SECTION ACC

ACCELERATOR CONTROL SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

ABS00DCY

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

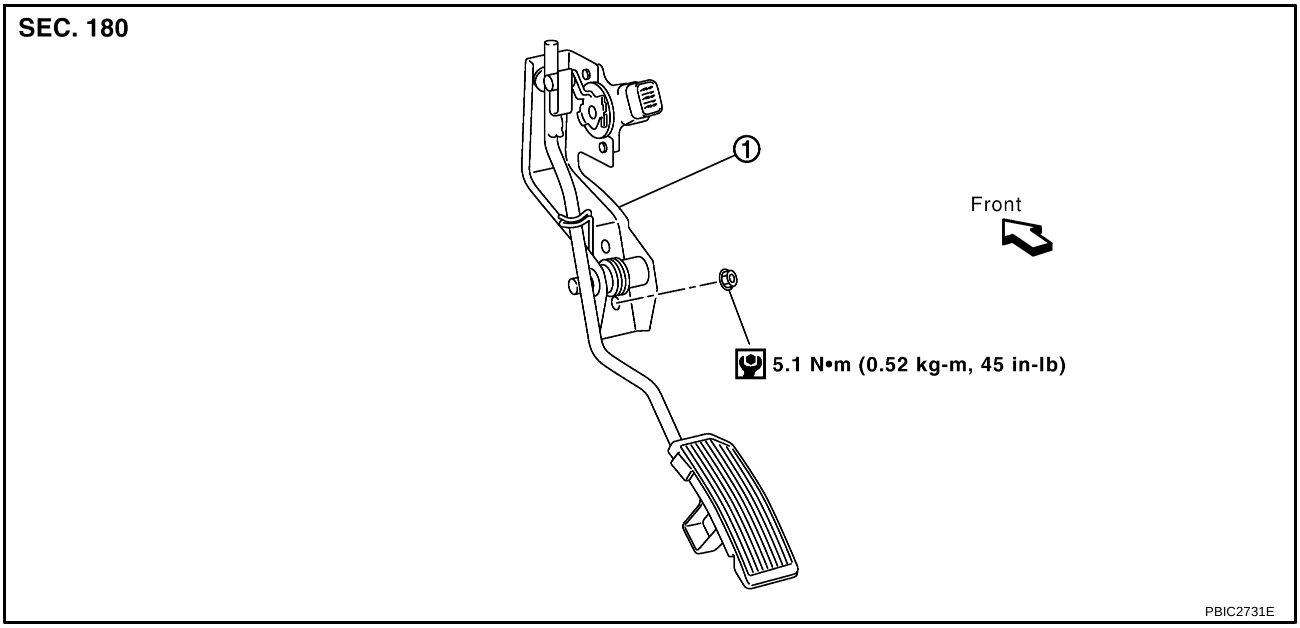
- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

ACCELERATOR CONTROL SYSTEM

PFP:18005

Removal and Installation

ABS00D0V



1. Accelerator pedal assembly

REMOVAL

1. Disconnect accelerator pedal position sensor harness connector.
2. Loosen nuts, and remove accelerator pedal assembly.

   CAUTION:

   - **Do not disassemble accelerator pedal assembly. Do not remove accelerator pedal position sensor from accelerator pedal assembly.**
   - **Avoid impact from dropping etc. during handling.**
   - **Be careful to keep accelerator pedal assembly away from water.**
   - **Do not adjust adjusting screw (painted yellow).**

INSTALLATION

Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

CAUTION:

When the harness connector of the accelerator pedal position sensor is disconnected, perform “Accelerator Pedal Released Position Learning”. Refer to EC-88, "Accelerator Pedal Released Position Learning" **.**

- Make sure that accelerator pedal moves smoothly within the whole operation range.
- Make sure that accelerator pedal securely returns to the original position.
- For the electrical inspection of accelerator pedal position sensor, refer to EC-555, "DTC P2122, P2123 APP SENSOR" , EC-562, "DTC P2127, P2128 APP SENSOR" and EC-578, "DTC P2138 APP SENSOR" .

SECTION ACS

AUTO CRUISE CONTROL SYSTEM

CONTENTS

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PFP:18930

Description

AKS00BEQ

Regarding the information for ASCD system, refer to EC-27, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" .

SECTION AT

AUTOMATIC TRANSAXLE

CONTENTS

INDEX FOR DTC

PFP:00024

Alphabetical Index

ACS008HT

NOTE:

If DTC “U1000” is displayed with other DTC, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION LINE”. Refer to AT-95 .

Items (CONSULT-II screen terms)	DTC CONSULT-II GST*1	Reference page
A/T 1ST GR FNCTN	P0731	AT-120
A/T 2ND GR FNCTN	P0732	AT-125
A/T 3RD GR FNCTN	P0733	AT-130
A/T 4TH GR FNCTN	P0734	AT-135
A/T TCC S/V FNCTN	P0744	AT-147
ATF TEMP SEN/CIRC	P0710	AT-104
BATT/FLUID TEMP SEN	—	AT-187
CAN COMM CIRCUIT	U1000	AT-95
CONTROL UNIT (RAM)	—	AT-198
CONTROL UNIT (ROM)	—	AT-198
CONT UNIT(EEP ROM)	—	AT-200
ENGINE SPEED SIG	P0725	AT-115
LINE PRESSURE S/V	P0745	AT-155
OVERRUN CLUTCH S/V	P1760	AT-177
PNP SW/CIRC	P0705	AT-98
SHIFT SOLENOID/V A*2	P0750	AT-162
SHIFT SOLENOID/V B*2	P0755	AT-167
T/C CLUTCH SOL/V	P0740	AT-142
THROTTLE POSI SEN*2	P1705	AT-172
VHCL SPEED SEN·A/T*3	P0720	AT-109
VHCL SPEED SEN·MTR	—	AT-182

*1: These numbers are prescribed by SAE J2012.

*2: When the fail-safe operation occurs, the MIL illuminates.

*3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

DTC No. Index

ACS008HU

NOTE:
If DTC “U1000” is displayed with other DTC, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION LINE”. Refer to AT-95 .

DTC CONSULT-II GST*1	Items (CONSULT-II screen terms)	Reference page
P0705	PNP SW/CIRC	AT-98
P0710	ATF TEMP SEN/CIRC	AT-104
P0720	VHCL SPEED SEN·A/T*3	AT-109
P0725	ENGINE SPEED SIG	AT-115
P0731	A/T 1ST GR FNCTN	AT-120
P0732	A/T 2ND GR FNCTN	AT-125
P0733	A/T 3RD GR FNCTN	AT-130
P0734	A/T 4TH GR FNCTN	AT-135
P0740	T/C CLUTCH SOL/V	AT-142
P0744	A/T TCC S/V FNCTN	AT-147
P0745	LINE PRESSURE S/V	AT-155
P0750	SHIFT SOLENOID/V A*2	AT-162
P0755	SHIFT SOLENOID/V B*2	AT-167
P1705	THROTTLE POSI SEN*2	AT-172
P1760	OVERRUN CLUTCH S/V	AT-177
U1000	CAN COMM CIRCUIT	AT-95
—	BATT/FLUID TEMP SEN	AT-187
—	CONTROL UNIT (RAM)	AT-198
—	CONTROL UNIT (ROM)	AT-198
—	CONT UNIT(EEP ROM)	AT-200
—	VHCL SPEED SEN·MTR	AT-182

*1: These numbers are prescribed by SAE J2012.
*2: When the fail-safe operation occurs, the MIL illuminates.
*3: The MIL illuminates when both the “Revolution sensor signal” and the “Vehicle speed sensor signal” meet the fail-safe condition at the same time.

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

ACS007QJ

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for On Board Diagnostic (OBD) System of A/T and Engine

ACS007QK

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

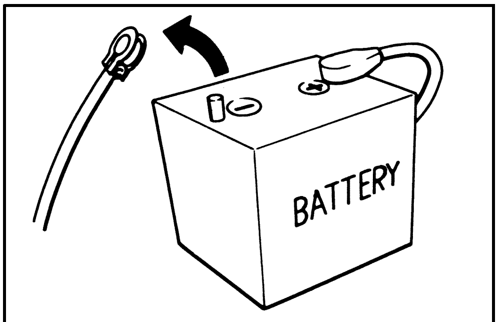
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect battery negative cable from battery negative terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to an open circuit. (Be sure the connectors are free from water, grease, dirt, bent terminals, etc.)**
- **Be sure to route and secure the harnesses properly after work. Interference of the harness with a bracket, etc. may cause the MIL to light up due to a short circuit.**
- **Be sure to connect the rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to a malfunction of the EGR system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the TCM and ECM before returning the vehicle to the customer.**

Precautions

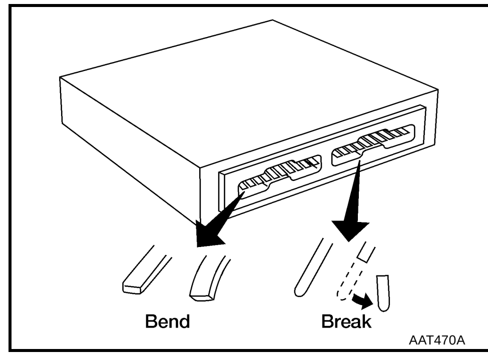
ACS007QN

- **Before connecting or disconnecting the TCM harness connector, turn ignition switch OFF and disconnect battery negative cable from battery negative terminal. Failure to do so may damage the TCM. Because battery voltage is applied to TCM even if ignition switch is turned off.**

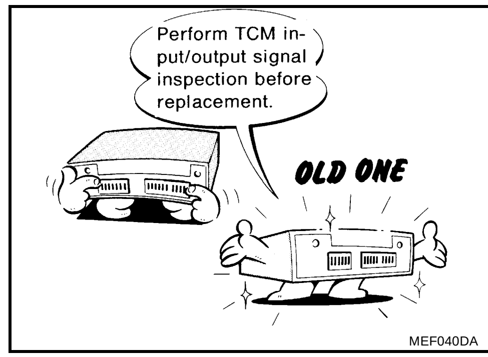


SEF289H

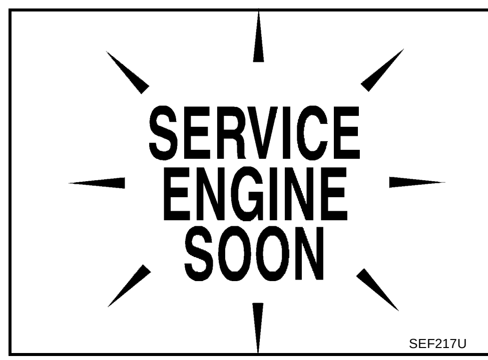
- **When connecting or disconnecting pin connectors into or from TCM, take care not to damage pin terminals (bend or break).**
  Make sure that there are not any bends or breaks on TCM pin terminal, when connecting pin connectors.



- **Before replacing TCM, perform TCM input/output signal inspection and make sure whether TCM functions properly or not. Refer to AT-77, "TCM Terminals and Reference Value" .**



- **After performing each TROUBLE DIAGNOSIS, perform "DTC (Diagnostic Trouble Code) CONFIRMATION PROCEDURE".**
  The DTC should not be displayed in the "DTC Confirmation Procedure" if the repair is completed.



- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Clean or replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to AT-9, "ATF COOLER SERVICE" .
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
  Always follow the procedures under "Changing A/T Fluid" in the AT section when changing A/T fluid. Refer to "Changing A/T Fluid", AT-17, "A/T FLUID" .

Service Notice or Precautions

ACS007QO

ATF COOLER SERVICE

If A/T fluid contains frictional material (clutches, bands, etc.), or if an A/T is repaired, overhauled, or replaced, inspect and clean the A/T oil cooler mounted in the radiator or replace the radiator. Flush cooler lines using cleaning solvent and compressed air after repair. Check Service Bulletins for latest A/T oil cooler cleaning procedure. For radiator replacement, refer to CO-11, "RADIATOR" , CO-14, "RADIATOR (ALUMINUM TYPE)" .

TORQUE CONVERTER SERVICE

The torque converter should be replaced under any of the following conditions:

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.
- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)
- Converter is contaminated with engine coolant containing antifreeze.
- Internal malfunction of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).
- Steel particles or clutch lining material found in fluid filter or on magnet indicates that lining material came from converter when no internal parts in unit are worn or damaged.

The torque converter should not be replaced if:

- The fluid has an odor, is discolored, and there is no evidence of metal or clutch facing particles.
- The threads in one or more of the converter bolt holes are damaged.
- Transaxle malfunction did not display evidence of damaged or worn internal parts, steel particles or clutch plate lining material in unit and inside the fluid filter.
- Vehicle has been exposed to high mileage (only). The exception may be where the torque converter clutch damper plate lining has seen excess wear by vehicles operated in heavy and/or constant traffic, such as taxi, delivery or police use.

OBD-II SELF-DIAGNOSIS

- A/T self-diagnosis is performed by the TCM in combination with the ECM. The results can be read through the blinking pattern of the O/D OFF indicator lamp or the malfunction indicator lamp (MIL). Refer to the table on AT-82, "SELF-DIAGNOSTIC RESULT MODE" for the indicator used to display each self-diagnostic result.
- The self-diagnostic results indicated by the MIL are automatically stored in both the ECM and TCM memories.
  Always perform the procedure "HOW TO ERASE DTC" on AT-40, "HOW TO ERASE DTC" to complete the repair and avoid unnecessary blinking of the MIL.
- The following self-diagnostic items can be detected using ECM self-diagnostic results mode* only when the O/D OFF indicator lamp does not indicate any malfunctions.
  - PNP switch
  - A/T 1st, 2nd, 3rd, or 4th gear function

*: For details of OBD-II, refer to AT-39, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.**
  For description and how to disconnect, refer to PG-44, "HARNESS CONNECTOR" .

Wiring Diagrams and Trouble Diagnosis

ACS007QP

When reading wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-2, "POWER SUPPLY ROUTING"

When performing trouble diagnosis, refer to the following:

- GI-10, "How to Follow Trouble Diagnoses"
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"

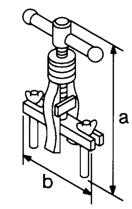
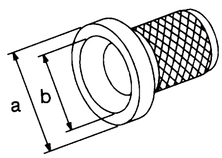
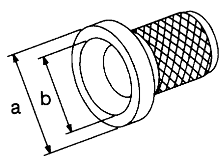
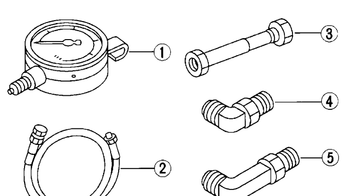
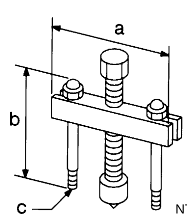
PREPARATION

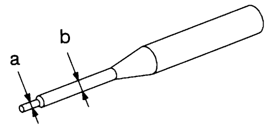
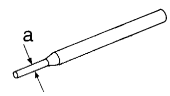
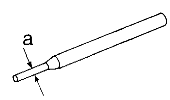
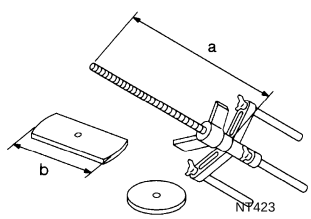
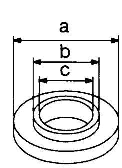
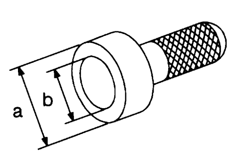
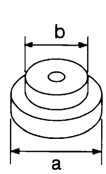
PFP:00100

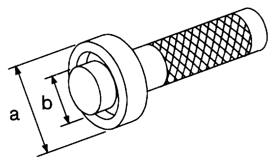
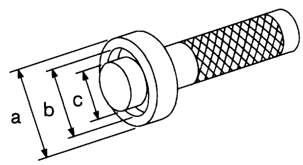
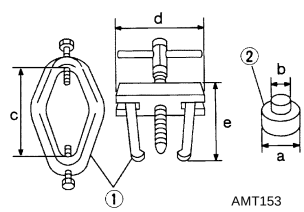
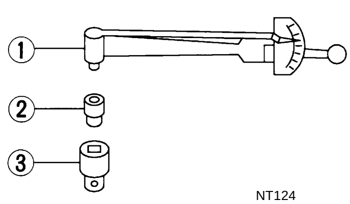
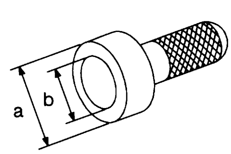
Special Service Tools

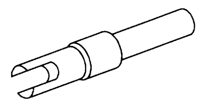
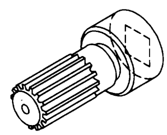
ACS007QQ

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
KV381054S0 (J-34286) Puller	 NT414	● Removing differential side bearing outer race ● Removing idler gear bearing outer race **a: 250 mm (9.84 in)** **b: 160 mm (6.30 in)**
ST33400001 (J-26082) Drift	 NT086	● Installing differential side oil seal ● Installing oil pump housing oil seal **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
KV40100621 (J-25273) Drift	 NT086	Installing differential side oil seal (With AWD models) **a: 60 mm (2.36 in) dia.** **b: 47 mm (1.85 in) dia.**
ST2505S001 (J-34301) Oil pressure gauge set 1. ST25051001 (J-34301) Oil pressure gauge 2. ST25052000 (J-34301) Hose 3. ST25053000 (J-25695-3) Joint pipe 4. ST25054000 (J-25695-4) Adapter 5. ST25055000 (J-25695-5) Adapter	 NT097	Measuring line pressure
ST27180001 (J-25726-A) Puller	 NT424	Removing idler gear **a: 100 mm (3.94 in)** **b: 110 mm (4.33 in)** **c: M8 x 1.25P**

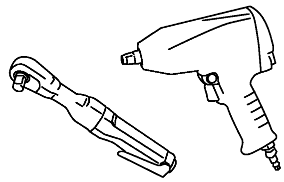
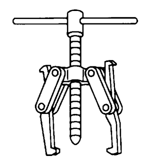
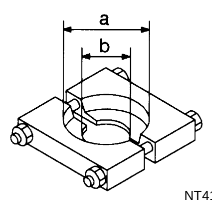
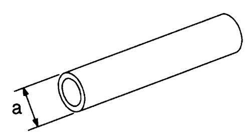
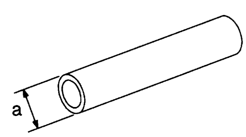
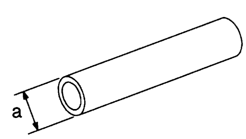
Tool number (Kent-Moore No.) Tool name	Description
ST23540000 (J-25689-A) Pin punch  NT442	Removing and installing parking rod plate and manual plate retaining pins **a: 2.3 mm (0.091 in) dia.** **b: 4 mm (0.16 in) dia.**
ST25710000 (J-25689-A) Pin punch  NT410	Aligning groove of manual shaft and hole of transaxle case **a: 2 mm (0.08 in) dia.**
KV32101000 (J-25689-A) Pin punch  NT410	● Installing manual shaft retaining pin ● Removing and installing pinion mate shaft lock pin **a: 4 mm (0.16 in) dia.**
KV31102400 (J-34285) Clutch spring compressor  NT423	Removing and installing clutch return springs **a: 320 mm (12.60 in)** **b: 174 mm (6.85 in)**
KV40100630 (J-26092) Drift  NT107	● Installing reduction pinion gear bearing inner race ● Installing idler gear bearing inner race **a: 67.5 mm (2.657 in) dia.** **b: 44 mm (1.73 in) dia.** **c: 38.5 mm (1.516 in) dia.**
ST30720000 (J-25405) Bearing installer  NT115	Installing idler gear bearing outer race **a: 77 mm (3.03 in) dia.** **b: 55.5 mm (2.185 in) dia.**
ST35321000 (—) Drift  NT073	Installing output shaft bearing **a: 49 mm (1.93 in) dia.** **b: 41 mm (1.61 in) dia.**

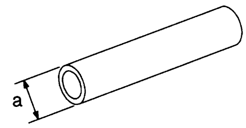
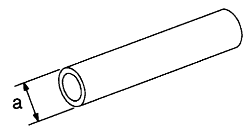
Tool number (Kent-Moore No.) Tool name	Description
ST33230000 (J-25805-01) Drift  NT084	Installing differential side bearing inner race **a: 51 mm (2.01 in) dia.** **b: 28.5 mm (1.122 in) dia.**
ST33220000 (—) Drift  NT085	Selecting differential side bearing adjusting shim **a: 37 mm (1.46 in) dia.** **b: 31 mm (1.22 in) dia.** **c: 22 mm (0.87 in) dia.**
ST3306S001 (J-22888-D) Differential side bearing puller set 1. ST33051001 (J-22888-D) Puller 2. ST33061000 (J-8107-2) Adapter  AMT153	Removing differential side bearing inner race **a: 38 mm (1.50 in) dia.** **b: 28.5 mm (1.122 in) dia.** **c: 130 mm (5.12 in)** **d: 135 mm (5.31 in)** **e: 100 mm (3.94 in)**
ST3127S000 (J-25765-A) Preload gauge 1. GG91030000 (J-25765-A) Torque wrench 2. HT62940000 (—) Socket adapter 3. HT62900000 (—) Socket adapter  NT124	● Checking final drive assembly turning torque ● Checking reduction pinion gear turning torque
ST35271000 (J-26091) Drift  NT115	Installing idler gear **a: 72 mm (2.83 in) dia.** **b: 63 mm (2.48 in) dia.**

Tool number (Kent-Moore No.) Tool name	Description
KV38107700 (J-39713) Preload adapter  NT087	Selecting differential side bearing adjusting shim
KV38105210 (J-39883) Preload adapter  NT075	● Selecting differential side bearing adjusting shim ● Checking fluid drive assembly turning torque

Commercial Service Tools

ACS007QR

Tool name	Description
Power tool  PBIC0190E	Loosening bolts and nuts
Puller  NT077	Removing idler gear bearing inner race
Puller  NT411	Removing reduction pinion gear bearing inner race **a: 60 mm (2.36 in) dia.** **b: 35 mm (1.38 in) dia.**
Drift  NT083	Installing radial needle bearing on bearing retainer **a: 36 mm (1.42 in) dia.**
Drift  NT083	Installing manual shaft oil seal **a: 22 mm (0.87 in) dia.**
Drift  NT083	Removing radial needle bearing from bearing retainer **a: 33.5 mm (1.319 in) dia.**

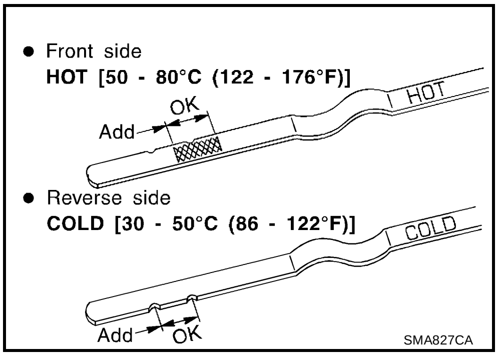
Tool name	Description
Drift 	Installing differential side bearing outer race (RH side) **a: 75 mm (2.95 in) dia.**
Drift 	Installing differential side bearing outer race (LH side) **a: 100 mm (3.94 in) dia.**

A/T FLUID

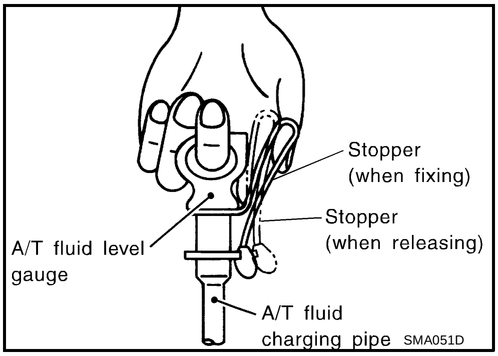
PFP:KLE40

Checking A/T Fluid

ACS007QS



1. Warm up engine.
2. Check for A/T fluid leakage.
3. Before driving, A/T fluid level can be checked at A/T fluid temperatures of 30 to 50°C (86 to 122°F) using “COLD” range on A/T fluid level gauge.
   a. Park vehicle on level surface and set parking brake.
   b. Start engine and move selector lever through each gear position. Leave selector lever in “P” position.
   c. Check A/T fluid level with engine idling.



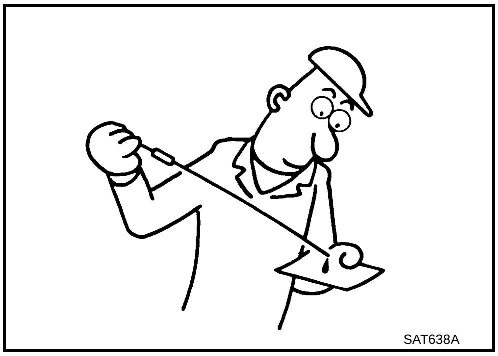
   d. Remove A/T fluid level gauge and note reading. If level is at low side of either range, and A/T fluid to the A/T fluid charging pipe.

      CAUTION:
      When wiping away the A/T fluid level gauge, always use lint-free paper, not a cloth one.
   e. Re-insert A/T fluid level gauge into A/T fluid charging pipe as far as it will go.

      CAUTION:
      Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.
   f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add A/T fluid to the A/T fluid charging pipe.

      CAUTION:
      Do not overfill.
4. Drive vehicle for approximately 5 minutes in urban areas.
5. Recheck A/T fluid level at A/T fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on A/T fluid level gauge.

   CAUTION:
   - **When wiping away the A/T fluid level gauge, always use lint-free paper, not a cloth one.**
   - **Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.**
6. Check A/T fluid condition.

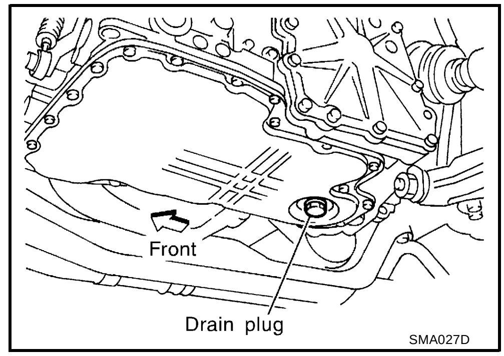


   - If A/T fluid is very dark or smells burned, checking operation of A/T. Flush cooling system after repair of A/T.
   - If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to CO-11, "RADIATOR" , CO-14, "RADIATOR (ALUMINUM TYPE)" .
7. Install the removed A/T fluid level gauge in the A/T fluid charging pipe.

   CAUTION:
   Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.

Changing A/T Fluid

ACS007QT



1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid from drain plug and refill with new A/T fluid. Always refill same volume with drained fluid.

   CAUTION:

   Do not reuse drain plug gasket.

   Fluid grade:

   NISSAN Automatic Transmission Fluid (ATF), DEXRON™ III/MERCON™ , or equivalent ATF. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

   Fluid capacity (With torque converter):

   Approx. 8.5 ℓ (9 US qt, 7-1/2 Imp qt)

   Drain plug

   :34 N·m (3.5 kg-m, 25 ft-lb)

4. Run engine at idle speed for 5 minutes.
5. Check A/T fluid level and condition. Refer to AT-17, "Checking A/T Fluid" . If A/T fluid is still dirty, repeat steps 2 through 5.

A/T Fluid Cooler Cleaning

ACS008HQ

Whenever an automatic transaxle is repaired, overhauled, or replaced, the A/T fluid cooler mounted in the radiator must be inspected and cleaned.
Metal debris and friction material, if present, can become trapped in the A/T fluid cooler. This debris can contaminate the newly serviced A/T or, in severe cases, can block or restrict the flow of A/T fluid. In either case, malfunction of the newly serviced A/T may result.
Debris, if present, may build up as A/T fluid enters the cooler inlet. It will be necessary to back flush the cooler through the cooler outlet in order to flush out any built up debris.

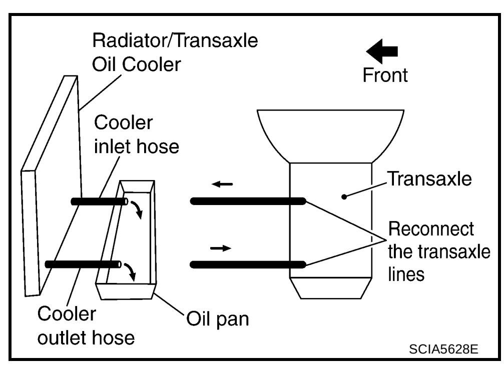
A/T FLUID COOLER CLEANING PROCEDURE

1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.
2. Identify the inlet and outlet fluid cooler hoses.
3. Disconnect the fluid cooler inlet and outlet rubber hoses from the steel cooler tubes or bypass valve.

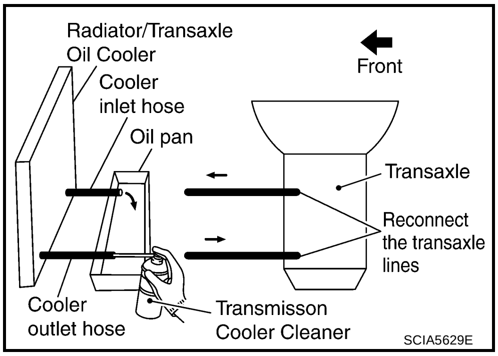
   NOTE:

   Replace the cooler hoses if rubber material from the hose remains on the tube fitting.

4. Allow any A/T fluid that remains in the cooler hoses to drain into the oil pan.

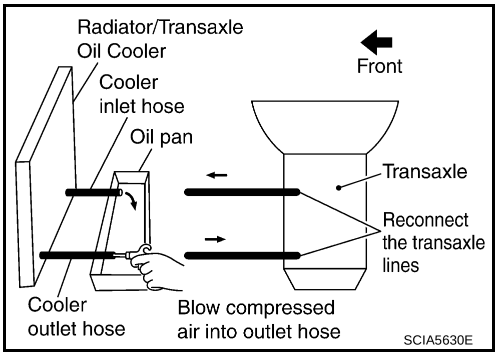


5. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.



CAUTION:
- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray cooler cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

6. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.
7. Insert the tip of an air gun into the end of the cooler outlet hose.
8. Wrap a shop rag around the air gun tip and of the cooler outlet hose.

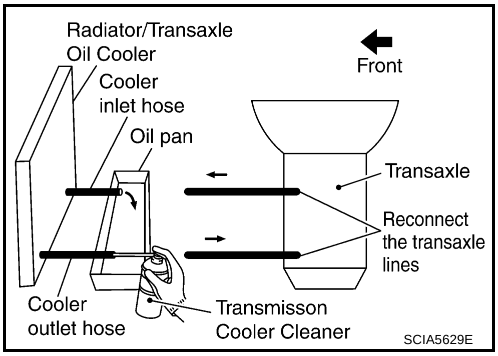


9. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose for 10 seconds to force out any remaining fluid.
10. Repeat steps 5 through 9 three additional times.
11. Position an oil pan under the banjo bolts that connect the fluid cooler steel lines to the transaxle.
12. Remove the banjo bolts.
13. Flush each steel line from the cooler side back toward the transaxle by spraying Transmission Cooler Cleaner in a continuous stream for 5 seconds.
14. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through each steel line from the cooler side back toward the transaxle for 10 seconds to force out any remaining fluid.
15. Ensure all debris is removed from the steel cooler lines.
16. Ensure all debris is removed from the banjo bolts and fittings.
17. Perform AT-19, "A/T FLUID COOLER DIAGNOSIS PROCEDURE" .

A/T FLUID COOLER DIAGNOSIS PROCEDURE

NOTE:
Insufficient cleaning of the cooler inlet hose exterior may lead to inaccurate debris identification.

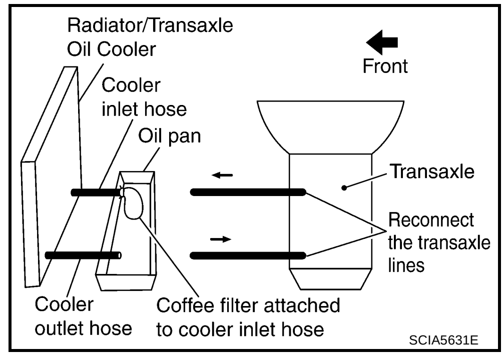
1. Position an oil pan under the automatic transaxle's inlet and outlet cooler hoses.
2. Clean the exterior and tip of the cooler inlet hose.
3. Insert the extension adapter hose of a can of Transmission Cooler Cleaner (Nissan P/N 999MP-AM006) into the cooler outlet hose.



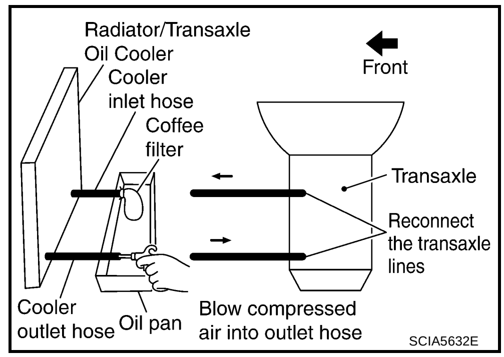
CAUTION:
- **Wear safety glasses and rubber gloves when spraying the Transmission Cooler Cleaner.**
- **Spray cooler cleaner only with adequate ventilation.**
- **Avoid contact with eyes and skin.**
- **Do not breath vapors or spray mist.**

4. Hold the hose and can as high as possible and spray Transmission Cooler Cleaner in a continuous stream into the cooler outlet hose until fluid flows out of the cooler inlet hose for 5 seconds.

5. Tie a common white, basket-type coffee filter to the end of the cooler inlet hose.

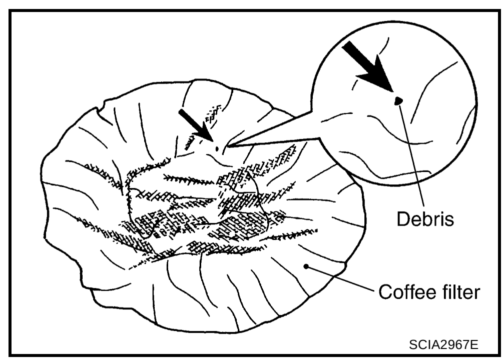


6. Insert the tip of an air gun into the end of the cooler outlet hose.
7. Wrap a shop rag around the air gun tip and end of cooler outlet hose.
8. Blow compressed air regulated to 5 - 9 kg/cm^2 (70 - 130 psi) through the cooler outlet hose to force any remaining A/T fluid into the coffee filter.
9. Remove the coffee filter from the end of the cooler inlet hose.
10. Perform AT-20, "A/T FLUID COOLER INSPECTION PROCEDURE" .

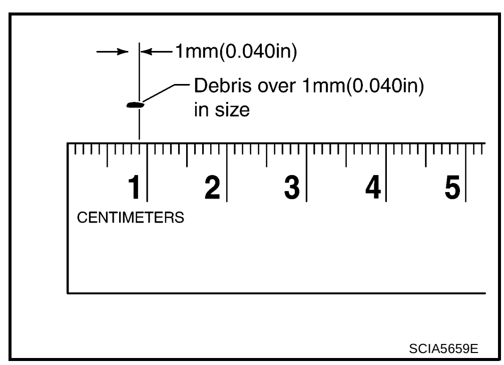


A/T FLUID COOLER INSPECTION PROCEDURE

1. Inspect the coffee filter for debris.
a. If small metal debris less than 1mm (0.040 in) in size or metal powder is found in the coffee filter, this is normal. If normal debris is found, the A/T fluid cooler/radiator can be re-used and the procedure is ended.



b. If one or more pieces of debris are found that are over 1mm (0.040 in) in size and/or peeled clutch facing material is found in the coffee filter, the fluid cooler is not serviceable. The radiator/ fluid cooler must be replaced and the inspection procedure is ended.



A/T FLUID COOLER FINAL INSPECTION

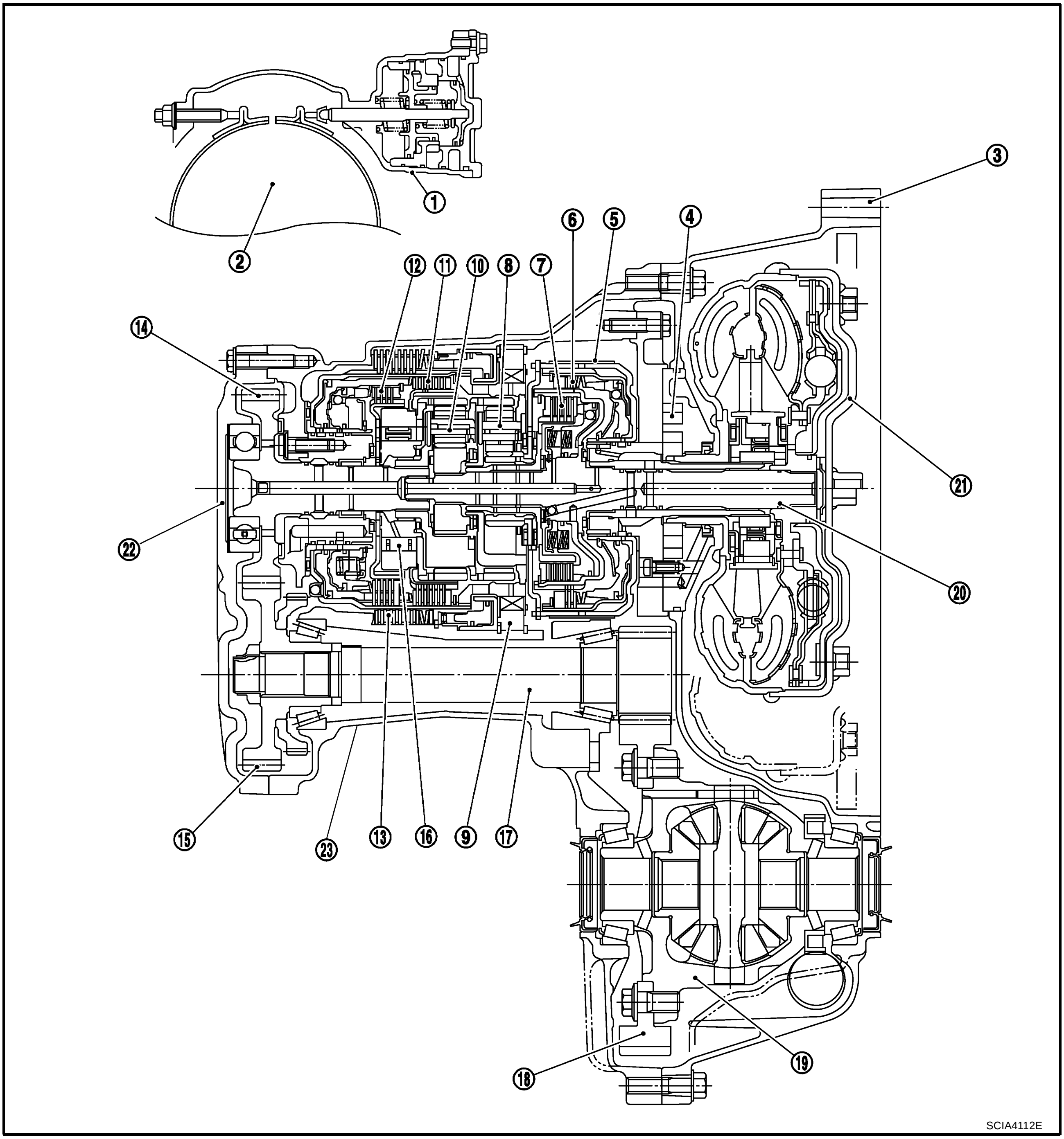
After performing all procedures, ensure that all remaining oil is cleaned from all components.

A/T CONTROL SYSTEM

PFP:31036

Cross-Sectional View

ACS007JH

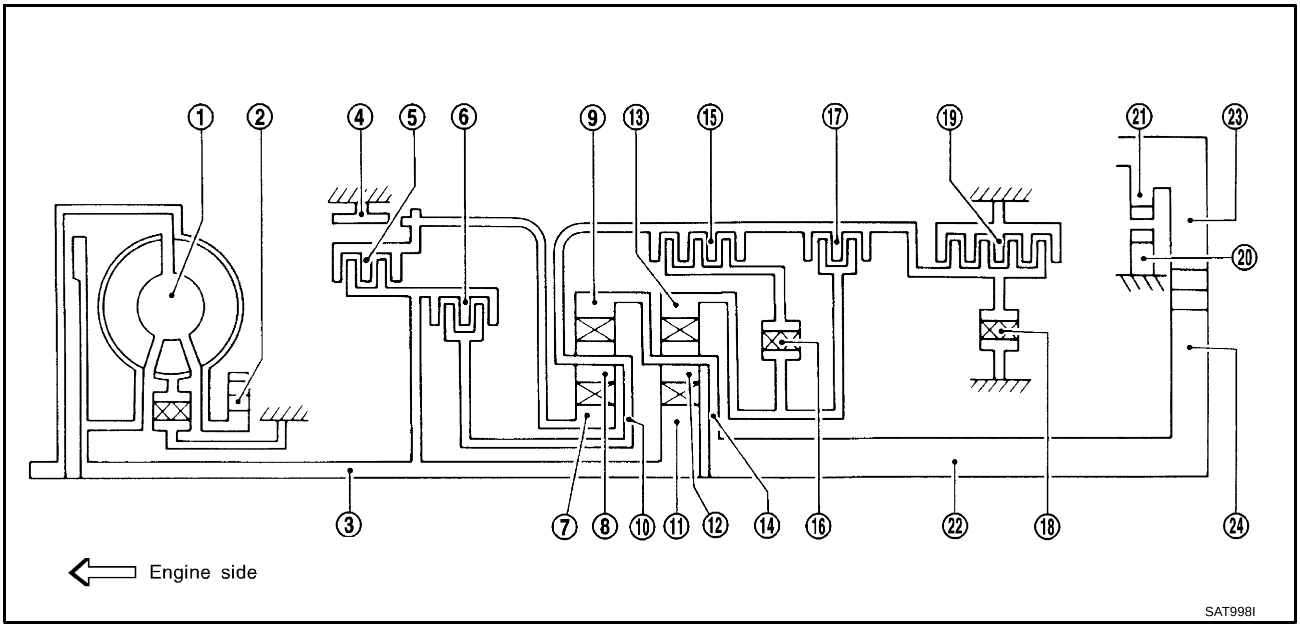


1.	Band servo piston assembly	2.	Reverse clutch drum	3.	Converter housing
4.	Oil pump	5.	Brake band	6.	Reverse clutch
7.	High clutch	8.	Front planetary gear	9.	Low one-way clutch
10.	Rear planetary gear	11.	Forward clutch	12.	Overrun clutch
13.	Low & reverse brake	14.	Output gear	15.	Idler gear
16.	Forward one-way clutch	17.	Reduction pinion gear	18.	Final gear
19.	Differential case	20.	Input shaft	21.	Torque converter
22.	Side cover	23.	Transaxle case		

Shift Mechanism

ACS007JI

CONSTRUCTION



1.	Torque converter	2.	Oil pump	3.	Input shaft
4.	Brake band	5.	Reverse clutch	6.	High clutch
7.	Front sun gear	8.	Front pinion gear	9.	Front internal gear
10.	Front planetary carrier	11.	Rear sun gear	12.	Rear pinion gear
13.	Rear internal gear	14.	Rear planetary carrier	15.	Forward clutch
16.	Forward one-way clutch	17.	Overrun clutch	18.	Low one-way clutch
19.	Low & reverse brake	20.	Parking pawl	21.	Parking gear
22.	Output shaft	23.	Idler gear	24.	Output gear

FUNCTION OF CLUTCH AND BRAKE

Clutch and brake components		Abbr.	Function
5	Reverse clutch	R/C	To transmit input power to front sun gear **7** .
6	High clutch	H/C	To transmit input power to front planetary carrier **10** .
15	Forward clutch	F/C	To connect front planetary carrier **10** with forward one-way clutch **16** .
17	Overrun clutch	O/C	To connect front planetary carrier **10** with rear internal gear **13** .
4	Brake band	B/B	To lock front sun gear **7** .
16	Forward one-way clutch	F/O.C	When forward clutch **15** is engaged, to stop rear internal gear **13** from rotating in opposite direction against engine revolution.
18	Low one-way clutch	L/O.C	To stop front planetary carrier **10** from rotating in opposite direction against engine revolution.
19	Low & reverse brake	L & R/B	To lock front planetary carrier **10** .

CLUTCH AND BAND CHART

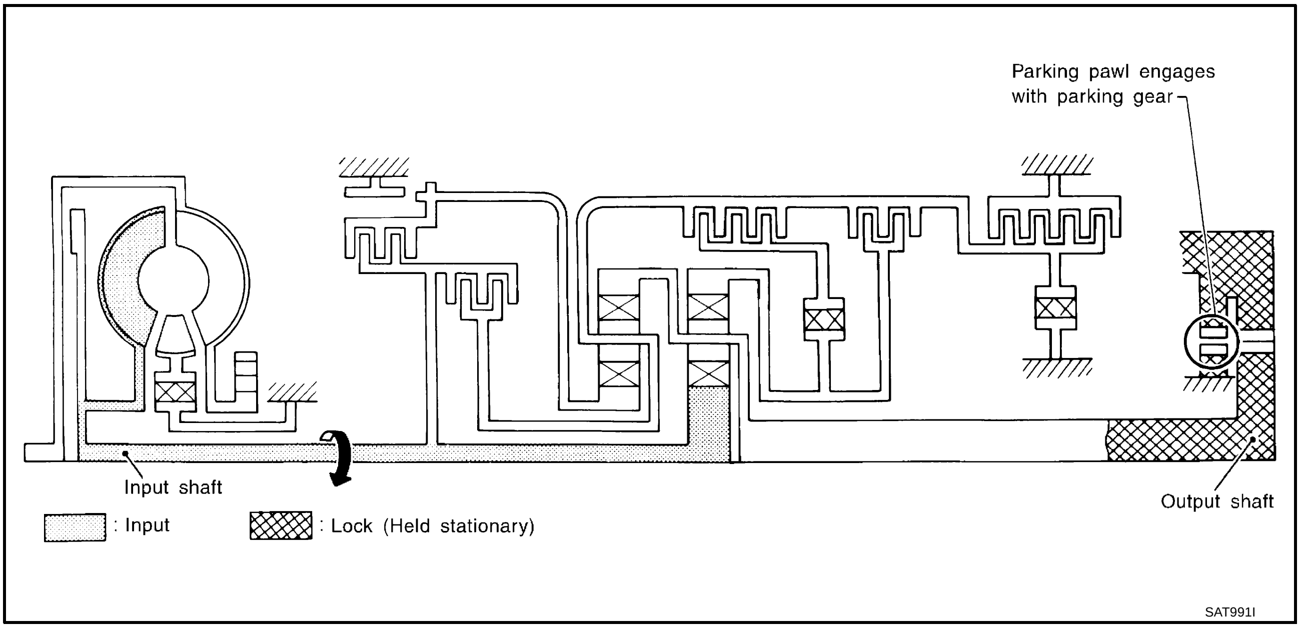
Shift position		R/C 5	H/C 6	F/C 15	O/C 17	Band servo			F/O.C 16	L/O.C 18	L&R/B 19	Lock-up	Remarks
						2nd apply	3rd release	4th apply					
P													PARK POSITION
R		○									○		REVERSE POSITION
N													NEUTRAL POSITION
D*4	1st			○	*1D				B	B			Automatic shift 1 ⇔ 2 ⇔ 3 ⇔ 4
	2nd			○	*1A	○			B				
	3rd		○	○	*1A	*2C	C		B			*1○	
	4th		○	C		*3C	C	○				○	
2	1st			○	○				B	B			Automatic shift 1 ⇔ 2 ⇐ 3
	2nd			○	○	○			B				
	3rd		○	○	○	*2C	C		B				
1	1st			○	○				B	B	○		Locks (held stationary) in 1st speed 1 ⇐ 2 ⇐ 3
	2nd			○	○	○			B				
	3rd		○	○	○	*2C	C		B				

- *1: Operates when overdrive control switch is set in “OFF” position.
- *2: Oil pressure is applied to both 2nd “apply” side and 3rd “release” side of band servo piston. However, brake band does not contract because oil pressure area on the “release” side is greater than that on the “apply” side.
- *3: Oil pressure is applied to 4th “apply” side in condition *2 above, and brake band contracts.
- *4: A/T will not shift to 4th when overdrive control switch is set in “OFF” position.
- ○: Operates.
- A: Operates when throttle opening is less than 3/16, activating engine brake.
- B: Operates during “progressive” acceleration.
- C: Operates but does not affect power transmission.
- D: Operates when throttle opening is less than 3/16, but does not affect engine brake.

POWER TRANSMISSION

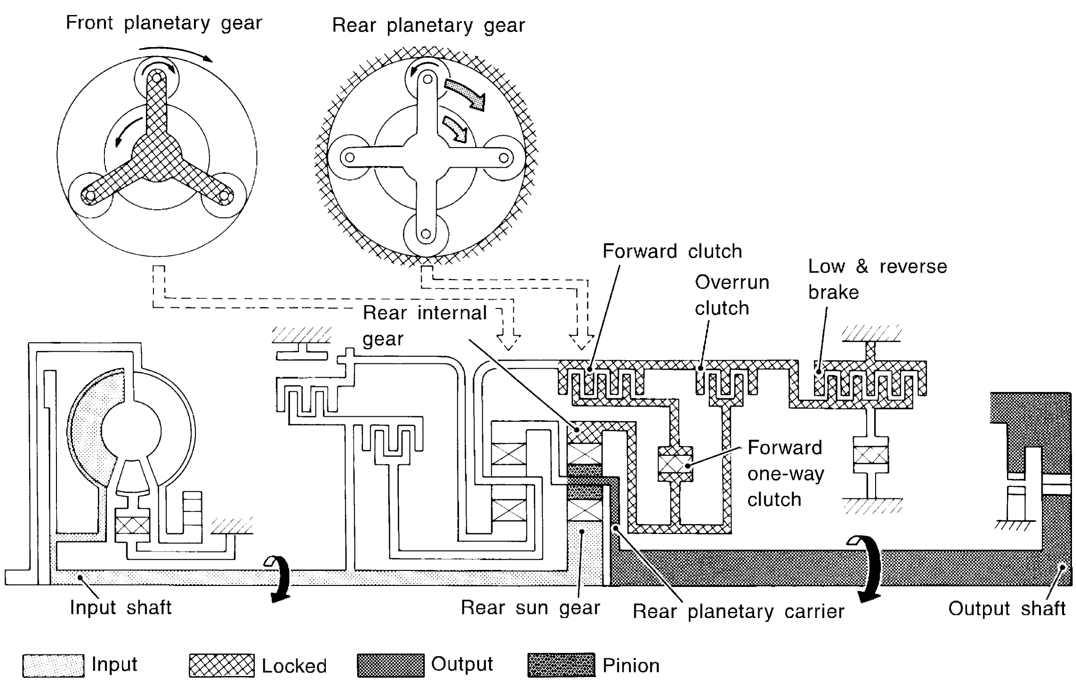
"N" and "P" Positions

- "N" position
  Power from the input shaft is not transmitted to the output shaft because the clutches do not operate.
- "P" position
  Similar to the "N" position, the clutches do not operate. The parking pawl engages with the parking gear to mechanically hold the output shaft so that the power train is locked.



“1_1” Position

● **Forward clutch** ● **Forward one-way clutch** ● **Overrun clutch** ● **Low & reverse brake**	As overrun clutch engages, rear internal gear is locked by the operation of low and reverse brake. This is different from that of D_1 and 2_1.
Engine brake	Overrun clutch always engages, therefore engine brake can be obtained when decelerating.



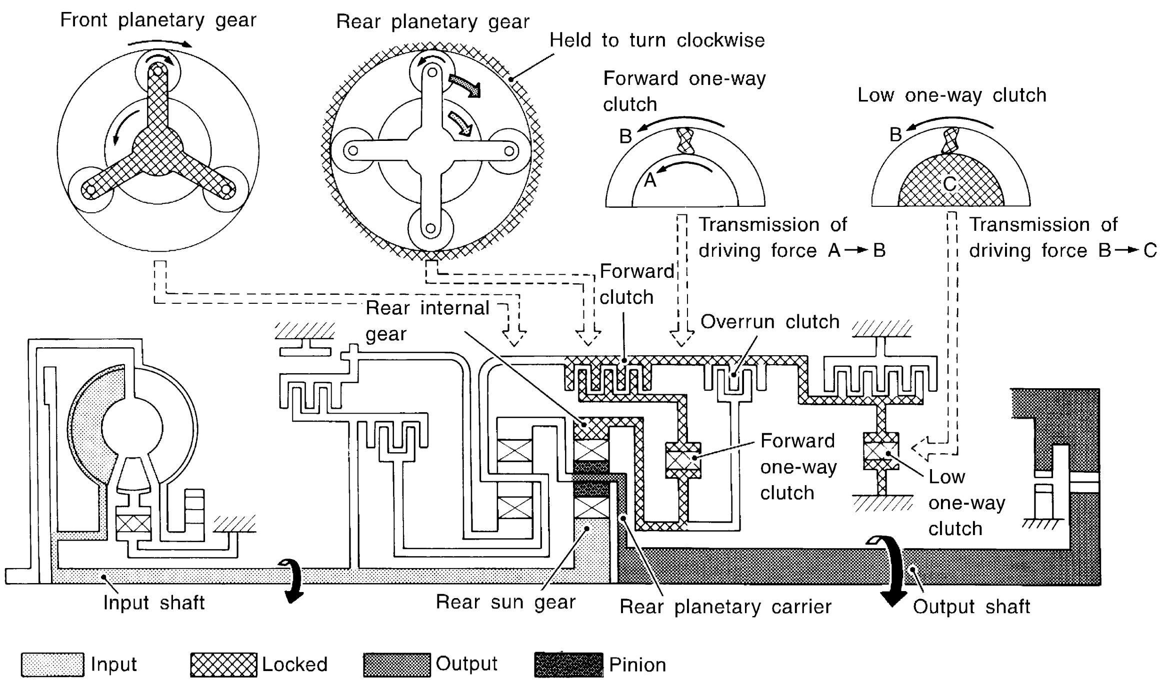
Power flow

Input shaft
⇩
Rear sun gear
⇩
Rear planetary carrier ⇨ Output shaft

SCIA1816E

"D1 " and "21 " Positions

● **Forward one-way clutch** ● **Forward clutch** ● **Low one-way clutch**	Rear internal gear is locked to rotate counterclockwise because of the functioning of these three clutches.
Overrun clutch engagement conditions (Engine brake)	D1 : Overdrive control switch "OFF" and throttle opening is less than 3/16 21 : Always engaged At D1 and 21 positions, engine brake is not activated due to free turning of low one-way clutch.



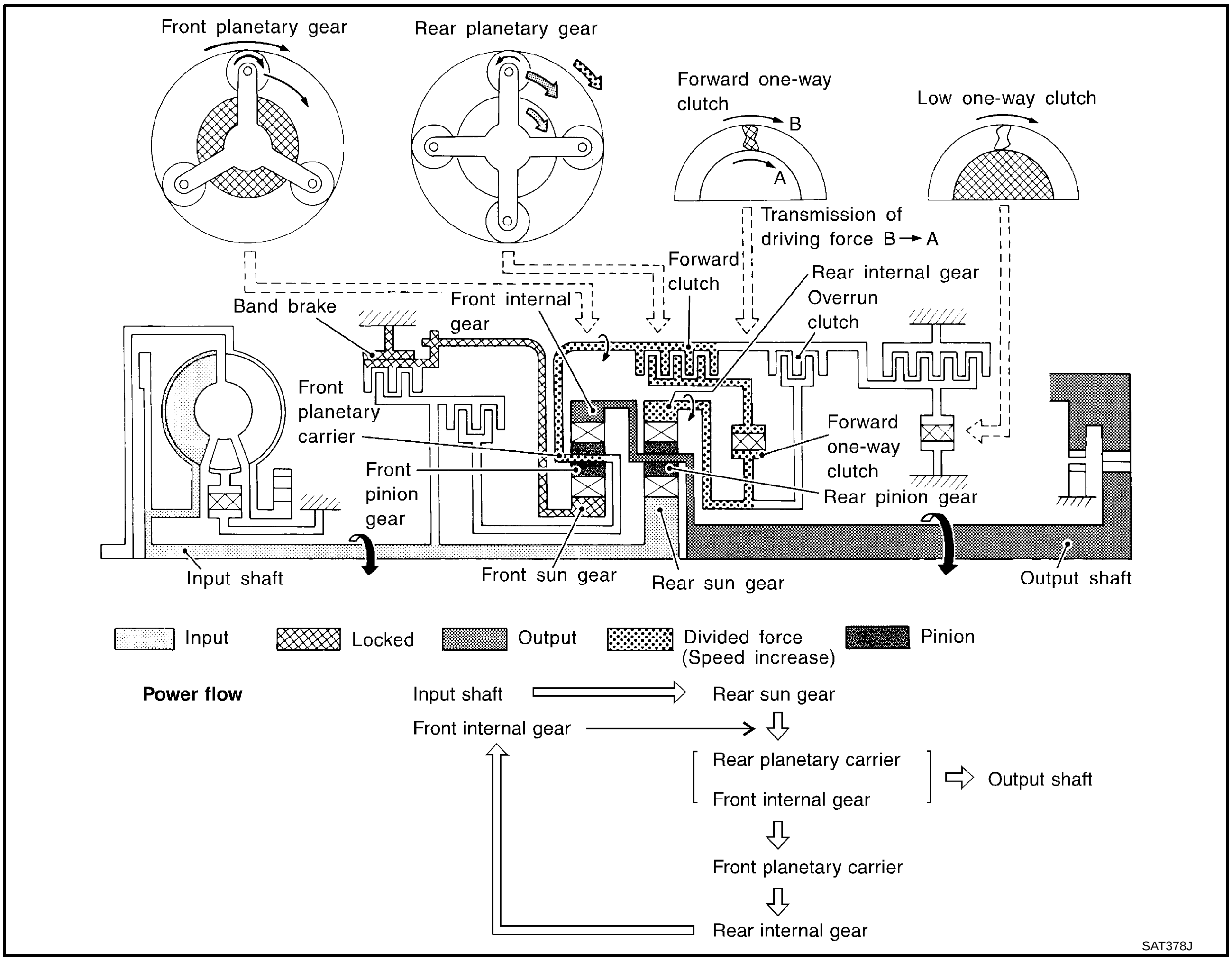
Power flow

Input shaft
⇩
Rear sun gear
⇩
Rear pinion gear
⇩
Rear planetary carrier → Output shaft

SAT377J

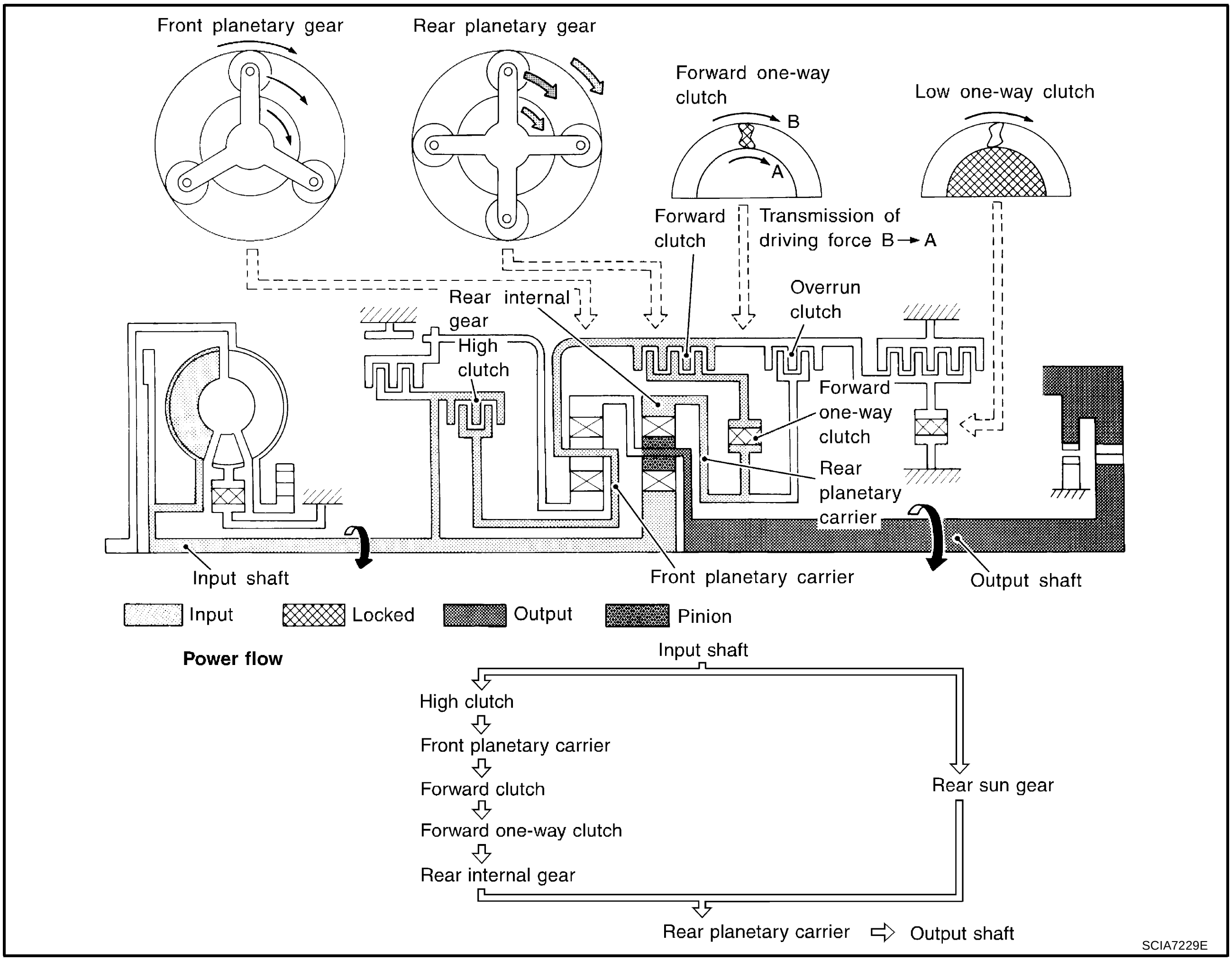
“D_2 ”, “2_2 ” and “1_2 ” Positions

● **Forward clutch** ● **Forward one-way clutch** ● **Brake band**	Rear sun gear drives rear planetary carrier and combined front internal gear. Front internal gear now rotates around front sun gear accompanying front planetary carrier. As front planetary carrier transfers the power to rear internal gear through forward clutch and forward one-way clutch, this rotation of rear internal gear increases the speed of rear planetary carrier compared with that of the 1st speed.
Overrun clutch engagement conditions	D_2 : Overdrive control switch “OFF” and throttle opening is less than 3/16 2_2 and 1_2 : Always engaged



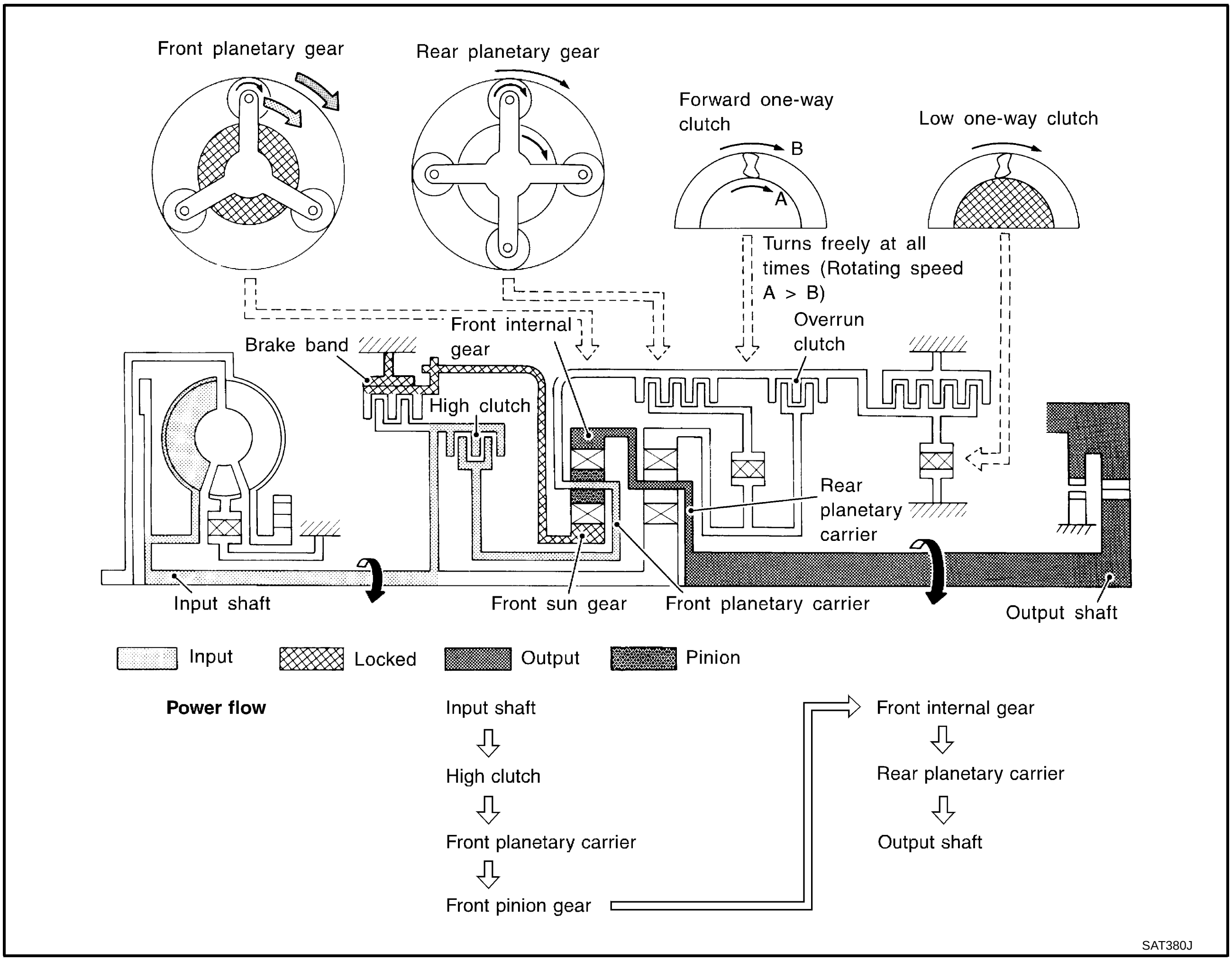
"D3 ", "23 " and "13 " Positions

● **High clutch** ● **Forward clutch** ● **Forward one-way clutch**	Input power is transmitted to front planetary carrier through high clutch. And front planetary carrier is connected to rear internal gear by operation of forward clutch and forward one-way clutch. This rear internal gear rotation and another input (the rear sun gear) accompany rear planetary carrier to turn at the same speed.
Overrun clutch engagement conditions	D3 : Overdrive control switch "OFF" and throttle opening is less than 3/16 23 and 13 : Always engaged



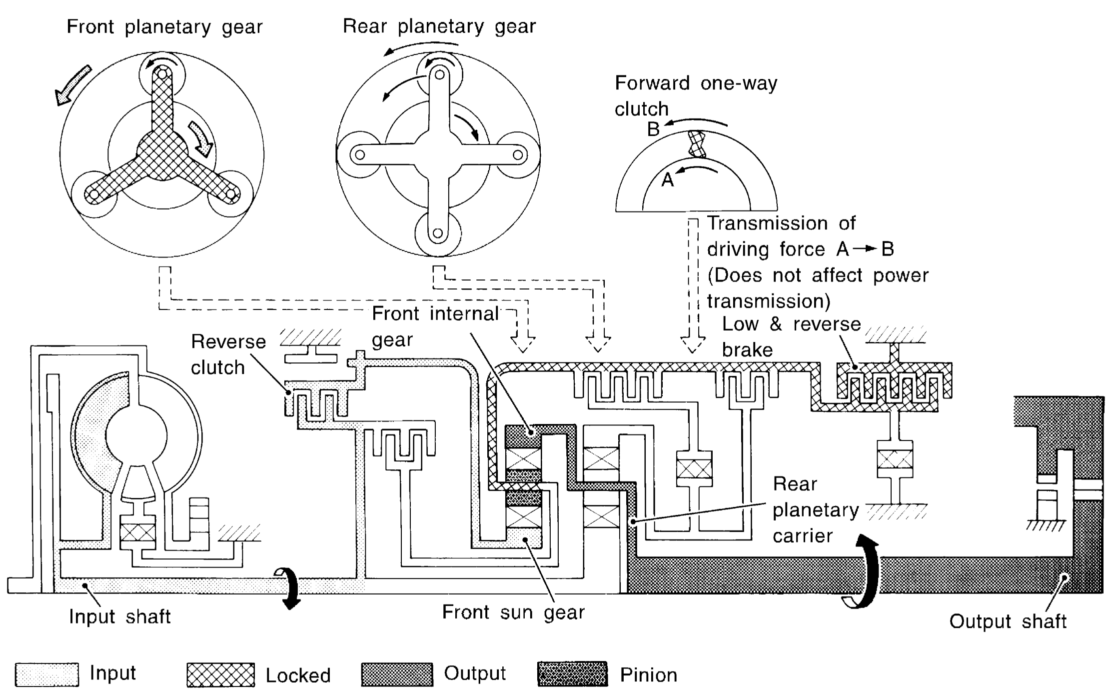
"D4 " (OD) Position

● **High clutch** ● **Brake band** ● **Forward clutch** (Does not affect power transmission)	Input power is transmitted to front carrier through high clutch. This front carrier turns around the sun gear which is fixed by brake band and makes front internal gear (output) turn faster.
Engine brake	At D4 position, there is no one-way clutch in the power transaxle line and engine brake can be obtained when decelerating.



"R" Position

● **Reverse clutch** ● **Low & reverse brake**	Front planetary carrier is stationary because of the operation of low and reverse brake. Input power is transmitted to front sun gear through reverse clutch, which drives front internal gear in the opposite direction.
Engine brake	As there is no one-way clutch in the power transaxle line, engine brake can be obtained when decelerating.



Power flow

Input shaft
⇩
Reverse clutch
⇩
Front pinion gear ⇦ Front sun gear
⇩
Front internal gear ⇨ Output shaft

SAT381J

TCM Function

ACS007JJ

The function of the TCM is to:

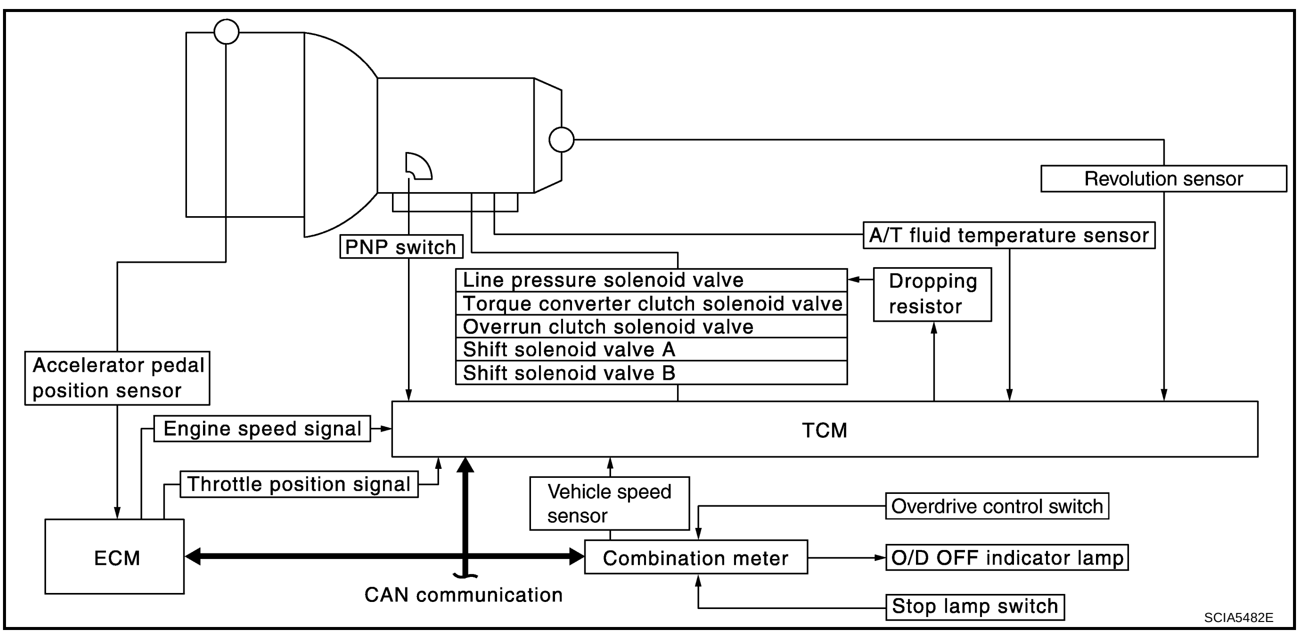
- Receive input signals sent from various switches and sensors.
- Determine required line pressure, shifting point, lock-up operation, and engine brake operation.
- Send required output signals to the respective solenoids.

CONTROL SYSTEM OUTLINE

The automatic transmission senses vehicle operating conditions through various sensors or signals. It always controls the optimum shift position and reduces shifting and lock-up shocks.

SWITCHES & SENSORS		TCM		ACTUATORS
PNP switch Accelerator pedal position (APP) sensor Closed throttle position signal Wide open throttle position signal Engine speed signal A/T fluid temperature sensor Revolution sensor Vehicle speed sensor Overdrive control switch signal Stop lamp switch signal	▶	Shift control Line pressure control Lock-up control Overrun clutch control Timing control Fail-safe control Self-diagnosis CONSULT-II communication line control Duet-EU control	▶	Shift solenoid valve A Shift solenoid valve B Overrun clutch solenoid valve Torque converter clutch solenoid valve Line pressure solenoid valve O/D OFF indicator lamp

CONTROL SYSTEM DIAGRAM



CAN Communication

ACS007JK

SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only. For details, refer to LAN-16, "CAN Communication Unit" .

Input/Output Signal of TCM

ACS007JL

Control item		Line pressure control	Vehicle speed control	Shift control	Lock-up control	Engine brake control	Fail-safe function (*3)	Self-diagnostics function
Input	Accelerator pedal position signal	X	X	X	X	X	X	X
	Vehicle speed sensor A/T (Revolution sensor)	X	X	X	X		X	X
	Vehicle speed sensor MTR(*1)	X	X	X	X			X
	Closed throttle position signal(*5)	(*2) X	(*2) X		X			(*4) X
	Wide open throttle position signal(*5)	(*2) X	(*2) X					(*4) X
	Engine speed signal				X			X
	PNP switch	X	X	X	X	X	X	(*4) X
	Stop lamp switch signal(*5)		X		X	X		(*4) X
	A/T fluid temperature sensors	X	X		X	X		X
	TCM power supply voltage signal	X						X
Output	Shift solenoid valve A/B		X				X	X
	Line pressure solenoid	X					X	X
	Torque converter clutch solenoid valve				X		X	X
	Overrun clutch solenoid valve		X			X	X	X
	O/D OFF indicator lamp(*6)							X

*1: Spare for vehicle speed sensor·A/T (revolution sensor)
*2: Spare for accelerator pedal position signal
*3: If these input and output signals are different, the TCM triggers the fail-safe function.
*4: Used as a condition for starting self-diagnostics; if self-diagnostics are not started, it is judged that there is some kind of error.
*5: Input by CAN communications.
*6: Output by CAN communications.

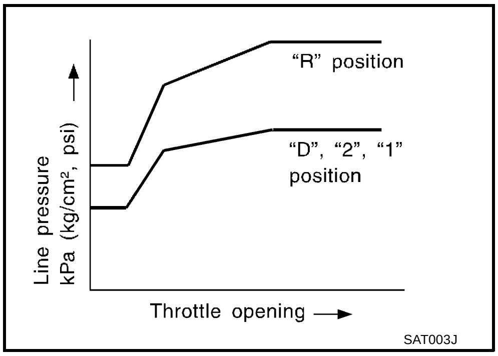
Line Pressure Control

ACS007JM

- TCM has various line pressure control characteristics to match the driving conditions.
- An ON-OFF duty signal is sent to the line pressure solenoid valve based on TCM characteristics.
- Hydraulic pressure on the clutch and brake is electronically controlled through the line pressure solenoid valve to accommodate engine torque. This results in smooth shift operation.

NORMAL CONTROL

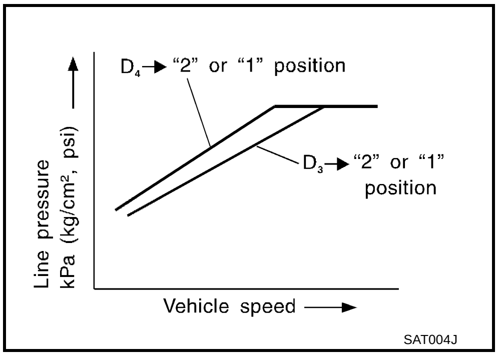
The characteristics of line pressure to throttle opening.



SAT003J

BACK-UP CONTROL (ENGINE BRAKE)

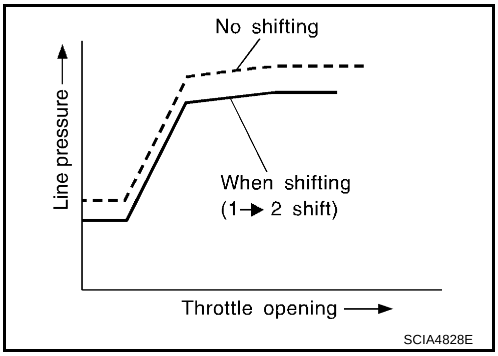
If the selector lever is shifted to "2" position while driving in D4 , D3 great driving force is applied to the clutch inside the transaxle. Clutch operating pressure (line pressure) must be increased to deal with this driving force.



SAT004J

DURING SHIFT CHANGE

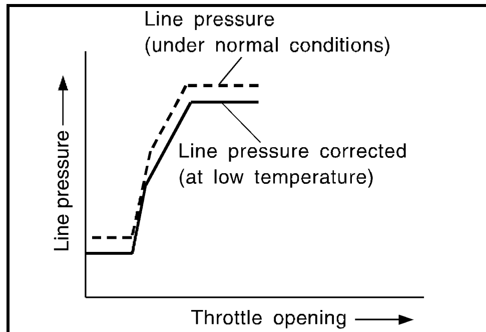
The line pressure is temporarily reduced corresponding to a change in engine torque when shifting gears (that is, when the shift solenoid valve is switched for clutch operation) to reduce shifting shock.



SCIA4828E

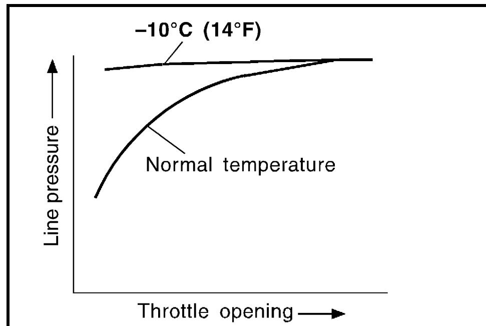
AT LOW FLUID TEMPERATURE

- Fluid viscosity and frictional characteristics of the clutch facing change with fluid temperature. Clutch engaging or band-contacting pressure is compensated for, according to fluid temperature, to stabilize shifting quality.
- The line pressure is reduced below 60°C (140°F) to prevent shifting shock due to low viscosity of A/T fluid when temperature is low.



SCIA4829E

- Line pressure is increased to a maximum irrespective of the throttle opening when fluid temperature drops to –10°C (14°F). This pressure rise is adopted to prevent a delay in clutch and brake operation due to extreme drop of fluid viscosity at low temperature.



SCIA4830E

Shift Control

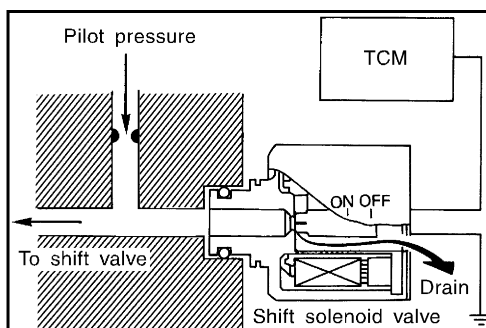
ACS007JN

The shift is regulated entirely by electronic control to accommodate vehicle speed and varying engine operations. This is accomplished by electrical signals transmitted by the revolution sensor and the ECM (accelerator pedal position sensor). This results in improved acceleration performance and fuel economy.

CONTROL OF SHIFT SOLENOID VALVES A AND B

The TCM activates shift solenoid valves A and B according to signals from the accelerator pedal position sensor and revolution sensor to select the optimum gear position on the basis of the shift schedule memorized in the TCM.

The shift solenoid valve performs simple ON-OFF operation. When set to "ON", the drain circuit closes and pilot pressure is applied to the shift valve.

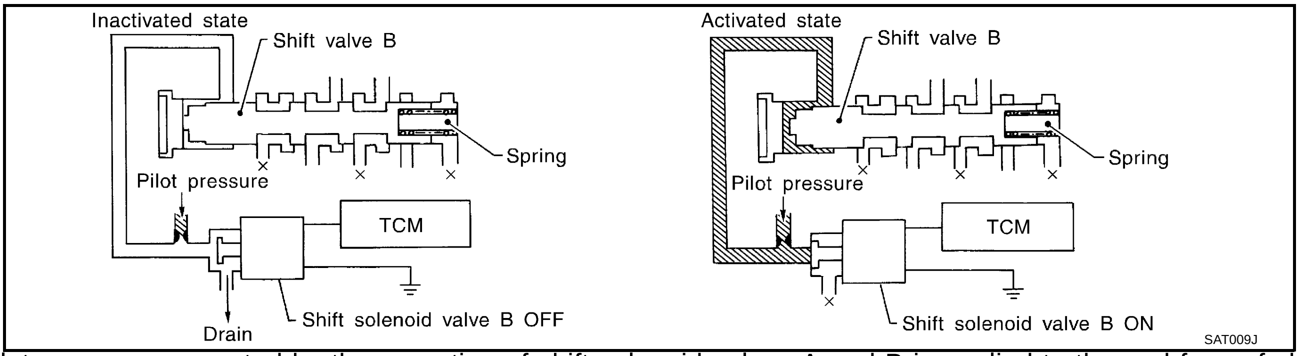


SAT008J

RELATION BETWEEN SHIFT SOLENOID VALVES A AND B AND GEAR POSITIONS

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONTROL OF SHIFT VALVES A AND B



Pilot pressure generated by the operation of shift solenoid valves A and B is applied to the end face of shift valves A and B.
The figure above shows the operation of shift valve B. When the shift solenoid valve is "ON", pilot pressure applied to the end face of the shift valve overcomes spring force, moving the valve upward.

Lock-Up Control

ACS007JO

The torque converter clutch piston in the torque converter is locked to eliminate torque converter slip to increase power transmission efficiency. The solenoid valve is controlled by an ON-OFF duty signal sent from the TCM. The signal is converted to an oil pressure signal which controls the torque converter clutch piston.

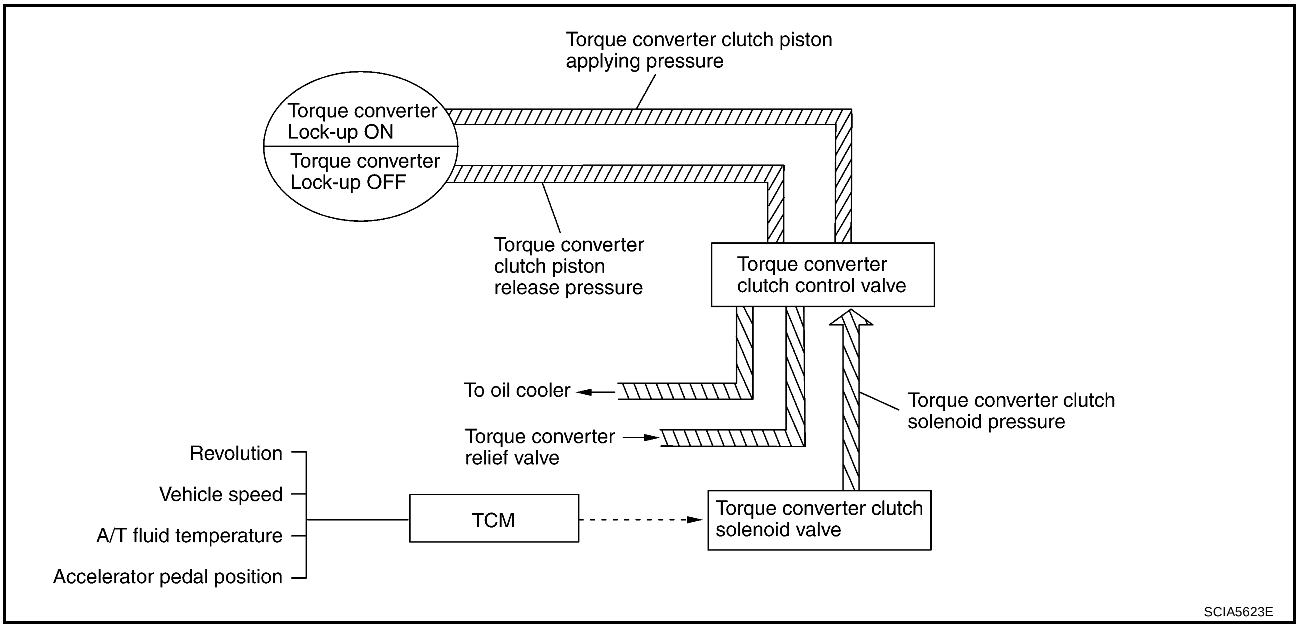
CONDITIONS FOR LOCK-UP OPERATION

When vehicle is driven in 3rd and 4th gear positions, vehicle speed and throttle opening are detected. If the detected values fall within the lock-up zone memorized in the TCM, lock-up is performed.

Overdrive control switch	ON	OFF
Selector lever	"D" position	
Gear position	D_4	D_3
Vehicle speed sensor	More than set value	
Throttle position sensor	Less than set opening	
Closed throttle position switch	OFF	
A/T fluid temperature sensor	More than 40°C (104°F)	

TORQUE CONVERTER CLUTCH SOLENOID VALVE CONTROL

Lock-Up Control System Diagram



Lock-Up Released

- In the lock-up released state, the torque converter clutch control valve is set into the unlocked state by draining the torque converter clutch piston applying pressure and the torque converter clutch piston release pressure is generated.
  In this way, the torque converter clutch piston is not coupled.

Lock-Up Applied

- In the lock-up applied state, the torque converter clutch control valve is set into the locked state by generating the torque converter clutch piston applying pressure and the torque converter clutch piston release pressure is drained.
  In this way, the torque converter clutch piston is pressed and coupled.

SMOOTH LOCK-UP CONTROL

When shifting from the lock-up released state to the lock-up applied state, the current output to the torque converter clutch solenoid is controlled with the TCM. In this way, when shifting to the lock-up applied state, the torque converter clutch is temporarily set to the half-clutched state to reduce the shock.

Half-Clutched State

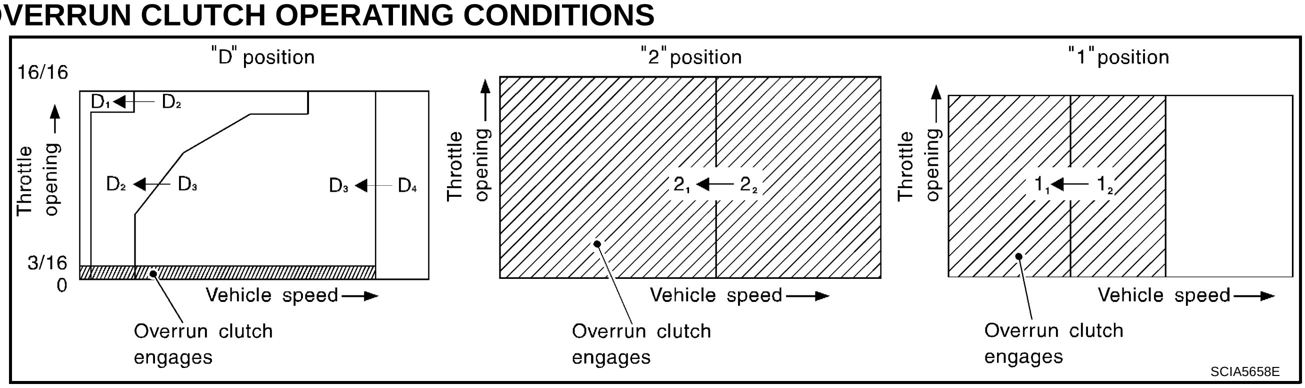
- The current output from the TCM to the torque converter clutch solenoid is varied to steadily increase the torque converter clutch solenoid pressure.
  In this way, the lock-up applying pressure gradually rises and while the torque converter clutch piston is put into half-clutched status, the torque converter clutch piston applying pressure is increased and the coupling is completed smoothly.

Engine Brake Control (Overrun Clutch Control)

ACS007JP

Forward one-way clutch is used to reduce shifting shocks in downshifting operations. This clutch transmits engine torque to the wheels. However, drive force from the wheels is not transmitted to the engine because the one-way clutch rotates idle. This means the engine brake is not effective.
The overrun clutch operates when the engine brake is needed.

OVERRUN CLUTCH OPERATING CONDITIONS



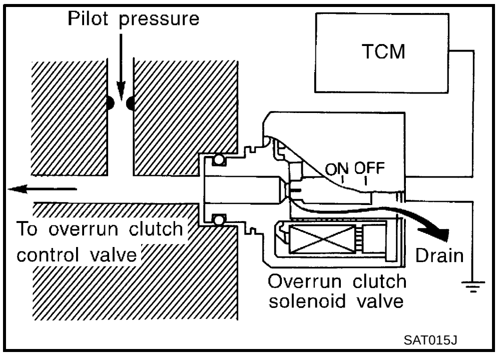
Selector lever position	Gear position	Throttle opening
“D” position	D_1 , D_2 , D_3 gear position	Less than 3/16
“2” position	2_1 , 2_2 gear position	At any position
“1” position	1_1 , 1_2 gear position	

OVERRUN CLUTCH SOLENOID VALVE CONTROL

The overrun clutch solenoid valve is operated by an ON-OFF signal transmitted by the TCM to provide overrun clutch control (engine brake control).

When this solenoid valve is "ON", the pilot pressure drain port closes. When it is "OFF", the drain port opens.

During the solenoid valve "ON" pilot pressure is applied to the end face of the overrun clutch control valve.

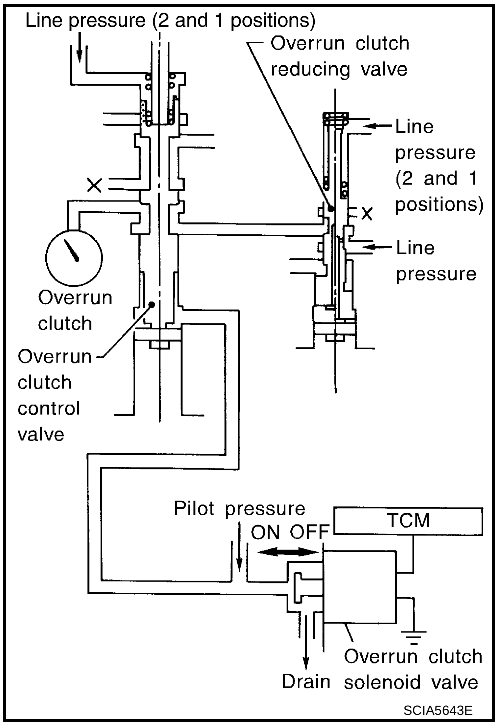


OVERRUN CLUTCH CONTROL VALVE OPERATION

When the solenoid valve is "ON", pilot pressure is applied to the overrun clutch control valve. This pushes up the overrun clutch control valve. The line pressure is then shut off so that the clutch does not engage.

When the solenoid valve is "OFF", pilot pressure is not generated. At this point, the overrun clutch control valve moves downward by spring force. As a result, overrun clutch operation pressure is provided by the overrun clutch reducing valve. This causes the overrun clutch to engage.

In the "2" and "1" positions, the overrun clutch control valve remains pushed down so that the overrun clutch is engaged at all times.



Control Valve

ACS007JQ

FUNCTION OF CONTROL VALVES

Valve name	Function
Pressure regulator valve, plug and sleeve plug	Regulates oil discharged from the oil pump to provide optimum line pressure for all driving conditions.
Pressure modifier valve and sleeve	Used as a signal supplementary valve to the pressure regulator valve. Regulates pressure-modifier pressure (signal pressure) which controls optimum line pressure for all driving conditions.
Pilot valve	Regulates line pressure to maintain a constant pilot pressure level which controls lock-up mechanism, overrun clutch, shift timing.
Accumulator control valve	Regulates accumulator back-pressure to pressure suited to driving conditions.
Manual valve	Directs line pressure to oil circuits corresponding to select positions. Hydraulic pressure drains when the shift lever is in Neutral.
Shift valve A	Simultaneously switches three oil circuits using output pressure of shift solenoid valve A to meet driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve B.
Shift valve B	Simultaneously switches two oil circuits using output pressure of shift solenoid valve B in relation to driving conditions (vehicle speed, throttle opening, etc.). Provides automatic downshifting and upshifting (1st → 2nd → 3rd → 4th gears/4th → 3rd → 2nd → 1st gears) in combination with shift valve A.
Overrun clutch control valve	Switches hydraulic circuits to prevent engagement of the overrun clutch simultaneously with application of the brake band in D_4 . (Interlocking occurs if the overrun clutch engages during D_4 .)
1st reducing valve	Reduces low & reverse brake pressure to dampen engine-brake shock when downshifting from the 1st position 1_2 to 1_1 .
Overrun clutch reducing valve	Reduces oil pressure directed to the overrun clutch and prevents engine-brake shock. In the 1st and 2nd positions, line pressure acts on the overrun clutch reducing valve to increase the pressure-regulating point, with resultant engine brake capability.
Torque converter relief valve	Prevents an excessive rise in torque converter pressure.
Torque converter clutch control valve, plug and sleeve	Activates or inactivates the lock-up function. Also provides smooth lock-up through transient application and release of the lock-up system.
1-2 accumulator valve and piston	Lessens the shock find when the 2nd gear band servo contracts, and provides smooth shifting.
3-2 timing valve	Switches the pace that oil pressure is released depending on vehicle speed; maximizes the high clutch release timing, and allows for soft downshifting.
Shuttle valve	Determines if the overrun clutch solenoid valve should control the 3-2 timing valve or the overrun clutch control valve and switches between the two.
Cooler check valve	At low speeds and with a small load when a little heat is generated, saves the volume of cooler flow, and stores the oil pressure for lock-up.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

ACS007QU

A/T system has two self-diagnostic systems.
The first is emission-related on board diagnostic system (OBD-II) performed by the TCM in combination with the ECM. The malfunction is indicated by the MIL (malfunction indicator lamp) and is stored as a DTC in the ECM memory but not the TCM memory.
The second is the TCM original self-diagnosis indicated by the O/D OFF indicator lamp. The malfunction is stored in the TCM memory. The detected items are overlapped with OBD-II self-diagnostic items. For detail, refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" .

OBD-II Function for A/T System

ACS007QV

The ECM provides emission-related on board diagnostic (OBD-II) functions for the A/T system. One function is to receive a signal from the TCM used with OBD-related parts of the A/T system. The signal is sent to the ECM when a malfunction occurs in the corresponding OBD-related part. The other function is to indicate a diagnostic result by means of the MIL (malfunction indicator lamp) on the instrument panel. Sensors, switches and solenoid valves are used as sensing elements.
The MIL automatically illuminates in One or Two Trip Detection Logic when a malfunction is sensed in relation to A/T system parts.

One or Two Trip Detection Logic of OBD-II

ACS007QW

ONE TRIP DETECTION LOGIC

If a malfunction is sensed during the first test drive, the MIL will illuminate and the malfunction will be stored in the ECM memory as a DTC. The TCM is not provided with such a memory function.

TWO TRIP DETECTION LOGIC

When a malfunction is sensed during the first test drive, it is stored in the ECM memory as a 1st trip DTC (diagnostic trouble code) or 1st trip freeze frame data. At this point, the MIL will not illuminate. — 1st trip
If the same malfunction as that experienced during the first test drive is sensed during the second test drive, the MIL will illuminate. — 2nd trip
The “trip” in the “One or Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation.

OBD-II Diagnostic Trouble Code (DTC)

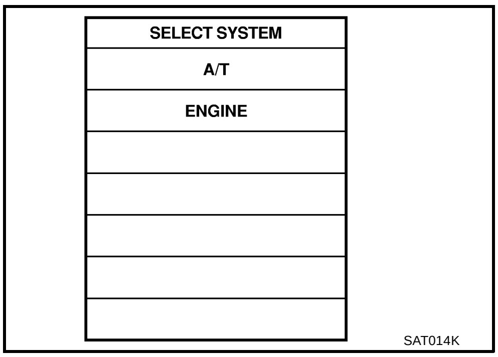
ACS007QX

HOW TO READ DTC AND 1ST TRIP DTC

DTC and 1st trip DTC can be read by the following methods.
(with CONSULT-II or GST) CONSULT-II or GST (Generic Scan Tool) Examples: P0705, P0720 etc.
These DTC are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

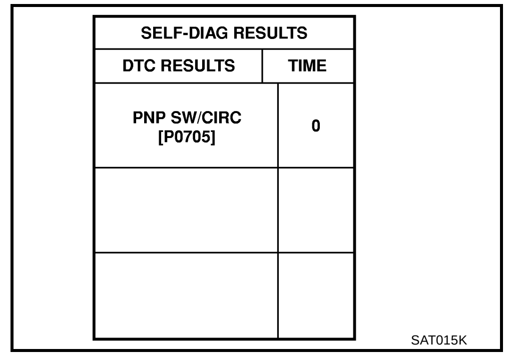
- **1st trip DTC No. is the same as DTC No.**
- **Output of the diagnostic trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST, they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal.**
  CONSULT-II can identify them as shown below, therefore, CONSULT-II (if available) is recommended.

A sample of CONSULT-II display for DTC and 1st trip DTC is shown on the next page. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode for “ENGINE” with CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

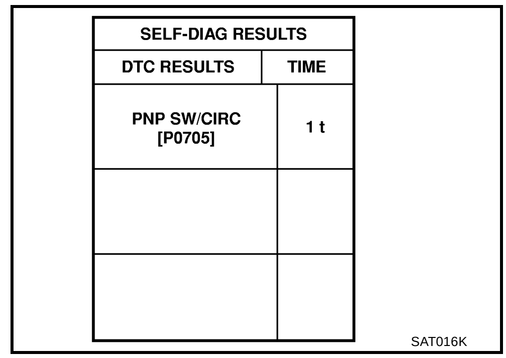


SAT014K

If the DTC is being detected currently, the time data will be “0”.



If a 1st trip DTC is stored in the ECM, the time data will be “1t”.



Freeze Frame Data and 1st Trip Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed and vehicle speed at the moment the ECM detects a malfunction.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data, and the data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For detail, refer to EC-123, "CONSULT-II Function (ENGINE)" .
Only one set of freeze frame data (either 1st trip freeze frame data of freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0306 Fuel Injection System Function — DTC: P0171, P0172, P0174, P0175
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the ECM memory is erased.

HOW TO ERASE DTC

The diagnostic trouble code can be erased by CONSULT-II, GST or ECM DIAGNOSTIC TEST MODE as described following.

- **If the battery cable is disconnected, the diagnostic trouble code will be lost within 24 hours.**
- **When you erase the DTC, using CONSULT-II or GST is easier and quicker than switching the mode selector on the ECM.**

The following emission-related diagnostic information is cleared from the ECM memory when erasing DTC related to OBD-II. For details, refer to EC-48, "Emission-Related Diagnostic Information" .

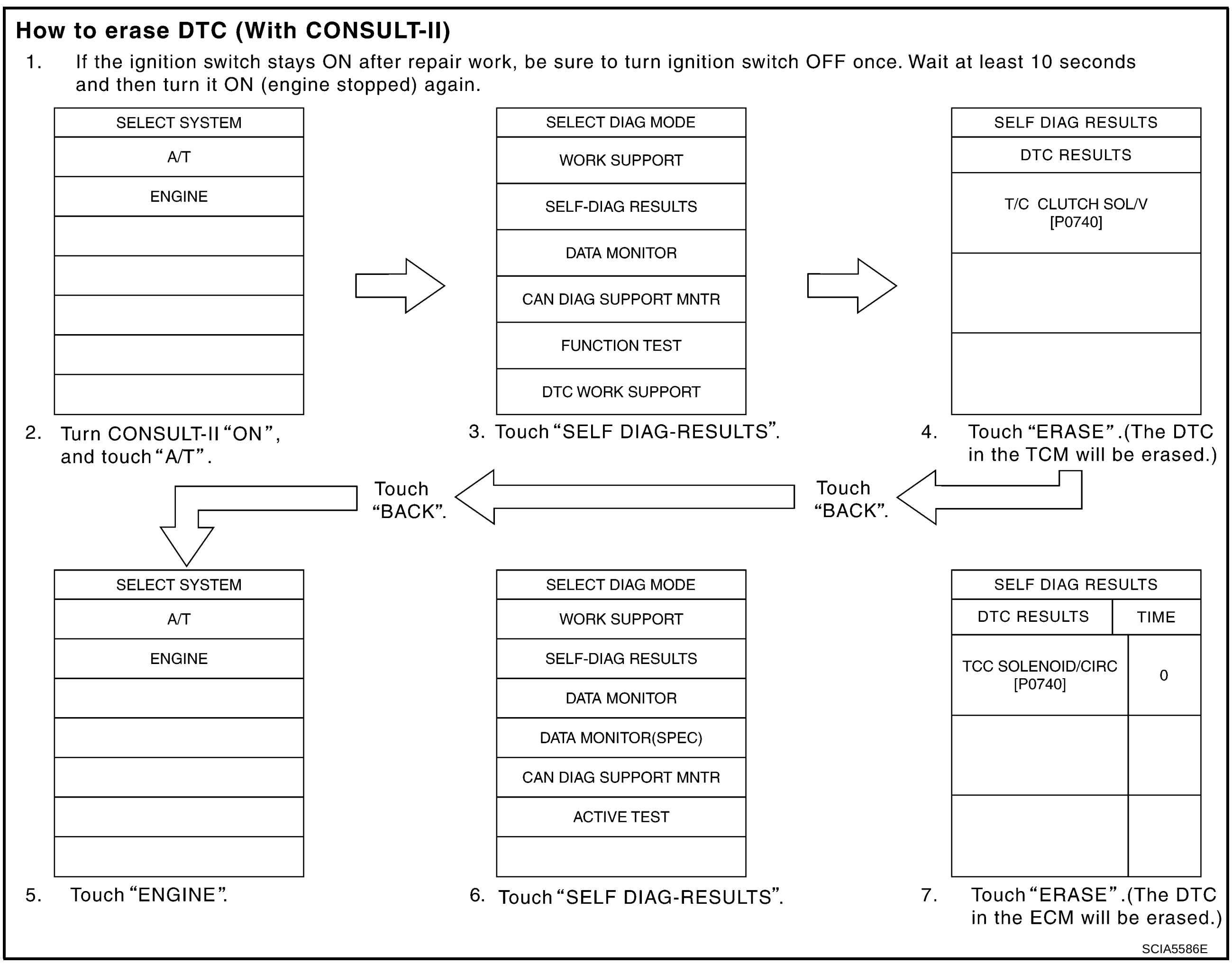
- **Diagnostic trouble codes (DTC)**
- **1st trip diagnostic trouble codes (1st trip DTC)**
- **Freeze frame data**

- **1st trip freeze frame data**
- **System readiness test (SRT) codes**
- **Test values**

HOW TO ERASE DTC (WITH CONSULT-II)

- **If a DTC is displayed for both ECM and TCM, it is necessary to be erased for both ECM and TCM.**

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT-II “ON” and touch “A/T”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. (The DTC in the TCM will be erased.) Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.
7. Touch “ERASE”. (The DTC in the ECM will be erased.)



HOW TO ERASE DTC (WITH GST)

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)”. Refer to AT-91, "TCM SELF-DIAGNOSTIC PROCEDURE" . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with Generic Scan Tool (GST). For details, refer to EC-136, "Generic Scan Tool (GST) Function" .

HOW TO ERASE DTC (NO TOOLS)

The O/D OFF indicator lamp is located on the combination meter.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform “TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)”. Refer to AT-91, "TCM SELF-DIAGNOSTIC PROCEDURE" . (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Perform “OBD-II SELF-DIAGNOSTIC PROCEDURE (No tools)”. Refer to EC-60, "How to Erase DTC" .

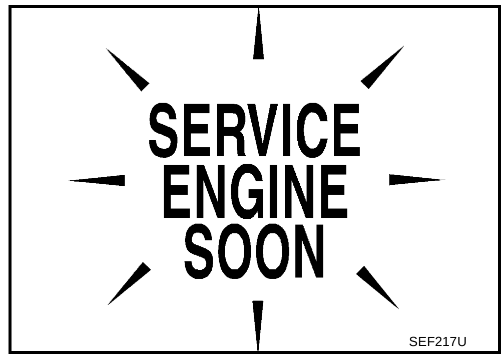
Malfunction Indicator Lamp (MIL)

ACS007QY

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   - If the MIL does not light up, refer to DI-25, "WARNING LAMPS" , or see EC-659, "MIL AND DATA LINK CONNECTOR" .
2. When the engine is started, the MIL should go off.
   - If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



TROUBLE DIAGNOSIS

PFP:00004

DTC Inspection Priority Chart

ACS007JR

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC “U1000” is displayed with other DTCs, first perform the trouble diagnosis for “DTC U1000 CAN COMMUNICATION”. Refer to **AT-95 .**

Priority	Detected items
1	CAN communication line
2	Except above

Fail-Safe

ACS008HS

The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.

Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of “1”, “2” or “D”. The customer may complain of sluggish or poor acceleration.

When the ignition switch is turned ON following Fail-Safe operation, O/D OFF indicator lamp blinks for about 8 seconds. Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .

The blinking of the O/D OFF indicator lamp for about 8 seconds will appear only once and be cleared. The customer may resume normal driving conditions.

Always follow the “WORK FLOW”, refer to AT-45, "WORK FLOW" .

The SELF-DIAGNOSIS results will be as follows:

- The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.
- During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

FAIL-SAFE FUNCTION

- The following fail-safe functions allow vehicles to be driven even when sensor, switch or solenoid malfunction occurs.

Vehicle Speed Sensor 1 (Revolution Sensor)

- Vehicle speed sensor 2 signal is input from combination meter.

Accelerator Pedal Position Sensor Signal

- If the accelerator pedal position sensor from ECM to TCM outputs an erratic signal, the control unit detects the throttle position by the closed throttle position signal and wide-open throttle position signal sent via the CAN communication from ECM.
  If an unexpected signal is sent from the accelerator pedal position sensor to ECM, ECM controls engine to maintain vehicle operation.

Closed throttle position signal	Wide open throttle position signal	Throttle position
–	ON	4/8
OFF	OFF	2/8
ON	OFF	0/8

Park/Neutral Position (PNP) Switch

- When the multiple PNP switch signals are input to TCM, the priority of selector lever position becomes "D", "N", "R", "2" and "1" in order by internal TCM determination.
  The use of 4th gear is inhibited until normal operation resumes. Because the hydraulic circuit of the control valve is switched by manual valve according to the selector lever position, however, actual operating condition of vehicle becomes as follows.

Actual lever position	PNP switch input signal	Running status
"P"	"P" position and other position signals	P
"R"	"R" position and other position signals	R
"N"	"N" position and other position signals	N
"D"	"D" position and other position signals	$D_1 \Leftrightarrow D_2 \Leftrightarrow D_3 \Leftrightarrow D_4$
"2"	"2" position and other position signals (Except "1" position)	$2_1 \Leftrightarrow 2_2 \Leftrightarrow 2_3$
	"2" position and "1" position signals	$2_1 \Leftrightarrow 2_2$
"1"	"1" position and other position signals (Except "2" position)	$1_1 \Leftrightarrow 1_2 \Leftrightarrow 1_3$
	"1" position and "2" position signals	$1_1 \Leftrightarrow 1_2$

Shift Solenoid Valve A and B

- If non-standard solenoid signal is sent to TCM, use of certain gears is limited. Refer to chart shown below.

Shift position	Normal			Malfunction in solenoid valve A			Malfunction in solenoid valve B			Malfunction in solenoid valves A and B		
	A	B	Gear	A	B	Gear	A	B	Gear	A	B	Gear
"D" position	●	●	1st	–	●→×		●→×	–		–	–	
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
	●	×	4th	–	x		●→×	–		–	–	
"2" position	●	●	1st	–	●→×	3rd	●→×	–	3rd	–	–	3rd
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	
"1" position	●	●	1st	–	●→×		●→×	–		–	–	
	×	●	2nd	–	●→×		×	–		–	–	
	×	×	3rd	–	x		×	–		–	–	

●: Solenoid ON
×: Solenoid OFF
–: Non-standard condition

Line Pressure Solenoid Valve

- If non-standard solenoid signal is sent to TCM, line pressure solenoid valve is turned OFF to achieve maximum oil pressure.

Torque Converter Clutch Solenoid Valve

- If non-standard solenoid signal is sent to TCM, torque converter clutch solenoid valve is turned OFF to release lock-up.

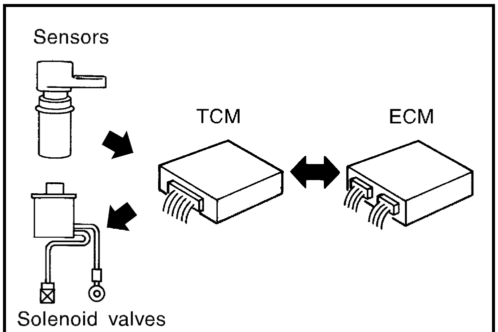
Overrun Clutch Solenoid Valve

- If non-standard solenoid signal is sent to TCM, overrun clutch solenoid valve is turned OFF to engage overrun clutch. This will result in more effective engine brake during deceleration.

How to Perform Trouble Diagnoses for Quick and Accurate Repair

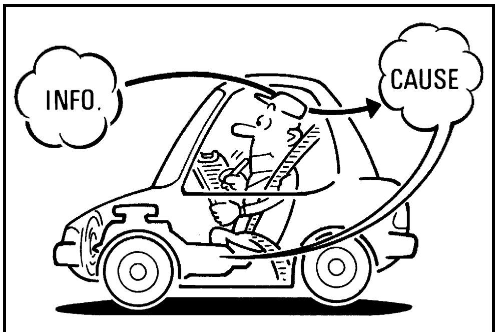
ACS007JT

INTRODUCTION



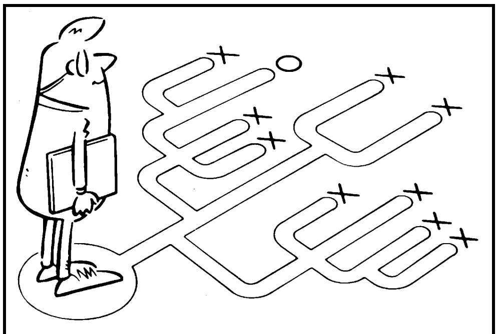
SAT631IA

The TCM receives a signal from the vehicle speed sensor, accelerator pedal position sensor or PNP switch and provides shift control or lock-up control via A/T solenoid valves.
Input and output signals must always be correct and stable in the operation of the A/T system. The A/T system must be in good operating condition and be free of valve seizure, solenoid valve malfunction, etc.
It is much more difficult to diagnose a malfunction that occurs intermittently rather than continuously. Most intermittent malfunctions are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



SAT632I

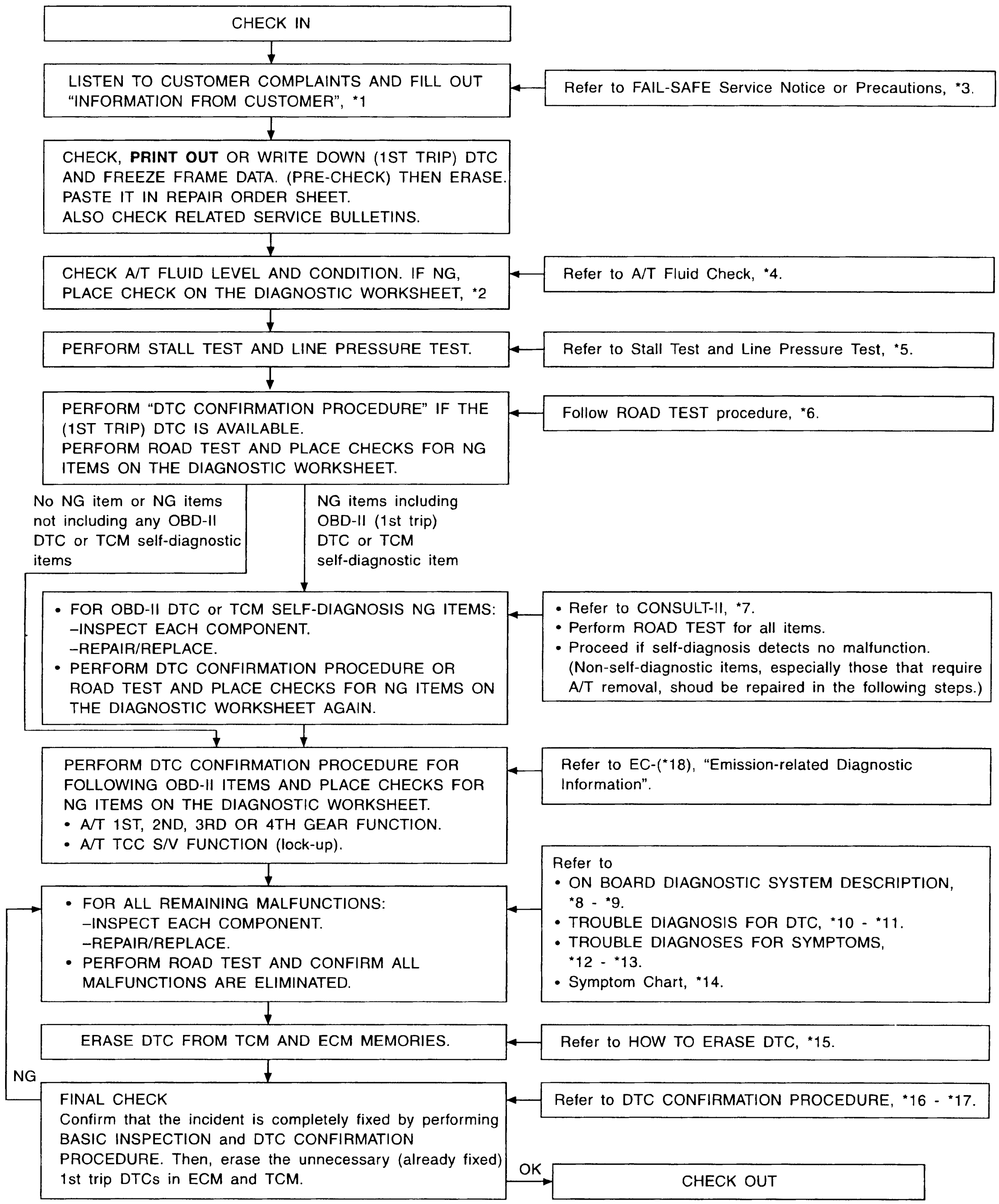
A visual check only, may not find the cause of the malfunctions. A road test with CONSULT-II or a circuit tester connected should be performed. Follow the AT-45, "WORK FLOW" .
Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a drivability complaint. The customer can supply good information about such malfunctions, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A “DIAGNOSTIC WORKSHEET” like the example (AT-47, "DIAGNOSTIC WORKSHEET") should be used.
Start your diagnosis by looking for “conventional” malfunctions first. This will help troubleshoot drivability malfunctions on an electronically controlled engine vehicle.
Also check related Service bulletins for information.


SEF234G

WORK FLOW

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate. In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.
Make good use of the two sheets provided, AT-47, "Information from Customer" and AT-48, "Diagnostic Worksheet" , to perform the best troubleshooting possible.

Work Flow Chart



SAT086JI

*1	AT-47	*2	AT-48	*3	AT-9
*4	AT-17	*5	AT-52, AT-55	*6	AT-57
*7	AT-80	*8	AT-39	*9	AT-42
*10	AT-95	*11	AT-200	*12	AT-205
*13	AT-244	*14	AT-67	*15	AT-40
*16	AT-95	*17	AT-200	*18	EC-48

DIAGNOSTIC WORKSHEET

Information from Customer

KEY POINTS

- **WHAT**..... Vehicle & A/T models
- **WHEN**..... Date, Frequencies
- **WHERE**..... Road conditions
- **HOW**..... Operating conditions, Symptoms

Customer name MR./MS	Model & Year	VIN
Trans. model	Engine	Mileage
Malfunction Date	Manuf. Date	In Service Date
Frequency	❑ Continuous ❑ Intermittent (times a day)	
Symptoms	❑ Vehicle does not move. (❑ Any position ❑ Particular position)	
	❑ No up-shift (❑ 1st → 2nd ❑ 2nd → 3rd ❑ 3rd → O/D)	
	❑ No down-shift (❑ O/D → 3rd ❑ 3rd → 2nd ❑ 2nd → 1st)	
	❑ Lockup malfunction	
	❑ Shift point too high or too low.	
	❑ Shift shock or slip (❑ N → D ❑ N → R ❑ Lockup ❑ Any drive position)	
	❑ Noise or vibration	
	❑ No kick down	
	❑ No pattern select	
	❑ Others ( )	
O/D OFF indicator lamp	Blinks for about 8 seconds.	
	❑ Continuously lit	❑ No lit
Malfunction indicator lamp (MIL)	❑ Continuously lit	❑ No lit

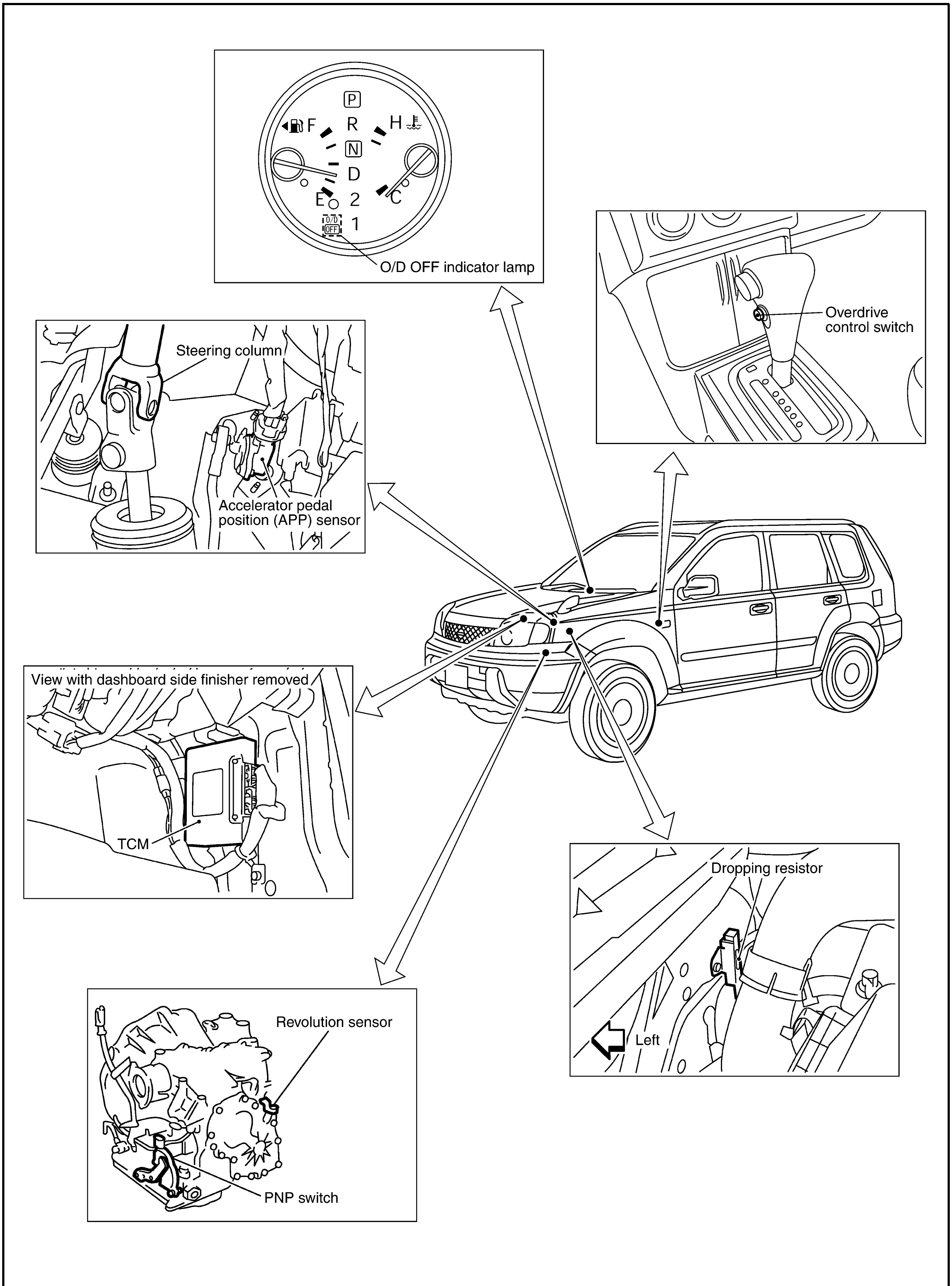
Diagnostic Worksheet

1.	❏ Read the Fail-safe and listen to customer complaints.		AT-43, AT-47
2.	❏ Check A/T fluid		AT-17
	❏ Leakage (Follow specified procedure) ❏ Fluid condition ❏ Fluid level		
3.	❏ Perform “STALL TEST” and “LINE PRESSURE TEST”.		AT-52, AT-55
	❏ “STALL TEST” — Mark possible damaged components/others.		
	❏ Torque converter one-way clutch ❏ Reverse clutch ❏ Forward clutch ❏ Overrun clutch ❏ Forward one-way clutch	❏ Low & reverse brake ❏ Low one-way clutch ❏ Engine ❏ Line pressure is low ❏ Clutches and brakes except high clutch and brake band are OK	
	❏ “LINE PRESSURE TEST” — Suspected parts:		
4.	❏ Perform “Road Test”.		AT-57
4-1.	“Check Before Engine is Started”		AT-57
	❏ AT-205, "O/D OFF Indicator Lamp Does Not Come On" . ❏ Perform self-diagnostics. Enter checks for detected items. AT-82 , AT-91 .		
	❏ AT-95, "DTC U1000 CAN COMMUNICATION LINE" . ❏ AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . ❏ AT-104, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . ❏ AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" . ❏ AT-115, "DTC P0725 ENGINE SPEED SIGNAL" . ❏ AT-120, "DTC P0731 A/T 1ST GEAR FUNCTION" . ❏ AT-125, "DTC P0732 A/T 2ND GEAR FUNCTION" . ❏ AT-130, "DTC P0733 A/T 3RD GEAR FUNCTION" . ❏ AT-135, "DTC P0734 A/T 4TH GEAR FUNCTION" . ❏ AT-142, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . ❏ AT-147, "DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)" . ❏ AT-155, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . ❏ AT-162, "DTC P0750 SHIFT SOLENOID VALVE A" . ❏ AT-167, "DTC P0755 SHIFT SOLENOID VALVE B" . ❏ AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" . ❏ AT-177, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . ❏ AT-182, "DTC VEHICLE SPEED SENSOR MTR" . ❏ AT-187, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . ❏ AT-194, "MAIN POWER SUPPLY AND GROUND CIRCUIT" . ❏ AT-198, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . ❏ AT-200, "DTC CONTROL UNIT(EEPROM)" .		

4.	4-2.	"Check at Idle"	AT-58
		❏ AT-207, "Engine Cannot Be Started in "P" and "N" Position" . ❏ AT-208, "In "P" Position, Vehicle Moves Forward or Backward When Pushed" . ❏ AT-209, "In "N" Position, Vehicle Moves" . ❏ AT-211, "Large Shock. "N" → "R" Position" . ❏ AT-212, "Vehicle Does Not Creep Backward in "R" Position" . ❏ AT-215, "Vehicle Does Not Creep Forward in "D", "2" or "1" Position" .	
	4-3.	"Cruise Test"	AT-60
		Part 1	
		❏ AT-217, "Vehicle Cannot Be Started From D_1" . ❏ AT-220, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" . ❏ AT-223, "A/T Does Not Shift: $D_2 \rightarrow D_3$" . ❏ AT-226, "A/T Does Not Shift: $D_3 \rightarrow D_4$" . ❏ AT-228, "A/T Does Not Perform Lock-Up" . ❏ AT-229, "A/T Does Not Hold Lock-Up Condition" . ❏ AT-231, "Lock-Up Is Not Released" . ❏ AT-232, "Engine Speed Does Not Return to Idle (Light Braking $D_4 \rightarrow D_3$)" .	
		Part 2	AT-63
		❏ AT-217, "Vehicle Cannot Be Started From D_1" . ❏ AT-220, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" . ❏ AT-223, "A/T Does Not Shift: $D_2 \rightarrow D_3$" . ❏ AT-226, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .	
		Part 3	AT-64
		❏ AT-234, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch "ON" → "OFF"" . ❏ AT-235, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever "D" → "2" Position" . ❏ AT-237, "A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever "2" → "1" on Position" . ❏ AT-240, "Vehicle Does Not Decelerate by Engine Brake" . ❏ Perform self-diagnostics. Enter checks for detected items. AT-82 , AT-91 .	
		❏ AT-95, "DTC U1000 CAN COMMUNICATION LINE" . ❏ AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" . ❏ AT-104, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" . ❏ AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" . ❏ AT-115, "DTC P0725 ENGINE SPEED SIGNAL" . ❏ AT-120, "DTC P0731 A/T 1ST GEAR FUNCTION" . ❏ AT-125, "DTC P0732 A/T 2ND GEAR FUNCTION" . ❏ AT-130, "DTC P0733 A/T 3RD GEAR FUNCTION" . ❏ AT-135, "DTC P0734 A/T 4TH GEAR FUNCTION" . ❏ AT-142, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" . ❏ AT-147, "DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)" . ❏ AT-155, "DTC P0745 LINE PRESSURE SOLENOID VALVE" . ❏ AT-162, "DTC P0750 SHIFT SOLENOID VALVE A" . ❏ AT-167, "DTC P0755 SHIFT SOLENOID VALVE B" . ❏ AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" . ❏ AT-177, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" . ❏ AT-182, "DTC VEHICLE SPEED SENSOR MTR" . ❏ AT-187, "DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)" . ❏ AT-194, "MAIN POWER SUPPLY AND GROUND CIRCUIT" . ❏ AT-198, "DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)" . ❏ AT-200, "DTC CONTROL UNIT(EEPROM)" .	
5.	❏ For self-diagnosis NG items, inspect each component. Repair or replace the damaged parts.		AT-260
6.	❏ Perform "Road Test".		AT-57
7.	❏ Perform the Diagnostic Procedures for all remaining items marked NG. Repair or replace the damaged parts. Refer to the Symptom Chart when you perform the procedures. (The chart also shows some other possible symptoms and the component inspection orders.)		AT-82, AT-91
8.	❏ Erase DTC from TCM and ECM memories.		AT-40, EC-60

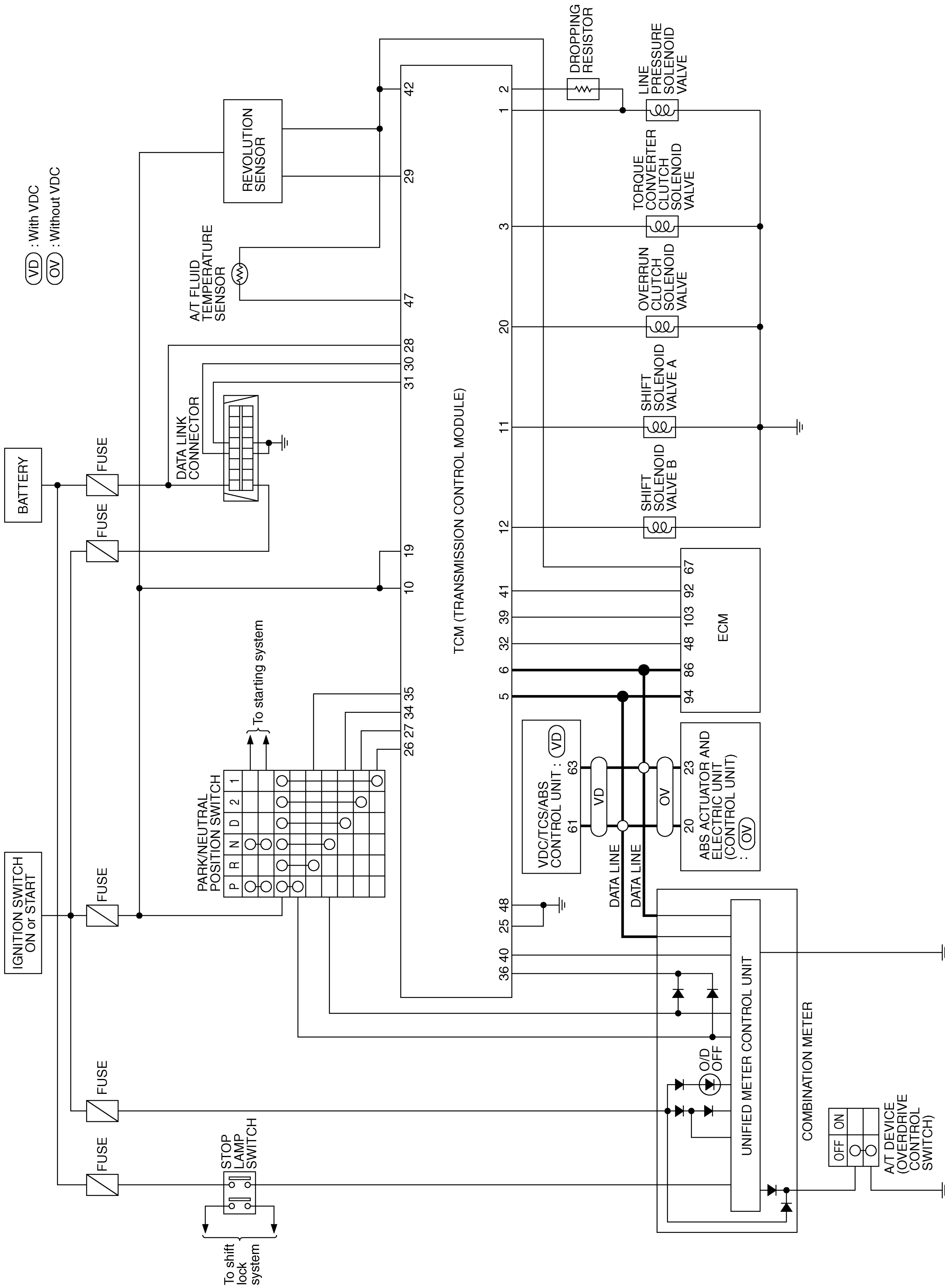
A/T Electrical Parts Location

ACS007JU



Circuit Diagram

ACS007JV



TCWB0006E

Inspections before Trouble Diagnosis

ACS007JW

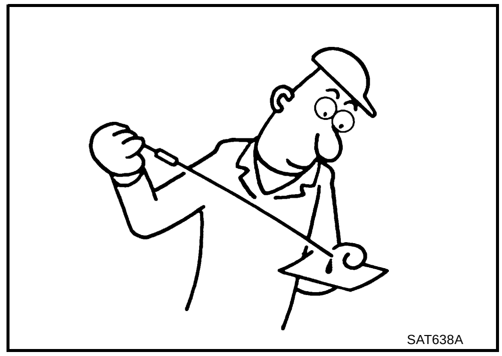
A/T FLUID CHECK

Fluid Leakage and Fluid Level Check

- Inspect for fluid leakage and check the fluid level. Refer to AT-17, "Checking A/T Fluid" .

Fluid Condition Check

Inspect the fluid condition.



SAT638A

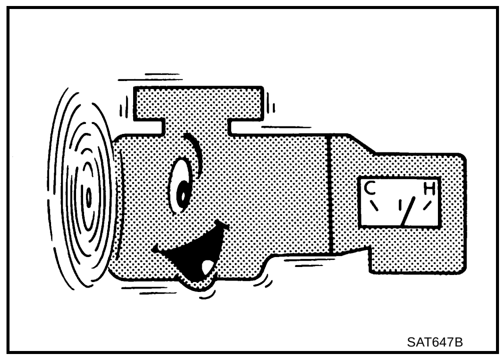
Fluid status	Conceivable Cause	Required Operation
Varnished (viscous varnish state)	Clutch, brake scorched	Replace the A/T fluid and check the A/T main unit and the vehicle for malfunctions (wire harnesses, cooler pipes, etc.)
Milky white or cloudy	Water in the fluid	Replace the A/T fluid and check for places where water is getting in.
Large amount of metal powder mixed in	Unusual wear of sliding parts within A/T	Replace the A/T fluid and check for improper operation of the A/T.

STALL TEST

Stall Test Procedure

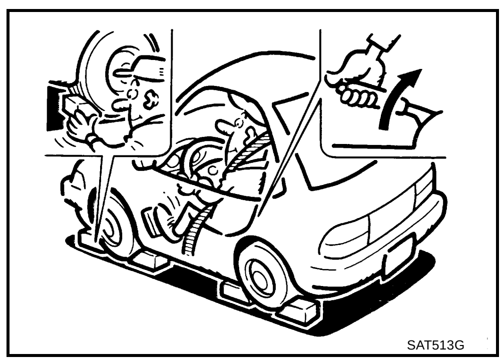
1. Check A/T fluid and engine oil levels. If necessary, add fluid and oil.
2. Drive vehicle for approximately 10 minutes or until fluid and oil reach operating temperature.

   ATF operating temperature: 50 - 80°C (122 - 176°F)



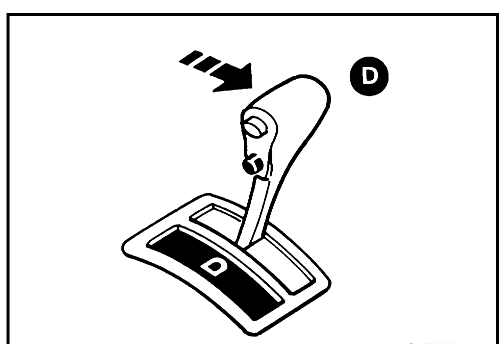
SAT647B

3. Set parking brake and block wheels.
4. Install a tachometer where it can be seen by driver during test.
   - **It is good practice to mark the point of specified engine rpm on indicator.**



SAT513G

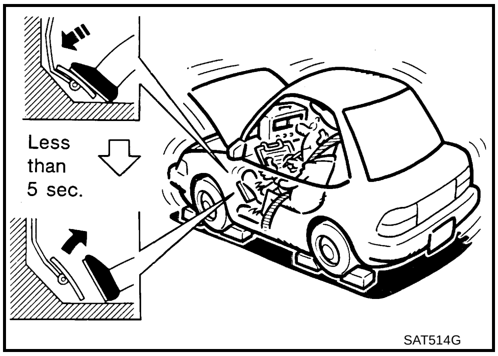
5. Start engine, apply foot brake, and place selector lever in “D” position.



SAT775B

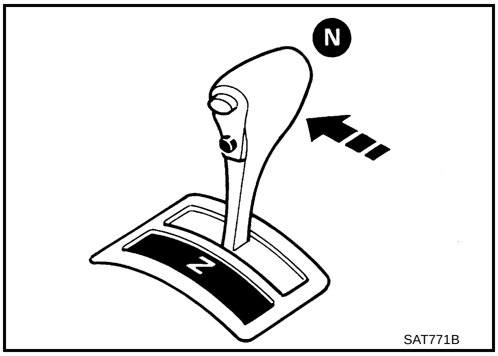
6. Accelerate to wide open throttle gradually while applying foot brake.
7. Quickly note the engine stall revolution and immediately release throttle.
   - **During test, do not hold throttle wide open for more than 5 seconds.**

   Stall revolution: 2,300 - 2,750 rpm



SAT514G

8. Move selector lever to “N” position.
9. Cool off ATF.
   - **Run engine at idle for at least 1 minute.**
10. Repeat steps 5 through 9 with selector lever in “2”, “1” and “R” positions.



SAT771B

Judgement of Stall Test

The test result and possible damaged components relating to each result are shown in the illustrations on next page.
In order to pinpoint the possible damaged components, refer to AT-46, "Work Flow Chart" .

NOTE:
Stall revolution is too high in “D”, “2”, or “1” position:

- Slippage occurs in 1st gear but not in 2nd and 3rd gears. ..... Low one-way clutch slippage
- Slippage occurs in the following gears:
  1st through 3rd gears in “D” position and engine brake functions with overdrive control switch set to OFF.
  1st and 2nd gears in “2” position and engine brake functions with accelerator pedal released (fully closed throttle)...... Forward clutch or forward one-way clutch slippage

Stall revolution is too high in “R” position:

- Engine brake does not function in “1” position. ..... Low & reverse brake slippage
- Engine brake functions in “1” position. ..... Reverse clutch slippage

Stall revolution within specifications:

- Vehicle does not achieve speed of more than 80 km/h (50 MPH). ..... One-way clutch seizure in torque converter housing

CAUTION:
Be careful since automatic fluid temperature increases abnormally.

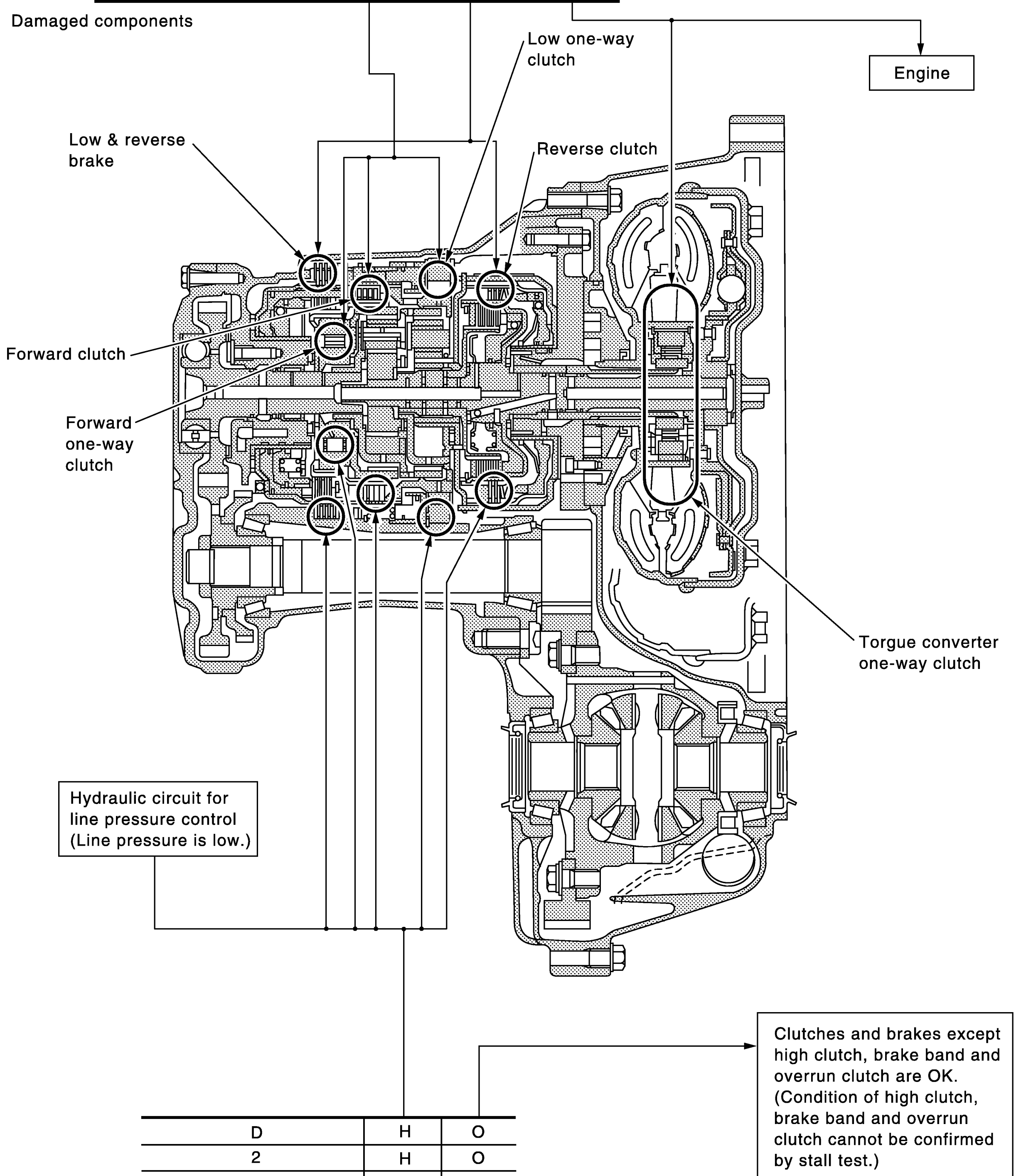
- Slippage occurs in 3rd and 4th gears in “D” position. ..... High clutch slippage
- Slippage occurs in 2nd and 4th gears in “D” position. ..... Brake band slippage
- Engine brake does not function in 2nd and 3rd gears in “D” position, 2nd gear in “2” position, and 1st gear in “1” position with overdrive control switch set to OFF. ..... Overrun clutch slippage

Stall revolution less than specifications:

- Poor acceleration during starts. ..... One-way clutch seizure in torque converter

Selector lever position	Judgement		
D	H	O	L
2	H	O	L
1	H	O	L
R	O	H	L

O : Stall revolution is normal.
H : Stall revolution is higher than specified.
L : Stall revolution is lower than specified.



D	H	O
2	H	O
1	H	O
R	H	O
Selector lever position	Judgement	

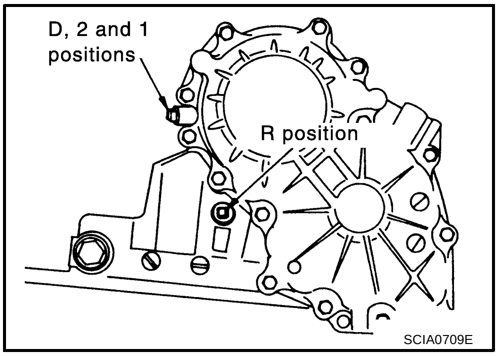
SCIA0707E

LINE PRESSURE TEST

Line Pressure Test Ports

Location of line pressure test ports are shown in the figure.

- **Always replace pressure plugs as they are self-sealing bolts.**

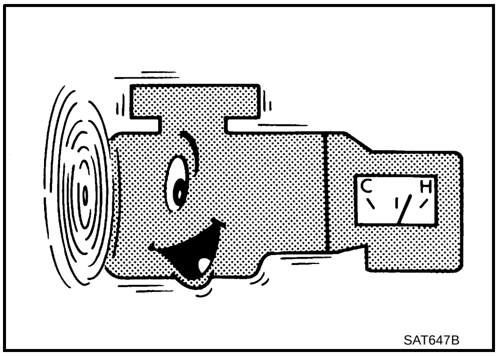


SCIA0709E

Line Pressure Test Procedure

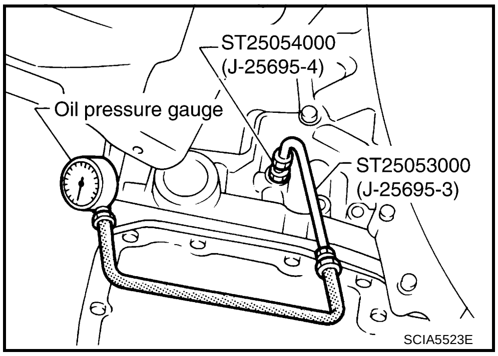
1. Check A/T fluid and engine oil levels. If necessary, add fluid or oil.
2. Drive vehicle for approx. 10 minutes or until engine oil and ATF reach operating temperature.

   ATF operating temperature: 50 - 80°C (122 -176°F)



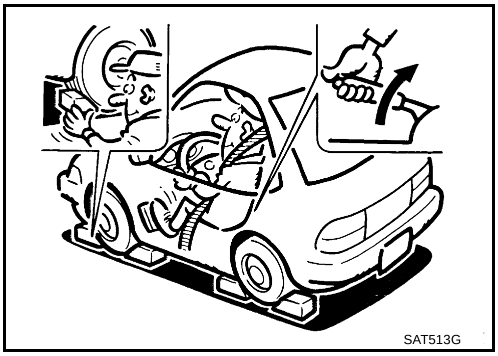
SAT647B

3. Install oil pressure gauge to corresponding line pressure port.

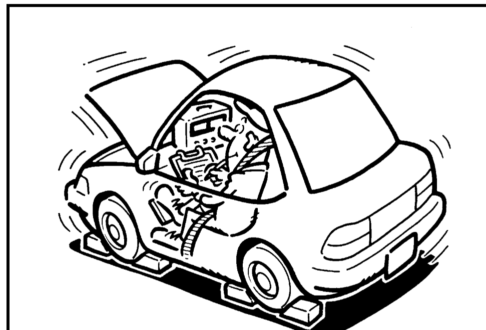


SCIA5523E

4. Set parking brake and block wheels.
   - **Continue to depress brake pedal fully while line pressure test is being performed at stall speed.**


SAT513G

5. Start engine and measure line pressure at idle and stall speed.
   - **When measuring line pressure at stall speed, follow the stall test procedure.**



SAT493G

Line Pressure

Engine speed rpm	Line pressure kPa (kg/cm^2 , psi)	
	“D”, “2” and “1” positions	“R” position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

Judgement of Line Pressure Test

Judgement		Suspected parts
At idle	Line pressure is low in all positions.	● Oil pump wear ● Control piston damage ● Pressure regulator valve or plug sticking ● Spring for pressure regulator valve damaged ● Fluid pressure leakage between oil strainer and pressure regulator valve ● Clogged strainer
	Line pressure is low in particular position.	● Fluid pressure leakage between manual valve and particular clutch ● For example, line pressure is: – Low in “R” and “1” positions, but – Normal in “D” and “2” positions. Therefore, fluid leakage exists at or around low and reverse brake circuit. Refer to AT-23, "CLUTCH AND BAND CHART" .
	Line pressure is high.	● Maladjustment of throttle position sensor ● A/T fluid temperature sensor damaged ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure modifier valve sticking ● Pressure regulator valve or plug sticking ● Open in dropping resistor circuit
At stall speed	Line pressure is low.	● Maladjustment of throttle position sensor ● Line pressure solenoid valve sticking ● Short circuit of line pressure solenoid valve circuit ● Pressure regulator valve or plug sticking ● Pressure modifier valve sticking ● Pilot valve sticking

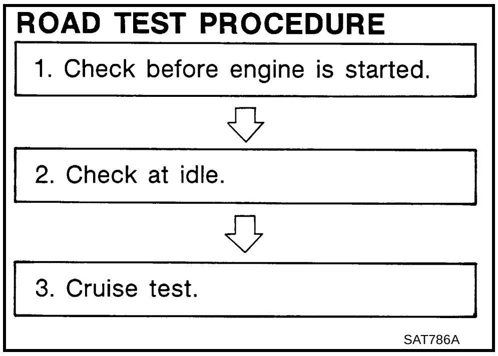
Road Test

ACS007JX

DESCRIPTION

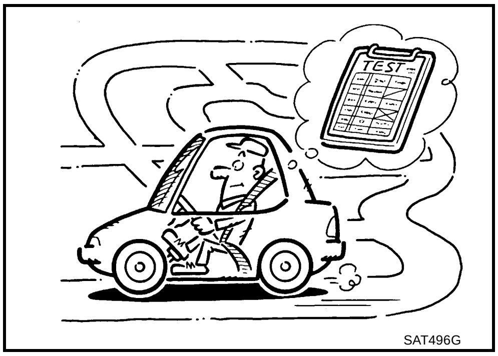
- The purpose of the test is to determine overall performance of A/T and analyze causes of malfunctions.
- The road test consists of the following three parts:

1. Check before engine is started. Refer to AT-57 .
2. Check at idle. Refer to AT-58 .
3. Cruise test
   - Inspection all the item from Part 1 to Part 3. Refer to AT-60 , AT-63 and AT-64 .



SAT786A

- Before road test, familiarize yourself with all test procedures and items to check.
- Perform tests on all items until specified symptom is found. Troubleshoot items which check out No Good after road test. Refer to the following.
  Refer to AT-39, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" and AT-202, "TROUBLE DIAGNOSES FOR SYMPTOMS" .



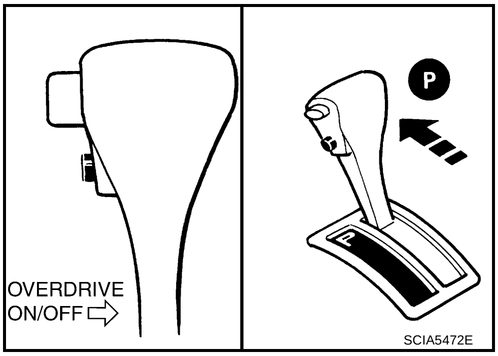
SAT496G

Check before Engine Is Started

ACS007JY

1. CHECK O/D OFF INDICATOR LAMP

1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



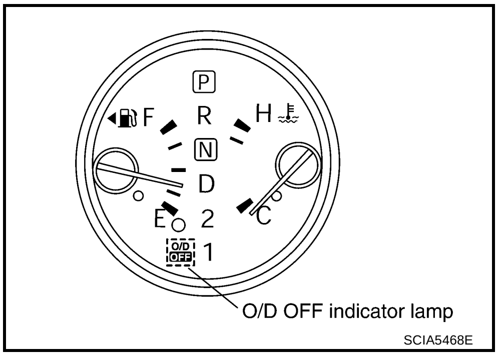
SCIA5472E

4. Turn ignition switch ON. (Do not start engine.)

Does O/D OFF indicator lamp come on for about 2 seconds?

YES >> 1. Turn ignition switch OFF.
2. Perform self-diagnosis and note NG items.
Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" , AT-91, "Diagnostic Procedure Without CONSULT-II" .
3. Go to AT-58, "Check at Idle" .

NO >> Stop “Road Test”. Go to AT-205, "O/D OFF Indicator Lamp Does Not Come On" .



SCIA5468E

A B AT D E F G H I J K L M

Check at Idle

ACS007JZ

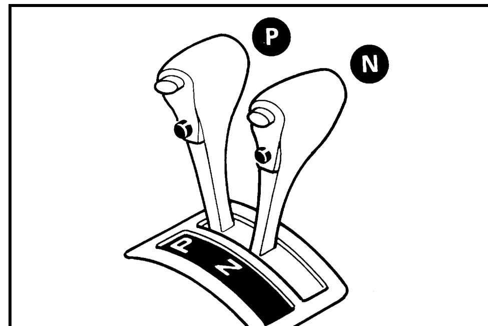
1. CHECK ENGINE START

1. Park vehicle on flat surface.
2. Turn ignition switch ON. (Do not start engine.)
3. Move selector lever to “P” or “N” position.
4. Turn ignition switch START position.

Is engine started?

YES >> GO TO 2.

NO >>
- Stop “Road Test”. Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-207, "Engine Cannot Be Started in “P” and “N” Position" .



SAT769B

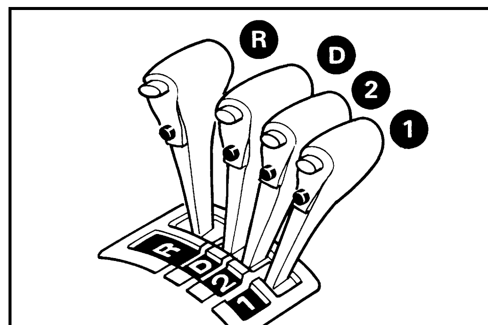
2. CHECK ENGINE START

1. Turn ignition switch ON. (Do not start engine.)
2. Move selector lever to “R”, “D”, “2” or “1” position.
3. Turn ignition switch START position.

Is engine started?

YES >>
- Stop “Road Test”. Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-207, "Engine Cannot Be Started in “P” and “N” Position" .
- Continue “Road Test”.

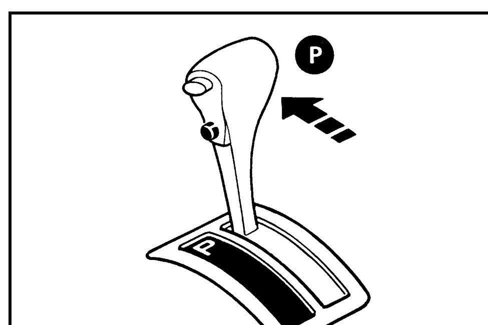
NO >> GO TO 3.



SAT770B

3. CHECK VEHICLE MOVE

1. Move selector lever to “P” position.
2. Turn ignition switch OFF.
3. Release parking brake.



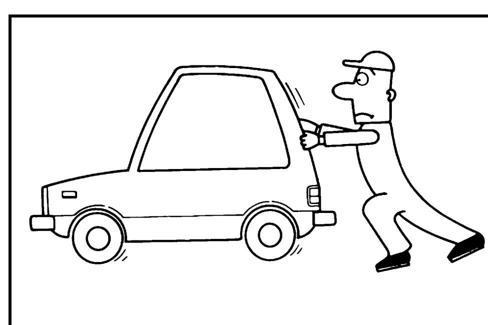
SAT768B

4. Push vehicle forward or backward.

Does vehicle move when it is pushed forward or backyard?

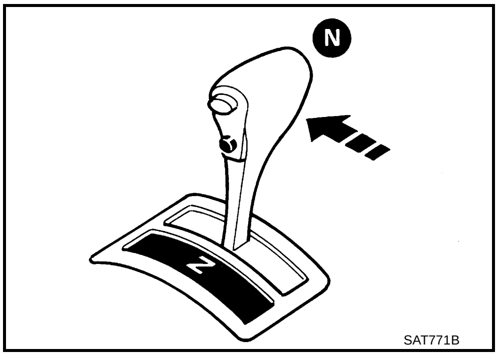
YES >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-208, "In “P” Position, Vehicle Moves Forward or Backward When Pushed" .
- Continue “Road Test”.

NO >> GO TO 4.


SAT796A

4. CHECK VEHICLE MOVE

1. Apply parking brake.
2. Start engine.
3. Move selector lever to “N” position.
4. Release parking brake.



SAT771B

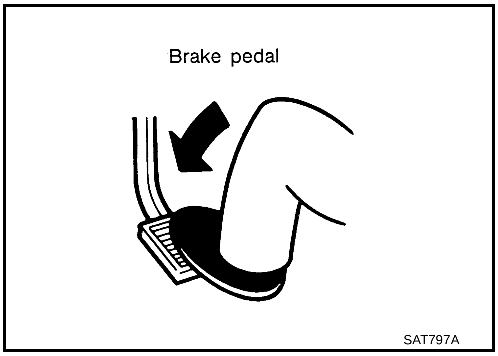
Does vehicle move forward or backward?

YES >> ● Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
● GO TO AT-209, "In “N” Position, Vehicle Moves" .
● Continue “Road Test”.

NO >> GO TO 5.

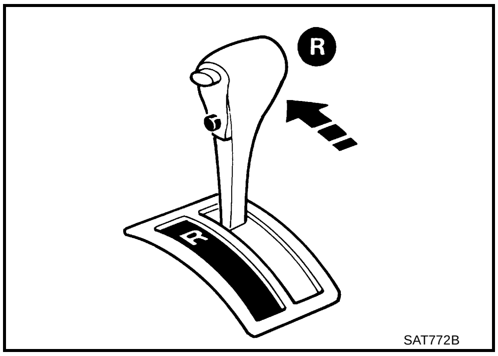
5. CHECK SHIFT SHOCK

1. Apply foot brake.



SAT797A

2. Move selector lever to “R” position.



SAT772B

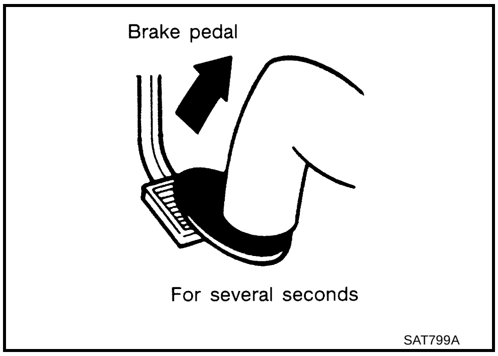
Is there large shock when changing from “N” to “R” position?

YES >> ● Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
● GO TO AT-211, "Large Shock. “N” → “R” Position" .
● Continue “Road Test”.

NO >> GO TO 6.

6. CHECK VEHICLE MOVE

Release foot brake for several seconds.



SAT799A

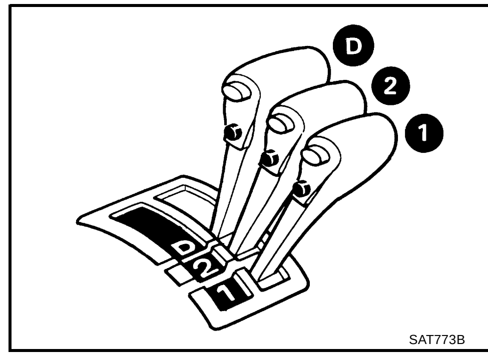
Does vehicle creep backward when foot brake is released?

YES >> GO TO 7.

NO >> ● Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
● GO TO AT-212, "Vehicle Does Not Creep Backward in “R” Position" .
● Continue “Road Test”.

7. CHECK VEHICLE MOVE

Move selector lever to “D”, “2” and “1” positions and check if vehicle creeps forward.



Does vehicle creep forward in all three positions?

YES >> Go to AT-60, "Cruise Test — Part 1" .
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-215, "Vehicle Does Not Creep Forward in “D”, “2” or “1” Position" .
- Continue “Road Test”.

Cruise Test — Part 1

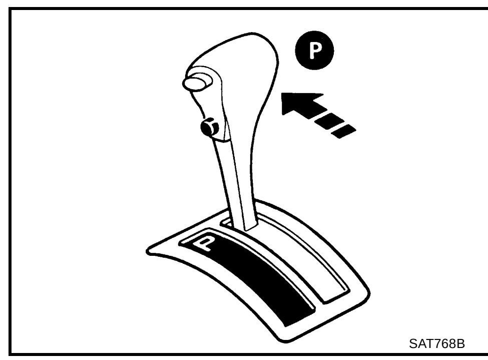
ACS007K0

1. CHECK STARTING GEAR (D_1) POSITION

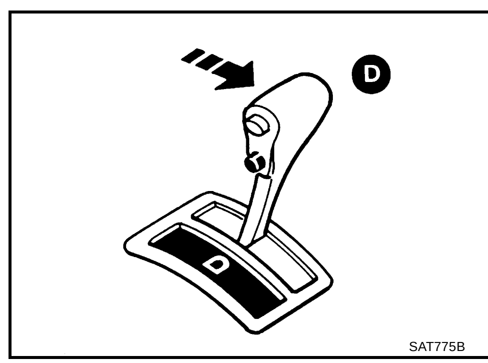
1. Drive vehicle for approximately 10 minutes to warm engine oil and ATF up to operating temperature.

ATF operating temperature: 50 - 80°C (122 - 176°F)

2. Park vehicle on flat surface.
3. Set overdrive control switch to ON position.
4. Move selector lever to “P” position.
5. Start engine.

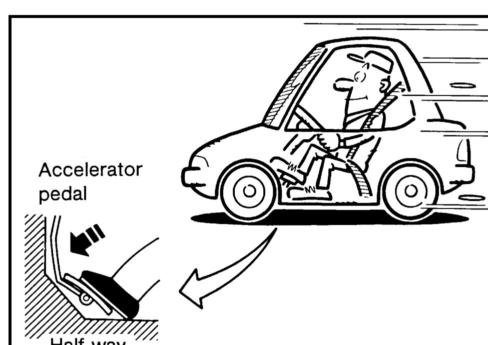


6. Move selector lever to “D” position.



7. Accelerate vehicle by constantly depressing accelerator pedal half-way.

Read gear position. Refer to **AT-84, "DATA MONITOR MODE"** **.**



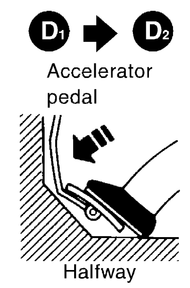
Does vehicle start from D_1 ?

YES >> GO TO 2.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-217, "Vehicle Cannot Be Started From D_1" .
- Continue “Road Test”.

2. CHECK SHIFT-UP (D_1 TO D_2)

Check shift-up (D_1 to D_2).
Specified speed when shifting from D_1 to D_2. Refer to AT-66, "Vehicle Speed When Shifting Gears" .

Read gear position, throttle opening and vehicle speed. Refer to AT-84, "DATA MONITOR MODE" .



SAT954I

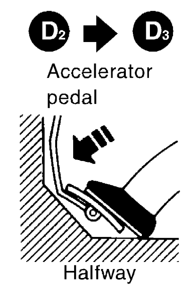
Does A/T shift from D_1 to D_2 at the specified speed?

YES >> GO TO 3.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-220, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .
- Continue “Road Test”.

3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3).
Specified speed when shifting from D_2 to D_3. Refer to AT-66, "Vehicle Speed When Shifting Gears" .

Read gear position, throttle opening and vehicle speed. Refer to AT-84, "DATA MONITOR MODE" .



SAT955I

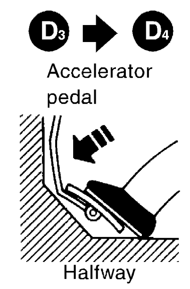
Does A/T shift from D_2 to D_3 at the specified speed?

YES >> GO TO 4.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-223, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue “Road Test”.

4. CHECK SHIFT-UP (D_3 TO D_4)

Check shift-up (D_3 to D_4).
Specified speed when shifting from D_3 to D_4. Refer to AT-66, "Vehicle Speed When Shifting Gears" .

Read gear position, throttle opening and vehicle speed. Refer to AT-84, "DATA MONITOR MODE" .



SAT956I

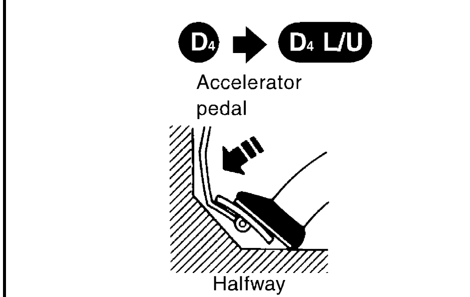
Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 5.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-226, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
- Continue “Road Test”.

5. CHECK LOCK-UP (D4 TO D4 L/U)

Check lock-up (D4 to D4 L/U).
Specified speed when lock-up occurs. Refer to AT-66, "Vehicle Speed When Performing and Releasing Lock-Up" .

Read vehicle speed, throttle opening when lock-up duty becomes 94%. Refer to AT-84, "DATA MONITOR MODE" .



SAT957I

Does A/T perform lock-up at the specified speed?

YES >> GO TO 6.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-228, "A/T Does Not Perform Lock-Up" .
- Continue “Road Test”.

6. CHECK LOCK-UP HOLD

Check lock-up hold.

When lock-up duty becomes 94%. Refer to AT-84, "DATA MONITOR MODE" .

Does A/T hold lock-up condition for more than 30 seconds?

YES >> GO TO 7.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-229, "A/T Does Not Hold Lock-Up Condition" .
- Continue “Road Test”.

7. CHECK SHIFT-DOWN (D4 L/U TO D4)

Release accelerator pedal.

When lock-up duty becomes 4%. Refer to AT-84, "DATA MONITOR MODE" .

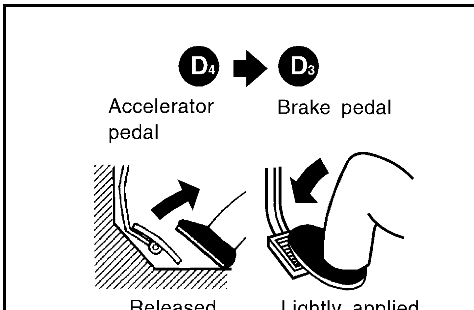
Is lock-up released when accelerator pedal is released?

YES >> GO TO 8.
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-231, "Lock-Up Is Not Released" .
- Continue “Road Test”.

8. CHECK SHIFT-DOWN (D4 TO D3)

Decelerate vehicle by applying foot brake lightly.

Read gear position and engine speed. Refer to AT-84, "DATA MONITOR MODE" .



SAT959I

Does engine speed return to idle smoothly when A/T is shifted from D4 to D3 ?

YES >> 1. Stop vehicle.
2. Go to AT-63, "Cruise Test — Part 2" .

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-232, "Engine Speed Does Not Return to Idle (Light Braking D4 → D3)" .
- Continue “Road Test”.

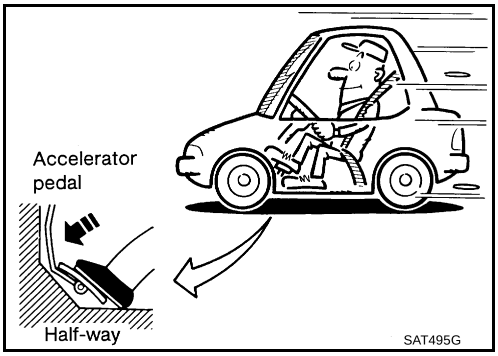
Cruise Test — Part 2

ACS007K1

1. CHECK STARTING GEAR (D_1) POSITION

1. Confirm gear selector lever is in “D” position.
2. Accelerate vehicle by half throttle again.

Read gear position. Refer to AT-84, "DATA MONITOR MODE" .



Does vehicle start from D_1 ?

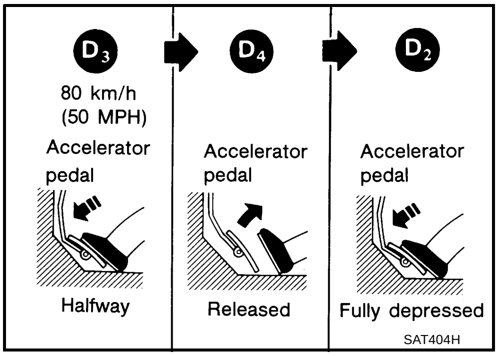
YES >> GO TO 2.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-217, "Vehicle Cannot Be Started From D_1" .
- Continue “Road Test”.

2. CHECK SHIFT-UP AND SHIFT-DOWN (D_3 TO D_4 TO D_2)

1. Accelerate vehicle to 80 km/h (50 MPH) as shown in the figure.
2. Release accelerator pedal and then quickly depress it fully.

Read gear position and throttle opening. Refer to AT-84, "DATA MONITOR MODE" .



Does A/T shift from D_4 to D_2 as soon as accelerator pedal is depressed fully?

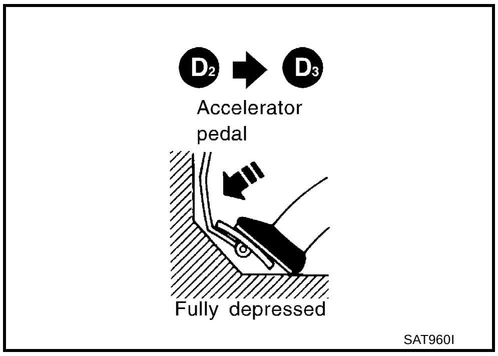
YES >> GO TO 3.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-220, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .
- Continue “Road Test”.

3. CHECK SHIFT-UP (D_2 TO D_3)

Check shift-up (D_2 to D_3)
Specified speed when shifting from D_2 to D_3 . Refer to AT-66, "Vehicle Speed When Shifting Gears" .

Read gear position, throttle opening and vehicle speed. Refer to AT-84, "DATA MONITOR MODE" .



Does A/T shift from D_2 to D_3 at the specified speed?

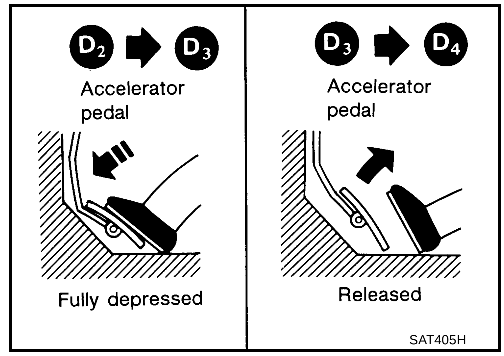
YES >> GO TO 4.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-223, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
- Continue “Road Test”.

4. CHECK SHIFT-UP (D_3 TO D_4) AND ENGINE BRAKE

Release accelerator pedal after shifting from D_2 to D_3.

Read gear position, throttle opening and vehicle speed. Refer to AT-84, "DATA MONITOR MODE" .



Does A/T shift from D_3 to D_4 and does vehicle decelerate by engine brake?

YES >> 1. Stop vehicle.
2. Go to AT-64, "Cruise Test — Part 3" .

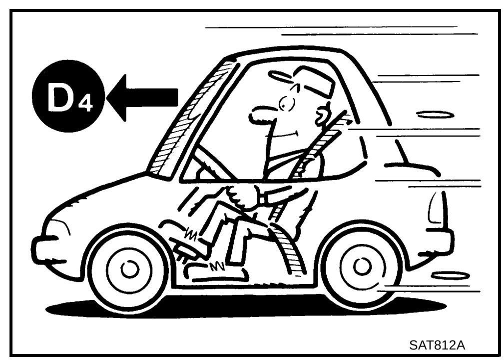
NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-226, "A/T Does Not Shift: $D_3 \rightarrow D_4$" .
- Continue “Road Test”.

Cruise Test — Part 3

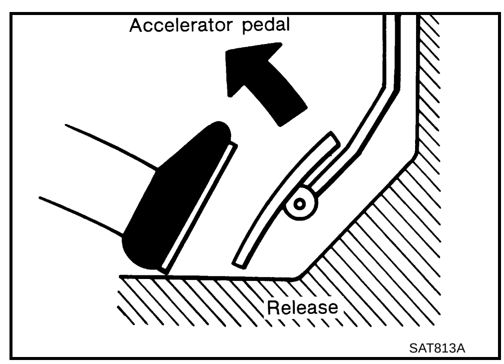
ACS007K2

1. CHECK SHIFT-DOWN (D_4 TO 3_3)

1. Confirm overdrive control switch is ON position.
2. Confirm gear selector lever is in “D” position.
3. Accelerate vehicle using half-throttle to D_4.

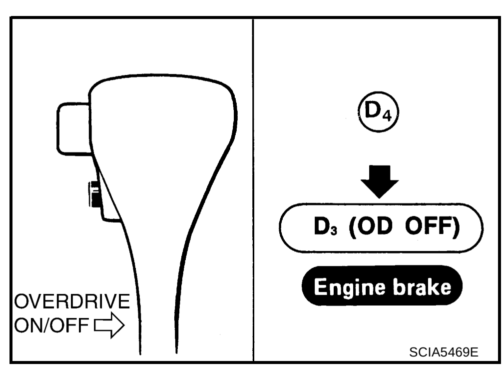


4. Release accelerator pedal.



5. Set overdrive control switch to OFF position while driving in D_4.

Read gear position and vehicle speed. Refer to AT-84, "DATA MONITOR MODE" .



Does A/T shift from D_4 to D_3 (O/D OFF)?

YES >> GO TO 2.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-234, "A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”" .
- Continue “Road Test”.

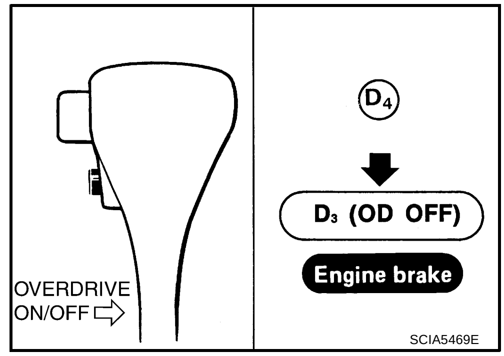
2. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 3.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-240, "Vehicle Does Not Decelerate by Engine Brake" .
- Continue “Road Test”.



SCIA5469E

3. CHECK SHIFT-DOWN (D_3 TO 2_2)

Move selector lever from “D” to “2” position while driving in D_3 (O/D OFF).

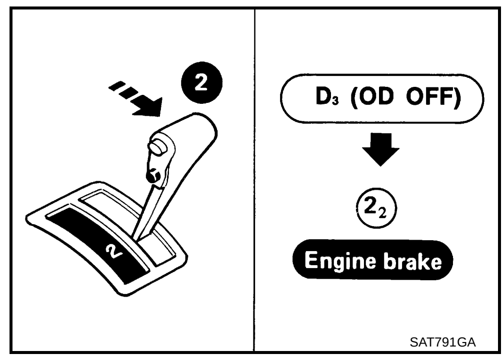
Read gear position. Refer to AT-84, "DATA MONITOR MODE"

.

Does A/T shift from D_3 (O/D OFF) to 2_2 ?

YES >> GO TO 4.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-235, "A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position" .
- Continue “Road Test”.



SAT791GA

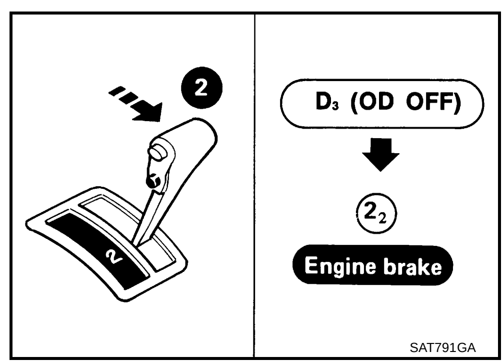
4. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?

YES >> GO TO 5.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-240, "Vehicle Does Not Decelerate by Engine Brake" .
- Continue “Road Test”.



SAT791GA

5. CHECK SHIFT-DOWN (2_2 TO 1_1)

Move selector lever from “2” to “1” position while driving in 2_2 .

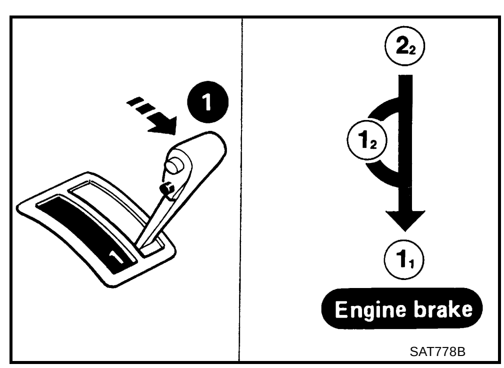
Read gear position. Refer to AT-84, "DATA MONITOR MODE"

.

Does A/T shift from 2_2 to 1_1 position?

YES >> GO TO 6.

NO >>
- Mark the box on the “DIAGNOSTIC WORKSHEET”. Refer to AT-47 .
- GO TO AT-237, "A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever “2” → “1” on Position" .
- Continue “Road Test”.

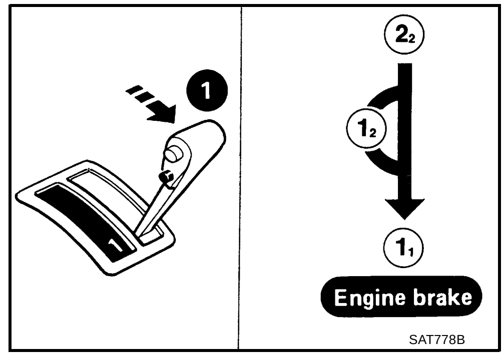


SAT778B

6. CHECK ENGINE BRAKE

Check engine brake.

Does vehicle decelerate by engine brake?



YES >> 1. Stop vehicle.
2. Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" , AT-91, "Diagnostic Procedure Without CONSULT-II" .

NO >>
- Mark the box on the "DIAGNOSTIC WORKSHEET". Refer to AT-47 .
- GO TO AT-240, "Vehicle Does Not Decelerate by Engine Brake" .
- Stop "Road Test".

Vehicle Speed When Shifting Gears

ACS007K3

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		D1 → D2	D2 → D3	D3 → D4	D4 → D3	D3 → D2	D2 → D1
Full throttle	Comfort	57 - 65 (35 - 40)	107 - 115 (66 - 71)	167 - 175 (104 - 109)	163 - 171 (101 - 106)	97 - 105 (60 - 65)	41 - 49 (25 - 30)
	Auto power	57 - 65 (35 - 40)	107 - 115 (66 - 71)	167 - 175 (104 - 109)	163 - 171 (101 - 106)	97 - 105 (60 - 65)	41 - 49 (25 - 30)
Half throttle	Comfort	36 - 44 (22 - 27)	71 - 79 (44 - 49)	131 - 139 (81 - 86)	77 - 85 (48 - 53)	38 - 46 (23 - 28)	5 - 13 (3 - 8)
	Auto power	42 - 50 (26 - 31)	79 - 87 (49 - 54)	131 - 139 (81 - 86)	77 - 85 (48 - 53)	45 - 53 (28 - 33)	5 - 13 (3 - 8)

Vehicle Speed When Performing and Releasing Lock-Up

ACS007K4

Throttle position	Overdrive control switch (Shift position)	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up "ON"	Lock-up "OFF"
1/8	ON [D4]	Comfort	61 - 69 (38 - 43)	51 - 59 (31 - 36)
		Power	61 - 69 (38 - 43)	51 - 59 (31 - 36)

Symptom Chart

ACS007K5

Numbers are arranged in order of inspection.
Perform inspections starting with number one and work up.

Items	Symptom	Condition	Diagnostic item	Reference page
No Lock-up Engagement/ TCC Inoperative	Torque converter is not locked up.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			3. Engine speed signal	AT-115
			4. A/T fluid temperature sensor	AT-104
			5. Line pressure test	AT-55
			6. Torque converter clutch solenoid valve	AT-142
			7. Control valve assembly	AT-260
		OFF vehicle	8. Torque converter	AT-280
	Torque converter clutch piston slip.	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Torque converter clutch solenoid valve	AT-142
			5. Line pressure solenoid valve	AT-155
			6. Control valve assembly	AT-260
		OFF vehicle	7. Torque converter	AT-280
	Lock-up point is extremely high or low.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			3. Torque converter clutch solenoid valve	AT-142
			4. Control valve assembly	AT-260
Shift Shock	Sharp shock in shifting from “N” to “D” position.	ON vehicle	1. Engine idle speed	EC-75
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. A/T fluid temperature sensor	AT-104
			5. Engine speed signal	AT-115
			6. Line pressure solenoid valve	AT-155
			7. Control valve assembly	AT-260
			8. Accumulator N-D	AT-260
		OFF vehicle	9. Forward clutch	AT-331

Items	Symptom	Condition	Diagnostic item	Reference page
Shift Shock	Too sharp a shock in change from D_1 to D_2.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Line pressure test	AT-55
			3. Accumulator servo release	AT-260
			4. Control valve assembly	AT-260
			5. A/T fluid temperature sensor	AT-104
		OFF vehicle	6. Brake band	AT-352
	Too sharp a shock in change from D_2 to D_3.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Line pressure test	AT-55
			3. Control valve assembly	AT-260
		OFF vehicle	4. High clutch	AT-325
			5. Brake band	AT-352
	Too sharp a shock in change from D_3 to D_4.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Line pressure test	AT-55
			3. Control valve assembly	AT-260
		OFF vehicle	4. Brake band	AT-352
			5. Overrun clutch	AT-331
			6. Forward one-way clutch	AT-342
	Gear change shock felt during deceleration by releasing accelerator pedal.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Line pressure test	AT-55
			3. Overrun clutch solenoid valve	AT-177
			4. Control valve assembly	AT-260
	Large shock changing from 1_2 to 1_1 in “1” position.	ON vehicle	1. Control valve assembly	AT-260
		OFF vehicle	2. Low & reverse brake	AT-338
Improper Shift Timing	Too high a gear change point from D_1 to D_2, from D_2 to D_3, from D_3 to D_4.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			3. Shift solenoid valve A	AT-162
			4. Shift solenoid valve B	AT-167
	Gear change directly from D_1 to D_3 occurs.	ON vehicle	1. Fluid level	AT-17
			2. Accumulator servo release	AT-260
		OFF vehicle	3. Brake band	AT-352
	Too high a change point from D_4 to D_3, from D_3 to D_2, from D_2 to D_1.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
	Kickdown does not operate when depressing pedal in D_4 within kickdown vehicle speed.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			3. Shift solenoid valve A	AT-162
			4. Shift solenoid valve B	AT-167

Items	Symptom	Condition	Diagnostic item	Reference page
Improper Shift Timing	Kickdown operates or engine overruns when depressing pedal in D_4 beyond kickdown vehicle speed limit.	ON vehicle	1. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Shift solenoid valve A	AT-162
			4. Shift solenoid valve B	AT-167
	Gear change from 2_2 to 2_3 in “2” position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-264
			2. Control cable adjustment	AT-252
	Gear change from 1_1 to 1_2 in “1” position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-264
			2. Control cable adjustment	AT-252
No Down Shift	Failure to change gear from D_4 to D_3 .	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Overrun clutch solenoid valve	AT-177
			4. Shift solenoid valve A	AT-162
			5. Line pressure solenoid valve	AT-155
			6. Control valve assembly	AT-260
		OFF vehicle	7. Brake band	AT-352
			8. Overrun clutch	AT-331
	Failure to change gear from D_3 to D_2 or from D_4 to D_2 .	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Shift solenoid valve A	AT-162
			4. Shift solenoid valve B	AT-167
			5. Control valve assembly	AT-260
		OFF vehicle	6. High clutch	AT-325
			7. Brake band	AT-352
	Failure to change gear from D_2 to D_1 or from D_3 to D_1 .	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Shift solenoid valve A	AT-162
			4. Shift solenoid valve B	AT-167
			5. Control valve assembly	AT-260
		OFF vehicle	6. Low one-way clutch	AT-280
			7. High clutch	AT-325
			8. Brake band	AT-352

Items	Symptom	Condition	Diagnostic item	Reference page
No Down Shift	Failure to change from D3 to 22 when changing lever into “2” position. AT-235	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Shift solenoid valve B	AT-167
			3. Control valve assembly	AT-260
			4. Control cable adjustment	AT-252
		OFF vehicle	5. Brake band	AT-352
	Does not change from 12 to 11 in “1” position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-264
			2. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			3. Shift solenoid valve A	AT-162
			4. Control valve assembly	AT-260
			5. Overrun clutch solenoid valve	AT-177
		OFF vehicle	6. Overrun clutch	AT-331
			7. Low & reverse brake	AT-338
No Up Shift	Failure to change gear from D1 to D2 .	ON vehicle	1. Control cable adjustment	AT-252
			2. Shift solenoid valve A	AT-162
			3. Control valve assembly	AT-260
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			5. Accelerator pedal position (APP) sensor	AT-172
		OFF vehicle	6. Brake band	AT-352
	Failure to change gear from D2 to D3 .	ON vehicle	1. Control cable adjustment	AT-252
			2. Shift solenoid valve B	AT-167
			3. Control valve assembly	AT-260
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			5. Accelerator pedal position (APP) sensor	AT-172
		OFF vehicle	6. High clutch	AT-325
			7. Brake band	AT-352

Items	Symptom	Condition	Diagnostic item	Reference page
No Up Shift	Failure to change gear from D3 to D4 .	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-264
			2. Overdrive control switch	AT-249
			3. Control cable adjustment	AT-252
			4. Shift solenoid valve A	AT-162
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			6. A/T fluid temperature sensor	AT-104
		OFF vehicle	7. Brake band	AT-352
	A/T does not shift to D4 when driving with overdrive control switch ON.	ON vehicle	1. Accelerator pedal position (APP) sensor	AT-172
			2. Park/neutral position (PNP) switch adjustment	AT-264
			3. Overdrive control switch	AT-249
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			5. Shift solenoid valve A	AT-162
			6. Overrun clutch solenoid valve	AT-177
			7. Control valve assembly	AT-260
			8. A/T fluid temperature sensor	AT-104
			9. Line pressure solenoid valve	AT-155
		OFF vehicle	10. Brake band	AT-352
			11. Overrun clutch	AT-331
Slips/Will Not Engage	Vehicle will not run in “R” position (but runs in “D”, “2” and “1” positions). Clutch slips. Very poor acceleration.	ON vehicle	1. Control cable adjustment	AT-252
			2. Stall test	AT-52
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Control valve assembly	AT-260
		OFF vehicle	6. Reverse clutch	AT-320
			7. High clutch	AT-325
			8. Forward clutch	AT-331
			9. Overrun clutch	AT-331
			10. Low & reverse brake	AT-338
	Vehicle will not run in “D” and “2” positions (but runs in “1” and “R” positions).	ON vehicle	1. Control cable adjustment	AT-252
		OFF vehicle	2. Low one-way clutch	AT-280

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Vehicle will not run in "D", "1", "2" positions (but runs in "R" position). Clutch slips. Very poor acceleration.	ON vehicle	1. Fluid level	AT-17
			2. Stall test	AT-52
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Control valve assembly	AT-260
			6. Accumulator N-D	AT-260
		OFF vehicle	7. Reverse clutch	AT-320
			8. High clutch	AT-325
			9. Forward clutch	AT-331
			10. Forward one-way clutch	AT-331
			11. Low one-way clutch	AT-280
	Clutches or brakes slip somewhat in starting.	ON vehicle	1. Fluid level	AT-17
			2. Control cable adjustment	AT-252
			3. Accelerator pedal position (APP) sensor	AT-172
			4. Line pressure test	AT-55
			5. Line pressure solenoid valve	AT-155
			6. Control valve assembly	AT-260
			7. Accumulator N-D	AT-260
		OFF vehicle	8. Forward clutch	AT-331
			9. Reverse clutch	AT-320
			10. Low & reverse brake	AT-338
			11. Oil pump	AT-299
			12. Torque converter	AT-280
	No creep at all. AT-212, AT-215	ON vehicle	1. Fluid level	AT-17
			2. Line pressure test	AT-55
			3. Control valve assembly	AT-260
		OFF vehicle	4. Forward clutch	AT-331
			5. Oil pump	AT-299
			6. Torque converter	AT-280
	Almost no shock or clutches slipping in change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Accumulator servo release	AT-260
			5. Control valve assembly	AT-260
		OFF vehicle	6. Brake band	AT-352

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Almost no shock or slipping in change from D_2 to D_3 .	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Control valve assembly	AT-260
		OFF vehicle	5. High clutch	AT-325
			6. Forward clutch	AT-331
	Almost no shock or slipping in change from D_3 to D_4 .	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Control valve assembly	AT-260
		OFF vehicle	5. Brake band	AT-352
	Races extremely fast or slips in changing from D_4 to D_3 when depressing pedal.	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Shift solenoid valve A	AT-162
			6. Control valve assembly	AT-260
		OFF vehicle	7. Brake band	AT-352
			8. Forward clutch	AT-331
	Races extremely fast or slips in changing from D_4 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Shift solenoid valve A	AT-162
			6. Shift solenoid valve B	AT-167
			7. Control valve assembly	AT-260
		OFF vehicle	8. Brake band	AT-352
			9. Forward clutch	AT-331
	Races extremely fast or slips in changing from D_3 to D_2 when depressing pedal.	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Shift solenoid valve B	AT-167
			6. Control valve assembly	AT-260
		OFF vehicle	7. Brake band	AT-352
			8. High clutch	AT-325

Items	Symptom	Condition	Diagnostic item	Reference page
Slips/Will Not Engage	Races extremely fast or slips in changing from D4 or D3 to D 1 when depressing pedal.	ON vehicle	1. Fluid level	AT-17
			2. Accelerator pedal position (APP) sensor	AT-172
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Shift solenoid valve A	AT-162
			6. Shift solenoid valve B	AT-167
			7. Control valve assembly	AT-260
		OFF vehicle	8. Forward clutch	AT-331
			9. Forward one-way clutch	AT-342
			10. Low one-way clutch	AT-280
	Vehicle will not run in any position.	ON vehicle	1. Fluid level	AT-17
			2. Control cable adjustment	AT-252
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
		OFF vehicle	5. Oil pump	AT-299
			6. High clutch	AT-325
			7. Brake band	AT-352
			8. Low & reverse brake	AT-338
			9. Torque converter	AT-280
			10. Parking components	AT-272
Others	Engine cannot be started in “P” and “N” positions. AT-207	ON vehicle	1. Ignition switch and starter	PG-2, SC-9
			2. Control cable adjustment	AT-252
			3. Park/neutral position (PNP) switch adjustment	AT-264
	Engine starts in positions other than “P” and “N”.	ON vehicle	1. Control cable adjustment	AT-252
			2. Park/neutral position (PNP) switch adjustment	AT-264
	Transaxle noise in “P“ and “N” positions.	ON vehicle	1. Fluid level	AT-17
			2. Line pressure test	AT-55
			3. Accelerator pedal position (APP) sensor	AT-172
			4. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
		OFF vehicle	5. Oil pump	AT-299
			6. Torque converter	AT-280
	Vehicle moves when changing into “P” position or parking gear does not disengage when shifted out of “P” position.	ON vehicle	1. Control cable adjustment	AT-252
		OFF vehicle	2. Parking components	AT-272

Items	Symptom	Condition	Diagnostic item	Reference page
Others	Vehicle runs in “N” position. AT-209	ON vehicle	1. Control cable adjustment	AT-252
		OFF vehicle	2. Forward clutch	AT-331
			3. Reverse clutch	AT-320
			4. Overrun clutch	AT-331
	Vehicle braked when shifting into “R” position.	ON vehicle	1. Fluid level	AT-17
			2. Control cable adjustment	AT-252
			3. Line pressure test	AT-55
			4. Line pressure solenoid valve	AT-155
			5. Control valve assembly	AT-260
		OFF vehicle	6. High clutch	AT-325
			7. Brake band	AT-352
			8. Forward clutch	AT-331
			9. Overrun clutch	AT-331
	Excessive creep.	ON vehicle	1. Engine idle speed	EC-75
	Engine stops when shifting lever into “R”, “D”, “2” and “1” positions.	ON vehicle	1. Engine idle speed	EC-75
			2. Fluid level	AT-17
			3. Torque converter clutch solenoid valve	AT-142
			4. Control valve assembly	AT-260
		OFF vehicle	5. Torque converter	AT-280
	Vehicle braked by gear change from D_1 to D_2.	ON vehicle	1. Fluid level	AT-17
		OFF vehicle	2. Reverse clutch	AT-320
			3. Low & reverse brake	AT-338
			4. High clutch	AT-325
			5. Low one-way clutch	AT-280
	Vehicle braked by gear change from D_2 to D_3.	ON vehicle	1. Fluid level	AT-17
		OFF vehicle	2. Brake band	AT-352
	Vehicle braked by gear change from D_3 to D_4.	ON vehicle	1. Fluid level	AT-17
		OFF vehicle	2. Overrun clutch	AT-331
			3. Forward one-way clutch	AT-342
			4. Reverse clutch	AT-320

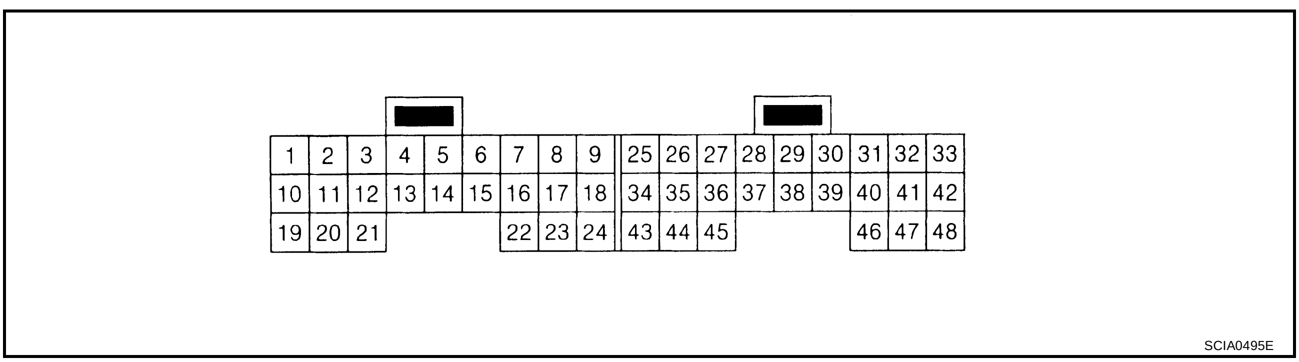
Items	Symptom	Condition	Diagnostic item	Reference page
Others	Maximum speed not attained. Acceleration poor.	ON vehicle	1. Fluid level	AT-17
			2. Park/neutral position (PNP) switch adjustment	AT-264
			3. Overdrive control switch	AT-249
			4. Accelerator pedal position (APP) sensor	AT-172
			5. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			6. Shift solenoid valve A	AT-162
			7. Shift solenoid valve B	AT-167
			8. Control valve assembly	AT-260
		OFF vehicle	9. Reverse clutch	AT-320
			10. High clutch	AT-325
			11. Brake band	AT-352
			12. Low & reverse brake	AT-338
			13. Oil pump	AT-299
			14. Torque converter	AT-280
	Transaxle noise in “D”, “2”, “1” and “R” positions.	ON vehicle	1. Fluid level	AT-17
		OFF vehicle	2. Torque converter	AT-280
	Engine brake does not operate in “1” position.	ON vehicle	1. Park/neutral position (PNP) switch adjustment	AT-264
			2. Control cable adjustment	AT-252
			3. Vehicle speed sensor·A/T (Revolution sensor) and vehicle speed sensor·MTR	AT-109, AT-182
			4. Control valve assembly	AT-260
			5. Overrun clutch solenoid valve	AT-177
		OFF vehicle	6. Overrun clutch	AT-331
			7. Low & reverse brake	AT-338
	Transaxle over-heats.	ON vehicle	1. Fluid level	AT-17
			2. Engine idle speed	EC-75
			3. Accelerator pedal position (APP) sensor	AT-172
			4. Line pressure test	AT-55
			5. Line pressure solenoid valve	AT-155
			6. Control valve assembly	AT-260
		OFF vehicle	7. Oil pump	AT-299
			8. Reverse clutch	AT-320
			9. High clutch	AT-325
			10. Brake band	AT-352
			11. Forward clutch	AT-331
			12. Overrun clutch	AT-331
			13. Low & reverse brake	AT-338
			14. Torque converter	AT-280

Items	Symptom	Condition	Diagnostic item	Reference page
Others	ATF shoots out during operation. White smoke emitted from exhaust pipe during operation.	ON vehicle	1. Fluid level	AT-17
		OFF vehicle	2. Reverse clutch	AT-320
			3. High clutch	AT-325
			4. Brake band	AT-352
			5. Forward clutch	AT-331
			6. Overrun clutch	AT-331
			7. Low & reverse brake	AT-338
	Unusual smell at fluid charging pipe.	ON vehicle	1. Fluid level	AT-17
		OFF vehicle	2. Torque converter	AT-280
			3. Oil pump	AT-299
			4. Reverse clutch	AT-320
			5. High clutch	AT-325
			6. Brake band	AT-352
			7. Forward clutch	AT-331
			8. Overrun clutch	AT-331
			9. Low & reverse brake	AT-338

TCM Terminals and Reference Value

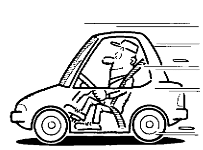
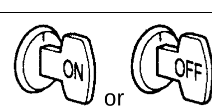
ACS007K6

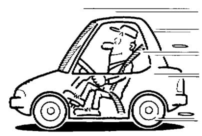
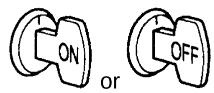
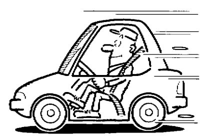
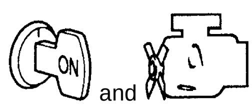
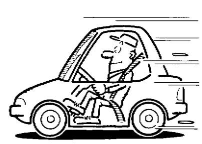
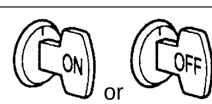
TCM CONNECTOR TERMINAL LAYOUT

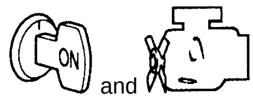
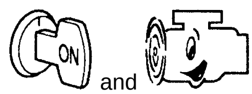
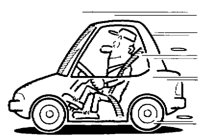
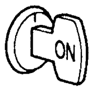


TCM INSPECTION TABLE

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	GY/R	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V
5	G/R	CAN H	—		—
6	GY/R	CAN L	—		—
10	BR/W	Power source		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V
19	BR/W	Power source	 or	Same as No. 10	
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V
25	B	Ground	Always		0V
26	BR/Y	PNP switch “1” position	 and	When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	L	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
28	L	Power source (Memory back-up)	Always		Battery voltage
29	W/R	Revolution sensor		When moving at 20 km/h (12 MPH)	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
30 *2	G/B	CONSULT- II (RX)	—		—
31 *2	W	CONSULT- II (TX)	—		—
32 *1	L	Sensor power	 or	When turning ignition switch ON.	4.5 - 5.5V
				When turning ignition switch OFF.	0V

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
34	W/G	PNP switch "D" position		When setting selector lever to "D" position.	Battery voltage
				When setting selector lever to other positions.	0V
35	Y/G	PNP switch "R" position		When setting selector lever to "R" position.	Battery voltage
				When setting selector lever to other positions.	0V
36	G	PNP switch "N" or "P" position		When setting selector lever to "N" or "P" position.	Battery voltage
				When setting selector lever to other positions.	0V
39 *1	L/OR	Engine speed signal		Refer to EC-115, "ECM INSPECTION TABLE" .	
40	L/W	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0V and more than 4.5V
41 *1	G/Y	Accelerator pedal position (APP) sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V Fully-open throttle: 4.4V
42 *1	B	Sensor ground	Always		0V
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V
48	B	Ground	Always		0V

*1: These terminals are connected to ECM.

*2: These terminals are connected to data link connector.

CONSULT-II Function (A/T)

ACS007K7

CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

FUNCTION

Diagnostic test mode	Function	Reference page
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	—
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	AT-82
Data monitor	Input/Output data in the ECM can be read.	AT-84
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.	AT-87
Function test	Performed by CONSULT-II instead of a technician to determine whether each system is “OK” or “NG”.	—
DTC work support	Select the operating condition to confirm Diagnosis Trouble Codes.	AT-87
ECM (ECU,TCM) part number	ECM (ECU,TCM) part number can be read.	—

CONSULT-II REFERENCE VALUE

NOTICE:

1. The CONSULT-II electrically displays shift timing and lock-up timing (that is, operation timing of each solenoid).
   Check for time difference between actual shift timing and the CONSULT-II display. If the difference is noticeable, mechanical parts (except solenoids, sensors, etc.) may be malfunctioning. Check mechanical parts using applicable diagnostic procedures.
2. Shift schedule (which implies gear position) displayed on CONSULT-II and that indicated in Service Manual may differ slightly. This occurs because of the following reasons:
- Actual shift schedule has more or less tolerance or allowance,
- Shift schedule indicated in Service Manual refers to the point where shifts start, and
- Gear position displayed on CONSULT-II indicates the point where shifts are completed.
3. Shift solenoid valve “A” or “B” is displayed on CONSULT-II at the start of shifting. Gear position is displayed upon completion of shifting (which is computed by TCM).

Item name	Condition	Display value (Approx.)
VHCL/S SE·A/T	During driving	Approximately matches the speedometer reading.
VHCL/S SE·MTR		
THRTL POS SEN	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V
		Fully-open throttle: 4.4V
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V
BATTERY VOLT	When turning ignition switch to “ON”.	Battery voltage
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.
OVERDRIVE SW	When O/D OFF indicator lamp is off.	ON
	When O/D OFF indicator lamp is on.	OFF
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF

Item name	Condition	Display value (Approx.)
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF
CLOSED THL/SW	Released accelerator pedal.	ON
	Fully depressed accelerator pedal.	OFF
W/O THRL/P-SW	Fully depressed accelerator pedal.	ON
	Released accelerator pedal.	OFF
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	OFF
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	OFF
OVERRUN/C S/V	When overrun clutch solenoid valve operates.	ON
	When overrun clutch solenoid valve does not operate.	OFF
BRAKE SW	Depressed brake pedal.	ON
	Released brake pedal.	OFF
GEAR	During driving	1, 2, 3, 4
SLCT LVR POSI	When setting selector lever to “N” or “P” position.	N · P
	When setting selector lever to “R” position.	R
	When setting selector lever to “D” position.	D
	When setting selector lever to “2” position.	2
	When setting selector lever to “1” position.	1
VEHICLE SPEED	During driving	Approximately matches the speedometer reading.
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 92%
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

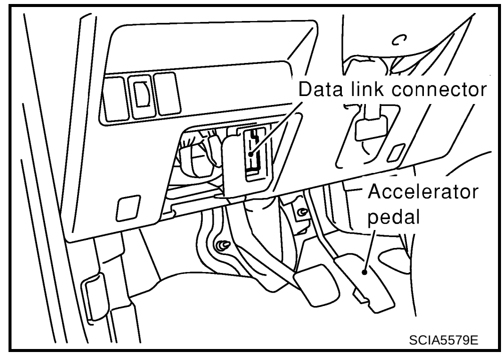
CONSULT-II SETTING PROCEDURE

CAUTION:

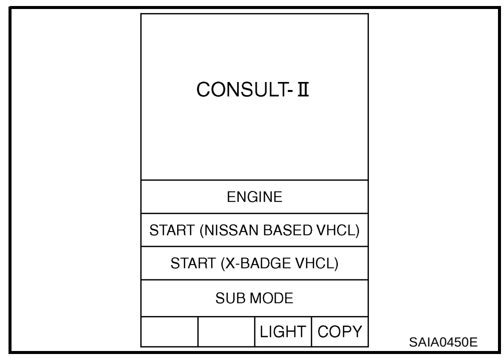
If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.

- For details, refer to the separate “CONSULT-II Operations Manual”.

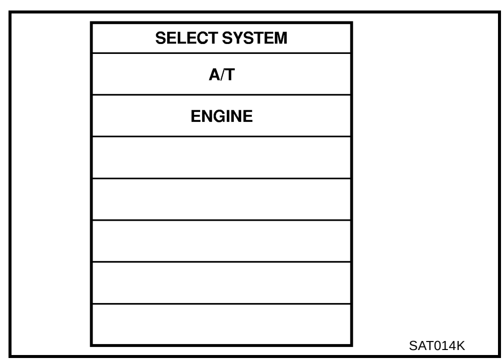
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located in instrument driver lower panel.



3. Turn ignition switch ON. (Do not start engine.)
4. Touch “START (NISSAN BASED VHCL)”.



5. Touch “A/T”.
   If “A/T” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .
6. Perform each diagnostic test mode according to each service procedure.

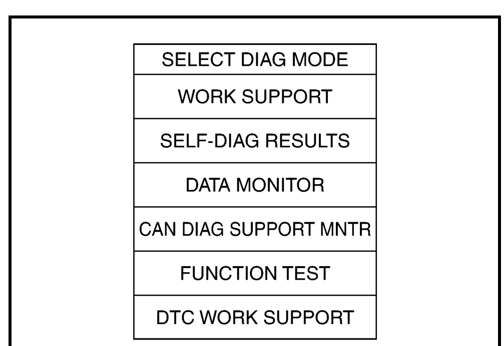


SELF-DIAGNOSTIC RESULT MODE

After performing AT-91, "Diagnostic Procedure Without CONSULT-II" , place check marks for results on the AT-47, "DIAGNOSTIC WORKSHEET" . Reference pages are provided following the items.

Operation Procedure

1. Perform AT-82, "CONSULT-II SETTING PROCEDURE" .
2. Touch “SELF-DIAG RESULTS”.
   Display shows malfunction experienced since the last erasing operation.

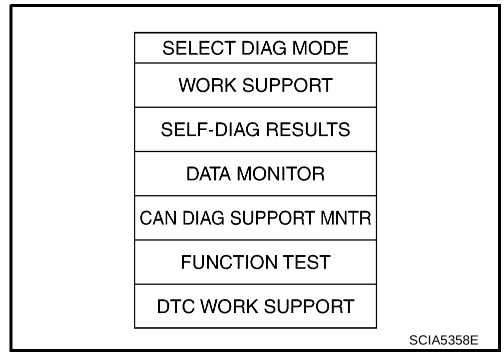


Display Items List

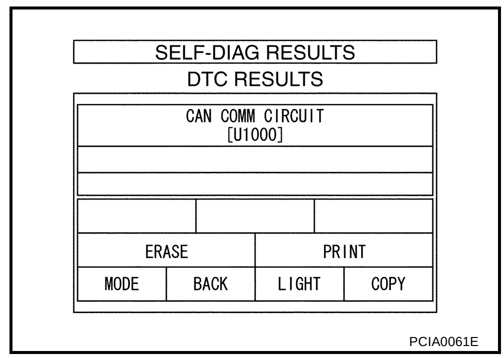
Items (CONSULT-II screen terms)	Malfunction is detected when...	Reference page
CAN COMM CIRCUIT	● Malfunction is detected in CAN communication line.	AT-95
VHCL SPEED SEN·A/T	● TCM does not receive the proper voltage signal from the sensor.	AT-109
VHCL SPEED SEN·MTR		AT-182
THROTTLE POSI SEN	● TCM receives an excessively low or high voltage from this sensor	AT-172
SHIFT SOLENOID/V A	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	AT-162
SHIFT SOLENOID/V B	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	AT-167
OVERRUN CLUTCH S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	AT-177
T/C CLUTCH SOL/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	AT-142
ATF TEMP SEN/CIRC	● TCM receives an excessively low or high voltage from the sensor.	AT-104
BATT/FLUID TEMP SEN		AT-187
ENGINE SPEED SIG	● TCM does not receive the proper voltage signal from the ECM.	AT-115
A/T 1ST GR FNCTN	● A/T cannot be shifted to the 1st gear position even if electrical circuit is good.	AT-120
A/T 2ND GR FNCTN	● A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.	AT-125
A/T 3RD GR FNCTN	● A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.	AT-130
A/T 4TH GR FNCTN	● A/T cannot be shifted to the 4th gear position even if electrical circuit is good.	AT-135
A/T TCC S/V FNCTN	● A/T cannot perform lock-up even if electrical circuit is good.	AT-147
LINE PRESSURE S/V	● TCM detects an improper voltage drop when it tries to operate the solenoid valve.	AT-155
CONTROL UNIT (RAM)	● TCM memory (RAM) is malfunctioning	AT-198
CONTROL UNIT (ROM)	● TCM memory (ROM) is malfunctioning	AT-198
CONT UNIT(EEP ROM)	● TCM memory (EEP ROM) is malfunctioning.	AT-200
PNP SW/CIRC	● TCM does not receive the correct voltage signal (based on the gear position) from the switch.	AT-98
INITIAL START	● This is not a malfunction message (Whenever shutting off a power supply to the TCM, this message appears on the screen). Refer to AT-194, "MAIN POWER SUPPLY AND GROUND CIRCUIT" .	AT-194
No failure (NO SELF DIAGNOSTIC FAILURE INDICATED FURTHER TESTING MAY BE REQUIRED)	● No failure has been detected.	—

How to Erase Self-Diagnostic Results

1. Perform AT-82, "CONSULT-II SETTING PROCEDURE" .
2. Touch “SELF-DIAG RESULTS”.



3. Touch ”ERASE”. (The self-diagnostic results will be erased.)



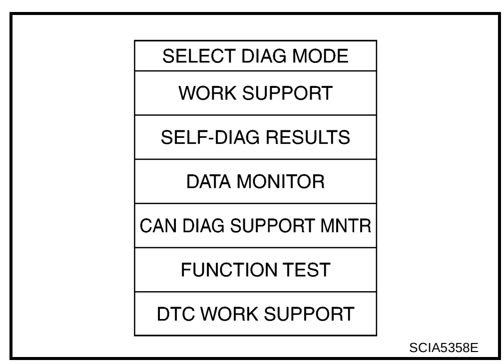
DATA MONITOR MODE

Operation Procedure

1. Perform AT-82, "CONSULT-II SETTING PROCEDURE" .
2. Touch “DATA MONITOR”.

   NOTE:

   When malfunction is detected, CONSULT-II performs “REAL-TIME DIAGNOSIS”. Also, any malfunction detected while in this mode will be displayed at real time.



Display Items List

X: Standard, —: Not applicable, ▼: Option

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
VHCL/S SE·A/T (km/h)	X	—	▼	Revolution sensor
VHCL/S SE·MTR (km/h)	X	—	▼	Vehicle speed display may not be accurate under approx. 10 km/h (6 mph). It may not indicate 0 km/h (0 mph) when vehicle is stationary.
THRTL POS SEN (V)	X	—	▼	
FLUID TEMP SE (V)	X	—	▼	
BATTERY VOLT (V)	X	—	▼	
ENGINE SPEED (rpm)	X	X	▼	

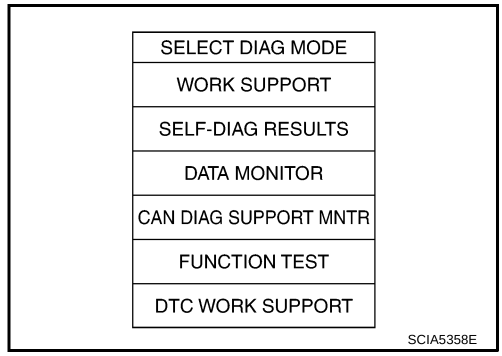
Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
TURBINE REV (rpm)	X	—	▼	
OVERDRIVE SW (ON/OFF)	X	—	▼	
PN POSI SW (ON/OFF)	X	—	▼	
R POSITION SW (ON/OFF)	X	—	▼	
D POSITION SW (ON/OFF)	X	—	▼	
2 POSITION SW (ON/OFF)	X	—	▼	
1 POSITION SW (ON/OFF)	X	—	▼	
ASCD·CRUISE (ON/OFF)	X	—	▼	Signal input with CAN communication.
ACC OD CUT (ON/OFF)	X	—	▼	
KICKDOWN SW (ON/OFF)	X	—	▼	Not mounted but displayed.
POWERSHIFT SW (ON/OFF)	X	—	▼	
CLOSED THL/SW (ON/OFF)	X	—	▼	Signal input with CAN communication.
W/O THRL/P-SW (ON/OFF)	X	—	▼	
*SHIFT S/V A (ON/OFF)	—	—	▼	Displays status of check signal (reinput signal) for TCM control signal output. Remains unchanged when solenoid valves are open or shorted.
*SHIFT S/V B (ON/OFF)	—	—	▼	
*OVERRUN/C S/V (ON/OFF)	—	—	▼	
HOLD SW (ON/OFF)	X	—	▼	Not mounted but displayed.
BRAKE SW (ON/OFF)	X	—	▼	Stop lamp switch
GEAR	—	X	▼	Gear position recognized by the TCM updated after gear-shifting
SLCT LVR POSI	—	X	▼	Selector lever position is recognized by the TCM. For fail-safe operation, the specific value used for control is displayed.
VEHICLE SPEED (km/h)	—	X	▼	Vehicle speed recognized by the TCM.
THROTTLE POSI (0.0/8)	—	X	▼	Degree of opening for accelerator recognized by the TCM For fail-safe operation, the specific value used for control is displayed.
LINE PRES DTY (%)	—	X	▼	
TCC S/V DUTY (%)	—	X	▼	
SHIFT S/V A (ON/OFF)	—	X	▼	
SHIFT S/V B (ON/OFF)	—	X	▼	
OVERRUN/C S/V (ON/OFF)	—	X	▼	
SELF-D DP LMP (ON/OFF)	—	X	▼	
TC SLIP RATIO (0.000)	—	—	▼	
TC SLIP SPEED (rpm)	—	—	▼	Difference between engine speed and torque converter input shaft speed
Voltage (V)	—	—	▼	Displays the value measured by the voltage probe.

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	TCM INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
Frequency (Hz)	—	—	▼	The value measured by the pulse probe is displayed.
DUTY·HI (high) (%)	—	—	▼	
DUTY·LOW (low) (%)	—	—	▼	
PLS WIDTH·HI (ms)	—	—	▼	
PLS WIDTH·LOW (ms)	—	—	▼	

CAN DIAGNOSTIC SUPPORT MONITOR MODE

Operation Procedure

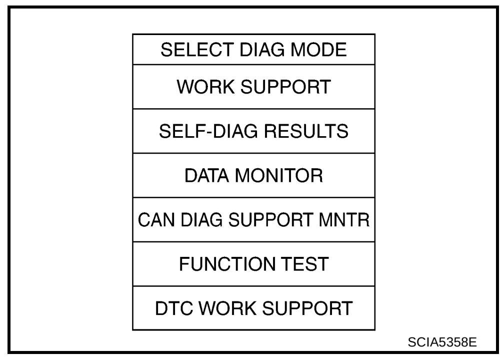
1. Perform AT-82, "CONSULT-II SETTING PROCEDURE" .
2. Touch “CAN DIAG SUPPORT MNTR”. Refer to LAN-13, "CAN Diagnostic Support Monitor" .



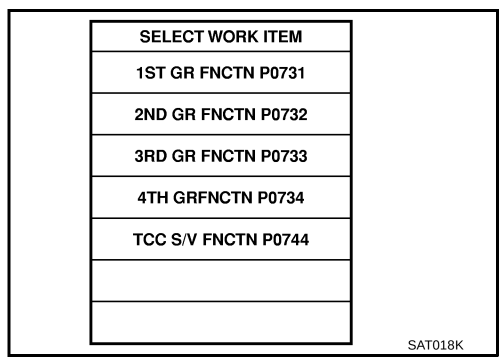
DTC WORK SUPPORT MODE

Operation Procedure

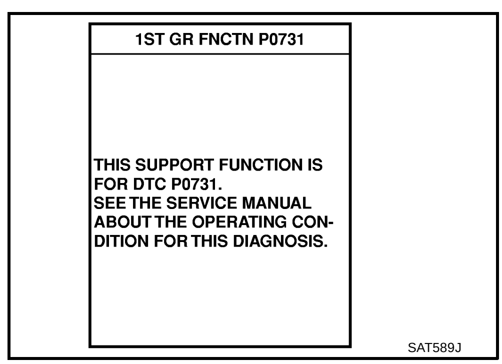
1. Perform AT-82, "CONSULT-II SETTING PROCEDURE" .
2. Touch “DTC WORK SUPPORT”.



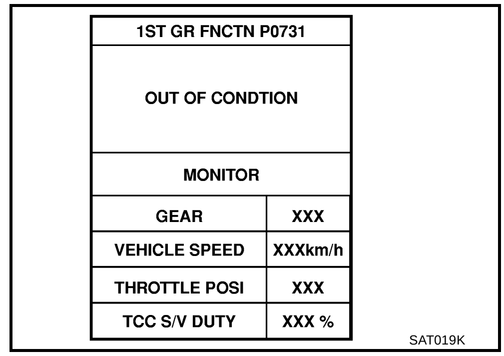
3. Touch select item menu (1ST, 2ND, etc.).



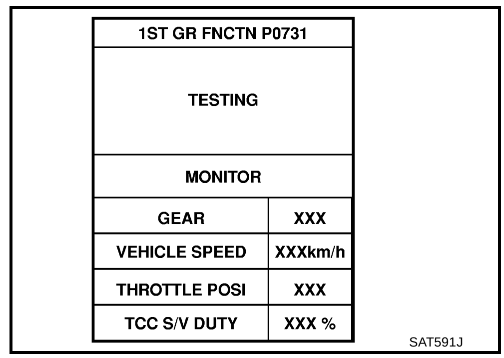
4. Touch “START”.



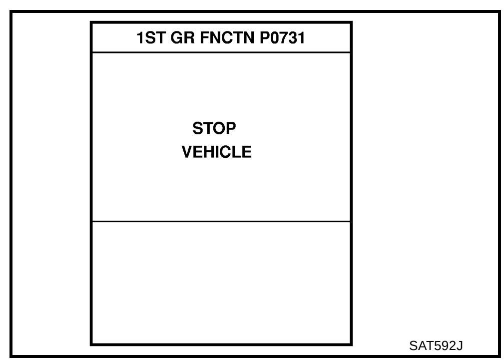
5. Perform driving test according to “DTC Confirmation Procedure” in “TROUBLE DIAGNOSIS FOR DTC”.

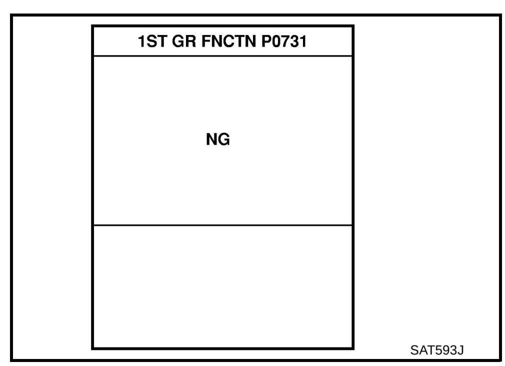


- **When testing conditions are satisfied, CONSULT-II screen changes from “OUT OF CONDITION” to “TESTING”.**

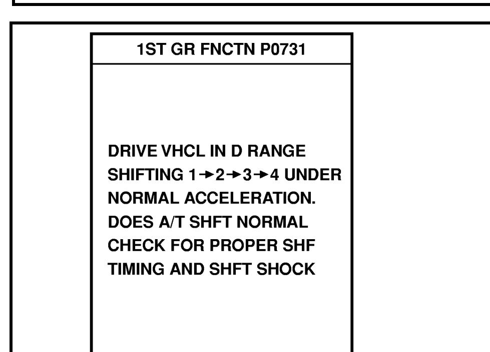


6. Stop vehicle. If “NG” appears on the screen, malfunction may exist. Go to “Diagnostic Procedure”.

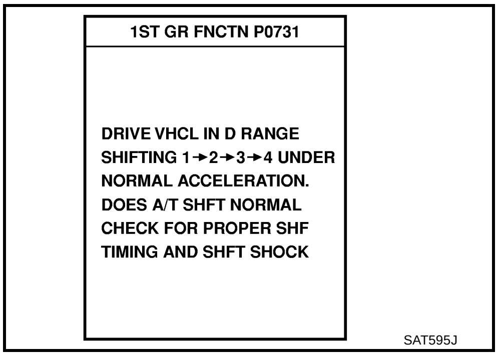




7. Perform test drive to check gear shift feeling in accordance with instructions displayed.



8. Touch “YES” or “NO”.



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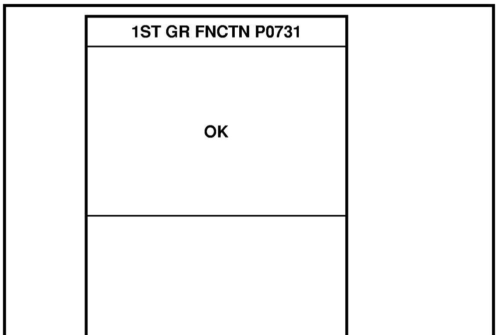
9. CONSULT-II procedure ended.
   If “NG” appears on the scene, a malfunction may exist. Go to “Diagnostic Procedure”.



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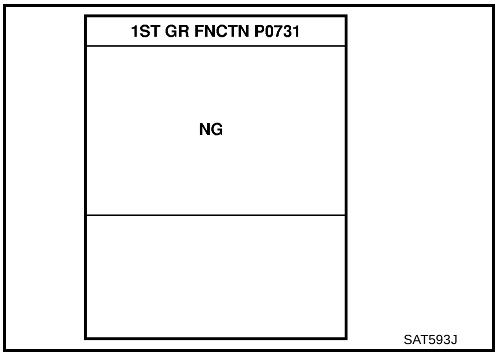

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Display Items List

DTC work support item	Description	Check item
1ST GR FNCTN P0731	Following items for “A/T 1st gear function (P0731)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
2ND GR FNCTN P0732	Following items for “A/T 2nd gear function (P0732)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG)	● Shift solenoid valve B ● Each clutch ● Hydraulic control circuit
3RD GR FNCTN P0733	Following items for “A/T 3rd gear function (P0733)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG)	● Shift solenoid valve A ● Each clutch ● Hydraulic control circuit
4TH GR FNCTN P0734	Following items for “A/T 4th gear function (P0734)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG)	● Shift solenoid valve A ● Shift solenoid valve B ● Overrun clutch solenoid valve ● Line pressure solenoid valve ● Each clutch ● Hydraulic control circuit
TCC S/V FNCTN P0744	Following items for “A/T TCC S/V function (lock-up) (P0744)” can be confirmed. ● Self-diagnosis status (whether the diagnosis is being performed or not) ● Self-diagnostic results (OK or NG)	● Torque converter clutch solenoid valve ● Each clutch ● Hydraulic control circuit

Diagnostic Procedure Without CONSULT-II

ACS007K8

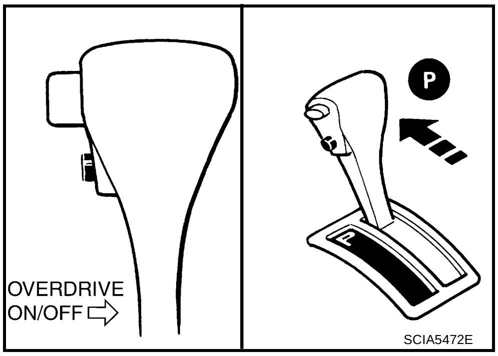
TCM SELF-DIAGNOSTIC PROCEDURE

- If a malfunction occurs in electrical system, turning ignition switch to ON will illuminate O/D OFF indicator lamp for 2 seconds. To detect a malfunction, entering a self-diagnosis start signal retrieves information on malfunctions from memory and indicates malfunction by blinking O/D OFF indicator lamp.

Diagnostic Procedure

1. CHECK O/D OFF INDICATOR LAMP

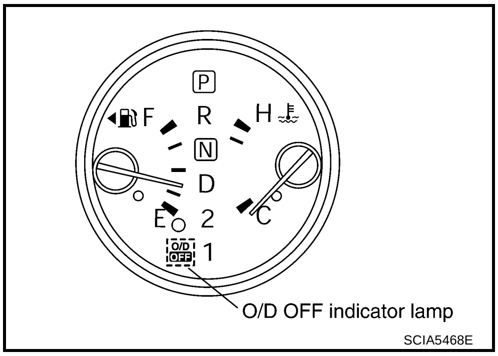
1. Park vehicle on flat surface.
2. Move selector lever to “P” position.
3. Turn ignition switch OFF. Wait at least 5 seconds.



4. Turn ignition switch ON. (Do not start engine.)

Does O/D OFF indicator lamp come on about 2 seconds?

YES >> GO TO 2.
NO >> Stop procedure. Perform AT-205, "O/D OFF Indicator Lamp Does Not Come On" before proceeding.



2. JUDGEMENT PROCEDURE STEP 1

1. Turn ignition switch OFF.
2. Keep pressing shift lock release button.
3. Move selector lever from “P” to “D” position.
4. Turn ignition switch ON. (Do not start engine.)
5. Keep pressing overdrive control switch while O/D OFF indicator lamp is lighting up for 2 seconds. (O/D OFF indicator lamp is on.)
6. Keep pressing overdrive control switch and shift selector lever to the position “2”. (O/D OFF indicator lamp is on.)
7. Stop pressing overdrive control switch. (O/D OFF indicator lamp is on.)
8. Shift selector lever to the position “1”. (O/D OFF indicator lamp is on.)
9. Keep pressing overdrive control switch. (O/D OFF indicator lamp is off.)
10. Depress accelerator pedal fully while pressing overdrive control switch.

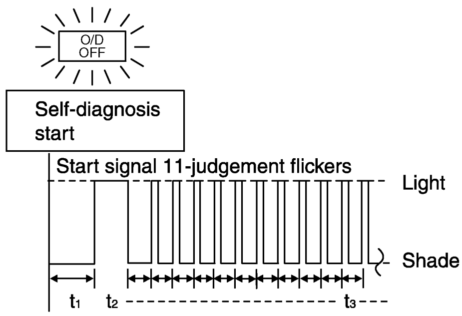
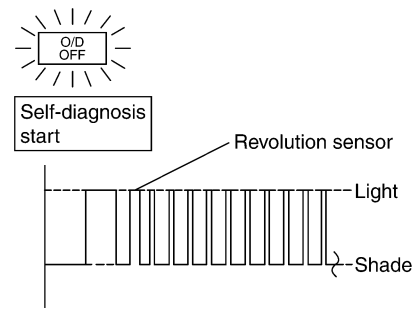
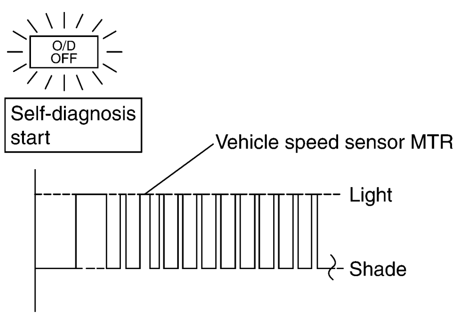
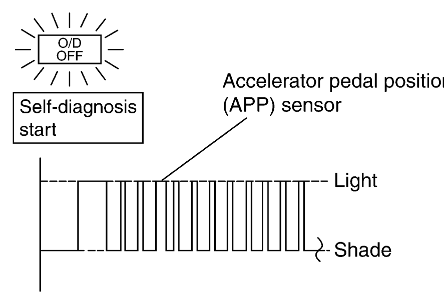
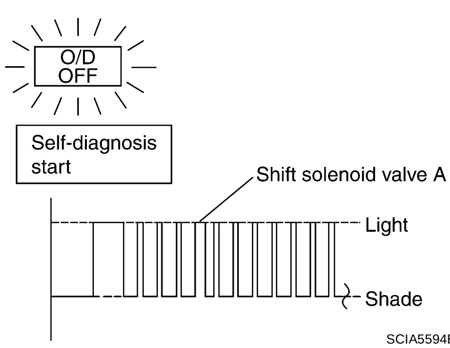
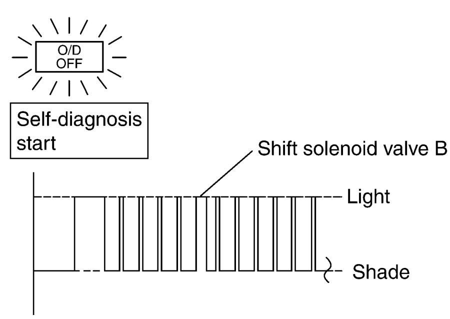
>> GO TO 3.

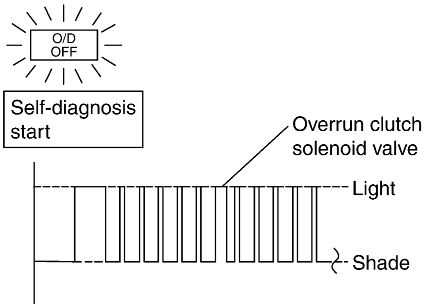
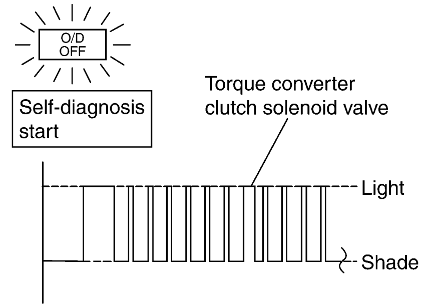
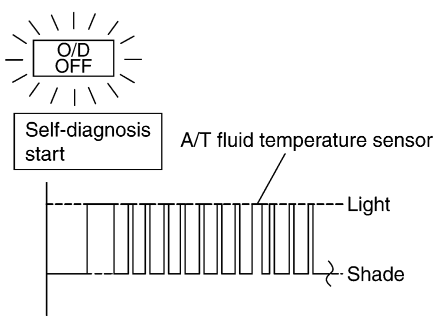
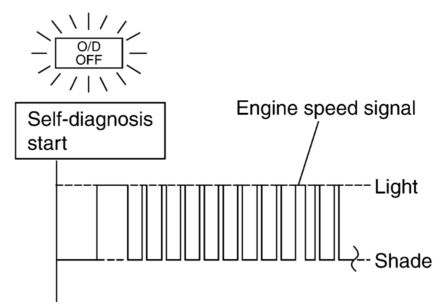
3. CHECK SELF-DIAGNOSIS CODE

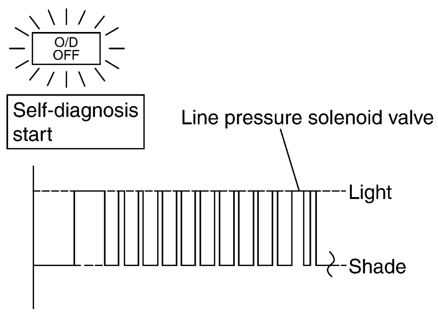
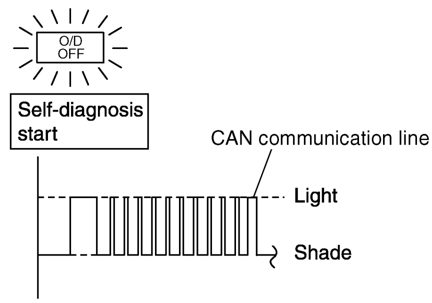
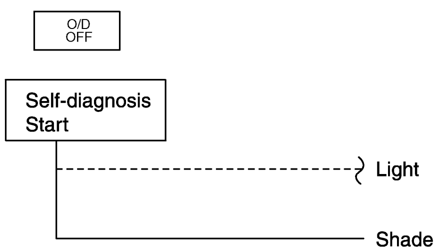
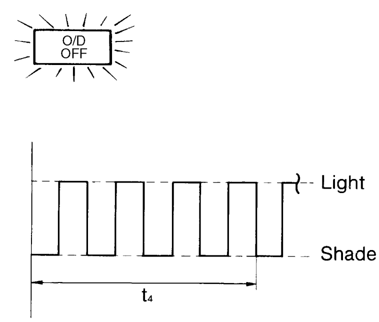
Check O/D OFF indicator lamp. Refer to AT-92, "JUDGEMENT OF SELF-DIAGNOSIS CODE" .

>> **DIAGNOSIS END**

JUDGEMENT OF SELF-DIAGNOSIS CODE

O/D OFF indicator lamp	
All judgement flickers are the same.  SCIA4672E All circuits that can be confirmed by self-diagnosis are OK.	1st judgement flicker is longer than others.  SCIA5591E Revolution sensor circuit is short-circuited or disconnected. ⇒ **Go to DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR).** Refer to AT-109
2nd judgement flicker is longer than others.  SCIA5592E Vehicle speed sensor circuit is short-circuited or disconnected. ⇒ **Go to DTC VEHICLE SPEED SENSOR·MTR.** Refer to AT-182	3rd judgement flicker is longer than others.  SCIA5593E Accelerator pedal position (APP) sensor circuit is short-circuited or disconnected. ⇒ **Go to DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR.** Refer to AT-172
4th judgement flicker is longer than others.  SCIA5594E Shift solenoid valve A circuit is short-circuited or disconnected. ⇒ **Go to DTC P0750 SHIFT SOLENOID VALVE A.** Refer to AT-162	5th judgement flicker is longer than others.  SCIA5595E Shift solenoid valve B circuit is short-circuited or disconnected. ⇒ **Go to DTC P0755 SHIFT SOLENOID VALVE B.** Refer to AT-167

O/D OFF indicator lamp	
6th judgement flicker is longer than others.  SCIA5596E Overrun clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P1760 OVERRUN CLUTCH SOLENOID VALVE.** Refer to AT-177	7th judgement flicker is longer than others.  SCIA5597E Torque converter clutch solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE.** Refer to AT-142
8th judgement flicker is longer than others.  SCIA5598E A/T fluid temperature sensor is disconnected or TCM power supply circuit is damaged. ⇒ **Go to DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE).** Refer to AT-187	9th judgement flicker is longer than others.  SCIA5599E Engine speed signal circuit is short-circuited or disconnected. ⇒ **Go to DTC P0725 ENGINE SPEED SIGNAL.** Refer to AT-115

O/D OFF indicator lamp	
10th judgement flicker is longer than others.  SCIA5600E Line pressure solenoid valve circuit is short-circuited or disconnected. ⇒ **Go to DTC P0745 LINE PRESSURE SOLENOID VALVE.** Refer to AT-155	11th judgement flicker is longer than others.  SCIA4673E CAN communication line is damaged. ⇒**Go to DTC U1000 CAN COMMUNICATION LINE.** Refer to AT-95
Lamp comes off.  SCIA4674E PNP switch, overdrive control switch, closed throttle position signal or wide open throttle position signal circuit is disconnected or TCM is damaged. (Because closed throttle position signal and wide open throttle position signal are input via CAN communication line malfunction may continue after self-diagnosis.) ⇒ **Go to TCM Self-diagnosis Does Not Activate** Refer to AT-244	Flickers as shown below.  SCIA4675E Battery power is low. Battery has been disconnected for a long time. Battery is connected conversely. (When reconnecting TCM connectors.—This is not a malfunction). ⇒**Go to MAIN POWER SUPPLY AND GROUND CIRCUIT.** Refer to AT-194

t_1 = 2.5 seconds t_2 = 2.0 seconds t_3 = 1.0 second t_4 = 1.0 second

HOW TO ERASE SELF-DIAGNOSTIC RESULTS

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait for at least 5 seconds and then turn it ON again.
2. Perform AT-91, "Diagnostic Procedure Without CONSULT-II" .
3. Turn ignition switch OFF. (The self-diagnostic results will be erased.)

DTC U1000 CAN COMMUNICATION LINE

PFP:31940

Description

ACS007QZ

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

ACS007R0

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “CAN COMM CIRCUIT” with CONSULT-II or 11th judgement flicker without CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

Possible Cause

ACS007R1

Harness or connectors
(CAN communication line is open or shorted.)

DTC Confirmation Procedure

ACS007R2

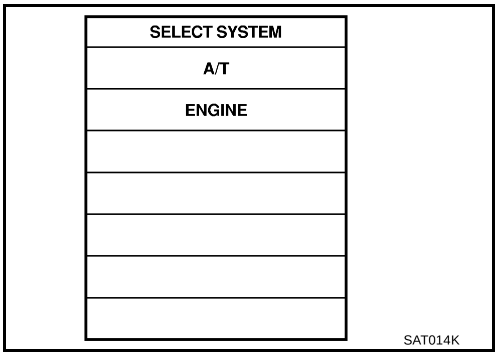
CAUTION:

If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Wait at least 6 seconds or start engine and wait for at least 6 seconds.
4. If DTC is detected, go to AT-97, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II”

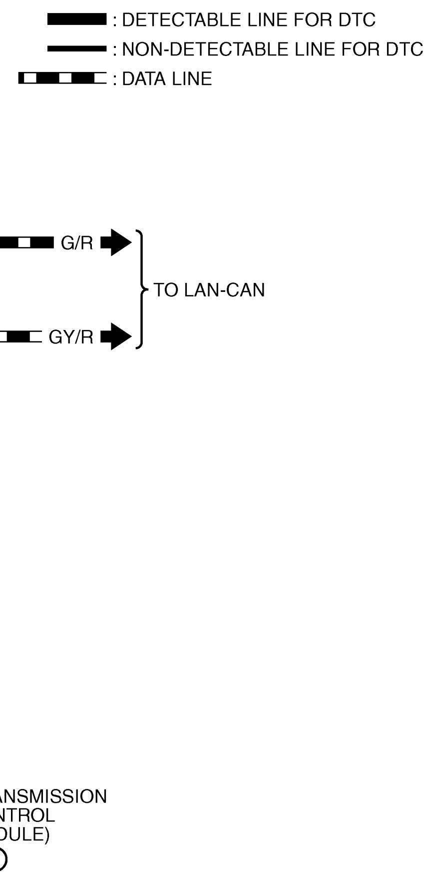
WITHOUT CONSULT-II

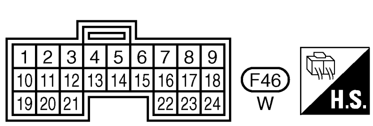
1. Turn ignition switch ON. (Do not start engine.)
2. Wait at least 6 seconds or start engine and wait at least 6 seconds.
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If DTC is detected, go to AT-97, "Diagnostic Procedure" .

Wiring Diagram — AT — CAN

ACS007R3

AT-CAN-01





TCWA0234E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition	Judgement standard (Approx.)
5	G/R	CAN H	—	—
6	GY/R	CAN L	—	—

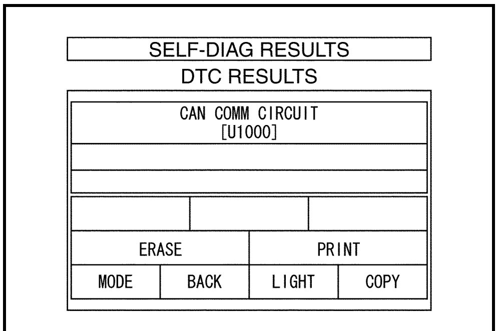
Diagnostic Procedure

ACS007R4

1. CHECK CAN COMMUNICATION CIRCUIT

With CONSULT-II

1. Turn ignition switch ON and start engine.
2. Select “SELF-DIAG RESULTS” mode for “A/T” with CONSULT-II.



PCIA0061E

Is any malfunction of the “CAN COMM CIRCUIT” indicated?

YES >> Print out CONSULT-II screen, GO TO LAN section. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .

NO >> **INSPECTION END**

A
B
AT
D
E
F
G
H
I
J
K
L
M

DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH

PFP:32006

Description

ACS007R5

- The PNP switch assembly includes a transaxle range switch.
- The transaxle range switch detects the selector lever position and sends a signal to the TCM.

CONSULT-II Reference Value

ACS007Z0

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

On Board Diagnosis Logic

ACS007R6

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “PNP SW/CIRC” with CONSULT-II is detected when TCM does not receive the correct voltage signal from the switch based on the gear position.

Possible Cause

ACS007R7

- Harness or connectors
  [The park/neutral position (PNP) switch circuit is open or shorted.]
- Park/neutral position (PNP) switch

DTC Confirmation Procedure

ACS007R8

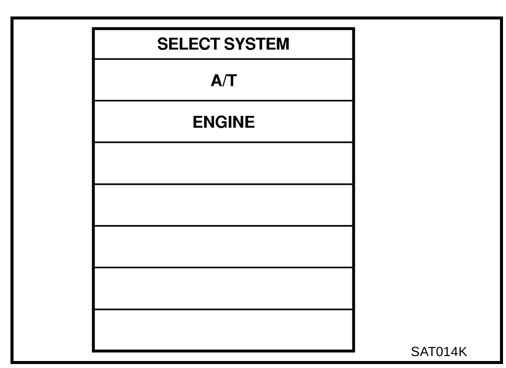
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.3V
   SLCT LVR POSI: “D” position (OD ON or OFF)
4. If the check result is NG, go to AT-101, "Diagnostic Procedure" .

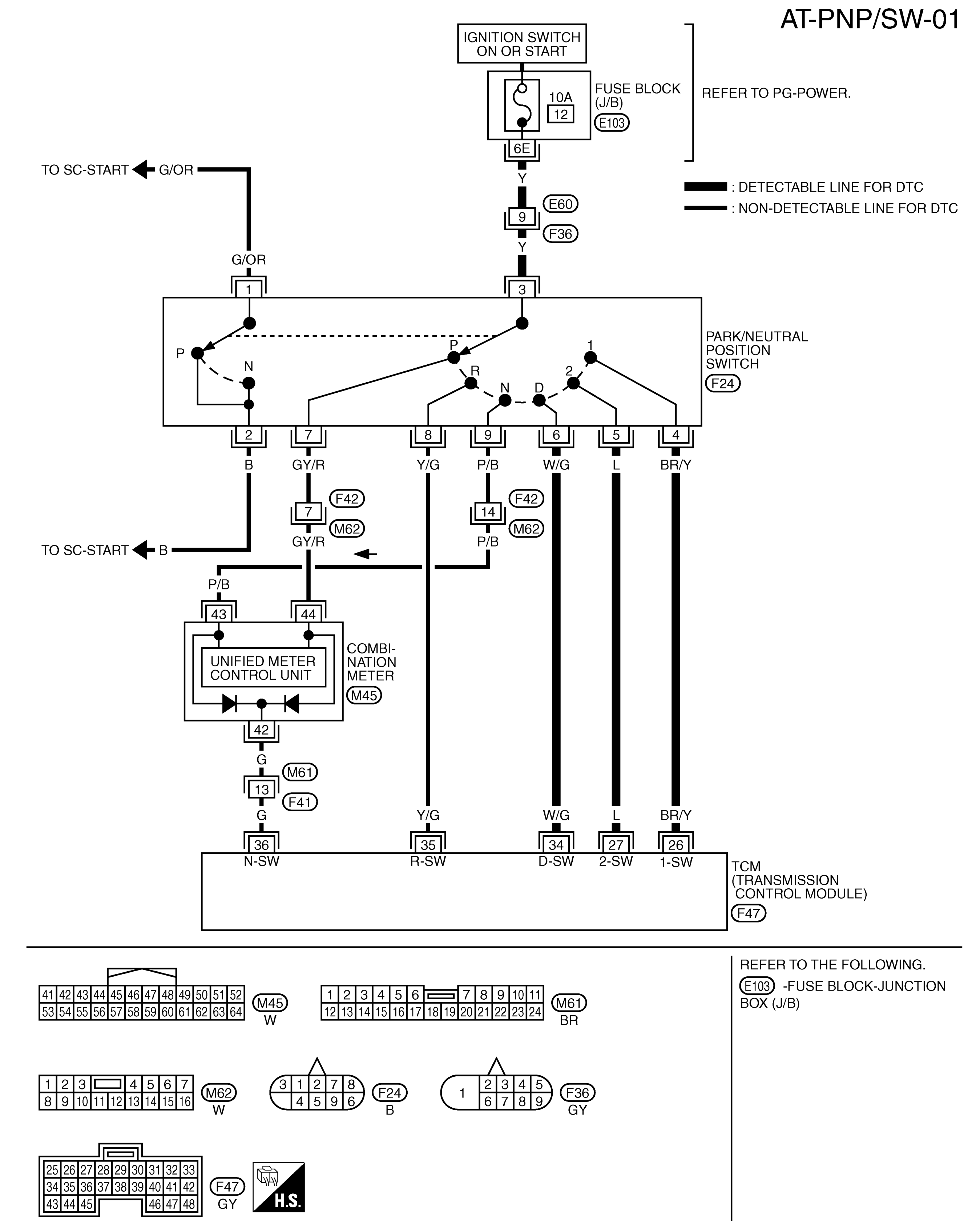


WITH GST

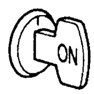
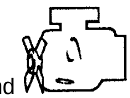
Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — PNP/SW

ACS007WU



Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
26	BR/Y	PNP switch “1” position	 and 	When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	L	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
34	W/G	PNP switch “D” position		When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	Y/G	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
36	G	PNP switch “N” or “P” position		When setting selector lever to “N” or “P” position.	Battery voltage
				When setting selector lever to other positions.	0V

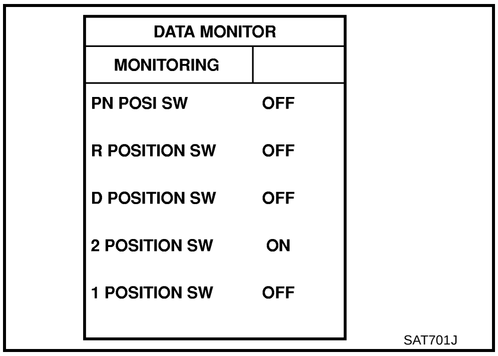
Diagnostic Procedure

ACS007Z1

1. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P”, “R”, “N”, “D”, “2” and “1” position switches moving selector lever to each position.



SAT701J

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

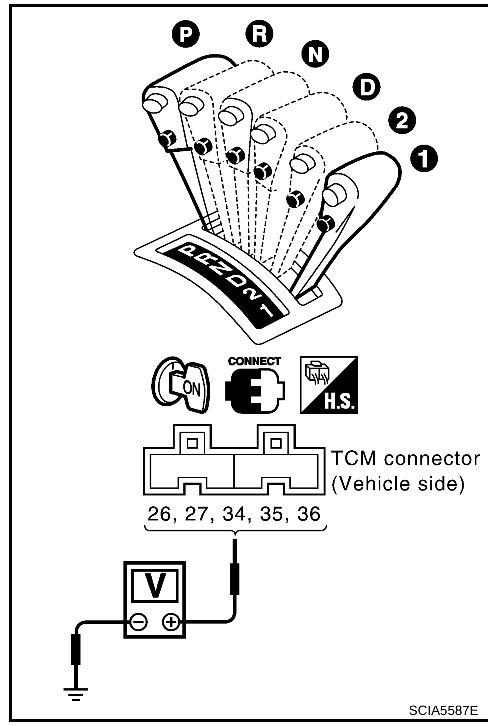
OK or NG

OK >> GO TO 6.
NG >> GO TO 3.

2. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position.



Lever position	Terminal				
	36	35	34	27	26
"P", "N"	B	0	0	0	0
"R"	0	B	0	0	0
"D"	0	0	B	0	0
"2"	0	0	0	B	0
"1"	0	0	0	0	B

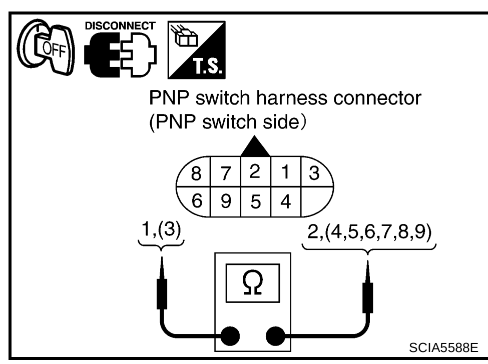
B: Battery voltage
0: 0V

OK or NG

OK >> GO TO 6.
NG >> GO TO 3.

3. CHECK PNP SWITCH

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Check continuity between PNP switch harness connector terminals.



Lever position	Connector	Terminal	Continuity
"P"	F24	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
"R"		3 - 8	
"N"		1 - 2, 3 - 9	
"D"		3 - 6	
"2"		3 - 5	
"1"		3 - 4	

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 3.

OK or NG

OK >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .
NG >> Repair or replace PNP switch. Refer to AT-263, "Park/Neutral Position (PNP) Switch" .

5. DETECT MALFUNCTIONING ITEMS

Check the following.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch.
- Harness for short or open between park/neutral position (PNP) switch and TCM.
- Harness for short or open between park/neutral position (PNP) switch and combination meter.
- Harness for short or open between combination meter and TCM.
- 10A fuse (NO.12, located in the fuse block)
- Combination meter. Refer to DI-4, "COMBINATION METERS" .
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK DTC

Perform AT-98, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT

PFP:31940

Description

ACS007RA

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.

CONSULT-II Reference Value

ACS007Z7

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

ACS007RB

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “ATF TEMP SEN/CIRC” with CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

ACS007RC

Check the following.

- Harness or connector
  (The sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

ACS007RD

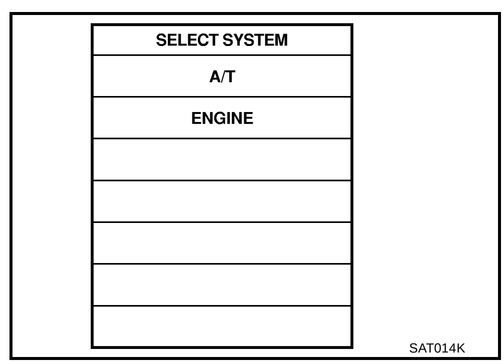
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “ENGINE” with CONSULT-II.
2. Start engine and maintain the following conditions for at least 10 minutes (Total). (It is not necessary to maintain continuously.)
   ENG SPEED: 450 rpm or more
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.2V
   SLCT LVR POSI: “D” position (OD ON)
3. If the check result is NG, go to AT-106, "Diagnostic Procedure" .



WITH GST

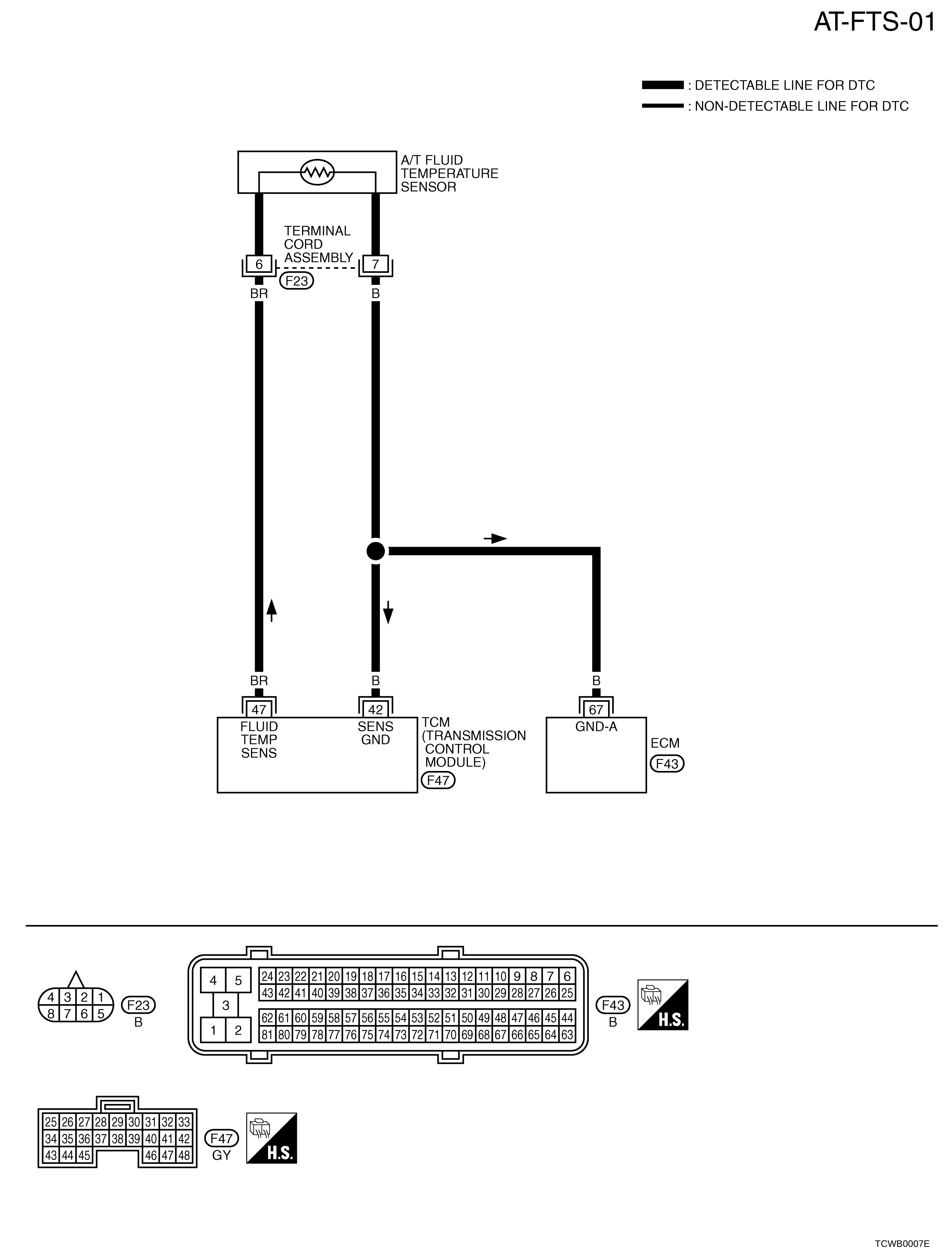
Follow the procedure “With CONSULT-II”.

WITHOUT CONSULT-II

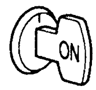
1. Start engine.
2. Drive vehicle under the following conditions.
   Selector lever: “D” position
   Vehicle speed: higher than 20km/h (12MPH)
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-106, "Diagnostic Procedure" .

Wiring Diagram — AT — FTS

ACS007WV



Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
42	B	Sensor ground	Always		0V
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

Diagnostic Procedure

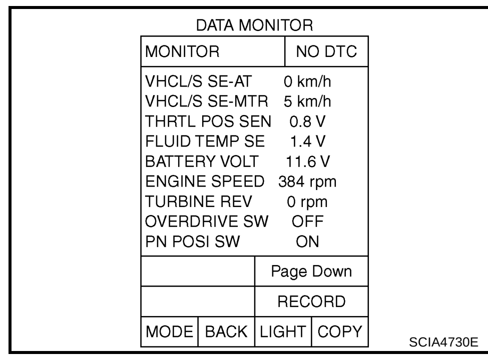
ACS007RE

1. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V

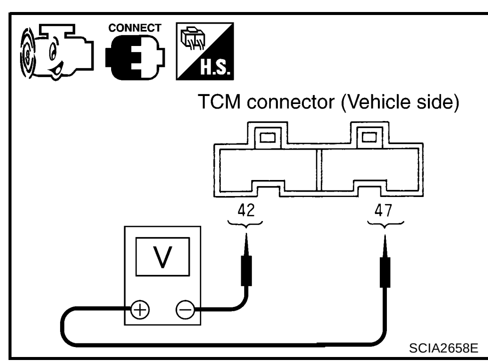


SCIA4730E

Without CONSULT-II

1. Start engine.
2. Check voltage TCM connector while warming up A/T.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F47	47 (BR) - 42 (B)	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V



SCIA2658E

OK or NG

OK >> GO TO 7.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEMS

Check the following.

- Harness for short or open between TCM, ECM and terminal cord assembly
- Ground circuit for ECM
  Refer to EC-155, "POWER SUPPLY AND GROUND CIRCUIT" .

OK or NG

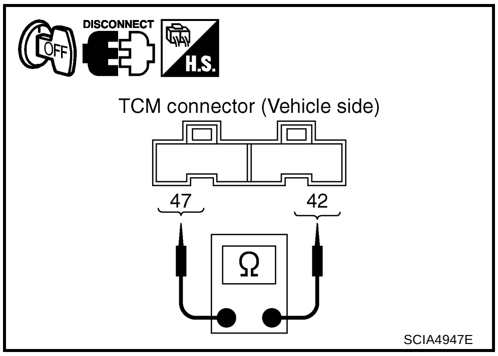
OK >> GO TO 3.
NG >> Repair or replace damaged parts.

A
B
AT
D
E
F
G
H
I
J
K
L
M

3. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect the TCM connector.
3. Check resistance between TCM connector terminals.

Item	Connector	Terminal (Wire color)	Tempera-ture °C (°F)	Resistance (Approx.)
TCM connector	F47	47 (BR) - 42 (B)	20 (68)	2.5kΩ
			80 (176)	0.3kΩ



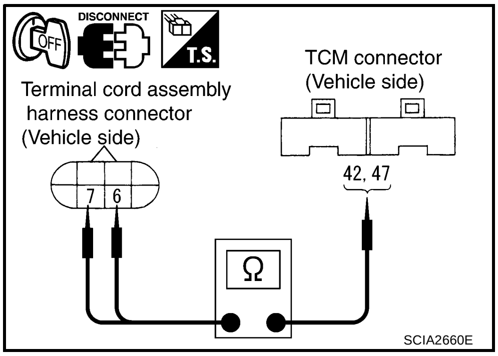
OK or NG

OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminals and TCM connector terminals.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F47	42 (B)	Yes
Terminal cord assembly harness connector	F23	7 (B)	
TCM connector	F47	47 (BR)	Yes
Terminal cord assembly harness connector	F23	6 (BR)	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

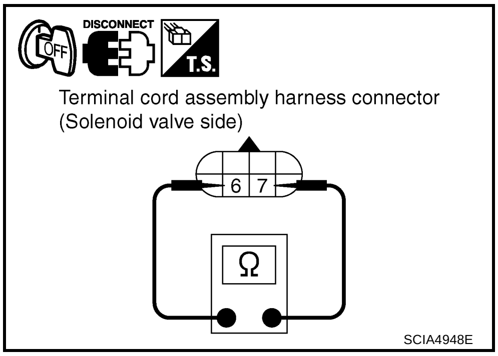
OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminals.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



4. Reinstall any part removed.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

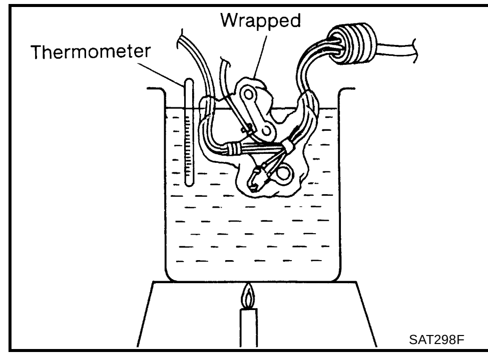
6. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.

– A/T fluid temperature sensor

• Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



– Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK DTC

Perform AT-104, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

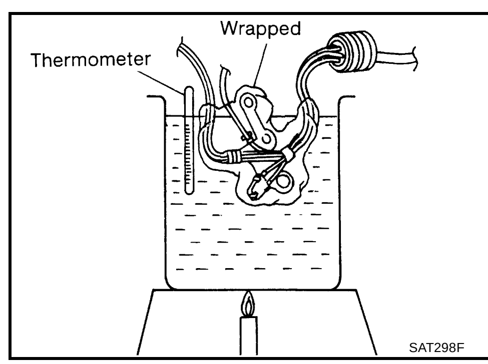
Component Inspection

ACS007RF

A/T FLUID TEMPERATURE SENSOR

- Remove oil pan. Refer to AT-260, "Control Valve Assembly and Accumulators" .
- Check resistance between terminal cord assembly harness connector terminals while changing temperature as shown.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)

PFP:32702

Description

ACS007RG

The revolution sensor detects the revolution of the idler gear parking pawl lock gear and emits a pulse signal. The pulse signal is sent to the TCM which converts it into vehicle speed.

CONSULT-II Reference Value

ACS007Z2

Item name	Condition	Display value
VHCL/S SE·A/T	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

ACS007RH

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code "VECH SPEED SEN·AT" with CONSULT-II or 1st judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

ACS007RI

Check the following.

- Harness or connector
  (The sensor circuit is open or shorted.)
- Revolution sensor

DTC Confirmation Procedure

ACS007RJ

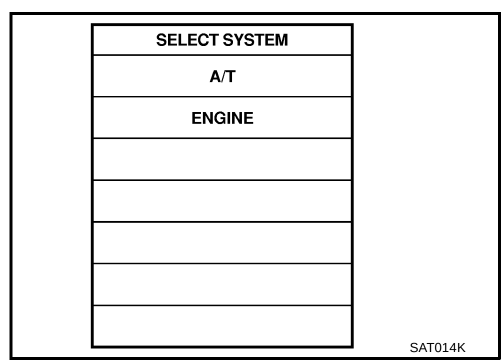
CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm that the malfunction is eliminated.

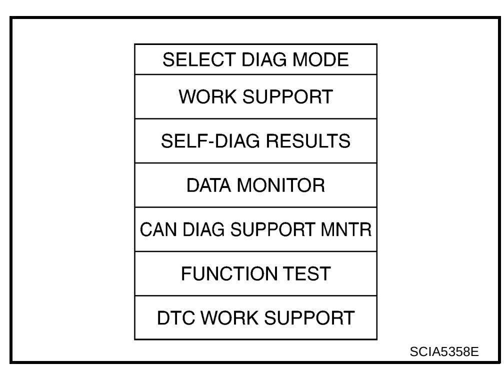
WITH CONSULT-II

1. Turn ignition switch ON and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Drive vehicle and check for an increase of "VHCL/S SE·MTR" value increase.
   If the check result is NG, go to AT-112, "Diagnostic Procedure" .
   If the check result is OK, go to following step.



SAT014K

3. Select "DATA MONITOR" mode for "A/T" with CONSULT-II.
4. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VHCL SPEED SE: 30 km/h (19 MPH) or more
   THRTL POS SEN: More than 1.2V
   SLCT LVR POSI: "D" position (OD ON)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
   If the check result is NG, go to AT-112, "Diagnostic Procedure" .
   If the check result is OK, go to following step.



SCIA5358E

5. Maintain the following conditions for at least 5 consecutive seconds.
   ENGINE SPEED: 3,500 rpm or more
   THRTL POS SEN: More than 1.2V

SLCT LVR POSI: “D” position (OD ON)
Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.

WITH GST

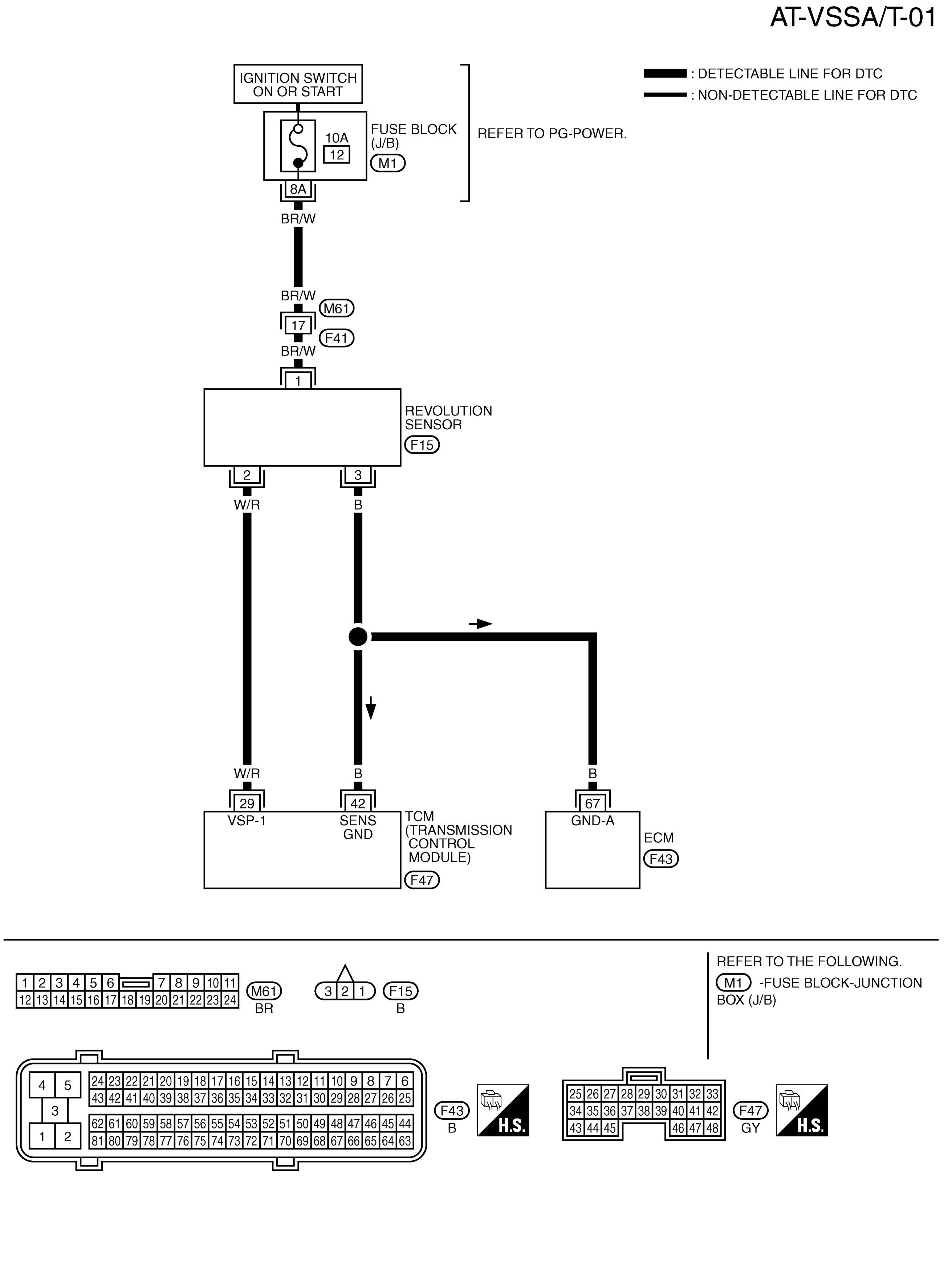
Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

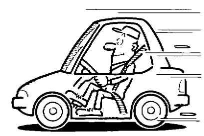
1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
   Selector lever: “D” position
   Vehicle speed: 30 km/h (19 MPH) or more
   Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-112, "Diagnostic Procedure" .

Wiring Diagram — AT — VSSA/T

ACS007RK



Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
29	W/R	Revolution sensor		When moving at 20 km/h (12 MPH)	450 Hz
				When vehicle parks.	Under 1.3V or over 4.5V
42	B	Sensor ground	Always		0V

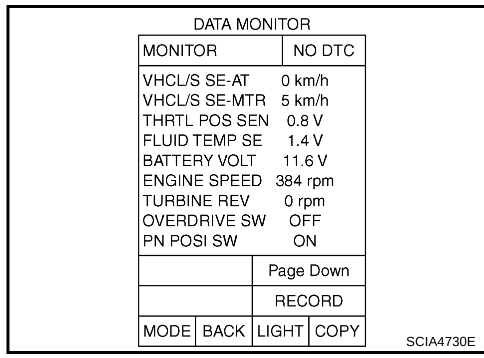
Diagnostic Procedure

ACS007RL

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·A/T” while driving.
   Check the value changes according to driving speed.



SCIA4730E

Item name	Condition	Display value
VHCL/S SE·A/T	During driving	Approximately matches the speedometer reading.

OK or NG

OK >> GO TO 8.
NG >> GO TO 2.

2. CHECK REVOLUTION SENSOR

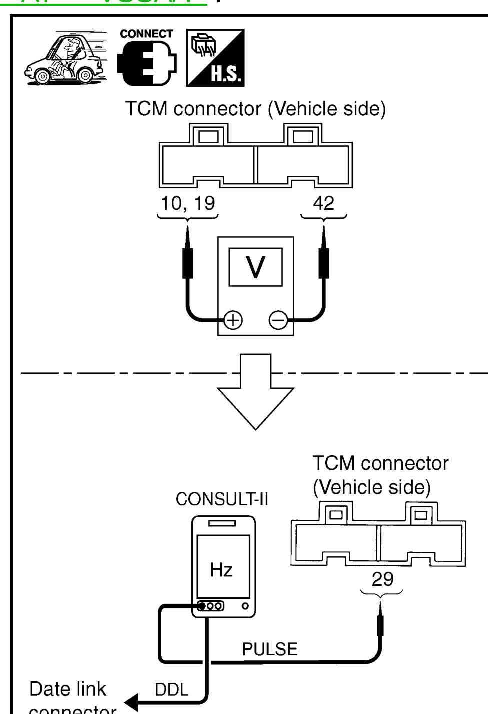
1. Start engine.
2. Check power supply to revolution sensor by voltage between TCM connector terminals. Refer to AT-195, "Wiring Diagram — AT — MAIN" and AT-111, "Wiring Diagram — AT — VSSA/T" .

Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46, F47	10 (BR/W) - 42 (B)	Battery voltage
		19 (BR/W) - 42 (B)	

3. If OK, check the pulse when vehicle cruises.

Item	Condition
Revolution sensor	When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function. **CAUTION:** **Connect the diagnosis data link cable to the data link connector.**

Item	Connector	Terminal (Wire color)	Data (Approx.)
TCM connector	F47	29 (W/R)	450 Hz



SCIA4939E

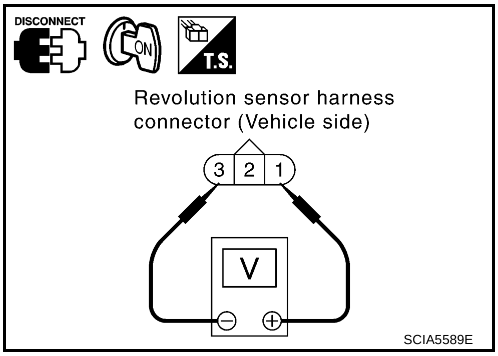
OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK POWER AND SENSOR GROUND

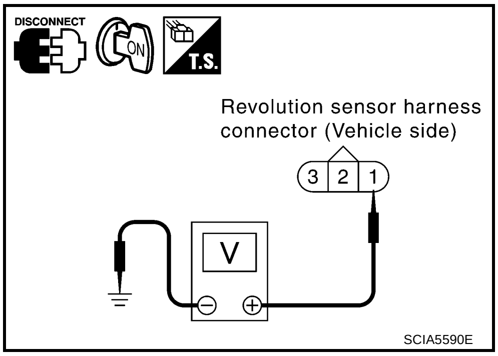
1. Turn ignition switch OFF.
2. Disconnect revolution sensor harness connector.
3. Turn ignition switch ON. (Do not start engine.)
4. Check voltage between revolution sensor harness connector terminals.

Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
Revolution sensor harness connector	F15	1 (BR/W) - 3 (B)	Battery voltage



5. Check voltage between revolution sensor harness connector terminal and ground.

Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
Revolution sensor harness connector	F15	1 (BR/W) - ground	Battery voltage



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

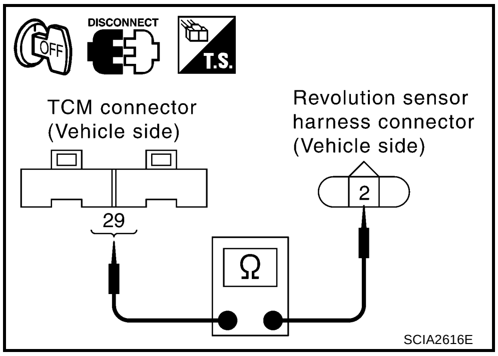
OK or NG

OK >> GO TO 4.
NG - 1 >> Battery voltage is not supplied between terminals 1 and 3, terminals 1 and ground: GO TO 6.
NG - 2 >> Battery voltage is not supplied between terminals 1 and 3 only: GO TO 7.

4. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR

1. Turn ignition switch OFF.
2. Disconnect TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F47	29 (W/R)	Yes
Revolution sensor harness connector	F15	2 (W/R)	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK TCM

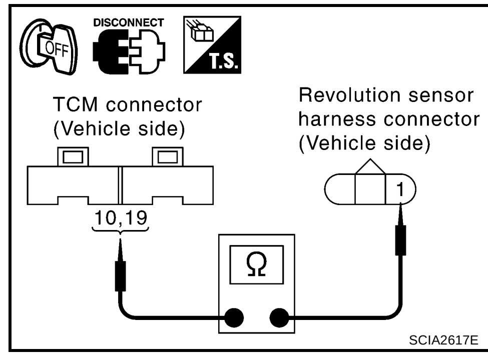
1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (POWER)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal. Refer to AT-51, "Circuit Diagram" and AT-195, "Wiring Diagram — AT — MAIN" .



Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	10 (BR/W)	Yes
Revolution sensor harness connector	F15	1 (BR/W)	
TCM connector	F46	19 (BR/W)	Yes
Revolution sensor harness connector	F15	1 (BR/W)	

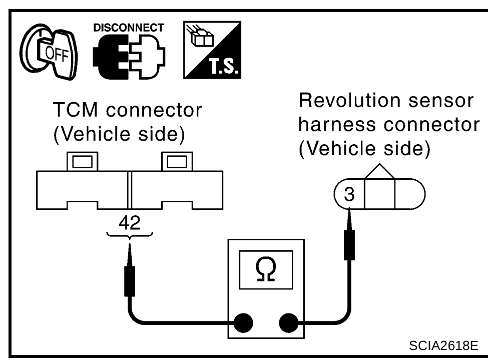
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> 10A fuse (No.12, located in the fuse block) or ignition switch are malfunctioning.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HARNESS BETWEEN TCM AND REVOLUTION SENSOR (SENSOR GROUND)

1. Turn ignition switch OFF.
2. Disconnect TCM connector and revolution sensor harness connector.
3. Check continuity between TCM connector terminal and revolution sensor harness connector terminal.



Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F47	42 (B)	Yes
Revolution sensor harness connector	F15	3 (B)	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK DTC

Perform AT-109, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

DTC P0725 ENGINE SPEED SIGNAL

PFP:24825

Description

ACS007RM

The engine speed signal is sent from ECM to TCM.

CONSULT-II Reference Value

ACS007Z3

Item name	Condition	Display value
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.

On Board Diagnosis Logic

ACS007RN

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “ENGINE SPEED SIG” with CONSULT-II or 9th judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from ECM.

Possible Cause

ACS007RO

Harness or connector (The circuit is open or shorted.)

DTC Confirmation Procedure

ACS007RP

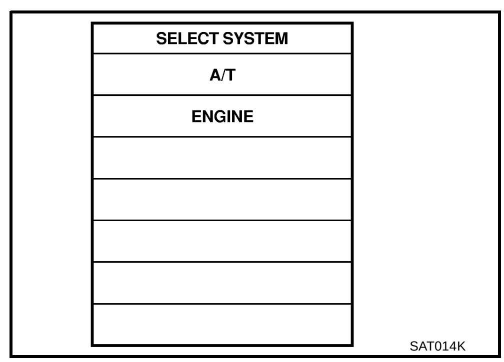
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

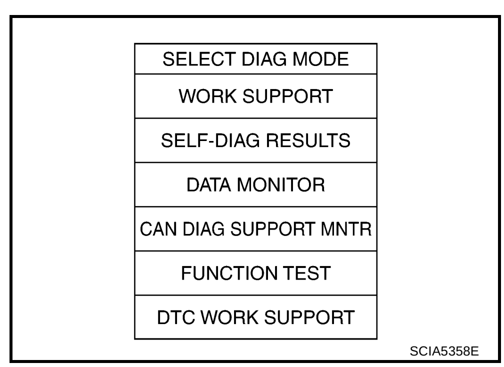
After the repair, perform the following procedure to confirm the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.



2. Start engine and maintain the following conditions for at least 10 consecutive seconds.
   VHCL SPEED SE: 10 km/h (6 MPH) or more
   THRTL POS SEN: More than 1.2V
   SLCT LVR POSI: “D” position (OD ON)
3. If the check result is NG, go to AT-118, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II”.

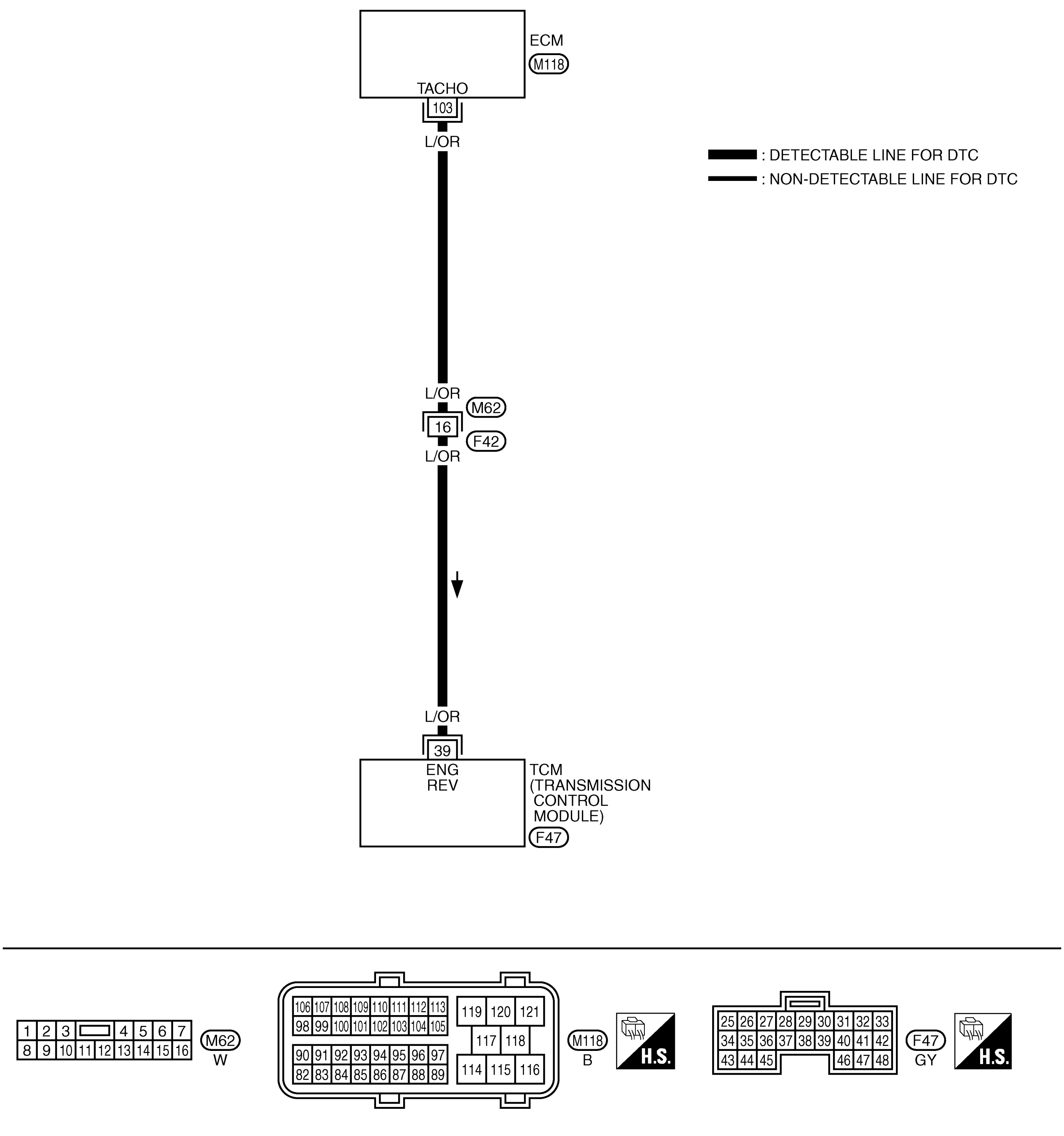
WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 5 seconds.
   Selector lever: “D” position (OD ON)
   Vehicle speed: 10 km/h (6 MPH) or more
   Throttle position: greater than 1.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-118, "Diagnostic Procedure" .

Wiring Diagram — AT — ENGSS

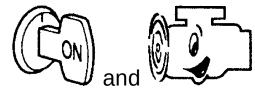
ACS007RQ

AT-ENGSS-01



TCWA0232E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition	Judgement standard (Approx.)
39	L/OR	Engine speed signal		Refer to EC-115, "ECM INSPECTION TABLE" .

Diagnostic Procedure

ACS007RR

1. CHECK DTC WITH ECM

Perform diagnostic test mode II (self-diagnostic results) for engine control. Check ignition signal circuit condition.

OK or NG

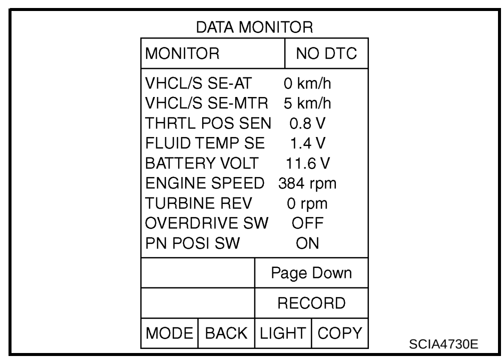
OK >> GO TO 2.
NG >> Check ignition signal circuit for engine control. Refer to EC-586, "IGNITION SIGNAL" .

2. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “ENGINE SPEED”.
   Check engine speed changes according to throttle position.

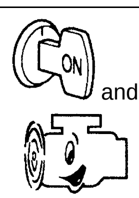
Item name	Condition	Display value
ENGINE SPEED	Engine running	Approximately matches the tachometer reading.

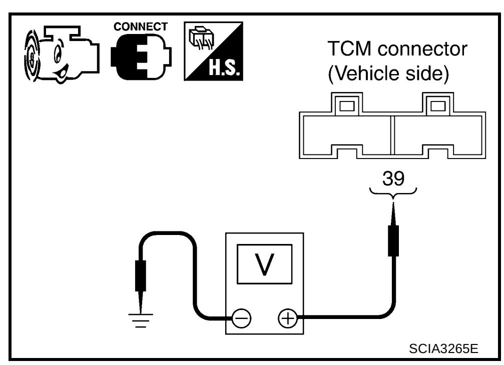


SCIA4730E

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F47	39 (L/OR) - Ground		Refer to EC-115, "ECM INSPECTION TABLE" .



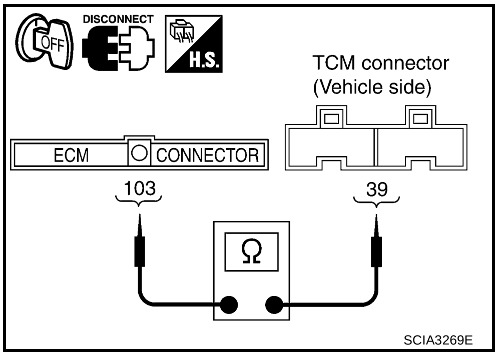
SCIA3265E

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND ECM

1. Turn ignition switch OFF.
2. Disconnect ECM connector and TCM connector.
3. Check continuity between ECM connector terminal and TCM connector terminal.



Item	Connector	Terminal (Wire color)	Continuity
TCM	F47	39 (L/OR)	Yes
ECM	M118	103 (L/OR)	

4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK DTC

Perform AT-115, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A B AT D E F G H I J K L M

DTC P0731 A/T 1ST GEAR FUNCTION

PFP:31940

Description

ACS007RS

- This malfunction will not be detected while O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when the A/T does not shift into first gear position as instructed by TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

ACS007RT

- This is an OBD-II self-diagnostic item.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from revolution sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is higher than the position (1st) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when either shift solenoid valve A is stuck open or shift solenoid valve B is stuck open.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: **1** , 2, 3 and 4 positions
  In case of gear position with shift solenoid valve A stuck open: **2*** , 2, 3 and 3 positions
  In case of gear position with shift solenoid valve B stuck open: **4*** , 3, 3 and 4 positions to each gear position above
  *: P0731 is detected.
- Diagnostic trouble code “A/T 1ST GR FNCTN” with CONSULT-II is detected when A/T cannot be shifted to the 1st gear position even if electrical circuit is good.

Possible Cause

ACS007RU

Check the following.

- Shift solenoid valve A
- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

ACS007RV

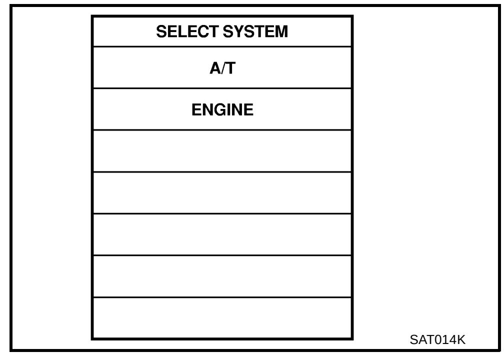
CAUTION:

- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

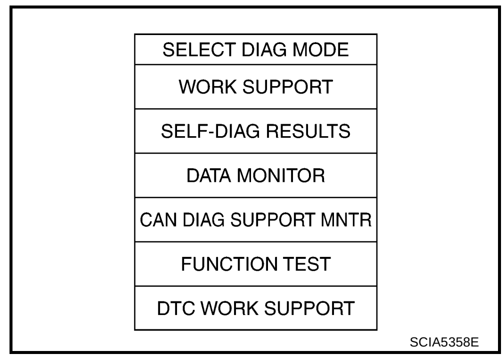
TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5V
   If out of range, drive vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “1ST GR FNCTN P0731” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



4. Accelerate vehicle to 15 to 20 km/h (9 to 12 MPH) under the following condition and release accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   SLCT LVR POSI: “D” position (OD ON)
   - **Make sure that “GEAR” shows “2” after releasing pedal.**
5. Depress accelerator pedal to WOT (more than 7.0/8 of “THROTTLE POSI”) quickly from a speed of 15 to 20 km/h (9 to 12 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-123, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to the following step.
   - **Make sure that “GEAR” shows “1” when depressing accelerator pedal to WOT.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0731 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**



6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0731 exists.	2 → 2 → 3 → 3
	4 → 3 → 3 → 4

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to “DIAGNOSTIC PROCEDURE”.)
   Refer to AT-123, "Diagnostic Procedure" .
   Refer to AT-66, "Vehicle Speed When Shifting Gears" .

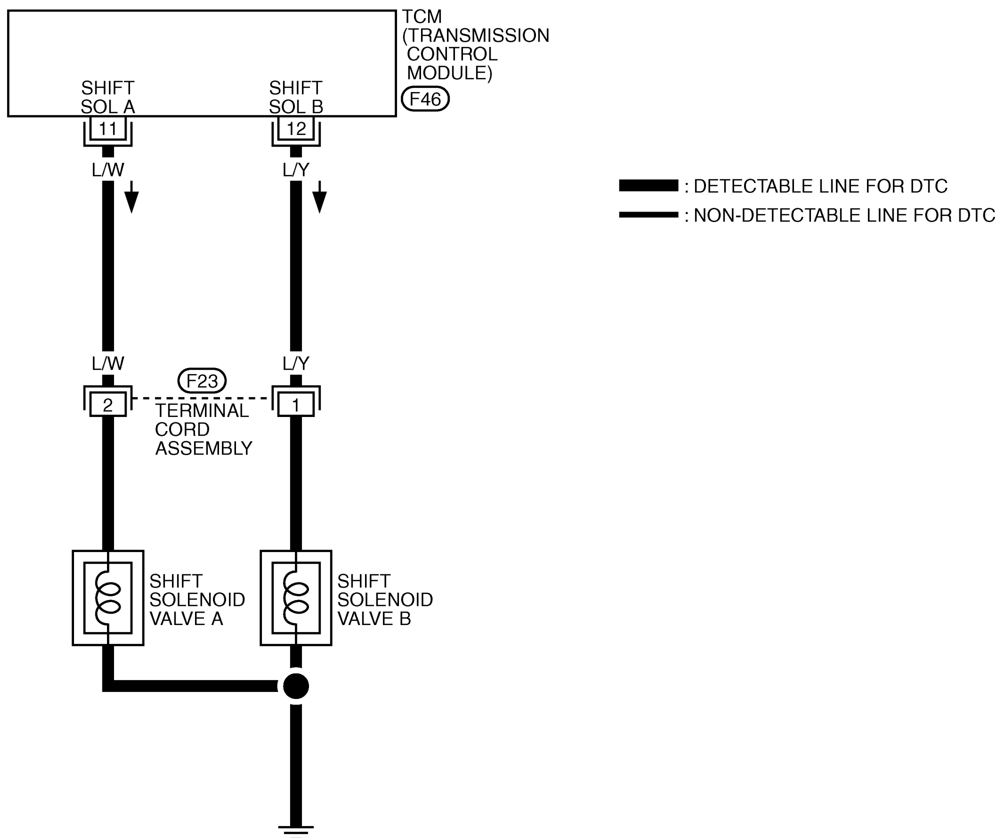
WITH GST

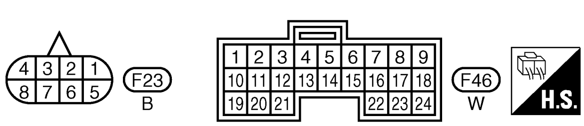
Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — 1STSIG

ACS007WW

AT-1STSIG-01





TCWA0049E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D1 " or "D4 ".)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in "D2 " or "D3 ".)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	0V

Diagnostic Procedure

ACS007RW

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
   - Shift solenoid valve A
   - Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground.

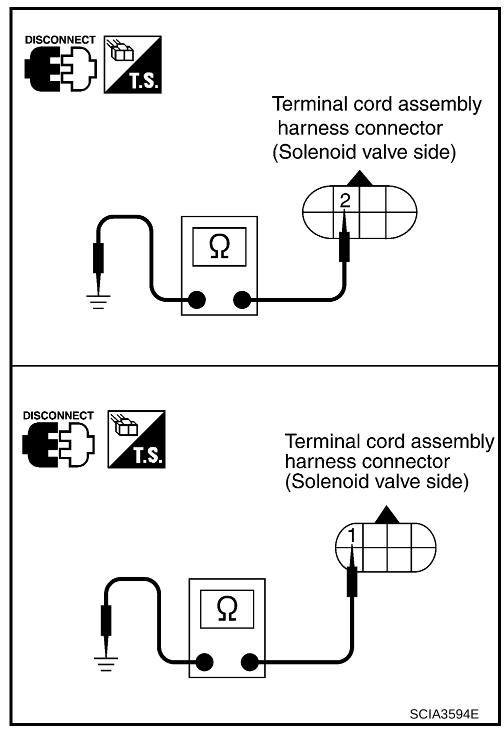
Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		5 - 20Ω

3. If OK, check harness for short to ground and short to power.
4. If OK, check continuity between ground and transaxle assembly.

OK or NG

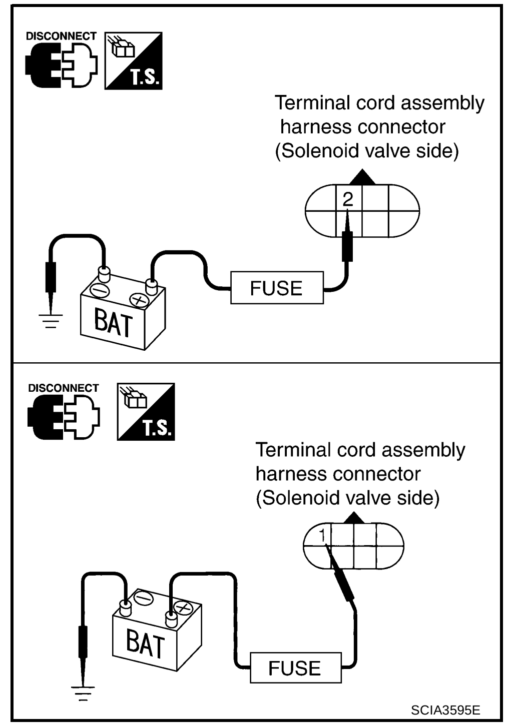
OK >> GO TO 2.

NG >> Repair or replace shift solenoid valve assembly.



2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
- Shift solenoid valve A
- Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground.



OK or NG

OK >> GO TO 3.
NG >> Repair or replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-120, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

DTC P0732 A/T 2ND GEAR FUNCTION

PFP:31940

Description

ACS007RX

- This malfunction will not be detected while O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when A/T does not shift into second gear position as instructed by TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

ACS007RY

- This is an OBD-II self-diagnostic item.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from revolution sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is higher than the position (2nd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve B is stuck open.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, **2** , 3 and 4 positions
  In case of gear position with shift solenoid valve B stuck open: 4, **3*** , 3 and 4 positions to each gear position above
  *: P0732 is detected.
- Diagnostic trouble code “A/T 2ND GR FNCTN” with CONSULT-II is detected when A/T cannot be shifted to the 2nd gear position even if electrical circuit is good.

Possible Cause

ACS007RZ

Check the following.

- Shift solenoid valve B
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

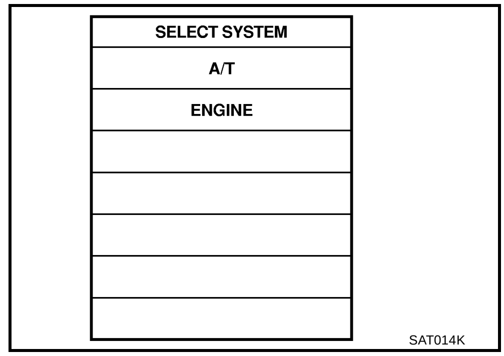
ACS007S0

CAUTION:

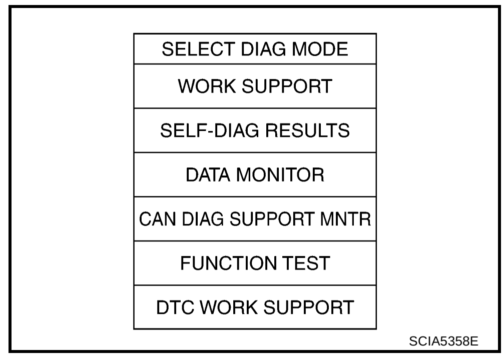
- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II



1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5V
   If out of range, drive vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select "2ND GR FNCTN P0732" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".



4. Accelerate vehicle to 35 to 40 km/h (22 to 25 MPH) under the following condition and release accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   SLCT LVR POSI: "D" position (OD ON)
   – **Make sure that "GEAR" shows "3" or "4" after releasing pedal.**
5. Depress accelerator pedal to WOT (more than 7.0/8 of "THROTTLE POSI") quickly from a speed of 35 to 40 km/h (22 to 25 MPH) until "TESTING" changes to "STOP VEHICLE" or "COMPLETED". (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-128, "Diagnostic Procedure" .
   If "STOP VEHICLE" appears on CONSULT-II screen, go to following step.
   – **Make sure that "GEAR" shows "2" when depressing accelerator pedal to WOT.**
   – **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAGNOSIS" for "ENGINE". In case a 1st trip DTC other than P0732 is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0732 exists.	4 → 3 → 3 → 4

8. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
   Refer to AT-128, "Diagnostic Procedure" .
   Refer to AT-66, "Vehicle Speed When Shifting Gears" .

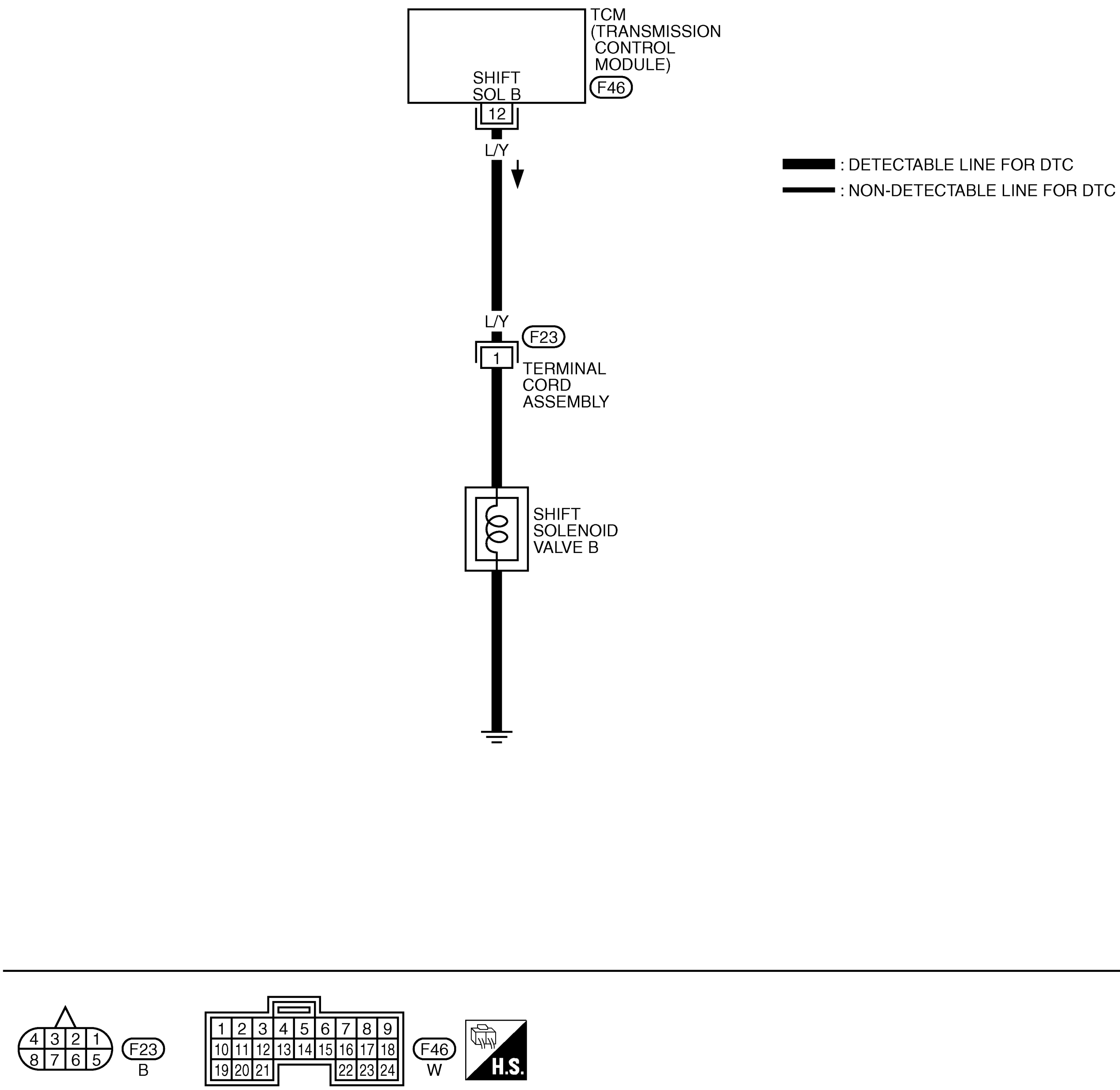
WITH GST

Follow the procedure "WITH CONSULT-II".

Wiring Diagram — AT — 2NDSIG

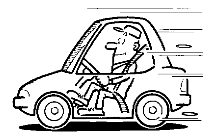
ACS007WX

AT-2NDSIG-01



TCWA0050E

Data are reference value and are measured between each terminal and ground.

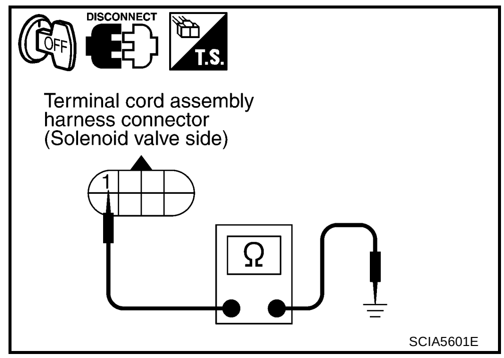
Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in “D_1 ” or “D_2 ”.)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in “D_3 ” or “D_4 ”.)	0V

Diagnostic Procedure

ACS007S1

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
   - Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω

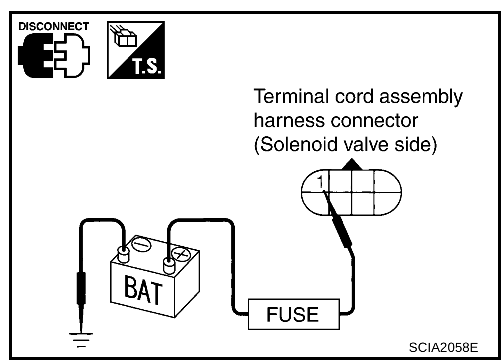
3. If OK, check harness for short to ground and short to power.
4. If OK, check continuity between ground and transaxle assembly.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
   - Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



OK or NG

OK >> GO TO 3.
NG >> Repair to replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check to ensure that:
   - Valve, sleeve and plug slide along valve bore under their own weight.
   - Valve, sleeve and plug are free from burrs, dents and scratches.
   - Control valve springs are free from damage, deformation and fatigue.
   - Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-125, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

DTC P0733 A/T 3RD GEAR FUNCTION

PFP:31940

Description

ACS007S2

- This malfunction will not be detected while O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when A/T does not shift into third gear position as instructed by TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning servo piston or brake band, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

On Board Diagnosis Logic

ACS007S3

- This is an OBD-II self-diagnostic item.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from revolution sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is higher than the position (3rd) supposed by TCM, the slip ratio will be more than normal. In case the ratio exceeds the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve A is stuck closed.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, 2, **3** and 4 positions
  In case of gear position with shift solenoid valve A stuck closed: 1, 1, **4*** and 4 positions to each gear position above
  *: P0733 is detected.
- Diagnostic trouble code "A/T 3RD GR FNCTN" with CONSULT-II is detected when A/T cannot be shifted to the 3rd gear position even if electrical circuit is good.

Possible Cause

ACS007S4

Check the following.

- Shift solenoid valve A
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

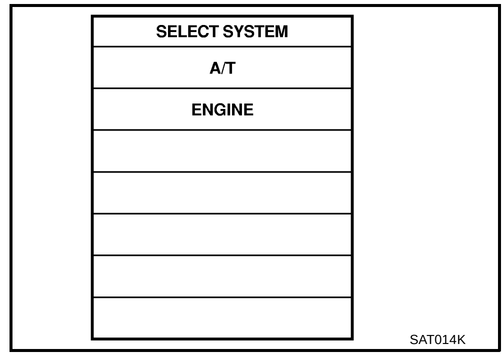
ACS007S5

CAUTION:

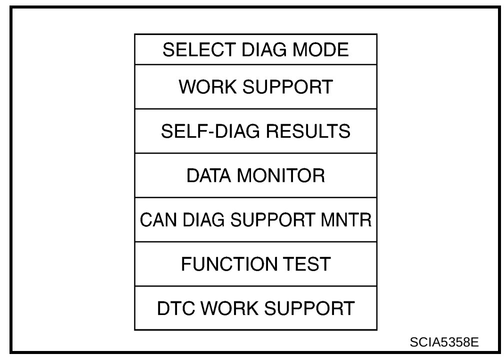
- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

TESTING CONDITION:
Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II



1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5V
   If out of range, drive vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “3RD GR FNCTN P0733” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



4. Accelerate vehicle to 55 to 70 km/h (34 to 44 MPH) under the following condition and release accelerator pedal completely.
   THROTTLE POSI: Less than 1.0/8 (at all times during step 4)
   SLCT LVR POSI: “D” position (OD ON)
   - **Make sure that “GEAR” shows “4” after releasing pedal.**
5. Depress accelerator pedal steadily with 3.5/8 - 4.5/8 of “THROTTLE POSI” from a speed of 55 to 70 km/h (34 to 44 MPH) until “TESTING” changes to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-133, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.
   - **Make sure that “GEAR” shows “3” when depressing accelerator pedal with 3.5/8 - 4.5/8 of “THROTTLE POSI”.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0733 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists.	1 → 2 → 3 → 4
Malfunction for P0733 exists.	1 → 1 → 4 → 4

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to Diagnostic Procedure.)
   Refer to AT-133, "Diagnostic Procedure" .
   Refer to AT-66, "Vehicle Speed When Shifting Gears" .

WITH GST

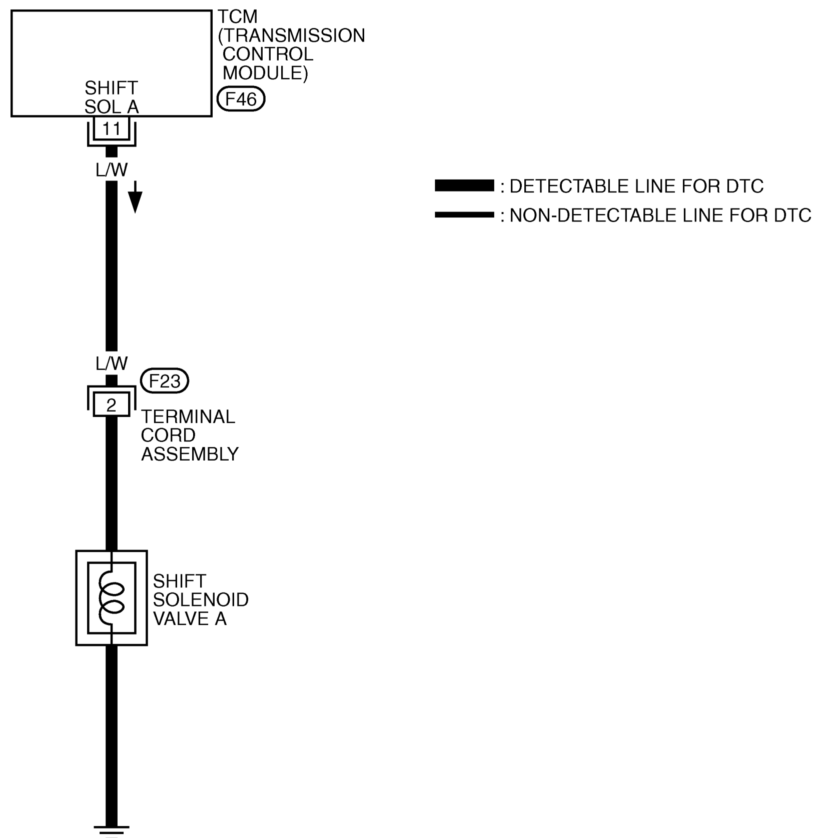
Follow the procedure “With CONSULT-II”.

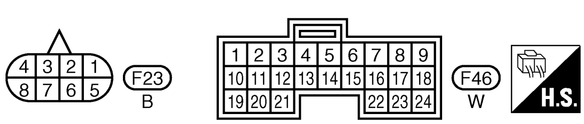
A B AT D E F G H I J K L M

Wiring Diagram — AT — 3RDSIG

ACS007WY

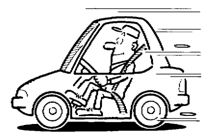
AT-3RDSIG-01





TCWA0051E

Data are reference value and are measured between each terminal and ground.

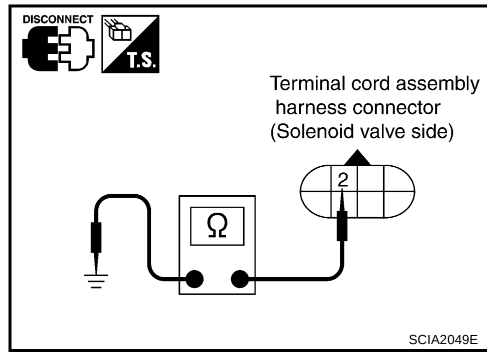
Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	0V

Diagnostic Procedure

ACS007S6

1. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
– Shift solenoid valve A
2. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω

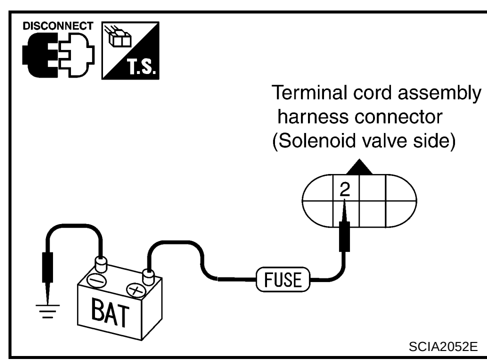
3. If OK, check harness for short to ground and short to power.
4. If OK, check continuity between ground and transaxle assembly.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace shift solenoid valve assembly.

2. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
– Shift solenoid valve A
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



OK or NG

OK >> GO TO 3.
NG >> Repair or replace shift solenoid valve assembly.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

OK >> GO TO 4.
NG >> Repair control valve assembly.

4. CHECK DTC

Perform AT-130, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Check control valve again. Repair or replace control valve assembly.

DTC P0734 A/T 4TH GEAR FUNCTION

PFP:31940

Description

ACS007S7

- This malfunction will not be detected while O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when A/T does not shift into fourth gear position or line pressure is low as instructed by TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II Reference Value

ACS007Z4

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 92%

On Board Diagnosis Logic

ACS007S8

- This is an OBD-II self-diagnostic item.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from revolution sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve A is stuck open or shift solenoid valve B is stuck closed.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, 2, 3 and **4** positions
  In case of gear position with shift solenoid valve A stuck open: 2, 2, 3 and **3*** positions
  In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and **1*** positions to each gear position above
  *: P0734 is detected.
- Diagnostic trouble code "A/T 4TH GR FNCTN" with CONSULT-II is detected when A/T cannot be shifted to the 4th gear position even if electrical circuit is good.

Possible Cause

ACS007S9

Check the following.

- Shift solenoid valve A
- Shift solenoid valve B
- Line pressure solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

ACS007SA

CAUTION:

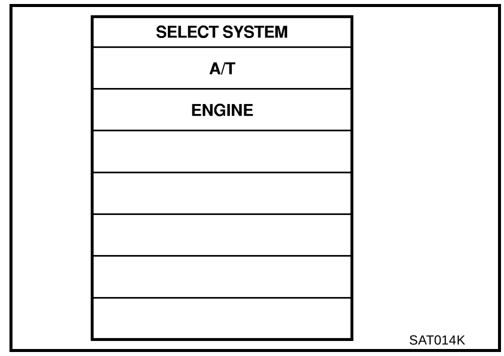
- **Always drive vehicle at a safe speed.**
- **Be careful not to rev engine into the red zone on the tachometer.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

TESTING CONDITION:

Always drive vehicle on a level road to improve the accuracy of test.
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

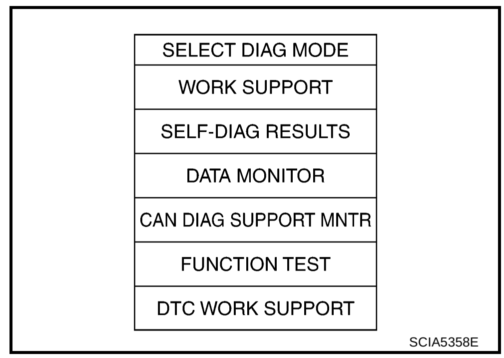
WITH CONSULT-II

1. Start engine and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5V
   If out of range, drive vehicle to decrease the voltage (warm up the fluid) or stop engine to increase the voltage (cool down the fluid).
3. Select “4TH GR FNCTN P0734” of “DTC WORK SUPPORT” mode for “A/T” with CONSULT-II and touch “START”.



SAT014K

4. Accelerate vehicle to 55 to 65 km/h (34 to 40 MPH) under the following condition and release accelerator pedal completely.
   THROTTLE POSI: Less than 5.5/8 (at all times during step 4)
   SLCT LVR POSI: “D” position (OD ON)
   - **Make sure that “GEAR” shows “3” after releasing pedal.**
5. Depress accelerator pedal steadily with 1.0/8 - 2.0/8 of “THROTTLE POSI” from a speed of 55 to 65 km/h (34 to 40 MPH) until “TESTING” has turned to “STOP VEHICLE” or “COMPLETED”. (It will take approximately 3 seconds.)
   If the check result NG appears on CONSULT-II screen, go to AT-138, "Diagnostic Procedure" .
   If “STOP VEHICLE” appears on CONSULT-II screen, go to following step.



SCIA5358E

   - **Make sure that “GEAR” shows “4” when depressing accelerator pedal with 1.0/8 - 2.0/8 of “THROTTLE POSI”.**
   - **If “TESTING” does not appear on CONSULT-II for a long time, select “SELF-DIAGNOSIS” for “ENGINE”. In case a 1st trip DTC other than P0734 is shown, refer to applicable “TROUBLE DIAGNOSIS FOR DTC”.**
6. Stop vehicle.
7. Follow the instruction displayed. (Check for normal shifting referring to the table below.)

Vehicle condition	Gear on actual transmission shift pattern when screen is changed to 1 → 2 → 3 → 4
No malfunction exists	1 → 2 → 3 → 4
Malfunction for P0734 exists.	2 → 2 → 3 → 3
	1 → 2 → 2 → 1

8. Make sure that “OK” is displayed. (If “NG” is displayed, refer to Diagnostic Procedure.)
   Refer to AT-138, "Diagnostic Procedure" .
   Refer to AT-66, "Vehicle Speed When Shifting Gears" .

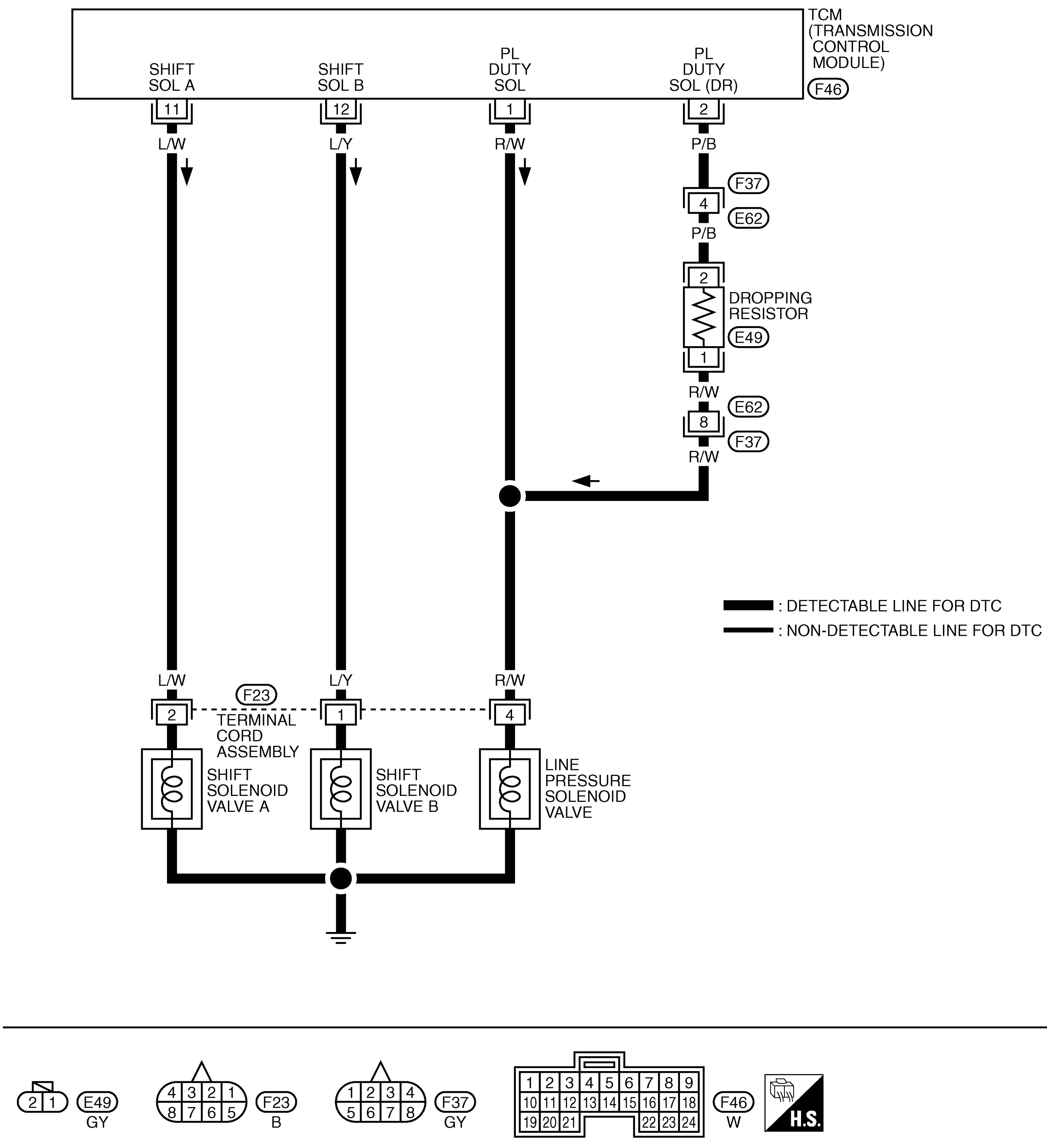
WITH GST

Follow the procedure “WITH CONSULT-II”.

Wiring Diagram — AT — 4THSIG

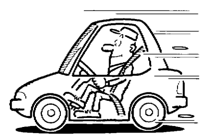
ACS007X6

AT-4THSIG-01



TCWA0052E

Data are reference value and are measured between each terminal and ground.

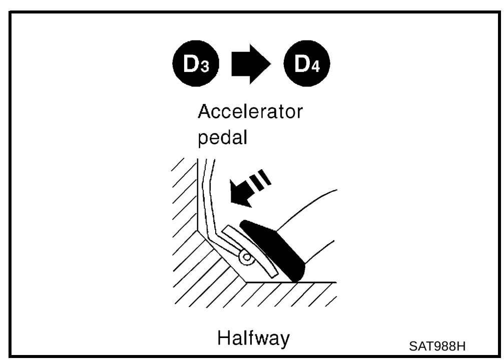
Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in "D_1" or "D_4".)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in "D_2" or "D_3".)	0V
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D_1" or "D_2".)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D_3" or "D_4".)	0V

Diagnostic Procedure

ACS007X9

1. CHECK SHIFT–UP (D_3 TO D_4)

During AT-60, "Cruise Test — Part 1" .



Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 11.
NO >> GO TO 2.

2. CHECK LINE PRESSURE

Perform line pressure test.
Refer to AT-55, "LINE PRESSURE TEST" .

Engine speed rpm	Line pressure kPa (kg/cm^2 , psi)	
	"D", "2" and "1" positions	"R" position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

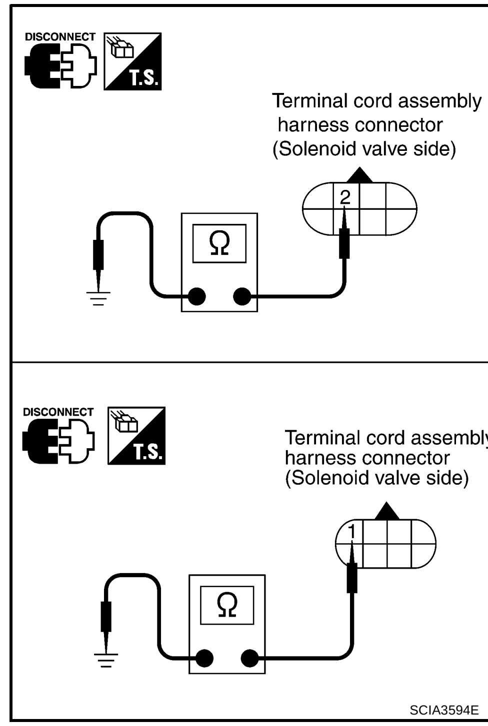
OK or NG

OK >> GO TO 3.
NG >> GO TO 7.

3. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
   - Shift solenoid valve A
   - Shift solenoid valve B
2. Check resistance between terminal cord assembly harness connector terminals and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω
Shift solenoid valve B	1		5 - 20Ω



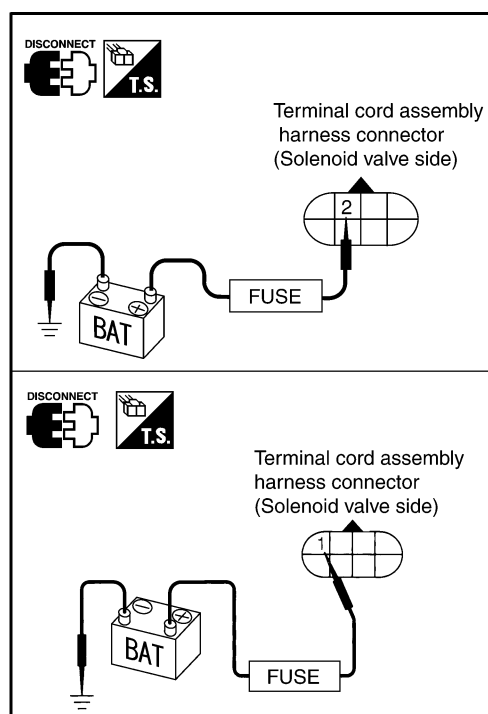
3. If OK, check harness for short to ground and short to power.
4. If OK, check continuity between ground and transaxle assembly.

OK or NG

OK >> GO TO 4.
NG >> Replace solenoid valve assembly.

4. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
   - Shift solenoid valve A
   - Shift solenoid valve B
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminals and ground.



OK or NG

OK >> GO TO 5.
NG >> Replace solenoid valve assembly.

5. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

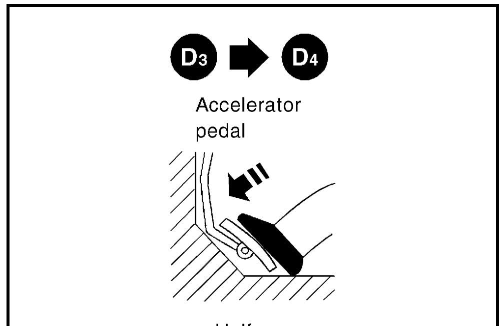
OK >> GO TO 6.
NG >> Repair control valve.

6. CHECK SHIFT–UP (D_3 TO D_4)

During AT-60, "Cruise Test — Part 1" .

Does A/T shift from D_3 to D_4 at the specified speed?

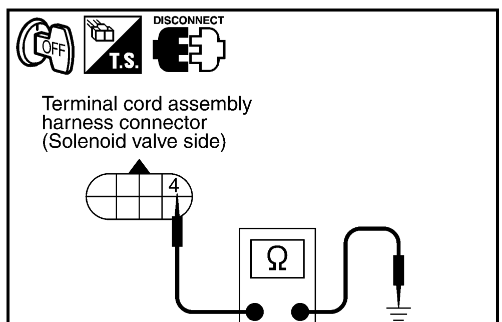
YES >> GO TO 11.
NO >> Check control valve again. Repair or replace control valve assembly.



SAT988H

7. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
- Line pressure solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.



SCIA3457E

Solenoid valve	Terminal		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω

OK or NG

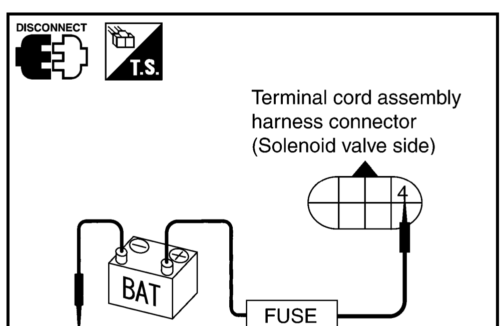
OK >> GO TO 8.
NG >> Replace solenoid valve assembly.

8. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
- Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

OK >> GO TO 9.
NG >> Replace solenoid valve assembly.



SCIA3275E

9. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check line pressure circuit valves for sticking.
- Pilot valve
- Shift solenoid valve A
- Shift solenoid valve B

OK or NG

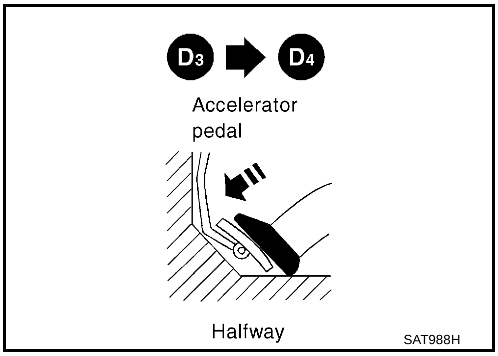
OK >> GO TO 10.
NG >> Repair or replace control valve.

10. CHECK SHIFT–UP (D_3 TO D_4)

During AT-60, "Cruise Test — Part 1" .

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 11.
NO >> Check control valve again. Repair or replace control valve assembly.



11. CHECK DTC

Perform AT-135, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Perform AT-60, "Cruise Test — Part 1" again and return to the start point of this test group.

A
B
AT
D
E
F
G
H
I
J
K
L
M

DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE

PFP:31940

Description

ACS007SC

Torque converter clutch solenoid valve is activated, with the gear in “D_4 ”, by TCM in response to signals sent from vehicle speed and throttle position sensors. Lock-up piston operation will then be controlled.
Lock-up operation, however, is prohibited when A/T fluid temperature is too low.
When the accelerator pedal is depressed (less than 2/8) in lock-up condition, the engine speed should not change abruptly. If there is a big jump in engine speed, there is no lock-up.

CONSULT-II Reference Value

ACS007Z5

Item name	Condition	Display value (Approx.)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

On Board Diagnosis Logic

ACS007SD

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “T/C CLUTCH SOL/V” with CONSULT-II or 7th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate solenoid valve.

Possible Cause

ACS007SE

Check the following.

- Torque converter clutch solenoid valve
- Harness or connector
  (The solenoid circuit is open or shorted.)

DTC Confirmation Procedure

ACS007SF

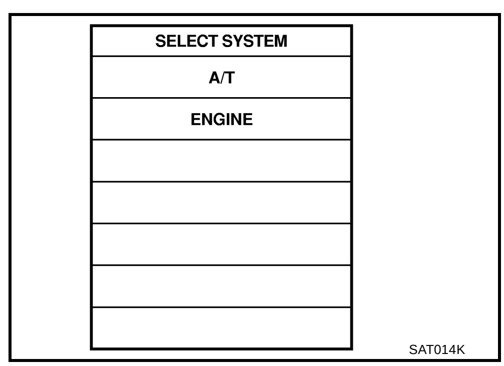
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II and wait at least 1 second.
3. Start engine and maintain the following conditions for at least 5 consecutive seconds.
   VEHICLE SPEED: 80 km/h (50 MPH) or more
   THROTTLE POSI: 0.5/8 - 1.0/8
   SLCT LVR POSI: “D” position (OD ON)
   Driving location: Driving the vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
4. If the check result is NG go to AT-144, "Diagnostic Procedure" .



SAT014K

WITH GST

Follow the procedure “WITH CONSULT-II”.

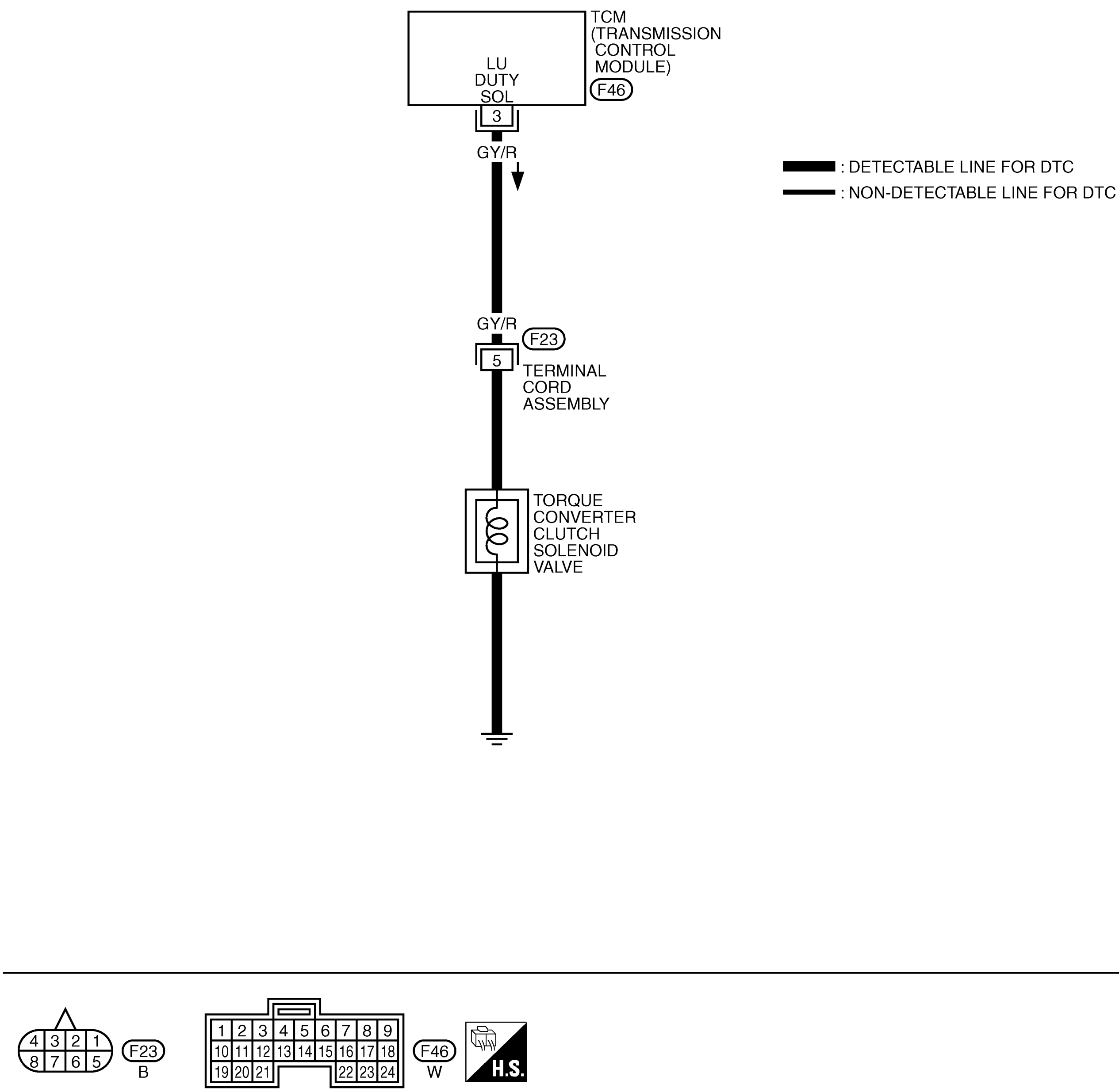
WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle in $D_1 \rightarrow D_2 \rightarrow D_3 \rightarrow D_4 \rightarrow D_4$ lock-up position.
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-144, "Diagnostic Procedure" .

Wiring Diagram — AT — TCV

ACS007SG

AT-TCV-01



TCWA0043E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
3	GY/R	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V

Diagnostic Procedure

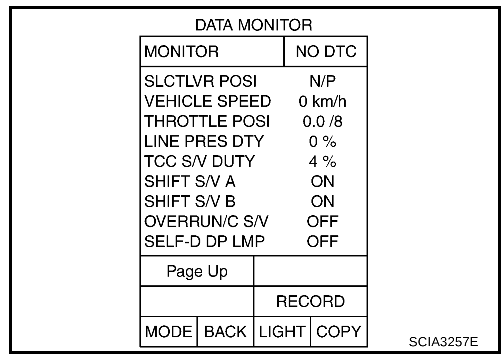
ACS007SH

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “TCC S/V DUTY” while driving.
   Check the value changes according to driving speed.

Item name	Condition	Display value (Approx.)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%

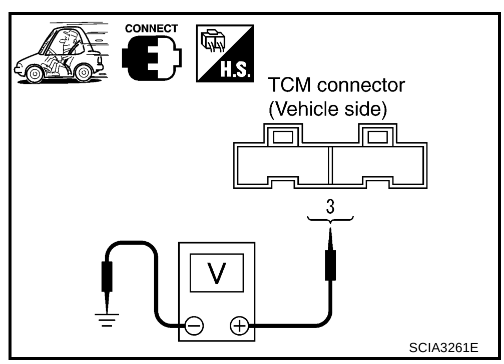


SCIA3257E

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F46	3 (GY/R) - Ground	When A/T performs lock-up.	8 - 15V
			When A/T does not perform lock-up.	0V



SCIA3261E

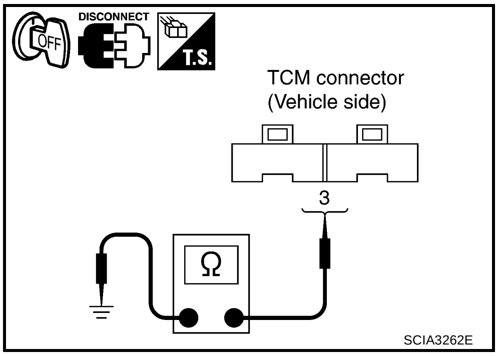
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK TORQUE CONVERTER CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid Valve	Connector	Terminal (Wire color)	Resistance (Approx.)
Torque converter clutch solenoid valve	F46	3 (GY/R) - Ground	5 - 20 Ω



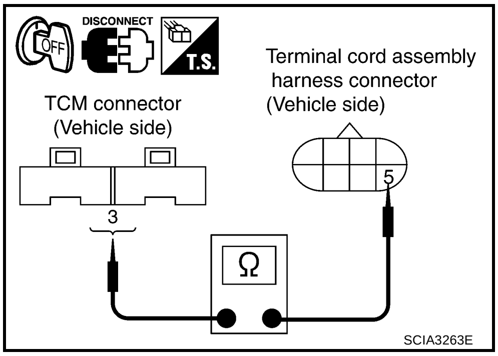
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	3 (GY/R)	Yes
Terminal cord assembly harness connector	F23	5 (GY/R)	



4. If OK, check harness for short to ground and short to power.
5. If OK, check continuity between ground and transaxle assembly.
6. Reinstall any part removed.

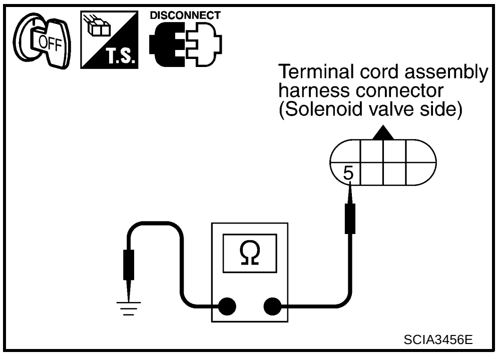
OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Torque converter clutch solenoid valve	F23	5 - Ground	5 - 20Ω



OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-142, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

ACS007SI

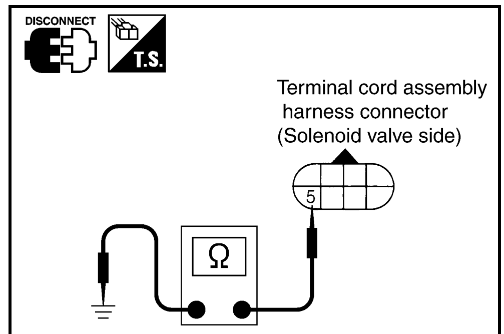
TORQUE CONVERTER CLUTCH SOLENOID VALVE

- For removal, refer to AT-260, "Control Valve Assembly and Accumulators" .

Resistance

- Check resistance between terminal and ground.

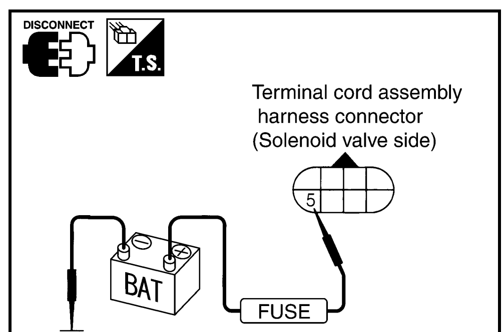
Solenoid valve	Terminal		Resistance (Approx.)
Torque converter clutch solenoid valve	5	Ground	5 - 20Ω



SCIA2063E

Operation

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SCIA2066E

DTC P0744 A/T TCC S/V FUNCTION (LOCK-UP)

PFP:31940

Description

ACS007NF

- This is an OBD-II self-diagnostic item and not available in TCM self-diagnosis.
- This malfunction will not be detected while O/D OFF indicator lamp is indicating another self-diagnosis malfunction.
- This malfunction is detected when A/T does not shift into fourth gear position or torque converter clutch does not lock-up as instructed by TCM. This is not caused by electrical malfunction (circuits open or shorted) but by mechanical malfunction such as control valve sticking, improper solenoid valve operation, malfunctioning oil pump or torque converter clutch, etc.

CONSULT-II Reference Value

ACS007Z6

Item name	Condition	Display value (Approx.)
TCC S/V DUTY	Lock-up OFF ⇔ Lock-up ON	4% ⇔ 94%
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 92%

On Board Diagnosis Logic

ACS007NG

- This is an OBD-II self-diagnostic item.
- This diagnosis monitors actual gear position by checking the torque converter slip ratio calculated by TCM as follows:
  Torque converter slip ratio = A x C/B
  A: Output shaft revolution signal from revolution sensor
  B: Engine speed signal from ECM
  C: Gear ratio determined as gear position which TCM supposes
  If the actual gear position is much lower than the position (4th) supposed by TCM, the slip ratio will be much less than normal. In case the ratio does not reach the specified value, TCM judges this diagnosis malfunction.
  This malfunction will be caused when shift solenoid valve B is stuck closed.
- Gear positions supposed by TCM are as follows.
  In case of gear position with no malfunctions: 1, 2, 3 and 4 positions
  In case of gear position with shift solenoid valve B stuck closed: 1, 2, 2 and 1* positions to each gear position above
  *: P0744 is detected.
- Diagnostic trouble code “A/T TCC S/V FNCTN” with CONSULT-II is detected when A/T cannot perform lock-up even if electrical circuit is good.

Possible Cause

ACS007NH

Check the following.

- Line pressure solenoid valve
- Torque converter clutch solenoid valve
- Each clutch
- Hydraulic control circuit

DTC Confirmation Procedure

ACS007NI

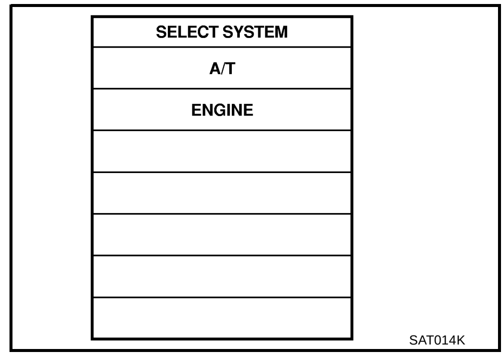
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this "DTC Confirmation Procedure" again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm that the malfunction is eliminated.

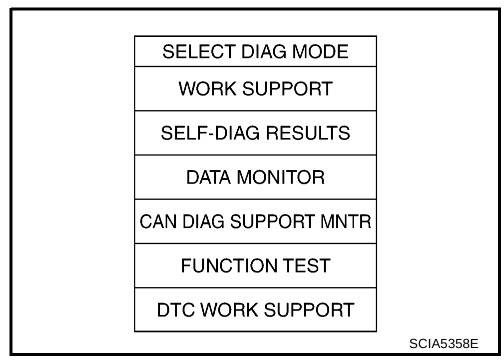
WITH CONSULT-II

1. Start engine and select "DATA MONITOR" mode for "A/T" with CONSULT-II.
2. Make sure that output voltage of A/T fluid temperature sensor is within the range below.
   FLUID TEMP SE: 0.4 - 1.5V
   If out of range, drive vehicle to decrease voltage (warm up the fluid) or stop engine to increase voltage (cool down the fluid).
3. Select "TCC S/V FNCTN P0744" of "DTC WORK SUPPORT" mode for "A/T" with CONSULT-II and touch "START".



SAT014K

4. Accelerate vehicle to more than 80 km/h (50 MPH) and maintain the following condition continuously until "TESTING" has turned to "COMPLETE". (It will take approximately 30 seconds after "TESTING" shows.)
   THROTTLE POSI: 1.0/8 - 2.0/8 (at all times during step 4)
   SLCT LVR POSI: "D" position
   TCC S/V DUTY: 94%
   VHCL/S SE·A/T: Constant speed of more than 80 km/h (50 MPH)



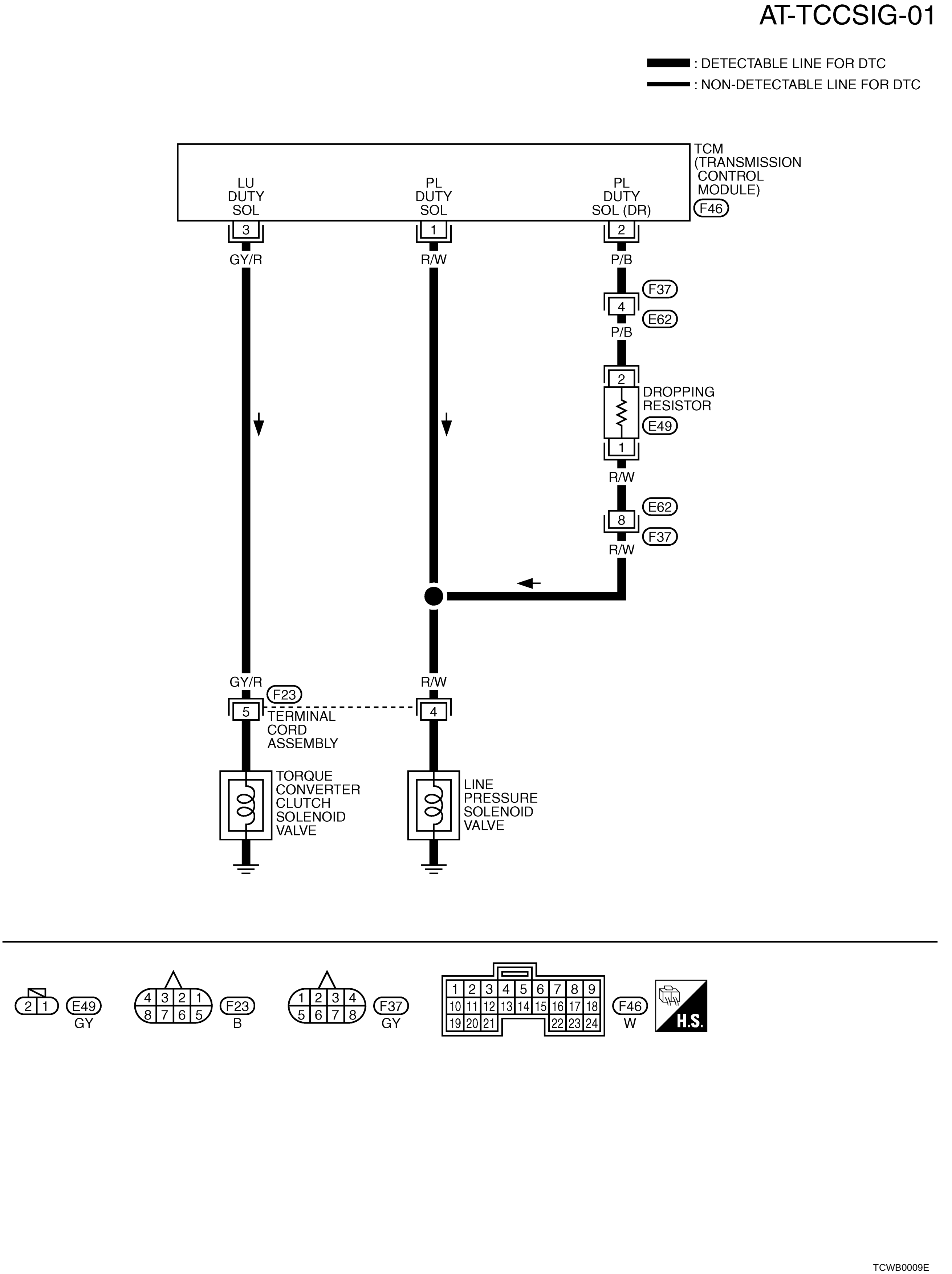
SCIA5358E

– **Make sure that "GEAR" shows "4".**
– **For shift schedule, refer to AT-66, "Vehicle Speed When Shifting Gears" .**
– **If "TESTING" does not appear on CONSULT-II for a long time, select "SELF-DIAG RESULTS". In case a 1st trip DTC other than "A/T TCC S/V FNCTN" is shown, refer to applicable "TROUBLE DIAGNOSIS FOR DTC".**

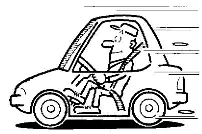
5. Make sure that "OK" is displayed. (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
   Refer to AT-150, "Diagnostic Procedure" .
   Refer to AT-66, "Vehicle Speed When Performing and Releasing Lock-Up" .

Wiring Diagram — AT — TCCSIG

ACS007X7



Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V
3	GY/R	Torque converter clutch solenoid valve		When A/T performs lock-up.	8 - 15V
				When A/T does not perform lock-up.	0V

Diagnostic Procedure

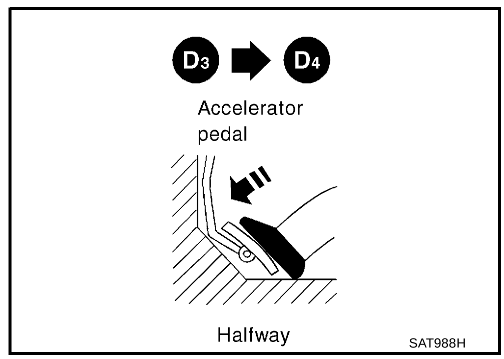
ACS007XA

1. CHECK SHIFT–UP (D_3 TO D_4)

During AT-60, "Cruise Test — Part 1" .

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 11.
NO >> GO TO 2.



2. CHECK LINE PRESSURE

Perform line pressure test. Refer to AT-55, "LINE PRESSURE TEST" .

Engine speed rpm	Line pressure kPa (kg/cm^2 , psi)	
	"D", "2" and "1" positions	"R" position
Idle	500 (5.1, 73)	778 (7.9, 113)
Stall	1,233 (12.6, 179)	1,918 (19.6, 278)

OK or NG

OK >> GO TO 3.
NG >> GO TO 6.

3. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check to ensure that:
- Valve, sleeve and plug slide along valve bore under their own weight.
- Valve, sleeve and plug are free from burrs, dents and scratches.
- Control valve springs are free from damage, deformation and fatigue.
- Hydraulic line is free from obstacles.

OK or NG

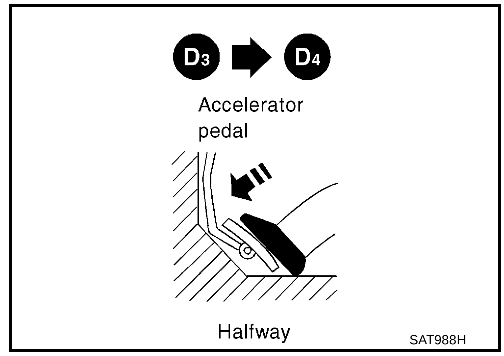
OK >> GO TO 4.
NG >> Repair or replace control valve.

4. CHECK SHIFT–UP (D_3 TO D_4)

During AT-60, "Cruise Test — Part 1" .

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 5.
NO >> Check control valve again. Repair or replace control valve assembly.



5. CHECK DTC

Perform AT-148, "DTC Confirmation Procedure" .

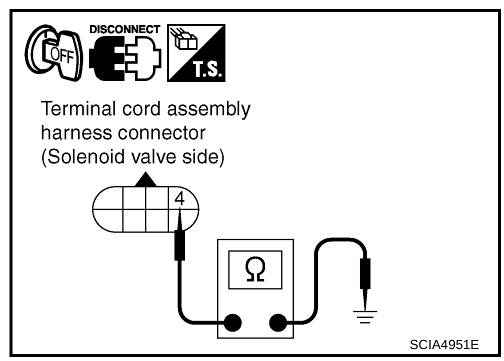
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

6. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
– Line pressure solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5Ω



OK or NG

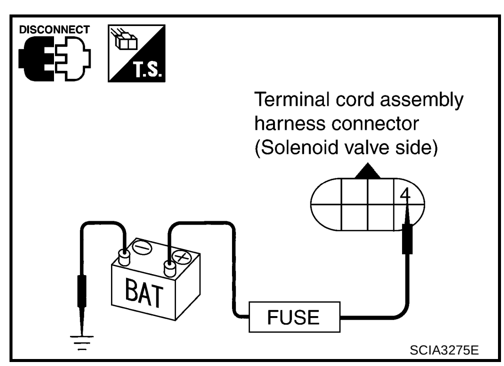
OK >> GO TO 7.
NG >> Replace solenoid valve assembly.

7. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
– Line pressure solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

OK or NG

OK >> GO TO 8.
NG >> Replace solenoid valve assembly.



8. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check line pressure circuit valves for sticking.
- Pressure regulator valve
- Pilot valve
- Pressure modifier valve

OK or NG

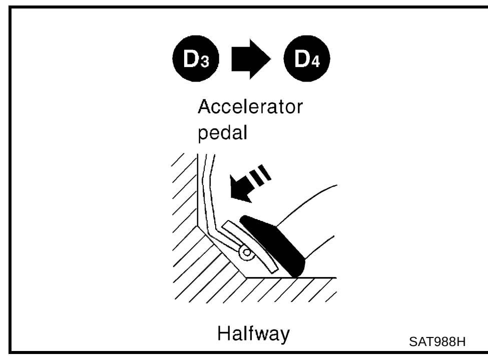
OK >> GO TO 9.
NG >> Repair or replace control valve.

9. CHECK SHIFT–UP (D_3 TO D_4)

During AT-60, "Cruise Test — Part 1" .

Does A/T shift from D_3 to D_4 at the specified speed?

YES >> GO TO 10.
NO >> Check control valve again. Repair or replace control valve assembly.



10. CHECK DTC

Perform AT-148, "DTC Confirmation Procedure" .

OK or NG

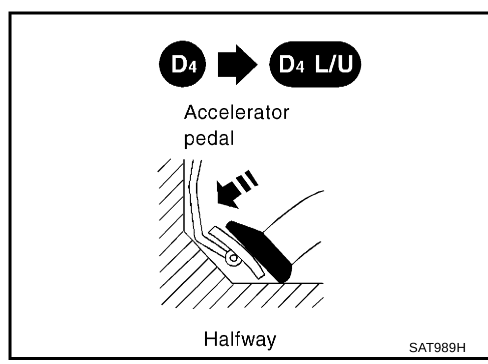
OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK LOCK–UP

During AT-60, "Cruise Test — Part 1" .

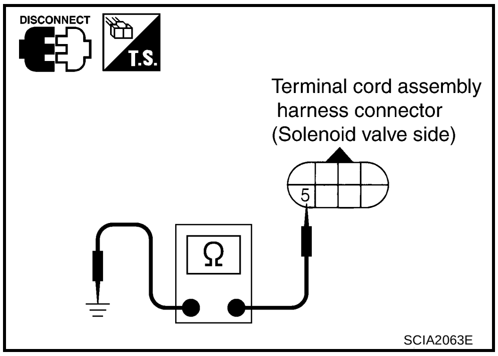
A/T perform lock-up at the specified speed?

YES >> Perform AT-60, "Cruise Test — Part 1" again and return to the start point of this test group.
NO >> GO TO 12.



12. CHECK VALVE RESISTANCE

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
- Torque converter clutch solenoid valve
2. Check resistance between terminal cord assembly harness connector terminal and ground.



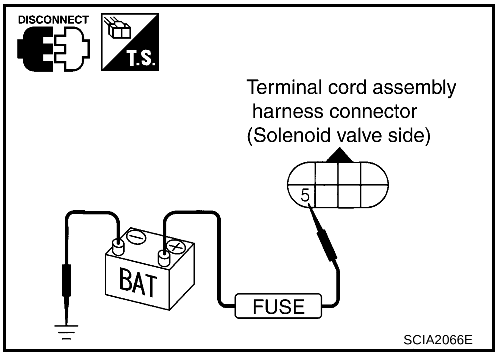
Solenoid valve	Terminal		Resistance (Approx.)
Torque converter clutch solenoid valve	5	Ground	5 - 20Ω

OK or NG

OK >> GO TO 13.
NG >> Replace solenoid valve assembly.

13. CHECK VALVE OPERATION

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
- Torque converter clutch solenoid valve
2. Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



OK or NG

OK >> GO TO 14.
NG >> Replace solenoid valve assembly.

14. CHECK CONTROL VALVE

1. Disassemble control valve assembly. Refer to AT-304, "Control Valve Assembly" .
2. Check control valves for sticking.
- Torque converter clutch control valve
- Torque converter clutch relief valve

OK or NG

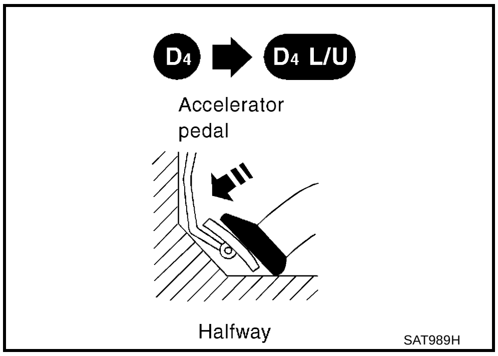
OK >> GO TO 15.
NG >> Repair or replace control valve.

15. CHECK LOCK–UP

During AT-60, "Cruise Test — Part 1" .

A/T perform lock-up at the specified speed?

YES >> GO TO 16.
NO >> Check control valve again. Repair or replace control valve assembly.



16. CHECK DTC

Perform AT-148, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> Perform AT-60, "Cruise Test — Part 1" again and return to the start point of this test group.

DTC P0745 LINE PRESSURE SOLENOID VALVE

PFP:31940

Description

ACS007SJ

Line pressure solenoid valve regulates oil pump discharge pressure to suit the driving condition in response to a signal sent from TCM.
The line pressure duty cycle value is not consistent when the closed throttle position switch is ON. To confirm the line pressure duty cycle at low pressure, accelerator (throttle) should be open until the closed throttle position switch is OFF.

CONSULT-II Reference Value

ACS007Z8

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 92%

On Board Diagnosis Logic

ACS007SK

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “L/PRESS SOL/CIRC” with CONSULT-II or 10th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

ACS007SL

Check the following.

- Harness or connector
  (The solenoid circuit is open shorted.)
- Line pressure solenoid valve

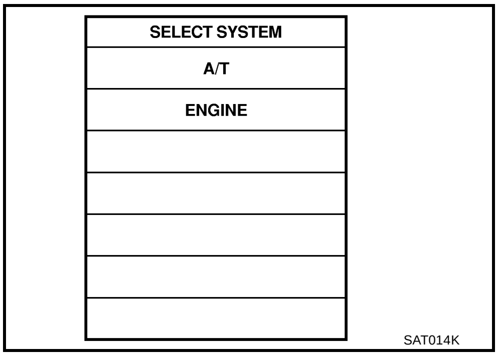
DTC Confirmation Procedure

ACS007SM

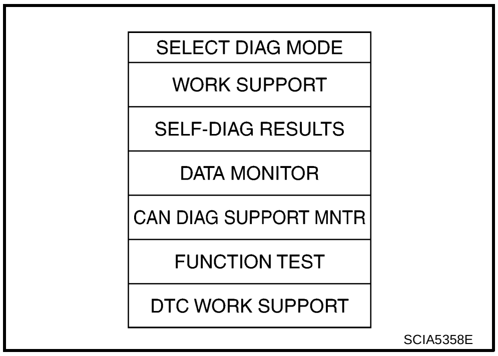
CAUTION:
If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.



2. Depress accelerator pedal completely and wait at least 5 seconds.
3. If check result is NG, go to AT-158, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II”.

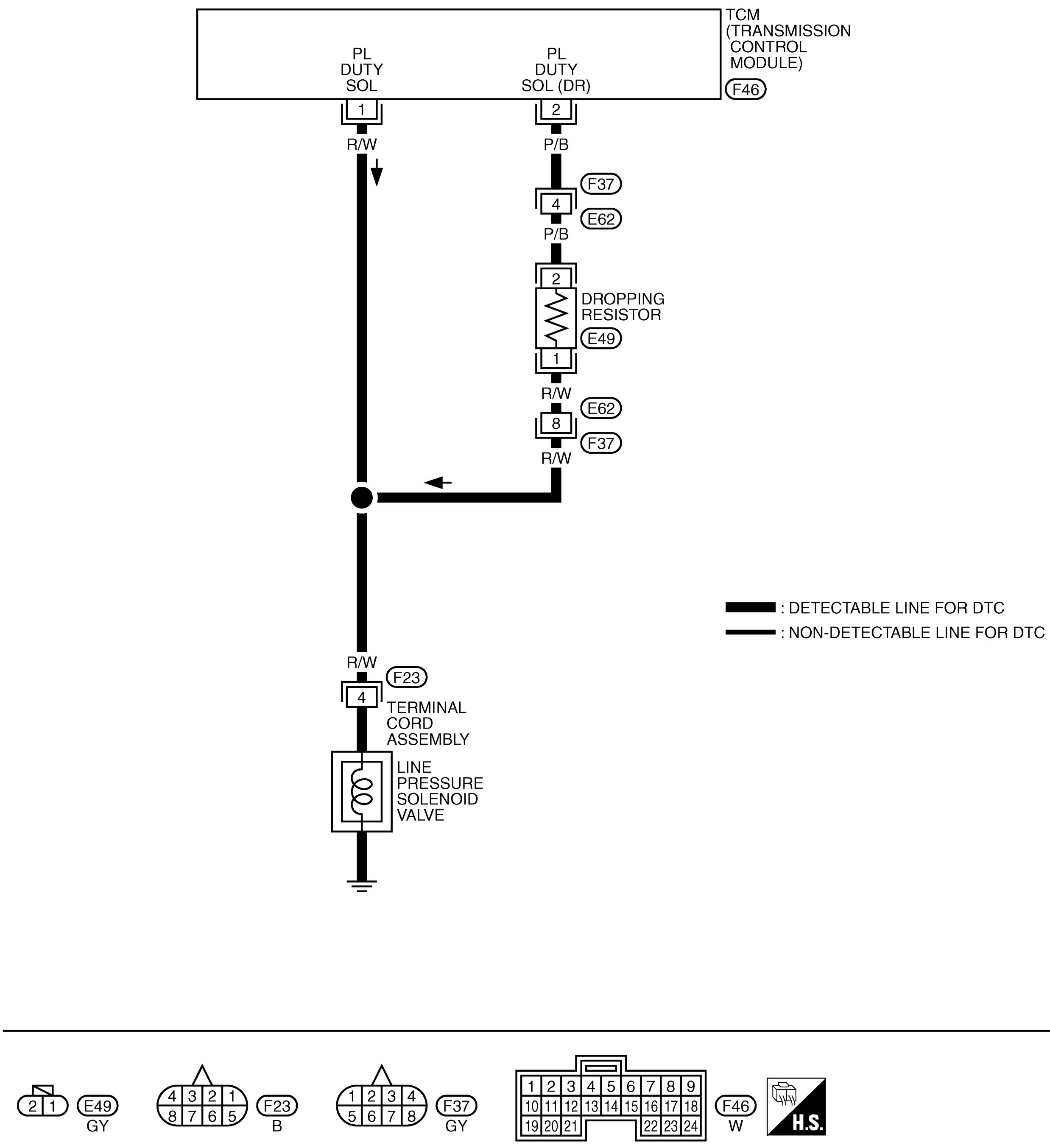
WITHOUT CONSULT-II

1. Start engine.
2. With brake pedal depressed, shift the lever from “P” → “N” → “D” → “N” → “P” positions.
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-158, "Diagnostic Procedure" .

Wiring Diagram — AT — LPSV

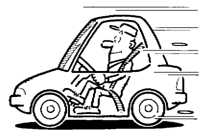
ACS007SN

AT-LPSV-01



TCWA0046E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
1	R/W	Line pressure solenoid valve		When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
				When depressing accelerator pedal fully after warming up engine.	0V
2	P/B	Line pressure solenoid valve (with dropping resistor)		When releasing accelerator pedal after warming up engine.	5 - 14V
				When depressing accelerator pedal fully after warming up engine.	0V

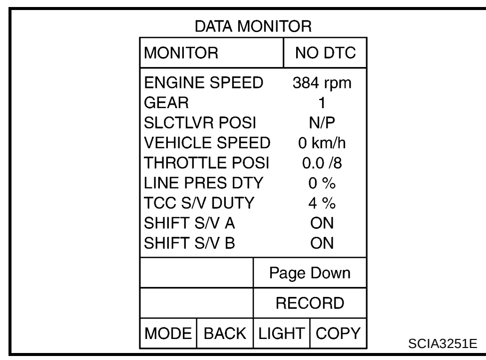
Diagnostic Procedure

ACS007SO

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “LINE PRES DTY” while driving.
   Check the value changes according to driving speed.

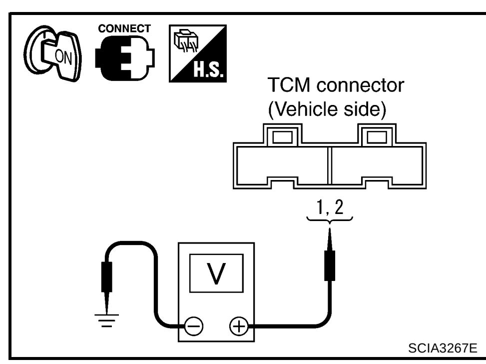


SCIA3251E

Item name	Condition	Display value (Approx.)
LINE PRES DTY	Small throttle opening (Low line pressure) ⇔ Large throttle opening (High line pressure)	0% ⇔ 92%

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.



SCIA3267E

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F46	1 (R/W) - Ground	When releasing accelerator pedal after warming up engine.	1.5 - 3.0V
			When depressing accelerator pedal fully after warming up engine.	0V
TCM connector	F46	2 (P/B) - Ground	When releasing accelerator pedal after warming up engine.	5 - 14V
			When depressing accelerator pedal fully after warming up engine.	0V

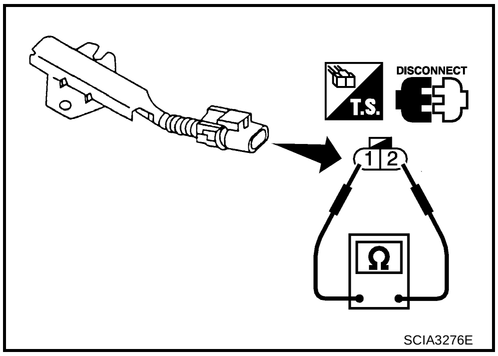
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK DROPPING RESISTOR

1. Turn ignition switch OFF.
2. Disconnect dropping resistor harness connector in engine room.
3. Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor harness connector	E49	1 - 2	12 Ω



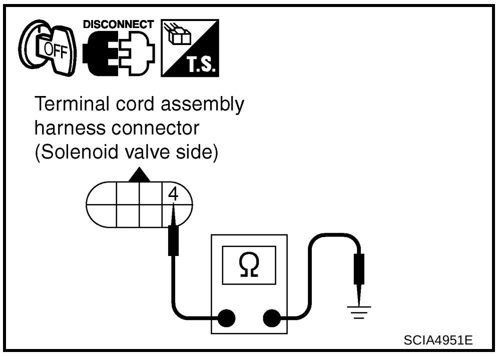
OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Line pressure solenoid valve	F23	4 - Ground	2.5 - 5.0 Ω



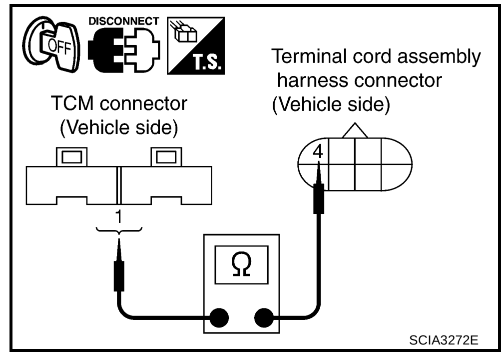
OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

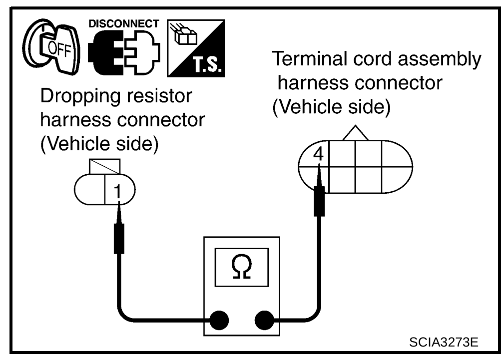
1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	1 (R/W)	Yes
Terminal cord assembly harness connector	F23	4 (R/W)	



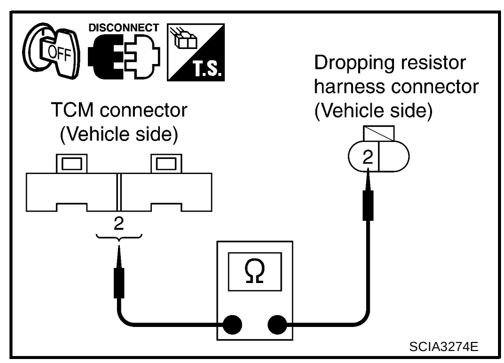
4. Check continuity between terminal cord assembly harness connector terminal and dropping resistor harness connector terminal.

Item	Connector	Terminal (Wire color)	Continuity
Dropping resistor harness connector	E49	1 (R/W)	Yes
Terminal cord assembly harness connector	F23	4 (R/W)	



5. Check continuity between dropping resistor harness connector terminal and TCM connector terminal.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	2 (P/B)	Yes
Dropping resistor harness connector	E49	2 (P/B)	



6. If OK, check harness for short to ground and short to power.
7. Reinstall any part removed.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK DTC

Perform AT-155, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

ACS007SP

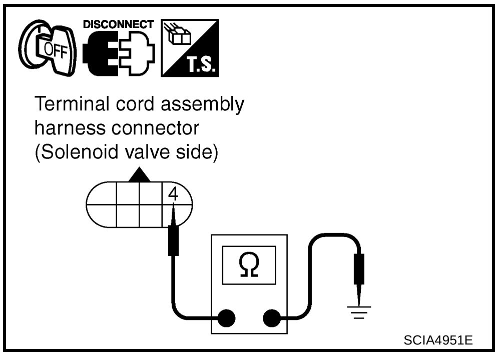
LINE PRESSURE SOLENOID VALVE

- For removal, refer to AT-260, "Control Valve Assembly and Accumulators" .

Resistance

- Check resistance between terminal and ground.

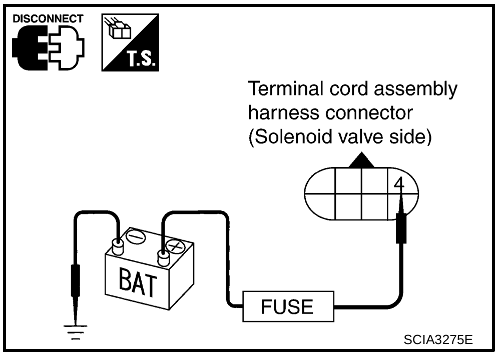
Solenoid valve	Terminal		Resistance (Approx.)
Line pressure solenoid valve	4	Ground	2.5 - 5.0Ω



SCIA4951E

Operation

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.

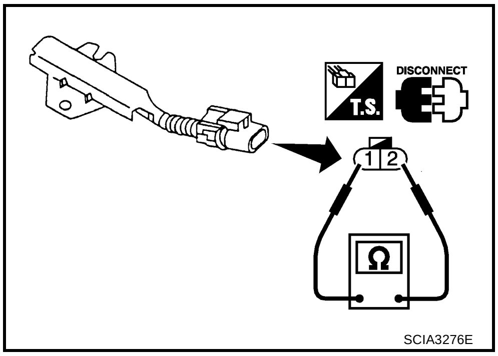


SCIA3275E

DROPPING RESISTOR

- Check resistance between terminals.

Item	Connector	Terminal	Resistance (Approx.)
Dropping resistor harness connector	E49	1 - 2	12 Ω



SCIA3276E

DTC P0750 SHIFT SOLENOID VALVE A

PFP:31940

Description

ACS007SQ

Shift solenoid valves A and B are turned ON or OFF by TCM in response to signals sent from PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II Reference Value

ACS007Z9

Item name	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D_1 ” or “D_4 ”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D_2 ” or “D_3 ”.)	OFF

On Board Diagnosis Logic

ACS007SR

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOLENOID/V A” with CONSULT-II or 4th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

ACS007SS

Check the following.

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve A

DTC Confirmation Procedure

ACS007ST

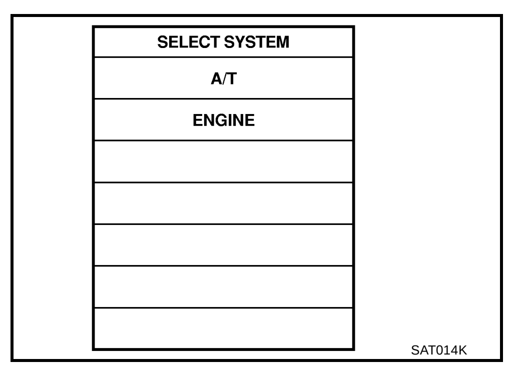
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.
3. Drive vehicle in “D” position and allow the transaxle to shift “1” → “2” (“GEAR”).
4. If the check result is NG, go to AT-164, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II”.

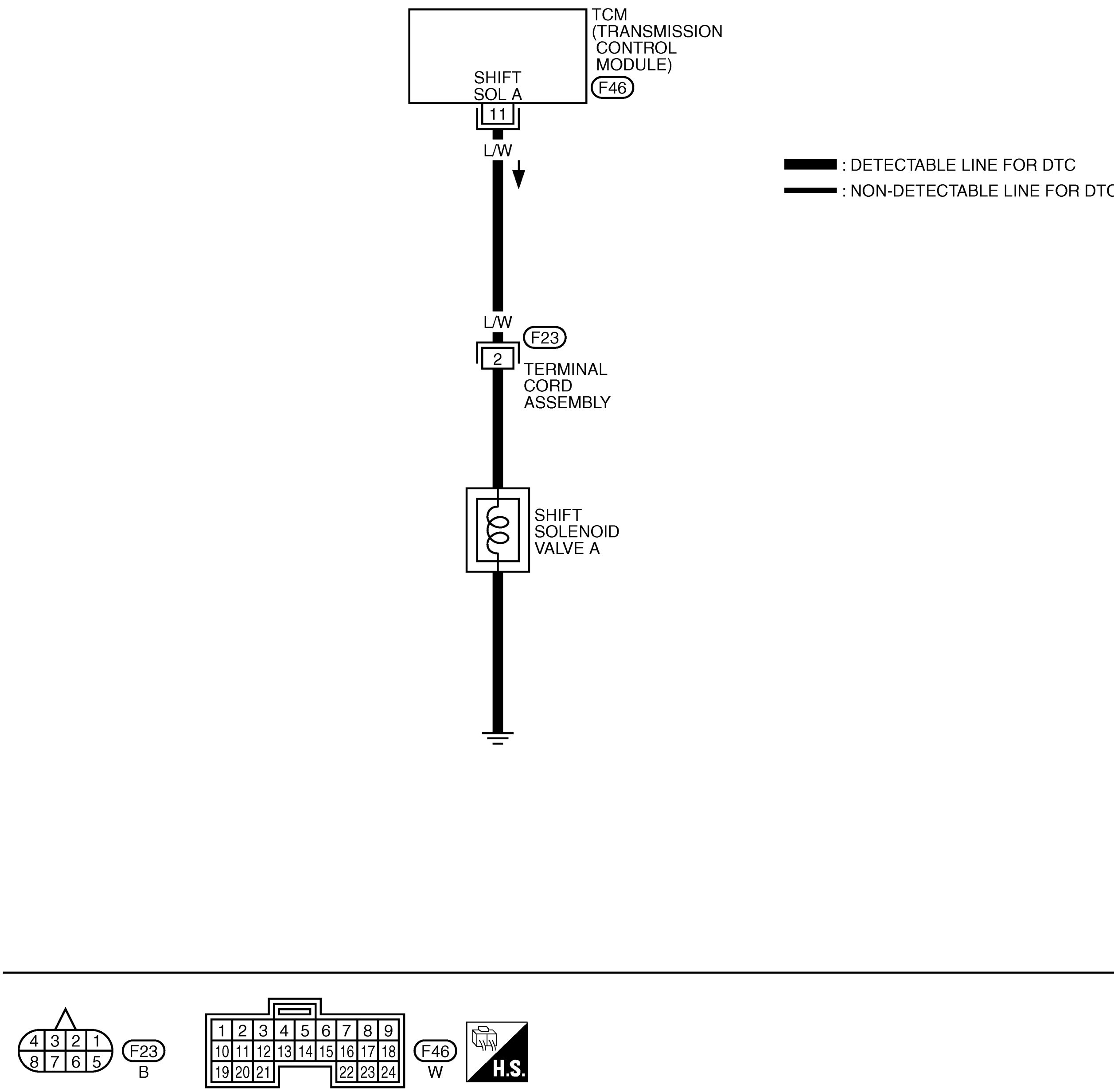
WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle in “D_1” → “D_2 ” position.
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-164, "Diagnostic Procedure" .

Wiring Diagram — AT — SSV/A

ACS007SU

AT-SSV/A-01



TCWA0040E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
11	L/W	Shift solenoid valve A		When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	Battery voltage
				When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	0V

Diagnostic Procedure

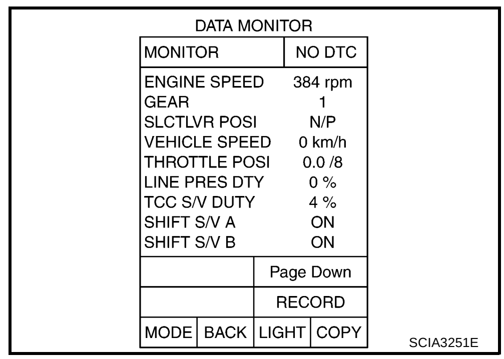
ACS007SV

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “SHIFT S/V A” while driving.
   Check the value changes according to driving speed.

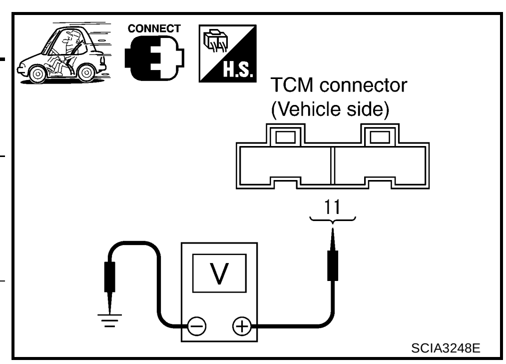
Item name	Condition	Display value
SHIFT S/V A	When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	ON
	When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	OFF



Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F46	11 (L/W) - Ground	When shift solenoid valve A operates. (When driving in “D1 ” or “D4 ”.)	Battery voltage
			When shift solenoid valve A does not operate. (When driving in “D2 ” or “D3 ”.)	0V

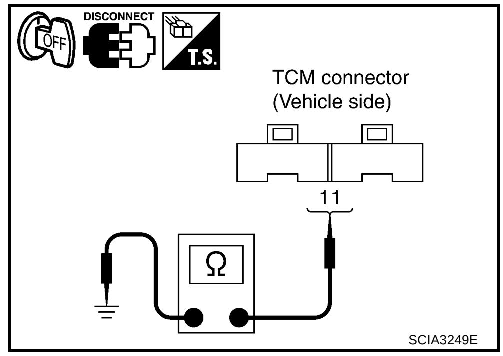


OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK SHIFT SOLENOID VALVE A CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.



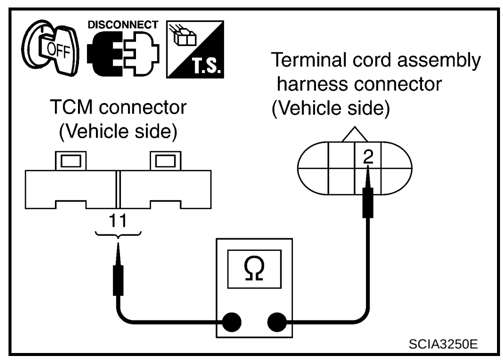
Solenoid valve	Connector	Terminal (Wire color)	Resistance (Approx.)
Shift solenoid valve A	F46	11 (L/W) - Ground	20 - 30 Ω

OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.



Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	11 (L/W)	Yes
Terminal cord assembly harness connector	F23	2 (L/W)	

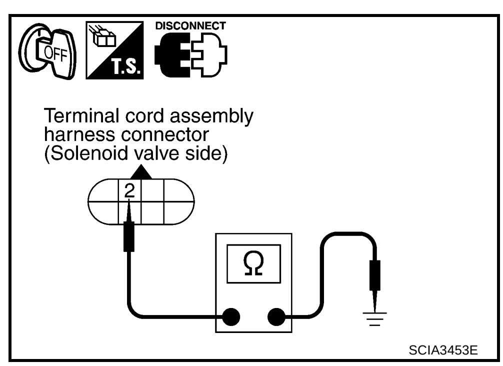
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve A	F23	2 - Ground	20 - 30 Ω

4. If OK, check continuity between ground and transaxle assembly.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-162, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

ACS007SW

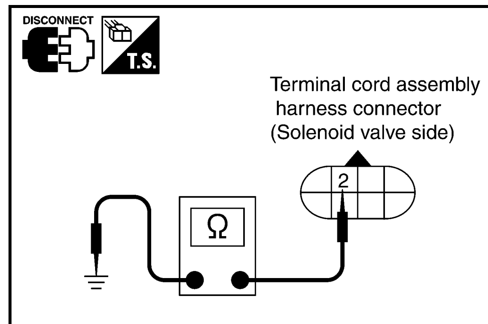
SHIFT SOLENOID VALVE A

- For removal, refer to AT-260, "Control Valve Assembly and Accumulators" .

Resistance

- Check resistance between terminal and ground.

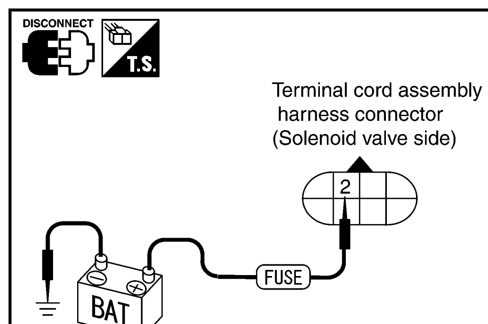
Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve A	2	Ground	20 - 30Ω



SCIA2049E

Operation

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SCIA2052E

DTC P0755 SHIFT SOLENOID VALVE B

PFP:31940

Description

ACS007SX

Shift solenoid valves A and B are turned ON or OFF by TCM in response to signals sent from PNP switch, vehicle speed and throttle position sensors. Gears will then be shifted to the optimum position.

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

CONSULT-II Reference Value

ACS007ZA

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in “D1 ” or “D2 ”.)	ON
	When shift solenoid valve B does not operate. (When driving in “D3 ” or “D4 ”.)	OFF

On Board Diagnosis Logic

ACS007SY

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “SHIFT SOLENOID/V B” with CONSULT-II or 5th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate the solenoid valve.

Possible Cause

ACS007SZ

Check the following.

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Shift solenoid valve B

DTC Confirmation Procedure

ACS007T0

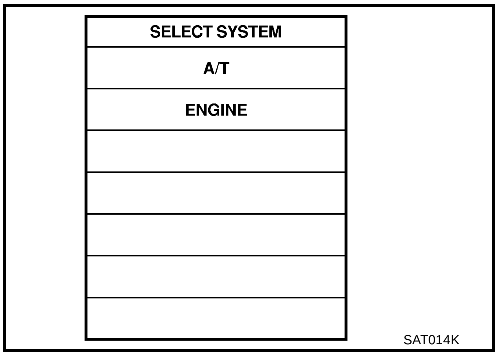
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.
3. Drive vehicle in “D” position and allow the transaxle to shift “1” → “2” → “3” (“GEAR”).
4. If the check result is NG, go to AT-169, "Diagnostic Procedure" .



SAT014K

WITH GST

Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

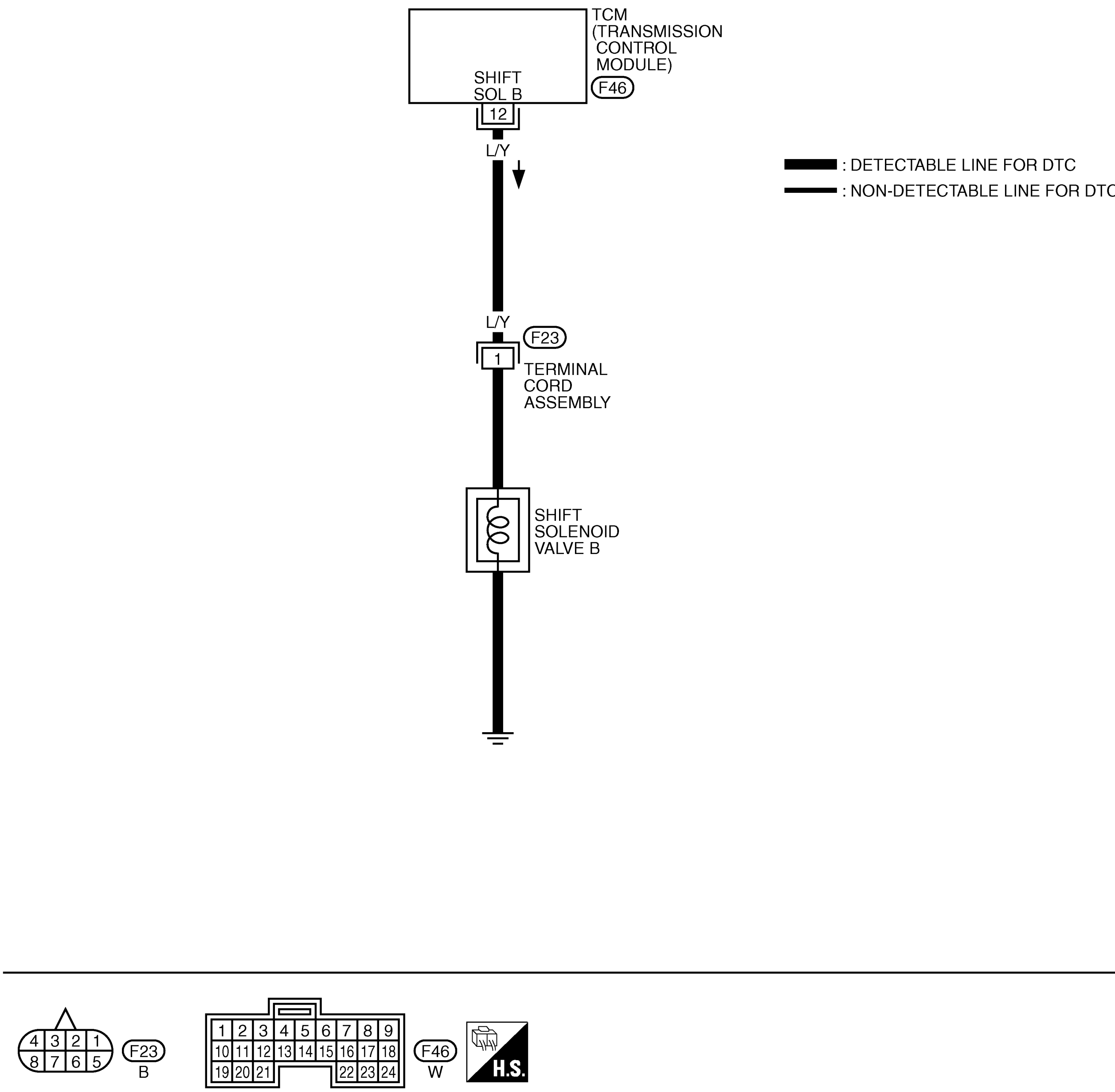
1. Start engine.
2. Drive vehicle in “D” → “D2” → “D3” position.
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-169, "Diagnostic Procedure" .

A B AT D E F G H I J K L M

Wiring Diagram — AT — SSV/B

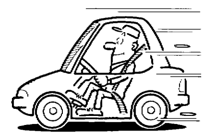
ACS007T1

AT-SSV/B-01



TCWA0041E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
12	L/Y	Shift solenoid valve B		When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	Battery voltage
				When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	0V

Diagnostic Procedure

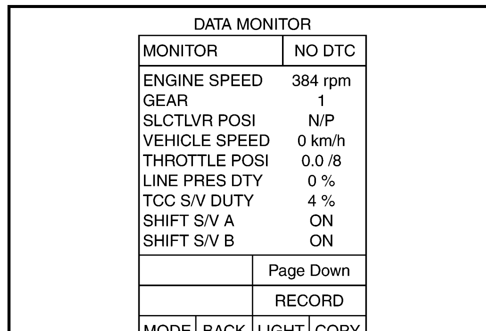
ACS007T2

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select "MAIN SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out the value of "SHIFT S/V B" while driving.
   Check the value changes according to driving speed.

Item name	Condition	Display value
SHIFT S/V B	When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	ON
	When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	OFF

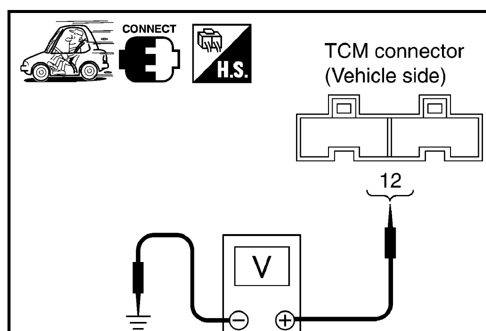


SCIA3251E

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F46	12 (L/Y) - Ground	When shift solenoid valve B operates. (When driving in "D1 " or "D2 ".)	Battery voltage
			When shift solenoid valve B does not operate. (When driving in "D3 " or "D4 ".)	0V



SCIA3253E

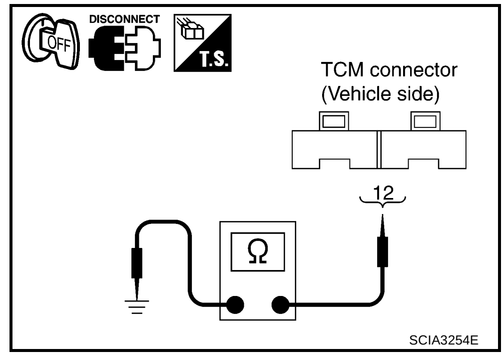
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK SHIFT SOLENOID VALVE B CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.

Solenoid valve	Connector	Terminal (Wire color)	Resistance (Approx.)
Shift solenoid valve B	F46	12 (L/Y) - Ground	5 - 20 Ω



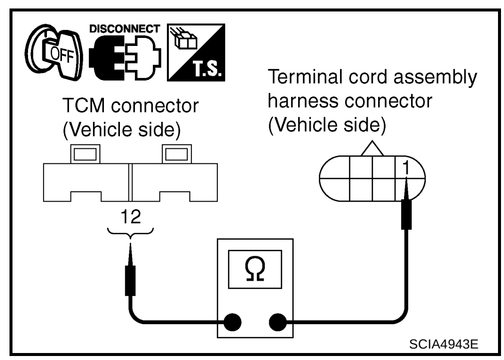
OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	12 (L/Y)	Yes
Terminal cord assembly harness connector	F23	1 (L/Y)	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

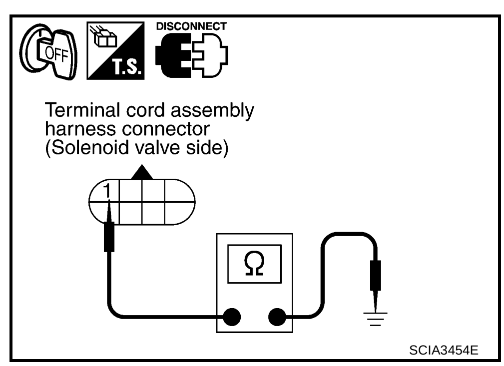
OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.

Solenoid valve	Connector	Terminal	Resistance (Approx.)
Shift solenoid valve B	F23	1 - Ground	5 - 20 Ω

4. If OK, check continuity between ground and transaxle assembly.



OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-167, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

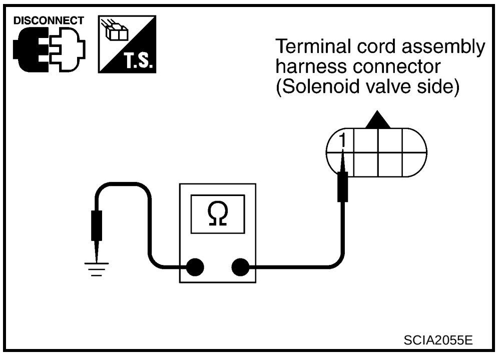
ACS007T3

SHIFT SOLENOID VALVE B

- For removal, refer to AT-260, "Control Valve Assembly and Accumulators" .

Resistance

- Check resistance between terminal and ground.

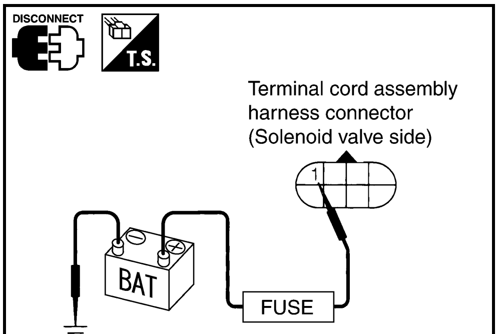


SCIA2055E

Solenoid valve	Terminal		Resistance (Approx.)
Shift solenoid valve B	1	Ground	5 - 20Ω

Operation

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



SCIA2058E

DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR

PFP:22620

Description

ACS007T4

Accelerator pedal position (APP) sensor is part of the system that controls throttle position. This system also uses an electric throttle control actuator, which consists of a throttle control motor and throttle position sensors. Accelerator pedal position signal is sent to the ECM.

CONSULT-II Reference Value

ACS007ZB

Item name	Condition	Display value (Approx.)
THRTL POS SEN	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V
		Fully-open throttle: 4.4V

On Board Diagnosis Logic

ACS007T5

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “THROTTLE POSI SEN” with CONSULT-II or 3rd judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the ECM.

Possible Cause

ACS007T6

Harness or connector
(The sensor circuit is open shorted.)

DTC Confirmation Procedure

ACS007T7

CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

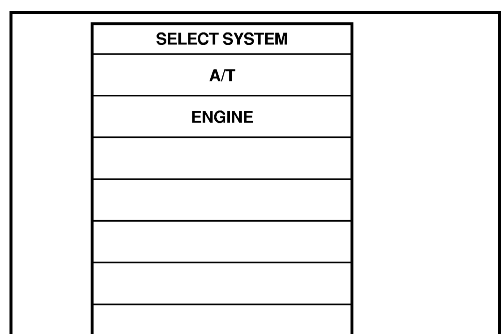
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Check the following.

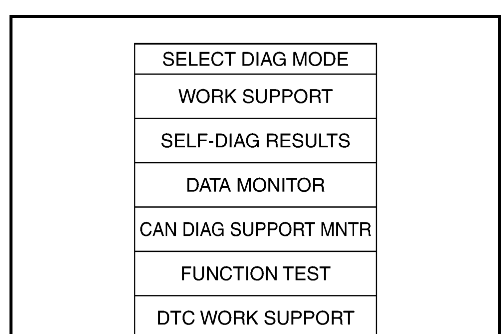
Accelerator pedal condition	THRTL POS SEN
Fully released	Approx. 0.8V
Partially depressed	0.8 - 4.4V
Fully depressed	Approx. 4.4V

   If the check result is NG, go to AT-175, "Diagnostic Procedure" .
   If the check result is OK, go to following step.



SAT014K

3. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
4. Start engine and maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   THRTL POS SEN: Approximately 3V or less
   SLCT LVR POSI: “D” position (OD ON)
   If the check result is NG, go to AT-175, "Diagnostic Procedure" .
   If the check result is OK, go to following step.



SCIA5358E

5. Maintain the following conditions for at least 3 consecutive seconds. Then release accelerator pedal completely.
   VEHICLE SPEED: 10 km/h (6 MPH) or more
   THRTL POS SEN: Wide open throttle
   SLCT LVR POSI: “D” position (OD ON)

WITH GST

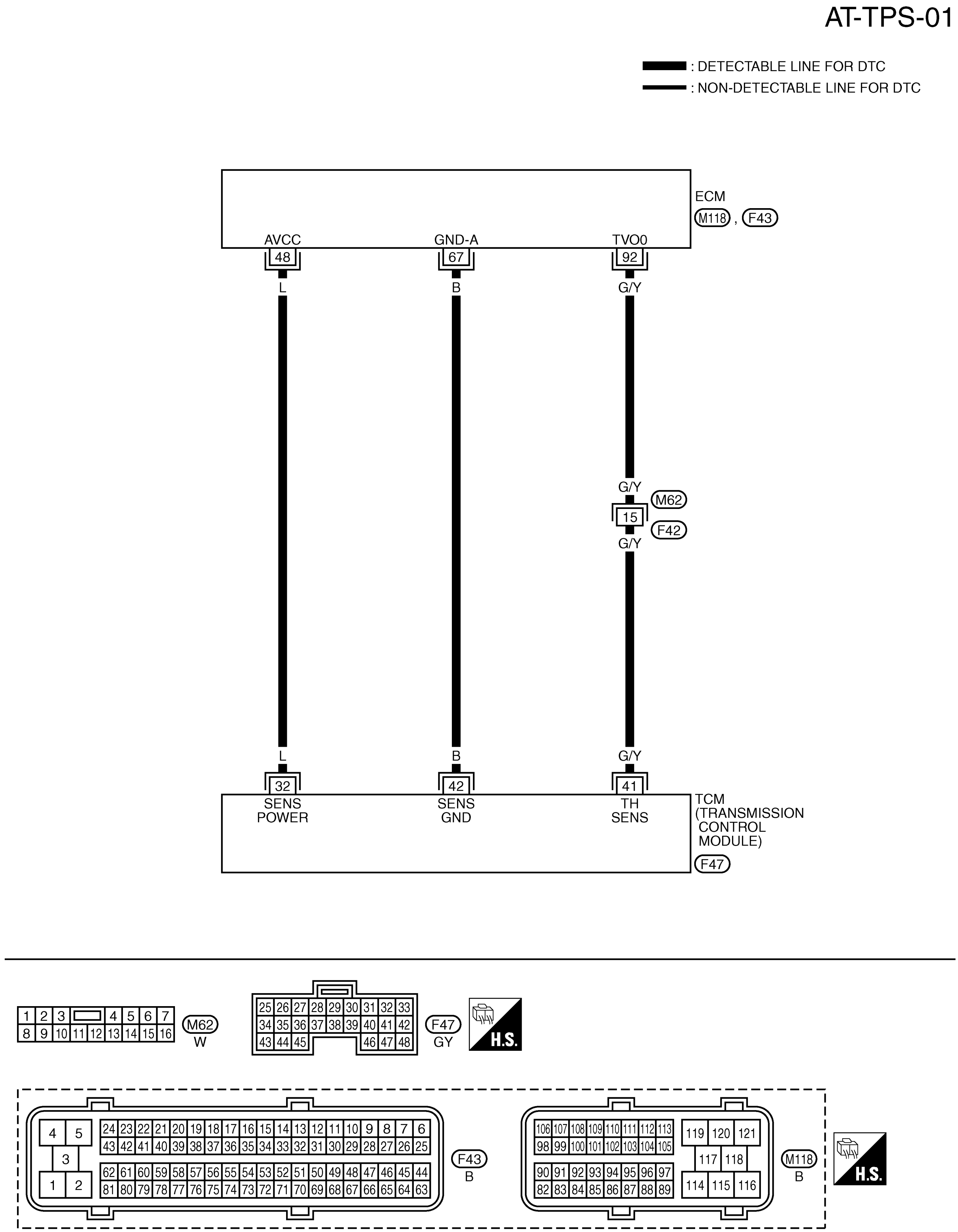
Follow the procedure “WITH CONSULT-II”.

WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions for more than 3 seconds.
   Selector lever position: “D” position
   Vehicle speed: 10km/h (6MPH) or more
   Throttle position: greater than 4.0/8 of the full throttle position
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-175, "Diagnostic Procedure" .

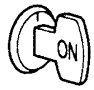
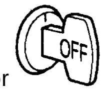
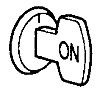
Wiring Diagram — AT — TPS

ACS007T8



TCWB0010E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
32	L	Sensor power	 or 	When turning ignition switch to “ON”.	4.5 - 5.5V
				When turning ignition switch to “OFF”.	0V
41	G/Y	Accelerator pedal position (APP) sensor		When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V Fully-open throttle: 4.4V
42	B	Sensor ground	Always		0V

Diagnostic Procedure

ACS007XB

1. CHECK DTC WITH ECM

- Check DTC with CONSULT-II “ENGINE”.
  Turn ignition switch ON and select “SELF DIAGNOSTIC RESULTS” mode for “ENGINE” with CONSULT-II. Refer to EC-123, "CONSULT-II Function (ENGINE)" .

OK or NG

OK >> GO TO 2.

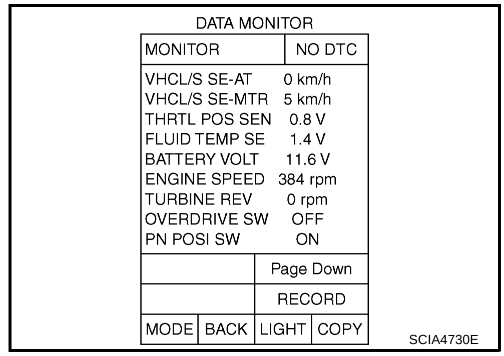
NG >> Check accelerator pedal position (APP) sensor circuit for engine control. Refer to EC-555, "DTC P2122, P2123 APP SENSOR" , EC-562, "DTC P2127, P2128 APP SENSOR" and EC-578, "DTC P2138 APP SENSOR" . If CAN communication line is detected, GO TO AT-95, "DTC U1000 CAN COMMUNICATION LINE" .

2. CHECK INPUT SIGNAL

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “THRTL POS SEN”.

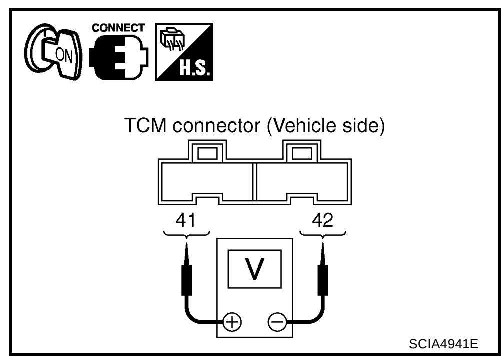
Item name	Condition	Display value (Approx.)
THRTL POS SEN	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V
		Fully-open throttle: 4.4V



Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F47	41(G/Y) - 42(B)	When depressing accelerator pedal slowly after warming up engine. (Voltage rises gradually in response to throttle position.)	Fully-closed throttle: 0.8V Fully-open throttle: 4.4V



OK or NG

OK >> GO TO 3.
NG >> Check harness for short or open between ECM and TCM regarding throttle position sensor circuit.

3. CHECK DTC

Perform AT-172, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

DTC P1760 OVERRUN CLUTCH SOLENOID VALVE

PFP:31940

Description

ACS007TA

Overrun clutch solenoid valve is activated by TCM in response to signals sent from PNP switch, overdrive control switch, vehicle speed and throttle position sensors. Overrun clutch operation will then be controlled.

CONSULT-II Reference Value

ACS007ZC

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates.	ON
	When overrun clutch solenoid valve does not operate.	OFF

On Board Diagnosis Logic

ACS007TB

- This is an OBD-II self-diagnostic item.
- Diagnostic trouble code “OVERRUN CLUTCH S/V” with CONSULT-II or 6th judgement flicker without CONSULT-II is detected when TCM detects an improper voltage drop when it tries to operate solenoid valve.

Possible Cause

ACS007TC

Check the following.

- Harness or connector
  (The solenoid circuit is open or shorted.)
- Overrun clutch solenoid valve

DTC Confirmation Procedure

ACS007TD

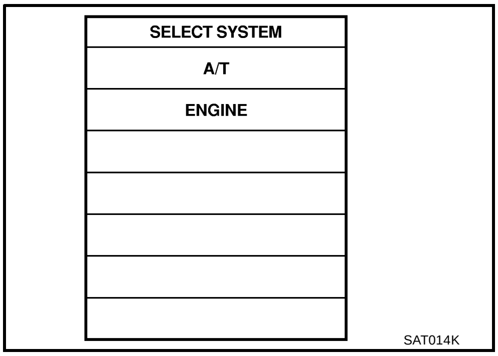
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

TESTING CONDITION:
Always drive vehicle on a level road to improve accuracy of test.
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.
2. Start engine.
3. Accelerate vehicle to a speed of more than 10 km/h (6 MPH) with “D” position (OD ON).
4. Release accelerator pedal completely with “D” position (OD OFF).



WITH GST

Follow the procedure “WITH CONSULT-II”.

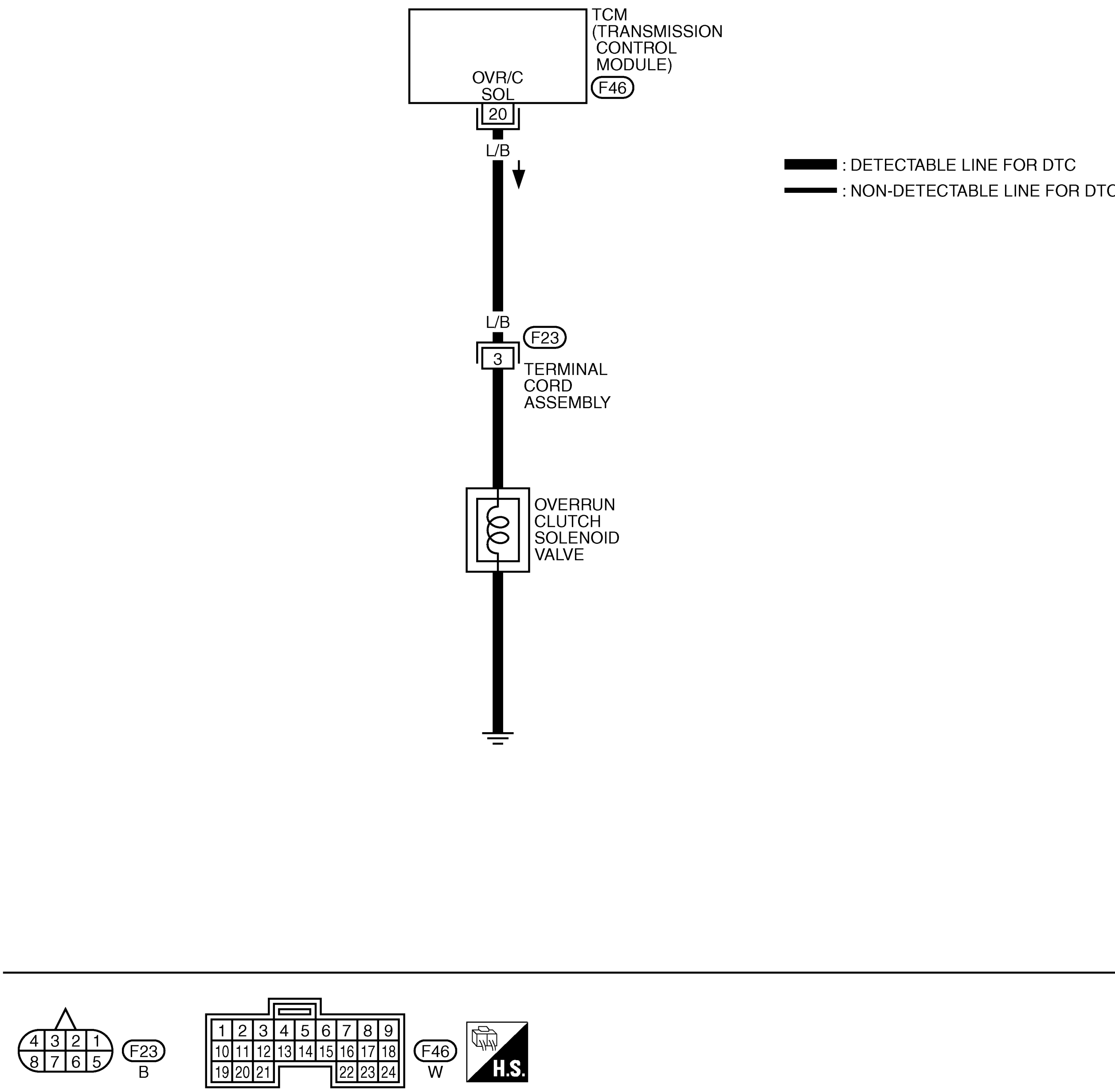
WITHOUT CONSULT-II

1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” position (OD ON), vehicle speed higher than 10 km/h (6 MPH).
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-179, "Diagnostic Procedure" .

Wiring Diagram — AT — OVRCSV

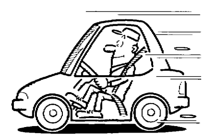
ACS007TE

AT-OVRCSV-01



TCWA0042E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
20	L/B	Overrun clutch solenoid valve		When overrun clutch solenoid valve operates.	Battery voltage
				When overrun clutch solenoid valve does not operate.	0V

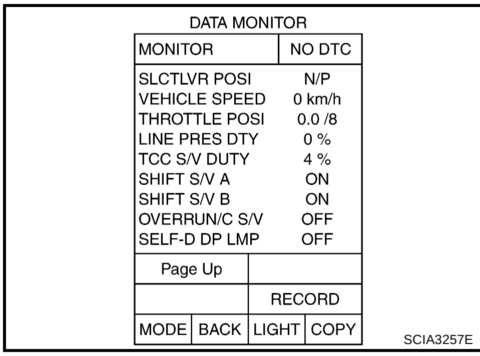
Diagnostic Procedure

ACS007TF

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “MAIN SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “OVERRUN/C S/V” while driving.
   Check the value changes according to driving speed.

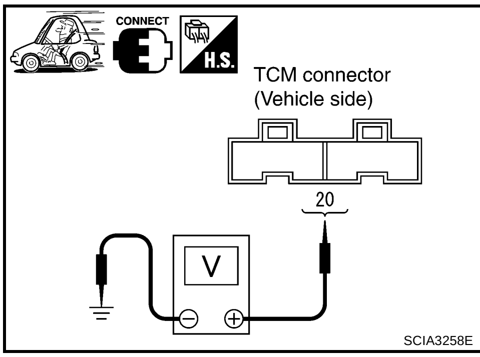


SCIA3257E

Item name	Condition	Display value
OVERRUN/C S/V	When overrun clutch solenoid valve operates.	ON
	When overrun clutch solenoid valve does not operate.	OFF

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.



SCIA3258E

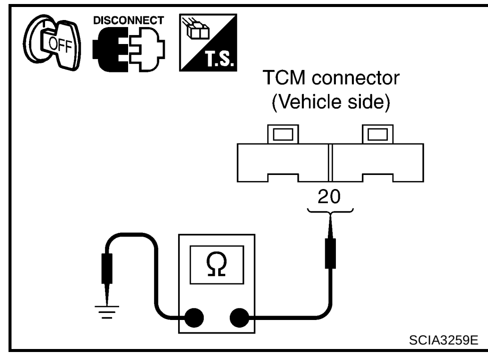
Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F46	20 (L/B) - Ground	When overrun clutch solenoid valve operates.	Battery voltage
			When overrun clutch solenoid valve does not operate.	0V

OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK OVERRUN CLUTCH SOLENOID VALVE CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminal and ground.



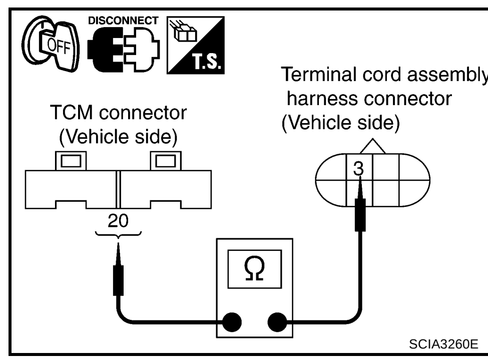
Solenoid valve	Connector	Terminal (Wire color)	Resistance (Approx.)
Overrun clutch solenoid valve	F46	20 (L/B) - Ground	20 - 30 Ω

OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminal and TCM connector terminal.



Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F46	20 (L/B)	Yes
Terminal cord assembly harness connector	F23	3 (L/B)	

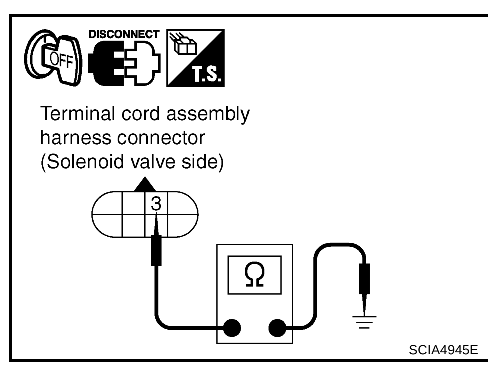
4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK VALVE RESISTANCE

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness connector terminal and ground.



Solenoid valve	Connector	Terminal	Resistance (Approx.)
Overrun clutch solenoid valve	F23	3 - Ground	20 - 30 Ω

4. If OK, check continuity between ground and transaxle assembly.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK DTC

Perform AT-177, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Component Inspection

ACS007TG

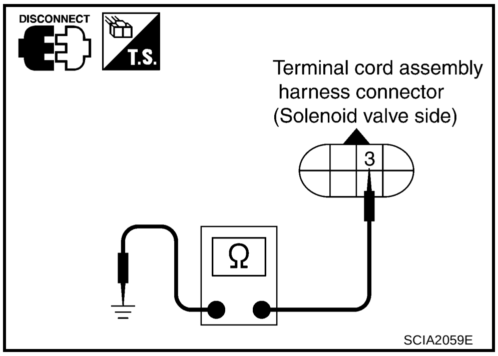
OVERRUN CLUTCH SOLENOID VALVE

- For removal, refer to AT-260, "Control Valve Assembly and Accumulators" .

Resistance

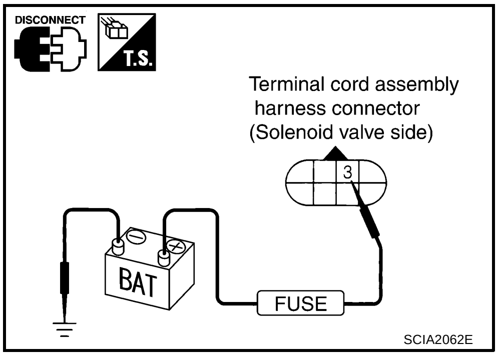
- Check resistance between terminal and ground.

Solenoid valve	Terminal		Resistance (Approx.)
Overrun clutch solenoid valve	3	Ground	20 - 30Ω



Operation

- Check solenoid valve by listening for its operating sound while applying battery voltage to the terminal and ground.



DTC VEHICLE SPEED SENSOR MTR

PFP:24814

Description

ACS007TH

Vehicle speed sensor·MTR is built into speedometer assembly. The sensor functions is an auxiliary device to the revolution sensor when it is malfunctioning. TCM will then use a signal sent from vehicle speed sensor·MTR.

CONSULT-II Reference Value

ACS007ZD

Item name	Condition	Display value
VHCL/S SE·MTR	During driving	Approximately matches the speedometer reading.

On Board Diagnosis Logic

ACS007TI

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “VHCL SPEED SEN·MTR” with CONSULT-II or 2nd judgement flicker without CONSULT-II is detected when TCM does not receive the proper voltage signal from the sensor.

Possible Cause

ACS007TJ

Check the following.

- Harness or connector
  (The sensor circuit is open or shorted.)
- Vehicle speed sensor

DTC Confirmation Procedure

ACS007TK

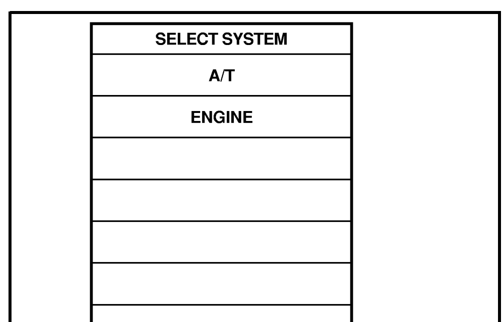
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

After the repair, perform the following procedure to confirm that the malfunction is eliminated.

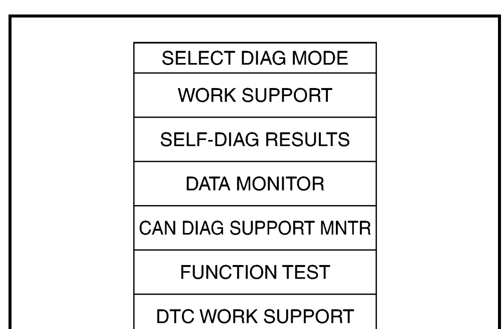
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for “A/T” with CONSULT-II.



SAT014K

2. Start engine and accelerate vehicle from 0 to 25 km/h (0 to 16 MPH).
3. If the check result is NG, go to AT-185, "Diagnostic Procedure" .



SCIA5358E

WITH GST

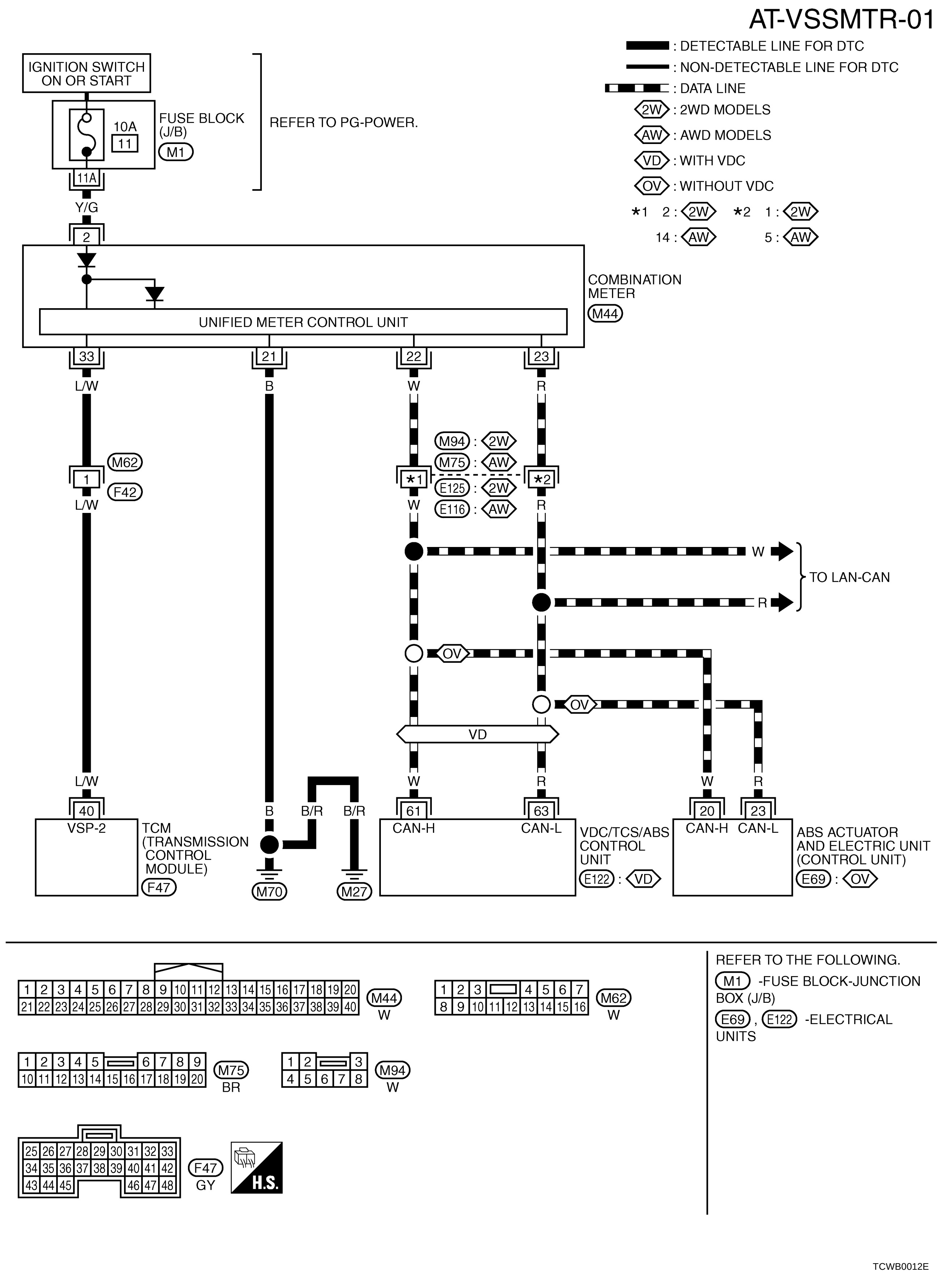
Follow the procedure “WITH CONSULT-II”

WITHOUT CONSULT-II

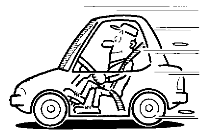
1. Start engine.
2. Drive vehicle under the following conditions:
   Selector lever in “D” and vehicle speed higher than 25 km/h (16 MPH).
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-185, "Diagnostic Procedure" .

Wiring Diagram — AT — VSSMTR

ACS007TL



Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
40	L/W	Vehicle speed sensor		When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0V and more than 4.5V

Diagnostic Procedure

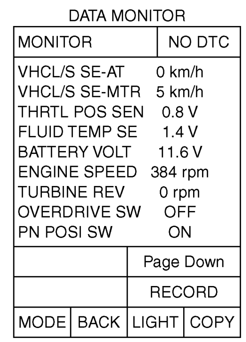
ACS007TM

1. CHECK INPUT SIGNAL

With CONSULT-II

1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “VHCL/S SE·MTR” while driving.
   Check the value changes according to driving speed.

Item name	Condition	Display value
VHCL/S SE·MTR	During driving	Approximately matches the speedometer reading.

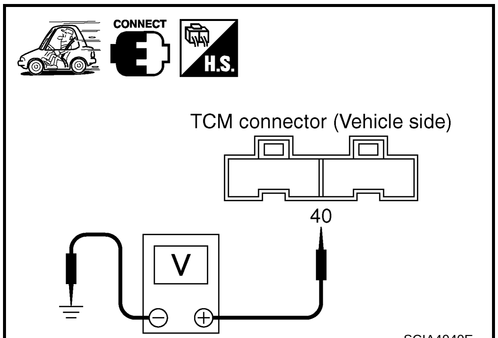


SCIA4730E

Without CONSULT-II

1. Start engine.
2. Check voltage between TCM connector terminal and ground.

Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F47	40(L/W) - Ground	When moving vehicle at 2 to 3 km/h (1 to 2 MPH) for 1 m (3 ft) or more.	Voltage varies between less than 0V and more than 4.5V



SCIA4940E

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following.

- Combination meter. Refer to DI-4, "COMBINATION METERS" .
- Harness for short or open between TCM and combination meter.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK DTC

Perform AT-182, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

DTC BATT/FLUID TEMP SEN (A/T FLUID TEMP SENSOR CIRCUIT AND TCM POWER SOURCE)

PFP:31940

Description

ACS007TN

A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to TCM.

CONSULT-II Reference Value

ACS007ZE

Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V

On Board Diagnosis Logic

ACS007TO

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “BATT/FLUID TEMP SEN” with CONSULT-II or 8th judgement flicker without CONSULT-II is detected when TCM receives an excessively low or high voltage from the sensor.

Possible Cause

ACS008QL

Check the following items.

- Harness or connector (Sensor circuit is open or shorted.)
- A/T fluid temperature sensor

DTC Confirmation Procedure

ACS007TP

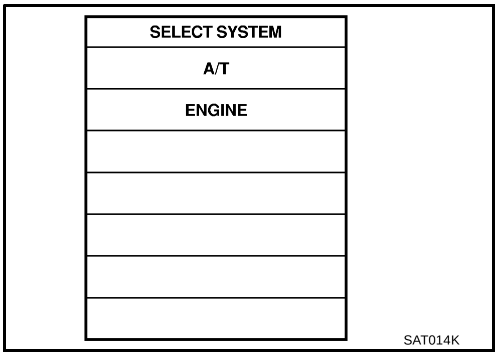
CAUTION:

- **Always drive vehicle at a safe speed.**
- **If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.**

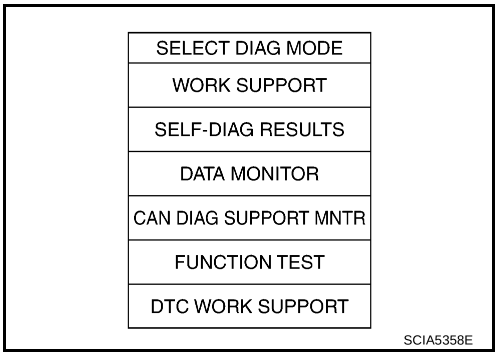
After the repair, perform the following procedure to confirm that the malfunction is eliminated.

WITH CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.



3. Drive vehicle under the following conditions.
SLCT LVR POSI: “D” position (OD ON)
VEHICLE SPEED: higher than 20 km/h (12 MPH)



WITH GST

Follow the procedure “WITH CONSULT-II”.

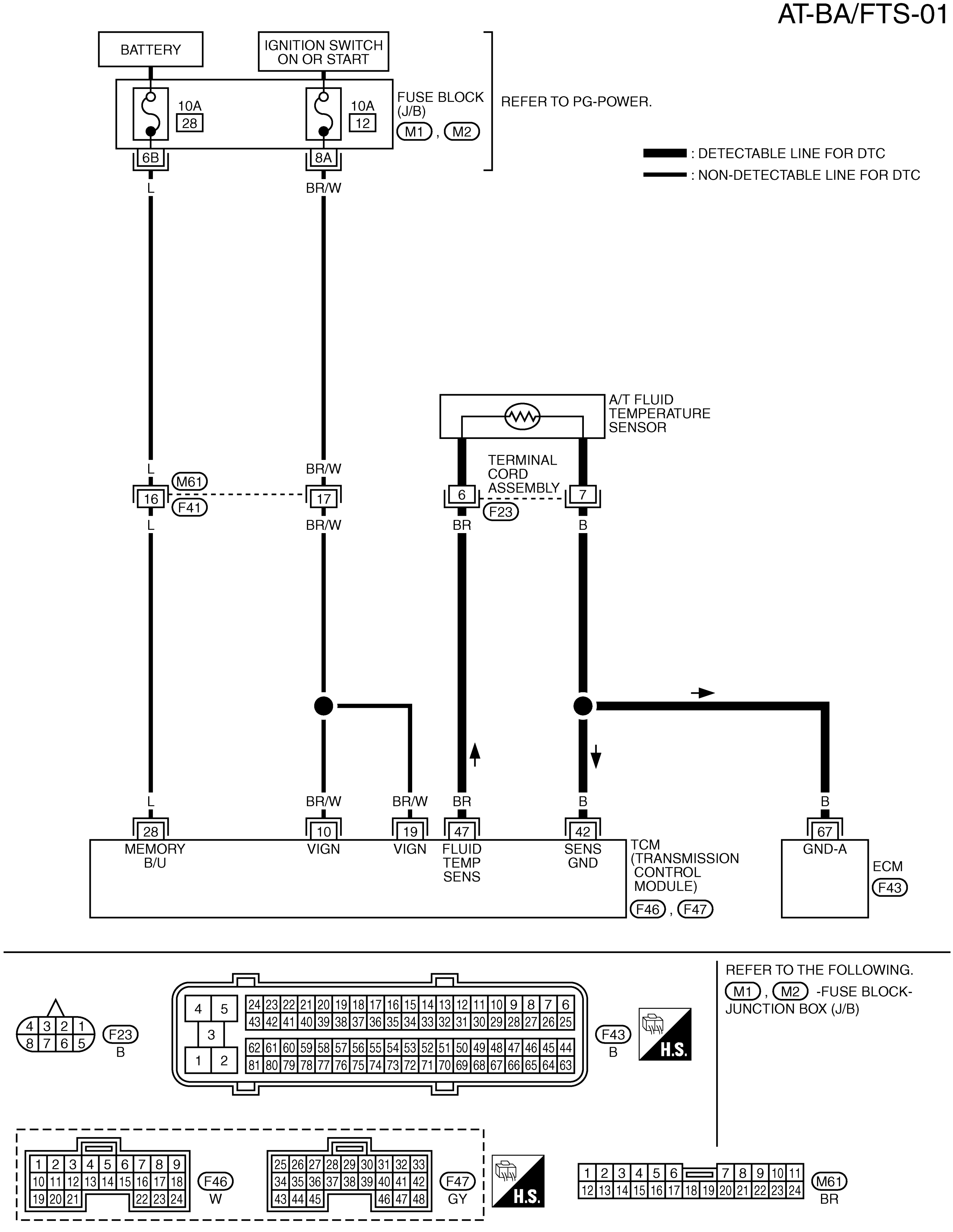
A
B
AT
D
E
F
G
H
I
J
K
L
M

WITHOUT CONSULT-II

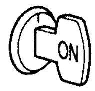
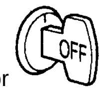
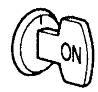
1. Start engine.
2. Drive vehicle under the following conditions.
   Selector lever: “D” position (OD ON)
   Vehicle speed: higher than 20 km/h (12 MPH)
3. Perform self-diagnosis.
   Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .
4. If the check result is NG, go to AT-190, "Diagnostic Procedure" .

Wiring Diagram — AT — BA/FTS

ACS007TQ



Data are reference value and are measured between each terminal and ground.

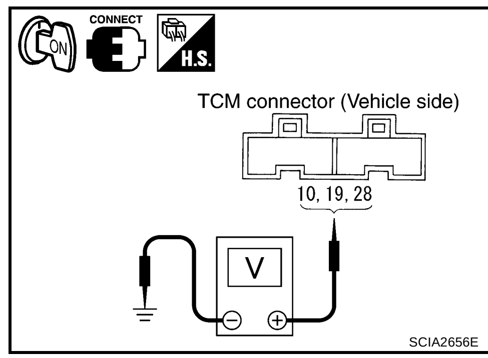
Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
10	BR/W	Power source	 or 	When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
19	BR/W	Power source		Same as No. 10	
28	L	Power source (Memory back-up)	Always		Battery voltage
42	B	Sensor ground	Always		0V
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	1.5V
				When ATF temperature is 80°C (176°F).	0.5V

Diagnostic Procedure

ACS007TR

1. CHECK TCM POWER SOURCE

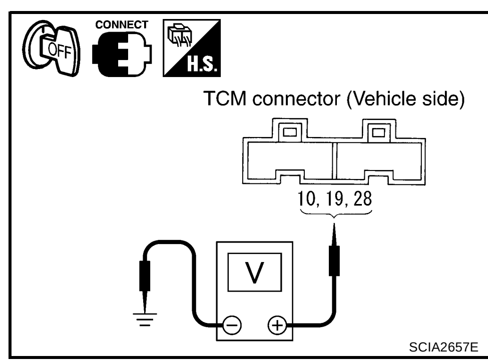
1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.



SCIA2656E

Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46	10 (BR/W)	Battery voltage
		19 (BR/W)	
	F47	28 (L)	

3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.



SCIA2657E

Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46	10 (BR/W)	0V
		19 (BR/W)	0V
	F47	28 (L)	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and TCM connector terminals 10, 19.
- Harness for short or open between battery and TCM connector terminal 28.
- 10A fuse (No.12, No.28, located in the fuse block)
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

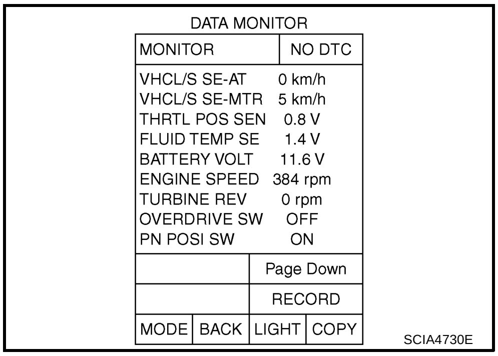
OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

3. CHECK INPUT SIGNAL OF A/T FLUID TEMPERATURE SENSOR

With CONSULT-II

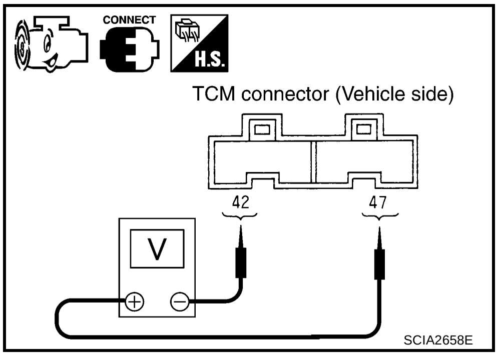
1. Start engine.
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out the value of “FLUID TEMP SE”.



Item name	Condition	Display value (Approx.)
FLUID TEMP SE	When ATF temperature is 20°C (68°F).	1.5V
	When ATF temperature is 80°C (176°F).	0.5V

Without CONSULT-II

1. Start engine.
2. Check voltage TCM connector terminals while warming up A/T.



Item	Connector	Terminal (Wire color)	Condition	Judgement standard (Approx.)
TCM connector	F47	47 (BR) - 42 (B)	When ATF temperature is 20°C (68°F).	1.5V
			When ATF temperature is 80°C (176°F).	0.5V

OK or NG

OK >> GO TO 9.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between TCM, ECM and terminal cord assembly harness connector
- Ground circuit for ECM
  Refer to PG-2, "POWER SUPPLY ROUTING" .

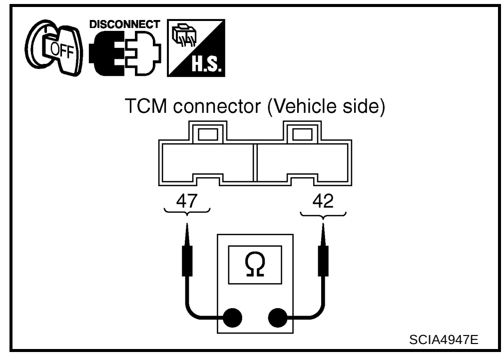
OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK FLUID TEMPERATURE SENSOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check resistance between TCM connector terminals.

Item	Connector	Terminal (Wire color)	Temperature °C (°F)	Resistance (Approx.)
TCM connector	F47	47 (BR) - 42 (B)	20 (68)	2.5 KΩ
			80 (176)	0.3 KΩ



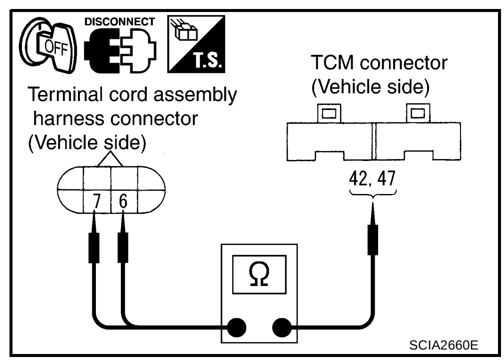
OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK HARNESS BETWEEN TCM AND TERMINAL CORD ASSEMBLY HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector and TCM connector.
3. Check continuity between terminal cord assembly harness connector terminals and TCM connector terminals.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F47	42 (B)	Yes
Terminal cord assembly harness connector	F23	7 (B)	
TCM connector	F47	47 (BR)	Yes
Terminal cord assembly harness connector	F23	6 (BR)	



4. If OK, check harness for short to ground and short to power.
5. Reinstall any part removed.

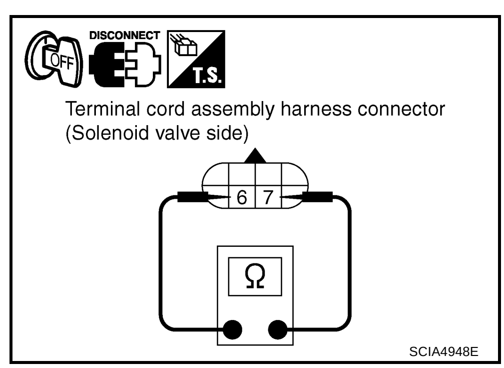
OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK A/T FLUID TEMPERATURE SENSOR WITH TERMINAL CORD ASSEMBLY

1. Turn ignition switch OFF.
2. Disconnect terminal cord assembly harness connector in engine room.
3. Check resistance between terminal cord assembly harness terminals.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



4. Reinstall any part removed.

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

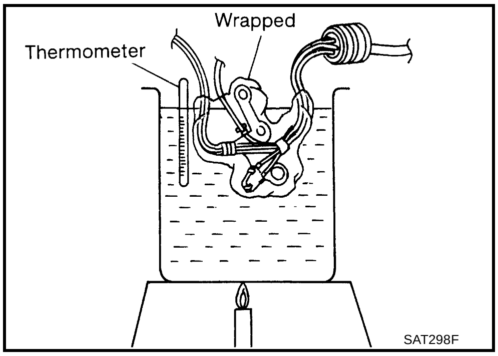
8. DETECT MALFUNCTIONING ITEM

1. Remove oil pan. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.

– A/T fluid temperature sensor

• Check resistance between terminal cord assembly harness terminals while changing temperature as shown.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



– Harness of terminal cord assembly for short or open

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

9. CHECK DTC

Perform AT-187, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 10.

10. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

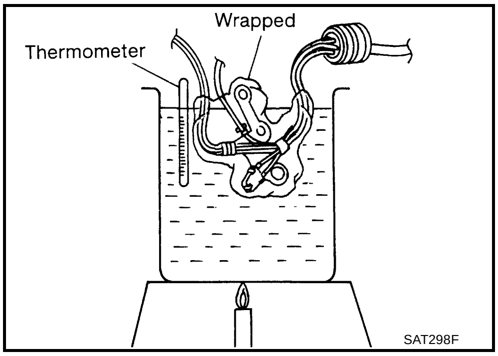
Component Inspection

ACS007TS

A/T FLUID TEMPERATURE SENSOR

- For removal, refer to AT-260, "Control Valve Assembly and Accumulators" .
- Check resistance between two terminals while changing temperature as shown at left.

Temperature °C (°F)	Resistance (Approx.)
20 (68)	2.5 kΩ
80 (176)	0.3 kΩ



MAIN POWER SUPPLY AND GROUND CIRCUIT

PFP:00100

Description

ACS007TT

When the power supply to TCM is cut off, for example because battery is removed, and the self-diagnostics memory function stops, malfunction is detected.

On Board Diagnosis Logic

ACS007TU

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “INITIAL START” with CONSULT-II is detected when TCM dose not receive the voltage signal from the battery power supply.
- This is not a malfunction message. (Whenever shutting off a power supply to TCM, this message appears on the screen.)

Possible Cause

ACS007TV

Harness or connector
(Battery or ignition switch and TCM circuit is open or shorted.)

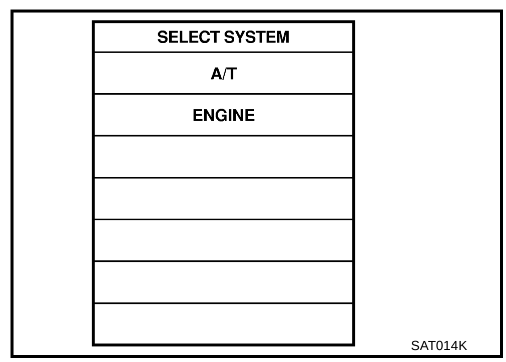
DTC Confirmation Procedure

ACS007TW

CAUTION:
If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

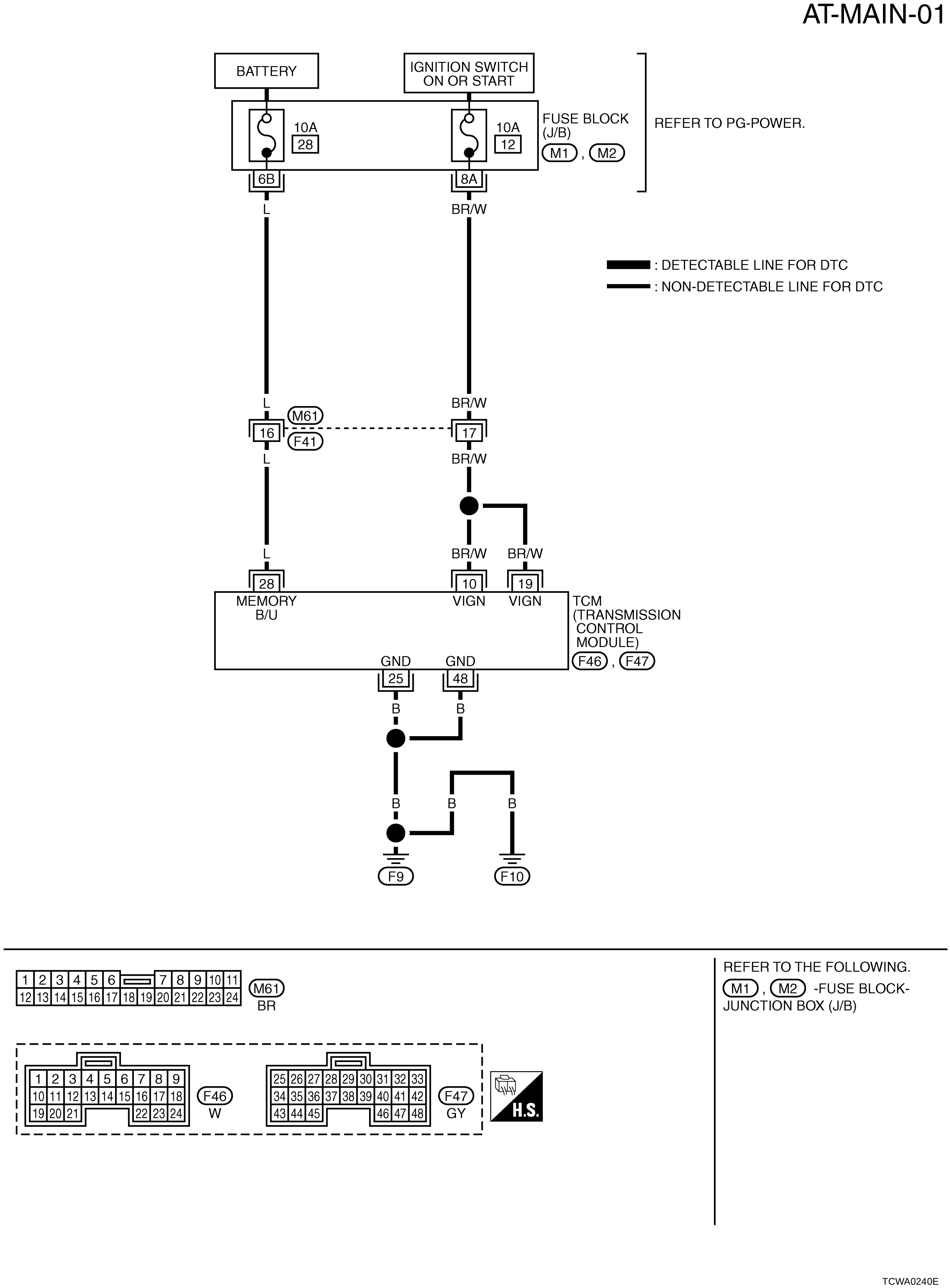
WITH CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Wait for at least 2 consecutive seconds.
4. If DTC is detected, go to AT-196, "Diagnostic Procedure" .

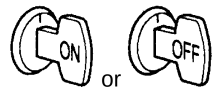


Wiring Diagram — AT — MAIN

ACS007TX



Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
10	BR/W	Power source		When turning ignition switch ON.	Battery voltage
				When turning ignition switch OFF.	0V
19	BR/W	Power source		Same as No. 10	
25	B	Ground	Always		0V
28	L	Power source (Memory back-up)	Always		Battery voltage
48	B	Ground	Always		0V

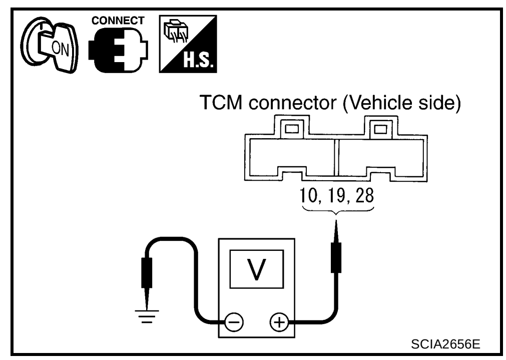
Diagnostic Procedure

ACS007TY

1. CHECK TCM POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground.

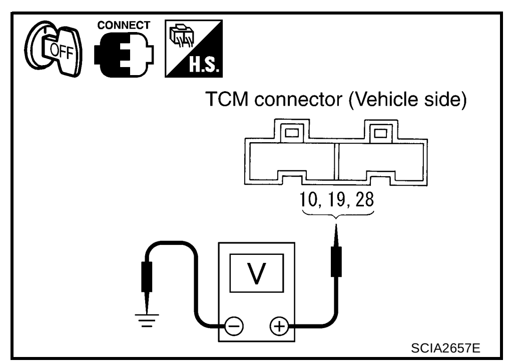
Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46	10 (BR/W)	Battery voltage
		19 (BR/W)	
	F47	28 (L)	



SCIA2656E

3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.

Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46	10 (BR/W)	0V
		19 (BR/W)	0V
	F47	28 (L)	Battery voltage



SCIA2657E

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and TCM connector terminals 10, 19
- Harness for short or open between battery and TCM connector terminal 28
- 10A fuse (No.12, No.28, located in the fuse block)
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

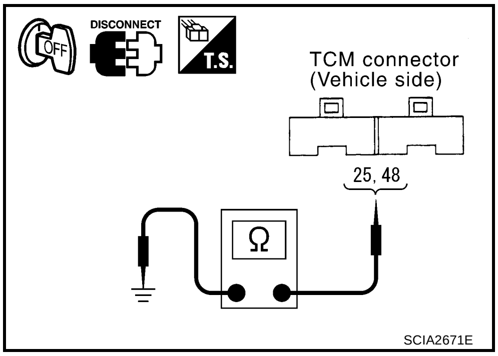
OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground.

Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F47	25 (B), 48 (B) -Ground	Yes



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK DTC

Perform AT-194, "DTC Confirmation Procedure" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

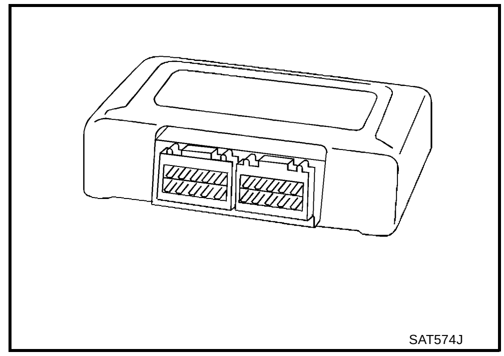
DTC CONTROL UNIT (RAM), CONTROL UNIT (ROM)

PFP:31036

Description

ACS007TZ

TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls A/T.



SAT574J

On Board Diagnosis Logic

ACS007U0

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “CONTROL UNIT (RAM)”, “CONTROL UNIT (ROM)” with CONSULT-II is detected when TCM memory (RAM) or (ROM).

Possible Cause

ACS007U1

TCM.

DTC Confirmation Procedure

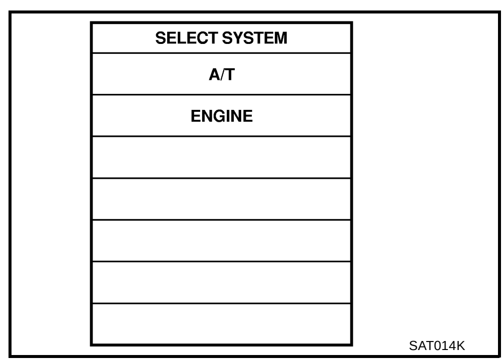
ACS007U2

CAUTION:

If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

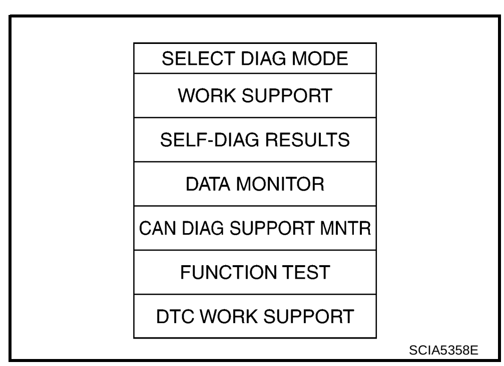
WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for A/T with CONSULT-II.
2. Start engine.



SAT014K

3. Run engine for at least 2 seconds at idle speed.
4. If the check result is NG, go to AT-199, "Diagnostic Procedure" .



SCIA5358E

Diagnostic Procedure

ACS007U3

1. CHECK DTC

With CONSULT-II

1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
2. Touch “ERASE”.
3. Perform AT-198, "DTC Confirmation Procedure" .

Is the “CONTROL UNIT (RAM)” or “CONTROL UNIT (ROM)” displayed again?

YES >> Replace TCM.
NO >> **INSPECTION END**

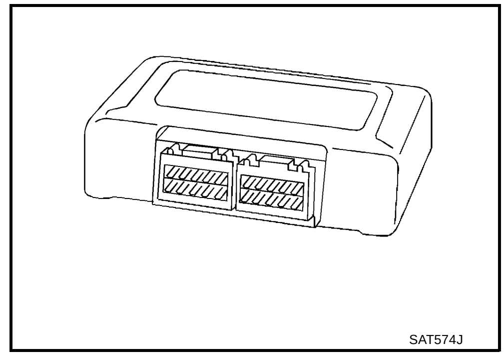
DTC CONTROL UNIT(EEPROM)

PFP:31036

Description

ACS007U4

TCM consists of a microcomputer and connectors for signal input and output and for power supply. The unit controls A/T.



On Board Diagnosis Logic

ACS007U5

- This is not an OBD-II self-diagnostic item.
- Diagnostic trouble code “CONT UNIT (EEP ROM)” with CONSULT-II is detected when TCM memory (EEP ROM) is malfunctioning.

Possible Cause

ACS007U6

TCM.

DTC Confirmation Procedure

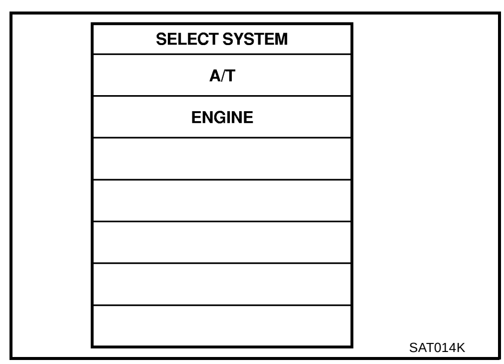
ACS007U7

CAUTION:

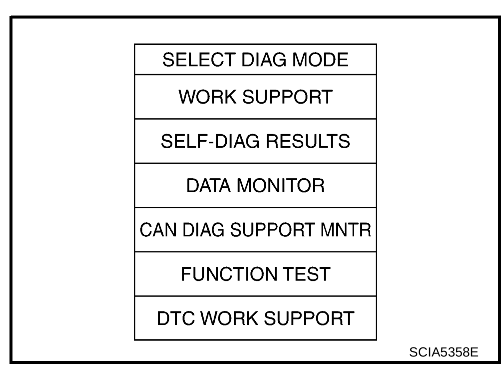
If performing this “DTC Confirmation Procedure” again, always turn ignition switch OFF and wait at least 10 seconds before continuing.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode for A/T with CONSULT-II.
2. Start engine.



3. Run engine for at least 2 seconds at idle speed.
4. If the check result is NG, go to AT-201, "Diagnostic Procedure" .



Diagnostic Procedure

ACS007U8

1. CHECK DTC

With CONSULT-II

1. Turn ignition switch ON and select “SELF-DIAG RESULTS” mode for A/T with CONSULT-II.
2. Move selector lever to “R” position.
3. Depress accelerator pedal (Full throttle position).
4. Touch “ERASE”.
5. Turn ignition switch OFF for 10 seconds.

Perform AT-200, "DTC Confirmation Procedure" .
See previous page.

Is the “CONT UNIT (EEP ROM)” displayed again?

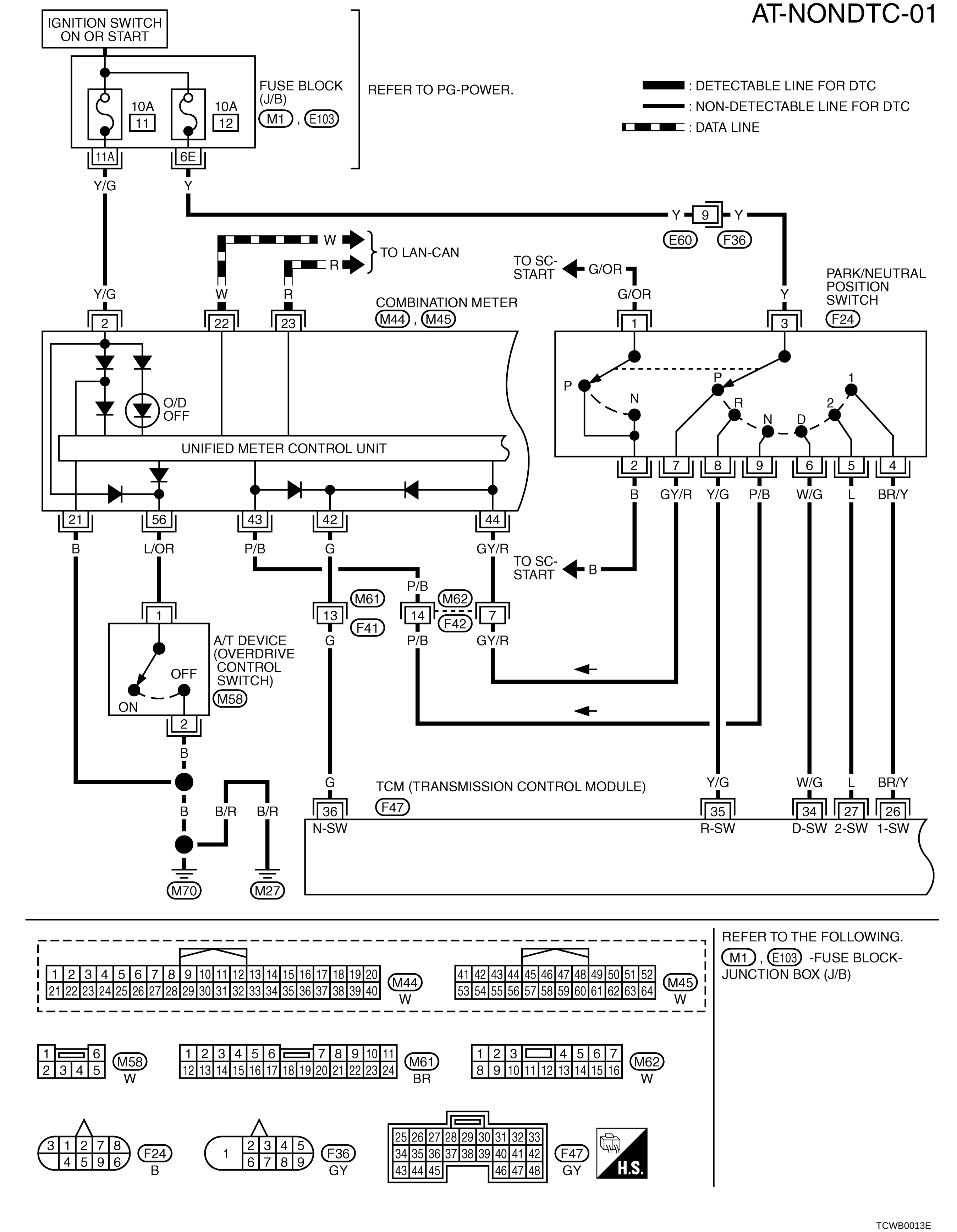
YES >> Replace TCM.
NO >> **INSPECTION END**

TROUBLE DIAGNOSES FOR SYMPTOMS

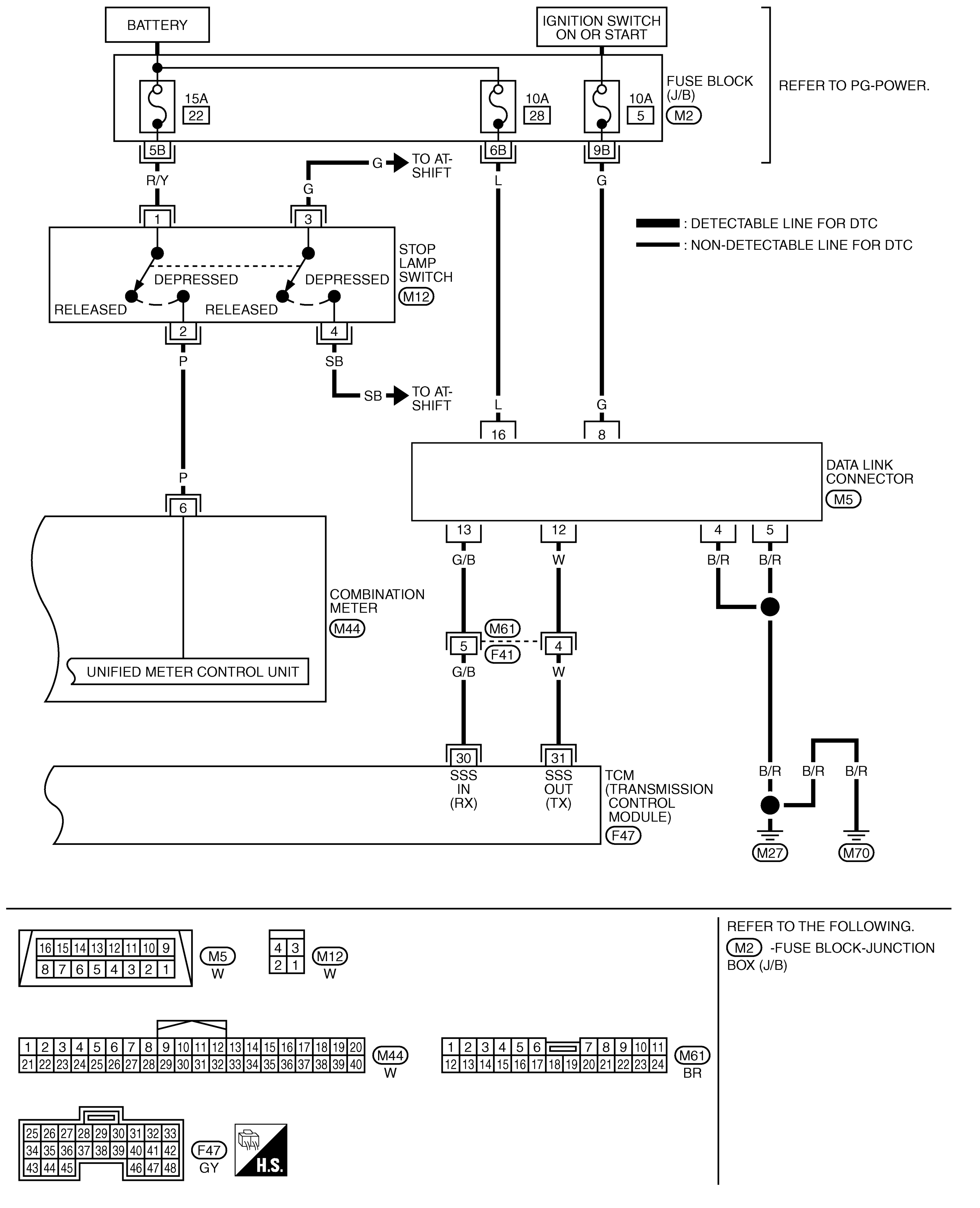
PFP:00100

Wiring Diagram — AT — NONDTC

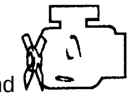
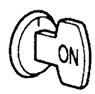
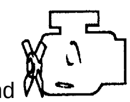
ACS007U9



AT-NONDTC-02


BATTERY
IGNITION SWITCH ON OR START
FUSE BLOCK (J/B) M2
REFER TO PG-POWER.
15A 22
10A 28
10A 5
5B
6B
9B
R/Y
G
L
G
TO AT-SHIFT
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
STOP LAMP SWITCH M12
DEPRESSED
RELEASED
P
SB
DATA LINK CONNECTOR M5
G/B
W
B/R
COMBINATION METER M44
UNIFIED METER CONTROL UNIT
M61
F41
TCM (TRANSMISSION CONTROL MODULE) F47
SSS IN (RX)
SSS OUT (TX)
M27
M70
REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)
M5 W
M12 W
M44 W
M61 BR
F47 GY
H.S.
TCWB0014E

Data are reference value and are measured between each terminal and ground.

Terminal	Wire color	Item	Condition		Judgement standard (Approx.)
26	BR/Y	PNP switch “1” position	 and 	When setting selector lever to “1” position.	Battery voltage
				When setting selector lever to other positions.	0V
27	L	PNP switch “2” position		When setting selector lever to “2” position.	Battery voltage
				When setting selector lever to other positions.	0V
30	G/B	CONSULT- II (RX)	—		—
31	W	CONSULT- II (TX)	—		—
34	W/G	PNP switch “D” position	 and 	When setting selector lever to “D” position.	Battery voltage
				When setting selector lever to other positions.	0V
35	Y/G	PNP switch “R” position		When setting selector lever to “R” position.	Battery voltage
				When setting selector lever to other positions.	0V
36	G	PNP switch “N” or “P” position		When setting selector lever to “N” or “P” position.	Battery voltage
				When setting selector lever to other positions.	0V

O/D OFF Indicator Lamp Does Not Come On

ACS007UA

SYMPTOM:
O/D OFF indicator lamp does not come on for about 2 seconds when turning ignition switch to ON.

1. CHECK CAN COMMUNICATION LINE

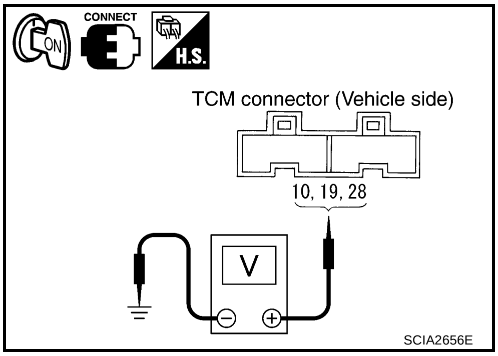
Perform the self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" .

Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-95, "DTC U1000 CAN COMMUNICATION LINE" .
NO >> GO TO 2.

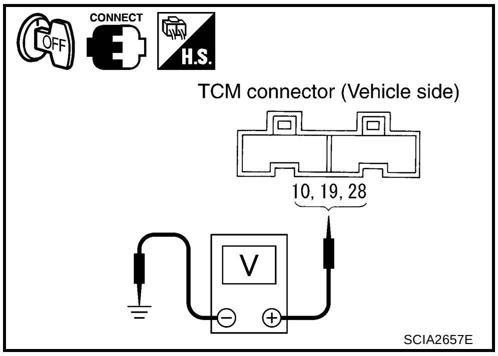
2. CHECK TCM POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground. Refer to AT-195, "Wiring Diagram — AT — MAIN" .



Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46	10 (BR/W)	Battery voltage
		19 (BR/W)	
	F47	28 (L)	

3. Turn ignition switch OFF.
4. Check voltage between TCM connector terminals and ground.



Item	Connector	Terminal (Wire color)	Judgement standard (Approx.)
TCM connector	F46	10 (BR/W)	0V
		19 (BR/W)	0V
	F47	28 (L)	Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

Check the following.

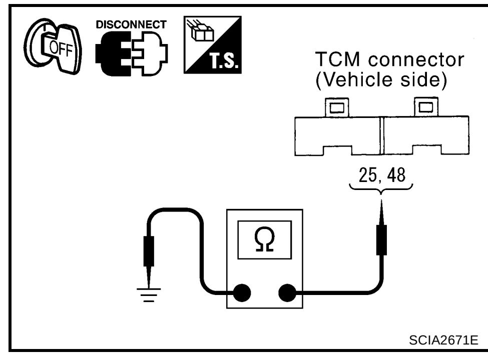
- Harness for short or open between ignition switch and TCM connector terminals 10, 19
- Harness for short or open between battery and TCM connector terminal 28
- 10A fuse (No.12, No. 28, located in the fuse block)
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK TCM GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect TCM connector.
3. Check continuity between TCM connector terminals and ground. Refer to AT-195, "Wiring Diagram — AT — MAIN" .



Item	Connector	Terminal (Wire color)	Continuity
TCM connector	F47	25 (B), 48 (B) -Ground	Yes

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and combination meter
- Combination meter. Refer to DI-4, "COMBINATION METERS" .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-57, "Check before Engine Is Started" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Engine Cannot Be Started in “P” and “N” Position

ACS007ZF

SYMPTOM:

- **Engine cannot be started with selector lever in “P” or “N” position.**
- **Engine can be started with selector lever in “D”, “2”, “1” or “R” position.**

1. CHECK SELF-DIAGNOSIS RESULTS

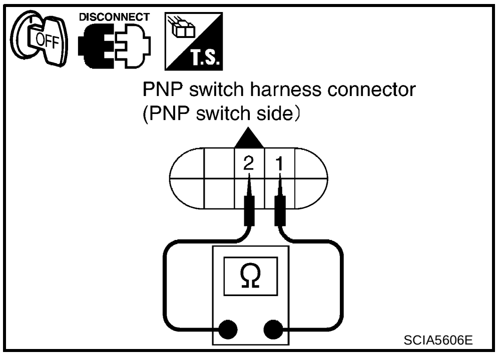
Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" .

Do the self-diagnosis results indicate PNP switch circuit?

YES >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .
NO >> GO TO 2.

2. CHECK PARK/NEUTRAL POSITION (PNP) SWITCH

Check continuity between park/neutral position (PNP) switch harness connector terminals. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .



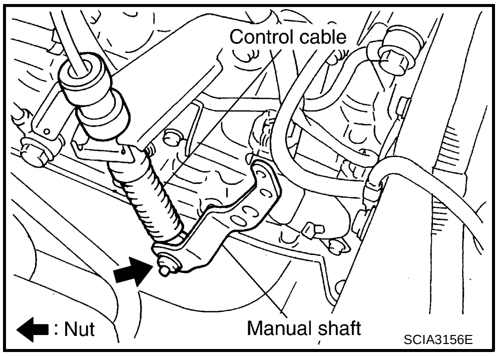
Lever position	Connector	terminal	Continuity
“P”, “N”	F24	1 - 2	Yes
Other positions			No

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 2.



OK or NG

OK >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .
NG >> 1. Check PNP switch (Refer to test group 2.) again after adjusting PNP switch (AT-264).
- If OK, **INSPECTION END**
- If NG, repair or replace PNP switch. Refer to AT-263, "REMOVAL AND INSTALLATION" .

4. CHECK STARTING SYSTEM

Check starting system. Refer to SC-9, "STARTING SYSTEM" .

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

In “P” Position, Vehicle Moves Forward or Backward When Pushed

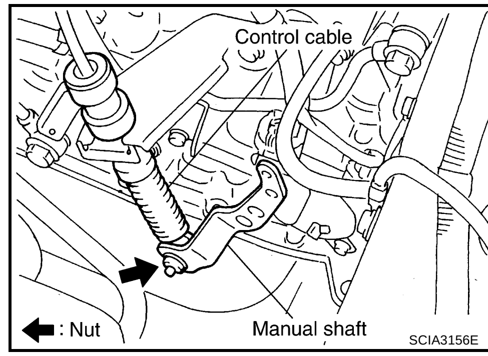
ACS007ZG

SYMPTOM:

Vehicle moves when it is pushed forward or backward with selector lever in “P” position.

1. CHECK CONTROL CABLE

Check control cable. Refer to AT-253, "Checking of A/T Position" .



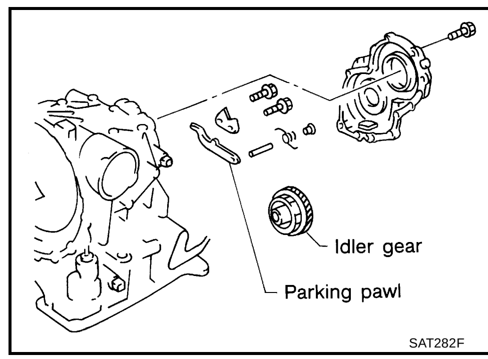
OK or NG

OK >> GO TO 2.

NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .

2. CHECK PARKING COMPONENTS

Check parking components. Refer to AT-272, "Components" and AT-280, "DISASSEMBLY" .



OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

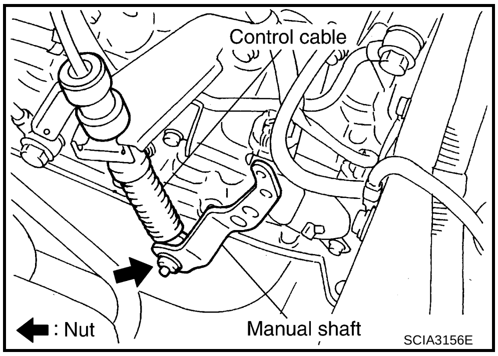
In "N" Position, Vehicle Moves

ACS007ZH

SYMPTOM:
Vehicle moves forward or backward when selecting "N" position.

1. CHECK CONTROL CABLE

Check control cable. Refer to AT-253, "Checking of A/T Position" .

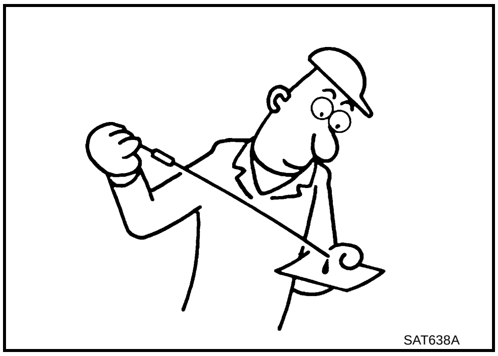


OK or NG

OK >> GO TO 2.
NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .

2. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-17, "Checking A/T Fluid" .

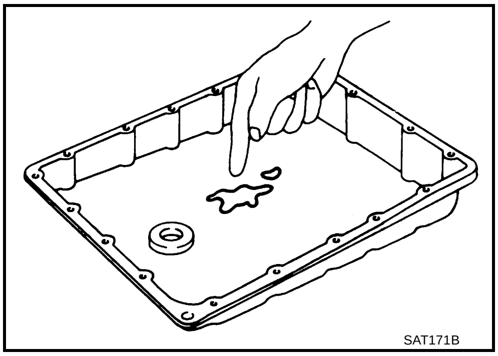


OK or NG

OK >> GO TO 3.
NG >> Refill ATF.

3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
2. Check the following.
- Forward clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .
- Reverse clutch assembly. Refer to AT-320, "Reverse Clutch" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again. Refer to AT-58, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Large Shock. “N” → “R” Position

ACS007ZI

SYMPTOM:
Large shock when shifting from “N” to “R” position.

1. CHECK SELF-DIAGNOSTIC RESULTS

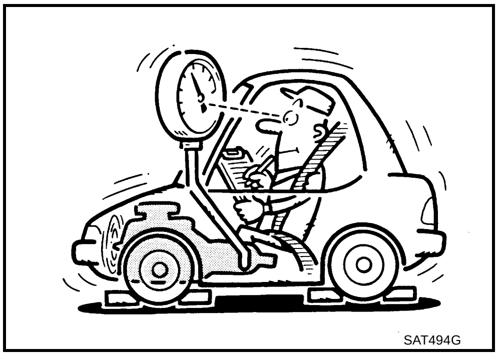
Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate A/T fluid temperature sensor, line pressure solenoid valve, accelerator pedal position (APP) sensor circuit?

YES >> Check damaged circuit. Refer to AT-104, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-155, "DTC P0745 LINE PRESSURE SOLENOID VALVE" or AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .
NO >> GO TO 2.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-55, "LINE PRESSURE TEST" .



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
- Line pressure solenoid valve
- Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again. Refer to AT-58, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

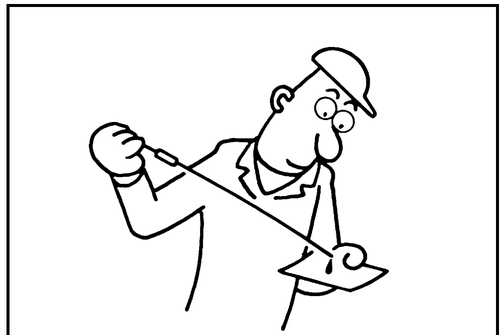
Vehicle Does Not Creep Backward in “R” Position

ACS007ZJ

SYMPTOM:
Vehicle does not creep backward when selecting “R” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-17, "Checking A/T Fluid" .



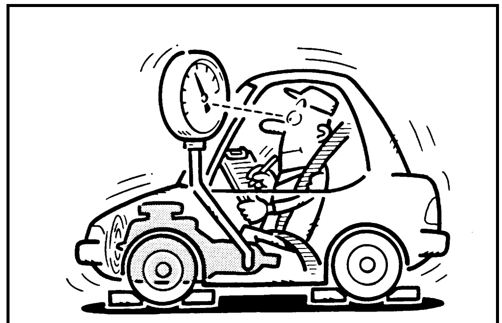
SAT638A

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “R” position. Refer to AT-55, "LINE PRESSURE TEST" .



SAT494G

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

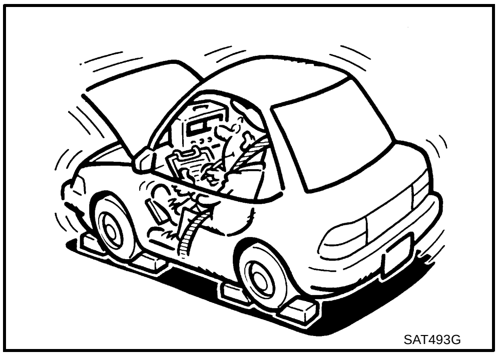
1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
– Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
– Line pressure solenoid valve
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following item:
– Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK STALL REVOLUTION

Check stall revolution with selector lever in “1” and “R” positions. Refer to AT-52, "STALL TEST" .



SAT493G

OK or NG

OK >> GO TO 6.
OK in “1” position, NG in “R” position>> GO TO 5.
NG in both “1” and “R” positions>> GO TO 7.

5. DETECT MALFUNCTIONING ITEM

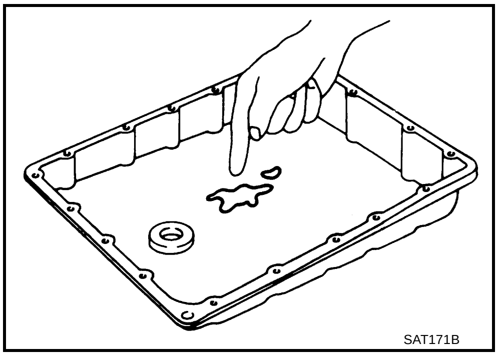
1. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
2. Check the following.
- Low & reverse brake assembly. Refer to AT-338, "Low & Reverse Brake" .
- Reverse clutch assembly. Refer to AT-320, "Reverse Clutch" .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



SAT171B

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING ITEM

1. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
2. Check the following.
- Reverse clutch assembly. Refer to AT-320, "Reverse Clutch" .
- High clutch assembly. Refer to AT-325, "High Clutch" .
- Low & reverse brake assembly. Refer to AT-338, "Low & Reverse Brake" .
- Forward clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .
- Overrun clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to AT-58, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

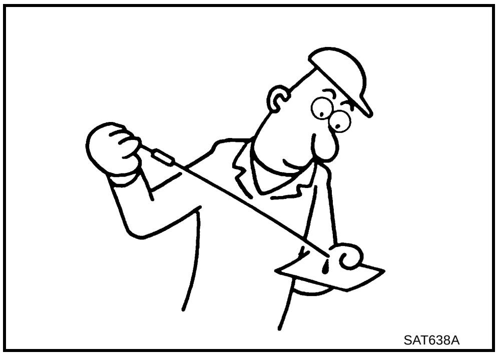
Vehicle Does Not Creep Forward in “D”, “2” or “1” Position

ACS007ZK

SYMPTOM:
Vehicle does not creep forward when selecting “D”, “2” or “1” position.

1. CHECK A/T FLUID LEVEL

Check A/T fluid level. Refer to AT-17, "Checking A/T Fluid" .



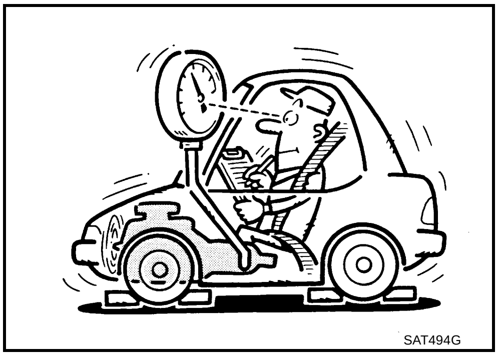
SAT638A

OK or NG

OK >> GO TO 2.
NG >> Refill ATF.

2. CHECK LINE PRESSURE

Check line pressure at idle with selector lever in “D” position. Refer to AT-55, "LINE PRESSURE TEST" .



SAT494G

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

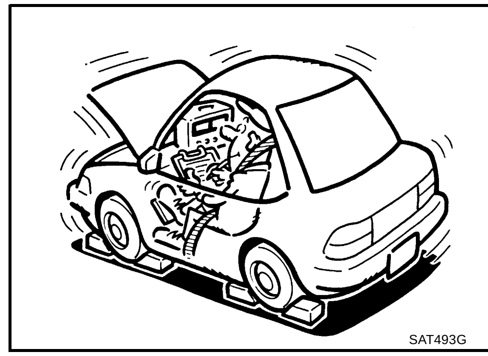
1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
   - Valves to control line pressure (Pressure regulator valve, pressure modifier valve, pilot valve and pilot filter)
   - Line pressure solenoid valve
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following item:
   - Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace damaged parts.

4. CHECK STALL REVOLUTION

Check stall revolution with selector lever in “D” position. Refer to AT-52, "STALL TEST" .



SAT493G

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

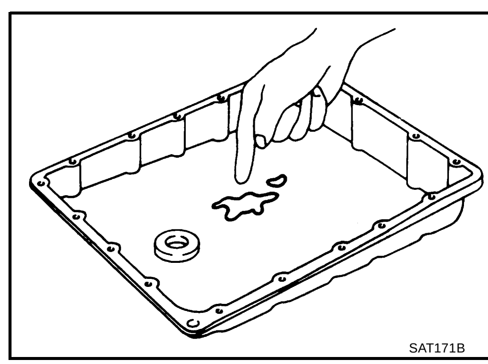
1. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
2. Check the following.
   - Oil pump assembly. Refer to AT-299, "Oil Pump" .
   - Forward clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .
   - Forward one-way clutch. Refer to AT-342, "Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub" .
   - Low one-way clutch. Refer to AT-280, "DISASSEMBLY" .
   - Torque converter. Refer to AT-280, "DISASSEMBLY" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



SAT171B

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7. CHECK SYMPTOM

Check again. Refer to AT-58, "Check at Idle" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Cannot Be Started From D1

ACS007ZL

SYMPTOM:

Vehicle cannot be started from D1 on “Cruise Test — Part 1” and “Cruise Test — Part 2”

1. CONFIRM THE SYMPTOM

Check if vehicle creep in “R” position.

OK or NG

OK >> GO TO 2.
NG >> GO TO AT-212, "Vehicle Does Not Creep Backward in “R” Position" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate vehicle speed sensor·A/T (revolution sensor), overrun clutch solenoid valve, torque converter clutch solenoid valve, shift solenoid valve A, B or vehicle speed sensor·MTR circuit?

YES >> Check damaged circuit. Refer to AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-177, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" , AT-142, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" , AT-162, "DTC P0750 SHIFT SOLENOID VALVE A" , AT-167, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-182, "DTC VEHICLE SPEED SENSOR MTR" .
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

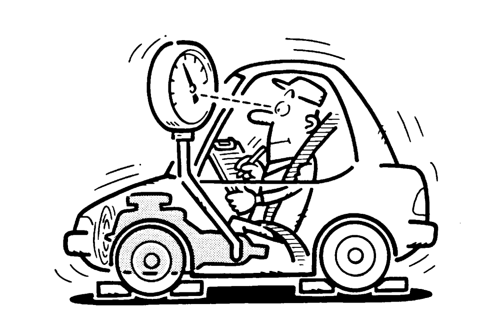
Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

4. CHECK LINE PRESSURE

Check line pressure at stall point with selector lever in “D” position. Refer to AT-55, "LINE PRESSURE TEST" .



SAT494G

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

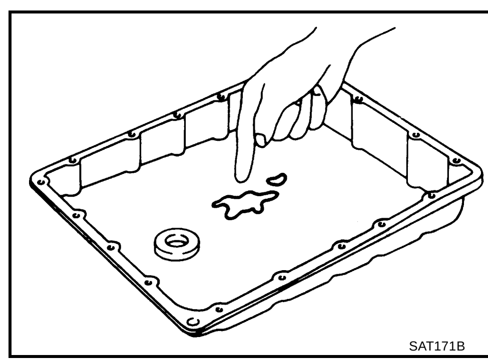
1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
- Forward clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .
- Low one-way clutch. Refer to AT-280, "DISASSEMBLY" .
- Forward one-way clutch. Refer to AT-342, "Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub" .
- High clutch assembly. Refer to AT-325, "High Clutch" .
- Torque converter. Refer to AT-280, "DISASSEMBLY" .
- Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

6. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following
- Shift valve A
- Shift valve B
- Shift solenoid valve A
- Shift solenoid valve B
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damage parts.

8. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" and AT-63, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: D1 → D2 or Does Not Kickdown: D4 → D2

ACS007ZM

SYMPTOM:
A/T does not shift from D1 to D2 at the specified speed on “Cruise Test — Part 1”.
A/T does not shift from D4 to D2 when depressing accelerator pedal fully at the specified speed on “Cruise Test — Part 2”.

1. CONFIRM THE SYMPTOM

Check if vehicle creep forward in “D” position and vehicle can be started from D1.

OK or NG

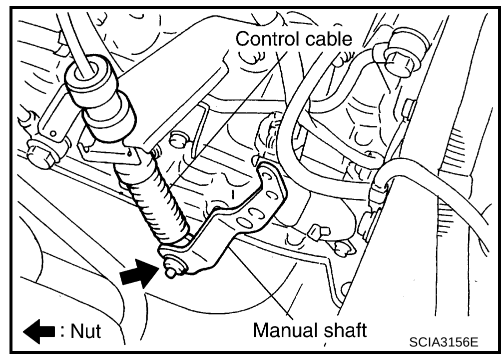
OK >> GO TO 2.
NG >> GO TO AT-215, "Vehicle Does Not Creep Forward in “D”, “2” or “1” Position" and AT-217, "Vehicle Cannot Be Started From D1" .

2. CHECK CONTROL CABLE

Check control cable. Refer to AT-253, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .



3. CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-182, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

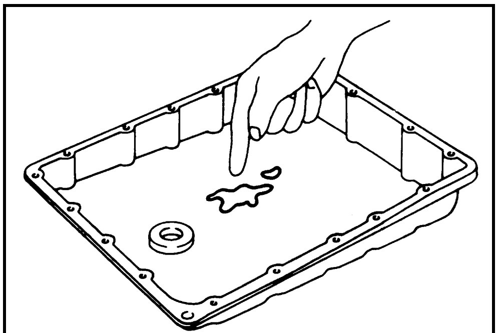
Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace accelerator pedal position (APP) sensor.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .


SAT171B

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
   - Shift valve A
   - Shift valve B
   - Shift solenoid valve A
   - Shift solenoid valve B
   - Pilot valve
   - Pilot filter
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
   - Servo piston assembly
   - Brake band

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
   - Shift valve A
   - Shift valve B
   - Shift solenoid valve A
   - Shift solenoid valve B
   - Pilot valve
   - Pilot filter

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" , AT-63, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_2 \rightarrow D_3$

ACS007ZN

SYMPTOM:

A/T does not shift from D_2 to D_3 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.

1. CONFIRM THE SYMPTOM

Check symptom. Refer to AT-60, "Cruise Test — Part 1" , AT-63, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

YES >> GO TO 2.

NO >> GO TO AT-215, "Vehicle Does Not Creep Forward in “D”, “2” or “1” Position" and AT-217, "Vehicle Cannot Be Started From D1" .

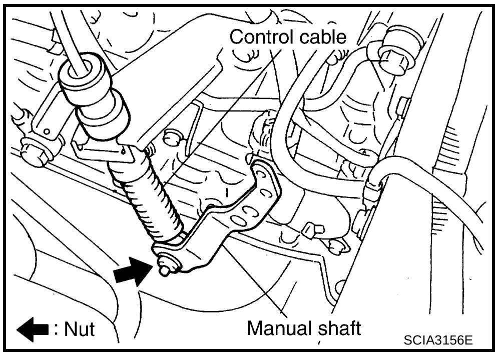
2. CHECK CONTROL CABLE

Check control cable. Refer to AT-253, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.

NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .



3. CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-182, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

4. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

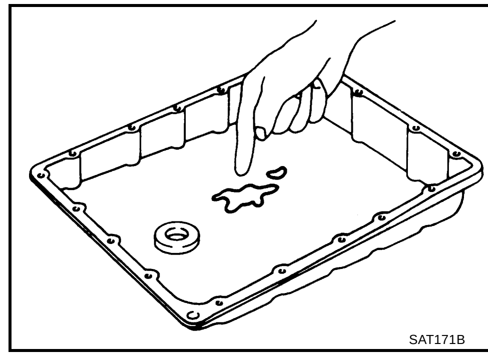
OK or NG

OK >> GO TO 5.

NG >> Repair or replace accelerator pedal position (APP) sensor.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
– Shift valve B
– Shift solenoid valve B
– Pilot valve
– Pilot filter
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
– Servo piston assembly
– High clutch assembly. Refer to AT-325, "High Clutch" .
– Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

7. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
– Shift valve B
– Shift solenoid valve B
– Pilot valve
– Pilot filter

OK or NG

OK >> GO TO 8.
NG >> Repair or replace damaged parts.

8. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" , AT-63, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 9.

9. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Shift: $D_3 \rightarrow D_4$

ACS007ZO

SYMPTOM:

- **A/T does not shift from D_3 to D_4 at the specified speed on “Cruise Test — Part 1” and “Cruise Test — Part 2”.**
- **A/T must be warm before D_3 to D_4 shift will occur.**

1. CONFIRM THE SYMPTOM

Check symptom. Refer to AT-60, "Cruise Test — Part 1" , AT-63, "Cruise Test — Part 2" .

Are “Vehicle Does Not Creep Forward in “D”, “2” or “1” Position” and “Vehicle Cannot Be Started From D_1 ” OK?

YES >> GO TO 2.
NO >> GO TO AT-215, "Vehicle Does Not Creep Forward in “D”, “2” or “1” Position" and AT-217, "Vehicle Cannot Be Started From D_1" .

2. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate PNP switch, A/T fluid temperature sensor, vehicle speed sensor·A/T (revolution sensor), shift solenoid valve A or B, vehicle speed sensor·MTR circuit?

YES >> Check damaged circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" , AT-104, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-162, "DTC P0750 SHIFT SOLENOID VALVE A" , AT-167, "DTC P0755 SHIFT SOLENOID VALVE B" or AT-182, "DTC VEHICLE SPEED SENSOR MTR" .
NO >> GO TO 3.

3. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

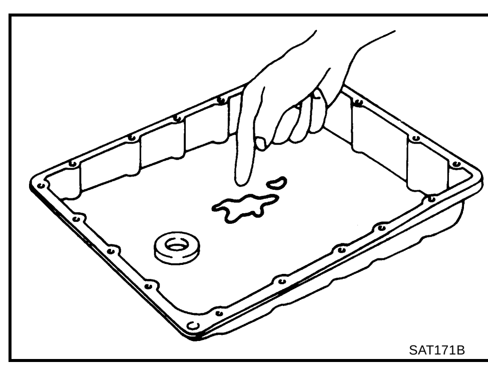
Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace accelerator pedal position (APP) sensor.

4. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Overrun clutch solenoid valve
- Pilot valve
- Pilot filter
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
- Servo piston assembly
- Brake band
- Torque converter. Refer to AT-280, "DISASSEMBLY" .
- Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Shift valve A
- Overrun clutch control valve
- Shift solenoid valve A
- Pilot valve
- Pilot filter

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" , AT-63, "Cruise Test — Part 2" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A/T Does Not Perform Lock-Up

ACS007ZP

SYMPTOM:

A/T does not perform lock-up at the specified speed on “Cruise Test — Part 1”.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate vehicle speed sensor·A/T (revolution sensor), A/T fluid temperature sensor, vehicle speed sensor·MTR, engine speed signal, torque converter clutch solenoid valve circuit?

YES >> Check damaged circuit. Refer to AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" , AT-104, "DTC P0710 A/T FLUID TEMPERATURE SENSOR CIRCUIT" , AT-182, "DTC VEHICLE SPEED SENSOR MTR" , AT-115, "DTC P0725 ENGINE SPEED SIGNAL" or AT-142, "DTC P0740 TORQUE CONVERTER CLUTCH SOLENOID VALVE" .

NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 3.

NG >> Repair or replace accelerator pedal position (APP) sensor.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
   - Torque converter clutch control valve
   - Torque converter clutch solenoid valve
   - Torque converter relief valve
   - Pilot valve
   - Pilot filter
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
   - Torque converter. Refer to AT-280, "DISASSEMBLY" .

OK or NG

OK >> GO TO 4.

NG >> Repair or replace damaged parts.

4. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**

NG >> GO TO 5.

5. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**

NG >> Repair or replace damaged parts.

A/T Does Not Hold Lock-Up Condition

ACS007ZQ

SYMPTOM:

A/T does not hold lock-up condition for more than 30 seconds on “Cruise Test — Part 1”.

1. CHECK SELF-DIAGNOSTIC RESULTS

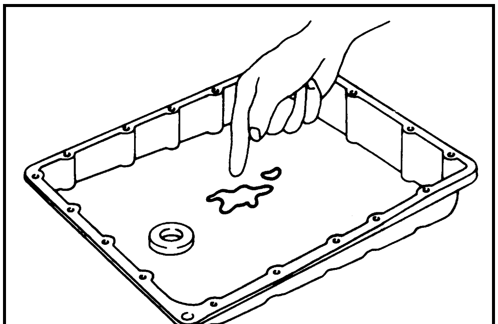
Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate engine speed signal?

YES >> Check engine speed signal circuit. Refer to AT-115, "DTC P0725 ENGINE SPEED SIGNAL" .
NO >> GO TO 2.

2. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .


SAT171B

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
– Torque converter clutch control valve
– Torque converter clutch solenoid valve
– Pilot valve
– Pilot filter
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
– Torque converter. Refer to AT-280, "DISASSEMBLY" .
– Oil pump assembly. Refer to AT-299, "Oil Pump" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
– Torque converter clutch control valve
– Torque converter clutch solenoid valve
– Pilot valve
– Pilot filter

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 6.

6. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Lock-Up Is Not Released

ACS007ZR

SYMPTOM:
Lock-up is not released when accelerator pedal is released on “Cruise Test — Part 1”.

1. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR CIRCUIT

Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate accelerator pedal position (APP) sensor circuit?

YES >> Check accelerator pedal position (APP) sensor circuit. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .
NO >> GO TO 2.

2. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Engine Speed Does Not Return to Idle (Light Braking D4 → D3)

ACS007ZS

SYMPTOM:

Engine speed does not smoothly return to idle when A/T shifts from D4 to D3 on “Cruise Test — Part 1”.

1. CHECK SELF-DIAGNOSTIC RESULTS

Perform self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

Do the self-diagnosis results indicate overrun clutch solenoid valve circuit?

YES >> Check overrun clutch solenoid valve circuit. Refer to AT-177, "DTC P1760 OVERRUN CLUTCH SOLENOID VALVE" .
NO >> GO TO 2.

2. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

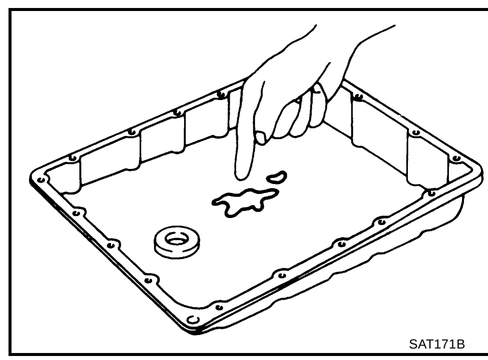
OK >> GO TO 3.
NG >> Repair or replace accelerator pedal position (APP) sensor.

3. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
– Overrun clutch control valve
– Overrun clutch reducing valve
– Overrun clutch solenoid valve
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
– Overrun clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

5. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Overrun clutch control valve
- Overrun clutch reducing valve
- Overrun clutch solenoid valve

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. CHECK SYMPTOM

Check again. Refer to AT-60, "Cruise Test — Part 1" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

A B AT D E F G H I J K L M

A/T Does Not Shift: $D_4 \rightarrow D_3$, When Overdrive Control Switch “ON” → “OFF”

ACS007UP

SYMPTOM:

A/T does not shift from D_4 to D_3 when changing overdrive control switch to “OFF” position on “Cruise Test — Part 3”.

1. CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

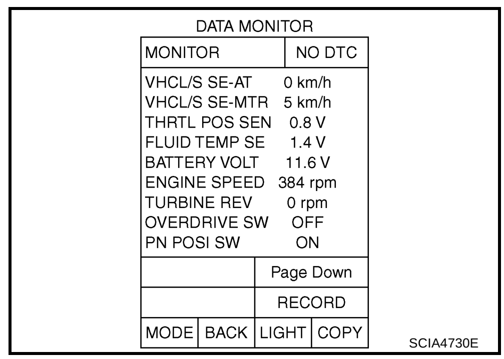
Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-95, "DTC U1000 CAN COMMUNICATION LINE" .
NO >> GO TO 2.

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “OVERDRIVE SW”.
   Check the signal of the overdrive control switch is indicated properly.
   (Overdrive switch “ON” displayed on CONSULT-II means overdrive “OFF”.)

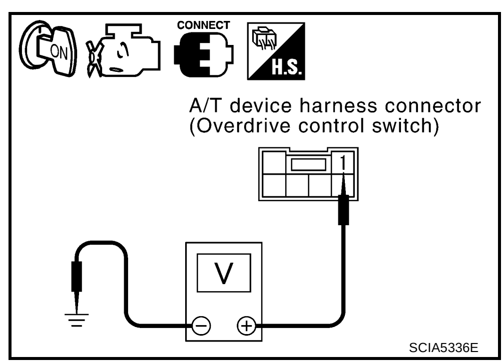


SCIA4730E

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	ON	OFF
	OFF	ON

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T device harness connector terminal and ground. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .



SCIA5336E

Item	Connector	Terminal (Wire color)	Overdrive control switch Condition	Data (Approx.)
A/T device harness connector	M58	1 (L/OR) - Ground	Releasing	Battery voltage
			Holding	0V

OK or NG

OK >> GO TO AT-223, "A/T Does Not Shift: $D_2 \rightarrow D_3$" .
NG >> Check overdrive control switch circuit. Refer to AT-244, "TCM Self-Diagnosis Does Not Activate" .

A/T Does Not Shift: $D_3 \rightarrow 2_2$, When Selector Lever “D” → “2” Position

ACS007UQ

SYMPTOM:

A/T does not shift from D_3 to 2_2 when changing selector lever from “D” to “2” position on “Cruise Test — Part 3”.

1. CONFIRM THE SYMPTOM

Check symptom. Refer to AT-64, "Cruise Test — Part 3" .

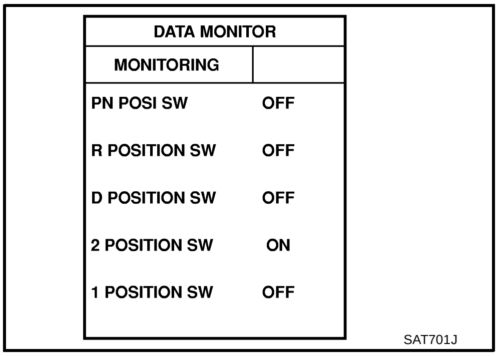
Is “A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$ ” OK?

YES (With CONSULT-II) >>GO TO 2.
YES (Without CONSULT-II) >>GO TO 3.
NO >> GO TO AT-220, "A/T Does Not Shift: $D_1 \rightarrow D_2$ or Does Not Kickdown: $D_4 \rightarrow D_2$" .

2. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.



SAT701J

Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> **INSPECTION END**
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

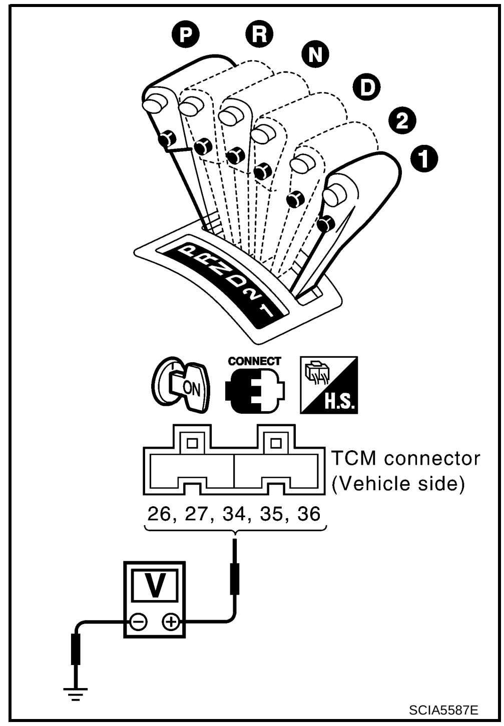
3. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .

Lever position	Terminal				
	36	35	34	27	26
“P”, “N”	B	0	0	0	0
“R”	0	B	0	0	0
“D”	0	0	B	0	0
“2”	0	0	0	B	0
“1”	0	0	0	0	B

B: Battery voltage
0: 0V



OK or NG

OK >> **INSPECTION END**
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

A/T Does Not Shift: $2_2 \rightarrow 1_1$, When Selector Lever “2” → “1” on Position

ACS007UR

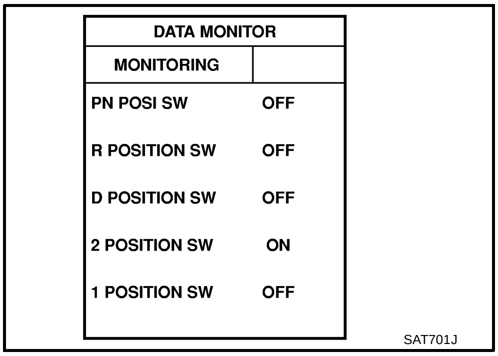
SYMPTOM:

A/T does not shift from 2_2 to 1_1 when changing selector lever from “2” to “1” position on “Cruise Test — Part 3”.

1. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.



Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 3.

NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

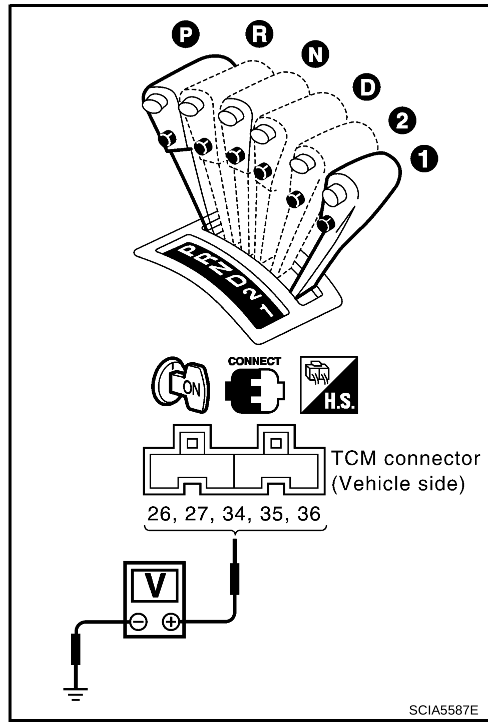
2. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .

Lever position	Terminal				
	36	35	34	27	26
"P", "N"	B	0	0	0	0
"R"	0	B	0	0	0
"D"	0	0	B	0	0
"2"	0	0	0	B	0
"1"	0	0	0	0	B

B: Battery voltage
0: 0V

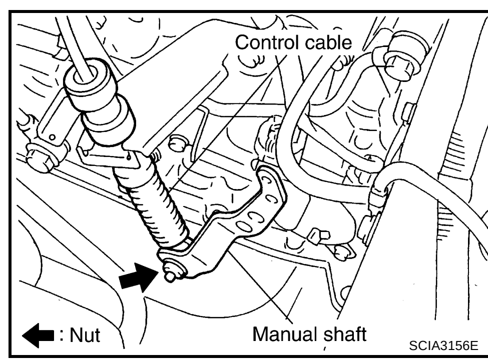


OK or NG

OK >> GO TO 3.
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

3. CHECK CONTROL CABLE

Check control cable. Refer to AT-253, "Checking of A/T Position" .



OK or NG

OK >> GO TO 4.
NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .

4. CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT

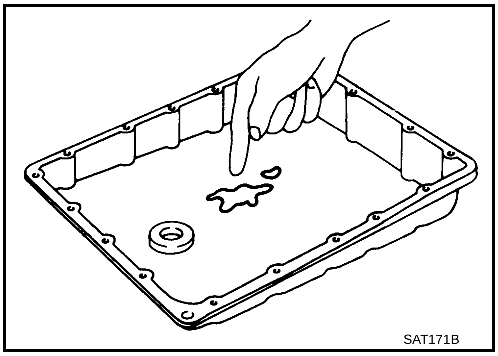
Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-182, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

5. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



SAT171B

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING ITEM

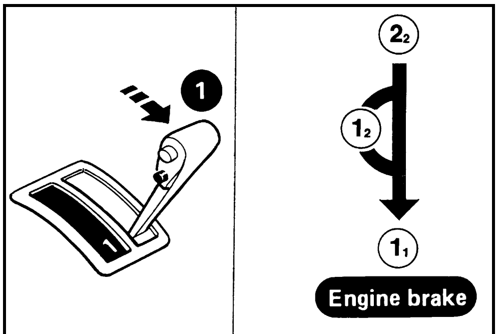
1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Shift valve A
- Shift solenoid valve A
- Overrun clutch control valve
- Overrun clutch solenoid valve
3. Disassemble A/T. Refer to AT-280, "DISASSEMBLY" .
4. Check the following.
- Servo piston assembly
- Brake band

OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK SYMPTOM

Check again. Refer to AT-64, "Cruise Test — Part 3" .



SAT778B

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

8. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

Vehicle Does Not Decelerate by Engine Brake

ACS007US

SYMPTOM:

- **Vehicle does not decelerate by engine brake when shifting from 2_2 (1_2) to 1_1 "Cruise Test — Part 3".**
- **Vehicle does not decelerate by engine brake when turning overdrive control switch OFF on "Cruise Test — Part 3".**
- **Vehicle does not decelerate by engine brake when shifting A/T from "D" to "2" position on "Cruise Test — Part 3".**

1. CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" or AT-91, "Diagnostic Procedure Without CONSULT-II" .

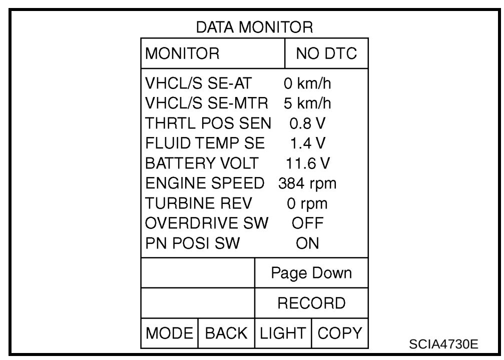
Is a malfunction in CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-95, "DTC U1000 CAN COMMUNICATION LINE" .
NO >> GO TO 2.

2. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Select "TCM INPUT SIGNALS" in "DATA MONITOR" mode for "A/T" with CONSULT-II.
3. Read out "OVERDRIVE SW".
   Check the signal of the overdrive control switch is indicated properly.
   (Overdrive switch "ON" displayed on CONSULT-II means overdrive "OFF".)

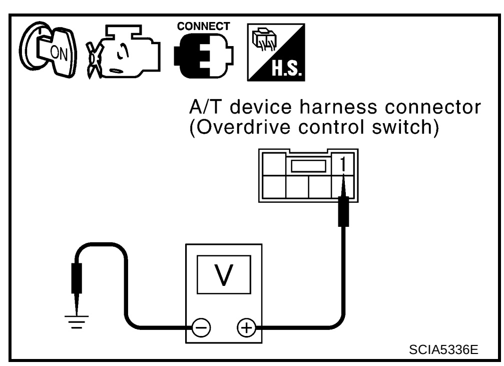


SCIA4730E

Item name	Overdrive control switch Condition	Display value
OVERDRIVE SW	ON	OFF
	OFF	ON

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine)
2. Check voltage between A/T device harness connector terminal and ground. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .



SCIA5336E

Item	Connector	Terminal (Wire color)	Overdrive control switch Condition	Data (Approx.)
A/T device harness connector	M58	1 (L/OR) - Ground	Releasing	Battery voltage
			Holding	0V

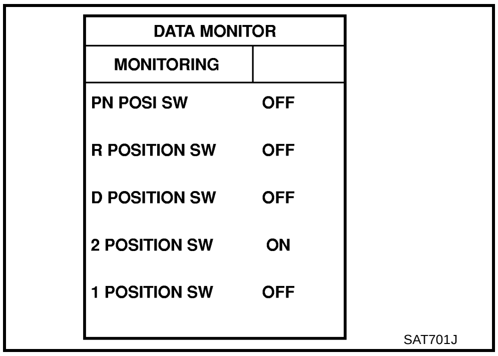
OK or NG

OK (With CONSULT-II)>>GO TO 3.
OK (Without CONSULT-II)>>GO TO 4.
NG >> Check overdrive control switch circuit. Refer to AT-244, "TCM Self-Diagnosis Does Not Activate" .

3. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.



Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

OK or NG

OK >> GO TO 5.
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

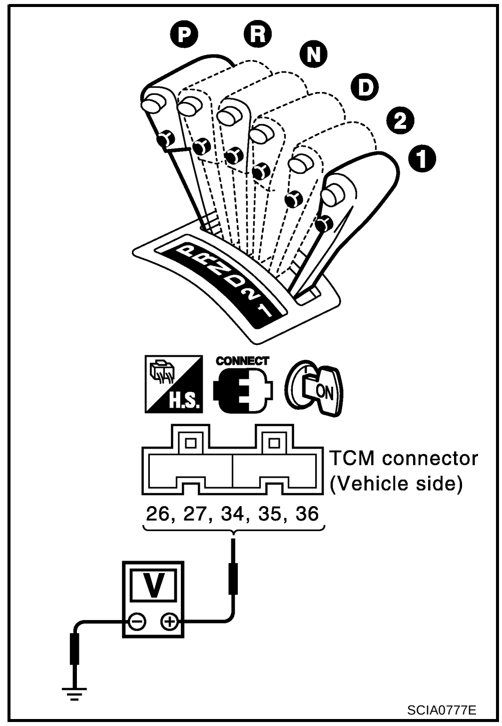
4. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .

Lever position	Terminal				
	36	35	34	27	26
“P”, “N”	B	0	0	0	0
“R”	0	B	0	0	0
“D”	0	0	B	0	0
“2”	0	0	0	B	0
“1”	0	0	0	0	B

B: Battery voltage
0: 0V

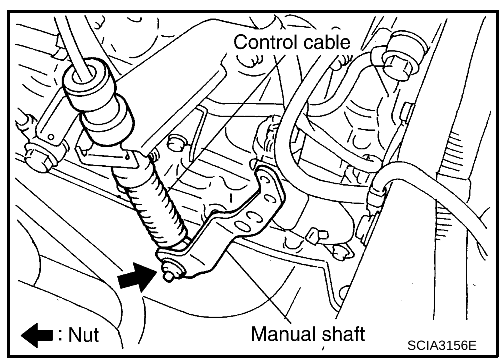


OK or NG

OK >> GO TO 5.
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

5. CHECK CONTROL CABLE

Check control cable. Refer to AT-253, "Checking of A/T Position" .



OK or NG

OK >> GO TO 6.
NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .

6. CHECK VEHICLE SPEED SENSOR·A/T AND VEHICLE SPEED SENSOR·MTR CIRCUIT

Check vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuit. Refer to AT-109, "DTC P0720 VEHICLE SPEED SENSOR·A/T (REVOLUTION SENSOR)" and AT-182, "DTC VEHICLE SPEED SENSOR MTR" .

OK or NG

OK >> GO TO 7.
NG >> Repair or replace vehicle speed sensor·A/T (revolution sensor) and vehicle speed sensor·MTR circuits.

A
B
AT
D
E
F
G
H
I
J
K
L
M

7. CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

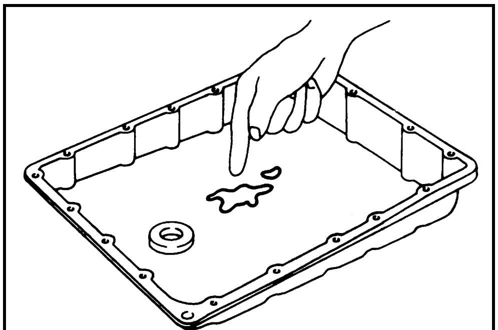
Check accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace accelerator pedal position (APP) sensor.

8. CHECK A/T FLUID CONDITION

1. Remove oil pan. Refer to AT-272, "Components" .
2. Check A/T fluid condition. Refer to AT-52, "Fluid Condition Check" .



SAT171B

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING ITEM

1. Remove control valve assembly. Refer to AT-260, "Control Valve Assembly and Accumulators" .
2. Check the following.
- Shift valve A
- Overrun clutch solenoid valve
3. Disassemble A/T. Refer to.
4. Check the following.
- Overrun clutch assembly. Refer to AT-331, "Forward and Overrun Clutches" .
- Low & reverse brake assembly. Refer to AT-338, "Low & Reverse Brake" .

OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK SYMPTOM

Check again. Refer to AT-64, "Cruise Test — Part 3" .

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 11.

11. CHECK TCM

1. Check TCM input/output signals. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

TCM Self-Diagnosis Does Not Activate

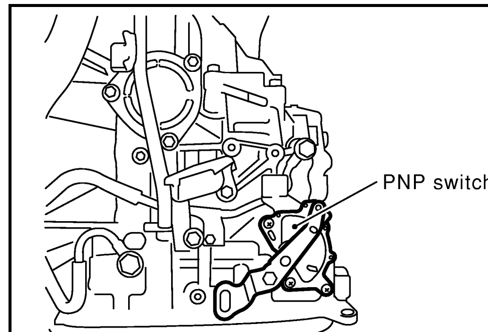
ACS007UT

SYMPTOM:

O/D OFF indicator lamp does not come on in TCM self-diagnostic procedure even if the lamp circuit is good.

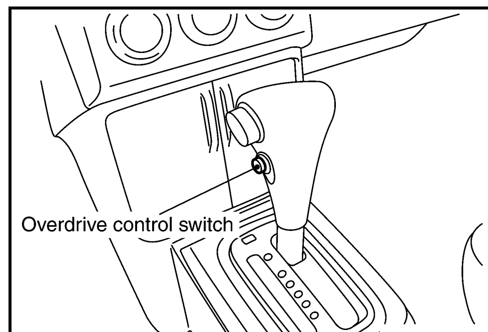
DESCRIPTION

- PNP switch
  PNP switch assembly includes a transaxle position switch. The transaxle position switch detects the selector lever position and sends a signal to the TCM.



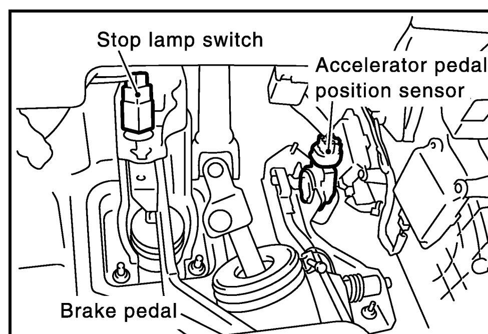
SCIA0752E

- Overdrive control switch
  Overdrive control switch detects the switch position (ON or OFF) and sends a signal to the TCM.



SCIA5418E

- Closed throttle position signal and wide open throttle position signal
  ECM judges throttle opening based on a signal from accelerator pedal position (APP) sensor, and sends the signal via CAN communication to TCM.



PBIB0498E

DIAGNOSTIC PROCEDURE

1. CHECK CAN COMMUNICATION LINE

Perform the self-diagnosis. Refer to AT-82, "SELF-DIAGNOSTIC RESULT MODE" .

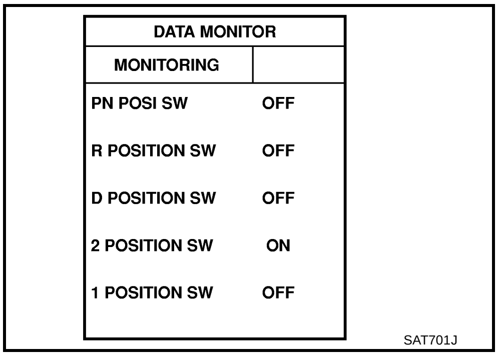
Is a malfunction in the CAN communication indicated in the results?

YES >> Check CAN communication line. Refer to AT-95, "DTC U1000 CAN COMMUNICATION LINE" .
NO (With CONSULT-II) >>GO TO 2.
NO (Without CONSULT-II) >>GO TO 3.

2. CHECK PNP SWITCH CIRCUIT (WITH CONSULT-II)

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “P·N”, “R”, “D”, “2” and “1” position switches moving selector lever to each position.



Item name	Condition	Display value
PN POSI SW	When setting selector lever to “N” or “P” position.	ON
	When setting selector lever to other positions.	OFF
R POSITION SW	When setting selector lever to “R” position.	ON
	When setting selector lever to other positions.	OFF
D POSITION SW	When setting selector lever to “D” position.	ON
	When setting selector lever to other positions.	OFF
2 POSITION SW	When setting selector lever to “2” position.	ON
	When setting selector lever to other positions.	OFF
1 POSITION SW	When setting selector lever to “1” position.	ON
	When setting selector lever to other positions.	OFF

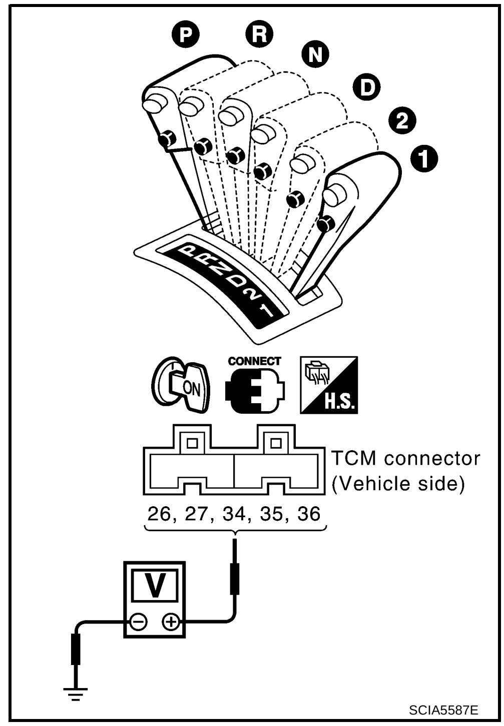
OK or NG

OK >> GO TO 4.
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

3. CHECK PNP SWITCH CIRCUIT (WITHOUT CONSULT-II)

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between TCM connector terminals and ground while moving selector lever through each position. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .



Lever position	Terminal				
	36	35	34	27	26
“P”, “N”	B	0	0	0	0
“R”	0	B	0	0	0
“D”	0	0	B	0	0
“2”	0	0	0	B	0
“1”	0	0	0	0	B

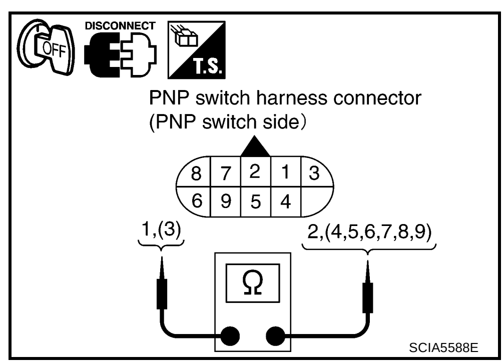
B: Battery voltage
0: 0V

OK or NG

OK >> GO TO 4.
NG >> Check park/neutral position (PNP) switch circuit. Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" .

4. CHECK PNP SWITCH

1. Turn ignition switch OFF.
2. Disconnect PNP switch harness connector.
3. Check continuity between PNP switch harness connector terminals.



Lever position	Connector	Terminal	Continuity
“P”	F24	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
“R”		3 - 8	
“N”		1 - 2, 3 - 9	
“D”		3 - 6	
“2”		3 - 5	
“1”		3 - 4	

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. CHECK CONTROL CABLE ADJUSTMENT

Check PNP switch again with control cable disconnected from manual shaft of A/T assembly. Refer to test group 4.

OK or NG

OK >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .
NG >> Repair or replace PNP switch.

6. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between ignition switch and park/neutral position (PNP) switch
- Harness for short or open between park/neutral position (PNP) switch and TCM
- Harness for short or open between park/neutral position (PNP) switch and combination meter
- Harness for short or open between combination meter and TCM
- 10A fuse (NO.12, located in the fuse block)
- Combination meter. Refer to DI-4, "COMBINATION METERS" .
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

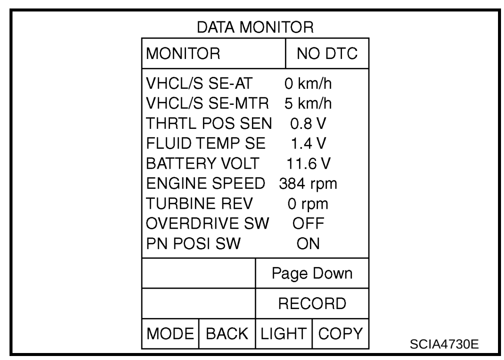
OK or NG

OK >> GO TO 7.
NG >> Repair or replace damaged parts.

7. CHECK OVERDRIVE CONTROL SWITCH CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for “A/T” with CONSULT-II.
3. Read out “OVERDRIVE SW”.
Check the signal of overdrive control switch is indicated properly.
(Overdrive switch “ON” displayed on CONSULT-II means overdrive “OFF”.)

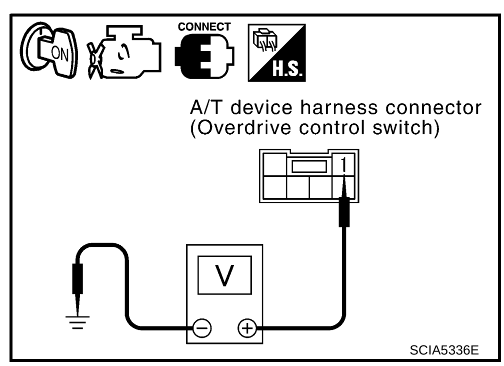


SCIA4730E

Item name	Overdrive control switch condition	Display value
OVERDRIVE SW	ON	OFF
	OFF	ON

Without CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between A/T device harness connector terminal and ground. Refer to AT-202, "Wiring Diagram — AT — NON-DTC" .



SCIA5336E

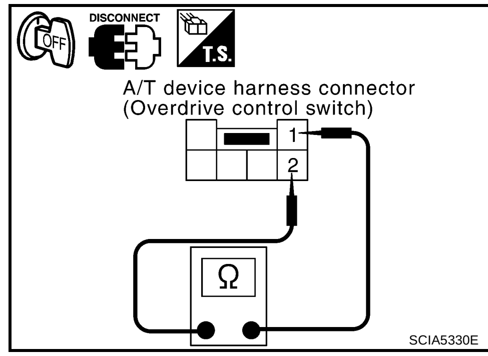
Item	Connector	Terminal (Wire color)	Overdrive control switch condition	Data (Approx.)
A/T device harness connector (Overdrive control switch)	M58	1 (L/OR) - Ground	Releasing	Battery voltage
			Holding	0V

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

8. CHECK OVERDRIVE CONTROL SWITCH

1. Turn ignition switch OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector terminals. Refer to AT-202, "Wiring Diagram — AT — NONDTC" .



Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T device harness connector (Overdrive control switch)	M58	1 - 2	Releasing	No
			Holding	Yes

OK or NG

OK >> GO TO 9.
NG >> Repair or replace damaged parts.

9. DETECT MALFUNCTIONING ITEM

Check the following.

- Harness for short or open between combination meter and A/T device harness connector
- Harness for short or open between A/T device harness connector and ground
- Combination meter. Refer to DI-4, "COMBINATION METERS" .

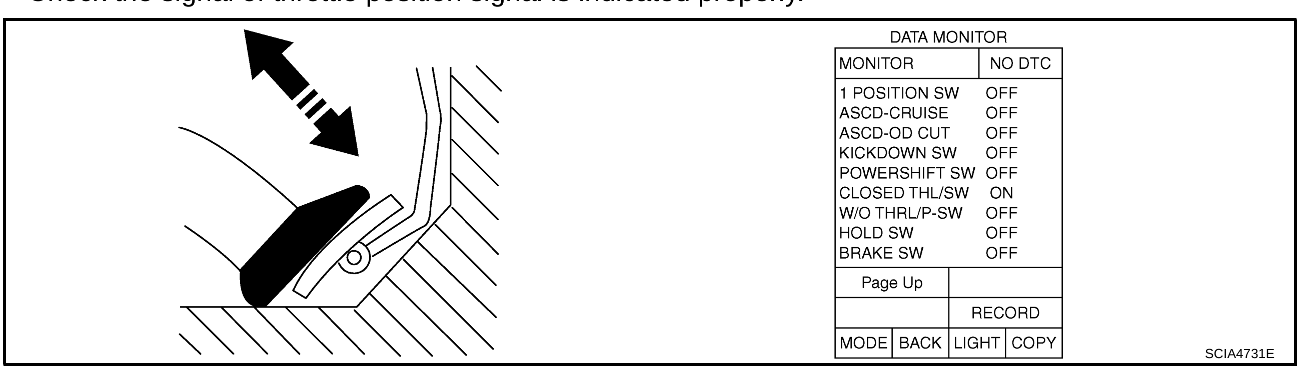
OK or NG

OK >> GO TO 10.
NG >> Repair or replace damaged parts.

10. CHECK CLOSED THROTTLE POSITION AND WIDE OPEN THROTTLE POSITION SIGNAL CIRCUIT

With CONSULT-II

1. Turn ignition switch ON. (Do not start engine.)
2. Select “TCM INPUT SIGNALS” in “DATA MONITOR” mode for A/T with CONSULT-II.
3. Read out “CLOSED THL/SW” and “W/O THRL/P” depressing and releasing accelerator pedal. Check the signal of throttle position signal is indicated properly.



Accelerator pedal condition	Data monitor	
	CLOSED THL/SW	W/O THRL/P-SW
Released	ON	OFF
Fully depressed	OFF	ON

OK or NG

OK >> GO TO 11.
NG >> Check the following. If any items are damaged, repair or replace damaged parts.

- Accelerator pedal position (APP) sensor. Refer to AT-172, "DTC P1705 ACCELERATOR PEDAL POSITION (APP) SENSOR" .

11. PERFORM SELF-DIAGNOSIS

Without CONSULT-II
Perform self-diagnosis. Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .

OK or NG

OK >> **INSPECTION END**
NG – 1 >> Self-diagnosis does not activate: GO TO 12.
NG – 2 >> DTC is displayed: Check the malfunctioning system. Refer to AT-91, "Diagnostic Procedure Without CONSULT-II" .

12. CHECK TCM

1. Check TCM input/output signal. Refer to AT-77, "TCM Terminals and Reference Value" .
2. If NG, recheck TCM pin terminals for damage or loose connection with harness connector.

OK or NG

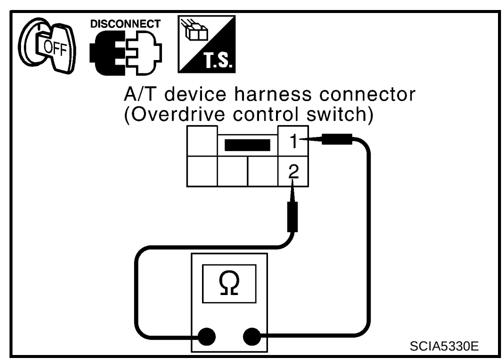
OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

COMPONENT INSPECTION

Overdrive Control Switch

- Check continuity between A/T device harness connector terminals.

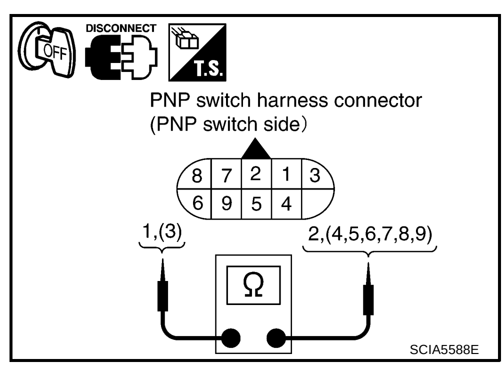
Item	Connector	Terminal	Overdrive control switch condition	Continuity
A/T device harness connector (Overdrive control switch)	M58	1 - 2	Releasing	No
			Holding	Yes



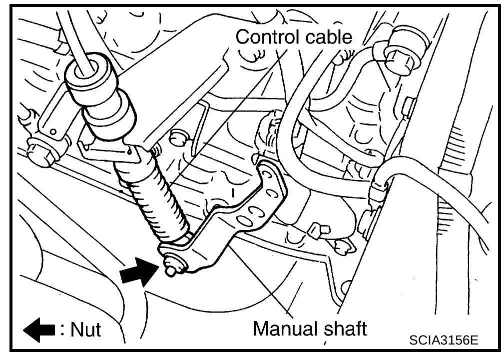
PNP Switch

1. Check continuity between PNP switch harness connector terminals.

Lever position	Connector	Terminal	Continuity
“P”	F24	1 - 2, 3 - 7	Yes *Continuity should not exist in positions other than the specified positions.
“R”		3 - 8	
“N”		1 - 2, 3 - 9	
“D”		3 - 6	
“2”		3 - 5	
“1”		3 - 4	



2. If NG, check again with control cable disconnected from manual shaft of A/T assembly. Refer to step 1.
3. If OK on step 2, adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .
4. If NG on step 2, remove PNP switch from A/T and check continuity of PNP switch terminals. Refer to step 1.
5. If OK on step 4, adjust PNP switch. Refer to AT-263, "Park/Neutral Position (PNP) Switch" .
6. If NG on step 4, replace PNP switch.



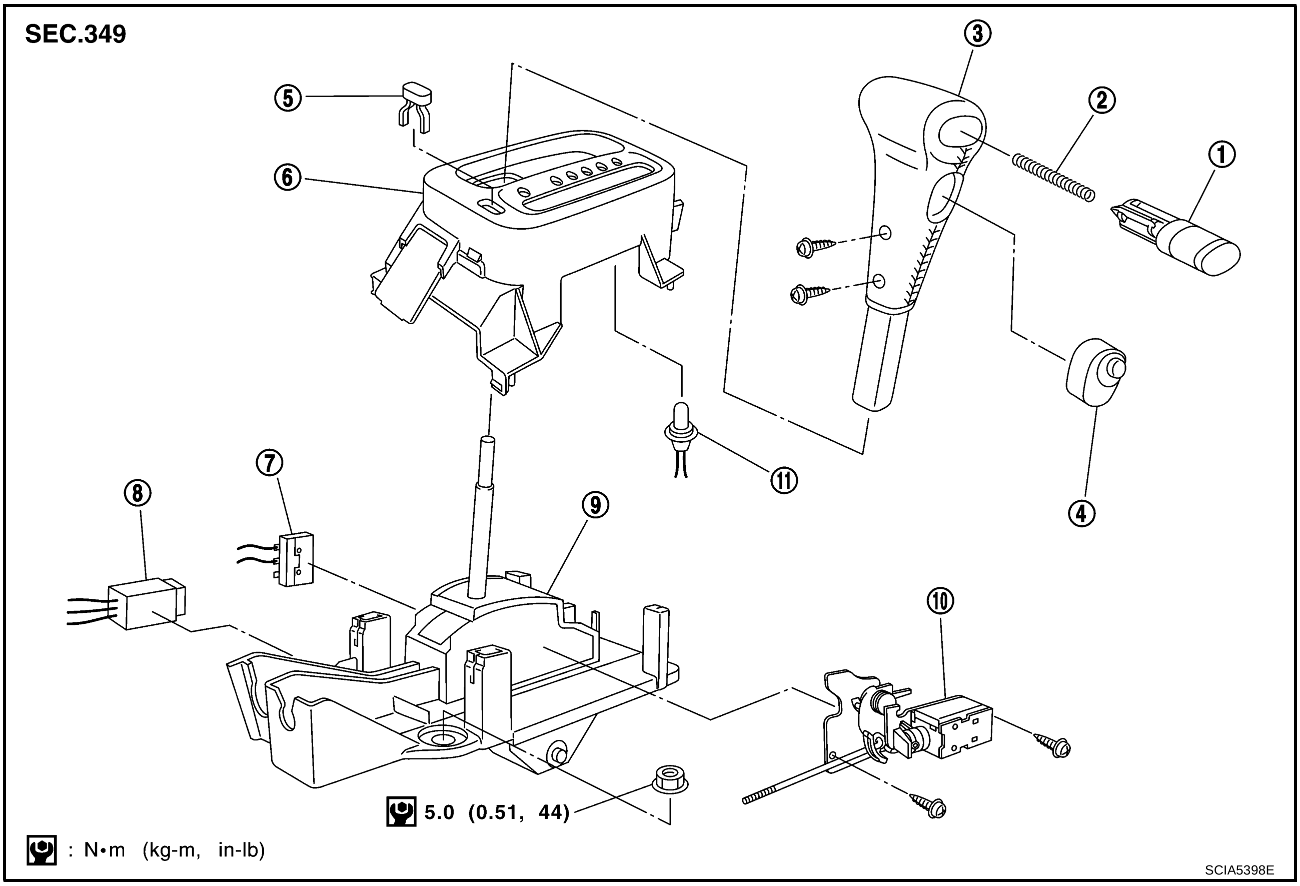
SHIFT CONTROL SYSTEM

PFP:34901

Control Device Removal and Installation

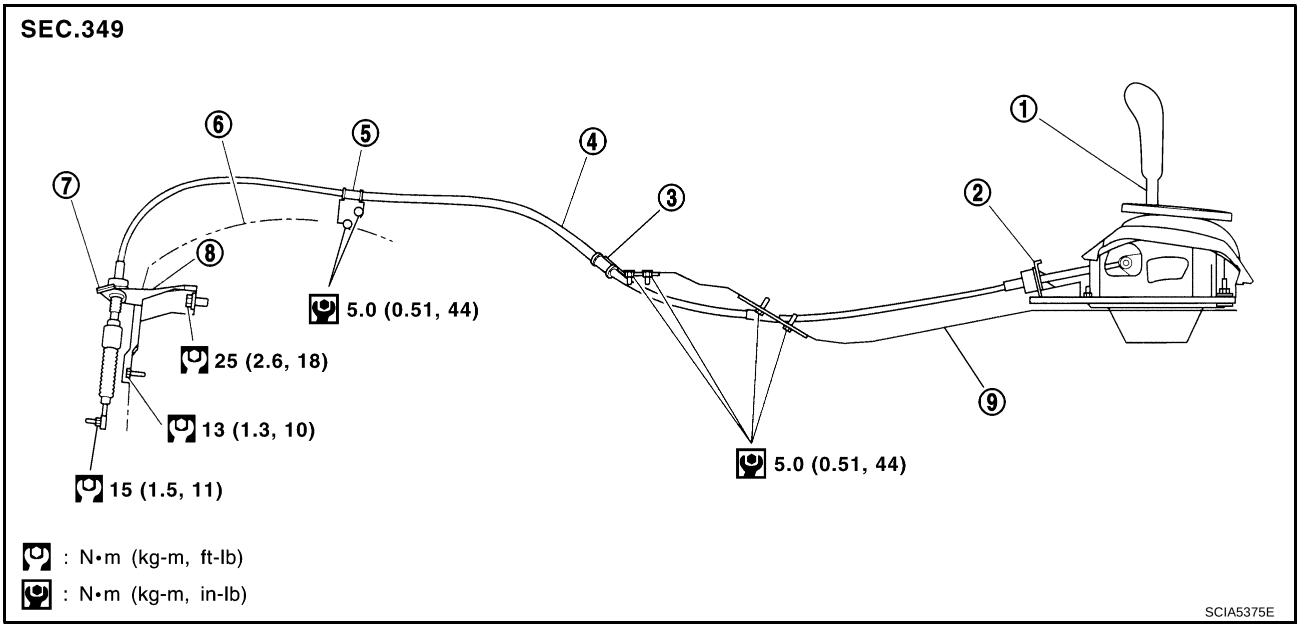
ACS007OQ

CONTROL DEVICE COMPONENTS



1.	Selector button	2.	Return spring	3.	Selector lever knob
4.	Overdrive control switch	5.	Shift lock release button cap	6.	Position indicator plate
7.	Park position switch	8.	A/T device harness connector	9.	Control device assembly
10.	Shift lock solenoid assembly	11.	Position lamp		

CONTROL CABLE COMPONENTS



1.	Control device assembly	2.	Lock plate	3.	Bracket
4.	Control cable	5.	Bracket	6.	Transaxle
7.	Lock plate	8.	Bracket	9.	Floor panel

REMOVAL

1. Remove A/T control finisher. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove center console. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
3. Remove cluster lid finisher. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
4. Disconnect control cable of control device assembly.
5. Disconnect key interlock cable of control device assembly. Refer to AT-258, "KEY INTERLOCK CABLE" .
6. Disconnect A/T device harness connector.
7. Remove control device assembly from vehicle.

INSTALLATION

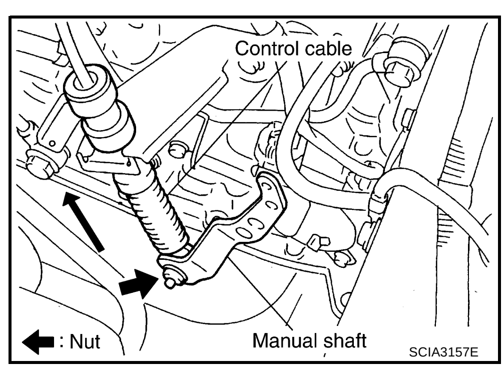
Note the following, and install in the reverse order of removal.

- After installation is completed, adjust and check A/T position. Refer to AT-252, "Adjustment of A/T Position" and AT-253, "Checking of A/T Position" .

Adjustment of A/T Position

ACS007OR

Move selector lever from “P” position to “1” position. You should be able to feel the detents in each position. If the detents cannot be felt or if the pointer indicating the position is improperly aligned, the control cable needs adjustment.



1. Place selector lever in “P” position.
2. Loosen control cable lock nut and place manual shaft in “P” position.

   CAUTION:
   Turn wheels more than 1/4 rotations and apply the park lock.
3. After pushing the control cable with the specified force, move your hands off the control cable.

   Specified force: 9.8 N (1.0 kg, 2.2 lb)
4. Connect control cable on manual shaft.

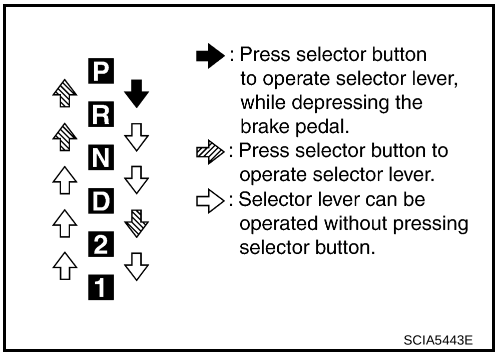
   CAUTION:
   No application of a force to the manual lever.

5. Tighten control cable lock nut.
6. Move selector lever from “P” to “1” position again. Make sure that selector lever moves smoothly.
7. Apply grease to contacting areas of selector lever and control cable. Install any part removed.

Checking of A/T Position

ACS007OS

1. Place selector lever in “P” position, and turn ignition switch ON (engine stop).
2. Make sure selector lever can be shifted to other than “P” position when brake pedal is depressed. Also make sure selector lever can be shifted from “P” position only when brake pedal is depressed.
3. Move selector lever and check for excessive effort, sticking, noise or rattle.
4. Confirm selector lever stops at each position with the feel of engagement when it is moved through all the positions. Check whether or not the actual position selector lever is in matches the position shown by the shift position indicator and transaxle body.
5. The method of operating selector lever to individual positions correctly should be as shown in the figure.
6. Confirm back-up lamps illuminate only when lever is placed in “R” position. Confirm back-up lamps do not illuminate when selector lever is in “P” or “N” position with selector lever pushed against “R” position.
7. Confirm engine can only be started with selector lever in “P” and “N” positions.
8. Make sure transaxle is locked completely in “P” position.



A/T SHIFT LOCK SYSTEM

PFP:34950

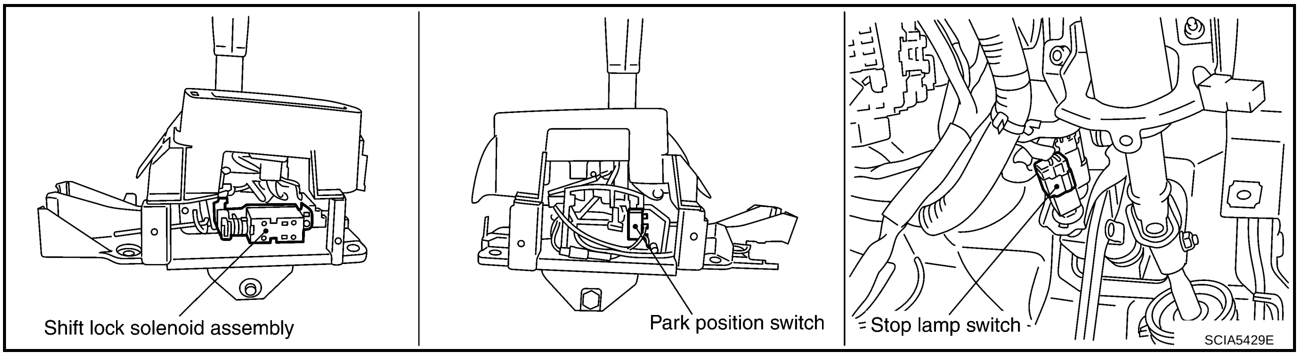
Description

ACS007UU

- The mechanical key interlock mechanism also operates as a shift lock:
  With the key switch turned to ON, the selector lever cannot be shifted from “P” (parking) to any other position unless the brake pedal is depressed.
  With the key removed, the selector lever cannot be shifted from “P” to any other position.
  The key cannot be removed unless the selector lever is placed in “P”.
- The shift lock and key interlock mechanisms are controlled by the ON-OFF operation of the shift lock solenoid and by the operation of the rotator and slider located inside the key cylinder.

Shift Lock System Electrical Parts Location

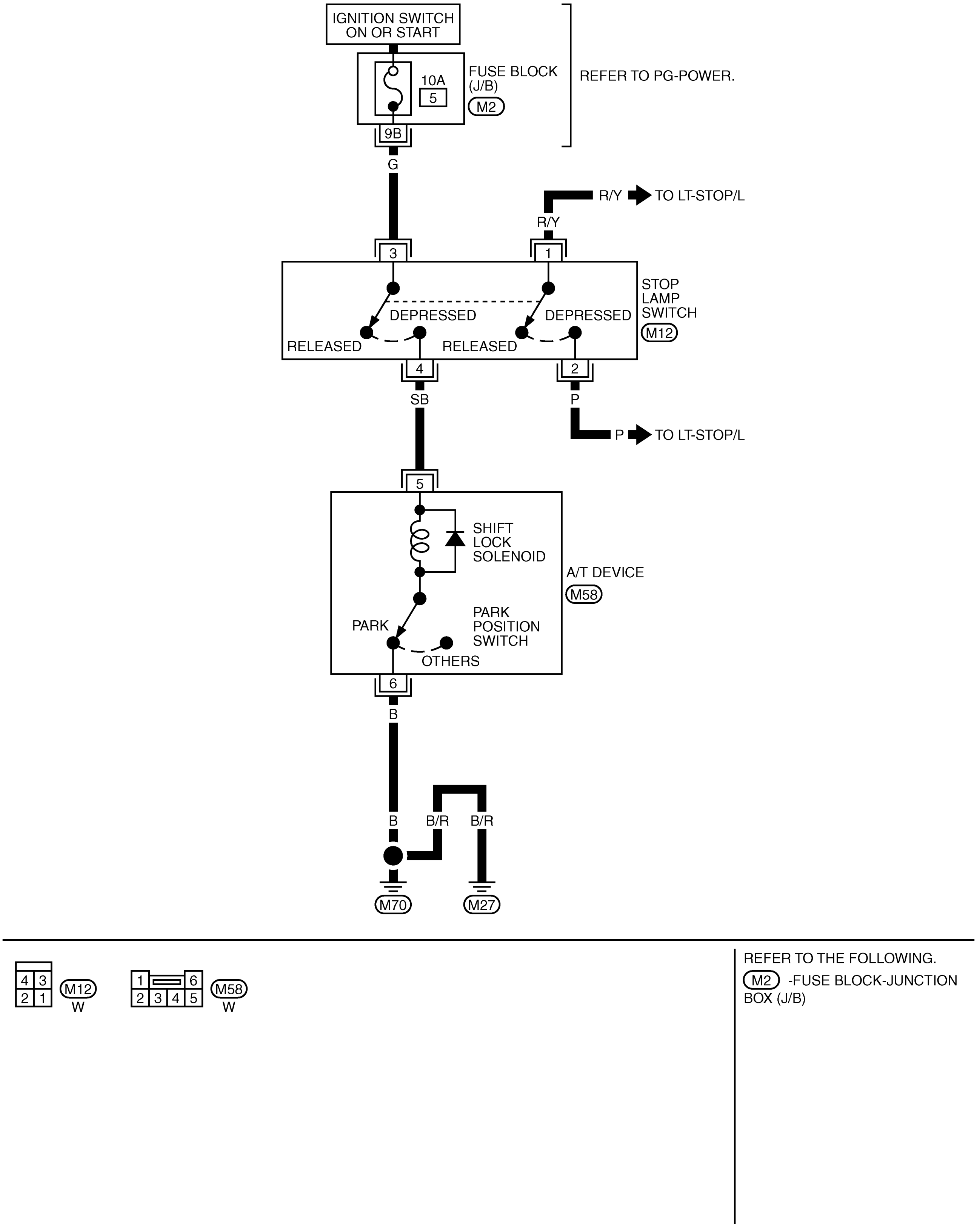
ACS007UV



Wiring Diagram — AT — SHIFT

ACS007UW

AT-SHIFT-01



TCWB0015E

Diagnostic Procedure

ACS007UX

SYMPTOM 1:

- **Selector lever cannot be moved from “P” position with key in ON position and brake pedal applied.**
- **Selector lever can be moved from “P” position with key in ON position and brake pedal released.**
- **Selector lever can be moved from “P” position when key is removed from key cylinder.**

SYMPTOM 2:

- **Ignition key cannot be removed when selector lever is set to “P” position.**
- **Ignition key can be removed when selector lever is set to any position except “P”.**

1. CHECK KEY INTERLOCK CABLE

Check key interlock cable for damage.

OK or NG

OK >> GO TO 2.
NG >> Repair key interlock cable. Refer to AT-258, "KEY INTERLOCK CABLE" .

2. CHECK A/T POSITION

Check A/T position. Refer to AT-253, "Checking of A/T Position" .

OK or NG

OK >> GO TO 3.
NG >> Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .

3. CHECK SHIFT LOCK SOLENOID AND PARK POSITION SWITCH

1. Turn ignition switch ON. (Do not start engine.)
2. Selector lever is set in “P” position.
3. Check operation sound.

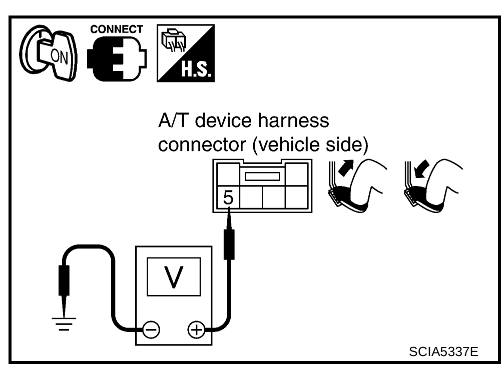
Condition	Brake pedal	Operation sound
When ignition switch is turned ON position and selector lever is set in “P” position.	Depressed	Yes
	Released	No

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

4. CHECK POWER SOURCE

1. Turn ignition switch ON. (Do not start engine.)
2. Check voltage between A/T device harness connector terminal and ground.



Voltage:

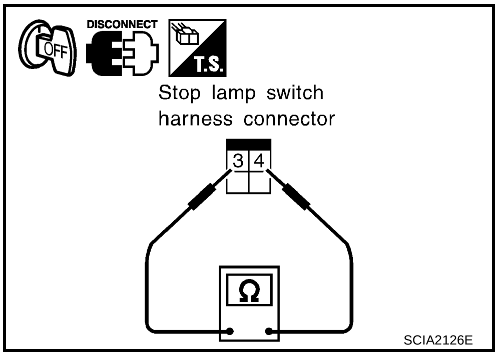
Brake pedal depressed: Battery voltage
Brake pedal released: 0V

OK or NG

OK >> GO TO 7.
NG >> GO TO 5.

5. CHECK STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch harness connector terminals.



Condition	Continuity
When brake pedal is depressed	Yes
When brake pedal is released	No

Check stop lamp switch after adjusting brake pedal — refer to **BR-6, "BRAKE PEDAL"** **.**

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

6. DETECT MALFUNCTIONING ITEM

Check the following. If any items are damaged, repair or replace damaged parts.

1. Harness for short or open between ignition switch and stop lamp switch harness connector
2. Harness for short or open between stop lamp switch harness connector and A/T device harness connector
3. 10A fuse [No.5, located in the fuse block (J/B)]
4. Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

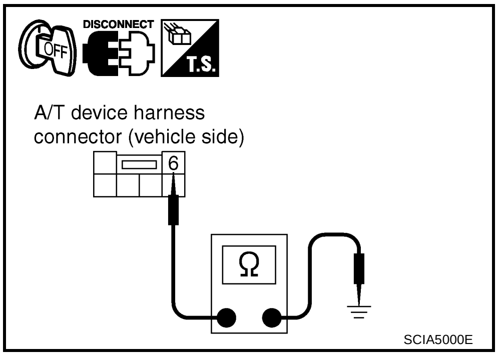
OK >> **INSPECTION END**
NG >> Repair or replace damaged parts.

7. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect A/T device harness connector.
3. Check continuity between A/T device harness connector terminal and ground.

Continuity should exist.

4. Connect A/T device harness connector.



OK or NG

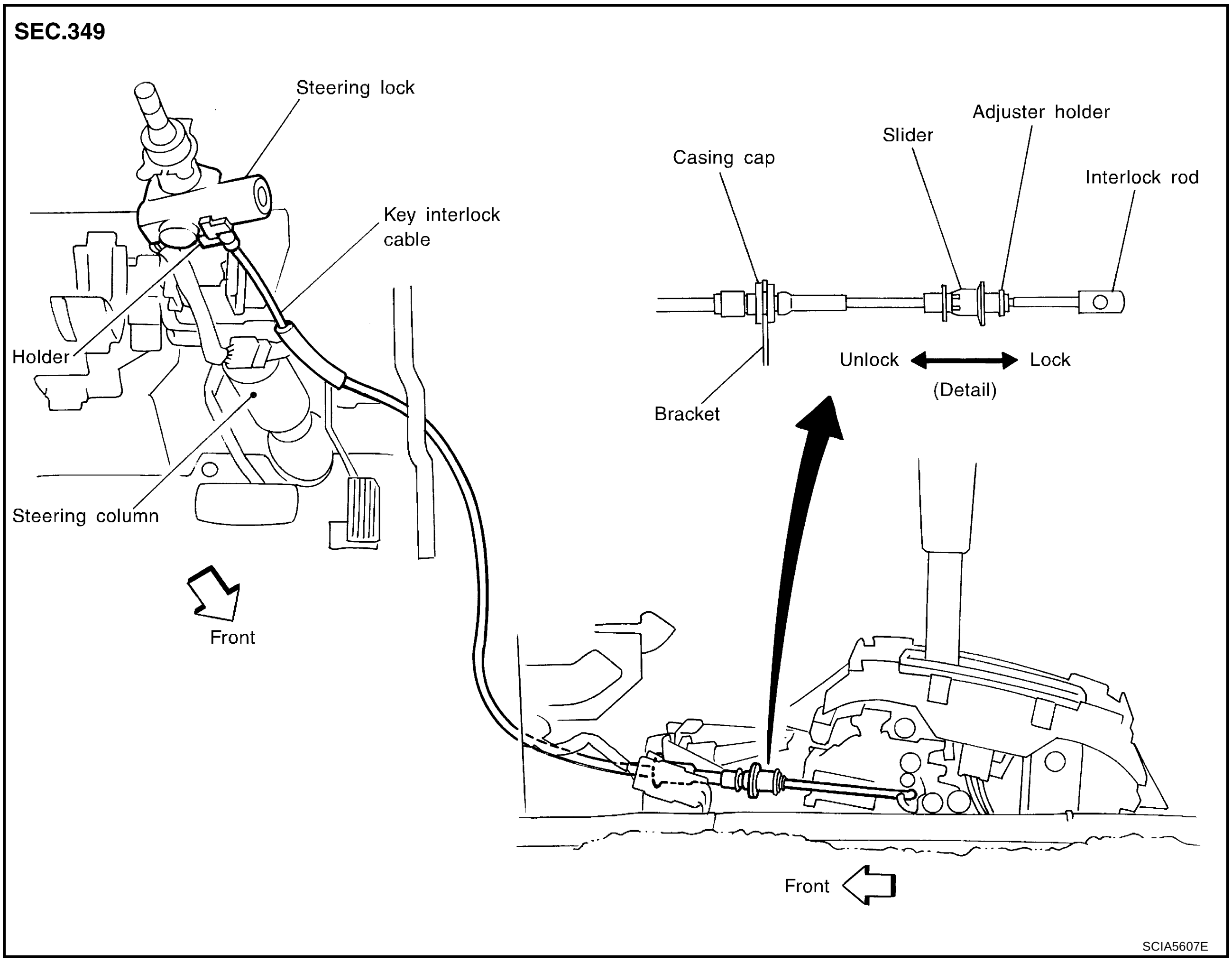
OK >> Replace shift lock solenoid or park position switch.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

KEY INTERLOCK CABLE

PFP:34908

Components

ACS007UY



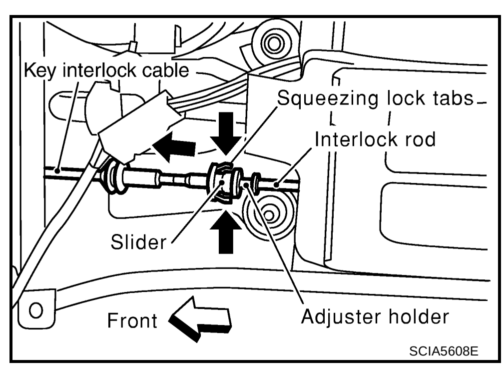
CAUTION:

- **Install key interlock cable in such a way that it will not be damaged by sharp bends, twists or interference with adjacent parts.**
- **After installing key interlock cable to control device, make sure that casing cap and bracket are firmly secured in their positions.**

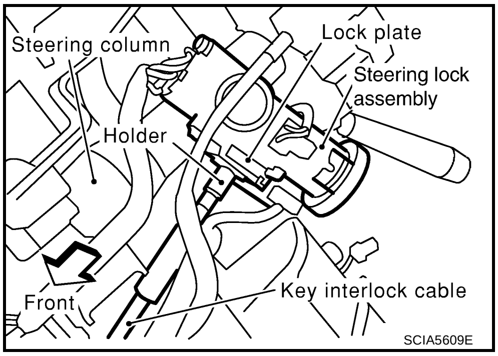
Removal

ACS007UZ

1. Unlock slider by squeezing lock tabs on slider from adjuster holder and remove interlock rod from key interlock cable.



2. Remove lock plate from steering lock assembly and remove key interlock cable.

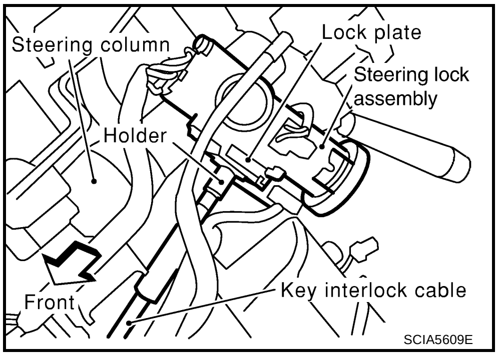


SCIA5609E

Installation

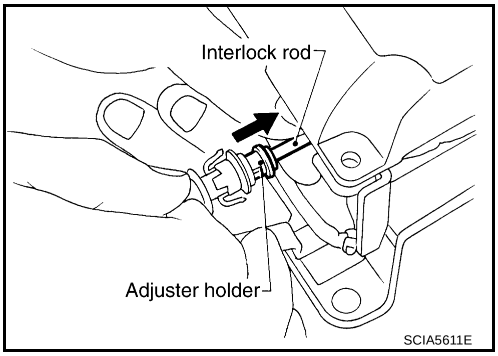
ACS007V0

1. Turn ignition switch lock position.
2. Set selector lever to “P” position.
3. Set key interlock cable to steering lock assembly and install lock plate.
4. Clamp key interlock cable to steering column and fix to key interlock cable with band.



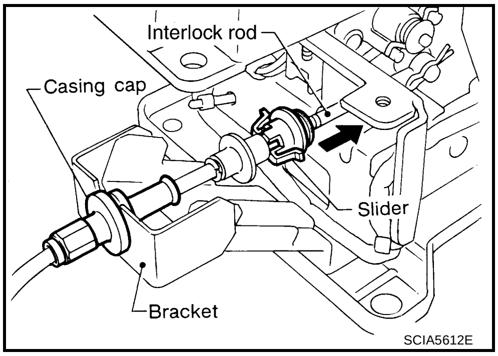
SCIA5609E

5. Insert interlock rod into adjuster holder.



SCIA5611E

6. Install casing cap to bracket.
7. Move slider in order to fix adjuster holder to interlock rod.



SCIA5612E

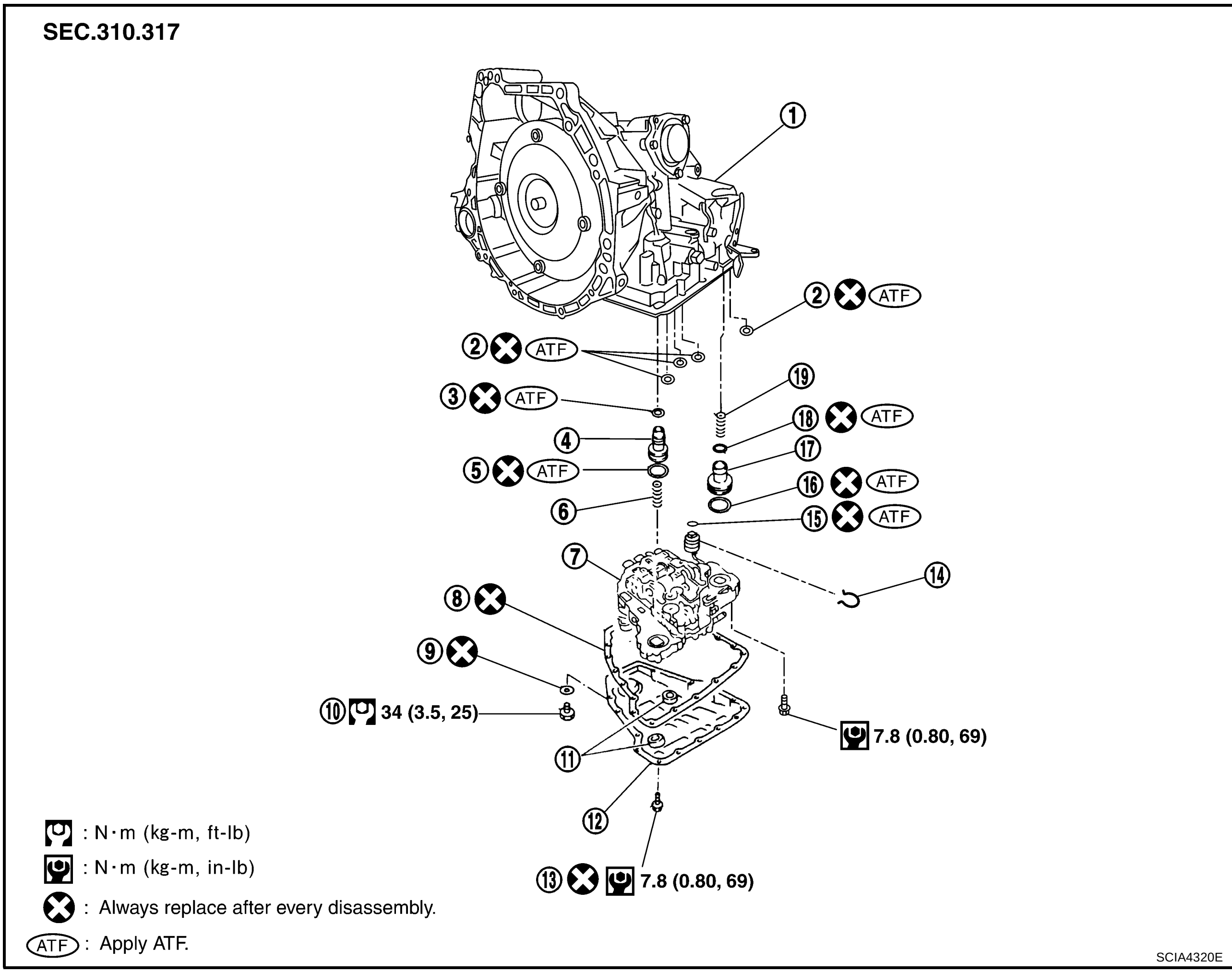
ON-VEHICLE SERVICE

PFP:00000

Control Valve Assembly and Accumulators

ACS007V1

COMPONENTS

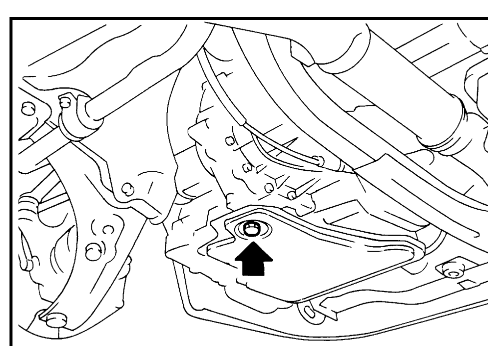


1. Transaxle	2. Lip seal	3. O-ring
4. Servo release accumulator piston	5. O-ring	6. Return spring
7. Control valve assembly	8. Oil pan gasket	9. Drain plug gasket
10. Drain plug	11. Magnet	12. Oil pan
13. Oil pan fitting bolt	14. Snap ring	15. O-ring
16. O-ring	17. N-D accumulator piston	18. O-ring
19. Return spring		

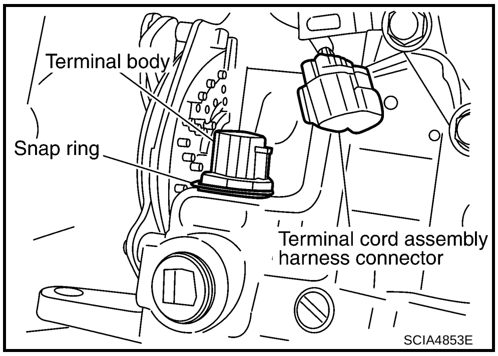
REMOVAL AND INSTALLATION

Removal

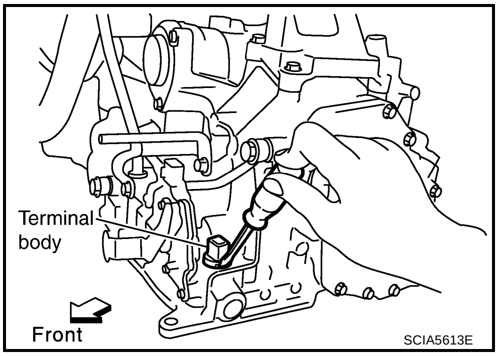
1. Disconnect battery negative cable from battery negative terminal.
2. Drain ATF from transaxle. Refer to AT-18, "Changing A/T Fluid" .
3. Remove oil pan and oil pan gasket.



4. Disconnect terminal cord assembly harness connector.
5. Remove snap ring from terminal body.
   CAUTION:
   Do not expand snap ring excessively.



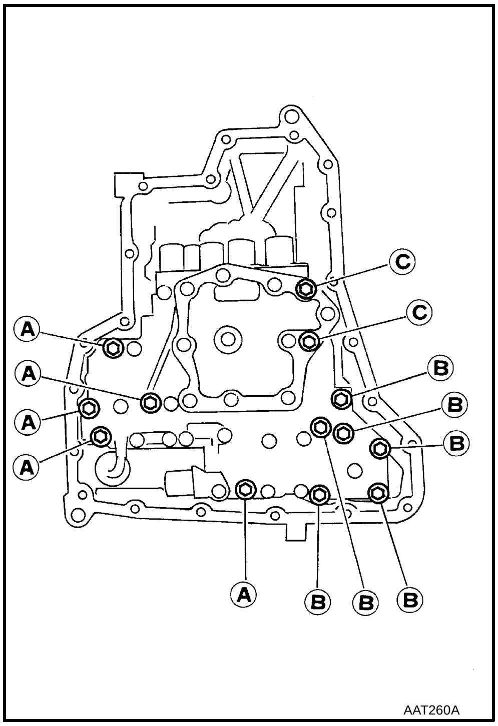
6. Remove terminal cord assembly by pushing terminal body into transaxle case.



7. Remove control valve assembly fixing bolts **A, B** and **C** .

Bolt length, number and location:

Bolt symbol	A	B	C
Bolt length " ℓ " mm (in)	40.0 (1.575)	33.0 (1.299)	43.5 (1.713)
Number of bolts	5	6	2



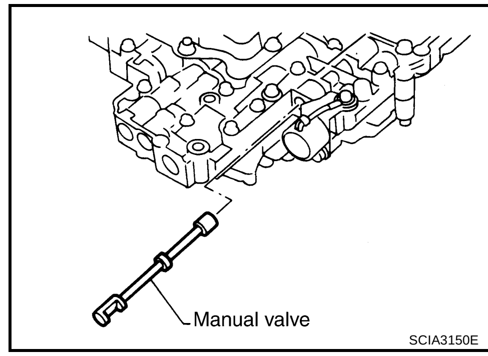
8. Remove control valve assembly from transaxle.
   CAUTION:
   Be careful not to drop manual valve and servo release accumulator return spring.

9. Remove manual valve from control valve assembly.

   CAUTION:

   Be careful not to drop manual valve.

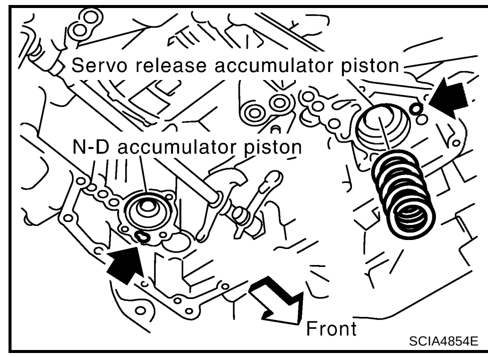
10. Remove O-ring from terminal body.
11. Disassemble and inspect control valve assembly if necessary. Refer to AT-304, "Control Valve Assembly" , AT-313, "Control Valve Upper Body" and AT-317, "Control Valve Lower Body" .



12. Remove servo release accumulator piston and N-D accumulator piston by applying compressed air if necessary.

    CAUTION:

    Hold each piston with a rag.

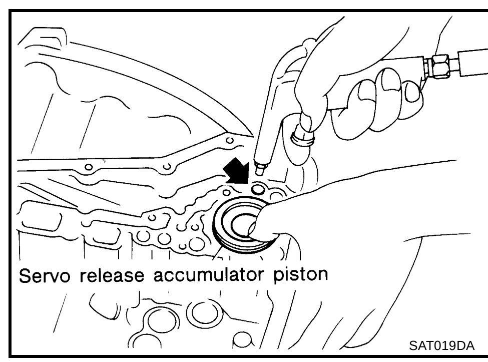


a. Blow air into the oil hole as shown in the figure and remove servo release accumulator piston from transaxle case.

   CAUTION:

   - **Strong flow of air will push the accumulator piston out along with a splash of oil. Cover the area with paper towels and blow air little by little to avoid this.**
   - **Wrap the removed accumulator piston in a paper towel.**

b. Remove O-rings from servo release accumulator piston.



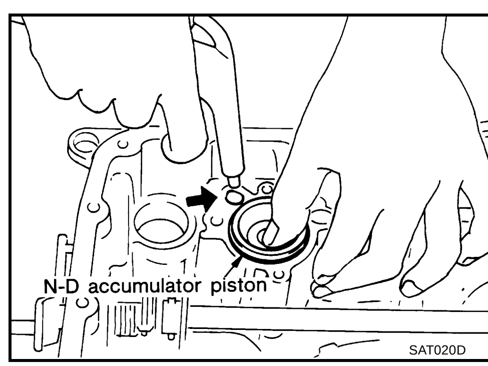
c. Blow air into the oil hole shown in the figure and remove N-D accumulator piston and return spring from transaxle case.

   CAUTION:

   - **Strong flow of air will push the accumulator piston out along with a splash of oil. Cover the area with paper towels and blow air little by little to avoid this.**
   - **Wrap the removed accumulator piston in a paper towel.**

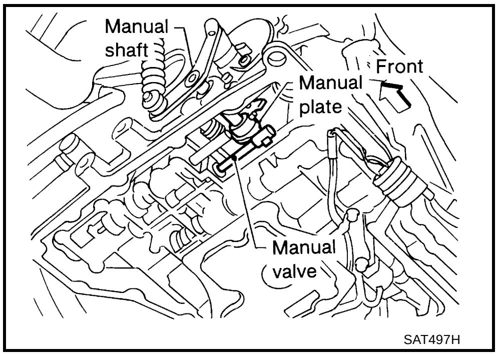
d. Remove O-rings from N-D accumulator piston.

13. Remove lip seals from oil groove for band servo.
14. Remove magnets from oil pan.



Installation

- **Note the following, and install in the reverse order of removal.**
- **Set manual shaft in “N” position, then align manual plate with groove in manual valve.**
- **After installing control valve assembly to transaxle case, make sure that selector lever can be moved to all positions.**
- **After completing installation, check for A/T fluid leakage, and fluid level. Refer to** **AT-17, "Checking A/T Fluid"****.**



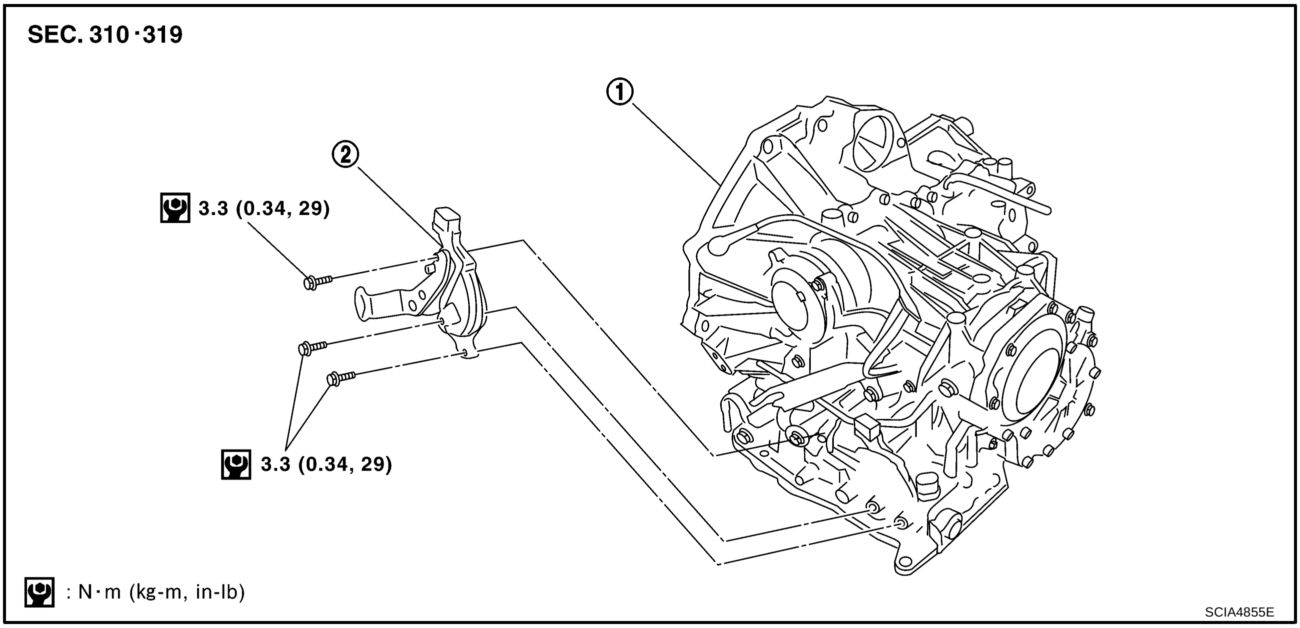
CAUTION:

- **Do not reuse O-rings and lip seals.**
- **Do not reuse oil pan gasket and oil pan fitting bolts.**
- **Do not reuse drain plug gasket.**
- **Apply ATF to manual valve.**
- **Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface.**

Park/Neutral Position (PNP) Switch

ACS007V2

COMPONENTS

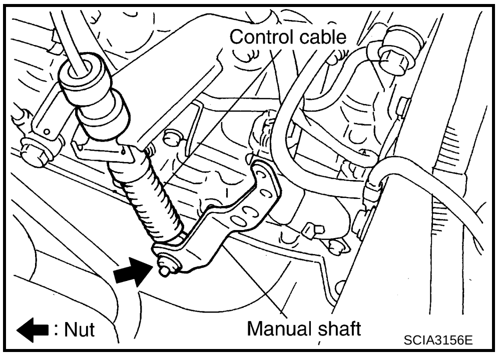


1. Transaxle assembly
2. PNP switch

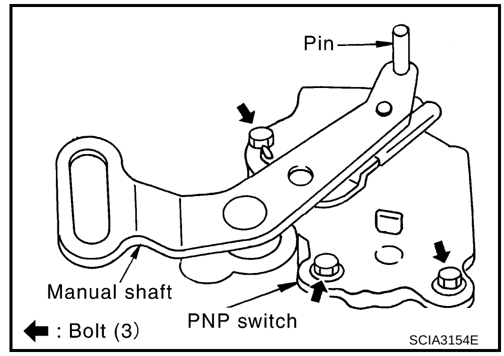
REMOVAL AND INSTALLATION

Removal

1. Set selector lever in “N” position.
2. Remove engine under cover.
3. Remove control cable end from manual shaft.



4. Remove PNP switch fitting bolts.
5. Remove PNP switch from transaxle assembly.



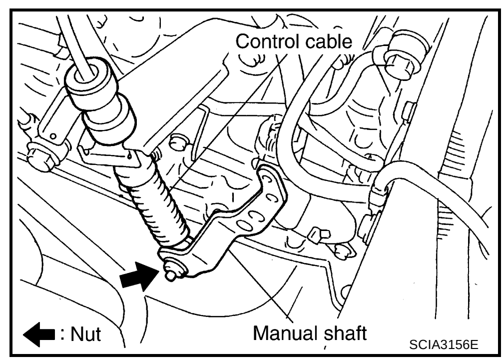
Installation

Note the following, and install in the reverse order of removal.

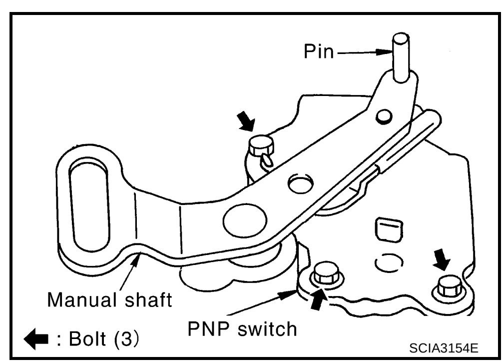
- Align PNP switch position when installing.
- After installation is completed, adjust and check A/T position. Refer to AT-251, "SHIFT CONTROL SYSTEM" , AT-264, "PARK/NEUTRAL POSITION (PNP) SWITCH ADJUSTMENT" .
- After installation is completed, check continuity of PNP switch. Refer to AT-244, "TCM Self-Diagnosis Does Not Activate" .

PARK/NEUTRAL POSITION (PNP) SWITCH ADJUSTMENT

1. Set selector lever and manual shaft in “N” position.
2. Remove control cable end from manual shaft.



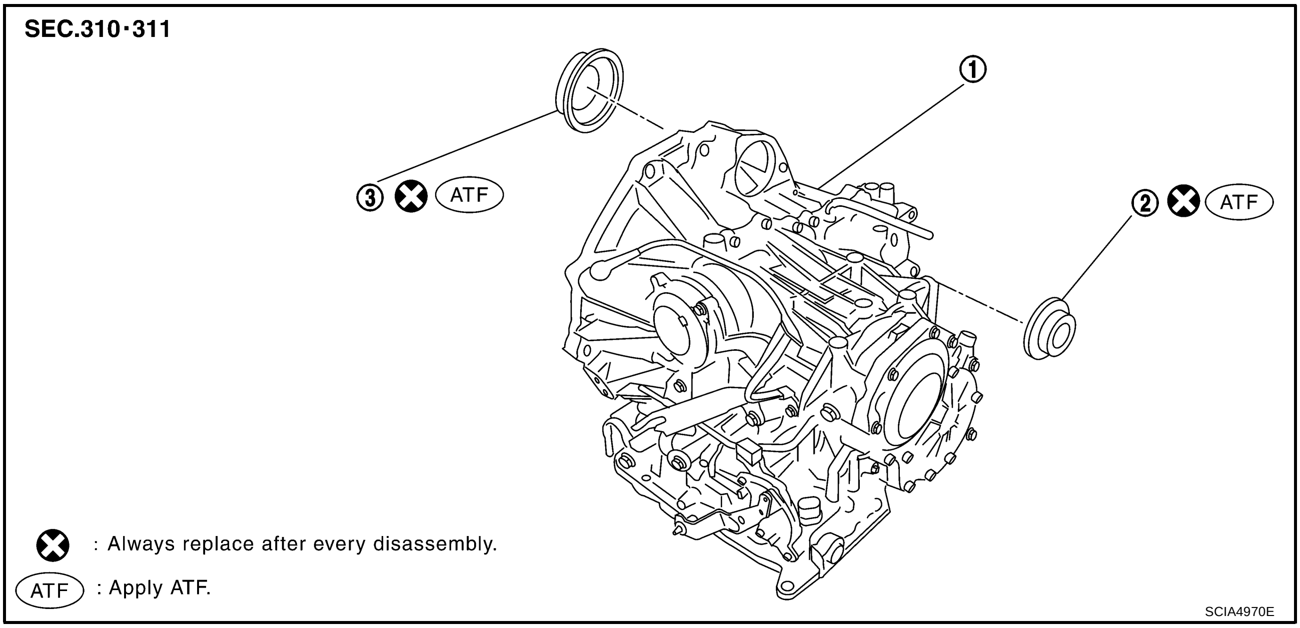
3. Loosen PNP switch fitting bolts.
4. Use a 3 mm (0.12 in) pin for this adjustment.
   a. Insert the pin straight into the manual shaft adjustment hole.
   b. Rotate PNP switch until the pin can also be inserted straight into the hole in PNP switch.
5. Tighten PNP switch fixing bolts.
6. Remove pin from adjustment hole after adjusting PNP switch.
7. Reinstall any part removed.
8. Adjust control cable. Refer to AT-252, "Adjustment of A/T Position" .
9. Check continuity of PNP switch. Refer to AT-249, "PNP Switch" .



Differential Side Oil Seal Replacement

ACS007V3

COMPONENTS



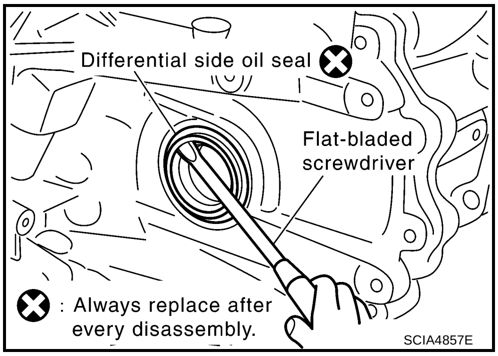
1. Transaxle assembly
2. LH differential side oil seal
3. RH differential side oil seal

REMOVAL AND INSTALLATION

Removal

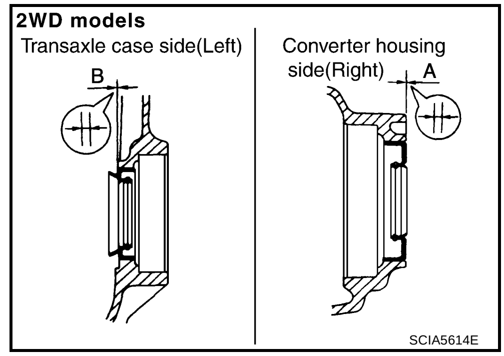
1. Remove exhaust front tube. Refer to EX-3, "Removal and Installation" .
2. Remove drive shaft. Refer to FAX-13, "FRONT DRIVE SHAFT" .
3. Remove transfer assembly from right side of transaxle (For AWD models). Refer to TF-48, "Removal and Installation" .
4. Remove differential side oil seal using a flat-bladed screwdriver.

   CAUTION:
   Be careful not to scratch transaxle case.



Installation

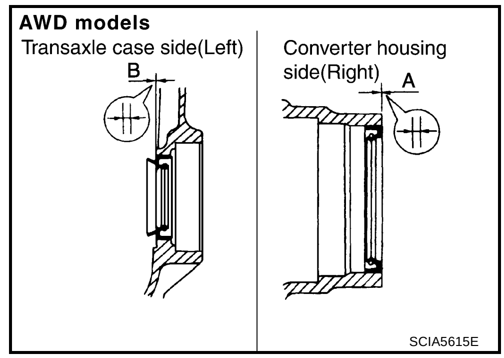
1. Drive the differential side oil seals into the case until it become flush using the drift below. Refer to dimensions A and B.



Unit: mm (in)

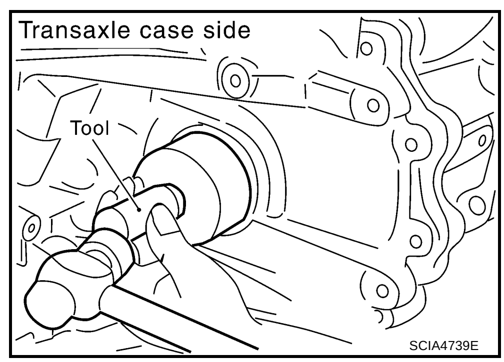
Dimensions A, B	0± 0.5 (0±0.020)

NOTE:
The differential side oil seal pulling direction is used as the reference.



Drift to be used:

Location	2WD models	AWD models
Transaxle case side (Left) Tool number (Kent-Moore No.)	ST33400001 (J-26082)	ST33400001 (J-26082)
Converter housing side (Right) Tool number (Kent-Moore No.)	ST33400001 (J-26082)	KV40100621 (J-25273)



CAUTION:
- **Apply ATF to differential side oil seals.**
- **Do not reuse differential side oil seals.**

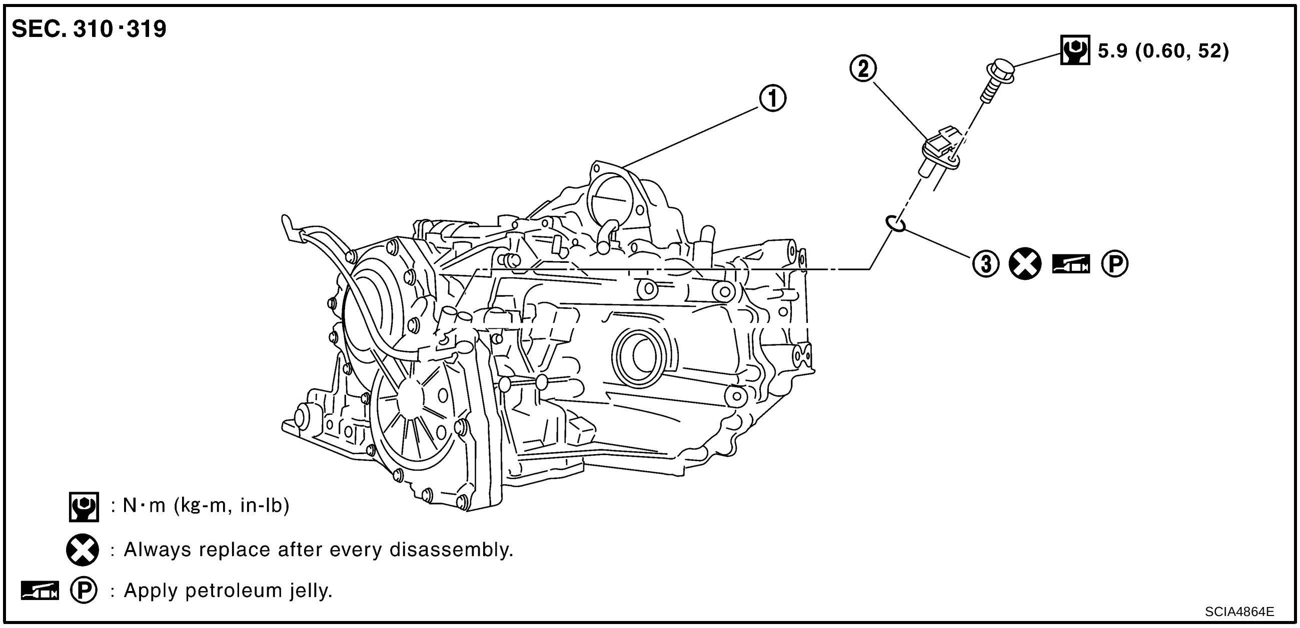
2. Reinstall any part removed.

CAUTION:
If lubricant leak has occurred, after finishing work, check A/T fluid level and fluid leakage. Refer to AT-17, "Checking A/T Fluid" **.**

Revolution Sensor Replacement

ACS007V4

COMPONENTS

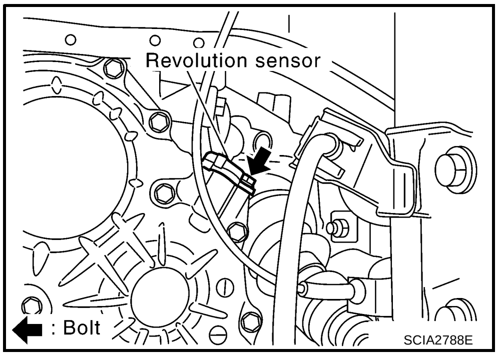


1. Transaxle assembly
2. Revolution sensor
3. O-ring

REMOVAL AND INSTALLATION

Removal

1. Remove front tire LH from vehicle with power tool.
2. Disconnect revolution sensor harness connector.
3. Remove revolution sensor from transaxle assembly.
4. Remove O-ring from revolution sensor.



Installation

Note the following, and install in the reverse order of removal.

CAUTION:

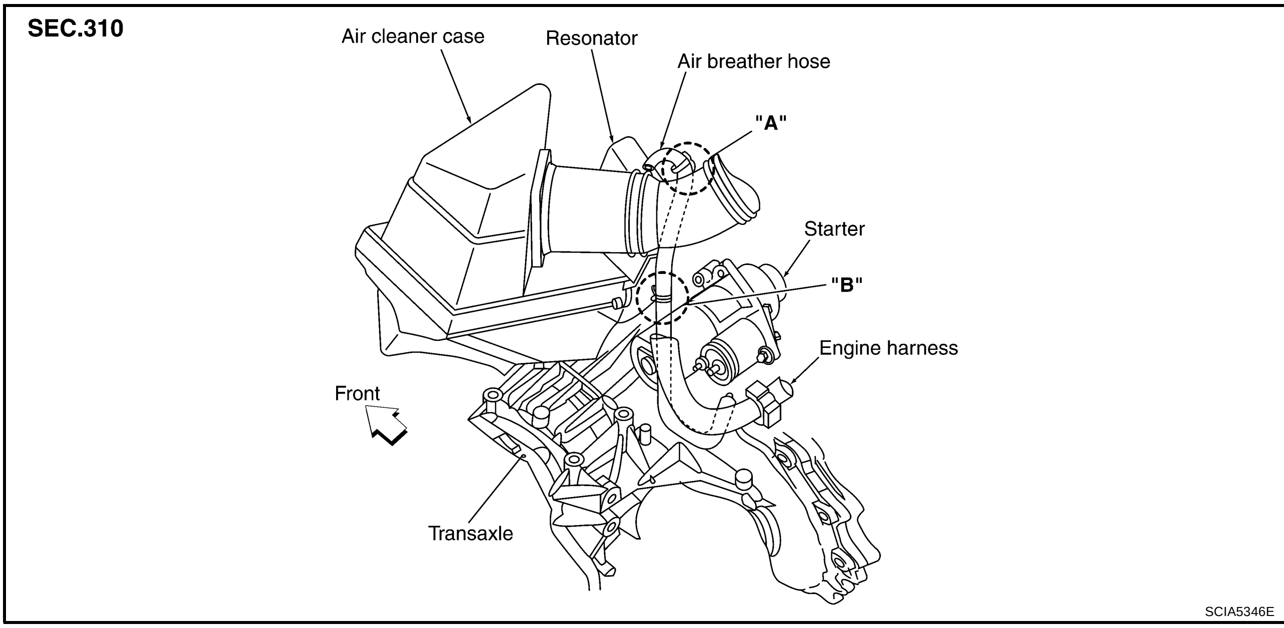
- **Do not reuse O-ring.**
- **Apply petroleum jelly to O-ring.**

AIR BREATHER HOSE

PFP:31098

Removal and Installation

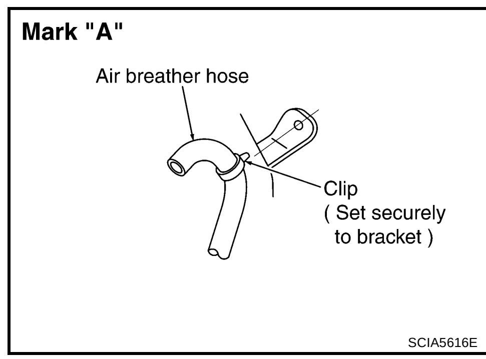
ACS007ZW



SCIA5346E

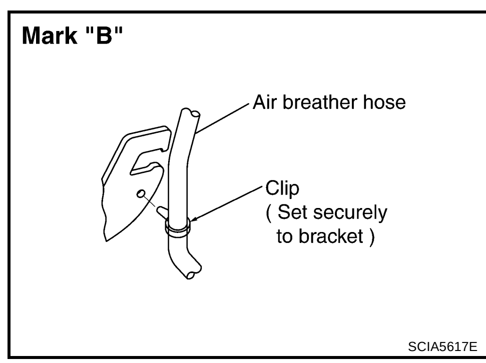
During removal and installation of air breather hose be careful of the following.

- Secure a mark “A” when installing air breather hose to resonator.



SCIA5616E

- Secure a mark “B” when installing air breather hose to air cleaner case.



SCIA5617E

CAUTION:

- **When installing an air breather hose, be careful not to be crushed or blocked by folding or bending the hose.**
- **When inserting a hose to the transaxle tube, be sure to insert it fully until its end reaches the tube bend R portion.**
- **When inserting a hose to the air breather tube, be sure to insert it fully until its end reaches the tube spool portion.**

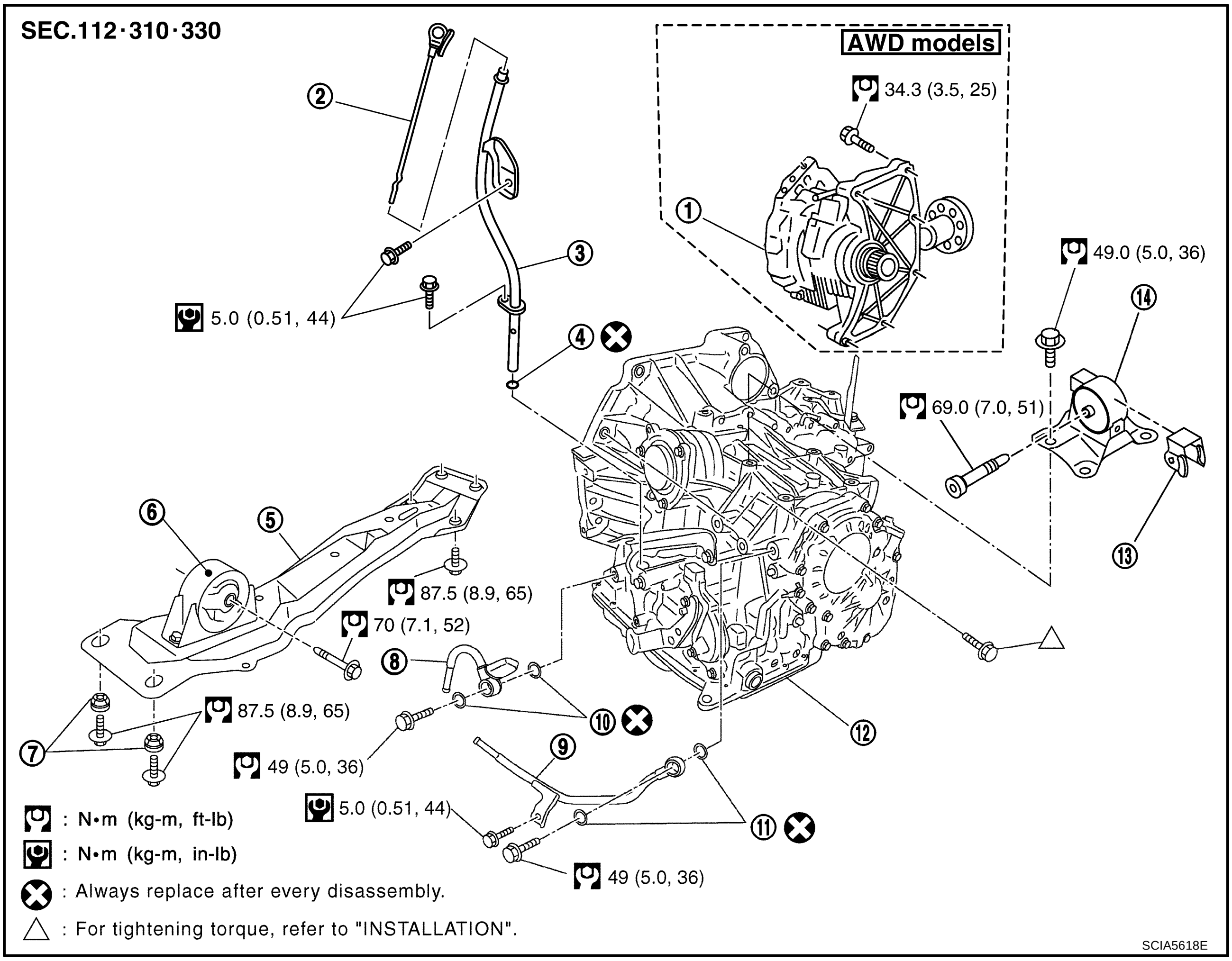
TRANSAXLE ASSEMBLY

PFP:32020

Removal and Installation

ACS007V5

COMPONENTS



1.	Transfer assembly	2.	A/T fluid level gauge	3.	A/T fluid charging pipe
4.	O-ring	5.	Center member	6.	Front engine mounting insulator
7.	Grommet	8.	Fluid cooler tube	9.	Fluid cooler tube
10.	Copper washer	11.	Copper washer	12.	Transaxle assembly
13.	Stopper	14.	LH engine mounting insulator		

REMOVAL

CAUTION:

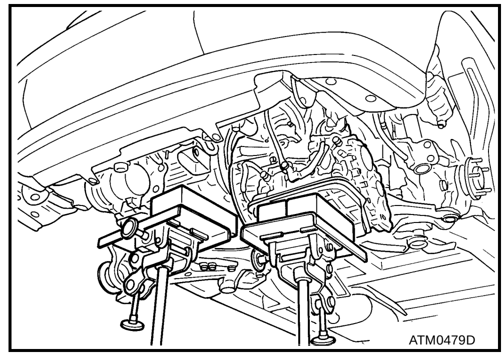
Before separating transaxle from engine, remove the crankshaft position sensor (POS) from cylinder block. Be careful not to damage sensor.

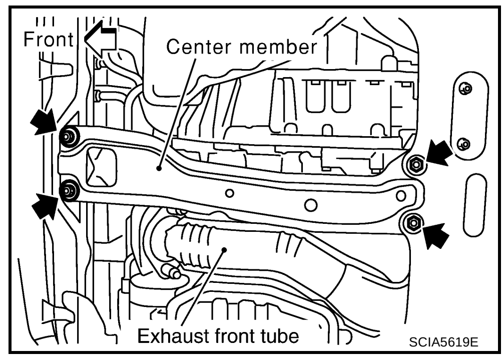
1. Remove battery and bracket, air cleaner and air duct.
2. Remove air breather hose. Refer to AT-268, "Removal and Installation" .
3. Disconnect terminal cord assembly harness connector, PNP switch harness connector and revolution sensor harness connector.
4. Remove crankshaft position sensor (POS) from cylinder block. Refer to EM-22, "OIL PAN AND OIL STRAINER" .

   CAUTION:

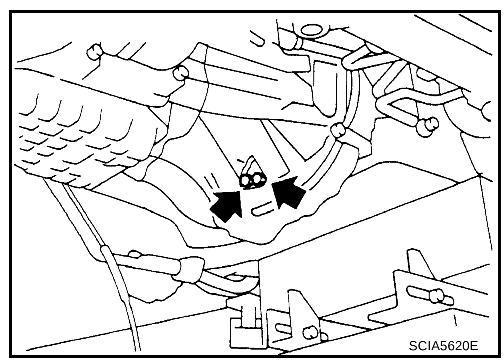
   - **Do not subject it to impact by dropping or hitting it.**
   - **Do not disassemble.**
   - **Do not allow metal filings, etc., to get on the sensor's front edge magnetic area.**
   - **Do not place in an area affected by magnetism.**

5. Disconnect control cable from transaxle assembly. Refer to AT-252, "CONTROL CABLE COMPONENTS" .
6. Remove exhaust front tube. Refer to EX-3, "Removal and Installation" .
7. Disconnect A/T fluid cooler hoses.
8. Remove front drive shaft. Refer to FAX-13, "FRONT DRIVE SHAFT" .
9. Remove transfer assembly. (For AWD models) Refer to TF-48, "Removal and Installation" .
10. Remove starter motor with power tool. Refer to SC-16, "Removal and Installation" .
11. Support transaxle assembly with a transmission jack.
12. Remove center member, front engine mounting insulator and LH engine mounting insulator with power tool.
13. Remove suspension member. Refer to FSU-17, "Removal and Installation" .





14. Remove rear plate cover. Refer to EM-22, "OIL PAN AND OIL STRAINER" .
    Rotate crankshaft to gain access to securing bolts.
15. Remove securing bolts between drive plate and torque converter. When turning crankshaft, turn it clockwise as viewed from the front of engine.
16. Support engine assembly with a transmission jack.
17. Remove bolts fixing transaxle assembly to engine assembly.
18. Lower transaxle assembly while supporting it with a transmission jack.
19. Remove A/T fluid level gauge from A/T fluid charging pipe.
20. Remove A/T fluid charging pipe from transaxle assembly.
21. Remove O-ring from A/T fluid charging pipe.

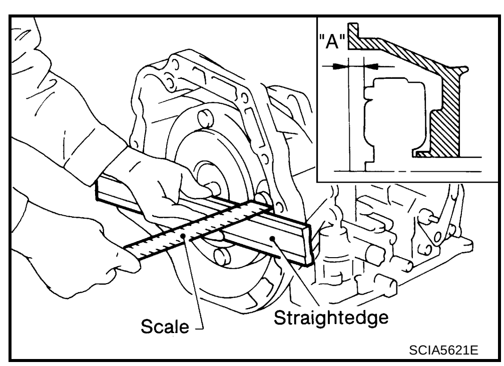


INSPECTION

Installation and Inspection of Torque Converter

- After inserting a torque converter to a transaxle, be sure to check dimension “A” to ensure it is within the reference value limit.

Distance “A”: 14 mm (0.55 in) or more



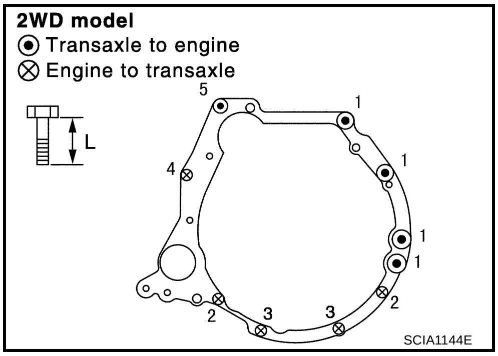
INSTALLATION

Install the removed parts in the reverse order of the removal, while paying attention to the following work.

- When installing transaxle assembly to engine assembly, attach the fixing bolts in accordance with the following table.

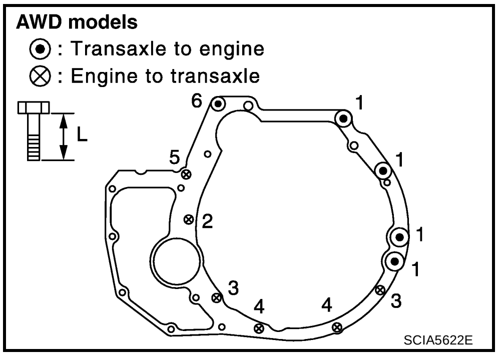
2WD models

Bolt No.	1	2	3	4	5
Number of bolts	4	2	2	1	1
Bolt length "ℓ"mm (in)	49 (1.93)	40 (1.57)	30 (1.18)	40 (1.57)	45 (1.77)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7,55)	42.7(4.4,31)		35(3.6,26)	



AWD models

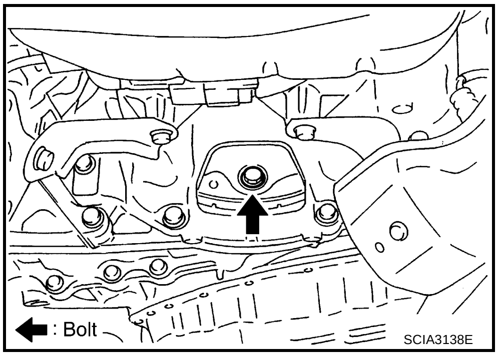
Bolt No.	1	2	3	4	5	6
Number of bolts	4	1	2	2	1	1
Bolt length "ℓ"mm (in)	49 (1.93)	45 (1.77)	40 (1.57)	30 (1.18)	40 (1.57)	45 (1.77)
Tightening torque N·m (kg-m, ft-lb)	75 (7.7,55)		42.7(4.4,31)		35(3.6,26)	



- Align the positions of tightening bolts for drive plate with those of torque converter, and temporarily tighten bolts. Then, tighten the bolts to specified torque.

  : 52 N·m (5.3 kg-m, 38 ft-lb)

  CAUTION:
  - **When turning crankshaft, turn it clockwise as viewed from the front of engine.**
  - **When tightening the tightening bolts for torque converter after fixing crankshaft pulley bolts, be sure to confirm the tightening torque of crankshaft pulley mounting bolts.**



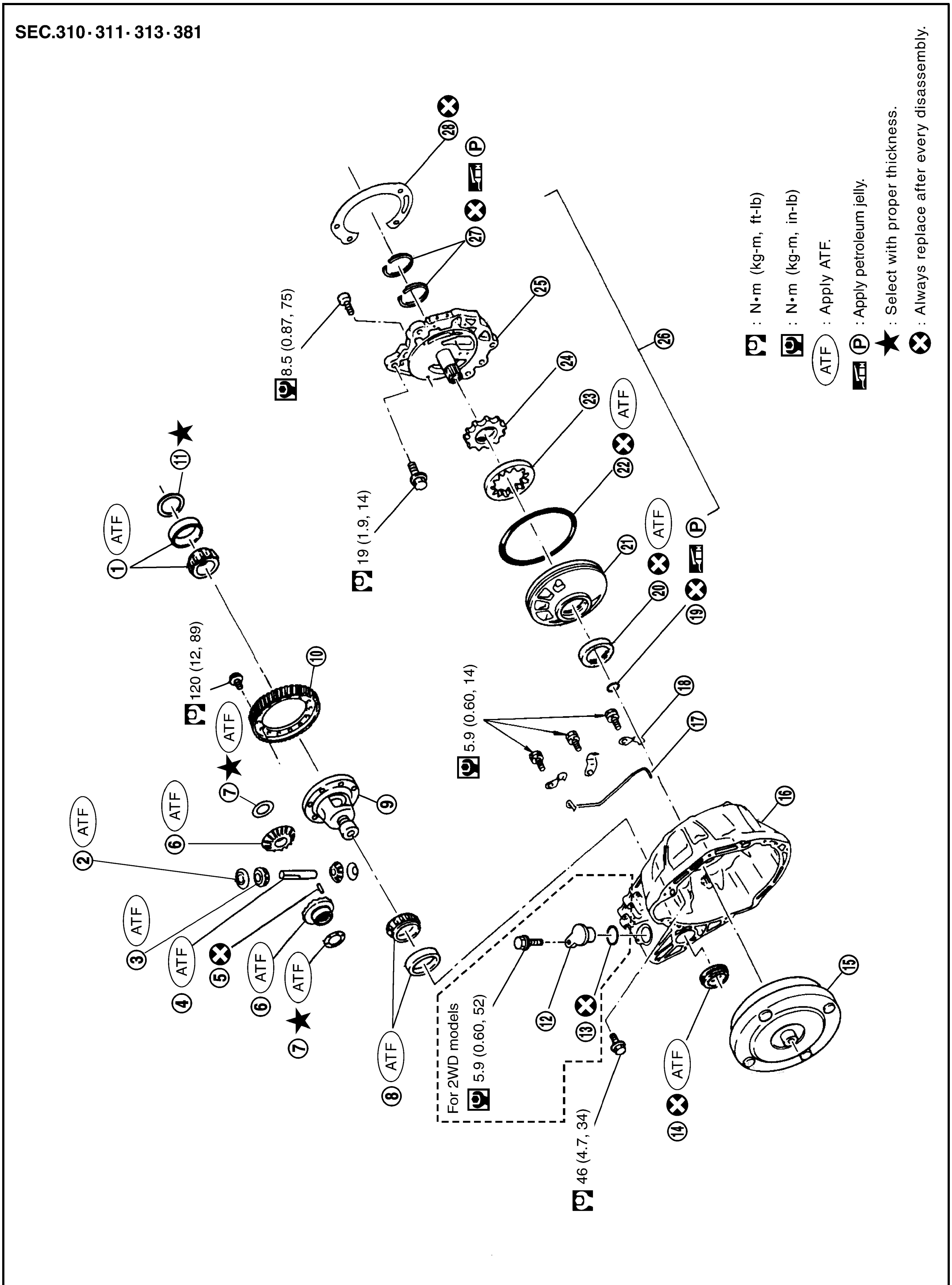
  - **After converter is installed to drive plate, rotate crankshaft several turns and make sure that transaxle rotates freely without binding.**
- After completing installation, check for A/T fluid leakage, A/T fluid level, and the positions of A/T. Refer to AT-17, "Checking A/T Fluid" , AT-252, "Adjustment of A/T Position" .

OVERHAUL

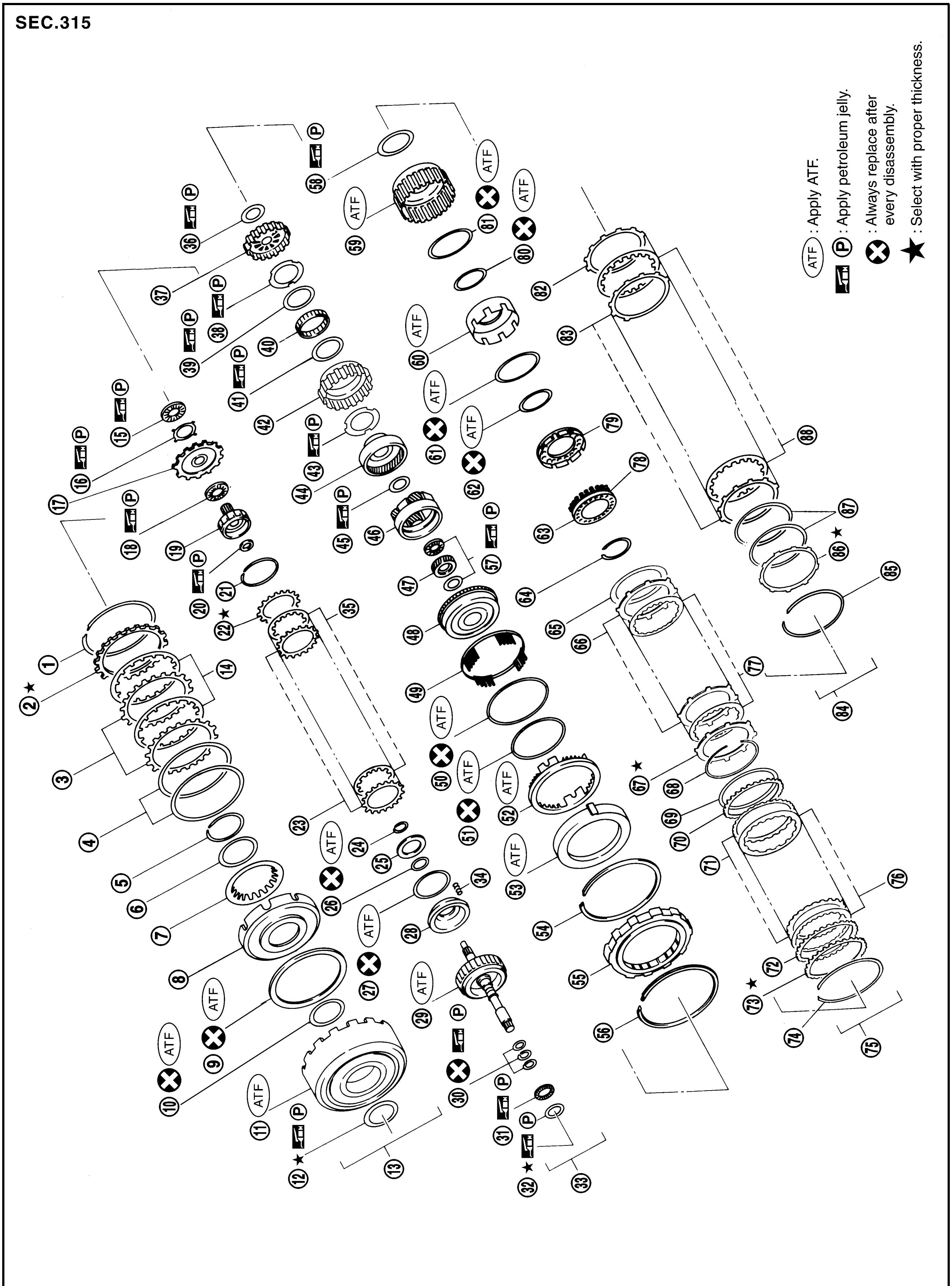
PFP:00000

Components

ACS007V7

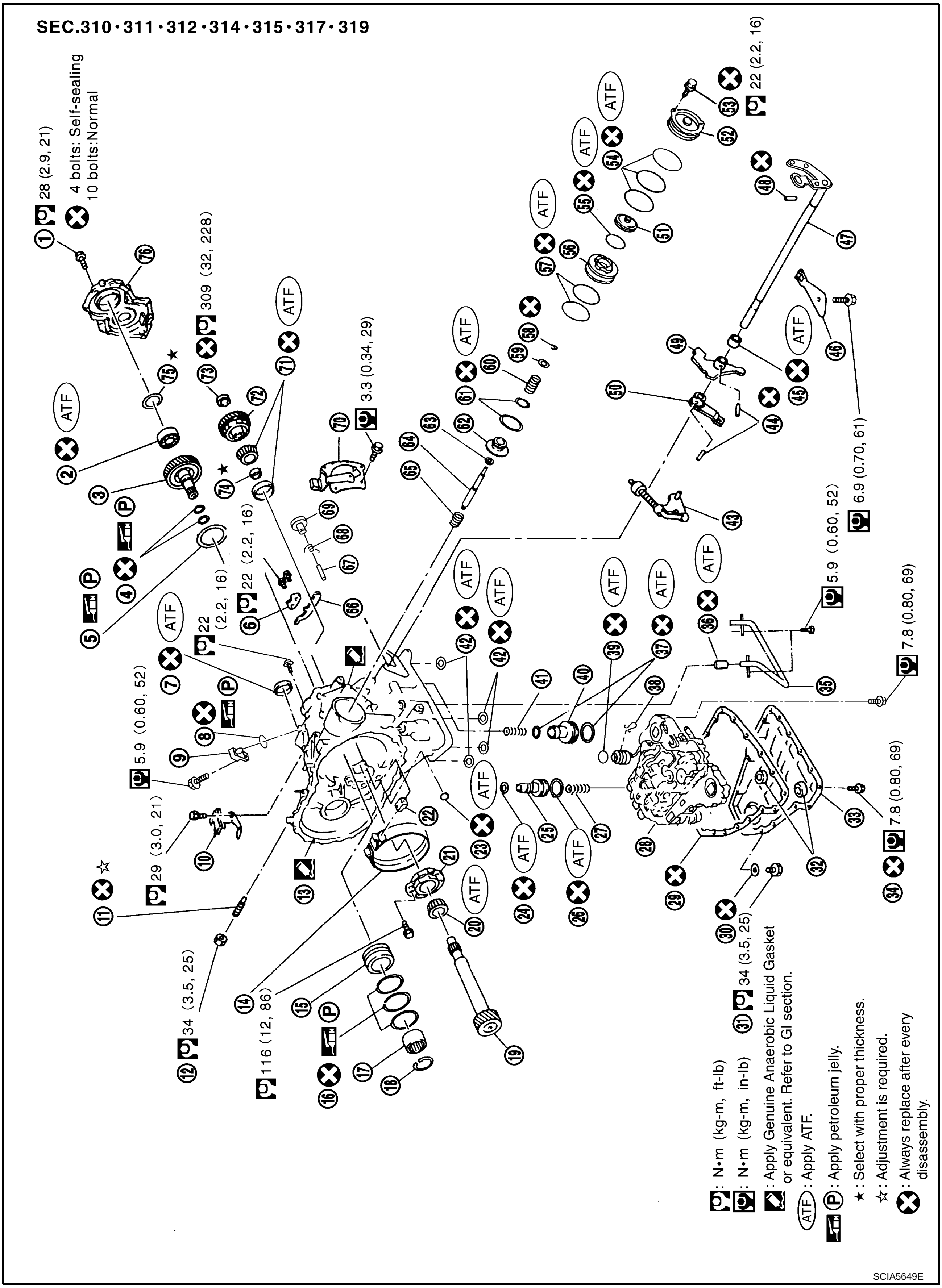


1. Differential side bearing
2. Pinion mate gear thrust washer
3. Pinion mate gear
4. Pinion mate shaft
5. Lock pin
6. Side gear
7. Side gear thrust washer
8. Differential side bearing
9. Differential case
10. Final gear
11. Differential side bearing adjusting shim
12. Plug
13. O-ring
14. RH differential side oil seal
15. Torque converter
16. Converter housing
17. Differential lubricant tube
18. Clip
19. O-ring
20. Oil pump housing oil seal
21. Oil pump housing
22. O-ring
23. Outer gear
24. Inner gear
25. Oil pump cover
26. Oil pump assembly
27. Seal ring
28. Gasket



1.	Snap ring	2.	Retaining plate	3.	Driven plate
4.	Dish plate	5.	Snap ring	6.	Spring retainer
7.	Return spring	8.	Reverse clutch piston	9.	Seal ring

10. D-ring
11. Reverse clutch drum
12. Thrust washer
13. Reverse clutch assembly
14. Drive plate
15. Needle bearing
16. Bearing race
17. Front sun gear
18. Needle bearing
19. High clutch hub
20. Needle bearing
21. Snap ring
22. Retaining plate
23. Driven plate
24. Snap ring
25. Spring retainer
26. D-ring
27. D-ring
28. High clutch piston
29. Input shaft assembly (high clutch drum)
30. Seal ring
31. Needle bearing
32. Bearing race
33. High clutch assembly
34. Return spring
35. Drive plate
36. Needle bearing
37. Overrun clutch hub
38. Thrust washer
39. Bearing race
40. Forward one-way clutch
41. Bearing race
42. Forward clutch hub
43. Thrust washer
44. Rear internal gear
45. Needle bearing
46. Rear planetary carrier
47. Rear sun gear
48. Front planetary carrier
49. Spring retainer
50. D-ring
51. D-ring
52. Low & reverse brake piston
53. Retainer
54. Snap ring
55. Low one-way clutch
56. Snap ring
57. Needle bearing
58. Needle bearing
59. Forward clutch drum
60. Forward clutch piston
61. Seal ring
62. D-ring
63. Spring retainer
64. Snap ring
65. Dish plate
66. Driven plate
67. Retaining plate
68. Snap ring
69. Dish plate
70. Retaining plate
71. Driven plate
72. Retaining plate
73. Retaining plate
74. Snap ring
75. Forward clutch assembly and overrun clutch assembly
76. Drive plate
77. Drive plate
78. Return spring
79. Overrun clutch piston
80. D-ring
81. Seal ring
82. Retaining plate
83. Driven plate
84. Low & reverse brake assembly
85. Snap ring
86. Retaining plate
87. Dish plate
88. Drive plate

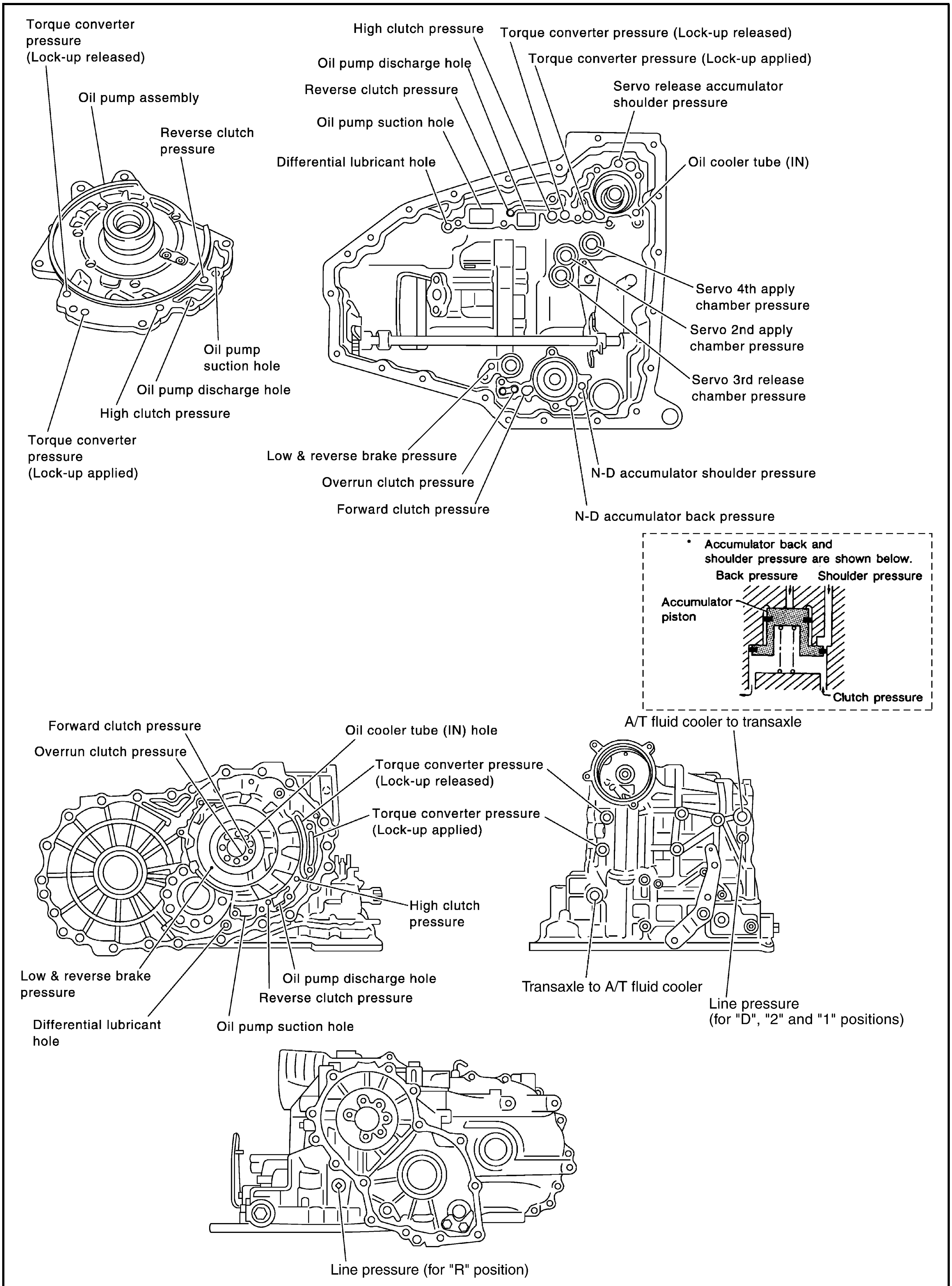


1.	Side cover fitting bolt	2.	Output shaft bearing	3.	Output shaft
4.	Seal ring	5.	Needle bearing	6.	Parking actuator support
7.	LH differential side oil seal	8.	O-ring	9.	Revolution sensor

10. Bracket
11. Anchor end pin
12. Lock nut
13. Transaxle case
14. Brake band
15. Bearing retainer
16. Seal ring
17. Radial needle bearing
18. Snap ring
19. Reduction pinion gear
20. Reduction pinion gear bearing inner race
21. Reduction pinion gear bearing outer race
22. Strut
23. O-ring
24. O-ring
25. Servo release accumulator piston
26. O-ring
27. Return spring
28. Control valve assembly
29. Oil pan gasket
30. Drain plug gasket
31. Drain plug
32. Magnet
33. Oil pan
34. Oil pan fitting bolt
35. Low & reverse brake tube
36. Oil sleeve
37. O-ring
38. Snap ring
39. O-ring
40. N-D accumulator piston
41. Return spring
42. Lip seal
43. Parking rod
44. Retaining pin
45. Manual shaft oil seal
46. Detent spring
47. Manual shaft
48. Retaining pin
49. Manual plate
50. Parking rod plate
51. O/D servo piston
52. O/D servo piston retainer
53. O/D servo piston retainer fitting bolt
54. O-ring
55. D-ring
56. Servo piston retainer
57. O-ring
58. E-ring
59. Spring retainer
60. O/D servo return spring
61. D-ring
62. Band servo piston
63. Band servo thrust washer
64. Band servo piston stem
65. 2nd servo return spring
66. Parking pawl
67. Parking shaft
68. Return spring
69. Parking pawl spacer
70. PNP switch
71. Idler gear bearing
72. Idler gear
73. Idler gear lock nut
74. Reduction pinion gear adjusting shim
75. Output shaft adjusting shim
76. Side cover

Oil Channel

ACS007V8



Locations of Adjusting Shims, Needle Bearings, Thrust Washers and Snap Rings

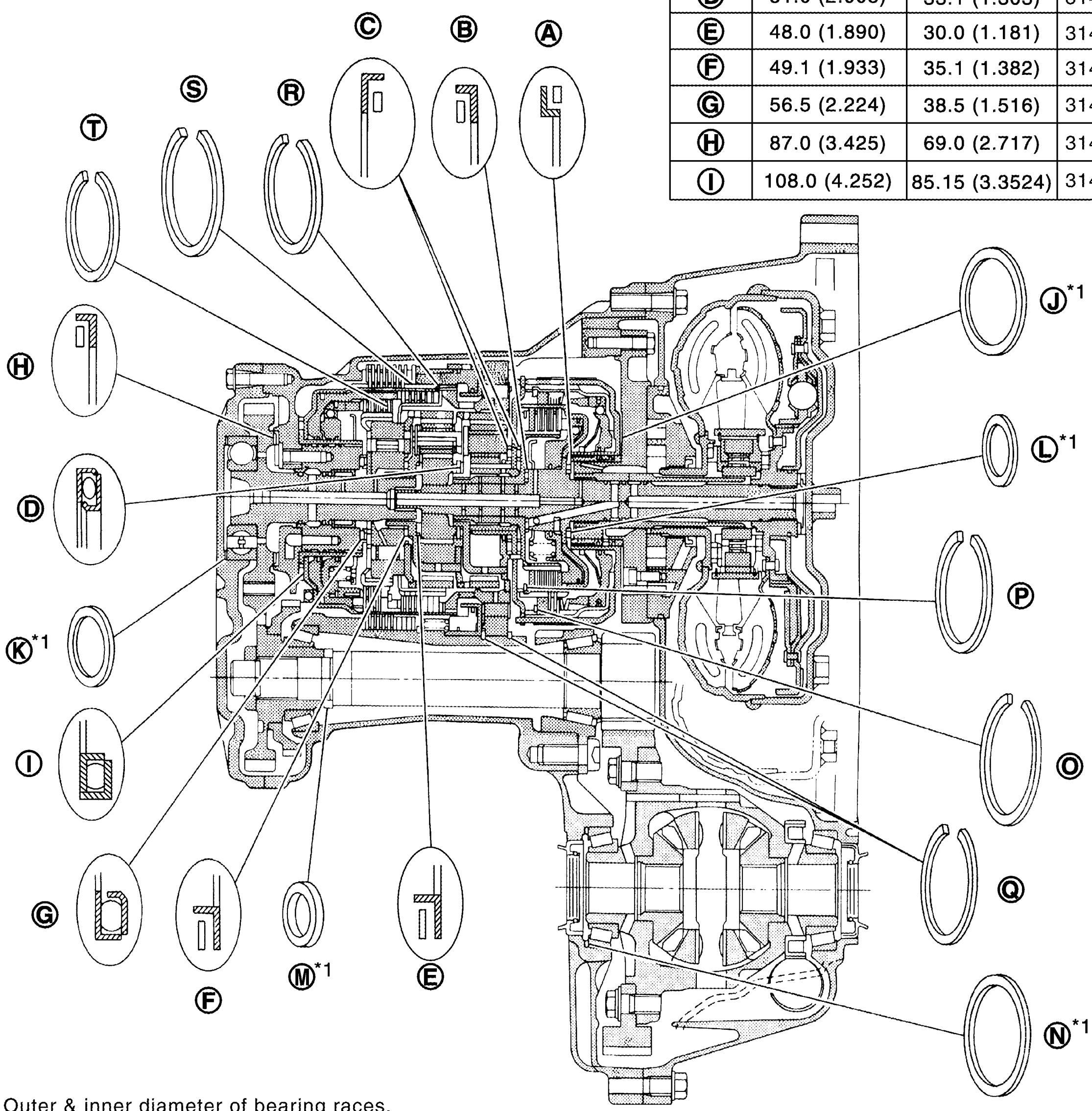
ACS007V9

Outer diameter of thrust washers

Item number	Outer diameter mm (in)	Part number*2
J *1	76.0 (2.992)	31508 80X13 - 31508 80X20
K *1	80.0 (3.150)	31438 80X60 - 31438 80X70

Outer and inner diameter of needle bearings

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Part number*2
A	49.1 (1.933)	35.2 (1.386)	31407 80X10
B	42.0 (1.654)	23.7 (0.933)	31407 80X01
C	70.0 (2.756)	50.0 (1.969)	31407 80X09
D	51.0 (2.008)	33.1 (1.303)	31407 80X02
E	48.0 (1.890)	30.0 (1.181)	31407 80X03
F	49.1 (1.933)	35.1 (1.382)	31407 80X10
G	56.5 (2.224)	38.5 (1.516)	31407 80X08
H	87.0 (3.425)	69.0 (2.717)	31407 80X07
I	108.0 (4.252)	85.15 (3.3524)	31407 80X24



Outer & inner diameter of bearing races, adjusting shims and adjusting spacer

Item number	Outer diameter mm (in)	Inner diameter mm (in)	Part number*2
L *1	51.0 (2.008)	36.0 (1.417)	31435 80X00 - 31435 80X06 31435 80X09 - 31435 80X14
M *1	38.0 (1.496)	28.1 (1.106)	31439 85X01 - 31439 85X06 31439 83X11 - 31439 83X24 31439 81X00 - 31439 81X24 31439 81X46 - 31439 81X49 31439 81X60 - 31439 81X74
N *1	75.0 (2.953)	67.0 (2.638)	31438 80X00 - 31438 80X11

Outer diameter of snap rings

Item number	Outer diameter mm (in)	Part number*2
O	150 (5.91)	31506 80X13
P	119.1 (4.689)	31506 80X06
Q	182.8 (7,197)	31506 80X08
R	144.8 (5.701)	31506 80X03
S	173.8 (6.843)	31506 80X09
T	133.9 (5.272)	31506 80X01

*1: Select proper thickness.

*2: Always check with the Parts Department for the latest parts information.

SCIA5660E

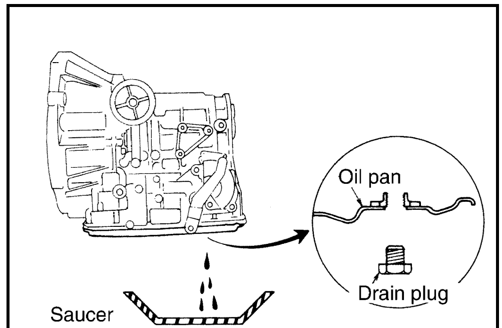
DISASSEMBLY

PFP:31020

Disassembly

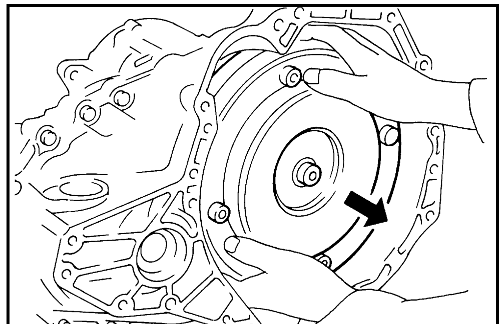
ACS007VA

1. Drain ATF through drain plug.
2. Remove drain plug gasket from drain plug.

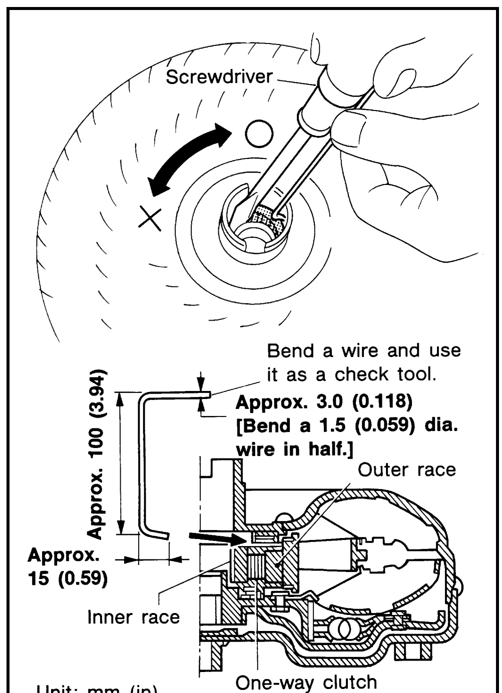


SCIA0003E

3. Remove torque converter.

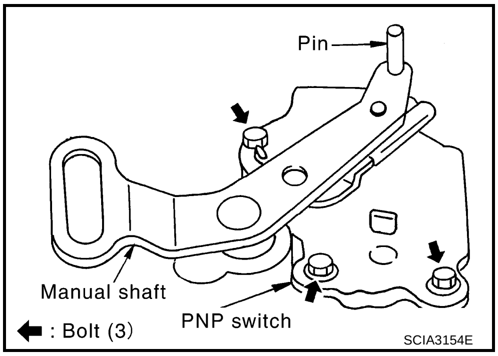

SAT008D

4. Check torque converter one-way clutch using check tool as shown in the right figure.
a. Insert check tool into groove of bearing support built into one-way clutch outer race.
b. When fixing bearing support with check tool, rotate one-way clutch spline using screwdriver.
c. Make sure that inner race rotates clockwise only. If not, replace torque converter assembly.

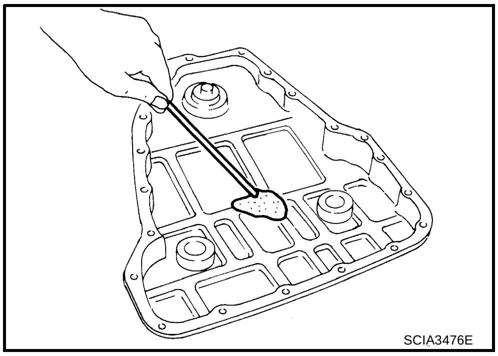


SAT009D

5. Set manual shaft to “P” position.
6. Remove PNP switch.
7. Remove bracket from transaxle case.
8. Remove revolution sensor from transaxle case.
9. Remove O-ring from revolution sensor.

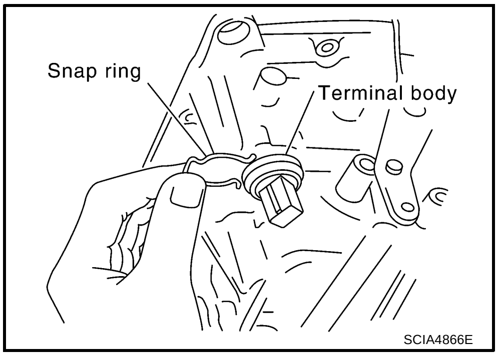


10. Remove oil pan fitting bolts.
11. Remove oil pan and oil pan gasket.
12. Check foreign materials in oil pan to help determine causes of malfunction. If the A/T fluid is very dark, smells burned, or contains foreign particles, frictional material (clutches, band) may need replacement. A tacky film that will not wipe clean indicates varnish build up. Varnish can cause valves, servo, and clutches to stick and can inhibit pump pressure.
   - **If frictional material is detected, perform A/T fluid cooler cleaning. Refer to** **AT-18, "A/T Fluid Cooler Cleaning"** **.**
13. Remove magnets from oil pan.
14. Remove control valve assembly according to the following procedures.

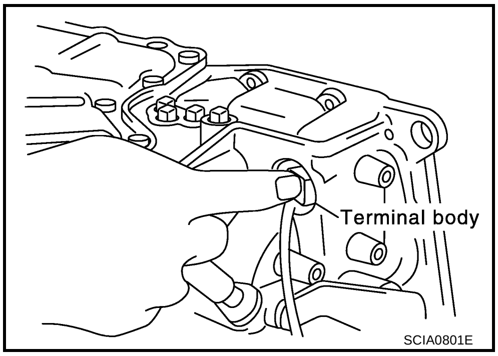


a. Remove snap ring from terminal body.

   CAUTION:
   Do not expand snap ring excessively.



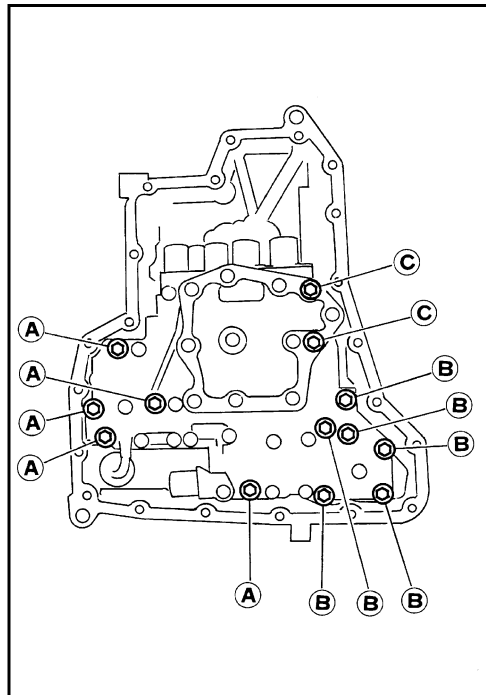
b. Push terminal body into transaxle case and draw out terminal cord assembly.



c. Remove control valve assembly fixing bolts **A** , **B** and **C** .

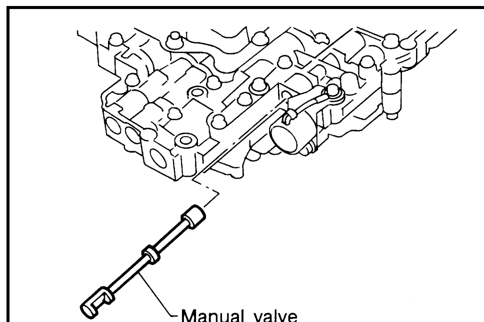
Bolt length, number and location:

Bolt symbol	A	B	C
Bolt length " ℓ " mm (in)	40.0 (1.575)	33.0 (1.299)	43.5 (1.713)
Number of bolts	5	6	2



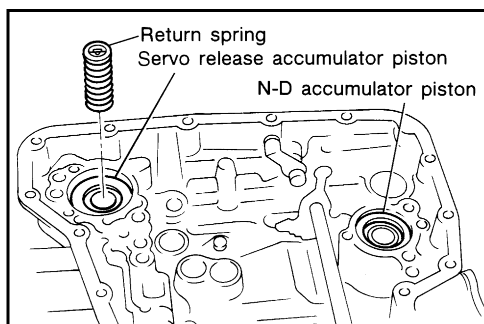
AAT260A

15. Remove manual valve from control valve assembly.
CAUTION:
Be careful not to drop manual valve.
16. Remove O-ring from terminal body.



SAT005F

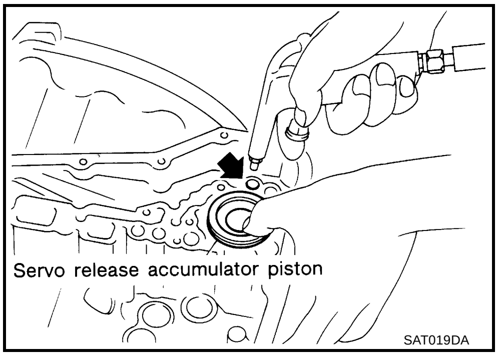
17. Remove return spring from servo release accumulator piston.



SCIA3477E

18. Remove servo release accumulator piston with compressed air.

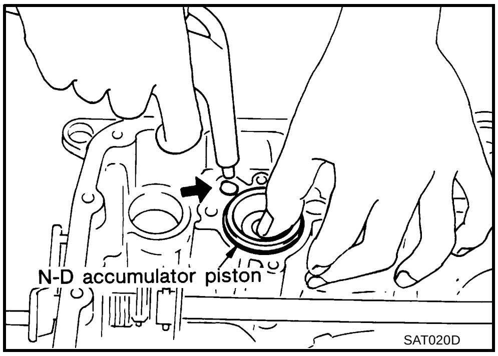
CAUTION:
- **Strong flow of air will push accumulator piston out along with a splash of oil. Cover the area with paper towels and blow air little by little to avoid this.**
- **Wrap the removed accumulator piston in a paper towel.**



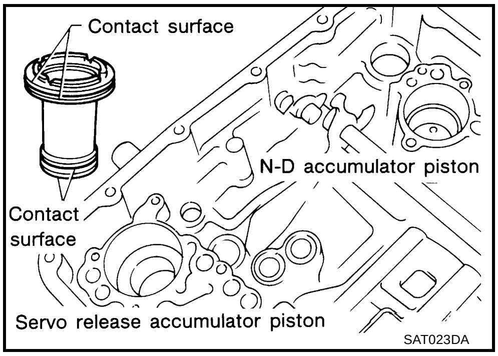
19. Remove O-rings from servo release accumulator piston.
20. Remove N-D accumulator piston and return spring with compressed air.

CAUTION:
- **Strong flow of air will push accumulator piston out along with a splash of oil. Cover the area with paper towels and blow air little by little to avoid this.**
- **Wrap the removed accumulator piston in a paper towel.**

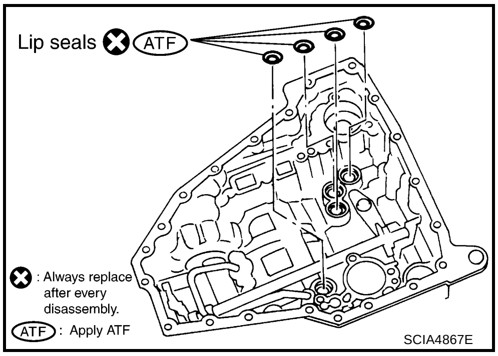
21. Remove O-rings from N-D accumulator piston.



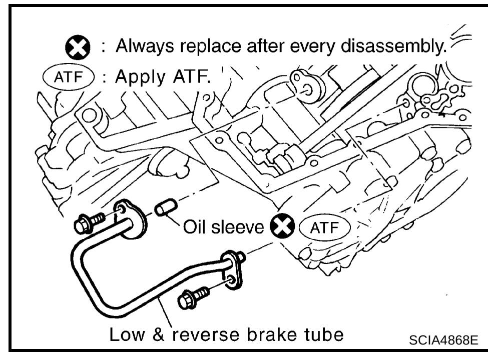
22. Check accumulator pistons and contact surface of transaxle case for damage.
23. Check return springs for damage and free length.



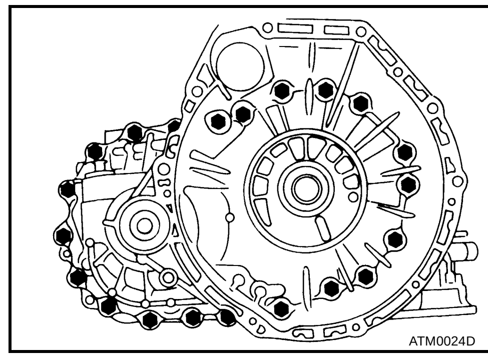
24. Remove lip seals from oil groove for band servo.



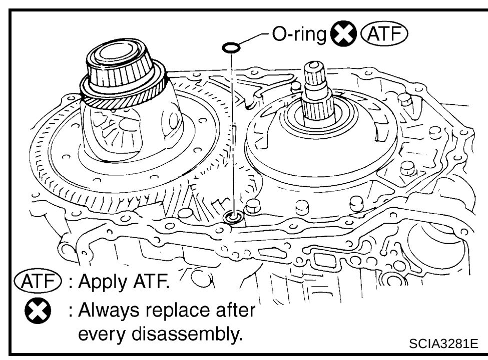
25. Remove low & reverse brake tube and oil sleeve.



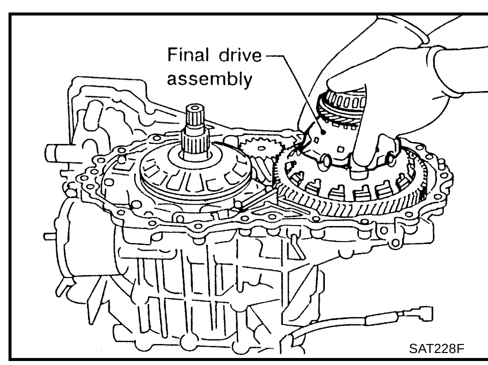
26. Remove converter housing according to the following procedures.
a. Remove converter housing mounting bolts.
b. Remove converter housing by lightly tapping it with a soft hammer.



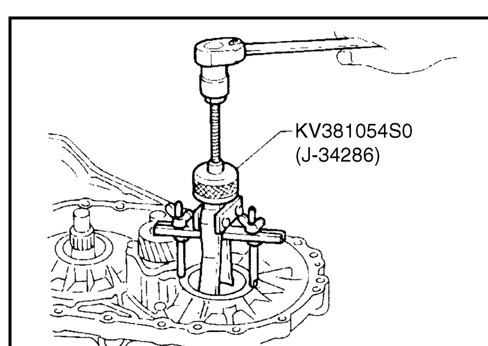
c. Remove O-ring from differential oil port.



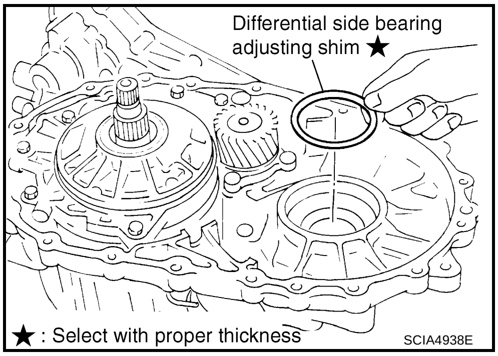
27. Remove final drive assembly from transaxle case.



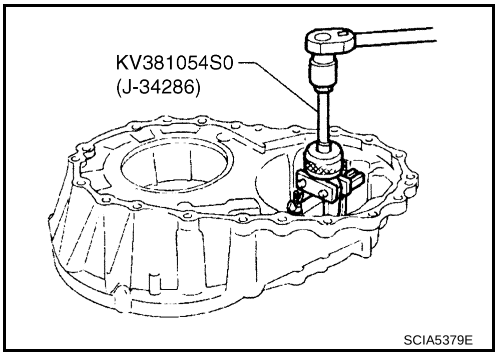
28. Remove differential side bearing outer race from transaxle case.



29. Remove differential side bearing adjusting shim from transaxle case.



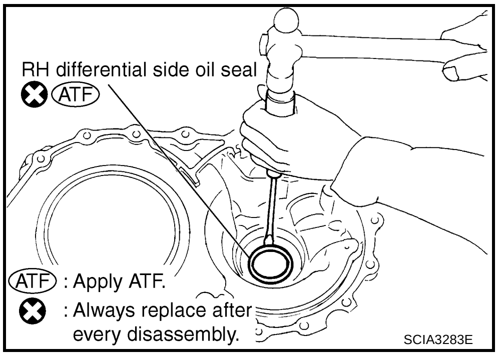
30. Remove differential side bearing outer race from converter housing.



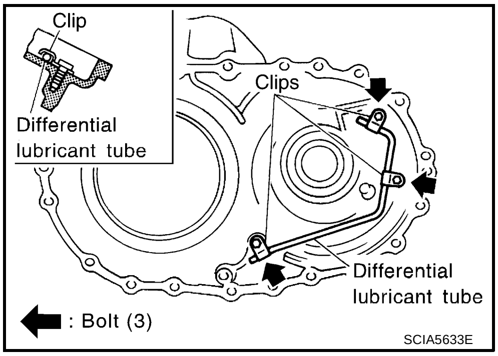
31. Remove RH differential side oil seal with flat-bladed screwdriver from converter housing.

CAUTION:

Be careful not to damage converter housing.

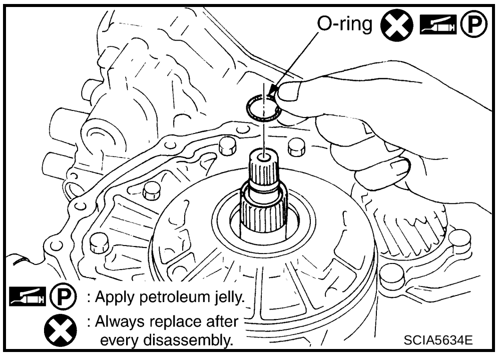


32. Remove differential lubricant tube from converter housing.
33. Remove plug from converter housing. (For 2WD models)
34. Remove O-ring from plug. (For 2WD models)

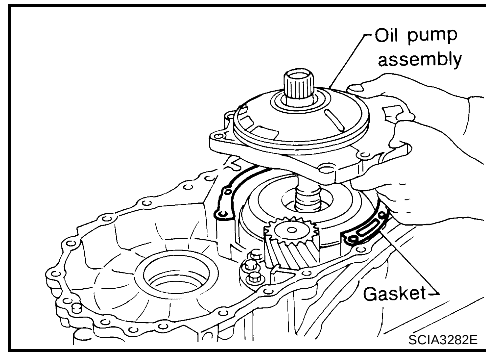


35. Remove oil pump assembly according to the following procedures.

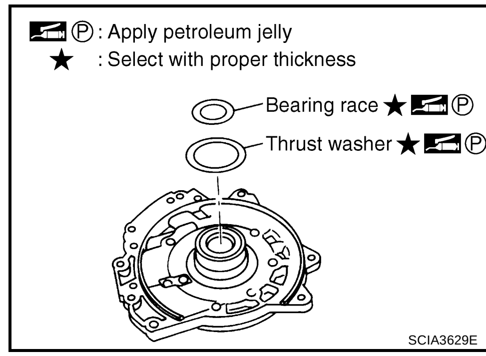
a. Remove O-ring from input shaft assembly (high clutch drum).



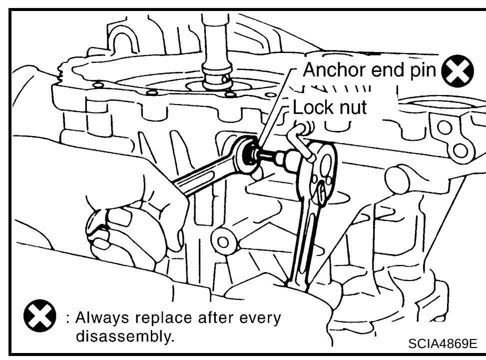
b. Remove oil pump assembly and gasket from transaxle case.



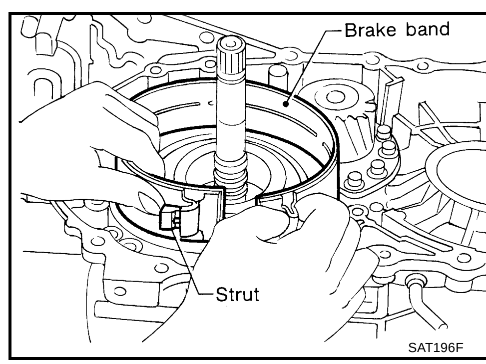
c. Remove thrust washer and bearing race from oil pump assembly.



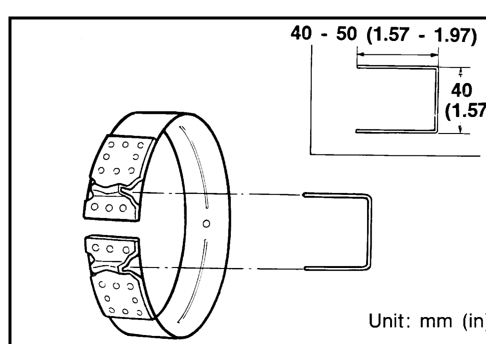
36. Remove brake band according to the following procedures.
a. Loosen lock nut, then back off anchor end pin.



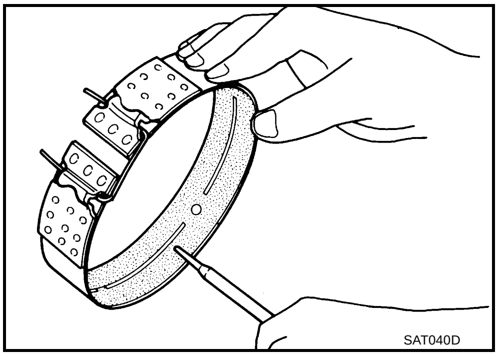
b. Remove brake band and strut from transaxle case.



- **To prevent brake linings from cracking or peeling, do not stretch the flexible band unnecessarily. When removing brake band, always secure it with a clip as shown in the right figure.**
  Leave the clip in position after removing brake band.

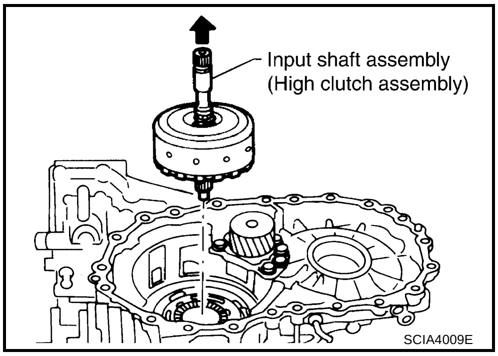


c. Check brake band facing for damage, cracks, wear or burns.

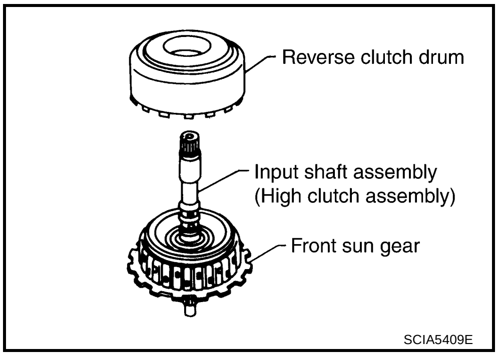


37. Remove input shaft assembly (high clutch assembly) and reverse clutch assembly according to the following procedures.

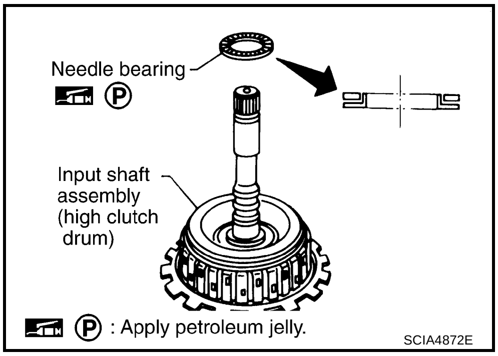
a. Remove input shaft assembly (high clutch assembly) with reverse clutch assembly.



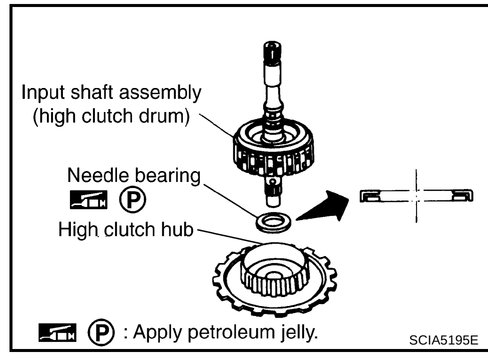
b. Remove input shaft assembly (high clutch assembly) from reverse clutch drum.



c. Remove needle bearing from input shaft assembly (high clutch drum) and check for damage or wear.

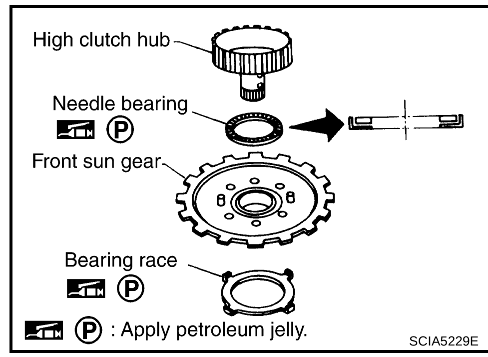


d. Remove high clutch hub (with front sun gear) and needle bearing from input shaft assembly (high clutch drum) and check for damage or wear.

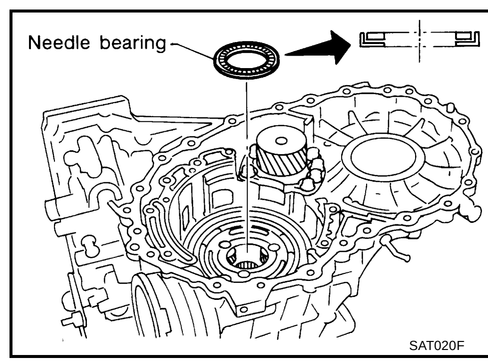


e. Remove front sun gear and needle bearing from high clutch hub and check for damage or wear.

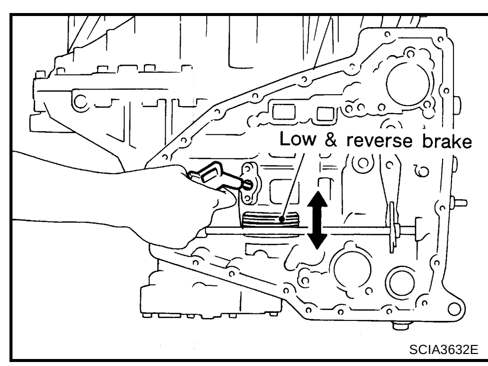
f. Remove bearing race from front sun gear and check for damage or wear.



38. Remove needle bearing from transaxle case and check for damage or wear.

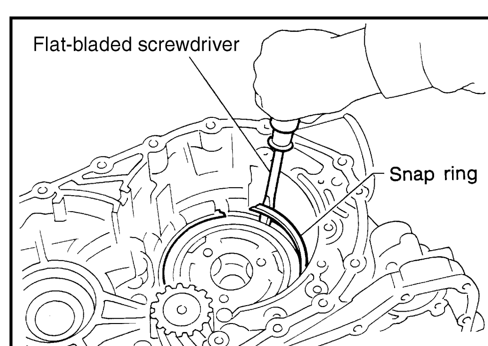


39. Apply compressed air and check to see that low & reverse brake operates.



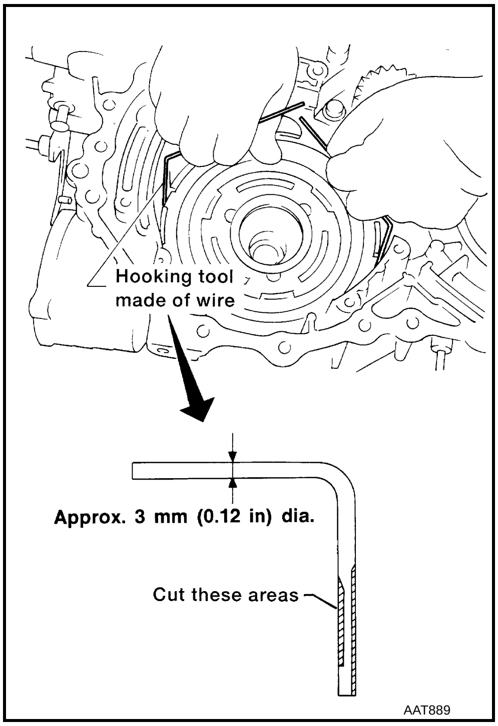
40. Remove low one-way clutch and front planetary carrier according to the following procedures.

a. Remove snap ring with flat-bladed screwdriver.

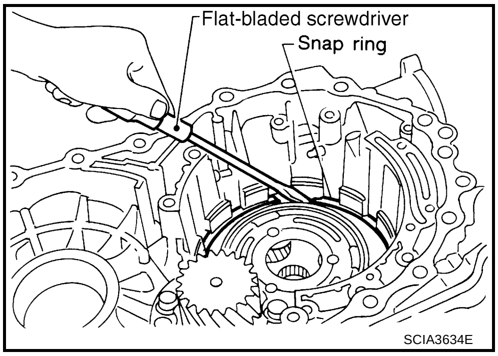


b. Remove low one-way clutch with a hook made of wire.

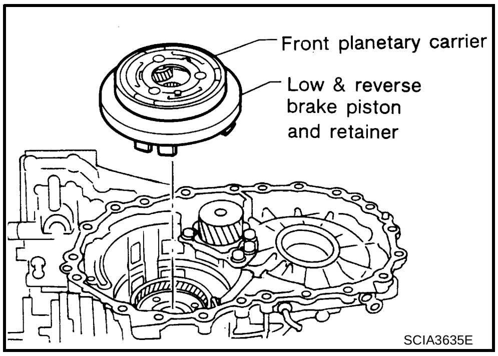
c. Check low one-way clutch for damage or wear.



d. Remove snap ring with flat-bladed screwdriver.



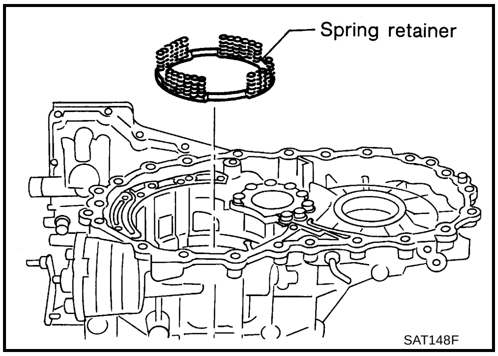
e. Remove front planetary carrier with low & reverse brake piston and retainer.



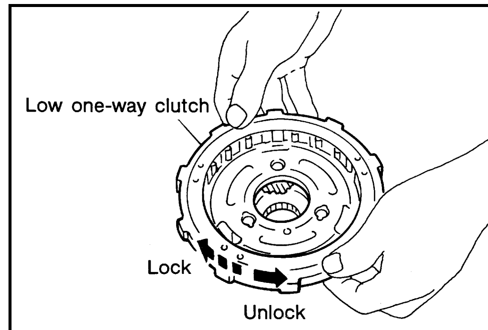
f. Remove spring retainer.

CAUTION:

Do not remove return springs from spring retainer.

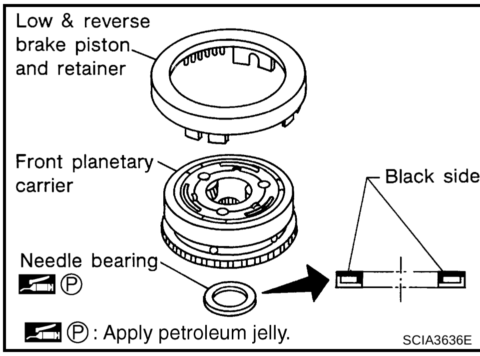


g. Make sure that low one-way clutch rotates in the direction of clockwise arrow and locks in opposite direction.



SAT048D

h. Remove needle bearing, low & reverse brake piston and retainer from front planetary carrier.
i. Check front planetary carrier, low & reverse brake piston, retainer and needle bearing for damage or wear.



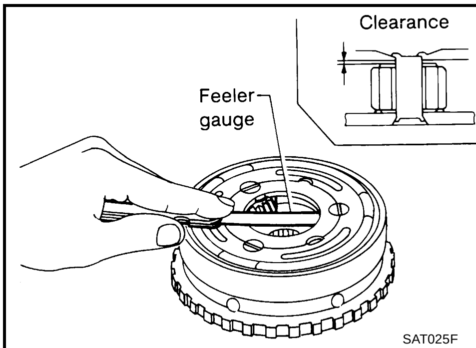
SCIA3636E

j. Check clearance between pinion washer and front planetary carrier with feeler gauge.

Standard clearance: 0.20 - 0.70 mm (0.0079 - 0.0276 in)

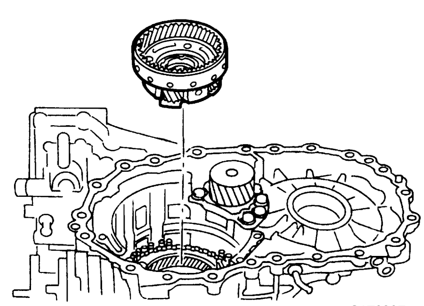
Allowable limit: 0.80 mm (0.0315 in)

Replace front planetary carrier if the clearance exceeds allowable limit.

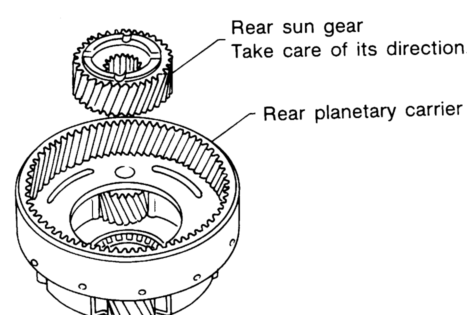


SAT025F

41. Remove rear planetary carrier and rear sun gear according to the following procedures.
a. Remove rear planetary carrier (with rear sun gear) from transaxle case.

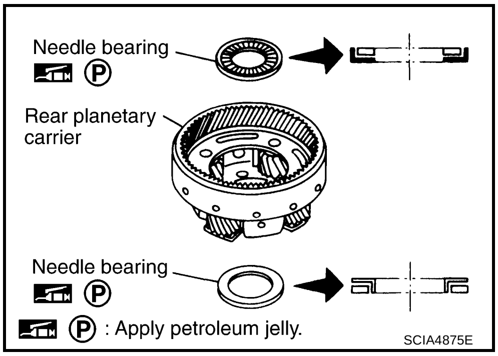

SAT026F

b. Remove rear sun gear from rear planetary carrier.



SAT027F

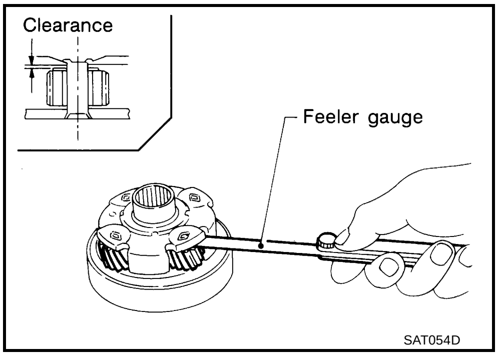
c. Remove needle bearings from rear planetary carrier.
d. Check rear planetary carrier, rear sun gear and needle bearings for damage or wear.



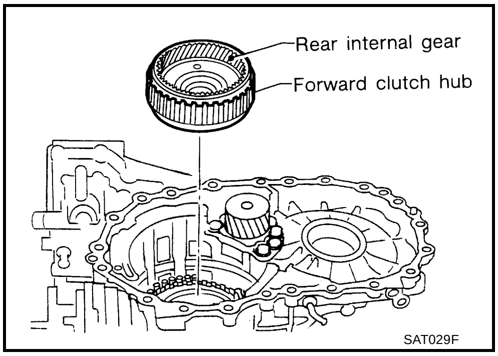
e. Check clearance between pinion washer and rear planetary carrier with feeler gauge.

Standard clearance: **0.20 - 0.70 mm (0.0079 - 0.0276 in)**
Allowable limit: **0.80 mm (0.0315 in)**

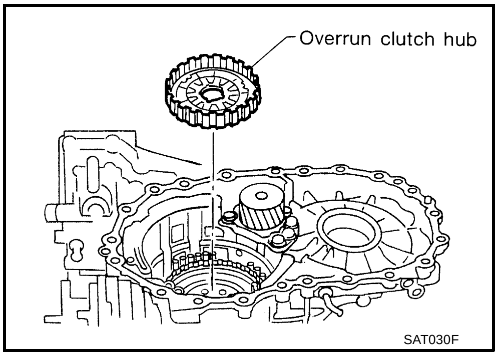
Replace rear planetary carrier if the clearance exceeds allowable limit.



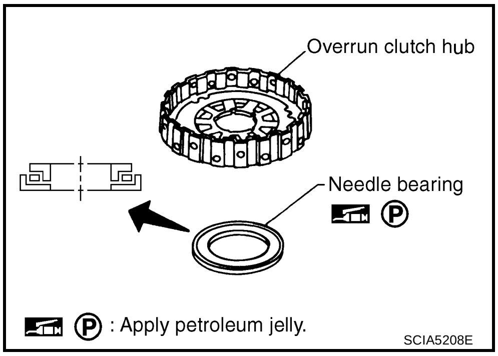
42. Remove rear internal gear and forward clutch hub from transaxle case.



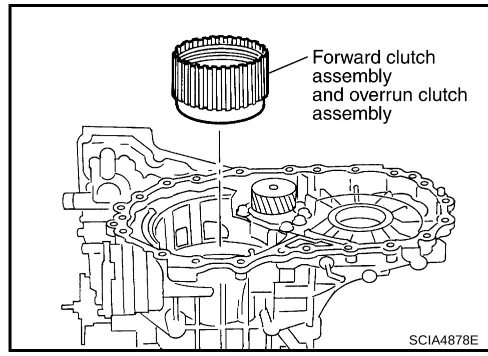
43. Remove overrun clutch hub from transaxle case.



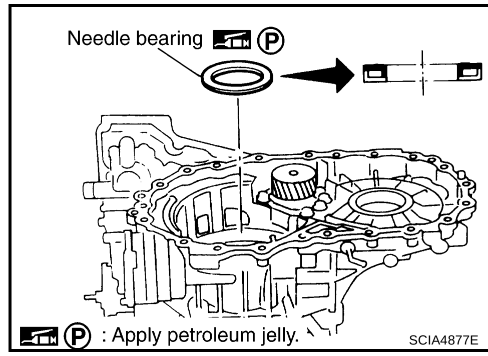
44. Remove needle bearing from overrun clutch hub and check for damage or wear.



45. Remove forward clutch assembly and overrun clutch assembly from transaxle case.



46. Remove needle bearing from transaxle case and check for damage or wear.

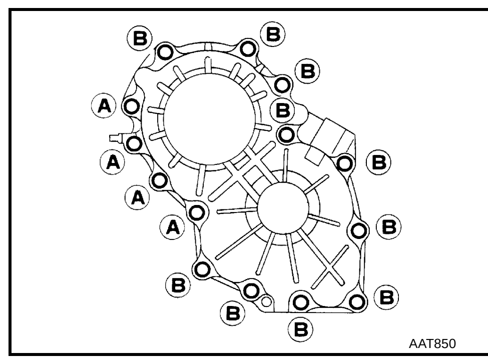


47. Remove output shaft assembly according to the following procedures.

a. Remove side cover fitting bolts.

CAUTION:

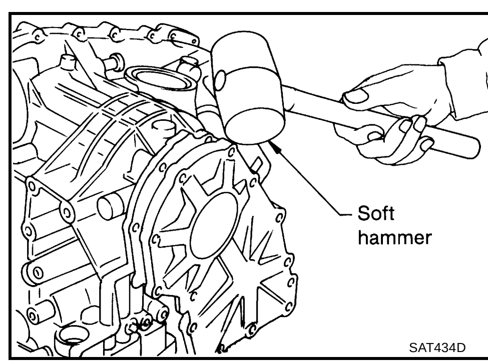
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**



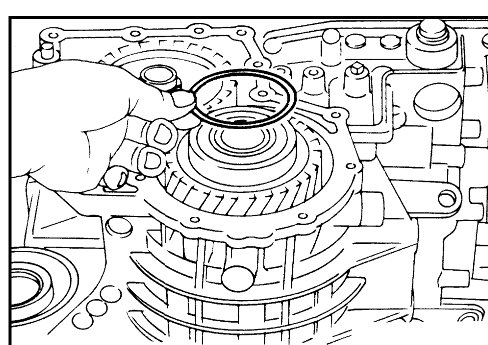
b. Remove side cover by lightly tapping it with a soft hammer.

CAUTION:

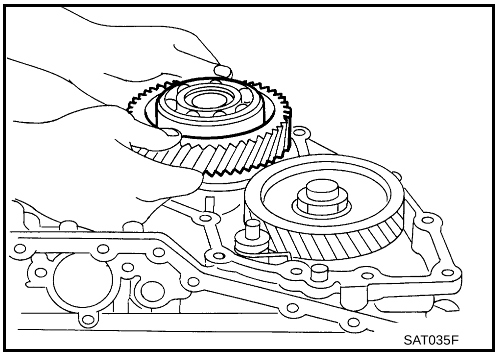
- **Be careful not to drop output shaft assembly. It might come out when removing side cover.**
- **Be careful not to damage side cover.**



c. Remove output shaft adjusting shim.

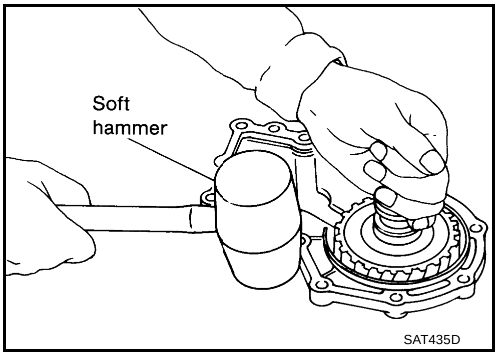


d. Remove output shaft assembly.


SAT035F

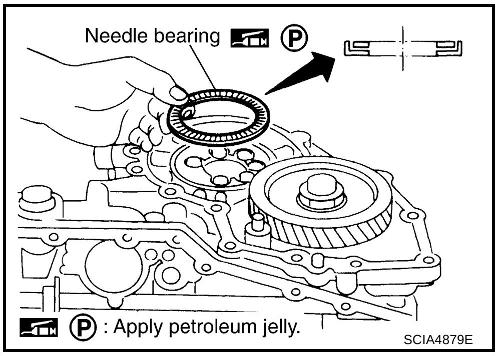
- If output shaft assembly came off with side cover, tap side cover with a soft hammer to separate.

  CAUTION:
  Be careful not to damage side cover.



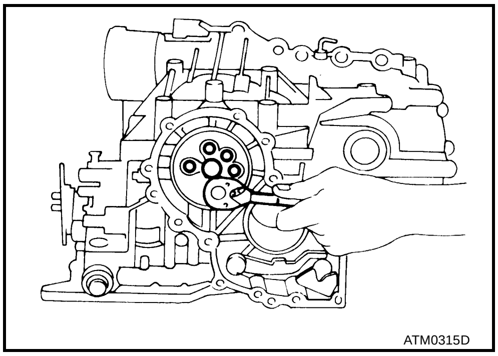
SAT435D

e. Remove needle bearing.



SCIA4879E

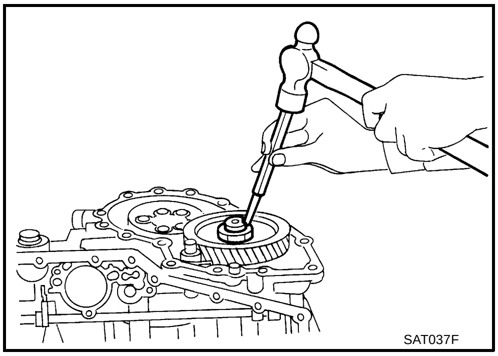
f. Remove bearing retainer from transaxle case.


ATM0315D

48. Disassemble reduction pinion gear according to the following procedures.

a. Set manual shaft to “P” position to fix idler gear.

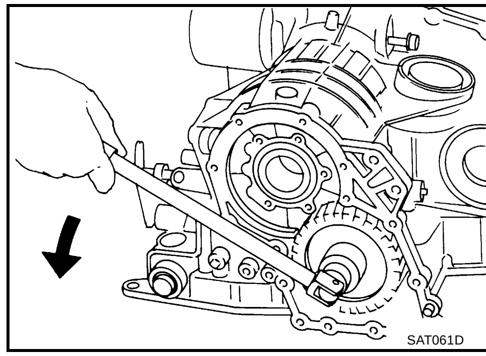
b. Unlock idler gear lock nut, using a pin punch.


SAT037F

c. Remove idler gear lock nut.

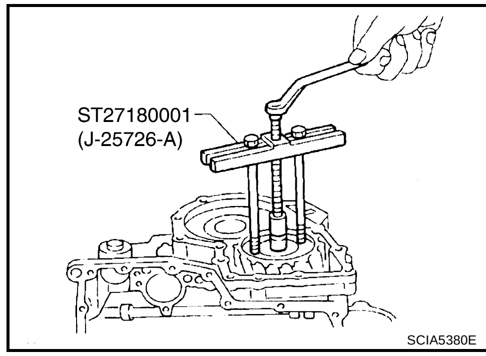
CAUTION:

Do not reuse idler gear lock nut.



SAT061D

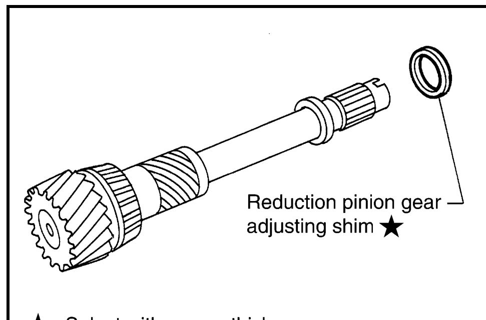
d. Remove idler gear with puller.



SCIA5380E

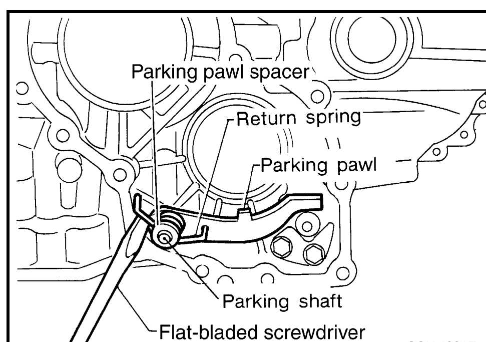
e. Remove reduction pinion gear.

f. Remove reduction pinion gear adjusting shim from reduction pinion gear.



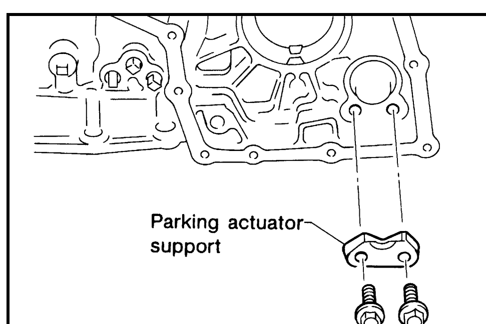
SCIA4880E

49. Remove return spring and parking pawl spacer with flat-bladed screwdriver from parking shaft.
50. Draw out parking shaft and remove parking pawl from transaxle case.
51. Check parking pawl and parking shaft for damage or wear.



SCIA4881E

52. Remove parking actuator support from transaxle case.
53. Check parking actuator support for damage or wear.

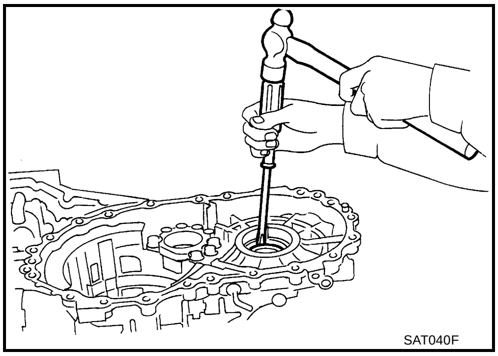


SAT066D

54. Remove LH differential side oil seal with flat-bladed screwdriver from transaxle case.

    CAUTION:

    Be careful not to scratch transaxle case.



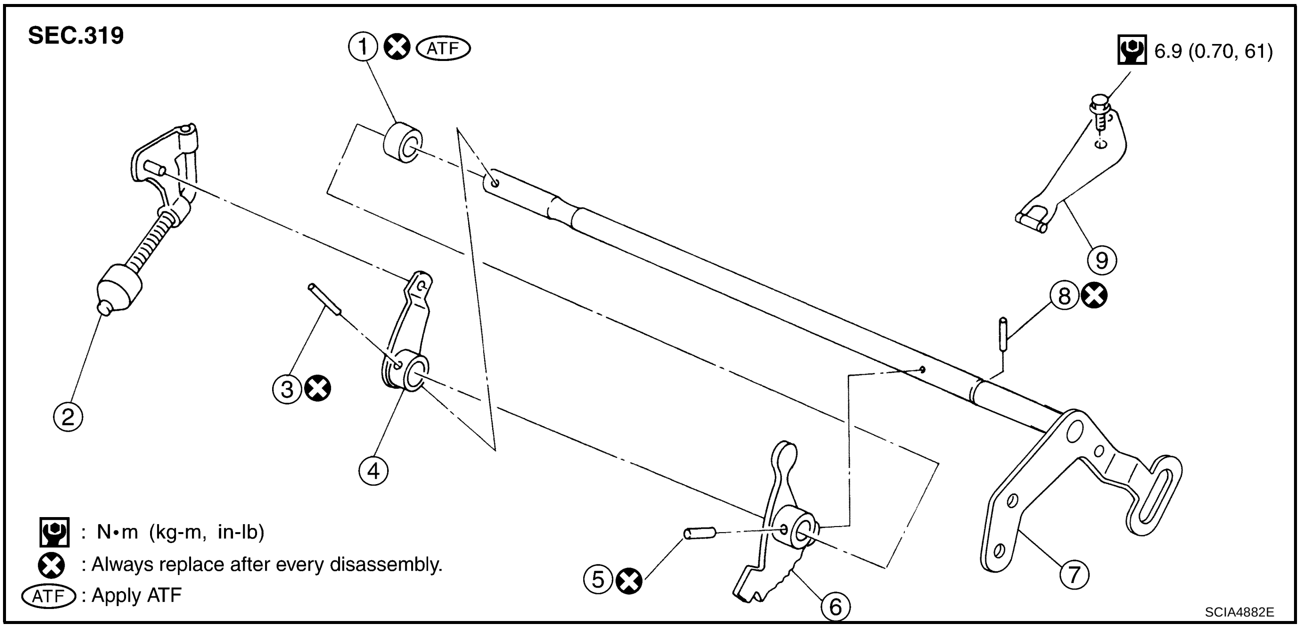
REPAIR FOR COMPONENT PARTS

PFP:00000

Manual Shaft

ACS007VB

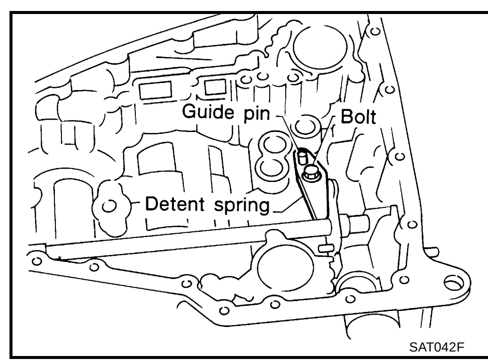
COMPONENTS



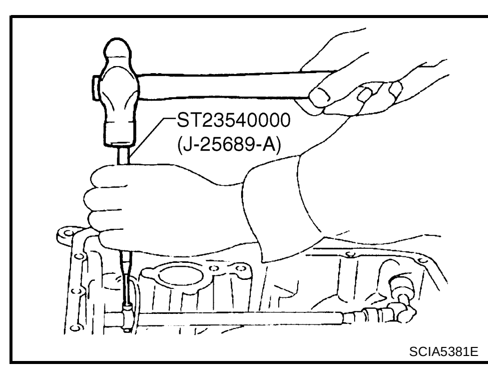
1.	Manual shaft oil seal	2.	Parking rod	3.	Retaining pin
4.	Parking rod plate	5.	Retaining pin	6.	Manual plate
7.	Manual shaft	8.	Retaining pin	9.	Detente spring

REMOVAL

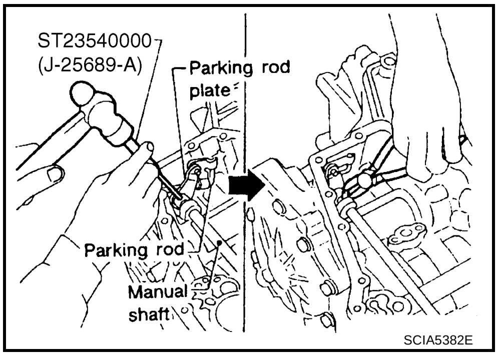
1. Remove detente spring from transaxle case.



2. Drive out manual plate retaining pin.

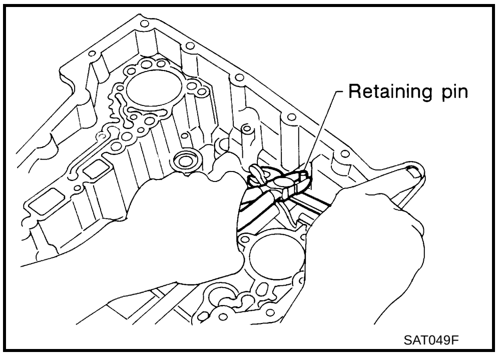


3. Drive and pull out parking rod plate retaining pin.
4. Remove parking rod plate (with parking rod) from manual shaft.
5. Draw out parking rod (with parking rod plate) from transaxle case.
6. Remove parking rod from parking rod plate.



SCIA5382E

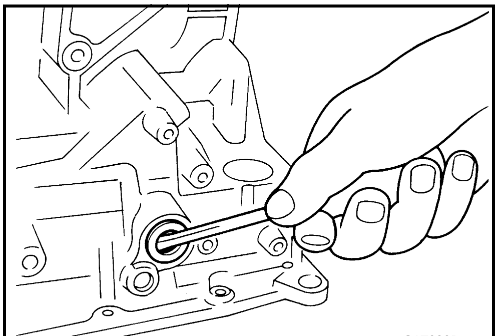
7. Pull out manual shaft retaining pin.
8. Remove manual shaft and manual plate from transaxle case.



SAT049F

9. Remove manual shaft oil seal.

   CAUTION:
   Be careful not to scratch transaxle case.


SAT080D

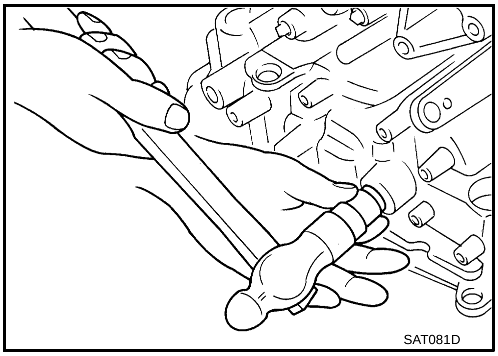
INSPECTION

- Check component parts for wear or damage. Replace if necessary.

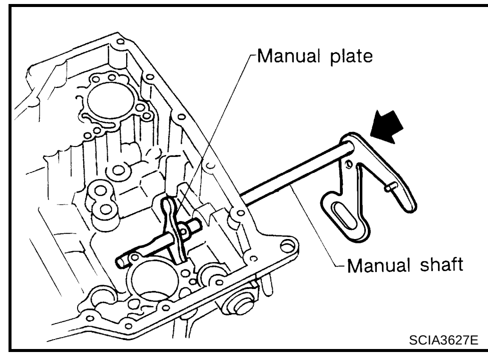
INSTALLATION

1. Use a drift [commercial service tool ϕ 22 mm (0.87 in)] to drive manual shaft oil seal into the transaxle case.

   CAUTION:
   - **Do not reuse manual shaft oil seal.**
   - **Apply ATF to outer surface of manual shaft oil seal.**
2. Install parking rod to parking rod plate.


SAT081D

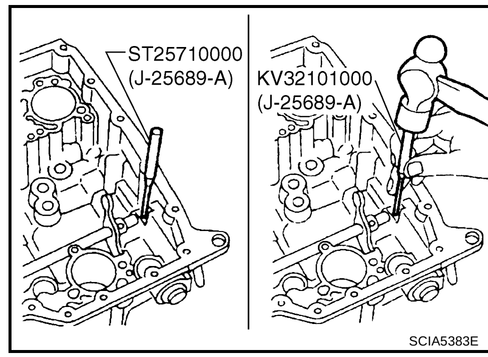
3. Install manual shaft and manual plate.
4. Install parking rod plate (with parking rod) on manual shaft.



5. Align groove of manual shaft and hole of transaxle case.
6. Install manual shaft retaining pin up to bottom of hole.

CAUTION:

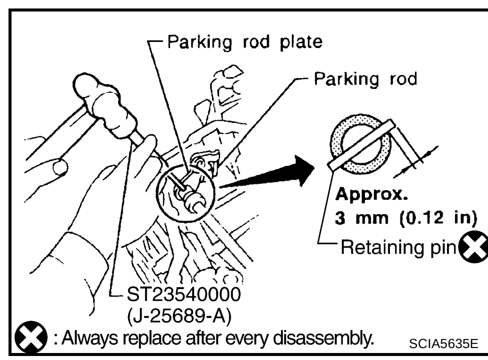
Do not reuse retaining pin.



7. Set parking rod plate onto manual shaft and drive retaining pin.

CAUTION:

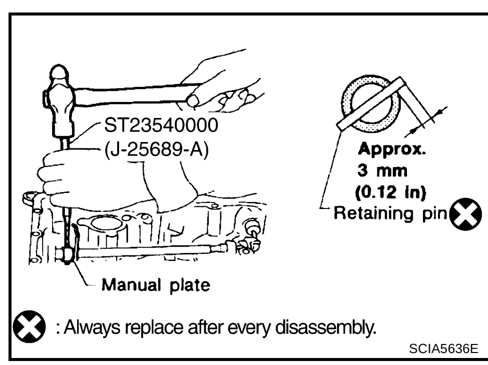
- **Do not reuse retaining pin.**
- **Both ends of pin should protrude.**



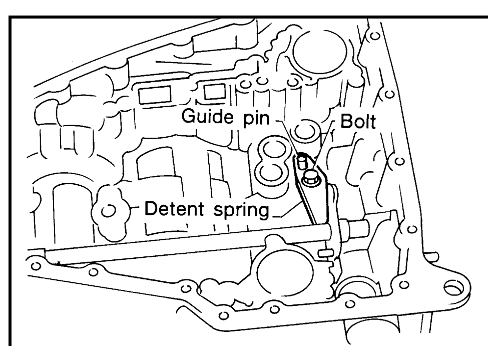
8. Install manual plate retaining pin.

CAUTION:

- **Do not reuse retaining pin.**
- **Both ends of pin should protrude.**



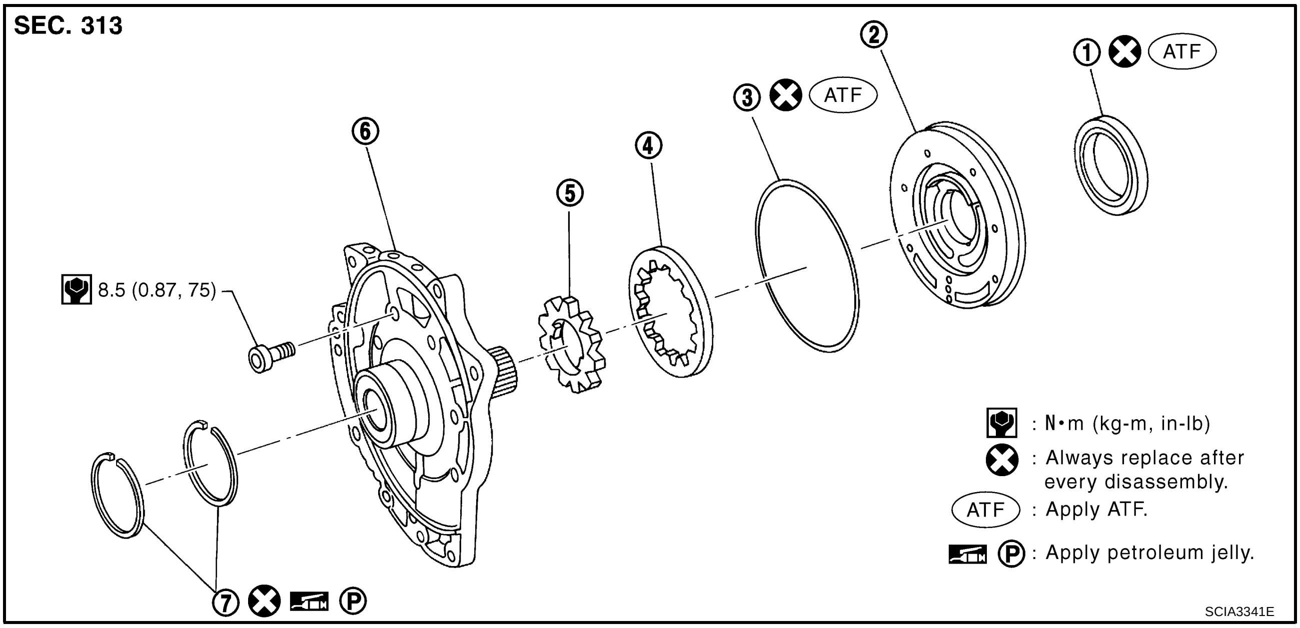
9. Install detente spring on transaxle case. Tighten detente spring fitting bolt to the specified torque. Refer to AT-296, "COMPONENTS" .



Oil Pump

ACS007VC

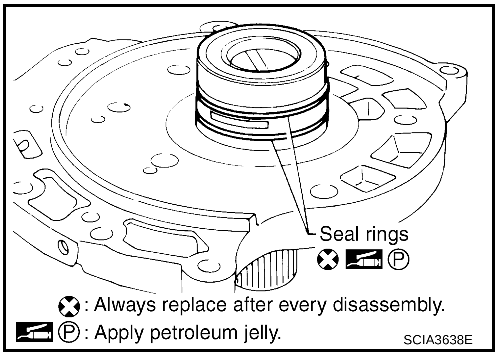
COMPONENTS



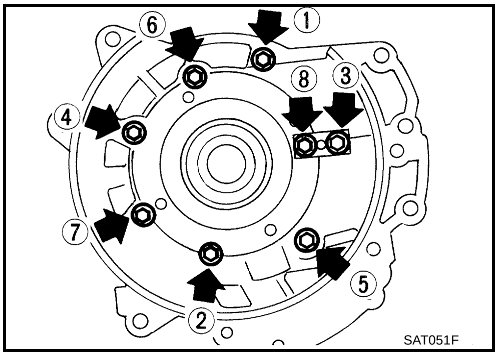
1.	Oil pump housing oil seal	2.	Oil pump housing	3.	O-ring
4.	Outer gear	5.	Inner gear	6.	Oil pump cover
7.	Seal ring				

DISASSEMBLY

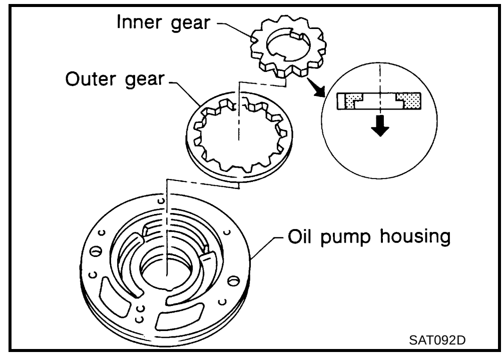
1. Remove seal rings.



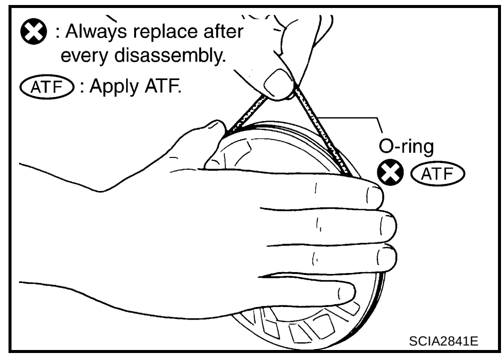
2. Loosen bolts in a crisscross pattern and remove oil pump cover.



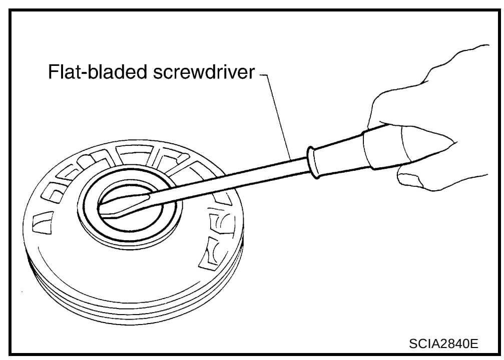
3. Remove inner gear and outer gear from oil pump housing.



4. Remove O-ring from oil pump housing.



5. Remove oil pump housing oil seal with flat-bladed screwdriver.
   CAUTION:
   Be careful not to scratch oil pump housing.



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INSPECTION

Oil Pump Housing, Oil Pump Cover, Inner Gear and Outer Gear

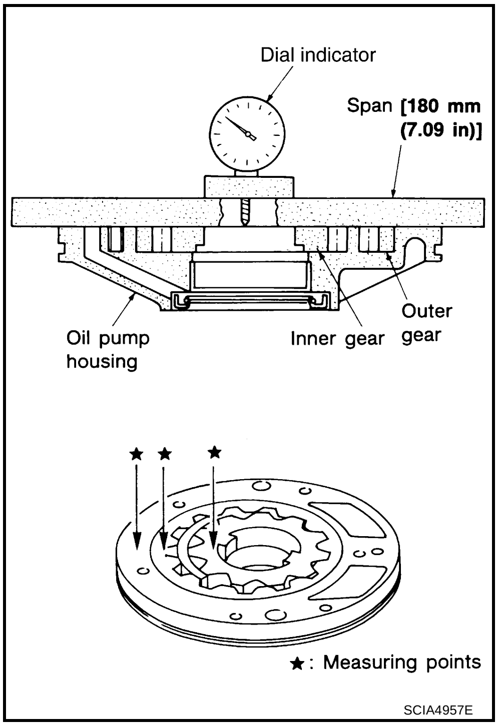
- Check for wear or damage.

Side Clearances

- Measure side clearance of inner gear and outer gear in at least four places around each outside edge. Maximum measured values should be within specified positions.

  Standard clearance: 0.030 - 0.050 mm (0.0012 - 0.0020 in)

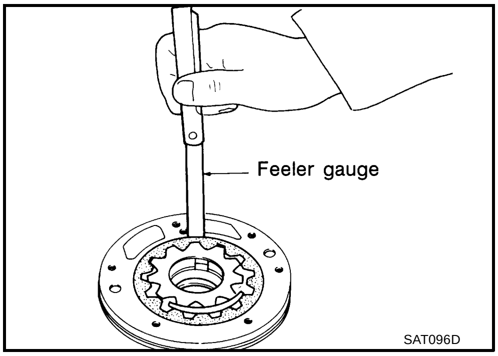
- If clearance is less than standard, select inner gear and outer gear as a set so that clearance is within specifications. Refer to AT-390, "Planetary Carrier and Oil Pump" .
- If clearance is more than standard, replace whole oil pump assembly except oil pump cover.



- Measure clearance between outer gear and oil pump housing.

  Standard clearance: 0.111 - 0.181 mm (0.0044 - 0.0071 in)
  Allowable limit: 0.181 mm (0.0071 in)

- If not within allowable limit, replace whole oil pump assembly except oil pump cover.

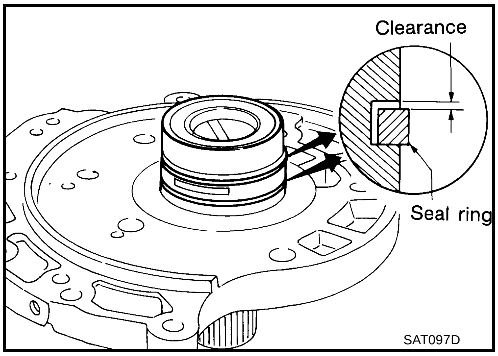


Seal Ring Clearance

- Measure clearance between seal ring and ring groove.

  Standard clearance: 0.1 - 0.25 mm (0.0039 - 0.0098 in)
  Allowable limit: 0.25 mm (0.0098 in)

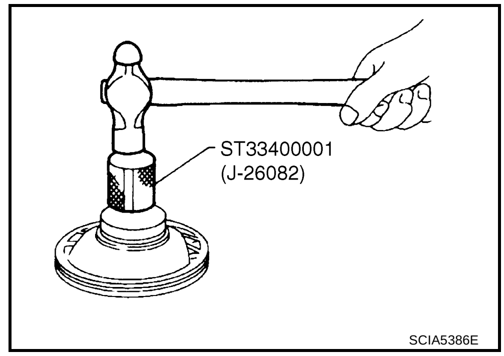
- If not within allowable limit, replace oil pump cover assembly.



ASSEMBLY

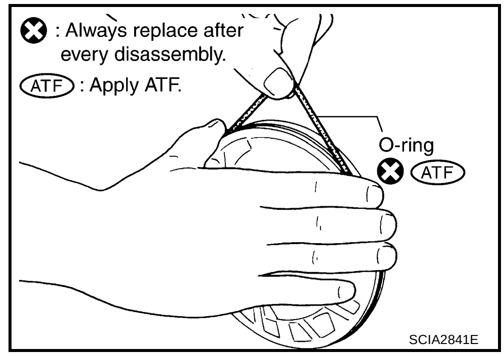
1. Install oil pump housing oil seal on oil pump housing.

CAUTION:
- **Do not reuse oil pump housing oil seal.**
- **Apply ATF to outer surface of oil pump housing oil seal.**



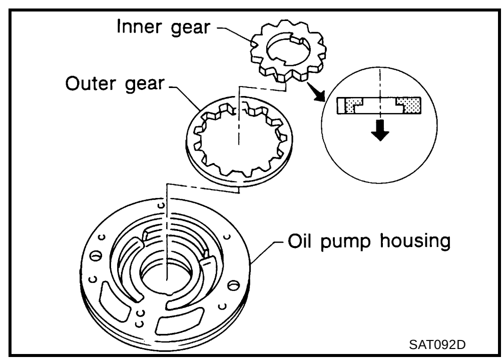
2. Install O-ring on oil pump housing.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



3. Install inner gear and outer gear on oil pump housing.

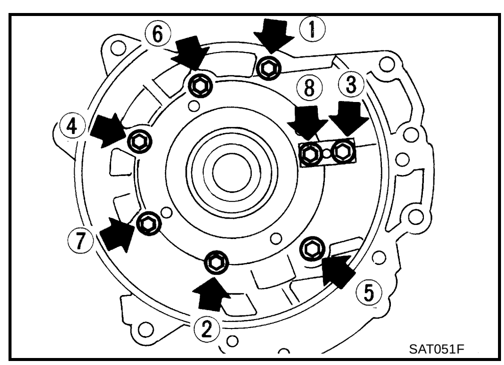
CAUTION:
Be careful of direction of inner gear.



4. Install oil pump cover on oil pump housing.

a. Wrap masking tape around splines of oil pump cover assembly to protect seal. Position oil pump cover assembly on oil pump housing assembly, then remove masking tape.

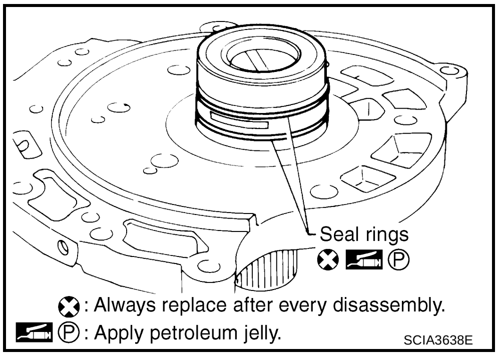
b. Tighten bolts in a crisscross pattern. Tighten oil pump cover bolts to the specified torque. Refer to AT-299, "COMPONENTS" .



5. Install new seal rings carefully after packing ring groove with petroleum jelly.

CAUTION:

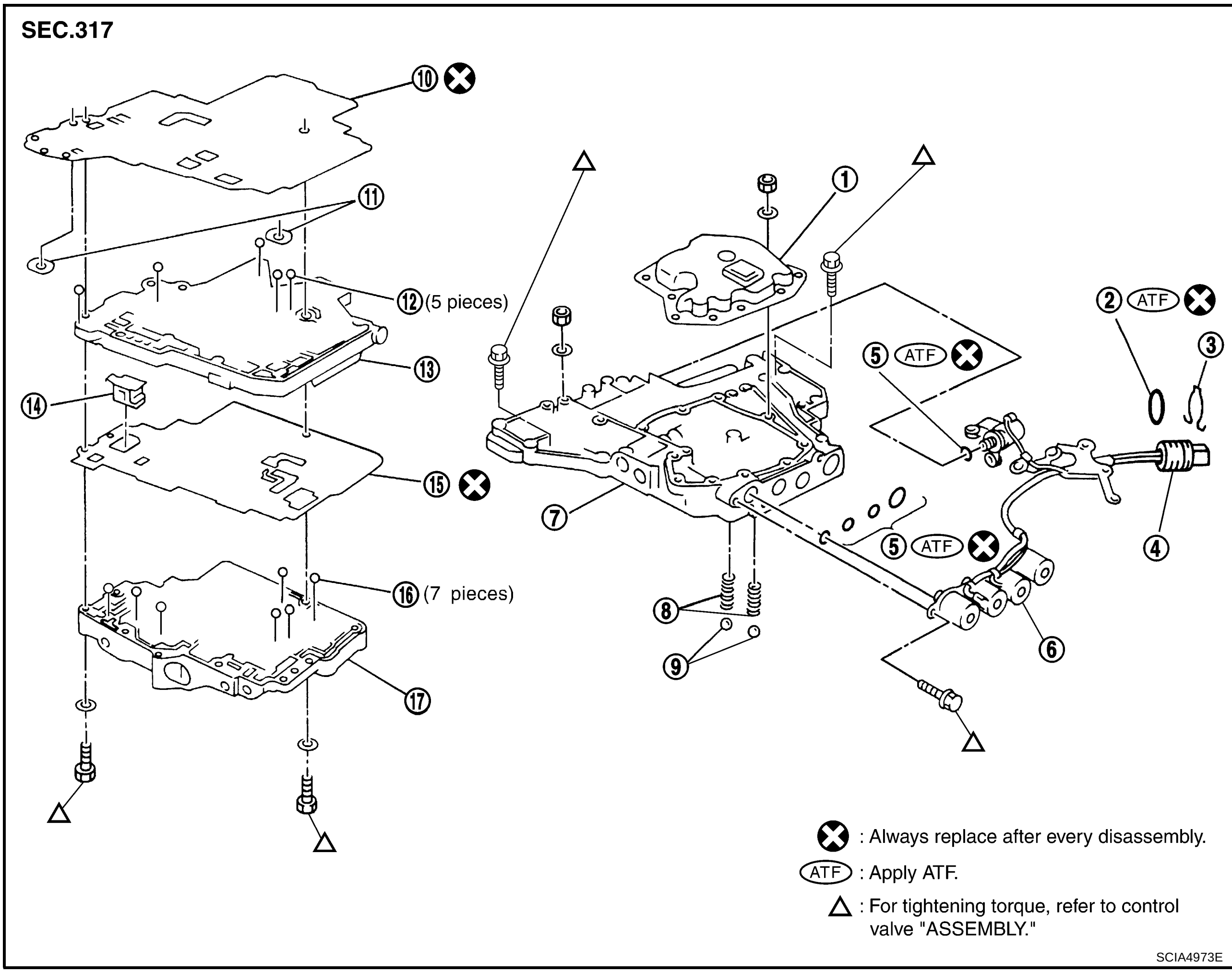
- **Do not spread gap of seal rings excessively while installing. The seal rings may be deformed.**
- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



Control Valve Assembly

ACS007VD

COMPONENTS



1.	Oil strainer	2.	O-ring	3.	Snap ring
4.	Terminal body	5.	O-ring	6.	Solenoid valve assembly
7.	Control valve lower body	8.	Oil cooler relief valve spring	9.	Check ball
10.	Separating plate	11.	Support plate	12.	Steel ball
13.	Control valve inter body	14.	Pilot filter	15.	Separating plate
16.	Steel ball	17.	Control valve upper body		

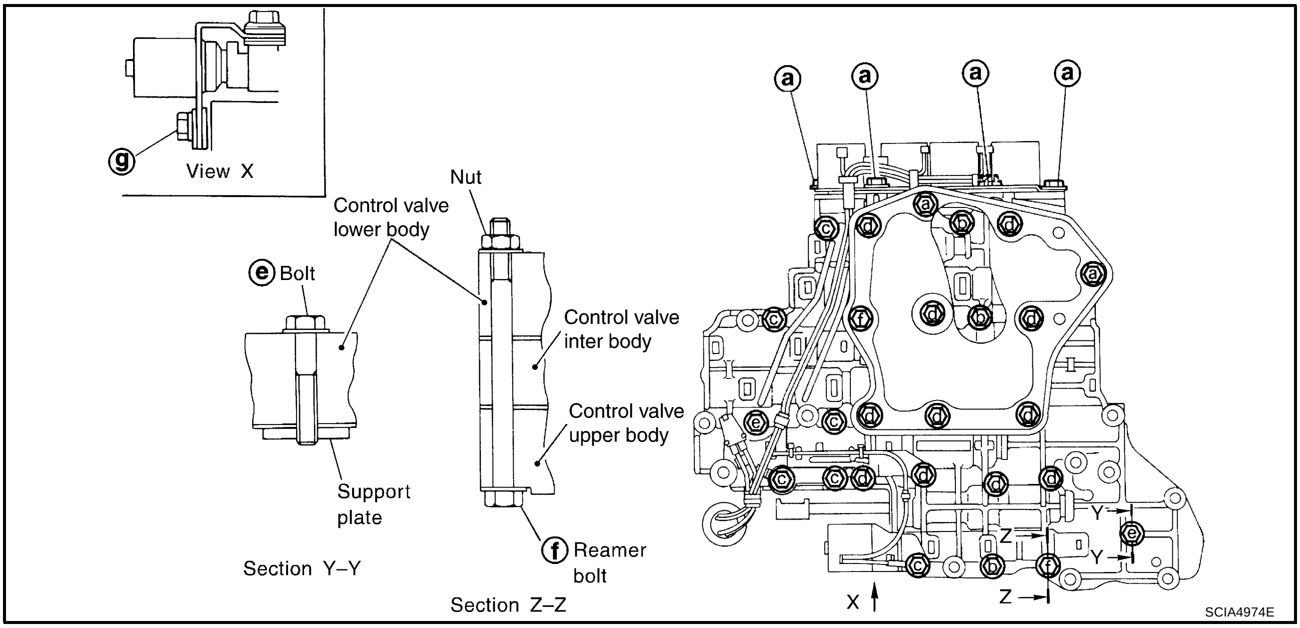
DISASSEMBLY

Disassemble control valve upper, inter and lower bodies.

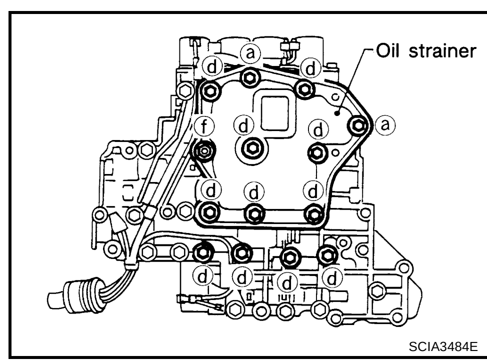
Bolt length, number and location:

Bolt symbol	a	b	c	d	e	f	g
Bolt length "ℓ" mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1

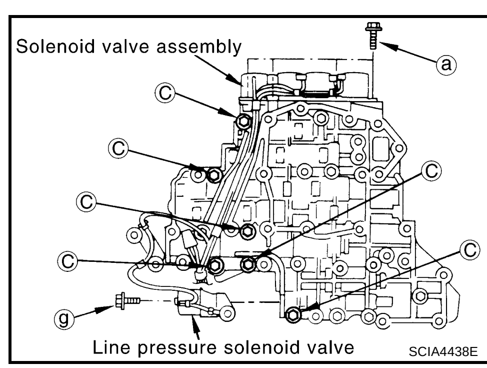
f: Reamer bolt and nut.



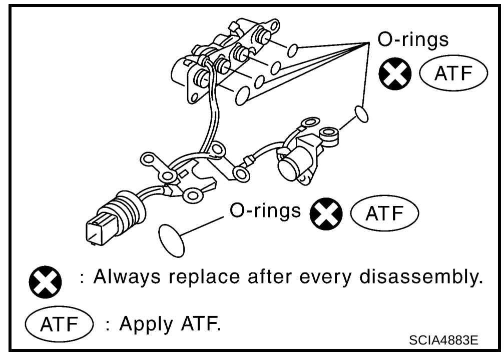
1. Remove bolts **a** , **d** , reamer bolt **f** and nut, and then remove oil strainer from control valve assembly.



2. Remove bolts **a, c, g** , solenoid valve assembly and line pressure solenoid valve from control valve assembly.

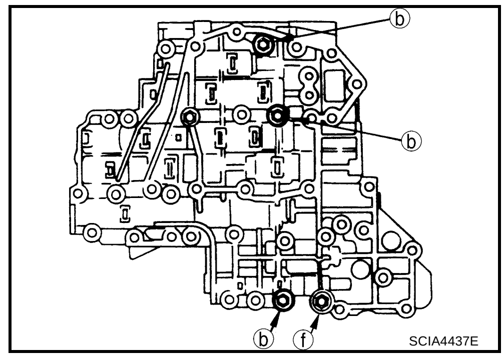


3. Remove O-rings from solenoid valves and terminal body.

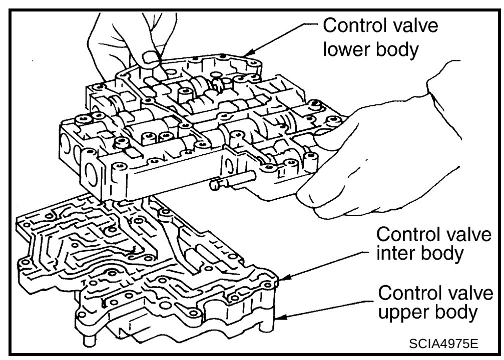


4. Place control valve upper body facedown, and remove bolts **b** , and nut **f** .

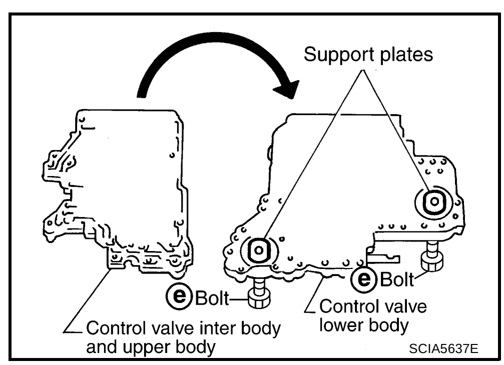
   CAUTION:
   Remove bolts with control valve upper body facing down, because control valve upper body and control valve inter body may come off and steel ball may fall and be lost.



5. Remove control valve lower body from control valve inter body.

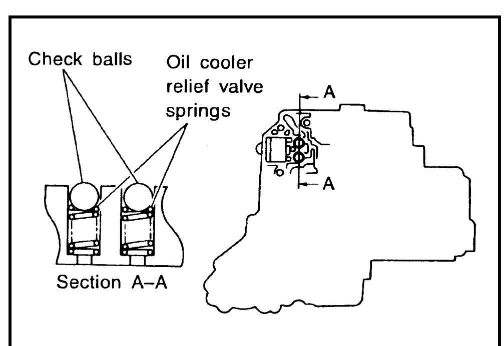


6. Turn over control valve lower body.
7. Remove bolts **e** , separating plate and support plates from control valve lower body.

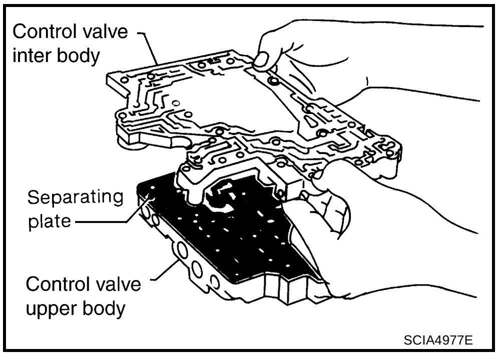


8. Remove check balls and oil cooler relief valve springs from control valve lower body.

   CAUTION:
   Be careful not to lose check balls and oil cooler relief valve springs.



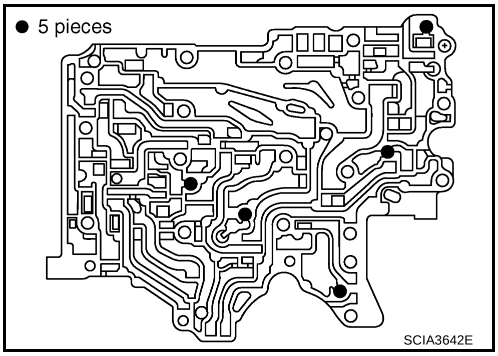
9. Remove control valve inter body from control valve upper body.



10. Check to see that steel balls are properly positioned in control valve inter body and then remove them.

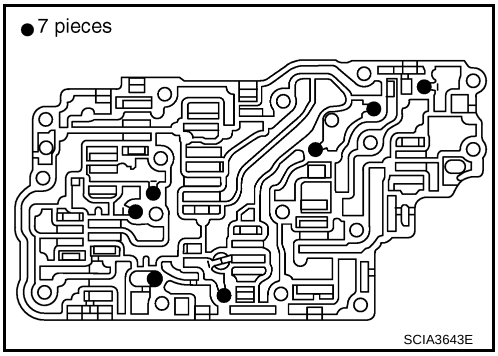
    CAUTION:
    Be careful not to lose steel balls.

11. Remove pilot filter from control valve upper body.
12. Remove separating plate from control valve upper body.



13. Check to see that steel balls are properly positioned in control valve upper body and then remove them.

    CAUTION:
    Be careful not to lose steel balls.

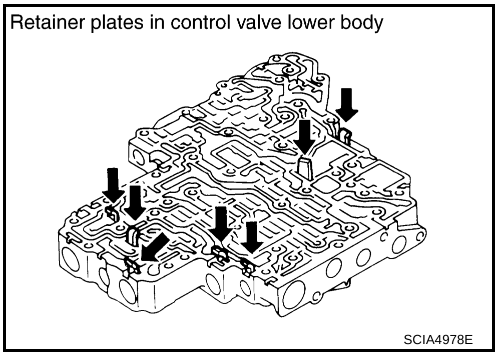


INSPECTION

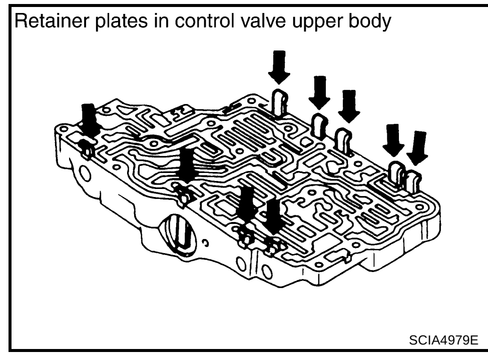
Control Valve Lower Body and Upper Body

CAUTION:
Be careful not to lose these parts.

- Check to see that retainer plates are properly positioned in control valve lower body.

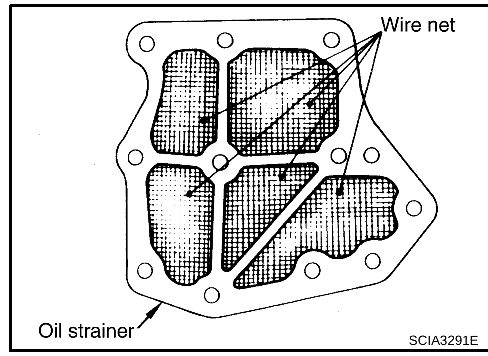


- Check to see that retainer plates are properly positioned in control valve upper body.



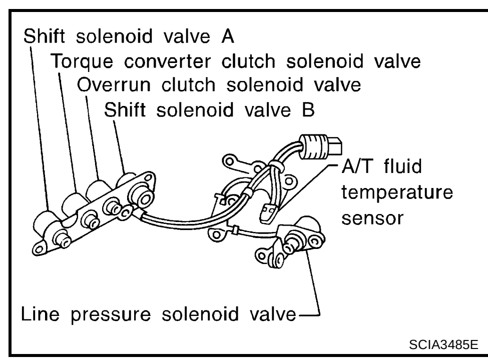
Oil Strainer

- Check wire netting of oil strainer for damage.



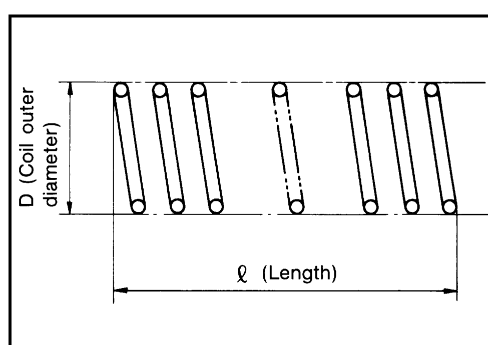
Shift Solenoid Valves “A” and “B”, Line Pressure Solenoid Valve, Torque Converter Clutch Solenoid Valve and Overrun Clutch Solenoid Valve

- Measure resistance.
  - For shift solenoid valve A, refer to AT-166, "Component Inspection" .
  - For shift solenoid valve B, refer to AT-171, "Component Inspection" .
  - For line pressure solenoid valve, refer to AT-161, "Component Inspection" .
  - For torque converter clutch solenoid valve, refer to AT-146, "Component Inspection" .
  - For overrun clutch solenoid valve, refer to AT-181, "Component Inspection" .
  - For A/T fluid temperature sensor, refer to AT-108, "Component Inspection" .



Oil Cooler Relief Valve Springs

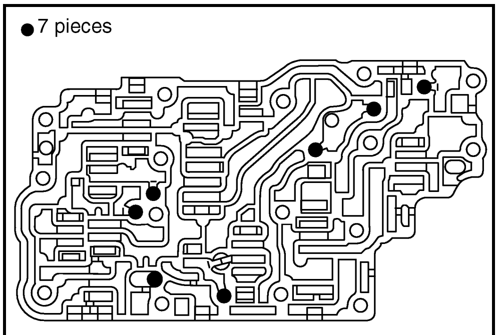
- Check springs for damage or deformation.
- Measure free length and outer diameter. Refer to AT-386, "Control Valves" .



ASSEMBLY

1. Install control valve upper, inter and lower body.

a. Place oil circuit of control valve upper body face up. Install steel balls in their proper positions.

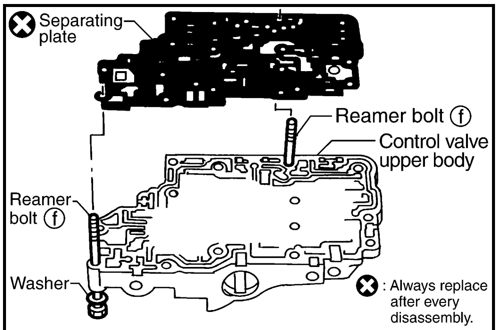


SCIA3643E

b. Install reamer bolts **f** from bottom of control valve upper body. Using reamer bolts as guides, install separating plate as a set.

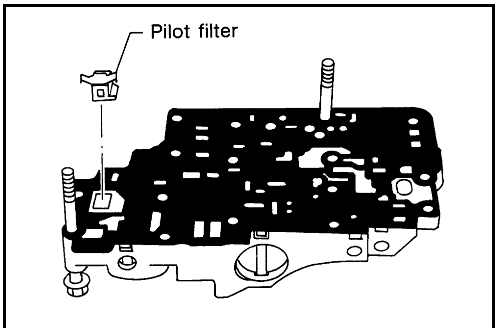
CAUTION:

Do not reuse separating plate.



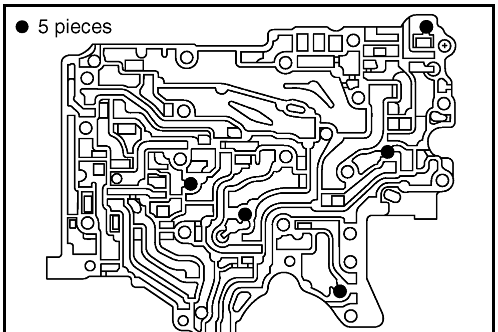
SCIA4980E

c. Install pilot filter.



SAT074F

d. Place control valve inter body as shown in the figure (side of control valve lower body face up). Install steel balls in their proper positions.

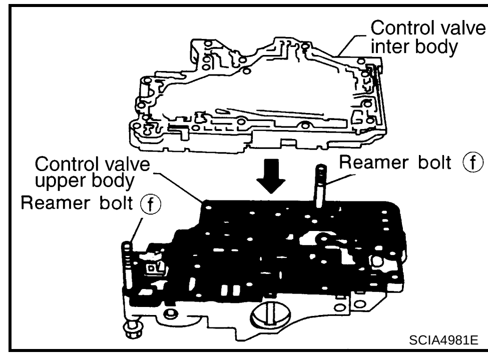


SCIA3642E

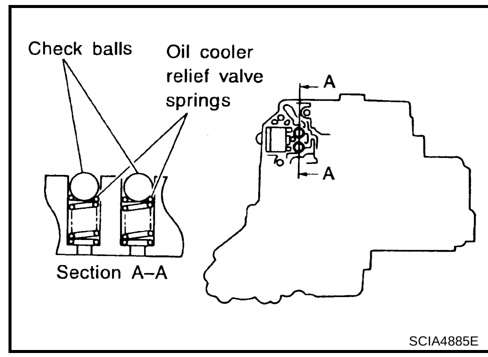
e. Install control valve inter body on control valve upper body using reamer bolts **f** as guides.

CAUTION:

Be careful not to dislocate or drop steel balls.



f. Install check balls and oil cooler relief valve springs in their proper positions in control valve lower body.

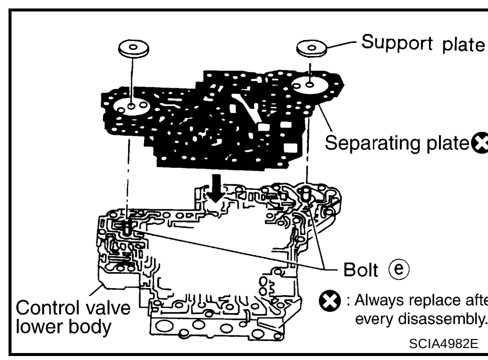


g. Install bolts **e** from bottom of control valve lower body. Using bolts **e** as guides, install separating plate as a set.

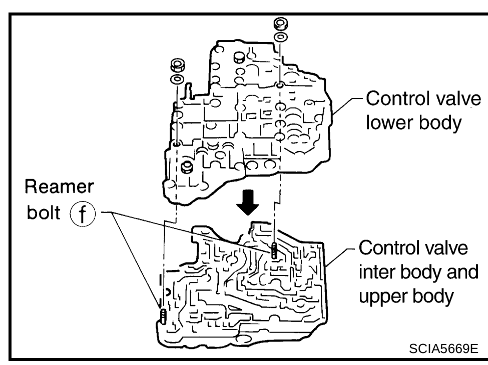
CAUTION:

Do not reuse separating plate.

h. Install support plates on control valve lower body.



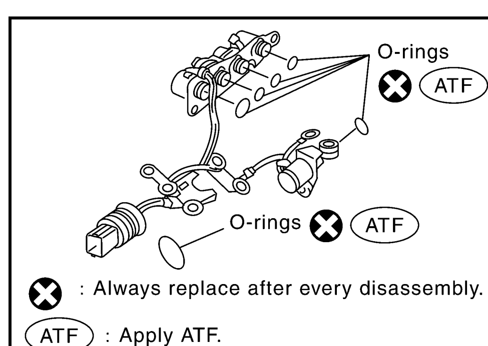
i. Install control valve lower body on control valve inter body using reamer bolts **f** as guides and tighten reamer bolts **f** slightly.



2. Install O-rings on solenoid valves and terminal body.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to O-rings.**

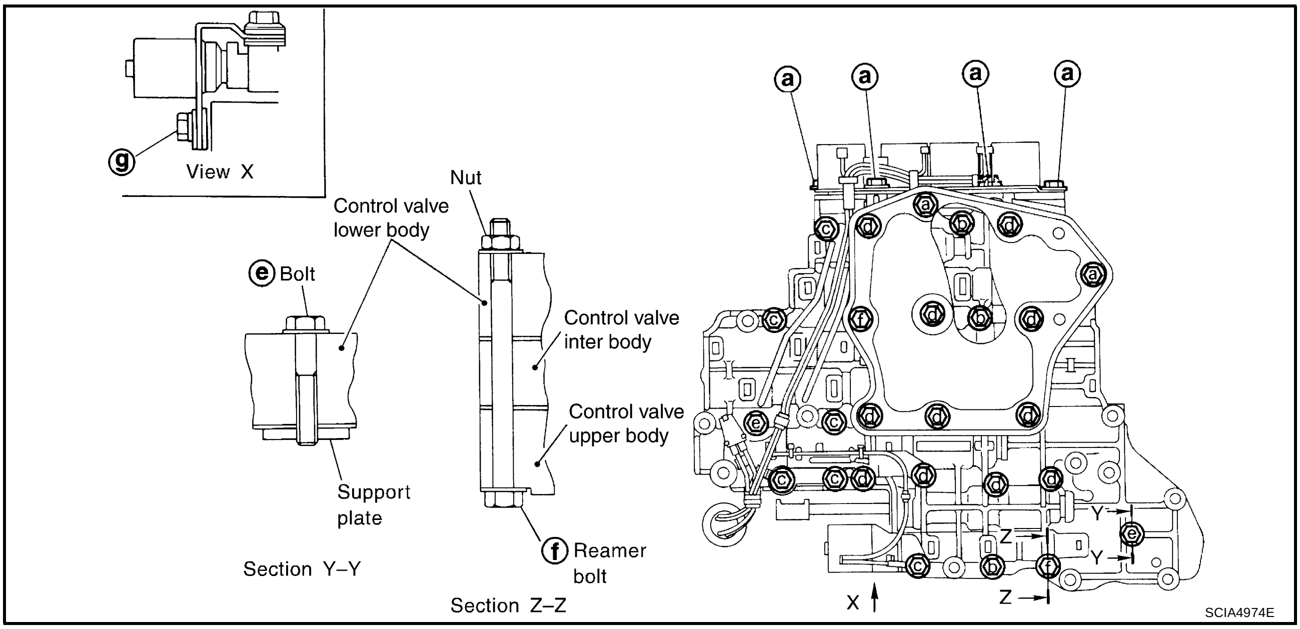


3. Install and tighten bolts.

Bolt length, number and location:

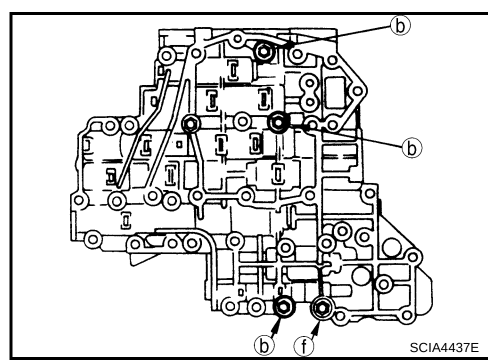
Bolt symbol	a	b	c	d	e	f	g
Bolt length “ℓ” mm (in)	13.5 (0.531)	58.0 (2.283)	40.0 (1.575)	66.0 (2.598)	33.0 (1.299)	78.0 (3.071)	18.0 (0.709)
Number of bolts	6	3	6	11	2	2	1
Tightening torque N·m (kg-m, in-lb)	7.8 (0.80, 69)				4.0 (0.41, 35)	7.8 (0.80, 69)	

f: Reamer bolt and nut.



a. Install and tighten bolts **b** and nut **f** to specified torque.

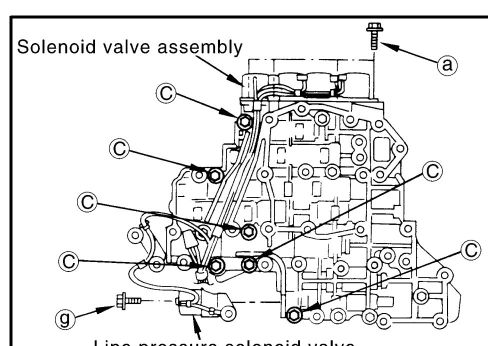
: 7.8 N·m (0.80 kg-m, 69 in-lb)



b. Install solenoid valve assembly and line pressure solenoid valve on control valve assembly.

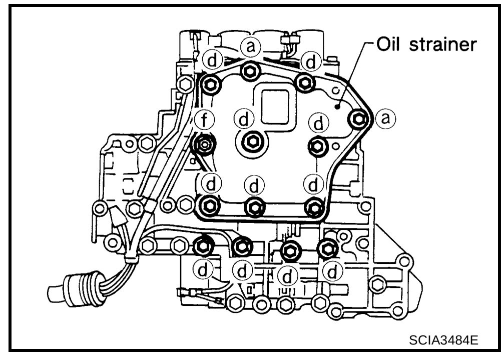
c. Tighten bolts **a** , **c** and **g** to specified torque.

: 7.8 N·m (0.80 kg-m, 69 in-lb)



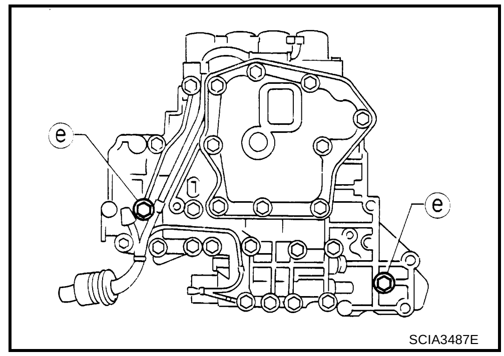
d. Set oil strainer, then tighten bolts **a** , **d** and nut **f** to specified torque.

: 7.8 N·m (0.80 kg-m, 69 in-lb)



e. Tighten bolts **e** to specified torque.

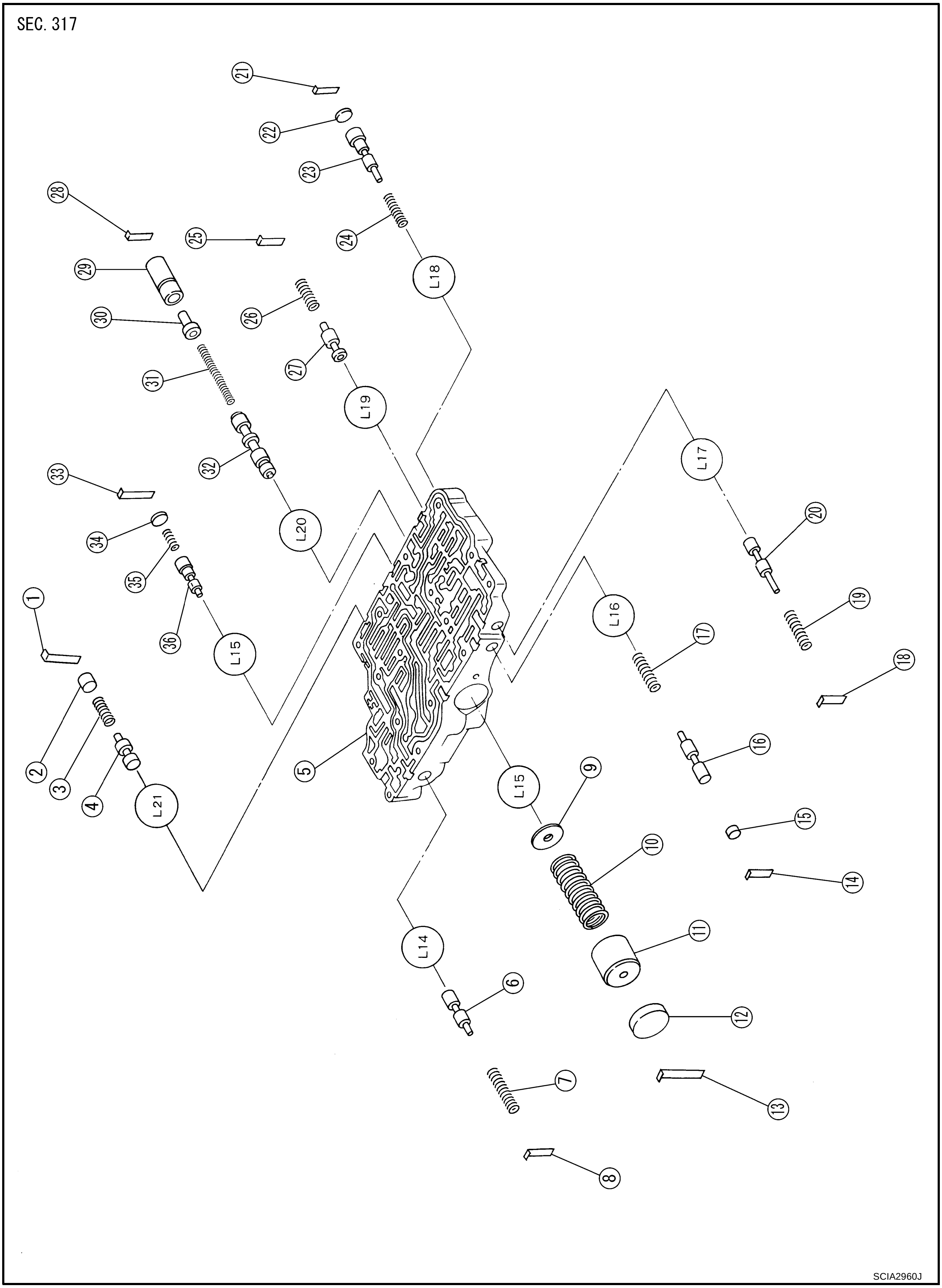
: 4.0 N·m (0.41 kg-m, 35 in-lb)



Control Valve Upper Body

ACS007VE

COMPONENTS



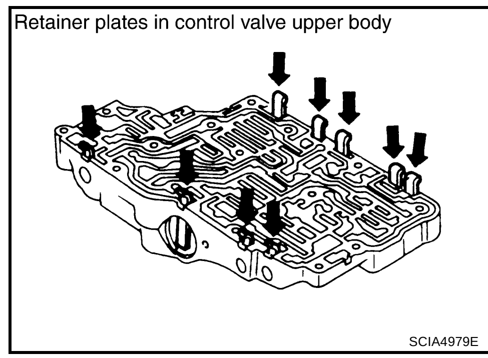
1.	Retainer plate	2.	Plug	3.	Cooler check valve spring
4.	Cooler check valve	5.	Control valve upper body	6.	Pilot valve
7.	Pilot valve spring	8.	Retainer plate	9.	1-2 accumulator retainer plate
10.	1-2 accumulator piston spring	11.	1-2 accumulator piston	12.	Plug
13.	Retainer plate	14.	Retainer plate	15.	Plug
16.	1st reducing valve	17.	1st reducing valve spring	18.	Retainer plate
19.	3-2 timing valve spring	20.	3-2 timing valve	21.	Retainer plate
22.	Plug	23.	Overrun clutch reducing valve	24.	Overrun clutch reducing valve spring
25.	Retainer plate	26.	Torque converter relief valve spring	27.	Torque converter relief valve
28.	Retainer plate	29.	Sleeve	30.	Plug
31.	Torque converter clutch control valve spring	32.	Torque converter clutch control valve	33.	Retainer plate
34.	Plug	35.	1-2 accumulator valve spring	36.	1-2 accumulator valve

DISASSEMBLY

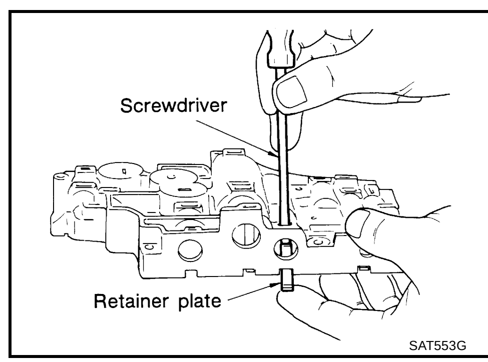
1. Remove valves at retainer plates.

   CAUTION:

   Do not use a magnetic pick-up tool.



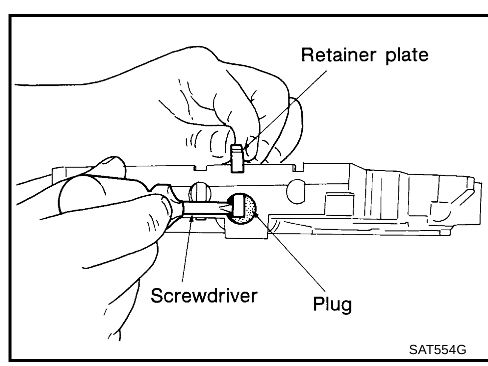
a. Use a screwdriver to remove retainer plates.



b. Remove retainer plates while holding spring, plugs or sleeves.

   CAUTION:

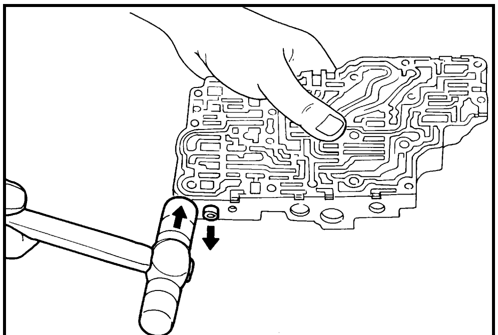
   Remove plugs slowly to prevent internal parts from jumping out.



c. Place mating surface of valve body face down, and remove internal parts.

CAUTION:

- **If a valve is hard to remove, place valve body face down and lightly tap it with a soft hammer.**
- **Be careful not to drop or damage valves and sleeves.**

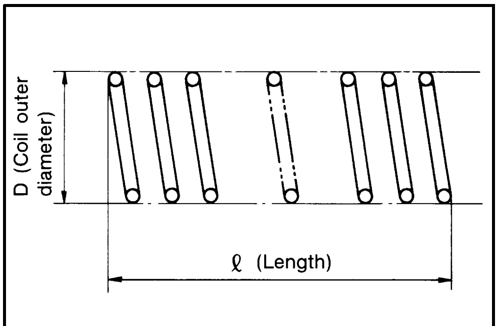


SAT137D

INSPECTION

Valve Springs

- Measure free length and outer diameter of each valve springs. Also check for damage or deformation. Refer to AT-386, "Control Valves" .
- Replace valve springs if deformed or fatigued.



SAT138D

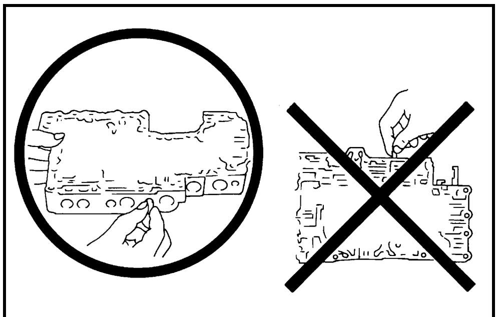
Control Valves

- Check sliding surfaces of valves, sleeves and plugs.

ASSEMBLY

CAUTION:

- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**

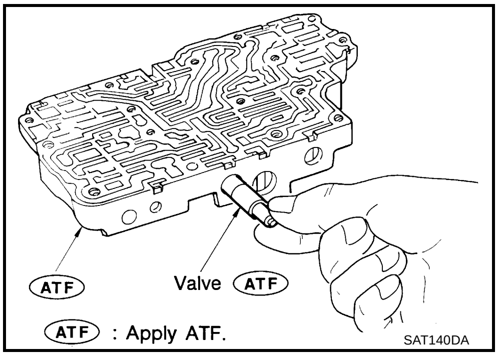


SAT139D

- Lubricate control valve body and all valves with ATF. Install control valves by sliding them carefully into their bores.

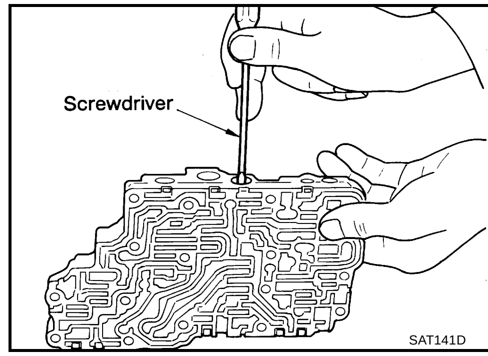
  CAUTION:

  - **Install each control valve one by one.**
  - **Install control valves after checking, because some of them are similar.**
  - **Be careful not to scratch or damage valve body.**



SAT140DA

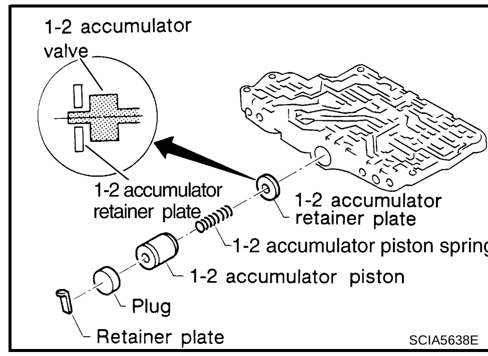
– Wrap a small screwdriver with vinyl tape and use it to insert valves into their proper positions.



SAT141D

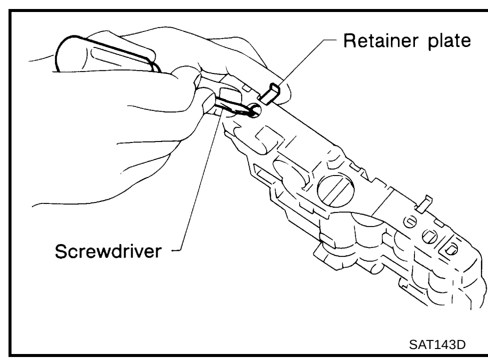
1-2 Accumulator Valve

- Install 1-2 accumulator valve. Align 1-2 accumulator retainer plate from opposite side of control valve body.
- Install 1-2 accumulator piston spring, 1-2 accumulator valve spring, 1-2 accumulator piston and plugs.



SCIA5638E

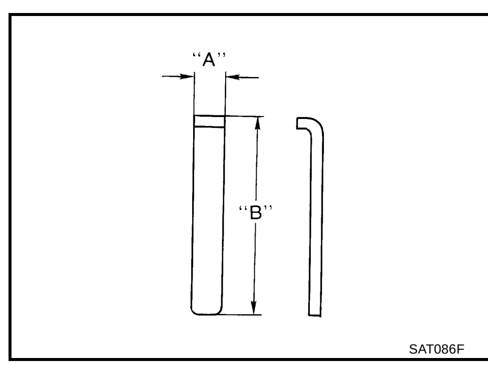
- Install retainer plates.
  – While pushing plugs (with 1-2 accumulator piston spring and 1-2 accumulator valve spring), install retainer plate.



SAT143D

Retainer Plates (Control Valve Upper Body)

- Install proper retainer plates. Refer to AT-313, "COMPONENTS" .



SAT086F

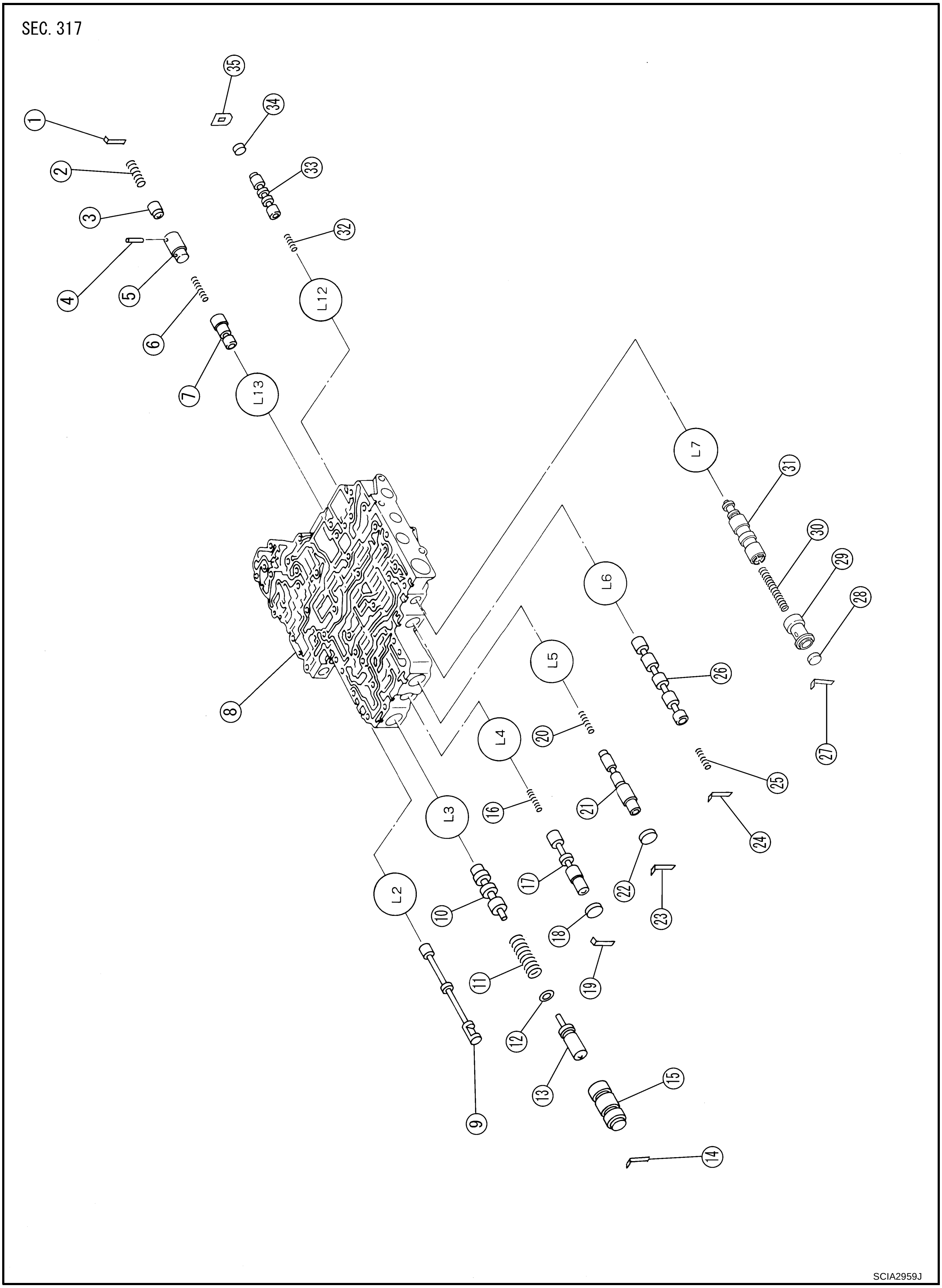
Unit: mm (in)

Location	Name of control valve	Width A	Length B
L14	Pilot valve	6.0 (0.236)	21.5 (0.846)
L16	1st reducing valve		
L17	3-2 timing valve		
L19	Torque converter relief valve		
L15	1-2 accumulator valve		40.5 (1.594)
	1-2 accumulator piston		
L18	Overrun clutch reducing valve		24.0 (0.945)
L21	Cooler check valve		
L20	Torque converter clutch control valve		28.0 (1.102)

Control Valve Lower Body

ACS007VF

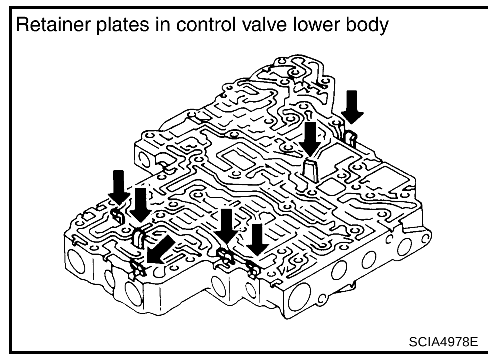
COMPONENTS



1. Retainer plate	2. Pressure modifier piston spring	3. Pressure modifier piston
4. Parallel pin	5. Sleeve	6. Pressure modifier valve spring
7. Pressure modifier valve	8. Control valve lower body	9. Manual valve
10. Pressure regulator valve	11. Pressure regulator valve spring	12. Spring seat
13. Plug	14. Retainer plate	15. Sleeve
16. Overrun clutch control valve spring	17. Overrun clutch control valve	18. Plug
19. Retainer plate	20. Accumulator control valve spring	21. Accumulator control valve
22. Plug	23. Retainer plate	24. Retainer plate
25. Shift valve A spring	26. Shift valve A	27. Retainer plate
28. Plug	29. Shuttle plug	30. Shuttle valve spring
31. Shuttle valve	32. Shift valve B spring	33. Shift valve B
34. Plug	35. Retainer plate	

DISASSEMBLY

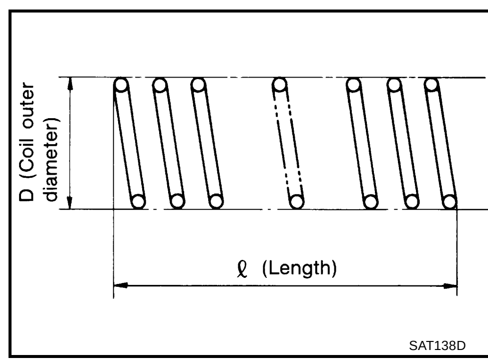
- Remove valves at retainer plates.
  For removal procedures, refer to AT-317, "COMPONENTS" .



INSPECTION

Valve Springs

- Check each valve springs for damage or deformation. Also measure free length and outer diameter. Refer to AT-386, "Control Valves" .
- Replace valve springs if deformed or fatigued.



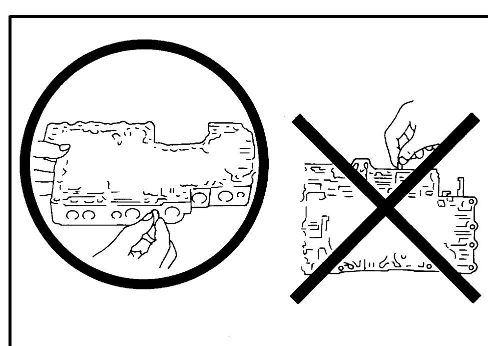
Control Valves

- Check sliding surfaces of control valves, sleeves and plugs for damage.

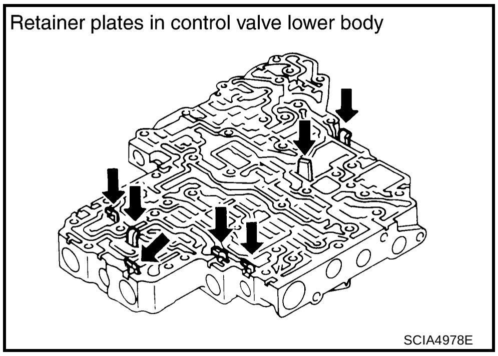
ASSEMBLY

CAUTION:

- **Apply ATF to all components before installation.**
- **Lay control valve body down when installing valves. Do not stand control valve body upright.**

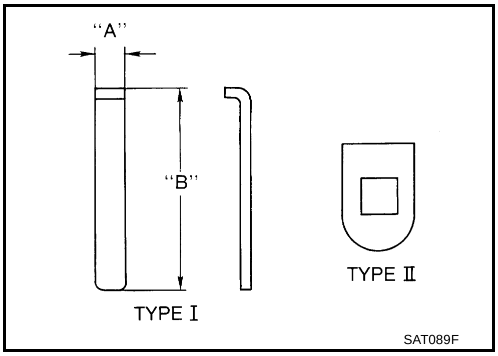


- Install control valves.
  For installation procedures, refer to AT-317, "COMPONENTS" .



Retainer Plates (Control Valve Lower Body)

- Install proper retainer plates. Refer to AT-317, "COMPONENTS" .



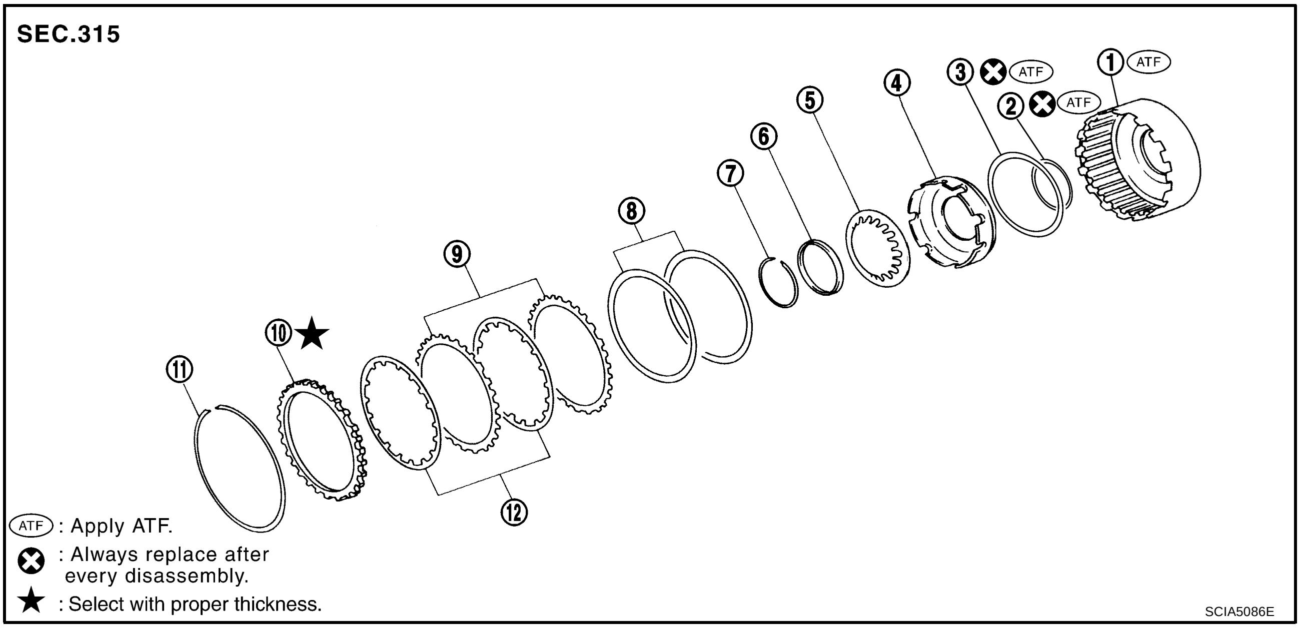
Unit: mm (in)

Location	Name of control valve and plug	Width A	Length B	Type
L3	Pressure regulator valve	6.0 (0.236)	28.0 (1.102)	I
L5	Accumulator control valve			
L6	Shift valve A			
L4	Overrun clutch control valve			
L13	Pressure modifier valve			
L7	Shuttle valve			
L12	Shift valve B	17.0 (0.669)	24.0 (0.945)	II

Reverse Clutch

ACS007VG

COMPONENTS



1.	Reverse clutch drum	2.	D-ring	3.	Seal ring
4.	Reverse clutch piston	5.	Return spring	6.	Spring retainer
7.	Snap ring	8.	Dish plate	9.	Driven plate
10.	Retaining plate	11.	Snap ring	12.	Drive plate

DISASSEMBLY

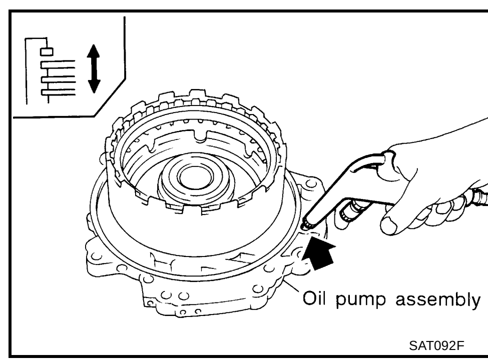
1. Check operation of reverse clutch.

a. Install seal ring onto drum support of oil pump cover and install reverse clutch assembly. Apply compressed air to oil hole.

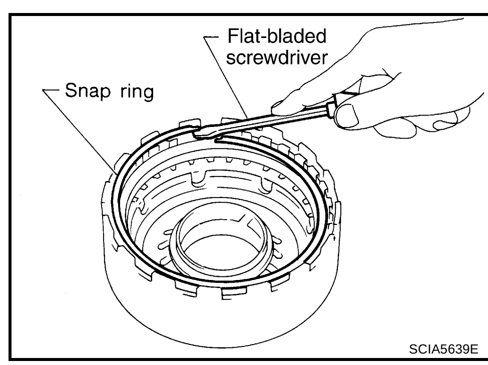
b. Check to see that retaining plate moves to snap ring.

c. If retaining plate does not contact snap ring:

- D-ring might be damaged.
- Seal ring might be damaged.
- Fluid might be leaking past piston check ball.



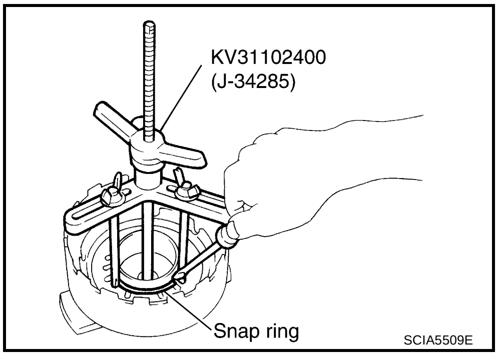
2. Remove snap ring with flat-bladed screwdriver.
3. Remove drive plates, driven plates, retaining plate, and dish plates.



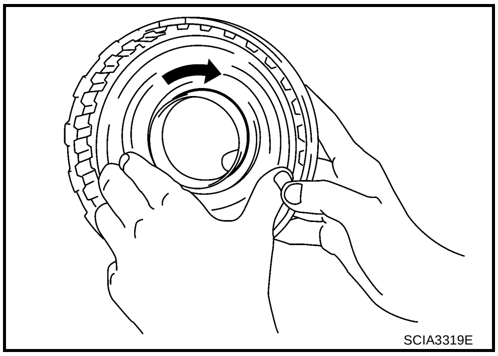
4. Set SST on spring retainer and remove snap ring from reverse clutch drum while compressing return spring.

CAUTION:
- **Set SST directly over return spring.**
- **Do not expand snap ring excessively.**

5. Remove spring retainer and return spring.



6. Remove reverse clutch piston from reverse clutch drum by turning it.
7. Remove D-ring and seal ring from reverse clutch piston.



INSPECTION

Reverse Clutch Snap Rings, Spring Retainer and Return Spring

- Check for deformation, fatigue or damage.
  If necessary, replace.

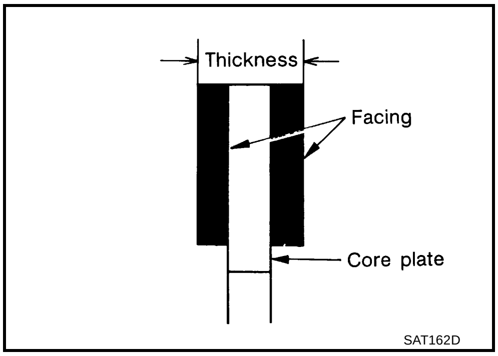
Reverse Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard:	**1.6 mm (0.063 in)**
Wear limit:	**1.4 mm (0.055 in)**

- If not within wear limit, replace.

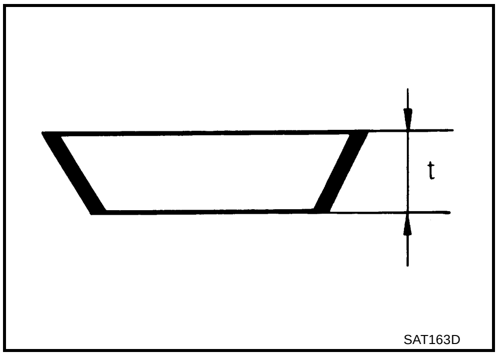


Reverse Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.

Thickness of dish plate: 3.08 mm (0.1213 in)

- If deformed or fatigued, replace.



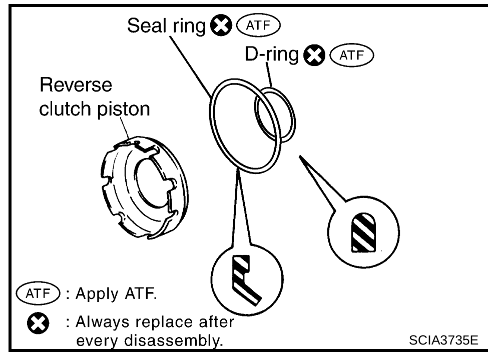
Reverse Clutch Piston

- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

ASSEMBLY

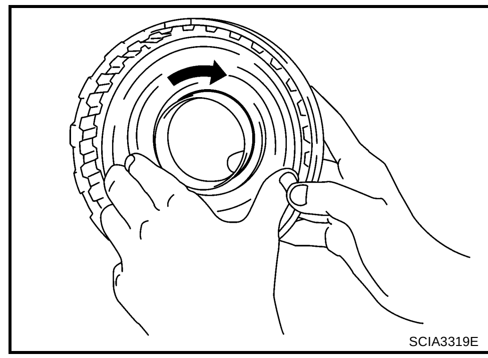
1. Install D-ring and seal ring on reverse clutch piston.

   CAUTION:
   - **Do not reuse D-ring and seal ring.**
   - **Apply ATF to D-ring and seal ring.**
   - **Be careful with the direction of seal ring.**



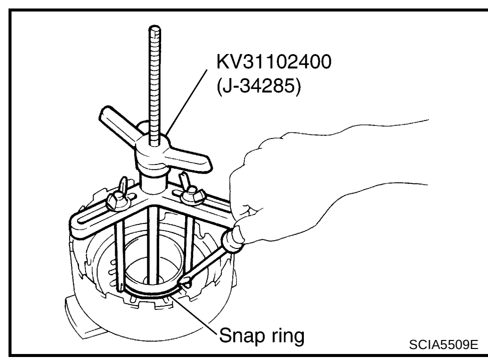
2. Install reverse clutch piston by turning it slowly.

   CAUTION:
   Apply ATF to inner surface of reverse clutch drum.



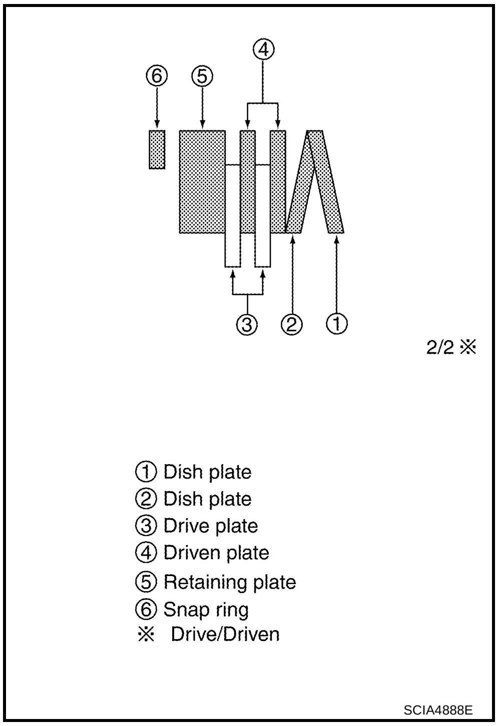
3. Install return spring and spring retainer on reverse clutch piston.
4. Set SST on spring retainer and install snap ring while compressing return spring.

   CAUTION:
   - **Set SST directly over return spring.**
   - **Do not expand snap ring excessively.**

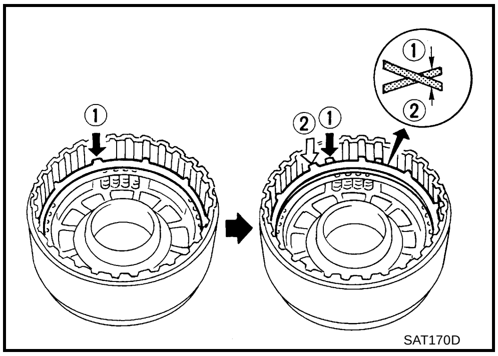


5. Install drive plates, driven plates, retaining plate and dish plates. Refer to AT-387, "REVERSE CLUTCH" .

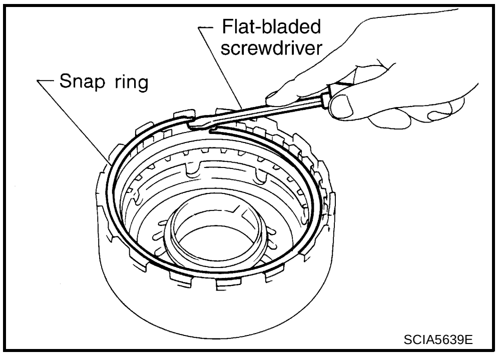
CAUTION:
Be careful with the order and the direction of plates.



NOTE:
Install two dish plates fitting each installation direction with reverse clutch drum groove displaced slightly.



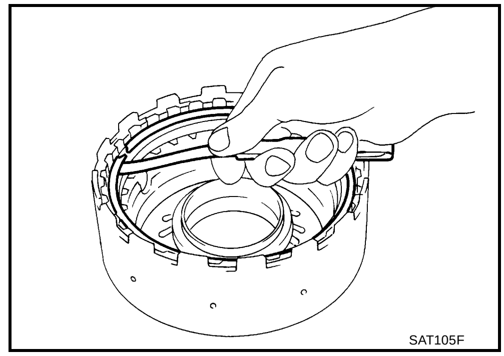
6. Install snap ring.



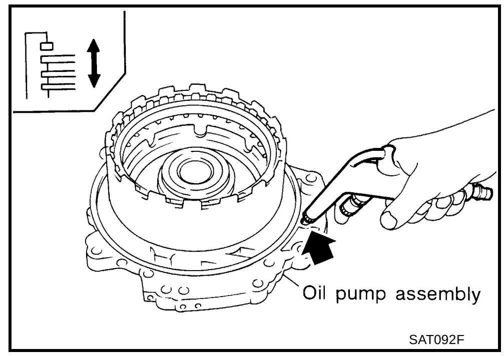
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate. Refer to AT-387, "REVERSE CLUTCH" .

Specified clearance

Standard:	**0.5 - 0.8 mm (0.020 - 0.031 in)**
Allowable limit:	**1.2 mm (0.047 in)**


SAT105F

8. Check operation of reverse clutch. Refer to AT-320, "DISASSEMBLY" .

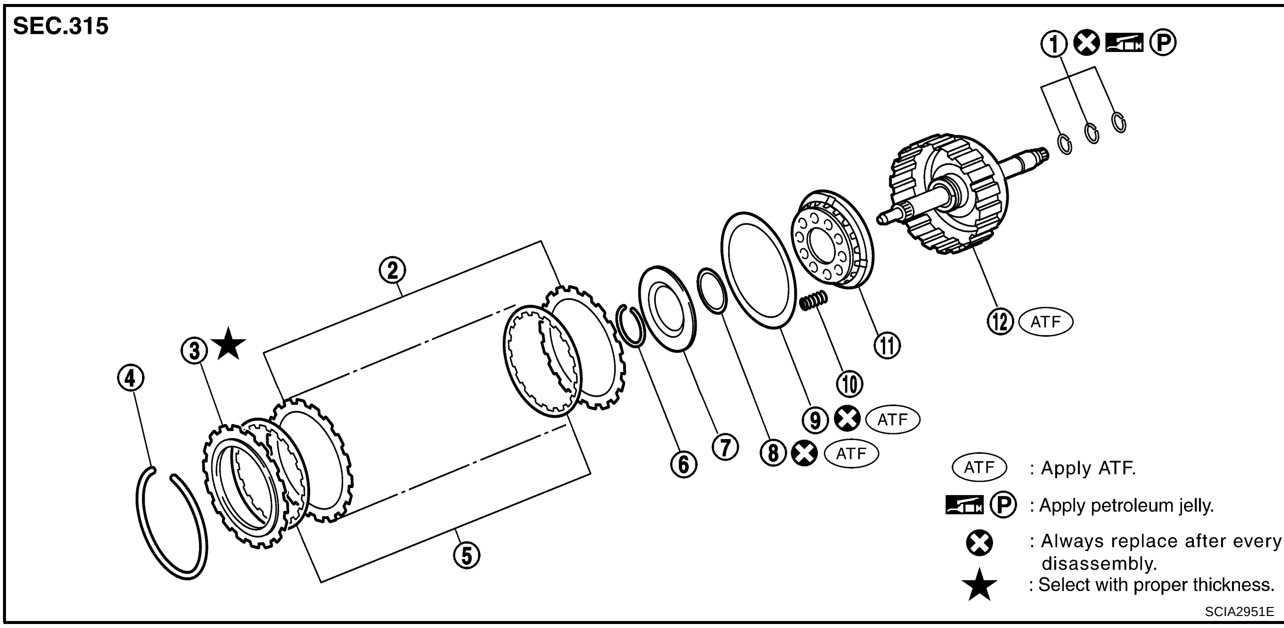


SAT092F

High Clutch

ACS007VH

COMPONENTS



1. Seal ring	2. Driven plate	3. Retaining plate
4. Snap ring	5. Drive plate	6. Snap ring
7. Spring retainer	8. D-ring	9. D-ring
10. Return spring	11. High clutch piston	12. Input shaft assembly (high clutch drum)

DISASSEMBLY

1. Check operation of high clutch.

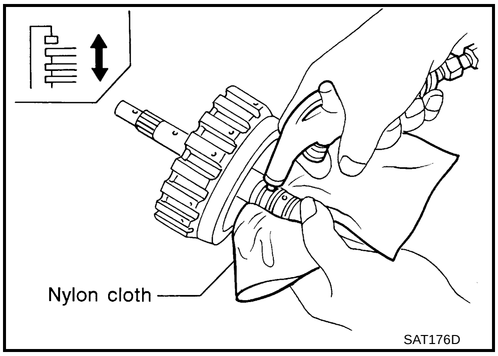
a. Apply compressed air to oil hole of input shaft assembly (high clutch drum) with nylon cloth.

CAUTION:
Stop up hole on opposite side of input shaft assembly (high clutch drum) with nylon cloth.

b. Check to see that retaining plate moves to snap ring.

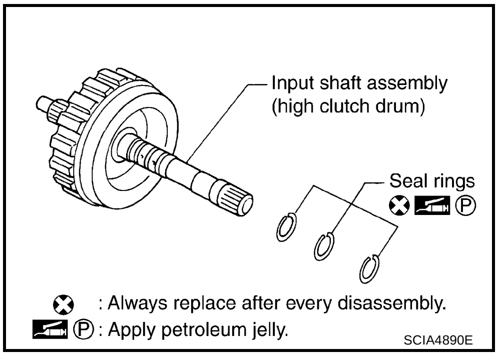
c. If retaining plate does not contact snap ring:

- Fluid might be leaking past piston check ball.

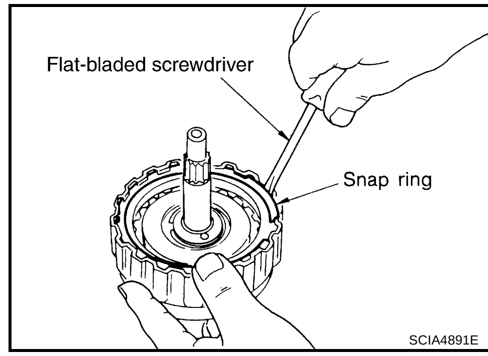


2. Remove seal rings from input shaft assembly (high clutch drum).

CAUTION:
Always replace seal rings when removed.

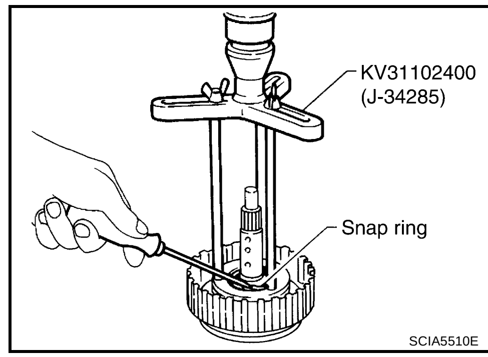


3. Remove snap ring with flat-bladed screwdriver.
4. Remove drive plates, driven plates and retaining plate.

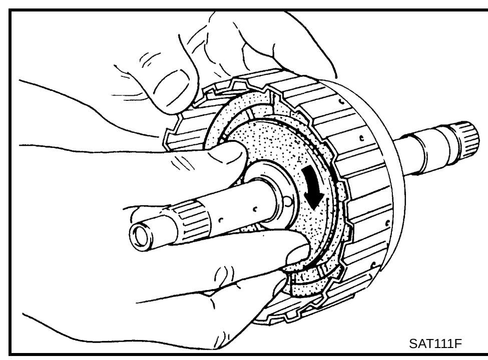


5. Set SST on spring retainer and remove snap ring from input shaft assembly (high clutch drum) while compressing return springs.

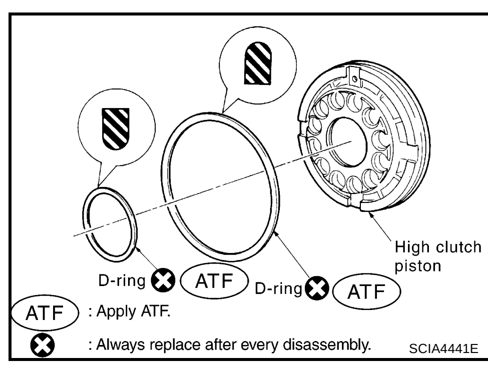
   CAUTION:
   - **Set SST directly over springs.**
   - **Do not expand snap ring excessively.**
6. Remove spring retainer and return springs.



7. Remove high clutch piston from input shaft assembly (high clutch drum) by turning it.



8. Remove D-rings from high clutch piston.



INSPECTION

High Clutch Snap Rings, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

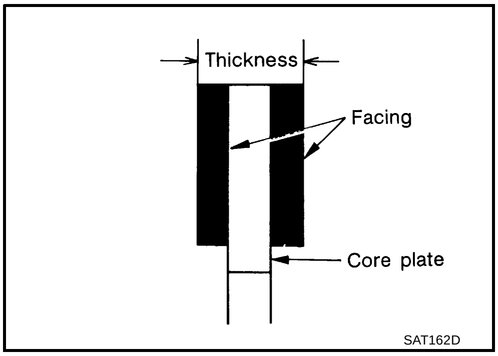
High Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard:	**1.6 mm (0.063 in)**
Wear limit:	**1.4 mm (0.055 in)**

- If not within wear limit, replace.



High Clutch Piston

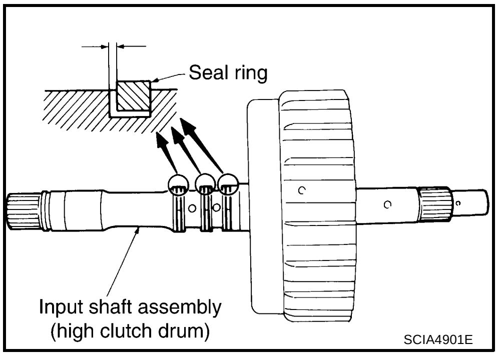
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side to make sure that air leaks past ball.

Seal Ring Clearance

- Install new seal rings onto input shaft assembly (high clutch drum).
- Measure clearance between seal ring and ring groove.

Standard clearance:	**0.08 - 0.23 mm (0.0031 - 0.0091 in)**
Allowable limit:	**0.23 mm (0.0091 in)**

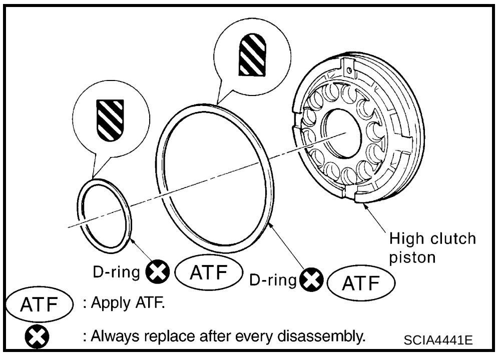
- If not within allowable limit, replace input shaft assembly (high clutch drum).



ASSEMBLY

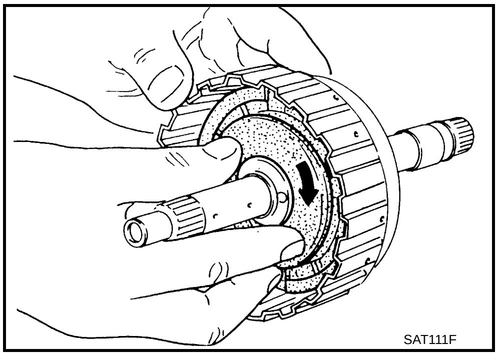
1. Install D-rings on high clutch piston.

   CAUTION:
   - **Apply ATF to D-rings.**
   - **Do not reuse D-rings.**

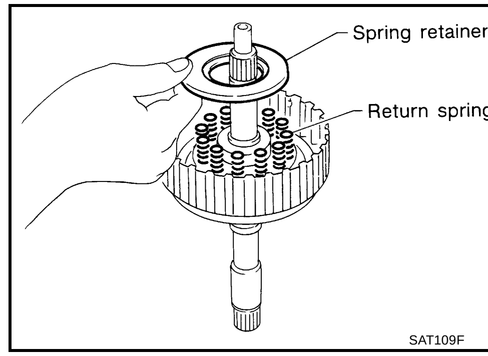


2. Install high clutch piston by turning it slowly.

   CAUTION:
   Apply ATF to inner surface of input shaft assembly (high clutch drum).

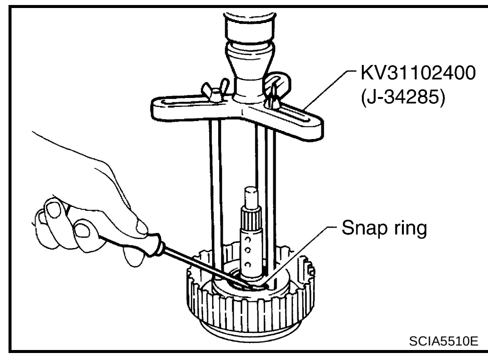


3. Install return springs and spring retainer on high clutch piston.

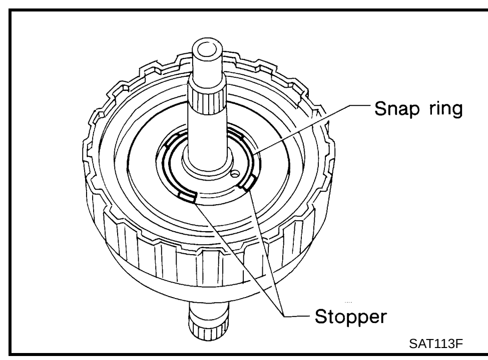


4. Set SST on spring retainer and install snap ring while slowly compressing return springs.

CAUTION:
- **Set SST directly over return springs.**
- **Do not expand snap ring excessively.**

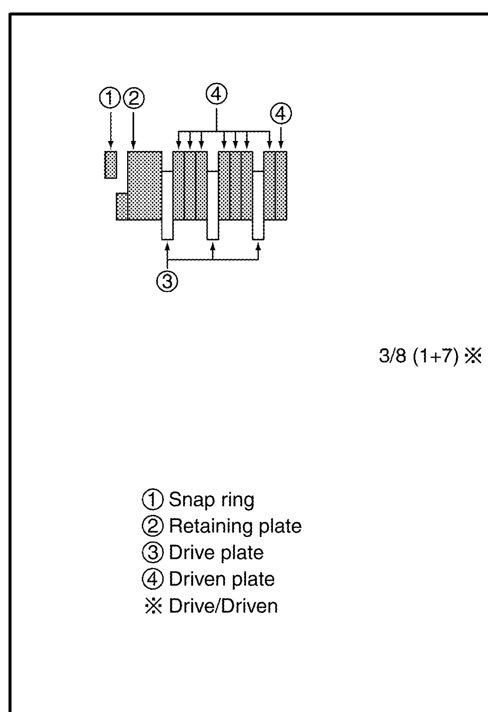


CAUTION:
Do not align snap ring gap with spring retainer stopper.

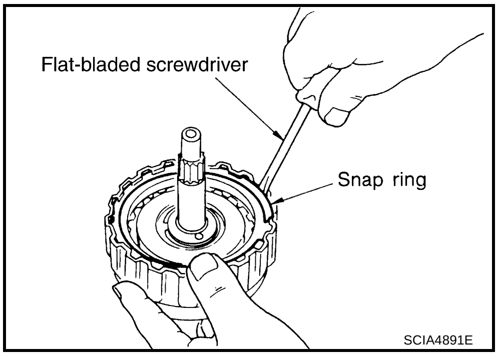


5. Install drive plates, driven plates and retaining plate. Refer to AT-387, "HIGH CLUTCH" .

CAUTION:
Be careful with the order and the direction of plates.



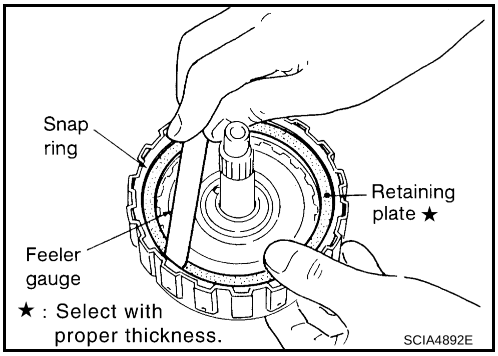
6. Install snap ring with flat-bladed screwdriver.



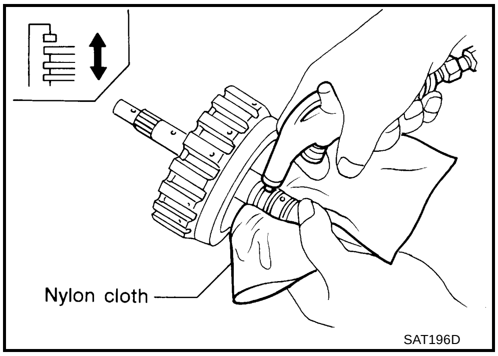
7. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate. Refer to AT-387, "HIGH CLUTCH" .

Specified clearance

Standard:	**1.8 - 2.2 mm (0.071 - 0.087 in)**
Allowable limit:	**2.8 mm (0.110 in)**



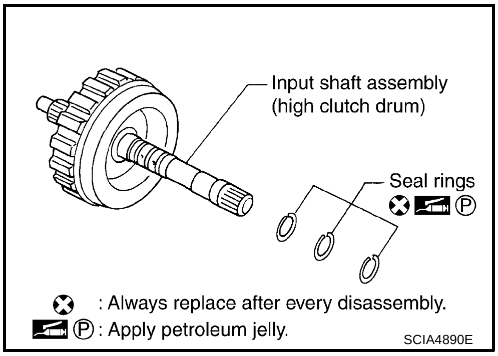
8. Check operation of high clutch. Refer to AT-325, "DISASSEMBLY" .



9. Install seal rings to input shaft assembly (high clutch drum).

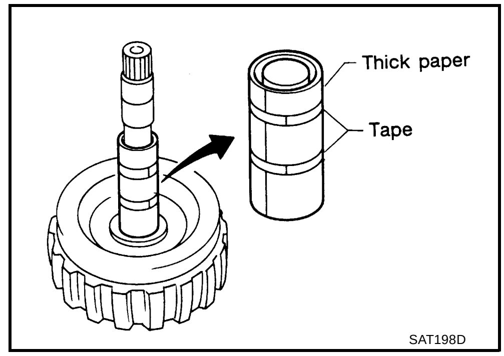
CAUTION:

- **Do not reuse seal rings.**
- **Apply petroleum jelly to seal rings.**



CAUTION:

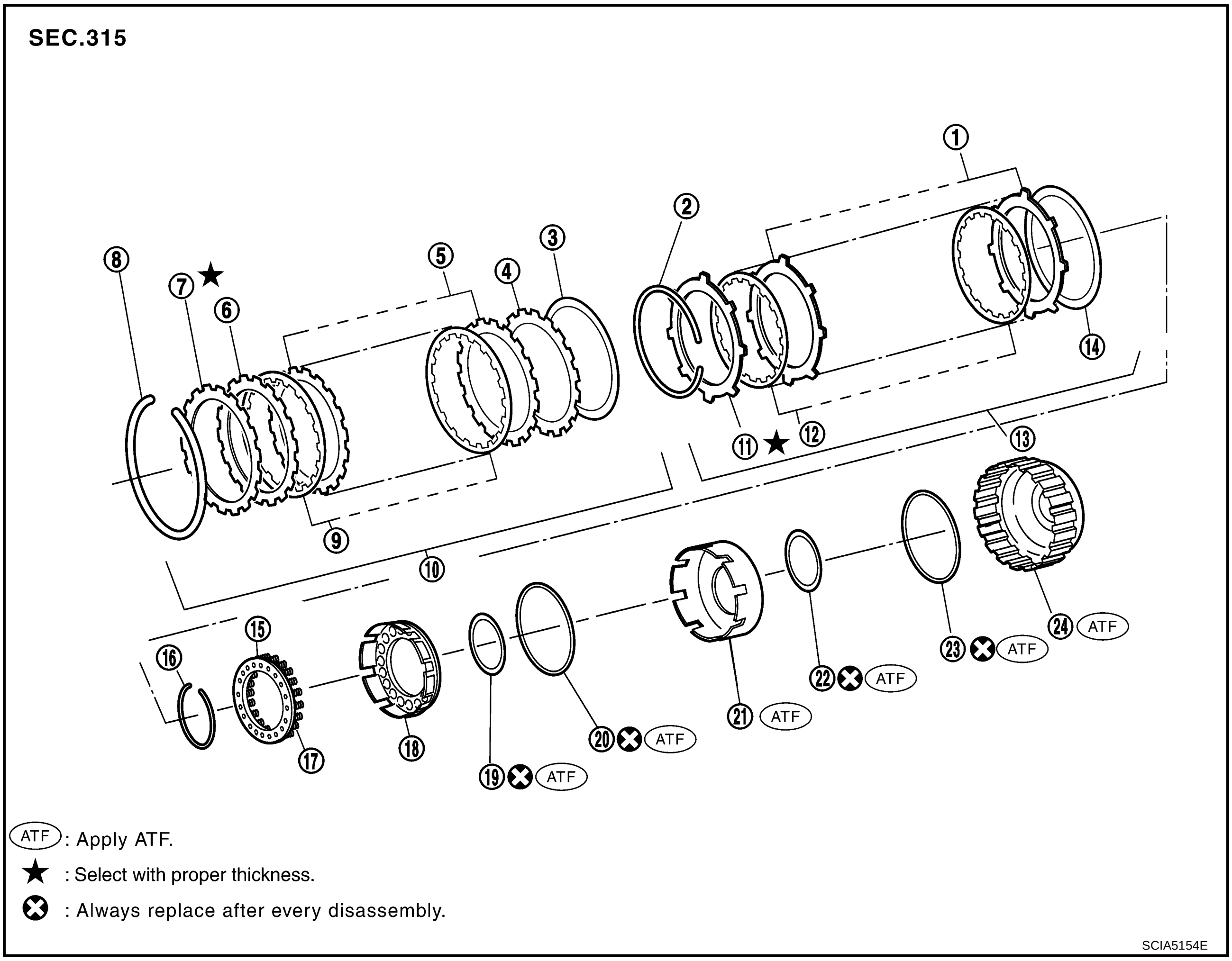
Roll paper around seal rings to prevent seal rings from spreading.



Forward and Overrun Clutches

ACS007VI

COMPONENTS



1.	Driven plate	2.	Snap ring	3.	Dish plate
4.	Retaining plate	5.	Driven plate	6.	Retaining plate
7.	Retaining plate	8.	Snap ring	9.	Drive plate
10.	Forward clutch	11.	Retaining plate	12.	Drive plate
13.	Overrun clutch	14.	Dish plate	15.	Spring retainer
16.	Snap ring	17.	Return spring	18.	Overrun clutch piston
19.	D-ring	20.	Seal ring	21.	Forward clutch piston
22.	D-ring	23.	Seal ring	24.	Forward clutch drum

DISASSEMBLY

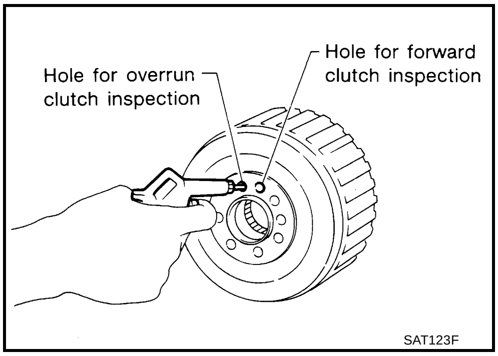
1. Check operation of forward clutch and overrun clutch.

a. Install bearing retainer of output shaft on forward clutch drum.

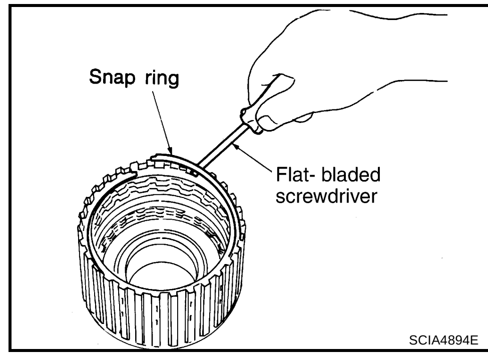
b. Apply compressed air to oil hole of forward clutch drum.

c. Check to see that retaining plate moves to snap ring.

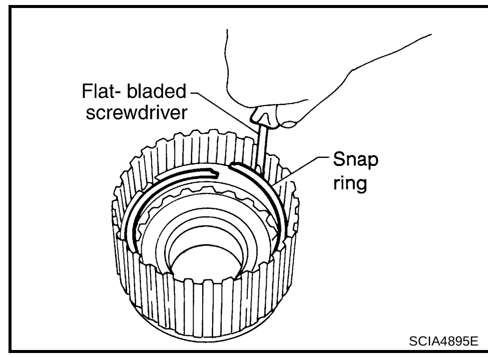
d. If retaining plate does not contact snap ring:
- D-ring might be damaged.
- Seal ring might be damaged.
- Fluid might be leaking past piston check ball.



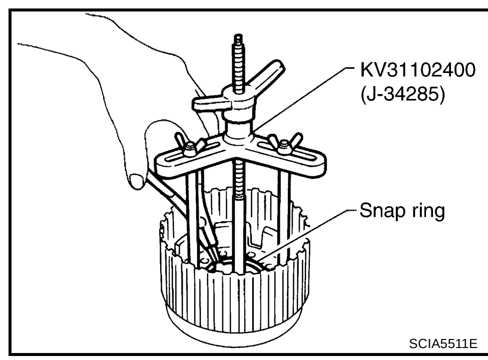
2. Remove snap ring for forward clutch with flat-bladed screwdriver.
3. Remove drive plates, driven plates, retaining plates and dish plate for forward clutch.



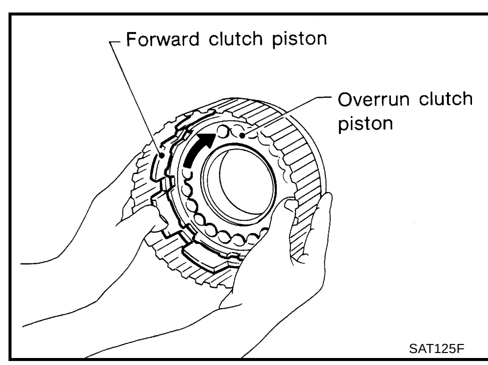
4. Remove snap ring for overrun clutch with flat-bladed screwdriver.
5. Remove drive plates, driven plates, retaining plate and dish plate for overrun clutch.



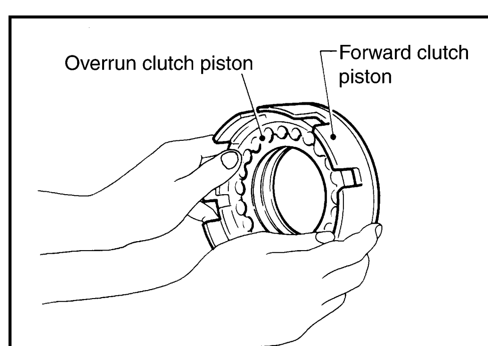
6. Set SST on spring retainer and remove snap ring from forward clutch drum while compressing return springs.
   CAUTION:
   - **Set SST directly over return springs.**
   - **Do not expand snap ring excessively.**
7. Remove spring retainer and return springs.
   CAUTION:
   Do not remove return springs from spring retainer.



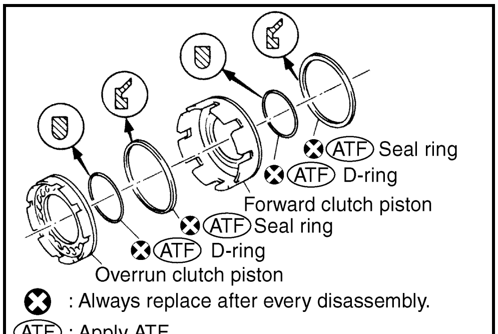
8. Remove forward clutch piston with overrun clutch piston from forward clutch drum by turning it.



9. Remove overrun clutch piston from forward clutch piston by turning it.



10. Remove D-rings and seal rings from forward clutch piston and overrun clutch piston.



SCIA3046E

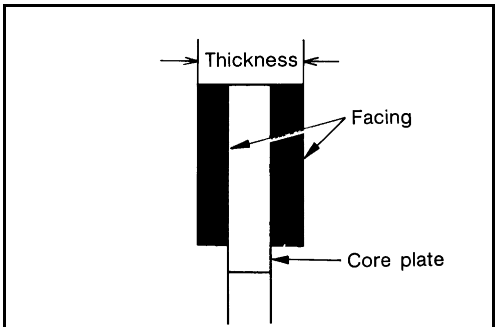
INSPECTION

Snap Rings, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage.
- Replace if necessary.
- **When replacing spring retainer and return springs, replace them as a set.**

Forward Clutch and Overrun Clutch Drive Plates

- Check facing for burns, cracks or damage.
- Measure thickness of facing.



SAT162D

Thickness of drive plate

Forward clutch

Standard:	**1.6 mm (0.063 in)**
Wear limit:	**1.4 mm (0.055 in)**

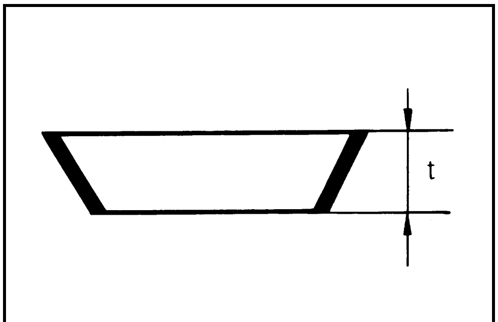
Overrun clutch

Standard:	**1.6 mm (0.063 in)**
Wear limit:	**1.4 mm (0.055 in)**

- If not within wear limit, replace.

Forward Clutch and Overrun Clutch Dish Plates

- Check for deformation or damage.
- Measure thickness of dish plate.



SAT163D

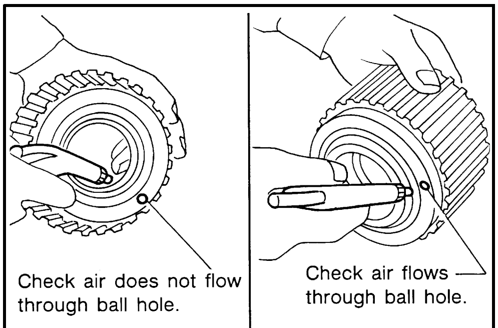
Thickness of dish plate

Forward clutch:	**2.7 mm (0.106 in)**
Overrun clutch:	**2.7 mm (0.106 in)**

- If deformed or fatigued, replace.

Forward Clutch Drum

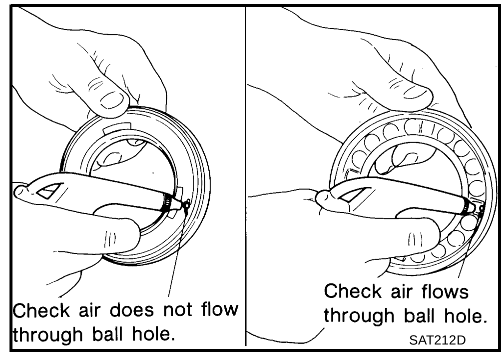
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole from outside of forward clutch drum. Make sure air leaks past ball.
- Apply compressed air to oil hole from inside of forward clutch drum. Make sure there is no air leakage.



SAT213D

Overrun Clutch Piston

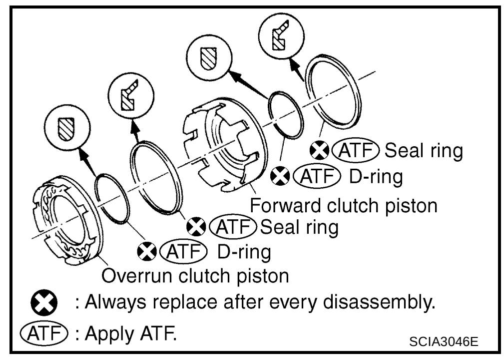
- Make sure that check balls are not fixed.
- Apply compressed air to check ball oil hole opposite return spring. Make sure there is no air leakage.
- Apply compressed air to oil hole on return spring side. Make sure that air leaks past ball.



ASSEMBLY

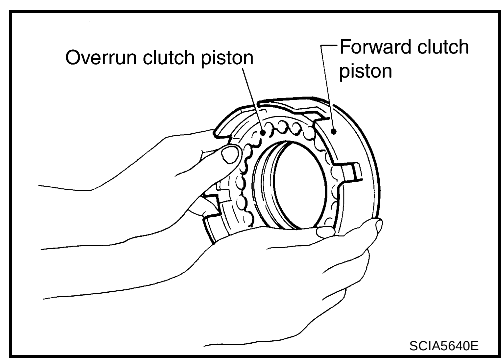
1. Install D-rings and seal rings on forward clutch piston and overrun clutch piston.

   CAUTION:
   - **Do not reuse D-rings and seal rings.**
   - **Apply ATF to D-rings and seal rings.**
   - **Take care with direction of seal rings.**



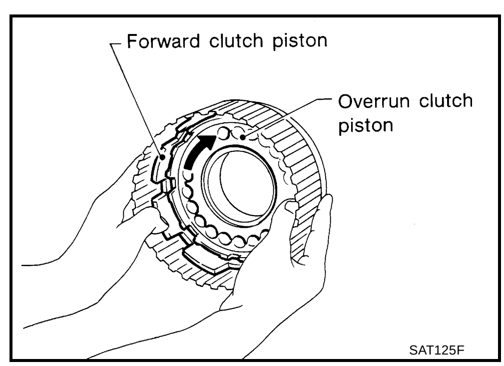
2. Install overrun clutch piston on forward clutch piston by turning it slowly.

   CAUTION:
   Apply ATF to inner surface of forward clutch piston.

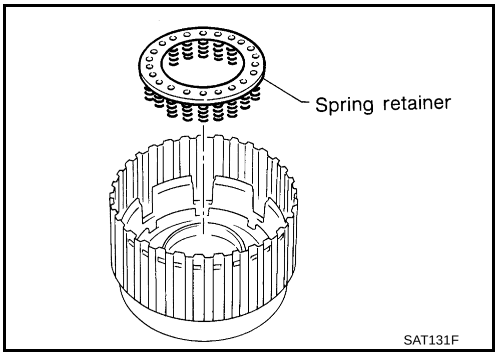


3. Install forward clutch piston with overrun clutch piston on forward clutch drum by turning it slowly.

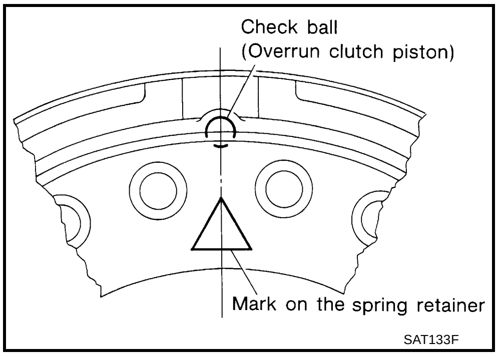
   CAUTION:
   Apply ATF to inner surface of forward clutch drum.



4. Install spring retainer and return springs on overrun clutch piston.

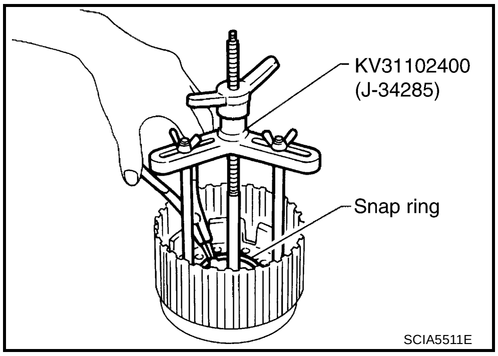


- Align the mark on spring retainer with check ball in overrun clutch piston.

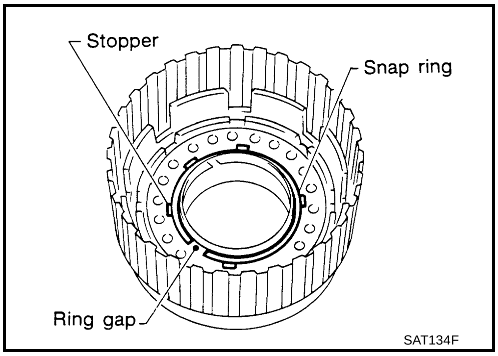


5. Set SST on spring retainer and install snap ring while compressing return springs.

CAUTION:
- **Set SST directly over return springs.**
- **Do not expand snap ring excessively.**



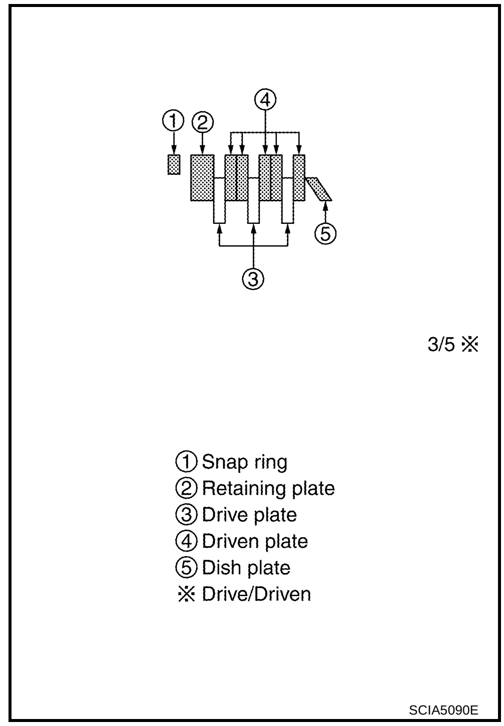
CAUTION:
Do not align snap ring gap with spring retainer stopper.



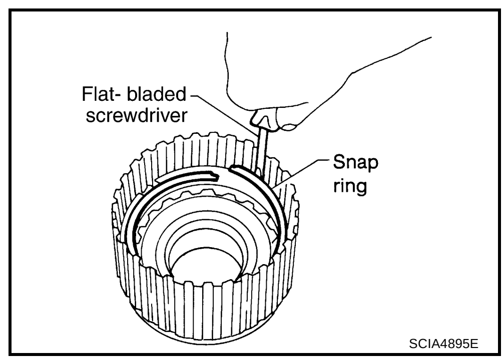
6. Install drive plates, driven plates, retaining plate and dish plate for overrun clutch. Refer to AT-388, "OVERRUN CLUTCH" .

   CAUTION:

   Be careful with the order and the direction of plates.



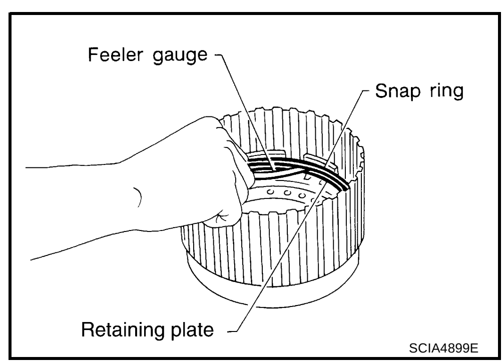
7. Install snap ring for overrun clutch with flat-bladed screwdriver.



8. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate. Refer to AT-388, "OVERRUN CLUTCH" .

   Specified clearance

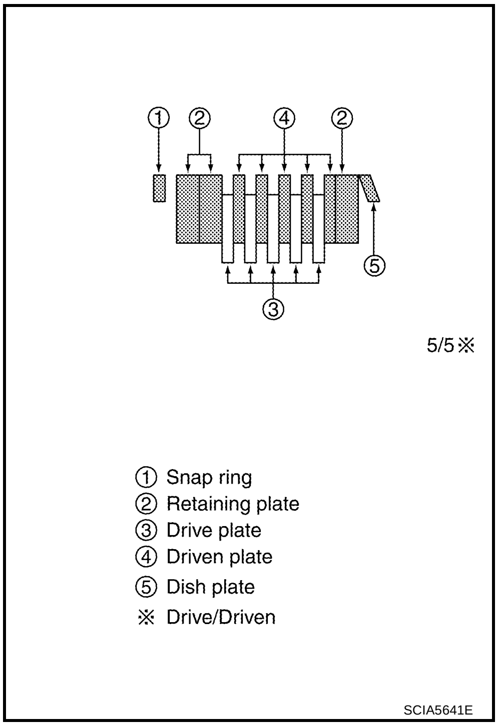
Standard:	**0.7 - 1.1 mm (0.028 - 0.043 in)**
Allowable limit:	**1.7 mm (0.067 in)**



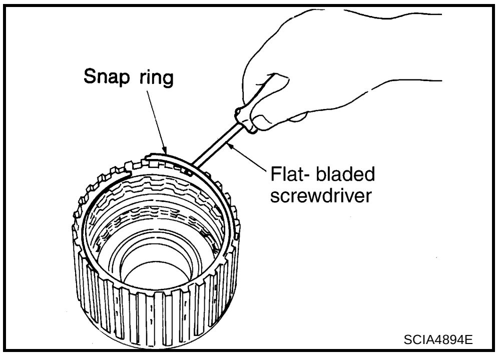
9. Install drive plates, driven plates, retaining plates and dish plate for forward clutch. Refer to AT-388, "FORWARD CLUTCH" .

   CAUTION:

   Be careful with the order and the direction of plates.



10. Install snap ring for forward clutch with flat-bladed screwdriver.

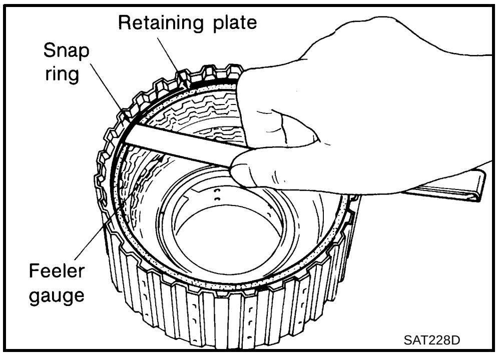


11. Measure clearance between retaining plate and snap ring. If not within allowable limit, select proper retaining plate. Refer to AT-388, "FORWARD CLUTCH" .

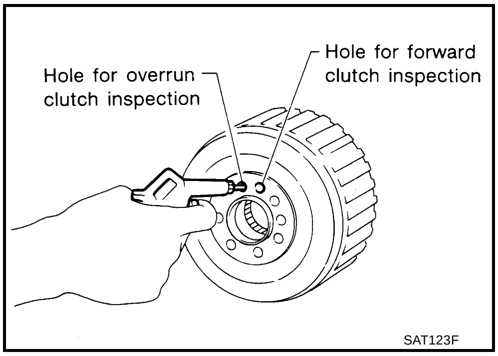
    Specified clearance

    Standard: 0.45 - 0.85 mm (0.0177 - 0.0335 in)

    Allowable limit: 1.85 mm (0.0728 in)



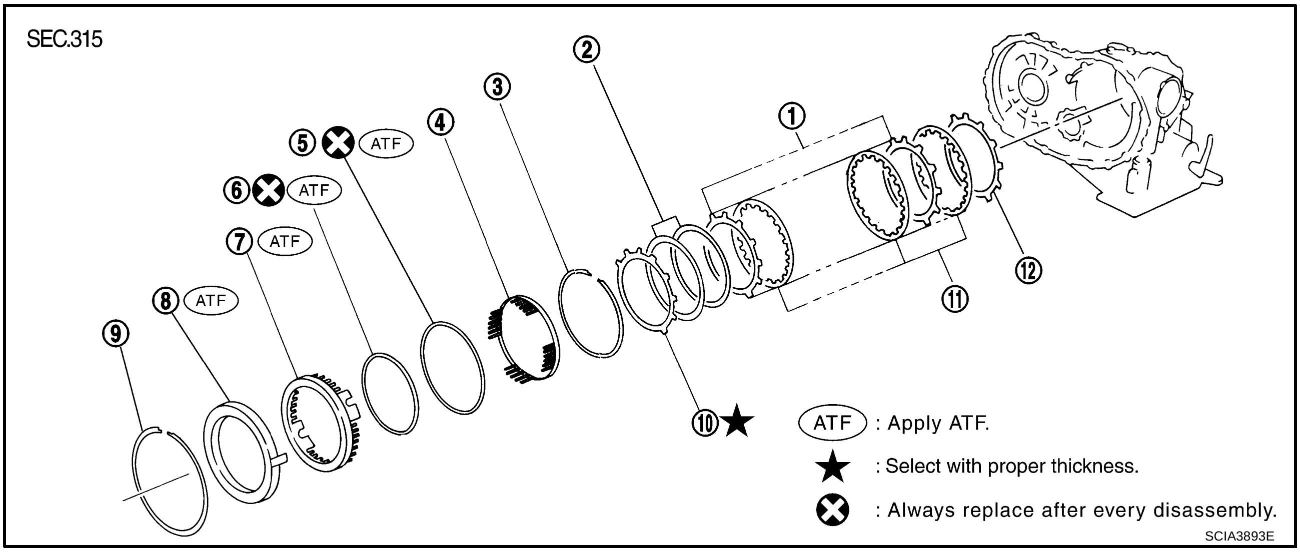
12. Check operation of forward clutch and overrun clutch. Refer to AT-331, "DISASSEMBLY" .



Low & Reverse Brake

ACS007VJ

COMPONENTS

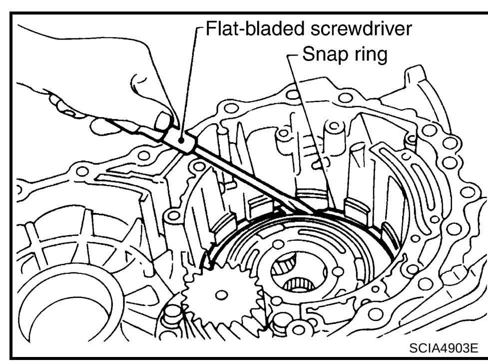


1.	Driven plate	2.	Dish plate	3.	Snap ring
4.	Spring retainer	5.	D-ring	6.	D-ring
7.	Low & reverse brake piston	8.	Retainer	9.	Snap ring
10.	Retaining plate	11.	Drive plate	12.	Retaining plate

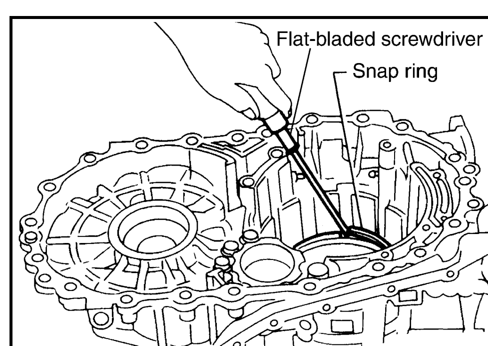
DISASSEMBLY

1. Check operation of low & reverse brake.
a. Apply compressed air to oil hole of transaxle case.
b. Check to see that retaining plate moves to snap ring.
c. If retaining plate does not contact snap ring:
   - D-ring might be damaged.
   - Fluid might be leaking past piston check ball.

2. Remove snap ring with flat-bladed screwdriver.
3. Remove low & reverse brake piston (with retainer) and spring retainer from transaxle case.



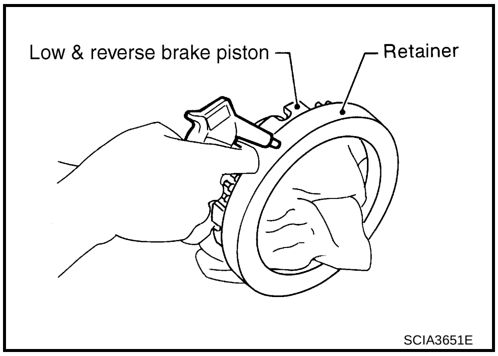
4. Remove snap ring with flat-bladed screwdriver.
5. Remove driven plates, drive plates, retaining plates and dish plates from transaxle case.



6. In order to remove low & reverse brake piston, apply compressed air to oil hole of retainer while holding low & reverse brake piston.

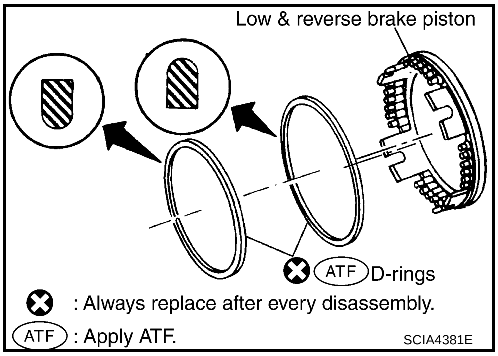
   CAUTION:

   Apply air gradually and allow low & reverse brake piston to come out evenly.



SCIA3651E

7. Remove D-rings from low & reverse brake piston.



SCIA4381E

INSPECTION

Low & Reverse Brake Snap Rings, Spring Retainer and Return Springs

- Check for deformation, fatigue or damage.
  If necessary, replace.
- **When replacing spring retainer and return springs, replace them as a set.**

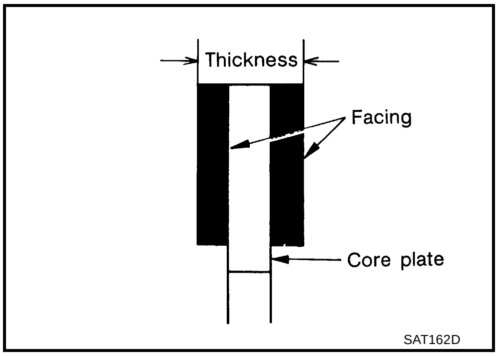
Low & Reverse Brake Drive Plate

- Check facing for burns, cracks or damage.
- Measure thickness of facing.

Thickness of drive plate

Standard:	**1.8 mm (0.071 in)**
Wear limit:	**1.6 mm (0.063 in)**

- If not within wear limit, replace.

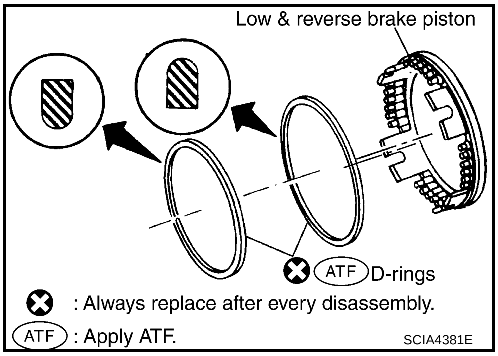


SAT162D

ASSEMBLY

1. Install D-rings on low & reverse brake piston.

   CAUTION:
   - **Do not reuse D-rings.**
   - **Apply ATF to D-rings.**

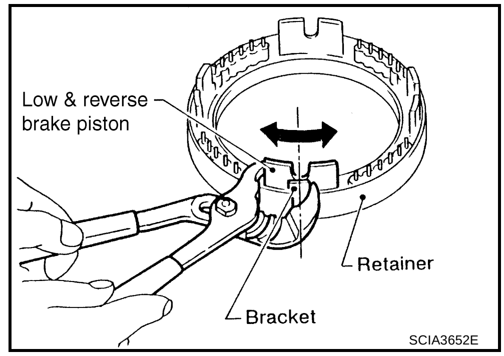


SCIA4381E

2. Set and align low & reverse brake piston with retainer.

CAUTION:

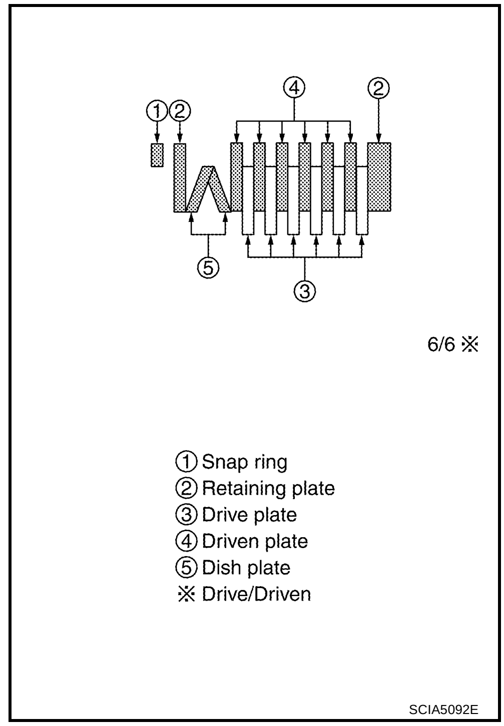
- **This operation is required in order to engage the protrusions of piston to return springs correctly.**
  Further procedures are given in AT-362, "ASSEMBLY" .
- **Apply ATF to surface of low & reverse brake piston and retainer.**



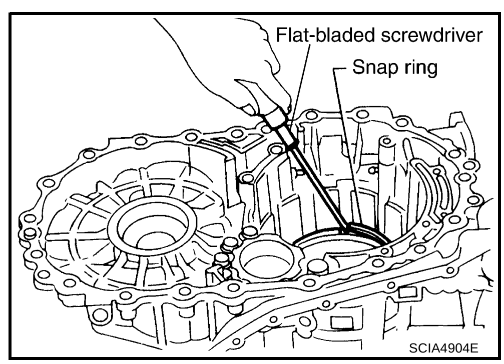
3. Install driven plates, drive plates, retaining plates and dish plates on transaxle case. Refer to AT-389, "LOW & REVERSE BRAKE" .

CAUTION:

Be careful with the order of plates and the direction of dish plates.



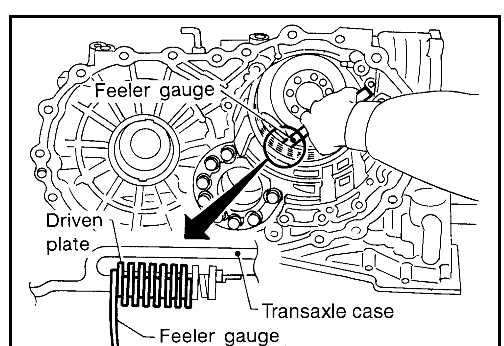
4. Install snap ring with flat-bladed screwdriver.



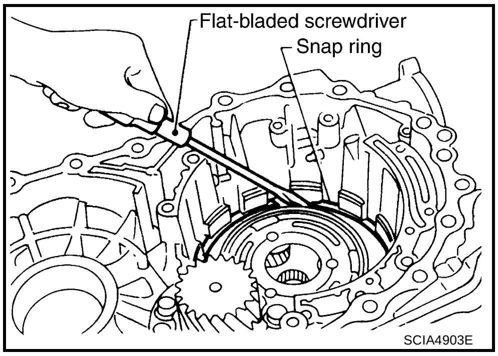
5. Measure clearance between retaining plate and transaxle case. If not within allowable limit, select proper retaining plate. (front side) Refer to AT-389, "LOW & REVERSE BRAKE" .

Specified clearance

Standard:	**1.7 - 2.1 mm (0.067 - 0.083 in)**
Allowable limit:	**3.3 mm (0.130 in)**



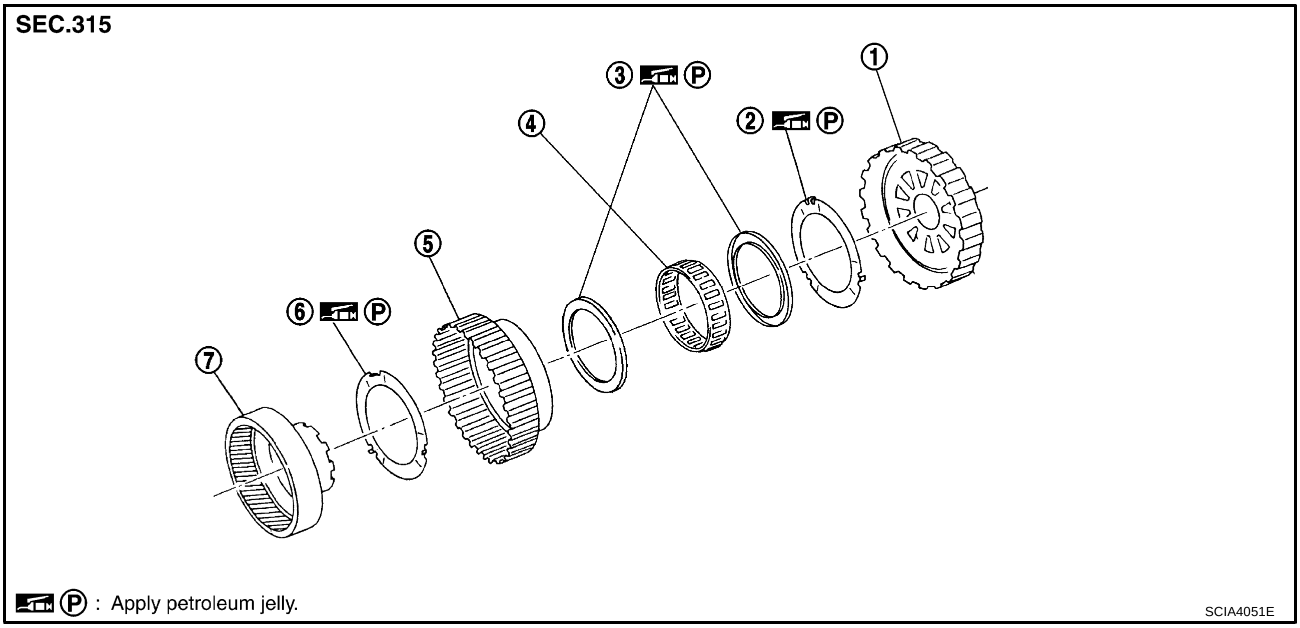
6. Install low & reverse brake piston (with retainer) and spring retainer on transaxle case.
7. Install snap ring with flat-bladed screwdriver.
8. Check operation of low & reverse brake. Refer to AT-338, "DISASSEMBLY" .



Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

ACS007VK

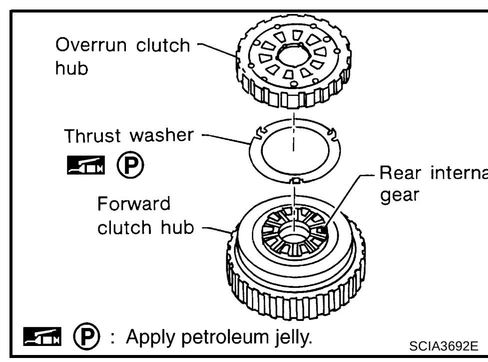
COMPONENTS



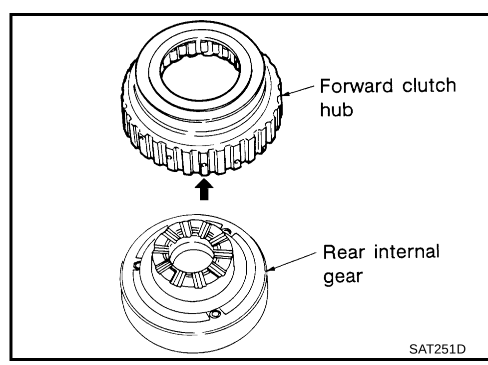
1.	Overrun clutch hub	2.	Thrust washer	3.	Bearing race
4.	Forward one-way clutch	5.	Forward clutch hub	6.	Thrust washer
7.	Rear internal gear				

DISASSEMBLY

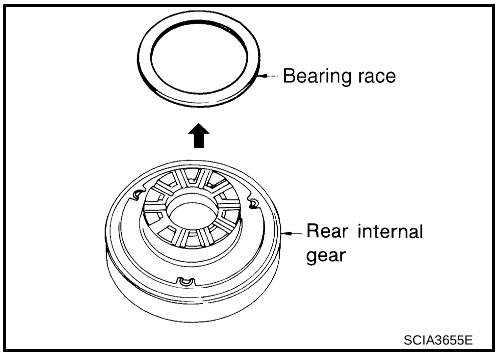
1. Remove overrun clutch hub and thrust washer from forward clutch hub.



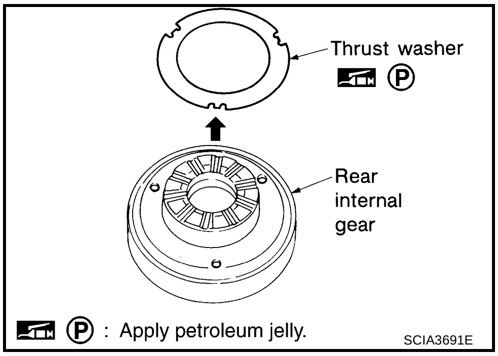
2. Remove forward clutch hub from rear internal gear.



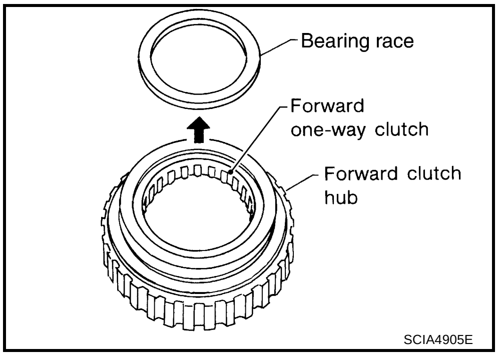
3. Remove bearing race from rear internal gear.



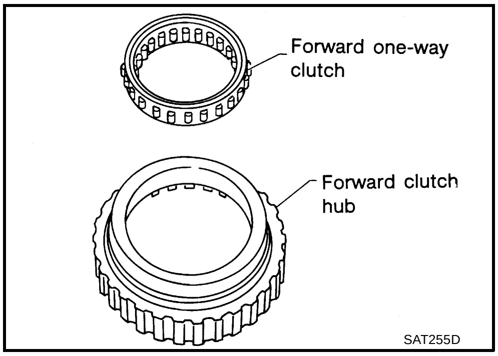
4. Remove thrust washer from rear internal gear.



5. Remove bearing race from forward one-way clutch.



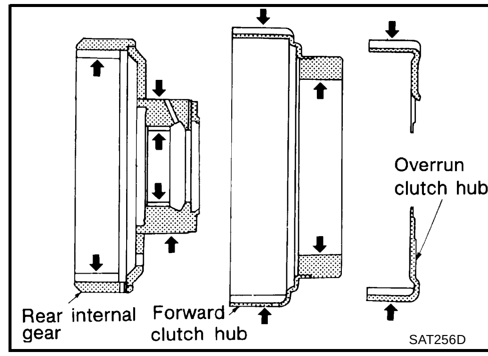
6. Remove forward one-way clutch from forward clutch hub.



INSPECTION

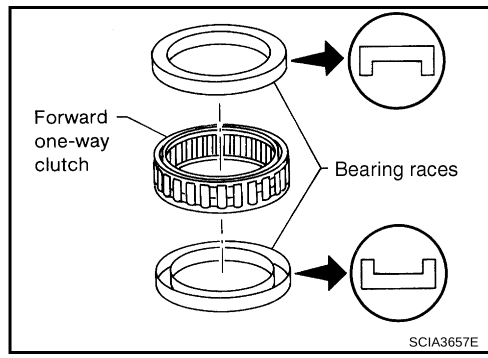
Rear Internal Gear, Forward Clutch Hub and Overrun Clutch Hub

- Check rubbing surfaces for wear or damage.



Bearing Races and Forward One-Way Clutch

- Check bearing races for deformation and damage.
- Check forward one-way clutch for wear and damage.

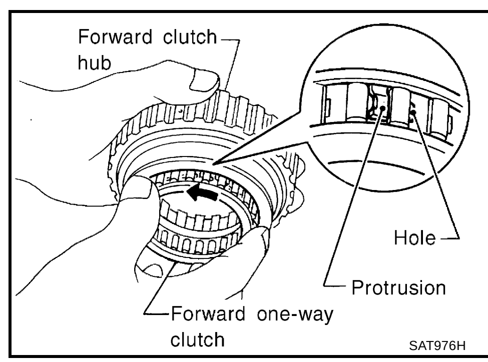


ASSEMBLY

1. Install forward one-way clutch on forward clutch hub.

   CAUTION:

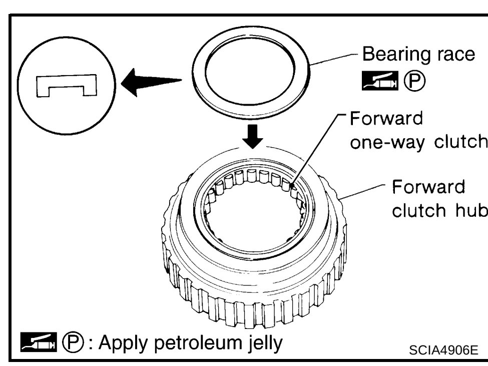
   Be careful with the direction of forward one-way clutch.



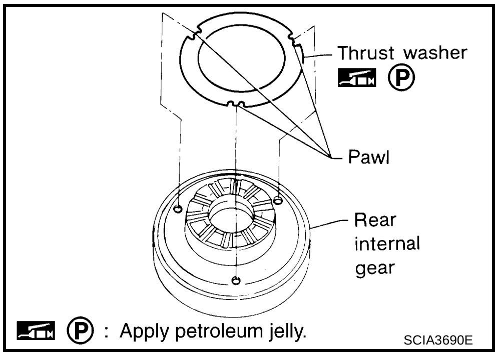
2. Install bearing race on forward one-way clutch.

   CAUTION:

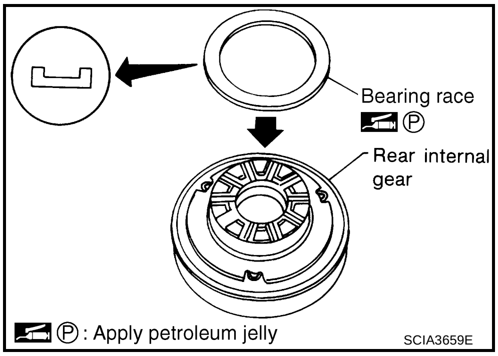
   Apply petroleum jelly to bearing race.



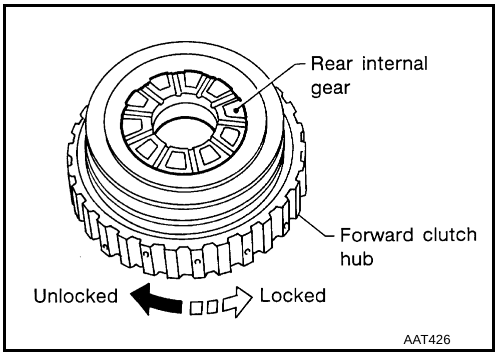
3. Install thrust washer on rear internal gear.
   CAUTION:
   - **Apply petroleum jelly to thrust washer.**
   - **Align pawls of thrust washer with holes of rear internal gear.**



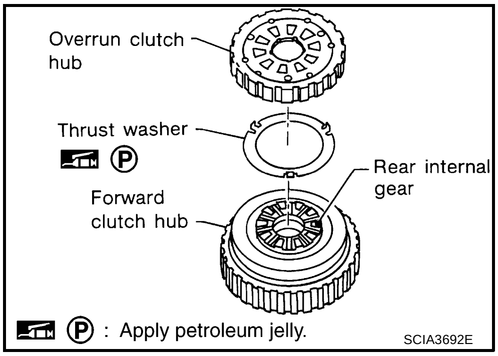
4. Install bearing race on rear internal gear.
   CAUTION:
   Apply petroleum jelly to bearing race.



5. Install forward clutch hub on rear internal gear.
   CAUTION:
   - **Check operation of forward one-way clutch.**
     Hold rear internal gear and turn forward clutch hub.
     Check forward clutch hub for correct locking and unlocking directions.
   - **If not as shown in figure, check installation direction of forward one-way clutch.**



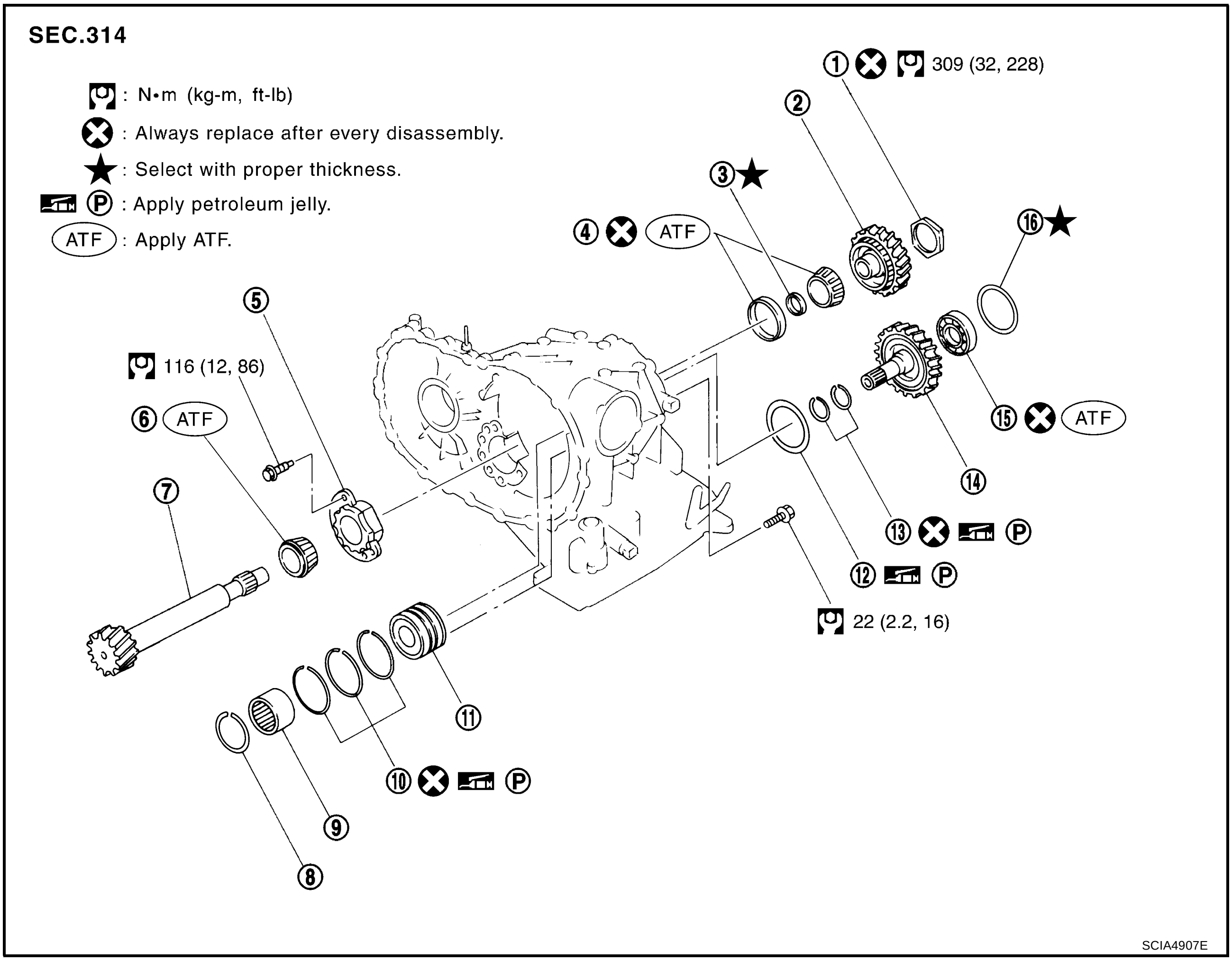
6. Install thrust washer and overrun clutch hub on forward clutch hub.
   CAUTION:
   - **Apply petroleum jelly to thrust washer.**
   - **Align pawls of thrust washer with holes of overrun clutch hub.**
   - **Align projections of rear internal gear with holes of overrun clutch hub.**



Output Shaft, Idler Gear, Reduction Pinion Gear and Bearing Retainer

ACS007VL

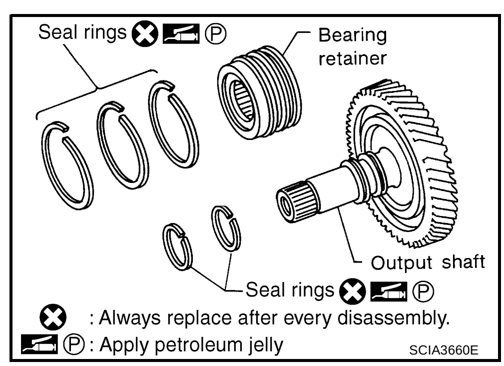
COMPONENTS



1.	Idler gear lock nut	2.	Idler gear	3.	Reduction pinion gear adjusting shim
4.	Idler gear bearing	5.	Reduction pinion gear bearing outer race	6.	Reduction pinion gear bearing inner race
7.	Reduction pinion gear	8.	Snap ring	9.	Radial needle bearing
10.	Seal ring	11.	Bearing retainer	12.	Needle bearing
13.	Seal ring	14.	Output shaft	15.	Output shaft bearing
16.	Output shaft adjusting shim				

DISASSEMBLY

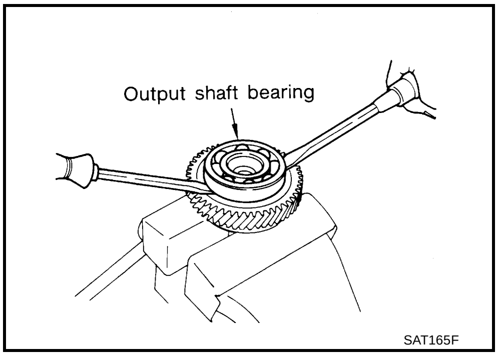
1. Remove seal rings from output shaft and bearing retainer.



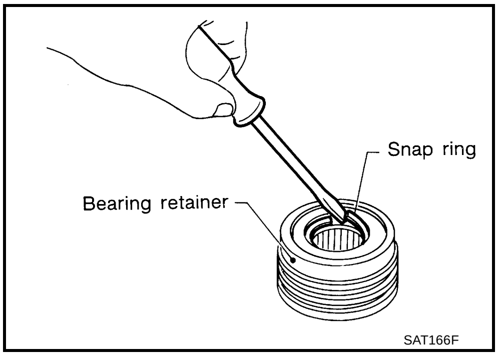
2. Remove output shaft bearing with flat-bladed screwdrivers.

CAUTION:

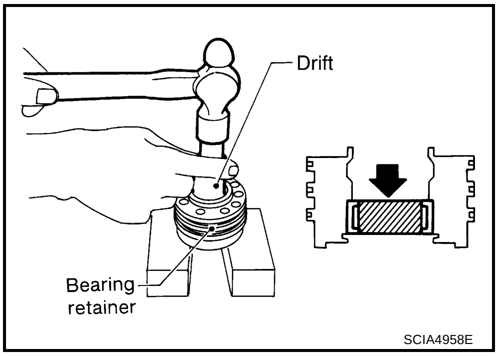
- **Always replace bearing with a new one when removed.**
- **Do not damage output shaft.**



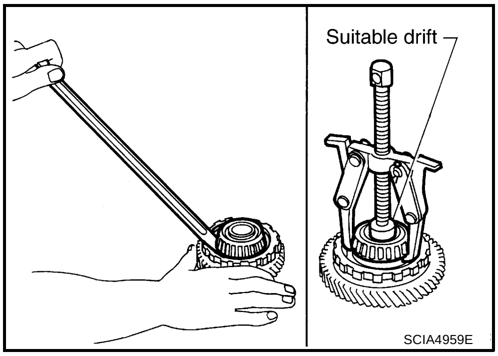
3. Remove snap ring from bearing retainer.



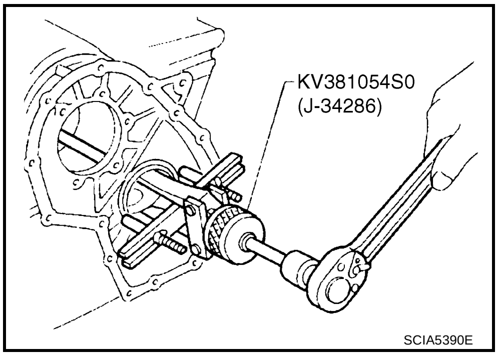
4. Remove radial needle bearing from bearing retainer.



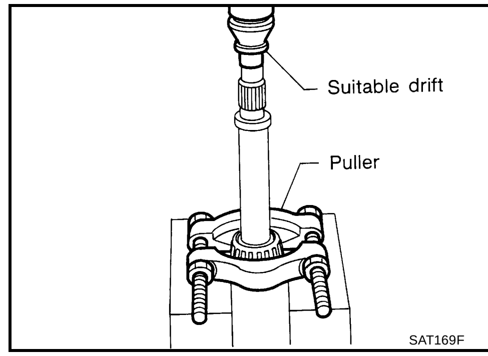
5. Remove idler gear bearing inner race from idler gear.



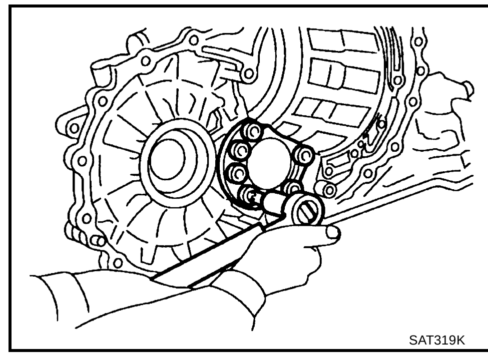
6. Remove idler gear bearing outer race from transaxle case.



7. Press out reduction pinion gear bearing inner race from reduction pinion gear.



8. Remove reduction pinion gear bearing outer race from transaxle case.



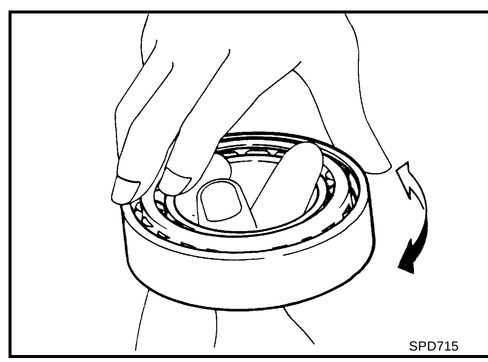
INSPECTION

Output Shaft, Idler Gear and Reduction Pinion Gear

- Check shafts for cracks, wear or bending.
- Check gears for wear, chips and cracks.

Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



Seal Ring Clearance

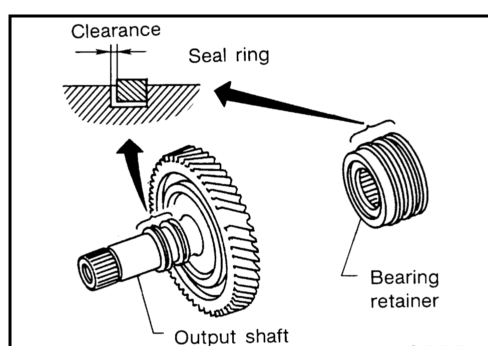
- Install new seal rings to output shaft.
- Measure clearance between seal ring and ring groove of output shaft.

Standard clearance: 0.10 - 0.25 mm (0.0039 - 0.0098 in)
Allowable limit: 0.25 mm (0.0098 in)

- If not within allowable limit, replace output shaft.
- Install new seal rings to bearing retainer.
- Measure clearance between seal ring and ring groove of bearing retainer.

Standard clearance: 0.10 - 0.30 mm (0.0039 - 0.0118 in)
Allowable limit: 0.30 mm (0.0118 in)

- If not within allowable limit, replace bearing retainer.

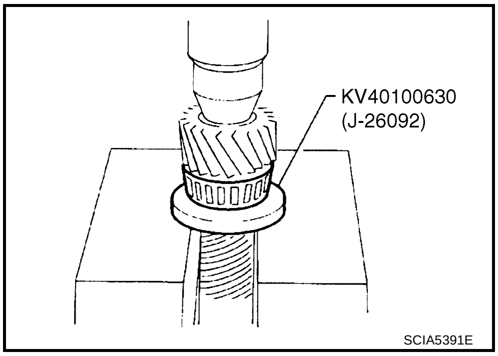


ASSEMBLY

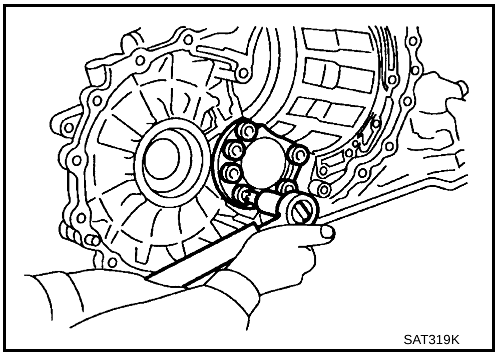
1. Press reduction pinion gear bearing inner race on reduction pinion gear.

   CAUTION:

   Apply ATF to reduction pinion gear bearing inner race.



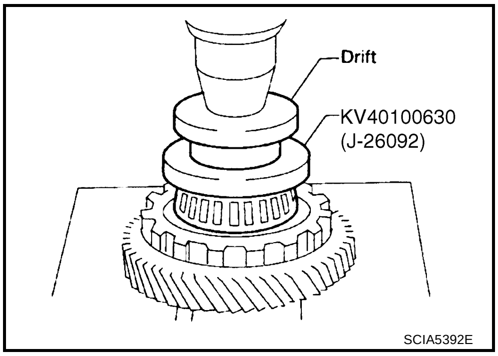
2. Install reduction pinion gear bearing outer race on transaxle case. Refer to AT-346, "COMPONENTS" .
3. Checking reduction pinion gear bearing preload. Refer to AT-364, "REDUCTION PINION GEAR BEARING PRELOAD" .



4. Press idler gear bearing inner race on idler gear.

   CAUTION:

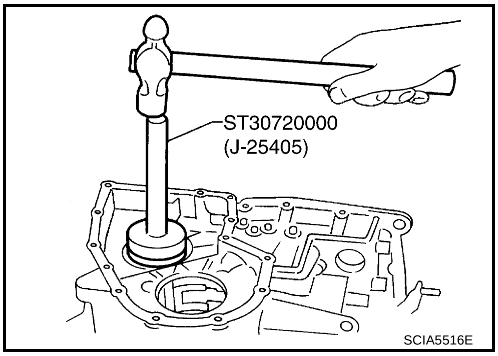
   - **Do not reuse idler gear bearing.**
   - **Apply ATF to idler gear bearing.**



5. Install idler gear bearing outer race on transaxle case.

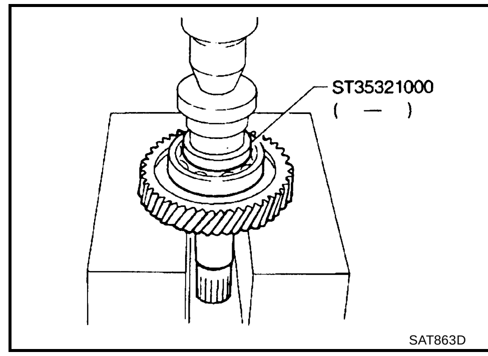
   CAUTION:

   - **Do not reuse idler gear bearing.**
   - **Apply ATF to idler gear bearing.**



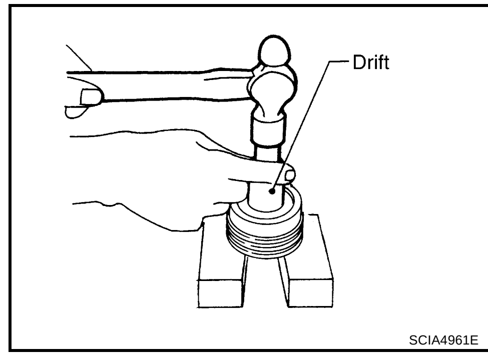
6. Press output shaft bearing on output shaft.

   CAUTION:
   - **Do not reuse output shaft bearing.**
   - **Apply ATF to output shaft bearing.**



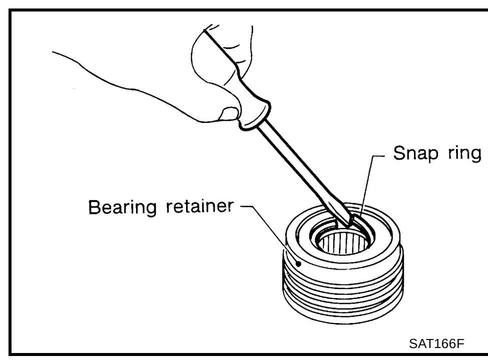
SAT863D

7. Press radial needle bearing on bearing retainer.



SCIA4961E

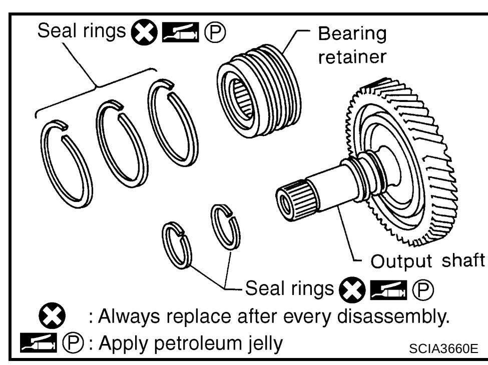
8. Install snap ring to bearing retainer.



SAT166F

9. After packing ring grooves with petroleum jelly, carefully install new seal rings on output shaft and bearing retainer.

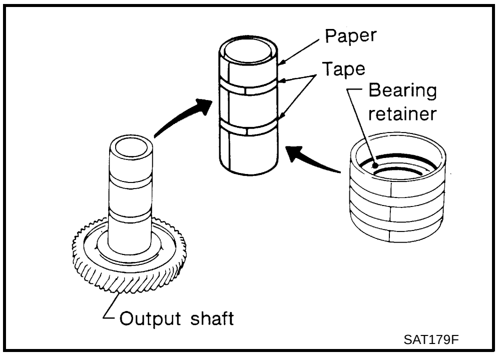
   CAUTION:
   - **Do not reuse seal rings.**
   - **Apply petroleum jelly to seal rings.**



SCIA3660E

CAUTION:

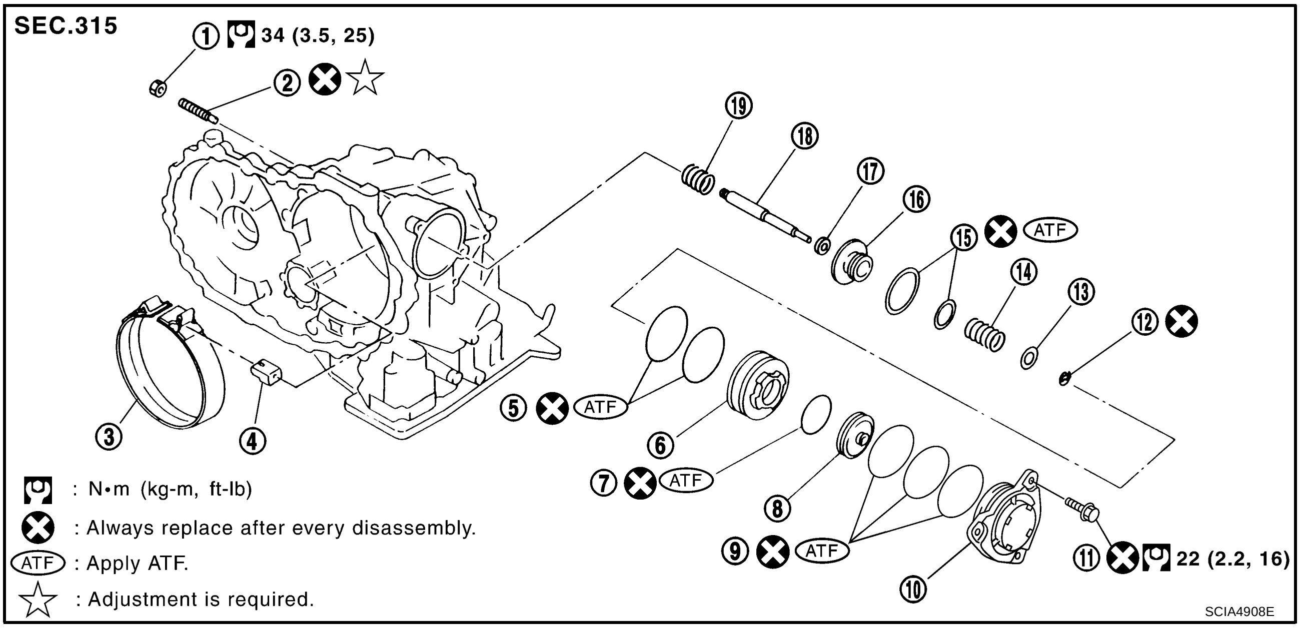
Roll paper around seal rings to prevent seal rings from spreading.



Band Servo Piston Assembly

ACS007VM

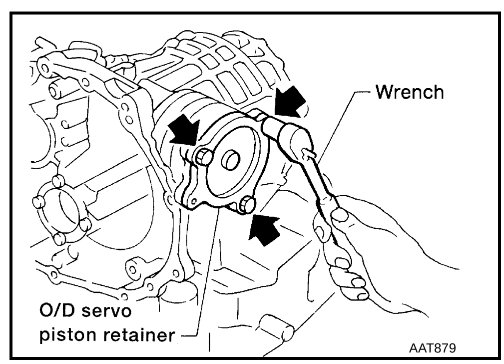
COMPONENTS



1. Lock nut
2. Anchor end pin
3. Brake band
4. Strut
5. O-ring
6. Servo piston retainer
7. D-ring
8. O/D servo piston
9. O-ring
10. O/D servo piston retainer
11. O/D servo piston retainer fitting bolt
12. E-ring
13. Spring retainer
14. O/D servo return spring
15. D-ring
16. Band servo piston
17. Band servo thrust washer
18. Band servo piston stem
19. 2nd servo return spring

DISASSEMBLY

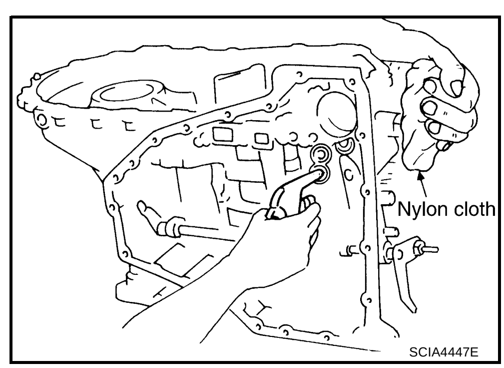
1. Remove O/D servo piston retainer fitting bolts.



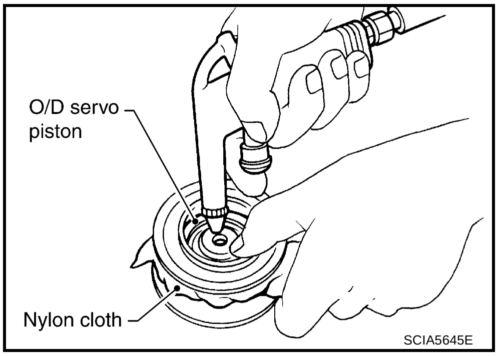
2. Apply compressed air to oil hole in transaxle case to remove O/D servo piston retainer and band servo piston assembly.

   CAUTION:

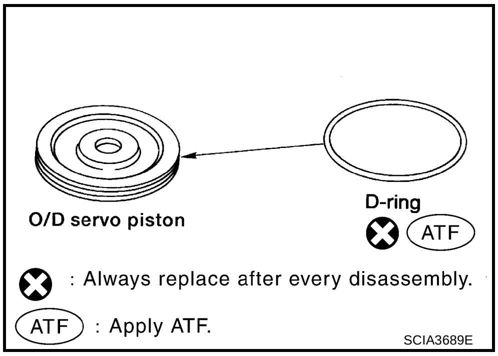
   Hold band servo piston assembly with a rag or nylon waste.
3. Remove 2nd servo return spring from transaxle case.



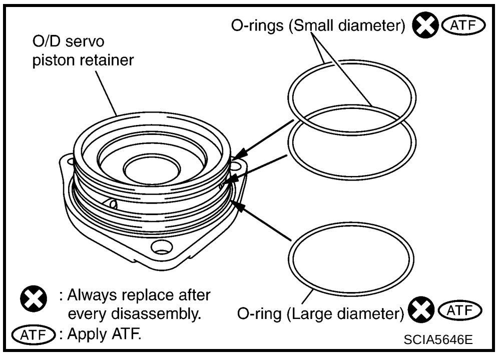
4. Apply compressed air to oil hole in O/D servo piston retainer to remove O/D servo piston from O/D servo piston retainer.
   CAUTION:
   Hold O/D servo piston while applying compressed air.



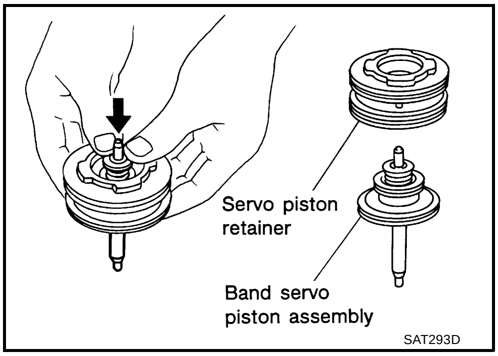
5. Remove D-ring from O/D servo piston.



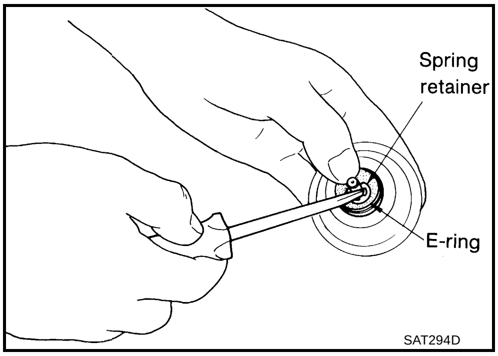
6. Remove O-rings from O/D servo piston retainer.



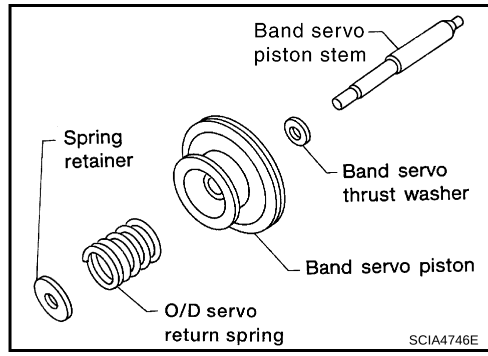
7. Remove band servo piston assembly from servo piston retainer by pushing it forward.



8. Place band servo piston stem end on a wooden block. While pushing spring retainer down, remove E-ring.

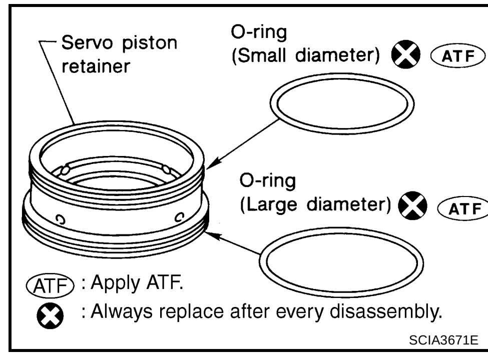


9. Remove spring retainer, O/D servo return spring, band servo thrust washer and band servo piston stem from band servo piston.



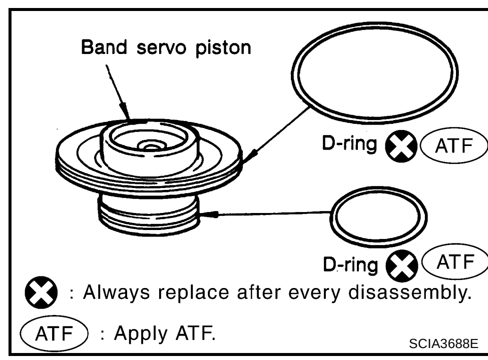
SCIA4746E

10. Remove O-rings from servo piston retainer.



SCIA3671E

11. Remove D-rings from band servo piston.



SCIA3688E

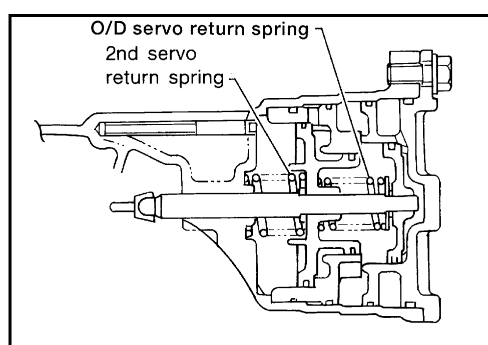
INSPECTION

Pistons, Retainers and Piston Stem

- Check frictional surfaces for abnormal wear or damage.

Return Springs

- Check for deformation or damage.
- Measure free length and outer diameter. Refer to AT-391, "Band Servo" .



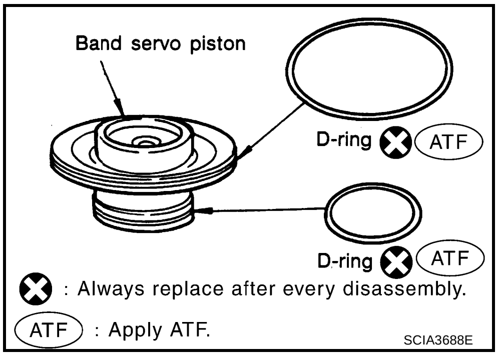
AAT884

ASSEMBLY

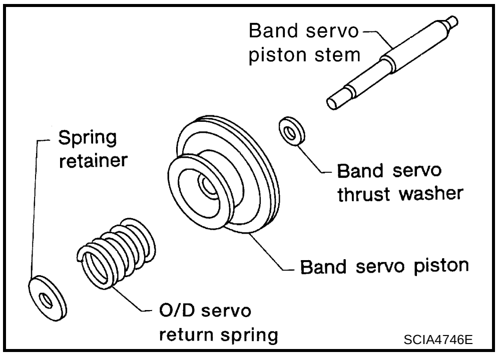
1. Install D-rings to band servo piston.

   CAUTION:

   - **Do not reuse D-rings.**
   - **Apply ATF to D-rings.**
   - **Pay attention to position of each D-rings.**



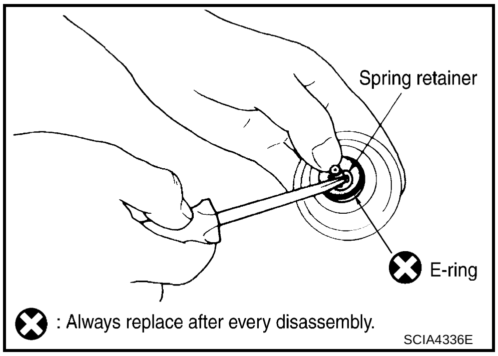
2. Install band servo piston stem, band servo thrust washer, O/D servo return spring and spring retainer to band servo piston.



3. Place band servo piston stem end on a wooden block. While pushing spring retainer down, install E-ring.

   CAUTION:

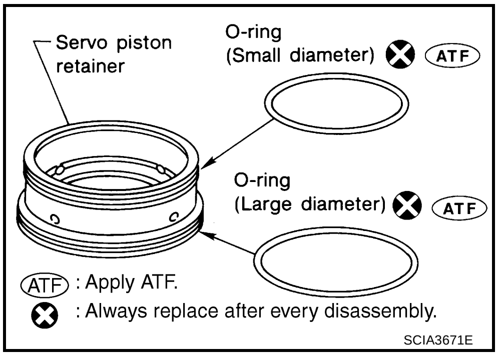
   Do not reuse E-ring.



4. Install O-rings to servo piston retainer.

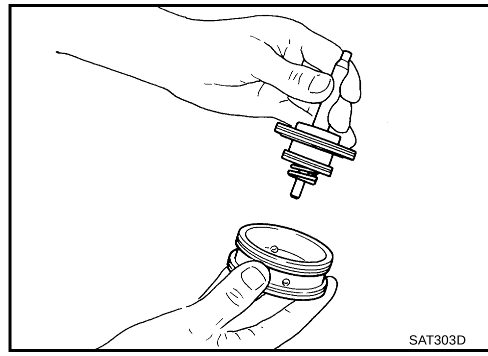
   CAUTION:

   - **Do not reuse O-rings.**
   - **Apply ATF to O-rings.**
   - **Pay attention to position of each O-rings.**



A B AT D E F G H I J K L M

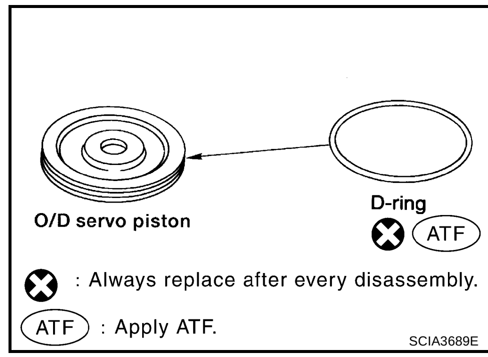
5. Install band servo piston assembly to servo piston retainer by pushing it inward.


SAT303D

6. Install D-ring to O/D servo piston.

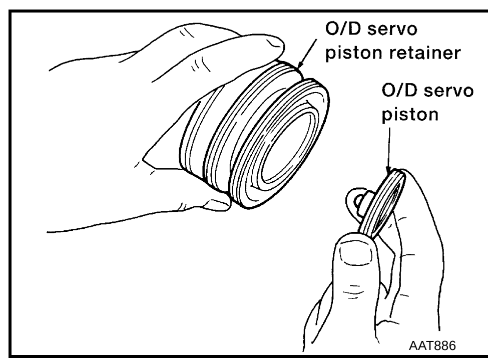
CAUTION:

- **Do not reuse D-ring.**
- **Apply ATF to D-ring.**



SCIA3689E

7. Install O/D servo piston to O/D servo piston retainer fitting the installation direction on it.

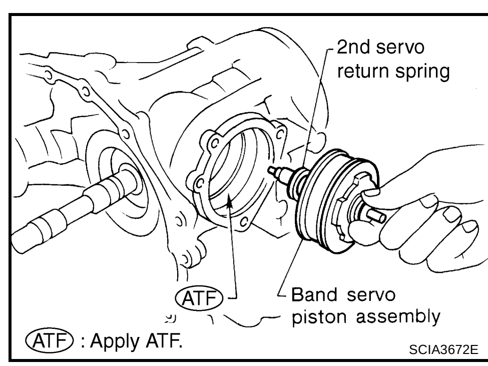


AAT886

8. Install band servo piston assembly and 2nd servo return spring to transaxle case.

CAUTION:

Apply ATF to O-rings of band servo piston assembly and transaxle case.

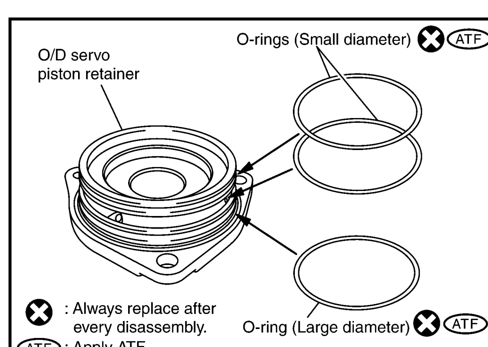


SCIA3672E

9. Install O-rings to O/D servo piston retainer.

CAUTION:

- **Do not reuse O-rings.**
- **Apply ATF to O-rings.**
- **Pay attention to position of each O-rings.**

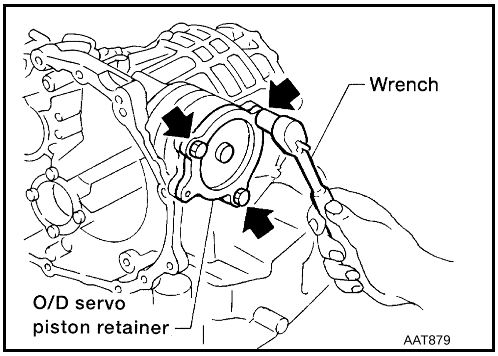


SCIA5646E

10. Install O/D servo piston retainer to transaxle case. Refer to AT-352, "COMPONENTS" .

    CAUTION:

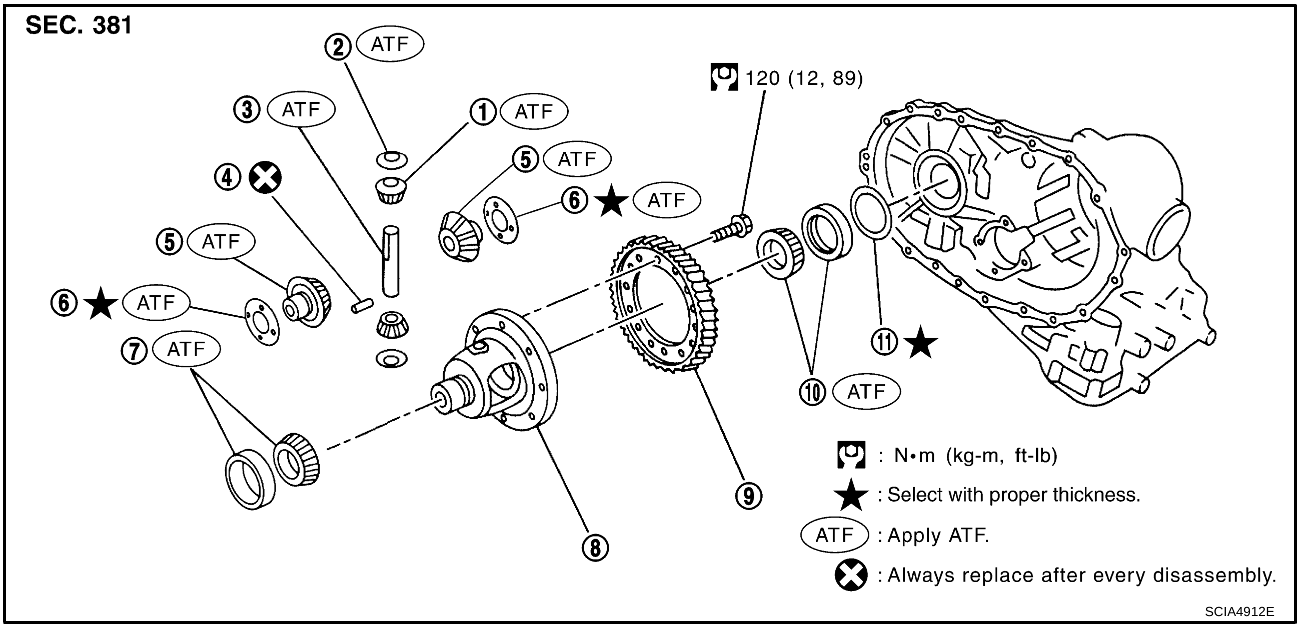
    - **Do not reuse O/D servo piston retainer fitting bolts.**
    - **Apply ATF to O-rings of O/D servo piston retainer and transaxle case.**



Final Drive

ACS007VN

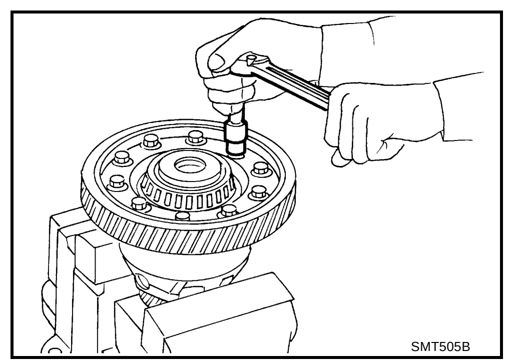
COMPONENTS



1. Pinion mate gear
2. Pinion mate gear thrust washer
3. Pinion mate shaft
4. Lock pin
5. Side gear
6. Side gear thrust washer
7. Differential side bearing
8. Differential case
9. Final gear
10. Differential side bearing
11. Differential side bearing adjusting shim

DISASSEMBLY

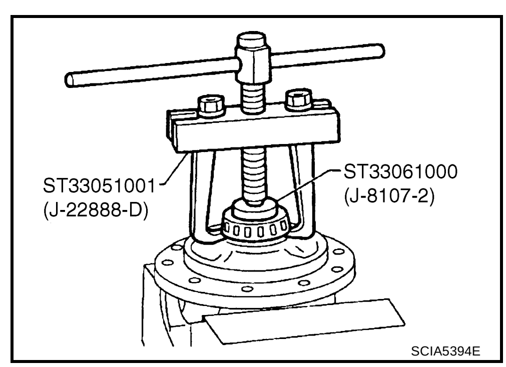
1. Remove final gear.



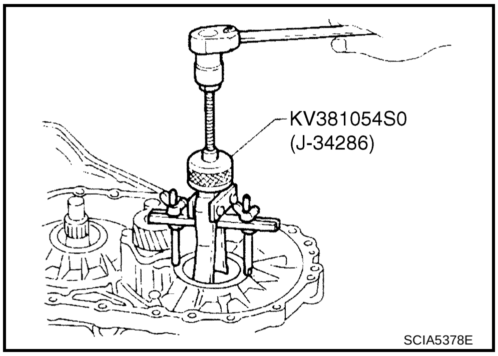
2. Press out differential side bearings.

   CAUTION:

   Be careful not to mix up the right and left bearings.

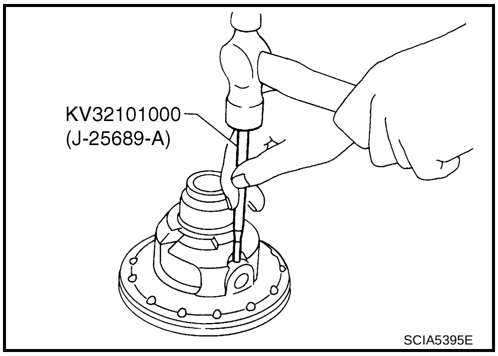


3. Remove differential side bearing outer race and differential side bearing adjusting shim from transaxle case.



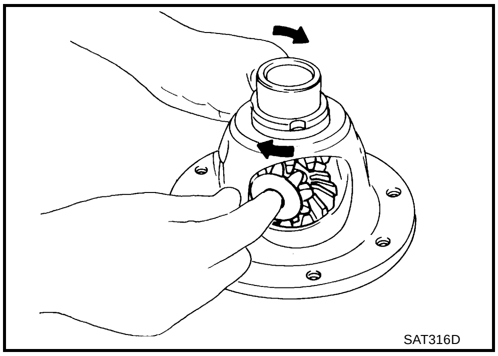
SCIA5378E

4. Drive out lock pin.



SCIA5395E

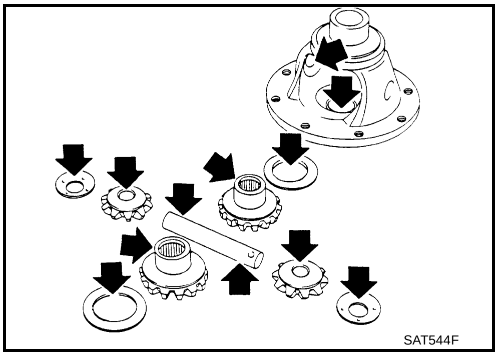
5. Draw out pinion mate shaft.
6. Remove pinion mate gears, pinion mate gear thrust washers, side gears and side gear thrust washers.


SAT316D

INSPECTION

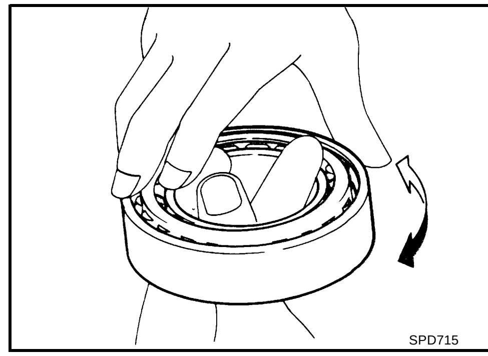
Gears, Washers, Pinion Mate Shaft and Differential Case

- Check mating surfaces of differential case, side gears, pinion mate gears and pinion mate shaft.
- Check washers for wear.


SAT544F

Bearings

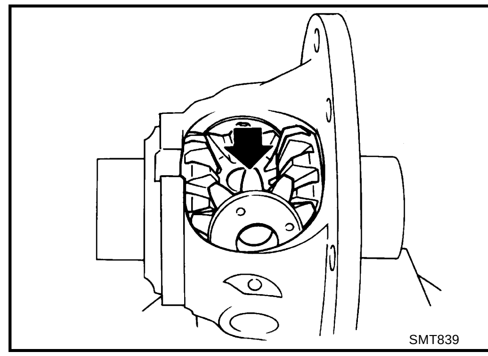
- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.
- **When replacing taper roller bearing, replace outer and inner race as a set.**



ASSEMBLY

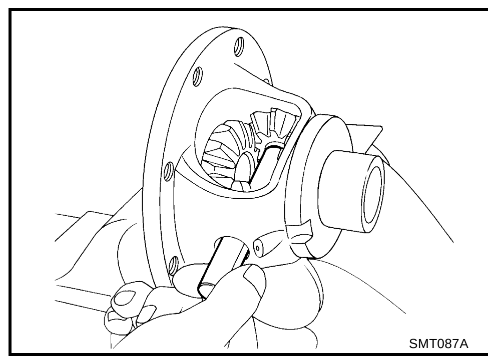
1. Attach side gear thrust washers to side gears, then install pinion mate thrust washers and pinion mate gears in place.

   CAUTION:
   Apply ATF to any parts.



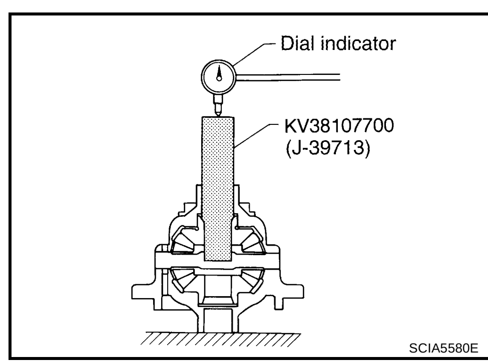
2. Insert pinion mate shaft.

   CAUTION:
   When inserting, be careful not to damage pinion mate gear thrust washers.



3. Measure clearance between side gear and differential case with washers following the procedure below:

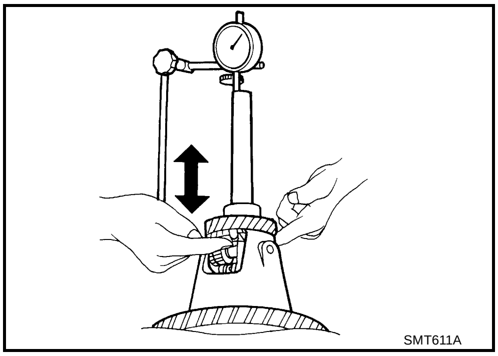
a. Set SST and dial indicator on side gear.



b. Move side gear up and down to measure dial indicator deflection. Always measure indicator deflection on both side gears.

Clearance between side gear and differential case with washer: 0.1 - 0.2 mm (0.004 - 0.008 in)

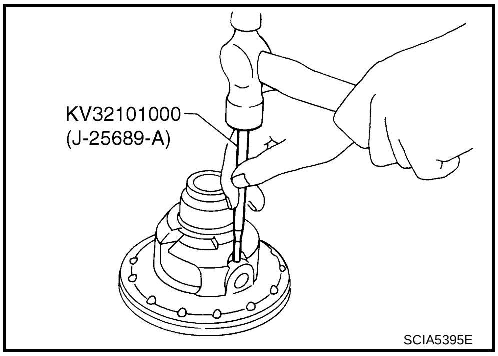
c. If not within specification, adjust clearance by changing thickness of differential side gear thrust washers. Refer to AT-389, "Final Drive" .



4. Install lock pin.

CAUTION:

- **Do not reuse lock pin.**
- **Make sure that lock pin is flush with case.**

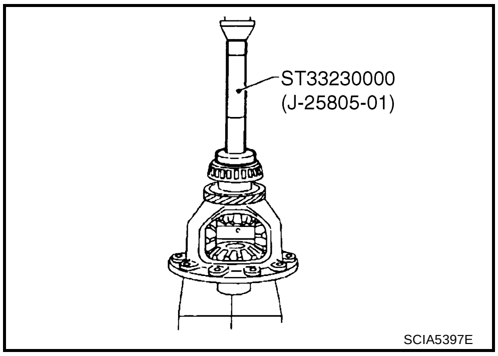


5. Press on differential side bearings.

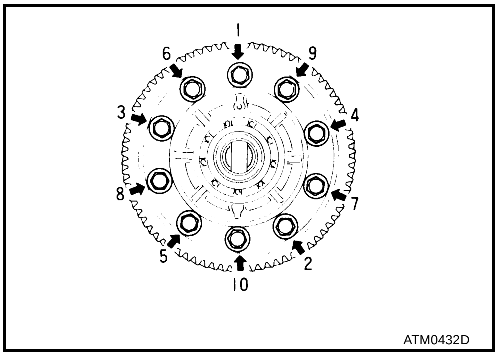
CAUTION:

Apply ATF to differential side bearings.

6. Install differential side bearing outer race and differential side bearing adjusting shim on transaxle case. Refer to AT-363, "Adjustment (1)" .



7. Tighten final gear and tighten fixing bolts to the specified torque in numerical order shown in the figure after temporarily tightening them. Refer to AT-358, "COMPONENTS" .



ASSEMBLY

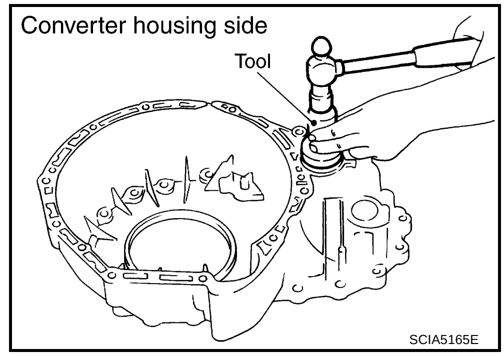
PFP:00000

Assembly (1)

ACS007VO

1. Install differential side oil seals on transaxle case and converter housing with tool.

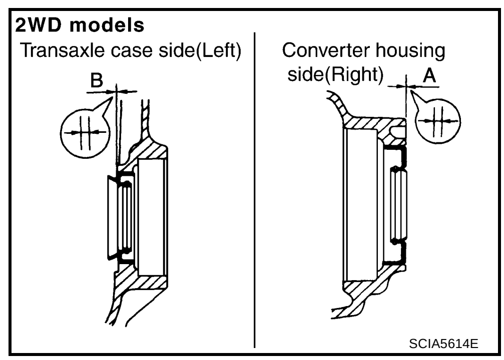
CAUTION:
- **Do not reuse differential side oil seals.**
- **Apply ATF to differential side oil seals.**



Drift to be used:

Location	2WD models	AWD models
Transaxle case side (Left) Tool number (Kent-Moore No.)	ST33400001 (J-26082)	ST33400001 (J-26082)
Converter housing side (Right) Tool number (Kent-Moore No.)	ST33400001 (J-26082)	KV40100621 (J-25273)

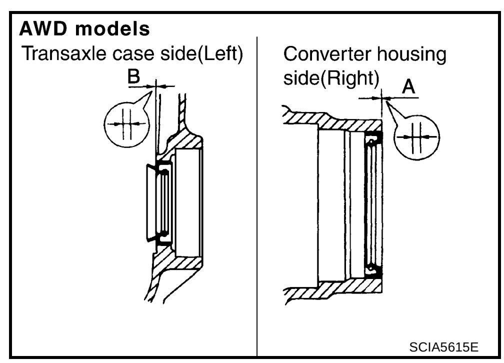
- Drive the differential side oil seals into the case until it become flush using the drift below. Refer to dimensions A and B.



Unit: mm (in)

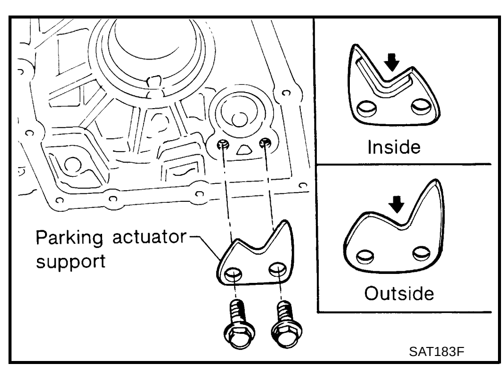
Dimensions A, B	0± 0.5 (0±0.020)

NOTE:
The differential side oil seal pulling direction is used as the reference.

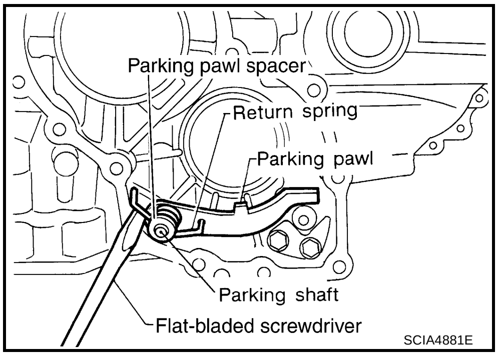


2. Install parking actuator support to transaxle case. Tighten parking actuator support bolts to the specified torque. Refer to AT-272, "Components" .

CAUTION:
Be careful with the direction of parking actuator support.



3. Install parking pawl on transaxle case and fix it with parking shaft.
4. Install return spring and parking pawl spacer.



SCIA4881E

Adjustment (1)

ACS007VP

DIFFERENTIAL SIDE BEARING PRELOAD

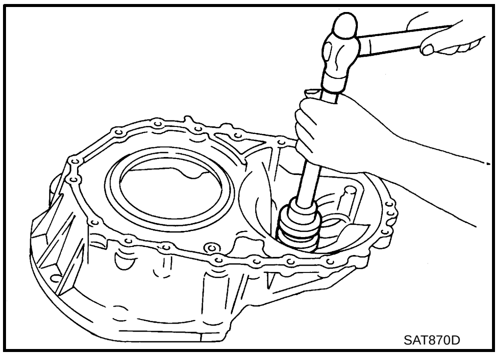
1. Install differential side bearing outer race without differential side bearing adjusting shim on transaxle case.

   CAUTION:

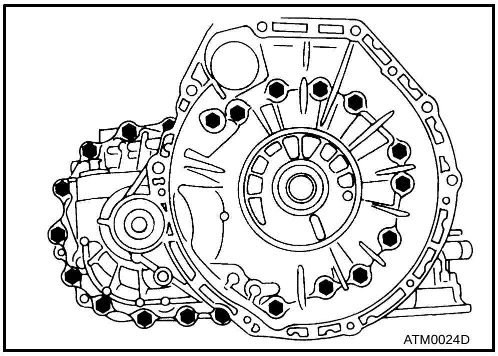
   Apply ATF to differential side bearing outer race.
2. Install differential side bearing outer race on converter housing.

   CAUTION:

   Apply ATF to differential side bearing outer race.

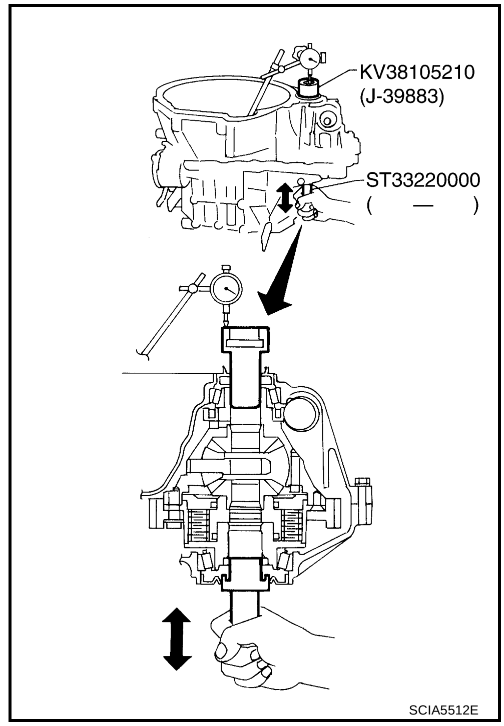

SAT870D

3. Place final drive assembly on transaxle case.
4. Install converter housing on transaxle case. Tighten converter housing mounting bolts to the specified torque. Refer to AT-272, "Components" .

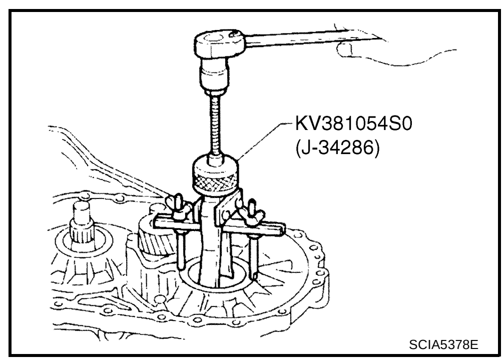

ATM0024D

5. Attach dial indicator on differential case at converter housing side.
6. Insert SST into differential side gear from transaxle case side.
7. Move SST up and down and measure dial indicator deflection.
8. Select proper thickness of differential side bearing adjusting shim(s). Refer to AT-390, "DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS" .
Suitable shim thickness = Dial indicator deflection + Specified bearing preload

Bearing preload: 0.05 - 0.09 mm (0.0020 - 0.0035 in)



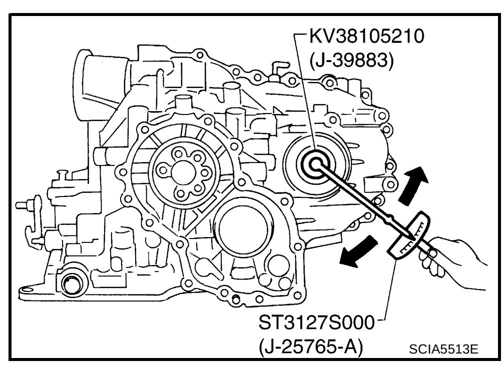
9. Remove converter housing from transaxle case.
10. Remove final drive assembly from transaxle case.
11. Remove differential side bearing outer race from transaxle case.
12. Reinstall differential side bearing outer race and differential side bearing adjusting shim selected from SDS table on transaxle case. Refer to AT-390, "DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS" .
13. Reinstall converter housing on transaxle case and tighten converter housing mounting bolts to the specified torque. Refer to AT-272, "Components" .



14. Insert SST and measure turning torque of final drive assembly.
   - **Turn final drive assembly in both directions several times to seat bearing rollers correctly.**

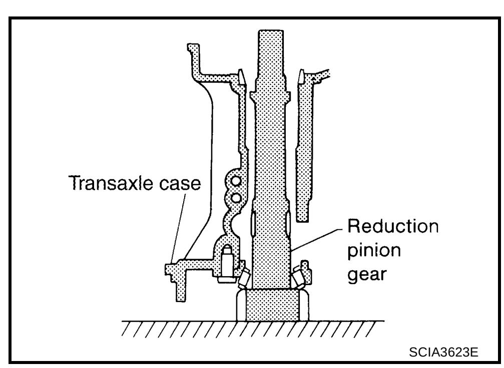
   Turning torque of final drive assembly (New bearing):
   0.78 - 1.37 N·m (8.0 - 14.0 kg-cm, 6.9 - 12.2 in-lb)

   - **When old bearing is used again, turning torque will be slightly less than the above.**
   - **Make sure torque is within the specified range.**



REDUCTION PINION GEAR BEARING PRELOAD

1. Remove converter housing and final drive assembly from transaxle case.
2. Select proper thickness of reduction pinion gear adjusting shim using the following procedures.
a. Place reduction pinion gear on transaxle case as shown.

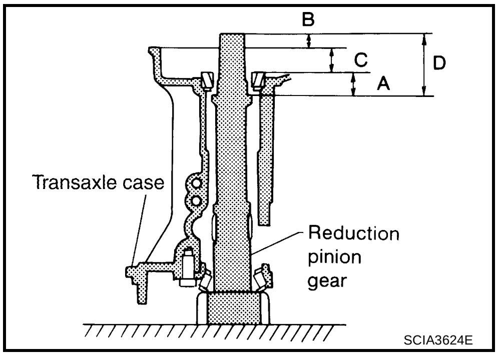


b. Place idler gear bearing on transaxle case.

c. Measure dimensions “B” “C” and “D” and calculate dimension “A”.

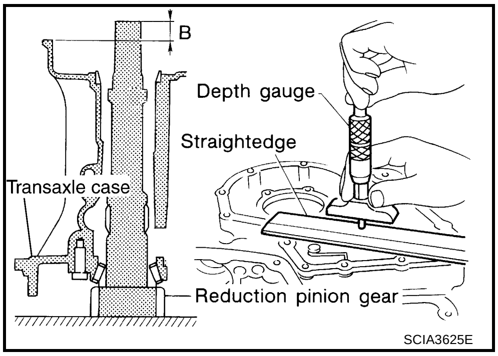
A = D – (B + C)

“A”: Distance between the surface of idler gear bearing inner race and the adjusting shim mating surface of reduction pinion gear.



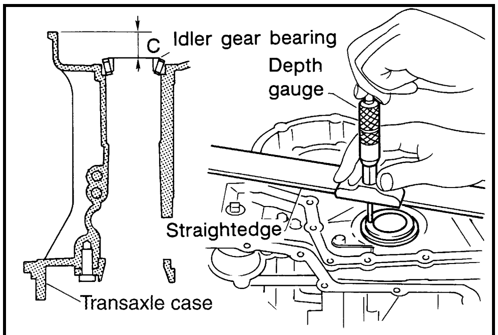
SCIA3624E

- Measure dimension “B” between the end of reduction pinion gear and the surface of transaxle case.
- **Measure dimension “B” in at least two places.**



SCIA3625E

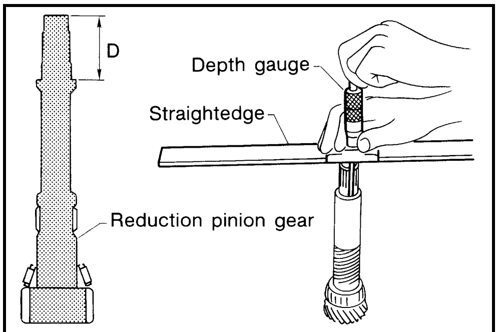
- Measure dimension “C” between the surface of idler gear bearing inner race and the surface of transaxle case.
- **Measure dimension “C” in at least two places.**



SCIA3626E

- Measure dimension “D” between the end of reduction pinion gear and the adjusting shim mating surface of reduction pinion gear.
- **Measure dimension “D” in at least two places.**
- Calculate dimension “A”.

A = D – (B + C)



SAT336DA

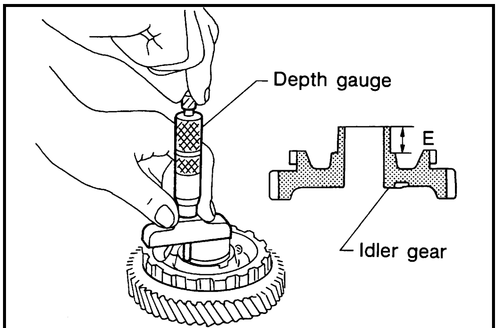
d. Measure dimension “E” between the end of idler gear and idler gear bearing inner race mating surface of idler gear.

- **Measure dimension “E” in at least two places.**

e. Select proper thickness of reduction pinion gear adjusting shim. Refer to AT-391, "REDUCTION PINION GEAR ADJUSTING SHIMS" .

Proper shim thickness = A – E – 0.05 mm (0.0020 in)*

(*: Bearing preload)

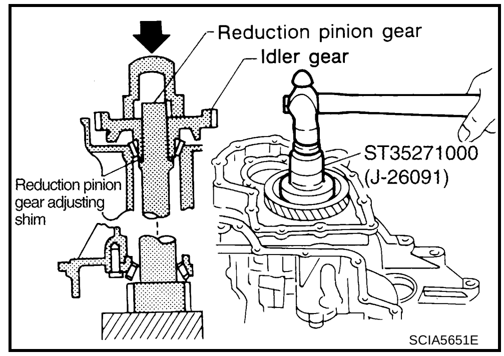


SAT337D

3. Install reduction pinion gear and reduction pinion gear adjusting shim selected in step 2-e on transaxle case.
4. Press idler gear bearing inner race on idler gear.

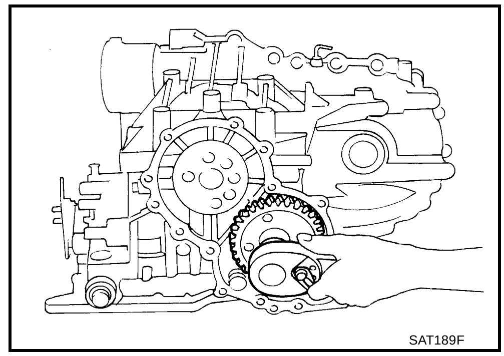
   CAUTION:
   - **Do not reuse idler gear bearing.**
   - **Apply ATF to idler gear bearing.**
5. Press idler gear on reduction pinion gear.

   CAUTION:
   Press idler gear until idler gear fully contacts adjusting shim.



6. Set manual shaft to “P” position to fix idler gear.
7. Tighten idler gear lock nut to the specified torque. Refer to AT-272, "Components" .

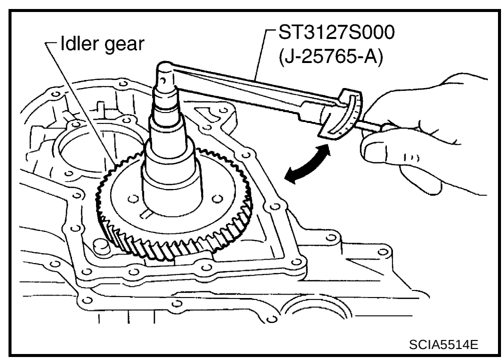
   CAUTION:
   Lock idler gear with parking pawl when tightening lock nut.



8. Measure turning torque of reduction pinion gear.
   - **When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.**

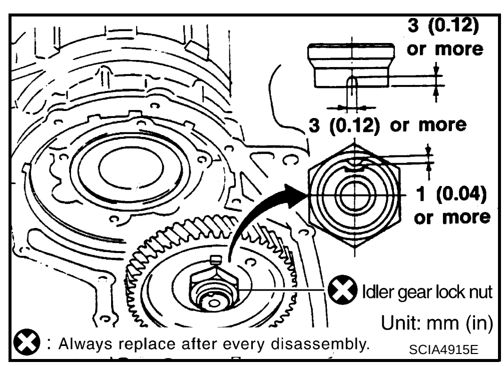
Turning torque of reduction pinion gear:	**0.05 - 0.39 N·m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb)**

   - **If turning torque is out of specification, decrease or increase thickness of reduction pinion gear adjusting shim.**



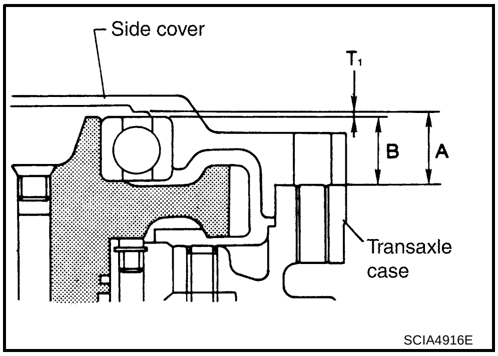
9. After properly adjusting turning torque, clinch idler gear lock nut as shown.

   CAUTION:
   Do not reuse idler gear lock nut.

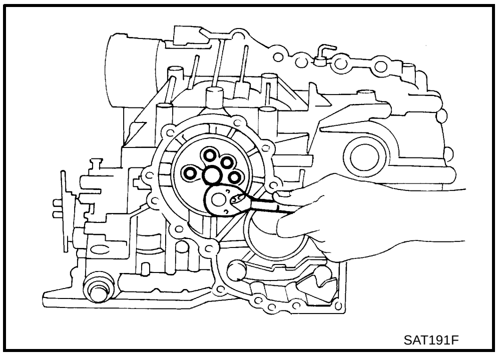


OUTPUT SHAFT END PLAY

- Measure clearance between side cover and the end of the output shaft bearing.
- Select proper thickness of output shaft adjusting shim so that clearance is within specifications.

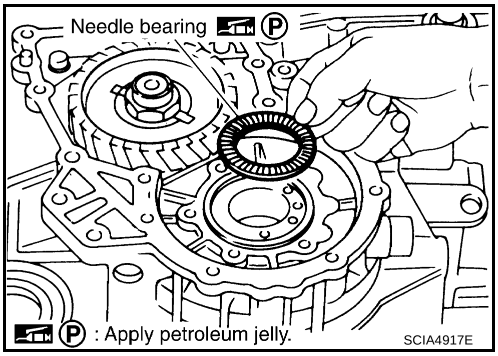


1. Install bearing retainer for output shaft. Refer to AT-272, "Components" .

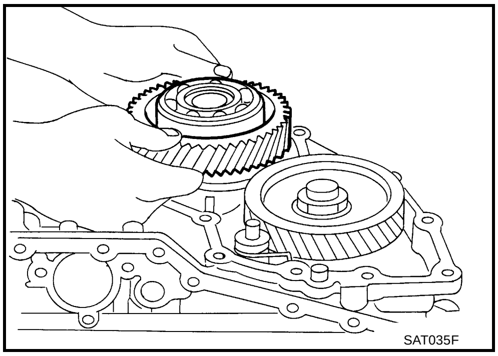


2. Install needle bearing on bearing retainer.

   CAUTION:
   - **Apply petroleum jelly to needle bearing.**
   - **Be careful with the direction of needle bearing.**



3. Install output shaft on transaxle case.

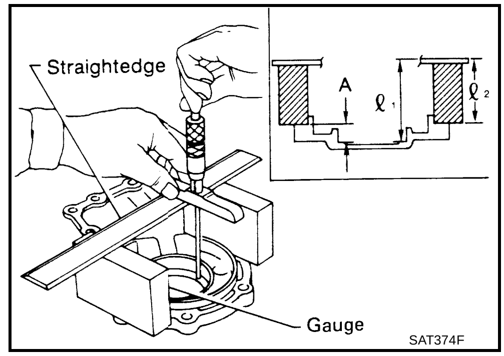


4. Measure dimensions "ℓ_1" and "ℓ_2" at side cover and then calculate dimension "A".
   - Measure dimension "ℓ_1" and "ℓ_2" in at least two places.

     "A": Distance between transaxle case fitting surface and adjusting shim mating surface.

     A = ℓ_1 – ℓ_2

     ℓ_2: Height of gauge

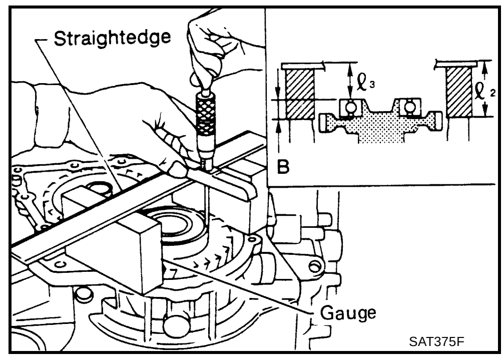


5. Measure dimensions "ℓ_2" and "ℓ_3" and then calculate dimension "B".
   - Measure dimension "ℓ_2" and "ℓ_3" in at least two places.

     "B": Distance between the end of output shaft bearing outer race and the side cover fitting surface of transaxle case.

     B = ℓ_2 – ℓ_3

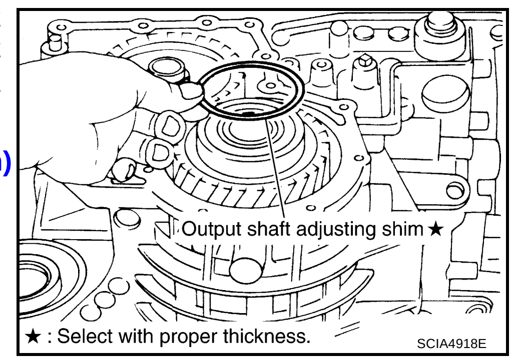
     ℓ_2: Height of gauge



6. Select proper thickness of output shaft adjusting shim so that output shaft end play (clearance between side cover and output shaft bearing) is within specifications. Refer to AT-392, "OUTPUT SHAFT ADJUSTING SHIMS" .

   Output shaft end play (A – B): 0 - 0.15 mm (0 - 0.0059 in)

7. Install output shaft adjusting shim on output shaft bearing.



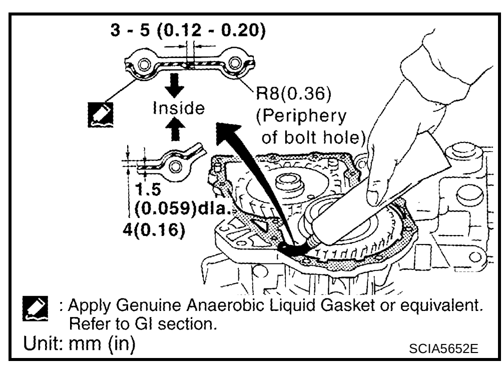
Assembly (2)

ACS007VQ

1. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .) to transaxle case as shown in figure.

   CAUTION:

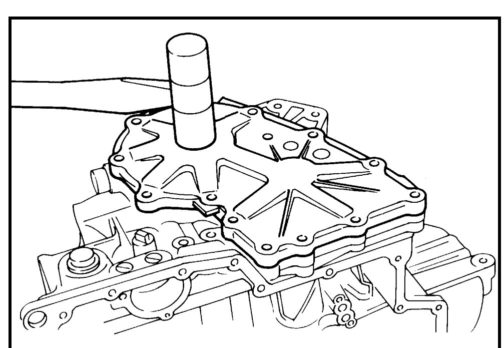
   Completely remove all moisture, oil and old sealant, etc. from the transaxle case and side cover mounting surface.



2. Fit mounting part of output shaft bearing on side cover to output shaft bearing, and after adjusting knock pin position, install it with light taps of a soft hammer and things like that.

   CAUTION:

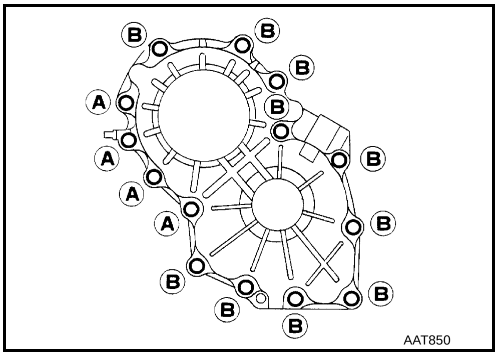
   When installing, to avoid getting damaged and deformed, set mounting part straight to parallel with the mounting surface.



3. Tighten side cover fitting bolts to specified torque. Refer to AT-272, "Components" .

CAUTION:

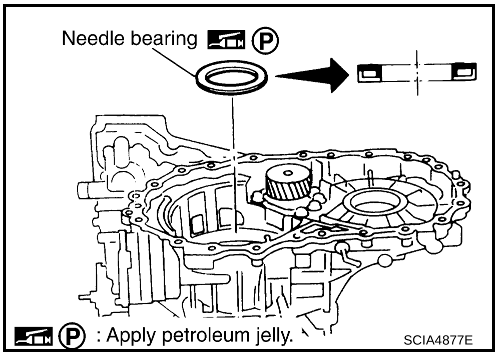
- **Do not mix bolts A and B.**
- **Always replace bolts A as they are self-sealing bolts.**



4. Install needle bearing on transaxle case.

CAUTION:

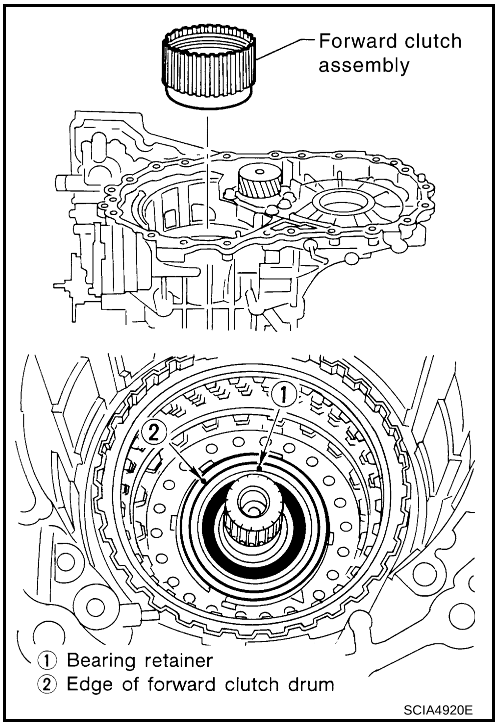
- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



5. Install forward clutch assembly.

CAUTION:

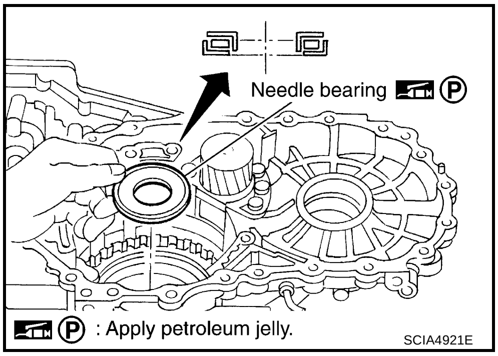
- **Align teeth of low & reverse brake before installing.**
- **Make sure that bearing retainer seal rings are not spread.**
- **If forward clutch assembly is correctly seated, points 1 and 2 are at almost same level.**



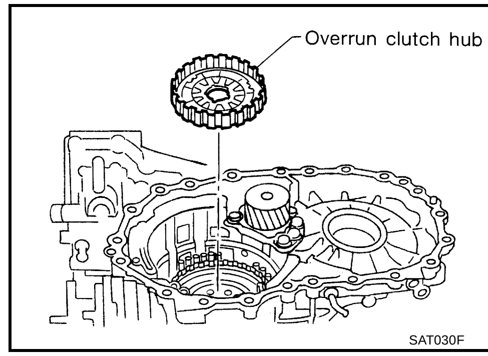
6. Install needle bearing.

CAUTION:

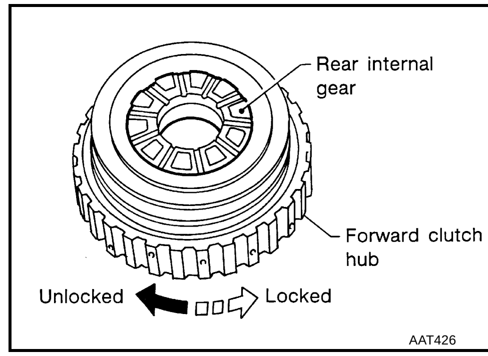
- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



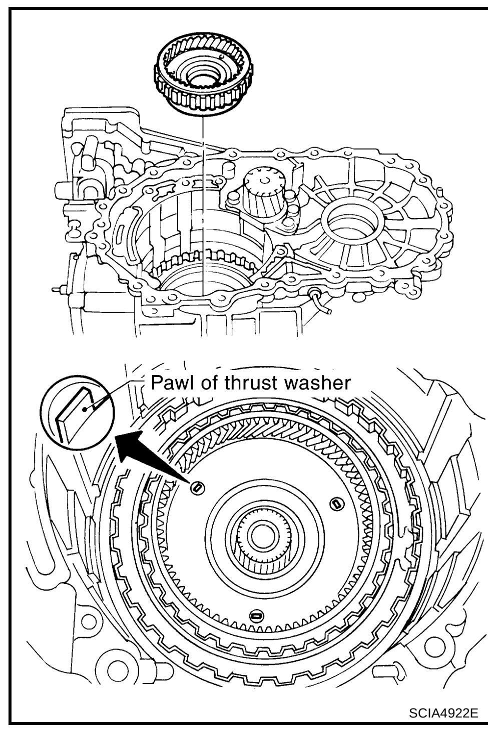
7. Install overrun clutch hub.
   CAUTION:
   Align teeth of overrun clutch before installing.



8. Check operation of forward one-way clutch.
   CAUTION:
   - **Hold rear internal gear and turn forward clutch hub. Check forward clutch hub for correct locking and unlocking directions.**
   - **If not as shown in figure, check installation direction of forward one-way clutch.**

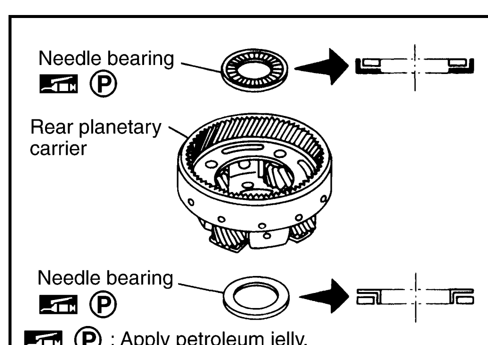


9. Install forward clutch hub and rear internal gear on transaxle case.
   CAUTION:
   - **Align teeth of forward clutch before installing.**
   - **Make sure that three pawls of thrust washer are correctly aligned after installing.**



10. Install rear planetary carrier and rear sun gear according to the following procedures.

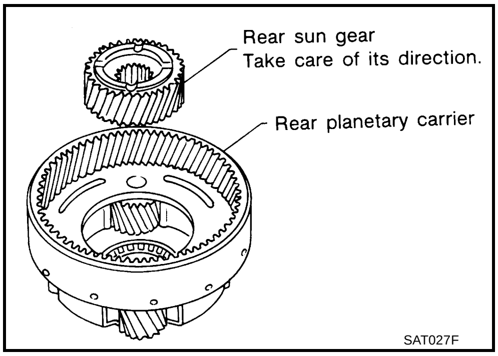
a. Install needle bearings on rear planetary carrier.
   CAUTION:
   - **Apply petroleum jelly to needle bearings.**
   - **Be careful with the direction of needle bearings.**



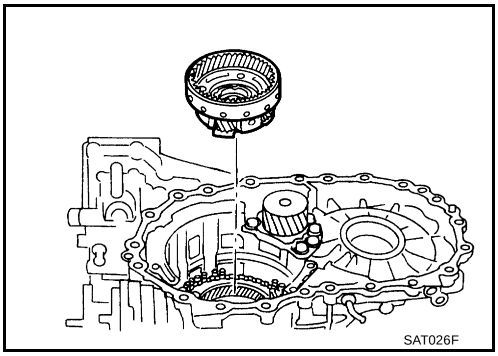
b. Install rear sun gear on rear planetary carrier.

CAUTION:

Be careful with the direction of rear sun gear.



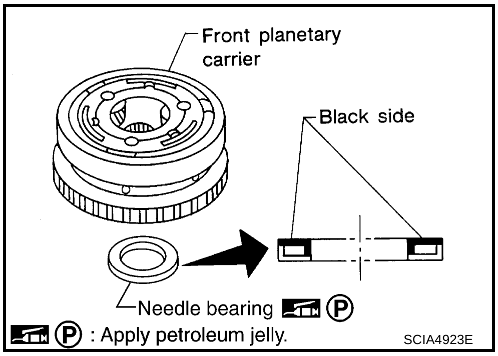
c. Install rear planetary carrier (with rear sun gear) on transaxle case.



11. Install needle bearing on front planetary carrier, then install them together on transaxle case.

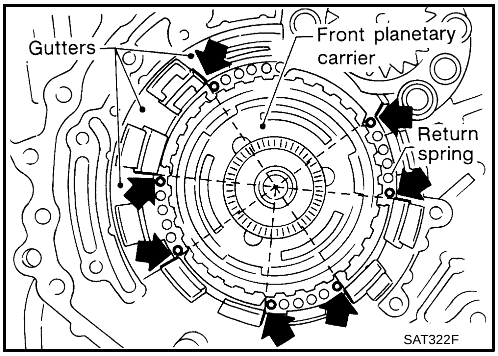
CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



12. Install low & reverse brake piston according to the following procedures.

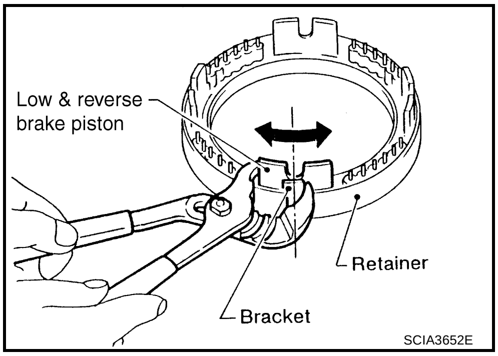
a. Set and align return springs to transaxle case gutters as shown in figure.



b. Set and align low & reverse brake piston with retainer.

CAUTION:

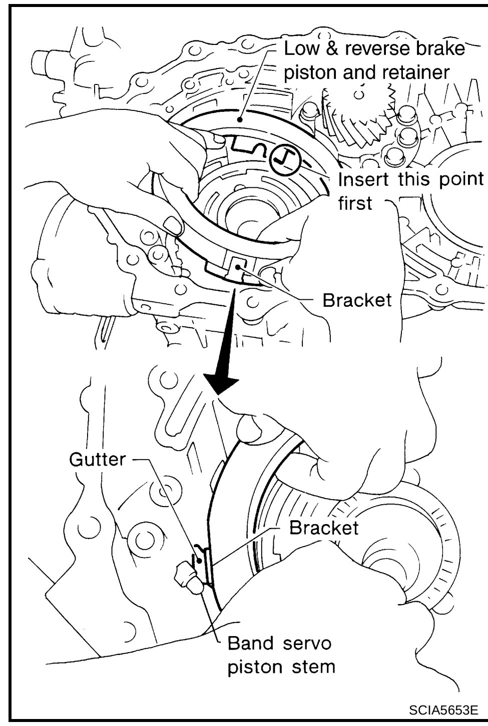
Apply ATF to the surface of low & reverse brake piston and retainer.



c. Install low & reverse brake piston and retainer on transaxle case.

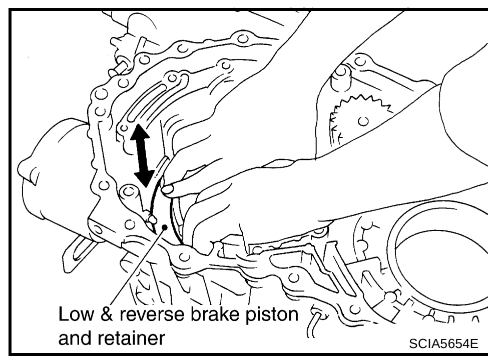
CAUTION:

Align bracket to specified gutter as indicated in the figure.

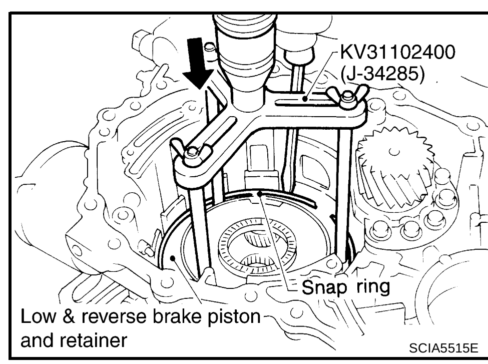


d. Make sure that each protrusion of low & reverse brake piston is correctly set to corresponding return spring as follows.

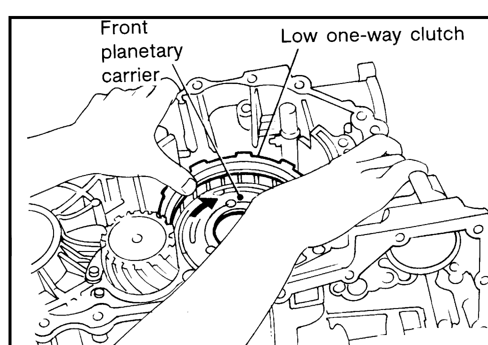
- **Push low & reverse brake piston and retainer evenly and confirm they move smoothly.**
- **If they cannot move smoothly, remove low & reverse brake piston and retainer and align return spring correctly as instructed in step "a".**



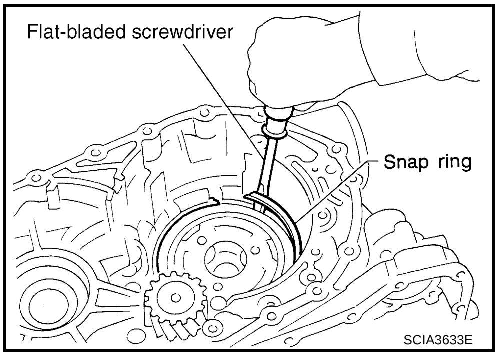
e. Push down low & reverse brake piston and retainer and install snap ring.



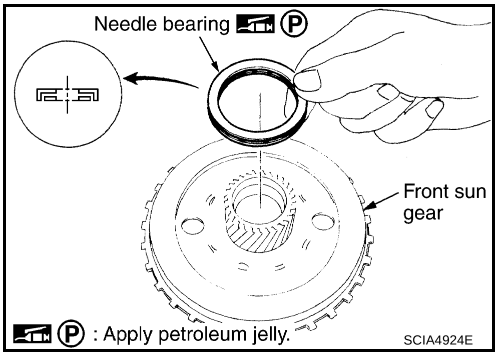
13. Install low one-way clutch to front planetary carrier by turning carrier in the direction of arrow shown.



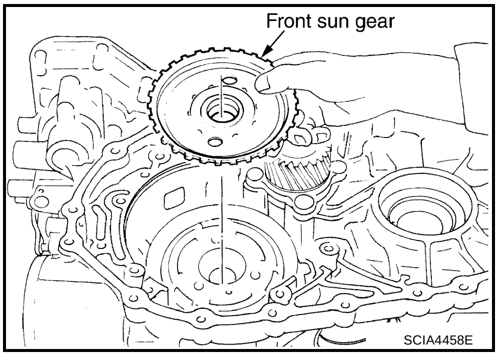
14. Install snap ring with flat-bladed screwdriver.
    CAUTION:
    Forward clutch and bearing must be correctly installed for snap ring to fit into groove of transaxle case.



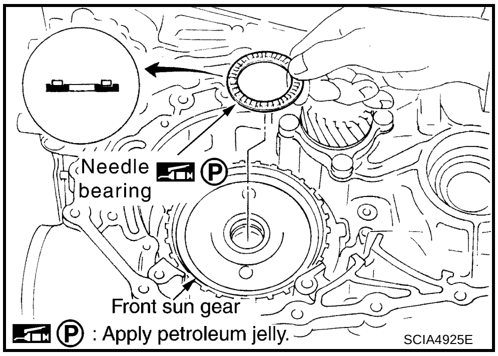
15. Install front sun gear according to the following procedures.
a. Install bearing race on front sun gear.
   CAUTION:
   Apply petroleum jelly to bearing race.
b. Install needle bearing on front sun gear.
   CAUTION:
   - **Apply petroleum jelly to needle bearing.**
   - **Be careful with the direction of needle bearing.**



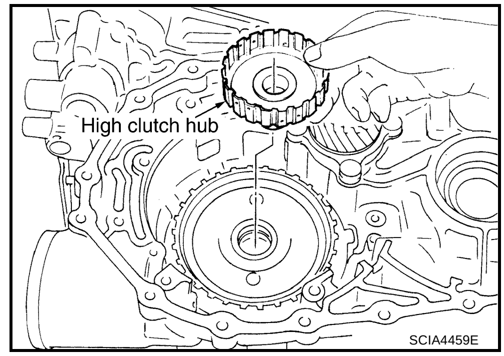
c. Install front sun gear on front planetary carrier.



16. Install high clutch hub according to the following procedures.
a. Install needle bearing on front sun gear.
   CAUTION:
   - **Apply petroleum jelly to needle bearing.**
   - **Be careful with the direction of needle bearing.**



b. Install high clutch hub on front sun gear.

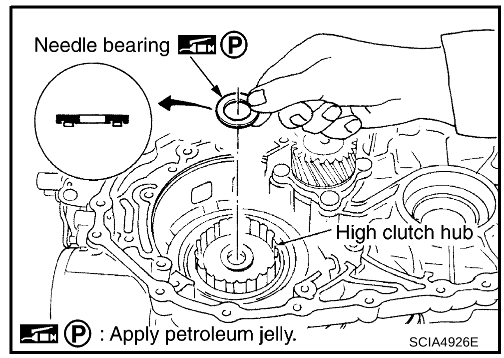


17. Install input shaft assembly (high clutch assembly) according to the following procedures.

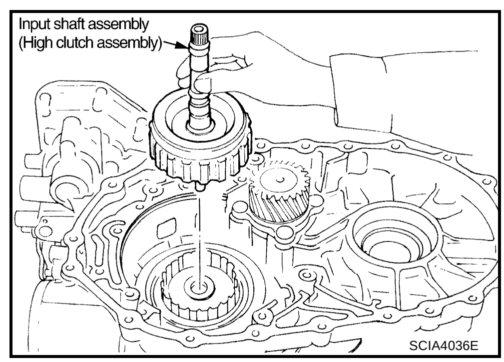
a. Install needle bearing on high clutch hub.

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



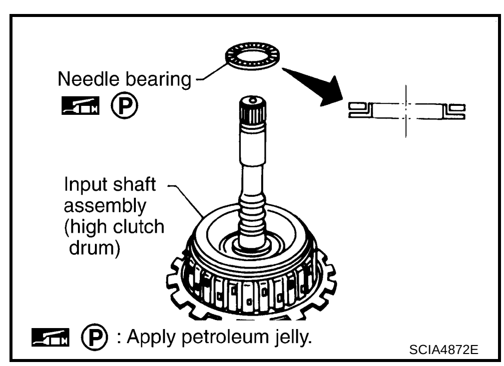
b. Install input shaft assembly (high clutch assembly) on high clutch hub.



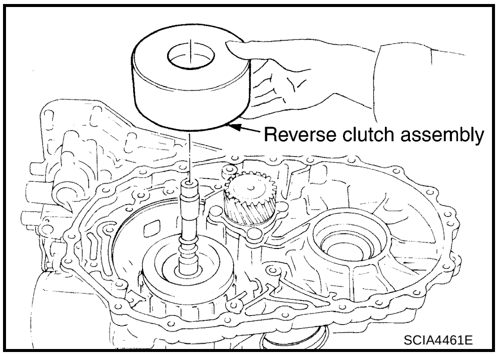
c. Install needle bearing on input shaft assembly (high clutch drum).

CAUTION:

- **Apply petroleum jelly to needle bearing.**
- **Be careful with the direction of needle bearing.**



18. Install reverse clutch assembly on input shaft assembly (high clutch drum).



SCIA4461E

Adjustment (2)

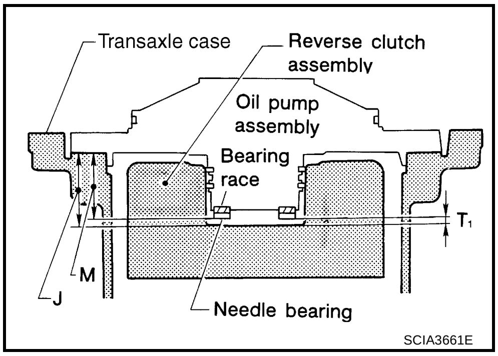
ACS007VR

When any parts listed below are replaced, adjust total end play and reverse clutch end play.

Part name	Total end play	Reverse clutch end play
transaxle case	●	●
Overrun clutch hub	●	●
Rear internal gear	●	●
Rear planetary carrier	●	●
Rear sun gear	●	●
Front planetary carrier	●	●
Front sun gear	●	●
High clutch hub	●	●
Input shaft assembly (high clutch drum)	●	●
Oil pump cover	●	●
Reverse clutch drum	—	●

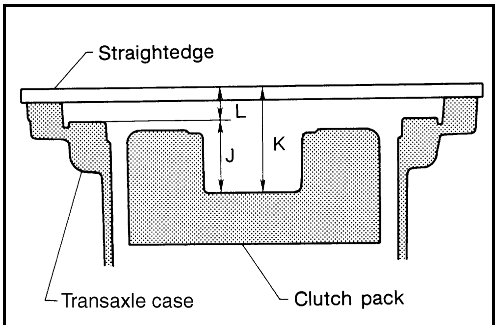
TOTAL END PLAY

- Measure clearance between reverse clutch drum and needle bearing for oil pump cover.
- Select proper thickness of bearing race so that end play is within specifications.



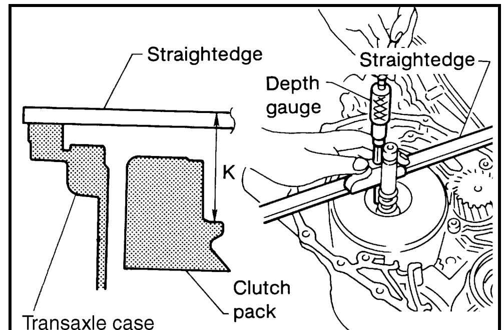
SCIA3661E

1. Measure dimensions “K” and “L” and then calculate dimension “J”.



SCIA3662E

a. Measure dimension "K".



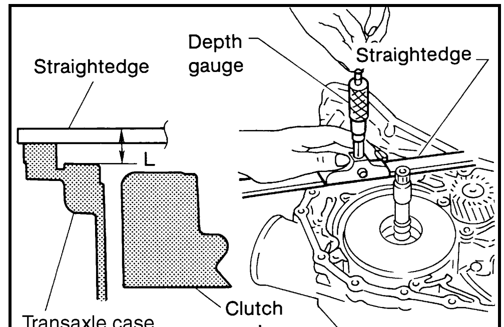
SCIA3663E

b. Measure dimension "L".

c. Calculate dimension "J".

"J": Distance between oil pump fitting surface of transaxle case and needle bearing mating surface of input shaft assembly (high clutch drum).

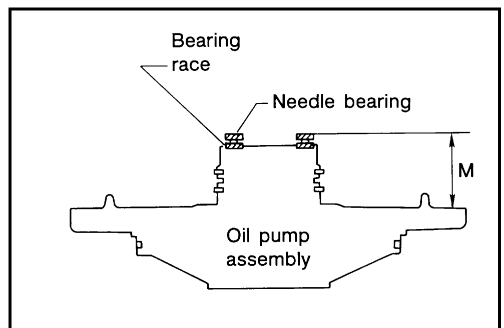
J = K – L



SCIA3664E

2. Measure dimension "M".

a. Place bearing race and needle bearing on oil pump assembly.

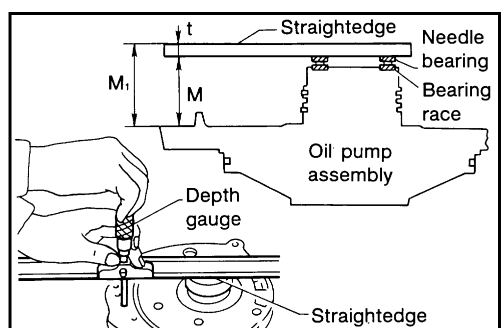


SAT378D

b. Measure dimension "M".

"M": Distance between transaxle case fitting surface of oil pump cover and needle bearing on oil pump cover.

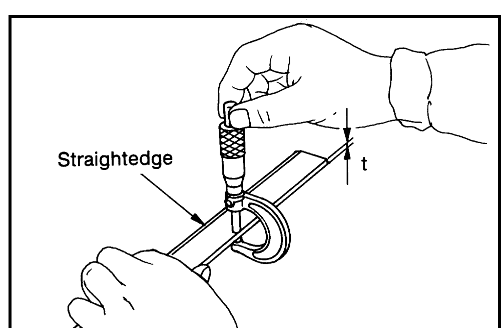
"M_1 ": Indication of gauge.



SAT379D

c. Measure thickness of straightedge "t".

$M = M_1 - t$



SAT443D

3. Adjust total end play "T_1 ".

T_1 = J – M

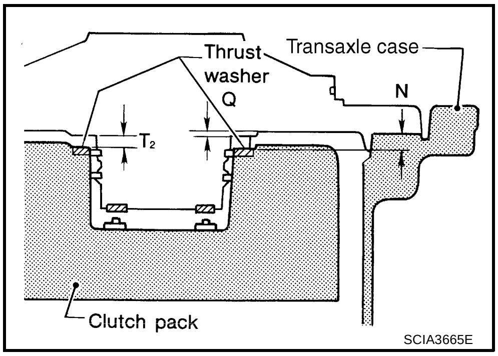
Total end play "T_1 ":

0.25 - 0.55 mm (0.0098 - 0.0217 in)

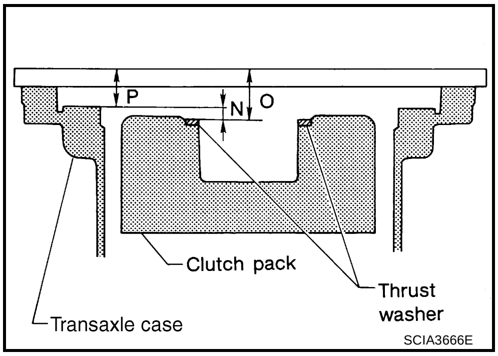
- Select proper thickness of bearing race so that total end play is within specifications. Refer to AT-392, "Total End Play" .

REVERSE CLUTCH END PLAY

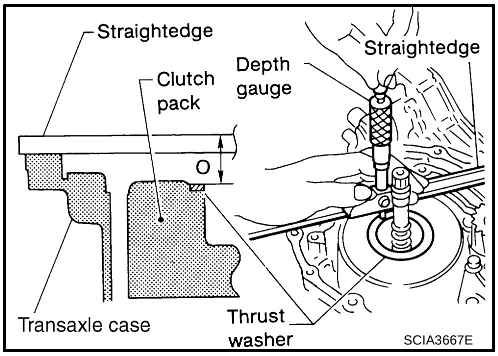
- Measure clearance between oil pump cover and thrust washer for reverse clutch drum.
- Select proper thickness of thrust washer so that end play is within specification.



1. Measure dimensions "O" and "P" and then calculate dimension "N".



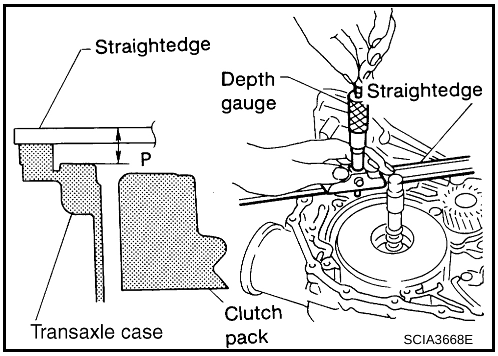
a. Place thrust washer on reverse clutch drum.
b. Measure dimension "O".



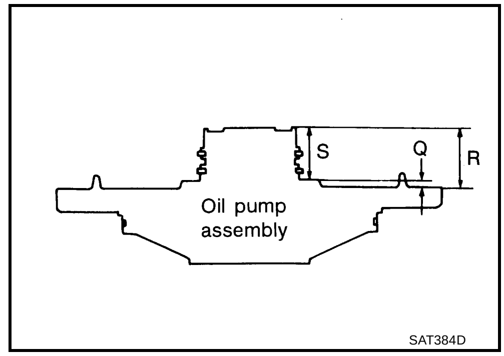
c. Measure dimension "P".
d. Calculate dimension "N".

"N": Distance between oil pump fitting surface of transaxle case and thrust washer on reverse clutch drum.

N = O – P

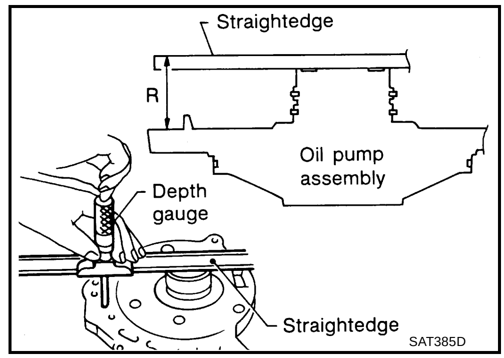


2. Measure dimensions “R” and “S” and then calculate dimension “Q”.



SAT384D

a. Measure dimension “R”.

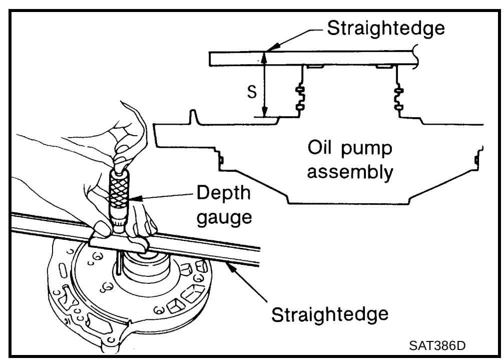


SAT385D

b. Measure dimension “S”.
c. Calculate dimension “Q”.

“Q”: Distance between transaxle case fitting surface and thrust washer mating surface.

Q = R – S



SAT386D

3. Adjust reverse clutch end play “T_2 ”.

T_2 = N – Q

Reverse clutch end play:

0.61 - 1.0 mm (0.0240 - 0.039 in)

- Select proper thickness of thrust washer so that reverse clutch end play is within specifications. Refer to AT-392, "Reverse Clutch End Play" .

Assembly (3)

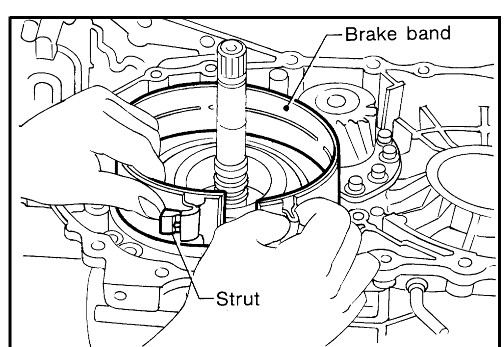
ACS007VS

1. Install anchor end pin and lock nut on transaxle case.

CAUTION:

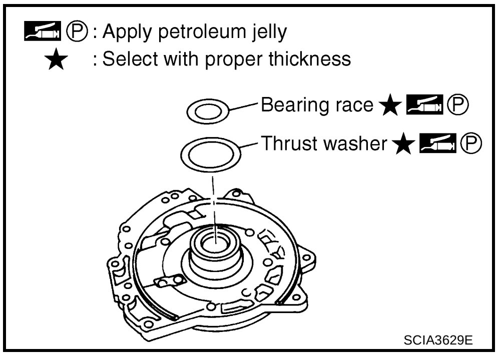
Do not reuse anchor end pin.

2. Place brake band and strut on outside of reverse clutch drum. Tighten anchor end pin just enough so that brake band is evenly fitted on reverse clutch drum.

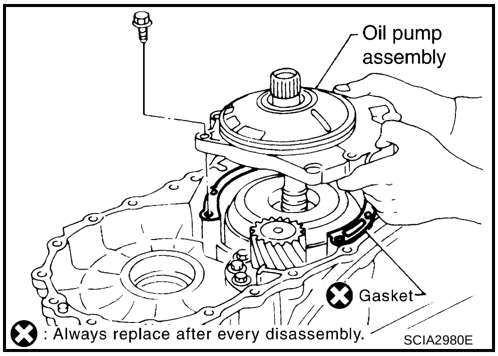


SAT196F

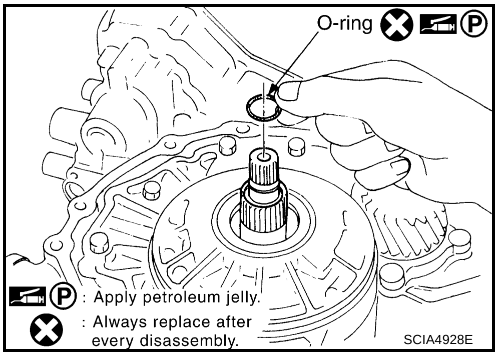
3. Place bearing race selected in total end play adjustment step on oil pump cover.
   CAUTION:
   Apply petroleum jelly to bearing race.
4. Place thrust washer selected in reverse clutch end play step on reverse clutch drum.
   CAUTION:
   Apply petroleum jelly to thrust washer.



5. Install oil pump assembly and gasket on transaxle case.
   CAUTION:
   Do not reuse gasket.
6. Tighten oil pump fitting bolts to the specified torque. Refer to AT-272, "Components" .



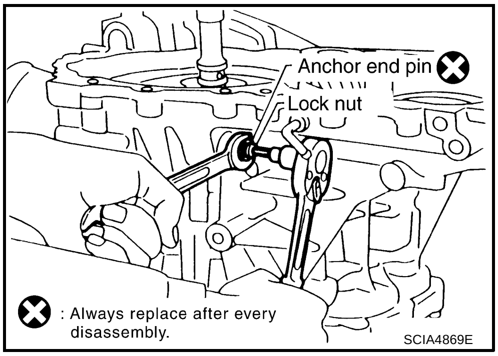
7. Install O-ring to input shaft assembly (high clutch drum).
   CAUTION:
   - **Do not reuse O-ring.**
   - **Apply petroleum jelly to O-ring.**



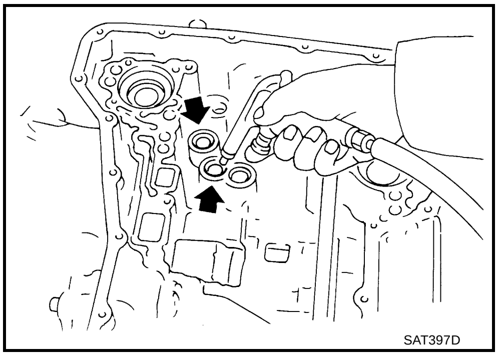
8. Adjust brake band.
   CAUTION:
   Do not reuse anchor end pin.
   a. Tighten anchor end pin to the specified torque.

      : 4.9 N·m (0.50 kg-m, 43 in-lb)

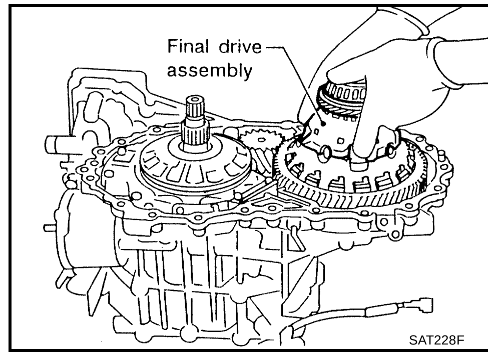
   b. Back off anchor end pin two and a half turns.
   c. While holding anchor end pin, tighten lock nut. Refer to AT-389, "BRAKE BAND" .



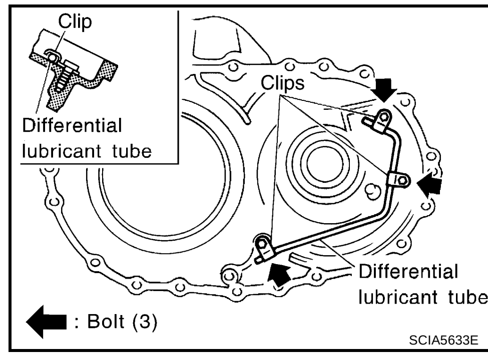
9. Apply compressed air to oil holes of transaxle case and check operation of brake band.



10. Install final drive assembly on transaxle case.

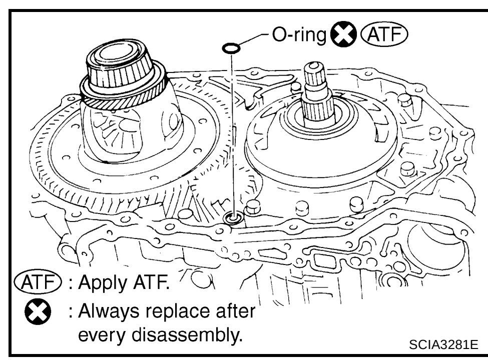


11. Install differential lubricant tube on converter housing. Tighten differential lubricant tube bolts to the specified torque. Refer to AT-272, "Components" .



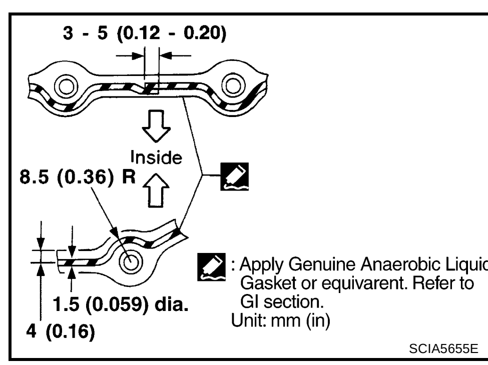
12. Install O-ring on differential oil port of transaxle case.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**



13. Apply recommended sealant (Genuine Anaerobic Liquid Gasket or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .) to transaxle case as shown in the figure.

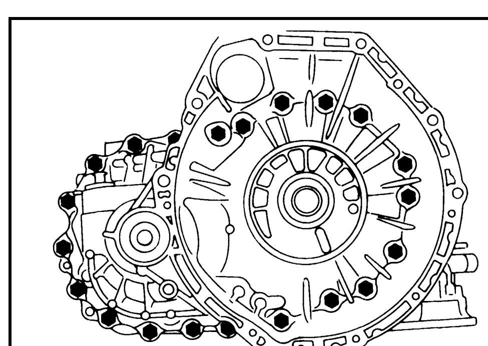
CAUTION:
Completely remove all moisture, oil and old sealant, etc. from the transaxle case and converter housing mounting surface.



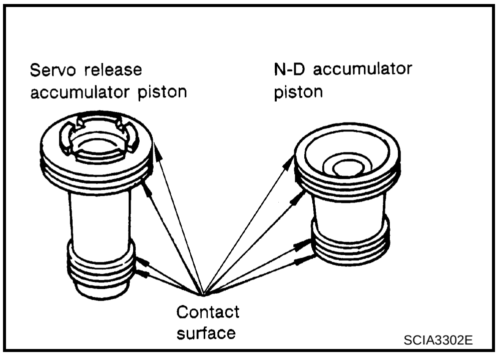
14. Install converter housing on transaxle case. Tighten converter housing mounting bolts to the specified torque. Refer to AT-272, "Components" .
15. Install O-ring on plug. (For 2WD models)

CAUTION:
Do not reuse O-ring.

16. Install plug on converter housing. (For 2WD models)

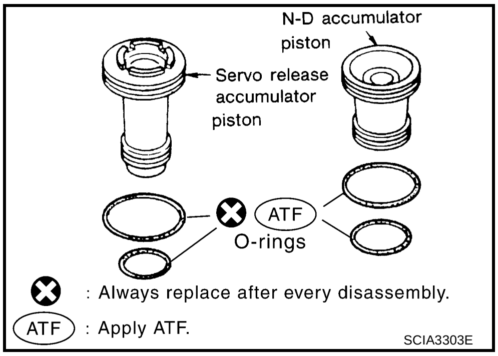


17. Install accumulator pistons.
a. Check contact surface of accumulator piston for damage.



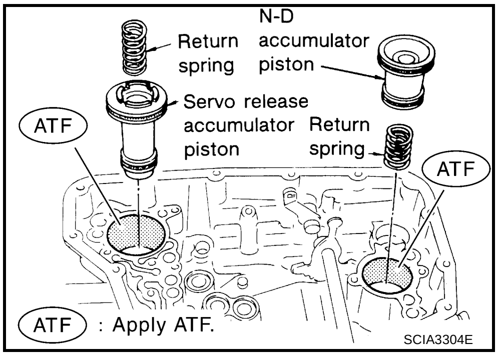
b. Install O-rings on accumulator pistons. Refer to AT-386, "O-RING" .

CAUTION:
- **Do not reuse O-rings.**
- **Apply ATF to O-rings.**



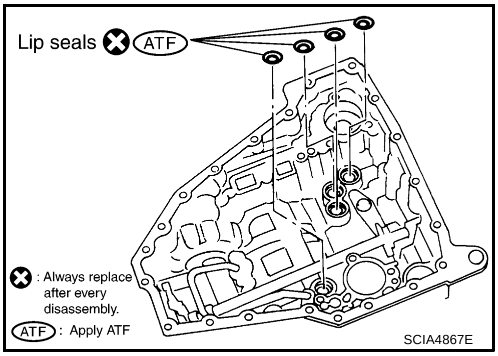
c. Install accumulator pistons and return springs on transaxle case. Refer to AT-387, "RETURN SPRING" .

CAUTION:
Apply ATF to inner surface of transaxle case.



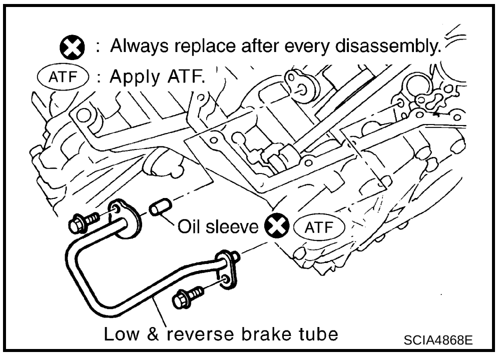
18. Install lip seals for band servo oil holes on transaxle case.

CAUTION:
- **Do not reuse lip seals.**
- **Apply ATF to lip seals.**



19. Install low & reverse brake tube and oil sleeve. Tighten Low & reverse brake tube bolts to the specified torque. Refer to AT-272, "Components" .

CAUTION:
- **Do not reuse oil sleeve.**
- **Apply ATF to oil sleeve.**



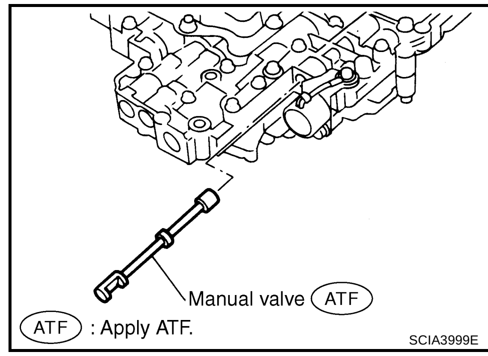
20. Install control valve assembly.

a. Install O-ring to terminal body.

CAUTION:
- **Do not reuse O-ring.**
- **Apply ATF to O-ring.**

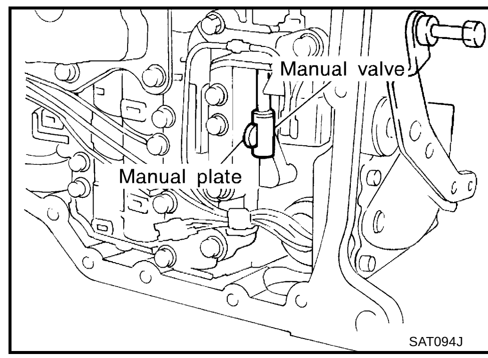
b. Insert manual valve into control valve assembly.

CAUTION:
Apply ATF to manual valve.



c. Set manual shaft in “N” position.

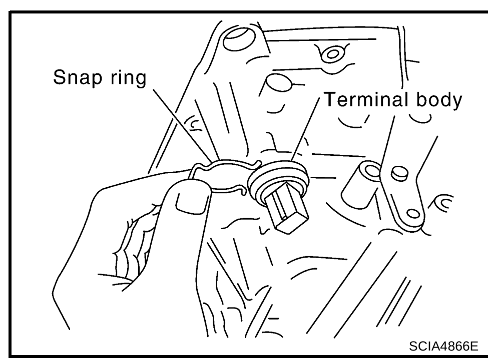
d. Install control valve assembly on transaxle case while aligning manual valve with manual plate.



e. Pass terminal cord assembly through transaxle case and install terminal body on transaxle case by pushing it.

f. Install snap ring to terminal body.

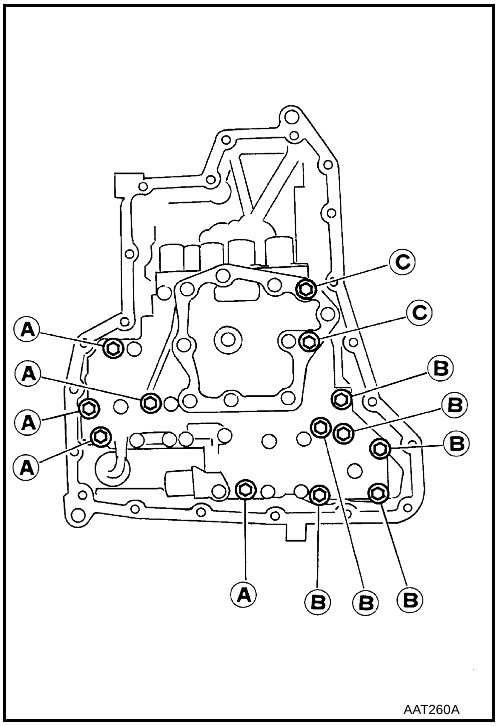
CAUTION:
Do not expand snap ring excessively.



g. Tighten control valve assembly fixing bolts **A** , **B** and **C** to the specified torque. Refer to AT-272, "Components" .

Bolt length, number and location:

Bolt symbol	A	B	C
Bolt length " ℓ " mm (in)	40.0 mm (1.575 in)	33.0 mm (1.299 in)	43.5 mm (1.713 in)
Number of bolts	5	6	2



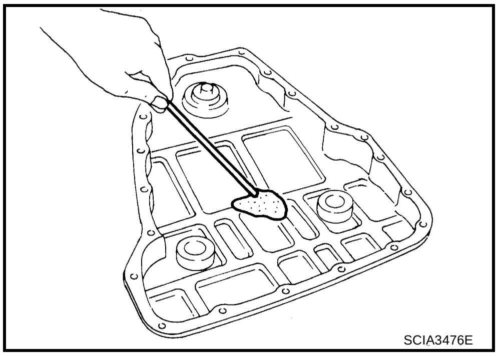
21. Install oil pan.

a. Attach a magnets to oil pan.

b. Install oil pan gasket on oil pan.

CAUTION:

- **Do not reuse oil pan gasket.**
- **Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface.**



c. Install oil pan (with oil pan gasket) on transaxle case.

CAUTION:

Completely remove all moisture, oil and old gasket, etc. from oil pan gasket mounting surface.

d. Tighten oil pan fitting bolts to the specified torque. Refer to AT-272, "Components" .

CAUTION:

- **Always replace oil pan fitting bolts as they are self-sealing bolts.**
- **Tighten four bolts in a crisscross pattern to prevent dislocation of oil pan gasket.**

e. Install drain plug gasket on drain plug.

CAUTION:

Do not reuse drain plug gasket.

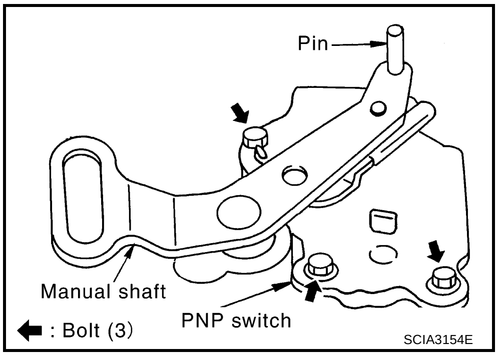
f. Tighten drain plug to the specified torque. Refer to AT-272, "Components" .

22. Install PNP switch.

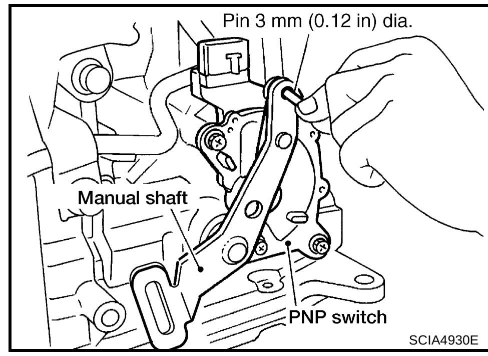
a. Set manual shaft in "P" position.

b. Temporarily install PNP switch on manual shaft.

c. Move manual shaft to "N" position.



d. Use a 3 mm (0.12 in) pin for this adjustment.
i. Insert the pin straight into the manual shaft adjustment hole.
ii. Rotate PNP switch until the pin can also be inserted straight into hole in PNP switch.
e. Tighten PNP switch fitting bolts. Refer to AT-272, "Components" .
f. Remove pin from adjustment hole after adjusting PNP switch.



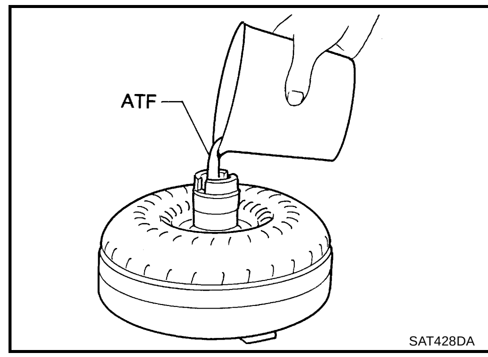
23. Install bracket on transaxle case.
24. Install O-ring on revolution sensor.

CAUTION:
- **Do not reuse O-ring.**
- **Apply petroleum jelly to O-ring.**

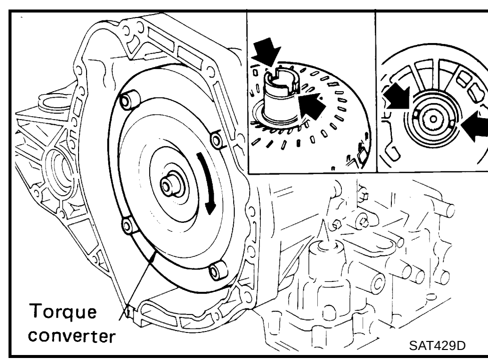
25. Install revolution sensor on transaxle case.
26. Install torque converter.

a. Pour ATF into torque converter.

CAUTION:
- **Approximately 1 liter (1-1/8 US qt, 7/8 Imp qt) of fluid is required for a new torque converter.**
- **When reusing old torque converter, add the same amount of fluid as was drained.**

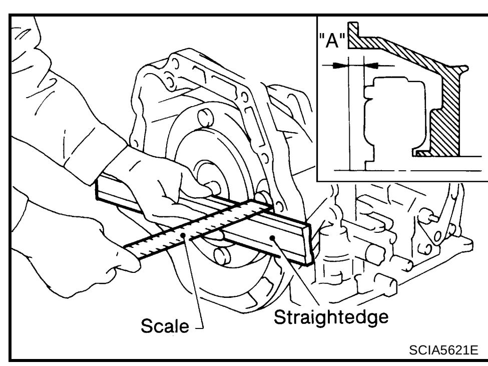


b. Install torque converter while aligning notches of torque converter with notches of oil pump.



c. Measure distance “A” to Make sure that torque converter is in proper position.

Distance “A”: 14 mm (0.55 in) or more



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ACS007VT

Engine		QR25DE	
Axle type		2WD	AWD
Automatic transaxle model		RE4F04B	
Automatic transaxle assembly	Model code number	85X65	85X64
Transaxle gear ratio	1st	2.785	
	2nd	1.545	
	3rd	1.000	
	4th	0.694	
	Reverse	2.272	
	Final drive	4.087	
Recommended fluid		NISSAN Automatic Transmission Fluid (ATF), DEXRONTM III/ MERCONTM, or equivalent ATF*	
Fluid capacity ℓ (US qt, Imp qt)		8.5 (9, 7-1/2)	

*: Refer to MA-11, "Fluids and Lubricants" .

Vehicle Speed When Shifting Gears

ACS007VU

Throttle position	Shift pattern	Vehicle speed km/h (MPH)					
		$D_1 \to D_2$	$D_2 \to D_3$	$D_3 \to D_4$	$D_4 \to D_3$	$D_3 \to D_2$	$D_2 \to D_1$
Full throttle	Comfort	57 - 65 (35 - 40)	107 - 115 (66 - 71)	167 - 175 (104 - 109)	163 - 171 (101 - 106)	97 - 105 (60 - 65)	41 - 49 (25 - 30)
	Auto power	57 - 65 (35 - 40)	107 - 115 (66 - 71)	167 - 175 (104 - 109)	163 - 171 (101 - 106)	97 - 105 (60 - 65)	41 - 49 (25 - 30)
Half throttle	Comfort	36 - 44 (22 - 27)	71 - 79 (44 - 49)	131 - 139 (81 - 86)	77 - 85 (48 - 53)	38 - 46 (23 - 28)	5 - 13 (3 - 8)
	Auto power	42 - 50 (26 - 31)	79 - 87 (49 - 54)	131 - 139 (81 - 86)	77 - 85 (48 - 53)	45 - 53 (28 - 33)	5 - 13 (3 - 8)

Vehicle Speed When Performing and Releasing Lock-Up

ACS008QK

Throttle position	Overdrive control switch (Shift position)	Shift pattern	Vehicle speed km/h (MPH)	
			Lock-up “ON”	Lock-up “OFF”
1/8	ON [D_4]	Comfort	61 - 69 (38 - 43)	51 - 59 (31 - 36)
		Power	61 - 69 (38 - 43)	51 - 59 (31 - 36)

Stall Revolution

ACS007VV

Stall revolution rpm	2,300 - 2,750

Line Pressure

ACS007VW

Engine speed	Line pressure kPa (kg/cm^2 , psi)	
	“D”, “2” and “1” positions	“R” position
At idle speed	500 (5.1, 73)	778 (7.9, 113)
At stall speed	1,233 (12.6, 179)	1,918 (19.6, 278)

Control Valves

ACS007VX

CONTROL VALVE AND PLUG RETURN SPRINGS

Unit: mm (in)

Parts			Item		
			Part No.*	Free length	Outer diameter
Upper body	L14	Pilot valve spring	31742-3AX03	38.98 (1.535)	8.9 (0.350)
	L15	1-2 accumulator valve spring	31742-3AX00	20.5 (0.807)	6.95 (0.274)
		1-2 accumulator piston spring	31742-3AX08	55.26 (2.176)	19.6 (0.772)
	L16	1st reducing valve spring	31742-80X05	27.0 (1.063)	7.0 (0.276)
	L17	3-2 timing valve spring	31736-01X00	23.29 (0.917)	6.65 (0.262)
	L18	Overrun clutch reducing valve spring	31742-80X15	37.5 (1.476)	6.9 (0.272)
	L19	Torque converter relief valve spring	31742-80X07	31.0 (1.220)	9.0 (0.354)
	L20	Torque converter clutch control valve spring	31742-85X00	57.0 (2.244)	6.5 (0.256)
	L21	Cooler check valve spring	31742-85X01	29.4 (1.157)	6.0 (0.236)
Lower body	L3	Pressure regulator valve spring	31742-80X13	45.0 (1.772)	15.0 (0.591)
	L4	Overrun clutch control valve spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	L5	Accumulator control valve spring	31742-80X02	22.0 (0.866)	6.5 (0.256)
	L6	Shift valve A spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	L7	Shuttle valve spring	31762-41X04	51.0 (2.008)	5.65 (0.222)
	L12	Shift valve B spring	31762-80X00	21.7 (0.854)	7.0 (0.276)
	L13	Pressure modifier piston spring	31742-41X15	30.5 (1.201)	9.8 (0.386)
		Pressure modifier valve spring	31742-80X16	32.0 (1.260)	6.9 (0.272)
	—	Oil cooler relief valve spring	31872-31X00	17.02 (0.670)	8.0 (0.315)

*: Always check with the Parts Department for the latest parts information.

Accumulator

ACS007VY

O-RING

Unit: mm (in)

Accumulator	Part No.*	Inner diameter (Small)	Part No.*	Inner diameter (Large)
Servo release accumulator	31526-41X03	26.9 (1.059)	31526-41X02	44.2 (1.740)
N-D accumulator	31526-31X08	34.6 (1.362)	31672-21X00	39.4 (1.551)

*: Always check with the Parts Department for the latest parts information.

RETURN SPRING

Unit: mm (in)

Accumulator	Part number*	Free length	Outer diameter
Servo release accumulator	31605-80X00	52.5 (2.067)	20.1 (0.791)
N-D accumulator	31605-31X15	43.5 (1.713)	28.0 (1.102)

*: Always check with the Parts Department for the latest parts information.

Clutch and Brakes

ACS007VZ

REVERSE CLUTCH

Model code number		85X64, 85X65	
Number of drive plates		2	
Number of driven plates		2	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Wear limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	0.5 - 0.8 (0.020 - 0.031)	
	Wear limit	1.2 (0.047)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		6.6 (0.260) 6.8 (0.268) 7.0 (0.276) 7.2 (0.283) 7.4 (0.291) 7.6 (0.299) 7.8 (0.307)	31537-80X78 31537-80X79 31537-80X80 31537-80X81 31537-80X82 31537-80X20 31537-80X21

*: Always check with the Parts Department for the latest parts information.

HIGH CLUTCH

Model code number			85X64, 85X65	
Number of drive plates			3	
Number of driven plates			7*1 + 1*2	
Drive plate thickness mm (in)	Standard		1.6 (0.063)	
	Wear limit		1.4 (0.055)	
Driven plate thickness mm (in)	*1	Standard	1.4 (0.055)	
	*2	Standard	2.0 (0.079)	
Clearance mm (in)	Standard		1.8 - 2.2 (0.071 - 0.087)	
	Wear limit		2.8 (0.110)	
Thickness of retaining plates			Thickness mm (in)	Part number*
			3.2 (0.126) 3.4 (0.134) 3.6 (0.142) 3.8 (0.150) 4.0 (0.157)	31537-81X11 31537-81X12 31537-81X13 31537-81X14 31537-81X15

*: Always check with the Parts Department for the latest parts information.

FORWARD CLUTCH

Model code number		85X64, 85X65	
Number of drive plates		5	
Number of driven plates		5	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Wear limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	0.45 - 0.85 (0.0177 - 0.0335)	
	Wear limit	1.85 (0.0728)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.2 (0.126)	31537-80X76
		3.4 (0.134)	31537-80X75
		3.6 (0.142)	31537-80X70
		3.8 (0.150)	31537-80X71
		4.0 (0.157)	31537-80X72
		4.2 (0.165)	31537-80X73
		4.4 (0.173)	31537-80X74

*: Always check with the Parts Department for the latest parts information.

OVERRUN CLUTCH

Model code number		85X64, 85X65	
Number of drive plates		3	
Number of driven plates		5	
Drive plate thickness mm (in)	Standard	1.6 (0.063)	
	Wear limit	1.4 (0.055)	
Driven plate thickness mm (in)	Standard	1.6 (0.063)	
Clearance mm (in)	Standard	0.7 - 1.1 (0.028 - 0.043)	
	Wear limit	1.7 (0.067)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		3.0 (0.118)	31537-80X65
		3.2 (0.126)	31537-80X66
		3.4 (0.134)	31537-80X67
		3.6 (0.142)	31537-80X68
		3.8 (0.150)	31537-80X69

*: Always check with the Parts Department for the latest parts information.

LOW & REVERSE BRAKE

Model code number		85X64, 85X65	
Number of drive plates		6	
Number of driven plates		6	
Drive plate thickness mm (in)	Standard	1.8 (0.071)	
	Wear limit	1.6 (0.063)	
Driven plate thickness mm (in)	Standard	1.8 (0.071)	
Clearance mm (in)	Standard	1.7 - 2.1 (0.067 - 0.083)	
	Wear limit	3.3 (0.130)	
Thickness of retaining plates		Thickness mm (in)	Part number*
		2.0 (0.079) 2.2 (0.087) 2.4 (0.094) 2.6 (0.102) 2.8 (0.110) 3.0 (0.118) 3.2 (0.126) 3.4 (0.134)	31667-80X10 31667-80X11 31667-80X12 31667-80X13 31667-80X14 31667-80X15 31667-80X16 31667-80X17

*: Always check with the Parts Department for the latest parts information.

CLUTCH AND BRAKE RETURN SPRINGS

Unit: mm (in)

Parts	Part number*	Free length	Outer diameter
Forward clutch (Overrun clutch) (22 pcs)	31505-80X02	21.4 (0.843)	10.3 (0.406)
High clutch (12 pcs)	31505-80X05	22.5 (0.886)	10.8 (0.425)
Low & reverse brake (24 pcs)	31505-80X07	24.1 (0.949)	6.6 (0.260)

*: Always check with the Parts Department for the latest parts information.

BRAKE BAND

Anchor end pin tightening torque N·m (kg-m, in-lb)	4.9 (0.50, 43)
Number of returning revolutions for anchor end pin	2.5
Lock nut tightening torque N·m (kg-m, ft-lb)	34 (3.5, 25)

Final Drive

ACS007W0

DIFFERENTIAL SIDE GEAR CLEARANCE

Clearance between side gear and differential case with washer mm (in)	0.1 - 0.2 (0.004 - 0.008)

DIFFERENTIAL SIDE GEAR THRUST WASHERS

Thickness mm (in)	Part number*
0.75 (0.0295) 0.80 (0.0315) 0.85 (0.0335) 0.90 (0.0354) 0.95 (0.0374)	38424-81X00 38424-81X01 38424-81X02 38424-81X03 38424-81X04

*: Always check with the Parts Department for the latest parts information.

DIFFERENTIAL SIDE BEARING PRELOAD ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.48 (0.0189)	31438-80X00
0.52 (0.0205)	31438-80X01
0.56 (0.0220)	31438-80X02
0.60 (0.0236)	31438-80X03
0.64 (0.0252)	31438-80X04
0.68 (0.0268)	31438-80X05
0.72 (0.0283)	31438-80X06
0.76 (0.0299)	31438-80X07
0.80 (0.0315)	31438-80X08
0.84 (0.0331)	31438-80X09
0.88 (0.0346)	31438-80X10
0.92 (0.0362)	31438-80X11

*: Always check with the Parts Department for the latest parts information.

BEARING PRELOAD

Differential side bearing preload mm (in)	0.05 - 0.09 (0.0020 - 0.0035)

TURNING TORQUE

Turning torque of final drive assembly N·m (kg-cm, in-lb)	0.78 - 1.37 (8.0 - 14.0, 6.9 - 12.2)

Planetary Carrier and Oil Pump

ACS007W1

PLANETARY CARRIER

Clearance between planetary carrier and pinion washer mm (in)	Standard	0.20 - 0.70 (0.0079 - 0.0276)
	Allowable limit	0.80 (0.0315)

OIL PUMP

Oil pump side clearance mm (in)		0.030 - 0.050 (0.0012 - 0.0020)	
Thickness of inner gears and outer gears		Inner gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31346-80X00 31346-80X01 31346-80X02
		Outer gear	
		Thickness mm (in)	Part number*
		11.99 - 12.0 (0.4720 - 0.4724) 11.98 - 11.99 (0.4717 - 0.4720) 11.97 - 11.98 (0.4713 - 0.4717)	31347-80X00 31347-80X01 31347-80X02
Clearance between oil pump housing and outer gear mm (in)	Standard	0.111 - 0.181 (0.0044 - 0.0071)	
	Allowable limit	0.181 (0.0071)	
Oil pump cover seal ring clearance mm (in)	Standard	0.1 - 0.25 (0.0039 - 0.0098)	
	Allowable limit	0.25 (0.0098)	

*: Always check with the Parts Department for the latest parts information.

Input Shaft

ACS007W2

SEAL RING CLEARANCE

Input shaft seal ring clearance mm (in)	Standard	0.08 - 0.23 (0.0031 - 0.0091)
	Allowable limit	0.23 (0.0091)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
26 (1.024)	22.4 (0.882)	1.97 (0.078)	31525 80X02

*: Always check with the Parts Department for the latest parts information.

Reduction Pinion Gear

ACS007W3

TURNING TORQUE

Turning torque of reduction pinion gear N·m (kg-cm, in-lb)	0.05 - 0.39 (0.5 - 4.0, 0.43 - 3.47)

REDUCTION PINION GEAR ADJUSTING SHIMS

NO.	Thickness mm (in)	Part number	NO.	Thickness mm (in)	Part number*
1	5.00 (0.1969)	31439-81X00	33	5.64 (0.2220)	31439-81X63
2	5.02 (0.1976)	31439-81X01	34	5.66 (0.2228)	31439-81X64
3	5.04 (0.1984)	31439-81X02	35	5.68 (0.2236)	31439-81X65
4	5.06 (0.1992)	31439-81X03	36	5.70 (0.2244)	31439-81X66
5	5.08 (0.2000)	31439-81X04	37	5.72 (0.2252)	31439-81X67
6	5.10 (0.2008)	31439-81X05	38	5.74 (0.2260)	31439-81X68
7	5.12 (0.2016)	31439-81X06	39	5.76 (0.2268)	31439-81X69
8	5.14 (0.2024)	31439-81X07	40	5.78 (0.2276)	31439-81X70
9	5.16 (0.2031)	31439-81X08	41	5.80 (0.2283)	31439-81X71
10	5.18 (0.2039)	31439-81X09	42	5.82 (0.2291)	31439-81X72
11	5.20 (0.2047)	31439-81X10	43	5.84 (0.2299)	31439-81X73
12	5.22 (0.2055)	31439-81X11	44	5.86 (0.2307)	31439-81X74
13	5.24 (0.2063)	31439-81X12	45	4.60 (0.1811)	31439-85X01
14	5.26 (0.2071)	31439-81X13	46	4.62 (0.1819)	31439-85X02
15	5.28 (0.2079)	31439-81X14	47	4.64 (0.1827)	31439-85X03
16	5.30 (0.2087)	31439-81X15	48	4.66 (0.1835)	31439-85X04
17	5.32 (0.2094)	31439-81X16	49	4.68 (0.1843)	31439-85X05
18	5.34 (0.2102)	31439-81X17	50	4.70 (0.1850)	31439-85X06
19	5.36 (0.2110)	31439-81X18	51	4.72 (0.1858)	31439-83X11
20	5.38 (0.2118)	31439-81X19	52	4.74 (0.1866)	31439-83X12
21	5.40 (0.2126)	31439-81X20	53	4.76 (0.1874)	31439-83X13
22	5.42 (0.2134)	31439-81X21	54	4.78 (0.1882)	31439-83X14
23	5.44 (0.2142)	31439-81X22	55	4.80 (0.1890)	31439-83X15
24	5.46 (0.2150)	31439-81X23	56	4.82 (0.1898)	31439-83X16
25	5.48 (0.2157)	31439-81X24	57	4.84 (0.1906)	31439-83X17
26	5.50 (0.2165)	31439-81X46	58	4.86 (0.1913)	31439-83X18
27	5.52 (0.2173)	31439-81X47	59	4.88 (0.1921)	31439-83X19
28	5.54 (0.2181)	31439-81X48	60	4.90 (0.1929)	31439-83X20
29	5.56 (0.2189)	31439-81X49	61	4.92 (0.1937)	31439-83X21
30	5.58 (0.2197)	31439-81X60	62	4.94 (0.1945)	31439-83X22
31	5.60 (0.2205)	31439-81X61	63	4.96 (0.1953)	31439-83X23
32	5.62 (0.2213)	31439-81X62	64	4.98 (0.1961)	31439-83X24

*: Always check with the Parts Department for the latest parts information.

Band Servo

ACS007W4

RETURN SPRING

Unit: mm (in)

Return spring	Part number*	Free length	Outer diameter
2nd servo return spring	31605-31X20	32.5 (1.280)	25.9 (1.020)
OD servo return spring	31605-80X07	62.6 (2.465)	21.7 (0.854)

*: Always check with the Parts Department for the latest parts information.

Output Shaft
ACS007W5

SEAL RING CLEARANCE

Output shaft seal ring clearance mm (in)	Standard	0.10 - 0.25 (0.0039 - 0.0098)
	Allowable limit	0.25 (0.0098)

SEAL RING

Outer diameter mm (in)	Inner diameter mm (in)	Width mm (in)	Part number*
33.71 (1.327)	30.25 (1.191)	1.95 (0.077)	31525 80X09

*: Always check with the Parts Department for the latest parts information.

END PLAY

Output shaft end play mm (in)	0 - 0.15 (0 - 0.0059)

OUTPUT SHAFT ADJUSTING SHIMS

Thickness mm (in)	Part number*
0.80 (0.0315)	31438-80X60
0.84 (0.0331)	31438-80X61
0.88 (0.0346)	31438-80X62
0.92 (0.0362)	31438-80X63
0.96 (0.0378)	31438-80X64
1.00 (0.0394)	31438-80X65
1.04 (0.0409)	31438-80X66
1.08 (0.0425)	31438-80X67
1.12 (0.0441)	31438-80X68
1.16 (0.0457)	31438-80X69
1.20 (0.0472)	31438-80X70

*: Always check with the Parts Department for the latest parts information.

Bearing Retainer
ACS007W6

SEAL RING CLEARANCE

Bearing retainer seal ring clearance mm (in)	Standard	0.10 - 0.30 (0.0039 - 0.0118)
	Allowable limit	0.30 (0.0118)

Total End Play
ACS007W7

Total end play mm (in)	0.25 - 0.55 (0.0098 - 0.0217)

BEARING RACE FOR ADJUSTING TOTAL END PLAY

Thickness mm (in)	Part number*
0.8 (0.031)	31435-80X00
1.0 (0.039)	31435-80X01
1.2 (0.047)	31435-80X02
1.4 (0.055)	31435-80X03
1.6 (0.063)	31435-80X04
1.8 (0.071)	31435-80X05
2.0 (0.079)	31435-80X06
0.9 (0.035)	31435-80X09
1.1 (0.043)	31435-80X10
1.3 (0.051)	31435-80X11
1.5 (0.059)	31435-80X12
1.7 (0.067)	31435-80X13
1.9 (0.075)	31435-80X14

*: Always check with the Parts Department for the latest parts information.

Reverse Clutch End Play
ACS007W8

Reverse clutch end play mm (in)	0.61 - 1.0 (0.0240 - 0.039)

THRUST WASHERS FOR ADJUSTING REVERSE CLUTCH DRUM END PLAY

Thickness mm (in)	Part number*
0.80 (0.0315)	31508-80X13
0.95 (0.0374)	31508-80X14
1.10 (0.0433)	31508-80X15
1.25 (0.0492)	31508-80X16
1.40 (0.0551)	31508-80X17
1.55 (0.0610)	31508-80X18
1.70 (0.0669)	31508-80X19
1.85 (0.0728)	31508-80X20

*: Always check with the Parts Department for the latest parts information.

Removal and Installation

ACS007W9

Unit: mm (in)

Distance between end of converter housing and torque converter	14 (0.55)

Shift Solenoid Valves

ACS007WA

Gear position	1	2	3	4
Shift solenoid valve A	ON (Closed)	OFF (Open)	OFF (Open)	ON (Closed)
Shift solenoid valve B	ON (Closed)	ON (Closed)	OFF (Open)	OFF (Open)

Solenoid Valves

ACS007WB

Solenoid valves	Resistance (Approx.) Ω	Terminal
Shift solenoid valve A	20 - 30	2
Shift solenoid valve B	5 - 20	1
Overrun clutch solenoid valve	20 - 30	3
Line pressure solenoid valve	2.5 - 5	4
Torque converter clutch solenoid valve	5 - 20	5

A/T Fluid Temperature Sensor

ACS007WC

Condition	Specification (Approximately)	
Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	1.5V ↓ 0.5V	2.5 kΩ ↓ 0.3 kΩ

Revolution Sensor

ACS007WD

Condition	Judgement standard
When moving at 20 km/h (12 MPH), use the CONSULT-II pulse frequency measuring function.	450 Hz (Approx.)
When vehicle parks.	Under 1.3V or over 4.5V

Dropping Resistor

ACS007WE

Resistance	12 Ω (Approx.)

SECTION ATC

AUTOMATIC AIR CONDITIONER

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AJS001OL

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Working with HFC-134a (R-134a)

AJS001OI

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed and compressor malfunction is likely to occur, refer to “CONTAMINATED REFRIGERANT” below. To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant identifier.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
  - **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
  - **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
  - **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
  - **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment], or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
  - **Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.**

CONTAMINATED REFRIGERANT

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact Nissan Customer Affairs for further assistance.

General Refrigerant Precautions

AJS001JW

WARNING:

- **Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Do not store or heat refrigerant containers above 52°C (125°F).**
- **Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Do not intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (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.**

Lubricant Precautions

AJS001JX

- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment], or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

Precautions for Refrigerant Connection

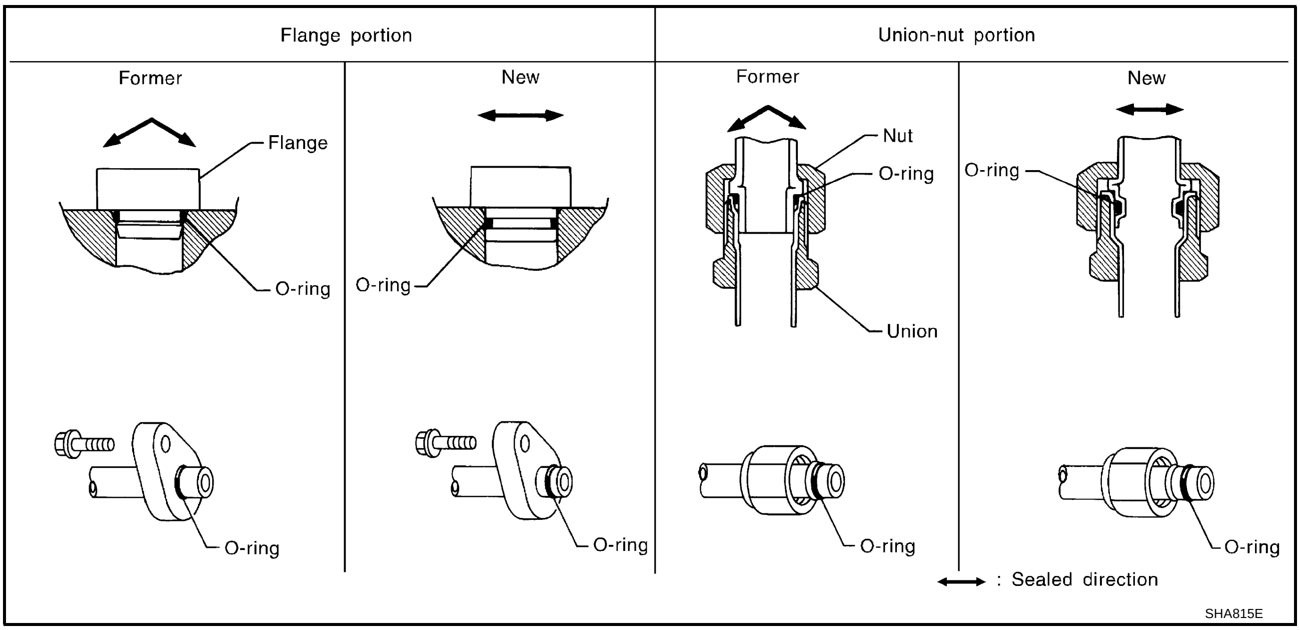
AJS001JY

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

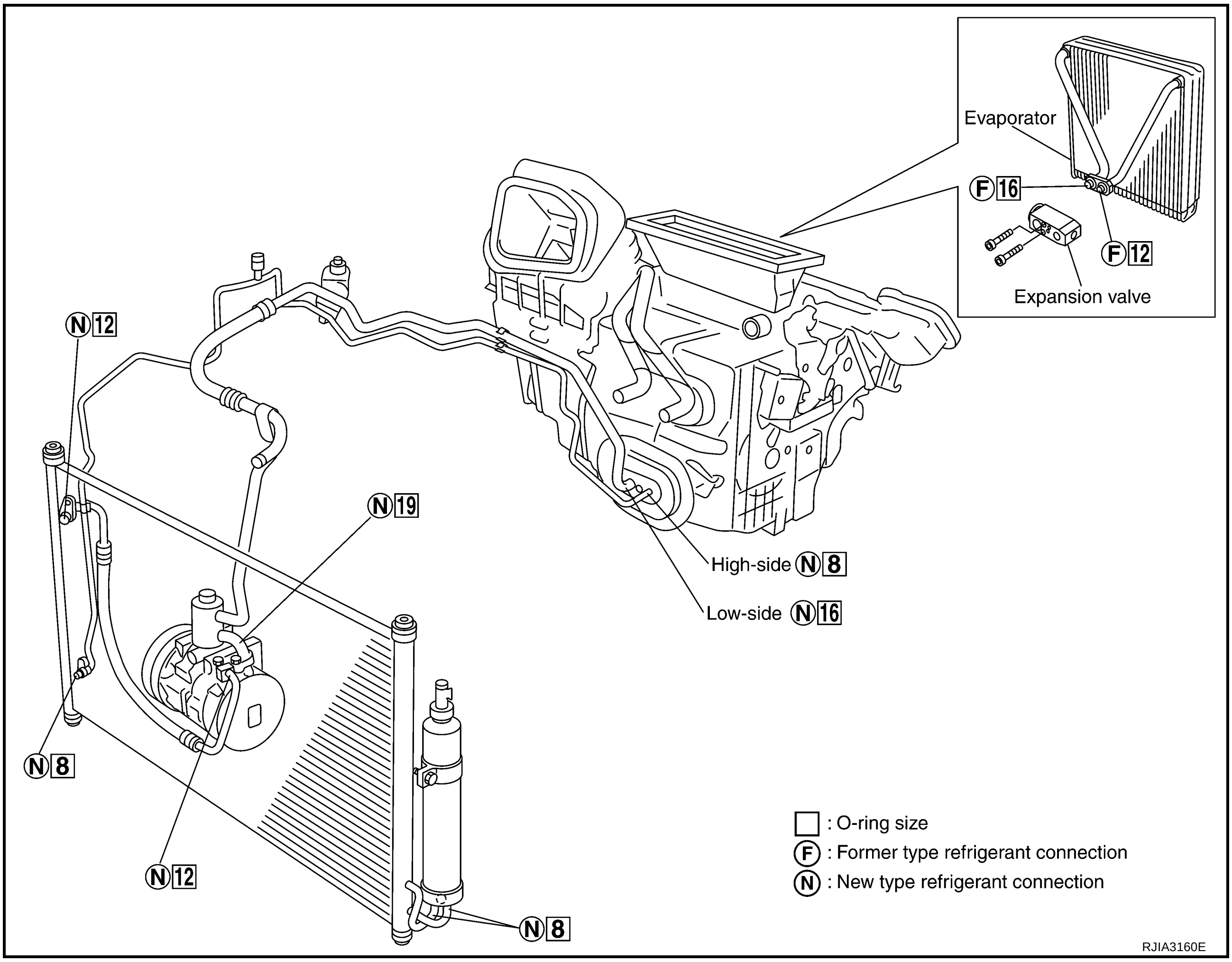
- Expansion valve to cooling unit
- Refrigerant pressure sensor to liquid tank

FEATURES OF NEW TYPE REFRIGERANT CONNECTION

- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.



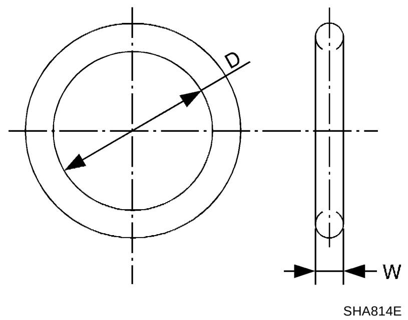
O-RING AND REFRIGERANT CONNECTION



CAUTION:

The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.

O-Ring Part Numbers and Specifications



Connection type	O-ring size	Part number	D mm (in)	W mm (in)
New	8	92471 N8210	6.8 (0.268)	1.85 (0.0728)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
Former	10	J2476 89956	9.25 (0.3642)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92475 71L00	11.0 (0.433)	2.4 (0.094)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.091)
New	19	92474 N8210	16.5 (0.650)	2.43 (0.0957)
Former		92477 N8200	17.12 (0.6740)	1.78 (0.0701)

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

CAUTION:

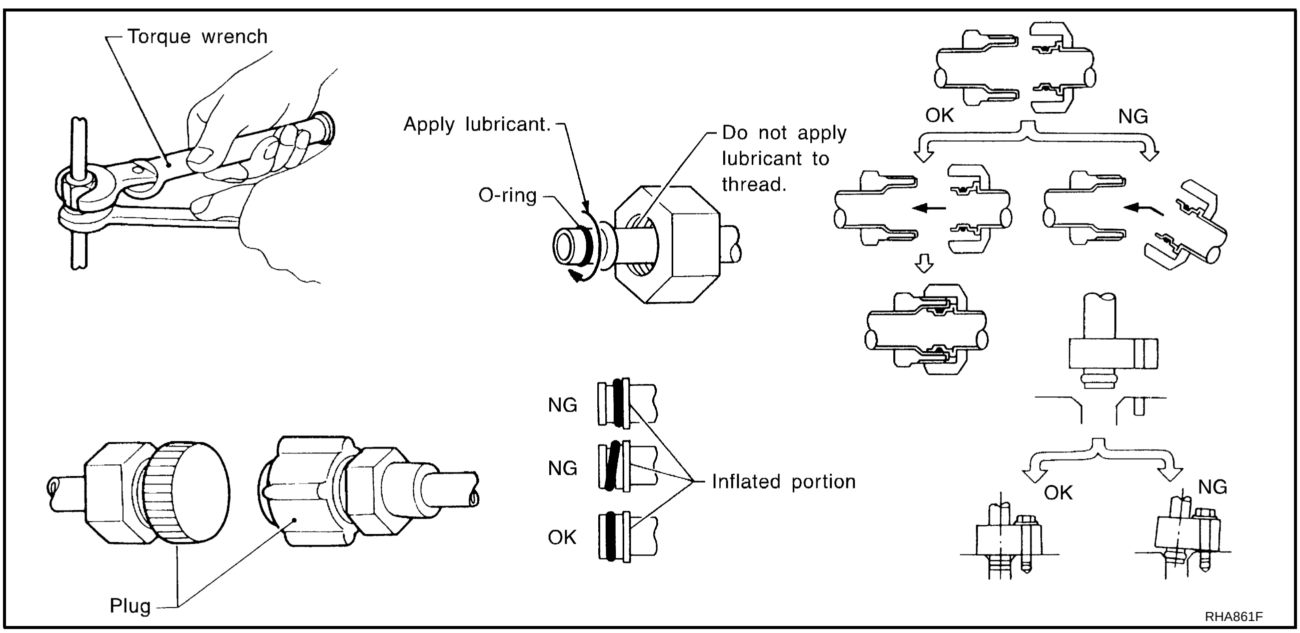
When replacing or cleaning refrigerant cycle components, observe the following.

- **When the compressor is removed, store it in the same position as it is when mounted on the car. Malfunction to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Lubricant name : Nissan A/C System Oil Type S

Part number : KLH00-PAGS0

- **O-ring must be closely attached to dented portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.**
- **After connecting line, conduct leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Precautions for Servicing Compressor

AJS001JZ

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow "Maintenance of Lubricant Quantity in Compressor" exactly. Refer to ATC-22, "Maintenance of Lubricant Quantity in Compressor" .**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for usual operation.**

Precautions for Service Equipment

AJS001K0

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer's instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

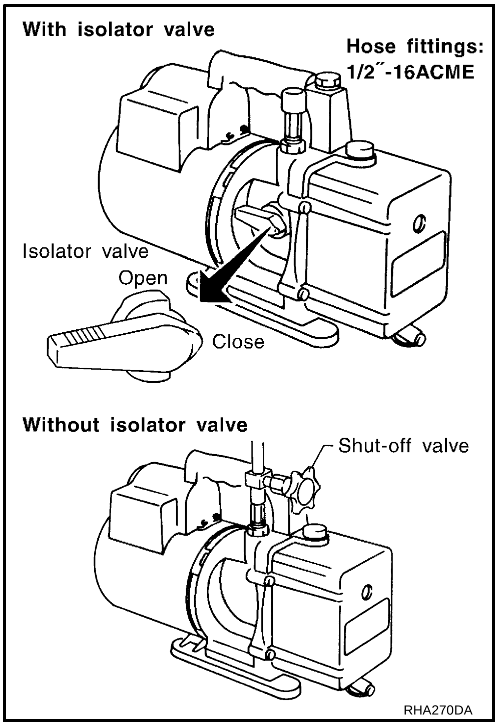
Be certain to follow the manufacturer's instructions for tester operation and tester maintenance.

VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.
To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

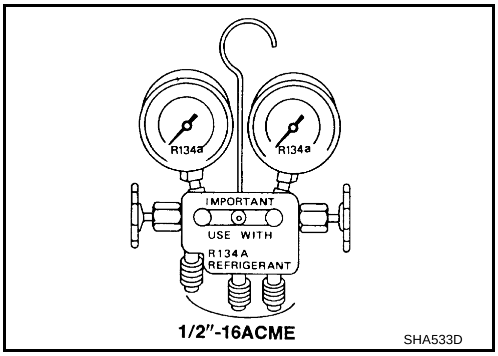
- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump's ability to pull a deep vacuum and are not recommended.



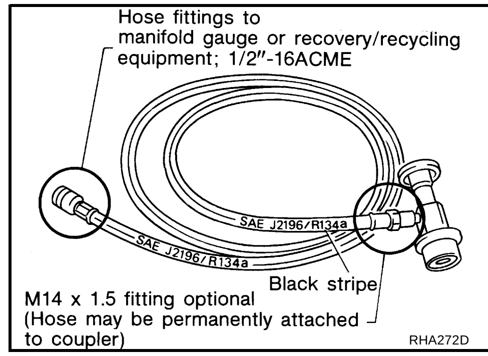
MANIFOLD GAUGE SET

Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SERVICE HOSES

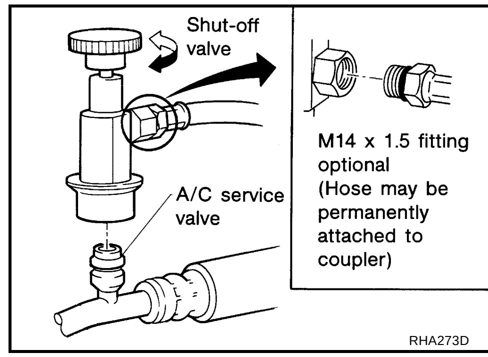
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

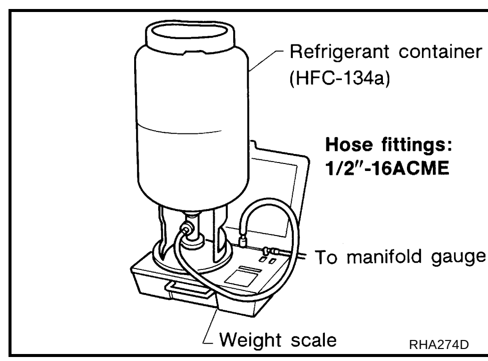
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

Precautions for Leak Detection Dye

AJS001K1

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electronic refrigerant leak detector. The fluorescent dye leak detector should be used in conjunction with an electronic refrigerant leak detector to (J-41995) pin-point refrigerant leaks.
- For your safety and your customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.
- A compressor shaft seal should not be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic refrigerant leak detector (J-41995).
- Always remove any remaining dye from the leak area after repairs are complete to avoid a misdiagnosis during a future service.

- Do not allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle (1/4 ounce / 7.4 cc) per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system or A/C system damage may result.
- The fluorescent properties of the dye will remain for over three (3) years unless a compressor malfunction occurs.

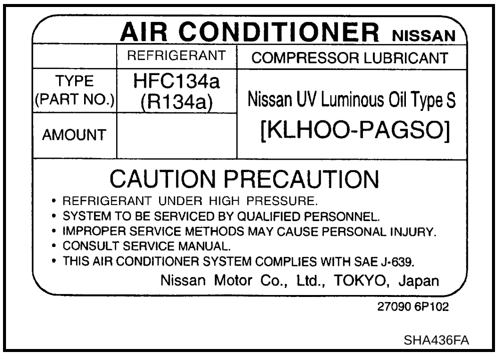
IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have this identification label on the front side of hood.



SHA436FA

Wiring Diagrams and Trouble Diagnosis

AJS001K2

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section.
- PG-3, "Wiring Diagram - POWER -" in PG section.

When you perform trouble diagnosis, refer to the following:

- GI-10, "How to Follow Trouble Diagnoses" in GI section.
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section.

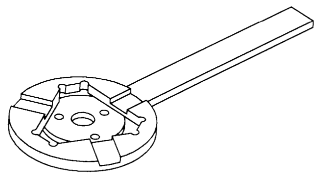
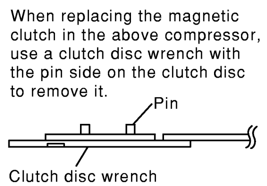
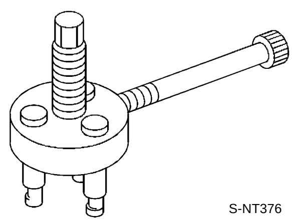
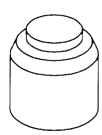
PREPARATION

PFP:00002

Special Service Tools

AJS001O3

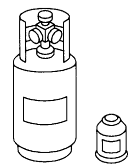
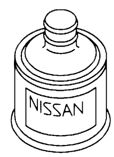
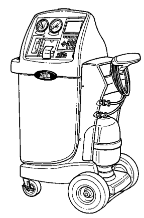
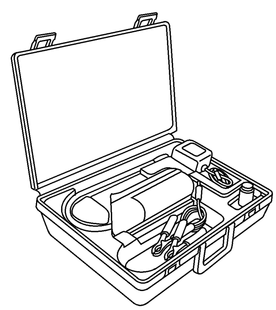
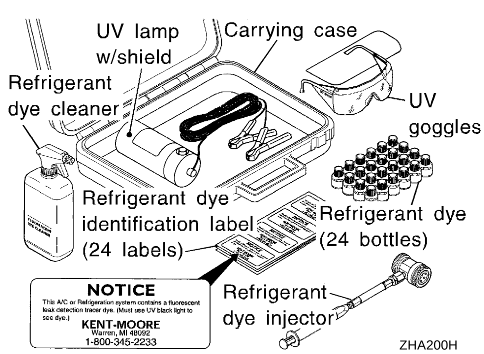
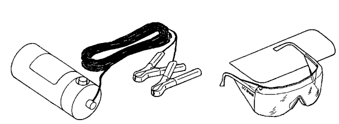
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

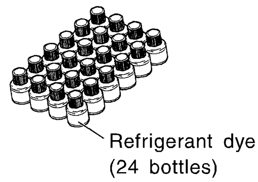
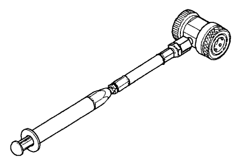
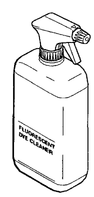
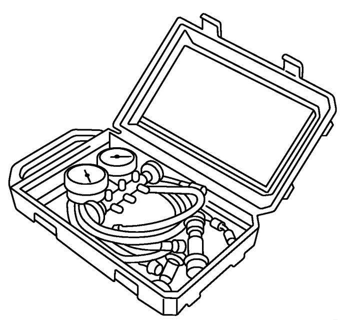
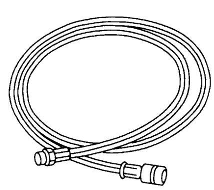
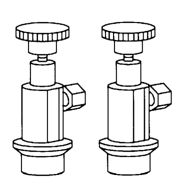
Tool number (Kent-Moore No.) Tool name		Description
KV99106100 (J-41260) Clutch disc wrench	 S-NT232  RJIA0194E	Removing shaft nut and clutch disc
KV99232340 (J-38874) Clutch disc puller	 S-NT376	Removing clutch disc
KV99106200 (J-41261) Pulley installer	 S-NT235	Installing pulley

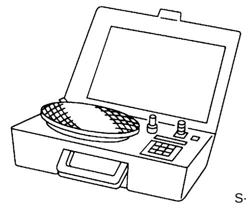
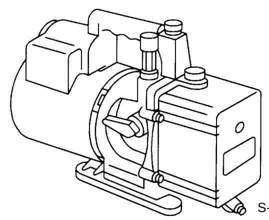
HFC-134a (R-134a) Service Tools and Equipment

AJS001O4

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

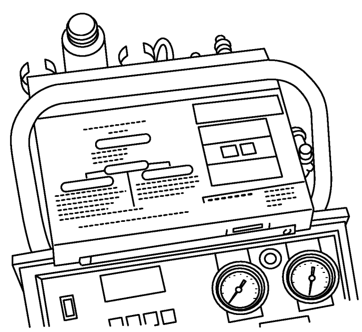
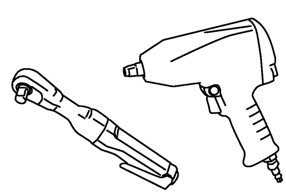
Tool number (Kent-Moore No.) Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● Large container 1/2″ -16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	 S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 mℓ (1.4 Imp fl oz)
(ACR2005-NI) ACR5 A/C Service Center	 WJIA0293E	Function: Refrigerant recovery, recycling and recharging
(J-41995) Electrical leak detector	 AHA281A	Power supply: DC 12V (Battery terminal)
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles

Tool number (Kent-Moore No.) Tool name		Description
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills
(J-39183) Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: ● The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size ● 1/2″ -16 ACME
Service hoses ● (J-39501-72) High-pressure side hose ● (J-39502-72) Low-pressure side hose ● (J-39476-72) Utility hose	 S-NT201	Hose color: ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: ● 1/2″ -16 ACME
Service couplers ● (J-39500-20) High-pressure side coupler ● (J-39500-24) Low-pressure side coupler	 S-NT202	Hose fitting to service hose: M14 × 1.5 fitting is optional or permanently attached.

Tool number (Kent-Moore No.) Tool name		Description
(J-39650) Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size 1/2″ -16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size 1/2″ -16 ACME

Commercial Service Tools

AJS001O5

Tool name		Description
Refrigerant identifier equipment	 RJIA0197E	Checking for refrigerant purity and system contamination
Power tool	 PBIC0190E	For loosening bolts and nuts

REFRIGERATION SYSTEM

PFP:KA990

Refrigerant Cycle

AJS001K5

REFRIGERANT FLOW

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation through the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

FREEZE PROTECTION

Under usual operating conditions, when the A/C is switched on, the compressor runs continuously, and the evaporator pressure, and therefore, temperature is controlled by the V-6 variable displacement compressor to prevent freeze up.

Refrigerant System Protection

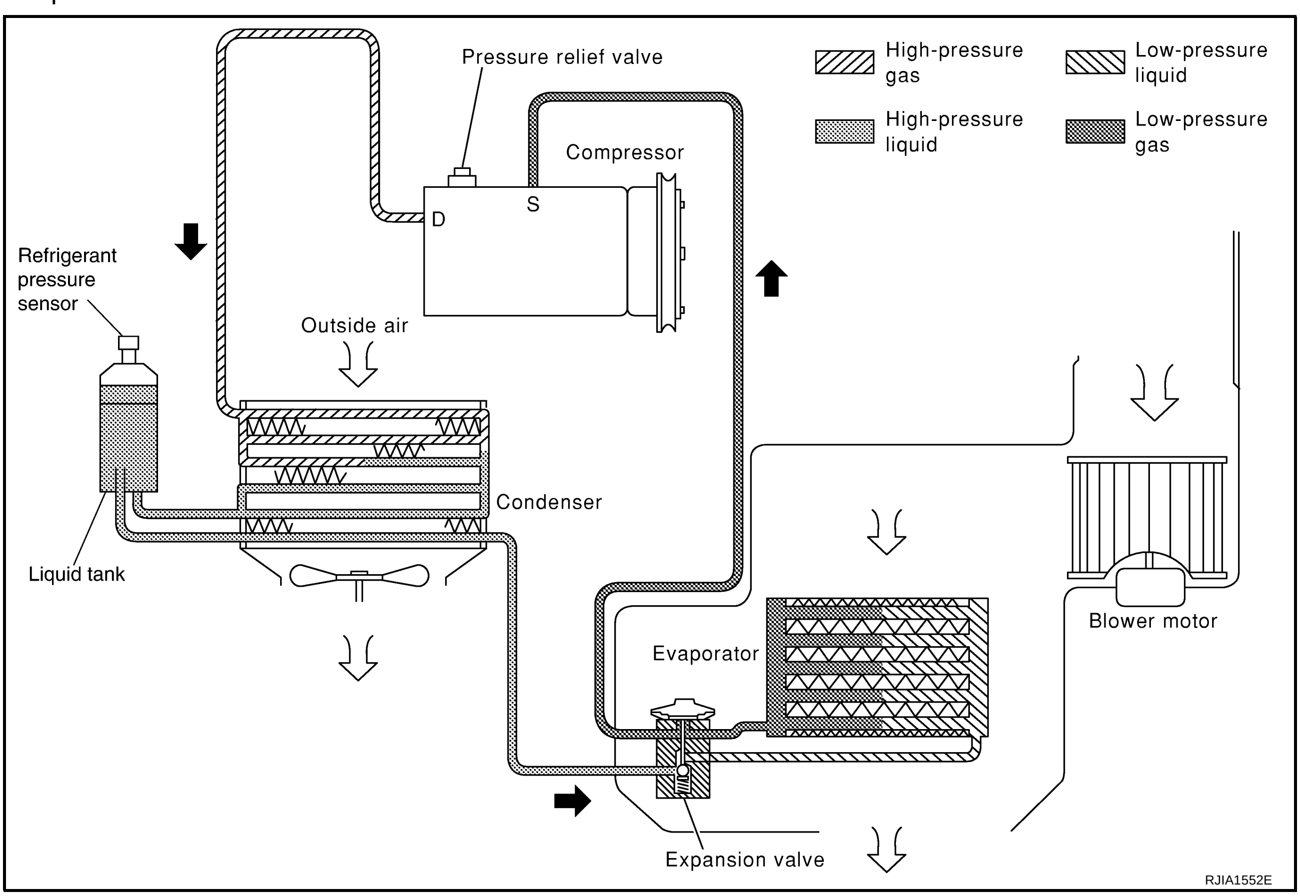
AJS001K6

REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the liquid tank. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm^2 , 398 psi), or below about 134 kPa (1.4 kg/cm^2 , 20 psi).

PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3,727 kPa (38 kg/cm^2 , 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor

AJS001K7

GENERAL INFORMATION

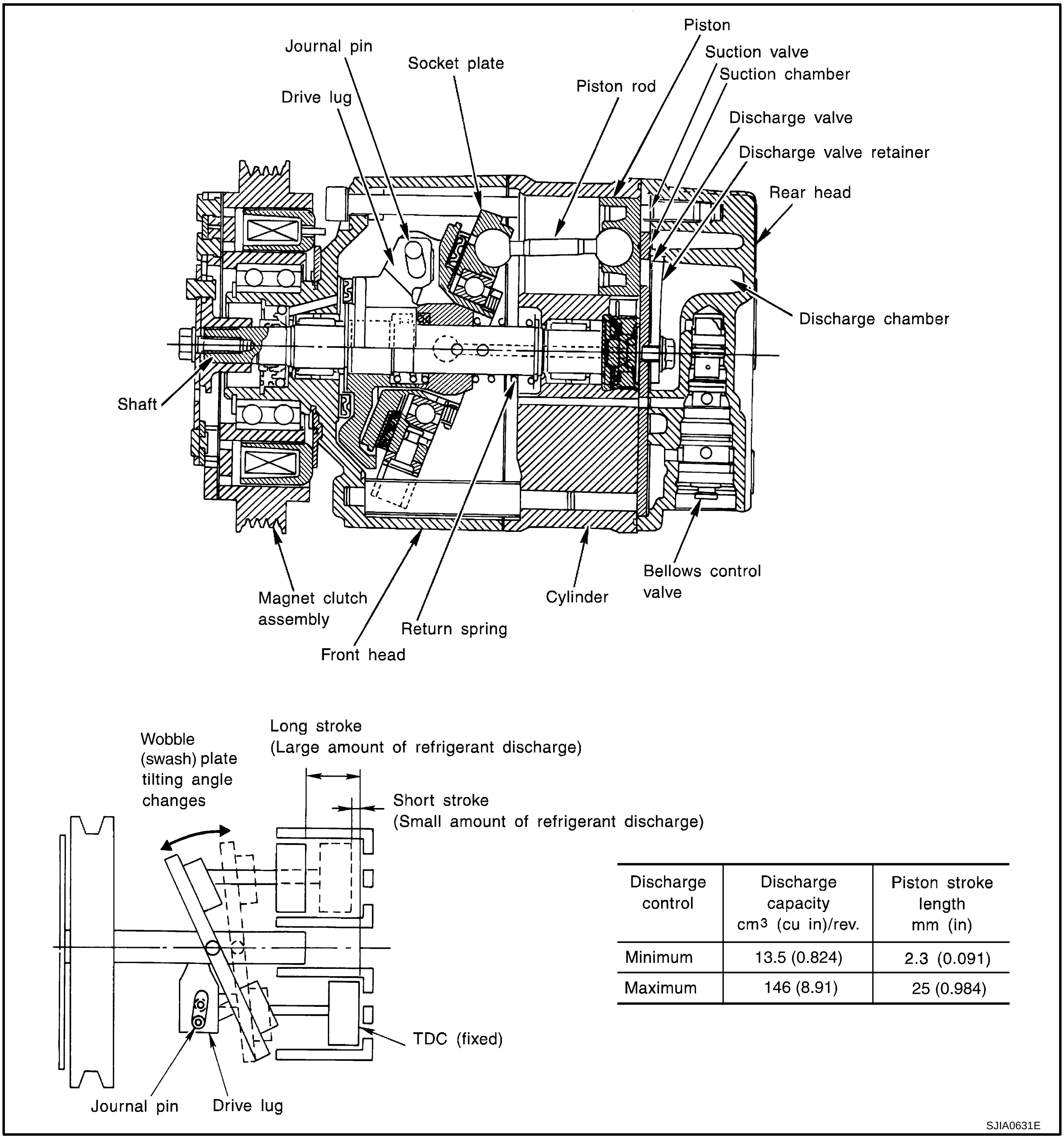
1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compressor do not drop too far below 5°C (41°F) when:
   Evaporator intake air temperature is less than 20°C (68°F).
   Engine is running at speeds less than 1,500 rpm.
   This is because the V-6 compressor provides a means of “capacity” control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A “clanking” sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the wobble (swash) plate has changed and is not a malfunction.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm^2 , 21 to 26 psi) under varying conditions.
   In previous compressors, however, suction pressure was reduced with increases in engine speed.

DESCRIPTION

General

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

The tilt of the wobble (swash) plate allows the piston's stroke to change so that refrigerant discharge can be continuously changed from 13.5 to 146 cm^3 (0.824 to 8.91 cu in).



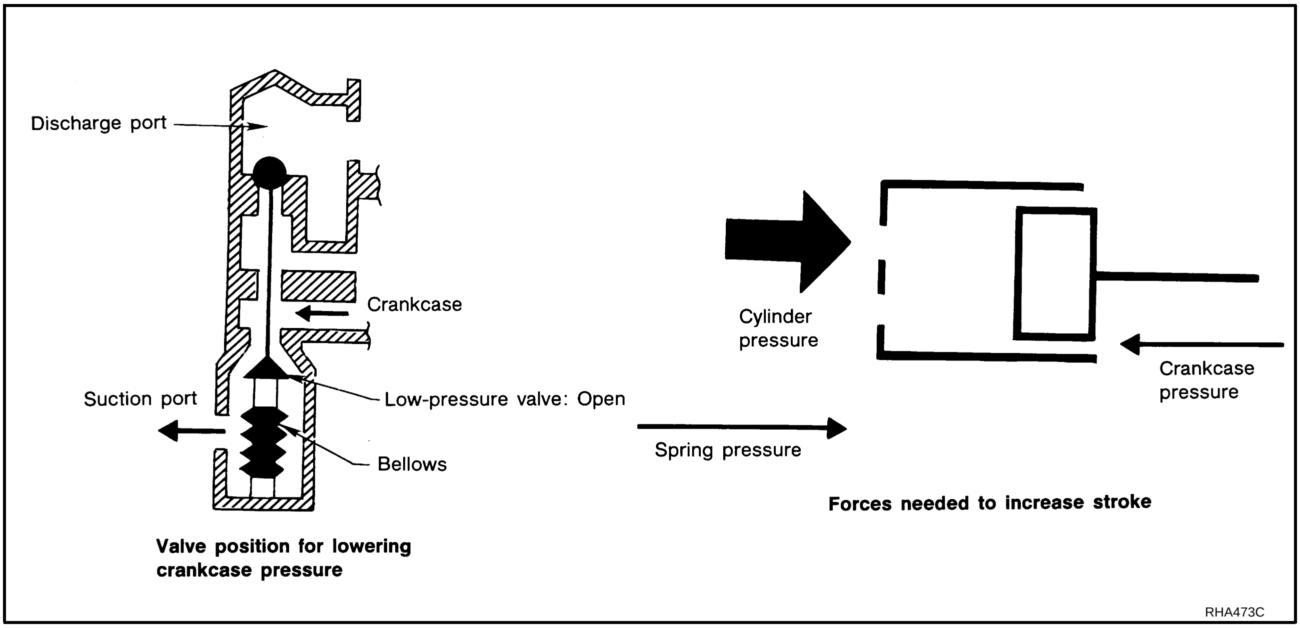
Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	13.5 (0.824)	2.3 (0.091)
Maximum	146 (8.91)	25 (0.984)

SJIA0631E

Operation

1. Operation Control Valve
   Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.
   Operation of the valve controls the internal pressure of the crankcase.
   The angle of the wobble (swash) plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.
2. Maximum Cooling
   Refrigerant pressure on the low-pressure side increases with an increase in heat loads.
   When this occurs, the control valve's bellows compress to open the low-pressure side valve and close the high-pressure side valve.
   This causes the following pressure changes:
   - The crankcase's internal pressure to equal the pressure on the low-pressure side;
   - The cylinder's internal pressure to be greater than the crankcase's internal pressure.

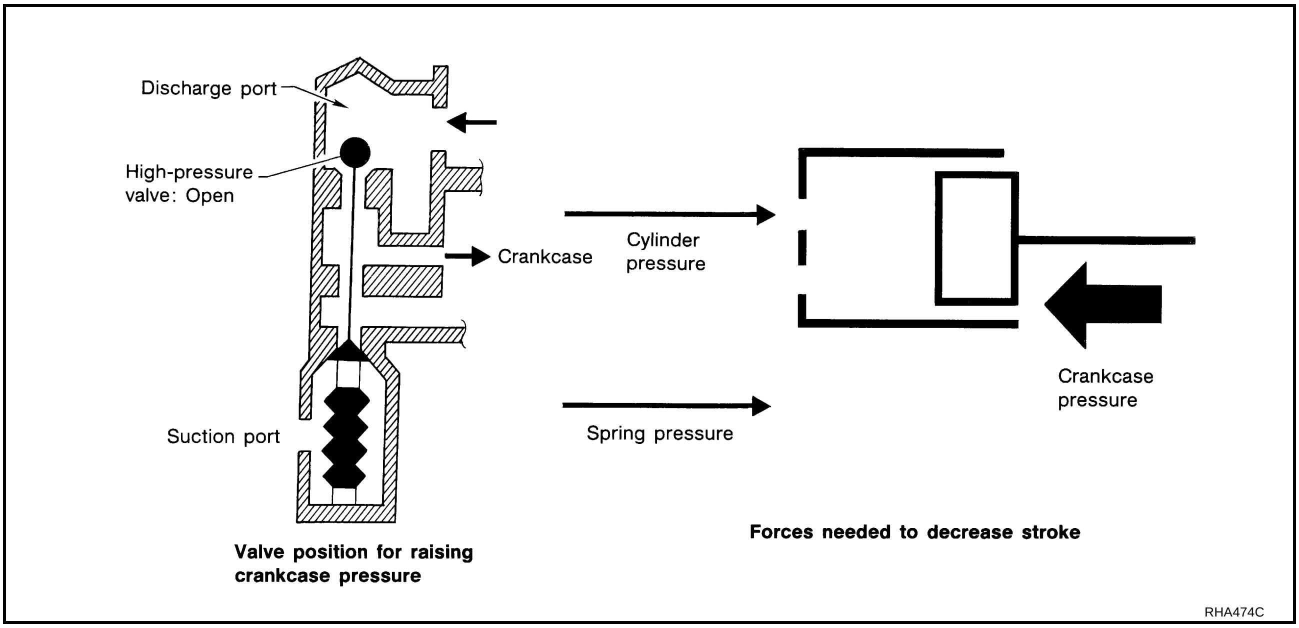
   Under this condition, the wobble (swash) plate is set to the maximum stroke position.



3. Capacity Control
   - Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
   - The bellows expands when refrigerant pressure on the suction pressure side drops below approxi mately 177 kPa (1.8 kg/cm^2 , 26 psi).

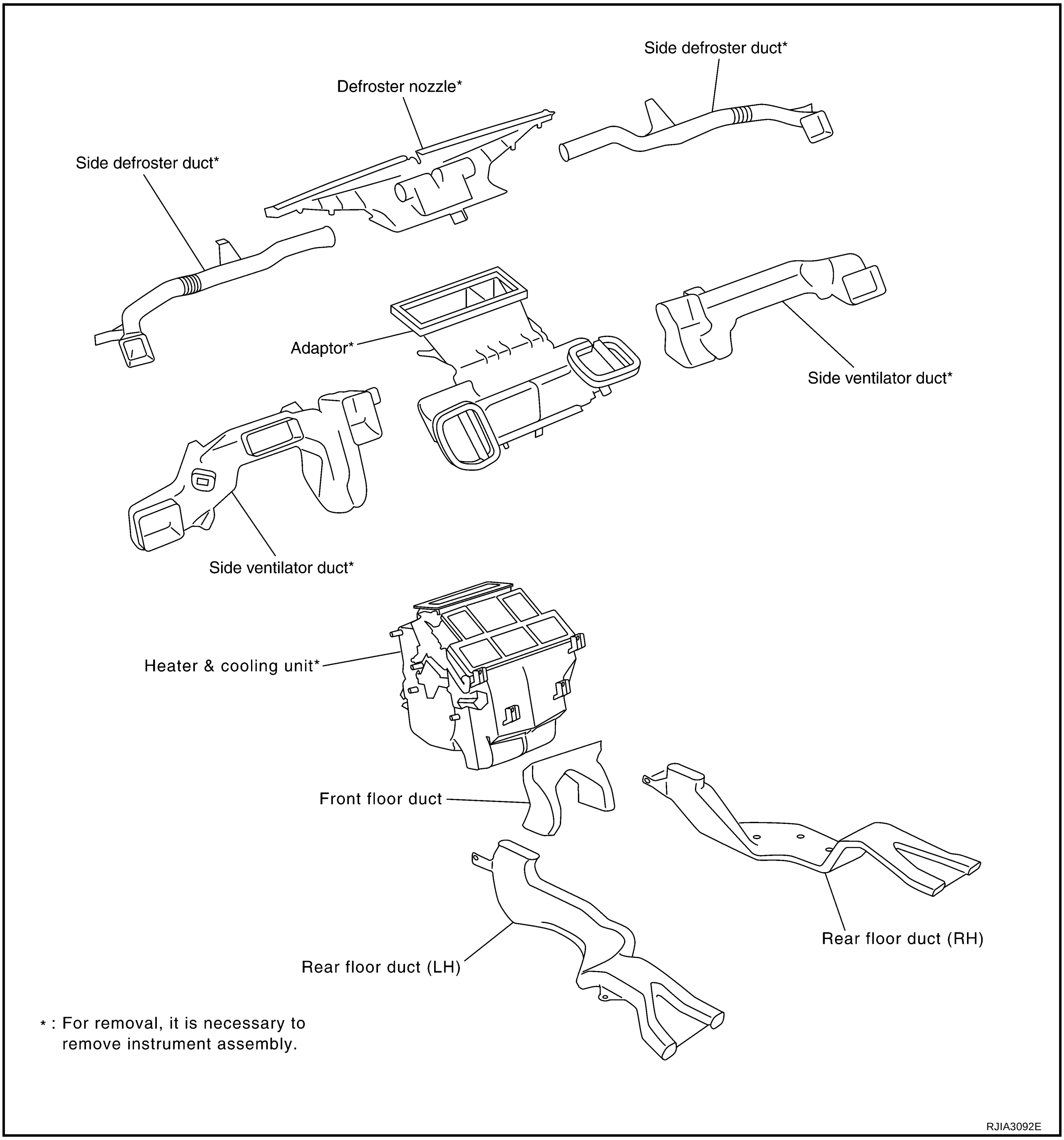
   Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high-pressure enters the crankcase.
   - The force acts around the journal pin near the wobble (swash) plate, and is generated by the pressure difference between before and behind the piston.

   The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc rises due to capacity control, the force around the journal pin makes the wobble (swash) plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the wobble (swash) plate.


Discharge port
High-pressure valve: Open
Crankcase
Cylinder pressure
Suction port
Spring pressure
Crankcase pressure
Valve position for raising crankcase pressure
Forces needed to decrease stroke
RHA474C

Component Layout

AJS001K8



LUBRICANT

PFP:KLG00

Maintenance of Lubricant Quantity in Compressor

AJS001K9

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.
If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor.
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

LUBRICANT

Name	**: Nissan A/C System Oil Type S**
Part number	**: KLH00-PAGS0**

LUBRICANT RETURN OPERATION

Adjust the lubricant quantity according to the test group shown below.

1. CHECK LUBRICANT RETURN OPERATION

Can lubricant return operation be performed?

- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

CAUTION:
If excessive lubricant leakage is noted, do not perform the lubricant return operation.

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS

1. Start engine, and set the following conditions:
- Engine speed: Idling to 1,200 rpm
- A/C switch: ON
- Blower speed: Max. position
- Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
- Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop engine.

>> GO TO 3.

3. CHECK REPLACEMENT PART

Should the compressor be replaced?

YES >> GO TO ATC-23, "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT" .
NO >> GO TO ATC-23, "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR" .

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

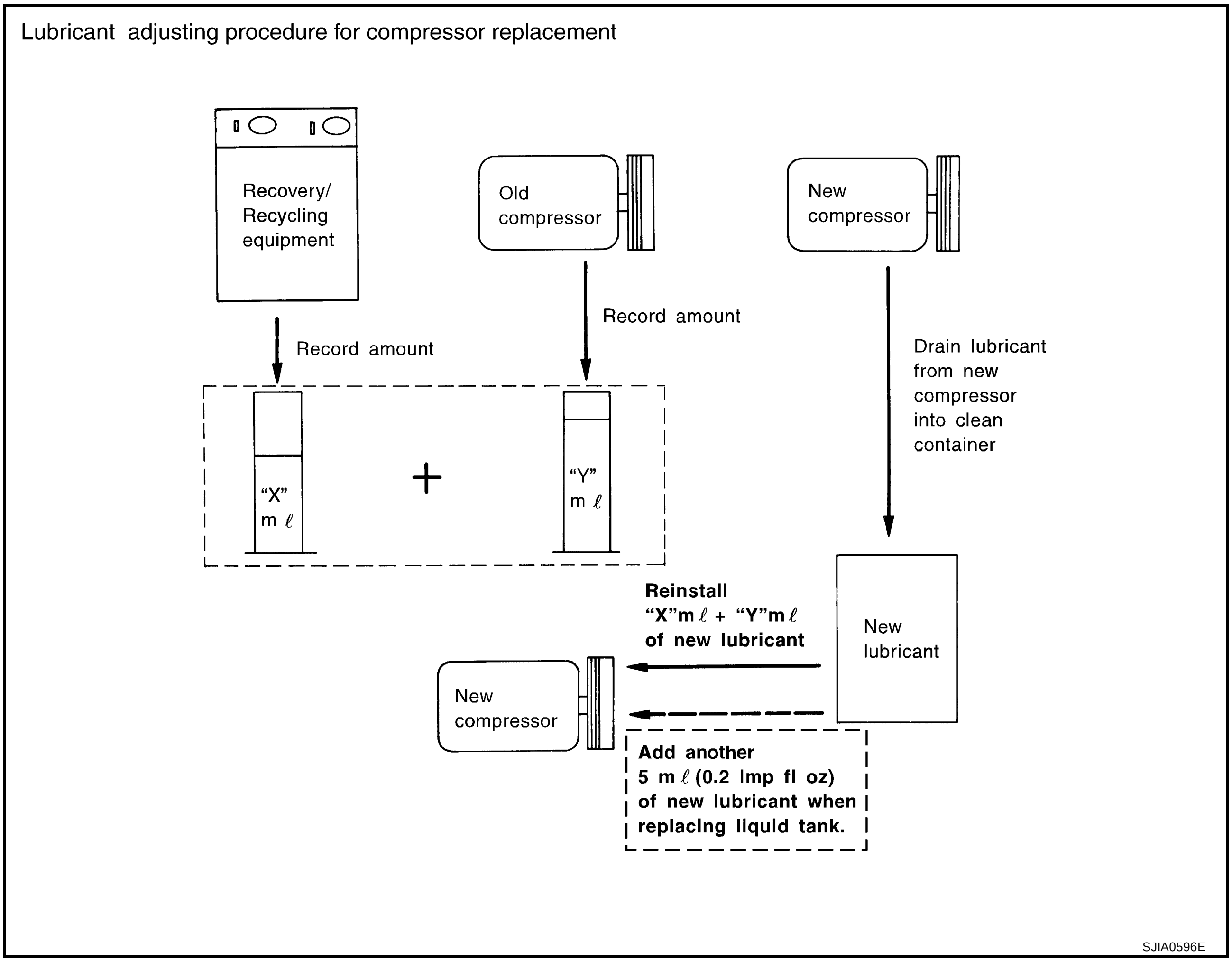
After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant m ℓ (Imp fl oz)	
Evaporator	75 (2.6)	-
Condenser	35 (1.2)	-
Liquid tank	10 (0.4)	-
In case of refrigerant leak	30 (1.1)	Large leak
	-	Small leak *1

*1: If refrigerant leak is small, no addition of lubricant is needed.

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

1. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to ATC-5, "CONTAMINATED REFRIGERANT" .
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to ATC-5, "CONTAMINATED REFRIGERANT" .
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
6. Drain the lubricant from the new compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from old compressor. Add this lubricant to new compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add another 5 m ℓ (0.2 Imp fl oz) of lubricant at this time.
   Do not add this 5 m ℓ (0.2 Imp fl oz) of lubricant only when replaces the compressor.



Lubricant adjusting procedure for compressor replacement
Recovery/ Recycling equipment
Old compressor
New compressor
Record amount
Record amount
Drain lubricant from new compressor into clean container
"X" m ℓ
+
"Y" m ℓ
Reinstall "X"m ℓ + "Y"m ℓ of new lubricant
New lubricant
New compressor
Add another 5 m ℓ (0.2 Imp fl oz) of new lubricant when replacing liquid tank.
SJIA0596E

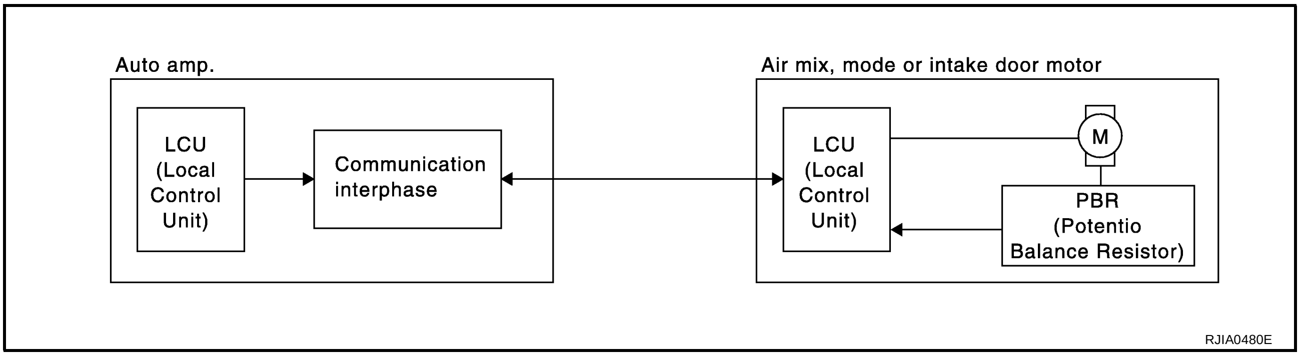
AIR CONDITIONER CONTROL

PFP:27500

Description of Air Conditioner LAN Control System

AJS001KA

The LAN (Local Area Network) system consists of auto amp., mode door motor, air mix door motor and intake door motor.
A configuration of these components is shown in the diagram below.

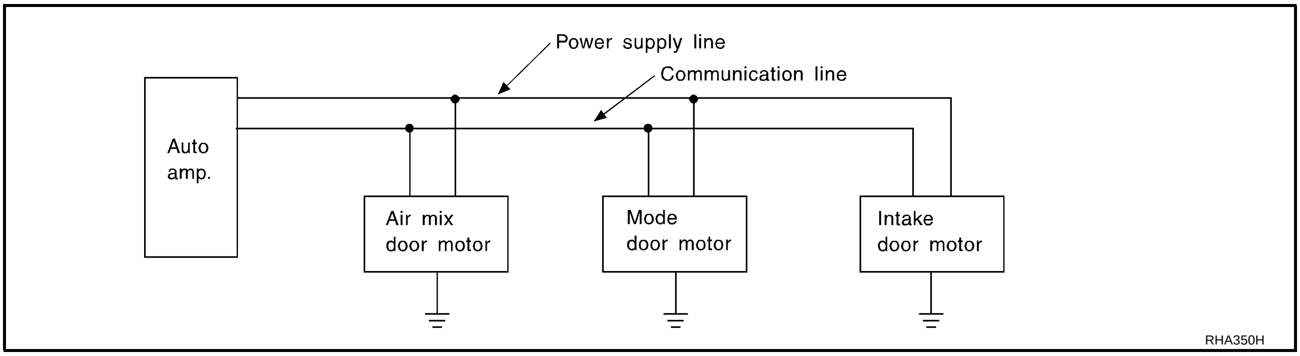


System Construction

AJS001KB

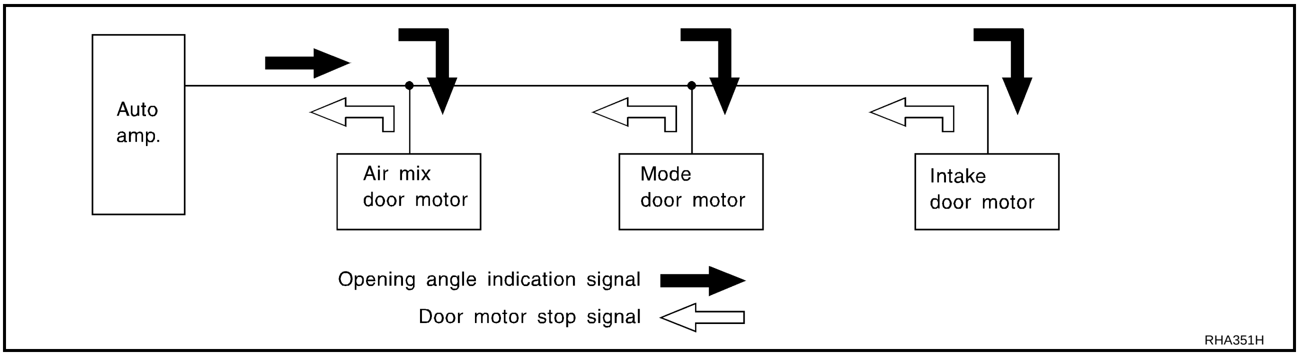
A small network is constructed between the auto amp., air mix door motor, mode door motor and intake door motor. The auto amp. and motors are connected by data transmission lines and motor power supply lines. The LAN network is built through the ground circuits of each door motor.
Addresses, motor opening angle signals, motor stop signals and error checking messages are all transmitted through the data transmission lines connecting the auto amp. and each door motor.
The following functions are contained in LCUs built into air mix door motor, mode door motor and intake door motor.

- Address
- Motor opening angle signal
- Data transmission
- Motor stop and drive decision
- Opening angle sensor (PBR function)
- Comparison
- Decision (Auto amp. indicated value and motor opening angle comparison)



OPERATION

The auto amp. receives data from each of the sensors. The auto amp. sends mode door, air mix door and intake door opening angle data to the mode door motor LCU, air mix door motor LCU and intake door motor LCU.
The mode door motor, air mix door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors is compared by the LCUs in each motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT or FRESH/RECIRCULATION operation is selected. The new selection data is returned to the auto amp.



TRANSMISSION DATA AND TRANSMISSION ORDER

Auto amp. data is transmitted consecutively to each of the door motors following the form shown in figure below.

Start:

Initial compulsory signal sent to each of the door motors.

Address:

Data sent from the auto amp. is selected according to data-based decisions made by the air mix door motor, mode door motor and intake door motor.
If the addresses are identical, the opening angle data and error check signals are received by the door motor LCUs. The LCUs then make the appropriate error decision. If the opening angle data is usual, door control begins.
If an error exists, the received data is rejected and corrected data received. Finally, door control is based upon the corrected opening angle data.

Opening Angle:

Data that shows the indicated door opening angle of each door motor.

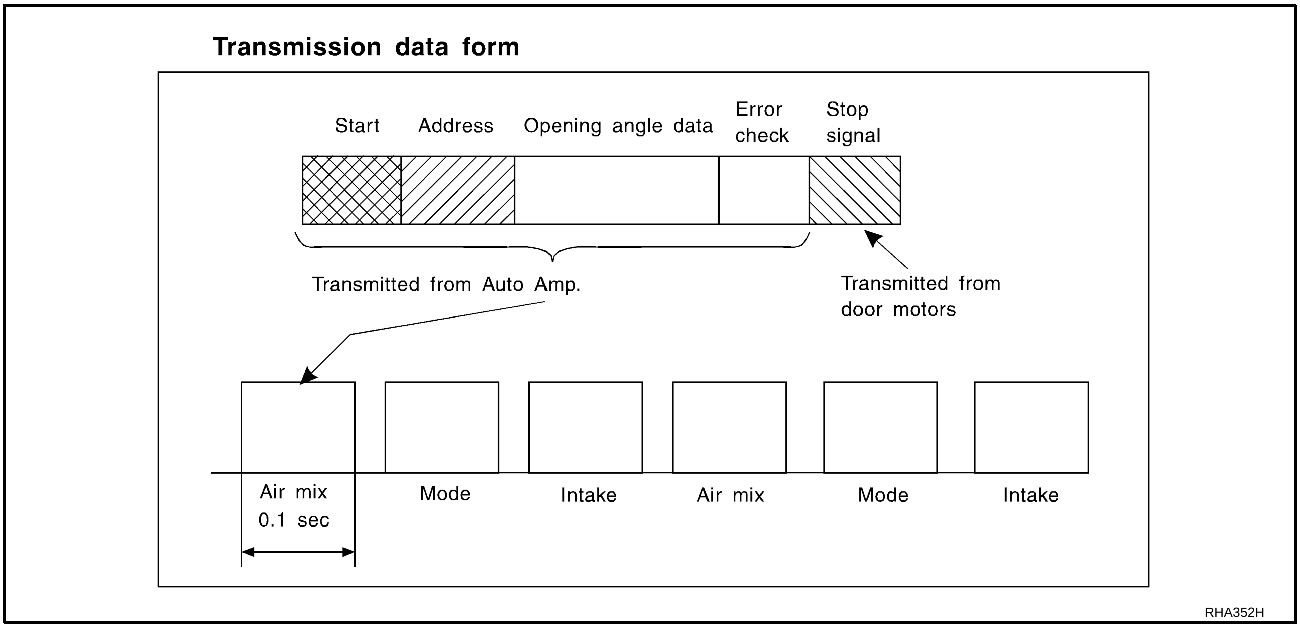
Error Check:

Procedure by which sent and received data is checked for errors. Error data is then compiled. The error check prevents corrupted data from being used by the air mix door motor, mode door motor and intake door motor. Error data can be related to the following symptoms.

- Malfunction electrical frequency
- Poor electrical connections
- Signal leakage from transmission lines
- Signal level fluctuation

Stop Signal:

At the end of each transmission, a stop operation, in-operation, or internal malfunction message is delivered to the auto amp. This completes one data transmission and control cycle.



AIR MIX DOOR CONTROL (AUTOMATIC TEMPERATURE CONTROL)

The air mix door is automatically controlled so that in-vehicle temperature is maintained at a predetermined value by the temperature setting, ambient temperature, in-vehicle temperature and amount of sunload.

FAN SPEED CONTROL

Blower speed is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and air mix door position.
With FAN control dial set to AUTO, the blower motor starts to gradually increase air flow volume.
When engine coolant temperature is low, the blower motor operation is delayed to prevent cool air from flowing.

INTAKE DOOR CONTROL

The intake doors are automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature, amount of sunload and ON-OFF operation of the compressor.

OUTLET DOOR CONTROL

The outlet door is automatically controlled by the temperature setting, ambient temperature, in-vehicle temperature, intake temperature and amount of sunload.

MAGNET CLUTCH CONTROL

The ECM controls compressor operation using input signals from the throttle position sensor, refrigerant pressure sensor and auto amp.

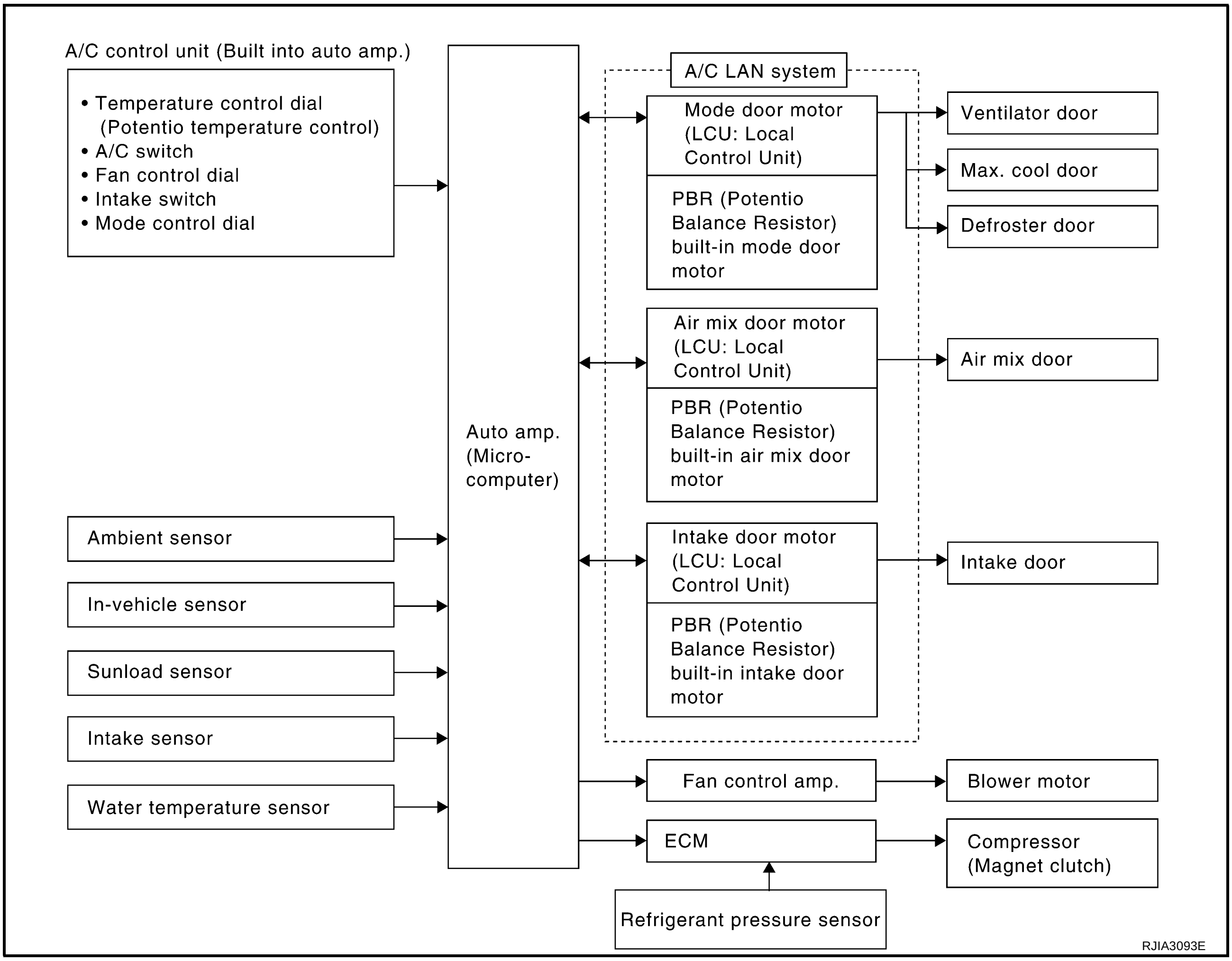
SELF-DIAGNOSTIC SYSTEM

The self-diagnostic system is built into the auto amp. to quickly locate the cause of symptoms.

Description of Control System

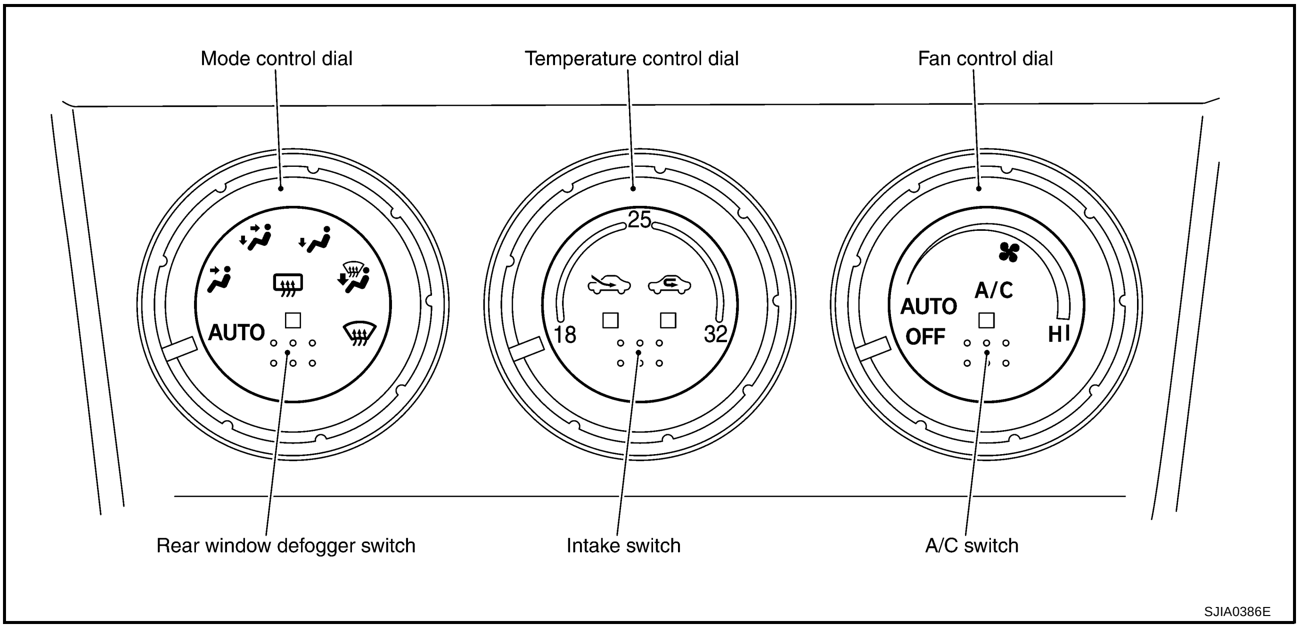
AJS001KC

The control system consists of input sensors, switches, the auto amp. (microcomputer) and outputs. The relationship of these components is shown in the diagram below:



Control Operation

AJS001KD



MODE CONTROL DIAL

Controls the air discharge outlets.
Positions the air outlet doors to the defrost position. Also positions the intake doors to the outside air position. When shifting mode control dial to DEF under the following conditions, compressor is turned ON. (A/C LED ON)

- FAN: ON
- A/C: OFF

TEMPERATURE CONTROL DIAL (POTENTIO TEMPERATURE CONTROL)

Increase or decrease the set temperature.

FAN CONTROL DIAL

Automatically or Manually control the blower speed. Twenty-five speeds are available for manual control. Shifting fan control dial to AUTO, compressor is turned ON automatically.

REAR WINDOW DEFOGGER SWITCH

When illumination is ON, rear window is defogged.

INTAKE SWITCH

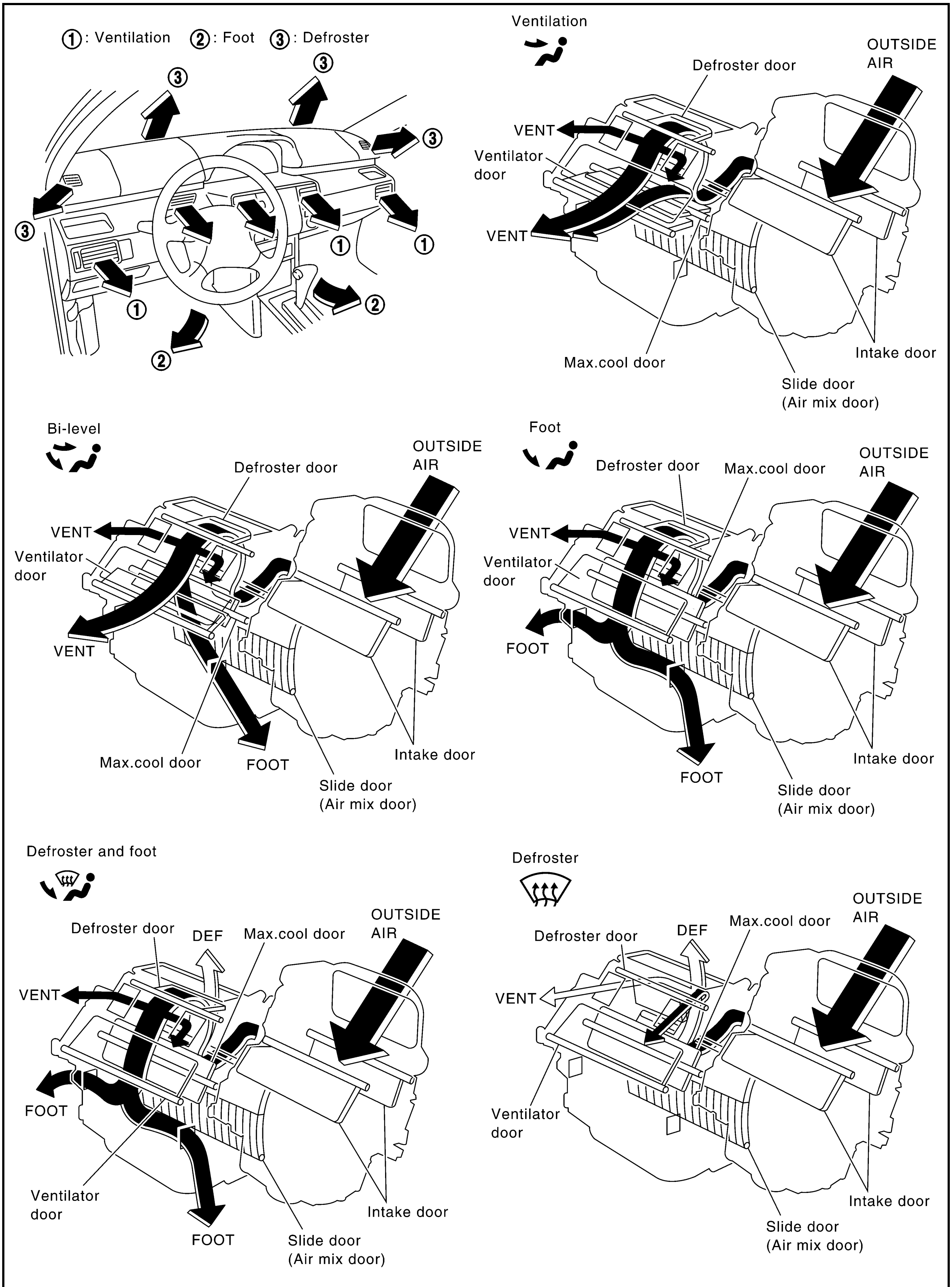
- When intake switch is ON, FRE indicator turns ON, and air inlet is fixed to FRE.
- When press intake switch again, REC indicator turns ON, and air inlet is fixed to REC.
- When intake switch is pressed for approximately 1.5 seconds or longer, REC and FRE indicators blink twice. Then, automatic control mode is entered. Inlet status is displayed even during automatic control.
- When shifting mode control dial to D/F, D/F2 or DEF position, FRE indicator is turned ON, or when compressor is turned from ON to OFF, REC switch is automatically turned OFF (fixed to FRE mode).
  REC mode can be re-entered by pressing intake switch again. (Except DEF position)

A/C SWITCH

The compressor is ON or OFF.
(Pressing the A/C switch when the fan control dial is ON will turn off the A/C switch and compressor.)

Discharge Air Flow

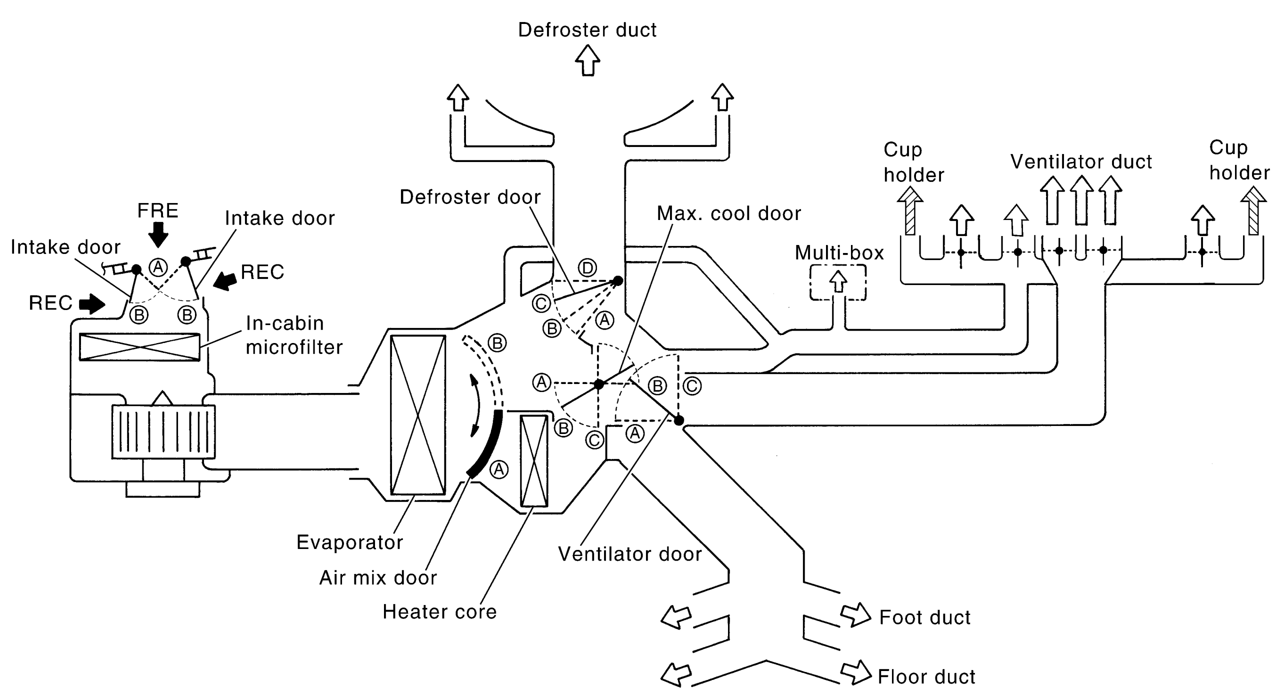
AJS001KE



System Description

AJS001KF

SWITCHES AND THEIR CONTROL FUNCTION



RJIA3183E

Door \ Position or switch	MODE control dial: VENT	B/L	FOOT	D/F	DEF	AUTO	Intake SW (REC)	Intake SW (FRE)	Temperature control dial: 18°C	~	32°C
Ventilator door	Ⓐ	Ⓑ	Ⓒ	Ⓒ	Ⓒ	AUTO	—		—		
Max. cool door	Ⓐ	Ⓑ	Ⓑ	Ⓑ	Ⓒ	AUTO	—		—		
Defroster door	Ⓓ	Ⓓ	Ⓓ or Ⓒ *1	Ⓑ	Ⓐ	AUTO	—		—		
Intake door	—			Ⓑ	Ⓑ	—	Ⓐ *2	Ⓑ *2	—		
Air mix door	—				—	—	—		Ⓐ	AUTO	Ⓑ

*1: This door position is switched by self-diagnosis STEP-6.
*2: Inlet status is displayed even during automatic control.

RJIA2822E

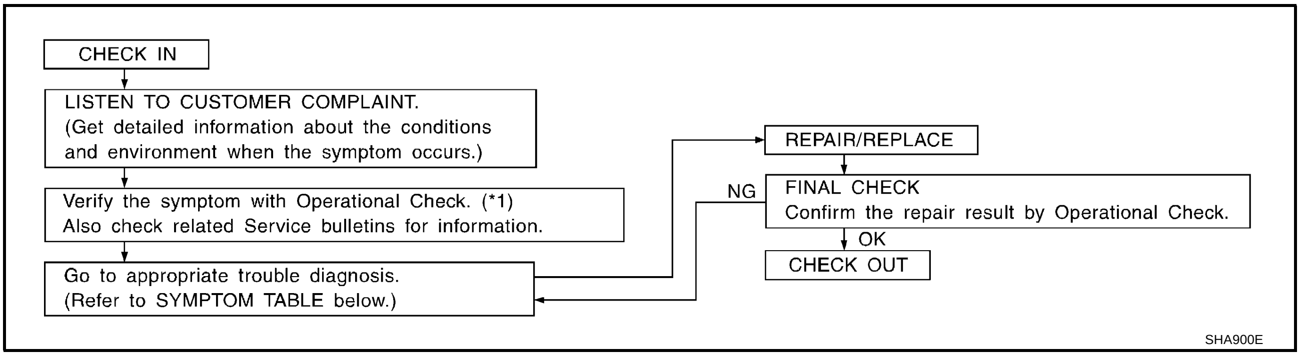
TROUBLE DIAGNOSIS

PFP:00004

How to Perform Trouble Diagnoses for Quick and Accurate Repair

AJS001KG

WORK FLOW



*1 ATC-50, "Operational Check"

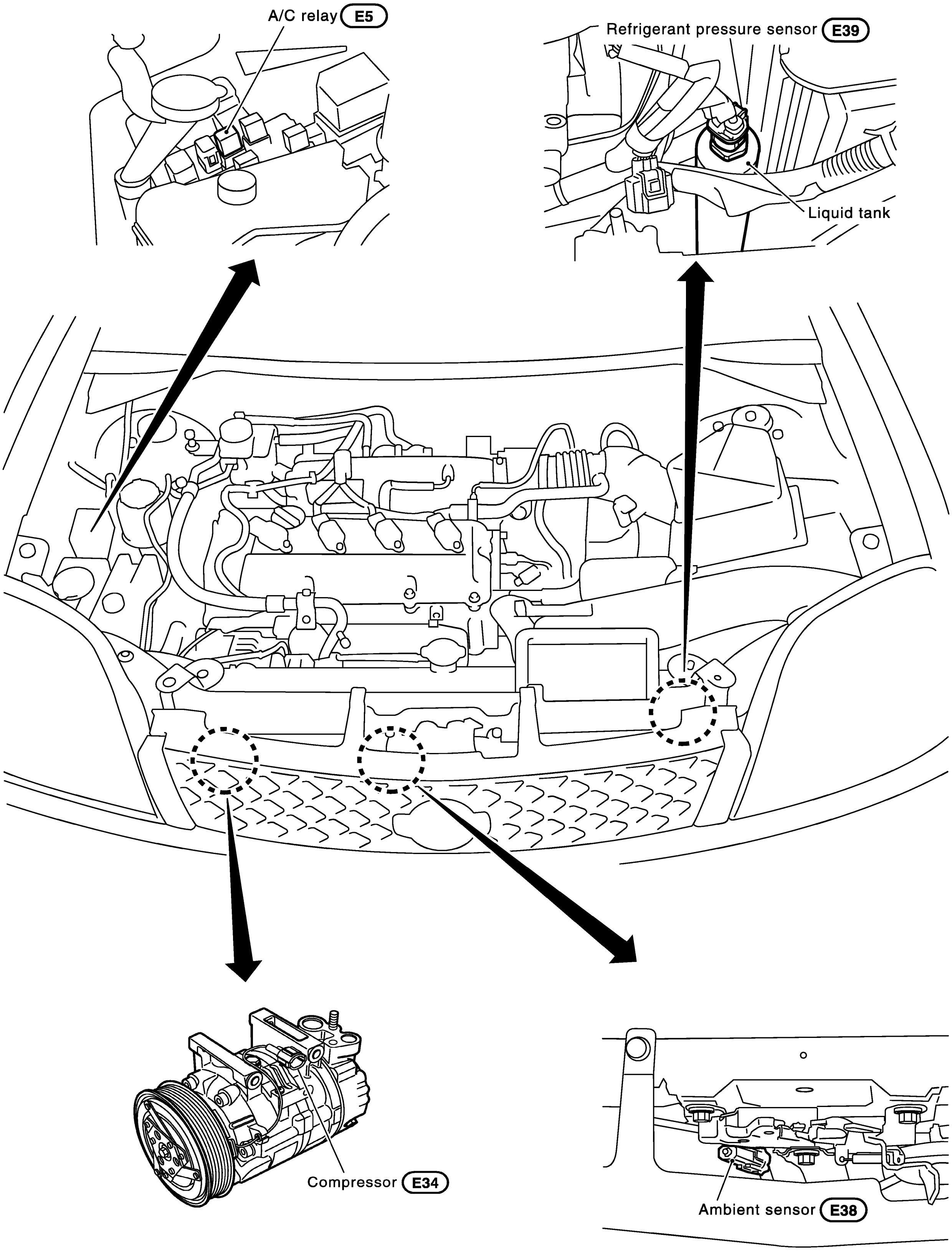
SYMPTOM TABLE

Symptom	Reference Page	
A/C system does not come on.	Go to Trouble Diagnosis Procedure for A/C System.	ATC-52, "Power Supply and Ground Circuit for Auto Amp."
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door Motor. (LAN)	ATC-57, "Mode Door Motor Circuit"
Mode door motor does not operate normally.		
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door Motor. (LAN)	ATC-60, "Air Mix Door Motor Circuit"
Air mix door motor does not operate normally.		
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor. (LAN)	ATC-63, "Intake Door Motor Circuit"
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	ATC-66, "Blower Motor Circuit"
Blower motor operation is malfunctioning under out of starting fan speed control.		
Magnet clutch does not engage.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	ATC-72, "Magnet Clutch Circuit"
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	ATC-78, "Insufficient Cooling"
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	ATC-86, "Insufficient Heating"
Noise	Go to Trouble Diagnosis Procedure for Noise.	ATC-87, "Noise"
Self-diagnosis cannot be performed.	Go to Trouble Diagnosis Procedure for Self-diagnosis.	ATC-88, "Self-diagnosis"

Component Parts and Harness Connector Location

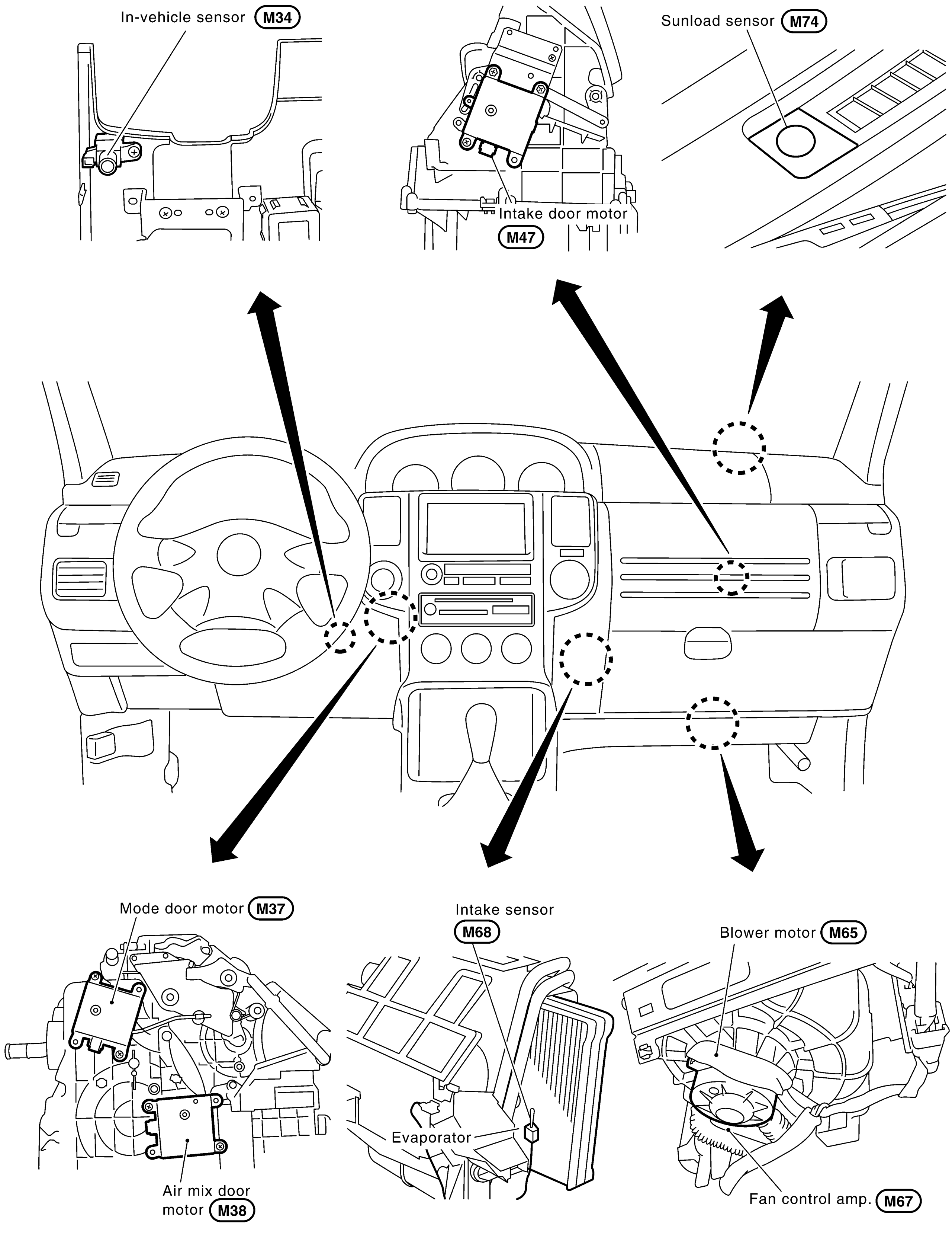
AJS001KH

ENGINE COMPARTMENT



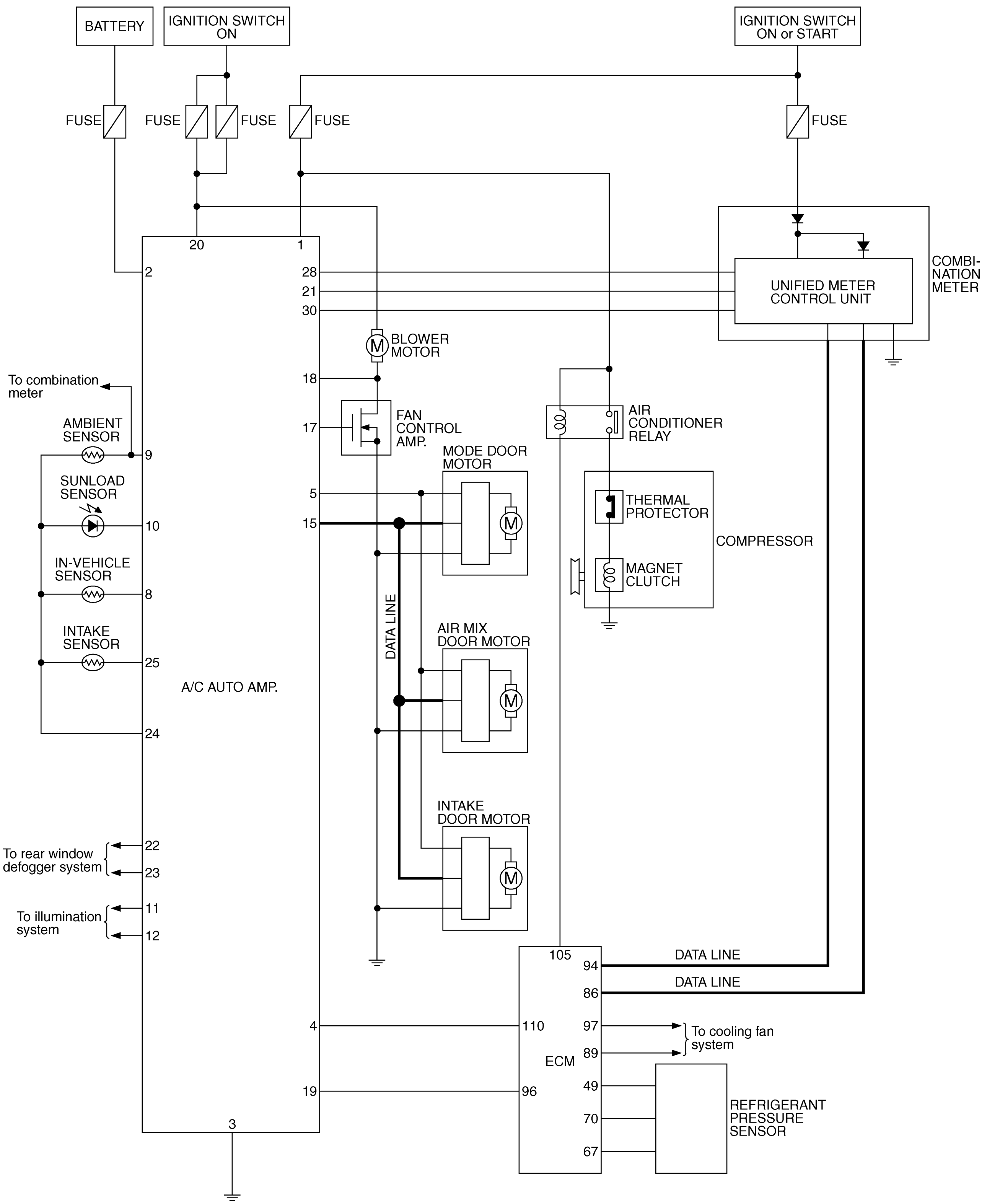
RJIA3094E

PASSENGER COMPARTMENT



Schematic — A/C, A —

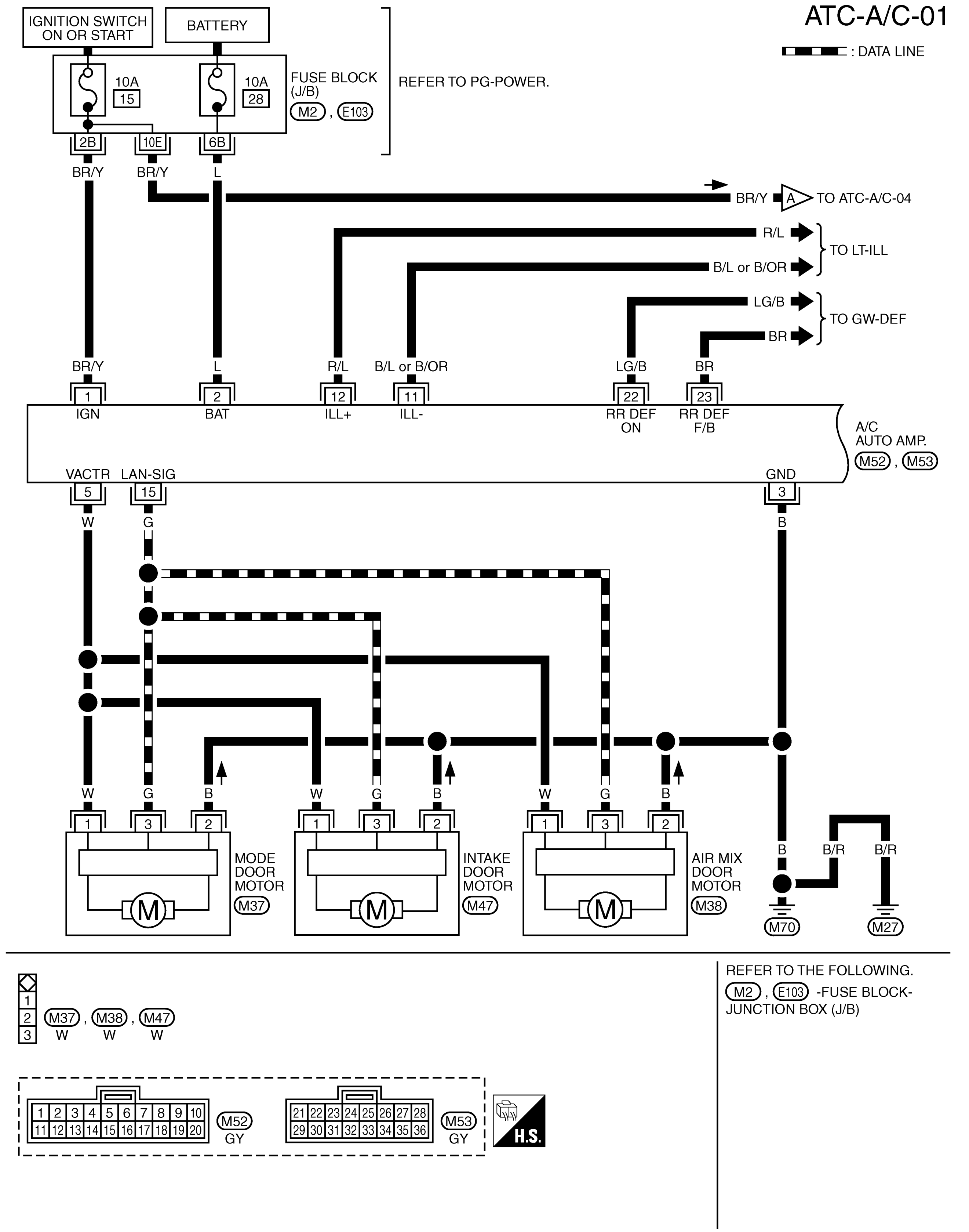
AJS001KI



TJWB0036E

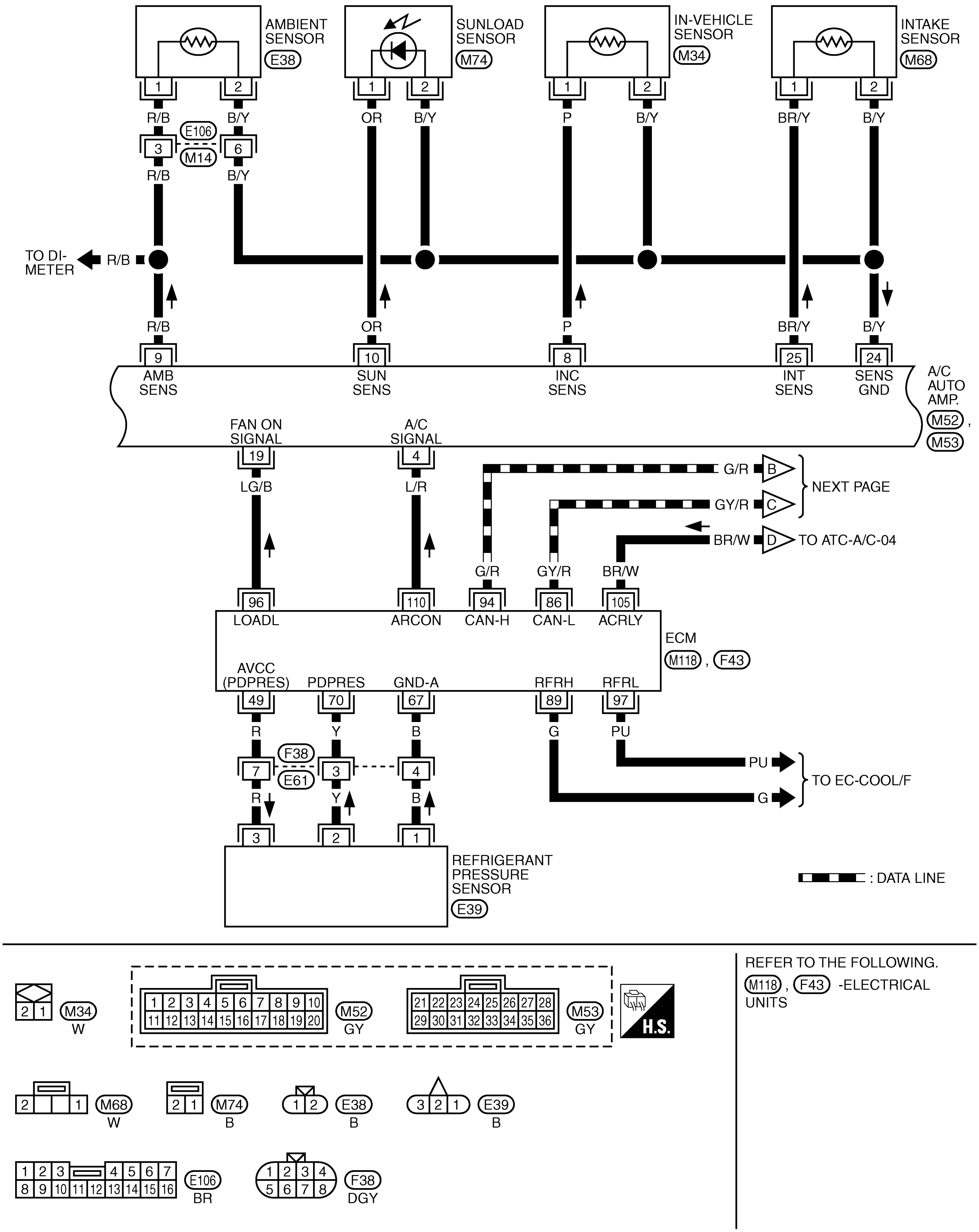
Wiring Diagram — A/C, A —

AJS001O6



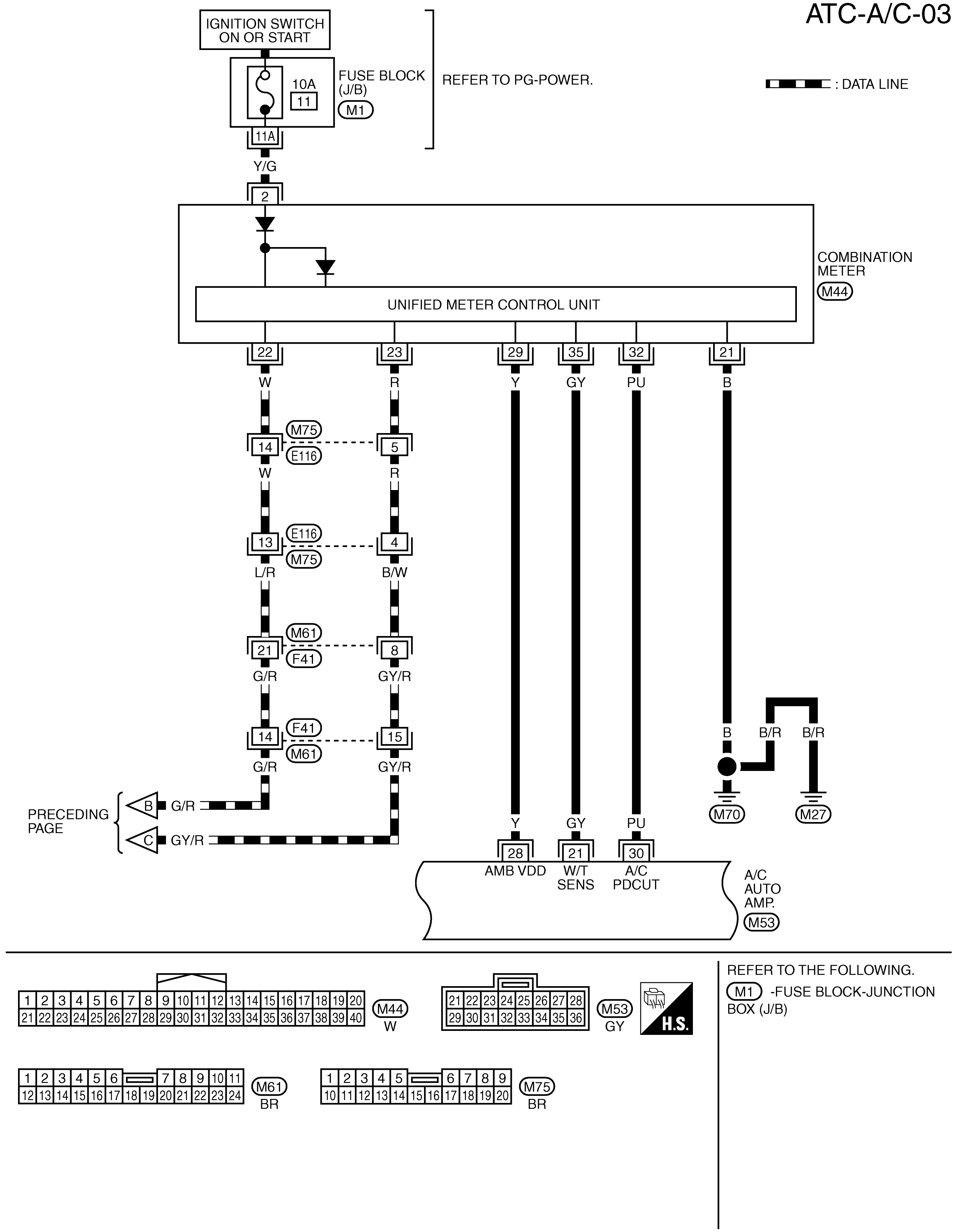
TJWB0044E

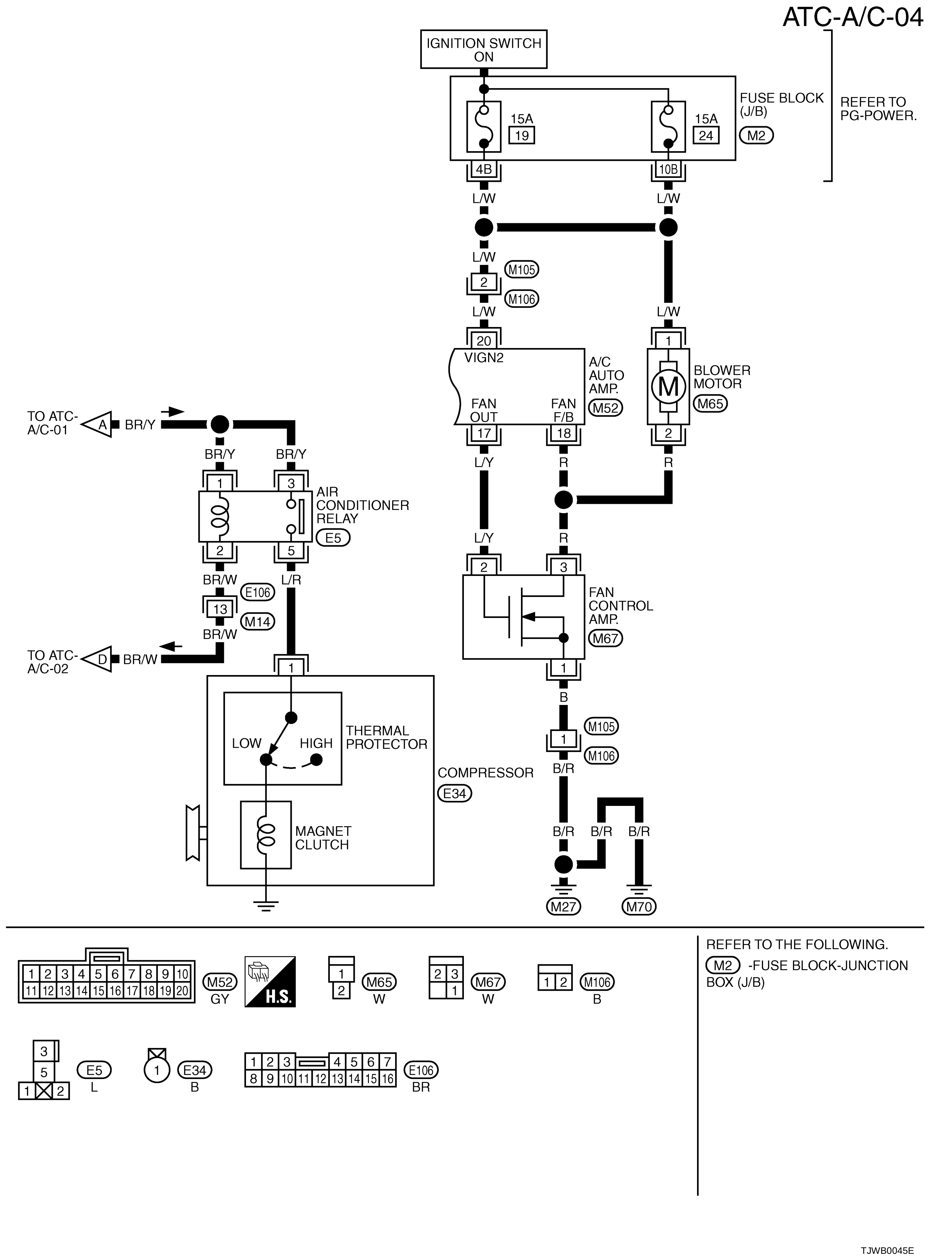
ATC-A/C-02



REFER TO THE FOLLOWING.
M118, F43 -ELECTRICAL UNITS

TJWB0037E

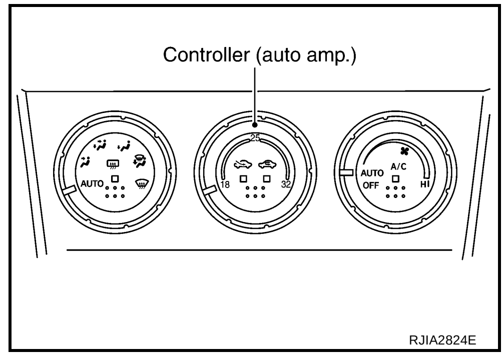

ATC-A/C-03
: DATA LINE
IGNITION SWITCH ON OR START
10A
11
FUSE BLOCK (J/B)
M1
REFER TO PG-POWER.
11A
Y/G
2
COMBINATION METER
M44
UNIFIED METER CONTROL UNIT
22
23
29
35
32
21
W
R
Y
GY
PU
B
M75
E116
14
5
13
4
L/R
B/W
M61
F41
21
8
G/R
GY/R
15
B/R
M70
M27
PRECEDING PAGE
B
C
28
30
AMB VDD
W/T SENS
A/C PDCUT
A/C AUTO AMP.
M53
BR
H.S.
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)
TJWB0038E


ATC-A/C-04
IGNITION SWITCH ON
FUSE BLOCK (J/B)
M2
REFER TO PG-POWER.
15A 19
15A 24
4B
10B
L/W
M105
M106
2
20
VIGN2
A/C AUTO AMP.
M52
FAN OUT
FAN F/B
17
18
BLOWER MOTOR
M65
TO ATC-A/C-01
A
BR/Y
AIR CONDITIONER RELAY
E5
L/Y
R
B
FAN CONTROL AMP.
M67
BR/W
L/R
E106
13
M14
TO ATC-A/C-02
D
THERMAL PROTECTOR
LOW
HIGH
COMPRESSOR
E34
MAGNET CLUTCH
B/R
M27
M70
GY
H.S.
W
L
BR
REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)
TJWB0045E

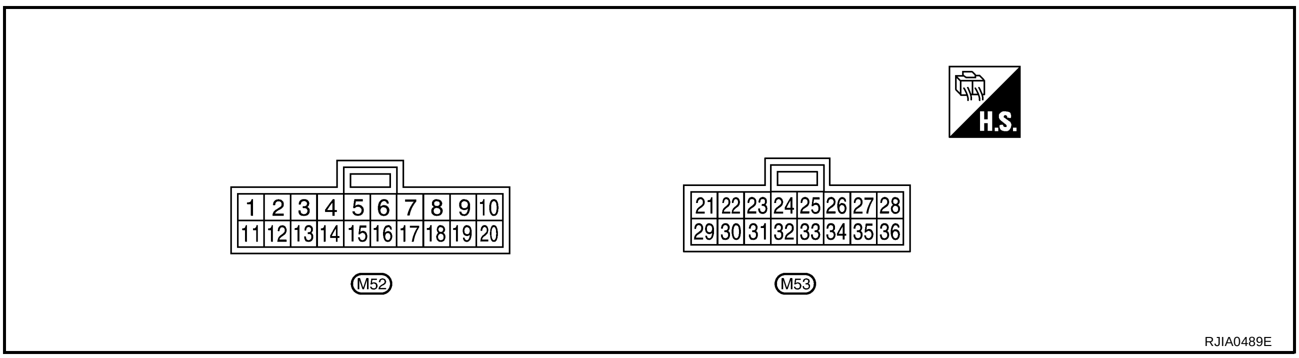
Auto Amp. Terminals and Reference Value

AJS001KK

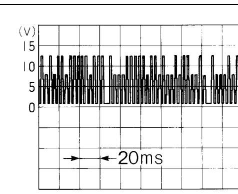
Measure voltage between each terminal and ground by following terminals and reference value for auto amp.

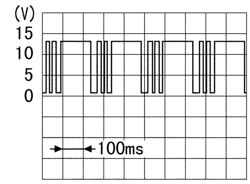


PIN CONNECTOR TERMINAL LAYOUT



TERMINALS AND REFERENCE VALUE FOR AUTO AMP.

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V)
1	BR/Y	Power supply for IGN	ON	-	Battery voltage
2	L	Power supply for BAT	OFF	-	Battery voltage
3	B	Ground	ON	-	Approx. 0
4	L/R	Compressor (A/C) ON signal	ON	A/C switch (Compressor): ON	Approx. 0
				A/C switch (Compressor): OFF	Approx. 5
5	W	Power supply for each door motor	ON	-	Battery voltage
8	P	In-vehicle sensor	-	-	-
9	R/B	Ambient sensor	-	-	-
10	OR	Sunload sensor	-	-	-
11	B/L or B/OR	Illumination ground	ON	Light switch: ON	Approx. 0
12	R/L	Power supply for illumination	ON	Light switch: ON	Approx. 12
15	G	LAN signal	ON	-	 HAK0652D
17	L/Y	Fan control amp. control signal	ON	Blower fan speed: 1st - 24th	Approx. 2.5 - 3.5
				Blower fan speed: 25th	Approx. 9.0
18	R	Blower motor feedback	ON	Blower fan speed: 1st	Approx. 8.0
19	LG/B	Blower fan ON signal	ON	Blower fan: ON	Approx. 0
				Blower fan: OFF	Approx. 5

Terminal No.	Wire color	Item	Ignition switch	Condition	Voltage (V)
20	L/W	Power supply for IGN2	ON	-	Battery voltage
21	GY	Water temperature sensor	ON	At idle [after warming up, approx. 80°C (176°F)] **CAUTION:** **The waveforms vary depending on coolant temperature.**	 SKIA0056J
22	LG/B	Rear window defogger ON signal	ON	Rear window defogger: ON	Approx. 0
				Rear window defogger: OFF	Approx. 12
23	BR	Rear window defogger feedback signal	ON	Rear window defogger: ON	Approx. 12
				Rear window defogger: OFF	Approx. 0
24	B/Y	Sensor ground	ON	-	Approx. 0
25	BR/Y	Intake sensor	-	-	-
28	Y	Power supply for ambient temperature display	ON	-	Approx. 5
30	PU	Compressor feedback signal	ON	-	Approx. 0
				When refrigerant pressure sensor connector is disconnected	Approx. 5

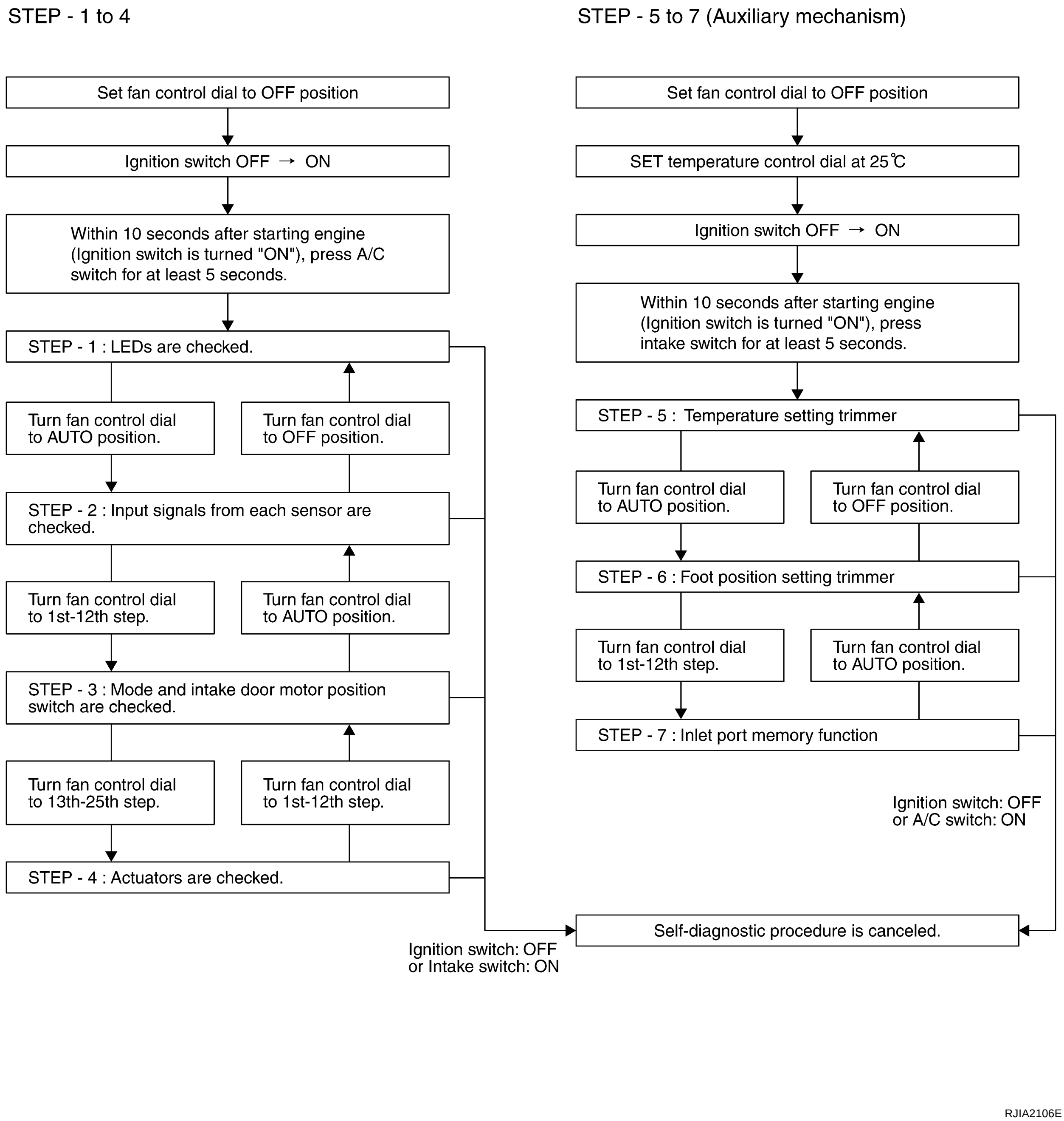
Self-diagnosis Function

AJS001KL

DESCRIPTION

The self-diagnostic system diagnoses sensors, door motors, blower motor, etc. by system line.
Self-diagnosis is step-1 to 7. There are two ways of changing method during self-diagnosis.

- Switching to self-diagnosis step-1 to 4.
  Shifting from usual control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from OFF to ON) and pressing A/C switch for at least 5 seconds. The A/C switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be canceled by either pressing intake switch or turning the ignition switch OFF. Shifting from one step to another is accomplished be means of turning fan control dial, as required.
- Switching to self-diagnosis step-5 to 7 (Auxiliary mechanism).
  Shifting from usual control to the self-diagnostic system is accomplished by starting the engine (turning the ignition switch from OFF to ON) and pressing intake switch for at least 5 seconds. The intake switch must be pressed within 10 seconds after starting the engine (ignition switch is turned ON). This system will be canceled by either pressing A/C switch or turning the ignition switch OFF. Shifting from one step to another is accomplished by means of turning fan control dial, as required.


STEP - 1 to 4
STEP - 5 to 7 (Auxiliary mechanism)
Set fan control dial to OFF position
Ignition switch OFF → ON
Within 10 seconds after starting engine (Ignition switch is turned "ON"), press A/C switch for at least 5 seconds.
STEP - 1 : LEDs are checked.
Turn fan control dial to AUTO position.
Turn fan control dial to OFF position.
STEP - 2 : Input signals from each sensor are checked.
Turn fan control dial to 1st-12th step.
Turn fan control dial to AUTO position.
STEP - 3 : Mode and intake door motor position switch are checked.
Turn fan control dial to 13th-25th step.
Turn fan control dial to 1st-12th step.
STEP - 4 : Actuators are checked.
Ignition switch: OFF or Intake switch: ON
Set fan control dial to OFF position
SET temperature control dial at 25℃
Ignition switch OFF → ON
Within 10 seconds after starting engine (Ignition switch is turned "ON"), press intake switch for at least 5 seconds.
STEP - 5 : Temperature setting trimmer
Turn fan control dial to AUTO position.
Turn fan control dial to OFF position.
STEP - 6 : Foot position setting trimmer
Turn fan control dial to 1st-12th step.
Turn fan control dial to AUTO position.
STEP - 7 : Inlet port memory function
Ignition switch: OFF or A/C switch: ON
Self-diagnostic procedure is canceled.
RJIA2106E

FUNCTION CONFIRMATION PROCEDURE

1. SET IN SELF-DIAGNOSTIC MODE (STEP-1 TO 4)

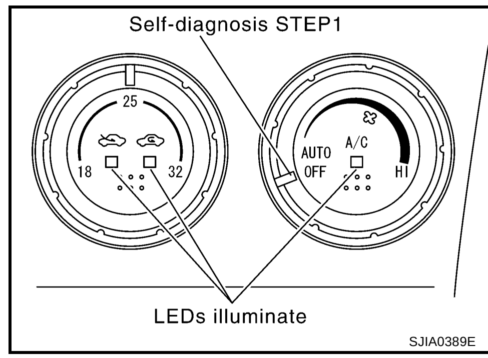
1. Set the fan control dial to OFF position.
2. Turn ignition switch ON.
3. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press A/C switch for at least 5 seconds.

   CAUTION:

   If battery voltage drops below 12V during diagnosis step-3, door motor speed becomes slower and as a result, the system may generate an error even when operation is usual. To avoid this, start engine before performing this diagnosis.

>> GO TO 2.

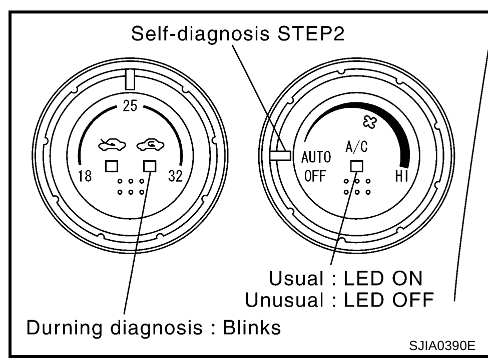
2. STEP-1: LEDS ARE CHECKED



Check intake and A/C switch LEDs illumination.

OK >> GO TO 3.
NG >> Refer to ATC-88, "Self-diagnosis" .

3. CHECK TO ADVANCE SELF-DIAGNOSIS STEP-2



1. Turn fan control dial to AUTO position.

   CAUTION:

   When switched to STEP-2, LED of REC position blinks for approximately 25 seconds.
2. Check A/C switch LED illumination.

Advance to self-diagnosis STEP-2?.

YES >> GO TO 4.
NO >> Replace controller.

4. CHECK TO RETURN SELF-DIAGNOSIS STEP-1

Turn fan control dial to OFF position.

Return to self-diagnosis STEP-1?

YES >> GO TO 5.
NO >> Replace controller.

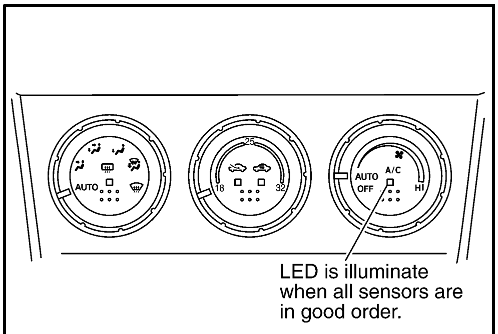
5. STEP-2: SENSOR CIRCUITS ARE CHECKED FOR OPEN OR SHORT CIRCUIT

1. Turn fan control dial to AUTO position.
2. Turn mode control dial to AUTO position.

   CAUTION:
   When switched to STEP-2, LED of REC position blinks for approximately 25 seconds.
3. Check A/C switch LED is illuminate.

OK or NG

OK >> GO TO 6.
NG >> GO TO 9.



SJIA0391E

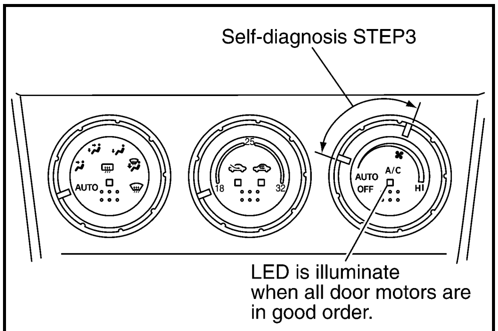
6. STEP-3: MODE DOOR AND INTAKE DOOR POSITIONS ARE CHECKED

1. Turn fan control dial to 1st–12th speed.
2. Check A/C switch LED is illuminate.

   CAUTION:
   When switched to STEP-3, LED of REC position blinks for approximately 50 seconds.

OK or NG

OK >> GO TO 7.
NG >> GO TO 10.

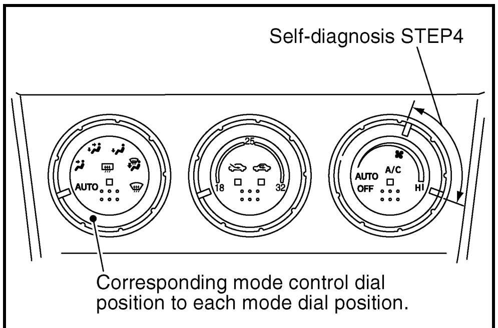


SJIA0392E

7. STEP-4: OPERATION OF EACH ACTUATOR IS CHECKED

1. Turn fan control dial to 13th–25th speed.
2. Change operation status of air conditioner by changing mode control dial position.

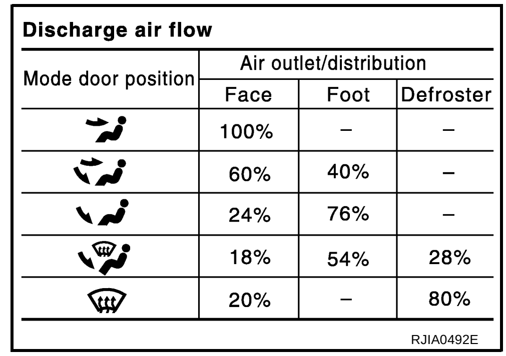
>> GO TO 8.



SJIA1015E

8. CHECK ACTUATORS

Refer to the following chart and confirm discharge air flow, air temperature, blower motor voltage and compressor operation.



Discharge air flow

Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	24%	76%	–
	18%	54%	28%
	20%	–	80%

RJIA0492E

	Mode control dial position					
STEP No.*1	STEP-41	STEP-42	STEP-43	STEP-44	STEP-45	STEP-46
Mode control dial position	AUTO	VENT	B/L	FOOT or FOOT2	D/F or D/F2	DEF
Mode door position	VENT	VENT	B/L	FOOT*2	D/F	DEF
Intake door position	REC	REC	REC	FRE	FRE	FRE
Air mix door position	FULL COLD	FULL COLD	FULL COLD	FULL HOT	FULL HOT	FULL HOT
Blower motor voltage	Approx. 4.5V	Approx. 10.5V	Approx. 8.5V	Approx. 8.5V	Approx. 8.5V	Approx. 12V
Compressor	ON	ON	OFF	OFF	ON	ON

Checks must be made visually, by listening to any noise, or by touching air outlets with your hand, etc. for improper operation.

*1: Step No. 41 to 46 are for differentiation and will not be displayed.

*2: FOOT position during automatic control. Refer to ATC-49, "AUXILIARY MECHANISM: FOOT POSITION SETTING TRIMMER" .

OK or NG

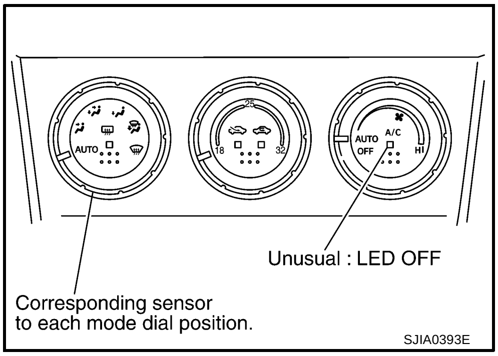
OK >> 1. Turn ignition switch OFF or intake switch ON.
2. INSPECTION END

NG >>
- Air outlet does not change.
  Go to Mode Door Motor Circuit. Refer to ATC-57, "Mode Door Motor Circuit" .
- Intake door does not change.
  Go to Intake Door Motor Circuit. Refer to ATC-63, "Intake Door Motor Circuit" .
- Blower motor operation is malfunctioning.
  Go to Blower Motor Circuit. Refer to ATC-66, "Blower Motor Circuit" .
- Magnet clutch does not engage.
  Go to Magnet Clutch Circuit. Refer to ATC-72, "Magnet Clutch Circuit" .
- Discharge air temperature does not change.
  Go to Air Mix Door Motor Circuit. Refer to ATC-60, "Air Mix Door Motor Circuit" .

9. CHECK MALFUNCTIONING SENSOR

Refer to the following chart.
*1: Perform self-diagnosis STEP-2 under sunshine.
When performing indoors, aim a light (more than 60W) at sunload sensor, otherwise LED of A/C switch will not indicate despite that sunload sensor is functioning properly.

CAUTION:
When switched to STEP-2, LED of REC position blinks for approximately 25 seconds.



Mode control dial position	Unusual	Malfunctioning sensor (Including circuits)	Reference page
VENT	A/C LED: OFF	Ambient sensor	*2
B/L		In-vehicle sensor	*3
FOOT or FOOT2		Sunload sensor*1	*4
D/F or D/F2		Intake sensor	*5
DEF		Air mix door motor (LCU) PBR	*6

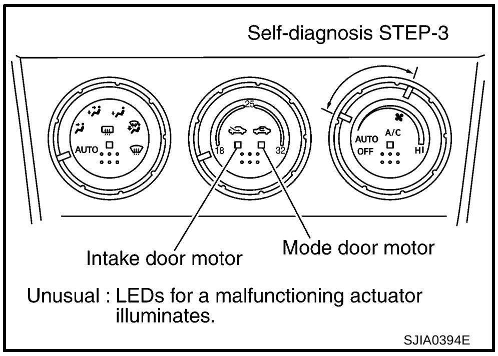
*2: ATC-89, "DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR" .
*3: ATC-92, "DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR" .
*4: ATC-94, "DIAGNOSTIC PROCEDURE FOR SUNLOAD SENSOR" .
*5: ATC-97, "DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR" .
*6: ATC-62, "DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR" .

>> INSPECTION END

10. CHECK MALFUNCTIONING DOOR MOTOR POSITION SWITCH

Mode and/or intake door motor position switch(es) is/are malfunctioning.

CAUTION:
When switched to STEP-3, LED of REC position blinks for approximately 50 seconds.



Unusual	Mode or intake door position	Reference page
REC LED: ON	Mode door motor	*1
FRE LED: ON	Intake door motor	*2

*1: ATC-59, "DIAGNOSTIC PROCEDURE FOR MODE DOOR MOTOR" .
*2: ATC-65, "DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR" .

>> INSPECTION END

A B C D E F G H I ATC K L M

AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER

The trimmer compensates for differences in range of ±3°C between temperature setting (Temperature control dial position) and temperature felt by driver.

Operating procedures for this trimmer are as follows:

1. Set temperature control dial at 25°C.
2. Set fan control dial to OFF.
3. Turn ignition switch ON.
4. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press intake switch for at least 5 seconds.
5. Turn temperature control dial as desired. Temperature will change at a rate of 1°C each time a dial is turned.

Setting temperature	LED status of each switch		
	FRE	REC	A/C
–3°C	ON	ON	ON
–2°C	ON	ON	OFF
–1°C	ON	OFF	ON
0°C (Initial setting)	OFF	OFF	OFF
1°C	OFF	OFF	ON
2°C	OFF	ON	OFF
3°C	OFF	ON	ON

When battery cable is disconnected, trimmer operation is canceled. Temperature set becomes that of initial condition, i.e. 0°C.

AUXILIARY MECHANISM: FOOT POSITION SETTING TRIMMER

Wind distribution ratio in FOOT mode can be set.

Operating procedures for this trimmer are as follows:

1. Set temperature control dial at 25°C.
2. Set fan control dial to AUTO.
3. Turn ignition switch ON.
4. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press intake switch for at least 5 seconds.
5. Turn temperature control dial as desired.

Type	Discharge air flow					
	Automatically controls the mode door			Manually controls the mode door		
	VENT	FOOT	DEF	VENT	FOOT	DEF
Type-A (initial setting)	24%	61%	15%	24%	76%	–
Type-B	24%	61%	15%	24%	61%	15%
Type-C	24%	76%	–	24%	61%	15%
Type-D	24%	76%	–	24%	76%	–

RJIA2825E

Type	LED status of each switch		
	FRE	REC	A/C
Type-A (initial setting)	OFF	OFF	ON
Type-B	OFF	ON	OFF
Type-C	OFF	ON	ON
Type-D	ON	OFF	OFF

AUXILIARY MECHANISM: INLET PORT MEMORY FUNCTION

When ignition switch is turned from OFF to ON, inlet port can be set to AUTO or manual.

Operating procedures for this trimmer are as follows:

1. Set fan control dial to 1st–25th speed.
2. Turn ignition switch ON.
3. Set in self-diagnostic mode as follows. Within 10 seconds after starting engine (ignition switch is turned ON.), press intake switch for at least 5 seconds.
4. Press intake switch as desired.

LED status of FRE position	LED status of REC position	Setting status		Setting changeover method
		FRE	REC	
OFF	OFF	AUTO control	AUTO control.	Intake SW: ON
OFF	ON	AUTO control (Initial setting)	Manual REC status is memorized. (Initial setting)	
ON	OFF	Manual FRE status is memorized.	AUTO control	
ON	ON	Manual FRE status is memorized.	Manual REC status is memorized.	

Operational Check

AJS001KM

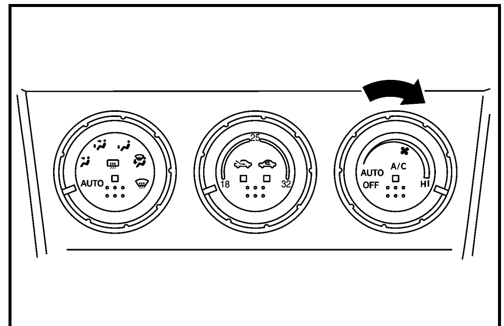
The purpose of the operational check is to confirm that the system operates properly.

Conditions : Engine running at usual operating temperature

CHECKING BLOWER

1. Turn fan control dial to 1st speed. Blower should operate on low speed.
2. Turn fan control dial to 2nd speed, and continue checking blower speed until all speeds are checked.
3. Leave blower on Max. speed.

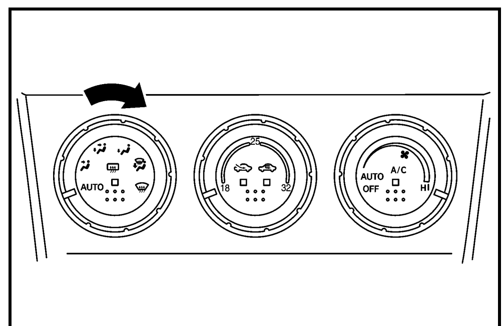
If NG, go to trouble diagnosis procedure for ATC-66, "Blower Motor Circuit" .
If OK, continue the check.



SJIA0395E

CHECKING DISCHARGE AIR

1. Turn mode control dial to each position.



SJIA0396E

2. Confirm that discharge air comes out according to the air distribution table. Refer to ATC-30, "Discharge Air Flow" .

Intake door position is checked in the next step.
If NG, go to trouble diagnosis procedure for ATC-57, "Mode Door Motor Circuit" .
If OK, continue the check.

NOTE:
Confirm that the compressor clutch is engaged (sound or visual inspection) and intake door position is at FRESH when the D/F, D/F2 or DEF position is selected.

Discharge air flow

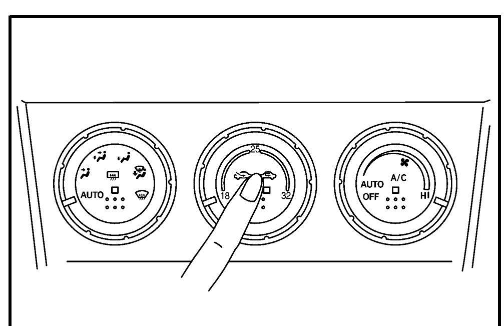
Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	24%	76%	–
	18%	54%	28%
	20%	–	80%

RJIA0492E

CHECKING INTAKE DOOR

1. Press intake switch. Recirculation indicator should illuminate.
2. Press intake switch again. Fresh indicator should illuminate.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for ATC-63, "Intake Door Motor Circuit" .
If OK, continue the check.

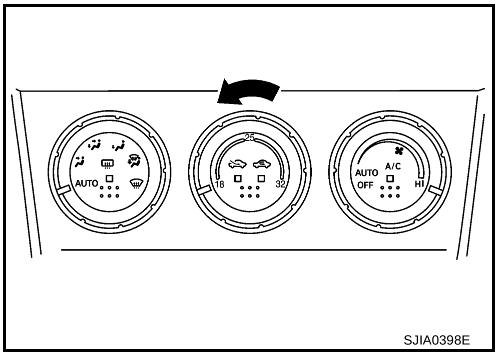


SJIA0397E

CHECKING TEMPERATURE DECREASE

1. Turn temperature control dial until 18°C.
2. Check for cold air at discharge air outlets.

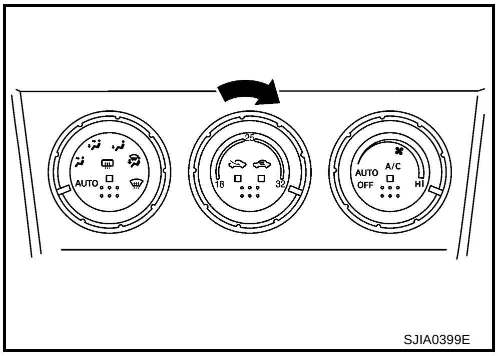
If NG, go to trouble diagnosis procedure for ATC-78, "Insufficient Cooling" .
If OK, continue the check.



CHECKING TEMPERATURE INCREASE

1. Turn temperature control dial until 32°C.
2. Check for hot air at discharge air outlets.

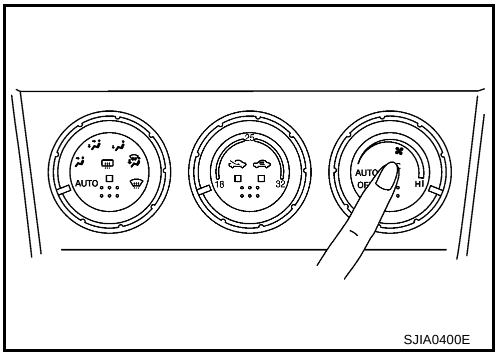
If NG, go to trouble diagnosis procedure for ATC-86, "Insufficient Heating" .
If OK, continue the check.



CHECKING A/C SWITCH

1. Turn fan control dial to AUTO position.
2. Press A/C switch.
   - Confirm that the compressor clutch engages (sound or visual inspection). (Discharge air and blower speed will depend on ambient, in-vehicle, and set temperatures.)

If NG, go to ATC-52, "Power Supply and Ground Circuit for Auto Amp." , then if necessary, trouble diagnosis procedure for ATC-72, "Magnet Clutch Circuit" .
If all operational checks are OK (symptom cannot be duplicated), go to Incident Simulation Tests in GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to ATC-32, "SYMPTOM TABLE" and perform applicable trouble diagnosis procedures.



A B C D E F G H I ATC K L M

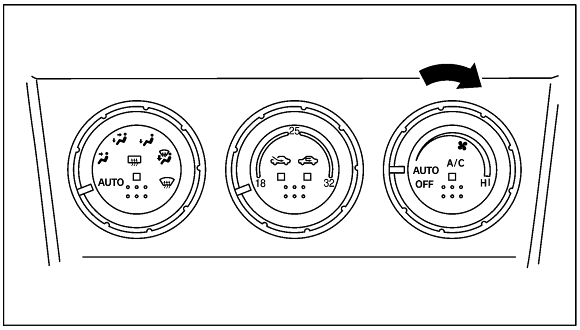
Power Supply and Ground Circuit for Auto Amp.

AJS001KN

SYMPTOM: A/C system does not come on.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK
a. Set fan control dial to AUTO position.
(Compressor is turned ON automatically.)
Confirm that the compressor clutch engages
(sound or visual inspection).
(blower speed will depend
on ambient, in-vehicle and set temperatures.)

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins. → 3. Check Main Power Supply and Ground Circuit. (*2)

RJIA2826E

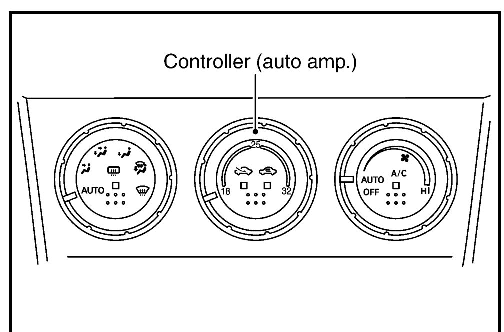
*1 ATC-50, "Operational Check"

*2 ATC-53, "DIAGNOSTIC PROCEDURE FOR A/C SYSTEM"

COMPONENT DESCRIPTION

Auto Amp. (Automatic Amplifier)

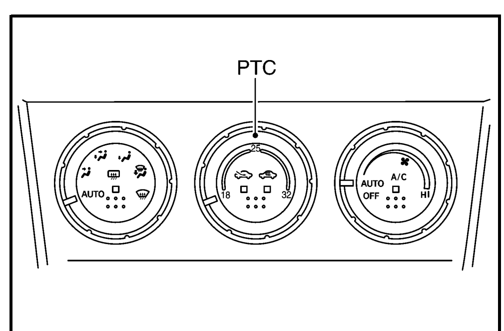
The auto amp. has a built-in microcomputer which processes information sent from various sensors needed for air conditioner operation. The air mix door motor, mode door motor, intake door motor, blower motor and compressor are then controlled.
The auto amp. is unitized with control mechanisms. Signals from various switches and Potentio Temperature Control (PTC) are directly entered into auto amp.
Self-diagnostic functions are also built into auto amp. to provide quick check of malfunctions in the auto air conditioner system.



RJIA2824E

Potentio Temperature Control (PTC)

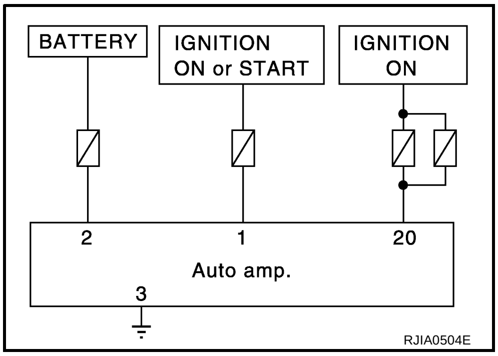
The PTC is built into the auto amp. It can be set at an interval of 1°C in the 18°C to 32°C temperature range by turning the temperature control dial.



SJIA0402E

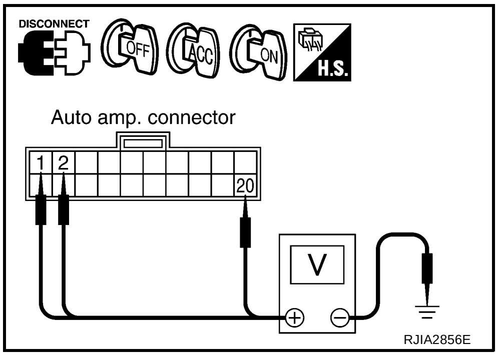
DIAGNOSTIC PROCEDURE FOR A/C SYSTEM

SYMPTOM: A/C system does not come on.



1. CHECK POWER SUPPLY CIRCUIT FOR AUTO AMP.

1. Disconnect auto amp. connector.
2. Check voltage between auto amp. harness connector M52 terminal 1 (BR/Y), 2 (L), 20 (L/W) and ground.



Terminals			Ignition switch position		
(+)		(−)	OFF	ACC	ON
Auto amp. connector	Terminal No. (wire color)				
M52	1 (BR/Y)	Ground	Approx. 0V	Approx. 0V	Battery voltage
M52	2 (L)	Ground	Battery voltage	Battery voltage	Battery voltage
M52	20 (L/W)	Ground	Approx. 0V	Approx. 0V	Battery voltage

OK or NG

OK >> GO TO 2.

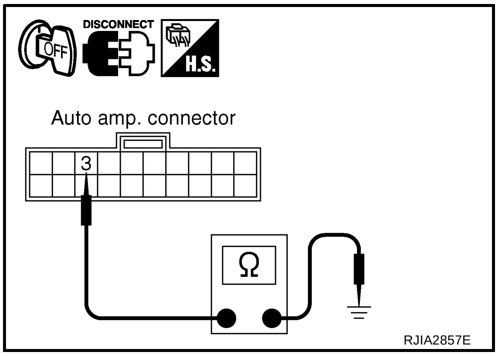
NG >> Check 10A fuses (Nos. 15 and 28) and 15A fuses (Nos. 19 and 24), located in the fuse block (J/B). Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .

- If fuses are OK, check harness for open circuit. Repair or replace if necessary.
- If fuses are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK GROUND CIRCUIT FOR AUTO AMP.

1. Turn ignition switch OFF.
2. Check continuity between auto amp. harness connector M52 terminal 3 (B) and ground.

3 – Ground : Continuity should exist.



OK or NG

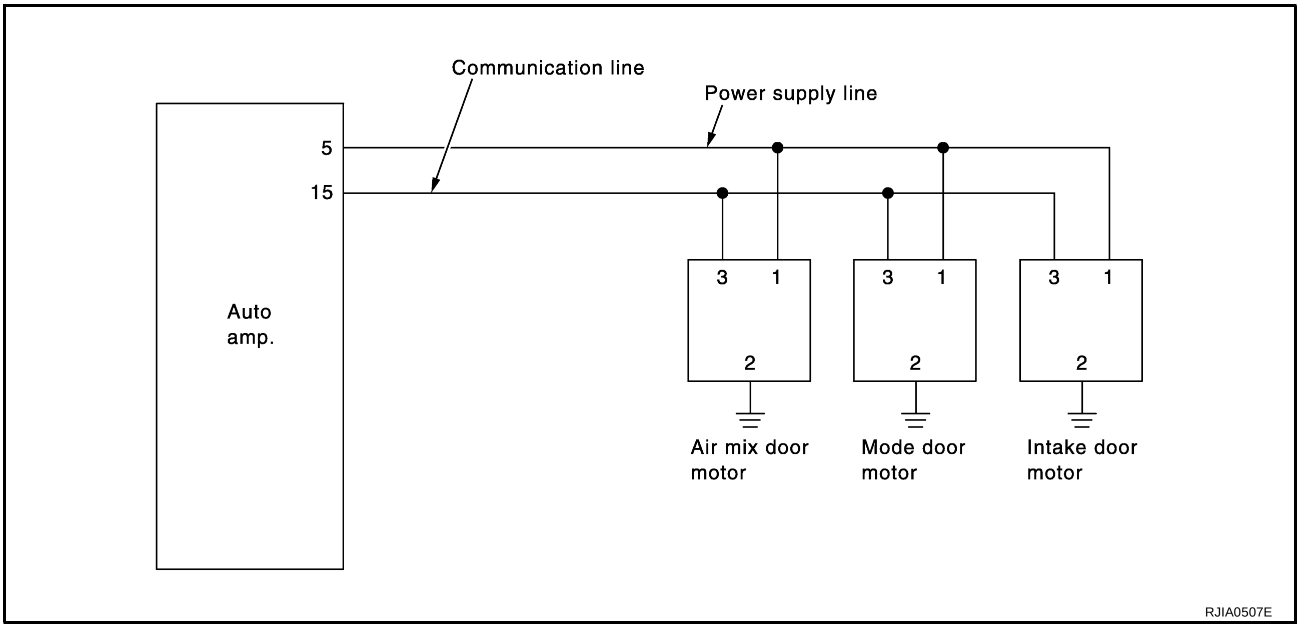
OK >> Replace auto amp.

NG >> Repair or replace harness.

LAN System Circuit

AJS001KO

SYMPTOM: Mode door motor, intake door motor and/or air mix door motor(s) does not operate normally.

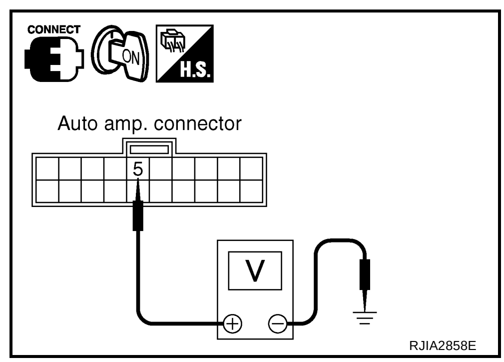


DIAGNOSTIC PROCEDURE FOR LAN CIRCUIT

1. CHECK POWER SUPPLY FOR AUTO AMP.

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M52 terminal 5 (W) and ground.

5 – Ground : Battery voltage

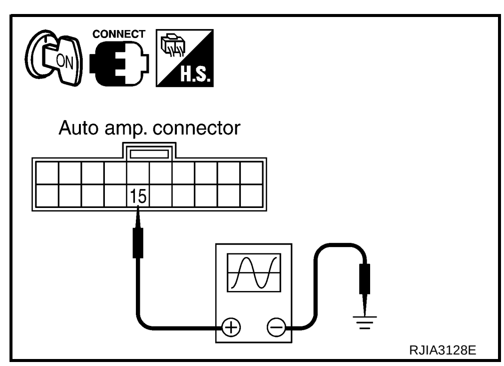


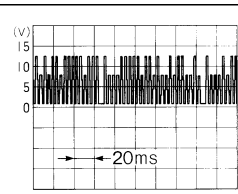
OK or NG

OK >> GO TO 2.
NG >> Replace auto amp.

2. CHECK SIGNAL FOR AUTO AMP.

Confirm A/C LAN signal between auto amp. harness connector M52 terminal 15 (G) and ground using an oscilloscope.



Terminals			Voltage
(+)		(−)	
Auto amp. connector	Terminal No. (wire color)		
M52	15 (G)	Ground	 HAK0652D

OK or NG

OK >> GO TO 3.
NG >> Replace auto amp.

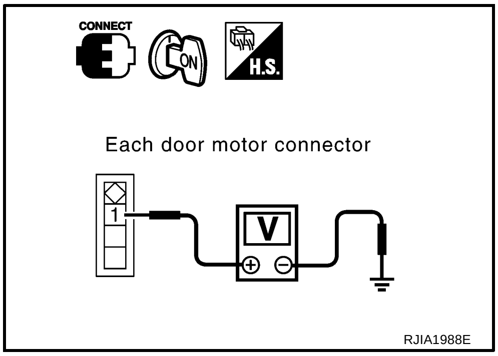
3. CHECK POWER SUPPLY FOR EACH DOOR MOTOR

Check voltage between mode door motor harness connector M37 terminal 1 (W), air mix door motor harness connector M38 terminal 1 (W) or intake door motor harness connector M47 terminal 1 (W) and ground.

1 – Ground : Battery voltage

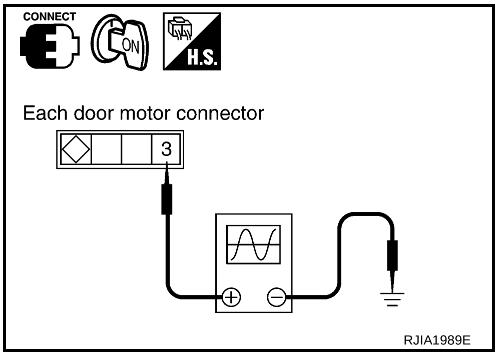
OK or NG

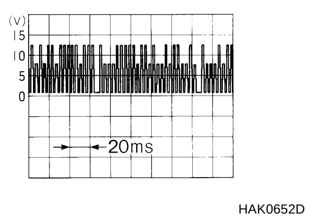
OK >> GO TO 4.
NG >> Replace harness or connector.



4. CHECK SIGNAL FOR EACH DOOR MOTOR

Confirm A/C LAN signal between mode door motor harness connector M37 terminal 3 (G), air mix door motor harness connector M38 terminal 3 (G) or intake door motor harness connector M47 terminal 3 (G) and ground using an oscilloscope.



Terminals			Voltage
(+)		(−)	
Door motor connector	Terminal No. (wire color)		
Mode door : M37	3 (G)	Ground	
Air mix door : M38	3 (G)		
Intake door : M47	3 (G)		

OK or NG

OK >> GO TO 5.
NG >> Replace harness or connector.

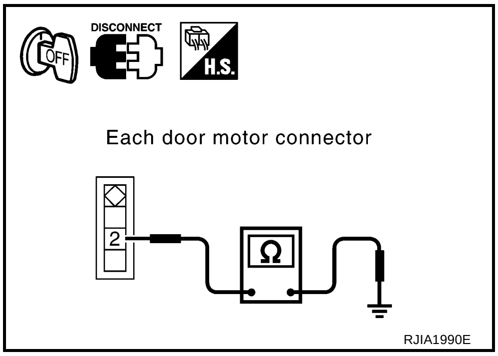
5. CHECK MOTOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect each door motor connector.
3. Check continuity between mode door motor harness connector M37 terminal 2 (B), air mix door motor harness connector M38 terminal 2 (B) or intake door motor harness connector M47 terminal 2 (B) and ground.

2 – Ground : Continuity should exist.

OK or NG

OK >> GO TO 6.
NG >> Replace harness or connector.



6. CHECK MOTOR OPERATION

1. Turn ignition switch OFF.
2. Disconnect each door motor connector.
3. Reconnect each door motor connector.
4. Turn ignition switch ON.
5. Confirm each door motor operation.

OK or NG

OK >> (Return to operate normally.)
- Poor contact in motor connector.

NG >> (Does not operate normally.)
- GO TO 7.

7. CHECK AIR MIX DOOR MOTOR AND INTAKE DOOR MOTOR OPERATION

1. Turn ignition switch OFF.
2. Disconnect mode, air mix, and intake door motor connectors.
3. Reconnect air mix and intake door motor connectors.
4. Turn ignition switch ON.
5. Confirm air mix door motor and intake door motor operation.

OK or NG

OK >> (Air mix and intake door motors operate normally.)
- Replace mode door motor.

NG >> (Air mix and intake door motors does not operate normally.)
- GO TO 8.

8. CHECK MODE DOOR MOTOR AND INTAKE DOOR MOTOR OPERATION

1. Turn ignition switch OFF.
2. Disconnect air mix door motor connector.
3. Reconnect mode door motor connector.
4. Turn ignition switch ON.
5. Confirm mode door motor and intake door motor operation.

OK or NG

OK >> (Mode and intake door motors operate normally.)
- Replace air mix door motor.

NG >> (Mode and intake door motors does not operate normally.)
- GO TO 9.

9. CHECK MODE DOOR MOTOR AND AIR MIX DOOR MOTOR OPERATION

1. Turn ignition switch OFF.
2. Disconnect intake door motor connector.
3. Reconnect air mix door motor connector.
4. Turn ignition switch ON.
5. Confirm mode door motor and air mix door motor operation.

OK or NG

OK >> (Mode and air mix door motors operate normally.)
- Replace intake door motor.

NG >> (Mode and air mix door motors does not operate normally.)
- Replace auto amp.

Mode Door Motor Circuit

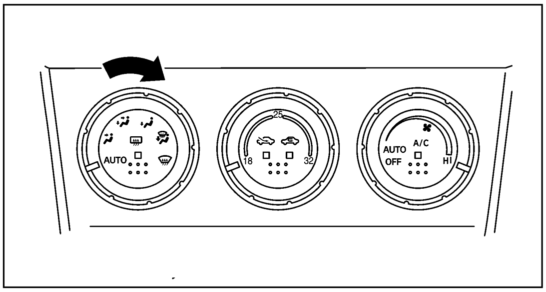
AJS001KP

SYMPTOM:

- Air outlet does not change.
- Mode door motor does not operate normally.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Discharge air

a. Turn mode control dial to each position.

Discharge air flow

Mode door position	Air outlet/distribution		
	Vent	Foot	Defroster
	100%	–	–
	60%	40%	–
	24%	76%	–
	18%	54%	28%
	20%	–	80%

b. Confirm that discharge air comes out according to the air distribution table at left.
Refer to “Discharge AIr Flow” (*1).

NOTE:
- **If OK (symptom cannot be duplicated), perform complete operational check (*2).**
  If NG (symptom is confirmed), continue with STEP-2 following.
- **Confirm that the compressor clutch is engaged (sound or visual inspection) and intake door position is at FRESH when DEF, D/F or D/F2 is selected.**
  Intake door position is checked in the next step.

2. Check for any service bulletins. → 3. Perform self-diagnosis STEP-1. (*3)
   - OK → 4.
   - NG → Go to appropriate malfunctioning sensor circuit. (*10)
4. Perform self-diagnosis STEP-2. (*4)
   - OK → 5.
5. Perform self-diagnosis STEP-3. (*4)
   - NG → Go to DIAGNOSTIC PROCEDURE FOR LAN SYSTEM CIRCUIT. (*11)
   - OK → 6.
6. Perform self-diagnosis STEP-4. (*4)
   - NG → Check mode door control linkage. (*12) → NG → Replace mode door motor.
   - OK **[Cause cannot be confirmed by self-diagnosis.]** → 7.
7. Check ambient sensor circuit. (*5)
   - OK → 8.
8. Check in-vehicle sensor circuit. (*6)
   - OK → 9.
9. Check sunload sensor circuit. (*7)
   - OK → 10.
10. Check intake sensor circuit. (*8)
    - OK → 11.
11. Check air mix door motor circuit. (*9)
    - OK → If the symptom still exists, perform a complete operational check (*2) and check for other symptoms. [Refer to symptom table, (*13).] Does another symptom exist?
      - YES → Go to Trouble Diagnosis for related symptoms. **[Another symptom exists.]**
      - NO → Replace auto amp. → INSPECTION END

RJIA3095E

*1	ATC-30, "Discharge Air Flow"	*2	ATC-50, "Operational Check"	*3	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.
*4	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5 to 7.	*5	ATC-89, "Ambient Sensor Circuit"	*6	ATC-91, "In-vehicle Sensor Circuit"
*7	ATC-94, "Sunload Sensor Circuit"	*8	ATC-97, "Intake Sensor Circuit"	*9	ATC-60, "Air Mix Door Motor Circuit"

*10 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.
*11 ATC-54, "DIAGNOSTIC PROCEDURE FOR LAN CIRCUIT"
*12 ATC-114, "AIR MIX DOOR MOTOR"
*13 ATC-32, "SYMPTOM TABLE"

SYSTEM DESCRIPTION

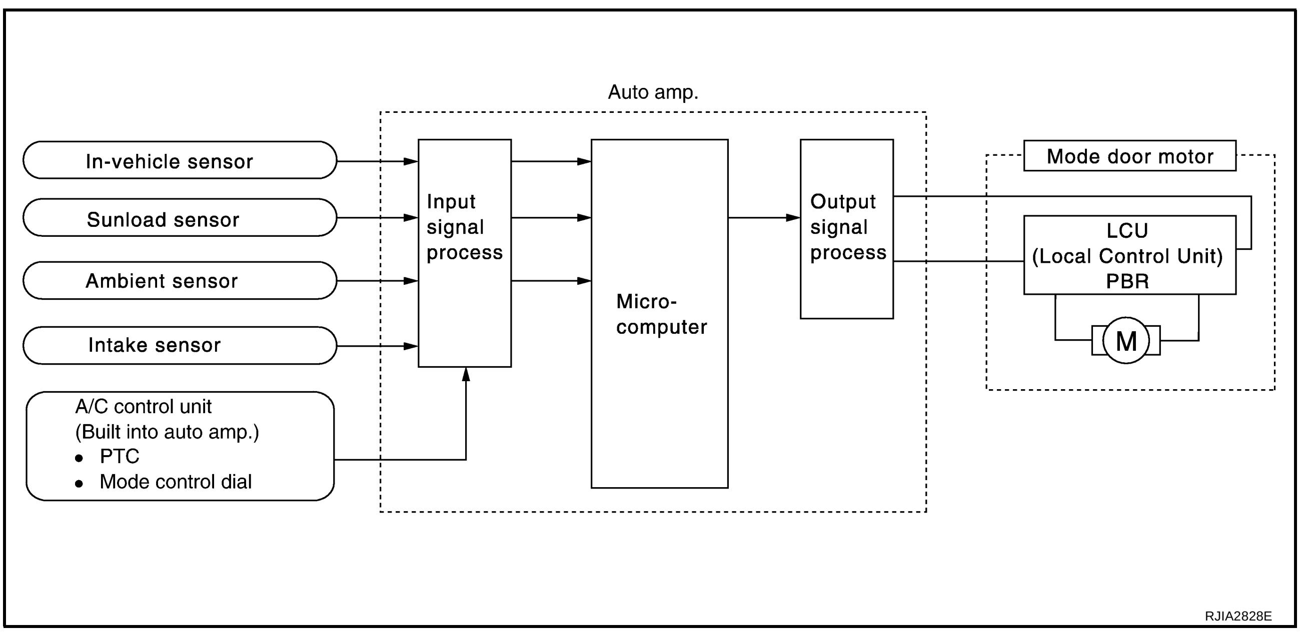
Component Parts

Mode door control system components are:

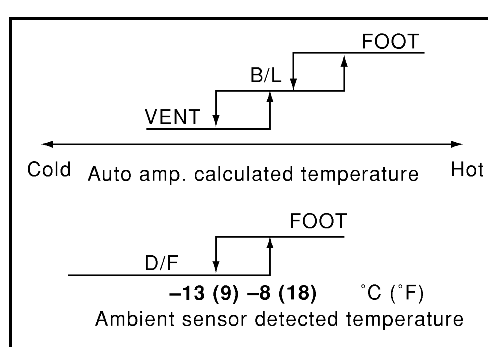
- Auto amp.
- Mode door motor (LCU)
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation

The auto amp. receives data from each of the sensors. The auto amp. sends air mix door, mode door and intake door opening angle data to the air mix door motor LCU, mode door motor LCU and intake door motor LCU.
The air mix door motor, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT or FRESH/RECIRCULATION operation is selected. The new selection data is returned to the auto amp.



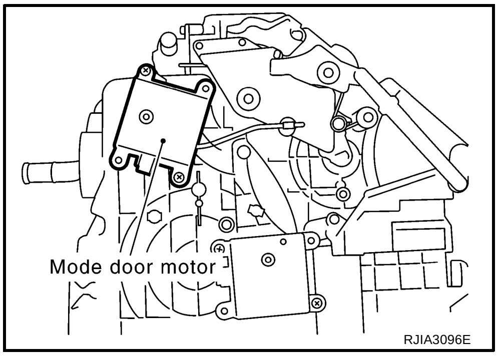
Mode Door Control Specification



COMPONENT DESCRIPTION

Mode Door Motor

The mode door motor is attached to the heater & cooling unit assembly. It rotates so that air is discharged from the outlet set by the auto amp. Motor rotation is conveyed to a link which activates the mode door.



DIAGNOSTIC PROCEDURE FOR MODE DOOR MOTOR

SYMPTOM: Mode door motor does not operate normally.
Perform diagnostic procedure. Refer to ATC-54, "DIAGNOSTIC PROCEDURE FOR LAN CIRCUIT" .

Air Mix Door Motor Circuit

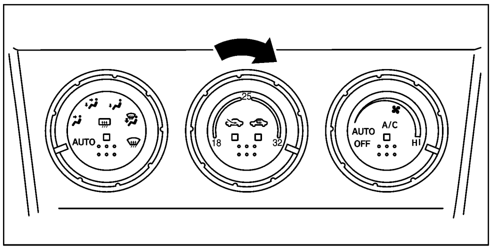
AJS001KQ

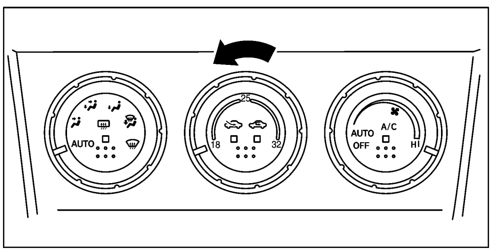
SYMPTOM:

- Discharge air temperature does not change.
- Air mix door motor does not operate.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.





OPERATIONAL CHECK

Temperature increase

a. Turn temperature control dial clockwise until 32˚C.
b. Check for hot air at discharge air outlets.

Temperature decrease

a. Turn temperature control dial counterclockwise until 18˚C.
b. Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins. → 3. Perform self-diagnosis STEP-1. (*2)

OK ↓

4. Perform self-diagnosis STEP-2. (*3) — NG → Go to appropriate malfunctioning sensor circuit. (*10)

OK ↓

5. Perform self-diagnosis STEP-4. (*3) — NG → Check air mix door motor. (*12)

Check air mix door motor. (*12): OK → Go to LAN system circuit. (*11); NG → Replace air mix door motor.

OK **[Cause cannot be confirmed by self-diagnosis.]** ↓

6. Check ambient sensor circuit. (*4)

OK ↓

7. Check in-vehicle sensor circuit. (*5)

OK ↓

8. Check sunload sensor circuit. (*6)

OK ↓

9. Check intake sensor circuit. (*7)

OK ↓

10. Check air mix door motor circuit. (*8)

OK ↓

If the symptom still exists, perform a complete operational check (*1) and check for other symptoms. [Refer to symptom table, (*9).] Does another symptom exist?

YES → Go to Trouble Diagnosis for related symptom. **Another symptom exists.**

NO ↓

Replace auto amp. → INSPECTION END

RJIA3097E

*1 ATC-50, "Operational Check"

*2 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.

*3 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5 to 7.

*4 ATC-89, "Ambient Sensor Circuit"

*5 ATC-91, "In-vehicle Sensor Circuit"

*6 ATC-94, "Sunload Sensor Circuit"

*7 ATC-97, "Intake Sensor Circuit"

*8 ATC-62, "DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR"

*9 ATC-32, "SYMPTOM TABLE"

*10 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.

*11 ATC-54, "LAN System Circuit"

*12 ATC-114, "AIR MIX DOOR MOTOR"

SYSTEM DESCRIPTION

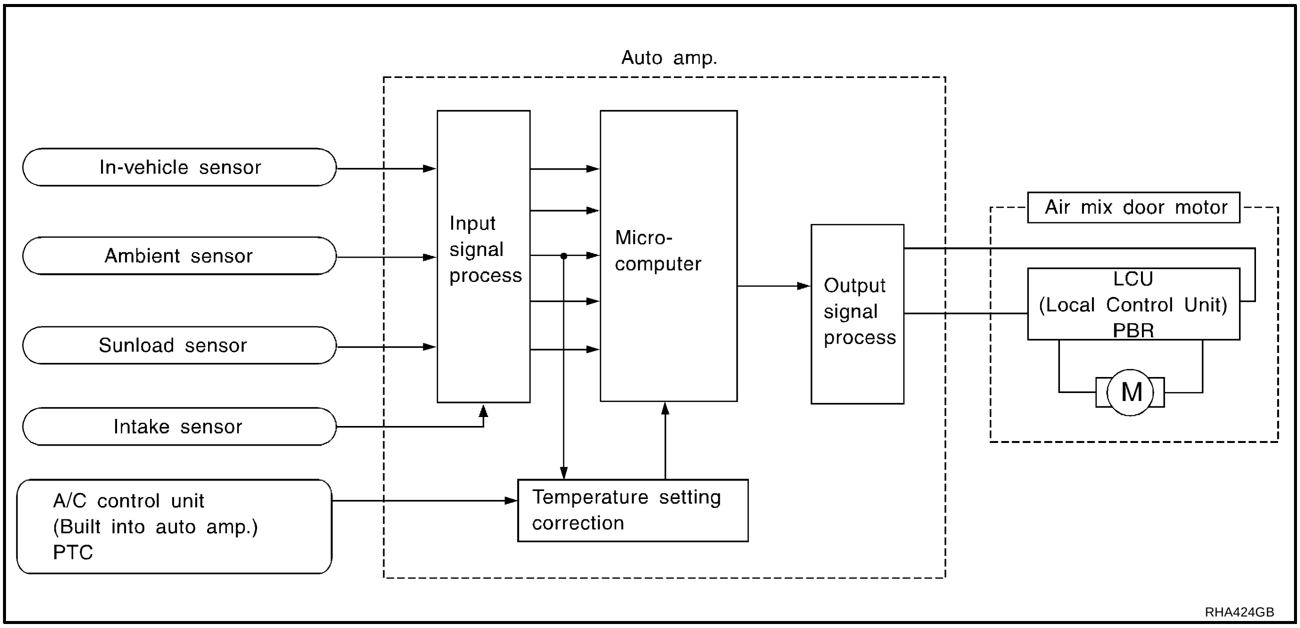
Component Parts

Air mix door control system components are:

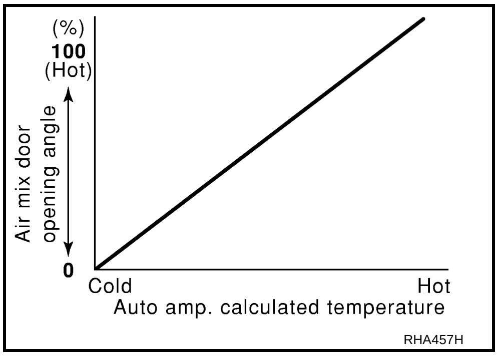
- Auto amp.
- Air mix door motor (LCU)
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation

The auto amp. receives data from each of the sensors. The auto amp. sends air mix door, mode door and intake door opening angle data to the air mix door motor LCU, mode door motor LCU and intake door motor LCU.
The air mix door motor, mode door motor and intake door motor read their respective signals according to the address signal. Opening angle indication signals received from the auto amp. and each of the motor position sensors are compared by the LCUs in each door motor with the existing decision and opening angles. Subsequently, HOT/COLD, DEF/VENT or FRESH/RECIRCULATION operation is selected. The new selection data is returned to the auto amp.



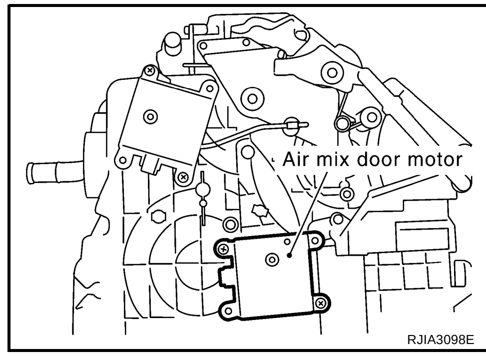
Air Mix Door Control Specification



COMPONENT DESCRIPTION

Air Mix Door Motor

The air mix door motor is attached to the heater & cooling unit assembly. It rotates so that the air mix door is opened or closed to a position set by the auto amp. The air mix door position is feedback to the auto amp. by PBR built-in air mix door motor.



DIAGNOSTIC PROCEDURE FOR AIR MIX DOOR MOTOR

SYMPTOM: Discharge air temperature does not change.
Perform diagnostic procedure. Refer to ATC-54, "DIAGNOSTIC PROCEDURE FOR LAN CIRCUIT" .

Intake Door Motor Circuit

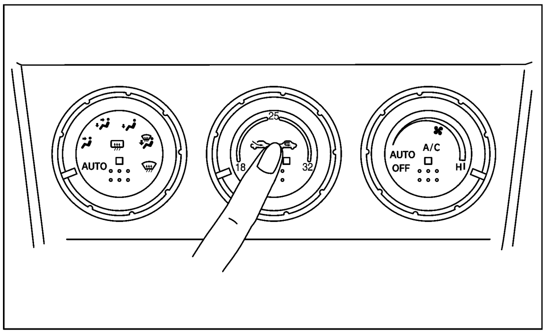
AJS001KR

SYMPTOM:

- Intake door does not change.
- Intake door motor does not operate normally.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



a. Press intake switch.
Recirculation indicator should illuminate.
b. Press intake switch again.
Fresh indicator should illuminate.
c. Listen for intake door position change (you should hear blower sound change slightly).

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Perform self-diagnosis STEP-1. (*2)

OK

4. Perform self-diagnosis STEP-2. (*3)

NG → Go to appropriate malfunctioning sensor circuit. (*10)

OK

5. Perform self-diagnosis STEP-4. (*3)

NG → Check intake door motor. (*12)
- OK → Go to LAN system circuit. (*11)
- NG → Replace intake door motor.

OK

[Cause cannot be confirmed by self-diagnosis.]

6. Check ambient sensor circuit. (*4)

OK

7. Check in-vehicle sensor circuit. (*5)

OK

8. Check sunload sensor circuit. (*6)

OK

9. Check intake sensor circuit. (*7)

OK

10. Check air mix door motor circuit. (*8)

OK

If the symptom still exists, perform a complete operational check (*1) and check for other symptoms. [Refer to symptom table, (*9).] Does another symptom exist?

- YES → Go To Trouble Diagnosis for related symptoms. **Another symptom exists.**
- NO → Replace auto amp. → INSPECTION END

RJIA3099E

*1 ATC-50, "Operational Check"
*2 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.
*3 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5 to 7.
*4 ATC-89, "Ambient Sensor Circuit"
*5 ATC-91, "In-vehicle Sensor Circuit"
*6 ATC-94, "Sunload Sensor Circuit"
*7 ATC-97, "Intake Sensor Circuit"
*8 ATC-60, "Air Mix Door Motor Circuit"
*9 ATC-32, "SYMPTOM TABLE"
*10 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.
*11 ATC-54, "LAN System Circuit"
*12 ATC-107, "INTAKE DOOR MOTOR"

SYSTEM DESCRIPTION

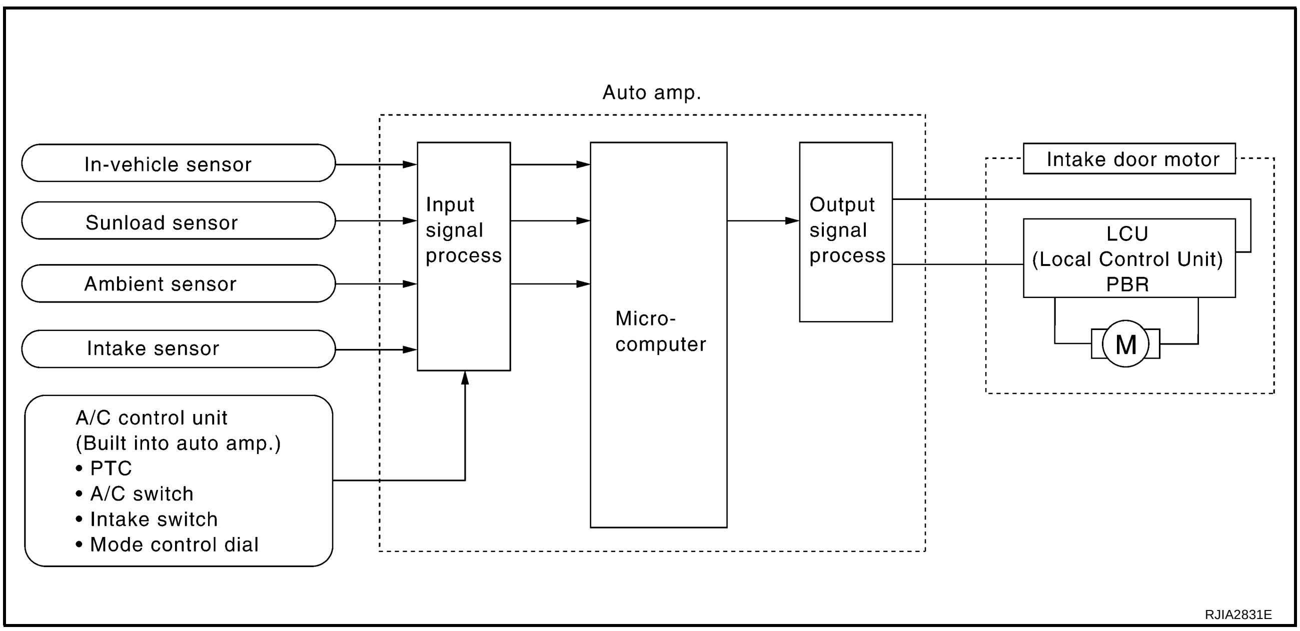
Component Parts

Intake door control system components are:

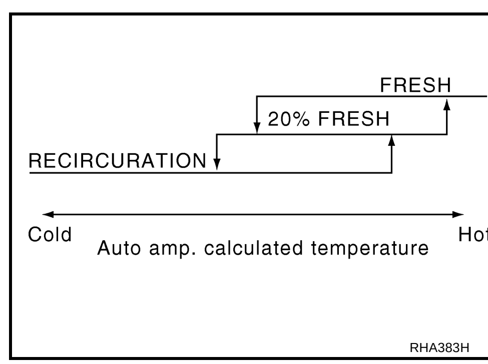
- Auto amp.
- Intake door motor (LCU)
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation

The intake door control determines intake door position based on the ambient temperature, the intake air temperature and the in-vehicle temperature. When set mode control dial to D/F, D/F2 or DEF position, or OFF switch is pushed, the auto amp. sets the intake door at the FRESH position.



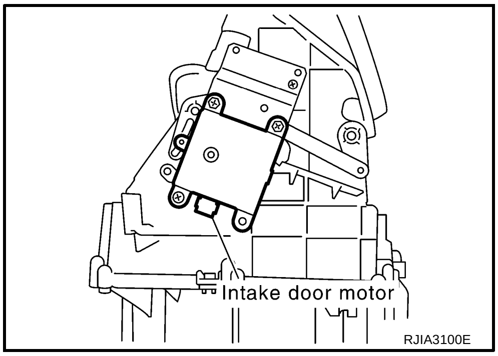
Intake Door Control Specification



COMPONENT DESCRIPTION

Intake Door Motor

The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the auto amp. Motor rotation is conveyed to a lever which activates the intake door.



DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

SYMPTOM: Intake door motor does not operate normally.
Perform diagnostic procedure. Refer to ATC-54, "DIAGNOSTIC PROCEDURE FOR LAN CIRCUIT" .

A B C D E F G H I ATC K L M

Blower Motor Circuit

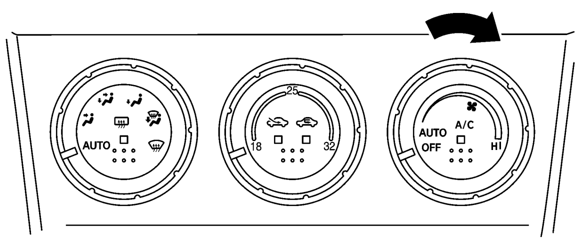
AJS001KS

SYMPTOM:

- Blower motor operation is malfunctioning.
- Blower motor operation is malfunctioning under out of starting fan speed control.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK - Blower
Turn fan control dial clockwise,
and continue checking blower speed until all speeds are checked.
If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins. → 3. Perform self-diagnosis STEP-1. (*2)

OK

4. Perform self-diagnosis STEP-2. (*3)
   - NG → Go to appropriate malfunctioning sensor circuit. (*10)

OK

5. Perform self-diagnosis STEP-4. (*4)
   Does blower motor speed change according to each code No.?

Code No.	41	42	43	44	45	46
Blower motor voltage	4.5V	10.5V	8.5V	8.5V	8.5V	12V

   - NO → Go to Blower Motor Circuit. (*11)

YES

6. Is engine coolant temperature below 56˚C(133˚F)?
   - NO → Blower motor operation is normal.

YES

7. Is blower motor operating under starting blower speed control?
   - NO → Go to Blower Motor Circuit. (*11) → OK → Check engine coolant temperature sensor circuit. (*12)

YES **[Cause cannot be confirmed by self-diagnosis.]**

8. Check ambient sensor circuit. (*5)

OK

9. Check in-vehicle sensor circuit. (*6)

OK

10. Check sunload sensor circuit. (*7)

OK

11. Check intake sensor circuit. (*8)

OK

If the symptom still exists, perform a complete operational check (*1) and check for other symptoms. [Refer to symptom table, (*9).] Does another symptom exist?
   - YES → Go to Trouble Diagnosis for related symptom. **Another symptom exists.**

NO

Replace auto amp. → INSPECTION END

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*1	ATC-50, "Operational Check"	*2	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.	*3	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5.
*4	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 7.	*5	ATC-89, "Ambient Sensor Circuit"	*6	ATC-91, "In-vehicle Sensor Circuit"
*7	ATC-94, "Sunload Sensor Circuit"	*8	ATC-97, "Intake Sensor Circuit"	*9	ATC-32, "SYMPTOM TABLE"
*10	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.	*11	ATC-68, "DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR"	*12	EC-205, "DTC P0117, P0118 ECT SENSOR"

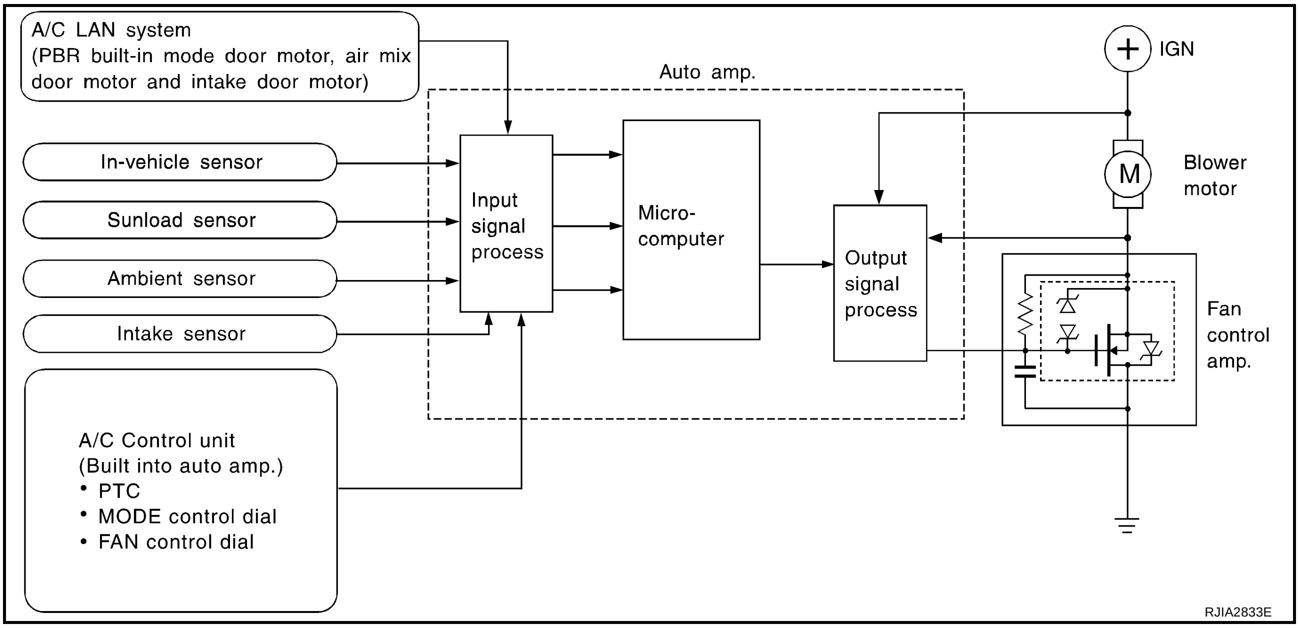
SYSTEM DESCRIPTION

Component Parts

Fan speed control system components are:

- Auto amp.
- A/C LAN system (PBR built-in air mix door motor, mode door motor and intake door motor)
- Fan control amp.
- In-vehicle sensor
- Ambient sensor
- Sunload sensor
- Intake sensor

System Operation



Automatic Mode

In the automatic mode, the blower motor speed is calculated by the auto amp. based on input from the PBR, in-vehicle sensor, sunload sensor, intake sensor and ambient sensor.

The blower motor applied voltage ranges from approximately 4 volts (lowest speed) to 12 volts (highest speed).

The control blower speed (in the range of 4 to 12V), the auto amp. supplies a gate voltage to the fan control amp. Based on this voltage, the fan control amp. controls the voltage supplied to the blower motor.

Starting Fan Speed Control

Start Up from COLD SOAK Condition (Automatic mode)

In a cold start up condition where the engine coolant temperature is below 56°C (133°F), the blower will not operate for a short period of time (up to 150 seconds). The exact start delay time varies depending on the ambient and engine coolant temperature.

In the most extreme case (very low ambient) the blower starting delay will be 150 seconds as described above. After this delay, the blower will operate at low speed until the engine coolant temperature rises above 56°C (133°F), and then the blower speed will increase to the objective speed.

Start Up from Usual or HOT SOAK Condition (Automatic mode)

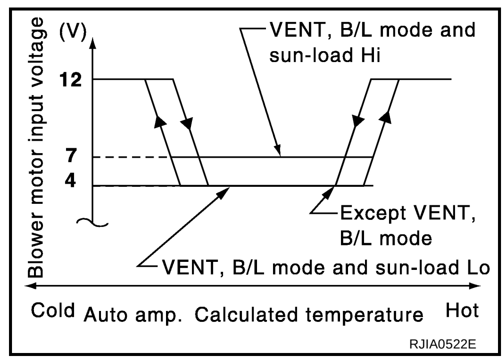
The blower will begin operation momentarily after the A/C switch is pushed. The blower speed will gradually rise to the objective speed over a time period of 3 seconds or less (actual time depends on the objective blower speed).

Blower Speed Compensation

Sunload

When the in-vehicle temperature and the set temperature are very close, the blower will be operating at low speed. The low speed will vary depending on the sunload. During conditions of low or no sunload, the blower low speed is usual low speed (approx. 4V). During high sunload conditions, the auto amp. causes the blower fan speed to increase (approx. 7V).

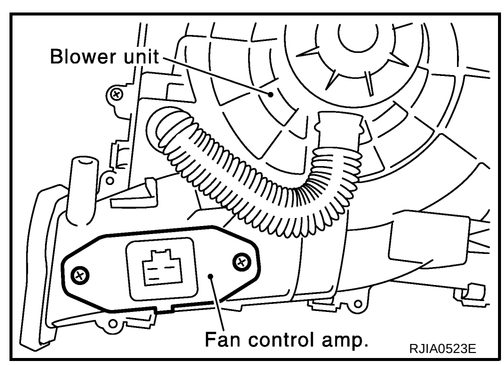
Fan Speed Control Specification



COMPONENT DESCRIPTION

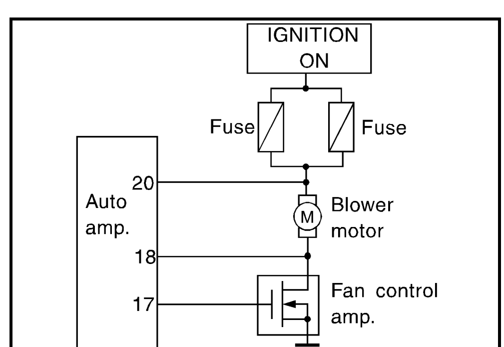
Fan Control Amp.

The fan control amp. is located on the intake unit. The fan control amp. receives a gate voltage from the auto amp. to steeples maintain the blower fan motor voltage in the 4 to 12 volt range.



DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

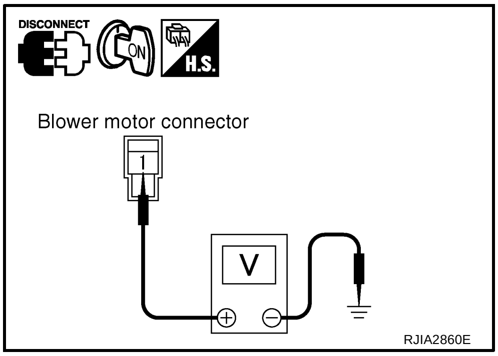
SYMPTOM: Blower motor operation is malfunctioning.



A B C D E F G H I ATC K L M

1. CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Disconnect blower motor connector.
2. Turn ignition switch ON.
3. Check voltage between blower motor harness connector M65 terminal 1 (L/W) and ground.



1 – Ground : Battery voltage

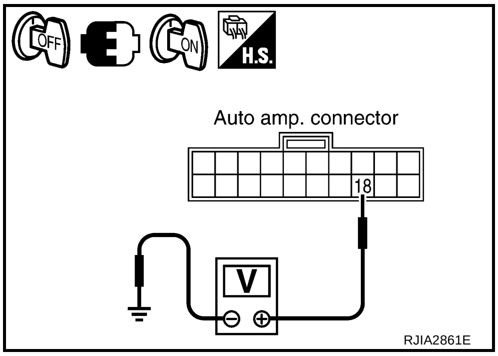
OK or NG

OK >> GO TO 2.
NG >> Check power supply circuit and 15A fuses [Nos. 19 and 24, located in the fuse block (J/B)]. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .

- If fuse are OK, check harness for open circuit. Repair or replace if necessary.
- If fuse are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK FAN FEEDBACK CIRCUIT

1. Turn ignition switch OFF.
2. Reconnect blower motor connector.
3. Check voltage between auto amp. harness connector M52 terminal 18 (R) and ground.



18 – Ground : Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 9.

3. CHECK BLOWER MOTOR

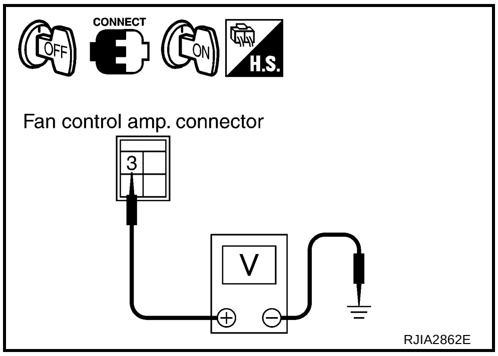
Refer to ATC-71, "COMPONENT INSPECTION" .

OK or NG

OK >> GO TO 4.
NG >> Replace blower motor.

4. CHECK POWER SUPPLY FOR FAN CONTROL AMP.

1. Turn ignition switch ON.
2. Check voltage between fan control amp. harness connector M67 terminal 3 (R) and ground.



Terminals			Condition	Voltage
(+)		(−)		
Fan control amp. connector	Terminal No. (wire color)			
M67	3 (R)	Ground	Fan speed: 1st	Approx. 8V

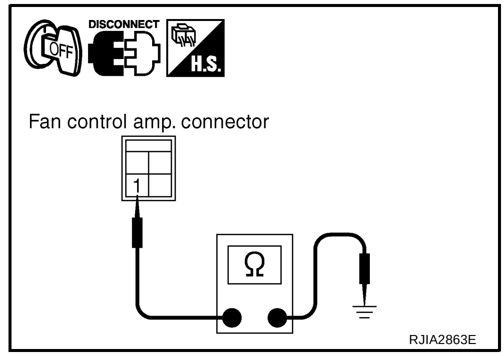
OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5. CHECK GROUND CIRCUIT FOR FAN CONTROL AMP.

1. Turn ignition switch OFF.
2. Disconnect fan control amp. connector.
3. Check continuity between fan control amp. harness connector M67 terminal 1 (B) and ground.

1 – Ground : Continuity should exist.

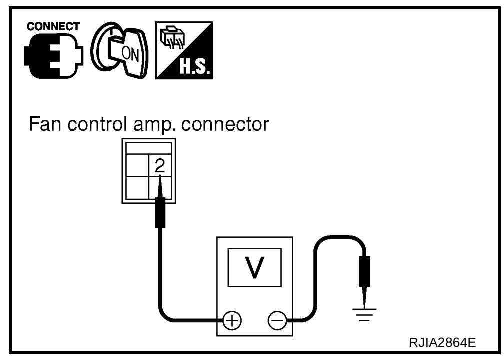


OK or NG

OK >> GO TO 6.
NG >> Repair harness or connector.

6. CHECK FOR AUTO AMP. OUTPUT SIGNAL

1. Reconnect the fan control amp. connector.
2. Turn ignition switch ON.
3. Check voltage between fan control amp. harness connector M67 terminal 2 (L/Y) and ground.



Terminals			Condition	Voltage
(+)		(−)		
Fan control amp. connector	Terminal No. (wire color)			
M67	2 (L/Y)	Ground	Fan speed: 1st - 24th	Approx. 2.5 - 3.5V
			Fan speed: 25th	Approx. 9.0V

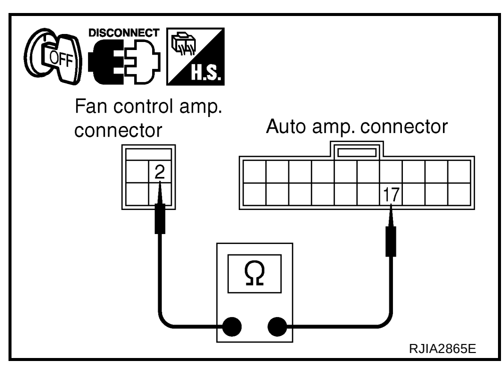
OK or NG

OK >> GO TO 9.
NG >>
- If the voltage is less than 2.5V: GO TO 7.
- If the voltage is more than 9.0V: GO TO 8.

7. CHECK CIRCUIT CONTINUITY BETWEEN AUTO AMP. AND FAN CONTROL AMP.

1. Turn ignition switch OFF.
2. Disconnect the auto amp. connector and fan control amp. connector.
3. Check continuity between auto amp. harness connector M52 terminal 17 (L/Y) and fan control amp. harness connector M67 terminal 2 (L/Y).

17 – 2 : Continuity should exist.



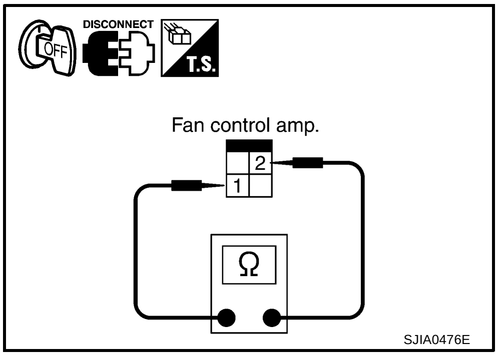
OK or NG

OK >> Replace fan control amp.
NG >> Repair harness or connector.

8. CHECK FAN CONTROL AMP.

1. Turn ignition switch OFF.
2. Disconnect the fan control amp. connector.
3. Check continuity between fan control amp. connector M67 terminal 2 and 1.

2 – 1 : Continuity should exist.



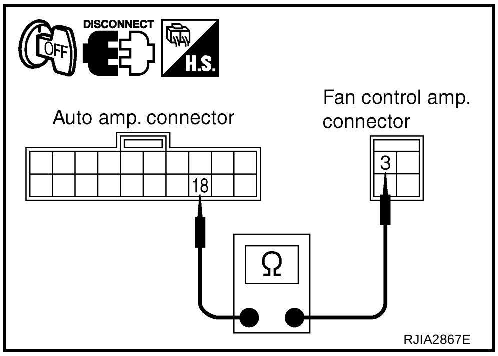
OK or NG

OK >> GO TO 9.
NG >> Replace fan control amp.

9. CHECK CIRCUIT CONTINUITY BETWEEN AUTO AMP. AND FAN CONTROL AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between auto amp. harness connector M52 terminal 18 (R) and fan control amp. harness connector M67 terminal 3 (R).

18 – 3 : Continuity should exist.



OK or NG

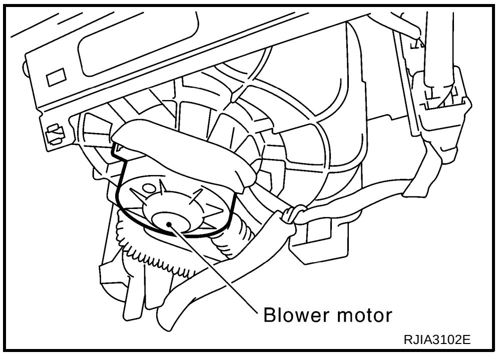
OK >> Replace auto amp.
NG >> Repair harness or connector.

COMPONENT INSPECTION

Blower Motor

Confirm smooth rotation of the blower motor.

- Ensure that there are no foreign particles inside the intake unit.

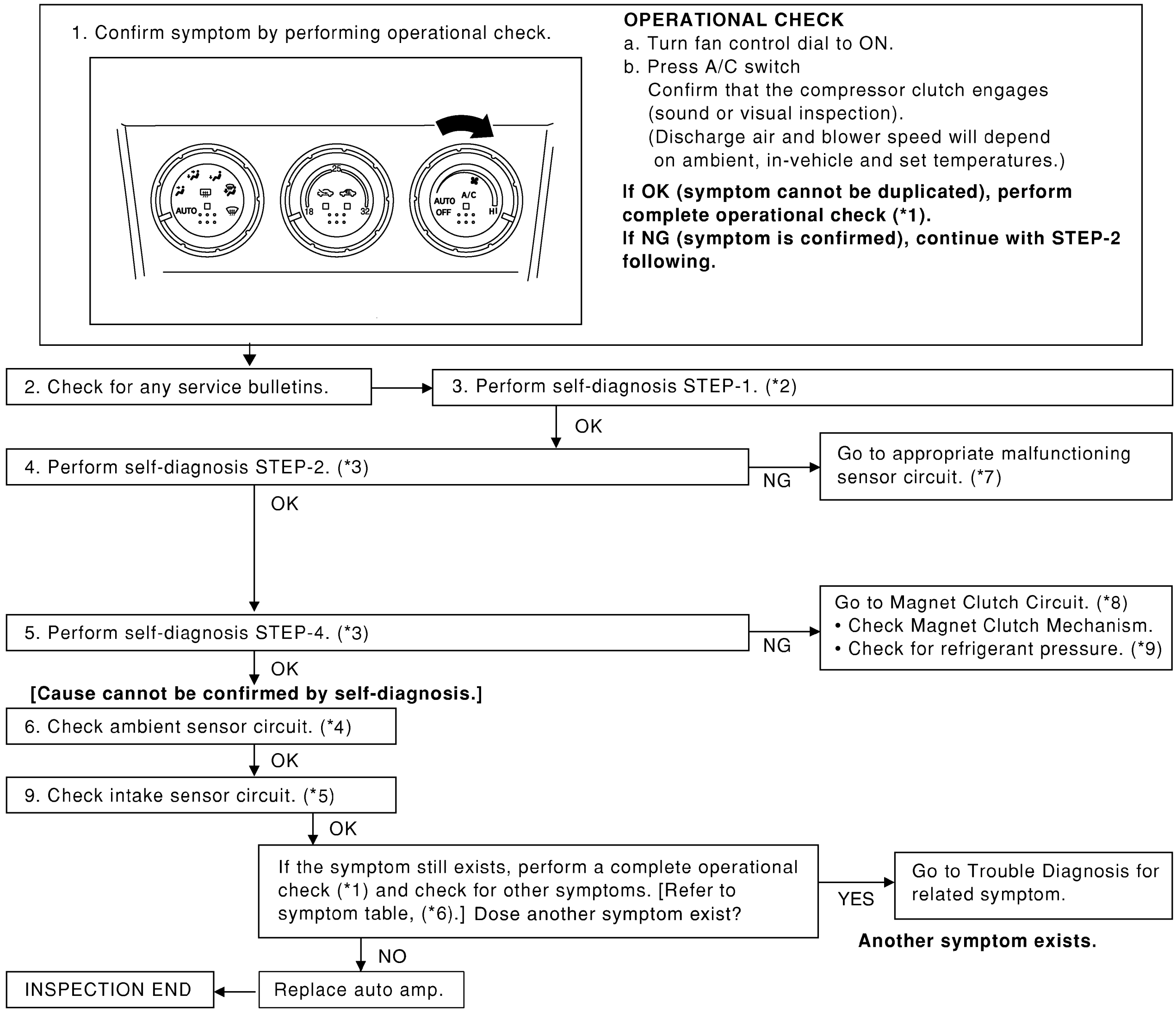


Magnet Clutch Circuit

AJS001KT

SYMPTOM: Magnet clutch does not engage.

INSPECTION FLOW



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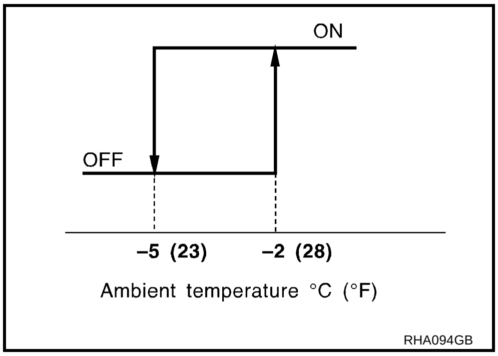
*1	ATC-50, "Operational Check"	*2	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.	*3	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5 to 7.
*4	ATC-89, "Ambient Sensor Circuit"	*5	ATC-97, "Intake Sensor Circuit"	*6	ATC-32, "SYMPTOM TABLE"
*7	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.	*8	ATC-73, "DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH"	*9	ATC-83, "TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE"

SYSTEM DESCRIPTION

Auto amp. controls compressor operation by ambient temperature and signal from ECM.

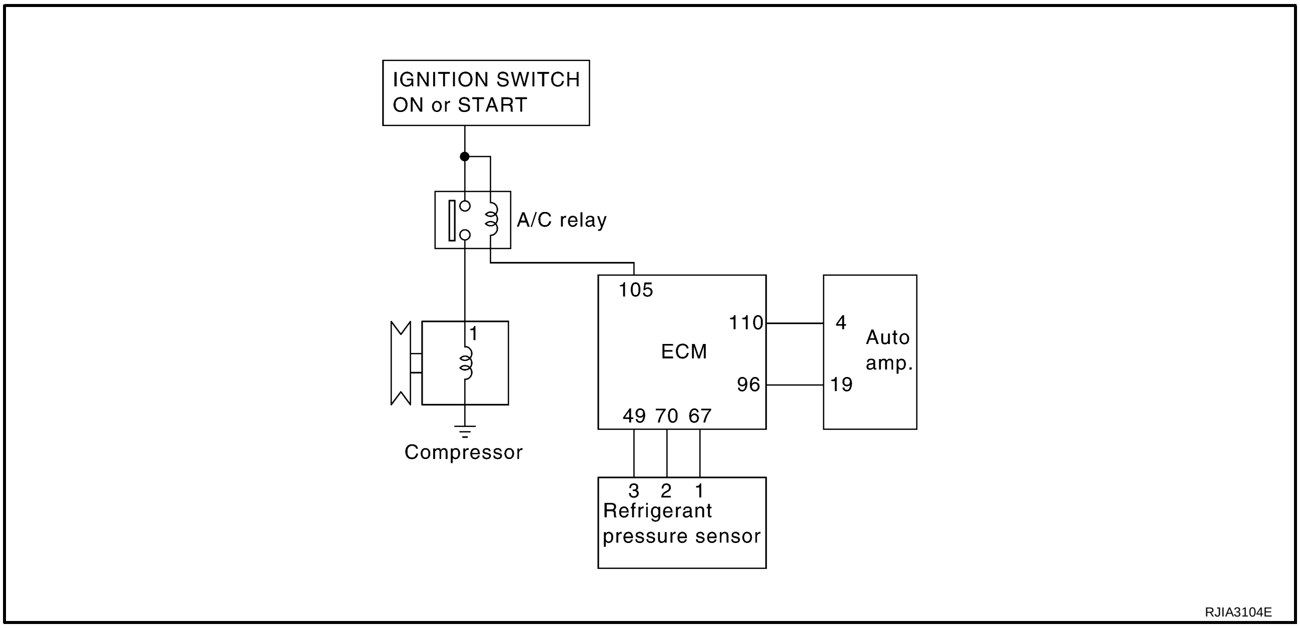
Low Temperature Protection Control

Auto amp. will turn compressor ON or OFF as determined by a signal detected by ambient sensor. When ambient temperatures are higher than –2°C (28°F), the compressor turns ON. The compressor turns OFF when ambient temperatures are lower than –5°C (23°F).



DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

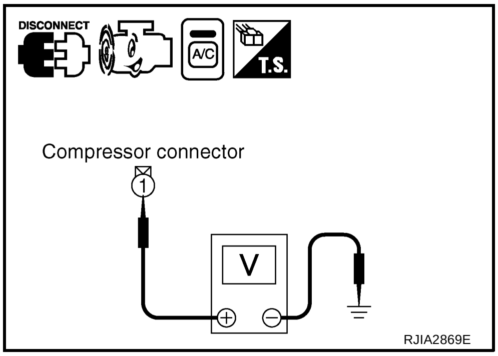
SYMPTOM: Magnet clutch does not engage when A/C switch is ON.



1. CHECK POWER SUPPLY FOR COMPRESSOR

1. Disconnect compressor connector.
2. Start the engine.
3. Turn fan control dial to AUTO position.
4. Press A/C switch.
5. Check voltage between compressor harness connector E34 terminal 1 (L/R) and ground.

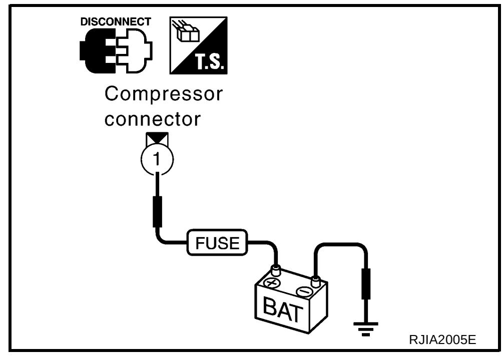
1 – Ground : Battery voltage



OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK MAGNET CLUTCH CIRCUIT



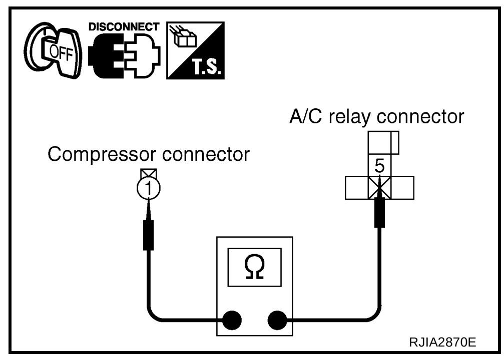
Check for operation sound when applying battery voltage direct current to terminal.

OK or NG

OK >> 1. Repair harness or connector.
2. Go to self-diagnosis procedure ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is usual.

NG >> 1. Replace magnet clutch. Refer to ATC-124, "Removal and Installation of Compressor Clutch" .
2. Go to self-diagnosis procedure ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is usual.

3. CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY AND COMPRESSOR



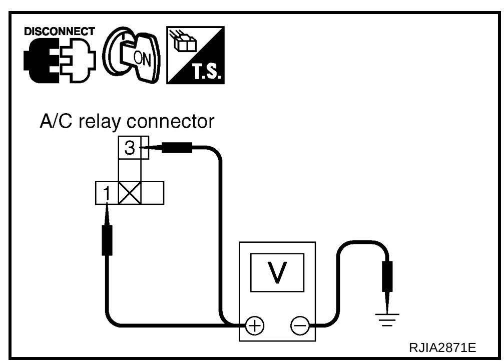
1. Turn ignition switch OFF.
2. Disconnect A/C relay connector.
3. Check continuity between A/C relay harness connector E5 terminal 5 (L/R) and compressor harness connector E34 terminal 1 (L/R).

5 – 1 : Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK POWER SUPPLY FOR A/C RELAY



1. Turn ignition switch ON.
2. Check voltage between A/C relay harness connector E5 terminal 1 (BR/Y), 3 (BR/Y) and ground.

1 – Ground : Battery voltage
3 – Ground : Battery voltage

OK or NG

OK >> GO TO 5.
NG >> Check power supply circuit and 10A fuse [No. 15 located in the fuse block (J/B)]. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .
- If fuse is OK, check harness for open circuit. Repair or replace if necessary.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

5. CHECK A/C RELAY AFTER DISCONNECTING IT

Refer to ATC-77, "A/C Relay" .

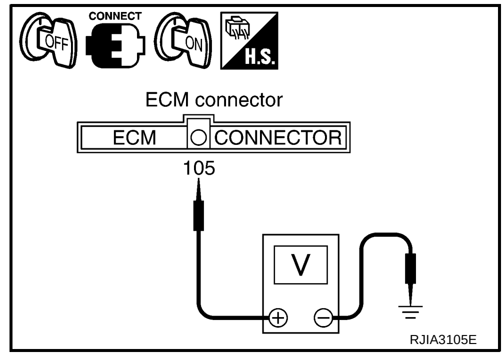
OK or NG

OK >> GO TO 6.
NG >> 1. Replace A/C relay.
2. Go to self-diagnosis procedure ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-4. Confirm that magnet clutch operation is usual.

6. CHECK COIL SIDE CIRCUIT OF A/C RELAY

1. Turn ignition switch OFF.
2. Reconnect A/C relay connector.
3. Start the engine.
4. Check voltage between ECM harness connector F43 terminal 105 (BR/W) and ground.

105 – Ground : Battery voltage



OK or NG

OK >> GO TO 7.
NG >> Repair harness or connector.

7. CHECK AMBIENT SENSOR

Refer to ATC-89, "Ambient Sensor Circuit" .

OK or NG

OK >> GO TO 8.
NG >> Repair or replace the malfunctioning part(s).

8. CHECK REFRIGERANT PRESSURE SENSOR

Refer to EC-619, "REFRIGERANT PRESSURE SENSOR" .

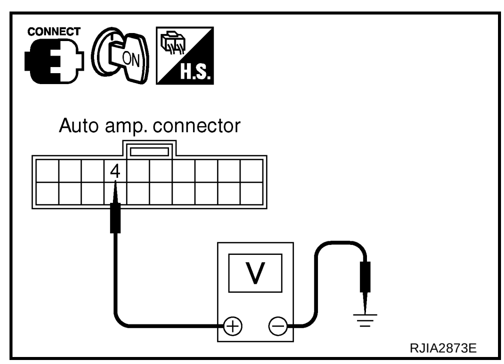
OK or NG

OK >> GO TO 9.
NG >> Repair or replace the malfunctioning part(s).

9. CHECK VOLTAGE FOR AUTO AMP. (COMPRESSOR ON SIGNAL)

1. Turn ignition switch ON.
2. Check voltage between auto amp. harness connector M52 terminal 4 (L/R) and ground.

Terminals (+) Auto amp. connector	Terminals (+) Terminal No. (wire color)	Terminals (–)	Condition	Voltage
M52	4 (L/R)	Ground	A/C SW: ON (Blower motor operates.)	Approx. 0V
			A/C SW: OFF	Approx. 5V

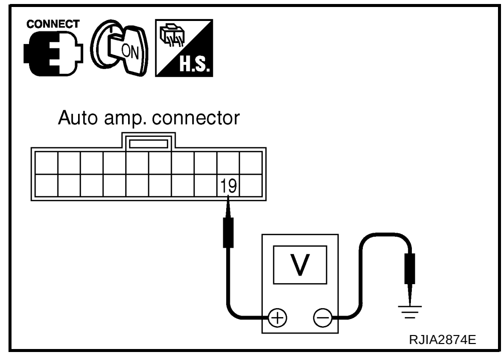


OK or NG

OK >> GO TO 10.
NG >>
- If the voltage is approx. 5V when the A/C switch is ON: Replace the auto amp.
- If the voltage is approx. 0V when the A/C switch is OFF: GO TO 12.

10. CHECK VOLTAGE FOR AUTO AMP. (FAN ON SIGNAL)

Check voltage between auto amp. harness connector M52 terminal 19 (LG/B) and ground.



Terminals			Condition	Voltage
(+)		(−)		
Auto amp. connector	Terminal No. (wire color)			
M52	19 (LG/B)	Ground	Fan control dial: ON (Blower motor operates.)	Approx. 0V
			Fan control dial: OFF	Approx. 5V

OK or NG

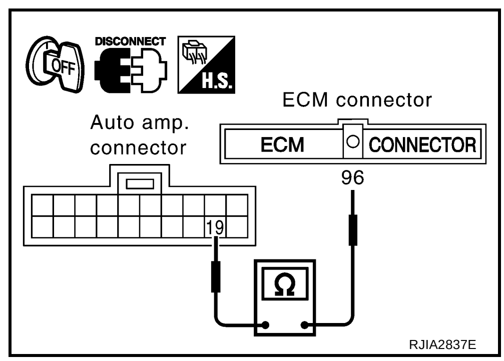
OK >> Replace auto amp.

NG >>
- If the voltage is approx. 5V when the blower motor is ON: Replace the auto amp.
- If the voltage is approx. 0V when the blower motor is OFF: GO TO 11.

11. CHECK CIRCUIT CONTINUITY BETWEEN ECM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect ECM connector and auto amp. connector.
3. Check continuity between ECM harness connector F43 terminal 96 (LG/B) and auto amp. harness connector M52 terminal 19 (LG/B).

96 – 19 : Continuity should exist.



OK or NG

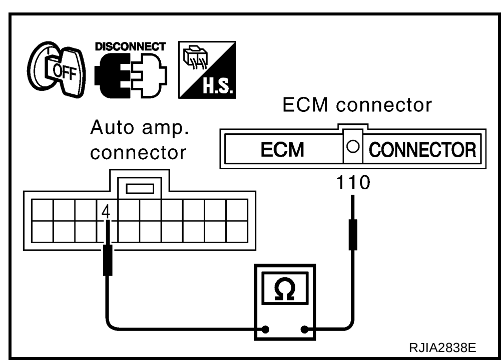
OK >> INSPECTION END

NG >> Repair harness or connector.

12. CHECK CIRCUIT CONTINUITY BETWEEN ECM AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect ECM connector and auto amp. connector.
3. Check continuity between ECM harness connector F43 terminal 110 (L/R) and auto amp. harness connector M52 terminal 4 (L/R).

110 – 4 : Continuity should exist.



OK or NG

OK >> GO TO 13.

NG >> Repair harness or connector.

13. CHECK REFRIGERANT PRESSURE SENSOR CIRCUIT

Refer to EC-619, "REFRIGERANT PRESSURE SENSOR" .

OK or NG

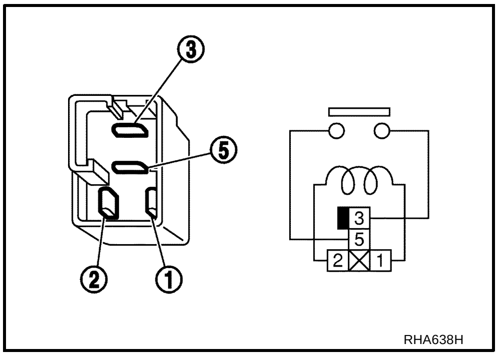
OK >> INSPECTION END

NG >> Repair or replace the malfunctioning part(s).

COMPONENT INSPECTION

A/C Relay

Check continuity between terminal Nos. 3 and 5.

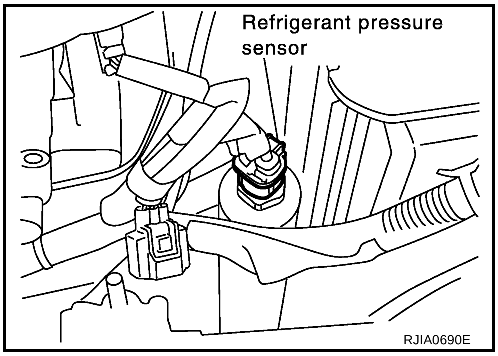


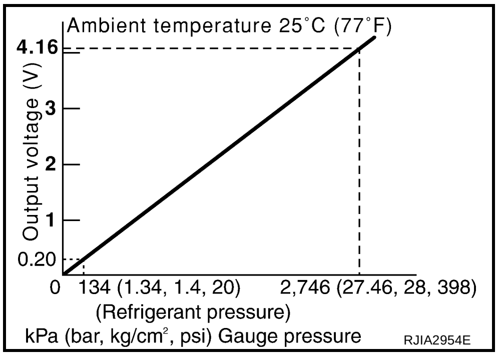
Conditions	Continuity
12V direct current supply between terminal Nos. 1 and 2	Yes
No current supply	No

If NG, replace relay.

Refrigerant Pressure Sensor

The refrigerant pressure sensor is attached to the liquid tank.
Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure. Refer to EC-619, "REFRIGERANT PRESSURE SENSOR" .





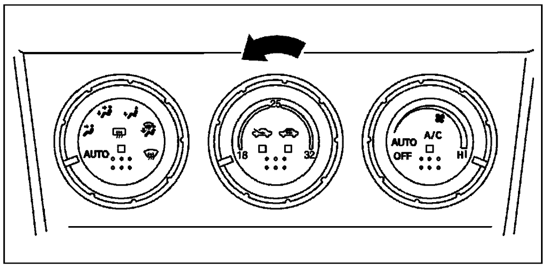
Insufficient Cooling

AJS001KU

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease

a. Turn temperature control dial counterclockwise until 18°C.

b. Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*1).

If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins. → 3.
3. Perform self-diagnosis STEP-1. (*2)
   - OK → 4.
4. Perform self-diagnosis STEP-2. (*3)
   - NG → Go to appropriate malfunctioning sensor circuit. (*8)
   - OK → 5.
5. Perform self-diagnosis STEP-4. (*3)
   - NG → **Go to appropriate malfunctioning items.**
     - Check LAN system circuit. (*9)
     - Check blower motor circuit. (*10)
     - Check magnet clutch circuit. (*11)
   - OK → 6.
6. Check compressor belt tension. Refer to (*4), "Checking Drive Belts".
   - NG → Adjust or replace compressor belt.
   - OK → 7.
7. Check air mix door operation.(*5)
   - NG → Replace air mix door motor.
   - OK → 8.
8. Check cooling fan motor operation.
   - NG → Refer to (*12), "System Description".
   - OK → 9.
9. Before connecting Recovery/Recycling/Recharging equipment to vehicle, check Recovery/Recycling/Recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
   - OK → 10.
10. Confirm refrigerant purity in supply tank using Recovery/Recycling/Recharging eguipment and refrigerant identifier.
    - NG → Refer to contaminated refrigerant. (*14).
    - OK → 11.
11. Connect Recovery/Recycling/Recharging equipment to vehicle. Confirm refrigerant purity in vehicle A/C system using Recovery/Recycling/Recharging equipment and refrigerant identifer.
    - NG → Refer to contaminated refrigerant. (*14).
    - OK → 12.
12. Check for evaporator core freeze up.
    - NG (Freeze up.) → Perform performance test diagnosis. Refer to (*13).
    - (Dose not freeze up.) OK → 13.
13. Check refrigeration cycle pressure with manifold gauge connected. Refer to (*6).
    - NG → Perform performance test diagnosis. Refer to (*13).
    - OK → 14.
14. Check ducts for air leaks.
    - NG → Replair air leaks.
    - OK → 15.
15. Perform temperature setting trimmer. (*7)
    (1) Set up AUXILIARY MECHANISM mode in self-diagnosis.
    (2) Turn temperature dial counterclockwise as desired.
    - OK → INSPECTION END

RJIA3106E

*1 ATC-50, "Operational Check"

*2 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.

*3 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5 to 7.

*4 EM-11, "Checking Drive Belt"

*5 ATC-60, "Air Mix Door Motor Circuit"

*6 ATC-82, "Test Reading"

*7 ATC-48, "AUXILIARY MECHANISM: TEMPERATURE SETTING TRIMMER"

*8 ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.

*9 ATC-54, "LAN System Circuit"

*10 ATC-66, "Blower Motor Circuit"

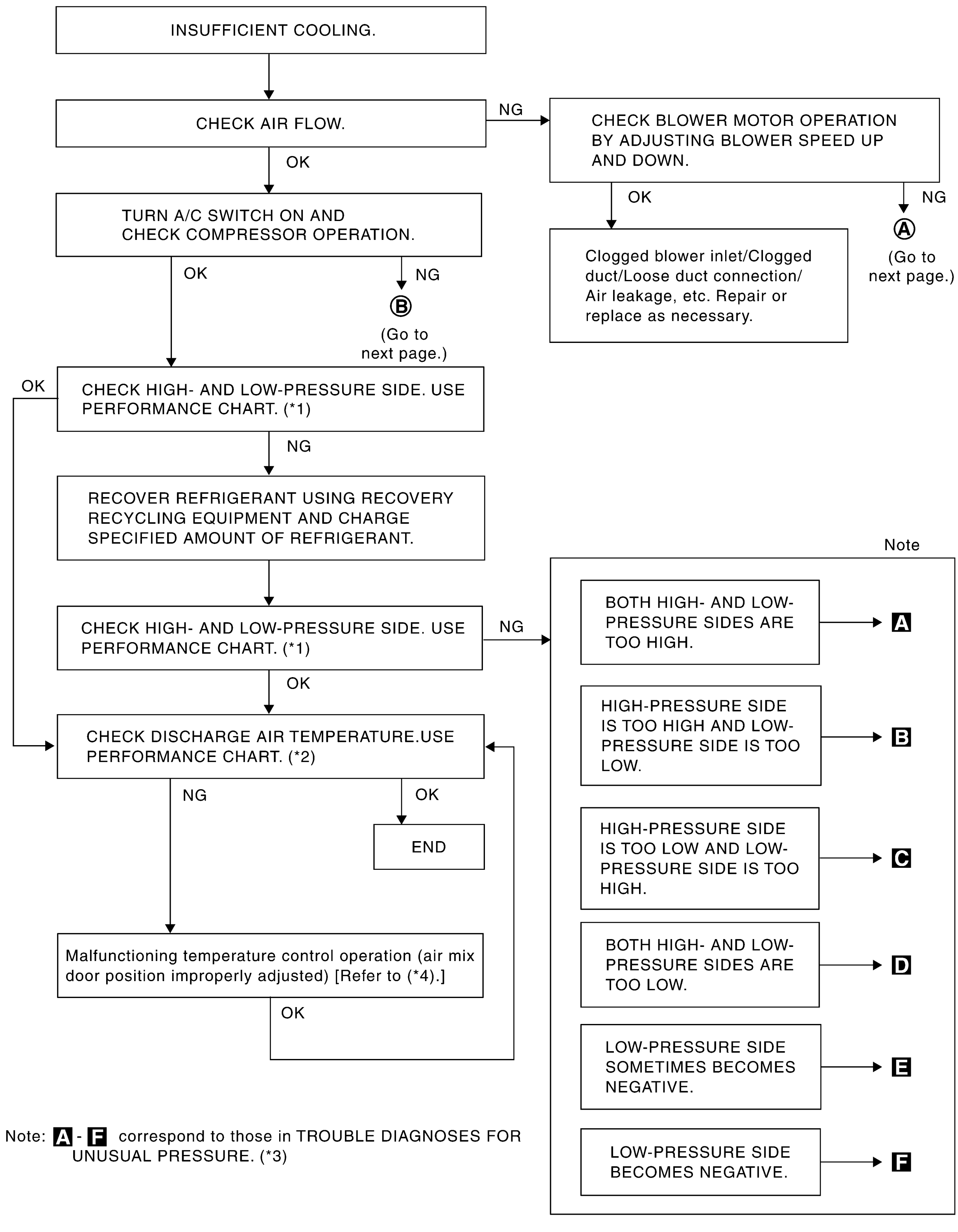
*11 ATC-72, "Magnet Clutch Circuit"

*12 EC-480, "SYSTEM DESCRIPTION"

*13 ATC-80, "PERFORMANCE TEST DIAGNOSIS"

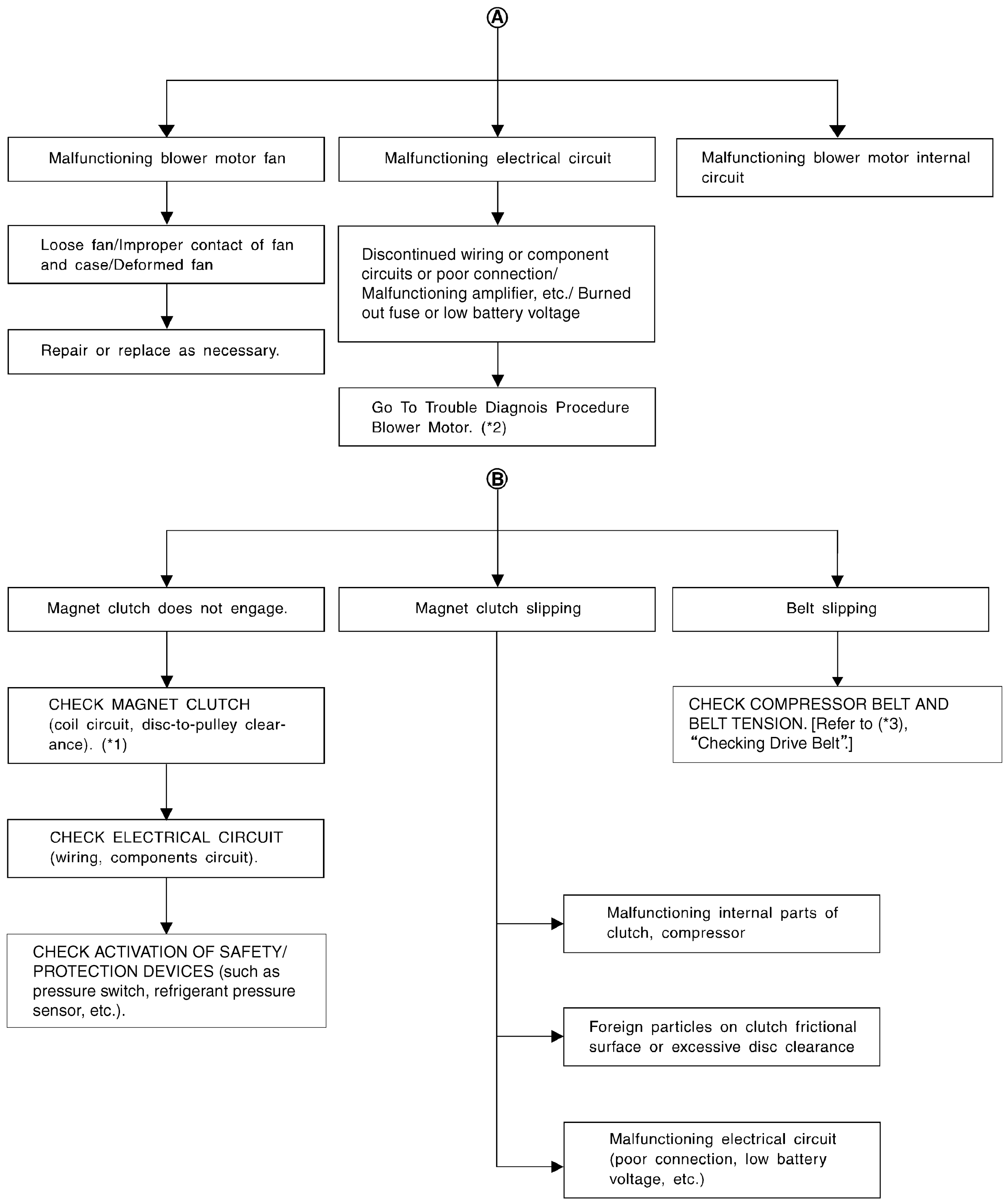
*14 ATC-5, "CONTAMINATED REFRIGERANT"

PERFORMANCE TEST DIAGNOSIS



*1 ATC-82, "PERFORMANCE CHART" *2 ATC-82, "PERFORMANCE CHART" *3 ATC-83, "TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE"

*4 ATC-60, "Air Mix Door Motor Circuit"



RJIA3107E

*1 ATC-124, "Removal and Installation of Compressor Clutch" *2 ATC-66, "Blower Motor Circuit" *3 EM-11, "Checking Drive Belt"

PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

Vehicle location	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door windows	Open
Hood	Open
TEMP.	Max. COLD
Mode control dial	(Ventilation) set
Intake switch	(Recirculation) set
Fan (blower) speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	10.0 - 11.6 (50 - 53)
	30 (86)	13.9 - 16.2 (57 - 61)
	35 (95)	17.8 - 21.4 (64 - 71)
60 - 70	25 (77)	11.6 - 13.9 (53 - 57)
	30 (86)	16.2 - 18.9 (61 - 66)
	35 (95)	21.4 - 24.5 (71 - 76)

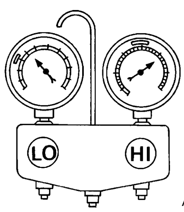
Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (kg/cm^2 , psi)	Low-pressure (Suction side) kPa (kg/cm^2 , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	30 (86)	980 - 1,180 (9.99 - 12.04, 142 - 171)	230 - 270 (2.35 - 2.75, 33 - 39)
	35 (95)	1,180 - 1,390 (12.04 - 14.18, 171 - 202)	260 - 310 (2.65 - 3.16, 38 - 45)
	40 (104)	1,400 - 1,580 (14.28 - 16.12, 203 - 229)	300 - 350 (3.06 - 3.57, 44 - 51)

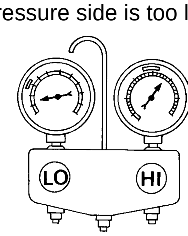
TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

Whenever system's high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

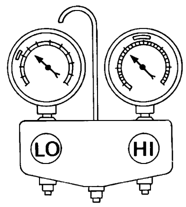
Both High- and Low-pressure Sides are Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too high.  AC359A	Pressure is reduced soon after water is splashed on condenser.	Excessive refrigerant charge in refrigeration cycle	Reduce refrigerant until specified pressure is obtained.
	Air suction by cooling fan is insufficient.	Insufficient condenser cooling performance ↓ 1. Condenser fins are clogged. 2. Improper fan rotation of cooling fan	● Clean condenser. ● Check and repair cooling fan as necessary.
	● Low-pressure pipe is not cold. ● When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2 , 28 psi). It then decreases gradually thereafter.	Poor heat exchange in condenser (After compressor operation stops, high-pressure decreases too slowly.) ↓ Air in refrigeration cycle	Evacuate repeatedly and recharge system.
	Engine tends to overheat.	Engine cooling systems malfunction.	Check and repair each engine cooling system.
	● An area of the low-pressure pipe is colder than areas near the evaporator outlet. ● Plates are sometimes covered with frost.	● Excessive liquid refrigerant on low-pressure side ● Excessive refrigerant discharge flow ● Expansion valve is open a little compared with the specification. ↓ Improper expansion valve adjustment	Replace expansion valve.

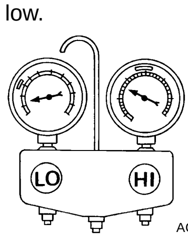
High-pressure Side is Too High and Low-pressure Side is Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too high and low-pressure side is too low.  AC360A	Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.	High-pressure tube or parts located between compressor and condenser are clogged or crushed.	● Check and repair or replace malfunctioning parts. ● Check lubricant for contamination.

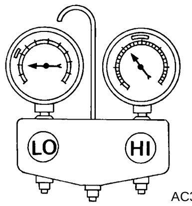
High-pressure Side Is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high- and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

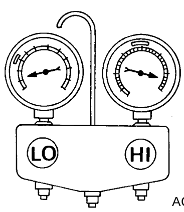
Both High- and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	● There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. ● Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	● Replace liquid tank. ● Check lubricant for contamination.
	● Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. ● Expansion valve inlet may be frosted. ● Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	● Check and repair malfunctioning parts. ● Check lubricant for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to ATC-133, "Checking for Refrigerant Leaks" .
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment 2. Malfunctioning expansion valve 3. Outlet and inlet may be clogged.	● Remove foreign particles by using compressed air. ● Replace expansion valve. ● Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	● Check and repair malfunctioning parts. ● Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	● Replace compressor. ● Repair evaporator fins. ● Replace evaporator. ● Refer to ATC-66, "Blower Motor Circuit" .

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	● Air conditioning system does not function and does not cyclically cool the compartment air. ● The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	● Drain water from refrigerant or replace refrigerant. ● Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. ● If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. ● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). ● If either of the above methods cannot correct the malfunction, replace expansion valve. ● Replace liquid tank. ● Check lubricant for contamination.

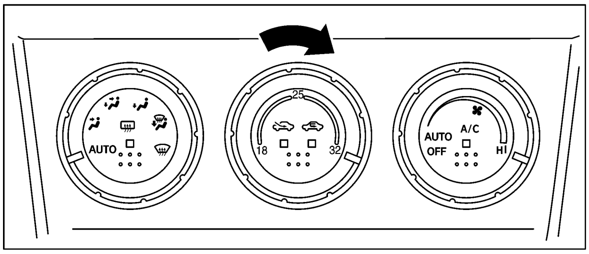
Insufficient Heating

AJS001KV

SYMPTOM: Insufficient heating

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature increase

a. Turn temperature dial clockwise until 32°C.

b. Check for hot air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

→ 3. Perform self-diagnosis STEP-1. (*2)

OK ↓

4. Perform self-diagnosis STEP-2. (*3)
   - NG → Go to appropriate malfunctioning sensor circuit. (*7)

OK ↓

5. Perform self-diagnosis STEP-4. (*3)
   - NG → **Go to appropriate malfunctioning items.**
     - Check LAN system circuit. (*8)
     - Check blower motor circuit. (*9)

OK ↓

6. Check the following:
   - Engine coolant level [Refer to (*4), “Changing Engine Coolant”.]
   - Hoses for leaks or kinks.
   - Radiator cap [Refer to (*5), “Checking Radiator Cap”.]
   - Air in cooling system.
   - NG → Repair/replace as necessary.

OK ↓

7. Check air mix door operation.
   - NG → Go to Air Mix Door Motor Circuit. (*10)

OK ↓

8. Check ducts for air leaks.
   - NG → Repair leaks.

OK ↓

9. Check the heater inlet and outlet hose temperatures by touching.
   - Hot inlet / Warm outlet → Check engine coolant temperature sensor (*6)
     - OK → System OK
     - NG → Repair or replace as necessary. Retest.
   - Both hoses warm → Check heater hoses for proper installation.
     - NG → Repair or replace as necessary. Retest.
     - OK → Note: Back flush heater core, drain and refill coolant. [Refer to (*4), “Changing Engine Coolant”.] Retest.
       - Hot inlet / Warm outlet → System OK
       - Both hoses warm → Replace heater core. Refill engine coolant. [Refer to (*4), “Changing Engine Coolant”.] Retest.
         - Hot inlet / Warm outlet → System OK

SJIA0409E

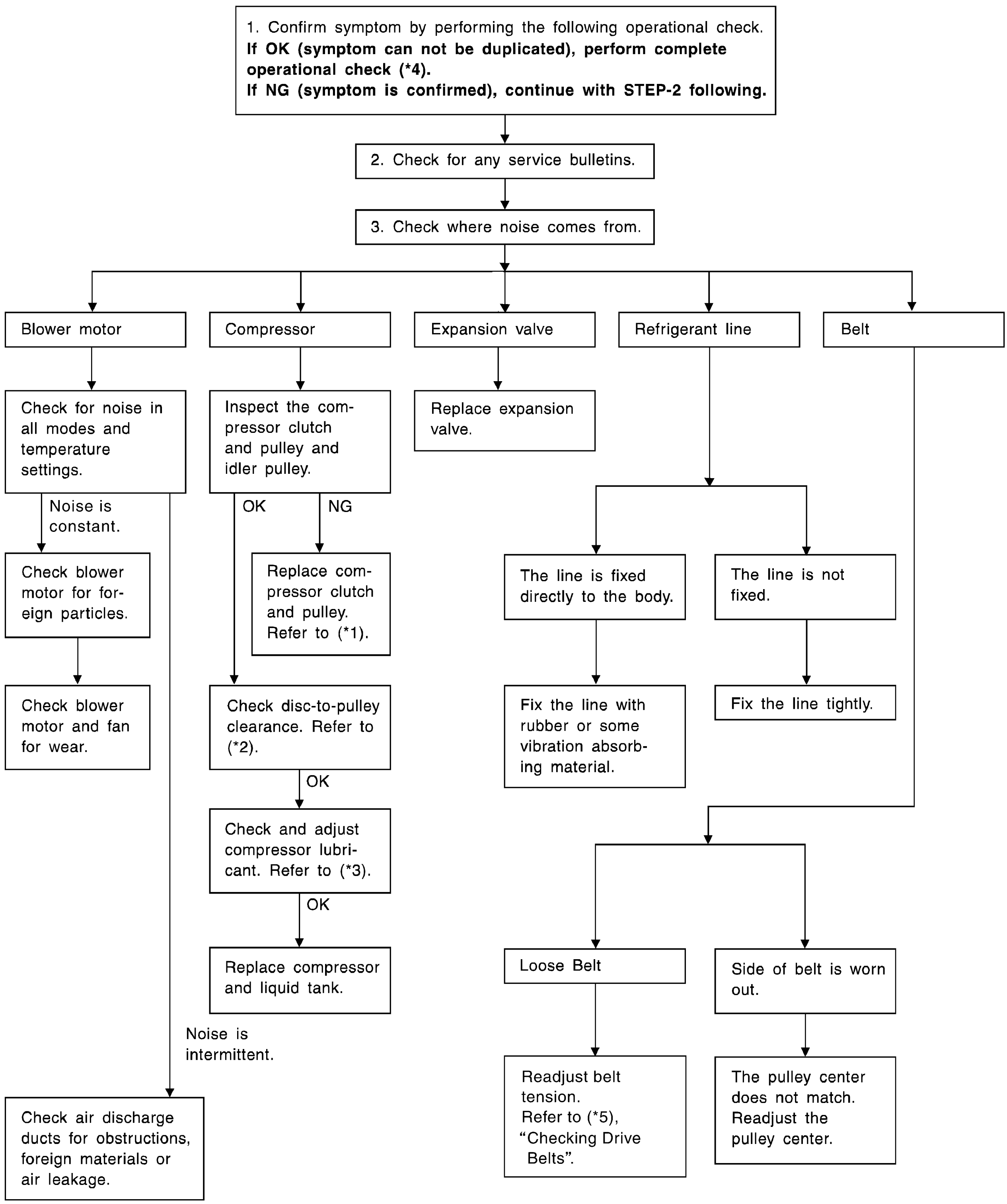
*1	ATC-50, "Operational Check"	*2	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 1.	*3	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 5 to 7.
*4	CO-8, "Changing Engine Coolant"	*5	CO-12, "Checking Radiator Cap"	*6	EC-205, "DTC P0117, P0118 ECT SENSOR"
*7	ATC-44, "FUNCTION CONFIRMATION PROCEDURE", see No. 9.	*8	ATC-54, "LAN System Circuit"	*9	ATC-66, "Blower Motor Circuit"
*10	ATC-60, "Air Mix Door Motor Circuit"				

Noise

AJS001KW

SYMPTOM: Noise

INSPECTION FLOW



RJIA3108E

*1 Compressor clutch, ATC-124, "REMOVAL" .	*2 Compressor clutch, ATC-126, "INSTALLATION" .	*3 ATC-22, "Maintenance of Lubricant Quantity in Compressor"
*4 ATC-50, "Operational Check"	*5 EM-11, "Checking Drive Belt"	

A B C D E F G H I ATC K L M

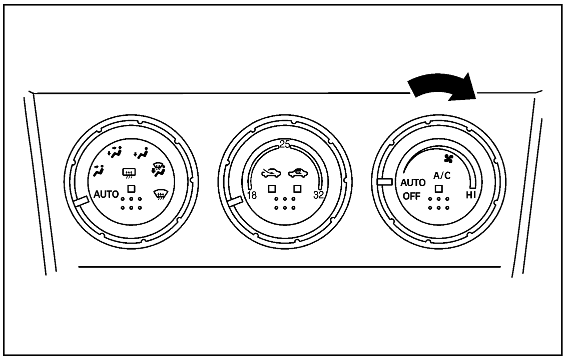
Self-diagnosis

AJS001KX

SYMPTOM: Self-diagnosis cannot be performed.

INSPECTION FLOW

1. Confirm symptom by performing operational check.



OPERATIONAL CHECK

a. Set mode control dial and fan control dial to AUTO position.

b. Press A/C switch.
Confirm that the compressor clutch engages (sound or visual inspection).
(Discharge air and blower speed will depend on ambient, in-vehicle and set temperatures.)

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue with STEP-2 following.

2. Check for any service bulletins.

3. Check Main Power Supply and Ground Circuit. (*2)

OK

Cause cannot be confirmed by self-diagnosis.

If the symptom still exists, perform a complete operational check (*1) and check for other symptoms. [Refer to symptom table, (*3).] Does another symptom exist?

NO → Replace auto amp. → INSPECTION END

YES → Go to Trouble Diagnosis for related symptom.

Another symptom exists.

RJIA3109E

*1 ATC-50, "Operational Check"

*2 ATC-52, "Power Supply and Ground Circuit for Auto Amp."

*3 ATC-32, "SYMPTOM TABLE"

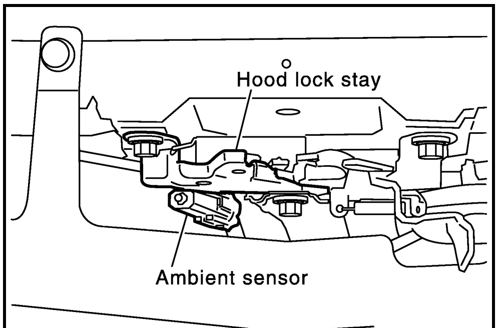
Ambient Sensor Circuit

AJS001KY

COMPONENT DESCRIPTION

Ambient Sensor

The ambient sensor is attached on the hood lock stay. It detects ambient temperature and converts it into a resistance value which is then input into the auto amp.



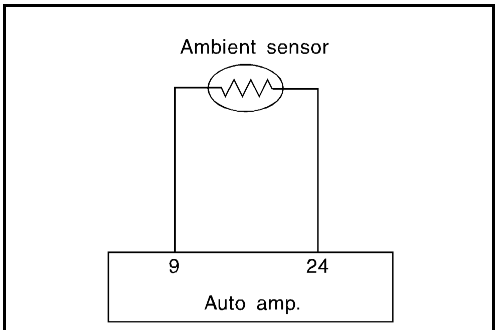
RJIA0048E

AMBIENT TEMPERATURE INPUT PROCESS

The auto amp. includes a processing circuit for the ambient sensor input. However, when the temperature detected by the ambient sensor increases quickly, the processing circuit retards the auto amp. function. It only allows the auto amp. to recognize an ambient temperature increase of 0.33°C (0.6°F) per 100 seconds.
As an example, consider stopping for a few minutes after high speed driving. Although the actual ambient temperature has not changed, the temperature detected by the ambient sensor will increase. This is because the heat from the engine compartment can radiate to the front grille area, location of the ambient sensor.

DIAGNOSTIC PROCEDURE FOR AMBIENT SENSOR

SYMPTOM: Ambient sensor circuit is open or shorted.
LED of A/C switch does not illuminate as a result of performing self-diagnosis STEP-2.

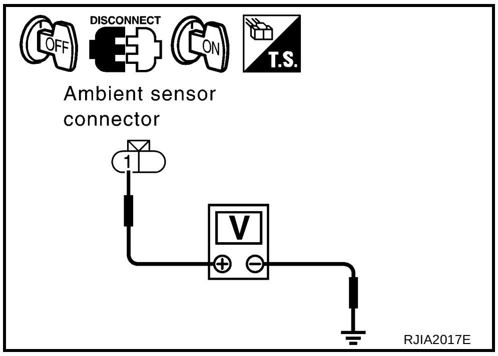


RHA051GD

1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR AND GROUND

1. Disconnect ambient sensor connector.
2. Turn ignition switch ON.
3. Check voltage between ambient sensor harness connector E38 terminal 1 (R/B) and ground.

1 – Ground : Approx. 5V

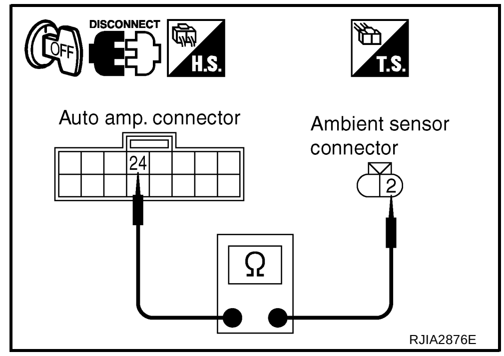


RJIA2017E

OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND AUTO AMP.



1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between ambient sensor harness connector E38 terminal 2 (B/Y) and auto amp. harness connector M53 terminal 24 (B/Y).

2 – 24 : Continuity should exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK AMBIENT SENSOR

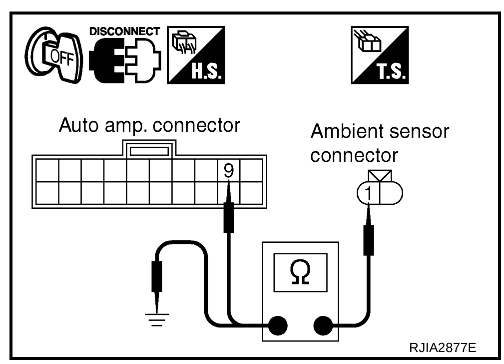
Refer to ATC-91, "Ambient Sensor" .

OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> 1. Replace ambient sensor.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

4. CHECK CIRCUIT CONTINUITY BETWEEN AMBIENT SENSOR AND AUTO AMP.



1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between ambient sensor harness connector E38 terminal 1 (R/B) and auto amp. harness connector M52 terminal 9 (R/B).

1 – 9 : Continuity should exist.

4. Check continuity between ambient sensor harness connector E38 terminal 1 (R/B) and ground.

1 – Ground : Continuity should not exist.

OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> Repair harness or connector.

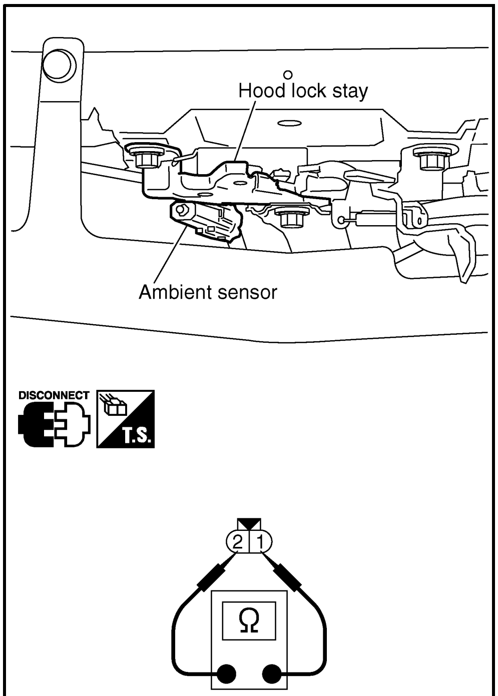
COMPONENT INSPECTION

Ambient Sensor

After disconnecting ambient sensor connector E38, measure resistance between terminals 2 and 1 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace ambient sensor.



SJIA0433E

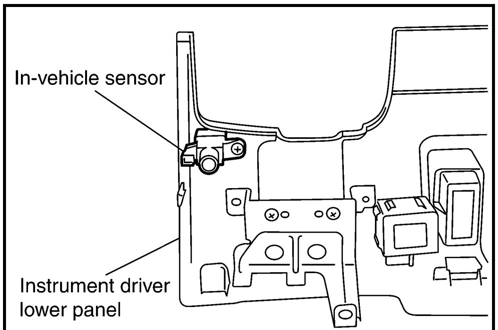
In-vehicle Sensor Circuit

AJS001KZ

COMPONENT DESCRIPTION

In-vehicle Sensor

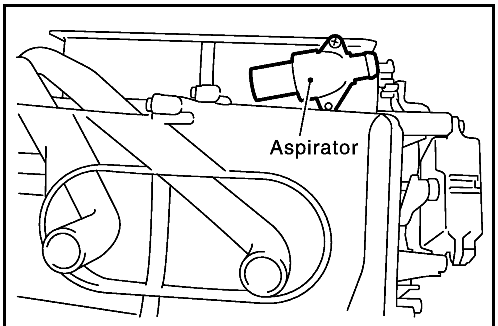
The in-vehicle sensor is located on instrument driver lower panel. It converts variations in temperature of compartment air drawn from the aspirator into a resistance value. It is then input into the auto amp.



RJIA2841E

Aspirator

The aspirator is located on front side of heater & cooling unit. It produces vacuum pressure due to air discharged from the heater & cooling unit, continuously taking compartment air in the aspirator.



RJIA0557E

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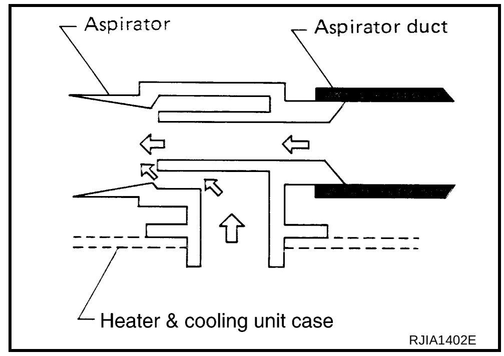
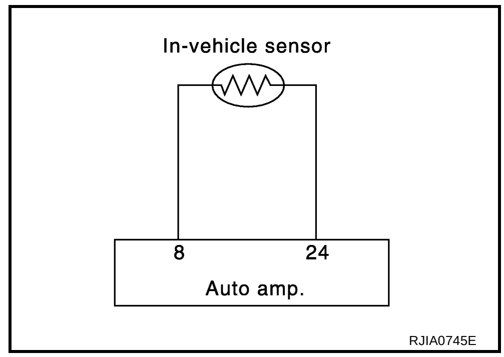


DIAGNOSTIC PROCEDURE FOR IN-VEHICLE SENSOR

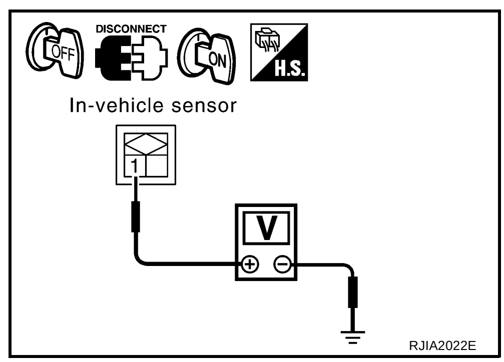
SYMPTOM: In-vehicle sensor circuit is open or shorted.
LED of A/C switch does not illuminate as a result of performing self-diagnosis STEP-2.



1. CHECK VOLTAGE BETWEEN IN-VEHICLE SENSOR AND GROUND

1. Disconnect in-vehicle sensor connector.
2. Turn ignition switch ON.
3. Check voltage between in-vehicle sensor harness connector M34 terminal 1 (P) and ground.

1 – Ground **: Approx. 5V**



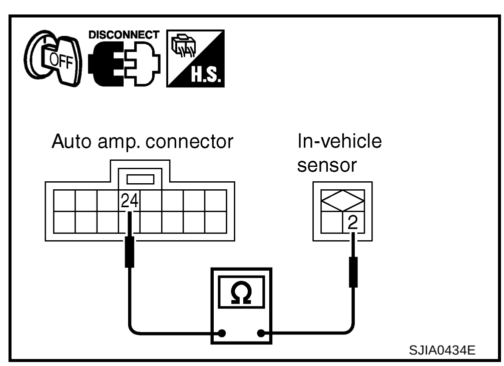
OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector M34 terminal 2 (B/Y) and auto amp. harness connector M53 terminal 24 (B/Y).

2 – 24 **: Continuity should exist.**



OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK IN-VEHICLE SENSOR

Refer to ATC-93, "In-vehicle Sensor" .

OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> 1. Replace in-vehicle sensor.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

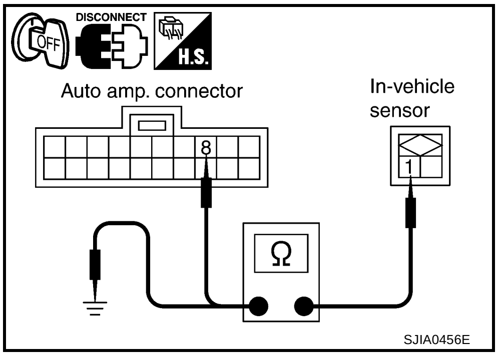
4. CHECK CIRCUIT CONTINUITY BETWEEN IN-VEHICLE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between in-vehicle sensor harness connector M34 terminal 1 (P) and auto amp. harness connector M52 terminal 8 (P).

1 – 8 : Continuity should exist.

4. Check continuity between in-vehicle sensor harness connector M34 terminal 1 (P) and ground.

1 – Ground : Continuity should not exist.



OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> Repair harness or connector.

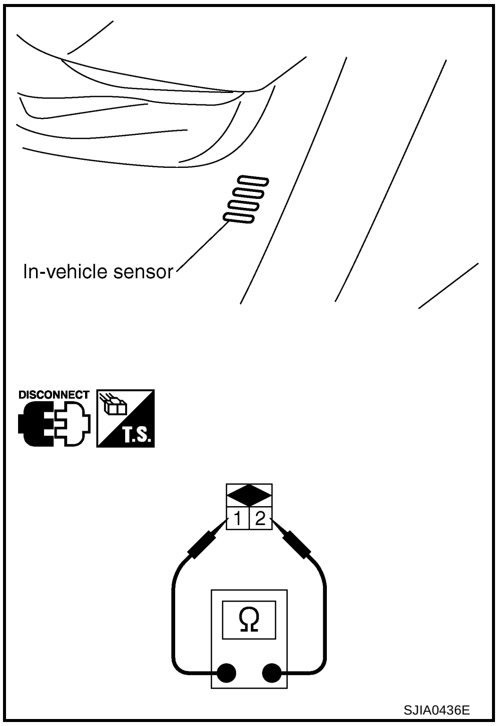
COMPONENT INSPECTION

In-vehicle Sensor

After disconnecting in-vehicle sensor connector M34, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.73
–10 (14)	9.92
–5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace in-vehicle sensor.

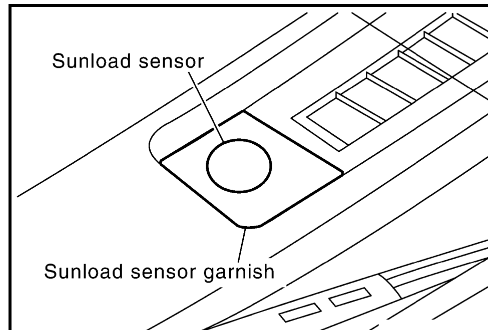


Sunload Sensor Circuit

AJS001L0

COMPONENT DESCRIPTION

The sunload sensor is located on the defroster grille (passenger side). It detects sunload entering through windshield by means of a photo diode. The sensor converts the sunload into a current value which is then input into the auto amp.



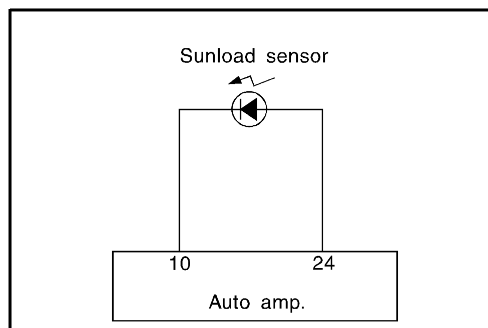
RJIA3110E

SUNLOAD INPUT PROCESS

The auto amp. also includes a processing circuit which averages the variations in detected sunload over a period of time. This prevents drastic swings in the ATC system operation due to small or quick variations in detected sunload.
For example, consider driving along a road bordered by an occasional group of large trees. The sunload detected by the sunload sensor will vary whenever the trees obstruct the sunlight. The processing circuit averages the detected sunload over a period of time, so that the (insignificant) effect of the trees momentarily obstructing the sunlight does not cause any change in the ATC system operation. On the other hand, shortly after entering a long tunnel, the system will recognize the change in sunload, and the system will react accordingly.

DIAGNOSTIC PROCEDURE FOR SUNLOAD SENSOR

SYMPTOM: Sunload sensor circuit is open or shorted.
LED of A/C switch does not illuminate as a result of performing self-diagnosis STEP-2.

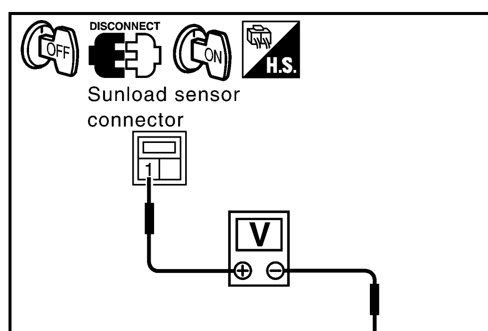


SHA601F

1. CHECK VOLTAGE BETWEEN SUNLOAD SENSOR AND GROUND

1. Disconnect sunload sensor connector.
2. Turn ignition switch ON.
3. Check voltage between sunload sensor harness connector M74 terminal 1 (OR) and ground.

1 – Ground **: Approx. 5V**



RJIA2027E

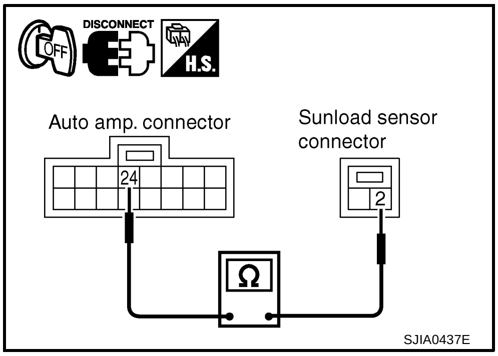
OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between sunload sensor harness connector M74 terminal 2 (B/Y) and auto amp. harness connector M53 terminal 24 (B/Y).

2 – 24 : Continuity should exist.



OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

3. CHECK SUNLOAD SENSOR.

1. Reconnect sunload sensor connector and auto amp. connector.
2. Refer to ATC-96, "Sunload Sensor" .

OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> 1. Replace sunload sensor.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

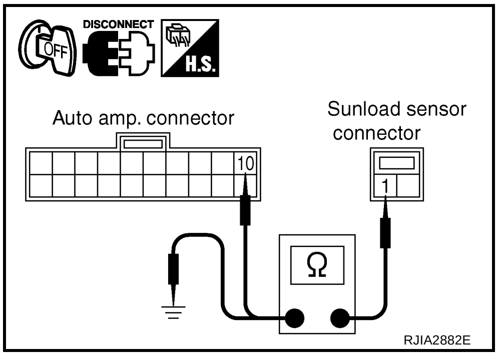
4. CHECK CIRCUIT CONTINUITY BETWEEN SUNLOAD SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between sunload sensor harness connector M74 terminal 1 (OR) and auto amp. harness connector M52 terminal 10 (OR).

1 – 10 : Continuity should exist.

4. Check continuity between sunload sensor harness connector M74 terminal 1 (OR) and ground.

1 – Ground : Continuity should not exist.



OK or NG

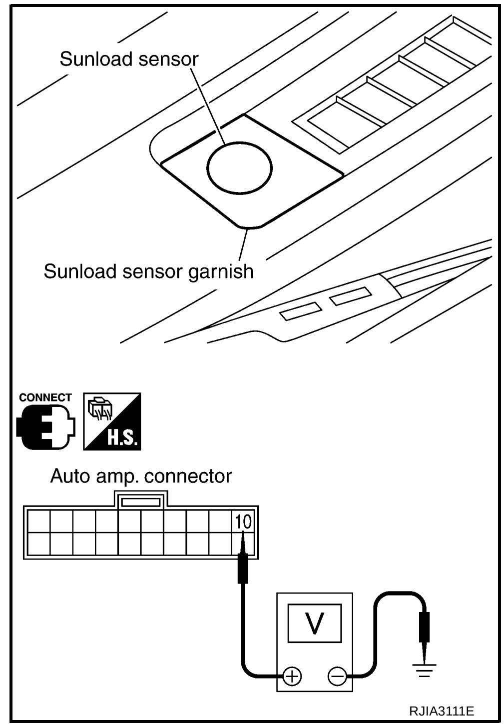
OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> Repair harness or connector.

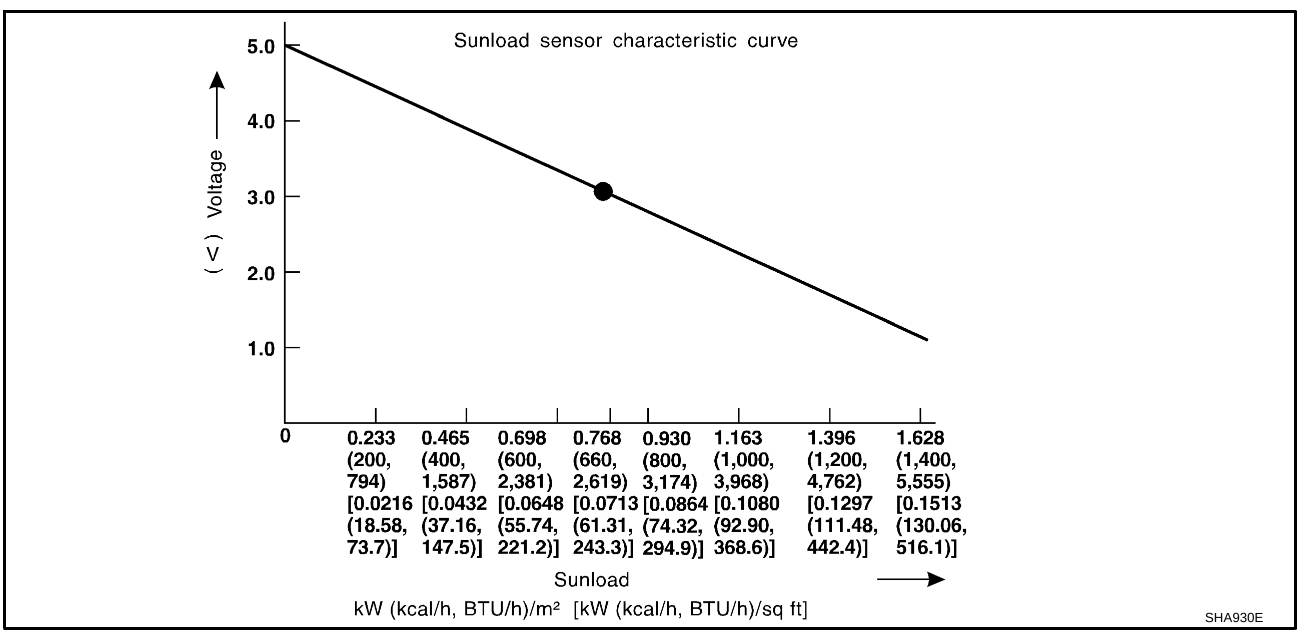
COMPONENT INSPECTION

Sunload Sensor

Measure voltage between auto amp. harness connector M52 terminal 10 (OR) and ground.
If NG, replace sunload sensor.



- When checking sunload sensor, select a place where sun shines directly on it.



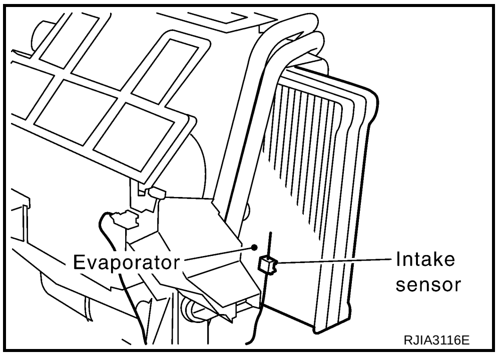
Intake Sensor Circuit

AJS001L1

COMPONENT DESCRIPTION

Intake Sensor

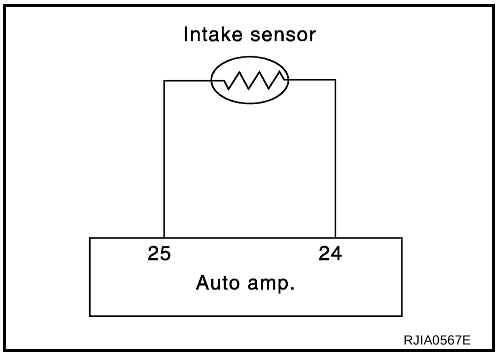
The intake sensor is located on the heater & cooling unit. It converts temperature of air after it passes through the evaporator into a resistance value which is then input to the auto amp.



RJIA3116E

DIAGNOSTIC PROCEDURE FOR INTAKE SENSOR

SYMPTOM: Intake sensor circuit is open or shorted.
LED of A/C switch does not illuminate as a result of performing self-diagnosis STEP-2.



RJIA0567E

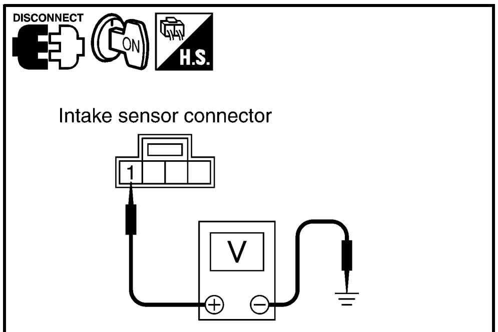
1. CHECK VOLTAGE BETWEEN INTAKE SENSOR AND GROUND

1. Disconnect intake sensor connector.
2. Turn ignition switch ON.
3. Check voltage between intake sensor harness connector M68 terminal 1 (BR/Y) and ground.

1 – Ground **: Approx. 5V**

OK or NG

OK >> GO TO 2.
NG >> GO TO 4.



RJIA3112E

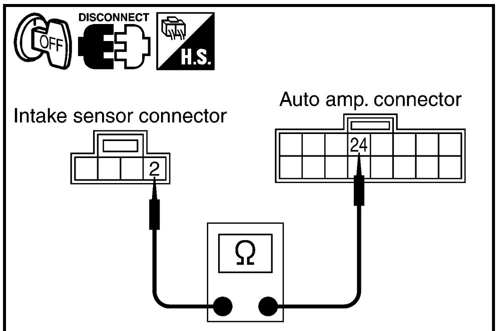
2. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between intake sensor harness connector M68 terminal 2 (B/Y) and auto amp. harness connector M53 terminal 24 (B/Y).

2 – 24 **: Continuity should exist.**

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.



RJIA3113E

3. CHECK INTAKE SENSOR

Refer to ATC-98, "Intake Sensor" .

OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> 1. Replace intake sensor.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

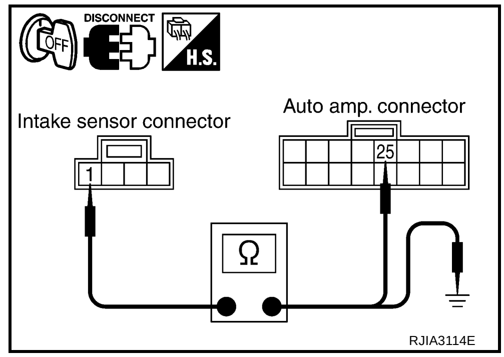
4. CHECK CIRCUIT CONTINUITY BETWEEN INTAKE SENSOR AND AUTO AMP.

1. Turn ignition switch OFF.
2. Disconnect auto amp. connector.
3. Check continuity between intake sensor harness connector M68 terminal 1 (BR/Y) and auto amp. harness connector M53 terminal 25 (BR/Y).

1 – 25 : Continuity should exist.

4. Check continuity between intake sensor harness connector M68 terminal 1 (BR/Y) and ground.

1 – Ground : Continuity should not exist.



OK or NG

OK >> 1. Replace auto amp.
2. Go to self-diagnosis ATC-44, "FUNCTION CONFIRMATION PROCEDURE" and perform self-diagnosis STEP-2.

NG >> Repair harness or connector.

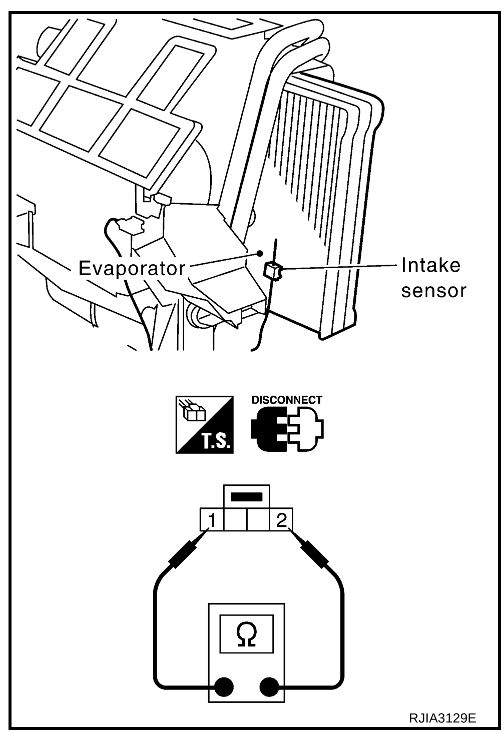
COMPONENT INSPECTION

Intake Sensor

After disconnecting intake sensor connector M68, measure resistance between terminals 1 and 2 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
–15 (5)	12.34
–10 (14)	9.62
–5 (23)	7.56
0 (32)	6.00
5 (41)	4.80
10 (50)	3.87
15 (59)	3.15
20 (68)	2.57
25 (77)	2.12
30 (86)	1.76
35 (95)	1.47
40 (104)	1.23
45 (113)	1.04

If NG, replace intake sensor.



CONTROLLER

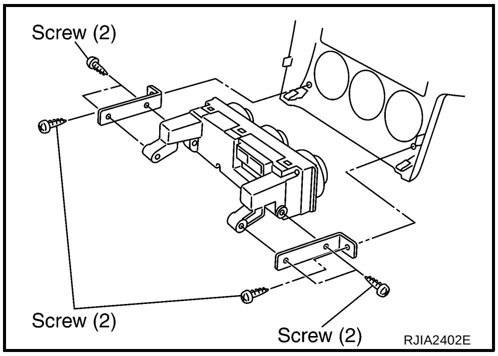
PFP:27500

Removal and Installation

AJS001L2

REMOVAL

1. Remove cluster lid C. Refer to IP-11, "Removal and Installation" .
2. Remove fixing screws, and then remove controller.



INSTALLATION

Installation is basically the reverse order of removal.

AMBIENT SENSOR

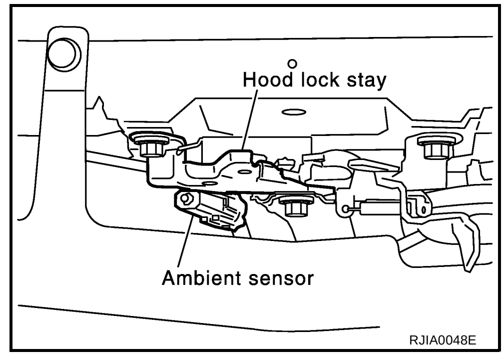
PFP:27722

Removal and Installation

AJS001L3

REMOVAL

1. Remove front grille. Refer to EI-18, "FRONT GRILLE" .
2. Disconnect ambient sensor connector, and then remove ambient sensor.



INSTALLATION

Installation is basically the reverse order of removal.

IN-VEHICLE SENSOR

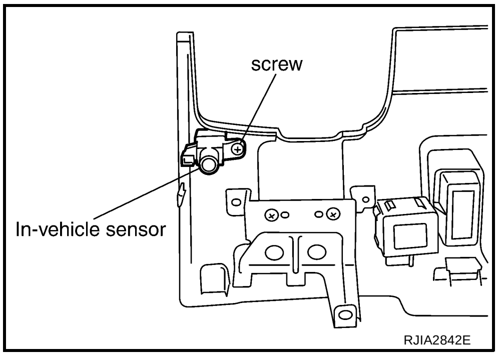
PFP:27720

Removal and Installation

AJS001L4

REMOVAL

1. Remove instrument driver lower panel. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screw, and then remove in-vehicle sensor.



INSTALLATION

Installation is basically the reverse order of removal.

SUNLOAD SENSOR

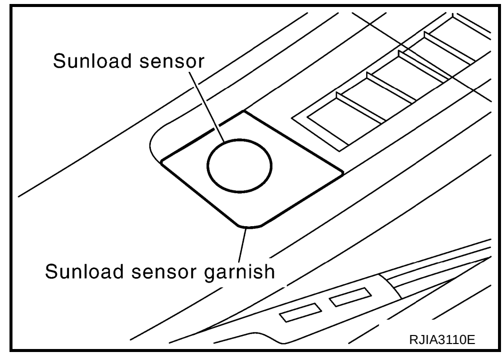
PFP:27721

Removal and Installation

AJS001L5

REMOVAL

1. Remove sunload sensor garnish.
2. Disconnect sunload sensor connector, and then remove sunload sensor.



INSTALLATION

Installation is basically the reverse order of removal.

INTAKE SENSOR

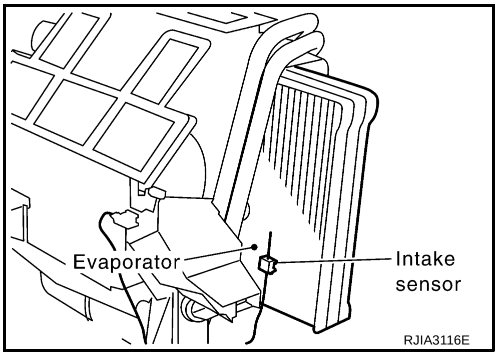
PFP:27723

Removal and Installation

AJS001L6

REMOVAL

1. Remove evaporator. Refer to ATC-131, "Removal and Installation of Evaporator" .
2. Remove intake sensor.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings for A/C piping with new ones, and then apply compressor oil to it when installing it.**
- **Mark the mounting position of intake sensor bracket.**
- **When recharging refrigerant, check for leaks.**

BLOWER UNIT

PFP:27200

Removal and Installation

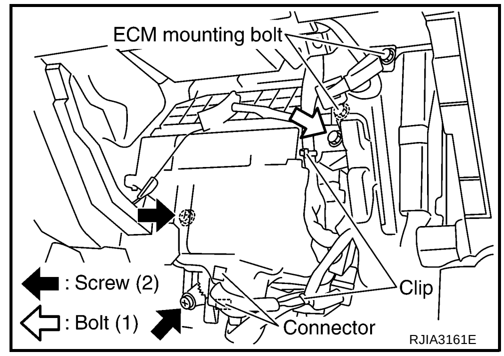
AJS001L7

REMOVAL

1. Remove glove box assembly.
2. Remove glove box cover, instrument passenger lower panel and instrument reinforcement. Refer to IP-11, "Removal and Installation" .
3. Remove ECM with ECM bracket attached.
4. Remove instrument panel mounting screw.
5. Remove blower unit mounting bolt and screws.
6. Disconnect blower motor connector and fan control amp. connector.
7. Disconnect intake door motor connector and harness clip.
8. Remove blower unit.

   CAUTION:

   Slide the blower unit toward the right, remove location pins (2 parts), and then move it downward.



INSTALLATION

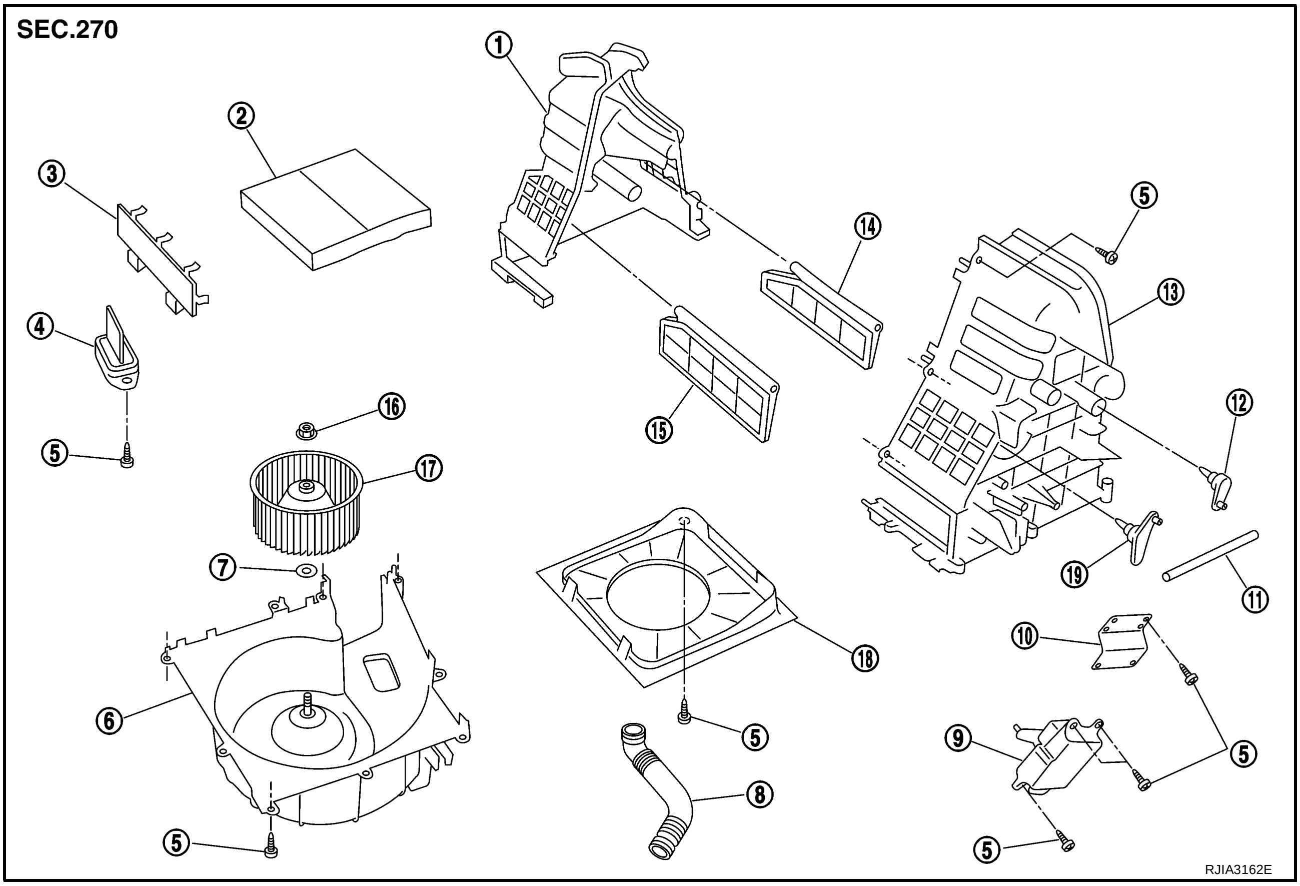
Installation is basically the reverse order of removal.

CAUTION:

- **Make sure location pins (2 parts) are securely installed.**

Disassembly and Assembly

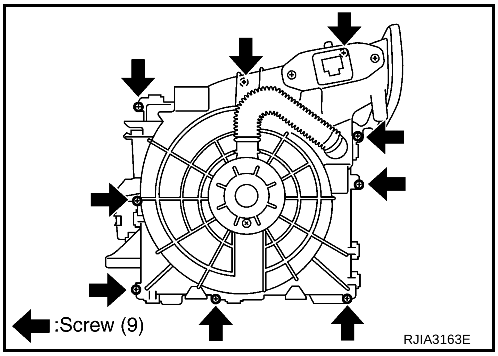
AJS001L8



1.	Upper case 2	2.	In-cabin microfilter	3.	Filter cover
4.	Fan control amp.	5.	Screw	6.	Blower fan motor assembly
7.	Washer	8.	Cooling hose	9.	Intake door motor
10.	Motor bracket	11.	Intake door link	12.	Intake door lever 2
13.	Upper case 1	14.	Intake door 2	15.	Intake door 1
16.	Nut	17.	Blower fan	18.	Bell mouth
19.	Intake door lever 1				

CAUTION:

If retaining tabs are damaged while disassembling blower unit, use 9 screws (27111-2Y000) to assemble blower unit.



BLOWER MOTOR

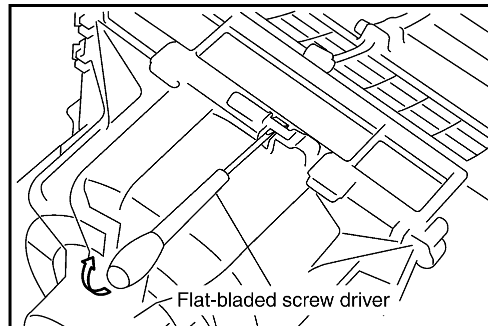
PFP:27226

Removal and Installation

AJS001L9

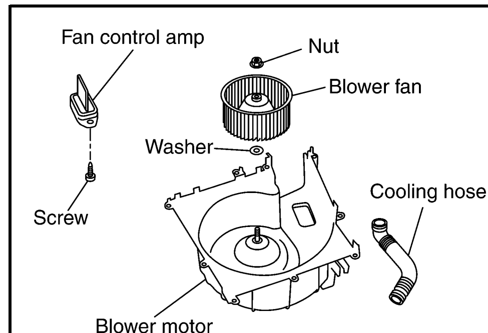
REMOVAL

1. Remove blower unit. Refer to ATC-104, "BLOWER UNIT" .
2. Separate blower unit.



RJIA3164E

3. Remove cooling hose, fan control amp. and blower fan.



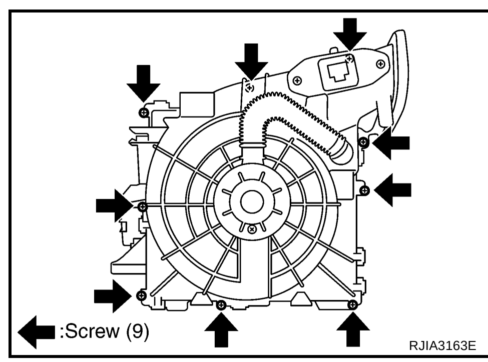
RJIA3165E

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

If retaining tabs are damaged while disassembling blower unit, use 9 screws (27111-2Y000) to assemble blower unit.



RJIA3163E

INTAKE DOOR MOTOR

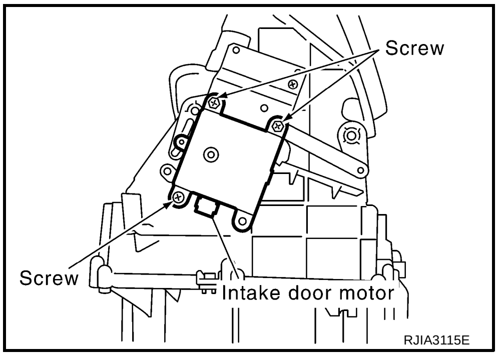
PFP:27730

Removal and Installation

AJS001LA

REMOVAL

1. Remove blower unit. Refer to ATC-104, "BLOWER UNIT" .
2. Remove mounting screws, and then remove intake door motor from blower unit.



INSTALLATION

Installation is basically the reverse order of removal.

A B C D E F G H I ATC K L M

FAN CONTROL AMPLIFIER

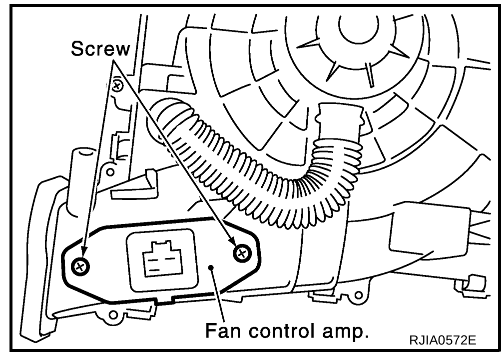
PFP:27761

Removal and Installation

AJS001LB

REMOVAL

1. Remove blower unit. Refer to ATC-104, "BLOWER UNIT" .
2. Remove mounting screws, and then remove fan control amp.



INSTALLATION

Installation is basically the reverse order of removal.

IN-CABIN MICROFILTER

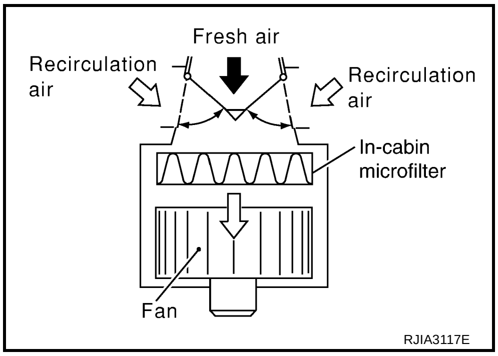
PFP:27277

Removal and Installation

AJS001LC

FUNCTION

Air inside passenger compartment is kept clean at either recirculation or fresh mode by installing in-cabin microfilter into blower unit.

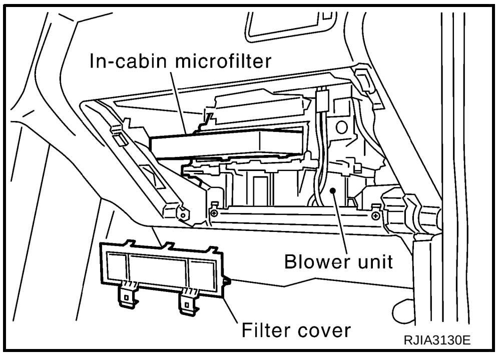


REPLACEMENT TIMING

Replace in-cabin microfilter.
Refer to MA-8, "CHASSIS AND BODY MAINTENANCE" in Schedule 1 and MA-9, "CHASSIS AND BODY MAINTENANCE" Schedule 2.
Caution label is fixed inside glove box.

REPLACEMENT PROCEDURES

1. Remove glove box. Refer to IP-11, "Removal and Installation" .
2. Remove filter cover.
3. Take out in-cabin microfilter from blower unit.
4. Replace with new one and reinstall on blower unit.
5. Reinstall glove box.



HEATER & COOLING UNIT ASSEMBLY

PFP:27110

Removal and Installation

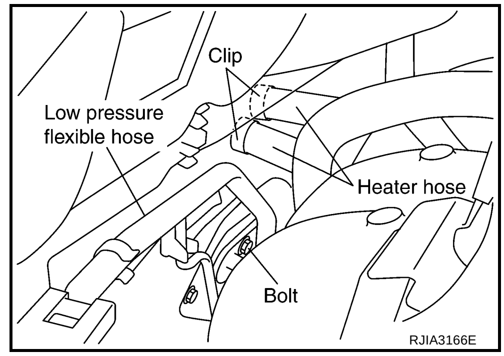
AJS001LD

REMOVAL

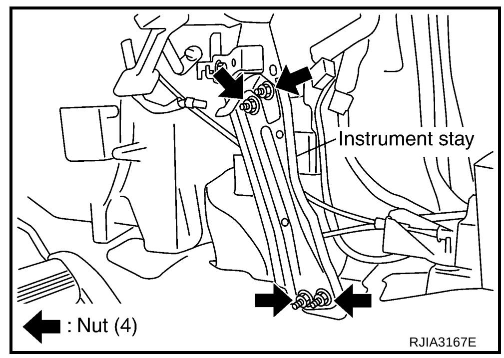
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Drain coolant from cooling system. Refer to CO-8, "Changing Engine Coolant" .
3. Disconnect two heater hoses from heater core pipe.
4. Remove mounting bolt from low-pressure flexible hose.

   CAUTION:

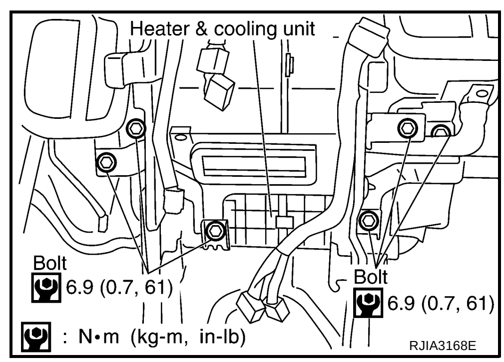
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



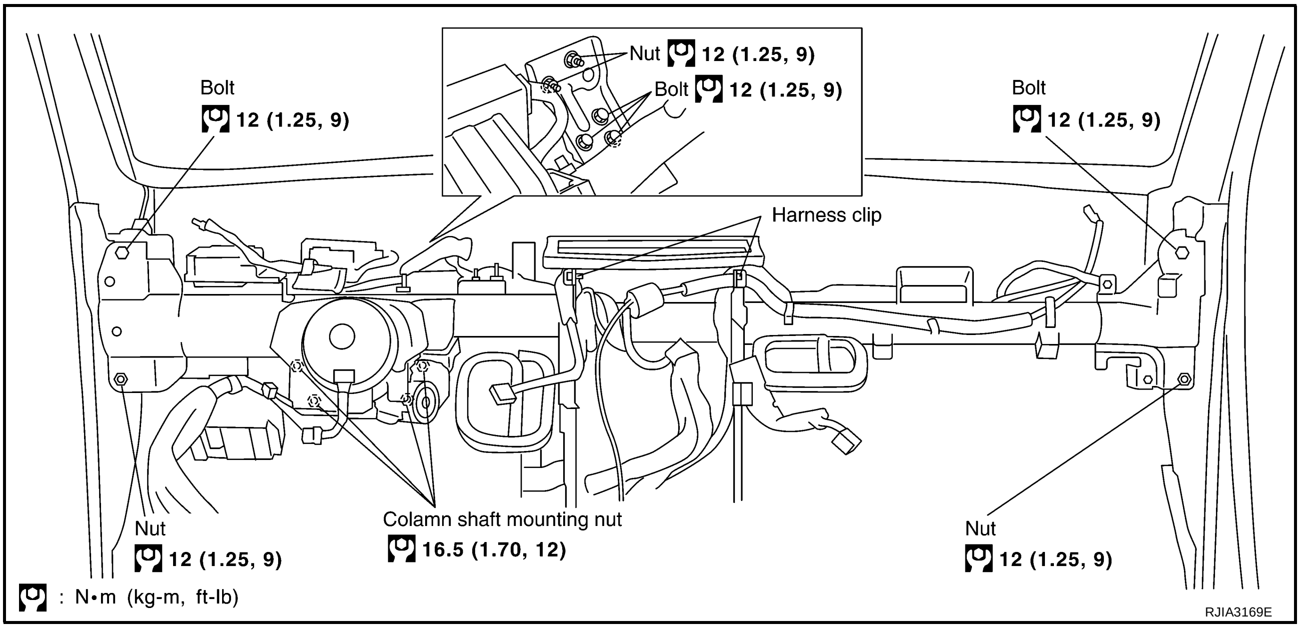
5. Remove blower unit. Refer to ATC-104, "BLOWER UNIT" .
6. Remove clips of vehicle harness from steering member.
7. Remove mounting nuts, and then remove instrument stay.



8. Remove mounting bolts from heater & cooling unit.



9. Remove steering member.



10. Remove heater & cooling unit.

CAUTION:

Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

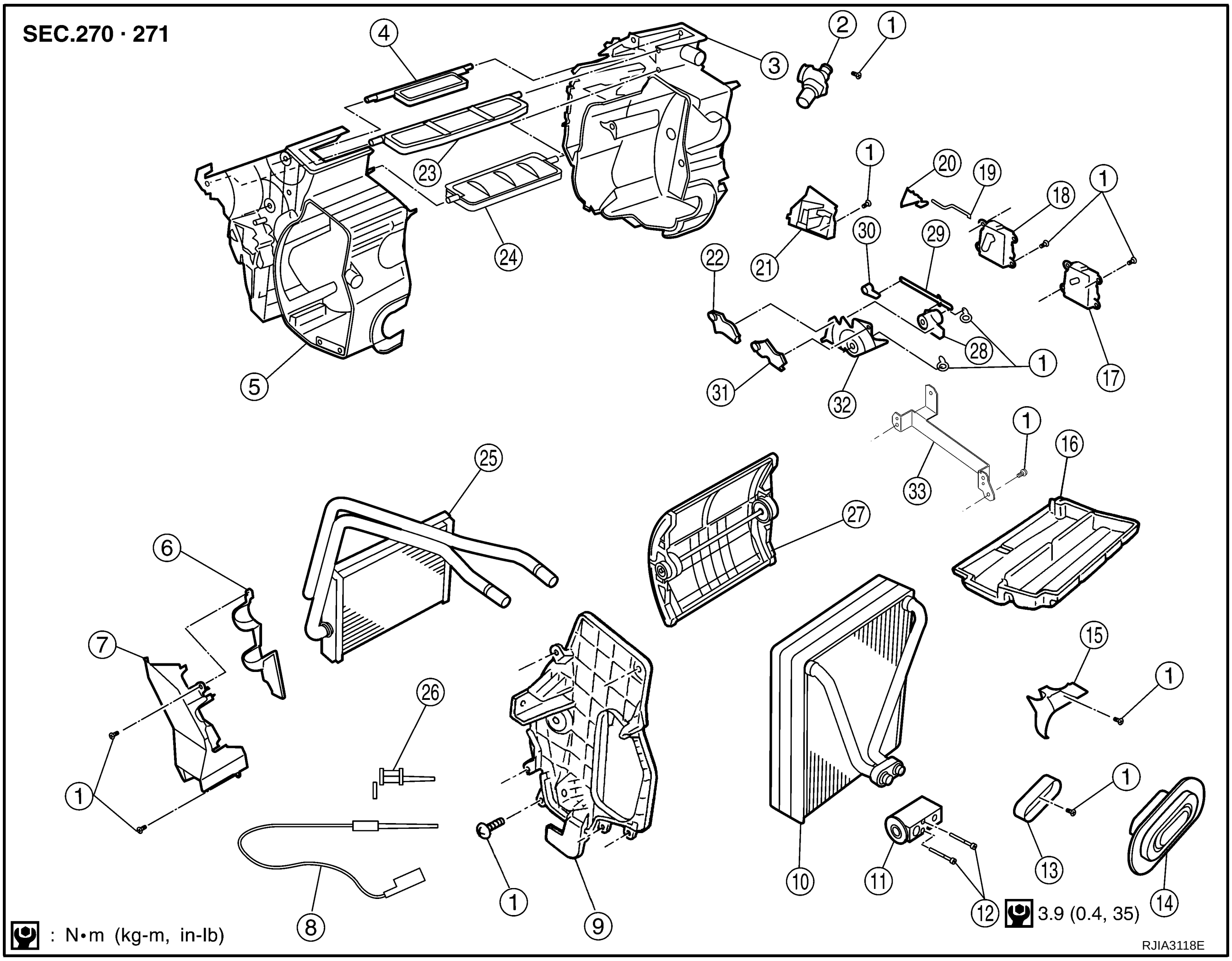
- **Replace O-rings of low-pressure flexible hose and high-pressure pipe with a new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

NOTE:

When filling radiator with coolant, refer to CO-8, "Changing Engine Coolant" .

Disassembly and Assembly

AJS001LE



1.	Screw	2.	Aspirator	3.	Heater & cooling unit case (left)
4.	Defroster door	5.	Heater & cooling unit case (right)	6.	Heater core cover
7.	Foot duct (right)	8.	Intake sensor	9.	Evaporator cover
10.	Evaporator	11.	Expansion valve	12.	Bolt
13.	Expansion valve cover	14.	Cooler grommet	15.	Heater pipe support
16.	Insulator	17.	Air mix door motor	18.	Mode door motor
19.	Rod	20.	Rod holder	21.	Foot duct (left)
22.	Defroster door lever	23.	Ventilator door	24.	Max. cool door
25.	Heater core	26.	Intake sensor bracket	27.	Slide door unit (Air mix door)
28.	Ventilator door link 2	29.	Ventilator door link 1	30.	Ventilator door lever
31.	Max. cool door lever	32.	Main link	33.	Harness bracket

MODE DOOR MOTOR

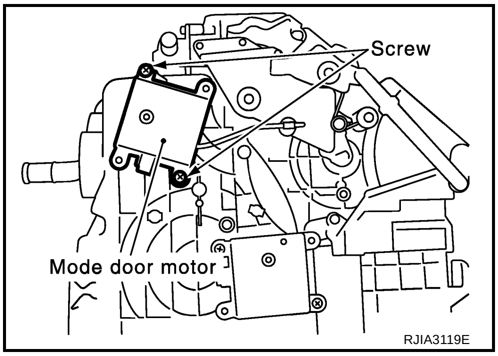
PFP:27731

Removal and Installation

AJS001LF

REMOVAL

1. Remove rod from rod holder.
2. Remove mounting screws, and then remove mode door motor.
3. Disconnect mode door motor connector.



RJIA3119E

INSTALLATION

1. Install rod to mode door.
2. Reconnect mode door motor connector.
3. Install mode door motor.
4. Turn ignition switch ON.
5. Turn mode control dial to VENT position.
6. Turn side link clockwise, and then install rod to rod holder.

AIR MIX DOOR MOTOR

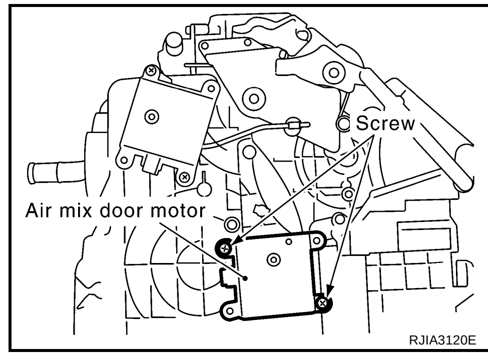
PFP:27732

Removal and Installation

AJS001LG

REMOVAL

1. Set the temperature control dial at 18°C, and then disconnect the battery cable from the negative terminal.
2. Disconnect air mix door motor connector.
3. Remove mounting screws, and then remove air mix door motor.



INSTALLATION

Installation is basically the reverse order of removal.

HEATER CORE

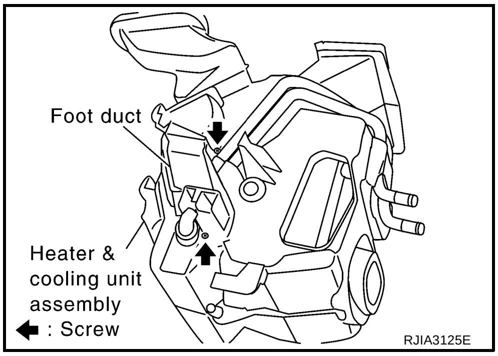
PFP:27140

Removal and Installation

AJS001LH

REMOVAL

1. Remove heater & cooling unit assembly. Refer to ATC-110, "HEATER & COOLING UNIT ASSEMBLY" .
2. Remove heater pipe support.
3. Remove mounting screws, and then remove foot duct and heater core cover.
4. Remove heater core from heater & cooling unit assembly.



INSTALLATION

Installation is basically the reverse order of removal.

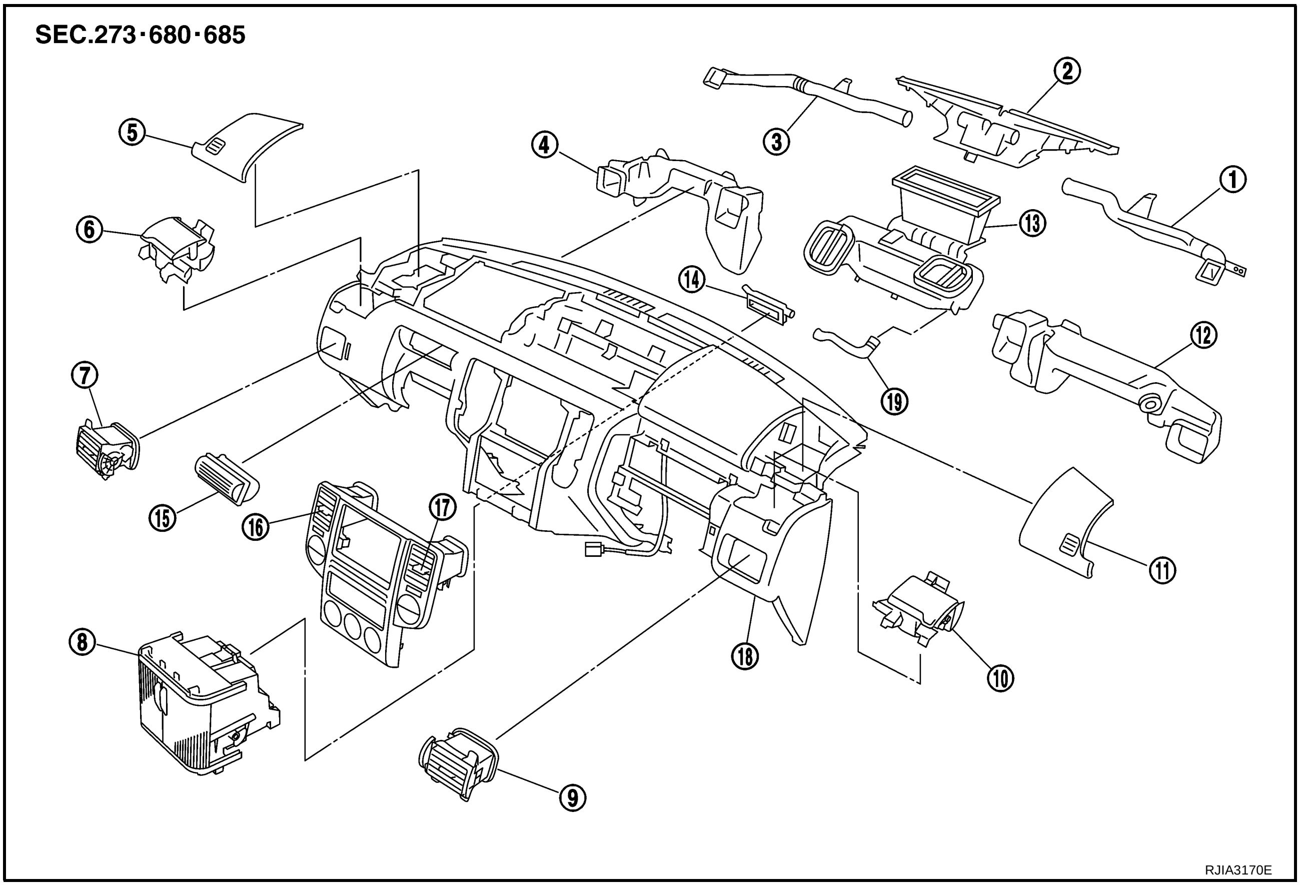
DUCTS AND GRILLES

PFP:27860

Removal and Installation

AJS001LI

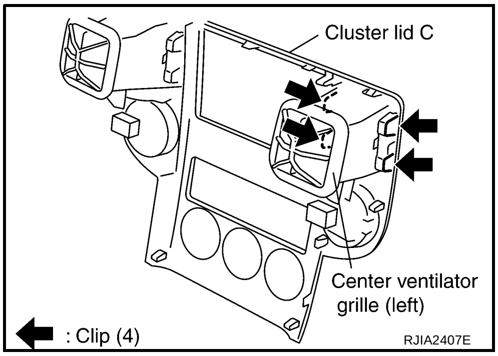
REMOVAL



1. Side defroster duct (right)	2. Defroster nozzle	3. Side defroster duct (left)
4. Side ventilator duct (left)	5. Front speaker grille (left)	6. Cup holder (left)
7. Side ventilator grille (left)	8. Multi-box (Instrument center lower panel)	9. Side ventilator grille (right)
10. Cup holder (right)	11. Front speaker grille (right)	12. Side ventilator duct (right)
13. Adaptor	14. Multi-box duct 2	15. Driver ventilator grille
16. Center ventilator grille (left)	17. Center ventilator grille (right)	18. Instrument panel
19. Multi-box duct 1		

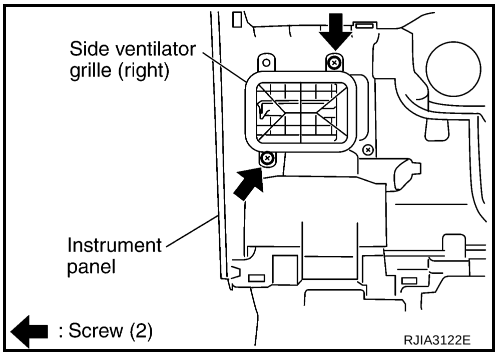
Removal of Center Ventilator Grille

1. Remove cluster lid C. Refer to IP-11, "Removal and Installation" .
2. Remove mounting clips, and then remove center ventilator grille.



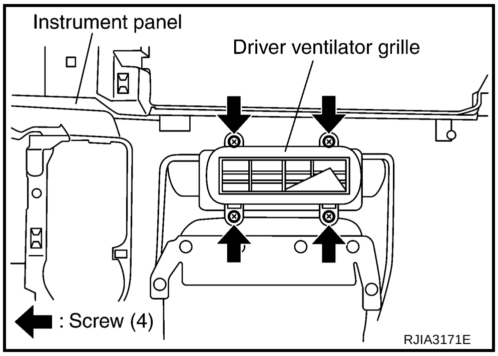
Removal of Side Ventilator Grille

1. Remove instrument panel. Refer to IP-11, "Removal and Installation" .
2. Remove side ventilator ducts. Refer to ATC-118, "Removal of Defroster Nozzle, Duct and Side Ventilator Duct" .
3. Remove mounting screws, and then remove side ventilator grille.



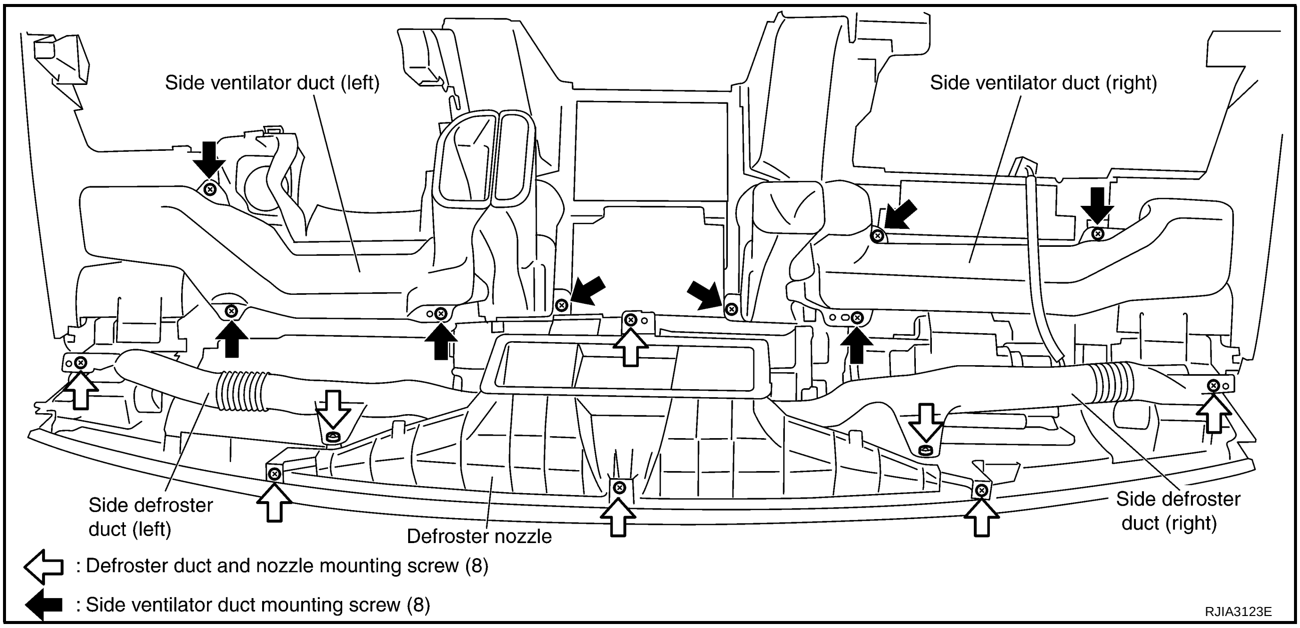
Removal of Driver Ventilator Grille

1. Remove instrument finisher. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then remove driver ventilator grille.



Removal of Defroster Nozzle, Duct and Side Ventilator Duct

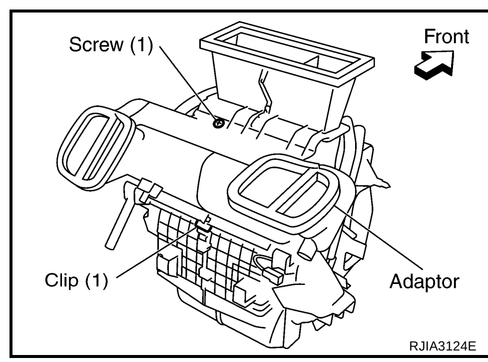
1. Remove instrument panel. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then remove side defroster ducts with defroster nozzle.



3. Remove mounting screws, and then remove side ventilator ducts.

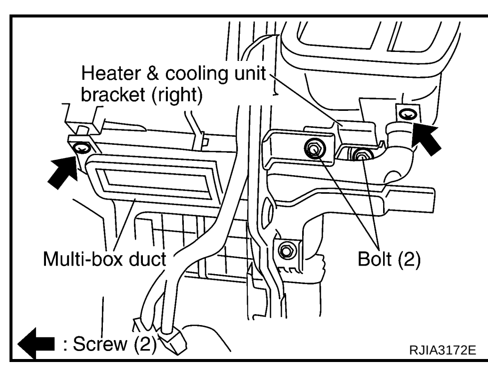
Removal of Adaptor

1. Remove heater & cooling unit assembly. Refer to ATC-110, "HEATER & COOLING UNIT ASSEMBLY" .
2. Remove mounting screw and clip.
3. Slide adaptor toward vehicle front, and then remove adaptor.



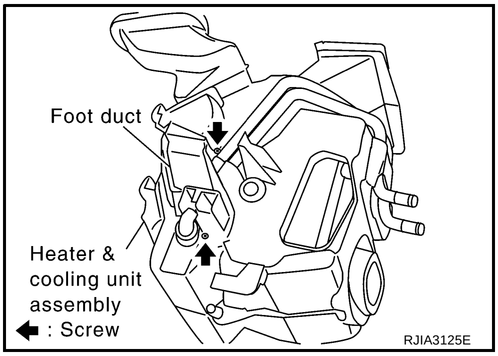
Removal of Multi-Box Duct

1. Remove instrument panel. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then disconnect multi-box duct from heater & cooling unit assembly.
3. Remove mounting bolts, and then remove heater & cooling unit bracket.
4. Remove multi-box duct from passenger side.



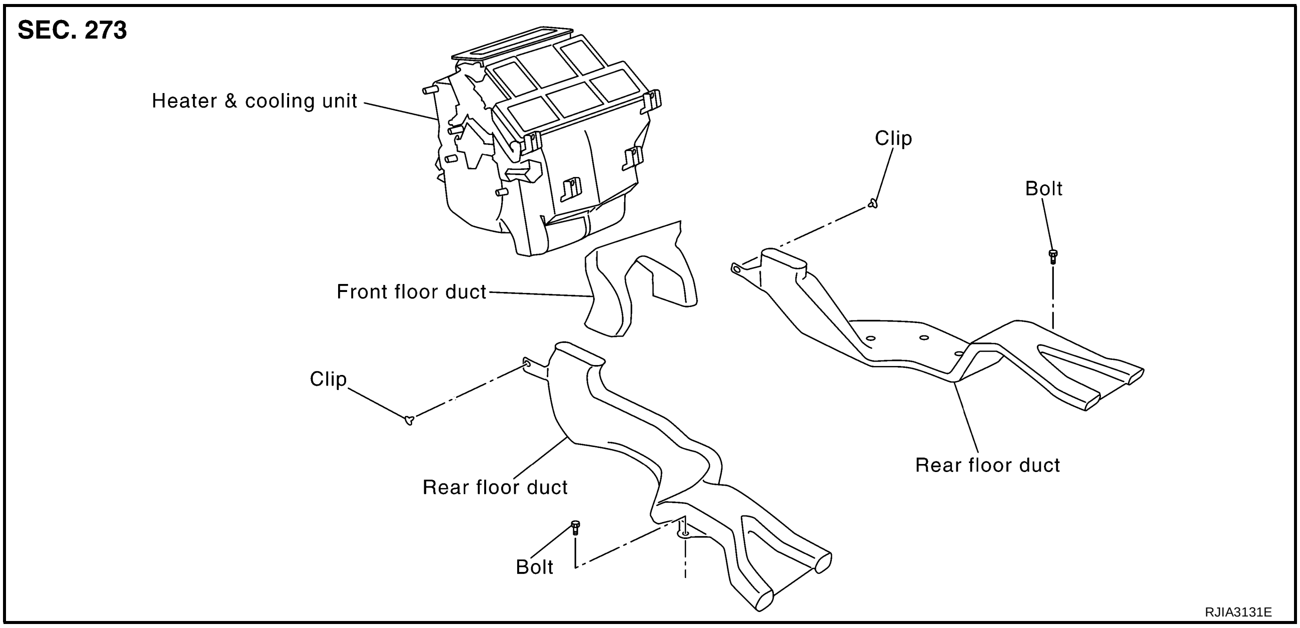
Removal of Foot Duct

1. Remove multi-box duct.
2. Remove mounting screws, and then remove foot duct.

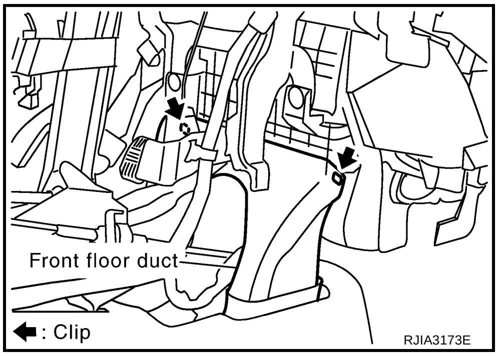


Removal of Floor Duct

1. Remove the front seats. Refer to SE-17, "FRONT SEAT" .
2. Remove multi-box (Instrument center lower panel). Refer to IP-11, "Removal and Installation" .
3. Peel back the floor trim to a point where the floor duct is visible.
4. Remove mounting bolt and clip, and then remove rear floor duct.



5. Remove mounting clips, and then remove front floor duct.



INSTALLATION

Installation is basically the reverse order of removal.

REFRIGERANT LINES

PFP:92600

HFC-134a (R-134a) Service Procedure

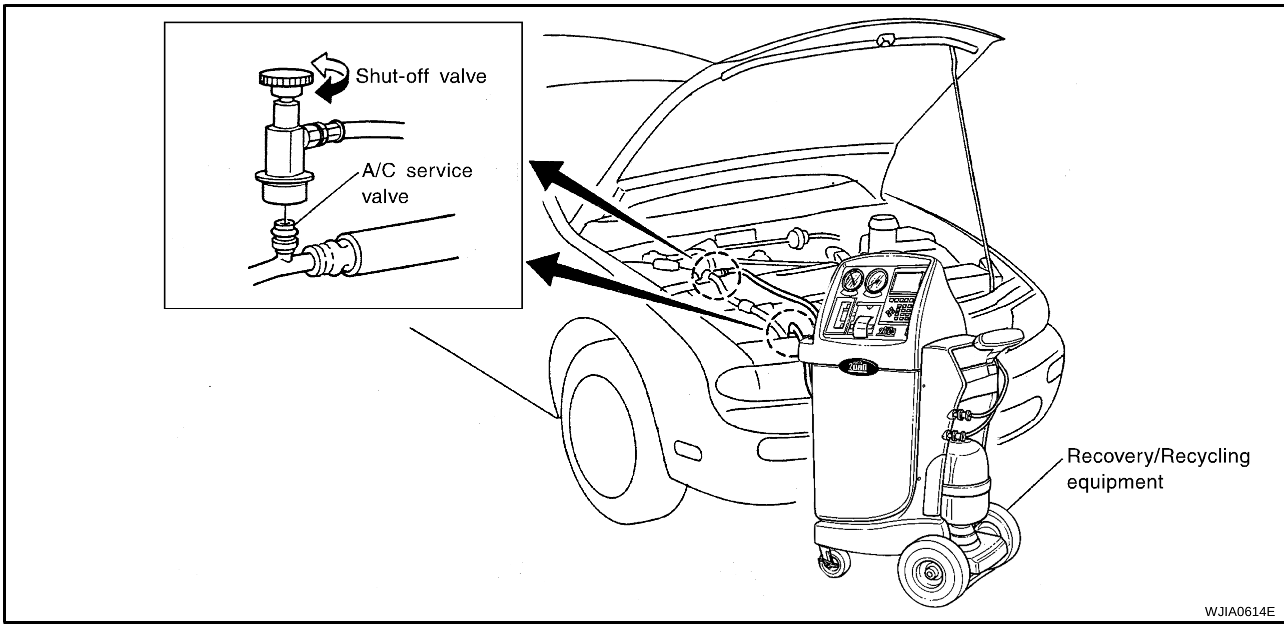
AJS001LJ

SETTING OF SERVICE TOOLS AND EQUIPMENT

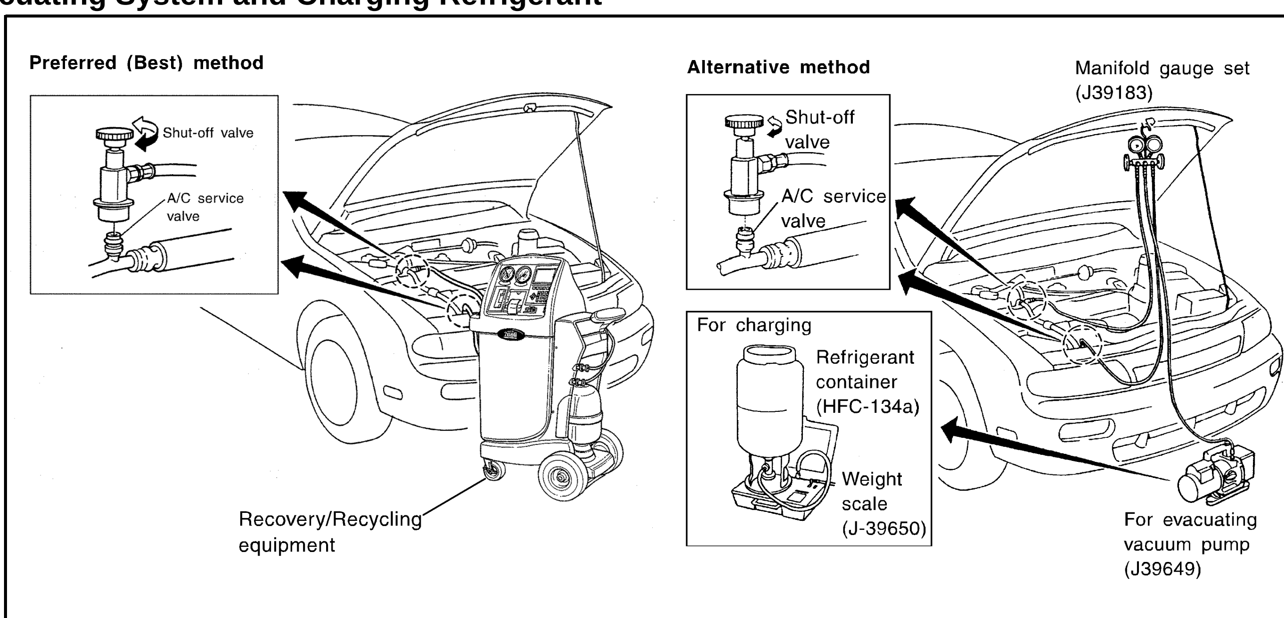
Discharging Refrigerant

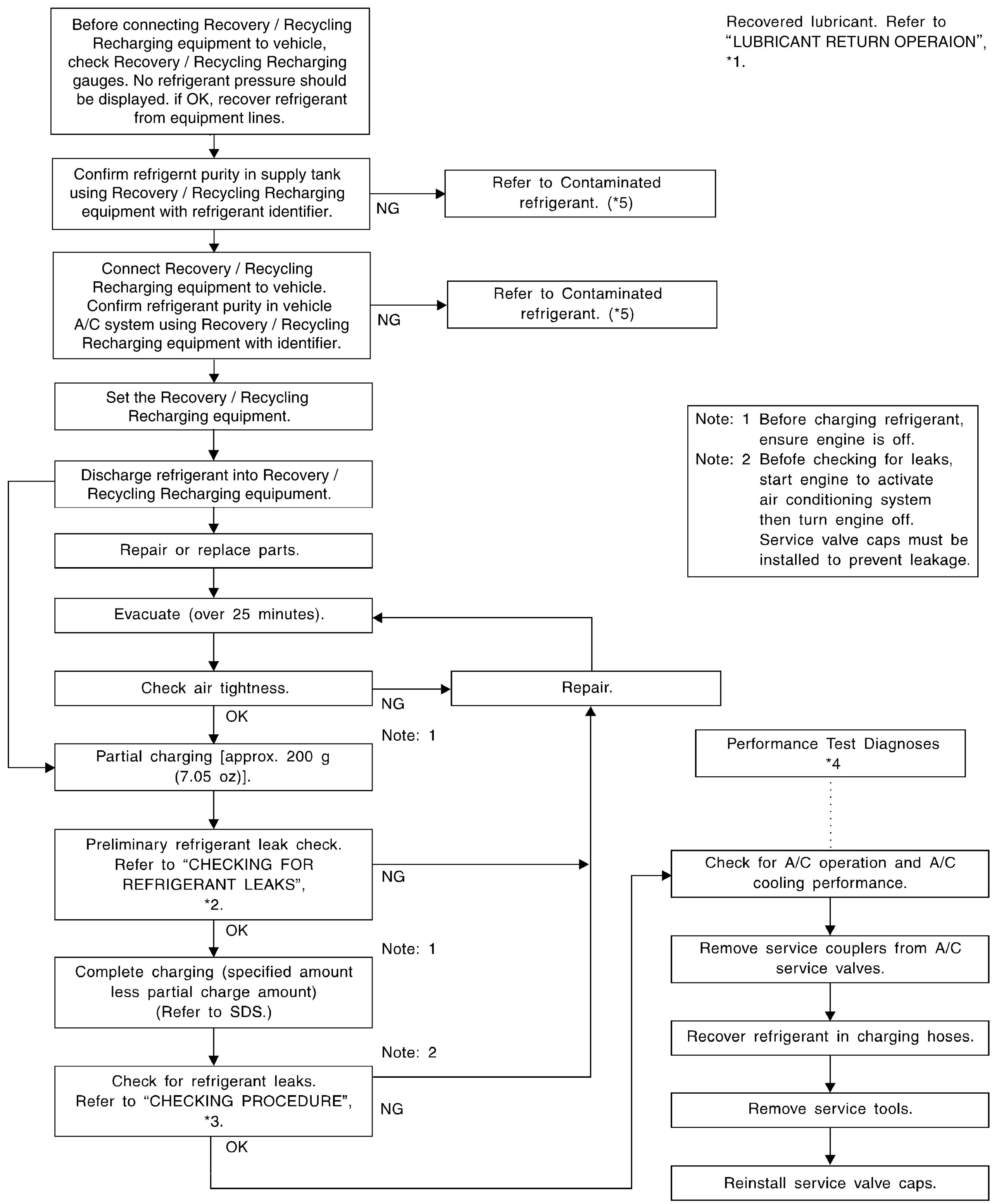
WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system, using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



Evacuating System and Charging Refrigerant





RJIA3006E

*1 ATC-22, "LUBRICANT RETURN OPERATION"

*2 ATC-133, "Checking for Refrigerant Leaks"

*3 ATC-135, "CHECKING PROCEDURE"

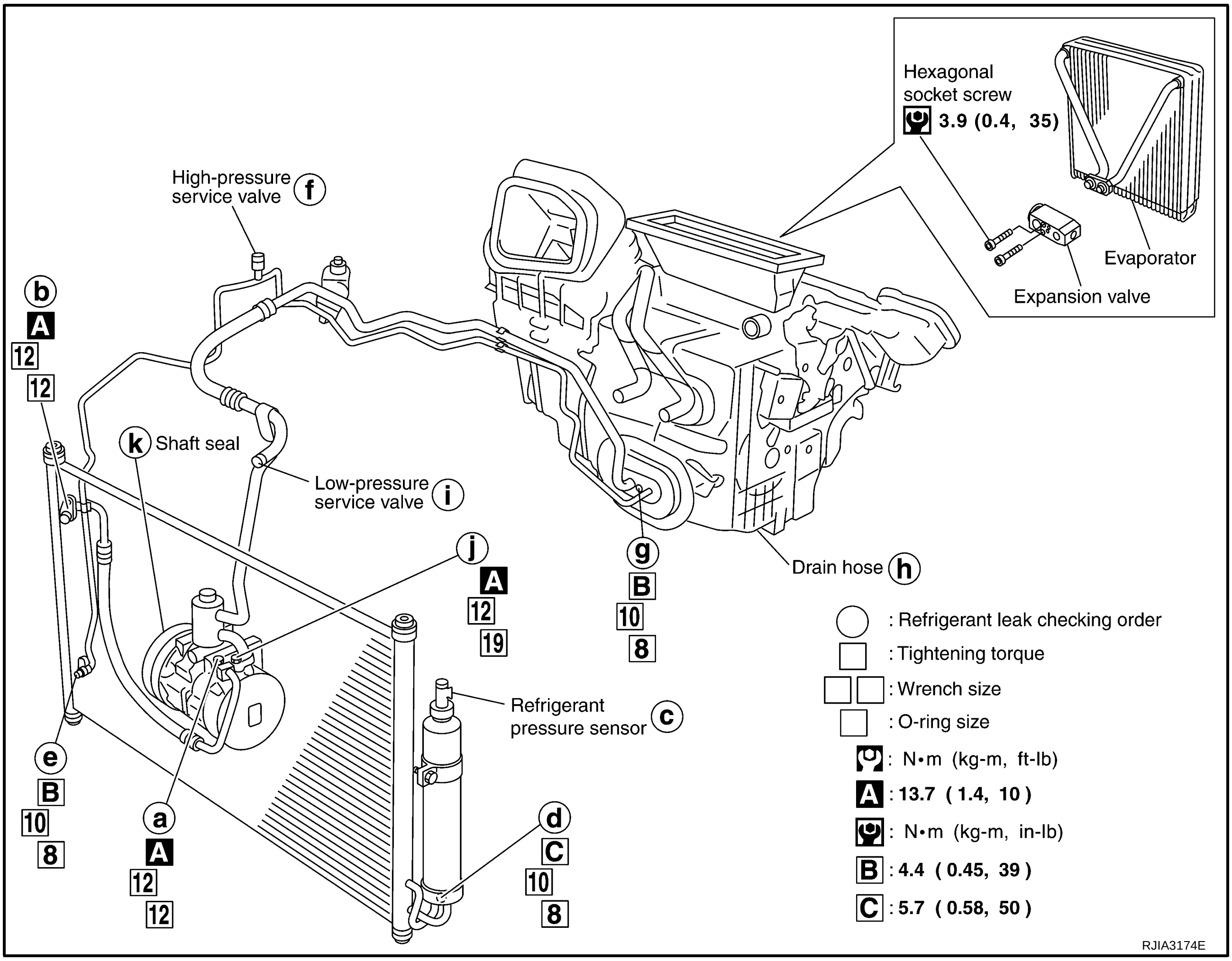
*4 ATC-80, "PERFORMANCE TEST DIAGNOSIS"

*5 ATC-5, "CONTAMINATED REFRIGERANT"

Components

AJS001LK

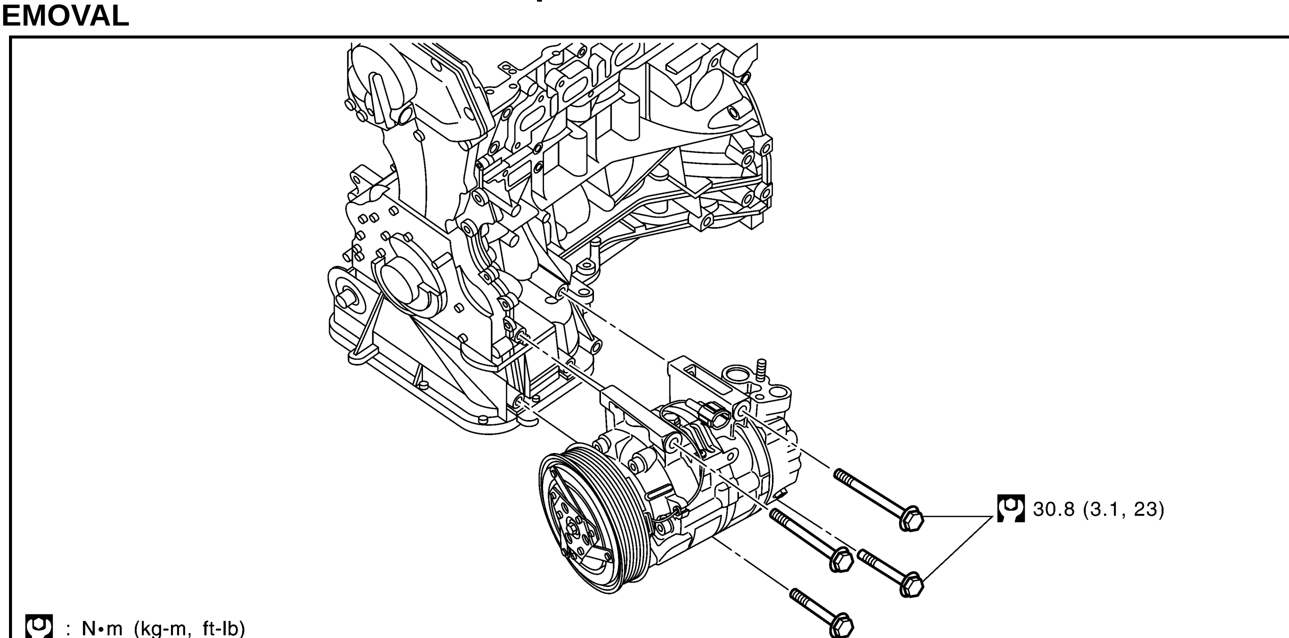
Refer to ATC-6, "Precautions for Refrigerant Connection" .



Removal and Installation of Compressor

AJS001LL

REMOVAL

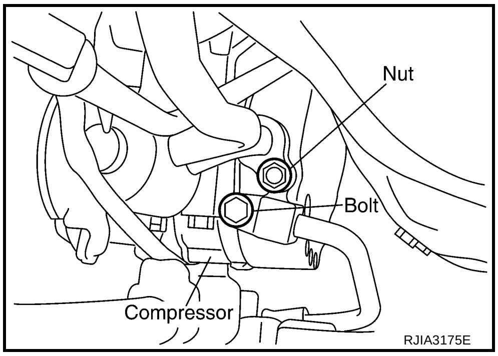


1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine undercover, using power tool.

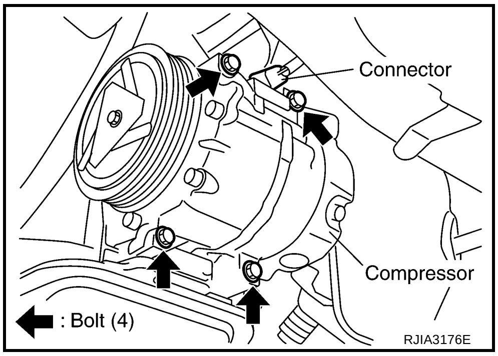
3. Remove compressor-alternator belt. Refer to EM-11, "Removal and Installation" or EM-12, "Removal and Installation of Drive Belt Auto-Tensioner" .
4. Remove mounting nut (bolt) from high-pressure flexible hose and low-pressure flexible hose.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Disconnect compressor connector.



6. Remove mounting bolts from compressor.
7. Remove compressor from the lower side of the vehicle.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure flexible hose with a new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

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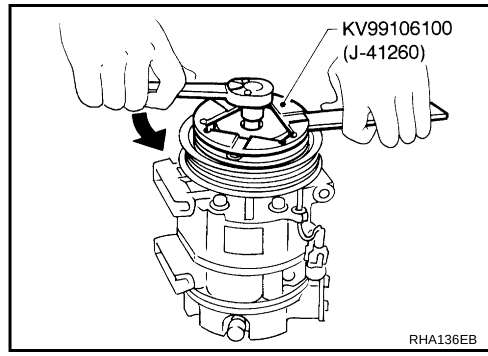
Removal and Installation of Compressor Clutch

AJS001OK

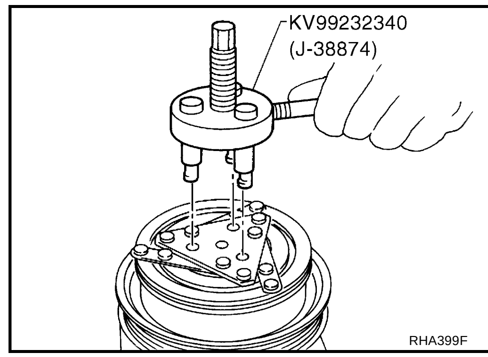
REMOVAL

Overhaul

1. When removing center bolt, hold clutch disc with clutch disc wrench (SST).

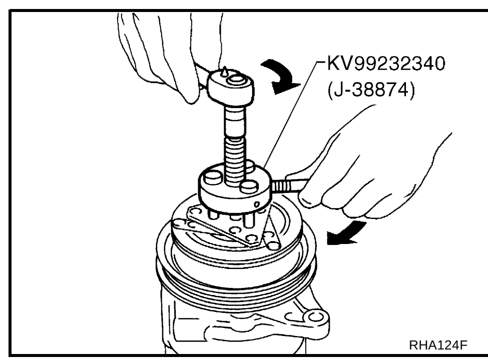


RHA136EB



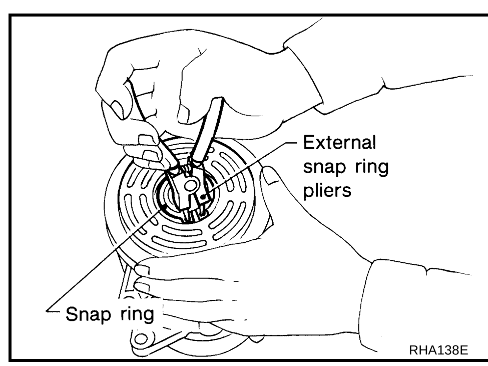
RHA399F

2. Remove clutch disc using clutch disc puller (SST).



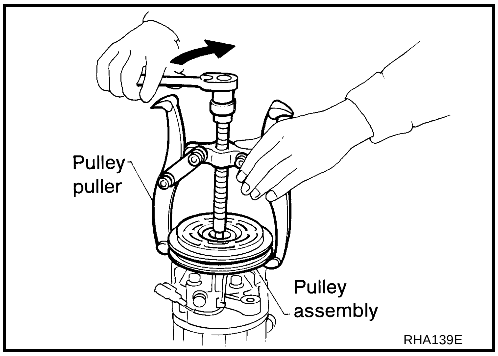
RHA124F

3. Remove snap ring using external snap ring pliers.

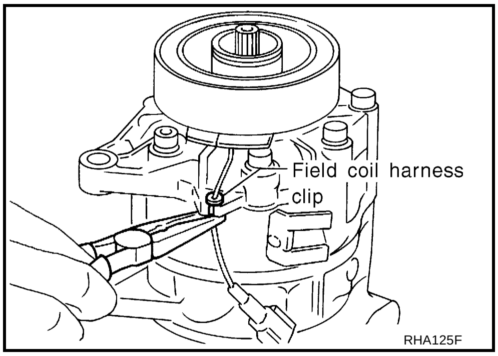


RHA138E

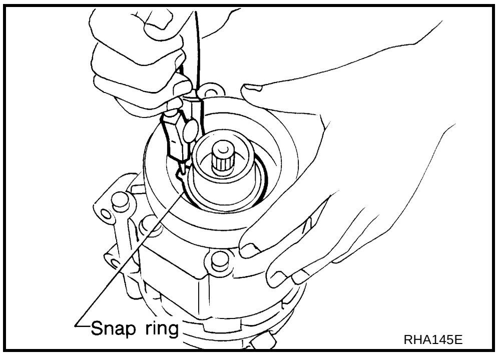
4. Position the center pulley puller on the end of the drive shaft, and remove pulley assembly using any commercially available pulley puller.
   To prevent the pulley groove from being deformed, the puller claws should be positioned into the edge of the pulley assembly.



5. Remove field coil harness clip using a pair of pliers.

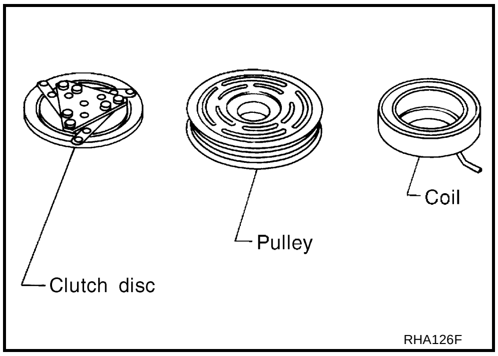


6. Remove snap ring using external snap ring pliers.



Inspection

Clutch disc
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

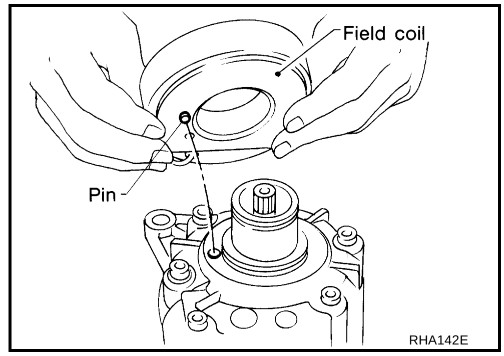


Pulley
Check the appearance of the pulley assembly. If contact surface of pulley shows signs of excessive grooving, replace clutch disc and pulley. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

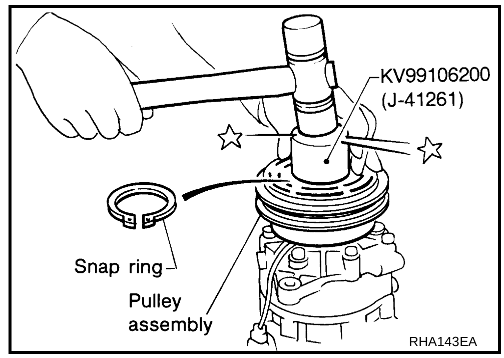
Coil
Check coil for loose connection or cracked insulation.

INSTALLATION

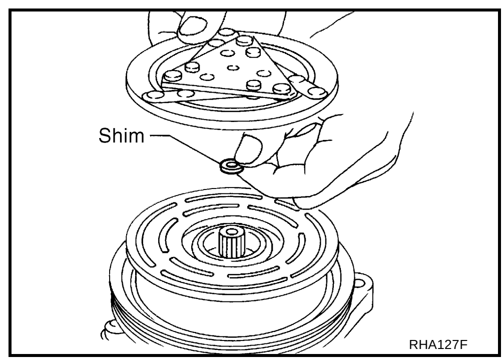
1. Install field coil.
   Be sure to align the coil's pin with the hole in the compressor's front head.
2. Install field coil harness clip using a screwdriver.



3. Install pulley assembly using pulley installer (SST) and a hand press, and then install snap ring using snap ring pliers.



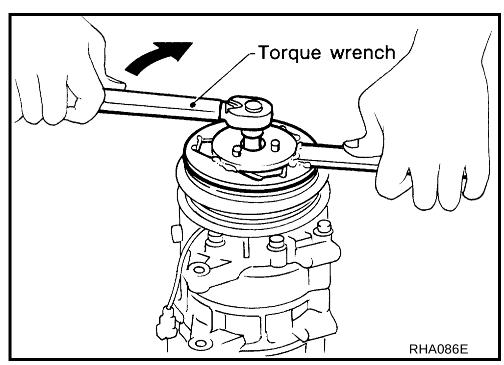
4. Install clutch disc on drive shaft, together with original shim(s). Press clutch disc down by hand.



5. Using the holder to prevent clutch disc rotation.

   : 14 N·m (1.4 kg-m, 10 ft-lb)

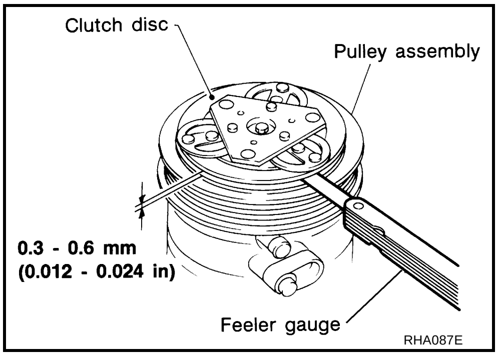
   After tightening the bolt, check that the pulley rotates smoothly.



6. Check clearance around the entire periphery of clutch disc.

   Disc to pulley clearance : 0.3 - 0.6 mm (0.012 - 0.024 in)

   If the specified clearance is not obtained, replace adjusting spacer and readjust.



Break-In Operation

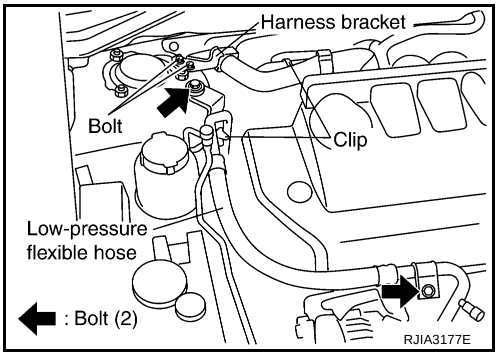
When replacing compressor clutch assembly, always carry out the break-in operation. This is done by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

Removal and Installation of Low-Pressure Flexible Hose

AJS001LN

REMOVAL

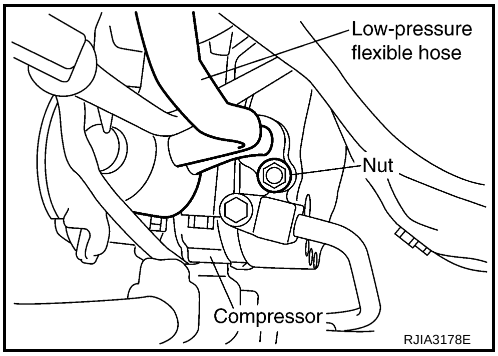
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove extension cowl top panel.
3. Remove the clips from low-pressure flexible hose.
4. Remove mounting bolts from low-pressure flexible hose bracket.
5. Remove harness bracket mounting bolt.



6. Remove mounting nut from low-pressure flexible hose.

   CAUTION:

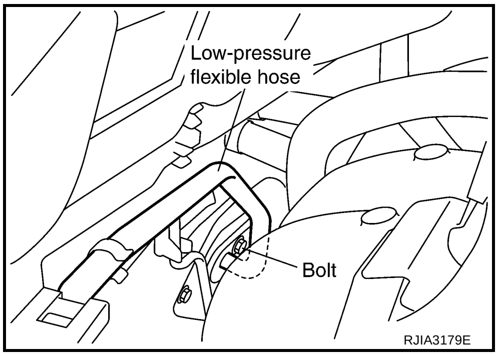
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



7. Remove mounting bolt, and then remove low-pressure flexible hose.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-ring of low-pressure flexible hose with a new one, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of High-Pressure Flexible Hose

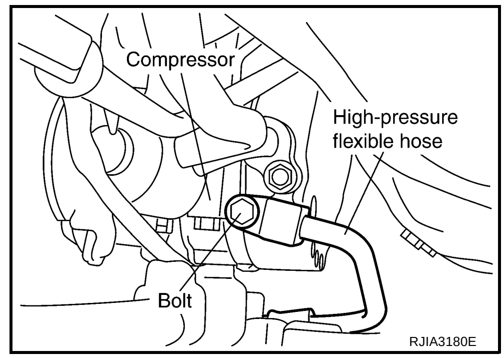
AJS001LO

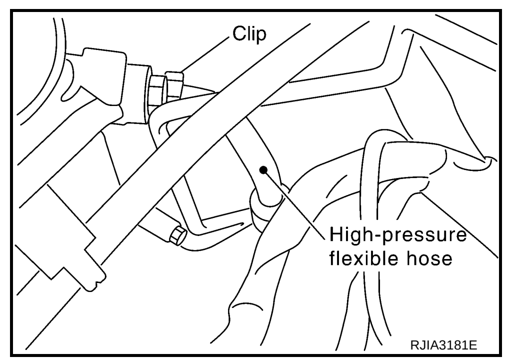
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove high-pressure flexible hose mounting clip.
3. Remove mounting nut from high-pressure flexible hose, and then remove it.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.





INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

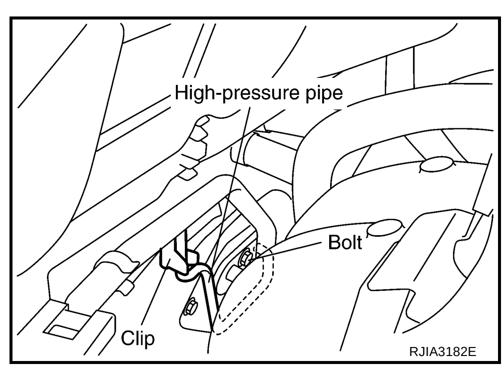
- **Replace O-ring of high-pressure flexible hose with a new one, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of High-Pressure Pipe

AJS001LP

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove low-pressure flexible hose. Refer to ATC-127, "Removal and Installation of Low-Pressure Flexible Hose" .
3. Remove high-pressure pipe from clip.

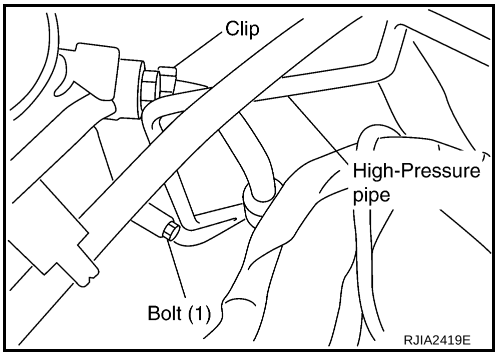


4. Remove mounting bolt from high-pressure pipe.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

5. Remove high-pressure pipe.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-ring of high-pressure pipe with a new one, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Condenser

AJS001LQ

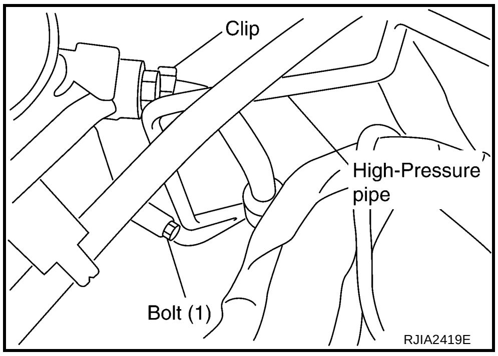
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Disconnect high-pressure flexible hose and high-pressure pipe from the condenser.

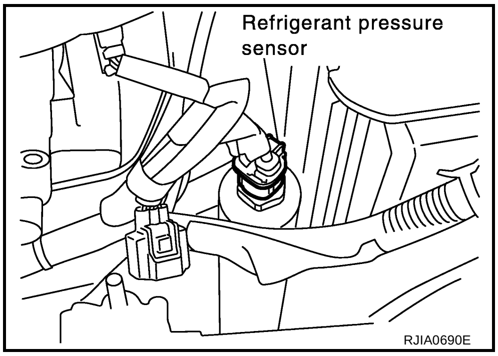
   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

3. Remove air duct (inlet). Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
4. Remove battery and battery tray.



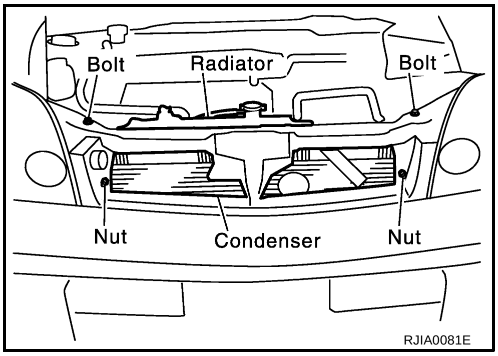
5. Disconnect refrigerant pressure sensor connector.



6. Remove front grille and radiator mounting bracket.
7. Remove mounting nuts from condenser.
8. Remove radiator from lower mount, move it to engine side, and then remove condenser between radiator and radiator core support.

   CAUTION:

   Be careful not to damage the core surface of condenser and radiator.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of high-pressure pipe and high-pressure flexible hose with new ones, and then apply compressor oil to them after installing them.**
- **When recharging refrigerant, check for leaks.**

Condenser mounting nuts

: 4.2 N·m (0.43 kg-m, 37 in-lb)

Removal and Installation of Liquid Tank

AJS001LR

REMOVAL

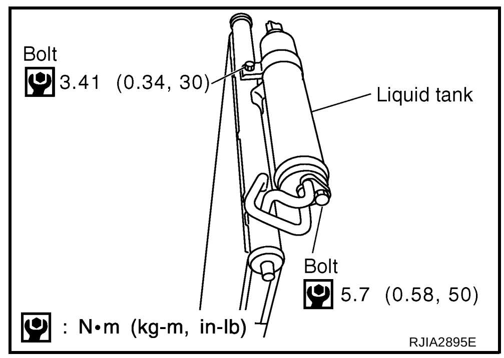
1. Remove condenser. Refer to ATC-129, "Removal and Installation of Condenser" .
2. Clean liquid tank and its surrounding area, and remove dirt and rust from liquid tank.

   CAUTION:

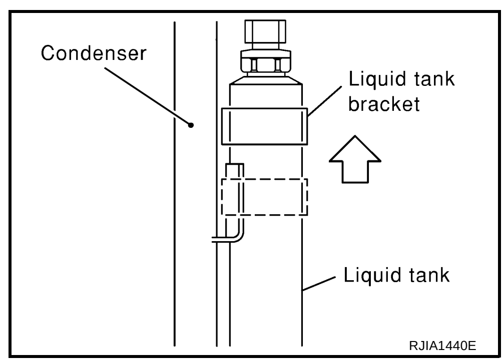
   Be sure to clean carefully.
3. Remove mounting bolt for liquid tank.

   CAUTION:

   Cap or wrap the joint of condenser pipe with a suitable material such as a vinyl tape to avoid the entry of air.



4. Lift liquid tank upward. Remove bracket from protruding part of condenser.
5. Slide liquid tank upward, and then remove liquid tank.

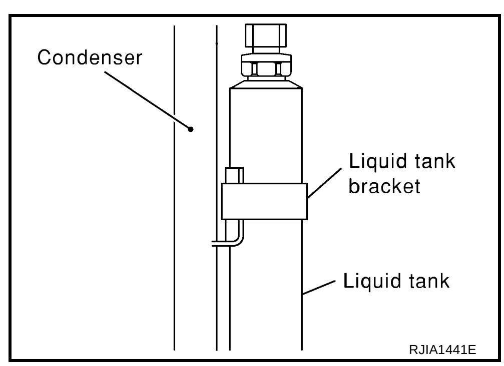


INSTALLATION

Install liquid tank, and then install liquid tank bracket on condenser.

CAUTION:

- **Make sure liquid tank bracket is securely installed at protrusion of condenser. (Make sure liquid tank bracket does not move to a position below center of liquid tank.)**
- **Replace O-rings of the condenser pipe with new ones, and then apply compressor oil to them after installing them.**
- **When recharging refrigerant, check for leaks.**

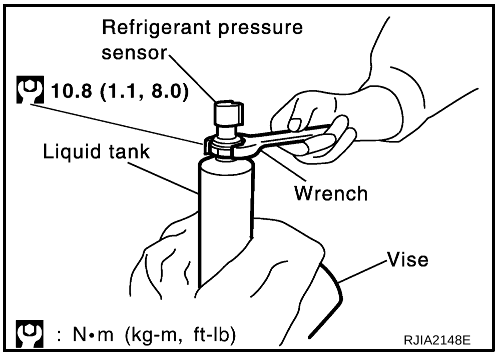


Removal and Installation of Refrigerant Pressure Sensor

AJS001LS

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge refrigerant.
2. Remove liquid tank. Refer to ATC-130, "Removal and Installation of Liquid Tank" .
3. Using a vise, secure liquid tank, and remove refrigerant pressure sensor.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Apply compressor oil to O-ring of refrigerant pressure sensor when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Evaporator

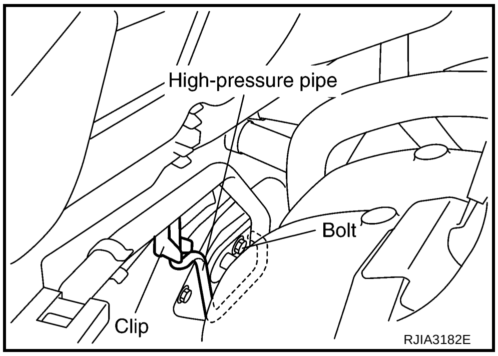
AJS001LU

REMOVAL

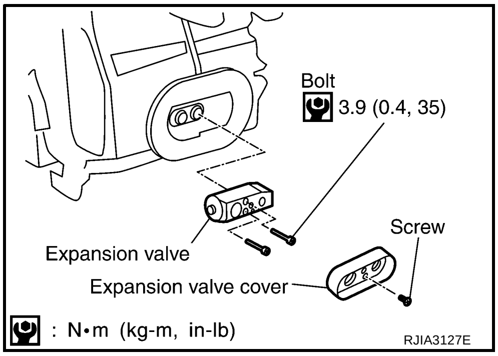
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove extension cowl top panel.
3. Disconnect low-pressure flexible hose and high-pressure pipe from evaporator.

   CAUTION:

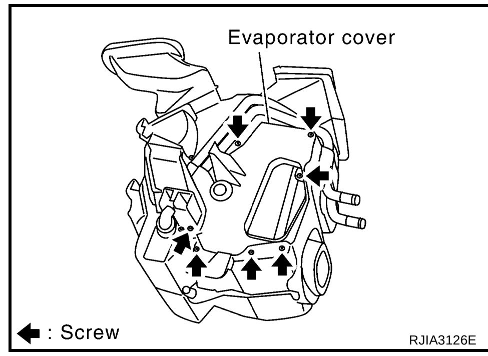
   Cap or wrap the joint of low-pressure flexible hose and high-pressure pipe with a suitable material such as a vinyl tape to avoid the entry of air.



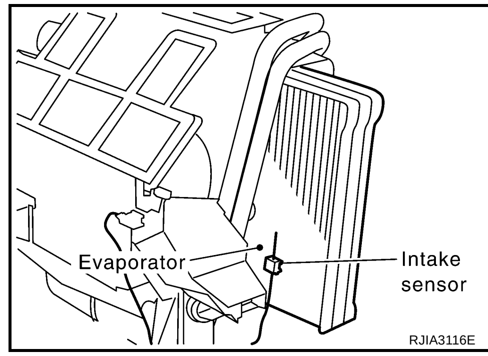
4. Remove mounting screw, and then remove expansion valve cover.
5. Remove mounting bolts, and then remove expansion valve.
6. Remove blower unit. Refer to ATC-104, "BLOWER UNIT" .



7. Remove foot duct (passenger side).
8. Remove mounting screws, and then remove evaporator cover.
9. Slide evaporator, and then remove it from heater & cooling unit assembly.



10. Remove intake sensor from evaporator, and then remove evaporator.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure pipe with new ones, and then apply compressor oil to them when installing them.**
- **Mark the mounting position of intake sensor bracket.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Expansion Valve

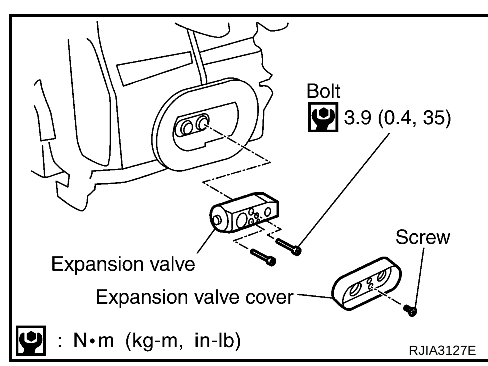
AJS001LV

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove extension cowl top panel.
3. Disconnect low-pressure flexible hose and high-pressure pipe from evaporator.

   CAUTION:

   Cap or wrap the joint of low-pressure flexible hose and high-pressure pipe with a suitable material such as a vinyl tape to avoid the entry of air.
4. Remove mounting screw, and then remove expansion valve cover.
5. Remove mounting bolts, and then remove expansion valve.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of expansion valve and piping with new ones, and then apply compressor oil to them when installing them.**
- **When recharging refrigerant, check for leaks.**

Checking for Refrigerant Leaks

AJS001LW

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electronic refrigerant leak detector or fluorescent dye leak detector.
If dye is observed, confirm the leak with an electronic refrigerant leak detector. It is possible a prior leak was repaired and not properly cleaned.
When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.
When searching for refrigerant leaks using an electronic leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:
Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

Checking System for Leaks Using the Fluorescent Leak Detector

AJS001LX

1. Check A/C system for leaks using the UV lamp and safety goggles [SST: J-42220] in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner [SST: J-43872] to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

   NOTE:
   Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
   Clean with a dry cloth or blow off with shop air.
   Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

Dye Injection

AJS001LY

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2 , 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool [SST: J-41459].
3. Connect the injector tool to the A/C LOW-PRESSURE side service fitting.
4. Start engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool J-41459 (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service fitting.

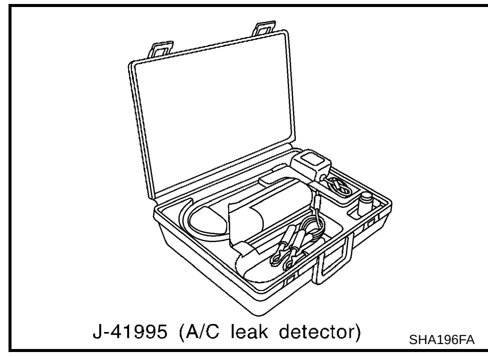
   CAUTION:
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.

Electronic Refrigerant Leak Detector

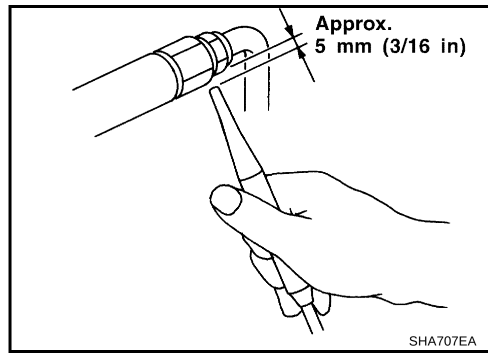
AJS001LZ

PRECAUTIONS FOR HANDLING LEAK DETECTOR

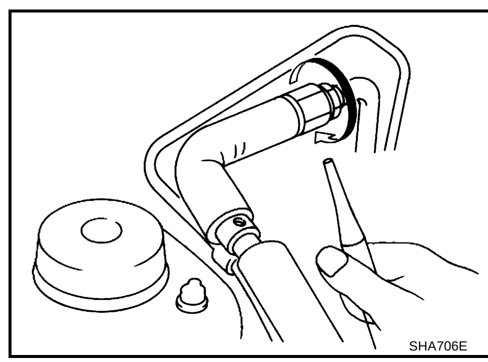
When performing a refrigerant leak check, use an A/C electrical leak detector [SST: J-41995] or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.



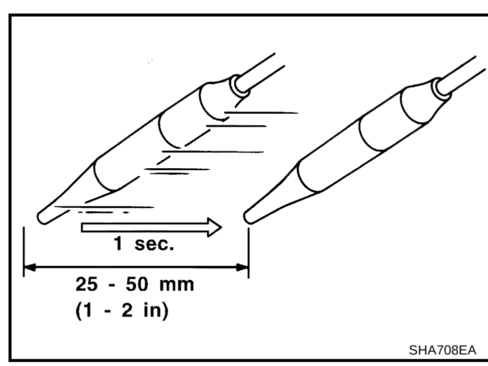
1. Position probe approximately 5 mm (3/16 in) away from point to be checked.



2. When testing, circle each fitting completely with probe.



3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



A
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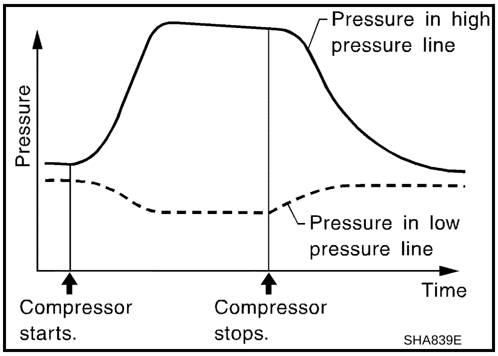
CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Turn engine OFF.
2. Connect a suitable A/C manifold gauge set [SST: J-39183] to the A/C service valves.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2 , 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

   NOTE:
   At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2 , 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet g) to the low-pressure side (evaporator drain hose h to shaft seal k). Refer to ATC-122, "Components" . Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.
   Compressor
   Check the fitting of high- and low-pressure hoses, relief valve and shaft seal.
   Liquid tank
   Check the refrigerant pressure sensor.
   Service valves
   Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

   NOTE:
   After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.
   Cooling unit (Evaporator)
   With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.
   Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.
5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
   If no leaks are found, perform steps 7 - 10.
7. Start engine.
8. Set the heater A/C control as follows;
   a. A/C switch: ON
   b. Mode control dial: VENT (Ventilation)
   c. Intake door position: Recirculation
   d. Temperature control dial: Max. cool
   e. Fan speed: High
9. Run engine at 1,500 rpm for at least 2 minutes.
10. Turn engine off and perform leak check again following steps 4 through 6 above.
    Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery/recycling recharging equipment. Repair the leaking fitting or component if necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Conduct A/C performance test to ensure system works properly.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Compressor

AJS001M0

Model		Calsonic Kansei make CWV-615M
Type		V-6 variable displacement
Displacement cm^3 (cu in)/rev	Max.	146 (8.91)
	Min.	13.5 (0.824)
Cylinder bore × stroke mm (in)		35.2 (1.386) × [2.3 - 25.0 (0.091 - 0.984)]
Direction of rotation		Clockwise (viewed from drive end)
Drive belt		Poly V

Lubricant

AJS001M1

Model		Calsonic Kansei make CWV-615M
Name		Nissan A/C System Oil Type S (DH-PS)
Part number		KLH00-PAGS0
Capacity mℓ (Imp fl oz)	Total in system	180 (6.3)
	Compressor (Service part) charging amount	180 (6.3)

Refrigerant

AJS001M2

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.55 (1.21)

Engine Idling Speed

AJS001M3

Refer to EC-75, "Idle Speed and Ignition Timing Check" .

Belt Tension

AJS001M4

Refer to EM-11, "DRIVE BELTS" .

SECTION AV

AUDIO, VISUAL & TELEPHONE SYSTEM

CONTENTS

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AKS00BEC

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Wiring Diagrams and Trouble Diagnosis

AKS00BED

When you read wiring diagrams, refer to the following:

- Refer to GI-14, "How to Read Wiring Diagrams" in GI section
- Refer to PG-2, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When you perform trouble diagnosis, refer to the following:

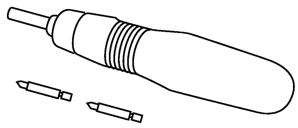
- Refer to GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- Refer to GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

PREPARATION

PFP:00002

Commercial Service Tools

AKS00BVB

Tool name	Description
Power tool  PBIC0191E	Loosening bolts and nuts

AUDIO

PFP:28111

System Description

AKS00BEE

Refer to Owner's Manual for audio system operating instructions.
Power is supplied at all times

- through 15A fuse (No. 32, located in the fuse and fusible link box)
- to audio unit terminal 6.

With the ignition switch in the ACC or ON position, power is supplied

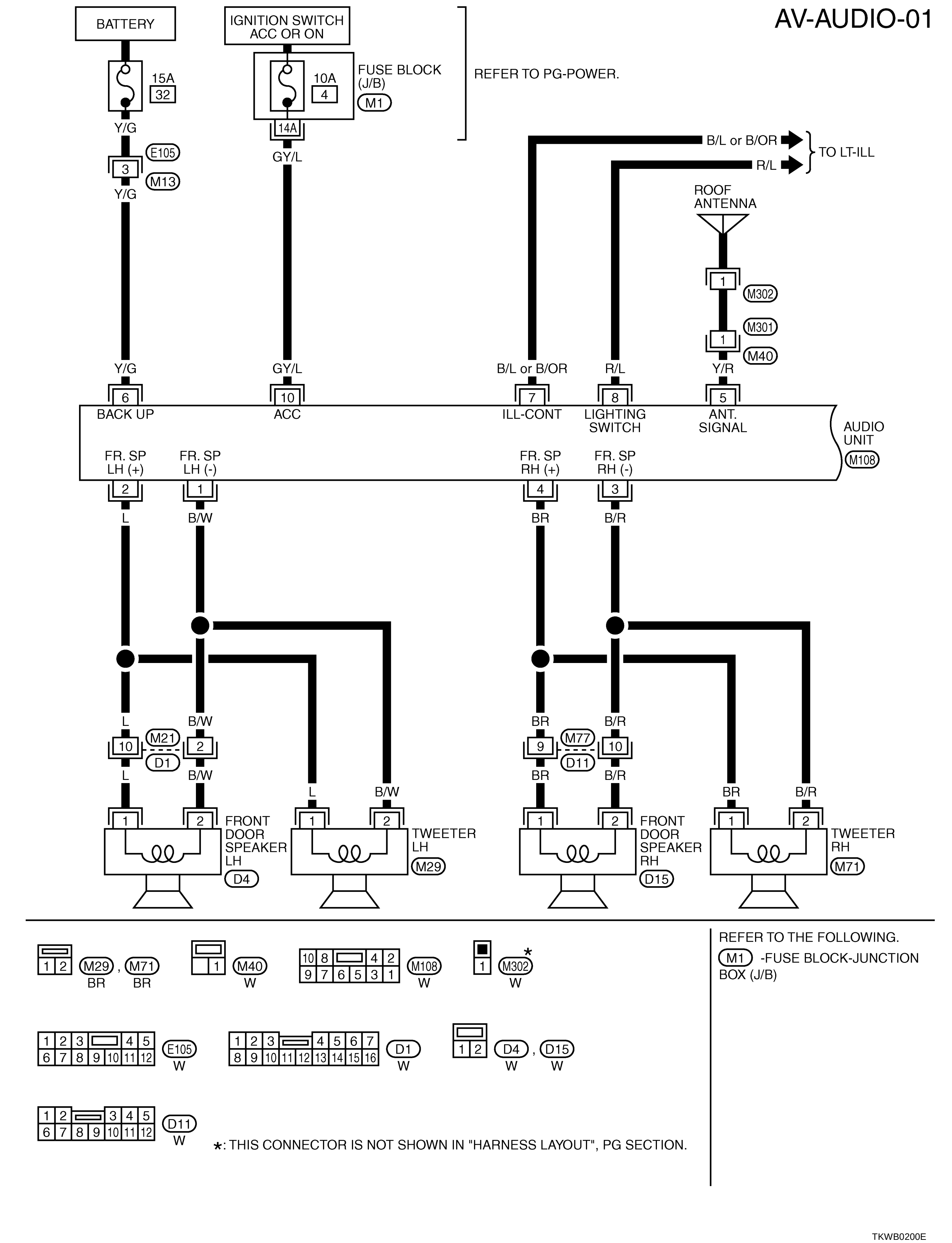
- through 10A fuse [No. 4, located in the fuse block (J/B)]
- to audio unit terminal 10.

Ground is supplied through the case of the audio unit.
Audio signals are supplied

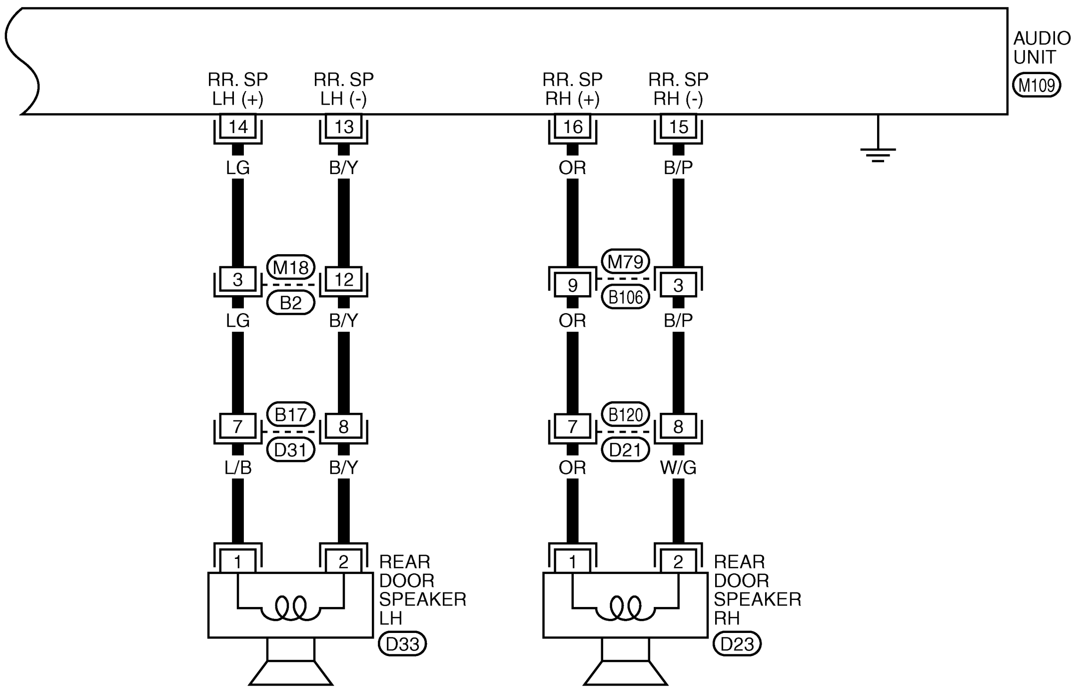
- through audio unit terminals 1, 2, 3, 4, 13, 14, 15 and 16
- to terminals 1 and 2 of front door speaker LH and RH
- to terminals 1 and 2 of rear door speaker LH and RH and
- to terminals 1 and 2 of tweeter LH and RH.

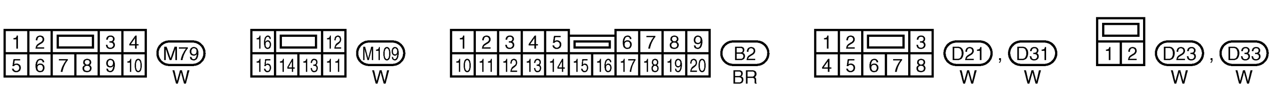
Wiring Diagram —AUDIO—

AKS00BEF



AV-AUDIO-02

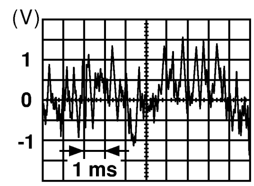
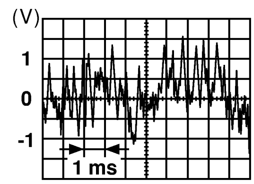
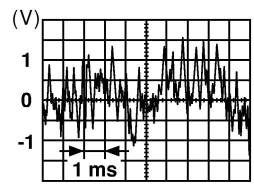
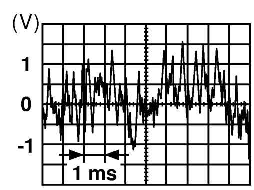




TKWB0201E

Terminals and Reference Value for Audio Unit

AKS00BEG

Terminal (Wire color) (+)	Terminal (Wire color) (–)	Item	Signal input/ output	Condition: Ignition switch	Condition: Operation	Reference value	Example of symptom
2 (L)	1 (B/W)	Audio sound signal front LH	Output	ON	Receive audio signal	 SKIA0177E	No sound from front door speaker and tweeter LH.
4 (BR)	3 (B/R)	Audio sound signal front RH	Output	ON	Receive audio signal	 SKIA0177E	No sound from front door speaker and tweeter RH.
5 (Y/R)	Ground	Antenna signal	Output	ACC	Radio switch is ON	Approx. 12V	Receiving status of radio broadcast becomes bad.
6 (Y/G)	Ground	Battery power supply	Input	OFF	–	Battery voltage	System does not work properly.
7 (B/L) or (B/OR)	Ground	Illumination control signal	Input	OFF	Illumination control switch is operated by lighting switch in 1st position.	Changes between approx. 0V and approx. 12V	Audio unit illumination does not function when lighting switch is ON.
8 (R/L)	Ground	Lighting switch signal	Input	ON	Lighting switch ON	Approx. 12V	Audio unit illumination does not function when lighting switch is ON.
					Lighting switch OFF	Approx. 0V	
10 (GY/L)	Ground	ACC power supply	Input	ACC	–	Battery voltage	System does not work properly.
14 (LG)	13 (B/Y)	Audio sound signal rear LH	Output	ON	Receive audio signal	 SKIA0177E	No sound from rear door speaker LH.
16 (OR)	15 (B/P)	Audio sound signal rear RH	Output	ON	Receive audio signal	 SKIA0177E	No sound from rear door speaker RH.

Trouble Diagnoses

AKS00BEI

AUDIO UNIT

Symptom	Possible causes	Repair order
Audio unit is inoperative (no digital display and no sound from speakers).	1. 10A fuse 2. 15A fuse 3. Poor audio unit case ground 4. Audio unit	1. Check 10A fuse [No. 4, located in fuse block (J/B)]. Turn ignition switch ON and verify that battery positive voltage is present at terminal 10 of audio unit. 2. Check 15A fuse (No.32, located in the fuse and fusible link box) and verify that battery positive voltage is present at terminal 6 of audio unit. 3. Check audio unit case ground. 4. Remove audio unit for repair.
Individual rear speaker is noisy or inoperative.	1. Each speaker 2. Output circuit to each speaker	1. Check speaker. 2. Check the output circuits to each speaker between audio unit and each speaker.
AM/FM stations are weak or noisy.	1. Roof antenna 2. Audio unit ground 3. Audio unit	1. Check roof antenna. 2. Check audio unit case ground. 3. Remove audio unit for repair.
Audio unit generates noise in AM and FM modes with engine running.	1. Poor audio unit ground 2. Loose or missing ground bonding straps 3. Ignition condenser or rear window defogger noise suppressor condenser 4. Ignition coil 5. Audio unit	1. Check audio unit case ground. 2. Check ground bonding straps. 3. Replace ignition condenser or rear window defogger noise suppressor condenser. 4. Check ignition coil. 5. Remove audio unit for repair.
Audio unit generates noise in AM and FM modes with accessories on (switch pops and motor noise).	1. Poor audio unit ground 2. Antenna 3. Accessory ground 4. Malfunctioning accessory	1. Check audio unit case ground. 2. Check antenna. 3. Check accessory ground. 4. Replace accessory.

Inspection

AKS00BEJ

AUDIO UNIT

All voltage inspections are made with:

- Ignition switch ON or ACC
- Audio unit ON
- Audio unit connected (If audio unit is removed for inspection, supply a ground to the case using a jumper wire.)

ANTENNA

Using a jumper wire, clip an auxiliary ground between antenna and body.

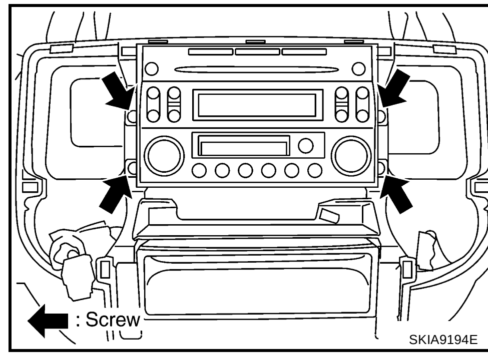
- If reception improves, check antenna ground (at body surface).
- If reception does not improve, check main feeder cable for short circuit or open circuit.

Removal and Installation of Audio Unit

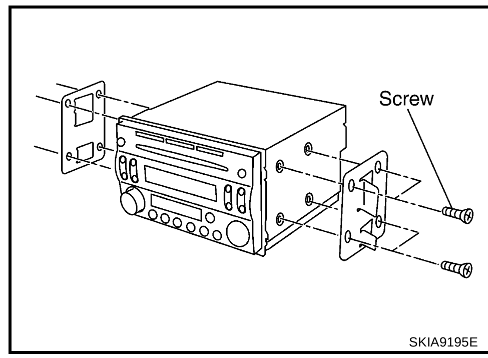
AKS00BEL

REMOVAL

1. Remove instrument cluster lid C. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove screws (4) and disconnect connector, and remove audio unit.



3. Remove screws (8) and bracket.



INSTALLATION

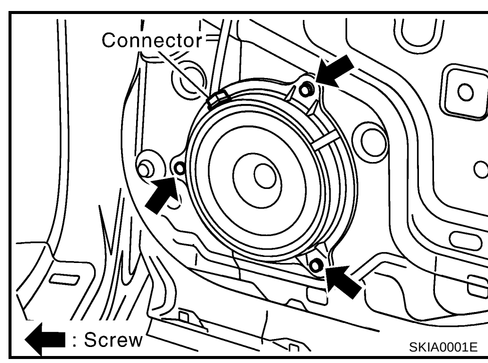
Install in the reverse order of removal.

Removal and Installation of Speakers

AKS00BEM

REMOVAL

1. Remove door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove speakers.



INSTALLATION

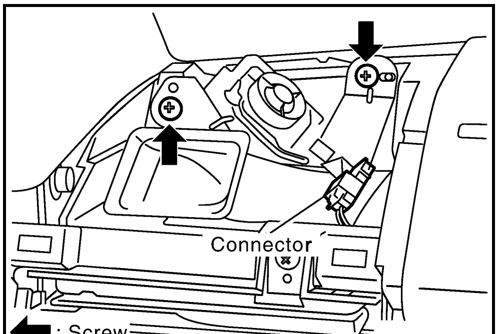
Install in the reverse order of remove.

Removal and Installation of Tweeters

AKS00BEN

REMOVAL

1. Remove front speaker grille. Refer to IP-12, "Front Speaker Grille (LH/RH)" .
2. Remove tweeters.



SKIA0002E

INSTALLATION

Install in the reverse order of remove.

A
B
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D
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H
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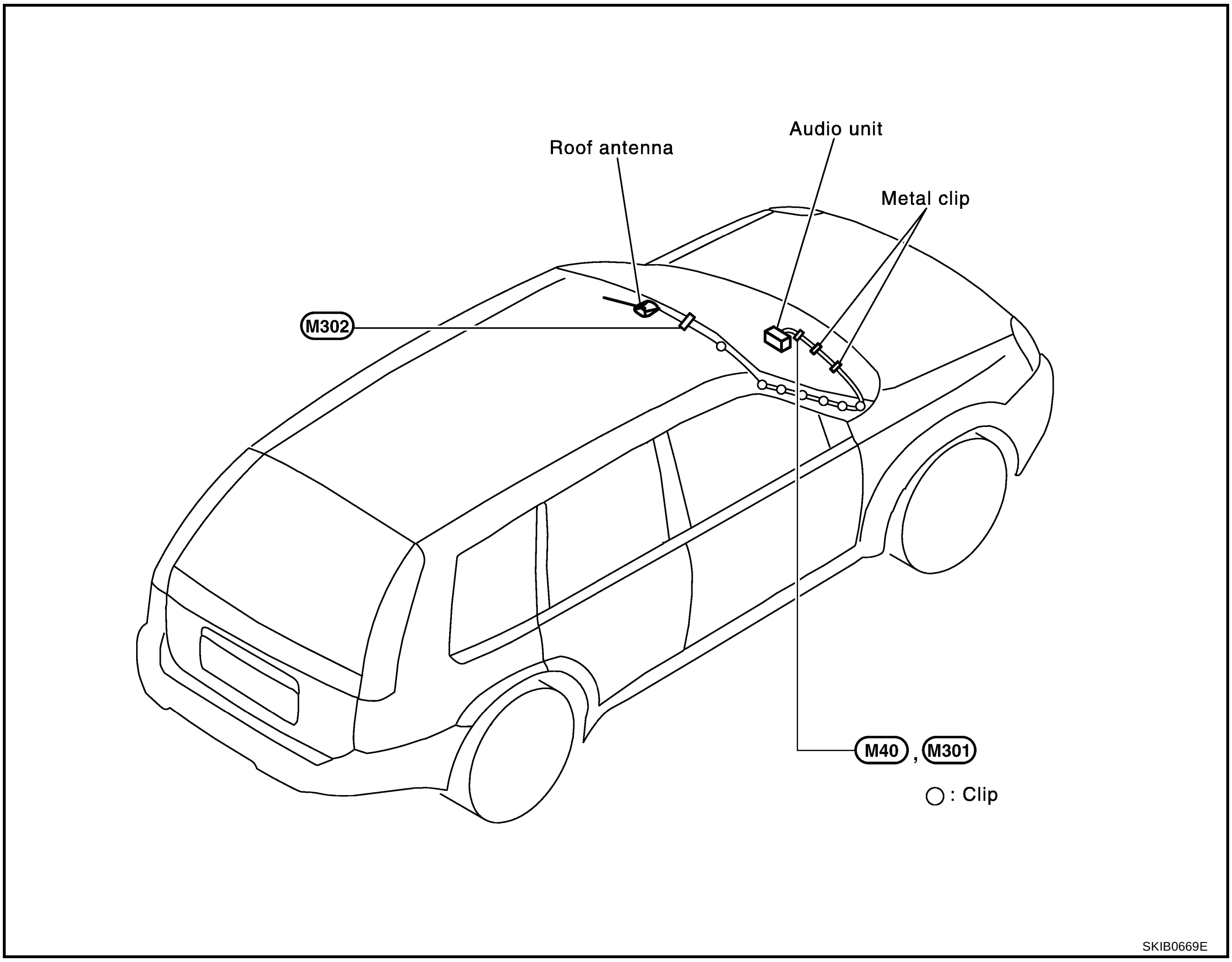
J
AV
L
M

AUDIO ANTENNA

PFP:28200

Antenna Route

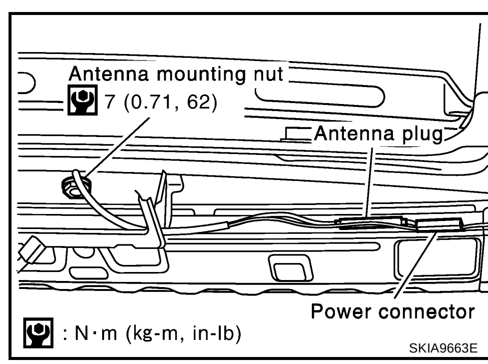
AKS00BEO

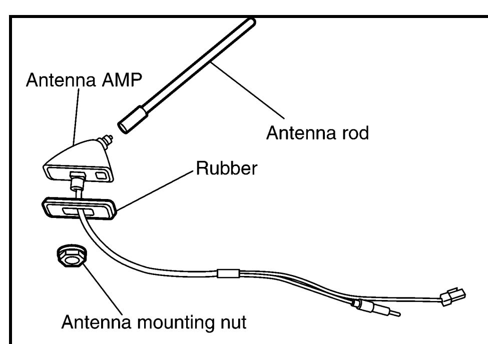


Removal and Installation of Roof Antenna

AKS00BEP

1. Remove headlining.
   - Refer to EI-40, "HEADLINING" in "Exterior/Interior (EI)" section.
2. Remove roof antenna mounting nuts, antenna plug, and disconnect power connector. Then remove roof antenna.





SECTION BCS

BODY CONTROL SYSTEM

CONTENTS

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AKS00BC9

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Wiring Diagrams and Trouble Diagnosis

AKS00BCA

When reading wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-2, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When performing trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

SMART ENTRANCE CONTROL UNIT

PFP:28596

Description

AKS00BCE

OUTLINE

The smart entrance control unit totally controls the following body electrical system operations.

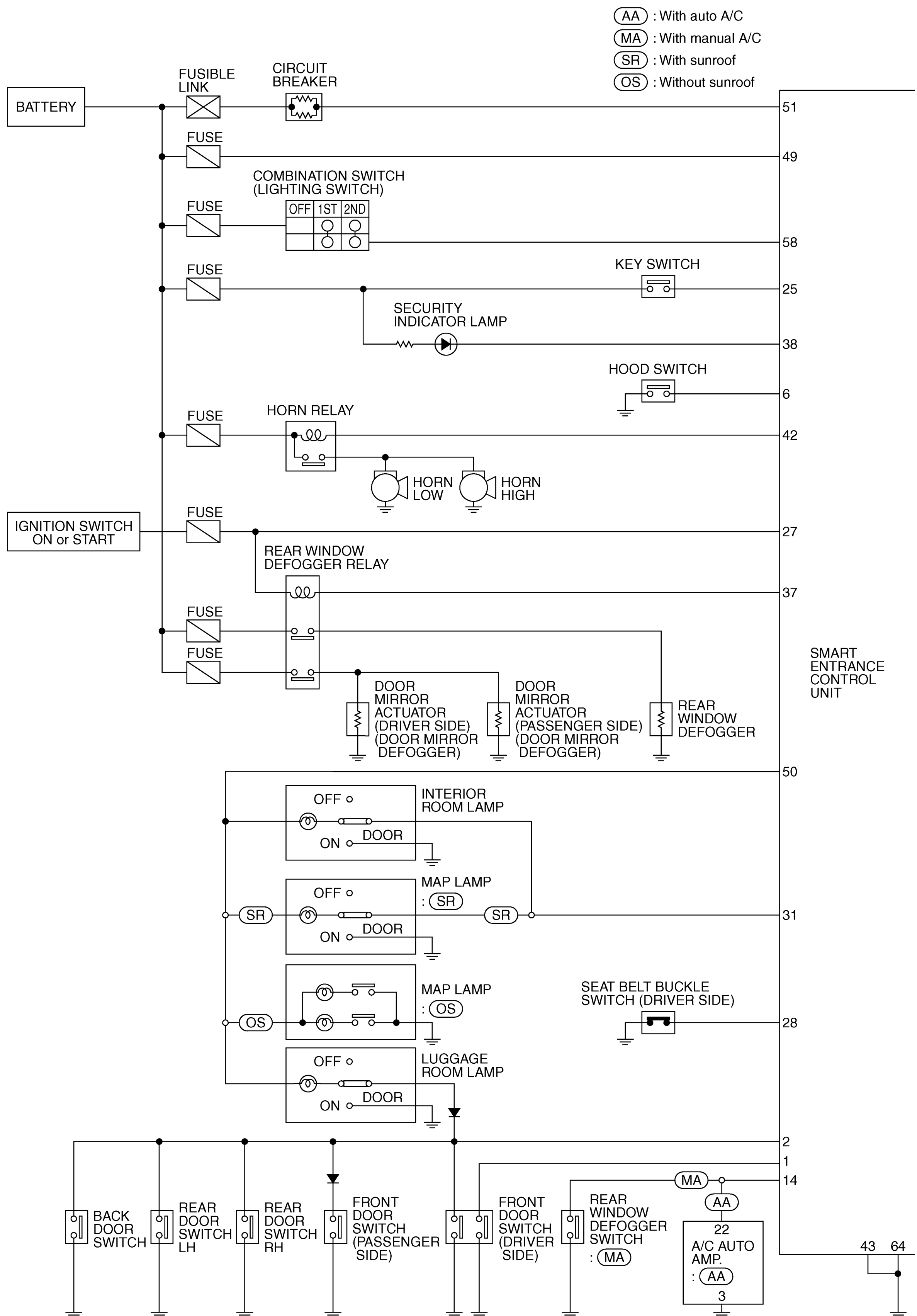
System	Reference
Power door lock	BL-23, "POWER DOOR LOCK SYSTEM"
Multi-remote control system	BL-45, "MULTI-REMOTE CONTROL SYSTEM"
Warning chime	DI-42, "WARNING CHIME"
Rear window defogger and door mirror defogger	GW-17, "REAR WINDOW DEFOGGER"
Theft warning system	BL-76, "VEHICLE SECURITY (THEFT WARNING) SYSTEM"
Interior room lamp	LT-43, "INTERIOR ROOM LAMP"

INPUT/OUTPUT

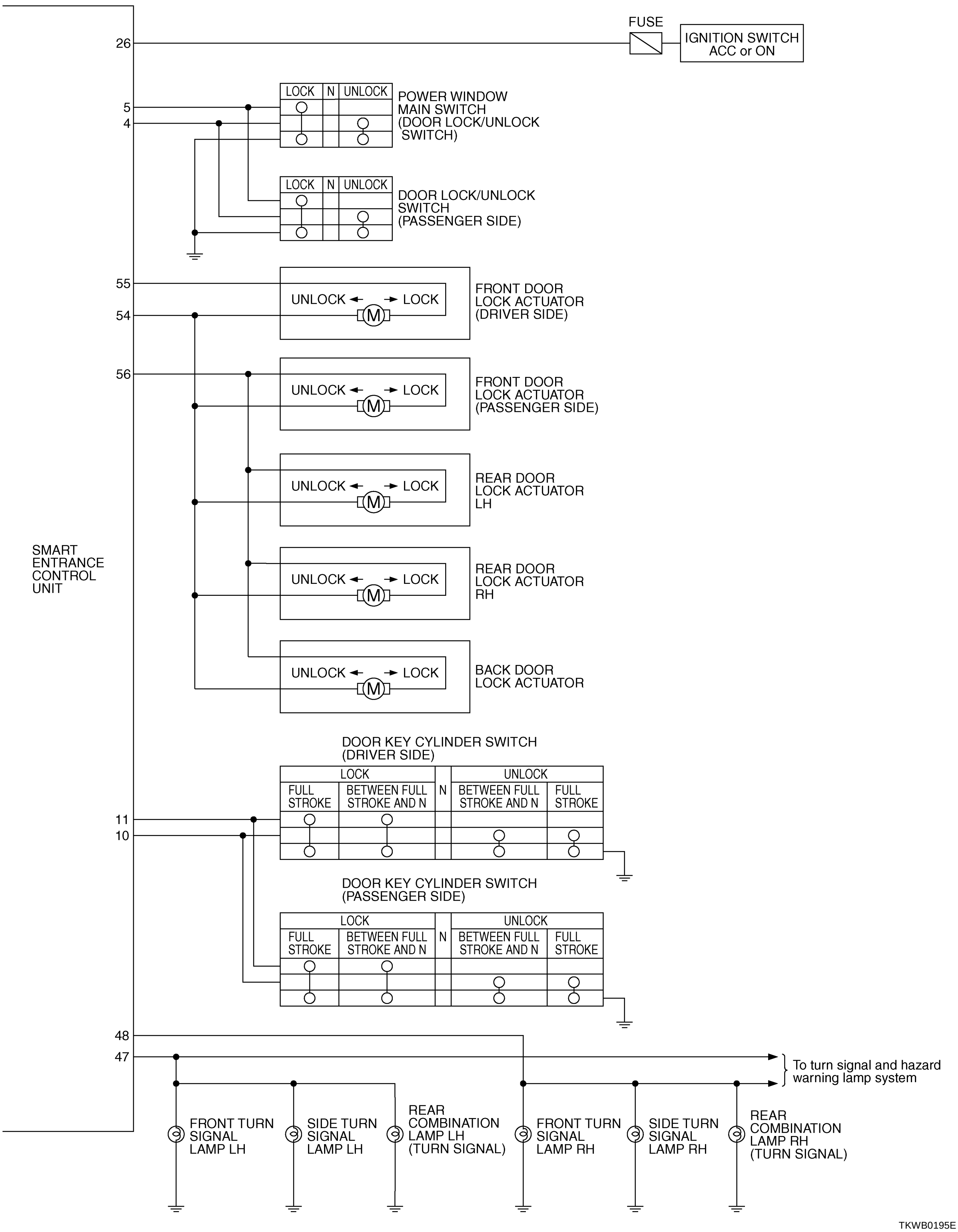
System	Input	Output
Power door lock	Door lock/unlock switch Door switches Door key cylinder switches Key switch (Insert)	Door lock actuator
Multi-remote control	Key switch (Insert) Ignition switch (ACC) Door switches Door lock/unlock switch Remote controller signal	Horn relay Interior room lamp Turn signal lamps Door lock actuators
Warning chime	Key switch (Insert) Ignition switch (ON) Lighting switch (1st, 2nd) Front door switch (driver side) Seat belt buckle switch (driver side)	Warning chime (located in smart entrance control unit)
Rear window defogger and door mirror defogger	Ignition switch (ON) Rear window defogger switch	Rear window defogger relay
Theft warning	Ignition switch (ACC, ON) Door switches Hood switch Door key cylinder switches (lock/unlock) Door lock/unlock switch	Turn signal lamps Horn relay Security indicator lamp
Interior room lamp	Door switches Door lock/unlock switch Ignition switch (ON) Key switch (Insert) Door key cylinder switches (lock/unlock)	Interior room lamp Luggage room lamp

Schematic

AKS00BCF



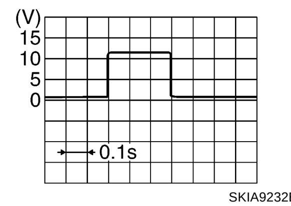
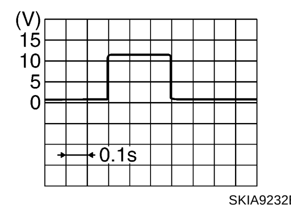
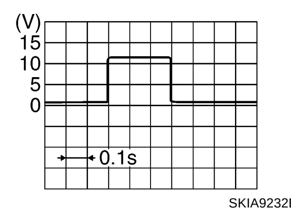
TKWB0194E


26
FUSE
IGNITION SWITCH ACC or ON
5
4
LOCK
N
UNLOCK
POWER WINDOW MAIN SWITCH (DOOR LOCK/UNLOCK SWITCH)
DOOR LOCK/UNLOCK SWITCH (PASSENGER SIDE)
55
54
56
UNLOCK
LOCK
M
FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
FRONT DOOR LOCK ACTUATOR (PASSENGER SIDE)
REAR DOOR LOCK ACTUATOR LH
REAR DOOR LOCK ACTUATOR RH
BACK DOOR LOCK ACTUATOR
SMART ENTRANCE CONTROL UNIT
DOOR KEY CYLINDER SWITCH (DRIVER SIDE)
DOOR KEY CYLINDER SWITCH (PASSENGER SIDE)
FULL STROKE
BETWEEN FULL STROKE AND N
11
10
48
47
To turn signal and hazard warning lamp system
FRONT TURN SIGNAL LAMP LH
SIDE TURN SIGNAL LAMP LH
REAR COMBINATION LAMP LH (TURN SIGNAL)
FRONT TURN SIGNAL LAMP RH
SIDE TURN SIGNAL LAMP RH
REAR COMBINATION LAMP RH (TURN SIGNAL)
TKWB0195E

Terminals and Reference Value for Smart Entrance Control Unit

AKS00BCG

Terminal No.	Wire color	Item	Condition: Ignition switch	Condition: Operation		Reference values (Approximate values)
1	SB	Front door switch (Driver side)	OFF	Front door (driver side)	Closed	12 V
					Open	0 V
2	R/W	All door switches	OFF	Any door	Closed	5 V
					Open	0 V
4	PU	Door lock/unlock switch	OFF	Door lock/unlock switch	Neutral	5 V
					Unlocks	0 V
5	GY				Neutral	5 V
					Locks	0 V
6	W/L	Hood switch	OFF	Hood	Open	0 V
					Closed	12 V
10	GY/R	Door key cylinder unlock switch	OFF	Door key cylinder lock switch	Neutral	5 V
					Unlocked	0 V
11	Y/PU		OFF		Neutral	5 V
					Locked	0 V
14	LG/B	Rear window defogger switch	ON	Rear window defogger switch	Not pushed	5 V
					Pushed	0 V
25	W/L	Key switch (Insert)	OFF	Key inserted		12 V
				Key removed from IGN key cylinder		0 V
26	GY/L	Ignition switch (ACC)	ACC	—		Battery voltage
27	G	Ignition switch (ON)	ON	—		Battery voltage
28	BR/W	Seat belt buckle switch	ON	Seat belt buckle	Unfastened	0 V
					Fastened	12 V
31	R/Y	Interior room lamp	OFF	When interior lamp is operated using remote controller (With lamp switch in “DOOR” position).	Unlock	0 V
					Lock	12 V
37	G/W	Rear window defogger relay	ON	Rear window defogger	OFF	12 V
					ON	0 V
38	OR	Security indicator lamp	OFF	Security indicator lamp goes off.		12 V
				Security indicator lamp illuminates.		0 V
42	W/G	Horn relay	OFF	Panic alarm is not operated.		12 V
				When panic alarm is operated using remote controller.		0 V
43	B	Ground	ON	—		0 V
47	G/B	Turn signal lamp LH	OFF	When door lock or unlock is operated using remote controller.		12 V
				Door lock or unlock is not operated using remote controller.		0 V
48	G/Y	Turn signal lamp RH	OFF	When door lock or unlock is operated using remote controller.		12 V
				Door lock or unlock is not operated using remote controller.		0 V
49	L/R	Power source (Fuse)	OFF	—		Battery voltage

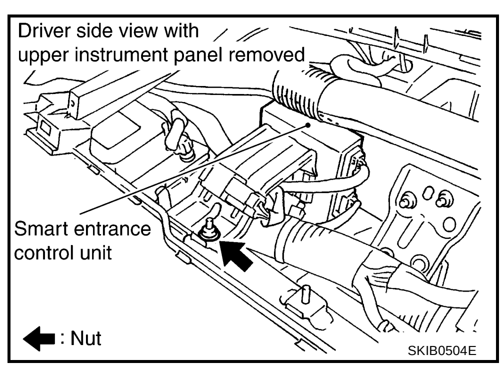
Terminal No.	Wire color	Item	Condition			Reference values (Approximate values)
			Ignition switch	Operation		
50	R	Battery saver (Interior room lamp)	OFF	Battery saver operates		12 V
				Does not battery saver operate (Interior room lamp is OFF).		0 V
51	W	Power source (C/B)	OFF	—		12 V
54	R/B	Door lock actuator	OFF	Door lock/unlock switch	Free	0 V
					Lock	
55	G/Y				Free	0 V
					Unlock	
56	G/R	Passenger and rear door lock actuators	OFF	Door lock/unlock switch	Free	0 V
					Unlock	
58	R/L	Lighting switch	OFF	Lighting switch is 1ST or 2ND positions		12 V
				Lighting switch is OFF position		0 V
64	B	Ground	ON	—		0 V

Removal and Installation of Smart Entrance Control Unit

AKS00BLT

REMOVAL

1. Disconnect battery cable at negative terminal.
2. Remove cluster lid “A”. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
3. Remove front speaker grille. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
4. Remove driver box. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
5. Remove bracket mounting nut (1).
6. Disconnect smart entrance control unit connector.
7. Remove smart entrance control unit.



A
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D
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H
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J
BCS
L
M

INSTALLATION

Installation is the reverse order of removal.

SECTION BL
BODY, LOCK & SECURITY SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AIS005N4

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Work

AIS005N5

- After removing and installing the opening/closing parts, be sure to carry out fitting adjustments to check their operation.
- Check the lubrication level, damage, and wear of each part. If necessary, grease or replace it.

Wiring Diagrams and Trouble Diagnosis

AIS005N6

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-2, "POWER SUPPLY ROUTING"

When you perform trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"
  Check for any Service bulletins before servicing the vehicle.

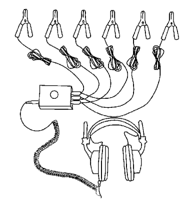
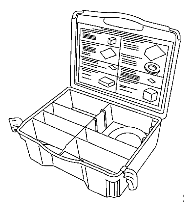
PREPARATION

PFP:00002

Special Service Tools

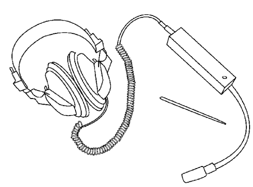
AIS0063G

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
(J-39570) Chassis ear	 SIIA0993E	Locating the noise
(J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of noise

Commercial Service Tools

AIS0063H

Tool name		Description
Engine ear	 SIIA0995E	Locating the noise

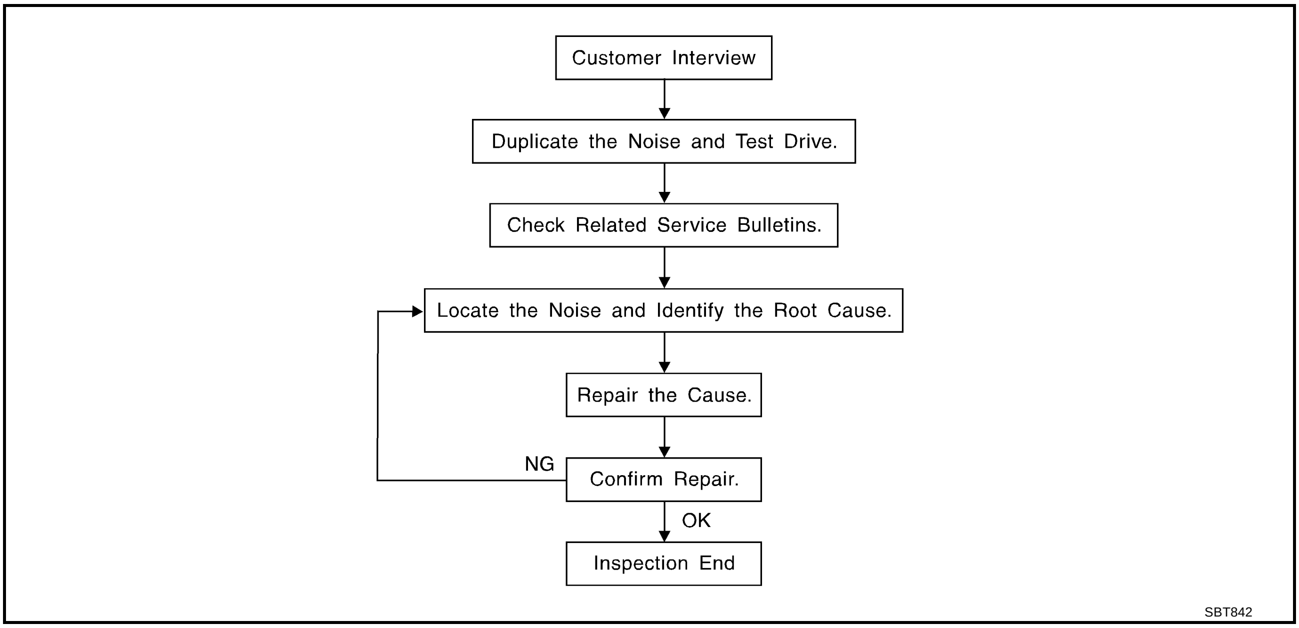
A B C D E F G H BL J K L M

SQUEAK AND RATTLE TROUBLE DIAGNOSES

PFP:00000

Work Flow

AIS0060Y



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to BL-10, "Diagnostic Worksheet" . This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces=higher pitch noise/softer surfaces=lower pitch noises/edge to surface=chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T models, drive position on A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.

If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to BL-8, "Generic Squeak and Rattle Troubleshooting" .

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
  - separate components by repositioning or loosening and retightening the component, if possible.
  - insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:

Do not use excessive force as many components are constructed of plastic and may be damaged.

NOTE:

Always check with the Parts Department for the latest parts information.

The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.

URETHANE PADS [1.5 mm (0.059 in) thick]

Insulates connectors, harness, etc.

76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)

INSULATOR (Foam blocks)

Insulates components from contact. Can be used to fill space behind a panel.

73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)

INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTHTAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit. Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

AIS0060Z

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

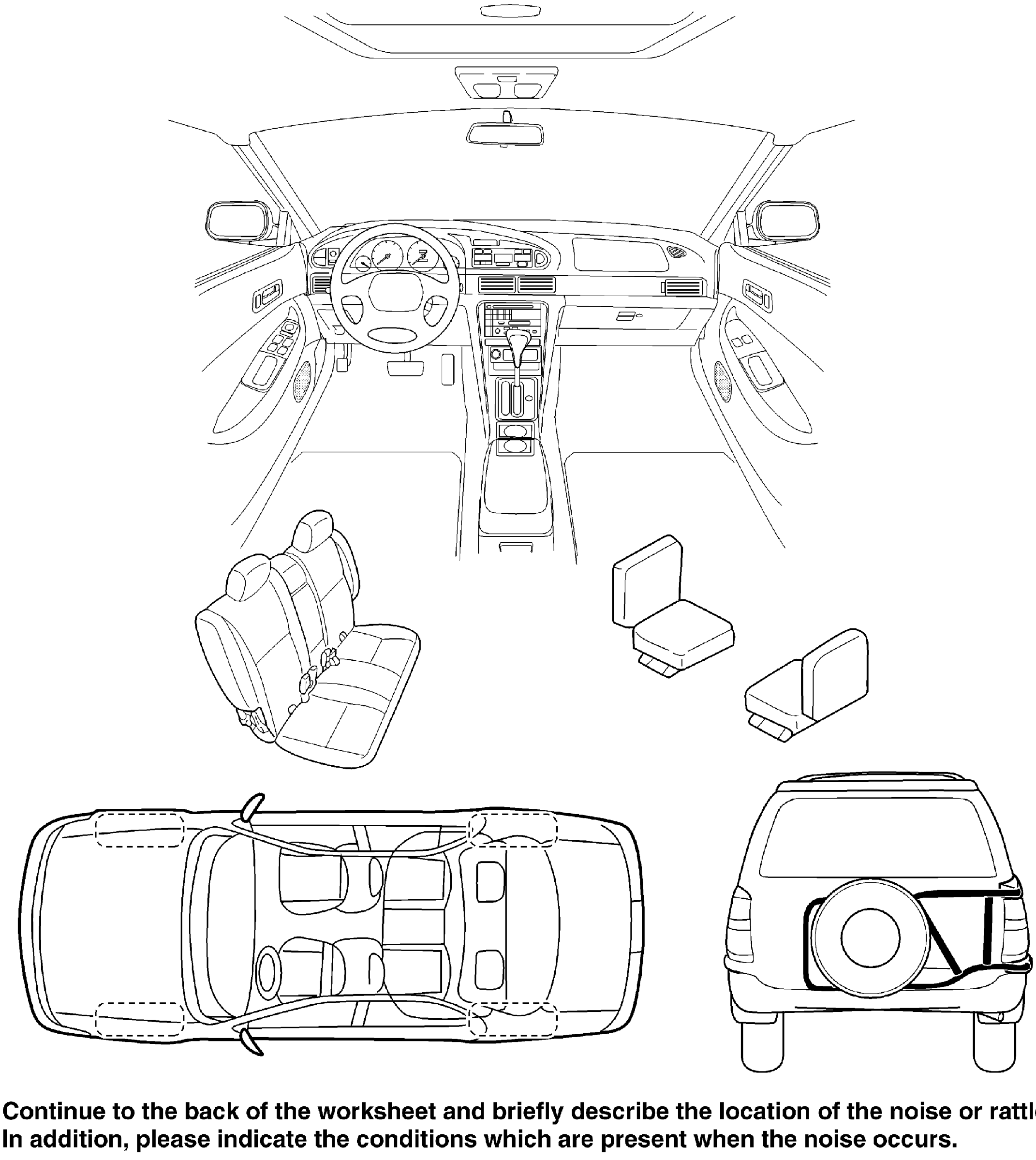
Diagnostic Worksheet

AIS00610

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB0723E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

____

____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

❏ anytime
❏ 1st time in the morning
❏ only when it is cold outside
❏ only when it is hot outside
❏ after sitting out in the sun
❏ when it is raining or wet
❏ dry or dusty conditions
❏ other: ____________________

III. WHEN DRIVING:

❏ through driveways
❏ over rough roads
❏ over speed bumps
❏ only at about ____ mph
❏ on acceleration
❏ coming to a stop
❏ on turns : left, right or either (circle)
❏ with passengers or cargo
❏ other: ____________________
❏ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

❏ squeak (like tennis shoes on a clean floor)
❏ creak (like walking on an old wooden floor)
❏ rattle (like shaking a baby rattle)
❏ knock (like a knock on a door)
❏ tick (like a clock second hand)
❏ thump (heavy, muffled knock noise)
❏ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

____

____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❏	❏	_______
- Noise verified on test drive	❏	❏	
- Noise source located and repaired	❏	❏	_______
- Follow up test drive performed to confirm repair	❏	❏	_______

VIN: ____________________ Customer Name: ____________________

W.O. #: ____________________ Date: ____________

This form must be attached to Work Order

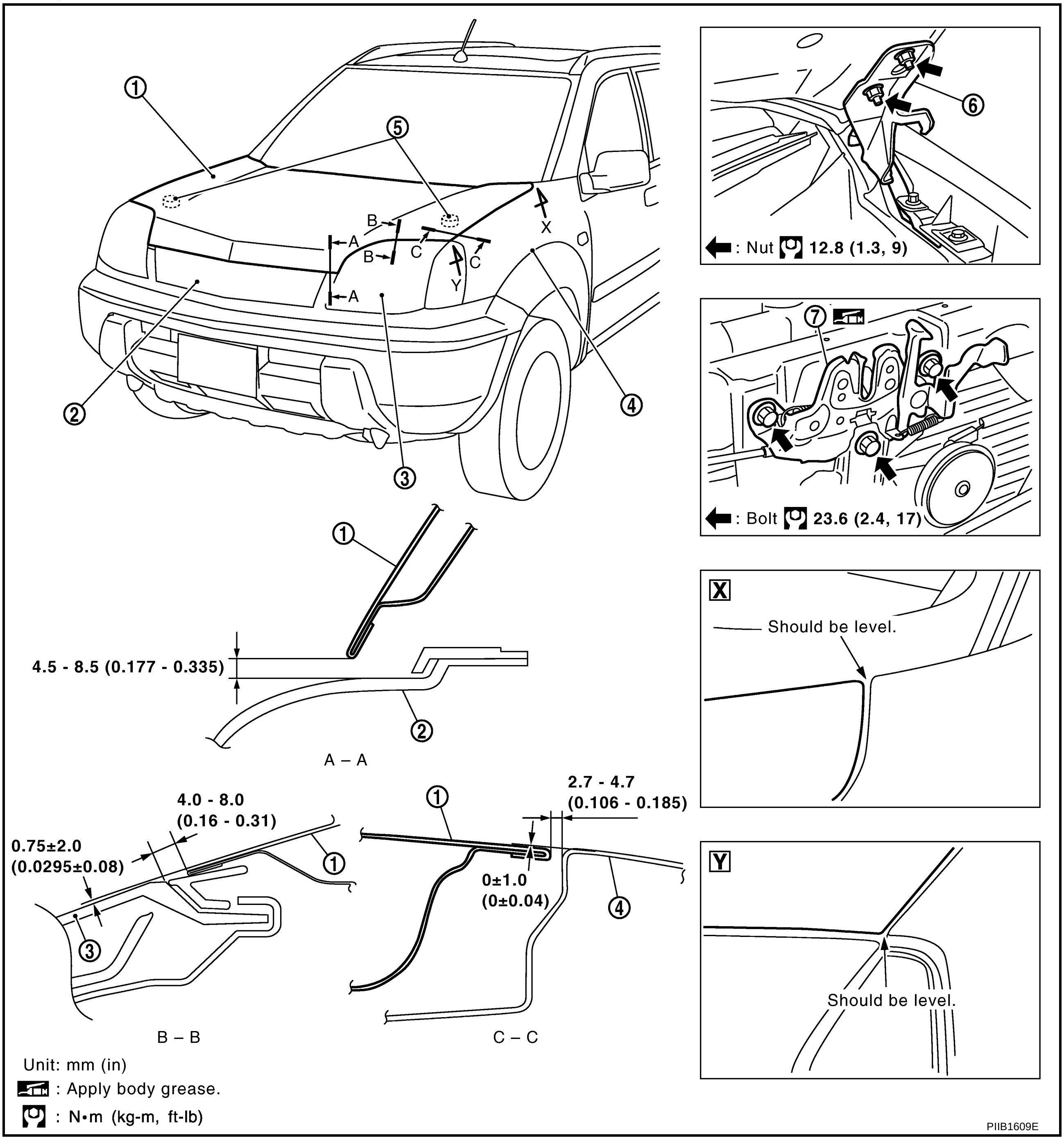
SBT844

HOOD

PFP:65100

Fitting Adjustment

AIS005NB



1. Hood assembly	2. Front grille	3. Headlamp
4. Front fender	5. Bumper rubber	6. Hood hinge
7. Hood lock assembly		

LONGITUDINAL AND LATERAL CLEARANCE ADJUSTMENT

1. Remove hood lock assembly, loosen the hood hinge nuts and close the hood.
2. Adjust the lateral and longitudinal clearance, and open the hood to tighten the hood hinge mounting bolts to the specified torque.
3. Install the hood lock temporarily, and align the hood striker and lock so that the centers of striker and lock become vertical viewed from the front, by moving the hood lock laterally.
4. Tighten hood lock mounting bolts to the specified torque.

CAUTION:
Adjust right/left clearance between hood and each part to the following specification.

Hood and front grille (A–A)	**: Less than 1.0 mm (0.04 in)**
Hood and fender (C–C)	**: Less than 1.0 mm (0.04 in)**

FRONT END HEIGHT ADJUSTMENT

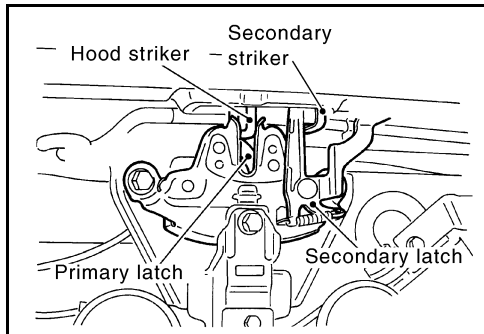
1. Remove the hood lock and adjust the height by rotating the bumper rubber until the hood becomes 1 to1.5 mm (0.04 to 0.059 in) lower than the fender.
2. Temporarily tighten the hood lock, and position it by engaging it with the hood striker. Check the lock and striker for looseness, and tighten the hood lock mounting bolts to the specified torque.

SURFACE HEIGHT ADJUSTMENT

1. Remove hood lock, and adjust the surface height difference of hood, fender and headlamp according to the fitting standard dimension, by rotating RH and LH bumper rubbers.
2. Install hood lock temporarily, and move hood lock laterally until the centers of striker and lock become vertical when viewed from the front.
3. Make sure that the hood lock secondary latch is properly engaged with the secondary striker with hood's own weight.
4. Make sure that the hood lock primary latch is securely engaged with the hood striker with hood's own weight by dropping hood from approx. 200 mm(7.87 in) height.

   CAUTION:

   Do not drop hood from a height of 300 mm (11.81 in) or more.
5. Move hood lockup and down until striker smoothly engages the lock when the hood is closed.



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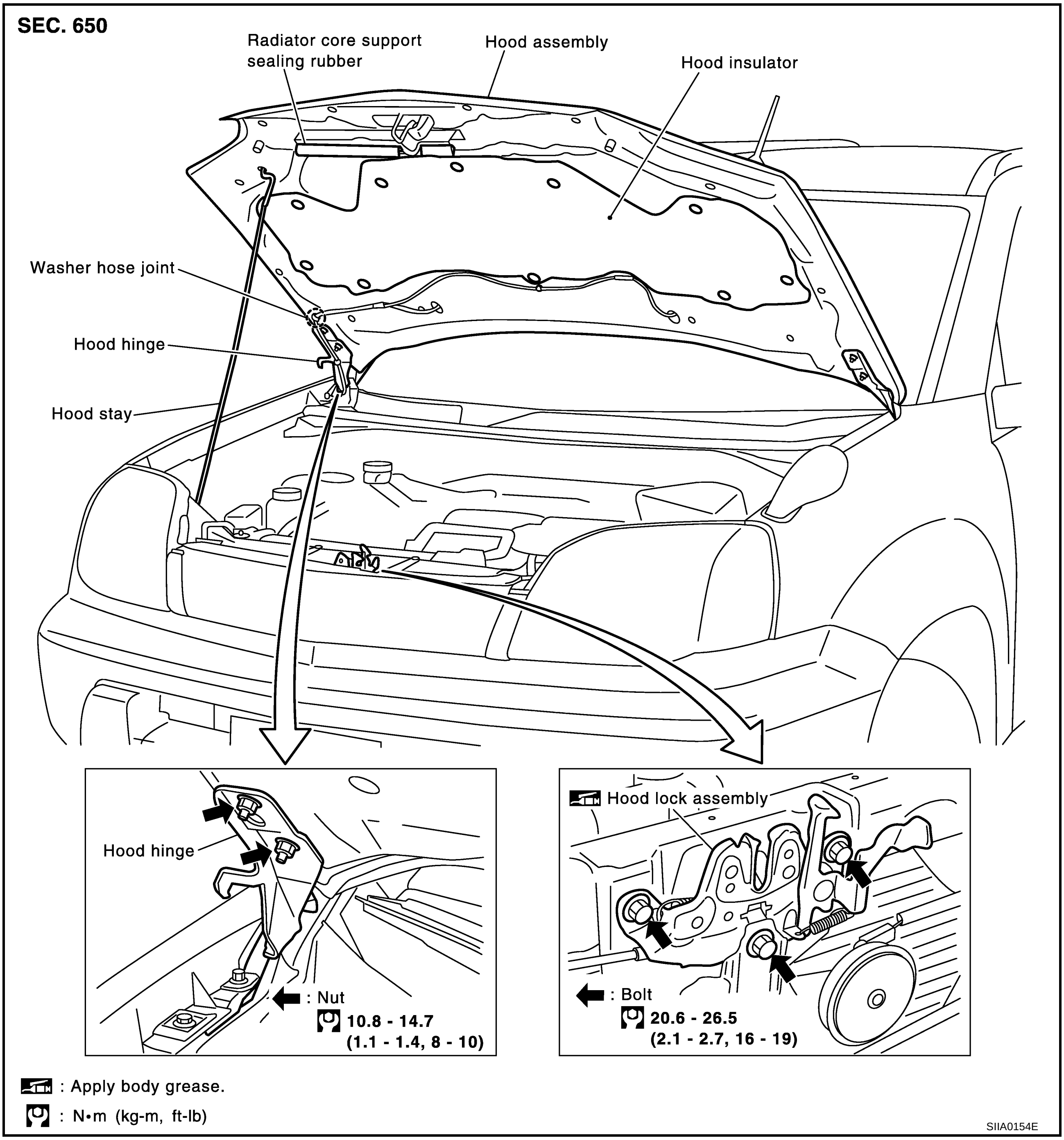
6. When pulling the hood opener lever gently, make sure that front end of the hood rises by approximately 20 mm (0.79 in) and that hood striker and hood lock primary latch is disengaged. Also make sure that hood opener returns to the original position.
7. After adjustment, tighten lock bolts to the specified torque.

Removal and Installation of Hood Assembly

AIS005NC



REMOVAL

1. Disconnect washer hose at the connection.
2. Remove hood hinge mounting nuts on the hood and then the hood assembly.

   CAUTION:

   Operate with two workers, because of its heavy weight.

INSTALLATION

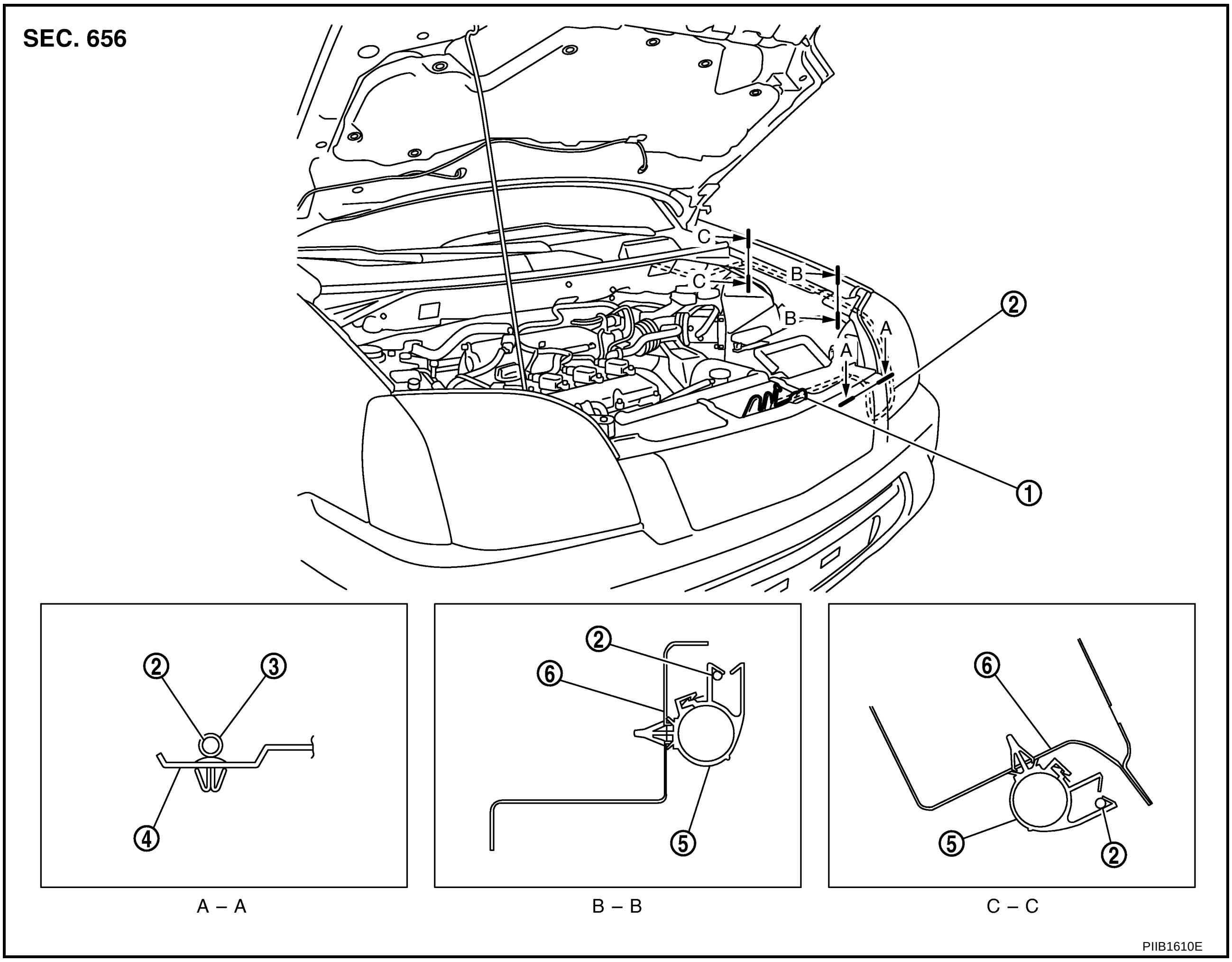
Install in the reverse order of removal.

CAUTION:

- **Before installing hood hinge, apply anticorrosive agent onto the mounting surface of the vehicle body.**
- **After installing, perform hood fitting adjustment. Refer to** **BL-12, "Fitting Adjustment"** **.**

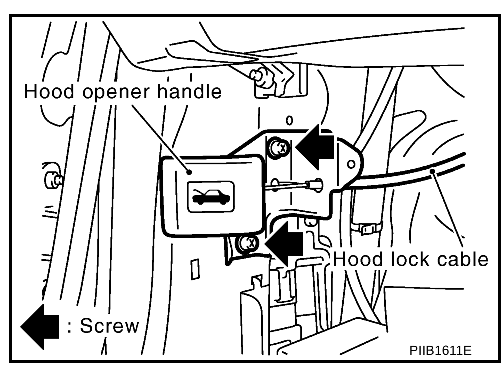
Removal and Installation of Hood Lock Control

AIS005ND



1.	Hood lock assembly	2.	Hood lock cable	3.	Cable clip
4.	Radiator core support sealing rubber	5.	Harness clip	6.	Hoodledge upper

REMOVAL

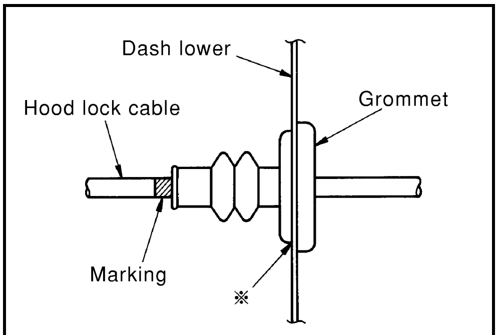


1. Remove hood lock cable from hood lock and clip of upper portion of radiator core support and hood ledge.
2. Remove fender protector. Refer to EI-20, "FENDER PROTECTOR" .
3. Remove dash side finisher. Refer to EI-36, "BODY SIDE TRIM" .
4. Remove attaching screw and then the hood opener.
5. Remove dash panel grommet and pull hood lock cable toward the passenger compartment.

   NOTE:
   When pulling the cable, be careful not to strip or scratch the outer surface.

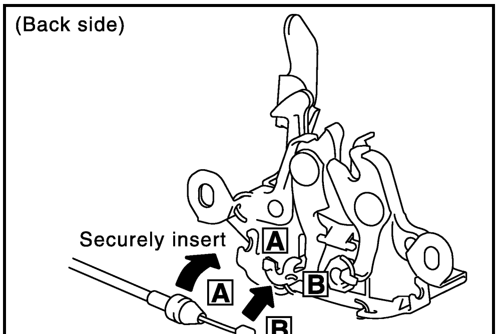
INSTALLATION

1. Pass hood lock cable through the opening while keeping the winding radius 100 mm (3.94 in) or larger.
2. After confirming that the grommet is properly positioned, push the grommet securely into the hole.
3. Apply sealant to the area on the grommet indicated with the * mark.



PIIA0173E

4. Connect cable securely to the lock.
5. After connection, confirm proper adjustment and operation for both hood lock and hood opener.



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Hood Lock Control Inspection

AIS005NE

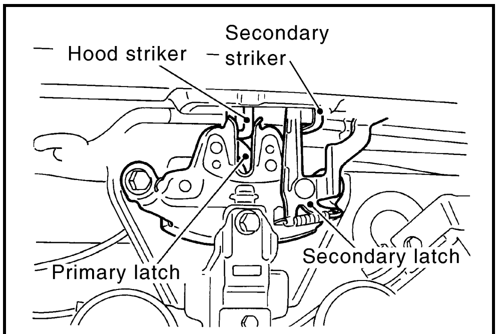
CAUTION:

If the hood lock cable is bent or deformed, replace it.

1. Make sure that the hood lock secondary latch is securely engaged with the secondary striker with hood's own weight.
2. Make sure that the hood lock primary latch is securely engaged with the hood striker with hood's own weight by dropping it from approx 200 mm (7.87 in) height.

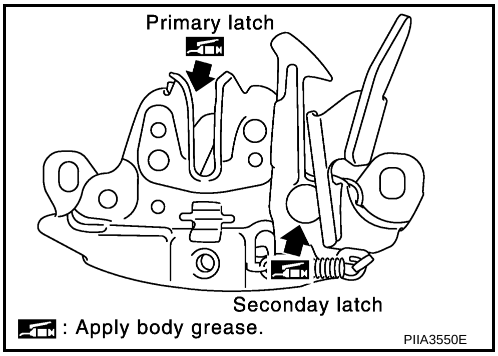
   CAUTION:

   Do not drop hood from a height of 300 mm (11.81 in) or more.



PIIB1082E

3. When pulling hood opener lever gently, make sure that front end of the hood rises by approximately 20 mm (0.79 in) and that hood striker and hood lock primary latch are disengaged. Also make sure that hood opener returns to the original position.
4. Confirm hood lock is properly lubricated. If necessary, apply “body grease” at the point shown in the figure.



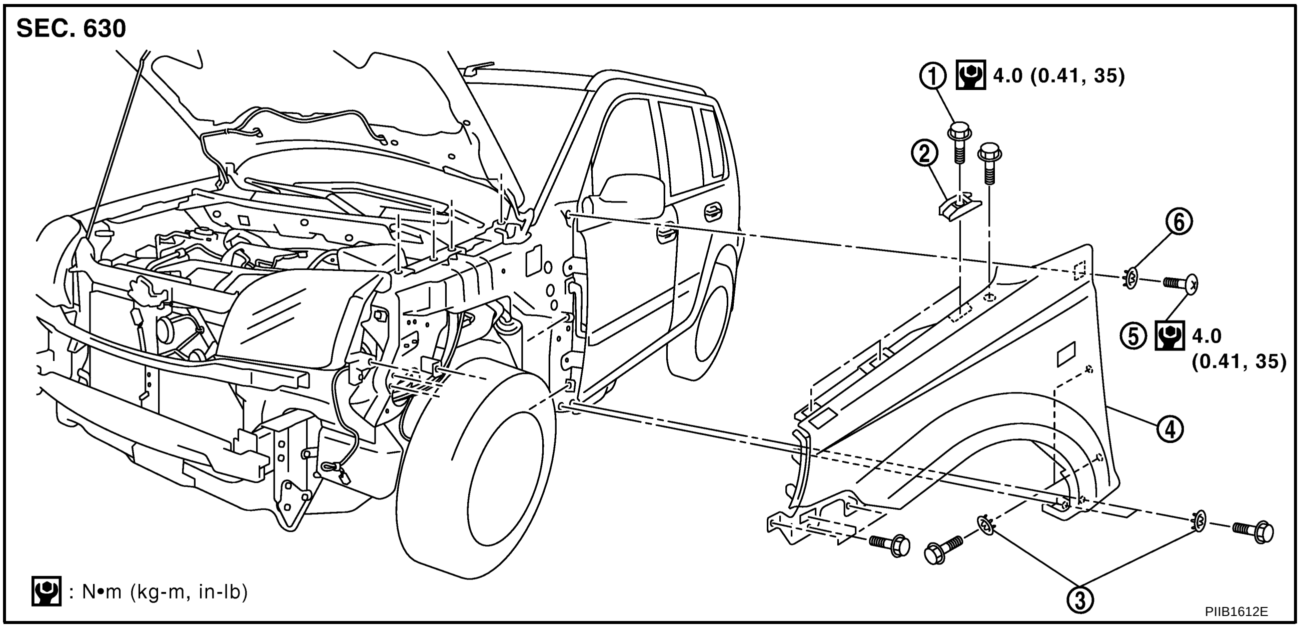
PIIA3550E

FRONT FENDER

PFP:63100

Removal and Installation

AIS0061L



1.	Bolt	2.	Stiffener	3.	Spring washer
4.	Front fender	5.	TORX bolt (T20)	6.	Spring washer

REMOVAL

1. Remove the front bumper. Refer to EI-14, "FRONT BUMPER" .
2. Remove the turn signal lamp. Refer to LT-22, "Removal and Installation of Front Turn Signal Lamp" .
3. Remove the front fender protector. Refer to EI-20, "FENDER PROTECTOR" .
4. Remove the mounting bolt and remove the front fender.

CAUTION:

While removing use a shop cloth to protect body from damaging.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

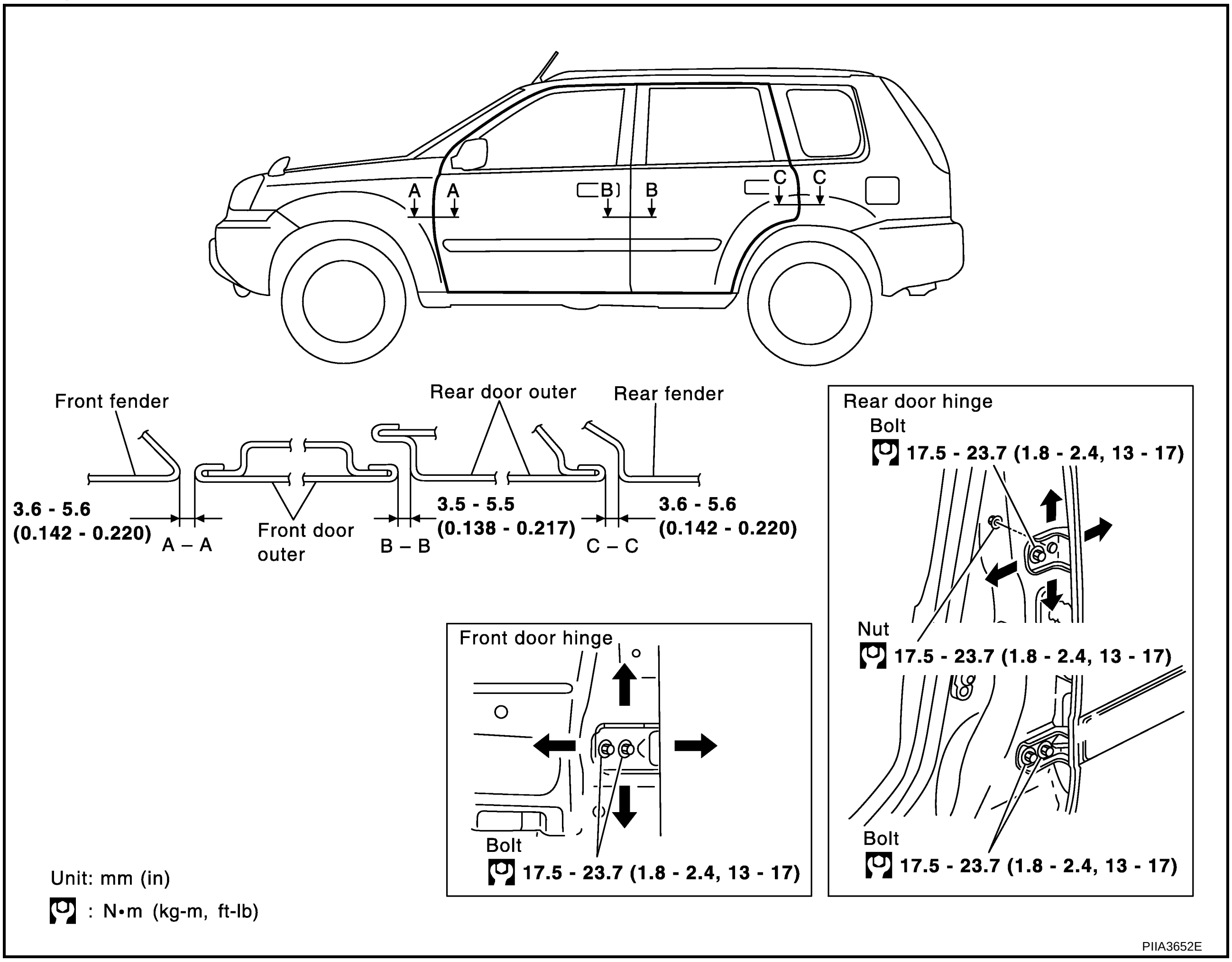
- **After installing, apply touch-up paint (the body color) onto the head of the front fender mounting bolts.**
- **After installing, check front fender adjustment. Refer to BL-12, "Fitting Adjustment" and BL-19, "Fitting Adjustment" .**

DOOR

PFP:80100

Fitting Adjustment

AIS005NF



FRONT DOOR

Longitudinal Clearance and Surface Height Adjustment at Front End

1. Remove fender protector. Refer to EI-20, "FENDER PROTECTOR" .
2. Working from the inside the fender, loosen hinge mount bolts on the body. Lift rear end of the front door to adjust clearance and surface difference properly.

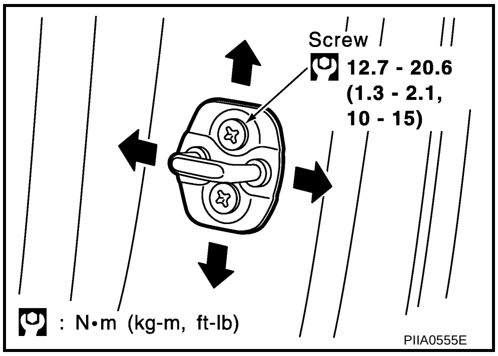
REAR DOOR

Longitudinal Clearance and Surface Height Adjustment at Front End

1. Remove upper and lower garnishes on the center pillar. Refer to EI-36, "BODY SIDE TRIM" .
2. Loosen mounting bolts from outside of vehicle, mounting nuts from inside of vehicle. Open rear door. Raise rear end of it to adjust.

STRIKER ADJUSTMENT

Adjust striker until it is parallel to the lock engagement direction.



Removal and Installation of Front Door

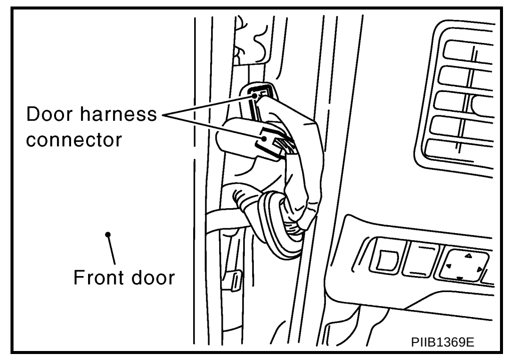
AIS005NG

CAUTION:

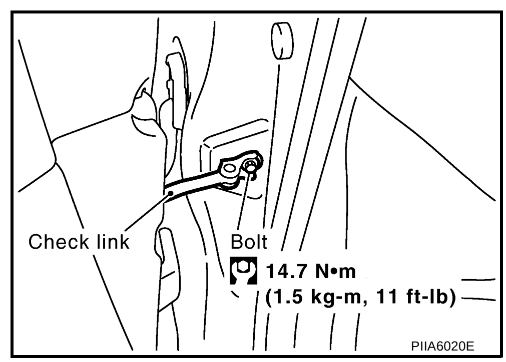
- **When removing and installing the front door assembly, support the door with a jack and cloth to protect the door and body.**
- **When removing and installing front door assembly, be sure to carry out the fitting adjustment. Refer to BL-19, "Fitting Adjustment" .**
- **Operate with two workers, because of its heavy weight.**
- **After installing, apply touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Check the hinge rotating part for poor lubrication. If necessary, apply “body grease”.**
- **Check front door open/close operation after installation.**

REMOVAL

1. Grommet is pulled out, and the front door harness connector is detached.

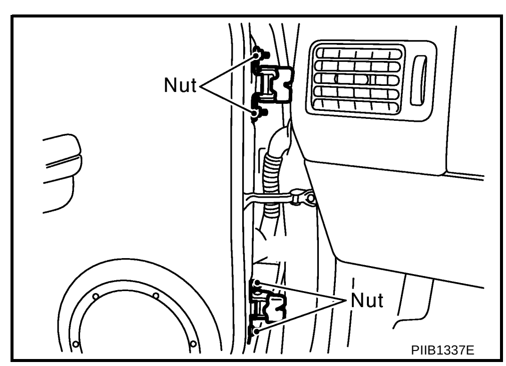


2. Remove the mounting bolts of the check link on the vehicle.



3. Remove the door-side hinge mounting nuts, and remove the door assembly.

   : 20.6 N·m (2.1 kg-m, 15 ft-lb)



INSTALLATION

Install in the reverse order of removal.

Removal and Installation of Rear Door

AIS005NH

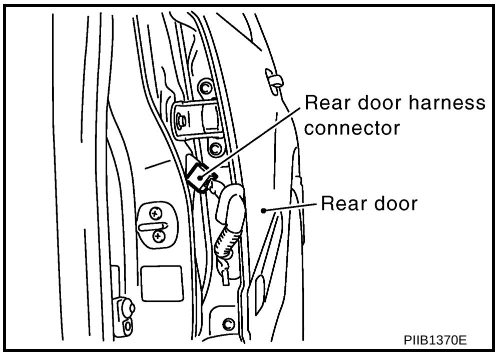
CAUTION:

- **When removing and installing the rear door assembly, support the door with a jack and cloth to protect the door and body.**
- **When removing and installing rear door assembly, be sure to carry out the fitting adjustment. Refer toBL-19, "Fitting Adjustment" .**
- **Check the hinge rotating part for poor lubrication. If necessary, apply “body grease”.**

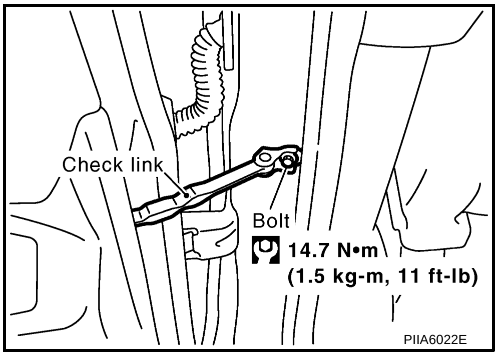
- **After installing, apply touch-up paint (the body color) onto the head of the hinge mounting nuts.**
- **Operate with two workers, because of its heavy weight.**
- **Check rear door open/close operation after installation.**

REMOVAL

1. Grommet is pulled out, and the rear door harness connector is detached.

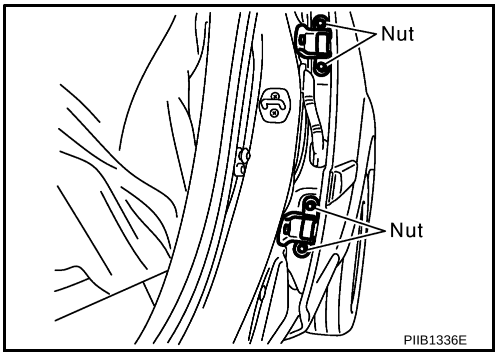


2. Remove the mounting bolts of the check link on the vehicle.



3. Remove the door-side hinge mounting nuts, and remove the door assembly.

   : 20.6 N·m (2.1 kg-m, 15 ft-lb)

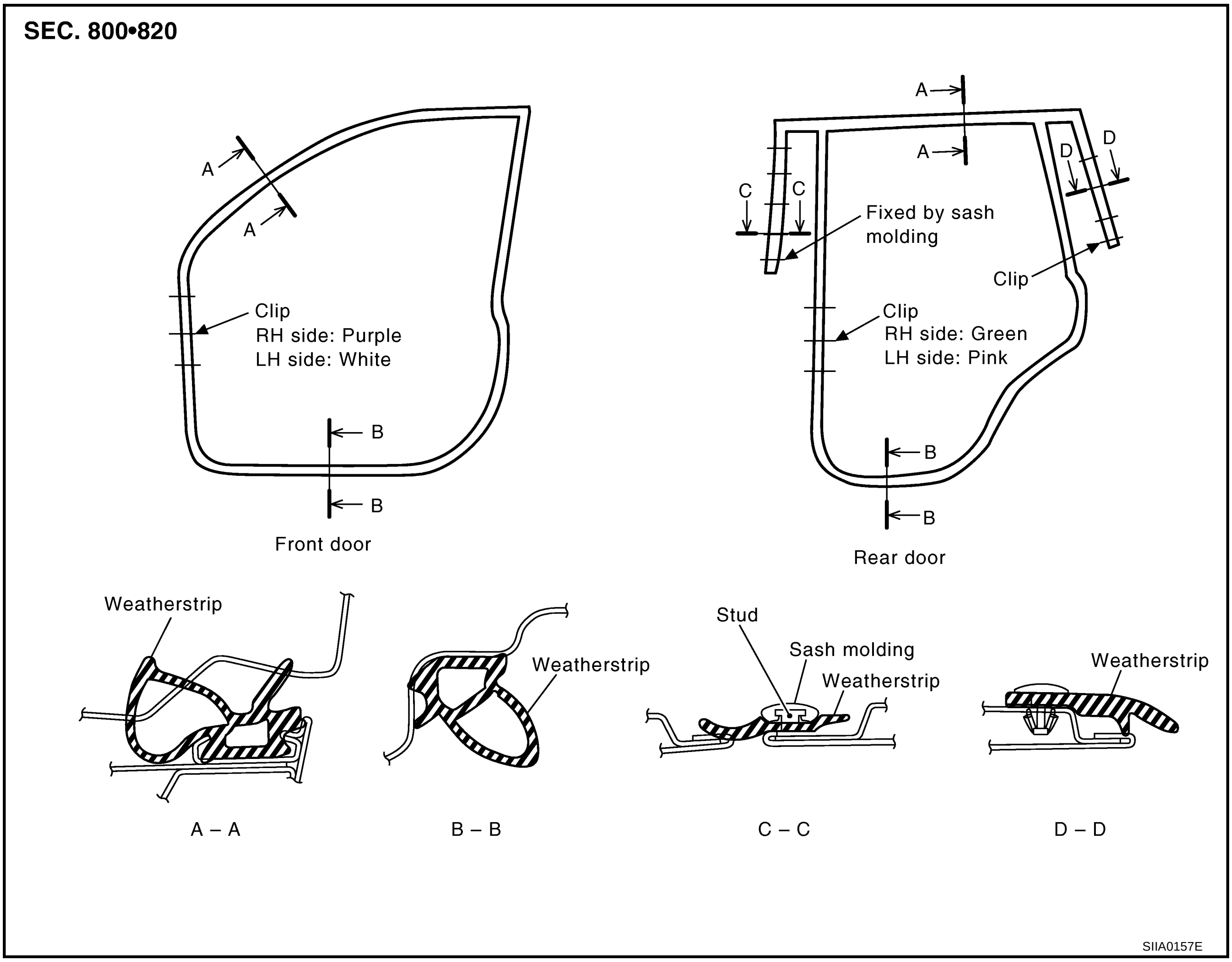


INSTALLATION

Install in the reverse order of removal.

Door Weatherstrip

AIS005NI



REMOVAL

1. Remove the mounting bolts of the check link on the vehicle. Refer to BL-20, "Removal and Installation of Front Door" or BL-20, "Removal and Installation of Rear Door" .
2. Remove the weatherstrip clips and remove weatherstrip.

CAUTION:

After removal, do not pull strongly on the weatherstrip.

INSTALLATION

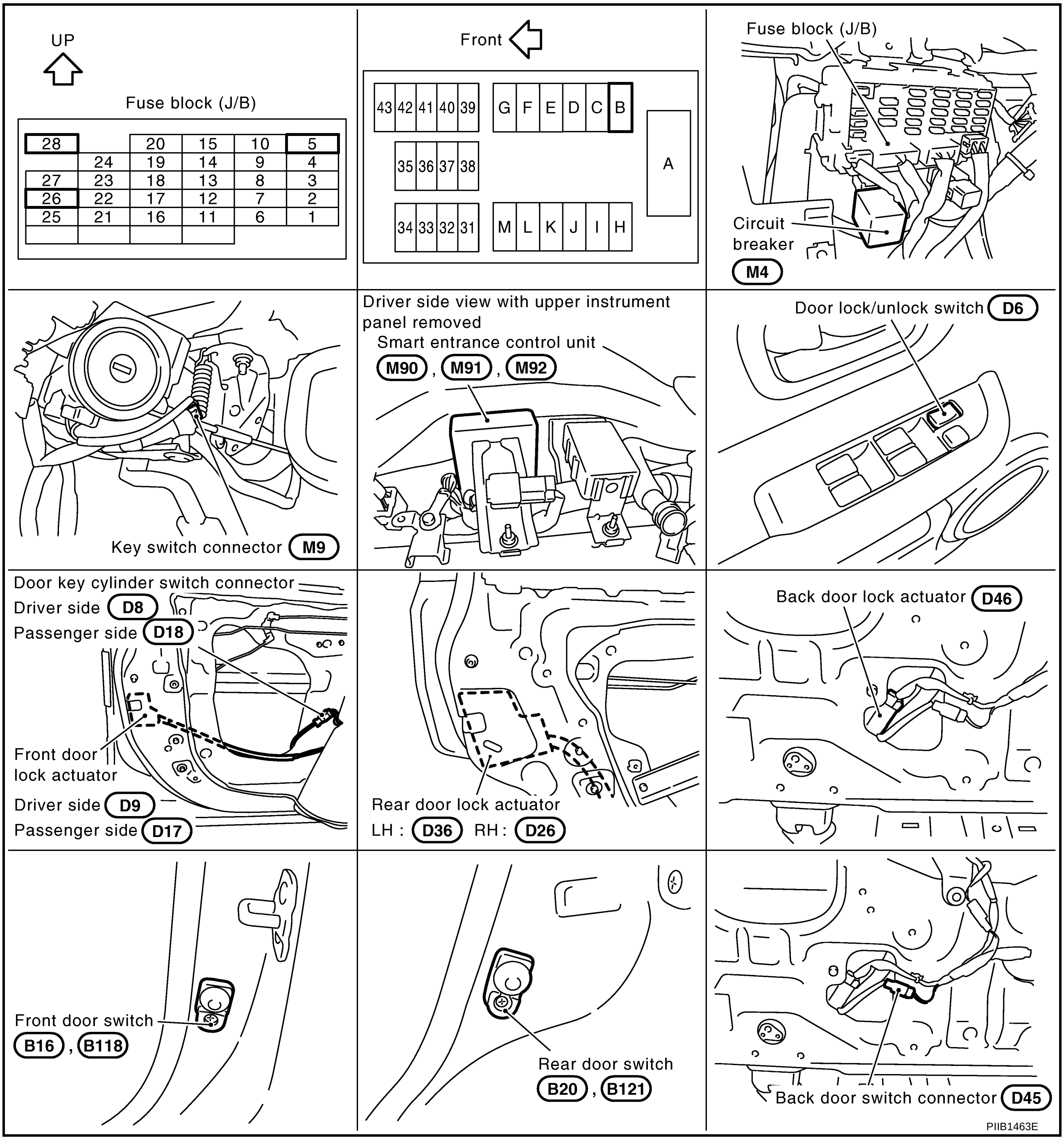
Install in the reverse order of removal.

POWER DOOR LOCK SYSTEM

PFP:24814

Component Parts and Harness Connector Location

AIS005X9



System Description

AIS005XA

OPERATION

Power is supplied at all times

- through 10A fuse [No. 26, located in the fuse block (J/B)]
- to smart entrance control unit terminal 49,
- through 40A fusible link (letter **B** , located in the fusible link and fuse box)
- to smart entrance control unit terminal 51.

Ground is supplied at all times

- to smart entrance control unit terminal 43 and 64
- through grounds M27 and M70.

When ignition switch is in ON or START position, power is supplied

- through 10A fuse [No. 5, located in the fuse block (J/B)]
- to smart entrance control unit terminal 27.

When key switch is in INSERTED position, power is supplied

- through 10A fuse [No. 28, located in the fuse block (J/B)]
- through key switch terminal 1
- through key switch terminal 2 and
- to smart entrance control unit terminal 25.

DOOR LOCK/UNLOCK SWITCH (POWER WINDOW MAIN SWITCH) OPERATION

When power window main switch (door lock/unlock switch) is in LOCK position, ground is supplied

- to smart entrance control unit terminal 5
- through power window main switch (door lock/unlock switch) terminal 17
- through power window main switch (door lock/unlock switch) terminal 19 and
- through grounds M27 and M70.

Then all doors are locked.
When power window main switch (door lock/unlock switch) is in UNLOCK position, ground is supplied

- to smart entrance control unit terminal 4
- through power window main switch (door lock/unlock switch) terminal 18
- through power window main switch (door lock/unlock switch) terminal 19 and
- through grounds M27 and M70.

Then all doors are unlocked.

DOOR LOCK/UNLOCK SWITCH (PASSENGER SIDE) OPERATION

When door lock/unlock switch (passenger side) is in LOCK position, ground is supplied

- to smart entrance control unit terminal 5
- through door lock/unlock switch (passenger side) terminal 2
- through door lock/unlock switch (passenger side) terminal 3 and
- through grounds M27 and M70.

Then all doors are locked.
When door lock/unlock switch (passenger side) is in UNLOCK position, ground is supplied

- to smart entrance control unit terminal 4
- through door lock/unlock switch (passenger side) terminal 1
- through door lock/unlock switch (passenger side) terminal 3 and
- through grounds M27 and M70.

Then all doors are unlocked.

DOOR KEY CYLINDER SWITCH OPERATION

Driver Side

When door key cylinder switch (driver side) is in LOCK position, ground is supplied

- to smart entrance control unit terminal 11
- through door key cylinder switch (driver side) terminal 1
- through door key cylinder switch (driver side) terminal 2 and
- through grounds M27 and M70.

Then all doors are locked.
When door key cylinder switch (driver side) is in UNLOCK position, ground is supplied

- to smart entrance control unit terminal 10
- through door key cylinder switch (driver side) terminal 3
- through door key cylinder switch (driver side) terminal 2 and
- through grounds M27 and M70.

Then all doors are unlocked.

Passenger Side

When door key cylinder switch (passenger side) is in LOCK position, ground is supplied

- to smart entrance control unit terminal 11
- through door key cylinder switch (passenger side) terminal 3
- through door key cylinder switch (passenger side) terminal 2 and
- through grounds M27 and M70.

Then all doors are locked.
When door key cylinder switch (passenger side) is in UNLOCK position, ground is supplied

- to smart entrance control unit terminal 10
- through door key cylinder switch (passenger side) terminal 1
- through door key cylinder switch (passenger side) terminal 2 and
- through grounds M27 and M70.

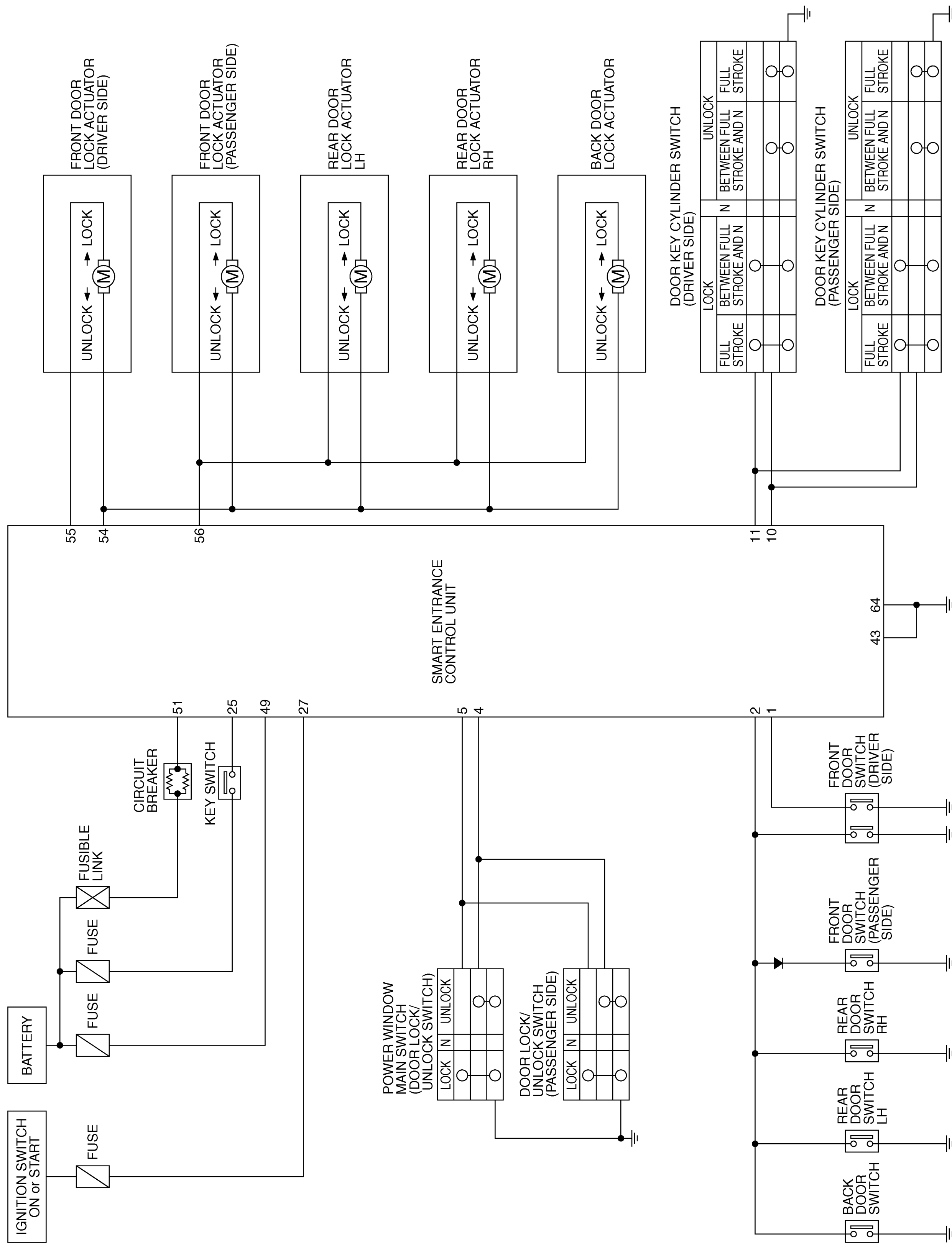
Then all doors are unlocked.

KEY REMINDER SYSTEM

- If the ignition key is in the ignition key cylinder and doors are open, setting lock/unlock switch, lock knob, key or multi-remote controller to “LOCK” locks the door once but then immediately unlocks all doors.

Schematic

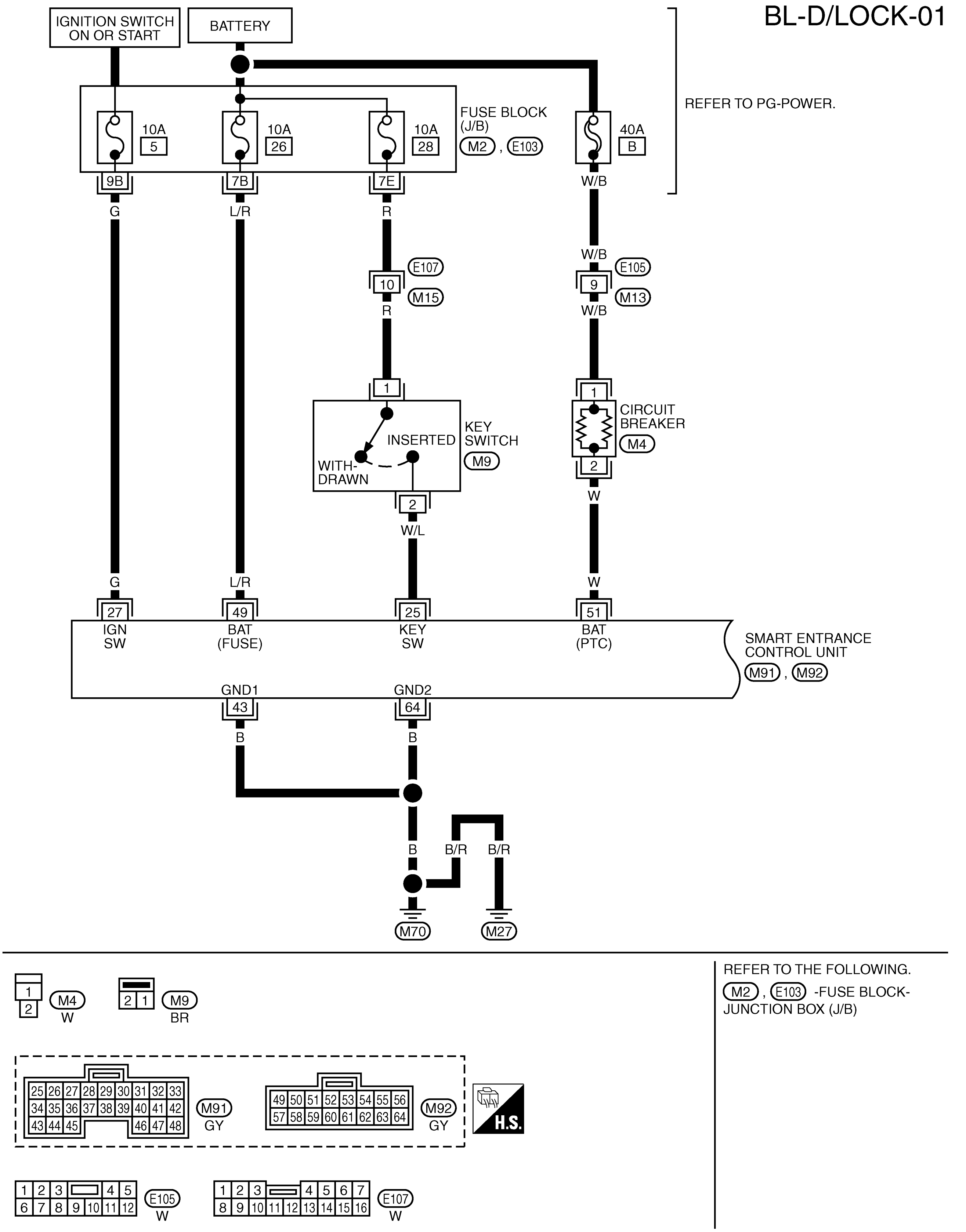
AIS005XB



TIWB0043E

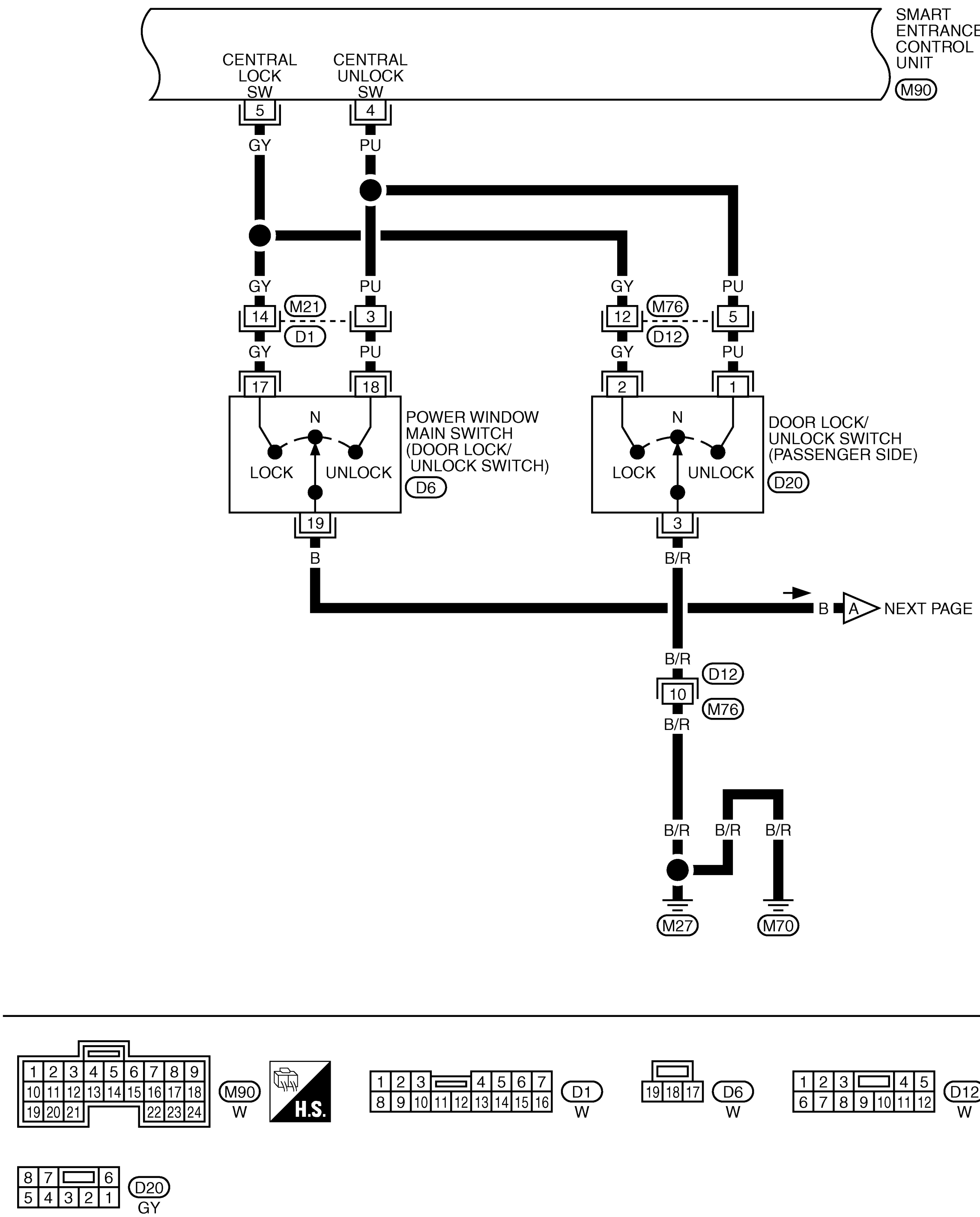
Wiring Diagram — D/LOCK —

AIS005XC



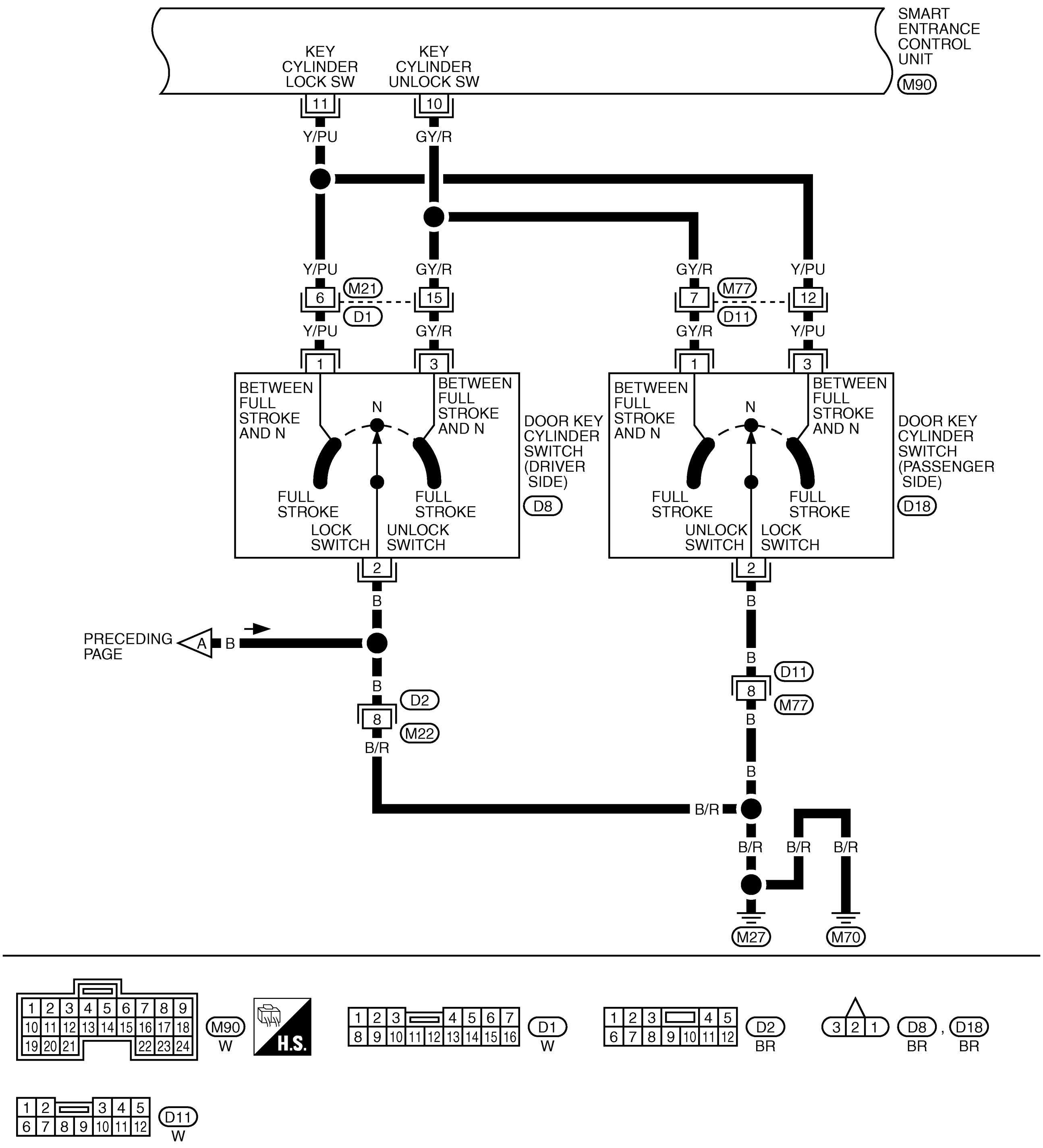
TIWA0550E

BL-D/LOCK-02



TIWB0044E

BL-D/LOCK-03



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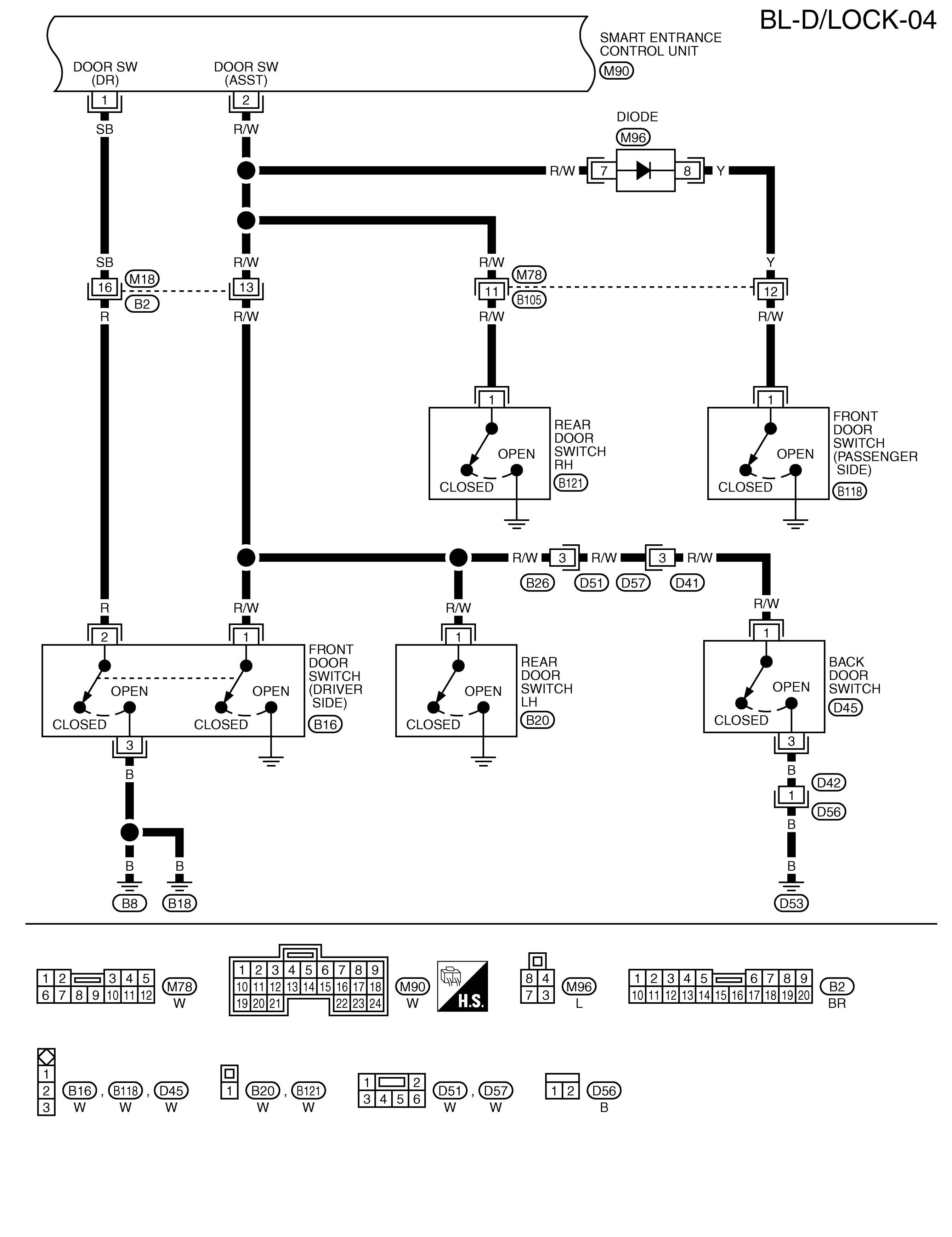
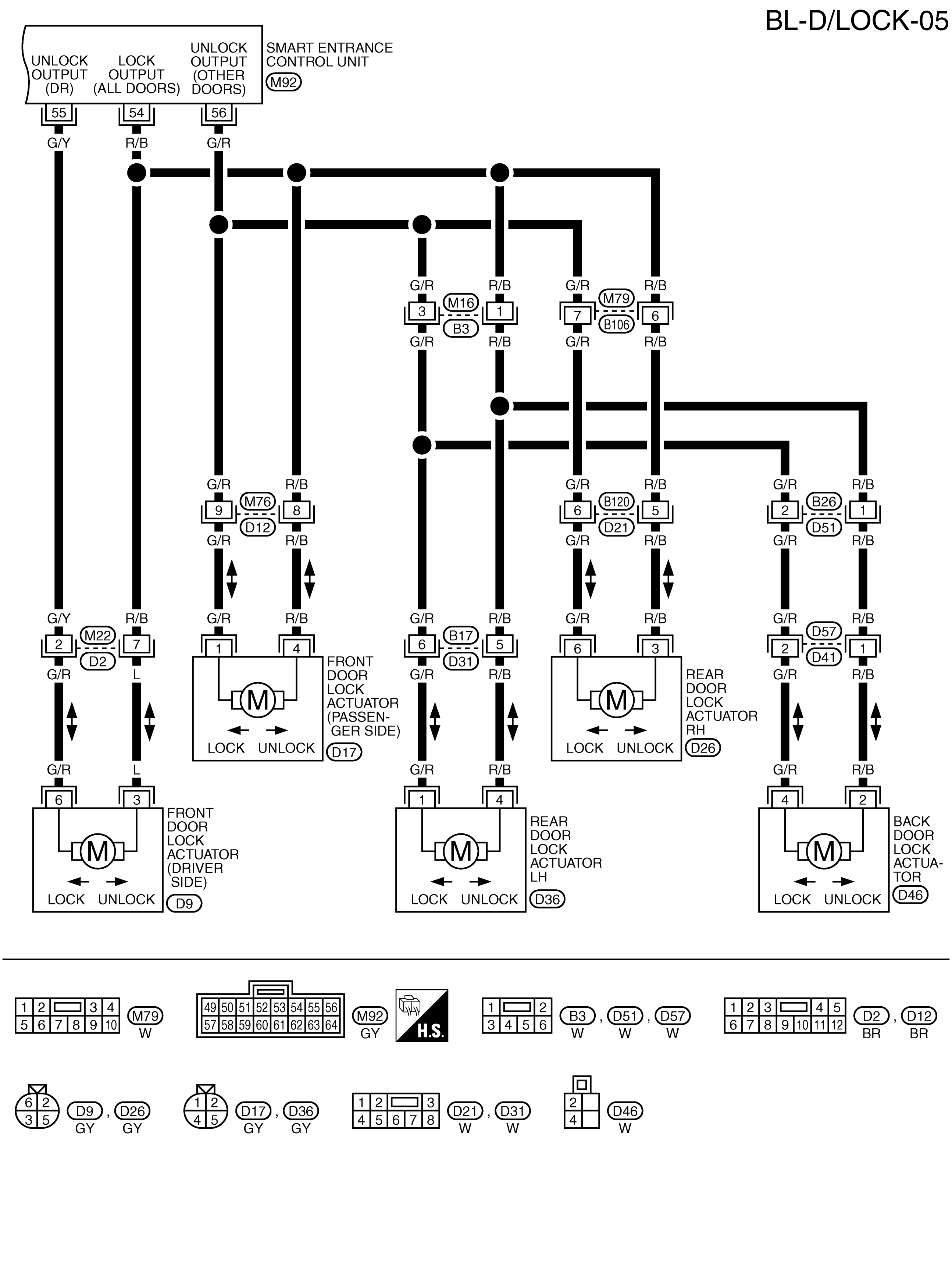

BL-D/LOCK-04
SMART ENTRANCE CONTROL UNIT
M90
DOOR SW (DR)
DOOR SW (ASST)
DIODE
M96
SB
R/W
Y
R
B
M18
B2
M78
B105
REAR DOOR SWITCH RH
B121
FRONT DOOR SWITCH (PASSENGER SIDE)
B118
OPEN
CLOSED
B26
D51
D57
D41
FRONT DOOR SWITCH (DRIVER SIDE)
B16
REAR DOOR SWITCH LH
B20
BACK DOOR SWITCH
D45
D42
D56
B8
B18
D53
W
H.S.
L
BR
TIWB0046E


BL-D/LOCK-05
SMART ENTRANCE CONTROL UNIT
M92
UNLOCK OUTPUT (DR)
LOCK OUTPUT (ALL DOORS)
UNLOCK OUTPUT (OTHER DOORS)
55
54
56
G/Y
R/B
G/R
M16
B3
M79
B106
M76
D12
B120
D21
B26
D51
M22
D2
B17
D31
D57
D41
FRONT DOOR LOCK ACTUATOR (PASSEN-GER SIDE)
D17
REAR DOOR LOCK ACTUATOR RH
D26
FRONT DOOR LOCK ACTUATOR (DRIVER SIDE)
D9
REAR DOOR LOCK ACTUATOR LH
D36
BACK DOOR LOCK ACTUA-TOR
D46
LOCK
UNLOCK
M
L
M79 W
M92 GY
H.S.
B3, D51, D57 W W W
D2, D12 BR BR
D9, D26 GY GY
D17, D36 GY GY
D21, D31 W W
D46 W
TIWB0047E

Terminal and Reference Value for Smart Entrance Control Unit

AIS005XD

Terminal	Wire color	Item	Condition	Voltage [V] (Approx.)
1	SB	Driver door switch	Door open (ON) → close (OFF)	0 → 5
2	R/W	All door switch	Door open (ON) → close (OFF)	0 → 5
4	PU	Power door lock switch unlock signal	Unlock operation (ON)	0
			Other than above (OFF)	5
5	GY	Power door lock switch lock signal	Lock operation (ON)	0
			Other than above (OFF)	5
10	GY/R	Door key cylinder unlock switch	OFF (Neutral) → ON (Unlocked)	5 → 0
11	Y/PU	Door key cylinder lock switch	OFF (Neutral) → ON (Locked)	5 → 0
25	W/L	Key switch	Key inserted (ON) → key removed from IGN key cylinder (OFF)	Battery voltage → 0
27	G	Ignition switch (ON)	Ignition switch is in ON or START position	Battery voltage
43	B	Ground	—	0
49	L/R	Power source (Fuse)	—	Battery voltage
51	W	Power source (PTC)	—	Battery voltage
54	R/B	All door lock actuator lock	Power door lock switch Lock operation	0 → Battery voltage → 0
55	G/Y	All door lock actuator unlock	Power door lock switch Unlock operation	0 → Battery voltage → 0
56	G/R	Passenger door and rear door (LH/RH) lock actuator unlock	Power door lock switch Unlock operation	0 → Battery voltage → 0
64	B	Ground	—	0

Symptom Chart

AIS005XE

Symptom	Diagnosis/service procedure	Reference page
Power door lock does not operate using any switch.	1. Smart entrance control unit power supply and ground circuit check	BL-33
	2. Front door lock actuator check (Driver side)	BL-38
	3. Front door lock actuator check (Passenger side)	BL-39
	4. Rear door lock actuator check LH	BL-40
	5. Rear door lock actuator check RH	BL-40
	6. Back door lock actuator check	BL-41
	7. Replace smart entrance control unit.	—
Power door lock does not operate with power window main switch (lock/unlock switch).	1.power window main switch (door lock/unlock switch) check	BL-34
	2. Replace smart entrance control unit.	—
Power door lock does not operate with door lock/unlock switch (passenger side).	1. Door lock/unlock switch (passenger side) check	
	2. Replace smart entrance control unit.	—
Power door lock does not operate with door key cylinder (driver side) switch.	1. Door key cylinder switch (driver side) check	BL-36
	2. Replace smart entrance control unit.	—
Power door lock does not operate with door key cylinder (passenger side) switch.	1. Door key cylinder switch (passenger side) check	
	2. Replace smart entrance control unit.	—
Specific door lock actuator does not operate.	1. Front door lock actuator check (Driver side)	BL-38
	2. Front door lock actuator check (Passenger side)	BL-39
	3. Rear door lock actuator LH	BL-40
	4. Rear door lock actuator RH	BL-40
	5. Back door lock actuator	BL-41
Key reminder system does not operate. (All of other functions are OK.)	1. Front door switch (Driver side) check	BL-42
	2. All door switch check	BL-42
	3. Key switch check	BL-44
	4. Replace smart entrance control unit.	—

Smart Entrance Control Unit Power Supply and Ground Circuit Check

AIS005XF

1. CHECK FUSE AND FUSIBLE LINK

- Check 10A fuse [No. 26, located in the fuse block (J/B)].
- Check 40A fusible link (letter B, located in the fusible link and fuse box).

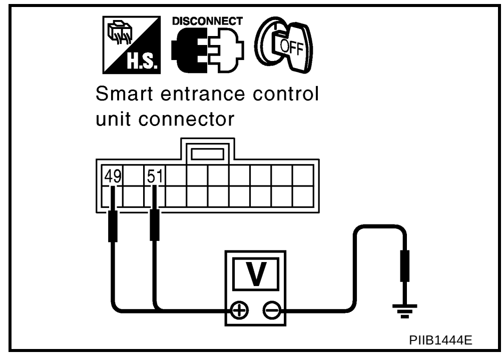
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check voltage between smart entrance control unit harness connector M92 terminal 49, 51 and ground.

49 (L/R) – Ground : Battery voltage
51 (W) – Ground : Battery voltage



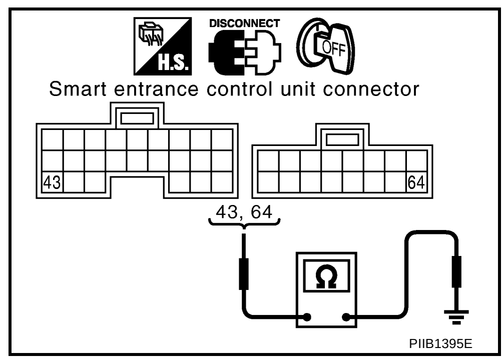
OK or NG

OK >> GO TO 3.
NG >> Check smart entrance control unit power supply circuit for open.

3. CHECK GROUND CIRCUIT

Check continuity between smart entrance control unit harness connector M91, M92 terminal 43, 64 and ground.

43 (B) – ground : Continuity should exit.
64 (B) – ground : Continuity should exit.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Repair or replace harness.

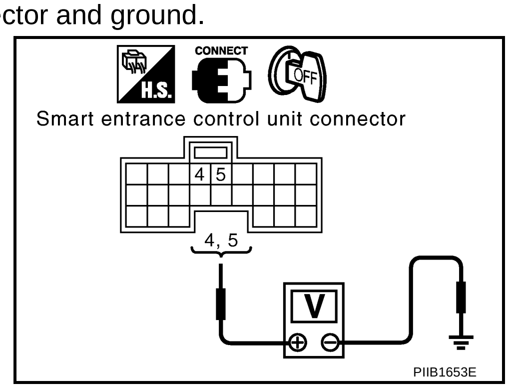
Power Window Main Switch (Door Lock/Unlock Switch) Check

AIS005XG

1. CHECK DOOR LOCK/UNLOCK SWITCH SIGNAL

Check continuity between smart entrance control unit harness connector and ground.

Connector	Terminals (Wire color) (+)	Terminals (Wire color) (-)	Condition of power window main switch (door lock/unlock switch)	Voltage (V) (Approx.)
M90	4 (PU)	Ground	Unlock	0
			Neutral / Lock	5
	5 (GY)		Lock	0
			Neutral / Unlock	5



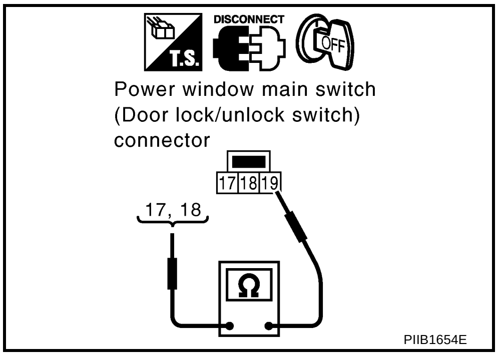
OK or NG

OK >> Power window main switch (door lock/unlock switch) circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR LOCK/UNLOCK SWITCH

1. Turn ignition switch OFF.
2. Disconnect power window main switch (door lock/unlock switch) connector.
3. Check continuity between power window main switch (door lock/unlock switch) terminals 17, 18 and 19.

Terminals		Condition of power window main switch (door lock/unlock switch)	Continuity
17	19	Lock	Yes
		Neutral / Unlock	No
18		Unlock	Yes
		Neutral / Lock	No



OK or NG

OK >> Check the following.

- Ground circuit for power window main switch (door lock/unlock switch)
- Harness for open or short between power window main switch (door lock/unlock switch) and smart entrance control unit connector

NG >> Replace power window main switch (door lock/unlock switch).

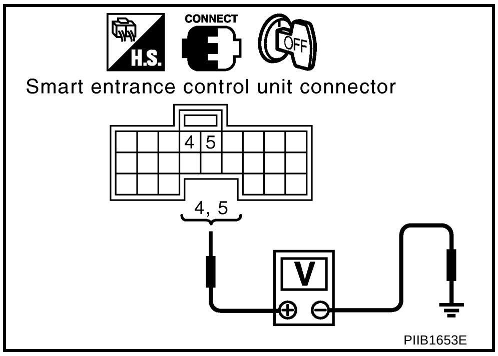
Door Lock/Unlock Switch (Passenger Side) Check

AIS0062S

1. CHECK DOOR LOCK/UNLOCK SWITCH SIGNAL

Check continuity between smart entrance control unit harness connector connector and ground.

Connector	Terminals (Wire color)		Condition of door lock/unlock switch (passenger side)	Voltage (V) (Approx.)
	(+)	(-)		
M90	4 (PU)	Ground	Unlock	0
			Neutral / Lock	5
	5 (GY)		Lock	0
			Neutral / Unlock	5



OK or NG

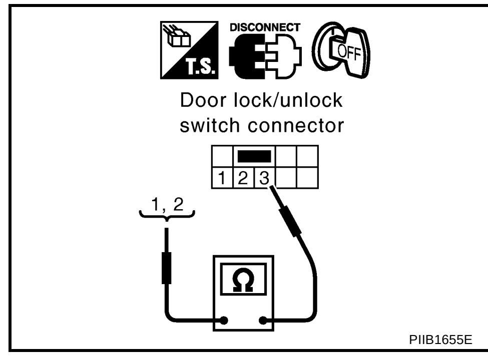
OK >> Door lock/unlock switch (passenger side) circuit is OK.

NG >> GO TO 2.

2. CHECK DOOR LOCK/UNLOCK SWITCH

1. Turn ignition switch OFF.
2. Disconnect door lock/unlock switch (passenger side) connector.
3. Check continuity between door lock/unlock switch (passenger side) terminals 1, 2 and 3.

Terminals		Condition of door lock/unlock switch (passenger side)	Continuity
1	3	Unlock	Yes
		Neutral / Lock	No
2		Lock	Yes
		Neutral / Unlock	No



OK or NG

OK >> Check the following.
- Ground circuit for door lock/unlock switch (passenger side)
- Harness for open or short between door lock/unlock switch (passenger side) and smart entrance control unit connector

NG >> Replace door lock/unlock switch (passenger side).

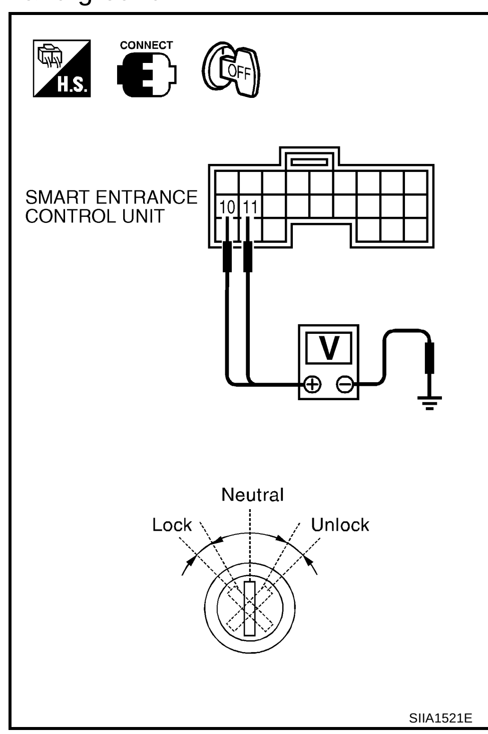
Door Key Cylinder Switch (Driver Side) Check

AIS005XH

1. CHECK DOOR KEY CYLINDER SWITCH SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminals (Wire color) (+)	Terminals (Wire color) (-)	Condition of door key cylinder switch (driver side)	Voltage (V) (Approx.)
M90	10 (GY/R)	Ground	Unlock	0
			Neutral / Lock	5
	11 (Y/PU)		Lock	0
			Neutral / Unlock	5



OK or NG

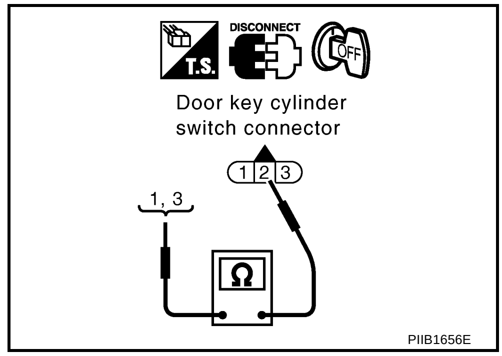
OK >> Door key cylinder switch (driver side) circuit is OK.

NG >> GO TO 2.

2. CHECK DOOR KEY CYLINDER SWITCH

1. Turn ignition switch OFF.
2. Disconnect door key cylinder switch (driver side) connector.
3. Check continuity between door key cylinder switch (driver side) terminals 1, 3 and 2.

Terminal		Condition of door key cylinder switch (driver side)	Continuity
1	2	Lock	Yes
		Neutral / Unlock	No
3		Unlock	Yes
		Neutral / Lock	No



OK or NG

OK >> Check the following.
- Door key cylinder switch (driver side) ground circuit
- Harness for open or short between time control unit and door key cylinder switch (driver side)

NG >> Replace door key cylinder switch (driver side).

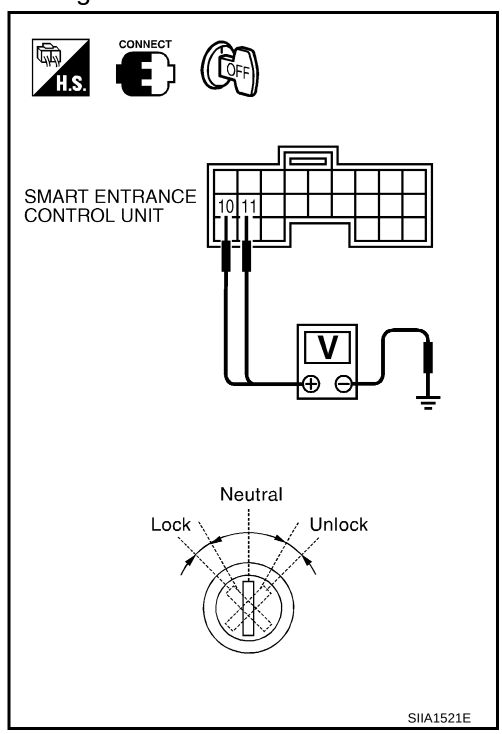
Door Key Cylinder Switch (Passenger Side) Circuit Check

AIS0062T

1. CHECK DOOR KEY CYLINDER SWITCH SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminals (Wire color)		Condition of door key cylinder switch (passenger side)	Voltage (V) (Approx.)
	(+)	(-)		
M90	10 (GY/R)	Ground	Unlock	0
			Neutral / Lock	5
	11 (Y/PU)		Lock	0
			Neutral / Unlock	5



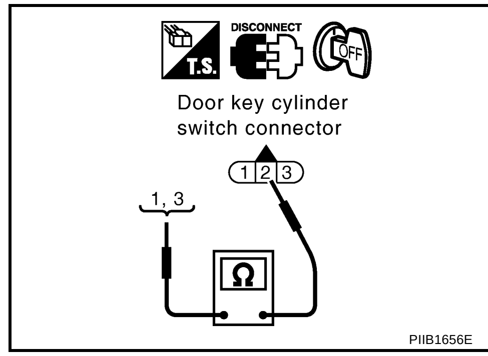
OK or NG

OK >> Door key cylinder switch (passenger side) circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR KEY CYLINDER SWITCH

1. Turn ignition switch OFF.
2. Disconnect door key cylinder switch (passenger side) connector.
3. Check continuity between door key cylinder switch (passenger side) terminals 1, 3 and 2.

Terminal		Condition of door key cylinder switch (passenger side)	Continuity
1	2	Unlock	Yes
		Neutral / Lock	No
3		Lock	Yes
		Neutral / Unlock	No



OK or NG

OK >> Check the following.
- Door key cylinder switch (passenger side) ground circuit
- Harness for open or short between time control unit and door key cylinder switch (passenger side)

NG >> Replace door key cylinder switch (passenger side).

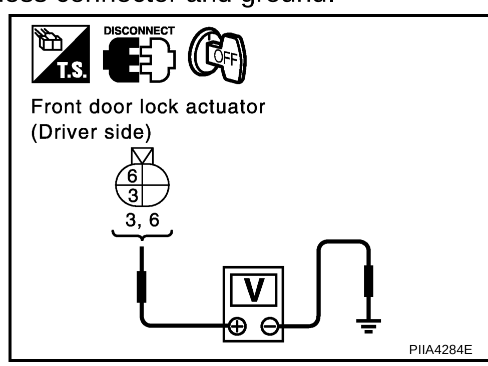
Front Door Lock Actuator (Driver Side) Check

AIS005XI

1. CHECK DOOR LOCK/UNLOCK SIGNAL

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (driver side) connector.
3. Check voltage between front door lock actuator (driver side) harness connector and ground.

Connector	Terminals (Wire color)		Condition of door lock/unlock switch	Voltage [V] (Approx.)
	(+)	(-)		
D9	3 (L)	Ground	Lock	Battery voltage
			Except above	0
	6 (G/R)		Unlock	Battery voltage
			Except above	0



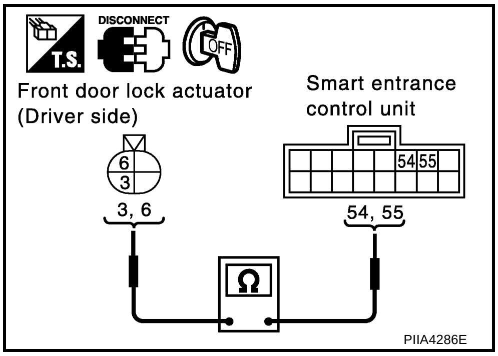
OK or NG

OK >> Replace front door lock actuator (driver side).
NG >> GO TO 2.

2. CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between front door lock actuator (driver side) harness connector D9 terminal 3, 6 and smart entrance control unit herness connector M92 terminal 54, 55.

3 (L) – 54 (R/B) : Continuity should exist.
6 (G/R) – 55 (G/Y) : Continuity should exist.



OK or NG

OK >> Check harness connection.
NG >> Repair or replace harness.

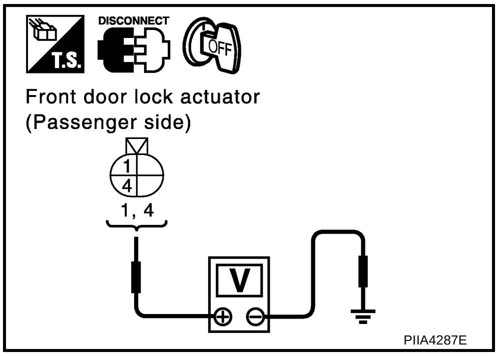
Front Door Lock Actuator (Passenger Side) Check

AIS005XJ

1. CHECK DOOR LOCK/UNLOCK SIGNAL

1. Turn ignition switch OFF.
2. Disconnect front door lock actuator (passenger side) connector.
3. Check voltage between front door lock actuator (passenger side) harness connector and ground.

Connector	Terminals (Wire color)		Condition of door lock/unlock switch	Voltage [V] (Approx.)
	(+)	(-)		
D17	4 (R/B)	Ground	Lock	Battery voltage
			Except above	0
	1 (G/R)		Unlock	Battery voltage
			Except above	0



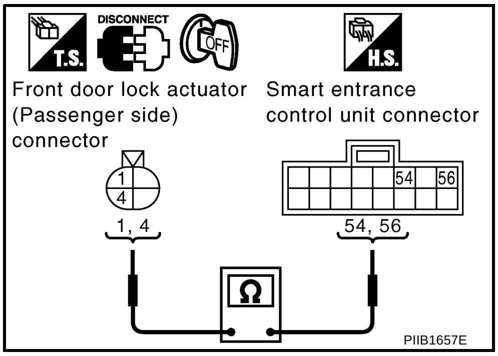
OK or NG

OK >> Replace front door lock actuator (passenger side).
NG >> GO TO 2.

2. CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between front door lock actuator (passenger side) harness connector D17 terminal 1, 4 and smart entrance control unit harness connector M92 terminal 54, 56.

4 (R/B) – 54 (R/B) : Continuity should exist.
1 (G/R) – 56 (G/R) : Continuity should exist.



OK or NG

OK >> Check harness connection.
NG >> Repair or replace harness.

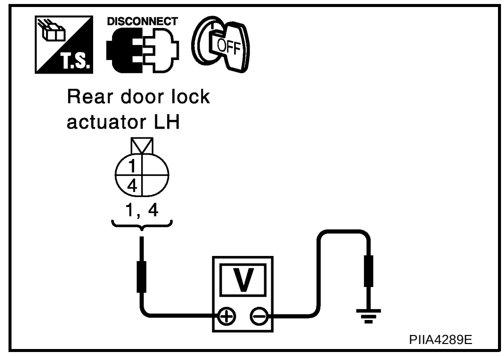
Rear Door Lock Actuator LH Check

AIS005XK

1. CHECK DOOR LOCK/UNLOCK SIGNAL

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator LH connector.
3. Check voltage between rear door lock actuator harness connector and ground.

Connector	Terminals (Wire color)		Condition of door lock/unlock switch	Voltage [V] (Approx.)
	(+)	(-)		
D36	4 (R/B)	Ground	Lock	Battery voltage
			Except above	0
	1 (G/R)		Unlock	Battery voltage
			Except above	0



PIIA4289E

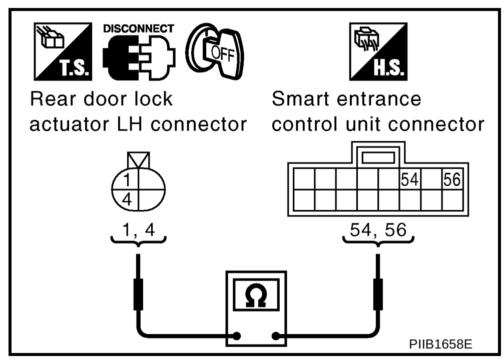
OK or NG

OK >> Replace rear door lock actuator LH.
NG >> GO TO 2.

2. CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between rear door lock actuator LH harness connector D36 terminal 1, 4 and smart entrance control unit harness connector M92 terminal 54, 56.

4 (R/B) – 54 (R/B) : Continuity should exist.
1 (G/R) – 56 (G/R) : Continuity should exist.



PIIB1658E

OK or NG

OK >> Check harness connection.
NG >> Repair or replace harness.

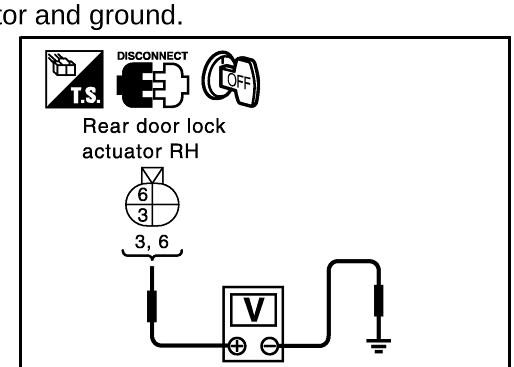
Rear Door Lock Actuator RH Check

AIS005XL

1. CHECK DOOR LOCK/UNLOCK SIGNAL

1. Turn ignition switch OFF.
2. Disconnect rear door lock actuator RH connector.
3. Check voltage between rear door lock actuator harness connector and ground.

Connector	Terminals (Wire color)		Condition of door lock/unlock switch	Voltage [V] (Approx.)
	(+)	(-)		
D26	3 (R/B)	Ground	Lock	Battery voltage
			Except above	0
	6 (G/R)		Unlock	Battery voltage
			Except above	0



PIIA4291E

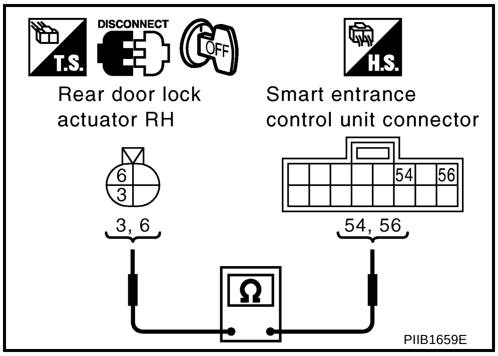
OK or NG

OK >> Replace rear door lock actuator RH.
NG >> GO TO 2.

2. CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between rear door lock actuator RH harness connector D26 terminal 3, 6 and smart entrance control unit harness connector M92 terminal 54, 56.

3 (R/B) – 54 (R/B) : Continuity should exist.
6 (G/R) – 56 (G/R) : Continuity should exist.



OK or NG

OK >> Check harness connection.
NG >> Check harness for open or short between smart entrance control unit and rear door lock actuator RH.

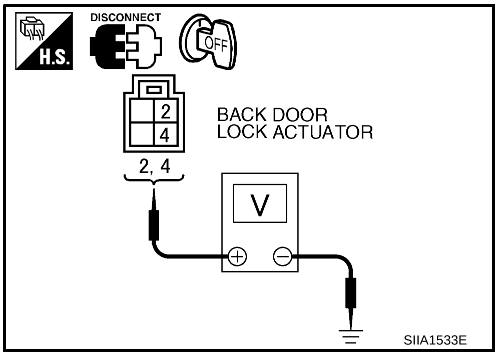
Back Door Lock Actuator Check

AIS005XM

1. CHECK DOOR LOCK/UNLOCK SIGNAL

1. Turn ignition switch OFF.
2. Disconnect back door lock actuator connector.
3. Check voltage between door lock actuator harness connector and ground.

Connector	Terminals (Wire color) (+)	Terminals (Wire color) (-)	Condition of door lock/unlock switch	Voltage [V] (Approx.)
D46	2 (R/B)	Ground	Lock	Battery voltage
			Except above	0
	4 (G/R)		Unlock	Battery voltage
			Except above	0



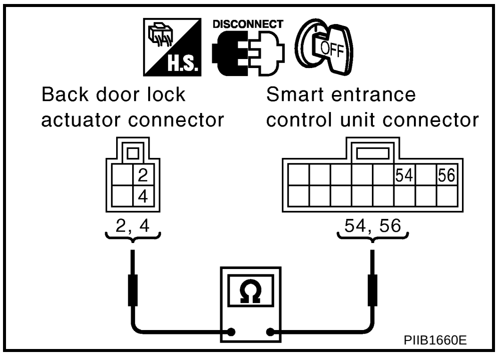
OK or NG

OK >> Replace back door lock actuator.
NG >> GO TO 2.

2. CHECK DOOR LOCK ACTUATOR CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between back door lock actuator harness connector D46 terminal 2, 4 and smart entrance control unit harness connector M92 terminal 54, 56.

2 (R/B) – 54 (R/B) : Continuity should exist.
4 (G/R) – 56 (G/R) : Continuity should exist.



OK or NG

OK >> Check harness connection.
NG >> Repair or replace harness.

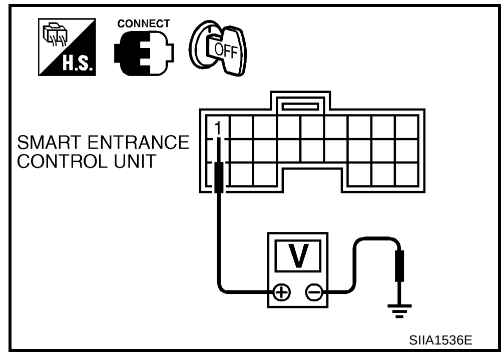
Front Door Switch (Driver Side) Check

AIS005XN

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminal (Wire color)		Condition of front door (driver side)	Voltage [V] (Approx.)
	(+)	(-)		
M90	1 (SB)	Ground	Close	5
			Open	0



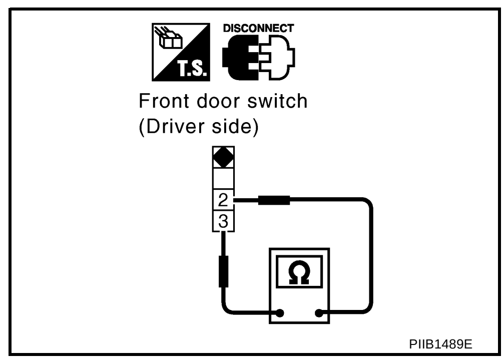
OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH

1. Disconnect front door switch (driver side) connector.
2. Check continuity of front door switch (driver side).

Terminal		Condition of front door switch (driver side)	Continuity
2	3	Pushed	No
		Released	Yes



OK or NG

OK >> Check the following.
- Front door switch (driver side) ground circuit or ground condition.
- Harness for open or short between smart entrance control unit and front door switch (driver side).

NG >> Replace front door switch (driver side).

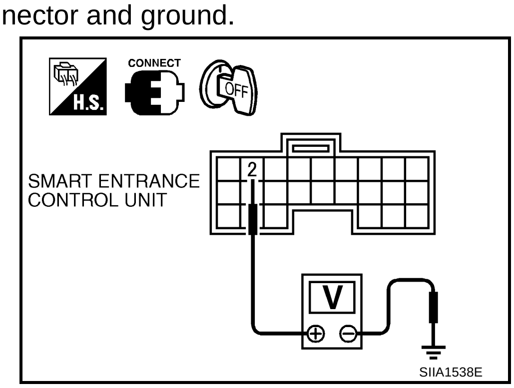
All Door Switch Check

AIS005XO

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminal (Wire color)		Condition of door	Voltage [V] (Approx.)
	(+)	(-)		
M90	2 (R/W)	Ground	Close	5
			Open	0



OK or NG

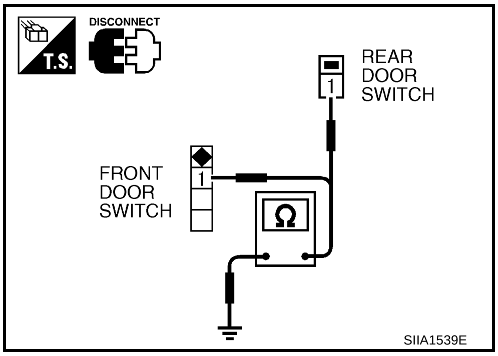
OK >> Door switch circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH

FRONT DOOR AND REAR DOOR

1. Disconnect door switch connector.
2. Check continuity between door switch terminal 1 and ground part of door switch.

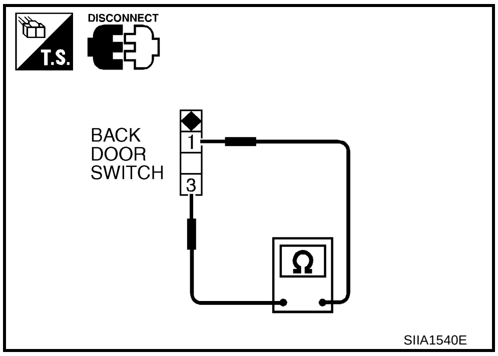
Terminal		Condition of door switch	Continuity
1	Ground part of door switch	Pushed	No
		Released	Yes



BACK DOOR

1. Disconnect door switch connector.
2. Check continuity of back door switch terminal 1 and 3.

Terminal		Condition of back door switch	Continuity
1	3	Pushed	No
		Released	Yes



OK or NG

OK >> Check the following.
- Door switch ground circuit or door switch ground condition
- Harness for open or short between smart entrance control unit and door switch

NG >> Replace door switch.

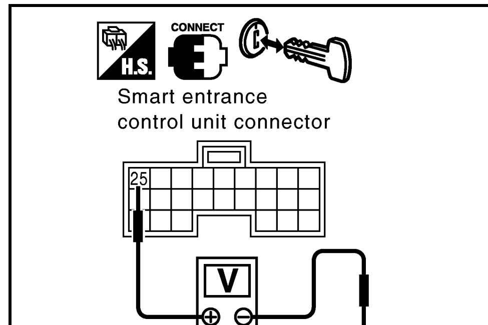
Key Switch Check

AIS005XP

1. CHECK KEY SWITCH INPUT SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminal (Wire color)		Condition of ignition key cylinder	Voltage [V] (Approx.)
	(+)	(-)		
M91	25 (W/L)	Ground	Key is inserted.	Battery voltage
			Key is removed.	0



PIIB1406E

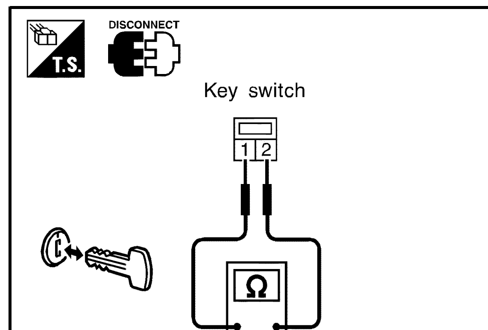
OK or NG

OK >> Key switch circuit is OK.
NG >> GO TO 2.

2. CHECK KEY SWITCH (INSERT)

1. Turn ignition switch OFF.
2. Disconnect key switch connector.
3. Check continuity between key switch terminals 1 and 2.

Terminals		Condition of ignition key cylinder	Continuity
1	2	Key is inserted	Yes
		Key is removed	No



SIIA1542E

OK or NG

OK >> Check the following.
- 10A fuse [No. 28, located in fuse block (J/B)]
- Harness for open or short between key switch and fuse
- Harness for open or short between smart entrance control unit and key switch

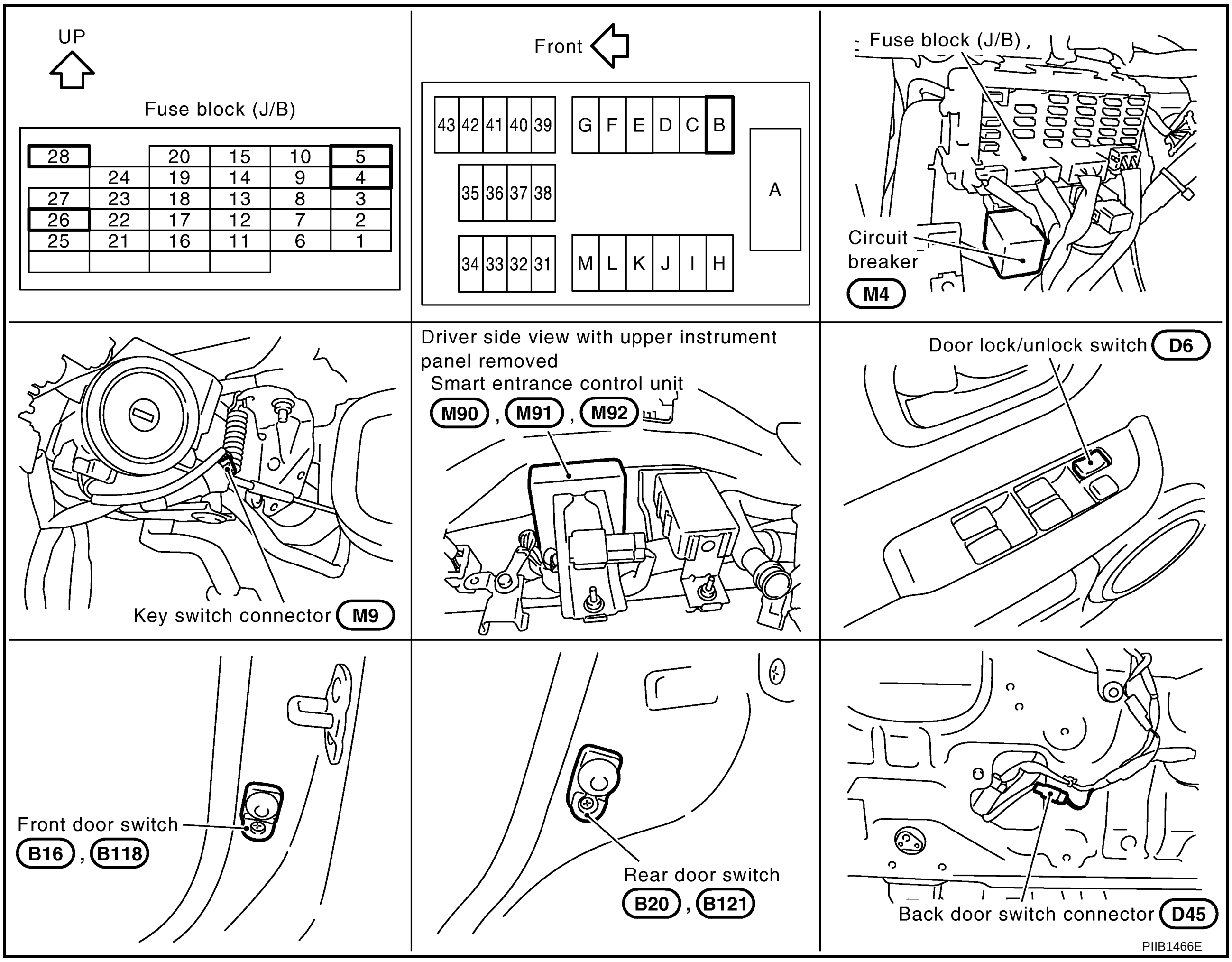
NG >> Replace key switch.

MULTI-REMOTE CONTROL SYSTEM

PFP:28596

Component Parts and Harness Connector Location

AIS005XQ



System Description

AIS005XR

INPUTS

Power is supplied at all times

- to key switch terminal 1
- through 10A fuse [No.28 located in the fuse block (J/B)].

When the key switch is ON (Ignition key is inserted in key cylinder), power is supplied

- to smart entrance control unit terminal 25
- through key switch terminal 2.

When the front door switch driver side is ON (door is open), ground supplied

- to smart entrance control unit terminal 1
- through door switch driver side terminal 2
- to door switch driver side terminal 3
- through body grounds B8 and B18.

When the any door switches (except back door) are ON (door is open), ground is supplied

- to smart entrance control unit terminal 2
- through each door switch terminal 1
- from each door switch case ground.

When the back door is ON (back door is open), ground is supplied

- to smart entrance control unit terminal 2
- through back door switch terminal 1 and 3

- from body ground D53.

When power window main switch (door lock/unlock switch) is LOCK, ground supplied

- to smart entrance control unit terminal 5
- through power window main switch (door lock/unlock switch) terminal 18
- through power window main switch (door lock/unlock switch) terminal 19
- through body grounds M27 and M70.

When power window main switch (door lock/unlock switch) is UNLOCK, ground supplied

- to smart entrance control unit terminal 4
- through power window main switch (door lock/unlock switch) terminal 17
- through power window main switch (door lock/unlock switch) terminal 19
- through body grounds M27 and M70.

When door lock/unlock switch (passenger side) is LOCK, ground supplied

- to smart entrance control unit terminal 5
- through door lock/unlock switch (passenger side) terminal 2
- through door lock/unlock switch (passenger side) terminal 3
- through body grounds M27 and M70.

When door lock/unlock switch (passenger side) is UNLOCK, ground supplied

- to smart entrance control unit terminal 4
- through door lock/unlock switch (passenger side) terminal 1
- through door lock/unlock switch (passenger side) terminal 3
- through body grounds M27 and M70.

Key fob signal is inputted to smart entrance control unit (The antenna of the system is combined with smart entrance control unit).

The multi-remote control system controls operation of the

- power door lock
- hazard and horn reminder
- interior room lamp
- panic alarm

OPERATED PROCEDURE

Power Door Lock Operation

When the following input signals are both supplied:

- key switch OFF (when ignition key is not inserted in key cylinder)
- door switch OFF (when all the doors are closed);

Smart entrance control unit receives a LOCK signal from key fob. Smart entrance control unit locks all doors with input of LOCK signal from key fob.
When an UNLOCK signal is sent from key fob once, driver's door will be unlocked.
Then, if an UNLOCK signal is sent from key fob again within 5 seconds, all other door will be unlocked.

Hazard and Horn Reminder

Power is supplied at all time

- to horn relay terminal 2
- through 10A fuse [No. 34, located in the fuse and fusible link box]

When smart entrance control unit receives LOCK or UNLOCK signal from key fob with all doors closed, ground supplied

- to horn relay terminal 1
- through smart entrance control unit terminal 42

Horn relay are now energized, and hazard warning lamp flashes and horn sounds as a reminder.
The hazard and horn reminder has C mode (horn chirp mode) and S mode (non-horn chirp mode).

Operating function of hazard and horn reminder

	C mode		S mode	
	Hazard warning lamp flash	Horn sound	Hazard warning lamp flash	Horn sound
Lock	Twice	Once	Twice	—
Unlock	Once	—	—	—

Interior Room Lamp Operation

When the following input signals are all supplied:

- door switch OFF (when all the doors are closed);
- driver's door LOCKED (with key fob);
- key switch OFF (when ignition key is not inserted in key cylinder).

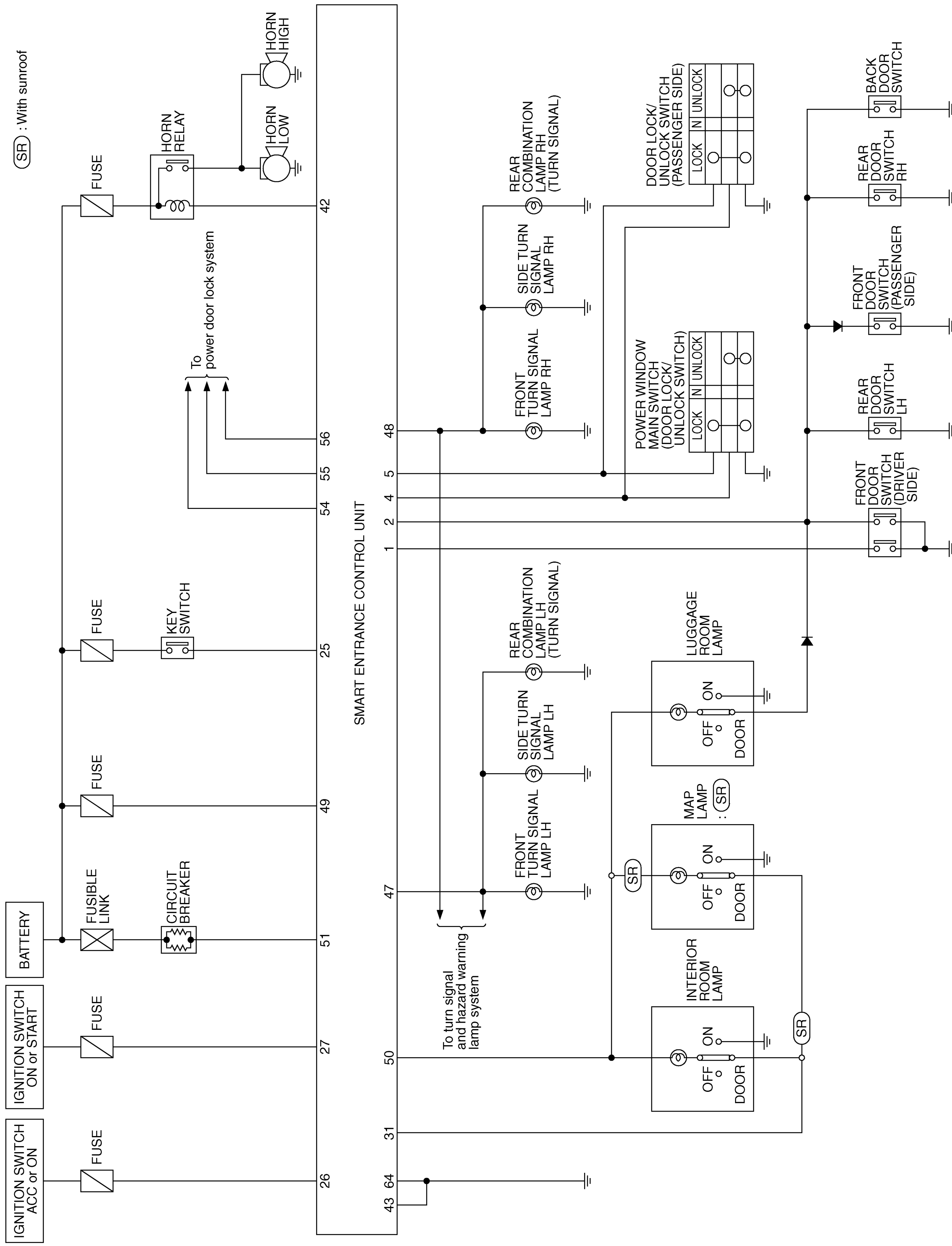
multi-remote control system turns on interior room lamp (for 30 seconds) with input of UNLOCK signal from remote controller.
For detailed description, refer to LT-43, "INTERIOR ROOM LAMP" .

Panic Alarm Operation

When key switch is OFF (when ignition key is not inserted in key cylinder), multi-remote control system turns on and OFF horn intermittently with input of PANIC ALARM signal from key fob.
The alarm automatically turns off after 25 seconds or when smart entrance control unit receives any signal from key fob.
For detailed description, refer to BL-76, "VEHICLE SECURITY (THEFT WARNING) SYSTEM"

Schematic

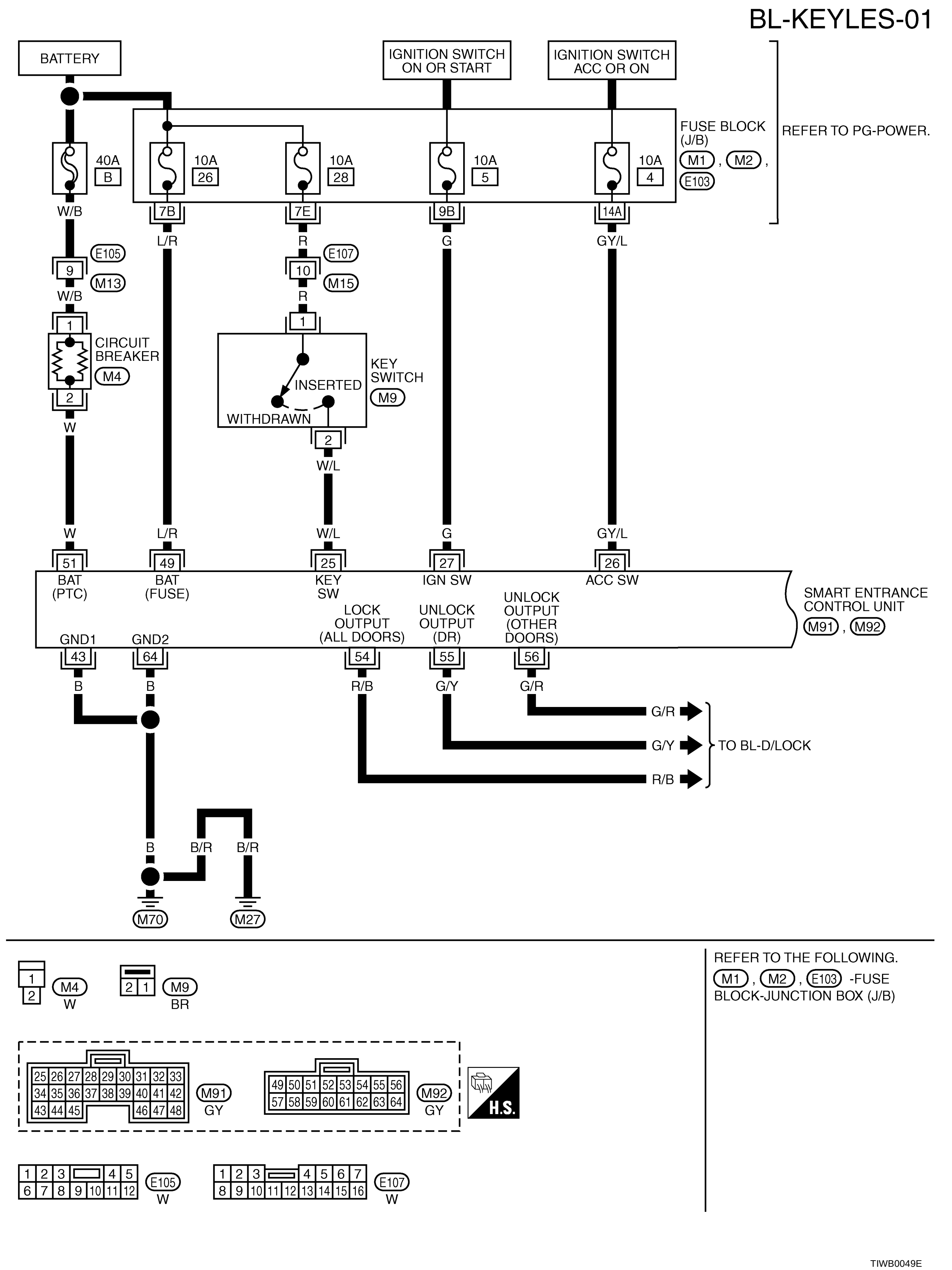
AIS005XS



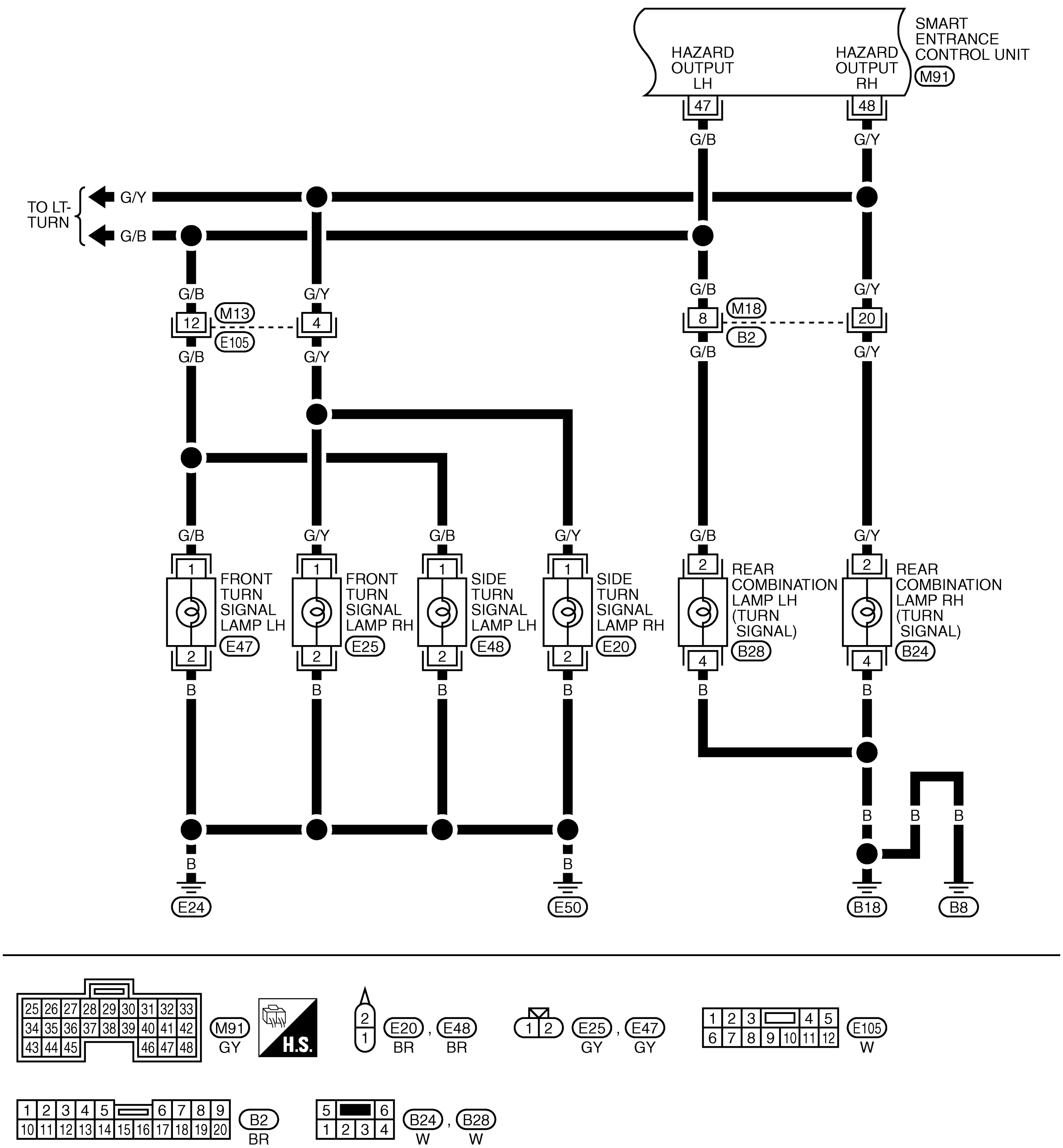
TIWB0048E

Wiring Diagram — MULTI —

AIS005XT

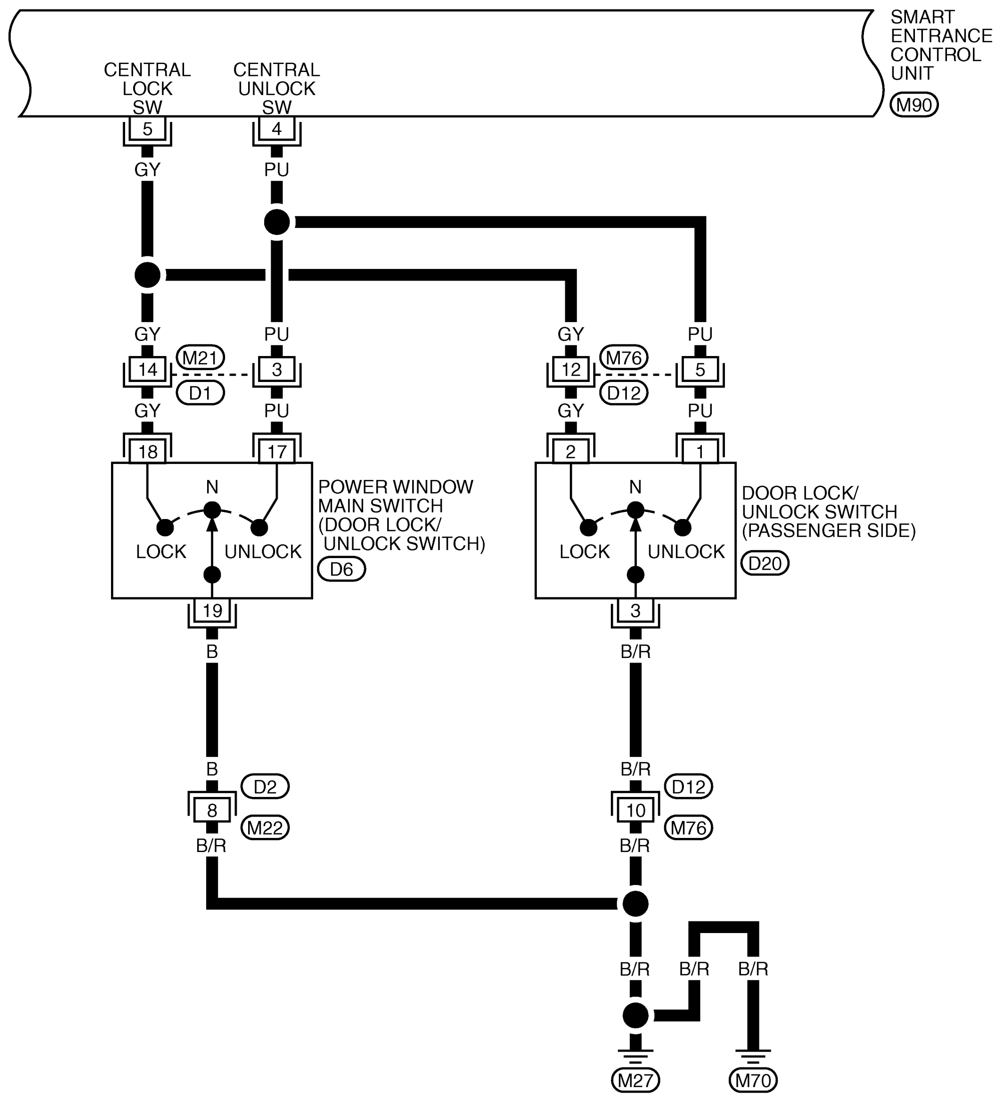


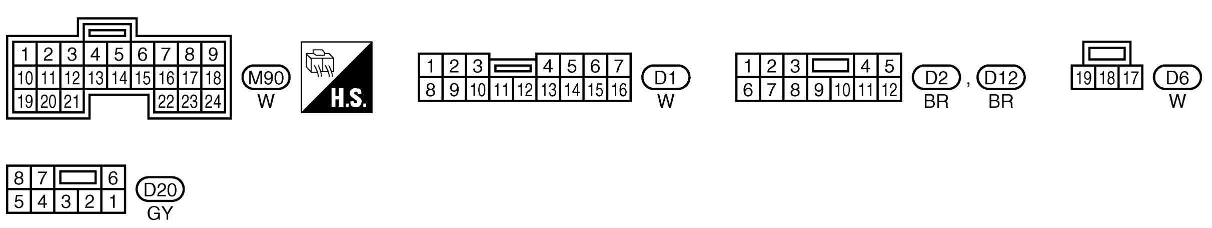
BL-KEYLES-02



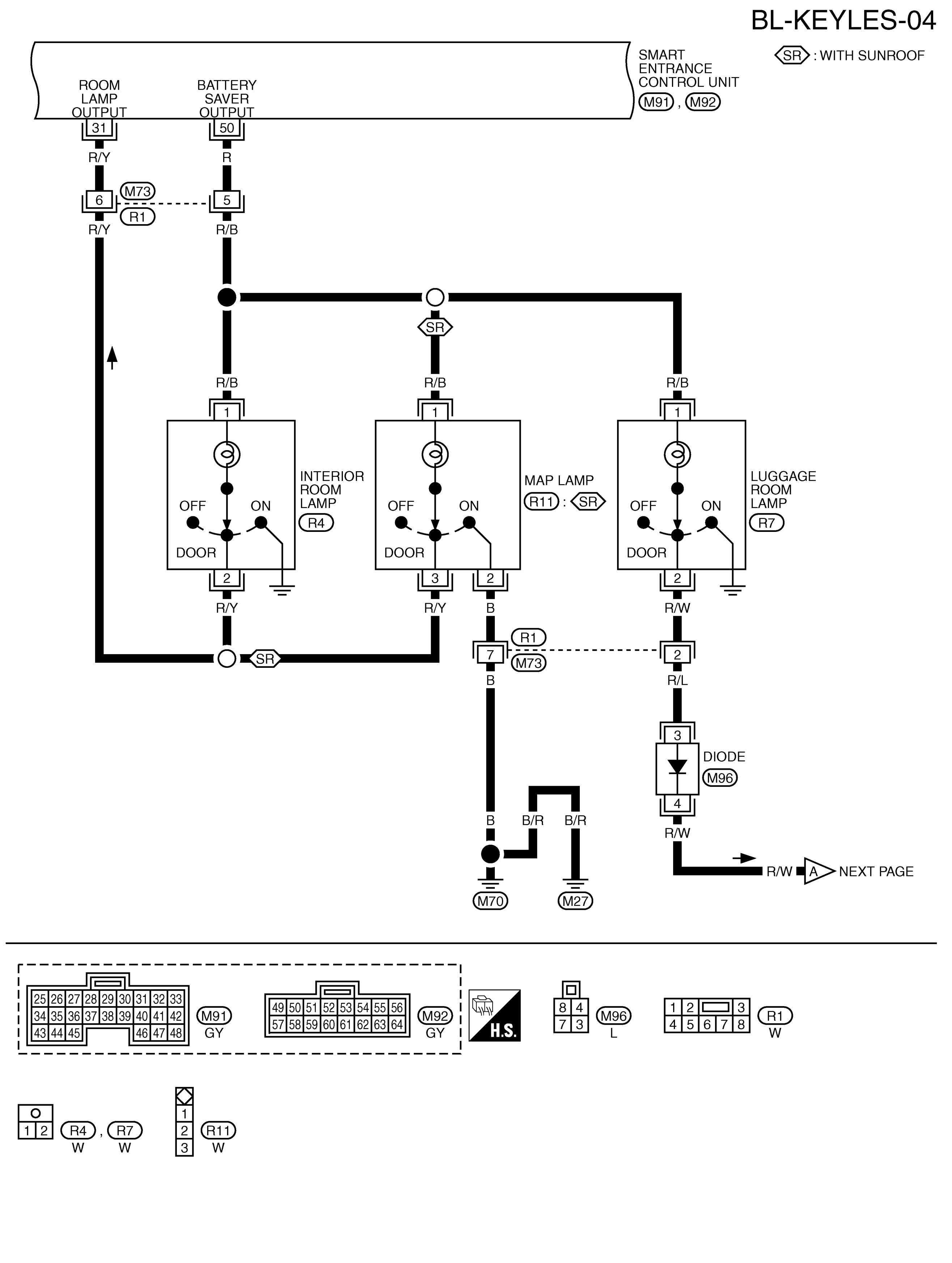
SMART ENTRANCE CONTROL UNIT
M91
HAZARD OUTPUT LH
HAZARD OUTPUT RH
47
48
G/B
G/Y
TO LT-TURN
G/Y
G/B
M13
E105
12
4
M18
B2
8
20
FRONT TURN SIGNAL LAMP LH
E47
FRONT TURN SIGNAL LAMP RH
E25
SIDE TURN SIGNAL LAMP LH
E48
SIDE TURN SIGNAL LAMP RH
E20
REAR COMBINATION LAMP LH (TURN SIGNAL)
B28
REAR COMBINATION LAMP RH (TURN SIGNAL)
B24
B
E24
E50
B18
B8
M91
GY
H.S.
E20, E48
BR BR
E25, E47
GY GY
E105
W
B2
BR
B24, B28
W W
TIWB0050E

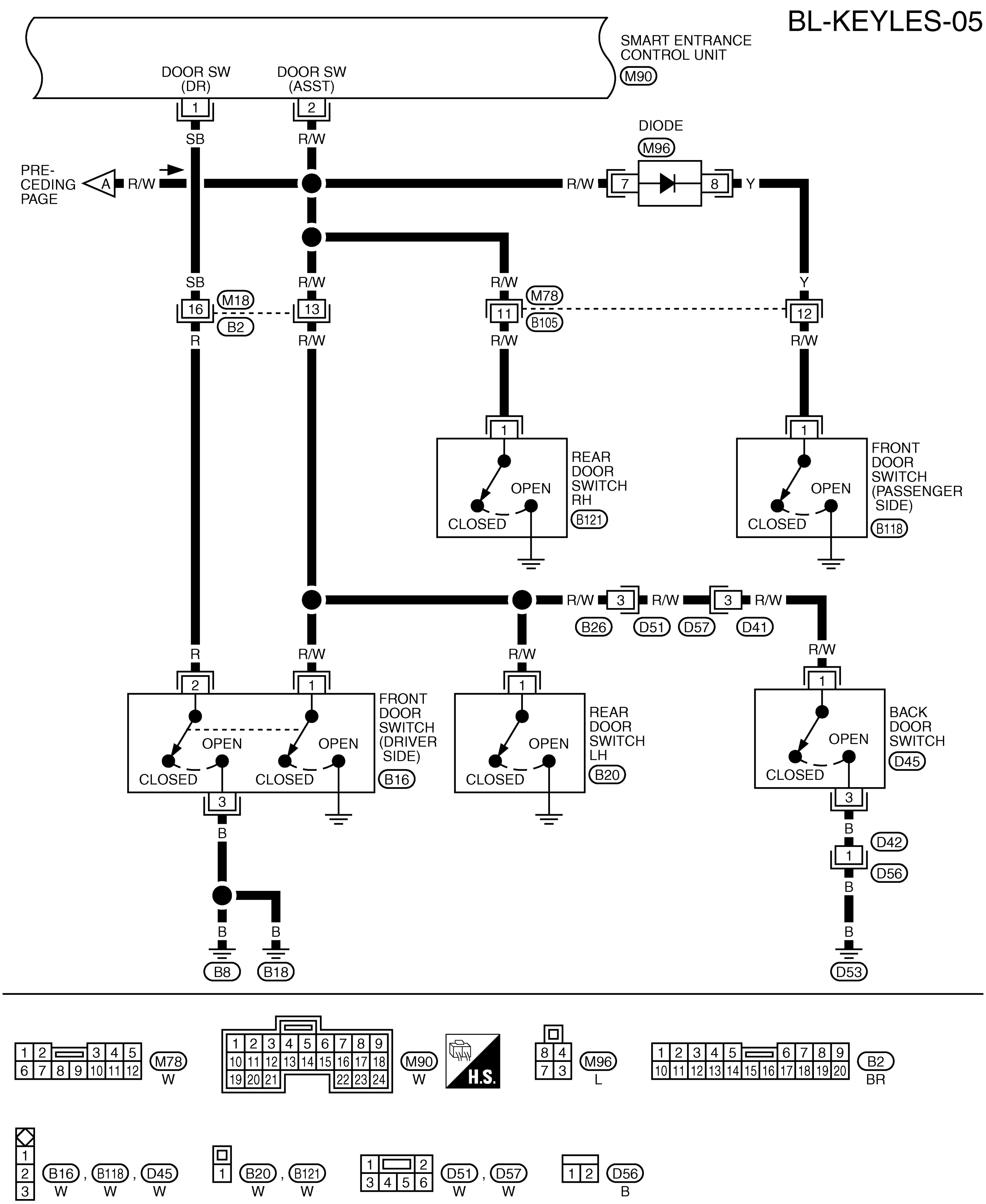
BL-KEYLES-03



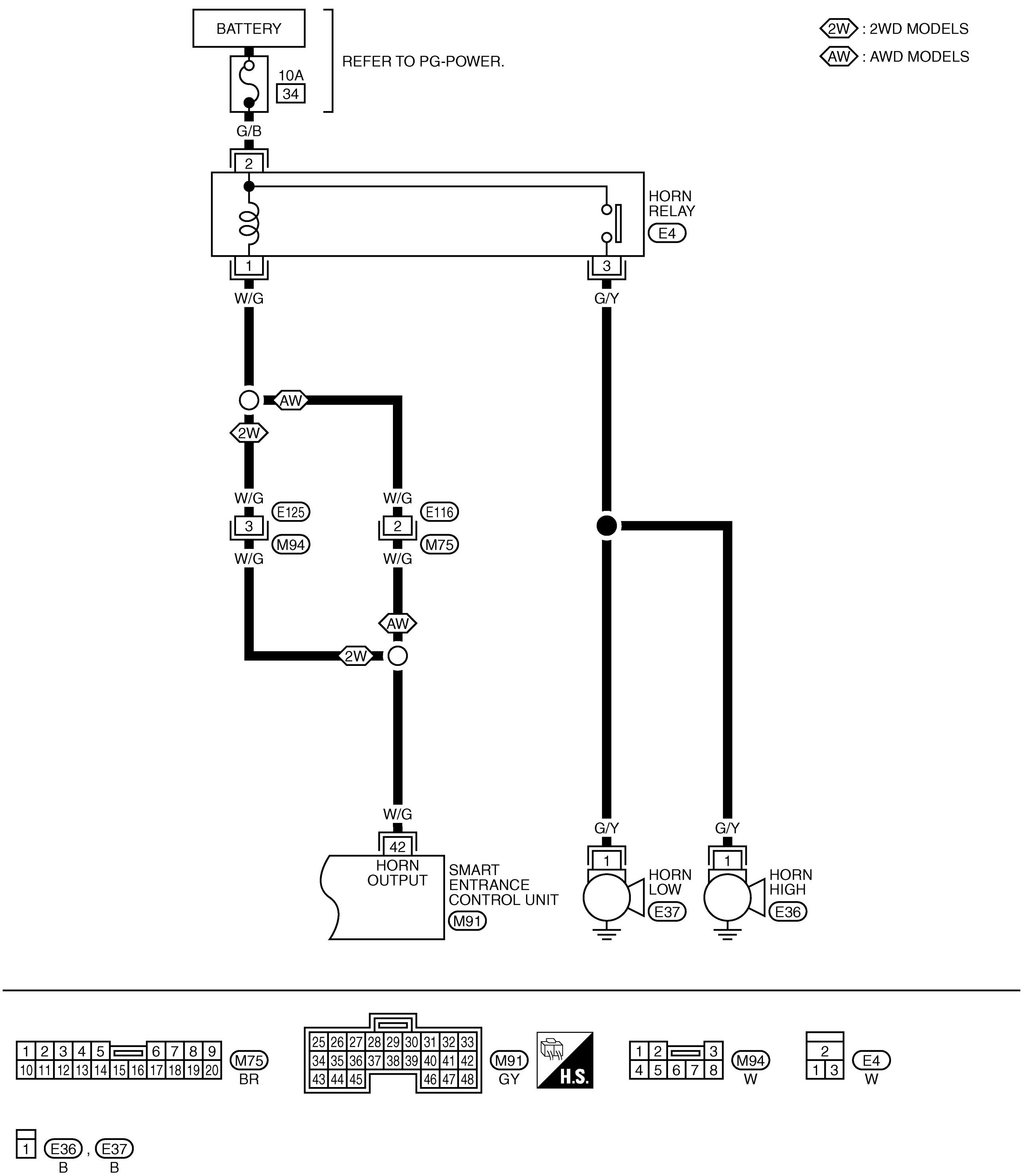


TIWB0051E


BL-KEYLES-04
SMART ENTRANCE CONTROL UNIT
M91 , M92
SR : WITH SUNROOF
ROOM LAMP OUTPUT
BATTERY SAVER OUTPUT
31
50
R/Y
R
M73
R1
6
5
R/B
SR
1
INTERIOR ROOM LAMP
R4
MAP LAMP
R11 : SR
LUGGAGE ROOM LAMP
R7
OFF
ON
DOOR
2
3
R/W
B
7
R/L
DIODE
M96
4
B/R
M70
M27
R/W
A
NEXT PAGE
25 26 27 28 29 30 31 32 33
34 35 36 37 38 39 40 41 42
43 44 45 46 47 48
GY
49 50 51 52 53 54 55 56
57 58 59 60 61 62 63 64
H.S.
8 4
7 3
L
1 2 3
4 5 6 7 8
W
TIWB0052E


BL-KEYLES-05
SMART ENTRANCE CONTROL UNIT
M90
DOOR SW (DR)
DOOR SW (ASST)
PRE-CEDING PAGE
DIODE
M96
REAR DOOR SWITCH RH
B121
FRONT DOOR SWITCH (PASSENGER SIDE)
B118
OPEN
CLOSED
FRONT DOOR SWITCH (DRIVER SIDE)
B16
REAR DOOR SWITCH LH
B20
BACK DOOR SWITCH
D45
M18
B2
M78
B105
B26
D51
D57
D41
D42
D56
B8
B18
D53
H.S.
TIWB0053E

BL-KEYLES-06



TIWB0054E

Terminal and Reference Value for Smart Entrance Control Unit

AIS005XU

Terminal	Wire color	Item	Condition	Voltage [V] (Approx.)
1	SB	Driver door switch	OFF (CLOSED) → ON (OPEN)	5 → 0
2	R/W	All door switch	OFF (CLOSED) → ON (OPEN)	5 → 0
4	PU	Door lock/unlock switch (UNLOCK)	Neutral → Unlock	5 → 0
5	GY	Door lock/unlock switch (LOCK)	Neutral → Lock	5 → 0
25	W/L	Ignition key switch (Insert)	Key inserted → Key removed from ignition key cylinder	Battery voltage → 0
26	GY/L	Ignition switch (ACC)	Ignition key is in (ACC or ON position)	Battery voltage
27	G	Ignition switch (ON)	Ignition key is in (ON or START position)	Battery voltage
31	R/Y	Interior room lamp	When doors are locked using remote controller (Lamp switch in “DOOR” position)	Battery voltage
42	W/G	Horn relay	When panic alarm is operated using remote controller (ON → OFF)	0 → Battery voltage
43	B	Ground	—	0
47	G/B	Hazard reminder (Turn signal lamp LH)	When door lock or unlock operated using remote controller (ON → OFF)	0 → Battery voltage
48	G/Y	Hazard reminder (Turn signal lamp RH)	When door lock or unlock operated using remote controller (ON → OFF)	0 → Battery voltage
49	L/R	Power source (Fuse)	—	Battery voltage
50	R	Battery saver (Interior room lamp)	Battery saver dose operate → does not operate (ON → OFF)	Battery voltage → 0
51	W	Power source (PTC)	—	Battery voltage
54	R/B	All door lock actuator (Lock)	Door lock/unlock switch (Neutral → Lock)	0 → Battery voltage → 0
55	G/Y	Driver door lock actuator (Unlock)	Door lock/unlock switch (Neutral →Unlock)	0 → Battery voltage → 0
56	G/R	Other door lock actuators (Unlock)	Door lock/unlock switch (Neutral → Unlock)	0 → Battery voltage → 0
64	B	Ground	—	0

Symptom Chart

AIS005XV

NOTE:

- Always check remote controller battery before replacing remote controller.
- The panic alarm operation and the interior room lamp operation of multi-remote control system do not activate with the ignition key inserted in the key cylinder.

Symptom	Diagnosis/service procedure	Reference page
All function of multi-remote control system do not operate.	1. Remote controller battery check	BL-57
	2. Power supply and ground circuit check	BL-57
	3. If above systems are OK, replace smart entrance control unit.	—
The new ID of key fob cannot be entered.	1. Key fob battery check	BL-57
	2. Key switch circuit check	BL-60
	3. Front door switch (Driver side) circuit check	BL-59
	4. All door switch circuit check	BL-59
	5. ACC switch circuit check	BL-57
	6. Door lock/unlock switch circuit check	BL-34
	7. Power supply and ground circuit check	BL-33
	8. If above systems are OK, replace smart entrance control unit.	—
Door lock or unlock does not function.	1. If the power door lock system does not operate manually, check power door lock system.	BL-23
	2. Key switch circuit check	BL-60
	3. Front door switch (Driver side) circuit check	BL-59
	4. All door switch circuit check	BL-59
	5. Key fob battery check	BL-57
	6. If above systems are OK, replace smart entrance control unit.	—
Hazard and horn reminder does not activate properly when pressing lock or unlock button of key fob.	1.Key fob battery check	BL-57
	2. Hazard reminder check	BL-61
	3.Horn reminder check (Horn chirp can be activated or deactivated.) **NOTE:** First check the horn chirp setting. Refer to BL-46, "Hazard and Horn Reminder"	BL-62
	4. Front door switch (Driver side) circuit check	BL-59
	5. All door switch circuit check	BL-59
	6. If above systems are OK, replace smart entrance control unit.	—
Interior room lamp operation does not activate properly.	1. Interior room lamp operation check	BL-62
	2. Front door switch (Driver side) circuit check	BL-59
	3. All door switch circuit check	BL-59
	4. Key switch circuit check	BL-60
	5. If above systems are OK, replace smart entrance control unit.	—
Panic alarm operation does not activate when panic alarm button is continuously pressed. (Horn reminder is OK.)	1. Key fob battery check	BL-57
	2. Key switch circuit check	BL-60
	3. If above systems are OK, replace smart entrance control unit.	—

Remote Controller Battery Check

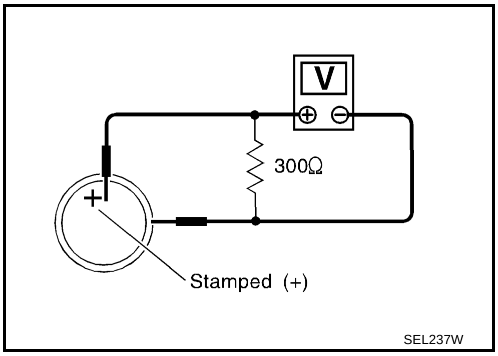
AIS005XW

1. CHECK KEY FOB BATTERY

Remove battery and measure voltage across battery positive and negative terminals, (+) and (–).

Voltage : 2.5V – 3.0V

NOTE:
Key fob does not function if battery is not set correctly.



SEL237W

OK or NG

OK >> Check the following.
- Key fob battery terminals for corrosion or damage
- Further inspection is necessary. Refer to BL-56, "Symptom Chart" .

NG >> Replace battery. Refer to BL-64, "Key Fob Battery Replacement" .

ACC Switch Circuit Check

AIS005XX

1. CHECK FUSE

- Check 10A fuse [No. 4, located in the fuse block (J/B)].

NOTE:
Refer to BL-45, "Component Parts and Harness Connector Location"

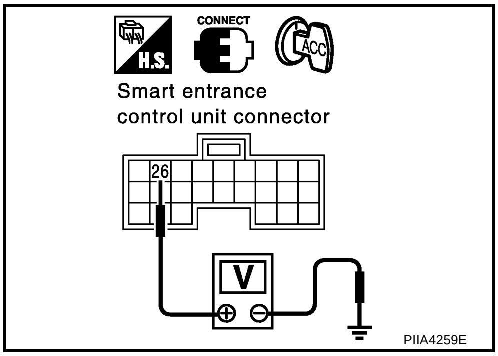
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK ACC SWITCH

Check voltage between smart entrance control unit connector and ground.

Connector	Terminal (Wire color)		Condition of ignition switch	Voltage [V] (Approx.)
	(+)	(–)		
M91	26 (GY/L)	Ground	ACC or ON	Battery voltage
			OFF	0



PIIA4259E

OK or NG

OK >> ACC switch circuit is OK.
NG >> Check harness for open between smart entrance control unit and fuse.

Power Supply and Ground Circuit Check

AIS005XY

1. CHECK FUSE AND FUSIBLE LINK

- Check 40A fusible link (letter **B** , located in the fuse and fusible link box).
- Check 10A fuse [No. 5, located in the fuse block (J/B)].
- Check 10A fuse [No. 26, located in the fuse block (J/B)].

NOTE:
Refer to BL-45, "Component Parts and Harness Connector Location"

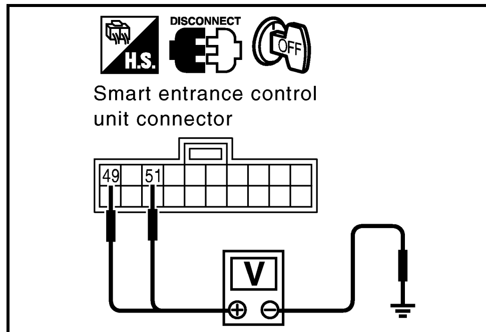
OK or NG

OK >> GO TO 2.
NG >> if fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK POWER SUPPLY CIRCUIT FOR SMART ENTRANCE CONTROL UNIT

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check voltage between smart entrance control unit harness connector M92 terminal 49, 51 and ground.

49 (L/R) – Ground : Battery voltage
51 (W) – Ground : Battery voltage



PIIB1444E

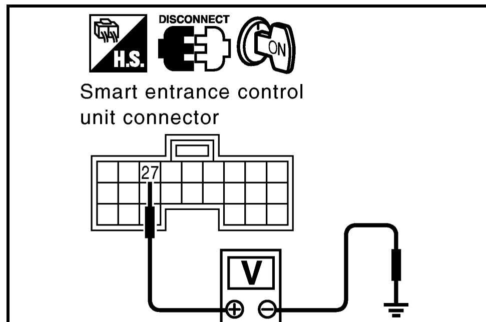
OK or NG

OK >> GO TO 3.
NG >> Check the following.
- Circuit breaker
- Harness for open between smart entrance control unit and fuse

3. CHECK IGNITION SWITCH ON CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between smart entrance control unit harness connector M91 terminal 27 and ground.

27 (G) – Ground : Battery voltage



PIIB1445E

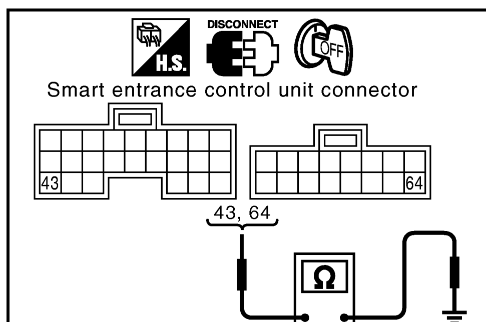
OK or NG

OK >> GO TO 4.
NG >> Check harness for open between smart entrance control unit and fuse.

4. CHECK GROUND CIRCUIT FOR SMART ENTRANCE CONTROL UNIT

1. Turn ignition switch OFF.
2. Check continuity between smart entrance control unit harness connector M91, M92 terminal 43, 64 and ground.

43 (B) – Ground : Continuity should exist.
64 (B) – Ground : Continuity should exist.



PIIB1395E

OK or NG

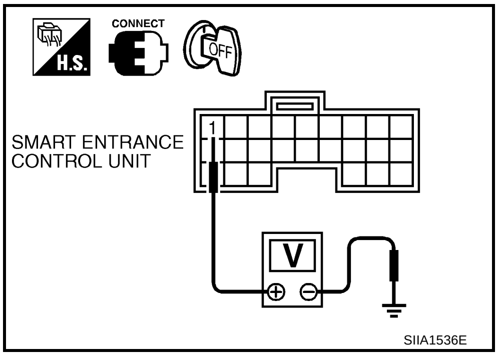
OK >> Power supply and ground circuits are OK.
NG >> Repair or replace harness.

Front Door Switch (Driver Side) Circuit Check

AIS005XZ

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector and ground.



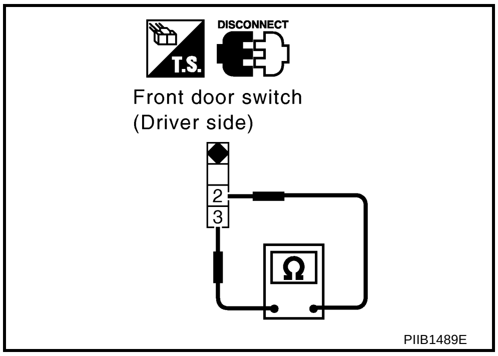
Connector	Terminal (Wire color)		Condition of front door (driver side)	Voltage [V] (Approx.)
	(+)	(–)		
M90	1 (SB)	Ground	Close	5
			Open	0

OK or NG

OK >> Door switch circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH

1. Disconnect front door switch (driver side) connector.
2. Check continuity of front door switch (driver side).



Terminal		Condition of front door switch (driver side)	Continuity
2	3	Pushed	No
		Released	Yes

OK or NG

OK >> Check the following.
- Front door switch (driver side) ground circuit
- Harness for open or short between smart entrance control unit and front door switch (driver side)

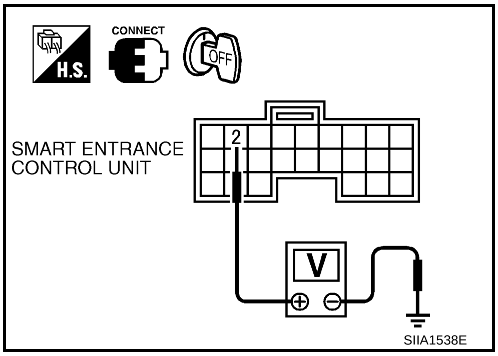
NG >> Replace front door switch (driver side).

All Door Switch Circuit Check

AIS005Y0

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector and ground.



Connector	Terminal (Wire color)		Condition of door	Voltage [V] (Approx.)
	(+)	(-)		
M90	2 (R/W)	Ground	Close	5
			Open	0

OK or NG

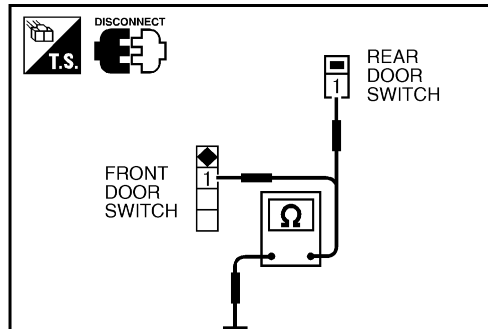
OK >> Door switch circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH

Front door and rear door

1. Disconnect door switch connector.
2. Check continuity between door switch terminal 1 and ground part of door switch.

Terminal		Condition of door switch	Continuity
1	Ground part of door switch	Pushed	No
		Released	Yes

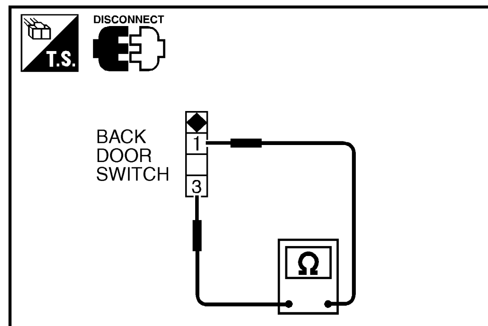


SIIA1539E

Back door

1. Disconnect door switch connector.
2. Check continuity of back door switch terminal 1 and 3.

Terminal		Condition of back door switch	Continuity
1	3	Pushed	No
		Released	Yes



SIIA1540E

OK or NG

OK >> Check the following.
- Door switch ground circuit or door switch ground condition
- Harness for open or short between smart entrance control unit and door switch

NG >> Replace door switch.

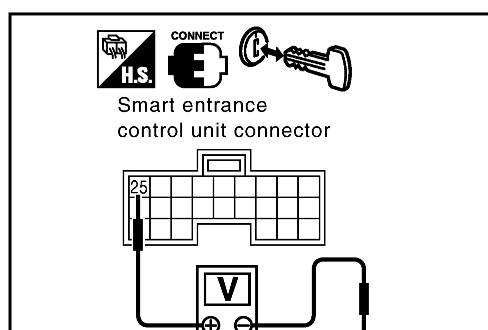
Key Switch Circuit Check

AIS005Y1

1. CHECK KEY SWITCH INPUT SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminal (Wire color)		Condition of ignition key cylinder	Voltage [V] (Approx.)
	(+)	(-)		
M91	25 (W/L)	Ground	Key is inserted.	Battery voltage
			Key is removed.	0



PIIB1406E

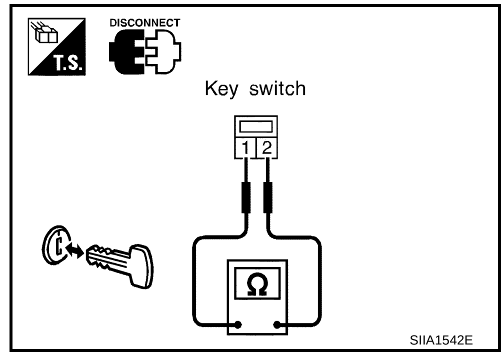
OK or NG

OK >> Key switch circuit is OK.
NG >> GO TO 2.

2. CHECK KEY SWITCH (INSERT)

1. Turn ignition switch OFF.
2. Disconnect key switch connector.
3. Check continuity between key switch terminals 1 and 2.

Terminals		Condition of ignition key cylinder	Continuity
1	2	Key is inserted	Yes
		Key is removed	No



OK or NG

OK >> Check the following.
- 10A fuse [No. 28, located in fuse block (J/B)]
- Harness for open or short between key switch and fuse
- Harness for open or short between smart entrance control unit and key switch

NG >> Replace key switch.

Hazard Reminder Check

AIS005Y2

1. CHECK HAZARD WARNING LAMP

Does hazard warning lamp flash with hazard switch?

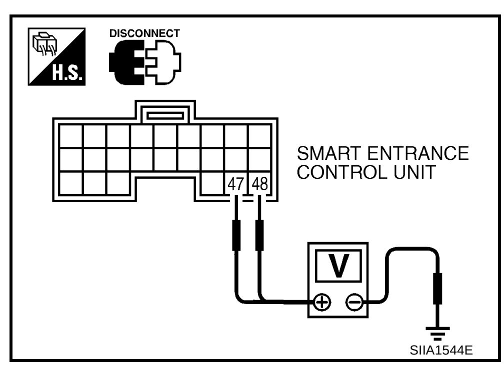
YES or NO

YES >> GO TO 2.

NO >> Check hazard warning lamp circuit. Refer to LT-17, "TURN SIGNAL AND HAZARD WARNING LAMPS" .

2. CHECK HAZARD REMINDER OPERATION

1. Remove key from ignition key cylinder.
2. Check voltage between smart entrance control unit harness connector and ground.



Connector	Terminals (Wire color)		Condition of key fob	Voltage [V] (Approx.)
	(+)	(–)		
M91	47 (G/B)	Ground	Lock button is pressed.	0→Battery voltage→0
			Unlock button is pressed.	0→Battery voltage→ 0→Battery voltage→0
	48 (G/Y)		Lock button is pressed.	0→Battery voltage→0
			Unlock button is pressed.	0→Battery voltage→ 0→Battery voltage→0

OK or NG

OK >> Check harness for open or short between smart entrance control unit and hazard switch.

NG >> Replace smart entrance control unit.

Horn Reminder Check

AIS005Y3

1. CHECK HORN

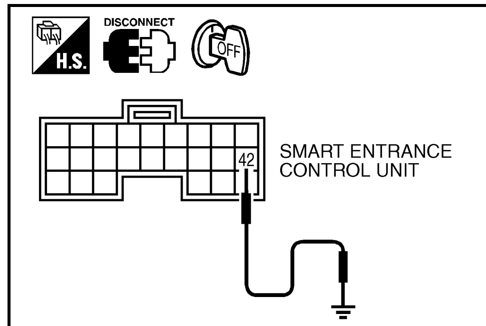
Does horn sound with horn switch?

YES or NO

YES >> GO TO 2.
NO >> Check horn circuit. Refer to WW-18, "HORN" .

2. CHECK HORN REMINDER OPERATION

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Apply ground to smart entrance control unit harness connector M91 terminal 42(W/G).



SIIA1545E

Does horn operate?

YES >> Replace smart entrance control unit.
NO >> Check harness for open between horn relay and smart entrance control unit.

Interior Room Lamp Operation Check

AIS005Y4

1. CHECK INTERIOR LAMP

Does interior room lamp illuminate with interior room lamp switch?

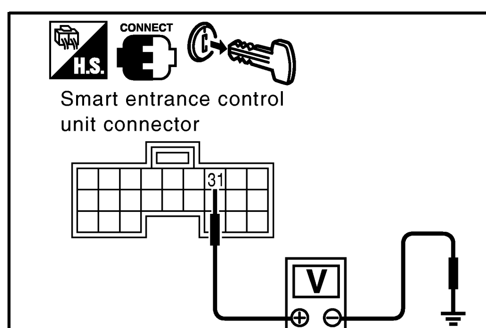
YES or NO

YES >> GO TO 2.
NO >> Check the following.
- Harness for open or short between smart entrance control unit and interior room lamp
- Interior room lamp

2. CHECK INTERIOR ROOM LAMP OPERATION

1. Remove key from ignition key cylinder.
2. Push unlock button of key fob with all doors closed and driver's door locked, and check voltage between smart entrance control unit harness connector and ground.

Connector	Terminal (Wire color)		Condition of key fob	Voltage [V] (Approx.)
	(+)	(–)		
M91	31 (R/Y)	Ground	Unlock button is pushed.	0 (For approx. 30 seconds.)
			Unlock button is not pushed.	Battery voltage



PIIB1448E

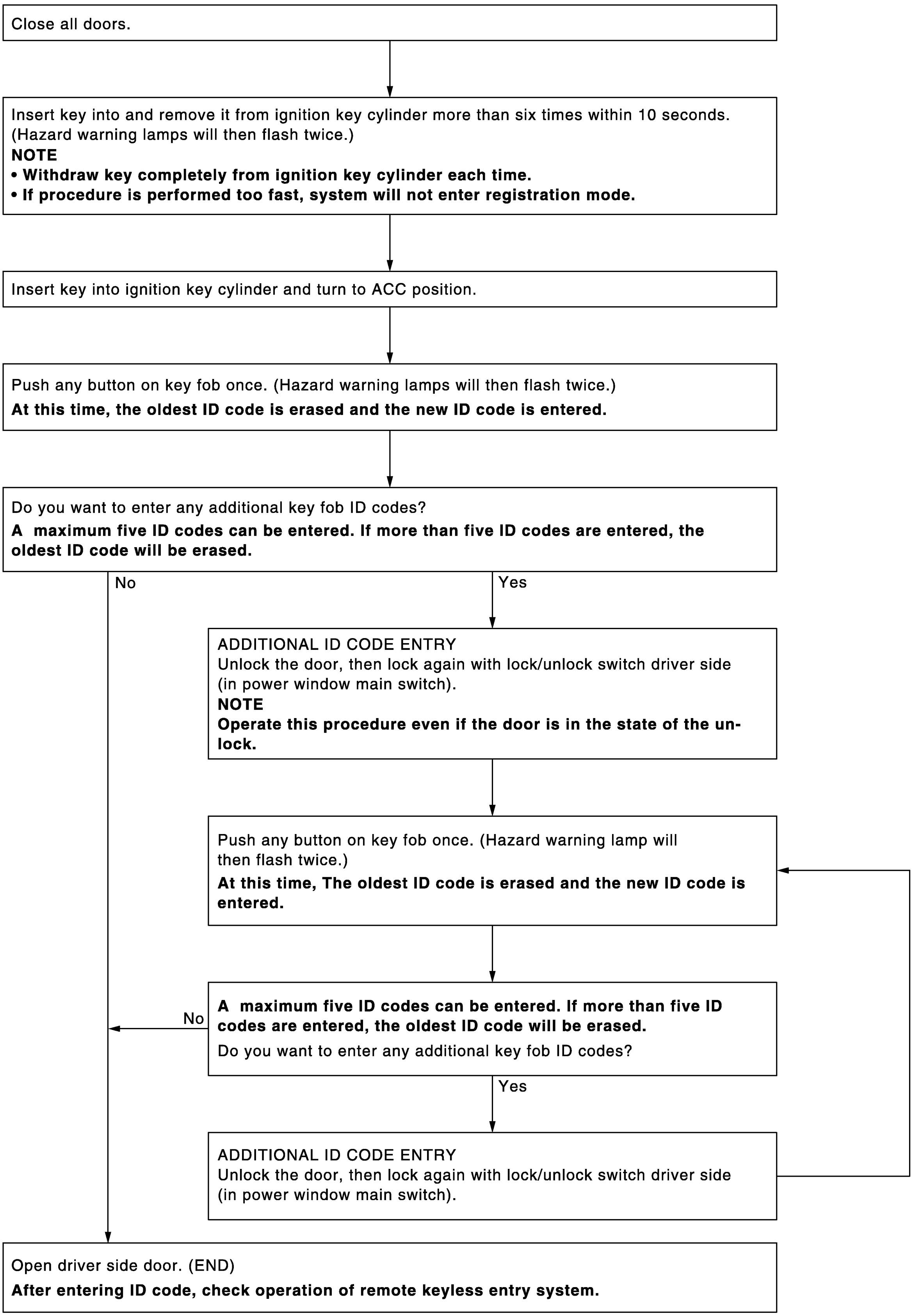
OK or NG

OK >> System is OK.
NG >> Check harness open or short between smart entrance control unit and interior room lamp.

ID Code Entry Procedure

AIS005Y5

KEY FOB ID SET UP



PIIA2839E

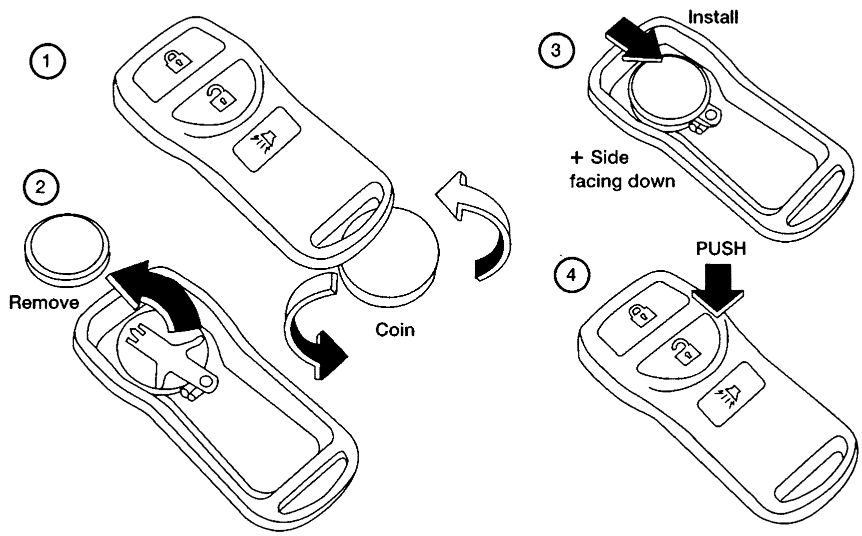
Key Fob Battery Replacement

AIS005Y6

NOTE:

- Be careful not to touch the circuit board or battery terminal.
- The key fob is water-resistant. However, if it does get wet, immediately wipe it dry.

1. Open the lid using a coin.
2. Remove the battery.
3. Install the new battery, positive side down.
4. Close the lid securely. Push the key fob buttons two or three times to check operation.



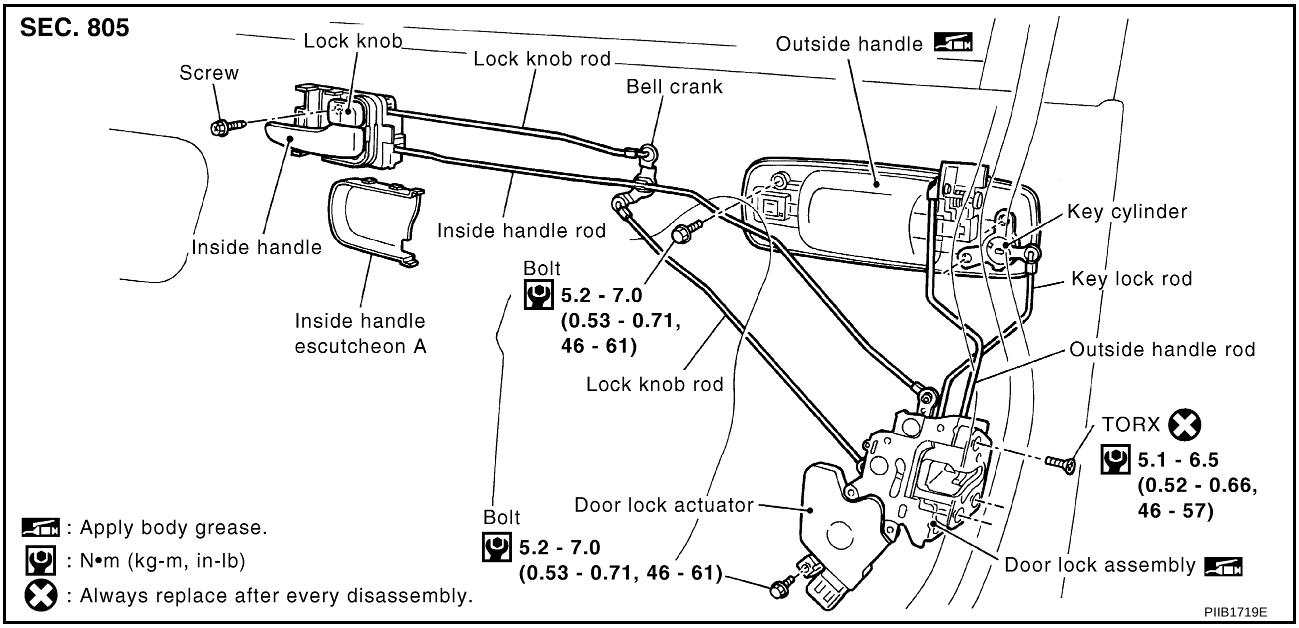
SIIA1509E

FRONT DOOR LOCK

PFP:80502

Component Parts Location

AIS005P1



Inspection and Adjustment

AIS005P3

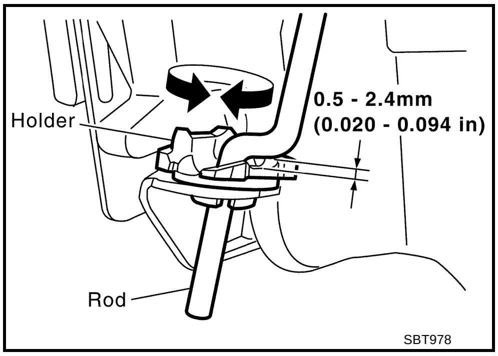
1. Remove door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove sealing screen.

   NOTE:
   If sealing screen is reused, cut butyl tape in a way that leaves it on the sealing screen.

OUT SIDE HANDLE ROD ADJUSTMENT

- Rotate bushing to obtain the gap between bushing and rod (as shown in the figure).

NOTE:
The gap must not be 0 mm (0 in). The rod must not be held pressed against the bushing.



Removal and Installation

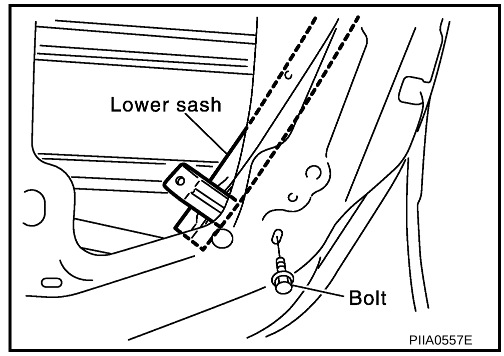
AIS005P4

REMOVAL

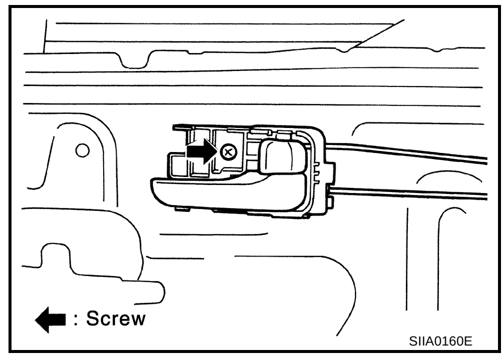
1. Remove door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove sealing screen.

   NOTE:
   If sealing screen is reused, cut butyl tape in a way that leaves it on the sealing screen.
3. Remove front door glass. Refer to GW-56, "FRONT DOOR GLASS AND REGULATOR" .

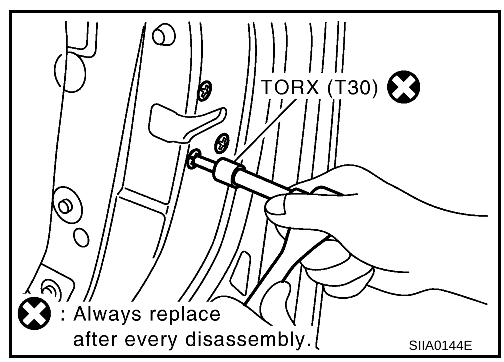
4. Remove mount bolts and pull upper portion of the rear lower sash out of the sash.
5. Remove inside handle escutcheon A.



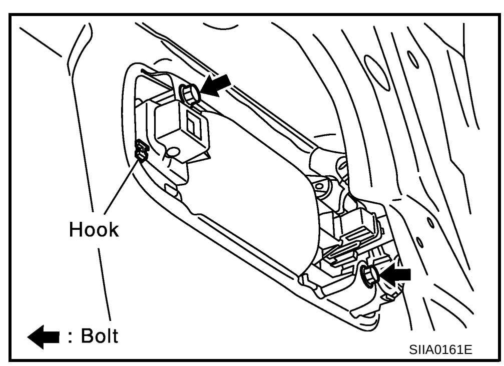
6. Remove inside handle mount screws.
7. Disconnect bell crank lock knob rod at the joints.
8. Disconnect inside handle rod (on the door lock assembly).
9. Slide inside handle rearward and remove it through the hole in the door panel.
10. Remove rod from the inside handle.
11. Working through the access hole, disconnect key cylinder rod and outside handle rod (on the handle) at the joint.



12. Disconnect door lock actuator connector.
13. Remove mount screw (TORX T30) and remove door lock assembly through the access hole.



14. Remove outside handle mount bolts and slide the outside handle rearward to pull the front end of the outside handle escutcheon from the outer panel. Remove outside handle.



INSTALLATION

Install in the reverse order of removal.

NOTE:

- Install the outside handle by pressing it forward and downward while tightening the bolts.
- Install each rod by rotating the rod holder until it engages with a tactile feel.

Disassembly and Assembly

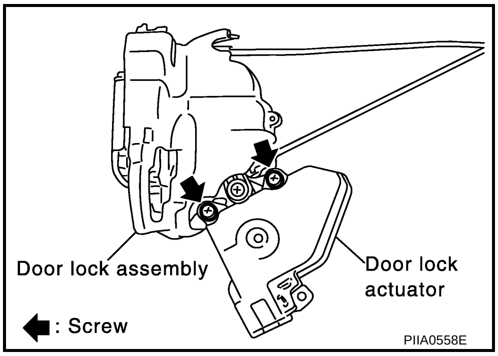
AIS005P5

DISASSEMBLY

NOTE:

The door lock actuator must be removed and installed with the door lock assembly off the vehicle.

1. Remove mount screws and door lock actuator from door lock assembly.
2. Pull the door lock actuator straight down to separate it from door lock assembly.



ASSEMBLY

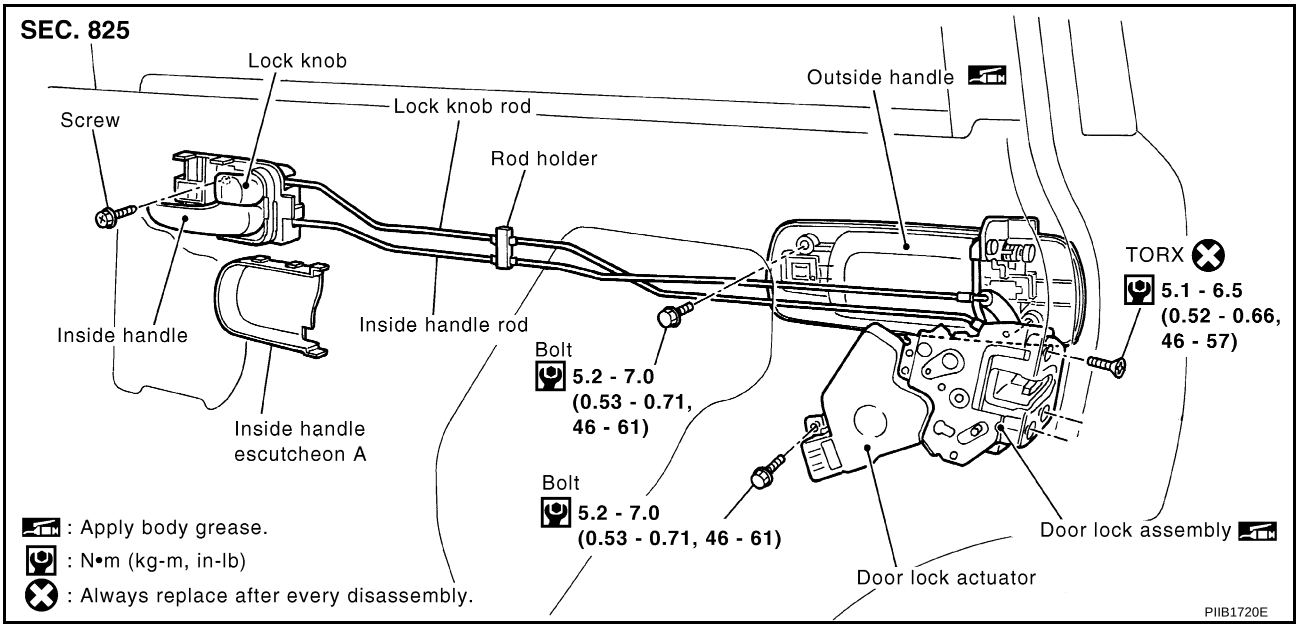
1. Align door lock actuator pivot with the door lock assembly knob lever cutout.
2. Move the knob lever and door lock actuator pivot toward the LOCK position to ensure that they are securely engaged.

REAR DOOR LOCK

PFP:82502

Component Parts Location

AIS005P7



Inspection and Adjustment

AIS005P9

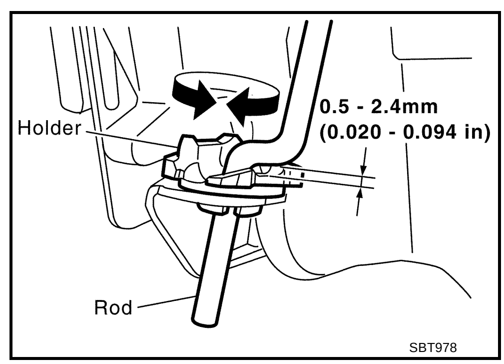
1. Remove rear door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove sealing screen.

NOTE:
If sealing screen is reused, cut butyl tape in a way that leaves it on the sealing screen.

OUT SIDE HANDLE ROD ADJUSTMENT

Rotate bushing to obtain the gap between bushing and rod (as shown in the figure).

NOTE:
The gap must not be 0 mm (0 in). The rod must not be held pressed against the bushing.



Removal and Installation

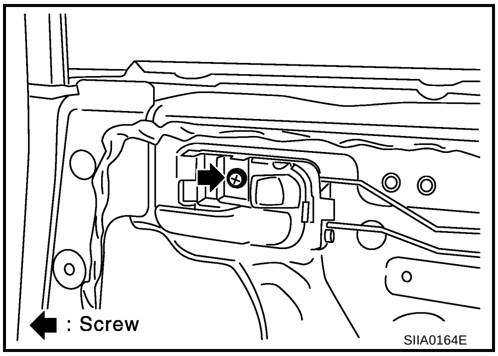
AIS005PA

REMOVAL

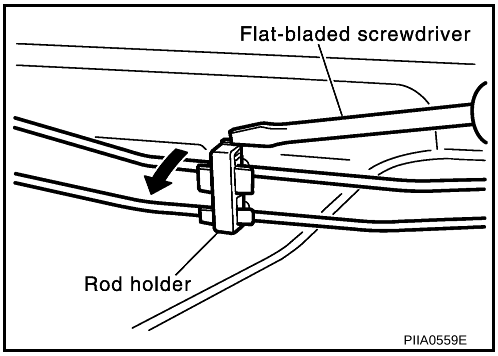
1. Remove rear door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove sealing screen.

   NOTE:
   If sealing screen is reused, cut butyl tape in a way that leaves it on the sealing screen.
3. Remove rear lower sash. Refer to GW-59, "REAR DOOR GLASS AND REGULATOR" .
4. Remove rear door glass. Refer to GW-59, "REAR DOOR GLASS AND REGULATOR" .
5. Remove inside handle escutcheon A.

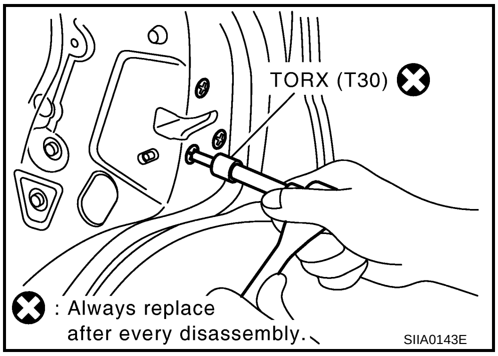
6. Remove inside handle mount screws.
7. Disconnect inside handle rod (on the door lock assembly).
8. Disconnect lock knob rod (on the door lock assembly).



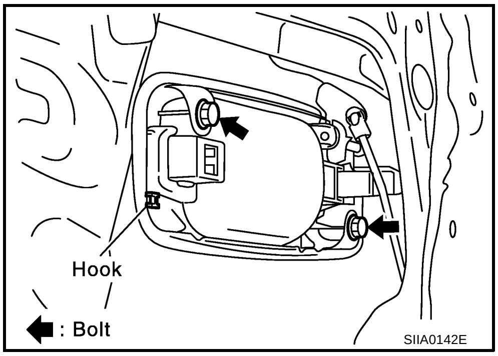
9. Pry rod holder off with a flat-bladed screwdriver to remove rod.
10. Slide inside handle rearward and remove it through the hole in the door panel.
11. Remove rod from the inside handle.
12. Disconnect door lock actuator connector.



13. Remove mount screw (TORX T30) and remove door lock assembly through the access hole.



14. Remove outside handle mount bolts. Slide outside handle rearward to pull front end of the outside handle escutcheon from the outer panel. Remove outside handle.



INSTALLATION

Install in the reverse order of removal.

NOTE:

- Install the outside handle by pressing it forward and downward while tightening the bolts.
- Install each rod by rotating the rod holder until it engages with a tactile feel.

Disassembly and Assembly

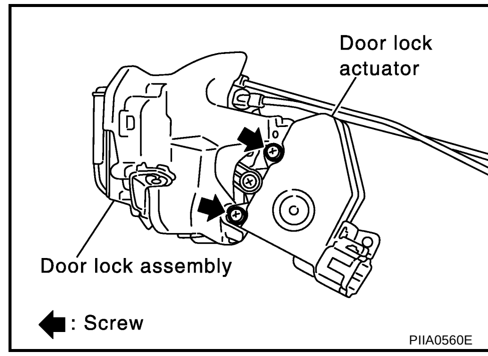
AIS005PB

DISASSEMBLY

NOTE:

The door lock actuator must be removed and installed with the door lock assembly off the vehicle.

1. Remove mount screws and door lock actuator from door lock assembly.
2. Pull the door lock actuator straight down to separate it from door lock assembly.



ASSEMBLY

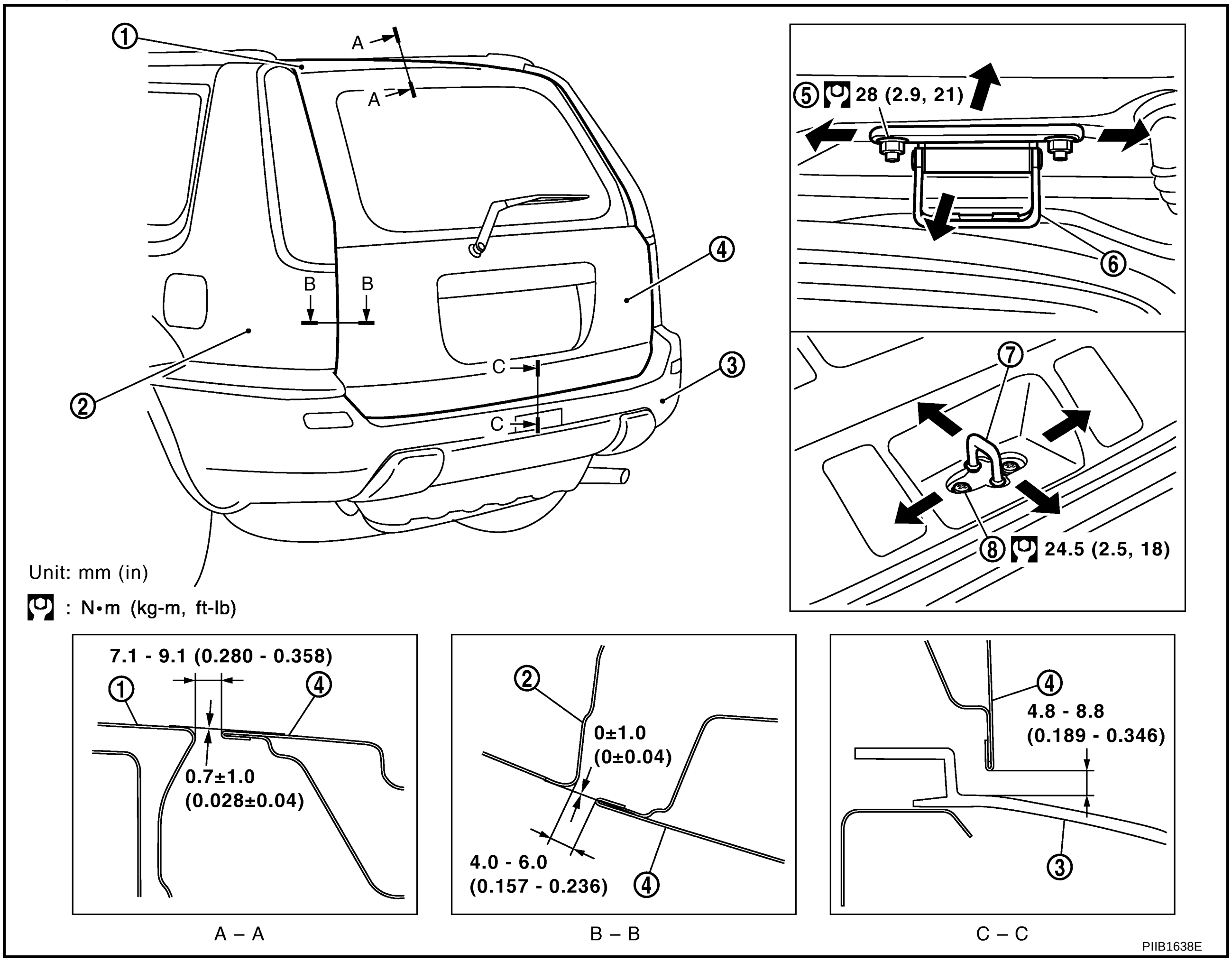
1. Align door lock actuator pivot with the door lock assembly knob lever cutout.
2. Move the knob lever and door lock actuator pivot toward the LOCK position to ensure that they are securely engaged.

BACK DOOR

PFP:90100

Fitting Adjustment

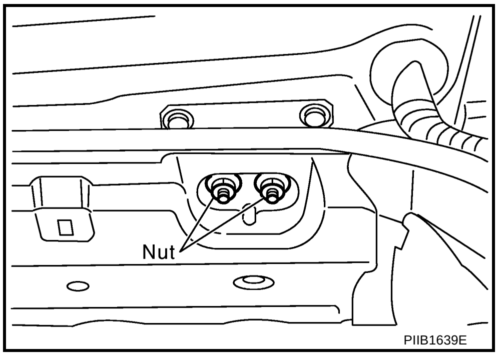
AIS005PD



1. Roof	2. Rear fender	3. Rear bumper
4. Back door	5. Nut	6. back door hinge
7. Striker	8. Screw	

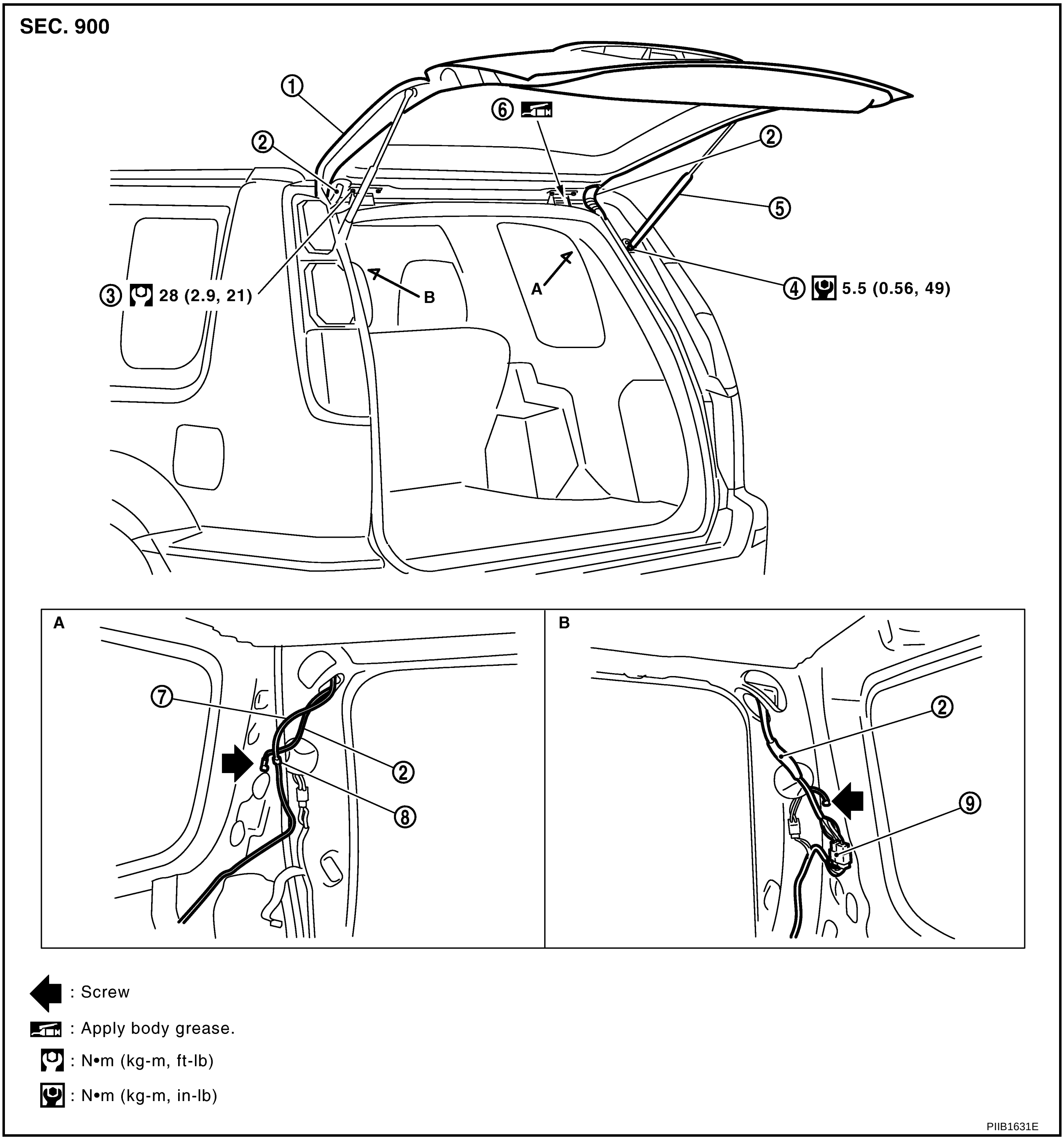
VERTICAL/LATERAL CLEARANCE ADJUSTMENT

1. With striker removed, loosen hinge mount nuts on the back door and close it.
2. Make lateral clearance and clearance to rear window glass equal. Open back door to tighten mounting bolts to specified torque.
3. If taking the steps above does not result in fine adjustment, remove headliner and loosen the hinge mount nuts on the vehicle for further adjustment.



Back Door Assembly

AIS005PE



1.	Back door assembly	2.	Back door harness	3.	Nut
4.	Bolt	5.	Back door stay	6.	back door hinge
7.	Washer hose	8.	Washer hose connector	9.	Back door harness connector

REMOVAL AND INSTALLATION

Removal

1. Disconnect connectors in the back door and encamp the harness. Pull the harness out of the back door.
2. Support the back door lock with a proper material to prevent it from falling and remove back door stay (gas stay).
3. Remove hinge mount nuts on the back door and remove back door assembly.

Installation

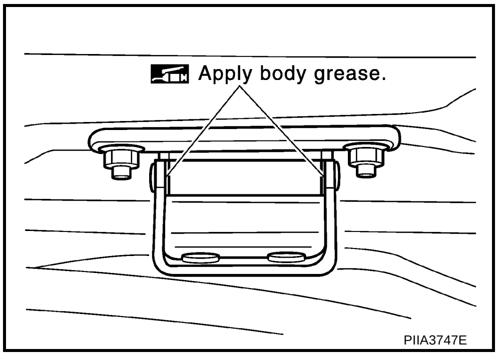
Install in the reverse order of removal.

CAUTION:

- **Operate with two workers, because of its heavy weight.**
- **After installing, apply touch-up paint (the body color) onto the head of the hinge mounting bolts.**
- **After installing, check the back door adjustment. Refer to BL-71, "Fitting Adjustment" .**

INSPECTION

1. Check hinges for the following items
   - Abnormal noise or door closing and opening effort
   - Component wear or damage
2. Apply Body Grease to the rotating part of the hinge.

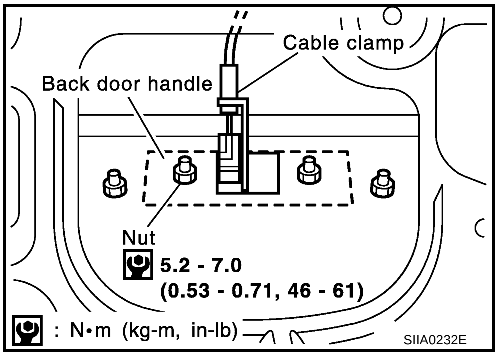


Removal and Installation of Back Door Handle

AIS005PF

REMOVAL

1. Remove back door trim. Refer to EI-35, "BACK DOOR TRIM" .
2. Remove license lamp finisher. Refer to EI-31, "LICENSE LAMP FINISHER" .
3. Remove cable clamp and remove cable from the back door handle.
4. Remove mount nuts and back door handle.



INSTALLATION

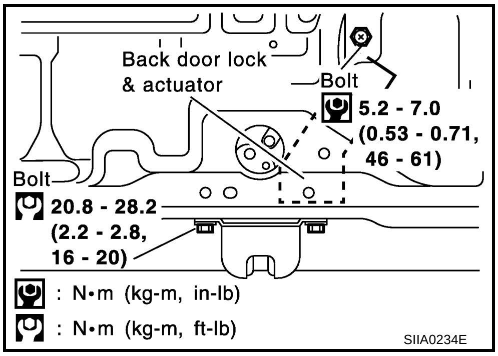
Install in the reverse order of removal.

Removal and Installation of Back Door Lock and Actuator

AIS005PG

REMOVAL

1. Remove back door trim. Refer to EI-35, "BACK DOOR TRIM" .
2. Disconnect back door lock & actuator connector.
3. Remove bolts from the back door lock and actuator and remove back door lock & actuator.



INSTALLATION

Install in the reverse order of removal.

Disassembly and Assembly of Back Door Lock & Back Door Lock Actuator

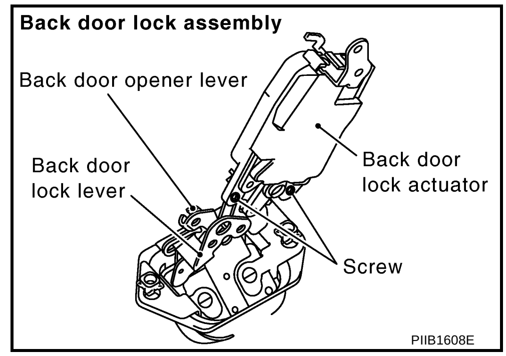
AIS0061K

DISASSEMBLY

CAUTION:

Be sure to remove or install the actuator with the Back door lock & back door lock actuator removed.

1. Remove the mounting screws, and remove the back door lock actuator from the back door lock.
2. Pull the back door lock actuator straight downward to separate it from the back door lock.

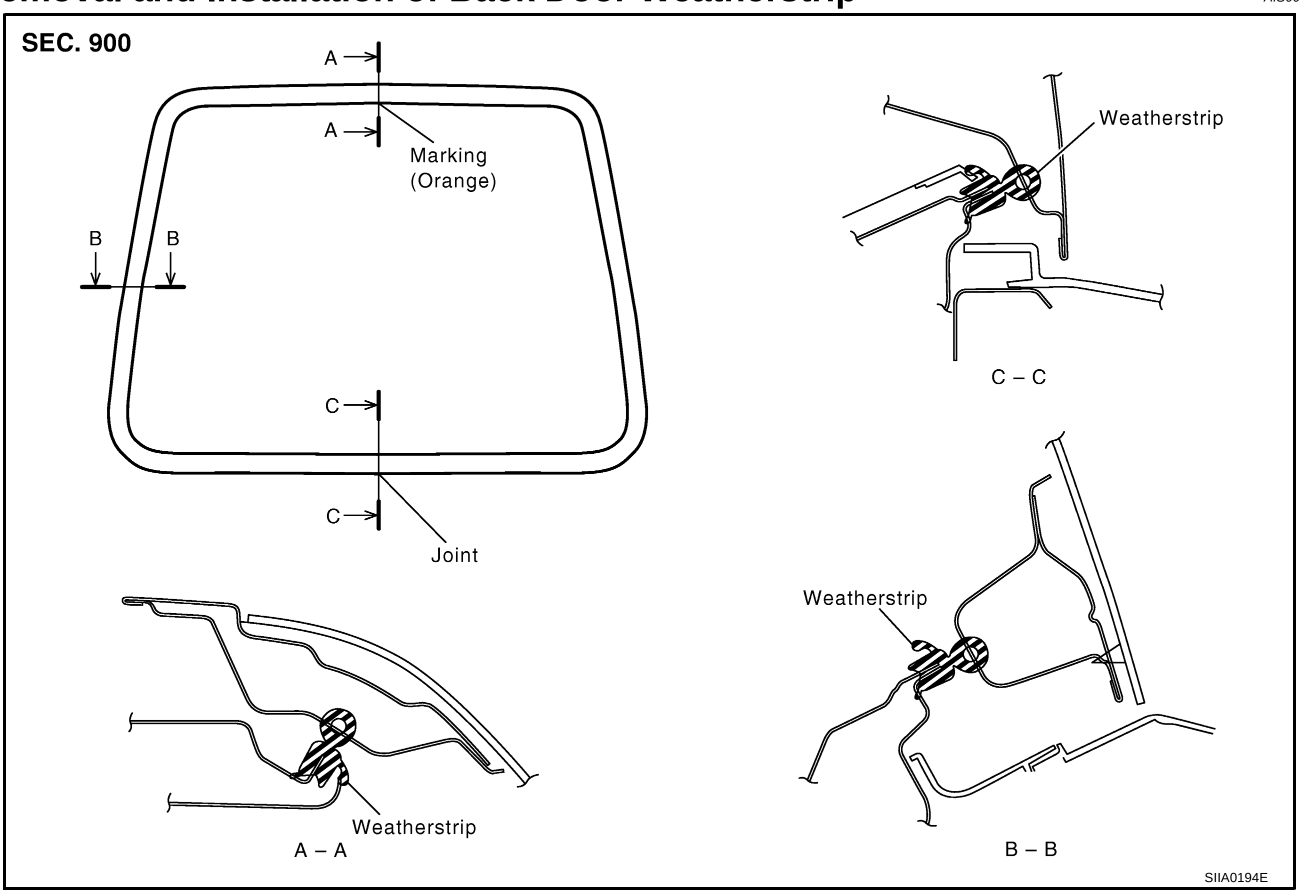


ASSEMBLY

1. Align the back door lock actuator pivot with the cutout on the knob lever of the, then assemble the actuator.
2. Move the knob lever and the back door lock actuator pivot toward the lock-on direction, and check that it engages securely.

Removal and Installation of Back Door Weatherstrip

AIS005PH



REMOVAL

Pull up and remove engagement with body from weatherstrip joint.

CAUTION:

After removal, do not pull strongly on the weatherstrip.

INSTALLATION

1. Working from the upper section, align weatherstrip mark with vehicle center position mark and install weatherstrip onto the vehicle.
2. For the lower section, align the weatherstrip seam with center of the striker.
3. After installation, pull the weatherstrip gently to ensure that there is no loose section.

   NOTE:

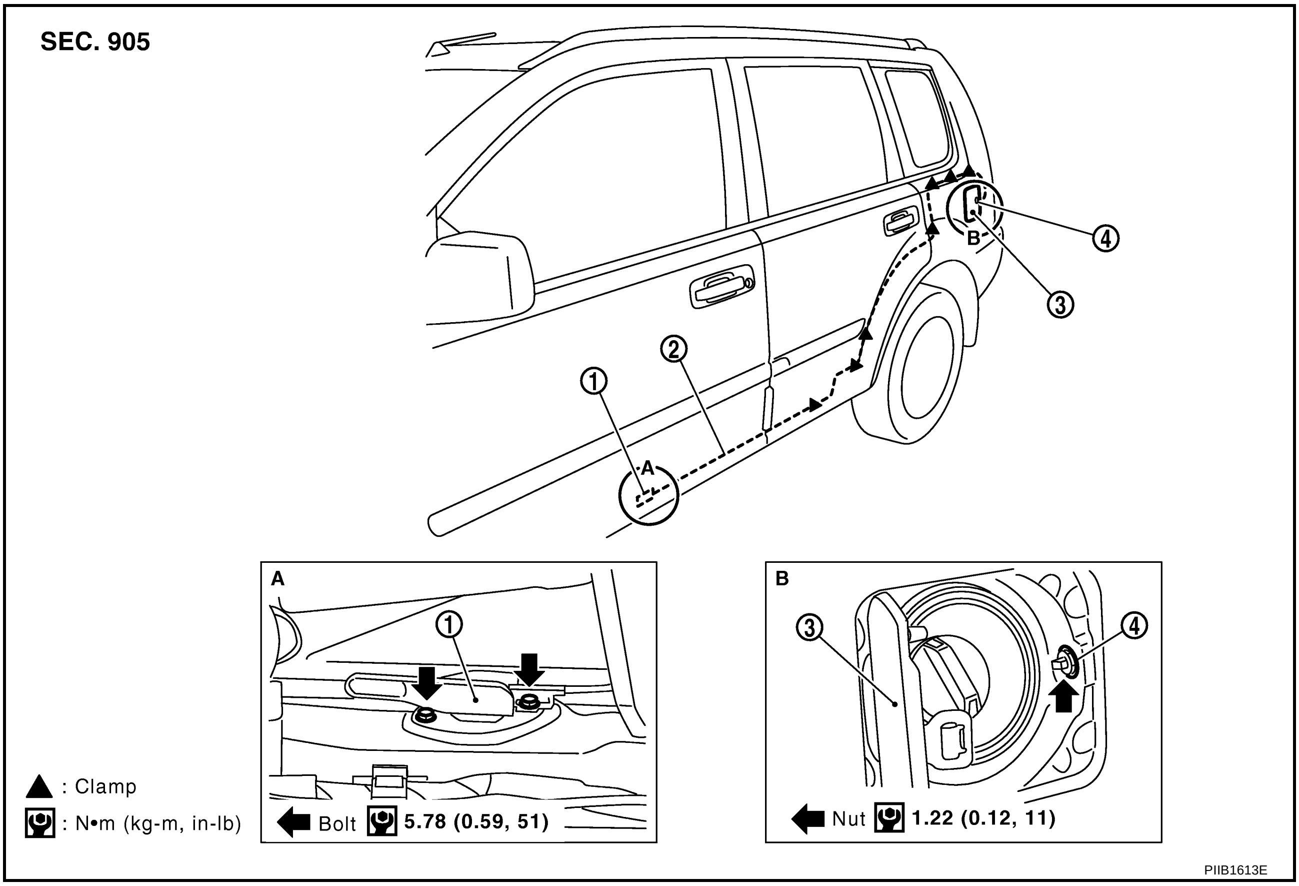
   Make sure the weatherstrip is fit tightly at each corner and back door rear plate.

FUEL FILLER LID OPENER

PFP:78820

Component Parts Location

AIS005PI



1. Fuel filler lid opener handle
2. Fuel filler lid opener cable
3. Fuel filler lid
4. Fuel filler lid lock

Removal and Installation of Fuel Filler Lid Opener Cable

AIS0061Y

REMOVAL

1. Remove luggage side lower finisher (LH), rear kicking plate (LH), center pillar lower garnish (LH) and front kicking plate (LH). Refer to EI-36, "BODY SIDE TRIM" .
2. Remove fuel filler lid lock mounting nut.
3. Remove fuel filler lid opener handle mounting bolts.
4. Disconnect each clamp of fuel filler lid opener cable.

INSTALLATION

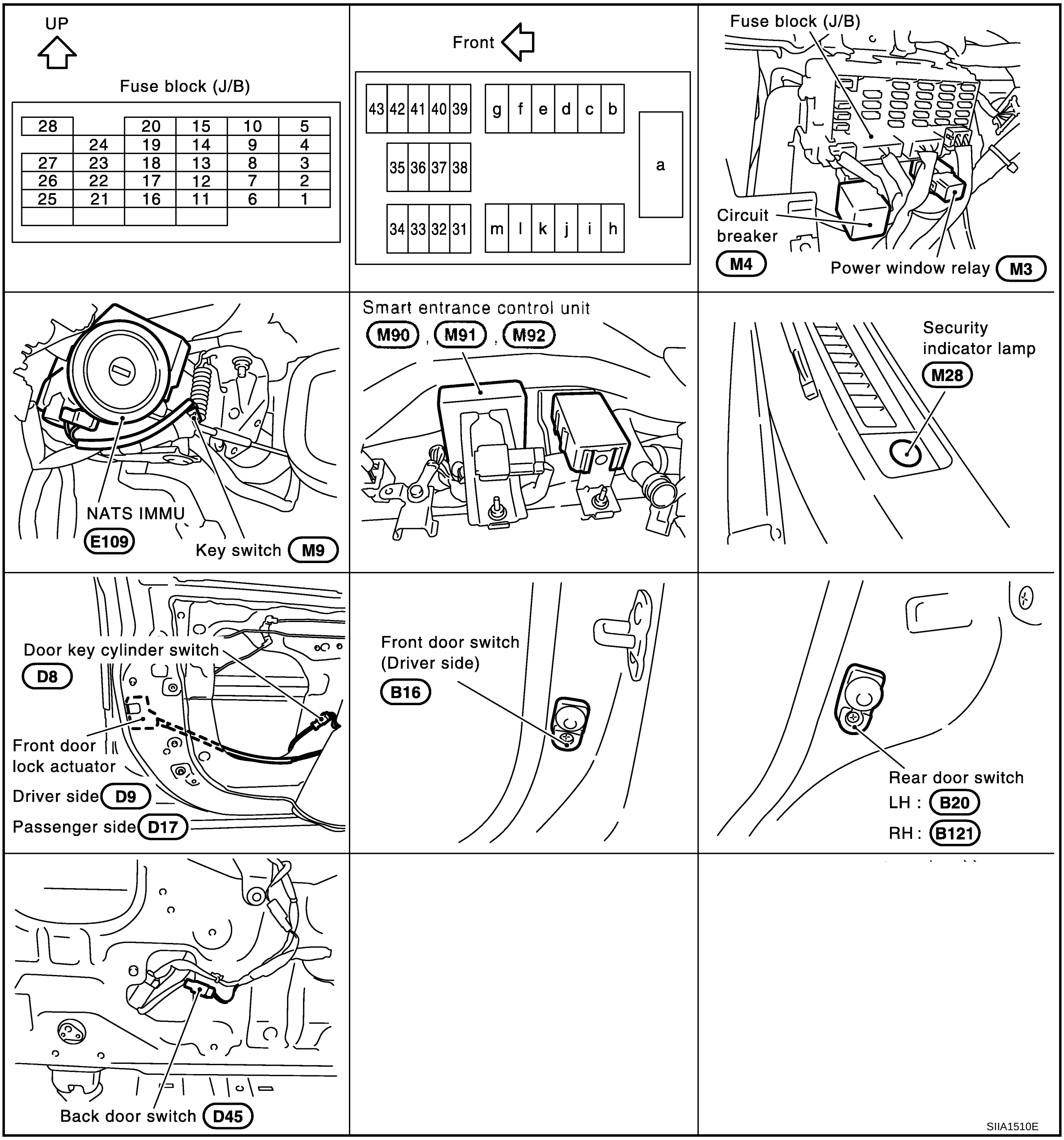
1. Install in the reverse order of removal.
2. after installing, check the operation.

VEHICLE SECURITY (THEFT WARNING) SYSTEM

PFP:28491

Component Parts and Harness Connector Location

AIS0062U

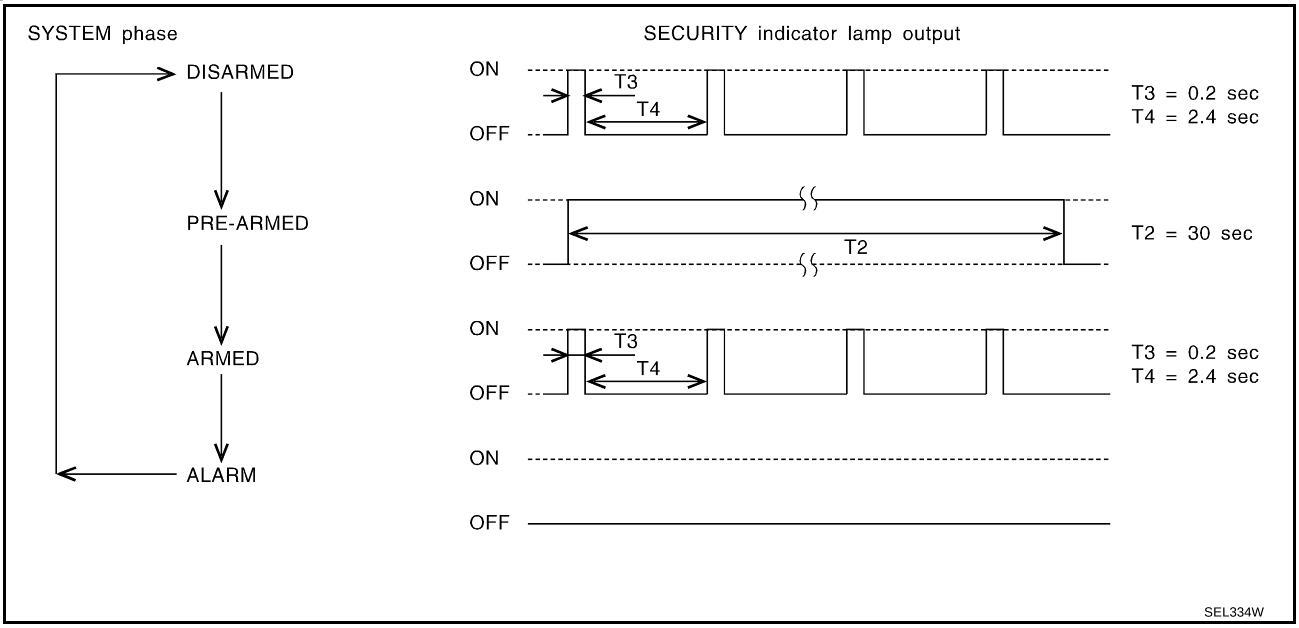


System Description

AIS0062V

DESCRIPTION

Operation Flow



Setting the Theft Warning System

Initial condition

1. Ignition switch is in OFF position.

Disarmed phase

- When the theft warning system is in the disarmed phase, the security indicator lamp blinks every 2.4 seconds. (with NATS)
- When the theft warning system is in the disarmed phase and any door(s), hood or back door is opened, the security indicator lamp blinks every 0.5 second (without NATS)

Pre-armed phase and armed phase

When the following operation 1 or 2 is performed, the vehicle security system turns into the “pre-armed” phase. (The security indicator lamp illuminates.)

1. Smart entrance control unit receives LOCK signal from key cylinder switch or key fob after hood, and all doors are closed.
2. Hood and all doors are closed after front doors are locked by key, lock/unlock switch or key fob.

After about 30 seconds, the system automatically shifts into the “armed” phase (the system is set). (The security indicator lamp blinks every 2.4 seconds.)

Canceling the Set Theft Warning System

When the following 1 or 2 operation is performed, the armed phase is canceled.

1. Unlock the doors with the key or key fob.
2. Open the back door with the key.

Activating the Alarm Operation of the Theft Warning System

Make sure the system is in the armed phase. (The security indicator lamp blinks every 2.4 seconds.)
When the following operation 1 or 2 is performed, the system sounds the horns and flashes the hazard warning lamp about 50 seconds.

1. Engine hood, back door or any door is opened during armed phase.
2. Disconnecting and connecting the battery connector before canceling armed phase.

POWER SUPPLY AND GROUND

Power is supplied at all times

- through 40A fusible link (letter **B** , located in the fuse and fusible link box)
- to circuit breaker terminals 1 and 2
- to smart entrance control unit terminal 51,
- through 10A fuse [No. 26, located in the fuse block (J/B)]
- to smart entrance control unit terminal 49,
- through 10A fuse [No. 28, located in the fuse block (J/B)]
- to security indicator lamp terminal 1.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No. 5, located in the fuse block (J/B)]
- to smart entrance control unit terminal 27.

With the ignition switch in the ACC or ON position, power is supplied

- through 10A fuse [No. 4, located in the fuse block (J/B)]
- to smart entrance control unit terminal 26.

Ground is supplied

- to smart entrance control unit terminals 43 and 64
- through body grounds M27 and M70.

INITIAL CONDITION TO ACTIVATE THE SYSTEM

The operation of the theft warning system is controlled by the doors and hood.
To activate the theft warning system, the smart entrance control unit must receive signals indicating the doors and hood are closed.
When a door is open, smart entrance control unit terminal 1 or 2 receives a ground signal from each door switch.
When the hood is open, smart entrance control unit terminal 6 receives a ground signal

- to hood switch terminal 1 and 2
- through body grounds E24, E50.

When smart entrance control unit receives LOCK signal from key cylinder switch or key fob and none of the described conditions exist, the theft warning system will automatically shift to armed mode.

THEFT WARNING SYSTEM ACTIVATION

With all doors (including hood) close if the key is used to lock doors, smart entrance control unit terminal 11 receives a ground signal

- from the door key cylinder switch (Driver side) terminal 1, or
- from the door key cylinder switch (Passenger side) terminal 3
- through body grounds M27 and M70.

If this signal, or lock signal from key fob is received by the smart entrance control unit, the vehicle security system will activate automatically.

NOTE:
Theft warning system can be set even though all doors are not locked.
Once the vehicle security system has been activated, smart entrance control unit terminal 38 supplies ground to terminal 2 of the security indicator lamp.
The security lamp will illuminate for approximately 30 seconds and then blinks every 2.4 seconds.
Now the vehicle security system is in armed phase.

THEFT WARNING SYSTEM ALARM OPERATION

The theft warning system is triggered by

- opening a door
- opening the hood
- detection of battery disconnect and connect.

Once the vehicle security system is in armed phase, if the smart entrance control unit receives a ground signal at terminal 1 or 2 (door switch or hood switch), the vehicle security system will be triggered. The hazard lamp flashes, the horn sounds intermittently.

Power is supplied at all times

- through 10A fuse (No, 34 located in fuse and fusible link box)
- to horn relay terminal 2.

When the vehicle security system is triggered, ground is supplied intermittently

- to horn relay terminal 1
- through smart entrance control unit terminal 42.

When horn relay are energized, then power is supplied to horn.
The horn sounds intermittently.
The alarm automatically turns off after 50 seconds but will reactivate if the vehicle is tampered with again.

THEFT WARNING SYSTEM DEACTIVATION

To deactivate the theft warning system, a door must be unlocked with the key or key fob.
When the key is used to unlock the door, smart entrance control unit terminal 10 receives a ground signal

- from the door key cylinder switch (Driver side) terminal 3, or
- from the door key cylinder switch (Passenger side) terminal 1

When the smart entrance control unit receives either one of these signals or unlock signal from key fob, the theft warning system is deactivated. (Disarmed phase)

PANIC ALARM OPERATION

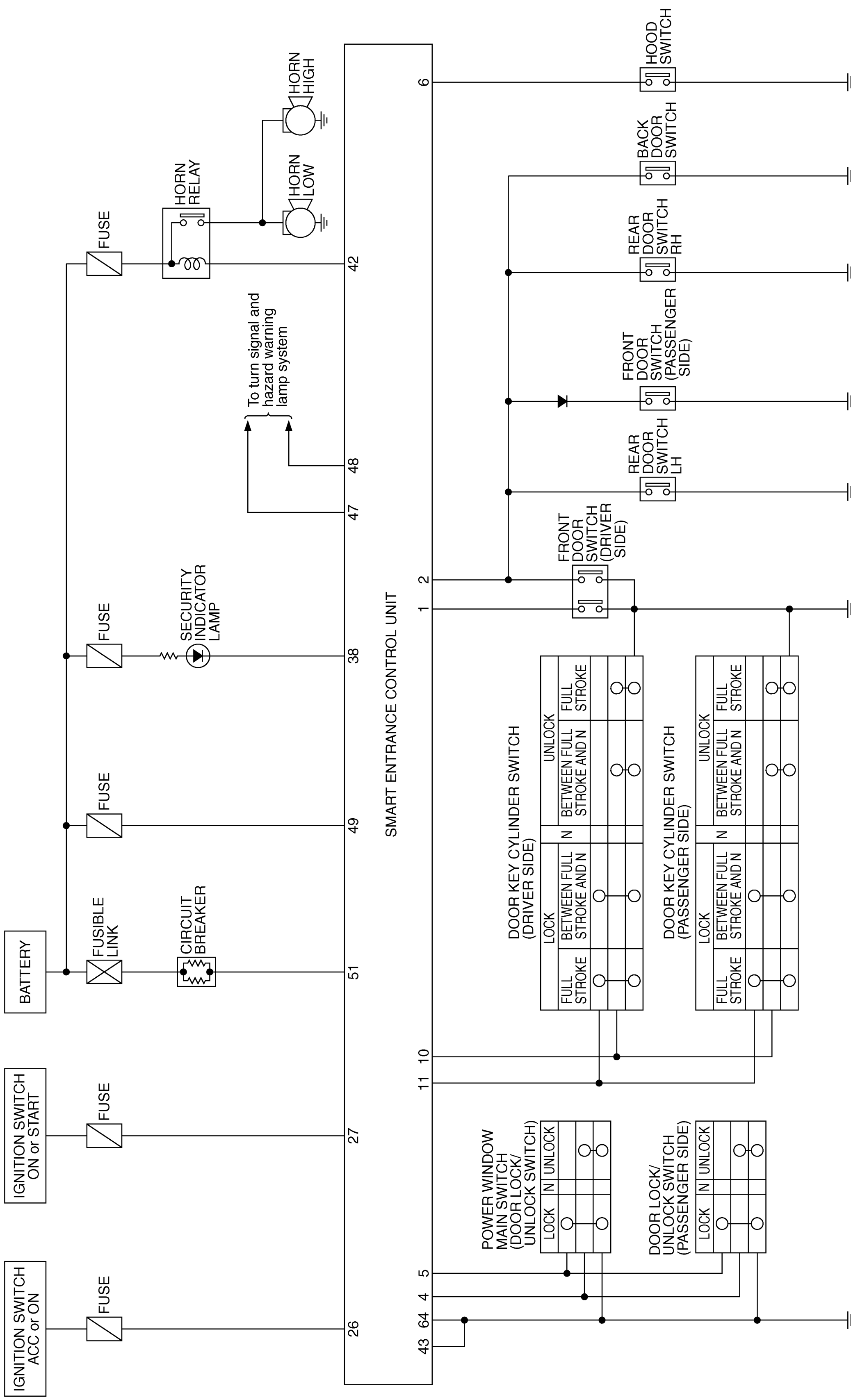
Multi-remote control system may or may not operate theft warning system (horn) as required.
When the multi-remote control system (panic alarm) is triggered, ground is supplied intermittently

- to horn relay terminal 1
- through smart entrance control unit terminal 42.

The horn sounds intermittently.
The alarm automatically turns off after 25 seconds or when smart entrance control unit receives any signal from key fob.

Schematic

AIS0062W

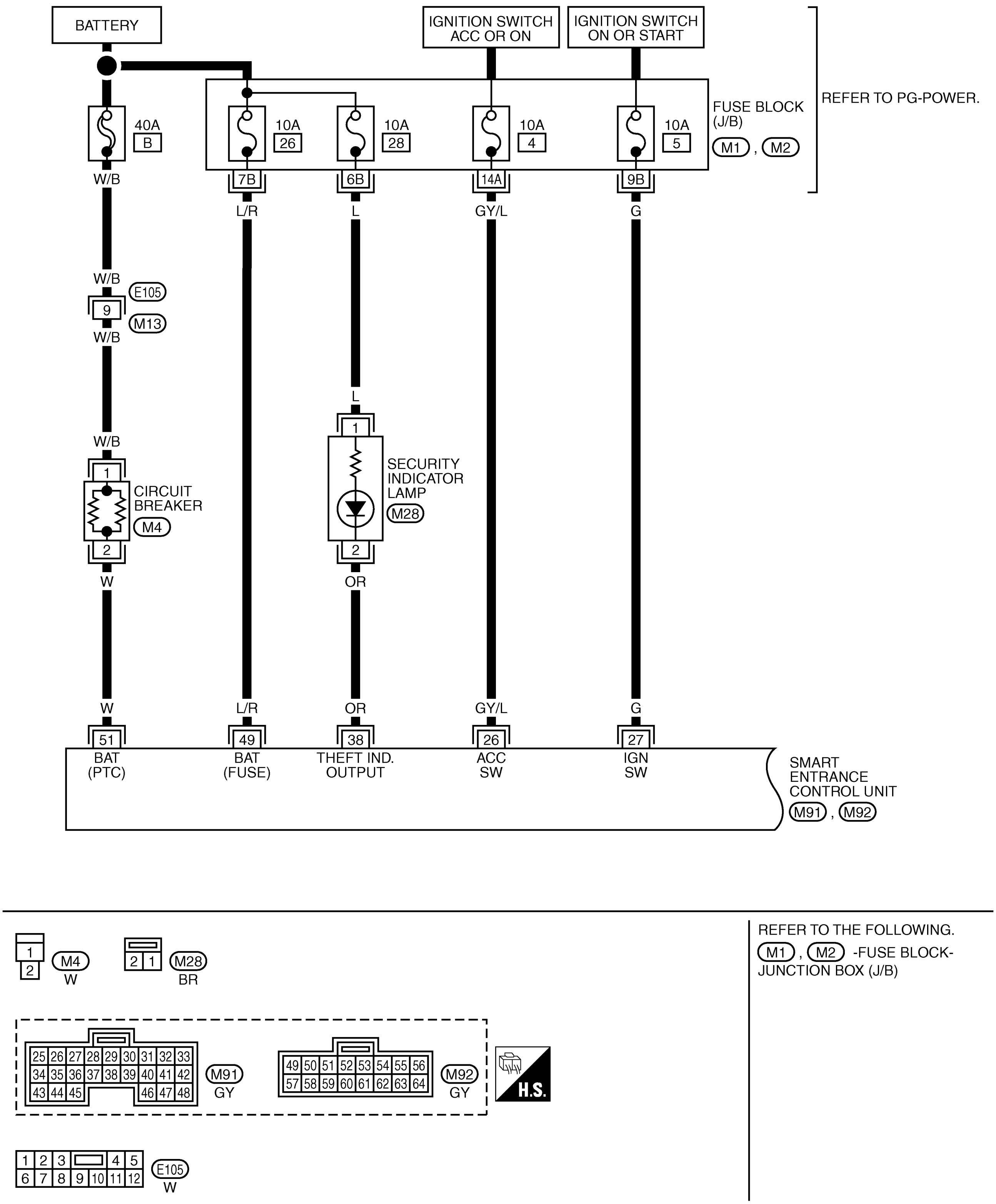


TIWB0055E

Wiring Diagram — VEHSEC —

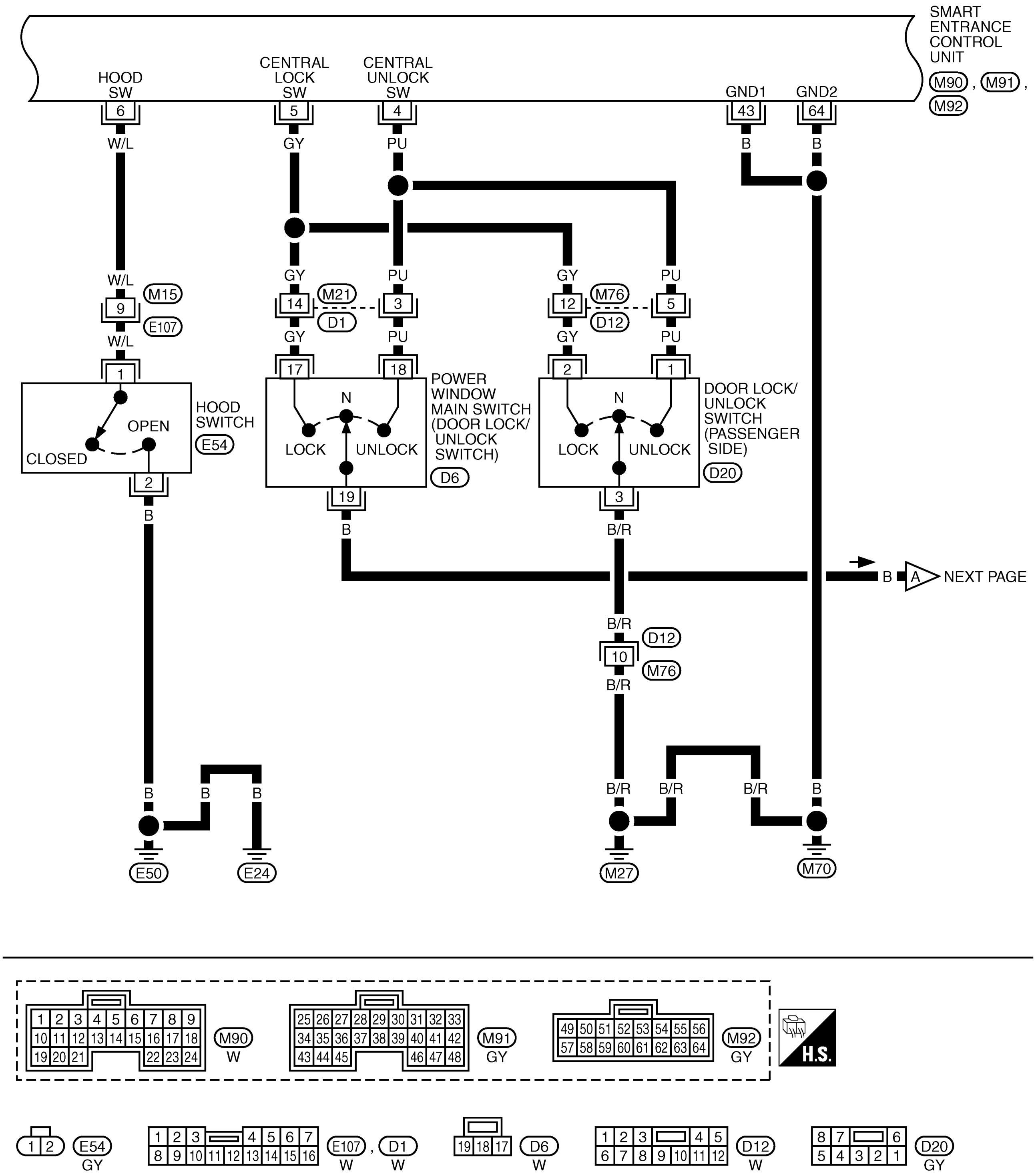
AIS0062X

BL-VEHSEC-01

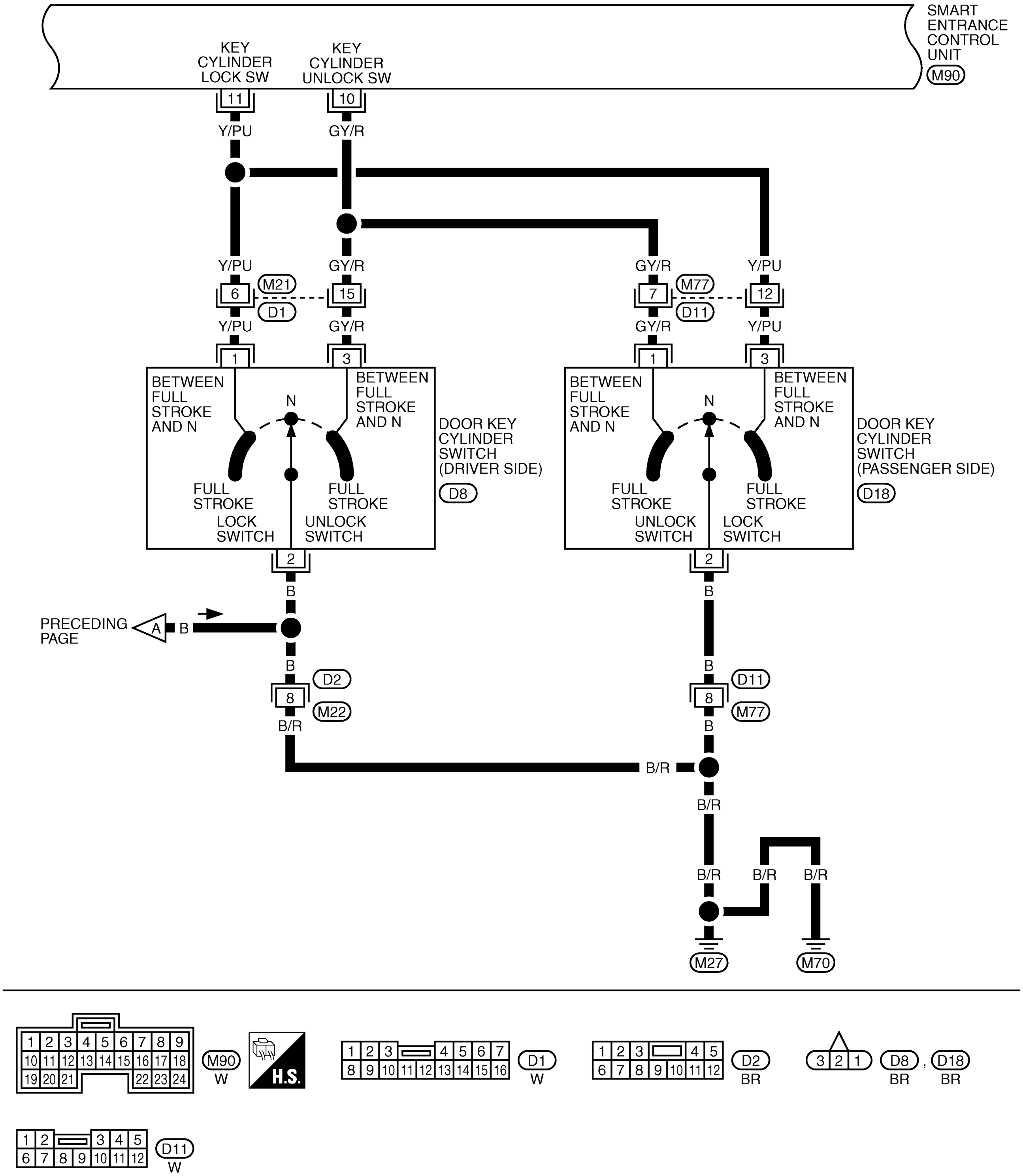


TIWB0056E

BL-VEHSEC-02

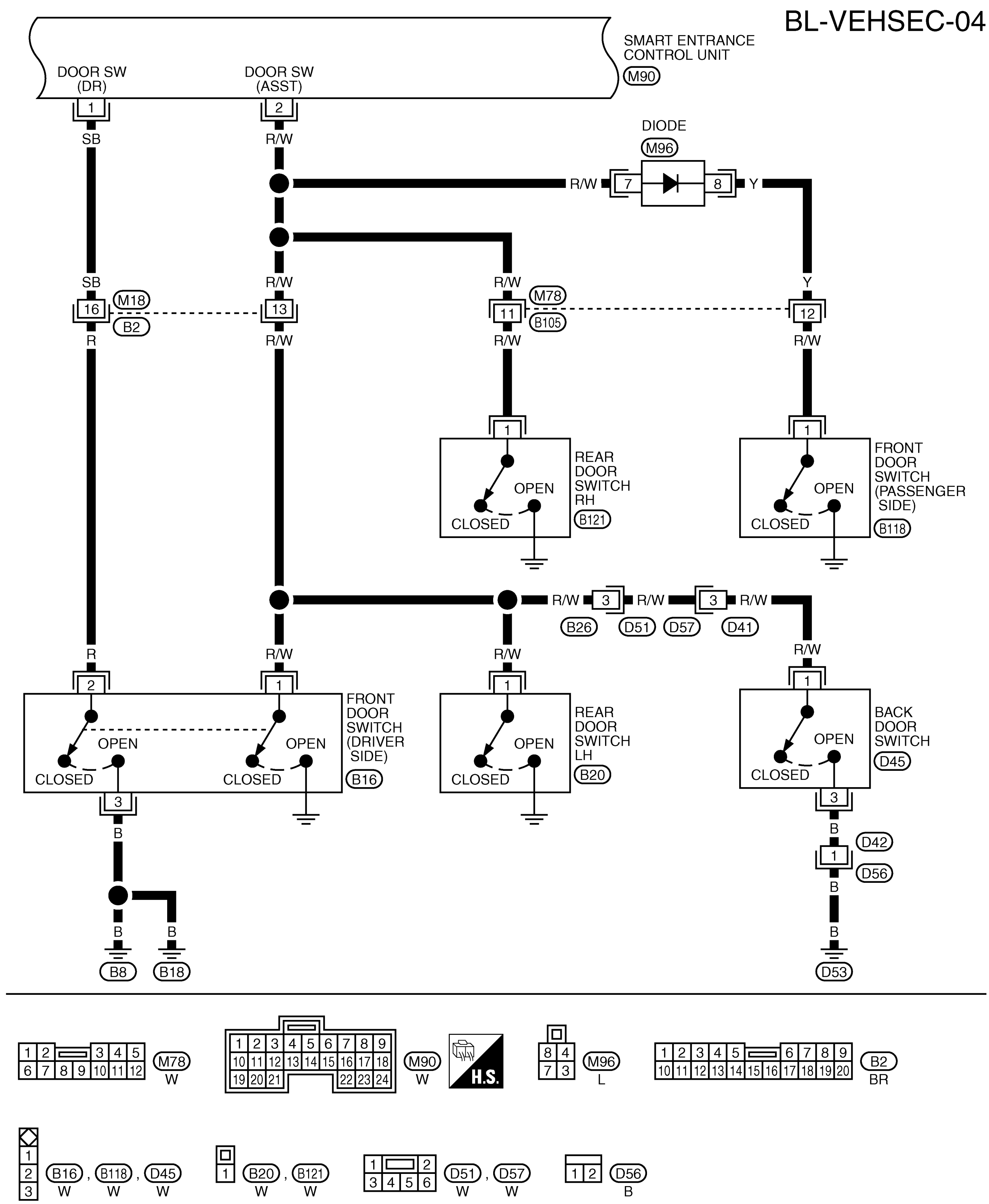

SMART ENTRANCE CONTROL UNIT
M90, M91, M92
HOOD SW
CENTRAL LOCK SW
CENTRAL UNLOCK SW
GND1
GND2
W/L
GY
PU
B
B/R
M15
E107
M21
D1
M76
D12
HOOD SWITCH
E54
OPEN
CLOSED
POWER WINDOW MAIN SWITCH (DOOR LOCK/ UNLOCK SWITCH)
D6
DOOR LOCK/ UNLOCK SWITCH (PASSENGER SIDE)
D20
N
LOCK
UNLOCK
A
NEXT PAGE
E50
E24
M27
M70
W
GY
H.S.
TIWB0057E

BL-VEHSEC-03

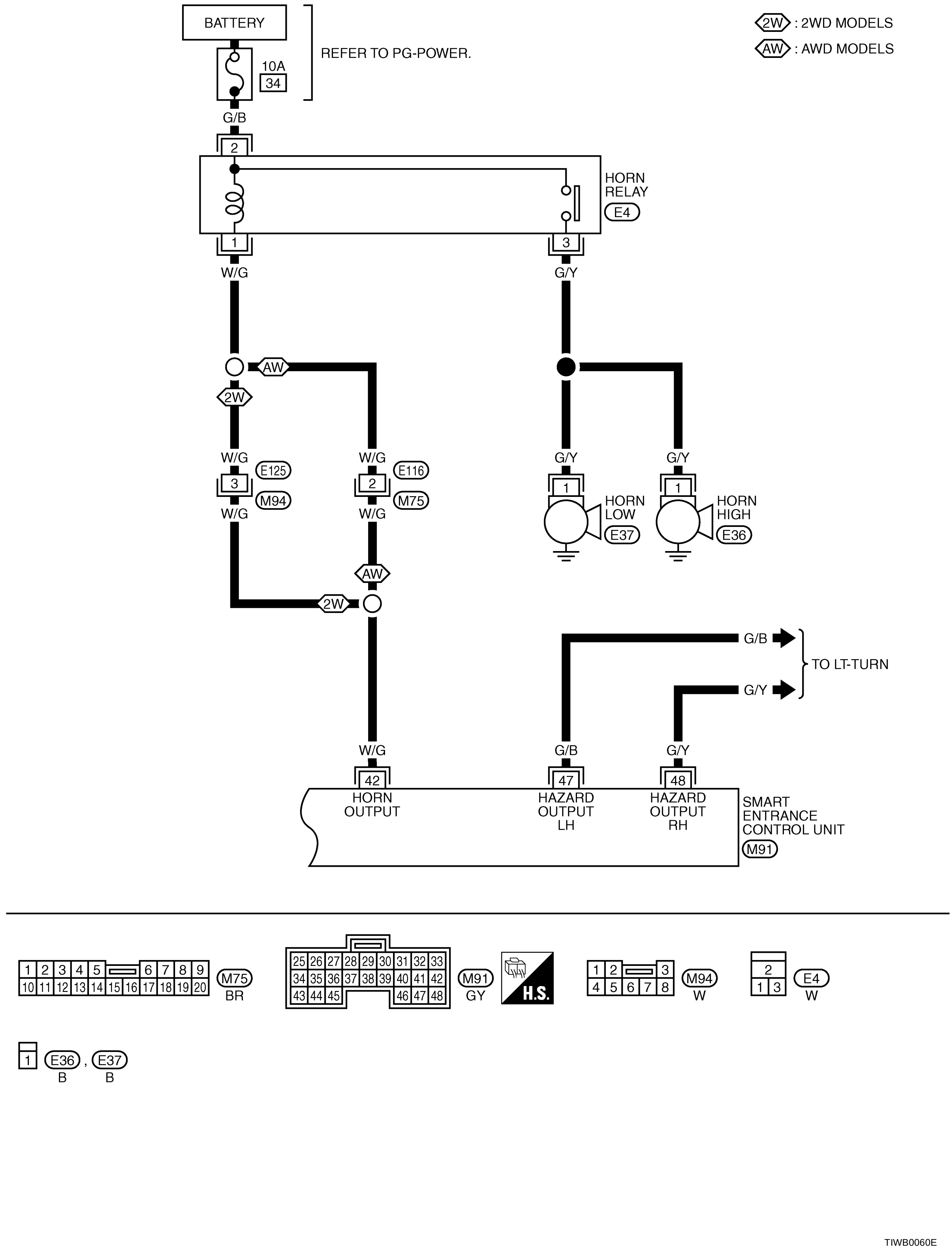


TIWB0058E

A
B
C
D
E
F
G
H
BL
J
K
L
M


BL-VEHSEC-04
SMART ENTRANCE CONTROL UNIT
M90
DOOR SW (DR)
DOOR SW (ASST)
DIODE
M96
SB
R/W
Y
R
M18
B2
M78
B105
REAR DOOR SWITCH RH
B121
FRONT DOOR SWITCH (PASSENGER SIDE)
B118
OPEN
CLOSED
B26
D51
D57
D41
FRONT DOOR SWITCH (DRIVER SIDE)
B16
REAR DOOR SWITCH LH
B20
BACK DOOR SWITCH
D45
D42
D56
B
B8
B18
D53
H.S.
L
BR
W
TIWB0059E

BL-VEHSEC-05


2W : 2WD MODELS
AW : AWD MODELS
BATTERY
10A
34
REFER TO PG-POWER.
G/B
2
HORN
RELAY
E4
1
3
W/G
G/Y
AW
2W
W/G
E125
3
M94
W/G
E116
2
M75
G/Y
1
HORN
LOW
E37
HORN
HIGH
E36
G/B
G/Y
TO LT-TURN
42
HORN
OUTPUT
47
HAZARD
OUTPUT
LH
48
HAZARD
OUTPUT
RH
SMART
ENTRANCE
CONTROL UNIT
M91
M75
BR
M91
GY
H.S.
M94
W
E4
W
E36
B
E37
B
TIWB0060E

Terminals and Reference Value for Smart Entrance Control Unit

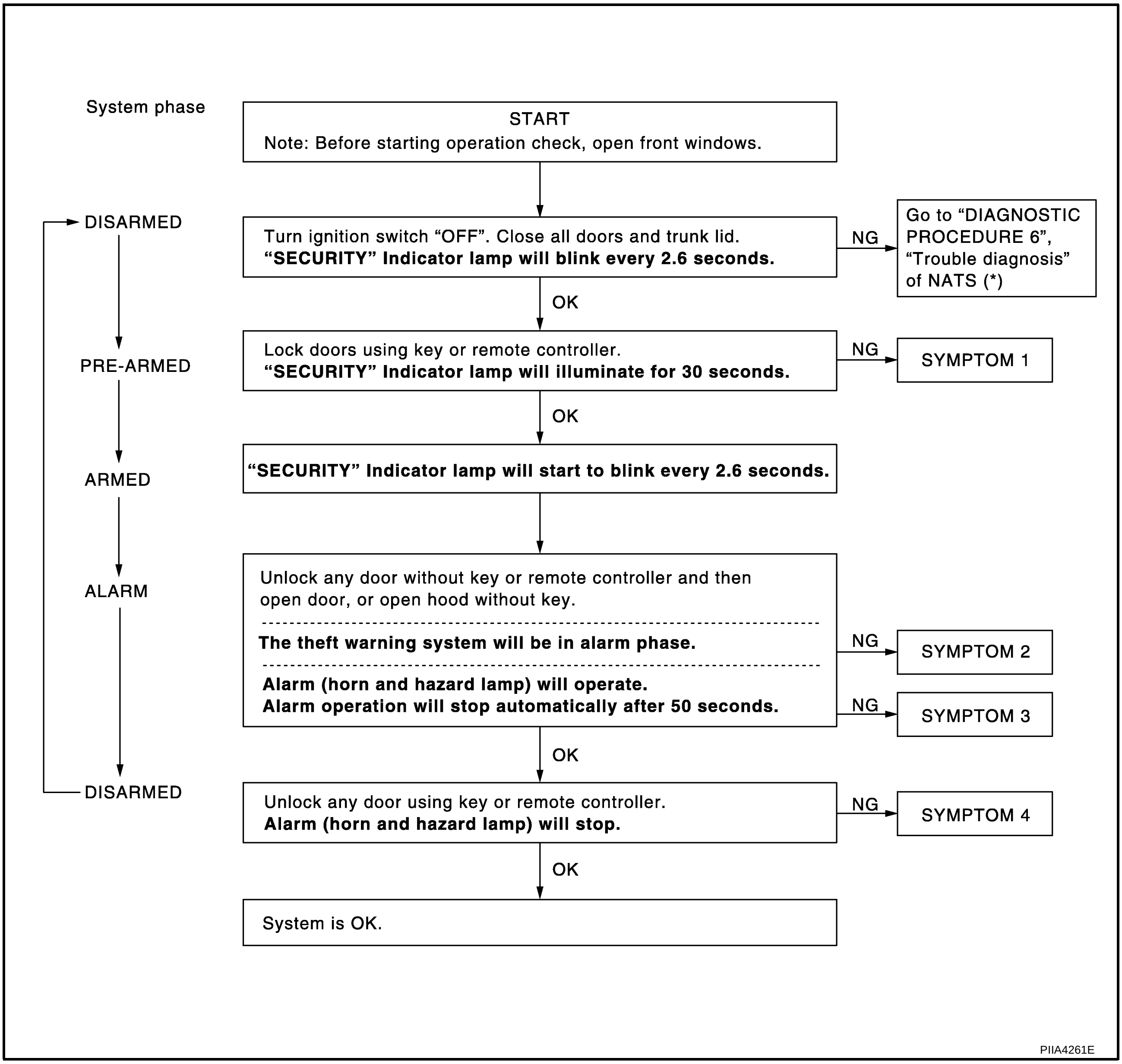
AIS0063I

TERMINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE [V] (Approx.)
1	SB	Door switch (Driver side)	ON (Door is opened) → OFF (Door is closed)	0 → 5
2	R/W	All door switch signal	ON (Door is opened) → OFF (Door is closed)	0 → 5
4	PU	Power door lock switch unlock signal	Unlock operation (ON)	0
			Other than above (OFF)	5
5	GY	Power door lock switch lock signal	Lock operation (ON)	0
			Other than above (OFF)	5
6	W/L	Hood switch signal	ON (Hood is opened) → OFF (Hood is closed)	0 → 5
10	GY/R	Door key cylinder unlock switch signal	OFF (Neutral) → ON (Unlocked)	5 → 0
11	Y/PU	Door key cylinder lock switch signal	OFF (Neutral) → ON (Locked)	5 → 0
26	GY/L	Ignition switch (ACC)	Ignition switch (ACC or ON position)	Battery voltage
27	G	Ignition switch (ON)	Ignition switch (ON or START position)	Battery voltage
38	OR	Security indicator lamp	Goes off → Illuminates	Battery voltage → 0
42	W/G	Horn relay	When panic alarm is operated using remote controller (ON → OFF)	0 → Battery voltage
43	B	Ground	—	0
49	L/R	Power source (Fuse)	—	Battery voltage
51	W	Power source (PTC)	—	Battery voltage
64	B	Ground	—	0

Preliminary Check

AIS0062Y

The system operation is canceled by turning ignition switch to “ACC” at any step between START and ARMED in the following flow chart.



After performing preliminary check, go to symptom chart. Refer to BL-88, "Symptom Chart".

Symptom Chart

AIS0062Z

PROCEDURE / SYMPTOM			Diagnostic procedure	Reference page
1	Vehicle security system cannot be set by ····	All items	Diagnostic Procedure 1 (Power supply and ground circuit check)	BL-89
			Diagnostic Procedure 2 (Driver door switch circuit check)	BL-90
			Diagnostic Procedure 3 (All door switch circuit check)	BL-90
			Diagnostic Procedure 4 (Hood switch circuit check)	BL-91
			If the above systems are “OK”, replace smart entrance control unit.	—
		Door outside key	Diagnostic Procedure 5 (Door key cylinder switch circuit check)	BL-92
			If the above systems are “OK”, replace smart entrance control unit.	—
		Key fob	Check “MULTI-REMOTE CONTROL” system.	BL-45
	Security indicator does not turn “ON”.		Diagnostic Procedure 6 (Security indicator lamp circuit check)	BL-94
			If the above systems are “OK”, replace smart entrance control unit.	—
2	*1 Vehicle security system does not alarm when ····	Any door is opened.	Diagnostic Procedure 2 (Driver door switch circuit check)	BL-90
			Diagnostic Procedure 3 (All door switch circuit check)	BL-90
			Diagnostic Procedure 4 (Hood switch circuit check)	BL-91
			If the above systems are “OK”, replace smart entrance control unit.	—
3	Vehicle security alarm does not activate.	Horn alarm	Diagnostic Procedure 7 (Theft warning horn circuit check)	BL-94
			If the above systems are “OK”, check horn system.	WW-18
		Hazard lamp alarm	Diagnostic Procedure 8 (Hazard lamp circuit check)	BL-96
			If the above systems are “OK”, replace smart entrance control unit.	—
4	Vehicle security system cannot be canceled by ····	Door outside key	Diagnostic Procedure 5 (Door key cylinder switch circuit check)	BL-92
			If the above systems are “OK”, replace smart entrance control unit.	—
		Key fob	Check “MULTI-REMOTE CONTROL” system.	BL-45

*1: Make sure the system is in the armed phase.

Diagnostic Procedure 1

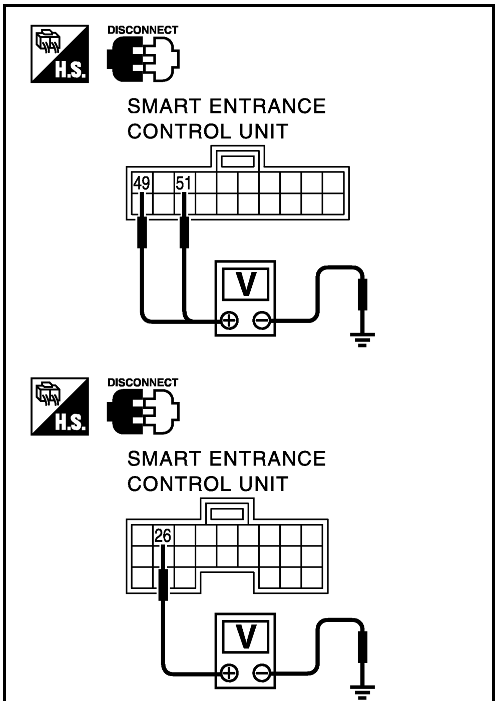
AIS00630

Power Supply and Ground Circuit Check

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminals (wire color)		Ignition switch position		
	(+)	(–)	OFF	ACC	ON
M91	26 (GY/L)	Ground	0V	Battery voltage	Battery voltage
M92	49 (L/R)		Battery voltage	Battery voltage	Battery voltage
	51 (W)		Battery voltage	Battery voltage	Battery voltage



PIIA4260E

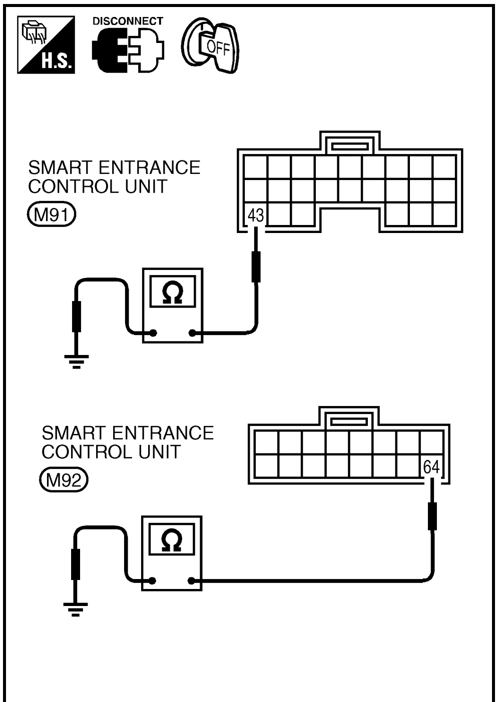
OK or NG

OK >> GO TO 2.
NG >> Check smart entrance control unit power supply circuit for open or short.

2. CHECK GROUND CIRCUIT

Check continuity between smart entrance control unit harness connector M91, M92 terminal 43, 64 and ground.

43 (B) – Ground : Continuity should exit.
64 (B) – Ground : Continuity should exit.



SIIA1518E

OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Check smart entrance control unit ground circuit for open or short.

Diagnostic Procedure 2

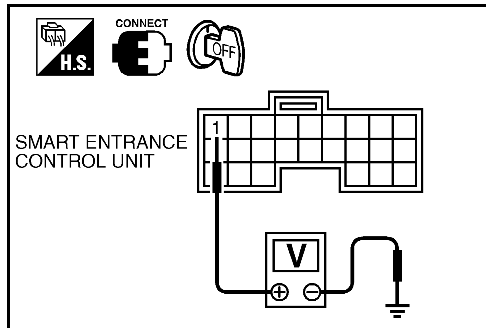
AIS00631

Front Door Switch (Driver side) Circuit Check

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminals (wire color)		Condition of front door (Driver side)	Voltage [V] (Approx.)
	(+)	(–)		
M90	1 (SB)	Ground	Closed	5
			Open	0



SIIA1536E

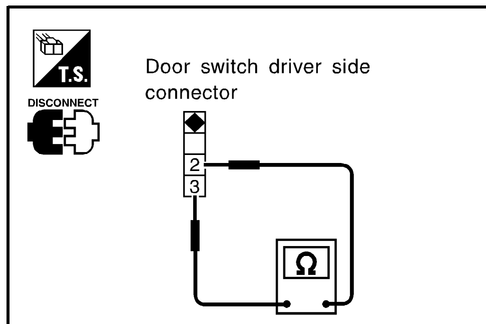
OK or NG

OK >> Front door switch (driver side) is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH

1. Disconnect front door switch (driver side) harness connector.
2. Check continuity between front door switch (driver side) terminals 2 and 3.

Terminals		Condition of front door switch (Driver side)	Continuity
2	3	Pushed	No
		Released	Yes



SIIA1537E

OK or NG

OK >> Check the following.
- Door switch ground circuit or front door switch (driver side) ground condition
- Harness for open or short between smart entrance control unit and front door switch (driver side)

NG >> Replace front door switch (driver side).

Diagnostic Procedure 3

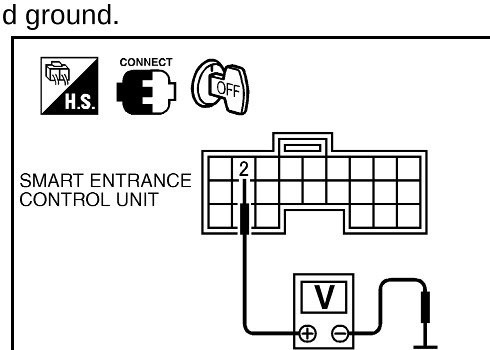
AIS00632

All Door Switch Circuit Check

1. CHECK DOOR SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit connector and ground.

connector	Terminals (wire color)		Condition of door	Voltage [V] (Approx.)
	(+)	(–)		
M90	2 (R/W)	Ground	Closed	5
			Open	0



SIIA1538E

OK or NG

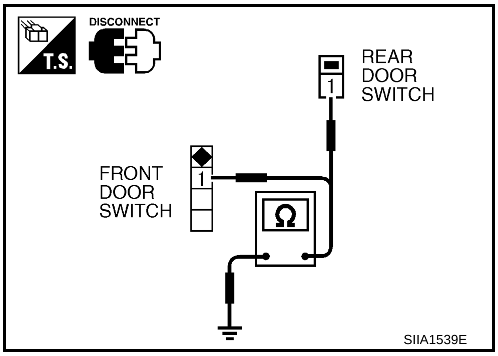
OK >> Door switch is OK.
NG >> GO TO 2.

2. CHECK DOOR SWITCH

Front door and rear door

1. Disconnect door switch harness connector.
2. Check continuity between door switch terminal 1 and ground.

Terminal		Condition of door switch	Continuity
1	Ground parts of door switch	Pushed	No
		Released	Yes

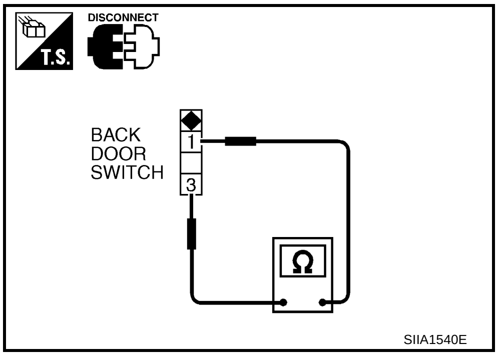


SIIA1539E

Back door

1. Disconnect door switch harness connector.
2. Check continuity between door switch terminals 1 and 3.

Terminal		Condition of back door switch	Continuity
1	3	Pushed	No
		Released	Yes



SIIA1540E

OK or NG

OK >> Check the following.
- Door switch ground circuit or door switch ground condition
- Harness for open or short between smart entrance control unit and door switch

NG >> Replace door switches.

Diagnostic Procedure 4

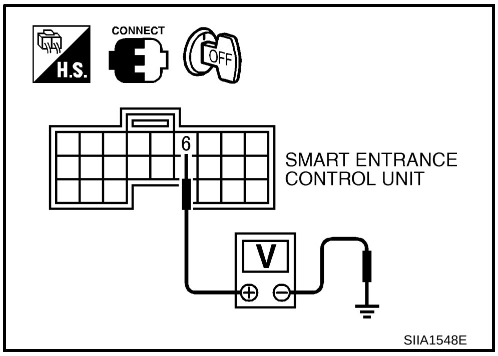
AIS00633

Hood Switch Circuit Check

1. CHECK HOOD SWITCH INPUT SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminals (wire color)		Condition of hood	Voltage [V] (Approx.)
	(+)	(–)		
M90	6 (W/L)	Ground	Open	0
			Close	5



SIIA1548E

OK or NG

OK >> Hood switch is OK.
NG >> GO TO 2.

2. CHECK HOOD SWITCH CONDITION

Check hood switch and hood fitting condition. Refer to BL-12, "Fitting Adjustment" .

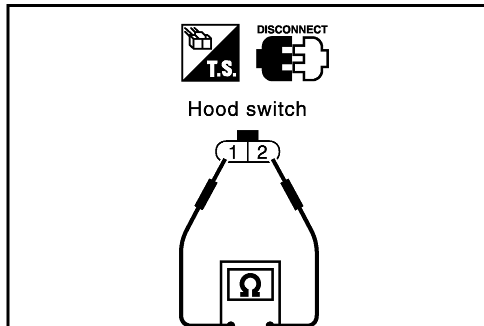
OK or NG

OK >> GO TO 3.
NG >> Adjust installation of hood switch.

3. CHECK HOOD SWITCH

1. Disconnect hood switch connector.
2. Check continuity between hood switch terminals.

Terminals		Condition of hood switch	Continuity
1	2	Closed (Pushed)	No
		Open (Released)	Yes



PIIA2498E

OK or NG

OK >> Check the following.
- Hood switch ground circuit
- Harness for open or short between hood switch and smart entrance control unit

NG >> Replace hood switch.

Diagnostic Procedure 5

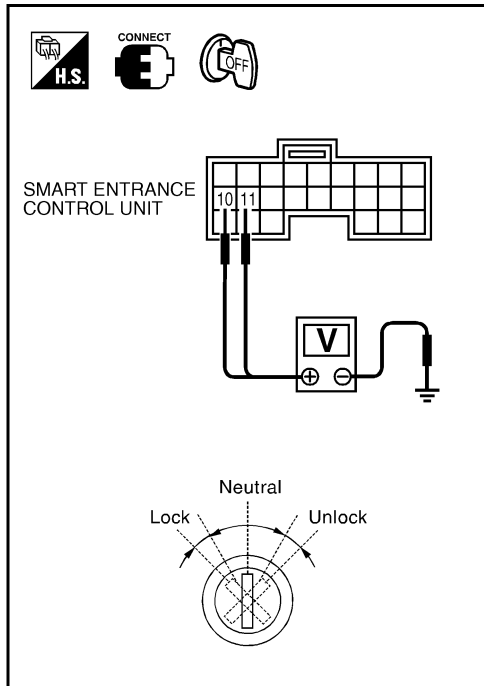
AIS00634

Door Key Cylinder Switch (Driver side) Circuit Check

1. CHECK DOOR KEY CYLINDER SWITCH SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connec-tor	Terminals (Wire color)		Condition of door key cylinder switch (driver side)	Voltage (V) (Approx.)
	(+)	(-)		
M90	10 (GY/R)	Ground	Unlock	0
			Neutral / Lock	5
	11 (Y/PU)		Lock	0
			Neutral / Unlock	5



SIIA1521E

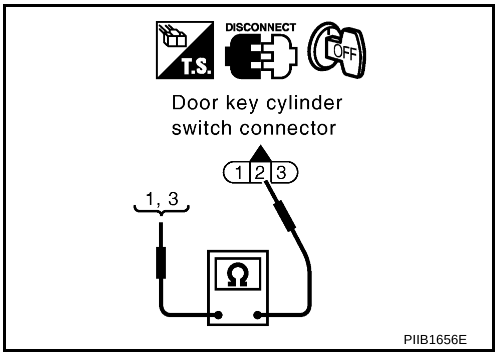
OK or NG

OK >> Door key cylinder switch (driver side) circuit is OK.
NG >> GO TO 2.

2. CHECK DOOR KEY CYLINDER SWITCH

1. Turn ignition switch OFF.
2. Disconnect door key cylinder switch (driver side) connector.
3. Check continuity between door key cylinder switch (driver side) terminals 1, 3 and 2.

Terminal		Condition of door key cylinder switch (driver side)	Continuity
1	2	Lock	Yes
		Neutral / Unlock	No
3		Unlock	Yes
		Neutral / Lock	No



OK or NG

OK >> Check the following.
- Door key cylinder switch (driver side) ground circuit
- Harness for open or short between time control unit and door key cylinder switch (driver side)

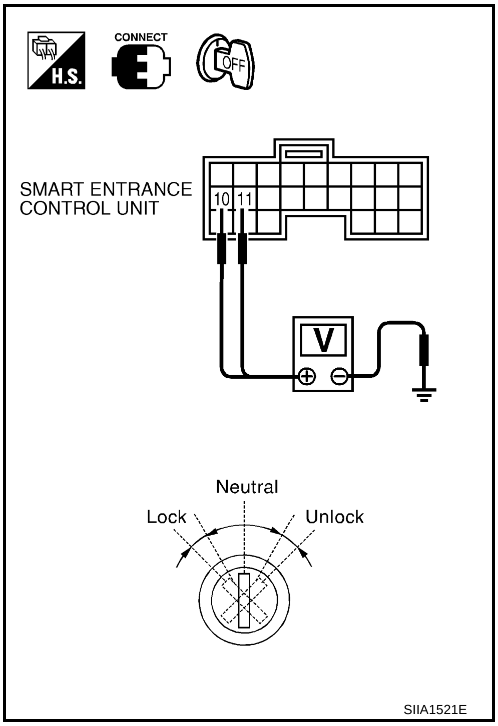
NG >> Replace door key cylinder switch (driver side).

Door Key Cylinder Switch (Passenger side) Circuit Check

1. CHECK DOOR KEY CYLINDER SWITCH SIGNAL

Check voltage between smart entrance control unit harness connector and ground.

Connector	Terminals (Wire color)		Condition of door key cylinder switch (passenger side)	Voltage (V) (Approx.)
	(+)	(-)		
M90	10 (GY/R)	Ground	Unlock	0
			Neutral / Lock	5
	11 (Y/PU)		Lock	0
			Neutral / Unlock	5



OK or NG

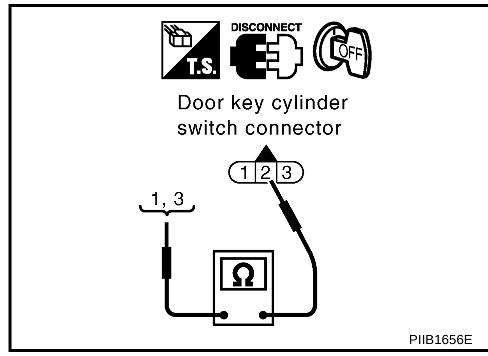
OK >> Door key cylinder switch (passenger side) circuit is OK.
NG >> GO TO 2.

A B C D E F G H BL J K L M

2. CHECK DOOR KEY CYLINDER SWITCH

1. Turn ignition switch OFF.
2. Disconnect door key cylinder switch (passenger side) connector.
3. Check continuity between door key cylinder switch (passenger side) terminals 1, 3 and 2.

Terminal		Condition of door key cylinder switch (passenger side)	Continuity
1	2	Unlock	Yes
		Neutral / Lock	No
3		Lock	Yes
		Neutral / Unlock	No



OK or NG

OK >> Check the following.

- Door key cylinder switch (passenger side) ground circuit
- Harness for open or short between time control unit and door key cylinder switch (passenger side)

NG >> Replace door key cylinder switch (passenger side).

Diagnostic Procedure 6

AIS00635

Security Indicator Lamp Circuit Check

1. INDICATOR LAMP CHECK

Check indicator lamp condition.

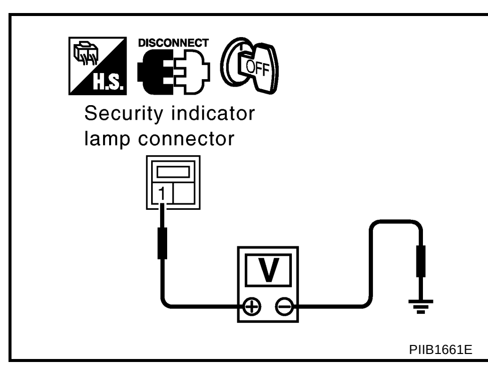
OK or NG

OK >> GO TO 2.
NG >> Replace indicator lamp.

2. CHECK POWER SUPPLY CIRCUIT FOR INDICATOR LAMP

1. Disconnect security indicator lamp connector.
2. Check voltage between indicator lamp harness connector M28 terminal 1 and ground.

1 (L) – Ground : Battery voltage



OK or NG

OK >> Check harness for open or short between security indicator lamp and smart entrance.
NG >> Check the following.

- 10A fuse [No. 28, located in fuse block (J/B)]
- Harness for open or short between security indicator lamp and smart entrance control unit.

Diagnostic Procedure 7

AIS00636

Theft Warning Horn Circuit Check

1. CHECK HORN

Check if horn sounds with horn switch.

Does horn operate?

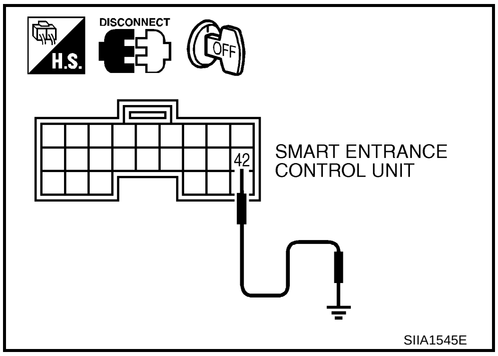
Yes >> GO TO 2.
No >> Check horn circuit. Refer to WW-18, "Wiring Diagram — HORN —" .

2. CHECK HORN REMINDER OPERATION

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit harness connector.
3. Apply ground to smart entrance control unit harness connector M91 terminal 42 (W/G).

Does horn operate?

Yes >> Replace smart entrance control unit.
No >> GO TO 3.



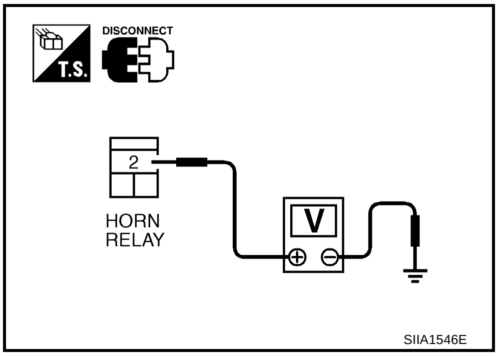
3. CHECK HORN RELAY POWER SUPPLY

1. Remove horn relay.
2. Check voltage between horn relay harness connector E4 terminal 2 and ground.

2 (G/B) – Ground : Battery voltage

OK or NG

OK >> Check harness open or short between smart entrance control unit and horn relay.
NG >> Check harness open or short between horn relay and fuse.



Diagnostic Procedure 8

AIS00637

Hazard Warning Lamp Circuit Check

1. CHECK HAZARD WARNING LAMP

Check if hazard warning lamp flashes with hazard switch.

Does hazard warning lamp operate?

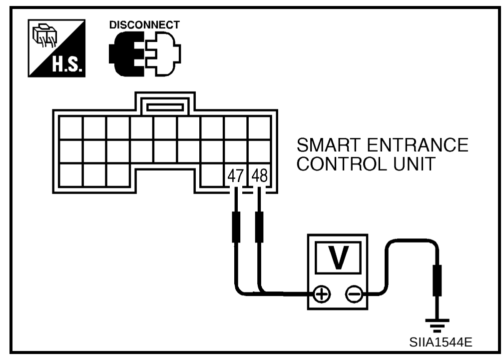
Yes >> GO TO 2.
No >> Check hazard warning lamp circuit.

2. CHECK HAZARD WARNING LAMP OPERATION

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check the following at when push the key fob switch.
   Check voltage between smart entrance control unit harness connector M91terminal 47, 48 and ground.

47 (G/B) – Ground : Battery voltage

48 (G/Y) – Ground : Battery voltage



OK or NG

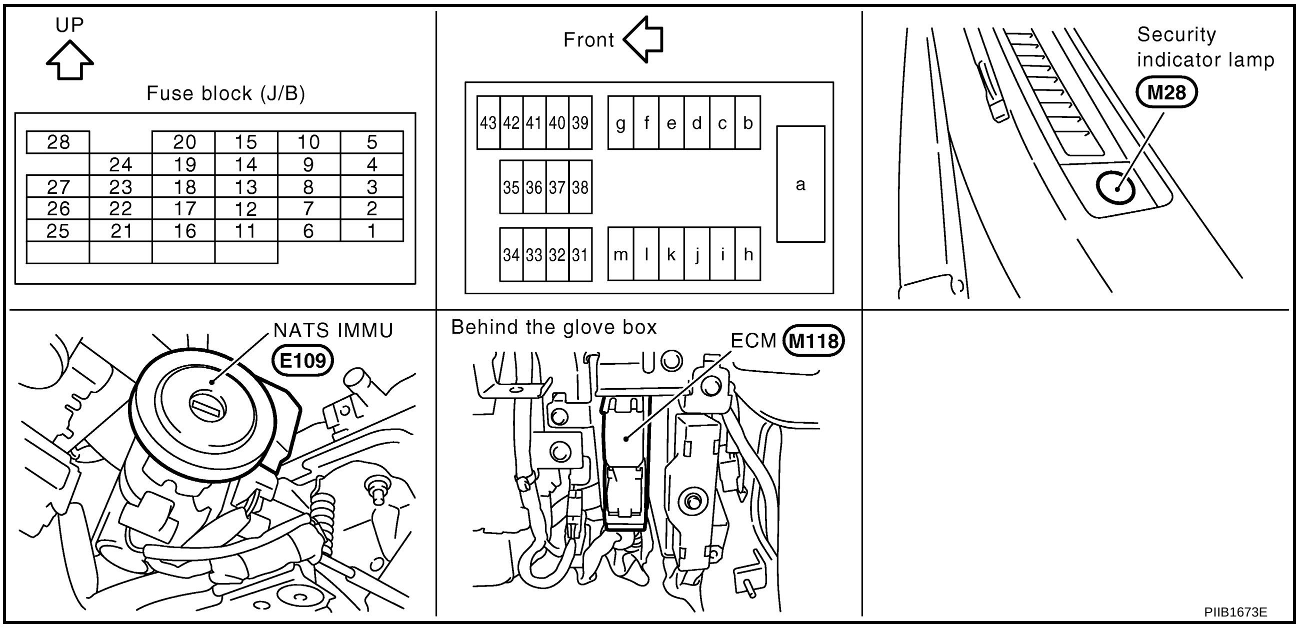
OK >> Check harness for open or short between smart entrance control unit and hazard switch.
NG >> Replace smart entrance control unit.

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)

PFP:25386

Component Parts and Harness Connector Location

AIS005YM



NOTE:

If customer reparts a “No start” condition, request ALL KEYS to brought to an NISSAN dealer in case of a NAVIS (NATS) malfunction.

System Description

AIS005YN

NVIS (Nissan Vehicle Immobilizer System - NATS) has the following immobilizer functions:

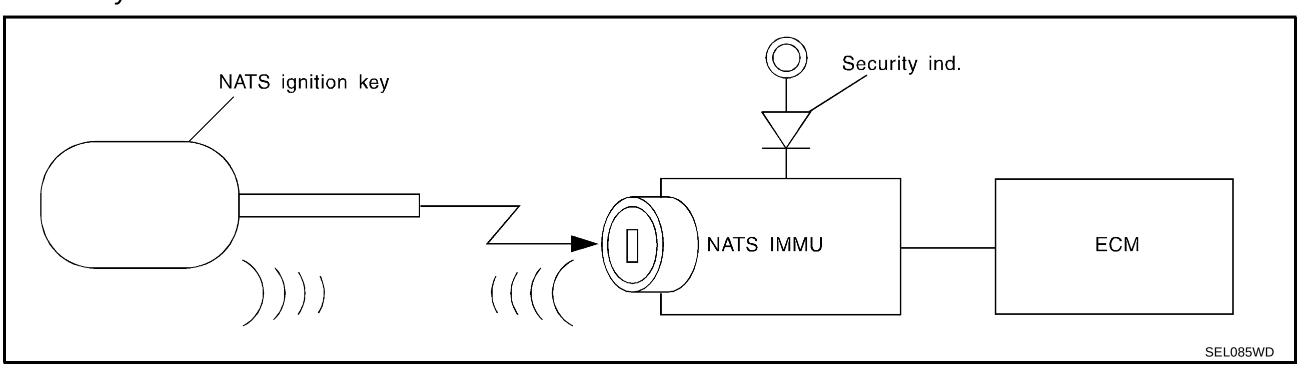
- Since only NVIS (NATS) ignition keys, whose ID Nos. have been registered into the ECM and NATS IMMU allow the engine to run, operation of a stolen vehicle without a NVIS (NATS) registered key is prevented by NVIS (NATS).
  That is to say, NVIS (NATS) will immobilize the engine if someone tries to start it without the registered key of NVIS (NATS).
- All of the originally supplied ignition key IDs have been registered in NVIS (NATS).
  If requested by the vehicle owner, a maximum of five key IDs can be registered into the NVIS (NATS) components.
- The security indicator blinks when the ignition switch is in “OFF” or “ACC” position. Therefore, NVIS (NATS) warns outsiders that the vehicle is equipped with the anti-theft system.
- When NVIS (NATS) detects trouble, the security indicator lamp lights up as follows.
- NVIS (NATS) trouble diagnoses, system initialization and additional registration of other NVIS (NATS) ignition key IDs must be carried out using CONSULT-II hardware and CONSULT-II NATS software.
  Regarding the procedures of NVIS (NATS) initialization and NATS ignition key ID registration, refer to CONSULT-II operation manual, NATS - IVIS / NVIS.
- **When servicing a malfunction of the NVIS (NATS) (indicated by lighting up of Security Indicator Lamp) or registering another NATS ignition key ID no., it may be necessary to re-register original key identification. Therefore, be sure to receive ALL KEYS from vehicle owner.**

System Composition

AIS005YO

The immobilizer function of the NVIS (NATS) consists of the following:

- NATS ignition key
- NATS immobilizer control unit (IMMU) located in the ignition key cylinder
- Engine control module (ECM)
- Security indicator



ECM Re-communicating Function

AIS005YP

Performing following procedure can automatically perform re-communication of ECM and NATS IMMU, but only when the ECM has been replaced with a new one (*1).
*1: New one means a virgin ECM which has never been energized on-board.
(In this step, initialization procedure by CONSULT-II is not necessary)

NOTE:

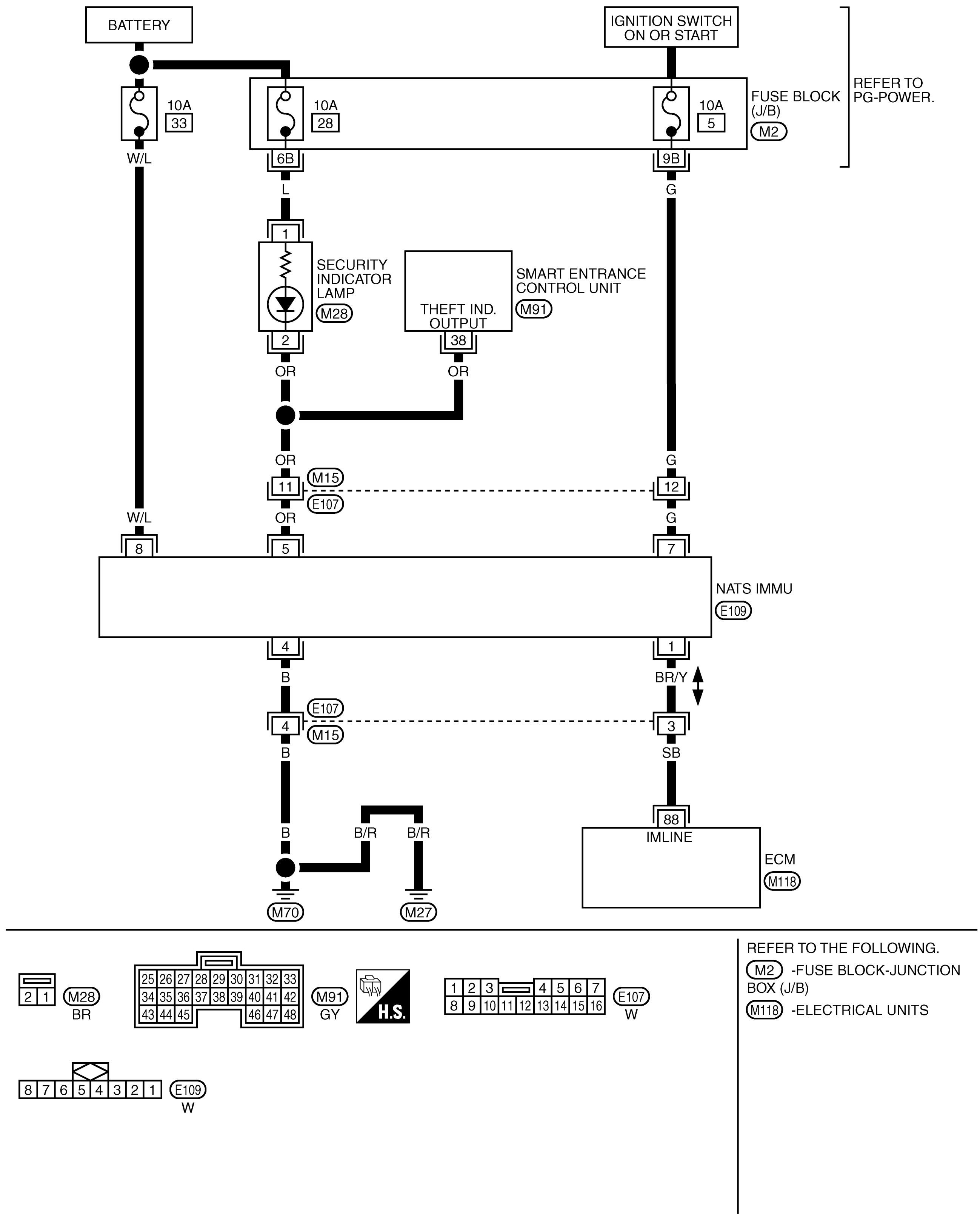
- **When registering new Key IDs or replacing the ECM other than brand new, refer to CONSULT-II Operation Manual NATS - IVIS / NVIS.**
- **If multiple keys are attached to the key holder, separate them before work.**
- **Distinguish keys with unregistered key ID from those with registered ID.**

1. Install ECM.
2. Using a registered key (*2), turn ignition switch to “ON”.
   *2: To perform this step, use the key (except for card plate key) that has been used before performing ECM replacement.
3. Maintain ignition switch in “ON” position for at least 5 seconds.
4. Turn ignition switch to “OFF”.
5. Start engine.
   If engine can be started, procedure is completed.
   If engine cannot be started, refer to CONSULT-II Operation Manual NATS - IVIS / NVIS and initialize control unit.

Wiring Diagram — NATS —

AIS005YQ

BL-NATS-01



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CONSULT-II

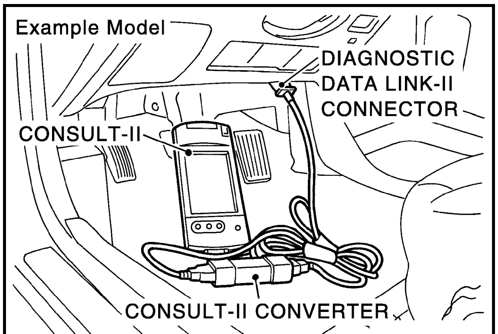
AIS005YS

CONSULT-II INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Insert NVIS (NATS) program card into CONSULT-II.

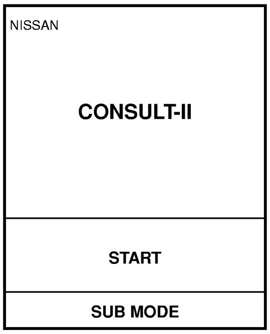
Program card : NATS (AEN02C–1)

3. Connect CONSULT-II to data link connector.



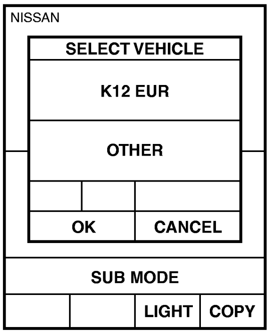
PAIA0070E

4. Turn ignition switch ON.
5. Touch “START”.



PBR455D

6. Touch “OTHER”.



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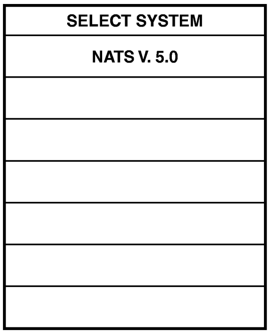
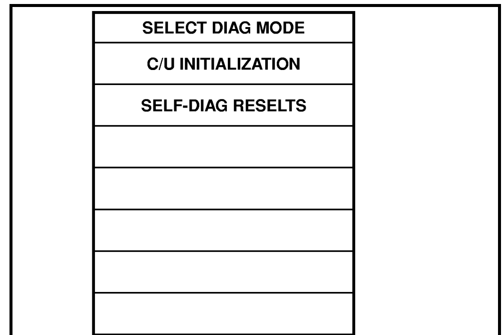
7. Select “NATS V.5.0”.



SEL027X

8. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual, NATS - IVIS / NVIS.



SEL150X

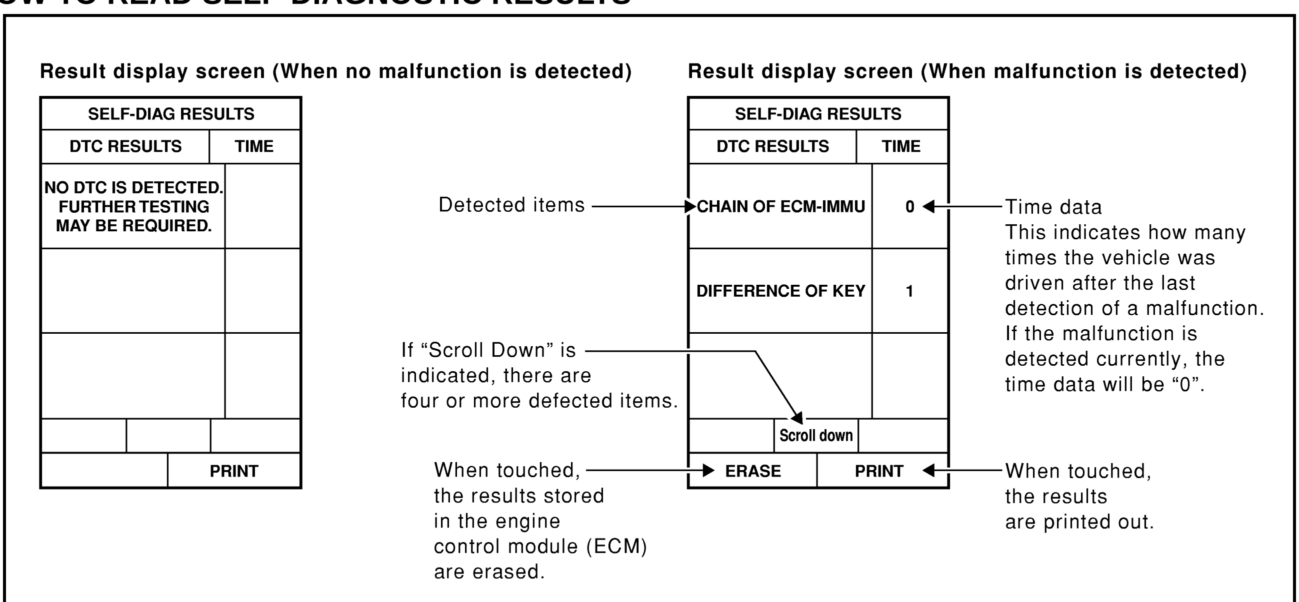
CONSULT-II DIAGNOSTIC TEST MODE FUNCTION

CONSULT-II DIAGNOSTIC TEST MODE	Description
C/U INITIALIZATION	When replacing any of the following components, C/U initialization and re-registration of all NATS ignition keys are necessary. [NATS ignition key/IMMU/ECM]
SELF-DIAG RESULTS	Detected items (screen terms) are as shown in the chart. BL-103, "NVIS (NATS) SELF-DIAGNOSTIC RESULTS ITEM CHART"

NOTE:

- When any initialization is performed, all ID previously registered will be erased and all NATS ignition keys must be registered again.
- The engine cannot be started with an unregistered key. In this case, the system may show “DIFFERENCE OF KEY” or “LOCK MODE” as a self-diagnostic result on the CONSULT-II screen.
- In rare case, “CHAIN OF ECM-IMMU” might be stored as a self-diagnostic result during key registration procedure, even if the system is not malfunctioning.

HOW TO READ SELF-DIAGNOSTIC RESULTS



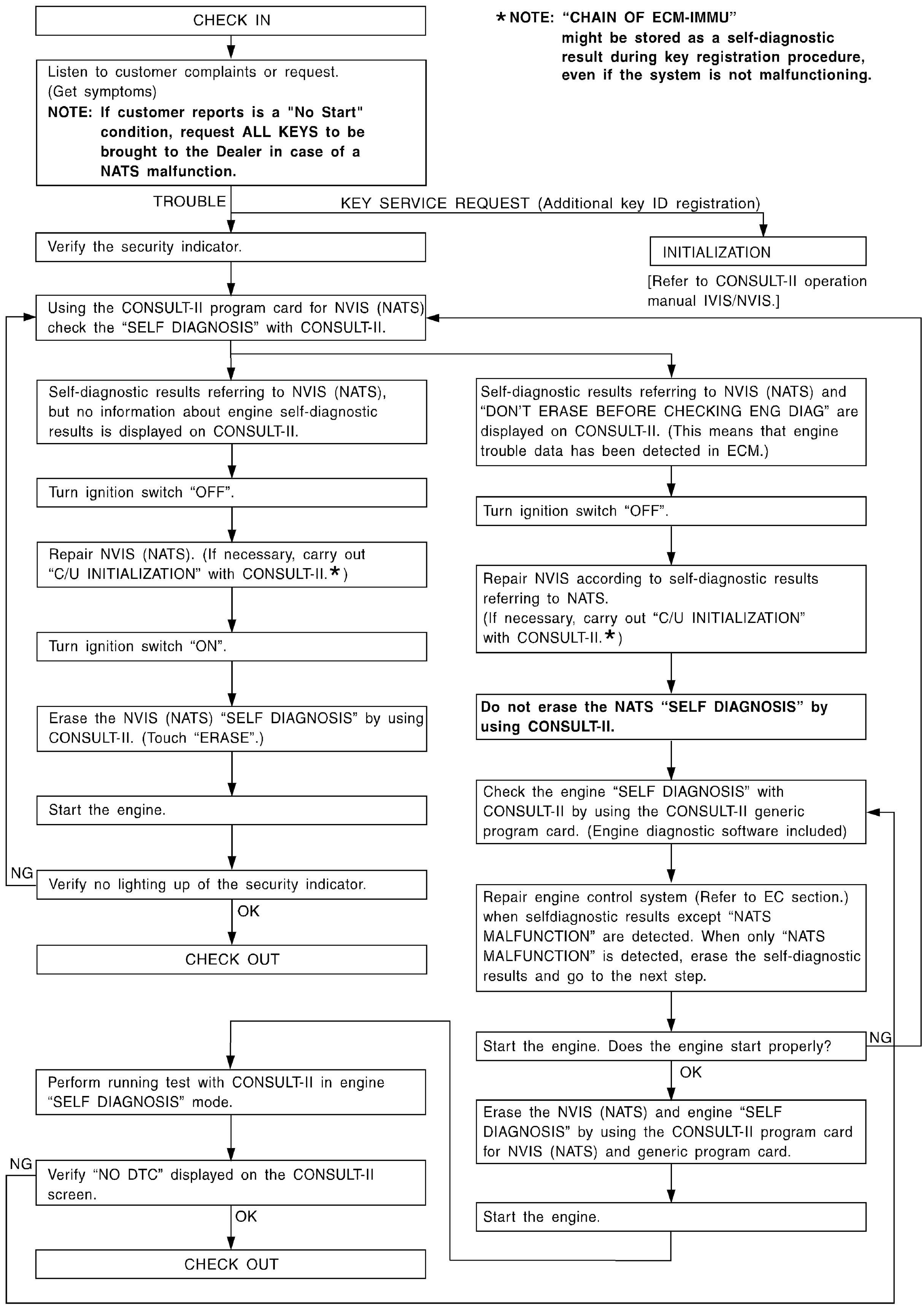
SEL151X

NVIS (NATS) SELF-DIAGNOSTIC RESULTS ITEM CHART

Detected items [NVIS (NATS) program card screen terms]	P No. Code (Self-diagnostic result of "ENGINE"	Malfunction is detected when.....	Reference page
ECM INT CIRC-IMMU	NATS MAL-FUNCTION P1613	The malfunction of ECM internal circuit of IMMU communication line is detected.	BL-107
CHAIN OF ECM-IMMU	NATS MAL-FUNCTION P1612	Communication impossible between ECM and IMMU (In rare case, "CHAIN OF ECM-IMMU" might be stored during key registration procedure, even if the system is not malfunctioning.)	BL-107
DIFFERENCE OF KEY	NATS MAL-FUNCTION P1615	IMMU can receive the key ID signal but the result of ID verification between key ID and IMMU is NG.	BL-110
CHAIN OF IMMU-KEY	NATS MAL-FUNCTION P1614	IMMU cannot receive the key ID signal.	BL-111
ID DISCORD, IMM-ECM	NATS MAL-FUNCTION P1611	The result of ID verification between IMMU and ECM is NG. System initialization is required.	BL-112
LOCK MODE	NATS MAL-FUNCTION P1610	When the starting operation is carried out five or more times consecutively under the following conditions, NATS will shift the mode to one which prevents the engine from being started. ● Unregistered ignition key is used. ● IMMU or ECM's malfunctioning.	BL-114
DON'T ERASE BEFORE CHECK-ING ENG DIAG	—	All engine trouble codes except NVIS (NATS) trouble code has been detected in ECM.	BL-104

Work Flow

AIS005YT



SEL004XA

Trouble Diagnoses

AIS005YU

SYMPTOM MATRIX CHART 1

Self-diagnosis related item

SYMPTOM	Displayed "SELF-DIAG RESULTS" on CONSULT-II screen.	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)	REFERENCE PART NO. OF ILLUSTRATION ON SYSTEM DIAGRAM
● Security indicator lighting up* ● Engine cannot be started	ECM INT CIRC-IMMU	PROCEDURE 1 (BL-107)	ECM	B
	CHAIN OF ECM-IMMU	PROCEDURE 2 (BL-107)	In rare case, "CHAIN OF ECM-IMMU" might be stored during key registration procedure, even if the system is not malfunctioning.	—
			Open circuit in battery voltage line of NATS IMMU circuit	C1
			Open circuit in ignition line of NATS IMMU circuit	C2
			Open circuit in ground line of NATS IMMU circuit	C3
			Open circuit in communication line between NATS IMMU and ECM	C4
			Short circuit between NATS IMMU and ECM communication line and battery voltage line	C4
			Short circuit between NATS IMMU and ECM communication line and ground line	C4
			ECM	B
			NATS IMMU	A
	DIFFERENCE OF KEY	PROCEDURE 3 (BL-110)	Unregistered key	D
			NATS IMMU	A
	CHAIN OF IMMU-KEY	PROCEDURE 4 (BL-111)	Malfunction of key ID chip	E
			NATS IMMU	A
	ID DISCORD, IMM-ECM	PROCEDURE 5 (BL-112)	System initialization has not yet been completed.	F
			ECM	B

SYMPTOM	Displayed "SELF-DIAG RESULTS" on CONSULT-II screen.	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)	REFERENCE PART NO. OF ILLUSTRATION ON SYSTEM DIAGRAM
● Security indicator lighting up* ● Engine cannot be started	LOCK MODE	PROCEDURE 7 (BL-114)	LOCK MODE	When the starting operation is carried out five or more times consecutively under the following conditions, NVIS (NATS) will shift the mode to one which prevents the engine from being started. ● Unregistered ignition key is used. ● IMMU or ECM's malfunctioning.
● MIL staying ON ● Security indicator lighting up*	DON'T ERASE BEFORE CHECKING ENG DIAG	WORK FLOW (BL-104)	Engine trouble data and NVIS (NATS) trouble data have been detected in ECM	—

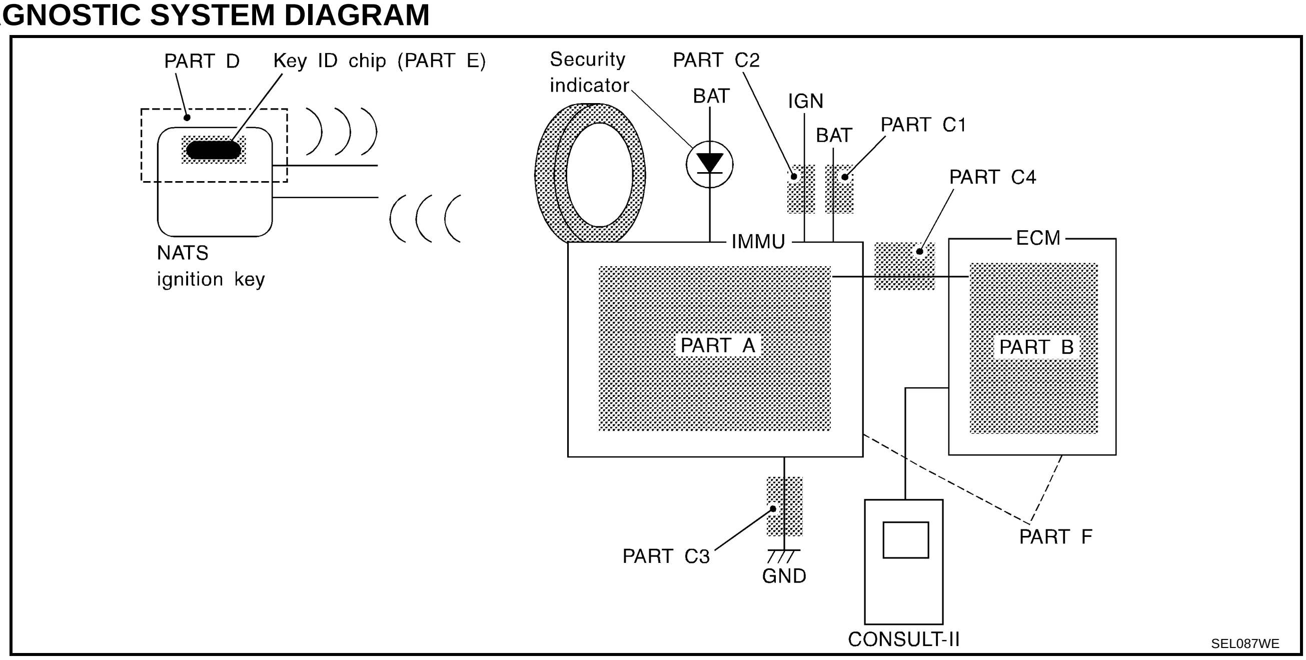
*: When NATS detects trouble, the security indicator lights up while ignition key is in the "ON" position.

SYMPTOM MATRIX CHART 2

Non self-diagnosis related item

SYMPTOM	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)	REFERENCE PART NO. OF ILLUSTRATION ON SYSTEM DIAGRAM
Security indictor does not light up.	PROCEDURE 6 (BL-113)	Security indicator	—
		Open circuit between Fuse and IMMU	—
		Continuation of initialization mode	—
		IMMU	A

DIAGNOSTIC SYSTEM DIAGRAM

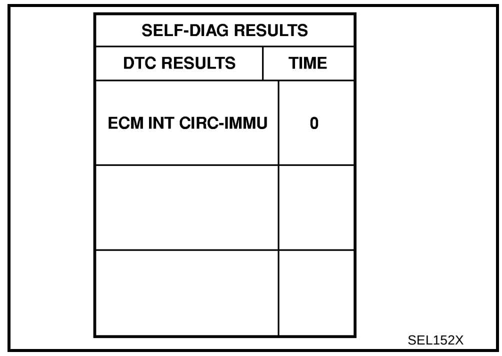


Diagnostic Procedure 1

AIS005YV

Self-diagnostic results:
“ECM INT CIRC-IMMU” displayed on CONSULT-II screen

1. Confirm SELF-DIAGNOSTIC RESULTS “ECM INT CIRC-IMMU” displayed on CONSULT-II screen. Ref. part No. B.
2. Replace ECM.
3. Perform initialization with CONSULT-II.
   For initialization, refer to “CONSULT-II operation manual NATS-IVIS / NVIS ”.



Diagnostic Procedure 2

AIS005YW

Self-diagnostic results:
“CHAIN OF ECM-IMMU” displayed on CONSULT-II screen

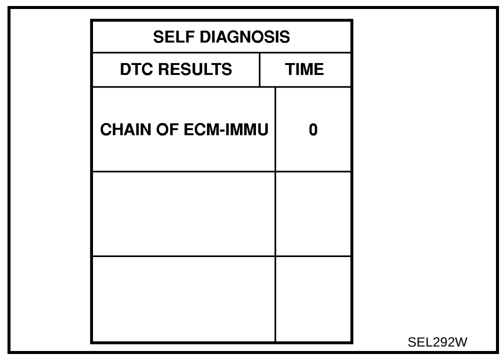
1. CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “CHAIN OF ECM-IMMU” displayed on CONSULT-II screen.

NOTE:
In rare case, “CHAIN OF ECM-IMMU” might be stored during key registration procedure, even if the system is not malfunctioning.

Is CONSULT-II screen displayed as shown in figure?

Yes >> GO TO 2.
No >> GO TO BL-105, "SYMPTOM MATRIX CHART 1" .



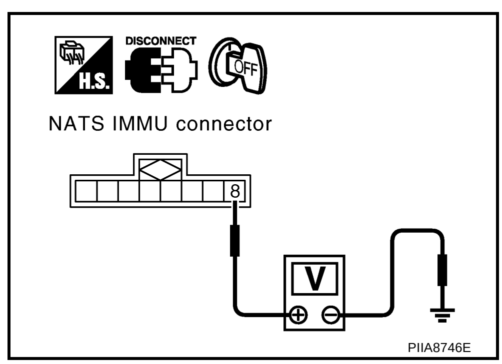
2. CHECK POWER SUPPLY CIRCUIT FOR NATS IMMU

1. Turn ignition switch OFF.
2. Disconnect NATS IMMU connector.
3. Check voltage between NATS IMMU harness connector E109 terminal 8 and ground with CONSULT-II or tester.

8 (W/L) – Ground : Battery voltage

OK or NG

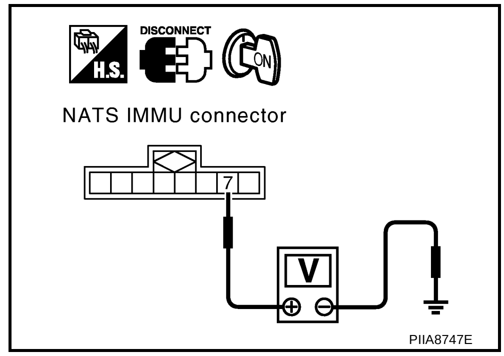
OK >> GO TO 3.
NG >> Check the following.
- 10A fuse (No. 33, located in the fuse and fusible link box)
- Harness for open or short between fuse and NATS IMMU **Ref. Part No. C1**



A B C D E F G H BL J K L M

3. CHECK IGNITION SWITCH ON SIGNAL

1. Turn ignition switch ON.
2. Check voltage between NATS IMMU harness connector E109 terminal 7 and ground with CONSULT-II or tester.



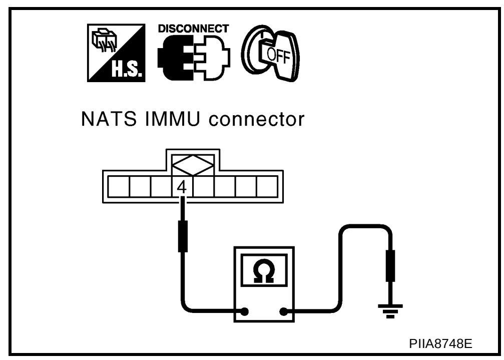
7 (G) – Ground : Battery voltage

OK or NG

OK >> GO TO 4.
NG >> Check the following.
- 10A fuse [No. 5, located in the fuse block (J/B)]
- Harness for open or short between fuse and NATS IMMU **Ref. part No. C2**

4. CHECK GROUND CIRCUIT FOR NATS IMMU

1. Turn ignition OFF.
2. Check harness continuity between NATS IMMU harness connector E109 terminal 4 and ground.



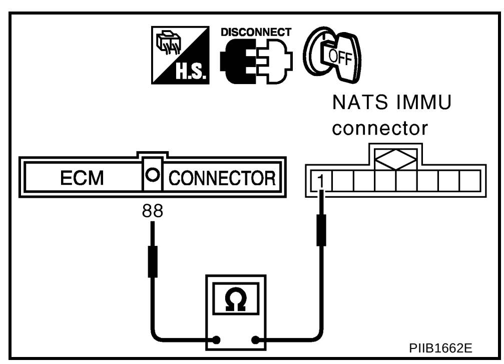
4 (B) – Ground : Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Repair harness. **Ref. part No. C3**

5. CHECK COMMUNICATION LINE OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check harness continuity between ECM harness connector M118 terminal 88 and NATS IMMU harness connector terminal 1.



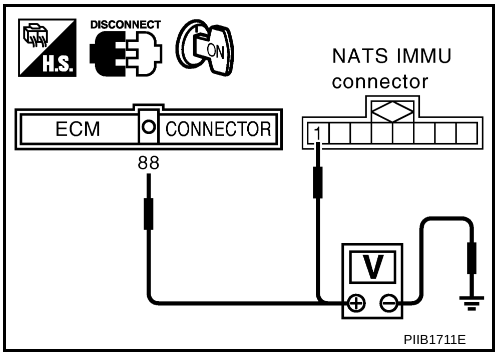
88 (SB) – 1 (BR/Y) : Continuity should exist.

OK or NG

OK >> GO TO 6.
NG >> Repair harness or connector. **Ref. part No. C4**

6. CHECK COMMUNICATION LINE BATTERY SHORT CIRCUIT

1. Turn ignition ON.
2. Check voltage between ECM harness connector M118 terminal 88, NATS IMMU harness connector E109 terminal 1 and ground.



88 (SB) – Ground : Approx. 0V

1 (BR/Y) – Ground : Approx. 0V

OK or NG

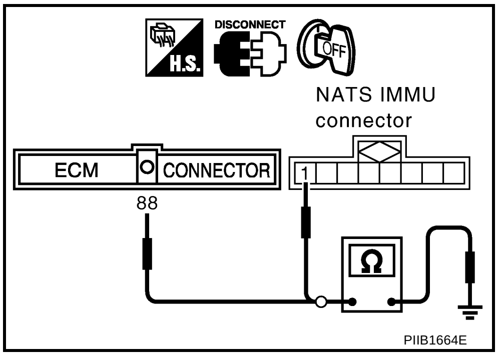
OK >> GO TO 7.

NG >> Check the following.

- Communication line is short-circuited with battery voltage line or ignition switch ON line
- Repair harness or connectors. **Ref. part No. C4**

7. CHECK COMMUNICATION LINE GROUND SHORT CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between ECM harness connector M118 terminal 88, NATS IMMU harness connector E109 terminal 1 and ground.



88 (SB) – Ground : Continuity should not exist.

1 (BR/Y) – Ground : Continuity should not exist.

OK or NG

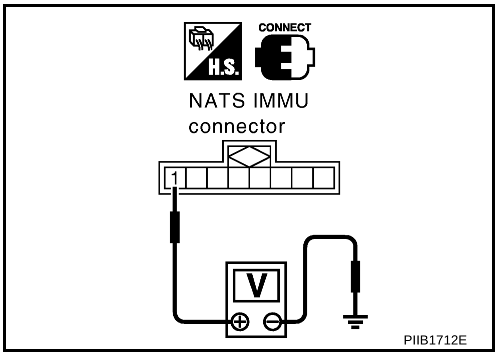
OK >> GO TO 8.

NG >> Check the following.

- Communication line is short-circuited with ground line
- Repair harness or connectors. **Ref. part No. C4**

8. SIGNAL FROM ECM TO IMMU CHECK

1. Connect NATS IMMU connector.
2. Check voltage between NATS IMMU harness connector E109 terminal 1 and ground with analogue tester.



1 (BR/Y) - Ground:

Before turning ignition switch “ON”

: Battery voltage

Just after turning ignition switch “ON”

: Pointer of tester should move.

OK or NG

OK >> NATS IMMU is malfunctioning.

- Replace NATS IMMU. **Ref. part No. A**
- Perform initialization with CONSULT-II
- For the operation of initialization, refer to “CONSULT-II Operation Manual NATS -IVIS / NVIS”

NG >> ECM is malfunctioning.

- Replace ECM. **Ref. part No. B**
- Perform initialization with CONSULT-II
- For the operation of initialization, refer to “CONSULT-II Operation Manual NATS -IVIS / NVIS”

Diagnostic Procedure 3

AIS005YX

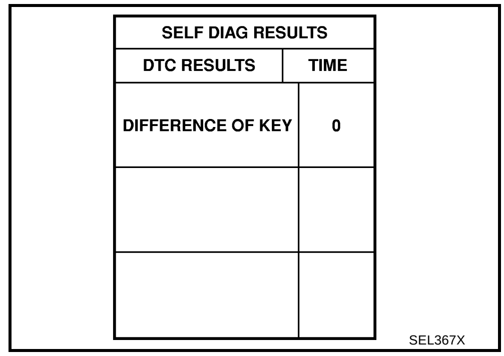
Self-diagnostic results:
"DIFFERENCE OF KEY" displayed on CONSULT-II screen

1. CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS "DIFFERENCE OF KEY" displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as shown in figure?

Yes >> GO TO 2.
No >> GO TO BL-105, "SYMPTOM MATRIX CHART 1" .



SEL367X

2. PERFORM INITIALIZATION WITH CONSULT-II

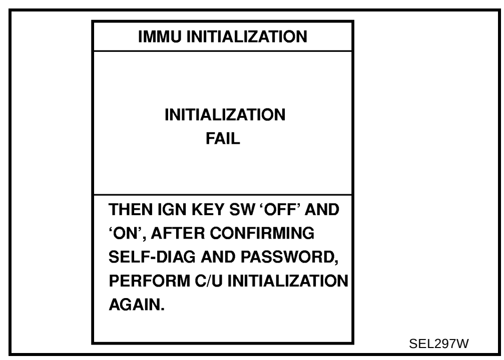
Perform initialization with CONSULT-II. Re-register all NATS ignition key IDs.
For initialization and registration of NATS ignition key IDs, refer to "CONSULT-II operation manual NATS -IVIS / NVIS".

NOTE:
If the initialization is not completed or fails, CONSULT-II shows above message on the screen.

Can the system be initialized and can the engine be started with re-registered NATS ignition key?

Yes >> Ignition key ID was unregistered. **Ref. part No. D**
No >> NAST IMMU is malfunctioning.

- Replace IMMU. **Ref. part No. A**
- Perform initialization with CONSULT-II
- For initialization, refer to "CONSULT-II operation manual NATS - IVIS / NVIS"



SEL297W

Diagnostic Procedure 4

AIS005YY

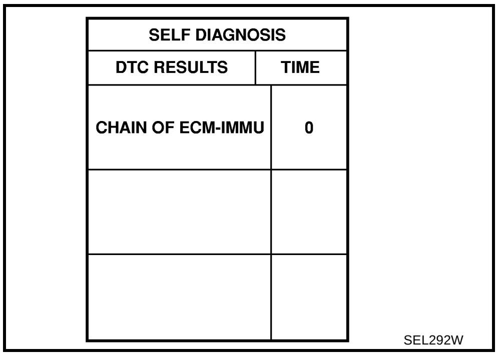
Self-diagnostic results:
“CHAIN OF IMMU-KEY” displayed on CONSULT-II screen

1. CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “CHAIN OF IMMU-KEY” displayed on CONSULT-II screen.

Is CONSULT-II screen displayed as shown in figure?

Yes >> GO TO 2.
No >> GO TO BL-105, "SYMPTOM MATRIX CHART 1" .



SEL292W

2. CHECK NATS IGNITION KEY ID CHIP

Start engine with another registered NATS ignition key.

Does the engine start?

Yes >> Ignition key ID chip is malfunctioning.
- Replace the ignition key. **Ref. part No. E**
- Perform initialization with CONSULT-II
- For initialization, refer to “CONSULT-II Operation Manual NATS -IVIS / NVIS”

No >> GO TO 3.

3. CHECK HARNESS CONNECTOR CONNECTION

Check NATS IMMU installation.
Refer to BL-115, "How to Replace NATS IMMU" .

OK or NG

OK >> NATS IMMU is malfunctioning.
- Replace NATS IMMU. **Ref. part No. A**
- Perform initialization with CONSULT-II
- For initialization, refer to “CONSULT-II Operation Manual NATS -IVIS / NVIS”

NG >> Reinstall NATS IMMU correctly.

Diagnostic Procedure 5

AIS005YZ

Self-diagnostic results:
“ID DISCORD, IMM-ECM” displayed on CONSULT-II screen

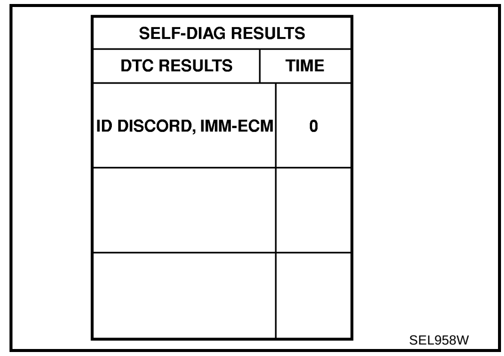
1. CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “ID DISCORD, IMM-ECM” displayed on CONSULT-II screen.

NOTE:
“ID DISCORD IMMU-ECM”:
Registered ID of IMMU is in discord with that of ECM.

<u>Is CONSULT-II screen displayed as shown in figure?</u>

Yes >> GO TO 2.
No >> GO TO BL-105, "SYMPTOM MATRIX CHART 1" .

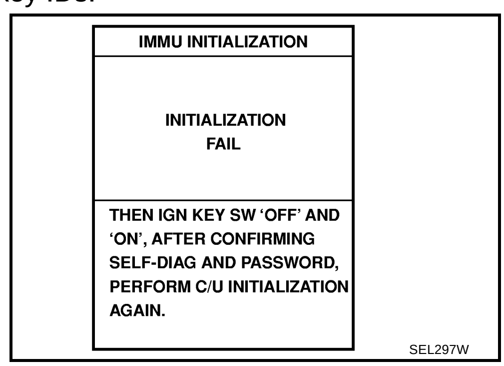


SEL958W

2. PERFORM INITIALIZATION WITH CONSULT-II

Perform initialization with CONSULT-II. Re-register all NATS ignition key IDs.
For initialization, refer to “CONSULT-II operation manual NATS - IVIS / NVIS”.

NOTE:
If the initialization is not completed or fails, CONSULT-II shows above message on the screen.



SEL297W

<u>Can the system be initialized?</u>

Yes >>
- Start engine. (END)
- (System initialization had not been completed. **Ref. part No. B**)

No >> ECM is malfunctioning.
- Replace ECM. **Ref. part No. B**
- Perform initialization with CONSULT-II
- For initialization, refer to “CONSULT-II operation manual NATS -IVIS / NVIS”

Diagnostic Procedure 6

AIS005Z0

"SECURITY INDICATOR LAMP DOES NOT LIGHT UP"

1. CHECK FUSE

Check 10A fuse [No. 28, located in the fuse block (J/B)].

Is 10A fuse OK?

Yes >> GO TO 2.
No >> Replace fuse.

2. CHECK SECURITY INDICATOR LAMP

1. Install 10A fuse.
2. Perform initialization with CONSULT-II.
   For initialization, refer to "CONSULT-II Operation Manual NATS - IVIS / NVIS".
3. Turn ignition switch OFF.
4. Start engine and turn ignition switch OFF.
5. Check the security indicator lamp lighting.

Security indicator lamp should be light up.

OK or NG

OK >> INSPECTION END
NG >> GO TO 3.

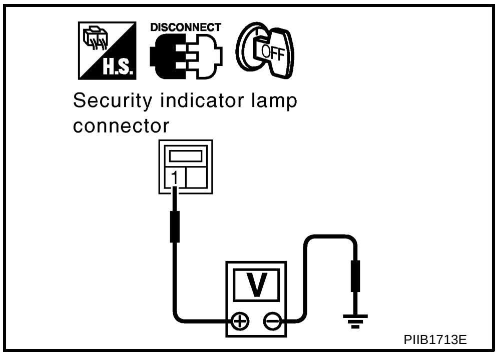
3. CHECK SECURITY INDICATOR LAMP POWER SUPPLY CIRCUIT

1. Disconnect security indicator lamp connector.
2. Check voltage between security indicator lamp harness connector M28 terminal 1 and ground.

1 (L) – Ground : Battery voltage

OK or NG

OK >> GO TO 4.
NG >> Check harness for open or short between fuse and security indicator lamp.



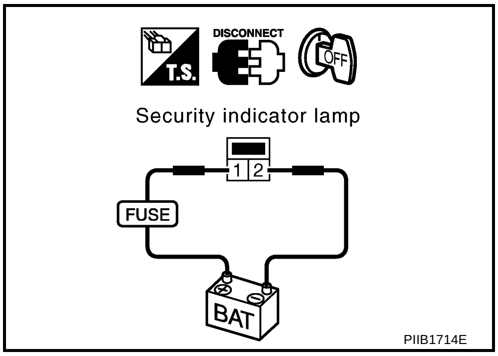
4. CHECK SECURITY INDICATOR LAMP

Apply 12V direct current to security indicator lamp connector M28 terminals 1 and 2.

Security indicator lamp should illuminate.

OK or NG

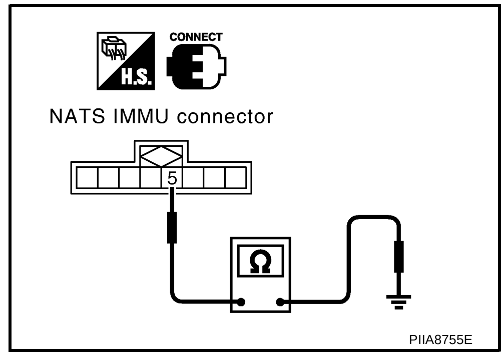
OK >> GO TO 5.
NG >> Replace security indicator lamp.



5. CHECK NATS IMMU FUNCTION

Check continuity between NATS IMMU harness connector E108 terminal 5 and ground.

5 (OR) – Ground : Continuity should exist intermittently.



OK or NG

OK >> Check harness for open or short between security indicator lamp and NATS IMMU.

NG >> NATS IMMU is malfunctioning.

- Replace NATS IMMU. **Ref. part No. A**
- Perform initialization with CONSULT-II
- For initialization, refer to “CONSULT-II operation manual NATS - IVIS / NVIS”

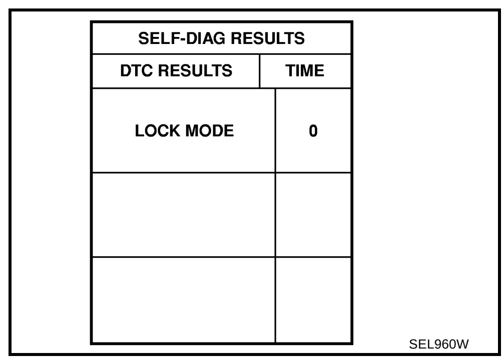
Diagnostic Procedure 7

AIS005Z1

Self-diagnostic results:
“LOCK MODE” displayed on CONSULT-II screen

1. CONFIRM SELF-DIAGNOSTIC RESULTS

Confirm SELF-DIAGNOSTIC RESULTS “LOCK MODE” is displayed on CONSULT-II screen.



Is CONSULT-II screen displayed as shown in figure?

Yes >> GO TO 2.

No >> GO TO BL-105, "SYMPTOM MATRIX CHART 1" .

2. ESCAPE FROM LOCK MODE

1. Turn ignition switch OFF.
2. Turn ignition switch ON with registered key. (Do not start engine.) Wait 5 seconds.
3. Return the key to OFF position.
4. Repeat steps 2 and 3 twice (total of three cycles).
5. Start the engine.

Does engine start?

Yes >> System is OK. (Now system is escaped from “LOCK MODE”.)

No >> GO TO 3.

3. CHECK NATS IMMU ILLUSTRATION

Check NATS IMMU installation. Refer to BL-115, "How to Replace NATS IMMU" .

OK or NG

OK >> GO TO 4.

NG >> Reinstall NATS IMMU correctly.

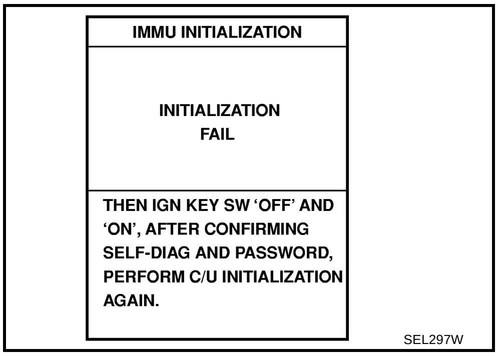
4. PERFORM INITIALIZATION WITH CONSULT-II

Perform initialization with CONSULT-II.
For initialization, refer to “CONSULT-II operation manual NATS - IVIS / NVIS”.

NOTE:
If the initialization is not completed or fails, CONSULT-II shows the above message on the screen.

<u>Can the system be initialized?</u>

Yes >> System is OK.
No >> GO TO 5.



SEL297W

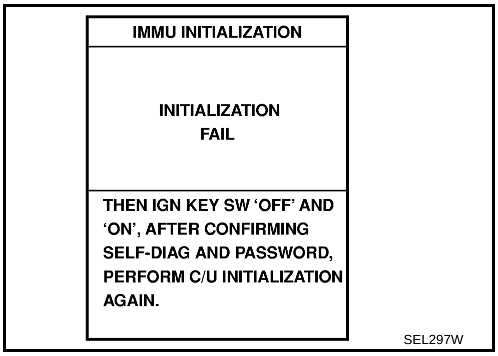
5. PERFORM INITIALIZATION WITH CONSULT-II AGAIN

1. Replace IMMU.
2. Perform initialization with CONSULT-II.
   For initialization, refer to “CONSULT-II operation manual NATS - IVIS / NVIS”.

NOTE:
If the initialization is not completed or fails, CONSULT-II shows the above message on the screen.

<u>Can the system be initialized?</u>

Yes >> System is OK. (NATS IMMU is malfunctioning. **Ref. part No. A**)
No >> ECM is malfunctioning.
- Replace ECM. **Ref. part No. B**
- Perform initialization with CONSULT-II
- For initialization, refer to “CONSULT-II operation manual NATS - IVIS / NVIS”

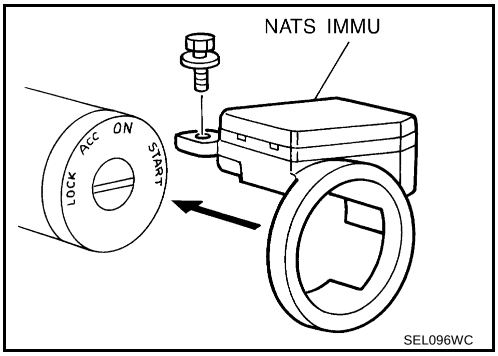


SEL297W

How to Replace NATS IMMU

AIS005Z2

NOTE:
- **If NATS IMMU is not installed correctly, NATS system will not operate properly and SELF-DIAG RESULTS on CONSULT-II screen will show “LOCK MODE”.**



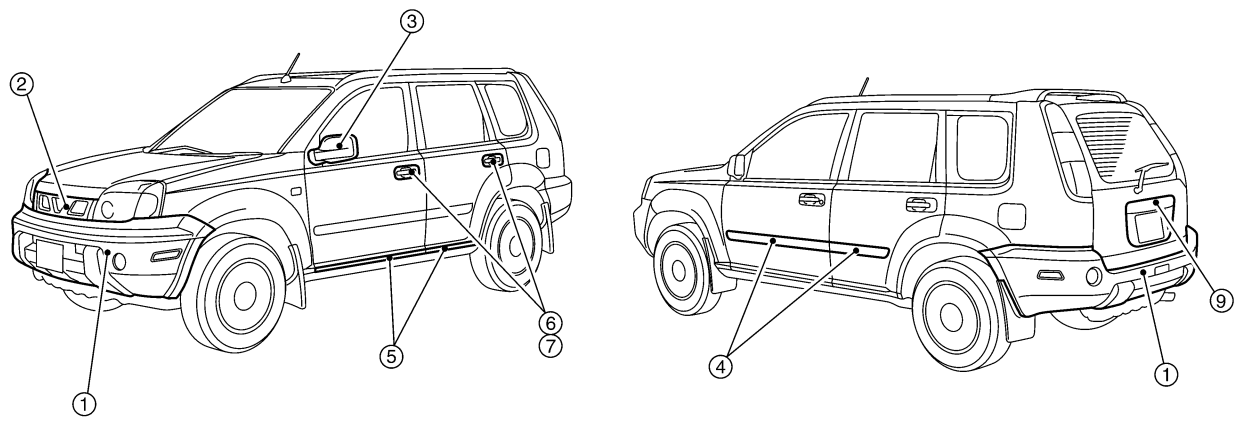
SEL096WC

BODY REPAIR

PFP:60100

Body Exterior Paint Color

AIS0065P



SIIA2415E

Component			Color code	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
			Description	Red	Dark blue	Green	Beige	Black	Silver	White
			Paint type	2S	2P	2P	M	2S	M	3P
			Hard clear coat	×	×	-	×	×	-	-
1	Bumper fascia	Upper	Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
		Lower	Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
			Black	AG64	AG64	AG64	AG64	AG64	AG64	AG64
2	Front grille	Molding	Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
			Chromium-plate	Cr	Cr	Cr	Cr	Cr	Cr	Cr
		Mesh	Black	AG01	AG01	AG01	AG01	AG01	AG01	AG01
3	Door outside mirror		Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
4	Side guard molding		Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
			Black	AG64	AG64	AG64	AG64	AG64	AG64	AG64
5	Lower door protector		Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
6	Door outside handle escutcheon		Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
7	Door outside handle		Chromium-plate	Cr	Cr	Cr	Cr	Cr	Cr	Cr
8	Rear spoiler		Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
9	Back door finisher		Body color	BAX6	BBW6	BDW0	BEV0	BKH3	BKY0	BQX1
			Chromium-plate	Cr	Cr	Cr	Cr	Cr	Cr	Cr

2S:Solid + Clear, M:Metallic, 2P:2-coat pearl, 3P:3-coat pearl

Body Component Parts

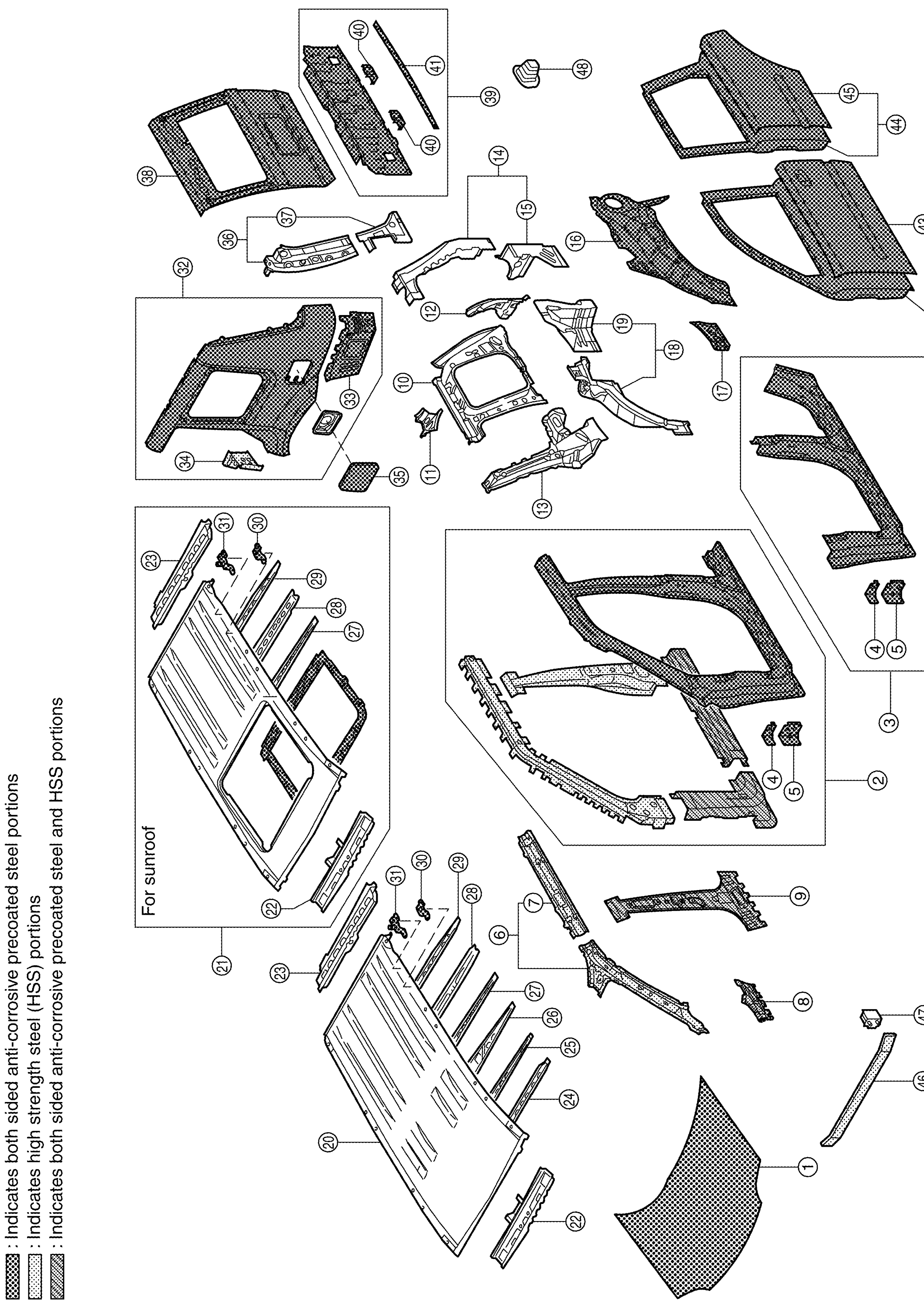
AIS0063K

UNDERBODY COMPONENT PARTS

A
B
C
D
E
F
G
H
BL
J
K
L
M

1. Radiator core support assembly
2. Upper radiator core support
3. Side radiator core support
4. Lower radiator core support
5. Hood lock stay
6. Hoodledge assembly (RH&LH)
7. Upper hoodledge (RH&LH)
8. Hoodledge reinforcement extension (RH&LH)
9. Lower front hoodledge (RH&LH)
10. Front hoodledge reinforcement (RH&LH)
11. Rear hoodledge reinforcement (RH&LH)
12. Upper dash assembly
13. Front cowl top
14. Upper dash crossmember assembly
15. Side cowl top
16. Lower dash
17. Side dash (RH&LH)
18. Front floor
19. Transmission control reinforcement
20. 2nd crossmember assembly
21. Front floor reinforcement
22. Front side member rear patch
23. Center bearing mounting bracket
24. Inner sill (RH&LH)
25. Rear floor front
26. Rear floor rear
27. Rear floor front extension
28. Rear floor belt anchor reinforcement
29. 2nd seat mounting bracket assembly (RH&LH)
30. Rear floor side (RH&LH)
31. Spare tire clamp bracket
32. 3rd crossmember
33. Front side member closing plate assembly (RH&LH)
34. Front side member front closing plate (RH&LH)
35. Front side member (RH&LH)
36. Battery support bracket (LH)
37. Front side member front extension (RH&LH)
38. Front side member center extension (RH&LH)
39. Rear seat crossmember
40. 5th crossmember
41. Center rear crossmember assembly
42. Rear side member assembly (RH&LH)
43. Rear side member front extension (RH&LH)
44. Rear side member extension (RH&LH)
45. Muffler mounting bracket assembly (LH)
46. Rear hook (LH)
47. Battery mounting reinforcement (LH)
48. Front floor reinforcement (RH&LH)

BODY COMPONENT PARTS



SIIA2417E

1. Hood
2. Side body assembly (RH&LH)
3. Outer sill assembly (RH&LH)
4. Front fender bracket (RH&LH) No.1
5. Front fender bracket (RH&LH) No.2
6. Inner upper front pillar assembly (RH&LH)
7. Inner side roof rail (RH&LH)
8. Lower front pillar reinforcement (RH&LH)
9. Inner center pillar (RH&LH)
10. Inner rear pillar (RH&LH)
11. Rear roof rail brace (RH&LH)
12. Inner lower rear pillar (RH&LH)
13. Inner rear pillar reinforcement (RH&LH)
14. Back pillar reinforcement assembly (RH&LH)
15. Lower rear pillar reinforcement (RH&LH)
16. Outer rear wheelhouse (RH&LH)
17. Outer rear wheelhouse extension (RH&LH)
18. Inner rear wheelhouse (RH&LH)
19. Inner rear wheelhouse rear extension (RH&LH)
20. Roof
21. Roof assembly
22. Front roof rail
23. Rear roof rail
24. Roof bow No.1
25. Roof bow No.2
26. Roof bow No.3
27. Roof bow No.4
28. Roof bow No.5
29. Rear roof bow
30. Center roof rack bracket (RH&LH)
31. Roof rack bracket (RH&LH)
32. Rear fender assembly (RH&LH)
33. Rear fender extension (RH&LH)
34. Striker retainer (RH&LH)
35. Fuel filler lid
36. Rear combination lamp base (RH&LH)
37. Rear fender corner (RH&LH)
38. Back door assembly
39. Rear panel assembly
40. Rear bumper side bracket
41. Rear panel stiffener
42. Front door assembly (RH&LH)
43. Outer front door panel (RH&LH)
44. Rear door assembly (RH&LH)
45. Outer rear door panel (RH&LH)
46. Front bumper reinforcement
47. Front bumper stay (RH&LH)
48. Rear bumper stay (RH&LH)

Corrosion Protection

AIS0063L

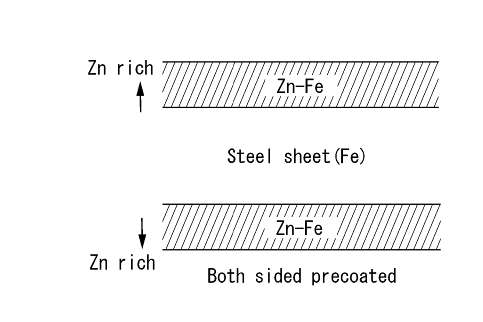
DESCRIPTION

To provide improved corrosion prevention, the following anti-corrosive measures have been implemented in NISSAN production plants. When repairing or replacing body panels, it is necessary to use the same anti-corrosive measures.

Anti-Corrosive Precoated Steel (Galvannealed Steel)

To improve repairability and corrosion resistance, a new type of anti-corrosive precoated steel sheet has been adopted replacing conventional zinc-coated steel sheet.

Galvannealed steel is electroplated and heated to form Zinc-iron alloy, which provides excellent and long term corrosion resistance with cationic electrodeposition primer.



SIIA2294E

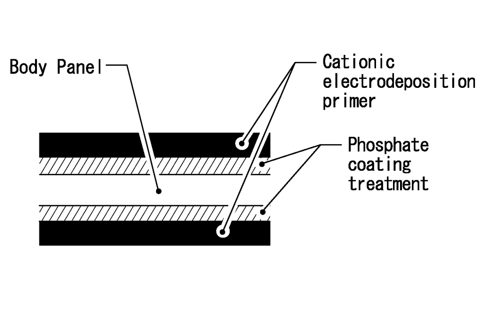
Nissan Genuine Service Parts are fabricated from galvannealed steel. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain the anti-corrosive performance built into the vehicle at the factory.

Phosphate Coating Treatment and Cationic Electrodeposition Primer

A phosphate coating treatment and a cationic electrodeposition primer, which provide excellent corrosion protection, are employed on all body components.

CAUTION:

Confine paint removal during welding operations to an absolute minimum.

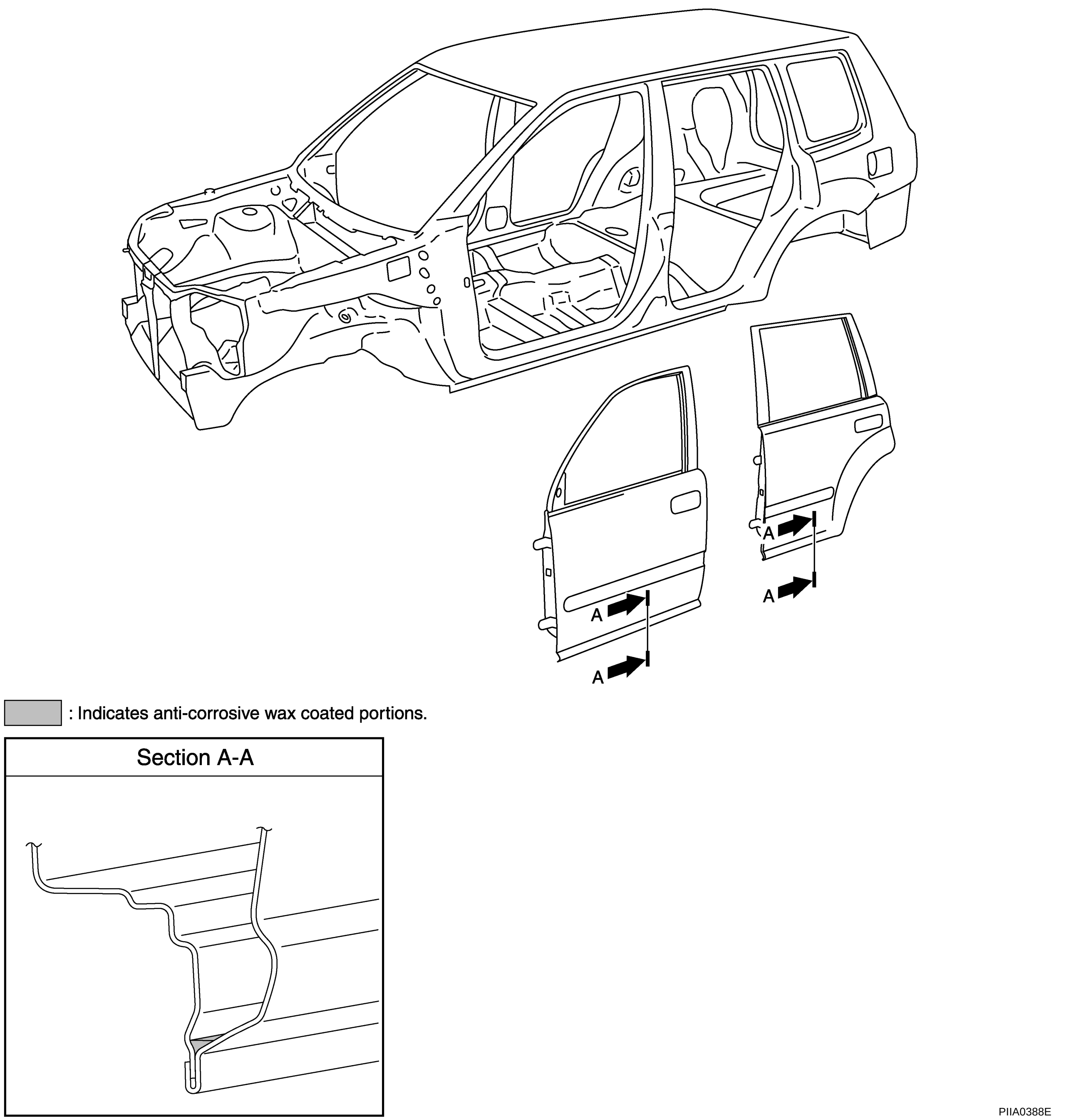


PIIA0095E

Nissan Genuine Service Parts are also treated in the same manner. Therefore, it is recommended that GENUINE NISSAN PARTS or equivalent be used for panel replacement to maintain anti-corrosive performance built into the vehicle at the factory.

ANTI-CORROSIVE WAX

To improve corrosion resistance, anti-corrosive wax is applied inside the body sill and inside other closed sections. Accordingly, when replacing these parts, be sure to apply anti-corrosive wax to the appropriate areas of the new parts. Select an excellent anti-corrosive wax which will penetrate after application and has a long shelf life.

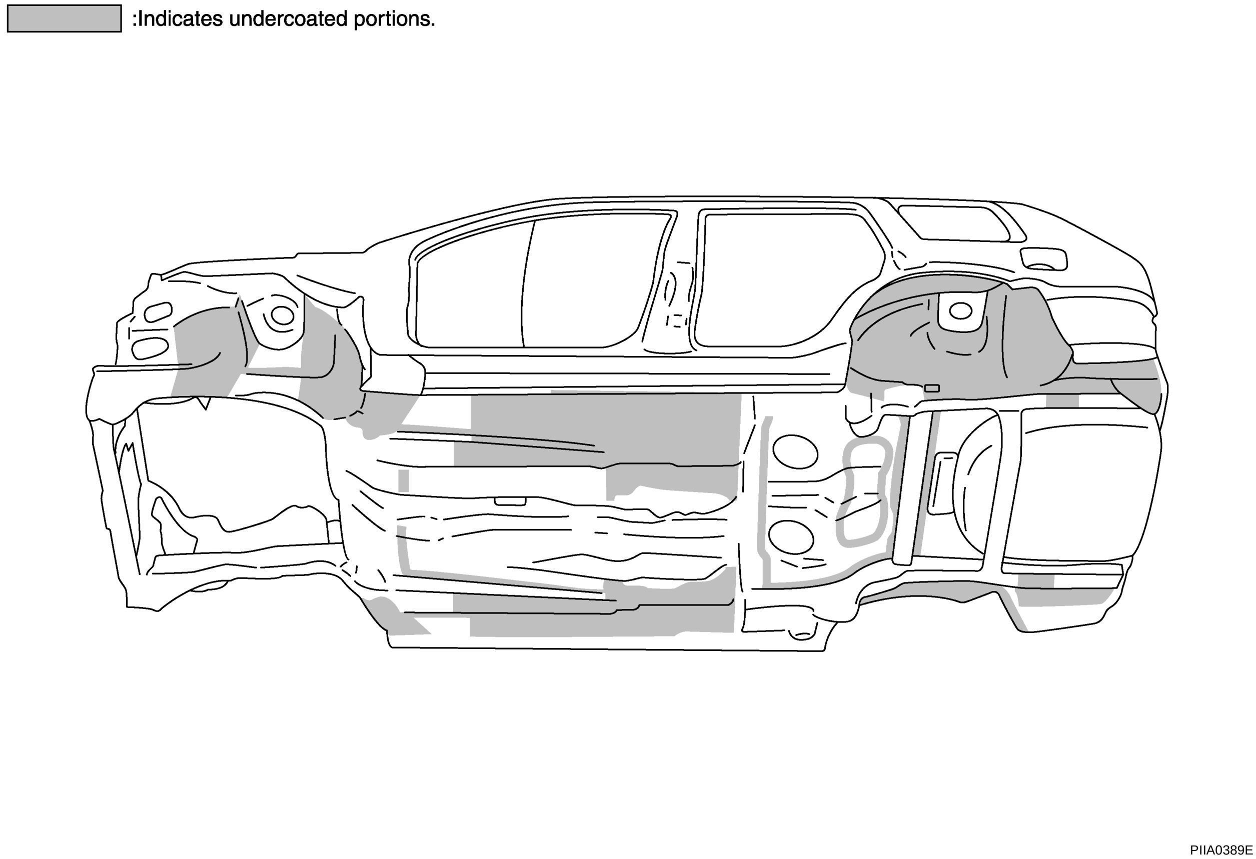


UNDERCOATING

The underside of the floor and wheelhouse are undercoated to prevent rust, vibration, noise and stone chipping. Therefore, when such a panel is replaced or repaired, apply undercoating to that part. Use an undercoating which is rust preventive, soundproof, vibration-proof, shock-resistant, adhesive, and durable.

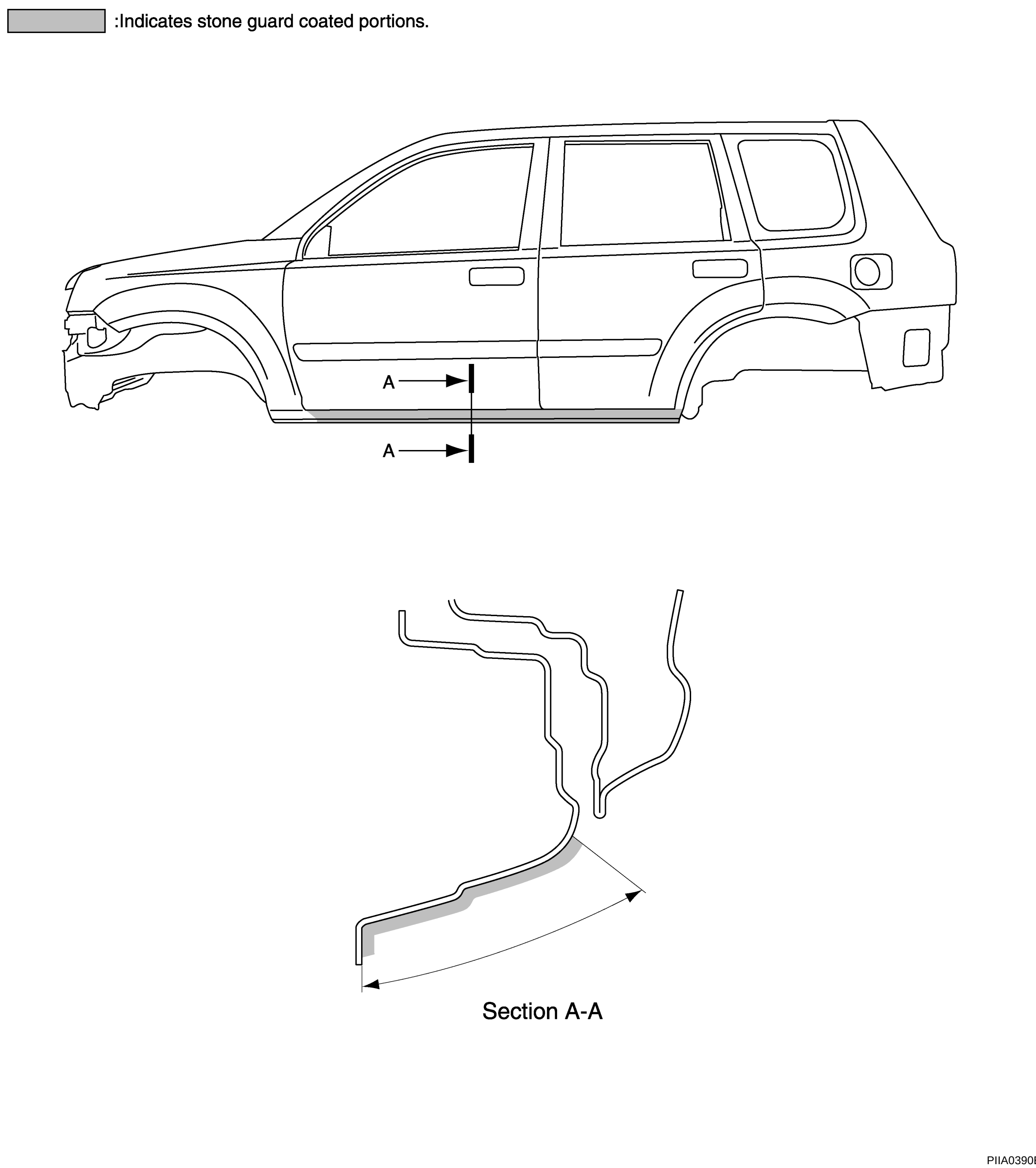
Precautions in Undercoating

1. Do not apply undercoating to any place unless specified (such as the areas above the muffler and three way catalyst which are subjected to heat).
2. Do not undercoat the exhaust pipe or other parts which become hot.
3. Do not undercoat rotating parts.
4. Apply bitumen wax after applying undercoating.



STONE GUARD COAT

To prevent damage caused by stones, the lower outer body panel (fender, door, etc.) have an additional layer of Stone Guard Coating over the ED primer coating. When replacing or repairing these panels, apply Stone Guard coating to the same portions as before. Use a coating which is rust preventive, durable, shock-resistant and has a long shelf life.

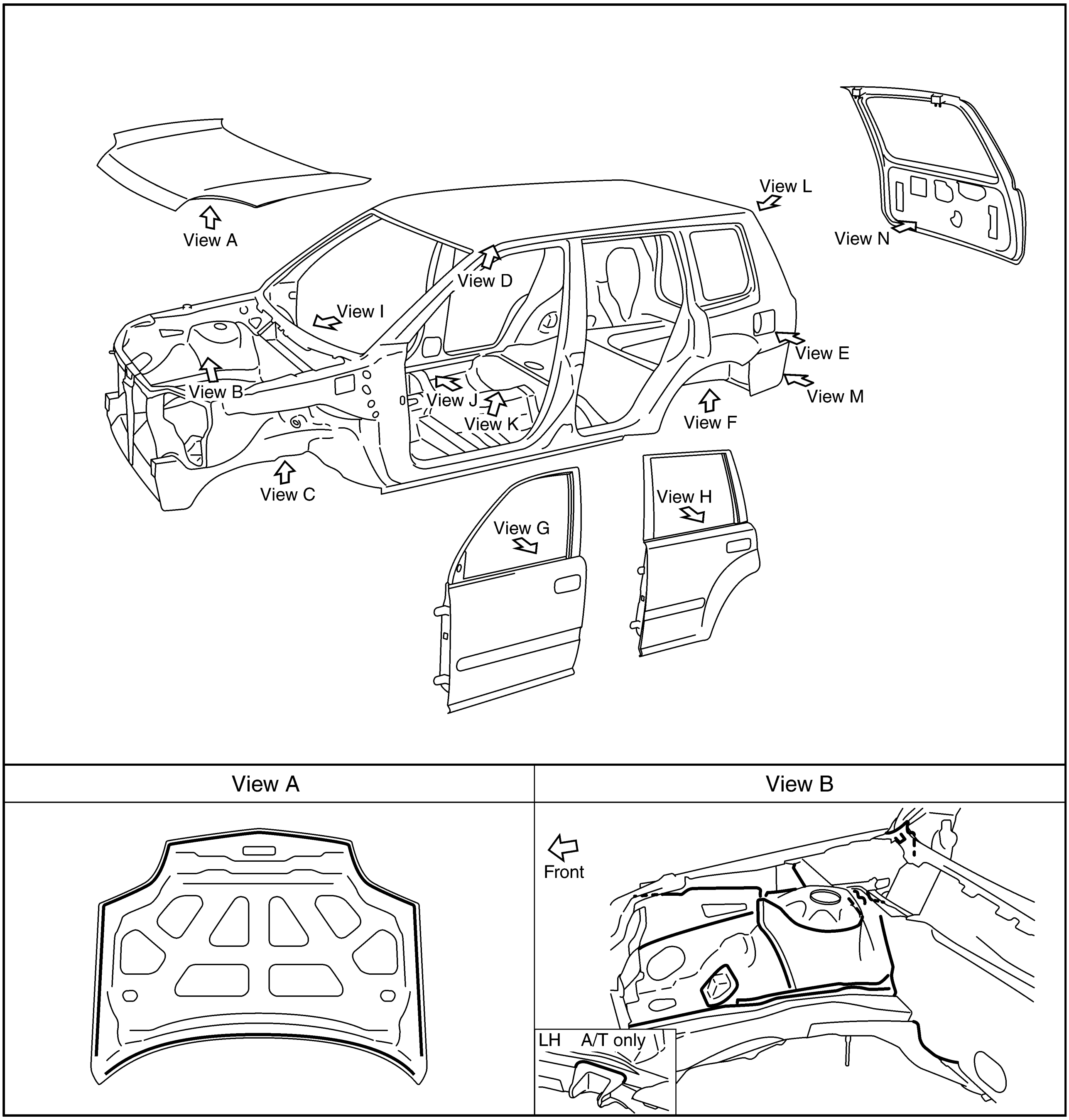


Body Sealing

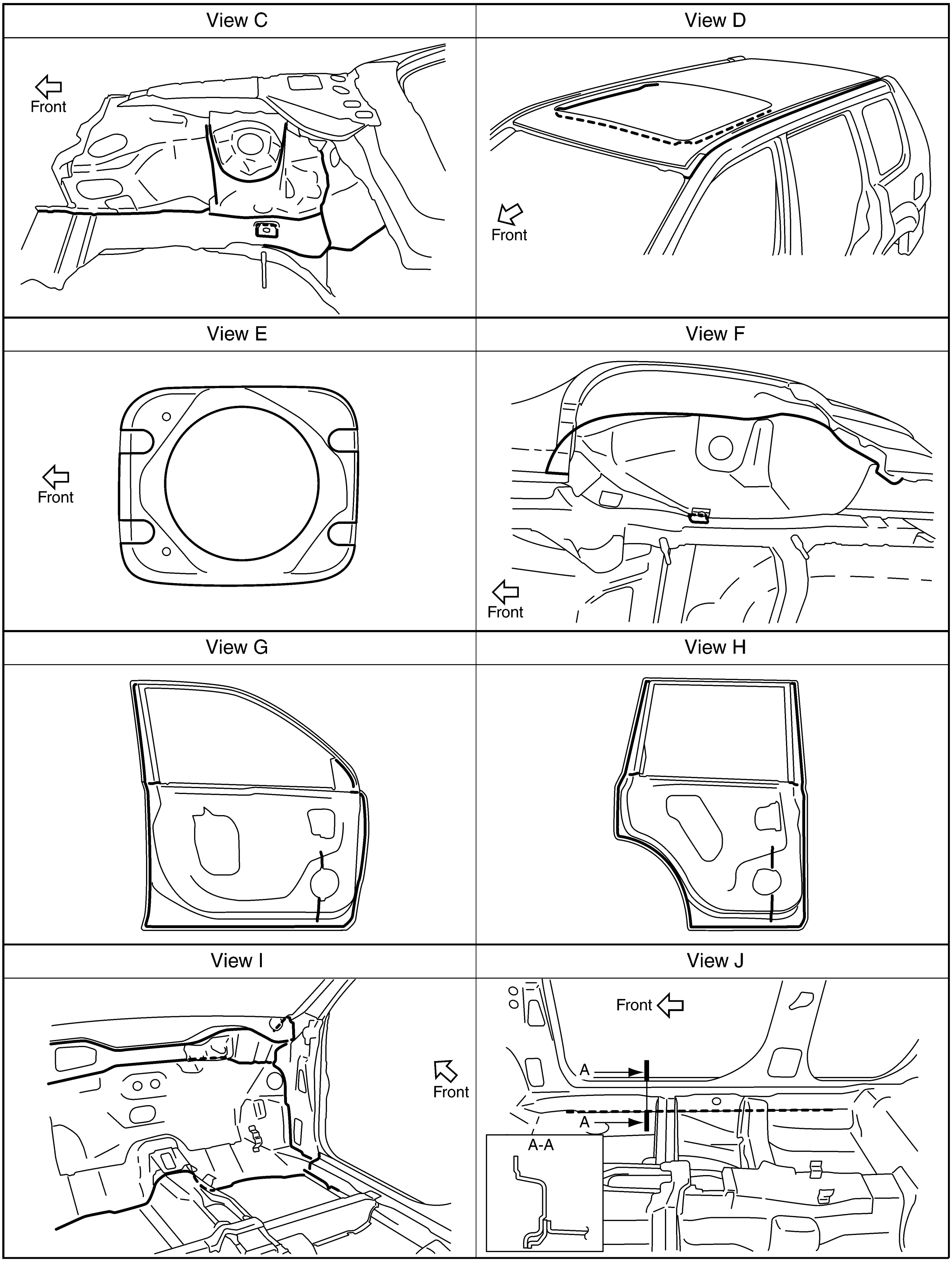
AIS0063M

DESCRIPTION

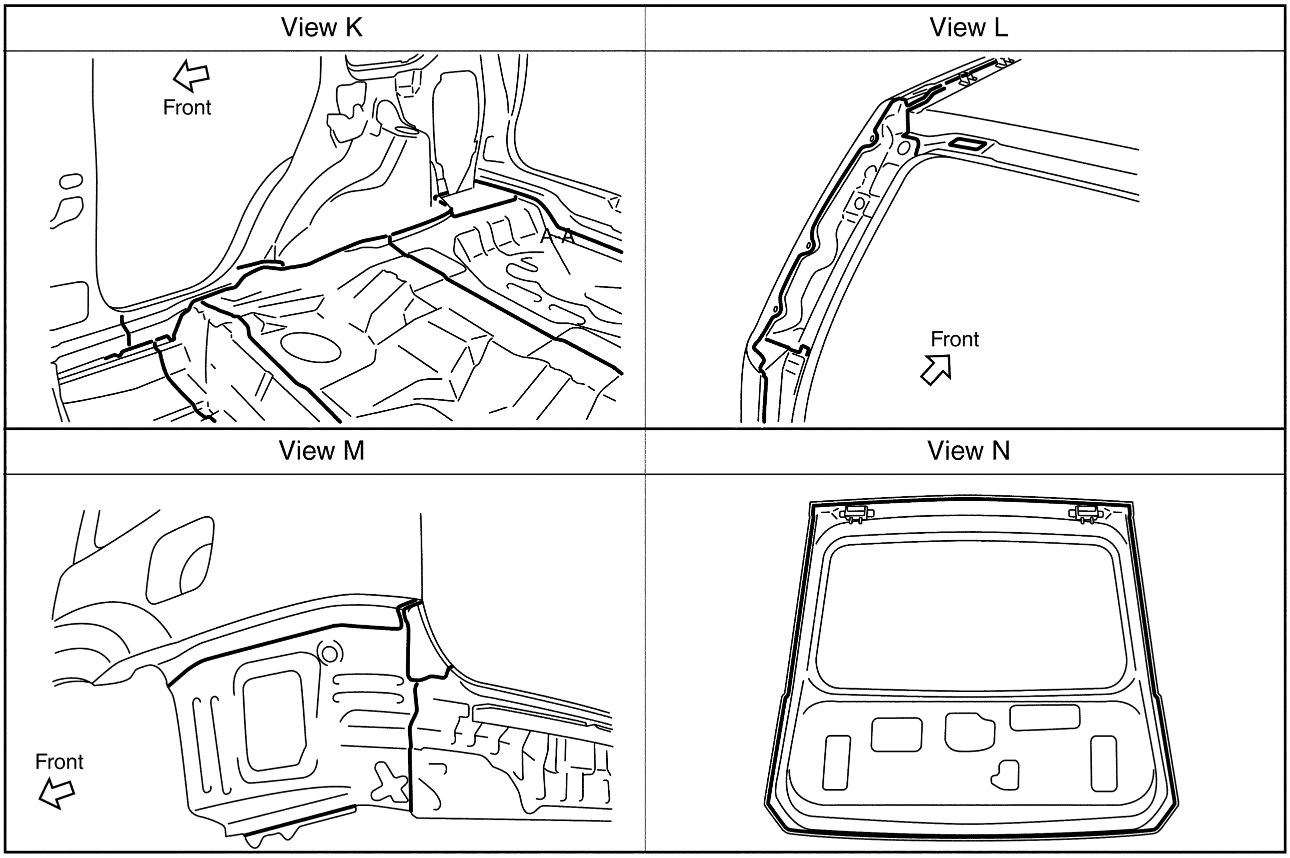
The following figure shows the areas which are sealed at the factory. Sealant which has been applied to these areas should be smooth and free from cuts or gaps. Care should be taken not to apply an excess amount of sealant and not to allow other unaffected parts to come into contact with the sealant.



SIIA2418E


View C
Front
View D
Front
View E
Front
View F
Front
View G
View H
View I
Front
View J
Front
A
A
A-A

SIIA2419E

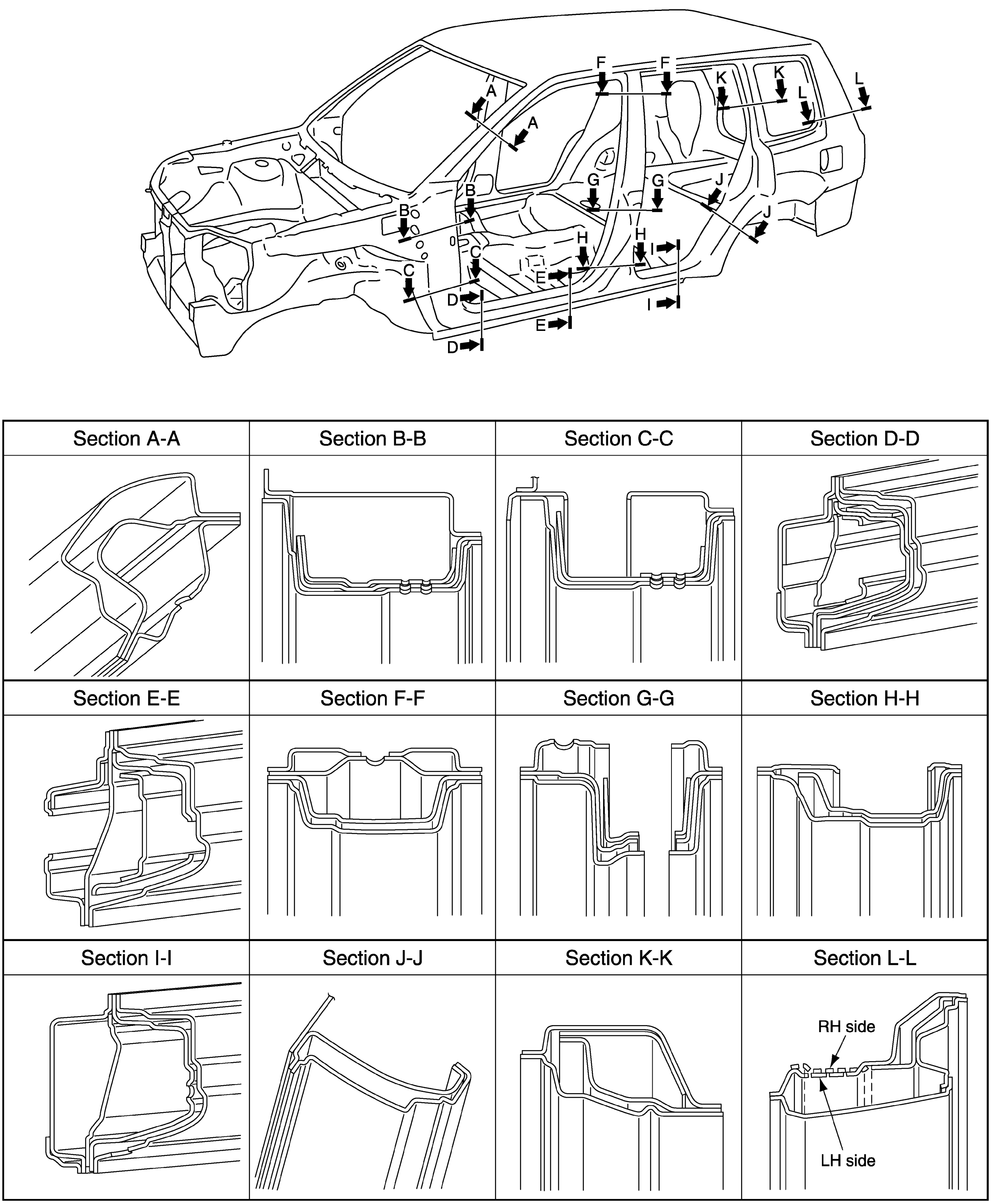


PIIA0393E

Body Construction

AIS0063N

BODY CONSTRUCTION



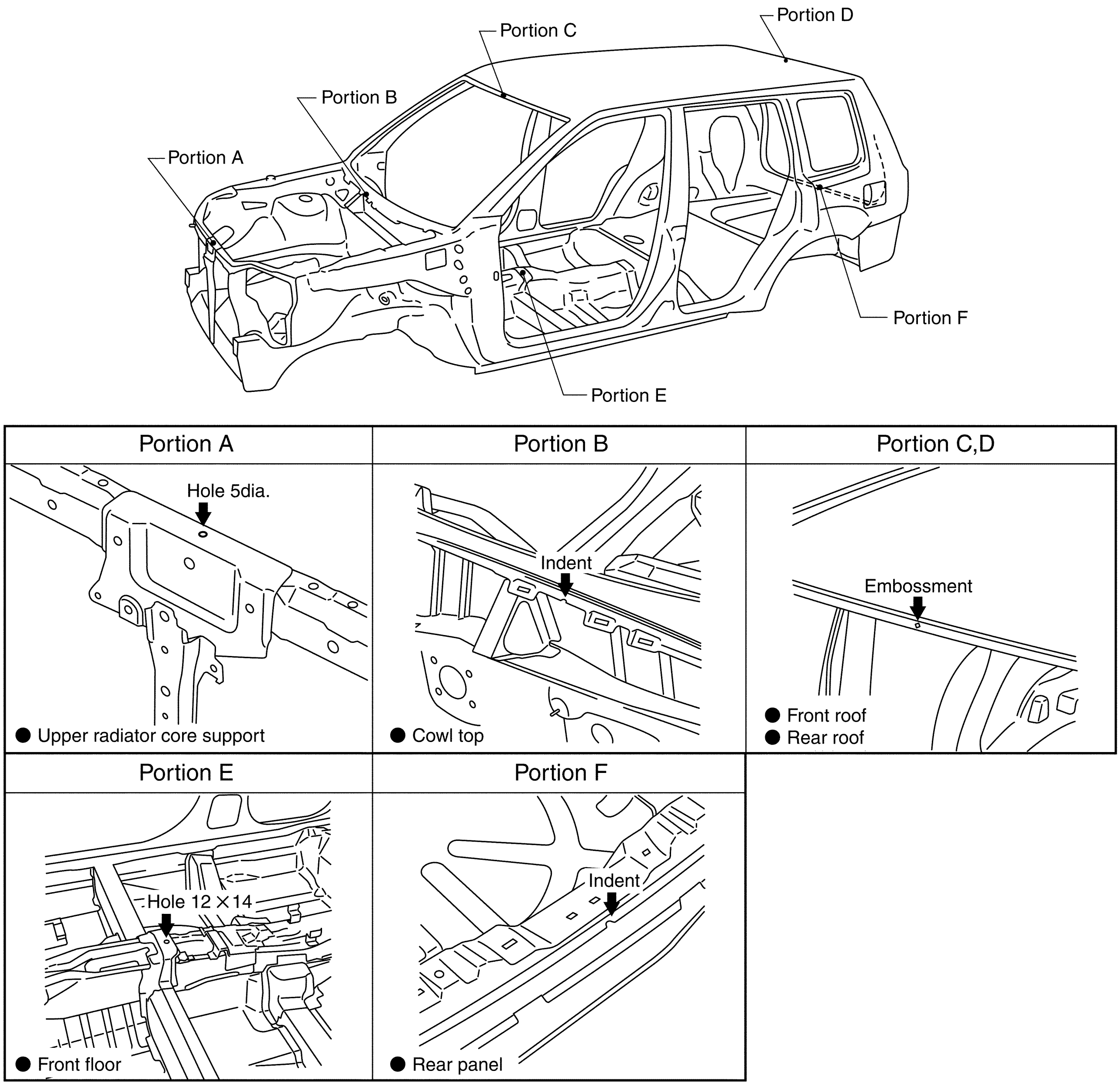
PIIA0394E

Body Alignment

AIS0063O

BODY CENTER MARKS

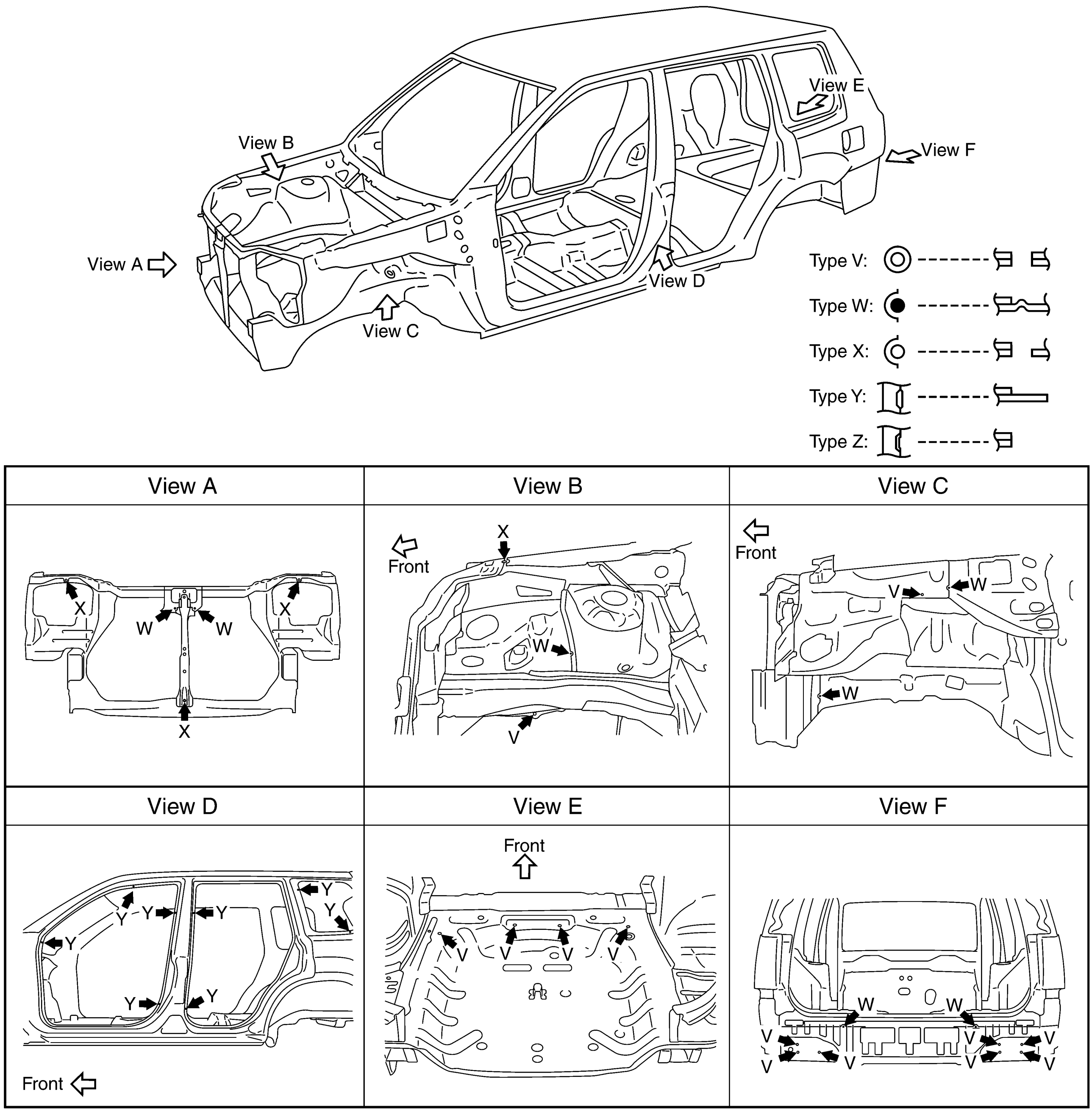
A mark has been placed on each part of the body to indicate the vehicle center. When repairing parts damaged by an accident which might affect the vehicle frame (members, pillars, etc.), more accurate and effective repair will be possible by using these marks together with body alignment specifications.



PIIA0395E

PANEL PARTS MATCHING MARKS

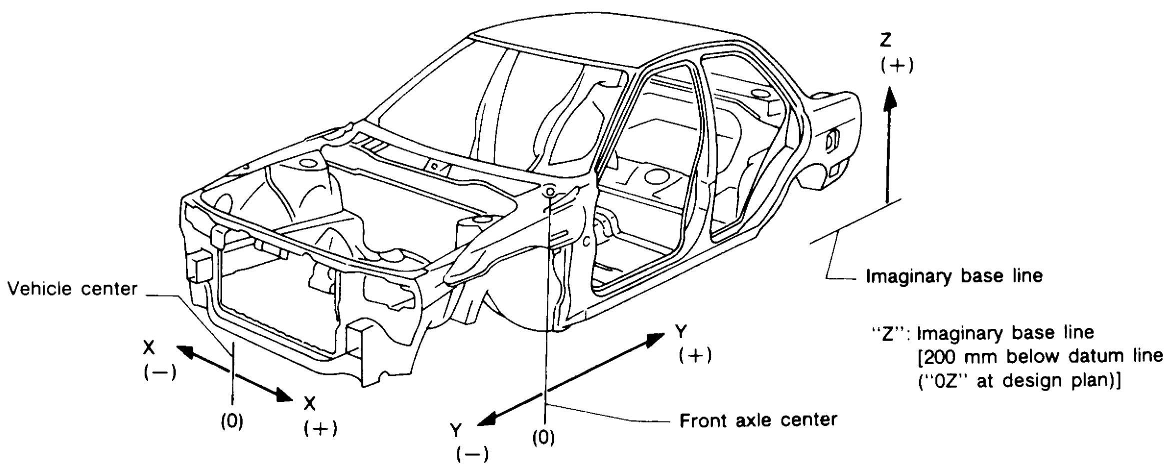
A mark has been placed on each body panel to indicate the parts matching positions. When repairing parts damaged by an accident which might affect the vehicle structure (members, pillars, etc.), more accurate and effective repair will be possible by using these marks together with body alignment specifications.



SIIA2420E

DESCRIPTION

- All dimensions indicated in the figures are actual.
- When using a tracking gauge, adjust both pointers to equal length. Then check the pointers and gauge itself to make sure there is no free play.
- When a measuring tape is used, check to be sure there is no elongation, twisting or bending.
- Measurements should be taken at the center of the mounting holes.
- An asterisk (*) following the value at the measuring point indicates that the measuring point on the other side is symmetrically the same value.
- The coordinates of the measurement points are the distances measured from the standard line of ″X″, ″Y″ and ″Z″.



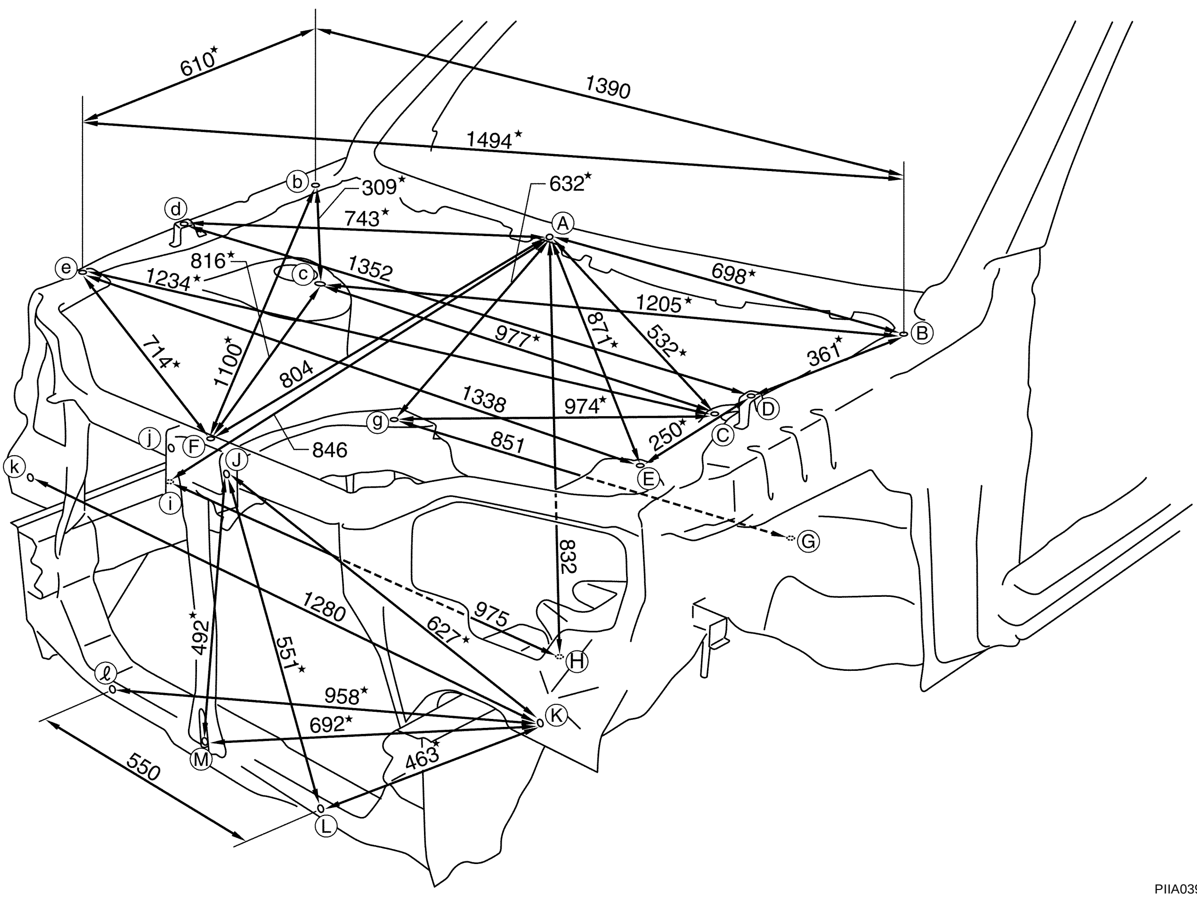
PIIA0104E

ENGINE COMPARTMENT

Measurement

Figures marked with a (⋆) indicate symmetrically identical dimensions on both right and left hand sides of the vehicle.

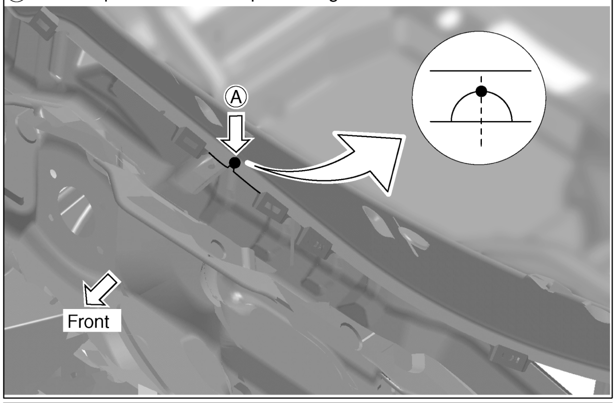
Unit : mm



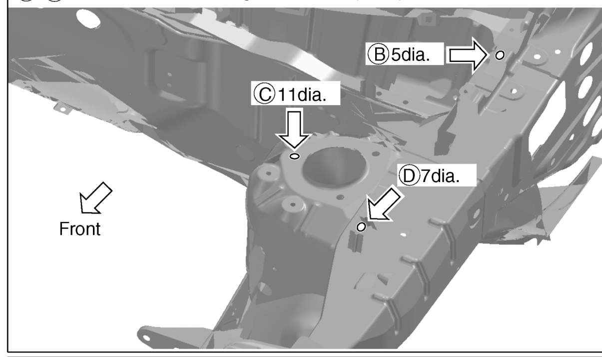
PIIA0397E

Measurement Points

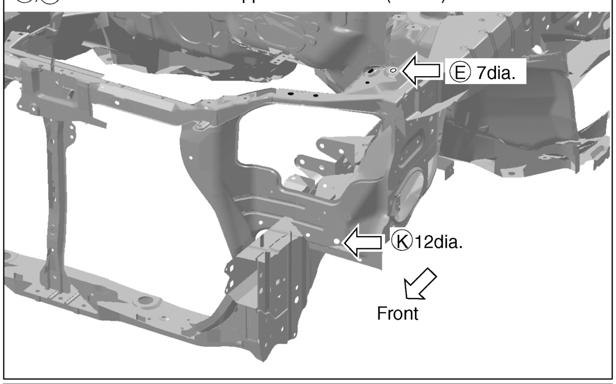
Ⓐ : Cowl top indent of center positioning mark



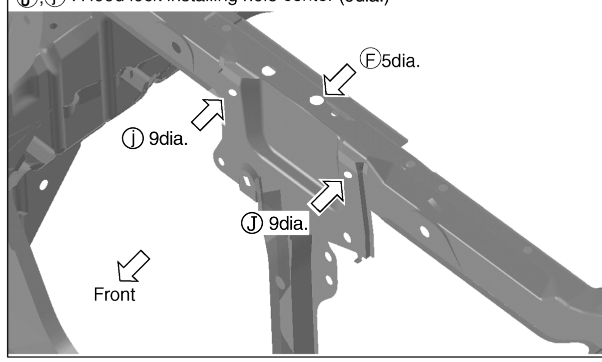
Ⓑ,ⓑ : Rear hoodledge reinforcement hole center (5dia.)
Ⓒ,ⓒ : Front suspension installing hole center (11dia.)
Ⓓ,ⓓ : Front fender installing hole center (7dia.)



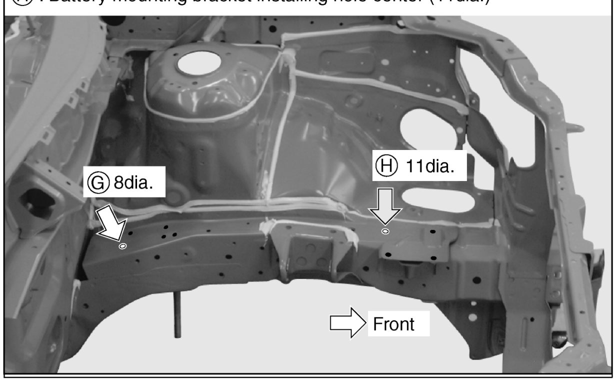
Ⓔ,ⓔ : Front fender installing hole center (7dia.)
Ⓚ,ⓚ : Side radiator core support hole center (12dia.)



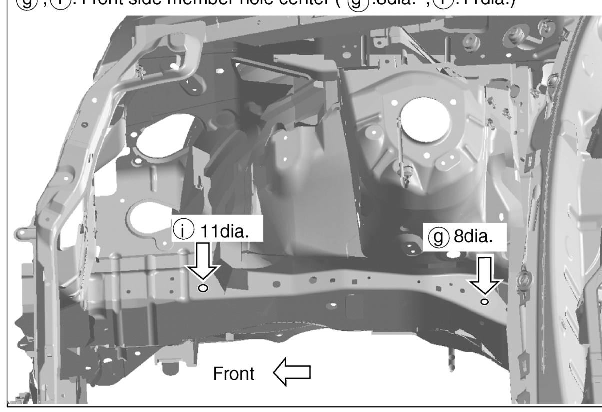
Ⓕ : Upper radiator core support hole center of center positioning mark (5dia.)
Ⓙ,ⓙ : Hood lock installing hole center (9dia.)



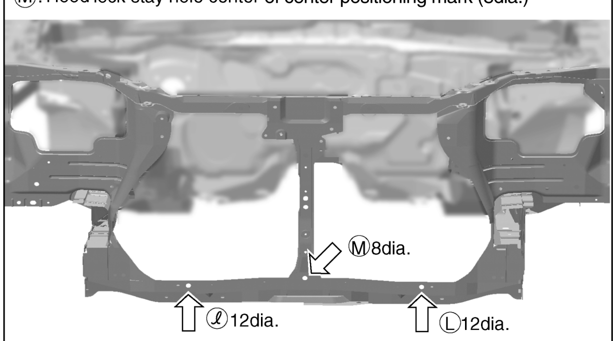
Ⓖ : ABS installing hole center (8dia.)
Ⓗ : Battery mounting bracket installing hole center (11dia.)



ⓖ , ⓘ: Front side member hole center (ⓖ:8dia. , ⓘ:11dia.)



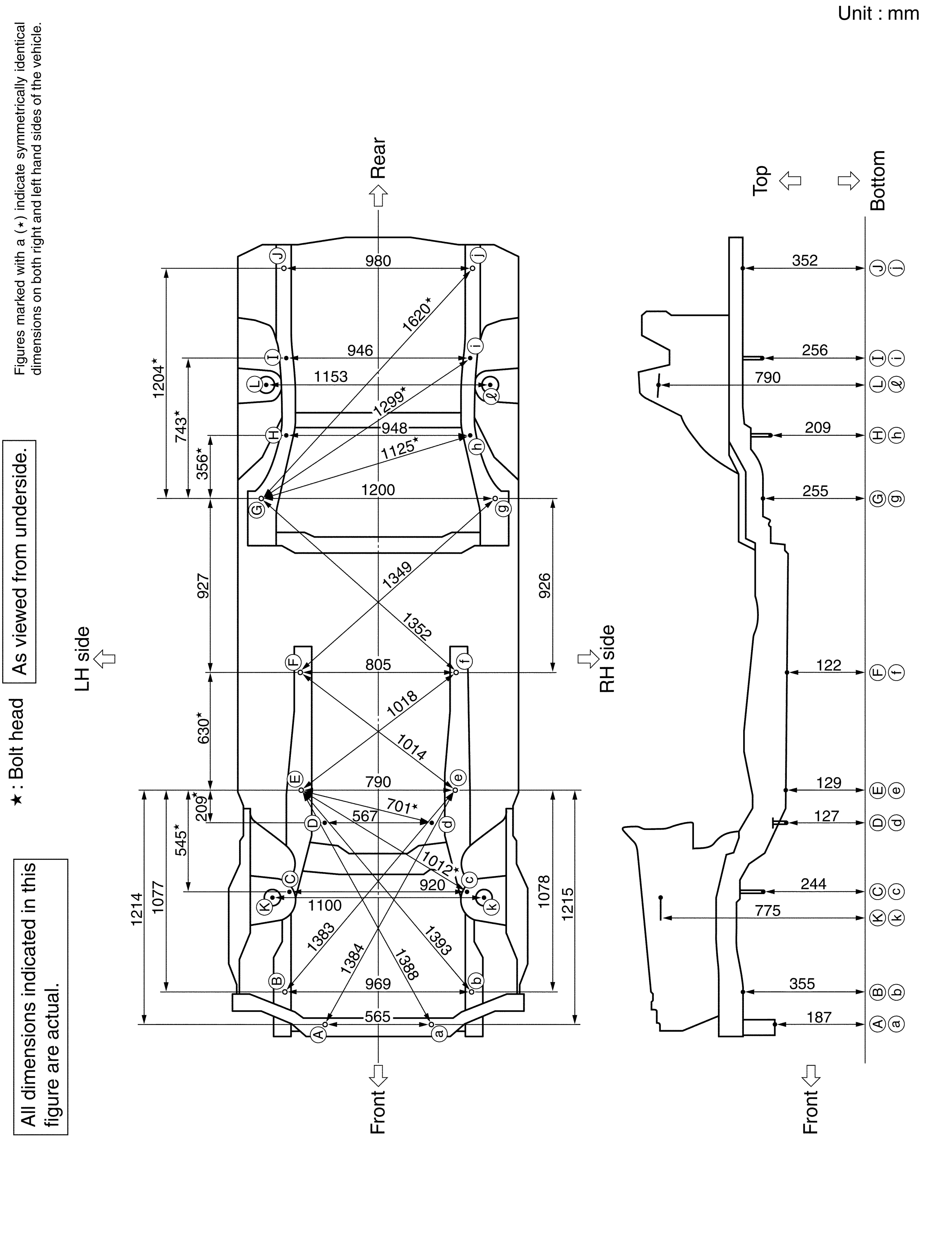
Ⓛ, ⓛ : Lower radiator core support hole center (12dia.)
Ⓜ: Hood lock stay hole center of center positioning mark (8dia.)



SIIA2421E

UNDERBODY

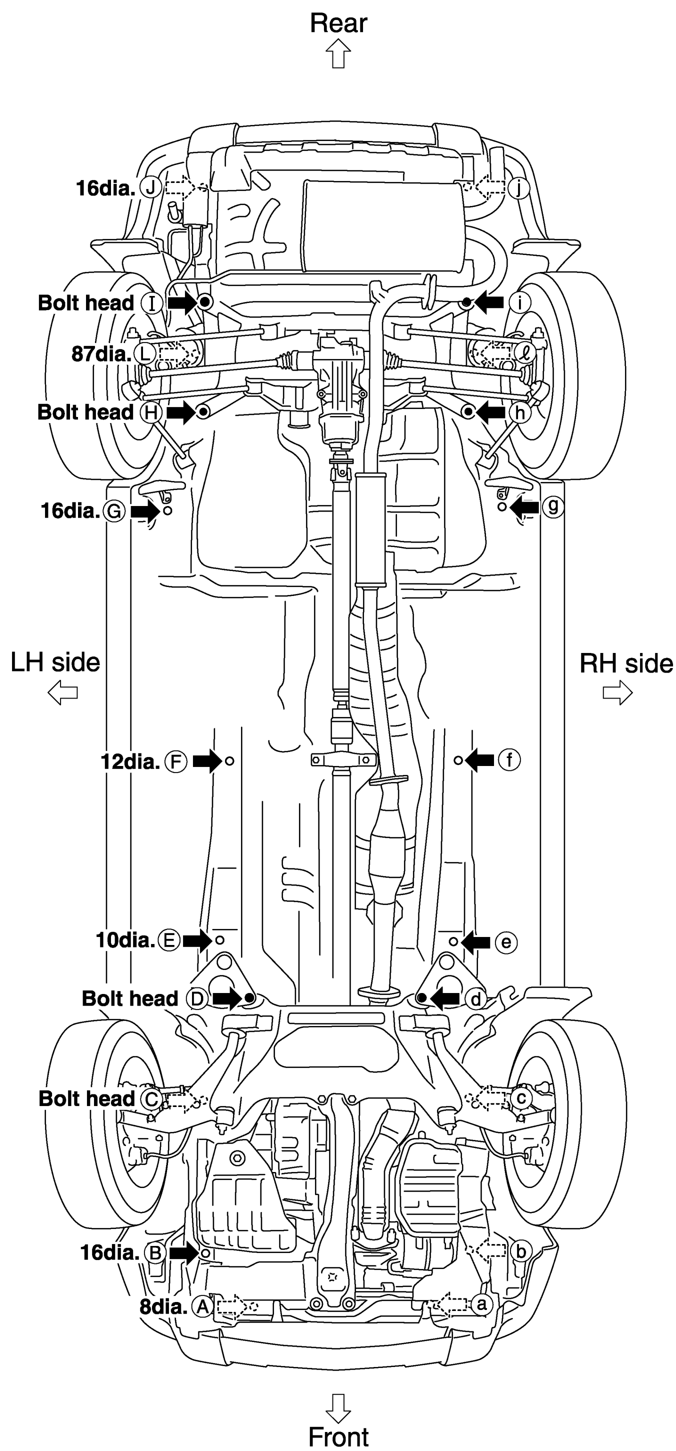
Measurement



Measurement Points

Unit : mm

As viewed from underside.



Coordinates:

A
X:280
Y:-607
Z:187

a
X:-285
Y:-609
Z:187

B
X:477
Y:-450
Z:355

b
X:-492
Y:-450
Z:355

C, c
X:460
Y:72
Z:244

D, d
X:284
Y:423
Z:127

E, e
X:395
Y:600
Z:129

F
X:400
Y:1230
Z:122

f
X:-405
Y:1230
Z:122

G, g
X:600
Y:2125
Z:255

H, h
X:474
Y:2455
Z:209

I, i
X:473
Y:2857
Z:256

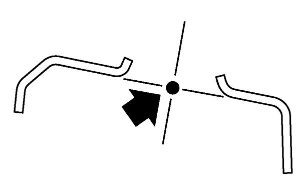
J, j
X:490
Y:3320
Z:352

Front and rear strut tower centers

Coordinates:

K, k
X:550
Y:29
Z:775

L, ℓ
X:576
Y:2715
Z:790



Front: K, k 87dia

Rear: L, ℓ 87dia

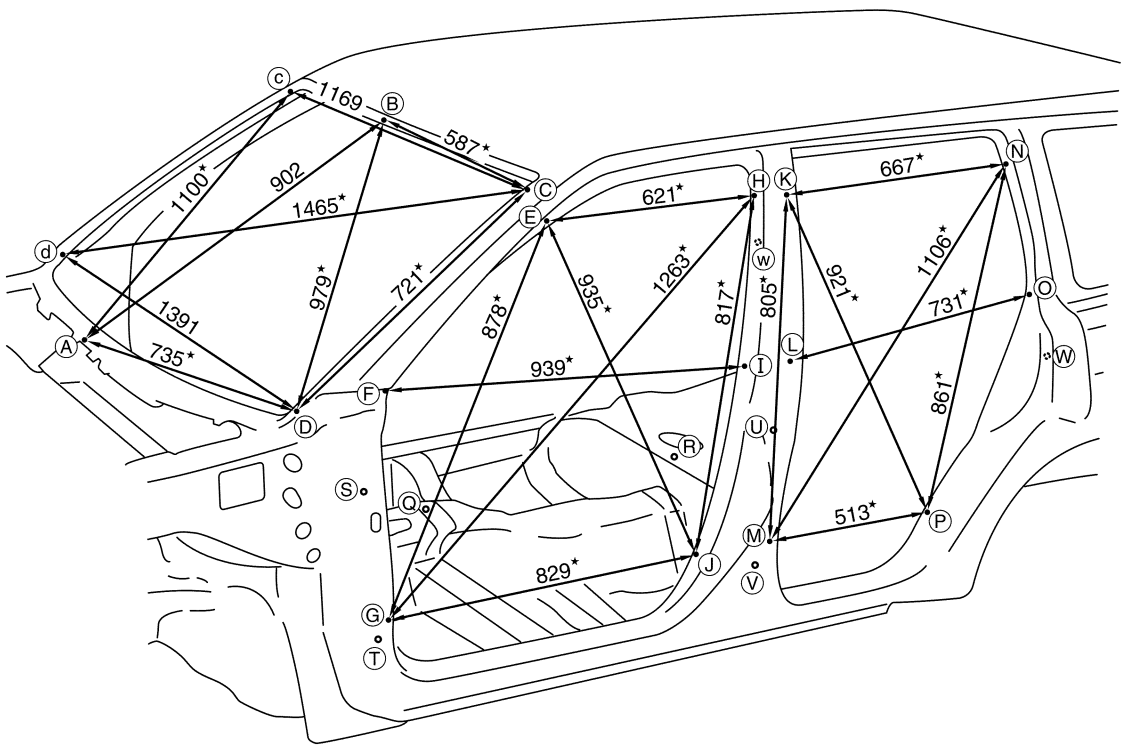
PIIA0400E

PASSENGER COMPARTMENT

Measurement

Unit : mm

Figures marked with a (⋆) indicate symmetrically identical dimensions on both right and left hand sides of the vehicle.

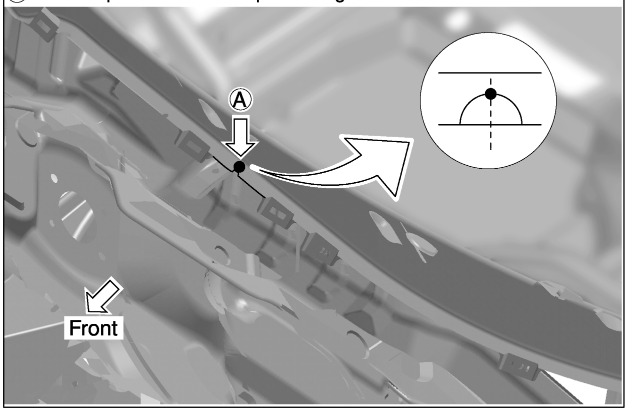


Point	Dimension	Point	Dimension	Point	Dimension
Ⓔ～ⓔ	1,317	Ⓜ～ⓟ	1,530⋆	Ⓡ～ⓜ	736
Ⓔ～ⓖ	1,632⋆	Ⓝ～ⓝ	1,296	Ⓡ～Ⓝ	1,225
Ⓔ～ⓗ	1,461⋆	Ⓝ～ⓟ	1,616⋆	Ⓡ～ⓝ	1,189
Ⓕ～ⓕ	1,435	Ⓞ～ⓞ	1,420	Ⓡ～Ⓞ	1,075
Ⓖ～ⓖ	1,437	Ⓟ～ⓟ	1,442	Ⓡ～ⓞ	1,030
Ⓖ～ⓗ	1,871⋆	Ⓠ～Ⓔ	1,117⋆	Ⓡ～Ⓟ	800
Ⓖ～ⓙ	1,661⋆	Ⓠ～Ⓕ	1,059⋆	Ⓡ～ⓟ	738
Ⓗ～ⓗ	1,328	Ⓠ～Ⓖ	874⋆	Ⓡ～Ⓦ	1,059
Ⓗ～ⓙ	1,607⋆	Ⓠ～Ⓗ	1,213⋆	Ⓡ～ⓦ	1,022
Ⓘ～ⓘ	1,456	Ⓠ～Ⓘ	1,053⋆	Ⓢ～Ⓤ	1,079⋆
Ⓙ～ⓙ	1,442	Ⓠ～Ⓙ	802⋆	Ⓢ～Ⓥ	1,111⋆
Ⓚ～ⓚ	1,327	Ⓡ～Ⓚ	1,132	Ⓣ～Ⓤ	1,102⋆
Ⓚ～ⓝ	1,471⋆	Ⓡ～ⓚ	1,092	Ⓣ～Ⓥ	1,028⋆
Ⓚ～ⓟ	1,662⋆	Ⓡ～Ⓛ	988	Ⓦ～ⓦ	1,152
Ⓛ～ⓛ	1,456	Ⓡ～ⓛ	938		
Ⓜ～ⓜ	1,442	Ⓡ～Ⓜ	799		

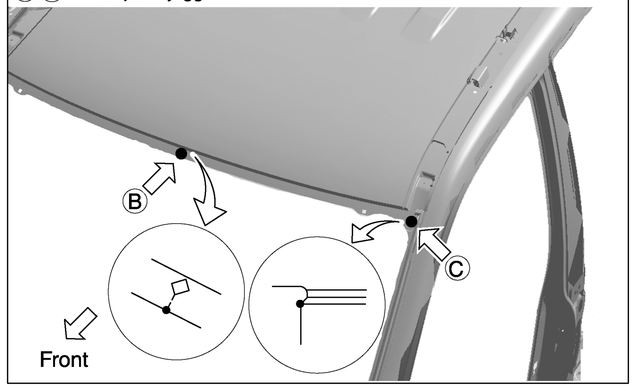
PIIA0401E

Measurement Points

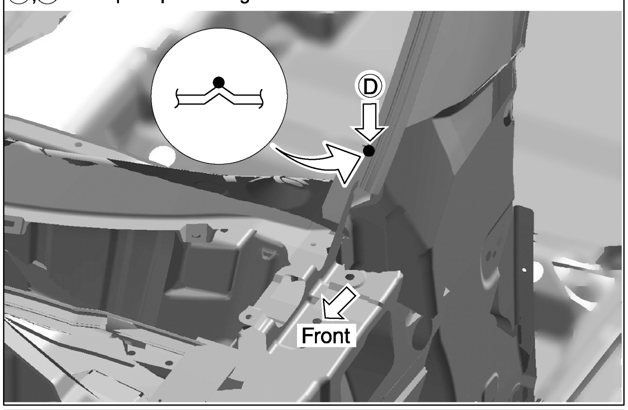
A : Cowl top indent of center positioning mark



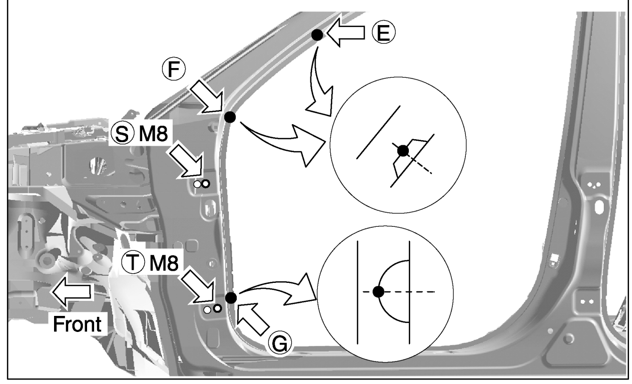
B :Front roof flange end of center positioning mark
C, c :Front pillar joggle



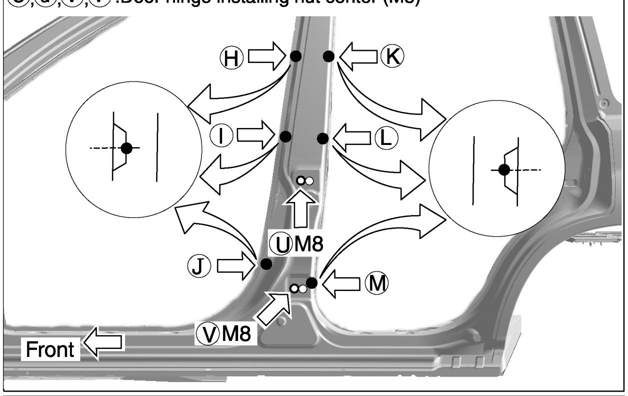
D, d :Front pillar positioning mark



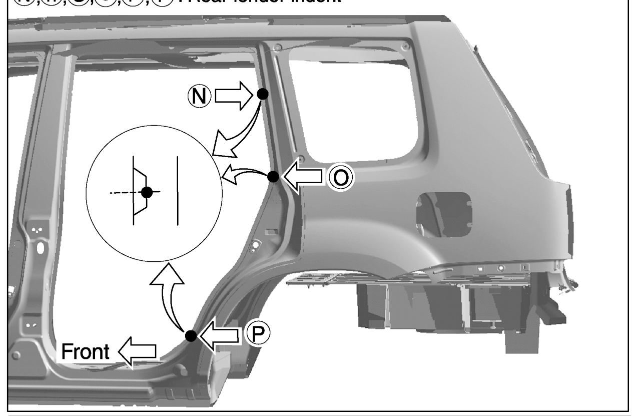
E, e, F, f, G, g : Front pillar indent
S, s, T, t : Door hinge installing nut center (M8)



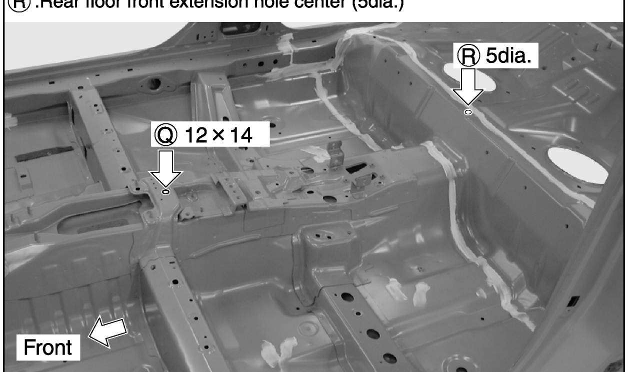
H, h, I, i, J, j, K, k, L, ℓ, M, m :Center pillar indent
U, u, V, v :Door hinge installing nut center (M8)



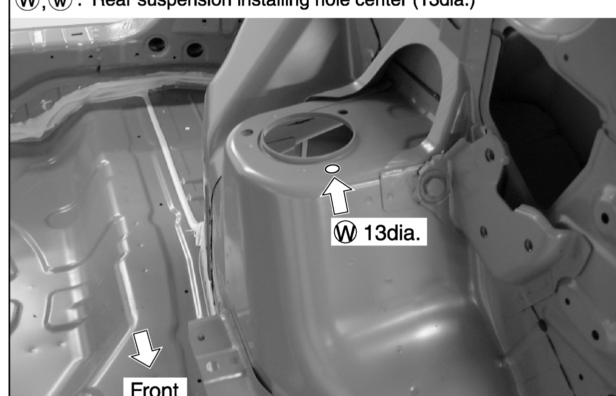
N, n, O, o, P, p : Rear fender indent



Q :2nd clossmember hole center of center positioning mark(12 × 14)
R :Rear floor front extension hole center (5dia.)



W, w : Rear suspension installing hole center (13dia.)



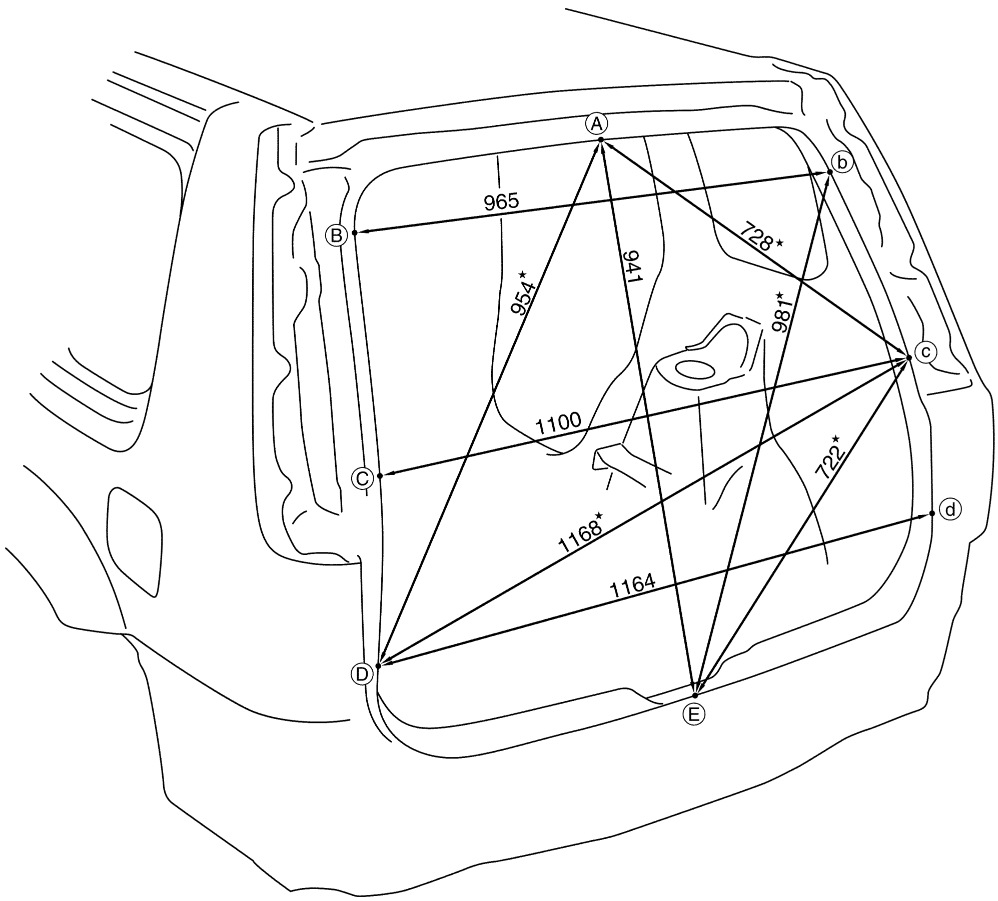
PIIA0402E

REAR BODY

Measurement

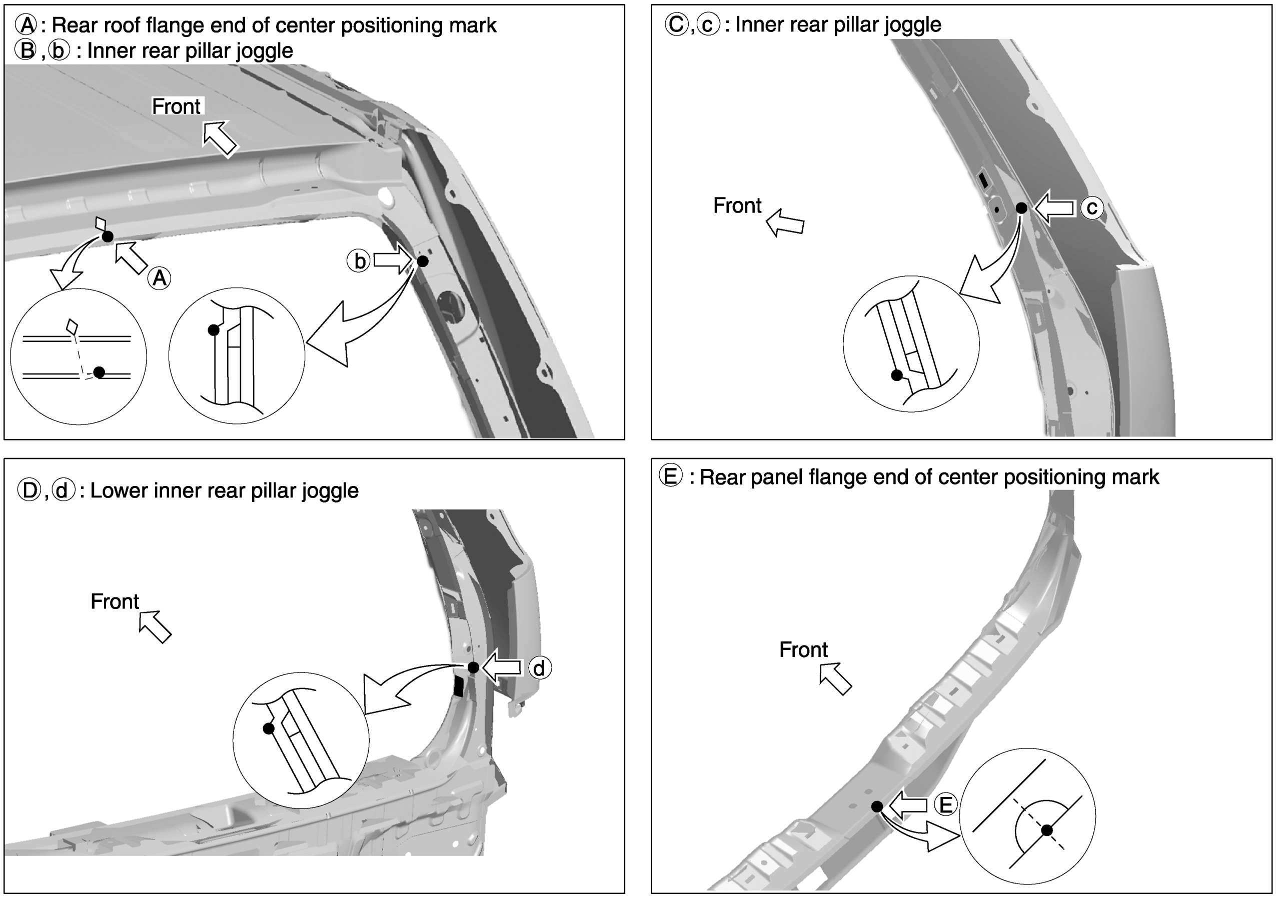
Figures marked with a (★) indicate symmetrically identical dimensions on both right and left hand sides of the vehicle.

Unit : mm



PIIA0403E

Measurement Points



PIIA0404E

Handling Precautions for Plastics

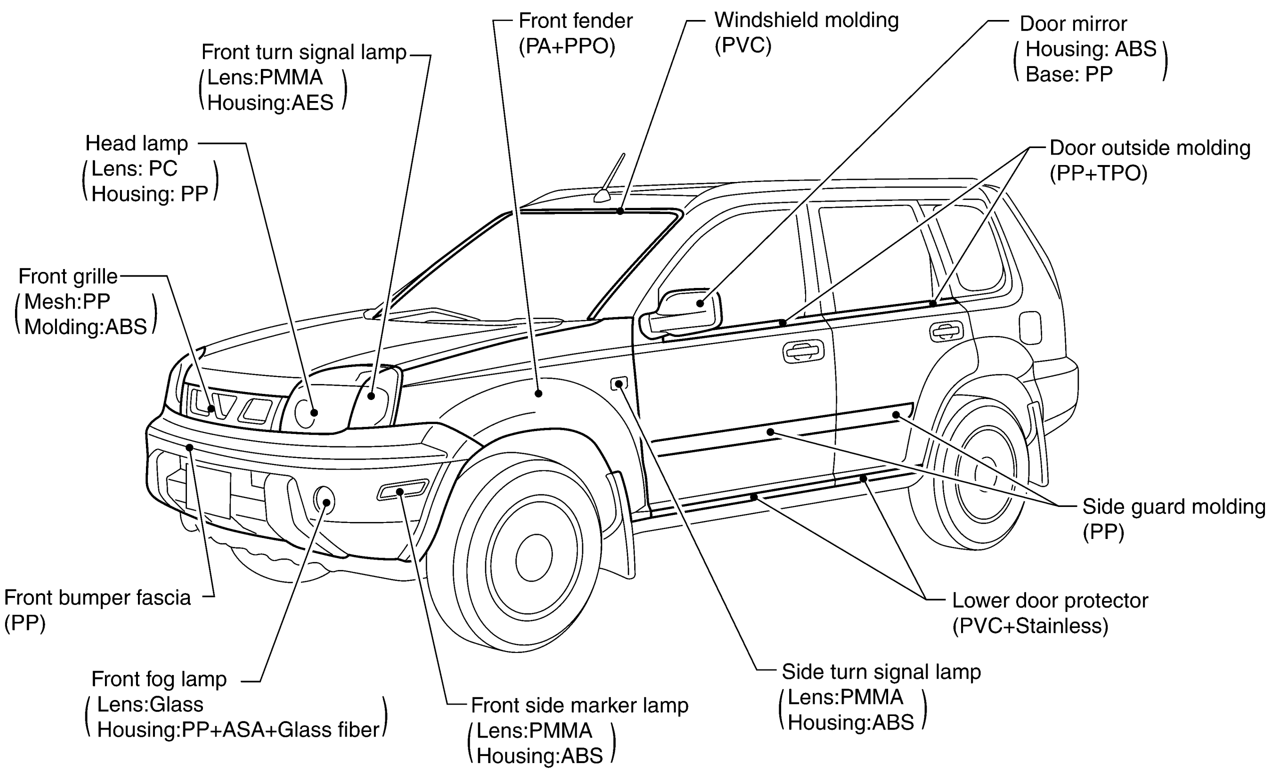
AIS0063P

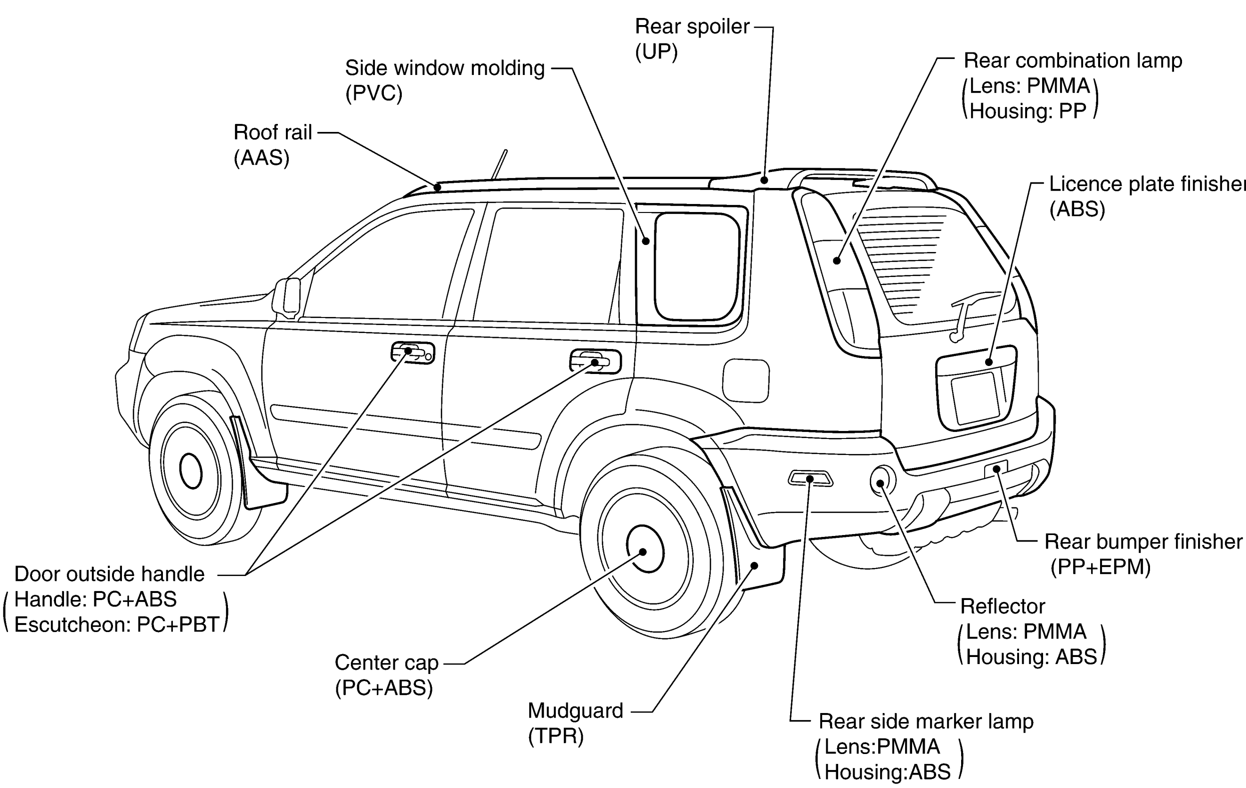
HANDLING PRECAUTIONS FOR PLASTICS

Abbre-viation	Material name	Heat resisting temperature °C(°F)	Resistance to gasoline and solvents	Other cautions
PE	Polyethylene	60(140)	Gasoline and most solvents are harmless if applied for a very short time (wipe up quickly).	Flammable
PVC	Polyvinyl Chloride	80(176)	Same as above.	Poison gas is emitted when burned.
EPM/ EPDM	Ethylene Propylene (Diene) rubber	80(176)	Same as above.	Flammable
TPO/ TPR	Thermoplastic Olefine/ Thermoplastic Rubber	80(176)	Same as above.	Flammable
PP	Polypropylene	90(194)	Same as above.	Flammable, avoid battery acid.
UP	Polyester thermoset	90(194)	Same as above.	Flammable
PS	Polystyrene	80(176)	Avoid solvents.	Flammable
ABS	Acrylonitrile Butadiene Styrene resin	80(176)	Avoid gasoline and solvents.	
AES	Acrylonitrile Ethylene Styrene	80(176)	Same as above.	
PMMA	Polymethyl Methacrylate	85(185)	Same as above.	
AAS	Acrylonitrile Acrylic Styrene	85(185)	Same as above.	
AS	Acrylonitrile Styrene	85(185)	Same as above.	
EVA	Polyvinyl Ethyl Acetate	90(194)	Same as above.	
ASA	Acrylonitrile Styrene Acrylate	100(222)	Same as above.	Flammable
PPO/ PPE	Polyphenylene Oxide/ Polyphenylene Ether	110(230)	Same as above.	
PC	Polycarbonate	120(248)	Same as above.	
PAR	Polyacrylate	180(356)	Same as above.	
L-LDPE	Lenear Low Density PE	45(100)	Gasoline and most solvents are harmless.	Flammable
PUR	Polyurethane	90(194)	Same as above.	
TPU	Thermoplastic Urethane	110(230)	Same as above.	
PPC	Polypropylene Composite	115(239)	Same as above.	Flammable
POM	Polyacetal	120(248)	Same as above.	Avoid battery acid.
PBT+PC	Polybutylene Terephthalate+Polycarbonate	120(248)	Same as above.	Flammable
PA	Polyamide (Nylon)	140(284)	Same as above.	Avoid immersing in water.
PBT	Polybutylene Terephthalate	140(284)	Same as above.	
FRP	Fiber Reinforced Plastics	170(338)	Same as above.	Avoid battery acid.
PET	Polyethylene Terephthalate	180(356)	Same as above.	
PEI	Polyetherimide	200(392)	Same as above.	

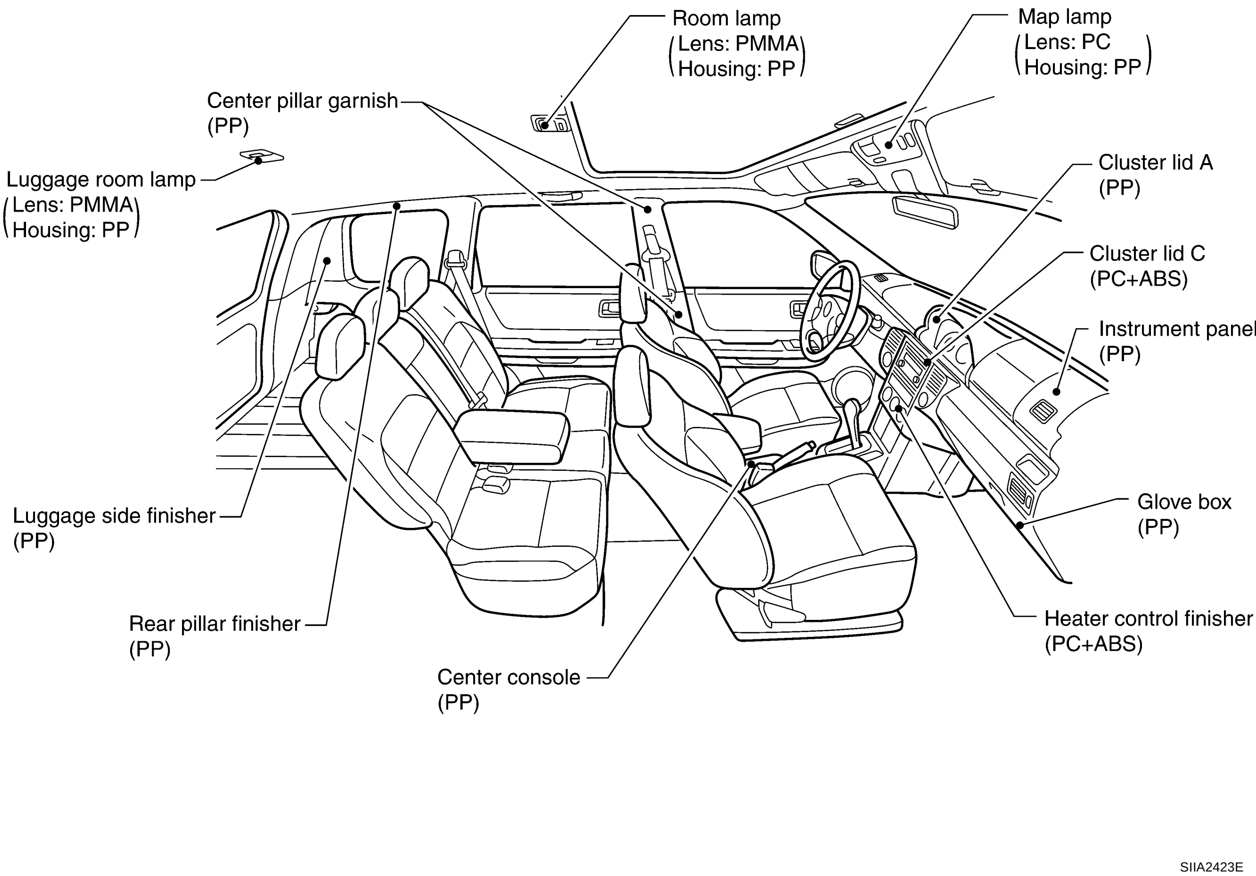
1. When repairing and painting a portion of the body adjacent to plastic parts, consider their characteristics (influence of heat and solvent) and remove them if necessary or take suitable measures to protect them.
2. Plastic parts should be repaired and painted using methods suiting the materials' characteristics.

LOCATION OF PLASTIC PARTS





SIIA2422E


Room lamp
(Lens: PMMA
Housing: PP)
Map lamp
(Lens: PC
Housing: PP)
Center pillar garnish
(PP)
Luggage room lamp
(Lens: PMMA
Housing: PP)
Cluster lid A
(PP)
Cluster lid C
(PC+ABS)
Instrument panel
(PP)
Glove box
(PP)
Luggage side finisher
(PP)
Rear pillar finisher
(PP)
Heater control finisher
(PC+ABS)
Center console
(PP)
SIIA2423E

Precautions in Repairing High Strength Steel

AIS0063Q

High strength steel is used for body panels in order to reduce vehicle weight.
Accordingly, precautions in repairing automotive bodies made of high strength steel are described below:

HIGH STRENGTH STEEL (HSS) USED IN NISSAN VEHICLES

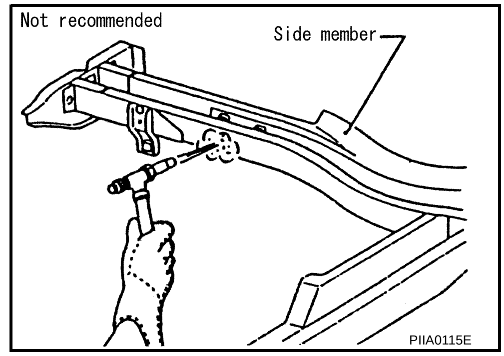
Tensile strength	Nissan/Infiniti designation	Major applicable parts
373 N/mm^2 (38 kg/mm^2 ,54klb/sq in)	SP130	● Front side member assembly ● Pillar hinge brace assembly ● Front & center pillar assembly ● Rear side member assembly ● Other reinforcements
785-981 N/mm^2 (80-100 kg/mm^2 114-142klb/sq in)	SP150	● Front bumper inner center reinforcement

SP130 is the most commonly used HSS.
SP150 HSS is used only on parts that require much more strength.

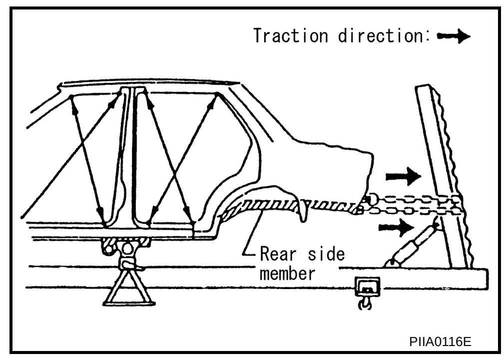
Read the Following Precautions When Repairing HSS:

1. Additional points to consider

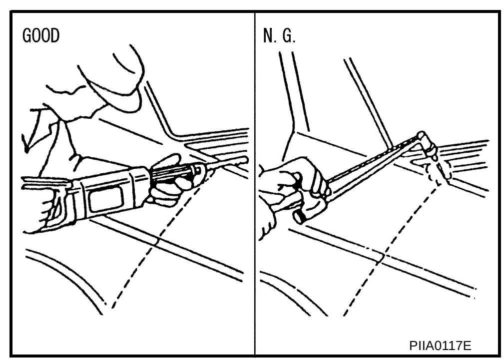
- The repair of reinforcements (such as side members) by heating is not recommended since it may weaken the component. When heating is unavoidable, do not heat HSS parts above 550°C (1,022°F).
  Verify heating temperature with a thermometer.
  (Crayon-type and other similar type thermometer are appropriate.)



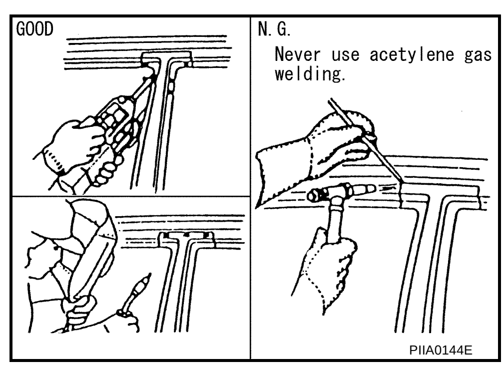
- When straightening body panels, use caution in pulling any HSS panel. Because HSS is very strong, pulling may cause deformation in adjacent portions of the body. In this case, increase the number of measuring points, and carefully pull the HSS panel.

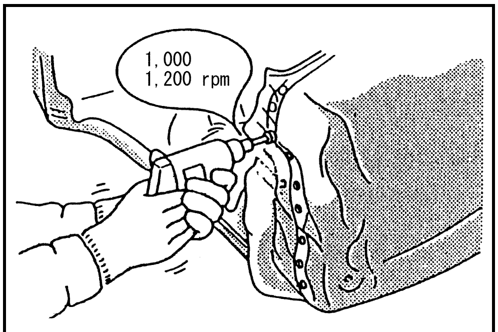


- When cutting HSS panels, avoid gas (torch) cutting if possible. Instead, use a saw to avoid weakening surrounding areas due to heat. If gas (torch) cutting is unavoidable, allow a minimum margin of 50 mm (1.97in).



- When welding HSS panels, use spot welding whenever possible in order to minimize weakening surrounding areas due to heat.
  If spot welding is impossible, use M.I.G. welding. Do not use gas (torch) welding because it is inferior in welding strength.

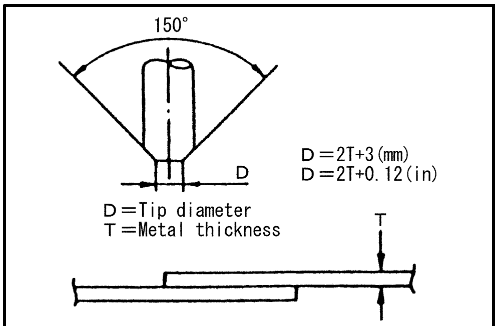




PIIA0145E

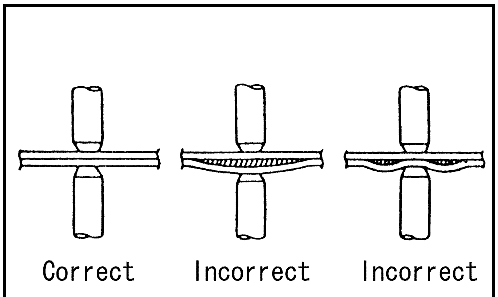
- The spot weld on HSS panels is harder than that of an ordinary steel panel.
  Therefore, when cutting spot welds on a HSS panel, use a low speed high torque drill (1,000 to 1,200 rpm) to increase drill bit durability and facilitate the operation.
- SP150 HSS panels with a tensile strength of 785 to 981 N/mm^2 (80 to 100 kg/mm^2, 114 to 142 klb/sq in), used as reinforcement in the door guard beams, is too strong to repair. When these HSS parts are damaged, the outer panels also sustain substantial damage; therefore, the assembly parts must be replaced.

2. Precautions in spot welding HSS
   This work should be performed under standard working conditions. Always note the following when spot welding HSS:
   - The electrode tip diameter must be sized properly according to the metal thickness.



PIIA0146E

- The panel surfaces must fit flush to each other, leaving no gaps.

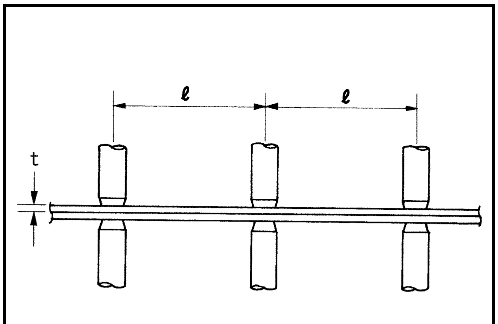


PIIA0147E

- Follow the specifications for the proper welding pitch.

Unit:mm

Thickness (t)	Minimum pitch (l)
0.6 (0.024)	10 (0.39) or over
0.8 (0.031)	12 (0.47) or over
1.0 (0.039)	18 (0.71) or over
1.2 (0.047)	20 (0.79) or over
1.6 (0.063)	27 (1.06) or over
1.8 (0.071)	31 (1.22) or over



PIIA0148E

Replacement Operations

AIS0063R

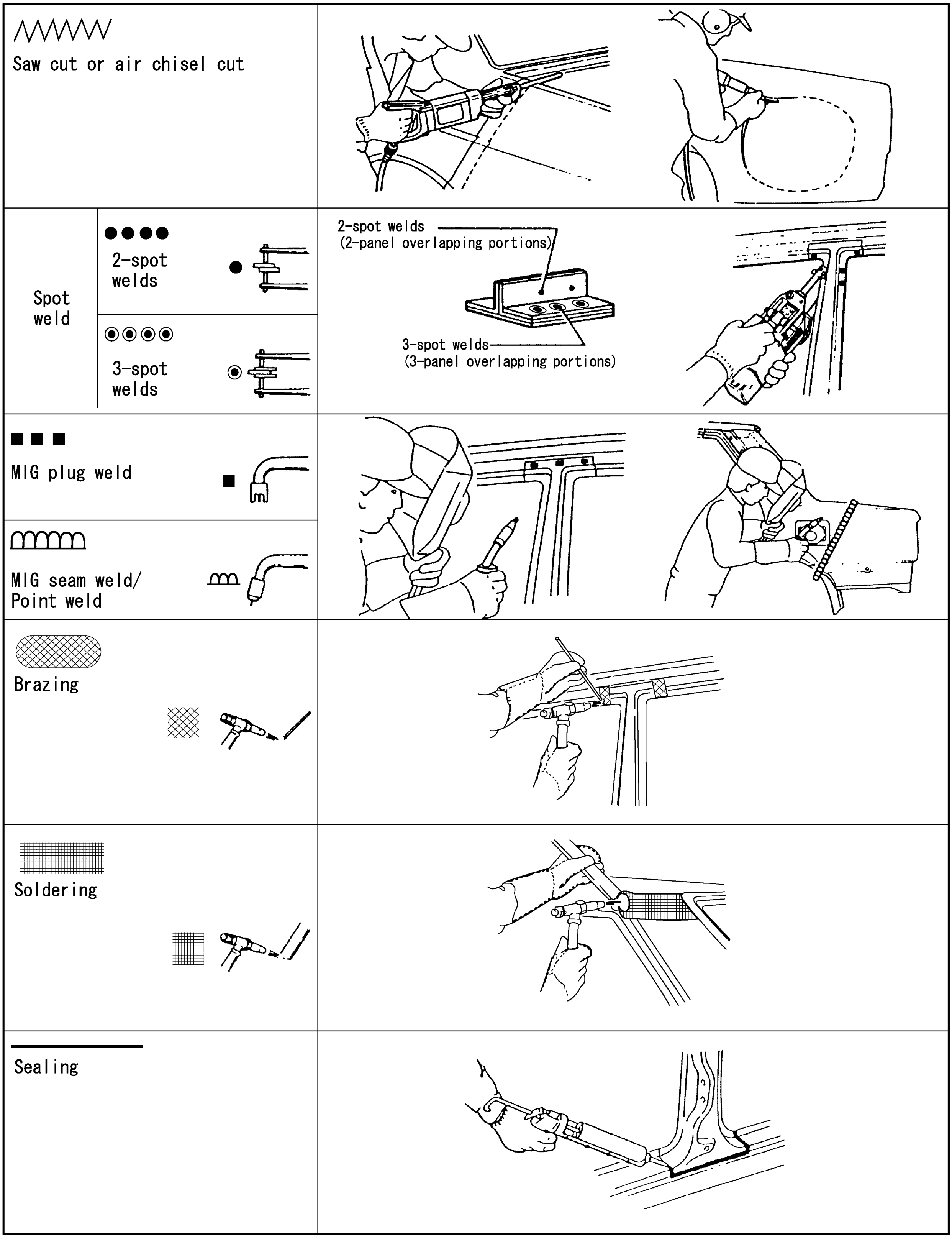
DESCRIPTION

This section is prepared for technicians who have attained a high level of skill and experience in repairing collision-damaged vehicles and also use modern service tools and equipment. Persons unfamiliar with body repair techniques should not attempt to repair collision-damaged vehicles by using this section.

Technicians are also encouraged to read Body Repair Manual (Fundamentals) in order to ensure that the original functions and quality of the vehicle can be maintained. The Body Repair Manual (Fundamentals) contains additional information, including cautions and warning, that are not including in this manual. Technicians should refer to both manuals to ensure proper repairs.

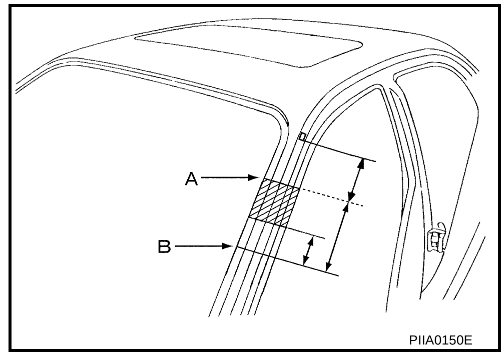
Please note that these information are prepared for worldwide usage, and as such, certain procedures might not apply in some regions or countries.

The symbols used in this manual for cutting and welding / brazing operations are shown below.

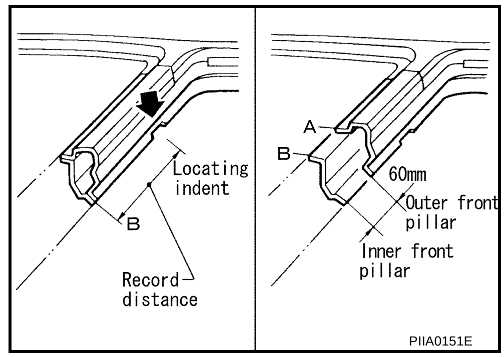


PIIA0149E

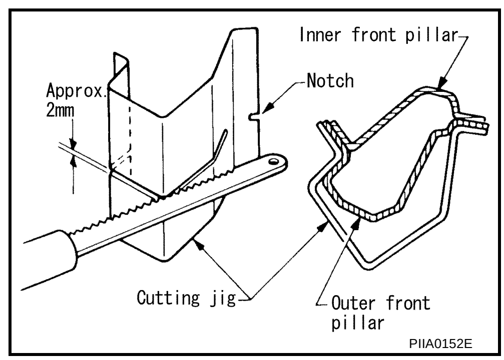
- Front pillar butt joint can be determined anywhere within shaded area as shown in the figure. The best location for the butt joint is at position A due to the construction of the vehicle. Refer to the front pillar section.



- Determine cutting position and record distance from the locating indent. Use this distance when cutting the service part. Cut outer front pillar over 60 mm above inner front pillar cut position.

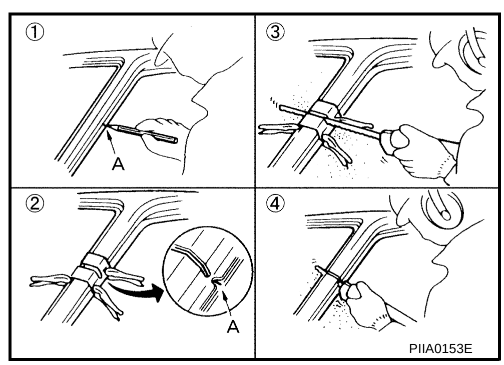


- Prepare a cutting jig to make outer pillar easier to cut. Also, this will permit service part to be accurately cut at joint position.

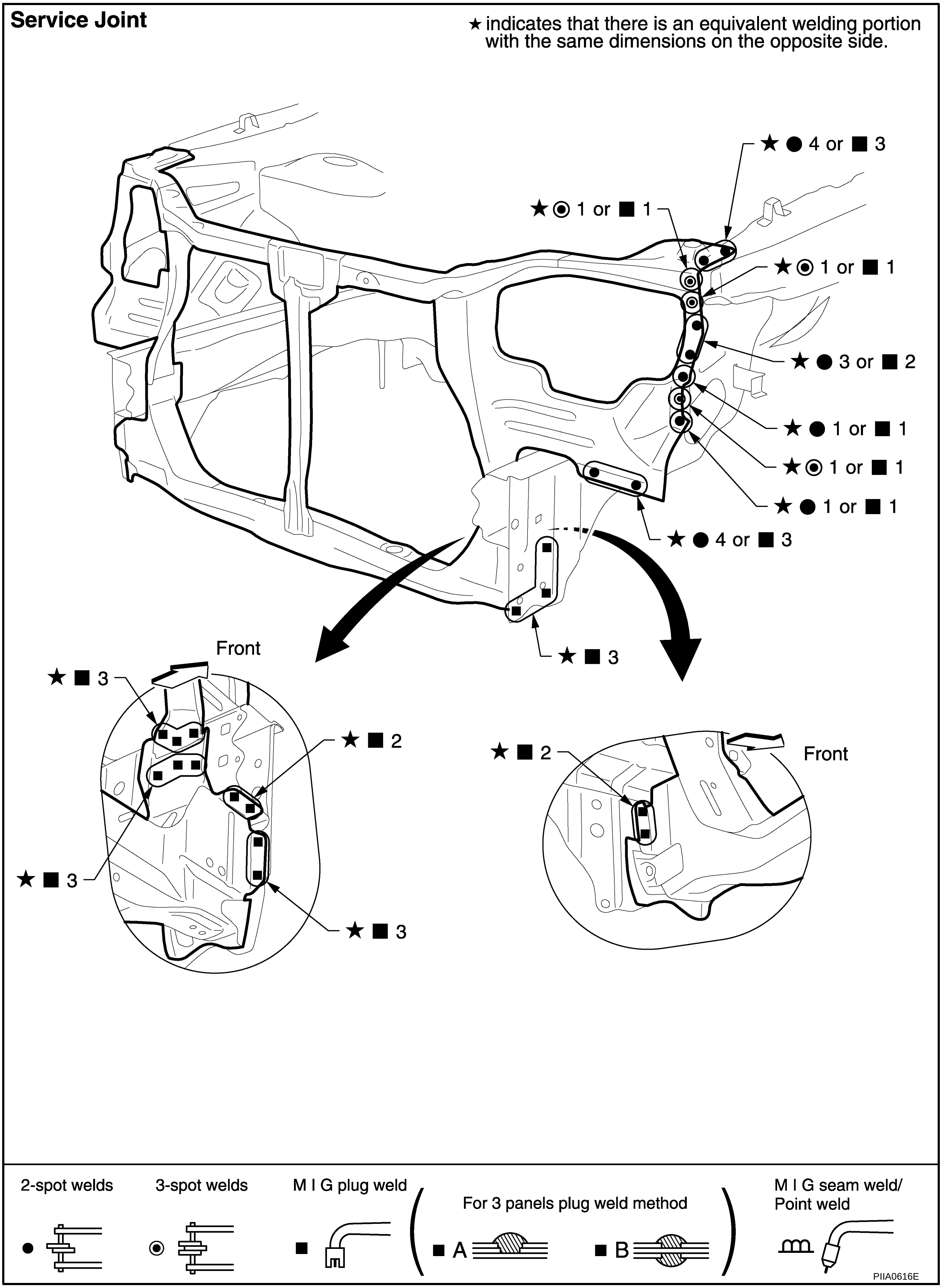


- An example of cutting operation using a cutting jig is as follows.

1. Mark cutting lines.
   A: Cut position of outer pillar
   B: Cut position of inner pillar
2. Align cutting line with notch on jig. Clamp jig to pillar.
3. Cut outer pillar along groove of jig. (At position A)
4. Remove jig and cut remaining portions.
5. Cut inner pillar at position B in same manner.



RADIATOR CORE SUPPORT

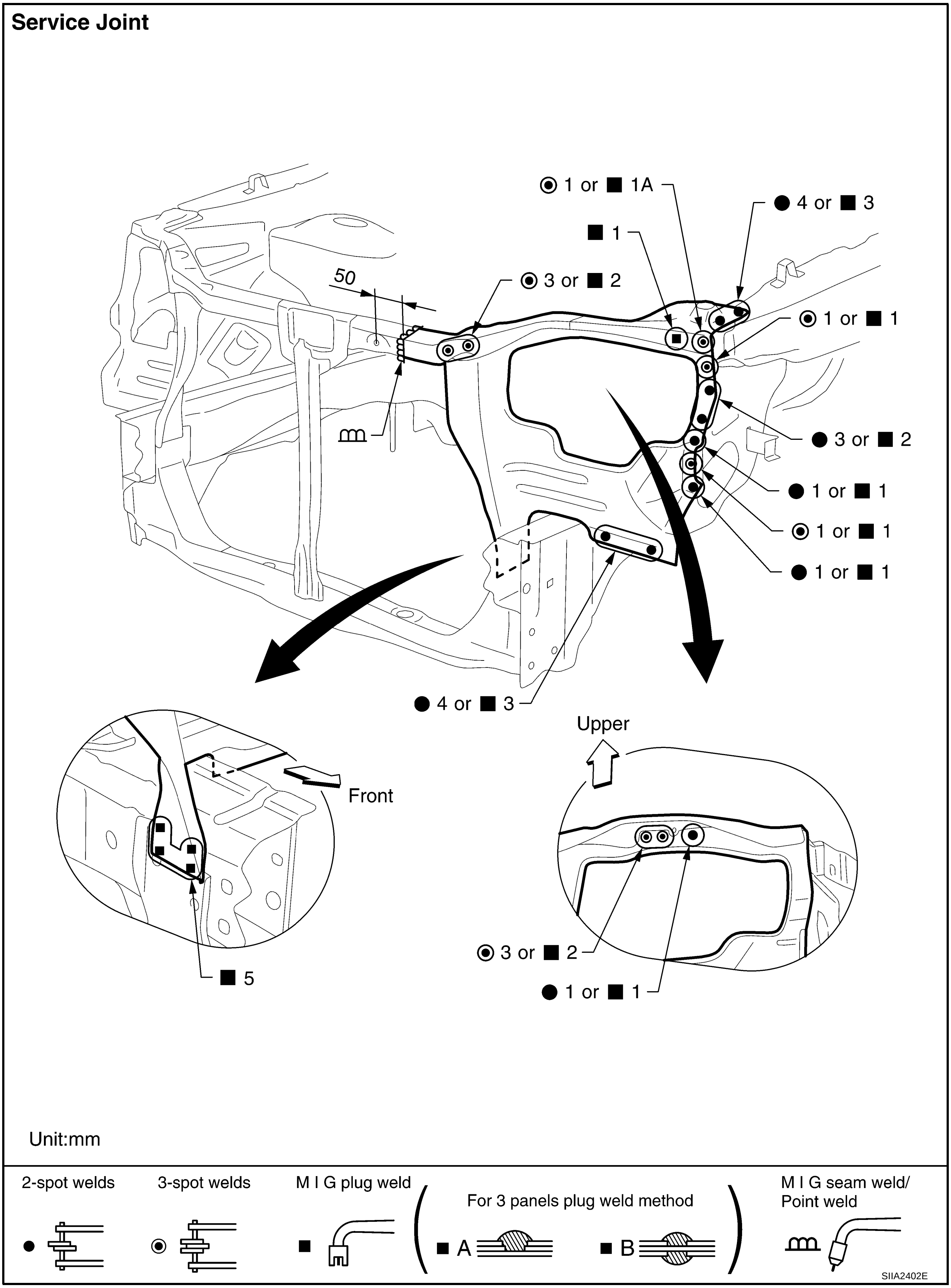


Change parts

- Radiator core support assembly

RADIATOR CORE SUPPORT (PARTIAL REPLACEMENT)

Service Joint

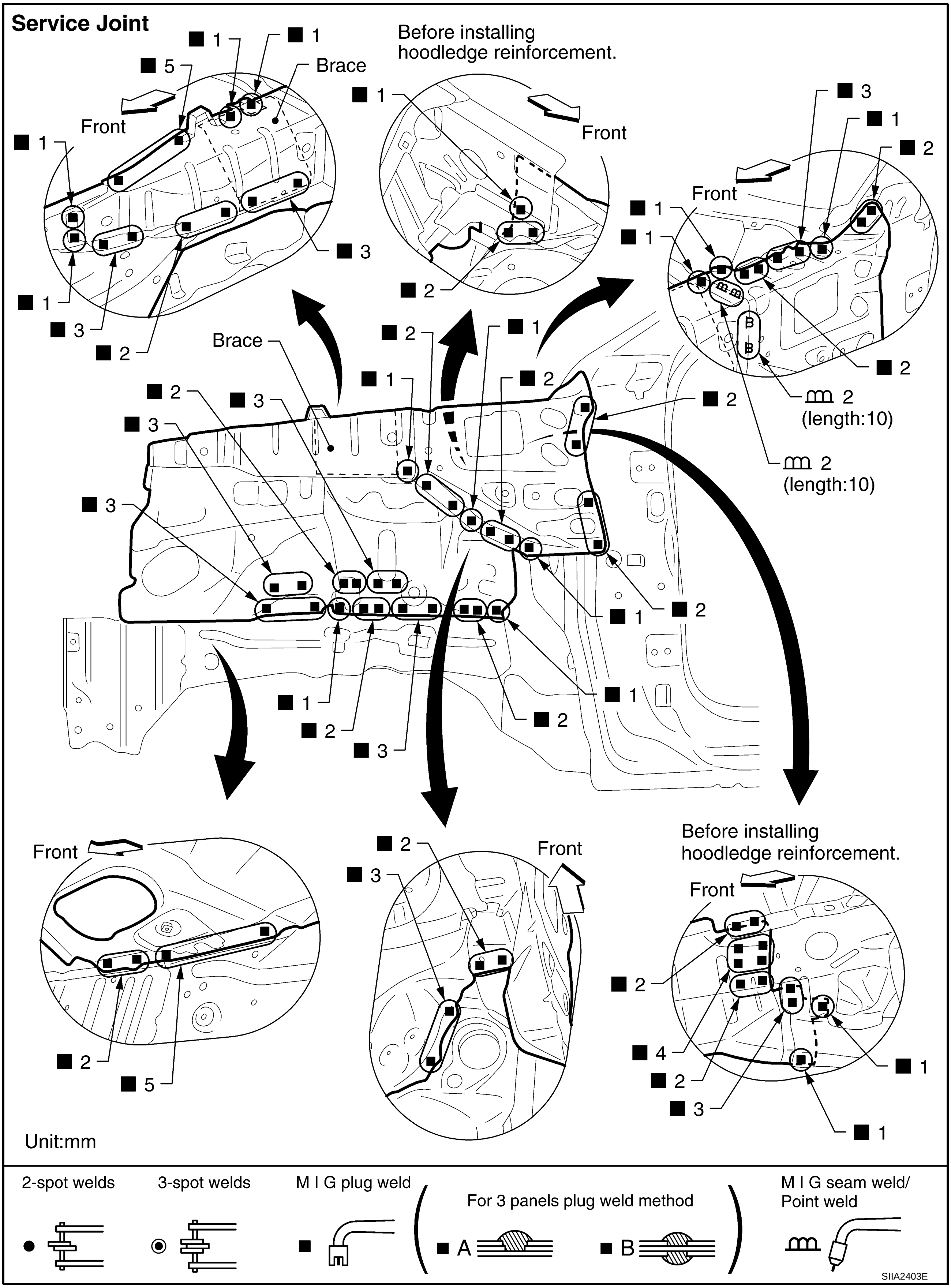


Change parts

- Upper radiator core support
- Side radiator core support (LH)

HOODLEDGE

- Work after radiator core support has been removed.

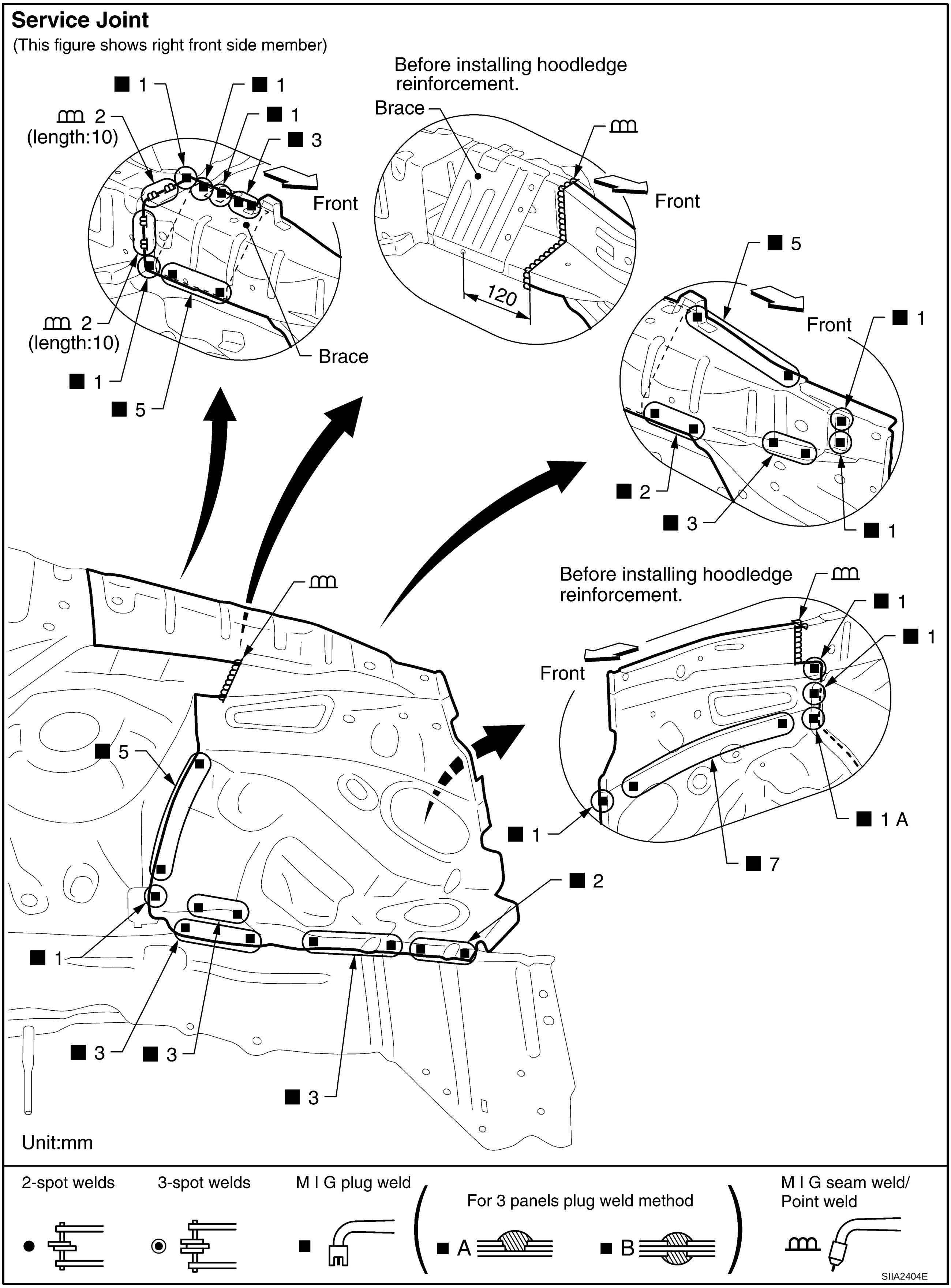


Change parts

- Hoodledge assembly (LH)
- Front hoodledge reinforcement (LH)
- Rear hoodledge reinforcement (LH)

HOODLEDGE (PARTIAL REPLACEMENT)

- Work after radiator core support has been removed.



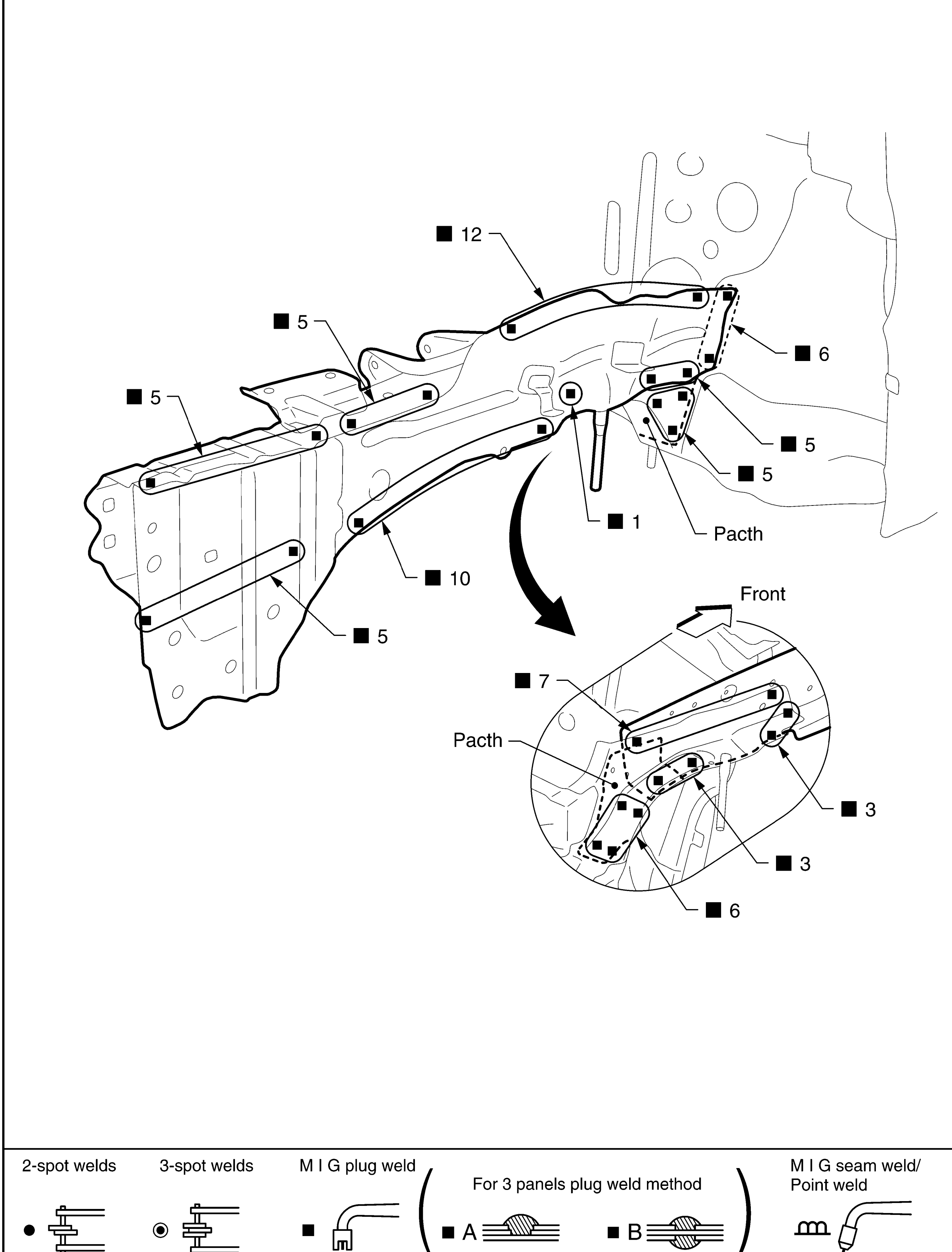
Change parts

- Front hoodledge reinforcement (RH)
- Upper hoodledge (RH)
- Lower front hoodledge (RH)

FRONT SIDE MEMBER

- Work after hoodledge and radiator core support have been removed.

Service Joint

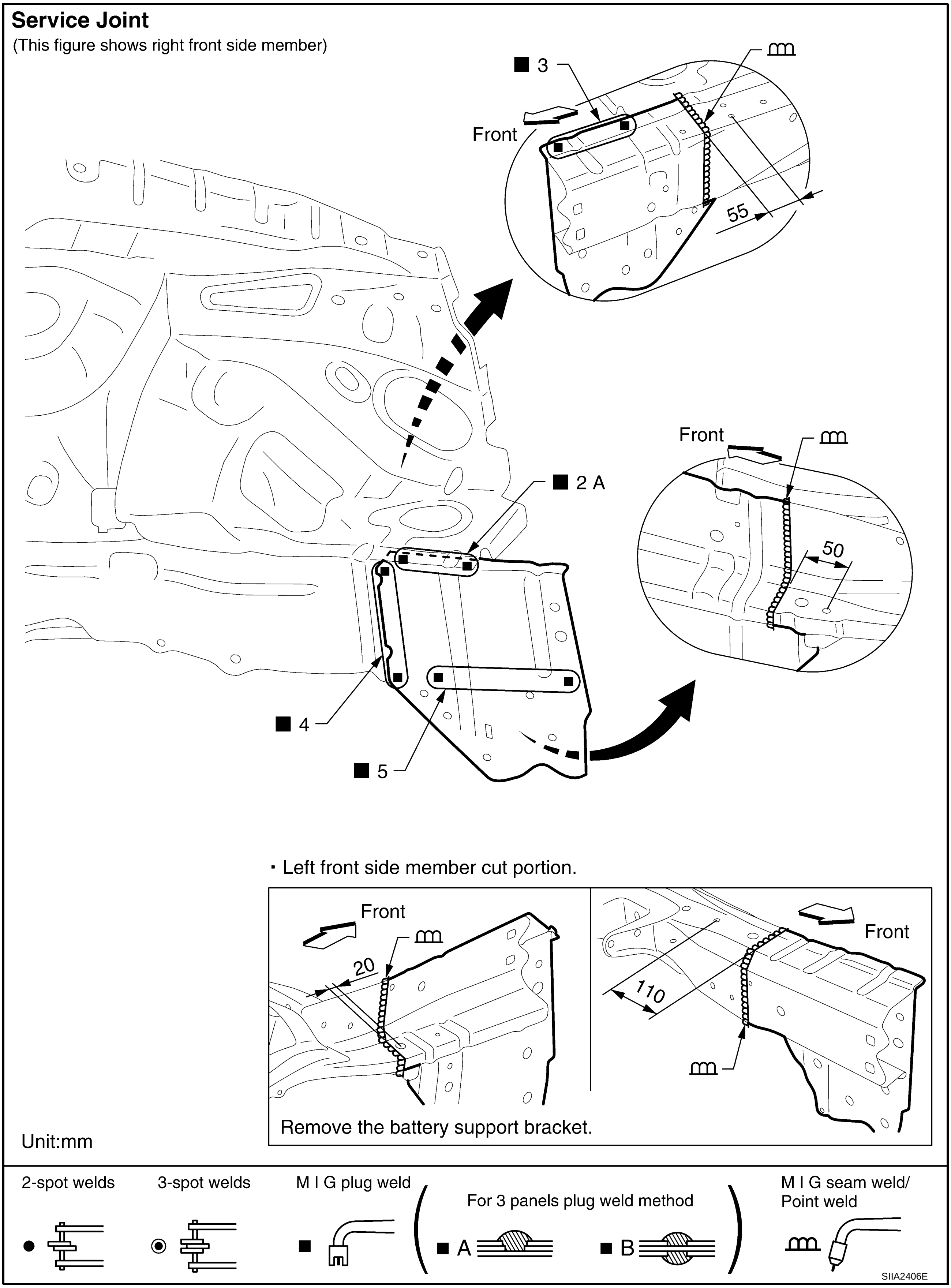


Change parts

- Front side member (LH)
- Front side member closing plate assembly (LH)

FRONT SIDE MEMBER (PARTIAL REPLACEMENT)

- Work after radiator core support has been removed.

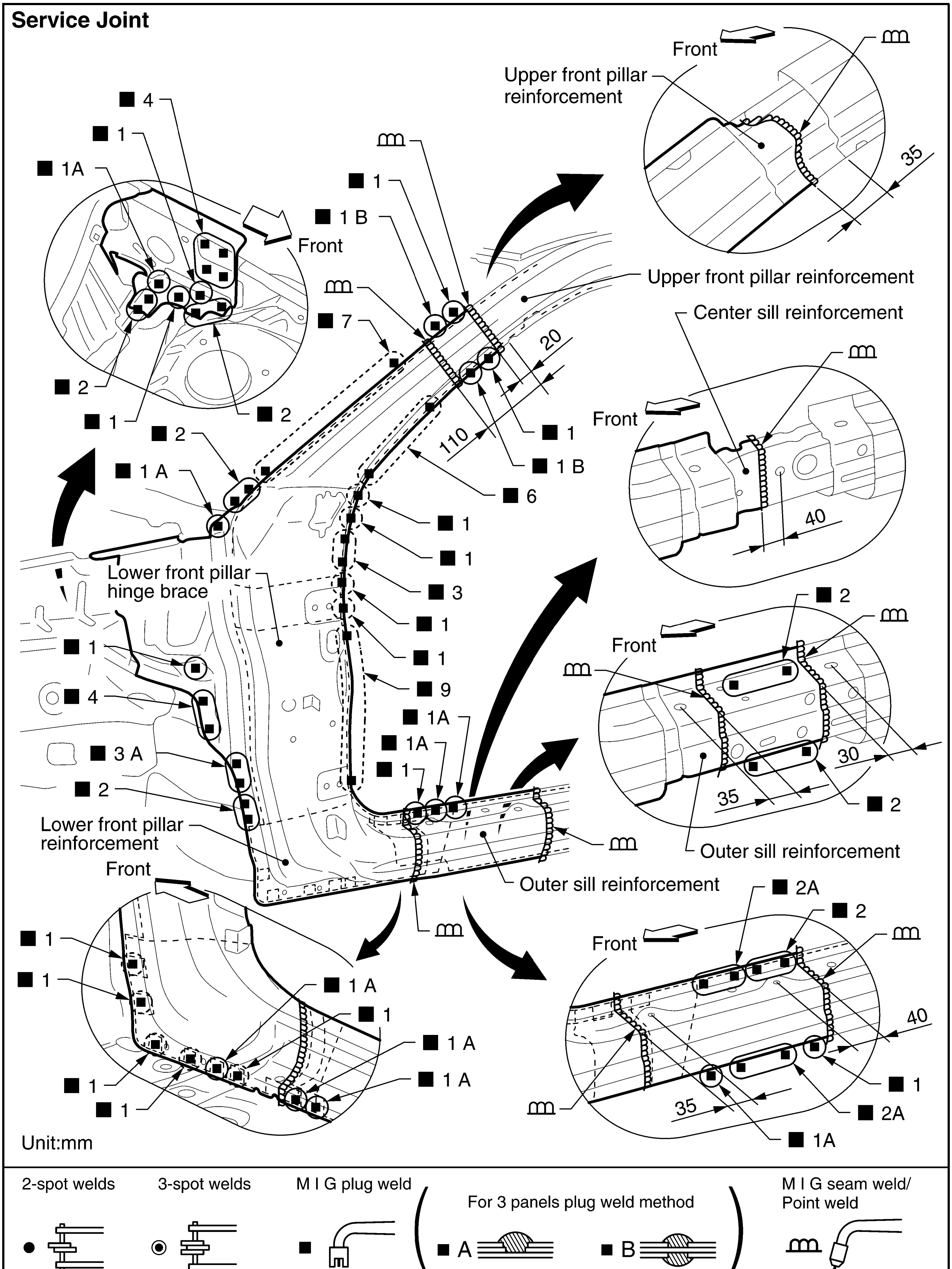


Change parts

- Front side member (RH)
- Front side member front closing plate (RH)

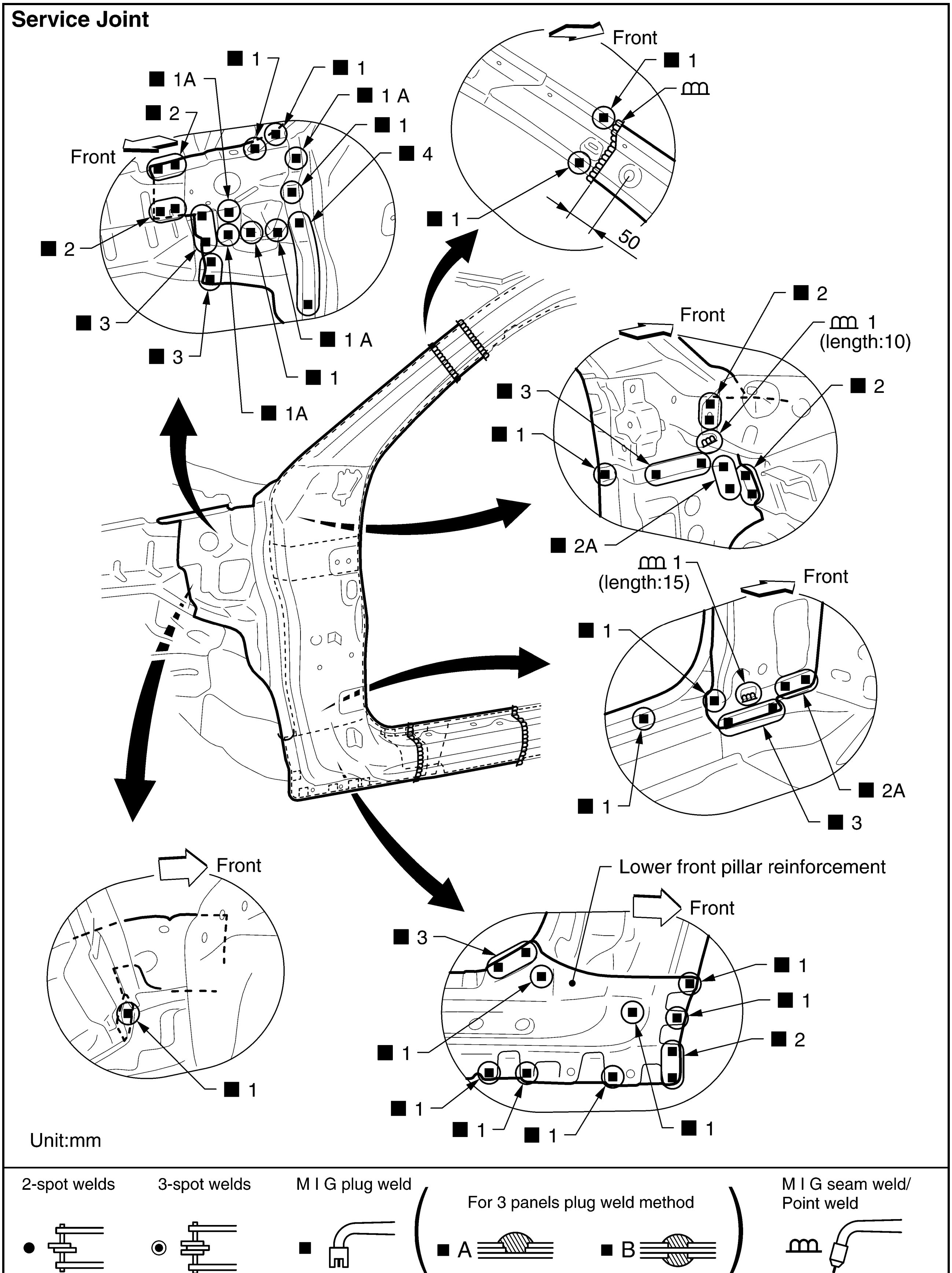
FRONT PILLAR

- Work after hoodledge reinforcement has been removed.

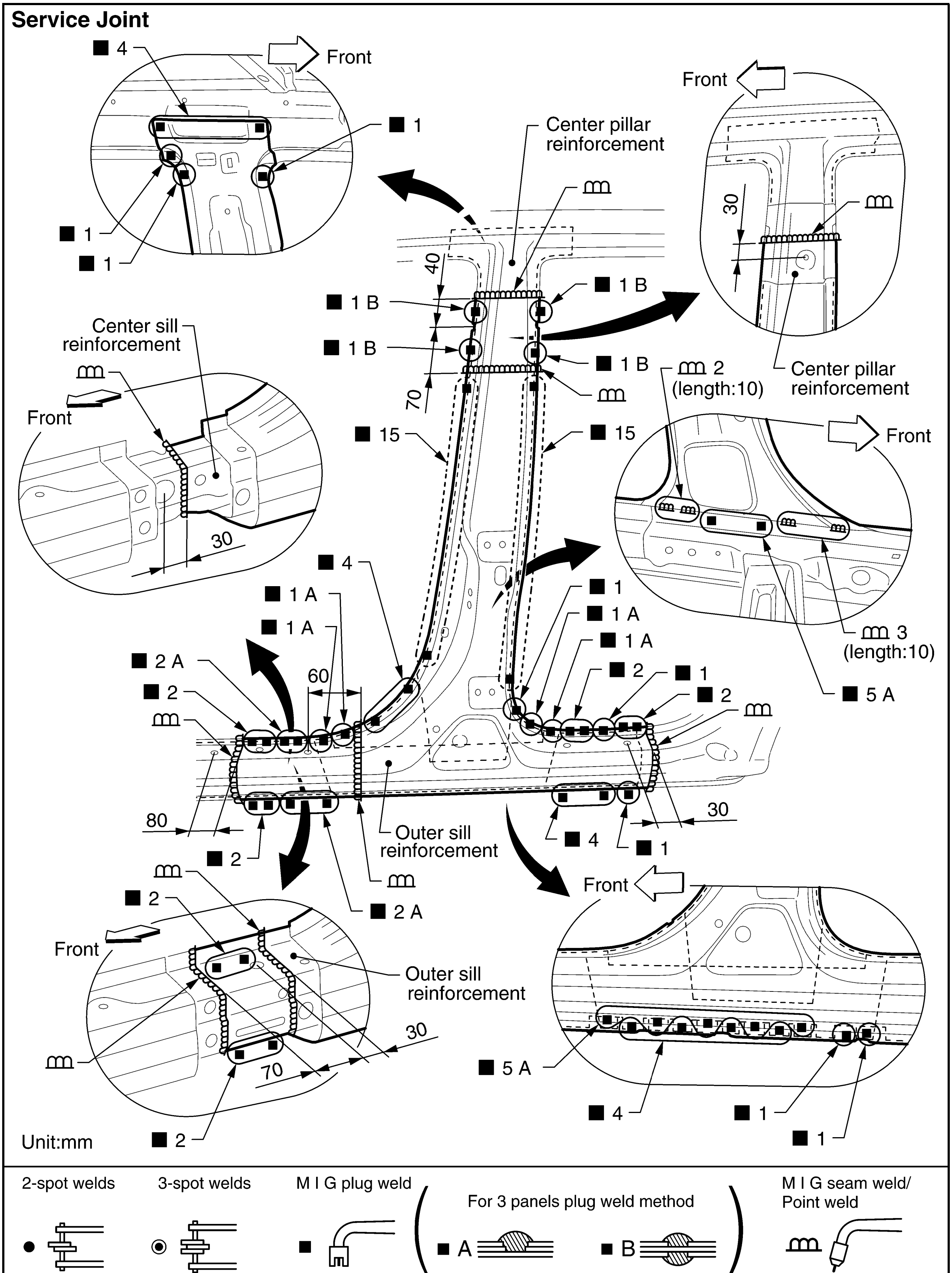


Change parts

- Side body assembly (LH)
- Inner upper front pillar assembly (LH)
- Side cowl top (LH)
- Side dash (LH)
- Lower front pillar reinforcement (LH)



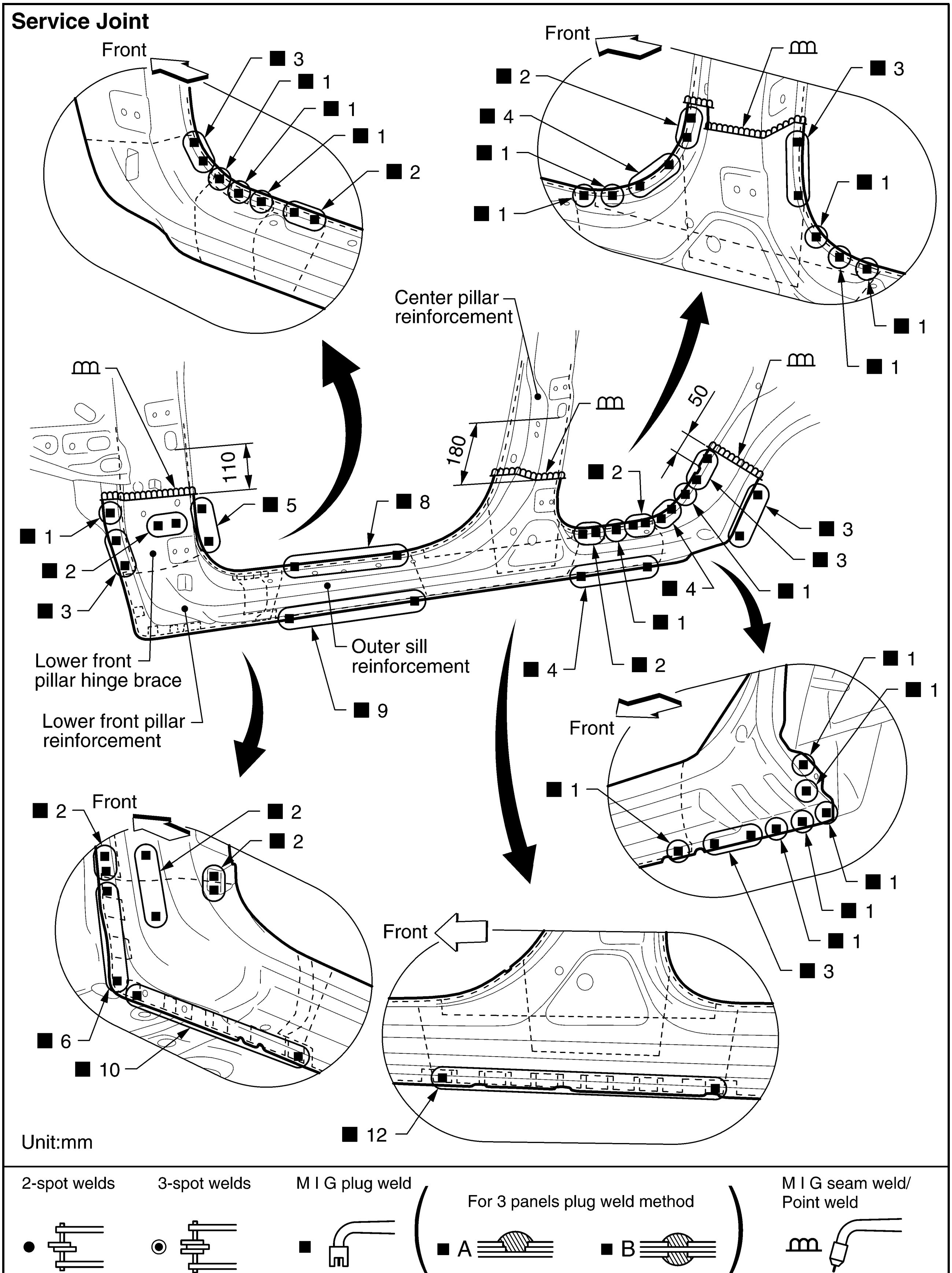
CENTER PILLAR



Change parts

- Side body assembly (LH)
- Inner center pillar (LH)

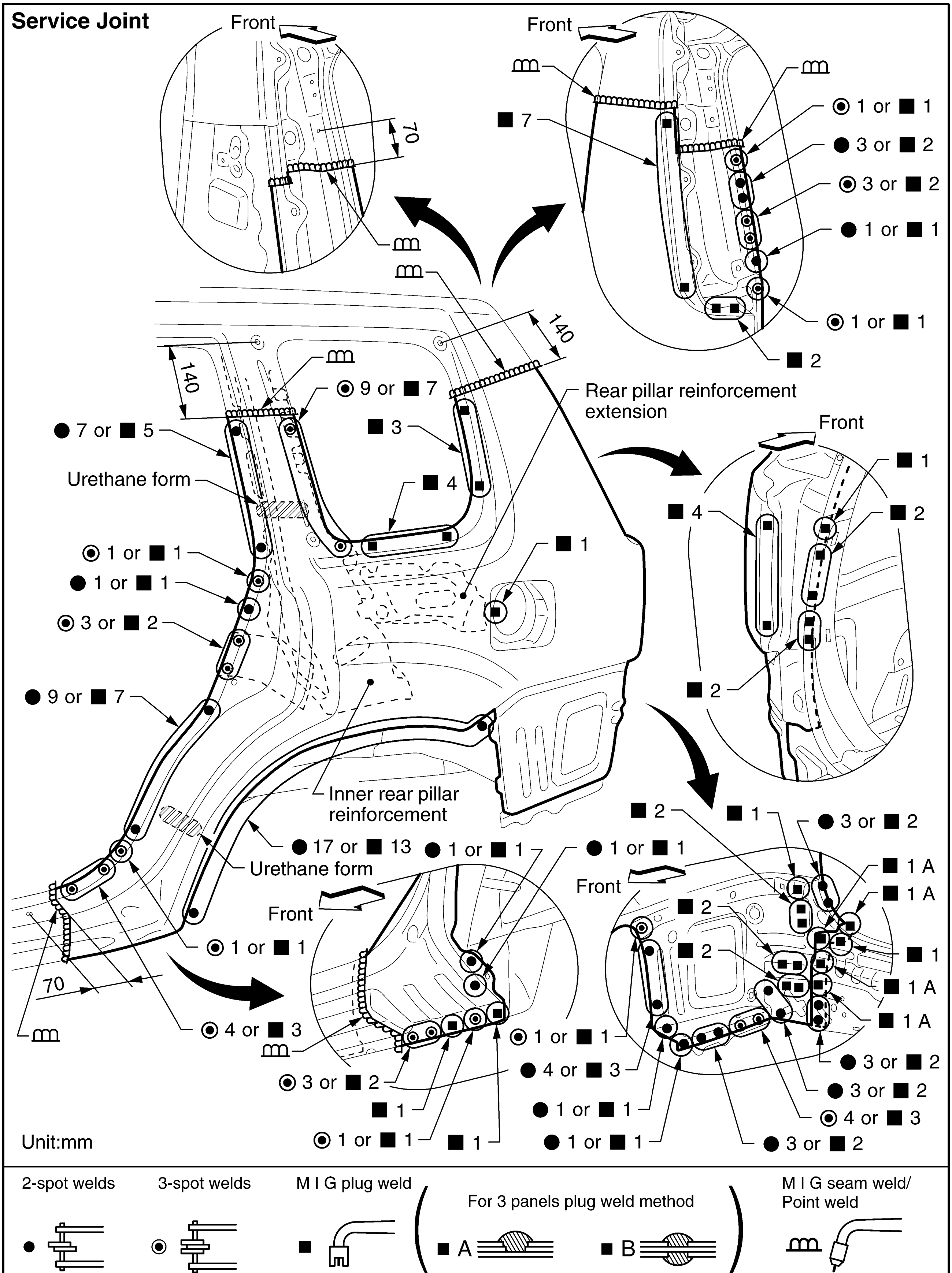
OUTER SILL



Change parts

- Outer sill assembly (LH)

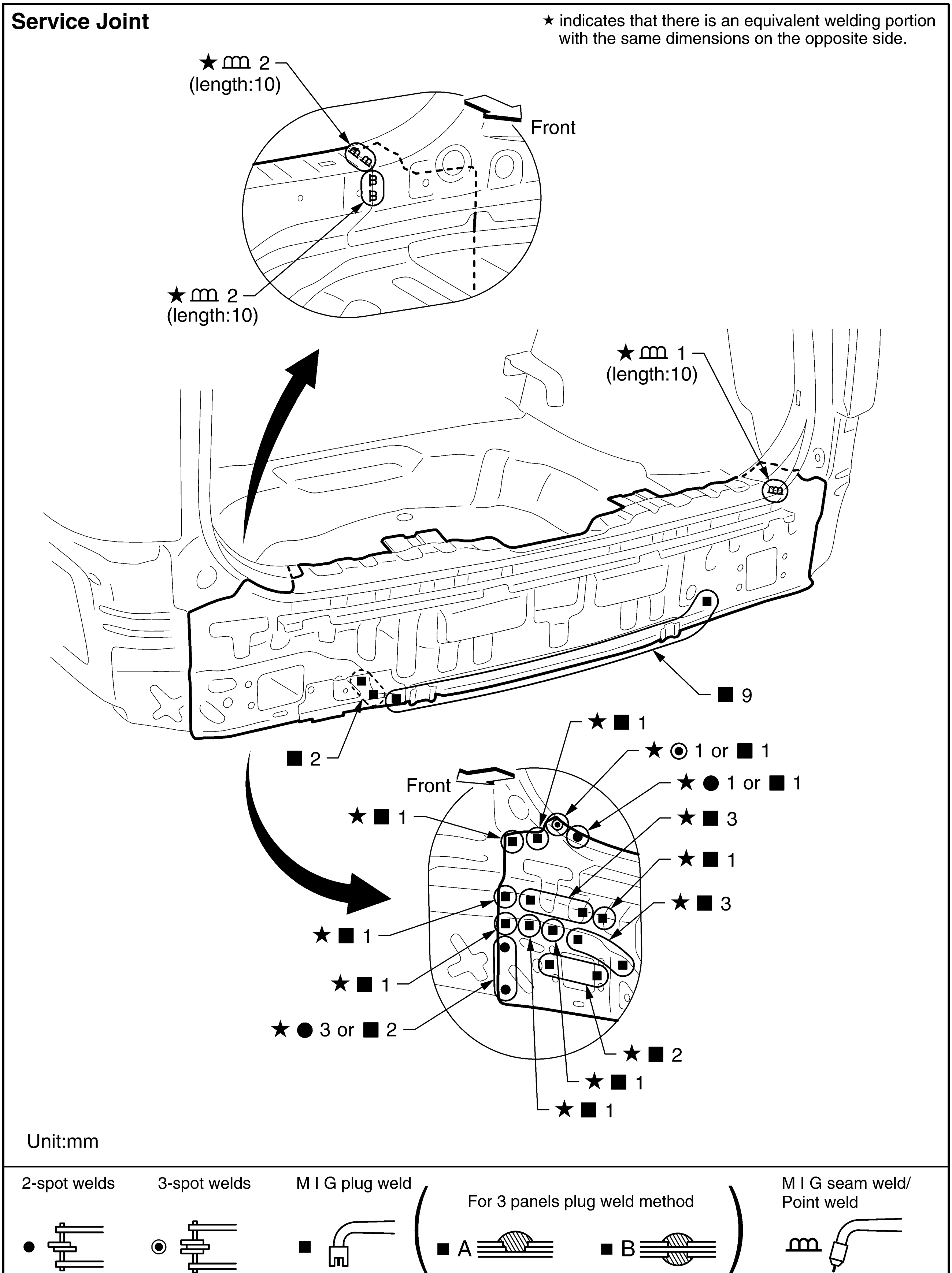
REAR FENDER



Change parts

- Rear fender assembly (LH)
- Rear combination lamp base (LH)

REAR PANEL

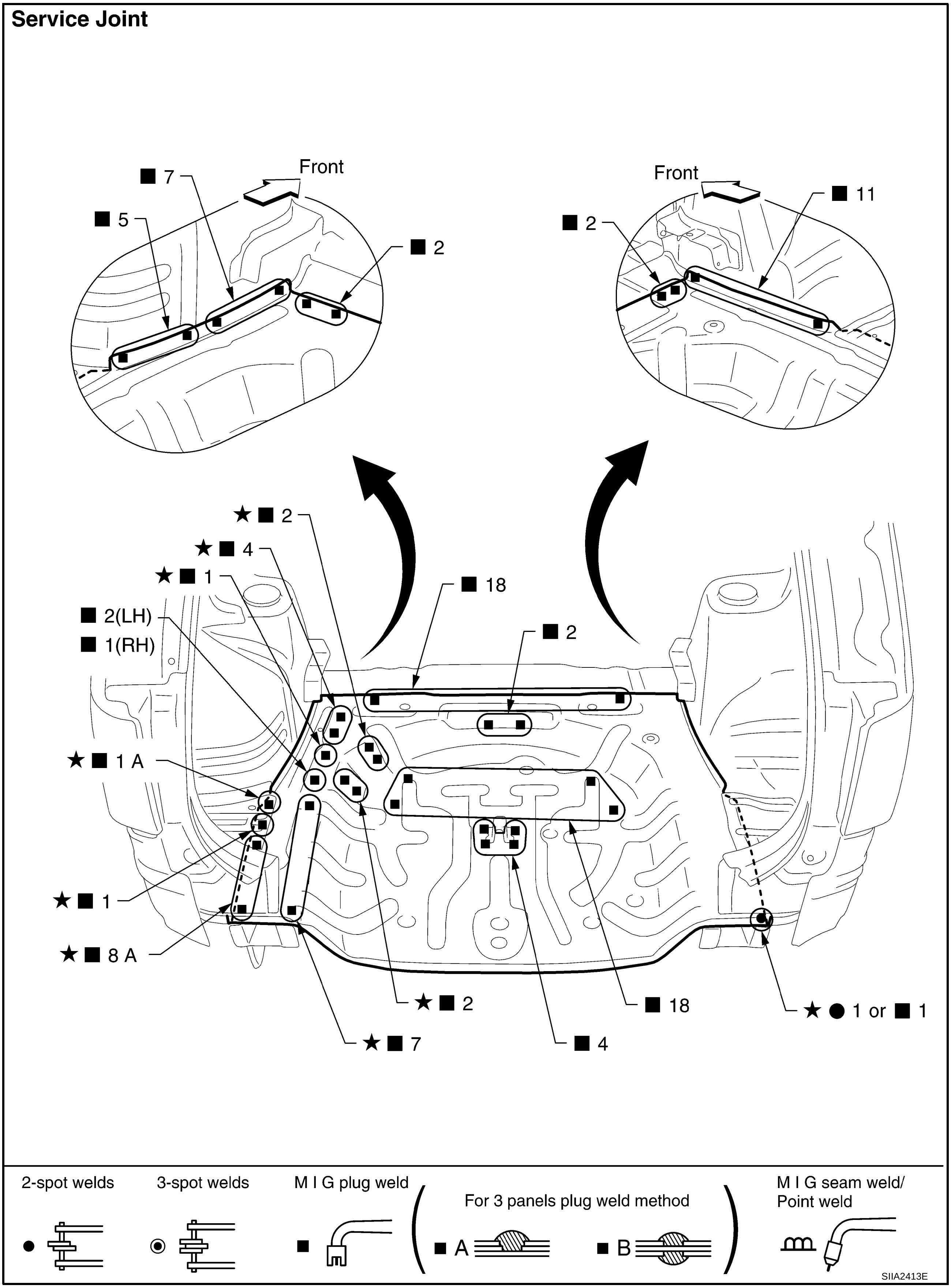


Change parts

- Rear panel assembly

REAR FLOOR REAR

- Work after rear panel has been removed.

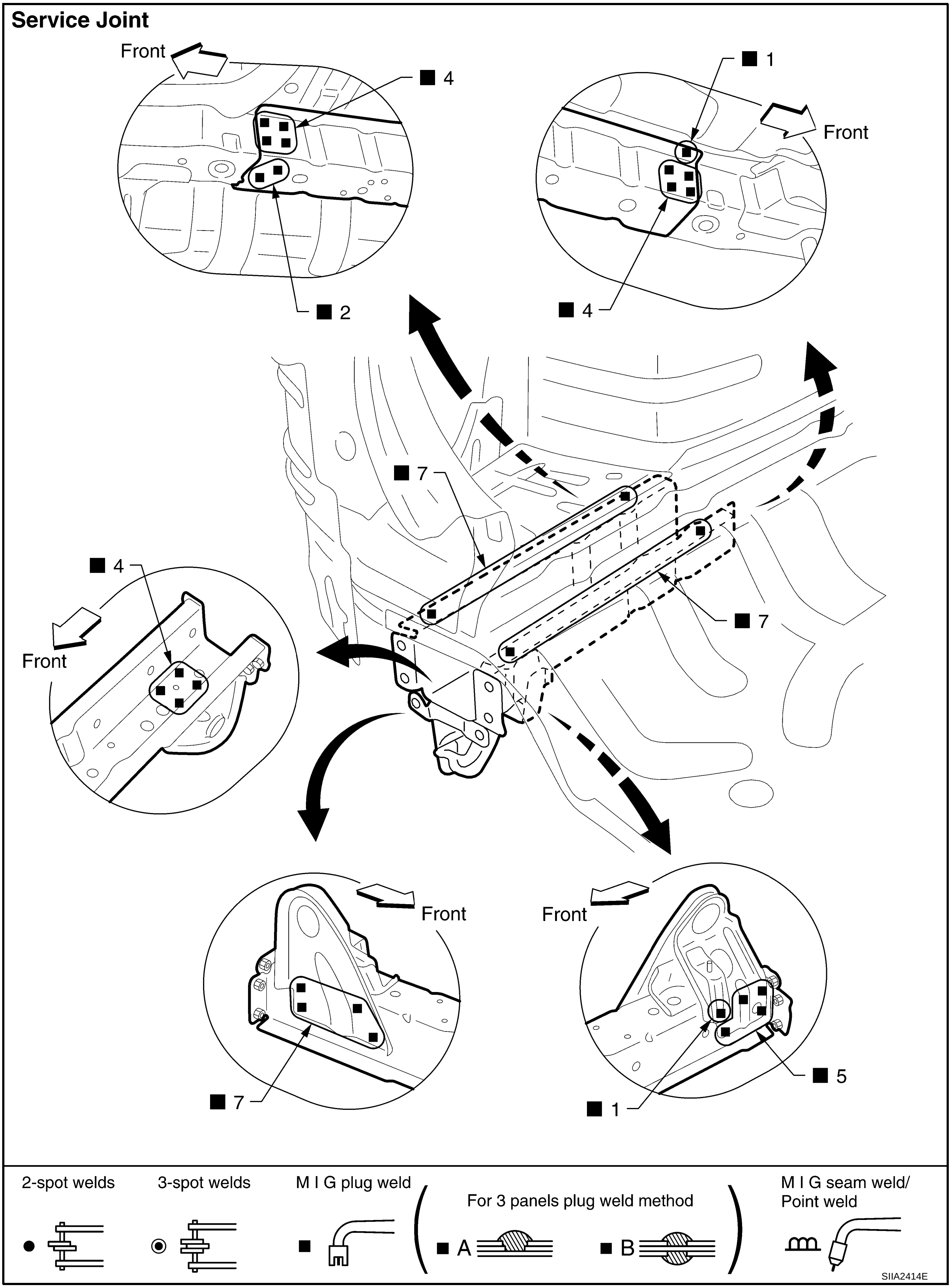


Change parts

- Rear floor rear
- Spare tire clamp bracket

REAR SIDE MEMBER EXTENSION

- Work after rear panel has been removed.



Change parts

- Rear side member extension (LH)
- Rear hook (LH)

SECTION BR
BRAKE SYSTEM

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AFS002KF

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

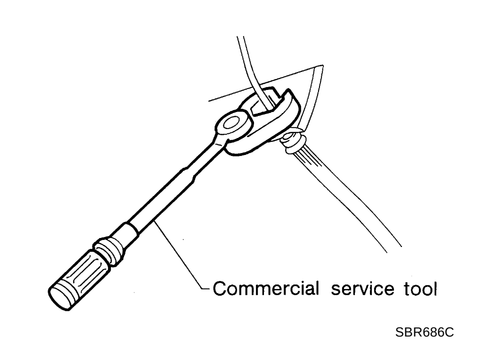
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Brake System

AFS002KG

- Clean dust on front brake and rear brake with a vacuum dust collector. Do not blow with compressed air.
- Recommended fluid is brake fluid “DOT 3”.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Use clean brake fluid, to clean or wash all parts of master cylinder and disc brake caliper,etc.
- Do not use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut torque wrench when removing and installing brake tube.
- When installing brake piping, be sure to check torque.
- Before working, turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit), VDC/TCS/ABS control unit or battery cable at negative terminal.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-30, "BRAKE BURNISHING PROCEDURE" (front disc brake), BR-36, "BRAKE BURNISHING PROCEDURE" (rear disc brake).



WARNING:

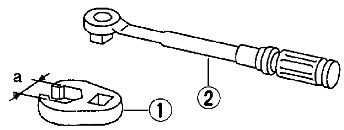
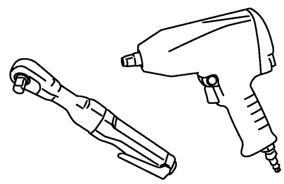
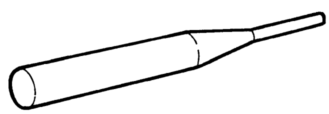
- **Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.**

PREPARATION

PFP:00002

Commercial Service Tools

AFS002KI

Tool name		Description
1.Flare nut crowfoot a:10 mm (0.39 in) / 12 mm (0.47 in) 2.Torque wrench	 NT360	Removing and installing each brake piping
Power tool	 PBIC0190E	Removing front and rear caliper assembly, tires
Pin punch Tip diameter:4 mm (0.16in)dia	 ZZA0515D	Removing and installing reservoir tank pin

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

AFS002PD

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			BR-25, BR-31	BR-25,BR-31	BR-25,BR-31	—	—	BR-30,BR-35	—	—	—	BR-30, BR-35	—	NVH in PR section	NHV in RFD section	NVH in FAX, RAX and FSU, RSU section	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in PS section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	Drum out of round	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×									×	×	×	×	×	×	×
		Shake				×								×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×				×	×	×		×

×: Applicable

BRAKE PEDAL

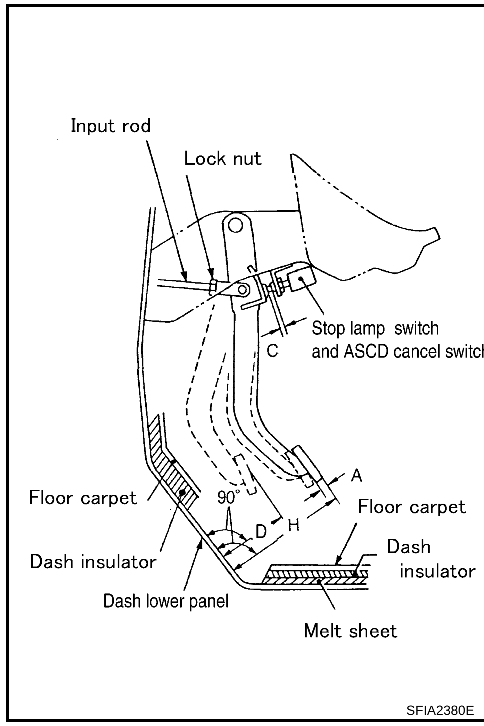
PFP:46501

Inspection and Adjustment

AFS002KK

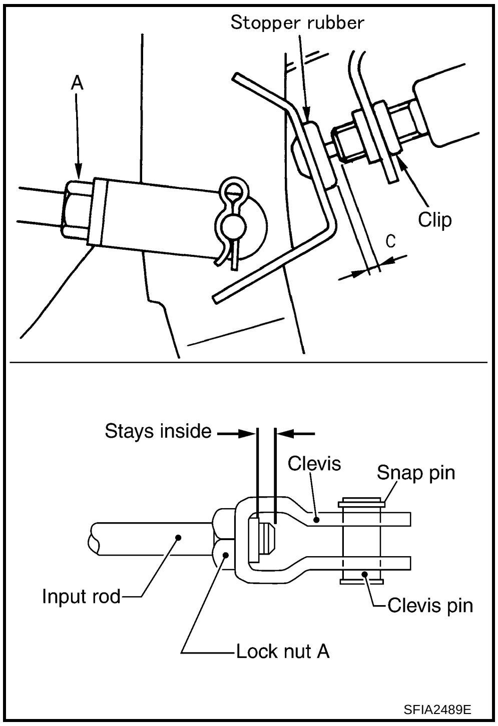
Play and clearance inspection between brake pedal and floor panel with pedal depressed.

- Check brake pedal play.
- Check brake pedal height from dash lower panel.
- Adjust height referring to the following specifications.



H	Brake pedal height (from dash lower panel top surface)	M/T model	156 – 166 mm (6.14 – 6.54 in)
		A/T model	164 – 174 mm (6.46 – 6.85 in)
D	Brake pedal depressed height [under a force of 490 N (50 kg, 110 lb) with engine running]	M/T model	80 mm (3.15 in) or more
		A/T model	85 mm (3.35 in) or more
C	Clearance between stopper rubber and threaded end of the stop lamp switch and ASCD cancel switch		0.74 – 1.96 mm (0.0291 – 0.0772 in)
A	Pedal play		3 – 11 mm (0.12 – 0.43 in)

ADJUSTMENT

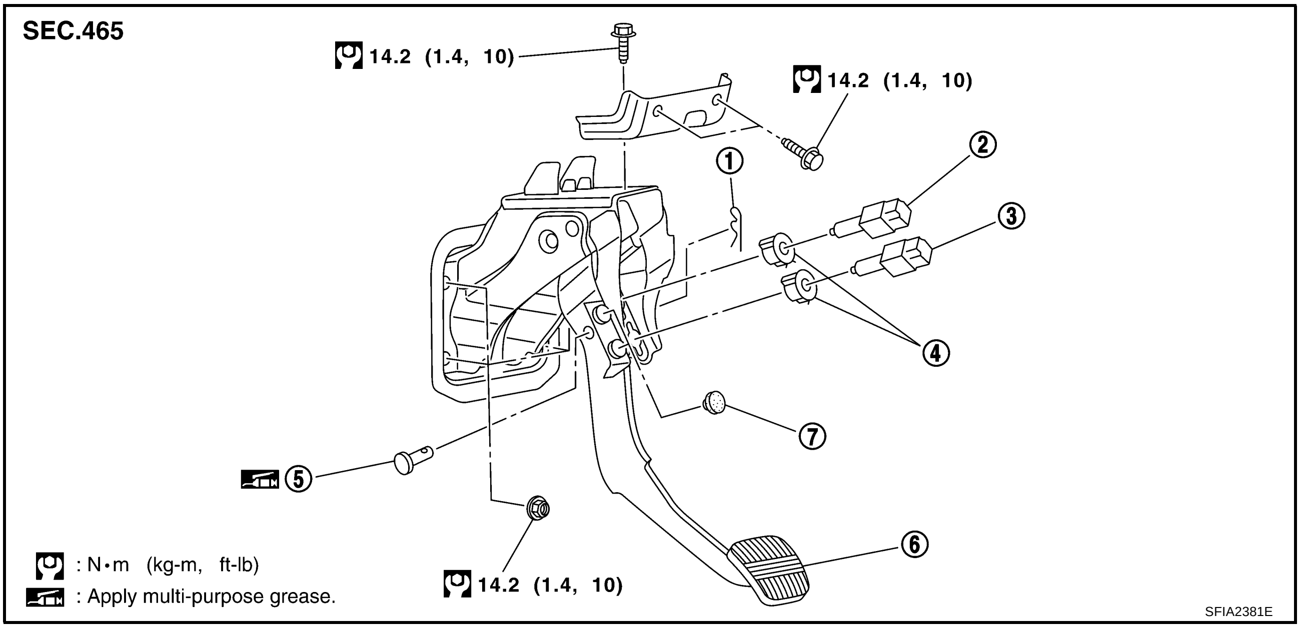


1. Loosen stop lamp switch and ASCD cancel switch by turning it counterclockwise by 45°.
2. Loosen lock nut (A) on the input rod to rotate input rod for adjusting brake pedal height to the specified one, and tighten lock nut (A).
   Refer to brake pedal height BR-6, "Inspection and Adjustment" , specified torque BR-22, "COMPONENTS" .
   CAUTION:
   Make sure the threaded end of input rod stays inside clevis.
3. With the pedal pulled and held by hand, press stop lamp switch and ASCD cancel switch until its threaded end contacts stopper rubber.
4. With the threaded end of the stop lamp switch and ASCD cancel switch contacting the bracket, rotate the switch clockwise by 45° to secure.
   CAUTION:
   Make sure that the clearance (C) between bracket and end of stop lamp switch and ASCD cancel switch is within the standard. Refer to BR-6, "Inspection and Adjustment" .
5. Check pedal play.
   CAUTION:
   Make sure that stop lamps goes off when pedal is released.
6. Start engine to check brake pedal depression height when depressed. Refer to BR-6, "Inspection and Adjustment" .

Removal and Installation

AFS002P8

COMPONENTS



1. Snap pin	2. Stop lamp switch	3. ASCD cancel switch
4. Clip	5. Clevis pin	6. Brake pedal assembly
7. Stopper rubber		

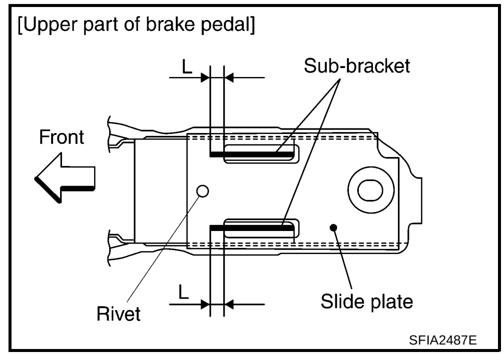
NOTE:
Clevis pin can be installed from both left and right.

REMOVAL

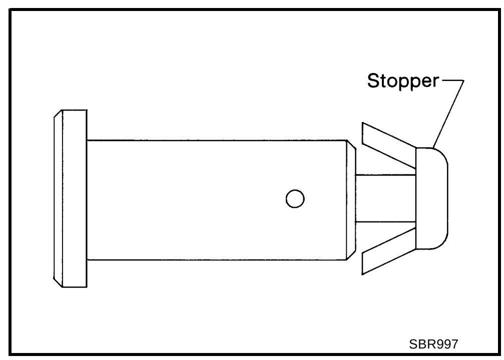
1. Remove instrument driver lower panel. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove steering column assembly from steering member. Refer to PS-12, "STEERING COLUMN" .
3. Remove stop lamp switch and ASCD cancel switch from brake pedal assembly.
4. Remove snap pin and clevis pin from clevis of brake booster.
5. Remove brake pedal assembly mounting nuts. Pull brake booster toward engine room to the extent that does not deform brake tube.
6. Remove brake booster clevis from input rod.
7. Remove mounting bolt and then remove brake pedal assembly from vehicle.

INSPECTION AFTER REMOVAL

- Check brake pedal upper rivet for deformation.
- Make sure that joint length (L) of sub-bracket and sliding plate is 4 mm (0.16 in) or more.
- Check brake pedal for bend, damage, and cracks on the welded parts.
- Replace brake pedal assembly if any non-standard condition is detected.



- Check clevis pin and plastic stopper for damage and deformation. Replace clevis pin if there are.



INSTALLATION

Install in the reverse order of the removal. Tightening torques for brake pedal assembly mounting nuts and bolt are referred to BR-7, "COMPONENTS" . Tightening torque for lock nut (A) is referred to BR-22, "COMPONENTS" .

- Adjust brake pedal height after installing brake pedal assembly to vehicle. Refer to BR-6, "Inspection and Adjustment" .

BRAKE FLUID

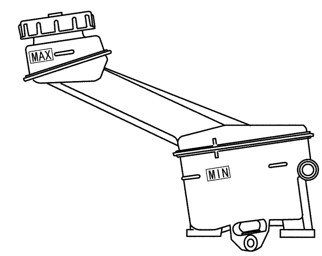
PFP:KN100

On-Board Inspection

AFS002KM

CHECKING BRAKE FLUID LEVEL

- Make sure that a brake fluid level in reservoir tank is within the standard (between MAX and MIN lines).
- Visually check around reservoir tank for fluid leakage.
- If the level is excessively low, check brake system for leakage.
- Release parking brake lever and see if brake warning lamp goes off. If not, check brake system for fluid leakage.



SFIA0066J

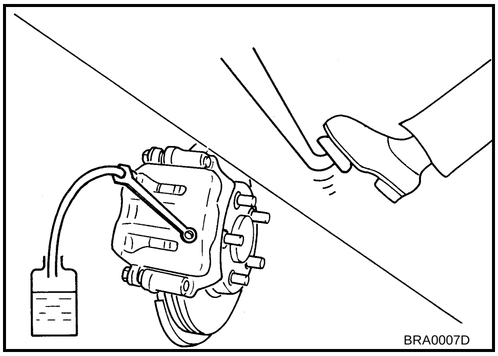
Drain and Refill

AFS002KN

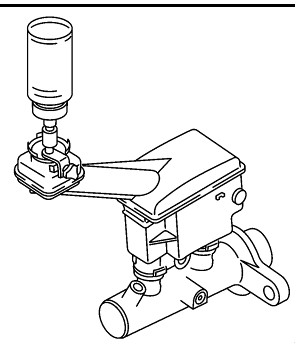
CAUTION:

- **Refill with new brake fluid "DOT 3".**
- **Do not reuse drained brake fluid.**
- **Do not let brake fluid splash on painted surfaces of body. This might damage paint, so when splashing it on the surfaces, immediately wipe off them and wash it away with water.**
- **Before servicing, disconnect electrical connectors of ABS actuator and electric unit (control unit), VDC/TCS/ABS control unit or battery cable at negative terminal.**

1. Connect a vinyl tube to bleed valve.
2. Depress brake pedal, loosen bleed valve, and gradually remove brake fluid.


BRA0007D

3. Clean inside of reservoir tank, and refill with new brake fluid.
4. Loosen bleed valve, depress brake pedal slowly to full stroke and then release it. Repeat the procedure every 2 or 3 seconds until the new brake fluid comes out, then close the bleed valve while depressing the pedal. Repeat the same work for each wheel.
5. Bleed air. Refer to BR-10, "Bleeding Brake System" .


SFIA2433E

Bleeding Brake System

AFS002KO

CAUTION:

- **While bleeding, pay attention to master cylinder fluid level.**
- **Turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit), VDC/TCS/ABS control unit or battery cable at negative terminal before working.**

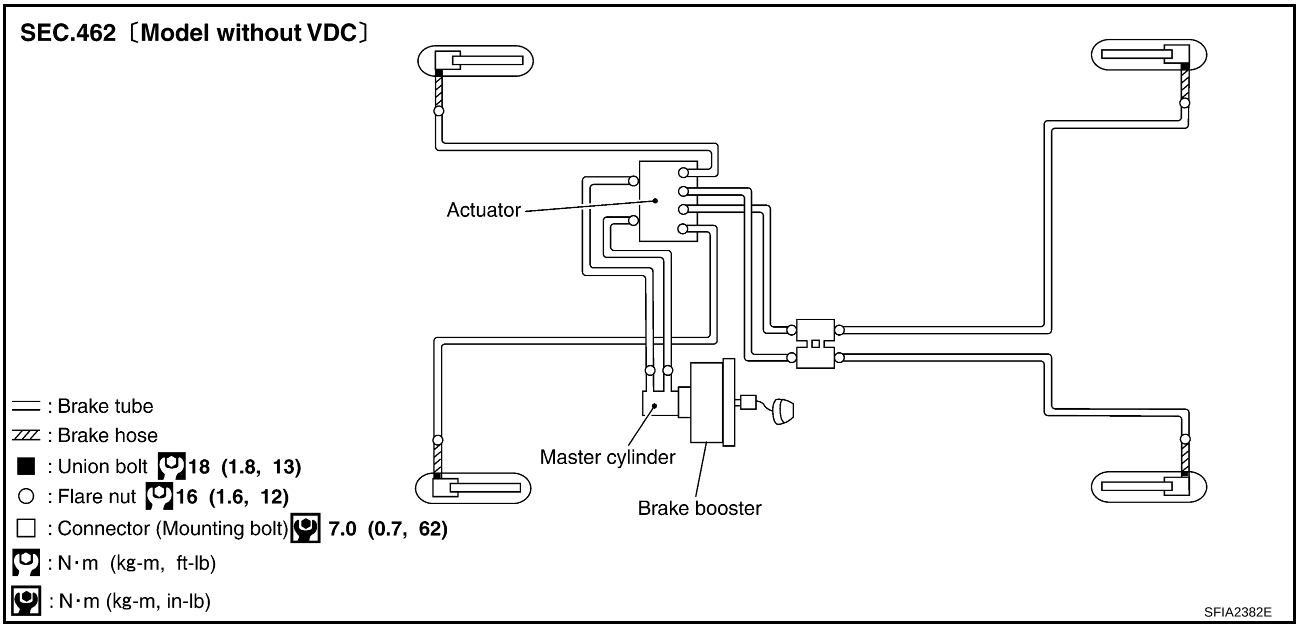
1. Connect a vinyl tube to rear right brake caliper bleed valve.
2. Fully depress brake pedal 4 or 5 times.
3. With brake pedal depressed, loosen bleed valve to bleed air in brake line, and then tighten it immediately.
4. Repeat steps 2 and 3 until all of the air is out of the brake line.
5. Tighten the bleed valve to the specified torque. Refer to front disc brake: BR-25, "Components" , rear disc brake: BR-31, "Components" .
6. From step 1 to 5, with master cylinder reservoir tank filled at least half way, bleed air from brake hydraulic line bleed valves in the following order:
   Rear right brake→Front left brake→Rear left brake→Front right brake

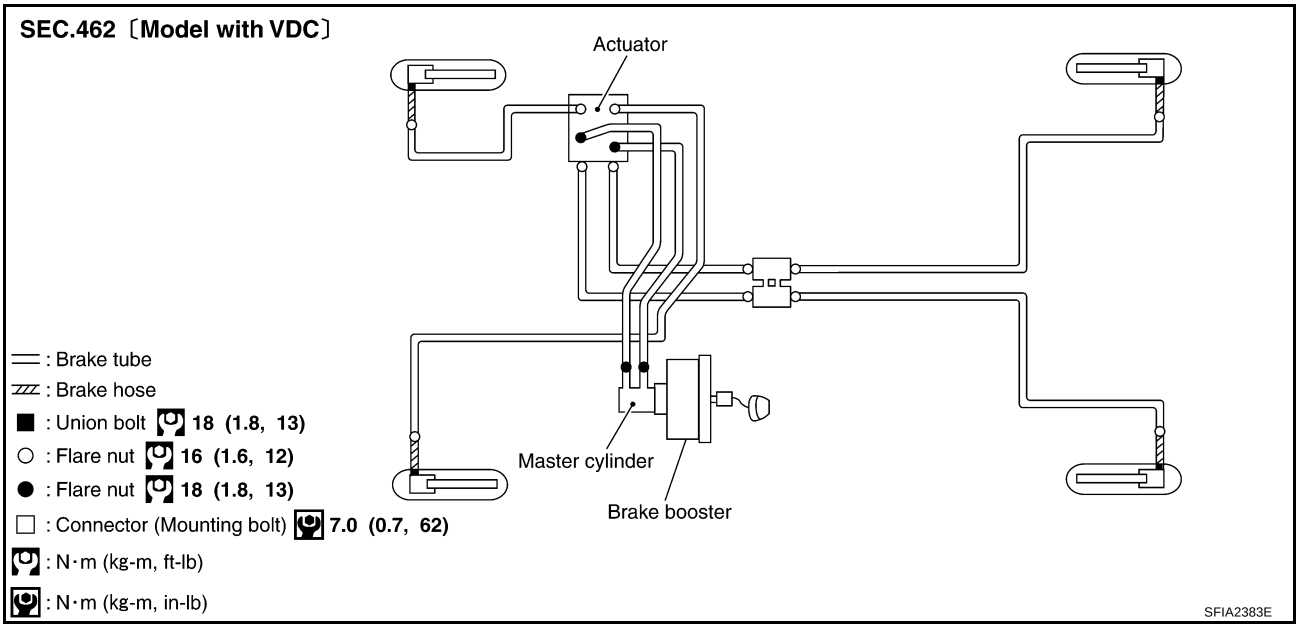
BRAKE PIPING AND HOSE

PFP:46210

Hydraulic Circuit

AFS002KP





CAUTION:

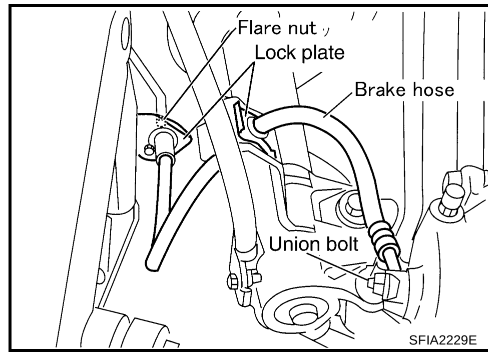
- **All brake hoses and tubes must be free from excessive bending, twisting and pulling.**
- **Make sure that there is no interference with other parts when turning steering both clockwise and counterclockwise.**
- **Brake tubes and hoses are important safety parts. Always disassemble the parts and retighten their fittings, if a brake fluid leak is detected. Replace applicable part with a new one, if damaged part is detected.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted surfaces of body, immediately wipe off them and wash it away with water immediately.**
- **Cover the open end of brake pipes and hoses when disconnecting to prevent entrance of dirt.**
- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

Removal and Installation of Front Brake Piping and Hose

AFS002KQ

REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Disconnect brake hose from brake tube, using a flare nut wrench.
3. Remove union bolt, and then remove brake hose from brake caliper assembly.
4. Remove lock plate, and then disconnect brake hose from vehicle.



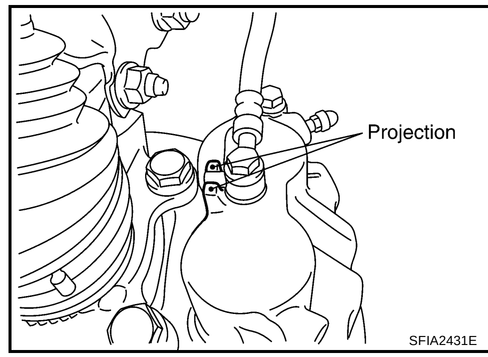
SFIA2229E

INSTALLATION

1. Install brake hose by aligning with the projections on brake caliper assembly, and tighten union bolt to the specified torque. Refer to BR-11, "Hydraulic Circuit" .

   CAUTION:

   Do not reuse copper washer.
2. Connect brake hose to brake tube. Temporarily tighten flare nut by hand as much as possible. Secure them to bracket with lock plate.
3. Tighten flare nut to the specified torque using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit" .
4. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
5. Check it after the installation. Refer to BR-13, "Inspection after Installation" .



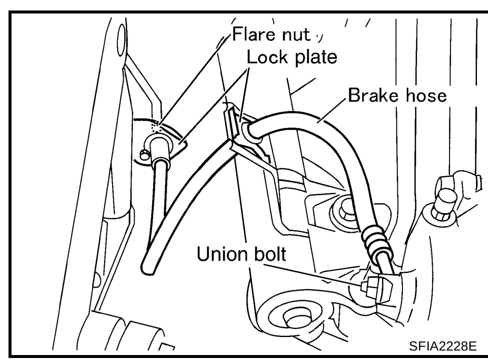
SFIA2431E

Removal and Installation of Rear Brake Piping and Hose

AFS002KR

REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Using a flare nut wrench, disconnect brake hose from brake tube.
3. Remove union bolt, and then remove brake hose from brake caliper assembly.
4. Remove lock plate, and then disconnect brake hose from vehicle.



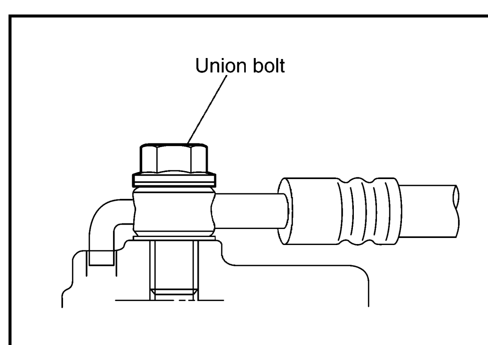
SFIA2228E

INSTALLATION

1. Attach L-shape metal fitting of the brake hose to brake caliper assembly positioning hole, and then tighten union bolt to the specified torque. Refer to BR-11, "Hydraulic Circuit" .

   CAUTION:

   Do not reuse the copper washer.
2. Install brake tube to brake hose after securing brake hose to vehicle using lock plate. Tighten flare nut to the specified torque after temporarily tightening them by hand using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit" .
3. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
4. Check it after the installation. Refer to BR-13, "Inspection after Installation" .



SFIA2049E

Inspection after Installation

AFS002KS

CAUTION:

Brake tubes and hoses are important safety parts. Always disassemble the parts and retighten their fittings, if a brake fluid leak is detected. Replace applicable part with a new one, if damaged part is detected.

1. Check brake hoses, brake tubes, and connections for fluid leakage, damage, twists, deformations, contacts with other parts, and loose connections.
2. While depressing brake pedal under a force of 785 N (80 kg, 177 lb) with engine running and keep it for about 5 seconds, then check each part for fluid leakage.

BRAKE MASTER CYLINDER

PFP:46010

On-Board Inspection

AFS002KT

LEAK INSPECTION

- Check for leaking in a master cylinder installation surface, a reservoir tank installation surface, and brake tube connections.

Removal and Installation

AFS002KU

CAUTION:

Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Disconnect brake fluid level switch harness connector.
3. Using a flare nut wrench, disconnect master cylinder brake tubes.
4. Remove master cylinder mounting nuts and remove master cylinder assembly from vehicle.

INSTALLATION

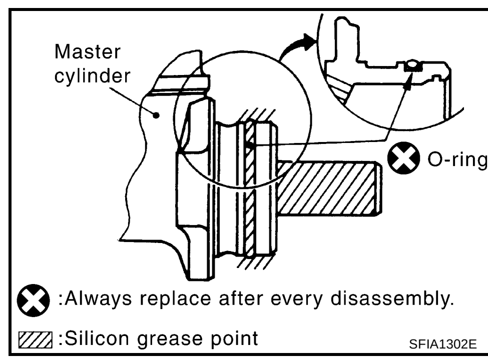
CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

1. Perform the following procedure for VDC models, install master cylinder assembly to brake booster assembly and tighten the nuts to the specified torque. Refer toBR-22, "COMPONENTS" .
   - Apply silicon grease in inner kit to O-ring and it's surrounding areas and to the booster side inner wall.

   CAUTION:

   - **Do not damage the sliding surface of the primary piston rod and do not allow foreign materials on it's surface.**
   - **Do not reuse O-ring.**

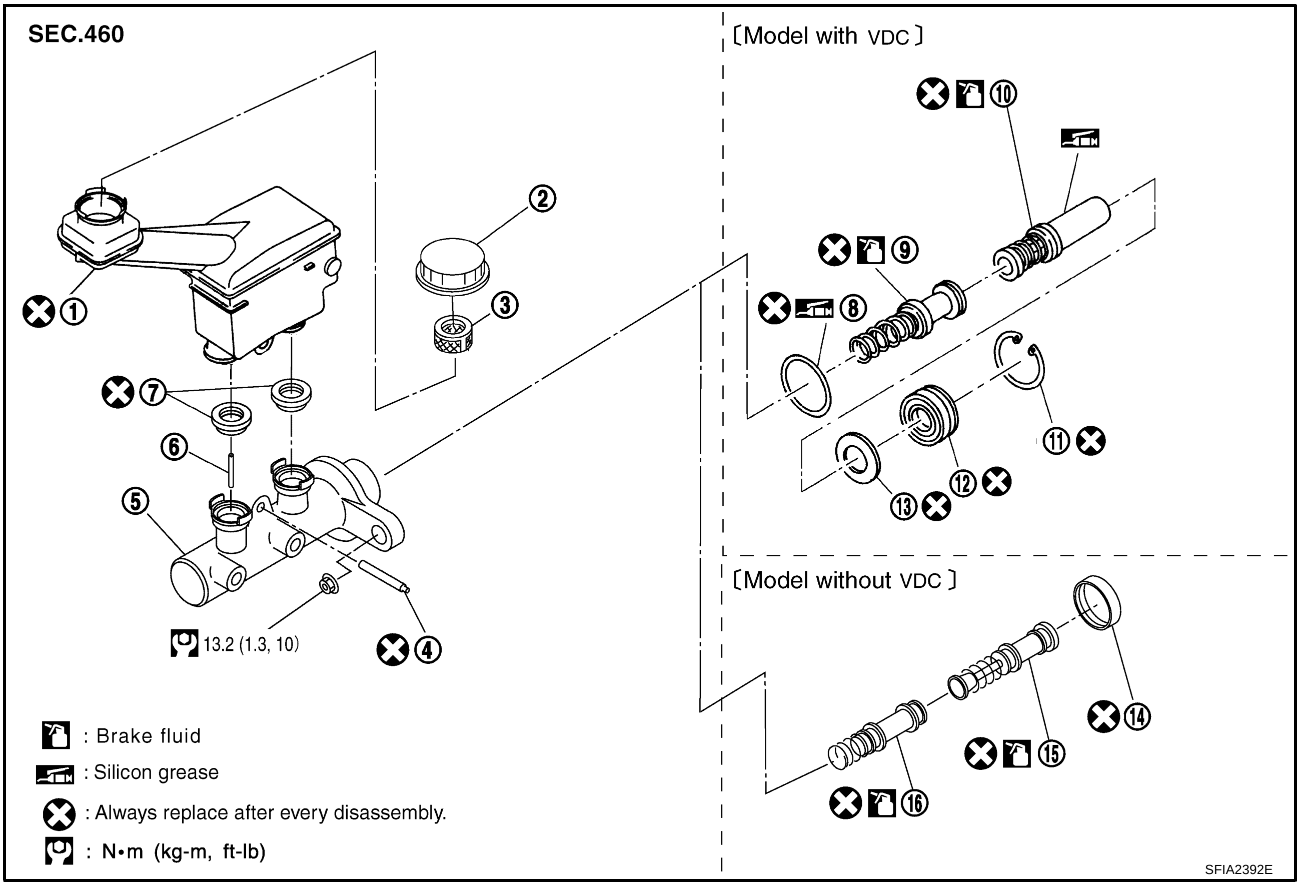


2. Install brake tube to master cylinder assembly and temporarily tighten flare nut by hand.
3. Tighten brake tube flare nut to the specified torque using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit" .
4. Connect brake fluid level switch harness connector.
5. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .

Disassembly and Assembly

AFS002KV

COMPONENTS



1.	Reservoir tank	2.	Reservoir cap	3.	Oil strainer
4.	Pin	5.	Cylinder body	6.	Piston stopper (models with VDC)
7.	Grommet	8.	O-ring	9.	Secondary piston assembly
10.	Primary piston assembly	11.	Snap ring	12.	Guide assembly
13.	Plate	14.	Stopper cap	15.	Primary piston assembly
16.	Secondary piston assembly				

MODEL WITHOUT VDC

CAUTION:

Remove reservoir tank only when absolutely necessary.

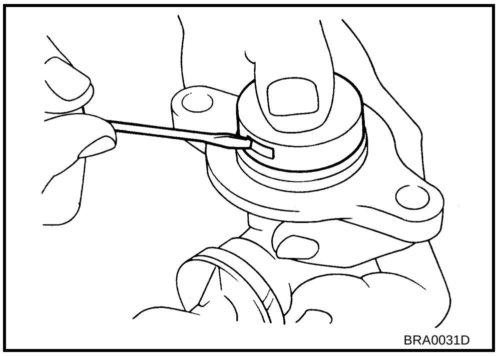
Disassembly (Piston Assembly)

1. Using a flat-bladed screwdriver as shown in the figure, lift up the tabs on stopper cap and remove it from master cylinder.

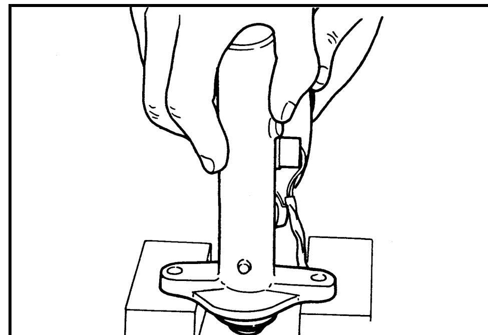
   NOTE:

   Remove stopper cap while holding it because primary piston assembly in master cylinder may pop out.

2. Carefully pull primary piston assembly straight out to prevent a cylinder inner wall from being damaged.



3. Tap flange using a soft block, such as wood, and carefully pull secondary piston assembly straight out to prevent cylinder body inner wall from being damaged.


BRA0033D

Inspection After Disassembly (Piston Assembly)

Cylinder body

- Check a inner wall of cylinder for damage, abrasions, corrosion, and pinholes. Replace the cylinder body if detected.

Assembly (Piston Assembly)

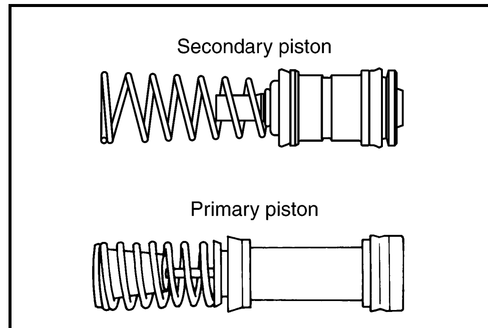
CAUTION:

- **Do not use mineral oils such as kerosene, gasoline during cleaning and assembly process.**
- **Make sure there is no foreign matter such as dirt or dust attached to inner cylinder walls, piston, or cup seal, and use care to avoid damaging parts with assembly tools.**
- **Do not drop parts. If a part is dropped, do not use it.**

1. Apply brake fluid to a cylinder inner wall, piston cups and contact surfaces between the piston assemblies. Then insert secondary piston assembly and primary piston assembly into cylinder body in this order.

   CAUTION:

   - **Pay attention to the orientation of piston cup, and insert straight to prevent the cup from being caught by cylinder inner wall.**
   - **Be sure to replace both piston assemblies to new ones in the kit without disassembling.**
   - **Do not reuse primary and secondary piston assemblies.**

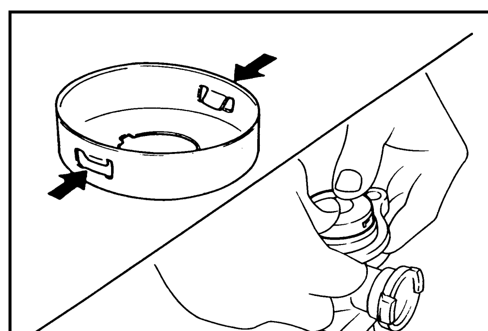


SFIA2051E

2. Holding down the piston with stopper cap, push stopper cap tabs so they are firmly into cylinder grooves, then attach stopper cap.

   CAUTION:

   Do not reuse stopper cap.

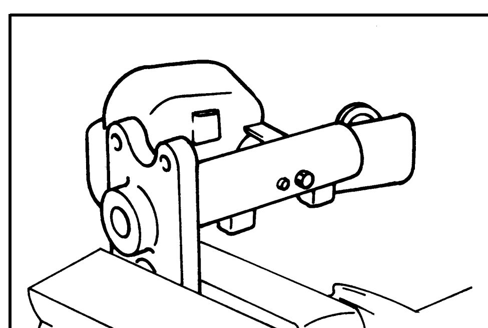

BRA0035D

Disassembly (Reservoir Tank)

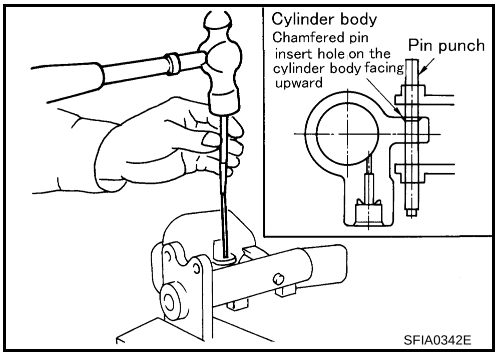
1. Secure master cylinder assembly into a vise with a chamfered pin insert hole on cylinder body facing upward.

   CAUTION:

   - **When securing master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**


BRA0588D

2. Using a pin punch [commercial service tool: diameter approximately 4 mm (0.16 in)], remove mounting pin on reservoir tank.
3. Remove master cylinder assembly from a vise.
4. Remove reservoir tank and grommet from cylinder body.



SFIA0342E

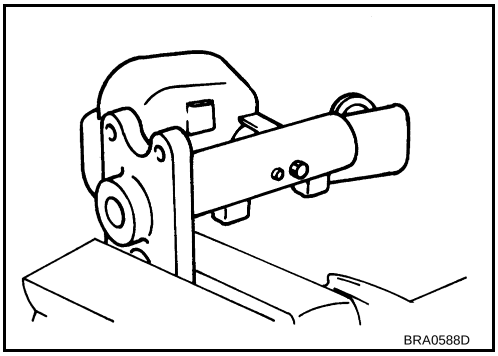
Assembly (Reservoir Tank)

1. Apply brake fluid “DOT 3” or rubber lubricant to a grommet, and then install it into cylinder body after installing grommet to reservoir tank.

   CAUTION:

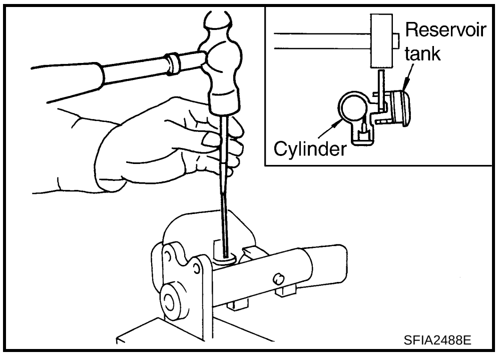
   Do not reuse reservoir tank and grommet.
2. Secure master cylinder assembly into a vise with the chamfered pin insert hole on cylinder body facing upward.

   CAUTION:
   - **When securing master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**


BRA0588D

3. Tilt reservoir tank as shown in the figure for mounting pin to be inserted. Return reservoir tank to a upright position when mounting pin passes through pinhole in cylinder body. Push mounting pin to an opposite pinhole of the reservoir tank, so that it is the same condition as the insertion side.

   CAUTION:
   - **Be sure to insert pin from the chamfered pinhole of cylinder body.**
   - **Do not reuse mounting pin.**



SFIA2488E

MODEL WITH VDC

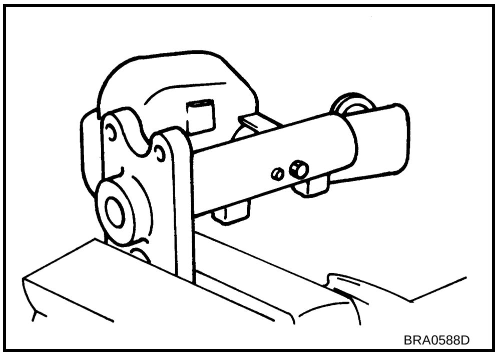
Disassembly

CAUTION:

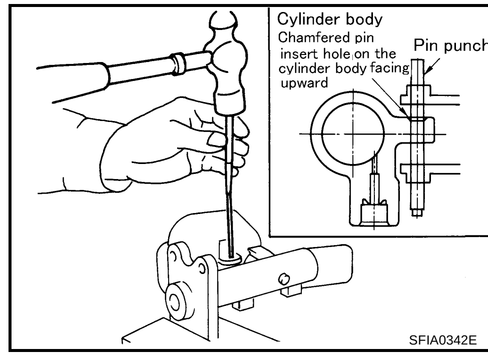
- **Cover primary piston rod using cloths during disassembly to prevent damage to it.**

1. Secure master cylinder assembly into a vise with the chamfered pin insert hole on cylinder body facing upward.

   CAUTION:
   - **When securing the master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**

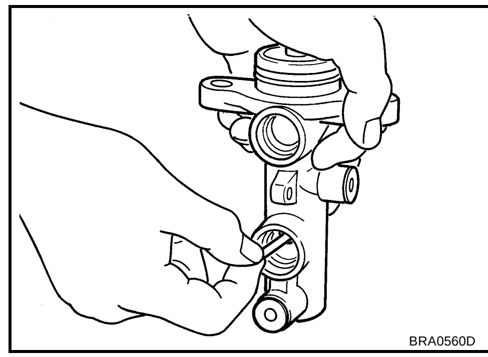

BRA0588D

2. Using a pin punch [commercial service tool: diameter approximately 4 mm (0.16 in)], remove mounting pin on the reservoir tank.
3. Remove master cylinder assembly from the vise.
4. Remove reservoir tank and grommet from cylinder body.



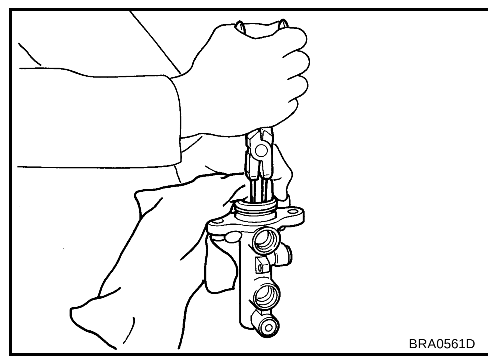
5. Push in primary piston assembly, and then remove piston stopper from cylinder body.

   CAUTION:
   Be careful not to damage an inner wall of cylinder body.

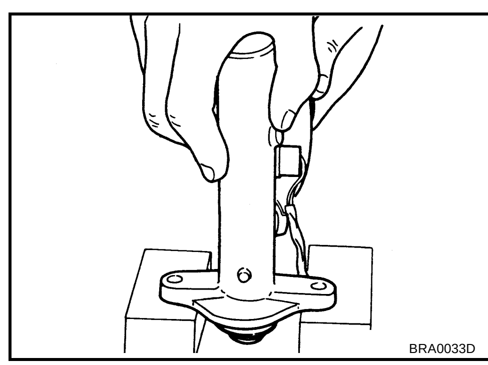


6. Remove snap ring while pressing in primary piston assembly so as to prevent piston from popping out.

   CAUTION:
   Be careful not to damage an inner wall of cylinder body.
7. Hold primary piston rod, and then pull primary piston assembly, plate, and guide assembly straight out.
8. Remove plate and guide assembly from primary piston assembly.



9. Tap flange using a soft block, such as wood, and carefully pull secondary piston assembly straight out to prevent a cylinder body inner wall from being damaged.



Inspection After Disassembly

Cylinder body

- Check an inner wall of cylinder for damage, abrasions, corrosion, and pinholes. Replace cylinder body if detected.

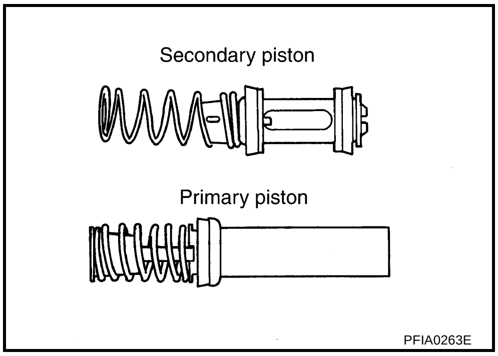
Assembly

CAUTION:

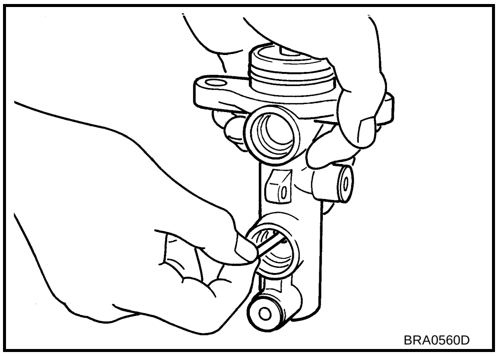
- **Do not use mineral oils such as kerosene, gasoline during cleaning and assembly process.**
- **Make sure there is no foreign matter such as dirt or dust attached to an inner cylinder wall, piston, or piston cup, and use care to avoid damaging parts with the assembly tools.**
- **Do not drop parts. If a part is dropped, do not use it.**

1. Apply brake fluid to cylinder inner wall body and contact surface of the piston assembly. Then insert secondary piston assembly and primary piston assembly into cylinder body.

   CAUTION:
   - **Do not reuse primary and secondary piston assemblies.**
   - **Pay attention to the orientation of piston cup. Also, insert pistons squarely to prevent scratching a cylinder inner wall.**

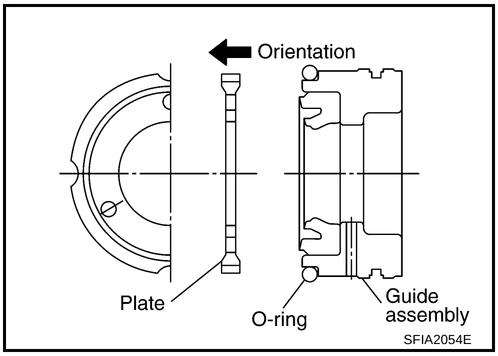


2. Install the piston stopper through a slit of secondary piston, while setting the slit of the piston towards a piston stopper hole of cylinder body. Visually check the secondary piston slit from the piston stopper hole and install the piston stopper.



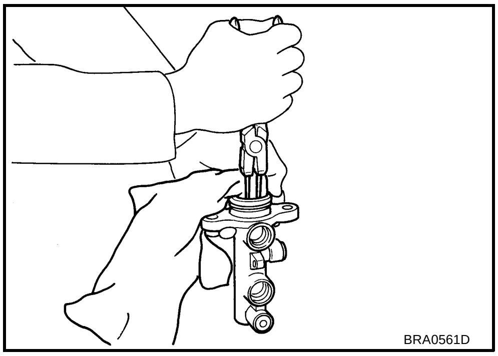
3. Insert plate and guide assembly into the cylinder body as shown.

   CAUTION:
   - **Be careful not to damage primary piston assembly rod.**
   - **Do not drop O-ring.**
   - **Do not tilt plate and guide assembly when inserting.**
   - **Do not reuse guide assembly and plate.**



4. Cover primary piston assembly rod with cloths to prevent damage to it, and then install snap ring when pressing in primary piston assembly.

   CAUTION:
   - **Make sure that snap ring is securely engaged in cylinder body inner diameter groove.**
   - **Do not reuse snap ring.**



5. Apply brake fluid “DOT 3” or rubber lubricant to a grommet, and then install it into reservoir tank.

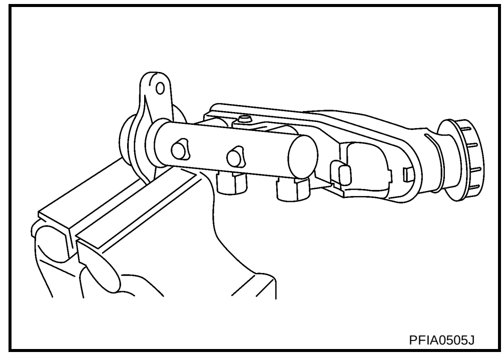
   CAUTION:
   Do not reuse grommet.

6. Install reservoir tank to cylinder body.

   CAUTION:
   Do not reuse reservoir tank.

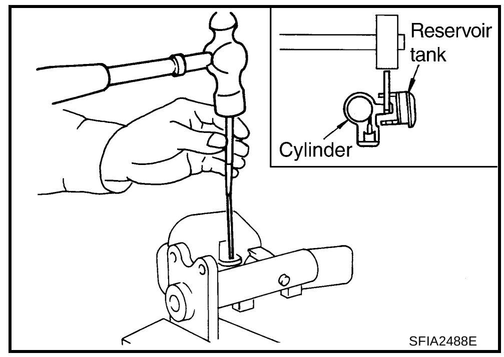
7. Secure master cylinder assembly into a vise with a chamfered pin insert hole on cylinder body facing upward.

   CAUTION:
   - **When securing the master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**



8. Tilt reservoir tank as shown in the figure and insert mounting pin. Return reservoir tank to a upright position when mounting pin passes through the pinhole in the cylinder body. Push the mounting pin to the opposite pinhole of the reservoir tank go that it is the same conditions as the insertion side.

   CAUTION:
   - **Be sure to insert pin from a chamfered pinhole of cylinder body.**
   - **Do not reuse mounting pin.**

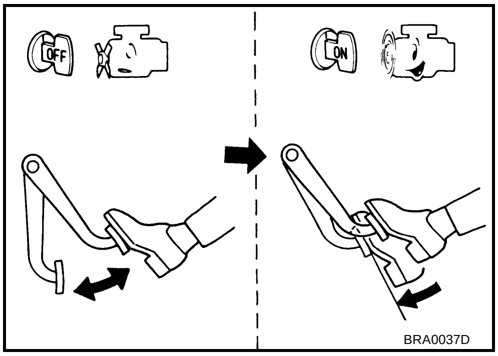


BRAKE BOOSTER
PFP:47200

On-Board Inspection and Service
AFS002KW

OPERATION CHECK

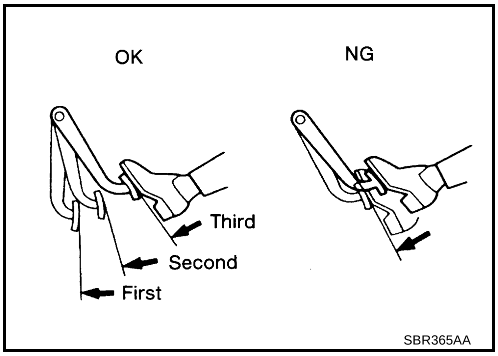
With engine stopped, change vacuum to atmospheric pressure by depressing brake pedal several times. Then with brake pedal fully depressed, start engine and when vacuum pressure reaches the standard, make sure that clearance between brake pedal and floor panel decreases.



BRA0037D

AIR TIGHT CHECK

- Run engine at idle for approximately 1 minute, and stop it after applying vacuum to booster. Depress brake pedal normally to change vacuum to atmospheric pressure. Make sure that distance at intervals of 5 seconds between brake pedal and floor panel gradually increases.
- Depress brake pedal while engine is running, and stop engine with pedal depressed. The pedal stroke should not change after holding pedal down for 30 seconds.

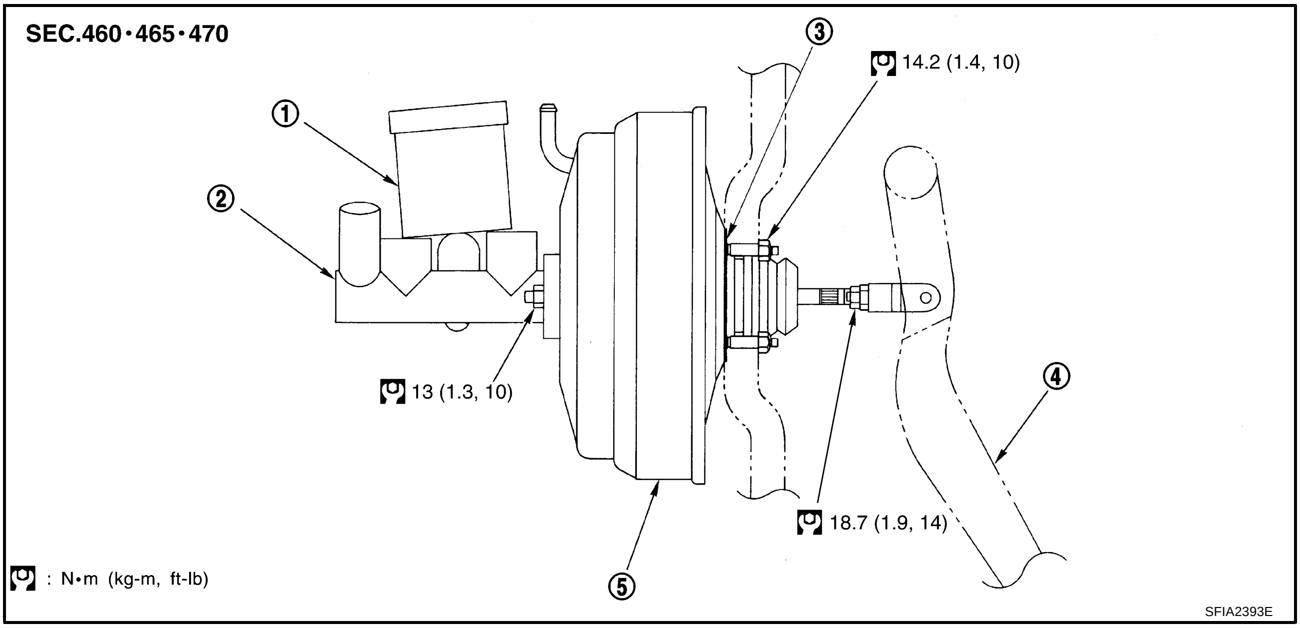


SBR365AA

Removal and Installation

AFS002KX

COMPONENTS



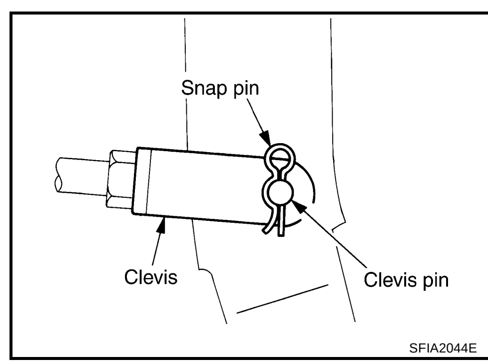
1. Reservoir tank	2. Cylinder body	3. Gasket
4. Brake pedal	5. Brake booster	

CAUTION:

- **Do not deform or bend the brake tube while removing and installing brake booster.**
- **Replace the clevis pin if it is damaged.**
- **Do not damage brake booster stud bolt threads. If brake booster is tilted during installation, the dash panel may damage the threads.**

REMOVAL

1. Remove brake master cylinder. Refer to BR-14, "Removal and Installation" .
2. Remove vacuum hose from brake booster. Refer to BR-24, "Components" .
3. Remove snap pin and clevis pin from inside vehicle.
4. Remove nuts on brake booster and brake pedal assembly.
5. Remove brake booster from dash panel in engine room side.



INSPECTION AFTER REMOVAL

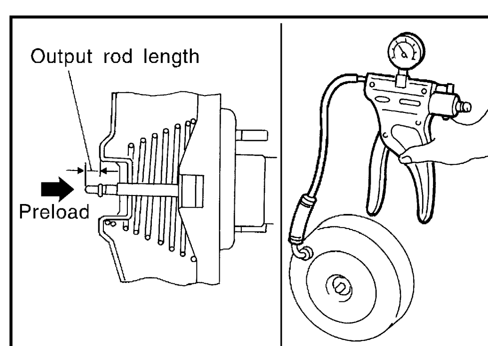
Output Rod Length Inspection

1. Apply a vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg) to brake booster using a handy vacuum pump.
2. Check output rod length.

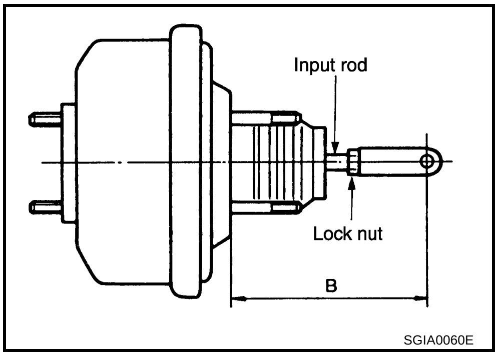
Standard dimension at a vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg) (Reference value)

Model without VDC : 10.4 mm (0.409 in)

Model with VDC : –6.2 mm (–0.244 in)



INSTALLATION



1. Loosen lock nut to adjust input rod length so that length B (in the figure) satisfies the specified value.

   Length "B" : 125 mm (4.92 in)

2. After adjusting "B", temporarily tighten lock nut to install booster assembly to vehicle. At this time, make sure that a gasket between booster assembly and dash panel is installed.

   CAUTION:
   Always install gasket between brake booster and dash panel.

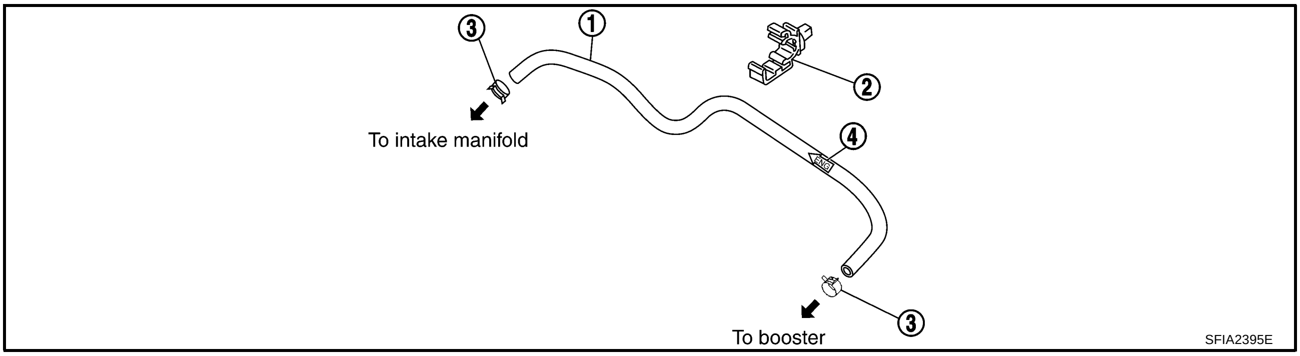
3. Connect brake pedal with clevis of input rod.
4. Install pedal bracket mounting nuts and bolt, and tighten them to the specified torque. Refer to BR-22, "COMPONENTS" .
5. Install master cylinder to booster assembly. Refer to BR-14, "Removal and Installation" .
6. Adjust the pedal height and the play of the brake pedal. Refer to BR-7, "ADJUSTMENT" .
7. Tighten lock nut of input rod to the specified torque. Refer to BR-22, "COMPONENTS" .
8. Refill new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .

VACUUM LINES

PFP:41920

Components

AFS002KY



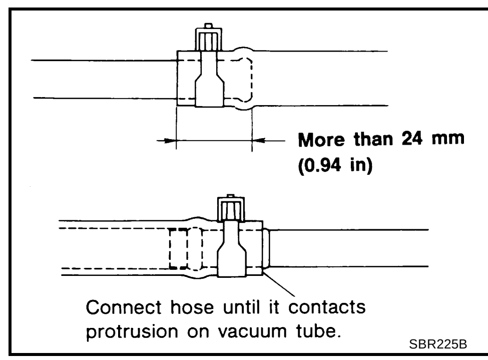
1. Vacuum hose
2. Clip
3. Clamp
4. Engine direction indicator stamp (built in check valve)

Removal and Installation

AFS002KZ

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in).**
- **Do not use lubricating oil during assembly.**



Inspection

AFS002L0

VISUAL INSPECTION

Check for correct assembly, damage and deterioration.

CHECK VALVE INSPECTION

Airtightness Inspection

Use a handy vacuum pump to check.

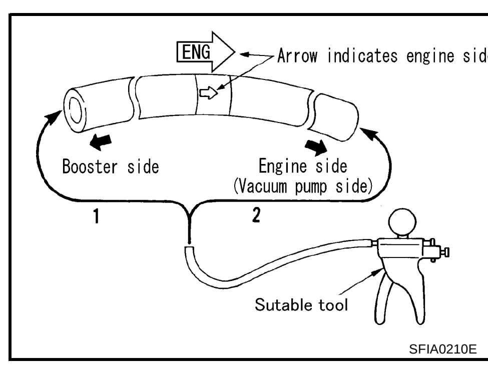
When connected to the booster side (1):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg) for 15 seconds under a vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg).

When connected to the engine side (2):

Vacuum should not exist.

- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.



FRONT DISC BRAKE

PFP:41000

On-Board Inspection

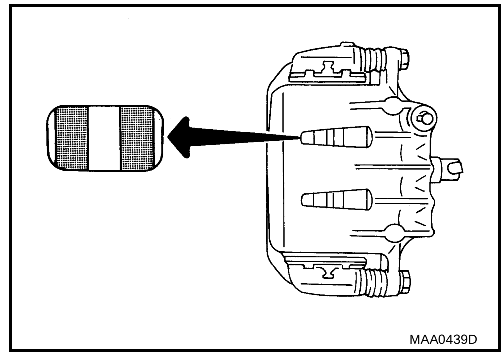
AFS002L1

PAD WEAR INSPECTION

- Check pad thickness from a inspection hole on cylinder body. Check using a scale if necessary.

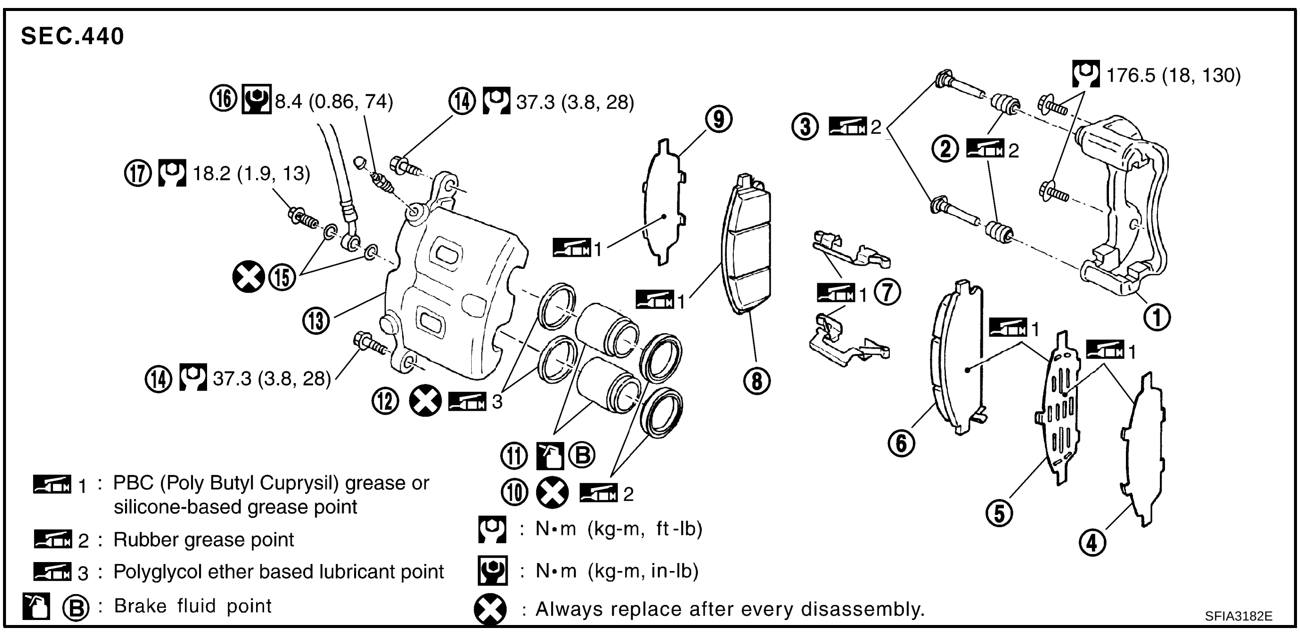
Standard thickness : 11.0 mm (0.433 in)

Repair limit thickness : 2.0 mm (0.079 in)



Components

AFS002L2



1.	Torque member	2.	Sliding pin boot	3.	Sliding pin
4.	Outer shim cover	5.	Outer shim	6.	Outer pad
7.	Pad retainer	8.	Inner pad	9.	Inner shim
10.	Piston boot	11.	Piston	12.	Piston seal
13.	Cylinder body	14.	Sliding pin bolt	15.	Copper washer
16.	Bleed valve	17.	Union bolt		

CAUTION:

- **Clean dust on caliper and brake pads with a vacuum dust collector to minimize hazard of airborne particles or other materials.**
- **While removing cylinder body, do not depress brake pedal because piston will pop out.**
- **It is not necessary to remove bolts on torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so as not to stretch brake hose.**
- **Do not damage piston boot.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Always replace shim and shim cover as a set when replacing brake pads.**
- **Keep rotor clean of brake fluid.**

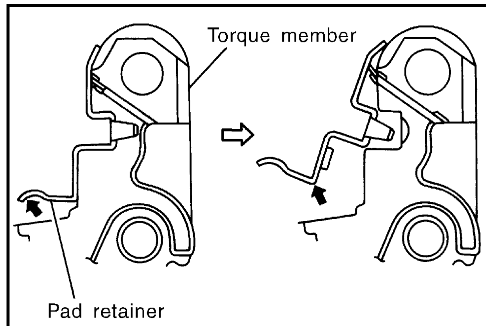
Removal and Installation of Brake Pad

AFS002L3

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove lower sliding pin bolt.
3. Hang cylinder body with a wire, and remove pads, pad retainers, shims, and shim cover from torque member.

   CAUTION:
   Lift pad retainers in the direction by the arrow (shown in the figure) so as not to damage it when removing pad retainers from the torque member.

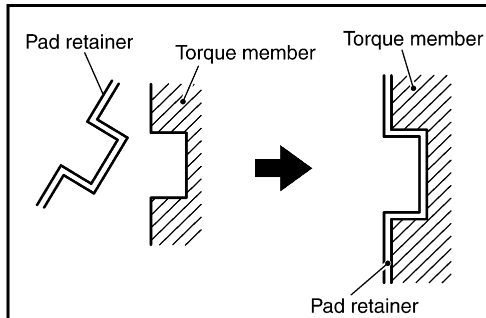


SBR556E

INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) or equivalent to between shim cover and shim. Install shim, shim cover, to pad.
2. Apply PBC (Poly Butyl Cuprysil) or equivalent to between pad retainer and pad. Install pad retainers and pads to torque member.

   CAUTION:
   Securely assemble pad retainers so that they are not being lifted up from torque member.



PFIA0273E

3. Install cylinder body to torque member.

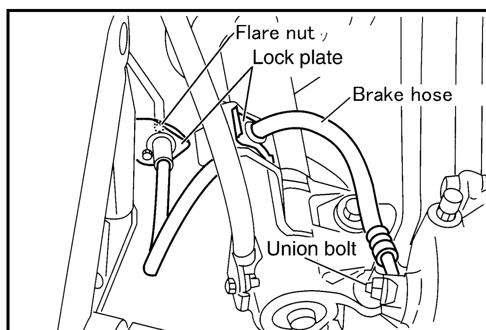
   CAUTION:
   In the case of replacing a pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.
4. Install lower sliding pin bolt, and tighten it to the specified torque. Refer to BR-25, "Components" .
5. Check front disc brake for drag.
6. Install tires to vehicle.

Removal and Installation of Brake Caliper Assembly

AFS002L4

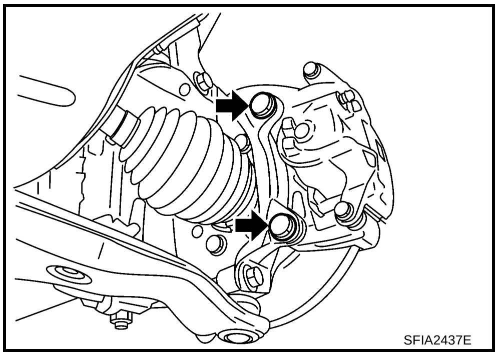
REMOVAL

1. Remove tires from vehicle with a power tool.
2. Fasten disc rotor using wheel nut.
3. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
4. Remove union bolt, and then disconnect brake hose from caliper assembly.

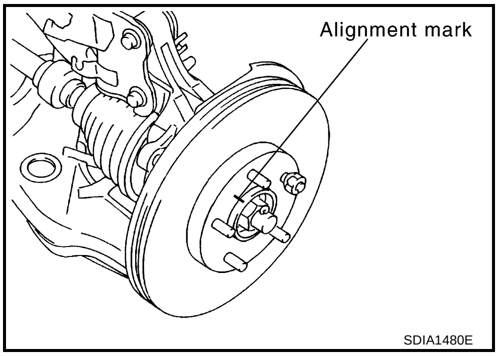


SFIA2229E

5. Remove torque member bolts, and remove brake caliper assembly.
   CAUTION:
   Do not drop brake pad.


SFIA2437E

6. Remove disc rotor.
   CAUTION:
   Put alignment marks on wheel hub assembly and disc rotor, if it necessary to remove disc rotor.



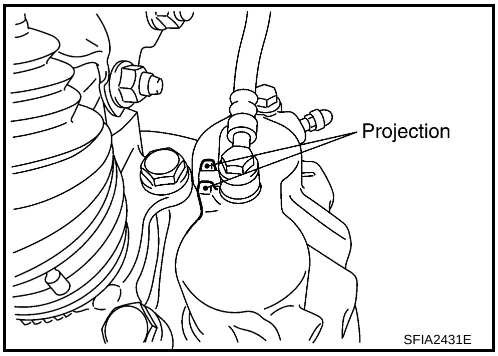
SDIA1480E

INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

1. Install disc rotor.
   CAUTION:
   Align the marks of disc rotor and wheel hub put at the time of removal when reusing disc rotor.
2. Install brake caliper assembly to vehicle, and tighten torque member mounting bolts to the specified torque. Refer to BR-25, "Components" .
   CAUTION:
   Do not allow oil or any moisture on all mating surface between steering knuckle and caliper assembly, bolts, and washer.
3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque. Refer to BR-25, "Components" .
   CAUTION:
   - **Do not reuse copper washers for union bolts.**
   - **Connect brake hose aligning with caliper assembly mounting projection.**
4. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
5. Check front disc brake for drag.
6. Install tires to vehicle.



SFIA2431E

Disassembly and Assembly of Brake Caliper Assembly

AFS002L5

NOTE:
Do not remove torque member, pads, shims, shim covers, and pad retainers when disassembling and assembling cylinder body assembly.

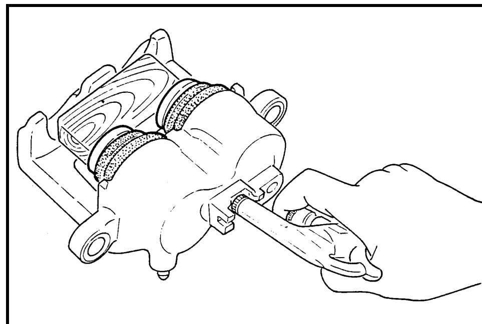
DISASSEMBLY

1. Remove sliding pin bolt, and then remove cylinder body from torque member.
   CAUTION:
   Do not drop pads, shims, shim cover and pad retainers from torque member.

2. Remove sliding pins and sliding pin boots from torque member.
3. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove pistons and piston boots.

   CAUTION:

   Do not get fingers caught in the pistons.

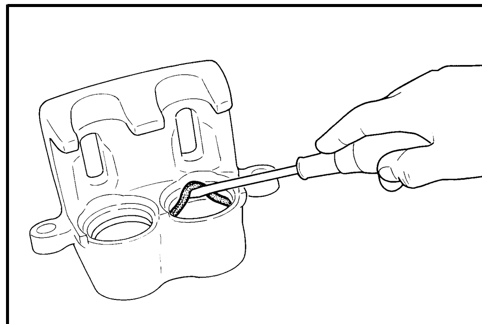


BRB0032D

4. Remove piston seal from cylinder body using a flat-bladed screwdriver.

   CAUTION:

   Be careful not to damage a cylinder inner wall.



SFIA0141E

INSPECTION AFTER DISASSEMBLY

Cylinder Body

CAUTION:

- **Clean cylinder body using new brake fluid. Do not use mineral oils such as gasoline or kerosene.**
- **Check a inner wall of the cylinder for wear or damage. Replace the cylinder if any non-standard condition is detected.**

Torque Member

Check torque member for wear, cracks, and damage. Replace if there are.

Piston

CAUTION:

- **Check a piston surface for corrosion, wear, and damage. Replace if there are.**
- **A piston sliding surface is plated. Do not polish with sandpaper.**

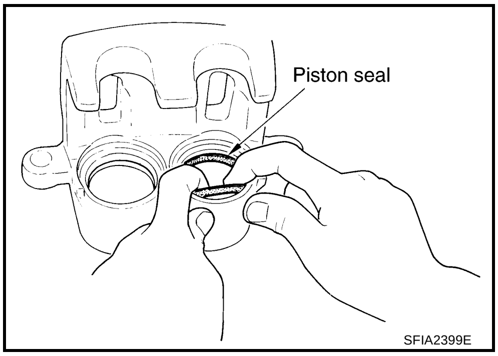
Sliding Pin, Sliding Pin Bolt, and Sliding Pin Boot

Check sliding pin, sliding pin bolt, and sliding pin boot for wear, damage, and cracks. Replace if there are.

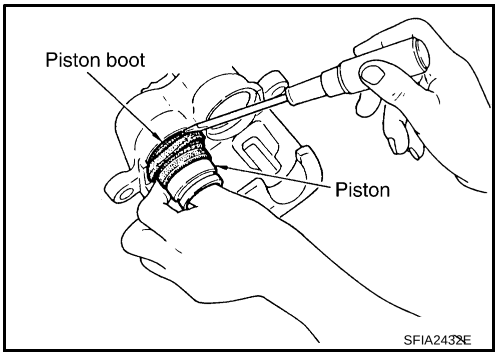
ASSEMBLY

CAUTION:
When assembling, use only rubber lubricant specified below.

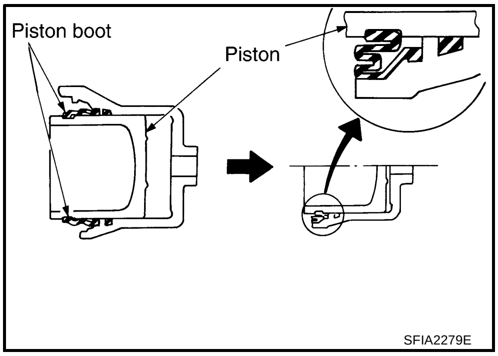
1. Apply polyglycol ether based lubricant to piston seal, and install them to cylinder body.
   CAUTION:
   Do not reuse piston seal.



2. Apply rubber grease to piston boot. Cover the piston end with piston boot, and then install cylinder side lip on piston boot securely into a groove on cylinder body.
   CAUTION:
   Do not reuse piston boot.



3. Apply brake fluid to piston. Insert into cylinder body by hand and insert piston boot piston-side lip into the piston groove.
   CAUTION:
   Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.
4. Install sliding pins and sliding pin boots to torque member.



5. Install torque member to steering knuckle, and tighten mounting bolts to the specified torque. Refer to BR-25, "Components" .
   CAUTION:
   Do not allow oil or any moisture on all contact surfaces between steering knuckle and brake caliper assembly.
6. Press in piston until pads can be installed, and then install cylinder body to torque member.
   NOTE:
   Use a disc brake piston tool (commercial service tool) to easily press piston in.
7. Tighten sliding pin bolts to the specified torque. Refer to BR-25, "Components" .

DISC ROTOR INSPECTION

Visual Inspection

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

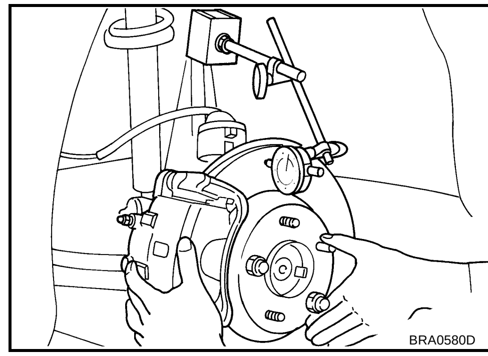
Runout Inspection

1. Fix disc rotor to wheel hub using wheel nuts (2 or more positions).
2. Inspect runout using a dial gauge. [Measured at 10 mm (0.39 in) inside the disc edge.]

   Runout limit : 0.06 mm (0.0024 in)

   (with it attached to the vehicle)

   NOTE:
   Before measuring, make sure wheel bearing axial end play is within the specification before measuring runout. Refer to FAX-7, "WHEEL BEARING INSPECTION" .

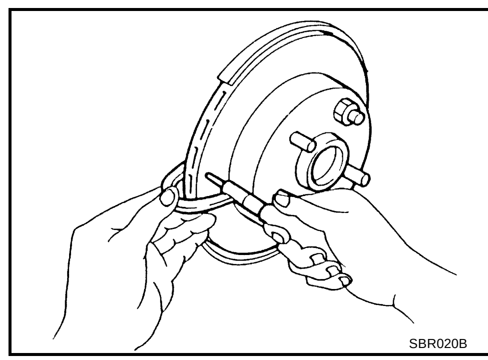


3. When runout exceeds limit value, displace mounting positions of disc rotor by one hole. And then find a position of the minimum value for runout.
4. Replace or lathe disc rotor if runout is outside the specified value after performing the above operation. (“MAD DL-8700”, “AMMCO 700 and 705” or equivalent.)

Thickness Inspection

Check thickness of the disc rotor using a micrometer. Replace disc rotor if thickness is under the wear limit.

Standard thickness	**: 28.0 mm (1.102 in)**
Wear limit	**: 26.0 mm (1.024 in)**



BRAKE BURNISHING PROCEDURE

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

REAR DISC BRAKE

PFP:44000

On-Board Inspection

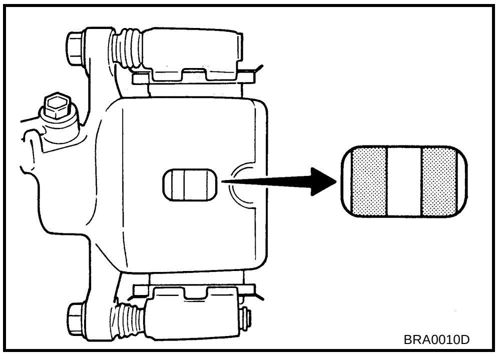
AFS002L6

PAD WEAR INSPECTION

- Check pad thickness from a inspection hole on cylinder body. Check using a scale if necessary.

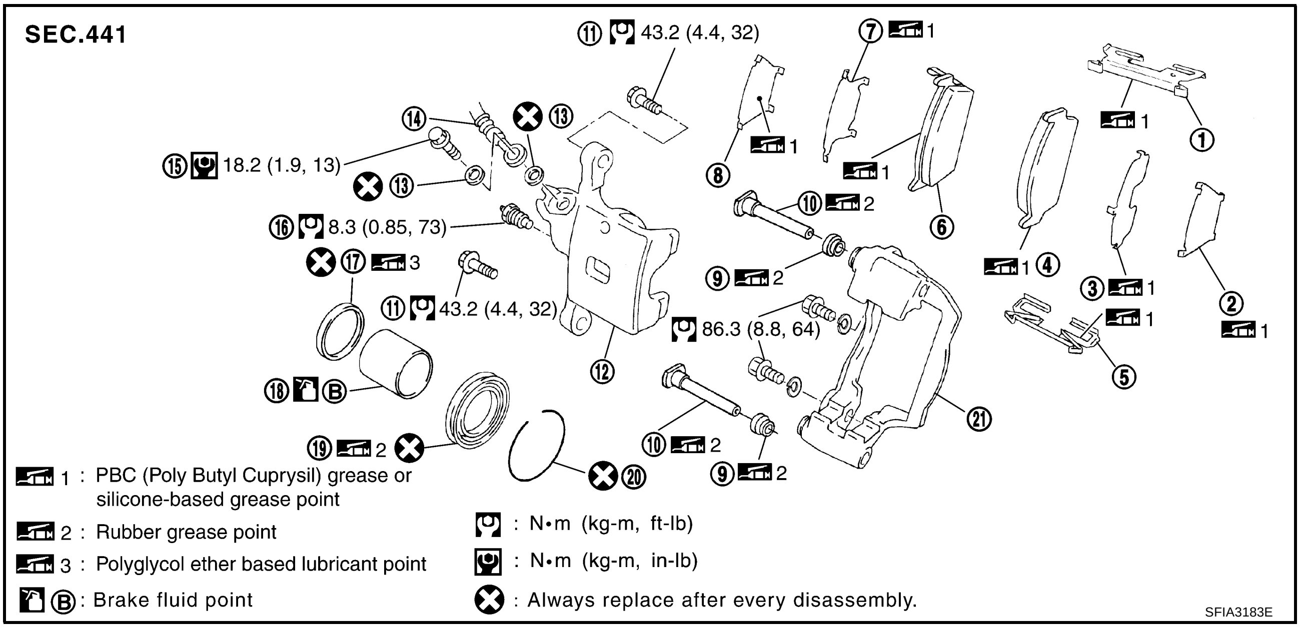
Standard

Standard thickness	:	**8.5 mm (0.335 in)**
Repair limit thickness	:	**2.0 mm (0.079 in)**


BRA0010D

Components

AFS002L7



SFIA3183E

1.	Pad retainer	2.	Outer shim cover	3.	Outer shim
4.	Outer pad	5.	Pad retainer	6.	Inner pad
7.	Inner shim	8.	Inner shim cover	9.	Sliding pin boot
10.	Sliding pin	11.	Sliding pin bolt	12.	Cylinder body
13.	Copper washer	14.	Brake hose	15.	Union bolt
16.	Bleed valve	17.	Piston seal	18.	Piston
19.	Piston boot	20.	Retaining ring	21.	Torque member

CAUTION:

- **Clean dust on caliper and brake pads with a vacuum dust collector to minimize hazard of air borne particles or other materials.**
- **While removing cylinder body, do not depress brake pedal because piston will pop out.**
- **It is not necessary to remove bolts on torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so as not to stretch brake hose.**
- **Do not damage piston boot.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Always replace shim and shim covers as a set when replacing brake pads.**
- **Keep rotor clean of brake fluid.**

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Removal and Installation of Brake Pad

AFS002L8

REMOVAL

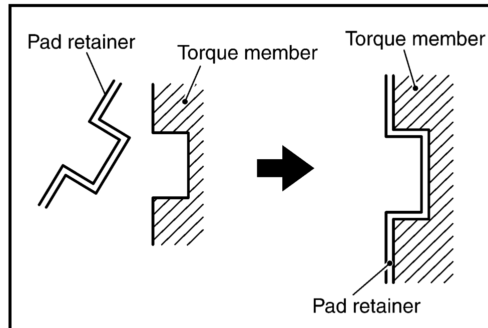
1. Remove tires from vehicle with a power tool.
2. Remove upper sliding pin bolt.
3. Hang cylinder body with a wire. Remove pads, pad retainers and shims, and shim covers from torque member.

INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) or equivalent to between shim cover and shim. Install inner shim, inner shim cover to inner pad, and outer shim, outer shim cover to outer pad.
2. Apply PBC (Poly Butyl Cuprysil) or equivalent to between pad retainer and pad. Install pad retainers and pads to torque member.
3. Press in piston until pads can be installed, and then install cylinder body to torque member.

   CAUTION:

   In the case of replacing pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.



PFIA0273E

4. Install upper sliding pin bolt and tighten to the specified torque. Refer to BR-31, "Components" .
5. Fasten disc rotor with a wheel nut. Put a foot on brake pedal a few times until it gets a responsive touch.
6. Check rear disc brake for drag.
7. Install tires to vehicle.

Removal and Installation of Brake Caliper Assembly

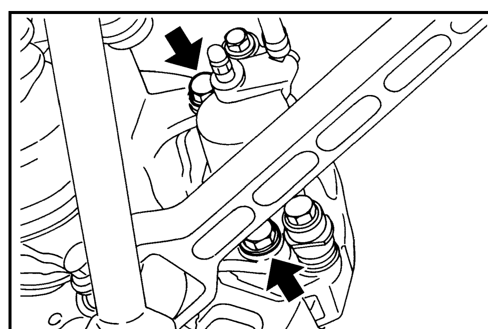
AFS002L9

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Fasten disc rotor using wheel nut.
3. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
4. Remove union bolt and then disconnect brake hose from caliper assembly.
5. Remove torque member bolts, and remove brake caliper assembly.

   CAUTION:

   Do not drop brake pad.

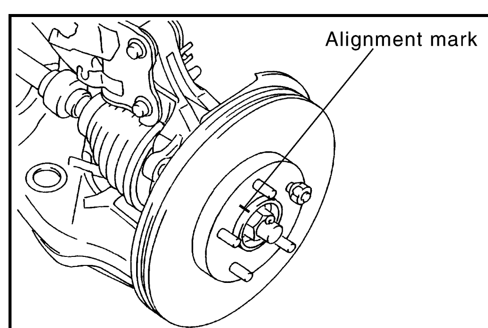


SFIA0143E

6. Remove disc rotor.

   CAUTION:

   Put alignment marks on wheel hub assembly and disc rotor, if it necessary to remove disc rotor.



SDIA1480E

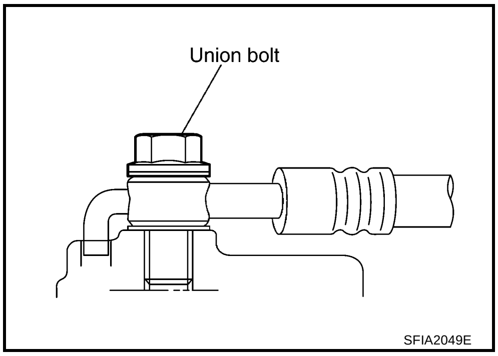
INSTALLATION

CAUTION:

- **Refill with new brake fluid "DOT 3".**

- **Do not reuse drained brake fluid.**

1. Install disc rotor.
   CAUTION:
   Align the marks of disc rotor and wheel hub put at the time of removal when reusing disc rotor.
2. Install brake caliper assembly vehicle, and tighten torque member mounting bolts to the specified torque.
   CAUTION:
   Before installing caliper assembly, wipe off oil and moisture on all mounting surfaces of rear axle and caliper assembly and threads, bolts and washers.
3. Install L-shaped pin of brake hose and then tighten union bolt to the specified torque.
   CAUTION:
   Do not reuse copper washer for union bolt.



SFIA2049E

4. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
5. Check rear disc brake for drag.
6. Install tires to the vehicle.

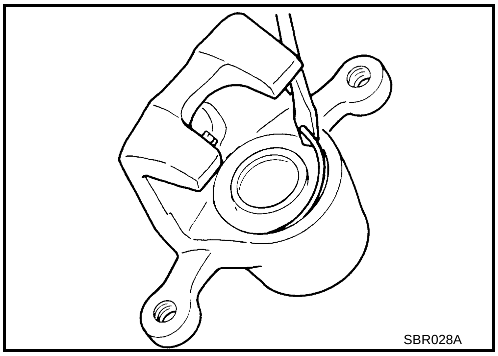
Disassembly and Assembly of Brake Caliper Assembly

AFS002LA

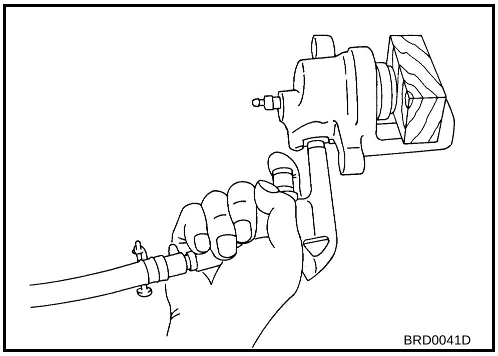
NOTE:
Do not remove torque member, pads, shims, shim covers, and pad retainers when disassembling and assembling cylinder body assembly.

DISASSEMBLY

1. Remove sliding pin bolt, and then remove cylinder body from torque member.
2. Remove sliding pin boot from torque member.
3. Remove retaining ring from cylinder body using a flat-bladed screwdriver as shown in the figure.


SBR028A

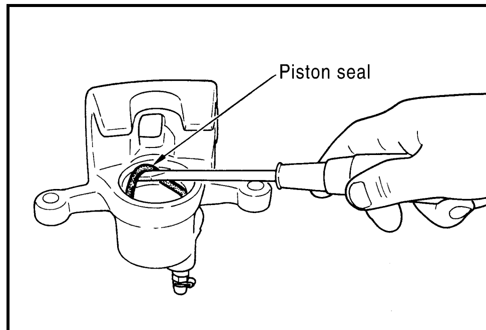
4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.
   CAUTION:
   Do not get fingers caught in the piston.


BRD0041D

5. Remove piston seal from cylinder body using a flat-bladed screwdriver.

   CAUTION:

   Be careful not to damage cylinder inner wall.



SFIA2277E

INSPECTION AFTER DISASSEMBLY

Cylinder Body

CAUTION:

- **Clean cylinder body using new brake fluid. Do not use mineral oils such as gasoline or kerosene.**
- **Check a inner wall of the cylinder for wear or damage. Replace the cylinder if any non-standard condition is detected.**

Torque Member

Check torque member for wear, cracks, and damage. Replace if there are.

Piston

CAUTION:

- **Check a piston surface for corrosion, wear, and damage. Replace if there are.**
- **A piston sliding surface is plated. Do not polish with sandpaper.**

Sliding pin,Sliding Pin Bolt, Sliding Pin Boot

Check sliding pin,sliding pin bolt and sliding pin boot for wear, damage, and cracks. Replace if there are.

ASSEMBLY

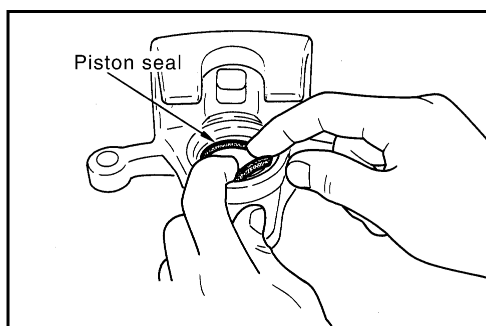
CAUTION:

When assembling, use only rubber lubricant specified below.

1. Apply polyglycol ether based lubricant to piston seal, and install them to cylinder body.

   CAUTION:

   Do not reuse piston seal.

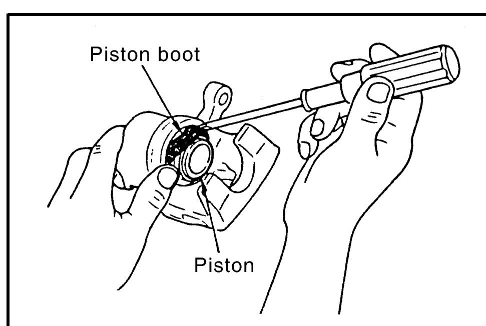


SFIA2278E

2. Apply rubber grease to piston boot. Cover the piston end with the piston boot, and then install cylinder side lip on the piston boot securely into the groove on cylinder body.

   CAUTION:

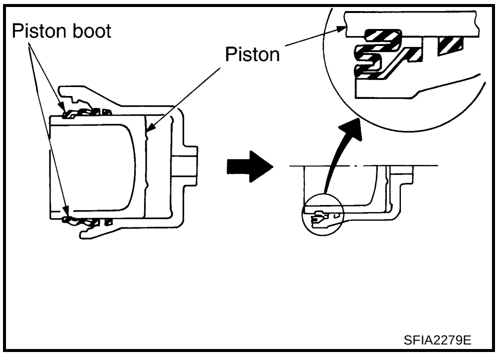
   Do not reuse piston boot.



SFIA2498E

3. Apply brake fluid to piston. Insert into cylinder body by hand and insert piston boot piston side lip into the piston groove.

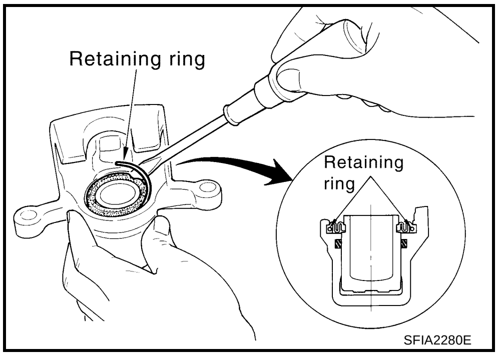
   CAUTION:
   Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.



SFIA2279E

4. Fix piston boot with retaining ring.

   CAUTION:
   - **Make sure that boot is securely engaged in the groove on cylinder body.**
   - **Do not reuse retainer ring.**
5. Install sliding pin boot to torque member.
6. Install the cylinder body to torque member, and then tighten sliding pin bolt to the specified torque.



SFIA2280E

DISC ROTOR INSPECTION

Visual Inspection

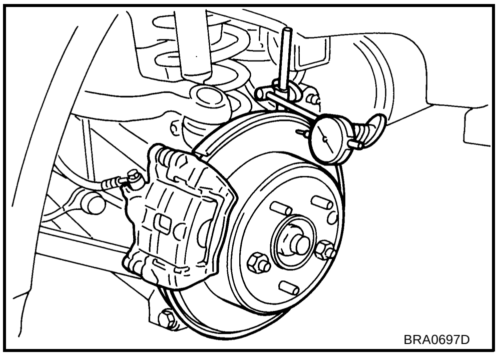
Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

Runout Inspection

1. Fix disc rotor to wheel hub using wheel nuts (2 or more positions).
2. Inspect runout using dial gauge. [Measured at 10 mm(0.39 in) inside disc edge.]

   Runout limit (with it attached to the vehicle)
   : 0.1 mm (0.0039 in)

   NOTE:
   Before measuring, make sure that wheel bearing axial end play is within the specification. Refer to RAX-5, "WHEEL BEARING INSPECTION" , RAX-15, "WHEEL BEARING INSPECTION" .

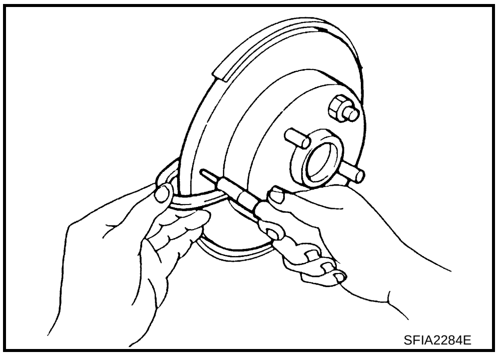

BRA0697D

3. When runout exceeds limit value, displace mounting position of disc rotor by one hole. And then find a position of the minimum value for runout.
4. Replace disc rotor if it is outside repair limit after performing the above operation.

Thickness Inspection

Check the thickness of the disc rotor using a micrometer. Replace disc rotor if the thickness is under the wear limit.

Standard thickness	**: 16.0 mm (0.631 in)**
Wear limit	**: 14.0 mm (0.551 in)**


SFIA2284E

A B C D E BR G H I J K L M

BRAKE BURNISHING PROCEDURE

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive the vehicle on a straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

AFS002LB

Unit: mm (in)

Front brake	Brake model		AD31VD
	Cylinder bore diameter		44.4 × 2 (1.748 × 2)
	Pad length × width × thickness		132.0 × 52.5 × 11.0 (5.20 × 2.067 × 0.433)
	Rotor outer diameter × thickness		280 × 28 (11.02 × 1.10)
Rear brake	Brake model		AD9VA
	Cylinder bore diameter		34.93 (1.375)
	Pad length × width × thickness		83.0 × 33.0 × 8.5 (3.268 × 1.299 × 0.335)
	Rotor outer diameter × thickness		292 × 16 (11.50 × 0.63)
Master cylinder	Cylinder bore diameter		25.4 (1)
Control valve	Valve model		Electric brake force distribution
Brake booster	Booster model		C215T
	Diaphragm diameter	Primary	230 (9.06)
		Secondary	205 (8.07)
Recommended brake fluid			DOT 3

Brake Pedal

AFS002LC

Brake pedal height (from dash lower panel top surface)	M/T model	156 – 166 mm (6.14 – 6.54 in)
	A/T model	164 – 174 mm (6.46 – 6.85 in)
Depressed pedal height [under a force of 490 N (50 kg, 110 lb) with engine running]	M/T model	80 mm (3.15 in) or more
	A/T model	85 mm (3.35 in) or more
Clearance between stopper rubber and threaded end of the stop lamp switch and ASCD cancel switch		0.74 - 1.96 mm (0.0291 - 0.0772 in)
Pedal play		3 - 11 mm (0.12 - 0.43 in)

Brake Booster

AFS002LD

Vacuum type

Input rod installation standard dimension	125 mm (4.92 in)

Check Valve

AFS002LE

Vacuum leakage [at vacuum of – 66.7 kPa (– 500 mmHg, – 19.69 inHg)]	Within 1.3 kPa (10 mmHg, 0.39 inHg) of vacuum for 15 seconds

Front Disc Brake

AFS002LF

Brake model		AD31VD
Brake pad	Standard thickness (new)	11.0 mm (0.433 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	28.0 mm (1.102 in)
	Repair limit thickness	26.0 mm (1.024 in)
	Maximum runout (with it attached to the vehicle)	0.06 mm (0.0024 in)

Rear Disc Brake

AFS002LG

Brake model		AD9VA
Brake pad	Standard thickness (new)	8.5 mm (0.335 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	16.0 mm (0.631 in)
	Repair limit thickness	14.0 mm (0.551 in)
	Maximum runout (with it attached to the vehicle)	0.1 mm (0.0039 in)

SECTION CL
CLUTCH

CONTENTS

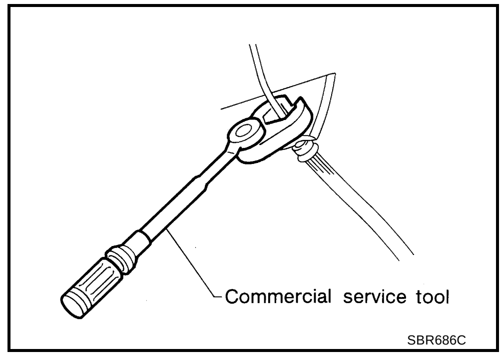
PRECAUTIONS

PFP:00001

Service Notice or Precautions

ACS007HL

- Recommended clutch fluid is brake fluid “DOT 3”. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .
- Do not reuse drained clutch fluid.
- Be careful not to splash clutch fluid on painted areas.
- Use a flare nut wrench, when removing and installing clutch piping.
- Use new clutch fluid to clean or wash all parts of master cylinder and operating cylinder.
- Do not use mineral oils such as gasoline or kerosene. It will corrode the rubber parts of the hydraulic system.



WARNING:
After cleaning clutch disc, clean it with a dust collector. Do not use compressed air.

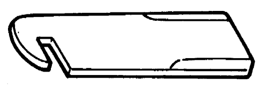
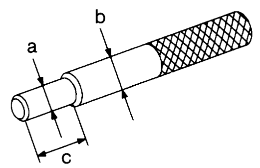
PREPARATION

PFP:00002

Special Service Tools

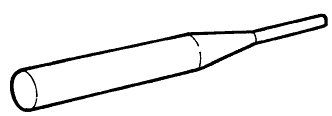
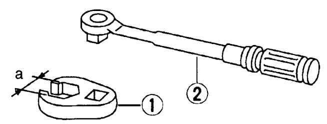
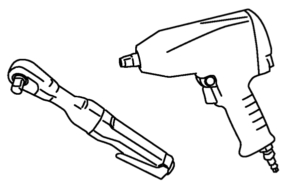
ACS007HM

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST20050240 (—) Diaphragm adjusting wrench  ZZA0508D	Adjusting unevenness of diaphragm spring of clutch cover
KV30101600 (—) Clutch aligning bar a: 15.9 mm (0.626 in) dia. b: 17.9 mm (0.705 in) dia. c: 40 mm (1.57 in)  S-NT405	Installing clutch cover and clutch disc

Commercial Service Tools

ACS007HN

Tool name	Description
Pin punch Tip diameter: 4.5 mm (0.177 in) dia.  ZZA0515D	Removing and installing master cylinder spring pin
1. Flare nut crowfoot a: 10 mm (0.39 in) 2. Torque wrench  S-NT360	Removing and installing clutch piping
Power tool  PBIC0190E	Loosening nuts and bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ACS007XH

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

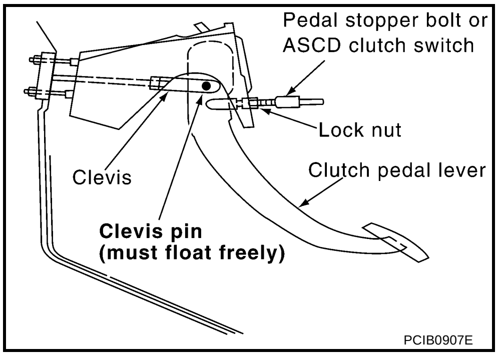
Reference page		CL-5	CL-7	CL-8	CL-10	EM-74	CL-12	CL-14	CL-14	CL-14	CL-14	CL-14	CL-14	CL-14	CL-14	CL-14	CL-14	CL-14	EM-108
SUSPECTED PARTS (Possible cause)		CLUTCH PEDAL (Inspection and adjustment)	CLUTCH LINE (Air in line)	MASTER CYLINDER PISTON CUP (Damaged)	OPERATING CYLINDER PISTON CUP (Damaged)	ENGINE MOUNTING (Loose)	RELEASE BEARING (Worn, dirty or damaged)	CLUTCH DISC (Out of true)	CLUTCH DISC (Runout is excessive)	CLUTCH DISC (Lining broken)	CLUTCH DISC (Dirty or burned)	CLUTCH DISC (Oily)	CLUTCH DISC (Worn out)	CLUTCH DISC (Hardened)	CLUTCH DISC (Lack of spline grease)	DIAPHRAGM SPRING (Damaged)	DIAPHRAGM SPRING (Out of tip alignment)	PRESSURE PLATE (Distortion)	FLYWHEEL (Distortion)
Symptom	Clutch grabs/chatters					1			2			2	2	2			2		
	Clutch pedal spongy		1	2	2														
	Clutch noisy						1												
	Clutch slips	1										2	2			3		4	5
	Clutch does not disengage	1	2	3	4			5	5	5	5	5			5	6	6	7	

CLUTCH PEDAL

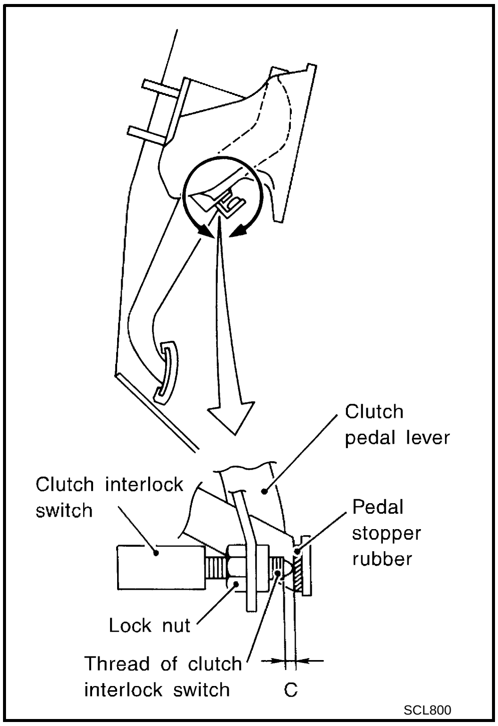
PFP:46540

On-Vehicle Inspection and Adjustment

ACS007XI



1. Make sure that clevis pin floats freely in the bore of clutch pedal. It should not be bound by clevis or clutch pedal.
a. If clevis pin is not free, make sure that pedal stopper bolt or ASCD clutch switch is not applying pressure to clutch pedal causing clevis pin to bind. To adjust, loosen lock nut and turn pedal stopper bolt or ASCD clutch switch.
b. Tighten lock nut.
c. Make sure that clevis pin floats in the bore of clutch pedal. It should not be bound by clutch pedal.
d. If clevis pin is still not free, remove clevis pin and check for deformation or damage. Replace clevis pin if necessary. Leave the pin removed for step 2.
2. Check clutch pedal stroke for free range of movement.
a. With clevis pin removed, manually move clutch pedal up and down to determine if it moves freely.
b. If any sticking is found, replace related parts (clutch pedal bracket, assist spring, bushing etc.) Re-assemble clutch pedal and again make sure that clevis pin floats freely in the bore of clutch pedal.
3. Adjust clearance “C” while depressing clutch pedal fully. (With clutch interlock switch)



Clearance “C” : 0.3 - 1.0mm (0.012 - 0.039 in)

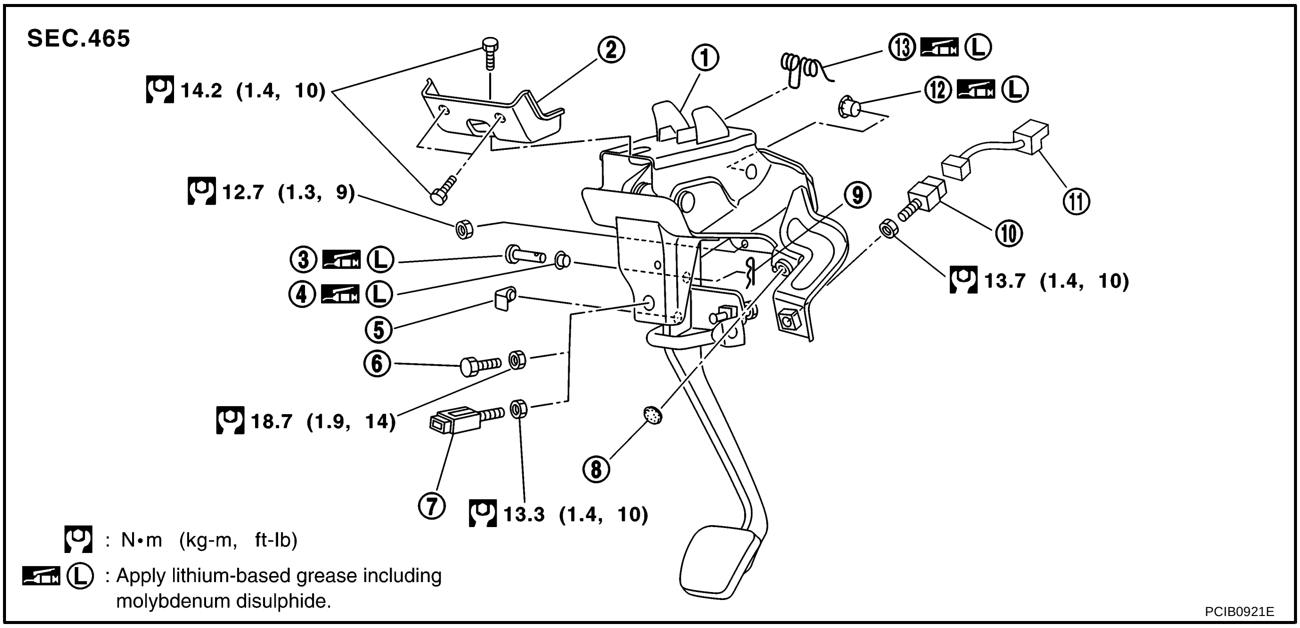
4. Check clutch hydraulic and system components (clutch master cylinder, clutch operating cylinder, clutch withdrawal lever, clutch release bearing, etc.) for sticking or binding.
a. If any sticking or binding is found, repair or replace related parts as necessary.
b. If hydraulic system repair was necessary, bleed the clutch hydraulic system. Refer to CL-7, "Air Bleeding Procedure" .

NOTE:
Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all the air from the system.

Removal and Installation

ACS007XJ

COMPONENTS



1. Clutch pedal assembly	2. Bracket	3. Clevis pin
4. Bushing	5. Stopper rubber	6. Pedal stopper bolt (Without ASCD)
7. ASCD clutch switch (With ASCD)	8. Stopper rubber	9. Snap pin
10. Clutch interlock switch	11. Sub harness	12. Bushing
13. Assist spring		

REMOVAL

1. Remove instrument driver lower panel. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect clutch interlock switch and ASCD clutch switch (with ASCD) harness connectors.
3. Remove snap pin and clevis pin from clevis of clutch master cylinder.
4. Remove clutch pedal assembly mounting nuts and bolts, and then remove clutch pedal assembly from the vehicle.

INSPECTION AFTER REMOVAL

- Check clutch pedal for bend, damage, or a cracked weld. If bend, damage, or a cracked weld is found, replace clutch pedal.
- Check assist spring for settling. If settling is found, replace assist spring.

INSTALLATION

Installation is the reverse order of removal.

NOTE:

Tighten pedal stopper bolt lock nut or ASCD clutch switch lock nut to the specified torque after installing clutch pedal assembly in vehicle and adjusting the pedal free play.

CLUTCH FLUID

PFP:00017

Air Bleeding Procedure

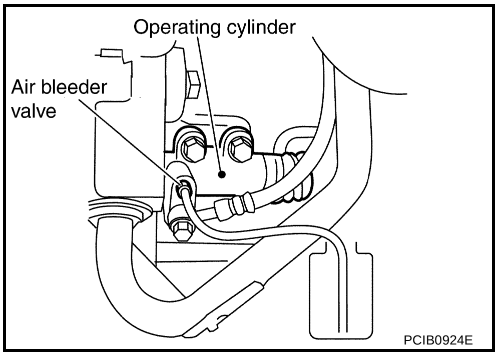
ACS007XK

NOTE:

Do not use a vacuum assist or any other type of power bleeder on this system. Use of a vacuum assist or power bleeder will not purge all the air from the system.

CAUTION:

- **Monitor clutch fluid level in reservoir tank to make sure it does not empty.**
- **Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.**
- Bleed the air of operating cylinder.



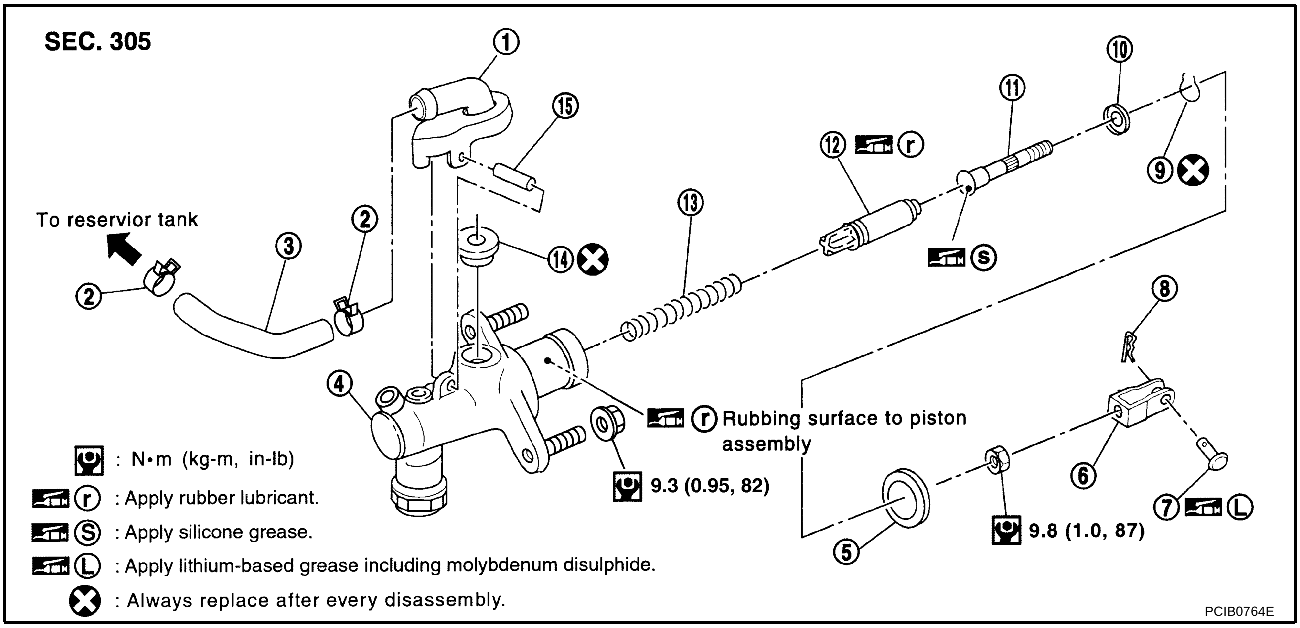
1. Fill master cylinder reservoir tank with new clutch fluid.
2. Connect a transparent vinyl hose to air bleeder valve.
3. Depress clutch pedal slowly and fully several times at an interval of 2 to 3 seconds and hold it.
4. With clutch pedal depressed, open air bleeder valve to release air.
5. Close air bleeder valve.
6. Release clutch pedal and wait for 5 seconds.
7. Repeat steps 3 to 6 until no bubbles can be observed in clutch fluid.
8. Tighten air bleeder valve to the specified torque. Refer to CL-10, "Components" .

CLUTCH MASTER CYLINDER

PFP:30610

Components

ACS007ZT



1.	Nipple	2.	Clamp	3.	Hose
4.	Cylinder body	5.	Seat	6.	Clevis
7.	Clevis pin	8.	Snap pin	9.	Stopper ring
10.	Stopper	11.	Push rod	12.	Piston assembly
13.	Return spring	14.	Seal	15.	Spring pin

Removal and Installation

ACS007XL

REMOVAL

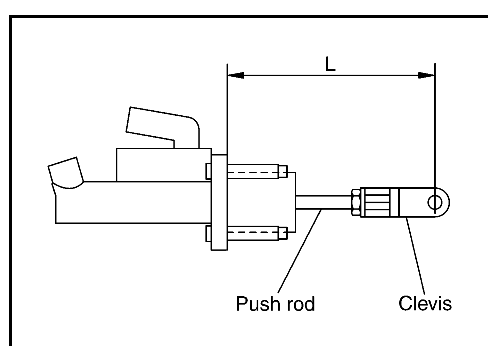
1. Using one of the following methods, remove hose from nipple.
   - Drain clutch fluid from reservoir tank and remove hose.
   - Remove hose from nipple. Immediately plug hose and reservoir tank to prevent clutch fluid from dripping.

   CAUTION:
   Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.
2. Remove clutch tube using a flare nut wrench.
3. Remove snap pin and clevis pin on clevis in passenger compartment to separate clutch pedal.
4. Remove mounting nuts on master cylinder assembly, and then master cylinder assembly from the vehicle.

INSTALLATION

1. Check position of clevis and push rod. If measurement is outside the standard length, adjust position of clevis and push rod.

   Length “L” : 122.0 mm (4.80 in)



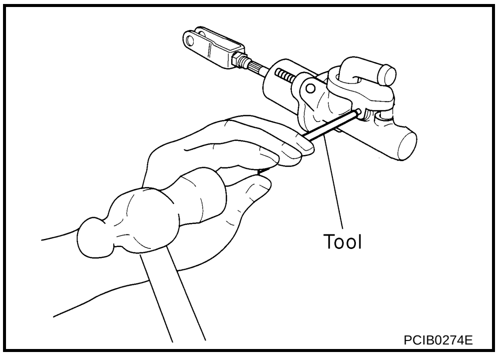
2. Connect clutch tube to master cylinder assembly and temporarily tighten flare nut.
3. Install master cylinder assembly and tighten mounting nut to the specified torque. Refer to CL-8, "Components" .
4. Tighten clutch tube flare nut to the specified torque using a flare nut torque wrench. Refer to CL-11, "Removal and Installation" .
5. Set clevis to clutch pedal and insert clevis pin.
6. Attach snap pin to clevis pin.
7. Install hose to nipple.

8. After completing this procedure, inspect and adjust for clutch pedal and then bleed the air from the clutch hydraulic system. Refer to CL-5, "On-Vehicle Inspection and Adjustment" and CL-7, "Air Bleeding Procedure" .

Disassembly and Assembly

ACS007YZ

DISASSEMBLY



1. Remove spring pin, using a pin punch.
2. Remove nipple and seal from cylinder body.
3. Loosen push rod lock nut then remove clevis and lock nut, if necessary.

   NOTE:
   Clutch pedal height is controlled with position of clevis and push rod.
4. Remove seat from cylinder body.
5. Remove stopper ring and stopper. Remove push rod from cylinder body while holding it securely to prevent piston assembly popping out.
6. Remove piston assembly and return spring.

INSPECTION AFTER DISASSEMBLY

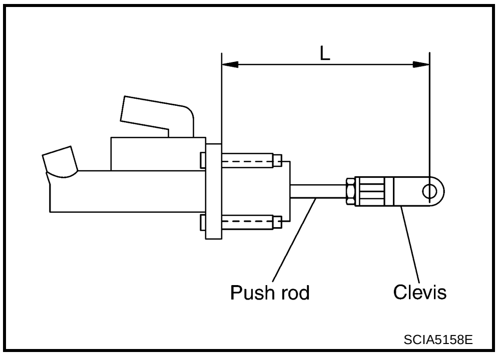
Check for any of the conditions shown below. If any malfunction is found, replace the part concerned.

- Damaged cylinder internal wall, foreign matter, wear, corrosion, or pinhole
- Damaged or deformed nipple or reservoir tank
- Settling of return spring
- Cracked or deformed seat

ASSEMBLY

1. Apply rubber lubricant to the internal surface of cylinder body, the sliding surface of piston assembly, and piston cup. Insert return spring and piston assembly to cylinder body.
2. Apply silicon grease to push rod and install stopper. Install stopper ring while holding down push rod by hand to prevent piston assembly from popping out.
3. Install seat to cylinder body.
4. Install seal and nipple to cylinder body. Install spring pin, using a pin punch.
5. Install clevis to push rod.
6. Check and adjust the positions of clevis and push rod. After adjusting “L”, tighten lock nut to the specified torque. Refer to CL-8, "Components" .

   Length “L” : 122.0 mm (4.80 in)

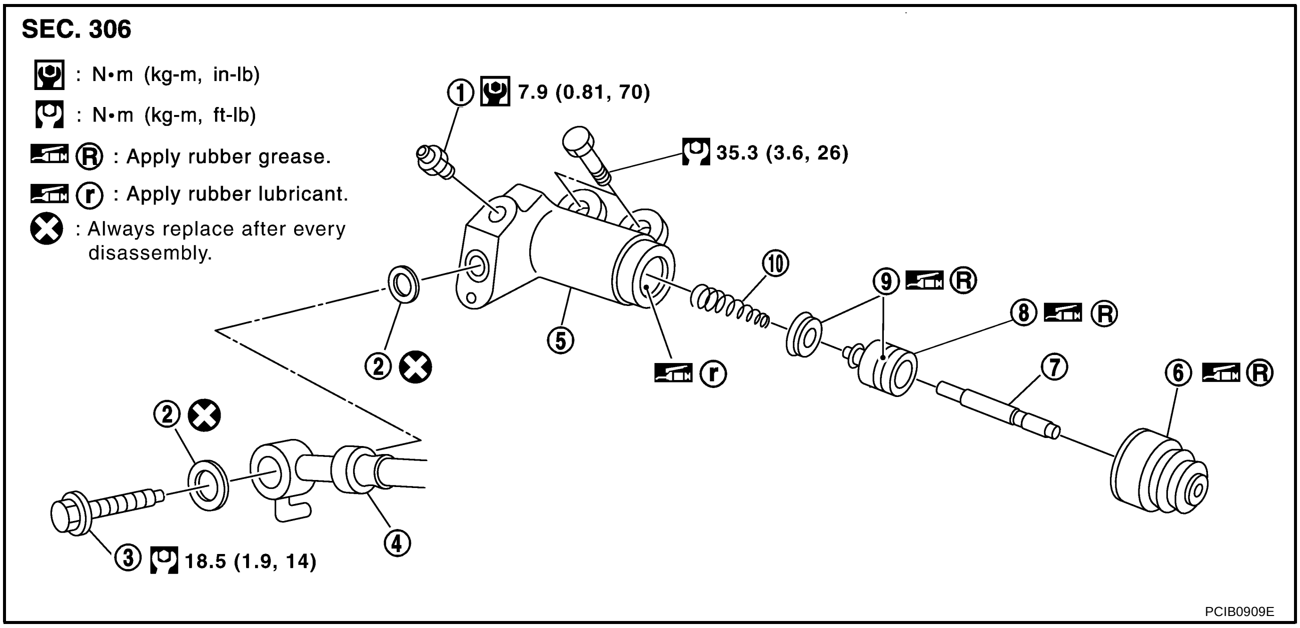


OPERATING CYLINDER

PFP:30620

Components

ACS007ZU



1.	Air bleeder valve	2.	Copper washer	3.	Union bolt
4.	Clutch hose	5.	Cylinder body	6.	Dust cover
7.	Push rod	8.	Piston assembly	9.	Piston cup
10.	Piston spring				

Removal and Installation

ACS007XN

REMOVAL

1. Drain clutch fluid.

   CAUTION:

   Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.
2. Remove clutch hose from operating cylinder.
3. Remove operating cylinder mounting bolt and remove operating cylinder from the vehicle.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Install hose with care so that it will not be bent or twisted.
- After completing the procedure, bleed the air from the clutch hydraulic system. Refer to CL-7, "Air Bleeding Procedure" .

Disassembly and Assembly

ACS007XO

DISASSEMBLY

- Remove dust cover and push rod. Then remove piston, piston cup, and piston spring from inside cylinder body.

INSPECTION AFTER DISASSEMBLY

Check for any of the conditions shown below. If any malfunction is found, replace the part concerned.

- Damage to cylinder internal surface or piston sliding surface. Foreign matter, wear, corrosion, or pinhole
- Settling of piston spring
- Cracked or deformed dust cover

ASSEMBLY

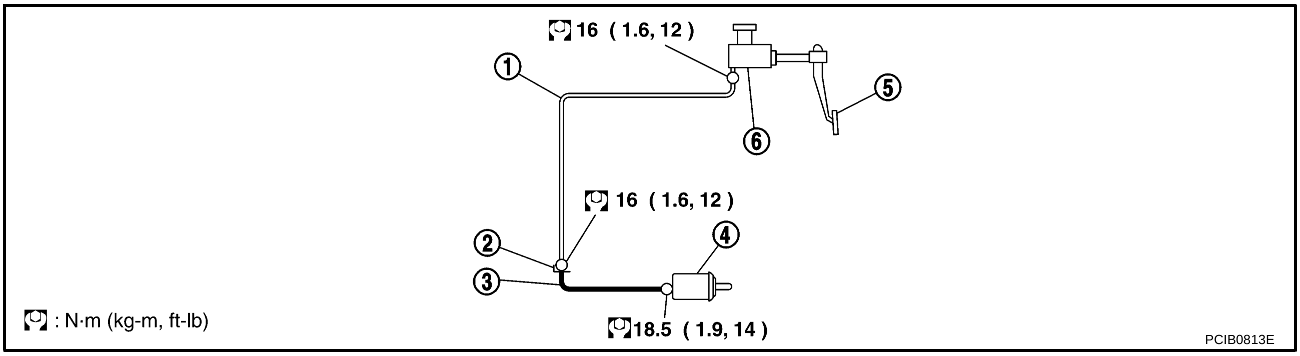
1. Apply rubber lubricant to cylinder body internal surface and rubber grease to piston cup and piston. Insert piston assembly and piston spring into cylinder body.
2. Apply rubber grease to dust cover and install push rod and dust cover.

CLUTCH PIPING

PFP:30650

Removal and Installation

ACS007XP

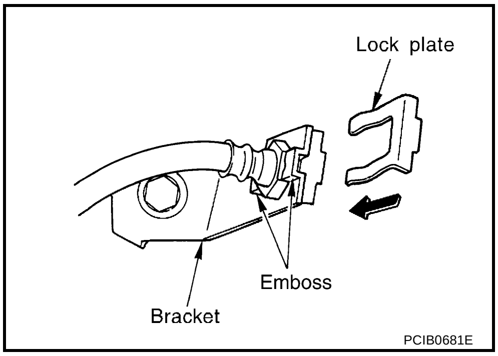


1.	Clutch tube	2.	Lock plate	3.	Clutch hose
4.	Operating cylinder	5.	Clutch pedal	6.	Master cylinder

Carefully observe the following steps during clutch tube removal and installation.

CAUTION:

Keep painted surface on the body or other parts free of clutch fluid. If it spills, wipe up immediately and wash the affected area with water.



- To fix clutch hose on bracket, position clutch hose clasp on the emboss of bracket and drive lock plate vertically from above. Be careful not to bend or twist clutch hose. Do not scratch or damage clutch hose.
- Tighten clutch tube flare nut to the specified torque.
- Tighten clutch hose union bolt to the specified torque.

  CAUTION:

  Do not reuse copper washer.
- After installation, bleed the air from the clutch hydraulic system. Refer to CL-7, "Air Bleeding Procedure" .

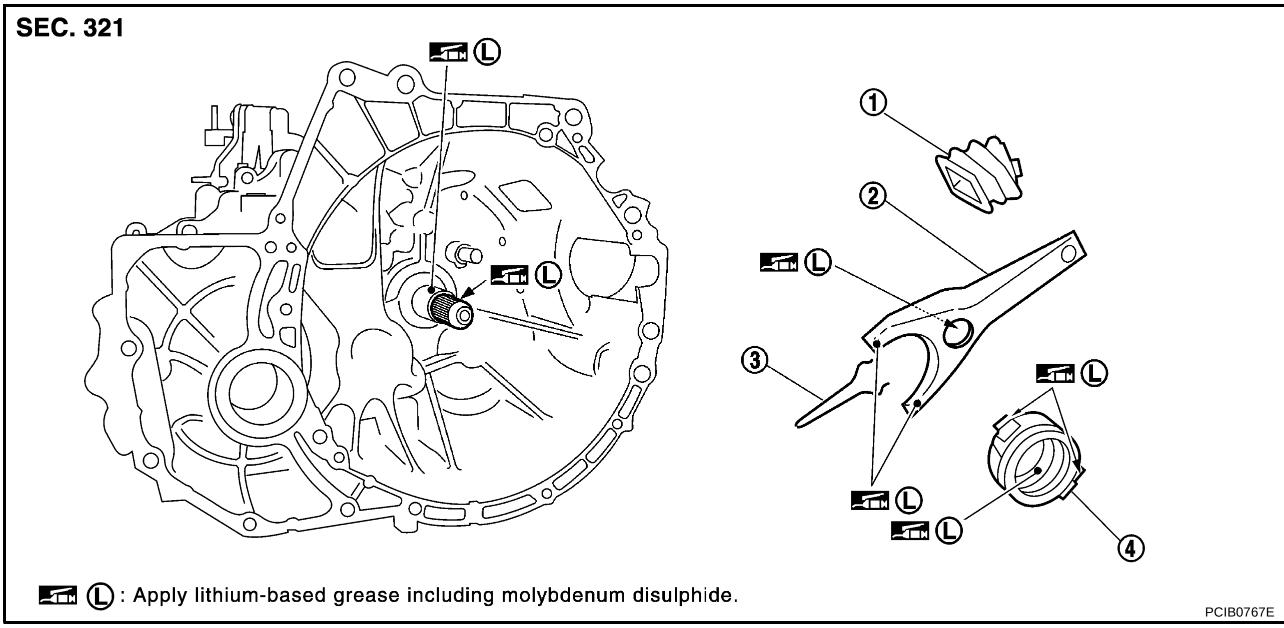
CLUTCH RELEASE MECHANISM

PFP:30502

Removal and Installation

ACS007XQ

COMPONENTS



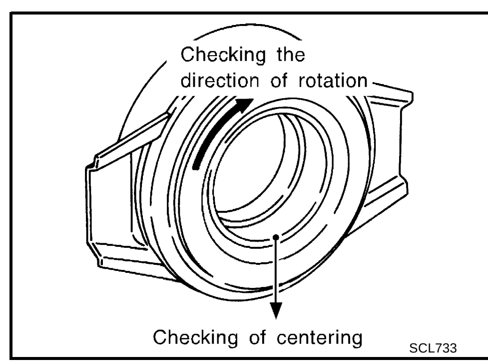
1. Dust cover
2. Withdrawal lever
3. Retainer spring
4. Release bearing

REMOVAL

1. Remove manual transaxle from the vehicle. Refer to MT-17, "Removal and Installation" .
2. Remove release bearing, withdrawal lever from inside clutch housing.
3. Remove dust cover.
4. Remove retainer spring from withdrawal lever.

INSPECTION AFTER REMOVAL

- If release bearing is seized, damaged, not properly centered or does not rotate smoothly, replace it.
- If contact surface of withdrawal lever is excessively worn, replace it.
- If dust cover is cracked, replace it.

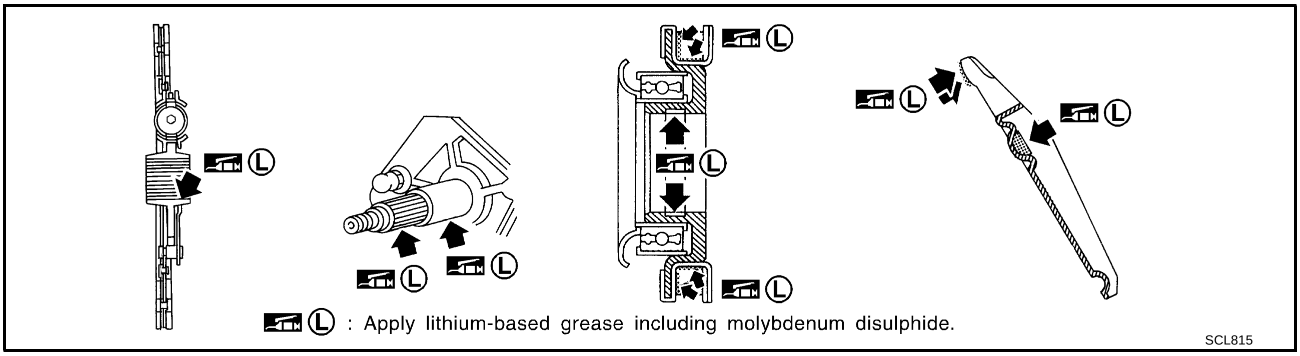


INSTALLATION

CAUTION:

- **Be sure to apply grease to the points specified. Otherwise, noise, poor disengagement, or damage to the clutch may result. Excessive grease may cause slip or judder. Wipe off any grease oozing from the parts.**
- **Be careful not to bring any grease to the clutch disk facing, pressure plate surface, and flywheel surface.**

1. Following the instructions below, apply grease to the specified points.



CAUTION:

Wipe off any old grease, debris, or powdery residue left on the grease applying surfaces.

- Evenly apply approximately 1 mm (0.04 in) thick coating of recommended grease to withdrawal lever and release bearing sliding surface.
- Apply recommended grease to withdrawal lever ball pin contact surface and inner slots of release bearing. The grease surface should be level with the surrounding area.
- Apply a thin coat of recommended grease evenly to release bearing sliding surface. Install release bearing. Wipe off any excess grease that oozes from the parts and then remove release bearing.

2. Install in the reverse order of removal.

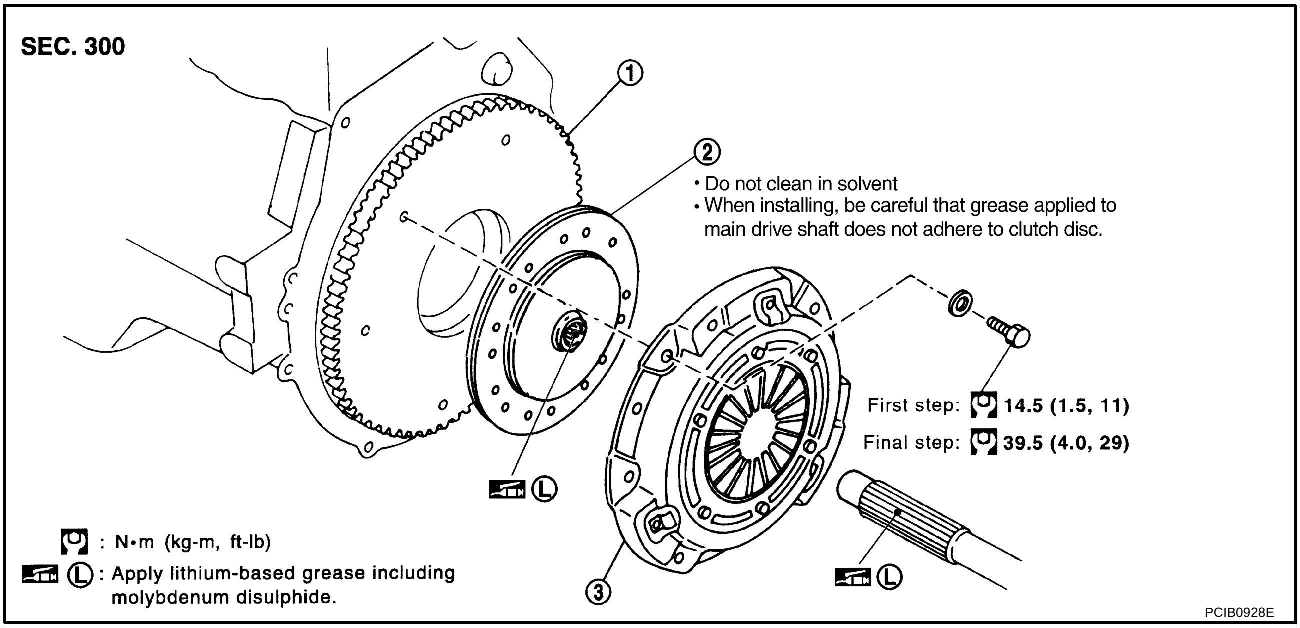
CLUTCH DISC, CLUTCH COVER AND FLYWHEEL

PFP:30100

Removal and Installation

ACS007XR

COMPONENTS



1. Flywheel
2. Clutch disc
3. Clutch cover

CAUTION:

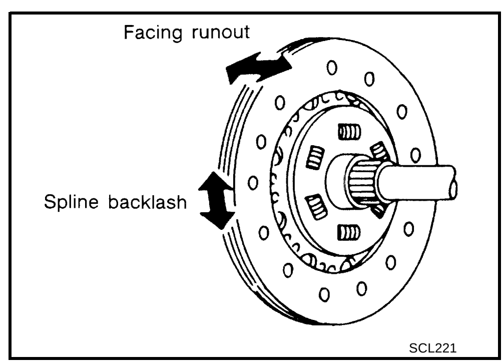
Be careful not to bring any grease to the clutch disc facing, pressure plate surface, and flywheel surface.

REMOVAL

1. Remove manual transaxle from the vehicle. Refer to MT-17, "Removal and Installation" .
2. Loosen clutch cover mounting bolts evenly with power tool. Then remove clutch cover and clutch disc.

INSPECTION AND ADJUSTMENT AFTER REMOVAL

Clutch Disc



- Measure circumferential runout relative to clutch disc center spline. If it is outside the specification, replace clutch disc.

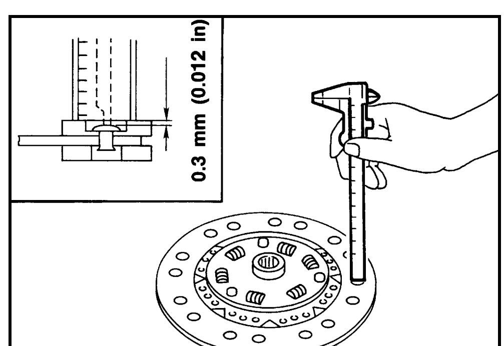
  Runout limit/diameter of the area to be measured

  : 1.0 mm (0.039 in)/230 mm (9.06 in) dia.

- Measure backlash to clutch disc spline and input shaft spline at the circumference of clutch disc. If outside the specification, replace clutch disc.

  Maximum allowable spline backlash

  : 1.0 mm (0.039 in)

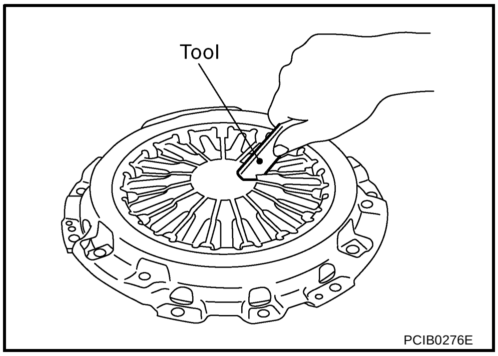


- Using calipers, measure the depth to clutch disc facing rivet heads. If it exceeds the allowable wear limit, replace clutch disc.

  Facing wear limit (depth to the rivet head)

  : 0.3 mm (0.012 in)

Clutch Cover



PCIB0276E

Check diaphragm spring lever claws for unevenness with the lever still on the vehicle. If they exceed the tolerance, adjust lever height using the diaphragm adjusting wrench.

Tolerance for diaphragm spring lever unevenness

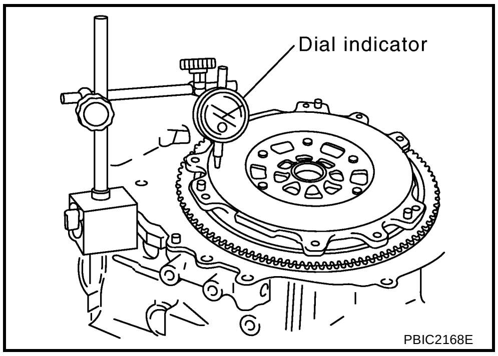
: 0.7 mm (0.028 in) or less

Tool number : ST20050240 (—)

- Check clutch cover thrust ring for wear or breakage. If wear or breakage is found, replace clutch cover assembly.

  NOTE:
  - Worn thrust ring will generate a beating noise when tapped at the rivet with a hammer.
  - Broken thrust ring will make a clinking sound when cover is shaken up and down.
- If a trace of burn or discoloration is found on the clutch cover pressure plate to clutch disc contact surface, repair the surface with sandpaper. If surface is damaged or distorted, replace the assembly.

Flywheel Runout



PBIC2168E

Using a dial indicator, measure runout at the flywheel clutch contact surface. If runout is outside the specification, replace flywheel. If a trace of burn or discoloration is found on the surface, repair it with sandpaper.

Allowable flywheel runout

: Refer to EM-108, "FLYWHEEL DEFLECTION (M/T MODELS)" .

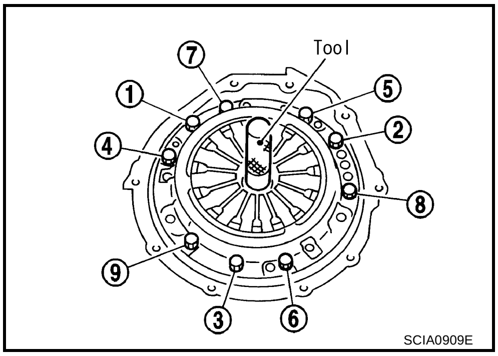
CAUTION:
Measure it at flywheel outer face (not on knock pin and clutch cover mounting hole).

INSTALLATION

1. Apply recommended grease to clutch disc and input shaft splines.

   CAUTION:
   Be sure to apply grease to the points specified. Otherwise, noise, poor disengagement, or damage to the clutch may result. Excessive grease may cause slip or judder. Wipe off any grease oozing from the parts.
2. Install clutch disc and clutch cover. Pre-tighten mounting bolts and install clutch aligning bar.

   Tool number : KV30101600 (—)



SCIA0909E

3. Tighten clutch cover attaching bolts evenly in two steps in the order shown in the figure. Refer to CL-14, "COMPONENTS" .
4. Install manual transaxle. Refer to MT-17, "Removal and Installation" .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Clutch Control System

ACS007XS

Type of clutch control	Hydraulic

Clutch Master Cylinder

ACS007XT

Inner diameter	15.87 mm (5/8 in)

Clutch Operating Cylinder

ACS007XU

Inner diameter	19.05 mm (3/4 in)

Clutch Disc

ACS007XV

Engine type	QR25DE
Model	240
Facing size (outer dia. x inner dia. x thickness)	240 mm × 160 mm × 3.5 mm (9.45 in × 6.30 in × 0.138 in)
Thickness of disc assembly with load	7.90 - 8.30 mm (0.3110 - 0.3268 in) with 5,688 N (580 kg, 1,279 lb)
Wear limit of facing surface to rivet head	0.3 mm (0.012 in)
Runout limit/diameter of the area to be measured	1.0 mm (0.039 in) / 230 mm (9.06 in) dia.
Maximum spline backlash (at outer edge of disc)	1.0 mm (0.039 in)

Clutch Cover

ACS007XW

Engine type	QR25DE
Model	240
Set-load	5,884 N (600 kg, 1,323 lb)
Diaphragm spring lever height	37.0 - 39.0 mm (1.457 - 1.535 in)
Uneven limit diaphragm spring toe height	0.7 mm (0.028 in) or less

Clutch Pedal

ACS007ZV

Clearance ″C″ between pedal stopper rubber and clutch interlock switch threaded while clutch pedal is fully depressed	0.3 - 1.0 mm (0.012 - 0.039 in)

SECTION CO
ENGINE COOLING SYSTEM

CONTENTS

PRECAUTIONS

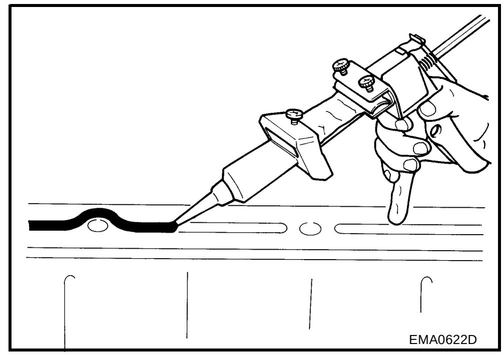
PFP:00001

Precautions for Liquid Gasket

ABS00CK4

LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach liquid gasket tube to the tube presser [SST: WS39930000 (—)].
   Use Genuine RTV Silicone Sealant or equivalent. Refer to **GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"** **.**
   - Within 5 minutes of liquid gasket application, install the mating component.
   - If liquid gasket protrudes, wipe it off immediately.
   - Do not retighten mounting bolts or nuts after the installation.
   - Wait 30 minutes or more after installation before refilling engine oil and engine coolant.



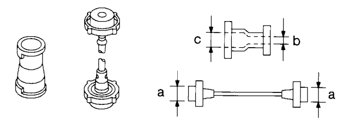
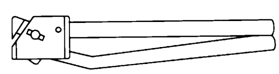
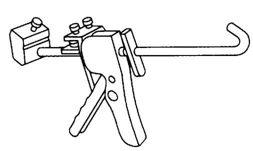
PREPARATION

PFP:00002

Special Service Tools

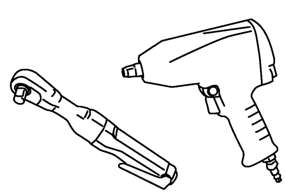
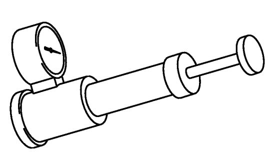
ABS00CK5

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
EG17650301 (J33984-A) Radiator cap tester adapter	 S-NT564	Adapting radiator cap tester to radiator cap and radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV99103510 (—) Radiator plate pliers A	 S-NT224	Installing radiator upper and lower tanks
KV99103520 (—) Radiator plate pliers B	 S-NT225	Removing radiator upper and lower tanks
WS39930000 (—) Tube presser	 S-NT052	Pressing the tube of liquid gasket

Commercial Service Tools

ABS00CK6

Tool name		Description
Power tool	 PBIC0190E	Loosening nuts and bolts
Radiator cap tester	 PBIC1982E	Checking radiator and radiator cap

OVERHEATING CAUSE ANALYSIS

PFP:00012

Troubleshooting Chart

ABS00CK7

	Symptom		Check items	
Cooling system parts malfunction	Poor heat transfer	Water pump malfunction	Worn or loose drive belt	—
		Thermostat and water control valve stuck closed	—	
		Damaged fins	Dust contamination or paper clogging	
			Physical damage	
		Clogged radiator cooling tube	Excess foreign material (rust, dirt, sand, etc.)	
	Reduced air flow	Cooling fan does not operate	Fan assembly	—
		High resistance to fan rotation		
		Damaged fan blades		
	Damaged radiator shroud	—	—	—
	Improper engine coolant mixture ratio	—	—	—
	Poor engine coolant quality	—	Engine coolant viscosity	—
	Insufficient engine coolant	Engine coolant leaks	Cooling hose	Loose clamp
				Cracked hose
			Water pump	Poor sealing
			Radiator cap	Loose
				Poor sealing
			Radiator	O-ring for damage, deterioration or improper fitting
				Cracked radiator tank
				Cracked radiator core
			Reservoir tank	Cracked reservoir tank
		Overflowing reservoir tank	Exhaust gas leaks into cooling system	Cylinder head deterioration
				Cylinder head gasket deterioration

OVERHEATING CAUSE ANALYSIS

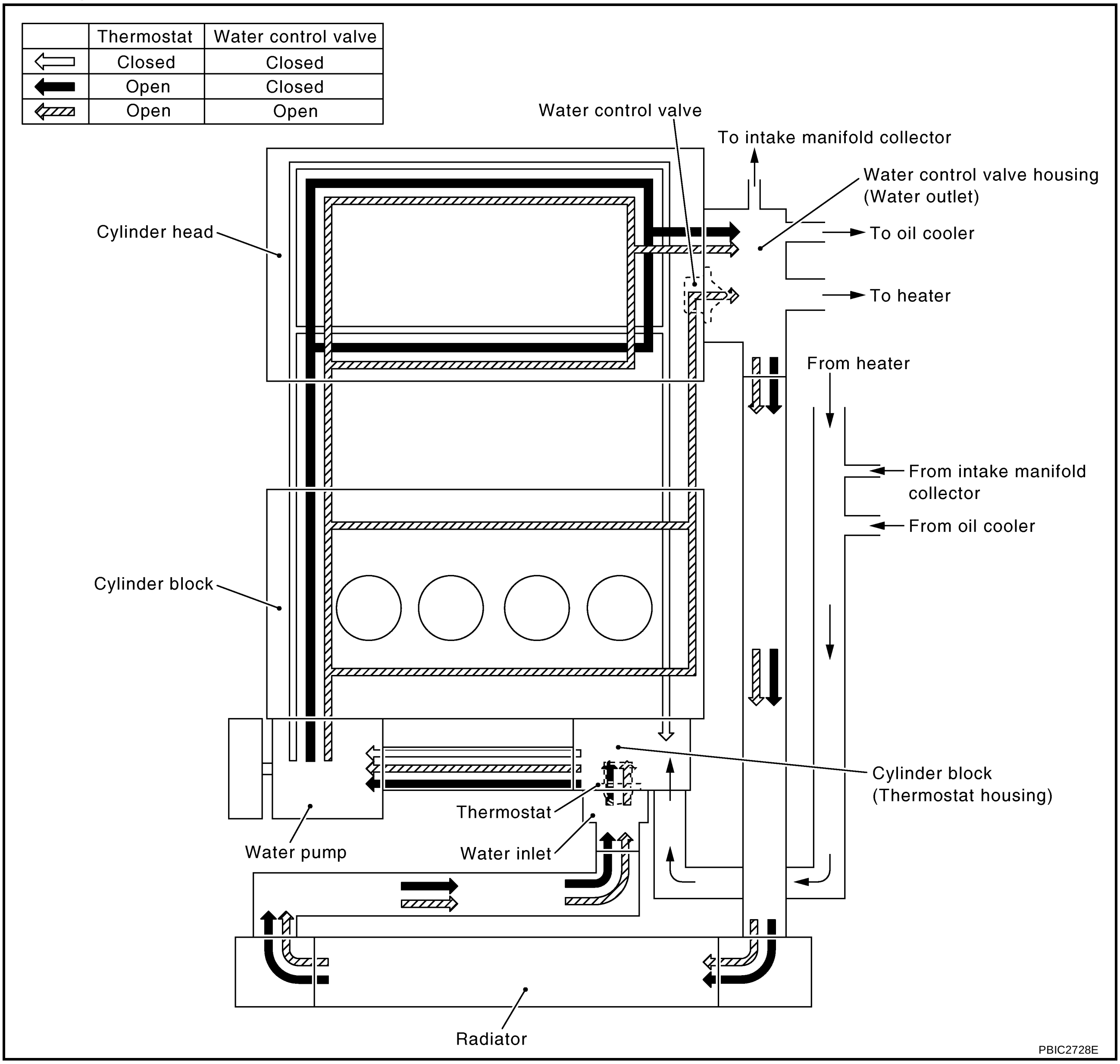
	Symptom		Check items	
Except cooling system parts malfunction	—	Overload on engine	Abusive driving	High engine rpm under no load
				Driving in low gear for extended time
				Driving at extremely high speed
			Power train system malfunction	—
			Installed improper size wheels and tires	
			Dragging brakes	
			Improper ignition timing	
	Blocked or restricted air flow	Blocked bumper	—	—
		Blocked radiator grille	Installed car brassiere	
			Mud contamination or paper clogging	
		Blocked radiator	—	
		Blocked condenser	Blocked air flow	
		Installed large fog lamp		

COOLING SYSTEM

PFP:21020

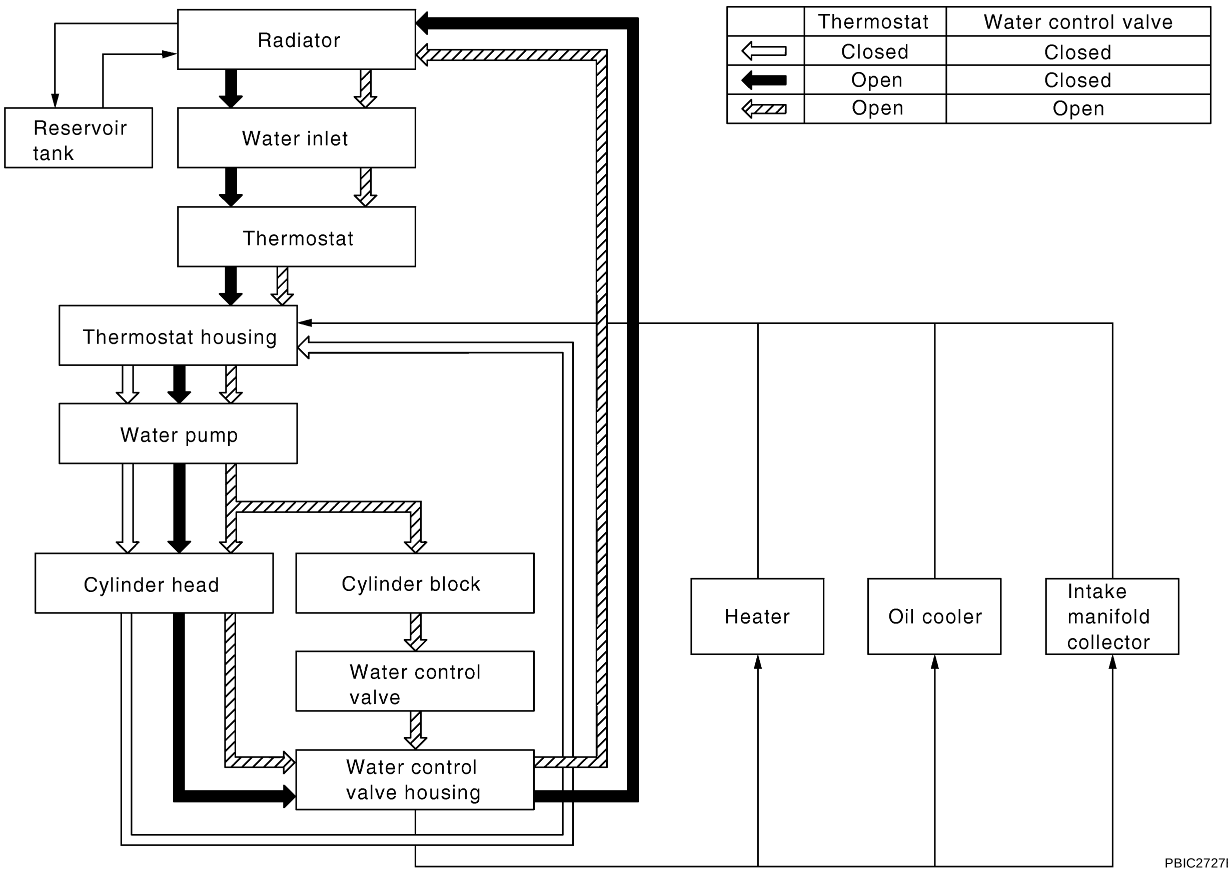
Cooling Circuit

ABS00CK8



System Chart

ABS00CK9



ENGINE COOLANT

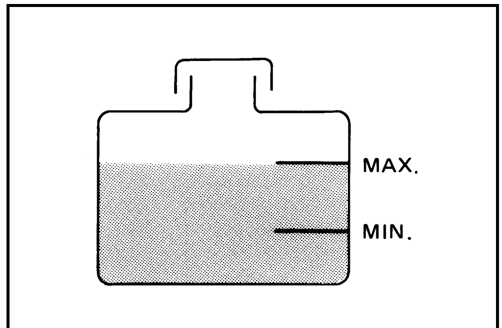
PFP:KQ100

Inspection

ABS00CKA

CHECKING ENGINE COOLANT LEVEL

- Check if the reservoir tank engine coolant level is within “MIN” to “MAX” range when the engine is cool.
- Adjust engine coolant level as necessary.



SMA412B

CHECKING LEAKAGE

- To check for leakage, apply pressure to the cooling system with a radiator cap tester (commercial service tool) and the radiator cap tester adapter [SST].

  Testing pressure:

  157 kPa (1.6 kg/cm^2 , 23 psi)

  WARNING:

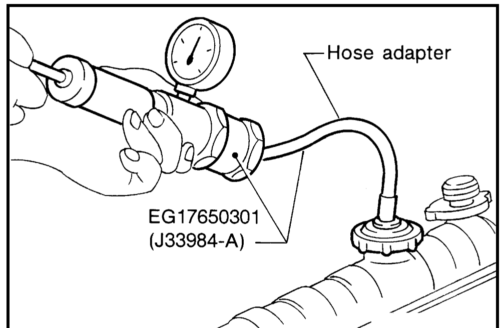
  Do not remove radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator.

  CAUTION:

  Higher test pressure than specified may cause radiator damage.

  NOTE:

  In a case that engine coolant decreases, replenish radiator with engine coolant.



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- If anything is found, repair or replace the damaged parts.

Changing Engine Coolant

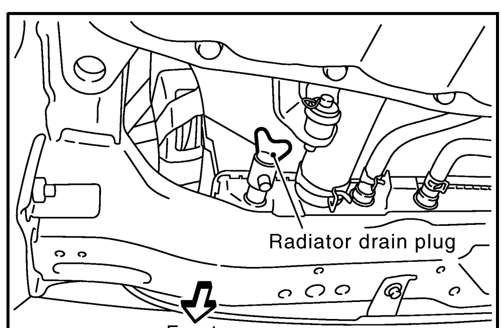
ABS00CKB

WARNING:

- **To avoid being scalded, do not change engine coolant when the engine is hot.**
- **Wrap a thick cloth around radiator cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**
- **Be careful not to allow engine coolant to contact drive belt.**

DRAINING ENGINE COOLANT

1. Remove RH and LH undercovers.
2. Open radiator drain plug at the bottom of radiator, and then remove radiator cap.



PBIC2250E

When drain all of engine coolant in the system, open water drain plug on cylinder block. Refer to **EM-82, "CYLINDER BLOCK"** **.**

3. Remove reservoir tank as necessary, and drain engine coolant and clean reservoir tank before installing.

4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to CO-10, "FLUSHING COOLING SYSTEM" .

REFILLING ENGINE COOLANT

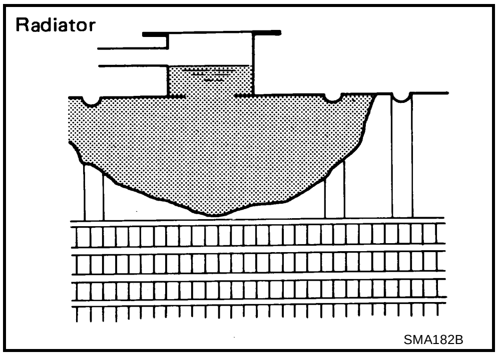
1. Install reservoir tank if removed, and radiator drain plug.

   CAUTION:

   Be sure to clean drain plug and install with new O-ring.

   - **If water drain plug on cylinder block is removed, close and tighten it. Refer to EM-82, "CYLINDER BLOCK" .**

2. Make sure that each hose clamp has been firmly tightened.
3. Fill radiator and reservoir tank to the specified level.



SMA182B

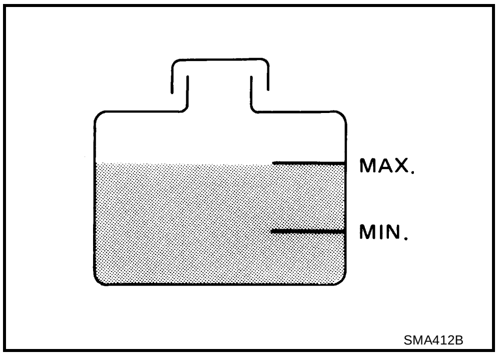
   - **Pour engine coolant through engine coolant filler neck slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.**
   - **Use Genuine Nissan Long Life Antifreeze/ Coolant or equivalent mixed with water (distilled or demineralized). Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .**

   Engine coolant capacity
   (With reservoir tank at “MAX” level)

   : Approx. 7.1 ℓ (7-1/2 US qt, 6-1/4 Imp qt)

   Reservoir tank engine coolant capacity
   (At “MAX” level)

   : 0.7 ℓ (3/4 US qt, 5/8 Imp qt)



SMA412B

4. Install radiator cap.
5. Warm up until opening thermostat and water control valve. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
   - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:

   Watch water temperature gauge so as not to overheat the engine.

6. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
   - If necessary, refill radiator up to filler neck with engine coolant.
7. Refill reservoir tank to “MAX” level line with engine coolant.
8. Repeat steps 3 through 6 two or more times with radiator cap installed until the engine coolant level no longer drops.
9. Check cooling system for leaks with the engine running.
10. Warm up the engine, and check for sound of engine coolant flow while running the engine from idle up to 3,000 rpm with heater temperature controller set at several position between “COOL” and “WARM”.
    - Sound may be noticeable at heater unit.
11. Repeat step 10 three times.
12. If sound is heard, bleed air from cooling system by repeating step 3 through 6 until the engine coolant level no longer drops.
    - **Clean excess engine coolant from the engine.**

FLUSHING COOLING SYSTEM

1. Install reservoir tank if removed, and radiator drain plug.

   CAUTION:

   Be sure to clean drain plug and install with new O-ring.

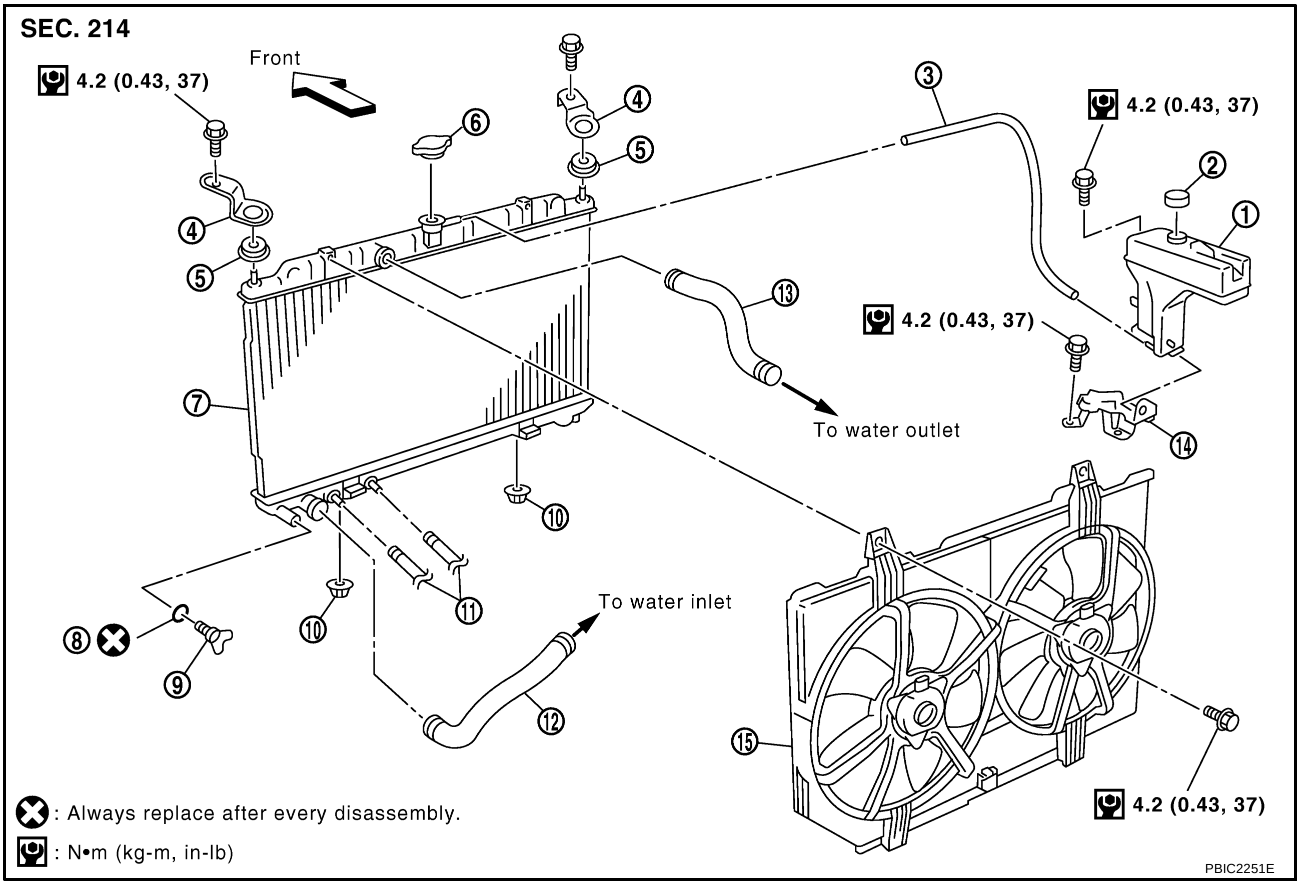
   - **If water drain plug on cylinder block is removed, close and tighten it. Refer to EM-82, "CYLINDER BLOCK" .**
2. Fill radiator and reservoir tank with water and reinstall radiator cap.
3. Run the engine and warm it up to normal operating temperature.
4. Rev the engine two or three times under no-load.
5. Stop the engine and wait until it cools down.
6. Drain water from the system. Refer to CO-8, "DRAINING ENGINE COOLANT" .
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.

RADIATOR

PFP:21400

Removal and Installation

ABS00CKC



1. Reservoir tank
2. Reservoir tank cap
3. Reservoir tank hose
4. Radiator mounting bracket
5. Mounting rubber (upper)
6. Radiator cap
7. Radiator
8. O-ring
9. Radiator drain plug
10. Mounting rubber (lower)
11. A/T fluid cooler hose
12. Radiator hose (lower)
13. Radiator hose (upper)
14. Bracket
15. Radiator cooling fan assembly

WARNING:
Do not remove radiator cap when the engine is hot. Serious burns could occur from high-pressure engine coolant escaping from radiator. Wrap a thick cloth around the cap. Slowly turn it a quarter of a turn to release built-up pressure. Carefully remove radiator cap by turning it all the way.

REMOVAL

1. Remove RH and LH undercovers.
2. Drain engine coolant. Refer to CO-8, "Changing Engine Coolant" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
3. Remove air duct (inlet) and air duct assembly. Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
4. Disconnect harness connector from fan motor, and move it aside.
5. Remove radiator hoses (upper and lower) and reservoir tank hose.
6. Remove A/T fluid cooler hoses. (A/T models)
   - Install plug to avoid leakage of A/T fluid.
7. Remove radiator mounting brackets.
8. Remove radiator and radiator cooling fan assembly.

   CAUTION:
   Do not damage or scratch A/C condenser and radiator core when removing.

9. Remove reservoir tank and bracket as necessary.

INSTALLATION

Install in the reverse order of removal.

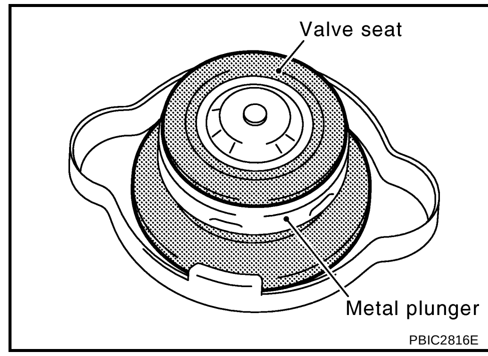
INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter [SST: EG17650301 (J33984-A)] and a radiator cap tester (commercial service tool). Refer to CO-8, "CHECKING LEAKAGE" .
- Start and warm up the engine. Visually check if there is no leaks of engine coolant and A/T fluid (A/T models).

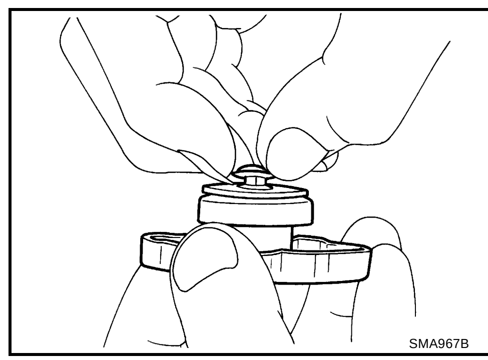
Checking Radiator Cap

ABS00CKD

- Check valve seat of radiator cap.
  - Check if valve seat is swollen to the extent that the edge of the plunger cannot be seen when watching it vertically from the top.
  - Check if valve seat has no soil and damage.



- Pull negative-pressure valve to open it and make sure that it closes completely when released.
  - Make sure that there is no dirt or damage on the valve seat of radiator cap negative-pressure valve.
  - Make sure that there are no unusualness in the opening and closing conditions of negative-pressure valve.



- Check radiator cap relief pressure.

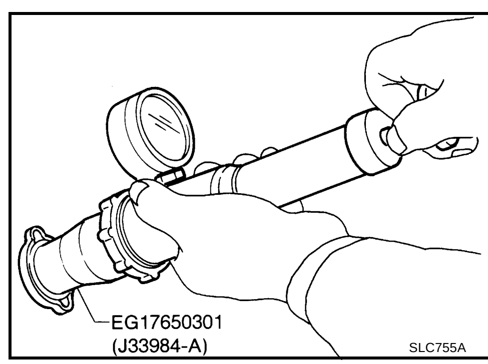
Standard:

78 - 98 kPa (0.8 - 1.0 kg/cm^2 , 11 - 14 psi)

Limit:

59 kPa (0.6 kg/cm^2 , 9 psi)

  - When connecting radiator cap to a radiator cap tester (commercial service tool) and the radiator cap tester adapter [SST], apply engine coolant to radiator cap seal surface.
  - Replace radiator cap if there is an unusualness in negative-pressure valve, or if the relief pressure falls below the limit.



Checking Radiator

ABS00CKE

Check radiator for mud or clogging. If necessary, clean radiator as follows.

- Be careful not to bend or damage radiator fins.
- When radiator is cleaned without removal, remove all surrounding parts such as cooling fan, radiator shroud and horns. Then tape harness and connectors to prevent water from entering.

1. Apply water by hose to the back side of the radiator core vertically downward.
2. Apply water again to all the radiator core surfaces once per minute.
3. Stop washing if any stains no longer flow out from radiator.

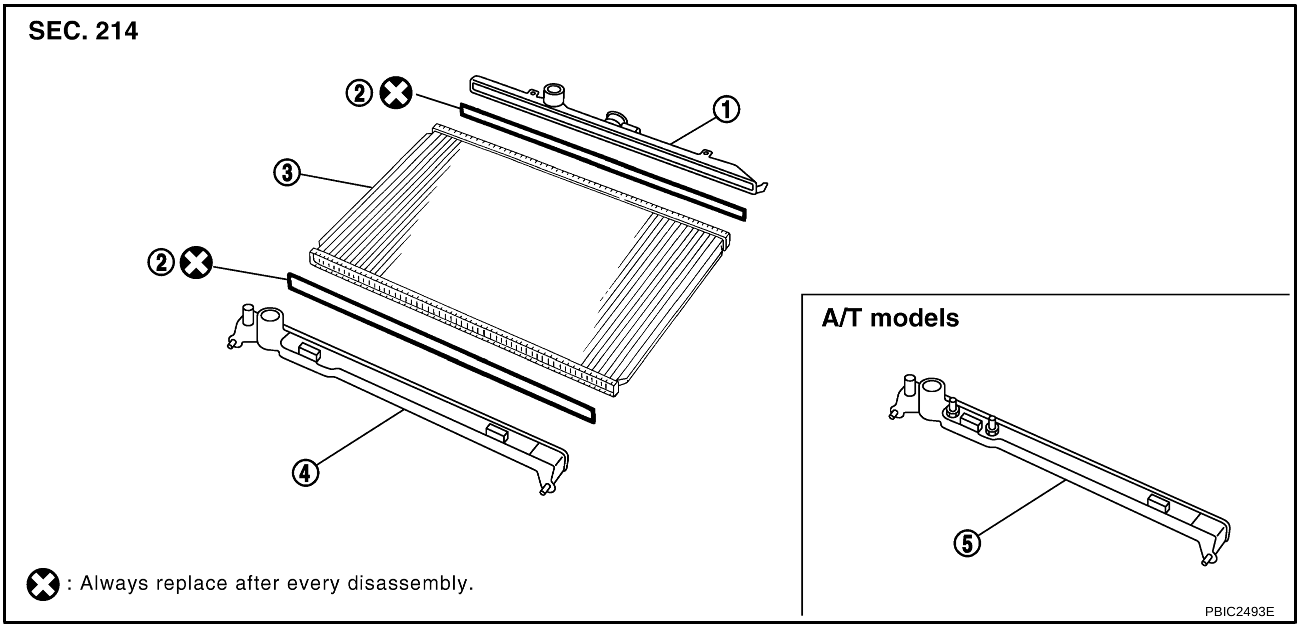
4. Blow air into the back side of radiator core vertically downward.
   - Use compressed air lower than 490 kPa (5 kg/cm^2 , 71 psi) and keep distance more than 30 cm (11.8 in).
5. Blow air again into all the radiator core surfaces once per minute until no water sprays out.

RADIATOR (ALUMINUM TYPE)

PFP:21460

Disassembly and Assembly

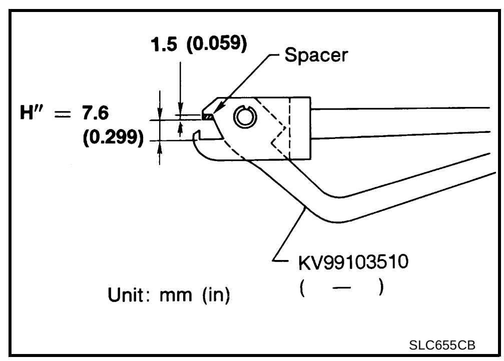
ABS00CKF



1.	Upper tank	2.	Sealing rubber	3.	Core
4.	Lower tank	5.	Lower tank (with A/T fluid cooler)		

PREPARATION

1. Attach spacer to tip of the radiator plate pliers A [SST].
   Spacer specification: 18 mm (0.71 in) wide × 8.5 mm (0.335 in) long × 1.5 mm (0.059 in) thick.



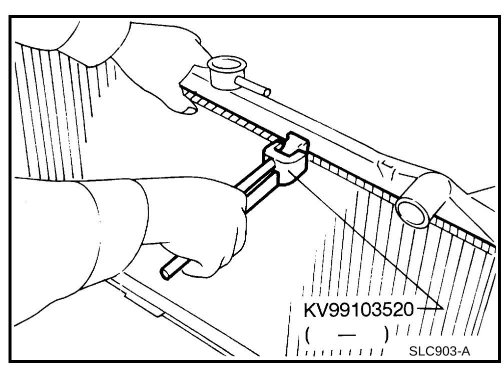
2. Make sure that when the radiator plate pliers A [SST: KV99103510 (—)] are closed dimension H″ is approx. 7.6 mm (0.299 in).
3. Adjust dimension H″ with spacer, if necessary.

DISASSEMBLY

1. Remove upper and lower tanks with the radiator plate pliers B [SST].

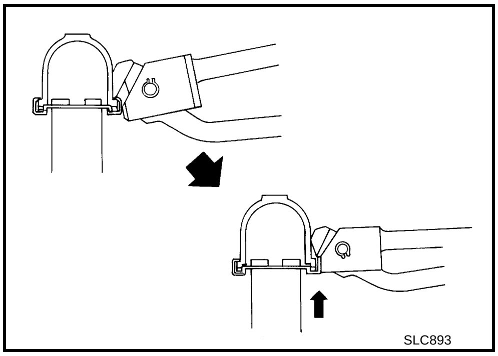
   CAUTION:
   Do not disassemble lower tank and A/T fluid cooler. (A/T models)

   NOTE:
   Regard lower tank and A/T fluid cooler as an assembly.



- Grip the crimped edge and bend it upwards so that radiator plate pliers B slips off.

  CAUTION:
  Do not bend excessively.



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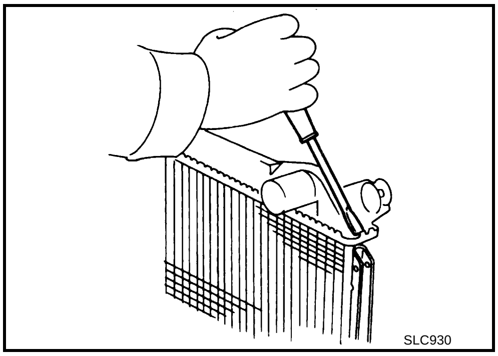
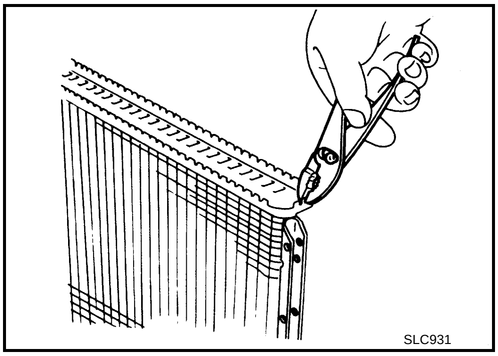
- In areas where the radiator plate pliers B cannot be used, use screwdriver to bend the edge up.

  CAUTION:
  Be careful not to damage tank.



SLC930

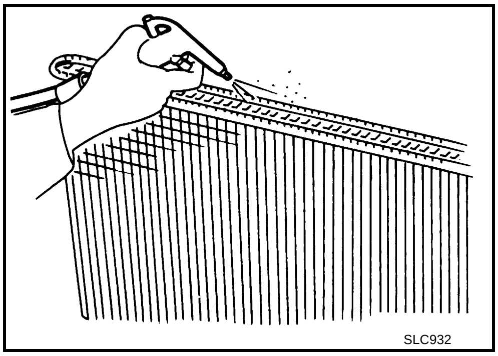
2. Remove sealing rubbers.
3. Make sure the edge stands straight up.



SLC931

ASSEMBLY

1. Clean contact portion of tank.

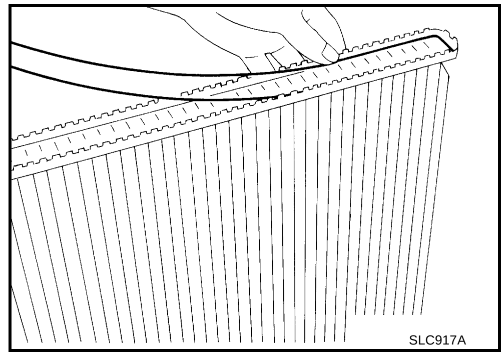


SLC932

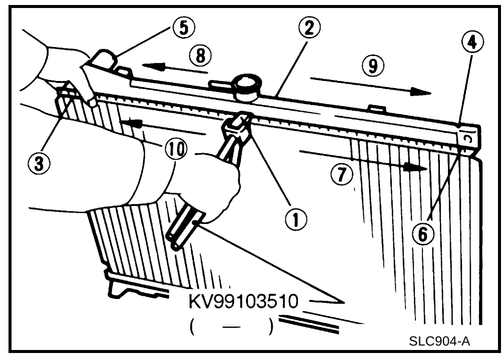
2. Install sealing rubbers while pushing it with fingers.

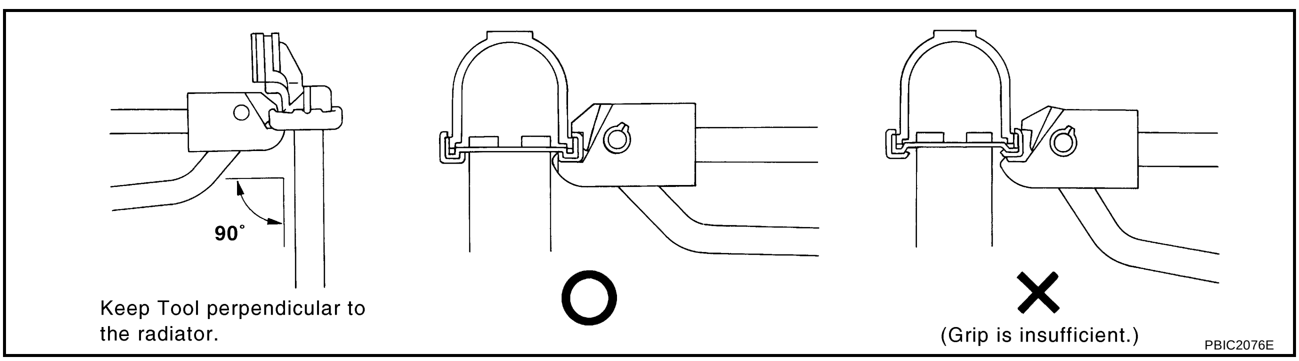
   CAUTION:

   Be careful not to twist sealing rubber.

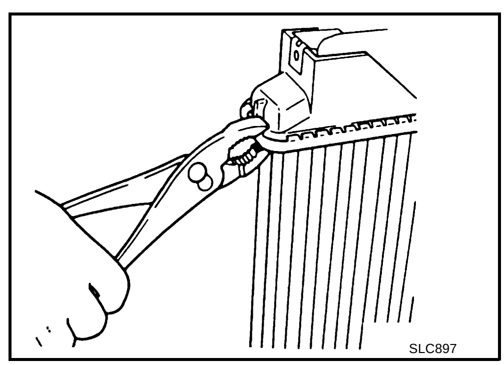


3. Caulk tank in numerical order as shown in the figure with the radiator plate pliers A [SST].



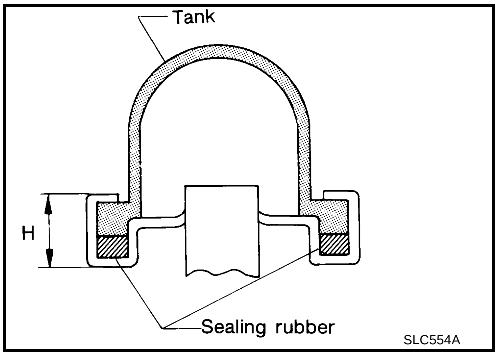


- Use pliers in the locations where the radiator plate pliers A cannot be used.



4. Make sure that the rim is completely crimped down.

   Standard height “H” : 8.0 - 8.4 mm (0.315 - 0.331 in)



5. Make sure that there is no leakage.
   Refer to CO-17, "INSPECTION" .

INSPECTION

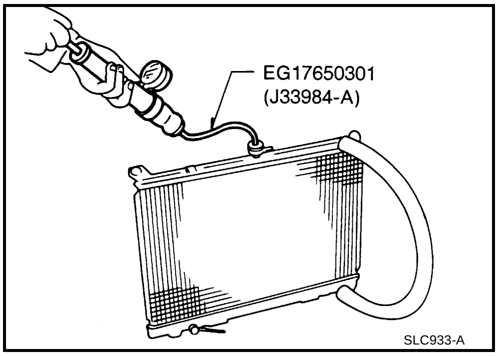
1. Apply pressure with the radiator cap tester adapter [SST] and a radiator cap tester (commercial service tool).

   Testing pressure

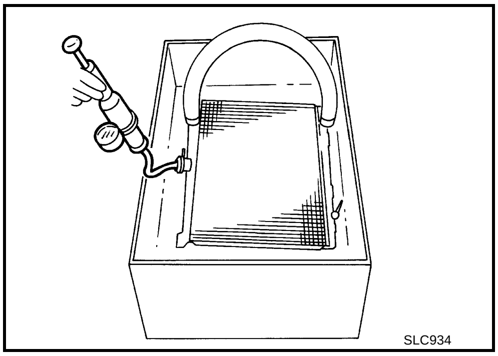
   : 157 kPa (1.6 kg/cm^2 , 23 psi)

   WARNING:
   To prevent the risk of hose coming undone while under pressure, securely fasten it down with hose clamp.

   CAUTION:
   Attach hose to A/T fluid cooler to seal its inlet and outlet. (A/T models)



2. Check for leakage by soaking radiator in a water container with the testing pressure applied.

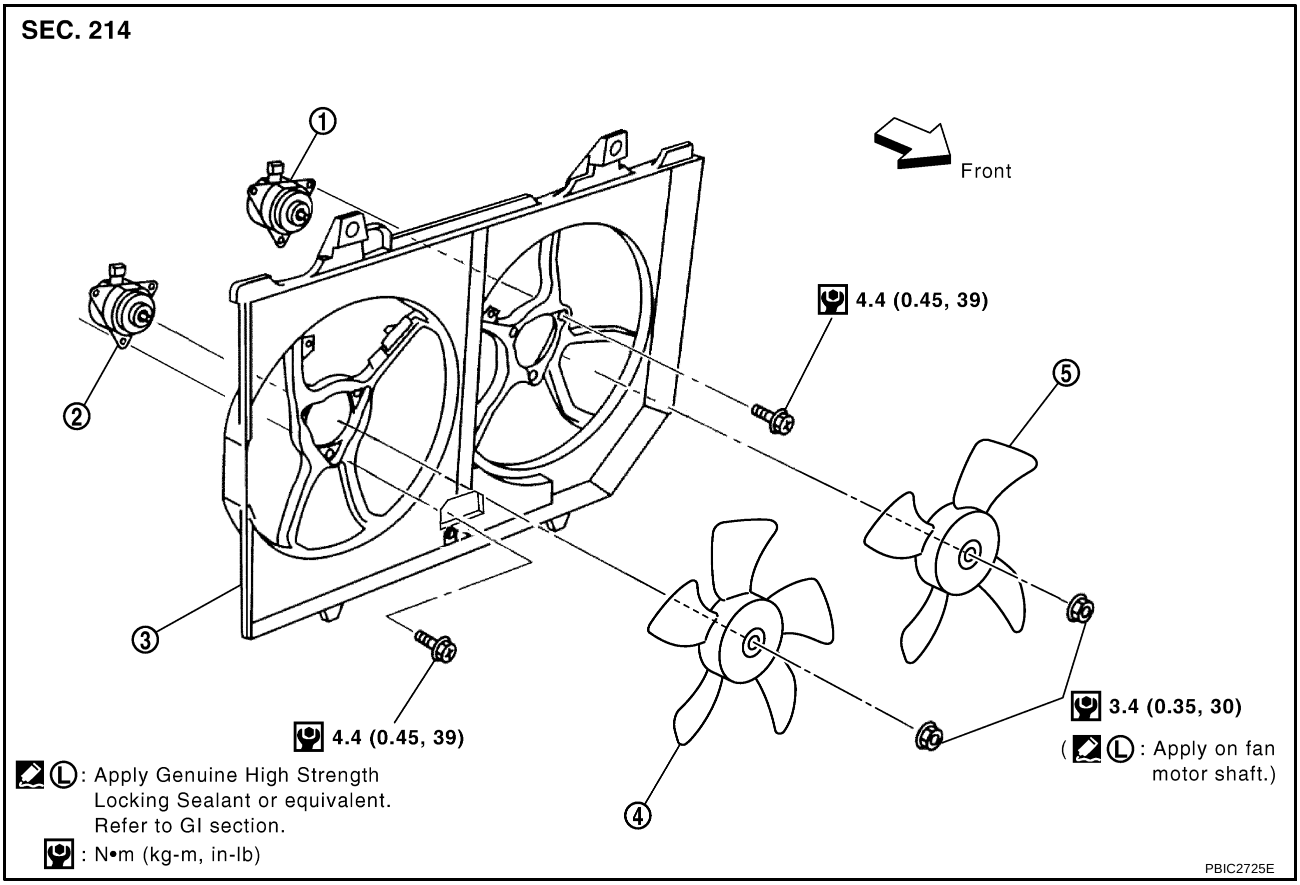


COOLING FAN

PFP:21140

Removal and Installation

ABS00CKG



1. Fan motor (LH)
2. Fan motor (RH)
3. Fan shroud
4. Cooling fan (RH)
5. Cooling fan (LH)

REMOVAL

1. Drain engine coolant from radiator. Refer to CO-8, "Changing Engine Coolant" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
2. Remove air duct (inlet) and air duct assembly. Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
3. Disconnect radiator hose (upper) at radiator side. Refer to CO-11, "RADIATOR" .

   CAUTION:
   Do not spill engine coolant on drive belt.
4. Disconnect harness connectors from fan motors (RH and LH), and move them to aside.
5. Remove radiator cooling fan assembly.

   CAUTION:
   Be careful not to damage or scratch on radiator core.

INSTALLATION

Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

Make sure that fan motors (RH and LH) operate normally.

NOTE:
Cooling fans are controlled by ECM. For details, refer to EC-480, "DTC P1217 ENGINE OVER TEMPERATURE" .

Disassembly and Assembly

ABS00DAD

DISASSEMBLY

1. Remove cooling fans (RH and LH) from fan motors (RH and LH).
2. Remove fan motors (RH and LH) from fan shroud.

INSPECTION AFTER DISASSEMBLY

Cooling Fan

Inspect cooling fan for crack or unusual bend.

- If anything is found, replace cooling fan.

ASSEMBLY

Assemble in the reverse order of disassembly.

CAUTION:

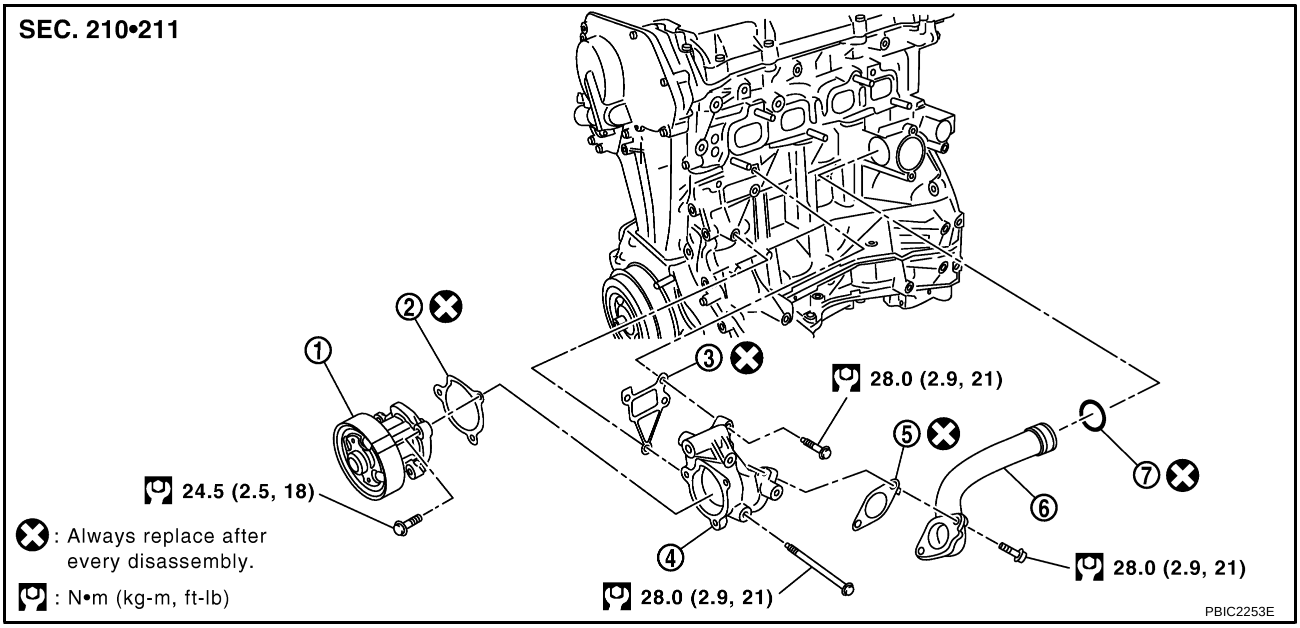
Cooling fans and fan motors are different between RH and LH. Be careful not to misassemble them.

WATER PUMP

PFP:21020

Removal and Installation

ABS00CKH



1.	Water pump	2.	Gasket	3.	Gasket
4.	Water pump housing	5.	Gasket	6.	Water pipe
7.	O-ring				

REMOVAL

1. Drain engine coolant from radiator drain plug at the bottom of radiator and from water drain plug on cylinder block. Refer to CO-8, "Changing Engine Coolant" and EM-82, "CYLINDER BLOCK" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
2. Remove the following parts.
   - RH undercover
   - Drive belt; Refer to EM-11, "DRIVE BELTS" .
   - Drive belt auto-tensioner; Refer to EM-12, "Removal and Installation of Drive Belt Auto-Tensioner" .
3. Remove water pump with power tool.
   - Engine coolant will leak from cylinder block, so have a receptacle ready below.

   CAUTION:
   - **Handle water pump vane so that it does not contact any other parts.**
   - **Water pump cannot be disassembled and should be replaced as a unit.**
4. Remove water pump housing with the following procedure;

a. Remove alternator. Refer to SC-20, "CHARGING SYSTEM" .

b. Remove oil level gauge and oil level gauge guide. Refer to EM-22, "OIL PAN AND OIL STRAINER" .

   CAUTION:
   Plug the oil level gauge guide opening to prevent oil pan from entering foreign materials.

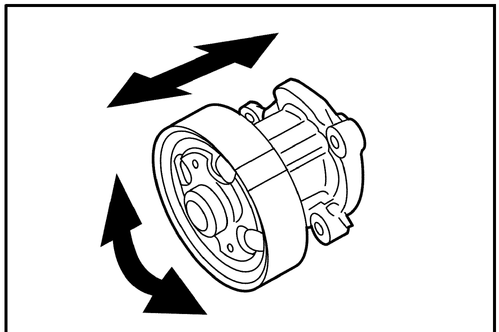
c. Remove mounting bolts for water pipe.

d. Remove water pump housing.

5. Remove exhaust manifold and three way catalyst assembly. Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .
6. Remove water pipe.

INSPECTION AFTER REMOVAL

- Visually check if there is no significant dirt or rusting on water pump body and vane.
- Make sure that there is no looseness in vane shaft, and that it turns smoothly when rotated by hand.
- Replace water pump, if necessary.



KBIA0155E

INSTALLATION

Note the following, and install in the reverse order of removal.

- When inserting water pipe end into cylinder block, apply a neutral detergent to O-ring. Then insert it immediately.

INSPECTION AFTER INSTALLATION

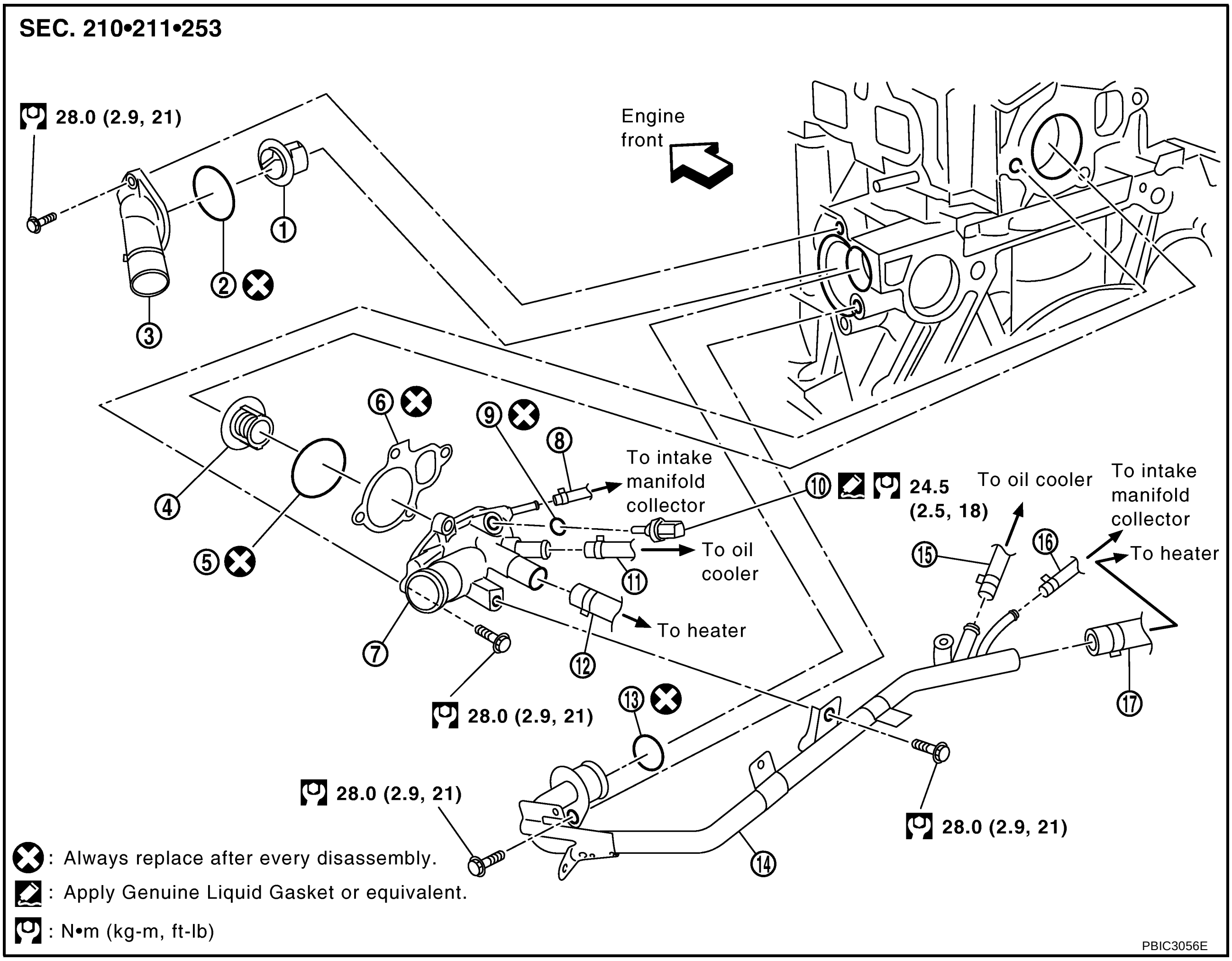
- Check for leaks of engine coolant using the radiator cap tester adapter [SST: EG17650301 (J33984-A)] and a radiator cap tester (commercial service tool). Refer to CO-8, "CHECKING LEAKAGE" .
- Start and warm up the engine. Visually check if there is no leaks of engine coolant.

THERMOSTAT AND WATER CONTROL VALVE

PFP:21200

Removal and Installation

ABS00CKI



1.	Thermostat	2.	Rubber ring	3.	Water inlet
4.	Water control valve	5.	Rubber ring	6.	Gasket
7.	Water control valve housing (water outlet)	8.	Water hose	9.	Washer
10.	Engine coolant temperature sensor	11.	Water hose	12.	Heater hose
13.	O-ring	14.	Heater pipe	15.	Water hose
16.	Water hose	17.	Heater hose		

REMOVAL

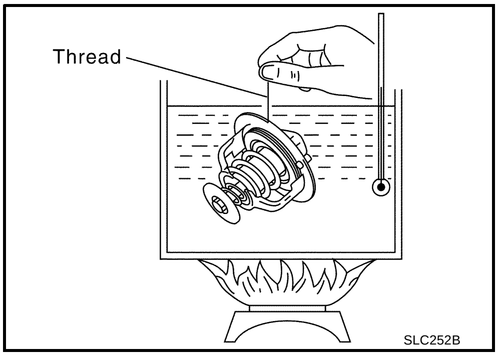
1. Drain engine coolant from radiator drain plug at the bottom of radiator and from water drain plug on cylinder block. Refer to CO-8, "Changing Engine Coolant" and EM-82, "CYLINDER BLOCK" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
2. Disconnect radiator hose (lower) at water inlet side. Refer to CO-11, "RADIATOR" .
3. Remove water inlet and thermostat.
4. Remove water control valve with the following procedure:

a. Disconnect radiator hose (upper) at water control valve housing (water outlet) side.
b. Disconnect harness connector from engine coolant temperature sensor.
c. Disconnect water hoses.
d. Remove heater pipe and heater hose.
e. After removing water control valve housing (water outlet), remove water control valve.

INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valves of thermostat and water control valve. Immerse fully in a container filled with water. Heat while stirring. (The example in the figure shows thermostat.)



- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the maximum valve lift amount.

  NOTE:
  The maximum valve lift amount standard temperature for water control valve is the reference value.
- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.

Standard:

Items	Thermostat	Water control valve
Valve opening temperature	80.5 - 83.5°C (177 - 182°F)	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8 mm/ 95°C (0.315 in/ 203°F)	8 mm/ 108°C (0.315 in/ 226°F)
Valve closing temperature	77°C (171°F)	90°C (194°F)

- If out of the standard, replace either or both thermostat and water control valve.

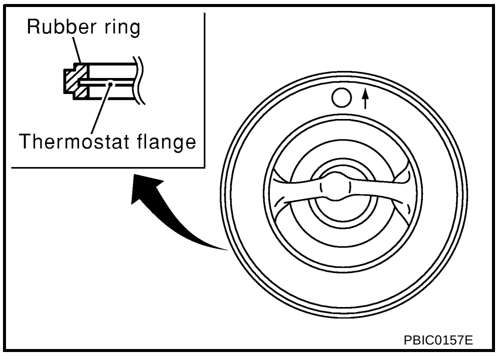
INSTALLATION

Note the following, and install in the reverse order of removal.

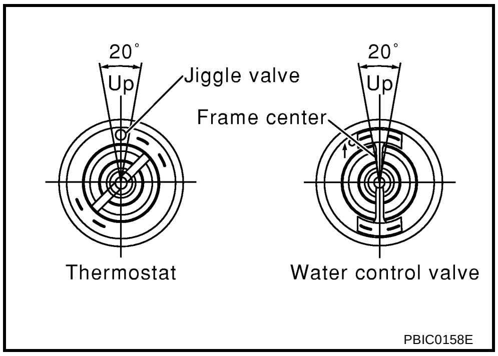
Thermostat and Water Control Valve

- Install thermostat with making rubber ring groove fit to thermostat flange with the whole circumference. (The example in the figure shows thermostat.)

  NOTE:
  Same procedure is applied for installation of water control valve.



- Install thermostat with jiggle valve facing upwards. (The position deviation may be within the range of 20 degrees as shown in the figure.)
- Install water control valve with the arrow facing up and the frame center part facing upwards. (The position deviation may be within the range of 20 degrees as shown in the figure.)



Heater Pipe Installation

Apply a neutral detergent to O-ring, then quickly insert the insertion part of heater pipe into cylinder block.

INSPECTION AFTER INSTALLATION

- Check for leaks of engine coolant using the radiator cap tester adapter [SST: EG17650301 (J33984-A)] and a radiator cap tester (commercial service tool). Refer to CO-8, "CHECKING LEAKAGE" .
- Start and warm up the engine. Visually check if there is no leaks of engine coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

ABS00CKJ

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, lmp qt)

Engine coolant capacity (With reservoir tank at “MAX” level)	7.1 (7-1/2, 6-1/4)
Reservoir tank engine coolant capacity (At “MAX” level)	0.7 (3/4, 5/8)

RADIATOR

Unit: kPa (kg/cm^2 , psi)

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11- 14)
	Limit	59 (0.6, 9)
Leakage test pressure		157 (1.6, 23)

THERMOSTAT

Valve opening temperature	80.5 - 83.5°C (177 - 182°F)
Maximum valve lift	8 mm/ 95°C (0.315 in/ 203°F)
Valve closing temperature	77°C (171°F)

WATER CONTROL VALVE

Valve opening temperature	93.5 - 96.5°C (200 - 206°F)
Maximum valve lift	8 mm/ 108°C (0.315 in/ 226°F)*
Valve closing temperature	90°C (194°F)

*: Reference data

SECTION DI

DRIVER INFORMATION SYSTEM

CONTENTS

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AKS00B9V

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Wiring Diagrams and Trouble Diagnosis

AKS00B9W

When reading wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-2, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When performing trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

COMBINATION METERS

PFP:24814

System Description

AKS00B9X

UNIFIED METER CONTROL UNIT

- Speedometer, odo/trip meter, tachometer, fuel gauge and water temperature gauge are controlled by the unified meter control unit, which is built into the combination meter.
- Digital meter is adopted for odo/trip meter*.
  *The record of the odo meter is kept even if the battery cable is disconnected. The record of the trip meter is erased when the battery cable is disconnected.
- Meter/gauge and odo/trip meter segments can be checked in diagnosis mode.

POWER SUPPLY AND GROUND CIRCUIT

Power is supplied at all times

- through 10 A fuse [No. 28, located in the fuse block (J/B)]
- to combination meter terminal 1.

With the ignition switch in the ON or START position, power is supplied

- through 10 A fuse [No. 11, located in the fuse block (J/B)]
- to combination meter terminal 2.

Ground is supplied

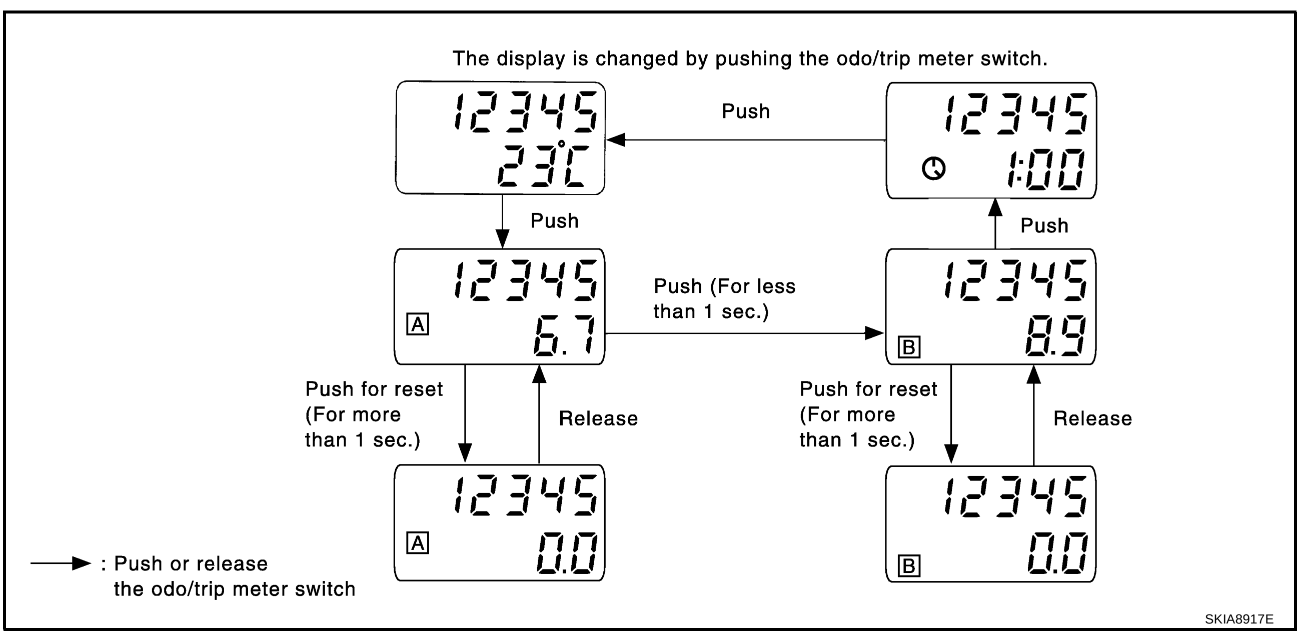
- to combination meter terminal 21
- through grounds M27 and M70.

ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR

- The vehicle speed signal and the memory signals from the meter memory circuit are processed by the combination meter and the mileage is displayed.
- Ambient temperature indicator indicates signal from ambient sensor processed by the combination meter.

How to Change The Display

Depressing the odo/trip meter switch toggles the mode in the following order.



- The odo/trip meter display mode toggling and trip display resetting can be identified by the amount of time that elapses from pressing the odo/trip meter switch to releasing it.
- When resetting with trip A displayed, only trip A display is reset. (The same way for trip B.)

SPEEDOMETER

VDC/TCS/ABS control unit [with VDC] or ABS actuator and electric unit (control unit) [without VDC] provides a vehicle speed signal to the combination meter for the speedometer with CAN communication line.

TACHOMETER

The tachometer indicates engine speed in revolutions per minute (rpm).
ECM provides an engine speed signal to combination meter for tachometer with CAN communication line.

WATER TEMPERATURE GAUGE

The water temperature gauge indicates the engine coolant temperature.
ECM provides an engine coolant temperature signal to combination meter for water temperature gauge with CAN communication line.

FUEL GAUGE

The fuel gauge indicates the approximate fuel level in the fuel tank.
The fuel gauge is regulated by a variable ground signal supplied

- from grounds M27 and M70
- through terminals 1 and 4 of the fuel level sensor unit
- through terminals 3 and 1 of the sub fuel level sensor unit and
- to combination meter terminal 8 for the fuel gauge.

AMBIENT TEMPERATURE INDICATOR

The ambient temperature is indicated by the signal from ambient sensor.
Combination meter inputs voltage conversed from resistance which ambient sensor detects.
Indication range is between -30 and 55 °C (-22 and 131 °F). When ambient temperature is less than -30 °C (-22 °F) or more than 55 °C (131 °F), display shows "--- °C". When indicated temperature becomes less than 3 °C (37 °F), ambient temperature indicator flashes as a sign of warning.

Without Auto A/C

Power is supplied

- through combination meter terminal 27
- to ambient sensor terminal 1.

Ground is supplied

- to combination meter terminal 28
- through ambient sensor terminal 2.

Signal is supplied

- through ambient sensor terminal 1
- to combination meter terminal 27.

With Auto A/C

Power is supplied

- through A/C auto amp. terminal 9
- to ambient sensor terminal 1.

Ground is supplied

- to combination meter terminal 28 and A/C auto amp. terminal 24
- through ambient sensor terminal 2.

And combination meter receives ambient sensor signal from ambient sensor

- through ambient sensor terminal 1
- to combination meter terminal 27.

NOTE:
Combination meter distinguishes whether or not combination meter terminal 29 receives voltage (Auto A/C recognition signal) from A/C auto amp. terminal 28. If the terminal receives, combination meter discerns as auto A/C.

Indication When Turning Ignition Switch OFF

- In a case that temperature detected by ambient sensor is higher than indicated temperature before turning ignition switch off.
  - In a case of more than 3.5 hours after turning ignition switch off, temperature detected by ambient sensor is indicated when turning ignition switch on.

- In a case of less then 3.5 hours after turning ignition switch off, temperature at the time of turning ignition switch off is indicated.

- In a case that temperature detected by ambient sensor is lower than indicated temperature before turning ignition switch off.
  - Temperature detected by ambient sensor is indicated when turning ignition switch on.

Indication During Running

Though temperature detected by ambient sensor temporarily changed, indicating temperature continentally indicates.

- In a case that temperature detected by ambient sensor is higher than indicated temperature.
  - If vehicle speed is more than 20 km/h (13 MPH), elevation of indicating temperature is limited according to the speed until temperature detected by ambient sensor is indicated.

    NOTE:
    Vehicle speed 20 km/h (13 MPH): 256 sec., 25 km/h (16 MPH): 238 sec., 35 km/h (22 MPH): 200 sec., 50 km/h (31 MPH): 144 sec., 65 km/h (40 MPH): 88 sec., more than 80 km/h (50 MPH): 32 sec.
  - If vehicle speed is more than 20 km/h (13 MPH), and that temperature detected by ambient sensor becomes 8 °C (46 °F) more than indicating temperature, indicating temperature will be elevated unit the degree becomes same as temperature detected by ambient sensor with limiting elevation of indicating temperature 1 °C par a minute.
  - If vehicle speed is less than 20 km/h (13 MPH), indicating temperature is continually kept.
- In a case that temperature detected by ambient sensor is lower than indicated temperature.
  - Temperature detected by ambient sensor is indicated during running.

CAN Communication

AKS00BQ7

SYSTEM DESCRIPTION

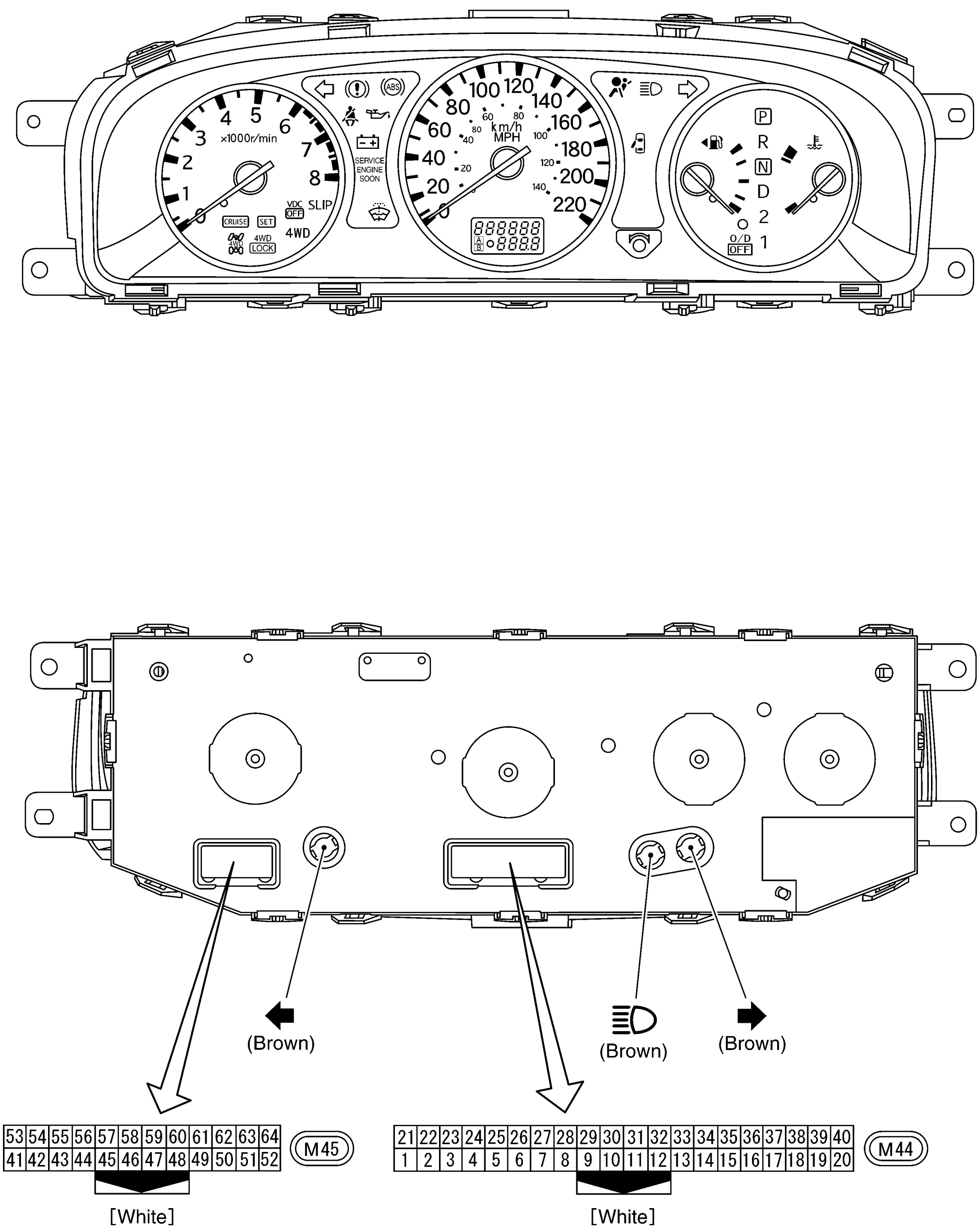
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

CAN COMMUNICATION UNIT

Refer to LAN-16, "CAN Communication Unit" in “LAN SYSTEM”.

Arrangement of Combination Meter

AKS00BA1



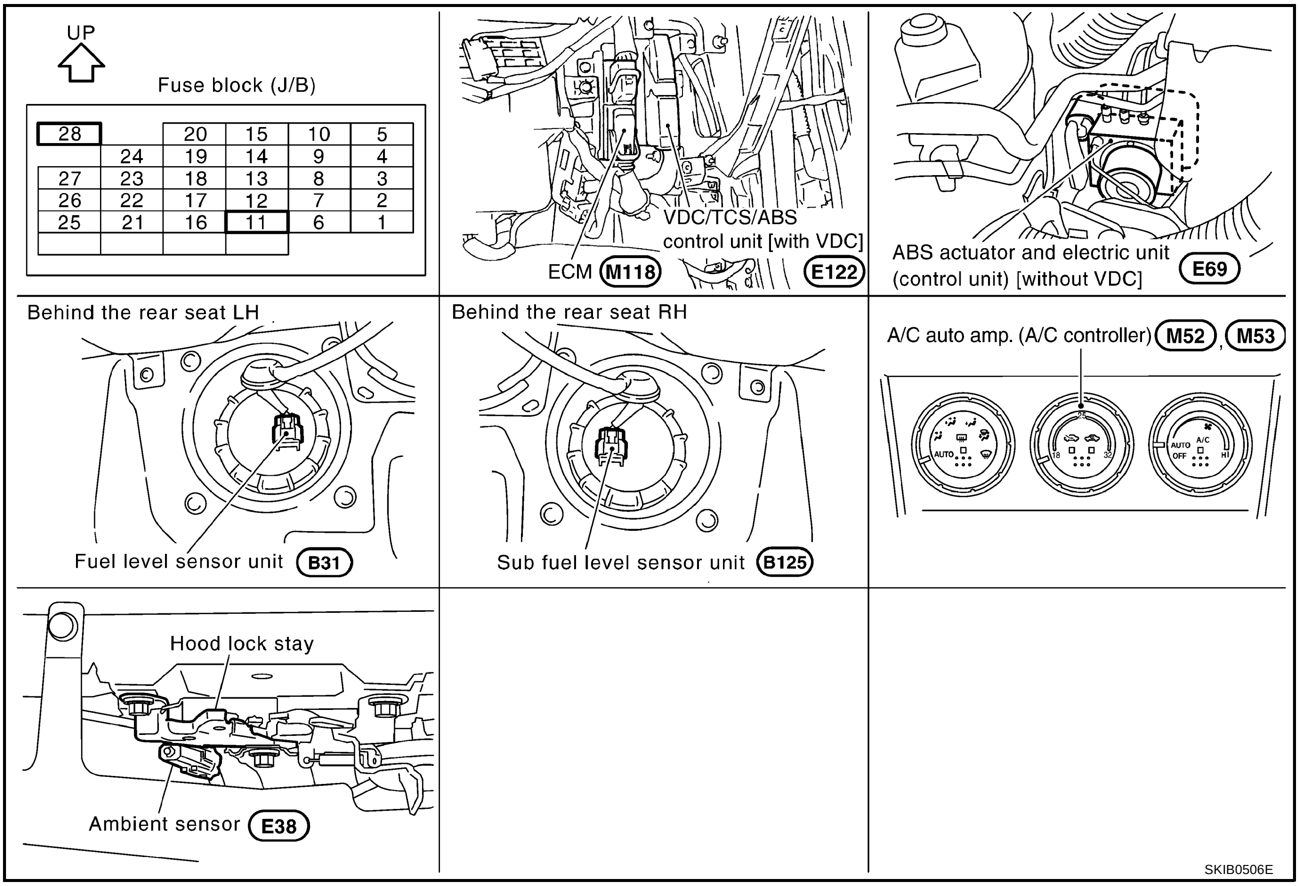
Bulb socket color	Bulb wattage
Brown	1.4W

( ) : Bulb socket color

SKIB0505E

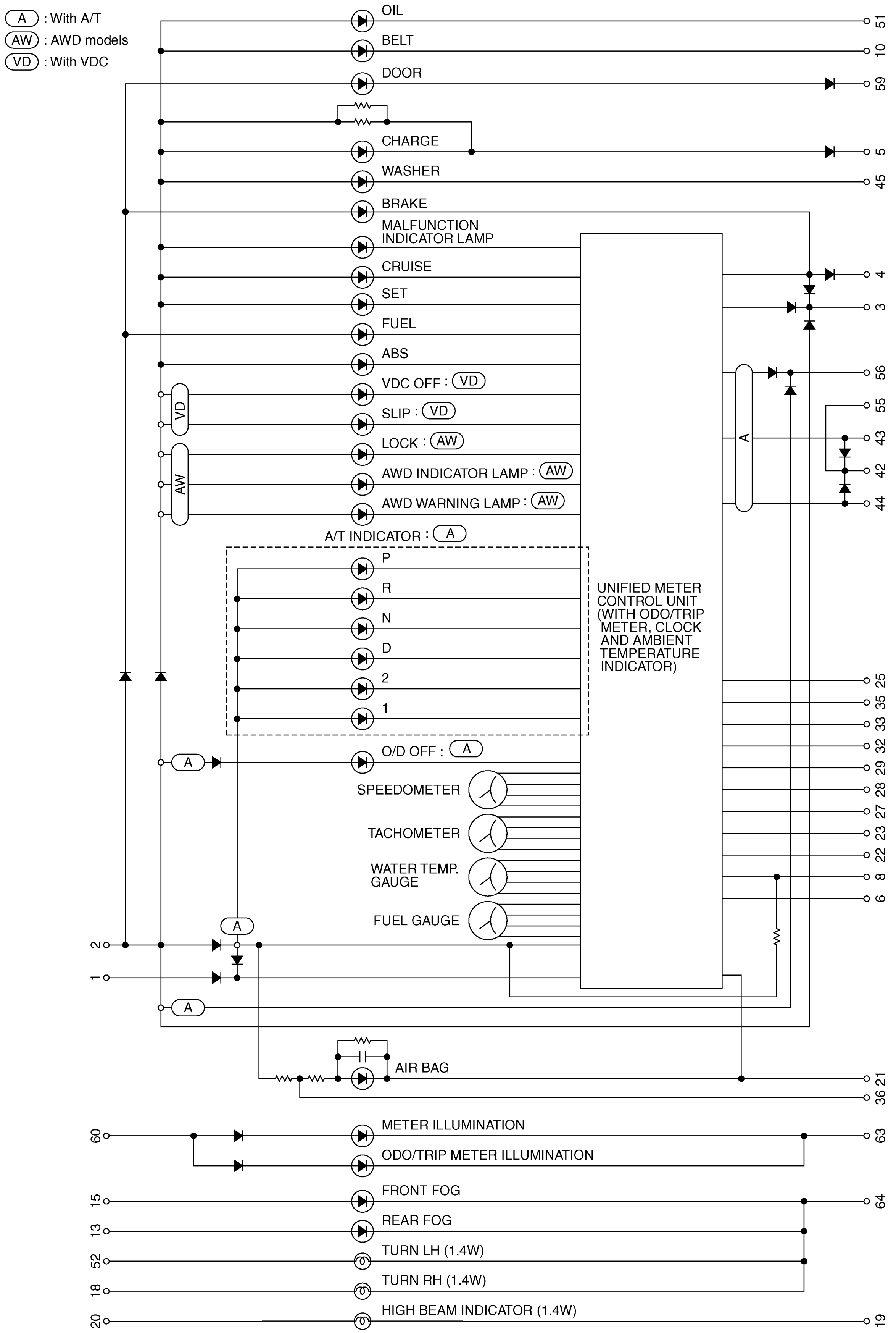
Component Parts and Harness Connector Location

AKS00BA0



Schematic

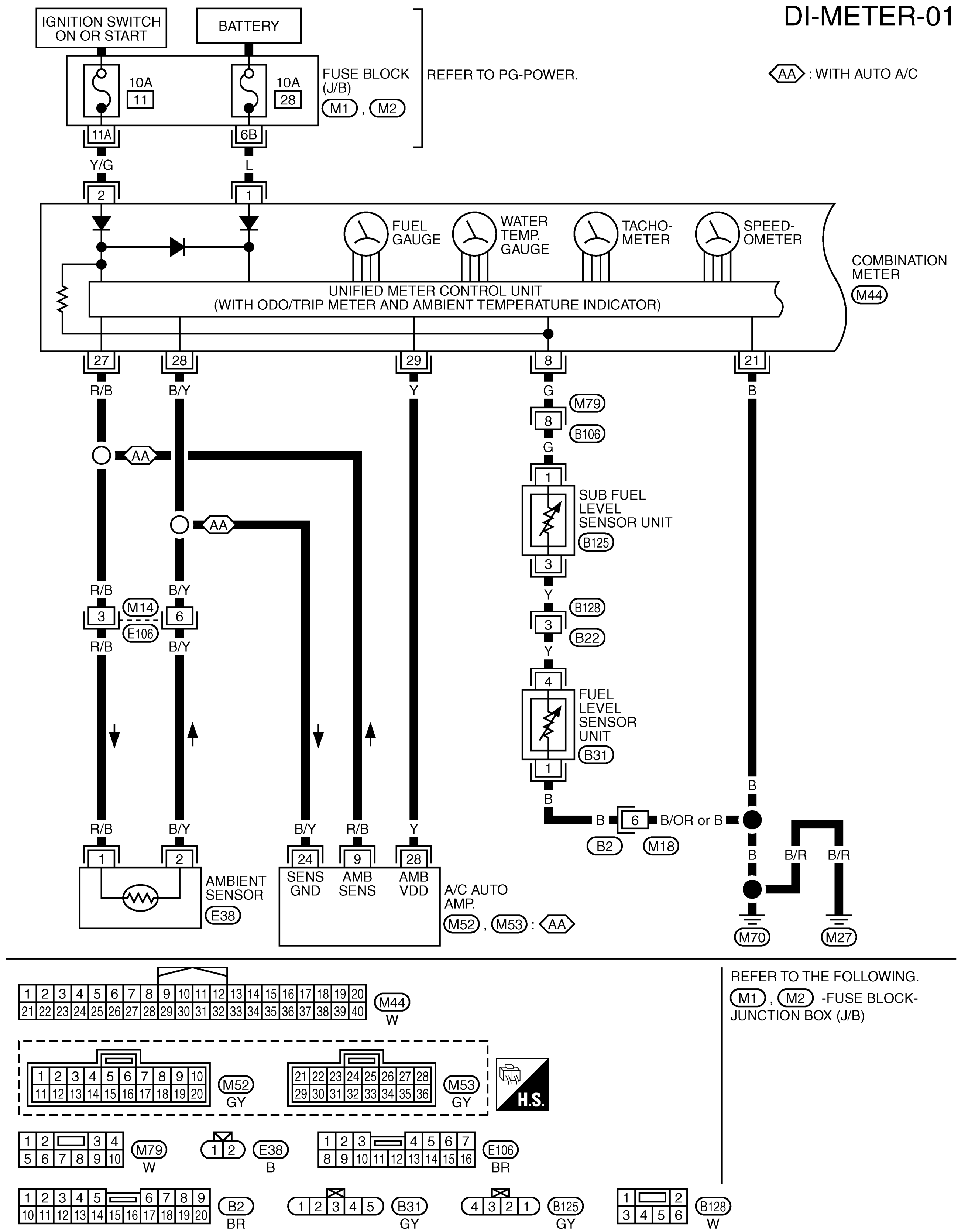
AKS00BA2

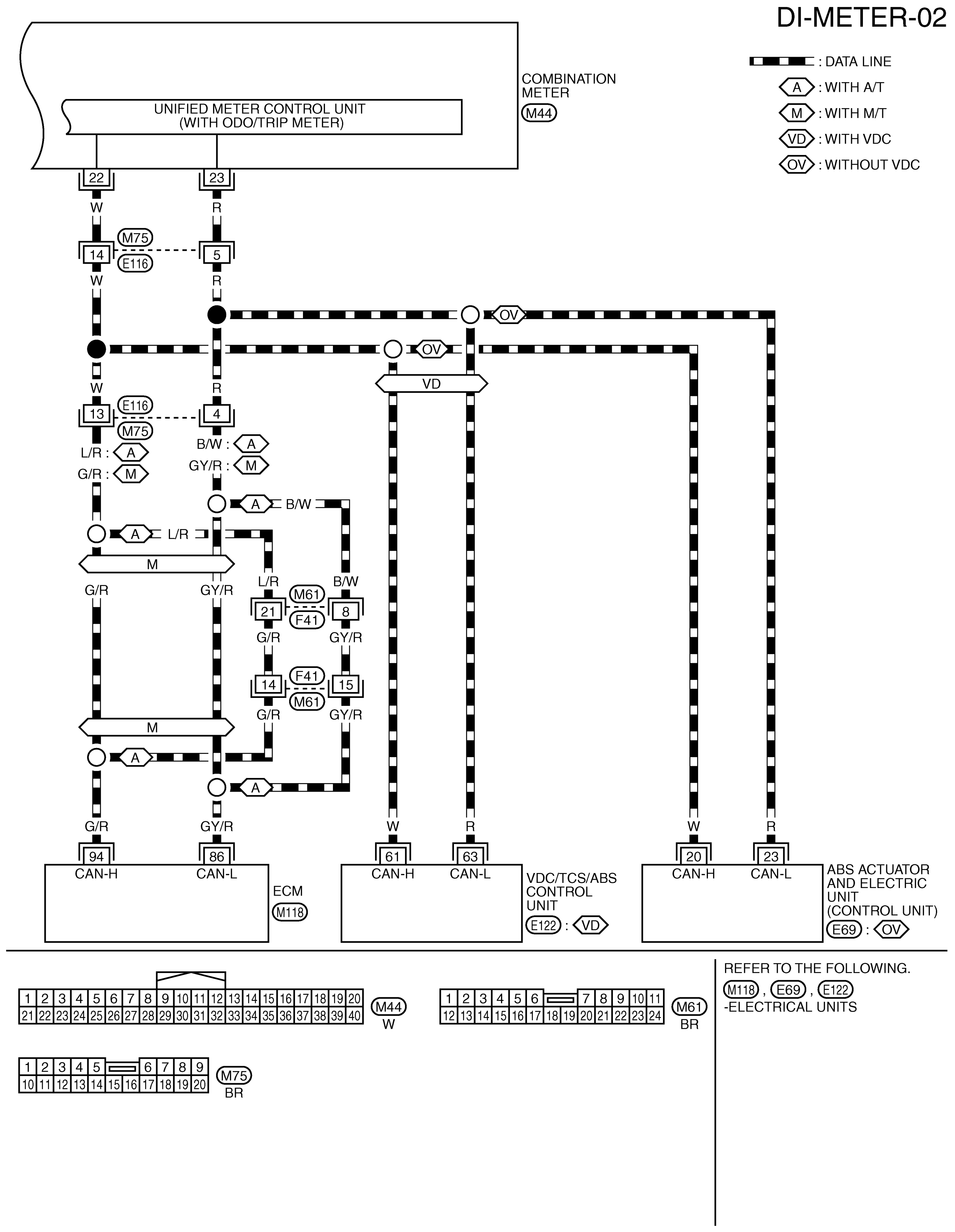


TKWB0170E

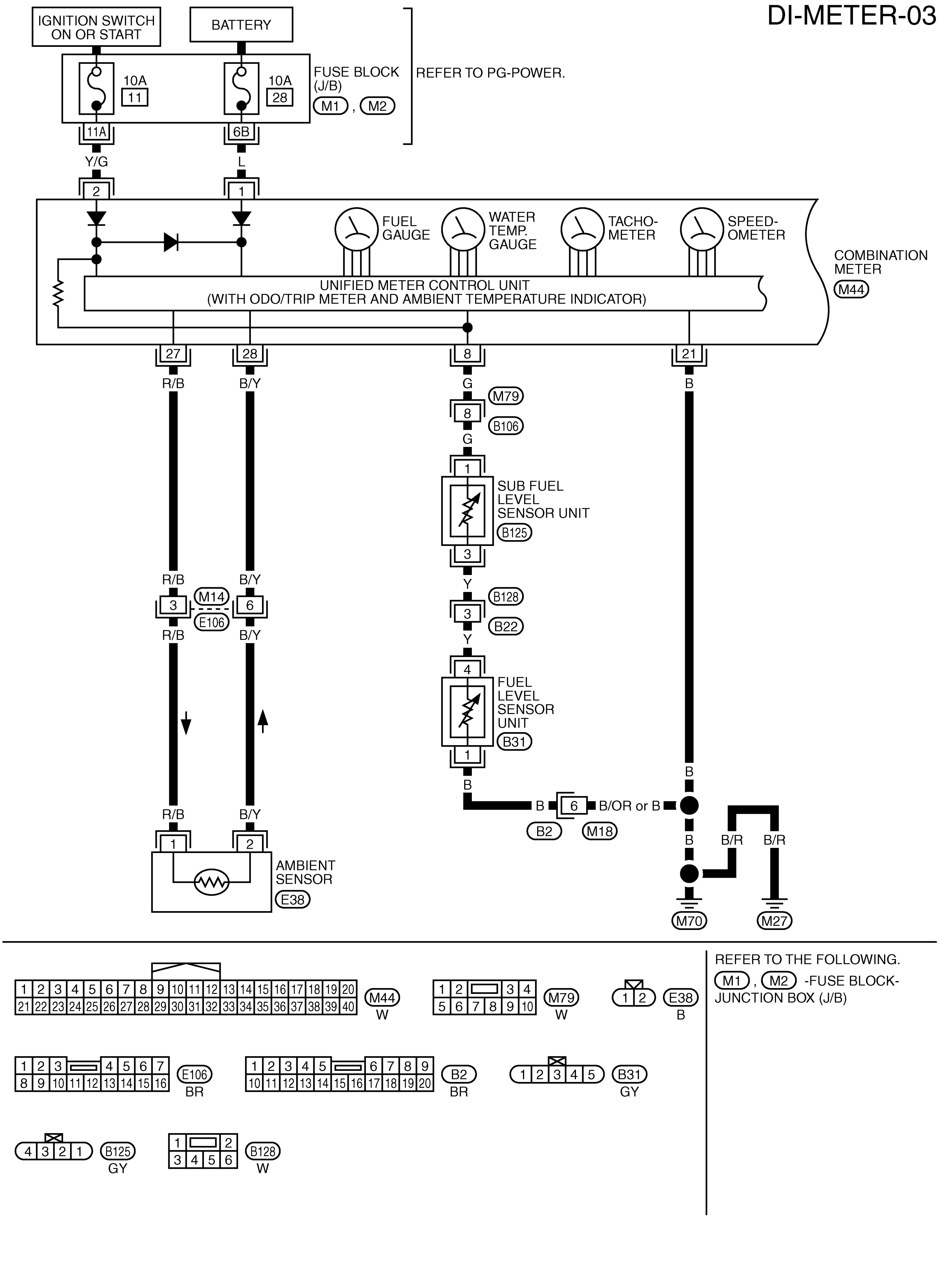
Wiring Diagram — METER —
AWD MODELS

AKS00BA3

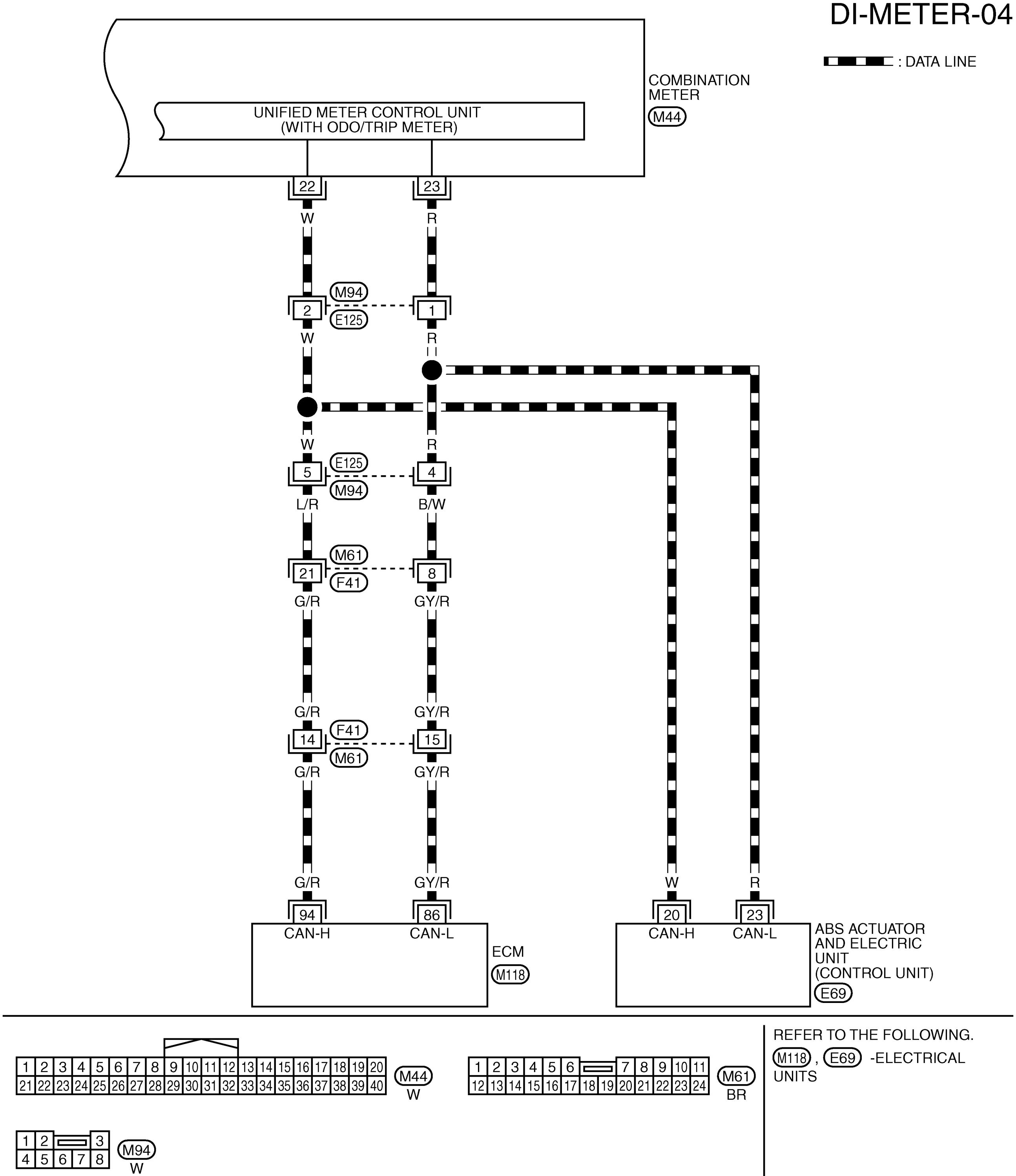



DI-METER-02
: DATA LINE
A : WITH A/T
M : WITH M/T
VD : WITH VDC
OV : WITHOUT VDC
COMBINATION METER
M44
UNIFIED METER CONTROL UNIT (WITH ODO/TRIP METER)
22
23
W
R
M75
E116
14
5
OV
VD
13
4
L/R : A
G/R : M
B/W : A
GY/R : M
B/W
L/R
M61
F41
21
8
G/R
GY/R
15
94
86
CAN-H
CAN-L
ECM
M118
61
63
VDC/TCS/ABS CONTROL UNIT
E122 : VD
20
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E69 : OV
M44
W
M61
BR
M75
BR
REFER TO THE FOLLOWING.
M118 , E69 , E122
-ELECTRICAL UNITS
TKWB0172E

2WD MODELS


DI-METER-03
IGNITION SWITCH ON OR START
BATTERY
10A 11
10A 28
FUSE BLOCK (J/B)
M1 , M2
REFER TO PG-POWER.
11A
6B
Y/G
L
2
1
FUEL GAUGE
WATER TEMP. GAUGE
TACHO-METER
SPEED-OMETER
COMBINATION METER
M44
UNIFIED METER CONTROL UNIT
(WITH ODO/TRIP METER AND AMBIENT TEMPERATURE INDICATOR)
27
28
8
21
R/B
B/Y
G
B
M79
B106
SUB FUEL LEVEL SENSOR UNIT
B125
B128
B22
Y
FUEL LEVEL SENSOR UNIT
B31
M14
E106
B/OR or B
B2
M18
B/R
AMBIENT SENSOR
E38
M70
M27
M44 W
M79 W
E38 B
E106 BR
B2 BR
B31 GY
B125 GY
B128 W
REFER TO THE FOLLOWING.
M1 , M2 -FUSE BLOCK-JUNCTION BOX (J/B)
TKWB0173E

DI-METER-04



REFER TO THE FOLLOWING.
M118, E69 -ELECTRICAL UNITS

Terminals and Reference Value for Combination Meter

AKS00BA6

Terminal No.	Wire Color	Item	Condition		Reference Value
			Ignition switch	Operation or condition	
1	L	Battery power supply	OFF	—	Battery voltage
2	Y/G	Ignition switch (ON)	ON	—	Battery voltage
8	G	Fuel level sensor signal	—	—	Refer to DI-23, "FUEL LEVEL SENSOR UNIT CHECK" .
21	B	Ground	ON	—	Approx. 0 V
22	W	CAN-H	—	—	—
23	R	CAN-L	—	—	—
27	R/B	Ambient sensor signal	—	—	Refer to DI-23, "AMBIENT SENSOR CHECK"
28	B/Y	Ambient sensor ground	—	—	—
29*1	Y	Auto A/C recognition signal	ON	—	Approx. 5 V

NOTE:
*1:With auto A/C

Self-Diagnosis Mode of Combination Meter

AKS00BA7

SELF-DIAGNOSIS FUNCTION

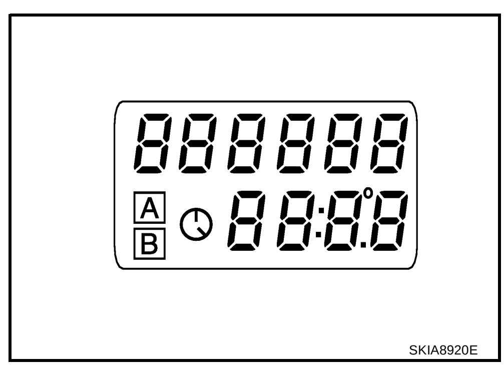
- Odo/trip meter segment operation can be checked in self-diagnosis mode.
- Meters/gauges can be checked in self-diagnosis mode.

OPERATION PROCEDURE

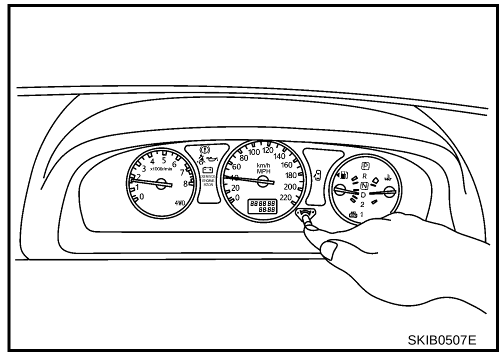
1. Turn the ignition switch ON, and switch the odo/trip meter to “trip A” or “trip B”.

   NOTE:
   If the diagnosis function is activated with the trip meter A displayed, the mileage on the trip meter A will indicate 0.0 mile, but the actual trip mileage will be retained. (The same way for trip B.)
2. Turn ignition switch OFF.
3. While pushing the odo/trip meter switch, turn ignition switch ON again.
4. Make sure that the trip meter displays “0.0”.
5. Push the odo/trip meter switch at least 3 times. (Within 7 seconds after the ignition switch is turned ON.)
6. All the segments on the odo/trip meter illuminate, and simultaneously the low-fuel warning lamp indicator illuminates. At this time, the unified meter control unit is turned to diagnosis mode.

   NOTE:
   If any of the segments is not displayed, replace the combination meter.



7. Push the odo/trip meter switch. Each meter/gauge should indicate as shown in the figure while pushing odo/trip meter switch. (At this time, the low-fuel warning lamp goes off.)



SKIB0507E

Trouble Diagnosis

AKS00BQ6

HOW TO PROCEED WITH TROUBLE DIAGNOSIS

1. Confirm the symptom or customer complaint.
2. Perform preliminary check. Refer to DI-15, "PRELIMINARY CHECK" .
3. According to the trouble diagnosis chart, repair or replace the cause of symptom. Refer to DI-16, "SYMPTOM CHART" .
4. Does the meter operate normally? If so, GO TO 5. If not, GO TO 2.
5. INSPECTION END

PRELIMINARY CHECK

1. CHECK WARNING LAMP ILLUMINATION

1. Turn ignition switch ON.
2. Make sure that warning lamp (such as MIL and oil pressure warning lamp) illuminate.

Does warning lamp illuminate?

YES >> GO TO 2.
NO >> GO TO 3.

2. CHECK SELF-DIAGNOSIS OPERATION

Perform combination meter self-diagnosis. Refer to DI-14, "SELF-DIAGNOSIS FUNCTION" .

Does self-diagnosis function operate?

YES >> GO TO 4.
NO >> GO TO 3.

3. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check power supply and ground circuit. Refer to DI-16, "Power Supply and Ground Circuit Inspection" .

OK or NG

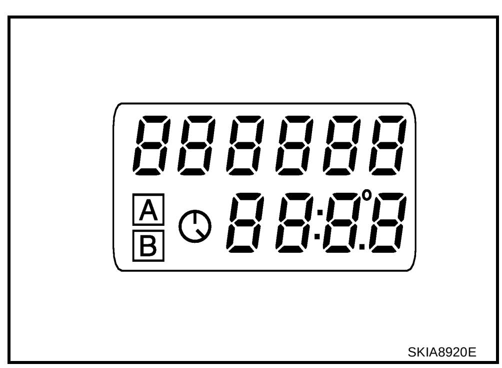
OK >> Replace combination meter.
NG >> Repair as need.

4. CHECK ODO/TRIP METER OPERATION

Check segment display status of odo/trip meter.

Is the display normal?

YES >> GO TO 5.
NO >> Replace combination meter.



SKIA8920E

5. CHECK LOW-FUEL WARNING LAMP ILLUMINATION

During inspection of low-fuel warning lamp, confirm illumination of low-fuel warning lamp.

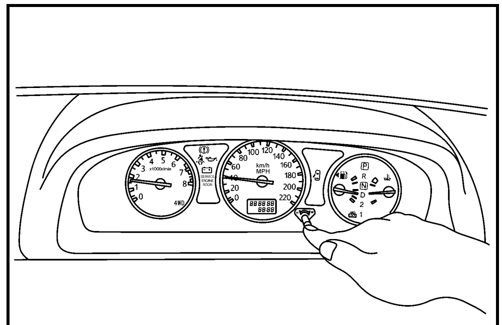
Condition of odo/trip meter switch	Fuel warning lamp
Pushed	Does not illuminate.
Released	Illuminates.

OK or NG

OK >> GO TO 6.
NG >> Replace combination meter.

6. CHECK METER CIRCUIT

Check indication of each meter/gauge in self-diagnosis mode.


SKIB0507E

OK or NG

OK >> INSPECTION END
NG >> Replace combination meter.

SYMPTOM CHART

Symptom	Possible cause
Indication is irregular for the speedometer and odo/trip meter.	Refer to DI-17, "Vehicle Speed Signal Inspection (With VDC)" or DI-17, "Vehicle Speed Signal Inspection (Without VDC)" .
Tachometer indication is malfunction.	Refer to DI-17, "Engine Speed Signal Inspection" .
Water temperature gauge indication is malfunction.	Refer to DI-18, "Engine Coolant Temperature Signal Inspection" .
Low-fuel warning lamp indication is irregular.	Refer to DI-18, "Fuel Level Sensor Inspection" .
Fuel gauge indication is malfunction.	
Ambient temperature indicator is malfunction.	Refer to DI-20, "Ambient Temperature Signal Inspection [Without Auto A/C]" or DI-22, "Ambient Temperature Signal Inspection [With Auto A/C]" .
A/T position indicator is malfunction.	Refer to DI-41, "A/T Indicator Does Not Illuminate" .

Power Supply and Ground Circuit Inspection

AKS00BAA

1. CHECK FUSE

Check for blown combination meter fuses.

Unit	Power source	Fuse No.
Combination meter	Battery	28
	Ignition switch (ON)	11

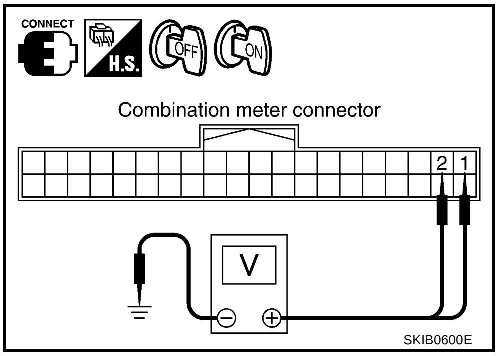
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .

2. CHECK POWER SUPPLY CIRCUIT

Check voltage between combination meter and ground.

Terminals			Ignition switch position	
(+)		(–)	OFF	ON
Connector	Terminal (Wire color)			
M44	2 (Y/G)	Ground	0 V	Battery voltage
	1 (L)		Battery voltage	Battery voltage



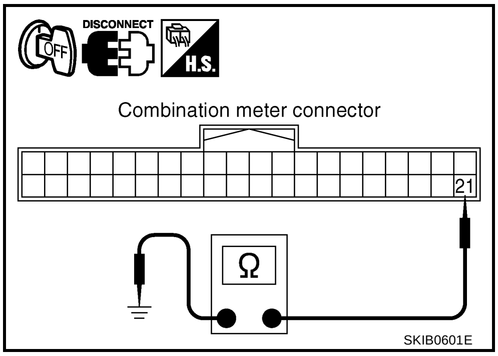
OK or NG

OK >> GO TO 3.
NG >> Check harness between combination meter and fuse.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter harness connector M44 terminal 21 (B) and ground.

21 (B) – Ground : Continuity should exist.



OK or NG

OK >> Power supply and ground circuit is OK.
NG >> Repair ground harness.

Vehicle Speed Signal Inspection (With VDC)

AKS00BLQ

1. CHECK VDC/TCS/ABS CONTROL UNIT SELF-DIAGNOSIS

Preform VDC/TCS/ABS control unit self-diagnosis. Refer to BRC-61, "CONSULT-II Functions" .

OK or NG

OK >> Replace combination meter.
NG >> Check applicable parts, repair or replace corresponding parts.

Vehicle Speed Signal Inspection (Without VDC)

AKS00BAG

1. CHECK ABS ACTUATOR AND ELECTRIC UNIT SELF-DIAGNOSIS

Preform ABS actuator and electric unit self-diagnosis. Refer to BRC-19, "CONSULT-II Functions" .

OK or NG

OK >> Replace combination meter.
NG >> Check applicable parts, repair or replace corresponding parts.

Engine Speed Signal Inspection

AKS00BAE

1. CHECK ECM SELF-DIAGNOSIS

Perform ECM self-diagnosis. Refer to EC-123, "CONSULT-II Function (ENGINE)" .

OK or NG

OK >> Replace combination meter.
NG >> Perform “Diagnostic Procedure” in displayed DTC.

Engine Coolant Temperature Signal Inspection

AKS00BAF

1. CHECK ECM SELF-DIAGNOSIS

Perform ECM self-diagnosis. Refer to EC-123, "CONSULT-II Function (ENGINE)" .

OK or NG

OK >> Replace combination meter.
NG >> Perform “Diagnostic Procedure” in displayed DTC.

Fuel Level Sensor Inspection

AKS00BAC

NOTE:
The following symptoms are not malfunction.

FUEL GAUGE

- Depending on vehicle posture or driving circumstances, fuel level in tank varies, and the pointer may fluctuate.
- If the vehicle is fueled with ignition switch ON, the pointer moves slowly.

LOW-FUEL WARNING LAMP

- Depending on vehicle posture or driving circumstances, fuel level in tank varies, and warning lamp ON timing may change.

1. CHECK HARNESS CONNECTOR

Check combination meter and fuel level sensor unit terminals (meter side, unit side, harness side) for looseness or bent terminals.

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

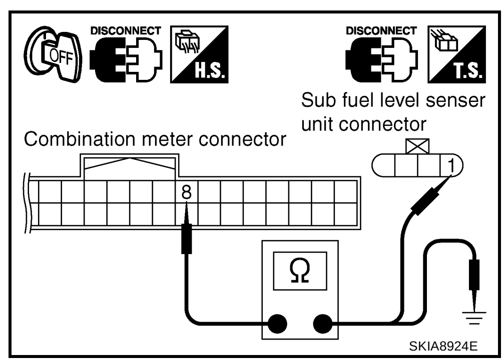
2. CHECK COMBINATION METER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect combination meter connector and sub fuel level sensor unit connector.
3. Check continuity between combination meter harness connector M44 terminal 8 (G) and sub fuel level sensor unit harness connector B125 terminal 1 (G).

8 (G) – 1 (G) : Continuity should exist.

4. Check continuity between combination meter harness connector M44 terminal 8 (G) and ground.

8 (G) – Ground : Continuity should not exist.



OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

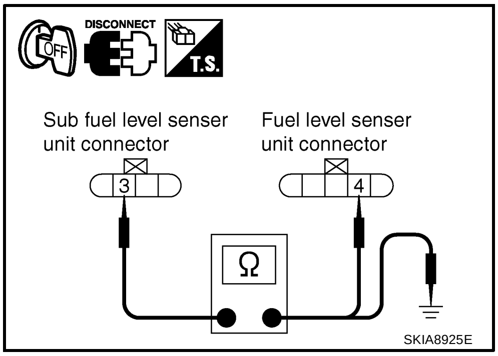
3. CHECK FUEL LEVEL SENSOR CIRCUIT

1. Disconnect fuel level sensor unit connector.
2. Check continuity between sub fuel level sensor unit harness connector B125 terminal 3 (Y) and fuel level sensor unit harness connector B31 terminal 4 (Y).

3 (Y) – 4 (Y) : Continuity should exist.

3. Check continuity between sub fuel level sensor unit harness connector B125 terminal 3 (Y) and ground.

3 (Y) – Ground : Continuity should not exist.



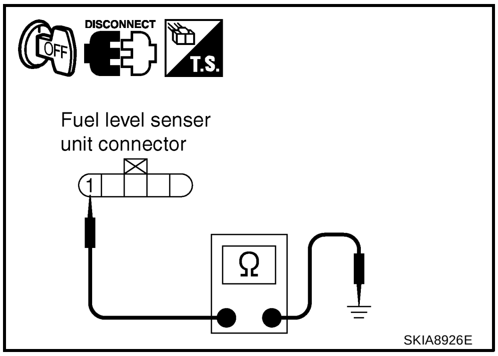
OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK GROUND CIRCUIT

Check continuity between fuel level sensor unit harness connector B31 terminal 1 (B) and ground.

1 (B) – Ground : Continuity should exist.



OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

5. CHECK FUEL LEVEL SENSOR

Check fuel level sensor units. Refer to DI-23, "FUEL LEVEL SENSOR UNIT CHECK" .

OK or NG

OK >> GO TO 6.
NG >> Replace fuel level sensor unit or sub fuel level sensor unit.

6. CHECK INSTALLATION CONDITION

Check fuel level sensor unit installation, and check whether the float arm interferes or binds with any of the internal components in fuel tank.

OK or NG

OK >> Replace combination meter.
NG >> Install fuel level sensor unit properly.

The Fuel Gauge Pointer Fluctuates, Indicator Wrong Value or Varies

AKS00BAH

1. CHECK FUEL GAUGE FLUCTUATION

Test drive vehicle to see if gauge fluctuates only during driving and just before or soon after stopping.

Does the indication value vary only during driving and just before or soon after stopping?

YES >> The pointer fluctuation may be caused by fuel level change in fuel tank. Condition is normal.
NO >> Ask the customer about the situation when the symptom occurs in detail, and perform the trouble diagnosis.

The Fuel Gauge Does Not Move to FULL Position

AKS00BAI

1. QUESTION 1

Does it take a long time for the pointer to move to FULL position?

YES or NO

YES >> GO TO 2.
NO >> GO TO 3.

2. QUESTION 2

Was the vehicle fueled with ignition switch ON?

YES or NO

YES >> Be sure to fuel the vehicle with ignition switch OFF. Otherwise, it will take a long time to move to FULL position because of the characteristic of fuel gauge.
NO >> GO TO 3.

3. QUESTION 3

Is the vehicle parked on an incline?

YES or NO

YES >> Check the fuel level indication with vehicle on a level surface.
NO >> GO TO 4.

4. QUESTION 4

During driving, does fuel gauge pointer move gradually toward EMPTY position?

YES or NO

YES >> Check fuel level sensor unit. Refer to DI-23, "FUEL LEVEL SENSOR UNIT CHECK" .
NO >> The float arm may interfere or bind with any of the components in fuel tank.

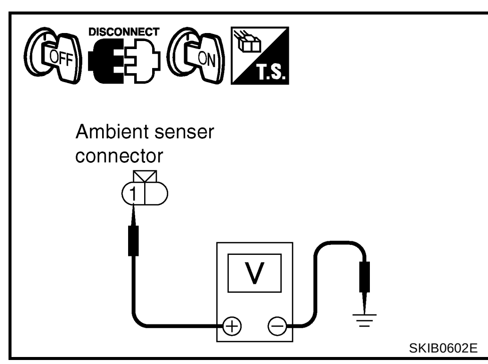
Ambient Temperature Signal Inspection [Without Auto A/C]

AKS00BAJ

1. CHECK VOLTAGE BETWEEN AMBIENT SENSOR HARNESS CONNECTOR AND GROUND

1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Turn ignition switch ON.
4. Check voltage between ambient sensor harness connector E38 terminal 1 (R/B) and ground.

1 (R/B) – Ground : Approx. 5 V



SKIB0602E

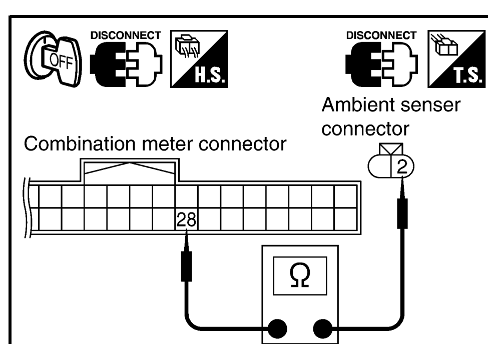
OK or NG

OK >> GO TO 2.
NG >> GO TO 4.

2. CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND COMBINATION METER

1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter harness connector M44 terminal 28 (B/Y) and ambient sensor harness connector E38 terminal 2 (B/Y).

28 (B/Y) – 2 (B/Y) : Continuity should exist.



SKIA9134E

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.

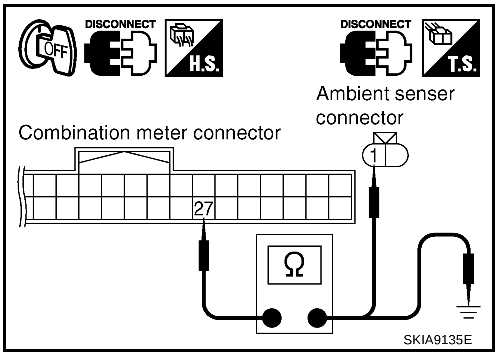
3. CHECK AMBIENT SENSOR

Check ambient sensor. Refer to DI-23, "AMBIENT SENSOR CHECK" .

OK or NG

OK >> Replace combination meter.
NG >> Replace ambient sensor.

4. CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND COMBINATION METER



1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Check continuity between combination meter harness connector M44 terminal 27 (R/B) and ambient sensor connector E38 terminal 1 (R/B).

27 (R/B) – 1 (R/B) : Continuity should exist.

4. Check continuity between combination meter harness connector M44 terminal 27 (R/B) and ground.

27 (R/B) – Ground : Continuity should not exist.

OK or NG

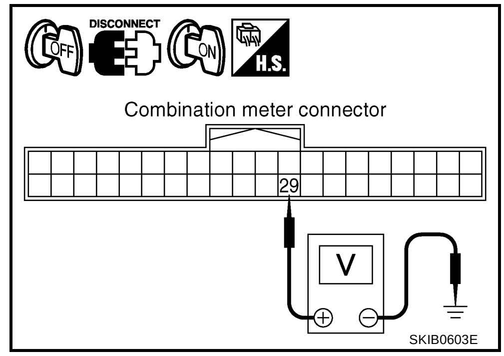
OK >> Replace combination meter.
NG >> Repair harness or connector.

A B C D E F G H I J DI L M

Ambient Temperature Signal Inspection [With Auto A/C]

AKS00BAK

1. CHECK AUTO A/C RECOGNITION SIGNAL INPUT



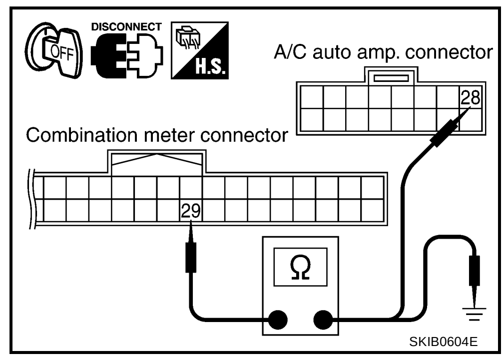
1. Turn ignition switch OFF.
2. Disconnect combination meter connector.
3. Turn ignition switch ON.
4. Check voltage between combination meter harness connector M44 terminal 29 (Y) and ground.

29 (Y) – Ground : Approx. 5 V

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK AUTO A/C RECOGNITION SIGNAL CIRCUIT



1. Turn ignition switch OFF.
2. Disconnect A/C auto amp. connector.
3. Check continuity between combination meter harness connector M44 terminal 29 (Y) and A/C auto amp. harness connector M53 terminal 28(Y).

29 (Y) – 28 (Y) : Continuity should exist.

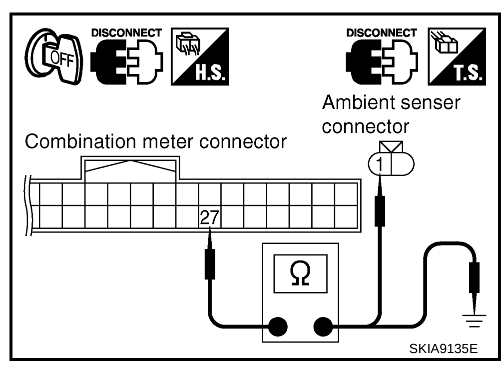
4. Check continuity between connector M44 terminal 29 (Y) and ground.

29 (Y) – Ground : Continuity should not exist.

OK or NG

OK >> Replace A/C auto amp.
NG >> Repair harness or connector.

3. CHECK AMBIENT SENSOR CIRCUIT BETWEEN AMBIENT SENSOR AND COMBINATION METER



1. Turn ignition switch OFF.
2. Disconnect ambient sensor connector.
3. Check continuity between combination meter harness connector M44 terminal 27 (R/B) and ambient sensor harness connector E38 terminal 1 (R/B).

27 (R/B) – 1 (R/B) : Continuity should exist.

4. Check continuity between combination meter harness connector M44 terminal 27 (R/B) and ground.

27 (R/B) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK A/C AUTO AMP. CIRCUIT

Check A/C auto amp. circuit. Refer to ATC-89, "Ambient Sensor Circuit" in ATC section.

OK or NG

OK >> Replace combination meter.
NG >> Check applicable parts, repair or replace corresponding parts.

Electrical Components Inspection

AKS00BAL

FUEL LEVEL SENSOR UNIT CHECK

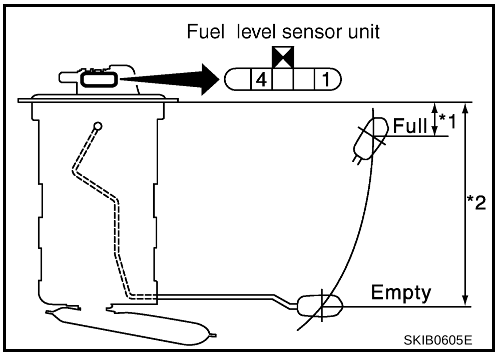
For removal, refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

Fuel Level Sensor Unit

Check the resistance between terminals 1 and 4.

Terminals		Float position mm (in)			Resistance value Ω
4	1	*1	Full	30 (1.18)	Approx. 5
		*2	Empty	159 (6.25)	Approx. 80

*1 and *2: When float rod is in contact with stopper.



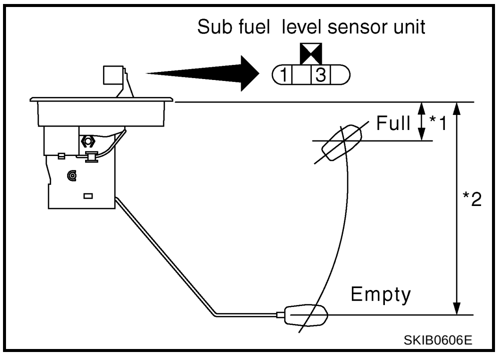
SKIB0605E

Sub Fuel Level Sensor Unit

Check the resistance between terminals 1 and 3.

Terminals		Float position mm (in)			Resistance value Ω
1	3	*1	Full	30 (1.18)	Approx. 1
		*2	Empty	191 (7.52)	Approx. 40.5

*1 and *2: When float rod is in contact with stopper.



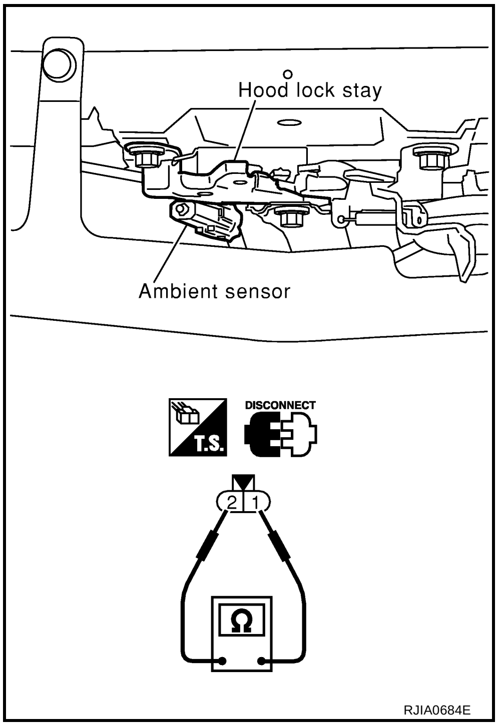
SKIB0606E

AMBIENT SENSOR CHECK

After disconnecting ambient sensor connector, measure resistance between terminals 2 and 1 at sensor side, using the table below.

Temperature °C (°F)	Resistance kΩ
-15 (5)	12.73
-10 (14)	9.92
-5 (23)	7.80
0 (32)	6.19
5 (41)	4.95
10 (50)	3.99
15 (59)	3.24
20 (68)	2.65
25 (77)	2.19
30 (86)	1.81
35 (95)	1.51
40 (104)	1.27
45 (113)	1.07

If NG, replace ambient sensor.



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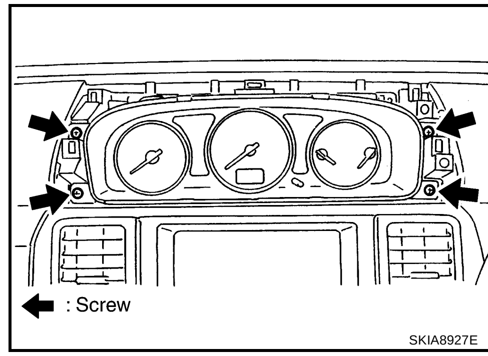
Removal and Installation for Combination Meter

AKS00BAM

REMOVAL

1. Remove cluster lid A. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove the screws (4), and pull out combination meter.
3. Disconnect connectors and remove combination meter.

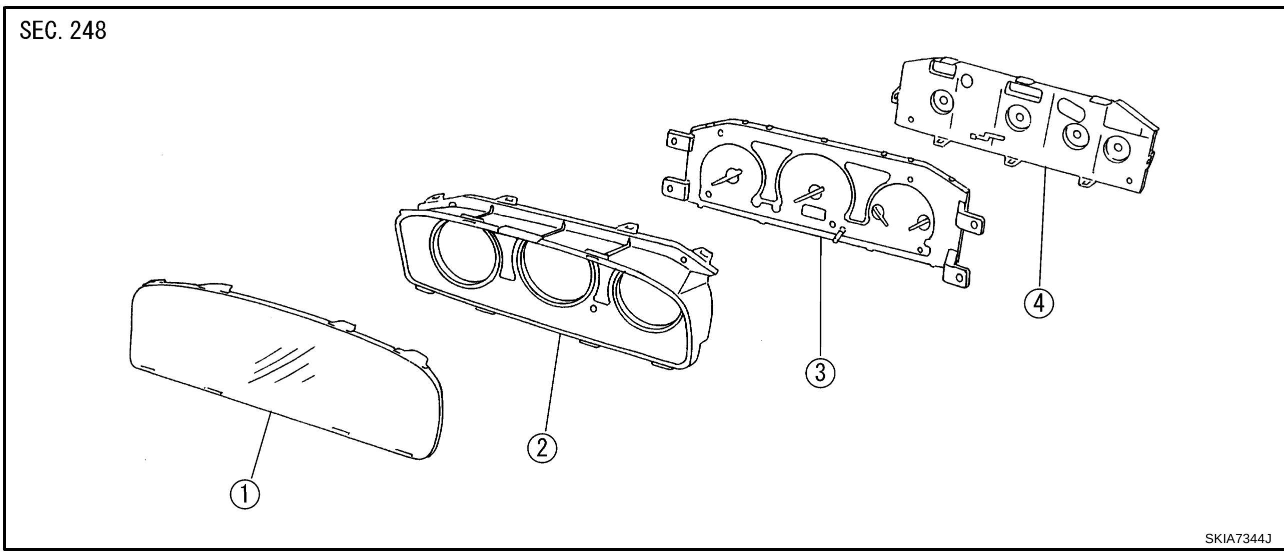


INSTALLATION

Installation is the reverse order of removal.

Disassembly and Assembly for Combination Meter

AKS00BAN



1. Front cover
2. Upper housing
3. Unified meter control unit assembly
4. Meter cover

DISASSEMBLY

1. Disengaged the tabs (8) to separate front cover.
2. Disengaged the tabs (8) to separate upper housing.
3. Disengaged the tabs (8) to separate meter cover.

ASSEMBLY

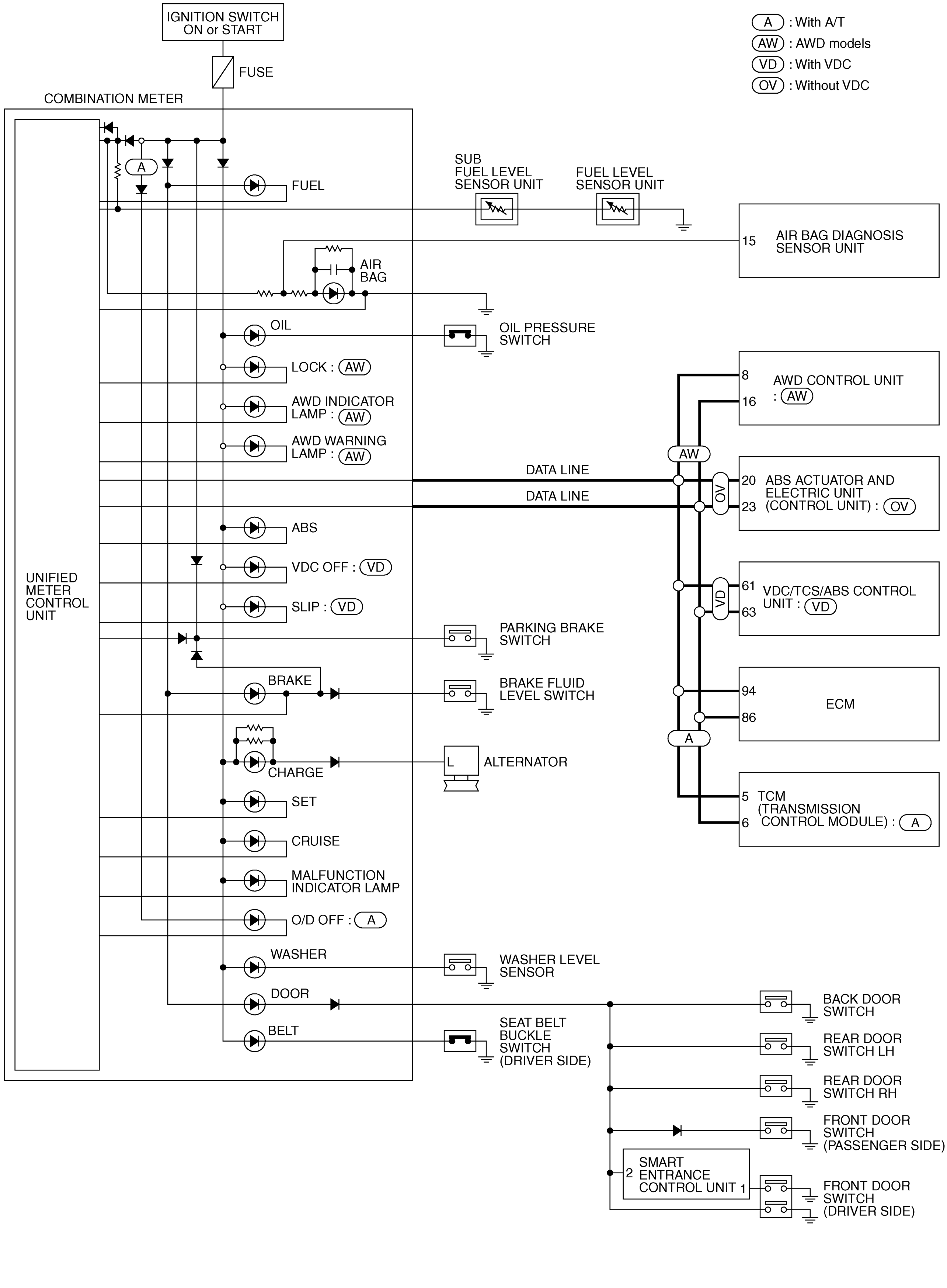
Assembly is the reverse order of disassembly.

WARNING LAMPS

PFP:24814

Schematic

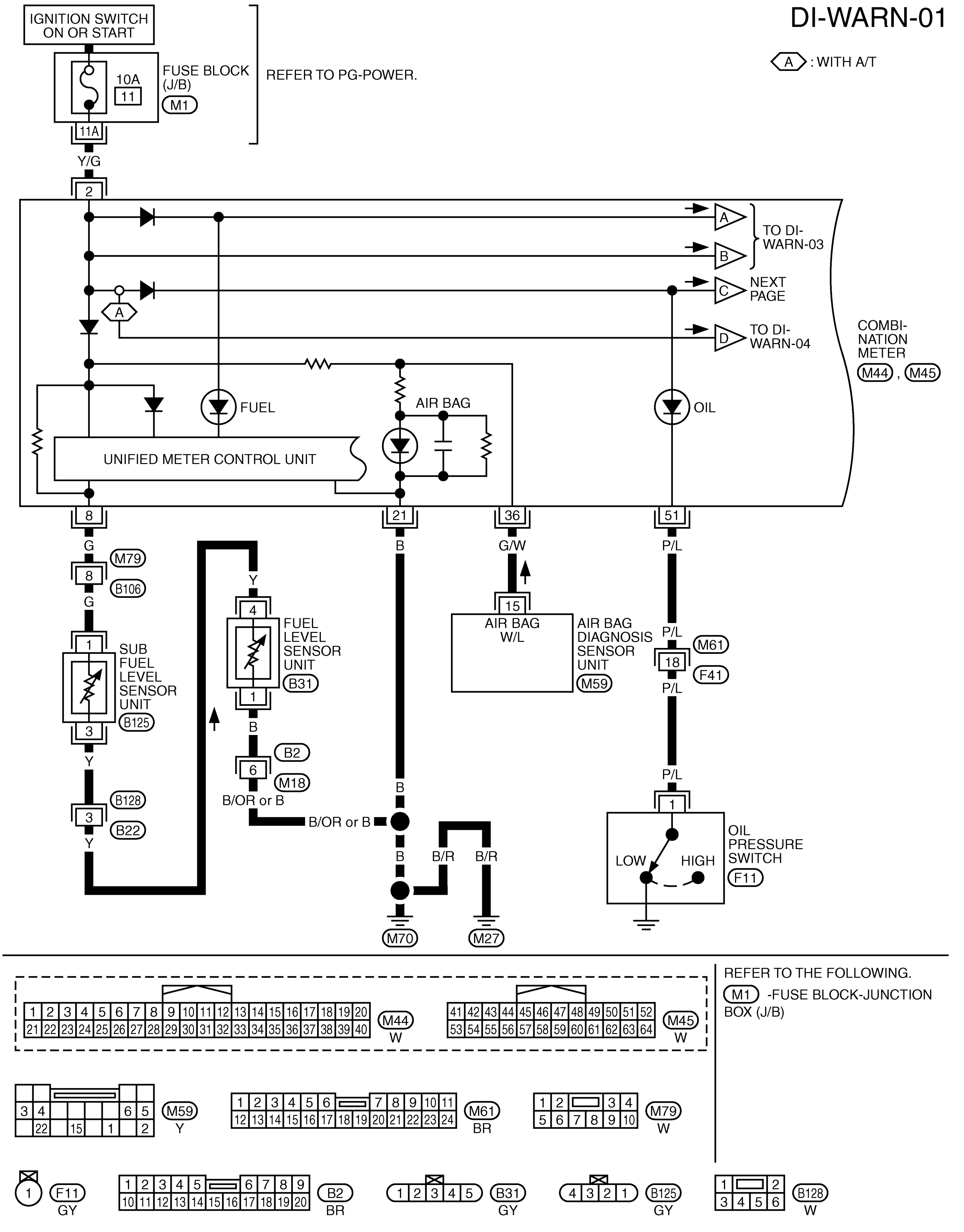
AKS00BAO



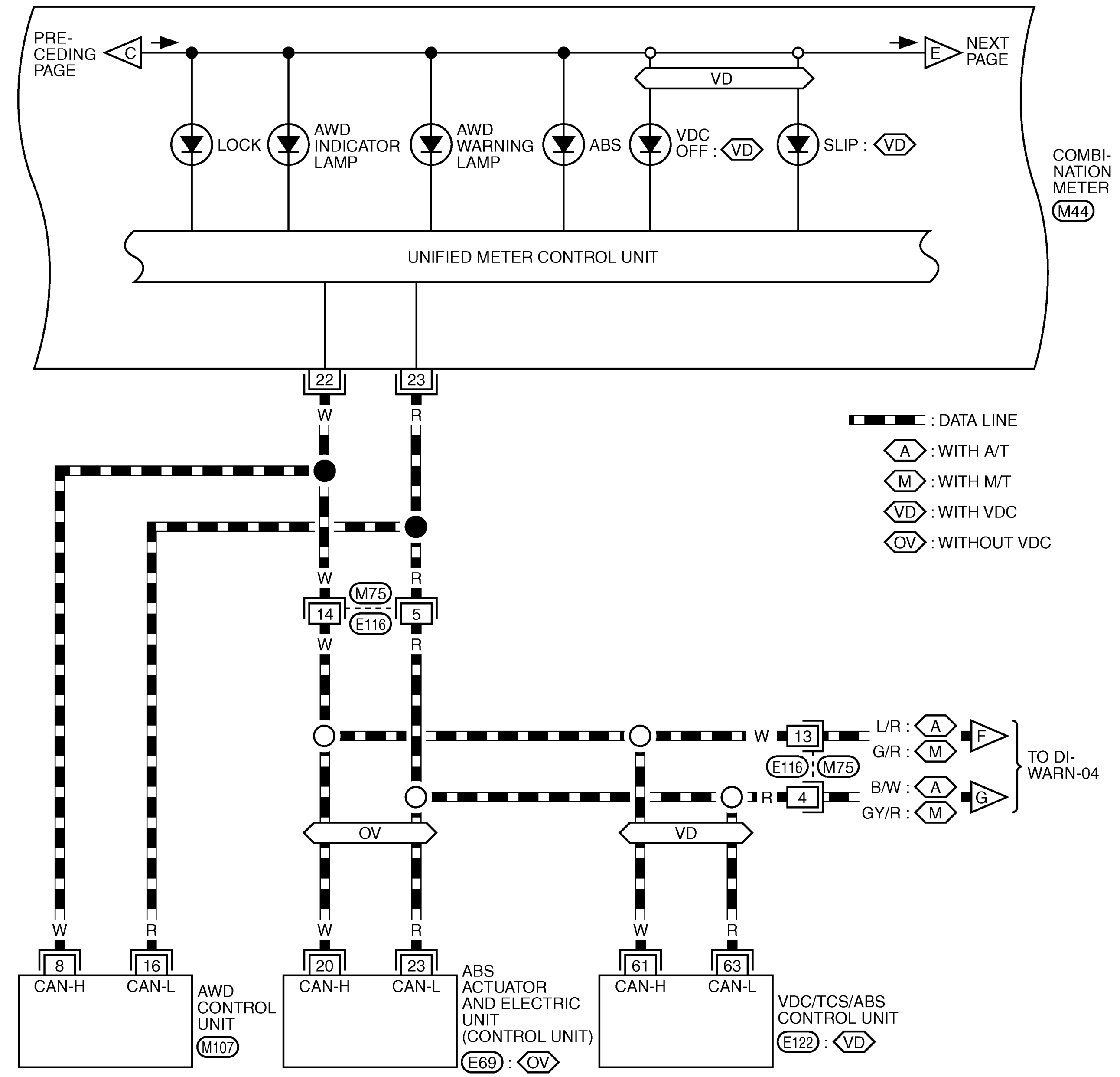
Wiring Diagram — WARN —

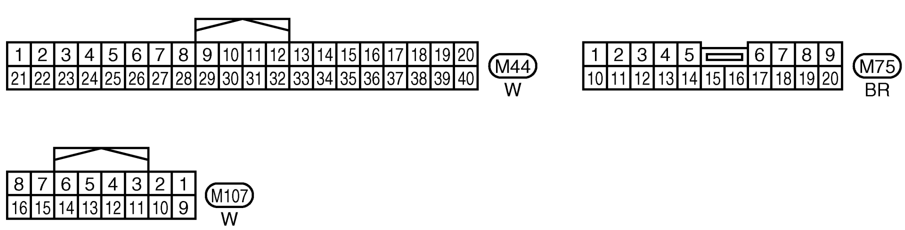
AKS00BAP

AWD MODELS



DI-WARN-02

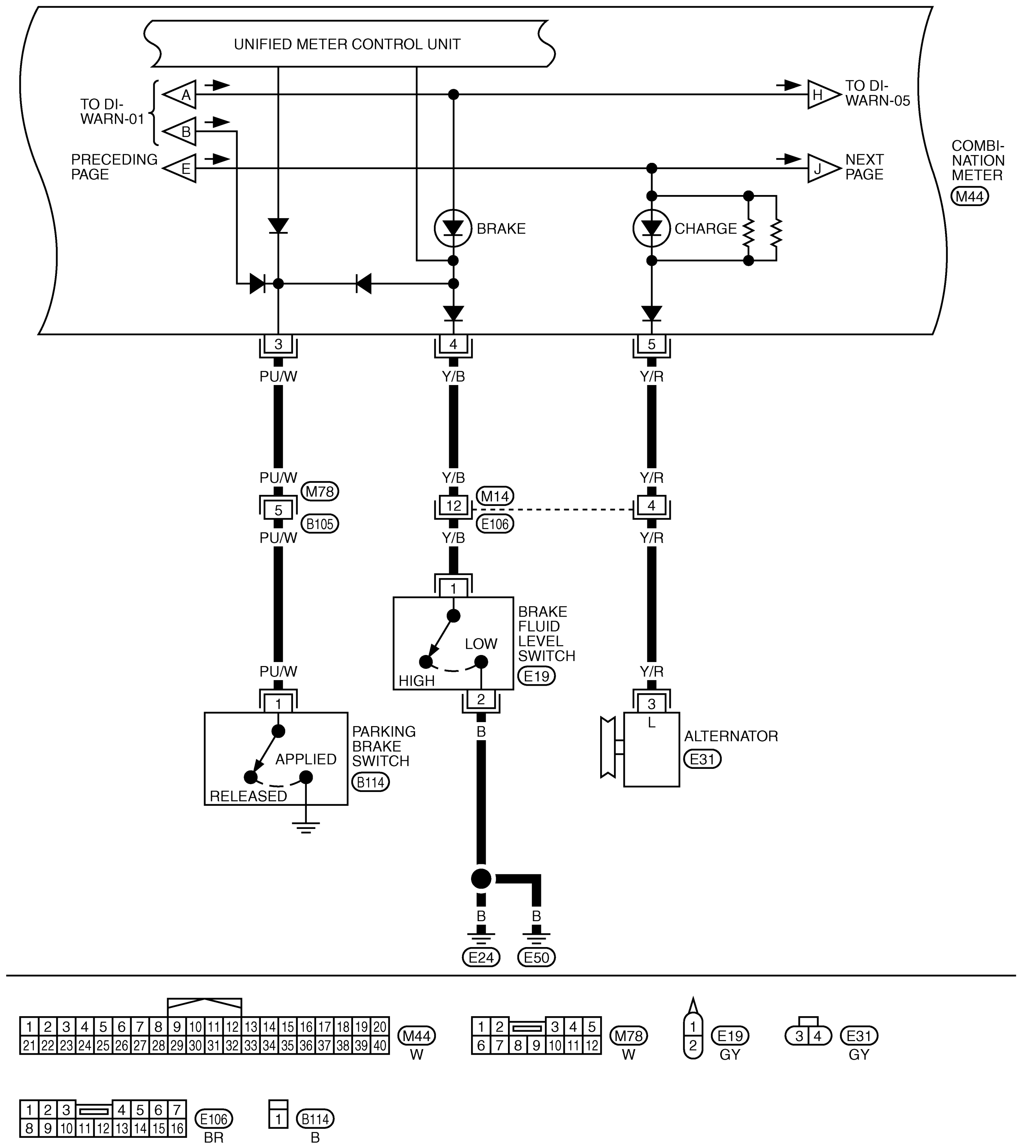




REFER TO THE FOLLOWING.
E69 , E122 -ELECTRICAL UNITS

TKWB0177E

DI-WARN-03



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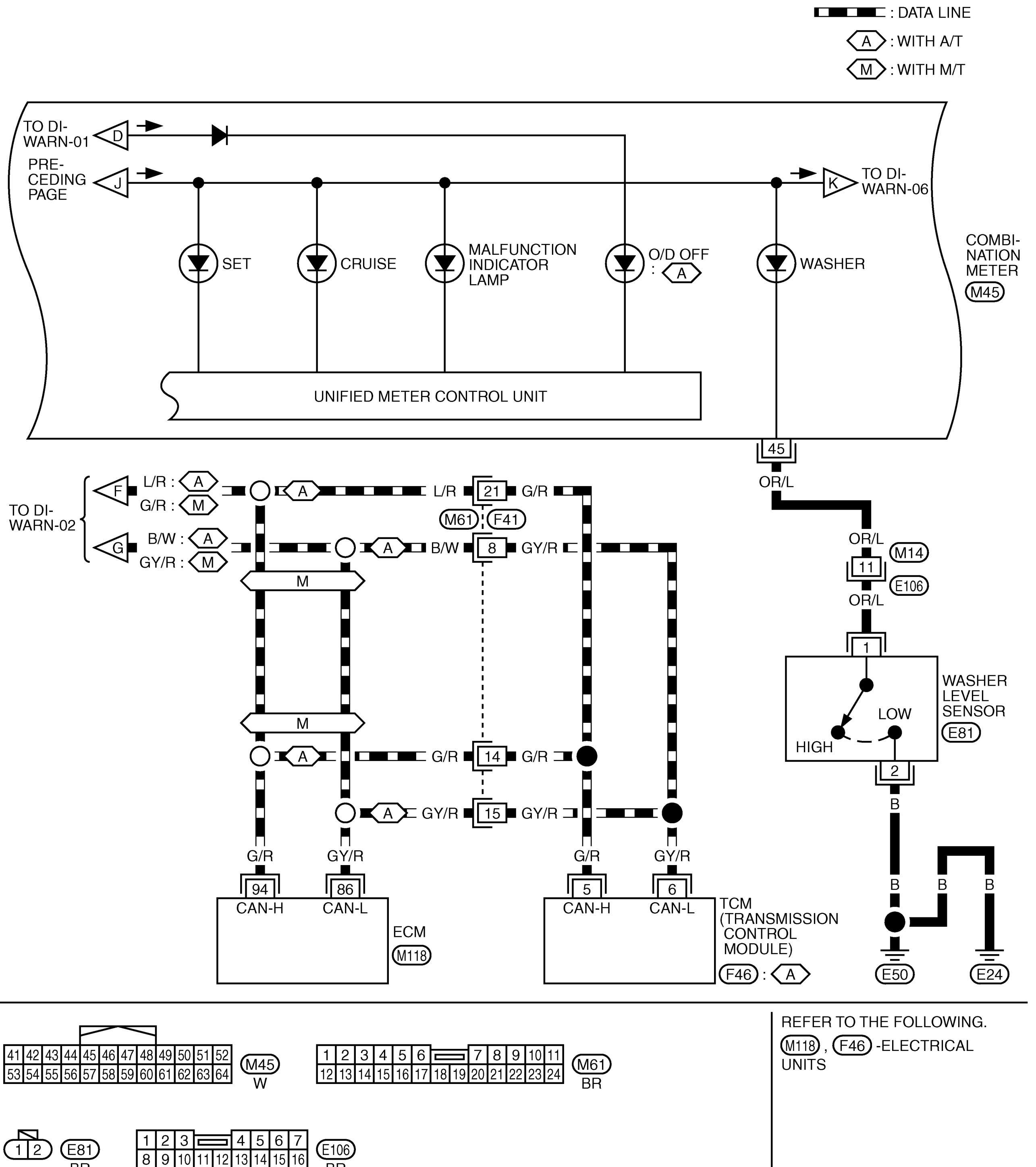
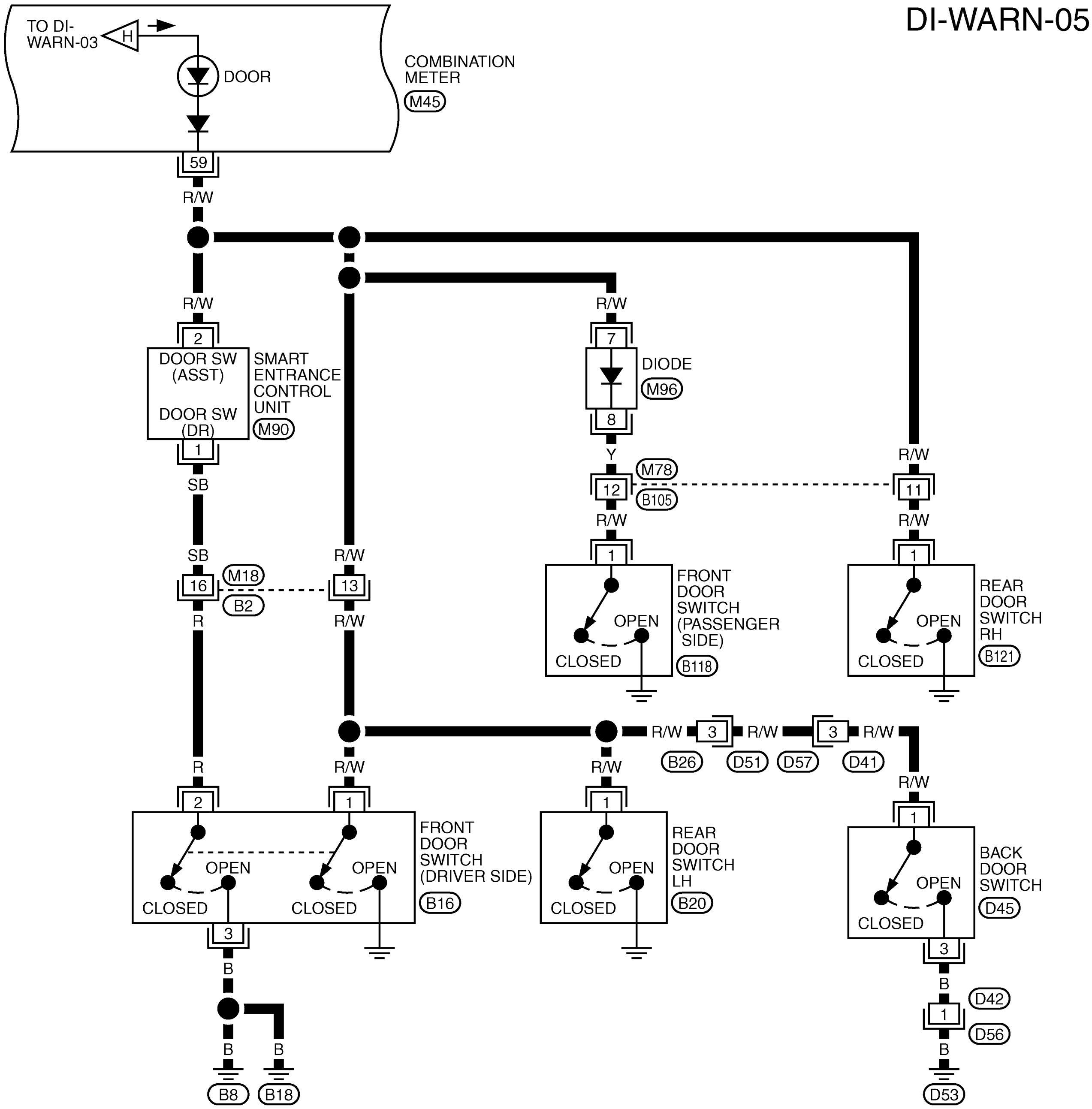
DI-WARN-04

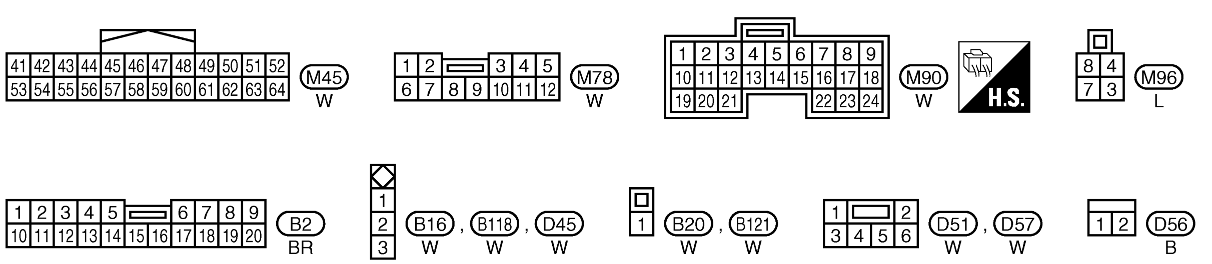


REFER TO THE FOLLOWING.
M118 , F46 -ELECTRICAL UNITS

TKWB0179E

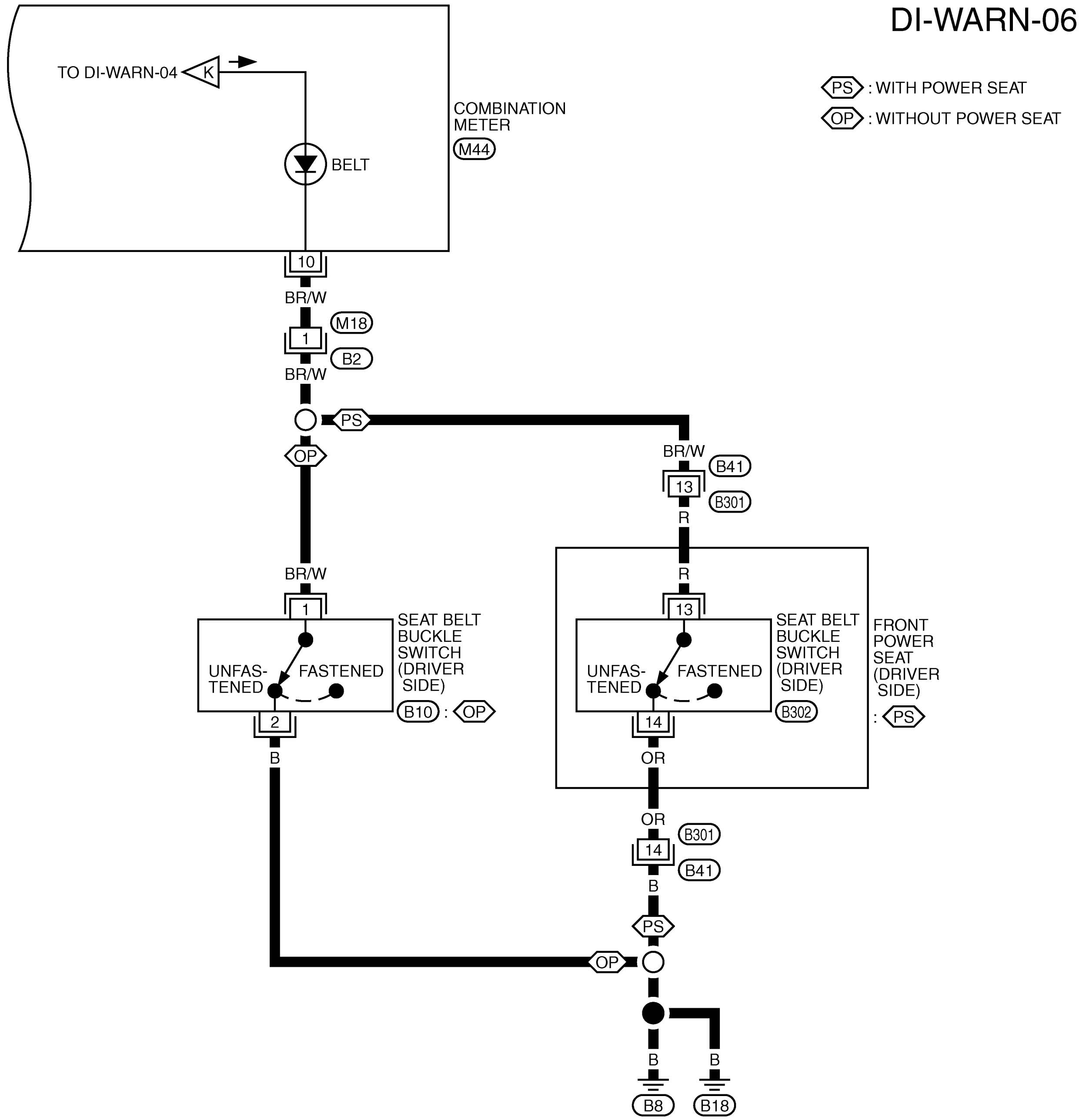
DI-WARN-05

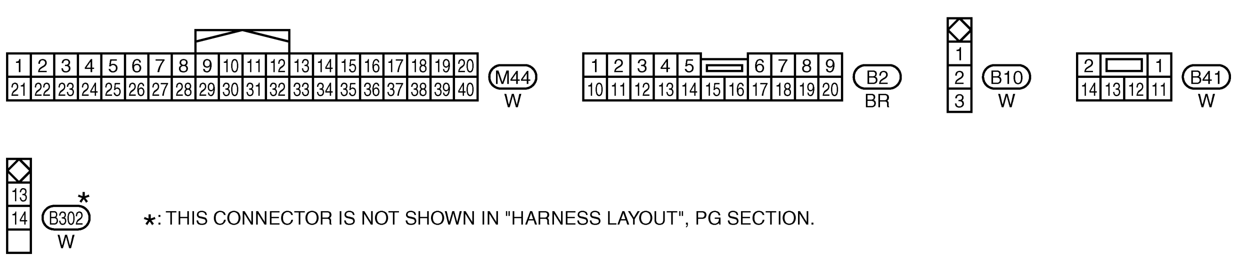




TKWB0180E

DI-WARN-06

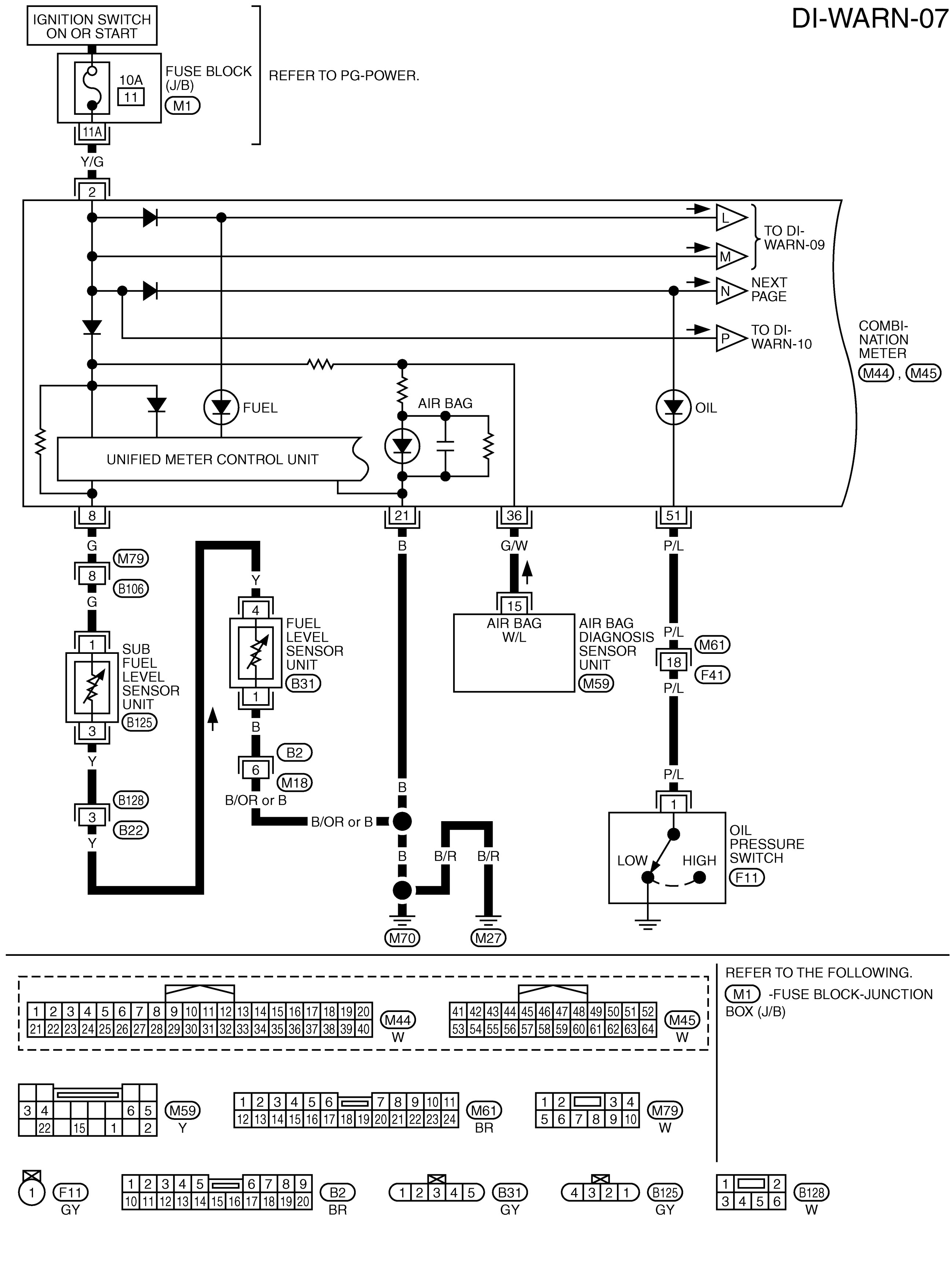




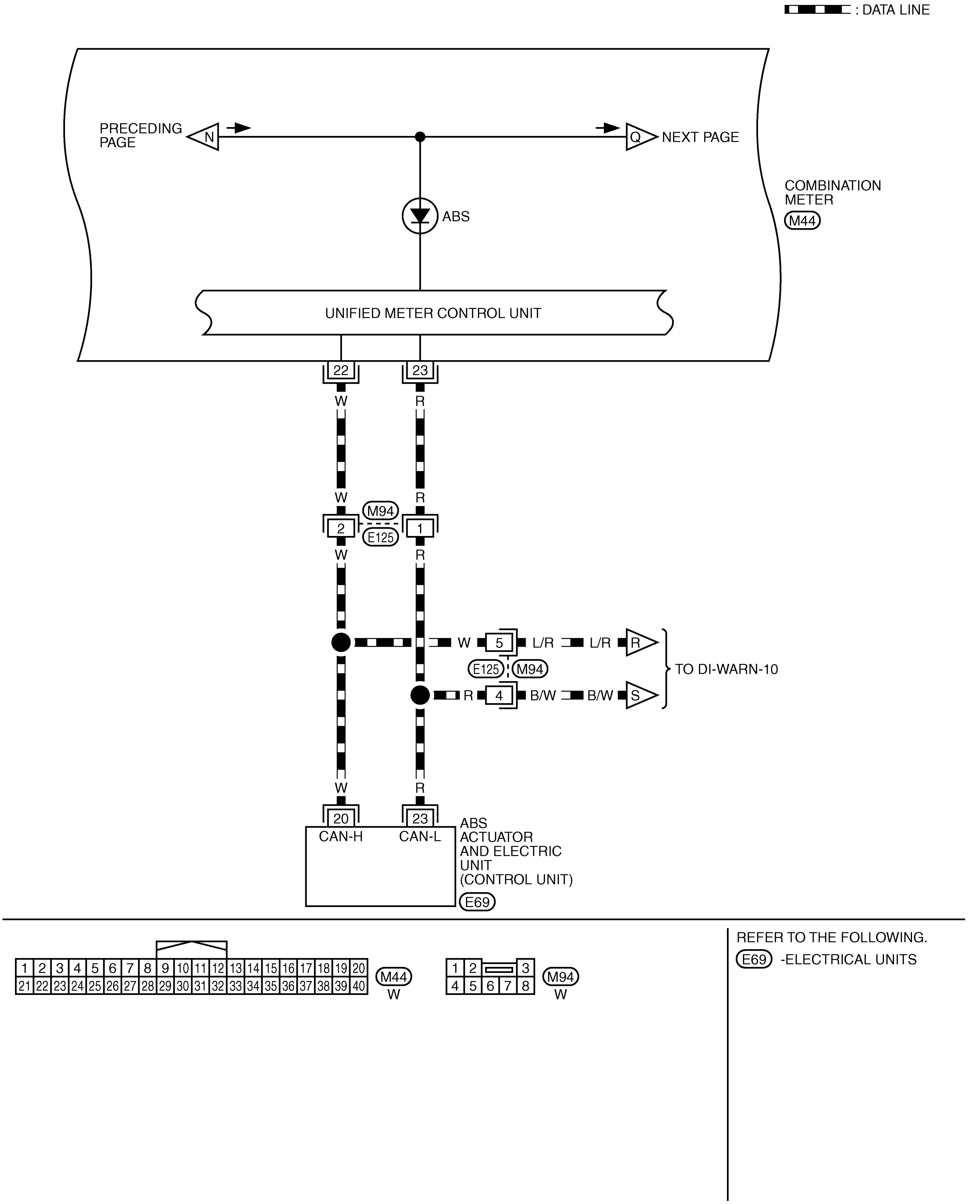
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TKWB0181E

2WD MODELS

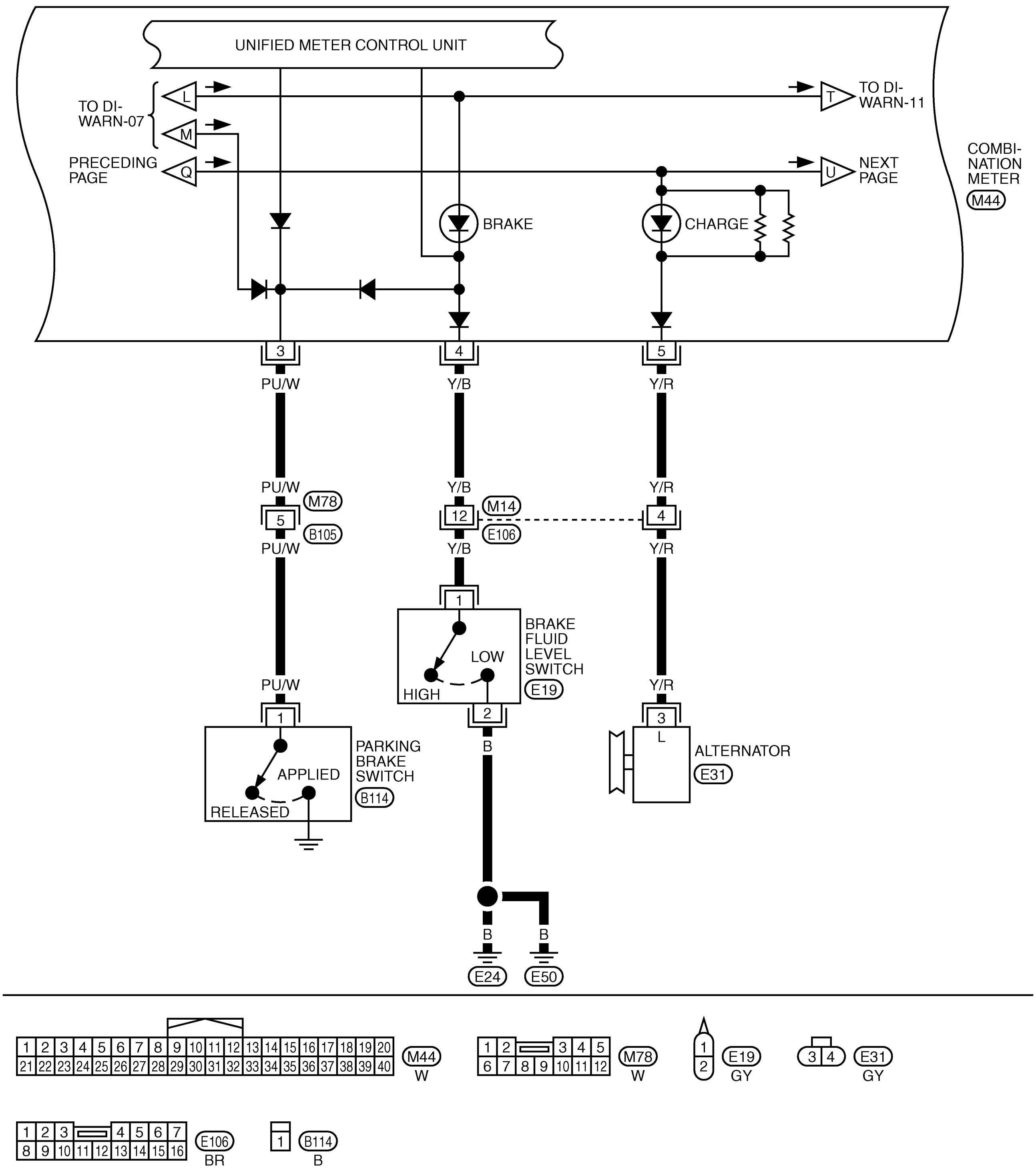

DI-WARN-07
IGNITION SWITCH ON OR START
10A
11
FUSE BLOCK (J/B)
M1
REFER TO PG-POWER.
11A
Y/G
2
L
M
TO DI-WARN-09
N
NEXT PAGE
P
TO DI-WARN-10
COMBI-NATION METER
M44, M45
FUEL
AIR BAG
OIL
UNIFIED METER CONTROL UNIT
8
21
36
51
G
M79
B106
G
B
G/W
P/L
Y
4
FUEL LEVEL SENSOR UNIT
B31
1
SUB FUEL LEVEL SENSOR UNIT
B125
3
15
AIR BAG W/L
AIR BAG DIAGNOSIS SENSOR UNIT
M59
M61
18
F41
B
B2
6
M18
B/OR or B
B/OR or B
B128
B22
B/R
B/R
LOW
HIGH
OIL PRESSURE SWITCH
F11
M70
M27
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)
M44
W
M45
W
M59
Y
M61
BR
M79
W
F11
GY
B2
BR
B31
GY
B125
GY
B128
W
TKWB0182E

DI-WARN-08



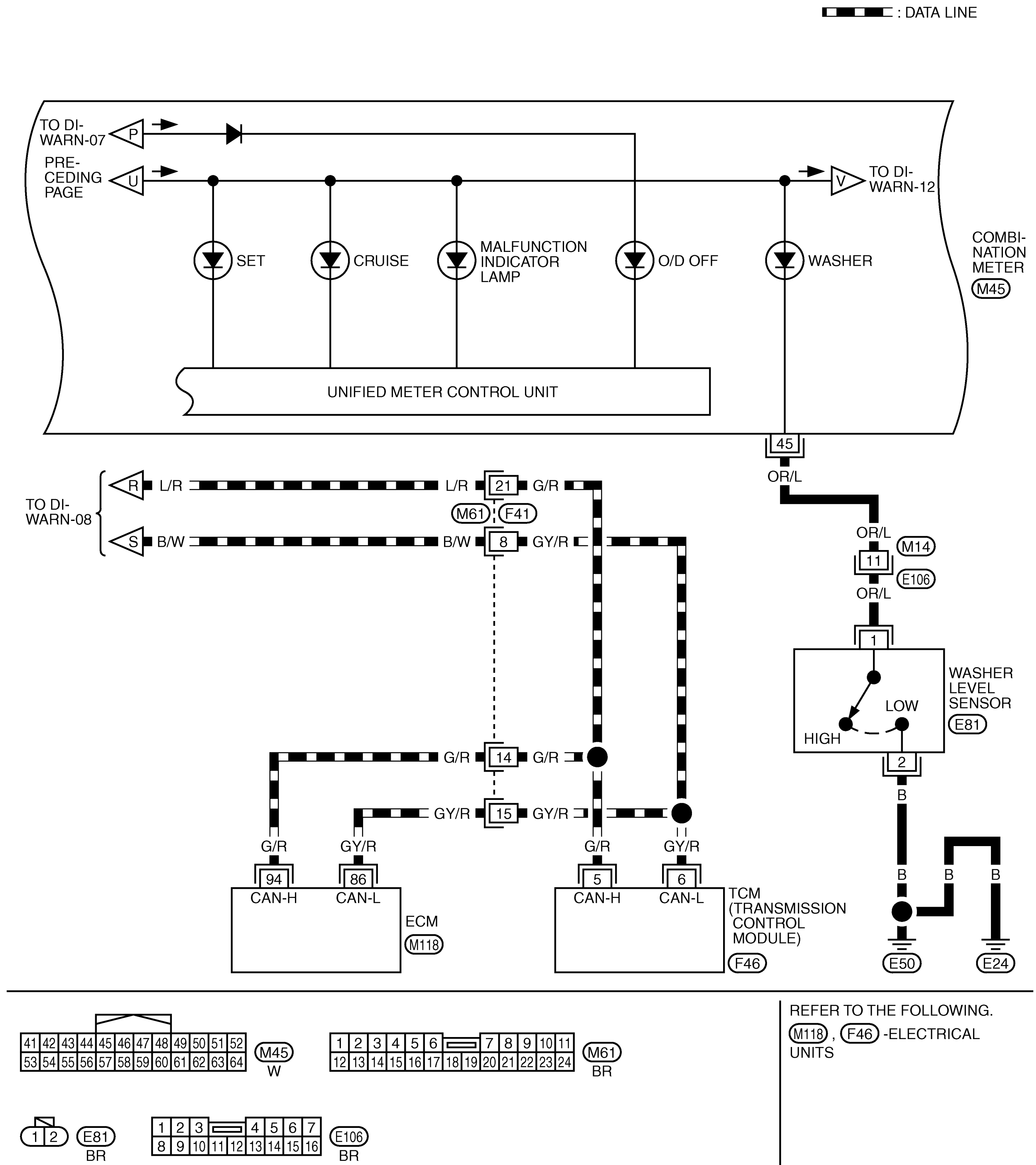
TKWB0183E

DI-WARN-09



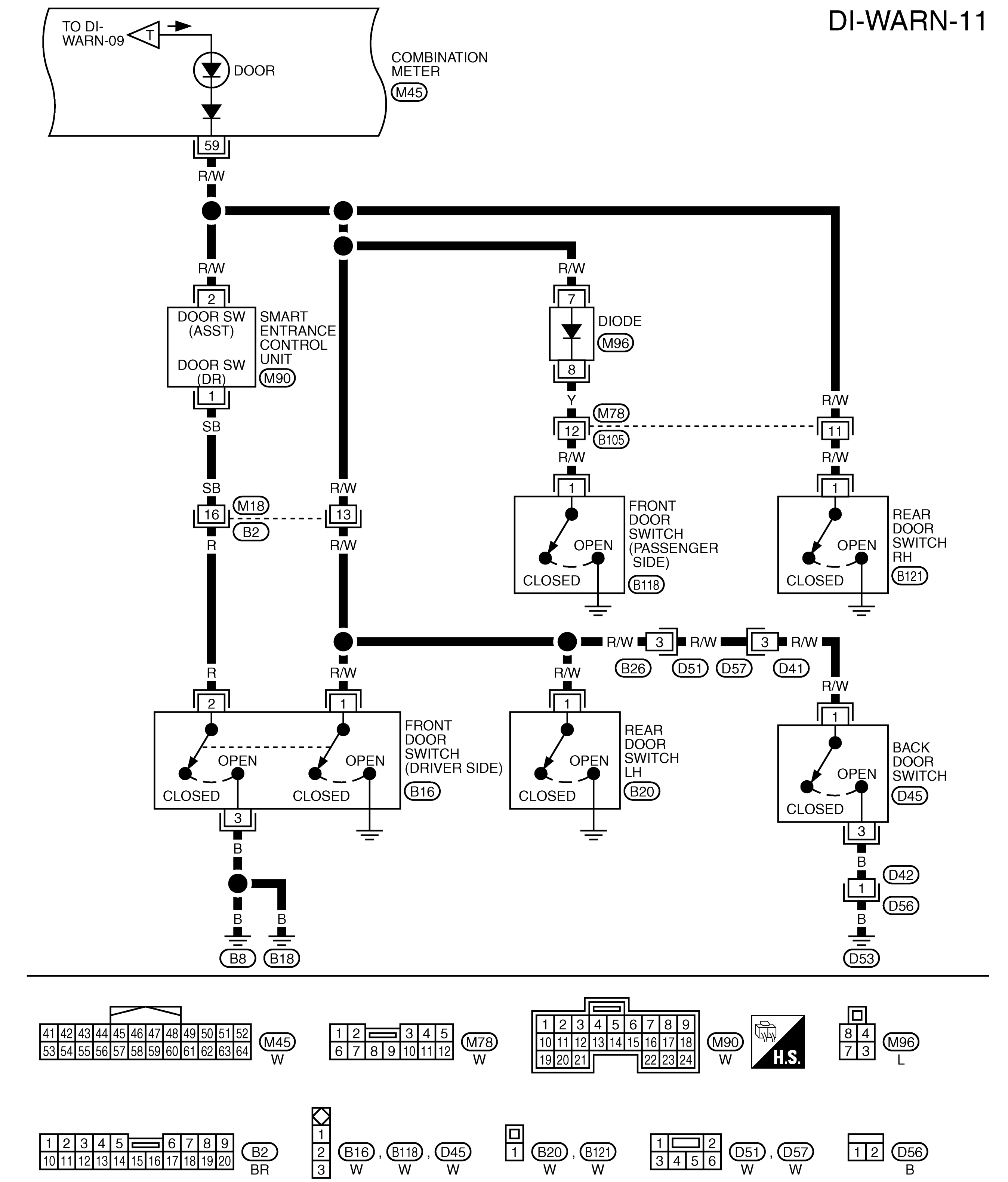
TKWB0184E

DI-WARN-10



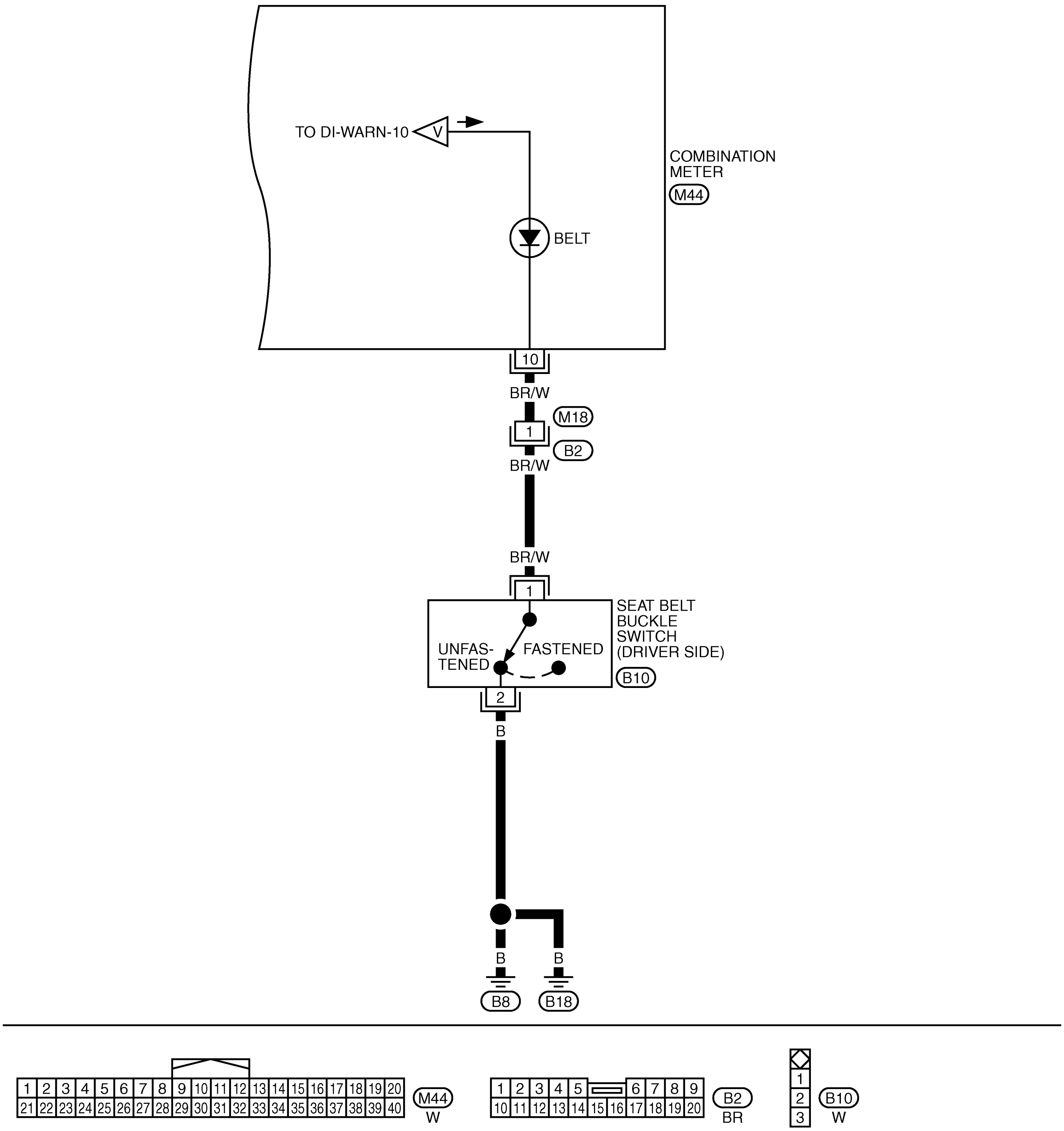
REFER TO THE FOLLOWING.
M118 , F46 -ELECTRICAL UNITS

TKWB0185E


DI-WARN-11
TO DI-WARN-09
T
DOOR
COMBINATION METER
M45
59
R/W
R/W
2
DOOR SW (ASST)
DOOR SW (DR)
SMART ENTRANCE CONTROL UNIT
M90
1
SB
SB
16
M18
B2
R
R/W
13
R/W
R/W
7
DIODE
M96
8
Y
M78
12
B105
R/W
R/W
11
R/W
1
FRONT DOOR SWITCH (PASSENGER SIDE)
OPEN
CLOSED
B118
1
REAR DOOR SWITCH RH
OPEN
CLOSED
B121
R/W
3
R/W
3
R/W
B26
D51
D57
D41
R
R/W
R/W
R/W
2
1
FRONT DOOR SWITCH (DRIVER SIDE)
OPEN
CLOSED
OPEN
CLOSED
B16
3
1
REAR DOOR SWITCH LH
OPEN
CLOSED
B20
1
BACK DOOR SWITCH
OPEN
CLOSED
D45
3
B
D42
1
D56
B
D53
B
B
B
B8
B18
41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59 60 61 62 63 64
M45
W
1 2 3 4 5
6 7 8 9 10 11 12
M78
W
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18
19 20 21 22 23 24
M90
W
H.S.
8 4
7 3
M96
L
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20
B2
BR
1
2
3
B16, B118, D45
W W W
1
B20, B121
W W
1 2
3 4 5 6
D51, D57
W W
1 2
D56
B

TKWB0186E

DI-WARN-12



TKWB0187E

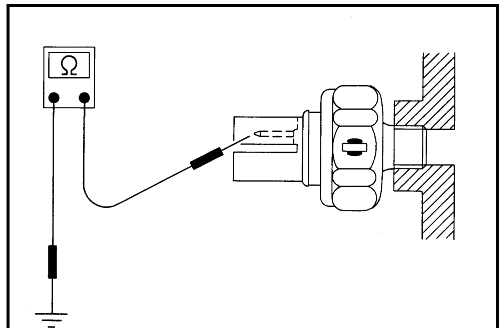
Electrical Components Inspection

AKS00BAT

OIL PRESSURE SWITCH CHECK

Condition	Oil pressure kPa (kg/cm^2 , psi)	Continuity
Engine running	More than 29 (0.3, 4)	No
Engine stopped	Less than 29 (0.3, 4)	Yes

Check the continuity between the terminals of oil pressure switch and body ground.

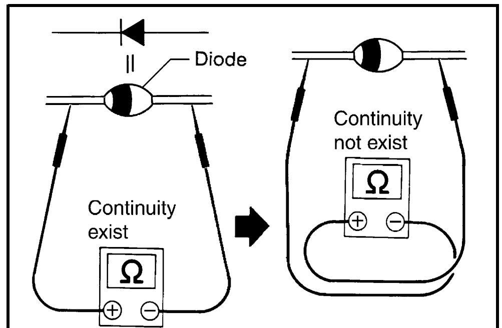


ELF0044D

DIODE CHECK

- Check continuity using an ohmmeter.
- Diode is functioning properly if test results are as shown in the figure at left.
- Check diodes at the combination meter harness connector instead of on the combination meter assembly.

  NOTE:
  Specification may vary depending on the type of tester. Before performing this inspection, be sure to refer to the instruction manual for the tester to be used.



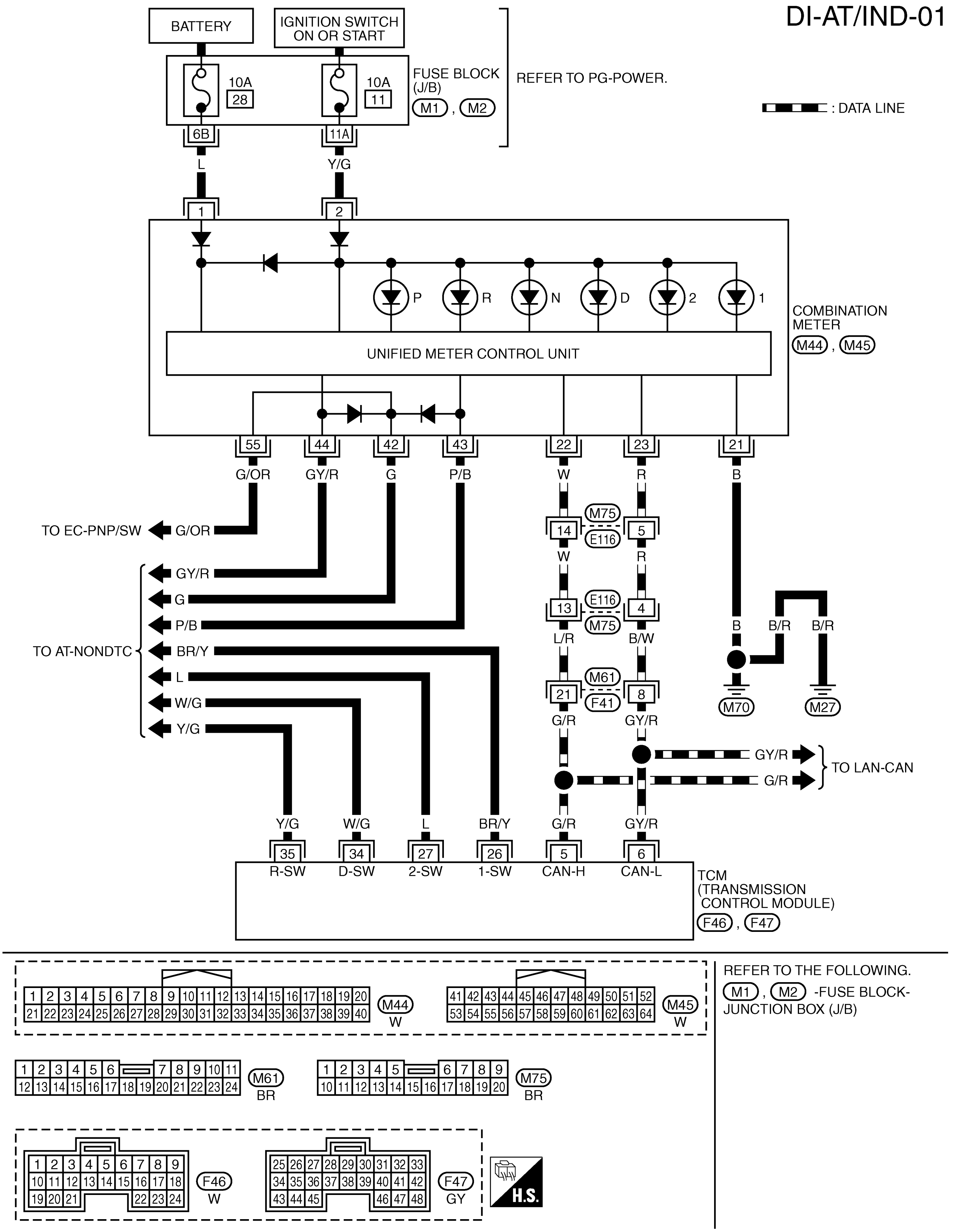
SKIB0607E

A/T INDICATOR

PFP:24814

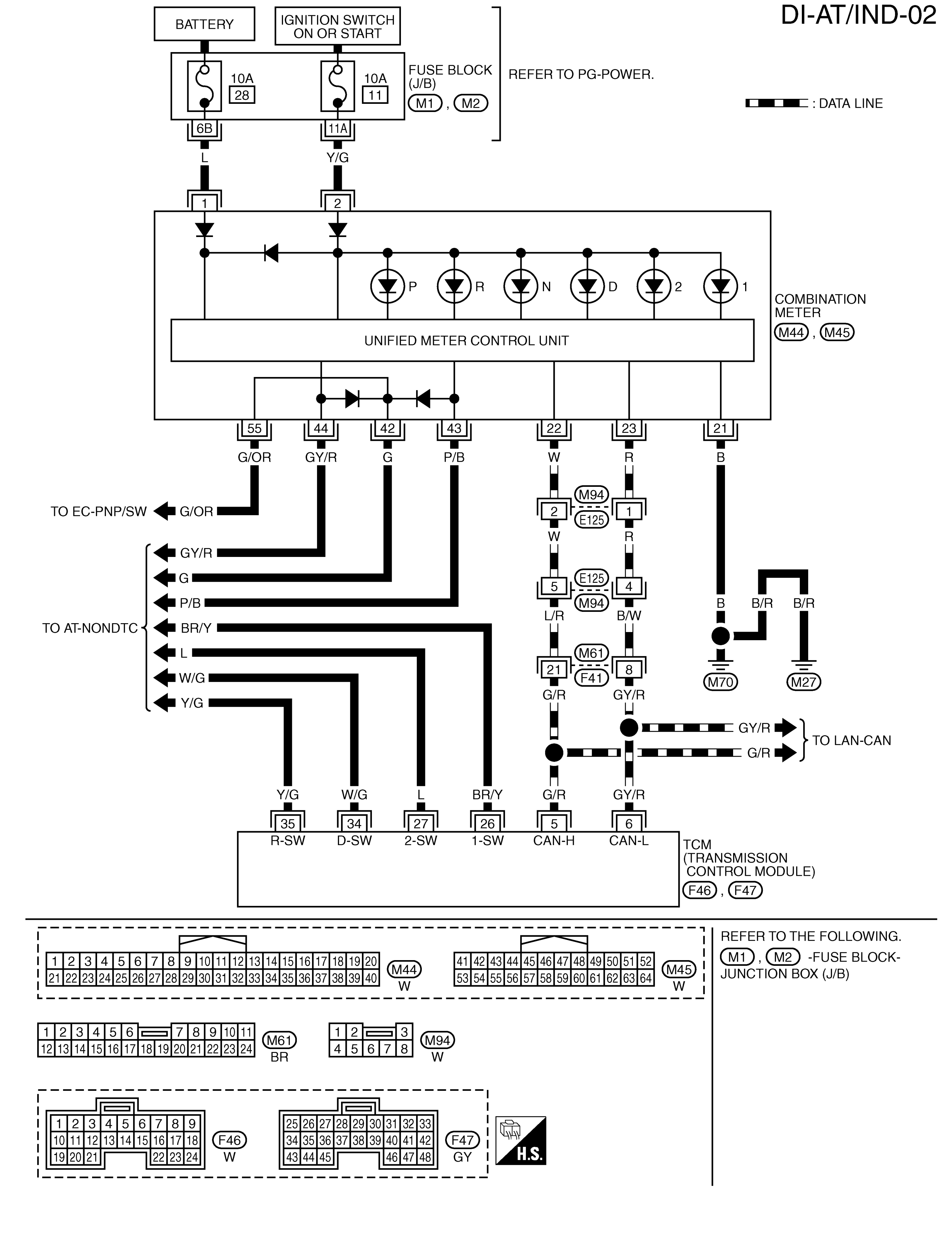
Wiring Diagram — AT/IND — AWD MODELS

AKS00BAV



A B C D E F G H I J DI L M

2WD MODELS


DI-AT/IND-02
BATTERY
IGNITION SWITCH ON OR START
10A 28
10A 11
FUSE BLOCK (J/B)
M1, M2
REFER TO PG-POWER.
: DATA LINE
6B
11A
L
Y/G
1
2
P R N D 2 1
COMBINATION METER
M44, M45
UNIFIED METER CONTROL UNIT
55 44 42 43 22 23 21
G/OR GY/R G P/B W R B
TO EC-PNP/SW
G/OR
TO AT-NONDTC
GY/R
G
P/B
BR/Y
L
W/G
Y/G
M94
E125
2 1
W R
E125
M94
5 4
L/R B/W
M61
F41
21 8
G/R GY/R
B B/R B/R
M70 M27
GY/R
G/R
TO LAN-CAN
Y/G W/G L BR/Y G/R GY/R
35 34 27 26 5 6
R-SW D-SW 2-SW 1-SW CAN-H CAN-L
TCM (TRANSMISSION CONTROL MODULE)
F46, F47
REFER TO THE FOLLOWING.
M1, M2 -FUSE BLOCK-JUNCTION BOX (J/B)
M44 W
M45 W
M61 BR
M94 W
F46 W
F47 GY
H.S.
TKWA1851E

A/T Indicator Does Not Illuminate

AKS00BAX

1. CHECK TCM SELF-DIAGNOSIS

Perform TCM self-diagnosis. Refer to AT-80, "CONSULT-II Function (A/T)" .

OK or NG

OK >> Replace combination meter.
NG >> Go to TCM trouble diagnosis.

WARNING CHIME

PFP:28596

System Description

AKS00BB4

The warning chime is controlled by the smart entrance control unit.
When a signal, or combination of signals, is received by the smart entrance control unit, the warning chime will sound.
The warning chime is located in the smart entrance control unit.

POWER SUPPLY AND GROUND CIRCUIT

Power is supplied at all times

- through 10 A fuse [No. 26, located in the fuse block (J/B)]
- to smart entrance control unit terminal 49
- through 10 A fuse [No. 28, located in the fuse block (J/B)]
- to key switch terminal 1
- through 10 A fuse (No. 31, located in fuse and fusible link box)
- to combination switch terminal 11.

With ignition switch in ON or START position, power is supplied

- through 10 A fuse [No. 5, located in the fuse block (J/B)]
- to smart entrance control unit terminal 27.

Ground is supplied

- to smart entrance control unit terminals 43 and 64
- through grounds M27 and M70.

IGNITION KEY WARNING CHIME

With key is inserted in the ignition key cylinder (OFF or ACC position), and the driver door open, the warning chime will sound.
Power is supplied as a signal

- through key switch terminal 2
- to smart entrance control unit terminal 25

Ground is supplied as a signal

- from front door switch (driver side) terminal 2
- to smart entrance control unit terminal 1.

Front door switch (driver side) terminal 3 is grounded through grounds B8 and B18.

LIGHT WARNING CHIME

With ignition switch in OFF or ACC position, driver door open and lighting switch in 1st or 2nd position, warning chime will sound.
Power is supplied as a signal

- through lighting switch terminal 12
- to smart entrance control unit terminal 58.

Ground is supplied as a signal

- from front door switch (driver side) terminal 2
- to smart entrance control unit terminal 1.

Front door switch (driver side) terminal 3 is grounded through grounds B8 and B18.

SEAT BELT WARNING CHIME

With ignition switch turned ON and seat belt unfastened [seat belt buckle switch (driver side) ON], warning chime will sound for approximately 6 seconds.

Without Power Seat

Ground is supplied as a signal

- from seat belt buckle switch (driver side) terminal 1
- to smart entrance control unit terminal 28.

Seat belt buckle switch (driver side) terminal 2 is grounded through grounds B8 and B18.

With Power Seat

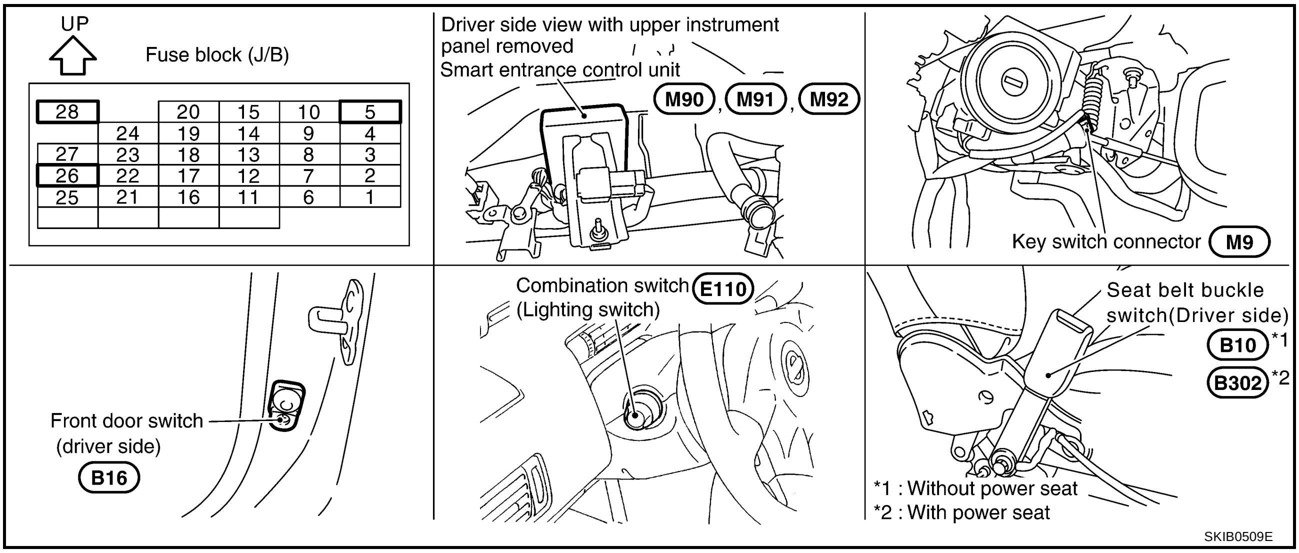
Ground is supplied as a signal

- from seat belt buckle switch (driver side) terminal 13
- to smart entrance control unit terminal 28.

Seat belt buckle switch (driver side) terminal 14 is grounded through grounds B8 and B18.

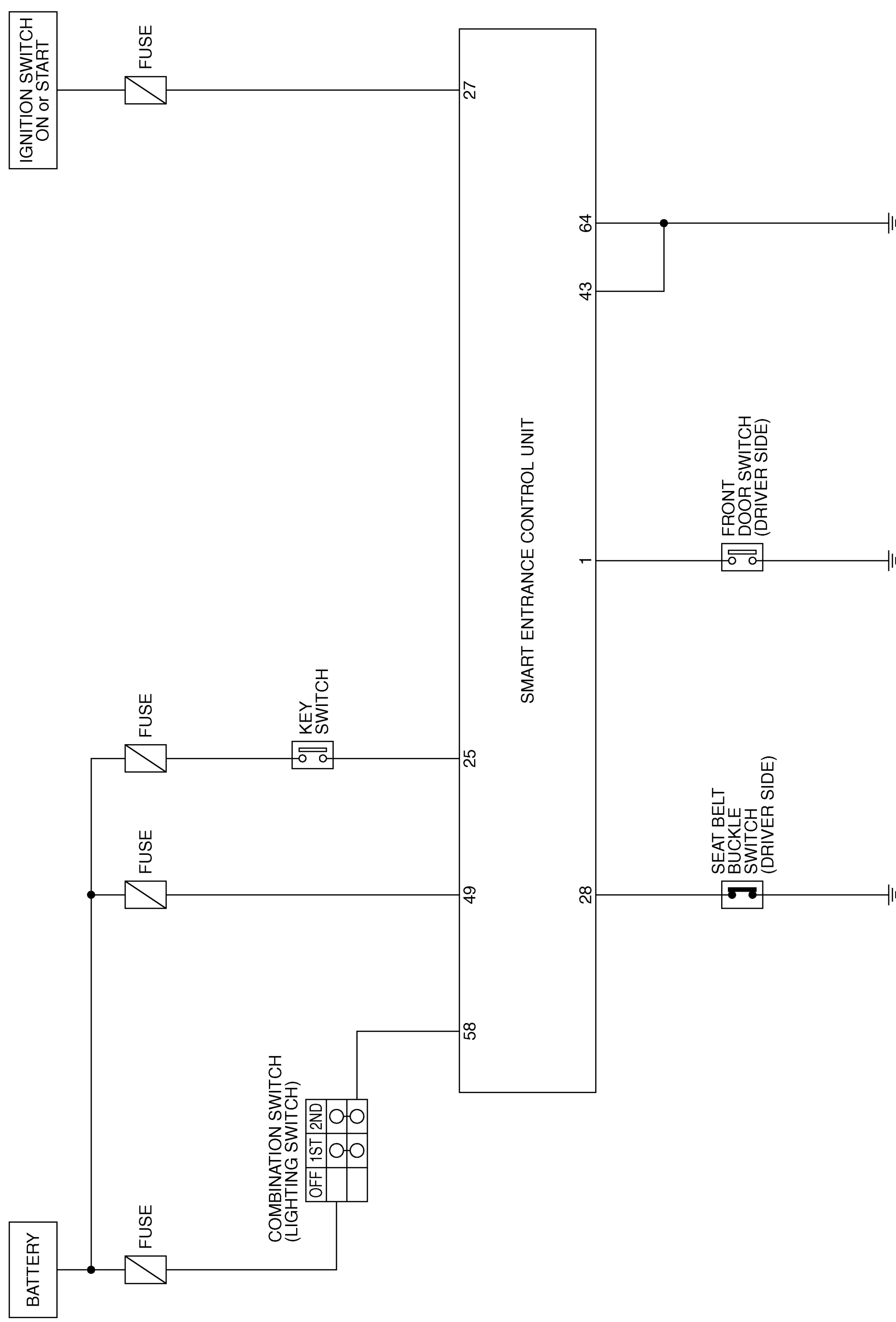
Component Parts and Harness Connector Location

AKS00BLS



Schematic

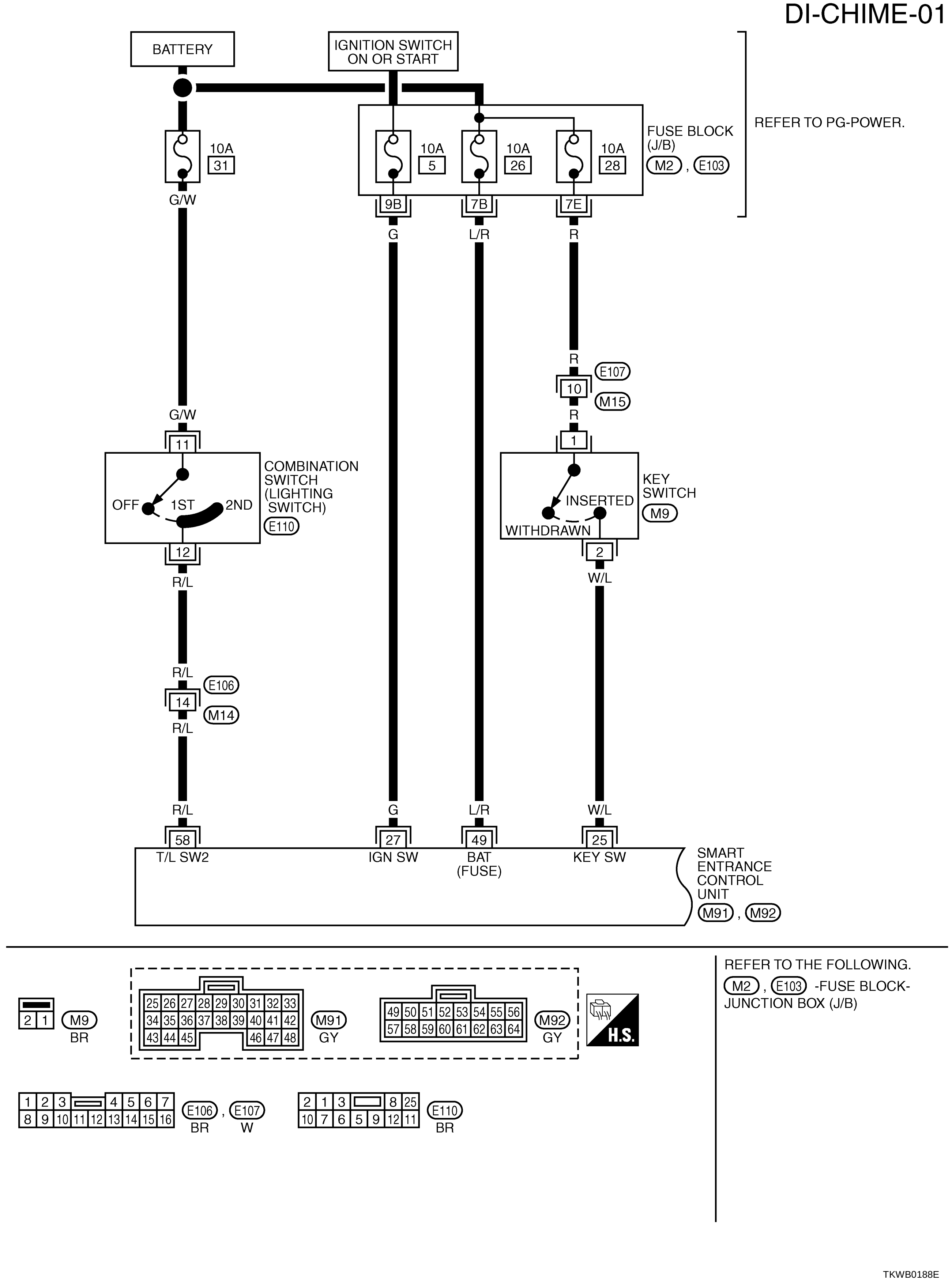
AKS00C35



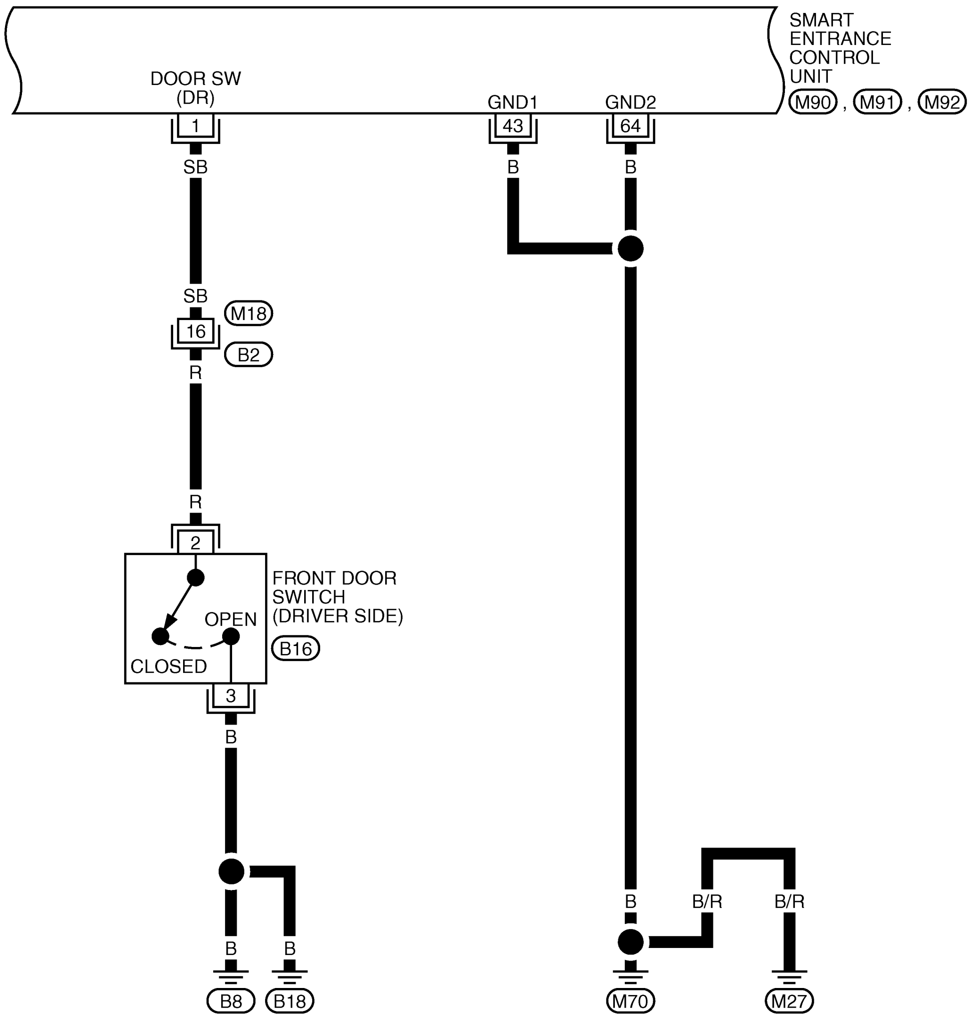
TKWB0269E

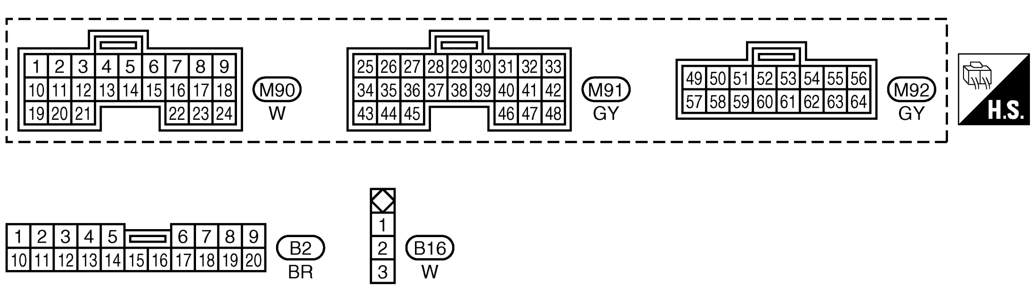
Wiring Diagram — CHIME —

AKS00BB5

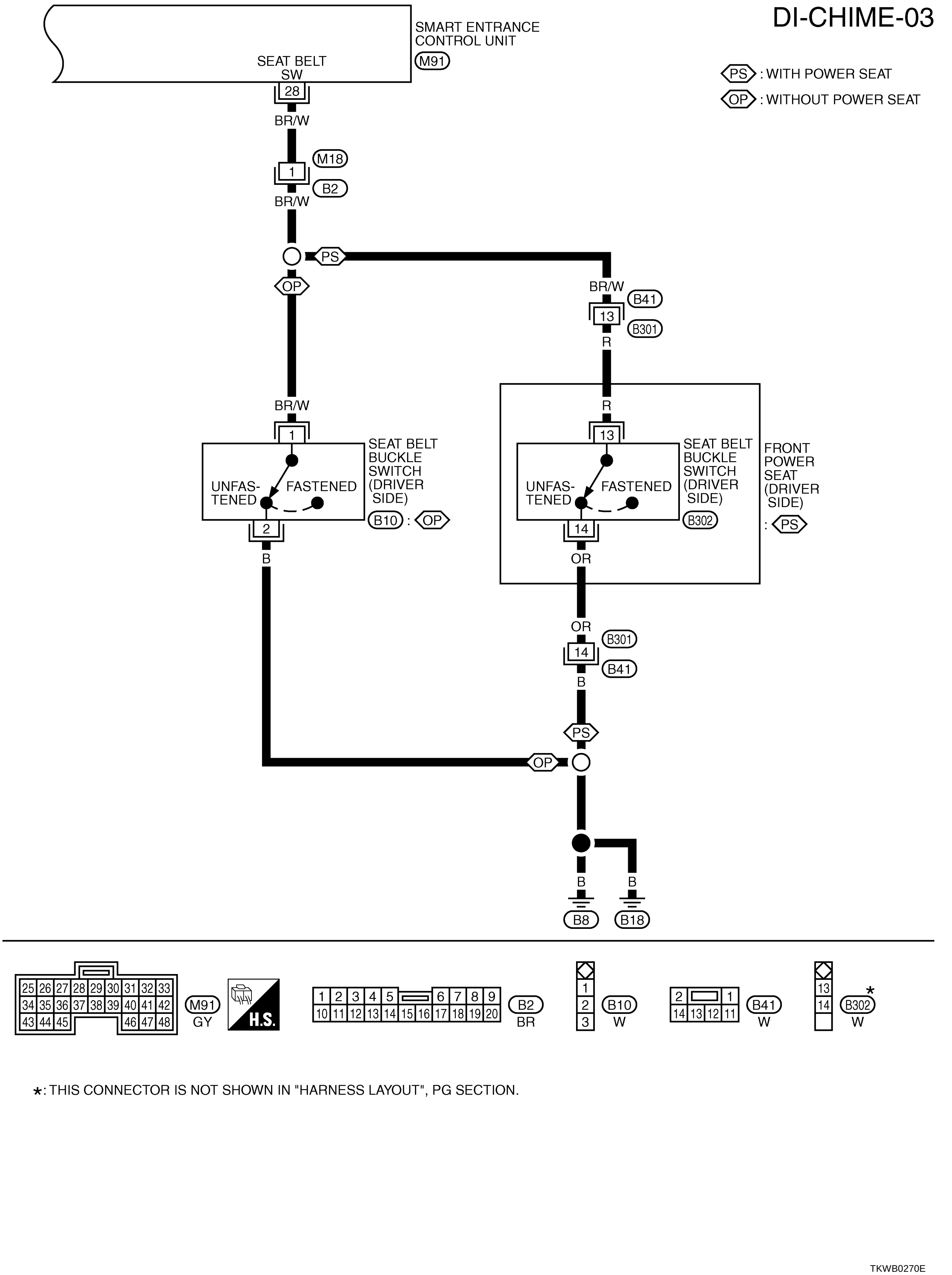


DI-CHIME-02





TKWB0189E


DI-CHIME-03
SMART ENTRANCE CONTROL UNIT
M91
SEAT BELT SW
28
BR/W
M18
1
B2
PS : WITH POWER SEAT
OP : WITHOUT POWER SEAT
PS
OP
B41
13
B301
R
SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
B10 : OP
UNFAS-TENED
FASTENED
2
B
SEAT BELT BUCKLE SWITCH (DRIVER SIDE)
B302
14
OR
FRONT POWER SEAT (DRIVER SIDE)
: PS
B8
B18
M91
GY
H.S.
B2
BR
B10
W
B41
W
B302
W
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.
TKWB0270E

Terminals and Reference Value for Smart Entrance Control Unit

AKS00BQR

Terminal No.	Wire color	Item	Condition			Reference values (Approximate values)
			Ignition switch	Operation		
1	SB	Front door switch (Driver side)	OFF	Front door (driver side)	Closed	12 V
					Open	0 V
25	W/L	Key switch (Insert)	OFF	Key inserted		12 V
				Key removed from ignition key cylinder		0 V
27	G	Ignition switch (ON)	ON	—		Battery voltage
28	BR/W	Seat belt buckle switch (Driver side)	ON	Seat belt buckle	Unfastened	0 V
					Fastened	12 V
43	B	Ground	ON	—		0 V
49	L/R	Power source (Fuse)	OFF	—		Battery voltage
58	R/L	Lighting switch	OFF	Lighting switch is 1ST or 2ND positions		12 V
				Lighting switch is OFF position		0 V
64	B	Ground	ON	—		0 V

Trouble Diagnosis

AKS00BQ8

HOW TO PROCEED WITH TROUBLE DIAGNOSIS

1. Confirm the symptom and customer complaint.
2. Understand the outline of system. Refer to DI-42, "System Description" .
3. Referring to trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to DI-48, "SYMPTOM CHART" .
4. Does warning chime system operate normally? If it operates normally, GO TO 5. If not, GO TO 3.
5. INSPECTION END

SYMPTOM CHART

Symptom	Diagnoses/Service procedure	Reference page
All warning chimes do not activate.	Power supply and ground circuit Inspection	DI-48
	If above systems are OK, replace smart entrance control unit	—
Light warning chime and key warning chime does not activate (Seat belt warning chime does activate)	Front door switch (driver side) Inspection	DI-49
	If above systems are OK, replace smart entrance control unit	—
Light warning chime does not activate.	Lighting switch input signal Inspection	DI-51
	If above systems are OK, replace smart entrance control unit	—
Key warning chime does not activate.	Key switch insert signal Inspection	DI-51
	If above systems are OK, replace smart entrance control unit	—
Seat belt warning chime does not activate	Seat belt buckle switch input signal Inspection [without power seat]	DI-52
	Seat belt buckle switch input signal Inspection [with power seat]	DI-54
	If above systems are OK, replace smart entrance control unit	—

Power Supply and Ground Circuit Inspection

AKS00BB8

1. CHECK FUSE

Check for blown smart entrance control unit fuses. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .

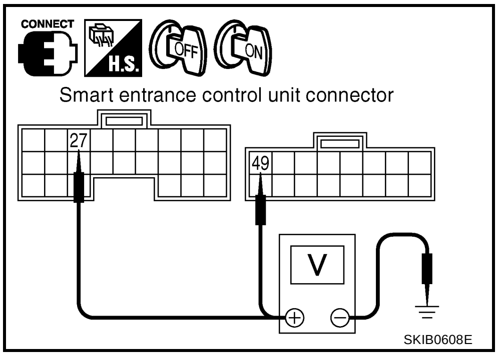
Unit	Power source	Fuse No.
Smart entrance control unit	Battery	26
	Ignition switch (ON)	5

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

2. CHECK POWER SUPPLY CIRCUIT

Check voltage between smart entrance control unit and ground.

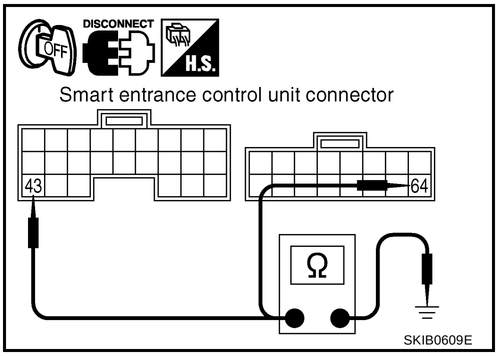


Terminals			Ignition switch position	
(+)		(–)	OFF	ON
Connector	Terminal (Wire color)			
M92	49 (L/R)	Ground	Battery voltage	Battery voltage
M91	27 (G)		0 V	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Check harness between fuse and smart entrance control unit.

3. CHECK GROUND CIRCUIT



1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check continuity between smart entrance control unit harness connector M91 terminal 43 (B) and ground.

   43 (B) – Ground : Continuity should exist.

4. Check continuity between smart entrance control unit harness connector M92 terminal 64 (B) and ground.

   64 (B) – Ground : Continuity should exist.

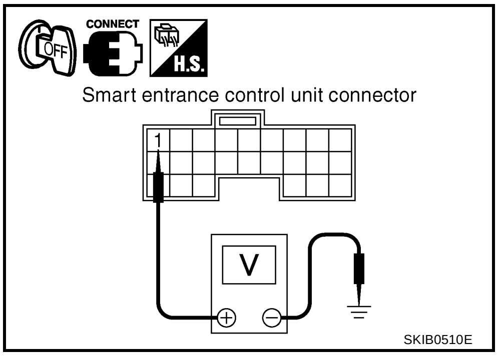
OK or NG

OK >> Power supply and ground circuit are OK.
NG >> Repair ground harness.

Front Door Switch (Driver Side) Inspection

AKS00BB9

1. CHECK DOOR SWITCH INPUT SIGNAL



1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector M90 terminal 1 (SB) and ground.

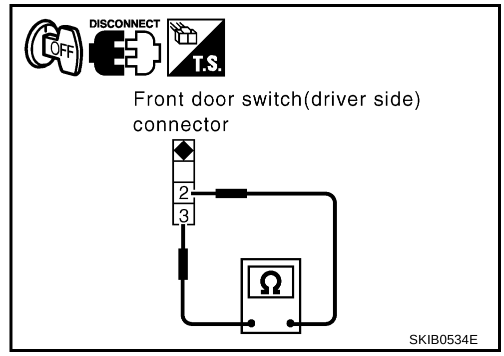
   1 (SB) – Ground
   When driver door is opened : Approx. 0 V
   When driver door is closed : Approx. 12 V

OK or NG

OK >> Front door switch (driver side) is OK.
NG >> GO TO 2.

2. CHECK FRONT DOOR SWITCH (DRIVER SIDE)

1. Disconnect front door switch (driver side) connector.
2. Check continuity between front door switch (driver side) B16 terminals 2 and 3.



2 – 3

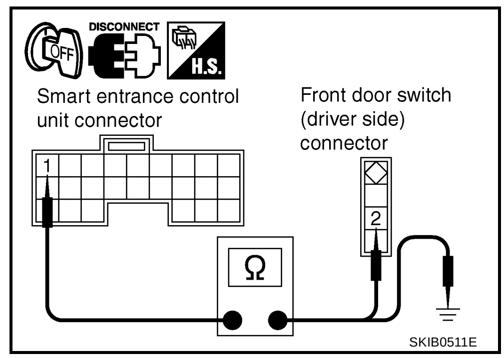
When door switch is released	**: Continuity should exist.**
When door switch is pushed	**: Continuity should not exist.**

OK or NG

OK >> GO TO 3.
NG >> Replace front door switch (driver side).

3. CHECK FRONT DOOR SWITCH CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between smart entrance control unit harness connector M90 terminal 1 (SB) and front door switch (driver side) harness connector B16 terminal 2 (R).



1 (SB) – 2 (R) : Continuity should exist.

3. Check continuity between smart entrance control unit harness connector M90 terminal 1 (SB) and ground.

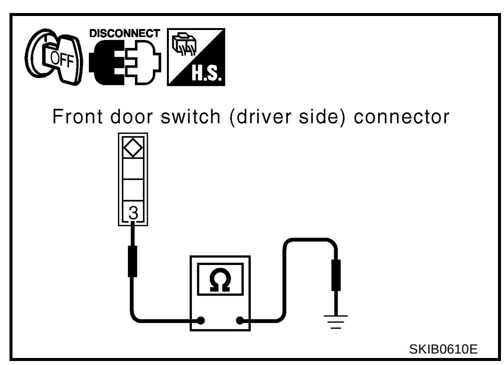
1 (SB) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK FRONT DOOR SWITCH GROUND CIRCUIT

Check continuity between front door switch (driver side) harness connector B16 terminal 3 (B) and ground.



3 (B) – Ground : Continuity should exist.

OK or NG

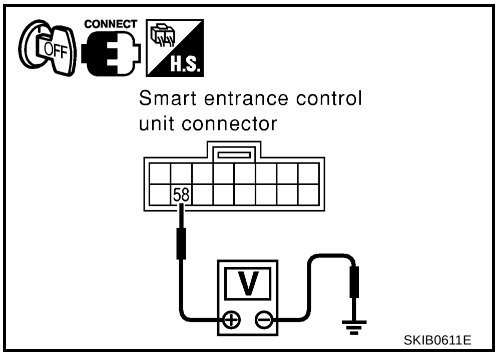
OK >> Replace smart entrance control unit.
NG >> Repair harness or connector.

Lighting Switch Input Signal Inspection

AKS00BBA

1. CHECK LIGHTING SWITCH INPUT SIGNAL

1. Turn ignition switch OFF.
2. Check voltage between smart entrance control unit harness connector M92 terminal 58 (R/L) and ground.



58 (R/L) – Ground

Lighting switch (1st or 2nd position)	**: Approx. 12 V**
Lighting switch (OFF)	**: Approx. 0 V**

OK or NG

OK >> Lighting switch is OK.
NG >> GO TO 2.

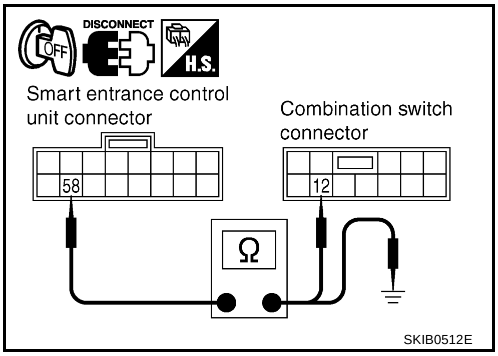
2. CHECK LIGHTING SWITCH CIRCUIT

1. Disconnect smart entrance control unit connector and combination switch connector.
2. Check continuity between smart entrance control unit harness connector M92 terminal 58 (R/L) and combination switch harness connector E110 terminal 12 (R/L).

   58 (R/L) – 12 (R/L) : Continuity should exist.

3. Check continuity between smart entrance control unit harness connector M92 terminal 58 (R/L) and ground.

   58 (R/L) – Ground : Continuity should not exist.



OK or NG

OK >> Check combination switch. Refer to LT-42, "COMBINATION SWITCH" .
NG >> Repair harness or connector.

Key Switch Insert Signal Inspection

AKS00BBB

1. CHECK FUSE

Check for blown key switch fuses. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .

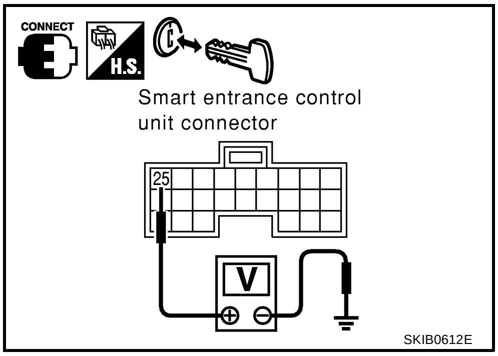
Unit	Power source	Fuse No.
Key switch	Battery	28

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.

2. CHECK KEY SWITCH INPUT SIGNAL

Check voltage between smart entrance control unit harness connector M91 terminal 25 (W/L) and ground.



25 (W/L) – Ground

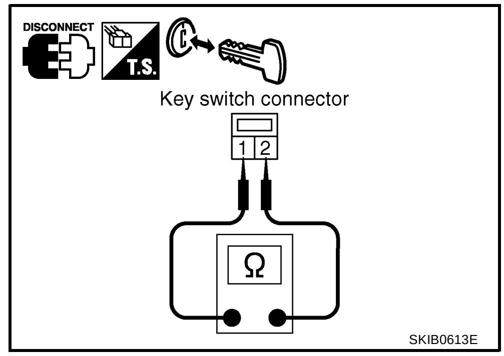
When key is inserted to ignition key cylinder	**: Approx. 12 V**
When key is removed from ignition key cylinder	**: Approx. 0 V**

OK or NG

OK >> Key switch is OK.
NG >> GO TO 3.

3. CHECK KEY SWITCH (INSERT)

1. Disconnect key switch connector.
2. Check continuity between key switch connector M9 terminals 1 and 2.



1 – 2

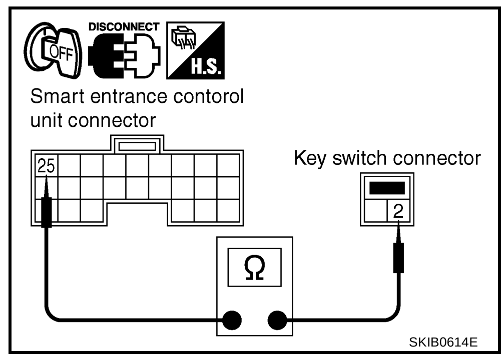
When key is inserted to ignition key cylinder	**: Continuity should exist.**
When key is removed from ignition key cylinder	**: Continuity should not exist.**

OK or NG

OK >> GO TO 4.
NG >> Replace key switch.

4. CHECK KEY SWITCH CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between smart entrance control unit harness connector M91 terminal 25 (W/L) and key switch harness connector M9 terminal 2 (W/L).



25 (W/L) – 2 (W/L) : Continuity should exist.

OK or NG

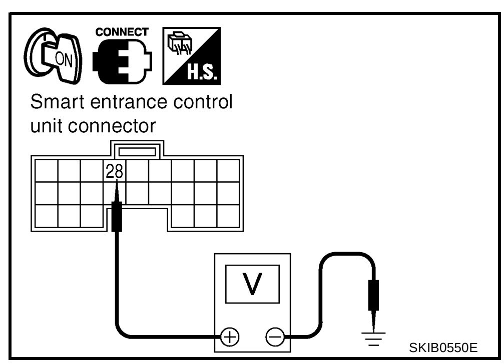
OK >> Check continuity open between key switch and fuse.
NG >> Repair harness or connector.

Seat Belt Buckle Switch Input Signal Inspection [Without Power Seat]

AKS00BQK

1. CHECK SEAT BELT BUCKLE SWITCH INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between smart entrance control unit harness connector M91 terminal 28 (BR/W) and ground.



28 (BR/W) – Ground

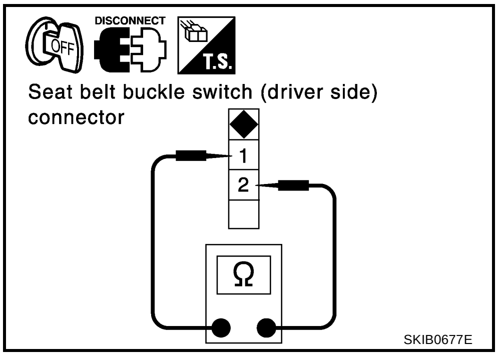
When seat belt is fastened	**: Approx. 12 V**
When seat belt is unfastened	**: Approx. 0 V**

OK or NG

OK >> Seat belt buckle switch is OK.
NG >> GO TO 2.

2. CHECK SEAT BELT BUCKLE SWITCH

1. Turn ignition switch OFF.
2. Disconnect seat belt buckle switch (driver side) connector.
3. Check continuity seat belt buckle switch (driver side) connector terminals 1 and 2.



1 – 2

When seat belt is fastened	**: Continuity should not exist.**
When seat belt is unfastened	**: Continuity should exist.**

OK or NG

OK >> GO TO 3.
NG >> Replace seat belt buckle switch (driver side).

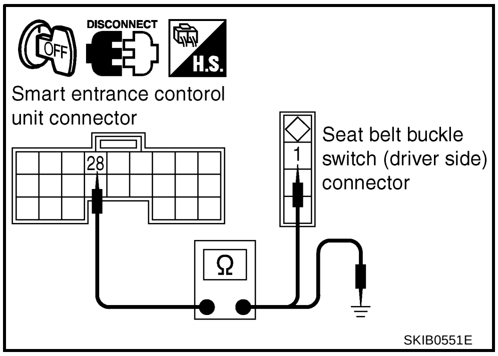
3. CHECK SEAT BELT BUCKLE SWITCH CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between smart entrance control unit harness connector M91 terminal 28 (BR/W) and seat belt buckle switch (driver side) harness connector B10 terminal 1 (BR/W).

28 (BR/W) – 1 (BR/W) : Continuity should exist.

3. Check continuity between smart entrance control unit harness connector M91 terminal 28 (BR/W) and ground.

28 (BR/W) – Ground : Continuity should not exist.



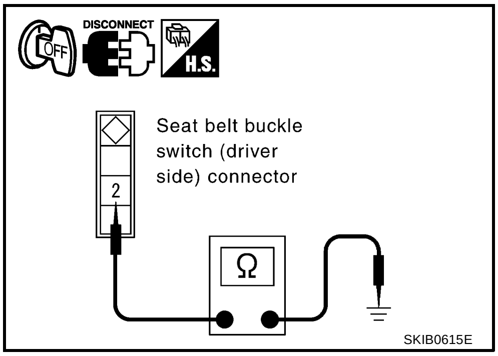
OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK SEAT BELT BUCKLE SWITCH GROUND CIRCUIT

Check continuity between seat belt buckle switch (driver side) harness connector B10 terminal 2 (B) and ground.

2 (B) – Ground : Continuity should exist.



OK or NG

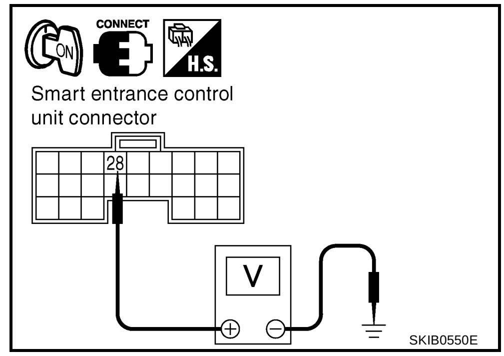
OK >> Replace smart entrance control unit.
NG >> Repair harness or connector.

Seat Belt Buckle Switch Input Signal Inspection [With Power Seat]

AKS00BQL

1. CHECK SEAT BELT BUCKLE SWITCH INPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between smart entrance control unit harness connector M91 terminal 28 (BR/W) and ground.



28 (BR/W) – Ground

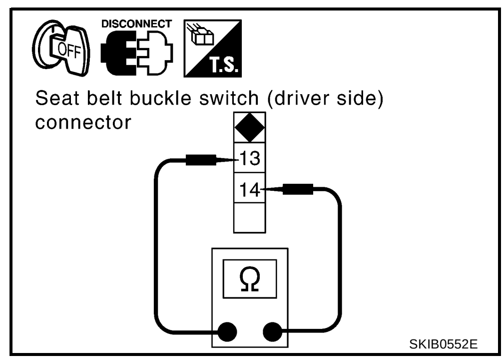
When seat belt is fastened	**: Approx. 12 V**
When seat belt is unfastened	**: Approx. 0 V**

OK or NG

OK >> Seat belt buckle switch is OK.
NG >> GO TO 2.

2. CHECK SEAT BELT BUCKLE SWITCH

1. Turn ignition switch OFF.
2. Disconnect seat belt buckle switch (driver side) connector.
3. Check continuity seat belt buckle switch (driver side) connector terminals 13 and 14.



13 – 14

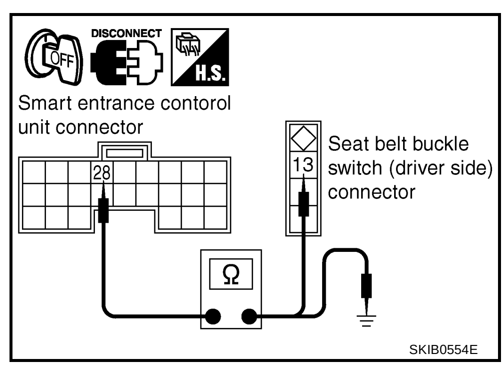
When seat belt is fastened	**: Continuity should not exist.**
When seat belt is unfastened	**: Continuity should exist.**

OK or NG

OK >> GO TO 3.
NG >> Replace seat belt buckle switch (driver side).

3. CHECK SEAT BELT BUCKLE SWITCH CIRCUIT

1. Disconnect smart entrance control unit connector.
2. Check continuity between smart entrance control unit harness connector M91 terminal 28 (BR/W) and seat belt buckle switch (driver side) harness connector B302 terminal 13 (R).



28 (BR/W) – 13 (R) : Continuity should exist.

3. Check continuity between smart entrance control unit harness connector M91 terminal 28 (BR/W) and ground.

28 (BR/W) – Ground : Continuity should not exist.

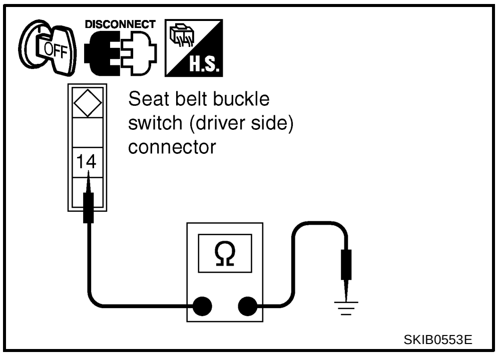
OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK SEAT BELT BUCKLE SWITCH GROUND CIRCUIT

Check continuity between seat belt buckle switch (driver side) harness connector B302 terminal 14 (OR) and ground.

14 (OR) – Ground : Continuity should exist.



OK or NG

OK >> Replace smart entrance control unit.
NG >> Repair harness or connector.

A
B
C
D
E
F
G
H
I
J
DI
L
M

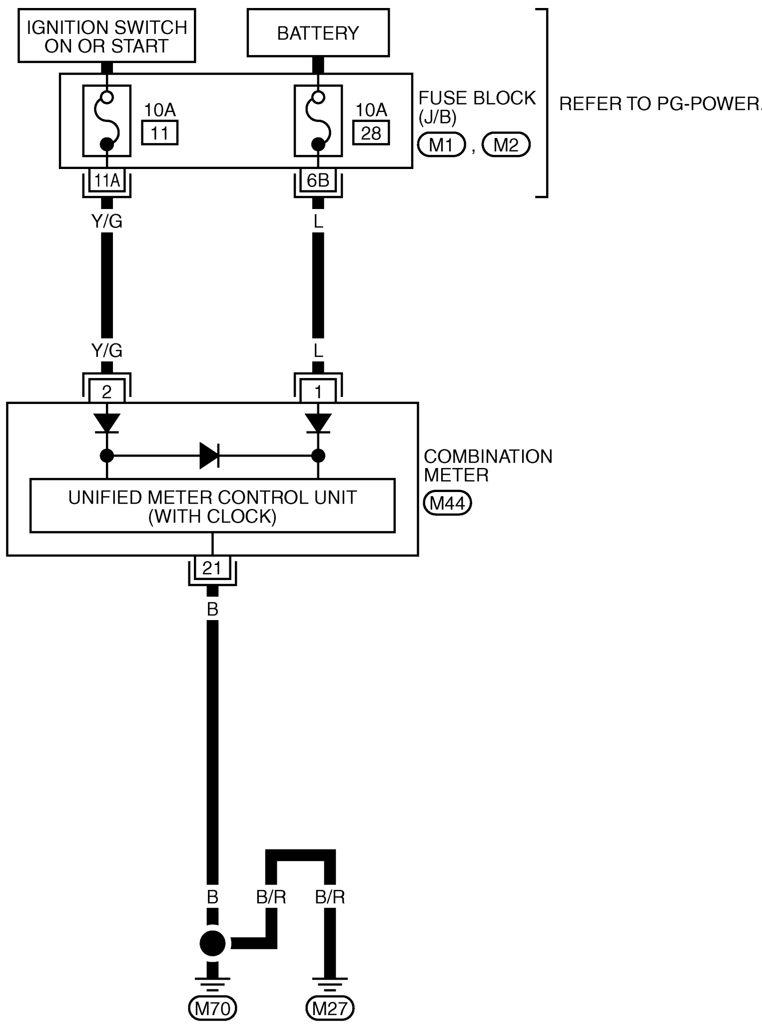
CLOCK

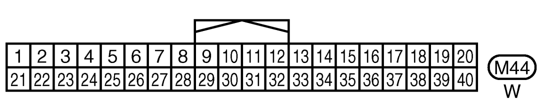
PFP:25820

Wiring Diagram — CLOCK —

AKS00BBC

DI-CLOCK-01





REFER TO THE FOLLOWING.
M1, M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TKWA1859E

SECTION EC
ENGINE CONTROL SYSTEM

CONTENTS

INDEX FOR DTC

PFP:00024

DTC No. Index

ABS00D80

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
No DTC	Flashing*6	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	EC-62
U1000	1000*4	CAN COMM CIRCUIT	EC-163
U1001	1001*4	CAN COMM CIRCUIT	EC-163
P0000	**0000**	**NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.**	—
P0011	0011	INT/V TIM CONT-B1	EC-166
P0031	0031	HO2S1 HTR (B1)	EC-170
P0032	0032	HO2S1 HTR (B1)	EC-170
P0037	0037	HO2S2 HTR (B1)	EC-176
P0038	0038	HO2S2 HTR (B1)	EC-176
P0101	0101	MAF SEN/CIRCUIT	EC-182
P0102	0102	MAF SEN/CIRCUIT	EC-191
P0103	0103	MAF SEN/CIRCUIT	EC-191
P0112	0112	IAT SEN/CIRCUIT	EC-199
P0113	0113	IAT SEN/CIRCUIT	EC-199
P0117	0117	ECT SEN/CIRC	EC-205
P0118	0118	ECT SEN/CIRC	EC-205
P0122	0122	TP SEN 2/CIRC	EC-211
P0123	0123	TP SEN 2/CIRC	EC-211
P0125	0125	ECT SENSOR	EC-219
P0127	0127	IAT SENSOR	EC-222
P0128	0128	THERMSTAT FNCTN	EC-225
P0132	0132	HO2S1 (B1)	EC-225
P0133	0133	HO2S1 (B1)	EC-234
P0134	0134	HO2S1 (B1)	EC-244
P0138	0138	HO2S2 (B1)	EC-252
P0139	0139	HO2S2 (B1)	EC-259
P0171	0171	FUEL SYS-LEAN-B1	EC-267
P0172	0172	FUEL SYS-RICH-B1	EC-274
P0181	0181	FTT SENSOR	EC-280
P0182	0182	FTT SEN/CIRCUIT	EC-286
P0183	0183	FTT SEN/CIRCUIT	EC-286
P0222	0222	TP SEN 1/CIRC	EC-291
P0223	0223	TP SEN 1/CIRC	EC-291
P0300	0300	MULTI CYL MISFIRE	EC-299
P0301	0301	CYL 1 MISFIRE	EC-299

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P0302	0302	CYL 2 MISFIRE	EC-299
P0303	0303	CYL 3 MISFIRE	EC-299
P0304	0304	CYL 4 MISFIRE	EC-299
P0327	0327	KNOCK SEN/CIRC-B1	EC-306
P0328	0328	KNOCK SEN/CIRC-B1	EC-306
P0335	0335	CKP SEN/CIRCUIT	EC-311
P0340	0340	CMP SEN/CIRC-B1	EC-319
P0420	0420	TW CATALYST SYS-B1	EC-327
P0441	0441	EVAP PURG FLOW/MON	EC-332
P0442	0442	EVAP SMALL LEAK	EC-338
P0444	0444	PURG VOLUME CONT/V	EC-348
P0445	0445	PURG VOLUME CONT/V	EC-348
P0447	0447	VENT CONTROL VALVE	EC-355
P0451	0451	EVAP SYS PRES SEN	EC-362
P0452	0452	EVAP SYS PRES SEN	EC-365
P0453	0453	EVAP SYS PRES SEN	EC-372
P0455	0455	EVAP GROSS LEAK	EC-380
P0456	0456	EVAP VERY SML LEAK	EC-388
P0460	0460	FUEL LEV SEN SLOSH	EC-399
P0461	0461	FUEL LEVEL SENSOR	EC-401
P0462	0462	FUEL LEVL SEN/CIRC	EC-403
P0463	0463	FUEL LEVL SEN/CIRC	EC-403
P0500	0500	VEH SPEED SEN/CIRC*5	EC-405
P0506	0506	ISC SYSTEM	EC-407
P0507	0507	ISC SYSTEM	EC-409
P0550	0550	PW ST P SEN/CIRC	EC-411
P0605	0605	ECM	EC-416
P0705	0705	PNP SW/CIRC	AT-98
P0710	0710	ATF TEMP SEN/CIRC	AT-104
P0720	0720	VEH SPD SEN/CIR AT*5	AT-109
P0725	0725	ENGINE SPEED SIG	AT-115
P0731	0731	A/T 1ST GR FNCTN	AT-120
P0732	0732	A/T 2ND GR FNCTN	AT-125
P0733	0733	A/T 3RD GR FNCTN	AT-130
P0734	0734	A/T 4TH GR FNCTN	AT-135
P0740	0740	TCC SOLENOID/CIRC	AT-142
P0744	0744	A/T TCC S/V FNCTN	AT-147
P0745	0745	L/PRESS SOL/CIRC	AT-155
P0750	0750	SFT SOL A/CIRC	AT-162
P0755	0755	SFT SOL B/CIRC	AT-167
P1065	1065	ECM BACK UP/CIRC	EC-419
P1111	1111	INT/V TIM V/CIR-B1	EC-423

DTC*1		Items (CONSULT-II screen terms)	Reference page
CONSULT-II GST*2	ECM*3		
P1121	1121	ETC ACTR	EC-427
P1122	1122	ETC FUNCTION/CIRC	EC-429
P1124	1124	ETC MOT PWR	EC-437
P1126	1126	ETC MOT PWR	EC-437
P1128	1128	ETC MOT	EC-443
P1143	1143	HO2S1 (B1)	EC-448
P1144	1144	HO2S1 (B1)	EC-454
P1146	1146	HO2S2 (B1)	EC-460
P1147	1147	HO2S2 (B1)	EC-468
P1148	1148	CLOSED LOOP-B1	EC-476
P1211	1211	TCS C/U FUNCTION	EC-478
P1212	1212	TCS/CIRC	EC-479
P1217	1217	ENG OVER TEMP	EC-480
P1225	1225	CTP LEARNING	EC-495
P1226	1226	CTP LEARNING	EC-497
P1229	1229	SENSOR POWER/CIRC	EC-499
P1444	1444	PURG VOLUME CONT/V	EC-504
P1446	1446	VENT CONTROL VALVE	EC-512
P1564	1564	ASCD SW	EC-519
P1572	1572	ASCD BRAKE SW	EC-527
P1574	1574	ASCD VHL SPD SEN	EC-538
P1610 - P1615	1610 - 1615	NATS MALFUNCTION	EC-46
P1705	1705	TP SEN/CIRC A/T	AT-172
P1706	1706	P-N POS SW/CIRCUIT	EC-540
P1720	1720	V/SP SEN (A/T OUT)	AT-109
P1760	1760	O/R CLTCH SOL/CIRC	AT-177
P1800	1800	VIAS S/V CIRC	EC-545
P1805	1805	BRAKE SW/CIRCUIT	EC-550
P2122	2122	APP SEN 1/CIRC	EC-555
P2123	2123	APP SEN 1/CIRC	EC-555
P2127	2127	APP SEN 2/CIRC	EC-562
P2128	2128	APP SEN 2/CIRC	EC-562
P2135	2135	TP SENSOR	EC-570
P2138	2138	APP SENSOR	EC-578

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by SAE J2012.
*3: In Diagnostic Test Mode II (Self-diagnostic results), this number is controlled by NISSAN.
*4: The troubleshooting for this DTC needs CONSULT-II.
*5: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.
*6: When engine is running.

Alphabetical Index

ABS00D7Z

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000, U1001. Refer to **EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE"** **.**

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
A/T 1ST GR FNCTN	P0731	0731	AT-120
A/T 2ND GR FNCTN	P0732	0732	AT-125
A/T 3RD GR FNCTN	P0733	0733	AT-130
A/T 4TH GR FNCTN	P0734	0734	AT-135
A/T TCC S/V FNCTN	P0744	0744	AT-147
APP SEN 1/CIRC	P2122	2122	EC-555
APP SEN 1/CIRC	P2123	2123	EC-555
APP SEN 2/CIRC	P2127	2127	EC-562
APP SEN 2/CIRC	P2128	2128	EC-562
APP SENSOR	P2138	2138	EC-578
ASCD BRAKE SW	P1572	1572	EC-527
ASCD SW	P1564	1564	EC-519
ASCD VHL SPD SEN	P1574	1574	EC-538
ATF TEMP SEN/CIRC	P0710	0710	AT-104
BRAKE SW/CIRCUIT	P1805	1805	EC-550
CAN COMM CIRCUIT	U1000	1000*4	EC-163
CAN COMM CIRCUIT	U1001	1001*4	EC-163
CKP SEN/CIRCUIT	P0335	0335	EC-311
CLOSED LOOP-B1	P1148	1148	EC-476
CMP SEN/CIRC-B1	P0340	0340	EC-319
CTP LEARNING	P1225	1225	EC-495
CTP LEARNING	P1226	1226	EC-497
CYL 1 MISFIRE	P0301	0301	EC-299
CYL 2 MISFIRE	P0302	0302	EC-299
CYL 3 MISFIRE	P0303	0303	EC-299
CYL 4 MISFIRE	P0304	0304	EC-299
ECM	P0605	0605	EC-416
ECM BACK UP/CIRC	P1065	1065	EC-419
ECT SEN/CIRC	P0117	0117	EC-205
ECT SEN/CIRC	P0118	0118	EC-205
ECT SENSOR	P0125	0125	EC-219
ENG OVER TEMP	P1217	1217	EC-480
ENGINE SPEED SIG	P0725	0725	AT-115
ETC ACTR	P1121	1121	EC-427
ETC FUNCTION/CIRC	P1122	1122	EC-429
ETC MOT	P1128	1128	EC-443
ETC MOT PWR	P1124	1124	EC-437
ETC MOT PWR	P1126	1126	EC-437
EVAP GROSS LEAK	P0455	0455	EC-380

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
EVAP PURG FLOW/MON	P0441	0441	EC-332
EVAP SMALL LEAK	P0442	0442	EC-338
EVAP SYS PRES SEN	P0451	0451	EC-362
EVAP SYS PRES SEN	P0452	0452	EC-365
EVAP SYS PRES SEN	P0453	0453	EC-372
EVAP VERY SML LEAK	P0456	0456	EC-388
FTT SEN/CIRCUIT	P0182	0182	EC-286
FTT SEN/CIRCUIT	P0183	0183	EC-286
FTT SENSOR	P0181	0181	EC-280
FUEL LEV SEN SLOSH	P0460	0460	EC-399
FUEL LEVEL SENSOR	P0461	0461	EC-401
FUEL LEVL SEN/CIRC	P0462	0462	EC-403
FUEL LEVL SEN/CIRC	P0463	0463	EC-403
FUEL SYS-LEAN-B1	P0171	0171	EC-267
FUEL SYS-RICH-B1	P0172	0172	EC-274
HO2S1 (B1)	P0132	0132	EC-227
HO2S1 (B1)	P0133	0133	EC-234
HO2S1 (B1)	P0134	0134	EC-244
HO2S1 (B1)	P1143	1143	EC-448
HO2S1 (B1)	P1144	1144	EC-454
HO2S1 HTR (B1)	P0031	0031	EC-170
HO2S1 HTR (B1)	P0032	0032	EC-170
HO2S2 (B1)	P0138	0138	EC-252
HO2S2 (B1)	P0139	0139	EC-259
HO2S2 (B1)	P1146	1146	EC-460
HO2S2 (B1)	P1147	1147	EC-468
HO2S2 HTR (B1)	P0037	0037	EC-176
HO2S2 HTR (B1)	P0038	0038	EC-176
IAT SEN/CIRCUIT	P0112	0112	EC-199
IAT SEN/CIRCUIT	P0113	0113	EC-199
IAT SENSOR	P0127	0127	EC-222
INT/V TIM CONT-B1	P0011	0011	EC-166
INT/V TIM V/CIR-B1	P1111	1111	EC-423
ISC SYSTEM	P0506	0506	EC-407
ISC SYSTEM	P0507	0507	EC-409
KNOCK SEN/CIRC-B1	P0327	0327	EC-306
KNOCK SEN/CIRC-B1	P0328	0328	EC-306
L/PRESS SOL/CIRC	P0745	0745	AT-155
MAF SEN/CIRCUIT	P0101	0101	EC-182
MAF SEN/CIRCUIT	P0102	0102	EC-191
MAF SEN/CIRCUIT	P0103	0103	EC-191
MULTI CYL MISFIRE	P0300	0300	EC-299

INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC*1		Reference page
	CONSULT-II GST*2	ECM*3	
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	EC-46
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No DTC	Flashing*6	EC-62
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	**P0000**	**0000**	—
O/R CLTCH SOL/CIRC	P1760	1760	AT-177
P-N POS SW/CIRCUIT	P1706	1706	EC-540
PNP SW/CIRC	P0705	0705	AT-98
PURG VOLUME CONT/V	P0444	0444	EC-348
PURG VOLUME CONT/V	P0445	0445	EC-348
PURG VOLUME CONT/V	P1444	1444	EC-504
PW ST P SEN/CIRC	P0550	0550	EC-411
SENSOR POWER/CIRC	P1229	1229	EC-499
SFT SOL A/CIRC	P0750	0750	AT-162
SFT SOL B/CIRC	P0755	0755	AT-167
TCC SOLENOID/CIRC	P0740	0740	AT-142
TCS C/U FUNCTIION	P1211	1211	EC-478
TCS/CIRC	P1212	1212	EC-479
THERMSTAT FNCTN	P0128	0128	EC-225
TP SEN 1/CIRC	P0222	0222	EC-291
TP SEN 1/CIRC	P0223	0223	EC-291
TP SEN 2/CIRC	P0122	0122	EC-211
TP SEN 2/CIRC	P0123	0123	EC-211
TP SENSOR	P2135	2135	EC-570
TP SEN/CIRC A/T	P1705	1705	AT-172
TW CATALYST SYS-B1	P0420	0420	EC-327
V/SP SEN (A/T OUT)	P1720	1720	AT-109
VEH SPD SEN/CIR AT*5	P0720	0720	AT-109
VEH SPEED SEN/CIRC*5	P0500	0500	EC-405
VENT CONTROL VALVE	P0447	0447	EC-355
VENT CONTROL VALVE	P1446	1446	EC-460
VIAS S/V CIRC	P1800	1800	EC-545

*1: 1st trip DTC No. is the same as DTC No.
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*4: The troubleshooting for this DTC needs CONSULT-II.
*5: When the fail-safe operations for both self-diagnoses occur, the MIL illuminates.
*6: When engine is running.

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

ABS00DCS

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

On Board Diagnostic (OBD) System of Engine and A/T

ABS00CKO

The ECM has an on board diagnostic system. It will light up the malfunction indicator (MIL) to warn the driver of a malfunction causing emission deterioration.

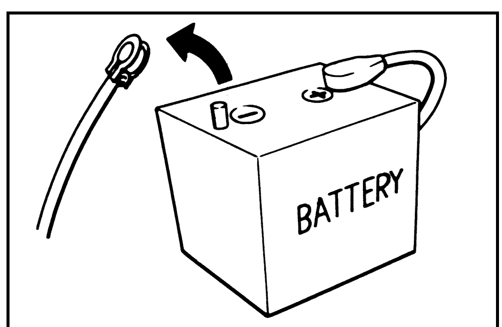
CAUTION:

- **Be sure to turn the ignition switch OFF and disconnect the battery ground cable before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)**
- **Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG-44, "HARNESS CONNECTOR" .**
- **Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.**
- **Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EVAP system or fuel injection system, etc.**
- **Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.**

Precaution

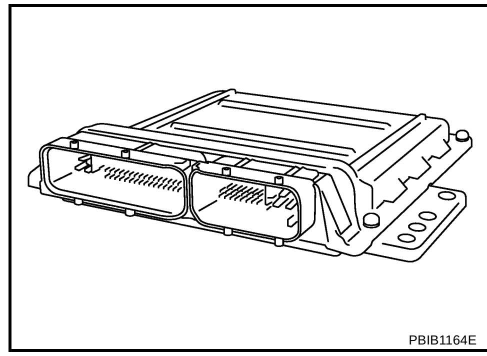
ABS00CKP

- **Always use a 12 volt battery as power source.**
- **Do not attempt to disconnect battery cables while engine is running.**
- **Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect battery ground cable. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned OFF.**
- **Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.**

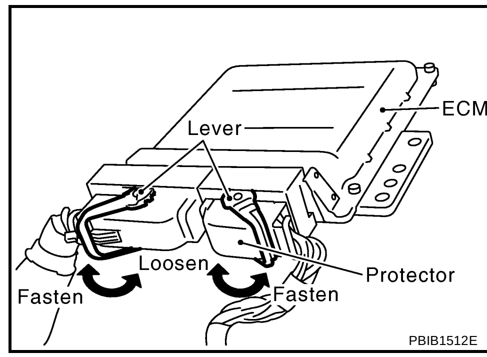


SEF289H

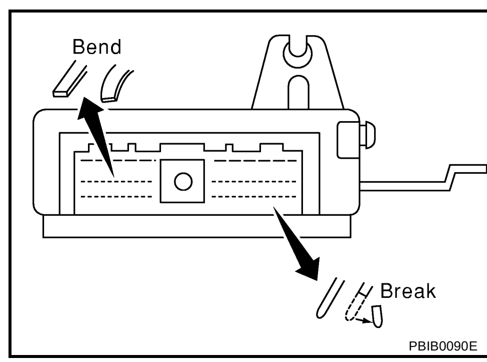
- Do not disassemble ECM.
- If battery cable is disconnected, the memory will return to the initial ECM values.
  The ECM will now start to self-control at its initial values. Engine operation can vary slightly when the cable is disconnected. However, this is not an indication of a malfunction. Do not replace parts because of a slight variation.



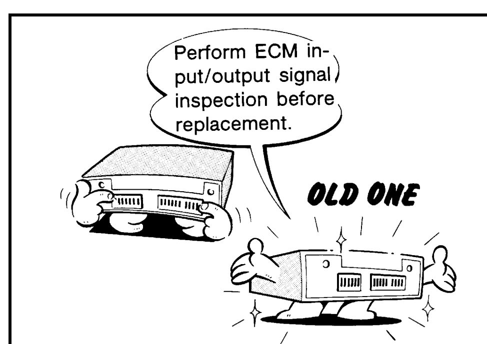
- If the battery is disconnected, the following emission related diagnostic information will be lost within 24 hours.
  - Diagnostic trouble codes
  - 1st trip diagnostic trouble codes
  - Freeze frame data
  - 1st freeze frame data
  - System readiness test (SRT) codes
  - Test values
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown in the figure.



- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
  Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.

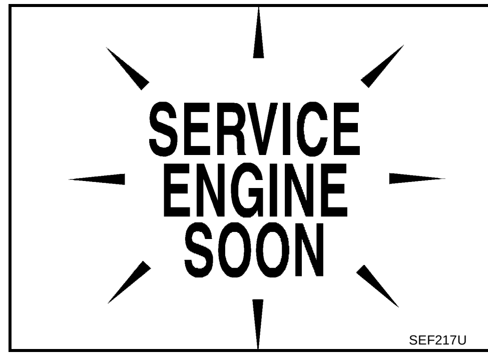


- Securely connect ECM harness connectors.
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep engine control system harness at least 10 cm (4 in) away from adjacent harness, to prevent engine control system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep engine control system parts and harness dry.
- Before replacing ECM, perform “ECM Terminals and Reference Value” inspection and make sure ECM functions properly. Refer to EC-115, "ECM Terminals and Reference Value"
  .



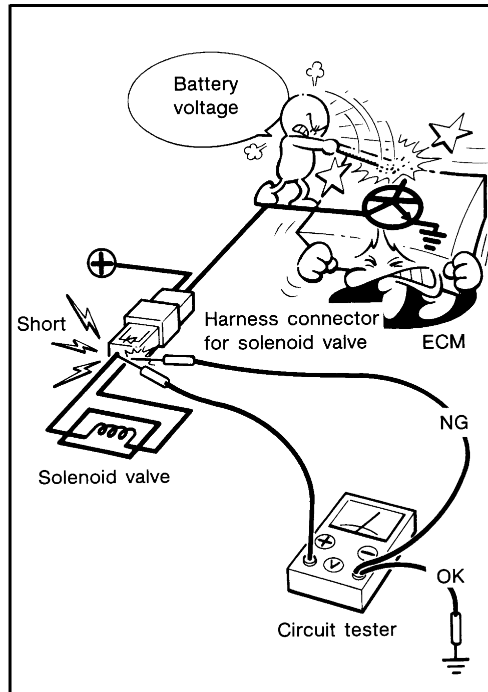
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble electric throttle control actuator.
- Even a slight leak in the air intake system can cause serious incidents.
- Do not shock or jar the camshaft position sensor (PHASE), crankshaft position sensor (POS).

- **After performing each TROUBLE DIAGNOSIS, perform DTC Confirmation Procedure or Overall Function Check.**
  The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Overall Function Check should be a good result if the repair is completed.



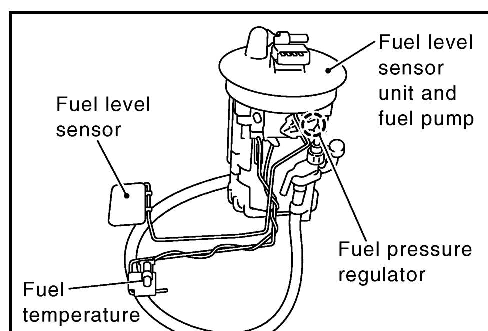
SEF217U

- **When measuring ECM signals with a circuit tester, connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.**
- **When measuring ECM signals with a circuit tester, never allow the two tester probes to contact.**
  Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- **Do not use ECM ground terminals when measuring input/ output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.**



SEF348N

- **Do not operate fuel pump when there is no fuel in lines.**
- **Tighten fuel hose clamps to the specified torque.**



PBIB2344E

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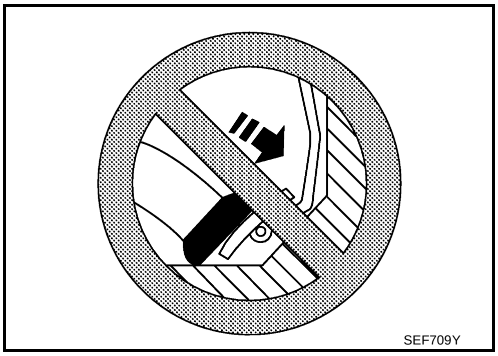
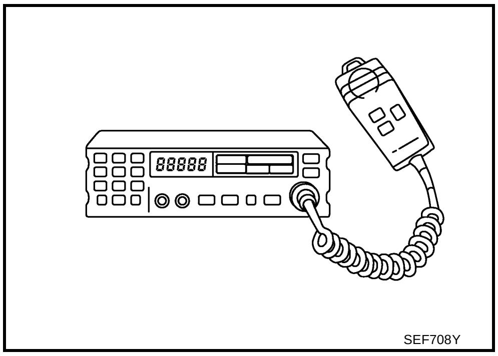
- **Do not depress accelerator pedal when starting.**
- **Immediately after starting, do not rev up engine unnecessarily.**
- **Do not rev up engine just prior to shutdown.**


SEF709Y

- **When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.**
  - **Keep the antenna as far as possible from the electronic control units.**
  - **Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls.**
    Do not let them run parallel for a long distance.
  - **Adjust the antenna and feeder line so that the standing-wave radio can be kept smaller.**
  - **Be sure to ground the radio to vehicle body.**



SEF708Y

Wiring Diagrams and Trouble Diagnosis

ABS00CKQ

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams"
- PG-2, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES"
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident"

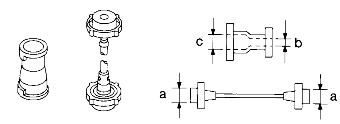
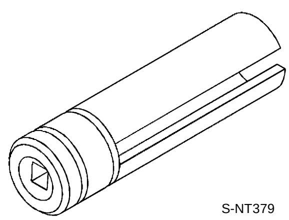
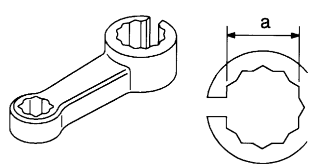
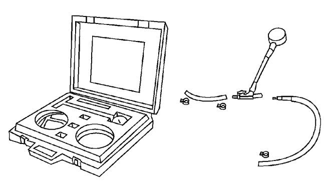
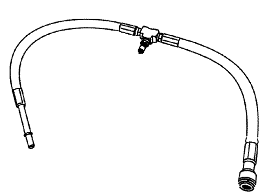
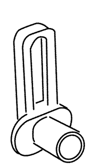
PREPARATION

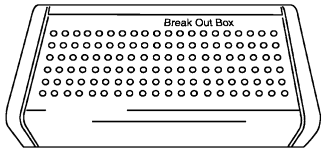
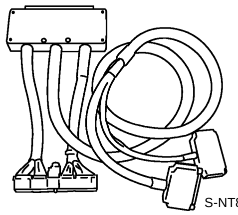
PFP:00002

Special Service Tools

ABS00CKR

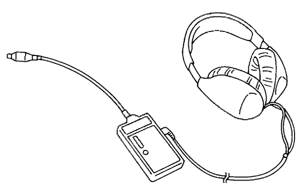
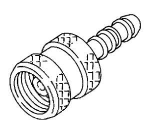
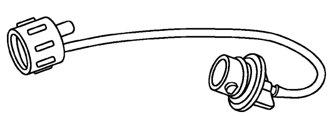
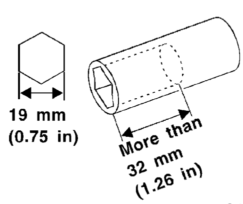
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

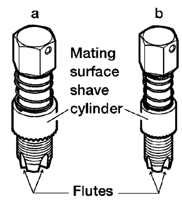
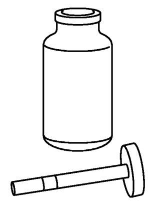
Tool number (Kent-Moore No.) Tool name	Description
EG17650301 (J-33984-A) Radiator cap tester adapter  S-NT564	Adapting radiator cap tester to radiator cap and radiator filler neck **a: 28 (1.10) dia.** **b: 31.4 (1.236) dia.** **c: 41.3 (1.626) dia.** Unit: mm (in)
KV10117100 (J-36471-A) Heated oxygen sensor wrench  S-NT379	Loosening or tightening heated oxygen sensors with 22 mm (0.87 in) hexagon nut
KV10114400 (J-38365) Heated oxygen sensor wrench  S-NT636	Loosening or tightening heated oxygen sensors **a: 22 mm (0.87 in)**
(J-44321) Fuel pressure gauge kit  LEC642	Checking fuel pressure
(J-44321-6) Fuel pressure adapter  LBIA0376E	Connecting fuel pressure gauge to quick connector type fuel lines.
(J-45488) Quick connector release  PBIC0198E	Remove fuel tube quick connectors in engine room.

Tool number (Kent-Moore No.) Tool name		Description
KV109E0010 (J-46209) Break-out box	 S-NT825	Measuring ECM signals with a circuit tester
KV109E0080 (J-45819) Y-cable adapter	 S-NT826	Measuring ECM signals with a circuit tester

Commercial Service Tools

ABS00CKS

Tool name (Kent-Moore No.)		Description
Leak detector i.e.:(J-41416)	 S-NT703	Locating the EVAP leak
EVAP service port adapter i.e.:(J-41413-OBD)	 S-NT704	Applying positive pressure through EVAP service port
Fuel filler cap adapter i.e.: (J-41416)	 S-NT815	Checking fuel tank vacuum relief valve opening pressure
Socket wrench	 S-NT705	Removing and installing engine coolant temperature sensor

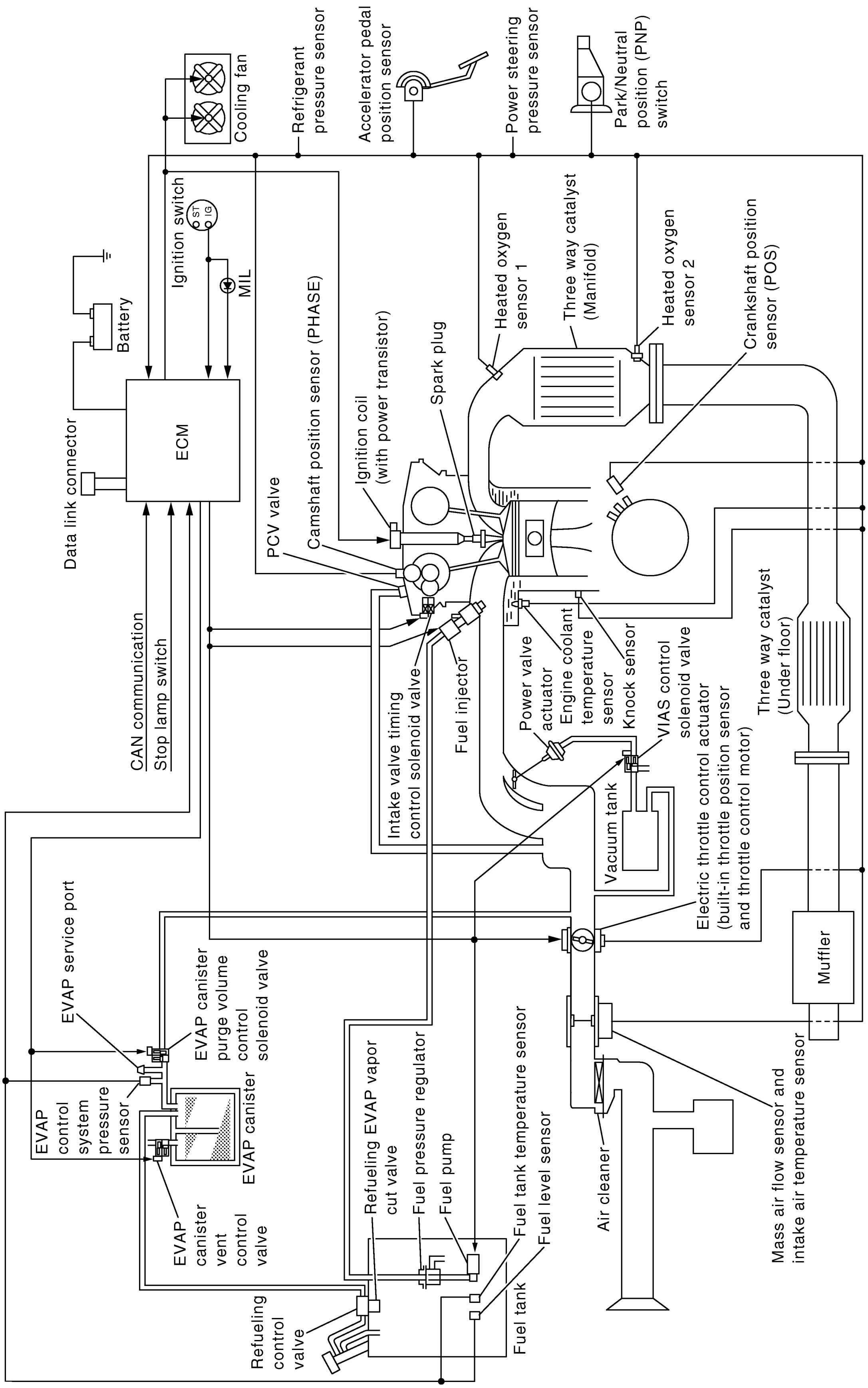
Tool name (Kent-Moore No.)		Description
Oxygen sensor thread cleaner i.e.: (J-43897-18) (J-43897-12)	AEM488	Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below. **a: 18 mm diameter with pitch 1.5 mm for Zirconia Oxygen Sensor** **b: 12 mm diameter with pitch 1.25 mm for Titania Oxygen Sensor**
Anti-seize lubricant i.e.: (Permatex^{TM} 133AR or equivalent meeting MIL specification MIL-A-907)	S-NT779	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.

ENGINE CONTROL SYSTEM

PFP:23710

System Diagram

ABS00CKT



PBIB2361E

Multiport Fuel Injection (MFI) System

ABS00CKW

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*3 Piston position	Fuel injection & mixture ratio control	Fuel injector
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Park/neutral position (PNP) switch	Gear position		
Knock sensor	Engine knocking condition		
Power steering pressure sensor	Power steering operation		
Heated oxygen sensor 1	Density of oxygen in exhaust gas		
Heated oxygen sensor 2*1	Density of oxygen in exhaust gas		
Wheel sensor*2	Vehicle speed		
Air conditioner switch	Air conditioner operation		
Battery	Battery voltage*3		

*1: This sensor is not used to control the engine system under normal conditions.

*2: This signal is sent to the ECM through CAN communication line.

*3: ECM determines the start signal status by the signal of engine speed and battery voltage.

SYSTEM DESCRIPTION

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the crankshaft position sensor and the mass air flow sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

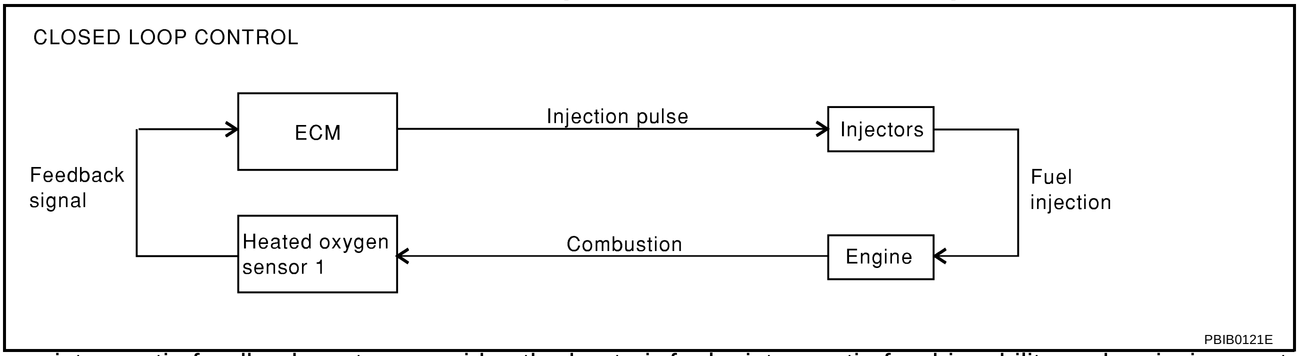
<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from N to D (A/T models)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation

MIXTURE RATIO FEEDBACK CONTROL (CLOSED LOOP CONTROL)



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst (manifold) can then better reduce CO, HC and NOx emissions. This system uses heated oxygen sensor 1 in the exhaust manifold to monitor whether the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about heated oxygen sensor 1, refer to EC-227, "DTC P0132 HO2S1" . This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).
This stage is referred to as the closed loop control condition.
Heated oxygen sensor 2 is located downstream of the three way catalyst (manifold). Even if the switching characteristics of heated oxygen sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from heated oxygen sensor 2.

Open Loop Control

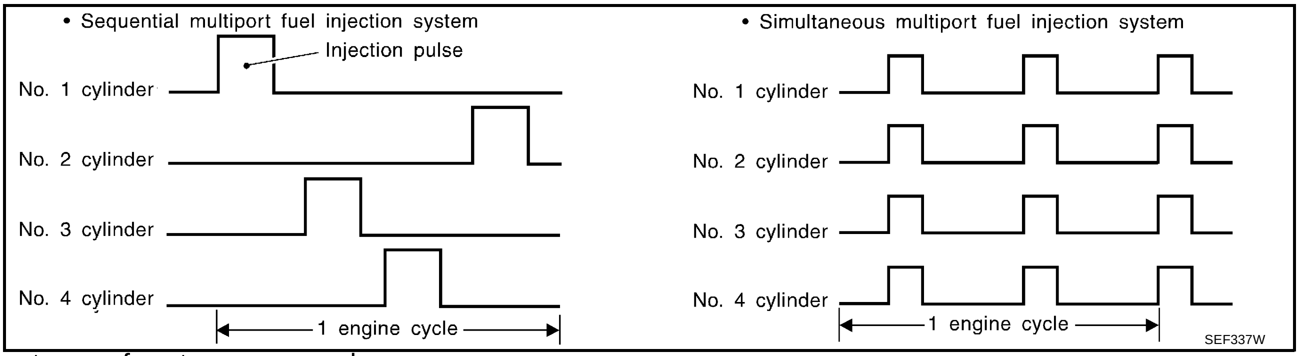
The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 or its circuit
- Insufficient activation of heated oxygen sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- After shifting from N to D (A/T models)
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from heated oxygen sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot wire) and characteristic changes during operation (i.e., fuel injector clogging) directly affect mixture ratio.
Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of “injection pulse duration” to automatically compensate for the difference between the two ratios.
“Fuel trim” refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.
“Short term fuel trim” is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from heated oxygen sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.
“Long term fuel trim” is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

FUEL INJECTION TIMING



Two types of systems are used.

Sequential Multiport Fuel Injection System

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.
The four injectors will then receive the signals two times for each engine cycle.
This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Electronic Ignition (EI) System

ABS00CKX

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed*2 Piston position	Ignition timing control	Power transistor
Camshaft position sensor (PHASE)			
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Knock sensor	Engine knocking		
Park/neutral position (PNP) switch	Gear position		
Wheel sensor*1	Vehicle speed		
Battery	Battery voltage*2		

*1: This signal is sent to the ECM through CAN communication line.

*2: ECM determines the start signal status by the signal of engine speed and battery voltage.

SYSTEM DESCRIPTION

Firing order: 1-3-4-2
The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM.
The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.
During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage

- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions. If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Fuel Cut Control (at No Load and High Engine Speed)

ABS00CKZ

INPUT/OUTPUT SIGNAL CHART

Sensor	Input Signal to ECM	ECM function	Actuator
Park/neutral position (PNP) switch	Neutral position	Fuel cut control	Fuel injector
Accelerator pedal position sensor	Accelerator pedal position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed		
Wheel sensor*	Vehicle speed		

*: This signal is sent to the ECM through CAN communication line.

SYSTEM DESCRIPTION

If the engine speed is above 1,800 rpm under no load (for example, the shift position is neutral and engine speed is over 1,800 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed.

Fuel cut will be operated until the engine speed reaches 1,500 rpm, then fuel cut will be cancelled.

NOTE:

This function is different from deceleration control listed under EC-22, "Multiport Fuel Injection (MFI) System"

AIR CONDITIONING CUT CONTROL

PFP:23710

Input/Output Signal Chart

ABS00DCO

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner ON signal	Air conditioner cut control	Air conditioner relay
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Refrigerant pressure sensor	Refrigerant pressure		
Power steering pressure sensor	Power steering operation		
Wheel sensor*1	Vehicle speed		
Battery	Battery voltage*2		

*1: This signal is sent to the ECM through CAN communication line.
*2: ECM determines the start signal status by the signal of engine speed and battery voltage.

SYSTEM DESCRIPTION

This system improves engine operation when the air conditioner is used.
Under the following conditions, the air conditioner is turned OFF.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When refrigerant pressure is excessively low or high.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

PFP:18930

System Description

ABS00D04

INPUT/OUTPUT SIGNAL CHART

Sensor	Input signal to ECM	ECM function	Actuator
ASCD brake switch	Brake pedal operation	ASCD vehicle speed control	Electric throttle control actuator
Stop lamp switch	Brake pedal operation		
ASCD clutch switch (M/T models)	Clutch pedal operation		
ASCD steering switch	ASCD steering switch operation		
Park/Neutral position (PNP) switch	Gear position		
Wheel sensor*	Vehicle speed		
TCM*(A/T models)	Powertrain revolution		

*: This signal is sent to the ECM through CAN communication line.

BASIC ASCD SYSTEM

Refer to Owner's Manual for ASCD operating instructions.
Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).
ECM controls throttle angle of electric throttle control actuator to regulate engine speed.
Operation status of ASCD is indicated by CRUISE indicator and SET indicator in combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

NOTE:
Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws.

SET OPERATION

Press MAIN switch. (The CRUISE indicator in combination meter illuminates.)
When vehicle speed reaches a desired speed between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH), press SET/COAST switch. (Then SET indicator in combination meter illuminates.)

ACCEL OPERATION

If the RESUME/ACCELERATE switch is depressed during cruise control driving, increase the vehicle speed until the switch is released or vehicle speed reaches maximum speed controlled by the system.
And then ASCD will keep the new set speed.

CANCEL OPERATION

When any of following conditions exist, cruise operation will be canceled.

- CANCEL switch is depressed
- Brake pedal is depressed
- Clutch pedal is depressed or shift position is changed to the neutral position (M/T models)
- Selector lever is changed to N, P, R position (A/T models)
- Vehicle speed decreased to 13km/h (8MPH) lower than the set speed
- VDC/TCS system is operated

When the ECM detects any of the following conditions, the ECM will cancel the cruise operation and inform the driver by blinking indicator lamp.

- Engine coolant temperature is slightly higher than the normal operating temperature, CRUISE lamp may blink slowly.
  When the engine coolant temperature decreases to the normal operating temperature, CRUISE lamp will stop blinking and the cruise operation will be able to work by pressing SET/COAST switch or RESUME/ACCELEATE switch.
- Malfunction for some self-diagnoses regarding ASCD control: SET lamp will blink quickly.

If MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

COAST OPERATION

When the SET/COAST switch is depressed during cruise control driving, decrease vehicle set speed until the switch is released. And then ASCD will keep the new set speed.

RESUME OPERATION

When the RESUME/ACCELERATE switch is depressed after cancel operation other than depressing MAIN switch is performed, vehicle speed will return to last set speed. To resume vehicle set speed, vehicle condition must meet following conditions.

- Brake pedal is released.
- Clutch pedal is released (M/T models)
- A/T selector lever is in other than P and N positions (A/T models)
- Vehicle speed is greater than 40 km/h (25 MPH) and less than 144 km/h (89 MPH)

Component Description

ABS00D05

ASCD STEERING SWITCH

Refer to EC-519 .

ASCD BRAKE SWITCH

Refer to EC-527 and EC-638 .

ASCD CLUTCH SWITCH

Refer to EC-527 .

STOP LAMP SWITCH

Refer to EC-527 , EC-550 and EC-638

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EC-427 , EC-429 , EC-437 and EC-443 .

ASCD INDICATOR

Refer to EC-648 .

CAN COMMUNICATION

PFP:23710

System Description

ABS00DCQ

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
Refer to LAN-16, "CAN Communication Unit" , about CAN communication for detail.

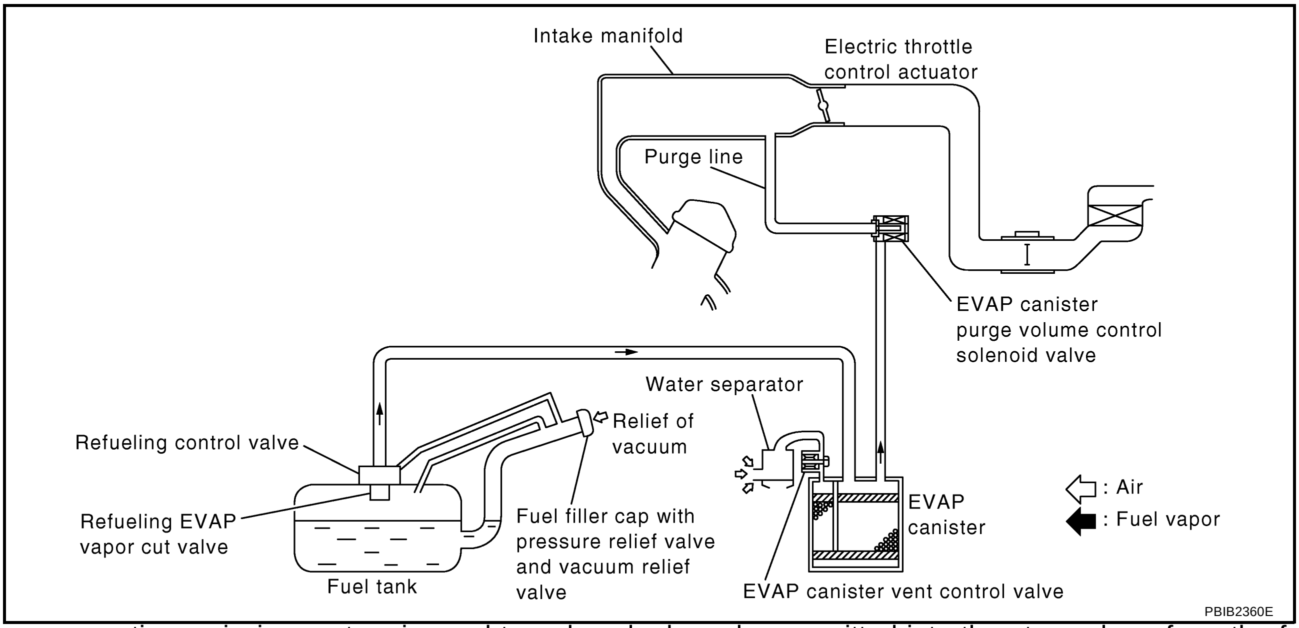
EVAPORATIVE EMISSION SYSTEM

PFP:14950

Description

ABS00CZV

SYSTEM DESCRIPTION



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister.

The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge volume control solenoid valve also shuts off the vapor purge line during decelerating and idling.

EVAPORATIVE EMISSION LINE DRAWING

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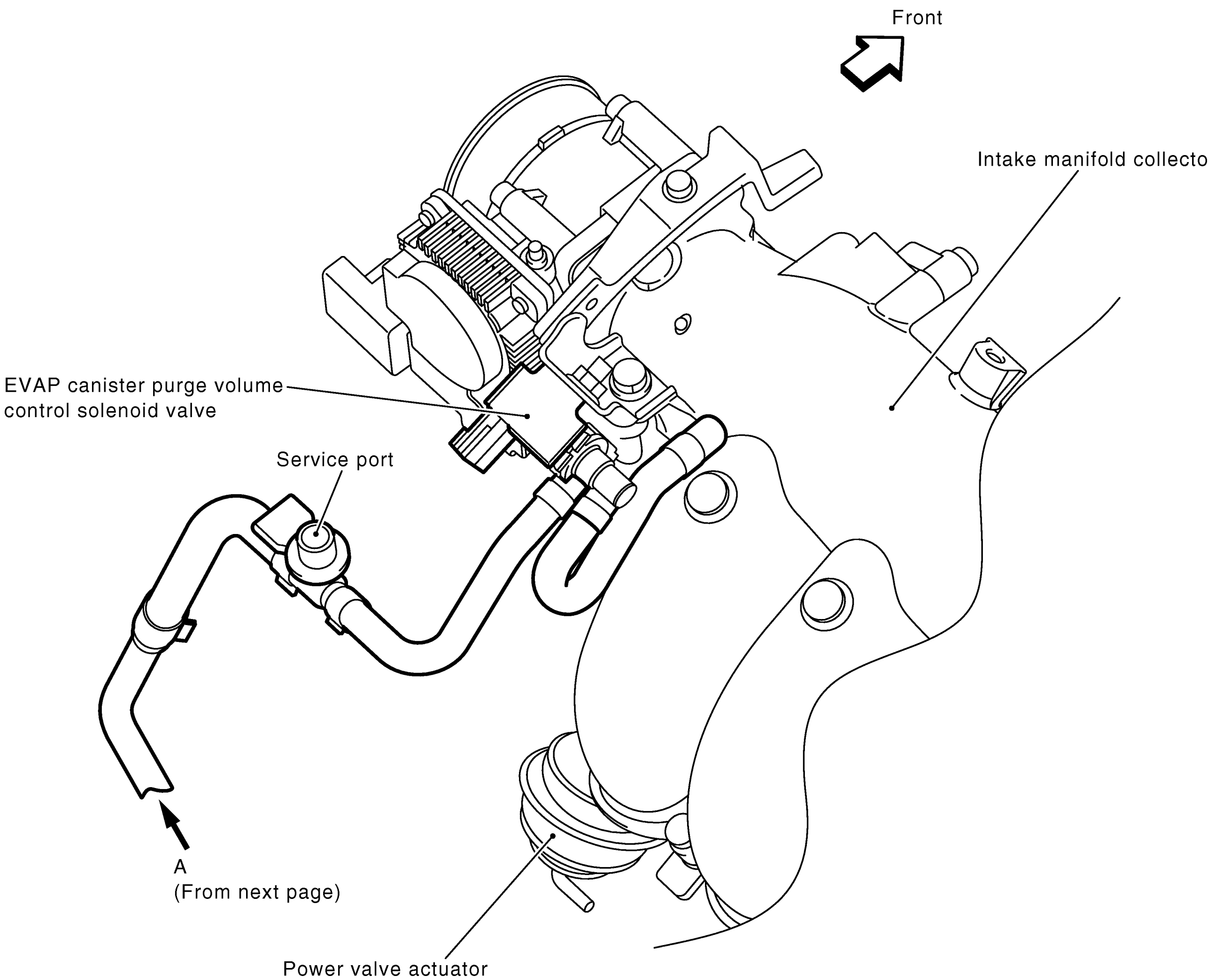
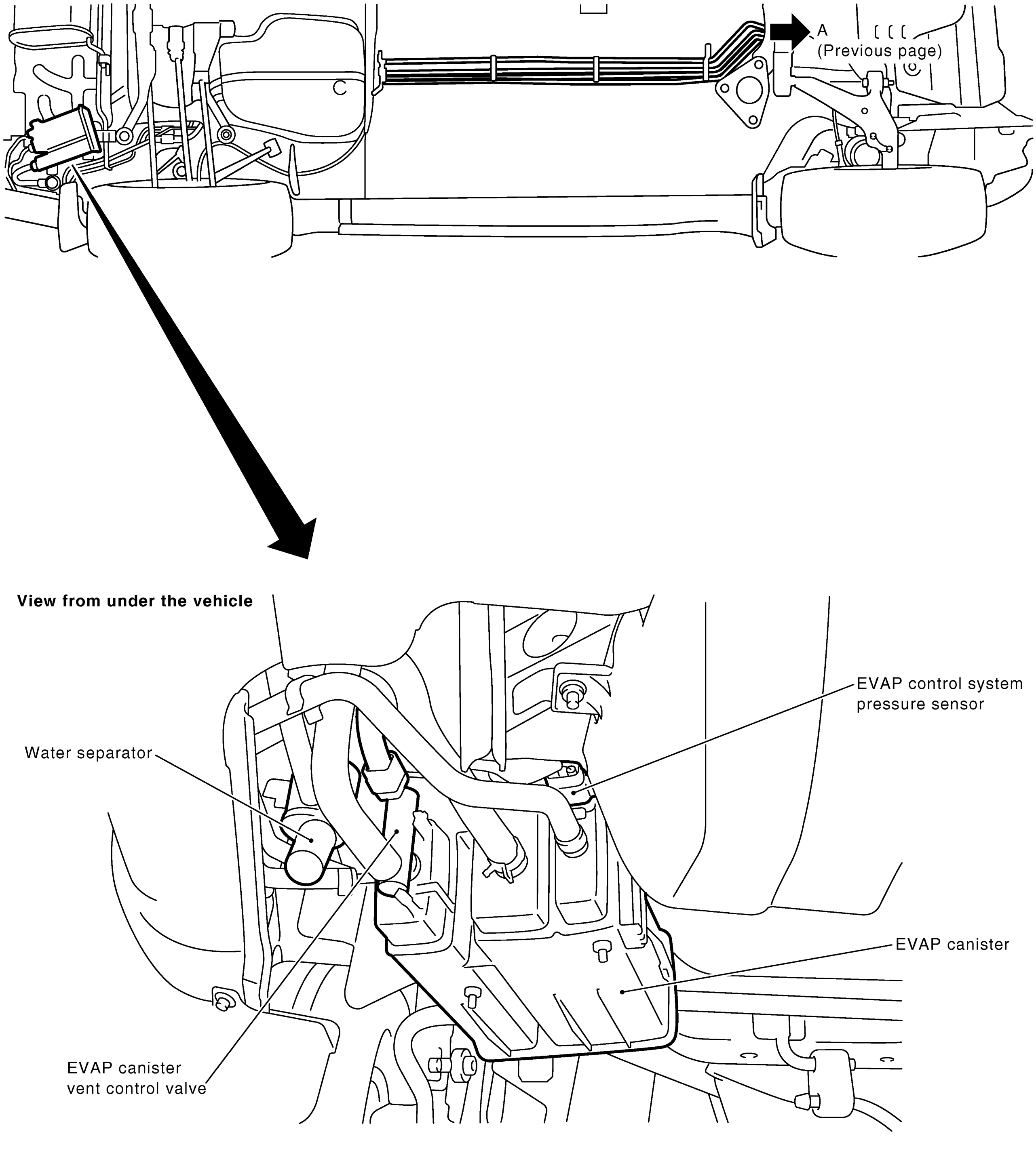


NOTE: Do not use soapy water or any type of solvent while installing vacuum hose or purge hoses.

PBIB2363E



A
(Previous page)
View from under the vehicle
EVAP control system pressure sensor
Water separator
EVAP canister
EVAP canister vent control valve
PBIB2352E

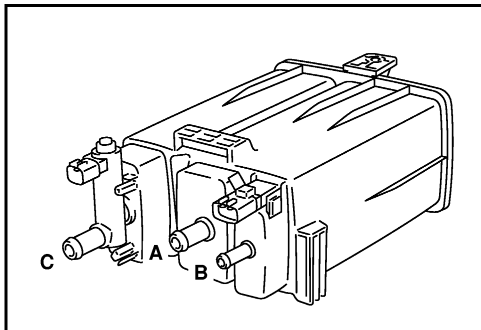
Component Inspection

ABS00CZW

EVAP CANISTER

Check EVAP canister as follows:

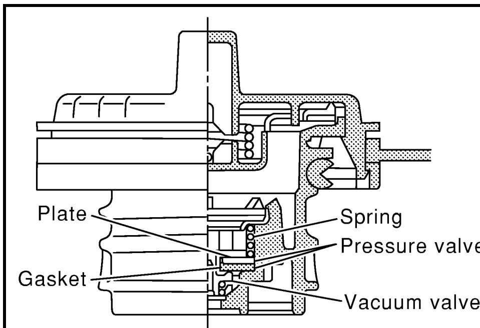
1. Block port **B** .
2. Blow air into port **A** and check that it flows freely out of port **C** .
3. Release blocked port **B** .
4. Apply vacuum pressure to port **B** and check that vacuum pressure exists at the ports **A** and **C** .
5. Block port **A** and **B** .
6. Apply pressure to port **C** and check that there is no leakage.



PBIB1044E

FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FULLER CAP)

1. Wipe clean valve housing.



SEF445Y

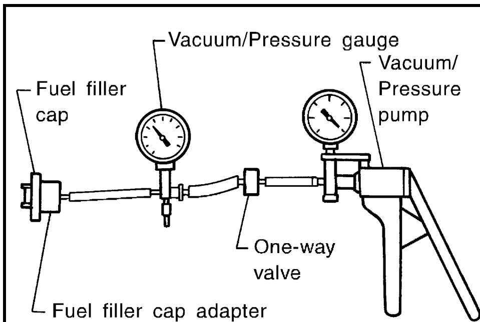
2. Check valve opening pressure and vacuum.

Pressure: **15.3 - 20.0 kPa**
(0.156 - 0.204 kg/cm^2 , 2.22 - 2.90 psi)
Vacuum: **–6.0 to –3.4 kPa**
(–0.061 to –0.035 kg/cm^2 , –0.87 to –0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



SEF943S

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection"

FUEL TANK TEMPERATURE SENSOR

Refer to EC-285, "Component Inspection" .

EVAP CANISTER VENT CONTROL VALVE

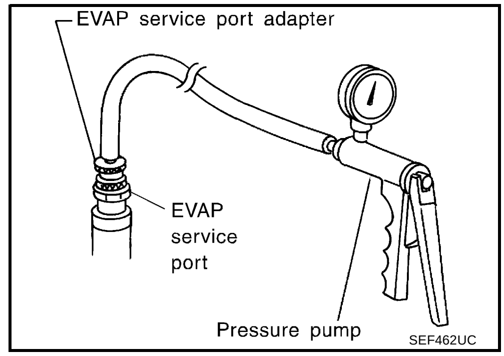
Refer to EC-360, "Component Inspection" .

EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-364, "Component Inspection" .

EVAP SERVICE PORT

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.

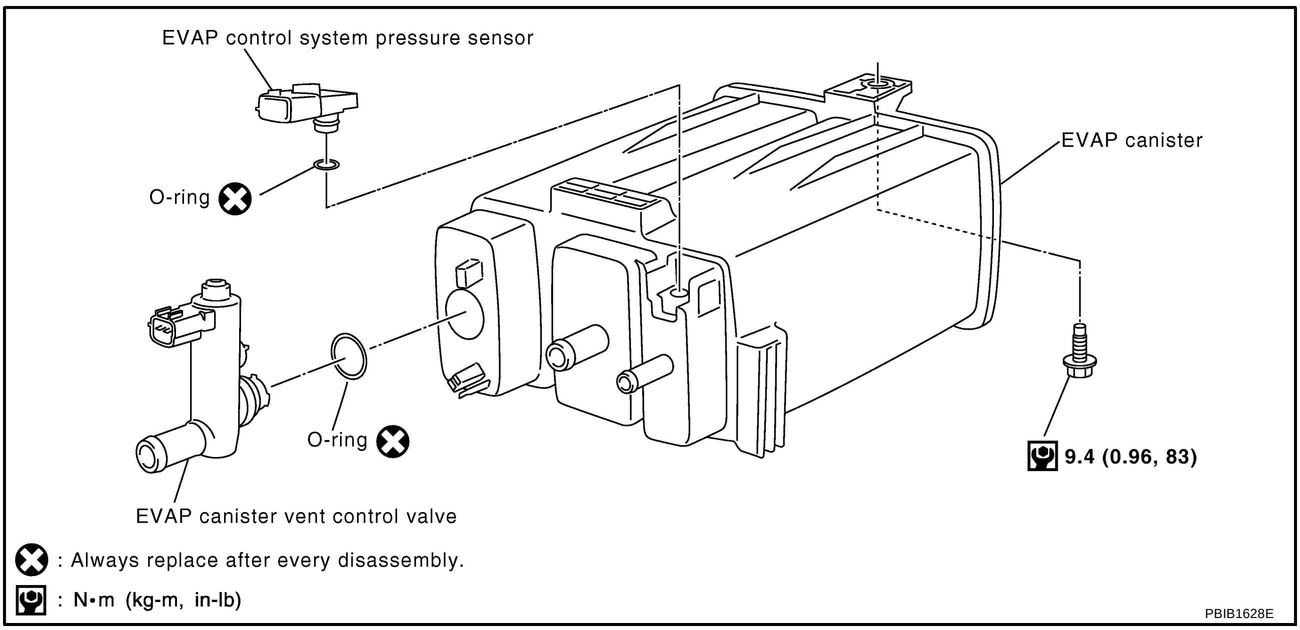


Removal and Installation

ABS00CZX

EVAP CANISTER

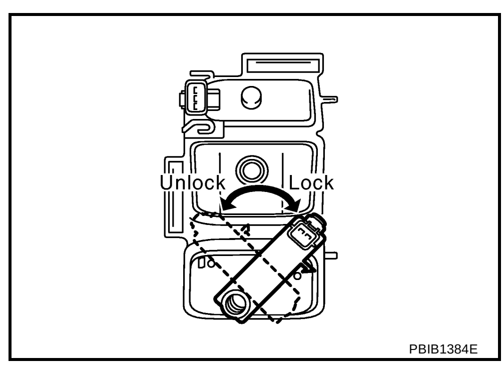
Tighten EVAP canister as shown in the figure.



EVAP CANISTER VENT CONTROL VALVE

1. Turn EVAP canister vent control valve counterclockwise.
2. Remove the EVAP canister vent control valve.

Always replace O-ring with a new one.



How to Detect Fuel Vapor Leakage

ABS00CZY

CAUTION:

- **Never use compressed air or a high pressure pump.**
- **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in EVAP system.**

NOTE:

- Do not start engine.
- Improper installation of EVAP service port adapter to the EVAP service port may cause a leak.

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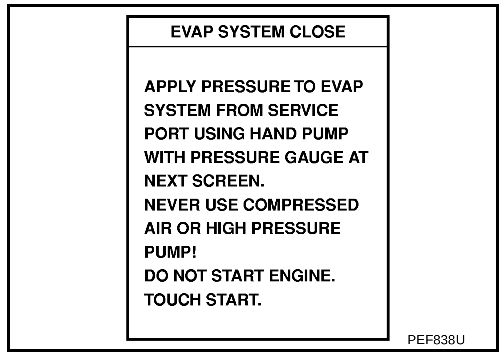
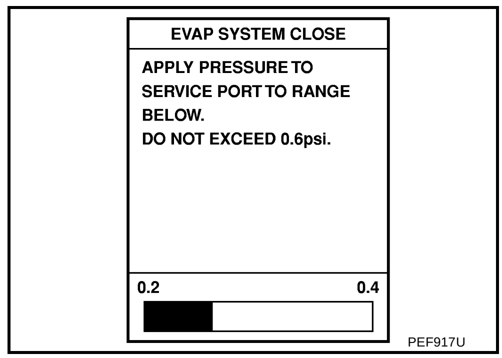
WITH CONSULT-II

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump and hose to the EVAP service port adapter.
3. Turn ignition switch ON.
4. Select the “EVAP SYSTEM CLOSE” of “WORK SUPPORT MODE” with CONSULT-II.
5. Touch “START”. A bar graph (Pressure indicating display) will appear on the screen.



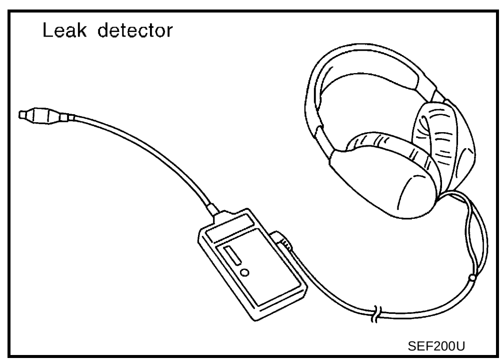
PEF838U

6. Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
7. Remove EVAP service port adapter and hose with pressure pump.



PEF917U

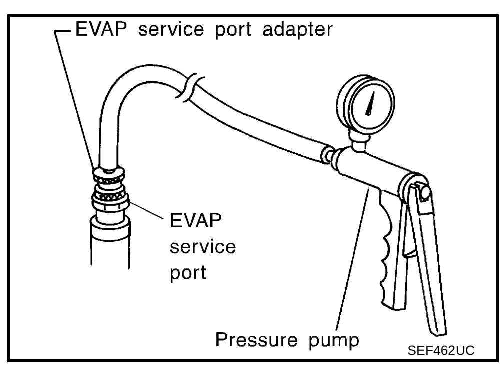
8. Locate the leak using a leak detector. Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



SEF200U

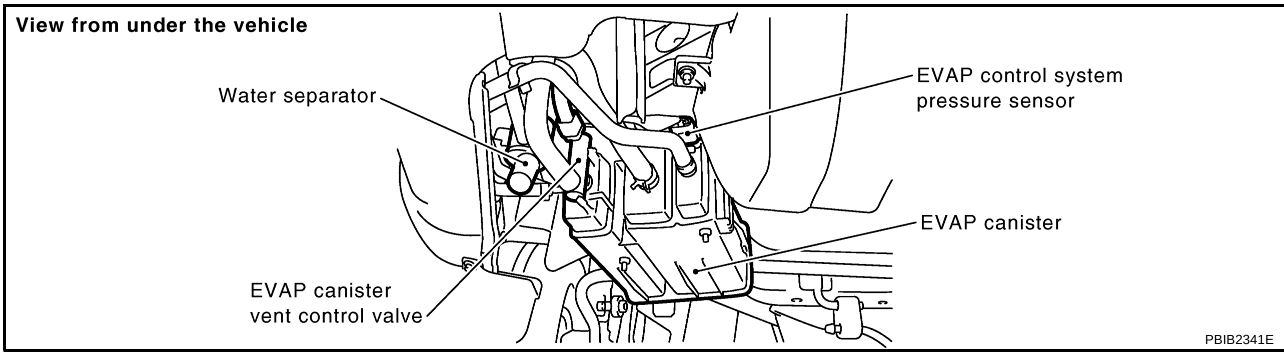
WITHOUT CONSULT-II

1. Attach the EVAP service port adapter securely to the EVAP service port.
2. Also attach the pressure pump with pressure gauge to the EVAP service port adapter.



SEF462UC

3. Apply battery voltage between the terminals EVAP canister vent control valve to make a closed EVAP system.



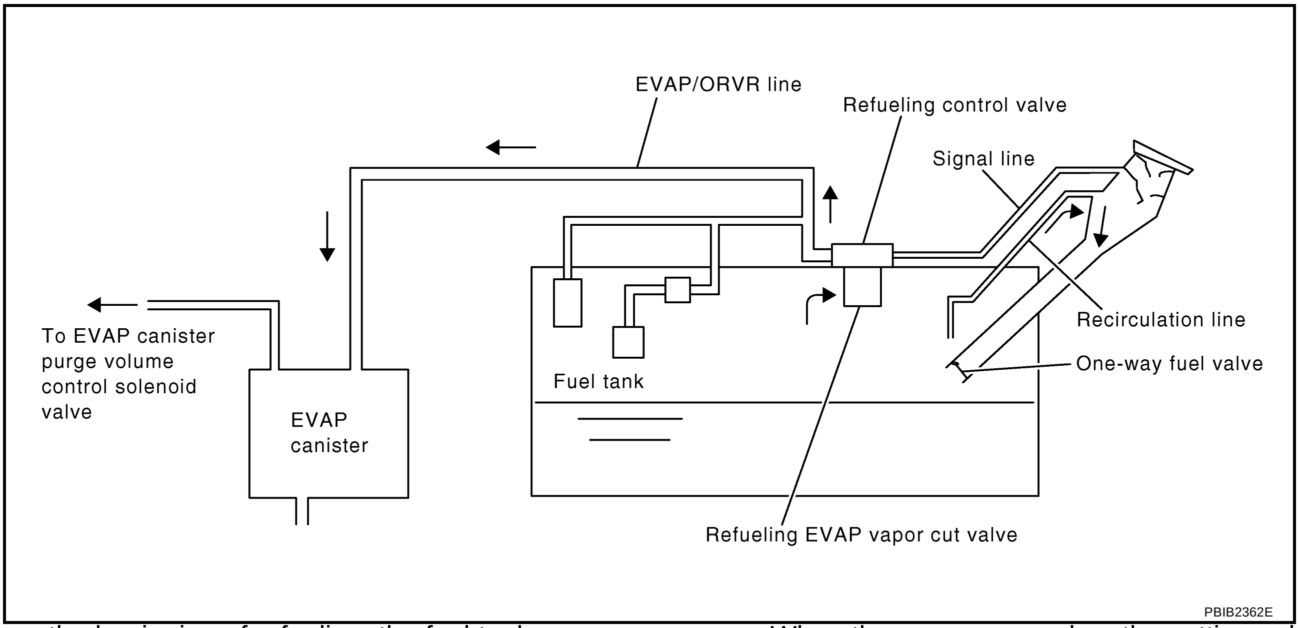
4. To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm^2 , 0.2 to 0.4 psi).
5. Remove EVAP service port adapter and hose with pressure pump.
6. Locate the leak using a leak detector. Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING"

ON BOARD REFUELING VAPOR RECOVERY (ORVR)

PFP:00032

System Description

ABS00CZZ



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and EVAP/ORVR line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.
When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.
The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

WARNING:

When conducting inspections below, be sure to observe the following:

- **Put a “CAUTION: INFLAMMABLE” sign in workshop.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.**
- **Be sure to furnish the workshop with a CO_2 fire extinguisher.**

CAUTION:

- **Before removing fuel line parts, carry out the following procedures:**
  - **Put drained fuel in an explosion-proof container and put lid on securely.**
  - **Release fuel pressure from fuel line. Refer to** **EC-90, "FUEL PRESSURE RELEASE"** **.**
  - **Disconnect battery ground cable.**
- **Always replace O-ring when the fuel gauge retainer is removed.**
- **Do not kink or twist hose and tube when they are installed.**
- **Do not tighten hose and clamps excessively to avoid damaging hoses.**
- **After installation, run engine and check for fuel leaks at connection.**
- **Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.**

Diagnostic Procedure

ABS00D00

SYMPTOM: FUEL ODOR FROM EVAP CANISTER IS STRONG.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
   The weight should be less than 2.5 kg (5.5 lb).

OK or NG

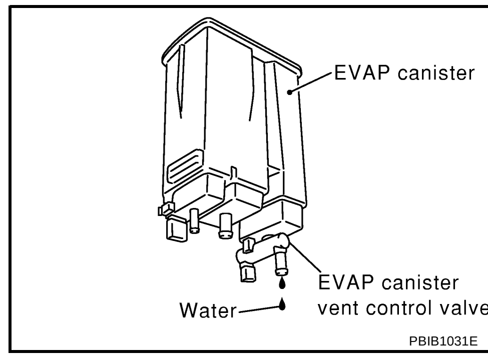
OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.
No >> GO TO 5.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

4. CHECK WATER SEPARATOR

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace water separator.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK REFUELING CONTROL VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace refueling control valve.

7. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> **INSPECTION END**
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

SYMPTOM: CANNOT REFUEL/FUEL ODOR FROM THE FUEL FILLER OPENING IS STRONG WHILE REFUELING.

1. CHECK EVAP CANISTER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Weigh the EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
   The weight should be less than 2.5 kg (5.5 lb).

OK or NG

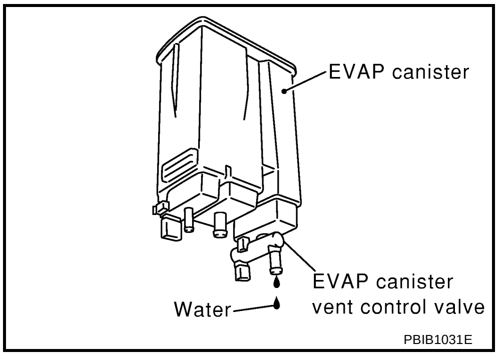
OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK IF EVAP CANISTER SATURATED WITH WATER

Does water drain from the EVAP canister?

Yes or No

Yes >> GO TO 3.
No >> GO TO 6.



3. REPLACE EVAP CANISTER

Replace EVAP canister with a new one.

>> GO TO 4.

4. CHECK WATER SEPARATOR

Refer to EC-42, "WATER SEPARATOR" .

OK or NG

OK >> GO TO 5
NG >> Replace water separator.

5. DETECT MALFUNCTIONING PART

Check the EVAP hose between EVAP canister and vehicle water separator for clogging or poor connection.

>> Repair or replace EVAP hose.

6. CHECK VENT HOSES AND VENT TUBES

Check hoses and tubes between EVAP canister and refueling EVAP vapor cut valve for clogging, kink, looseness and improper connection.

OK or NG

OK >> GO TO 7.
NG >> Repair or replace hoses and tubes.

7. CHECK FILLER NECK TUBE

Check recirculation line for clogging, dents and cracks.

OK or NG

OK >> GO TO 8.
NG >> Replace filler neck tube.

8. CHECK REFUELING CONTROL VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace refueling control valve.

9. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

10. CHECK FUEL FILLER TUBE

Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.

OK or NG

OK >> GO TO 11.
NG >> Replace fuel filler tube.

11. CHECK ONE-WAY FUEL VALVE-I

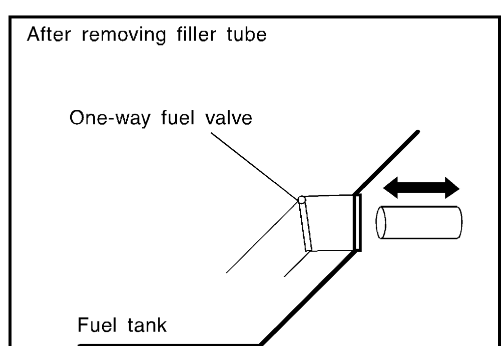
Check one-way valve for clogging.

OK or NG

OK >> GO TO 12.
NG >> Repair or replace one-way fuel valve with fuel tank.

12. CHECK ONE-WAY FUEL VALVE-II

1. Make sure that fuel is drained from the tank.
2. Remove fuel filler tube and hose.
3. Check one-way fuel valve for operation as follows.
   When a stick is inserted, the valve should open, when removing stick it should close.
   Do not drop any material into the tank.



OK or NG

OK >> **INSPECTION END**
NG >> Replace fuel filler tube or replace one-way fuel valve with fuel tank.

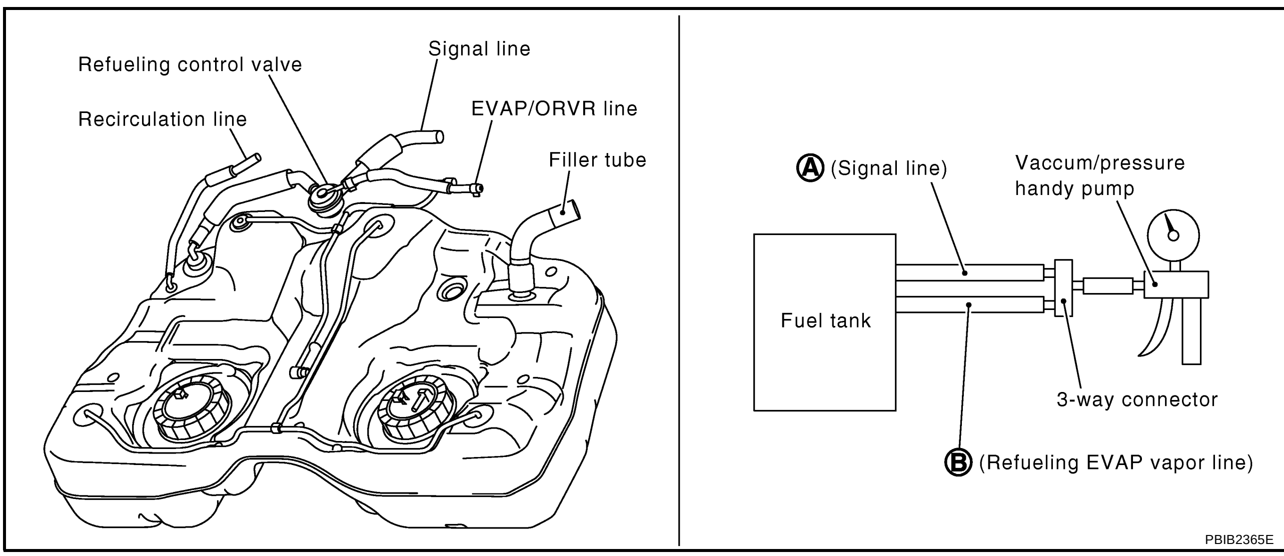
Component Inspection

ABS00D01

REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

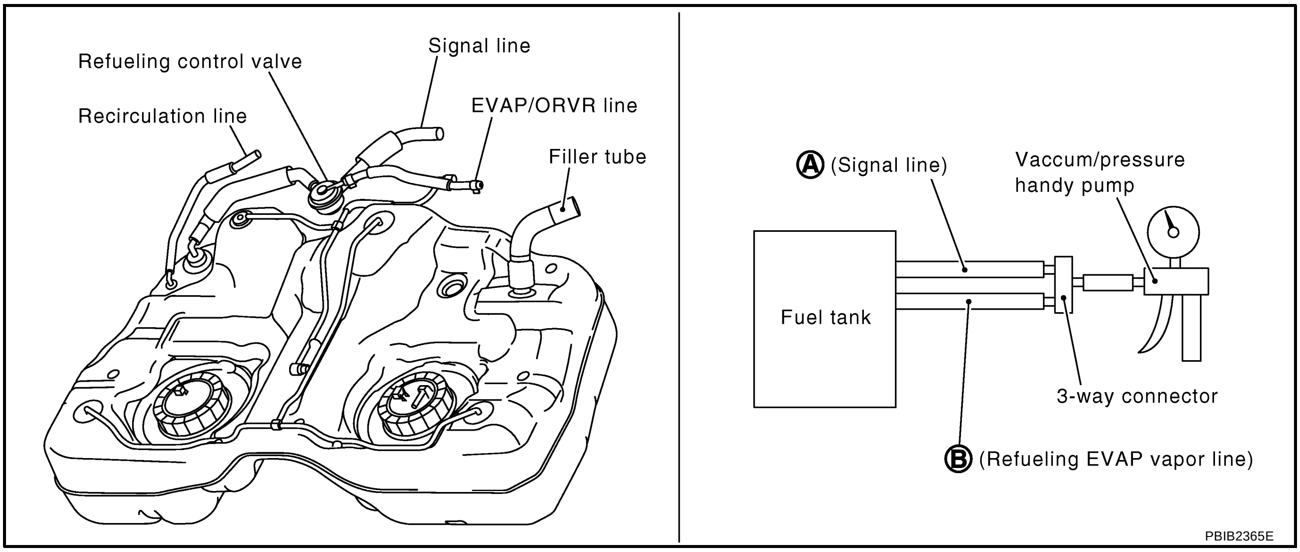
1. Remove fuel tank. Refer to FL-11, "FUEL TANK" .
2. Drain fuel from the tank as follows:
a. Remove fuel feed hose located on the fuel gauge retainer.
b. Connect a spare fuel hose, one side to fuel gauge retainer where the hose was removed and the other side to a fuel container.
c. Drain fuel using “FUEL PUMP RELAY” in “ACTIVE TEST” mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
a. Connect vacuum pump to hose end.
b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
c. Put fuel tank upside down.
d. Apply vacuum pressure to hose end [–13.3 kPa (–100 mmHg, –3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



Without CONSULT-II

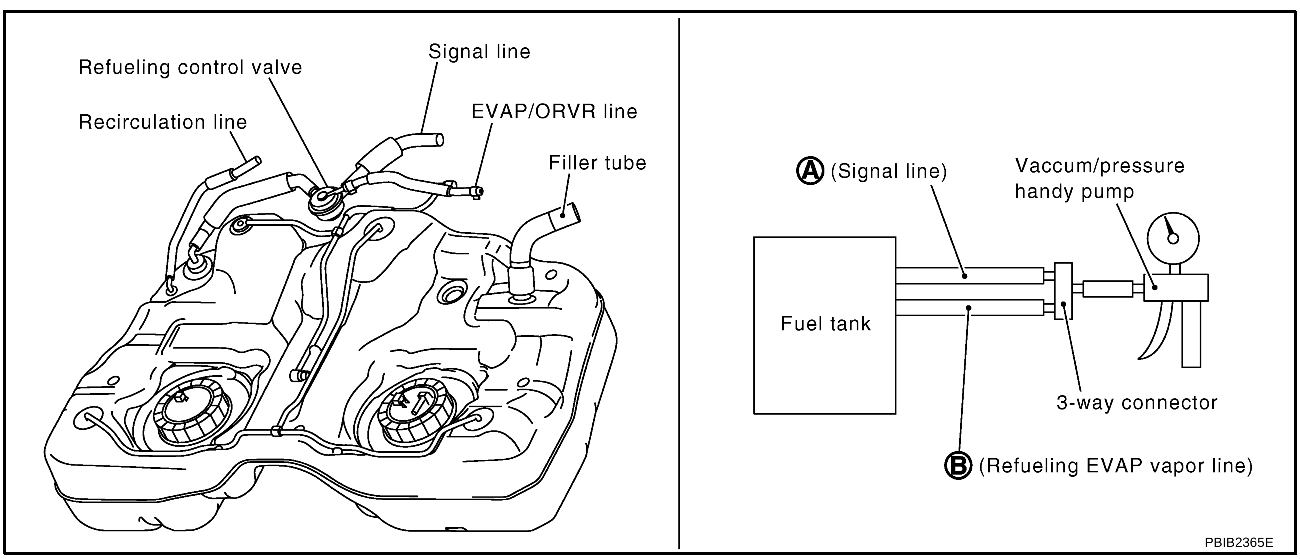
1. Remove fuel tank. Refer to FL-11, "FUEL TANK" .
2. Drain fuel from the tank as follows:
a. Remove fuel gauge retainer.
b. Drain fuel from the tank using a handy pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from the end of EVAP/ORVR line hose), and check that the air flows freely into the tank.
4. Check refueling EVAP vapor cut valve for being stuck to open as follows.
a. Connect vacuum pump to hose end.
b. Remove fuel gauge retainer with fuel gauge unit.
Always replace O-ring with new one.
c. Put fuel tank upside down.

d. Apply vacuum pressure to hose end [–13.3 kPa (–100 mmHg, –3.94 inHg)] with fuel gauge retainer remaining open and check that the pressure is applicable.



REFUELING CONTROL VALVE

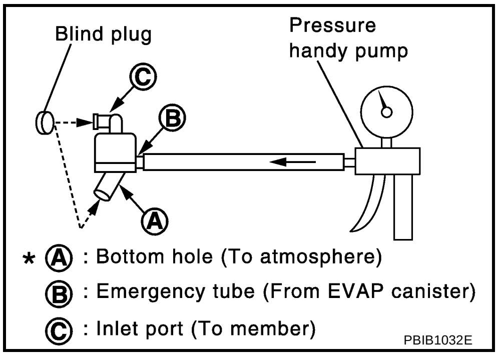
1. Remove fuel filler cap.
2. Check air continuity between hose ends A and B.
   Blow air into the hose end B. Air should flow freely into the fuel tank.
3. Blow air into hose end A and check there is no leakage.
4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.



WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.

4. Check that **A** and **C** are not clogged by blowing air into **B** with **A** , and then **C** plugged.



5. In case of NG in items 2 - 4, replace the parts.

NOTE:
- Do not disassemble water separator.

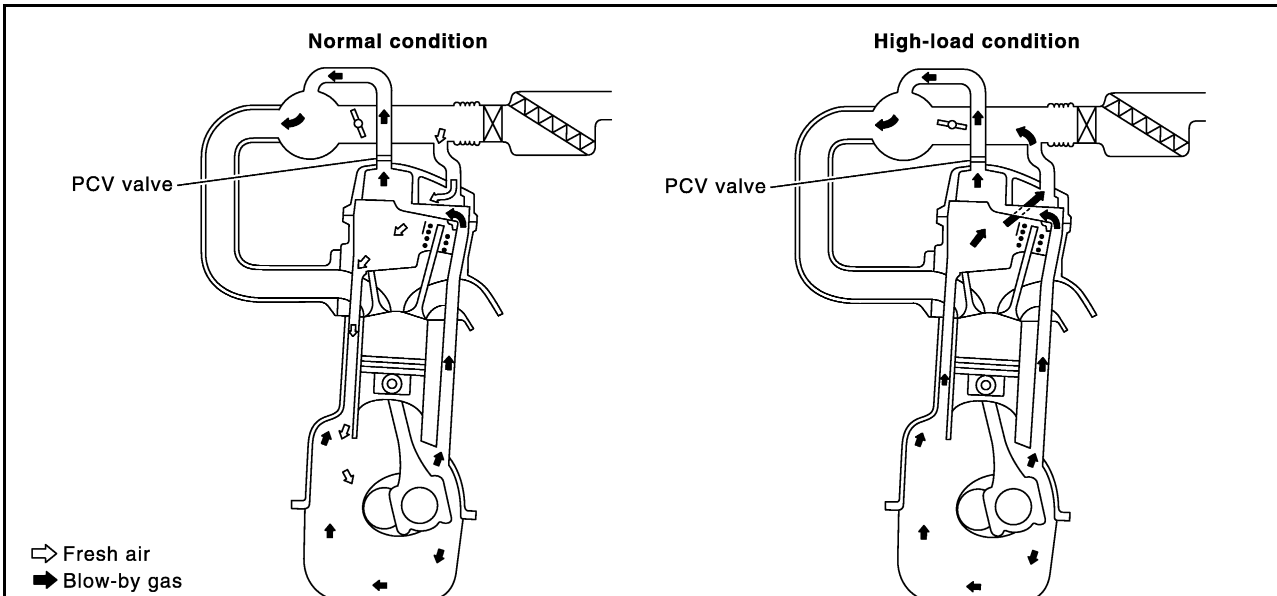
POSITIVE CRANKCASE VENTILATION

PFP:11810

Description

ABS00D02

SYSTEM DESCRIPTION

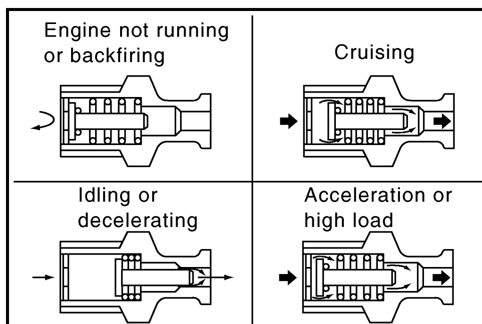


PBIB0492E

This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover. Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.



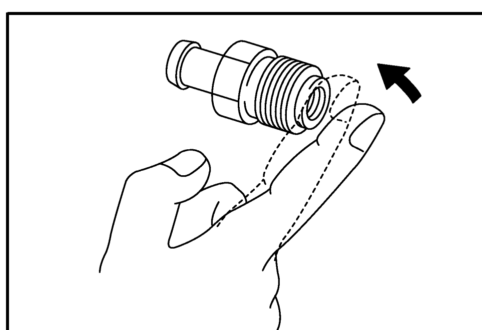
PBIB1588E

Component Inspection

ABS00D03

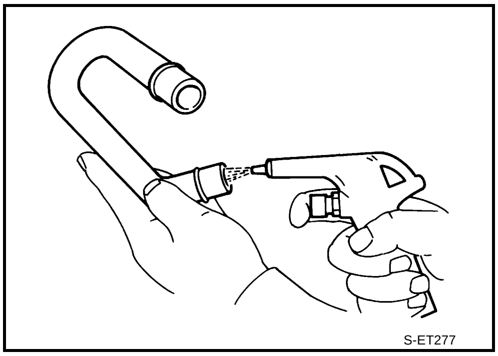
PCV (POSITIVE CRANKCASE VENTILATION) VALVE

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



PBIB1589E

PCV VALVE VENTILATION HOSE

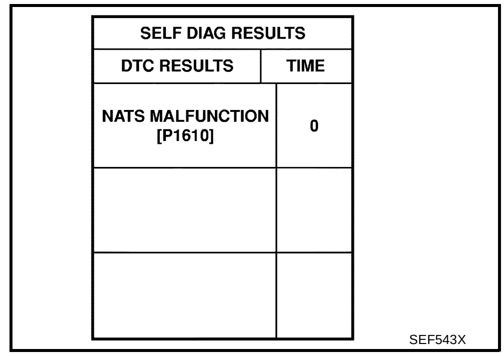


1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS) PFP:25386

Description

ABS00DCR



SEF543X

- **If the security indicator lights up with the ignition switch in the ON position or "NATS MALFUNCTION" is displayed on "SELF-DIAG RESULTS" screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to BL-97, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .**
- **Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching "ERASE" in "SELF-DIAG RESULTS" mode with CONSULT-II.**
- **When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card.**
  Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and all NVIS (NATS) ignition key ID registration, refer to CONSULT-II Operation Manual, IVIS/NVIS.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

PFP:00028

Introduction

ABS00CL7

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	Diagnostic service
Diagnostic Trouble Code (DTC)	Service $03 of SAE J1979
Freeze Frame data	Service $02 of SAE J1979
System Readiness Test (SRT) code	Service $01 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Service $07 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Service $06 of SAE J1979
Calibration ID	Service $09 of SAE J1979

The above information can be checked using procedures listed in the table below.

×: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT status	SRT code	Test value
CONSULT-II	×	×	×	×	×	×	—
GST	×	×	×	—	×	×	×
ECM	×	×*	—	—	×	—	—

*: When DTC and 1st trip DTC simultaneously appear on the display, they cannot be clearly distinguished from each other.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-102, "Fail-Safe Chart" .)

Two Trip Detection Logic

ABS00CL8

When a malfunction is detected for the 1st time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>
If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The "trip" in the "Two Trip Detection Logic" means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

×: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	×	—	—	—	—	—	×	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	×	—	—	×	—	—
One trip detection diagnoses (Refer to EC-48, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" .)	—	×	—	—	×	—	—	—
Except above	—	—	—	×	—	×	×	—

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.

Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Emission-Related Diagnostic Information

ABS00CL9

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

×: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3					
CAN COMM CIRCUIT	U1000	1000*6	—	—	1 (A/T) 2 (M/T)	× —	EC-163
CAN COMM CIRCUIT	U1001	1001*6	—	—	2	—	EC-163
NO DTC IS DETECTED. FURTHER TESTING MAY BE QUIRED.	**P0000**	**0000**	—	—	—	**Flashing*7 *8**	EC-62
INT/V TIM CONT-B1	P0011	0011	—	—	2	×	EC-166
HO2S1 HTR (B1)	P0031	0031	×	×	2	×	EC-170
HO2S1 HTR (B1)	P0032	0032	×	×	2	×	EC-170
HO2S2 HTR (B1)	P0037	0037	×	×	2	×	EC-176
HO2S2 HTR (B1)	P0038	0038	×	×	2	×	EC-176
MAF SEN/CIRCUIT	P0101	0101	—	—	2	×	EC-182
MAF SEN/CIRCUIT	P0102	0102	—	—	1	×	EC-191
MAF SEN/CIRCUIT	P0103	0103	—	—	1	×	EC-191
IAT SEN/CIRCUIT	P0112	0112	—	—	2	×	EC-199
IAT SEN/CIRCUIT	P0113	0113	—	—	2	×	EC-199
ECT SEN/CIRC	P0117	0117	—	—	1	×	EC-205
ECT SEN/CIRC	P0118	0118	—	—	1	×	EC-205
TP SEN 2/CIRC	P0122	0122	—	—	1	×	EC-211
TP SEN 2/CIRC	P0123	0123	—	—	1	×	EC-211
ECT SENSOR	P0125	0125	—	—	1	×	EC-219
IAT SENSOR	P0127	0127	—	—	2	×	EC-222
THERMSTAT FNCTN	P0128	0128	—	—	2	×	EC-225
HO2S1 (B1)	P0132	0132	—	×	2	×	EC-227
HO2S1 (B1)	P0133	0133	×	×	2	×	EC-234
HO2S1 (B1)	P0134	0134	—	×	2	×	EC-244
HO2S2 (B1)	P0138	0138	—	×	2	×	EC-252
HO2S2 (B1)	P0139	0139	×	×	2	×	EC-259
FUEL SYS-LEAN-B1	P0171	0171	—	—	2	×	EC-267
FUEL SYS-RICH-B1	P0172	0172	—	—	2	×	EC-274
FTT SENSOR	P0181	0181	—	—	2	×	EC-280
FTT SEN/CIRCUIT	P0182	0182	—	—	2	×	EC-286
FTT SEN/CIRCUIT	P0183	0183	—	—	2	×	EC-286
TP SEN 1/CIRC	P0222	0222	—	—	1	×	EC-291
TP SEN 1/CIRC	P0223	0223	—	—	1	×	EC-291

Items (CONSULT-II screen terms)	DTC*[1]		SRT code	Test value/ Test limit (GST only)	Trip	MIL lighting up	Reference page
	CONSULT-II GST*[2]	ECM*[3]					
MULTI CYL MISFIRE	P0300	0300	—	—	2	×	EC-299
CYL 1 MISFIRE	P0301	0301	—	—	2	×	EC-299
CYL 2 MISFIRE	P0302	0302	—	—	2	×	EC-299
CYL 3 MISFIRE	P0303	0303	—	—	2	×	EC-299
CYL 4 MISFIRE	P0304	0304	—	—	2	×	EC-299
KNOCK SEN/CIRC-B1	P0327	0327	—	—	2	—	EC-306
KNOCK SEN/CIRC-B1	P0328	0328	—	—	2	—	EC-306
CKP SEN/CIRCUIT	P0335	0335	—	—	2	×	EC-311
CMP SEN/CIRC-B1	P0340	0340	—	—	2	×	EC-319
TW CATALYST SYS-B1	P0420	0420	×	×	2	×	EC-327
EVAP PURG FLOW/MON	P0441	0441	×	×	2	×	EC-332
EVAP SMALL LEAK	P0442	0442	×	×	2	×	EC-338
PURG VOLUME CONT/V	P0444	0444	—	—	2	×	EC-348
PURG VOLUME CONT/V	P0445	0445	—	—	2	×	EC-348
VENT CONTROL VALVE	P0447	0447	—	—	2	×	EC-355
EVAP SYS PRES SEN	P0451	0451	—	—	2	×	EC-362
EVAP SYS PRES SEN	P0452	0452	—	—	2	×	EC-365
EVAP SYS PRES SEN	P0453	0453	—	—	2	×	EC-372
EVAP GROSS LEAK	P0455	0455	—	—	2	×	EC-380
EVAP VERY SML LEAK	P0456	0456	×*[4]	×	2	×	EC-388
FUEL LEV SEN SLOSH	P0460	0460	—	—	2	×	EC-399
FUEL LEVEL SENSOR	P0461	0461	—	—	2	×	EC-401
FUEL LEVL SEN/CIRC	P0462	0462	—	—	2	×	EC-403
FUEL LEVL SEN/CIRC	P0463	0463	—	—	2	×	EC-403
VEH SPEED SEN/CIRC*[5]	P0500	0500	—	—	2	×	EC-405
ISC SYSTEM	P0506	0506	—	—	2	×	EC-407
ISC SYSTEM	P0507	0507	—	—	2	×	EC-409
PW STP SEN/CIRC	P0550	0550	—	—	2	—	EC-411
ECM	P0605	0605	—	—	1 or 2	× or —	EC-416
PNP SW/CIRC	P0705	0705	—	—	2	×	AT-98
ATF TEMP SEN/CIRC	P0710	0710	—	—	2	×	AT-104
VEH SPD SEN/CIR AT*[5]	P0720	0720	—	—	2	×	AT-109
ENGINE SPEED SIG	P0725	0725	—	—	2	×	AT-115
A/T 1ST GR FNCTN	P0731	0731	—	—	2	×	AT-120
A/T 2ND GR FNCTN	P0732	0732	—	—	2	×	AT-125
A/T 3RD GR FNCTN	P0733	0733	—	—	2	×	AT-130
A/T 4TH GR FNCTN	P0734	0734	—	—	2	×	AT-135
TCC SOLENOID/CIRC	P0740	0740	—	—	2	×	AT-142
A/T TCC S/V FNCTN	P0744	0744	—	—	2	×	AT-147
L/PRESS SOL/CIRC	P0745	0745	—	—	2	×	AT-155
SFT SOL A/CIRC	P0750	0750	—	—	1	×	AT-162
SFT SOL B/CIRC	P0755	0755	—	—	1	×	AT-167

Items (CONSULT-II screen terms)	DTC*1		SRT code	Test value/ Test limit (GST only)	Trip	MIL lighting up	Reference page
	CONSULT-II GST*2	ECM*3					
ECM BACK UP/CIRC	P1065	1065	—	—	2	×	EC-419
INT/V TIM V/CIR-B1	P1111	1111	—	—	2	×	EC-423
ETC ACTR	P1121	1121	—	—	1	×	EC-427
ETC FUNCTION/CIRC	P1122	1122	—	—	1	×	EC-429
ETC MOT PWR	P1124	1124	—	—	1	×	EC-437
ETC MOT PWR	P1126	1126	—	—	1	×	EC-437
ETC MOT	P1128	1128	—	—	1	×	EC-443
HO2S1 (B1)	P1143	1143	×	×	2	×	EC-448
HO2S1 (B1)	P1144	1144	×	×	2	×	EC-454
HO2S2 (B1)	P1146	1146	×	×	2	×	EC-460
HO2S2 (B1)	P1147	1147	×	×	2	×	EC-468
CLOSED LOOP-B1	P1148	1148	—	—	1	×	EC-476
TCS C/U FUNCTION	P1211	1211	—	—	2	—	EC-478
TCS/CIRC	P1212	1212	—	—	2	—	EC-479
ENG OVER TEMP	P1217	1217	—	—	1	×	EC-480
CTP LEARNING	P1225	1225	—	—	2	—	EC-495
CTP LEARNING	P1226	1226	—	—	2	—	EC-497
SENSOR POWER/CIRC	P1229	1229	—	—	1	×	EC-499
PURG VOLUME CONT/V	P1444	1444	—	—	2	×	EC-504
VENT CONTROL VALVE	P1446	1446	—	—	2	×	EC-512
ASCD SW	P1564	1564	—	—	1	—	EC-519
ASCD BRAKE SW	P1572	1572	—	—	1	—	EC-527
ASCD VHL SPD SEN	P1574	1574	—	—	1	—	EC-538
NATS MALFUNCTION	P1610 - P1615	1610 - 1615	—	—	2	—	EC-46
TPV SEN/CIRC A/T	P1705	1705	—	—	1	×	AT-172
P-N POS SW/CIRCUIT	P1706	1706	—	—	2	×	EC-540
V/SP SEN (A/T)	P1720	1720	—	—	2	—	AT-109
O/R CLTCH SOL/CIRC	P1760	1760	—	—	2	×	AT-177
VIAS S/V CIRC	P1800	1800	—	—	2	—	EC-545
BRAKE SW/CIRCUIT	P1805	1805	—	—	2	—	EC-550
APP SEN 1/CIRC	P2122	2122	—	—	1	×	EC-555
APP SEN 1/CIRC	P2123	2123	—	—	1	×	EC-555
APP SEN 2/CIRC	P2127	2127	—	—	1	×	EC-562
APP SEN 2/CIRC	P2128	2128	—	—	1	×	EC-562
TP SENSOR	P2135	2135	—	—	1	×	EC-570
APP SENSOR	P2138	2138	—	—	1	×	EC-578

*1: 1st trip DTC No. is the same as DTC No.
*2: This number is prescribed by SAE J2012.
*3: In Diagnostic Test Made II (Self-diagnostic results), this number is controlled by NISSAN.
*4: SRT code will not be set if the self-diagnostic result is NG.
*5: When the fail-safe operations for both self-diagnoses occur at the same time, the MIL illuminates.
*6: The troubleshooting for this DTC needs CONSULT-II.
*7: When the ECM is in the mode of displaying SRT status, MIL may flash. For the details, refer to EC-56, "How to Display SRT Status"
*8: When engine is running, MIL may flash. For the details, refer to EC-62, "MIL Flashing Without DTC" .

DTC AND 1ST TRIP DTC

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic results obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

For malfunctions in which 1st trip DTCs are displayed, refer to EC-48, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" . These items are required by legal regulations to continuously monitor the system/ component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Service $07 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a malfunction. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to EC-95, "WORK FLOW" . Then perform DTC Confirmation Procedure or Overall Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

DTC and 1st trip DTC can be read by the following methods.

WITH CONSULT-II

WITH GST

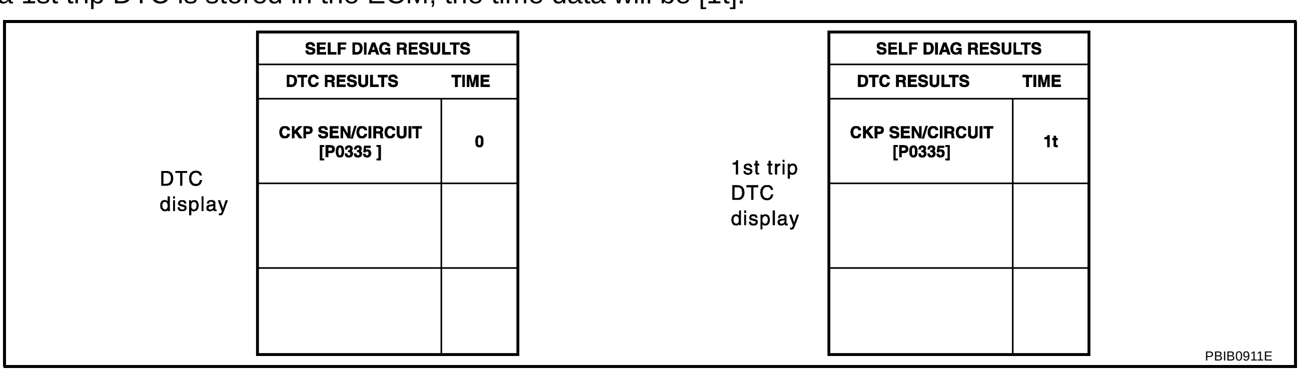
CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1148, P1706, etc.
These DTCs are prescribed by SAE J2012.
(CONSULT-II also displays the malfunctioning component or system.)

NO TOOLS

The number of blinks of the MIL in the Diagnostic Test Mode II (Self-Diagnostic Results) indicates the DTC. Example: 0340, 1148, 1706, etc.
These DTCs are controlled by NISSAN.

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST or the Diagnostic Test Mode II do not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.
If the DTC is being detected currently, the time data will be [0].
If a 1st trip DTC is stored in the ECM, the time data will be [1t].



FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed, base fuel schedule and intake air temperature at the moment a malfunction is detected.
Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see EC-127, "Freeze Frame Data and 1st Trip Freeze Frame Data" .
Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.
Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in EC-48, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" .

SYSTEM READINESS TEST (SRT) CODE

System Readiness Test (SRT) code is specified in Service $01 of SAE J1979.
As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.
If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.
In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.
Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate “INCMP” for these items.

NOTE:
The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.
If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:
If MIL is “ON” during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”) and DTC (No DTCs) before the inspection.

SRT Item

The table below shows required self-diagnostic items to set the SRT to “CMPLT”.

SRT item (CONSULT-II indication)	Performance Priority*1	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	2	Three way catalyst function	P0420
EVAP SYSTEM	1	EVAP control system	P0442
	2	EVAP control system	P0456
	2	EVAP control system purge flow monitoring	P0441
HO2S	2	Heated oxygen sensor 1	P0133
		Heated oxygen sensor 1	P1143
		Heated oxygen sensor 1	P1144
		Heated oxygen sensor 2	P0139
		Heated oxygen sensor 2	P1146
		Heated oxygen sensor 2	P1147
HO2S HTR	2	Heated oxygen sensor 1 heater	P0031, P0032
		Heated oxygen sensor 2 heater	P0037, P0038

*1: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example				
		Diagnosis	Ignition cycle ← ON →	OFF ← ON →	OFF ← ON →	OFF ← ON →
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)
		P0402	OK (1)	— (1)	— (1)	OK (2)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)
		P0402	— (0)	— (0)	OK (1)	— (1)
		P1402	OK (1)	OK (2)	— (2)	— (2)
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”
NG exists	Case 3	P0400	OK	OK	—	—
		P0402	—	—	—	—
		P1402	NG	—	NG	NG (Consecutive NG)
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL “ON”)
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”

OK: Self-diagnosis is carried out and the result is OK.
NG: Self-diagnosis is carried out and the result is NG.
—: Self-diagnosis is not carried out.

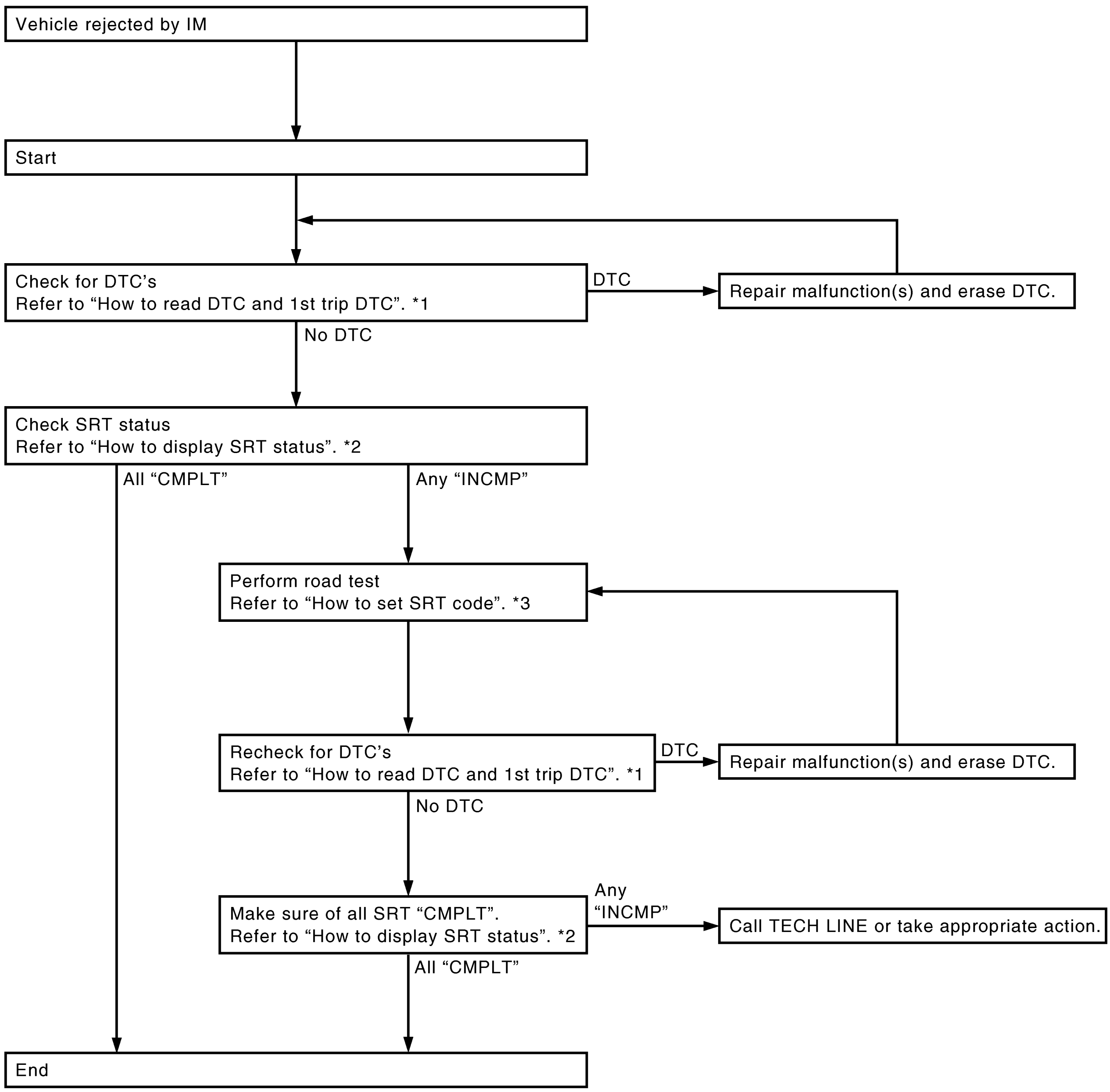
When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above
When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above
If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above
The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary for each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

  NOTE:
  SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.



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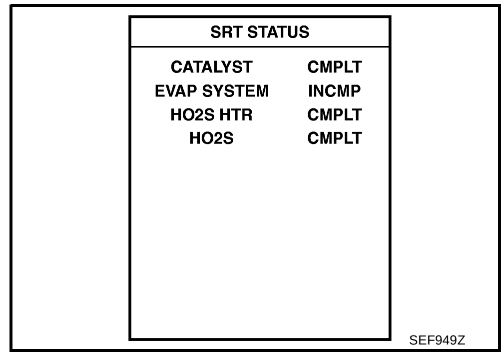
*1 EC-51 *2 EC-56 *3 EC-56

How to Display SRT Status



SEF949Z

WITH CONSULT-II

Selecting “SRT STATUS” in “DTC CONFIRMATION” mode with CONSULT-II.

For items whose SRT codes are set, a “CMPLT” is displayed on the CONSULT-II screen; for items whose SRT codes are not set, “INCMP” is displayed.

A sample of CONSULT-II display for SRT code is shown in the figure.

“INCMP” means the self-diagnosis is incomplete and SRT is not set.

“CMPLT” means the self-diagnosis is complete and SRT is set.

WITH GST

Selecting Service $01 with GST (Generic Scan Tool)

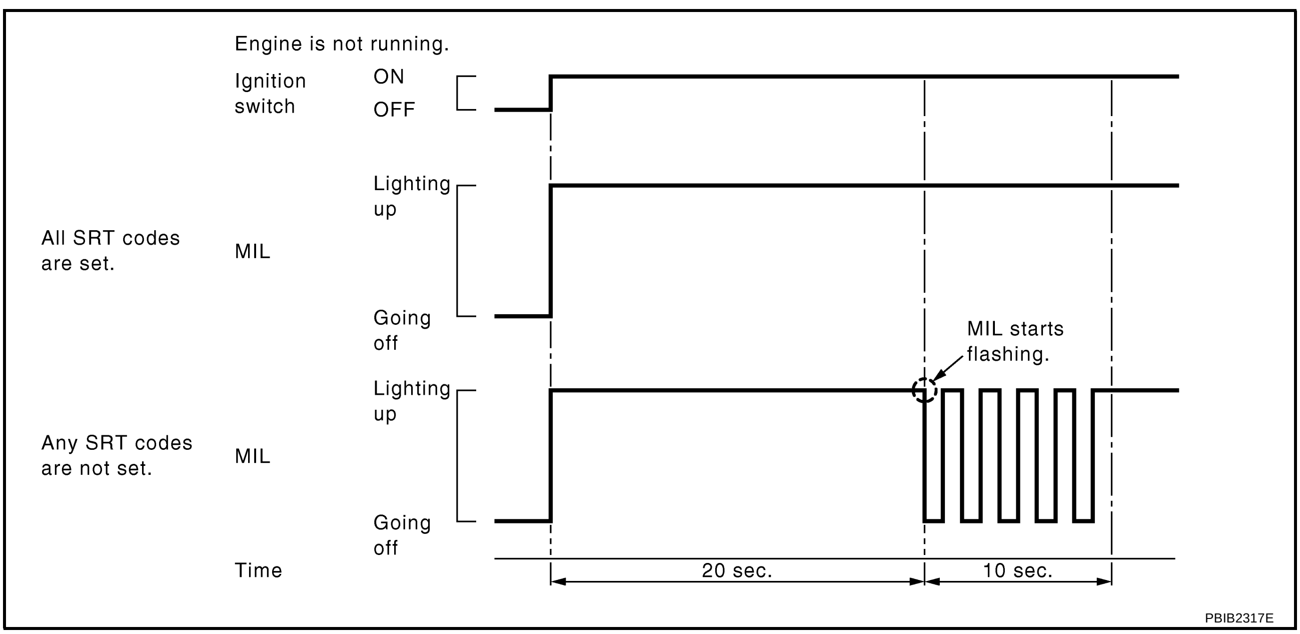
NO TOOLS

A SRT code itself can not be displayed while only SRT status can be.

1. Turn ignition switch ON and wait 20 seconds.
2. SRT status is indicated as shown below.

– When all SRT codes are set, MIL lights up continuously.

– When any SRT codes are not set, MIL will flash periodically for 10 seconds.



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How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions.

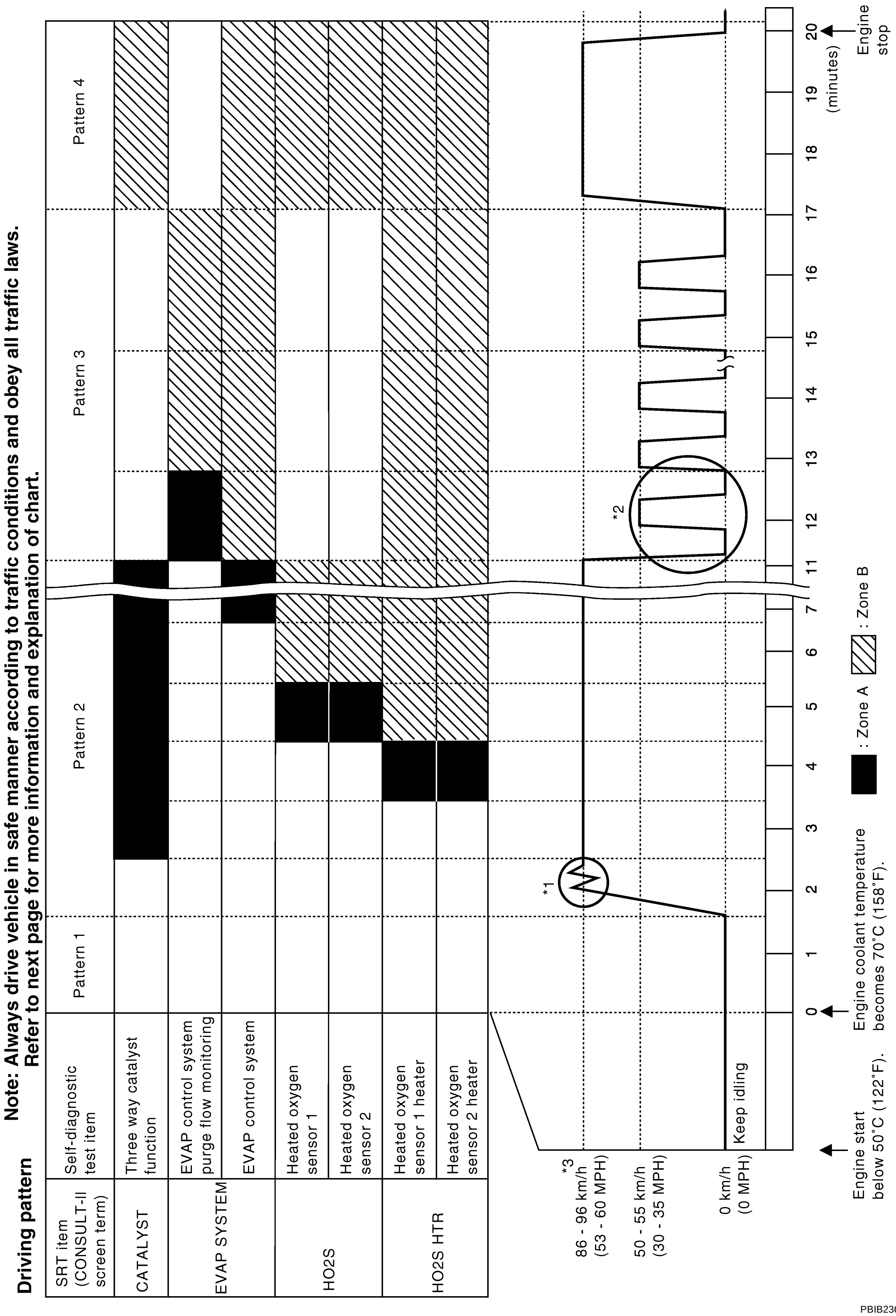
WITH CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on “Performance Priority” in the table on EC-52, "SRT Item" .

WITHOUT CONSULT-II

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

Driving Pattern



- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
  Zone A refers to the range where the time, required for the diagnosis under normal conditions*, is the shortest.
  Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
  Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of –10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 73 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 73 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 107 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in *2 must be repeated at least 3 times.

Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

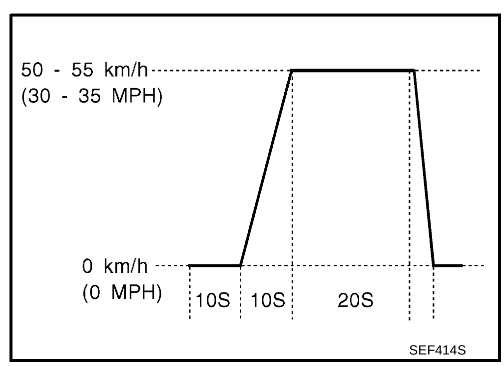
*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

*2: Operate the vehicle in the following driving pattern.

1. Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
2. Repeat driving pattern shown at right at least 10 times.

– **During acceleration, hold the accelerator pedal as steady as possible.**

*3: Checking the vehicle speed with GST is advised.



Suggested Transmission Gear Position for A/T Models

Set the selector lever in the D position with the overdrive switch turned ON.

Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

A
EC
C
D
E
F
G
H
I
J
K
L
M

	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:		For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	CRUISE shift point km/h (MPH)	km/h (MPH)
1st to 2nd	29 (18)	29 (15)	24 (15)
2nd to 3rd	54 (34)	54 (34)	40 (25)
3rd to 4th	75 (47)	75 (47)	64 (40)
4th to 5th	91 (57)	82 (51)	72 (45)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate.

Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	45 (28)
2nd	85 (53)
3rd	135 (84)
4th	—
5th	—

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

The following is the information specified in Service $06 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

Item	Self-diagnostic test item	DTC	Test value (GST display)		Test limit	Conversion
			TID	CID		
CATALYST	Three way catalyst function	P0420	01H	01H	Max.	1/128
		P0420	02H	81H	Min.	1
EVAP SYSTEM	EVAP control system (Small leak)	P0442	05H	03H	Max.	1/128 mm^2
	EVAP control system purge flow monitoring	P0441	06H	83H	Min.	20 mV
	EVAP control system (Very small leak)	P0456	07H	03H	Max.	1/128 mm^2
HO2S	Heated oxygen sensor 1	P0133	09H	04H	Max.	16 ms
		P1143	0AH	84H	Min.	10 mV
		P1144	0BH	04H	Max.	10 mV
	Heated oxygen sensor 2	P0139	19H	86H	Min.	10 mV/500 ms
		P1147	1AH	86H	Min.	10 mV
		P1146	1BH	06H	Max.	10 mV
HO2S HTR	Heated oxygen sensor 1 heater	P0032	29H	08H	Max.	20 mV
		P0031	2AH	88H	Min.	20 mV
	Heated oxygen sensor 2 heater	P0038	2DH	0AH	Max.	20 mV
		P0037	2EH	8AH	Min.	20 mV

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC

With CONSULT-II

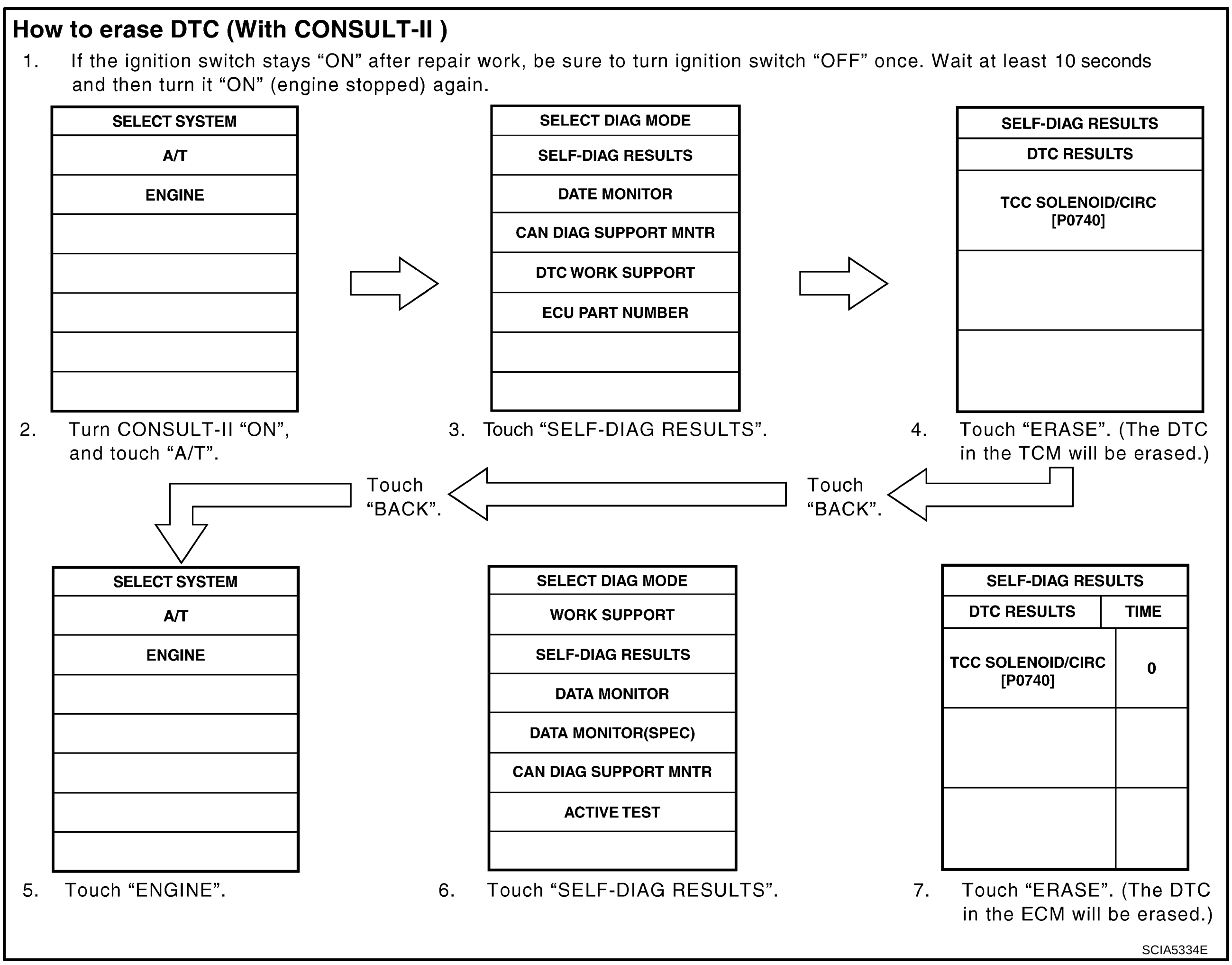
The emission related diagnostic information in the ECM can be erased by selecting “ERASE” in the “SELF-DIAG RESULTS” mode with CONSULT-II.

If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

NOTE:

If the DTC is not for AT related items (see EC-8, "INDEX FOR DTC"), skip steps 2 through 4.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Turn CONSULT-II ON and touch “AT”.
3. Touch “SELF-DIAG RESULTS”.
4. Touch “ERASE”. [The DTC in the TCM (Transmission control module) will be erased.] Then touch “BACK” twice.
5. Touch “ENGINE”.
6. Touch “SELF-DIAG RESULTS”.
7. Touch “ERASE”. (The DTC in the ECM will be erased.)



With GST

The emission related diagnostic information in the ECM can be erased by selecting Service $04 with GST.

NOTE:

If the DTC is not for AT related items (see EC-8, "INDEX FOR DTC"), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once.
   Wait at least 10 seconds and then turn it ON (engine stopped) again.

2. Perform AT-41, "HOW TO ERASE DTC (WITH GST)" . (The DTC in the TCM will be erased.)
3. Select Service $04 with GST (Generic Scan Tool).

No Tools

NOTE:
If the DTC is not for AT related items (see EC-8, "INDEX FOR DTC"), skip step 2.

1. If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.
2. Perform AT-42, "HOW TO ERASE DTC (NO TOOLS)" . (The DTC in the TCM will be erased.)
3. Change the diagnostic test mode from Mode II to Mode I by depressing the accelerator pedal. Refer to EC-63, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .

- **If the battery is disconnected, the emission-related diagnostic information will be lost within 24 hours.**
- **The following data are cleared when the ECM memory is erased.**
  - Diagnostic trouble codes
  - 1st trip diagnostic trouble codes
  - Freeze frame data
  - 1st trip freeze frame data
  - System readiness test (SRT) codes
  - Test values

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

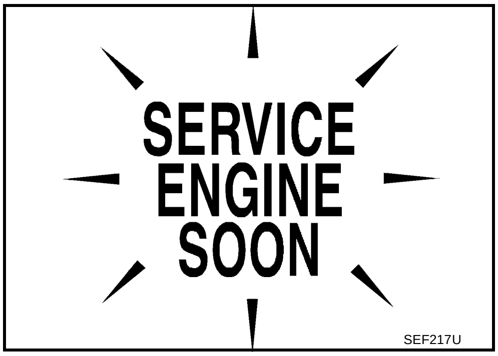
Malfunction Indicator Lamp (MIL)

ABS00CLB

DESCRIPTION

The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
   If the MIL does not light up, refer to DI-25, "WARNING LAMPS" , or see EC-659, "MIL AND DATA LINK CONNECTOR" .
2. When the engine is started, the MIL should go off.
   If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.



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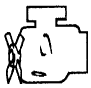
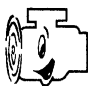
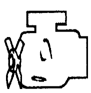
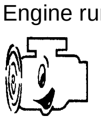
ON BOARD DIAGNOSTIC SYSTEM FUNCTION

The on board diagnostic system has the following four functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in ON position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. ● Misfire (Possible three way catalyst damage) ● One trip detection diagnoses
Mode II	Ignition switch in ON position  Engine stopped 	SELF-DIAGNOSTIC RESULTS	This function allows DTCs and 1st trip DTCs to be read.
	Engine running 	HEATED OXYGEN SENSOR 1 MONITOR	This function allows the fuel mixture condition (lean or rich), monitored by heated oxygen sensor 1, to be read.

When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.
Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

MIL Flashing Without DTC

- When any SRT codes are not set, MIL may flash without DTC. For the details, refer to EC-56, "How to Display SRT Status"
- If the ECM is in Diagnostic Test Mode II, MIL may flash when engine is running. In this case, check ECM diagnostic test mode. EC-63, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
  How to switch the diagnostic test (function) modes, and details of the above functions are described later. EC-63, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
  The following emission-related diagnostic information is cleared when the ECM memory is erased.

– Diagnostic trouble codes
– 1st trip diagnostic trouble codes
– Freeze frame data
– 1st trip freeze frame data
– System readiness test (SRT) codes
– Test values

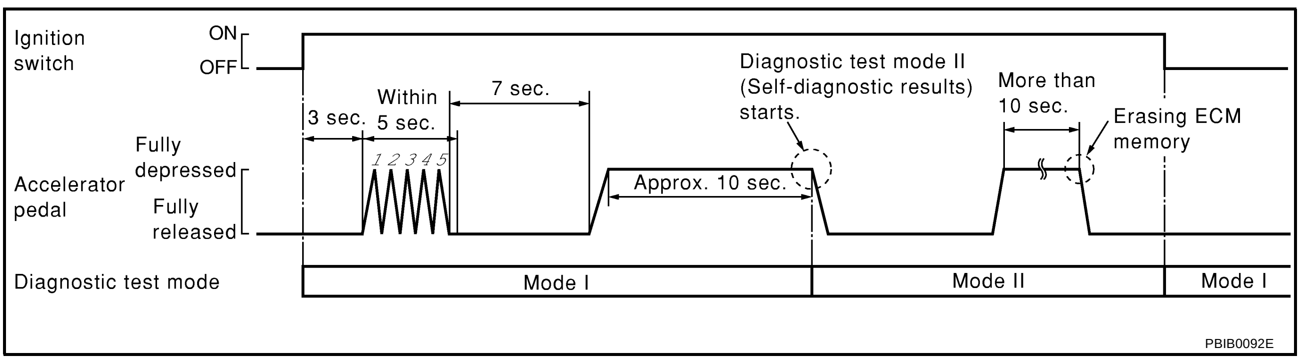
HOW TO SWITCH DIAGNOSTIC TEST MODE

NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**
- **Always ECM returns to Diagnostic Test Mode I after ignition switch is turned OFF.**

How to Set Diagnostic Test Mode II (Self-Diagnostic Results)

1. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
2. Repeat the following procedure quickly 5 times within 5 seconds.
a. Fully depress the accelerator pedal.
b. Fully release the accelerator pedal.
3. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 10 seconds until the MIL starts blinking.
NOTE:
Do not release the accelerator pedal for 10 seconds if MIL may start blinking on the halfway of this 10 seconds. This blinking is displaying SRT status and is continued for another 10 seconds. For the details, refer to EC-56, "How to Display SRT Status" .
4. Fully release the accelerator pedal.
ECM has entered to Diagnostic Test Mode II (Self-diagnostic results).
NOTE:
Wait until the same DTC (or 1st trip DTC) appears to confirm all DTCs certainly.



How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)

1. Set the ECM in Diagnostic Test Mode II (Self-diagnostic results).
Refer to EC-63, "How to Set Diagnostic Test Mode II (Self-Diagnostic Results)" .
2. Start Engine.
ECM has entered to Diagnostic Test Mode II (Heated oxygen sensor 1 monitor).
ECM will start heated oxygen sensor 1 monitoring from the bank 1 sensor.

How to Erase Diagnostic Test Mode II (Self-Diagnostic Results)

1. Set ECM in Diagnostic Test Mode II (Self-diagnostic results).
Refer to EC-63, "How to Set Diagnostic Test Mode II (Self-Diagnostic Results)" .
2. Fully depress the accelerator pedal and keep it for more than 10 seconds.
The emission-related diagnostic information has been erased from the backup memory in the ECM.
3. Fully release the accelerator pedal, and confirm the DTC 0000 is displayed.

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb.
Refer to DI-25, "WARNING LAMPS"

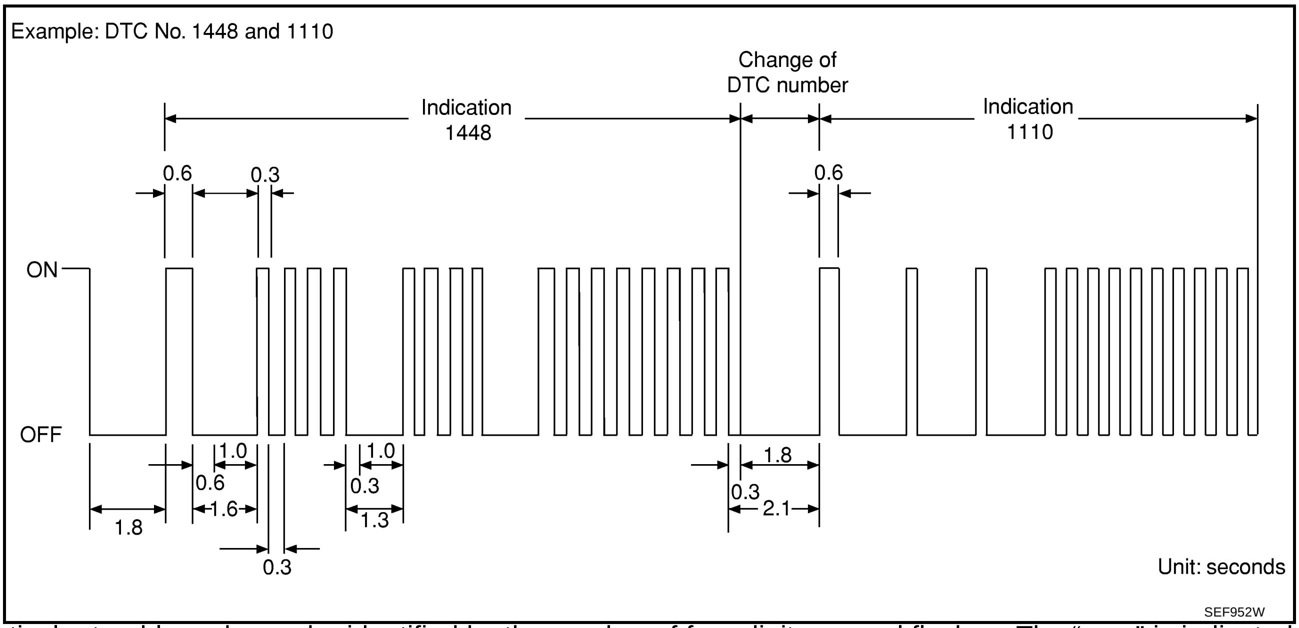
DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MIL	Condition
ON	When the malfunction is detected.
OFF	No malfunction

These DTC numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS)

DIAGNOSTIC TEST MODE II — SELF-DIAGNOSTIC RESULTS

In this mode, the DTC and 1st trip DTC are indicated by the number of blinks of the MIL as shown below.
The DTC and 1st trip DTC are displayed at the same time. If the MIL does not illuminate in diagnostic test mode I (Malfunction warning), all displayed items are 1st trip DTCs. If only one code is displayed when the MIL illuminates in diagnostic test mode II (SELF-DIAGNOSTIC RESULTS), it is a DTC; if two or more codes are displayed, they may be either DTCs or 1st trip DTCs. DTC No. is same as that of 1st trip DTC. These unidentified codes can be identified by using the CONSULT-II or GST. A DTC will be used as an example for how to read a code.



A particular trouble code can be identified by the number of four-digit numeral flashes. The “zero” is indicated by the number of ten flashes. The length of time the 1,000th-digit numeral flashes on and off is 1.2 seconds consisting of an ON (0.6-second) - OFF (0.6-second) cycle.
The 100th-digit numeral and lower digit numerals consist of a 0.3-second ON and 0.3-second OFF cycle.
A change from one digit numeral to another occurs at an interval of 1.0-second OFF. In other words, the later numeral appears on the display 1.3 seconds after the former numeral has disappeared.
A change from one trouble code to another occurs at an interval of 1.8-second OFF.
In this way, all the detected malfunctions are classified by their DTC numbers. The DTC 0000 refers to no malfunction. (See EC-8, "INDEX FOR DTC")

How to Erase Diagnostic Test Mode II (Self-Diagnostic Results)

The DTC can be erased from the back-up memory in the ECM by depressing accelerator pedal.
Refer to EC-63, "How to Erase Diagnostic Test Mode II (Self-Diagnostic Results)"

- **If the battery is disconnected, the DTC will be lost from the backup memory within 24 hours.**
- **Be careful not to erase the stored memory before starting trouble diagnoses.**

DIAGNOSTIC TEST MODE II — HEATED OXYGEN SENSOR 1 MONITOR

In this mode, the MIL displays the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor 1.

MIL	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

To check the heated oxygen sensor 1 function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.
Next run engine at about 2,000 rpm for about 2 minutes under no load conditions. Then make sure that the MIL comes ON more than 5 times within 10 seconds with engine running at 2,000 rpm under no load.

OBD System Operation Chart

ABS00CLC

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the 1st time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to EC-47, "Two Trip Detection Logic" .
- The MIL will go off after the vehicle is driven 3 times (driving pattern B) with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in OK for the 2nd trip.

SUMMARY CHART

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

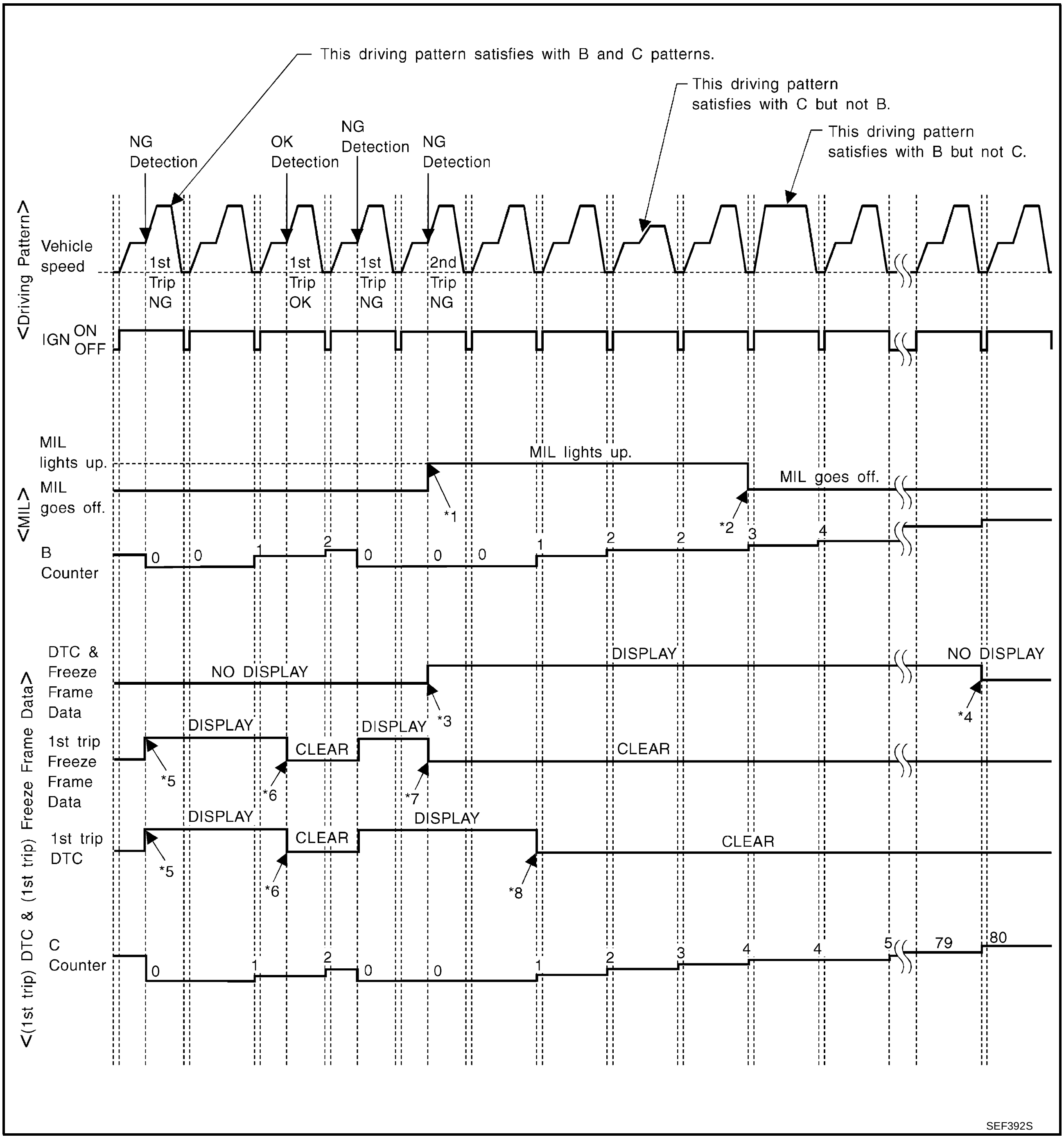
For details about patterns B and C under “Fuel Injection System” and “Misfire”, see EC-67 .

For details about patterns A and B under “Other”, see EC-69 .

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

*5: When a malfunction is detected for the 1st time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: The 1st trip DTC and the 1st trip freeze frame data will be cleared at the moment OK is detected.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

*8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in “OBD SYSTEM OPERATION CHART”)

<Driving Pattern C>

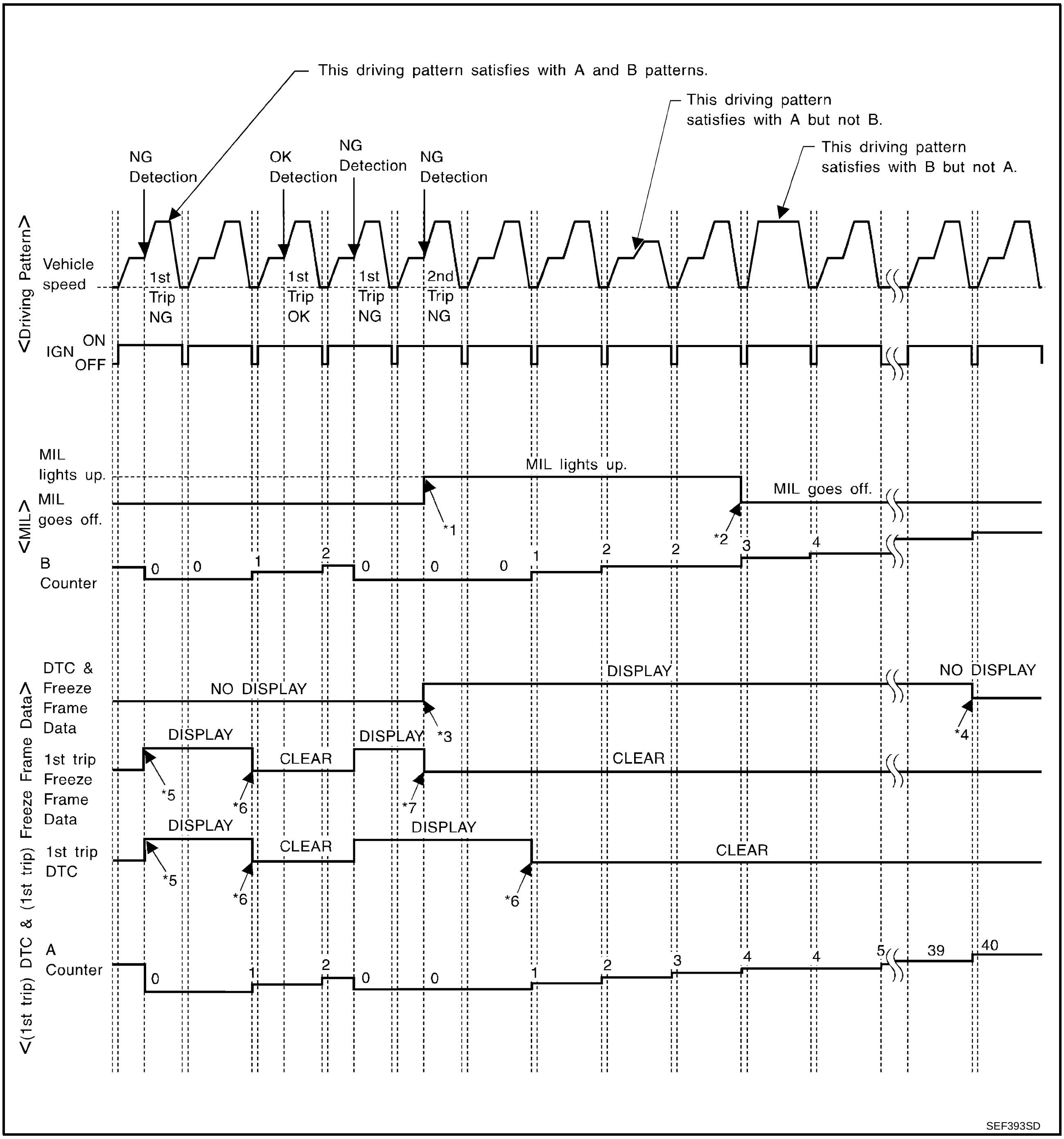
Driving pattern C means the vehicle operation as follows:
The following conditions should be satisfied at the same time:
Engine speed: (Engine speed in the freeze frame data) ±375 rpm
Calculated load value: (Calculated load value in the freeze frame data) x (1±0.1) [%]
Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:
If the stored freeze frame data is as follows:
Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)
To be satisfied with driving pattern C, the vehicle should run under the following conditions:
Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of vehicle conditions above.
- The C counter will be counted up when vehicle conditions above is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80. (*2 in “OBD SYSTEM OPERATION CHART”)
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”



*1: When the same malfunction is detected in two consecutive trips, MIL will light up.

*2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.

*3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

*4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

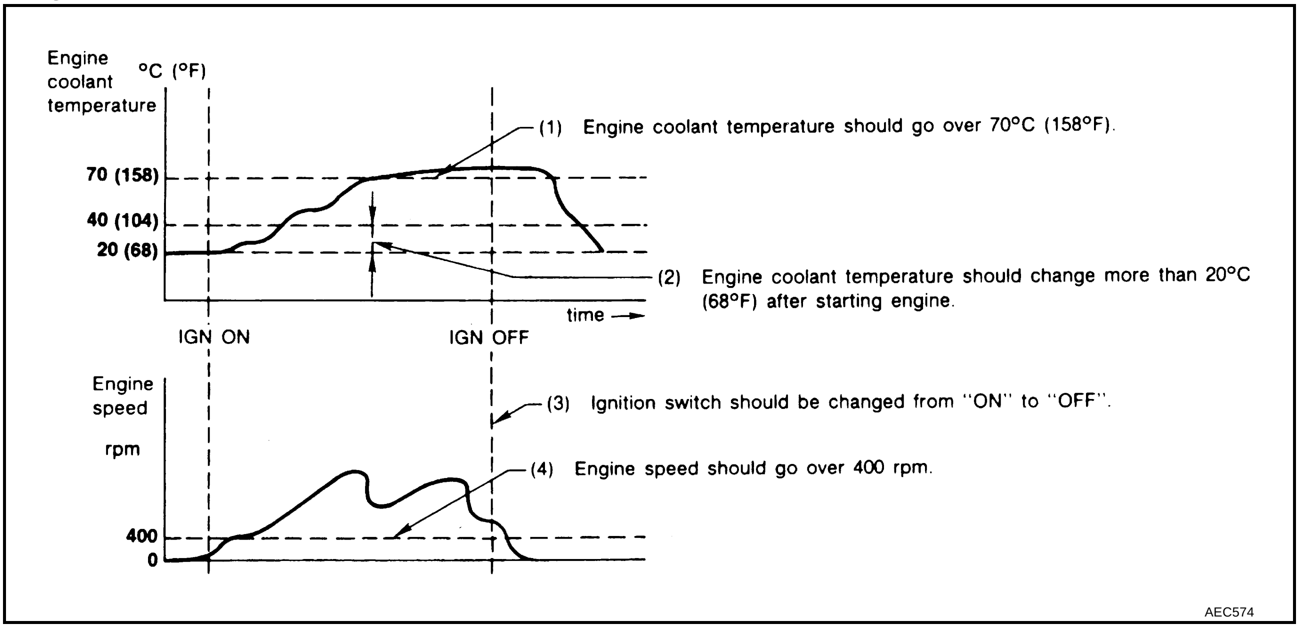
*5: When a malfunction is detected for the 1st time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.

*6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.

*7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

<Driving Pattern A>



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40 (*2 in “OBD SYSTEM OPERATION CHART”).

<Driving Pattern B>

Driving pattern B means the vehicle operation as follows:
All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in “OBD SYSTEM OPERATION CHART”).

BASIC SERVICE PROCEDURE

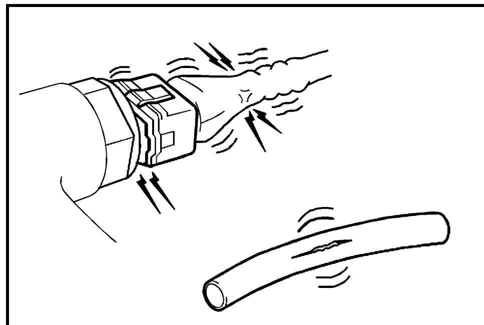
PFP:00018

Basic Inspection

ABS00DCV

1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
   - Harness connectors for improper connections
   - Wiring harness for improper connections, pinches and cut
   - Vacuum hoses for splits, kinks and improper connections
   - Hoses and ducts for leaks
   - Air cleaner clogging
   - Gasket



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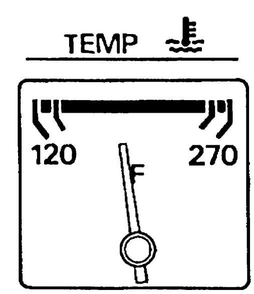
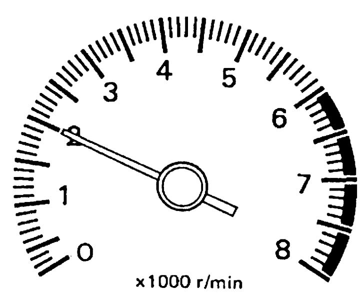
3. Confirm that electrical or mechanical loads are not applied.
   - Headlamp switch is OFF.
   - Air conditioner switch is OFF.
   - Rear window defogger switch is OFF.
   - Steering wheel is in the straight-ahead position, etc.
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.



SEF976U

5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.



SEF977U

<u>OK or NG</u>

OK >> GO TO 3.
NG >> GO TO 2.

2. REPAIR OR REPLACE

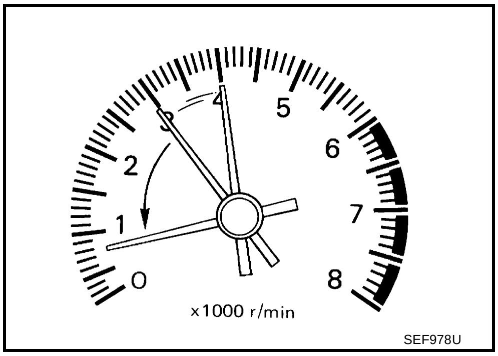
Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3.

3. CHECK TARGET IDLE SPEED

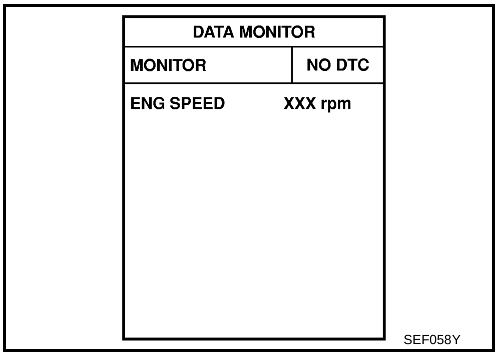
With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.



3. Read idle speed in “DATA MONITOR” mode with CONSULT-II. Refer to EC-75, "IDLE SPEED"

   M/T: 700 ± 50 rpm (in Neutral position)
   A/T: 700 ± 50 rpm (in P or N position)



Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed. Refer to EC-75, "IDLE SPEED"

   M/T: 700 ± 50 rpm (in Neutral position)
   A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-88, "Throttle Valve Closed Position Learning" .

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-88, "Idle Air Volume Learning" .
Is Idle Air Volume Learning carried out successfully?

Yes or No

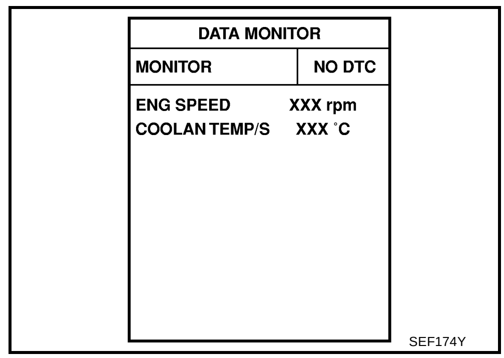
Yes >> GO TO 7.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.
Refer to EC-75, "IDLE SPEED"

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed.
Refer to EC-75, "IDLE SPEED"

M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit.
Refer to EC-319, "DTC P0340 CMP SENSOR (PHASE)" .
- Check crankshaft position sensor (POS) and circuit.
Refer to EC-311, "DTC P0335 CKP SENSOR (POS)" .

OK or NG

OK >> GO TO 9.
NG >> 1. Repair or replace.
2. GO TO 4.

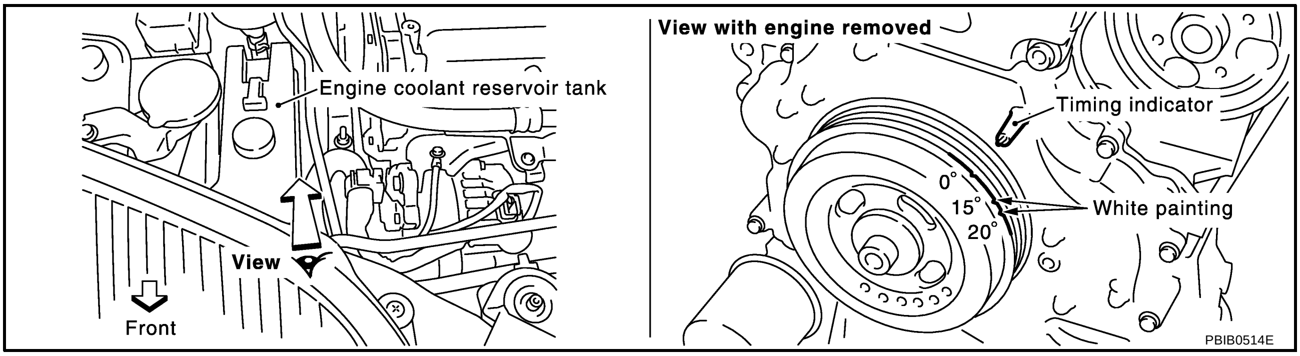
9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light.
   Refer to EC-75, "IGNITION TIMING"



M/T: 15 ± 5° BTDC (in Neutral position)
A/T: 15 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 19.
NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-88, "Throttle Valve Closed Position Learning" .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-88, "Idle Air Volume Learning" .
Is Idle Air Volume Learning carried out successfully?

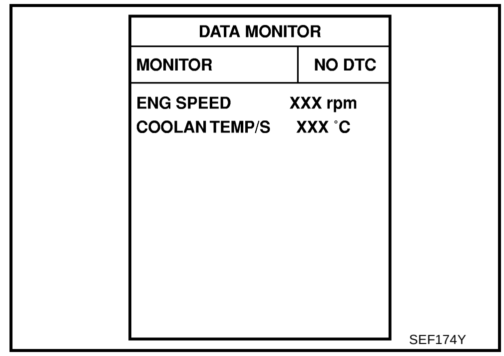
Yes or No

Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

14. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.
   Refer to EC-75, "IDLE SPEED"



M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to EC-75, "IDLE SPEED"

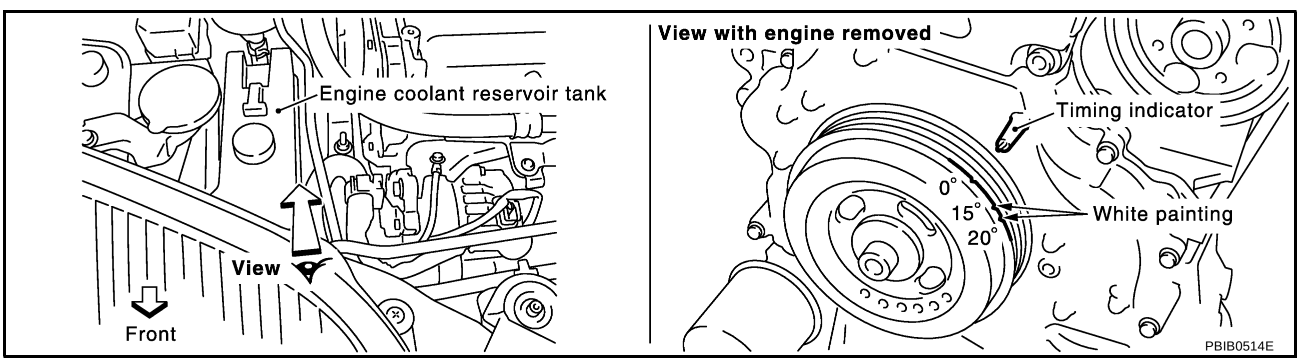
M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light.
   Refer to EC-75, "IGNITION TIMING"



M/T: 15 ± 5° BTDC (in Neutral position)
A/T: 15 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 19.
NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-49, "TIMING CHAIN" .

OK or NG

OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit.
  Refer to EC-319, "DTC P0340 CMP SENSOR (PHASE)" .
- Check crankshaft position sensor (POS) and circuit.
  Refer to EC-311, "DTC P0335 CKP SENSOR (POS)" .

OK or NG

OK >> GO TO 18.
NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .

>> GO TO 4.

19. INSPECTION END

Did you replace the ECM, referring this Basic Inspection procedure?

Yes or No

Yes >> 1. Perform EC-87, "VIN Registration"
2. **INSPECTION END**
No >> **INSPECTION END**

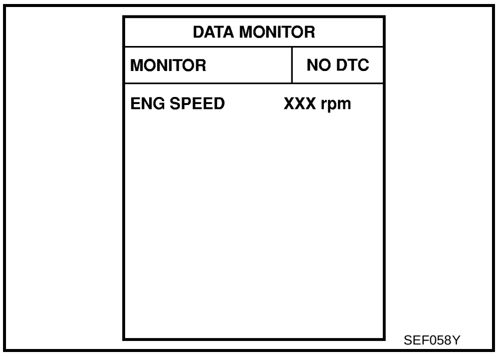
Idle Speed and Ignition Timing Check

ABS00CL1

IDLE SPEED

With CONSULT-II

Start engine and warm it up to normal operating temperature.



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With GST

Check idle speed in Service $01 with GST.

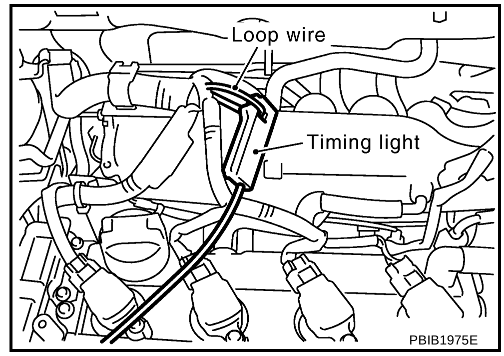
IGNITION TIMING

Any of following two methods may be used.

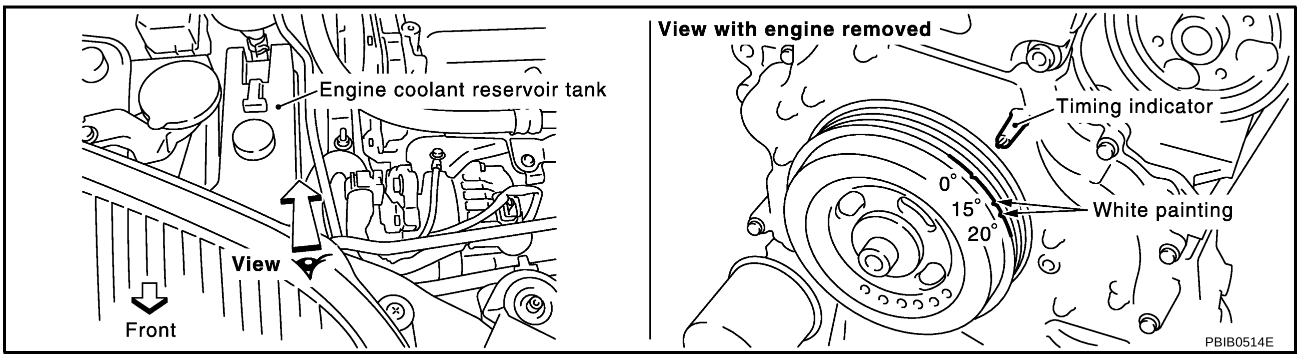
Method A

1. Slide the harness protector off the ignition coil No.1 to clear the wires.

2. Attach timing light to the wires.

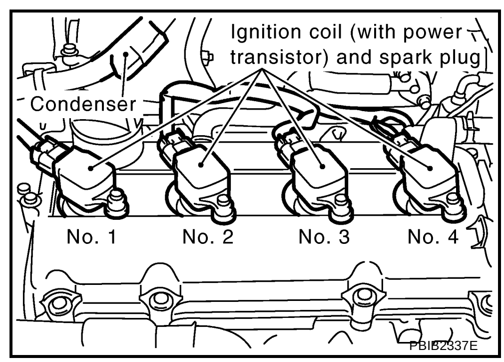


3. Check ignition timing.

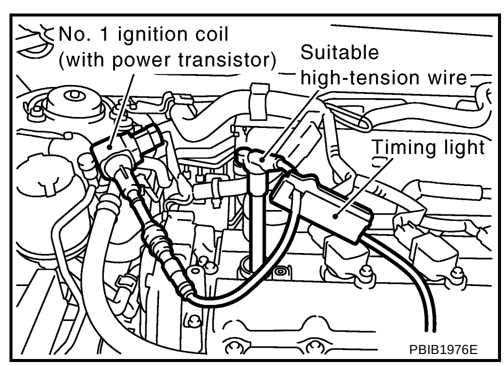


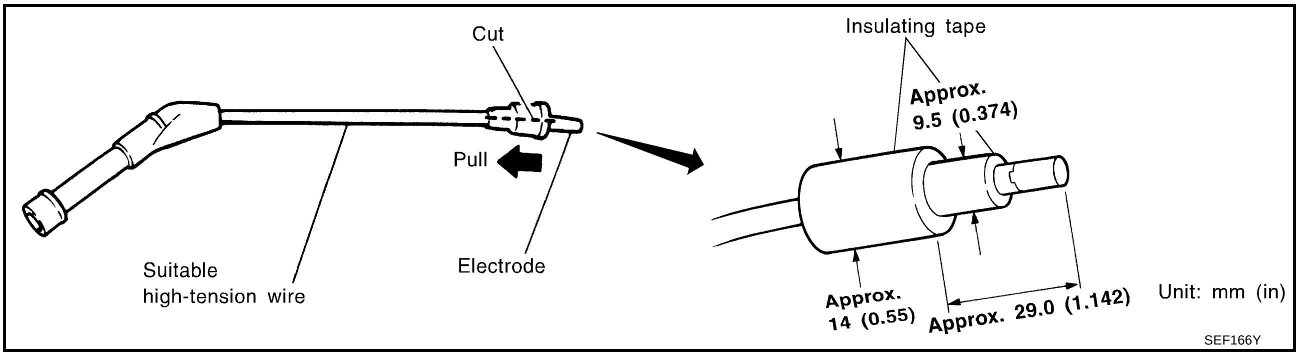
Method B

1. Remove No. 1 ignition coil.

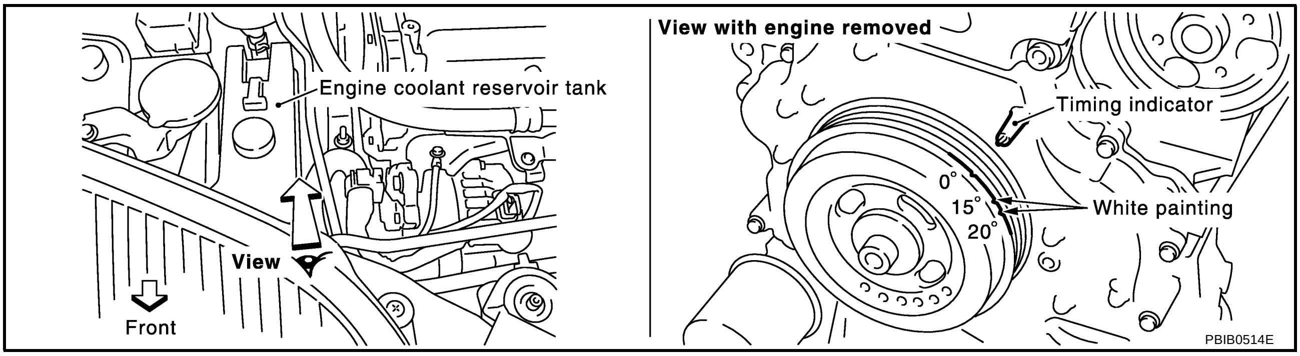


2. Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.





3. Check ignition timing.



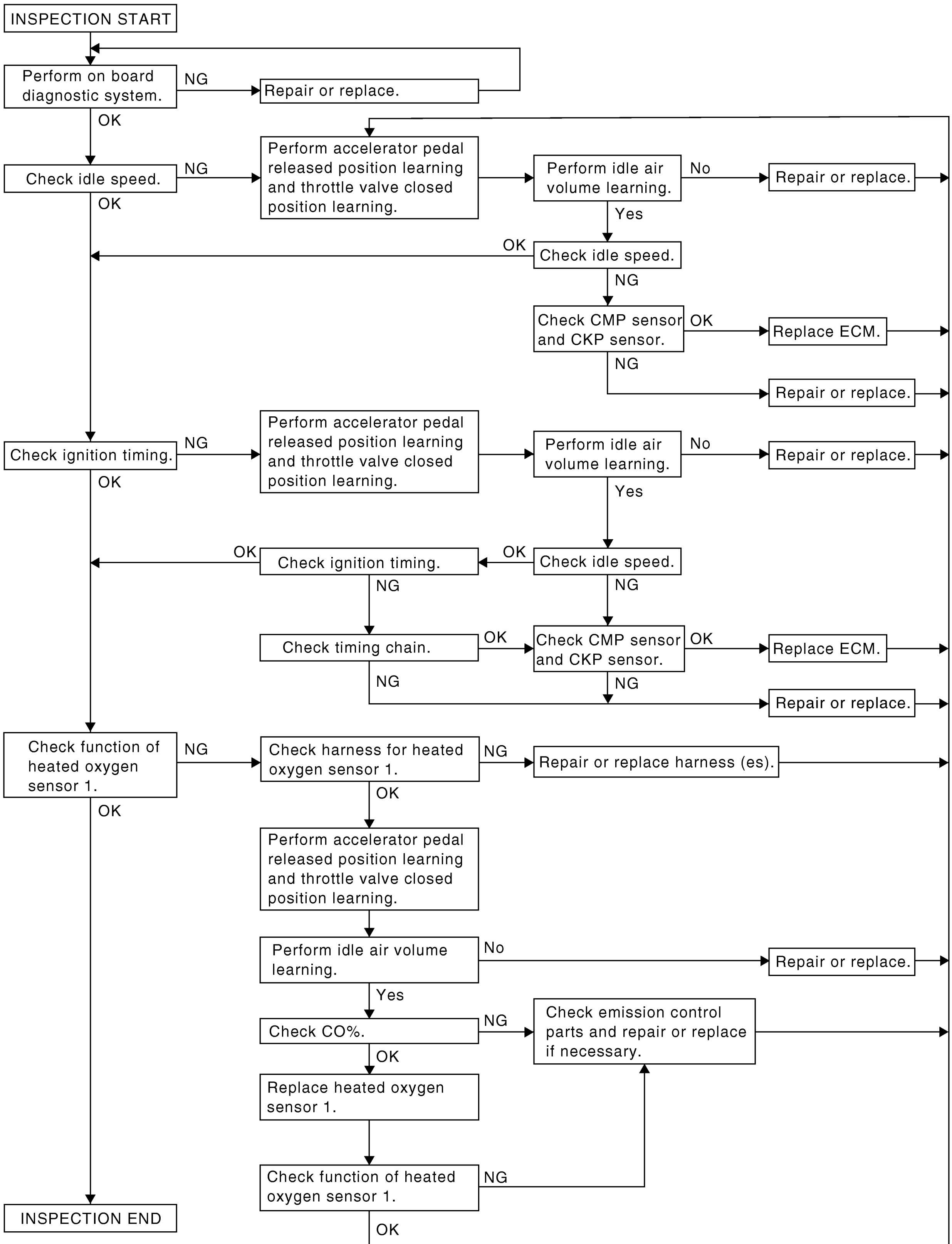
Idle Mixture Ratio Adjustment

ABS00CL2

PREPARATION

1. Make sure that the following parts are in good order.
   - Battery
   - Ignition system
   - Engine oil and coolant levels
   - Fuses
   - ECM harness connector
   - Vacuum hoses
   - Air intake system
     (Oil filler cap, oil level gauge, etc.)
   - Fuel pressure
   - Engine compression
   - Throttle valve
   - Evaporative emission system
2. On air conditioner equipped models, checks should be carried out while the air conditioner is OFF.
3. On automatic transmission equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in P or N position.
4. When measuring CO percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn OFF headlamp, heater blower, rear window defogger.
6. Keep front wheels pointed straight ahead.

OVERALL SEQUENCE



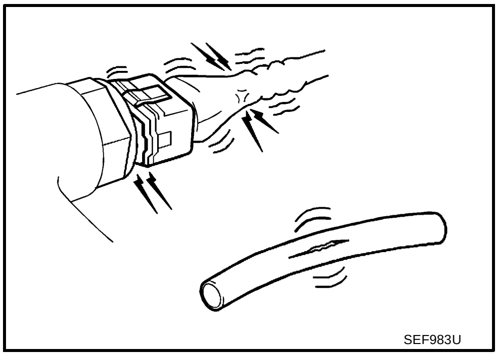
NOTE:
If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

PBIB2001E

DETAILED PROCEDURE

1. INSPECTION START

1. Check service records for any recent repairs that may indicate a related malfunction, or a current need for scheduled maintenance.
2. Open engine hood and check the following:
   - Harness connectors for improper connections
   - Wiring harness for improper connections, pinches and cut
   - Vacuum hoses for splits, kinks and improper connections
   - Hoses and ducts for leaks
   - Air cleaner clogging
   - Gasket
3. Confirm that electrical or mechanical loads are not applied.
   - Headlamp switch is OFF.
   - Air conditioner switch is OFF.
   - Rear window defogger switch is OFF.
   - Steering wheel is in the straight-ahead position, etc.



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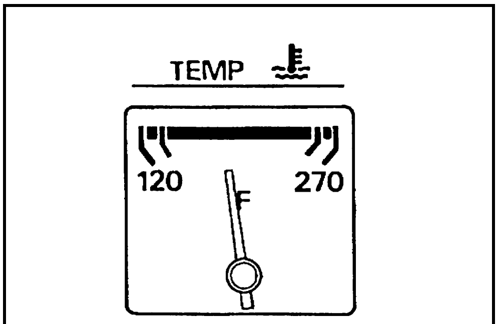
4. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
   Ensure engine stays below 1,000 rpm.



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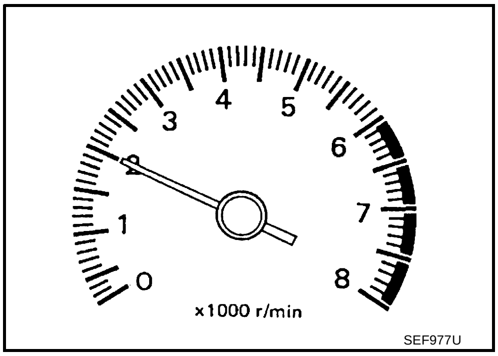
5. Run engine at about 2,000 rpm for about 2 minutes under no load.
6. Make sure that no DTC is displayed with CONSULT-II or GST.

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



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2. REPAIR OR REPLACE

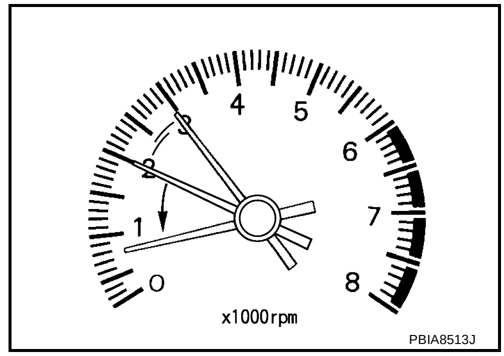
Repair or replace components as necessary according to corresponding Diagnostic Procedure.

>> GO TO 3.

3. CHECK TARGET IDLE SPEED

With CONSULT-II

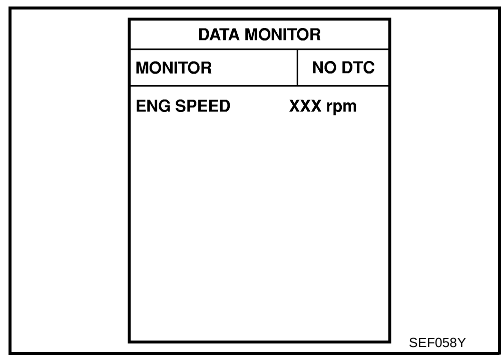
1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.



3. Read idle speed in “DATA MONITOR” mode with CONSULT-II. Refer to EC-75, "IDLE SPEED" .

M/T: 700 ± 50 rpm (in Neutral position)

A/T: 700 ± 50 rpm (in P or N position)



Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed for about 1 minute.
3. Check idle speed. Refer to EC-75, "IDLE SPEED" .

M/T: 700 ± 50 rpm (in Neutral position)

A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .

>> GO TO 5.

5. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-88, "Throttle Valve Closed Position Learning" .

>> GO TO 6.

6. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-88, "Idle Air Volume Learning" .

Is Idle Air Volume Learning carried out successfully?

Yes or No

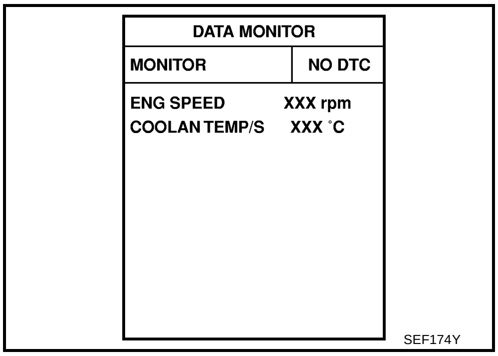
Yes >> GO TO 7.

No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

7. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.
Refer to EC-75, "IDLE SPEED" .



M/T: 700 ± 50 rpm (in Neutral position)

A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to EC-75, "IDLE SPEED" .

M/T: 700 ± 50 rpm (in Neutral position)

A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 10.

NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit.
Refer to EC-319, "DTC P0340 CMP SENSOR (PHASE)" .
- Check crankshaft position sensor (POS) and circuit.
Refer to EC-311, "DTC P0335 CKP SENSOR (POS)" .

OK or NG

OK >> GO TO 9.

NG >> 1. Repair or replace.
2. GO TO 4.

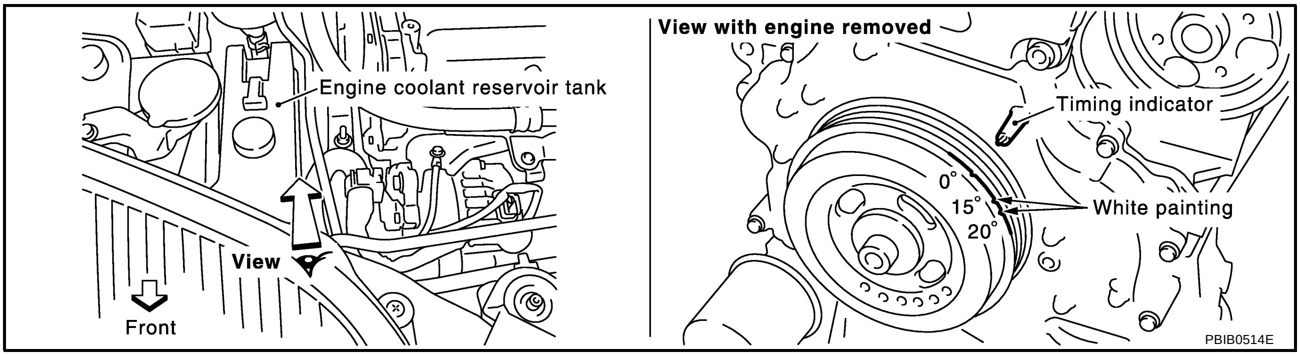
9. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .

>> GO TO 4.

10. CHECK IGNITION TIMING

1. Run engine at idle.
2. Check ignition timing with a timing light. Refer to EC-75, "IGNITION TIMING" .



M/T: 15 ± 5° BTDC (in Neutral position)

A/T: 15 ± 5° BTDC (in P or N position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.
OK (Without CONSULT-II)>>GO TO 20.
NG >> GO TO 11.

11. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Stop engine.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .

>> GO TO 12.

12. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-88, "Throttle Valve Closed Position Learning" .

>> GO TO 13.

13. PERFORM IDLE AIR VOLUME LEARNING

Perform EC-88, "Idle Air Volume Learning" .

Is Idle Air Volume Learning carried out successfully?

Yes or No

Yes >> GO TO 14.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

A
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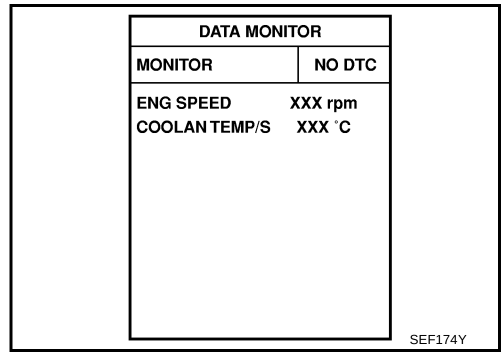
J
K
L
M

14. CHECK TARGET IDLE SPEED AGAIN

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Read idle speed in “DATA MONITOR” mode with CONSULT-II.
   Refer to EC-75, "IDLE SPEED" .



M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Check idle speed. Refer to EC-75, "IDLE SPEED" .

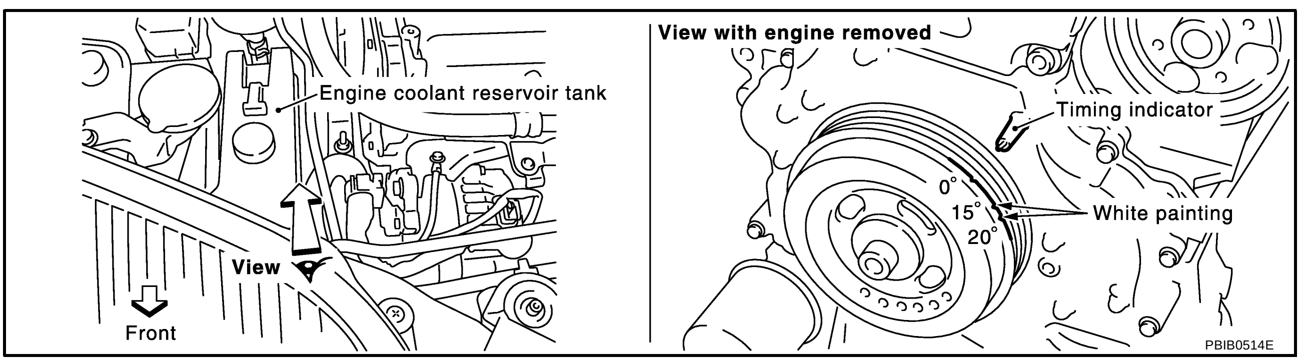
M/T: 700 ± 50 rpm (in Neutral position)
A/T: 700 ± 50 rpm (in P or N position)

OK or NG

OK >> GO TO 15.
NG >> GO TO 17.

15. CHECK IGNITION TIMING AGAIN

1. Run engine at idle.
2. Check ignition timing with a timing light. Refer to EC-75, "IGNITION TIMING" .



M/T: 15 ± 5° BTDC (in Neutral position)
A/T: 15 ± 5° BTDC (in P or N position)

OK or NG

OK (With CONSULT-II)>>GO TO 19.
OK (Without CONSULT-II)>>GO TO 20.
NG >> GO TO 16.

16. CHECK TIMING CHAIN INSTALLATION

Check timing chain installation. Refer to EM-49, "TIMING CHAIN" .

OK or NG

OK >> GO TO 17.
NG >> 1. Repair the timing chain installation.
2. GO TO 4.

17. DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit.
  Refer to EC-319, "DTC P0340 CMP SENSOR (PHASE)" .
- Check crankshaft position sensor (POS) and circuit.
  Refer to EC-311, "DTC P0335 CKP SENSOR (POS)" .

OK or NG

OK >> GO TO 18.
NG >> 1. Repair or replace.
2. GO TO 4.

18. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is a rare case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .

>> GO TO 4.

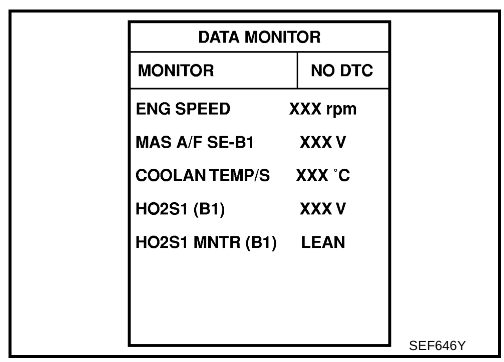
19. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. See “HO2S1 MNTR (B1)” in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time: RICH → LEAN → RICH

2 times: RICH → LEAN → RICH → LEAN → RICH



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OK or NG

OK >> **INSPECTION END**
NG (Monitor does not fluctuate.)>>GO TO 21.
NG (Monitor fluctuates less than 5 times.)>>GO TO 28.

20. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

Without CONSULT-II

1. Stop engine and set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor).
   Refer to EC-63, "HOW TO SWITCH DIAGNOSTIC TEST MODE" .
2. Start engine and run it at about 2,000 rpm for about 2 minutes under no load.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

OK >> **INDPECTION END**
NG (MIL does not come on)>>GO TO 21.
NG (MIL comes on less than 5 times)>>GO TO 28.

21. CHECK HEATED OXYGEN SENSOR 1 HARNESS

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 1 harness connector.
4. Check harness continuity between ECM terminal 35 and heated oxygen sensor 1 terminal 1.
   Refer to EC-229, "Wiring Diagram" .

   Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 22.
NG >> 1. Repair or replace harness between ECM and heated oxygen sensor 1.
2. GO TO 4.

22. PERFORM ACCELERATOR PEDAL RELEASED POSITION LEARNING

1. Reconnect ECM harness connector.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .

>> GO TO 23.

23. PERFORM THROTTLE VALVE CLOSED POSITION LEARNING

Perform EC-88, "Throttle Valve Closed Position Learning" .

>> GO TO 24.

24. PERFORM IDLE AIR VOLUME LEARNING

Refer to EC-88, "Idle Air Volume Learning" .
Is the Idle Air Volume Learning carried out successfully?

Yes or No

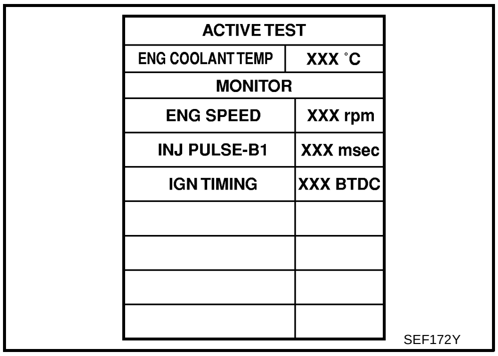
Yes (With CONSULT-II)>>GO TO 25.
Yes (Without CONSULT-II)>> GO TO 26.
No >> 1. Follow the instruction of Idle Air Volume Learning.
2. GO TO 4.

25. CHECK CO%

With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. Turn ignition switch OFF, wait at least 10 seconds and then turn ON.
3. Select “ENG COOLANT TEMP” in “ACTIVE TEST” mode.
4. Set “ENG COOLANT TEMP” to 5°C (41°F) by touching “DOWN” and “Qd”.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed.
6. Check CO%.

   Idle CO: 0.3 – 9.5% and engine runs smoothly.



OK or NG

OK >> GO TO 28.
NG >> GO TO 27.

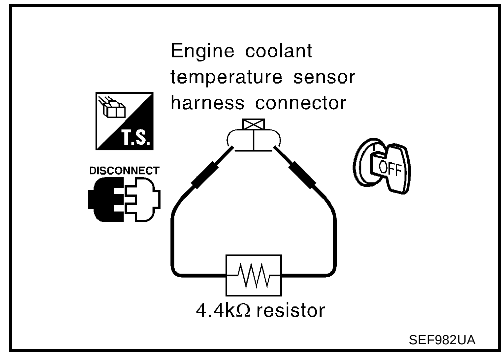
26. CHECK CO%

Without CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.
2. Turn ignition switch OFF.
3. Disconnect engine coolant temperature sensor harness connector.
4. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.
5. Start engine and rev it (2,000 to 3,000 rpm) two or three times under no load, then run engine at idle speed.
6. Check CO%.

   Idle CO: 0.3 – 9.5% and engine runs smoothly.

7. After checking CO%, turn ignition switch OFF, disconnect the resistor from the terminals of engine coolant temperature sensor harness connector, and then connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.



OK or NG

OK >> GO TO 28.
NG >> GO TO 27.

27. RECONNECT HEATED OXYGEN SENSOR 1 HARNESS CONNECTOR

1. Turn ignition switch OFF.
2. Reconnect heated oxygen sensor 1 harness connector.

>> GO TO 31.

28. REPLACE HEATED OXYGEN SENSOR 1

1. Stop engine.
2. Replace heated oxygen sensor 1.

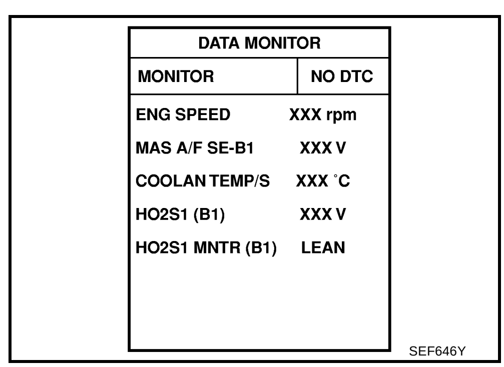
With CONSULT-II>>GO TO 29.
Without CONSULT-II>>GO TO 30.

29. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

With CONSULT-II

1. Start engine and warm it up until engine coolant temperature indicator points the middle of gauge.
2. See “HO2S1 MNTR (B1)” in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

   1 time: RICH → LEAN → RICH
   2 times: RICH → LEAN → RICH → LEAN → RICH



OK or NG

OK >> GO TO 4.
NG >> GO TO 31.

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30. CHECK HEATED OXYGEN SENSOR 1 SIGNAL

Without CONSULT-II

1. Set ECM to Self-diagnostic mode II (Heated oxygen sensor 1 monitor).
   Refer to EC-63, "How to Set Diagnostic Test Mode II (Heated Oxygen Sensor 1 Monitor)" .
2. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the MIL comes on more than 5 times during 10 seconds.

OK or NG

OK >> GO TO 4.
NG >> GO TO 31.

31. DETECT MALFUNCTIONING PART

Check the following.

- Check fuel pressure regulator and repair or replace if necessary.
  Refer to EC-90, "Fuel Pressure Check" .
- Check mass air flow sensor and its circuit, and repair or replace if necessary.
  Refer to EC-182, "DTC P0101 MAF SENSOR" , EC-191, "DTC P0102, P0103 MAF SENSOR" .
- Check fuel injector and its circuit, and repair or replace if necessary.
  Refer to EC-607, "INJECTOR CIRCUIT" .
- Check engine coolant temperature sensor and its circuit, and repair or replace if necessary.
  Refer to EC-205, "DTC P0117, P0118 ECT SENSOR" and EC-219, "DTC P0125 ECT SENSOR" .

OK or NG

OK >> GO TO 33.
NG >> 1. Repair or replace.
2. GO TO 32.

32. ERASE UNNECESSARY DTC

After this inspection, unnecessary DTC might be displayed.
Erase the stored memory in ECM and TCM.
Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" and AT-40, "HOW TO ERASE DTC" .

>> GO TO 4.

33. CHECK ECM FUNCTION

1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of an incident, but this is the rarely the case.)
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .

>> GO TO 4.

VIN Registration

ABS00D7Y

DESCRIPTION

VIN Registration is an operation to registering VIN in ECM. It must be performed each time ECM is replaced.

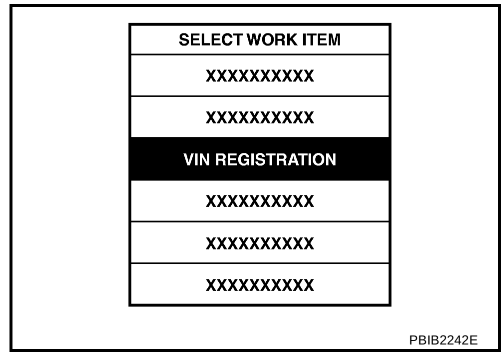
NOTE:
Accurate VIN which is registered in ECM may be required for Inspection & Maintenance (I/M).

OPERATION PROCEDURE

With CONSULT-II

1. Check the VIN of the vehicle and note it. Refer to GI-49, "IDENTIFICATION INFORMATION" .
2. Turn ignition switch ON and engine stopped.

3. Select “VIN REGISTRATION” in “WORK SUPPORT” mode.
4. Follow the instruction of CONSULT-II display.



Accelerator Pedal Released Position Learning

ABS00CL3

DESCRIPTION

Accelerator Pedal Released Position Learning is an operation to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. It must be performed each time harness connector of accelerator pedal position sensor or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON and wait at least 2 seconds.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and wait at least 2 seconds.
5. Turn ignition switch OFF and wait at least 10 seconds.

Throttle Valve Closed Position Learning

ABS00CL4

DESCRIPTION

Throttle Valve Closed Position Learning is an operation to learn the fully closed position of the throttle valve by monitoring the throttle position sensor output signal. It must be performed each time harness connector of electric throttle control actuator or ECM is disconnected.

OPERATION PROCEDURE

1. Make sure that accelerator pedal is fully released.
2. Turn ignition switch ON.
3. Turn ignition switch OFF wait at least 10 seconds.
   Make sure that throttle valve moves during above 10 seconds by confirming the operating sound.

Idle Air Volume Learning

ABS00CL5

DESCRIPTION

Idle Air Volume Learning is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time electric throttle control actuator or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PREPARATION

Before performing Idle Air Volume Learning, make sure that all of the following conditions are satisfied.
Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- Park/neutral position (PNP) switch: ON
- Electric load switch: OFF
  (Air conditioner, headlamp, rear window defogger)
  On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up

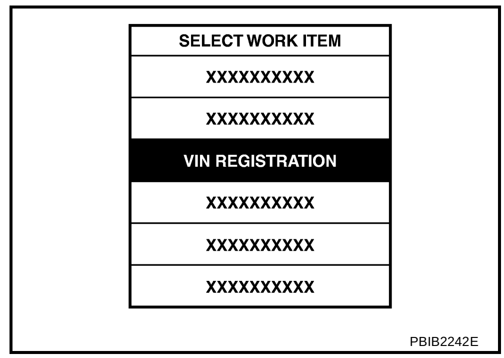
A EC C D E F G H I J K L M

- A/T models with CONSULT-II
  - For with CONSULT-II, drive vehicle until “FLUID TEMP SE” in “DATA MONITOR” mode of “A/T” system indicates less than 0.9V.
- M/T models and A/T models without CONSULT-II
  - Drive vehicle for 10 minutes.

OPERATION PROCEDURE

With CONSULT-II

1. Perform EC-88, "Accelerator Pedal Released Position Learning" .
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Select “IDLE AIR VOL LEARN” in “WORK SUPPORT” mode.



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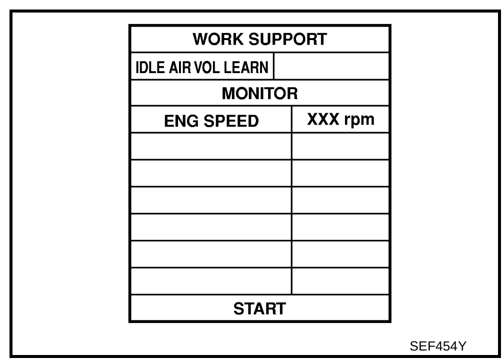
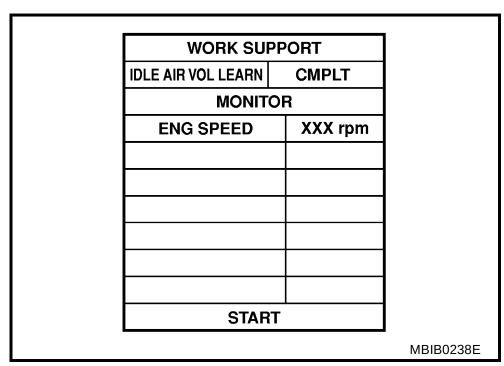
6. Touch “START” and wait 20 seconds.



SEF454Y

7. Make sure that “CMPLT” is displayed on CONSULT-II screen. If “CMPLT” is not displayed, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the DIAGNOSTIC PROCEDURE below.
8. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.



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ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm (in Neutral position) A/T: 700±50 rpm (in P or N position)
Ignition timing	M/T: 15±5° BTDC (in Neutral position) A/T: 15±5° BTDC (in P or N position)

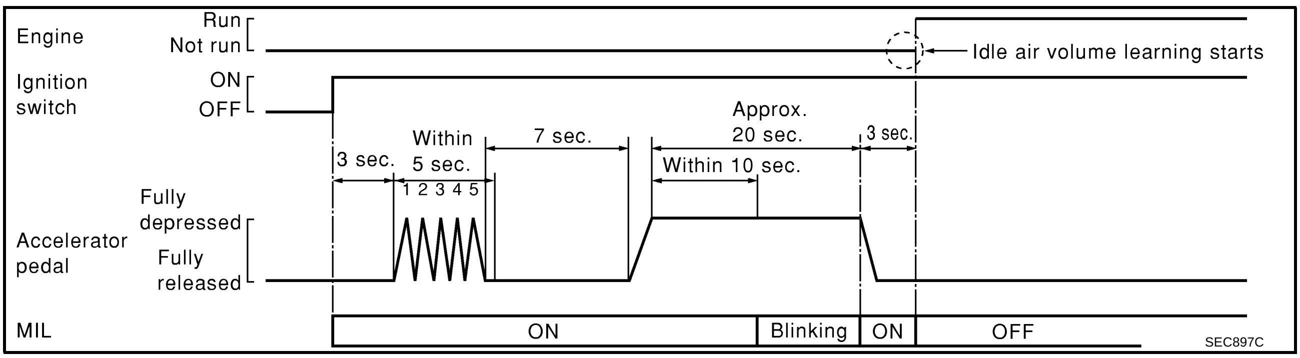
Without CONSULT-II

NOTE:

- **It is better to count the time accurately with a clock.**
- **It is impossible to switch the diagnostic mode when an accelerator pedal position sensor circuit has a malfunction.**

1. Perform EC-88, "Accelerator Pedal Released Position Learning" .
2. Perform EC-88, "Throttle Valve Closed Position Learning" .

3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic PREPARATION (previously mentioned) are in good order.
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Confirm that accelerator pedal is fully released, turn ignition switch ON and wait 3 seconds.
7. Repeat the following procedure quickly five times within 5 seconds.
a. Fully depress the accelerator pedal.
b. Fully release the accelerator pedal.
8. Wait 7 seconds, fully depress the accelerator pedal and keep it for approx. 20 seconds until the MIL stops blinking and turned ON.
9. Fully release the accelerator pedal within 3 seconds after the MIL turned ON.
10. Start engine and let it idle.
11. Wait 20 seconds.



12. Rev up the engine two or three times and make sure that idle speed and ignition timing are within the specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 700±50 rpm (in Neutral position) A/T: 700±50 rpm (in P or N position)
Ignition timing	M/T: 15±5° BTDC (in Neutral position) A/T: 15±5° BTDC (in P or N position)

13. If idle speed and ignition timing are not within the specification, Idle Air Volume Learning will not be carried out successfully. In this case, find the cause of the incident by referring to the Diagnostic Procedure below.

DIAGNOSTIC PROCEDURE

If idle air volume learning cannot be performed successfully, proceed as follows:

1. **Check that throttle valve is fully closed.**
2. **Check PCV valve operation.**
3. **Check that downstream of throttle valve is free from air leakage.**
4. **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the incident.**
   It is useful to perform EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .
5. **If any of the following conditions occur after the engine has started, eliminate the cause of the incident and perform Idle Air Volume Learning all over again:**

- **Engine stalls.**
- **Erroneous idle.**

Fuel Pressure Check

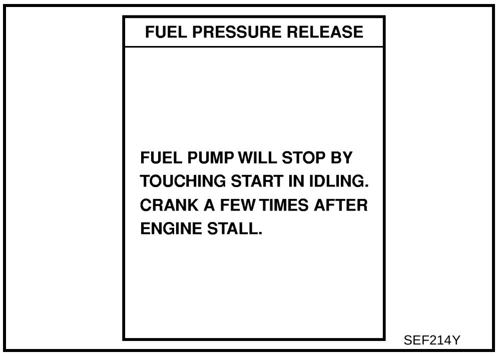
ABS00DAQ

FUEL PRESSURE RELEASE

With CONSULT-II

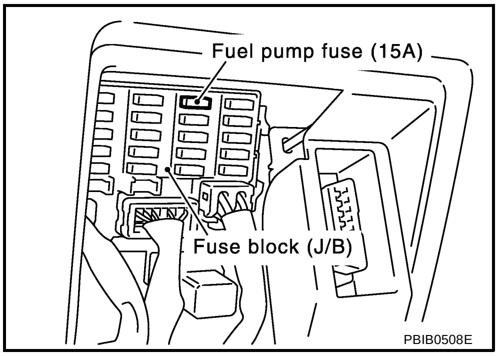
1. Turn ignition switch ON.

2. Perform “FUEL PRESSURE RELEASE” in “WORK SUPPORT” mode with CONSULT-II.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.



Without CONSULT-II

1. Remove fuel pump fuse located in fuse box.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.
5. Reinstall fuel pump fuse after servicing fuel system.



FUEL PRESSURE CHECK

CAUTION:
Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

NOTE:
Prepare pans or saucers under the disconnected fuel line because the fuel may spill out. The fuel pressure cannot be completely released because T30 models do not have fuel return system.

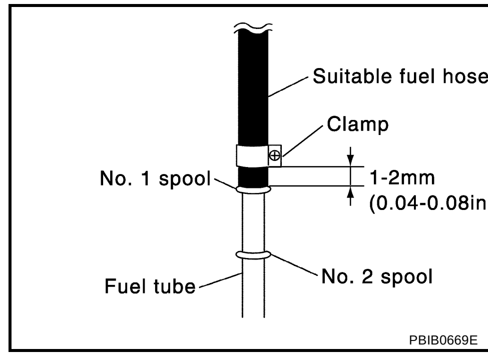
Method A

CAUTION:

- **The fuel hose connection method used when taking fuel pressure check must not be used for other purposes.**
- **Be careful not to scratch or put debris around connection area when servicing, so that the quick connector maintains sealability with O-rings inside.**
- **Do not perform fuel pressure check with electrical systems operating (i.e. lights, rear defogger, A/C, etc.) Fuel pressure gauge may indicate false readings due to varying engine load and changes in manifold vacuum.**

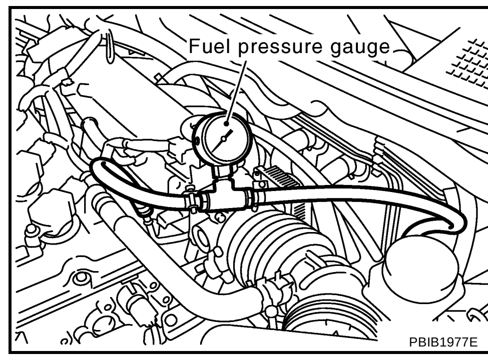
1. Release fuel pressure to zero. Refer to EC-90, "FUEL PRESSURE RELEASE" .
2. Prepare fuel hose for fuel pressure check, and connect fuel pressure gauge.
   - Use suitable fuel hose for fuel pressure check (genuine NISSAN fuel hose without quick connector).
   - To avoid unnecessary force or tension to hose, use moderately long fuel hose for fuel pressure check.
   - Do not use the fuel hose for checking fuel pressure with damage or cracks on it.
   - Use Pressure Gauge to check fuel pressure.
3. Remove fuel hose. Refer to EM-16, "INTAKE MANIFOLD" .
   - Do not twist or kink fuel hose because it is plastic hose.
   - Do not remove fuel hose from quick connector.
   - Keep the original fuel hose to be free from intrusion of dust or foreign substances with a suitable cover.

4. Install the fuel pressure gauge as shown in the figure.
   - Wipe off oil or dirt from hose insertion part using cloth moistened with gasoline.
   - Apply proper amount of gasoline between top of the fuel tube and No.1 spool.
   - Insert fuel hose for fuel pressure check until it touches the No.1 spool on fuel tube.
   - Use NISSAN genuine hose clamp (part number: 16439 N4710 or 16439 40U00).
   - When reconnecting fuel line, always use new clamps.
   - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.
   - Use a torque driver to tighten clamps.
   - Install hose clamp to the position within 1 - 2 mm (0.04 - 0.08 in).



Tighting torque: **1 - 1.5 N·m (0.1 - 0.15 kg-m, 9 - 13 in-lb)**

   - Make sure that clamp screw does not contact adjacent parts.
5. After connecting fuel hose for fuel pressure check, pull the hose with a force of approximately 98 N (10 kg, 22 lb) to confirm fuel tube does not come off.
6. Turn ignition switch ON, and check for fuel leakage.
7. Start engine and check for fuel leakage.
8. Read the indication of fuel pressure gauge.



   - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
   - During fuel pressure check, confirm for fuel leakage from fuel connection every 3 minutes.

At idling: **Approximately 350 kPa (3.57 kg/cm^2 , 51 psi)**

9. If result is unsatisfactory, go to next step.
10. Check the following.
    - Fuel hoses and fuel tubes for clogging
    - Fuel filter for clogging
    - Fuel pump
    - Fuel pressure regulator for clogging

    If OK, replace fuel pressure regulator.
    If NG, repair or replace.

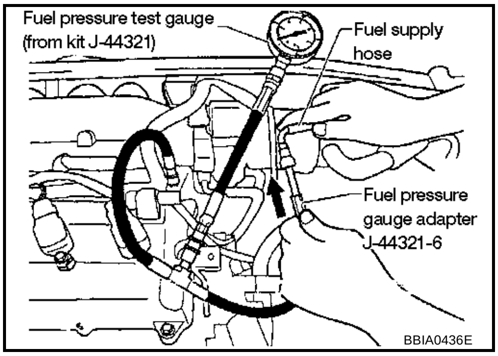
Method B

CAUTION:

- **Be careful not to scratch or get the fuel hose connection area dirty when servicing, so that the quick connector o-ring maintains sealability.**
- **Use Fuel Pressure Gauge Kit J-44321 and Fuel Pressure Adapter J-44321-6 to check fuel pressure.**

1. Release fuel pressure to zero. Refer to EC-90, "FUEL PRESSURE RELEASE" .
2. Remove fuel hose using Quick Connector Release J-45488. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   - Do not twist or kink fuel hose because it is plastic hose.
   - Do not remove fuel hose from quick connector.
   - Keep fuel hose connections clean.

3. Install Fuel Pressure Adapter J-44321-6 and Fuel Pressure Gauge (from kit J-44321) as shown in figure.
   - Do not distort or bend fuel rail tube when installing fuel pressure gauge adapter.
   - When reconnecting fuel hose, check the original fuel hose for damage and abnormality.



4. Turn ignition switch ON (reactivate fuel pump), and check for fuel leakage.
5. Start engine and check for fuel leakage.
6. Read the indication of fuel pressure gauge.
   - During fuel pressure check, check for fuel leakage from fuel connection every 3 minutes.

At idling: Approximately 350 kPa (3.57 kg/cm^2 , 51 psi)

7. If result is unsatisfactory, go to next step.
8. Check the following.
   - Fuel hoses and fuel tubes for clogging
   - Fuel filter for clogging
   - Fuel pump
   - Fuel pressure regulator for clogging

   If OK, replace fuel pressure regulator.
   If NG, repair or replace.
9. Before disconnecting Fuel Pressure Gauge and Fuel Pressure Adapter J-44321-6, release fuel pressure to zero. Refer to EC-90, "FUEL PRESSURE RELEASE"

TROUBLE DIAGNOSIS

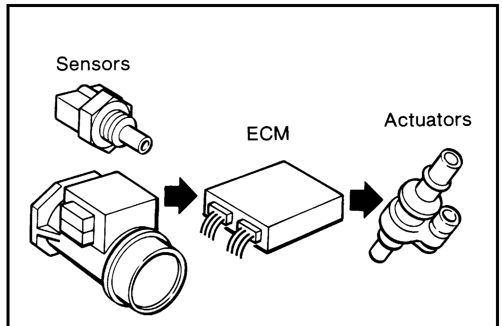
PFP:00004

Trouble Diagnosis Introduction

ABS00CLD

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no malfunctions such as vacuum leaks, fouled spark plugs, or other malfunctions with the engine.



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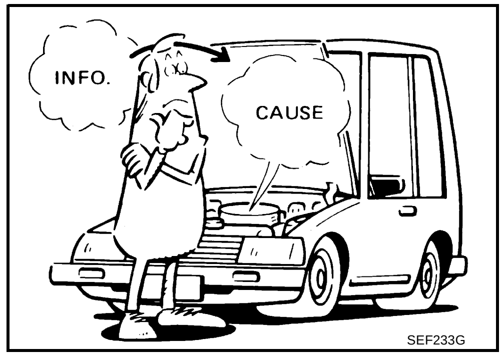
It is much more difficult to diagnose an incident that occurs intermittently rather than continuously. Most intermittent incidents are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.



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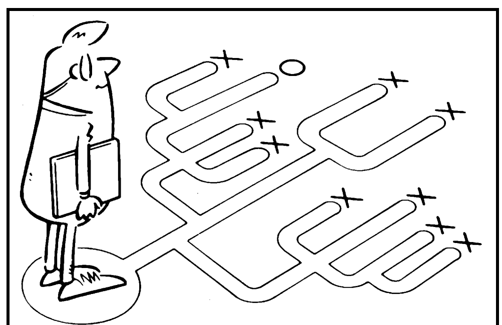
A visual check only may not find the cause of the incidents. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the WORK FLOW on EC-95 .

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such incidents, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A DIAGNOSTIC WORKSHEET like the example on EC-99 should be used.

Start your diagnosis by looking for conventional malfunctions first. This will help troubleshoot driveability malfunctions on an electronically controlled engine vehicle.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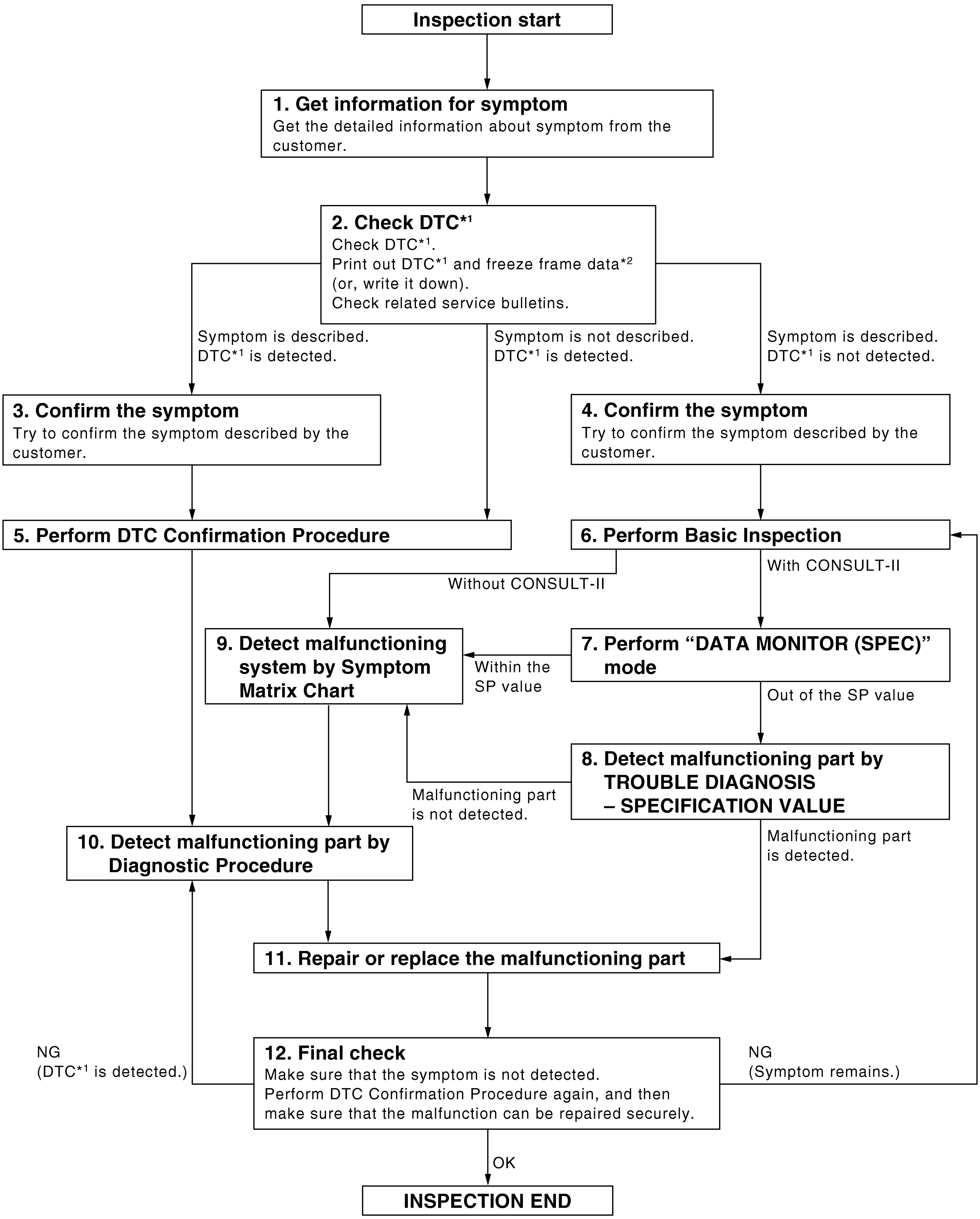
WORK FLOW

Overall Sequence



*1: Include 1st trip DTC.
*2: Include 1st trip freeze frame data.

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Detailed Flow

1. GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the EC-98, "DIAGNOSTIC WORKSHEET" .

>> GO TO 2.

2. CHECK DTC*[1]

1. Check DTC*[1] .
2. Perform the following procedure if DTC*[1] is displayed.
   - Record DTC*[1] and freeze frame data*[2] . (Print them out with CONSULT-II or GST.)
   - Erase DTC*[1] . (Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .)
   - Study the relationship between the cause detected by DTC*[1] and the symptom described by the customer. (Symptom Matrix Chart is useful. Refer to EC-102, "Fail-Safe Chart" .)
3. Check related service bulletins for information.

Is any symptom described and any DTC detected?

Symptom is described, DTC*[1] is displayed>>GO TO 3.
Symptom is described, DTC*[1] is not displayed>>GO TO 4.
Symptom is not described, DTC*[1] is displayed>>GO TO 5.

3. CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer (except MIL ON).
DIAGNOSIS WORK SHEET is useful to verify the incident.
Connect CONSULT-II to the vehicle in “DATA MONITOR (AUTO TRIG)” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4. CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
DIAGNOSIS WORK SHEET is useful to verify the incident.
Connect CONSULT-II to the vehicle in “DATA MONITOR (AUTO TRIG)” mode and check real time diagnosis results.
Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

5. PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC Confirmation Procedure for the displayed DTC*[1] , and then make sure that DTC*[1] is detected again.
At this time, always connect CONSULT-II to the vehicle, and check diagnostic results in real time on “DATA MONITOR (AUTO TRIG)”.
If two or more DTCs*[1] are detected, refer to EC-100, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data*[2] is useful if the DTC*[1] is not detected.
- Perform Overall Function Check if DTC Confirmation Procedure is not included on Service Manual. This simplified check procedure is an effective alternative though DTC*[1] cannot be detected during this check. If the result of Overall Function Check is NG, it is the same as the detection of DTC*[1] by DTC Confirmation Procedure.

Is DTC*[1] detected?

Yes >> GO TO 10.
No >> Check according to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

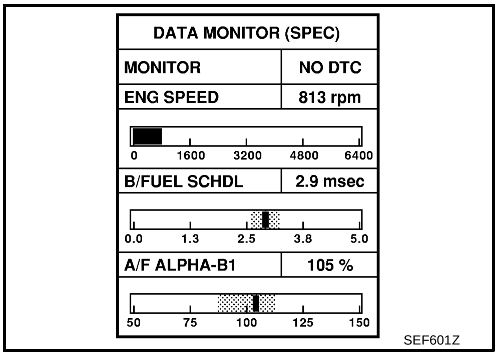
6. PERFORM BASIC INSPECTION

Perform EC-70, "Basic Inspection" .

With CONSULT-II>>GO TO 7.
Without CONSULT-II>>GO TO 9.

7. PERFORM DATA MONITOR (SPEC) MODE

With CONSULT-II
Make sure that “MAS A/F SE-B1”, “B/FUEL SCHDL”, and “A/F ALPHA-B1” is within the SP value using CONSULT-II “DATA MONITOR (SPEC)” mode. Refer to EC-186, "Diagnostic Procedure" .



Are they within the SP value?

Yes >> GO TO 9.
No >> GO TO 8.

8. DETECT MALFUNCTIONING PART BY TROUBLE DIAGNOSIS - SPECIFICATION VALUE

Detect malfunctioning part according to EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .

Is malfunctioning part detected?

Yes >> GO TO 11.
No >> GO TO 9.

9. DETECT MALFUNCTIONING SYSTEM BY SYMPTOM MATRIX CHART

Detect malfunctioning system according to EC-103, "Symptom Matrix Chart" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptom.

>> GO TO 10.

10. DETECT MALFUNCTIONING PART BY DIAGNOSTIC PROCEDURE

Inspect according to Diagnostic Procedure of the system.

NOTE:

The Diagnostic Procedure in EC section described based on open circuit inspection. A short circuit inspection is also required for the circuit check in the Diagnostic Procedure. For details, refer to Circuit Inspection in GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" .

Is malfunctioning part detected?

Yes >> GO TO 11.

No >> Monitor input data from related sensors or check voltage of related ECM terminals using CONSULT-II. Refer to EC-138, "CONSULT-II Reference Value in Data Monitor" , EC-115, "ECM Terminals and Reference Value" .

11. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. Reconnect parts or connectors disconnected during Diagnostic Procedure again after repair and replacement.
3. Check DTC. If DTC is displayed, erase it, refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

>> GO TO 12.

12. FINAL CHECK

When DTC was detected in step 2, perform DTC Confirmation Procedure or Overall Function Check again, and then make sure that the malfunction have been repaired securely.
When symptom was described from the customer, refer to confirmed symptom in step 3 or 4, and make sure that the symptom is not detected.

OK or NG

NG (DTC*[1] is detected)>>GO TO 10.
NG (Symptom remains)>>GO TO 6.
OK >> 1. Before returning the vehicle to the customer, make sure to erase unnecessary DTC*[1] in ECM and TCM (Transmission Control Module). (Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" and AT-40, "HOW TO ERASE DTC" .)

2. If the completion of SRT is needed, drive vehicle under the specific driving pattern. Refer to EC-57, "Driving Pattern" .

3. **INSPECTION END**

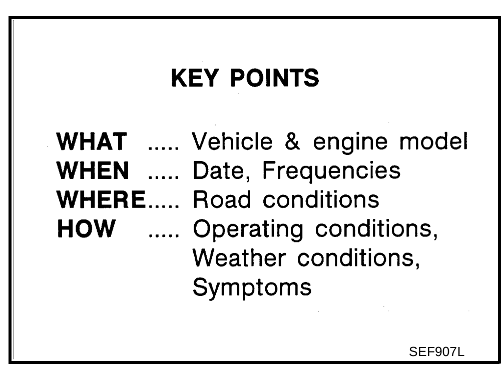
*1: Include 1st trip DTC.
*2: Include 1st trip freeze frame data.

DIAGNOSTIC WORKSHEET

Description

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about an incident. It is important to fully understand the symptoms or conditions for a customer complaint.
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.
Some conditions may cause the MIL to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere.



Worksheet Sample

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date

Fuel and fuel filler cap		☐ Vehicle ran out of fuel causing misfire ☐ Fuel filler cap was left off or incorrectly screwed on.
Symptoms	☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]
	☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]
	☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]
	☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes
Weather conditions		☐ Not affected
	Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F
Engine conditions		☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm
Road conditions		☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)
Driving conditions		☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH
Malfunction indicator lamp		☐ Turned on ☐ Not turned on

MTBL0017

DTC Inspection Priority Chart

ABS00CLE

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

NOTE:

If DTC U1000 or U1001 is displayed with other DTC, first perform the trouble diagnosis for DTC U1000 and U1001. Refer to **EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE"** **.**

Priority	Detected items (DTC)
1	● U1000 U1001 CAN communication line ● P0101 P0102 P0103 Mass air flow sensor ● P0112 P0113 P0127 Intake air temperature sensor ● P0117 P0118 P0125 Engine coolant temperature sensor ● P0122 P0123 P0222 P0223 P1225 P1226 P2135 Throttle position sensor ● P0128 Thermostat function ● P0181 P0182 P0183 Fuel tank temperature sensor ● P0327 P0328 Knock sensor ● P0335 Crankshaft position sensor (POS) ● P0340 Camshaft position sensor (PHASE) ● P0460 P0461 P0462 P0463 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P1229 Sensor power supply ● P1610-P1615 NATS ● P1706 Park/Neutral position (PNP) switch ● P2122 P2123 P2127 P2128 P2138 Accelerator pedal position sensor

Priority	Detected items (DTC)
2	● P0031 P0032 Heated oxygen sensor 1 heater ● P0037 P0038 Heated oxygen sensor 2 heater ● P0132 P0133 P0134 P1143 P1144 Heated oxygen sensor 1 ● P0138 P0139 P1146 P1147 Heated oxygen sensor 2 ● P0441 EVAP control system purge flow monitoring ● P0444 P0445 P1444 EVAP canister purge volume control solenoid valve ● P0447 P1446 EVAP canister vent control valve ● P0451 P0452 P0453 EVAP control system pressure sensor ● P0506 P0507 Idle speed control system ● P0550 power steering pressure sensor ● P0705 P0710 P0720 P0725 P0740 P0744 P0745 P0750 P0755 P1705 P1760 A/T related sensors and solenoid valves ● P1065 ECM power supply ● P1111 Intake valve timing control solenoid valve ● P1122 Electric throttle control function ● P1124 P1126 P1128 Electric throttle control actuator ● P1720 Vehicle speed sensor ● P1800 VIAS control solenoid valve ● P1805 Brake switch
3	● P0011 Intake valve timing control ● P0171 P0172 Fuel injection system function ● P0300 - P0304 Misfire ● P0420 Three way catalyst function ● P0442 P0456 EVAP control system (SMALL LEAK, VERY SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0731-P0734 A/T function ● P1121 Electric throttle control actuator ● P1148 Closed loop control ● P1211 TCS control unit ● P1212 TCS communication line ● P1217 Engine over temperature (OVERHEAT) ● P1564 ASCD steering switch ● P1572 ASCD brake switch ● P1574 ASCD vehicle speed sensor

Fail-Safe Chart

ABS00CLF

When the DTC listed below is detected, the ECM enters fail-safe mode and the MIL lights up.

<table>
<tr><th>DTC No.</th><th>Detected items</th><th colspan="2">Engine operating condition in fail-safe mode</th></tr>
<tr><td>P0102
P0103</td><td>Mass air flow sensor circuit</td><td colspan="2">Engine speed will not rise more than 2,400 rpm due to the fuel cut.</td></tr>
<tr><td rowspan="6">P0117
P0118</td><td rowspan="6">Engine coolant temperature sensor circuit</td><td colspan="2">Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START.
CONSULT-II displays the engine coolant temperature decided by ECM.</td></tr>
<tr><td>Condition</td><td>Engine coolant temperature decided (CONSULT-II display)</td></tr>
<tr><td>Just as ignition switch is turned ON or START</td><td>40°C (104°F)</td></tr>
<tr><td>More than approx. 4 minutes after ignition ON or START</td><td>80°C (176°F)</td></tr>
<tr><td>Except as shown above</td><td>40 - 80°C (104 - 176°F)
(Depends on the time)</td></tr>
<tr><td colspan="2">When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</td></tr>
<tr><td>P0122
P0123
P0222
P0223
P2135</td><td>Throttle position sensor</td><td colspan="2">The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.
The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.
So, the acceleration will be poor.</td></tr>
<tr><td rowspan="3">P1121</td><td rowspan="3">Electric throttle control actuator</td><td colspan="2">(When electric throttle control actuator does not function properly due to the return spring malfunction:)
ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.</td></tr>
<tr><td colspan="2">(When throttle valve opening angle in fail-safe mode is not in specified range:)
ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.</td></tr>
<tr><td colspan="2">(When ECM detects the throttle valve is stuck open:)
While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls.
The engine can restart in N or P (A/T), Neutral (M/T) position, and engine speed will not exceed 1,000 rpm or more.</td></tr>
<tr><td>P1122</td><td>Electric throttle control function</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P1124
P1126</td><td>Throttle control relay</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P1128</td><td>Throttle control motor</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P1229</td><td>Sensor power supply</td><td colspan="2">ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.</td></tr>
<tr><td>P2122
P2123
P2127
P2128
P2138</td><td>Accelerator pedal position sensor</td><td colspan="2">The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees.
The ECM regulates the opening speed of the throttle valve to be slower than the normal condition.
So, the acceleration will be poor.</td></tr>
</table>

- When there is an open circuit on MIL circuit, the ECM cannot warn the driver by lighting MIL up when there is malfunction on engine control system.
  Therefore, when electrical controlled throttle and part of ECM related diagnoses are continuously detected as NG for 5 trips, ECM warns the driver that engine control system malfunctions and MIL circuit is open by means of operating fail-safe function.
  The fail-safe function also operates when above diagnoses except MIL circuit are detected, and demands the driver to repair the malfunction.

Engine operating condition in fail-safe mode	Engine speed will not rise more than 2,500 rpm due to the fuel cut

Symptom Matrix Chart

ABS00CLH

SYSTEM — BASIC ENGINE CONTROL SYSTEM

		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-613
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-90
	Injector circuit	1	1	2	3	2		2	2			2			EC-607
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-30
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-44
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-70
	Electric throttle control actuator	1	1	2	3	3	2	2	2	2		2		2	EC-427, EC-429 , EC-437 , EC-443
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-70
	Ignition circuit	1	1	2	2	2		2	2			2			EC-586
Power supply and ground circuit		2	2	3	3	3		3	3		2	3			EC-155
Mass air flow sensor circuit		1	1	2	2	2		2	2			2			EC-182, EC-191
Engine coolant temperature sensor circuit		1	1	2	2	2	3	2	2	3	1	2			EC-205, EC-219
Throttle position sensor circuit			1	2		2	2	2	2	2		2			EC-211, EC-291 , EC-495 , EC-497 , EC-570
Accelerator pedal position sensor circuit				3	2	1	2			2					EC-499, EC-555 , EC-562 , EC-578
Heated oxygen sensor 1 circuit			1	2	3	2		2	2			2			EC-227, EC-234 , EC-244 , EC-448 , EC-454
Knock sensor circuit				2	2							3			EC-306
Crankshaft position sensor (POS) circuit		2	2												EC-311
Camshaft position sensor (PHASE) circuit		2	2												EC-319

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Vehicle speed signal circuit		2	3		3						3			EC-405
Power steering pressure sensor circuit						3	3	3	3					EC-411
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-416, EC-419
Intake valve timing control solenoid valve circuit	3	3	2		1	3	2	2	3		3			EC-423
VIAS control solenoid valve circuit					1									EC-545, EC-597
Park/neutral position (PNP) switch circuit			3		3	3	3	3	3		3			EC-540
Refrigerant pressure sensor circuit		2				3	3	3	3		4			EC-619
Electrical load signal circuit						3	3	3	3					EC-625
Air conditioner circuit	2	2	3	3	3	3	3	3	3		3		2	MTC-28or ATC-32
VDC/TCS/ABS control unit*1			4											BRC-48
ABS actuator and electric unit (control unit)*2			4											BRC-9

1 - 6: The numbers refer to the order of inspection.
(continued on next page)
*1: With VDC models.
*2: Without VDC models.

SYSTEM — ENGINE MECHANICAL & OTHER

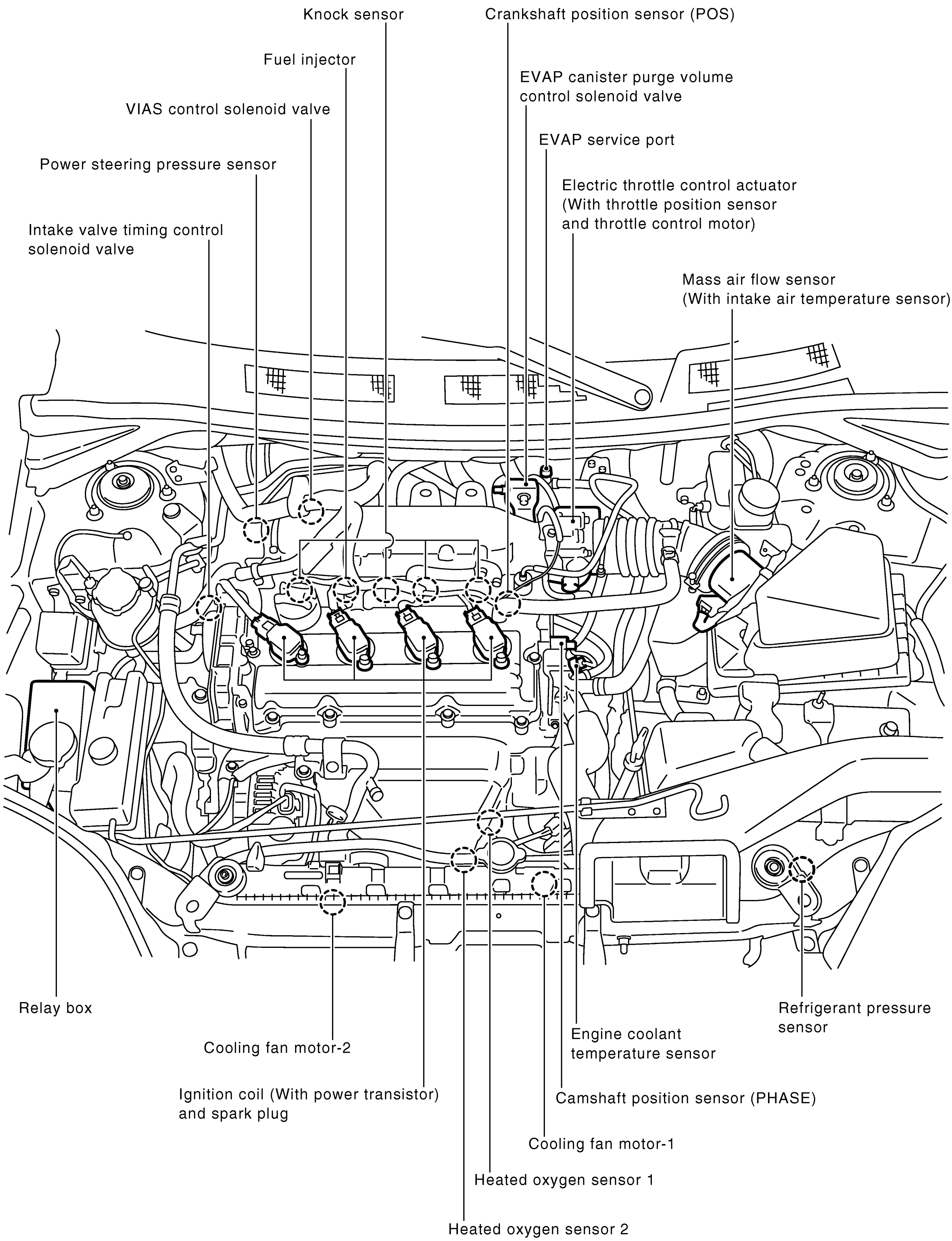
		SYMPTOM													Reference page
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel tank	5													FL-11
	Fuel piping			5	5	5		5	5			5			EM-30
	Vapor lock		5												—
	Valve deposit														—
	Poor fuel (Heavy weight gaso-line, Low octane)	5		5	5	5		5	5			5			—
Air	Air duct														EM-14
	Air cleaner														EM-14
	Air leakage from air duct (Mass air flow sensor —electric throttle control actuator)		5	5		5		5	5			5			EM-14
	Electric throttle control actuator	5			5		5			5					EM-16
	Air leakage from intake manifold/ Collector/Gasket														EM-16
Cranking	Battery	1	1	1		1		1	1			1		1	SC-4
	Generator circuit														SC-20
	Starter circuit	3													SC-9
	Signal plate/Flywheel/Drive plate	6													EM-82
	Park/neutral position (PNP) switch	4													MT-13 or AT-98
Engine	Cylinder head	5	5	5	5	5		5	5			5			EM-62
	Cylinder head gasket										4		3		
	Cylinder block														
	Piston												4		
	Piston ring	6	6	6	6	6		6	6			6			EM-82
	Connecting rod														
	Bearing														
	Crankshaft														

		SYMPTOM													
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	Reference page
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Valve mechanism	Timing chain														EM-49
	Camshaft														EM-37
	Intake valve timing control	5	5	5	5	5		5	5			5			EM-49
	Intake valve												3		EM-62
	Exhaust valve														
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			EM-20, EX-2
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5	2		EM-22, LU-9 , LU-12 , LU-4
	Oil level (Low)/Filthy oil														LU-6
Cooling	Radiator/Hose/Radiator filler cap														CO-11
	Thermostat									5					CO-22
	Water pump														CO-20
	Water gallery	5	5	5	5	5		5	5		2	5			CO-6
	Cooling fan									5					CO-18
	Coolant level (low)/Contaminated coolant														CO-8
NVIS (NISSAN Vehicle Immobilizer System — NATS)		1	1												BL-97

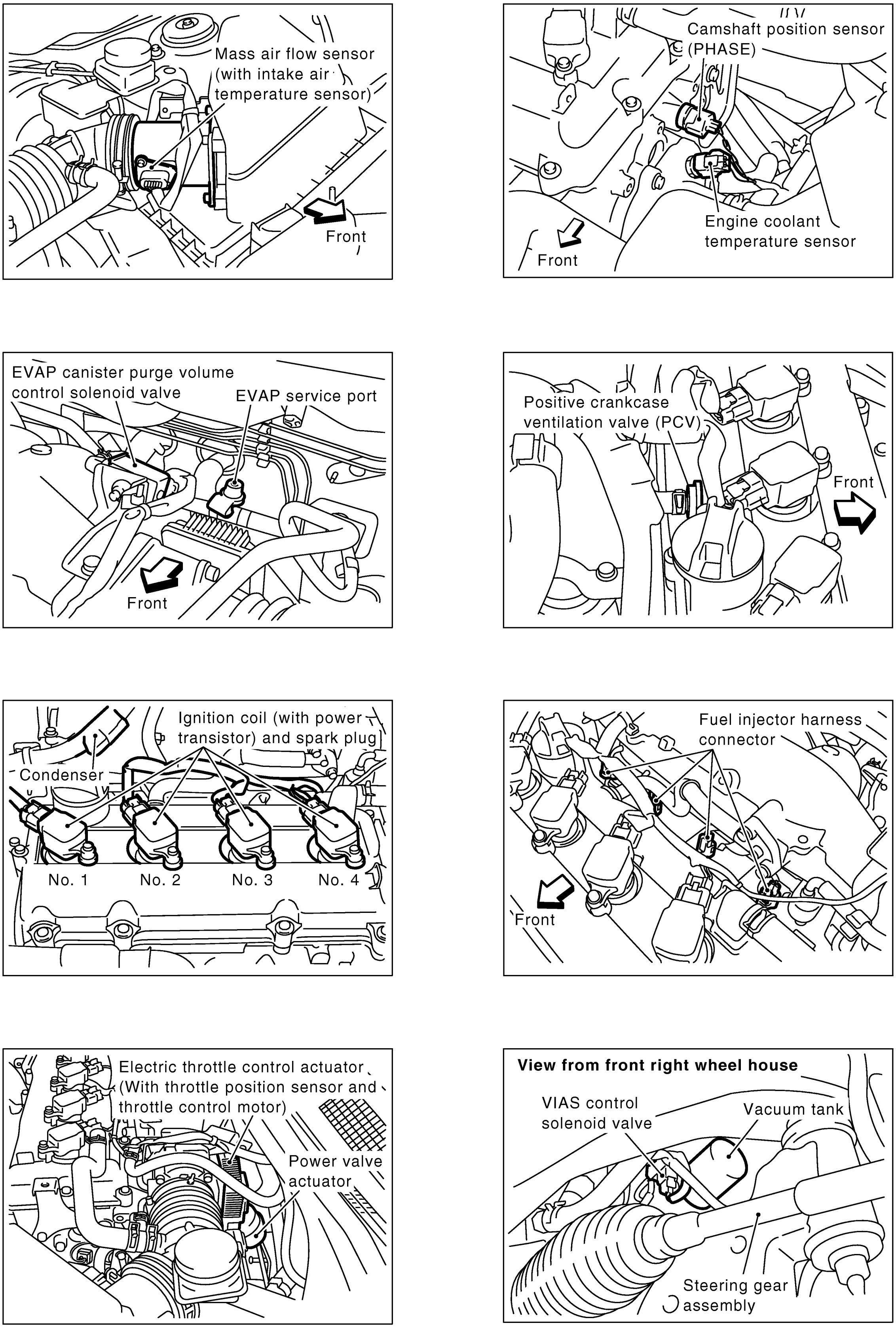
1 - 6: The numbers refer to the order of inspection.

Engine Control Component Parts Location

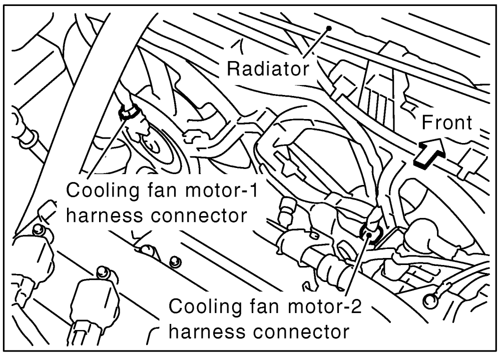
ABS00CLI

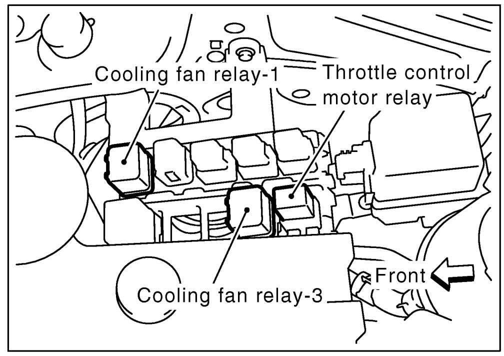


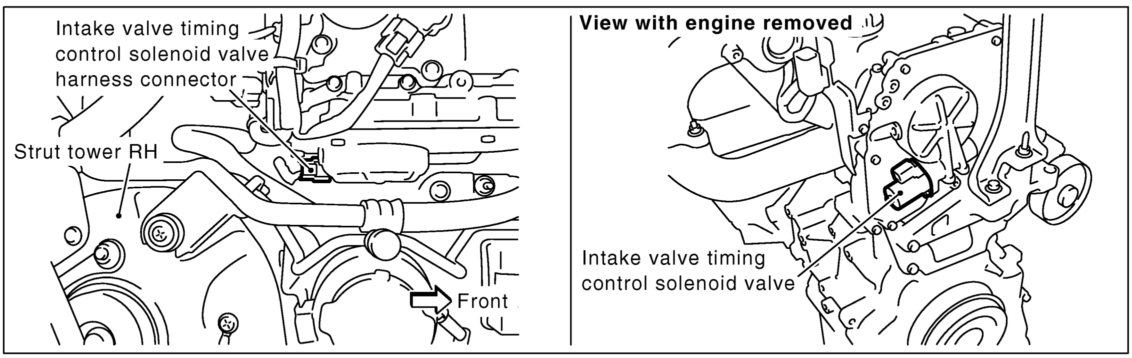
PBIB2333E

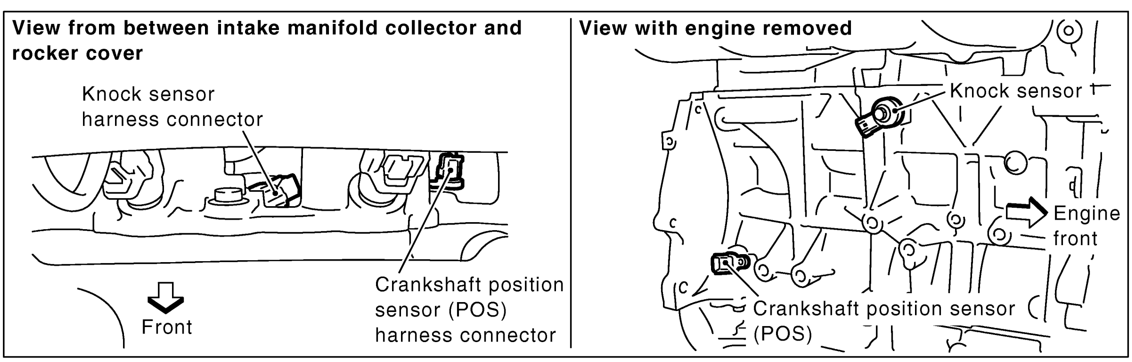

Mass air flow sensor (with intake air temperature sensor)
Front
Camshaft position sensor (PHASE)
Engine coolant temperature sensor
Front
EVAP canister purge volume control solenoid valve
EVAP service port
Front
Positive crankcase ventilation valve (PCV)
Front
Ignition coil (with power transistor) and spark plug
Condenser
No. 1
No. 2
No. 3
No. 4
Fuel injector harness connector
Front
Electric throttle control actuator (With throttle position sensor and throttle control motor)
Power valve actuator
View from front right wheel house
VIAS control solenoid valve
Vacuum tank
Steering gear assembly

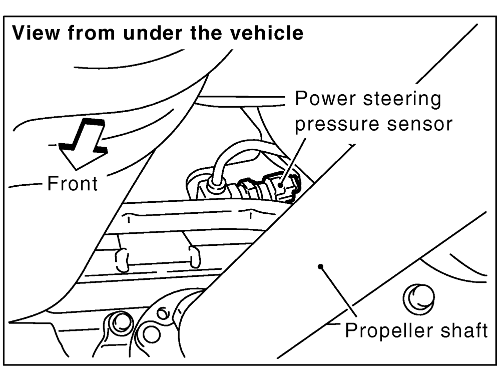
PBIB2346E

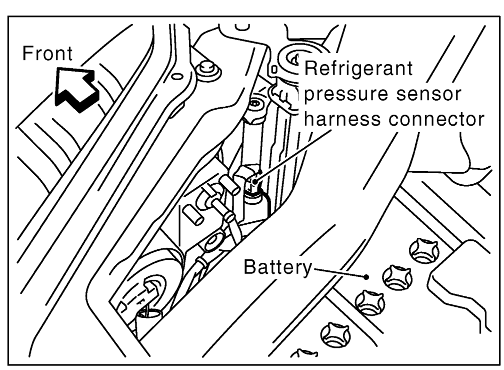

Radiator
Front
Cooling fan motor-1 harness connector
Cooling fan motor-2 harness connector


Cooling fan relay-1
Throttle control motor relay
Front
Cooling fan relay-3

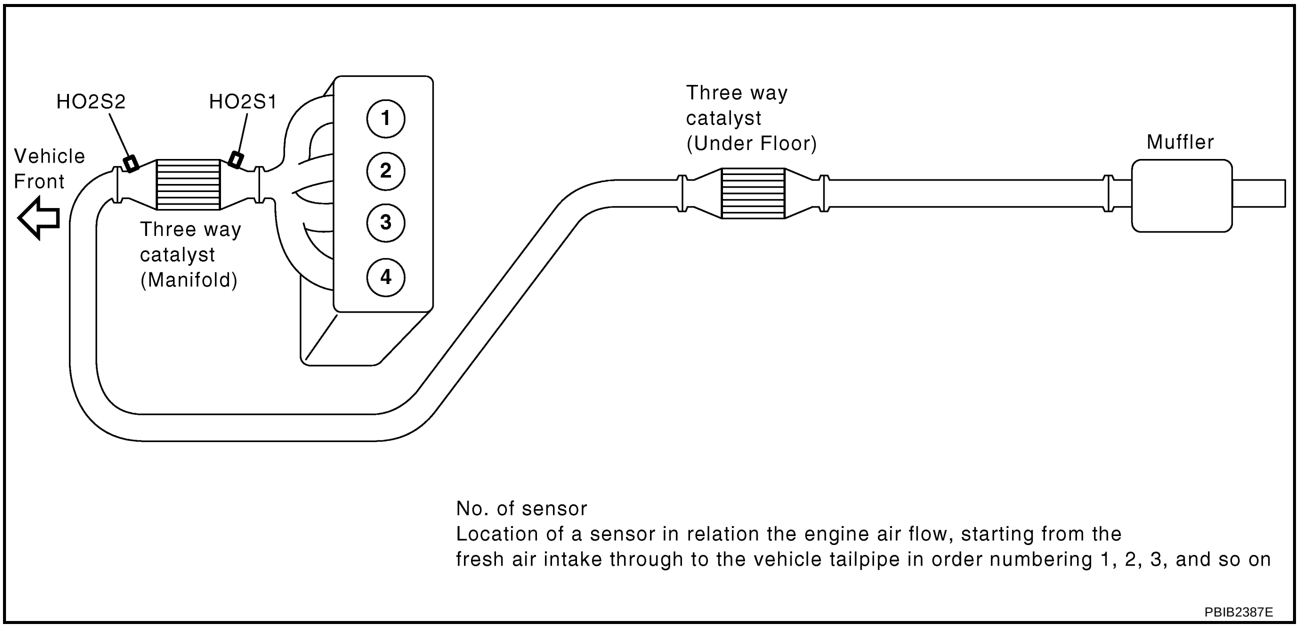

Intake valve timing control solenoid valve harness connector
Strut tower RH
Front
View with engine removed
Intake valve timing control solenoid valve

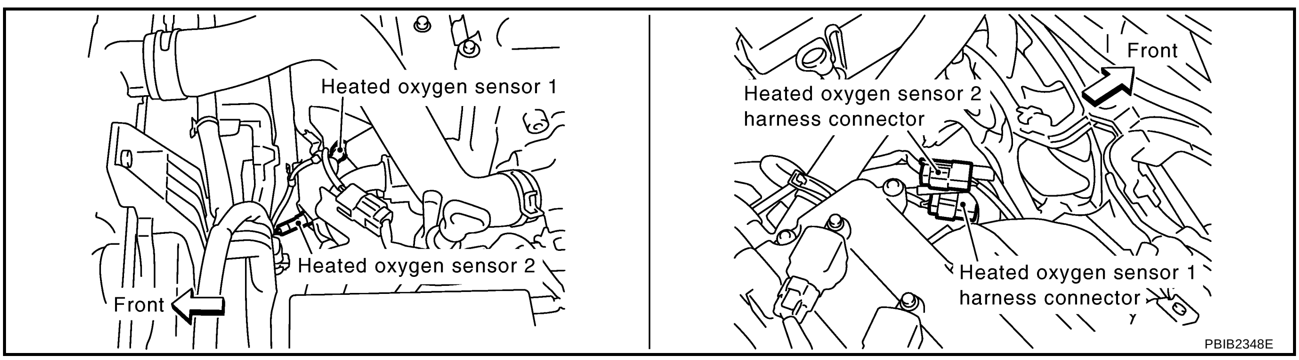

View from between intake manifold collector and rocker cover
Knock sensor harness connector
Front
Crankshaft position sensor (POS) harness connector
View with engine removed
Knock sensor
Engine front
Crankshaft position sensor (POS)

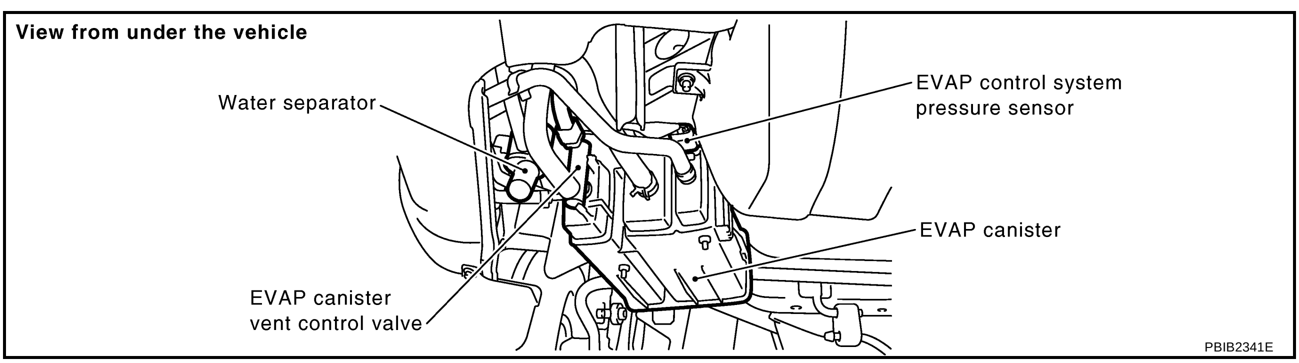

View from under the vehicle
Power steering pressure sensor
Front
Propeller shaft

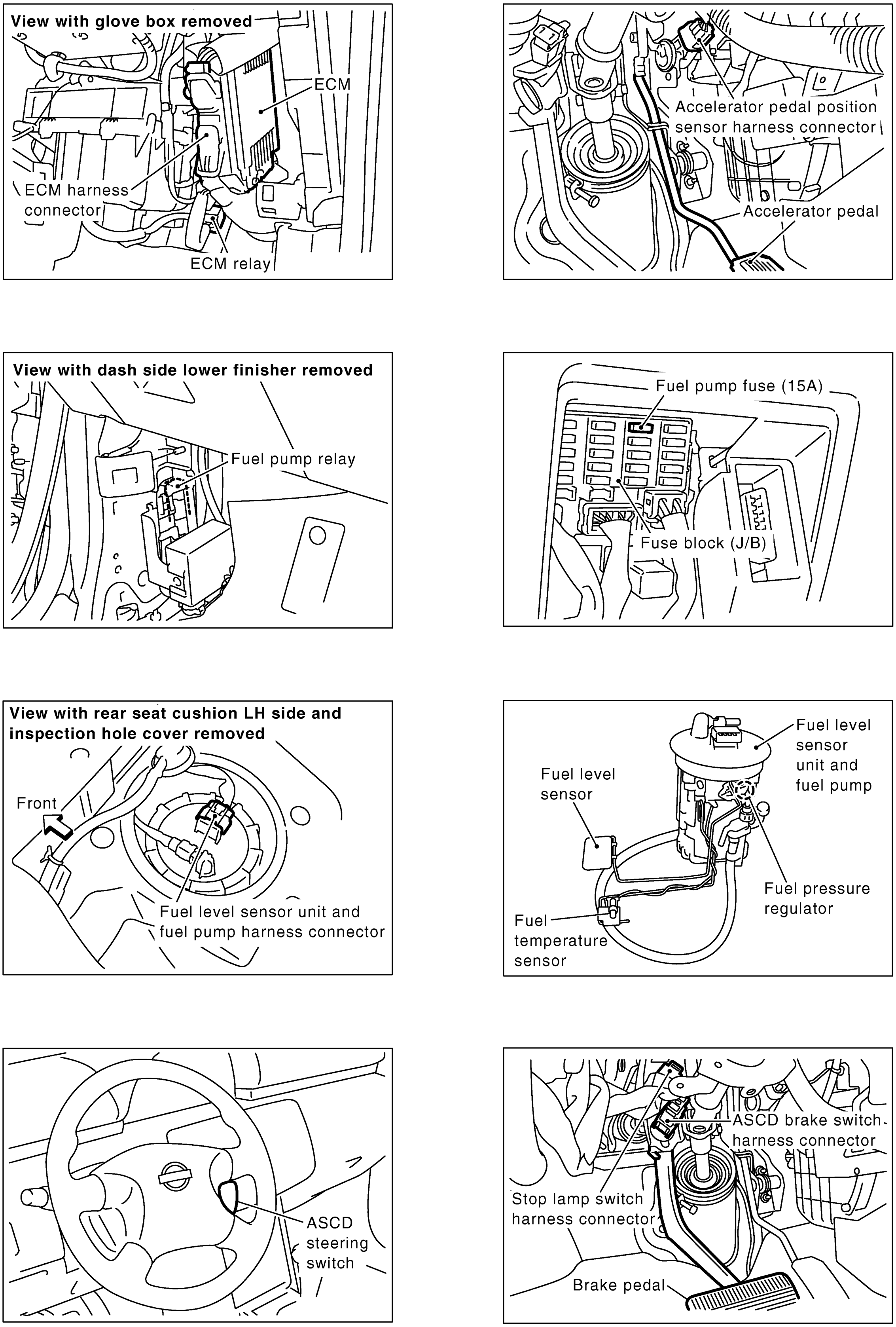

Front
Refrigerant pressure sensor harness connector
Battery

PBIB2347E


HO2S2
HO2S1
Vehicle
Front
Three way
catalyst
(Manifold)
1
2
3
4
Three way
catalyst
(Under Floor)
Muffler
No. of sensor
Location of a sensor in relation the engine air flow, starting from the
fresh air intake through to the vehicle tailpipe in order numbering 1, 2, 3, and so on
PBIB2387E

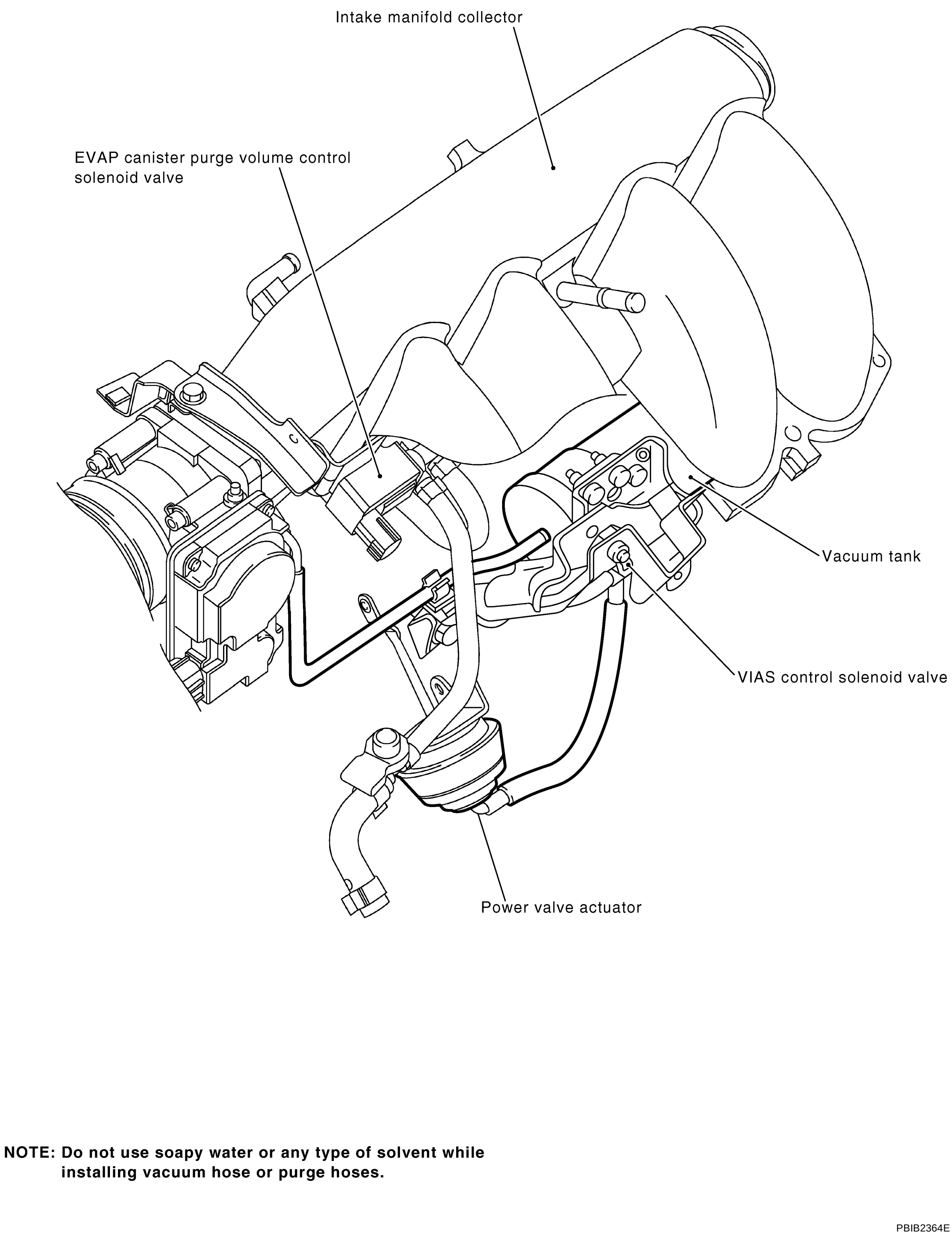

Heated oxygen sensor 1
Heated oxygen sensor 2
Front
Front
Heated oxygen sensor 2
harness connector
Heated oxygen sensor 1
harness connector
PBIB2348E


View from under the vehicle
Water separator
EVAP control system
pressure sensor
EVAP canister
EVAP canister
vent control valve
PBIB2341E


View with glove box removed
ECM
ECM harness connector
ECM relay
Accelerator pedal position sensor harness connector
Accelerator pedal
View with dash side lower finisher removed
Fuel pump relay
Fuel pump fuse (15A)
Fuse block (J/B)
View with rear seat cushion LH side and inspection hole cover removed
Front
Fuel level sensor unit and fuel pump harness connector
Fuel level sensor unit and fuel pump
Fuel level sensor
Fuel pressure regulator
Fuel temperature sensor
ASCD steering switch
ASCD brake switch harness connector
Stop lamp switch harness connector
Brake pedal
PBIB2349E

Vacuum Hose Drawing

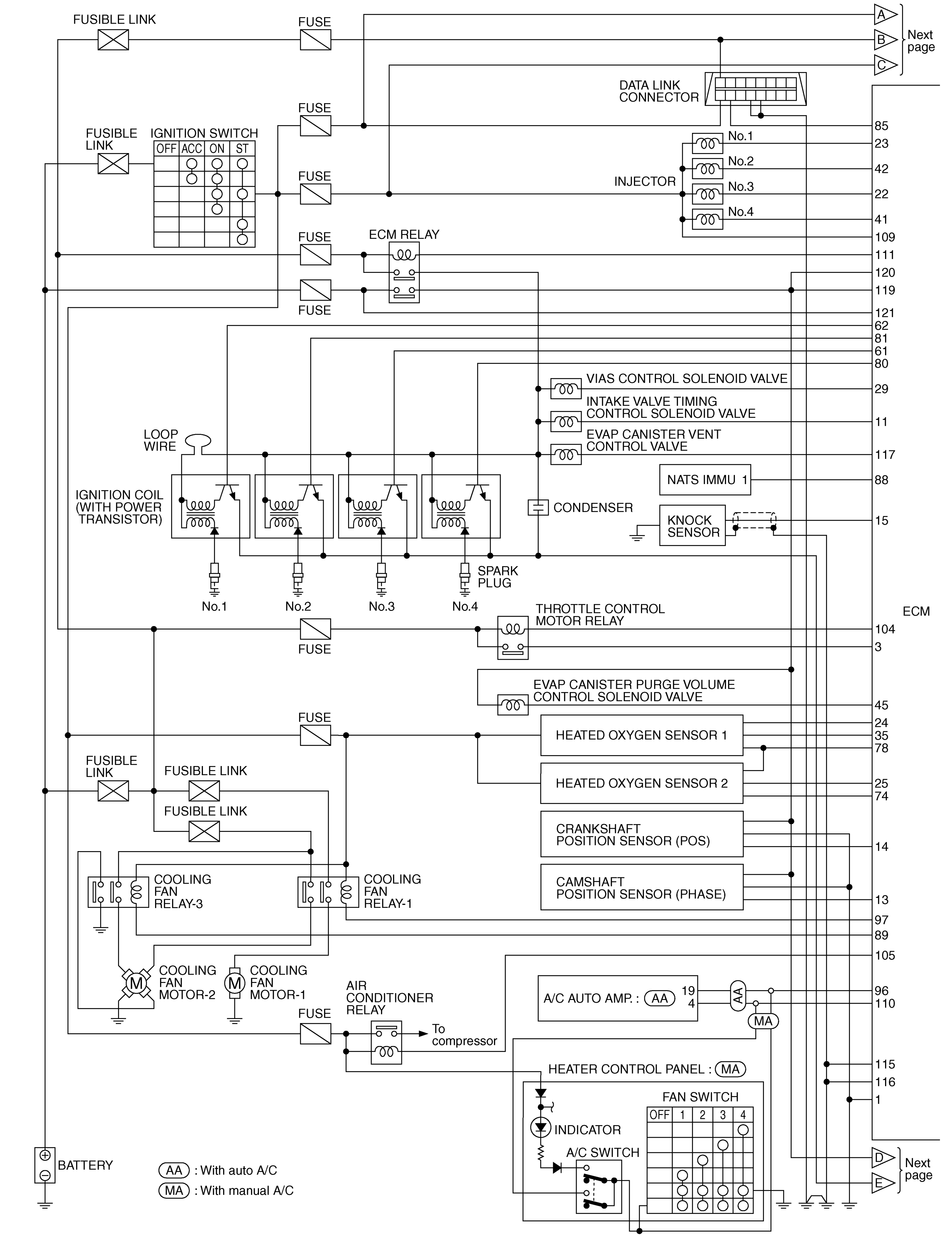
ABS00CKU



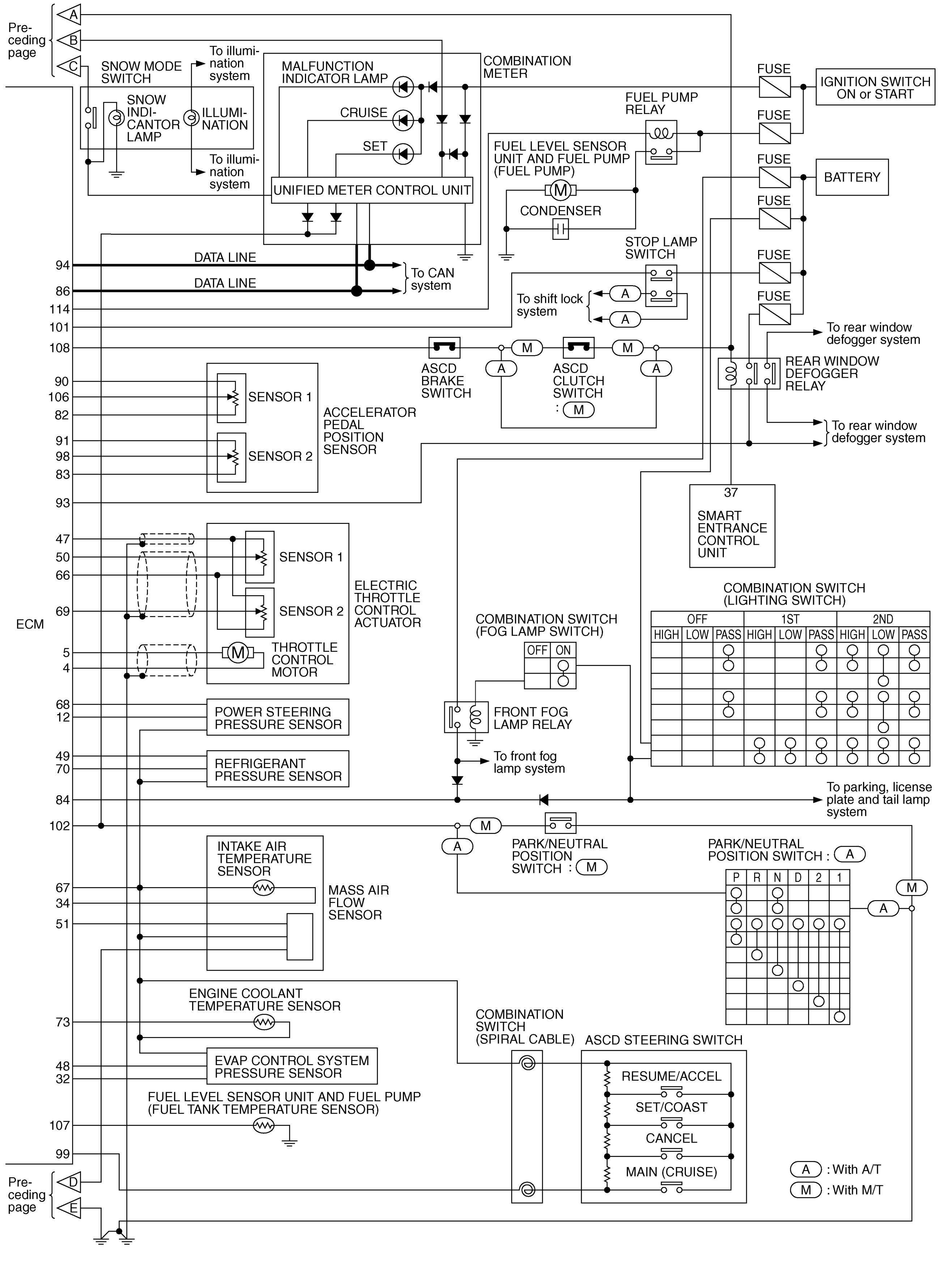
Refer to EC-21, "System Diagram" for Vacuum Control System.

Circuit Diagram

ABS00CLJ

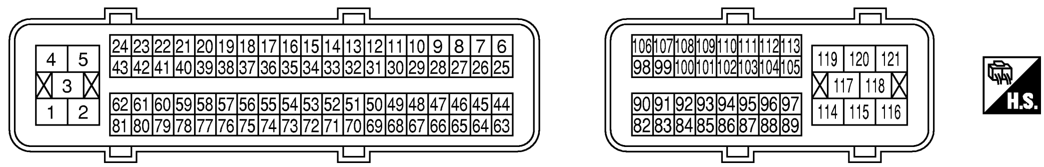


TBWB0107E


Pre-
ceding
page
SNOW MODE
SWITCH
SNOW
INDI-
CANTOR
LAMP
ILLUMI-
NATION
To illumi-
nation
system
MALFUNCTION
INDICATOR LAMP
CRUISE
SET
UNIFIED METER CONTROL UNIT
COMBINATION
METER
FUSE
IGNITION SWITCH
ON or START
FUEL PUMP
RELAY
FUEL LEVEL SENSOR
UNIT AND FUEL PUMP
(FUEL PUMP)
CONDENSER
BATTERY
STOP LAMP
SWITCH
DATA LINE
To CAN
system
To shift lock
system
To rear window
defogger system
ASCD
BRAKE
SWITCH
ASCD
CLUTCH
SWITCH
REAR WINDOW
DEFOGGER
RELAY
SENSOR 1
SENSOR 2
ACCELERATOR
PEDAL
POSITION
SENSOR
SMART
ENTRANCE
CONTROL
UNIT
ELECTRIC
THROTTLE
CONTROL
ACTUATOR
THROTTLE
CONTROL
MOTOR
ECM
COMBINATION SWITCH
(LIGHTING SWITCH)
OFF 1ST 2ND
HIGH LOW PASS
COMBINATION SWITCH
(FOG LAMP SWITCH)
OFF ON
FRONT FOG
LAMP RELAY
To front fog
lamp system
POWER STEERING
PRESSURE SENSOR
REFRIGERANT
PRESSURE SENSOR
To parking, license
plate and tail lamp
system
PARK/NEUTRAL
POSITION
SWITCH
PARK/NEUTRAL
POSITION SWITCH
P R N D 2 1
INTAKE AIR
TEMPERATURE
SENSOR
MASS AIR
FLOW
SENSOR
ENGINE COOLANT
TEMPERATURE SENSOR
COMBINATION
SWITCH
(SPIRAL CABLE)
ASCD STEERING SWITCH
RESUME/ACCEL
SET/COAST
CANCEL
MAIN (CRUISE)
EVAP CONTROL SYSTEM
PRESSURE SENSOR
FUEL LEVEL SENSOR UNIT AND FUEL PUMP
(FUEL TANK TEMPERATURE SENSOR)
A : With A/T
M : With M/T
TBWB0108E

ECM Harness Connector Terminal Layout

ABS00CLK



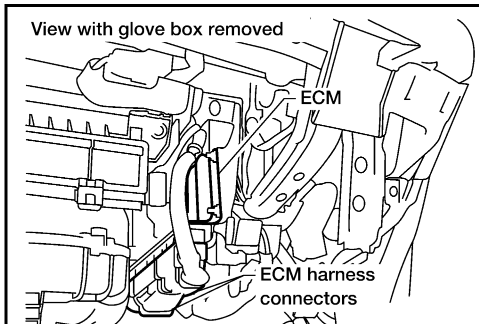
MBIB0045E

ECM Terminals and Reference Value

ABS00CLL

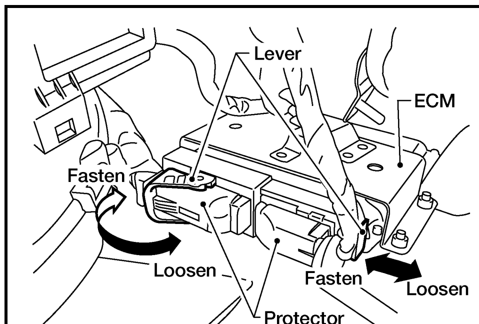
PREPARATION

1. ECM is located in the right side of the cowl top (behind the strut tower).



BBIA0231E

2. Remove ECM harness protector.
3. When disconnecting ECM harness connector, loosen it with levers as far as they will go as shown at right.
4. Connect a break-out box (SST) and Y-cable adapter (SST) between the ECM and ECM harness connector.
   - Use extreme care not to touch 2 pins at 1 time.
   - Data is for comparison and may not be exact.



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ECM INSPECTION TABLE

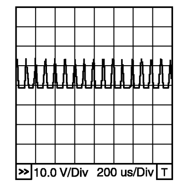
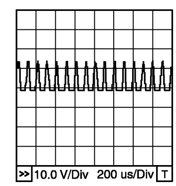
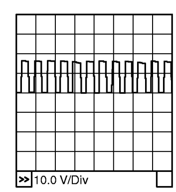
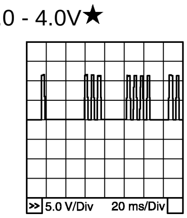
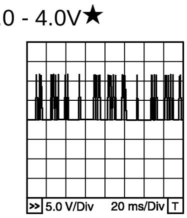
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

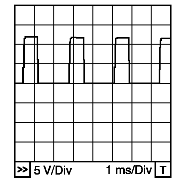
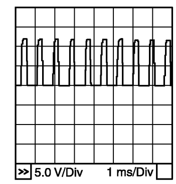
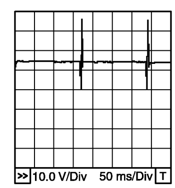
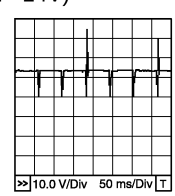
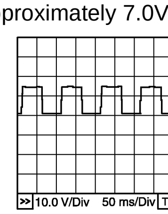
CAUTION:

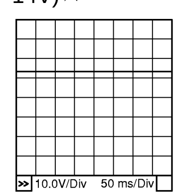
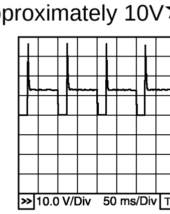
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

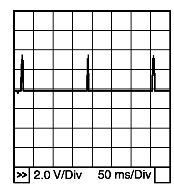
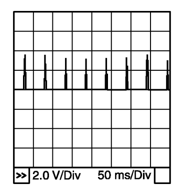
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	**[Engine is running]** ● Idle speed	Body ground
3	W/B	Throttle control motor power supply	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

A
EC
C
D
E
F
G
H
I
J
K
L
M

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	G	Throttle control motor (Close)	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	0 - 14V★  PBIB0534E
5	R	Throttle control motor (Open)	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E
11	Y	Intake valve timing control solenoid valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,500 rpm	7 - 10V★ 
12	P	Power steering pressure sensor	**[Engine is running]** ● Steering wheel: Being turned	0.5 - 4.0V
			[Engine is running] ● Steering wheel: Not being turned	0.4 - 0.8V
13	L/W	Camshaft position sensor (PHASE)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  PBIB0525E
			[Engine is running] ● Engine speed: 2,000 rpm.	1.0 - 4.0V★  PBIB0526E

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	PU/R	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 3.0V★  PBIB0527E
			[Engine is running] ● Engine speed: 2,000 rpm	Approximately 3.0V★  PBIB0528E
15	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V
22 23 41 42	G/B R/B L/B Y/B	Fuel injector No. 3 Fuel injector No. 1 Fuel injector No. 4 Fuel injector No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIB0530E
24	G/W	Heated oxygen sensor 1 heater	**[Engine is running]** ● **Warm-up condition** ● Engine speed: Below 3,600 rpm.	Approximately 7.0V★  PBIB0519E
			[Engine is running] ● Engine speed: Above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	PU/R	Heated oxygen sensor 2 heater	**[Engine is running]** ● **Warm-up condition** ● Engine speed: Below 3,600 rpm after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under on load	0 - 1.0V
			[Ignition switch: ON] ● Engine stopped. **[Engine is running]** ● Engine speed: Above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
29	Y	VIAS control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Engine speed: Above 5,000 rpm	0 - 1.0V
32	L/W	EVAP control system pressure sensor	**[Ignition switch: ON]**	Approximately 1.8 - 4.8V
34	Y/G	Intake air temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
35	P/L	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed: 2,000 rpm	0 - Approximately 1.0V (Periodically change)
45	P	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E
47	R	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5V
48	L	Sensor power supply (EVAP control system pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
49	R	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
50	W	Throttle position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	Less than 4.75V
51	OR	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.9 - 1.1V
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,500 rpm.	1.6 - 1.9V
61 62 80 81	L/R B/R GY/R PU	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.1V★  PBIB0521E
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,000 rpm.	0 - 0.2V★  PBIB0522E
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Sensor power supply (Power steering pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
69	R	Throttle position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	More than 0.36V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
70	Y	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch: ON (Compressor operates.)	1.0 - 4.0V
73	BR/Y	Engine coolant temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
74	OR/B	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
82	R/Y	Sensor ground (Accelerator pedal position sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	L	Sensor ground (Accelerator pedal position sensor 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
84	L/Y	Electrical load signal (Headlamp signal)	**[Lighting switch: ON]** ● Lighting switch: 1st or 2nd	BATTERY VOLTAGE (11 - 14V)
			[Lighting switch: ON] ● Lighting switch: OFF	Approximately 0V
85	LG	DATA link connector	**[Ignition switch: ON]** ● CONSULT-II or GST: Disconnected.	BATTERY VOLTAGE (11 - 14V)
86	GY/R	CAN communication line	**[Ignition switch: ON]**	Approximately 2.3V
89	G	Cooling fan relay (High)	**[Engine is running]** ● Cooling fan: Not operating	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Cooling fan: High speed operating	0 - 1.0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	**[Ignition switch: ON]**	Approximately 5V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V
93	BR	Electrical load signal (Rear window defogger signal)	**[Ignition switch: ON]** ● Rear window defogger switch: ON	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON] ● Rear window defogger switch: OFF	Approximately 0V
94	G/R	CAN communication line	**[Ignition switch: ON]**	Approximately 2.8V

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
96	LG/B	Heater fan switch	**[Engine is running]** ● Heater fan switch: ON	Approximately 0V
			[Engine is running] ● Heater fan switch: OFF	BATTERY VOLTAGE (11 - 14V)
97	PU	Cooling fan relay (Low)	**[Engine is running]** ● cooling fan: Not operating	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Cooling fan: Low speed operating	0 - 1.0V
98	B/W	Accelerator pedal position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.15 - 0.6V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	1.95 - 2.4V
99	W/R	ASCD steering switch	**[Ignition switch: ON]** ● ASCD steering switch: OFF	Approximately 4V
			[Ignition switch: ON] ● MAIN (CRUISE) switch: Pressed	Approximately 0V
			[Ignition switch: ON] ● CANCEL switch: Pressed	Approximately 1V
			[Ignition switch: ON] ● RESUME/ACCEL switch: Pressed	Approximately 3V
			[Ignition switch: ON] ● SET/COAST switch: Pressed	Approximately 2V
101	P	Stop lamp switch	**[Ignition switch: OFF]** ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
102	G/OR	PNP switch	**[Ignition switch: ON]** ● Shift lever: P or N (A/T), Neutral (M/T)	Approximately 0V
			[Ignition switch: ON] ● Except above position	BATTERY VOLTAGE (11 - 14V)
104	W/B	Throttle control motor relay	**[Ignition switch: OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON]	0 - 1.0V
106	W	Accelerator pedal position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	3.9 - 4.7V
107	P/L	Fuel tank temperature sensor	**[Engine is running]**	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
108	GY/L	ASCD brake switch	**[Ignition switch: ON]** ● Brake pedal: Slightly depressed (A/T) ● Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Fully released (A/T) ● Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)
109	B/R	Ignition switch	**[Ignition switch: OFF]**	0V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
110	L/R	Air conditioner switch signal	**[Engine is running]** ● Both A/C switch and blower switch: ON	Approximately 0V
			[Engine is running] ● A/C switch is OFF	BATTERY VOLTAGE (11 - 14V)
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
114	B/OR	Fuel pump relay	**[Ignition switch: ON]** ● For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0V
			[Ignition switch: ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	**[Engine is running]** ● Idle speed	Body ground
117	G	EVAP canister vent control valve	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch: OFF]**	BATTERY VOLTAGE (11 - 14V)

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

CONSULT-II Function (ENGINE)

ABS00CLM

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output of the specification for Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
CAN diagnostic support monitor	The results of transmit/receive diagnosis of CAN communication can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	This mode is used to inform customers when their vehicle condition requires periodic maintenance.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECM part number	ECM part number can be read.

*: The following emission-related diagnostic information is cleared when the ECM memory is erased.

- Diagnostic trouble codes
- 1st trip diagnostic trouble codes
- Freeze frame data
- 1st trip freeze frame data
- System readiness test (SRT) codes
- Test values

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

Item			DIAGNOSTIC TEST MODE							
			WORK SUPPORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	DATA MONITOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
				DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUPPORT
ENGINE CONTROL COMPONENT PARTS	INPUT	Crankshaft position sensor (POS)		×	×	×	×			
		Camshaft position sensor (PHASE)		×		×	×			
		Mass air flow sensor		×		×	×			
		Engine coolant temperature sensor		×	×	×	×	×		
		Heated oxygen sensor 1		×		×	×		×	×
		Heated oxygen sensor 2		×		×	×		×	×
		Vehicle speed sensor		×	×	×	×			
		Accelerator pedal position sensor		×		×	×			
		Throttle position sensor		×		×	×			
		Fuel tank temperature sensor		×		×	×	×		
		EVAP control system pressure sensor		×		×	×			
		Intake air temperature sensor		×	×	×	×			
		Knock sensor		×						
		Refrigerant pressure sensor				×	×			
		Closed throttle position switch (accelerator pedal position sensor signal)				×	×			
		Air conditioner switch				×	×			
		Park/neutral position (PNP) switch		×		×	×			
		Stop lamp switch		×		×	×			
		Power steering pressure sensor		×		×	×			
		Battery voltage				×	×			
		Load signal				×	×			
		Snow mode switch*3				×	×			
		Fuel level sensor		×		×	×			
		ASCD steering switch		×		×	×			
		ASCD brake switch		×		×	×			
		ASCD clutch switch		×		×	×			

Item			DIAGNOSTIC TEST MODE							
			WORK SUPPORT	SELF-DIAGNOSTIC RESULTS		DATA MONITOR	DATA MONITOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
				DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUPPORT
ENGINE CONTROL COMPONENT PARTS	OUTPUT	Fuel injector				×	×	×		
		Power transistor (Ignition timing)				×	×	×		
		Throttle control motor relay		×		×	×			
		Throttle control motor		×						
		EVAP canister purge volume control solenoid valve		×		×	×	×		×
		Air conditioner relay				×	×			
		Fuel pump relay	×			×	×	×		
		Cooling fan relay		×		×	×	×		
		Heated oxygen sensor 1 heater		×		×	×		×	
		Heated oxygen sensor 2 heater		×		×	×		×	
		EVAP canister vent control valve	×	×		×	×	×		
		Intake valve timing control solenoid valve		×		×	×	×		
		VIAS control solenoid valve		×		×	×	×		
		Calculated load value			×	×	×			

X: Applicable

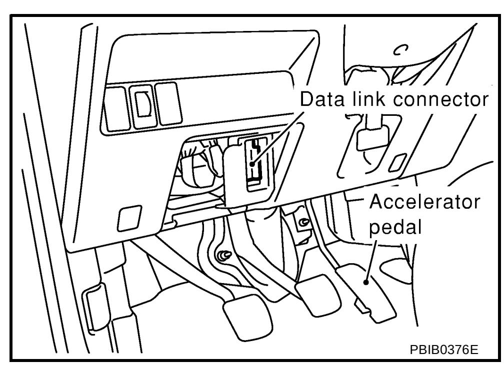
*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-52, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .

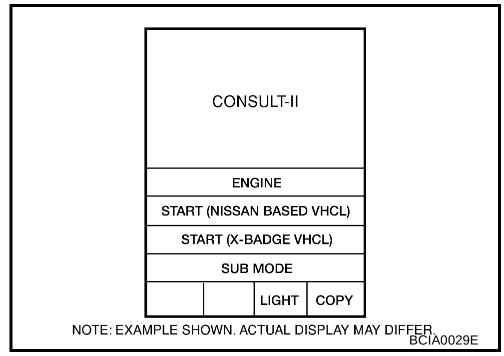
*3: With 2WD models.

INSPECTION PROCEDURE

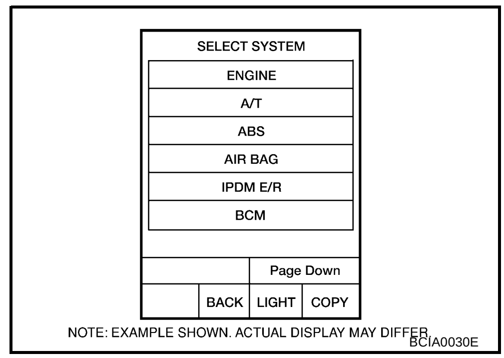
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector, which is located under LH dash panel.
3. Turn ignition switch ON.



4. Touch “START” (NISSAN BASED VHCL).

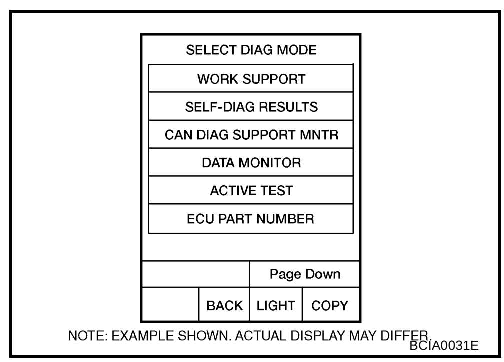


5. Touch “ENGINE”.
   If “ENGINE” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .



6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.



WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
FUEL PRESSURE RELEASE	● FUEL PUMP WILL STOP BY TOUCHING START DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM.	When learning the idle air volume
SELF-LEARNING CONT	● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT.	When clearing the coefficient of self-learning control value

WORK ITEM	CONDITION	USAGE
EVAP SYSTEM CLOSE	CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS. ● IGN SW ON ● ENGINE NOT RUNNING ● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). ● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM ● FUEL TANK TEMP. IS MORE THAN 0°C (32°F). ● WITHIN 10 MINUTES AFTER STARTING “EVAP SYSTEM CLOSE” ● WHEN TRYING TO EXECUTE “EVAP SYSTEM CLOSE” UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. **NOTE:** **WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY “BATTERY VOLTAGE IS LOW. CHARGE BATTERY”, EVEN IN USING CHARGED BATTERY.**	When detecting EVAP vapor leak point of EVAP system
VIN REGISTRATION	● IN THIS MODE, VIN IS REGISTE RED IN ECM.	When registering VIN in ECM
TARGET IDLE RPM ADJ*	● IDLE CONDITION	When setting target idle speed
TARGET IGN TIM ADJ*	● IDLE CONDITION	When adjusting target ignition timing

*: This function is not necessary in the usual service procedure.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of “DTC and 1st trip DTC”, refer to EC-48, "EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS" .

Freeze Frame Data and 1st Trip Freeze Frame Data

Freeze frame data item*	Description
DIAG TROUBLE CODE [PXXXX]	● The engine control component part/control system has a trouble code, it is displayed as “PXXXX”. (Refer to EC-8, "INDEX FOR DTC" .)
FUEL SYS-B1	● “Fuel injection system status” at the moment a malfunction is detected is displayed. ● One mode in the following is displayed. “Mode2”: Open loop due to detected system malfunction “Mode3”: Open loop due to driving conditions (power enrichment, deceleration enleanment) “Mode4”: Closed loop - using oxygen sensor(s) as feedback for fuel control “Mode5”: Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	● The engine coolant temperature at the moment a malfunction is detected is displayed.
L-FUEL TRM-B1 [%]	● “Long-term fuel trim” at the moment a malfunction is detected is displayed. ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
S-FUEL TRM-B1 [%]	● “Short-term fuel trim” at the moment a malfunction is detected is displayed. ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
ENGINE SPEED [rpm]	● The engine speed at the moment a malfunction is detected is displayed.

Freeze frame data item*	Description
VEHICL SPEED [km/h] or [mph]	● The vehicle speed at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	● The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	● The intake air temperature at the moment a malfunction is detected is displayed.

*: The items are the same as those of 1st trip freeze frame data.

DATA MONITOR MODE

Monitored Item

×: Applicable

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
ENG SPEED [rpm]	×	×	● Indicates the engine speed computed from the signals of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	● Accuracy becomes poor if engine speed drops below the idle rpm. ● If the signal is interrupted while the engine is running, an abnormal value may be indicated.
MAS A/F SE-B1 [V]	×	×	● The signal voltage of the mass air flow sensor is displayed.	● When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]		×	● "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	
A/F ALPHA-B1 [%]		×	● The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	● When the engine is stopped, a certain value is indicated. ● This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	×	×	● The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed.	● When the engine coolant temperature sensor is open or short-circulated, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2S1 (B1) [V]	×	×	● The signal voltage of the heated oxygen sensor 1 is displayed.	
HO2S2 (B1) [V]	×	×	● The signal voltage of the heated oxygen sensor 2 is displayed.	
HO2S1 MNTR (B1) [RICH/LEAN]	×	×	● Display of heated oxygen sensor 1 signal during air-fuel ratio feedback control: RICH: Means the mixture became rich, and control is being affected toward a leaner mixture. LEAN: Means the mixture became lean, and control is being affected toward a rich mixture.	● After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. ● When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR (B1) [RICH/LEAN]	×		● Display of heated oxygen sensor 2 signal: RICH: Means the amount of oxygen after three way catalyst is relatively small. LEAN: Means the amount of oxygen after three way catalyst is relatively large.	● When the engine is stopped, a certain value is indicated.
VHCL SPEED SE [km/h] or [mph]	×	×	● The vehicle speed computed from the vehicle speed signal is displayed.	
BATTERY VOLT [V]	×	×	● The power supply voltage of ECM is displayed.	

Monitored item [Unit]	ECM INPUT SIGNALS	MAIN SIGNALS	Description	Remarks
ACCEL SEN 1 [V]	×	×	● The accelerator pedal position sensor signal voltage is displayed.	● ACCEL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
ACCEL SEN 2 [V]	×			
THRTL SEN 1 [V]	×	×	● The throttle position sensor signal voltage is displayed.	● THRTL SEN 2 signal is converted by ECM internally. Thus, it differs from ECM terminal voltage signal.
THRTL SEN 2 [V]	×			
FUEL T/TEMP SE [°C] or [°F]	×		● The fuel temperature (determined by the signal voltage of the fuel tank temperature sensor) is displayed.	
INT/A TEMP SE [°C] or [°F]	×	×	● The intake air temperature (determined by the signal voltage of the intake air temperature sensor) is indicated.	
EVAP SYS PRES [V]	×		● The signal voltage of EVAP control system pressure sensor is displayed.	
FUEL LEVEL SE [V]	×		● The signal voltage of the fuel level sensor is displayed.	
START SIGNAL [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the starter signal.	● After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	×	×	● Indicates idle position [ON/OFF] computed by ECM according to the accelerator pedal position sensor signal.	
AIR COND SIG [ON/OFF]	×	×	● Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal.	
P/N POSI SW [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal.	
PW/ST SIGNAL [ON/OFF]	×	×	● [ON/OFF] condition of the power steering system (determined by the signal voltage of the power steering pressure sensor signal) is indicated.	
LOAD SIGNAL [ON/OFF]	×	×	● Indicates [ON/OFF] condition from the electrical load signal. ON: Rear window defogger switch is ON and/or lighting switch is in 1st or 2nd position and/or heater fan switch is ON. OFF: Rear window defogger switch and lighting switch and heater fan switch are OFF.	
SNOW MODE SW* [ON/OFF]			● Indicates [NO/OFF] condition from the snow mode switch signal.	
IGNITION SW [ON/OFF]	×	×	● Indicates [ON/OFF] condition from ignition switch.	
HEATER FAN SW [ON/OFF]	×		● Indicates [ON/OFF] condition from the heater fan switch signal.	
BRAKE SW [ON/OFF]	×		● Indicates [ON/OFF] condition from the stop lamp switch signal.	
INJ PULSE-B1 [msec]		×	● Indicates the actual fuel injection pulse width compensated by ECM according to the input signals.	● When the engine is stopped, a certain computed value is indicated.
IGN TIMING [BTDC]		×	● Indicates the ignition timing computed by ECM according to the input signals.	● When the engine is stopped, a certain value is indicated.

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
CAL/LD VALUE [%]			● “Calculated load value” indicates the value of the current airflow divided by peak air-flow.	
MASS AIRFLOW [g·m/s]			● Indicates the mass airflow computed by ECM according to the signal voltage of the mass air flow sensor.	
PURG VOL C/V [%]			● Indicates the EVAP canister purge volume control solenoid valve control value com-puted by the ECM according to the input signals. ● The opening becomes larger as the value increases.	
INT/V TIM (B1) [°CA]			● Indicates [°CA] of intake camshaft advanced angle.	
INT/V SOL (B1) [%]			● The control value of the intake valve timing control solenoid valve (determined by ECM according to the input signal) is indicated. ● The advance angle becomes larger as the value increases.	
VIAS S/V [ON/OFF]			● The control condition of the VIAS control solenoid valve (determined by ECM accord-ing to the input signals) is indicated. ON: VIAS control solenoid valve is operat-ing. OFF: VIAS control solenoid valve is not operating.	
AIR COND RLY [ON/OFF]		×	● The air conditioner relay control condition (determined by ECM according to the input signals) is indicated.	
FUEL PUMP RLY [ON/OFF]		×	● Indicates the fuel pump relay control condi-tion determined by ECM according to the input signals.	
VENT CONT/V [ON/OFF]			● The control condition of the EVAP canister vent control valve (determined by ECM according to the input signals) is indicated. ON: Closed OFF: Open	
THRTL RELAY [ON/OFF]		×	● Indicates the throttle control motor relay control condition determined by the ECM according to the input signals.	
COOLING FAN [HI/LOW/OFF]		×	● Indicates the condition of the cooling fan (determined by ECM according to the input signals). HI: High speed operation LOW: Low speed operation OFF: Stop	
HO2S1 HTR (B1) [ON/OFF]			● Indicates [ON/OFF] condition of heated oxy-gen sensor 1 heater determined by ECM according to the input signals.	
HO2S2 HTR (B1) [ON/OFF]			● Indicates [ON/OFF] condition of heated oxy-gen sensor 2 heater determined by ECM according to the input signals.	

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
IDL A/V LEARN [YET/CMPLT]			● Display the condition of Idle Air Volume Learning YET: Idle Air Volume Learning has not been performed yet. CMPLT: Idle Air Volume Learning has already been performed successfully.	
TRVL AFTER MIL [km] or [mile]			● Distance traveled while MIL is activated.	
O2SEN HTR DTY [%]			● Indicates the heated oxygen sensor 1 heater control value computed by the ECM according to the input signals.	
AC PRESS SEN [V]			● The signal voltage from the refrigerant pressure sensor is displayed.	
VHCL SPEED SE [km/h] or [mph]			● The vehicle speed computed from the vehicle speed signal sent from TCM is displayed.	
SET VHCL SPD [km/h] or [mph]			● The preset vehicle speed is displayed.	
MAIN SW [ON/OFF]			● Indicates [ON/OFF] condition from MAIN (CRUISE) switch signal.	
CANCEL SW [ON/OFF]			● Indicates [ON/OFF] condition from CANCEL switch signal.	
RESUME/ACC SW [ON/OFF]			● Indicates [ON/OFF] condition from RESUME/ACCEL switch signal.	
SET SW [ON/OFF]			● Indicates [ON/OFF] condition from SET/COAST switch signal.	
BRAKE SW1 [ON/OFF]			● Indicates [ON/OFF] condition from ASCD brake switch signal, and ASCD clutch switch signal (M/T models).	
BRAKE SW2 [ON/OFF]			● Indicates [ON/OFF] condition of stop lamp switch signal.	
VHCL SPD CUT [NON/CUT]			● Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed increased to excessively high compared with the ASCD set speed, and ASCD operation is cut off.	
LO SPEED CUT [NON/CUT]			● Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.	
AT OD MONITOR [ON/OFF]			● Indicates [ON/OFF] condition of A/T O/D according to the input signal from the TCM.	
AT OD CANCEL [ON/OFF]			● Indicates [ON/OFF] condition of A/T O/D cancel signal sent from the TCM.	
CRUISE LAMP [ON/OFF]			● Indicates [ON/OFF] condition of CRUISE lamp determined by the ECM according to the input signals.	

Monitored item [Unit]	ECM INPUT SIG-NALS	MAIN SIG-NALS	Description	Remarks
SET LAMP [ON/OFF]			● Indicates [ON/OFF] condition of SET lamp determined by the ECM according to the input signals.	
Voltage [V]			● Voltage, frequency, duty cycle or pulse width measured by the probe.	● Only “#” is displayed if item is unable to be measured. ● Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.
Frequency [msec], [Hz] or [%]				
DUTY-HI				
DUTY-LOW				
PLS WIDTH-HI				
PLS WIDTH-LOW				

*: With 2WD models.

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

DATA MONITOR (SPEC) MODE

Monitored Item

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	×		● Indicates the engine speed computed from the signal of the crankshaft position sensor (POS) and camshaft position sensor (PHASE).	
MAS A/F SE-B1 [V]	×	×	● The signal voltage of the mass air flow sensor specification is displayed.	● When engine is running specification range is indicated.
B/FUEL SCHDL [msec]			● “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction.	● When engine is running specification range is indicated.
A/F ALPHA-B1 [%]		×	● The mean value of the air-fuel ratio feedback correction factor per cycle is indicated.	● When engine is running specification range is indicated. ● This data also includes the data for the air-fuel ratio learning control.

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	● Engine: Return to the original trouble condition ● Change the amount of fuel injection using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Fuel injector ● Heated oxygen sensor 1
IGNITION TIMING	● Engine: Return to the original trouble condition ● Timing light: Set ● Retard the ignition timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Perform Idle Air Volume Learning.

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BAL-ANCE	● Engine: After warming up, idle the engine. ● A/C switch OFF ● Shift lever P or N (A/T), Neutral (M/T) ● Cut off each fuel injector signal one at a time using CONSULT-II.	Engine runs rough or dies.	● Harness and connectors ● Compression ● Fuel injector ● Power transistor ● Spark plug ● Ignition coil
COOLING FAN*	● Ignition switch: ON ● Turn the cooling fan “LOW”, “HI” and “OFF” with CONSULT-II.	Cooling fan moves and stops.	● Harness and connectors ● Cooling fan relay ● Cooling fan motor
ENG COOLANT TEMP	● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Engine coolant temperature sensor ● Fuel injector
FUEL PUMP RELAY	● Ignition switch: ON (Engine stopped) ● Turn the fuel pump relay “ON” and “OFF” using CONSULT-II and listen to operating sound.	Fuel pump relay makes the operating sound.	● Harness and connectors ● Fuel pump relay
VIAS SOL VALVE	● Ignition switch: ON ● Turn solenoid valve “ON” and “OFF” with CONSULT-II and listen for operating sound.	Solenoid valve makes an operating sound.	● Harness and connectors ● Solenoid valve
PURG VOL CONT/V	● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II.	Engine speed changes according to the opening percent.	● Harness and connectors ● Solenoid valve
FUEL/T TEMP SEN	● Change the fuel tank temperature using CONSULT-II.		
VENT CON-TROL/V	● Ignition switch: ON (Engine stopped) ● Turn solenoid valve “ON” and “OFF” with the CONSULT-II and listen to operating sound.	Solenoid valve makes an operating sound.	● Harness and connectors ● Solenoid valve
V/T ASSIGN ANGLE	● Engine: Return to the original trouble condition ● Change intake valve timing using CONSULT-II.	If trouble symptom disappears, see CHECK ITEM.	● Harness and connectors ● Intake valve timing control solenoid valve

*: Leaving cooling fan “OFF” with CONSULT-II while engine is running may cause the engine to over heat.

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

For details, refer to EC-52, "SYSTEM READINESS TEST (SRT) CODE" .

SRT WORK SUPPORT Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

DTC WORK SUPPORT Mode

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	PURGE FLOW P0441	Refer to corresponding trouble diagnosis for DTC.	EC-332
	EVAP SML LEAK P0442/P1442*		EC-338
	EVAP V/S SML LEAK P0456/P1456*		EC-388
	PURG VOL CN/V P1444		EC-504
HO2S1	HO2S1 (B1) P0133		EC-234
	HO2S1 (B1) P0134		EC-244
	HO2S1 (B1) P1143		EC-448
	HO2S1 (B1) P1144		EC-454
HO2S2	HO2S2 (B1) P0139		EC-259
	HO2S2 (B1) P1146		EC-460
	HO2S2 (B1) P1147		EC-468

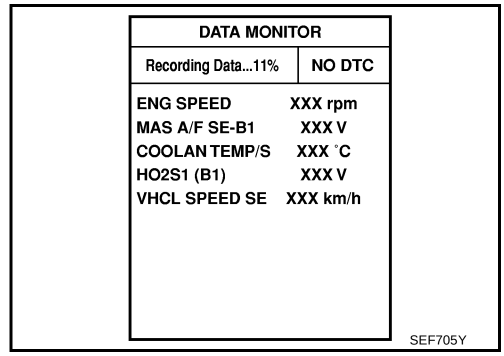
*: DTC P1442 and P1456 does not apply to T30 models but appears in DTC WORK SUPPORT MODE screens.

REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

Description

CONSULT-II has two kinds of triggers and they can be selected by touching “SETTING” in “DATA MONITOR” mode.

1. “AUTO TRIG” (Automatic trigger):
   - The malfunction will be identified on the CONSULT-II screen in real time.
     In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM.
     At the moment a malfunction is detected by ECM, “MONITOR” in “DATA MONITOR” screen is changed to “Recording Data: xx%” as shown at right, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, “REAL-TIME DIAG” screen is displayed. If “STOP” is touched on the screen during “Recording Data: xx%”, “REAL-TIME DIAG” screen is also displayed.
     The recording time after the malfunction detection and the recording speed can be changed by “TRIGGER POINT” and “Recording Speed”. Refer to CONSULT-II Operation Manual.
2. “MANU TRIG” (Manual trigger):
   - DTC/1st trip DTC and malfunction item will not be displayed automatically on CONSULT-II screen even though a malfunction is detected by ECM.
     DATA MONITOR can be performed continuously even though a malfunction is detected.



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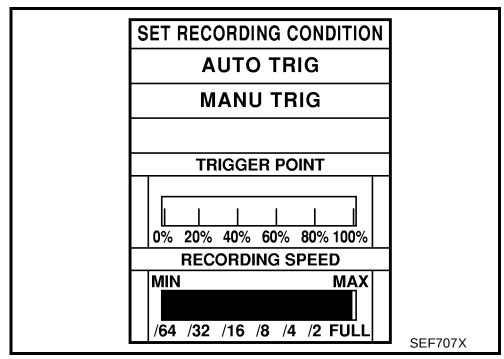

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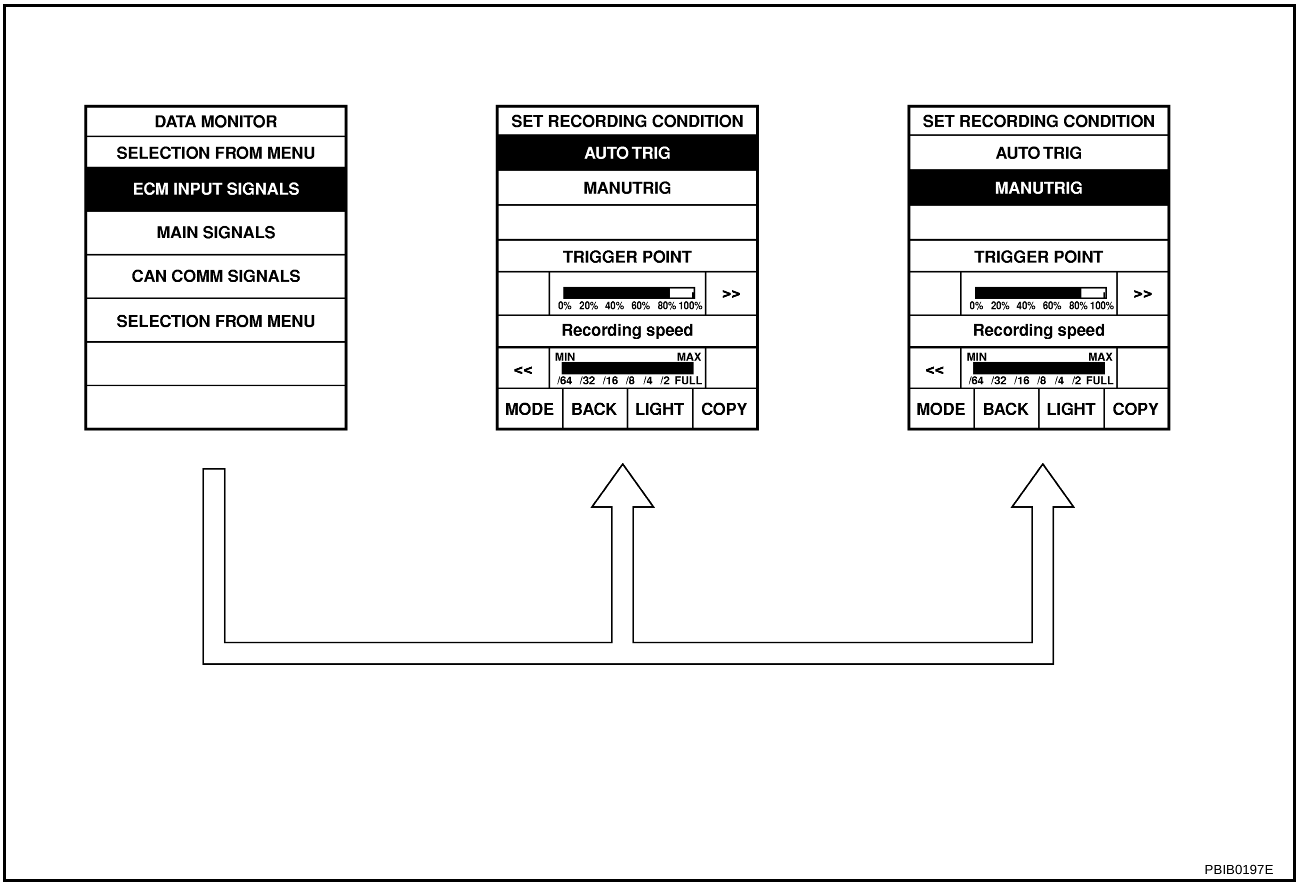
Operation

1. “AUTO TRIG”
   - While trying to detect the DTC/1st trip DTC by performing the DTC Confirmation Procedure, be sure to select to “DATA MONITOR (AUTO TRIG)” mode. You can confirm the malfunction at the moment it is detected.
   - While narrowing down the possible causes, CONSULT-II should be set in “DATA MONITOR (AUTO TRIG)” mode, especially in case the incident is intermittent.
     When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the DTC Confirmation Procedure, the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to “Incident Simulation Tests” in GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" .)
2. “MANU TRIG”
   - If the malfunction is displayed as soon as “DATA MONITOR” is selected, reset CONSULT-II to “MANU TRIG”. By selecting “MANU TRIG” you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.

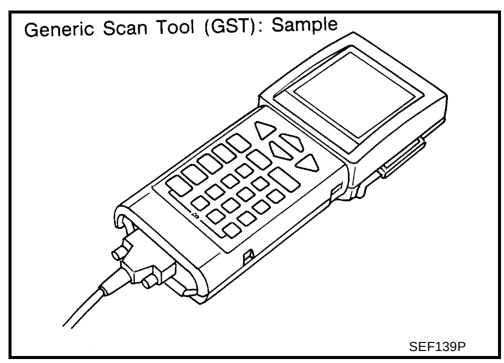


Generic Scan Tool (GST) Function

ABS00CLN

DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained below.
ISO9141 is used as the protocol.
The name GST or Generic Scan Tool is used in this service manual.



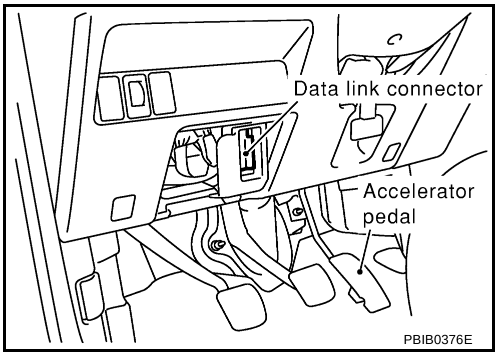
FUNCTION

Diagnostic test mode		Function
Service $01	READINESS TESTS	This diagnostic service gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
Service $02	(FREEZE DATA)	This diagnostic service gains access to emission-related data value which were stored by ECM during the freeze frame. For details, refer to EC-52, "FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA" .
Service $03	DTCs	This diagnostic service gains access to emission-related power train trouble codes which were stored by ECM.

Diagnostic test mode		Function
Service $04	CLEAR DIAG INFO	This diagnostic service can clear all emission-related diagnostic information. This includes: ● Clear number of diagnostic trouble codes (Service $01) ● Clear diagnostic trouble codes (Service $03) ● Clear trouble code for freeze frame data (Service $01) ● Clear freeze frame data (Service $02) ● Reset status of system monitoring test (Service $01) ● Clear on board monitoring test results (Service $06 and $07)
Service $06	(ON BOARD TESTS)	This diagnostic service accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
Service $07	(ON BOARD TESTS)	This diagnostic service enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
Service $08	—	This diagnostic service can close EVAP system in ignition switch ON position (Engine stopped). When this diagnostic service is performed, EVAP canister vent control valve can be closed. In the following conditions, this diagnostic service cannot function. ● Low ambient temperature ● Low battery voltage ● Engine running ● Ignition switch OFF ● Low fuel temperature ● Too much pressure is applied to EVAP system
Service $09	(CALIBRATION ID)	This diagnostic service enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

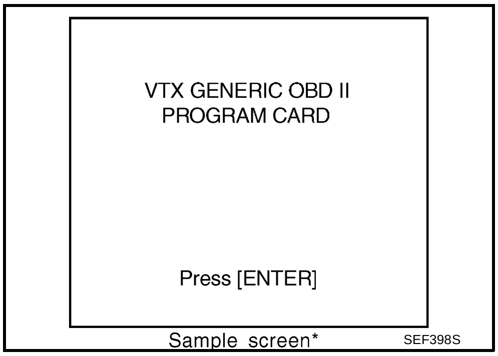
INSPECTION PROCEDURE

1. Turn ignition switch OFF.
2. Connect GST to data link connector, which is located under LH dash panel near the fuse box cover.
3. Turn ignition switch ON.



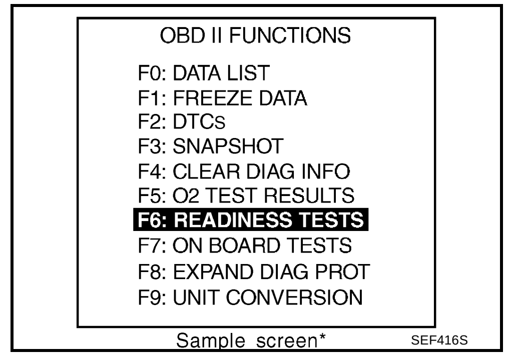
4. Enter the program according to instruction on the screen or in the operation manual.

(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.



CONSULT-II Reference Value in Data Monitor

ABS00CLO

Remarks:
- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.
  * Specification data may not be directly related to their components signals/values/operations.
  i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION		SPECIFICATION
ENG SPEED	● Run engine and compare the CONSULT-II value with tachometer indication.		Almost the same speed as the tachometer indication.
MAS A/F SE-B1	See EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .		
B/FUEL SCHDL	See EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .		
A/F ALPHA-B1	See EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .		
COOLAN TEMP/S	● Engine: After warming up		More than 70°C (158°F)
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 (B1)	● Warm-up condition ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	LEAN ←→ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1)	● Engine: After warming up ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	LEAN ←→ RICH
VEH SPEED SE	● Turn drive wheels and compare the CONSULT-II value with speedometer indication.		Almost the same speed as the speedometer indication.
BATTERY VOLT	● Ignition switch: ON (Engine stopped)		11 - 14V
ACCEL SEN 1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.0 - 4.7V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.3 - 1.2V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
THRTL SEN 1 THRTL SEN 2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T), 1ST (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V
EVAP SYS PRES	● Ignition switch: ON		1.8 - 4.8V
START SIGNAL	● Ignition switch: ON → START → ON		OFF → ON → OFF

MONITOR ITEM	CONDITION		SPECIFICATION
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T), Neutral (M/T)	ON
		Shift lever: Except above position	OFF
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel: Not being turn.	OFF
		Steering wheel: Being turned.	ON
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 1st or 2nd and/or heater fan switch is ON.	ON
		Rear window defogger switch is OFF, lighting switch and heater fan switch is OFF.	OFF
SNOW MODE SW	● Ignition switch: ON	Snow mode switch: ON	ON
		Snow mode switch: OFF	OFF
IGNITION SW	● Ignition switch: ON → OFF → ON		ON → OFF → ON
HEATER FAN SW	● Engine: After warming up, idle the engine	Heater fan: Operating.	ON
		Heater fan: Not operating	OFF
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
INJ PULSE-B1	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec
IGN TIMING	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	13° - 17° BTDC
		2,000 rpm	25° - 45° BTDC
CAL/LD VALUE	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s
PURG VOL C/V	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0%
		2,000 rpm	20 - 30%

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	–5° - 5°CA
		When revving engine up to 2,000 rpm quickly.	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly.	Approx. 0% - 50%
AIR COND RLY	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates)	ON
VIAS S/V	● Engine: After warming up	Idle	OFF
		More than 5,000 rpm	ON
FUEL PUMP RLY	● For 1 second after turning ignition switch ON ● Engine running or cranking		ON
	● Except above conditions		OFF
VENT CONT/V	● Ignition switch: ON		OFF
THRTL RELAY	● Ignition switch: ON		ON
COOLING FAN	● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH
HO2S1 HTR (B1)	● Engine: After warming up ● Engine speed: Below 3,600 rpm		ON
	● Engine speed: Above 3,600 rpm		OFF
HO2S2 HTR (B1)	● Engine speed: Below 3,600 rpm after the following conditions are met ● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.		ON
	● Engine speed: Above 3,600 rpm		OFF
TRVL AFTER MIL	● Ignition switch: ON	Vehicle has traveled after MIL has turned ON.	0 - 65,535 km (0 - 40,723 mile)
O2SEN HTR DTY	● Engine coolant temperature when engine started: More than 80°C (176°F) ● Engine speed: Below 3,600 rpm		Approx. 50%
AC PRESS SEN	● Ignition switch: ON (Engine stopped)		Approx. 0V
	● Engine: Idle ● Air conditioner switch: OFF		1.0 - 4.0V
VEH SPEED SE	● Turn drive wheels and compare the CONSULT-II value with speedometer indication.		Almost the same speed as the speedometer indication
SET VHCL SPD	● Engine: Running	ASCD: Operating	The preset vehicle speed is displayed.
MAIN SW	● Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF

MONITOR ITEM	CONDITION		SPECIFICATION
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	● Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal: Fully released (A/T) ● Brake pedal and clutch pedal: Fully released (M/T)	ON
		● Brake pedal: Slightly depressed (A/T) ● Brake pedal and/or clutch pedal: Fully depressed (M/T)	OFF
BRAKE SW2 (STOP lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON
CRUISE LAMP	● Ignition switch: ON	MAIN switch is pressed at 1st time → 2nd time	ON → OFF
SET LAMP	● MAIN switch: ON ● When vehicle is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

*: Accelerator pedal position sensor 2 signal and throttle position sensor 2 signal are converted by ECM internally. Thus, they differ from ECM terminals voltage signal.

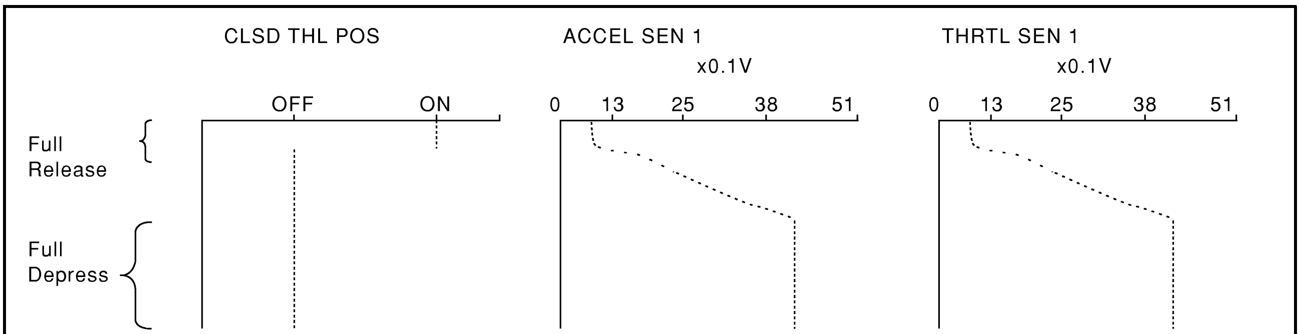
Major Sensor Reference Graph in Data Monitor Mode

ABS00CLP

The following are the major sensor reference graphs in “DATA MONITOR” mode.

CLSD THL POS, ACCEL SEN 1, THRTL SEN 1

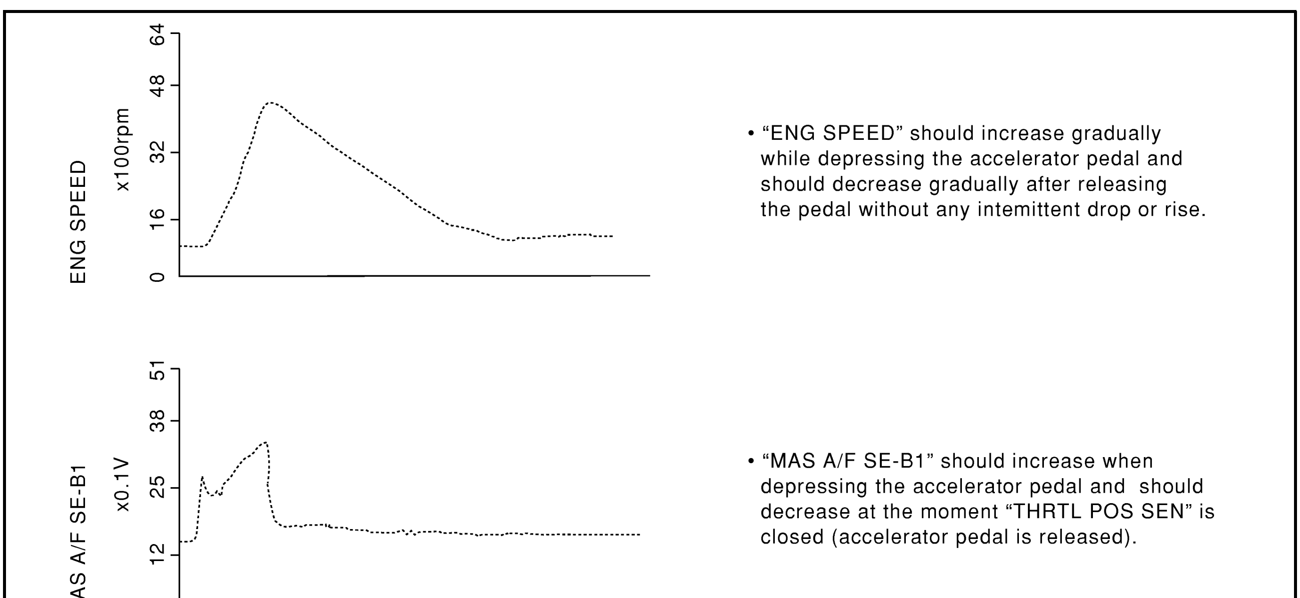
Below is the data for “CLSD THL POS”, “ACCEL SEN 1” and “THRTL SEN 1” when depressing the accelerator pedal with the ignition switch ON and with shift lever in D position (A/T), 1st position (M/T).
The signal of “ACCEL SEN 1” and “THRTL SEN 1” should rise gradually without any intermittent drop or rise after “CLSD THL POS” is changed from ON to OFF.



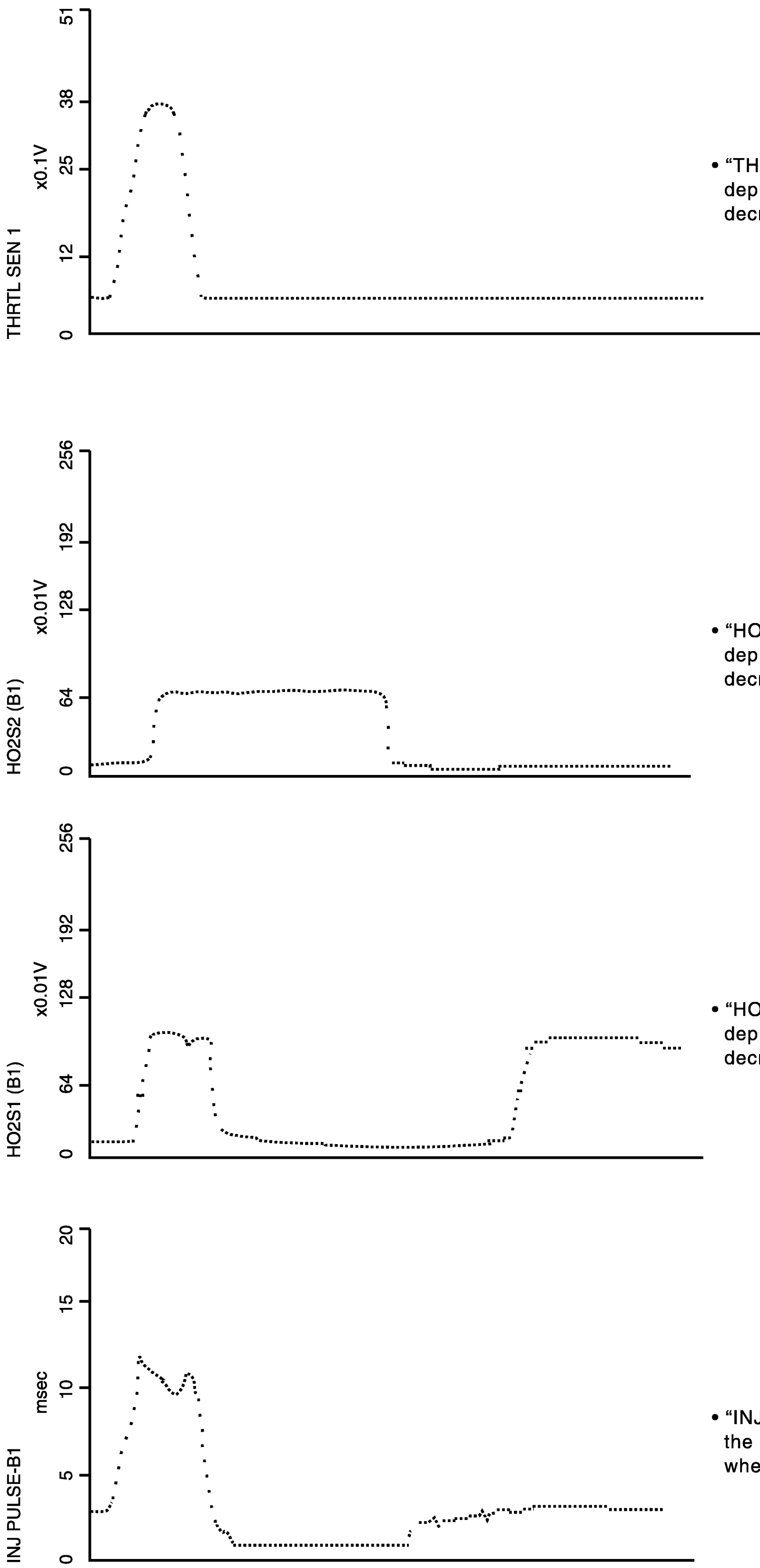
PBIB0198E

ENG SPEED, MAS A/F SE-B1, THRTL SEN 1, HO2S1 (B1), HO2S2 (B1), INJ PULSE-B1

Below is the data for “ENG SPEED”, “MAS A/F SE-B1”, “THRTL SEN 1”, “HO2S2 (B1)” and “INJ PULSE-B1” when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.
Each value is for reference, the exact value may vary.



SEF241Y



- “THRTL SEN 1” should increase while depressing the accelerator pedal and should decrease while releasing it.
- “HO2S2 (B1)” may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.
- “HO2S1 (B1)” may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.
- “INJ PULSE-B1” should increase when depressing the accelerator pedal and should decrease when the pedal is released.

PBIB0668E

TROUBLE DIAGNOSIS - SPECIFICATION VALUE

PFP:00031

Description

ABS00CLQ

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of the Engine Control System. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

Testing Condition

ABS00CLR

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm^2 , 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up*1
- Electrical load: Not applied*2
- Engine speed: Idle

*1: For A/T models, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates more than 60°C (140°F).

For M/T models, after the engine is warmed up to normal operating temperature, drive vehicle for 5 minutes.

*2: Rear window defogger switch, air conditioner switch, lighting switch are OFF. Steering wheel is straight ahead.

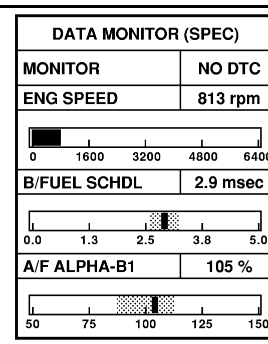
Inspection Procedure

ABS00CLS

NOTE:

Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform EC-70, "Basic Inspection" .
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to EC-145, "Diagnostic Procedure" .

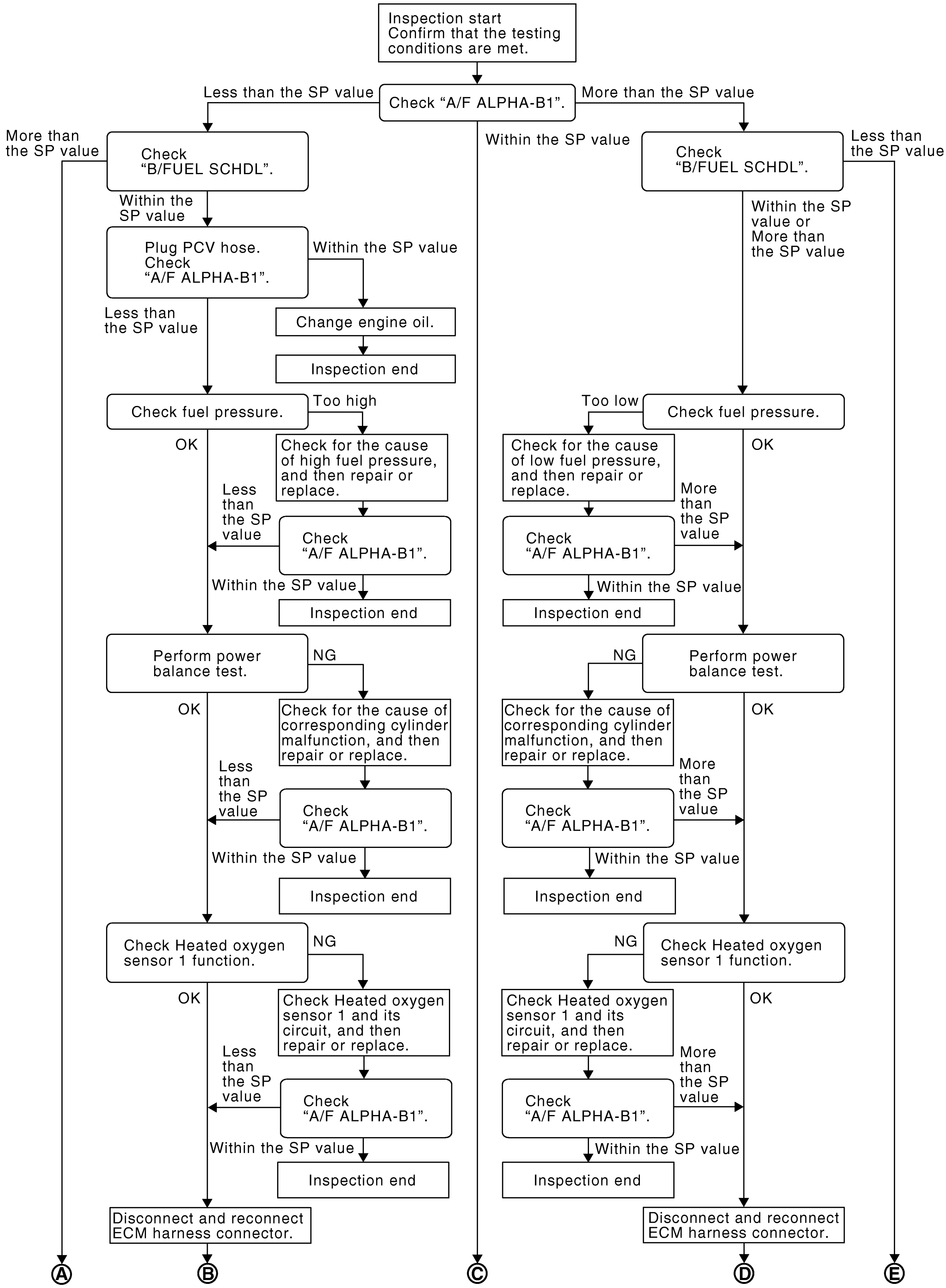


SEF601Z

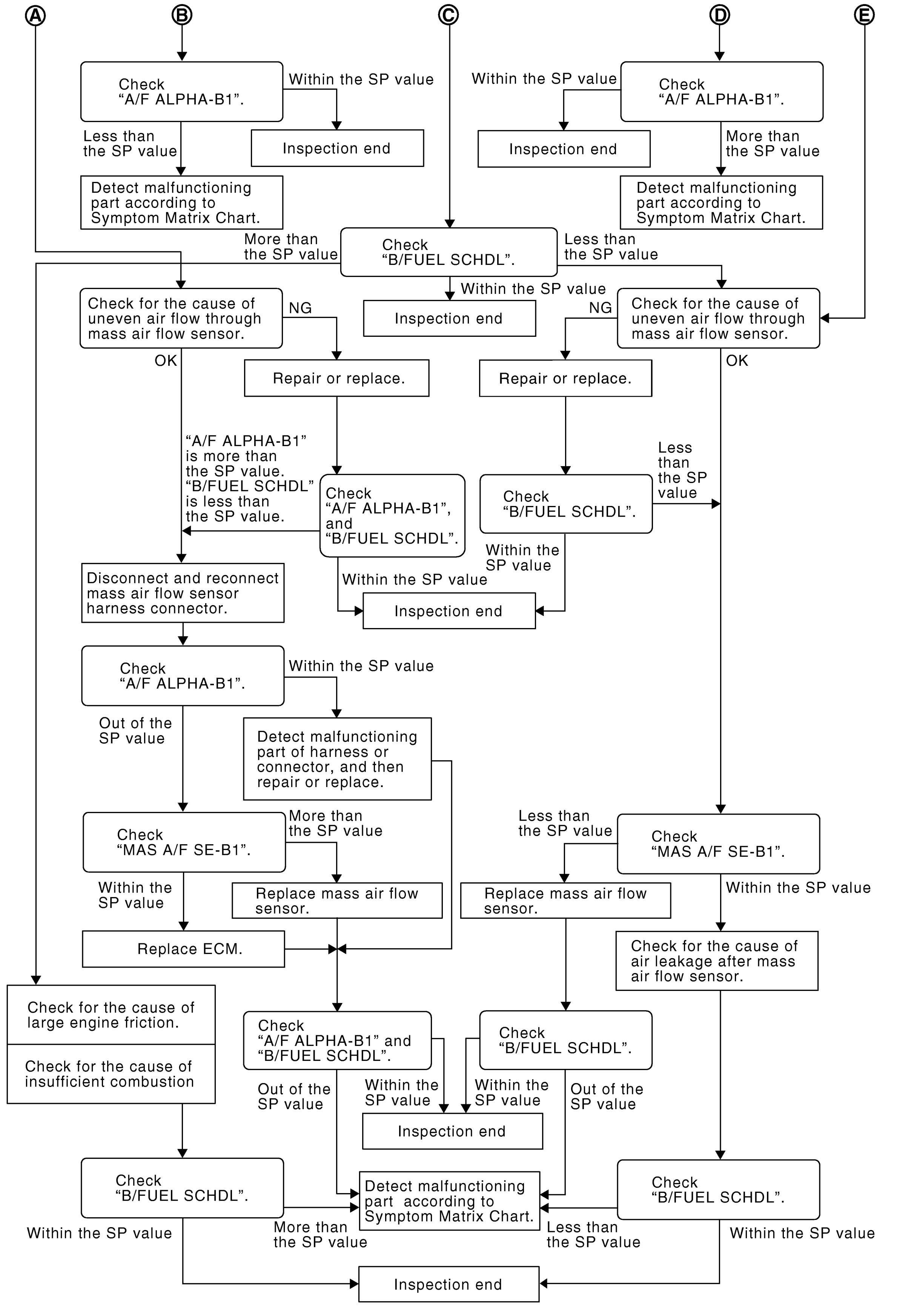
Diagnostic Procedure

ABS00CLT

OVERALL SEQUENCE



PBIB2384E

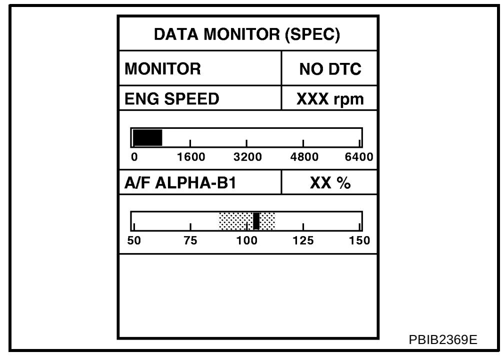

A
B
C
D
E
Check "A/F ALPHA-B1".
Within the SP value
Inspection end
Less than the SP value
Detect malfunctioning part according to Symptom Matrix Chart.
Within the SP value
Check "A/F ALPHA-B1".
Inspection end
More than the SP value
Detect malfunctioning part according to Symptom Matrix Chart.
More than the SP value
Check "B/FUEL SCHDL".
Less than the SP value
Within the SP value
Inspection end
Check for the cause of uneven air flow through mass air flow sensor.
NG
Repair or replace.
OK
NG
Check for the cause of uneven air flow through mass air flow sensor.
Repair or replace.
OK
"A/F ALPHA-B1" is more than the SP value. "B/FUEL SCHDL" is less than the SP value.
Check "A/F ALPHA-B1", and "B/FUEL SCHDL".
Check "B/FUEL SCHDL".
Less than the SP value
Within the SP value
Within the SP value
Inspection end
Disconnect and reconnect mass air flow sensor harness connector.
Check "A/F ALPHA-B1".
Within the SP value
Detect malfunctioning part of harness or connector, and then repair or replace.
Out of the SP value
Check "MAS A/F SE-B1".
More than the SP value
Replace mass air flow sensor.
Within the SP value
Replace ECM.
Less than the SP value
Check "MAS A/F SE-B1".
Replace mass air flow sensor.
Within the SP value
Check for the cause of air leakage after mass air flow sensor.
Check for the cause of large engine friction.
Check for the cause of insufficient combustion
Check "A/F ALPHA-B1" and "B/FUEL SCHDL".
Check "B/FUEL SCHDL".
Out of the SP value
Within the SP value
Within the SP value
Out of the SP value
Inspection end
Check "B/FUEL SCHDL".
Detect malfunctioning part according to Symptom Matrix Chart.
Check "B/FUEL SCHDL".
Within the SP value
More than the SP value
Less than the SP value
Within the SP value
Inspection end
PBIB2509E

DETAILED PROCEDURE

1. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Confirm that the testing conditions are met. Refer to EC-144, "Testing Condition" .
3. Select “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

   NOTE:
   Check “A/F ALPHA-B1” for approximately 1 minute because they may fluctuate. It is NG if the indication is out of the SP value even a little.

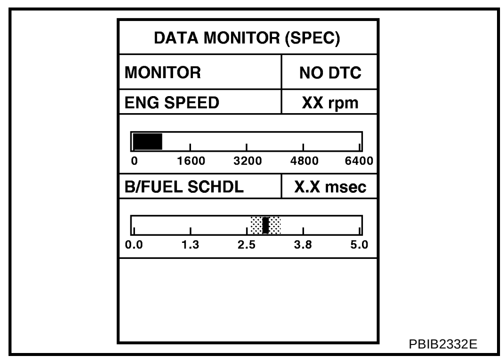


OK or NG

OK >> GO TO 17.
NG (Less than the SP value)>>GO TO 2.
NG (More than the SP value)>>GO TO 3.

2. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

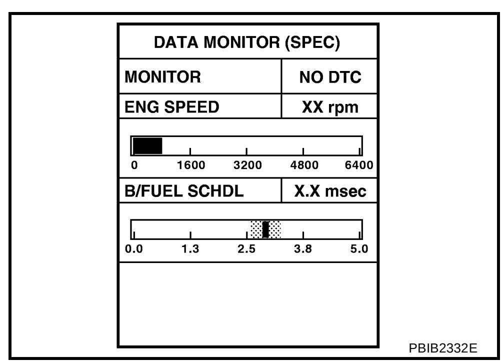


OK or NG

OK >> GO TO 4.
NG (More than the SP value)>>GO TO 19.

3. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.



OK or NG

OK >> GO TO 6.
NG (More than the SP value)>>GO TO 6.
NG (Less than the SP value)>>GO TO 25.

4. CHECK “A/F ALPHA-B1”

1. Stop the engine.
2. Disconnect PCV hose, and then plug it.
3. Start engine.
4. Select “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHANGE ENGINE OIL

1. Stop the engine.
2. Change engine oil.

   NOTE:
   This symptom may occur when a large amount of gasoline is mixed with engine oil because of driving conditions (such as when engine oil temperature does not rise enough since a journey distance is too short during winter). The symptom will not be detected after changing engine oil or changing driving condition.

>> **INSPECTION END**

6. CHECK FUEL PRESSURE

Check fuel pressure. (Refer to EC-90, "Fuel Pressure Check" .)

OK or NG

OK >> GO TO 9.
NG (Fuel pressure is too high)>>Replace fuel pressure regulator, refer to EC-90, "Fuel Pressure Check" . GO TO 8.
NG (Fuel pressure is too low)>>GO TO 7.

7. DETECT MALFUNCTIONING PART

1. Check the following.
   - Clogged and bent fuel hose and fuel tube
   - Clogged fuel filter
   - Fuel pump and its circuit (Refer to EC-613, "FUEL PUMP CIRCUIT" .)
2. If NG, repair or replace the malfunctioning part. (Refer to EC-90, "Fuel Pressure Check" .)
   If OK, replace fuel pressure regulator.

>> GO TO 8.

8. CHECK "A/F ALPHA-B1"

1. Start engine.
2. Select "A/F ALPHA-B1" in "DATA MONITOR (SPEC)" mode, and make sure that the indication is within the SP value.

OK or NG

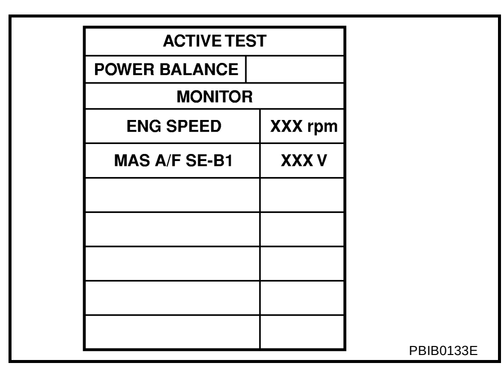
OK >> **INSPECTION END**
NG >> GO TO 9.

9. PERFORM POWER BALANCE TEST

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Make sure that the each cylinder produces a momentary engine speed drop.

OK or NG

OK >> GO TO 12.
NG >> GO TO 10.



10. DETECT MALFUNCTIONING PART

1. Check the following.
- Ignition coil and its circuit (Refer to EC-586, "IGNITION SIGNAL" .)
- Fuel injector and its circuit (Refer to EC-607, "INJECTOR CIRCUIT" .)
- Intake air leakage
- Low compression pressure (Refer to EM-62, "CHECKING COMPRESSION PRESSURE" .)
2. If NG, repair or replace the malfunctioning part.
If OK, replace fuel injector. (It may be caused by leakage from fuel injector or clogging.)

>> GO TO 11.

11. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

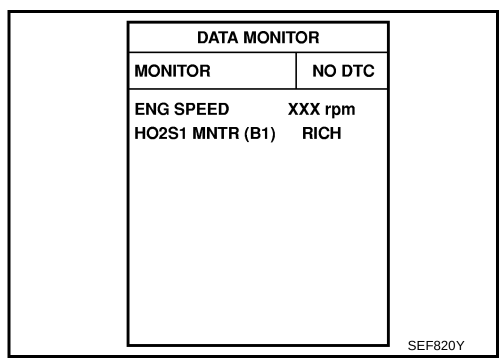
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 12.

12. CHECK HEATED OXYGEN SENSOR 1 FUNCTION

1. Run engine at about 2,000 rpm for about 2 minutes under no load.
2. Select “HO2S1 MNTR (B1)”, in “DATA MONITOR” mode.
3. Running engine at 2,000 rpm under no load (The engine is warmed up to normal operating temperature.), check that the monitor fluctuates between LEAN and RICH more than 5 times during 10 seconds.

1 time : RICH → LEAN → RICH
2 times : RICH → LEAN → RICH → LEAN → RICH



OK or NG

OK >> GO TO 15.
NG >> GO TO 13.

13. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT

Check heated oxygen sensor 1 and its circuit. Refer to EC-227, "DTC P0132 HO2S1" .

>> GO TO 14.

14. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 15.

15. DISCONNECT AND RECONNECT ECM HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect ECM harness connector. Check pin terminal and connector for damage, and then reconnect it.

>> GO TO 16.

16. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

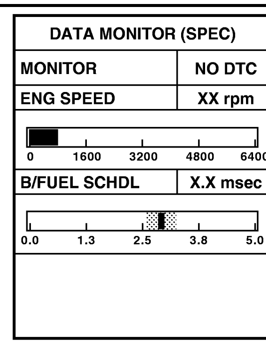
OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to EC-103, "Symptom Matrix Chart" .

17. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG (More than the SP value)>>GO TO 18.
NG (Less than the SP value)>>GO TO 25.



PBIB2332E

18. DETECT MALFUNCTIONING PART

1. Check for the cause of large engine friction. Refer to the following.
   - Engine oil level is too high
   - Engine oil viscosity
   - Belt tension of power steering, alternator, A/C compressor, etc. is excessive
   - Noise from engine
   - Noise from transmission, etc.
2. Check for the cause of insufficient combustion. Refer to the following.
   - Valve clearance malfunction
   - Intake valve timing control function malfunction
   - Camshaft sprocket installation malfunction, etc.

>> Repair or replace malfunctioning part, and then GO TO 30.

19. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

OK or NG

OK >> GO TO 21.
NG >> Repair or replace malfunctioning part, and then GO TO 20.

20. CHECK “A/F ALPHA-B1”, AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG (“B/FUEL SCHDL” is more, “A/F ALPHA-B1” is less than the SP value)>>GO TO 21.

21. DISCONNECT AND RECONNECT MASS AIR FLOW SENSOR HARNESS CONNECTOR

1. Stop the engine.
2. Disconnect mass air flow sensor harness connector. Check pin terminal and connector for damage and then reconnect it again.

>> GO TO 22.

22. CHECK “A/F ALPHA-B1”

1. Start engine.
2. Select “A/F ALPHA-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

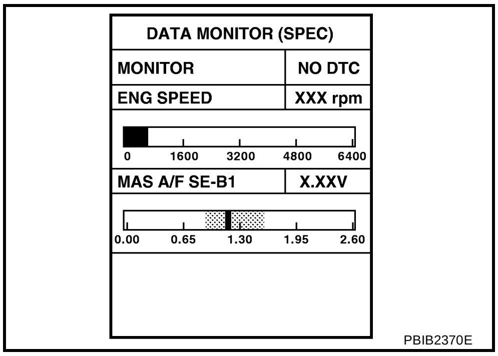
OK >> 1. Detect malfunctioning part of mass air flow sensor circuit and repair it. Refer to EC-191 .
2. GO TO 29.
NG >> GO TO 23.

23. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 24.
NG (More than the SP value)>>Replace mass air flow sensor, and then GO TO 29.



24. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to BL-99, "ECM Re-communicating Function" .
3. Perform EC-87, "VIN Registration" .
4. Perform EC-88, "Accelerator Pedal Released Position Learning" .
5. Perform EC-88, "Throttle Valve Closed Position Learning" .
6. Perform EC-88, "Idle Air Volume Learning" .

>> GO TO 29.

25. CHECK INTAKE SYSTEM

Check for the cause of uneven air flow through mass air flow sensor. Refer to the following.

- Crushed air ducts
- Malfunctioning seal of air cleaner element
- Uneven dirt of air cleaner element
- Improper specification of intake air system

OK or NG

OK >> GO TO 27.
NG >> Repair or replace malfunctioning part, and then GO TO 26.

26. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

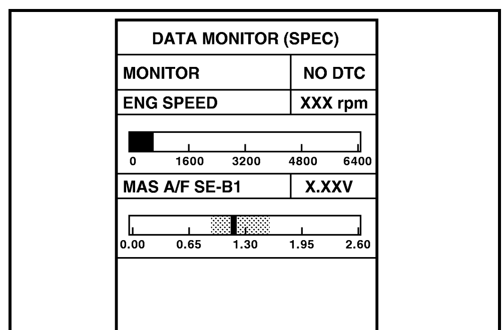
OK >> **INSPECTION END**
NG (Less than the SP value)>>GO TO 27.

27. CHECK “MAS A/F SE-B1”

Select “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> GO TO 28.
NG (Less than the SP value)>>Replace mass air flow sensor, and then GO TO 30.



PBIB2370E

28. CHECK INTAKE SYSTEM

Check for the cause of air leak after the mass air flow sensor. Refer to the following.

- Disconnection, looseness, and cracks in air duct
- Looseness of oil filler cap
- Disconnection of oil level gauge
- Open stuck, breakage, hose disconnection, or cracks of PCV valve
- Disconnection or cracks of EVAP purge hose, open stuck of EVAP canister purge volume control solenoid valve
- Malfunctioning seal of rocker cover gasket
- Disconnection, looseness, or cracks of hoses, such as vacuum hose, connecting to intake air system parts
- Malfunctioning seal of intake air system, etc.

>> GO TO 30.

29. CHECK “A/F ALPHA-B1” AND “B/FUEL SCHDL”

Select “A/F ALPHA-B1” and “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to EC-103, "Symptom Matrix Chart" .

30. CHECK “B/FUEL SCHDL”

Select “B/FUEL SCHDL” in “DATA MONITOR (SPEC)” mode, and then make sure that the indication is within the SP value.

OK or NG

OK >> **INSPECTION END**
NG >> Detect malfunctioning part according to EC-103, "Symptom Matrix Chart" .

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

PFP:00006

Description

ABS00CLU

Intermittent incidents may occur. In many cases, the malfunction resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on (1st trip) DTC visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific malfunctioning area.

Common intermittent incidents Report Situations

STEP in Work Flow	Situation
2	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than [0] or [1t].
3 or 4	The symptom described by the customer does not recur.
5	(1st trip) DTC does not appear during the DTC Confirmation Procedure.
10	The Diagnostic Procedure for PXXXX does not indicate the malfunctioning area.

Diagnostic Procedure

ABS00CLV

1. INSPECTION START

Erase (1st trip) DTCs. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

>> GO TO 2.

2. CHECK GROUND TERMINALS

Check ground terminals for corroding or loose connection.
Refer to EC-162, "Ground Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. SEARCH FOR ELECTRICAL INCIDENT

Perform GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" , “INCIDENT SIMULATION TESTS”.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK CONNECTOR TERMINALS

Refer to GI-23, "How to Check Terminal" , “HOW TO PROBE CONNECTORS”, “How to Check Enlarged Contact Spring of Terminal”.

OK or NG

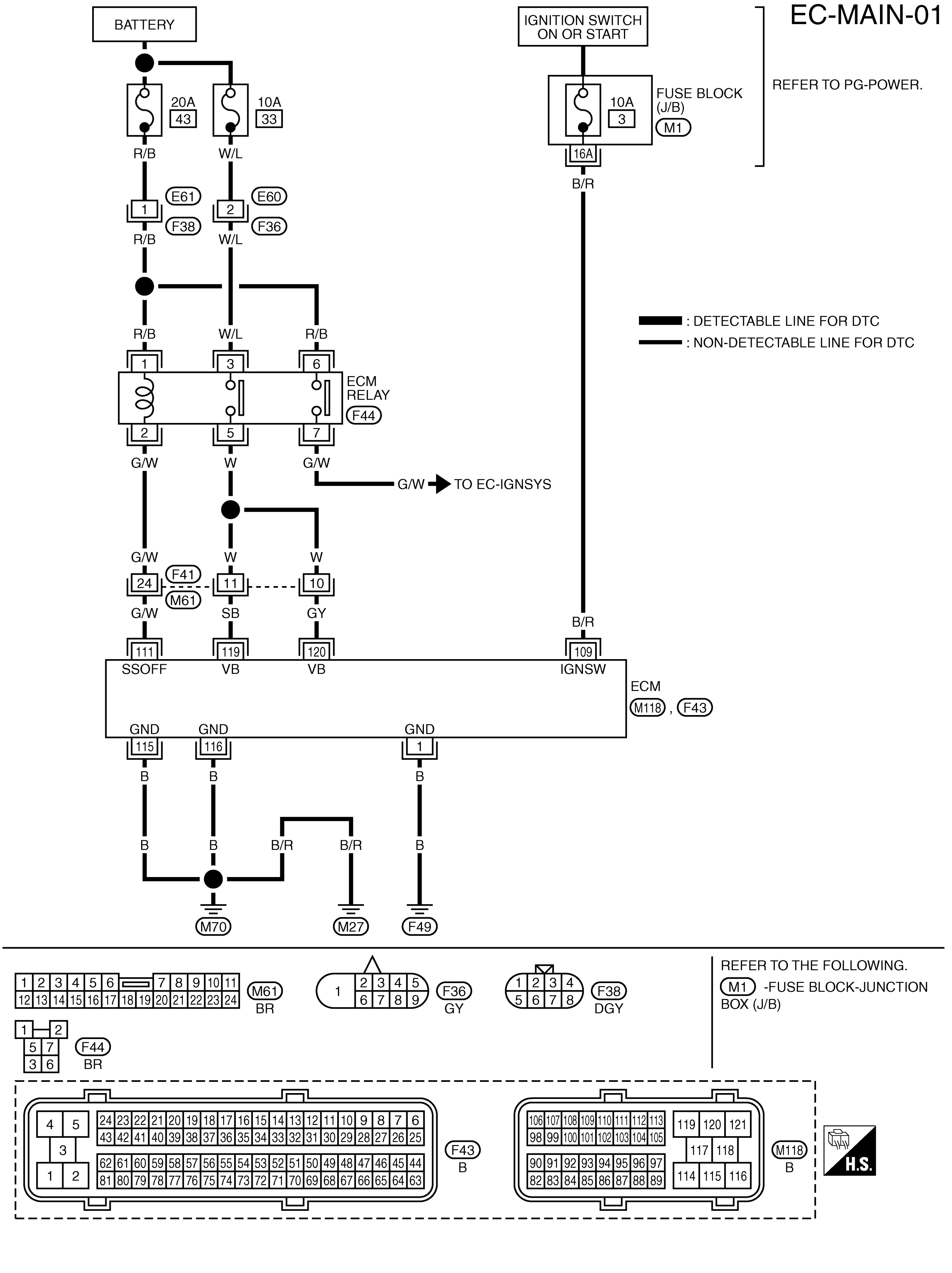
OK >> **INSPECTION END**
NG >> Repair or replace connector.

POWER SUPPLY AND GROUND CIRCUIT

PFP:24110

Wiring Diagram

ABS00CLW



A
EC
C
D
E
F
G
H
I
J
K
L
M

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	B	ECM ground	**[Engine is running]** ● Idle speed	Body ground
109	B/R	Ignition switch	**[Ignition switch: OFF]**	0V
			[Ignition switch: ON]	BATTERY VOLTAGE (11 - 14V)
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
115 116	B B	ECM ground	**[Engine is running]** ● Idle speed	Body ground
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00D81

1. INSPECTION START

Start engine.

Is engine running?

Yes or No

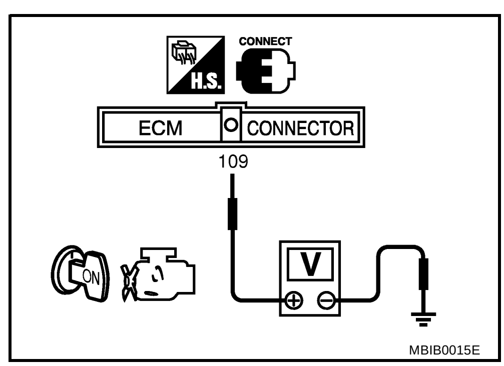
Yes >> GO TO 11.

No >> GO TO 2.

2. CHECK ECM POWER SUPPLY CIRCUIT-I

1. Turn ignition switch OFF and then ON.
2. Check voltage between ECM terminal 109 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

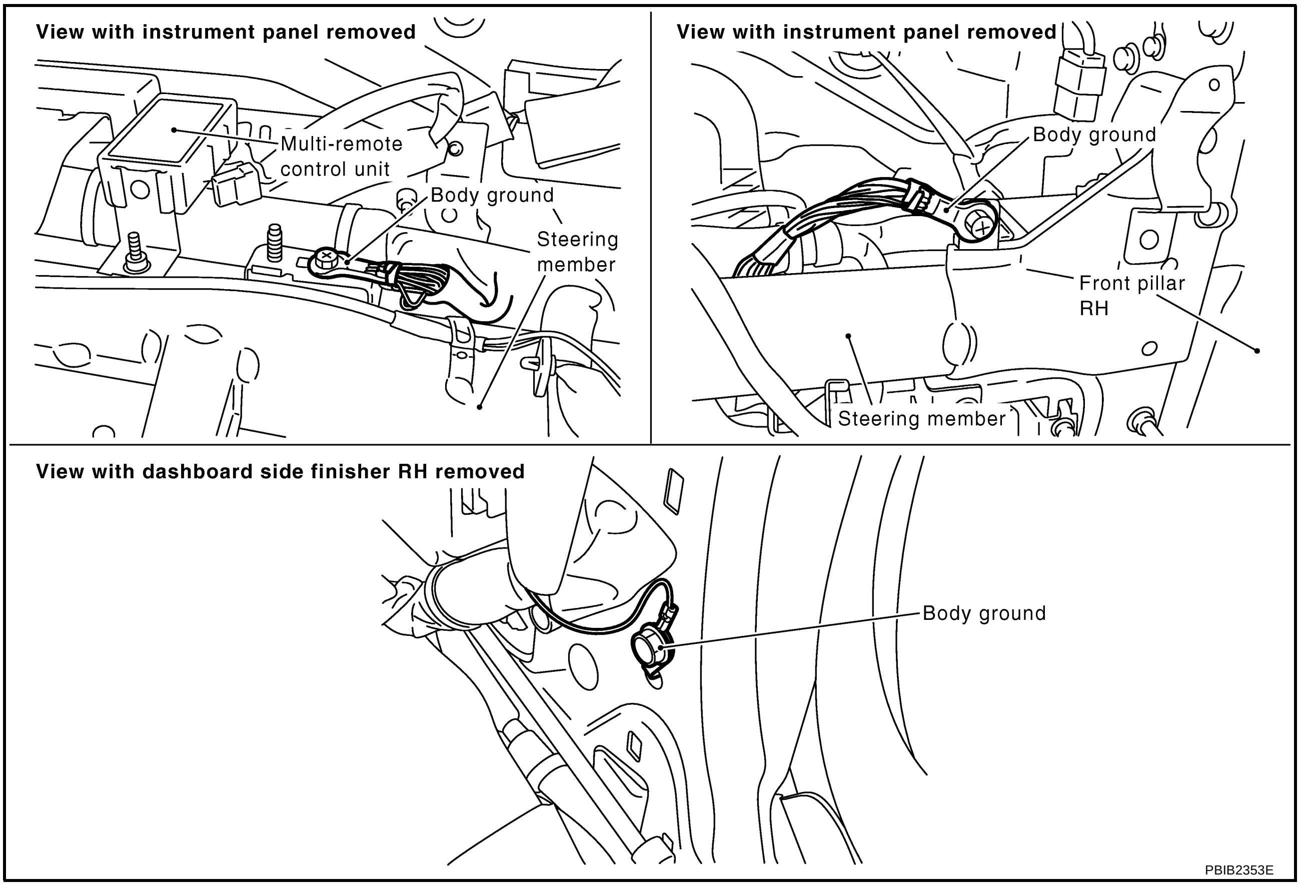
Check the following.

- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between ECM and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 5.
NG >> Repair or replace ground connections.

5. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 1, 115, 116 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

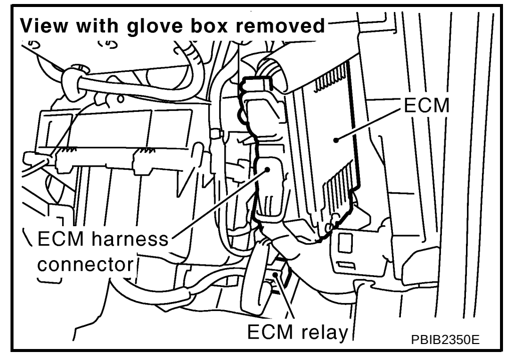
3. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to power in harness or connectors.

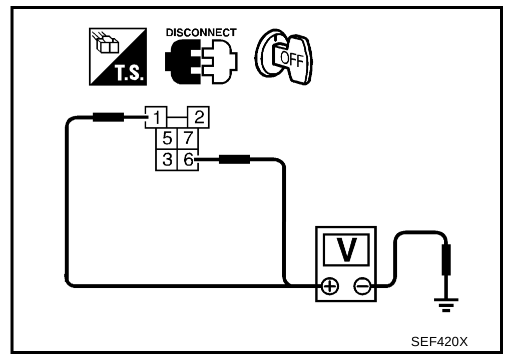
6. CHECK ECM POWER SUPPLY CIRCUIT-II

1. Disconnect ECM relay.



2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- 20A fuse
- Harness for open or short between ECM relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 111 and ECM relay terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness for open or short between ECM relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ECM RELAY

Refer to EC-162, "Component Inspection" .

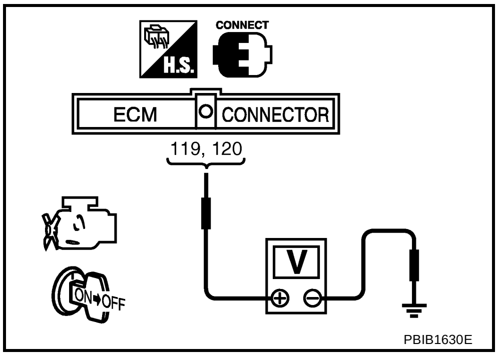
OK or NG

OK >> Go to EC-586, "IGNITION SIGNAL" .
NG >> Replace ECM relay.

11. CHECK ECM POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and then OFF.
3. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: After turning ignition switch OFF, battery voltage will exist for a few seconds, then drop approximately 0V.

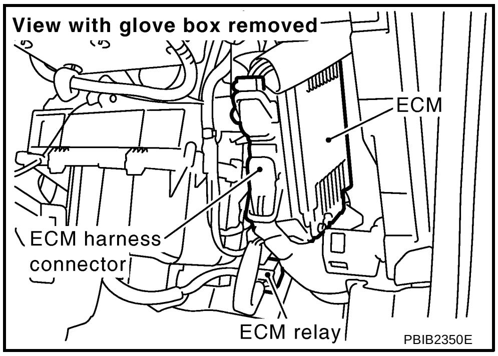


OK or NG

OK >> GO TO 17.
NG (Battery voltage does not exist.)>>GO TO 12.
NG (Battery voltage exists for more than a few seconds.)>>GO TO 14.

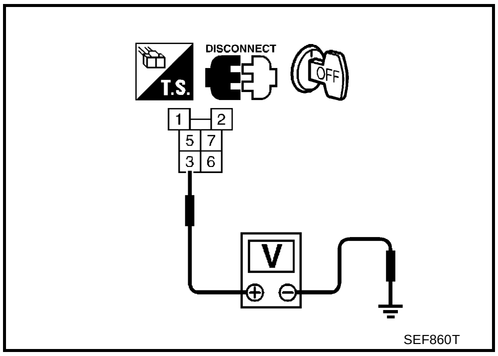
12. CHECK ECM POWER SUPPLY CIRCUIT-IV

1. Disconnect ECM relay.



2. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E60, F36
- 10A fuse
- Harness for open or short between ECM relay and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK ECM POWER SUPPLY CIRCUIT-V

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 119, 120 and ECM relay terminal 5.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness for open or short between ECM relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

16. CHECK ECM RELAY

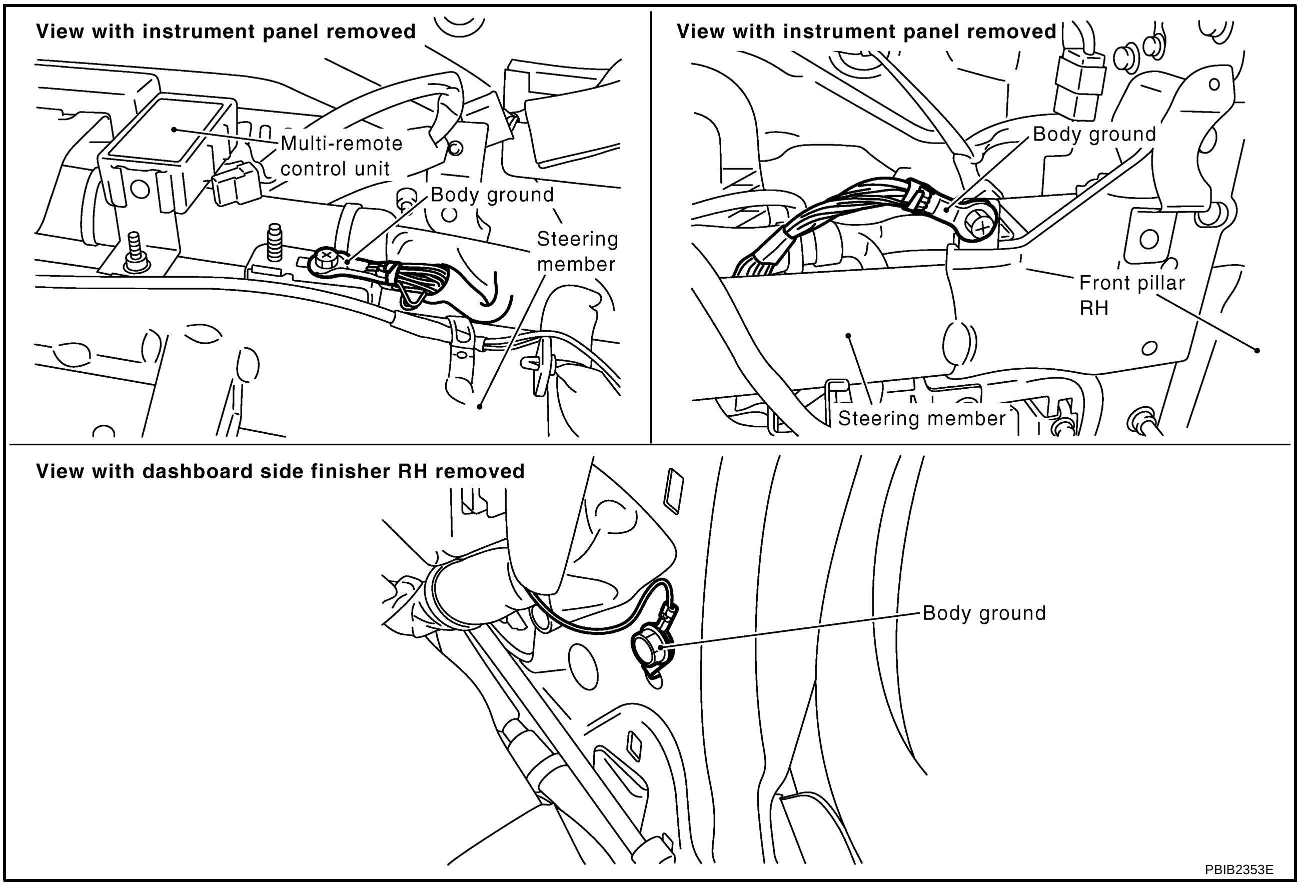
Refer to EC-162, "Component Inspection" .

OK or NG

OK >> GO TO 17.
NG >> Replace ECM relay.

17. CHECK GROUND CONNECTIONS

Loosen and retighten three ground screws on the body.
Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 18.
NG >> Repair or replace ground connections.

18. CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 1, 115, 116 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 19.
NG >> Repair open circuit or short to power in harness or connectors.

19. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

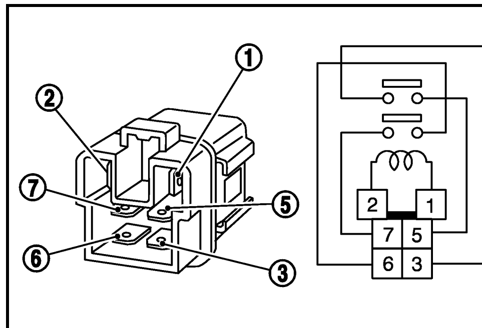
ABS00DAR

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



PBIB0077E

Ground Inspection

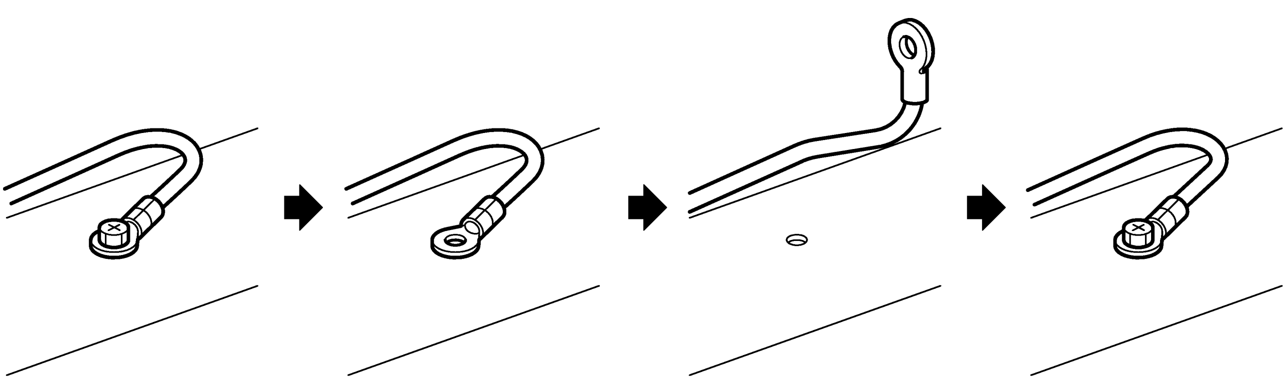
ABS00CLY

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to PG-13, "Ground Distribution" .

Ground Inspection



Remove bolt (screw).

Inspect mating surfaces for tarnish, dirt, rust, etc. Clean as required to assure good contact.

Reinstall bolt (screw) securely.

PBIB1870E

DTC U1000, U1001 CAN COMMUNICATION LINE

PFP:23710

Description

ABS00CLZ

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

On Board Diagnosis Logic

ABS00CM0

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
U1000*1 1000*1	CAN communication line	• ECM cannot communicate to other control units. • ECM cannot communicate for more than the specified time.	• Harness or connectors (CAN communication line is open or shorted)
U1001*2 1001*2			

*1: **This self-diagnosis has the one trip detection logic. (A/T models)**
The MIL will not light up for this diagnosis. (M/T models)
*2: **The MIL will not light up for this diagnosis.**

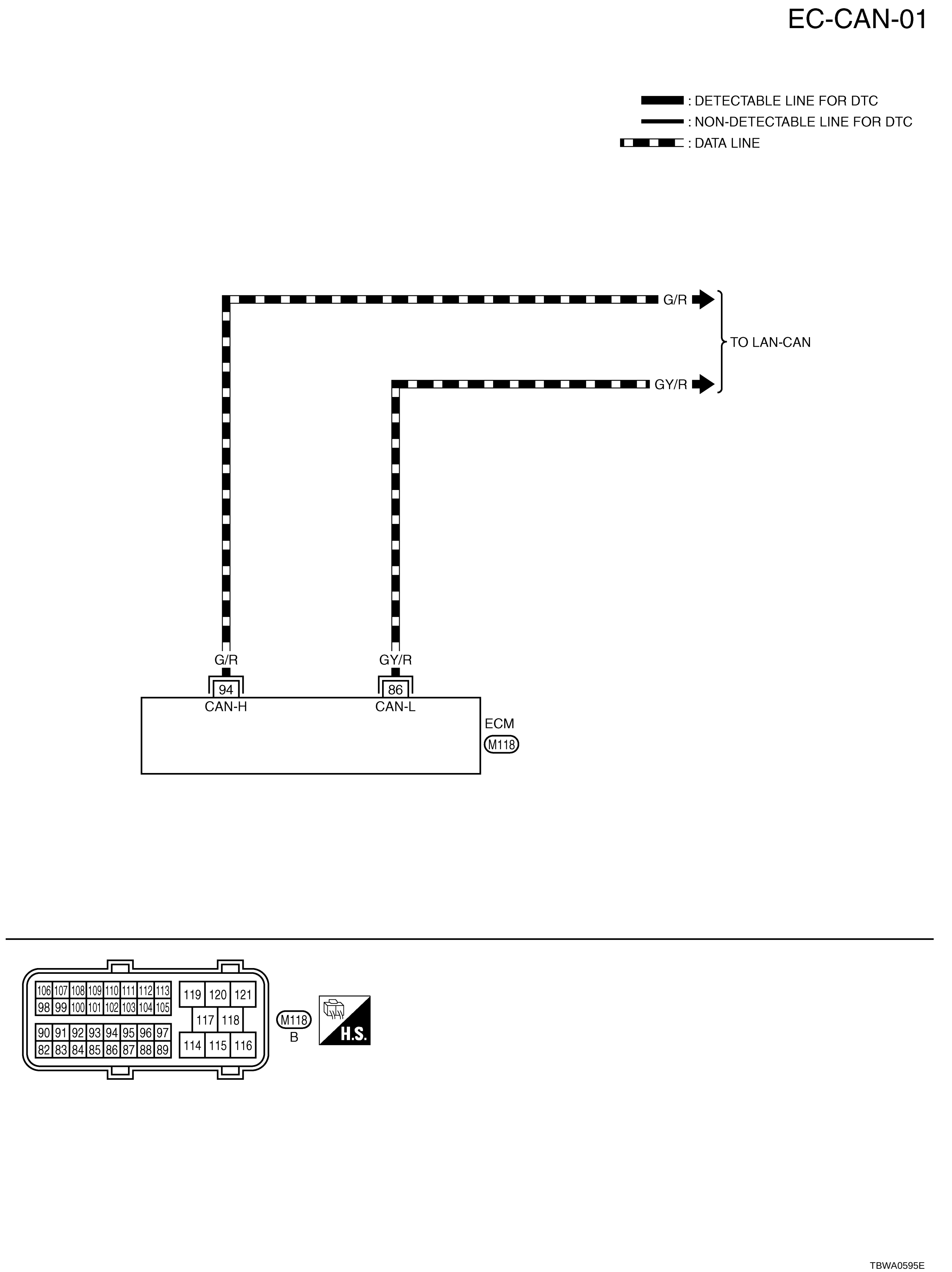
DTC Confirmation Procedure

ABS00CM1

1. Turn ignition switch ON and wait at least 3 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If 1st trip DTC is detected, go to EC-165, "Diagnostic Procedure" .

Wiring Diagram

ABS00CM2



Diagnostic Procedure

ABS00CM3

Go to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .

DTC P0011 IVT CONTROL

PFP:23796

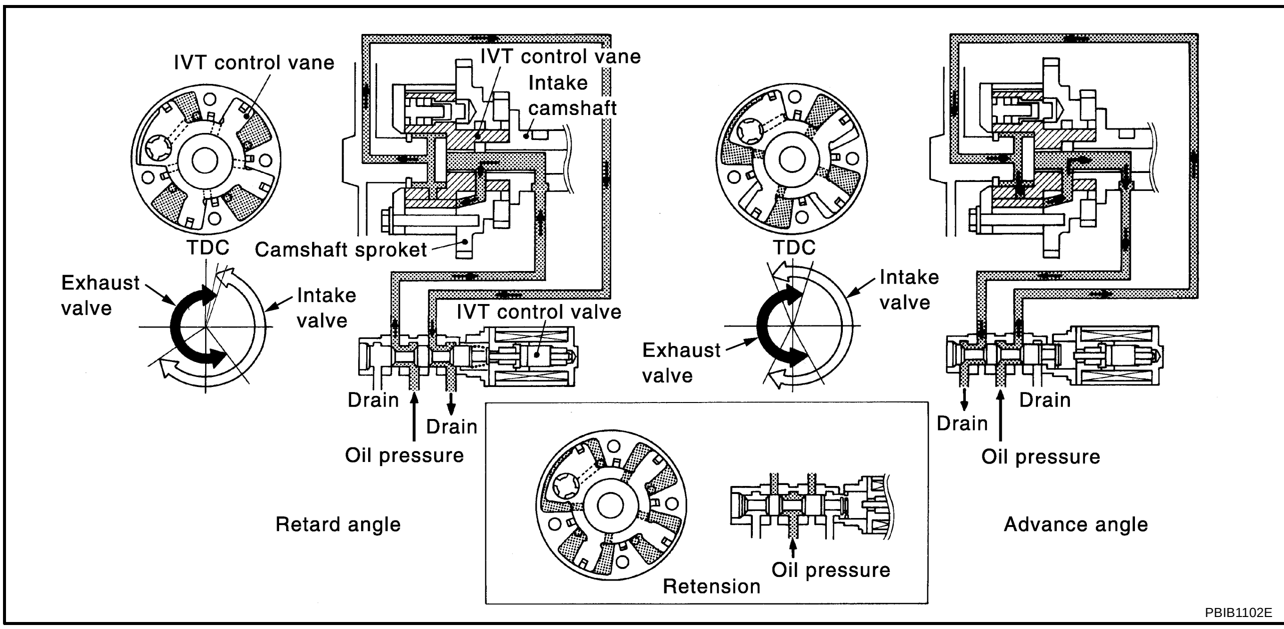
Description

ABS00CM4

SYSTEM DESCRIPTION

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed and piston position	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)			
Engine coolant temperature sensor	Engine coolant temperature		
Wheel sensor*	Vehicle speed		

*: This signal is sent to ECM through CAN communication line.



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CM5

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM (B1)	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	–5° - 5°CA
		When revving engine up to 2,000 rpm quickly.	Approx. 0° - 20°CA
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly.	Approx. 0% - 50%

On Board Diagnosis Logic

ABS00CM6

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • intake valve control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

FAIL-SAFE MODE

ECM enters fail-safe mode when the malfunction is detected.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function

DTC Confirmation Procedure

ABS00CM7

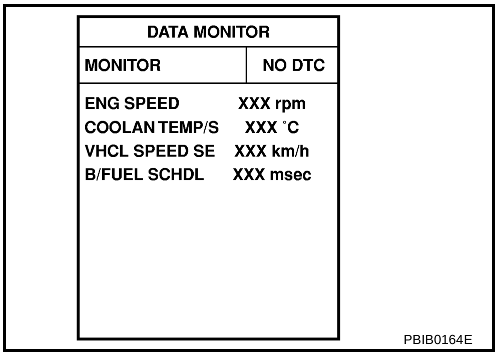
CAUTION:
Always drive at a safe speed.

NOTE:
- **If DTC P0011 is displayed with DTC P1111, first perform trouble diagnosis for DTC P1111. Refer to EC-166, "DTC P0011 IVT CONTROL" .**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 10 consecutive seconds.
   Hold the accelerator pedal as steady as possible.



PBIB0164E

ENG SPEED	500 - 2,000 rpm (A constant rotation is maintained.)
COOLAN TEMPS	60 - 120°C (158 - 248°F)
B/FUEL SCHDL	More than 7.26 msec
Shift lever	P or N (A/T) position Neutral (M/T) position

4. Let engine idle for 10 seconds.
5. If the 1st trip DTC is detected, go to EC-168, "Diagnostic Procedure" .
   If the 1st trip DTC is not detected, go to next step.
6. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMPS	70 - 105°C (158 - 221°F)
Shift lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

7. If the 1st trip DTC is detected, go to EC-168, "Diagnostic Procedure" .

WITH GST

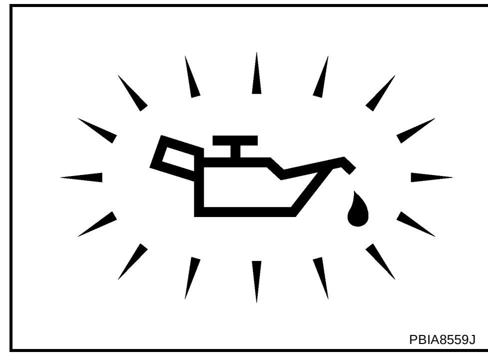
Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CM8

1. CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.



OK or NG

OK >> GO TO 2.
NG >> Go to LU-6, "OIL PRESSURE CHECK" .

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-169, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace intake valve timing control solenoid valve.

3. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-318, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace crankshaft position sensor (POS).

4. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-325, "Component Inspection" .

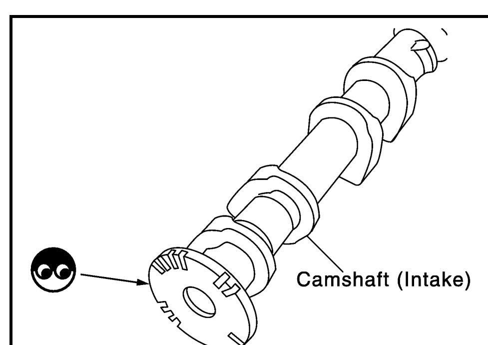
OK or NG

OK >> GO TO 5.
NG >> Replace camshaft position sensor (PHASE).

5. CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end



OK or NG

OK >> GO TO 6.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misaligned.
Are there any service records that may cause timing chain misaligned?

Yes or No

Yes >> Check timing chain installation. Refer to EM-49, "TIMING CHAIN" .
No >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to EM-45, "Inspection of Camshaft Sprocket (INT) Oil Groove" .

OK or NG

OK >> GO TO 8.
NG >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
For Wiring Diagram, refer to EC-313 for CKP sensor (POS) and EC-321 for CMP sensor (PHASE).

>> **INSPECTION END**

Component Inspection

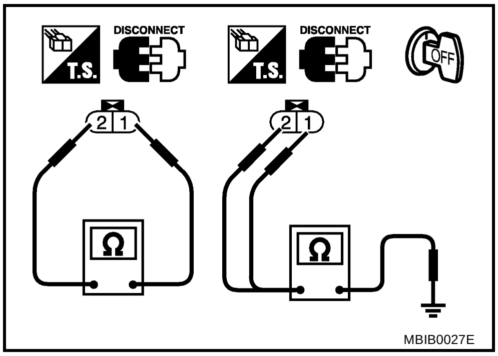
ABS00DCT

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	8Ω [at 20°C (68°F)]
1 or 2 and ground	∞ Ω (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve.
If OK, go to next step.

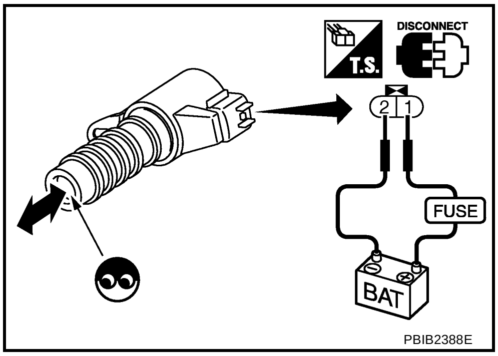


MBIB0027E

3. Remove intake valve timing control solenoid valve.
4. Provide 12V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
If NG, replace intake valve timing control solenoid valve.

NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.



PBIB2388E

Removal and Installation

ABS00DCU

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EM-49, "TIMING CHAIN" .

DTC P0031, P0032 HO2S1 HEATER

PFP:22690

Description

ABS00D68

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater control	Heated oxygen sensor 1 heater
Engine coolant temperature sensor	Engine coolant temperature		

The ECM performs ON/OFF duty control of the heated oxygen sensor 1 heater corresponding to the engine speed and engine coolant temperature. The duty percent varies with engine coolant temperature when engine is started.

OPERATION

Engine speed rpm	Heated oxygen sensor 1 heater
Above 3,600	OFF
Below 3,600 after warming up	ON

CONSULT-II Reference Value in Data Monitor Mode

ABS00D69

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	● Engine: After warming up ● Engine speed: Below 3,600 rpm	ON
	● Engine speed: Above 3,600 rpm	OFF
O2SEN HTR DTY	● Engine coolant temperature when engine started: More than 80°C (176°F) ● Engine speed: Below 3,600 rpm	Approx. 50%

On Board Diagnosis Logic

ABS00D6A

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0031 0031	Heated oxygen sensor 1 heater control circuit low	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	● Harness or connectors (The heated oxygen sensor 1 heater circuit is open or shorted.) ● Heater oxygen sensor 1 heater
P0032 0032	Heated oxygen sensor 1 heater control circuit high	The current amperage in the heated oxygen sensor 1 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 1 heater.)	● Harness or connectors (The heated oxygen sensor 1 heater circuit is shorted.) ● Heater oxygen sensor 1 heater

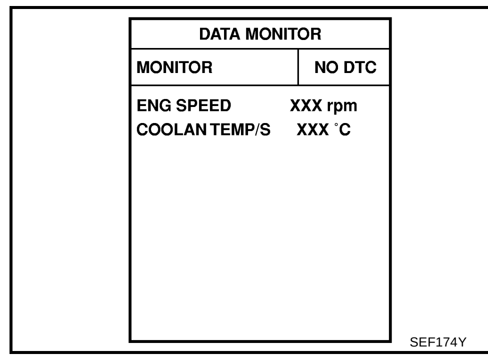
DTC Confirmation Procedure

ABS00D6B

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and run it for at least 6 seconds at idle speed.
5. If 1st trip DTC is detected, go to EC-173, "Diagnostic Procedure".

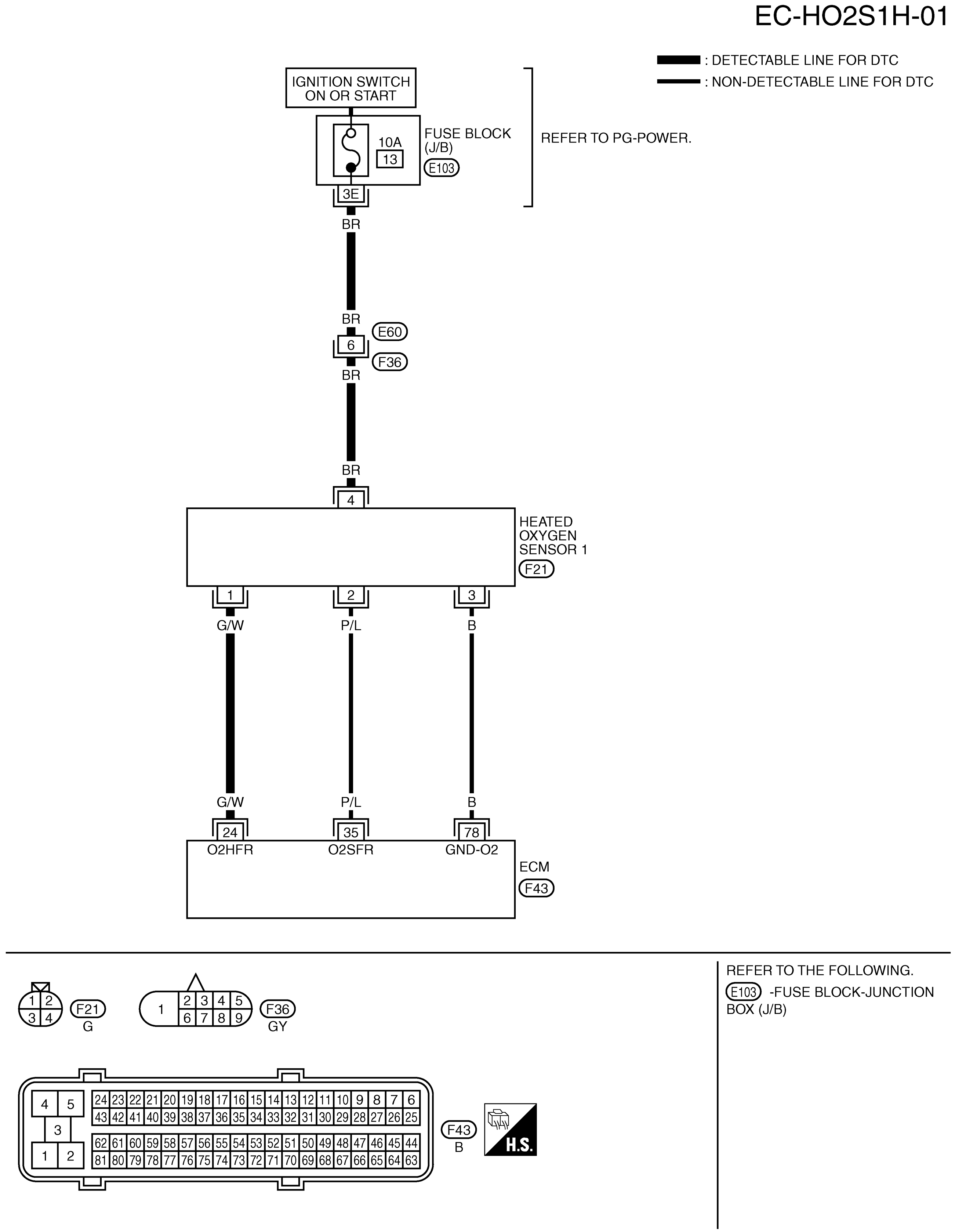


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00D6C

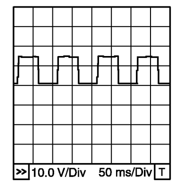


TBWB0109E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
24	G/W	Heated oxygen sensor 1 heater	**[Engine is running]** ● **Warm-up condition** ● Engine speed: Below 3,600 rpm.	Approximately 7.0V★  10.0 V/Div 50 ms/Div T PBIB0519E
			[Engine is running] ● Engine speed: Above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

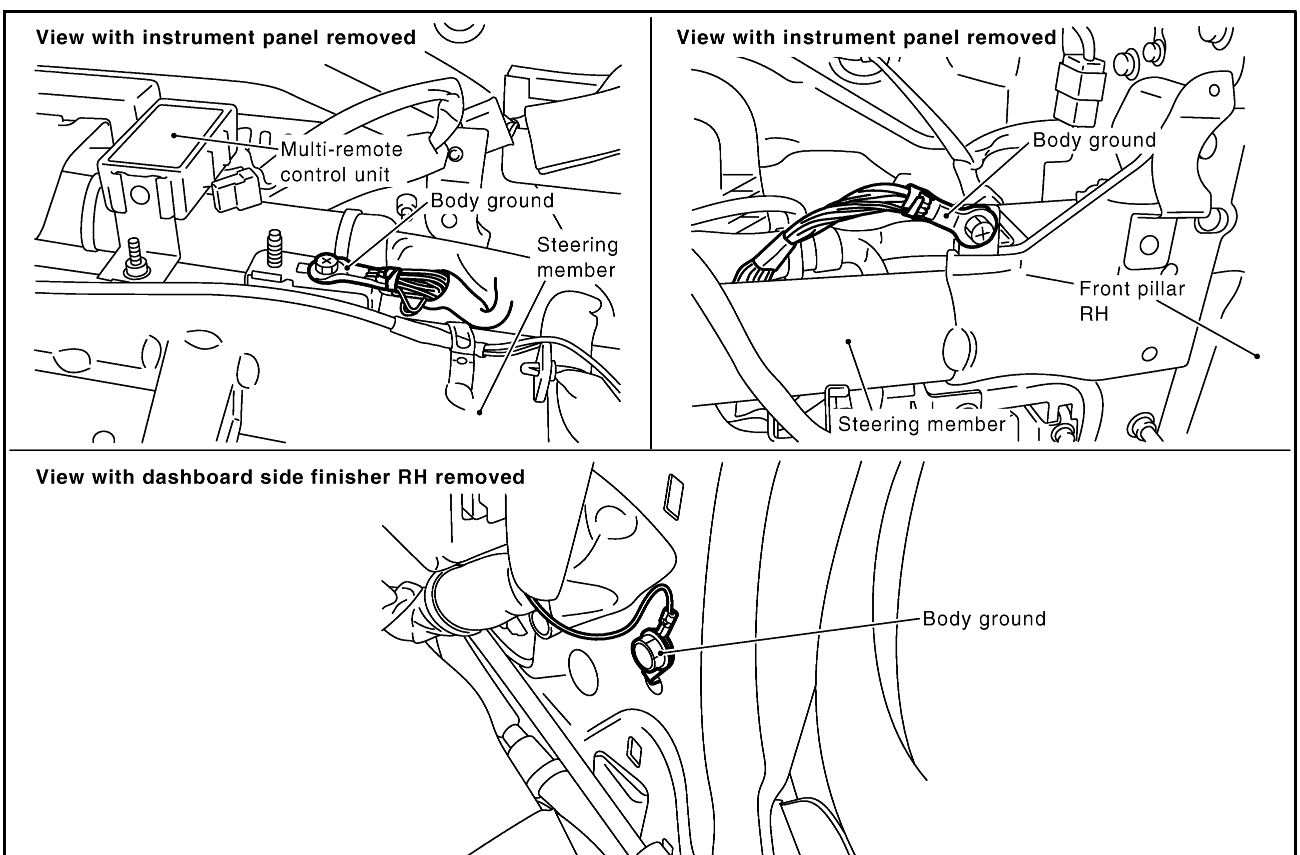
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D82

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



PBIB2353E

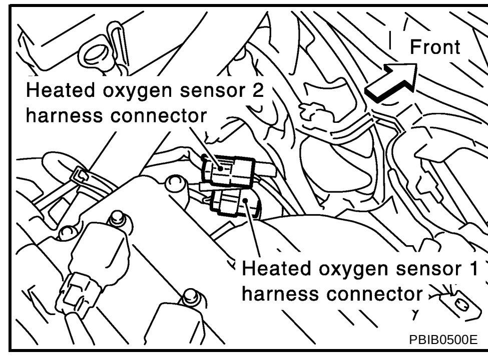
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

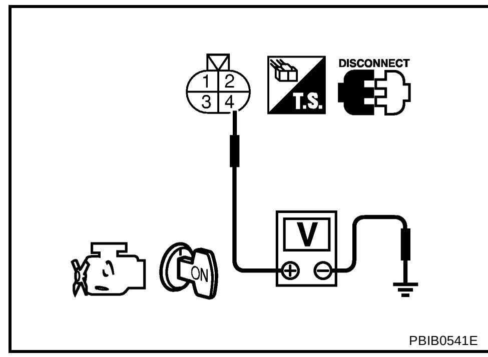
2. CHECK HO2S1 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Turn ignition switch ON.



3. Check voltage between HO2S1 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E60, F36
- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between heated oxygen sensor 1 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S1 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 24 and HO2S1 terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-175, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00D6E

HEATED OXYGEN SENSOR 1 HEATER

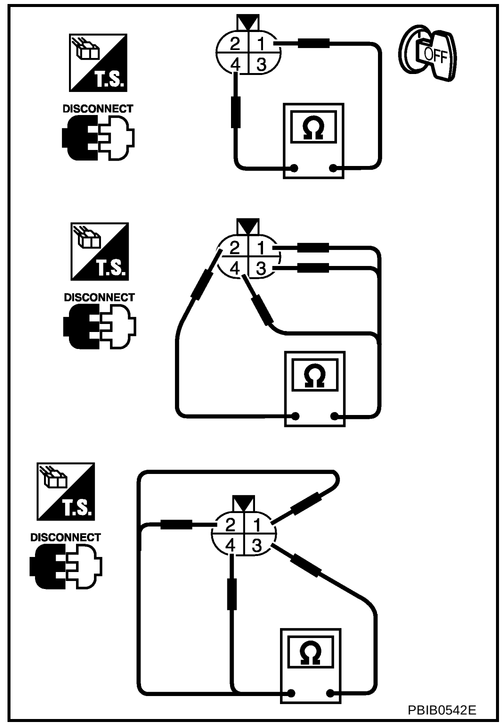
1. Check resistance between HO2S1 terminals as follows.

Terminal No.	Resistance
1 and 4	3.3 - 4.0 Ω [at 25°C (77°F)]
2 and 1, 3, 4	∞ Ω (Continuity should not exist)
3 and 1, 2, 4	

2. If NG, replace heated oxygen sensor 1.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**



PBIB0542E

Removal and Installation

ABS00D6F

HEATED OXYGEN SENSOR 1

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

DTC P0037, P0038 HO2S2 HEATER

PFP:226A0

Description

ABS00CM9

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater control	Heated oxygen sensor 2 heater
Crankshaft position sensor (POS)			
Engine coolant temperature sensor	Engine coolant temperature		
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater corresponding to the engine speed, amount of intake air and engine coolant temperature.

OPERATION

Engine speed rpm	Heated oxygen sensor 2 heater
Above 3,600	OFF
● Below 3,600 rpm after the following conditions are met. ● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load	ON

CONSULT-II Reference Value in Data Monitor Mode

ABS00CMA

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	● Engine speed: Below 3,600 rpm after the following conditions are met ● Engine: After warming up ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	ON
	● Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

ABS00CMB

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0037 0037	Heated oxygen sensor 2 heater control circuit low	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively low voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	● Harness or connectors (The heated oxygen sensor 2 heater circuit is open or shorted.) ● Heater oxygen sensor 2 heater
P0038 0038	Heated oxygen sensor 2 heater control circuit high	The current amperage in the heated oxygen sensor 2 heater circuit is out of the normal range. (An excessively high voltage signal is sent to ECM through the heated oxygen sensor 2 heater.)	● Harness or connectors (The heated oxygen sensor 2 heater circuit is shorted.) ● Heater oxygen sensor 2 heater

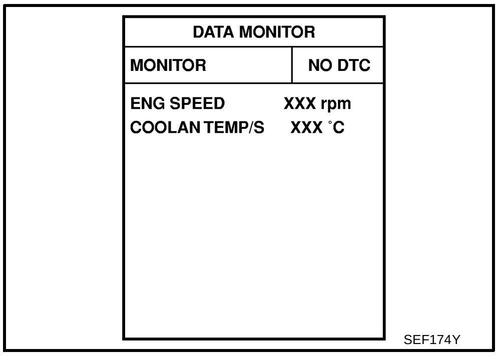
DTC Confirmation Procedure

ABS00CMC

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. If 1st trip DTC is detected, go to EC-179, "Diagnostic Procedure".



SEF174Y

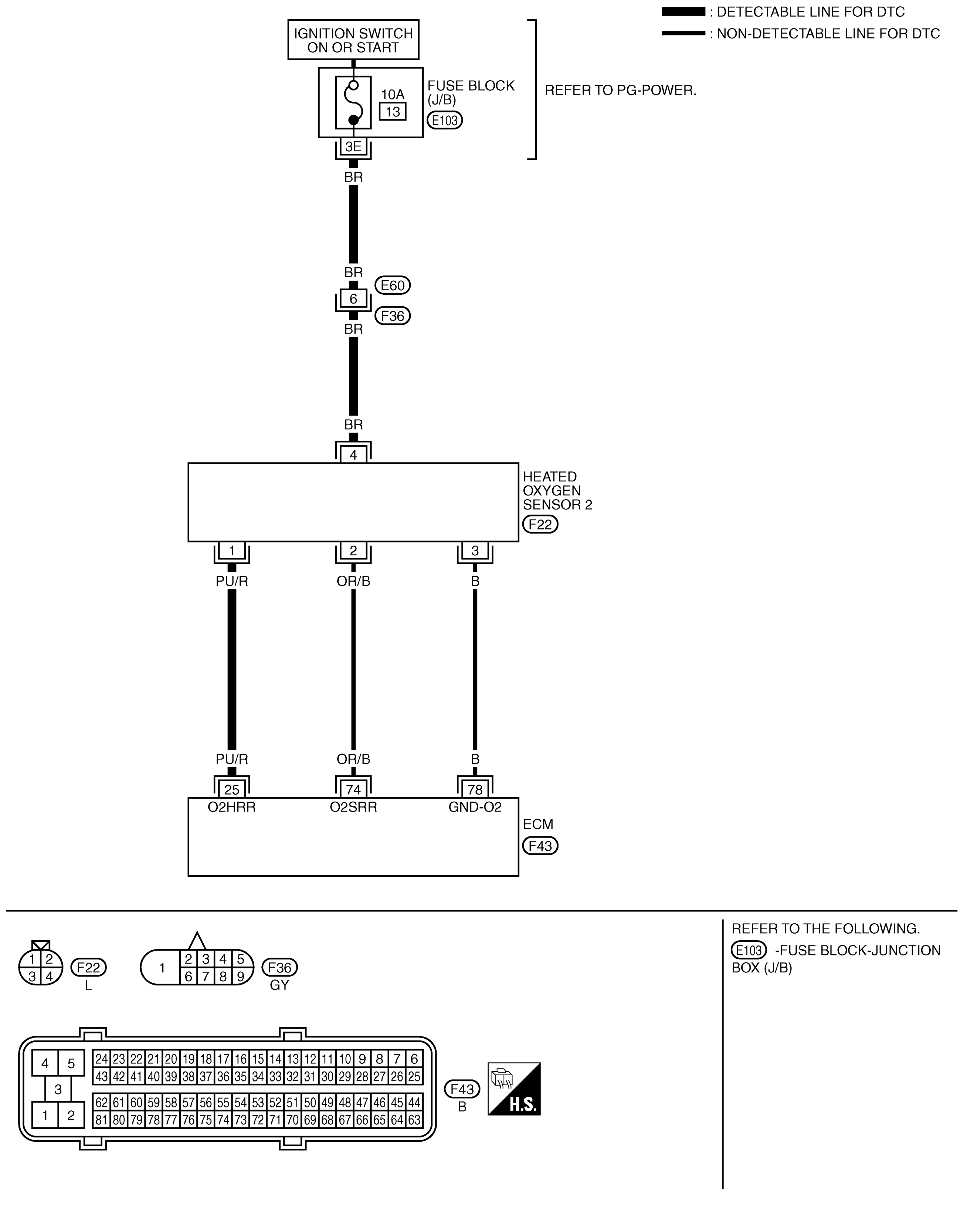
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CMD

EC-HO2S2H-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

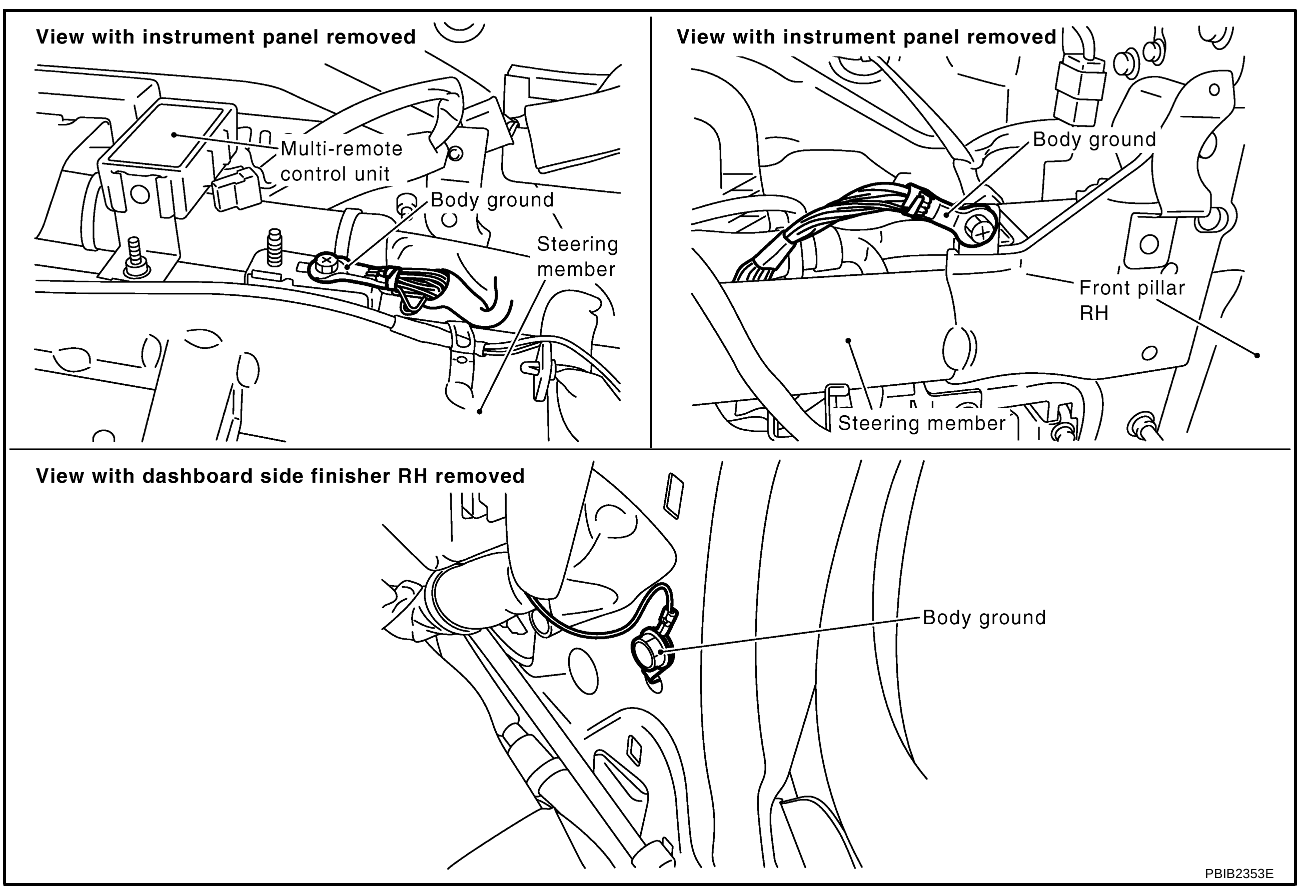
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
25	PU/R	Heated oxygen sensor 2 heater	**[Engine is running]** ● **Warm-up condition** ● Engine speed: Below 3,600 rpm after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under on load	0 - 1.0V
			[Ignition switch: ON] ● Engine stopped. **[Engine is running]** ● Engine speed: Above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00D83

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



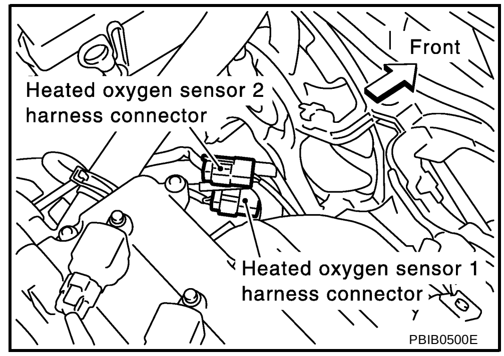
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

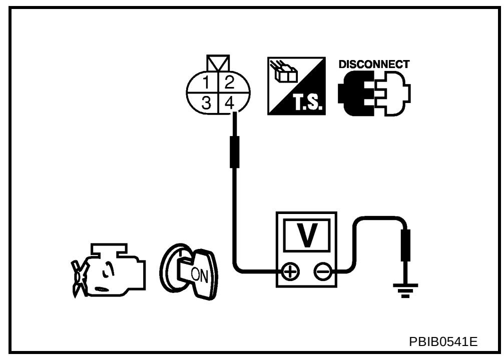
2. CHECK HO2S2 POWER SUPPLY CIRCUIT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Turn ignition switch ON.



3. Check voltage between HO2S2 terminal 4 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E60, F36
- Fuse block (J/B) connector E103
- 10A fuse
- Harness for open or short between heated oxygen sensor 2 and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 25 and HO2S2 terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2 HEATER

Refer to EC-181, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00CMF

HEATED OXYGEN SENSOR 2 HEATER

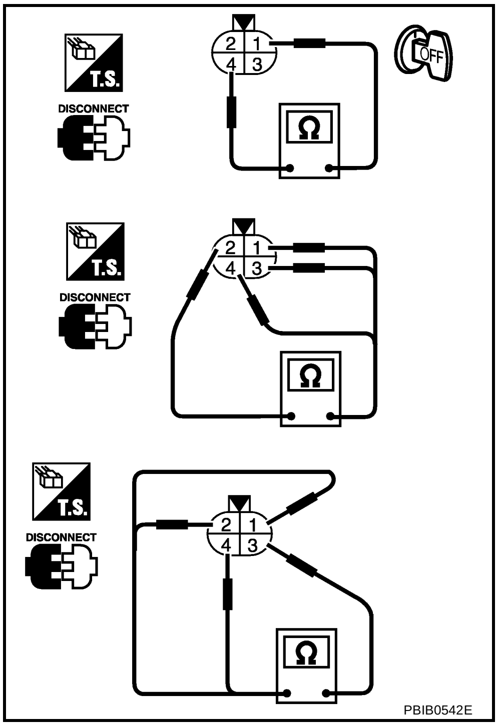
1. Check resistance between HO2S2 terminals as follows.

Terminal No.	Resistance
1 and 4	5.0 - 7.0 Ω [at 25°C (77°F)]
2 and 1, 3, 4	∞ Ω (Continuity should not exist)
3 and 1, 2, 4	

2. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**



PBIB0542E

Removal and Installation

ABS00CMG

HEATED OXYGEN SENSOR 2

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

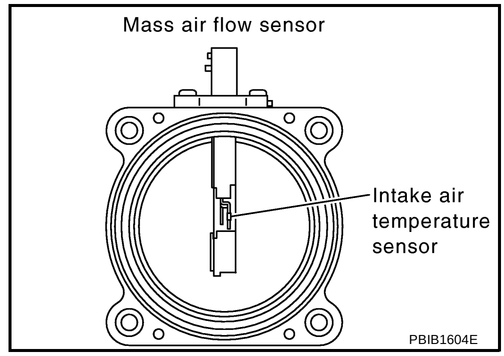
DTC P0101 MAF SENSOR

PFP:22680

Component Description

ABS00CMH

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.
Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CMI

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	See EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .		
CAL/LD VALUE	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s

On Board Diagnosis Logic

ABS00CMJ

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0101 0101	Mass air flow sensor circuit range/performance problem	A)	A high voltage from the sensor is sent to ECM under light load driving condition.	● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor ● EVAP control system pressure sensor ● Intake air temperature sensor
		B)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air leaks ● Mass air flow sensor ● EVAP control system pressure sensor ● Intake air temperature sensor

DTC Confirmation Procedure

ABS00CMK

Perform PROCEDURE FOR MALFUNCTION A first.
If the 1st trip DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B.

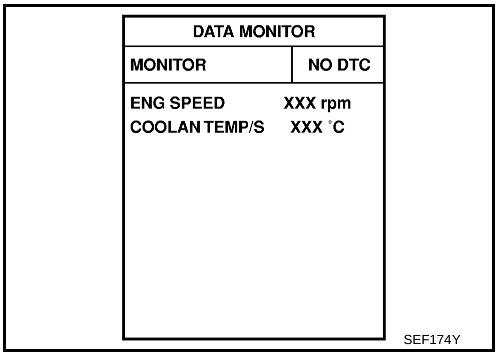
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

NOTE:
If engine will not start or stops soon, wait at least 10 seconds with engine stopped (Ignition switch ON) instead of running engine at idle speed.

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and warm it up to normal operating temperature.
4. Run engine for at least 10 seconds at idle speed.
5. If 1st trip DTC is detected, go to EC-186, "Diagnostic Procedure" .



With GST

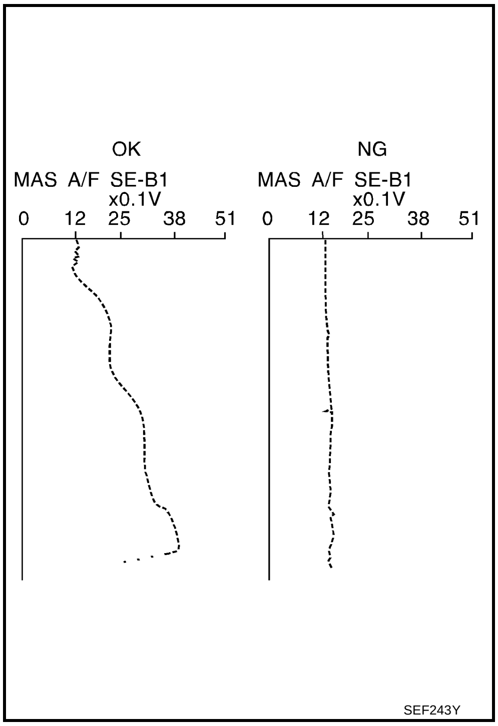
Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR MALFUNCTION B

CAUTION:
Always drive vehicle at a safe speed.

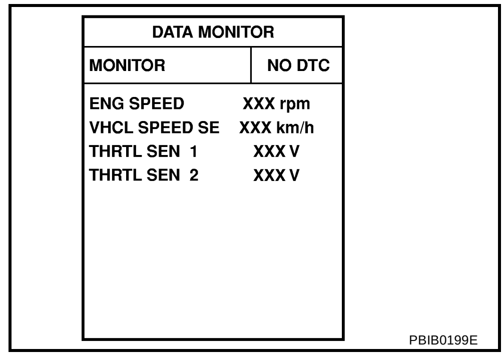
With CONSULT-II

1. Turn ignition switch ON.
2. Start engine and warm it up to normal operating temperature.
   If engine cannot be started, go to EC-186, "Diagnostic Procedure" .
3. Select “DATA MONITOR” mode with CONSULT-II.
4. Check the voltage of “MAS A/F SE-B1” with “DATA MONITOR”.
5. Increases engine speed to about 4,000 rpm.
6. Monitor the linear voltage rise in response to engine speed increases.
   If NG, go to EC-186, "Diagnostic Procedure" .
   If OK, go to following step.



7. Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL SEN 1	More than 3V
THRTL SEN 2	More than 3V
Shift lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.



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8. If 1st DTC is detected, go to EC-186, "Diagnostic Procedure" .

Overall Function Check

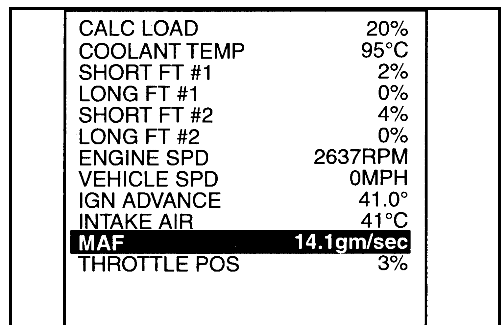
ABS00CML

PROCEDURE FOR MALFUNCTION B

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st tip DTC might not be confirmed.

With GST

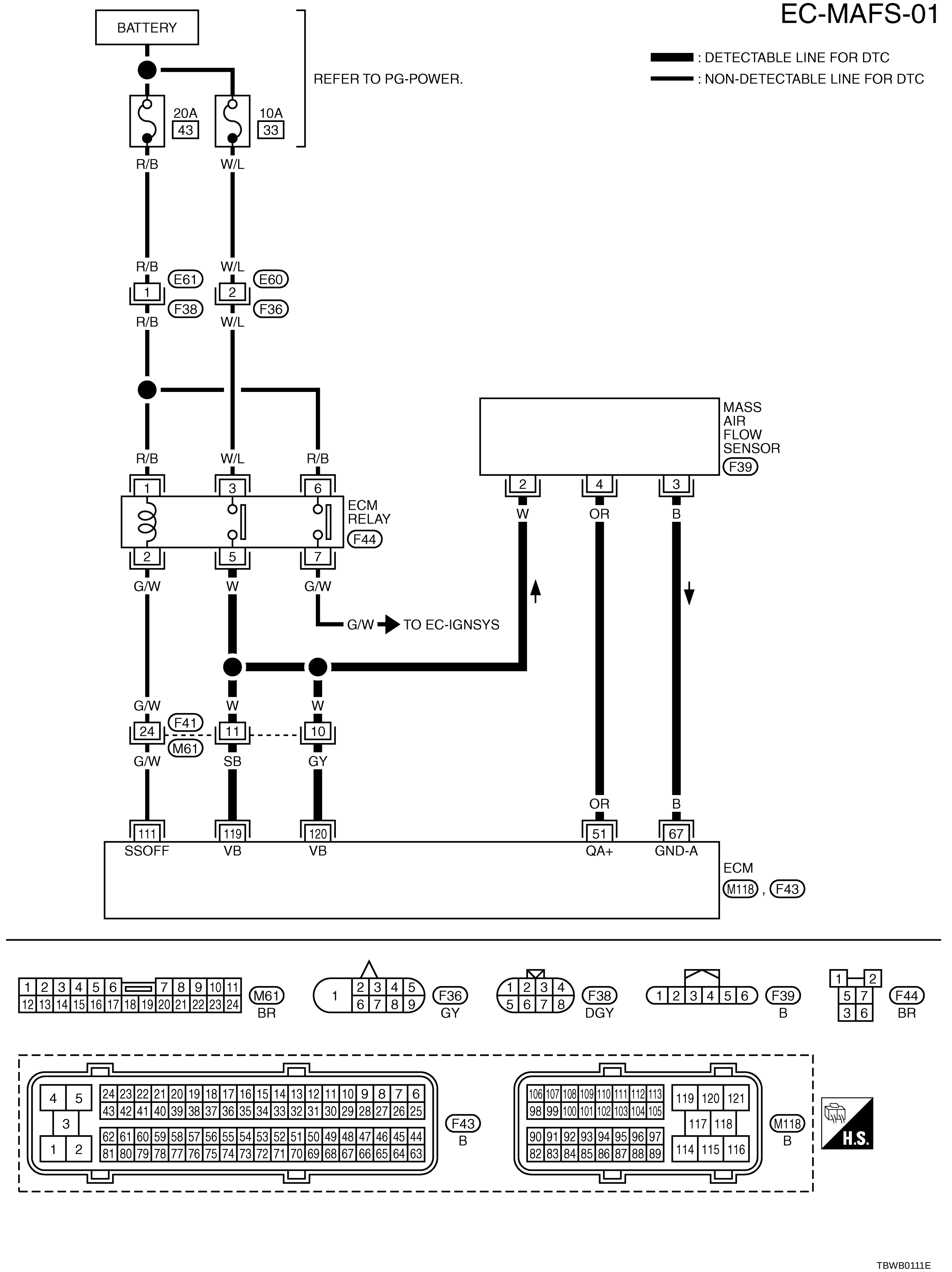
1. Start engine and warm it up to normal operating temperature.
2. Select Service $01 with GST.
3. Check the mass air flow sensor signal with Service $01.
4. Check for linear mass air flow sensor signal value rise in response to increases to about 4,000 rpm in engine speed.
5. If NG, go to EC-186, "Diagnostic Procedure" .



SEF534P

Wiring Diagram

ABS00CMM



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	OR	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.9 - 1.1V
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,500 rpm.	1.6 - 1.9V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00CMN

1. INSPECTION START

Which malfunction (A or B) is duplicated?

A or B

A >> GO TO 3.
B >> GO TO 2.

2. CHECK INTAKE AIR LEAK

Check the following for connections.

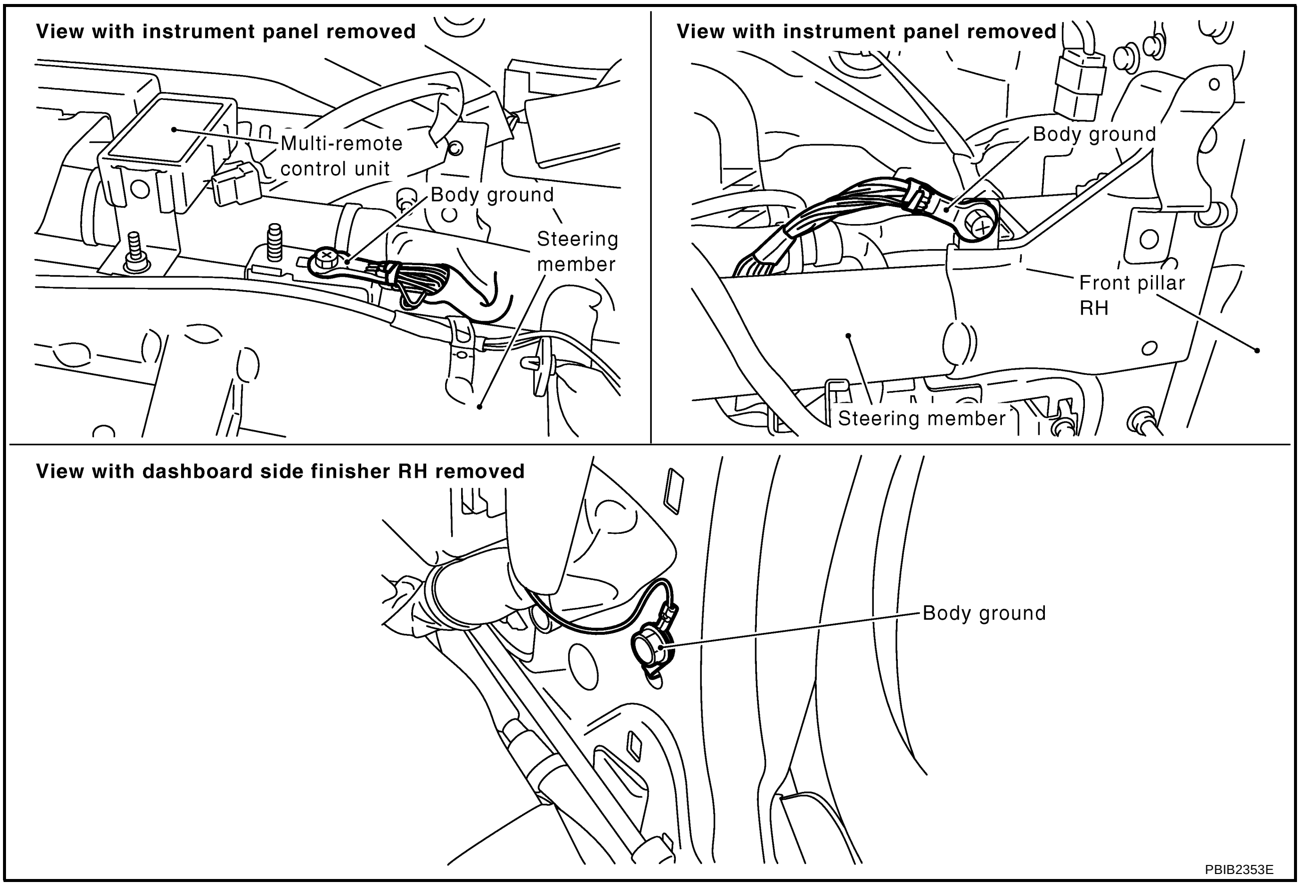
- Air duct
- Vacuum hoses
- Intake air passage between air duct and intake manifold

OK or NG

OK >> GO TO 3.
NG >> Reconnect the parts.

3. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .

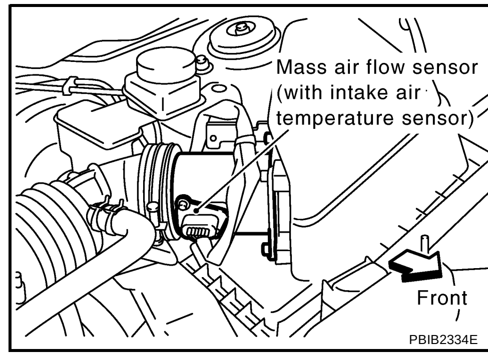


OK or NG

OK >> GO TO 4.
NG >> Repair or replace ground connections.

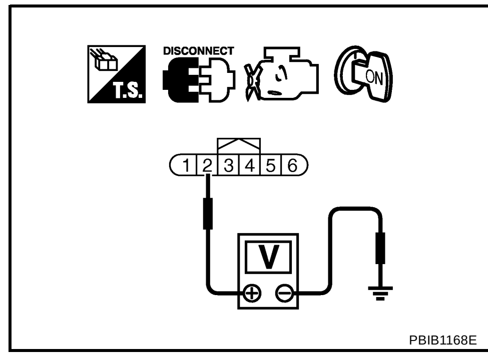
4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between MAF sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness for open or short between MAF sensor and ECM relay
- Harness for open or short between MAF sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 67.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 51.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-204, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace intake air temperature sensor.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-364, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor.

10. CHECK MASS AIR FLOW SENSOR

Refer to EC-189, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace mass air flow sensor.

11. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00CMO

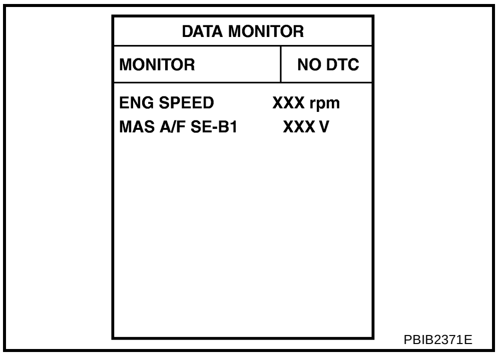
MASS AIR FLOW SENSOR

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-II and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication under the following conditions.

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
Idle to about 4,000 rpm*	0.9 - 1.1 to Approx. 2.4

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.



PBIB2371E

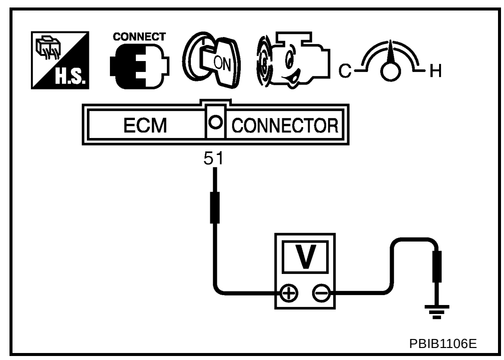
5. If the voltage is out of specification, proceed the following.
a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
   - Crushed air ducts
   - Malfunctioning seal of air cleaner element
   - Uneven dirt of air cleaner element
   - Improper specification of intake air system parts
b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again.
   If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor.

Without CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.

Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
Idle to about 4,000 rpm*	0.9 - 1.1 to Approx. 2.4

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.



4. If the voltage is out of specification, proceed the following.
a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
   - Crushed air ducts
   - Malfunctioning seal of air cleaner element
   - Uneven dirt of air cleaner element
   - Improper specification of intake air system parts
b. If NG, repair or replace malfunctioning part and perform step 2 to 3 again.
   If OK, go to next step.
5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor.

Removal and Installation

ABS00CMP

MASS AIR FLOW SENSOR

Refer to EM-14, "AIR CLEANER AND AIR DUCT" .

DTC P0102, P0103 MAF SENSOR

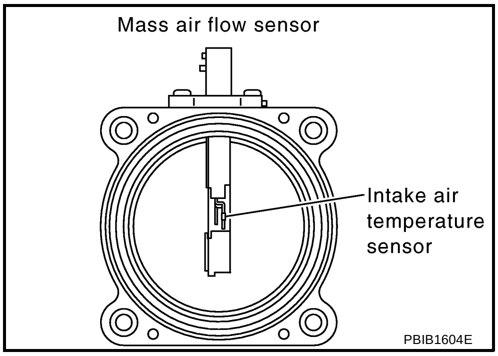
PFP:22680

Component Description

ABS00CMQ

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. The mass air flow sensor controls the temperature of the hot wire to a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the electric current supplied to hot wire is changed to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CMR

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAS A/F SE-B1	See EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .		
CAL/LD VALUE	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	10% - 35%
		2,500 rpm	10% - 35%
MASS AIRFLOW	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	1.0 - 4.0 g·m/s
		2,500 rpm	4.0 - 10.0 g·m/s

On Board Diagnosis Logic

ABS00CMS

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0102 0102	Mass air flow sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air leaks ● Mass air flow sensor
P0103 0103	Mass air flow sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

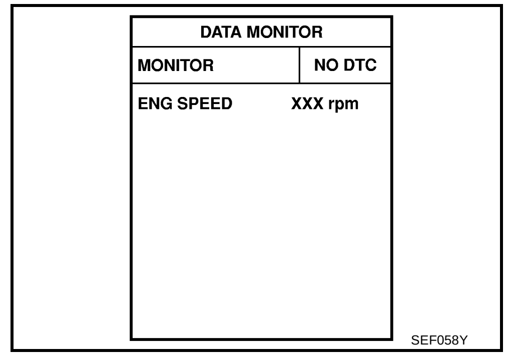
ABS00CMT

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P0102

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait at least 5 seconds.
4. If DTC is detected, go to EC-194, "Diagnostic Procure" .



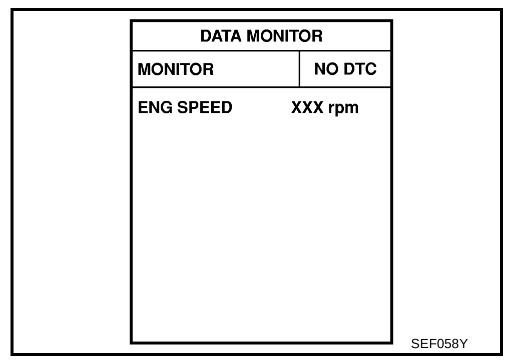
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR DTC P0103

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-194, "Diagnostic Procedure" .
   If DTC is not detected, go to next step.
5. Start engine and wait at least 5 seconds.
6. If DTC is detected, go to EC-194, "Diagnostic Procedure" .

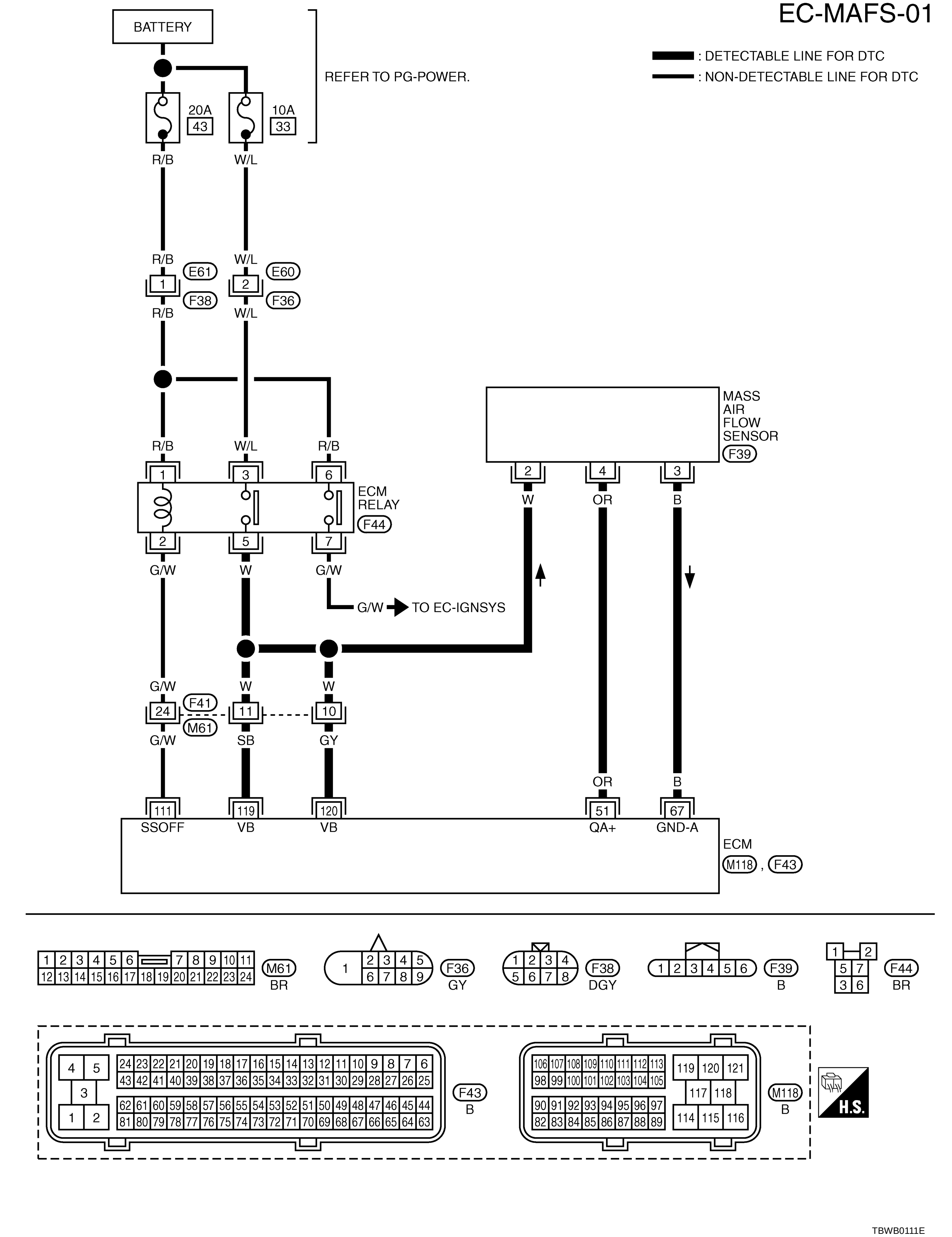


With GST

Follow the procedure “With CONSULT-II” above.

Wiring Diagram

ABS00CMU



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
51	OR	Mass air flow sensor	**[Engine is running]** ● **Warm-up condition** ● Idle speed	0.9 - 1.1V
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,500 rpm.	1.6 - 1.9V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00D84

1. INSPECTION START

Which malfunction (P0102 or P0103) is duplicated?

P0102 or P0103

P0102 >> GO TO 2.
P0103 >> GO TO 3.

2. CHECK INTAKE SYSTEM

Check the following for connection.

- Air duct
- Vacuum hoses
- Intake air passage between air duct to intake manifold

OK or NG

OK >> GO TO 3.
NG >> Reconnect the parts.

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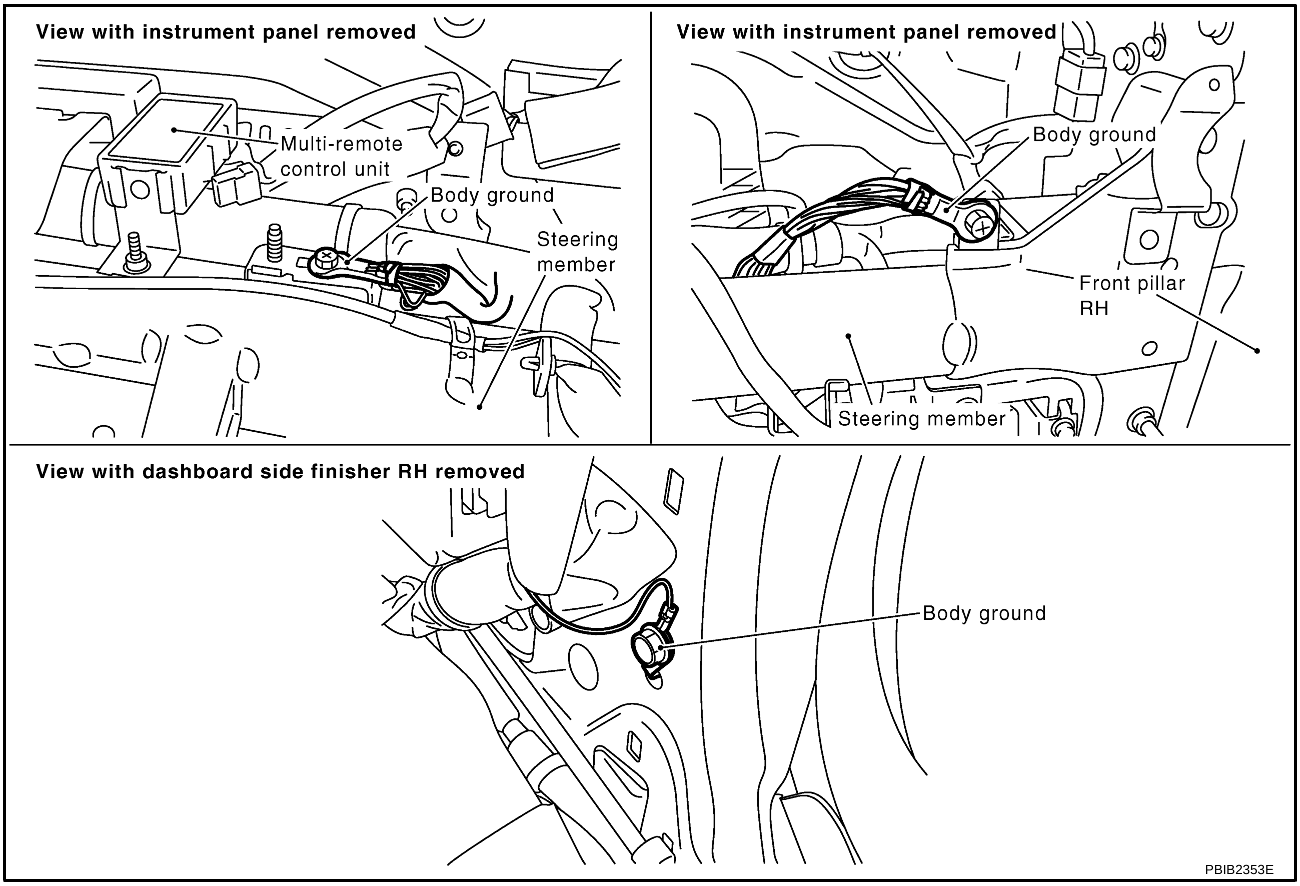
3. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .

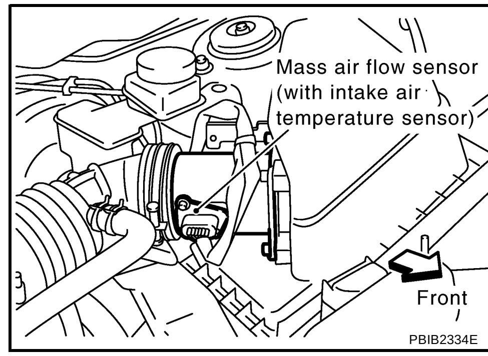


OK or NG

OK >> GO TO 4.
NG >> Repair or replace ground connections.

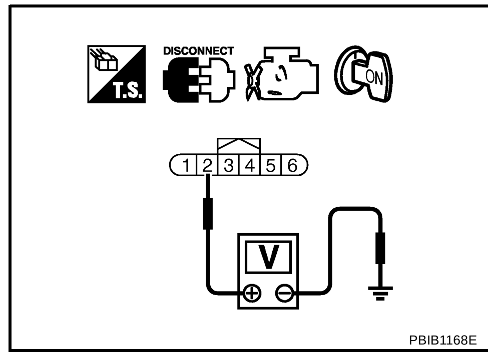
4. CHECK MAF SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between MAF sensor terminals 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness for open or short between MAF sensor and ECM
- Harness for open or short between MAF sensor and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK MAF SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 3 and ECM terminal 67.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK MAF SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between MAF sensor terminal 4 and ECM terminal 51.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to EC-197, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace mass air flow sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00CMW

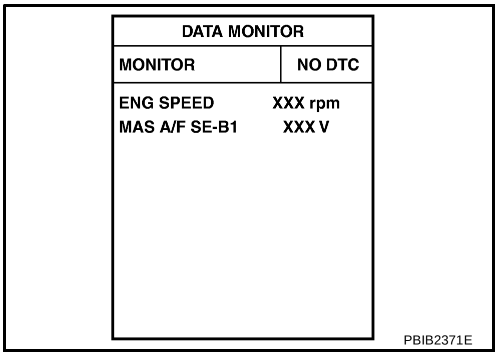
MASS AIR FLOW SENSOR

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Connect CONSULT-II and select “DATA MONITOR” mode.
4. Select “MAS A/F SE-B1” and check indication under the following conditions.

Condition	MAS A/F SE-B1 (V)
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
Idle to about 4,000 rpm*	0.9 - 1.1 to Approx. 2.4

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

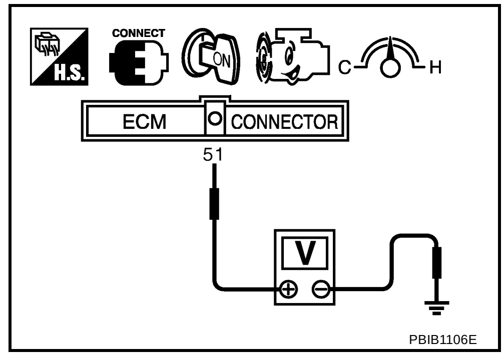


PBIB2371E

5. If the voltage is out of specification, proceed the following.
   a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
      - Crushed air ducts
      - Malfunctioning seal of air cleaner element
      - Uneven dirt of air cleaner element
      - Improper specification of intake air system parts
   b. If NG, repair or replace malfunctioning part and perform step 2 to 4 again.
      If OK, go to next step.
6. Turn ignition switch OFF.
7. Disconnect mass air flow sensor harness connector and reconnect it again.
8. Perform step 2 to 4 again.
9. If NG, clean or replace mass air flow sensor.

Without CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 51 (Mass air flow sensor signal) and ground.



Condition	Voltage V
Ignition switch ON (Engine stopped.)	Approx. 0.4
Idle (Engine is warmed-up to normal operating temperature.)	0.9 - 1.1
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 1.9
Idle to about 4,000 rpm*	0.9 - 1.1 to Approx. 2.4

*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.

4. If the voltage is out of specification, proceed the following.

a. Check for the cause of uneven air flow through mass air flow sensor. Refer to following.
   - Crushed air ducts
   - Malfunctioning seal of air cleaner element
   - Uneven dirt of air cleaner element
   - Improper specification of intake air system parts

b. If NG, repair or replace malfunctioning part and perform step 2 to 3 again.
   If OK, go to next step.

5. Turn ignition switch OFF.
6. Disconnect mass air flow sensor harness connector and reconnect it again.
7. Perform step 2 and 3 again.
8. If NG, clean or replace mass air flow sensor.

Removal and Installation

ABS00CMX

MASS AIR FLOW SENSOR

Refer to EM-14, "AIR CLEANER AND AIR DUCT" .

DTC P0112, P0113 IAT SENSOR

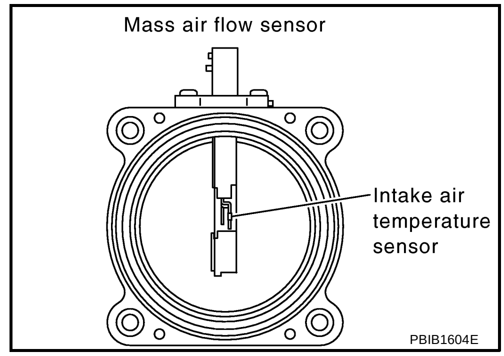
PFP:22630

Component Description

ABS00CMY

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

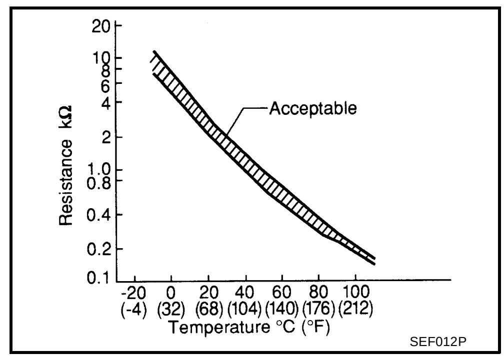


PBIB1604E

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.32	1.94 - 2.06
80 (176)	1.23	0.295 - 0.349

*: This data is reference value and is measured between ECM terminal 34 (Intake air temperature sensor) and ground.



SEF012P

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

ABS00CMZ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0112 0112	Intake air temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air temperature sensor
P0113 0113	Intake air temperature sensor circuit high input	An excessively low voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

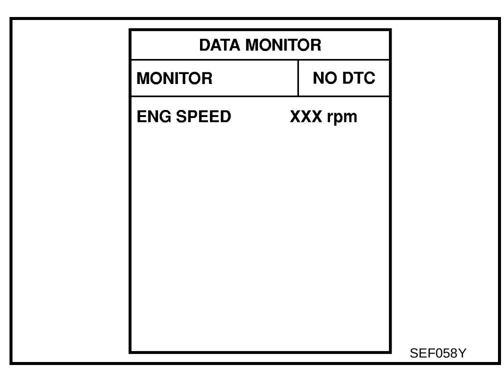
ABS00CN0

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-202, "Diagnostic Procedure".



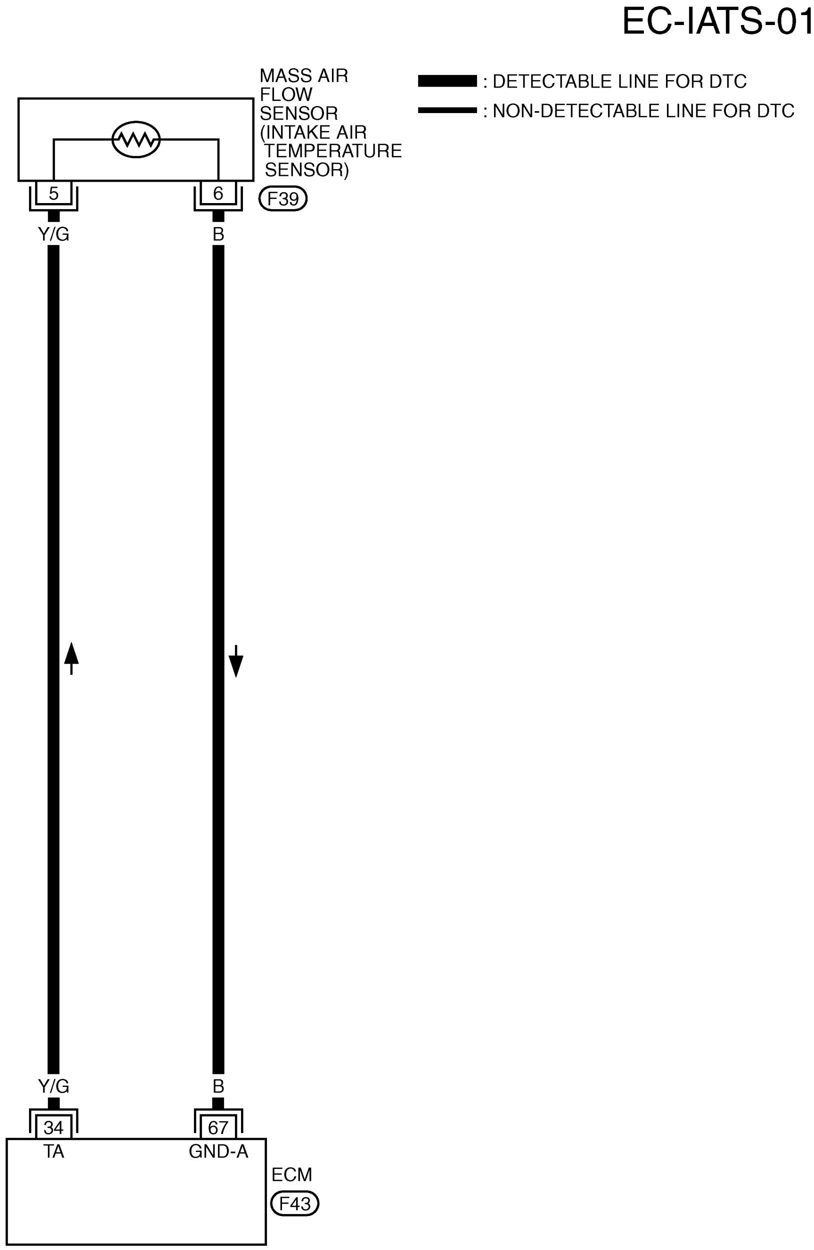
SEF058Y

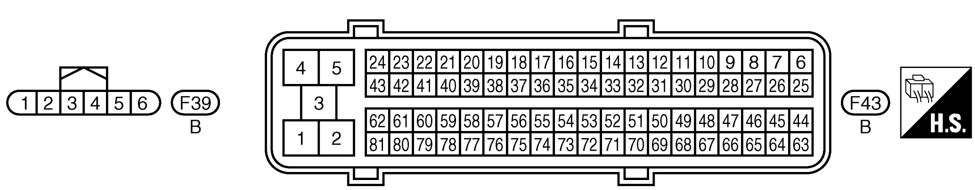
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CN1





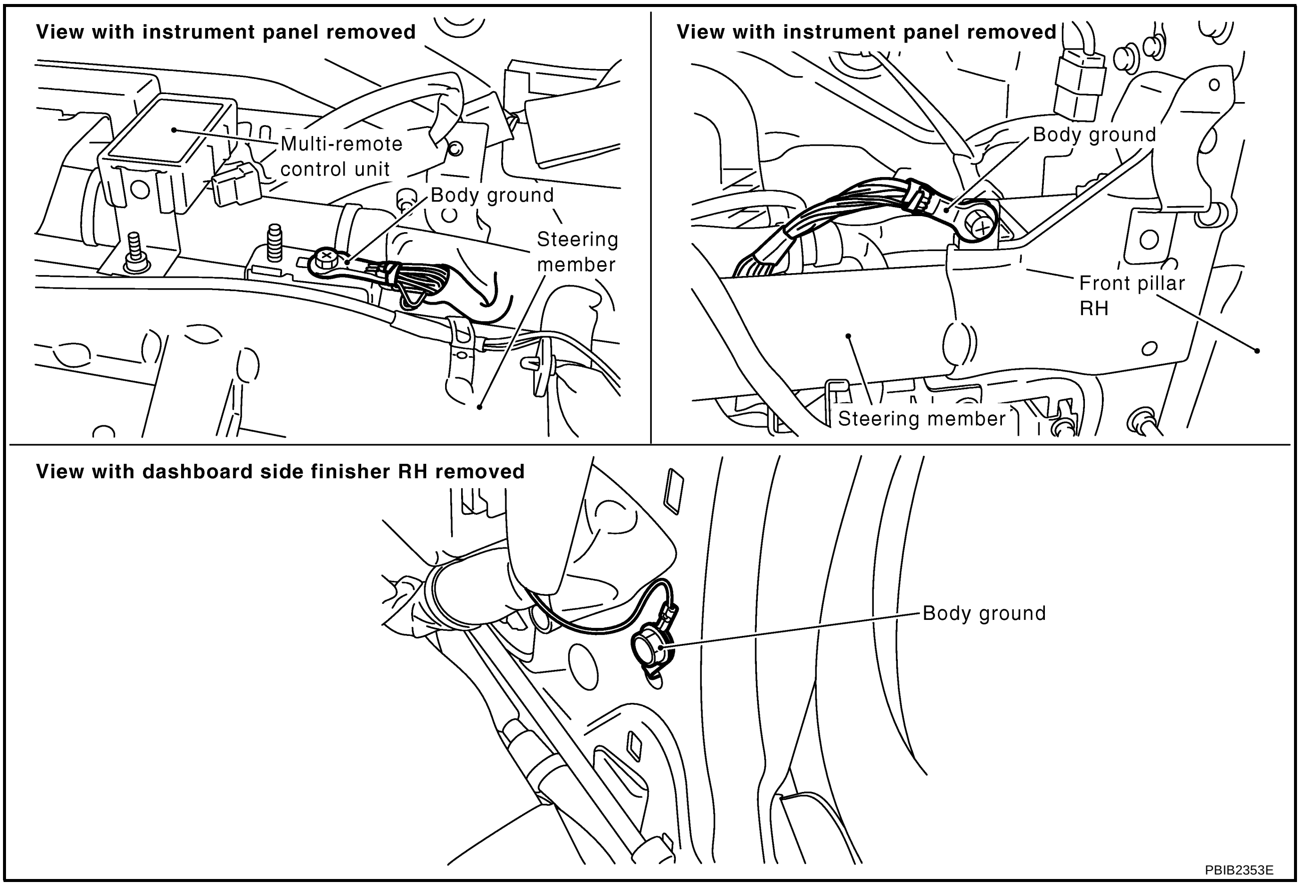
TBWB0112E

Diagnostic Procedure

ABS00D85

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .

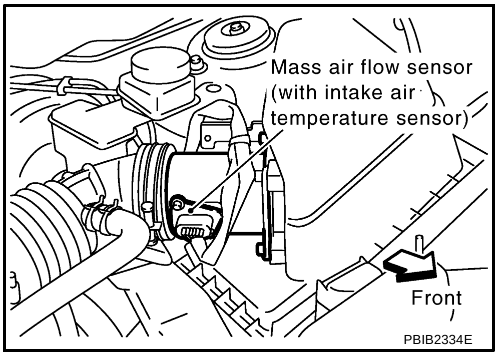


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

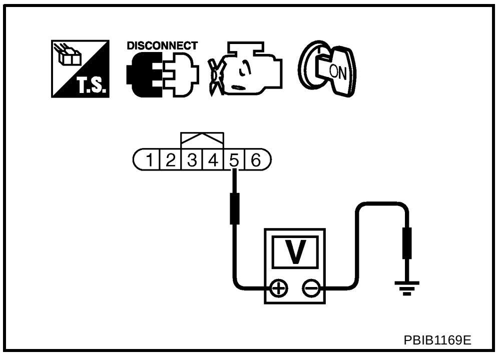
2. CHECK INTAKE AIR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect mass air flow (MAF) sensor (with intake air temperature sensor) harness connector.
2. Turn ignition switch ON.



3. Check voltage between MAF sensor terminal 5 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE AIR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between MAF sensor terminal 6 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-204, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace MAF sensor (with intake air temperature sensor).

5. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

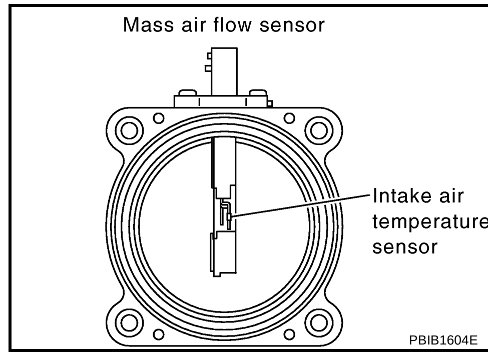
ABS00CN3

INTAKE AIR TEMPERATURE SENSOR

1. Check resistance between intake air temperature sensor terminals 5 and 6 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.94 - 2.06

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



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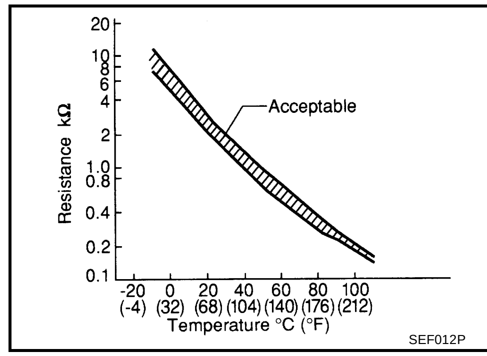


SEF012P

Removal and Installation

ABS00CN4

MASS AIR FLOW SENSOR

Refer to EM-14, "AIR CLEANER AND AIR DUCT" .

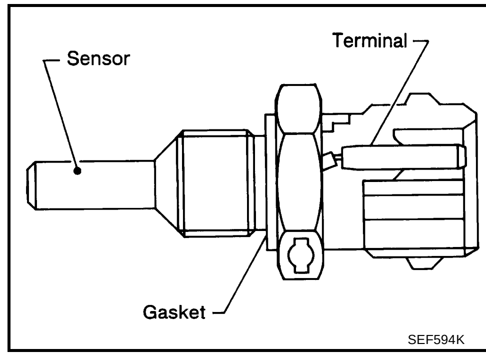
DTC P0117, P0118 ECT SENSOR

PFP:22630

Component Description

ABS00CN5

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

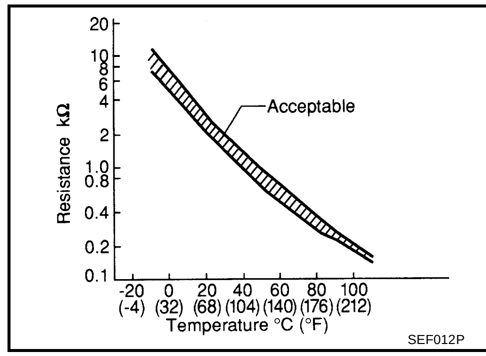


SEF594K

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



SEF012P

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

ABS00CN6

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P0117 0117	Engine coolant temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor
P0118 0118	Engine coolant temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

FAIL-SAFE MODE

When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

<table>
<tr><th>Detected items</th><th colspan="2">Engine operating condition in fail-safe mode</th></tr>
<tr><td rowspan="6">Engine coolant temperature sensor circuit</td><td colspan="2">Engine coolant temperature will be determined by ECM based on the time after turning ignition switch ON or START.
CONSULT-II displays the engine coolant temperature decided by ECM.</td></tr>
<tr><td>Condition</td><td>Engine coolant temperature decided (CONSULT-II display)</td></tr>
<tr><td>Just as ignition switch is turned ON or START</td><td>40°C (104°F)</td></tr>
<tr><td>More than approx. 4 minutes after ignition ON or START</td><td>80°C (176°F)</td></tr>
<tr><td>Except as shown above</td><td>40 - 80°C (104 - 176°F)
(Depends on the time)</td></tr>
<tr><td colspan="2">When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while engine is running.</td></tr>
</table>

DTC Confirmation Procedure

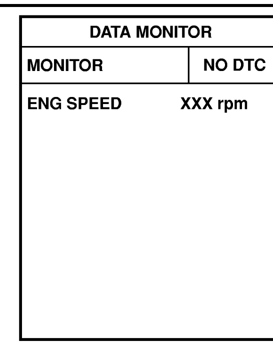
ABS00CN7

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If DTC is detected, go to EC-208, "Diagnostic Procedure" .



SEF058Y

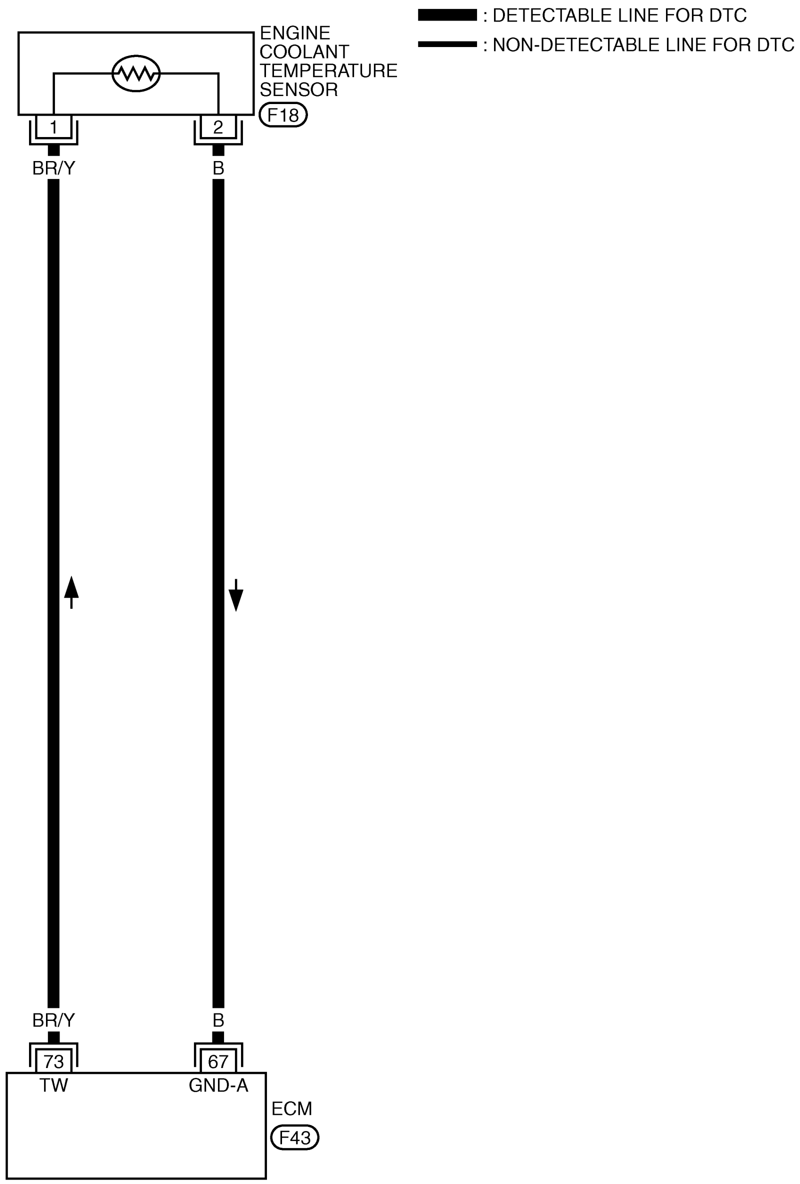
WITH GST

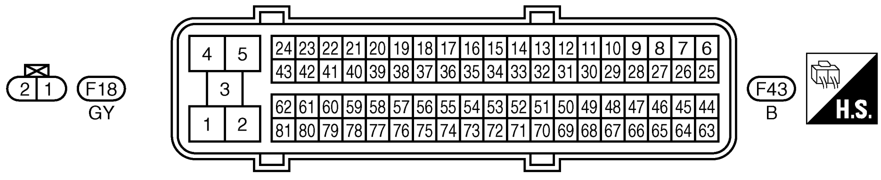
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CN8

EC-ECTS-01





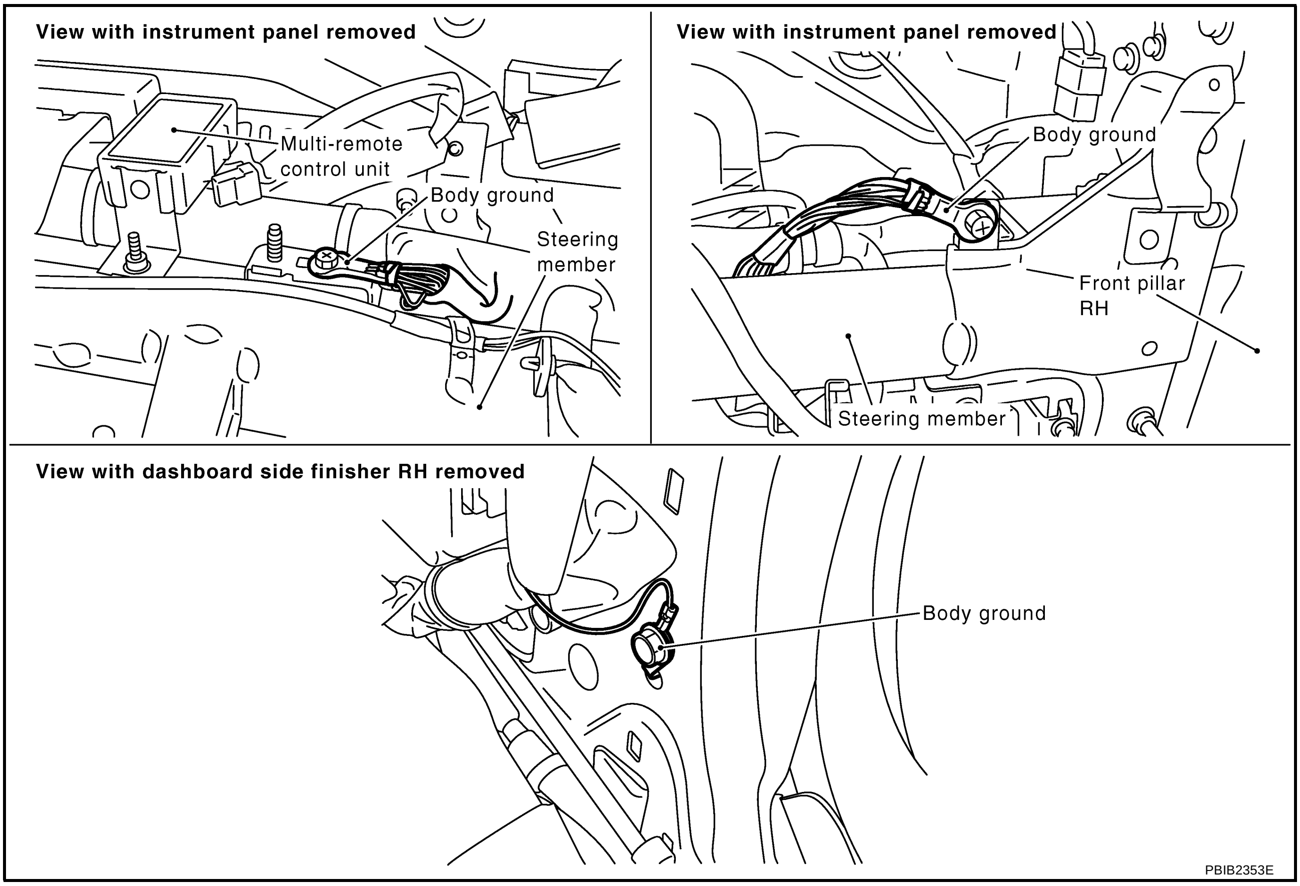
TBWB0113E

Diagnostic Procedure

ABS00D86

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .

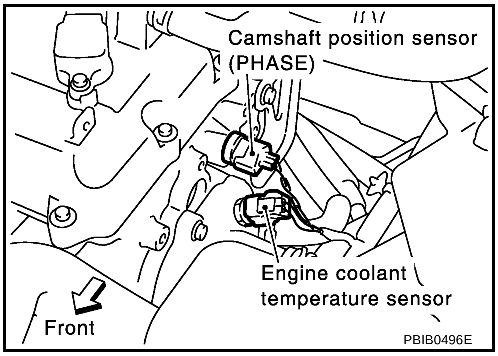


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

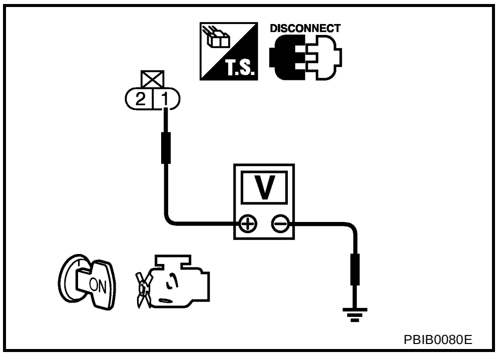
2. CHECK ECT SENSOR POWER SUPPLY CIRCUIT

1. Disconnect engine coolant temperature (ECT) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between ECT sensor terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK ECT SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECT sensor terminal 2 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-210, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace engine coolant temperature sensor.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

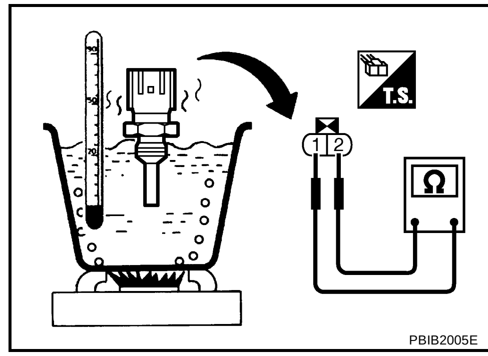
>> **INSPECTION END**

Component Inspection

ABS00CNA

ENGINE COOLANT TEMPERATURE SENSOR

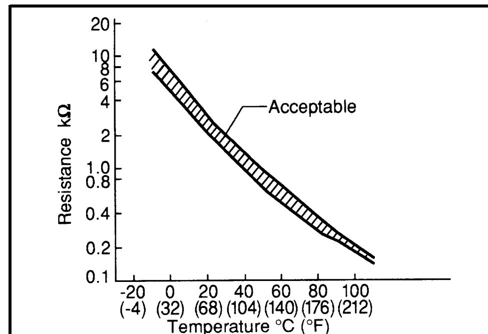
1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



PBIB2005E

<Reference data>

Engine coolant temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF012P

2. If NG, replace engine coolant temperature sensor.

Removal and Installation

ABS00CNB

ENGINE COOLANT TEMPERATURE SENSOR

Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .

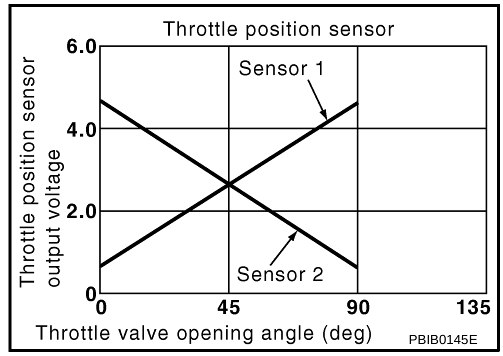
DTC P0122, P0123 TP SENSOR

PFP:16119

Component Description

ABS00CNC

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CND

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN 1 THRTL SEN 2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T), 1ST (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. thus it differs from ECM terminal voltage signal.

On Board Diagnosis Logic

ABS00CNE

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0122 0122	Throttle position sensor 2 circuit low input	An excessively low voltage from the TP sensor 2 is sent to ECM.	● Harness or connectors (The TP sensor 2 circuit is open or shorted.) (The APP sensor 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 2) ● Accelerator pedal position sensor (APP sensor 2)
P0123 0123	Throttle position sensor 2 circuit high input	An excessively high voltage from the TP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

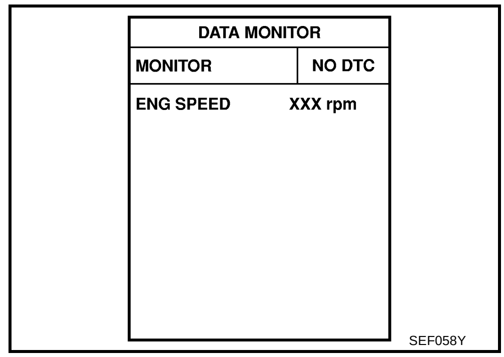
DTC Confirmation Procedure

ABS00CNF

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-215, "Diagnostic Procedure" .



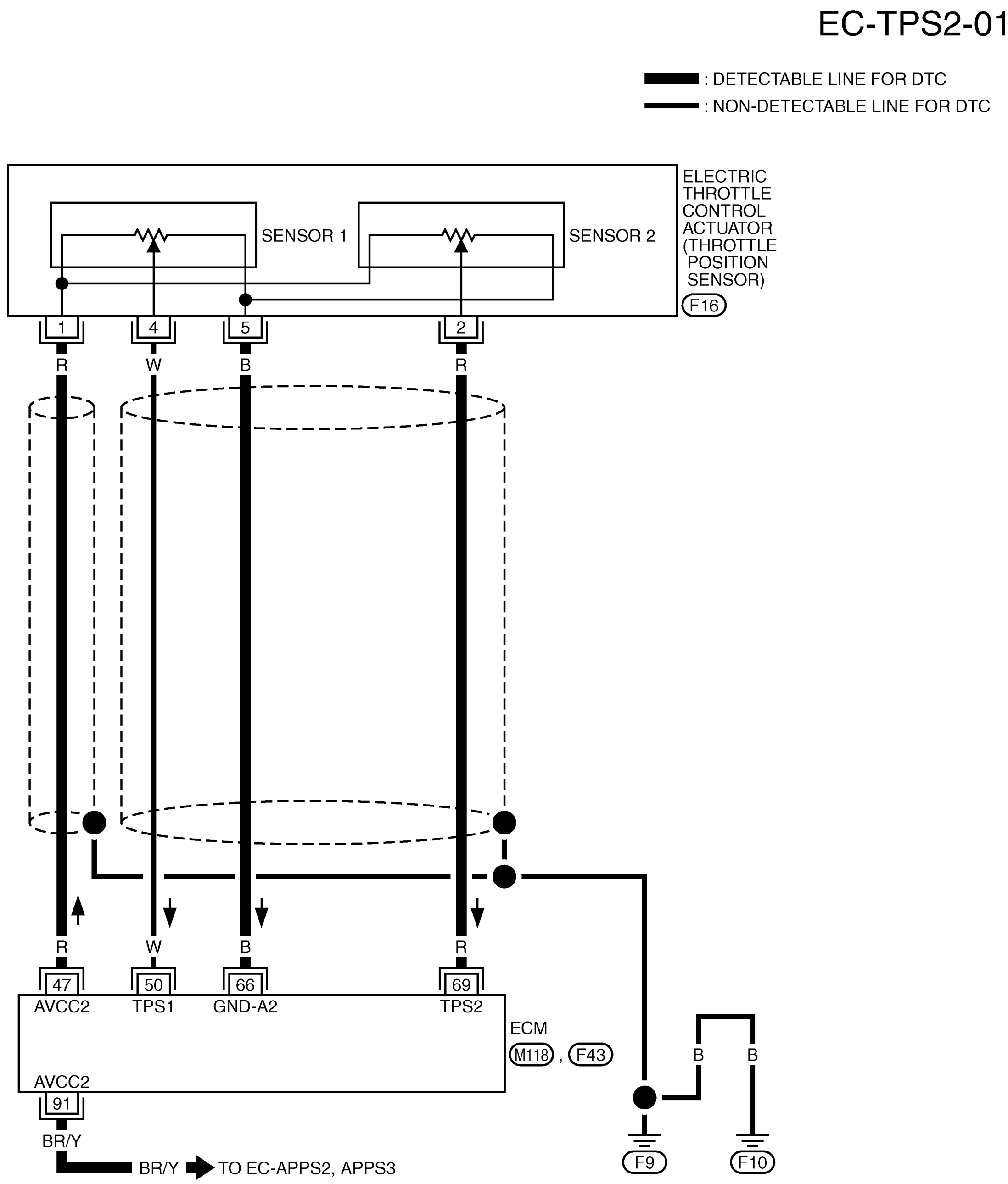
SEF058Y

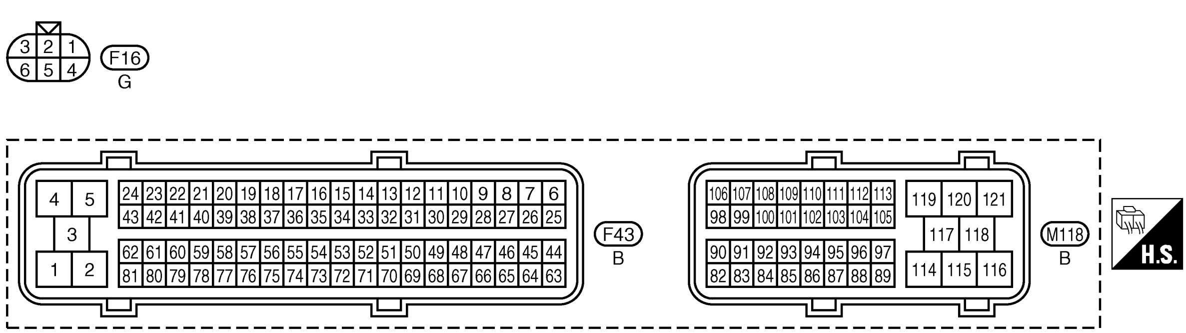
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CNG





TBWB0114E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

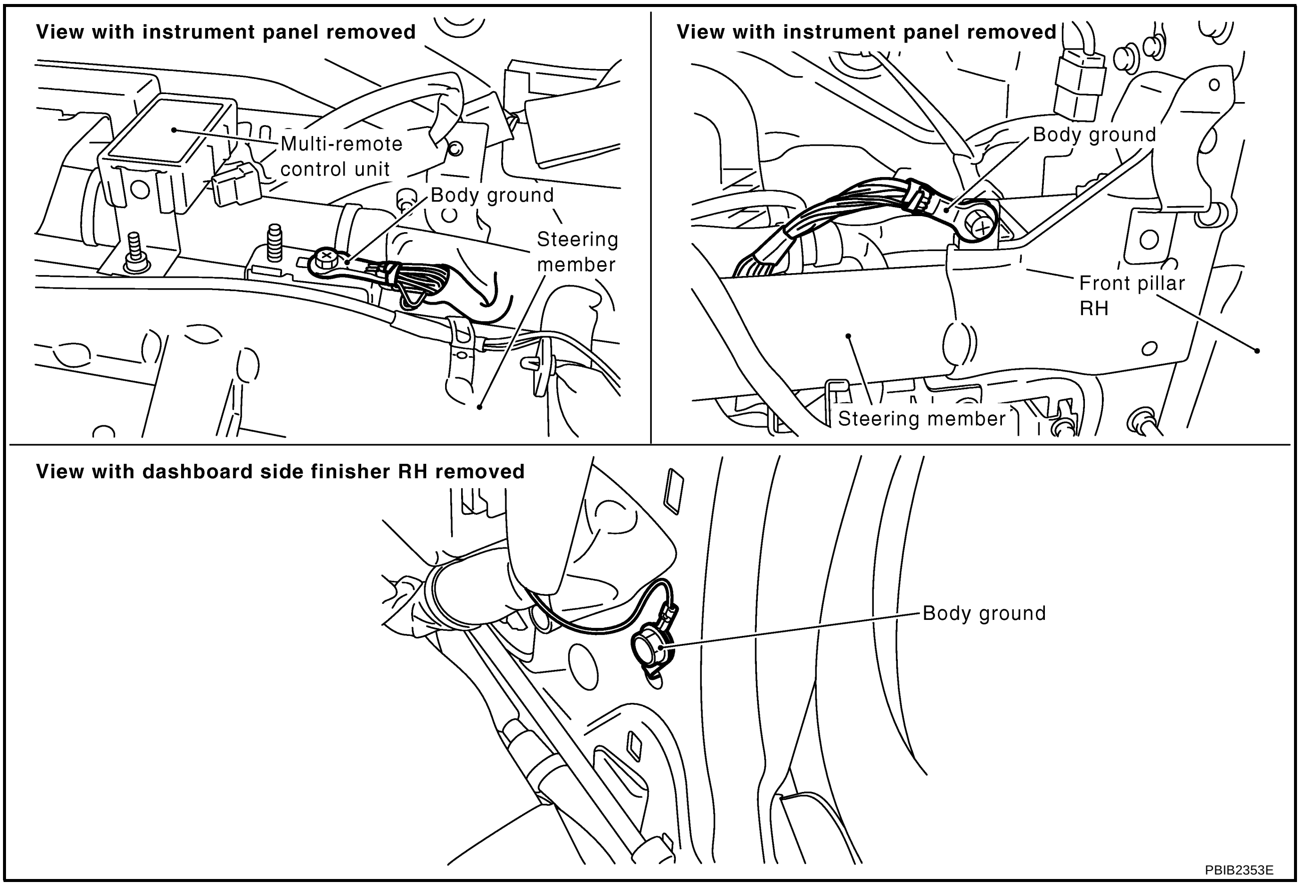
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	R	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5V
50	W	Throttle position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
69	R	Throttle position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	More than 0.36V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V

Diagnostic Procedure

ABS00D87

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

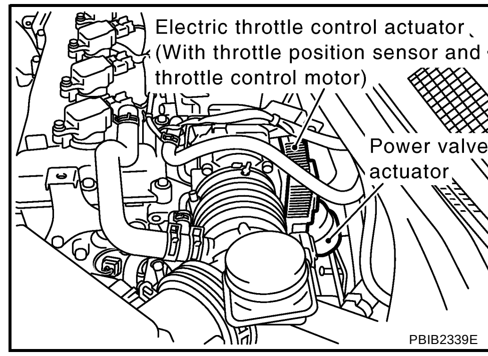


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

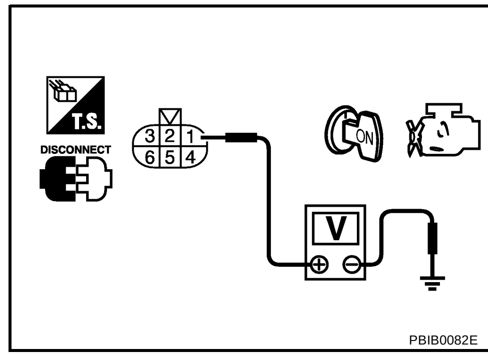
2. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK THROTTLE POSITION SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	EC-213
91	APP sensor terminal 4	EC-564

OK or NG

OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to EC-569, "Component Inspection" .

OK or NG

OK >> GO TO 11
NG >> GO TO 6.

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6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK THROTTLE POSITION SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 5 and ECM terminal 66.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK THROTTLE POSITION SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between electric throttle control actuator terminal 2 and ECM terminal 69.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE POSITION SENSOR

Refer to EC-218, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

11. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

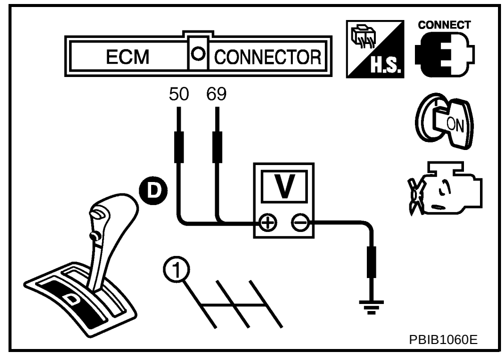
>> **INSPECTION END**

Component Inspection

ABS00CNI

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set shift lever to D (A/T) or 1st (M/T) position.
5. Check voltage between ECM terminals 50 (TP sensor 1), 69 (TP sensor 2) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-88, "Throttle Valve Closed Position Learning" .
8. Perform EC-88, "Idle Air Volume Learning" .

Remove and Installation

ABS00CNJ

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "INTAKE MANIFOLD" .

DTC P0125 ECT SENSOR

PFP:22630

Description

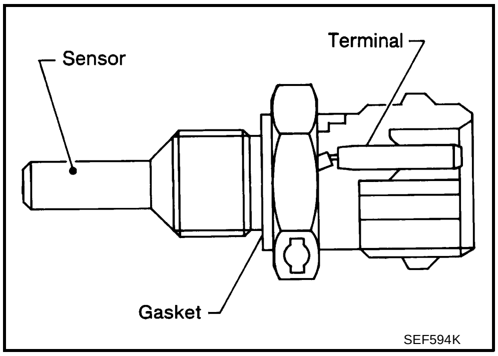
ABS00CNK

NOTE:

If DTC P0125 is displayed with P0117 or P0118, first perform the trouble diagnosis for DTC P0117 or P0118. Refer to **EC-205, "DTC P0117, P0118 ECT SENSOR" .**

COMPONENT DESCRIPTION

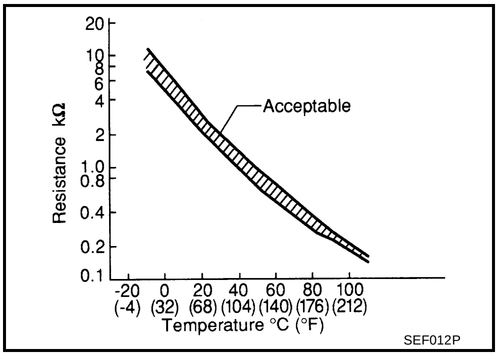
The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: This data is reference value and is measured between ECM terminal 73 (Engine coolant temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

ABS00CNL

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0125 0125	Insufficient engine coolant temperature for closed loop fuel control	● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. ● Engine coolant temperature is insufficient for closed loop fuel control.	● Harness or connectors (High resistance in the circuit) ● Engine coolant temperature sensor ● Thermostat

DTC Confirmation Procedure

ABS00CNM

CAUTION:

Be careful not to overheat engine.

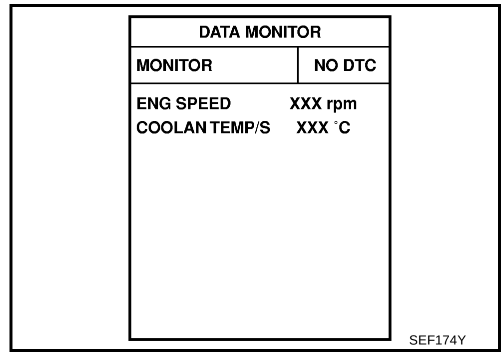
NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.

2. Select “DATA MONITOR” mode with CONSULT-II.
3. Check that “COOLAN TEMP/S” is above 10°C (50°F).
   If it is above 10°C (50°F), the test result will be OK.
   If it is below 10°C (50°F), go to following step.
4. Start engine and run it for 65 minutes at idle speed.
   If “COOLAN TEMP/S” increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
5. If DTC is detected, go to EC-220, "Diagnostic Procedure" .



WITH GST

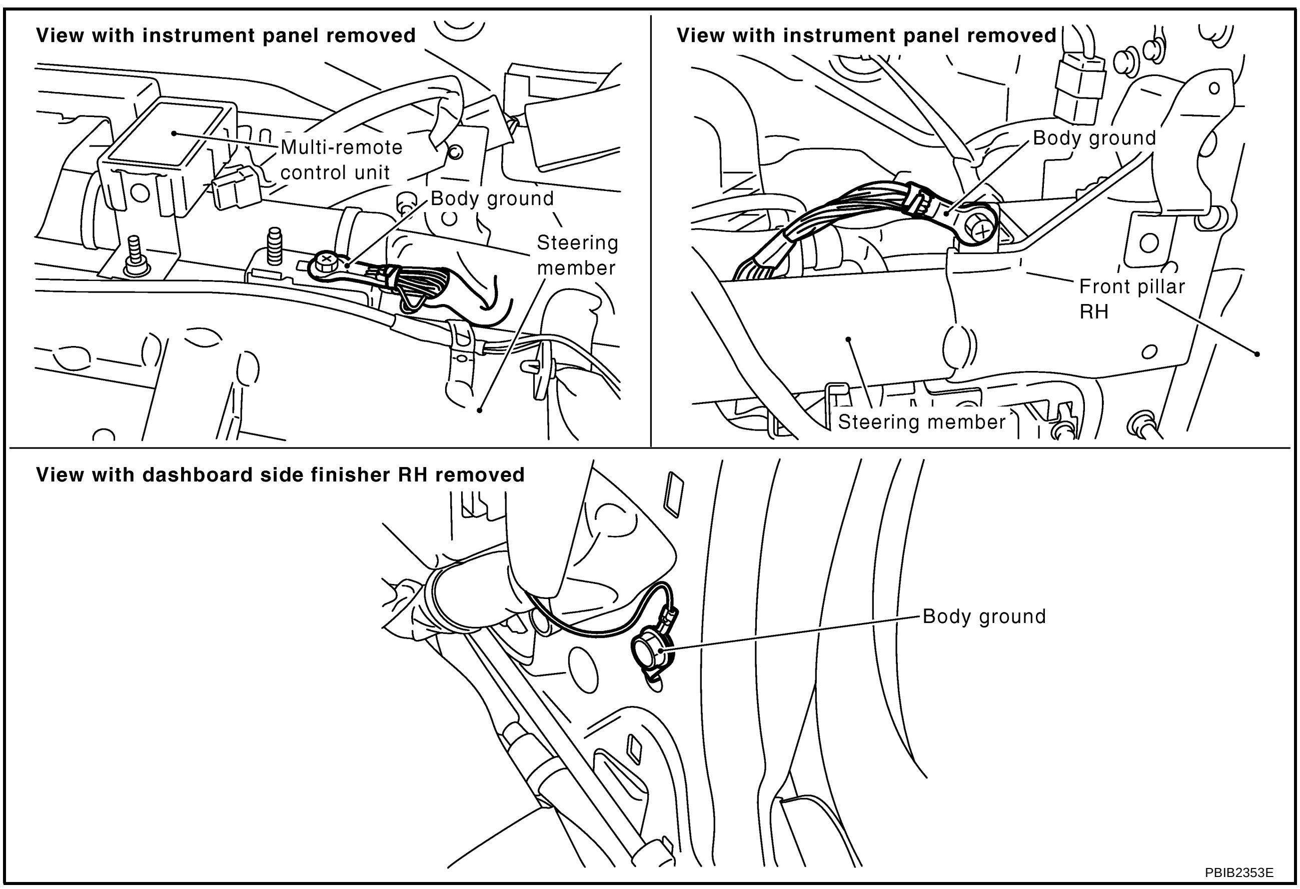
Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CNN

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-221, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace engine coolant temperature sensor.

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3. CHECK THERMOSTAT OPERATION

When the engine is cold [lower than 70°C (158°F)] condition, grasp lower radiator hose and confirm the engine coolant does not flow.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace thermostat. Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .

4. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

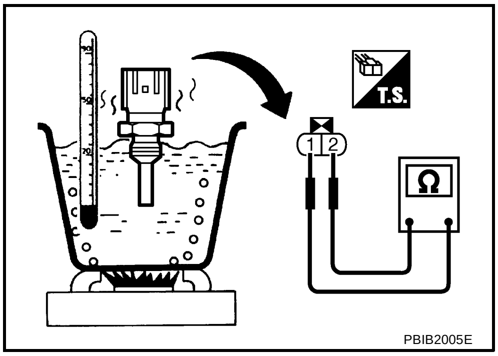
>> **INSPECTION END**

Component Inspection

ABS00CNO

ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.

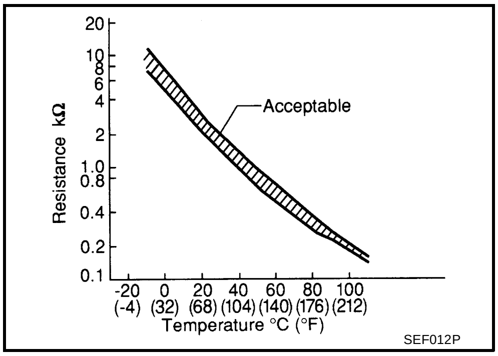


PBIB2005E

<Reference data>

Engine coolant temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor.



SEF012P

Removal and Installation

ABS00CNP

ENGINE COOLANT TEMPERATURE SENSOR

Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE"

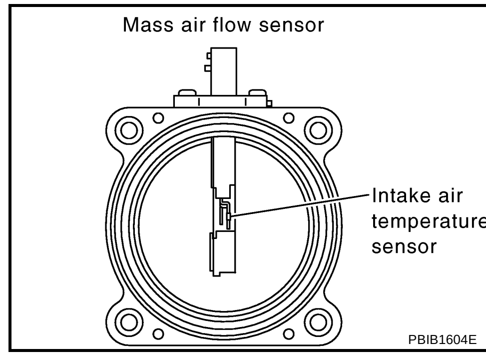
DTC P0127 IAT SENSOR

PFP:22630

Component Description

ABS00CNQ

The intake air temperature sensor is built into mass air flow sensor. The sensor detects intake air temperature and transmits a signal to the ECM.
The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

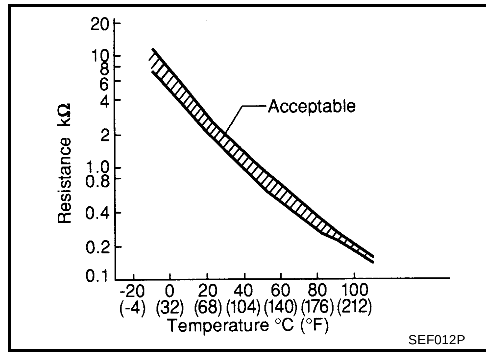


PBIB1604E

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
25 (77)	3.32	1.94 - 2.06
80 (176)	1.23	0.295 - 0.349

*: This data is reference value and is measured between ECM terminal 34 (Intake air temperature sensor) and ground.



SEF012P

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

ABS00CNR

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0127 0127	Intake air temperature too high	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	● Harness or connectors (The sensor circuit is open or shorted) ● Intake air temperature sensor

DTC Confirmation Procedure

ABS00CNS

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

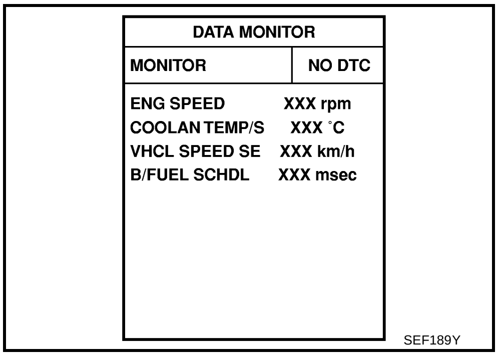
TESTING CONDITION:

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Wait until engine coolant temperature is less than 90°C (194°F)
a. Turn ignition switch ON.

b. Select “DATA MONITOR” mode with CONSULT-II.
c. Check the engine coolant temperature.
d. If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch OFF and cool down engine.
   - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch ON.
3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to EC-223, "Diagnostic Procedure" .



WITH GST

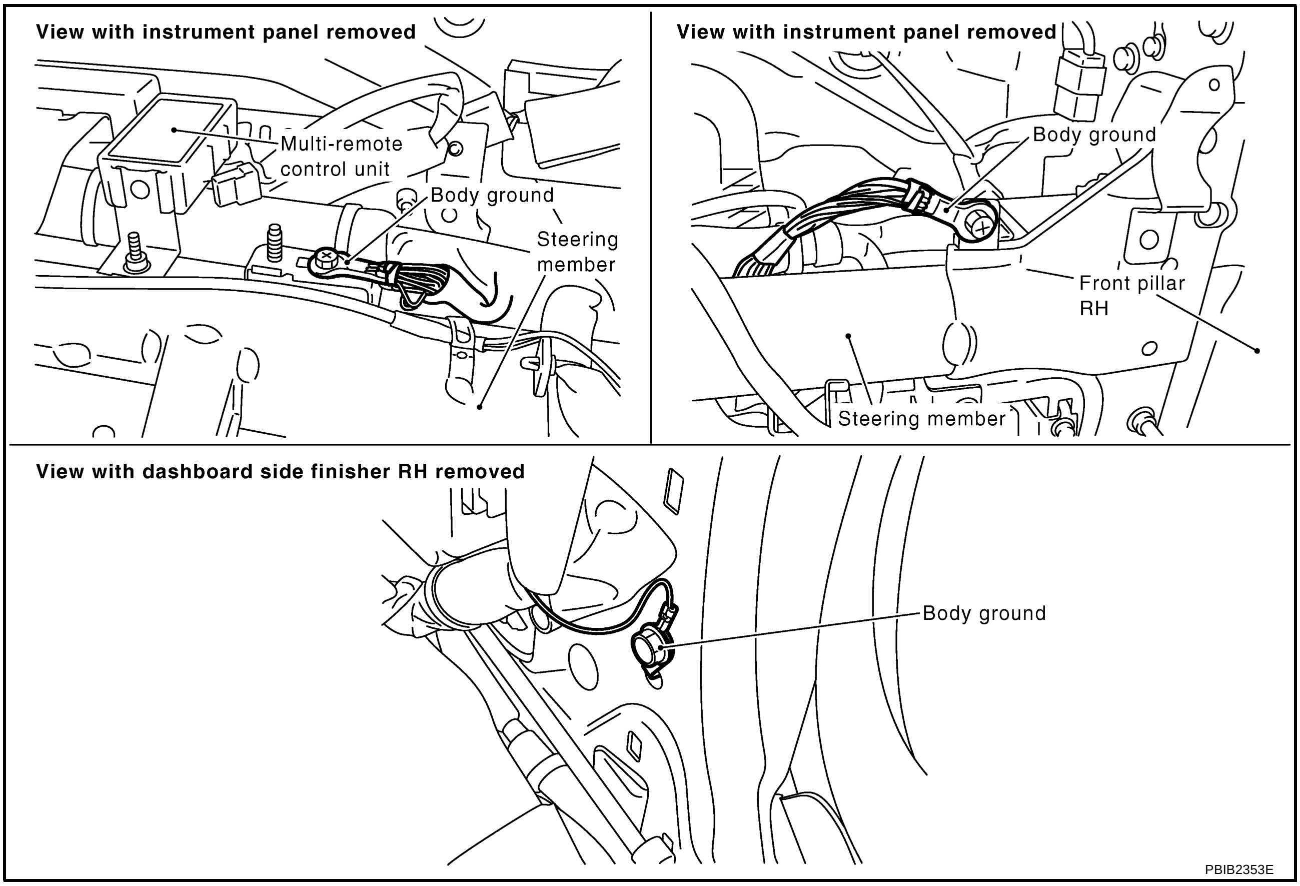
Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CNT

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to EC-224, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace mass air flow sensor (with intake air temperature sensor).

3. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
Refer to EC-201, "Wiring Diagram" .

>> **INSPECTION END**

Component Inspection

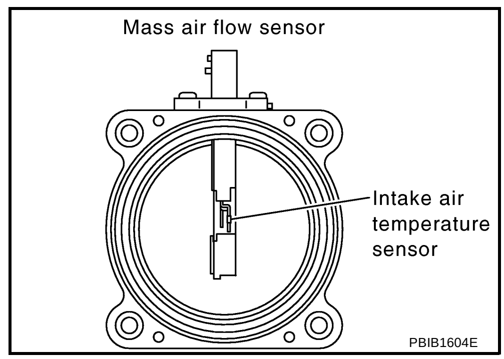
ABS00CNU

INTAKE AIR TEMPERATURE SENSOR

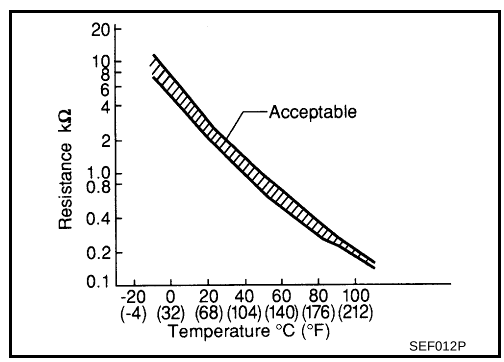
1. Check resistance between intake air temperature sensor terminals 5 and 6 under the following conditions.

Intake air temperature °C (°F)	Resistance kΩ
25 (77)	1.94 - 2.06

2. If NG, replace mass air flow sensor (with intake air temperature sensor).



PBIB1604E



SEF012P

Removal and Installation

ABS00CNV

MASS AIR FLOW SENSOR

Refer to EM-14, "AIR CLEANER AND AIR DUCT" .

DTC P0128 THERMOSTAT FUNCTION

PFP:21200

On Board Diagnosis Logic

ABS00CNW

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough.
This is due to a leak in the seal or the thermostat stuck open.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0128 0128	Thermostat function	The engine coolant temperature does not reach to specified temperature even though the engine has run long enough.	• Thermostat • Leakage from sealing portion of thermostat • Engine coolant temperature sensor

DTC Confirmation Procedure

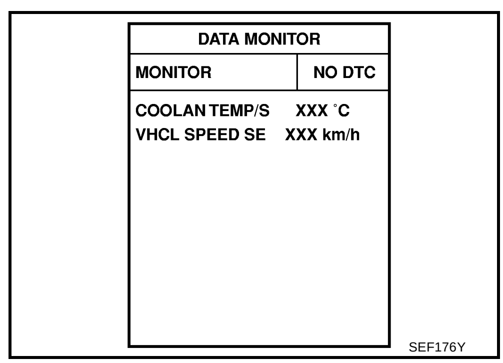
ABS00CNX

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:

- **For best results, perform at ambient temperature of –10°C (14°F) or higher.**
- **For best results, perform at engine coolant temperature of –10°C (14°F) to 68°C (154°F).**

WITH CONSULT-II

1. Replace thermostat with new one. Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .
   Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on.
2. Turn ignition switch ON.
3. Select “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.
4. Check that the “COOLAN TEMP/S” is above 68°C (154°F).
   If it is below 68°C (154°F), go to following step.
   If it is above 68°C (154°F), cool down the engine to less than 68°C (154°F), then retry from step 1.
5. Drive vehicle for 10 consecutive minutes under the following conditions.



VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)

If 1st trip DTC is detected, go to EC-225, "Diagnostic Procedure" .

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CNY

1. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-226, "Component Inspection" .

OK or NG

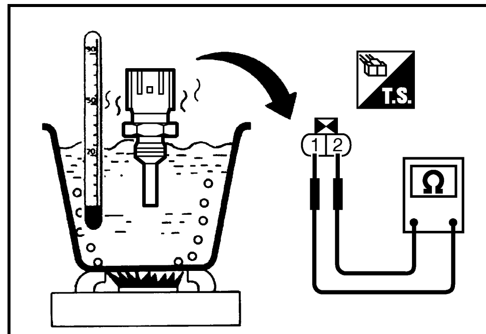
OK >> **INSPECTION END**
NG >> Replace engine coolant temperature sensor.

Component Inspection

ABS00CNZ

ENGINE COOLANT TEMPERATURE SENSOR

1. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.

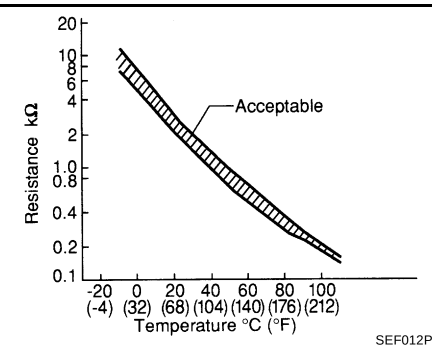


PBIB2005E

<Reference data>

Engine coolant temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

2. If NG, replace engine coolant temperature sensor.



SEF012P

Removal and Installation

ABS00CO0

ENGINE COOLANT TEMPERATURE SENSOR

Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .

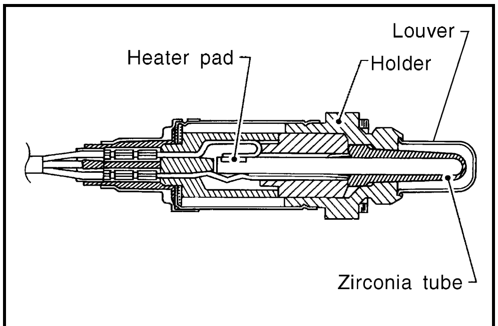
DTC P0132 HO2S1

PFP:22690

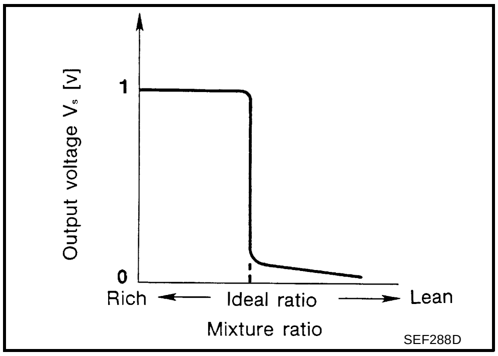
Component Description

ABS00D6G

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



SEF463R



SEF288D

CONSULT-II Reference Value in Data Monitor Mode

ABS00D6H

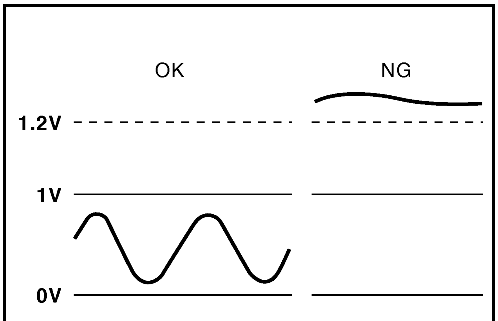
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

ABS00D6I

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 output is not inordinately high.



PBIB1848E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0132 0132	Heated oxygen sensor 1 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1

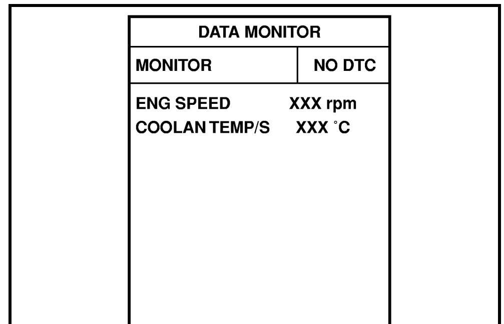
DTC Confirmation Procedure

ABS00D6J

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. Restart engine and let it idle for 2 minutes.
6. If 1st trip DTC is detected, go to EC-230, "Diagnostic Procedure" .



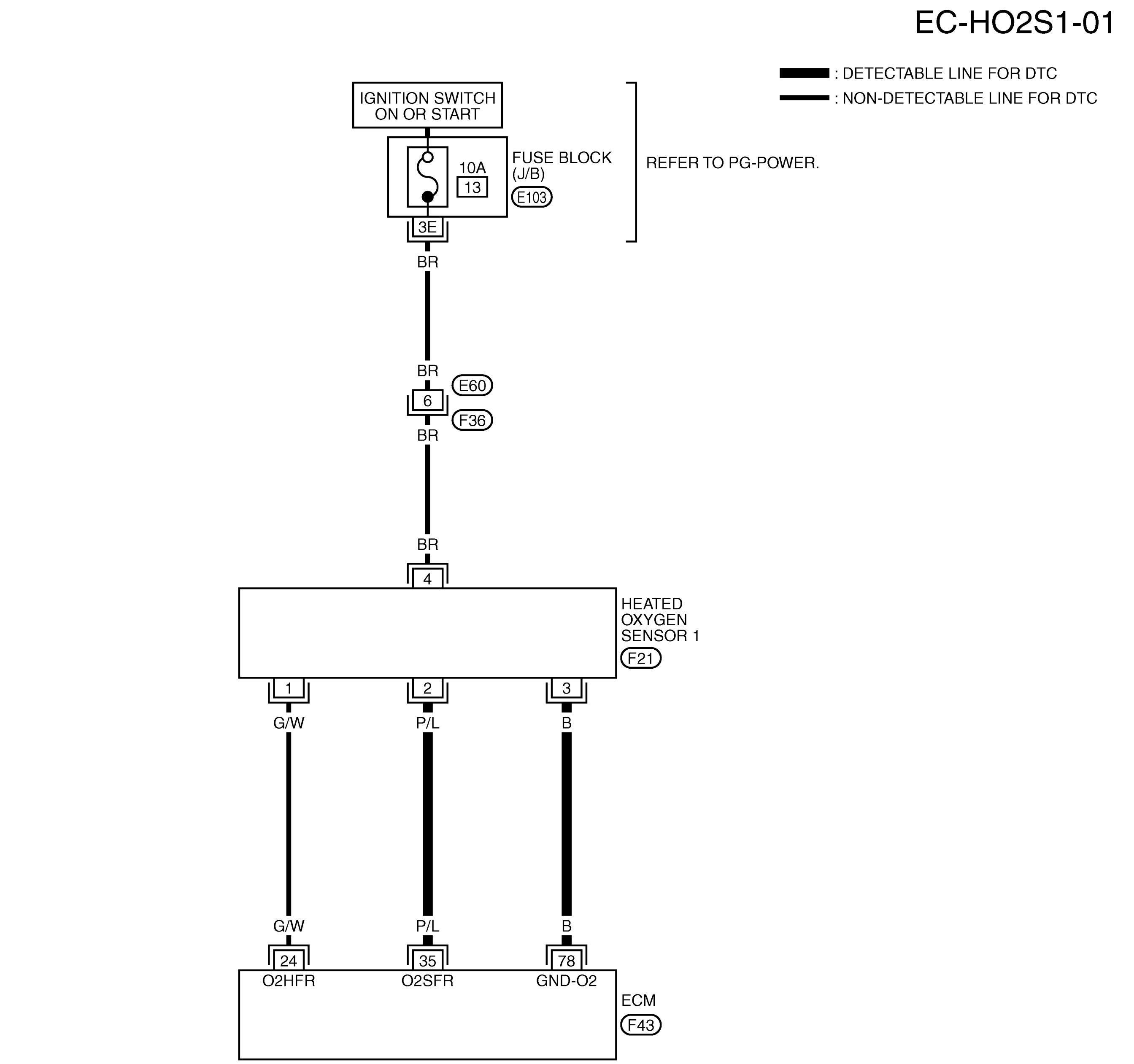
SEF174Y

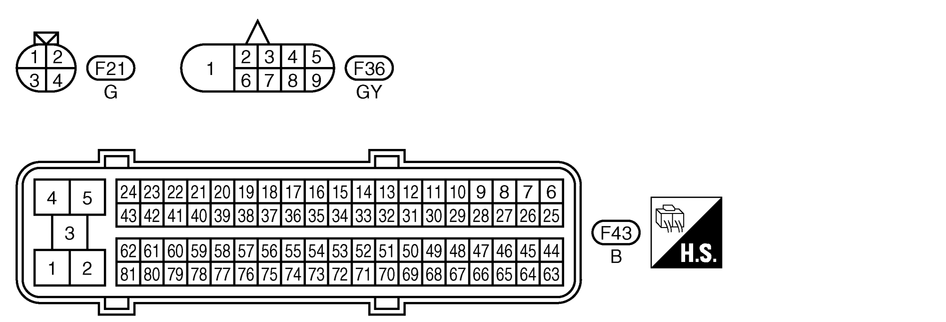
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00D6K





REFER TO THE FOLLOWING.
E103 -FUSE BLOCK-JUNCTION BOX (J/B)

TBWB0115E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

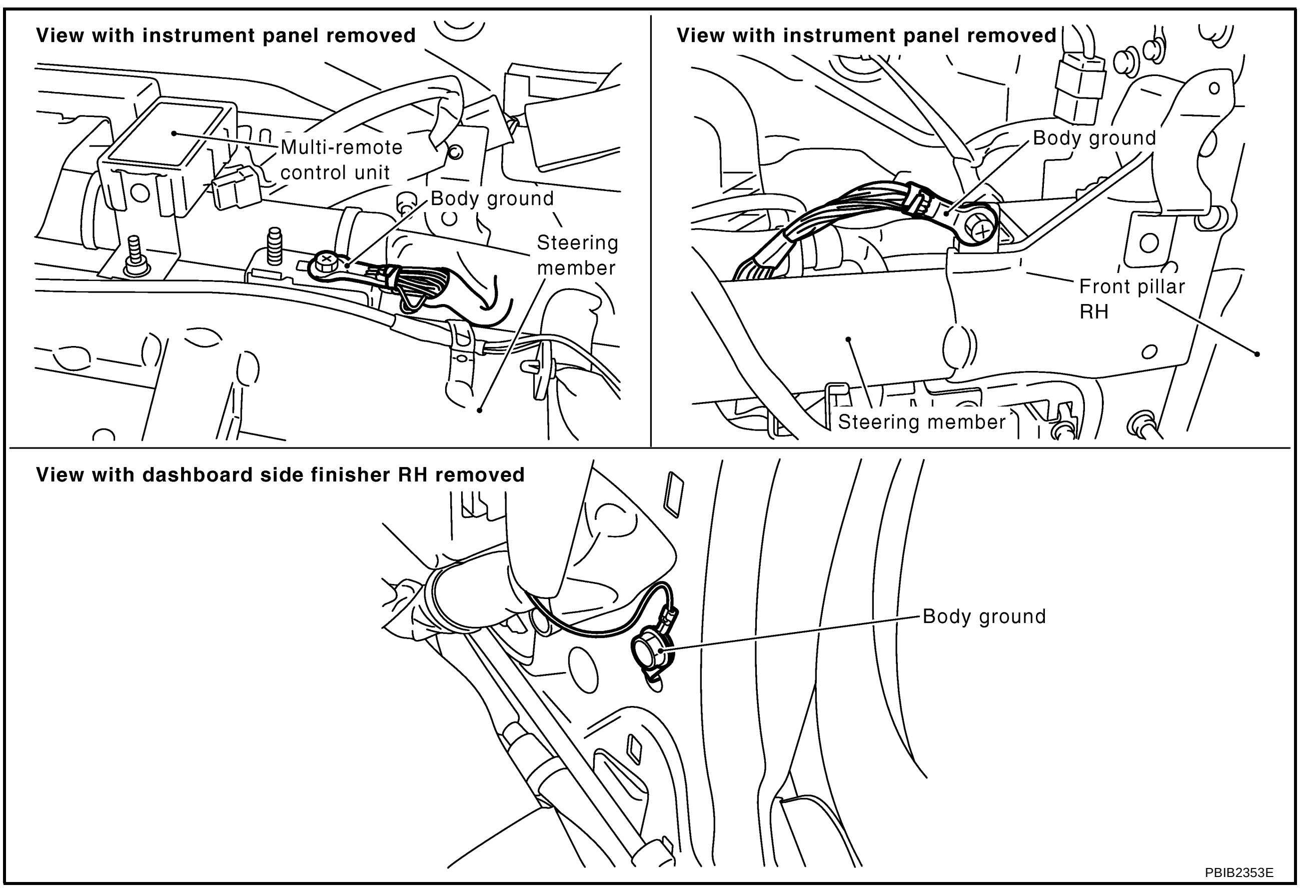
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	P/L	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed: 2,000 rpm	0 - Approximately 1.0V (Periodically change)
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00D88

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.

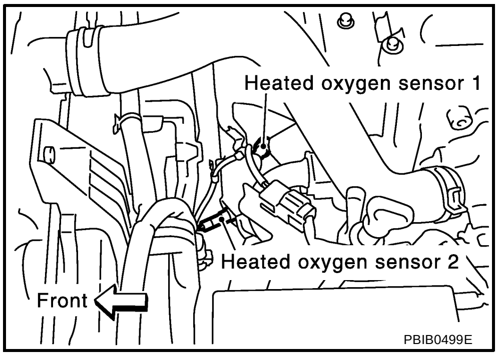
NG >> Repair or replace ground connections.

2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.

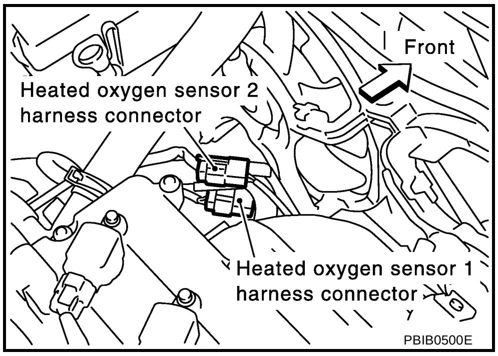


3. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 terminal 3 and ECM terminal 78.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 terminal 2 and ECM terminal 35.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power and short to ground.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HO2S1 CONNECTOR FOR WATER

Check heated oxygen sensor 1 connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace harness or connectors.

6. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-232, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace heated oxygen sensor 1.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

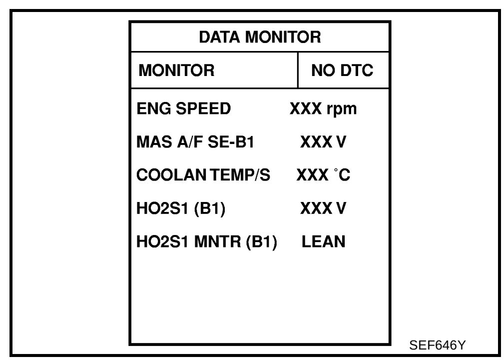
Component Inspection

ABS00D6M

HEATED OXYGEN SENSOR 1

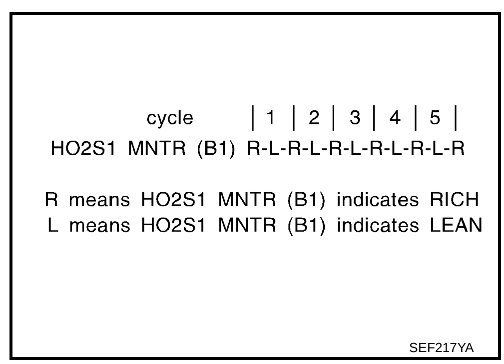
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

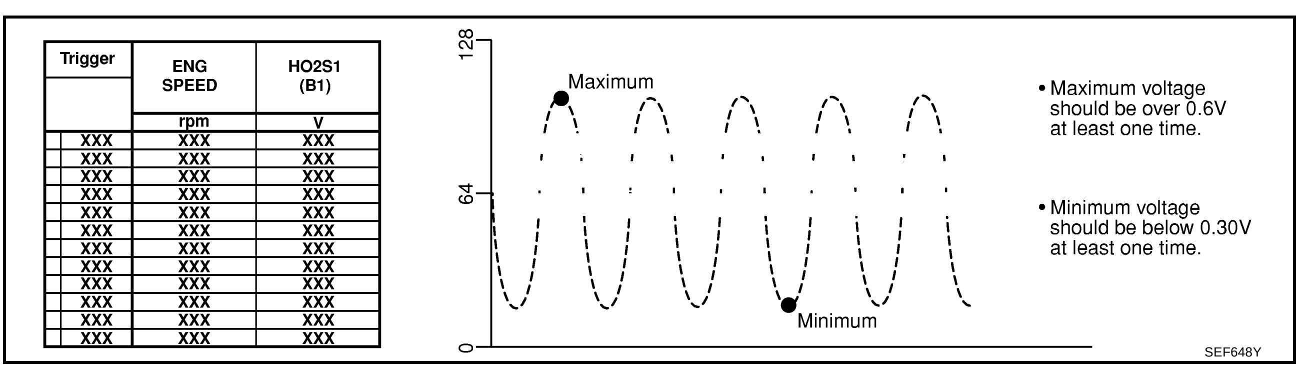


SEF646Y

6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



SEF217YA



SEF648Y

CAUTION:

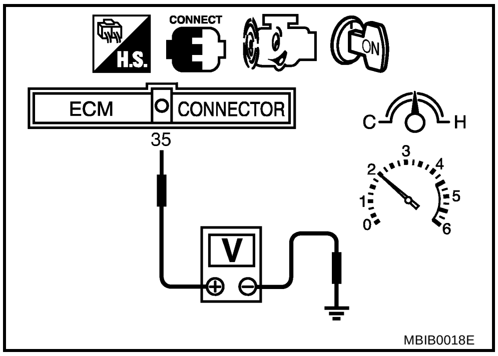
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**

- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least 1 time.
   - The minimum voltage is below 0.3V at least 1 time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00D6N

HEATED OXYGEN SENSOR 1

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

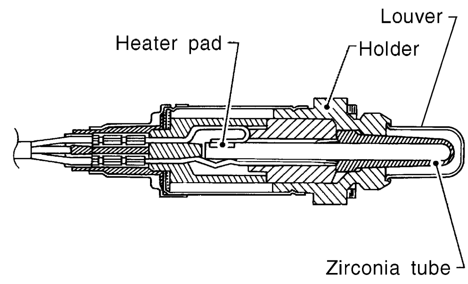
DTC P0133 HO2S1

PFP:22690

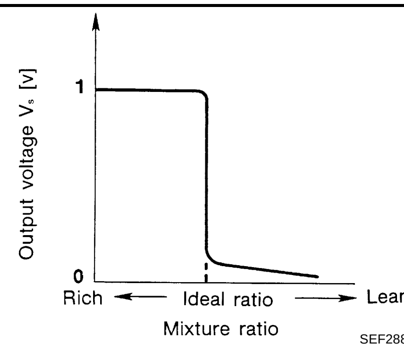
Component Description

ABS00D6O

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



SEF463R



SEF288D

CONSULT-II Reference Value in Data Monitor Mode

ABS00D6P

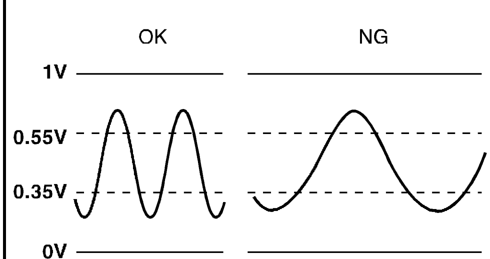
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

ABS00D6Q

To judge the malfunction of heated oxygen sensor 1, this diagnosis measures response time of heated oxygen sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 temperature index. Judgment is based on whether the compensated time (heated oxygen sensor 1 cycling time index) is inordinately long or not.



SEF010V

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DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0133 0133	Heated oxygen sensor 1 circuit slow response	The response of the voltage signal from the sensor takes more than the specified time.	● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1 ● Fuel pressure ● Fuel injector ● Intake air leaks ● Exhaust gas leaks ● PCV valve ● Mass air flow sensor

DTC Confirmation Procedure

ABS00D6R

CAUTION:
Always drive vehicle at a safe speed.

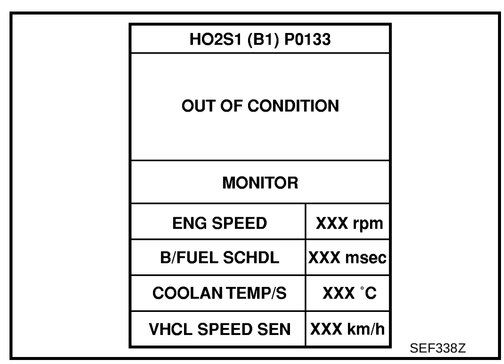
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- **Always perform at a temperature above –10°C (14°F).**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.
   NOTE:
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

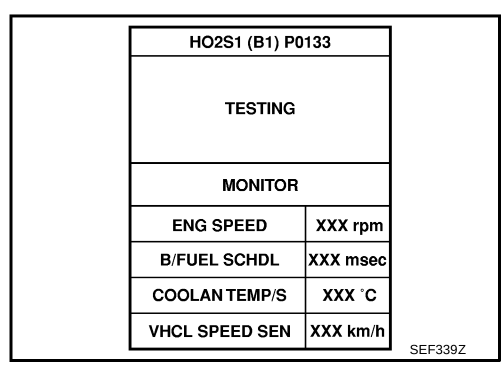


SEF338Z

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 40 to 50 seconds.)

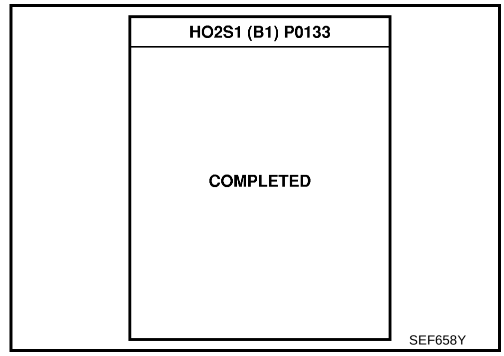
ENG SPEED	1,600 - 3,300 rpm
VHCL SPEED SE	More than 80 km/h (50 MPH)
B/FUEL SCHDL	4.2 - 14.5 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.



SEF339Z

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-238, "Diagnostic Procedure" .



SEF658Y

Overall Function Check

ABS00D6S

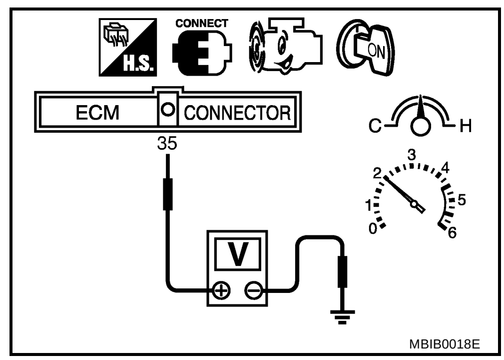
Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1(B1) signal] and ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.

   1 time : 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

   2 times : 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
4. If NG, go to EC-238, "Diagnostic Procedure" .

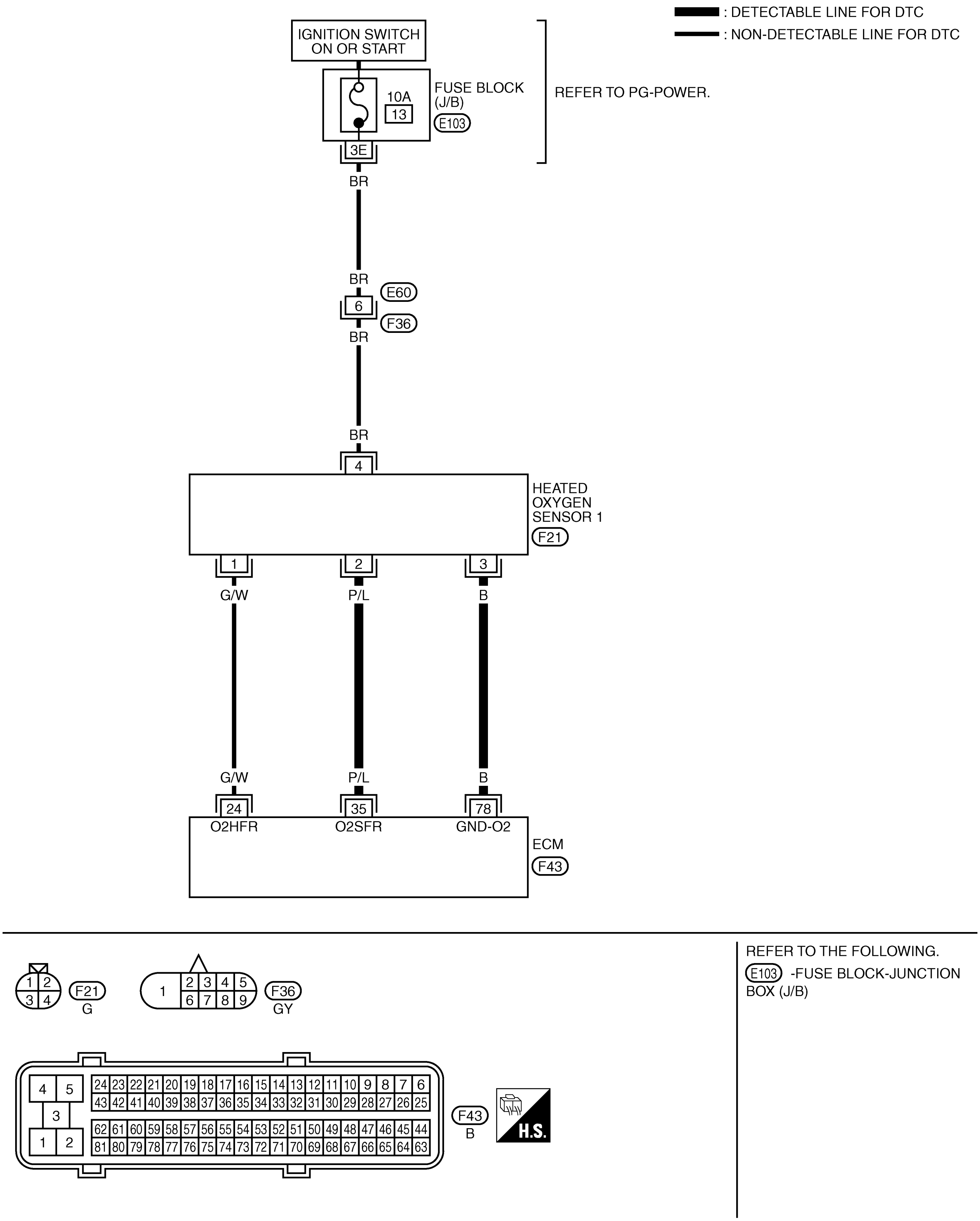


MBIB0018E

Wiring Diagram

ABS00D6T

EC-HO2S1-01



TBWB0115E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

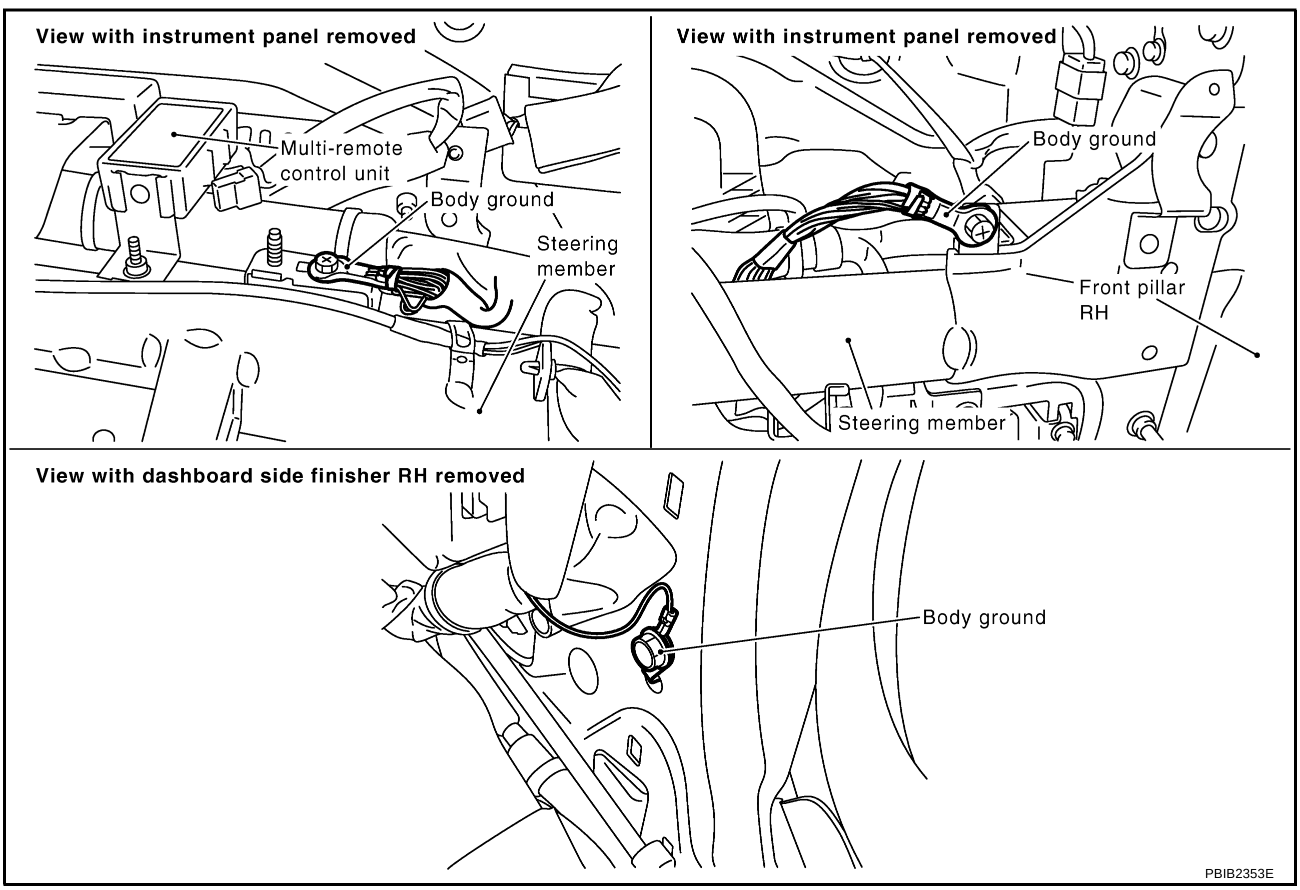
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	P/L	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed: 2,000 rpm	0 - Approximately 1.0V (Periodically change)
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00D89

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body. Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.

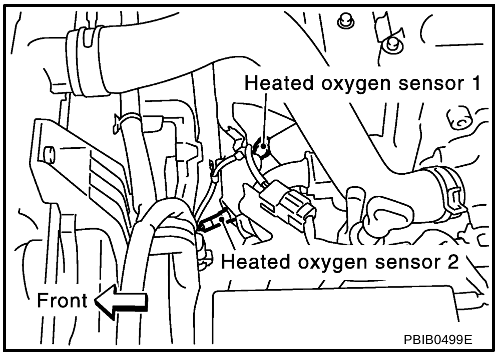
NG >> Repair or replace ground connections.

2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

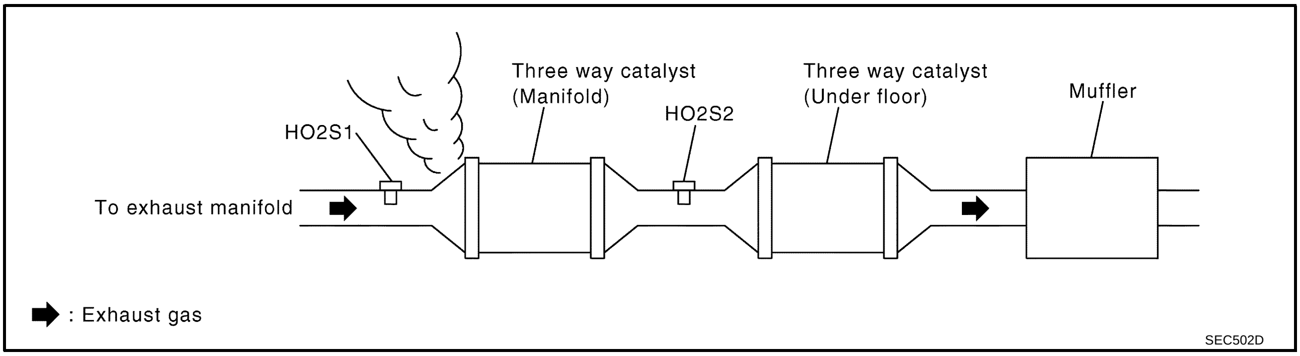
Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

>> GO TO 3.



3. CHECK FOR EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

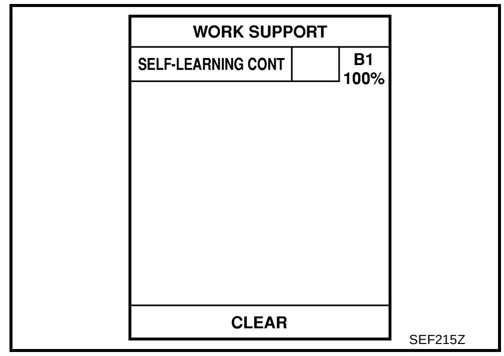
OK or NG

OK >> GO TO 5.
NG >> Repair or replace.

5. CLEAR THE SELF-LEARNING DATA

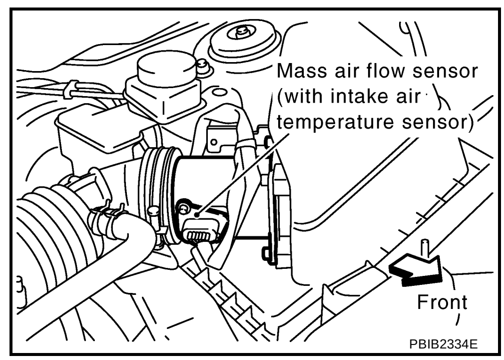
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171 or DTC P0172 (Refer to EC-267, "DTC P0171 FUEL INJECTION SYSTEM FUNCTION" or EC-274, "DTC P0172 FUEL INJECTION SYSTEM FUNCTION").

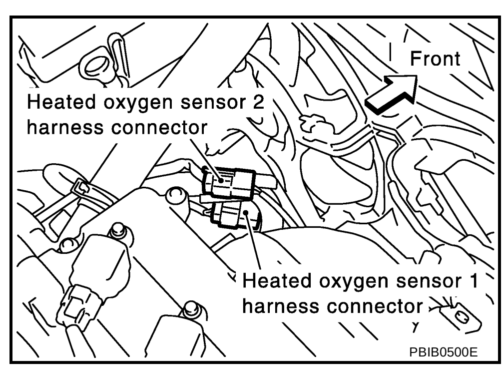
No >> GO TO 6.

6. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S1 terminal 3 and ECM terminal 78. Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 7.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 terminal 2 and ECM terminal 35.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK MASS AIR FLOW SENSOR

Refer to EC-189, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace mass air flow sensor.

9. CHECK PCV VALVE

Refer to EC-44, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace PCV valve.

10. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-242, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace heated oxygen sensor 1.

11. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

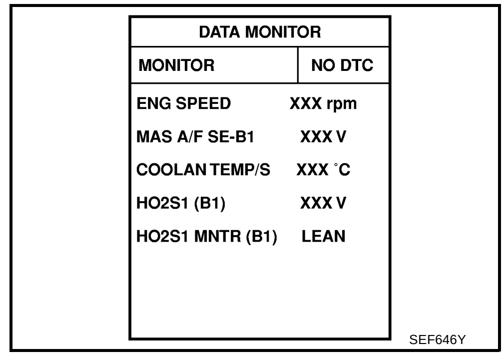
Component Inspection

ABS00D6V

HEATED OXYGEN SENSOR 1

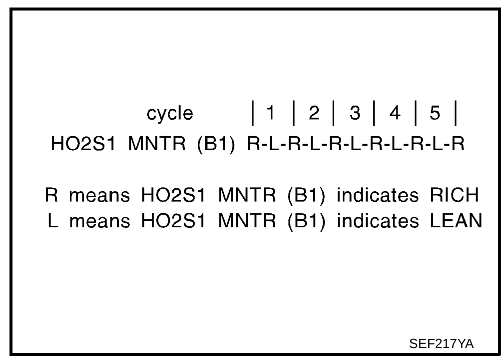
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

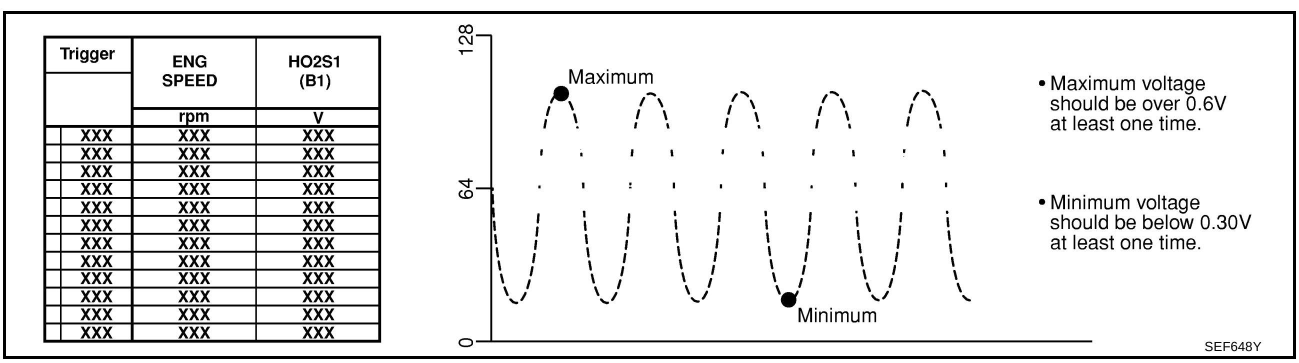


SEF646Y

6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



SEF217YA



SEF648Y

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

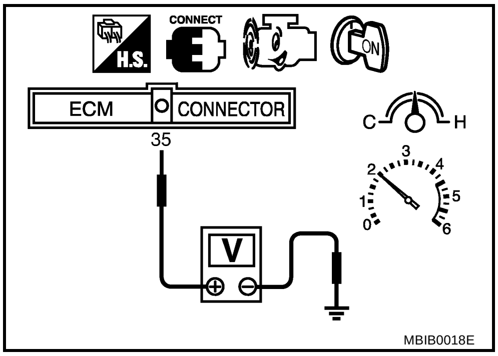
Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.

3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least 1 time.
   - The minimum voltage is below 0.3V at least 1 time.
   - The voltage never exceeds 1.0V.

1 time : **0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**

2 times : **0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V →0.6 - 1.0V → 0 - 0.3V**



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00D6W

HEATED OXYGEN SENSOR 1

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

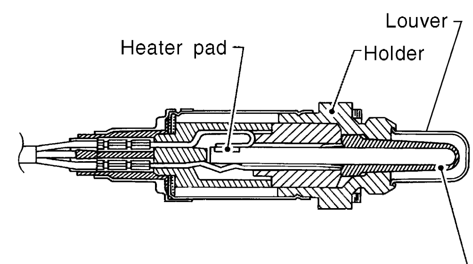
DTC P0134 HO2S1

PFP:22690

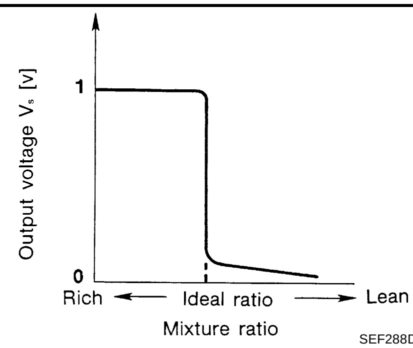
Component Description

ABS00D6X

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



SEF463R



SEF288D

CONSULT-II Reference Value in Data Monitor Mode

ABS00D6Y

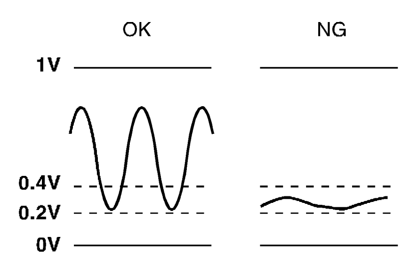
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ⟷ 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ⟷ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

ABS00D6Z

Under the condition in which the heated oxygen sensor 1 signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.



SEF237U

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0134 0134	Heated oxygen sensor 1 circuit no activity detected	The voltage from the sensor is constantly approx. 0.3V.	● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 1

DTC Confirmation Procedure

ABS00D70

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

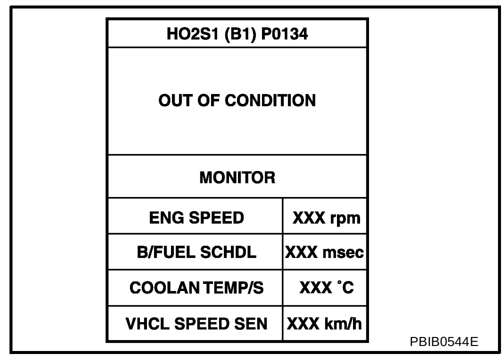
Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “HO2S1 (B1) P0134” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
3. Touch “START”.
4. Let it idle for at least 3 minutes.

   NOTE:

   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.

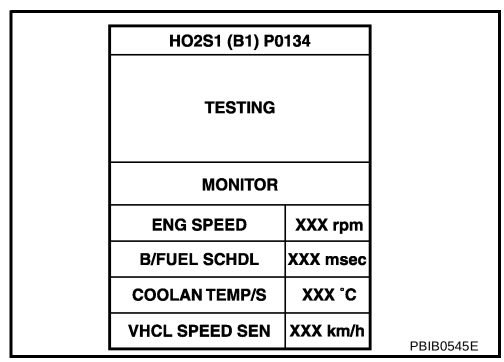


PBIB0544E

5. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 10 to 60 seconds.)

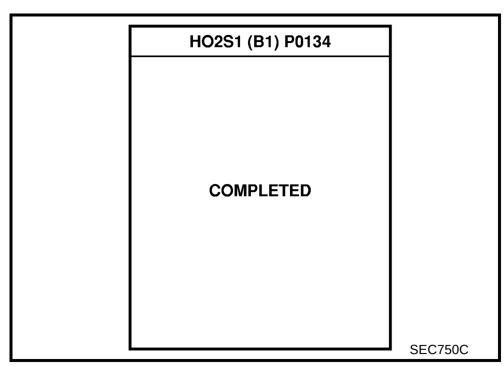
ENG SPEED	1,500 - 3,300 rpm
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	1.8 - 14.5 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.



PBIB0545E

6. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-248, "Diagnostic Procedure" .



SEC750C

Overall Function Check

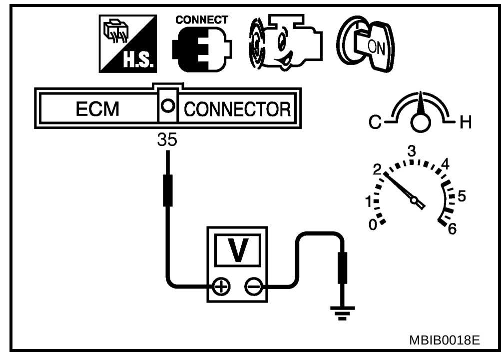
ABS00D71

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage does not remain in the range of 0.2 to 0.4V.
4.

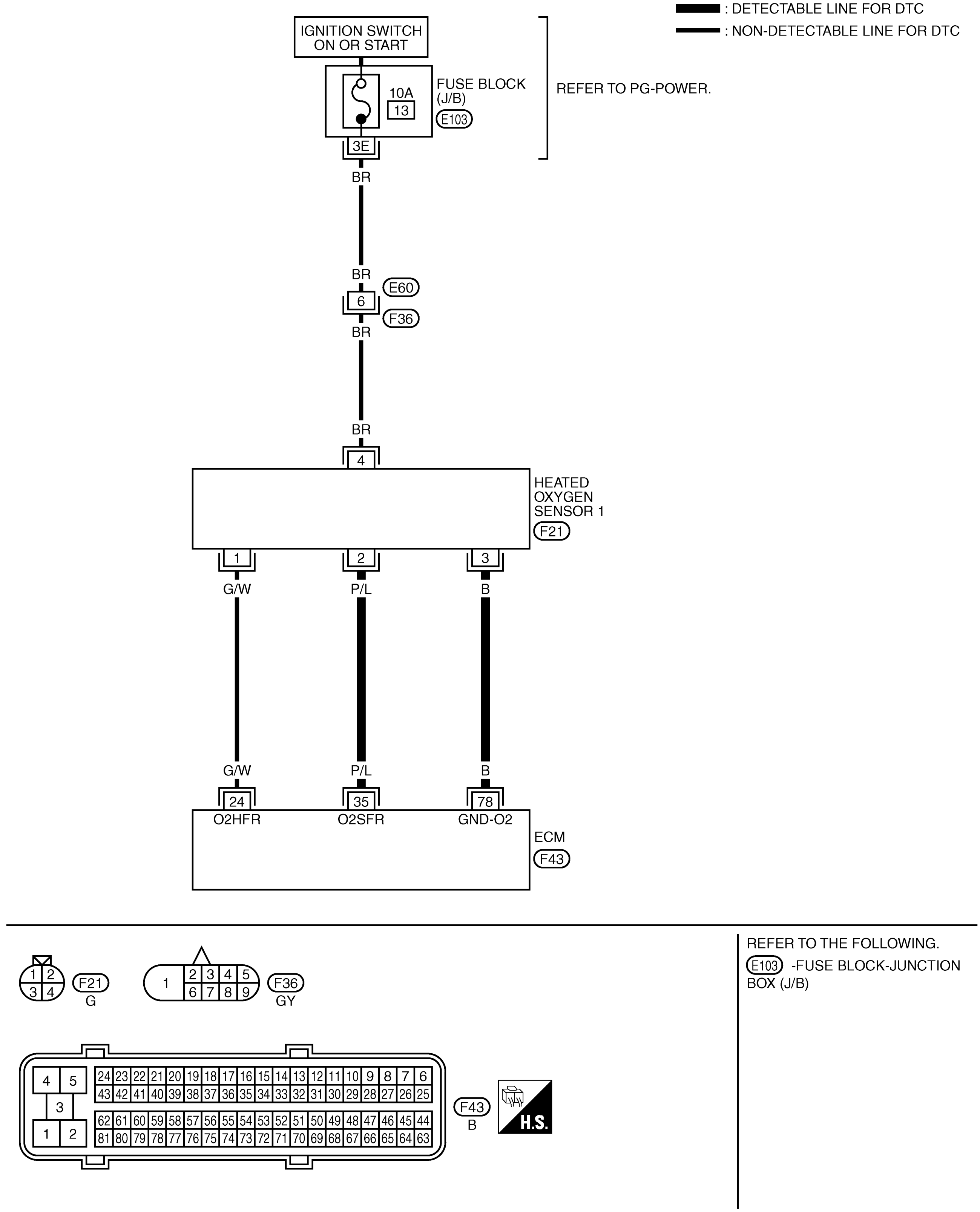
   If NG, go to EC-248, "Diagnostic Procedure" .



Wiring Diagram

ABS00D72

EC-HO2S1-01



TBWB0115E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

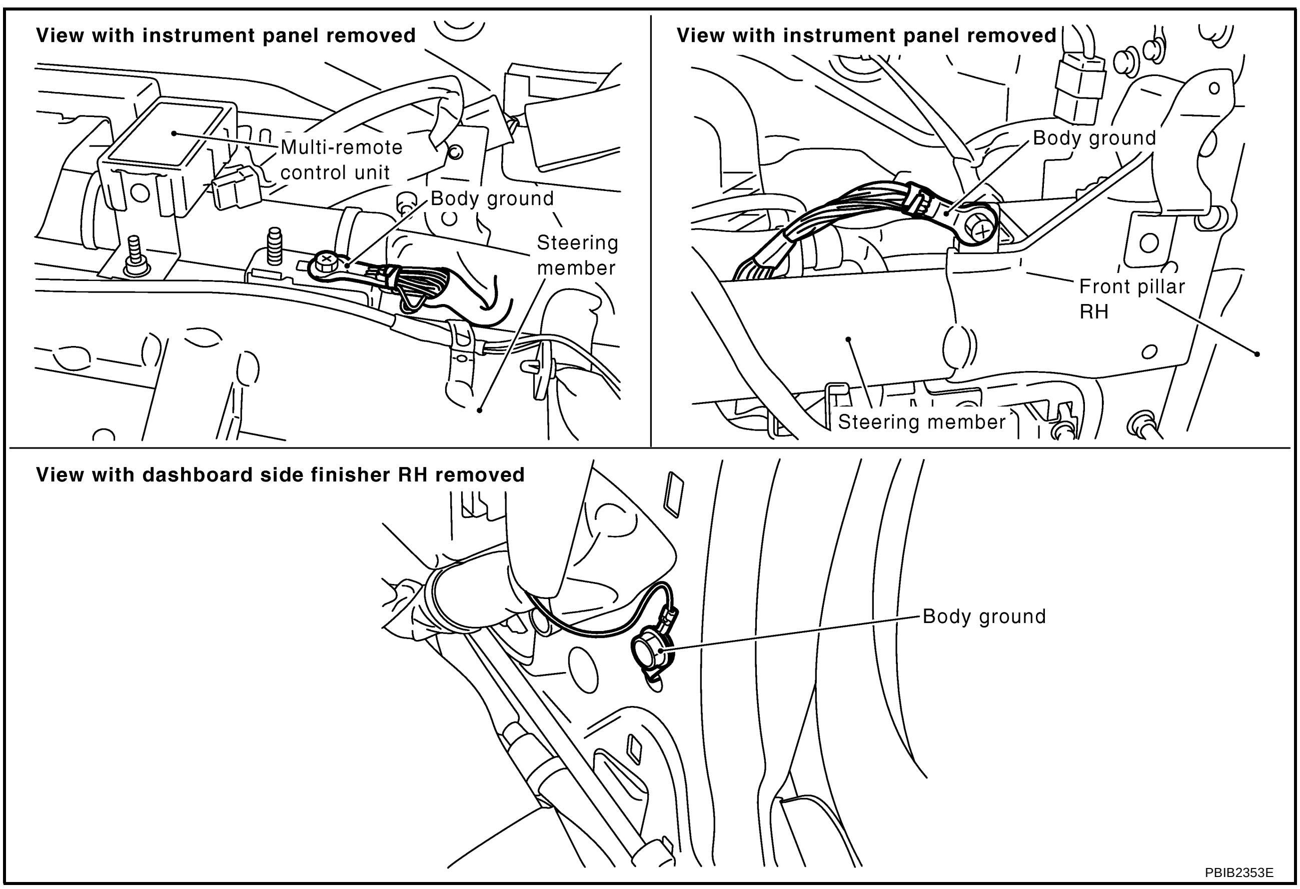
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	P/L	Heated oxygen sensor 1	**[Engine is running]** ● **Warm-up condition** ● Engine speed: 2,000 rpm	0 - Approximately 1.0V (Periodically change)
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00D8A

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

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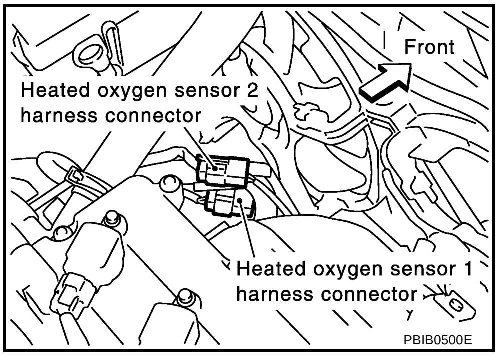
2. CHECK HO2S1 GROUND CIRCUIT FOR OPEN AND SHORT



1. Disconnect heated oxygen sensor 1 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S1 terminal 3 and ECM terminal 78. Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK HO2S1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S1 terminal 2 and ECM terminal 35. Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground. Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power and short to ground.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-250, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 1.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

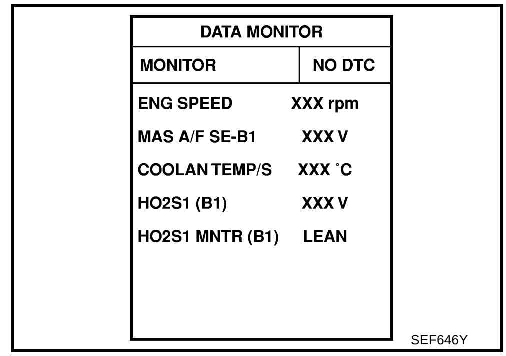
Component Inspection

ABS00D74

HEATED OXYGEN SENSOR 1

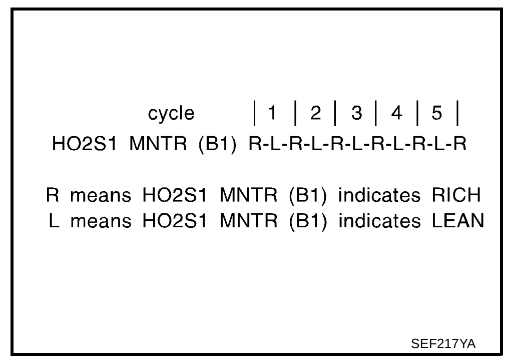
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

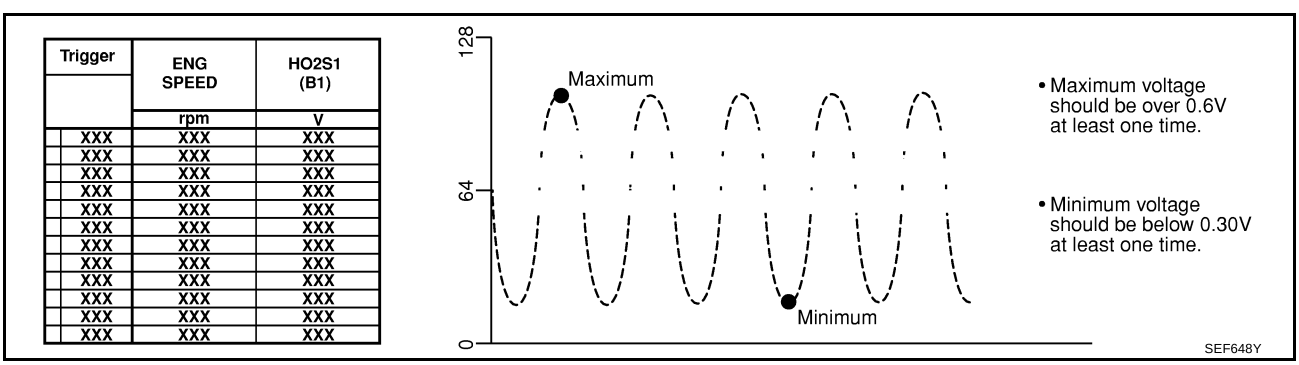


SEF646Y

6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



SEF217YA



SEF648Y

CAUTION:

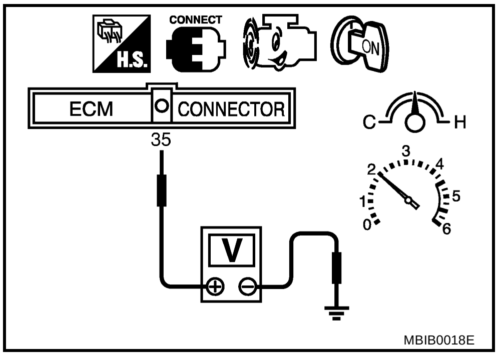
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.

3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least 1 time.
   - The minimum voltage is below 0.3V at least 1 time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00D75

HEATED OXYGEN SENSOR 1

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

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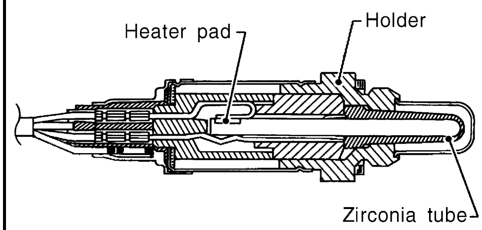
DTC P0138 HO2S2

PFP:226A0

Component Description

ABS00CO1

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



SEF327R

CONSULT-II Reference Value in Data Monitor Mode

ABS00CO2

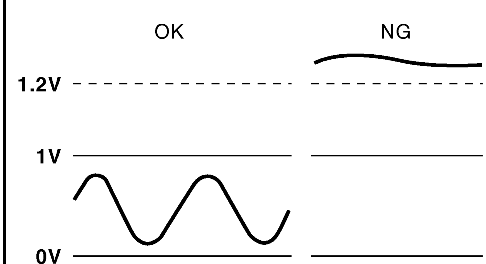
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Warm-up condition ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

ABS00CO3

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the voltage is unusually high during the various driving condition such as fuel-cut.



PBIB1848E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0138 0138	Heated oxygen sensor 2 circuit high voltage	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2

DTC Confirmation Procedure

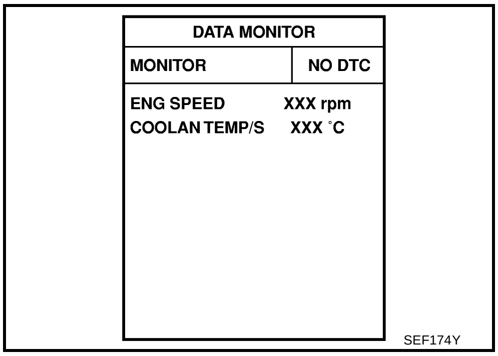
ABS00CO4

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.

4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 2 minutes.
6. If 1st trip DTC is detected, go to EC-255, "Diagnostic Procude" .



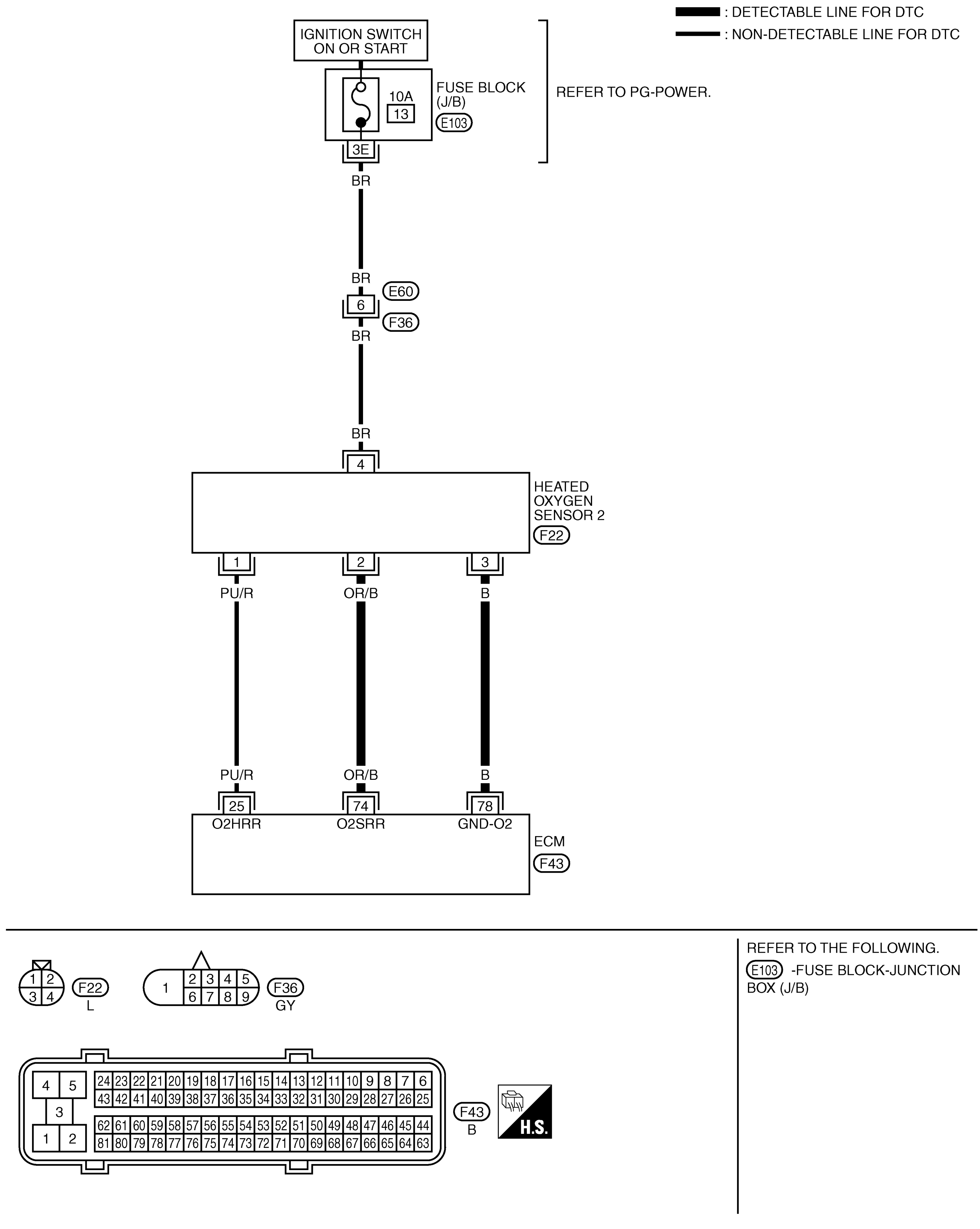
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CO5

EC-HO2S2-01



TBWB0116E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

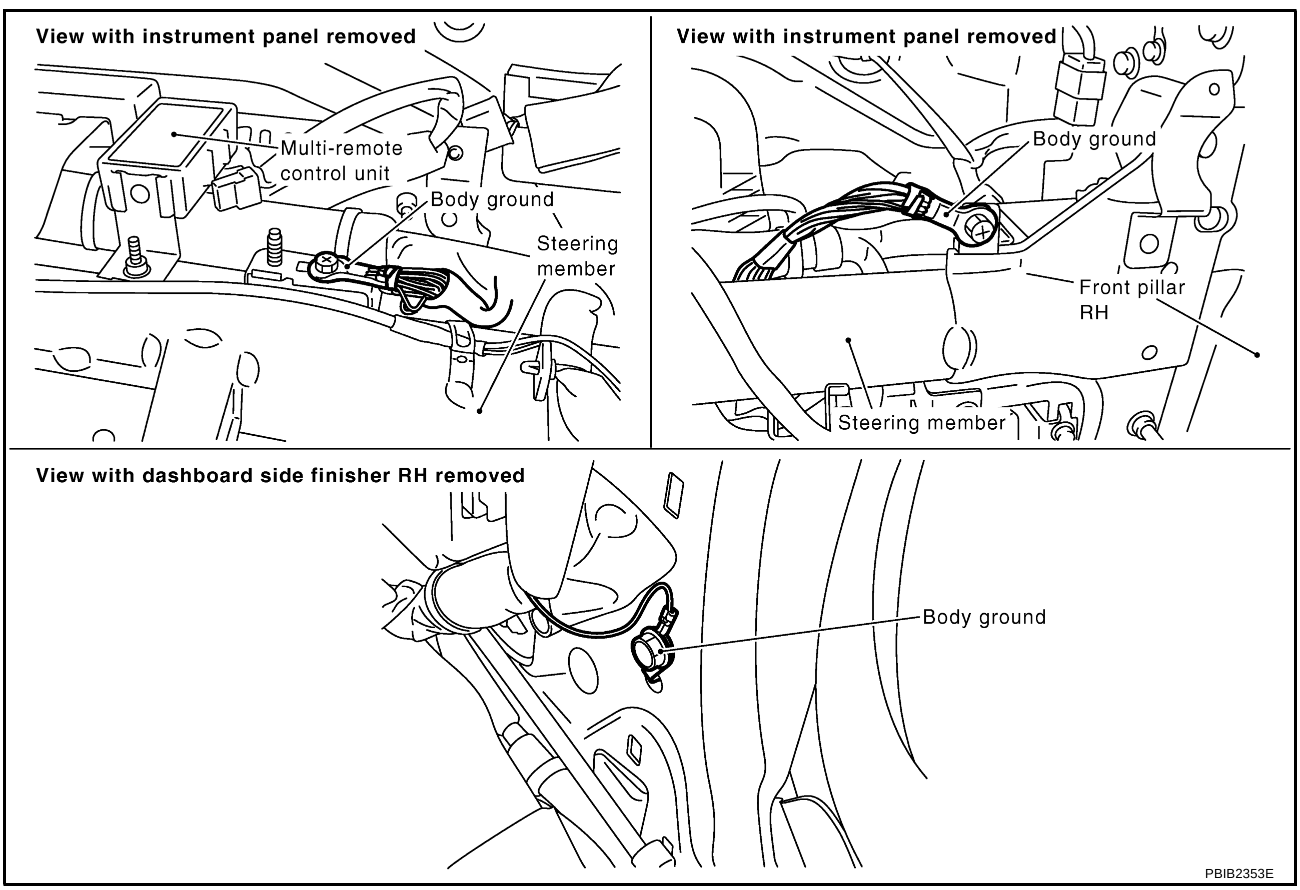
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	OR/B	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00D8B

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.

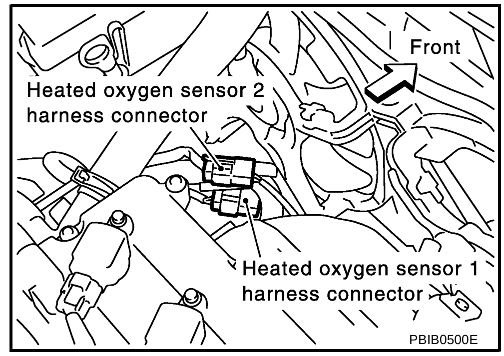
NG >> Repair or replace ground connections.

2. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect heated oxygen sensor 2 harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between HO2S2 terminal 3 and ECM terminal 78.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 2 ECM terminal 74.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 CONNECTOR FOR WATER

Check heated oxygen sensor 2 for water.

Water should not exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-257, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

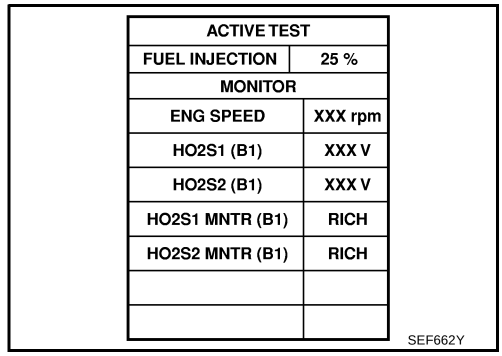
Component Inspection

ABS00CO7

HEATED OXYGEN SENSOR 2

With CONSULT-II

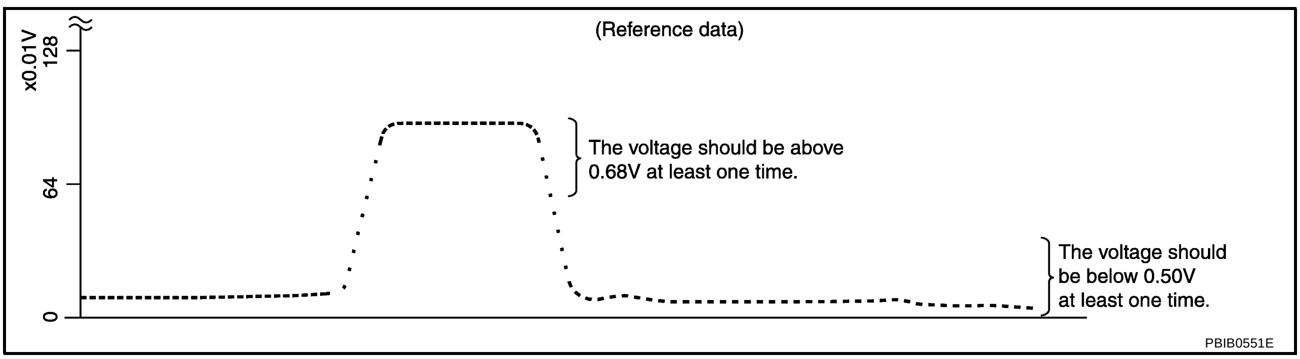
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



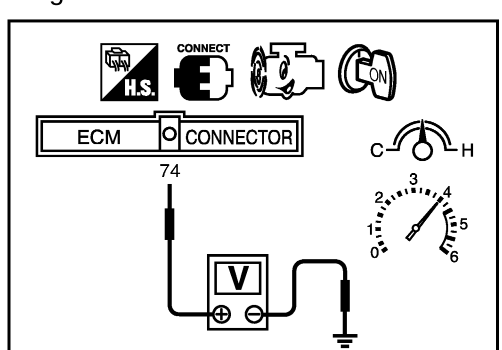
“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is –25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68V at least once during this procedure.
   If the voltage is above 0.68V at step 6, step 7 is not necessary.
7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), 3rd gear position (M/T).



The voltage should be below 0.50V at least once during this procedure.

8. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00CO8

HEATED OXYGEN SENSOR 2

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

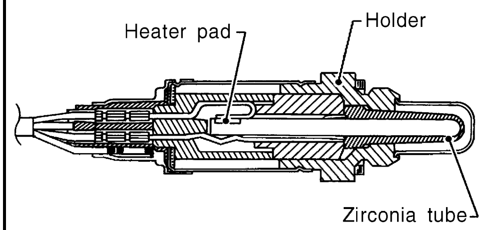
DTC P0139 HO2S2

PFP:226A0

Component Description

ABS00CO9

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



SEF327R

CONSULT-II Reference Value in Data Monitor Mode

ABS00COA

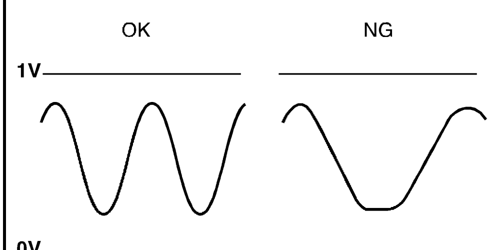
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	• Engine: After warming up • After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle to 3,000 rpm quickly	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

ABS00COB

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during the various driving condition such as fuel-cut.



SEF302U

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0139 0139	Heated oxygen sensor 2 circuit slow response	It takes more time for the sensor to respond between rich and lean than the specified time.	• Harness or connectors (The sensor circuit is open or shorted) • Heated oxygen sensor 2 • Fuel pressure • Fuel injector • Intake air leaks

DTC Confirmation Procedure

ABS00COC

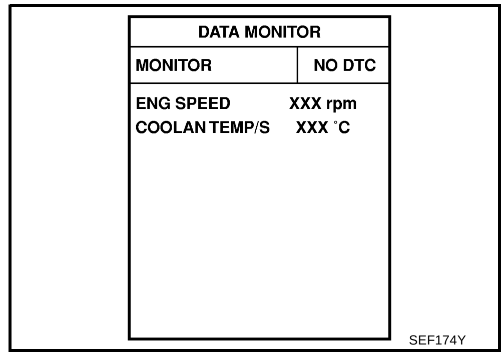
NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

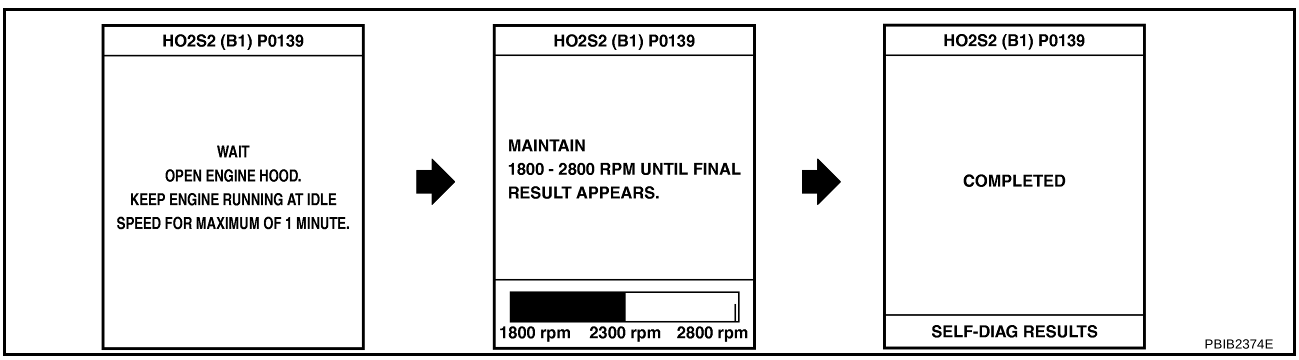
For the best results, perform “DTC WORK SUPPORT” at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II



SEF174Y

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at lest 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Select “HO2S2 (B1) P0139” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-II and follow the instruction of CONSULT-II.



PBIB2374E

NOTE:

It will take at most 10 minutes until “COMPLETED” is displayed.

8. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
   If “NG” is displayed, refer to EC-263, "Diagnostic Procedure" .
   If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Return to step 1.

Overall Function Check

ABS00COD

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

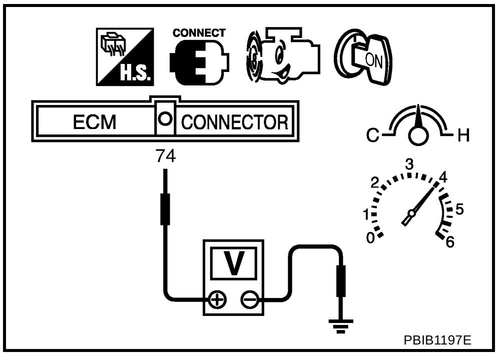
CAUTION:

Always drive vehicle at a safe speed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.

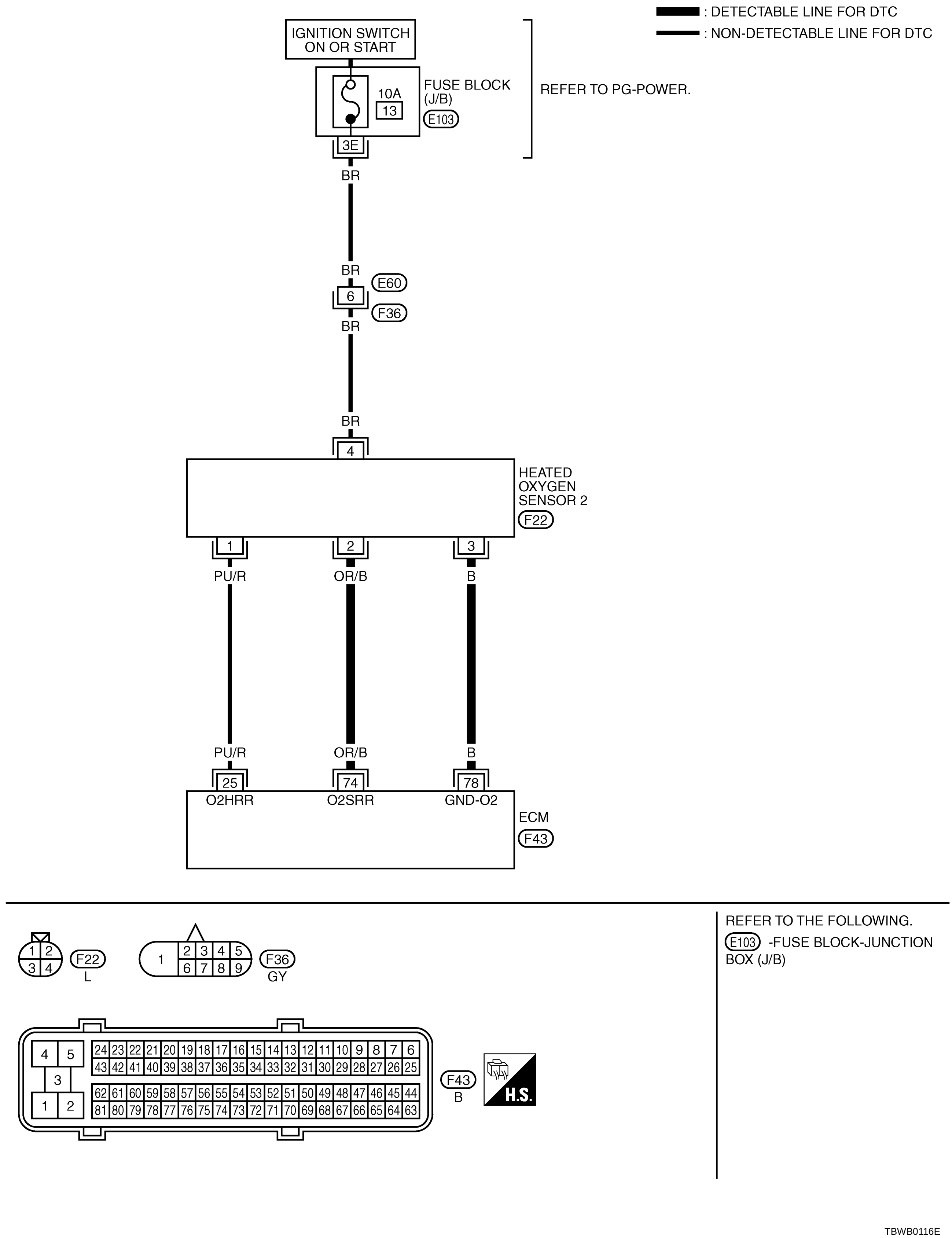
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   A change of voltage should be more than 0.06V for 1 second during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), 3rd gear position (M/T).
   A change of voltage should be more than 0.06V for 1 second during this procedure.
8. If NG, go to EC-263, "Diagnostic Procedure" .



Wiring Diagram

ABS00COE

EC-HO2S2-01



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K
L
M

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

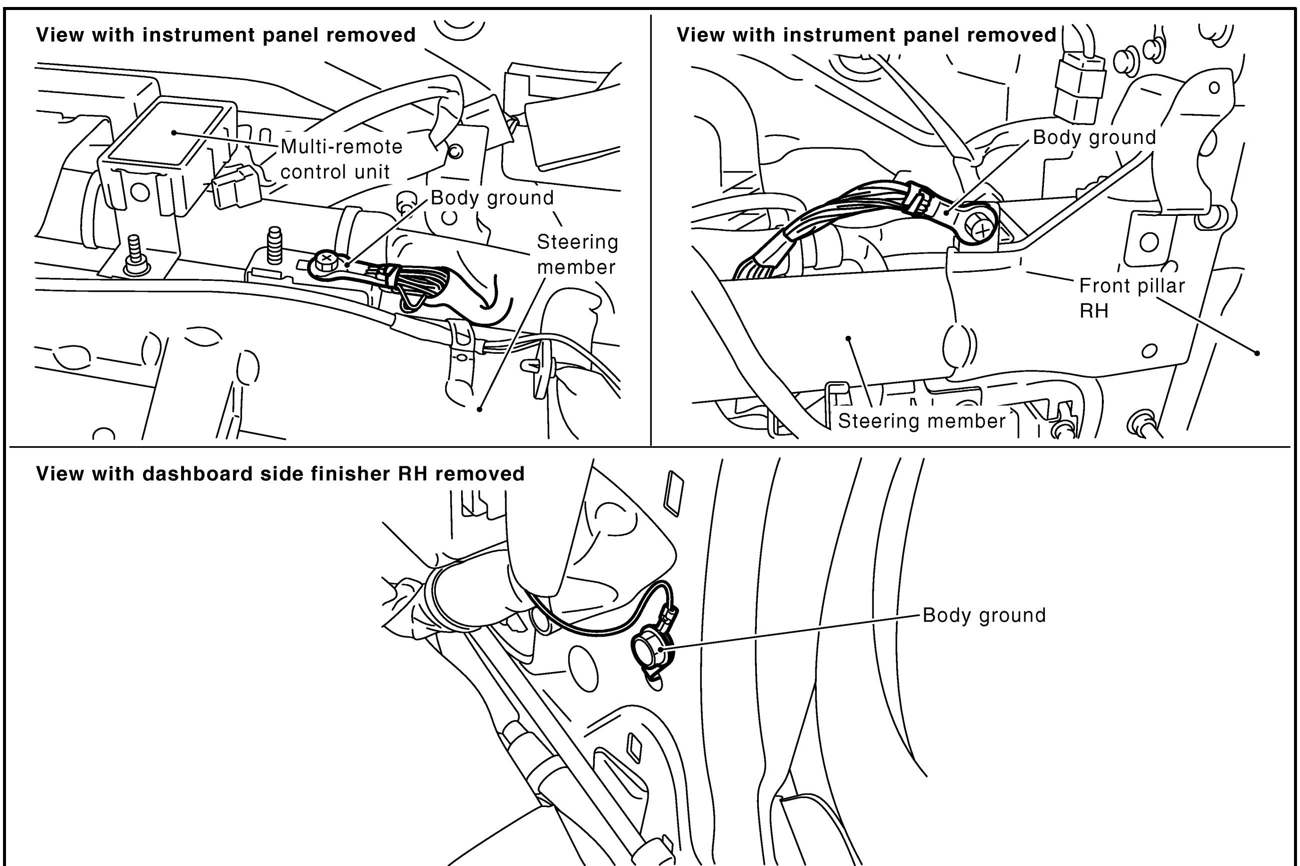
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	OR/B	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00COF

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .



OK or NG

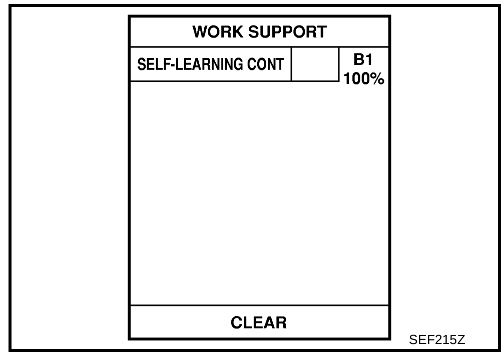
OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

With CONSULT-II

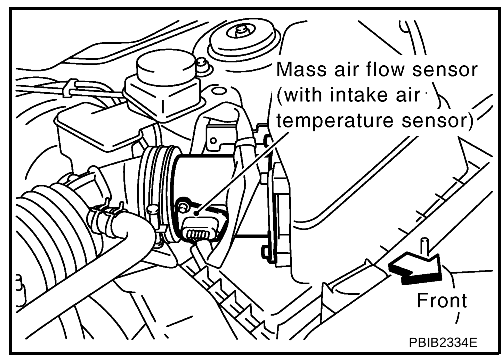
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 or P0172 detected?
Is it difficult to start engine?



SEF215Z

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 or P0172 detected?
Is it difficult to start engine?



PBIB2334E

Yes or No

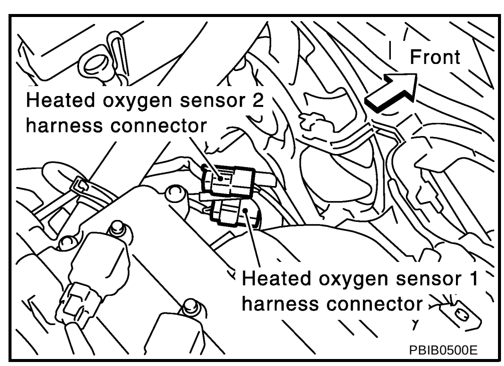
Yes >> Perform trouble diagnosis for DTC P0171 or P0172. Refer to EC-267, "DTC P0171 FUEL INJECTION SYSTEM FUNCTION" or EC-274, "DTC P0172 FUEL INJECTION SYSTEM FUNCTION" .
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Disconnect heated oxygen sensor 2 harness connector.
4. Check harness continuity between ECM terminal 78 and HO2S2 terminal 3.
Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground or short to power.



PBIB0500E

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 74 and HO2S2 terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-265, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

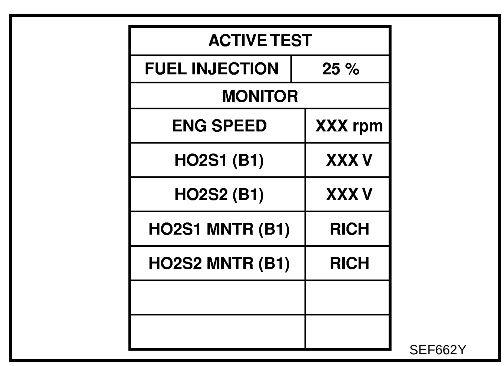
Component Inspection

ABS00COG

HEATED OXYGEN SENSOR 2

With CONSULT-II

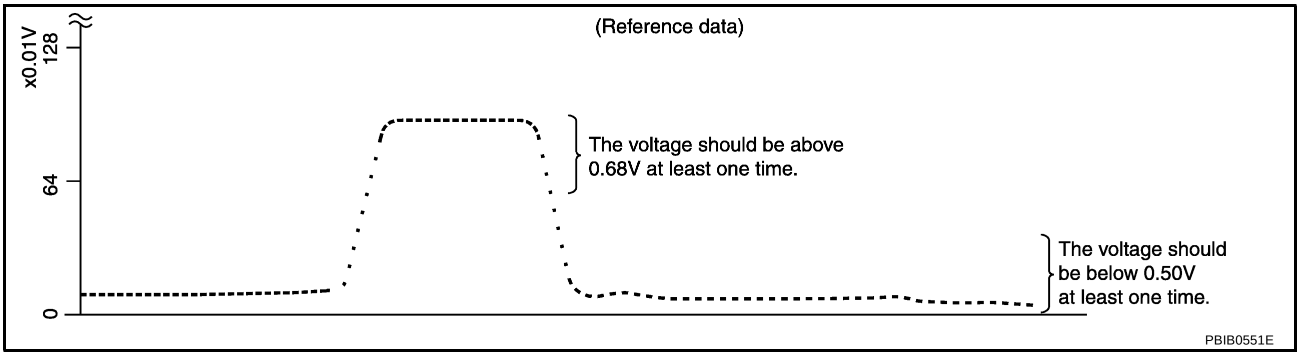
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



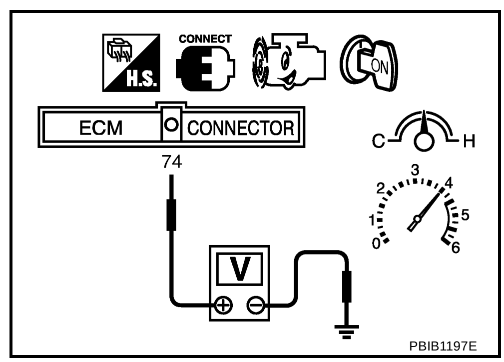
“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is –25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68V at least once during this procedure.
   If the voltage is above 0.68V at step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), 3rd gear position (M/T).
   The voltage should be below 0.50V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00COH

HEATED OXYGEN SENSOR 2

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

DTC P0171 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

ABS00D76

With the Air-Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0171 0171	Fuel injection system too lean	● Fuel injection system does not operate properly. ● The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.)	● Intake air leaks ● Heated oxygen sensor 1 ● Fuel injector ● Exhaust gas leaks ● Incorrect fuel pressure ● Lack of fuel ● Mass air flow sensor ● Incorrect PCV hose connection

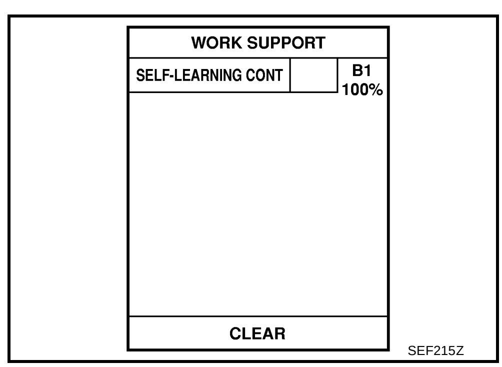
DTC Confirmation Procedure

ABS00D77

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Select “DATA MONITOR” mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes.
   The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to EC-270, "Diagnostic Procedure" .
   NOTE:
   If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.



SEF215Z

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

   The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

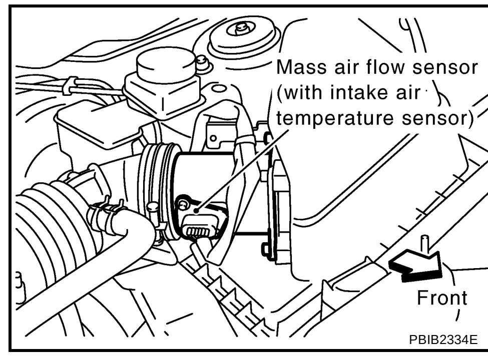
Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)

Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.
8. Crank engine while depressing accelerator pedal. If engine starts, go to EC-270, "Diagnostic Procedure" . If engine does not start, check exhaust and intake air leak visually.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector.
4. Restart engine and let it idle for at least 5 seconds.
5. Stop engine and reconnect mass air flow sensor harness connector.
6. Select Service $03 with GST. Make sure DTC P0102 is detected.
7. Select Service $04 with GST and erase the DTC P0102.
8. Start engine again and let it idle for at least 10 minutes.
9. Select Service $07 with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to EC-270, "Diagnostic Procedure" .



NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for 10 minutes. Refer to the table below.
Hold the accelerator pedal as steady as possible.

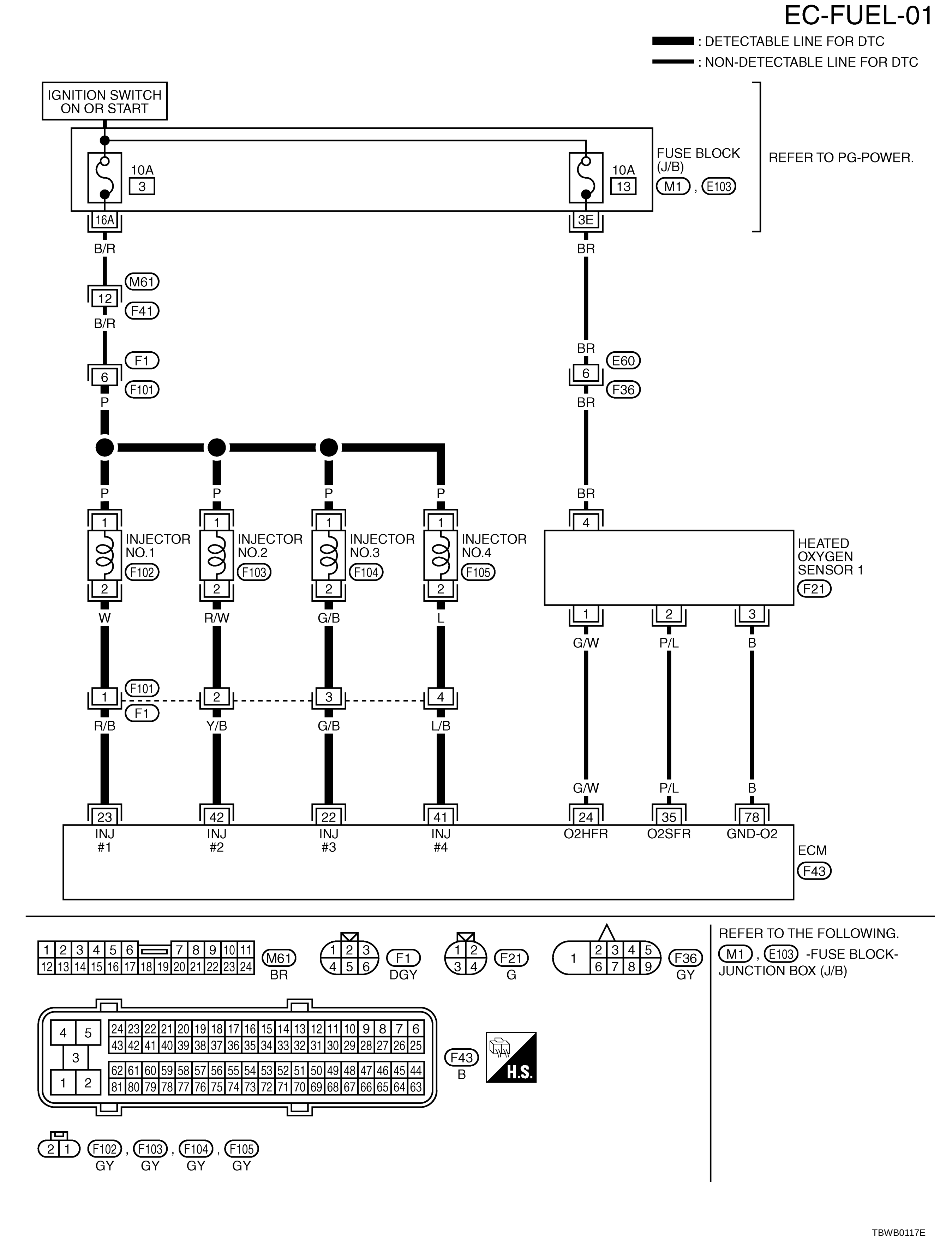
The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

10. If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
11. Crank engine while depressing accelerator pedal. If engine starts, go to EC-270, "Diagnostic Procedure" . If engine does not start, check exhaust and intake air leak visually.

Wiring Diagram

ABS00D78

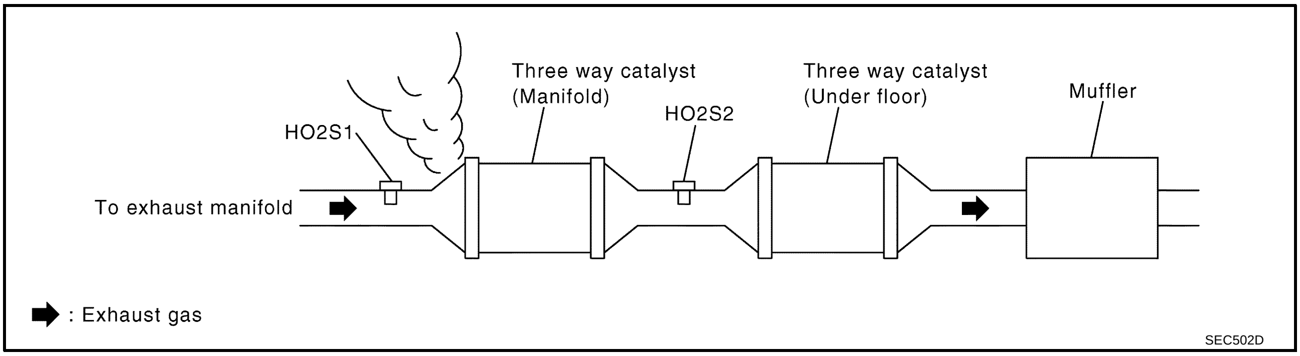


Diagnostic Procedure

ABS00D8C

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

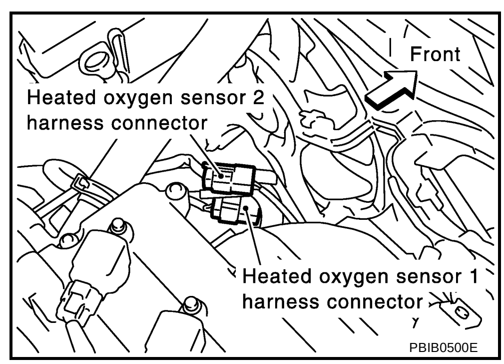
2. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Listen for an intake air leak after the mass air flow sensor.
2. Check PCV hose connection.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT



1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S1 terminal 2 and ECM terminal 35.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

6. Also check harness for short to power and short ground.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-90, "FUEL PRESSURE RELEASE" .
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-91, "FUEL PRESSURE CHECK" .

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm^2 , 51 psi)

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to EC-613, "FUEL PUMP CIRCUIT" .)
- Fuel pressure regulator (Refer to EC-90, "Fuel Pressure Check" .)
- Fuel lines (Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .)
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-II

1. Install all removed parts.
2. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-II.

1.0 - 4.0 g·m/sec:	**at idling**
4.0 - 10 g·m/sec:	**at 2,500 rpm**

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in Service $01 with GST.

1.0 - 4.0 g·m/sec:	**at idling**
4.0 - 10 g·m/sec:	**at 2,500 rpm**

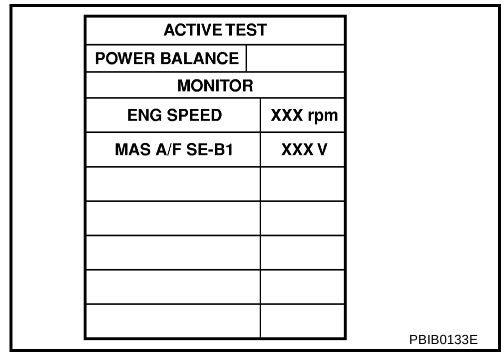
OK or NG

OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-182, "DTC P0101 MAF SENSOR" .

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-II

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.

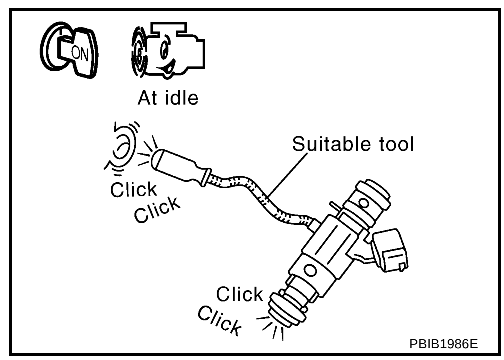


PBIB0133E

Without CONSULT-II

1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



PBIB1986E

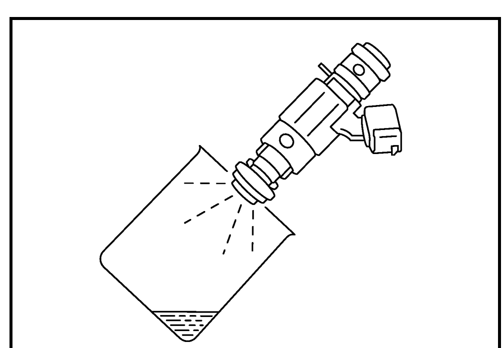
OK or NG

OK >> GO TO 8.
NG >> Perform trouble diagnosis for EC-607, "INJECTOR CIRCUIT" .

8. CHECK FUEL INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch OFF.
3. Remove fuel injector gallery assembly. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   Keep fuel hose and all injectors connected to fuel injector gallery.
   The fuel injector harness connectors should remain connected.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injector.
6. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

Fuel should be sprayed evenly for each fuel injector.


PBIB1726E

OK or NG

OK >> GO TO 9.
NG >> Replace injectors from which fuel does not spray out. Always replace O-ring with new ones.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P0172 FUEL INJECTION SYSTEM FUNCTION

PFP:16600

On Board Diagnosis Logic

ABS00D7A

With the Air-Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.
In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection control	Fuel injector

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible Cause
P0172 0172	Fuel injection system too rich	• Fuel injection system does not operate properly. • The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.)	• Heated oxygen sensor 1 • Fuel injector • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor

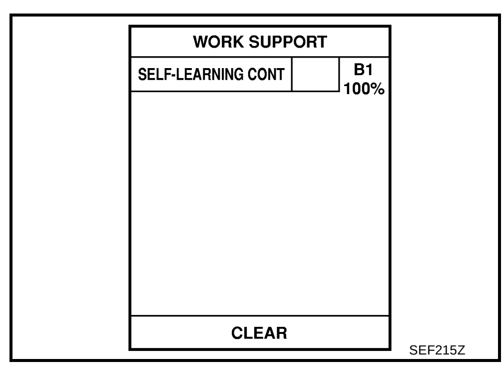
DTC Confirmation Procedure

ABS00D7B

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
4. Clear the self-learning control coefficient by touching “CLEAR”.
5. Select “DATA MONITOR” mode with CONSULT-II.
6. Start engine again and let it idle for at least 10 minutes.
   The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to EC-277, "Diagnostic Procedure" .
   NOTE:
   If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.



SEF215Z

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

   The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

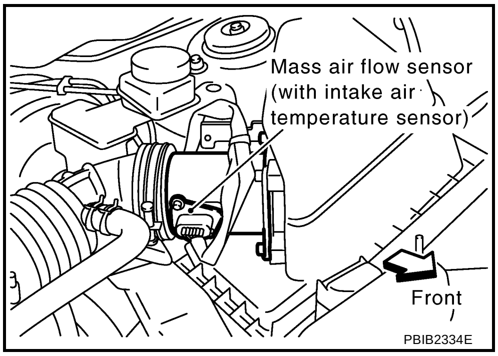
Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

7. If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.

8. Crank engine while depressing accelerator pedal.
   If engine starts, go to EC-277, "Diagnostic Procedure" . If engine does not start, remove spark plugs and check for fouling, etc.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Select Service $03 with GST. Make sure DTC P0102 is detected.
6. Select Service $04 with GST and erase the DTC P0102.
7. Start engine again and let it idle for at least 10 minutes.
8. Select Service $07 with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to EC-277, "Diagnostic Procedure" .



NOTE:
If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

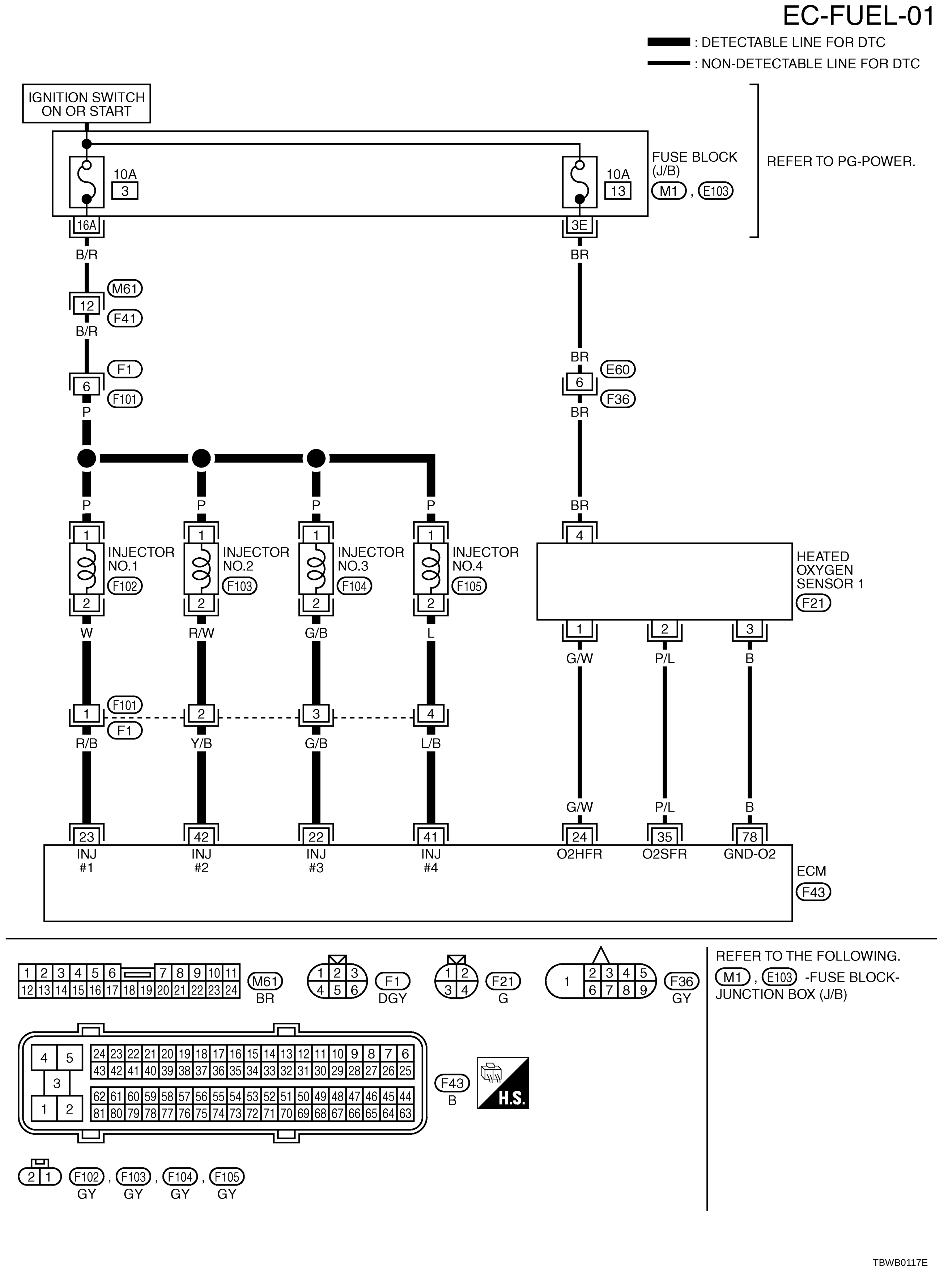
   The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the freeze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

9. If it is difficult to start engine at step 7, the fuel injection system has a malfunction.
10. Crank engine while depressing accelerator pedal.
    If engine starts, go to EC-277, "Diagnostic Procedure" . If engine does not start, remove ignition plugs and check for fouling, etc.

Wiring Diagram

ABS00D7C

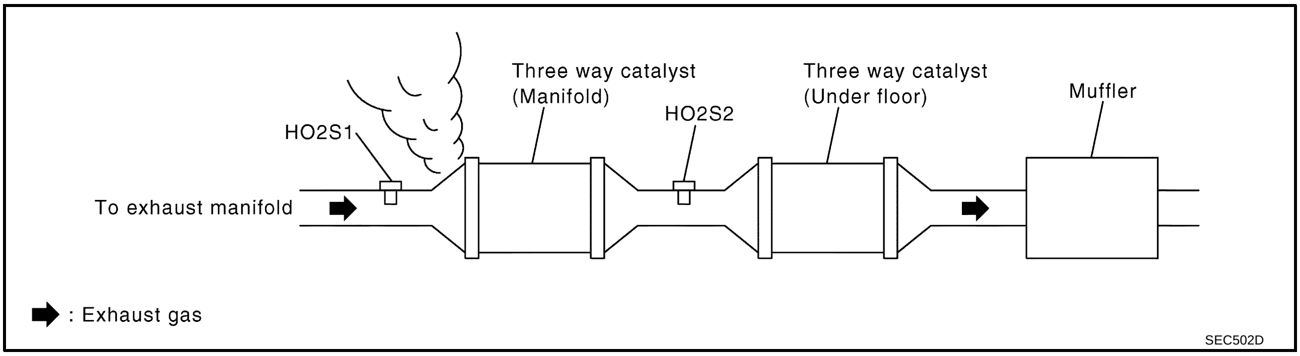


Diagnostic Procedure

ABS00D8D

1. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before three way catalyst (manifold).



OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK FOR INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK HEATED OXYGEN SENSOR 1 CIRCUIT FOR OPEN AND SHORT

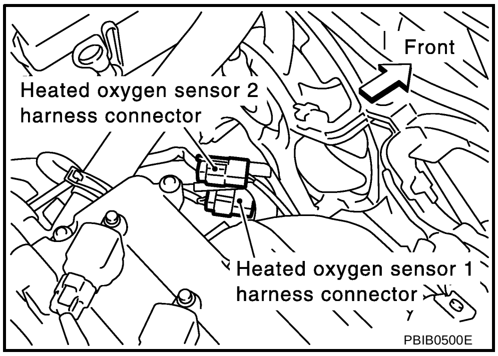
1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 (HO2S1) harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S1 terminal 2 and ECM terminal 35.
Refer to Wiring Diagram.

Continuity should exist.

5. Check harness continuity between ECM terminal 35 or HO2S1 terminal 2 and ground.
Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power and short to ground.



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK FUEL PRESSURE

1. Release fuel pressure to zero. Refer to EC-90, "FUEL PRESSURE RELEASE" .
2. Install fuel pressure gauge and check fuel pressure. Refer to EC-91, "FUEL PRESSURE CHECK" .

At idling: Approximately 350 kPa (3.5 bar, 3.57 kg/cm2, 51 psi)

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to EC-613, "FUEL PUMP CIRCUIT" .)
- Fuel pressure regulator (Refer to EC-90, "Fuel Pressure Check" .)
- Fuel lines (Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .)
- Fuel filter for clogging

>> Repair or replace.

6. CHECK MASS AIR FLOW SENSOR

With CONSULT-II

1. Install all removed parts.
2. Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-II.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10 g·m/sec: at 2,500 rpm

With GST

1. Install all removed parts.
2. Check mass air flow sensor signal in Service $01 with GST.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10 g·m/sec: at 2,500 rpm

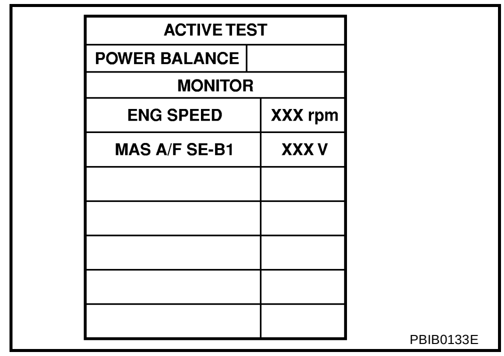
OK or NG

OK >> GO TO 7.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-182, "DTC P0101 MAF SENSOR" .

7. CHECK FUNCTION OF FUEL INJECTORS

With CONSULT-II

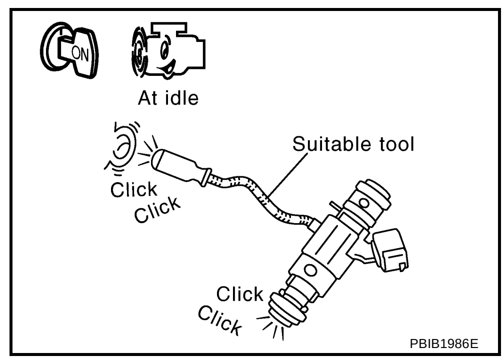
1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.



Without CONSULT-II

1. Start engine.
2. Listen to each fuel injector operating sound.

Clicking noise should be heard.



OK or NG

OK >> GO TO 8.
NG >> Perform trouble diagnosis for EC-607, "INJECTOR CIRCUIT" .

8. CHECK FUEL INJECTOR

1. Remove fuel injector assembly. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   Keep fuel hose and all injectors connected to fuel injector gallery.
2. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
3. Disconnect fuel injector harness connectors.
4. Disconnect all ignition coil harness connectors.
5. Prepare pans or saucers under each fuel injectors.
6. Crank engine for about 3 seconds.
   Make sure fuel does not drip from fuel injector.

OK or NG

OK (Does not drip.)>>GO TO 9.
NG (Drips.)>>Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

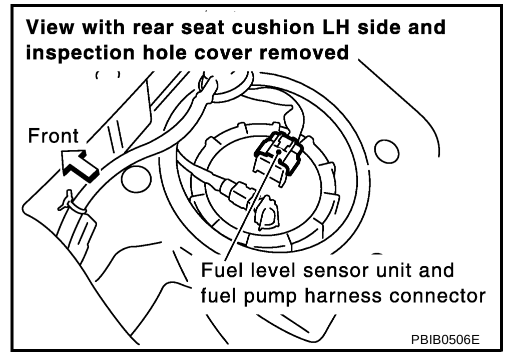
DTC P0181 FTT SENSOR

PFP:22630

Component Description

ABS00COQ

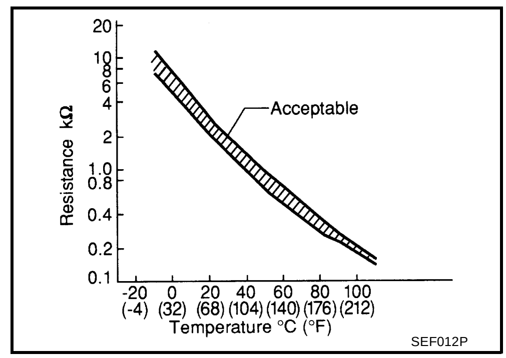
The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference value and is measured between ECM terminal 107 (Fuel tank temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use ground other than ECM, such as ground.

On Board Diagnosis Logic

ABS00COR

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/ performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	● Harness or connectors (The sensor circuit is open or shorted) ● Fuel tank temperature sensor

DTC Confirmation Procedure

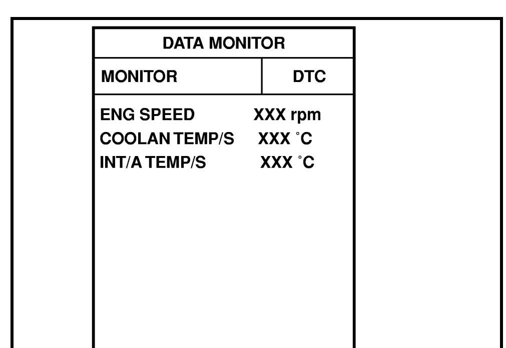
ABS00COS

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 10 seconds.
   If the result is NG, go to EC-283, "Diagnostic Procedure" .
   If the result is OK, go to following step.
4. Check “COOLAN TEMP/S” value.
   If the “COOLAN TEMP/S” is less than 60°C (140°F), the result will be OK.
   If the “COOLAN TEMP/S” is above 60°C (140°F), go to the following step.
5. Cool engine down until “COOLAN TEMP/S” signal is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to EC-283, "Diagnostic Procedure" .



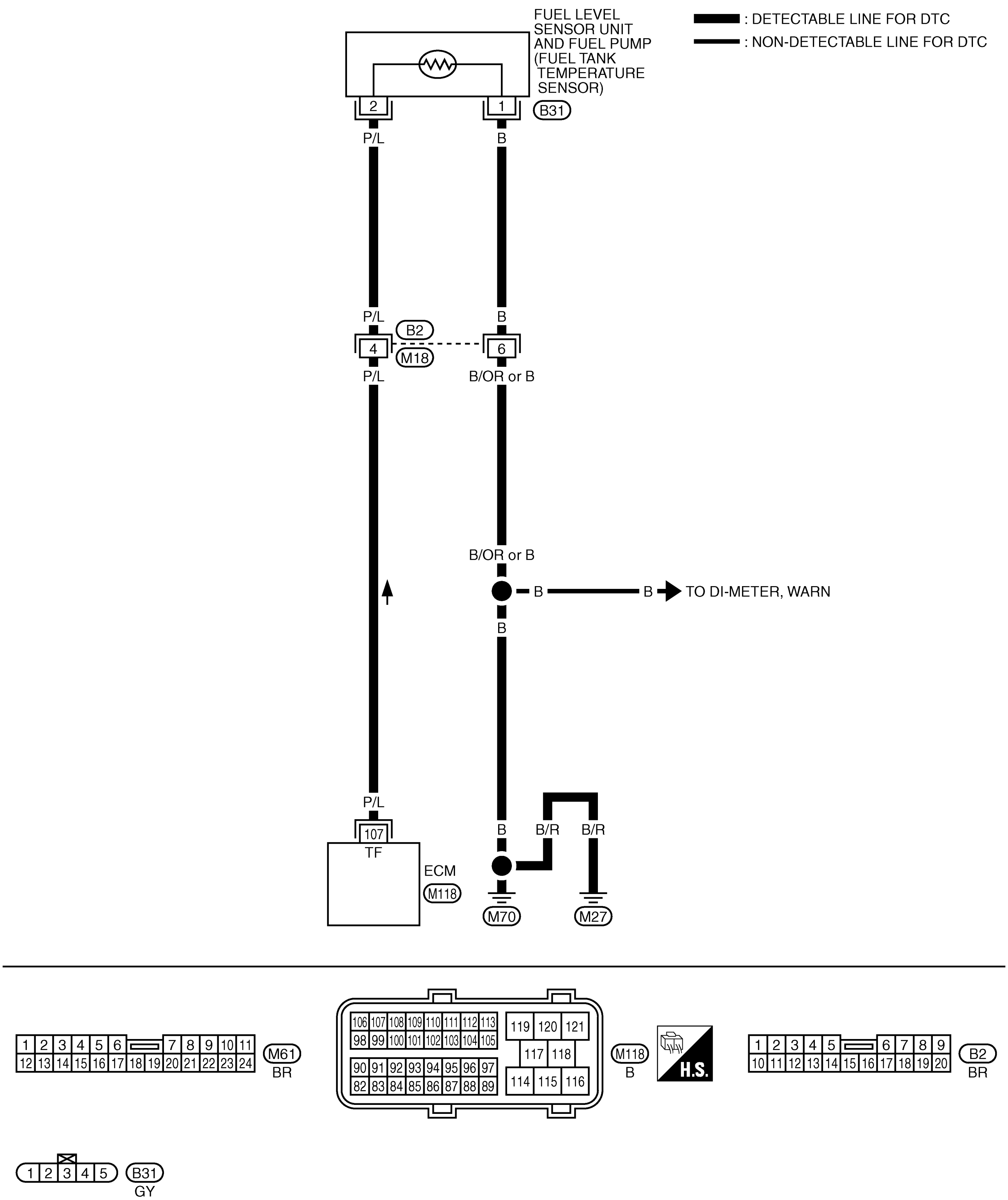
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00COT

EC-FTTS-01



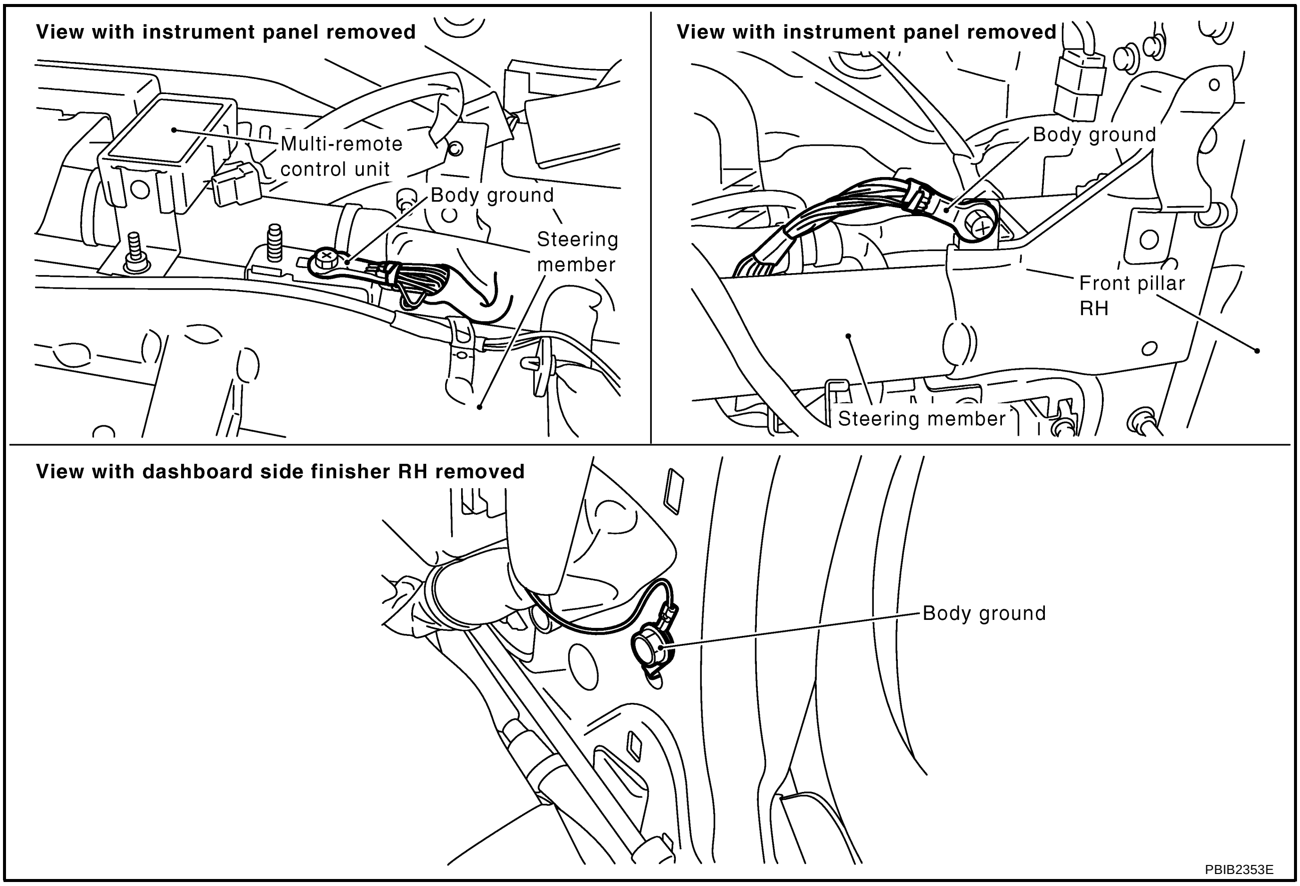
TBWB0118E

Diagnostic Procedure

ABS00COU

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .



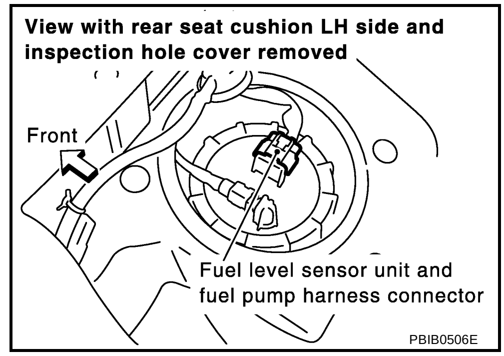
OK or NG

OK >> GO TO 2.

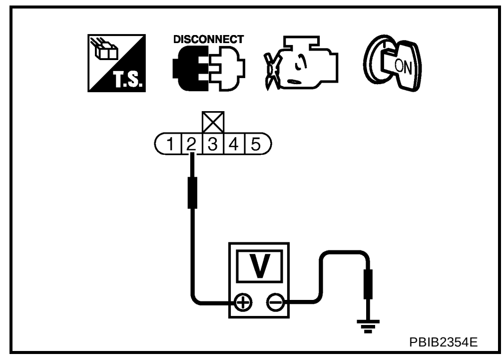
NG >> Repair or replace ground connections.

2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect “fuel level sensor unit and fuel pump” harness connector.
3. Turn ignition switch ON.



4. Check voltage between “fuel level sensor unit and fuel pump” terminal 2 and ground with CONSULT-II or tester.



Voltage: Approximately 5V

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M18
- Harness for open or short between ECM and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to ground or short to power in harness or connector.

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 1 and ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M18
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM.

>> Repair open circuit or short to power in harness or connectors.

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, EC-285, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace fuel level sensor unit.

7. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

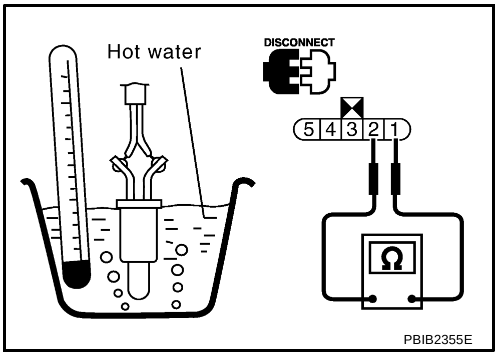
Component Inspection

ABS00COV

FUEL TANK TEMPERATURE SENSOR

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90



PBIB2355E

Removal and Installation

ABS00COW

FUEL TANK TEMPERATURE SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

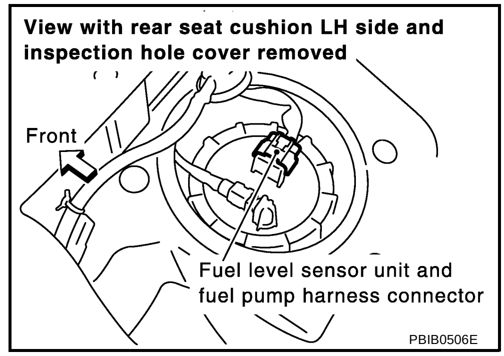
DTC P0182, P0183 FTT SENSOR

PFP:22630

Component Description

ABS00COX

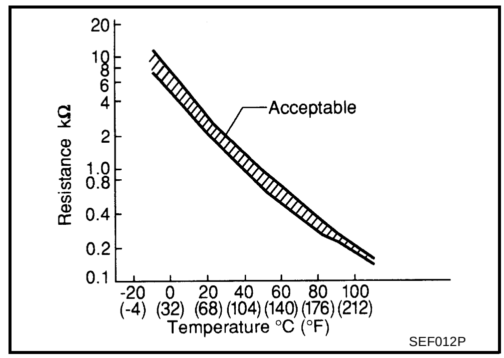
The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference value and is measured between ECM terminal 107 (Fuel tank temperature sensor) and ground.



CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use ground other than ECM, such as ground.

On Board Diagnosis Logic

ABS00COY

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0182 0182	Fuel tank temperature sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Fuel tank temperature sensor
P0183 0183	Fuel tank temperature sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

DTC Confirmation Procedure

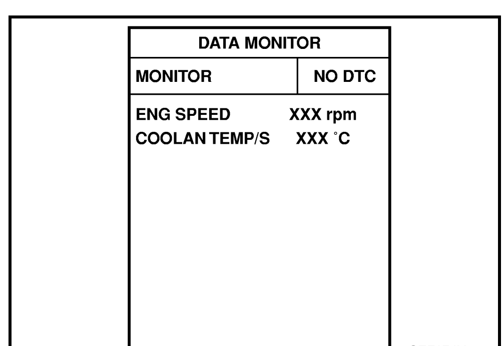
ABS00COZ

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-288, "Diagnostic Procedure".



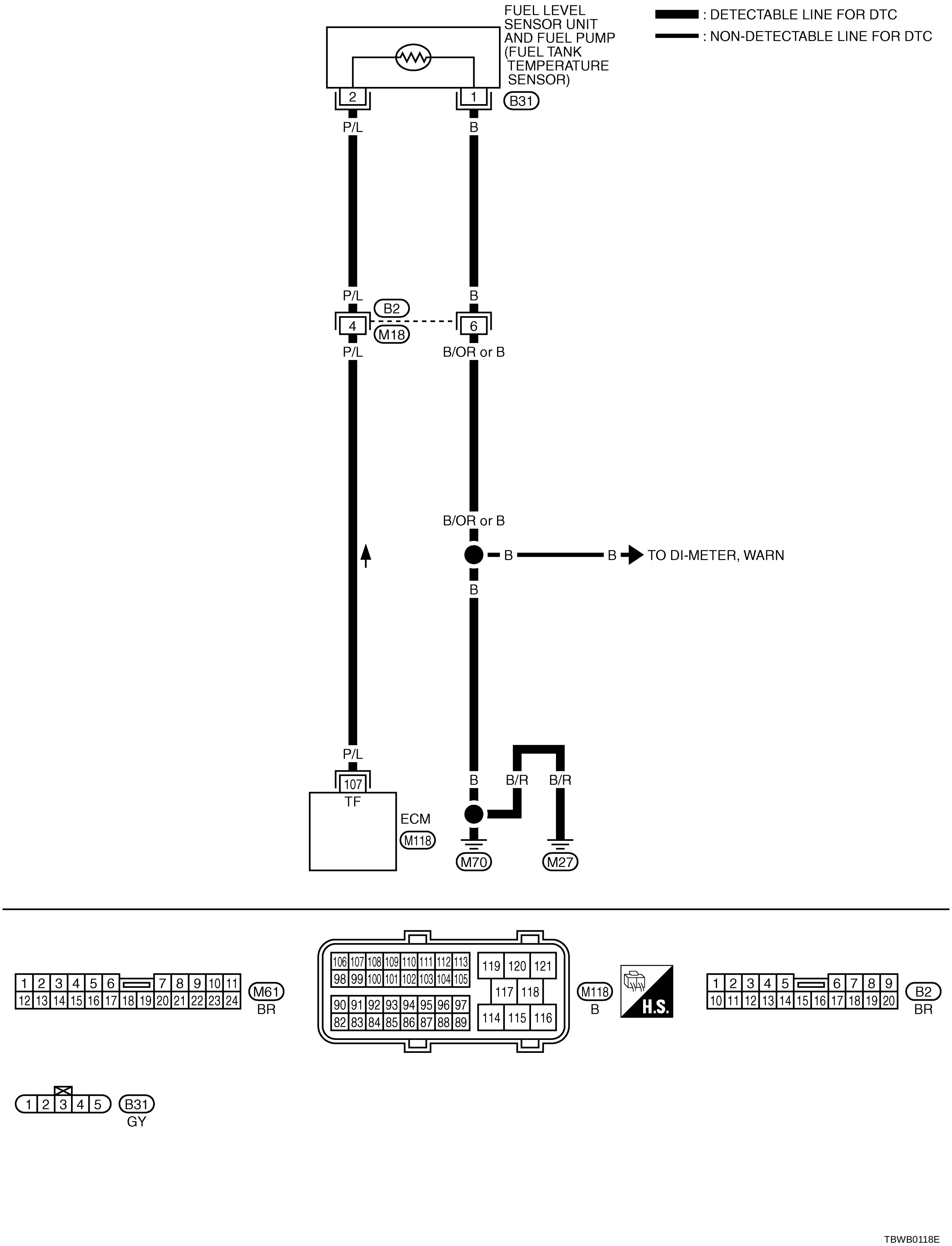
WITH GST

Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

ABS00CP0

EC-FTTS-01

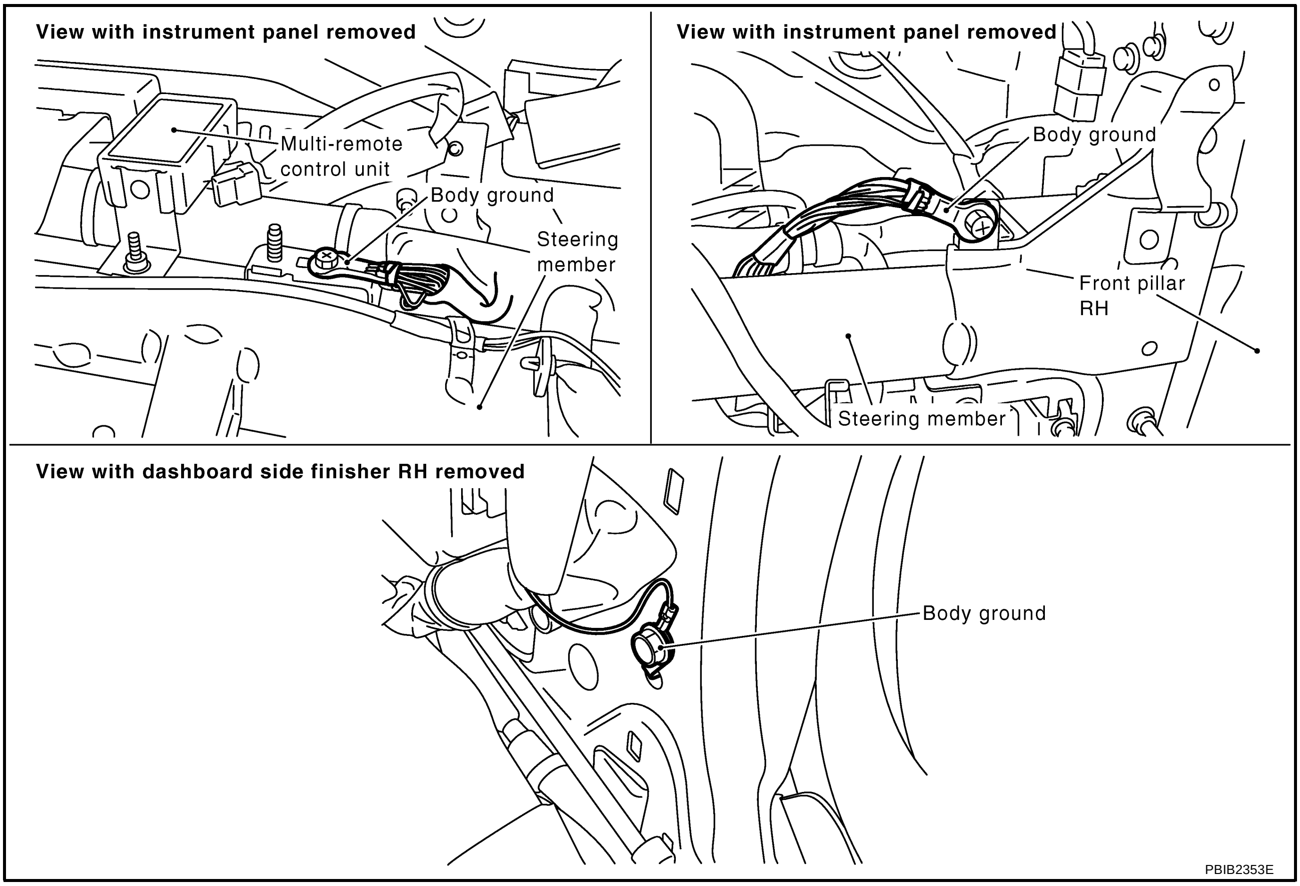


Diagnostic Procedure

ABS00CP1

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .



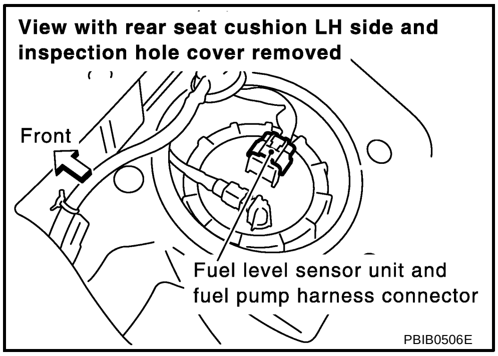
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

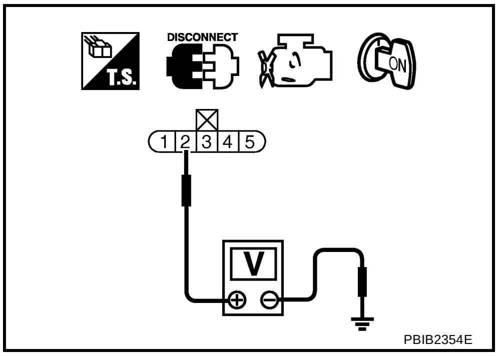
2. CHECK FUEL TANK TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Turn ignition switch ON.



3. Check voltage between “fuel level sensor unit and fuel pump” terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M18
- Harness for open or short between ECM and “fuel level sensor unit and fuel pump”

>> Repair open circuit or short to ground or short to power in harness or connector.

4. CHECK FUEL TANK TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between “fuel level sensor unit and fuel pump” terminal 1 and ground. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M18
- Harness for open or short between “fuel level sensor unit and fuel pump” and ECM

>> Repair open circuit or short to power in harness or connector.

6. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to, EC-290, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace “fuel level sensor unit and fuel pump”.

7. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

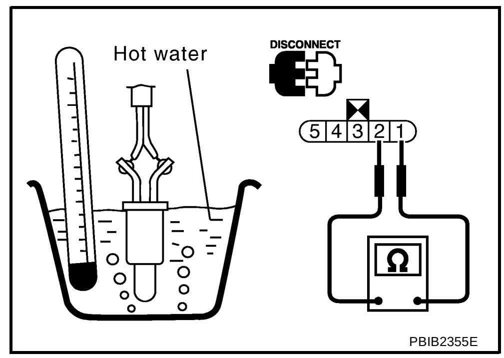
ABS00CP2

FUEL TANK TEMPERATURE SENSOR

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace “fuel level sensor unit and fuel pump”.



Removal and Installation

ABS00CP3

FUEL TANK TEMPERATURE SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

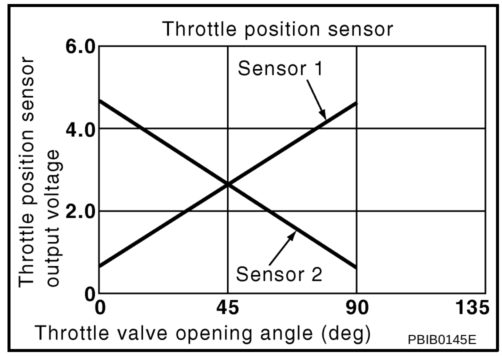
DTC P0222, P0223 TP SENSOR

PFP:16119

Component Description

ABS00CP4

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CP5

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN 1 THRTL SEN 2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T), 1ST (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, it differs from ECM terminals voltage signal.

On Board Diagnosis Logic

ABS00CP6

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0222 0222	Throttle position sensor 1 circuit low input	An excessively low voltage from the TP sensor 1 is sent to ECM.	● Harness or connectors (The TP sensor 1 circuit is open or shorted.) (The APP sensor 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 1) ● Accelerator pedal position sensor (APP sensor 2)
P0223 0223	Throttle position sensor 1 circuit high input	An excessively high voltage from the TP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

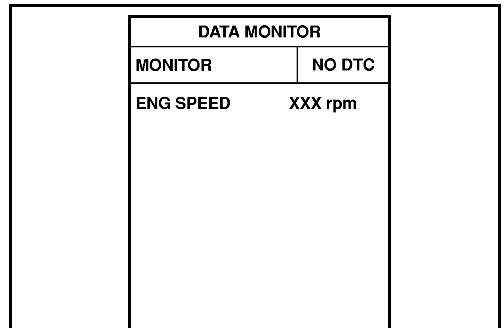
DTC Confirmation Procedure

ABS00CP7

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-295, "Diagnostic Procedure" .



SEF058Y

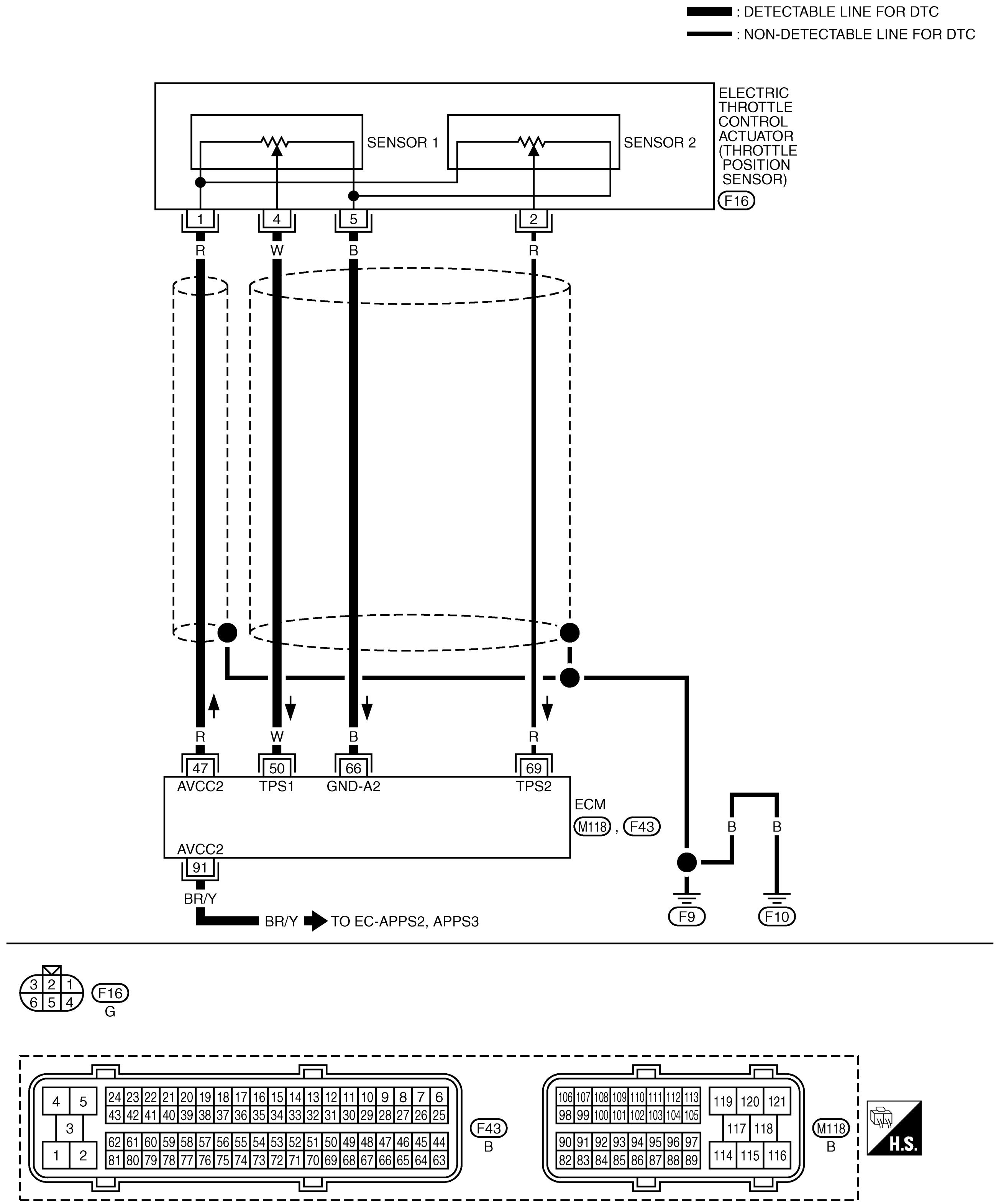
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CP8

EC-TPS1-01



TBWB0119E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

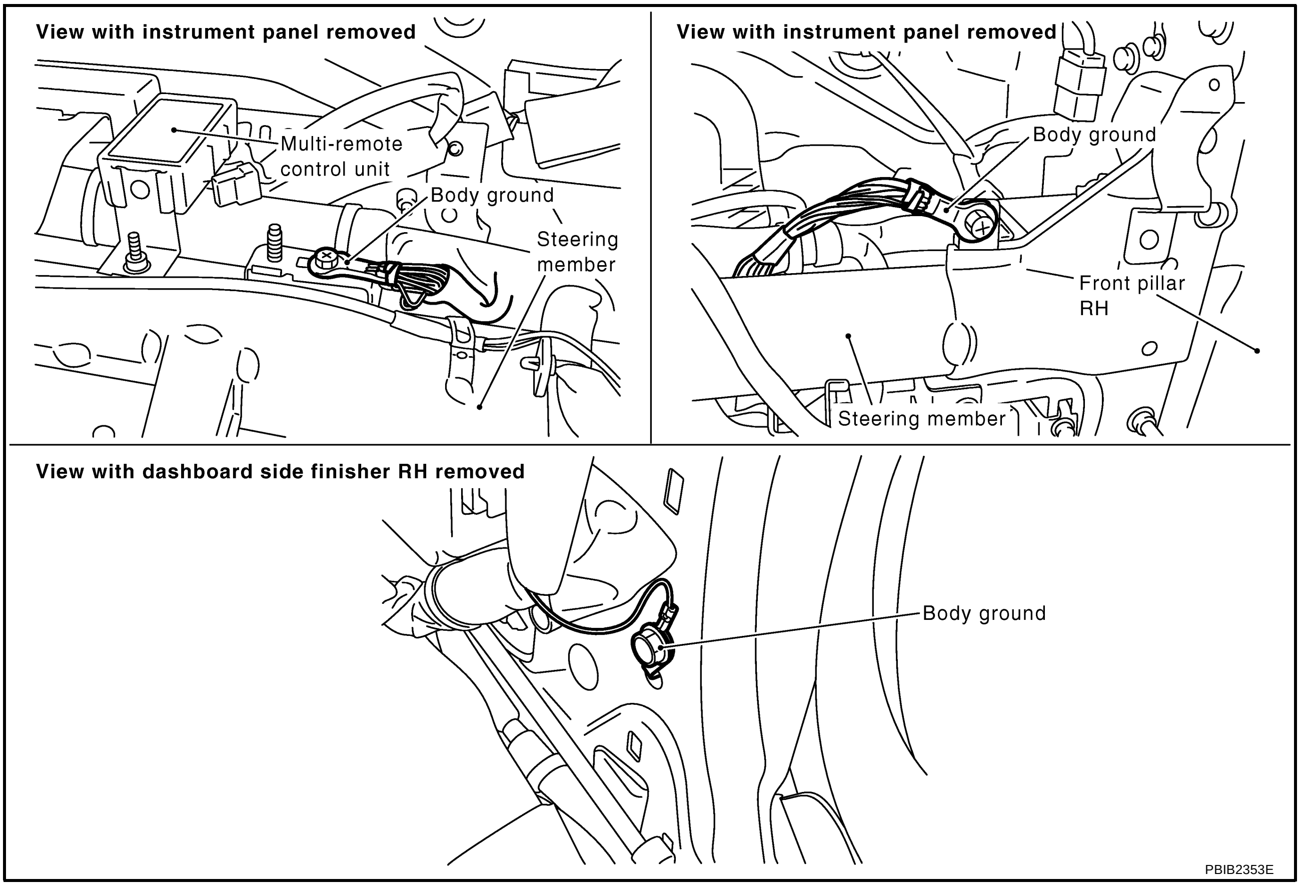
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	R	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5V
50	W	Throttle position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
69	R	Throttle position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	More than 0.36V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V

Diagnostic Procedure

ABS00CP9

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .

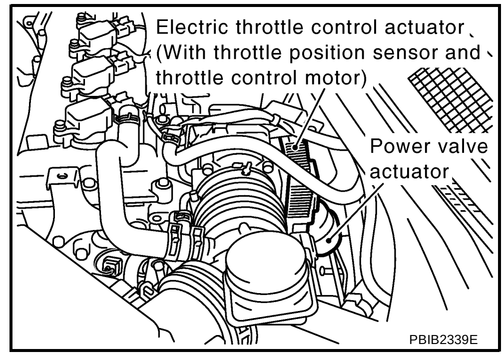


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

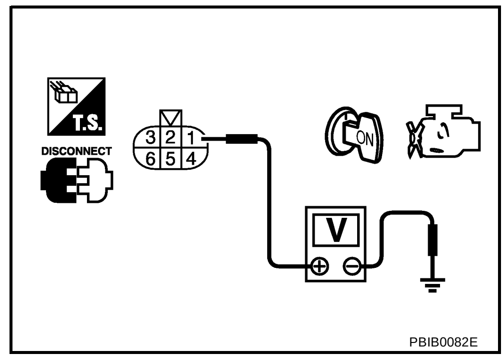
2. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK THROTTLE POSITION SENSOR 1 POWER SUPPLY CIRCUIT-III

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	EC-213
91	APP sensor terminal 4	EC-564

OK or NG

OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to EC-569, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> GO TO 6.

A
EC
C
D
E
F
G
H
I
J
K
L
M

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK THROTTLE POSITION SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 66 and electric throttle control actuator terminal 5. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK THROTTLE POSITION SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 50 and electric throttle control actuator terminal 4. Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE POSITION SENSOR

Refer to EC-298, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

11. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

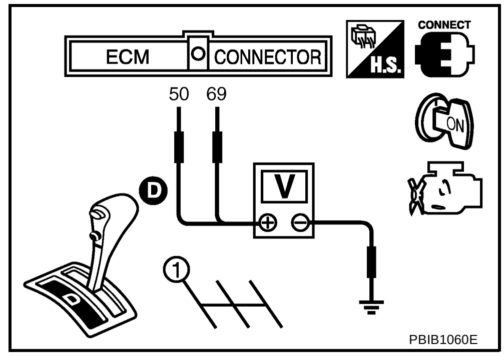
>> **INSPECTION END**

Component Inspection

ABS00CPA

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set shift lever to D (A/T) or 1st (M/T) position.
5. Check voltage between ECM terminals 50 (TP sensor 1 signal), 69 (TP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-88, "Throttle Valve Closed Position Learning" .
8. Perform EC-88, "Idle Air Volume Learning" .

Remove and Installation

ABS00CPB

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "INTAKE MANIFOLD" .

DTC P0300 - P0304 MULTIPLE CYLINDER MISFIRE, NO. 1 - 4 CYLINDER MISFIRE

PFP:00000

On Board Diagnosis Logic

ABS00CPC

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position (CKP) sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three way catalyst damage)
   On the 1st trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.
   When a misfire condition occurs, the ECM monitors the CKP sensor (POS) signal every 200 engine revolutions for a change.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.
   If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.
   When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.
   If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)
   For misfire conditions that will not damage the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a 2nd trip. During this condition, the ECM monitors the CKP sensor signal every 1,000 engine revolutions.
   A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0300 0300	Multiple cylinder misfire detected	Multiple cylinder misfire.	● Improper spark plug ● Insufficient compression ● Incorrect fuel pressure ● The fuel injector circuit is open or shorted ● Fuel injector ● Intake air leak ● The ignition signal circuit is open or shorted ● Lack of fuel ● Drive plate or flywheel ● Heated oxygen sensor 1 ● Incorrect PCV hose connection
P0301 0301	No.1 cylinder misfire detected	No. 1 cylinder misfires.	
P0302 0302	No. 2 cylinder misfire detected	No. 2 cylinder misfires.	
P0303 0303	No. 3 cylinder misfire detected	No. 3 cylinder misfires.	
P0304 0304	No. 4 cylinder misfire detected	No. 4 cylinder misfires.	

DTC Confirmation Procedure

ABS00CPD

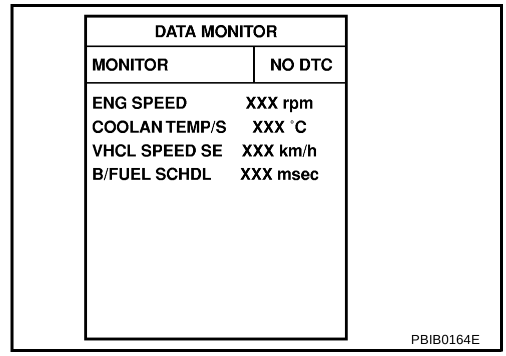
CAUTION:

Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws when driving.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II



1. Turn ignition switch ON, and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Restart engine and let it idle for about 15 minutes.
5. If 1st trip DTC is detected, go to EC-300, "Diagnostic Procedure" .

   NOTE:
   If 1st trip DTC is not detected during above procedure, performing the following procedure is advised.

a. Turn ignition switch OFF and wait at least 10 seconds.
b. Start engine and drive the vehicle under the similar conditions to (1st trip) Freeze Frame Data for a certain time. Refer to the table below.
   Hold the accelerator pedal as steady as possible.

   The similar conditions to (1st trip) Freeze Frame Data means the vehicle operation that the following conditions should be satisfied at the same time.

Engine speed	Engine speed in the freeze frame data ± 400 rpm
Vehicle speed	Vehicle speed in the feaze frame data ± 10 km/h (6 MPH)
Engine coolant temperature (T) condition	When the freeze frame data shows lower than 70 °C (158 °F), T should be lower than 70 °C (158 °F).
	When the freeze frame data shows higher than or equal to 70 °C (158 °F), T should be higher than or equal to 70 °C (158 °F).

   The time to driving varies according to the engine speed in the freeze frame data.

Engine speed	Time
Around 1,000 rpm	Approximately 10 minutes
Around 2,000 rpm	Approximately 5 minutes
More than 3,000 rpm	Approximately 3.5 minutes

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CPE

1. CHECK FOR INTAKE AIR LEAK AND PCV HOSE

1. Start engine and run it at idle speed.
2. Listen for the sound of the intake air leak.
3. Check PCV hose connection.

OK or NG

OK >> GO TO 2.
NG >> Discover air leak location and repair.

2. CHECK FOR EXHAUST SYSTEM CLOGGING

Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.

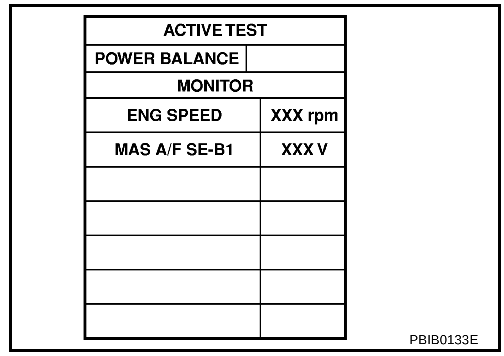
OK or NG

OK >> GO TO 3.
NG >> Repair or replace it.

3. PERFORM POWER BALANCE TEST

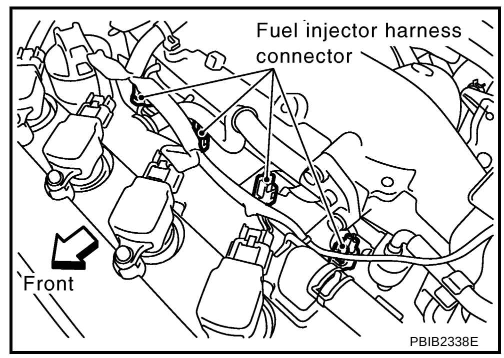
With CONSULT-II

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?



Without CONSULT-II

When disconnecting each fuel injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

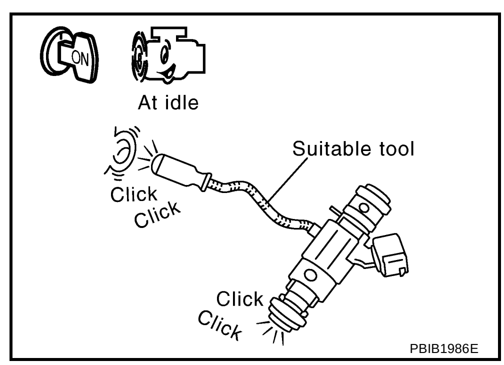


Yes or No

Yes >> GO TO 4.
No >> GO TO 9.

4. CHECK FUEL INJECTOR

Does each fuel injector make an operating sound at idle?



Yes or No

Yes >> GO TO 5.
No >> Check fuel injector(s) and circuit(s). Refer to EC-607, "INJECTOR CIRCUIT" .

5. CHECK FUNCTION OF IGNITION COIL-I

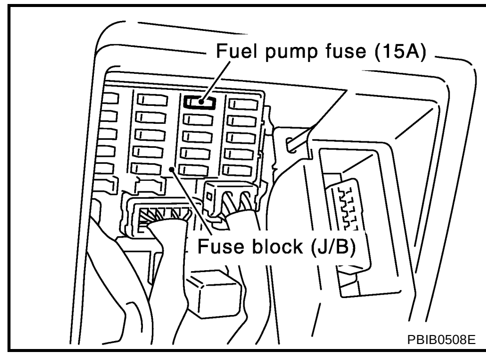
CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse located in fuse box to release fuel pressure.

   NOTE:

   Do not use CONSULT-II to release fuel pressure, or fuel pressure applies again during the following procedure.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.



7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.

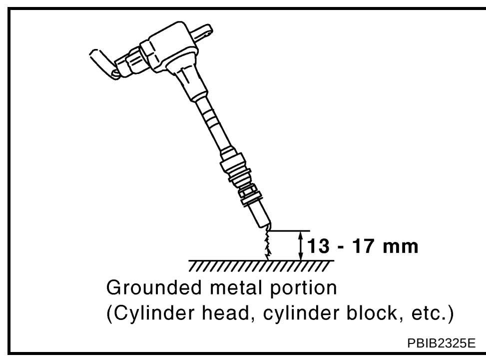
    Spark should be generated.

    CAUTION:

    - **Do not approach to the spark plug and the ignition coil within 50cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
    - **It might cause to damage the ignition coil if the gap of more than 17 mm is taken.**

    NOTE:

    When the gap is 13 mm or less, the spark might be generated even if the coil is malfunctioning.



OK or NG

OK >> GO TO 9.
NG >> GO TO 6.

6. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

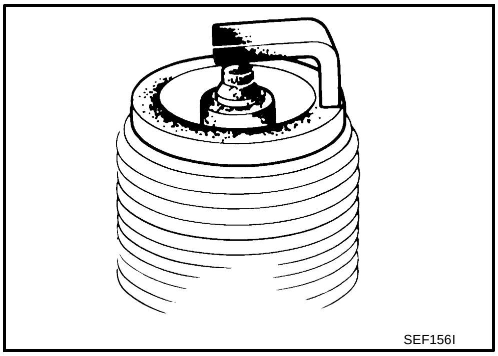
   Spark should be generated.

OK or NG

OK >> GO TO 7.
NG >> Check ignition coil, power transistor and their circuits. Refer to EC-586, "IGNITION SIGNAL" .

7. CHECK SPARK PLUG

Check the spark plugs and check for fouling, etc.


SEF156I

OK or NG

OK >> GO TO 8.
NG >> Repair or replace spark plug (s) with standard type one (s). For spark plug type ignition coil. Refer to MA-18, "Changing Spark Plugs (Platinum-Tipped Type)" .

8. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

OK >> **INSPECTION END**
NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-18, "Changing Spark Plugs (Platinum-Tipped Type)" .

9. CHECK COMPRESSION PRESSURE

Check compression pressure.
Refer to EM-62, "CHECKING COMPRESSION PRESSURE" .

Standard:	**1,250 kPa (12,8 kg/cm^2 , 181 psi)/300 rpm**
Minimum:	**1,060 kPa (10,8 kg/cm^2 , 154 psi)/300 rpm**
Difference between each cylinder:	**98 kPa (1.0 kg/cm^2 , 14 psi)/300 rpm**

OK or NG

OK >> GO TO 10.
NG >> Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

10. CHECK FUEL PRESSURE

1. Install all removed parts.
2. Release fuel pressure to zero. Refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Install fuel pressure gauge and check fuel pressure.

At idle: Approximately. 350 kPa (3.57 kg/cm^2 , 51 psi)

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Fuel pump and circuit (Refer to EC-613, "FUEL PUMP CIRCUIT" .)
- Fuel pressure regulator (Refer to EC-90, "Fuel Pressure Check" .)
- Fuel lines (Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .)
- Fuel filter for clogging

\>> Repair or replace.

12. CHECK IGNITION TIMING

Checking the following items. Refer to EC-70, "Basic Inspection" .

Items	Specifications	
Target idle speed	M/T	700 ± 50 rpm (in Neutral position)
	A/T	700 ± 50 rpm (in P or N position)
Ignition timing	M/T	15 ± 5° BTDC (in Neutral position)
	A/T	15 ± 5° BTDC (in P or N position)

OK or NG

OK >> GO TO 13.
NG >> Follow the EC-70, "Basic Inspection" .

13. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-232, "Component Inspection" .

OK or NG

OK >> GO TO 14.
NG >> Replace heated oxygen sensor 1.

14. CHECK MASS AIR FLOW SENSOR

With CONSULT-II

Check “MASS AIR FLOW” in “DATA MONITOR” mode with CONSULT-II.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10.0 g·m/sec: at 2,500 rpm

With GST

Check mass air flow sensor signal in Service $01 with GST.

1.0 - 4.0 g·m/sec: at idling
4.0 - 10.0 g·m/sec: at 2,500 rpm

OK or NG

OK >> GO TO 15.
NG >> Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or ground. Refer to EC-182, "DTC P0101 MAF SENSOR" .

15. CHECK SYMPTOM MATRIX CHART

Check items on the rough idle symptom in EC-103, "Symptom Matrix Chart" .

OK or NG

OK >> GO TO 16.
NG >> Repair or replace.

16. ERASE THE 1ST TRIP DTC

Some tests may cause a 1st trip DTC to be set.
Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .

>> GO TO 17.

17. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

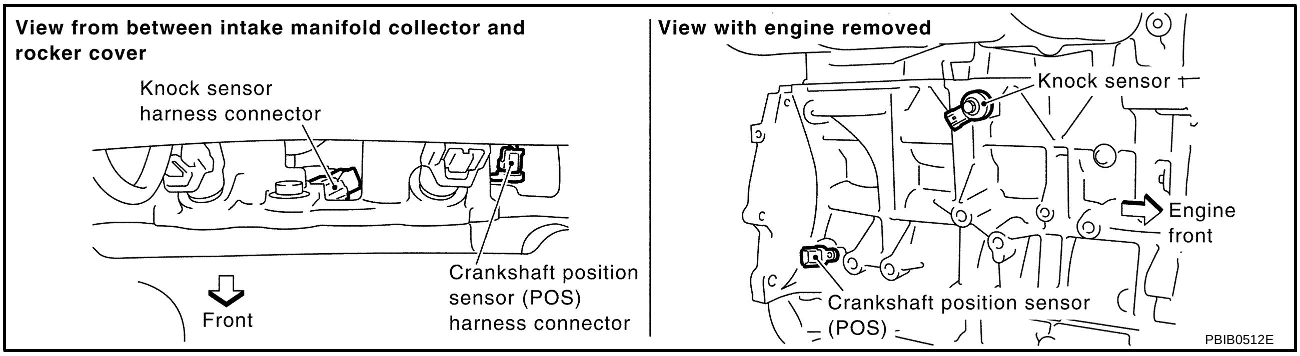
DTC P0327, P0328 KS

PFP:22060

Component Description

ABS00CPF

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM.



On Board Diagnosis Logic

ABS00CPG

The MIL will not light up for these diagnoses.

DTC No.	Trouble Diagnosis Name	DTC Detected Condition	Possible Cause
P0327 0327	Knock sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● Knock sensor
P0328 0328	Knock sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

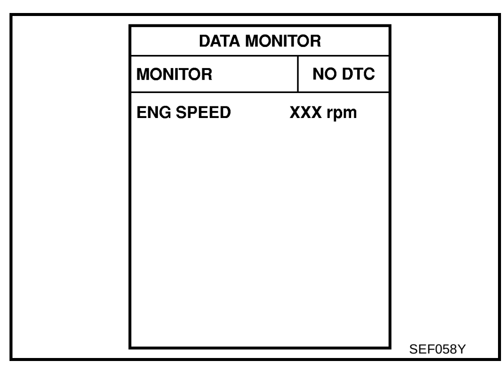
DTC Confirmation Procedure

ABS00CPH

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to EC-308, "Diagnostic Procedure" .

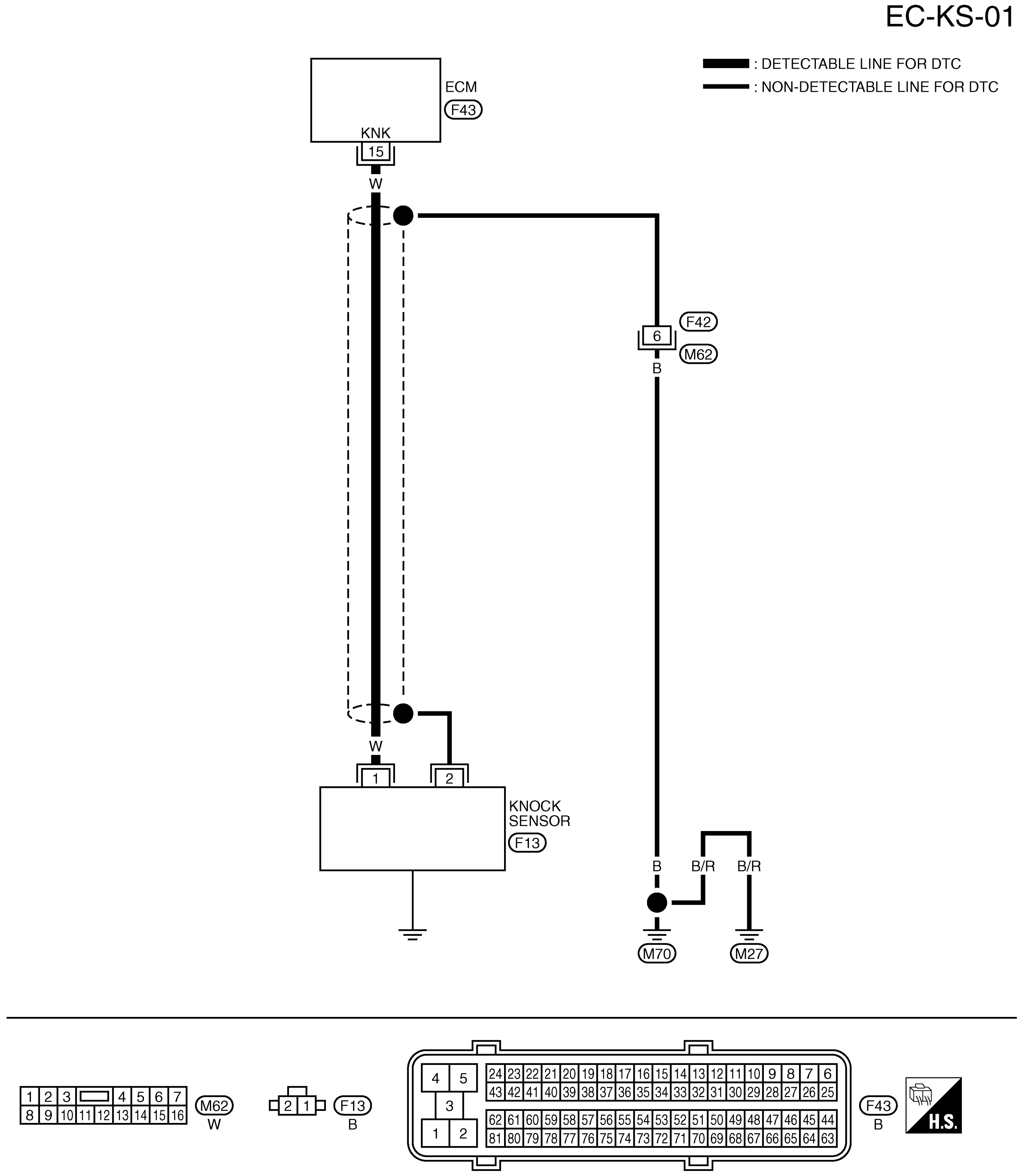


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CPI



TBWB0120E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
15	W	Knock sensor	**[Engine is running]** ● Idle speed	Approximately 2.5V

Diagnostic Procedure

ABS00D8E

1. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-I

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check resistance between ECM terminal 15 and ground. Refer to Wiring Diagram.

   NOTE:

   It is necessary to use an ohmmeter which can measure more than 10 MΩ.

   Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

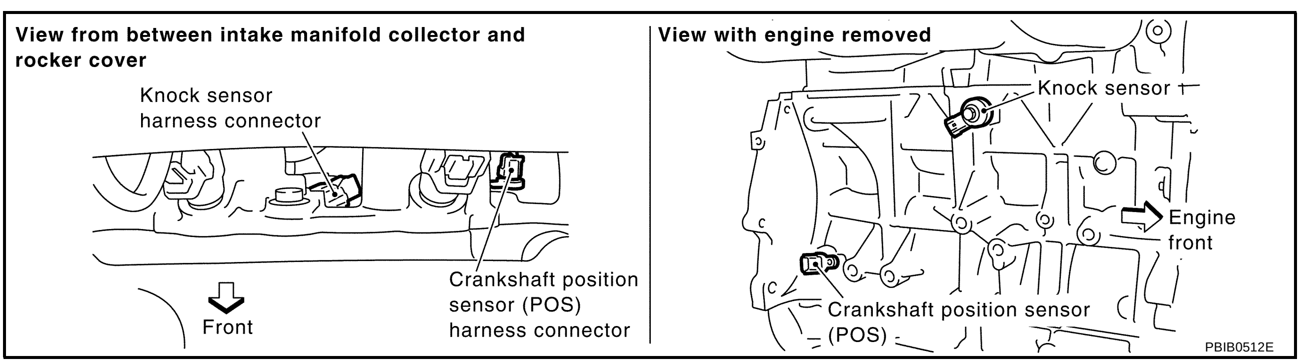
4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK KNOCK SENSOR INPUT SIGNAL CIRCUIT-II

1. Disconnect knock sensor harness connector.



2. Check harness continuity between ECM terminal 15 and knock sensor terminal 1. Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK KNOCK SENSOR

Refer to EC-310, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace knock sensor.

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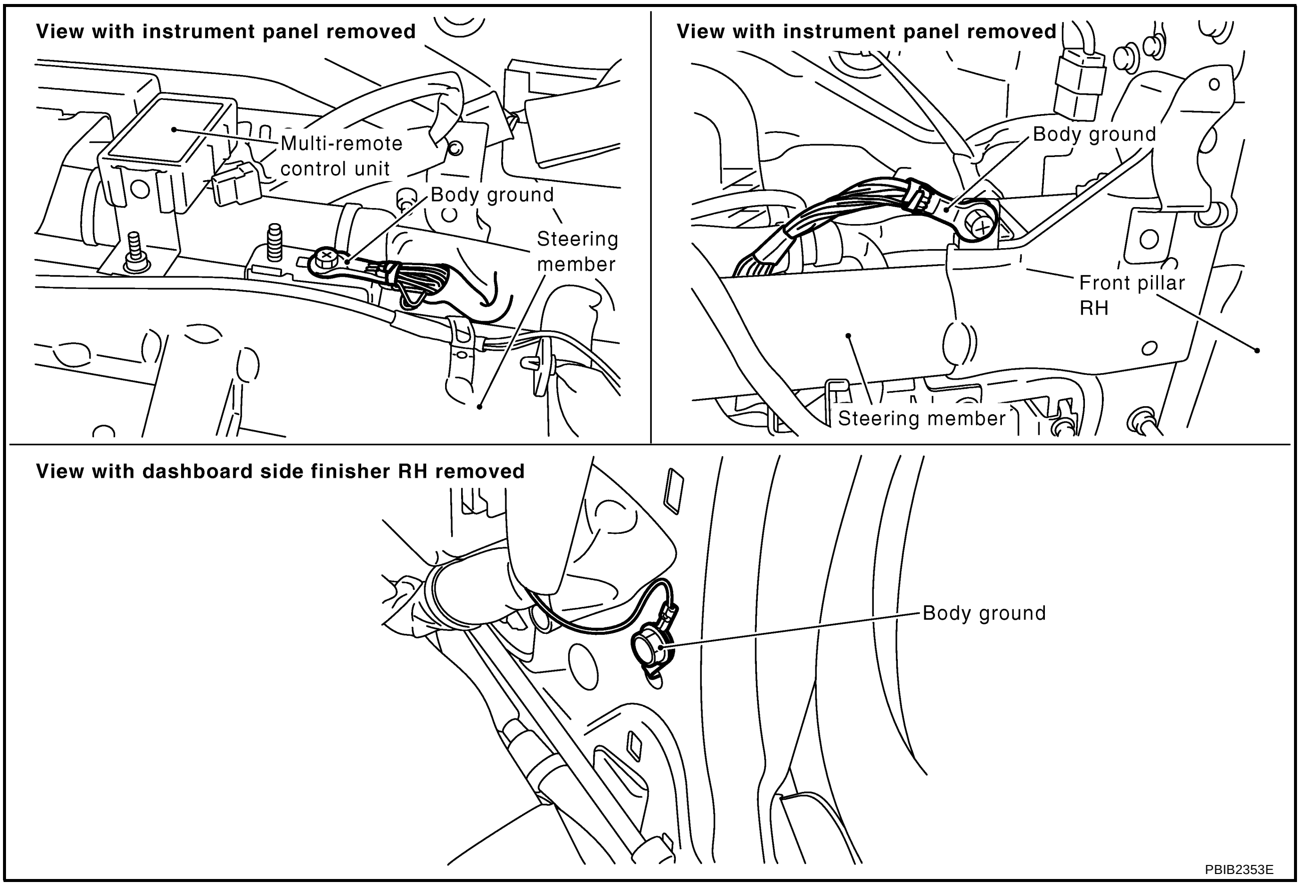
M

4. CHECK GROUND CONNECTIONS

Loosen and retighten ground three screws on the body.
Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 5.
NG >> Repair or replace ground connections.

5. CHECK KNOCK SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT

1. Disconnect knock sensor harness connector.
2. Check harness continuity between knock sensor terminal 2 and ground.

Continuity should exist

3. Also check harness for short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING RART

Check the following.

- Harness connectors F42, M62
- Harness for open or short between knock sensor terminal 2 and ground

>> Repair open circuit or short to power in harness or connectors.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00CPK

KNOCK SENSOR

Check resistance between knock sensor terminal 1 and ground.

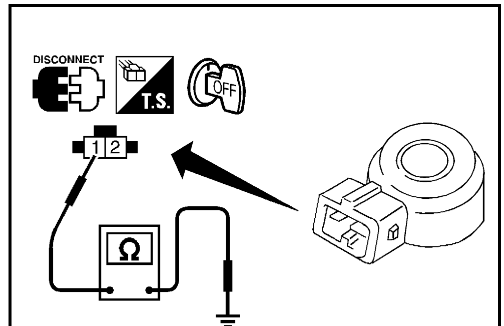
NOTE:

It is necessary to use an ohmmeter which can measure more than 10 MΩ.

Resistance: Approximately 530 - 590kΩ [at 20°C (68°F)]

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use only new ones.



SEF227W

Removal and Installation

ABS00CPL

KNOCK SENSOR

Refer to EM-82, "CYLINDER BLOCK" .

DTC P0335 CKP SENSOR (POS)

PFP:23731

Component Description

ABS00CPM

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and Hall IC.

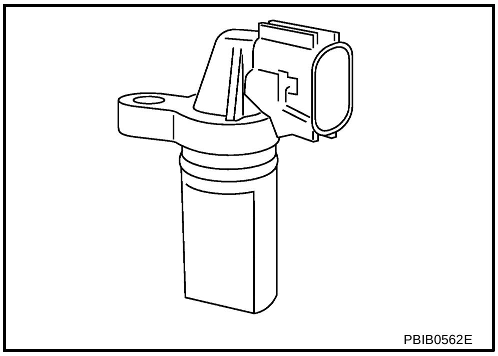
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

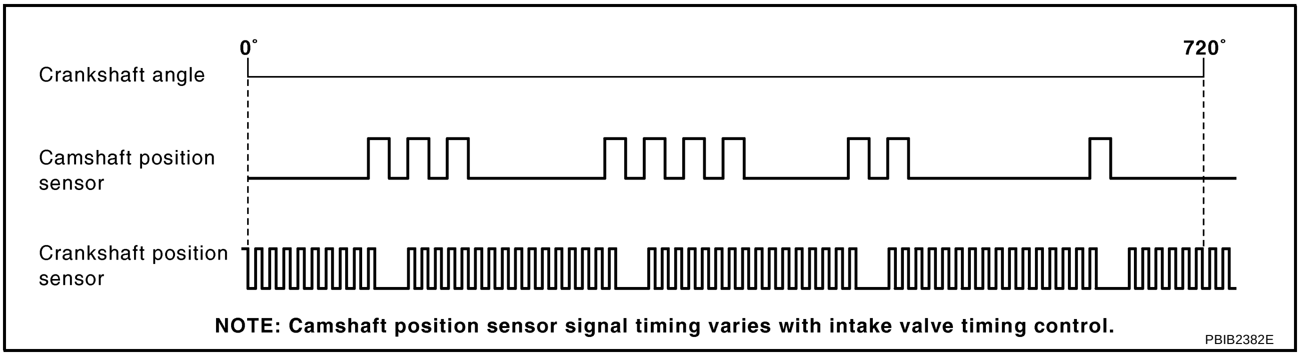
The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

ECM receives the signals as shown in the figure.





CONSULT-II Reference Value in Data Monitor Mode

ABS00CPN

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	• Run engine and compare the CONSULT-II value with tachometer indication.	Almost the same speed as the tachometer indication.

On Board Diagnosis Logic

ABS00CPO

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0335 0335	Crankshaft position sensor (POS) circuit	• The crankshaft position sensor (POS) signal is not detected by the ECM during the first few seconds of engine cranking. • The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. • The crankshaft position sensor (POS) signal is not in the normal pattern during engine running.	• Harness or connectors (The sensor circuit is open or shorted) • Crankshaft position sensor (POS) • Signal plate

DTC Confirmation Procedure

ABS00CPP

NOTE:

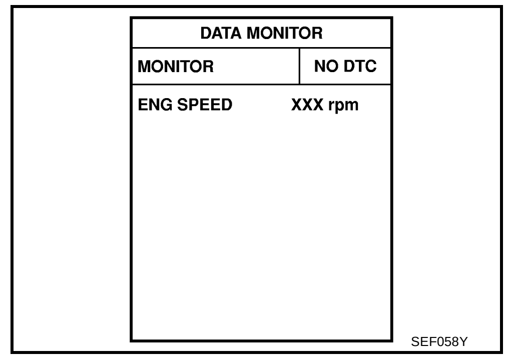
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
3. If 1st trip DTC is detected, go to EC-315, "Diagnostic Procedure" .

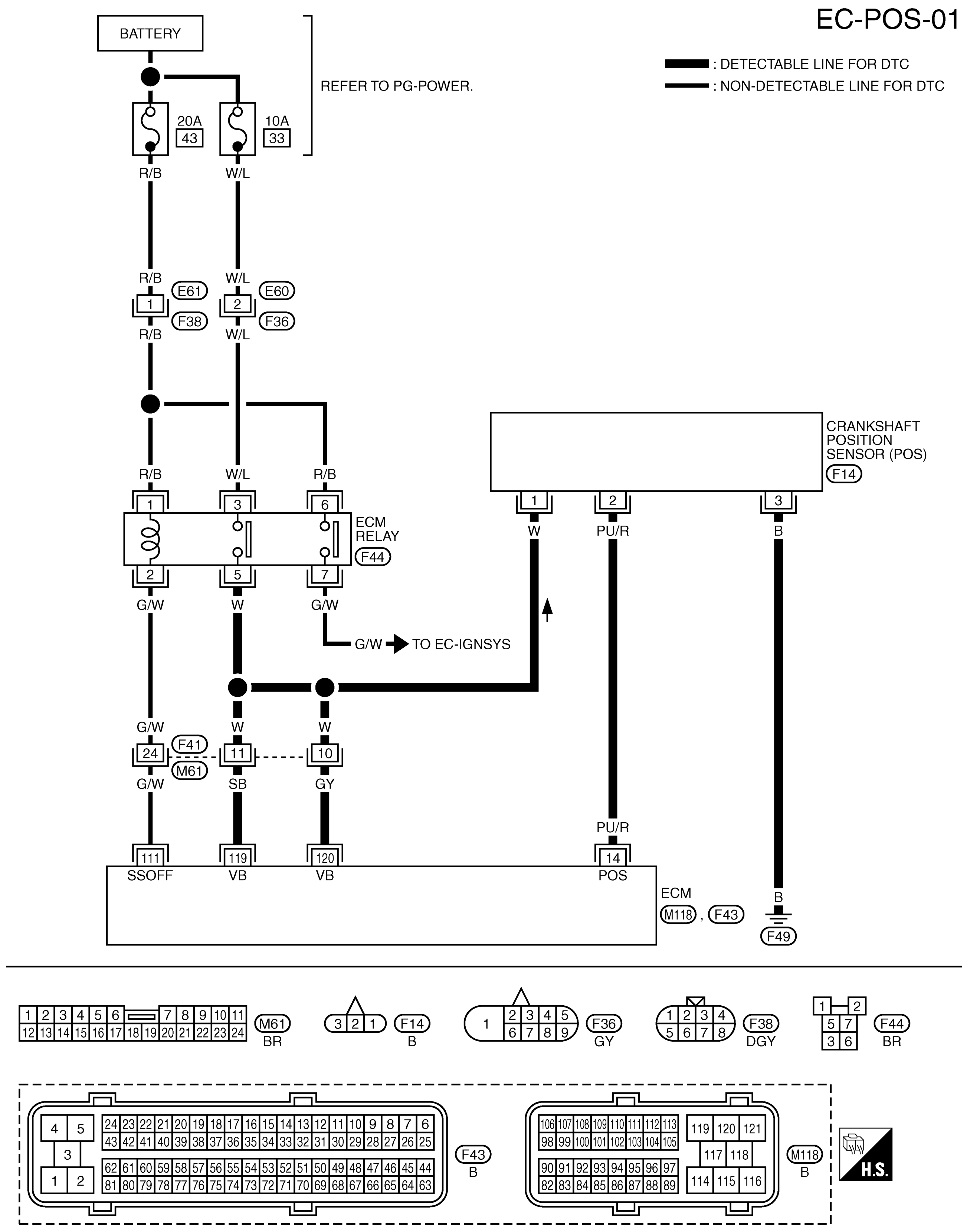


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CPQ

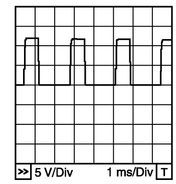
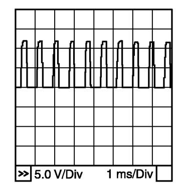


TBWB0121E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
14	PU/R	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	Approximately 3.0V★  PBIB0527E
			[Engine is running] ● Engine speed: 2,000 rpm	Approximately 3.0V★  PBIB0528E

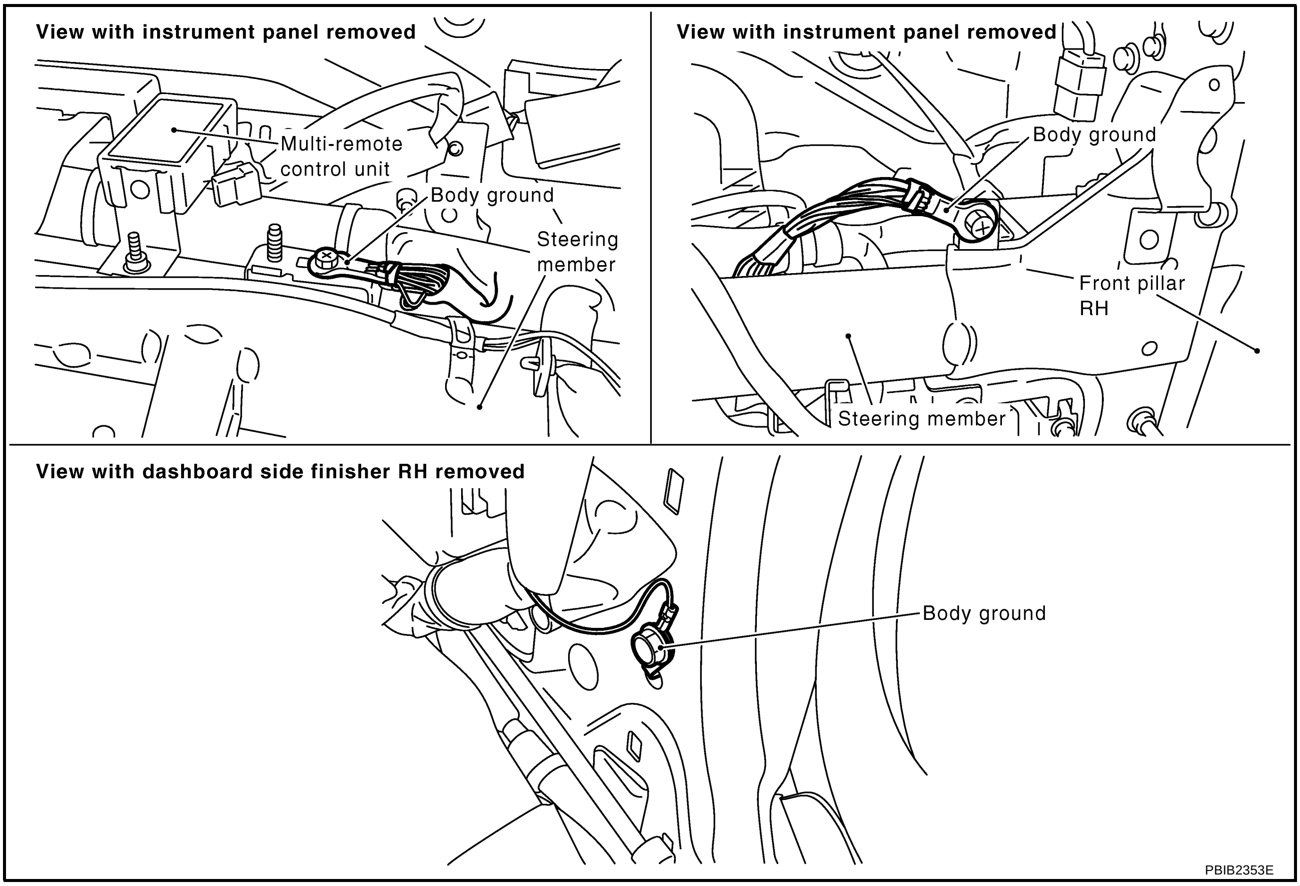
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8F

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .

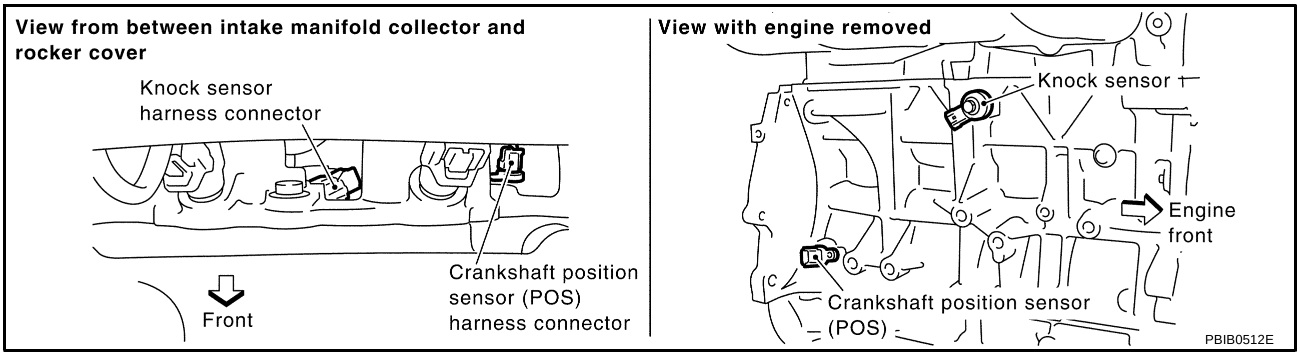


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

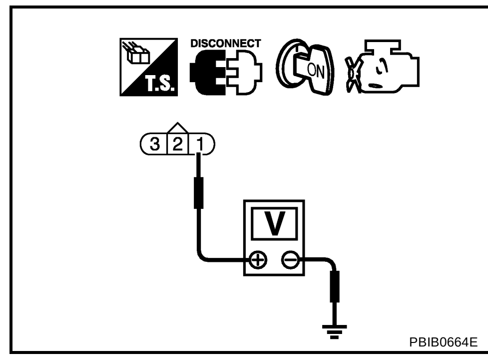
2. CHECK CRANKSHAFT POSITION (CKP) SENSOR (POS) POWER SUPPLY CIRCUIT

1. Disconnect crankshaft position (CKP) sensor (POS) harness connector.



2. Turn ignition switch ON.
3. Check voltage between CKP sensor (POS) terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness for open or short between CKP sensor (POS) and ECM
- Harness for open or short between CKP sensor (POS) and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CKP SENSOR (POS) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between CKP sensor (POS) terminal 3 and ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to power in harness or connectors.

5. CHECK CKP SENSOR (POS) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between CKP sensor (POS) terminal 2 and ECM terminal 14.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-318, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace crankshaft position sensor (POS).

7. CHECK GEAR TOOTH

Visually check for chipping signal plate gear tooth.

OK or NG

OK >> GO TO 8.
NG >> Replace the signal plate.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

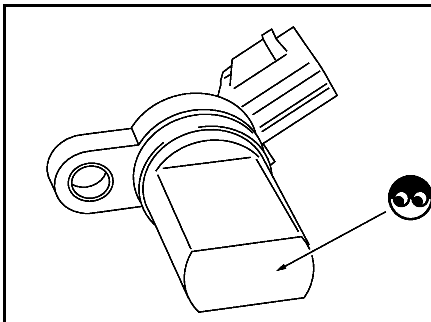
>> **INSPECTION END**

Component Inspection

ABS00CPS

CRANKSHAFT POSITION SENSOR (POS)

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.

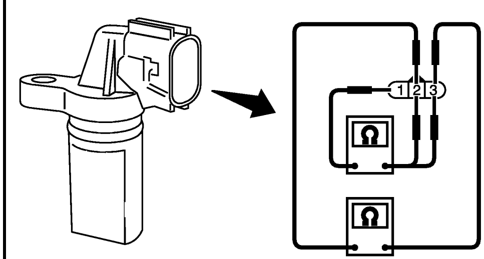


PBIB0563E

5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	

6. If NG, replace crankshaft position sensor (POS).



PBIB0564E

Removal and Installation

ABS00CPT

CRANKSHAFT POSITION SENSOR (POS)

Refer to EM-82, "CYLINDER BLOCK" .

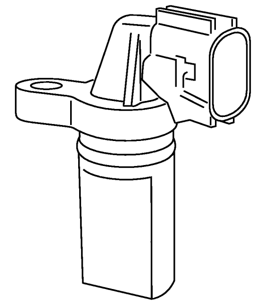
DTC P0340 CMP SENSOR (PHASE)

PFP:23731

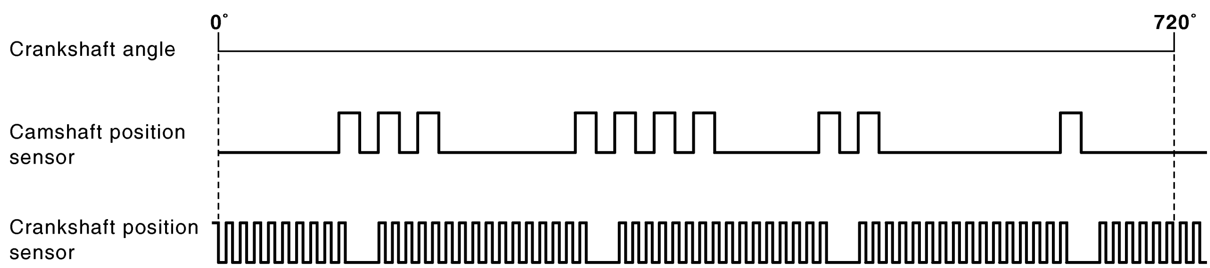
Component Description

ABS00CPU

The camshaft position sensor (PHASE) senses the retraction with intake valve camshaft (INT) to identify a particular cylinder. The camshaft position sensor (PHASE) senses the piston position.
When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.
The sensor consists of a permanent magnet and Hall IC.
When engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
ECM receives the signals as shown in the figure.



PBIB0562E



NOTE: Camshaft position sensor signal timing varies with intake valve timing control.

PBIB2382E

On Board Diagnosis Logic

ABS00CPV

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0340 0340	Camshaft position sensor (PHASE) circuit	• The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not set to ECM during engine running. • The cylinder No. signal is not in the normal pattern during engine running.	• Harness or connectors (The sensor circuit is open or shorted) • Camshaft position sensor (PHASE) • Camshaft (INT) • Starter motor (Refer to SC-9, "STARTING SYSTEM" .) • Starting system circuit (Refer to SC-9, "STARTING SYSTEM" .) • Dead (Weak) battery

DTC Confirmation Procedure

ABS00CPW

NOTE:

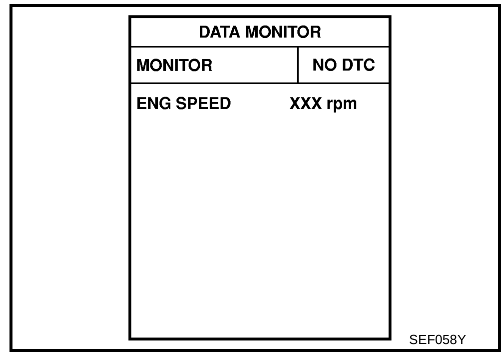
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
4. If 1st trip DTC is detected, go to EC-322, "Diagnostic Procedure" .
   If 1st trip DTC is not detected, go to next step.
5. Maintaining engine speed at more than 800 rpm for at least 5 seconds.
6. If 1st trip DTC is detected, go to EC-322, "Diagnostic Procedure" .

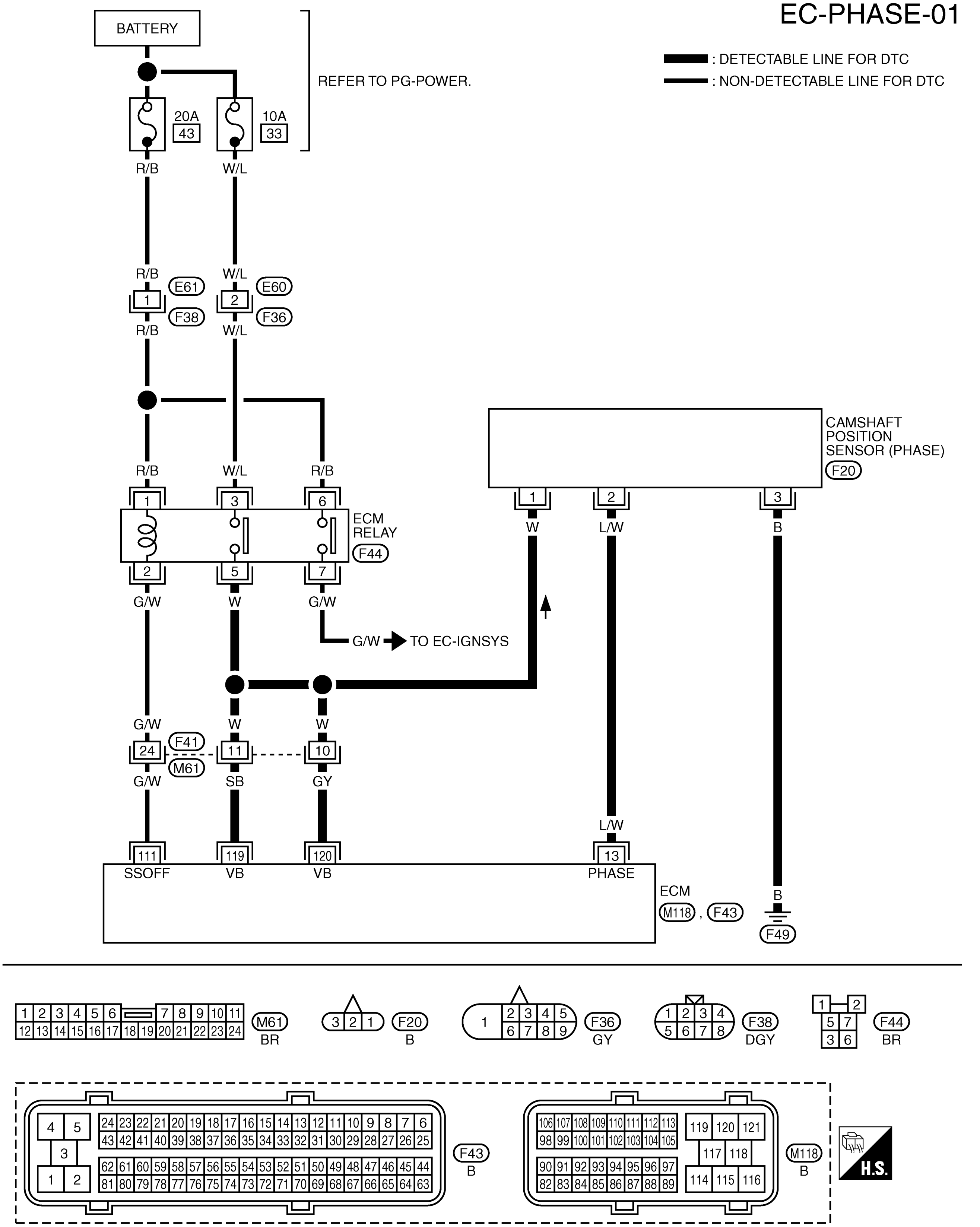


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CPX

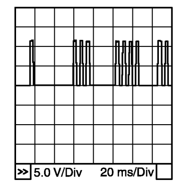
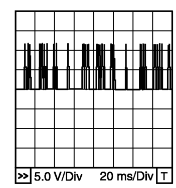


TBWB0122E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
13	L/W	Camshaft position sensor (PHASE)	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	1.0 - 4.0V★  PBIB0525E
			[Engine is running] ● Engine speed: 2,000 rpm.	1.0 - 4.0V★  PBIB0526E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00CPY

1. CHECK STARTING SYSTEM

Turn ignition switch to START position.

Does the engine turn over?

Does the starter motor operate?

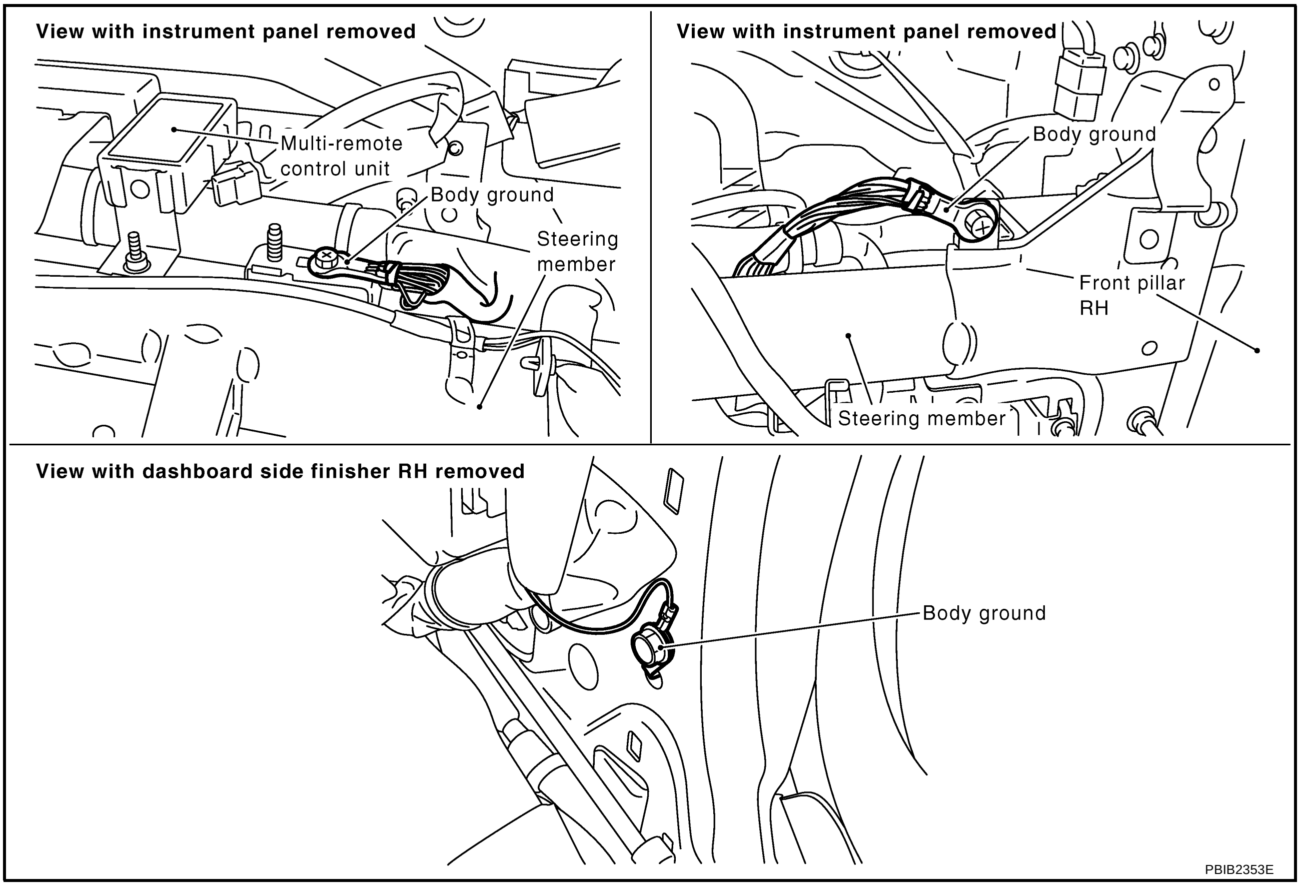
Yes or No

Yes >> GO TO 2.

No >> Check starting system. (Refer to SC-9, "STARTING SYSTEM" .)

2. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .

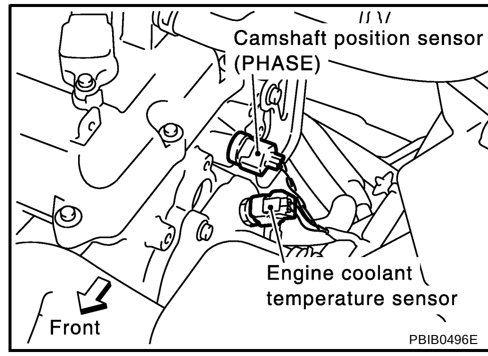


OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

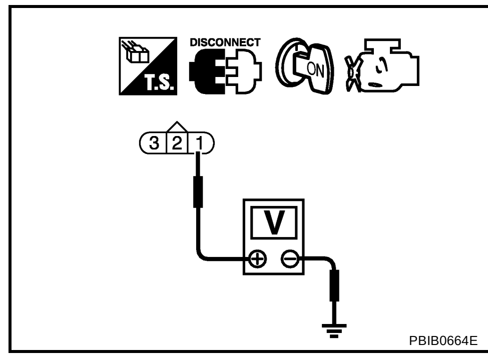
3. CHECK CAMSHAFT POSITION (CMP) SENSOR (PHASE) POWER SUPPLY CIRCUIT

1. Disconnect camshaft position (CMP) sensor (PHASE) harness connector.
2. Turn ignition switch ON.



3. Check voltage between CMP sensor (PHASE) terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness for open or short between CMP sensor (PHASE) and ECM
- Harness for open or short between CMP sensor (PHASE) and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK CMP SENSOR (PHASE) GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between CMP sensor (PHASE) terminal 3 and ground.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair open circuit or short to power in harness or connectors.

6. CHECK CMP SENSOR (PHASE) INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 13 and CMP sensor (PHASE) terminal 2. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

A

C D E F G H I J K L M

7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-325, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace camshaft position sensor (PHASE).

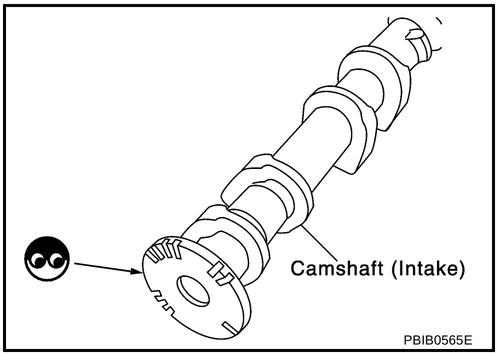
8. CHECK CAMSHAFT (INT)

Check the following.

- Accumulation of debris to the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end

OK or NG

OK >> GO TO 9.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.



9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

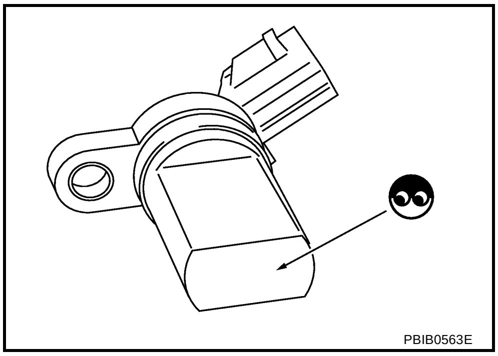
>> **INSPECTION END**

Component Inspection

ABS00CPZ

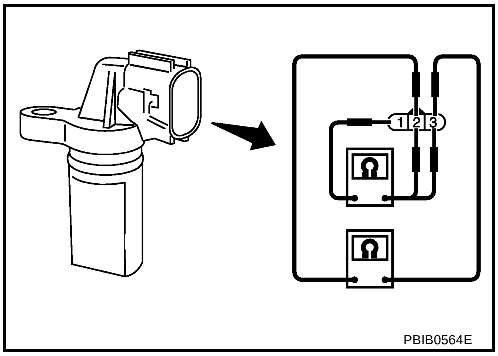
CAMSHAFT POSITION SENSOR (PHASE)

1. Loosen the fixing bolt of the sensor.
2. Disconnect camshaft position sensor (PHASE) harness connector.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	



Removal and Installation

ABS00CQ0

CAMSHAFT POSITION SENSOR (PHASE)

Refer to EM-37, "CAMSHAFT" .

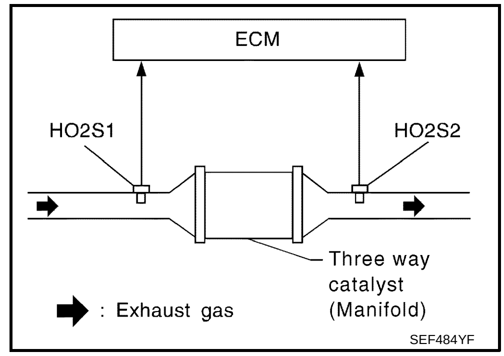
DTC P0420 THREE WAY CATALYST FUNCTION

PFP:20905

On Board Diagnosis Logic

ABS00CQ1

The ECM monitors the switching frequency ratio of heated oxygen sensors 1 and 2.
A three way catalyst (manifold) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2. As oxygen storage capacity decreases, the heated oxygen sensor 2 switching frequency will increase.
When the frequency ratio of heated oxygen sensors 1 and 2 approaches a specified limit value, the three way catalyst (manifold) malfunction is diagnosed.



SEF484YF

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0420 0420	Catalyst system efficiency below threshold	● Three way catalyst (manifold) does not operate properly. ● Three way catalyst (manifold) does not have enough oxygen storage capacity.	● Three way catalyst (manifold) ● Exhaust tube ● Intake air leaks ● Fuel injector ● Fuel injector leaks ● Spark plug ● Improper ignition timing

DTC Confirmation Procedure

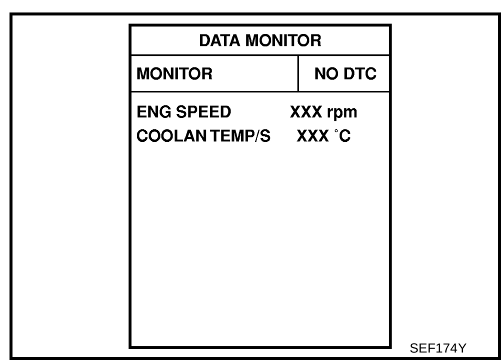
ABS00CQ2

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

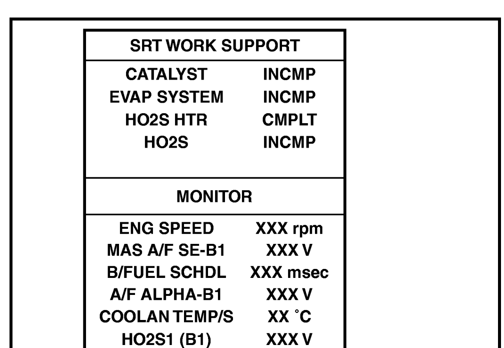
WITH CONSULT-II

TESTING CONDITION:
Do not hold engine speed for more than the specified minutes below.

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).
7. Open engine hood.
8. Select “DTC & SRT CONFIRMATION” then “SRT WORK SUPPORT” mode with CONSULT-II.
9. Rev engine up to 2,500 to 3,500 rpm and hold it for 3 consecutive minutes, then release the accelerator pedal completely.
   If “INCMP” of “CATALYST” changed to “CMPLT”, GO TO STEP 12.
10. Wait 5 seconds at idle.



SEF174Y



SEF940Z

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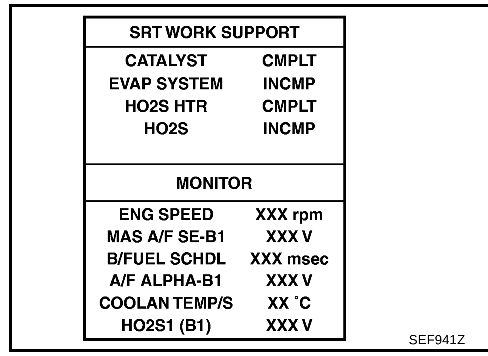
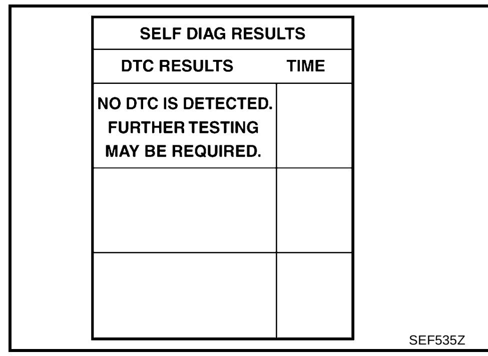
11. Rev engine up to 2,000 to 3,000 rpm and maintain it until "IMCMP" of "CATALYST" changes to "CMPLT" (it will take approximately 5 minutes).
    If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest step 1.



SEF941Z

12. Select "SELF-DIAG RESULTS" mode with CONSULT-II.
13. Confirm that the 1st trip DTC is not detected.
    If the 1st trip DTC is detected, go to EC-329, "Diagnostic Procedure" .



SEF535Z

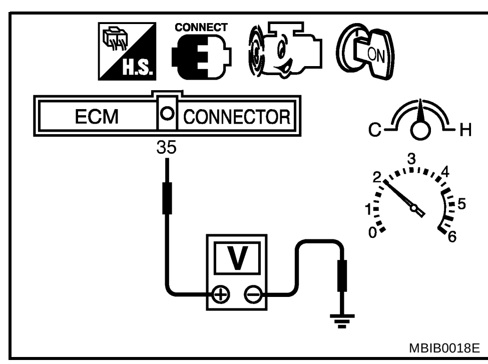
Overall Function Check

ABS00CQ3

Use this procedure to check the overall function of the three way catalyst (Manifold). During this check, a 1st trip DTC might not be confirmed.

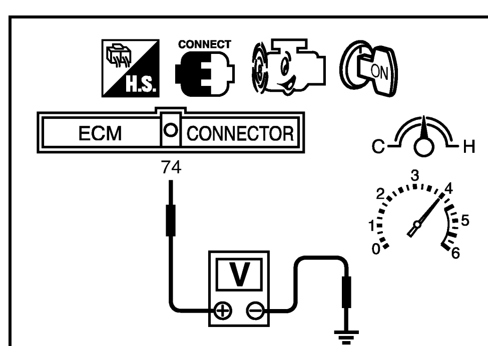
WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,00 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Open engine hood.
6. Set voltmeters probes between ECM terminal 35 (HO2S1 signal) and ground, and ECM terminal 74 (HO2S2 signal) and ground.
7. Keep engine speed at 2,000 rpm constant under no load.



MBIB0018E

8. Make sure that the voltage switching frequency (high & low) between ECM terminal 74 and ground is very less than that of ECM terminal 35 and ground.
   Switching frequency ratio = A/B
   A: Heated oxygen sensor 2 voltage switching frequency
   B: Heated oxygen sensor 1 voltage switching frequency
   This ratio should be less than 0.75.
   If the ratio is greater than above, it means three way catalyst does not operate properly. Go to EC-329, "Diagnostic Procedure" .



PBIB1197E

NOTE:
If the voltage at terminal 35 does not switch periodically more than 5 times within 10 seconds at step 8, perform trouble diagnosis for DTC P0133 first. (See EC-234, "DTC P0133 HO2S1" .)

Diagnostic Procedure

ABS00CQ4

1. CHECK EXHAUST SYSTEM

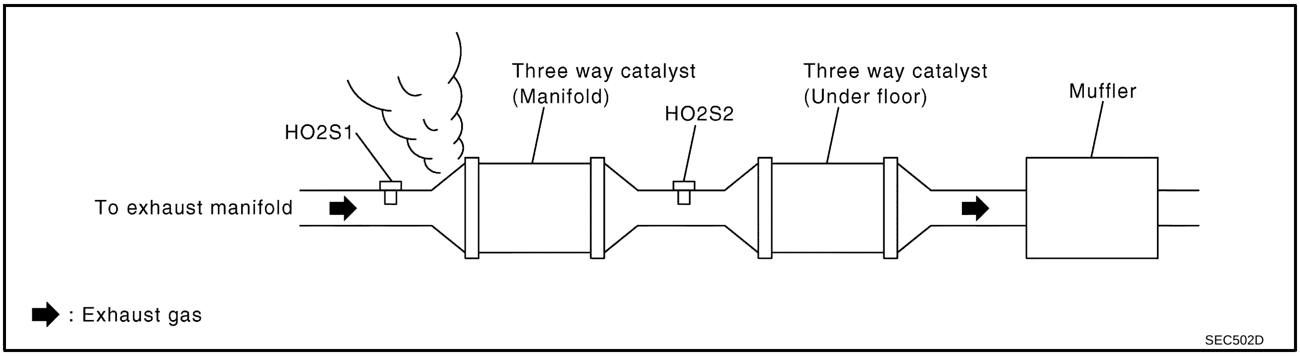
Visually check exhaust tubes and muffler for dent.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK EXHAUST GAS LEAK

1. Start engine and run it at idle.
2. Listen for an exhaust gas leak before the three way catalyst (manifold).



OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK INTAKE AIR LEAK

Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace.

4. CHECK IGNITION TIMING

Check for ignition timing. Refer to EC-70, "Basic Inspection" .

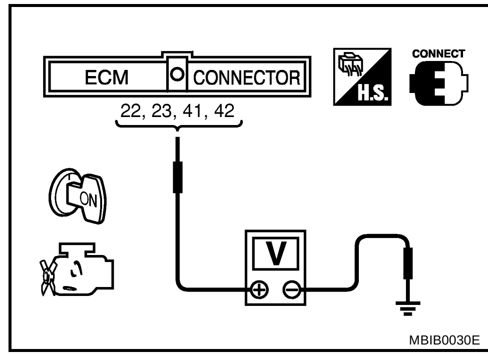
Items	Specifications	
Target idle speed	A/T	700 ± 50 rpm (in P or N position)
	M/T	700 ± 50 rpm (in Neutral position)
Ignition timing	A/T	15 ± 5° BTDC (in P or N position)
	M/T	15 ± 5° BTDC (in Neutral position)

OK or NG

OK >> GO TO 5.
NG >> Follow the EC-70, "Basic Inspection" .

5. CHECK FUEL INJECTOR

1. Refer to Wiring Diagram for Injectors, EC-608, "Wiring Diagram" .
2. Stop engine and then turn ignition switch ON.
3. Check voltage between ECM terminals 22, 23, 41, 42 and ground with CONSULT-II or tester.



Voltage: Battery voltage

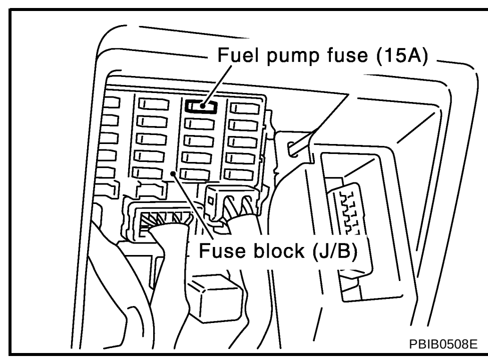
OK or NG

OK >> GO TO 6.
NG >> Perform EC-609, "Diagnostic Procedure" .

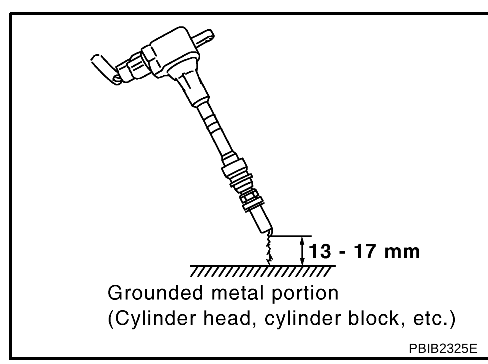
6. CHECK FUNCTION OF IGNITION COIL-I

CAUTION:
Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Remove fuel pump fuse located in fuse box to release fuel pressure.
   NOTE:
   Do not use CONSULT-II to release fuel pressure, or fuel pressure applies again during the following procedure.



3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch OFF.
6. Remove all ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
7. Remove ignition coil and spark plug of the cylinder to be checked.
8. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.
9. Connect spark plug and harness connector to ignition coil.
10. Fix ignition coil using a rope etc. with gap of 13 - 17 mm between the edge of the spark plug and grounded metal portion as shown in the figure.
11. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded metal portion.



Spark should be generated.

CAUTION:
- **Do not approach to the spark plug and the ignition coil within 50cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
- **It might cause to damage the ignition coil if the gap of more than 17 mm is taken.**

NOTE:
When the gap is 13 mm or less, the spark might be generated even if the coil is malfunctioning.

OK or NG

OK >> GO TO 10.
NG >> GO TO 7.

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7. CHECK FUNCTION OF IGNITION COIL-II

1. Turn ignition switch OFF.
2. Disconnect spark plug and connect a known-good spark plug.
3. Crank engine for about 3 seconds, and recheck whether spark is generated between the spark plug and the grounded metal portion.

Spark should be generated.

OK or NG

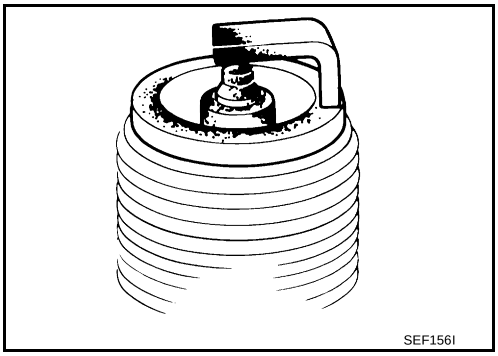
OK >> GO TO 8.
NG >> Check ignition coil, power transistor and their circuits. Refer to EC-586, "IGNITION SIGNAL" .

8. CHECK SPARK PLUG

Check the spark plugs and check for fouling, etc.

OK or NG

OK >> GO TO 9.
NG >> Repair or replace spark plug (s) with standard type one (s). For spark plug type ignition coil. Refer to MA-18, "Changing Spark Plugs (Platinum-Tipped Type)" .



SEF156I

9. CHECK FUNCTION OF IGNITION COIL-III

1. Reconnect the initial spark plugs.
2. Crank engine for about three seconds, and recheck whether spark is generated between the spark plug and the grounded portion.

Spark should be generated.

OK or NG

OK >> **INSPECTION END**
NG >> Replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-18, "Changing Spark Plugs (Platinum-Tipped Type)" .

10. CHECK FUEL INJECTOR

1. Turn ignition switch OFF.
2. Remove fuel injector assembly. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
   Keep fuel hose and all fuel injectors connected to fuel injector gallery.
3. Disconnect ignition coil assembly harness connector.
4. Reconnect all fuel injector harness connectors disconnected.
5. Turn ignition switch ON.
   Make sure fuel does not drip from fuel injector.

OK or NG

OK (Does not drip)>>GO TO 11.
NG (Drips)>>Replace the fuel injector(s) from which fuel is dripping.

11. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

Trouble is fixed>>**INSPECTION END**
Trouble is not fixed>>Replace three way catalyst (manifold).

DTC P0441 EVAP CONTROL SYSTEM

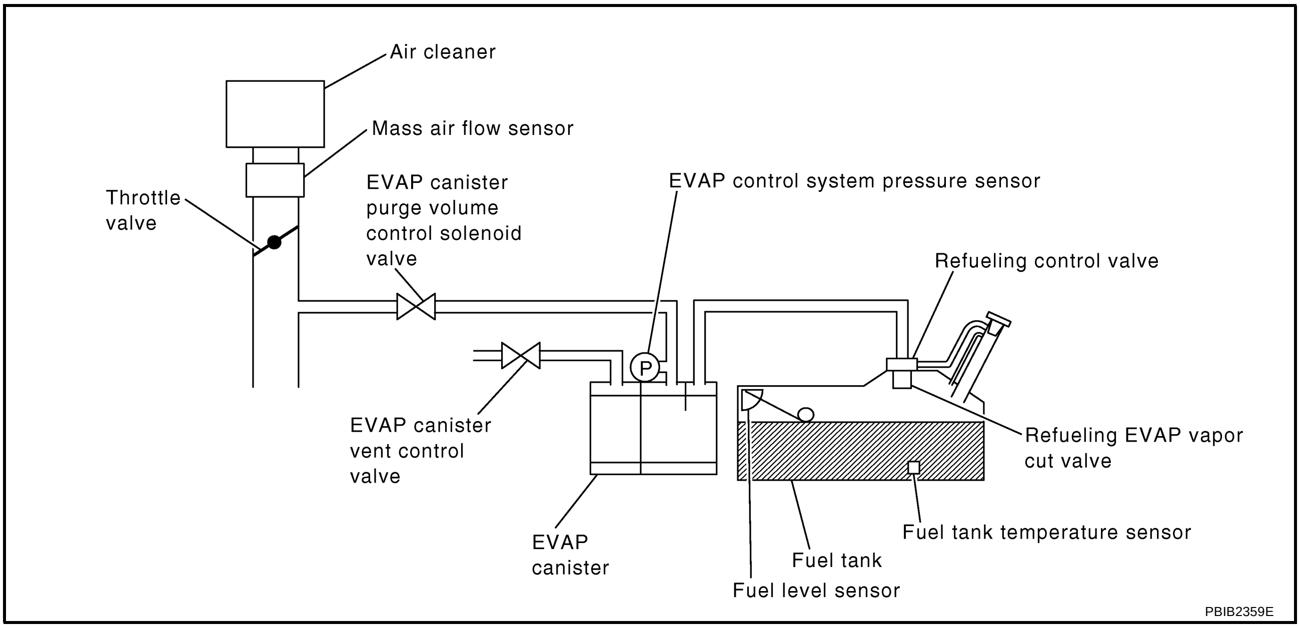
PFP:14950

System Description

ABS00CQ5

NOTE:

If DTC P0441 is displayed with other DTC such as P2122, P2123 P2127, P2128, P2138, first perform trouble diagnosis for other DTC.



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

ABS00CQ6

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a malfunction is determined.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0441 0441	EVAP control system incorrect purge flow	EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.	● EVAP canister purge volume control solenoid valve stuck closed ● EVAP control system pressure sensor and the circuit ● Loose, disconnected or improper connection of rubber tube ● Blocked rubber tube ● Cracked EVAP canister ● EVAP canister purge volume control solenoid valve circuit ● Accelerator pedal position sensor ● Blocked purge port ● EVAP canister vent control valve

DTC Confirmation Procedure

ABS00CQ7

CAUTION:
Always drive vehicle at a safe speed.

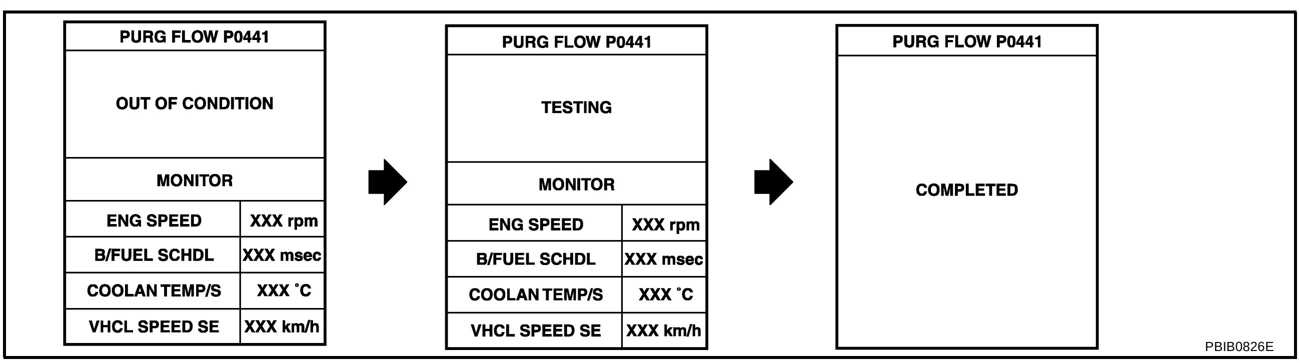
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 70 seconds.
4. Select “PURG FLOW P0441” of “EVAPORATIVE SYSTEM” in “DTC CONFIRMATION” mode with CONSULT-II.
5. Touch “START”.
   If “COMPLETED” is displayed, go to step 7.
6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take at least 35 seconds.)

Shift lever	Suitable position
VHCL SPEED SE	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 10.0 msec
COOLAN TEMP/S	More than 0°C



If TESTING is not changed for a long time, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-334, "Diagnostic Procedure" .

Overall Function Check

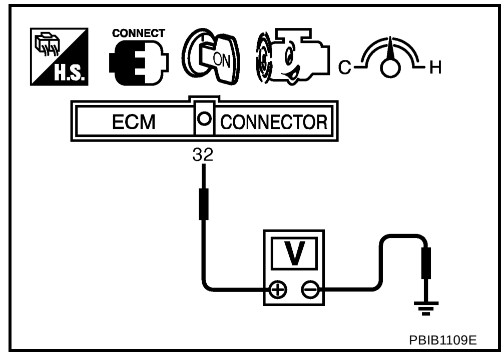
ABS00CQ8

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Start engine and wait at least 70 seconds.

5. Set voltmeter probes to ECM terminals 32 (EVAP control system pressure sensor signal) and ground.
6. Check EVAP control system pressure sensor value at idle speed and note it.
7. Establish and maintain the following conditions for at least 1 minute.



Air conditioner switch	ON
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Shift position	Any position other than P, N or R (A/T), Neutral (M/T)

8. Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
9. If NG, go to EC-334, "Diagnostic Procedure" .

Diagnostic Procedure

ABS00CQ9

1. CHECK EVAP CANISTER

1. Turn ignition switch OFF.
2. Check EVAP canister for cracks.

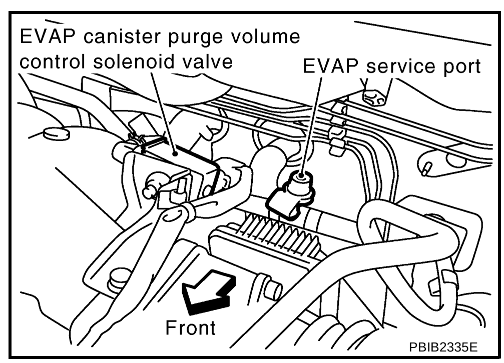
OK or NG

OK (With CONSULT-II)>>GO TO 2.
OK (Without CONSULT-II)>>GO TO 3.
NG >> Replace EVAP canister.

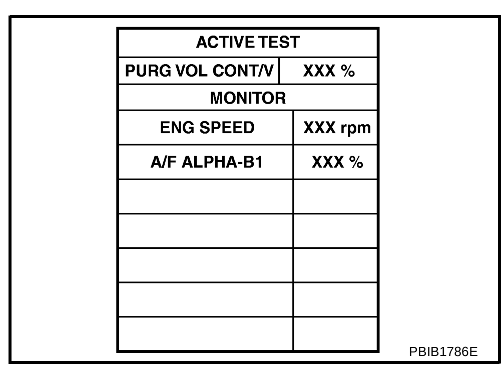
2. CHECK PURGE FLOW

With CONSULT-II

1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
2. Start engine and let it idle.
3. Select “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II.
4. Rev engine up to 2,000 rpm.



5. Touch “Qd” and “Qu” on CONSULT-II screen to adjust “PURG VOL CONT/V” opening and check vacuum existence.



PURG VOL CONT/V	VACUUM
100%	Should exist.
0%	should not exist.

OK or NG

OK >> GO TO 7.
NG >> GO TO 4.

3. CHECK PURGE FLOW

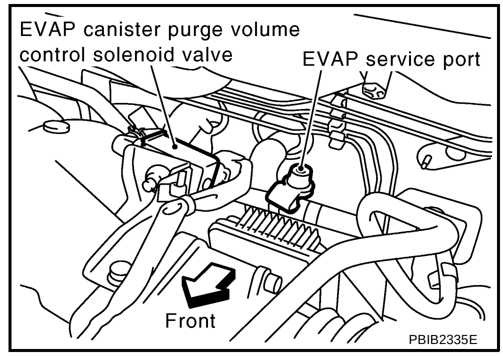
Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum gauge indication when revving engine up to 2,000 rpm.

   Vacuum should exist.

6. Release the accelerator pedal fully and let idle.

   Vacuum should not exist.



OK or NG

OK >> GO TO 7.
NG >> GO TO 4.

4. CHECK EVAP PURGE LINE

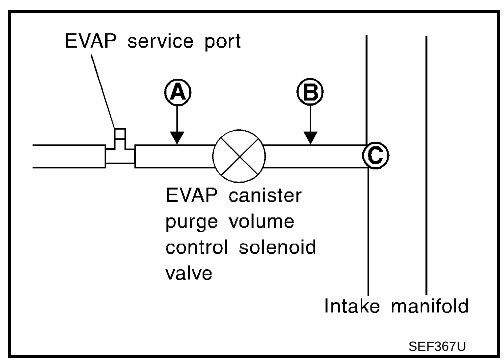
1. Turn ignition switch OFF.
2. Check EVAP purge line for improper connection or disconnection.
   Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .

OK or NG

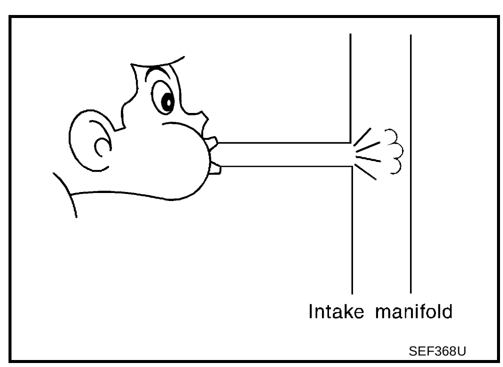
OK >> GO TO 5.
NG >> Repair it.

5. CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B** .
2. Blow air into each hose and EVAP purge port **C** .



3. Check that air flows freely.



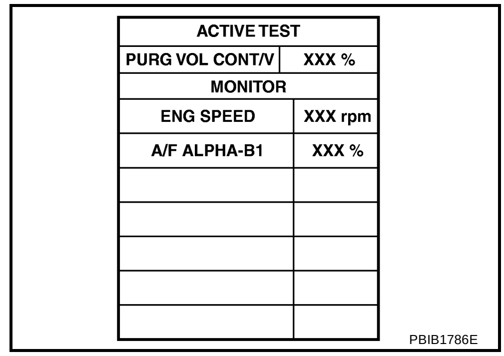
OK or NG

OK (With CONSULT-II)>>GO TO 6.
OK (Without CONSULT-II)>>GO TO 7.
NG >> Repair or clean hoses and/or purge port.

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Start engine.
2. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that engine speed varies according to the valve opening.



OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve.

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION

Refer to DTC Confirmation Procedure for DTC P0452, EC-366, "DTC Confirmation Procedure" P0453, EC-373, "DTC Confirmation Procedure" .

OK or NG

OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor.

10. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 11.
NG >> Clean the rubber tube using an air blower.

11. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-360, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace EVAP canister vent control valve.

12. CHECK EVAP PURGE LINE

Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks.
Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .

OK or NG

OK >> GO TO 13.
NG >> Replace it.

13. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 14.

14. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

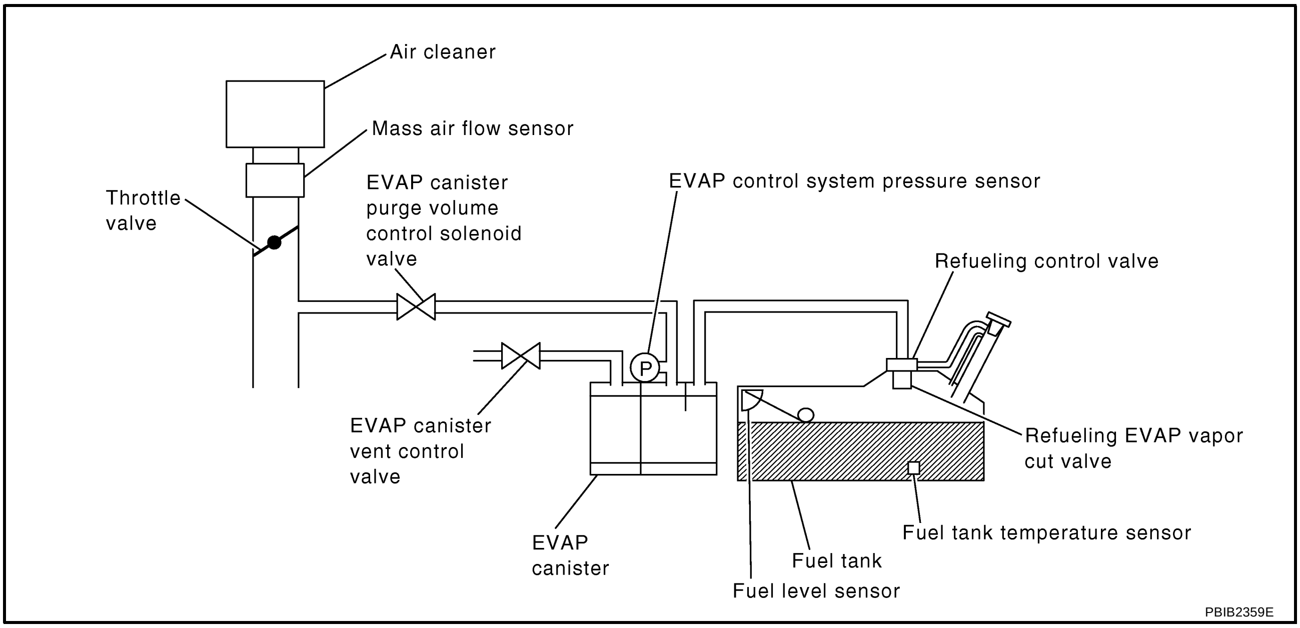
DTC P0442 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

ABS00CQA

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.
If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following Vacuum test conditions.
The EVAP canister vent control valve is closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve will then be opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0442 0442	EVAP control system small leak detected (negative pressure)	EVAP control system has a leak, EVAP control system does not operate properly.	● Incorrect fuel tank vacuum relief valve ● Incorrect fuel filler cap used ● Fuel filler cap remains open or fails to close. ● Foreign matter caught in fuel filler cap. ● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. ● Foreign matter caught in EVAP canister vent control valve. ● EVAP canister or fuel tank leaks ● EVAP purge line (pipe and rubber tube) leaks ● EVAP purge line rubber tube bent ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged ● Water separator ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Fuel level sensor and the circuit ● Refueling EVAP vapor cut valve ● Refueling control valve ● ORVR system leaks

CAUTION:

- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

DTC Confirmation Procedure

ABS00CQB

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

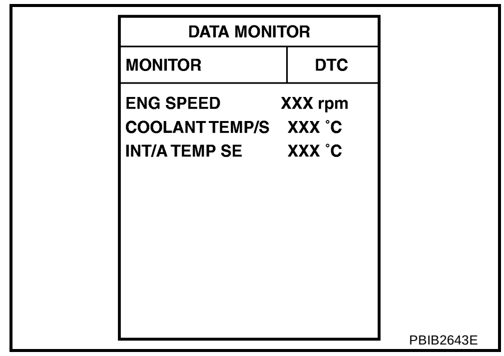
TESTING CONDITION:

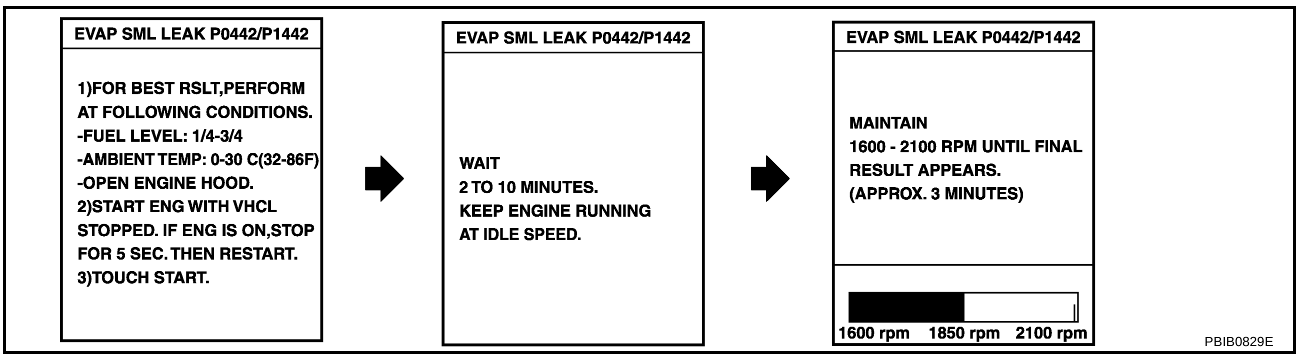
- **Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.**
- **Always perform test at a temperature of 0 to 30°C (32 to 86°F).**

WITH CONSULT-II

1. Turn ignition switch ON.
2. Turn ignition switch OFF and wait at least 10 seconds.

3. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
4. Check the following conditions are met.
   COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
   INT/A TEMP SE: 0 - 30°C (32 - 86°F)
5. Select “EVAP SML LEAK P0442/P1442” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
   Follow the instruction displayed.

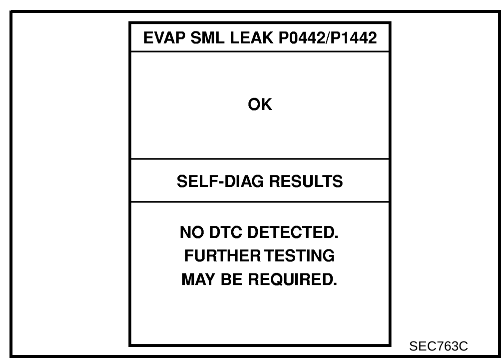




NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to EC-70, "Basic Inspection" .

6. Make sure that “OK” is displayed.
   If “NG” is displayed, refer to EC-341, "Diagnostic Procedure" .

   NOTE:
   Make sure that EVAP hoses are connected to the EVAP canister purge volume control solenoid valve properly.



WITH GST

NOTE:
Be sure to read the explanation of EC-57, "Driving Pattern" before driving vehicle.

1. Start engine.
2. Drive vehicle according to EC-57, "Driving Pattern"
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ignition switch ON.
5. Select Service $07 with GST.

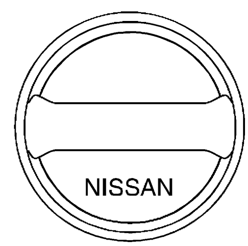
- If P0442 is displayed on the screen, go to EC-341, "Diagnostic Procedure" .
- If P0441 is displayed on the screen, go to EC-334, "Diagnostic Procedure" for DTC P0441.

Diagnostic Procedure

ABS00CQC

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.



SEF915U

OK or NG

OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.

2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until racheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-33, "FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FULLER CAP)" .

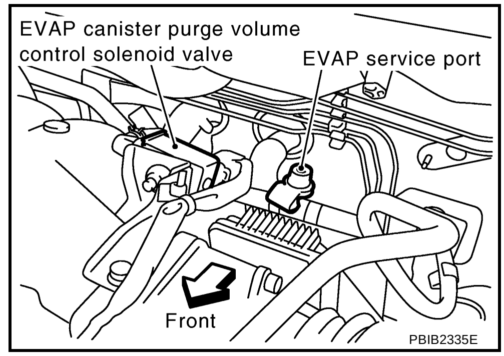
OK or NG

OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

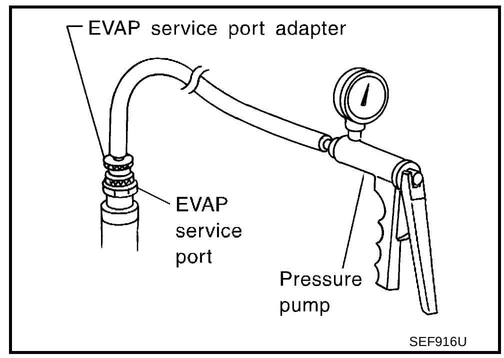
5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.
For the location of EVAP service port, refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .

NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



PBIB2335E



SEF916U

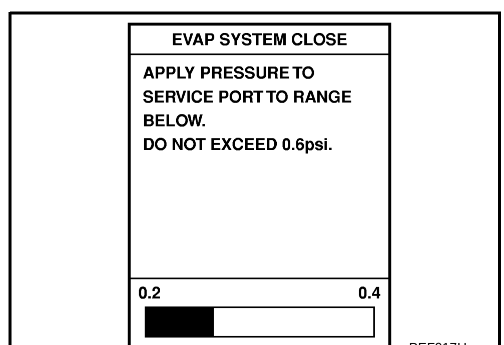
With CONSULT-II>>GO TO 6.
Without CONSULT-II>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-II

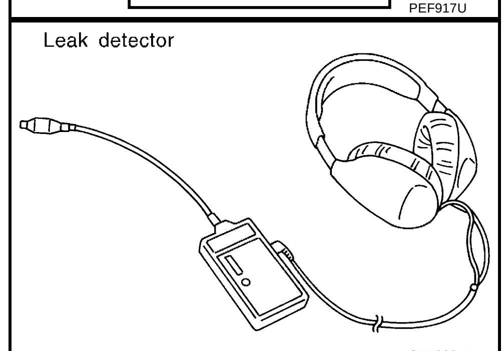
1. Turn ignition switch ON.
2. Select “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT-II.
3. Touch “START” and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
   Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



SEF200U

OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

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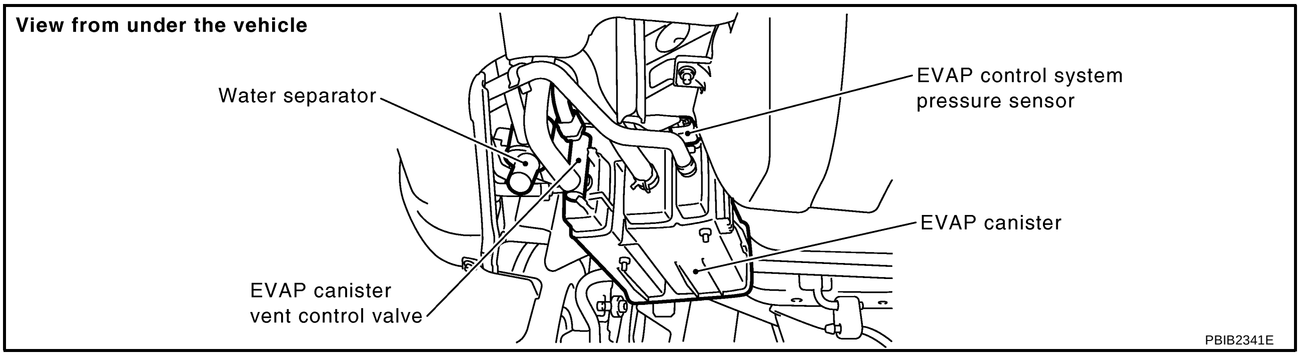
7. CHECK FOR EVAP LEAK

Without CONSULT-II

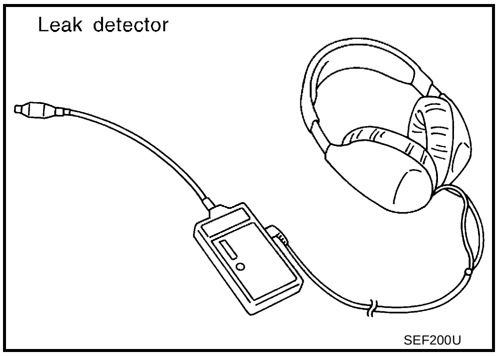
1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

8. CHECK WATER SEPARATOR

Refer to EC-347, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Clean or replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following,

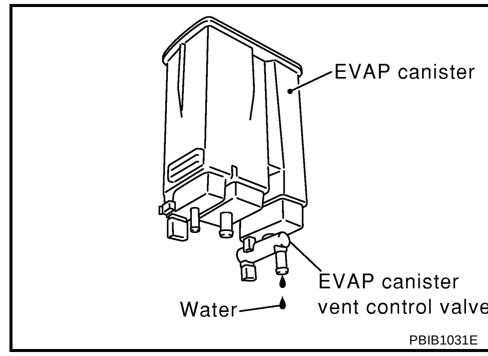
- EVAP canister vent control valve is installed properly.
  Refer to EC-34, "Removal and Installation" .
- EVAP canister vent control valve.
  Refer toEC-360, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?



Yes or No

Yes >> GO TO 11.
No (With CONSULT-II)>>GO TO 13.
No (Without CONSULT-II)>>GO TO 14.

11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.5 kg (5.5 lb).

OK or NG

OK (With CONSULT-II)>>GO TO 13.
OK (Without CONSULT-II)>>GO TO 14.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

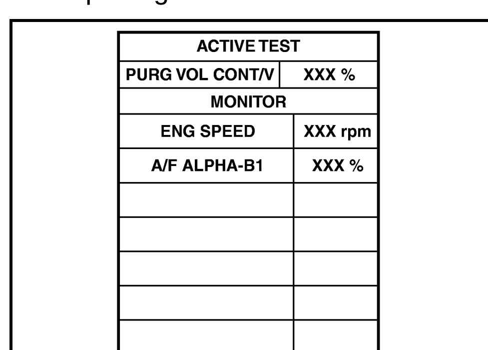
- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode.
4. Touch “Qu” on CONSULT-II screen to increase “PURG VOL CONT/V” opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.



OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

OK >> GO TO 17.
NG >> GO TO 15.

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .

OK or NG

OK >> GO TO 16.
NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection" .

OK or NG

OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-285, "Component Inspection" .

OK or NG

OK >> GO TO 18.
NG >> Replace fuel level sensor unit.

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-371, "Component Inspection" .

OK or NG

OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor.

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.
Refer to EC-30, "EVAPORATIVE EMISSION SYSTEM" .

OK or NG

OK >> GO TO 20.
NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to EC-37, "ON BOARD REFUELING VAPOR RECOVERY (ORVR)" .

OK or NG

OK >> GO TO 22.
NG >> Repair or replace hoses and tubes.

22. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 23.
NG >> Repair or replace hoses, tubes or filler neck tube.

23. CHECK REFUELING CONTROL VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 24.
NG >> Replace refueling control valve.

24. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 25.
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

25. CHECK FUEL LEVEL SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

OK or NG

OK >> GO TO 26.
NG >> Replace fuel level sensor unit.

26. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

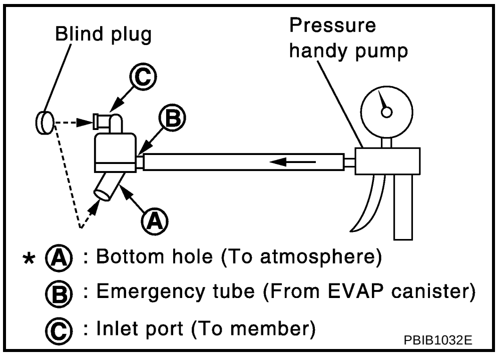
Component Inspection

ABS00DAY

WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A** , and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

   NOTE:
   Do not disassemble water separator.



DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

Description

ABS00CQD

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Wheel sensor*2	Vehicle speed		

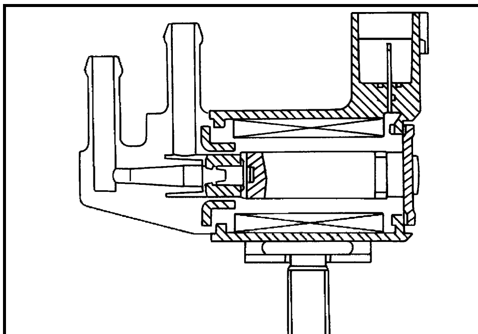
*1: The ECM determines the start signal status by the signal of engine speed and battery voltage.

*2: This signal is sent to the ECM through CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



SEF337U

CONSULT-II Reference Value in Data Monitor Mode

ABS00CQE

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	• Engine: After warming up • Shift lever: P or N (A/T), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	0%
		2,000 rpm	20 - 30%

DTC P0444, P0445 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

On Board Diagnosis Logic

ABS00CQF

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0444 0444	EVAP canister purge volume control solenoid valve circuit open	An excessively low voltage signal is sent to ECM through the valve	● Harness or connectors (The solenoid valve circuit is open or shorted.) ● EVAP canister purge volume control solenoid valve
P0445 0445	EVAP canister purge volume control solenoid valve circuit shorted	An excessively high voltage signal is sent to ECM through the valve	● Harness or connectors (The solenoid valve circuit is shorted.) ● EVAP canister purge volume control solenoid valve

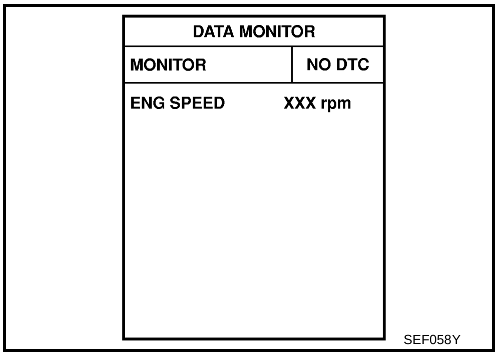
DTC Confirmation Procedure

ABS00CQG

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 13 seconds.
4. If 1st trip DTC is detected, go to EC-352, "Diagnostic Procedure" .



SEF058Y

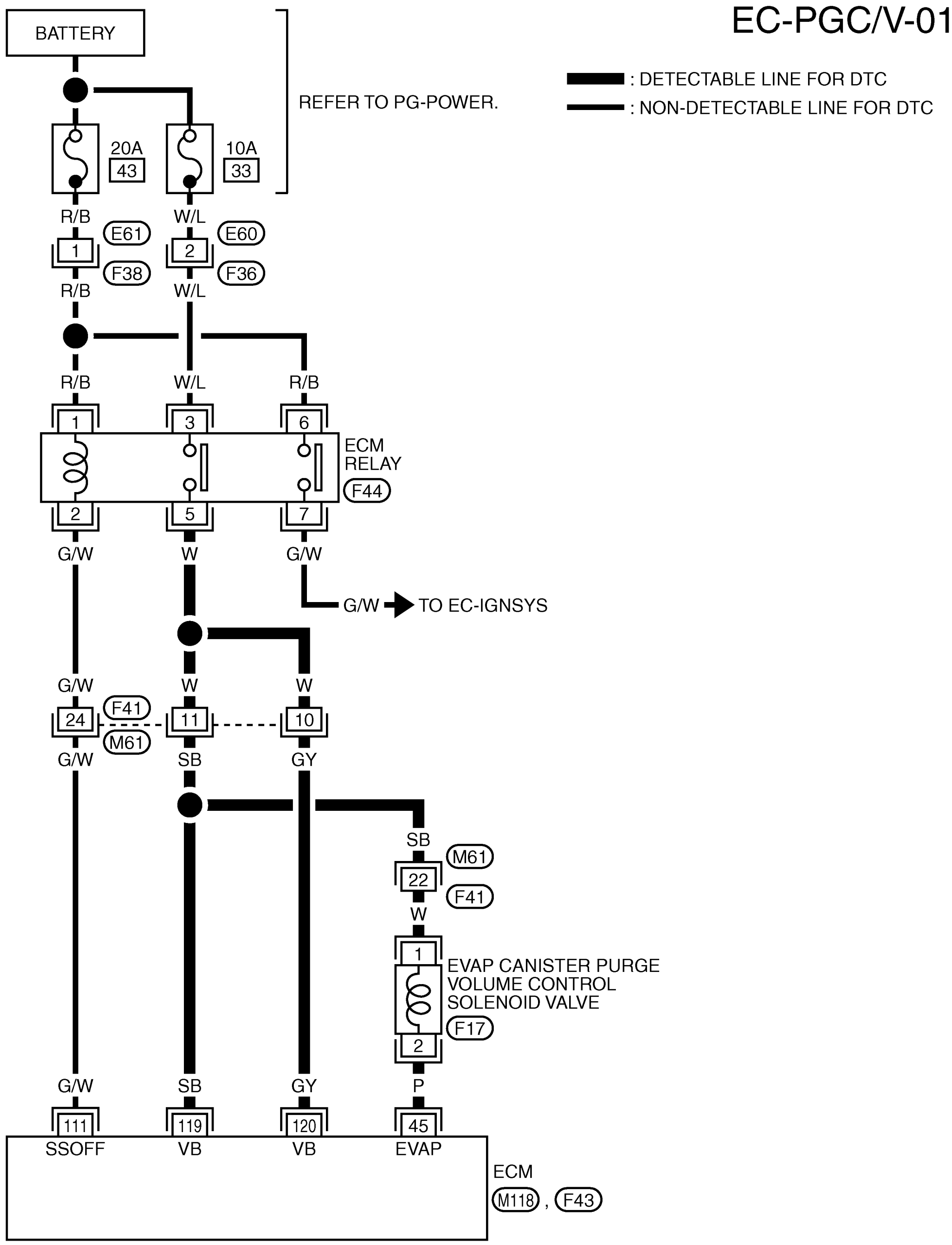
WITH GST

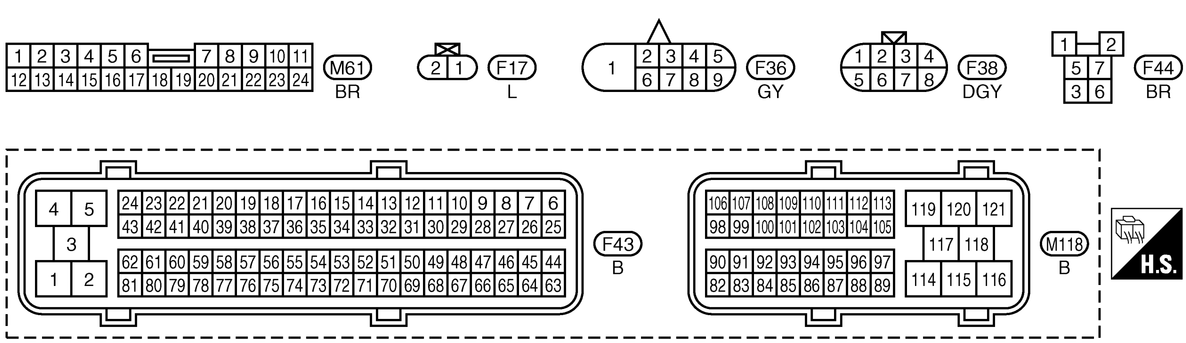
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CQH

EC-PGC/V-01



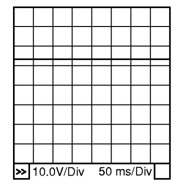
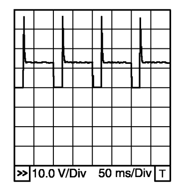


TBWB0123E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	P	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

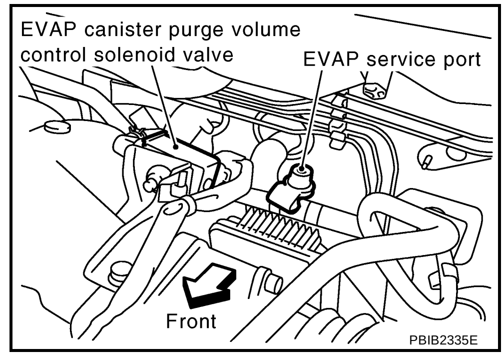
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8G

1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.

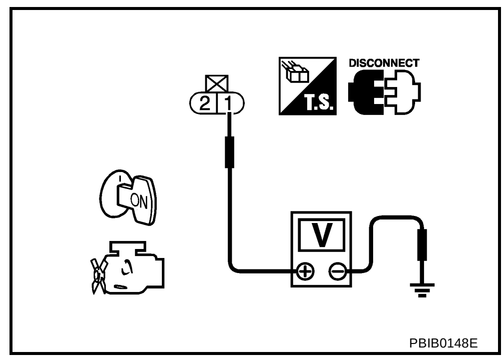


4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M61, F41
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay.
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP canister purge volume control solenoid valve terminal 2 and ECM terminal 45. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

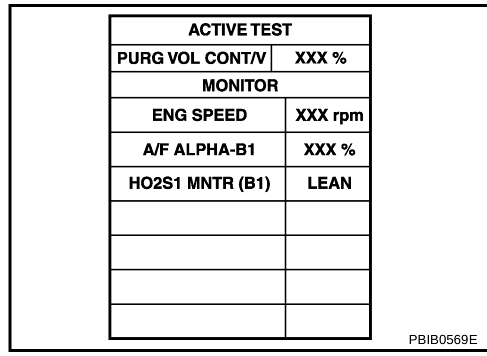
OK or NG

OK (With CONSULT-II)>>GO TO 4.
OK (Without CONSULT-II)>>GO TO 5.
NG >> Repair open circuit or short to ground and short to power in harness or connectors.

4. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Reconnect all harness connectors disconnected.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that engine speed varies according to the valve opening.



PBIB0569E

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace EVAP canister purge volume control solenoid valve.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

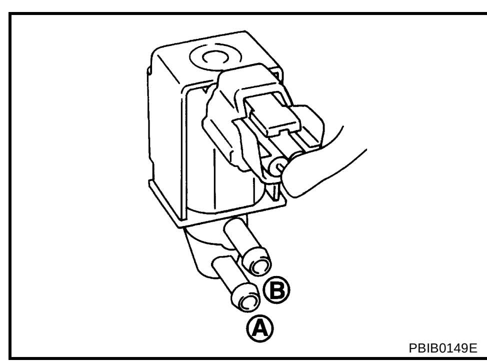
ABS00CQJ

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No

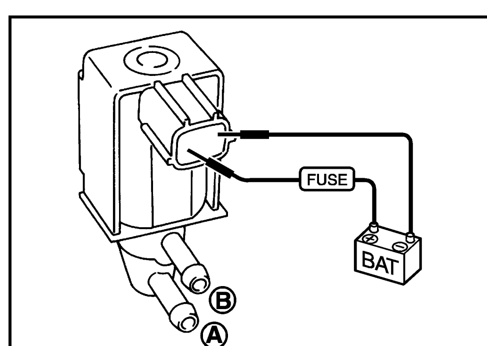


PBIB0149E

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

Removal and Installation

ABS00CQK

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EM-16, "INTAKE MANIFOLD" .

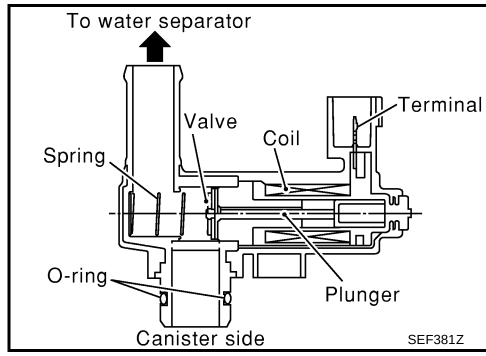
DTC P0447 EVAP CANISTER VENT CONTROL VALVE

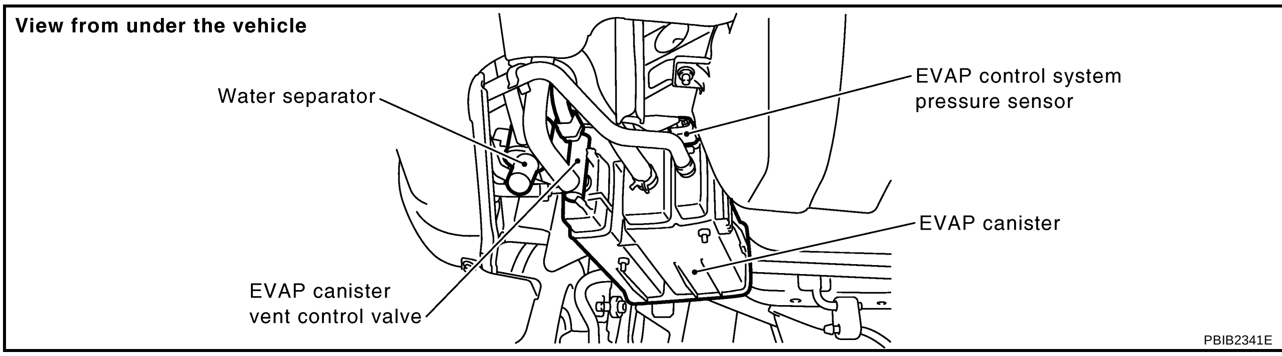
PFP:14935

Component Description

ABS00CQL

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.
This solenoid valve is used only for diagnosis, and usually remains opened.
When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows EVAP Control System diagnoses.





CONSULT-II Reference Value in Data Monitor Mode

ABS00CQM

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

ABS00CQN

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0447 0447	EVAP canister vent control valve circuit open	An improper voltage signal is sent to ECM through EVAP canister vent control valve.	● Harness or connectors (The valve circuit is open or shorted.) ● EVAP canister vent control valve

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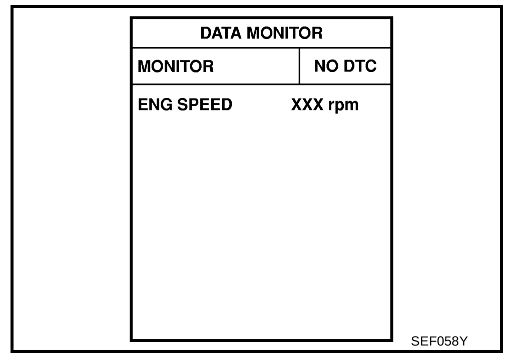
DTC Confirmation Procedure

ABS00CQO

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait at least 8 seconds.
4. If 1st trip DTC is detected, go to EC-358, "Diagnostic Procedure" .



SEF058Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CQP

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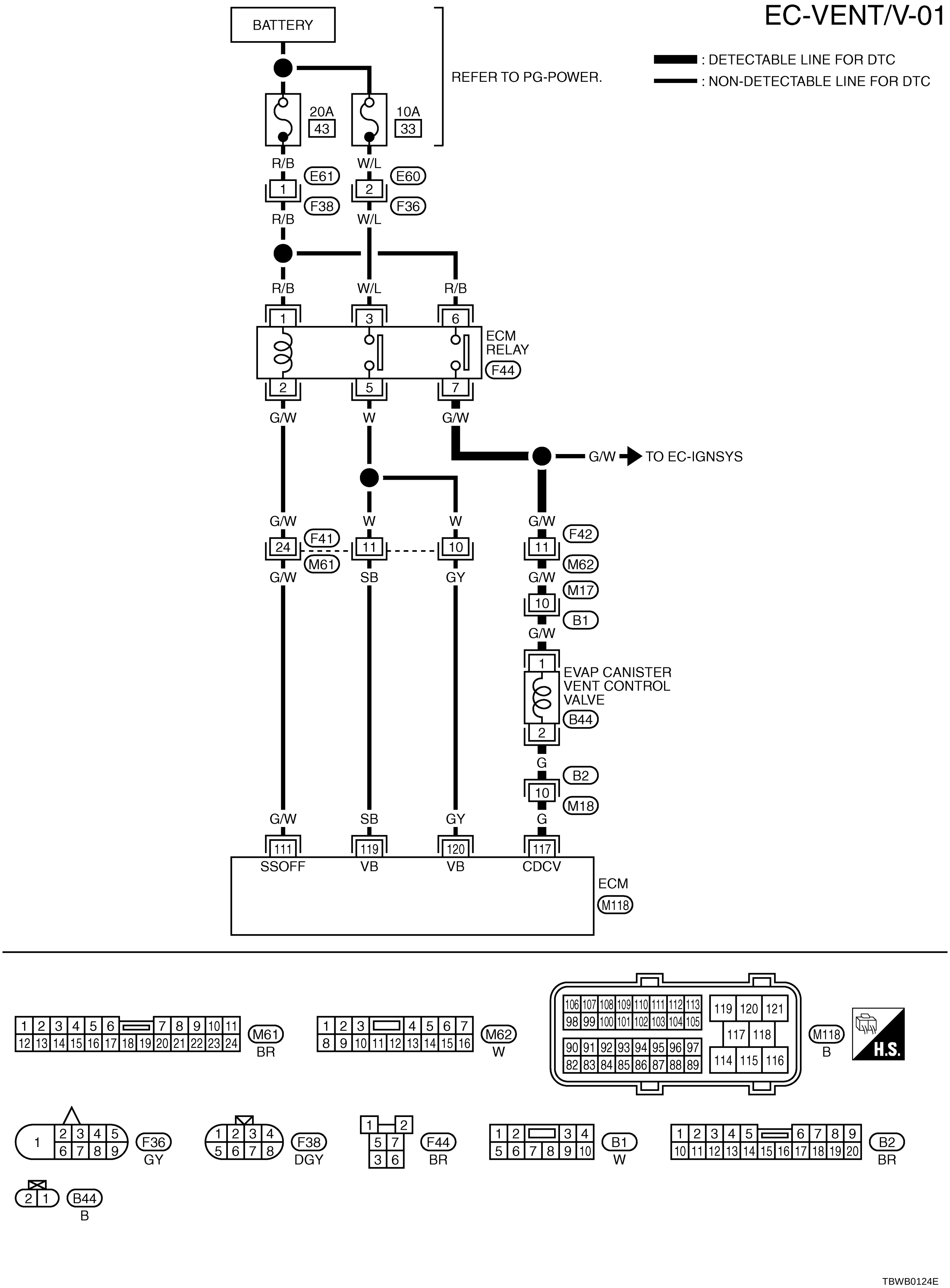


Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
117	G	EVAP canister vent control valve	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00CQQ

1. INSPECTION START

1. Do you have CONSULT-II?

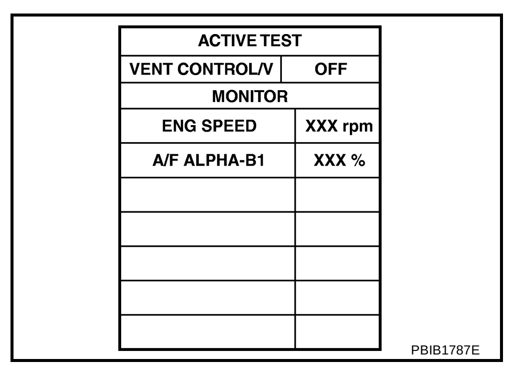
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT

With CONSULT-II

1. Turn ignition switch OFF and then turn ON.
2. Select “VENT CONTROL/V” in “ACTIVE TEST” mode with CONSULT-II.
3. Touch “ON/OFF” on CONSULT-II screen.
4. Check for operating sound of the valve.
   Clicking noise should be heard.

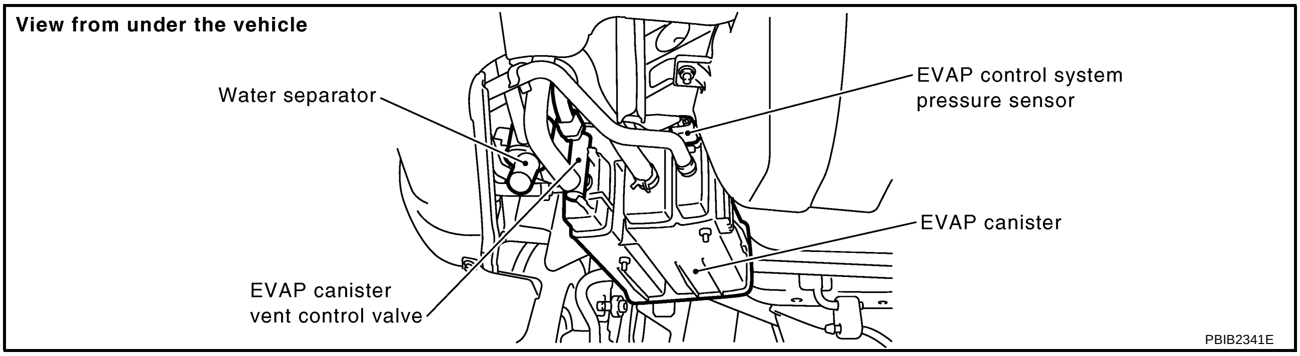


OK or NG

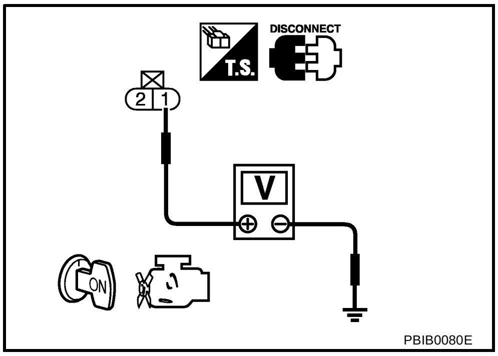
OK >> GO TO 7.
NG >> GO TO 3.

3. CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister vent control valve harness connector.



3. Turn ignition switch ON.
4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F42, M62
- Harness connectors M17, B1
- Harness for open or short between EVAP canister vent control valve and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 117 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B2, M118
- Harness for open or short between EVAP canister vent control valve and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 8.
NG >> Clean the rubber tube using an air blower.

8. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-360, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP canister vent control valve.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

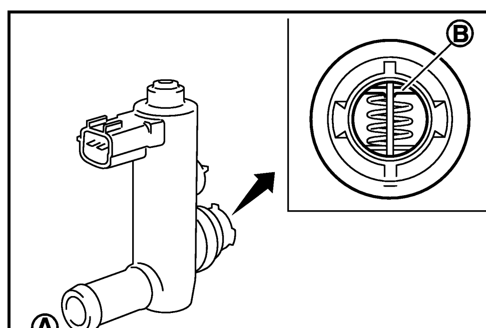
Component Inspection

ABS00CQR

EVAP CANISTER VENT CONTROL VALVE

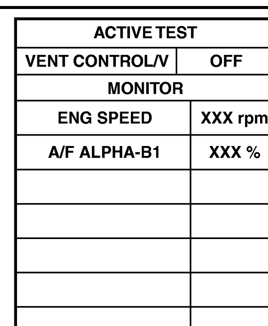
With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
   If NG, replace EVAP canister vent control valve.
   If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



PBIB1033E

5. Perform “VENT CONTROL/V” in “ACTIVE TEST” mode.
6. Check air passage continuity and operation delay time.
   Make sure new O-ring is installed properly.



PBIB1787E

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

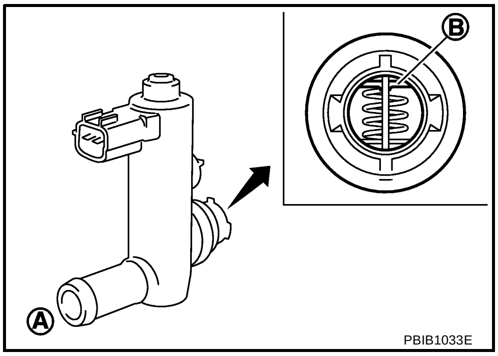
Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve.
If OK, go to next step.

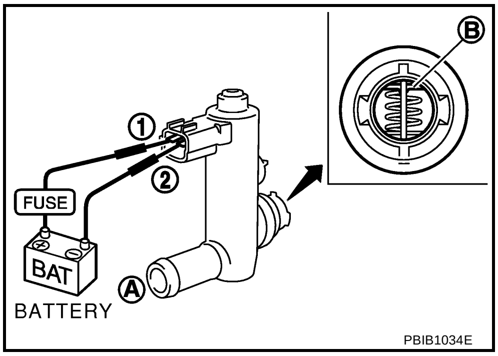
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 6 again.

Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



3. Check air passage continuity and operation delay time under the following conditions.
   Make sure new O-ring is installed properly.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

If NG, replace EVAP canister vent control valve.
If OK, go to next step.

4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
5. Perform step 3 again.

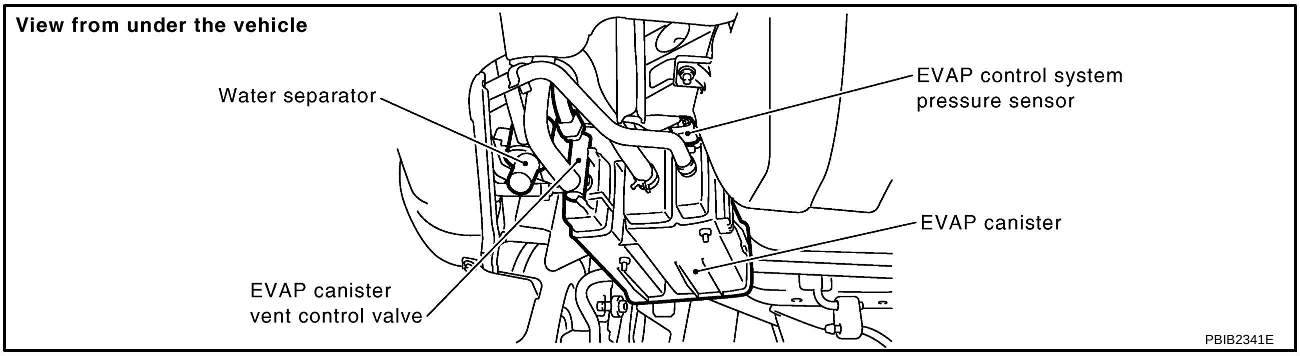
DTC P0451 EVAP CONTROL SYSTEM PRESSURE SENSOR

PFP:22365

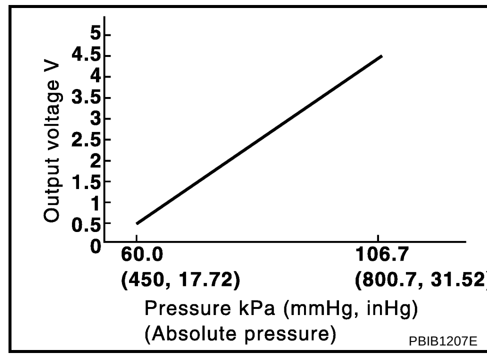
Component Description

ABS00CQS

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.



PBIB2341E



PBIB1207E

CONSULT-II Reference Value in Data Monitor Mode

ABS00CQT

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

ABS00CQU

NOTE:
If DTC P0451 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229.
Refer to EC-499, "DTC P1229 SENSOR POWER SUPPLY" .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0451 0451	EVAP control system pressure sensor performance	ECM detects a sloshing signal from the EVAP control system pressure sensor	● Harness or connectors ● EVAP control system pressure sensor

DTC Confirmation Procedure

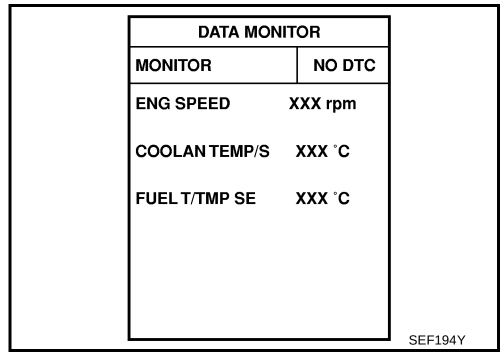
ABS00CQV

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch OFF and wait at least 10 seconds.
2. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and wait at least 40 seconds.

   NOTE:
   Do not depress accelerator pedal even slightly.
   If 1st trip DTC is detected, go to EC-363, "Diagnostic Procedure" .



WITH GST

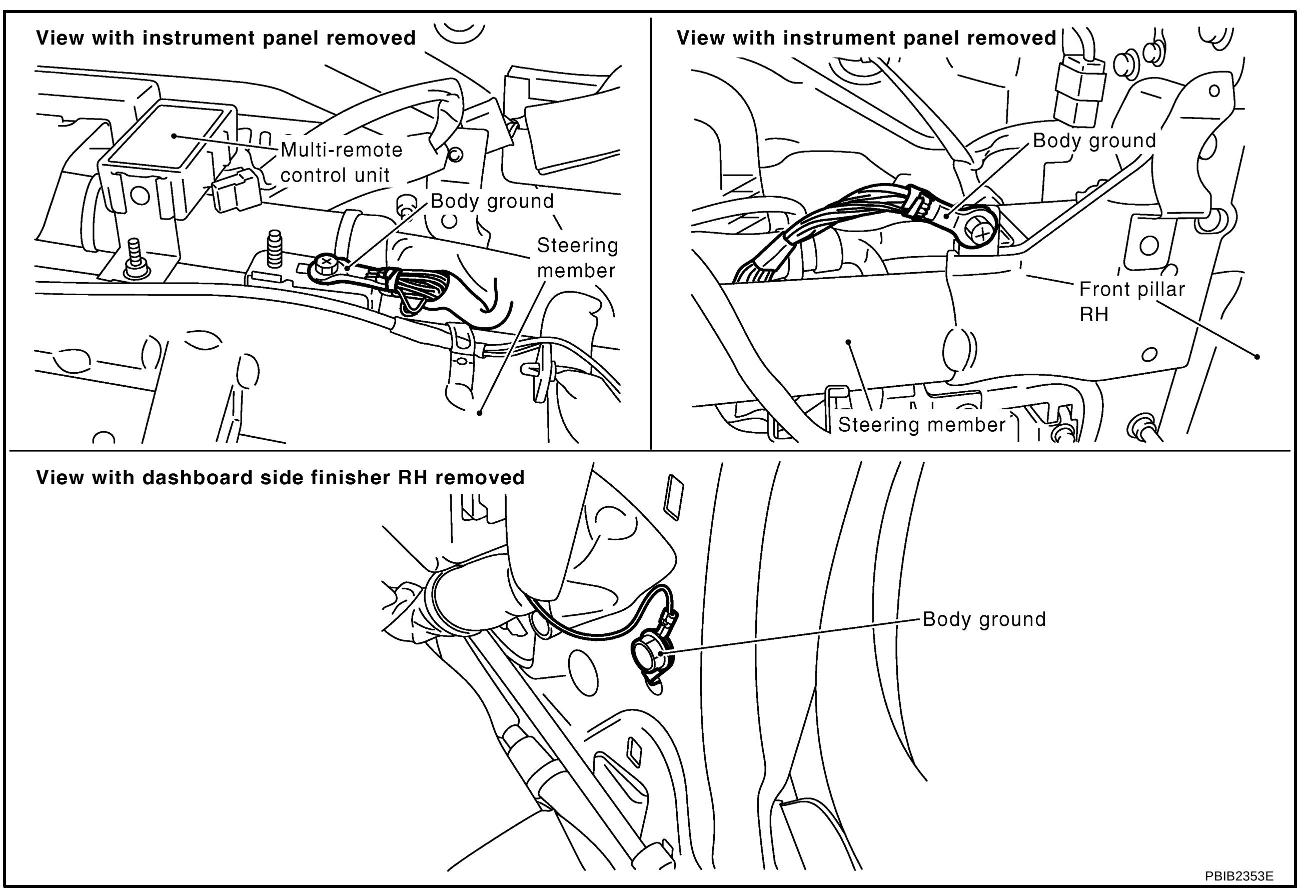
Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CQW

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .

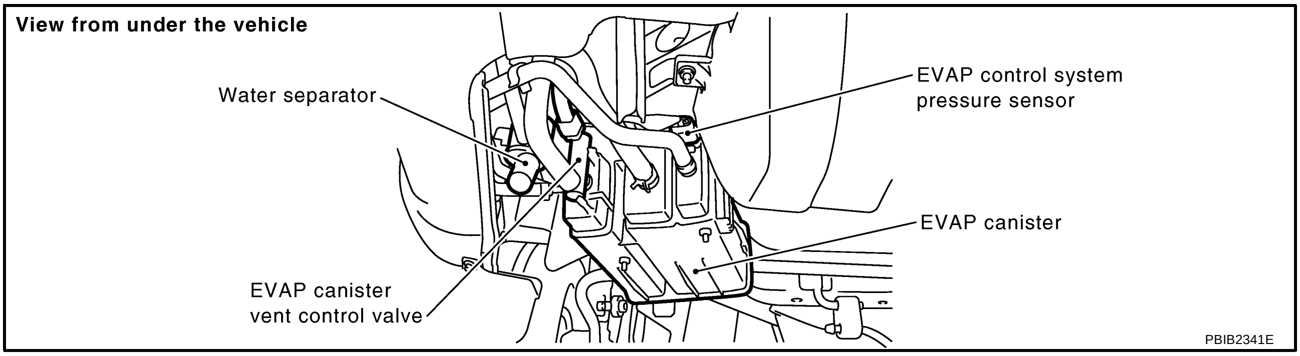


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR FOR WATER

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness connector.

3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-364, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace EVAP control system pressure sensor.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .
For wiring diagram, refer to EC-367 .

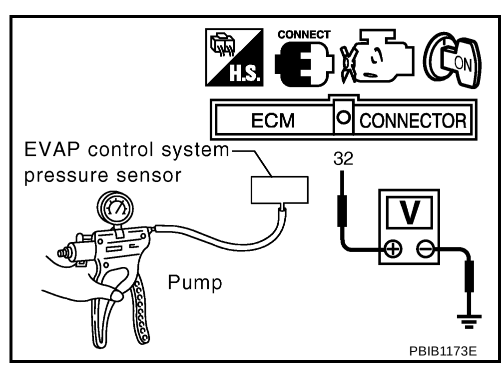
>> **INSPECTION END**

Component Inspection

ABS00CQX

EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
   Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 32 and ground under the following conditions.



Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:
- **Always calibrate the vacuum pump gauge when using it.**
- **Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).**

4. If NG, replace EVAP control system pressure sensor.

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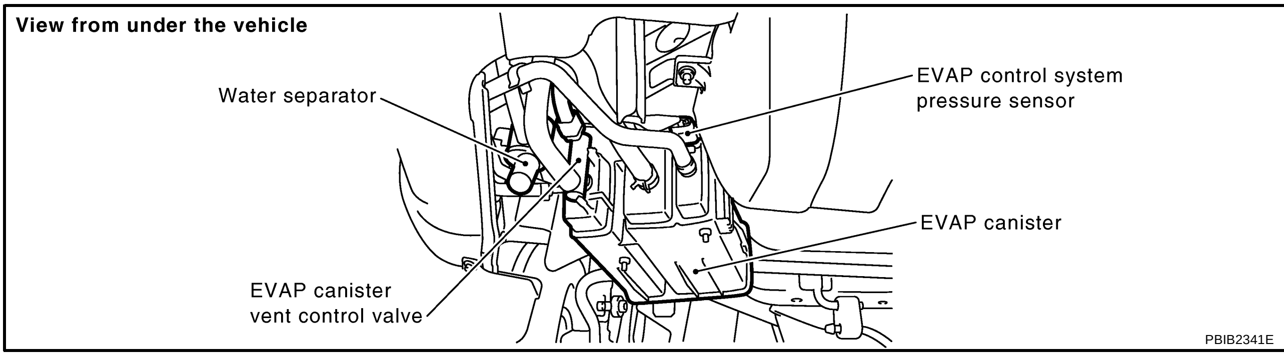
DTC P0452 EVAP CONTROL SYSTEM PRESSURE SENSOR

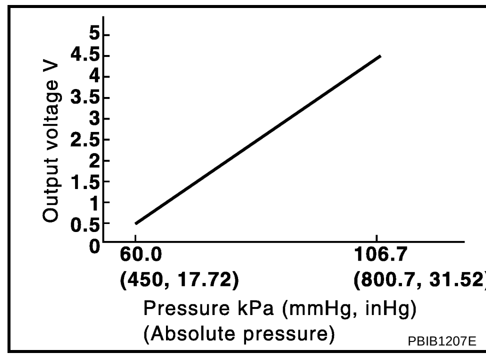
PFP:25085

Component Description

ABS00CQY

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.





CONSULT-II Reference Value in Data Monitor Mode

ABS00CQZ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

ABS00CR0

NOTE:
If DTC P0452 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-499, "DTC P1229 SENSOR POWER SUPPLY" .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0452 0452	EVAP control system pressure sensor low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● EVAP control system pressure sensor

DTC Confirmation Procedure

ABS00CR1

NOTE:

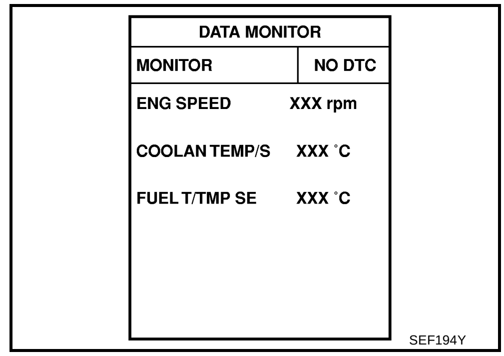
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

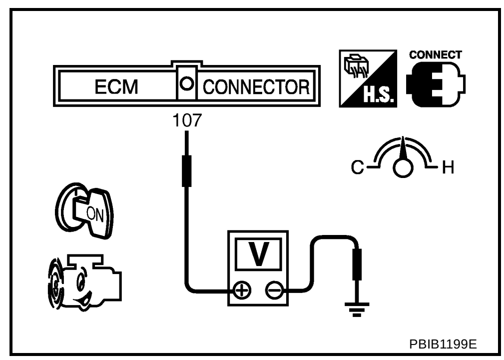
WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. Make sure that “FUEL T/TEMP SE” is more than 0°C (32°F).
6. Start engine and wait at least 20 seconds.
   If 1st trip DTC is detected, go to EC-368, "Diagnostic Procedure"
   .



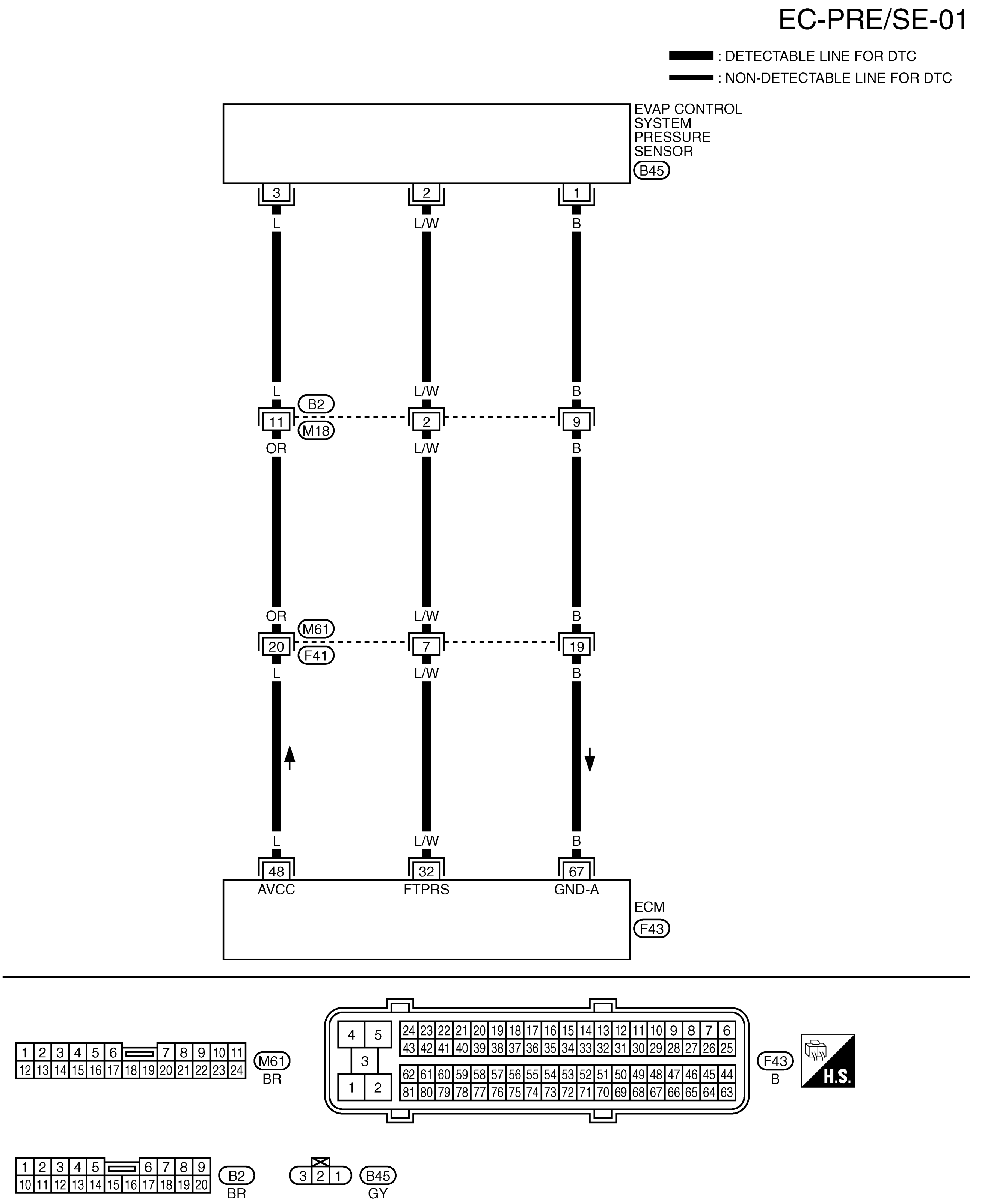
WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and wait at least 20 seconds.
5. Select Service $07 with GST.
   If 1st trip DTC is detected, go to EC-368, "Diagnostic Procedure"
   .



Wiring Diagram

ABS00CR2



TBWB0125E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

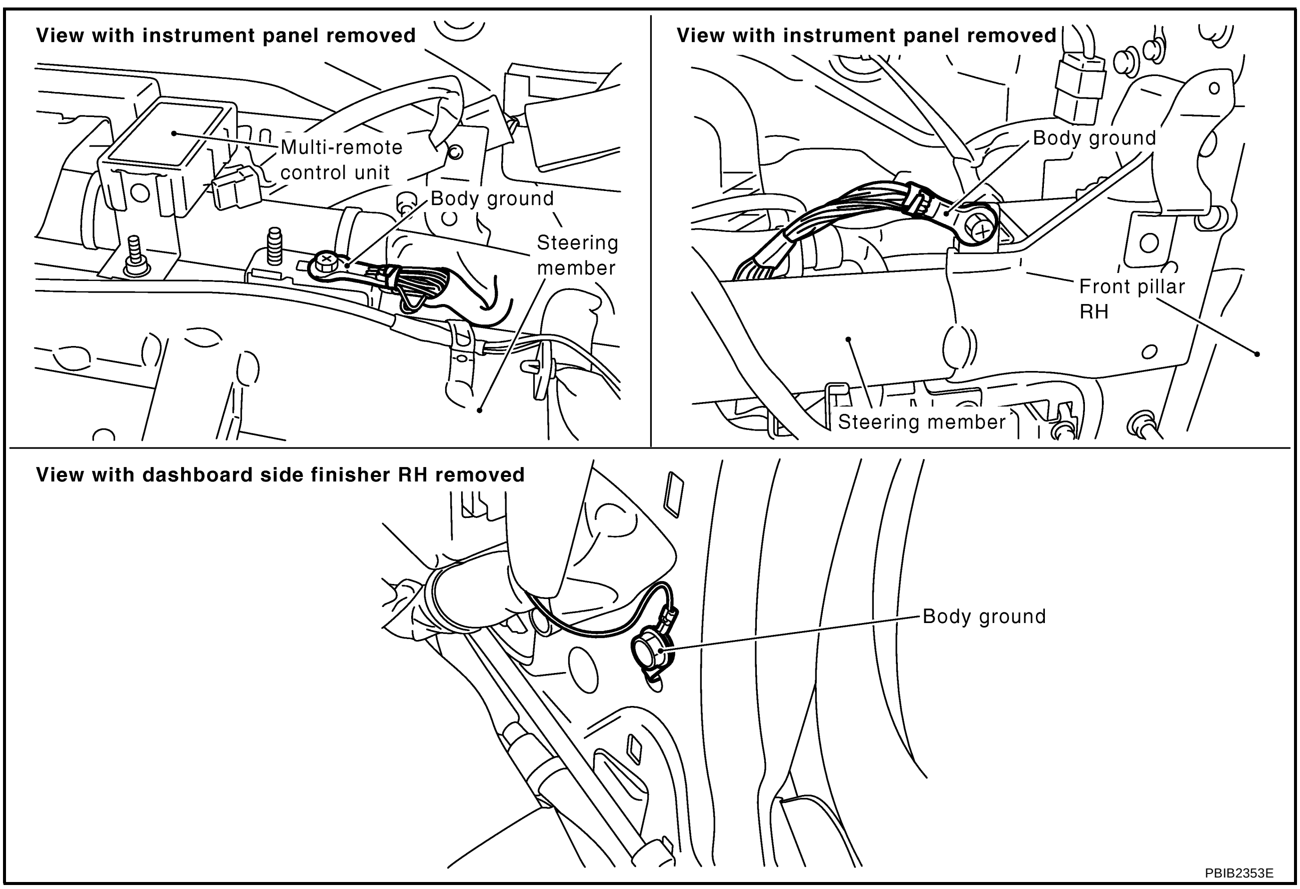
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L/W	EVAP control system pressure sensor	**[Ignition switch: ON]**	Approximately 1.8 - 4.8V
48	L	Sensor power supply (EVAP control system pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00CR3

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .



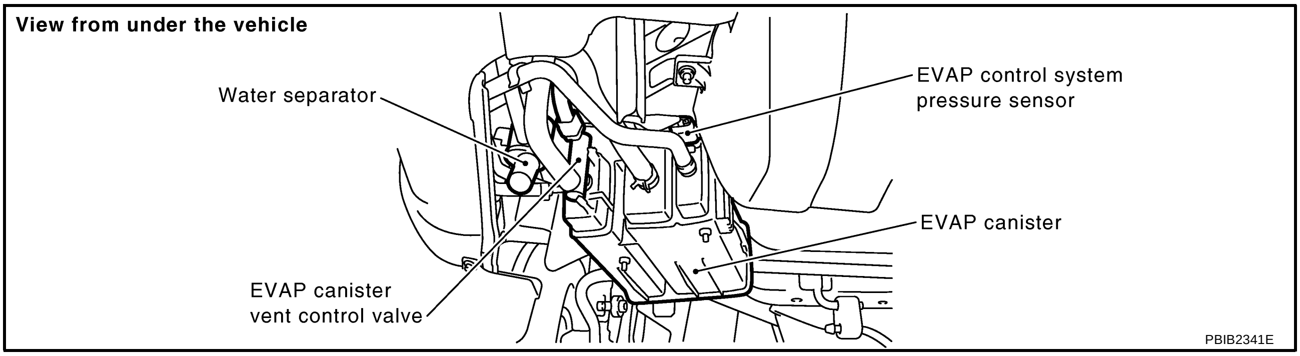
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness connector.

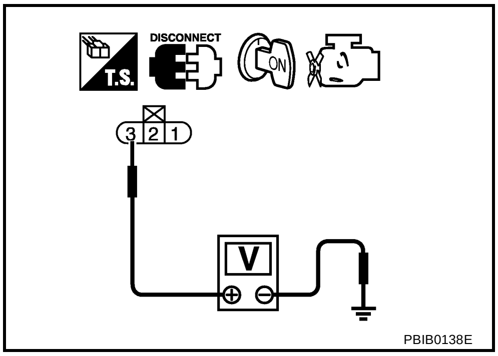
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness connectors B2, M18
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 67.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness connectors B2, M18
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness connectors B2, M18
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-371, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace EVAP control system pressure sensor.

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10. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

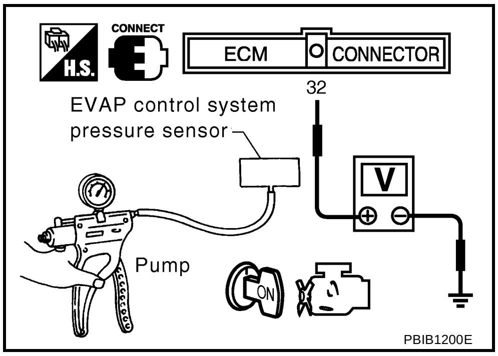
>> **INSPECTION END**

Component Inspection

ABS00CR4

EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister. **Always replace O-ring with a new one.**
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 32 and ground under the following conditions.



Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:
- **Always calibrate the vacuum pump gauge when using it.**
- **Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).**

4. If NG, replace EVAP control system pressure sensor.

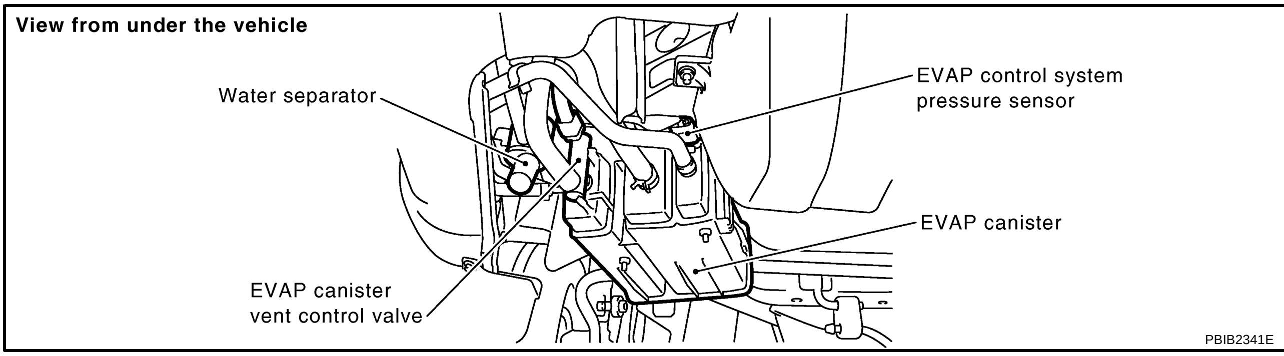
DTC P0453 EVAP CONTROL SYSTEM PRESSURE SENSOR

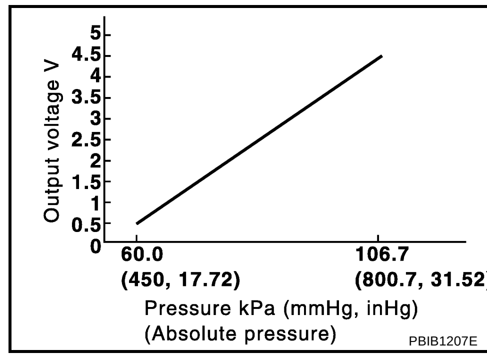
PFP:25085

Component Description

ABS00CR5

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases.





CONSULT-II Reference Value in Data Monitor Mode

ABS00CR6

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 1.8 - 4.8V

On Board Diagnosis Logic

ABS00CR7

NOTE:
If DTC P0453 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229.
Refer to EC-499, "DTC P1229 SENSOR POWER SUPPLY" .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0453 0453	EVAP control system pressure sensor high input	An excessively high voltage from the sensor is sent to ECM.	● Harness or connectors (The sensor circuit is open or shorted.) ● EVAP control system pressure sensor ● EVAP canister vent control valve ● EVAP canister ● Water separator ● Rubber hose to EVAP canister vent control valve to water separator

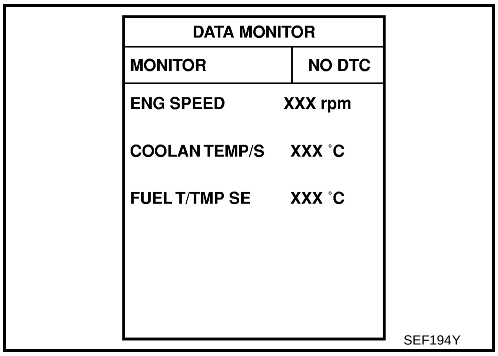
DTC Confirmation Procedure

ABS00CR8

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

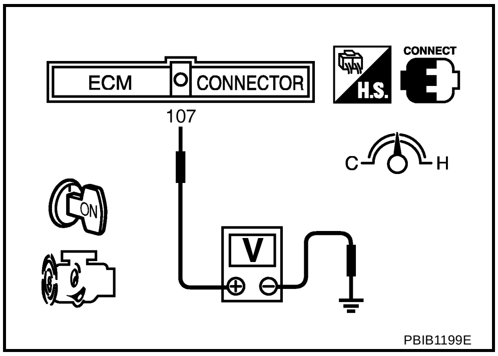
1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
6. Wait at least 10 seconds.
   If 1st trip DTC is detected, go to EC-375, "Diagnostic Procedure" .



SEF194Y

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Check that voltage between ECM terminal 107 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Wait at least 10 seconds.
5. Select Service $07 with GST.
   If 1st trip DTC is detected, go to EC-375, "Diagnostic Procedure" .



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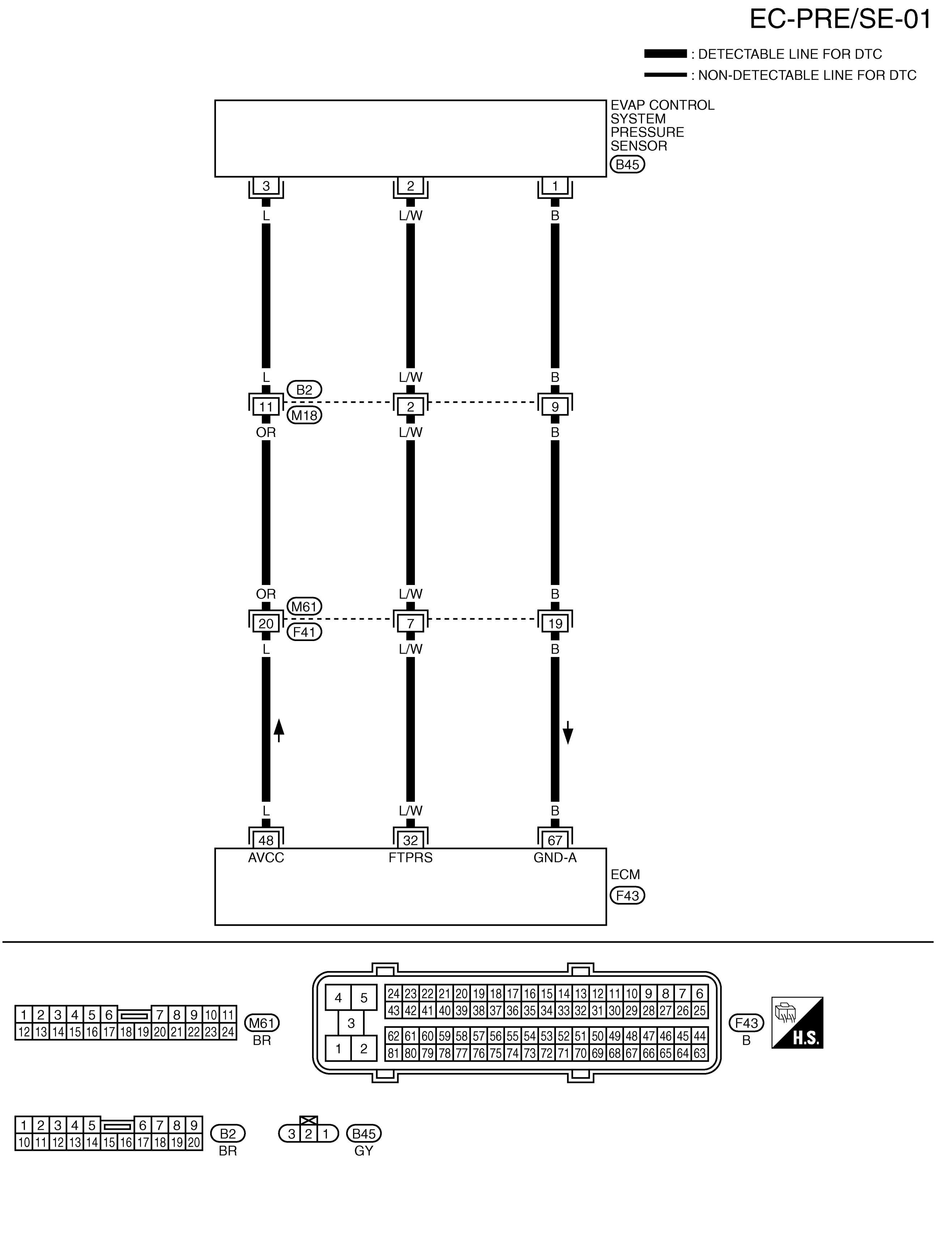
Wiring Diagram

ABS00CR9



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

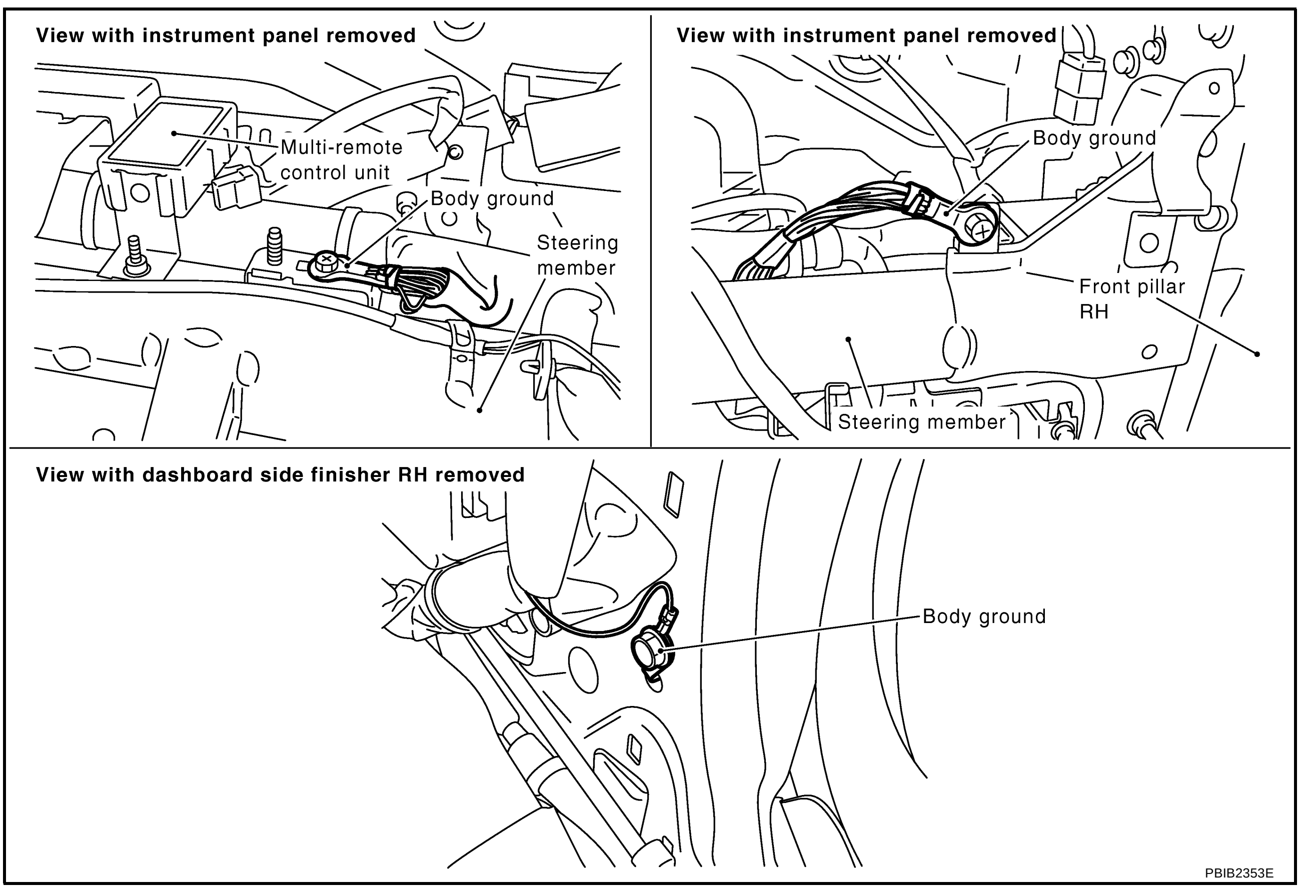
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L/W	EVAP control system pressure sensor	**[Ignition switch: ON]**	Approximately 1.8 - 4.8V
48	L	Sensor power supply (EVAP control system pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00CRA

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .

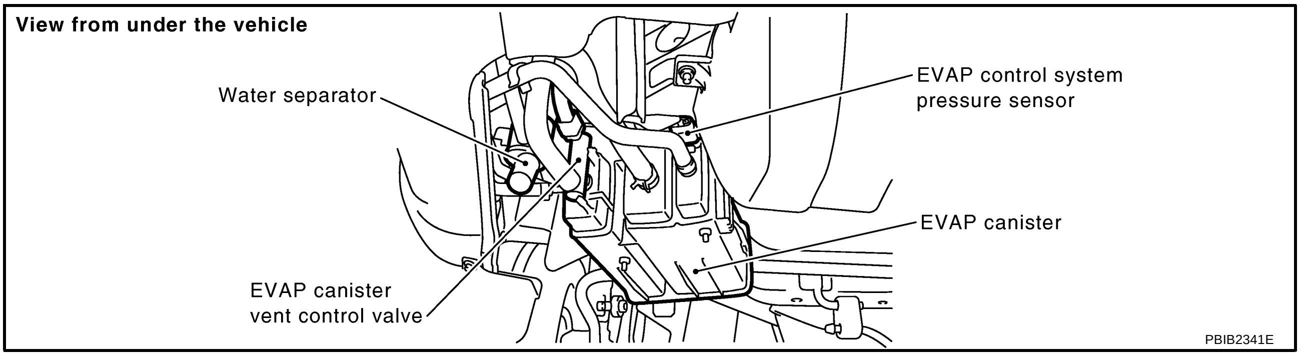


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.



2. Check sensor harness connector for water.

Water should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness connector.

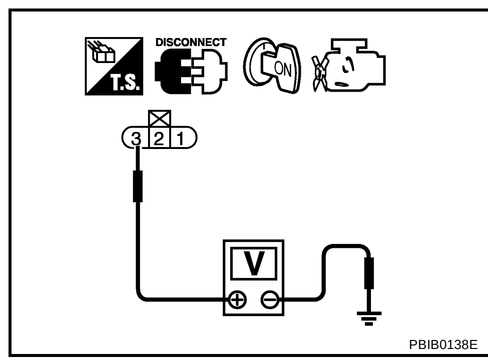
3. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between EVAP control system pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.



4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness connectors B2, M18
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between EVAP control system pressure sensor terminal 1 and ECM terminal 67.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness connectors B2, M18
- Harness for open or short between EVAP control system pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 32 and EVAP control system pressure sensor terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F41, M61
- Harness connectors B2, M18
- Harness for open or short between ECM and EVAP control system pressure sensor

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK RUBBER TUBE

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging, vent and kinked.

OK or NG

OK >> GO TO 10.
NG >> Clean the rubber tube using an air blower, repair or replace rubber tube.

10. CHECK EVAP CANISTER VENT CONTROL VALVE

Refer to EC-360, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> Replace EVAP canister vent control valve.

11. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-379, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace EVAP control system pressure sensor.

12. CHECK WATER SEPARATOR

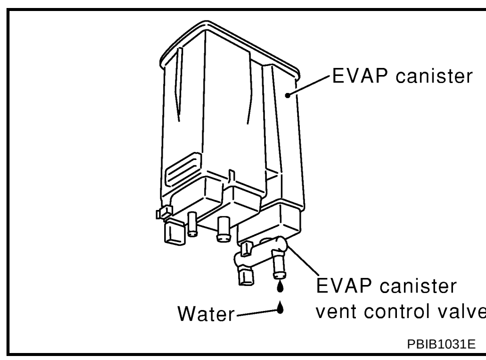
Refer to EC-379, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Clean or replace water separator.

13. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.



Yes or No

Yes >> GO TO 14.
No >> GO TO 16.

14. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.
The weight should be less than 2.5 kg (5.5 lb).

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

15. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between to EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

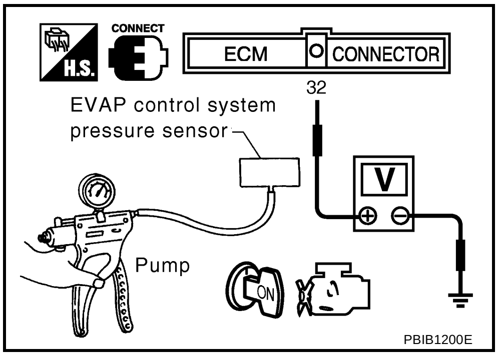
>> **INSPECTION END**

Component Inspection

ABS00CRB

EVAP CONTROL PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected from EVAP canister.
   Always replace O-ring with a new one.
2. Install a vacuum pump to EVAP control system pressure sensor.
3. Turn ignition switch ON and check output voltage between ECM terminal 32 and ground under the following conditions.



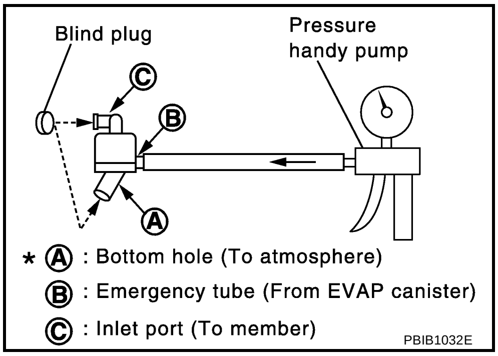
Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	2.1 to 2.5V lower than above value

CAUTION:
- **Always calibrate the vacuum pump gauge when using it.**
- **Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or pressure over 101.3 kPa (760 mmHg, 29.92 inHg).**

4. If NG, replace EVAP control system pressure sensor.

WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A** , and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.
   NOTE:
   Do not disassemble water separator.



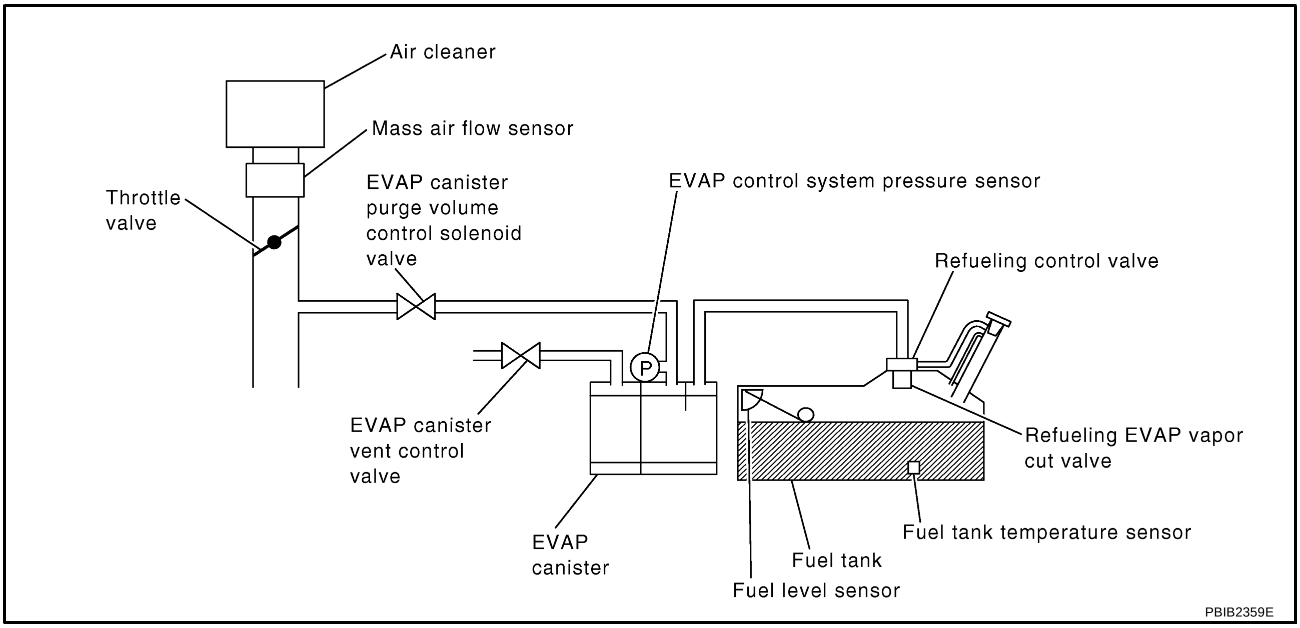
DTC P0455 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

ABS00CRC

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in EVAP system between the fuel tank and EVAP canister purge volume control solenoid valve.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0455 0455	EVAP control system gross leak detected	EVAP control system has a very large leak such as fuel filler cap fell off, EVAP control system does not operate properly.	● Fuel filler cap remains open or fails to close. ● Incorrect fuel tank vacuum relief valve ● Incorrect fuel filler cap used ● Foreign matter caught in fuel filler cap. ● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. ● Foreign matter caught in EVAP canister vent control valve. ● EVAP canister or fuel tank leaks ● EVAP purge line (pipe and rubber tube) leaks ● EVAP purge line rubber tube bent. ● Blocked or bent rubber table to EVAP ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● O-ring of EVAP canister vent control valve is missing or damaged. ● EVAP control system pressure sensor ● Refueling EVAP vapor cut valve ● Refueling control valve ● ORVR system leaks

CAUTION:
- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

DTC Confirmation Procedure

ABS00CRD

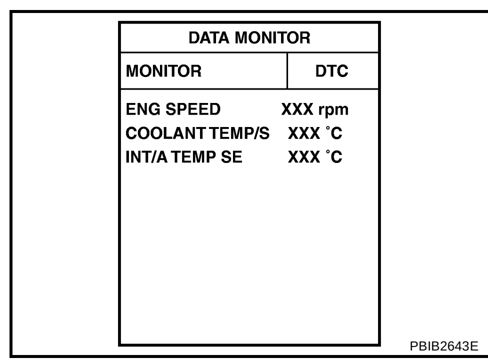
CAUTION:
Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:
- **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
- **Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 and 3/4 full, and vehicle is placed on flat level surface.**
- **Open engine hood before conducting the following procedures.**

WITH CONSULT-II

1. Tighten fuel filler cap securely until racheting sound is heard.
2. Turn ignition switch ON.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON and select "DATA MONITOR" mode with CONSULT-II.
5. Make sure that the following conditions are met.
   COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
   INT/A TEMP SE: 0 - 60°C (32 - 140°F)
6. Select "EVAP SML LEAK P0442/P1442" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II. Follow the instruction displayed.



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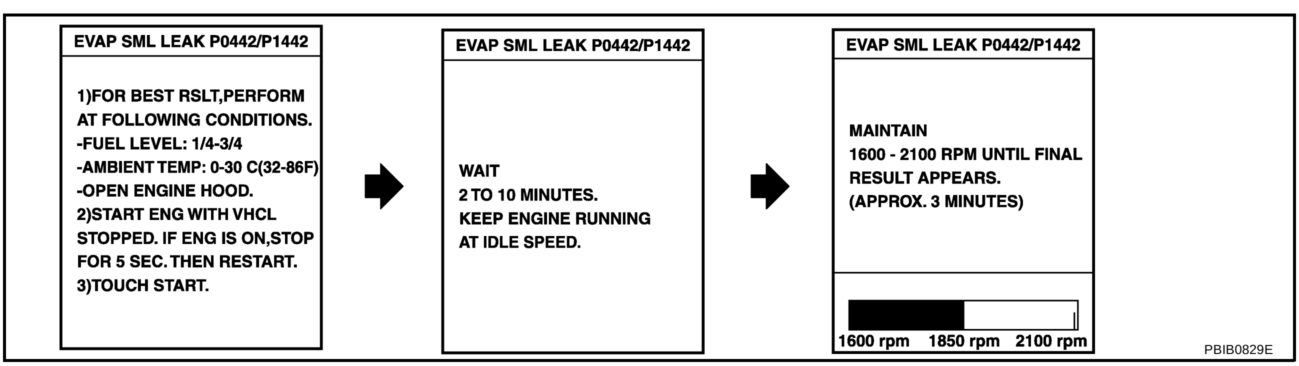
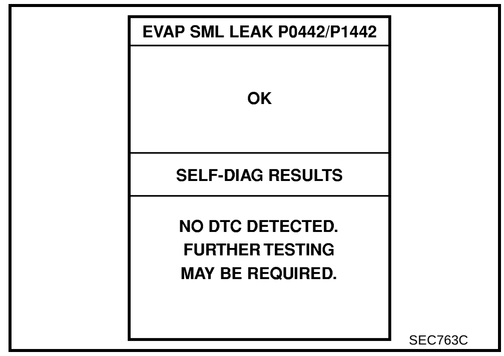


PBIB0829E

NOTE:
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to EC-70, "Basic Inspection" .

7. Make sure that "OK" is displayed.

If “NG” is displayed, select “SELF-DIAG RESULTS” mode with CONSULT-II and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to EC-382, "Diagnostic Procedure" .
If P0442 is displayed, perform Diagnostic Procedure for DTC P0442, EC-341 .



SEC763C

WITH GST

NOTE:
Be sure to read the explanation of EC-57, "Driving Pattern" before driving vehicle.

1. Start engine.
2. Drive vehicle according to EC-57, "Driving Pattern" .
3. Stop vehicle.
4. Turn ignition switch OFF, wait at least 10 seconds and then turn ignition switch ON.
5. Select Service $07 with GST.

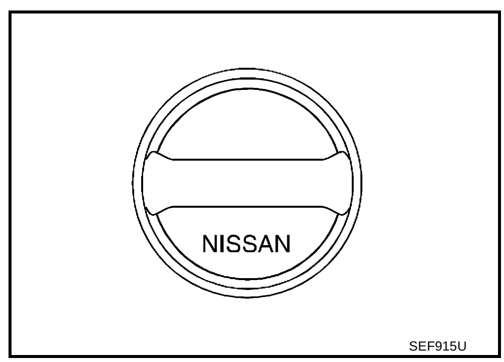
- If P0455 is displayed on the screen, go to EC-382, "Diagnostic Procedure" .
- If P0442 is displayed on the screen, go to EC-341, "Diagnostic Procedure" for DTC P0442.
- If P0441 is displayed on the screen, go to EC-334, "Diagnostic Procedure" . for DTC P0441.

Diagnostic Procedure

ABS00CRE

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.



SEF915U

OK or NG

OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.

2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until racheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

Refer to EC-33, "FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FULLER CAP)"

OK or NG

OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

5. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection.
Refer to EC-30, "EVAPORATIVE EMISSION SYSTEM" .

OK or NG

OK >> GO TO 6.
NG >> Repair or reconnect the hose.

6. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 7.

7. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

- EVAP canister vent control is installed properly.
  Refer to EC-34, "Removal and Installation"
- EVAP canister vent control valve.
  Refer to EC-360, "Component Inspection"

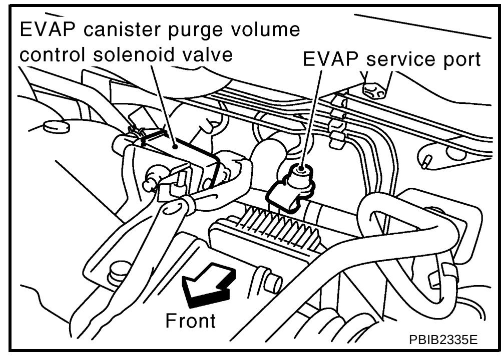
OK or NG

OK >> GO TO 8.
NG >> Repair or replace EVAP canister vent control valve and O-ring.

8. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.

NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.



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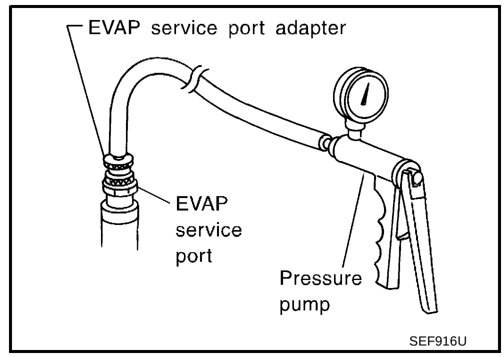


SEF916U

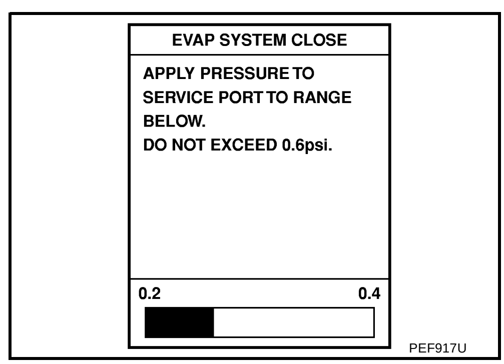
With CONSULT-II>>GO TO 9.
Without CONSULT-II>>GO TO 10.

9. CHECK FOR EVAP LEAK

With CONSULT-II

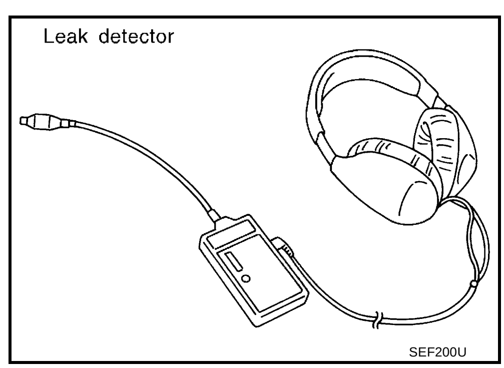
1. Turn ignition switch ON.
2. Select “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT-II.
3. Touch “START” and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
   Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



SEF200U

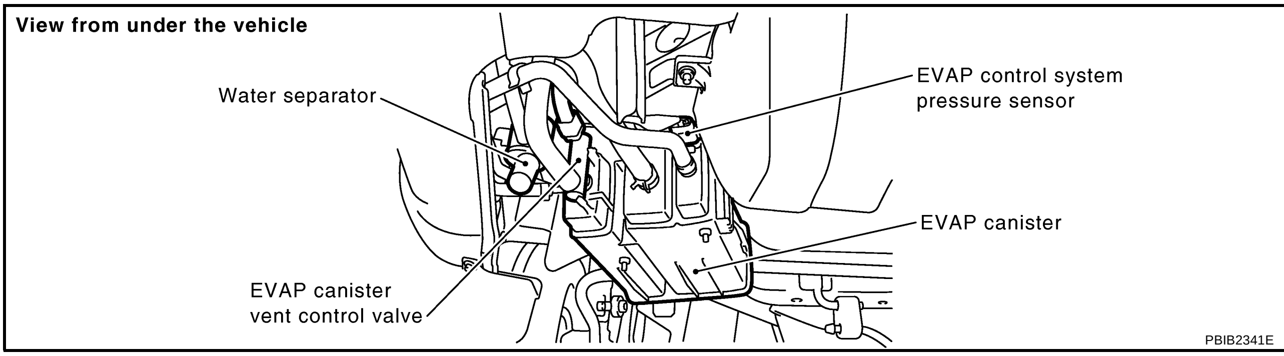
OK or NG

OK >> GO TO 11.
NG >> Repair or replace.

10. CHECK FOR EVAP LEAK

Without CONSULT-II

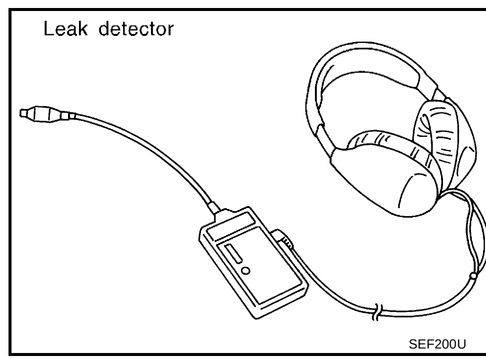
1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



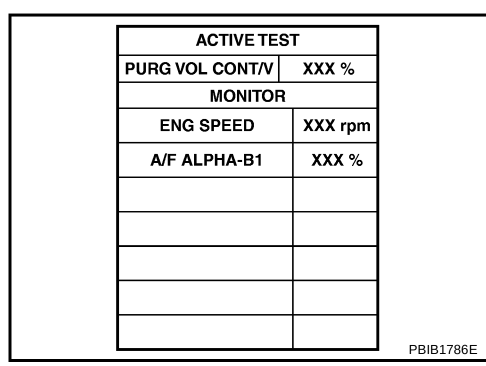
OK or NG

OK >> GO TO 12.
NG >> Repair or replace.

11. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode.
4. Touch “Qu” on CONSULT-II screen to increase “PURG VOL CONT/V” opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.



OK or NG

OK >> GO TO 14.
NG >> GO TO 13.

12. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

OK >> GO TO 15.
NG >> GO TO 13.

13. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-112, "Vacuum Hose Drawing" .

OK or NG

OK (With CONSULT-II)>>GO TO 14.
OK (Without CONSULT-II)>>GO TO 15.
NG >> Repair or reconnect the hose.

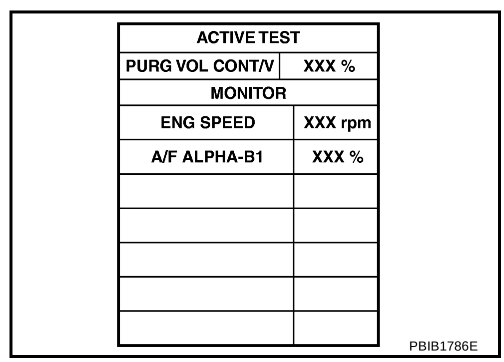
14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Start engine.
2. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that engine speed varies according to the valve opening.

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.



15. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace EVAP canister purge volume control solenoid valve.

16. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-285, "Component Inspection" .

OK or NG

OK >> GO TO 17.
NG >> Replace fuel level sensor unit.

17. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-371, "Component Inspection" .

OK or NG

OK >> GO TO 18.
NG >> Replace EVAP control system pressure sensor.

18. CHECK EVAP/ORVR LINE

Check refueling EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to EC-37, "ON BOARD REFUELING VAPOR RECOVERY (ORVR)" .

OK or NG

OK >> GO TO 19.
>> Repair or replace hoses and tubes.

19. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 20.
>> Repair or replace hoses, tubes or filler neck tube.

20. CHECK REFUELING CONTROL VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 21.
NG >> Replace refueling control valve.

21. CHECK EVAPP VAPOR CUT VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 22.
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

22. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P0456 EVAP CONTROL SYSTEM

PFP:14950

On Board Diagnosis Logic

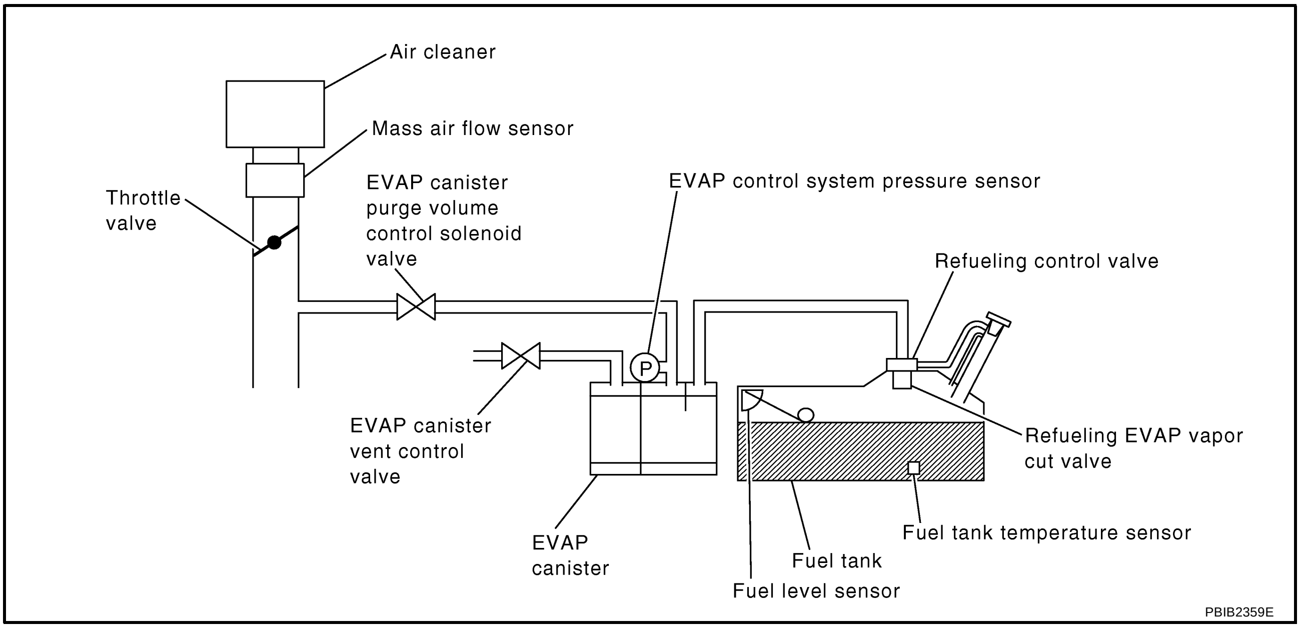
ABS00CRF

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold vacuum in the same way as conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P0456 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0442 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0456 0456	Evaporative emission control system very small leak (negative pressure check)	● EVAP system has a very small leak. ● EVAP system does not operate properly.	● Incorrect fuel tank vacuum relief valve ● Incorrect fuel filler cap used ● Fuel filler cap remains open or fails to close. ● Foreign matter caught in fuel filler cap. ● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. ● Foreign matter caught in EVAP canister vent control valve. ● EVAP canister or fuel tank leaks ● EVAP purge line (pipe and rubber tube) leaks ● EVAP purge line rubber tube bent ● Loose or disconnected rubber tube ● EVAP canister vent control valve and the circuit ● EVAP canister purge volume control solenoid valve and the circuit ● Fuel tank temperature sensor ● Water separator ● O-ring of EVAP canister vent control valve is missing or damaged ● EVAP canister is saturated with water ● EVAP control system pressure sensor ● Refueling EVAP vapor cut valve ● ORVR system leaks ● Refueling control valve ● Fuel level sensor and the circuit ● Foreign matter caught in EVAP canister purge volume control solenoid valve

CAUTION:

- **Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.**
- **If the fuel filler cap is not tightened properly, the MIL may come on.**
- **Use only a genuine NISSAN rubber tube as a replacement.**

DTC Confirmation Procedure

ABS00CRG

NOTE:

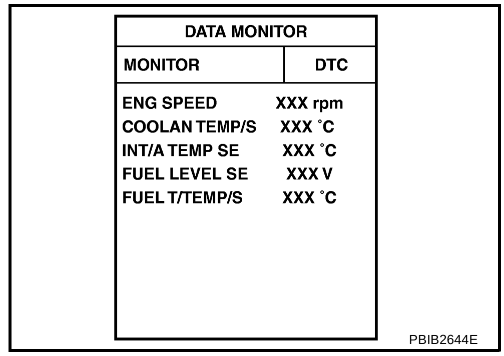
- **If DTC P0456 is displayed with P0442, first perform trouble diagnosis for DTC P0456.**
- **After repair, make sure that the hoses and clips are installed properly.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- **Open engine hood before conducting following procedure.**
- **If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.**
  - **Fuel filler cap is removed.**
  - **Refilled or drained the fuel.**
  - **EVAP component parts is/are removed.**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

WITH CONSULT-II

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.



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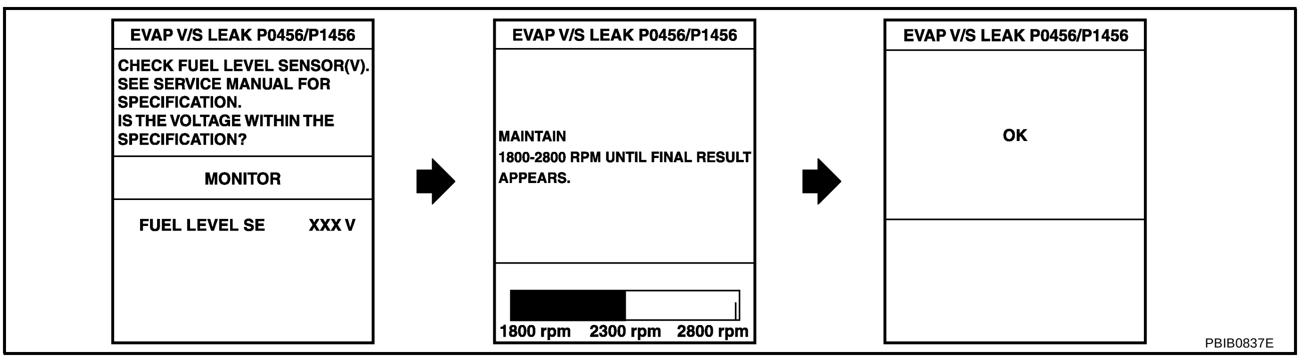
2. Make sure the following conditions are met.
   FUEL LEVEL SE: 0.25 - 1.4V
   COOLAN TEMP/S: 0 - 32°C (32 - 90°F)
   FUEL T/TMP SE: 0 - 35°C (32 - 95°F)
   INT/A TEMP SE: More than 0°C (32°F)
   If NG, turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the “FUEL LEVEL SE” meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON.
5. Select “EVAP V/S LEAK P0456” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
   Follow the instruction displayed.



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6. Make sure that “OK” is displayed.
   If “NG” is displayed, refer to EC-391, "Diagnostic Procedure" .
   NOTE:
   - **If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to EC-70, "Basic Inspection" .**
   - **Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.**

Overall Function Check

ABS00CRH

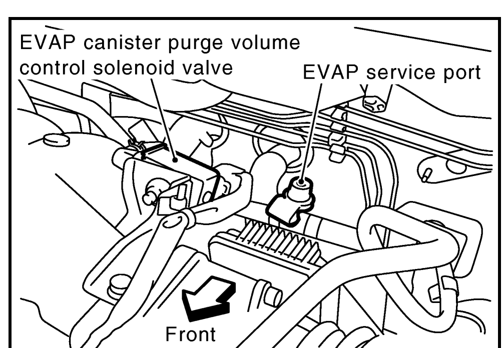
WITH GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.

CAUTION:

- **Never use compressed air, doing so may damage the EVAP system.**
- **Do not start engine.**
- **Do not exceeded 4.12 kPa (0.042 kg/cm^2 , 0.6 psi).**

1. Attach the EVAP service port adapter securely to the EVAP service port.



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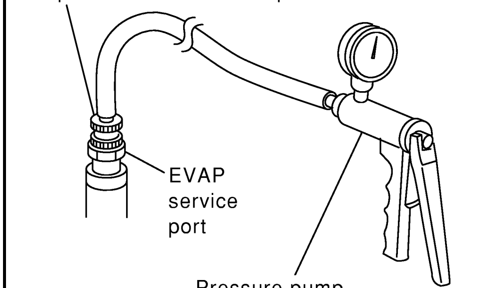
2. Set the pressure pump and a hose.
3. Also set a vacuum gauge via 3-way connector and a hose.
4. Turn ignition switch ON.
5. Connect GST and select Service $08.
6. Using Service $08 control the EVAP canister vent control valve (close).
7. Apply pressure and make sure the following conditions are satisfied.
   Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)
   Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).
   If NG, go to EC-391, "Diagnostic Procedure" .
   If OK, go to next step.



SEF462UI

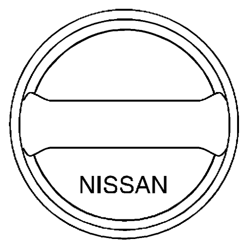
8. Disconnect GST.
9. Start engine and warm it up to normal operating temperature.
10. Turn ignition switch OFF and wait at least 10 seconds.
11. Restart engine and let it idle for 90 seconds.
12. Keep engine speed at 2,000 rpm for 30 seconds.
13. Turn ignition switch OFF.
    NOTE:
    For more information, refer to GST Instruction Manual.

Diagnostic Procedure

ABS00CRI

1. CHECK FUEL FILLER CAP DESIGN

1. Turn ignition switch OFF.
2. Check for genuine NISSAN fuel filler cap design.



SEF915U

OK or NG

OK >> GO TO 2.
NG >> Replace with genuine NISSAN fuel filler cap.

2. CHECK FUEL FILLER CAP INSTALLATION

Check that the cap is tightened properly by rotating the cap clockwise.

OK or NG

OK >> GO TO 3.
NG >> 1. Open fuel filler cap, then clean cap and fuel filler neck threads using air blower.
2. Retighten until racheting sound is heard.

3. CHECK FUEL FILLER CAP FUNCTION

Check for air releasing sound while opening the fuel filler cap.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK FUEL TANK VACUUM RELIEF VALVE

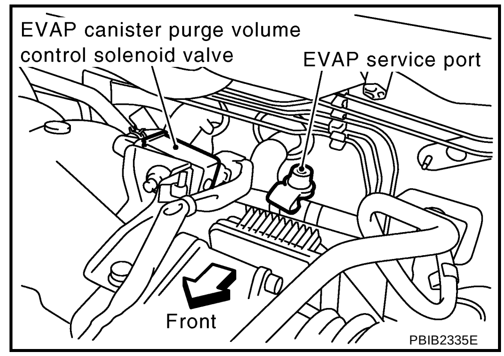
Refer to EC-33, "FUEL TANK VACUUM RELIEF VALVE (BUILT INTO FUEL FULLER CAP)" .

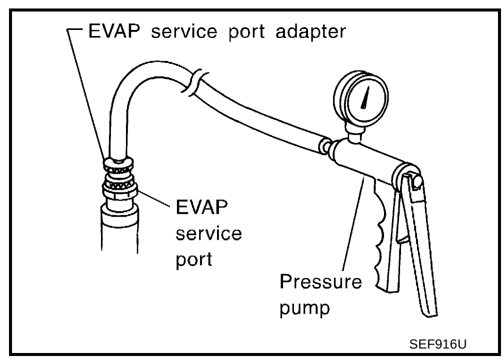
OK or NG

OK >> GO TO 5.
NG >> Replace fuel filler cap with a genuine one.

5. INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.
For the location of EVAP service port, refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .





NOTE:
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

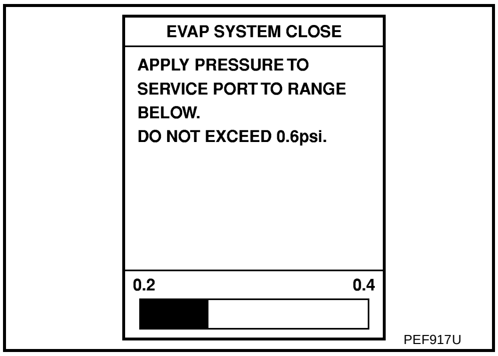
With CONSULT-II>>GO TO 6.
Without CONSULT-II>>GO TO 7.

6. CHECK FOR EVAP LEAK

With CONSULT-II

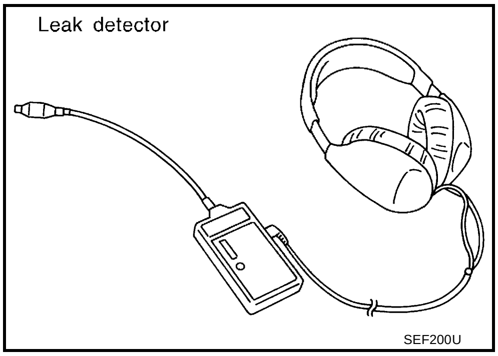
1. Turn ignition switch ON.
2. Select “EVAP SYSTEM CLOSE” of “WORK SUPPORT” mode with CONSULT-II.
3. Touch “START” and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in the system.**



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details.
   Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



SEF200U

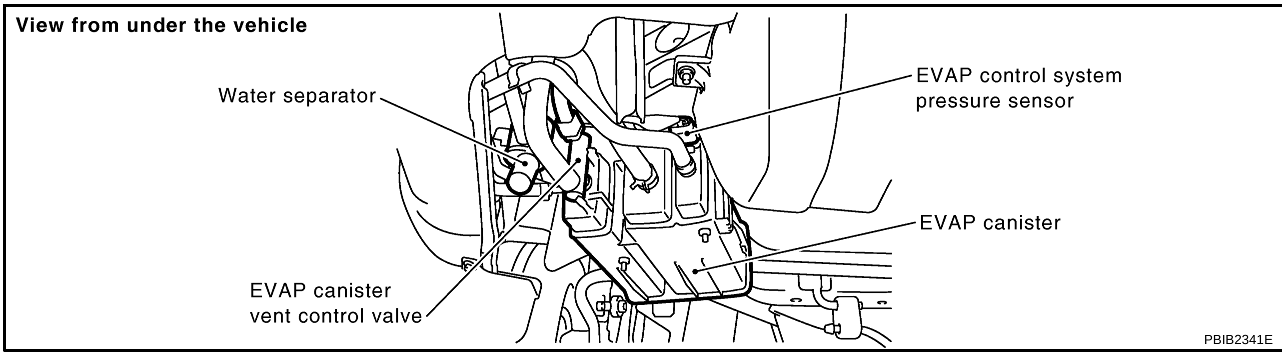
OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

7. CHECK FOR EVAP LEAK

Without CONSULT-II

1. Turn ignition switch OFF.
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)

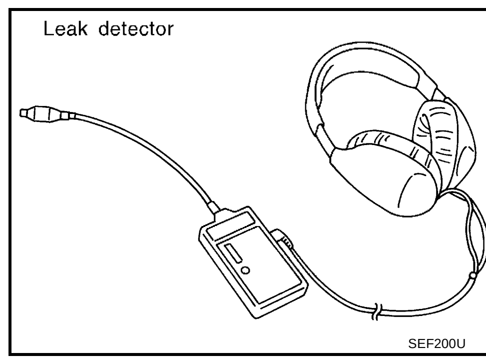


PBIB2341E

3. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

   CAUTION:
   - **Never use compressed air or a high pressure pump.**
   - **Do not exceed 4.12 kPa (0.042 kg/cm^2 , 0.6 psi) of pressure in the system.**

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .



SEF200U

OK or NG

OK >> GO TO 8.
NG >> Repair or replace.

8. CHECK WATER SEPARATOR

Refer to EC-398, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace water separator.

9. CHECK EVAP CANISTER VENT CONTROL VALVE

Check the following.

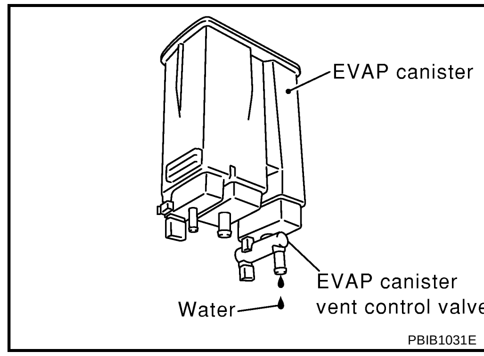
- EVAP canister vent control valve is installed properly.
  Refer to EC-34, "Removal and Installation" .
- EVAP canister vent control valve.
  Refer to EC-360, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Repair or replace EVAP canister vent control valve and O-ring.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Does water drain from the EVAP canister?



Yes or No

Yes >> GO TO 11.
No (With CONSULT-II)>>GO TO 13.
No (Without CONSULT-II)>>GO TO 14.

11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.5 kg (5.5 lb).

OK or NG

OK (With CONSULT-II)>>GO TO 13.
OK (Without CONSULT-II)>>GO TO 14.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

With CONSULT-II

1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
2. Start engine.
3. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode.
4. Touch “Qu” on CONSULT-II screen to increase “PURG VOL CONT/V” opening to 100%.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %

PBIB1786E

OK or NG

OK >> GO TO 16.
NG >> GO TO 15.

14. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine.
3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port.
4. Start engine and let it idle for at least 80 seconds.
5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm.

OK or NG

OK >> GO TO 17.
NG >> GO TO 15.

15. CHECK VACUUM HOSE

Check vacuum hoses for clogging or disconnection. Refer to EC-112, "Vacuum Hose Drawing" .

OK or NG

OK >> GO TO 16.
NG >> Repair or reconnect the hose.

16. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection" .

OK or NG

OK >> GO TO 17.
NG >> Replace EVAP canister purge volume control solenoid valve.

17. CHECK FUEL TANK TEMPERATURE SENSOR

Refer to EC-285, "Component Inspection" .

OK or NG

OK >> GO TO 18.
NG >> Replace fuel level sensor unit.

18. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-371, "Component Inspection" .

OK or NG

OK >> GO TO 19.
NG >> Replace EVAP control system pressure sensor.

19. CHECK EVAP PURGE LINE

Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection.
Refer to EC-31, "EVAPORATIVE EMISSION LINE DRAWING" .

OK or NG

OK >> GO TO 20.
NG >> Repair or reconnect the hose.

20. CLEAN EVAP PURGE LINE

Clean EVAP purge line (pipe and rubber tube) using air blower.

>> GO TO 21.

21. CHECK EVAP/ORVR LINE

Check EVAP/ORVR line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to EC-37, "ON BOARD REFUELING VAPOR RECOVERY (ORVR)" .

OK or NG

OK >> GO TO 22.
NG >> Repair or replace hoses and tubes.

22. CHECK SIGNAL LINE AND RECIRCULATION LINE

Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.

OK or NG

OK >> GO TO 23.
NG >> Repair or replace hose, tube or filler neck tube.

23. CHECK REFUELING CONTROL VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 24.
NG >> Replace refueling control valve.

24. CHECK REFUELING EVAP VAPOR CUT VALVE

Refer to EC-41, "Component Inspection" .

OK or NG

OK >> GO TO 25.
NG >> Replace refueling EVAP vapor cut valve with fuel tank.

25. CHECK FUEL LEVEL SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

OK or NG

OK >> GO TO 26.
NG >> Replace fuel level sensor unit.

26. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

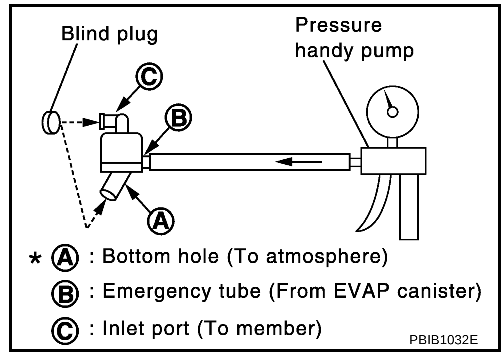
Component Inspection

ABS00DAZ

WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A** , and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

   NOTE:
   Do not disassemble water separator.



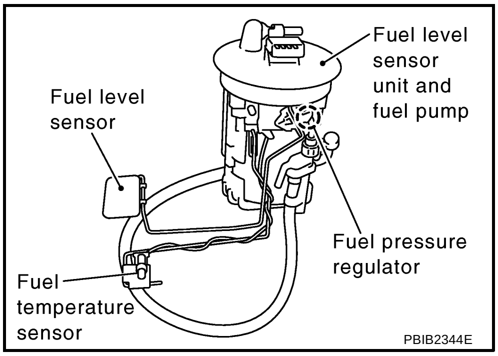
DTC P0460 FUEL LEVEL SENSOR

PFP:25060

Component Description

ABS00CRJ

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line.
It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



On Board Diagnostic Logic

ABS00CRK

NOTE:
If DTC P0460 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .
When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0460 0460	Fuel level sensor circuit noise	Even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.	● Harness or connectors (The CAN communication line is open or shorted) ● Harness or connectors (The sensor circuit is open or shorted) ● Combination meter ● Fuel level sensor

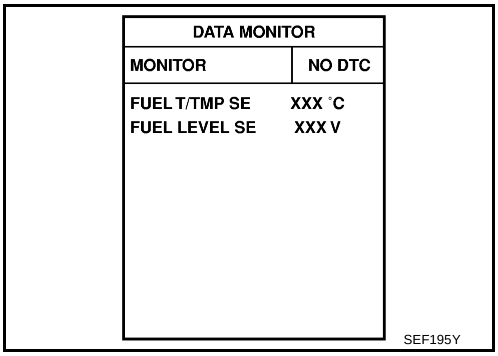
DTC Confirmation Procedure

ABS00CRL

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Start engine and wait maximum of 2 consecutive minutes.
4. If 1st trip DTC is detected, go to EC-400, "Diagnostic Procedure" .



WITH GST

Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

ABS00DAS

1. CHECK FUEL GAUGE OPERATION

Refer to DI-4, "ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR" .

OK or NG

OK >> GO TO 2.
NG >> Follow the instruction of DI-4, "ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR" .

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to DI-18, "Fuel Level Sensor Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning parts.

3. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

ABS00CRN

FUEL LEVEL SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY"

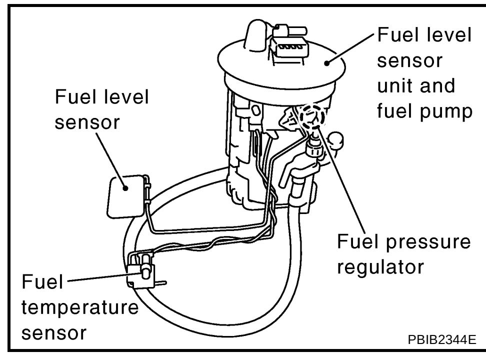
DTC P0461 FUEL LEVEL SENSOR

PFP:25060

Component Description

ABS00CRO

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter sends the fuel level sensor signal to the ECM through CAN communication line.
It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



On Board Diagnostic Logic

ABS00CRP

NOTE:
If DTC P0461 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to**EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .**
Driving long distances naturally affect fuel gauge level.
This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0461 0461	Fuel level sensor circuit range/performance	The output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.	● Harness or connectors (the CAN communication line is open or shorted) ● Harness or connectors (The sensor circuit is open or shorted) ● Combination meter ● Fuel level sensor

Overall Function Check

ABS00CRQ

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed.

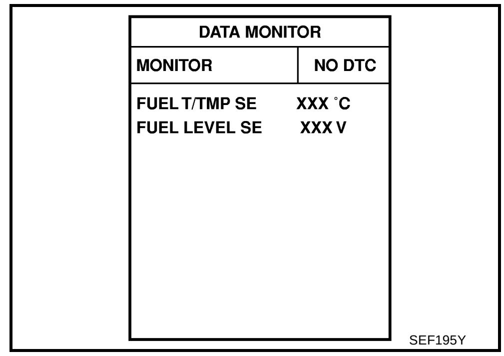
WARNING:
When performing following procedure, be sure to observe the handling of the fuel. Refer to **FL-11, "FUEL TANK" .**
TESTING CONDITION:
Before starting overall function check, preparation of draining fuel and refilling fuel is required.

WITH CONSULT-II

NOTE:
Start from step 10, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.

5. Turn ignition switch OFF and wait at least 10 seconds then turn ON.
6. Select “FUEL LEVEL SE” in “DATA MONITOR” mode with CONSULT-II.
7. Check “FUEL LEVEL SE” output voltage and note it.
8. Select “FUEL PUMP” in “ACTIVE TEST” mode with CONSULT-II.
9. Touch “ON” and drain fuel approximately 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
10. Check “FUEL LEVEL SE” output voltage and note it.
11. Fill fuel into the fuel tank for 30ℓ (7-7/8 US gal, 6-5/8 Imp gal).
12. Check “FUEL LEVEL SE” output voltage and note it.
13. Confirm whether the voltage changes more than 0.03V during step 7 to 10 and 10 to 12.
    If NG, go to EC-402, "Diagnostic Procedure"



SEF195Y

WITH GST

NOTE:
Start from step 8, if it is possible to confirm that the fuel cannot be drained by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

1. Prepare a fuel container and a spare hose.
2. Release fuel pressure from fuel line, refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Remove the fuel feed hose on the fuel level sensor unit.
4. Connect a spare fuel hose where the fuel feed hose was removed.
5. Turn ignition switch ON.
6. Drain fuel by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
7. Confirm that the fuel gauge indication varies.
8. Fill fuel into the fuel tank for 30ℓ (7-7/8 US gal, 6-5/8 Imp gal).
9. Confirm that the fuel gauge indication varies.
10. If NG, go to EC-402, "Diagnostic Procedure" .

Diagnostic Procedure

ABS00DAT

1. CHECK FUEL GAUGE OPERATION

Refer to DI-4, "ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR" .

OK or NG

OK >> GO TO 2.
NG >> Follow the instruction of DI-4, "ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR" .

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to DI-18, "Fuel Level Sensor Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning parts.

3. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

ABS00CRS

FUEL LEVEL SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

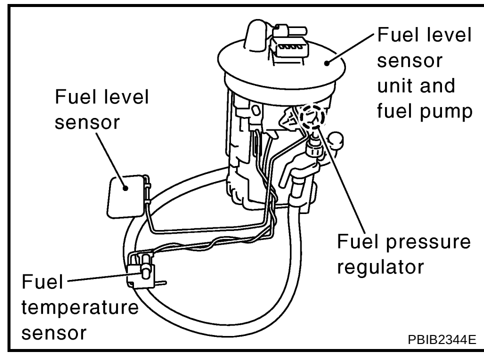
DTC P0462, P0463 FUEL LEVEL SENSOR

PFP:25060

Component Description

ABS00CRT

The fuel level sensor is mounted in the fuel level sensor unit. The sensor detects a fuel level in the fuel tank and transmits a signal to the combination meter. The combination meter. sends the fuel level sensor signal to the ECM through CAN communication.
It consists of two parts, one is mechanical float and the other is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.



On Board Diagnostic Logic

ABS00CRU

NOTE:
If DTC P0462 or P0463 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0462 0462	Fuel level sensor circuit low input	An excessively low voltage from the sensor is sent to ECM.	● Harness or connectors (The CAN communication line is open or shorted) ● Harness or connectors (The sensor circuit is open or shorted) ● Combination meter ● Fuel level sensor
P0463 0463	Fuel level sensor circuit high input	An excessively high voltage from the sensor is sent to ECM.	

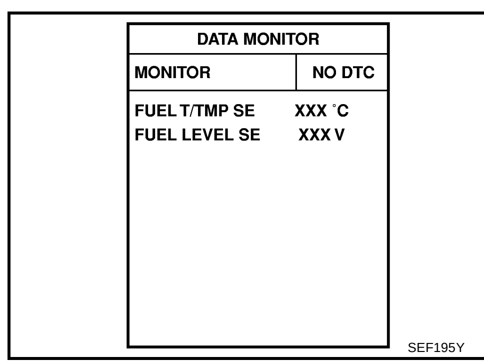
DTC Confirmation Procedure

ABS00CRV

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch ON.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-404, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

A EC C D E F G H I J K L M

Diagnostic Procedure

ABS00DAU

1. CHECK FUEL GAUGE OPERATION

Refer to DI-4, "ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR" .

OK or NG

OK >> GO TO 2.
NG >> Follow the instruction of DI-4, "ODO/TRIP METER, CLOCK AND AMBIENT TEMPERATURE INDICATOR" .

2. CHECK FUEL LEVEL SENSOR AND CIRCUIT

Refer to DI-18, "Fuel Level Sensor Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace malfunctioning parts.

3. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Removal and Installation

ABS00CRX

FUEL LEVEL SENSOR

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

DTC P0500 VSS

PFP:32702

Description

ABS00CRY

NOTE:

If DTC P0500 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the combination meter. The combination meter then sends a signal to the ECM through CAN communication line.

On Board Diagnosis Logic

ABS00CRZ

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0500 0500	Vehicle speed sensor	The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven.	● Harness or connectors (The CAN communication line is open or shorted) ● Harness or connectors (The wheel sensor circuit is open or shorted) ● Wheel sensor ● Combination meter ● VDC/TCS/ABS control unit (with VDC models) ● ABS actuator and electric unit (control unit) (without VDC models)

DTC Confirmation Procedure

ABS00CS0

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

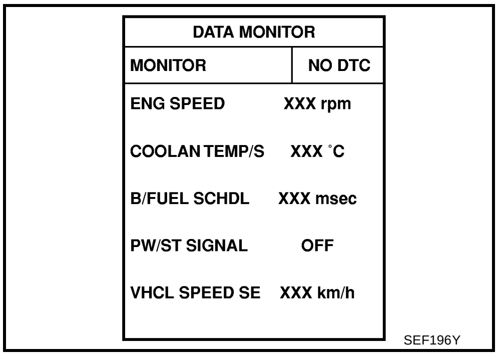
TESTING CONDITION:

Steps 1 and 2 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine.
2. Read “VHCL SPEED SE” in “DATA MONITOR” mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
   If NG, go to EC-406, "Diagnostic Procedure" .
   If OK, go to following step.
3. Select “DATA MONITOR” mode with CONSULT-II.
4. Warm engine up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.

ENG SPEED	1,750 - 6,000 rpm (A/T) 2,000 - 6,000 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	6.0 - 31.8 msec (A/T) 5.0 - 31.8 msec (M/T)
Shift lever	Suitable position
PW/ST SIGNAL	OFF



SEF196Y

6. If 1st trip DTC is detected, go to EC-406, "Diagnostic Procedure" .

Overall Function Check

ABS00CS1

Use this procedure to check the overall function of the vehicle speed sensor circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Lift up drive wheels.
2. Start engine.
3. Read vehicle speed sensor signal in Service $01 with GST.
   The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
4. If NG, go to EC-406, "Diagnostic Procedure" .

Diagnostic Procedure

ABS00DAV

1. CHECK DTC WITH “VDC/TCS/ABS CONTROL UNIT (WITH VDC MODELS)” OR “ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (WITHOUT VDC MODELS)”

Refer to BRC-48, "TROUBLE DIAGNOSIS" (with VDC models) or refer to BRC-9, "TROUBLE DIAGNOSIS" (without VDC models).

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK COMBINATION METER

Check combination meter function.
Refer to DI-4, "COMBINATION METERS" .

>> **INSPECTION END**

DTC P0506 ISC SYSTEM

PFP:23781

Description

ABS00CS3

NOTE:

If DTC P0506 is displayed with other DTC, first perform the trouble diagnosis for the other DTC displayed.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

ABS00CS4

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0506 0506	Idle speed control system RPM lower than expected	The idle speed is less than the target idle speed by 100 rpm or more.	● Electric throttle control actuator ● Intake air leak

DTC Confirmation Procedure

ABS00CS5

NOTE:

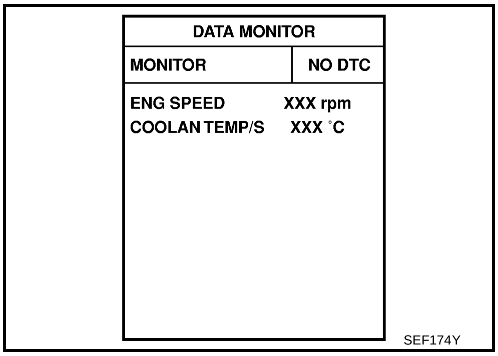
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform EC-88, "Idle Air Volume Learning" , before conducting DTC Confirmation Procedure. For the target idle speed, refer to the EC-663, "SERVICE DATA AND SPECIFICATIONS (SDS)"**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**
- **Always perform the test at a temperature above −10°C (14°F).**

WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON again and select “DATA MONITOR” mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to EC-408, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CS6

1. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 2.
NG >> Discover air leak location and repair.

2. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .
4. Perform EC-87, "VIN Registration" .
5. Perform EC-88, "Accelerator Pedal Released Position Learning" .
6. Perform EC-88, "Throttle Valve Closed Position Learning" .
7. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

DTC P0507 ISC SYSTEM

PFP:23781

Description

ABS00CS7

NOTE:

If DTC P0507 is displayed with other DTC, first perform the trouble diagnosis for the other DTC displayed.

The ECM controls the engine idle speed to a specified level through the fine adjustment of the air, which is let into the intake manifold, by operating the electric throttle control actuator. The operating of the throttle valve is varied to allow for optimum control of the engine idling speed. The crankshaft position sensor (POS) detects the actual engine speed and sends a signal to the ECM.

The ECM controls the electric throttle control actuator so that the engine speed coincides with the target value memorized in the ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warming up, deceleration, and engine load (air conditioner, power steering and cooling fan operation, etc.).

On Board Diagnosis Logic

ABS00CS8

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0507 0507	Idle speed control system RPM higher than expected	The idle speed is more than the target idle speed by 200 rpm or more.	• Electric throttle control actuator • Intake air leak • PCV system

DTC Confirmation Procedure

ABS00CS9

NOTE:

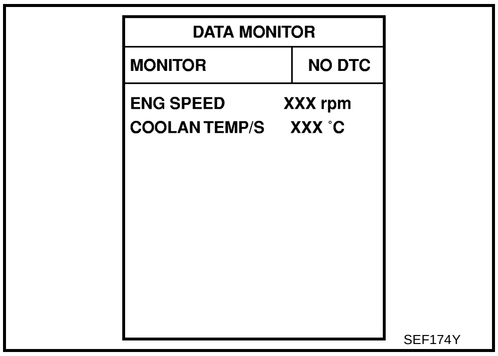
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- **If the target idle speed is out of the specified value, perform** **EC-88, "Idle Air Volume Learning"** **, before conducting DTC Confirmation Procedure. For the target idle speed, refer to the** **EC-663, "SERVICE DATA AND SPECIFICATIONS (SDS)"** **.**

TESTING CONDITION:

- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**
- **Always perform the test at a temperature above –10°C (14°F).**

WITH CONSULT-II

1. Open engine hood.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Turn ignition switch ON again and select “DATA MONITOR” mode with CONSULT-II.
5. Start engine and run it for at least 1 minute at idle speed.
6. If 1st trip DTC is detected, go to EC-410, "Diagnostic Procedure" .



SEF174Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CSA

1. CHECK PCV HOSE CONNECTION

Confirm that PCV hose is connected correctly.

OK or NG

OK >> GO TO 2.
NG >> Repair or replace.

2. CHECK INTAKE AIR LEAK

1. Start engine and let it idle.
2. Listen for an intake air leak after the mass air flow sensor.

OK or NG

OK >> GO TO 3.
NG >> Discover air leak location and repair.

3. REPLACE ECM

1. Stop engine.
2. Replace ECM.
3. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .
4. Perform EC-87, "VIN Registration" .
5. Perform EC-88, "Accelerator Pedal Released Position Learning" .
6. Perform EC-88, "Throttle Valve Closed Position Learning" .
7. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

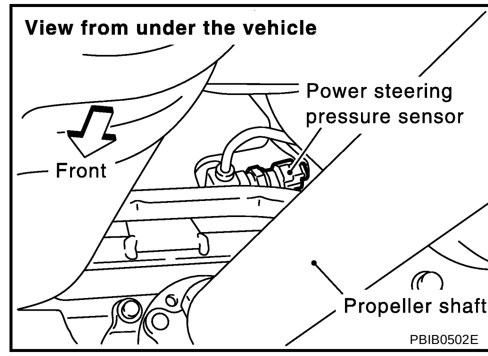
DTC P0550 PSP SENSOR

PFP:49763

Component Description

ABS00CSB

Power steering pressure (PSP) sensor is installed to the power steering high-pressure tube and detects a power steering load. This sensor is a potentiometer which transforms the power steering load into output voltage, and emits the voltage signal to the ECM. The ECM controls the electric throttle control actuator and adjusts the throttle valve opening angle to increase the engine speed and adjusts the idle speed for the increased load.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CSC

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel: Not being turned.	OFF
		Steering wheel: Being turned.	ON

On Board Diagnosis Logic

ABS00CSD

The MIL will not light up for this diagnosis.

NOTE:
If DTC P0550 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229.
Refer to **EC-499, "DTC P1229 SENSOR POWER SUPPLY"** **.**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0550 0550	Power steering pressure sensor circuit	An excessively low or high voltage from the sensor is sent to ECM.	• Harness or connectors (The sensor circuit is open or shorted.) • Power steering pressure sensor

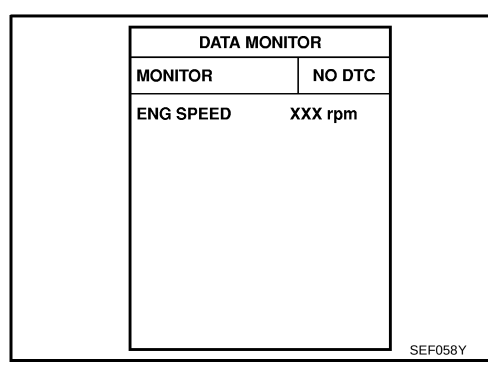
DTC Confirmation Procedure

ABS00CSE

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-413, "Diagnostic Procedure" .

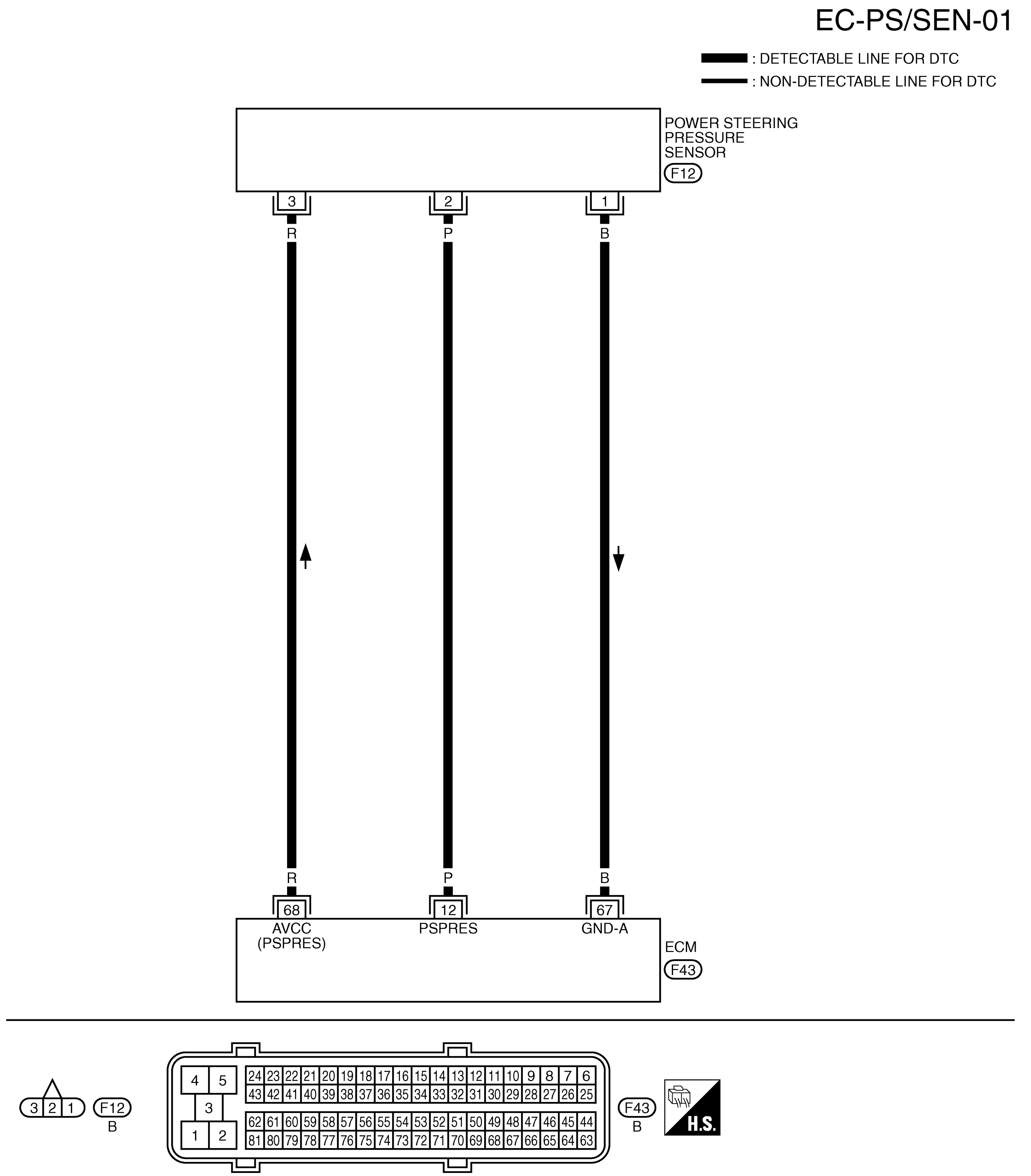


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CSF



TBWB0126E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

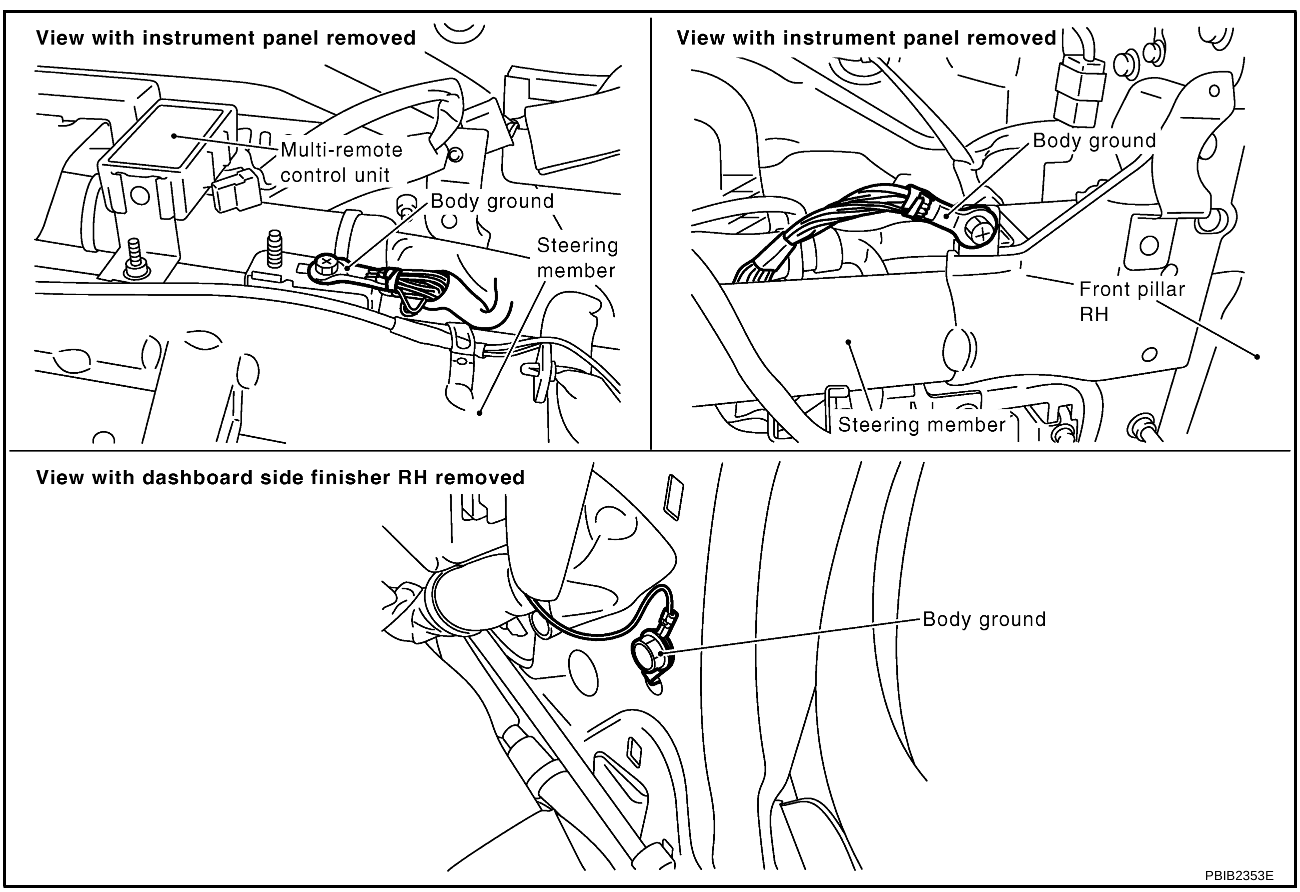
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	P	Power steering pressure sensor	**[Engine is running]** ● Steering wheel: Being turned	0.5 - 4.0V
			[Engine is running] ● Steering wheel: Not being turned	0.4 - 0.8V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
68	R	Sensor power supply (Power steering pressure sensor)	**[Ignition switch: ON]**	Approximately 5V

Diagnostic Procedure

ABS00D8H

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .



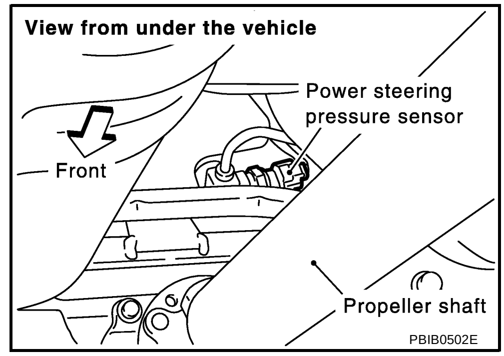
OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

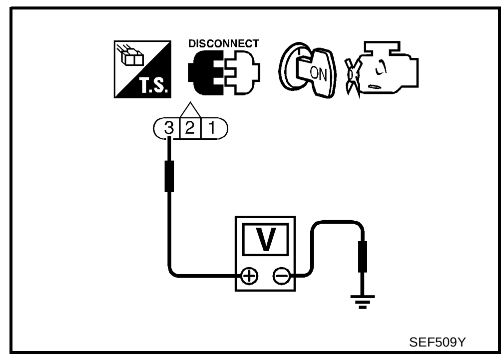
2. CHECK PSP SENSOR POWER SUPPLY CIRCUIT

1. Disconnect power steering pressure (PSP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between PSP sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK PSP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between PSP sensor terminal 1 and ECM terminal 67.
Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PSP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between PSP sensor terminal 2 and ECM terminal 12.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK PSP SENSOR

Refer to EC-415, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace PSP sensor.

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6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

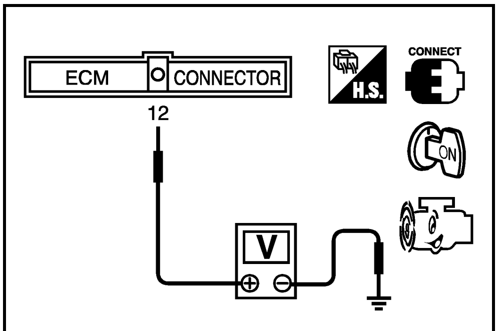
Component Inspection

ABS00CSH

POWER STEERING PRESSURE SENSOR

1. Reconnect all harness connectors disconnected.
2. Start engine and let it idle.
3. Check voltage between ECM terminal 12 and ground under the following conditions.

Condition	Voltage
Steering wheel: Being turned fully.	0.5 - 4.5V
Steering wheel: Not being turned.	0.4 - 0.8V



MBIB0025E

Removal and Installation

ABS00DAW

POWER STEERING PRESSURE SENSOR

Refer to PS-33, "HYDRAULIC LINE" .

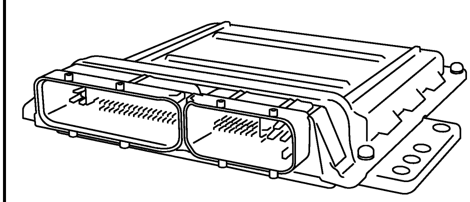
DTC P0605 ECM

PFP:23710

Component Description

ABS00CSI

The ECM consists of a microcomputer and connectors for signal input and output and for power supply. The ECM controls the engine.



PBIB1164E

On Board Diagnosis Logic

ABS00CSJ

This self-diagnosis has one or two trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P0605 0605	Engine control module	A)	ECM calculation function is malfunctioning.	● ECM
		B)	ECM EEP-ROM system is malfunctioning.	
		C)	ECM self shut-off function is malfunctioning.	

FAIL-SAFE MODE

ECM enters fail-safe mode when malfunction A is detected.

Detected items	Engine operation condition in fail-safe mode
Malfunction A	● ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring. ● ECM deactivates ASCD operation.

DTC Confirmation Procedure

ABS00CSK

Perform PROCEDURE FOR MALFUNCTION A first. If the 1st trip DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION B. If there is no malfunction on PROCEDURE FOR MALFUNCTION B, perform PROCEDURE FOR MALFUNCTION C.

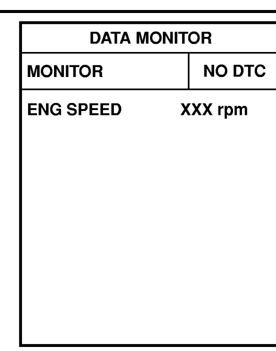
NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

With CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If 1st trip DTC is detected, go to EC-417, "Diagnostic Procedure" .



SEF058Y

With GST

Follow the procedure “With CONSULT-II” above.

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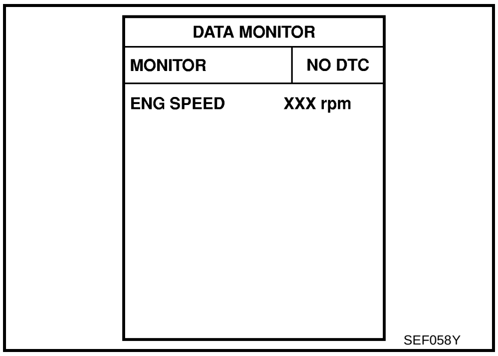
PROCEDURE FOR MALFUNCTION B

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. If 1st trip DTC is detected, go to EC-417, "Diagnostic Procedure" .



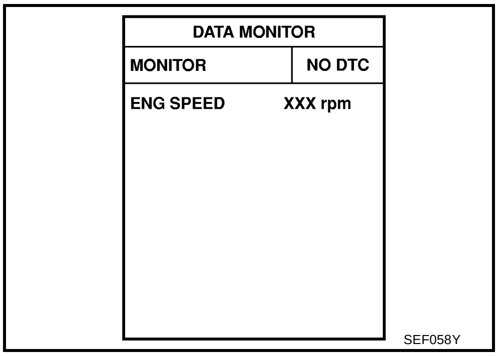
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
4. Repeat step 3 for 32 times.
5. If 1st trip DTC is detected, go to EC-417, "Diagnostic Procedure" .



With GST

Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

ABS00CSL

1. INSPECTION START

With CONSULT-II

1. Turn ignition switch ON.
2. Select “SELF DIAG RESULTS” mode with CONSULT-II.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-416, "DTC Confirmation Procedure" .
5. Is the 1st trip DTC P0605 displayed again?

With GST

1. Turn ignition switch ON.
2. Select Service $04 with GST.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-416, "DTC Confirmation Procedure" .
5. Is the 1st trip DTC P0605 displayed again?

Yes or No

Yes >> GO TO 2.
No >> **INSPECTION END**

2. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .
3. Perform EC-87, "VIN Registration" .
4. Perform EC-88, "Accelerator Pedal Released Position Learning" .
5. Perform EC-88, "Throttle Valve Closed Position Learning" .
6. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

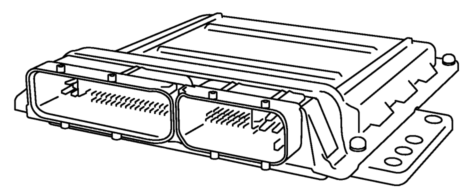
DTC P1065 ECM POWER SUPPLY

PFP:23710

Component Description

ABS00CSU

Battery voltage is supplied to the ECM even when the ignition switch is turned OFF for the ECM memory function of the DTC memory, the air-fuel ratio feedback compensation value memory, the Idle Air Volume Learning value memory, etc.



PBIB1164E

On Board Diagnosis Logic

ABS00CSV

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1065 1065	ECM power supply circuit	ECM back-up RAM system does not function properly.	• Harness or connectors [The ECM power supply (back-up) circuit is open or shorted.] • ECM

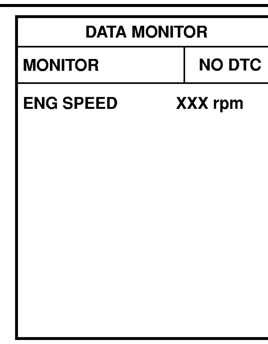
DTC Confirmation Procedure

ABS00CSW

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
5. Repeat steps 3 and 4 for four times.
6. If 1st trip DTC is detected, go to EC-421, "Diagnostic Procedure" .



SEF058Y

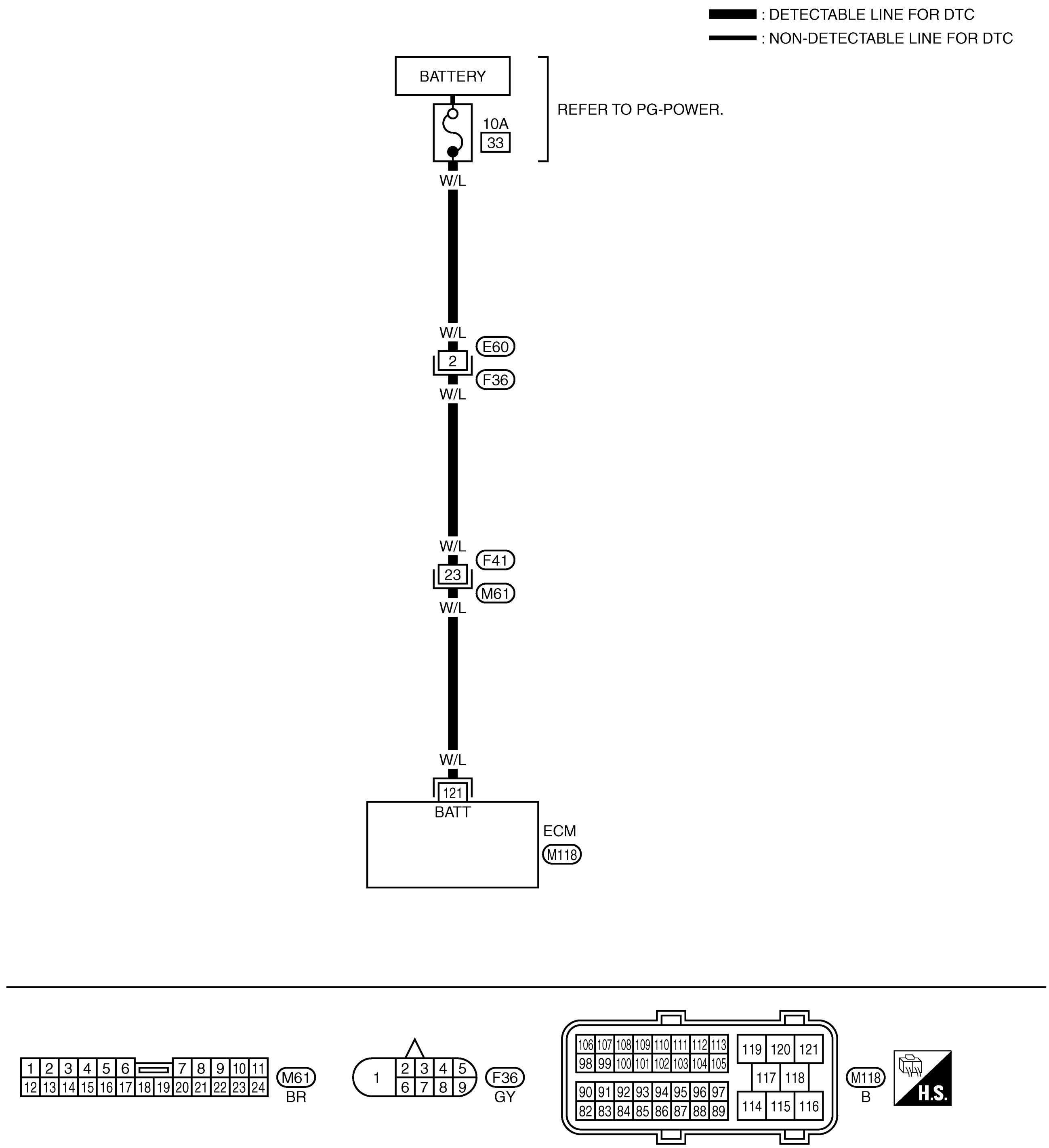
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CSX

EC-ECM/PW-01



TBWA0611E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch: OFF]**	BATTERY VOLTAGE (11 - 14V)

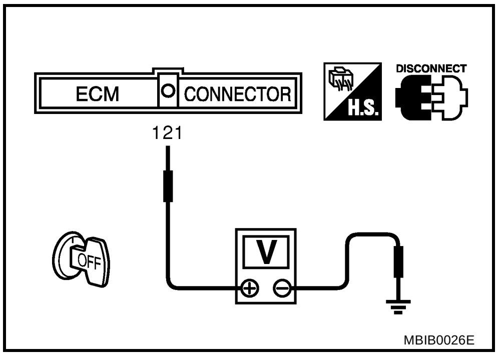
Diagnostic Procedure

ABS00D8I

1. CHECK ECM POWER SUPPLY

1. Turn ignition switch OFF.
2. Check voltage between ECM terminal 121 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E60, M36
- Harness connectors F41, M61
- 10A fuse
- Harness for open or short between ECM and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness or connectors.

4. PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT-II

1. Turn ignition switch ON.
2. Select “SELF DIAG RESULTS” mode with CONSULT-II.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-419, "DTC Confirmation Procedure" .
5. Is the 1st trip DTC P1065 displayed again?

With GST

1. Turn ignition switch ON.
2. Select Service $04 with GST.
3. Touch “ERASE”.
4. **Perform DTC Confirmation Procedure.**
   See EC-419, "DTC Confirmation Procedure" .
5. Is the 1st trip DTC P1065 displayed again?

Yes or No

Yes >> GO TO 5.
No >> **INSPECTION END**

5. REPLACE ECM

1. Replace ECM.
2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs.
   Refer to EC-46, "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM-NATS)" .
3. Perform EC-87, "VIN Registration" .
4. Perform EC-88, "Accelerator Pedal Released Position Learning" .
5. Perform EC-88, "Throttle Valve Closed Position Learning" .
6. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

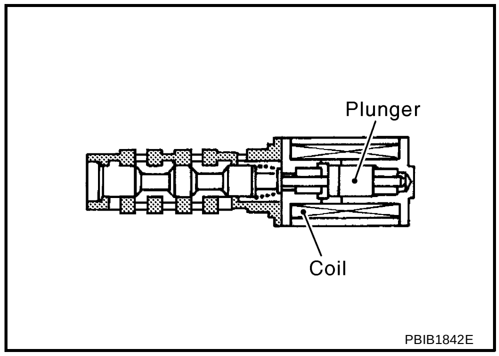
DTC P1111 IVT CONTROL SOLENOID VALVE

PFP:23796

Component Description

ABS00CSZ

Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.
The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.
The longer pulse width advances valve angle.
The shorter pulse width retards valve angle.
When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



PBIB1842E

CONSULT-II Reference Value in Data Monitor Mode

ABS00CT0

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1)	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0% - 2%
		When revving engine up to 2,000 rpm quickly.	Approx. 0% - 50%

On Board Diagnosis Logic

ABS00CT1

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1111 1111	Intake valve timing control solenoid valve circuit	An improper voltage is sent to the ECM through intake valve timing control solenoid valve.	● Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.) ● Intake valve timing control solenoid valve

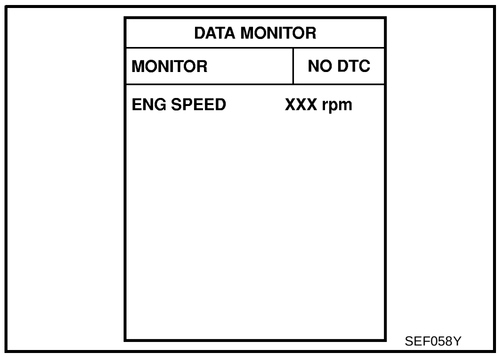
DTC Confirmation Procedure

ABS00CT2

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If 1st trip DTC is detected, go to EC-425, "Diagnostic Procedure".



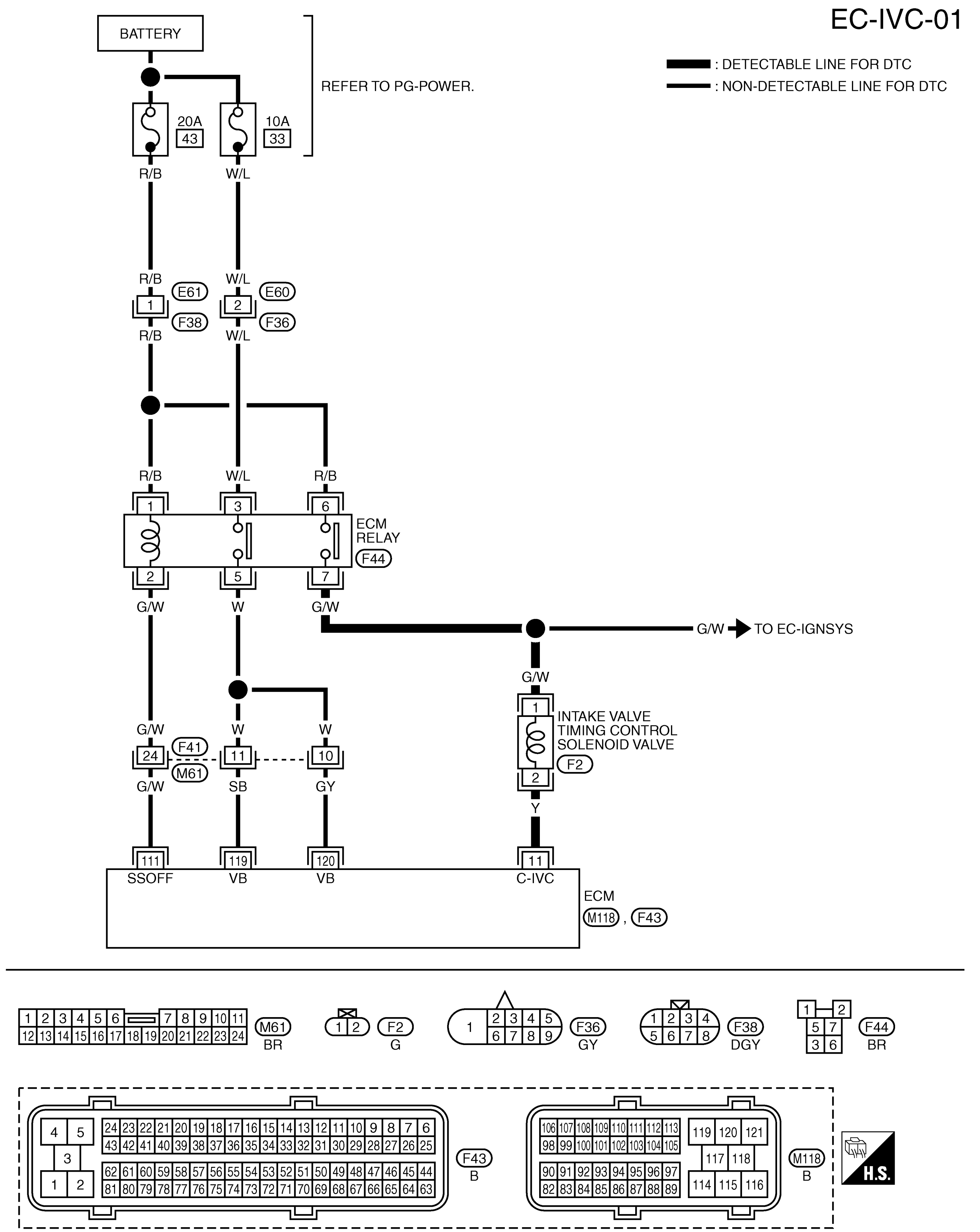
SEF058Y

WITH GST

Following the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CT3



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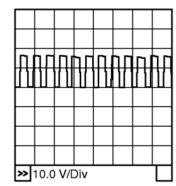
Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:
Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
11	Y	Intake valve timing control solenoid valve	**[Engine is running]** ● **Warm-up condition** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,500 rpm	7 - 10V★  PBIB1790E

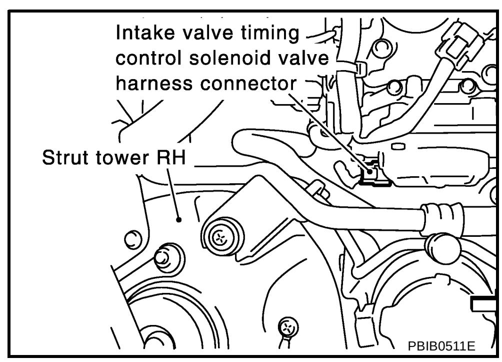
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8J

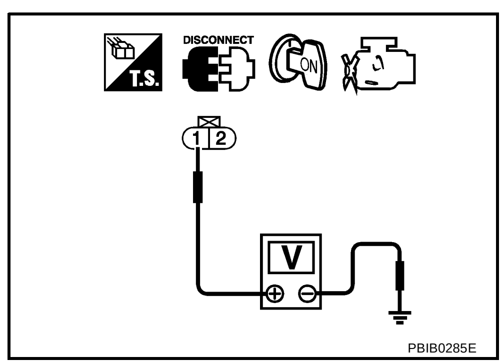
1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect intake valve timing control solenoid valve harness connector.
3. Turn ignition switch ON.



4. Check voltage between intake valve timing control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 2.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

2. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between intake valve timing control solenoid valve terminal 2 and ECM terminal 11. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-426, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace intake valve timing control solenoid valve.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

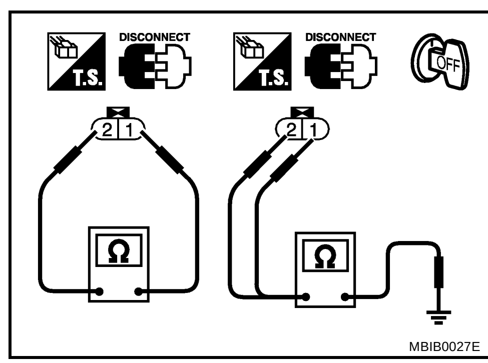
ABS00CT5

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.

Terminal	Resistance
1 and 2	8Ω [at 20°C (68°F)]
1 or 2 and ground	∞ Ω (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve.
If OK, go to next step.

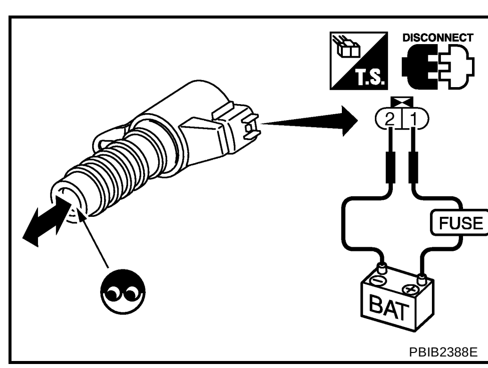


MBIB0027E

3. Remove intake valve timing control solenoid valve.
4. Provide 12V DC between intake valve timing control solenoid valve terminals and then interrupt it. Make sure that the plunger moves as shown in the figure.

CAUTION:
Do not apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
If NG, replace intake valve timing control solenoid valve.

NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.



PBIB2388E

Removal and Installation

ABS00CT6

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EM-49, "TIMING CHAIN" .

DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR

PFP:16119

Component Description

ABS00CT7

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The throttle position sensor detects the throttle valve position, and the opening and closing speed of the throttle valve and feeds the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

ABS00CT8

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition		Possible cause
P1121 1121	Electric throttle control actuator	A)	Electric throttle control actuator does not function properly due to the return spring malfunction.	• Electric throttle control actuator
		B)	Throttle valve opening angle in fail-safe mode is not in specified range.	
		C)	ECM detects the throttle valve is stuck open.	

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Malfunction A	ECM controls the electric throttle actuator by regulating the throttle opening around the idle position. The engine speed will not rise more than 2,000 rpm.
Malfunction B	ECM controls the electric throttle control actuator by regulating the throttle opening to 20 degrees or less.
Malfunction C	While the vehicle is driving, it slows down gradually by fuel cut. After the vehicle stops, the engine stalls. The engine can restart in N or P (A/T models), Neutral (M/T models) position, and engine speed will not exceed 1,000 rpm or more.

DTC Confirmation Procedure

ABS00CT9

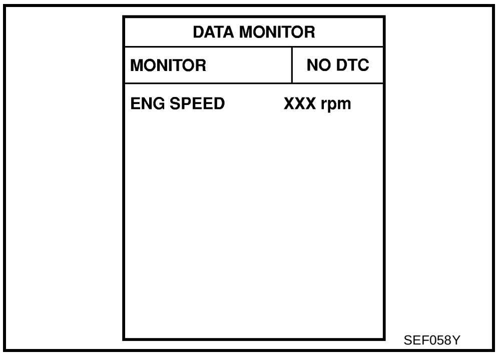
NOTE:

- **Perform PROCEDURE FOR MALFUNCTION A AND B first. If the DTC cannot be confirmed, perform PROCEDURE FOR MALFUNCTION C.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A AND B

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Set shift lever to D position (A/T) or 1st position (M/T), and wait at least 3 seconds.
4. Set shift lever to P position (A/T) or Neutral position (M/T).
5. Turn ignition switch OFF and wait at least 10 seconds.
6. Turn ignition switch ON and wait at least 1 second.
7. Set shift lever to D position (A/T) or 1st position (M/T), and wait at least 3 seconds.
8. Set shift lever to P position (A/T) or Neutral position (M/T).
9. Turn ignition switch OFF, wait at least 10 seconds, and then turn ON.
10. If DTC is detected, go to EC-428, "Diagnostic Procedure" .



SEF058Y

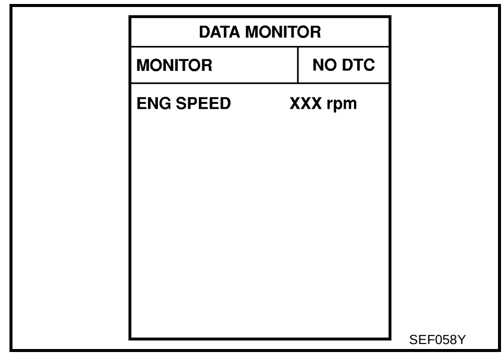
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR MALFUNCTION C

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Set shift lever to D position (A/T) or 1st position (M/T) and wait at least 3 seconds.
4. Set shift lever to N, P position (A/T) or Neutral (M/T) position.
5. Start engine and let it idle for 3 seconds.
6. If DTC is detected, go to EC-428, "Diagnostic Procedure" .



With GST

Follow the procedure “With CONSULT-II” above.

Diagnostic Procedure

ABS00CTA

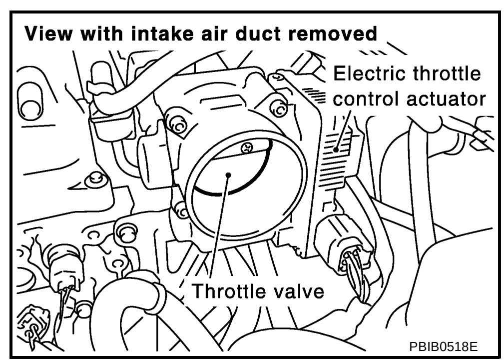
1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if a foreign matter is caught between the throttle valve and the housing.

OK or NG

OK >> GO TO 2.

NG >> Remove the foreign matter and clean the electric throttle control actuator inside.



2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

DTC P1122 ELECTRIC THROTTLE CONTROL FUNCTION

PFP:16119

Description

ABS00CTB

NOTE:
If DTC P1122 is displayed with DTC P1121 or 1126, first perform the trouble diagnosis for DTC P1121 or P1126. Refer to EC-427, "DTC P1121 ELECTRIC THROTTLE CONTROL ACTUATOR" or EC-437, "DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY" .

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc.
The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

ABS00CTC

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1122 1122	Electric throttle control performance problem	Electric throttle control function does not operate properly.	● Harness or connectors (The throttle control motor circuit is open or shorted) ● Electric throttle control actuator

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

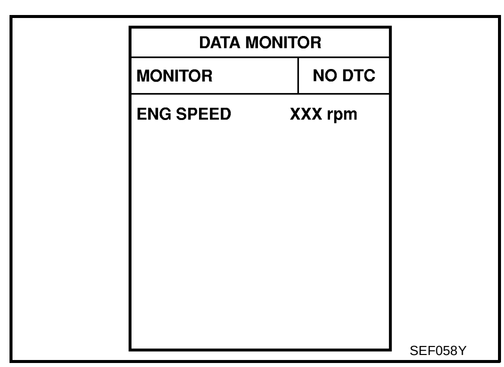
DTC Confirmation Procedure

ABS00CTD

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 11V when engine is running.

WITH CONSULT-II

1. Turn ignition switch “ON” and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-432, "Diagnostic Procedure" .

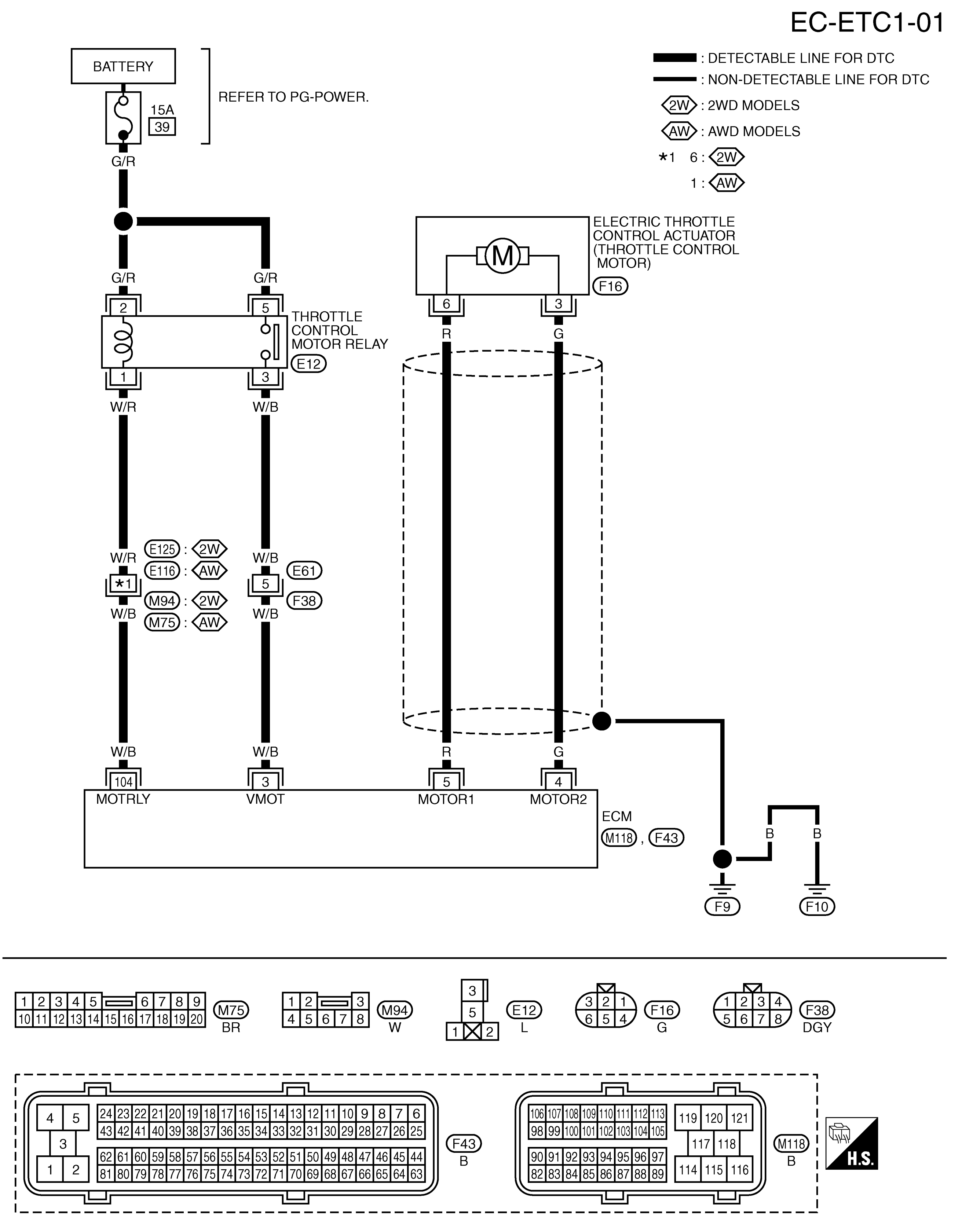


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CTE

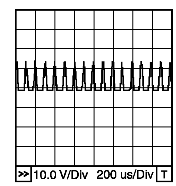
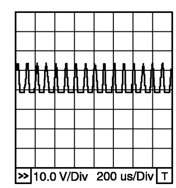


TBWB0151E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	W/B	Throttle control motor power supply	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
4	G	Throttle control motor (Close)	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	0 - 14V★  PBIB0534E
5	R	Throttle control motor (Open)	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E
104	W/B	Throttle control motor relay	**[Ignition switch: OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON]	0 - 1.0V

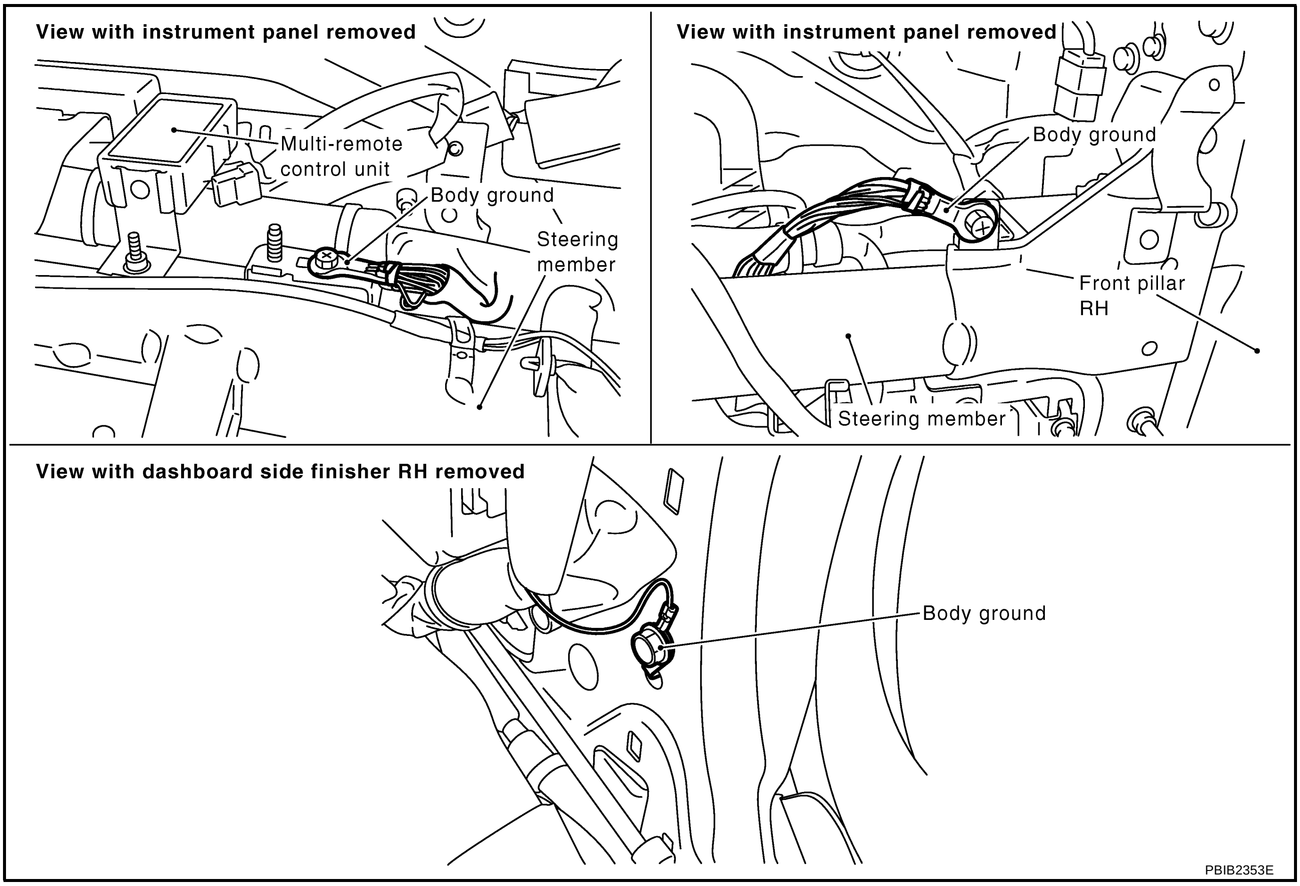
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8K

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



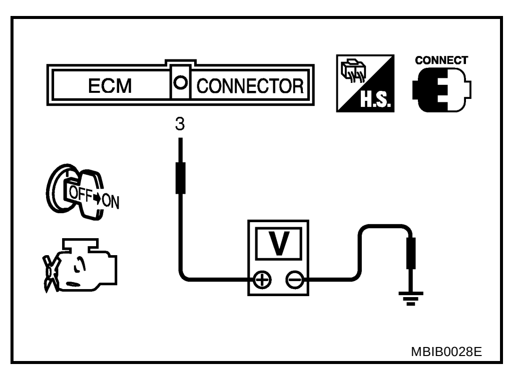
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK THROTTLE CONTROL MOTOR RELAY SIGNAL CIRCUIT

Check voltage between ECM terminal 3 and ground under the following conditions with CONSULT-II or tester.

Ignition switch	Voltage
OFF	Approximately 0V
ON	Battery voltage (11 - 14V)



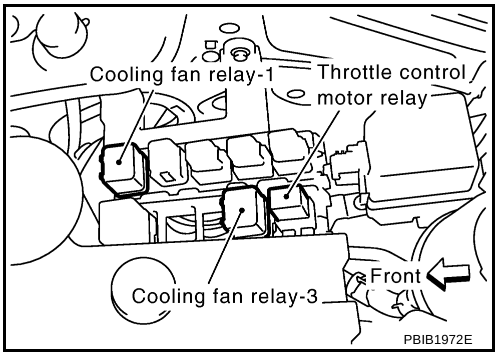
OK or NG

OK >> GO TO 10.
NG >> GO TO 3.

A
EC
C
D
E
F
G
H
I
J
K
L
M

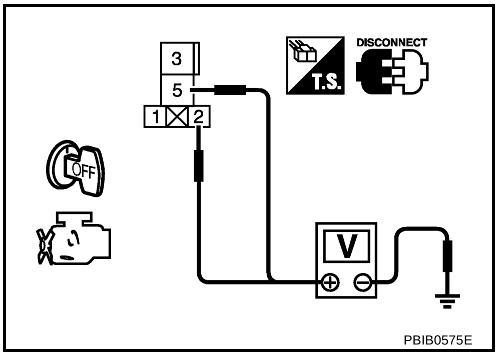
3. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect throttle control motor relay.



3. Check voltage between throttle control motor relay terminals 2, 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse
- Harness for open or short between throttle control motor relay and battery

>> Repair or replace harness or connectors.

5. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between throttle control motor relay terminal 3 and ECM terminal 3.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- Harness for open or short between throttle control motor relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT

1. Check continuity between throttle control motor relay terminal 1 and ECM terminal 104.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E125, M94 (2WD models)
- Harness connectors E116, M75 (AWD models)
- Harness for open or short between throttle control motor relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE CONTROL MOTOR RELAY

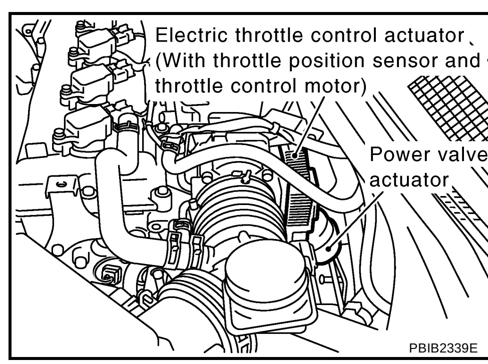
Refer to EC-436, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace throttle control motor relay.

10. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Turn ignition switch OFF.
2. Disconnect electric throttle control actuator harness connector.
3. Check harness continuity between the following terminals.
   Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist

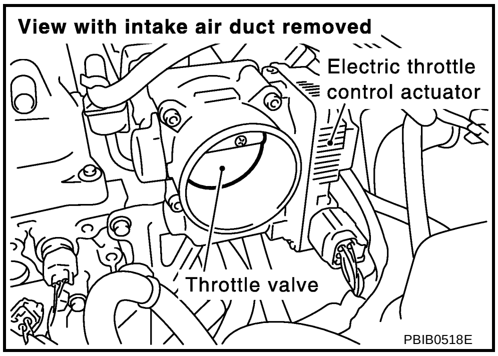
4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Remove the intake air duct.
2. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 12.
NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

12. CHECK THROTTLE CONTROL MOTOR

Refer to EC-436, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> GO TO 14.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 14.
NG >> Repair or replace harness or connectors.

14. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

Component Inspection

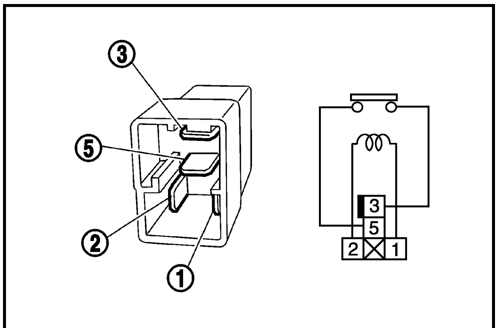
ABS00CTG

THROTTLE CONTROL MOTOR RELAY

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



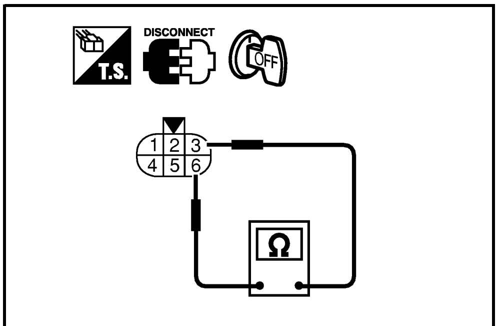
PBIB0098E

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform EC-88, "Throttle Valve Closed Position Learning" .
5. Perform EC-88, "Idle Air Volume Learning" .



PBIB0095E

Remove and Installation

ABS00CTH

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "INTAKE MANIFOLD" .

DTC P1124, P1126 THROTTLE CONTROL MOTOR RELAY

PFP:16119

Component Description

ABS00CTI

Power supply for the throttle control motor is provided to the ECM via throttle control motor relay. The throttle control motor relay is ON/OFF controlled by the ECM. When the ignition switch is turned ON, the ECM sends an ON signal to throttle control motor relay and battery voltage is provided to the ECM. When the ignition switch is turned OFF, the ECM sends an OFF signal to throttle control motor relay and battery voltage is not provided to the ECM.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CTJ

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL RELAY	● Ignition switch: ON	ON

On Board Diagnosis Logic

ABS00CTK

These self-diagnoses have one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1124 1124	Throttle control motor relay circuit short	ECM detects the throttle control motor relay is stuck ON.	● Harness or connectors (The throttle control motor relay circuit is shorted) ● Throttle control motor relay
P1126 1126	Throttle control motor relay circuit open	ECM detects a voltage of power source for throttle control motor is excessively low.	● Harness or connectors (The throttle control motor relay circuit is open) ● Throttle control motor relay

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

DTC Confirmation Procedure

ABS00CTL

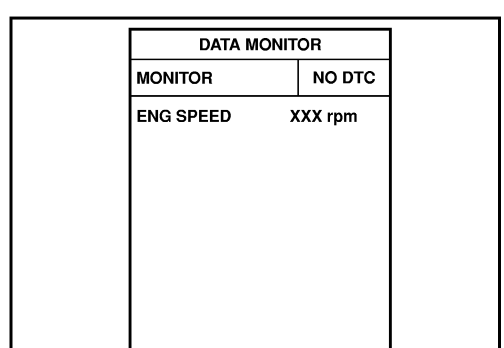
NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR DTC P1124

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 8V.

With CONSULT-II

1. Turn ignition switch ON and wait at least 1 second.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. If DTC is detected, go to EC-440, "Diagnostic Procedure" .



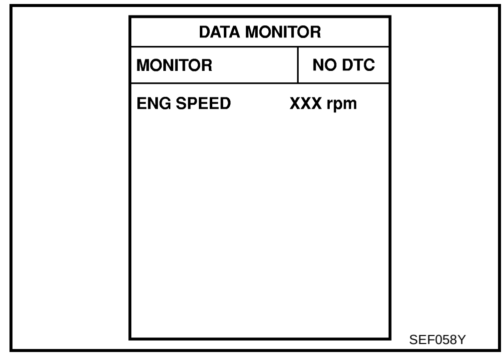
With GST

Follow the procedure “With CONSULT-II” above.

PROCEDURE FOR DTC P1126

With CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-440, "Diagnostic Procedure" .

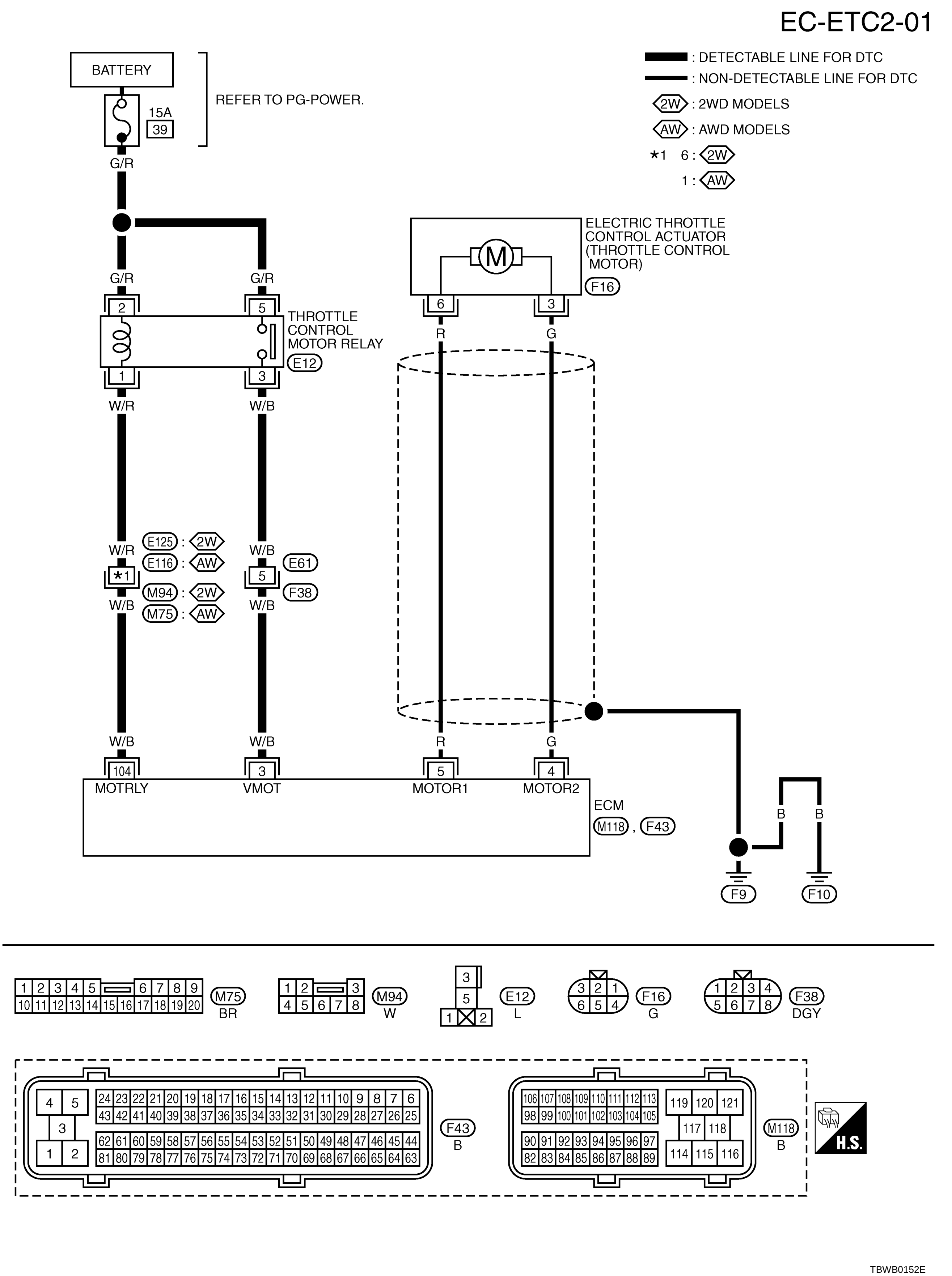


With GST

Follow the procedure “With CONSULT-II” above.

Wiring Diagram

ABS00CTM



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

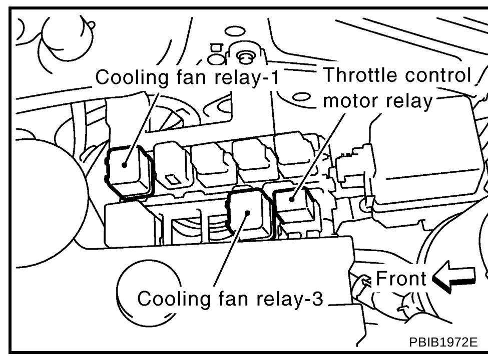
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	W/B	Throttle control motor power supply	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
104	W/B	Throttle control motor relay	**[Ignition switch: OFF]**	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON]	0 - 1.0V

Diagnostic Procedure

ABS00D8L

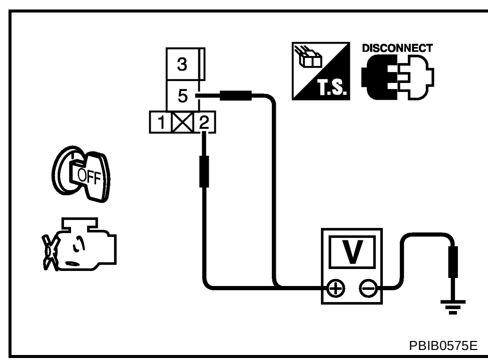
1. CHECK THROTTLE CONTROL MOTOR RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect throttle control motor relay.



3. Check voltage between throttle control motor relay terminals 2, 5 and ground.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse
- Harness for open or short between throttle control motor relay and battery

>> Repair or replace harness or connectors.

3. CHECK THROTTLE CONTROL MOTOR RELAY INPUT SIGNAL CIRCUIT

1. Disconnect ECM harness connector.
2. Check harness continuity between throttle control motor relay terminal 3 and ECM terminal 3.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- Harness for open or short between throttle control motor relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK THROTTLE CONTROL MOTOR RELAY OUTPUT SIGNAL CIRCUIT

1. Check continuity between throttle control motor relay terminal 1 and ECM terminal 104.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E125, M94 (2WD models)
- Harness connectors E116, M75 (AWD models)
- Harness for open or short between throttle control motor relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK THROTTLE CONTROL MOTOR RELAY

Refer to EC-442, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace throttle control motor relay.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

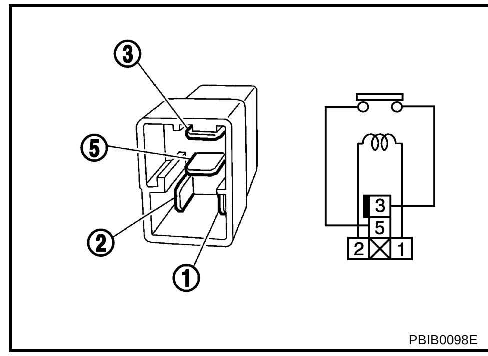
ABS00D8M

THROTTLE CONTROL MOTOR RELAY

1. Apply 12V direct current between relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

3. If NG, replace throttle control motor relay.



DTC P1128 THROTTLE CONTROL MOTOR

PFP:16119

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Component Description

ABS00CTO

The throttle control motor is operated by the ECM and it opens and closes the throttle valve.
The current opening angle of the throttle valve is detected by the throttle position sensor and it provides feedback to the ECM to control the throttle control motor to make the throttle valve opening angle properly in response to driving condition.

On Board Diagnosis Logic

ABS00CTP

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1128 1128	Throttle control motor circuit short	ECM detects short in both circuits between ECM and throttle control motor.	• Harness or connectors (The throttle control motor circuit is shorted.) • Electric throttle control actuator (The throttle control motor)

FAIL-SAFE MODE

When the malfunction is detected, ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

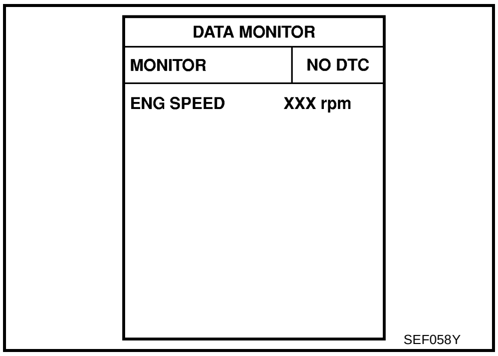
DTC Confirmation Procedure

ABS00CTQ

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 2 seconds.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 5 seconds.
4. If DTC is detected, go to EC-446, "Diagnostic Procedure" .



SEF058Y

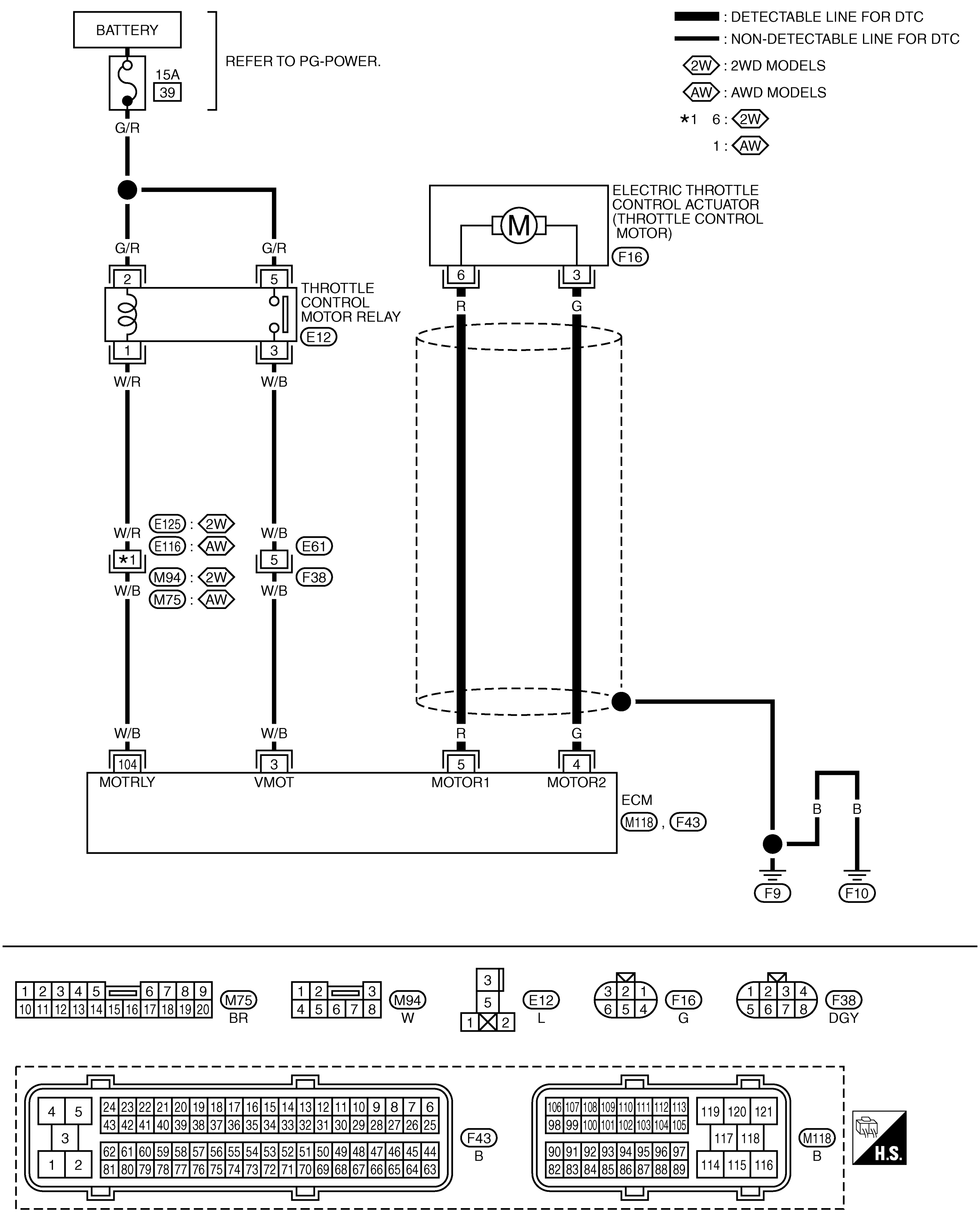
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CTR

EC-ETC3-01

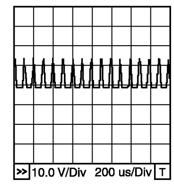
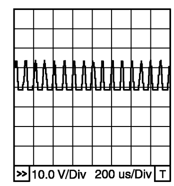


TBWB0153E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
4	G	Throttle control motor (Close)	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	0 - 14V★  PBIB0534E
5	R	Throttle control motor (Open)	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	0 - 14V★  PBIB0533E

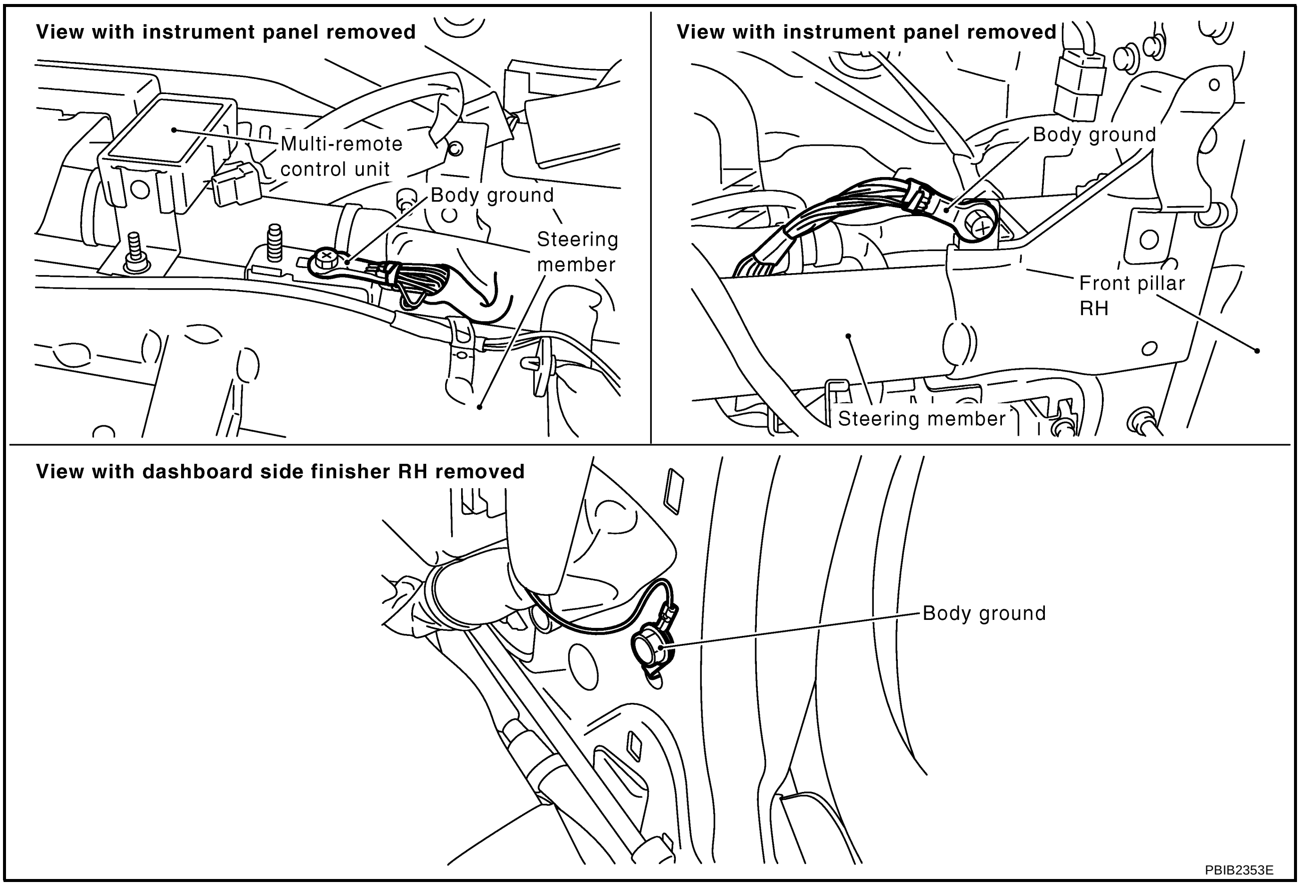
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8N

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

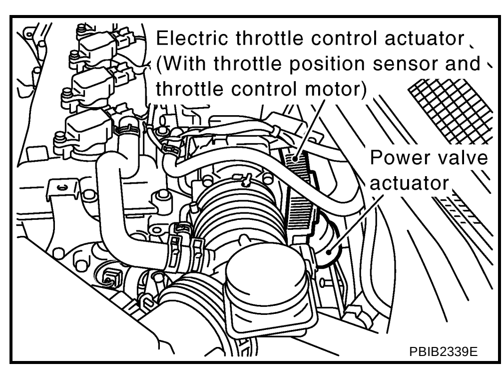


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK THROTTLE CONTROL MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN OR SHORT

1. Disconnect electric throttle control actuator harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals.
   Refer to Wiring Diagram.



Electric throttle control actuator terminal	ECM terminal	Continuity
3	4	Should exist
	5	Should not exist
6	4	Should not exist
	5	Should exist

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

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3. CHECK THROTTLE CONTROL MOTOR

Refer to EC-447, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 5.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

Component Inspection

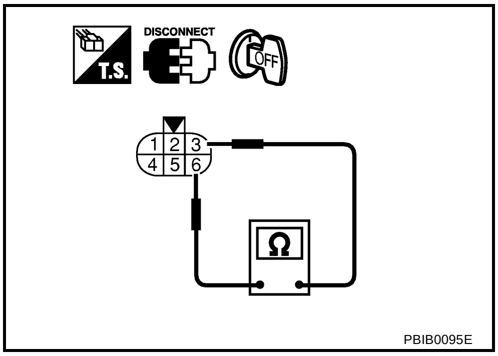
ABS00CTT

THROTTLE CONTROL MOTOR

1. Disconnect electric throttle control actuator harness connector.
2. Check resistance between terminals 3 and 6.

Resistance: Approximately 1 - 15 Ω [at 25 °C (77°F)]

3. If NG, replace electric throttle control actuator and go to next step.
4. Perform EC-88, "Throttle Valve Closed Position Learning" .
5. Perform EC-88, "Idle Air Volume Learning" .



Removal and Installation

ABS00CTU

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "INTAKE MANIFOLD" .

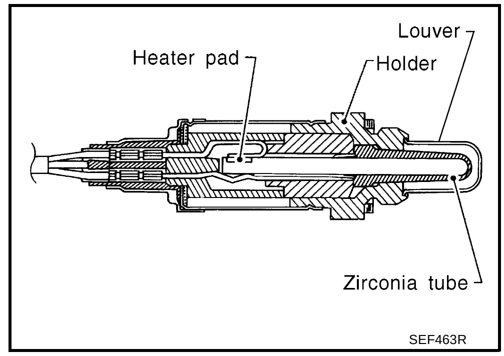
DTC P1143 HO2S1

PFP:22690

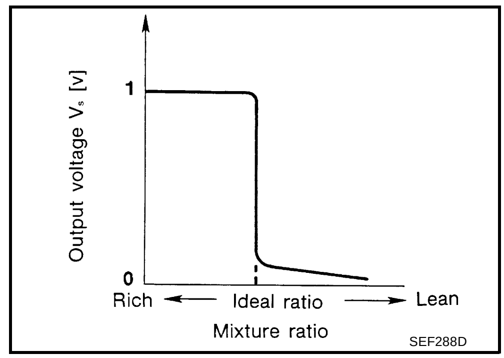
Component Description

ABS00D7E

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



SEF463R



SEF288D

CONSULT-II Reference Value in Data Monitor Mode

ABS00D7F

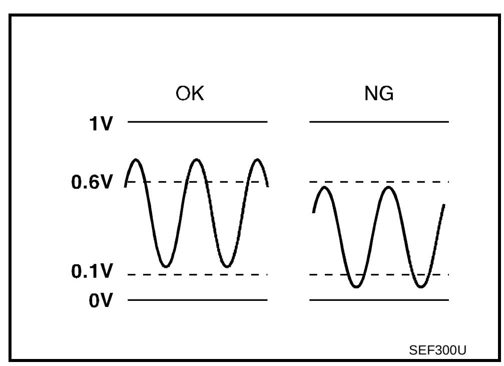
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

ABS00D7G

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the rich output is sufficiently high and whether the lean output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.



SEF300U

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1143 1143	Heated oxygen sensor 1 lean shift monitoring	The maximum and minimum voltage from the sensor are not reached to the specified voltages.	● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Fuel injector ● Intake air leaks

DTC Confirmation Procedure

ABS00D7H

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

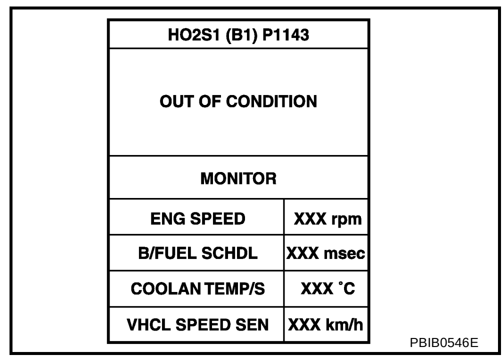
- **Always perform at a temperature above –10°C (14°F).**
- **Before performing following procedure, confirm that battery voltage is more than 11V at idle.**

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 10 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1143” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

   NOTE:

   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

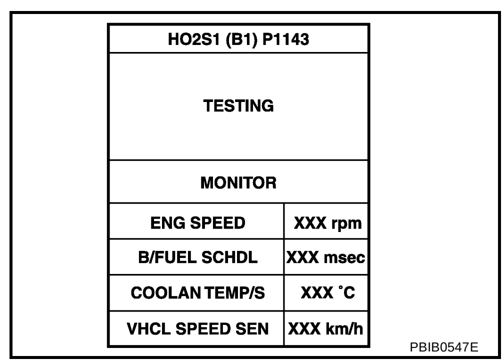


PBIB0546E

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

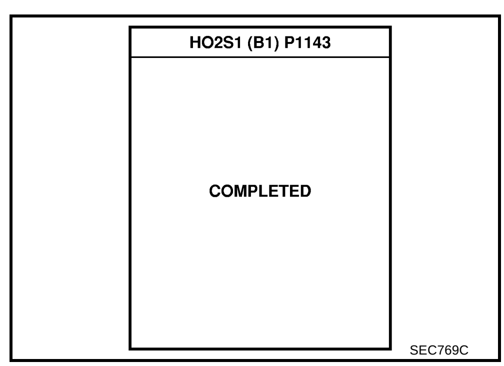
ENG SPEED	1,200 - 3,100 rpm
VHCL SPEED SE	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	1.8 - 12.5 msec
Shift lever	Suitable position

   If “TESTING” is not displayed after 5 minutes, retry from step 2.



PBIB0547E

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-450, "Diagnostic Procedure" .



SEC769C

Overall Function Check

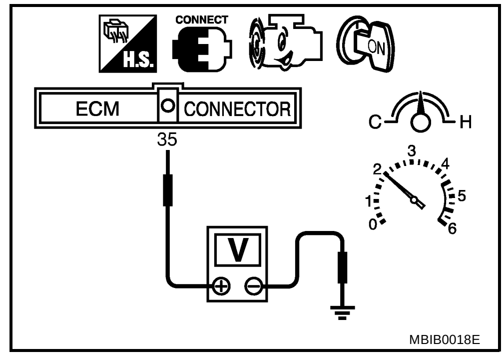
ABS00D7I

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.

2. Set voltmeter probes between ECM terminal 35 [HO2S1(B1) signal] and ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
   - The maximum voltage is over 0.6V at least 1 time.
   - The minimum voltage is over 0.1V at least 1 time.
4. If NG, go to EC-450, "Diagnostic Procedure" .

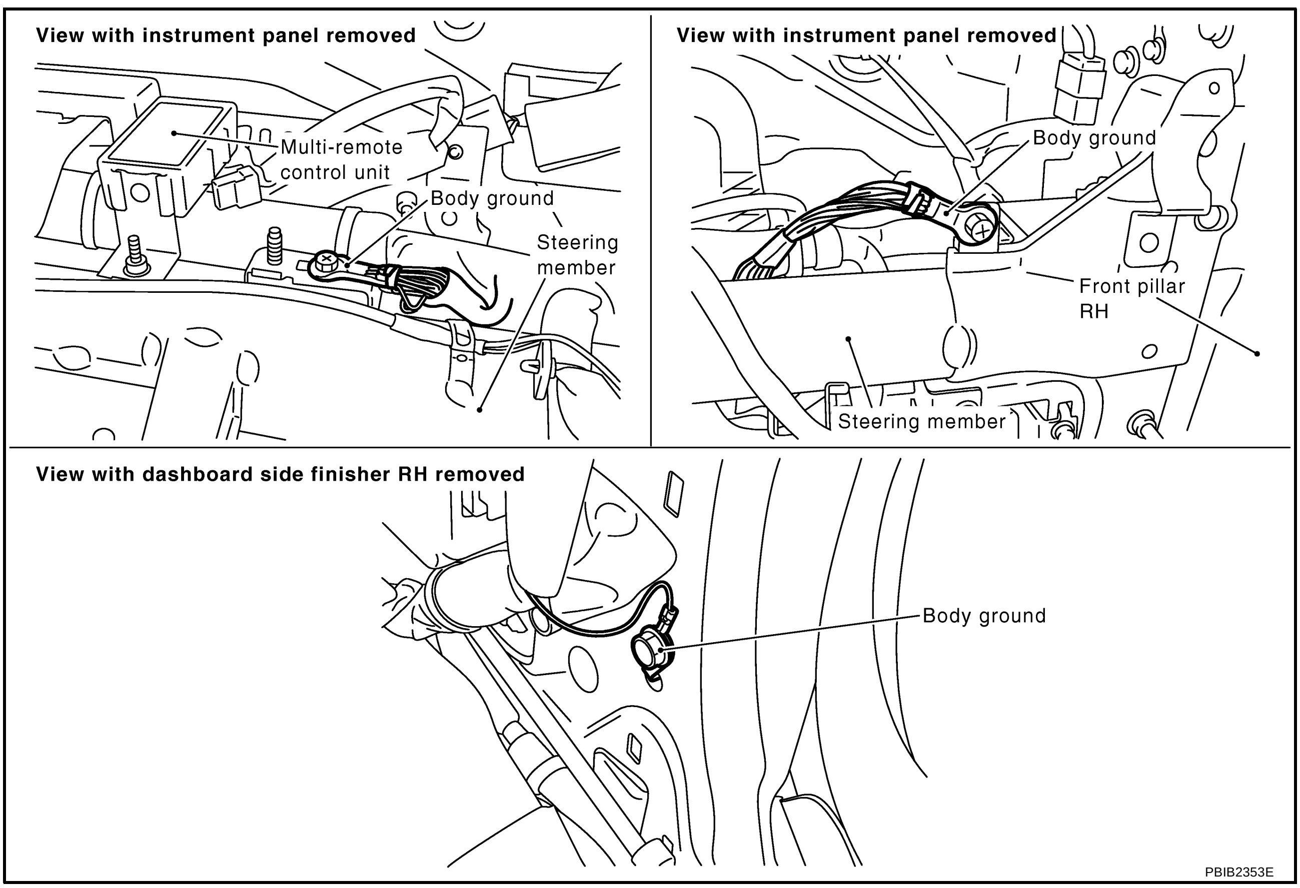


Diagnostic Procedure

ABS00D7J

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 2.

NG >> Repair or replace ground connections.

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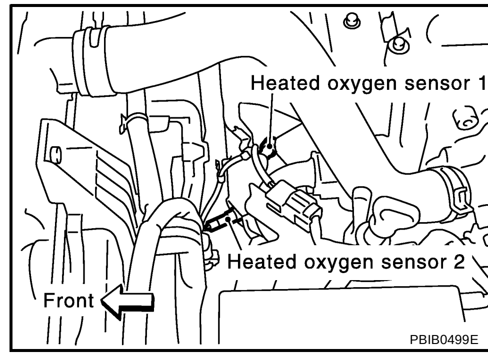
2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

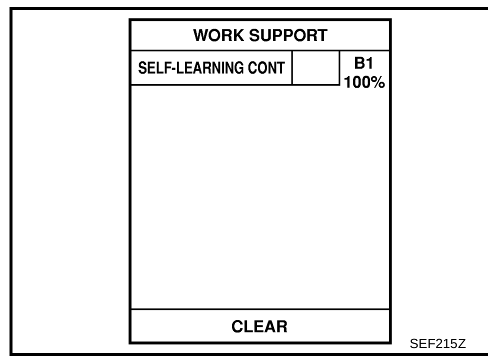
>> GO TO 3.



3. CLEAR THE SELF-LEARNING DATA

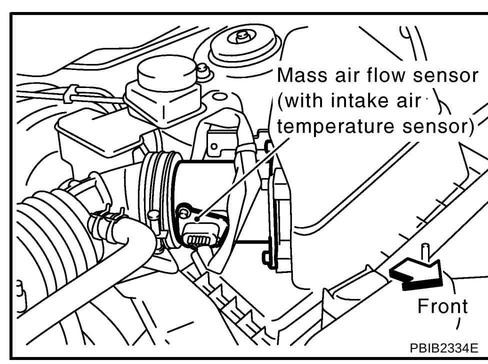
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-267, "DTC P0171 FUEL INJECTION SYSTEM FUNCTION" .
No >> GO TO 4.

4. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-175, "Component Inspection" .

OK or NG

OK >> GO TO 5.
NG >> Replace heated oxygen sensor 1.

5. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-175, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

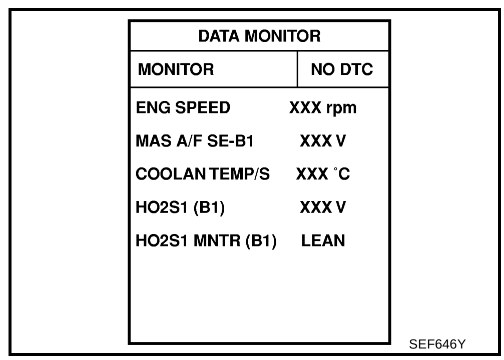
Component Inspection

ABS00D7K

HEATED OXYGEN SENSOR 1

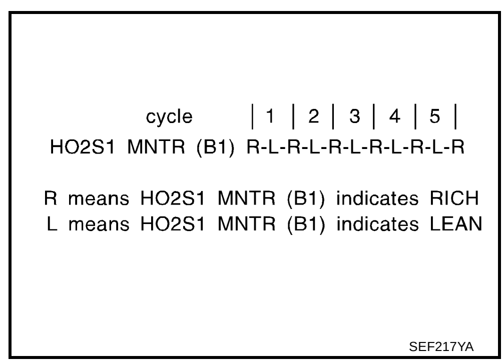
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

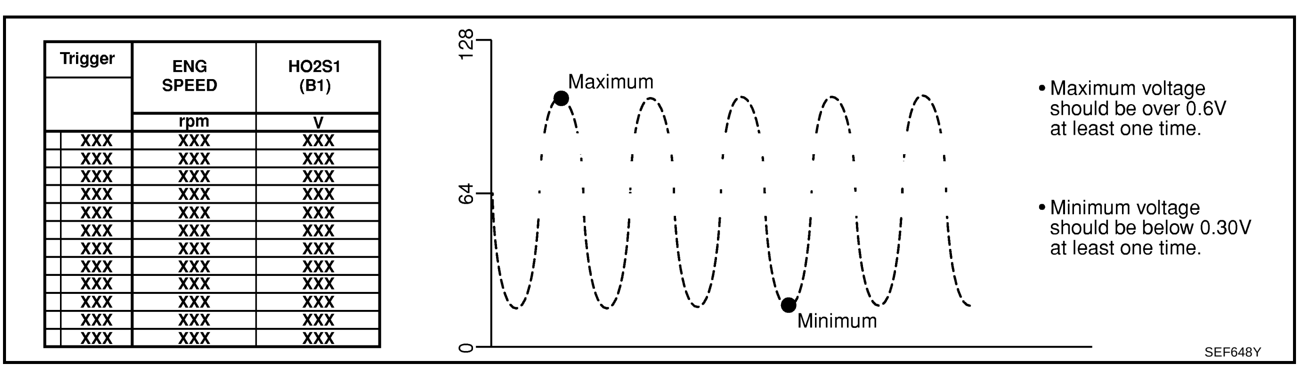


SEF646Y

6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH”more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



SEF217YA



SEF648Y

CAUTION:

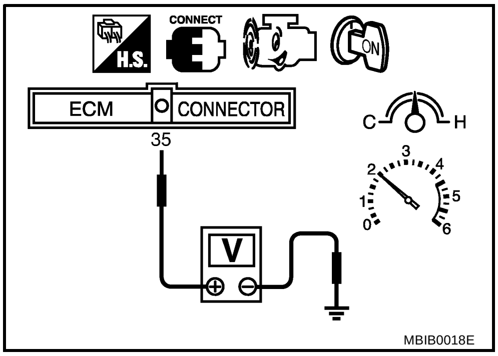
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**

- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least 1 time.
   - The minimum voltage is below 0.3V at least 1 time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00D7L

HEATED OXYGEN SENSOR 1

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

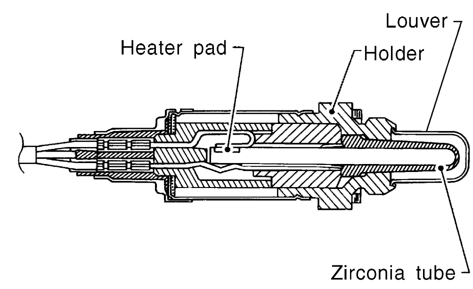
DTC P1144 HO2S1

PFP:22690

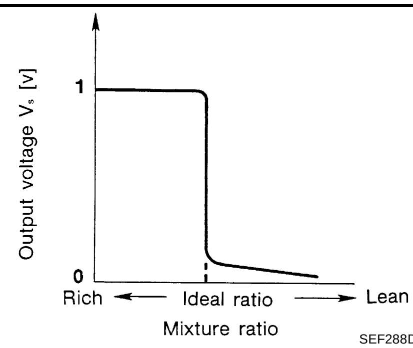
Component Description

ABS00D7M

The heated oxygen sensor 1 is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.



SEF463R



SEF288D

CONSULT-II Reference Value in Data Monitor Mode

ABS00D7N

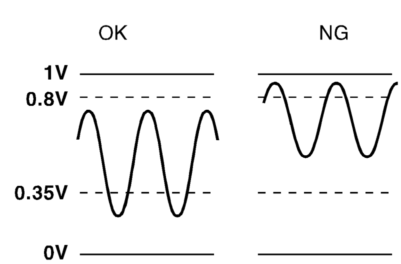
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	● Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ←→ 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ←→ RICH Changes more than 5 times during 10 seconds.

On Board Diagnosis Logic

ABS00D7O

To judge the malfunction, the output from the heated oxygen sensor 1 is monitored to determine whether the rich output is sufficiently high and lean output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.



SEF299U

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1144 1144	Heated oxygen sensor 1 rich shift monitoring	The maximum and minimum voltages from the sensor are beyond the specified voltages.	● Heated oxygen sensor 1 ● Heated oxygen sensor 1 heater ● Fuel pressure ● Fuel injector

DTC Confirmation Procedure

ABS00D7P

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

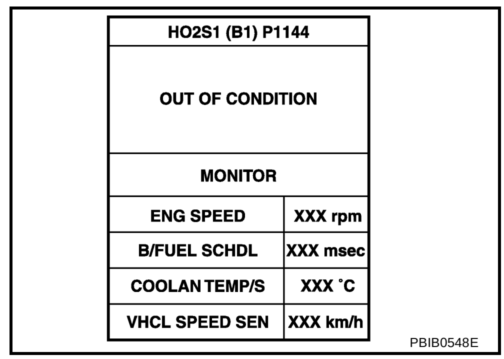
- **Always perform at a temperature above –10°C (14°F).**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine and wait at least 5 seconds.
3. Turn ignition switch ON and select “HO2S1 (B1) P1144” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
4. Touch “START”.
5. Start engine and let it idle for at least 3 minutes.

   NOTE:

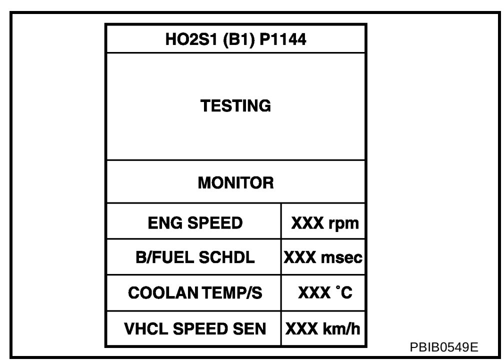
   Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.



PBIB0548E

6. When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 50 seconds or more.)

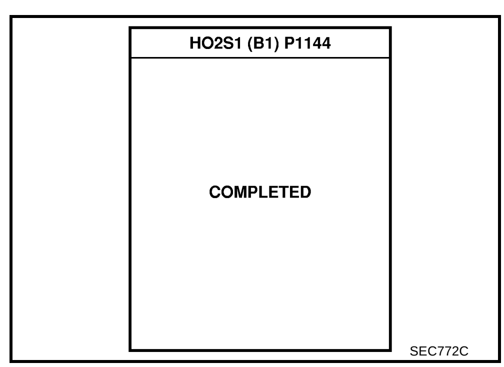
ENG SPEED	1,600 - 2,800 rpm (A/T) 1,500 - 2,800 rpm (M/T)
VHCL SPEED SE	Less than 101 km/h (63 MPH)
B/FUEL SCHDL	3.0 - 12.0 msec
Shift lever	Suitable position



PBIB0549E

   If “TESTING” is not displayed after 5 minutes, retry from step 2.

7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-456, "Diagnostic Procedure" .



SEC772C

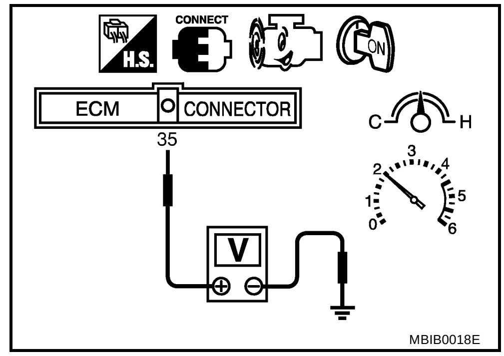
Overall Function Check

ABS00D7Q

Use this procedure to check the overall function of the heated oxygen sensor 1 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1(B1) signal] and ground.
3. Check one of the following with engine speed held at 2,000 rpm constant under no load.
   - The maximum voltage is below 0.8V at least 1 time.
   - The minimum voltage is below 0.35V at least 1 time.
4. If NG, go to EC-456, "Diagnostic Procedure" .



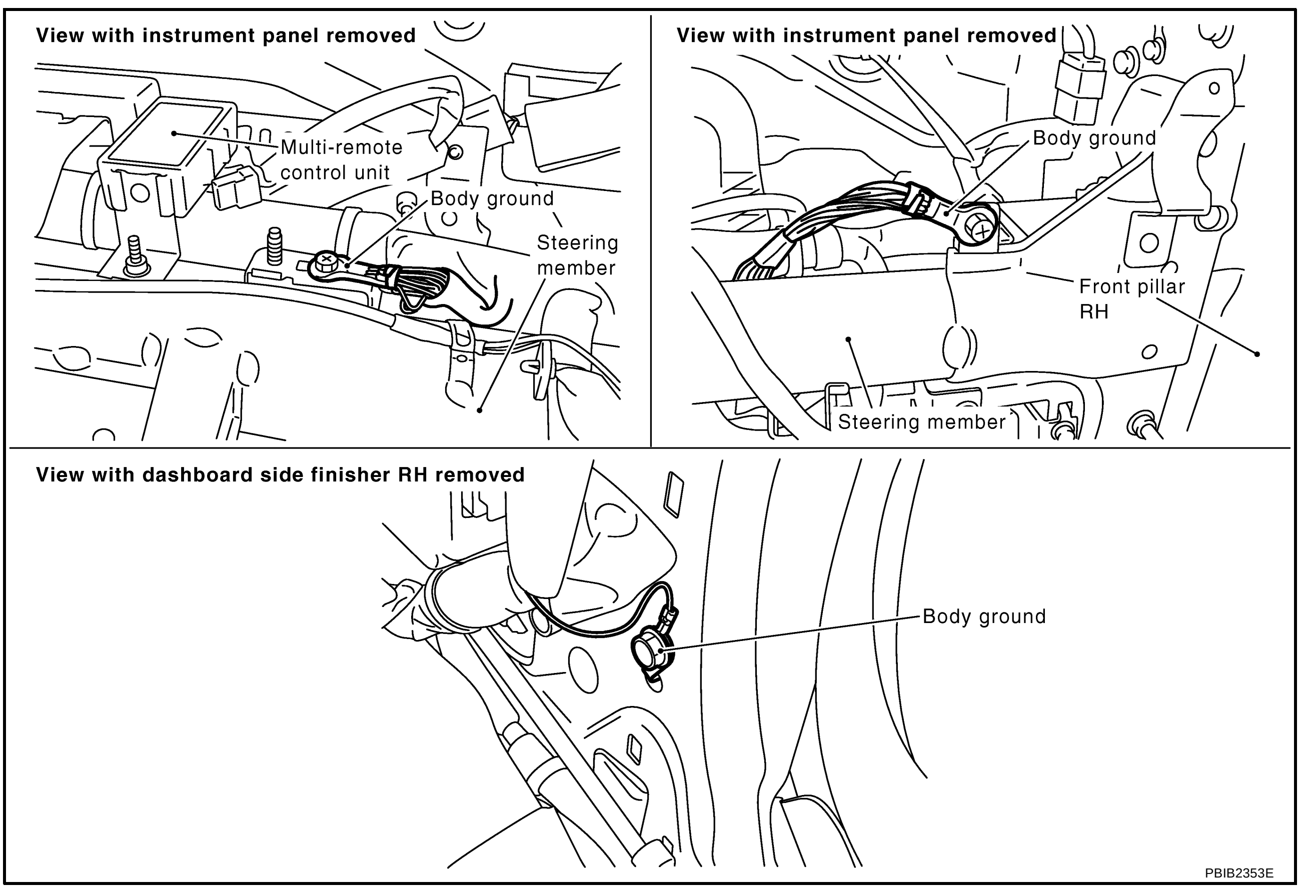
MBIB0018E

Diagnostic Procedure

ABS00D7R

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



PBIB2353E

OK or NG

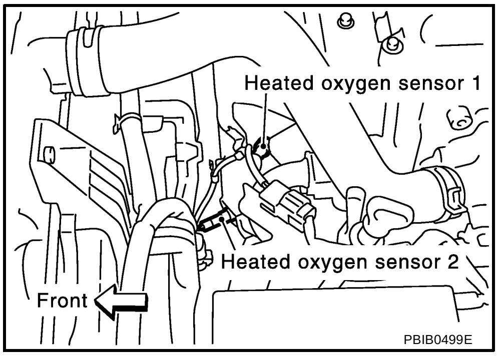
OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. RETIGHTEN HEATED OXYGEN SENSOR 1

Loosen and retighten heated oxygen sensor 1.

Tightening torque: 50 N·m (5.1 kg-m, 37 ft-lb)

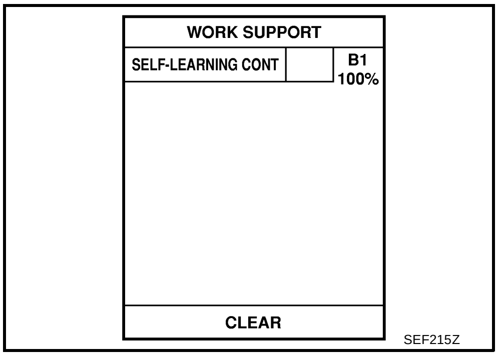
>> GO TO 3.



3. CLEAR THE SELF-LEARNING DATA

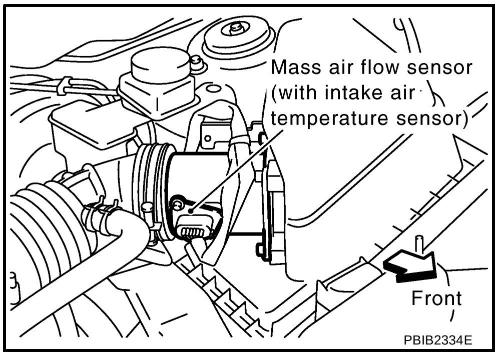
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



Yes or No

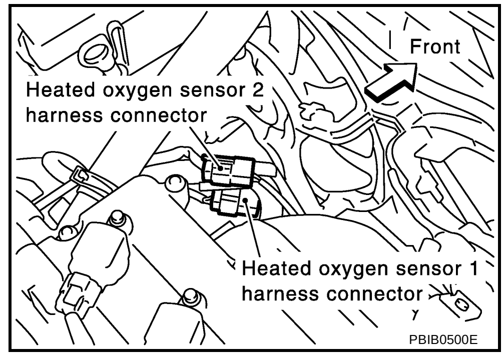
Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-274, "DTC P0172 FUEL INJECTION SYSTEM FUNCTION" .

No >> GO TO 4.

4. CHECK HO2S1 CONNECTOR FOR WATER

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 1 harness connector.
3. Check connectors for water.

Water should not exist.



OK or NG

OK >> GO TO 5.
NG >> Repair or replace harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 1 HEATER

Refer to EC-175, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 1.

6. CHECK HEATED OXYGEN SENSOR 1

Refer to EC-175, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace heated oxygen sensor 1.

7. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00D7S

HEATED OXYGEN SENSOR 1

With CONSULT-II

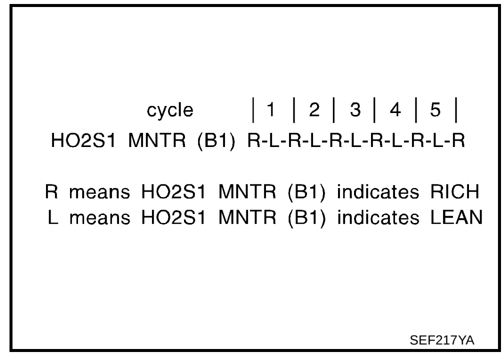
1. Start engine and warm it up to normal operating temperature.
2. Select “MANU TRIG” and adjust “TRIGGER POINT” to 100% in “DATA MONITOR” mode with CONSULT-II.
3. Select “HO2S1 (B1)” and “HO2S1 MNTR (B1)”.
4. Hold engine speed at 2,000 rpm under no load during the following steps.
5. Touch “RECORD” on CONSULT-II screen.

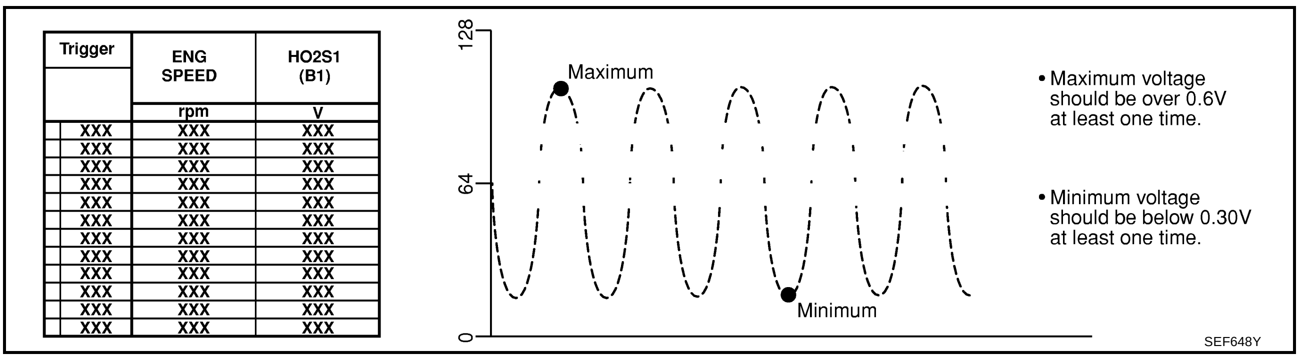
DATA MONITOR

MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

6. Check the following.
   - “HO2S1 MNTR (B1)” in “DATA MONITOR” mode changes from “RICH” to “LEAN” to “RICH” more than 5 times in 10 seconds.
     5 times (cycles) are counted as shown at right.
   - “HO2S1 (B1)” voltage goes above 0.6V at least once.
   - “HO2S1 (B1)” voltage goes below 0.3V at least once.
   - “HO2S1 (B1)” voltage never exceeds 1.0V.



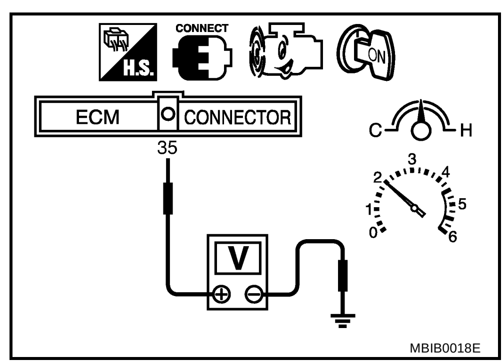


CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times within 10 seconds.
   - The maximum voltage is over 0.6V at least 1 time.
   - The minimum voltage is below 0.3V at least 1 time.
   - The voltage never exceeds 1.0V.

   1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
   2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V



CAUTION:
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00D7T

HEATED OXYGEN SENSOR 1

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

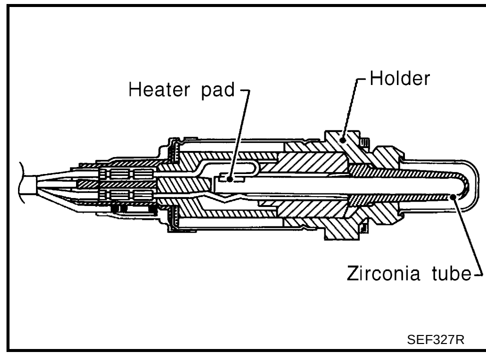
DTC P1146 HO2S2

PFP:226A0

Component Description

ABS00CTV

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



SEF327R

CONSULT-II Reference Value in Data Monitor Mode

ABS00CTW

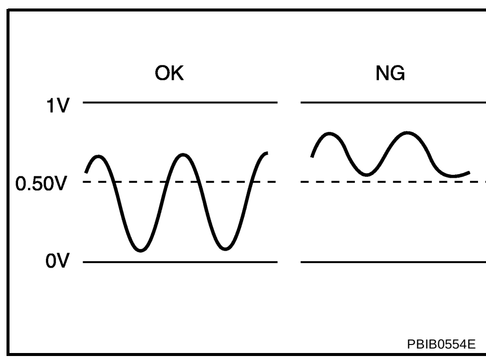
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle up to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

ABS00CTX

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity of the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the minimum voltage of sensor is sufficiently low during the various driving condition such as fuel-cut.



PBIB0554E

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1146 1146	Heated oxygen sensor 2 minimum voltage monitoring	The minimum voltage from the sensor is not reached to the specified voltage.	● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Fuel injector

DTC Confirmation Procedure

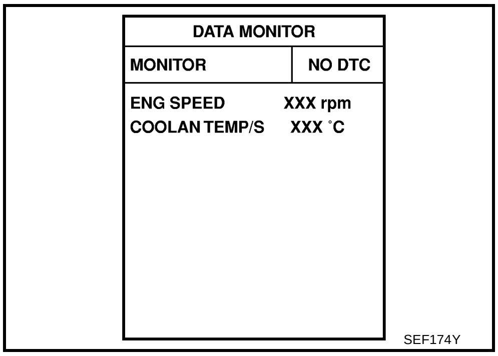
ABS00CTY

NOTE:
If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

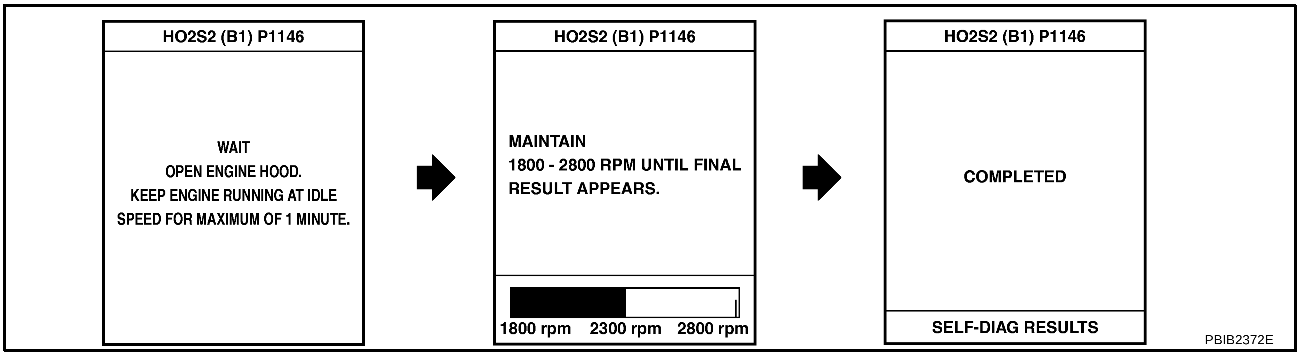
TESTING CONDITION:
For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select “DATA MONITOR ” mode with CONSULT-II
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).



SEF174Y

7. Open engine hood.
8. Select “HO2S2 (B1) P1146” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-II.
9. Following the instruction of COSULT-II.



PBIB2372E

   NOTE:
   It will take at most 10 minutes until “COMPLETED” is displayed.
10. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
    If “NG” is displayed, refer to EC-464, "Diagnostic Procedure" .
    If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Return to step 1.

Overall Function Check

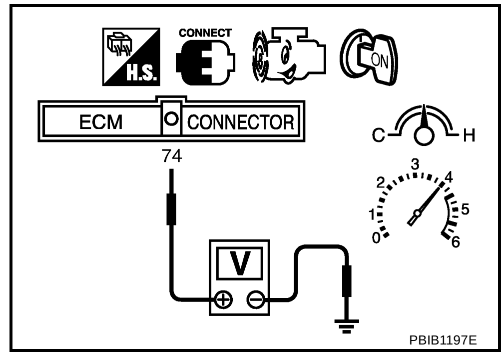
ABS00CTZ

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

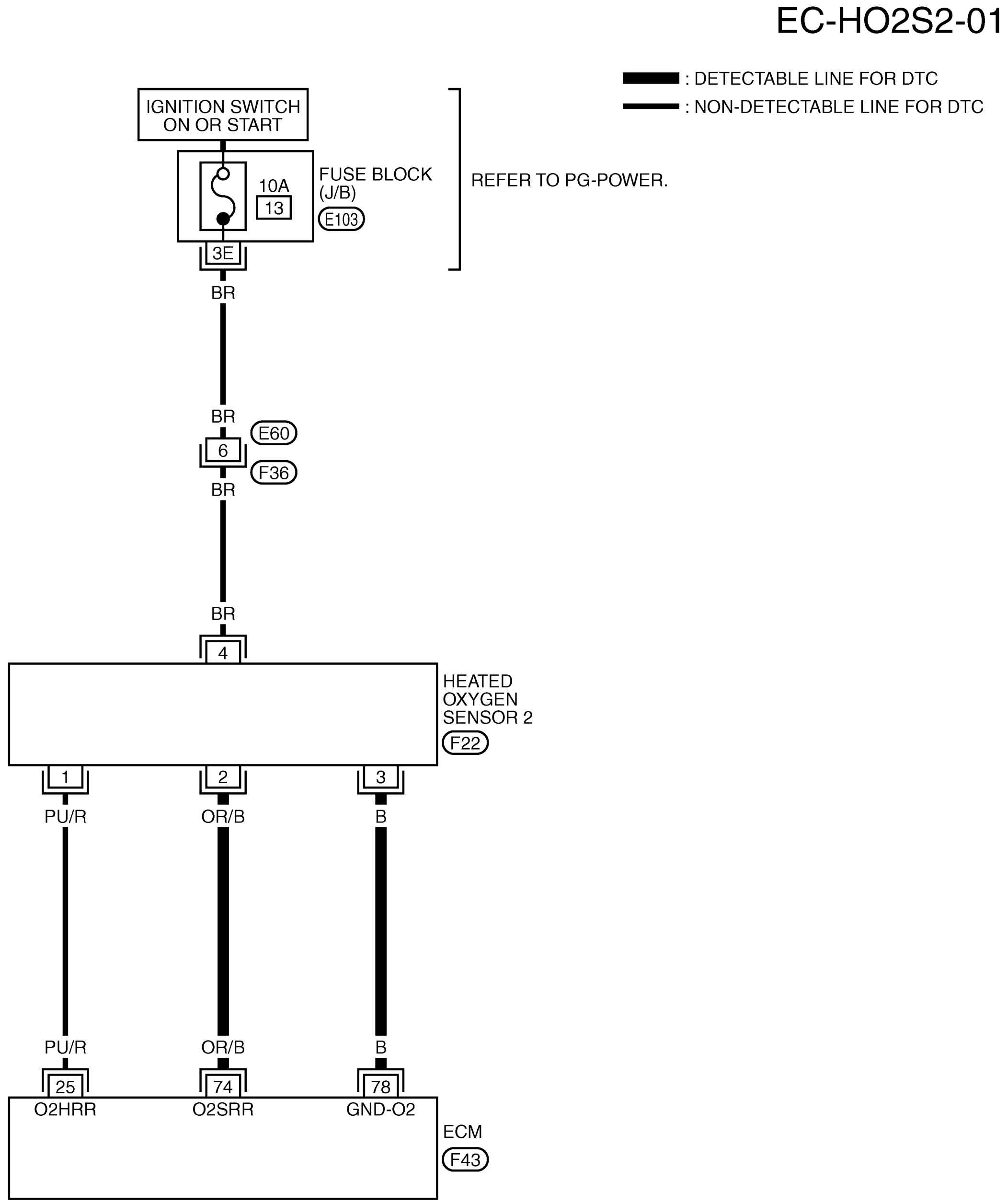
1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.

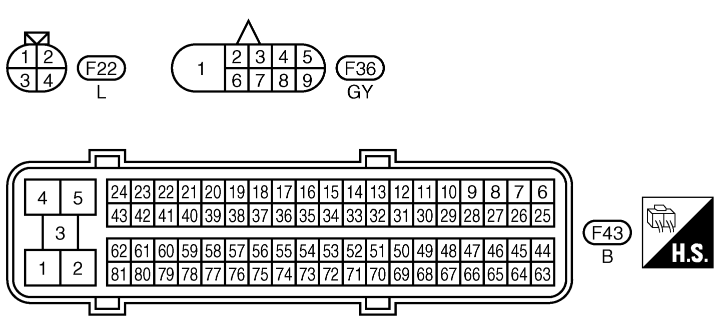
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be below 0.50V at least once during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.
7. Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T) 3rd gear position (M/T).
   The voltage should be below 0.50V at least once during this procedure.
8. If NG, go to EC-464, "Diagnostic Procedure" .



Wiring Diagram

ABS00CU0





REFER TO THE FOLLOWING.
E103 -FUSE BLOCK-JUNCTION BOX (J/B)

TBWB0116E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

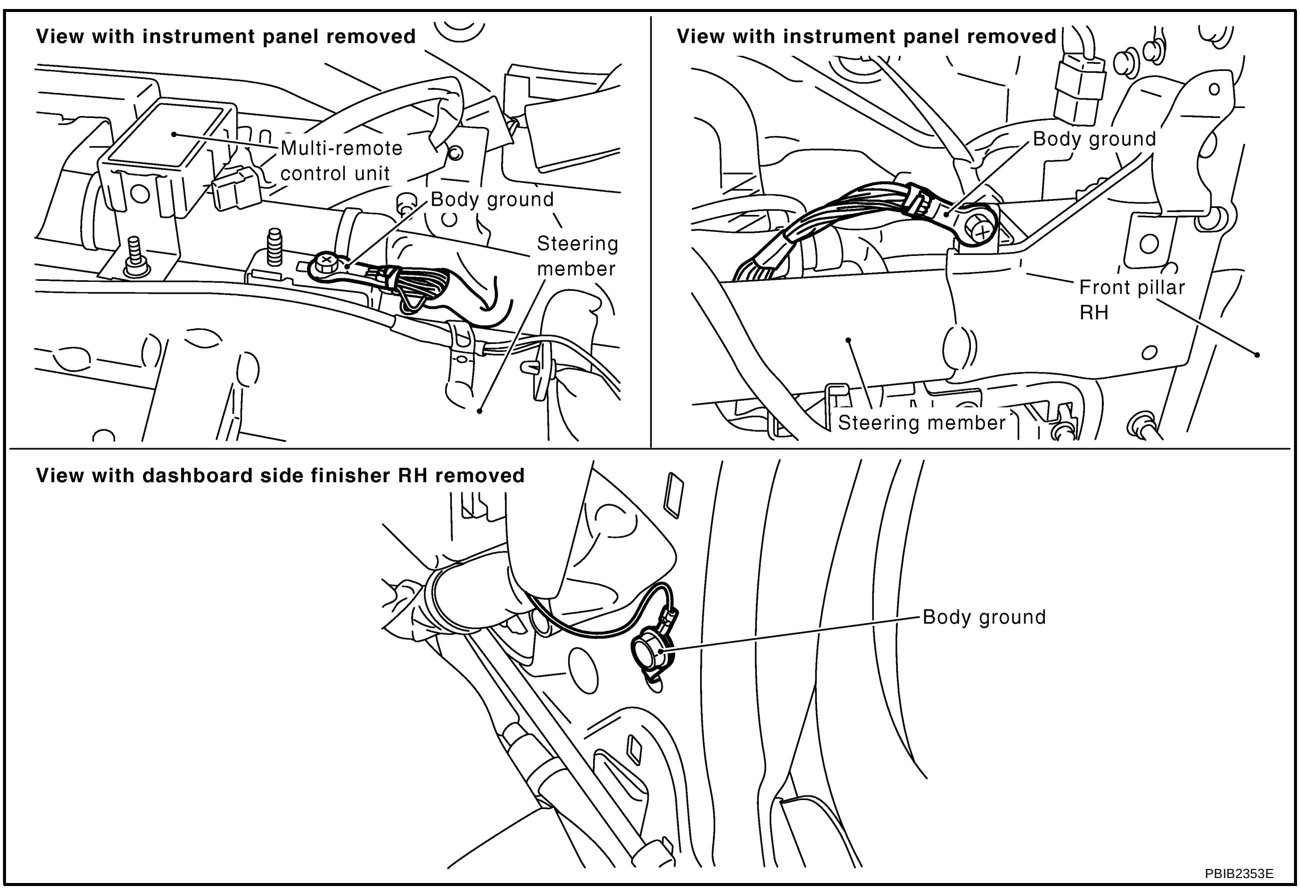
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	OR/B	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00D8O

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

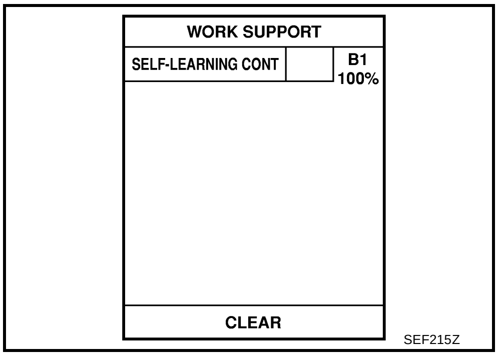
OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

With CONSULT-II

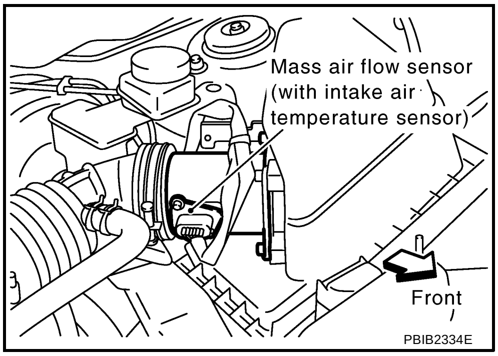
1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



SEF215Z

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0172 detected?
   Is it difficult to start engine?



PBIB2334E

Yes or No

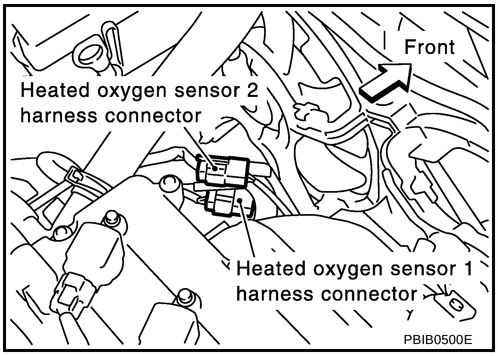
Yes >> Perform trouble diagnosis for DTC P0172. Refer to EC-274, "DTC P0172 FUEL INJECTION SYSTEM FUNCTION" .
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S2 terminal 3 and ECM terminal 78.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.



PBIB0500E

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 2 and ECM terminal 74.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-181, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

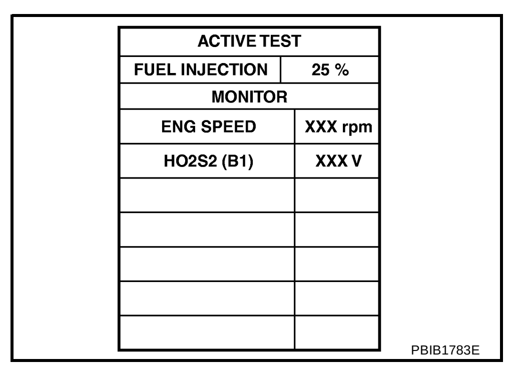
Component Inspection

ABS00CU2

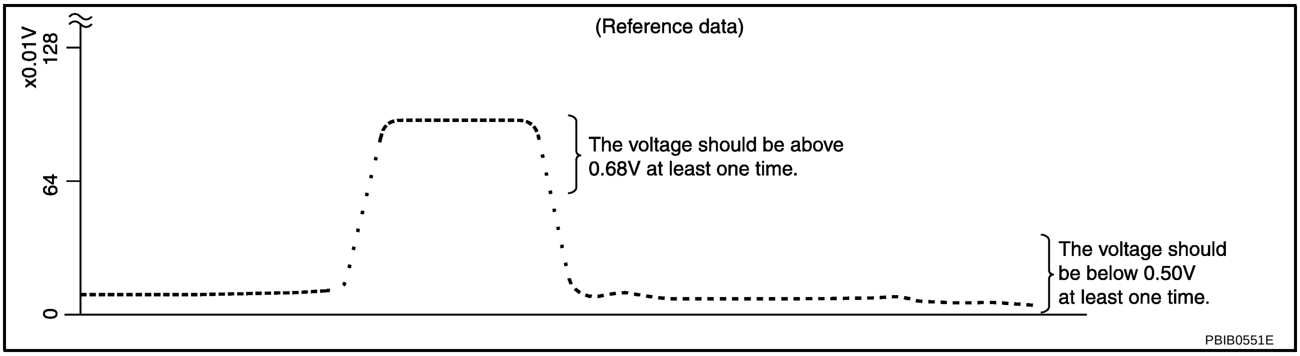
HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



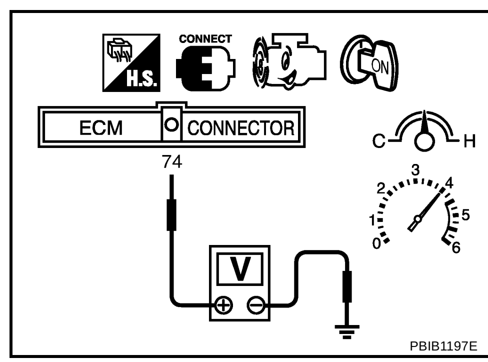
“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is –25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68V at least once during this procedure.
   If the voltage is above 0.68V at step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), 3rd gear position (M/T).
   The voltage should be below 0.50V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00CU3

HEATED OXYGEN SENSOR 2

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

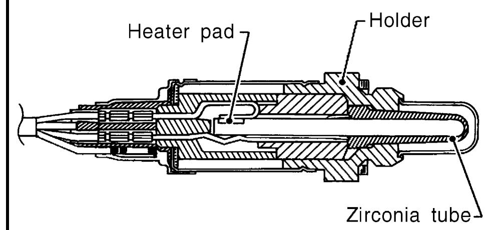
DTC P1147 HO2S2

PFP:226A0

Component Description

ABS00CU4

The heated oxygen sensor 2, after three way catalyst (manifold), monitors the oxygen level in the exhaust gas on each bank.
Even if switching characteristics of the heated oxygen sensor 1 are shifted, the air-fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.
This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.
Under normal conditions the heated oxygen sensor 2 is not used for engine control operation.



SEF327R

CONSULT-II Reference Value in Data Monitor Mode

ABS00CU5

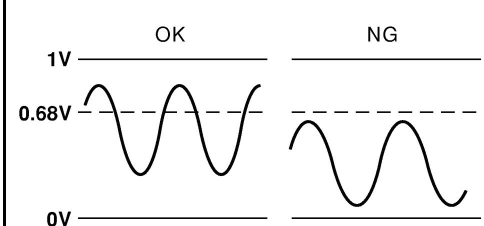
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up ● After keeping engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	Revving engine from idle up to 3,000 rpm quickly.	0 - 0.3V ←→ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ←→ RICH

On Board Diagnosis Logic

ABS00CU6

The heated oxygen sensor 2 has a much longer switching time between rich and lean than the heated oxygen sensor 1. The oxygen storage capacity before the three way catalyst (manifold) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during the various driving condition such as fuel-cut.



SEF259VA

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1147 1147	Heated oxygen sensor 2 maximum voltage monitoring	The maximum voltage from the sensor is not reached to the specified voltage.	● Harness or connectors (The sensor circuit is open or shorted) ● Heated oxygen sensor 2 ● Fuel pressure ● Fuel injector ● Intake air leaks

DTC Confirmation Procedure

ABS00CU7

NOTE:

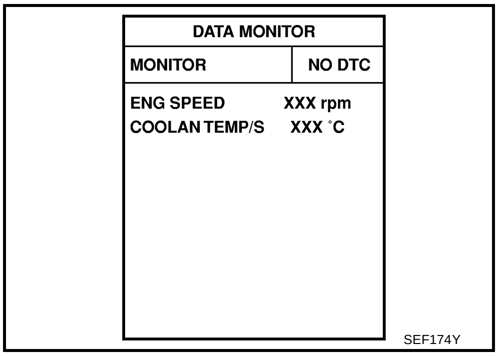
If DTC confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

TESTING CONDITION:

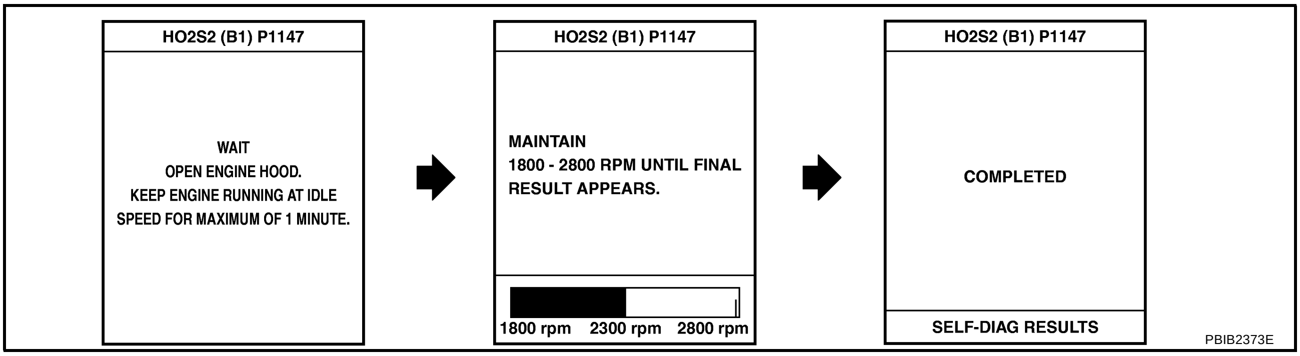
For the best results, perform DTC WORK SUPPORT at a temperature of 0 to 30°C (32 to 86°F).

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.
2. Start engine and warm it up to the normal operating temperature.
3. Turn ignition switch OFF and wait at least 10 seconds.
4. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
5. Let engine idle for 1 minute.
6. Make sure that “COOLAN TEMP/S” indicates more than 70°C (158°F).
   If not, warm up engine and go to next step when “COOLAN TEMP/S” indication reaches to 70°C (158°F).



SEF174Y

7. Open engine hood.
8. Select “HO2S2 (B1) P1147” of “HO2S2” in “DTC WORK SUPPORT” mode with CONSULT-II.
9. Following the instruction of CONSULT-II.



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   NOTE:
   It will take at most 10 minutes until “COMPLETED” is displayed.
10. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”.
    If “NG” is displayed, refer to EC-472, "Diagnostic Procedure" .
    If “CAN NOT BE DIAGNOSED” is displayed, perform the following.

a. Turn ignition switch OFF and leave the vehicle in a cool place (soak the vehicle).
b. Return to step 1.

Overall Function Check

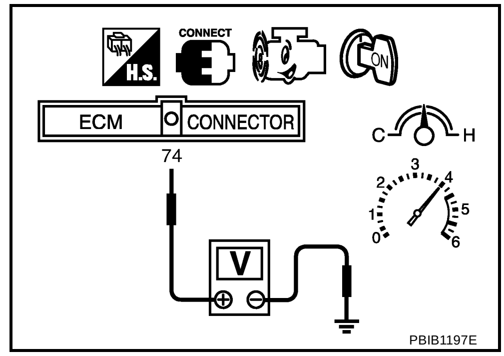
ABS00CU8

Use this procedure to check the overall function of the heated oxygen sensor 2 circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.

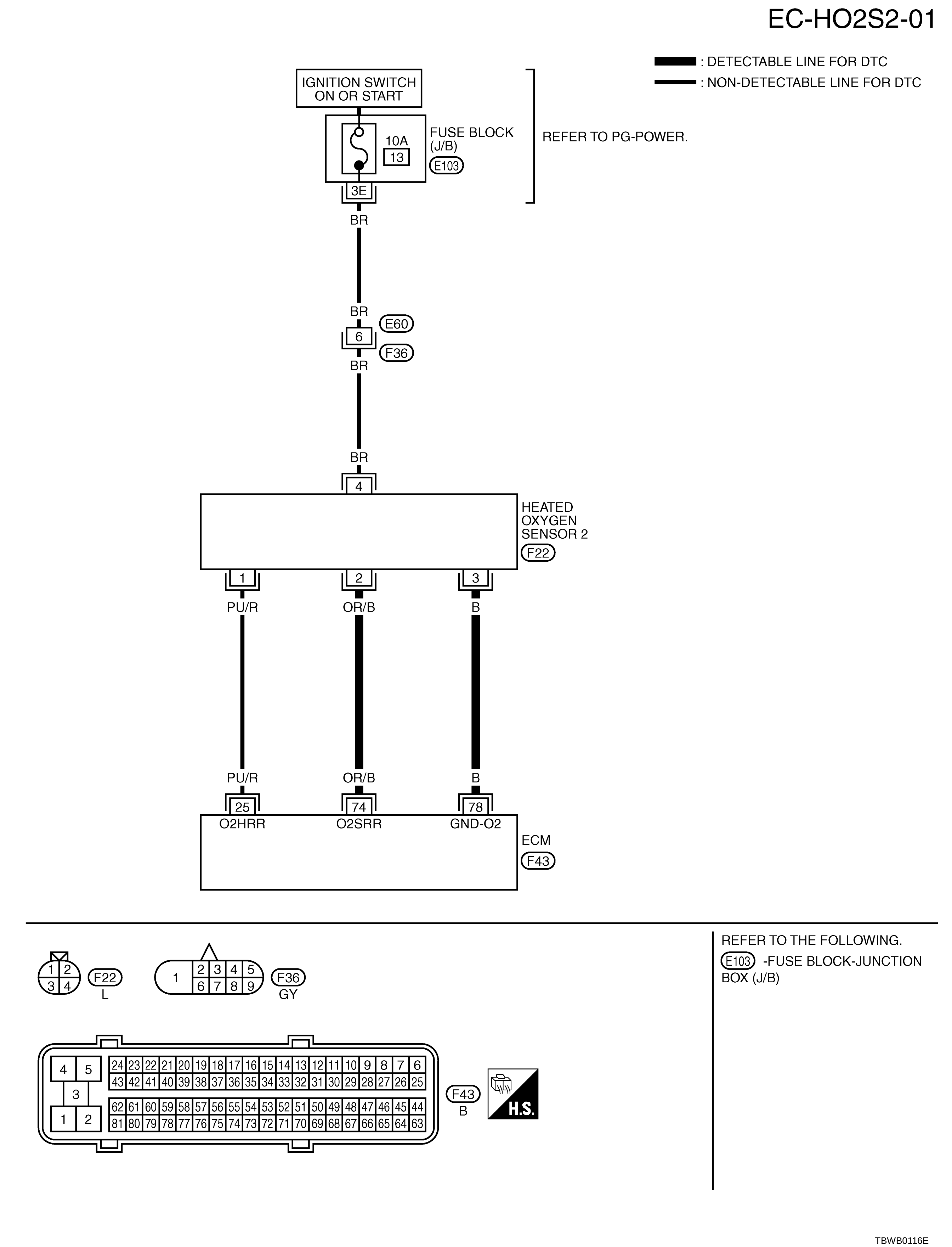
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68V at least once during this procedure.
   If the voltage can be confirmed in step 6, step 7 is not necessary.



7. Keep vehicle idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with “OD” OFF (A/T) 3rd gear position (M/T).
   The voltage should be above 0.68V at least once during this procedure.
8. If NG, go to EC-472, "Diagnostic Procedure" .

Wiring Diagram

ABS00CU9



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

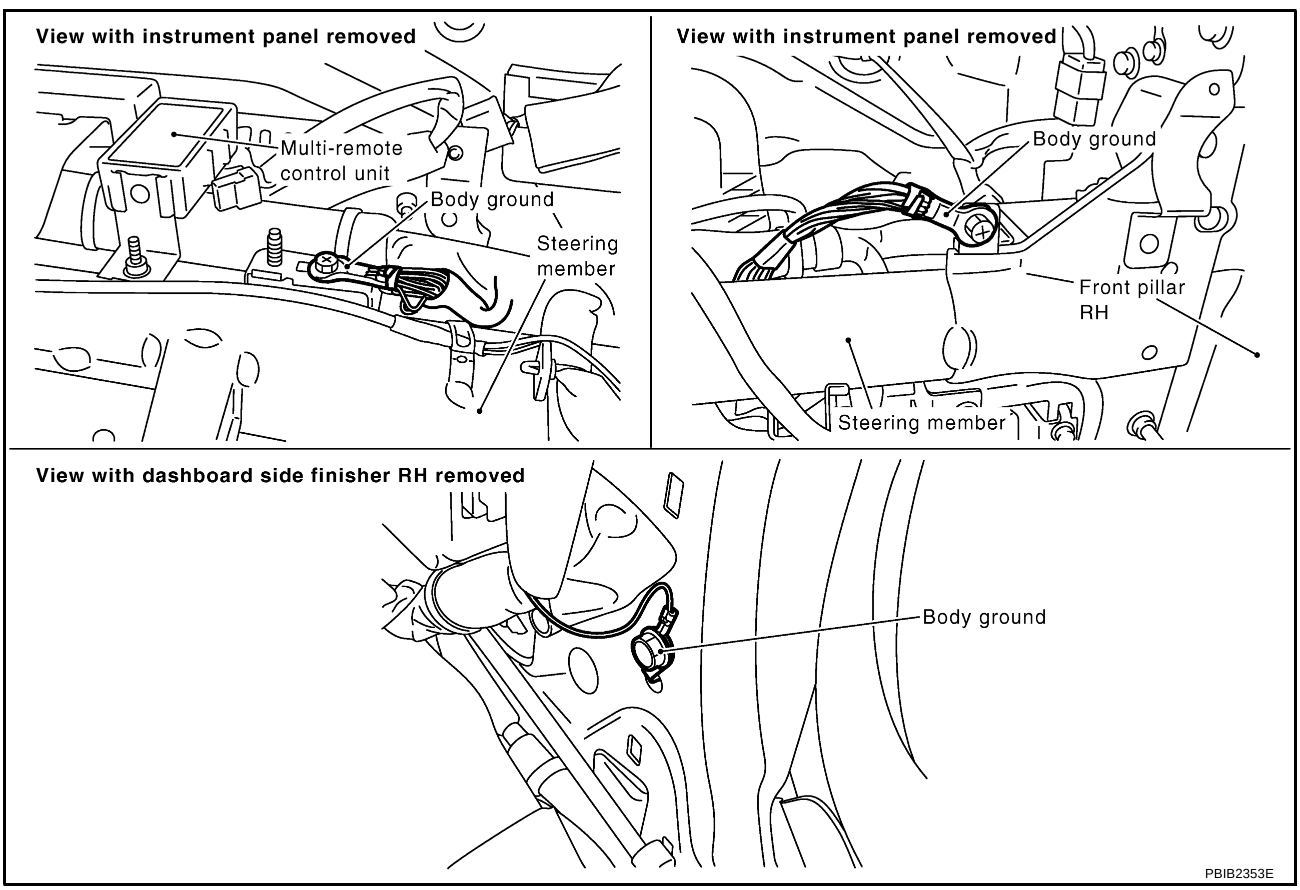
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	OR/B	Heated oxygen sensor 2	**[Engine is running]** ● **Warm-up condition** ● Revving engine from idle up to 3,000 rpm quickly after the following conditions are met. ● Keeping the engine speed between 3,500 and 4,000 rpm for 1 minute and at idle for 1 minute under no load.	0 - Approximately 1.0V
78	B	Sensor ground (Heated oxygen sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V

Diagnostic Procedure

ABS00D8P

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten ground three screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

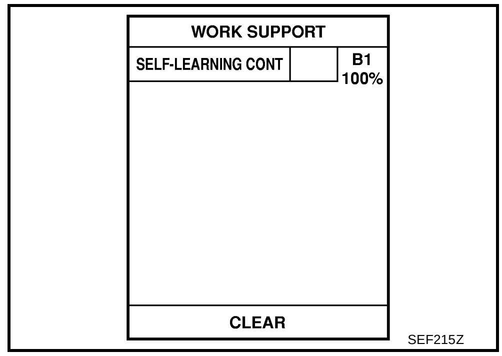
OK >> GO TO 2.

NG >> Repair or replace ground connections.

2. CLEAR THE SELF-LEARNING DATA

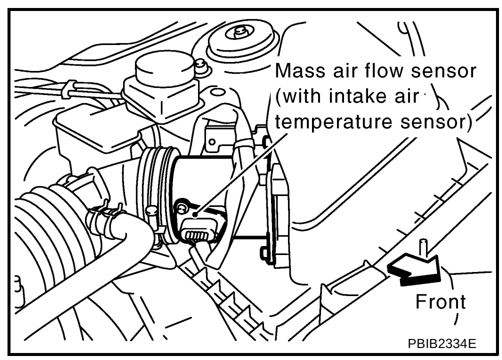
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “SELF-LEARNING CONT” in “WORK SUPPORT” mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching “CLEAR”.
4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF.
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure that DTC P0102 is displayed.
6. Erase the DTC memory. Refer to EC-60, "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION" .
7. Make sure that DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 detected?
   Is it difficult to start engine?



Yes or No

Yes >> Perform trouble diagnosis for DTC P0171. Refer to EC-267, "DTC P0171 FUEL INJECTION SYSTEM FUNCTION" .

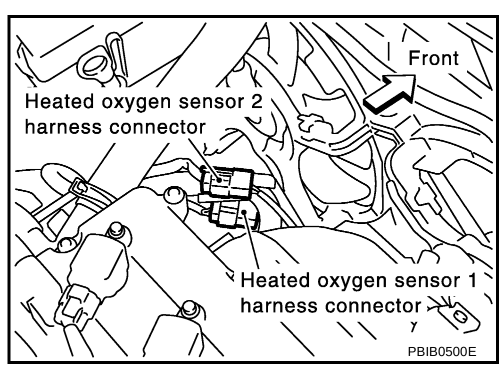
No >> GO TO 3.

3. CHECK HO2S2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect heated oxygen sensor 2 harness connector.
3. Disconnect ECM harness connector.
4. Check harness continuity between HO2S2 terminal 3 and ECM terminal 78.
   Refer to Wiring Diagram.

   Continuity should exist.

5. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 4.

NG >> Repair open circuit or short to ground or short to power in harness or connectors.

A
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4. CHECK HO2S2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between HO2S2 terminal 2 and ECM terminal 74.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Check harness continuity between ECM terminal 74 or HO2S2 terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should not exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK HEATED OXYGEN SENSOR 2

Refer to EC-257, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace heated oxygen sensor 2.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

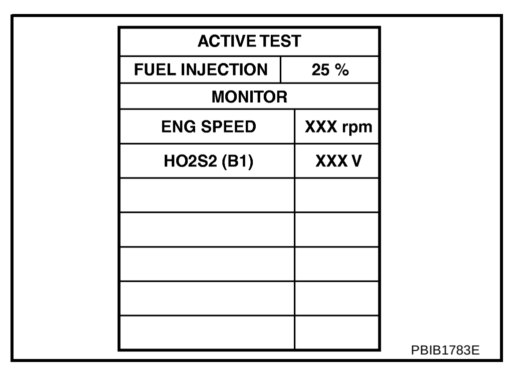
Component Inspection

ABS00CUB

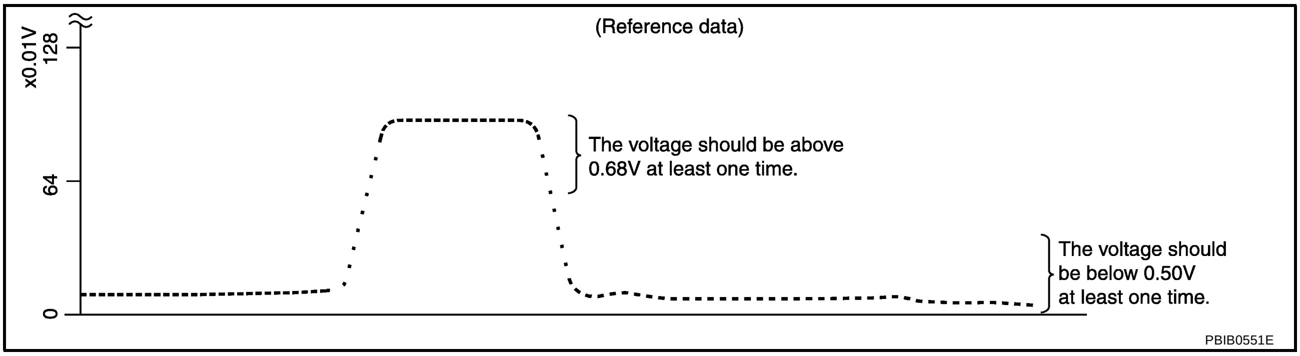
HEATED OXYGEN SENSOR 2

With CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Select “FUEL INJECTION” in “ACTIVE TEST” mode, and select “HO2S2 (B1)” as the monitor item with CONSULT-II.



6. Check “HO2S2 (B1)” at idle speed when adjusting “FUEL INJECTION” to ±25%.



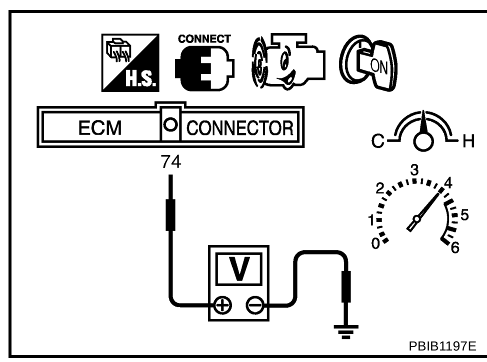
“HO2S2 (B1)” should be above 0.68V at least once when the “FUEL INJECTION” is +25%.
“HO2S2 (B1)” should be below 0.50V at least once when the “FUEL INJECTION” is –25%.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Without CONSULT-II

1. Start engine and warm it up to the normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
4. Let engine idle for 1 minute.
5. Set voltmeter probes between ECM terminal 74 (HO2S2 signal) and ground.
6. Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
   (Depress and release accelerator pedal as soon as possible.)
   The voltage should be above 0.68V at least once during this procedure.
   If the voltage is above 0.68V at step 6, step 7 is not necessary.



7. Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with OD OFF (A/T), 3rd gear position (M/T).
   The voltage should be below 0.50V at least once during this procedure.
8. If NG, replace heated oxygen sensor 2.

CAUTION:

- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.**
- **Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.**

Removal and Installation

ABS00CUC

HEATED OXYGEN SENSOR 2

Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .

DTC P1148 CLOSED LOOP CONTROL

PFP:22690

On Board Diagnosis Logic

ABS00D7U

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1148 1148	Closed loop control function	The closed loop control function does not operate even when vehicle is driving in the specified condition.	• The heated oxygen sensor 1 circuit is open or shorted. • Heated oxygen sensor 1 • Heated oxygen sensor heater

DTC Confirmation Procedure

ABS00D7V

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

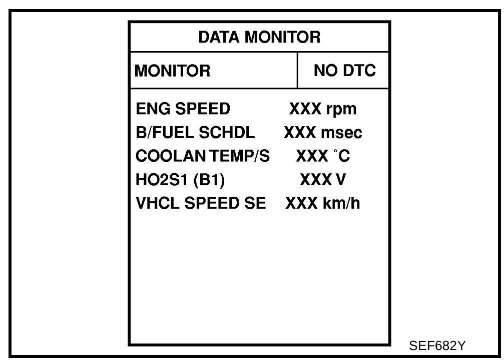
TESTING CONDITION:

- **Never raise engine speed above 3,600 rpm during the DTC Confirmation Procedure. If the engine speed limit is exceeded, retry the procedure from step 2.**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Hold engine speed at 2,000 rpm and check one of the following.
   - “HO2S1 (B1)” voltage should go above 0.70V at least once.
   - “HO2S1 (B1)” voltage should go below 0.21V at least once.

   If the check result is NG, perform EC-477, "Diagnostic Procedure" .
   If the check result is OK, perform the following step.
4. Let engine idle at least 5 minutes.
5. Maintain the following condition at least 50 consecutive seconds.



SEF682Y

B/FUEL SCHDL	2.75 msec or more
ENG SPEED	More than 1,600 rpm
Shift lever	Suitable position
VHCL SPEED SE	More than 70 km/h (43 MPH)

During this test, P0132 may be displayed on CONSULT-II screen.

6. If DTC is detected, go to EC-477, "Diagnostic Procedure" .

Overall Function Check

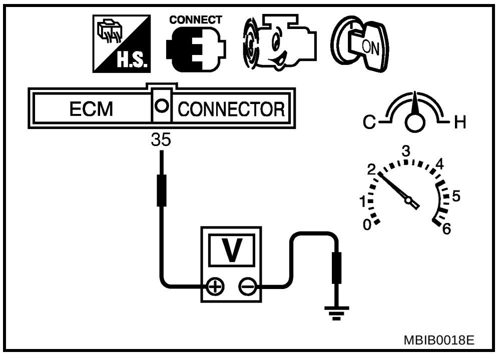
ABS00D7W

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed.

WITH GST

1. Start engine and warm it up to normal operating temperature.

2. Set voltmeter probes between ECM terminal 35 [HO2S1 (B1) signal] and ground.
3. Check the following with engine speed held at 2,000 rpm constant under no load.
   - The voltage should go above 0.70V at least once.
   - The voltage should go below 0.21V at least once.
4. If NG, go to EC-477, "Diagnostic Procedure" .



Diagnostic Procedure

ABS00D7X

Perform trouble diagnosis for DTC P0133, EC-234, "DTC P0133 HO2S1" .

DTC P1211 TCS CONTROL UNIT

PFP:47850

Description

ABS00D9A

The malfunction information related to TCS is transferred through the CAN communication line from VDC/TCS/ABS control unit (with VDC models) or “ABS actuator and electric unit (control unit)” (without VDC models) to ECM.

Be sure to erase the malfunction information such as DTC not only for VDC/TCS/ABS control unit (with VDC models) or “ABS actuator and electric unit (control unit)” (without VDC models) but also for ECM after TCS related repair.

On Board Diagnosis Logic

ABS00D9B

Freeze frame data is not stored in the ECM for this self-diagnosis.
The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1211 1211	TCS control unit	ECM receives a malfunction information from VDC/TCS/ABS control unit (with VDC models) or “ABS actuator and electric unit (control unit)” (without VDC models).	● VDC/TCS/ABS control unit (with VDC models) ● ABS actuator and electric unit (control unit) (without VDC models) ● TCS related parts

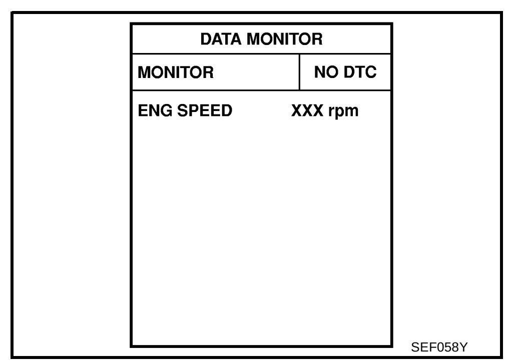
DTC Confirmation Procedure

ABS00D9C

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 60 seconds.
4. If 1st trip DTC is detected, go to EC-478, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00D9D

Go to BRC-9, "TROUBLE DIAGNOSIS" (without VDC models) or BRC-48, "TROUBLE DIAGNOSIS" (with VDC models).

DTC P1212 TCS COMMUNICATION LINE

PFP:47850

Description

ABS00D9E

NOTE:
If DTC P1212 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

This CAN communication line is used to control the smooth engine operation during the TCS operation. Pulse signals are exchanged between ECM and VDC/TCS/ABS control unit (with VDC models) or “ABS actuator and electric unit (control unit)” (without VDC models).

Be sure to erase the malfunction information such as DTC not only for VDC/TCS/ABS control unit (with VDC models) or “ABS actuator and electric unit (control unit)” (without VDC models) but also for ECM after TCS related repair.

On Board Diagnosis Logic

ABS00D9F

Freeze frame data is not stored in the ECM for this self-diagnosis.
The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1212 1212	TCS communication line	ECM can not receive the information from VDC/TCS/ABS control unit (with VDC models) or “ABS actuator and electric unit (control unit)” (without VDC models) continuously.	• Harness or connectors (The CAN communication line is open or shorted.) • VDC/TCS/ABS control unit (with VDC models) • ABS actuator and electric unit (control unit) (without VDC models) • Dead (Weak) battery

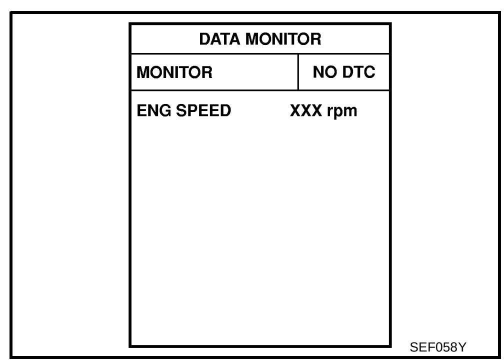
DTC Confirmation Procedure

ABS00D9G

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 10 seconds.
4. If a 1st trip DTC is detected, go to EC-479, "Diagnostic Procedure" .



SEF058Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00D9H

Go to BRC-9, "TROUBLE DIAGNOSIS" (without VDC models) or BRC-48, "TROUBLE DIAGNOSIS" (with VDC models).

DTC P1217 ENGINE OVER TEMPERATURE

PFP:00000

Description

ABS00CUE

SYSTEM DESCRIPTION

NOTE:
If DTC P1217 is displayed with DTC U1000 or U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to **EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE"** **.**

Cooling Fan Control

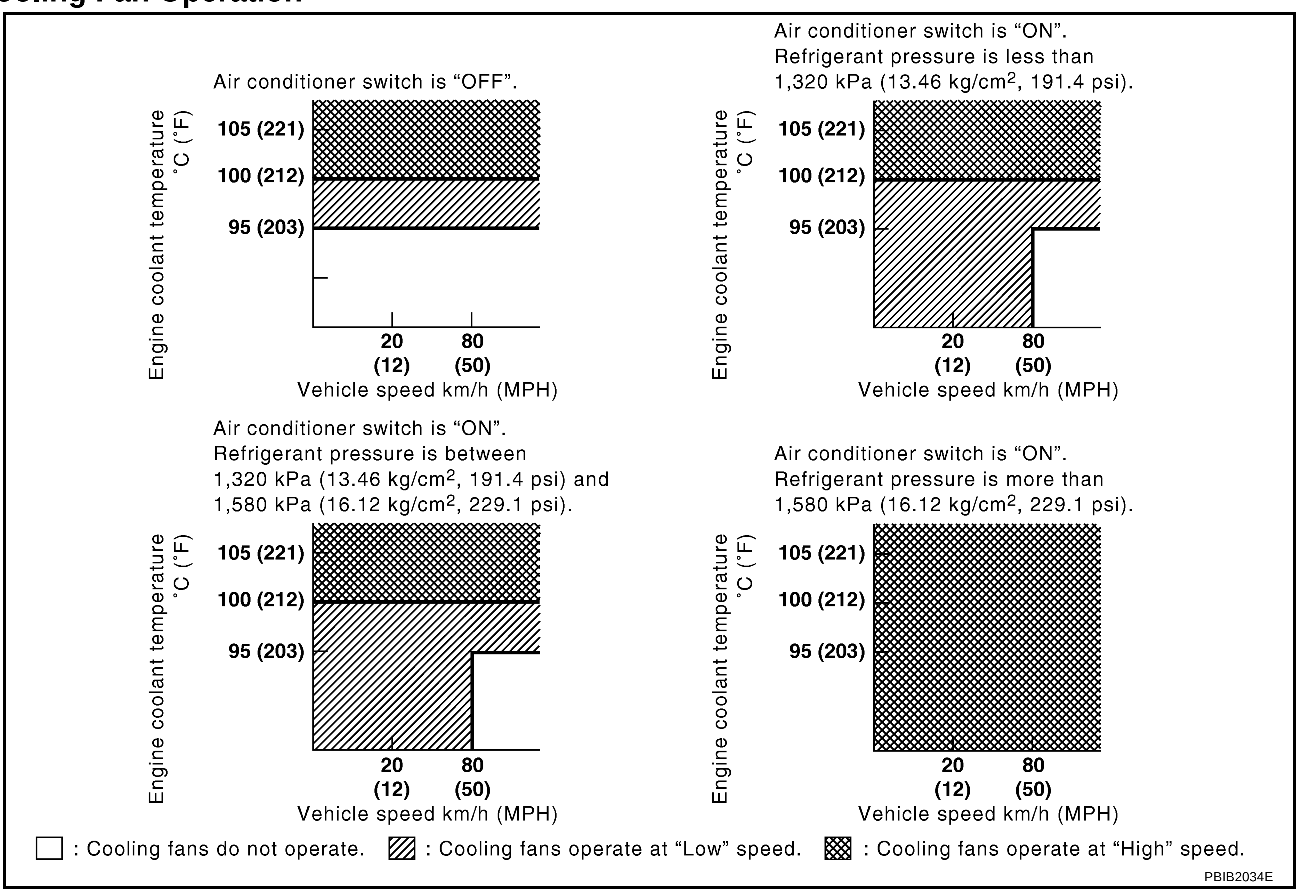
Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	Cooling fan control	Cooling fan relays
Battery	Battery voltage*1		
Wheel sensor	Vehicle speed*2		
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner ON signal		
Refrigerant pressure sensor	Refrigerant pressure		

*1: The ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to ECM through CAN communication line.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

Cooling Fan Operation



CONSULT-II Reference Value in Data Monitor Mode

ABS00CUF

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF	OFF
		Air conditioner switch: ON (Compressor operates.)	ON
COOLING FAN	● Engine: After warming up, idle the engine ● Air conditioner switch: OFF	Engine coolant temperature is 94°C (201°F) or less	OFF
		Engine coolant temperature is between 95°C (203°F) and 99°C (210°F)	LOW
		Engine coolant temperature is 100°C (212°F) or more	HIGH

On Board Diagnosis Logic

ABS00CUG

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise. When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1217 1217	Engine over temperature (Overheat)	● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. ● Engine coolant is not within the specified range.	● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan relays ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat For more information, refer to EC-492, "Main 12 Causes of Overheating" .

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to CO-8, "Changing Engine Coolant" . Also, replace the engine oil. Refer to LU-7, "Changing Engine Oil" .

1. **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-12, "Anti-Freeze Coolant Mixture Ratio" .**
2. **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

Overall Function Check

ABS00CUH

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

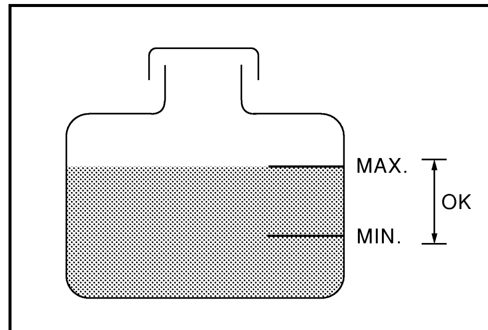
WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

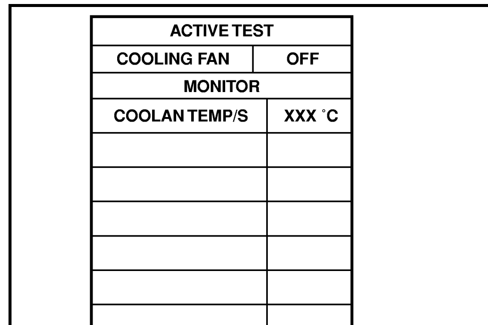
WITH CONSULT-II

1. Check the coolant level in the reservoir tank and radiator.
   NOTE:
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-485, "Diagnostic Procedure"
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-485, "Diagnostic Procedure" .
3. Turn ignition switch ON.



SEF621W

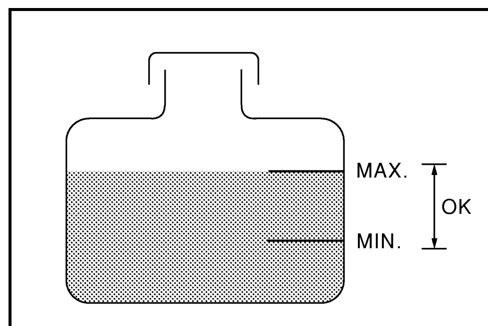
4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
5. If the results are NG, go to EC-485, "Diagnostic Procedure" .



SEF646X

WITH GST

1. Check the coolant level in the reservoir tank and radiator.
   NOTE:
   Allow engine to cool before checking coolant level.
   If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to EC-485, "Diagnostic Procedure" .
2. Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to EC-485, "Diagnostic Procedure" .
3. Start engine.
   CAUTION:
   Be careful not to overheat engine.
4. Turn air conditioner switch ON.
5. Turn blower fan switch ON.
6. Make sure that cooling fans operates at low speed.
   If NG, go to EC-485, "Diagnostic Procedure" .
   If OK, go to the following step.
7. Turn ignition switch OFF.
8. Turn air conditioner switch and blower fan switch OFF.
9. Disconnect engine coolant temperature sensor harness connector.
10. Connect 150Ω resistor to engine coolant temperature sensor harness connector.



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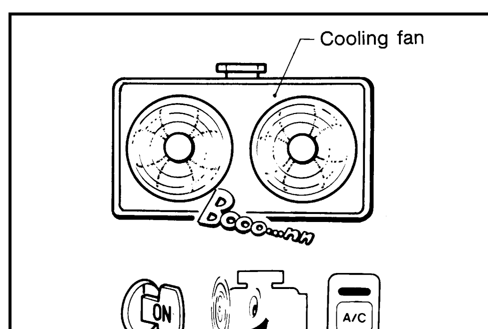
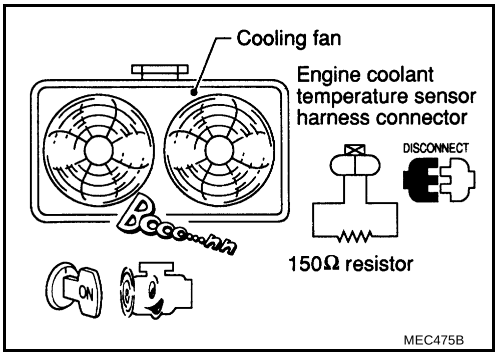


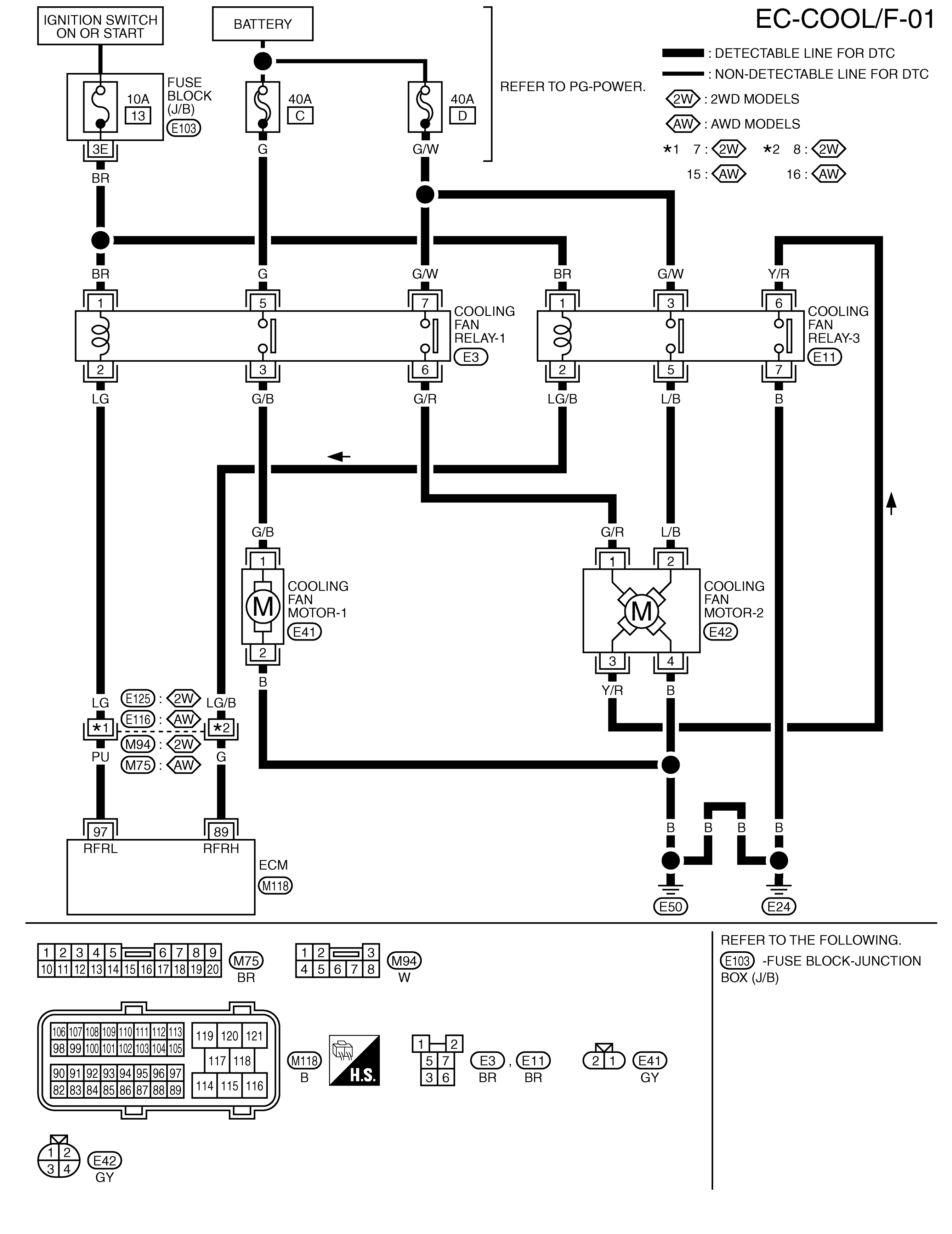
SEC163BA

11. Restart engine and make sure that cooling fan operates at higher speed than low speed.
    CAUTION:
    Be careful not to overheat engine.
12. If NG, go to EC-485, "Diagnostic Procedure" .



Wiring Diagram

ABS00CUI



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
89	G	Cooling fan relay (High)	**[Engine is running]** ● Cooling fan: Not operating	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Cooling fan: High speed operating	0 - 1.0V
97	PU	Cooling fan relay (Low)	**[Engine is running]** ● cooling fan: Not operating	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Cooling fan: Low speed operating	0 - 1.0V

Diagnostic Procedure

ABS00D8Q

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

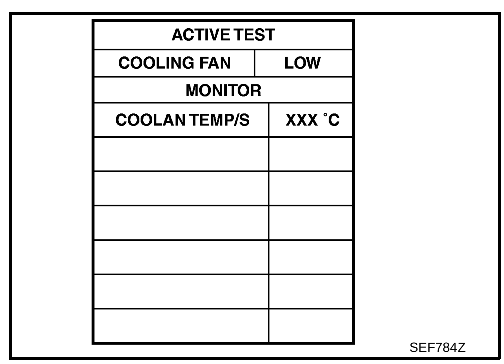
Yes >> GO TO 2.

No >> GO TO 4.

2. CHECK COOLING FAN LOW SPEED OPERATION

With CONSULT-II

1. Turn ignition switch ON.
2. Perform “COOLING FAN” in “ACTIVE TEST” mode with CONSULT-II and touch “LOW” on the CONSULT-II screen.
3. Make sure that cooling fans-1 and -2 operates at low speed.



SEF784Z

OK or NG

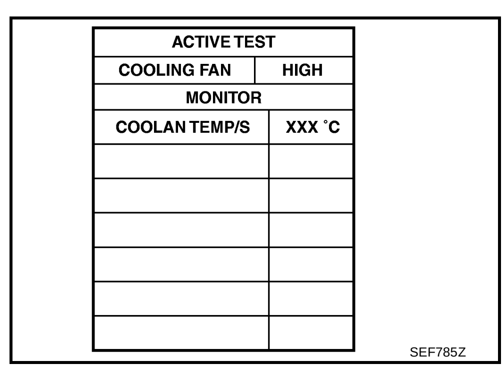
OK >> GO TO 3.

NG >> Check cooling fan low speed control circuit. (Go to EC-489, "PROCEDURE A" .)

3. CHECK COOLING FAN HIGH SPEED OPERATION

With CONSULT-II

1. Touch “HI” on the CONSULT-II screen.
2. Make sure that cooling fans-1 and -2 operates at higher speed than low speed.



SEF785Z

OK or NG

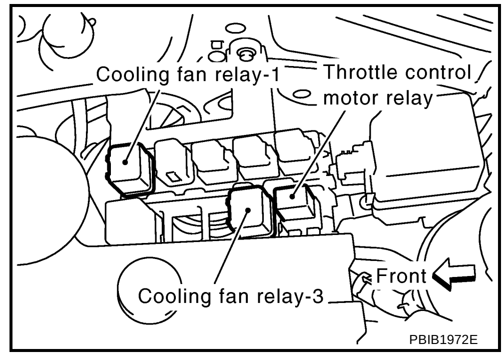
OK >> GO TO 6.

NG >> Check cooling fan high speed control circuit. (Go to EC-491, "PROCEDURE B" .)

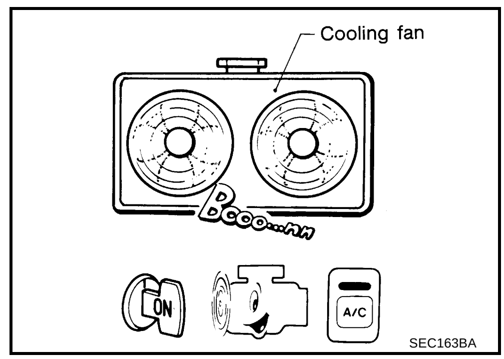
4. CHECK COOLING FAN LOW SPEED OPERATION

Without CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-3.
3. Start engine and let it idle.
4. Turn air conditioner switch ON.
5. Turn blower fan switch ON.



6. Make sure that cooling fans-1 and -2 operates at low speed.



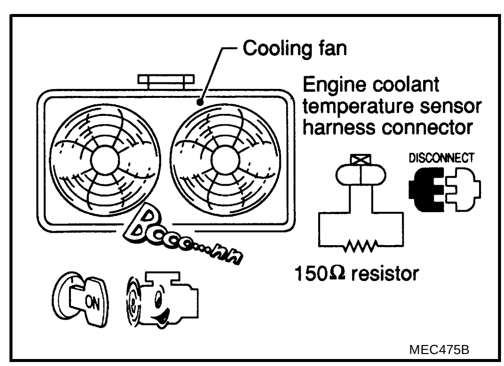
OK or NG

OK >> GO TO 5.
NG >> Check cooling fan low speed control circuit. (Go to EC-489, "PROCEDURE A" .)

5. CHECK COOLING FAN HIGH SPEED OPERATION

Without CONSULT-II

1. Turn air conditioner switch and blower fan switch OFF.
2. Stop engine and turn ignition switch OFF.
3. Reconnect cooling fan relay-3.
4. Disconnect engine coolant temperature sensor harness connector.
5. Connect 150Ω resistor to engine coolant temperature sensor harness connector.
6. Restart engine and make sure that cooling fans-1 and -2 operates at higher speed than low speed.



OK or NG

OK >> GO TO 6.
NG >> Check cooling fan high speed control circuit. (Go to EC-491, "PROCEDURE B" .)

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6. CHECK COOLING SYSTEM FOR LEAK

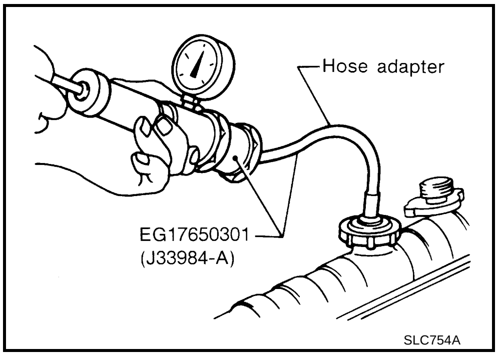
Apply pressure to the cooling system with a tester, and check if the pressure drops.

Testing pressure: 157 kPa (1.57 bar, 1.6 kg/cm^2 , 23psi)

CAUTION:

Higher than the specified pressure may cause radiator damage.

Pressure should not drop.



OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

7. DETECT MALFUNCTIONING PART

Check the following for leak.

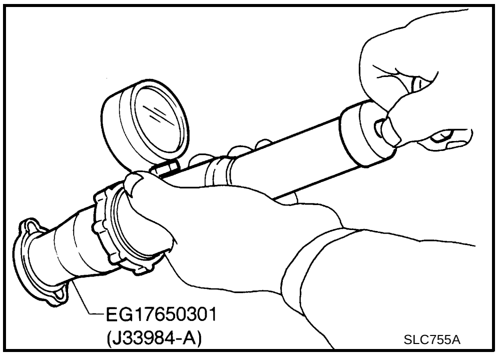
- Hose
- Radiator
- Water pump (Refer toCO-20, "WATER PUMP" .)

>> Repair or replace.

8. CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.

Radiator cap relief pressure: 59 - 98 kPa (0.59 - 0.98 bar, 0.6 - 1.0 kg/cm^2 , 9 - 14 psi)

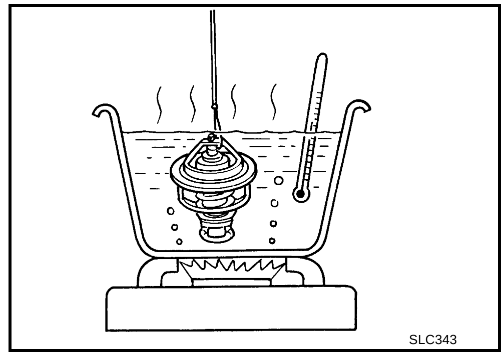


OK or NG

OK >> GO TO 11.
NG >> Replace radiator cap.

9. CHECK THERMOSTAT

1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
   It should seat tightly.
3. Check valve opening temperature and valve lift.



Valve opening temperature:	**82 °C (180 °F) [standard]**
Valve lift:	**More than 8 mm/95 °C (0.31 in/203 °F)**

4. Check if valve is closed at 5°C (9°F) below valve opening temperature.
   For details, refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .

OK or NG

OK >> GO TO 12.
NG >> Replace thermostat.

10. CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to EC-210, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace engine coolant temperature sensor.

11. CHECK MAIN 12 CAUSES

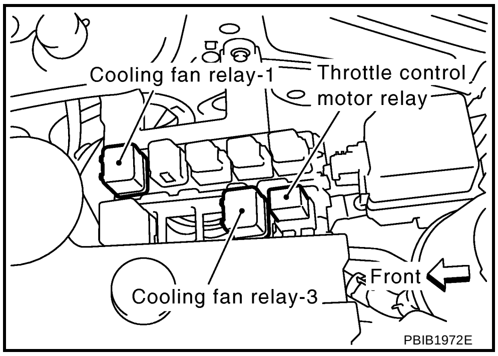
If the cause cannot be isolated, go to EC-492, "Main 12 Causes of Overheating" .

>> **INSPECTION END**

PROCEDURE A

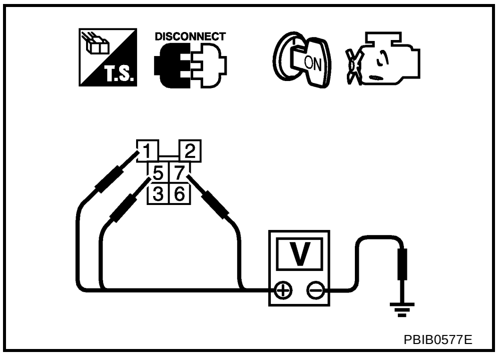
1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-1.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relay-1 terminals 1, 5, 7 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

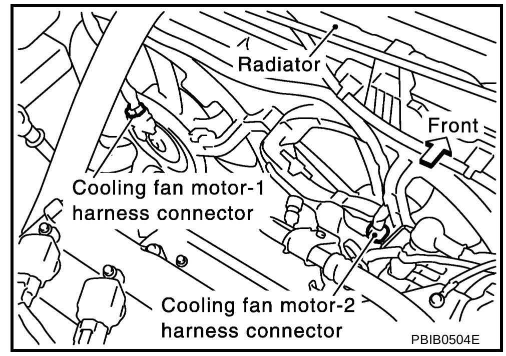
Check the following.

- Fuse block (J/B) connector E103
- 10A fuse
- 40A fusible links
- Harness for open or short between cooling fan relay-1 and fuse
- Harness for open or short between cooling fan relay-1 and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN MOTORS CONTROL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between the following;
cooling fan relay-1 terminal 3 and cooling fan motor-1 terminal 1,
cooling fan motor-1 terminal 2 and ground.



Continuity should exist.

4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following;
cooling fan relay-1 terminal 6 and cooling fan motor-2 terminal 1,
cooling fan motor-2 terminal 4 and ground.

Continuity should exist.

6. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK COOLING FAN MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between cooling fan relay-1 terminal 2 and ECM terminal 97.
Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E125, M94 (2WD models)
- Harness connectors E116, M75 (AWD models)
- Harness for open or short between cooling fan relay-1 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK COOLING FAN RELAY-1

Refer to EC-493, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace cooling fan relay.

7. CHECK COOLING FAN MOTORS-1 AND -2

Refer to EC-493, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace cooling fan motors.

8. CHECK INTERMITTENT INCIDENT

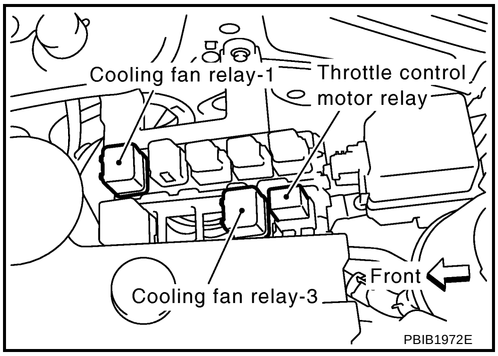
Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

PROCEDURE B

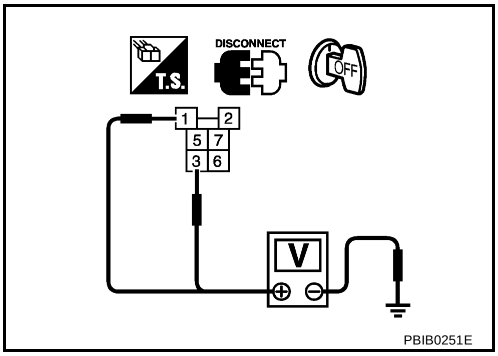
1. CHECK COOLING FAN POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect cooling fan relay-3.
3. Turn ignition switch ON.



4. Check voltage between cooling fan relay-3 terminals 1, 3 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between cooling fan relay-3 and fuse
- Harness for open or short between cooling fan relay-3 and battery

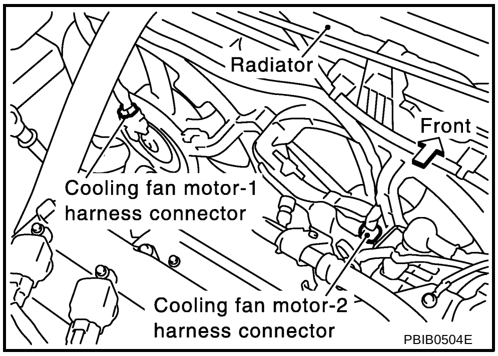
>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK COOLING FAN MOTORS CONTROL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect cooling fan motor-2 harness connector.
3. Check harness continuity between the following;
cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2,
cooling fan motor-2 terminal 3 and cooling fan relay-3 terminal 6,
cooling fan relay-3 terminal 7 and ground.

Continuity should exist.

4. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK COOLING FAN MOTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between cooling fan relay-3 terminal 2 and ECM terminal 89.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E125, M94 (2WD models)
- Harness connectors E116, M75 (AWD models)
- Harness for open or short between cooling fan relay-3 and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK COOLING FAN RELAY-3

Refer to EC-493, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> Replace cooling fan relay.

7. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Main 12 Causes of Overheating

ABS00CUK

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	Refer to MA-12, "Anti-Freeze Coolant Mixture Ratio" .
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	Refer to CO-8, "Changing Engine Coolant" .
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm^2 , 9 - 14 psi) (Limit)	Refer to CO-12, "Checking Radiator Cap" .
ON*2	5	● Coolant leaks	● Visual	No leaks	Refer to CO-8, "CHECKING LEAKAGE" .
ON*2	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" , and CO-11, "RADIATOR" .

Engine	Step	Inspection item	Equipment	Standard	Reference page
ON*1	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P1217 (EC-480, "DTC P1217 ENGINE OVER TEMPERATURE").
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON*3	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	Refer to CO-8, "Changing Engine Coolant" .
OFF*4	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	Refer to CO-8, "CHECKING ENGINE COOLANT LEVEL" .
OFF	11	● Cylinder head	● Straight gauge feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	Refer to EM-62, "CYLINDER HEAD" .
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	Refer to EM-82, "CYLINDER BLOCK" .

*1: Turn the ignition switch ON.
*2: Engine running at 3,000 rpm for 10 minutes.
*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.
*4: After 60 minutes of cool down time.
For more information, refer to CO-4, "OVERHEATING CAUSE ANALYSIS" .

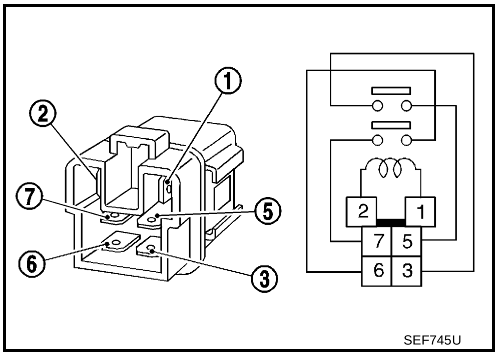
Component Inspection

ABS00DAX

COOLING FAN RELAYS-1 AND -3

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

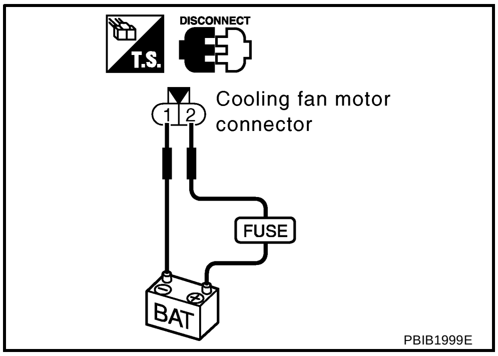


SEF745U

COOLING FAN MOTOR-1

1. Disconnect cooling fan motor harness connector.
2. Supply cooling fan motor terminals with battery voltage and check operation.

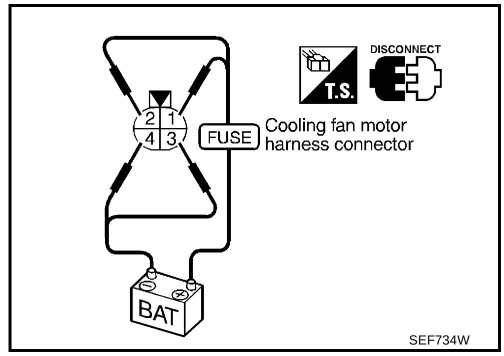
	Terminals	
	(+)	(-)
Cooling fan motor	1	2



PBIB1999E

COOLING FAN MOTOR-2

1. Disconnect cooling fan motor harness connector.
2. Supply cooling fan motor terminals with battery voltage and check operation.



	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

DTC P1225 TP SENSOR

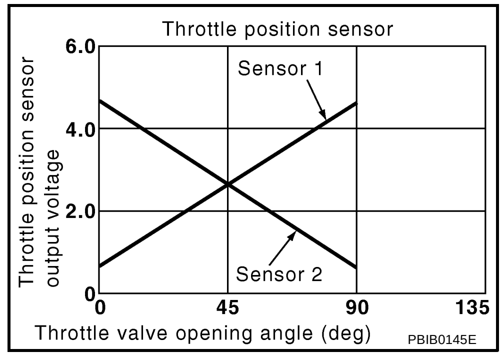
PFP:16119

Component Description

ABS00CUM

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.

The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



PBIB0145E

On Board Diagnosis Logic

ABS00CUN

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1225 1225	Closed throttle position learning performance problem	Closed throttle position learning value is excessively low.	• Electric throttle control actuator (TP sensor 1 and 2)

DTC Confirmation Procedure

ABS00CUO

NOTE:

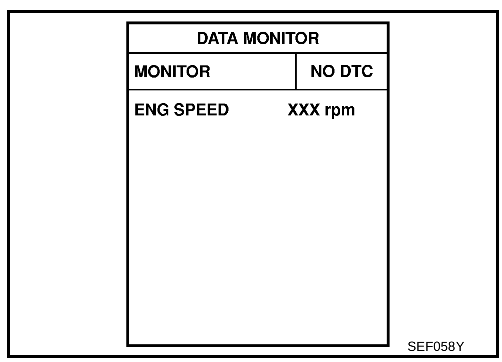
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Turn ignition switch ON.
5. If 1st trip DTC is detected, go to EC-496, "Diagnostic Procedure" .



SEF058Y

WITH GST

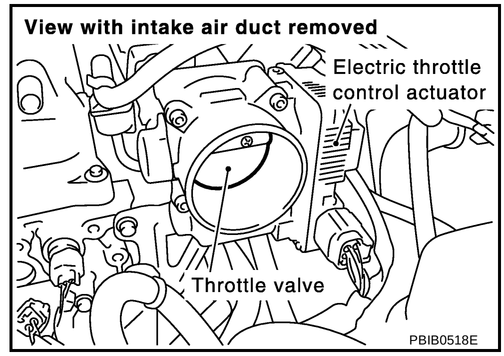
Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CUP

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 2.

NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

Remove and Installation

ABS00CUQ

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "INTAKE MANIFOLD" .

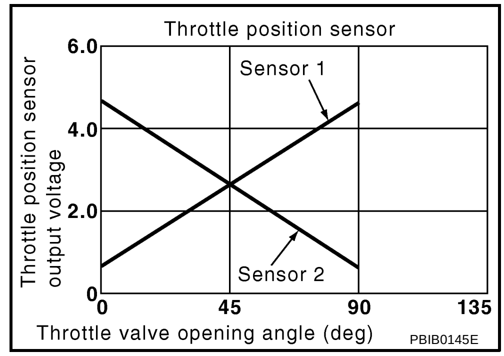
DTC P1226 TP SENSOR

PFP:16119

Component Description

ABS00CUR

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



On Board Diagnosis Logic

ABS00CUS

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1226 1226	Closed throttle position learning performance problem	Closed throttle position learning is not performed successfully, repeatedly.	● Electric throttle control actuator (TP sensor 1 and 2)

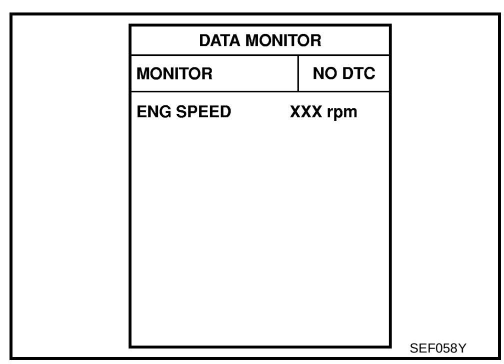
DTC Confirmation Procedure

ABS00CUT

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Turn ignition switch OFF, wait at least 10 seconds.
4. Turn ignition switch ON.
5. Repeat steps 3 and 4 for 32 times.
6. If 1st trip DTC is detected, go to EC-498, "Diagnostic Procude" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

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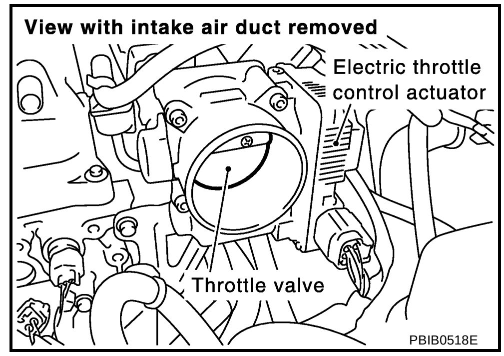
Diagnostic Procedure

ABS00CUU

1. CHECK ELECTRIC THROTTLE CONTROL ACTUATOR VISUALLY

1. Turn ignition switch OFF.
2. Remove the intake air duct.
3. Check if foreign matter is caught between the throttle valve and the housing.



OK or NG

OK >> GO TO 2.

NG >> Remove the foreign matter and clean the electric throttle control actuator inside.

2. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

Remove and Installation

ABS00CUV

ELECTRIC THROTTLE CONTROL ACTUATOR

Refer to EM-16, "INTAKE MANIFOLD" .

DTC P1229 SENSOR POWER SUPPLY

PFP:16119

On Board Diagnosis Logic

ABS00CUW

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1229 1229	Sensor power supply circuit short	ECM detects a voltage of power source for sensor is excessively low or high.	● Harness or connectors (The APP sensor 1 circuit is shorted.) (The PSP sensor circuit is shorted.) (The refrigerant pressure sensor circuit is shorted.) (The EVAP control system pressure sensor circuit is shorted.) ● Accelerator pedal position sensor (APP sensor 1) ● Power steering pressure sensor ● Refrigerant pressure sensor ● EVAP control system pressure sensor

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
ECM stops the electric throttle control actuator control, throttle valve is maintained at a fixed opening (approx. 5 degrees) by the return spring.

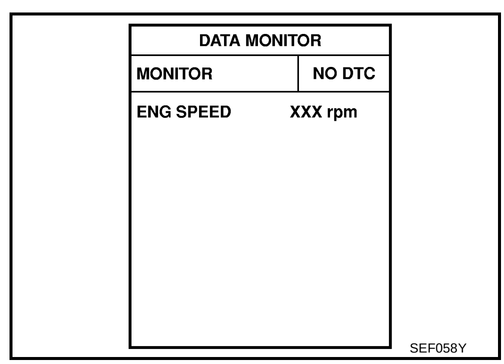
DTC Confirmation Procedure

ABS00CUX

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-501, "Diagnostic Procedure" .



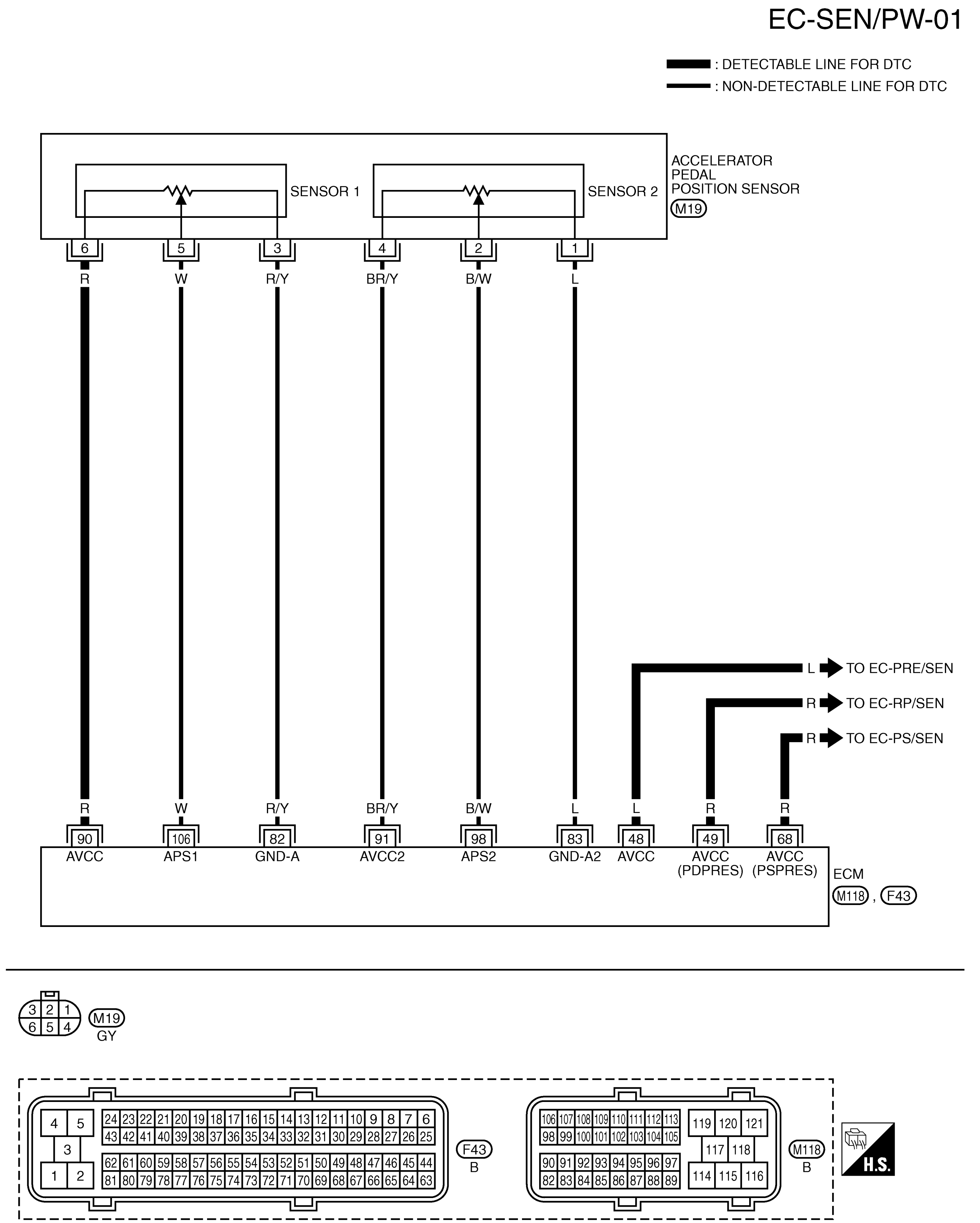
SEF058Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CUY



TBWB0129E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

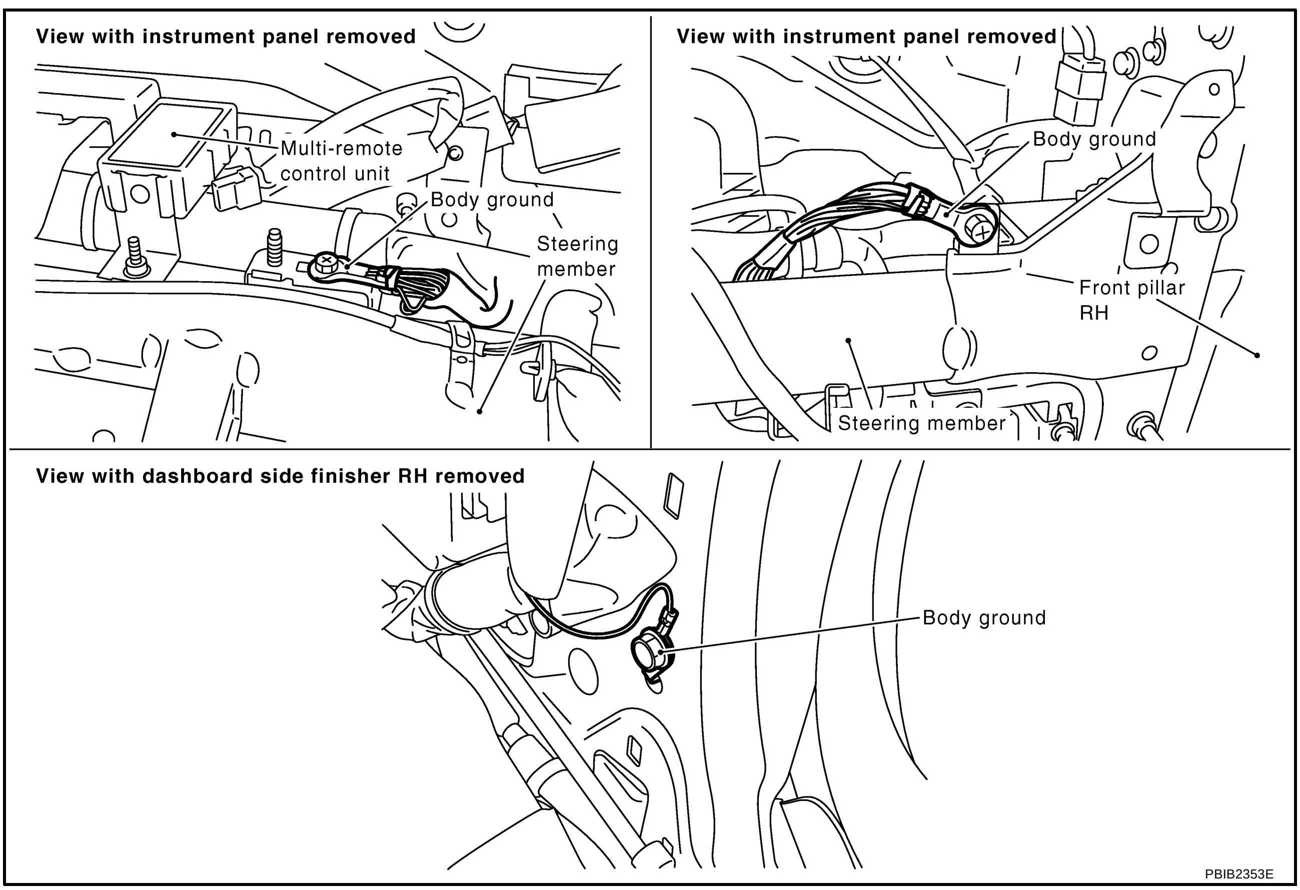
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
48	L	Sensor power supply (EVAP control system pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
49	R	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
68	R	Sensor power supply (Power steering pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	**[Ignition switch: ON]**	Approximately 5V

Diagnostic Procedure

ABS00CUZ

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to EC-162, "Ground Inspection" .

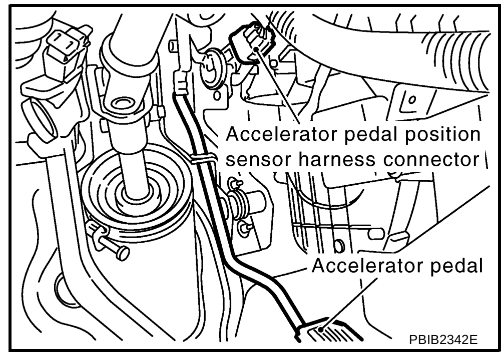


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

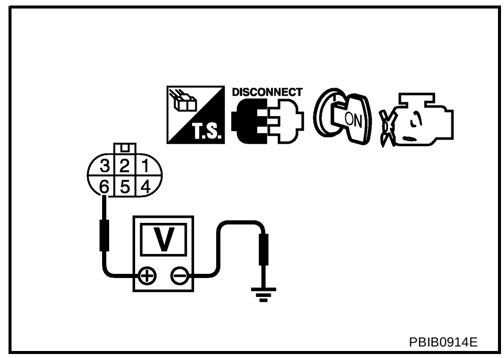
2. CHECK ACCELERATOR PEDAL POSITION SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 2 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 5.
NG >> GO TO 3.

3. CHECK SENSOR POWER SUPPLY CIRCUITS

Check the following.

- Harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
48	EVAP control system pressure sensor terminal 3	EC-367
49	Refrigerant pressure sensor terminal 3	EC-620
68	PSP sensor terminal 3	EC-412
90	APP sensor terminal 6	EC-557

OK or NG

OK >> GO TO 4.
NG >> Repair short to ground or short to power in harness or connectors.

4. CHECK COMPONENTS

Check the following.

- Refrigerant pressure sensor (Refer to ATC-77, "COMPONENT INSPECTION" (with auto A/C models), MTC-52, "ELECTRICAL COMPONENT INSPECTION" (with manual A/C models).)
- Power steering pressure sensor (Refer to EC-415, "Component Inspection" .)
- EVAP control system pressure sensor (Refer to EC-364, "Component Inspection" .)

OK or NG

OK >> GO TO 7.
NG >> Replace malfunctioning component.

5. CHECK APP SENSOR

Refer to EC-561 .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

PFP:14920

Description

ABS00CWE

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*1	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Battery	Battery voltage*1		
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Accelerator pedal position		
Heated oxygen sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Wheel sensor	Vehicle speed*2		

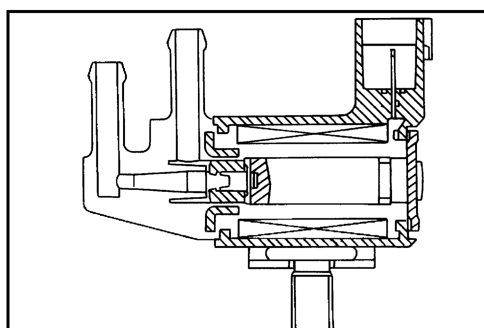
*1: ECM determines the start signal status by the signals of engine speed and battery voltage.

*2: This signal is sent to the ECM though CAN communication line.

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.



SEF337U

CONSULT-II Reference Value in Data Monitor Mode

ABS00CWF

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Shift lever: P or N (A/T), Neutral (M/T) ● Air conditioner switch: OFF ● No load	Idle	0%
		2,000 rpm	20 - 30%

On Board Diagnosis Logic

ABS00CWG

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1444 1444	EVAP canister purge volume control solenoid valve	The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed.	● EVAP control system pressure sensor ● EVAP canister purge volume control solenoid valve (The valve is stuck open.) ● EVAP canister vent control valve ● EVAP canister ● Hoses (Hoses are connected incorrectly or clogged.)

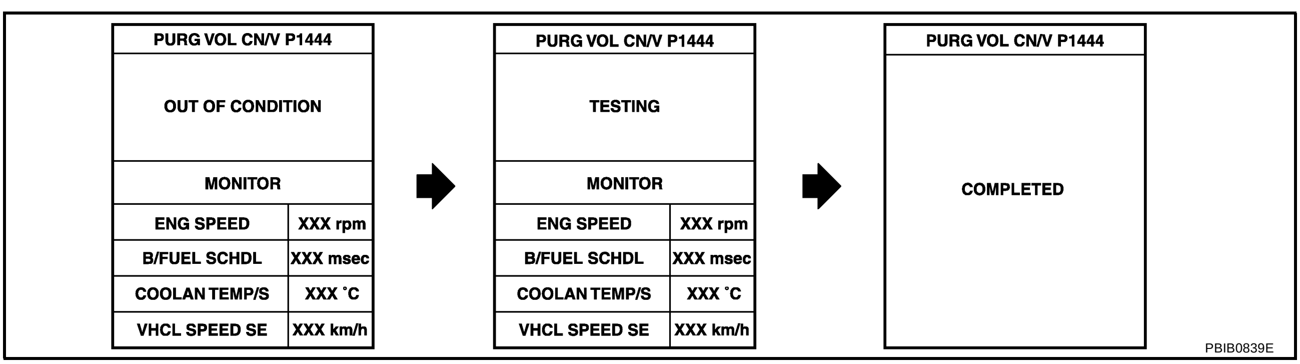
DTC Confirmation Procedure

ABS00CWH

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON.
4. Select “PURG VOL CN/V P1444” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
5. Touch “START”.



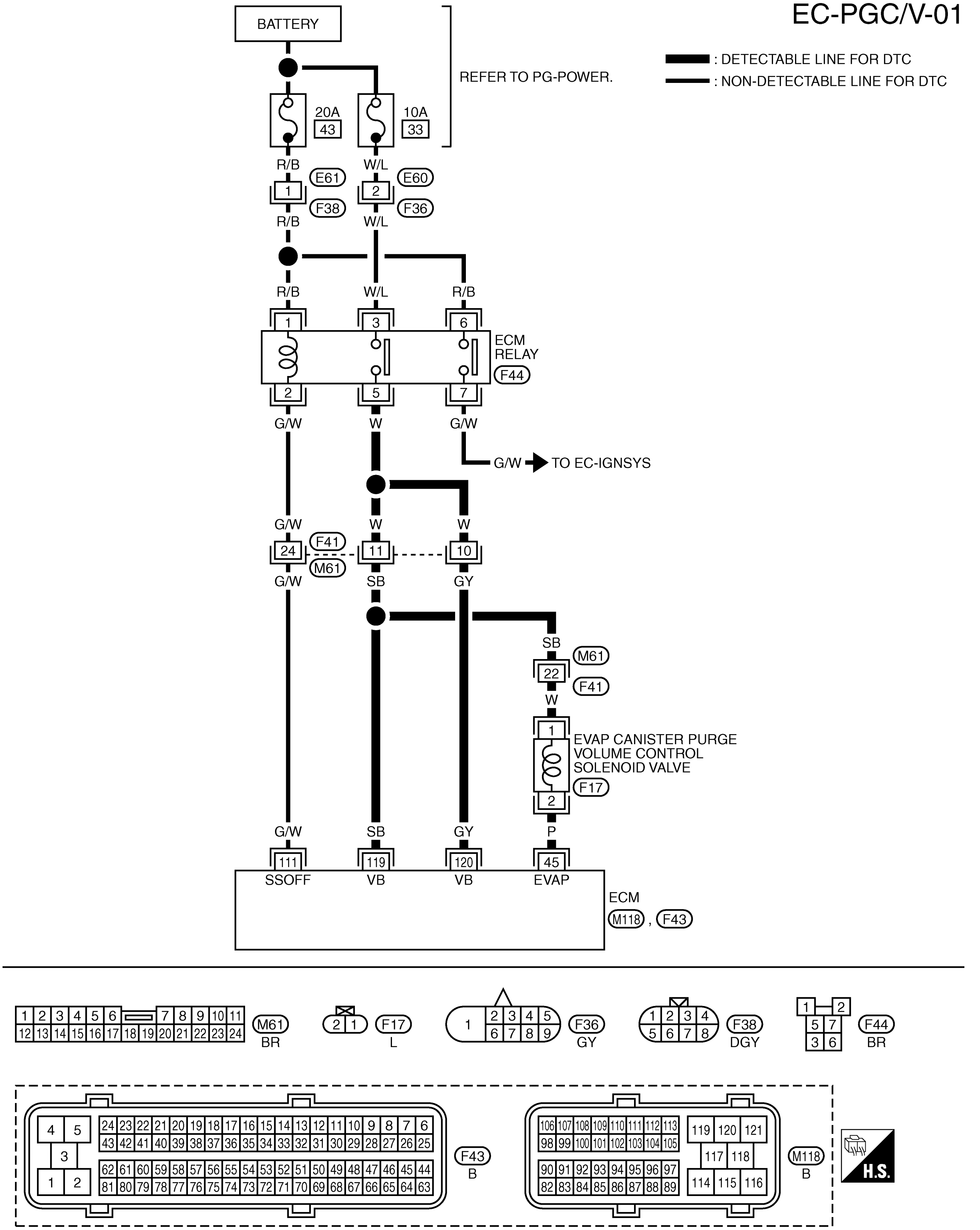
6. Start engine and let it idle until “TESTING” on CONSULT-II changes to “COMPLETED”.
(It will take approximately 10 seconds.)
If “TESTING” is not displayed after 5 minutes, retry from step 2.
7. Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to EC-508, "Diagnostic Procedure" .

WITH GST

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Start engine and let it idle for at least 20 seconds.
4. Select “Service 07” with GST.
5. If 1st trip DTC is detected, go to EC-508, "Diagnostic Procedure" .

Wiring Diagram

ABS00CWI

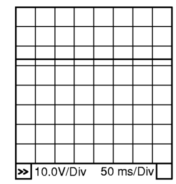
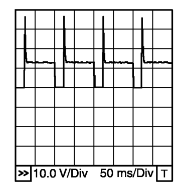


TBWB0123E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
45	P	EVAP canister purge volume control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)★  PBIB0050E
			[Engine is running] ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine)	Approximately 10V★  PBIB0520E
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

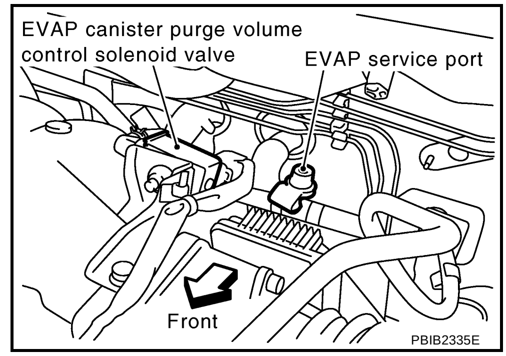
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00CWJ

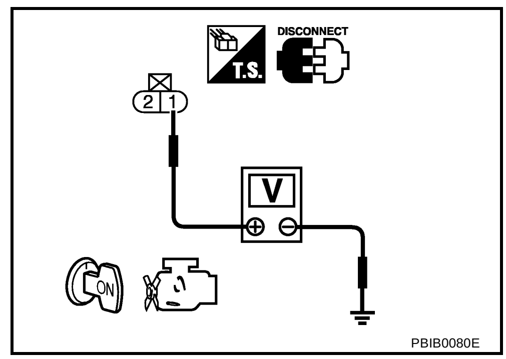
1. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect EVAP canister purge volume control solenoid valve harness connector.
3. Turn ignition switch ON.



4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M61, F41
- Harness for open or short between EVAP canister purge volume control solenoid valve and ECM relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 45 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

A EC C D E F G H I J K L M

4. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 5.
NG >> Replace EVAP control system pressure sensor.

5. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-371, "Component Inspection" .

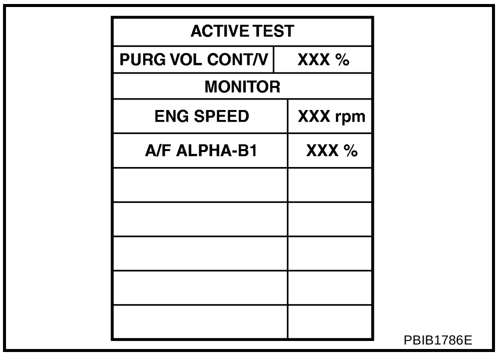
OK or NG

OK (With CONSULT-II)>>GO TO 6.
OK (Without CONSULT-II)>>GO TO 7.
NG >> Replace EVAP control system pressure sensor.

6. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Start engine.
4. Perform “PURG VOL CONT/V” in “ACTIVE TEST” mode with CONSULT-II. Check that engine speed varies according to the valve opening.



OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EC-353, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP canister purge volume control solenoid valve.

8. CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.
2. Check the rubber tube for clogging.

OK or NG

OK >> GO TO 9.
NG >> Clean the rubber tube using an air blower.

9. CHECK EVAP CANISTER VENT CONTROL VALVE

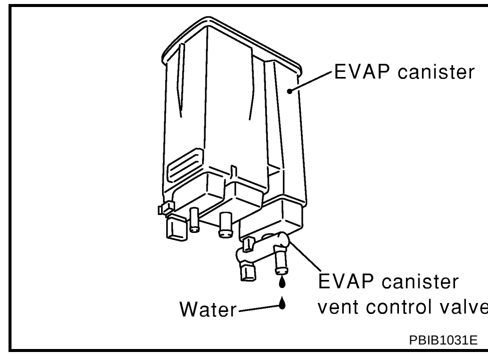
Refer to EC-360, "Component Inspection" .

OK or NG

OK >> GO TO 10.
NG >> Replace EVAP canister vent control valve.

10. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure attached.
2. Check if water will drain from the EVAP canister.



YES or NO

YES >> GO TO 11.
NO >> GO TO 13.

11. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure attached.

The weight should be less than 2.5 kg (5.5 lb).

OK or NG

OK >> GO TO 13.
NG >> GO TO 12.

12. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

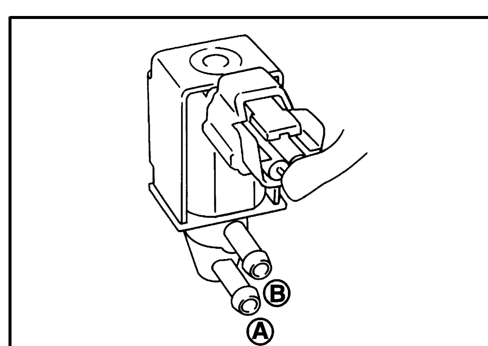
ABS00CWK

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

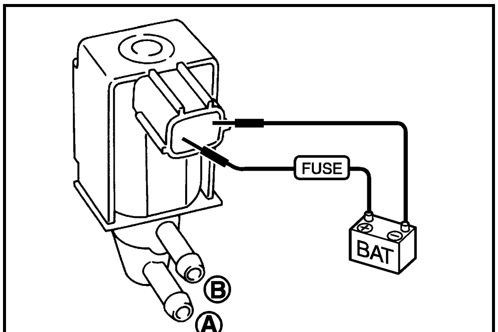
Condition (PURG VOL CONT/V value)	Air passage continuity between A and B
100%	Yes
0%	No



Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No



PBIB0150E

Removal and Installation

ABS00CWL

EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

Refer to EM-16, "INTAKE MANIFOLD"

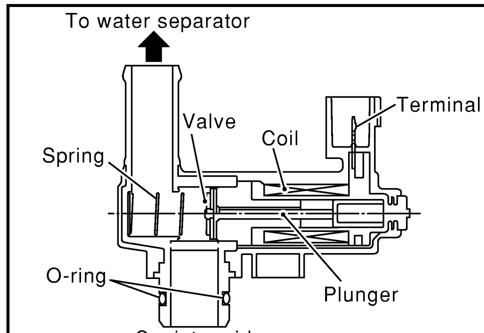
DTC P1446 EVAP CANISTER VENT CONTROL VALVE

PFP:14935

Component Description

ABS00CWM

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.
This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.
This solenoid valve is used only for diagnosis, and usually remains opened.
When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows “EVAP Control System” diagnoses.



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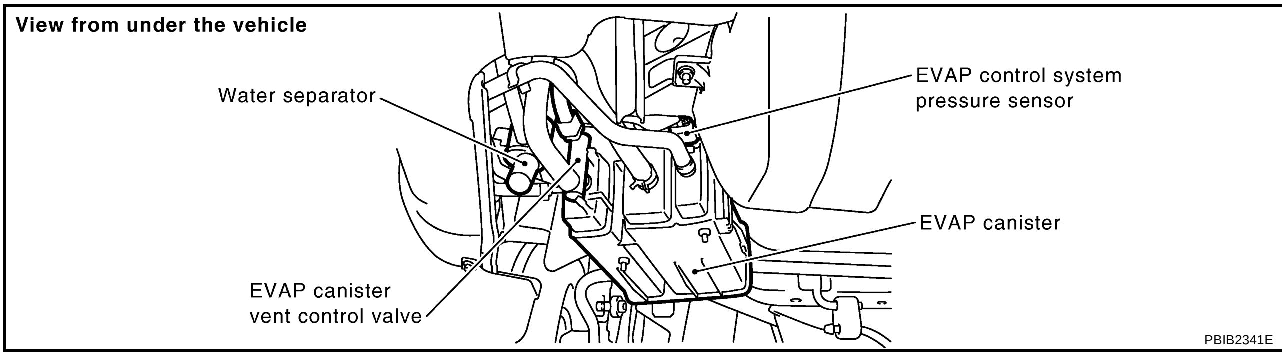


PBIB2341E

CONSULT-II Reference Value in Data Monitor Mode

ABS00CWN

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

ABS00CWO

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1446 1446	EVAP canister vent control valve close	EVAP canister vent control valve remains closed under specified driving conditions.	● EVAP canister vent control valve ● EVAP control system pressure sensor and the circuit ● Blocked rubber tube to EVAP canister vent control valve ● Water separator ● EVAP canister is saturated with water

DTC Confirmation Procedure

ABS00CWP

CAUTION:

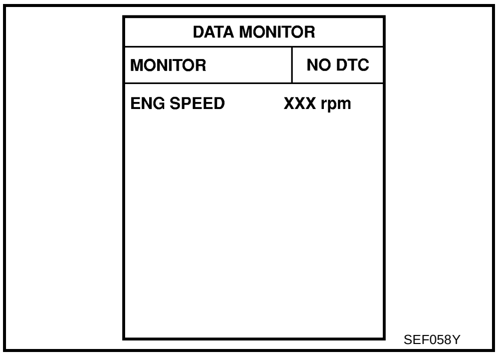
Always drive vehicle at a safe speed.

NOTE:

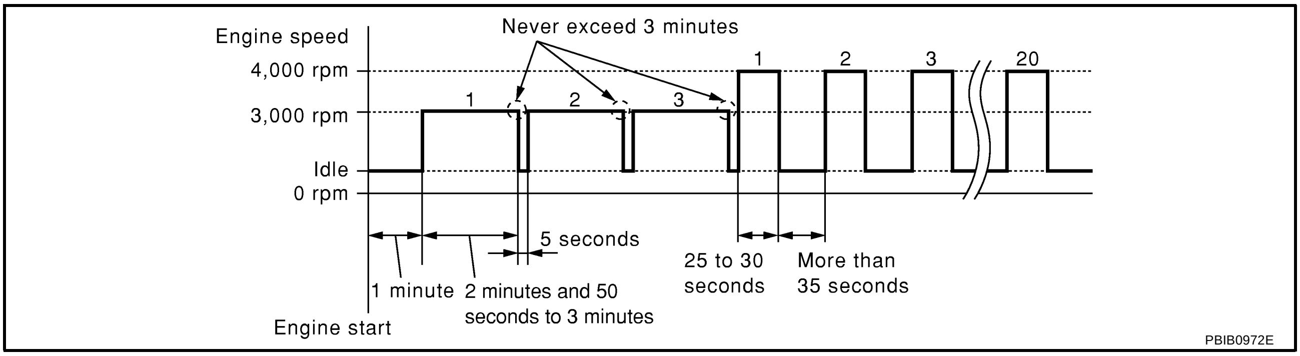
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON and wait at least 5 seconds.
2. Turn ignition switch OFF and wait at least 10 seconds.
3. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-II.



4. Start engine and let it idle for at least 1 minute.
5. Repeat next procedures 3 times.
   a. Increase the engine speed up to 3,000 to 3,500 rpm and keep it for 2 minutes and 50 seconds to 3 minutes.
   Never exceed 3 minutes.
   b. Fully released accelerator pedal and keep engine idle for about 5 seconds.
6. If 1st trip DTC is detected, go to EC-515, "Diagnostic Procedure" .
   If 1st trip DTC is not detected, go to the next step.
7. Repeat next procedure 20 times.
   a. Quickly increase the engine speed up to 4,000 to 4,500 rpm or more and keep it for 25 to 30 seconds.
   b. Fully released accelerator pedal and keep engine idle for at least 35 seconds.



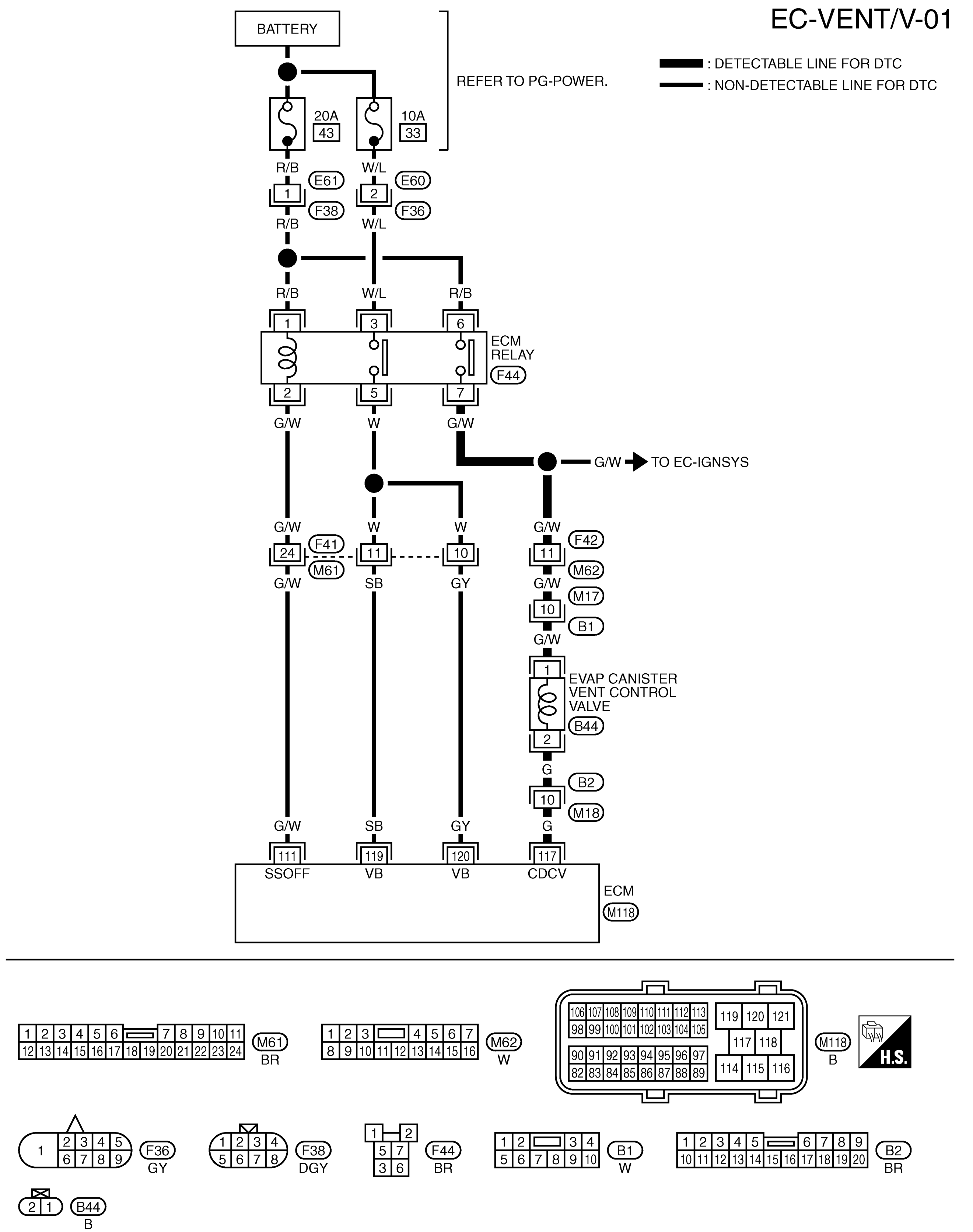
8. If 1st trip DTC is detected, go to EC-515, "Diagnostic Procedure" .

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CWQ



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Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

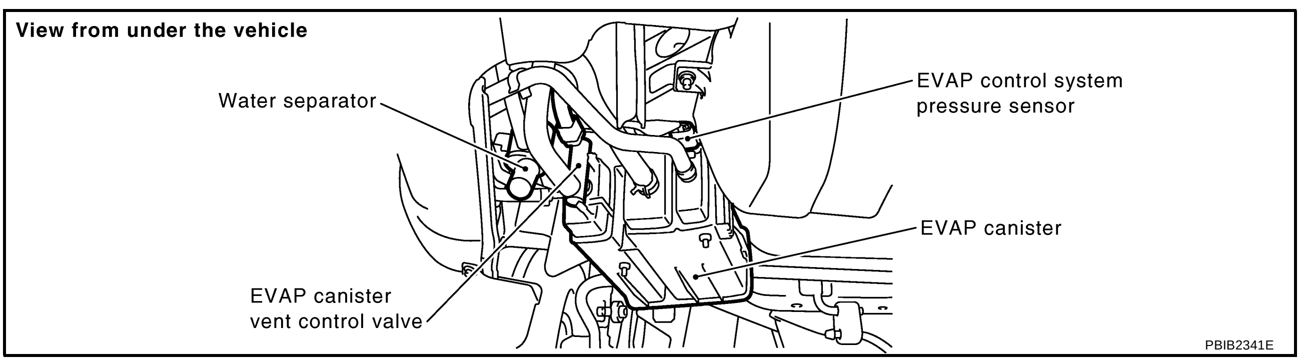
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
117	G	EVAP canister vent control valve	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00CWR

1. CHECK RUBBER TUBE

1. Turn ignition switch OFF.
2. Disconnect rubber tube connected to EVAP canister vent control valve.
3. Check the rubber tube for clogging.



OK or NG

OK >> GO TO 2.
NG >> Clean rubber tube using an air blower.

2. CHECK WATER SEPARATOR

Refer to EC-517, "Component Inspection" .

OK or NG

OK >> GO TO 3.
NG >> Replace water separator.

3. CHECK EVAP CANISTER VENT CONTROL VALVE

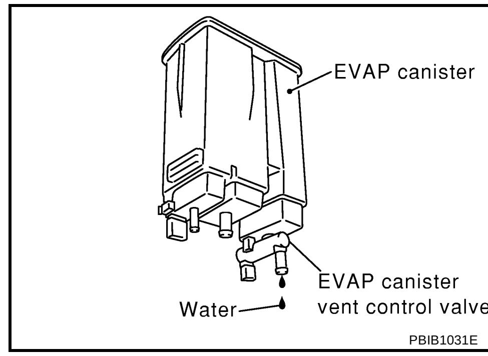
Refer to EC-517, "EVAP CANISTER VENT CONTROL VALVE" .

OK or NG

OK >> GO TO 4.
NG >> Replace EVAP canister vent control valve.

4. CHECK IF EVAP CANISTER SATURATED WITH WATER

1. Remove EVAP canister with EVAP canister vent control valve and EVAP control system pressure sensor attached.
2. Check if water will drain from the EVAP canister.



Yes or No

Yes >> GO TO 5.
No >> GO TO 7.

5. CHECK EVAP CANISTER

Weigh the EVAP canister with the EVAP canister vent control valve and EVAP control system pressure sensor attached.

The weight should be less than 2.5 kg (5.5 lb).

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- EVAP canister for damage
- EVAP hose between EVAP canister and water separator for clogging or poor connection

>> Repair hose or replace EVAP canister.

7. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR

1. Disconnect EVAP control system pressure sensor harness connector.
2. Check connectors for water.

Water should not exist.

OK or NG

OK >> GO TO 8.
NG >> Replace EVAP control system pressure sensor.

8. CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

Refer to EC-379, "Component Inspection" .

OK or NG

OK >> GO TO 9.
NG >> Replace EVAP control system pressure sensor.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

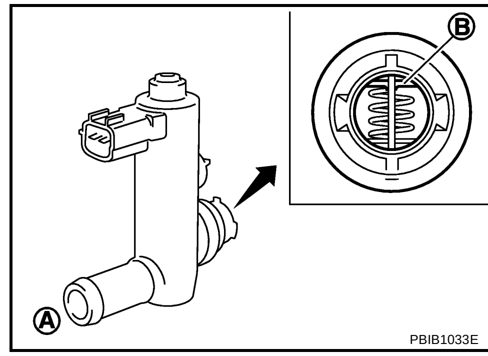
Component Inspection

ABS00CWS

EVAP CANISTER VENT CONTROL VALVE

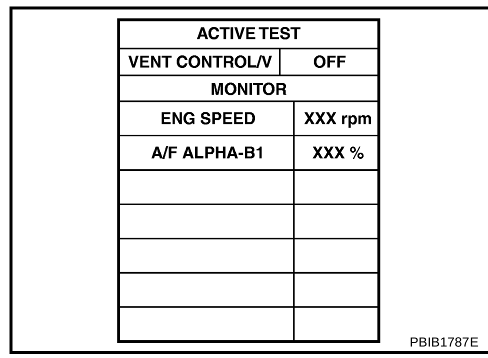
With CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.
   If NG, replace EVAP canister vent control valve.
   If OK, go to next step.
3. Reconnect harness connectors disconnected.
4. Turn ignition switch ON.



PBIB1033E

5. Perform “VENT CONTROL/V” in “ACTIVE TEST” mode.
6. Check air passage continuity and operation delay time.



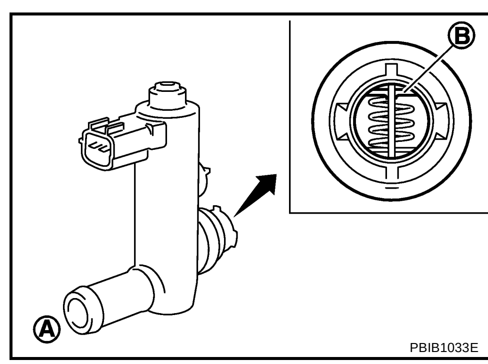
PBIB1787E

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

   Operation takes less than 1 second.
   Make sure new O-ring is installed properly.
   If NG, replace EVAP canister vent control valve.
   If OK, go to next step.
7. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.
8. Perform step 5 again.

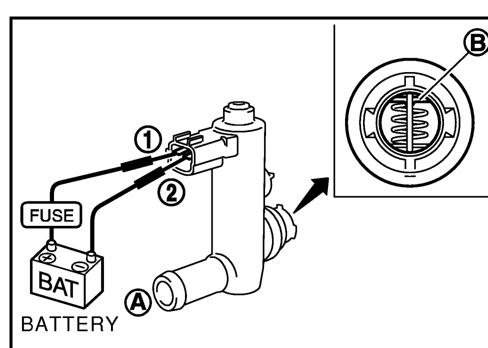
Without CONSULT-II

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



PBIB1033E

3. Check air passage continuity and operation delay time under the following conditions.



PBIB1034E

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

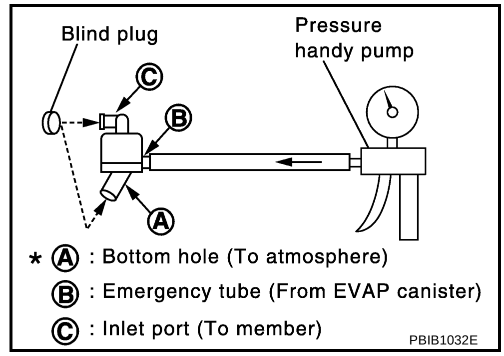
   Operation takes less than 1 second.
   Make sure new O-ring is installed properly.
   If NG, replace EVAP canister vent control valve.
   If OK, go to next step.
4. Clean the air passage (Portion **A** to **B**) of EVAP canister vent control valve using an air blower.

5. Perform step 3 again.

WATER SEPARATOR

1. Check visually for insect nests in the water separator air inlet.
2. Check visually for cracks or flaws in the appearance.
3. Check visually for cracks or flaws in the hose.
4. Check that **A** and **C** are not clogged by blowing air into **B** with **A** , and then **C** plugged.
5. In case of NG in items 2 - 4, replace the parts.

   NOTE:
   Do not disassemble water separator.



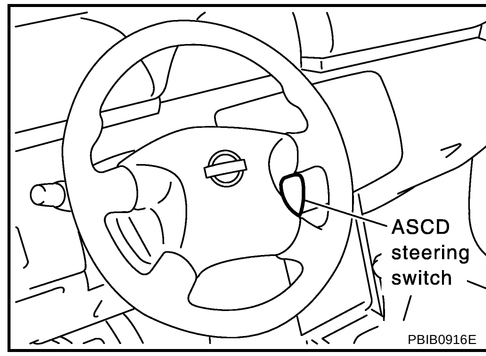
DTC P1564 ASCD STEERING SWITCH

PFP:25551

Component Description

ABS00CWT

ASCD steering switch has variant values of electrical resistance for each button. ECM reads voltage variation of switch, and determines which button is operated.
Refer to EC-27, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CWU

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
MAIN SW	● Ignition switch: ON	MAIN switch: Pressed	ON
		MAIN switch: Released	OFF
CANCEL SW	● Ignition switch: ON	CANCEL switch: Pressed	ON
		CANCEL switch: Released	OFF
RESUME/ACC SW	● Ignition switch: ON	RESUME/ACCELERATE switch: Pressed	ON
		RESUME/ACCELERATE switch: Released	OFF
SET SW	● Ignition switch: ON	SET/COAST switch: Pressed	ON
		SET/COAST switch: Released	OFF

On Board Diagnosis Logic

ABS00CWV

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.

NOTE:
If DTC P1564 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605.
Refer to EC-416, "DTC P0605 ECM" .

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1564 1564	ASCD steering switch	● An excessively high voltage signal from the ASCD steering switch is sent to ECM. ● ECM detects that input signal from the ASCD steering switch is out of the specified range. ● ECM detects that the ASCD steering switch is stuck ON.	● Harness or connectors (The switch circuit is open or shorted.) ● ASCD steering switch ● ECM

DTC Confirmation Procedure

ABS00CWW

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

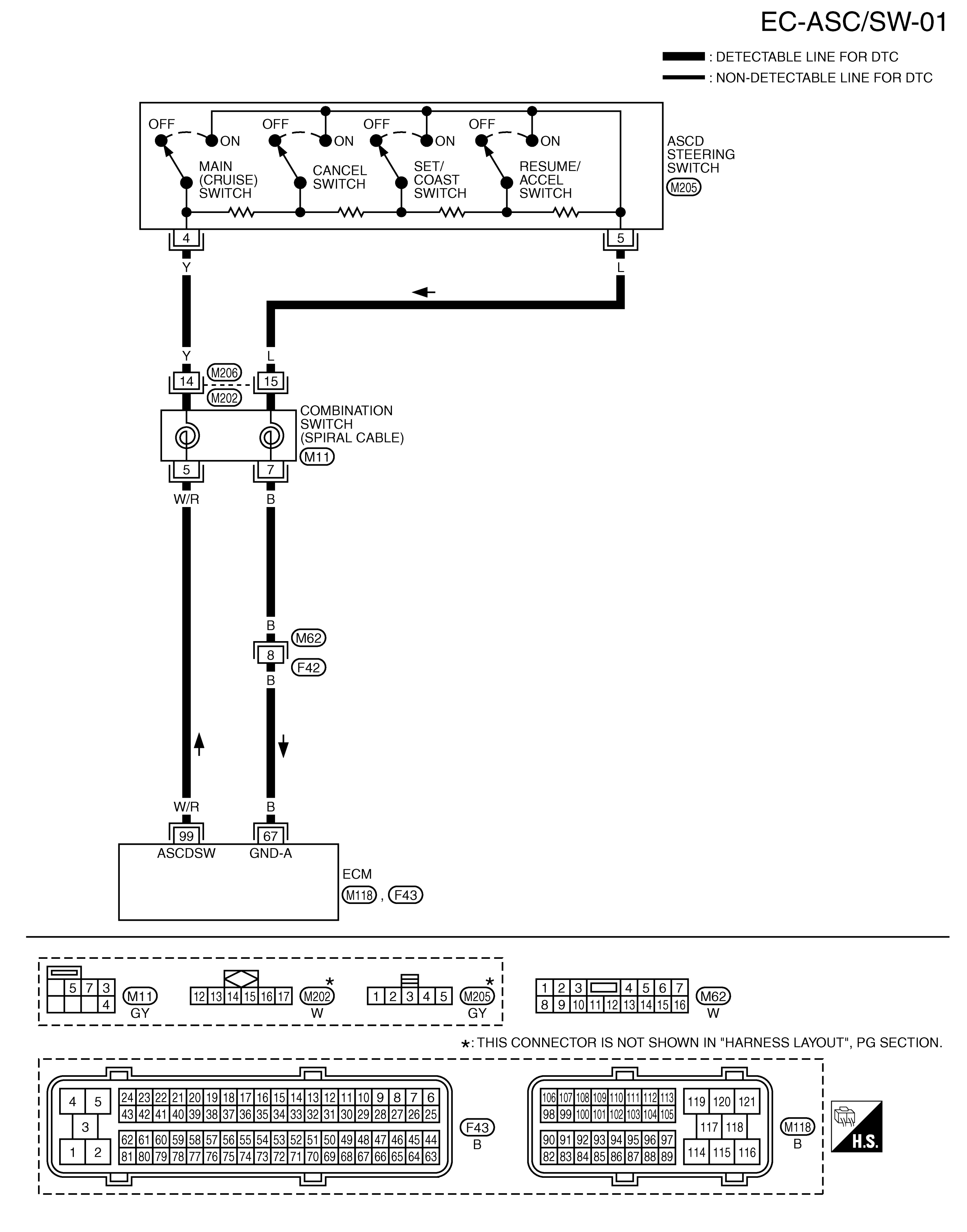
1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Wait at least 10 seconds.
4. Press MAIN switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
7. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
8. If DTC is detected, go to EC-523, "Diagnostic Procedure" .

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CWX



TBWB0130E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

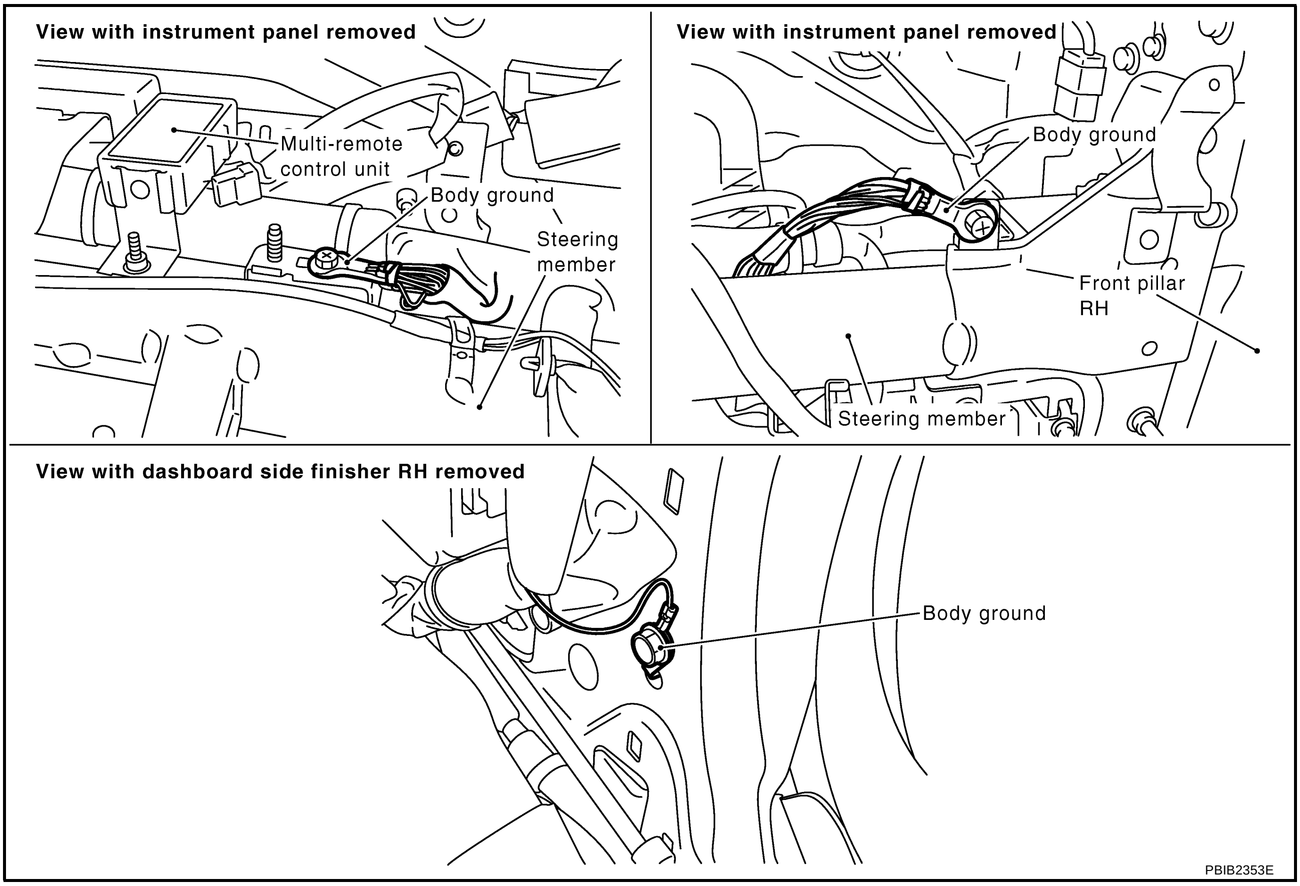
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
99	W/R	ASCD steering switch	**[Ignition switch: ON]** ● ASCD steering switch: OFF	Approximately 4V
			[Ignition switch: ON] ● MAIN switch: Pressed	Approximately 0V
			[Ignition switch: ON] ● CANCEL switch: Pressed	Approximately 1V
			[Ignition switch: ON] ● RESUME/ACCELERATE switch: Pressed	Approximately 3V
			[Ignition switch: ON] ● SET/COAST switch: Pressed	Approximately 2V

Diagnostic Procedure

ABS00CWY

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



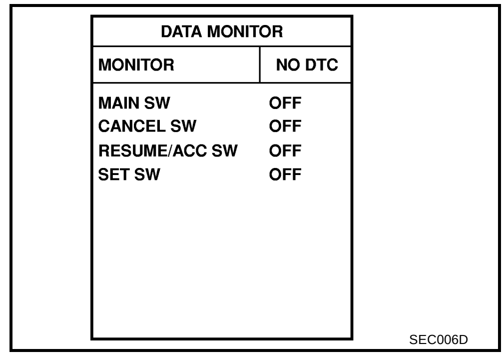
OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT-II

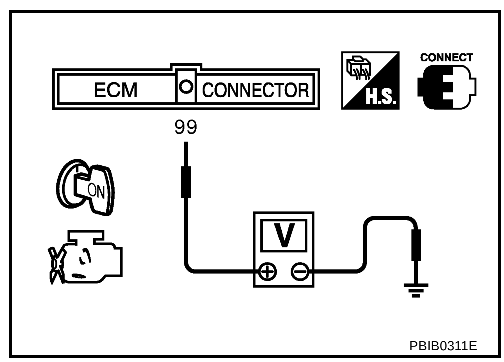
1. Turn ignition switch ON.
2. Select “MAIN SW”, “RESUME/ACC SW”, “SET SW and “CANCEL SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check each item indication under the following conditions.



Switch	Monitor item	Condition	Indication
MAIN switch	MAIN SW	Pressed	ON
		Released	OFF
CANCEL switch	CANCEL SW	Pressed	ON
		Released	OFF
RESUME/ACCEL-ERATE switch	RESUME/ACC SW	Pressed	ON
		Released	OFF
SET/COAST switch	SET SW	Pressed	ON
		Released	OFF

Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 99 and ground with pressing each button.



Switch	Condition	Voltage [V]
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4.0
CANCEL switch	Pressed	Approx. 1.0
	Released	Approx. 4.0
RESUME/ACCELER-ATE switch	Pressed	Approx. 3.0
	Released	Approx. 4.0
SET/COAST switch	Pressed	Approx. 2.0
	Released	Approx. 4.0

OK or NG

OK >> GO TO 8.
NG >> GO TO 3.

3. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ASCD steering switch harness connector and ECM harness connector.
3. Check harness continuity between ASCD steering switch terminal 5 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M62, F42
- Harness connectors M206, M202
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between ECM terminal 99 and ASCD steering switch terminal 4.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M206, M202
- Combination switch (spiral cable)
- Harness for open and short between ECM and ASCD steering switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD STEERING SWITCH

Refer to EC-526, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace ASCD steering switch.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

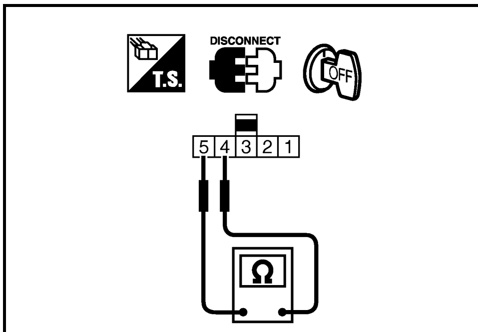
>> **INSPECTION END**

Component Inspection

ABS00CWZ

ASCD STEERING SWITCH

1. Disconnect ASCD steering switch harness connector M205.
2. Check continuity between ASCD steering switch terminals 4 and 5 with pushing each switch.



PBIB2201E

Switch	Condition	Resistance [Ω]
MAIN switch	Pressed	Approx. 0
	Released	Approx. 4,000
CANCEL switch	Pressed	Approx. 250
	Released	Approx. 4,000
RESUME/ACCELERATE switch	Pressed	Approx. 1,480
	Released	Approx. 4,000
SET/COAST switch	Pressed	Approx. 660
	Released	Approx. 4,000

If NG, replace ASCD steering switch.

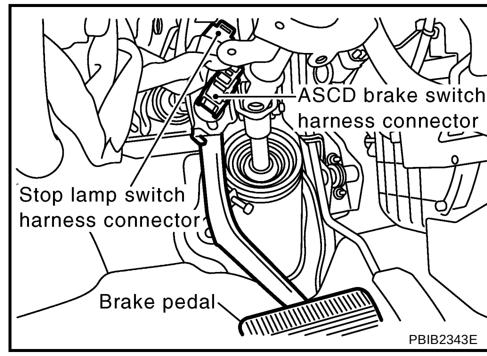
DTC P1572 ASCD BRAKE SWITCH

PFP:25320

Component Description

ABS00CX0

When the brake pedal is depressed, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal).
Refer to EC-27, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CX1

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1 (ASCD brake switch)	• Ignition switch: ON	• Brake pedal: Fully released (A/T) • Brake pedal and clutch pedal: Fully released (M/T)	ON
		• Brake pedal: Slightly depressed (A/T) • Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (STOP lamp switch)	• Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

ABS00CX2

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.

NOTE:

- **If DTC P1572 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-416, "DTC P0605 ECM" .**
- **This self-diagnosis has one trip detection logic. When malfunction A is detected, DTC is not stored in ECM memory. And in that case, 1st trip DTC and 1st trip freeze frame data are displayed. 1st trip DTC is erased when ignition switch is turned OFF. And even when malfunction A is detected in two consecutive trips, DTC is not stored in ECM memory.**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition		Possible Cause
P1572 1572	ASCD brake switch	A)	When the vehicle speed is above 30km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to ECM at the same time.	• Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Harness or connectors (M/T models) (The ASCD clutch switch circuit is shorted.) • Stop lamp switch • ASCD brake switch • ASCD clutch switch (M/T models) • Incorrect stop lamp switch installation • Incorrect ASCD brake switch installation • Incorrect ASCD clutch switch installation (M/T models) • ECM
		B)	ASCD brake switch signal is not sent to ECM for extremely long time while the vehicle is driving	

DTC Confirmation Procedure

ABS00CX3

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

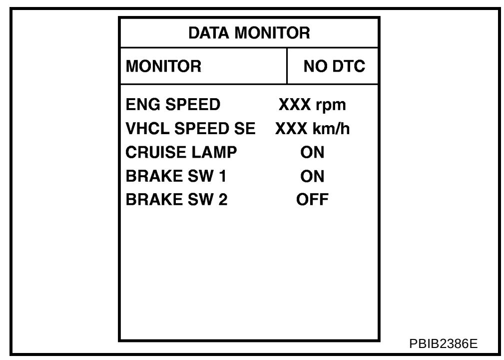
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
- Procedure for malfunction B is not described here. It takes extremely long time to complete procedure for malfunction B. By performing procedure for malfunction A, the incident that causes malfunction B can be detected.

TESTING CONDITION:

Steps 4 and 5 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Press MAIN switch and make sure that CRUISE indicator lights up.
4. Drive the vehicle for at least 5 consecutive seconds under the following condition.



VHCL SPEED SE	More than 30 km/h (19 MPH)
Shift lever	Suitable position

If 1st trip DTC is detected, go to EC-531, "Diagnostic Procedure" .

If 1st trip DTC is not detected, go to the following step.

5. Drive the vehicle for at least 5 consecutive seconds under the following condition.

VHCL SPEED SE	More than 30 km/h (19 MPH)
Shift lever	Suitable position
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

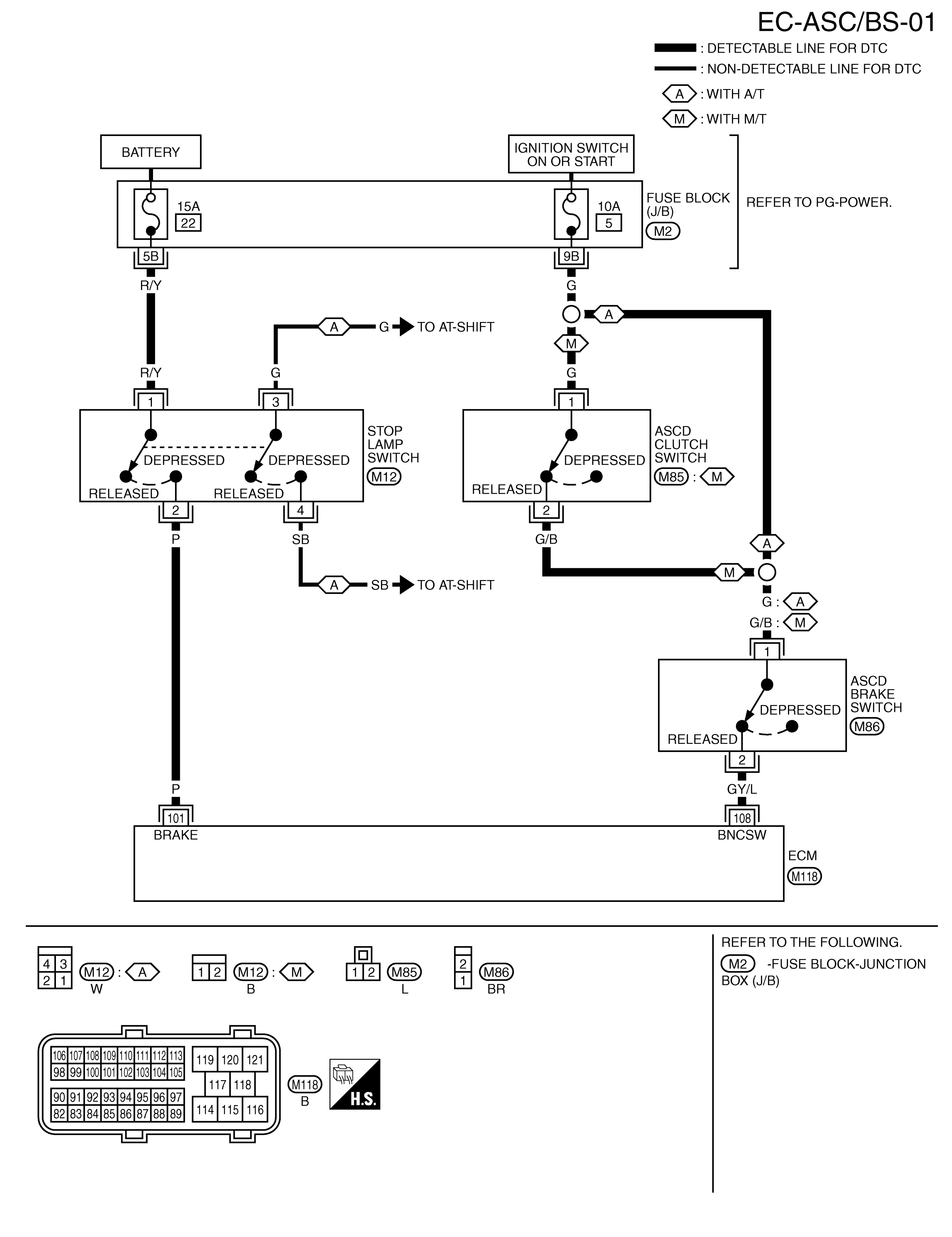
6. If 1st trip DTC is detected, go to EC-531, "Diagnostic Procedure" .

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CX4



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	P	Stop lamp switch	**[Ignition switch: OFF]** ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
108	GY/L	ASCD brake switch	**[Ignition switch: ON]** ● Brake pedal: Slightly depressed (A/T) ● Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Fully released (A/T) ● Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00CX5

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

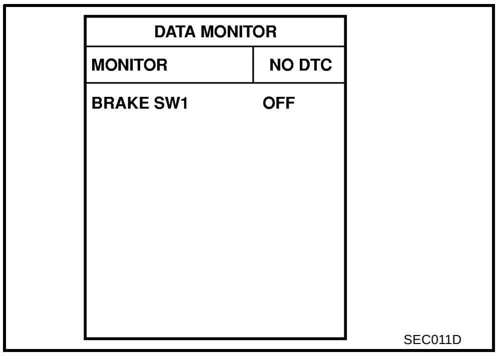
1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-II.
3. Check “BRAKE SW1” indication under the following conditions.

A/T models

CONDITION	INDICATION
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

M/T models

CONDITION	INDICATION
Clutch pedal or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON



SEC011D

Without CONSULT-II

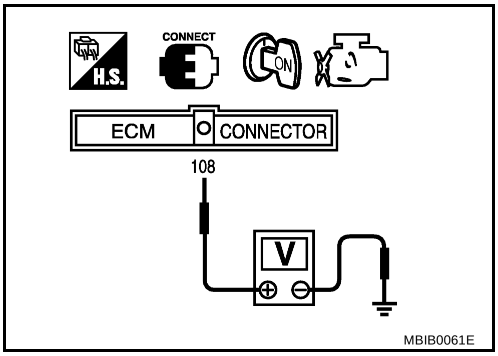
1. Turn ignition switch ON.
2. Check voltage between ECM terminal 108 and ground under the following conditions.

A/T models

CONDITION	VOLTAGE
Brake pedal: Slightly depressed	Approximately 0V
Brake pedal: Fully released	Battery voltage

M/T models

CONDITION	VOLTAGE
Clutch pedal or brake pedal: Slightly depressed	Approximately 0V
Clutch pedal and brake pedal: Fully released	Battery voltage



MBIB0061E

OK or NG

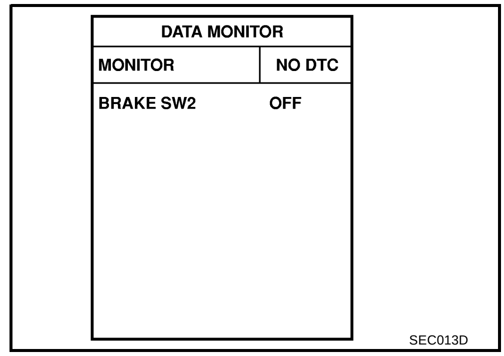
OK >> GO TO 2.
NG (M/T models) >>GO TO 3.
NG (A/T models) >>GO TO 8.

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

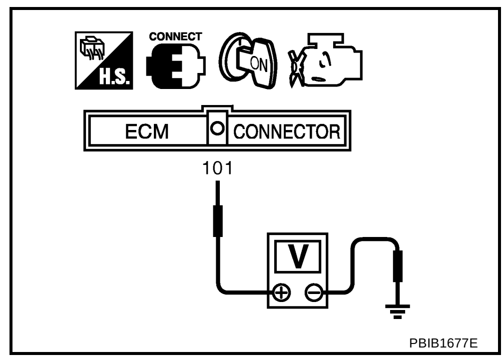
CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON



Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0V
Brake pedal: Slightly depressed	Battery voltage

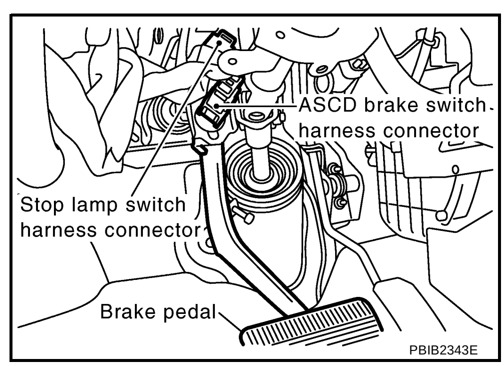


OK or NG

OK >> GO TO 18.
NG >> GO TO 13.

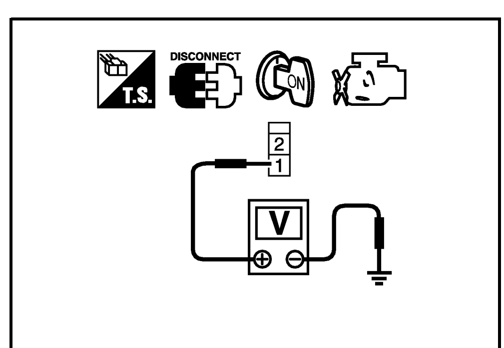
3. CHECK ASCD CLUTCH SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.



4. Check voltage between ASCD brake switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
Clutch pedal: Fully released	Battery voltage
Clutch pedal: Slightly depressed	Approx. 0V

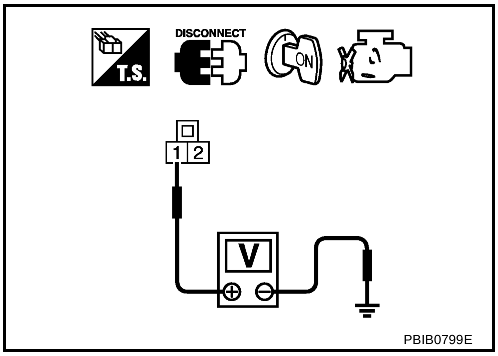


OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between ASCD clutch switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD clutch switch terminal 2 and ASCD brake switch terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH

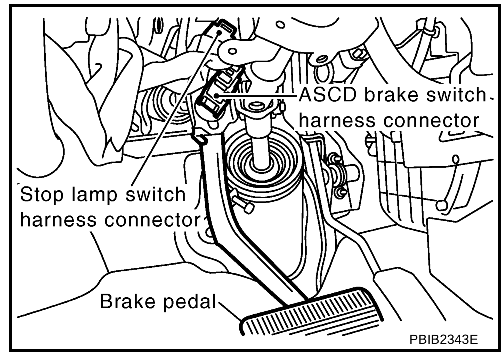
Refer to EC-536, "Component Inspection"

OK or NG

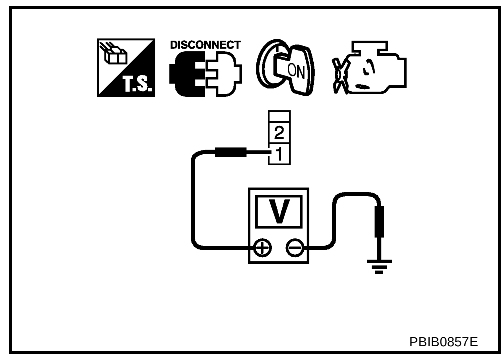
OK >> GO TO 18.
NG >> Replace ASCD clutch switch.

8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.



4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check harness for open or short between ECM and ASCD brake switch.

>> Repair open circuit or short to ground or short to power in harness or connectors.

A
EC
C
D
E
F
G
H
I
J
K
L
M

12. CHECK ASCD BRAKE SWITCH

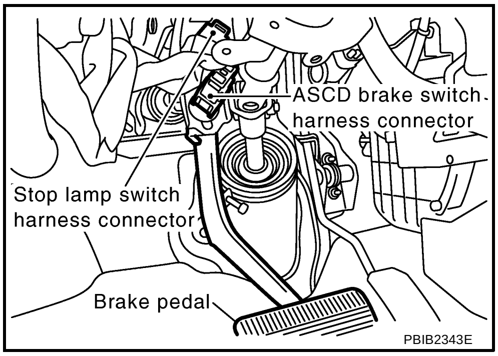
Refer to EC-536, "Component Inspection"

OK or NG

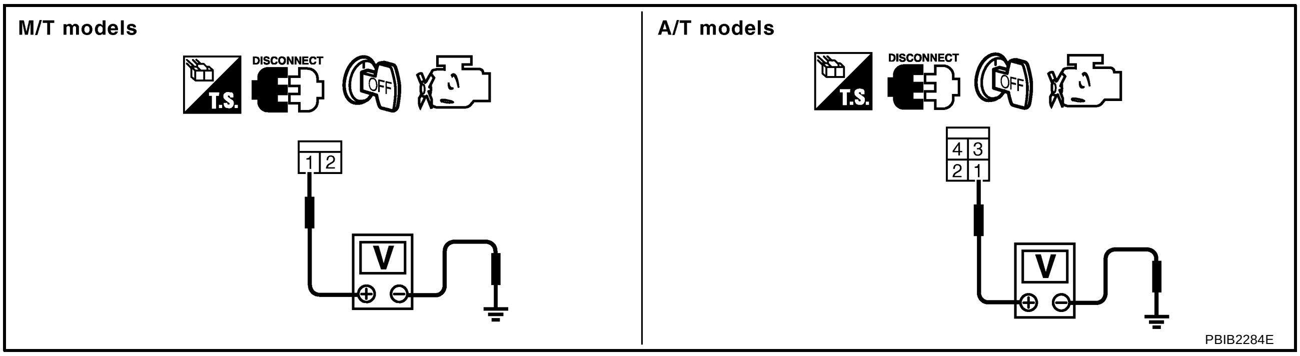
OK >> GO TO 18.
NG >> Replace ASCD brake switch.

13. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.



3. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 15.
NG >> GO TO 14.

14. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 15A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 17.
NG >> GO TO 16.

16. DETECT MALFUNCTIONING PART

Check harness for open or short between ECM and stop lamp switch.

>> Repair open circuit or short to ground or short to power in harness or connectors.

17. CHECK STOP LAMP SWITCH

Refer to EC-536, "Component Inspection"

OK or NG

OK >> GO TO 18.
NG >> Replace stop lamp switch.

18. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

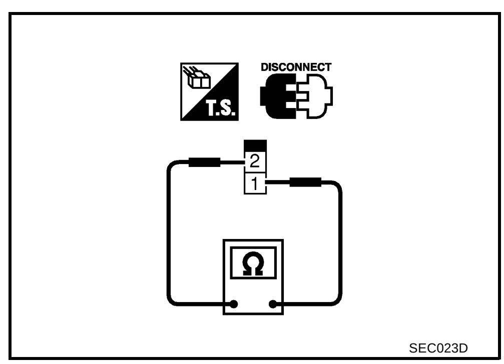
ABS00CX6

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to BR-6, "BRAKE PEDAL" , and perform step 3 again.



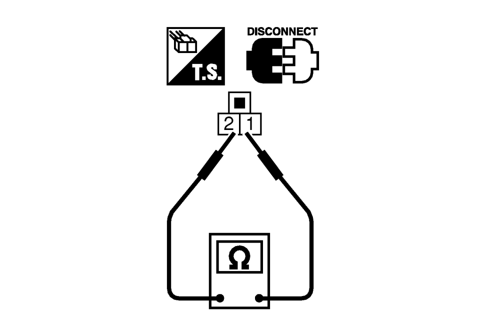
ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.

3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.

Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

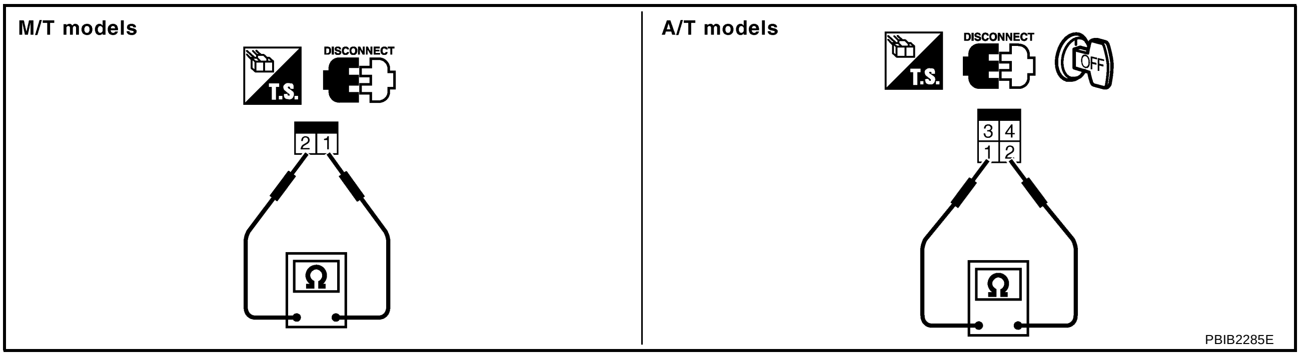
If NG, adjust ASCD clutch switch installation, refer to CL-5, "CLUTCH PEDAL" , and perform step 3 again.



SEC024D

STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



PBIB2285E

Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to BR-6, "BRAKE PEDAL" , and perform step 3 again.

DTC P1574 ASCD VEHICLE SPEED SENSOR

PFP:31036

Component Description

ABS00CX7

The ECM receives two vehicle speed sensor signals via CAN communication line. One is sent from combination meter, and the other is from TCM (Transmission control module). The ECM uses these signals for ASCD control. Refer to EC-27, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for ASCD functions.

On Board Diagnosis Logic

ABS00CX8

This self-diagnosis has the one trip detection logic.
The MIL will not light up for this diagnosis.

NOTE:

- **If DTC P1574 is displayed with DTC U1000, U1001, first perform the trouble diagnosis for DTC U1000, U1001. Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .**
- **If DTC P1574 is displayed with DTC P0500, first perform the trouble diagnosis for DTC P0500. Refer to EC-405, "DTC P0500 VSS"**
- **If DTC P1574 is displayed with DTC P0605, first perform the trouble diagnosis for DTC P0605. Refer to EC-416, "DTC P0605 ECM"**

DTC No.	Trouble Diagnosis Name	DTC Detecting Condition	Possible Cause
P1574 1574	ASCD vehicle speed sensor	ECM detects a difference between two vehicle speed signals is out of the specified range.	• Harness or connectors (The CAN communication line is open or shorted.) • Harness or connectors (The combination meter circuit is open or shorted.) • TCM (A/T models) • Combination meter • VDC/TCS/ABS control unit (with VDC models) • ABS actuator and electric unit (control unit) (without VDC models) • Wheel sensor • ECM

DTC Confirmation Procedure

ABS00CX9

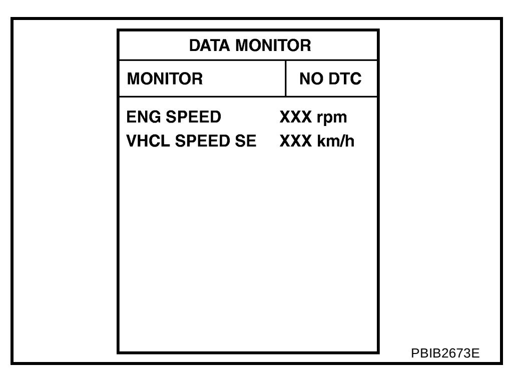
CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Step 3 may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

WITH CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Drive the vehicle at more than 40 km/h (25MPH).
4. If DTC is detected, go to EC-539, "Diagnostic Procedure" .



WITH GST

Follow the procedure “WITH CONSULT-II” above.

Diagnostic Procedure

ABS00CXA

1. CHECK DTC WITH TCM

Check DTC with TCM. Refer to AT-39, "ON BOARD DIAGNOSTIC (OBD) SYSTEM" .

OK or NG

OK >> GO TO 2.
NG >> Perform trouble shooting relevant to DTC indicated.

2. CHECK DTC WITH VDC/TCS/ABS CONTROL UNIT (WITH VDC MODELS) OR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) (WITHOUT VDC MODELS)

Refer to BRC-9, "TROUBLE DIAGNOSIS" (without VDC models) or BRC-48, "TROUBLE DIAGNOSIS" (with VDC models).

OK or NG

OK >> GO TO 3.
NG >> Repair or replace.

3. CHECK COMBINATION METER

Check combination meter function.
Refer to DI-4, "COMBINATION METERS" .

>> **INSPECTION END**

DTC P1706 PNP SWITCH

PFP:32006

Component Description

ABS00CXB

When the shift lever position is P or N (A/T), Neutral (M/T) park/neutral position (PNP) switch is ON.
ECM detects the position because the continuity of the line (the ON signal) exists.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CXC

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: P or N (A/T), Neutral (M/T)	ON
		Shift lever: Except above position	OFF

On Board Diagnosis Logic

ABS00CXD

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1706 1706	Park/neutral position switch	The signal of the park/neutral position (PNP) switch is not changed in the process of engine starting and driving.	● Harness or connectors [The park/neutral position (PNP) switch circuit is open or shorted.] ● Park/neutral position (PNP) switch

DTC Confirmation Procedure

ABS00CXE

CAUTION:

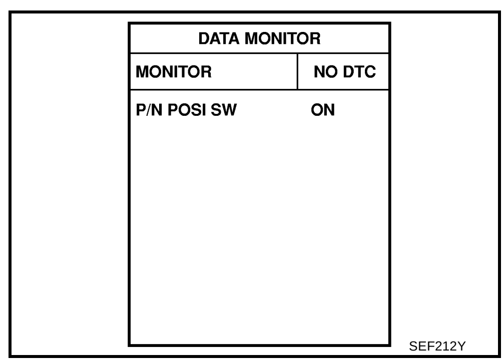
Always drive vehicle at a safe speed.

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

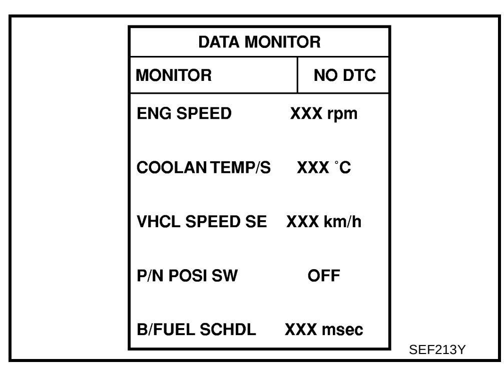


SEF212Y

Position (Selector lever)	Known-good signal
N or P position (A/T) Neutral position (M/T)	ON
Except above position	OFF

If NG, go to EC-543, "Diagnostic Procedure" .
If OK, go to following step.

3. Select “DATA MONITOR” mode with CONSULT-II.
4. Start engine and warm it up to normal operating temperature.
5. Maintain the following conditions for at least 60 consecutive seconds.



SEF213Y

ENG SPEED	More than 1,500 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 31.8 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Shift lever position	Suitable position

6. If 1st trip DTC is detected, go to EC-543, "Diagnostic Procedure" .

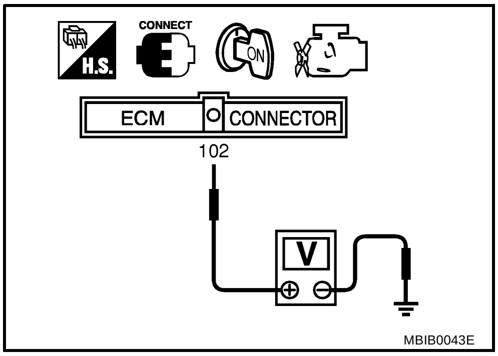
Overall Function Check

ABS00CXF

Use this procedure to check the overall function of the park/neutral position (PNP) switch circuit. During this check, a 1st trip DTC might not be confirmed.

WITH GST

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 102 (PNP switch signal) and body ground under the following conditions.

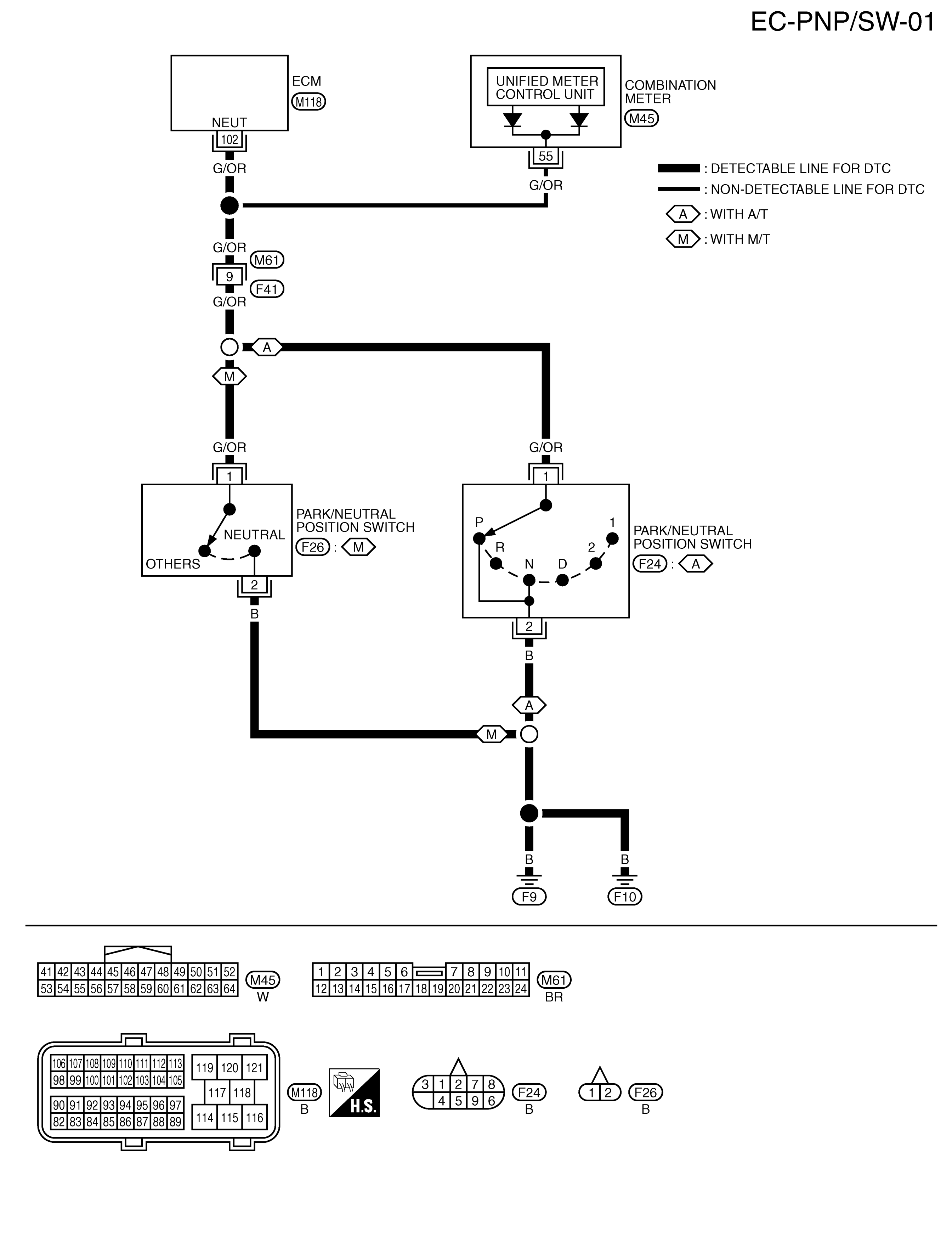


Condition (Shift lever)	Voltage V (Known good data)
P or N position (A/T) Neutral position (M/T)	Approx. 0
Except above position	BATTERY VOLTAGE (11 - 14V)

3. If NG, go to EC-543, "Diagnostic Procedure" .

Wiring Diagram

ABS00CXG



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	G/OR	PNP switch	**[Ignition switch: ON]** ● Shift lever: P or N (A/T), Neutral (M/T)	Approximately 0V
			[Ignition switch: ON] ● Except above position	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00D8R

1. CHECK PNP SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect park/neutral position (PNP) switch harness connector.
3. Check harness continuity between PNP switch terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.
4. Also check harness for short to power.

OK or NG

OK >> GO TO 2.
NG >> Repair open circuit or short to power in harness or connectors.

2. CHECK PNP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between PNP switch terminal 1 and ECM terminal 102.
   Refer to Wiring Diagram.

   Continuity should exist.
3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M61, F41
- Harness for open or short between PNP switch and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK PNP SWITCH

Refer to AT-98, "DTC P0705 PARK/NEUTRAL POSITION (PNP) SWITCH" (A/T) or MT-13, "PARK/NEUTRAL POSITION (PNP) SWITCH" (M/T).

OK or NG

OK >> GO TO 4.
NG >> Replace PNP switch.

5. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

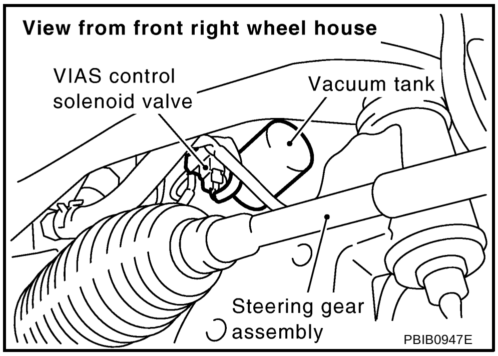
DTC P1800 VIAS CONTROL SOLENOID VALVE

PFP:14955

Component Description

ABS00CXI

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve actuator. It responds to ON/OFF signals from the ECM. When the solenoid is OFF, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CXJ

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	● Engine: After warming up	Idle	OFF
		More than 5,000 rpm	ON

On Board Diagnosis Logic

ABS00CXK

The MIL will not light up for this self-diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1800 1800	VIAS control solenoid valve circuit	An excessively low or high voltage signal is sent to ECM through the valve	● Harness or connectors (The solenoid valve circuit is open or shorted.) ● VIAS control solenoid valve

DTC Confirmation Procedure

ABS00CXL

NOTE:

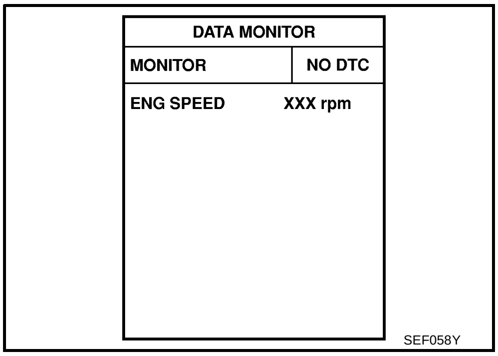
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 11V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for at least 5 seconds.
4. If 1st trip DTC is detected, go to EC-547, "Diagnostic Procedure" .

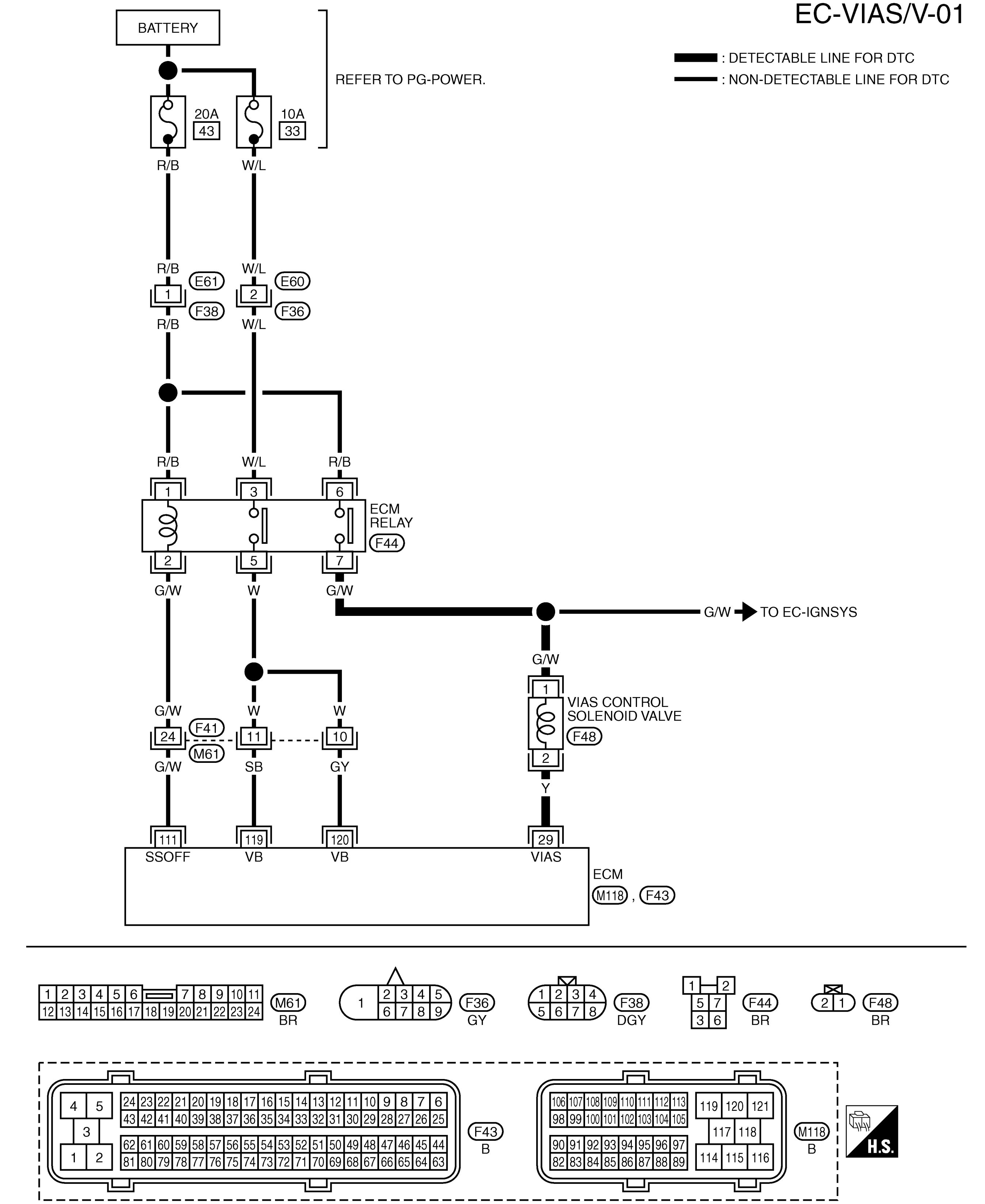


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CXM



TBWB0131E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

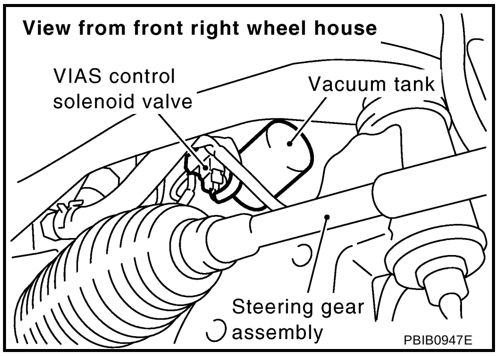
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
29	Y	VIAS control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Engine speed: Above 5,000 rpm	0 - 1.0V
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00CXN

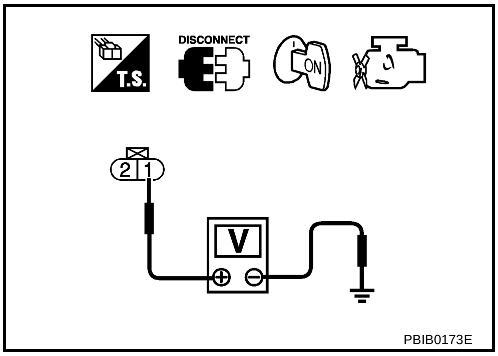
1. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect VIAS control solenoid valve harness connector.
3. Turn ignition switch ON.



4. Check voltage between VIAS control solenoid valve terminal 1 and ground with CONSULT-II or tester.

   Voltage: Battery voltage



OK or NG

OK >> GO TO 2.

NG >> Repair open circuit or short to ground or short to power in harness connectors.

2. CHECK VIAS CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 29 and VIAS control solenoid valve terminal 2. Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK VIAS CONTROL SOLENOID VALVE

Refer to EC-548, "Component Inspection" .

OK or NG

OK >> GO TO 4.
NG >> Replace VIAS control solenoid valve.

4. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

ABS00CXO

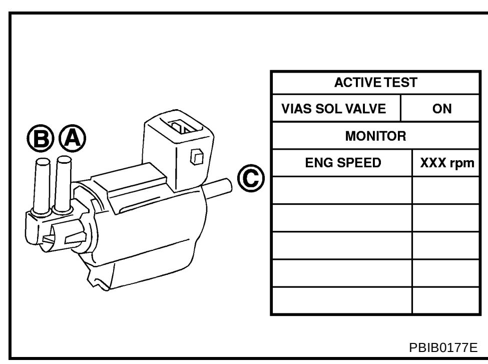
VIAS CONTROL SOLENOID VALVE

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch ON.
3. Perform “VIAS SOL VALVE” in “ACTIVE TEST” mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.



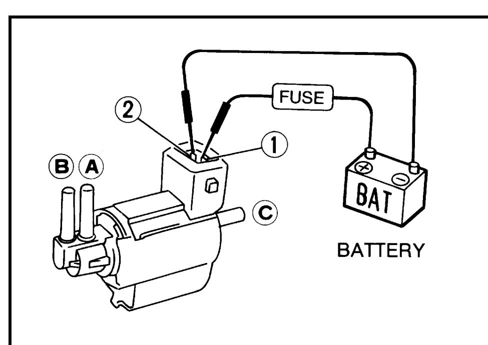
PBIB0177E

With GST

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

Operation takes less than 1 second.



MEC488B

Removal and Installation

ABS00CXP

VIAS CONTROL SOLENOID VALVE

Refer to EM-16, "INTAKE MANIFOLD" .

DTC P1805 BRAKE SWITCH

PFP:25320

Description

ABS00CXQ

Brake switch signal is applied to the ECM through the stop lamp switch when the brake pedal is depressed. This signal is used mainly to decrease the engine speed when the vehicle is driving.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CXR

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

On Board Diagnosis Logic

ABS00CXS

The MIL will not light up for this diagnosis.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P1805 1805	Brake switch	A brake switch signal is not sent to ECM for extremely long time while the vehicle is driving.	● Harness or connectors (The stop lamp switch circuit is open or shorted.) ● Stop lamp switch

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode.

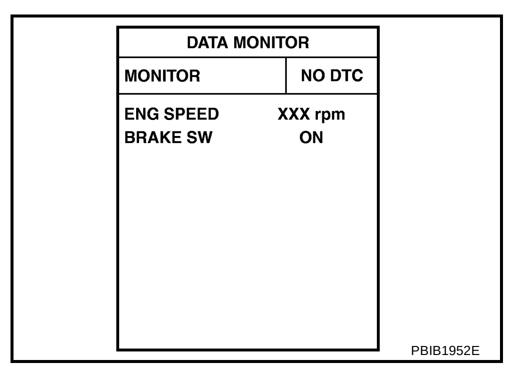
<table>
<tr><th colspan="2">Engine operating condition in fail-safe mode</th></tr>
<tr><td colspan="2">ECM controls the electric throttle control actuator by regulating the throttle opening to a small range. Therefore, acceleration will be poor.</td></tr>
<tr><td>Vehicle condition</td><td>Driving condition</td></tr>
<tr><td>When engine is idling</td><td>Normal</td></tr>
<tr><td>When accelerating</td><td>Poor acceleration</td></tr>
</table>

DTC Confirmation Procedure

ABS00CXT

WITH CONSULT-II

1. Turn ignition switch ON.
2. Fully depress the brake pedal for at least 5 seconds.
3. Erase the DTC with CONSULT-II.
4. Select “DATA MONITOR” mode with CONSULT-II.
5. If 1st trip DTC is detected, go to EC-552, "Diagnostic Procedure" .

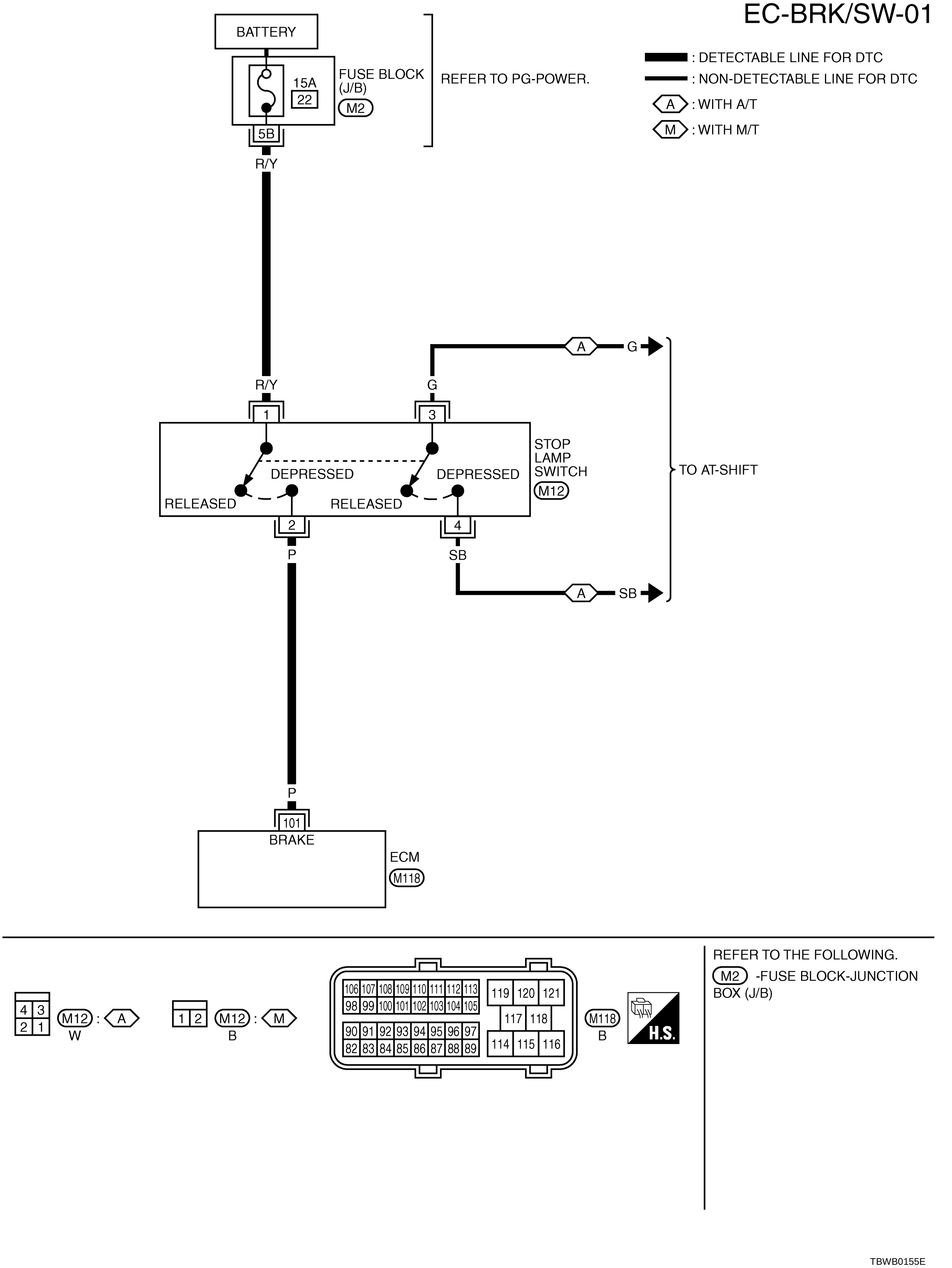


WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CXU



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	P	Stop lamp switch	**[Ignition switch: OFF]** ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00D8S

1. CHECK STOP LAMP SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Check the stop lamp when depressing and releasing the brake pedal.

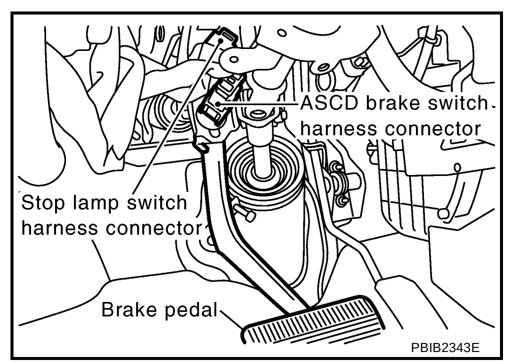
Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

OK or NG

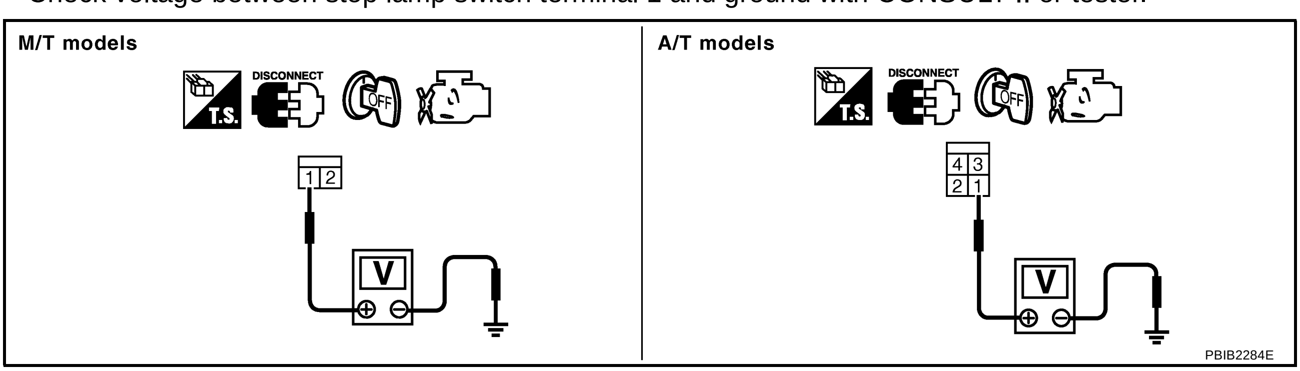
OK >> GO TO 4.
NG >> GO TO 2.

2. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

A
EC
C
D
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J
K
L
M

3. DETECT MALFUNCTIONING PART

Check the following.

- 15A fuse
- Fuse block (J/B) connector M2
- Harness for open and short between stop lamp switch and battery

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.
2. Disconnect ECM harness connector.
3. Check harness continuity between stop lamp switch terminal 2 and ECM terminal 101.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK STOP LAMP SWITCH

Refer to EC-554, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace stop lamp switch.

6. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

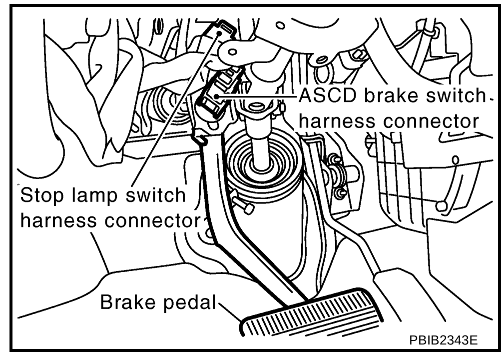
>> **INSPECTION END**

Component Inspection

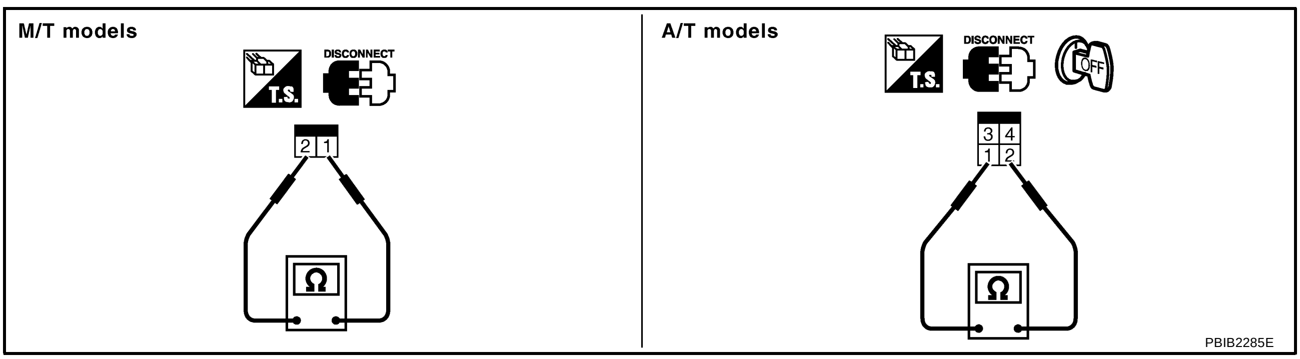
ABS00CXW

STOP LAMP SWITCH

1. Disconnect stop lamp switch harness connector.



2. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Conditions	Continuity
Brake pedal: Fully released	Should not exist.
Brake pedal: Slightly depressed	Should exist.

If NG, adjust brake pedal installation, refer to BR-6, "BRAKE PEDAL" , and perform step 2 again.

DTC P2122, P2123 APP SENSOR

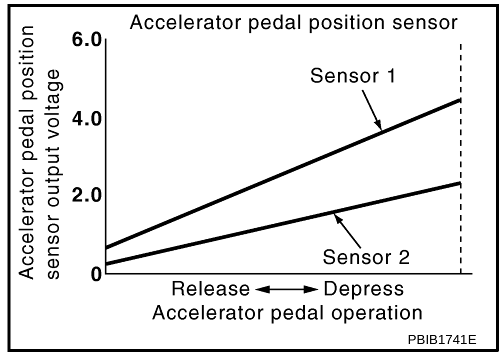
PFP:18002

Component Description

ABS00CXX

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.

Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CXY

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN 1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.0 - 4.7V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.3 - 1.2V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, they differs from ECM terminal voltage signal.

On Board Diagnosis Logic

ABS00CXZ

These self-diagnoses have the one trip detection logic.

NOTE:

If DTC P2122 or P2123 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to EC-499, "DTC P1229 SENSOR POWER SUPPLY" .

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2122 2122	Accelerator pedal position sensor 1 circuit low input	An excessively low voltage from the APP sensor 1 is sent to ECM.	● Harness or connectors (The APP sensor 1 circuit is open or shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 1)
P2123 2123	Accelerator pedal position sensor 1 circuit high input	An excessively high voltage from the APP sensor 1 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

ABS00CY0

NOTE:

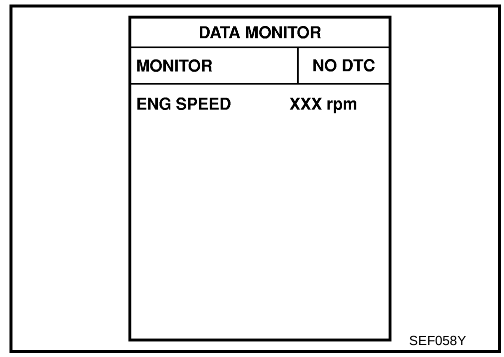
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-559, "Diagnostic Procedure" .



SEF058Y

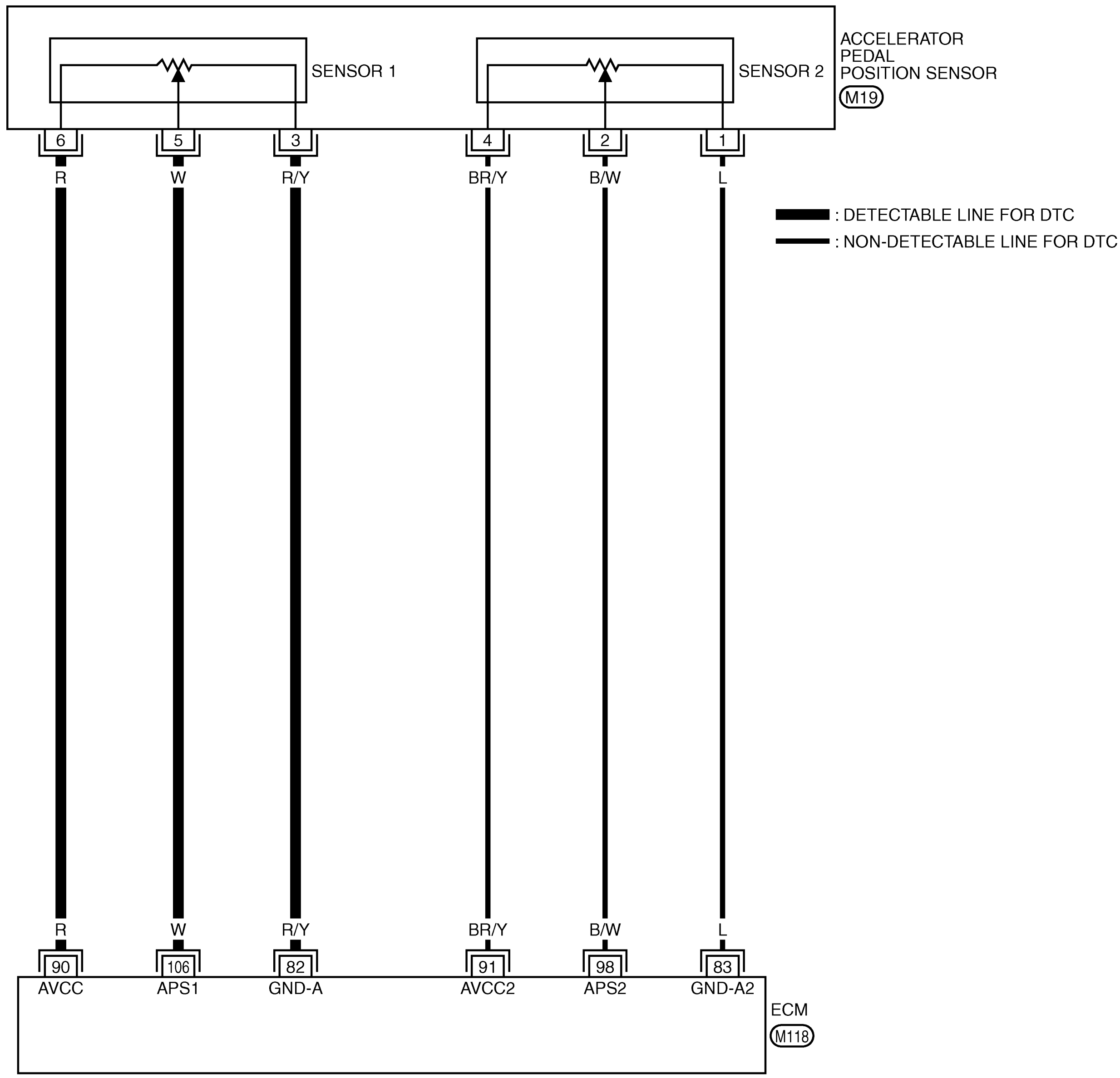
WITH GST

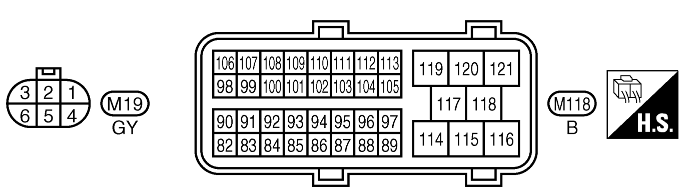
Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CY1

EC-APPS1-01





TBWA0624E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

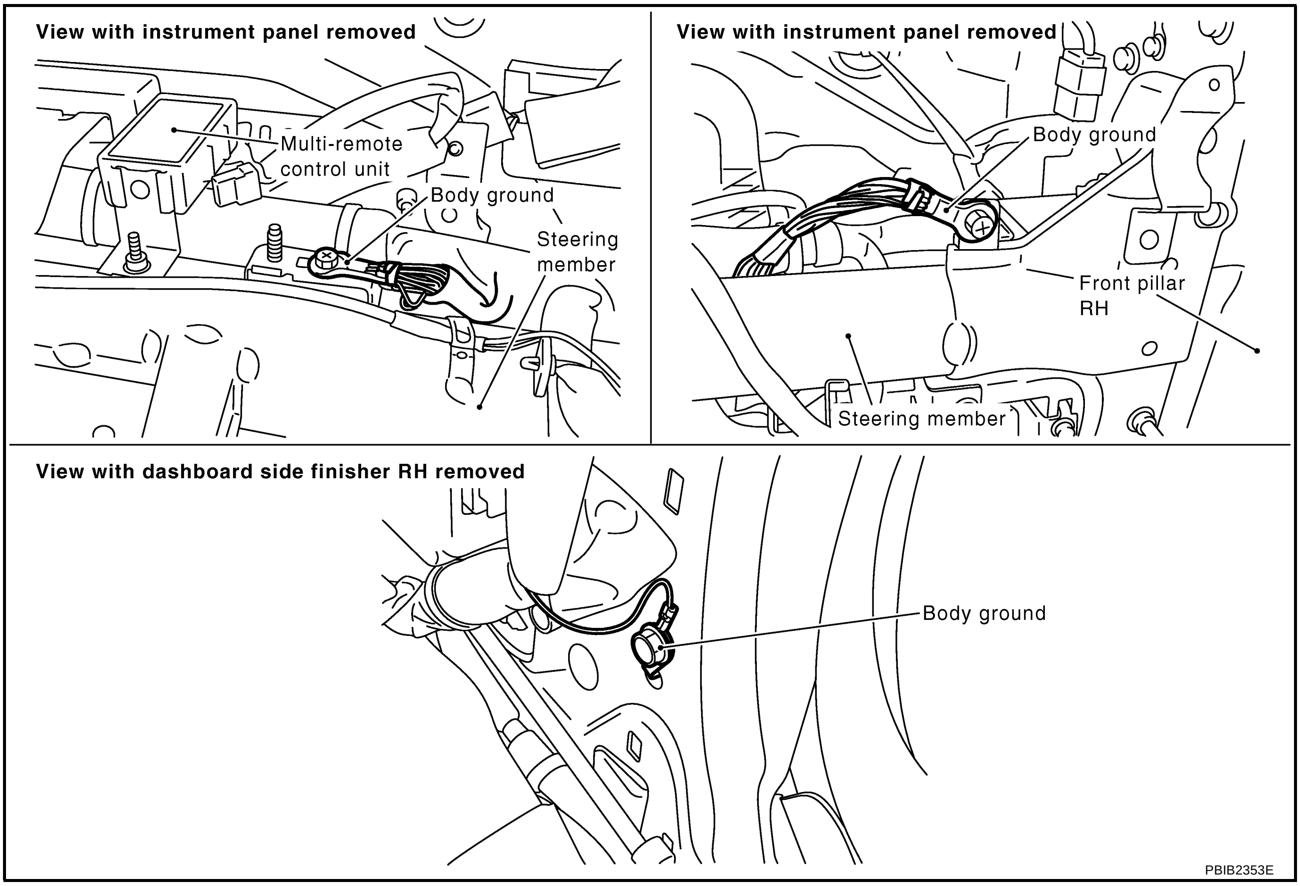
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
82	R/Y	Sensor ground (Accelerator pedal position sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	L	Sensor ground (Accelerator pedal position sensor 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	**[Ignition switch: ON]**	Approximately 5V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V
98	B/W	Accelerator pedal position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.15 - 0.6V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	3.9 - 4.7V

Diagnostic Procedure

ABS00D8T

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

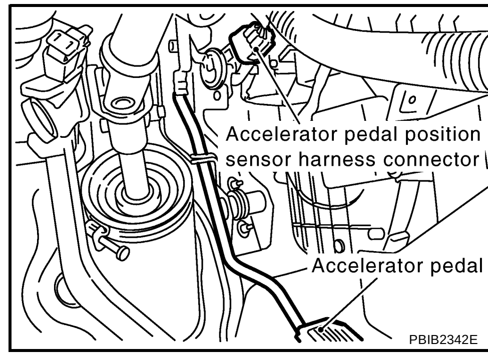


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

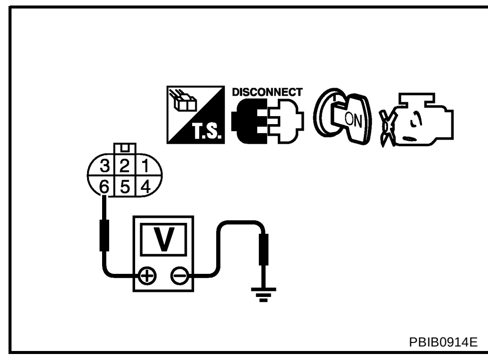
2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between APP sensor terminal 6 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK APP SENSOR 1 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 3 and ECM terminal 82.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK APP SENSOR 1 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between APP sensor terminal 5 and ECM terminal 106.
   Refer to Wiring Diagram.

Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to EC-561, "Component Inspection" .

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

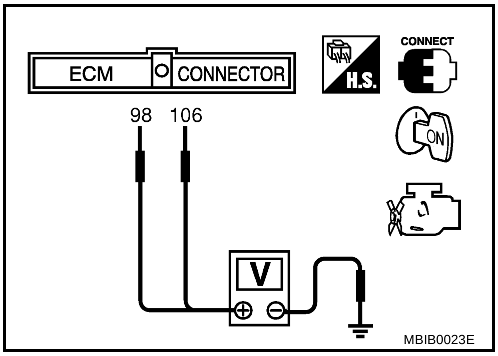
>> **INSPECTION END**

Component Inspection

ABS00CY3

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.15 - 0.6V
	Fully depressed	1.95 - 2.4V

4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-88, "Accelerator Pedal Released Position Learning" .
6. Perform EC-88, "Throttle Valve Closed Position Learning" .
7. Perform EC-88, "Idle Air Volume Learning" .

Removal and Installation

ABS00CY4

ACCELERATOR PEDAL

Refer to ACC-3, "ACCELERATOR CONTROL SYSTEM" .

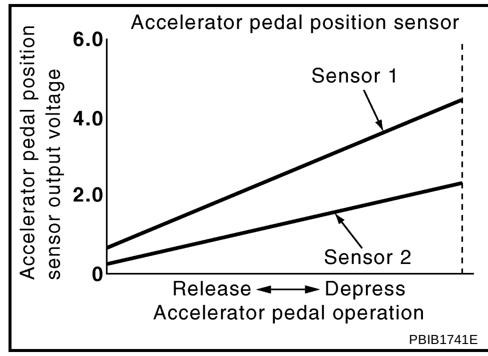
DTC P2127, P2128 APP SENSOR

PFP:18002

Component Description

ABS00CY5

The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.



Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CY6

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN 1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.0 - 4.7V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.3 - 1.2V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, they differs from ECM terminal voltage signal.

On Board Diagnosis Logic

ABS00CY7

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2127 2127	Accelerator pedal position sensor 2 circuit low input	An excessively low voltage from the APP sensor 2 is sent to ECM.	● Harness or connectors (The APP sensor 2 circuit is open or shorted.) (The TP sensor circuit is shorted.) ● Accelerator pedal position sensor (Accelerator pedal position sensor 2) ● Electric throttle control actuator (TP sensor 1 and 2)
P2128 2128	Accelerator pedal position sensor 2 circuit high input	An excessively high voltage from the APP sensor 2 is sent to ECM.	

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

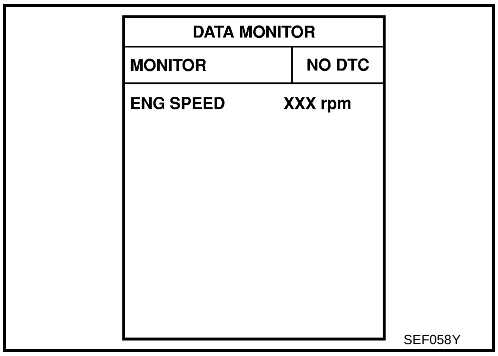
DTC Confirmation Procedure

ABS00CY8

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-566, "Diagnostic Procedure" .



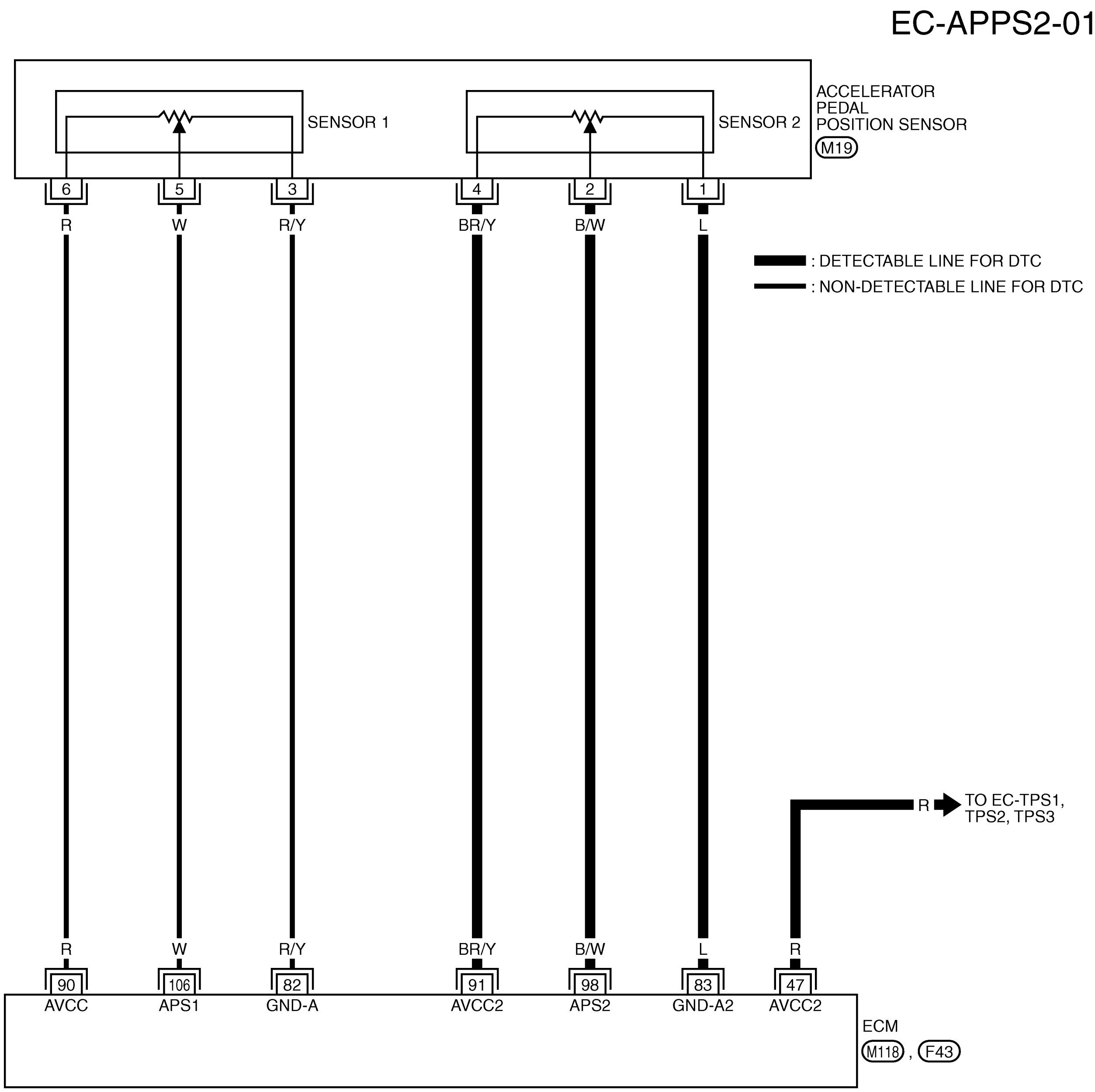
SEF058Y

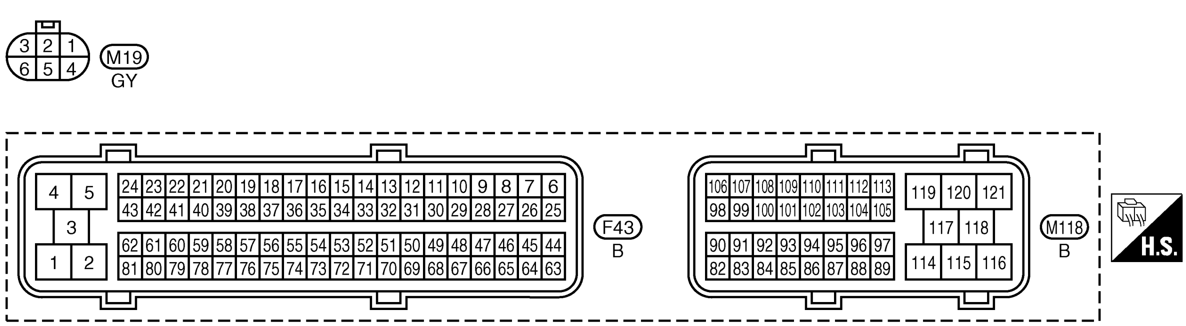
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CY9





TBWB0087E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

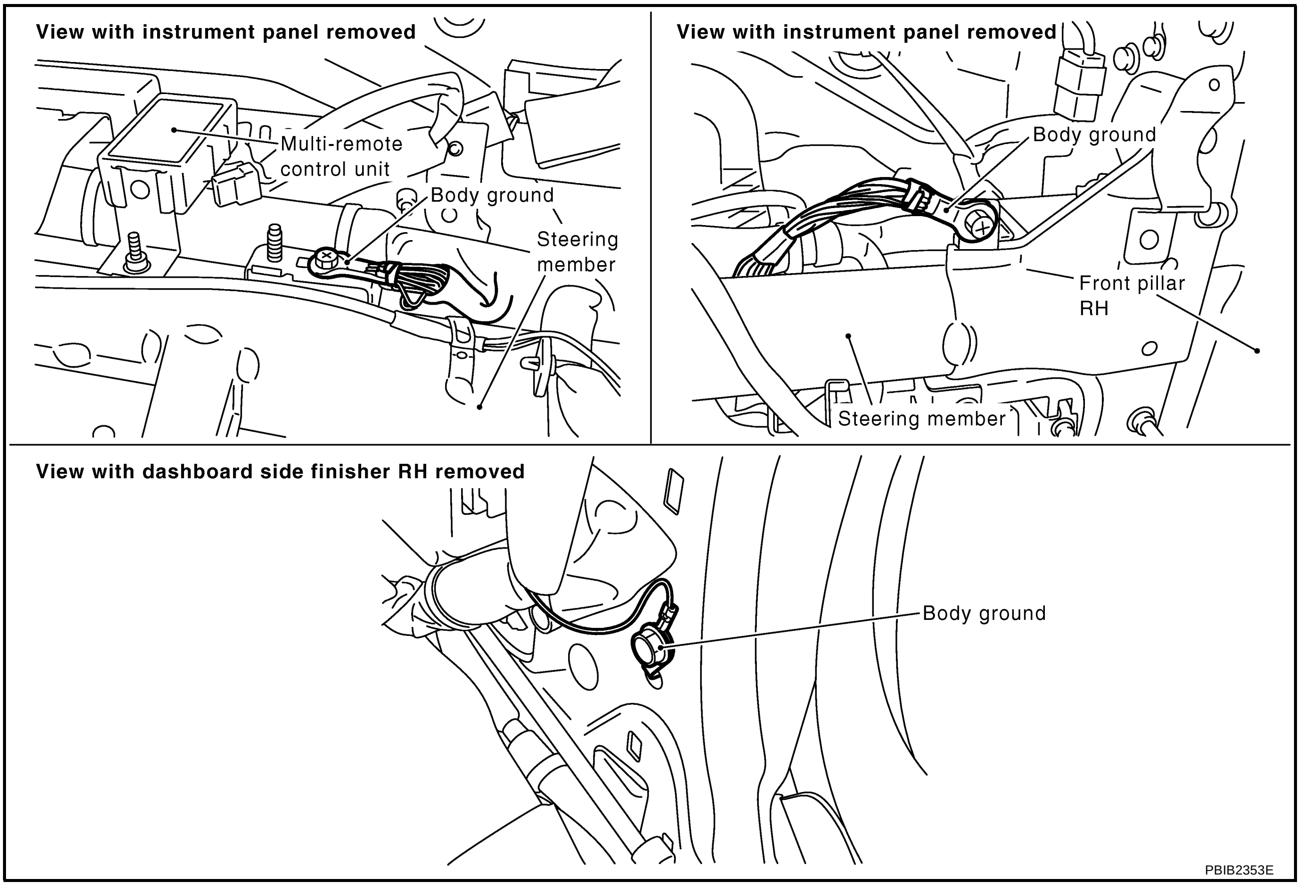
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	R	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5V
82	R/Y	Sensor ground (Accelerator pedal position sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	L	Sensor ground (Accelerator pedal position sensor 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	**[Ignition switch: ON]**	Approximately 5V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V
98	B/W	Accelerator pedal position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.15 - 0.6V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	3.9 - 4.7V

Diagnostic Procedure

ABS00D8U

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

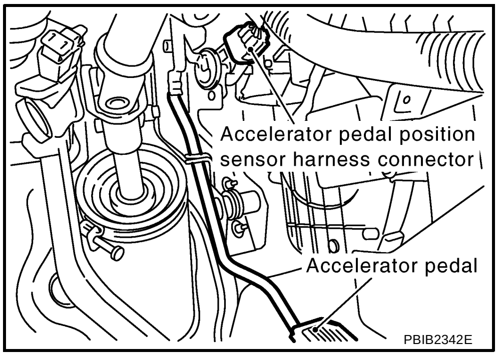


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

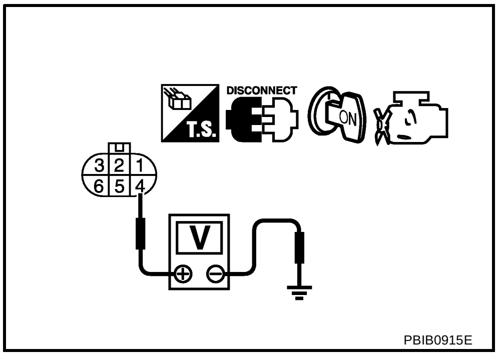
1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.



PBIB2342E

3. Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



PBIB0915E

OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 91. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	EC-572
91	APP sensor terminal 4	EC-564

OK or NG

OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK THROTTLE POSITION SENSOR

Refer to EC-577, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> GO TO 6.

6. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK APP SENSOR 2 GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 1 and ECM terminal 83.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK APP SENSOR 2 INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between APP sensor terminal 2 and ECM terminal 98.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR

Refer to EC-569, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

11. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

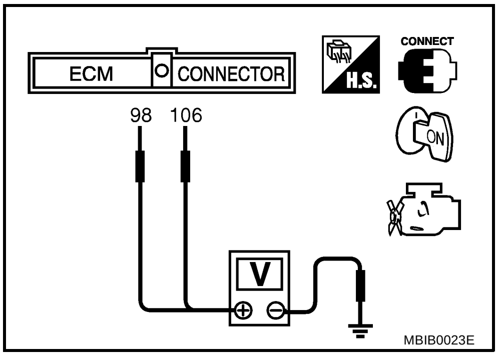
>> **INSPECTION END**

Component Inspection

ABS00CYB

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.15 - 0.6V
	Fully depressed	1.95 - 2.4V

4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-88, "Accelerator Pedal Released Position Learning" .
6. Perform EC-88, "Throttle Valve Closed Position Learning" .
7. Perform EC-88, "Idle Air Volume Learning" .

Remove and Installation

ABS00CYC

ACCELERATOR PEDAL

Refer to ACC-3, "ACCELERATOR CONTROL SYSTEM" .

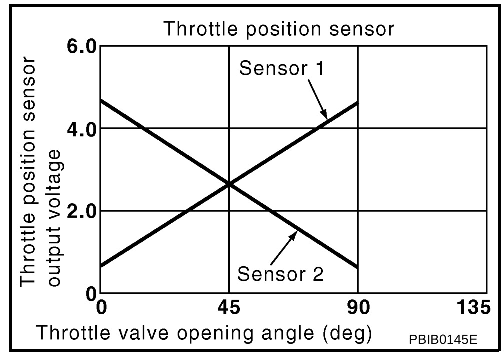
DTC P2135 TP SENSOR

PFP:16119

Component Description

ABS00CYD

Electric throttle control actuator consists of throttle control motor, throttle position sensor, etc. The throttle position sensor responds to the throttle valve movement.
The throttle position sensor has two sensors. These sensors are a kind of potentiometers which transform the throttle valve position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the throttle valve and feed the voltage signals to the ECM. The ECM judges the current opening angle of the throttle valve from these signals and the ECM controls the throttle control motor to make the throttle valve opening angle properly in response to driving condition.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CYE

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL SEN 1 THRTL SEN 2*	● Ignition switch: ON (Engine stopped) ● Shift lever: D (A/T), 1ST (M/T)	Accelerator pedal: Fully released	More than 0.36V
		Accelerator pedal: Fully depressed	Less than 4.75V

*: Throttle position sensor 2 signal is converted by ECM internally. Thus, they differs from ECM terminal voltage signal.

On Board Diagnosis Logic

ABS00CYF

This self-diagnosis has the one trip detection logic.

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2135 2135	Throttle position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from TP sensor 1 and TP sensor 2.	● Harness or connector (The TP sensor 1 and 2 circuit is open or shorted.) (The APP sensor 2 circuit is shorted.) ● Electric throttle control actuator (TP sensor 1 and 2) ● Accelerator pedal position sensor (APP sensor 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operation condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

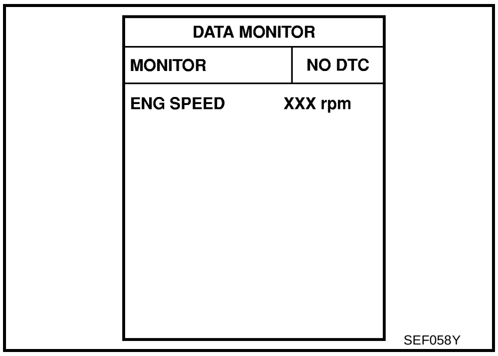
ABS00CYG

NOTE:
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.
TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.

2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-574, "Diagnostic Procedure" .



SEF058Y

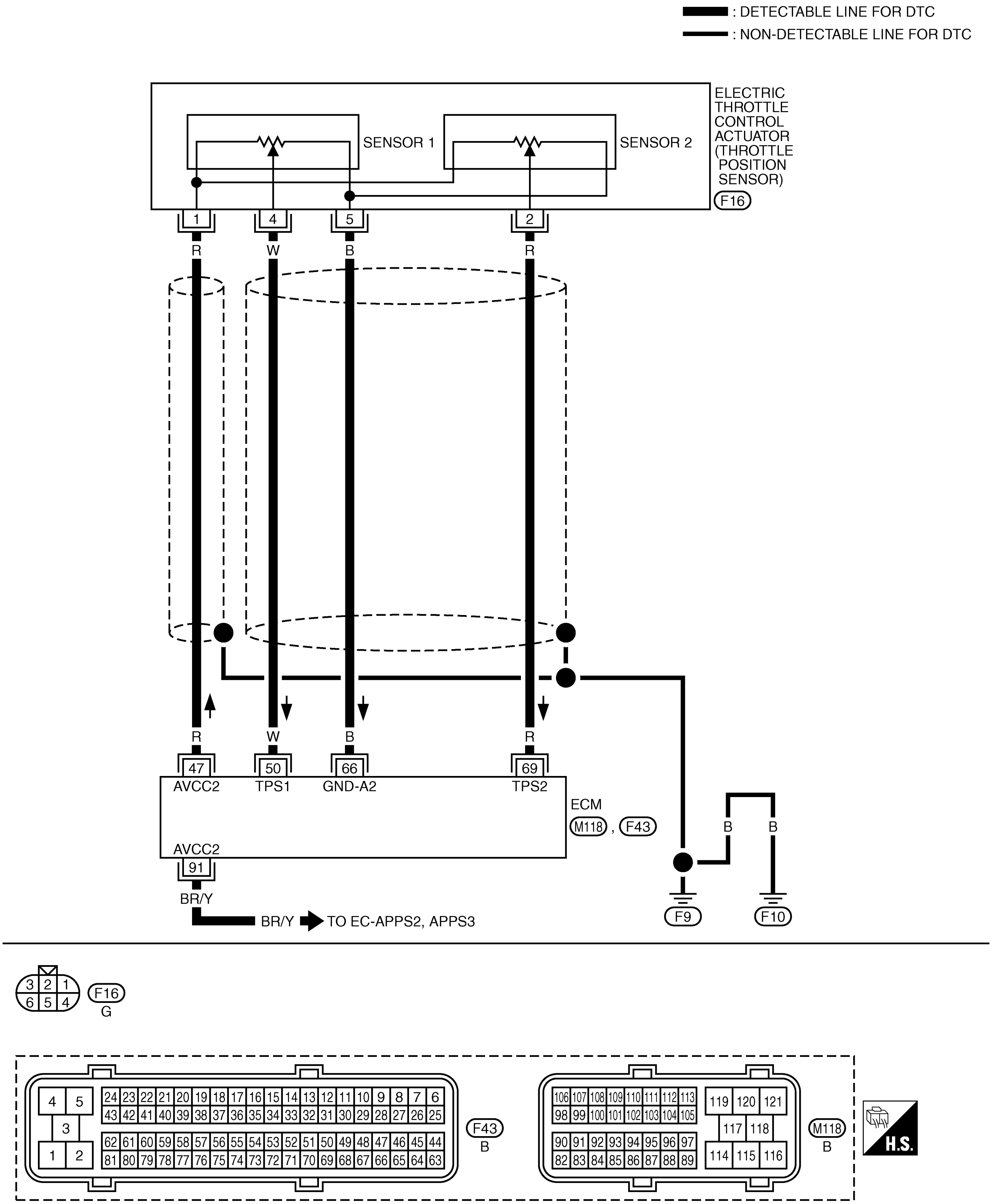
WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CYH

EC-TPS3-01



TBWB0132E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

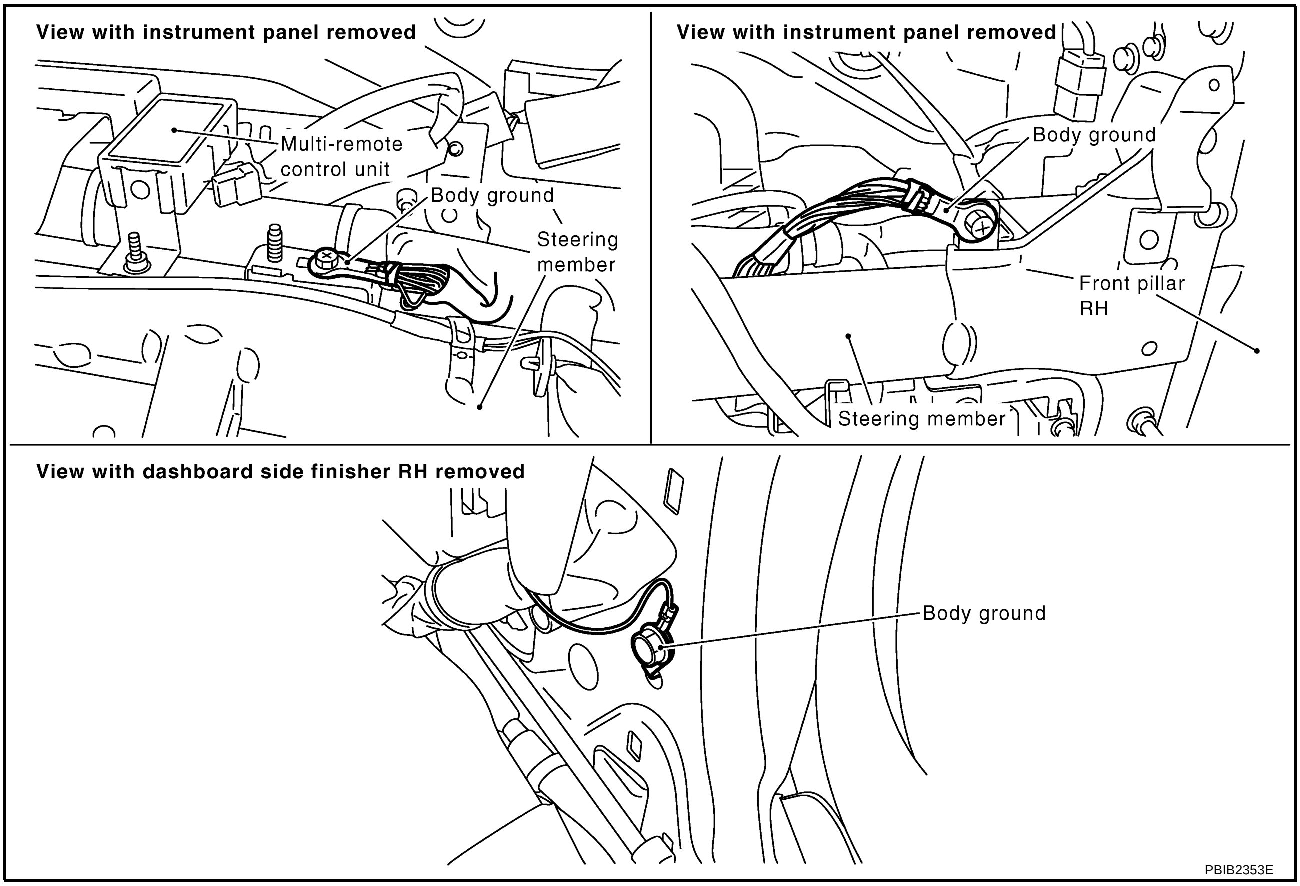
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	R	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5V
50	W	Throttle position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	More than 0.36V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	Less than 4.75V
66	B	Sensor ground (Throttle position sensor)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
69	R	Throttle position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully released	Less than 4.75V
			[Ignition switch: ON] ● Engine stopped ● Shift lever: D (A/T), 1ST (M/T) ● Accelerator pedal: Fully depressed	More than 0.36V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V

Diagnostic Procedure

ABS00D8V

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

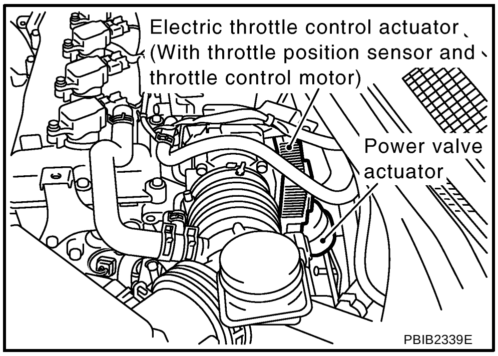


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

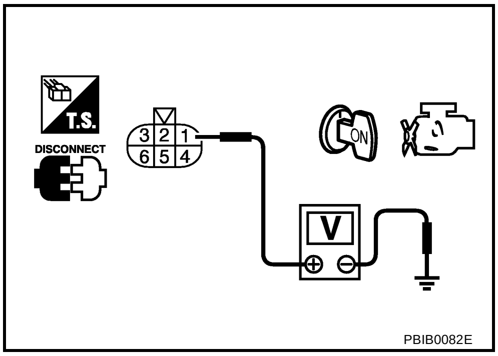
2. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-I

1. Disconnect electric throttle control actuator harness connector.
2. Turn ignition switch ON.



3. Check voltage between electric throttle control actuator terminal 1 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 7.
NG >> GO TO 3.

3. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 1 and ECM terminal 47. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair or replace open circuit.

4. CHECK THROTTLE POSITION SENSOR POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	EC-572
91	APP sensor terminal 4	EC-564

OK or NG

OK >> GO TO 5.
NG >> Repair short to ground or short to power in harness or connectors.

5. CHECK APP SENSOR

Refer to EC-569, "Component Inspection" .

OK or NG

OK >> GO TO 11
NG >> GO TO 6.

6. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

7. CHECK THROTTLE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between electric throttle control actuator terminal 5 and ECM terminal 66.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK THROTTLE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
   electric throttle control actuator terminal 4 and ECM terminal 50,
   electric throttle control actuator terminal 2 and ECM terminal 69.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK THROTTLE POSITION SENSOR

Refer to EC-577, "Component Inspection" .

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

11. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

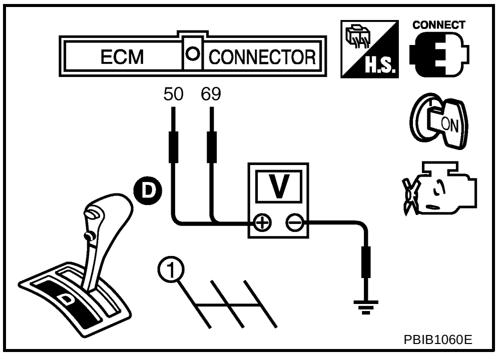
>> **INSPECTION END**

Component Inspection

ABS00CYJ

THROTTLE POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Turn ignition switch ON.
4. Set shift lever to D (A/T) or 1st (M/T) position.
5. Check voltage between ECM terminals 50 (TP sensor 1), 69 (TP sensor 2) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
50 (Throttle position sensor 1)	Fully released	More than 0.36V
	Fully depressed	Less than 4.75V
69 (Throttle position sensor 2)	Fully released	Less than 4.75V
	Fully depressed	More than 0.36V

6. If NG, replace electric throttle control actuator and go to the next step.
7. Perform EC-88, "Throttle Valve Closed Position Learning" .
8. Perform EC-88, "Idle Air Volume Learning" .

Remove and Installation

ABS00CYK

ELECTRIC THROTTLE CONTROL ACTUATOR

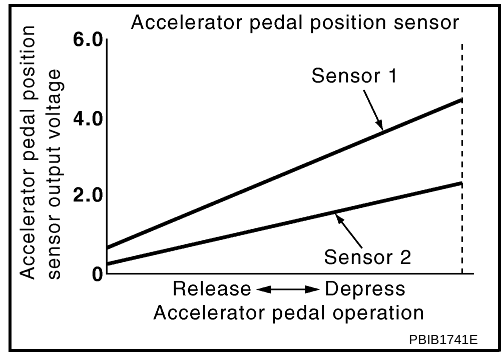
Refer to EM-16, "INTAKE MANIFOLD" .

DTC P2138 APP SENSOR

PFP:18002

Component Description

ABS00CYL



The accelerator pedal position sensor is installed on the upper end of the accelerator pedal assembly. The sensor detects the accelerator position and sends a signal to the ECM.
Accelerator pedal position sensor has two sensors. These sensors are a kind of potentiometers which transform the accelerator pedal position into output voltage, and emit the voltage signal to the ECM. In addition, these sensors detect the opening and closing speed of the accelerator pedal and feed the voltage signals to the ECM. The ECM judges the current opening angle of the accelerator pedal from these signals and controls the throttle control motor based on these signals.
Idle position of the accelerator pedal is determined by the ECM receiving the signal from the accelerator pedal position sensor. The ECM uses this signal for the engine operation such as fuel cut.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CYM

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
ACCEL SEN 1	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.5 - 1.0V
		Accelerator pedal: Fully depressed	4.0 - 4.7V
ACCEL SEN 2*	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	0.3 - 1.2V
		Accelerator pedal: Fully depressed	3.9 - 4.8V
CLSD THL POS	● Ignition switch: ON (Engine stopped)	Accelerator pedal: Fully released	ON
		Accelerator pedal: Slightly depressed	OFF

*: Accelerator pedal position sensor 2 signal is converted by ECM internally. Thus, they differs from ECM terminal voltage signal.

On Board Diagnosis Logic

ABS00CYN

This self-diagnosis has the one trip detection logic.

NOTE:
If DTC P2138 is displayed with DTC P1229, first perform the trouble diagnosis for DTC P1229. Refer to **EC-499 .**

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P2138 2138	Accelerator pedal position sensor circuit range/performance problem	Rationally incorrect voltage is sent to ECM compared with the signals from APP sensor 1 and APP sensor 2.	● Harness or connector (The APP sensor 1 and 2 circuit is open or shorted.) (The TP sensor circuit is shorted.) ● Accelerator pedal position sensor (APP sensor 1 and 2) ● Electric throttle control actuator (TP sensor 1 and 2)

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Engine operating condition in fail-safe mode
The ECM controls the electric throttle control actuator in regulating the throttle opening in order for the idle position to be within +10 degrees. The ECM regulates the opening speed of the throttle valve to be slower than the normal condition. So, the acceleration will be poor.

DTC Confirmation Procedure

ABS00CYO

NOTE:

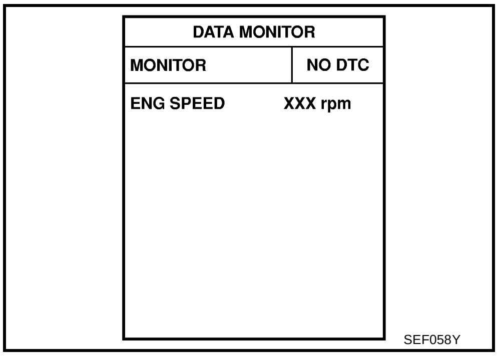
If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select “DATA MONITOR” mode with CONSULT-II.
3. Start engine and let it idle for 1 second.
4. If DTC is detected, go to EC-582, "Diagnostic Procedure" .



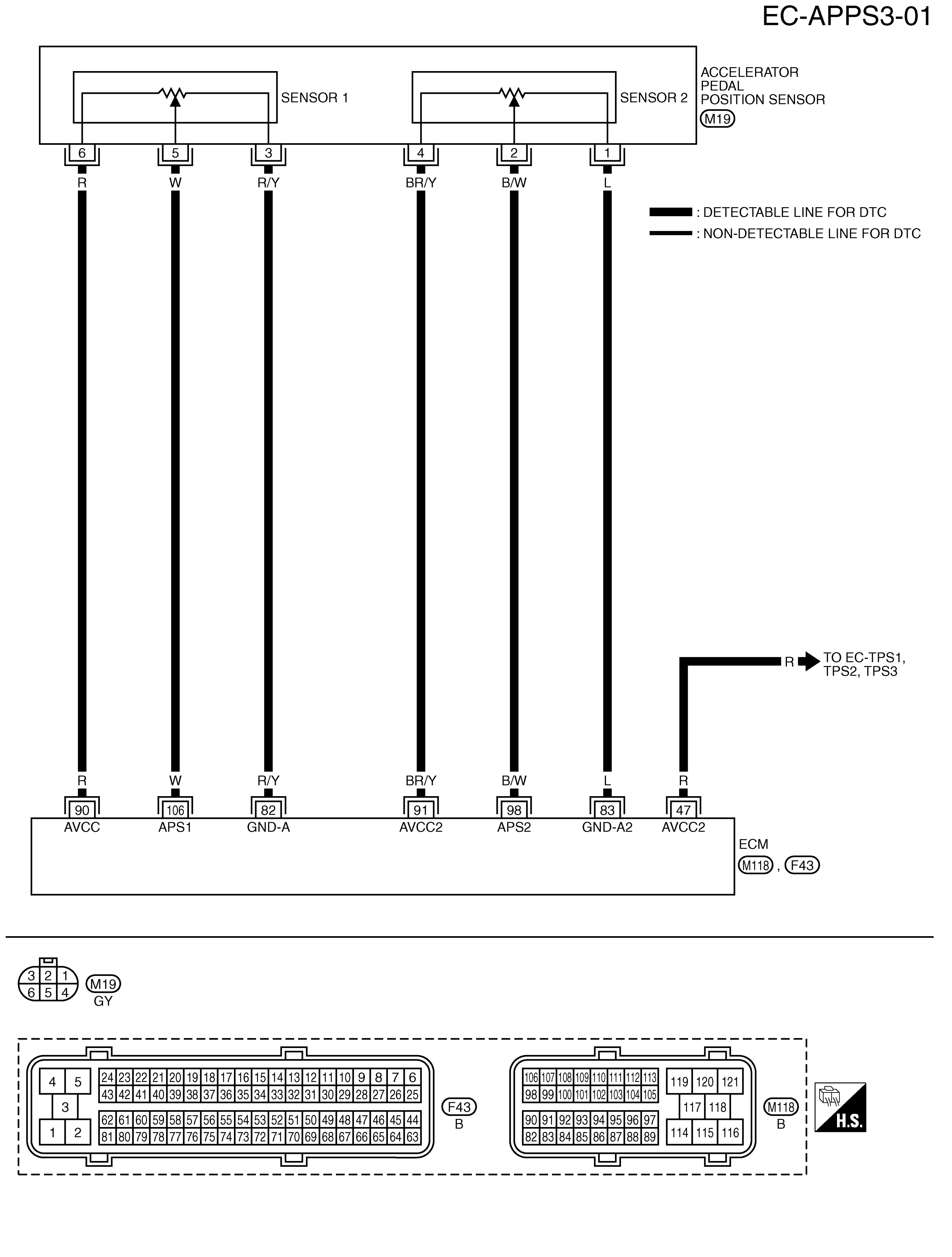
SEF058Y

WITH GST

Follow the procedure “WITH CONSULT-II” above.

Wiring Diagram

ABS00CYP



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

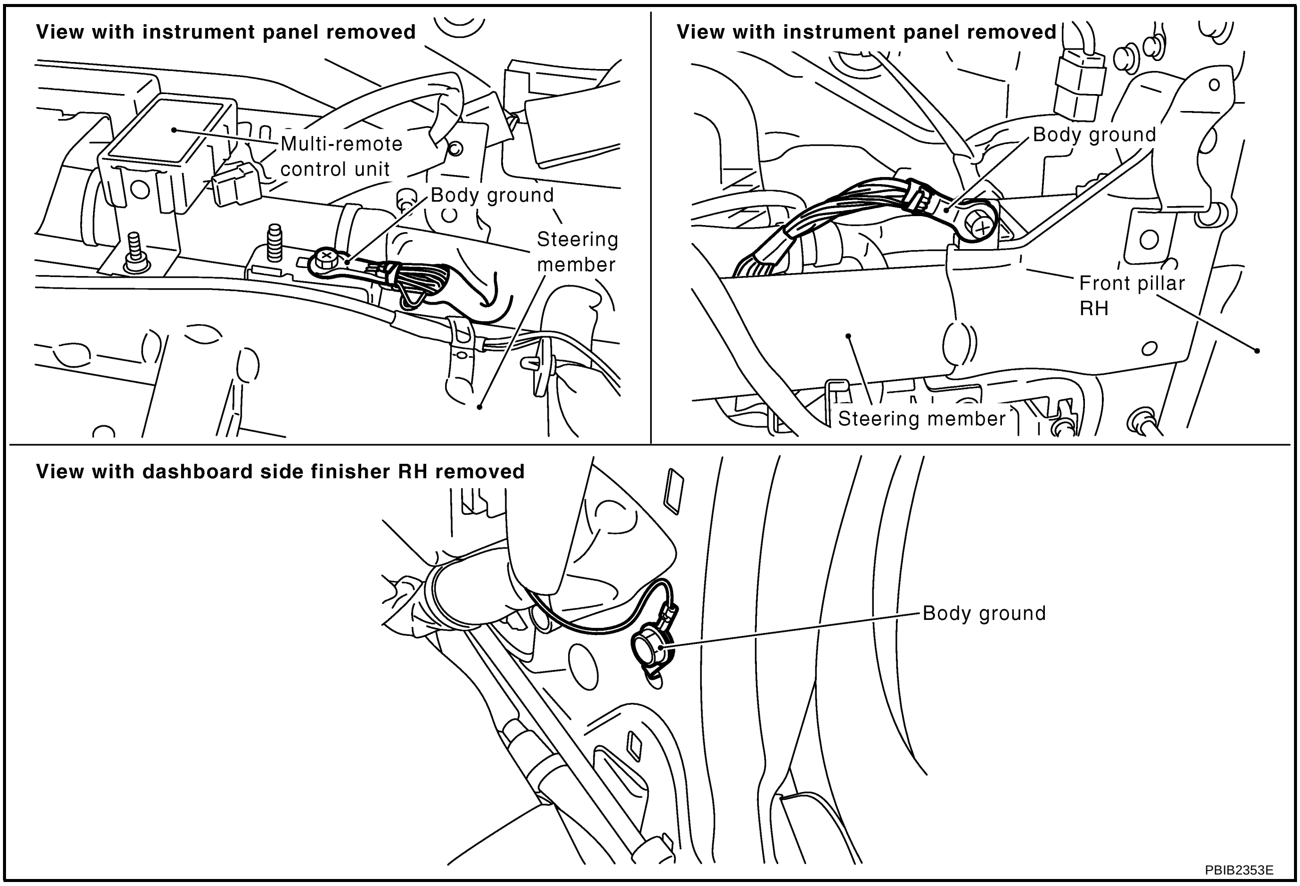
TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
47	R	Sensor power supply (Throttle position sensor)	**[Ignition switch: ON]**	Approximately 5V
82	R/Y	Sensor ground (Accelerator pedal position sensor 1)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
83	L	Sensor ground (Accelerator pedal position sensor 2)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
90	R	Sensor power supply (Accelerator pedal position sensor 1)	**[Ignition switch: ON]**	Approximately 5V
91	BR/Y	Sensor power supply (Accelerator pedal position sensor 2)	**[Ignition switch: ON]**	Approximately 5V
98	B/W	Accelerator pedal position sensor 2	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.15 - 0.6V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	1.95 - 2.4V
106	W	Accelerator pedal position sensor 1	**[Ignition switch: ON]** ● Engine stopped ● Accelerator pedal: Fully released	0.5 - 1.0V
			[Ignition switch: ON] ● Engine stopped ● Accelerator pedal: Fully depressed	3.9 - 4.7V

Diagnostic Procedure

ABS00D8W

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

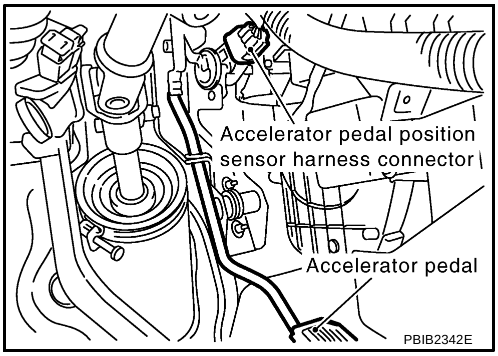


OK or NG

OK >> GO TO 2.
NG >> Repair or replace ground connections.

2. CHECK APP SENSOR 1 POWER SUPPLY CIRCUIT

1. Disconnect accelerator pedal position (APP) sensor harness connector.
2. Turn ignition switch ON.

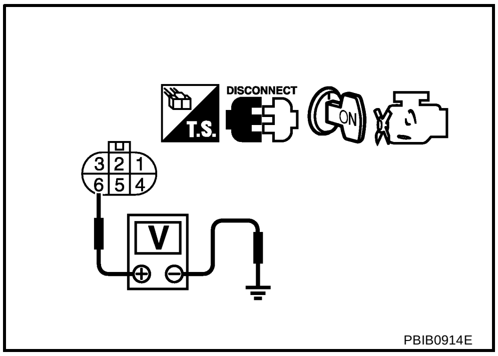


3. Check voltage between APP sensor terminal 6 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



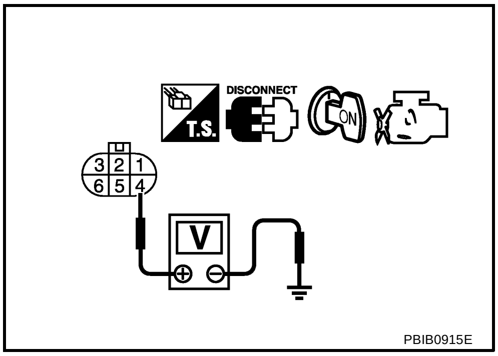
3. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-I

Check voltage between APP sensor terminal 4 and ground with CONSULT-II or tester.

Voltage: Approximately 5V

OK or NG

OK >> GO TO 8.
NG >> GO TO 4.



4. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between APP sensor terminal 4 and ECM terminal 91. Refer to Wiring Diagram.

Continuity should exist.

OK or NG

OK >> GO TO 5.
NG >> Repair or replace open circuit.

5. CHECK APP SENSOR 2 POWER SUPPLY CIRCUIT-III

Check harness for short to power and short to ground, between the following terminals.

ECM terminal	Sensor terminal	Reference Wiring Diagram
47	Electric throttle control actuator terminal 1	EC-572
91	APP sensor terminal 4	EC-564

OK or NG

OK >> GO TO 6.
NG >> Repair short to ground or short to power in harness or connectors.

6. CHECK THROTTLE POSITION SENSOR

Refer to EC-577, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> GO TO 7.

7. REPLACE ELECTRIC THROTTLE CONTROL ACTUATOR

1. Replace the electric throttle control actuator.
2. Perform EC-88, "Throttle Valve Closed Position Learning" .
3. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

8. CHECK APP SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between the following;
   APP sensor terminal 3 and ECM terminal 82,
   APP sensor terminal 1 and ECM terminal 83.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK APP SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between the following;
   APP sensor terminal 5 and ECM terminal 106,
   APP sensor terminal 2 and ECM terminal 98.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK APP SENSOR

Refer to EC-585, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> GO TO 11.

11. REPLACE ACCELERATOR PEDAL ASSEMBLY

1. Replace the accelerator pedal assembly.
2. Perform EC-88, "Accelerator Pedal Released Position Learning" .
3. Perform EC-88, "Throttle Valve Closed Position Learning" .
4. Perform EC-88, "Idle Air Volume Learning" .

>> **INSPECTION END**

12. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

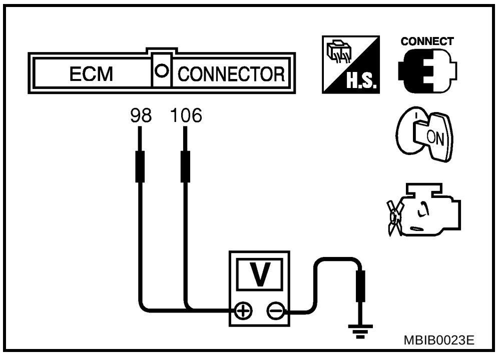
>> **INSPECTION END**

Component Inspection

ABS00CYR

ACCELERATOR PEDAL POSITION SENSOR

1. Reconnect all harness connectors disconnected.
2. Turn ignition switch ON.
3. Check voltage between ECM terminals 106 (APP sensor 1 signal), 98 (APP sensor 2 signal) and ground under the following conditions.



Terminal	Accelerator pedal	Voltage
106 (Accelerator pedal position sensor 1)	Fully released	0.5 - 1.0V
	Fully depressed	3.9 - 4.7V
98 (Accelerator pedal position sensor 2)	Fully released	0.15 - 0.6V
	Fully depressed	1.95 - 2.4V

4. If NG, replace accelerator pedal assembly and go to the next step.
5. Perform EC-88, "Accelerator Pedal Released Position Learning" .
6. Perform EC-88, "Throttle Valve Closed Position Learning" .
7. Perform EC-88, "Idle Air Volume Learning" .

Remove and Installation

ABS00CYS

ACCELERATOR PEDAL

Refer to ACC-3, "ACCELERATOR CONTROL SYSTEM" .

IGNITION SIGNAL

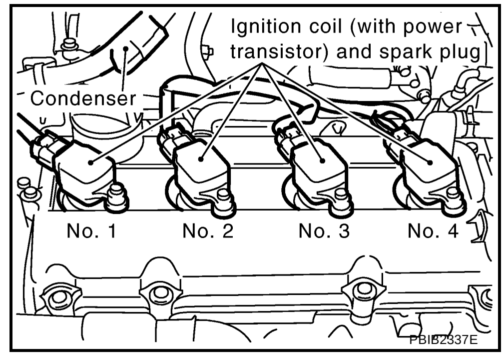
PFP:22448

Component Description

ABS00CYT

IGNITION COIL & POWER TRANSISTOR

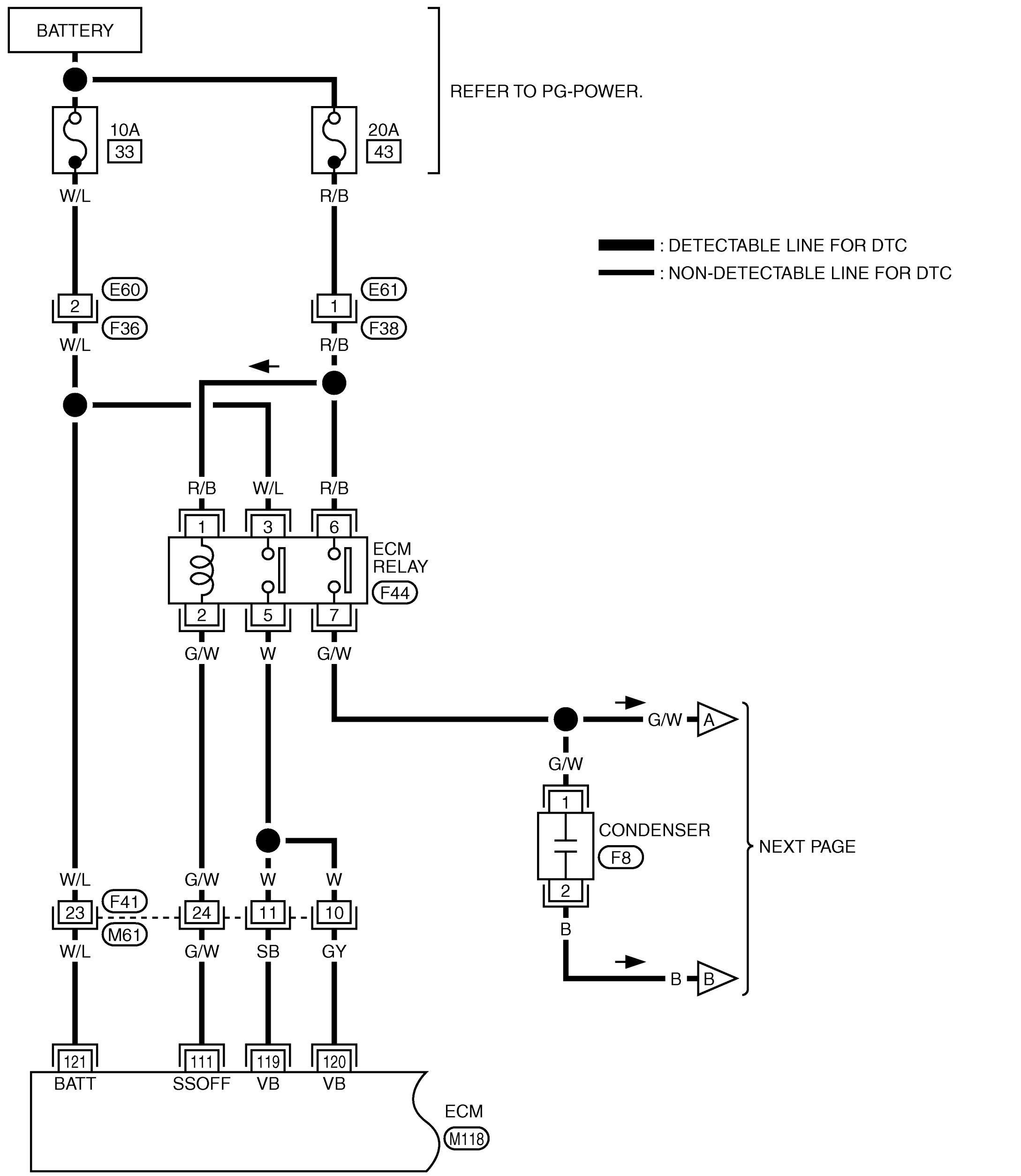
The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns ON and OFF the ignition coil primary circuit. This ON/OFF operation induces the proper high voltage in the coil secondary circuit.

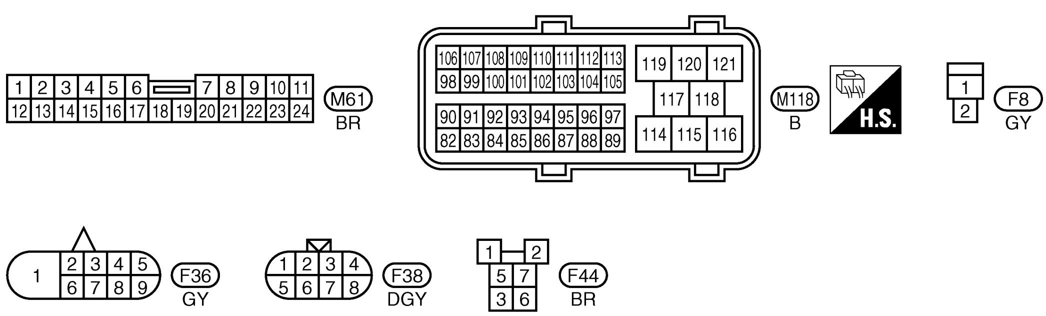


Wiring Diagram

ABS00CYU

EC-IGNSYS-01





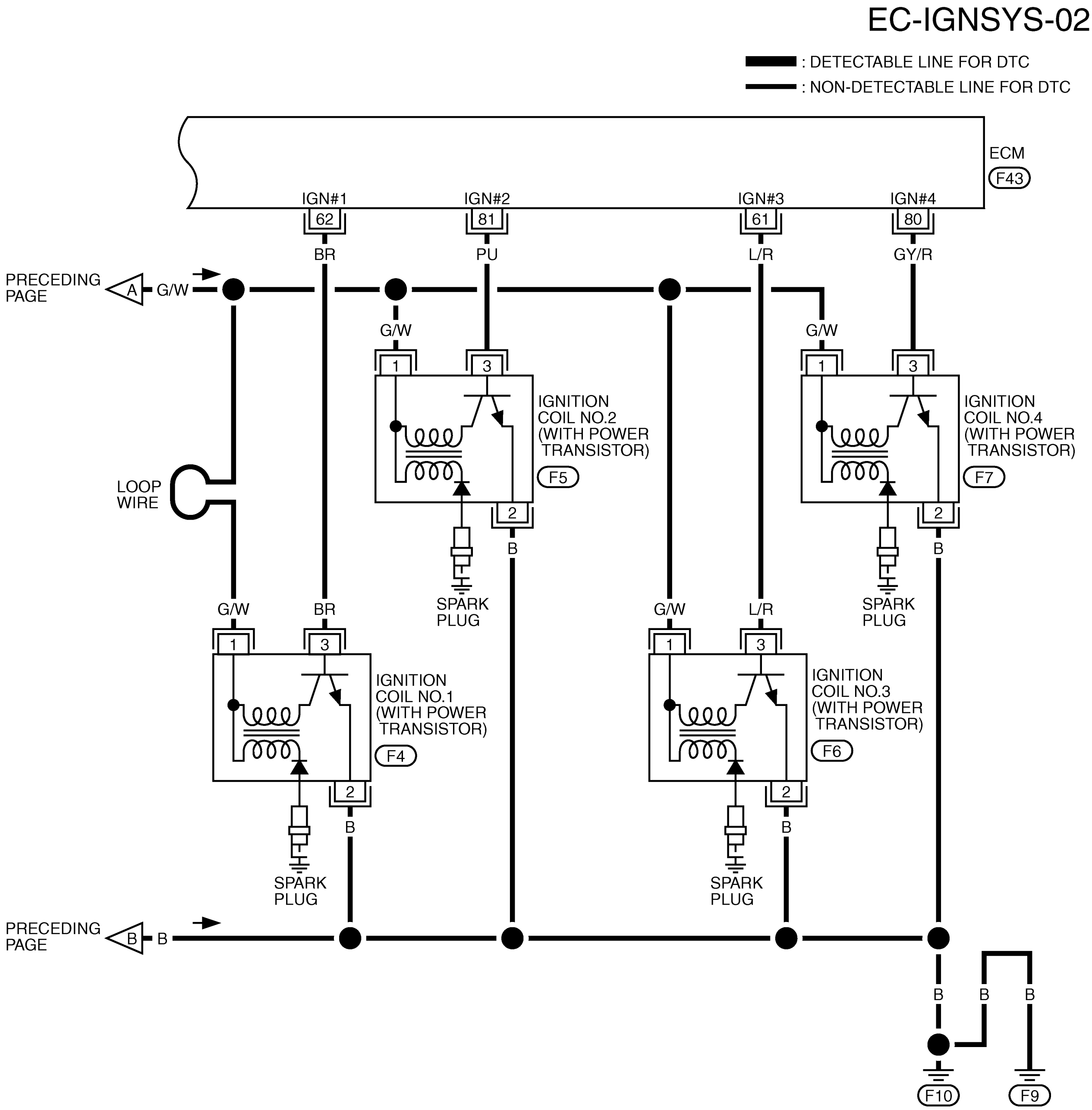
TBWA0628E

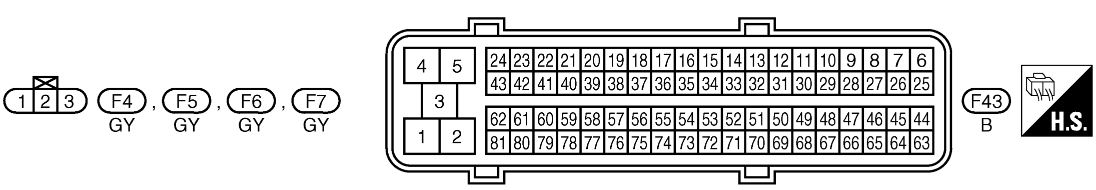
Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
111	G/W	ECM relay (Self shut-off)	**[Engine is running]** **[Ignition switch: OFF]** ● For a few seconds after turning ignition switch OFF	0 - 1.0V
			[Ignition switch: OFF] ● More than a few seconds after turning ignition switch OFF	BATTERY VOLTAGE (11 - 14V)
119 120	SB GY	Power supply for ECM	**[Ignition switch: ON]**	BATTERY VOLTAGE (11 - 14V)
121	W/L	Power supply for ECM (Back-up)	**[Ignition switch: OFF]**	BATTERY VOLTAGE (11 - 14V)


EC-IGNSYS-02
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
ECM
F43
IGN#1
IGN#2
IGN#3
IGN#4
62
81
61
80
BR
PU
L/R
GY/R
PRECEDING PAGE
A
G/W
LOOP WIRE
IGNITION COIL NO.1 (WITH POWER TRANSISTOR)
F4
IGNITION COIL NO.2 (WITH POWER TRANSISTOR)
F5
IGNITION COIL NO.3 (WITH POWER TRANSISTOR)
F6
IGNITION COIL NO.4 (WITH POWER TRANSISTOR)
F7
SPARK PLUG
PRECEDING PAGE
B
F10
F9

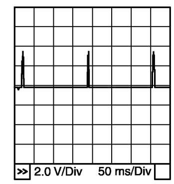
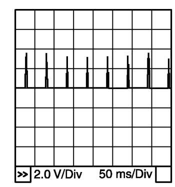

1 2 3
F4 , F5 , F6 , F7
GY GY GY GY
4 5 3 1 2
24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6
43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25
62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44
81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63
F43
B
H.S.

TBWB0133E

Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
61 62 80 81	L/R BR GY/R PU	Ignition signal No. 3 Ignition signal No. 1 Ignition signal No. 4 Ignition signal No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	0 - 0.1V★  PBIB0521E
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,000 rpm.	0 - 0.2V★  PBIB0522E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8X

1. CHECK ENGINE START

Turn ignition switch OFF, and restart engine.

Is engine running?

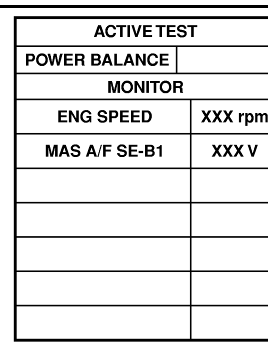
Yes or No

Yes (With CONSULT-II)>>GO TO 2.
Yes (Without CONSULT-II)>>GO TO 3.
No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-II

1. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
2. Make sure that each circuit produces a momentary engine speed drop.



PBIB0133E

OK or NG

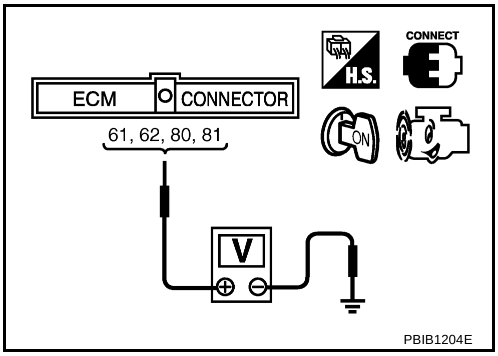
OK >> **INSPECTION END**
NG >> GO TO 12.

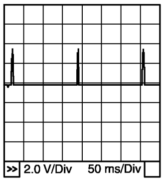
3. CHECK OVERALL FUNCTION

Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 61, 62, 80, 81 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.

NOTE:
The pulse cycle changes depending on rpm at idle.





PBIB0521E

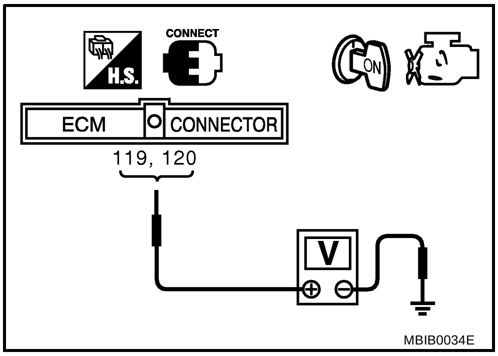
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 12.

4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 119, 120 and ground with CONSULT-II or tester.

Voltage: Battery voltage

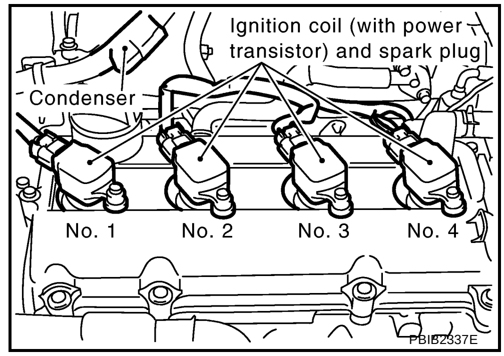


OK or NG

OK >> GO TO 5.
NG >> Go to EC-155, "POWER SUPPLY AND GROUND CIRCUIT" .

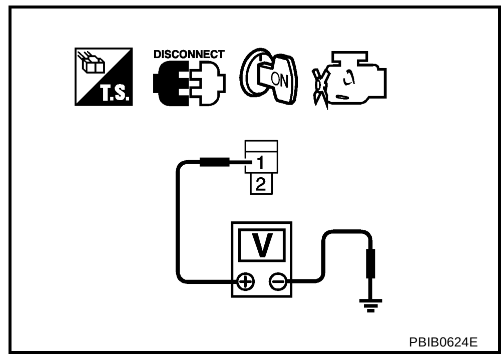
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Turn ignition switch ON.



4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

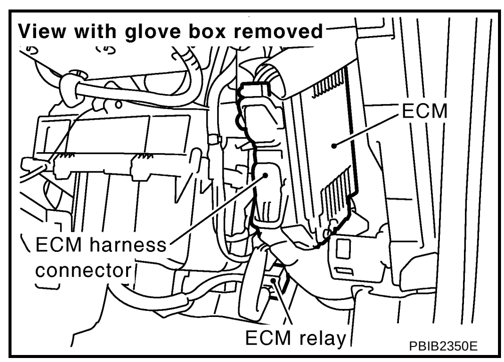
OK >> GO TO 10.
NG >> GO TO 6.

6. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect ECM relay.
3. Check harness continuity between ECM relay terminal 7 and condenser terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.



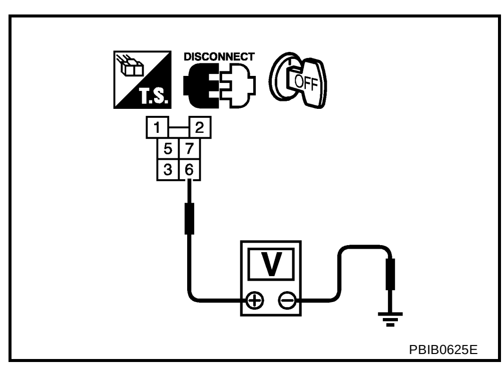
OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV

Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- 20A fuse
- Harness for open or short between ECM relay and battery

>> Repair or replace harness or connectors.

9. CHECK ECM RELAY

Refer to EC-595, "Component Inspection" .

OK or NG

OK >> GO TO 17.
NG >> Replace ECM relay.

10. CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between condenser terminal 2 and ground.
   Refer to Wiring diagram.

   Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair open circuit or short to power in harness or connector.

11. CHECK CONDENSER

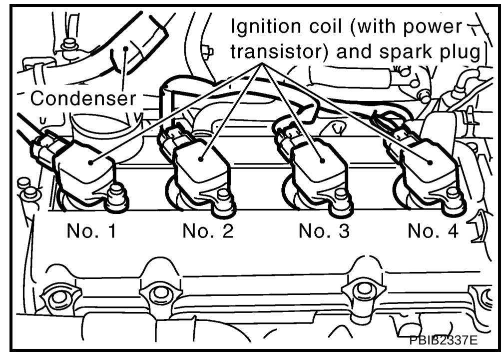
Refer to EC-595, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace condenser.

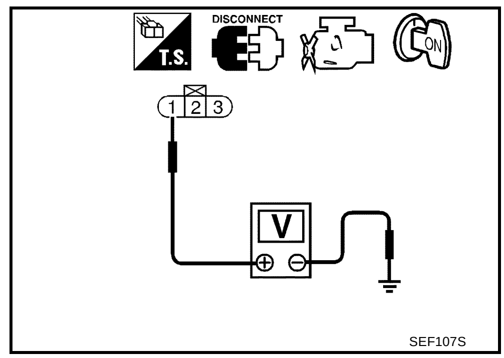
12. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch ON.



5. Check voltage between ignition coil terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 13.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

13. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and ground. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 14.
NG >> Repair open circuit or short to power in harness or connectors.

14. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 61, 62, 80, 81 and ignition coil terminal 3. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to EC-595, "Component Inspection" .

OK or NG

OK >> GO TO 16.
NG >> Replace ignition coil with power transistor.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

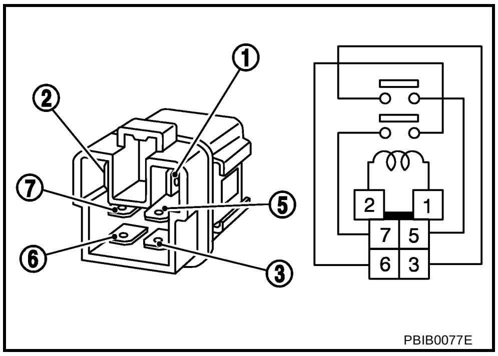
ABS00CYW

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



PBIB0077E

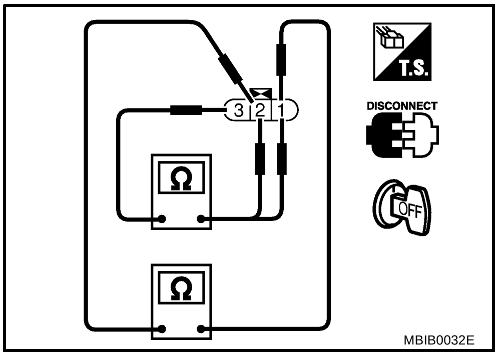
IGNITION COIL WITH POWER TRANSISTOR

CAUTION:

Do the following procedure in the place where ventilation is good without the combustible.

1. Turn ignition switch OFF.
2. Disconnect ignition coil harness connector.
3. Check resistance between ignition coil terminals as follows.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 and 2	Except 0 or ∞
1 and 3	Except 0
2 and 3	

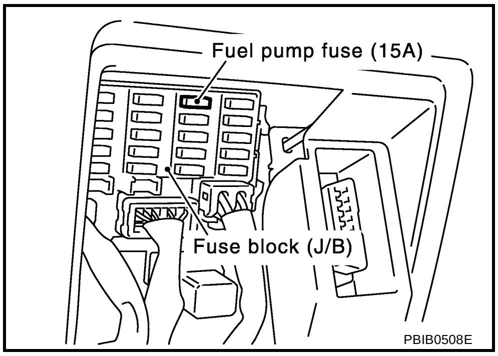


MBIB0032E

4. If NG, Replace ignition coil with power transistor.
   If OK, go to next step.
5. Turn ignition switch OFF.
6. Reconnect all harness connectors disconnected.
7. Remove fuel pump fuse in located in fuse box to release fuel pressure.

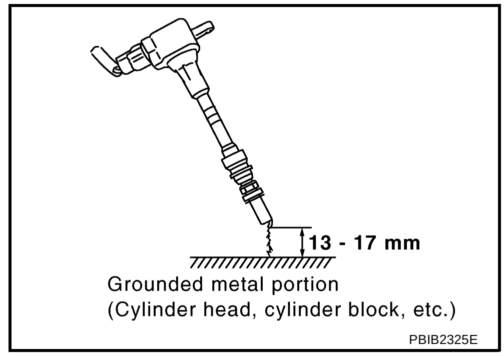
   NOTE:

   Do not use CONSULT-II to release fuel pressure, or fuel pressure applies again during the following procedure.
8. Start engine.
9. After engine stalls, crank it two or three times to release all fuel pressure.
10. Turn ignition switch OFF.
11. Remove ignition coil harness connectors to avoid the electrical discharge from the ignition coils.
12. Remove ignition coil and spark plug of the cylinder to be checked.
13. Crank engine for 5 seconds or more to remove combustion gas in the cylinder.



PBIB0508E

14. Connect spark plug and harness connector to ignition coil.
15. Fix ignition coil using a rope etc. with gap of 13 - 17 mm between the edge of the spark plug and grounded metal portion as shown in the figure.



16. Crank engine for about three seconds, and check whether spark is generated between the spark plug and the grounded part.

    Spark should be generated.

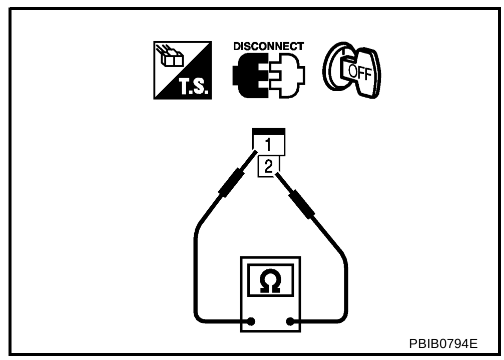
    CAUTION:
    - **Do not approach to the spark plug and the ignition coil within 50cm. Be careful not to get an electrical shock while checking, because the electrical discharge voltage becomes 20kV or more.**
    - **It might cause to damage the ignition coil if the gap of more than 17 mm is taken.**

    NOTE:
    When the gap is 13 mm or less, the spark might be generated even if the coil is malfunctioning.
17. If NG, Replace ignition coil with power transistor.

CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals as 1 and 2.

    Resistance: Above 1 MΩ [at 25°C (77°F)]



Removal and Installation

ABS00CYX

IGNITION COIL WITH POWER TRANSISTOR

Refer to EM-27, "IGNITION COIL" .

VIAS

PFP:14956

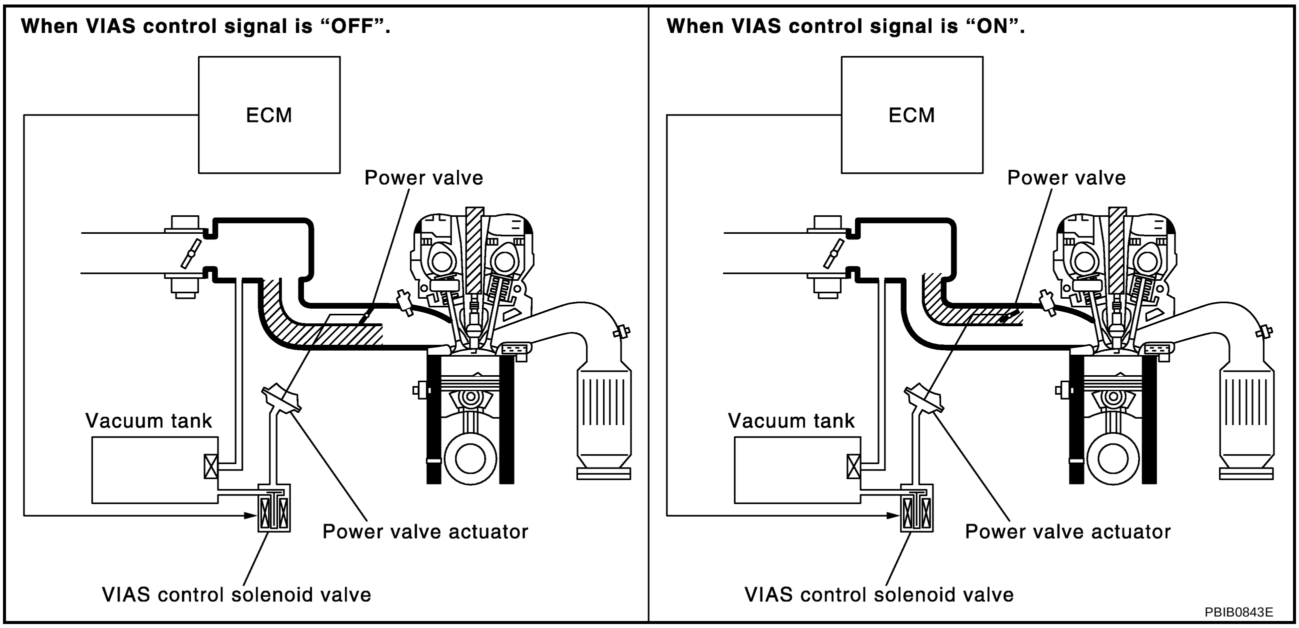
Description

ABS00CYY

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM function	Actuator
Mass air flow sensor	Amount of intake air	VIAS control	VIAS control solenoid valve
Throttle position sensor	Throttle position		
Accelerator pedal position sensor	Closed throttle position		
Battery	Battery voltage*		
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*		
Engine coolant temperature sensor	Engine coolant temperature		

*: ECM determines the start signal status by the signals of engine speed and battery voltage.

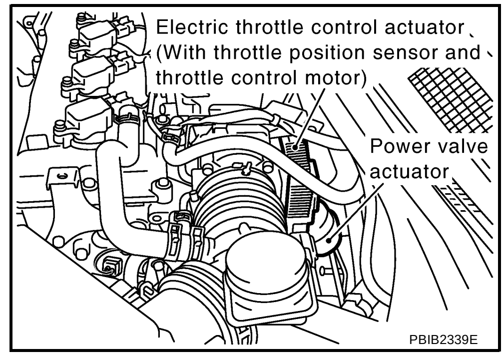


When the engine is running at low or medium speed, the power valve is fully closed. Under this condition, the effective suction port length is equivalent to the total length of the intake manifold collector's suction port including the intake valve. This long suction port provides increased air intake which results in improved suction efficiency and higher torque generation.
The surge tank and one-way valve are provided. When engine is running at high speed, the ECM sends the signal to the VIAS control solenoid valve. This signal introduces the intake manifold vacuum into the power valve actuator and therefore opens the power valve to two suction passages together in the collector.
Under this condition, the effective port length is equivalent to the length of the suction port provided independently for each cylinder. This shortened port length results in enhanced engine output with reduced suction resistance under high speeds.

COMPONENT DESCRIPTION

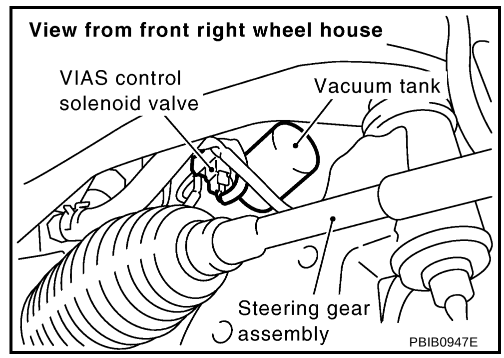
Power Valve Actuator

The power valve actuator is installed in intake manifold collector and used to control the suction passage of the variable induction air control system. It is set in the fully closed or fully opened position by the power valve actuator operated by the vacuum stored in the surge tank. The vacuum in the surge tank is controlled by the VIAS control solenoid valve.



VIAS Control Solenoid Valve

The VIAS control solenoid valve cuts the intake manifold vacuum signal for power valve actuator. It responds to ON/OFF signals from the ECM. When the solenoid is off, the vacuum signal from the intake manifold is cut. When the ECM sends an ON signal the coil pulls the plunger downward and feeds the vacuum signal to the power valve actuator.



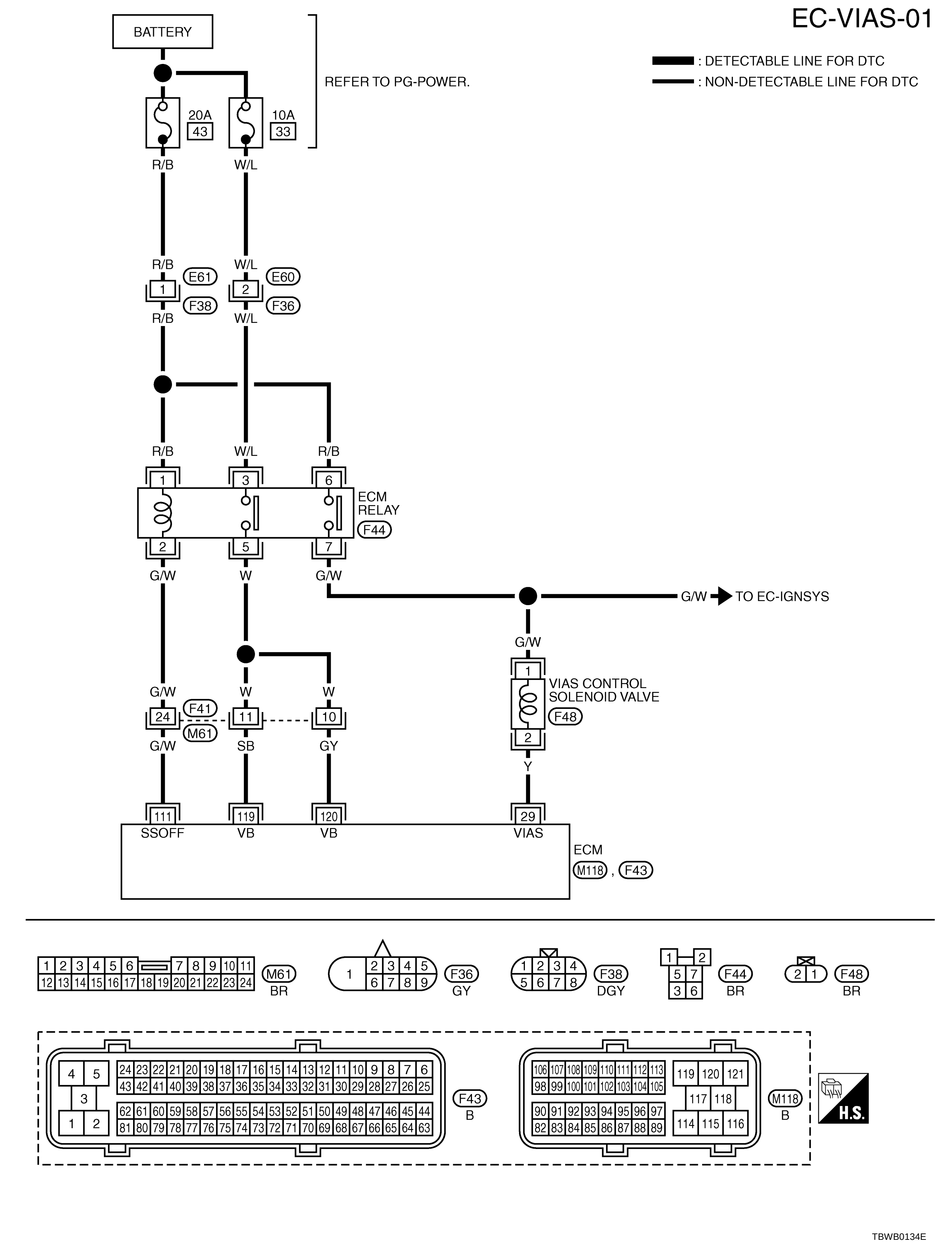
CONSULT-II Reference Value in Data Monitor Mode

ABS00CYZ

MONITOR ITEM	CONDITION		SPECIFICATION
VIAS S/V	● Engine: After warming up	Idle	OFF
		More than 5,000 rpm	ON

Wiring Diagram

ABS00CZ0



A
EC
C
D
E
F
G
H
I
J
K
L
M

Specification data are reference values and are measured between each terminal and body ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
29	Y	VIAS control solenoid valve	**[Engine is running]** ● Idle speed	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] ● Engine speed: Above 5,000 rpm	0 - 1.0V

Diagnostic Procedure

ABS00D8Y

1. CHECK OVERALL FUNCTION

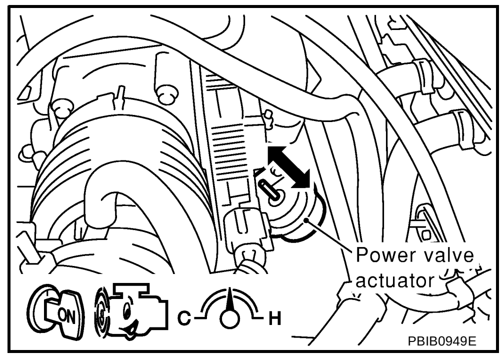
With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Perform “VIAS SOL VALVE” in “ACTIVE TEST” mode with CONSULT-II.

ACTIVE TEST	
VIAS SOL VALVE	OFF
MONITOR	
ENG SPEED	XXX rpm

PBIB0844E

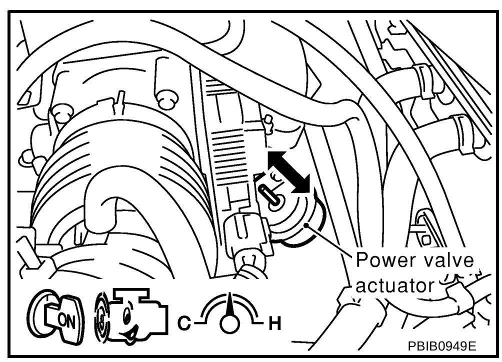
3. Turn VIAS control solenoid valve ON and OFF, and make sure that power valve actuator rod moves.



PBIB0949E

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Rev engine quickly up to above 5,000 rpm and make sure that power valve actuator rod moves.



PBIB0949E

OK or NG

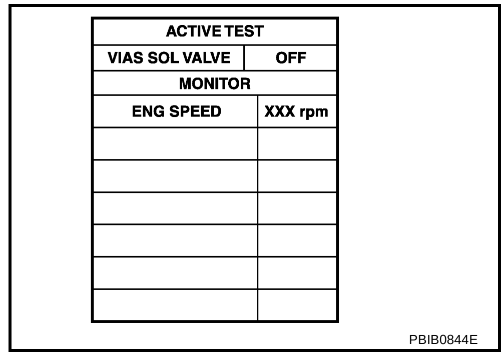
OK >> **INSPECTION END**
NG (With CONSULT-II) >>GO TO 2.
NG (Without CONSULT-II) >>GO TO 3.

2. CHECK VACUUM EXISTENCE

With CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Start engine and let it idle.
3. Perform “VIAS SOL VALVE” in “ACTIVE TEST” mode with CONSULT-II.
4. Turn VIAS control solenoid valve ON and OFF, and check vacuum existence under the following conditions.

VIAS SOL VALVE	Vacuum
ON	Should exist.
OFF	Should not exist.



OK or NG

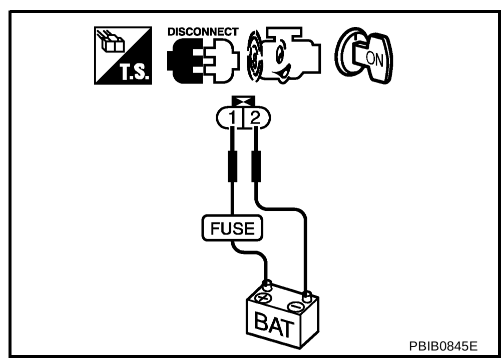
OK >> Repair or replace power valve actuator.
NG >> GO TO 4.

3. CHECK VACUUM EXISTENCE

Without CONSULT-II

1. Stop engine and disconnect vacuum hose connected to power valve actuator.
2. Disconnect VIAS control solenoid valve harness connector.
3. Start engine and let it idle.
4. Apply 12V of direct current between VIAS control solenoid valve terminals 1 and 2.
5. Check vacuum existence under the following conditions.

Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.

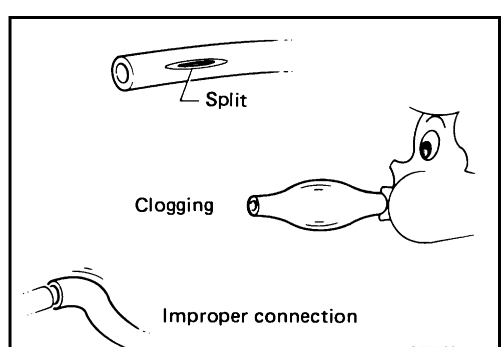


OK or NG

OK >> Repair or replace power valve actuator.
NG >> GO TO 4.

4. CHECK VACUUM HOSE

1. Stop engine.
2. Check hoses and tubes between intake manifold and power valve actuator for crack, clogging, improper connection or disconnection. Refer to EC-112, "Vacuum Hose Drawing" .



OK or NG

OK >> GO TO 5.
NG >> Repair hoses or tubes.

5. CHECK VACUUM TANK

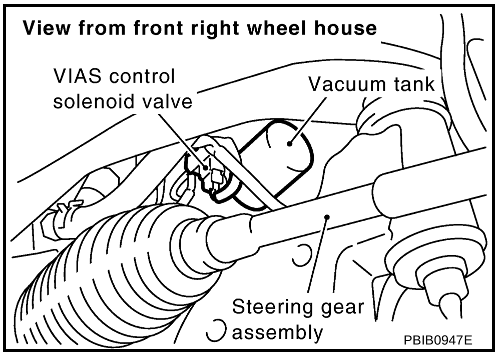
Refer to EC-605, "Component Inspection" .

OK or NG

OK >> GO TO 6.
NG >> Replace vacuum tank.

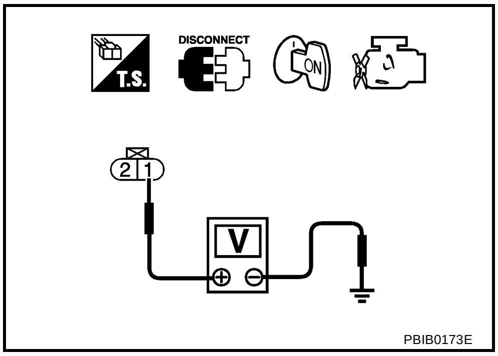
6. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT-I

1. Disconnect VIAS control solenoid valve harness connector.
2. Turn ignition switch ON.



3. Check voltage between VIAS control solenoid valve terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

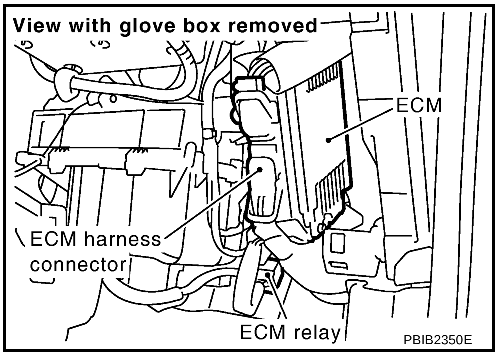
OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect ECM relay.
3. Check harness continuity between ECM relay terminal 7 and condenser terminal 1.
   Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.



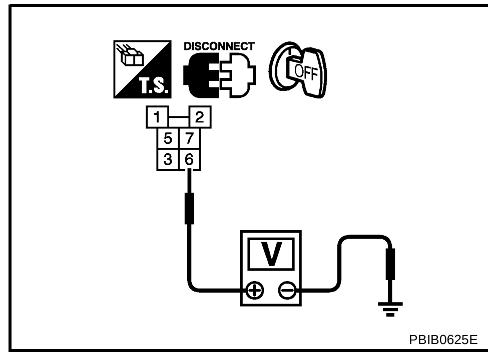
OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK VIAS CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT-III

Check voltage between ECM relay terminal 6 and ground with CON-SULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- 20A fuse
- Harness for open or short between ECM relay and battery

>> Repair or replace harness or connectors.

10. CHECK ECM RELAY

Refer to EC-595, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace ECM relay.

11. CHECK VIAS CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between VIAS control solenoid valve terminal 2 and ECM terminal 29. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK VIAS CONTROL SOLENOID VALVE

Refer to EC-605, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace VIAS control solenoid valve.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

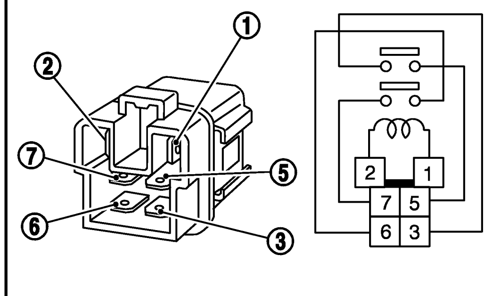
ABS00CZ2

ECM RELAY

1. Apply 12V direct current between ECM relay terminals 1 and 2.
2. Check continuity between relay terminals 3 and 5, 6 and 7.

Condition	Continuity
12V direct current supply between terminals 1 and 2	Yes
OFF	No

3. If NG, replace ECM relay.



PBIB0077E

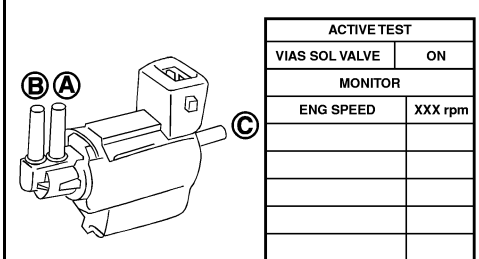
VIAS CONTROL SOLENOID VALVE

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch ON.
3. Perform “VIAS SOL VALVE” in “ACTIVE TEST” mode.
4. Check air passage continuity and operation delay time under the following conditions.

Condition VIAS SOL VALVE	Air passage continuity between A and B	Air passage continuity between A and C
ON	Yes	No
OFF	No	Yes

Operation takes less than 1 second.



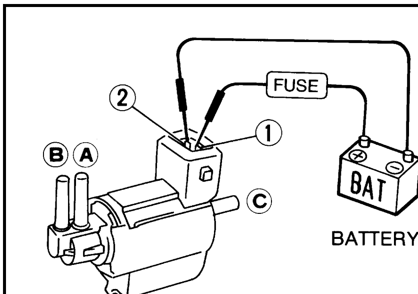
PBIB0177E

With GST

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B	Air passage continuity between A and C
12V direct current supply between terminals 1 and 2	Yes	No
No supply	No	Yes

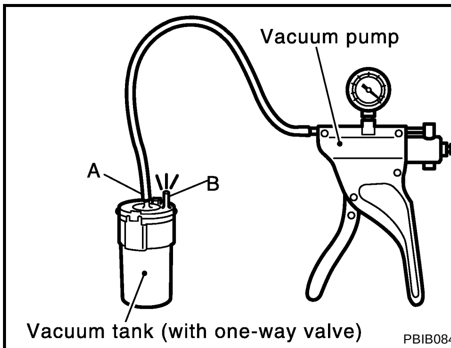
Operation takes less than 1 second.



MEC488B

VACUUM TANK

1. Disconnect vacuum hose connected to vacuum tank.
2. Connect a vacuum pump to the port **A** of vacuum pump.
3. Apply vacuum and make sure that vacuum exists at the port **B** .



PBIB0846E

Removal and Installation

ABS00CZ3

VIAS CONTROL SOLENOID VALVE

Refer to EM-16, "INTAKE MANIFOLD" .

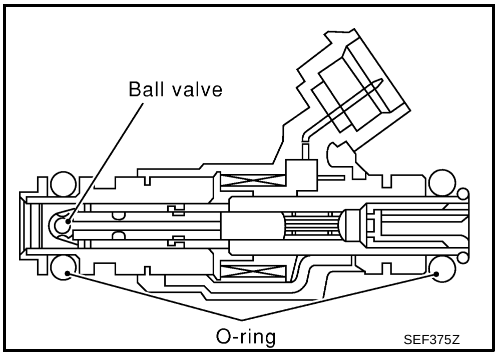
INJECTOR CIRCUIT

PFP:16600

Component Description

ABS00CZ4

The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the fuel injector circuit, the coil in the fuel injector is energized. The energized coil pulls the ball valve back and allows fuel to flow through the fuel injector into the intake manifold. The amount of fuel injected depends upon the fuel injection pulse duration. Pulse duration is the length of time the fuel injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.



CONSULT-II Reference Value in Data Monitor Mode

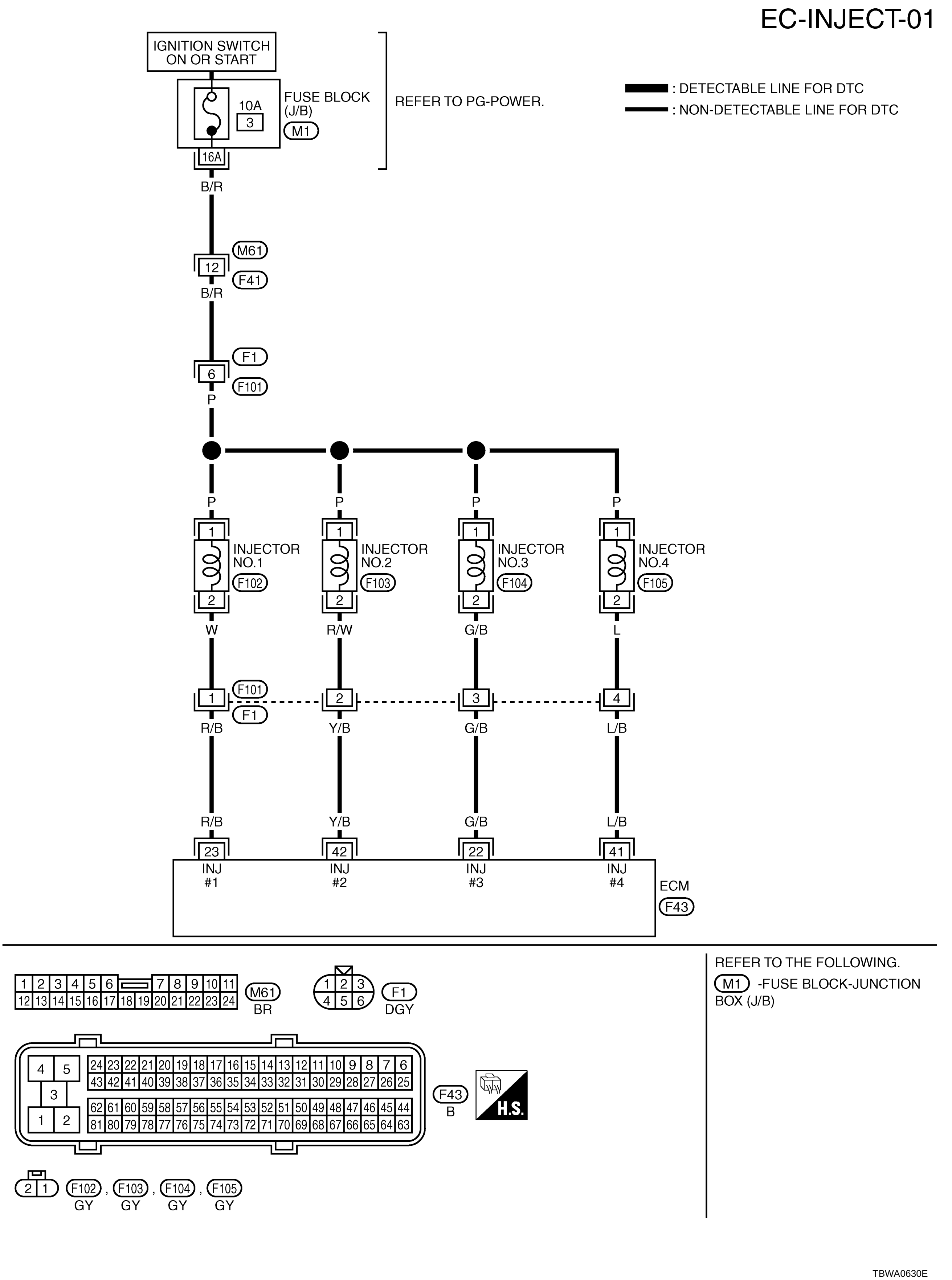
ABS00CZ5

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
B/FUEL SCHDL	See EC-144, "TROUBLE DIAGNOSIS - SPECIFICATION VALUE" .		
INJ PULSE-B1	• Engine: After warming up • Shift lever: N (A/T), Neutral (M/T) • Air conditioner switch: OFF • No load	Idle	2.0 - 3.0 msec
		2,000 rpm	1.9 - 2.9 msec

Wiring Diagram

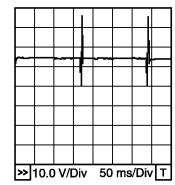
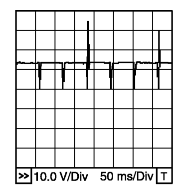
ABS00CZ6



Specification data are reference values and are measured between each terminal and ground.
Pulse signal is measured by CONSULT-II.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
22 23 41 42	G/B R/B L/B Y/B	Fuel injector No. 3 Fuel injector No. 1 Fuel injector No. 4 Fuel injector No. 2	**[Engine is running]** ● **Warm-up condition** ● Idle speed **NOTE:** The pulse cycle changes depending on rpm at idle.	BATTERY VOLTAGE (11 - 14V)★  PBIB0529E
			[Engine is running] ● **Warm-up condition** ● Engine speed: 2,000 rpm	BATTERY VOLTAGE (11 - 14V)★  PBIB0530E

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

Diagnostic Procedure

ABS00D8Z

1. INSPECTION START

Turn ignition switch to START.

Is any cylinder ignited?

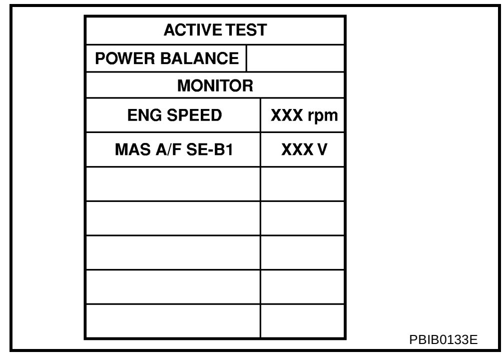
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK OVERALL FUNCTION

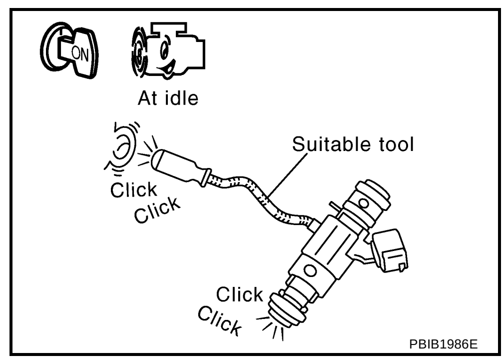
With CONSULT-II

1. Start engine.
2. Perform “POWER BALANCE” in “ACTIVE TEST” mode with CONSULT-II.
3. Make sure that each circuit produces a momentary engine speed drop.



Without CONSULT-II

1. Start engine.
2. Listen to each fuel injector operating sound.
   Clicking noise should be heard.

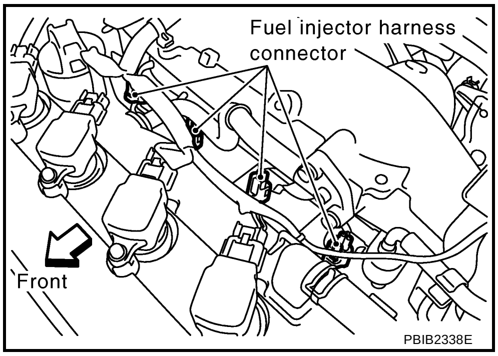


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

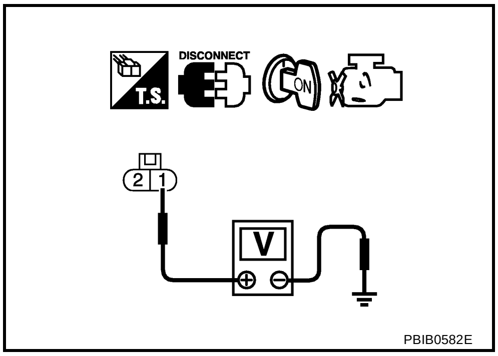
3. CHECK FUEL INJECTOR POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect fuel injector harness connector.
3. Turn ignition switch ON.



4. Check voltage between fuel injector terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M61, F41
- Harness connectors F1, F101
- Fuse block (J/B) connector M1
- 10A fuse
- Harness for open or short between fuel injector and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK FUEL INJECTOR OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between fuel injector terminal 2 and ECM terminals 22, 23, 41, 42. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power in harness or connectors.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors F101, F1
- Harness for open or short between fuel injector and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK FUEL INJECTOR

Refer to EC-612, "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace fuel injector.

8. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

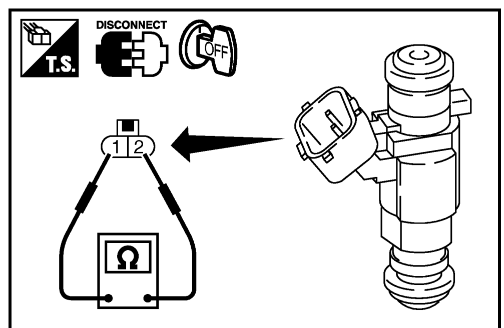
Component Inspection

ABS00CZ8

FUEL INJECTOR

1. Disconnect fuel injector harness connector.
2. Check resistance between terminals as shown in the figure.

Resistance: 13.5 - 17.5Ω [at 10 - 60°C (50 - 140°F)]



PBIB1727E

Removal and Installation

ABS00CZ9

FUEL INJECTOR

Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .

FUEL PUMP CIRCUIT

PFP:17042

Description

ABS00CZA

SYSTEM DESCRIPTION

Sensor	Input Signal to ECM	ECM Function	Actuator
Crankshaft position sensor (POS) Camshaft position sensor (PHASE)	Engine speed*	Fuel pump control	Fuel pump relay
Battery	Battery voltage*		

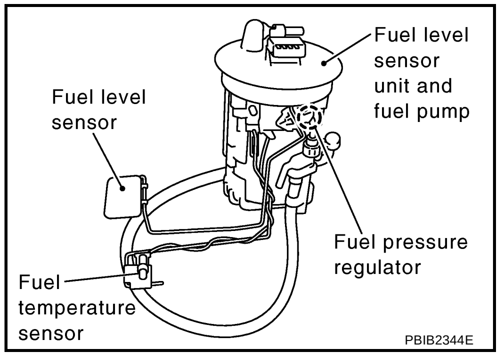
*: ECM determines the start signal status by the signals of engine speed and battery voltage.

The ECM activates the fuel pump for 1 second after the ignition switch is turned ON to improve engine startability. If the ECM receives a engine speed signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to operate. If the engine speed signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 1 second.
Engine running or cranking	Operates.
When engine is stopped	Stops in 1.5 seconds.
Except as shown above	Stops.

COMPONENT DESCRIPTION

A turbine type design fuel pump is used in the furl tank.



CONSULT-II Reference Value in Data Monitor Mode

ABS00CZB

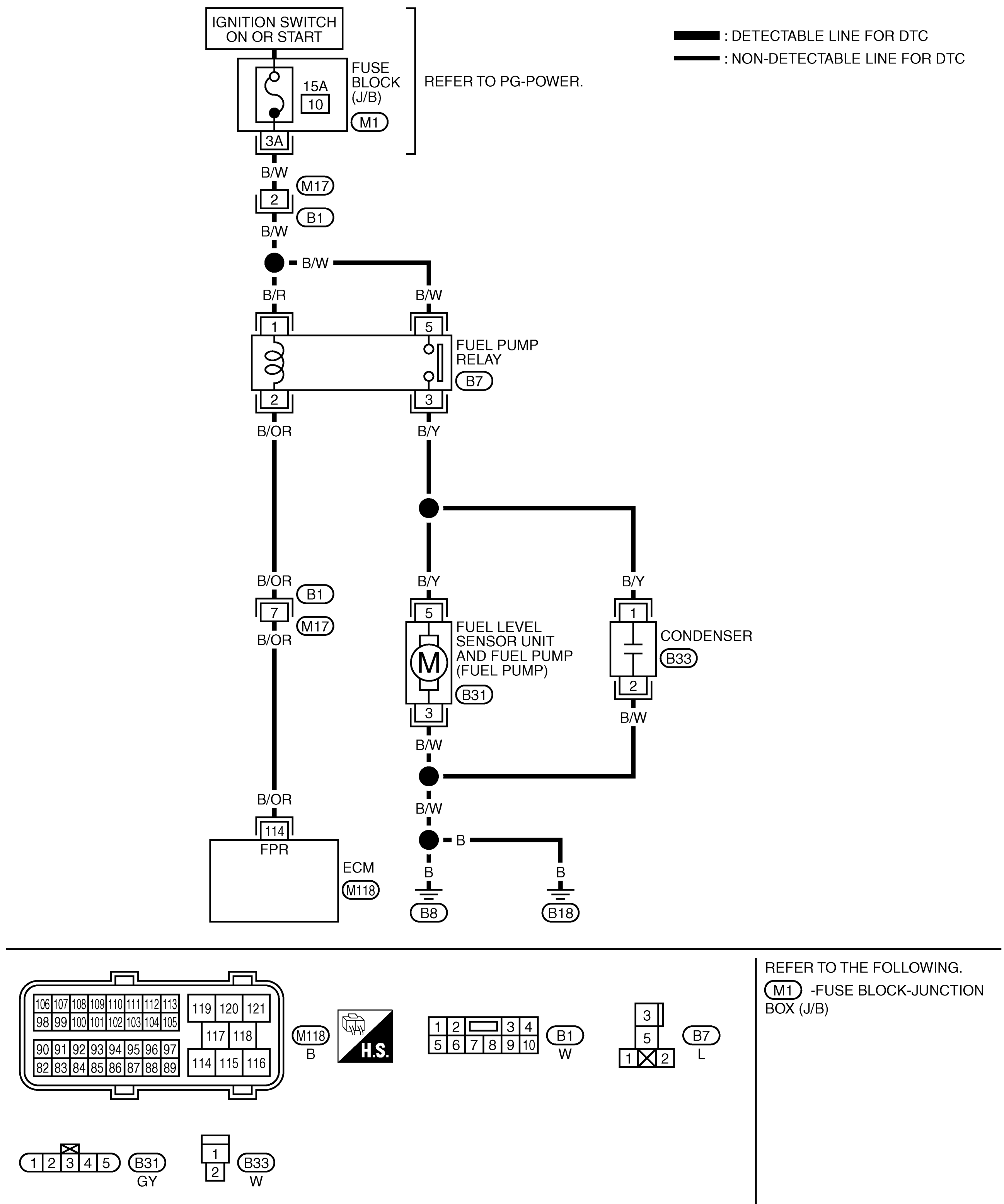
Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	• For 1 seconds after turning ignition switch ON • Engine running or cranking	ON
	• Except above conditions	OFF

Wiring Diagram

ABS00CZC

EC-F/PUMP-01



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
114	B/OR	Fuel pump relay	**[Ignition switch: ON]** ● For 1 second after turning ignition switch ON **[Engine is running]**	0 - 1.0V
			[Ignition switch: ON] ● More than 1 second after turning ignition switch ON	BATTERY VOLTAGE (11 - 14V)

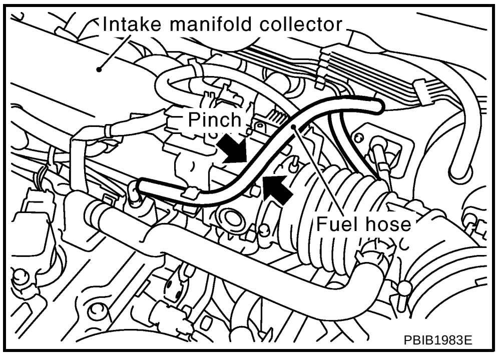
Diagnostic Procedure

ABS00D90

1. CHECK OVERALL FUNCTION

1. Turn ignition switch ON.
2. Pinch fuel feed hose with two fingers.

Fuel pressure pulsation should be felt on the fuel hose for 1 second after ignition switch is turned ON.



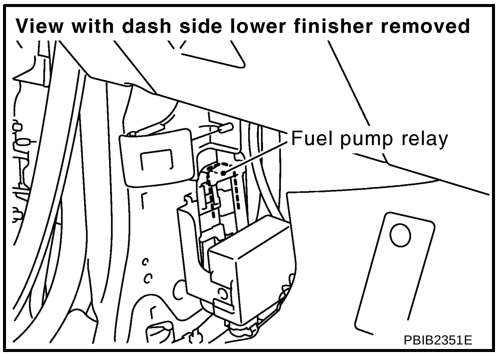
PBIB1983E

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK FUEL PUMP RELAY POWER SUPPLY CIRCUIT

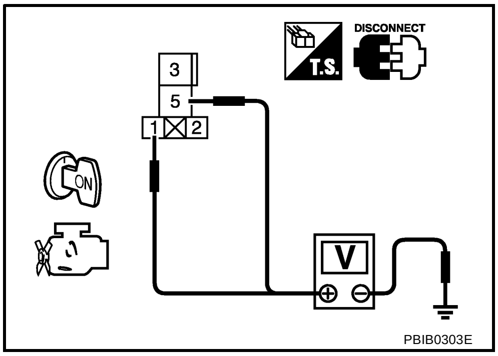
1. Turn ignition switch OFF.
2. Disconnect fuel pump relay.
3. Turn ignition switch ON.



PBIB2351E

4. Check voltage between fuel pump relay terminals 1, 5 and ground with CONSULT-II or tester.

Voltage: Battery voltage



PBIB0303E

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors M17, B1
- Fuse block (J/B) connector M1
- 15A fuse
- Harness for open or short between fuel pump relay and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check harness continuity between the following;
   fuel pump relay terminal 3 and condenser terminal 1,
   condenser terminal 2 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between fuel pump relay and condenser
- Harness for open or short between condenser and ground

>> Repair open circuit or short to ground or short to power in harness connectors.

6. CHECK CONDENSER

Refer to EC-618, "Component Inspection" .

OK or NG

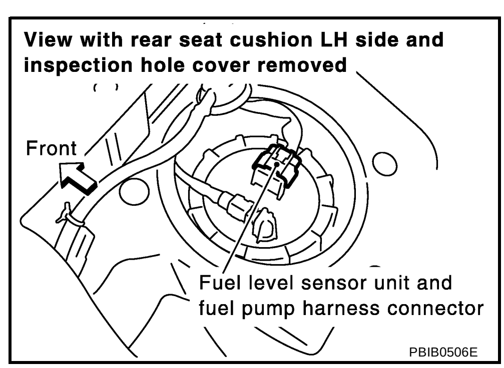
OK >> GO TO 7.
NG >> Replace condenser.

7. CHECK FUEL PUMP POWER SUPPLY AND GROUND CIRCUIT FOR OPEN AND SHORT

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.
2. Check harness continuity between the following;
   fuel pump relay terminal 3 and “fuel level sensor unit and fuel pump” terminal 5,
   “fuel level sensor unit and fuel pump” terminal 3 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between fuel pump relay and “fuel level sensor unit and fuel pump”
- Harness for open or short between “fuel level sensor unit and fuel pump” and ground

>> Repair open circuit or short to ground or short to power in harness connectors.

9. CHECK FUEL PUMP RELAY OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between fuel pump relay terminal 2 and ECM terminal 114.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 11.
NG >> GO TO 10.

10. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M17
- Harness for open or short between fuel pump relay and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK FUEL PUMP RELAY

Refer to EC-618, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace fuel pump relay.

12. CHECK FUEL PUMP

Refer to EC-618, "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace fuel pump.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

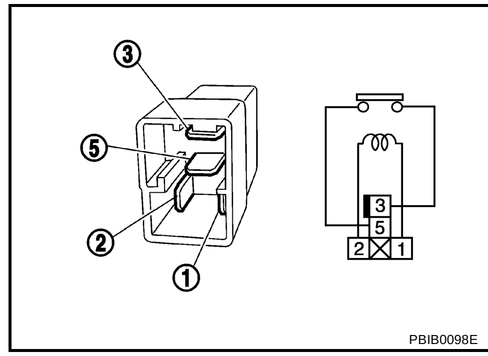
Component Inspection

ABS00CZE

FUEL PUMP RELAY

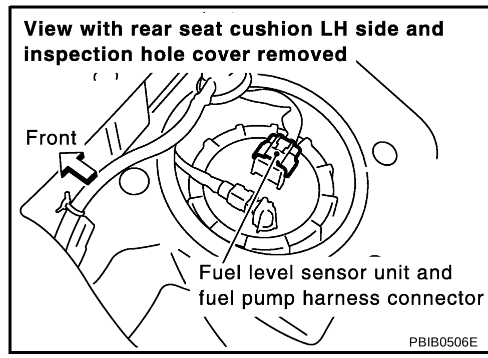
Check continuity between terminals 3 and 5 under the following conditions.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No



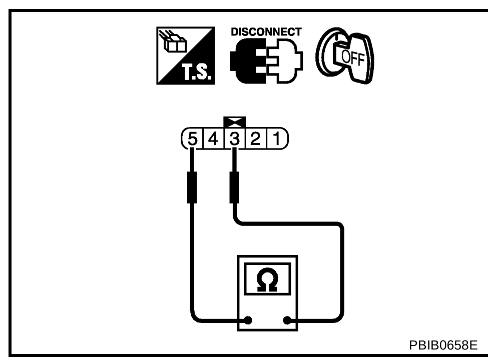
FUEL PUMP

1. Disconnect “fuel level sensor unit and fuel pump” harness connector.



2. Check resistance between “fuel level sensor unit and fuel pump” terminals **3** and **5** .

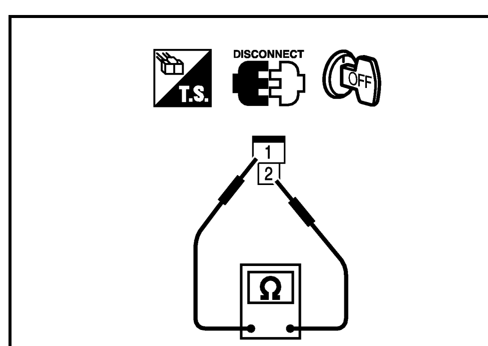
Resistance: Approximately: 0.2 - 5.0Ω[at 25°C (77°F)]



CONDENSER

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check resistance between condenser terminals 1 and 2.

Resistance: Above 1MΩ [at 25°C (77°F)]



Removal and Installation

ABS00CZF

FUEL PUMP

Refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .

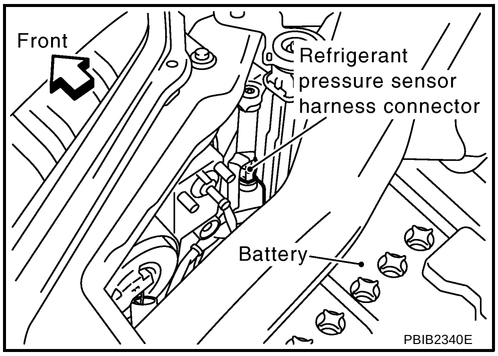
REFRIGERANT PRESSURE SENSOR

PFP:92136

Component Description

ABS00CZG

The refrigerant pressure sensor is installed at the condenser of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.



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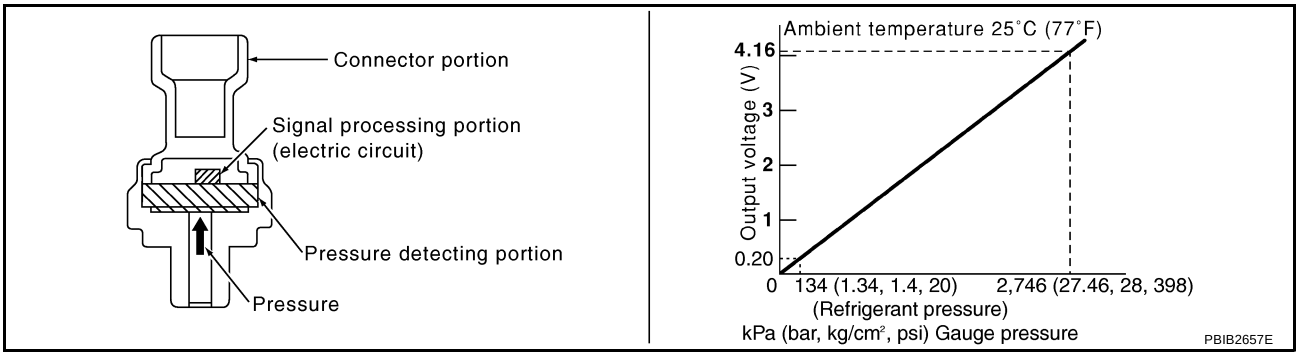

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Wiring Diagram

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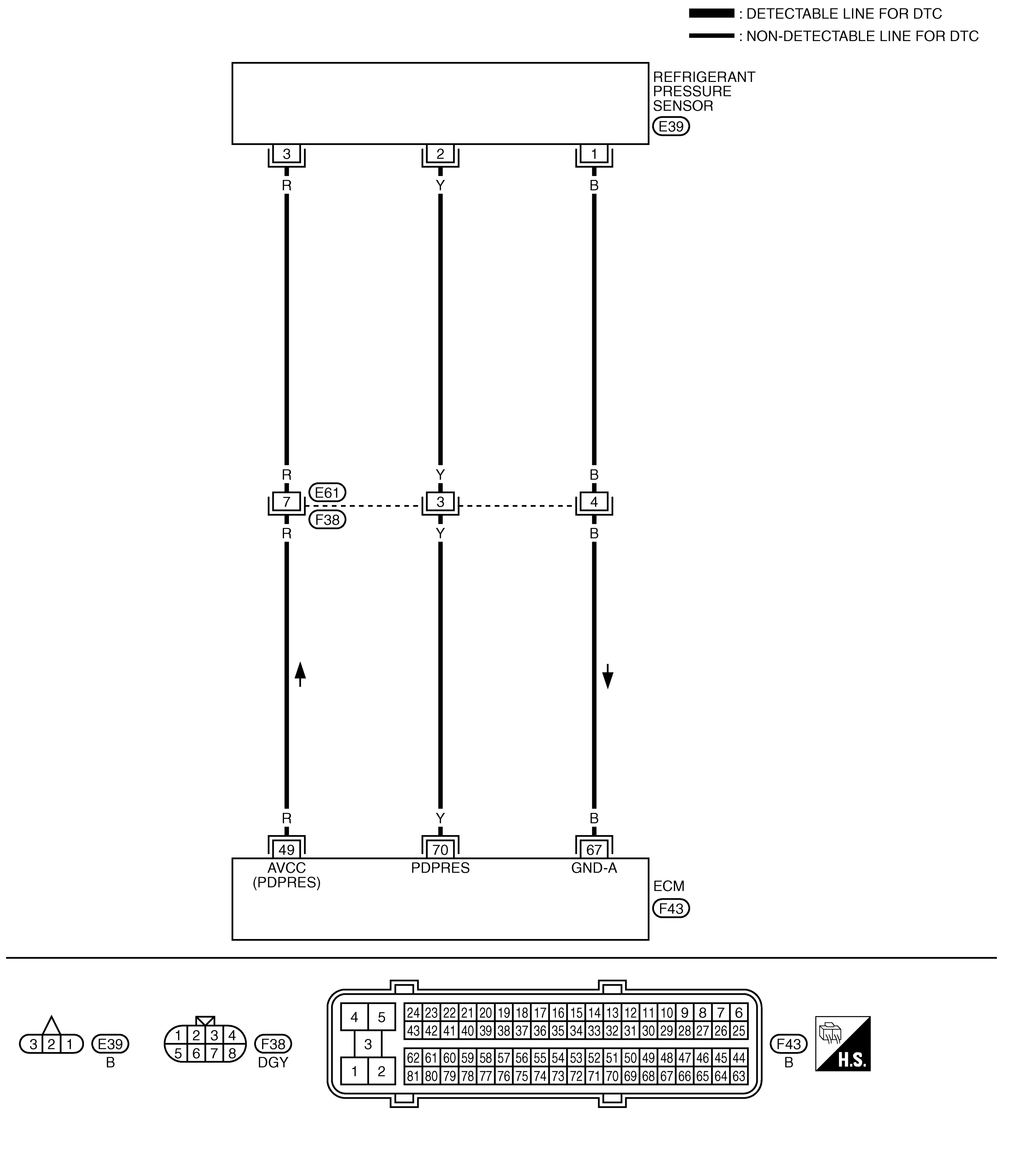
EC-RP/SEN-01



TBWB0135E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
49	R	Sensor power supply (Refrigerant pressure sensor)	**[Ignition switch: ON]**	Approximately 5V
67	B	Sensor ground	**[Engine is running]** ● **Warm-up condition** ● Idle speed	Approximately 0V
70	Y	Refrigerant pressure sensor	**[Engine is running]** ● **Warm-up condition** ● Both A/C switch and blower switch are ON (Compressor operates.)	1.0 - 4.0V

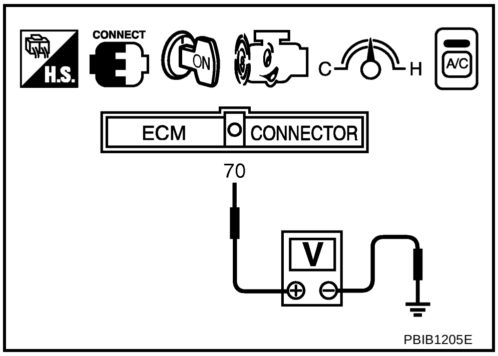
Diagnostic Procedure

ABS00D91

1. CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION

1. Start engine and warm it up to normal operating temperature.
2. Turn A/C switch and blower switch ON.
3. Check voltage between ECM terminal 70 and ground with CONSULT-II or tester.

Voltage: 1.0 - 4.0V

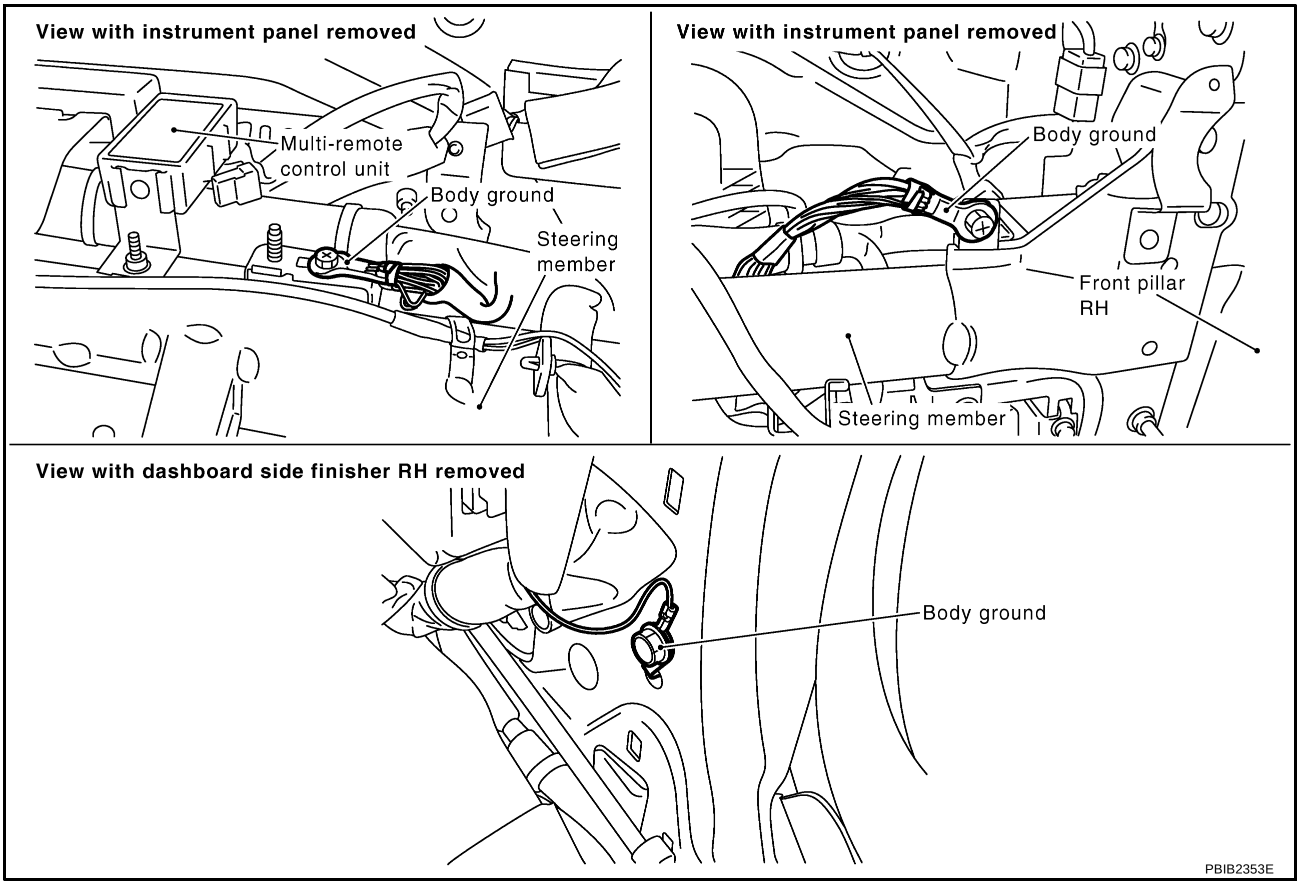


OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK GROUND CONNECTIONS

1. Turn A/C switch and blower switch OFF.
2. Stop engine.
3. Turn ignition switch OFF.
4. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .



OK or NG

OK >> GO TO 3.
NG >> Repair or replace ground connections.

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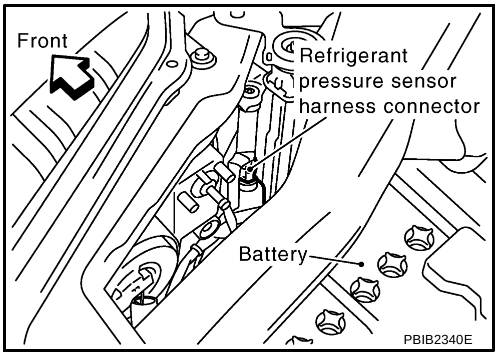
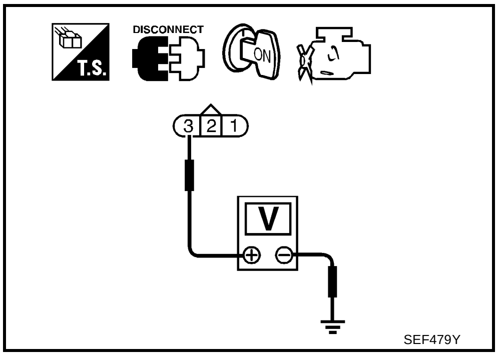
3. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Disconnect refrigerant pressure sensor harness connector.
2. Turn ignition switch ON.



3. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.

Voltage: Approximately 5V



OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between refrigerant pressure sensor terminal 1 and ECM terminal 67. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between refrigerant pressure sensor terminal 2 and ECM terminal 70.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> GO TO 8.

8. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E61, F38
- Harness for open or short between refrigerant pressure sensor and ECM

>> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

OK or NG

OK >> Replace refrigerant pressure sensor.
NG >> Repair or replace.

Removal and Installation

ABS00CZJ

REFRIGERANT PRESSURE SENSOR

Refer to ATC-131, "Removal and Installation of Refrigerant Pressure Sensor" (with auto A/C models) or MTC-91, "Removal and Installation for Refrigerant Pressure Sensor" (with manual A/C models).

ELECTRICAL LOAD SIGNAL

PFP:25350

CONSULT-II Reference Value in Data Monitor Mode

ABS00DAK

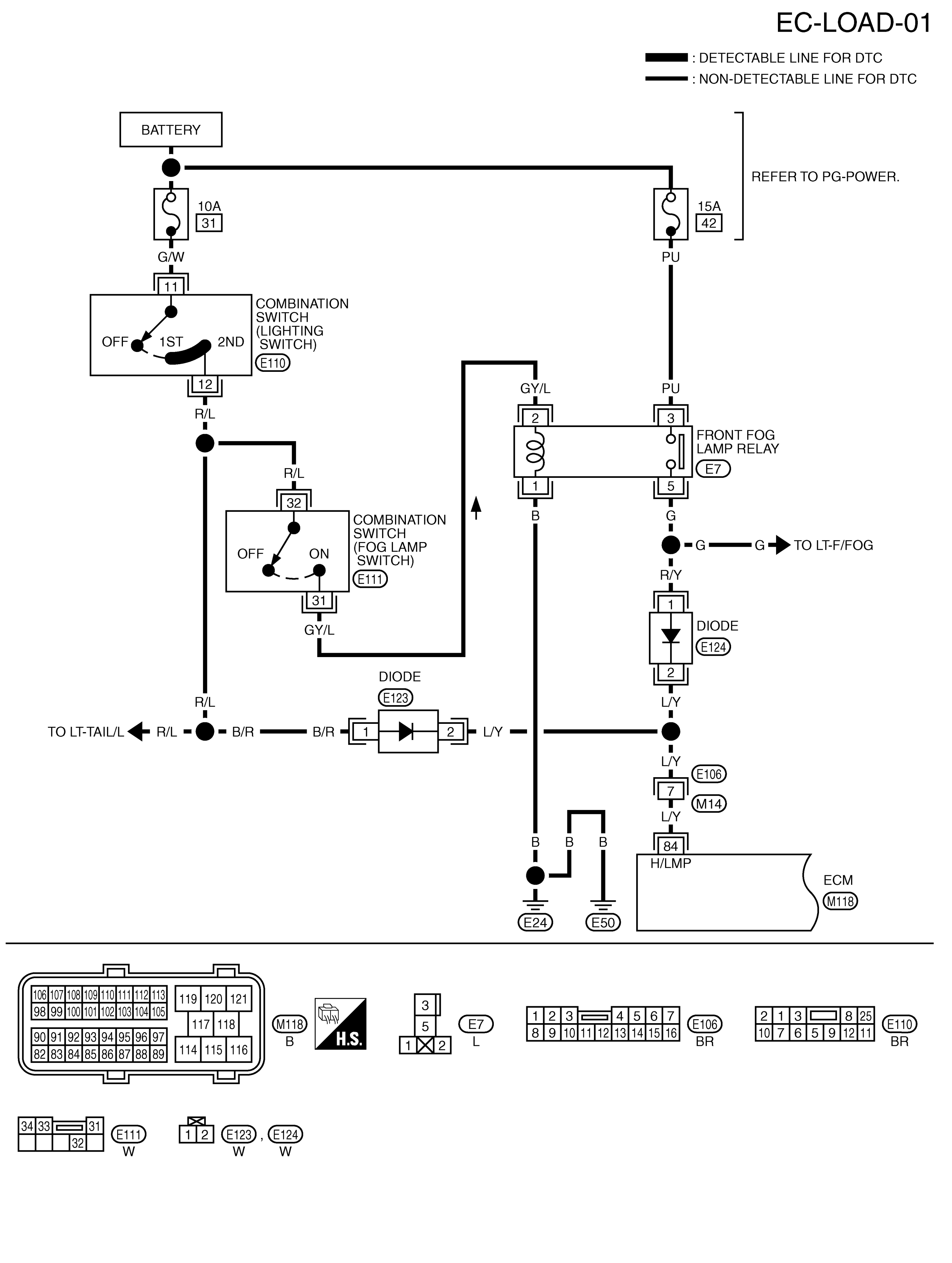
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch is ON and/or lighting switch is in 1st or 2ndand/or heater fan switch is ON.	ON
		Rear window defogger switch is OFF and lighting switch is OFF and heater fan switch is OFF.	OFF

Wiring Diagram

ABS00DAL

HEADLAMP



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
84	L/Y	Electrical load signal (Headlamp signal)	**[Lighting switch: ON]** ● Lighting switch: 1st or 2nd position	BATTERY VOLTAGE (11 - 14V)
			[Lighting switch: ON] ● Lighting switch: OFF	Approximately 0V

Diagnostic Procedure

ABS00DAM

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

Yes >> GO TO 2.

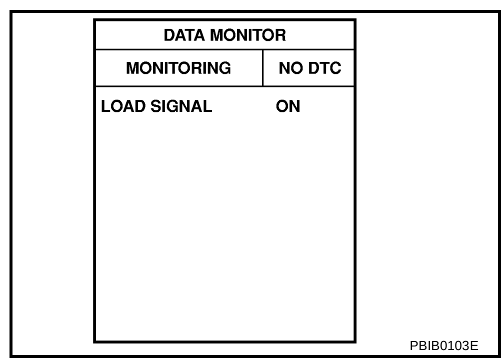
No >> GO TO 6.

2. CHECK HEADLAMP CIRCUIT OVERALL FUNCTION-I

With CONSULT-II

1. Turn ignition switch ON.
2. Check “LOAD SIGNAL” in “DATA MONITOR” mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Lighting switch: ON at 1st or 2nd	ON
Lighting switch: OFF	OFF



OK or NG

OK >> GO TO 4.

NG >> GO TO 3.

3. CHECK HEADLAMP FUNCTION

1. Start engine.
2. Check that headlamps are illuminated.

OK or NG

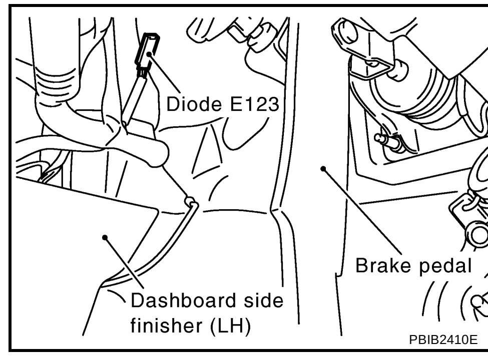
OK >> GO TO 10.

NG >> Refer to LT-4, "HEADLAMP - DAYTIME LIGHT SYSTEM -" .

4. CHECK HEADLAMP CIRCUIT OVERALL FUNCTION-II

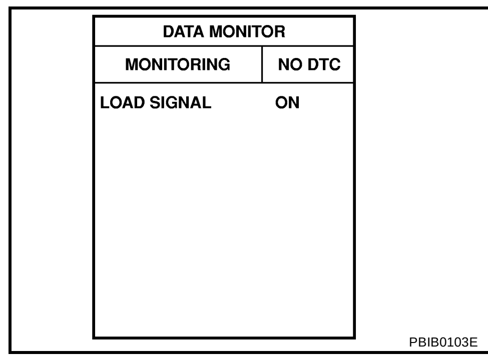
With CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect DIODE E123 connector.
3. Turn ignition switch ON.
4. Turn lighting switch ON at 1st or 2nd.



5. Check “LOAD SIGNAL” in “DATA MONITOR” mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Fog lamp switch: ON	ON
Fog lamp switch: OFF	OFF



OK or NG

OK >> **INSPECTION END.**
NG >> GO TO 5.

5. CHECK FRONT FOG LAMP FUNCTION

1. Turn lighting switch ON at 1st or 2nd.
2. Turn fog lamp switch ON.
3. Check that front fog lamps are illuminated.

OK or NG

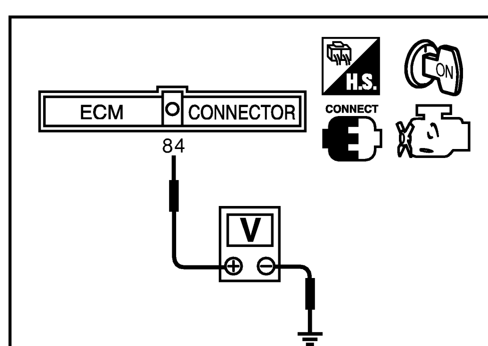
OK >> GO TO 12.
NG >> Refer to LT-36, "FRONT FOG LAMP" .

6. CHECK HEADLAMP CIRCUIT OVERALL FUNCTION-I

Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 84 and ground under the following conditions.

Condition	Voltage
Lighting switch: ON at 1st or 2nd	BATTERY VOLTAGE
Lighting switch: OFF	0V



OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

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7. CHECK HEADLAMP FUNCTION

1. Start engine.
2. Check that headlamps are illuminated.

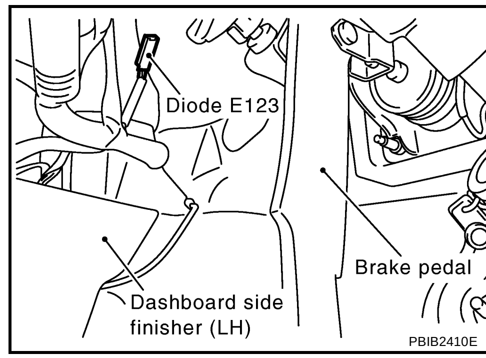
OK or NG

OK >> GO TO 10.
NG >> Refer to LT-4, "HEADLAMP - DAYTIME LIGHT SYSTEM -" .

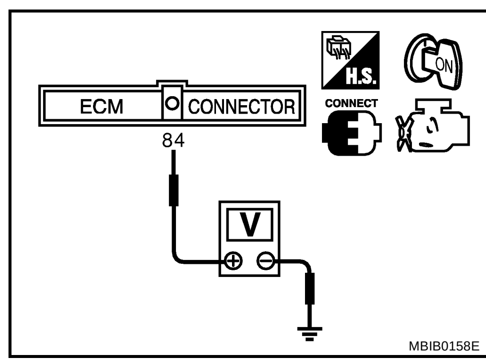
8. CHECK HEADLAMP CIRCUIT OVERALL FUNCTION-II

Without CONSULT-II

1. Turn ignition switch OFF.
2. Disconnect DIODE E123 connector
3. Turn ignition switch ON
4. Turn lighting switch ON at 1st or 2nd.



5. Check voltage between ECM terminal 84 and ground under the following conditions.



Condition	Voltage
Fog lamp switch: ON	BATTERY VOLTAGE
Fog lamp switch: OFF	0V

OK or NG

OK >> **INSPECTION END.**
NG >> GO TO 9.

9. CHECK FRONT FOG LAMP FUNCTION

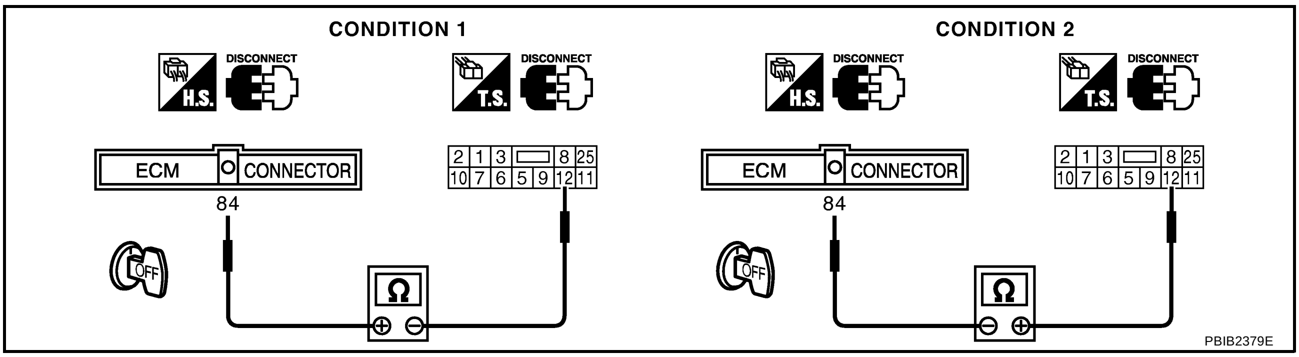
1. Turn lighting switch ON at 1st or 2nd.
2. Turn fog lamp switch ON.
3. Check that front fog lamps are illuminated.

OK or NG

OK >> GO TO 12.
NG >> Refer to LT-36, "FRONT FOG LAMP" .

10. CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Stop engine.
2. Turn lighting switch OFF
3. Turn ignition switch OFF.
4. Disconnect ECM harness connector and lighting switch harness connector.
5. Check harness continuity between ECM terminal 84 and lighting switch terminal 12 under the following conditions.



Condition	Continuity
1	Should exist
2	Should not exist

6. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.
NG >> GO TO 11.

11. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E106, M14
- DIODE E123
- Harness for open and short between ECM and lighting switch

>> Repair open circuit or short to ground or short to power in harness or connectors.

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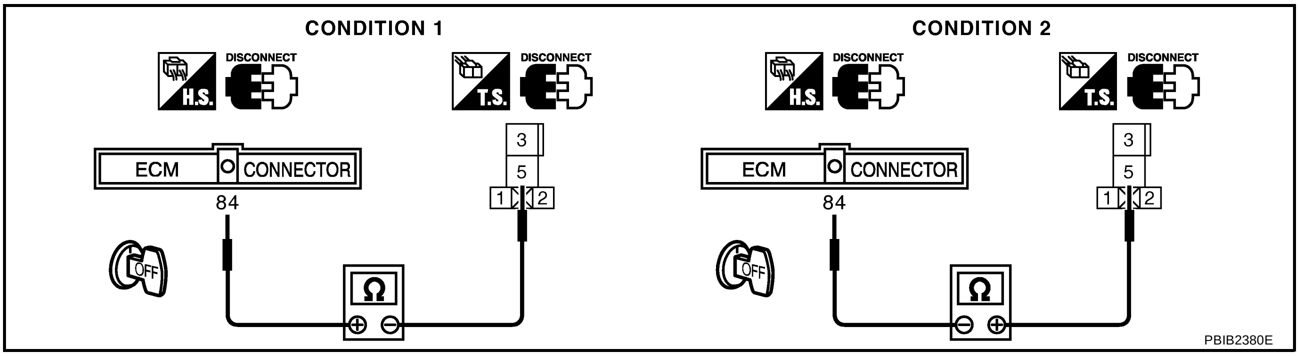
12. CHECK FOG LAMP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Stop engine.
2. Turn lighting switch OFF.
3. Turn fog lamp switch OFF.
4. Disconnect ECM harness connector and front fog lamp relay.
5. Check harness continuity between ECM terminal 84 and front fog lamp relay terminal 5 under the following conditions.



Condition	Continuity
1	Should exist
2	Should not exist

6. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors E106, M14
- DIODE E124
- Harness for open and short between ECM and front fog lamp relay

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK INTERMITTENT INCIDENT

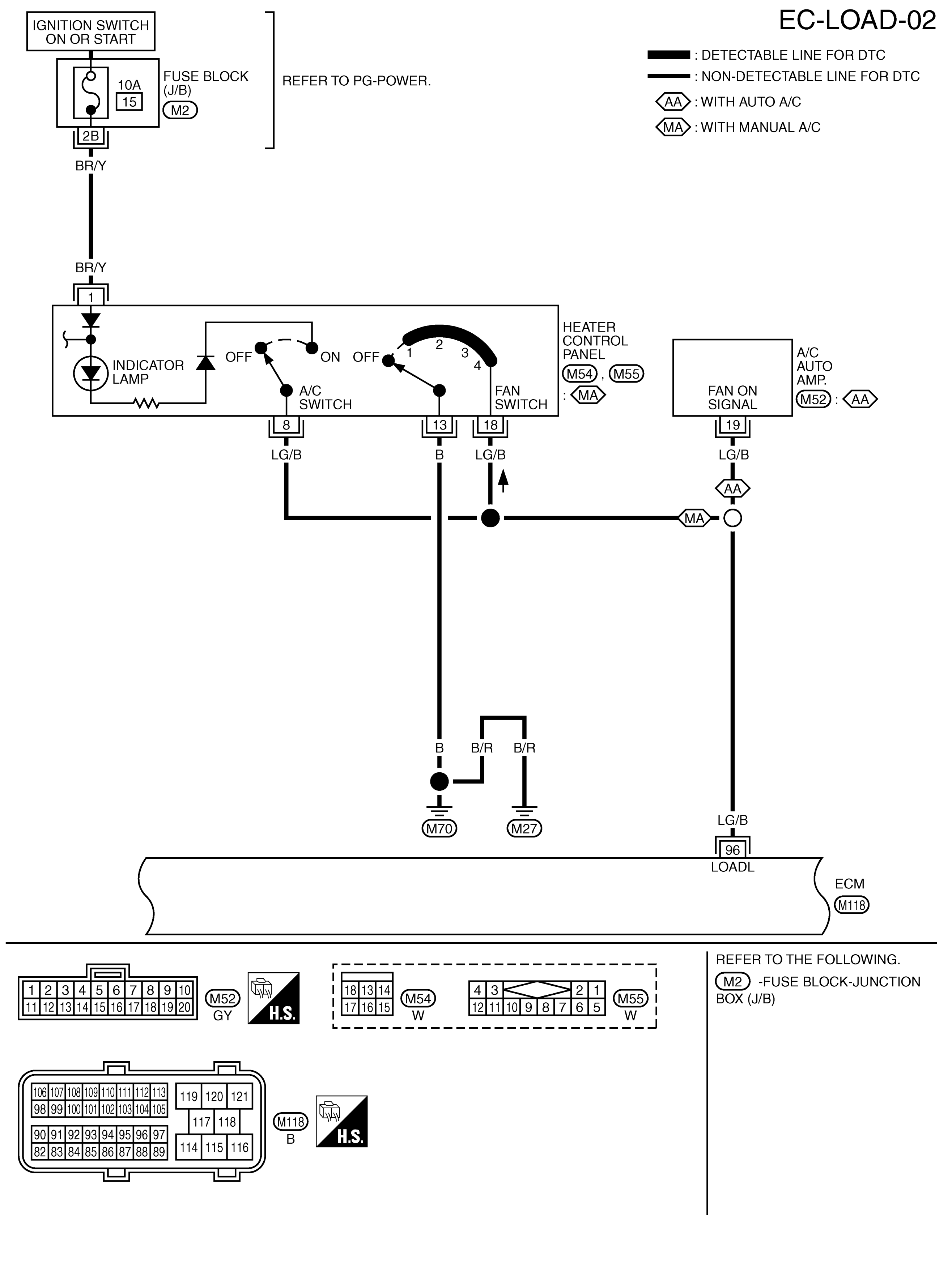
Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Wiring Diagram

ABS00DCZ

HEATER FAN



Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
96	LG/B	Heater fan switch	**[Engine is running]** ● Heater fan switch: ON	Approximately 0V
			[Engine is running] ● Heater fan switch: OFF	BATTERY VOLTAGE (11 - 14V)

Diagnostic Procedure

ABS00DD0

1. INSPECTION START

Do you have CONSULT-II?

Yes or No

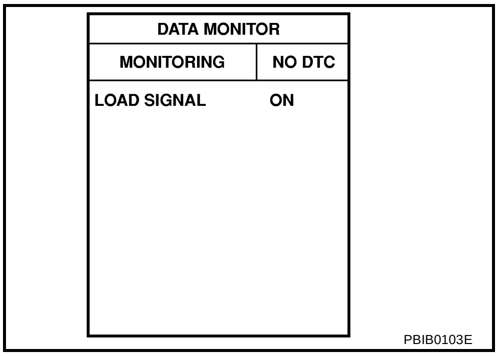
Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK HEATER FAN CIRCUIT OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. Check “LOAD SIGNAL” in “DATA MONITOR” mode with CONSULT-II under the following conditions.

Condition	LOAD SIGNAL
Heater fan switch: ON in any position	ON
Heater fan switch: OFF	OFF



PBIB0103E

OK or NG

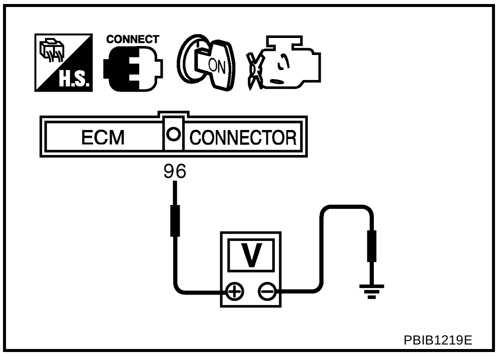
OK >> **INSPECTION END.**
NG >> GO TO 4.

3. CHECK HEATER FAN CIRCUIT OVERALL FUNCTION

Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 96 and ground under the following conditions.

Condition	Voltage
Heater fan switch: ON in any position	Approximately 0V
Heater fan switch: OFF	BATTERY VOLTAGE (11 -14V)



PBIB1219E

OK or NG

OK >> **INSPECTION END.**
NG >> GO TO 4.

4. CHECK HEATER FAN SWITCH FUNCTION

1. Start engine.
2. Turn heater fan switch ON in any position.
3. Check that heater fan turns properly.

OK or NG

OK >> GO TO 5.
NG >> Refer to ATC-32, "TROUBLE DIAGNOSIS" (with auto A/C models) or MTC-28, "TROUBLE DIAGNOSIS" (with manual A/C models).

5. CHECK HEATER FAN INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Stop engine.
2. Turn heater fan switch OFF.
3. Turn ignition switch OFF.
4. Disconnect ECM harness connector.
5. Disconnect A/C auto amp. harness connector or heater control panel harness connector.
6. Check harness continuity between the following;
   ECM terminal 96 and A/C auto amp. terminal 19 (with auto A/C models),
   ECM terminal 96 and heater control panel terminal 8, 18 (with manual A/C models).
   Refer to Wiring Diagram.

   Continuity should exist.

7. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following;

- harness for open or short between ECM and A/C auto amp. (with auto A/C models).
- harness for open or short between ECM and heater control panel (with manual A/C models).

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK INTERMITTENT INCIDENT

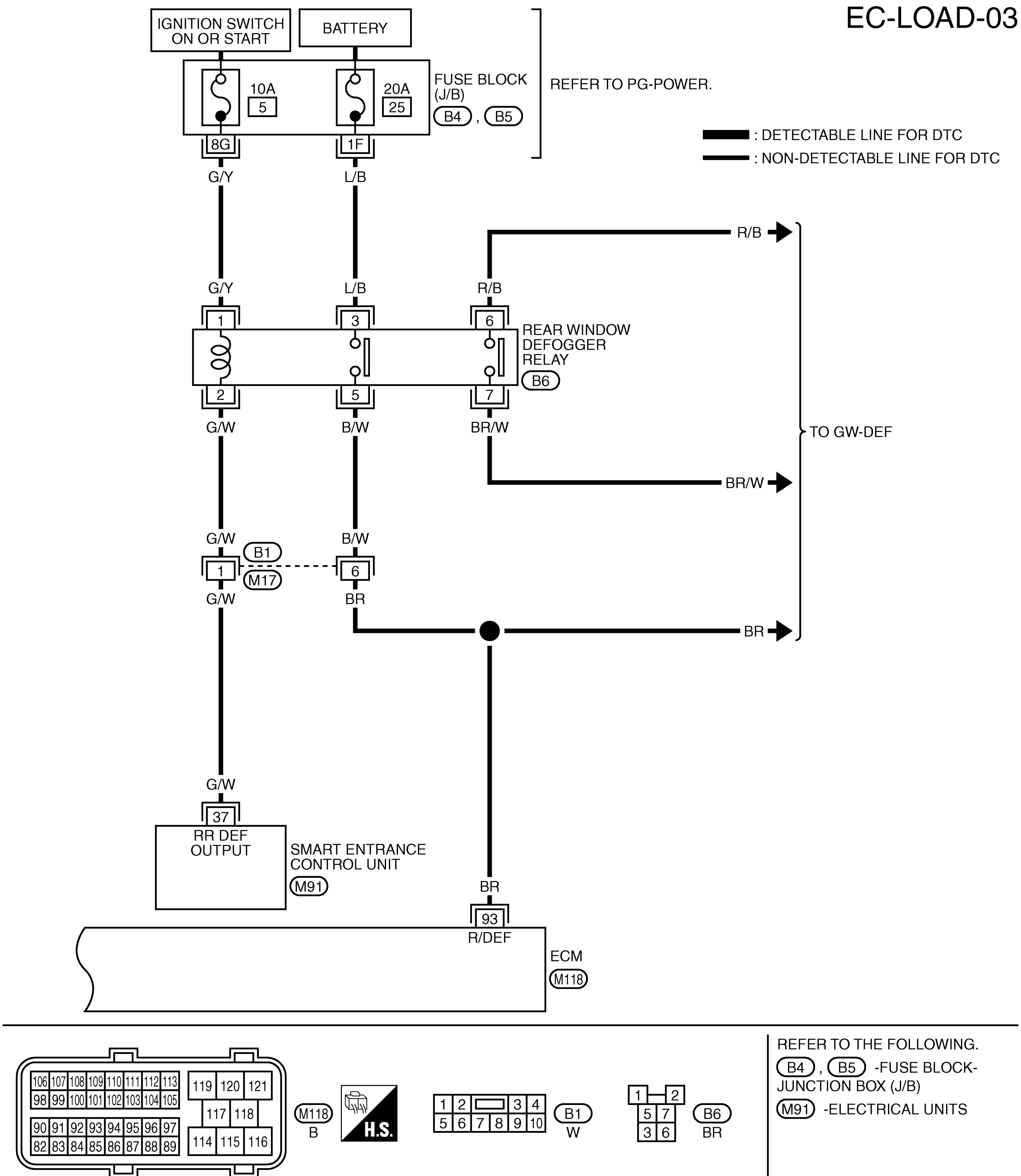
Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Wiring Diagram

ABS00DD1

REAR WINDOW DEFOGGER



TBWB0138E

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
93	BR	Electrical load signal (Rear window defogger signal)	**[Ignition switch: ON]** ● Rear window defogger switch: ON	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch: ON] ● Rear window defogger switch: OFF	Approximately 0V

Diagnostic Procedure

ABS00DD2

1. INSPECTION START

Do you have CONSULT-II?

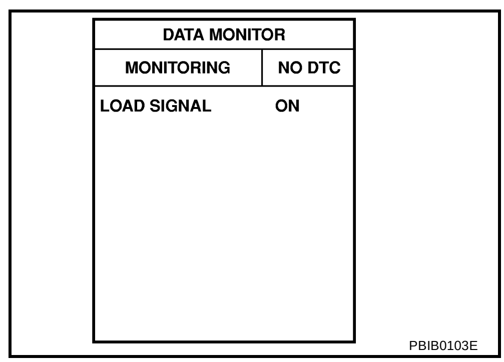
Yes or No

Yes >> GO TO 2.
No >> GO TO 3.

2. CHECK REAR WINDOW DEFOGGER CIRCUIT OVERALL FUNCTION

With CONSULT-II

1. Turn ignition switch ON.
2. Check “LOAD SIGNAL” in “DATA MONITOR” mode with CONSULT-II under the following conditions.



Condition	LOAD SIGNAL
Rear window defogger switch: ON	ON
Rear window defogger switch: OFF	OFF

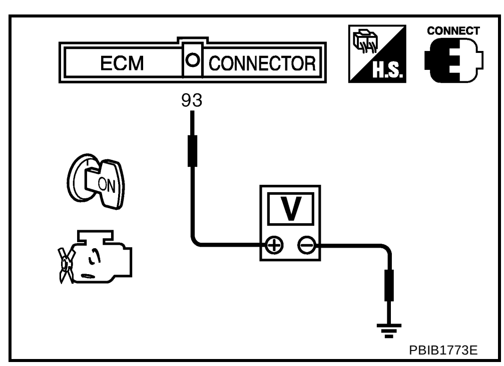
OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

3. CHECK REAR WINDOW DEFOGGER CIRCUIT OVERALL FUNCTION

Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 93 and ground under the following conditions.



Condition	Voltage
Rear window defogger switch: ON	BATTERY VOLTAGE
Rear window defogger switch: OFF	Approximately 0V

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 4.

A
EC
C
D
E
F
G
H
I
J
K
L
M

4. CHECK REAR WINDOW DEFOGGER FUNCTION

1. Turn rear window defogger switch ON.
2. Check the rear windshield. Is the rear windshield heated up?

Yes or No

Yes >> GO TO 5.
No >> Refer to GW-17, "REAR WINDOW DEFOGGER"

5. CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn rear window defogger switch OFF.
2. Turn ignition switch OFF.
3. Disconnect ECM harness connector and rear window defogger relay.
4. Check harness continuity between ECM terminal 93 and rear window defogger relay terminals 5. Refer to Wiring Diagram.

Continuity should exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- Harness connectors B1, M17
- Harness for open or short between ECM and rear window defogger relay.

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK INTERMITTENT INCIDENT

Perform EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

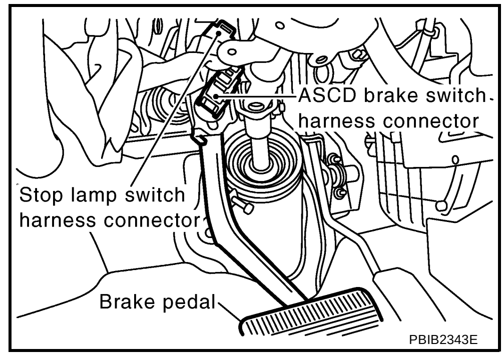
ASCD BRAKE SWITCH

PFP:25320

Component Description

ABS00CZM

When depress on the brake pedal, ASCD brake switch is turned OFF and stop lamp switch is turned ON. ECM detects the state of the brake pedal by this input of two kinds (ON/OFF signal)
Refer to EC-27, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.



CONSULT-II Reference Value in Data Monitor Mode

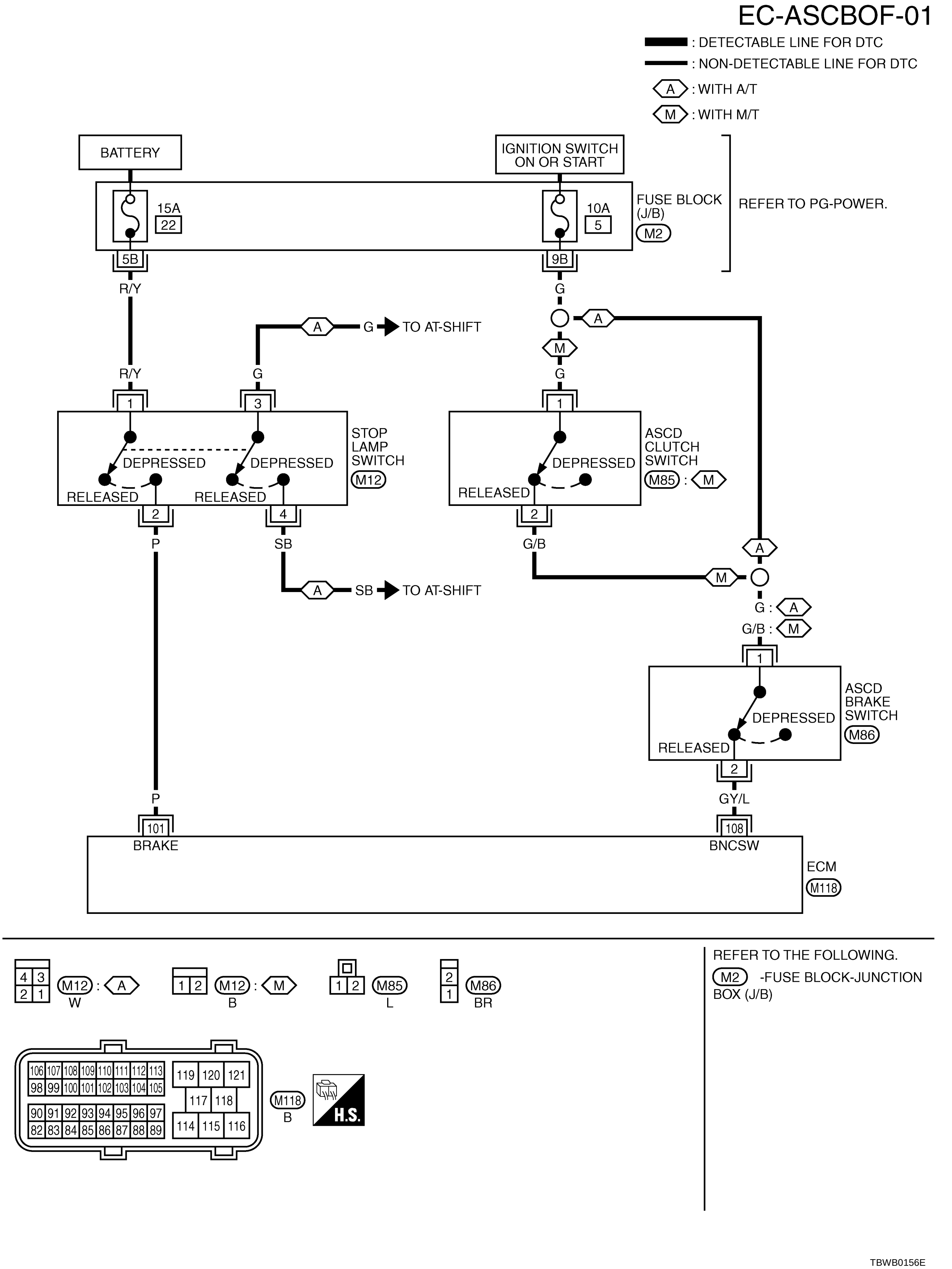
ABS00CZN

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
BRAKE SW1 (ASCD brake switch)	● Ignition switch: ON	● Brake pedal: Fully released (A/T) ● Brake pedal and clutch pedal: Fully released (M/T)	ON
		● Brake pedal: Slightly depressed (A/T) ● Brake pedal and/or clutch pedal: Slightly depressed (M/T)	OFF
BRAKE SW2 (STOP lamp switch)	● Ignition switch: ON	Brake pedal: Fully released	OFF
		Brake pedal: Slightly depressed	ON

Wiring Diagram

ABS00CZO



ASCD BRAKE SWITCH

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
101	P	Stop lamp switch	**[Ignition switch: OFF]** ● Brake pedal: Fully released	Approximately 0V
			[Ignition switch: OFF] ● Brake pedal: Slightly depressed	BATTERY VOLTAGE (11 - 14V)
108	GY/L	ASCD brake switch	**[Ignition switch: ON]** ● Brake pedal: Slightly depressed (A/T) ● Brake pedal and/or clutch pedal: Slightly depressed (M/T)	Approximately 0V
			[Ignition switch: ON] ● Brake pedal: Fully released (A/T) ● Brake pedal and clutch pedal: Fully released (M/T)	BATTERY VOLTAGE (11 - 14V)

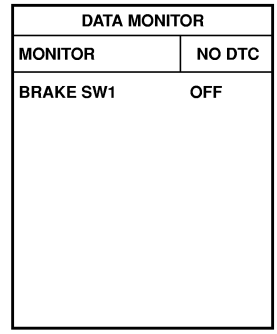
Diagnostic Procedure

ABS00CZP

1. CHECK OVERALL FUNCTION-I

With CONSULT-II

1. Turn ignition switch ON.
2. Select “BRAKE SW1” in “DATA MONITOR” mode with CONSULT-II.
3. Check “BRAKE SW1” indication under the following conditions.



SEC011D

A/T models

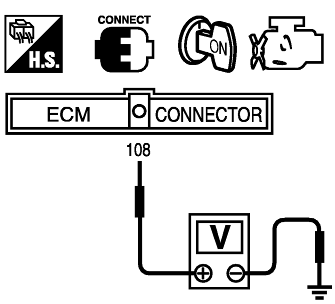
CONDITION	INDICATION
Brake pedal: Slightly depressed	OFF
Brake pedal: Fully released	ON

M/T models

CONDITION	INDICATION
Clutch pedal or brake pedal: Slightly depressed	OFF
Clutch pedal and brake pedal: Fully released	ON

Without CONSULT-II

1. Turn ignition switch ON.
2. Check voltage between ECM terminal 108 and ground under the following conditions.



MBIB0061E

A/T models

CONDITION	VOLTAGE
Brake pedal: Slightly depressed	Approximately 0V
Brake pedal: Fully released	Battery voltage

M/T models

CONDITION	VOLTAGE
Clutch pedal or brake pedal: Slightly depressed	Approximately 0V
Clutch pedal and brake pedal: Fully released	Battery voltage

OK or NG

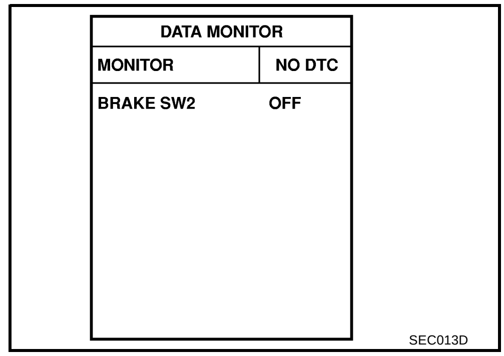
OK >> GO TO 2.
NG (M/T models) >>GO TO 3.
NG (A/T models) >>GO TO 8.

2. CHECK OVERALL FUNCTION-II

With CONSULT-II

Check “BRAKE SW2” indication in “DATA MONITOR” mode.

CONDITION	INDICATION
Brake pedal: Fully released	OFF
Brake pedal: Slightly depressed	ON

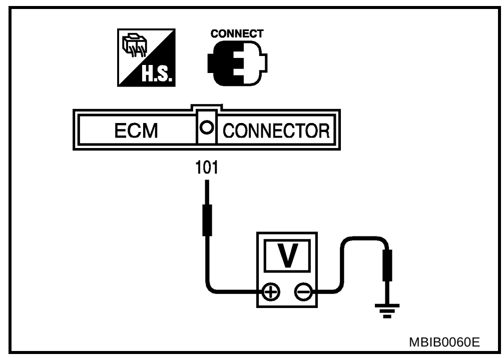


SEC013D

Without CONSULT-II

Check voltage between ECM terminal 101 and ground under the following conditions.

CONDITION	VOLTAGE
Brake pedal: Fully released	Approximately 0V
Brake pedal: Slightly depressed	Battery voltage



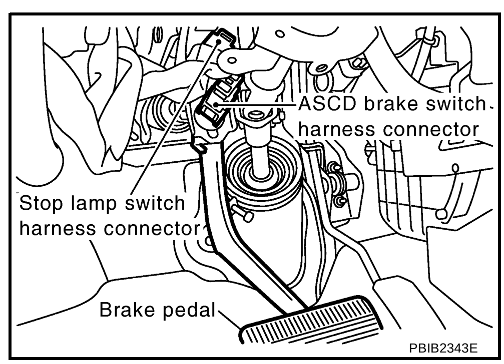
MBIB0060E

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 13.

3. CHECK ASCD CLUTCH SWITCH CIRCUIT

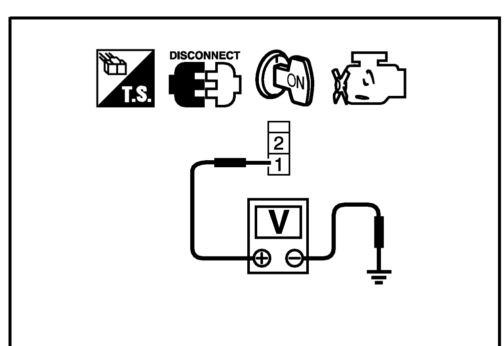
1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.



PBIB2343E

4. Check voltage between ASCD brake switch terminal 1 and ground under the following conditions with CONSULT-II or tester.

CONDITION	VOLTAGE
Clutch pedal: Fully released	Battery voltage
Clutch pedal: Slightly depressed	Approx. 0V



PBIB0857E

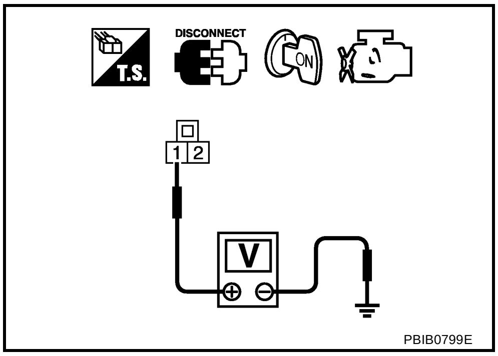
OK or NG

OK >> GO TO 10.
NG >> GO TO 4.

4. CHECK ASCD CLUTCH SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Turn ignition switch ON.
4. Check voltage between ASCD clutch switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.
- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between ASCD clutch switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

6. CHECK ASCD CLUTCH SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ASCD clutch switch terminal 2 and ASCD brake switch terminal 1. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK ASCD CLUTCH SWITCH

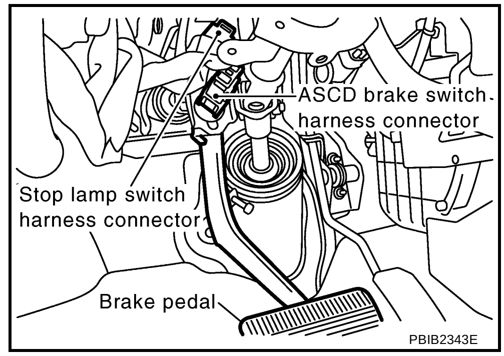
Refer to EC-646, "Component Inspection"

OK or NG

OK >> GO TO 18.
NG >> Replace ASCD clutch switch.

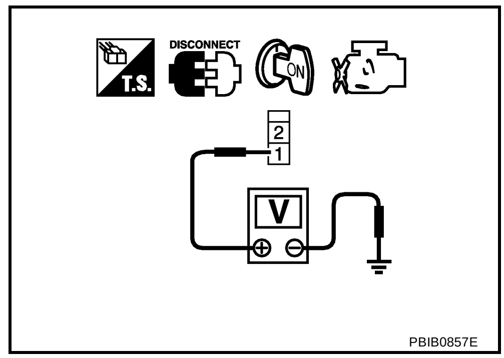
8. CHECK ASCD BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Turn ignition switch ON.



4. Check voltage between ASCD brake switch terminal 1 and ground with CONSULT-II or tester.

Voltage: Battery voltage



OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between ASCD brake switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

10. CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 108 and ASCD brake switch terminal 2. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

11. CHECK ASCD BRAKE SWITCH

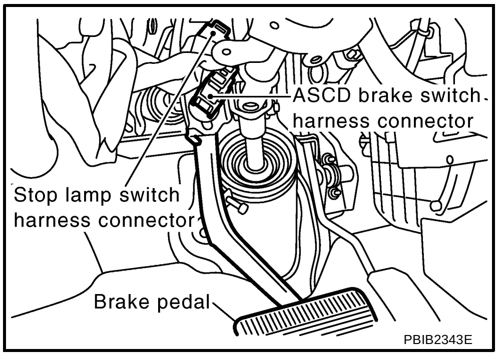
Refer to EC-646, "Component Inspection"

OK or NG

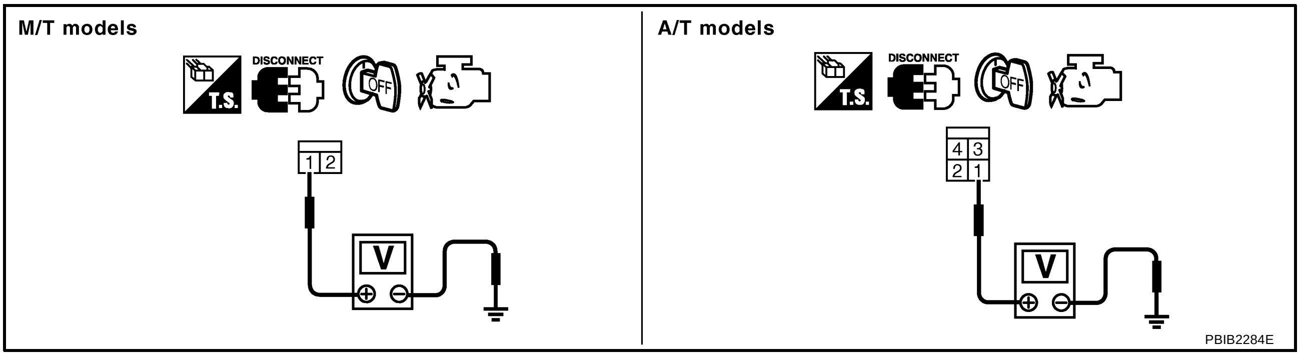
OK >> GO TO 16.
NG >> Replace ASCD brake switch.

12. CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Disconnect stop lamp switch harness connector.



2. Check voltage between stop lamp switch terminal 1 and ground with CONSULT -II or tester.



Voltage: Battery voltage

OK or NG

OK >> GO TO 14.
NG >> GO TO 13.

13. DETECT MALFUNCTIONING PART

Check the following.

- Fuse block (J/B) connector M2
- 10A fuse
- Harness for open or short between stop lamp switch and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

14. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 101 and stop lamp switch terminal 2.
   Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 15.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

15. CHECK STOP LAMP SWITCH

Refer to EC-646, "Component Inspection"

OK or NG

OK >> GO TO 16.

NG >> Replace stop lamp switch.

16. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

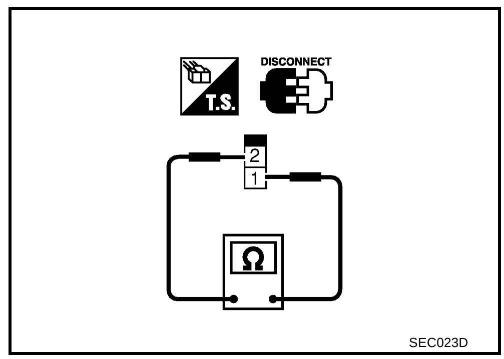
>> **INSPECTION END**

Component Inspection

ABS00DB0

ASCD BRAKE SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check continuity between ASCD brake switch terminals 1 and 2 under the following conditions.

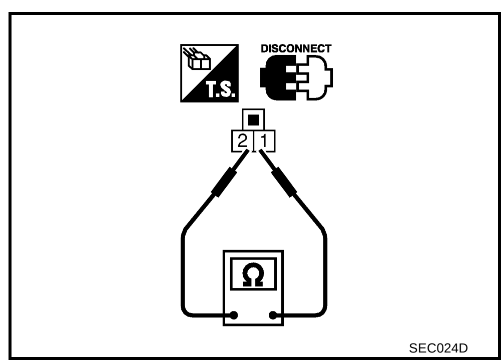


Condition	Continuity
Brake pedal: Fully released.	Should exist.
Brake pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD brake switch installation, refer to BR-6, "BRAKE PEDAL" , and perform step 3 again.

ASCD CLUTCH SWITCH

1. Turn ignition switch OFF.
2. Disconnect ASCD clutch switch harness connector.
3. Check continuity between ASCD clutch switch terminals 1 and 2 under the following conditions.



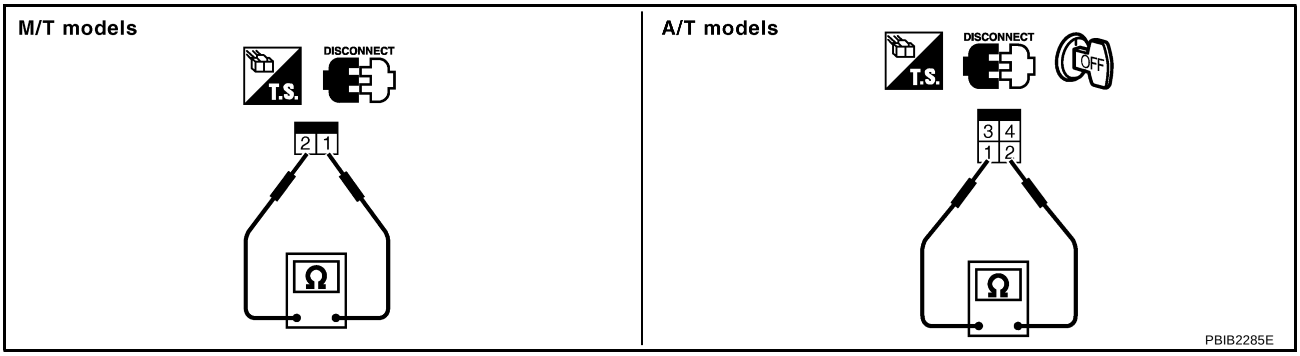
Condition	Continuity
Clutch pedal: Fully released.	Should exist.
Clutch pedal: Slightly depressed.	Should not exist.

If NG, adjust ASCD clutch switch installation, refer to CL-5, "CLUTCH PEDAL" , and perform step 3 again.

STOP LAMP SWITCH

1. Turn ignition switch OFF.
2. Disconnect stop lamp switch harness connector.

3. Check continuity between stop lamp switch terminals 1 and 2 under the following conditions.



Condition	Continuity
Brake pedal: Fully released.	Should not exist.
Brake pedal: Slightly depressed.	Should exist.

If NG, adjust stop lamp switch installation, refer to BR-6, "BRAKE PEDAL" , and perform step 3 again.

ASCD INDICATOR

PFP:24814

Component Description

ABS00CZQ

ASCD indicator lamp illuminates to indicate ASCD operation status. Lamp has two indicators, CRUISE and SET, and is integrated in combination meter.
CRUISE indicator illuminates when MAIN switch on ASCD steering switch is turned ON to indicated that ASCD system is ready for operation.
SET indicator illuminates when following conditions are met.

- CRUISE indicator is illuminated.
- SET/COAST switch on ASCD steering switch is turned ON while vehicle speed is within the range of ASCD setting.

SET indicator remains lit during ASCD control.
Refer to EC-27, "AUTOMATIC SPEED CONTROL DEVICE (ASCD)" for the ASCD function.

CONSULT-II Reference Value in Data Monitor Mode

ABS00CZR

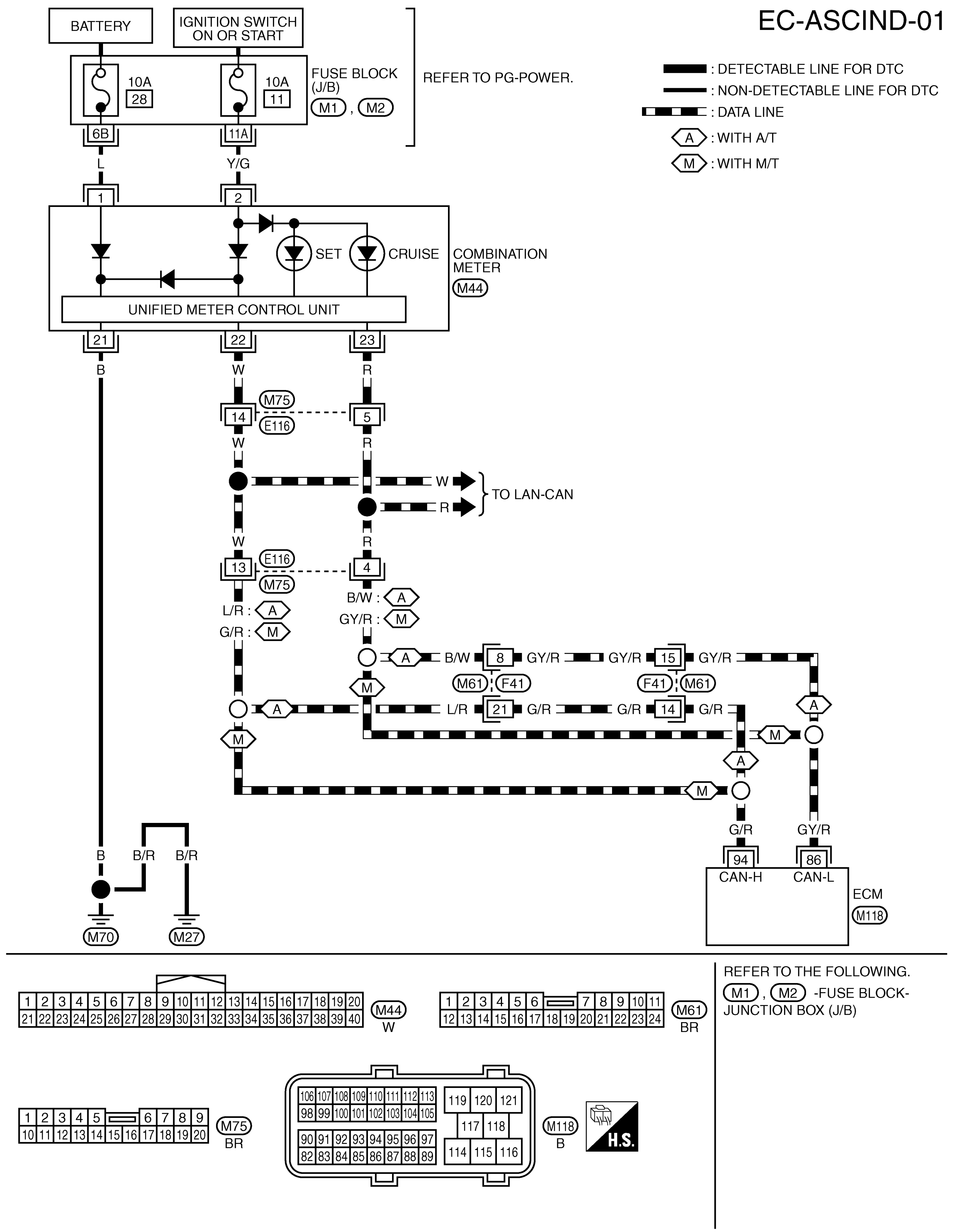
Specification data are reference value.

MONITOR ITEM	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	MAIN switch: Pressed at 1st time →2nd time	ON → OFF
SET LAMP	● MAIN switch: ON ● When vehicle is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

Wiring Diagram

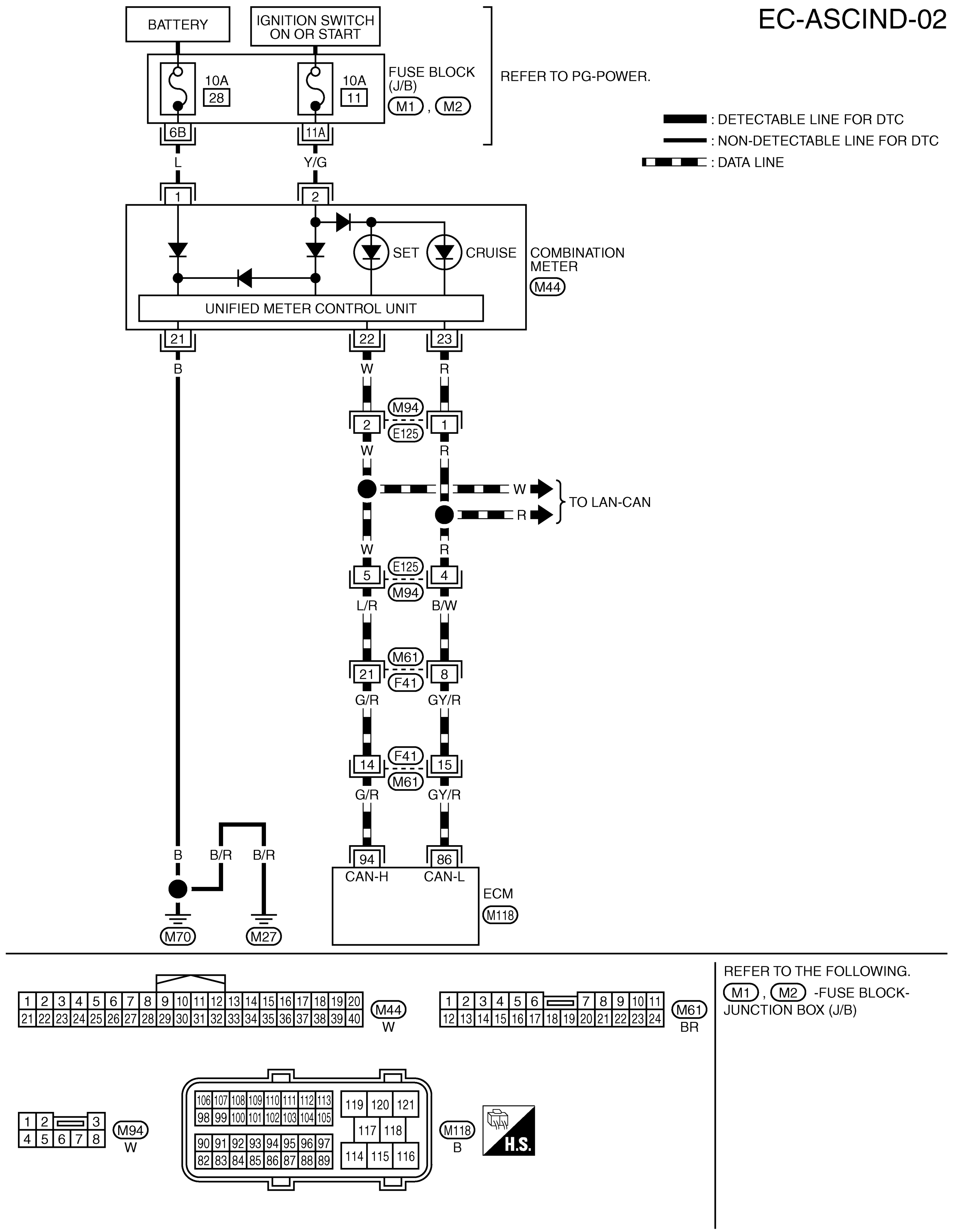
ABS00CZS

AWD



TBWA0764E

2WD



TBWA0765E

Diagnostic Procedure

ABS00CZT

1. CHECK OVERALL FUNCTION

Check ASCD indicator under the following conditions.

ASCD INDICATOR	CONDITION		SPECIFICATION
CRUISE LAMP	● Ignition switch: ON	MAIN switch: Pressed at 1st time → 2nd time	ON → OFF
SET LAMP	● MAIN switch: ON ● When vehicle is between 40 km/h (25 MPH) and 144 km/h (89 MPH)	ASCD: Operating	ON
		ASCD: Not operating	OFF

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 2.

2. CHECK DTC

Check that DTC U1000 or U1001is not displayed.

Yes or No

Yes >> Perform trouble diagnoses for DTC U1000, U1001, refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .
No >> GO TO 3.

3. CHECK COMBINATION METER OPERATION

Does combination meter operate normally?

Yes or No

Yes >> GO TO 4.
No >> Check combination meter circuit. Refer to DI-4, "COMBINATION METERS" .

4. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

SNOW MODE SWITCH

PFP:25310

Description

ABS00D92

NOTE:

If DTC U1000 or U1001 are displayed, first perform the trouble diagnosis for DTC U1000, U1001.

Refer to EC-163, "DTC U1000, U1001 CAN COMMUNICATION LINE" .

The snow mode switch signal is sent to the combination meter from the snow mode switch. The combination meter then sends the signal to the ECM by CAN communication line.

The snow mode is used for driving or starting the vehicle on snowy roads or slippery areas. If the snow mode is activated, the vehicle speed will not be accelerated immediately than your original pedal in due to avoid the vehicle slip. In other words, ECM controls the rapid engine torque change by controlling the electric throttle control actuator operating speed.

CONSULT-II Reference Value in the Data Monitor Mode

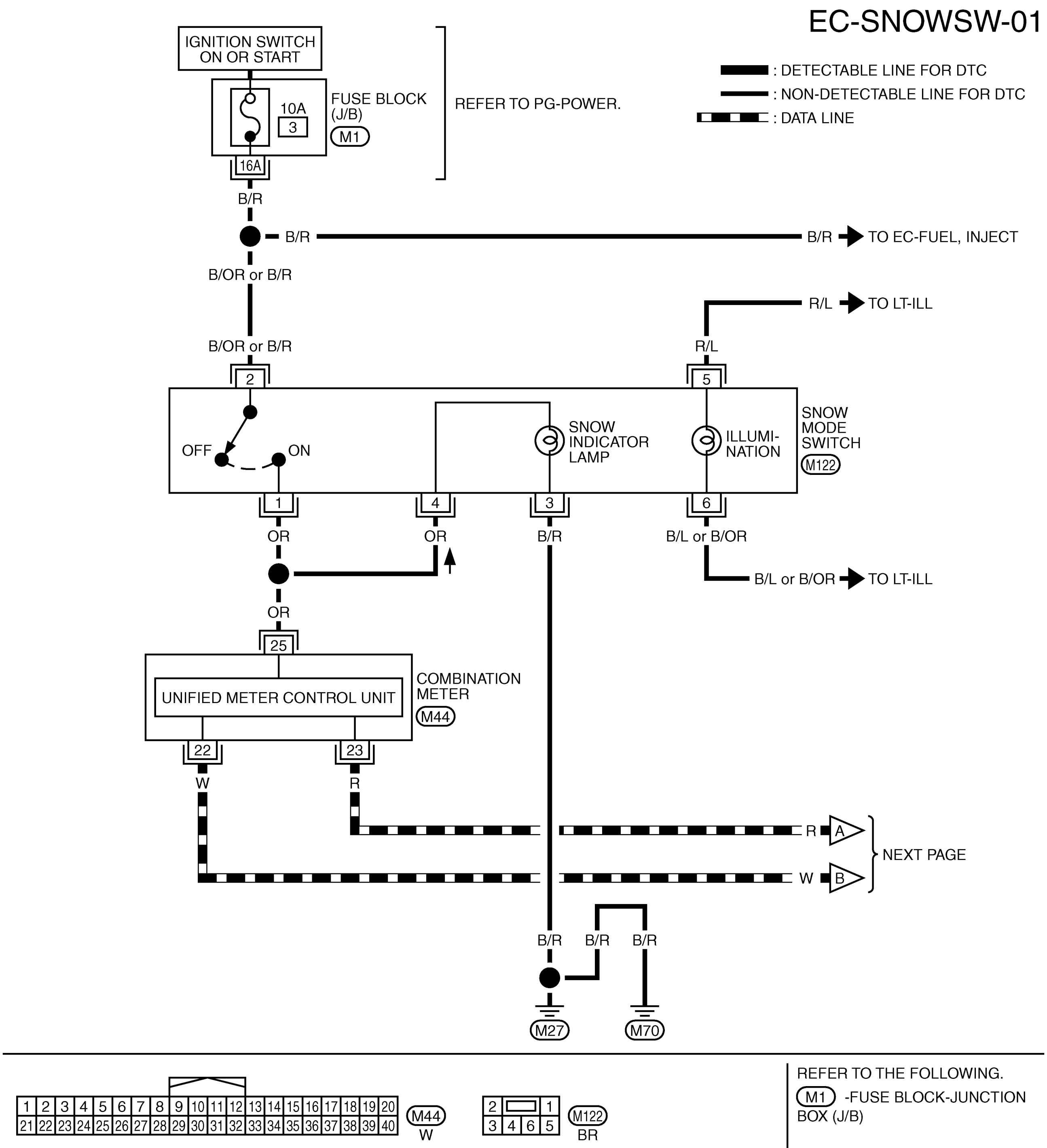
ABS00D93

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SNOW MODE SW	● Ignition switch: ON	Snow mode switch: ON	ON
		Snow mode switch: OFF	OFF

Wiring Diagram

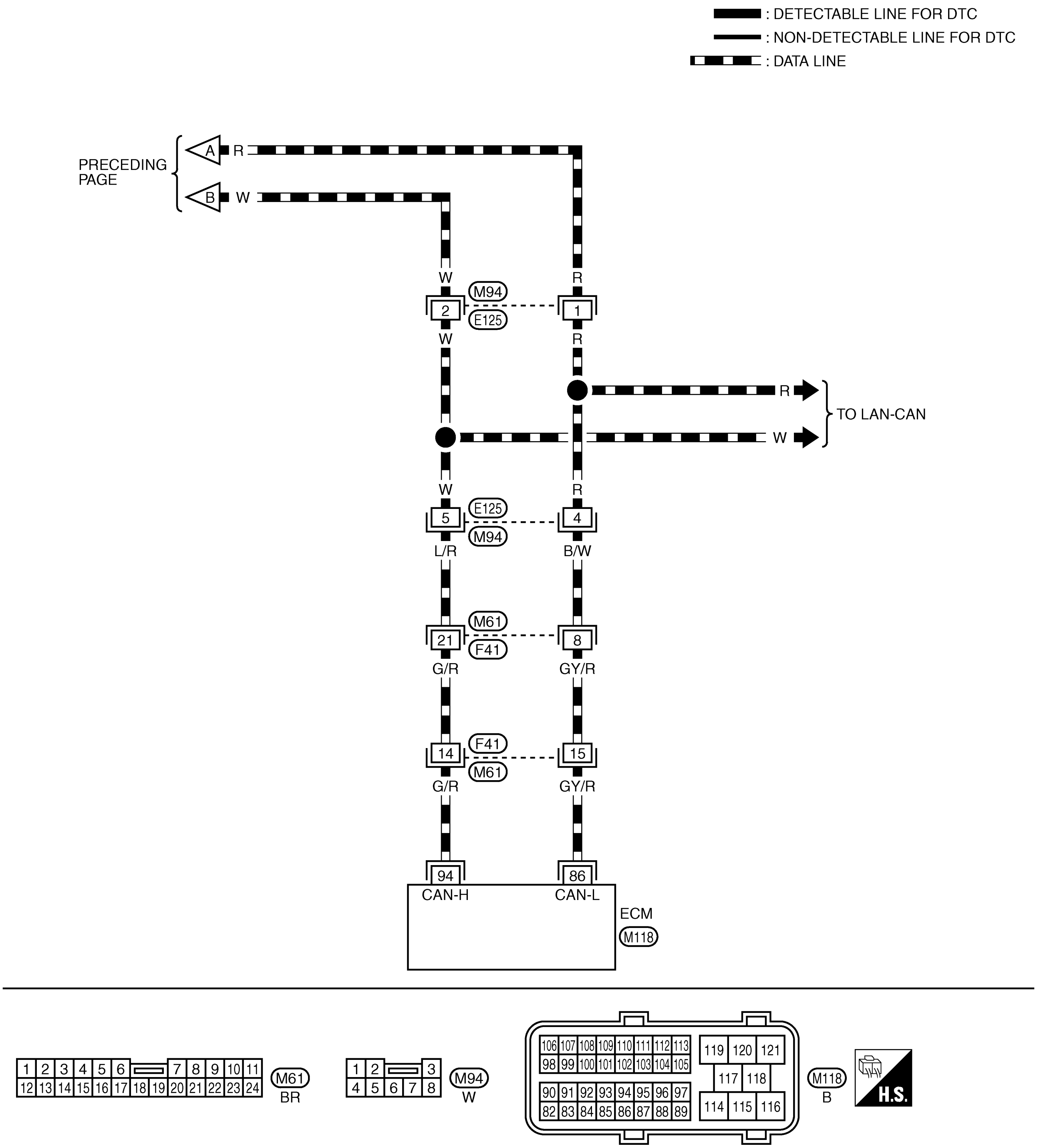
ABS00D94



REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)

TBWB0139E

EC-SNOWSW-02



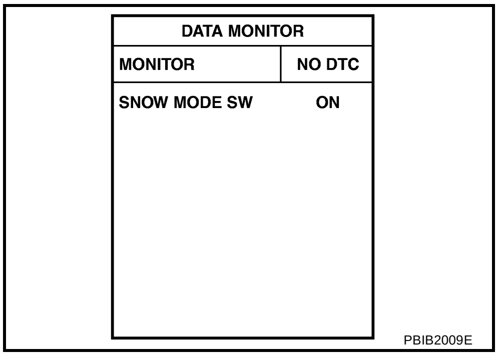
TBWB0140E

Diagnostic Procedure

ABS00D95

1. CHECK SNOW MODE SWITCH OVERALL FUNCTION- I

1. Turn ignition switch ON.
2. Select “SNOW MODE SW” in “DATA MONITOR” mode with CONSULT-II.
3. Check “SNOW MODE SW” indication under the following conditions.



CONDITION	INDICATION
Snow mode switch: ON	ON
Snow mode switch: OFF	OFF

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK SNOW MODE SWITCH OVERALL FUNCTION- II

1. Start engine.
2. Check the snow mode indicator in the combination meter under the following condition.

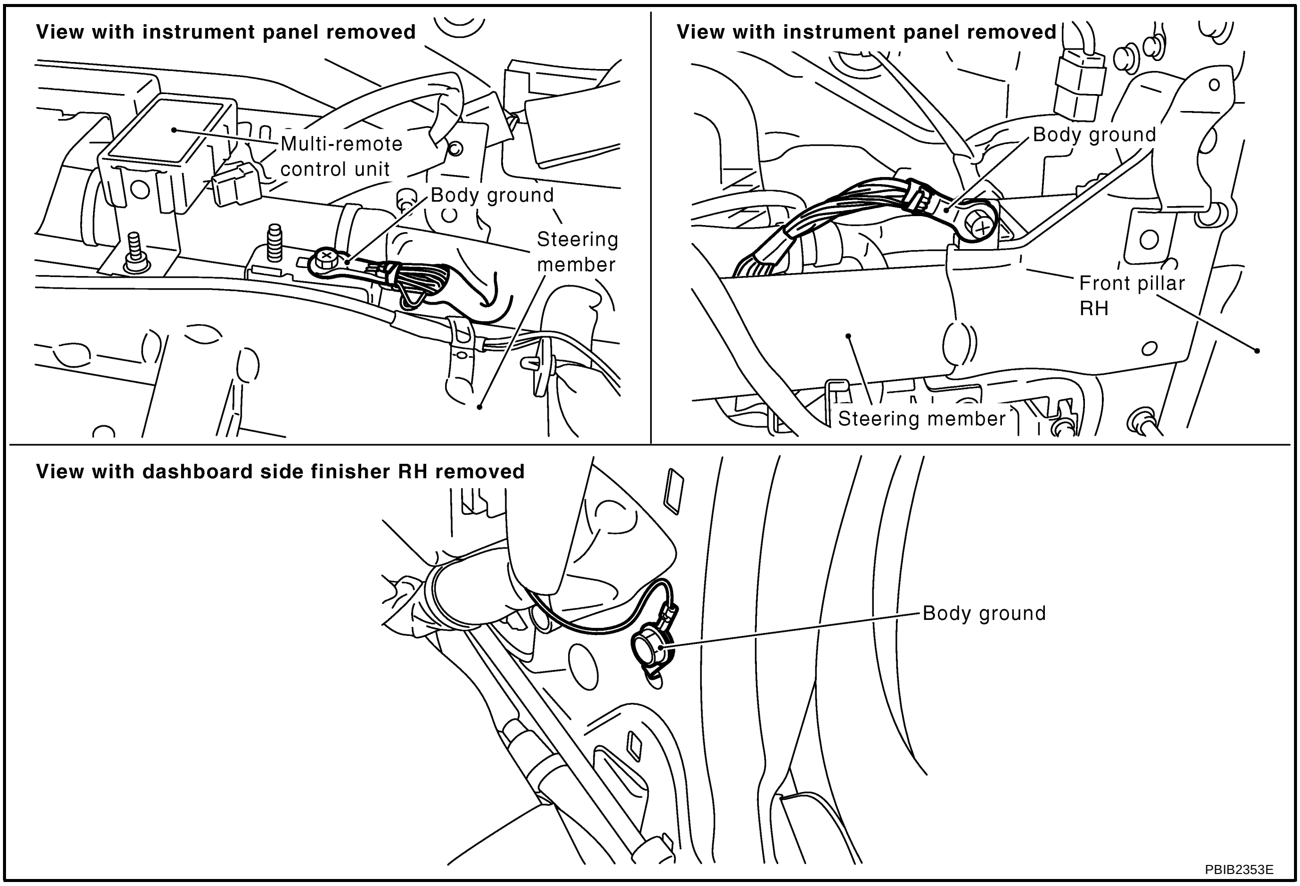
CONDITION	INDICATION
Snow mode switch: ON	ON
Snow mode switch: OFF	OFF

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 3.

3. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body.
   Refer to EC-162, "Ground Inspection" .

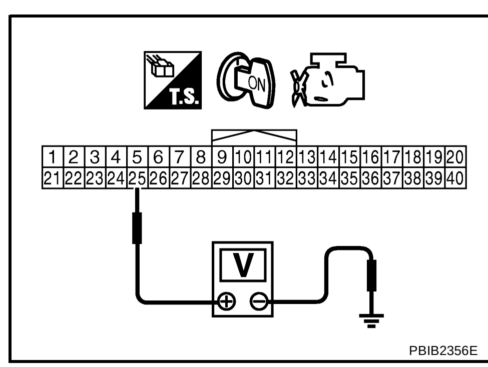


OK or NG

OK >> GO TO 4.
NG >> Repair or replace ground connections.

4. CHECK POWER SUPPLY CIRCUIT-I

1. Disconnect combination meter harness connector.
2. Turn ignition switch ON.
3. Check voltage between combination meter terminal 25 and ground under the following conditions with CONSULT-II or tester.



CONDITION	VOLTAGE
Snow mode switch: ON	Battery voltage
Snow mode switch: OFF	0V

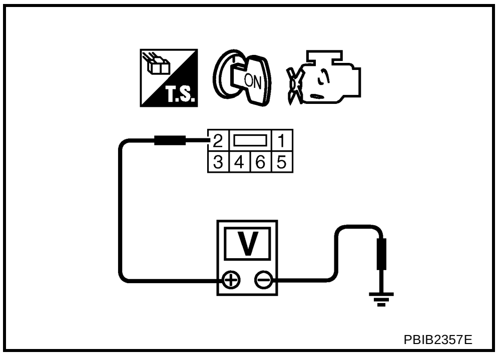
OK or NG

OK >> GO TO 8.
NG >> GO TO 5.

5. CHECK POWER SUPPLY CIRCUIT-II

1. Turn ignition switch OFF.
2. Disconnect snow mode switch.
3. Turn ignition switch ON.
4. Check voltage between snow mode switch terminal 2 and ground with CONSULT-II or tester.

Voltage: Battery voltage.



OK or NG

OK >> GO TO 7.
NG >> GO TO 6.

6. DETECT MALFUNCTIONING PART

Check the following.

- 10A fuse
- Fuse block (J/B) M1
- Harness for open or short between snow mode switch and fuse.

>> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK SNOW MODE SWITCH OUT PUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between snow mode switch terminal 1 and combination meter terminal 25. Refer to Wiring Diagram.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 8.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

8. CHECK SNOW MODE INDICATOR LAMP INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect snow mode switch harness connector.
3. Check harness continuity between snow mode switch terminal 4 and combination meter terminal 25. Refer to Wiring Diagram.

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 9.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

9. CHECK SNOW MODE INDICATOR LAMP GROUND CIRCUIT FOR OPEN AND SHORT

1. Check harness continuity between snow mode switch terminal 3 and ground.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to power.

OK or NG

OK >> GO TO 10.
NG >> Repair open circuit or short to power in harness or connectors.

10. CHECK SNOW MODE INDICATOR LAMP

1. Check harness continuity between snow mode switch terminals 3 and 4.
   Refer to Wiring Diagram.

   Continuity should exist.

2. Also check harness for short to ground or short to power.

OK or NG

OK >> GO TO 11.
NG >> Replace snow mode switch.

11. CHECK SNOW MODE SWITCH

Refer to EC-658, "Component Inspection" .

OK or NG

OK >> GO TO 12.
NG >> Replace snow mode switch.

12. CHECK COMBINATION METER

Refer to DI-4, "COMBINATION METERS" .

OK or NG

OK >> GO TO 13.
NG >> Replace combination meter.

13. CHECK INTERMITTENT INCIDENT

Refer to EC-154, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT" .

>> **INSPECTION END**

Component Inspection

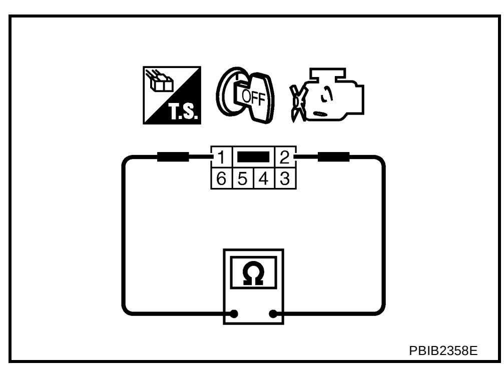
ABS00D96

SNOW MODE SWITCH

1. Check snow mode switch continuity between terminals 1 and 2 under the following condition.

CONDITION	CONTINUITY
Snow mode switch: ON	Should exist
Snow mode switch: OFF	Should not exist

2. If NG, replace snow mode switch.



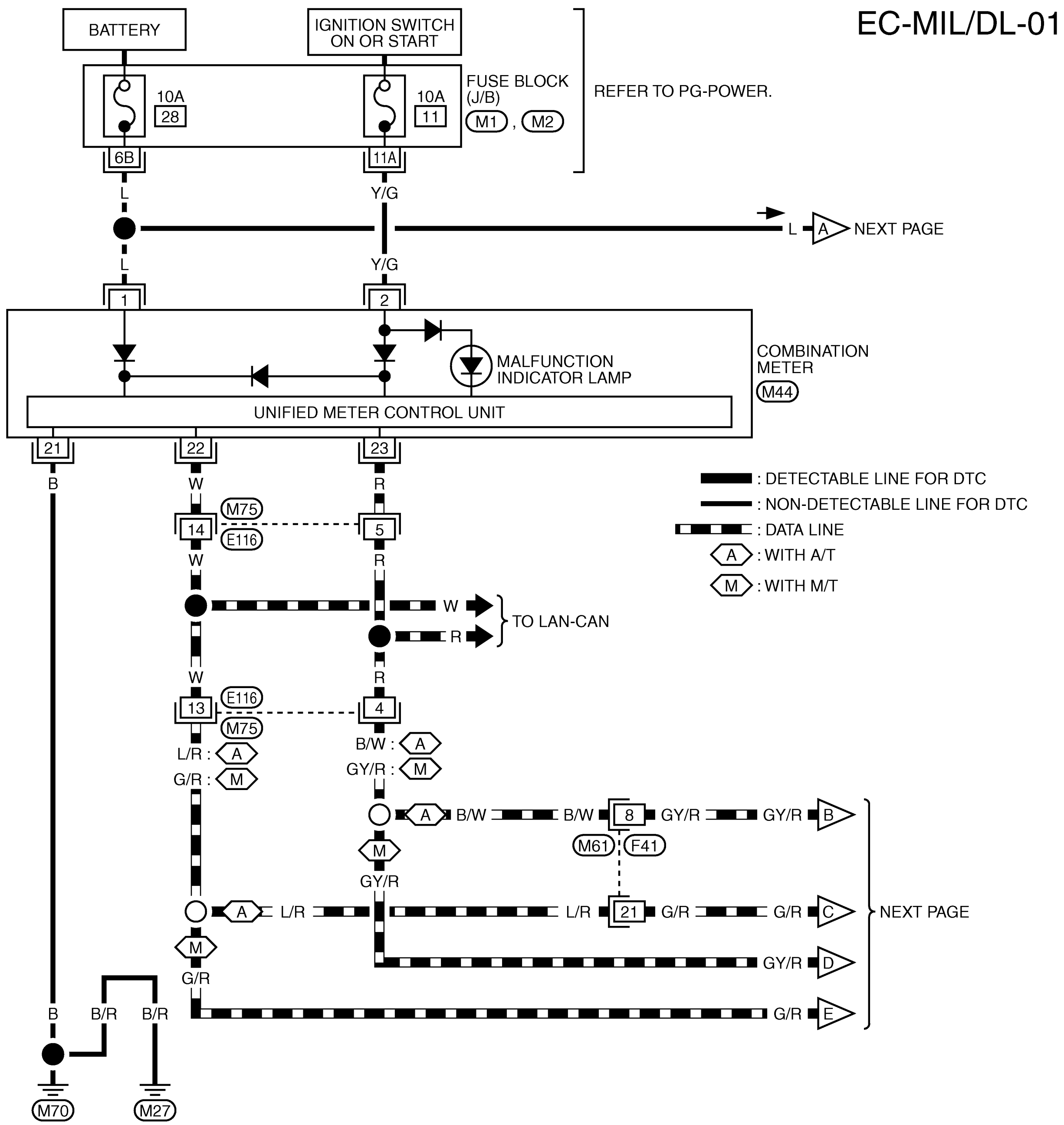
MIL AND DATA LINK CONNECTOR

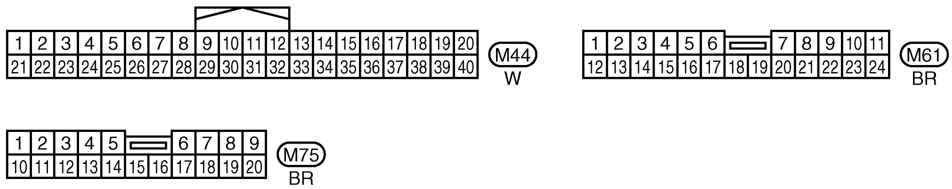
PFP:24814

Wiring Diagram

ABS00CZU

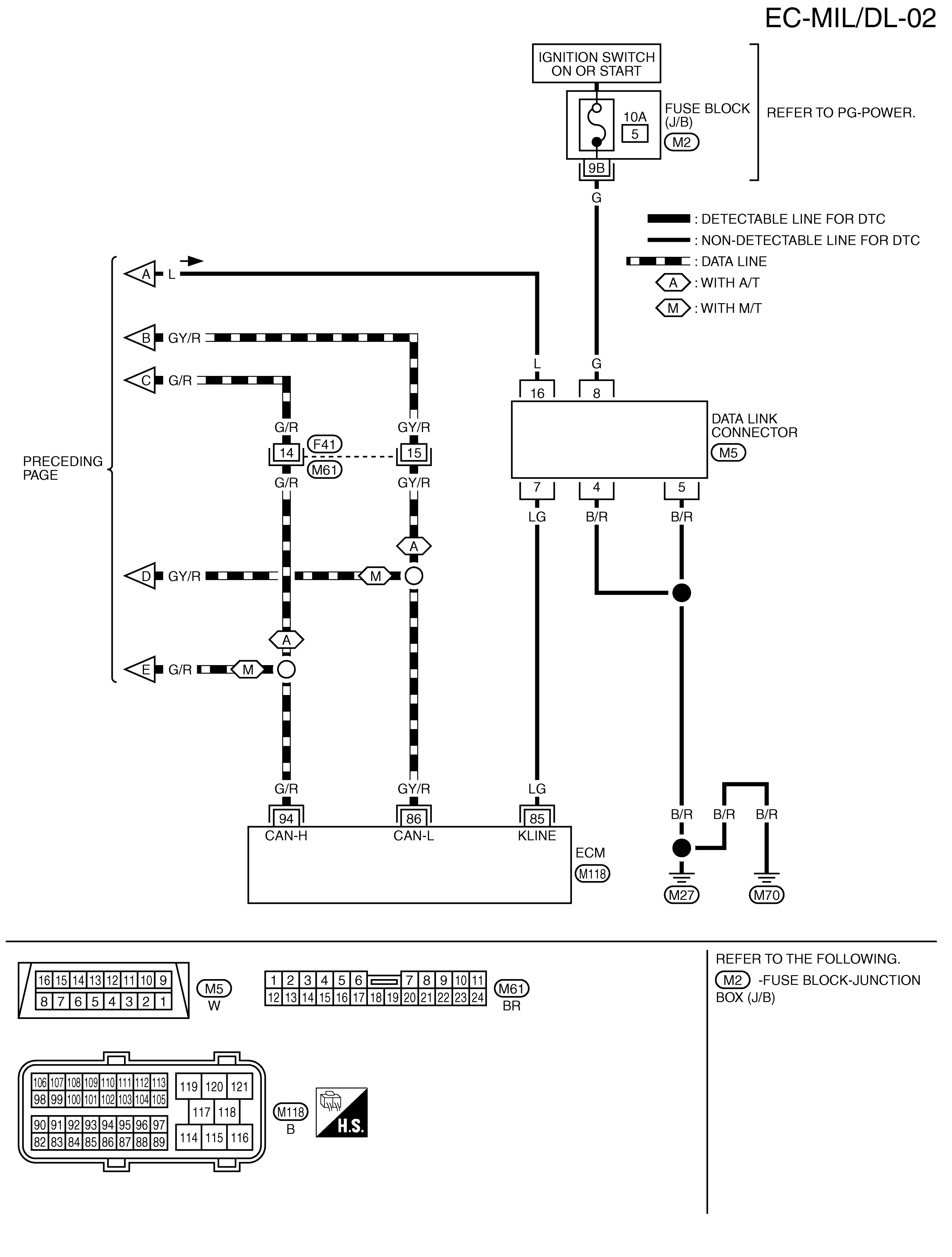
AWD



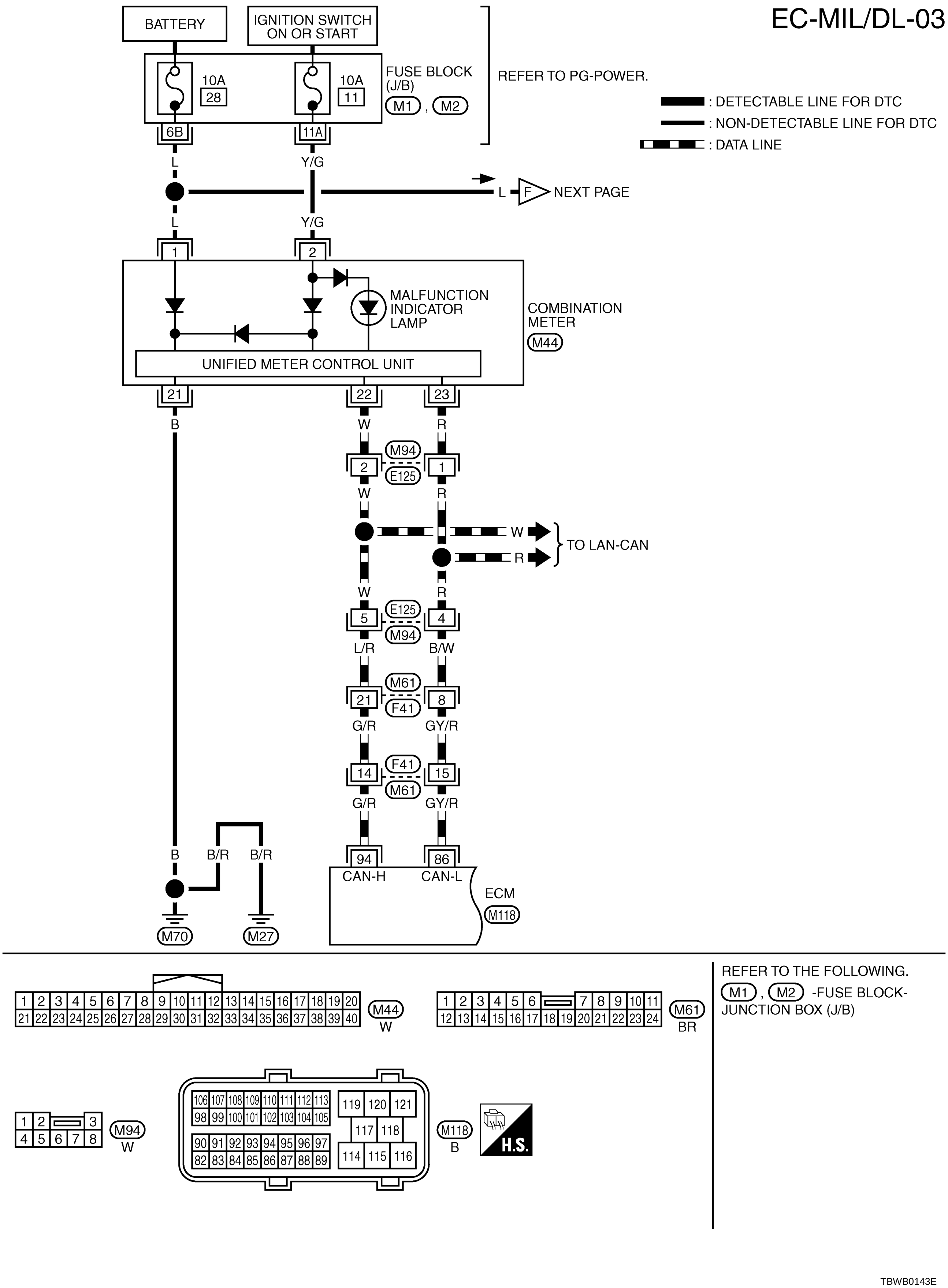


REFER TO THE FOLLOWING.
M1, M2 -FUSE BLOCK-JUNCTION BOX (J/B)

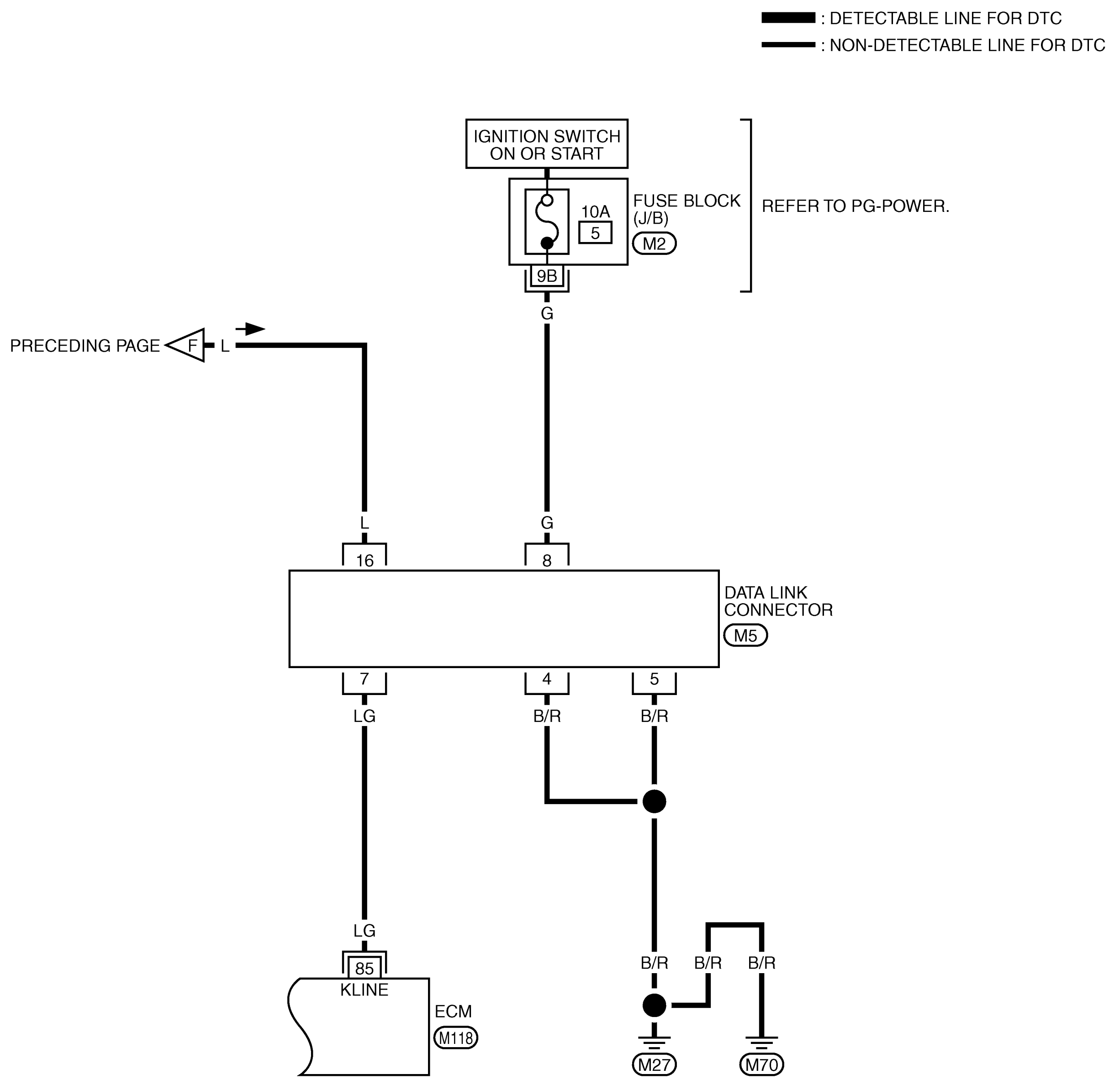
TBWB0141E

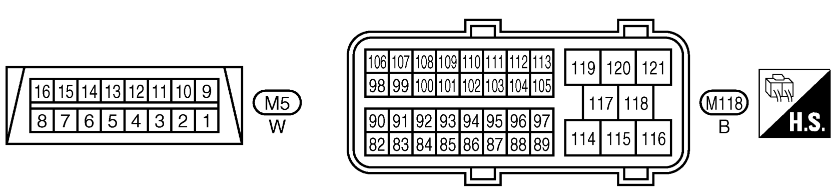

EC-MIL/DL-02
IGNITION SWITCH ON OR START
10A
5
FUSE BLOCK (J/B)
M2
9B
REFER TO PG-POWER.
G
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE
A : WITH A/T
M : WITH M/T
A L
B GY/R
C G/R
D GY/R
E G/R
PRECEDING PAGE
L
G
16
8
DATA LINK CONNECTOR
M5
7
4
5
LG
B/R
B/R
G/R
GY/R
14
15
F41
M61
94
86
85
CAN-H
CAN-L
KLINE
ECM
M118
M27
M70
M5
W
M61
BR
M118
B
H.S.
REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)
TBWB0142E

2WD


EC-MIL/DL-03
BATTERY
IGNITION SWITCH ON OR START
10A 28
10A 11
FUSE BLOCK (J/B)
M1 , M2
REFER TO PG-POWER.
: DETECTABLE LINE FOR DTC
: NON-DETECTABLE LINE FOR DTC
: DATA LINE
6B
11A
L
Y/G
L F NEXT PAGE
1
2
MALFUNCTION INDICATOR LAMP
COMBINATION METER
M44
UNIFIED METER CONTROL UNIT
21
22
23
B
W
R
M94
E125
TO LAN-CAN
L/R
B/W
M61
F41
G/R
GY/R
B/R
94
86
CAN-H
CAN-L
ECM
M118
M70
M27
M44 W
M61 BR
REFER TO THE FOLLOWING.
M1 , M2 -FUSE BLOCK-JUNCTION BOX (J/B)
M94 W
M118 B
H.S.
TBWB0143E

EC-MIL/DL-04





REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TBWB0144E

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Fuel Pressure

ABS00D06

Fuel pressure at idle	Approximately 350 kPa (3.57kg/cm^2 , 51psi)

Idle Speed and Ignition Timing

ABS00D07

Target idle speed	No load*1 [in P or N position (A/T) or Neutral position (M/T)]	700 ± 50 rpm
Air conditioner: ON	In P or N position (A/T) or Neutral position (M/T)	800 rpm or more*2
Ignition timing	In P or N position (A/T) or Neutral position (M/T)	15° ± 5° BTDC

*1: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater fan & rear window defogger)
- Steering wheel: Kept in straight-ahead position

*2: It refrigerant pressure is low, the idle speed may not be increased.

Calculated Load Value

ABS00D08

Conditions	Calculated load value% (Using CONSULT-II or GST)
At idle	10 - 35
At 2,500 rpm	10 - 35

Mass Air Flow Sensor

ABS00D09

Supply voltage	Battery voltage (11 - 14V)
Output voltage at idle	0.9 - 1.1V*
Mass air flow (Using CONSULT-II or GST)	1.0 - 4.0 g·m/sec at idle* 4.0 - 10.0 g·m/sec at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and running under no load.

Intake Air Temperature Sensor

ABS00D0A

Temperature °C (°F)	Resistance kΩ
25 (77)	1.94 - 2.06
80 (176)	0.295 - 0.349

Engine Coolant Temperature Sensor

ABS00D0B

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

Heated Oxygen Sensor 1 Heater

ABS00D0C

Resistance [at 25°C (77°F)]Ω	3.3 - 4.0

Heated Oxygen Sensor 2 Heater

ABS00D0D

Resistance [at 25°C (77°F)]	5.0 - 7.0Ω

Crankshaft Position Sensor (POS)

ABS00D0F

Refer to EC-318, "Component Inspection" .

Camshaft Position Sensor (PHASE)

ABS00D0G

Refer to EC-325, "Component Inspection" .

Throttle Control Motor

ABS00D0H

Resistance [at 25°C (77°F)]	Approximately 1 - 15Ω

Fuel Injector

ABS00D0I

Resistance [at 10 - 60°C (50 - 140°F)]	13.5 - 17.5Ω

Fuel Pump

ABS00D0J

Resistance [at 25°C (77°F)]	Approximately 0.2 - 5.0Ω

SECTION EI
EXTERIOR & INTERIOR

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AIS005RZ

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions

AIS005S0

- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping tools with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

- Do not use any organic solvent, such as thinner or benzine.

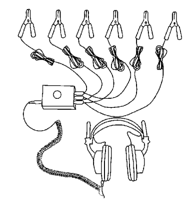
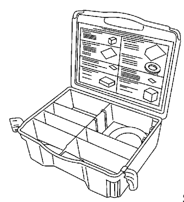
PREPARATION

PFP:00002

Special Service Tools

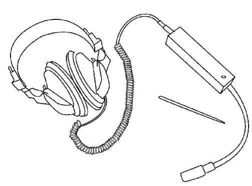
AIS0061G

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
(J-39570) Chassis ear	 SIIA0993E	Locating the noise
(J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of the noise

Commercial Service Tools

AIS0061H

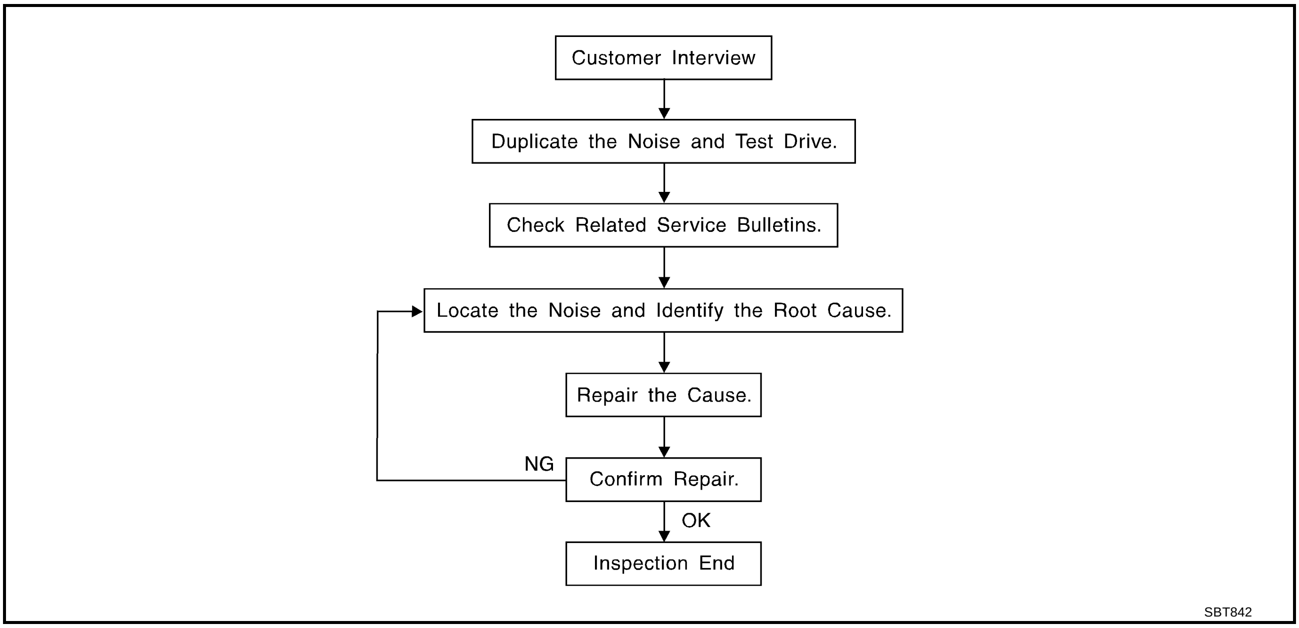
Tool name		Description
Engine ear	 SIIA0995E	Locating the noise

SQUEAK AND RATTLE TROUBLE DIAGNOSES

PFP:00000

Work Flow

AIS00617



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to EI-9, "Diagnostic Worksheet" . This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces=higher pitch noise/softer surfaces=lower pitch noises/edge to surface=chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:
1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T models, drive position on A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to EI-7, "Generic Squeak and Rattle Troubleshooting" .

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
  - separate components by repositioning or loosening and retightening the component, if possible.
  - insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.

NOTE:
Always check with the Parts Department for the latest parts information.
The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)

INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTHTAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit. Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

AIS00618

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

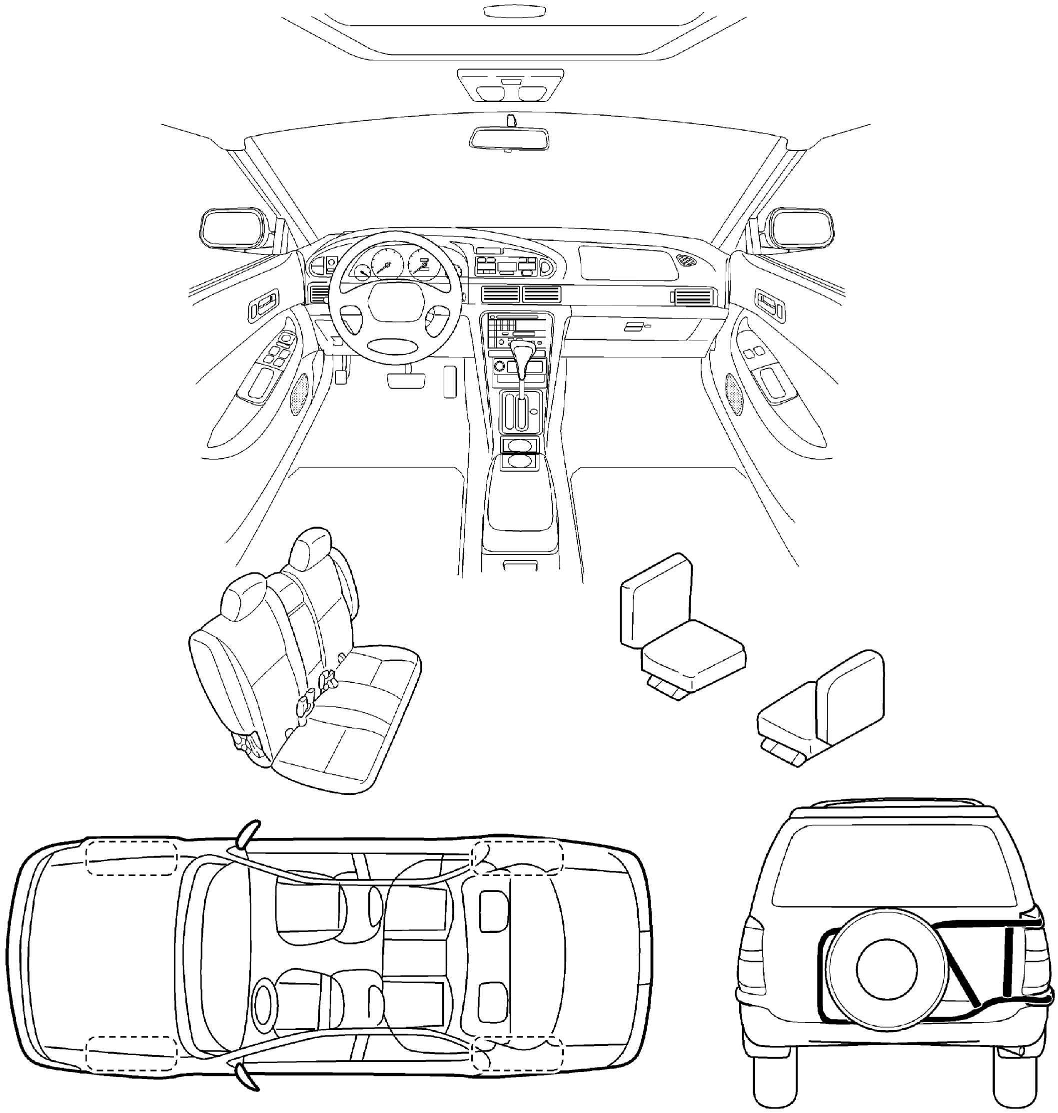
Diagnostic Worksheet

AIS00619

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB0723E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

____

____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

- ❏ anytime
- ❏ 1st time in the morning
- ❏ only when it is cold outside
- ❏ only when it is hot outside
- ❏ after sitting out in the sun
- ❏ when it is raining or wet
- ❏ dry or dusty conditions
- ❏ other: ____________________

III. WHEN DRIVING:

- ❏ through driveways
- ❏ over rough roads
- ❏ over speed bumps
- ❏ only at about ____ mph
- ❏ on acceleration
- ❏ coming to a stop
- ❏ on turns : left, right or either (circle)
- ❏ with passengers or cargo
- ❏ other: ____________________
- ❏ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

- ❏ squeak (like tennis shoes on a clean floor)
- ❏ creak (like walking on an old wooden floor)
- ❏ rattle (like shaking a baby rattle)
- ❏ knock (like a knock on a door)
- ❏ tick (like a clock second hand)
- ❏ thump (heavy, muffled knock noise)
- ❏ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

____

____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❏	❏	______
- Noise verified on test drive	❏	❏	
- Noise source located and repaired	❏	❏	______
- Follow up test drive performed to confirm repair	❏	❏	______

VIN: ____________________ Customer Name: ____________________

W.O. #: ____________________ Date: ____________

This form must be attached to Work Order

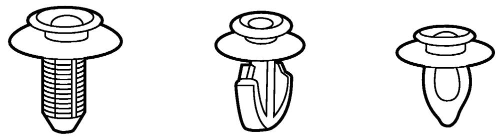
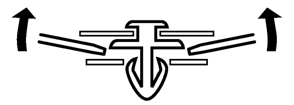
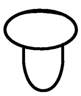
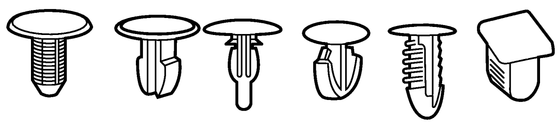
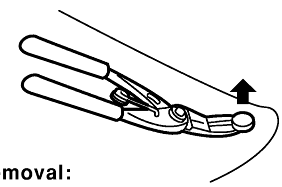
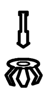
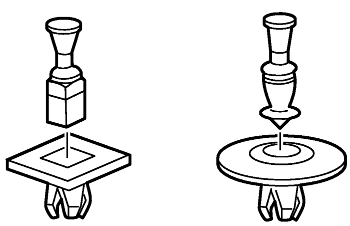
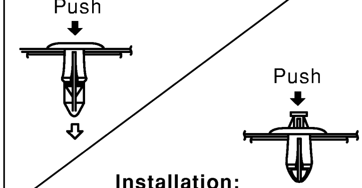
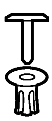
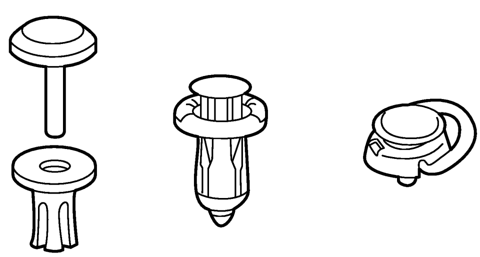
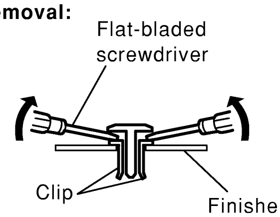
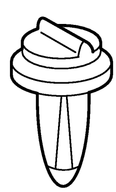
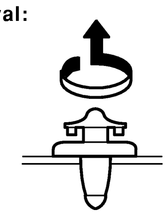
SBT844

CLIP AND FASTENER

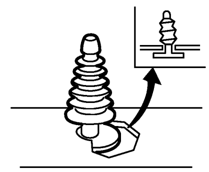
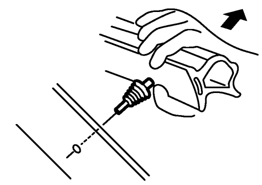
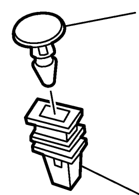
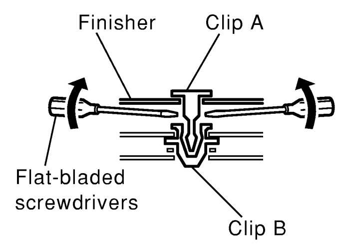
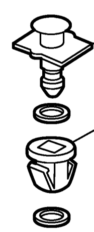
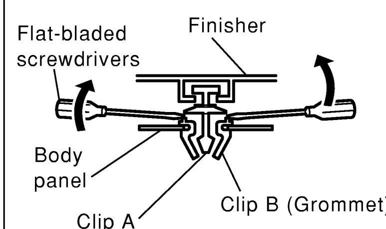
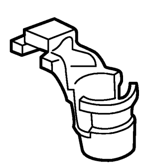
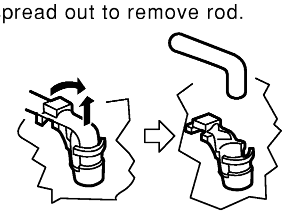
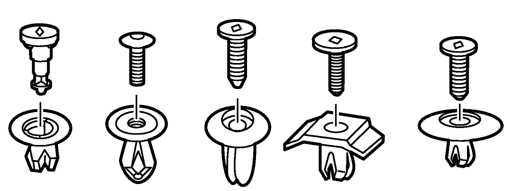
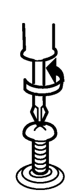
PFP:76906

Clip and Fastener

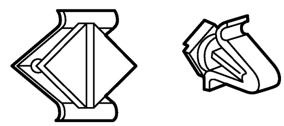
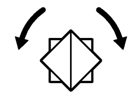
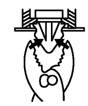
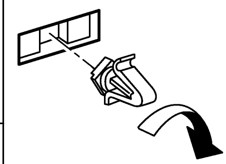
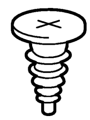
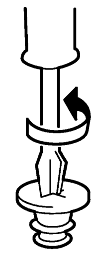
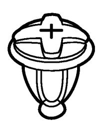
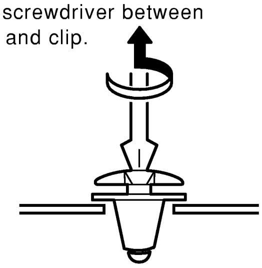
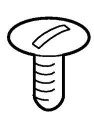
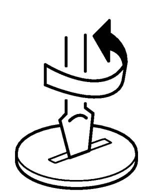
AIS005S5

Symbol No.	Shapes	Removal & Installation
C101 		**Removal:** Remove by bending up with flat-bladed screwdrivers or clip remover. 
C103 		 **Removal:** Remove with a clip remover.
C203 		**Removal:** Push center pin to catching position. (Do not remove center pin by hitting it.)  **Installation:**
C205 		**Removal:** 
C206 		**Removal:** 

SIIA0315E

Symbol No.	Shapes	Removal & Installation
CE103 		**Removal:** 
CF110 		**Removal:** 
CF118 		**Removal:** 
CR103		**Removal:** Holder portion of clip must be spread out to remove rod. 
CS101 		**Removal:** 1. Screw out with a Phillips screwdriver. 2. Remove female portion with flat-bladed screwdriver. 

SIIA0316E

Symbol No.	Shapes	Removal & Installation
CG101 		**Removal:**   **Removal:** **Installation:** 
CS102 		
CS113 		**Removal:** Disconnect upper connection of clip with a flat-bladed screwdriver, then remove clip while inserting a flat-bladed screwdriver between body panel and clip. 
C111 		

SIIA0317E

FRONT BUMPER

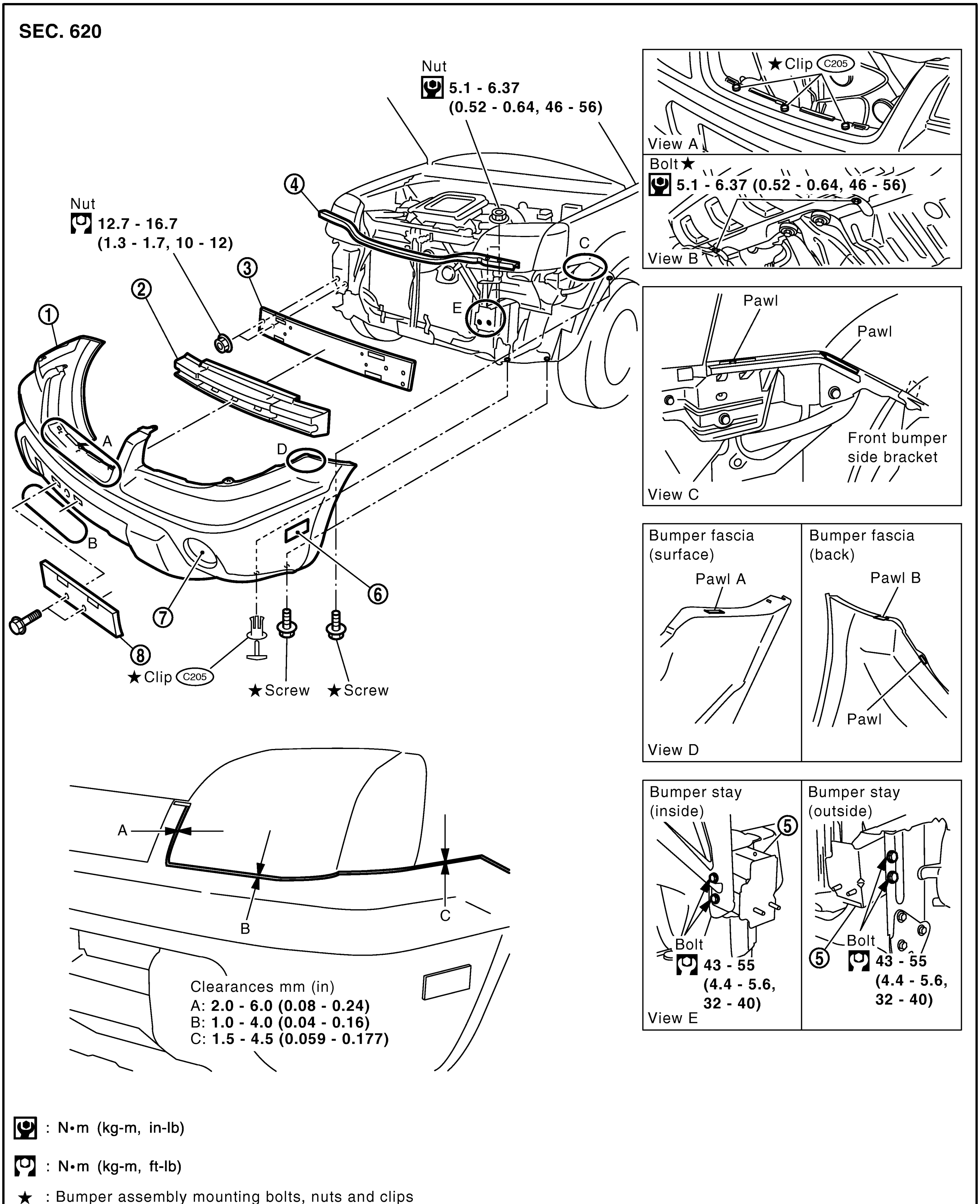
PFP:F2022

Removal and Installation

AIS005S6

CAUTION:

Bumper fascia is made of resin. Do not apply strong force to it, and be careful to prevent contact with oil.



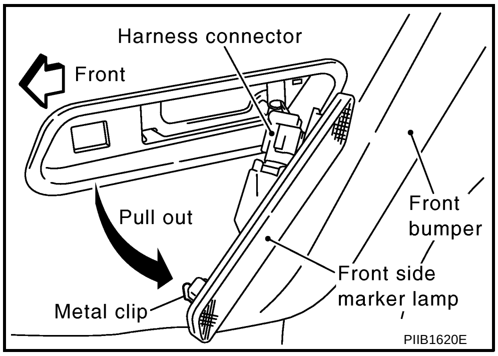
1. Front bumper fascia
2. Energy shock absorber
3. Bumper reinforcement

4. Bumper upper retainer
5. Bumper stay
6. Front side marker lamp
7. Front fog lamp
8. License plate bracket

A
B
C
D
E
F
G
H
EI
J
K
L
M

REMOVAL

1. Remove front grille. Refer to EI-18, "Removal and Installation" .
2. Remove front side marker lamp and disconnect front side marker lamp harness connectors.



3. Remove mounting screws and clips on front fender protector (right/left).
4. Remove front bumper fascia mounting screws from front fender (right/left).
5. Remove clips from the top surface of front bumper and bolts from the lower surface.
6. Press down pawls A (1 each on left/right sides) on bumper fascia to remove. Then disengage pawls B (1 each on left/right sides) on the fender and disconnect front fog lamp harness connectors.
7. Remove front bumper fascia assembly.

   CAUTION:
   When removing bumper fascia, 2 workers are required so as to prevent it from dropping.
8. Remove energy shock absorber.
9. Remove mounting nuts from bumper reinforcement assembly.
10. Remove mounting nuts from bumper upper retainer assembly.
11. Remove mounting bolts from bumper stay assembly (right/left).
12. Remove mounting bolts from license plate bracket.

INSTALLATION

Install in the reverse order of removal.

NOTE:
After installation, adjust the clearance.

REAR BUMPER

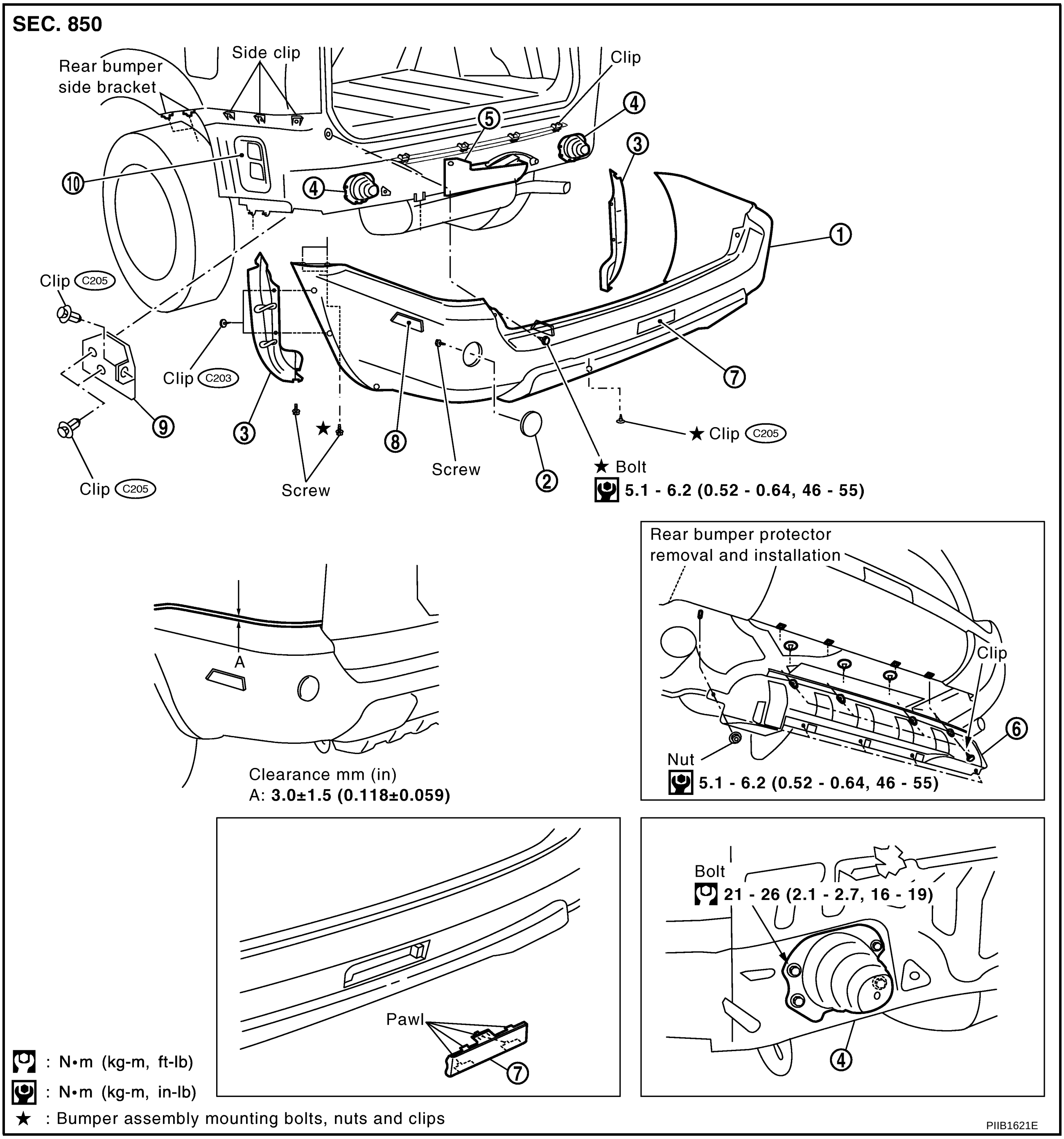
PFP:H5022

Removal and Installation

AIS005S7

CAUTION:

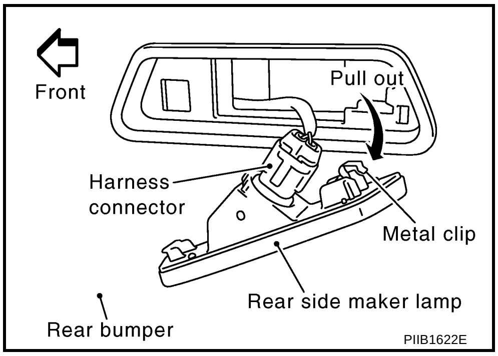
Bumper fascia is made of resin. Do not apply strong force to it, and be careful to prevent contact with oil.



1.	Rear bumper fascia	2.	Reflector	3.	Bumper closing (right/left)
4.	Bumper stay (right/left)	5.	Rear bumper energy absorber	6.	Rear bumper protector
7.	Rear bumper finisher	8.	Rear side marker lamp	9.	Fuel tube cover
10.	Drafter assembly				

REMOVAL

1. Remove mounting nuts and clips on rear bumper protector.
2. Remove mounting nuts and clips on bumper closing (right/left).
3. Remove rear side marker lamp and disconnect rear side marker lamp harness connectors.



4. Remove mounting screws on rear fender protectors.
5. Remove mounting bolts and clips on rear bumper fascia.
6. Spread bumper fascia toward the outside and remove it from the side clips.
7. Pull bumper fascia assembly straight rearward to remove.

   CAUTION:
   When removing bumper fascia, 2 workers are required so as to prevent it from dropping.
8. Remove rear bumper energy absorber.
9. Remove mounting bolts on bumper stay (right/left).
10. Remove rear bumper finisher. and remove the reflectors from bumper.

INSTALLATION

Install in the reverse order of removal.

NOTE:
After installation, adjust the clearance.

Removal of Fuel Tube Cover

1. Remove clips of fuel tube cover.
2. Remove fuel tube cover.

Installation of Fuel Tube Cover

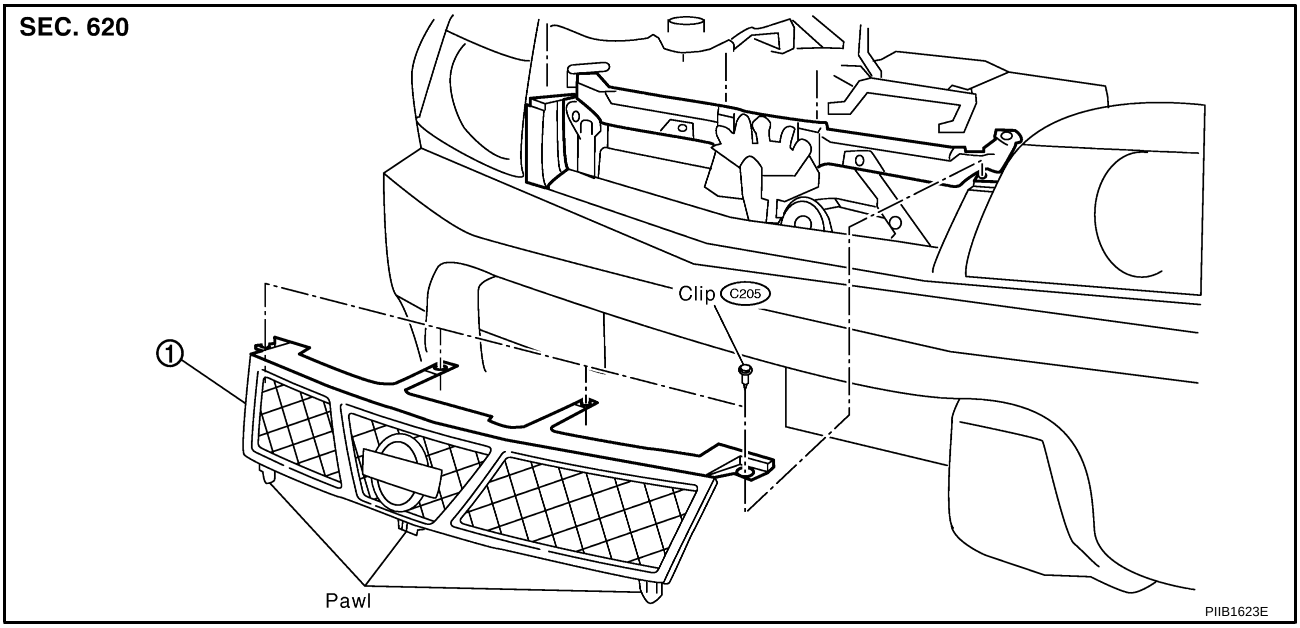
Install in the reverse order of removal.

FRONT GRILLE

PFP:62310

Removal and Installation

AIS005S8



1. Front grille

REMOVAL

CAUTION:

Apply protection tape around outer circumference of front grille (bumper fascia side).

1. Remove clips from top edge of grille.
2. Disconnect pawls, and remove front grille.

INSTALLATION

Install in the reverse order of removal.

COWL TOP

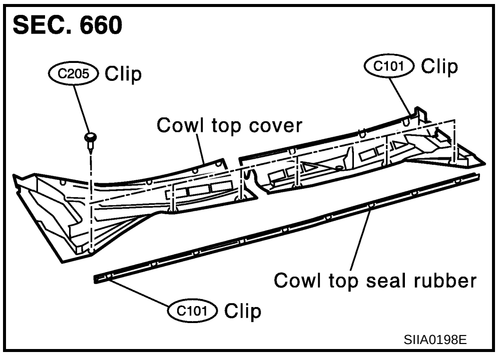
PFP:66100

Removal and Installation

AIS005S9

REMOVAL

1. Remove wiper arms (left and right). Refer to WW-6, "Removal and Installation of Front Wiper Arms, Adjustment of Wiper Arms Stop Location" .
2. Remove cowl top seal rubber.
3. Remove cowl top rubber mounting clips. Then remove cowl top cover.



INSTALLATION

Install in the reverse order of removal.

CAUTION:

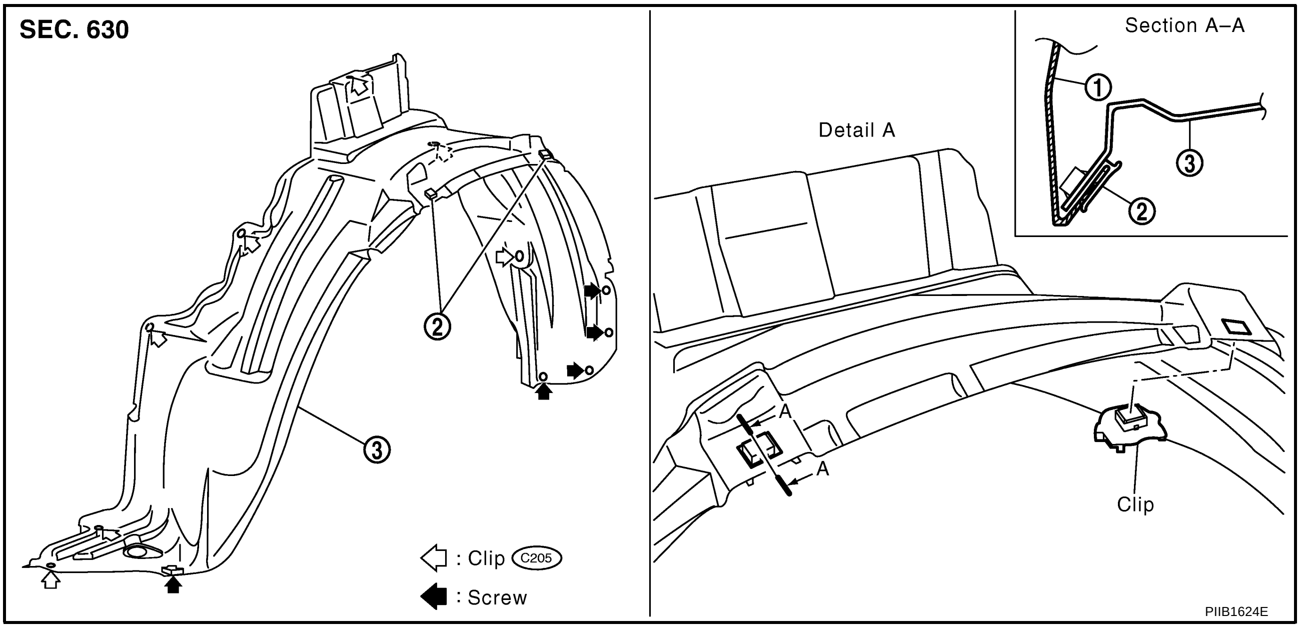
- **When installing cowl top cover, make sure that blind clips are securely fitted in panel holes on body, and then press them in.**
- **Refer to WW-6, "Removal and Installation of Front Wiper Arms, Adjustment of Wiper Arms Stop Location" in WW section for wiper arm installation.**

FENDER PROTECTOR

PFP:63840

Removal and Installation

AIS005SA



1. Front fender
2. Clip
3. Fender protector

REMOVAL

1. Remove screws and clips of fender protector.
2. Remove fender protector.

INSTALLATION

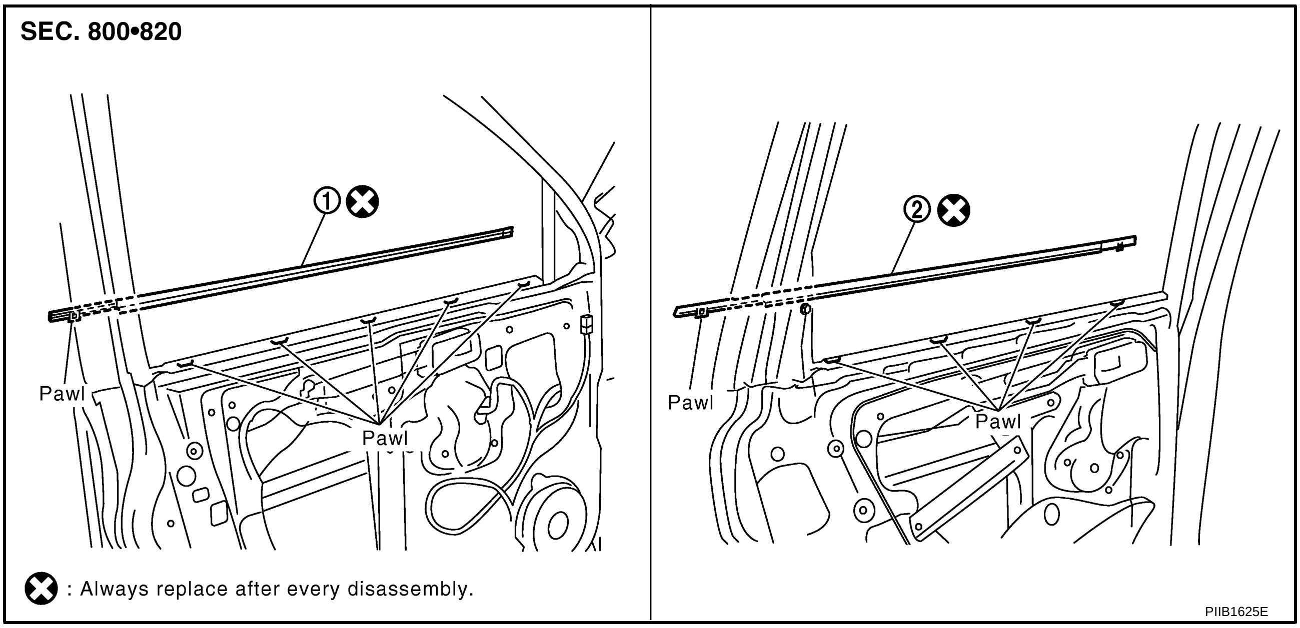
Install in the reverse order of removal.

DOOR OUTSIDE MOLDING

PFP:82820

Removal and Installation

AIS005SB



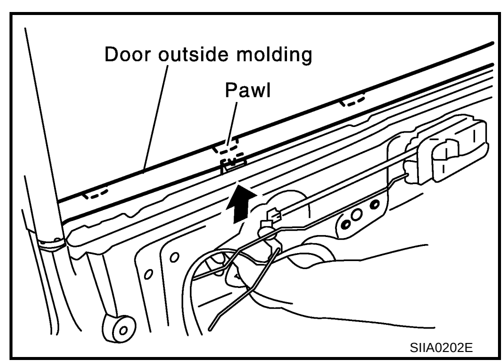
1. Front door outside molding
2. Rear door outside molding

FRONT DOOR OUTSIDE MOLDING

Removal

1. Roll the front door window all the way up.
2. Remove front door finisher. Refer to EI-32, "Removal and Installation" .
3. Remove corner cover and door mirror. Refer to GW-64, "Removal and Installation" .
4. Disengage front door outside molding pawl.
5. Reaching from inner side of door, use a clip clamp tool to disengage front door outside molding from the pawl.

   NOTE:
   Insert clip clamp tool into the door pawl, then disengage by pressing in the direction of arrow. (See figure on the right)



Installation

Install in the reverse order of removal.

NOTE:
To install, press molding into the outer panel flange and engage the pawls.

REAR DOOR OUTSIDE MOLDING

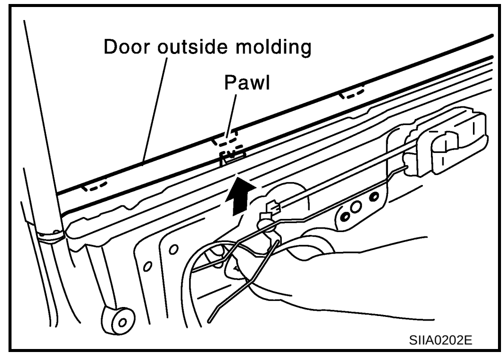
Removal

1. Roll the rear door window all the way up.
2. Remove rear door finisher. Refer to EI-32, "Removal and Installation" .
3. Remove corner inner cover and corner outer cover. Refer to GW-59, "Removal and Installation" .
4. Disengage rear door outside mold pawl.

5. Reaching from inner side of door, use a clip clamp tool to disengage rear door outside molding from the pawl.

   NOTE:

   Insert clip clamp tool into the door pawl, then disengage by pressing in the direction of arrow. (See figure on the right)



Installation

Install in the reverse order of removal.

NOTE:

To install, press molding into the outer panel flange and engage the pawls.

CAUTION:

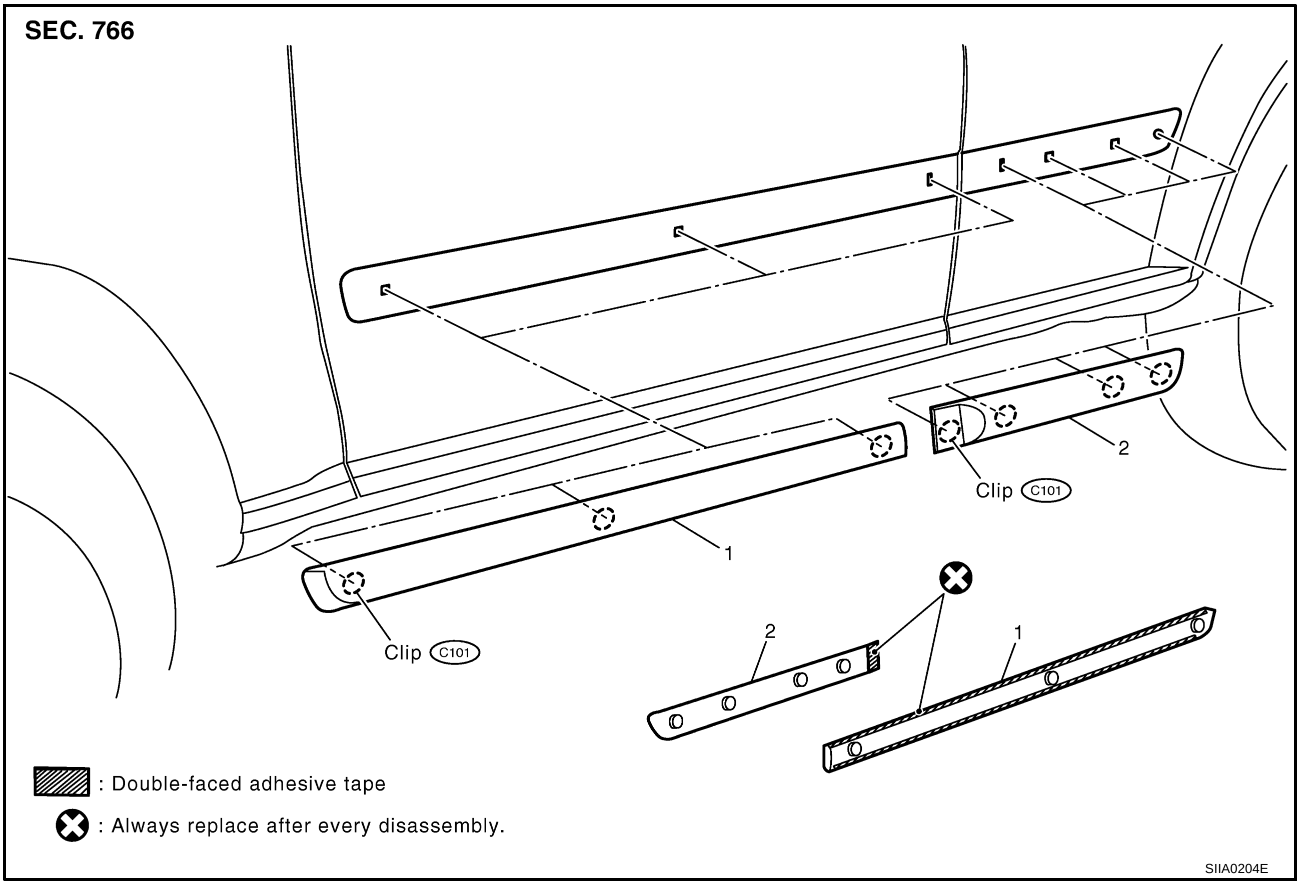
- **Be careful not to apply excessive force when removing because it is easy deform parts.**
- **After removal, visually inspect molding, and it is deformed, replace it with new molding.**

SIDE GUARD MOLDING

PFP:76840

Removal and Installation

AIS005SC



1. Side guard molding (front)
2. Side guard molding (rear)

SIDE GUARD MOLDING (FRONT AND REAR)

Removal

1. Apply masking tape around outer circumference of side guard molding.
2. Remove double-faced adhesive tapes with (wide) resin spatula. Disengage clips and remove side guard molding (front and rear).

Installation

1. Remove double-faced adhesive tape remaining on vehicle.
2. Clean contact surface of vehicle (to side guard molding), and install side guard molding to vehicle.

CAUTION:

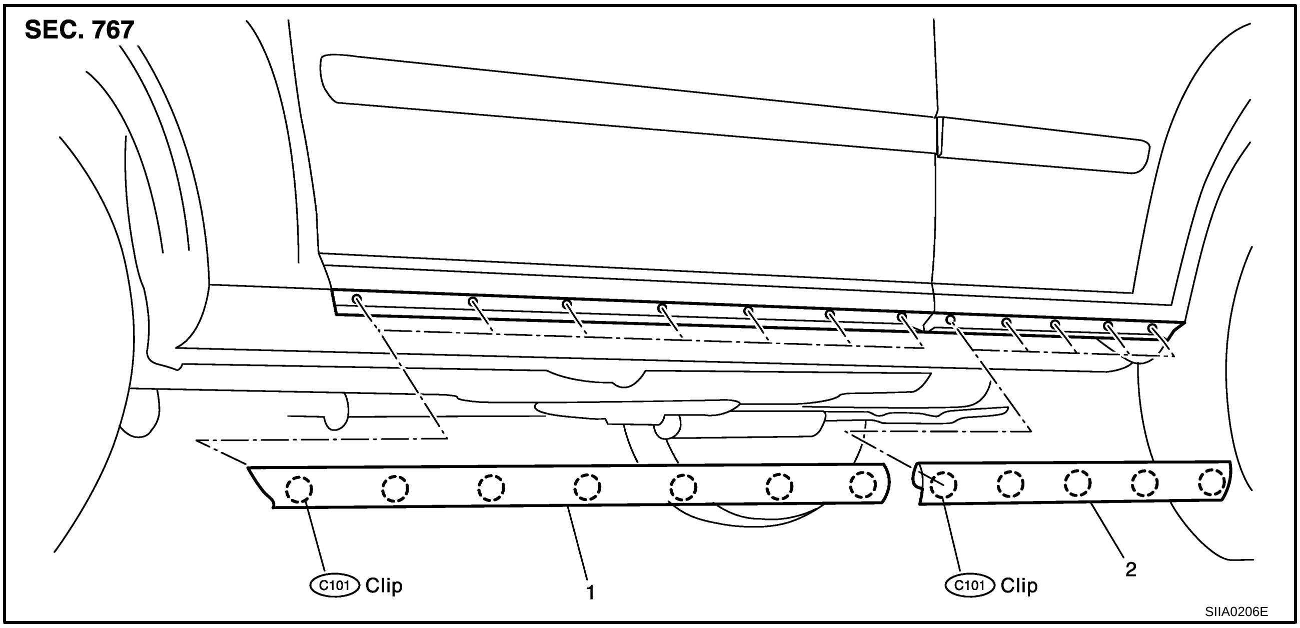
- **Do not let air between contact surfaces when installing.**
- **To secure contact, do not wash vehicle within 24 hours after installation.**

DOOR OUTSIDE LOWER MOLDING

PFP:82877

Removal and Installation

AIS005SD



1. Door outside molding (front)
2. Door outside molding (rear)

DOOR OUTSIDE LOWER MOLDING (FRONT AND REAR)

Removal

1. Remove clips of door outside lower molding.
2. Remove door outside lower molding (front and rear).

Installation

Install in the reverse order of removal.

CAUTION:

When installing door outside lower molding, make sure that blind clips are securely fitted in panel hole on body and then press them in.

SIDE SILL PROTECTOR

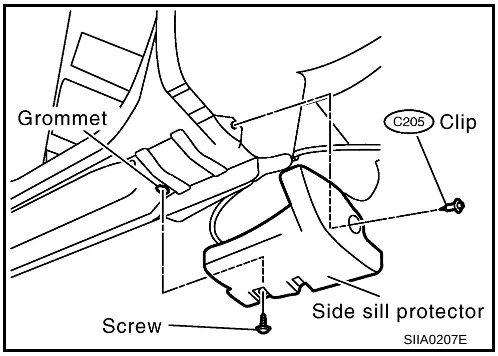
PFP:86856

Removal and Installation

AIS005SE

REMOVAL

1. Remove screw and clip of side sill protector.
2. Remove side sill protector.



INSTALLATION

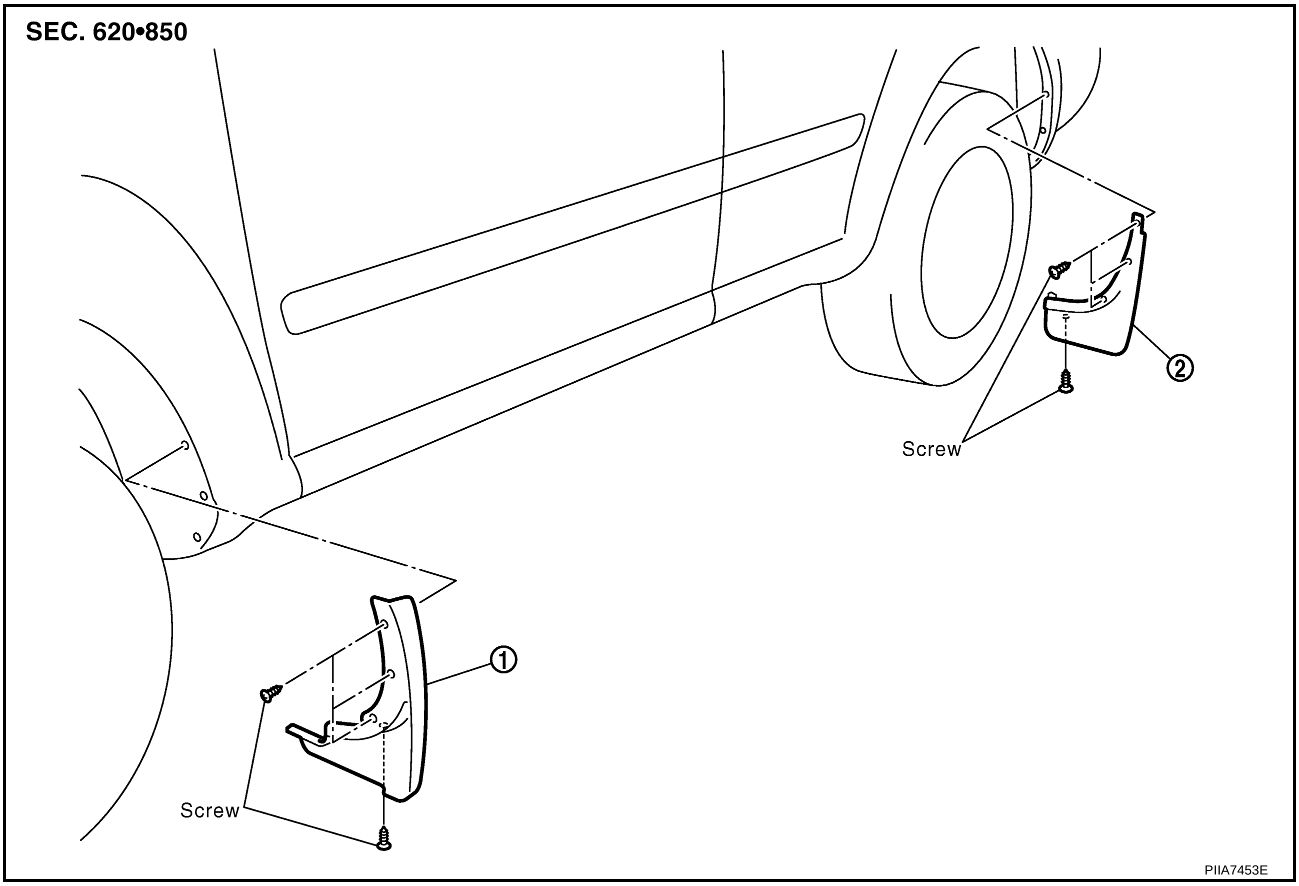
Install in the reverse order of removal.

MUDGUARD

PFP:63854

Removal and Installation

AIS0061I



1. Mudguard (front)
2. Mudguard (rear)

REMOVAL

1. Remove mounting screws from mudguard.
2. Remove mudguard assembly (front/rear).

INSTALLATION

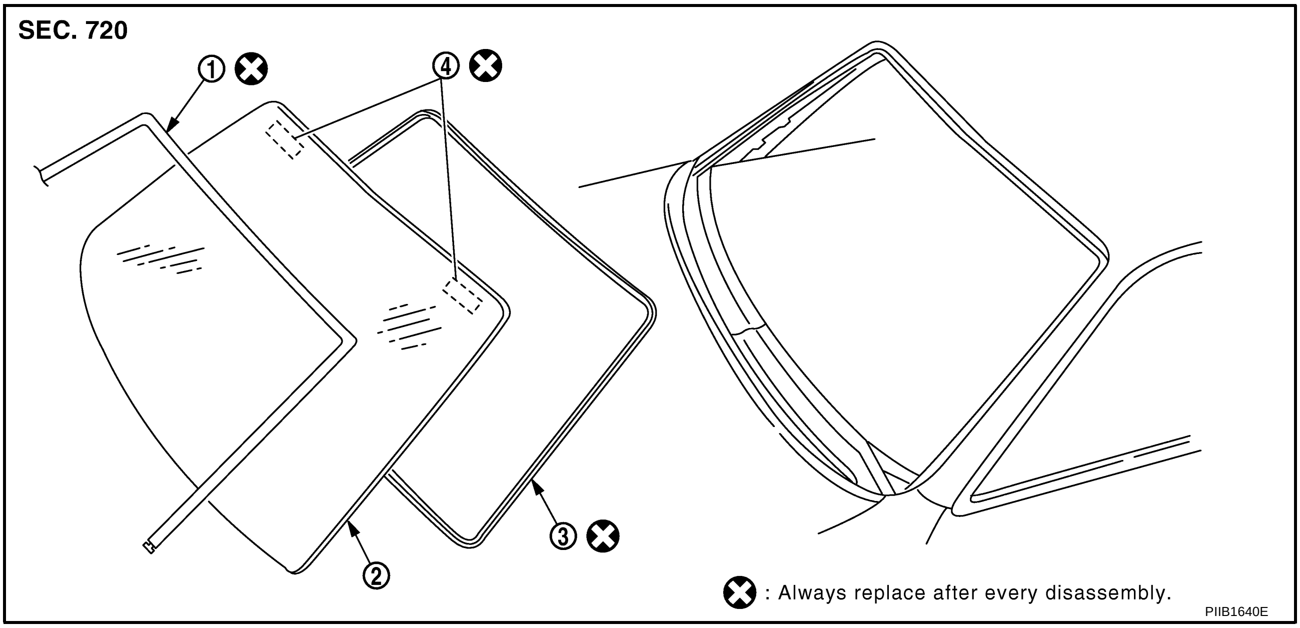
Install in the reverse order of removal.

WINDSHIELD MOLDING

PFP:72700

Removal and Installation

AIS0061J



1. Windshield molding
2. Windshield glass
3. Open cell foam dam
4. Spacer

REMOVAL

Remove windshield molding. Refer to GW-11, "WINDSHIELD GLASS AND MOLDING" .

INSTALLATION

Install windshield molding. Refer to GW-11, "WINDSHIELD GLASS AND MOLDING" .

ROOF RAIL

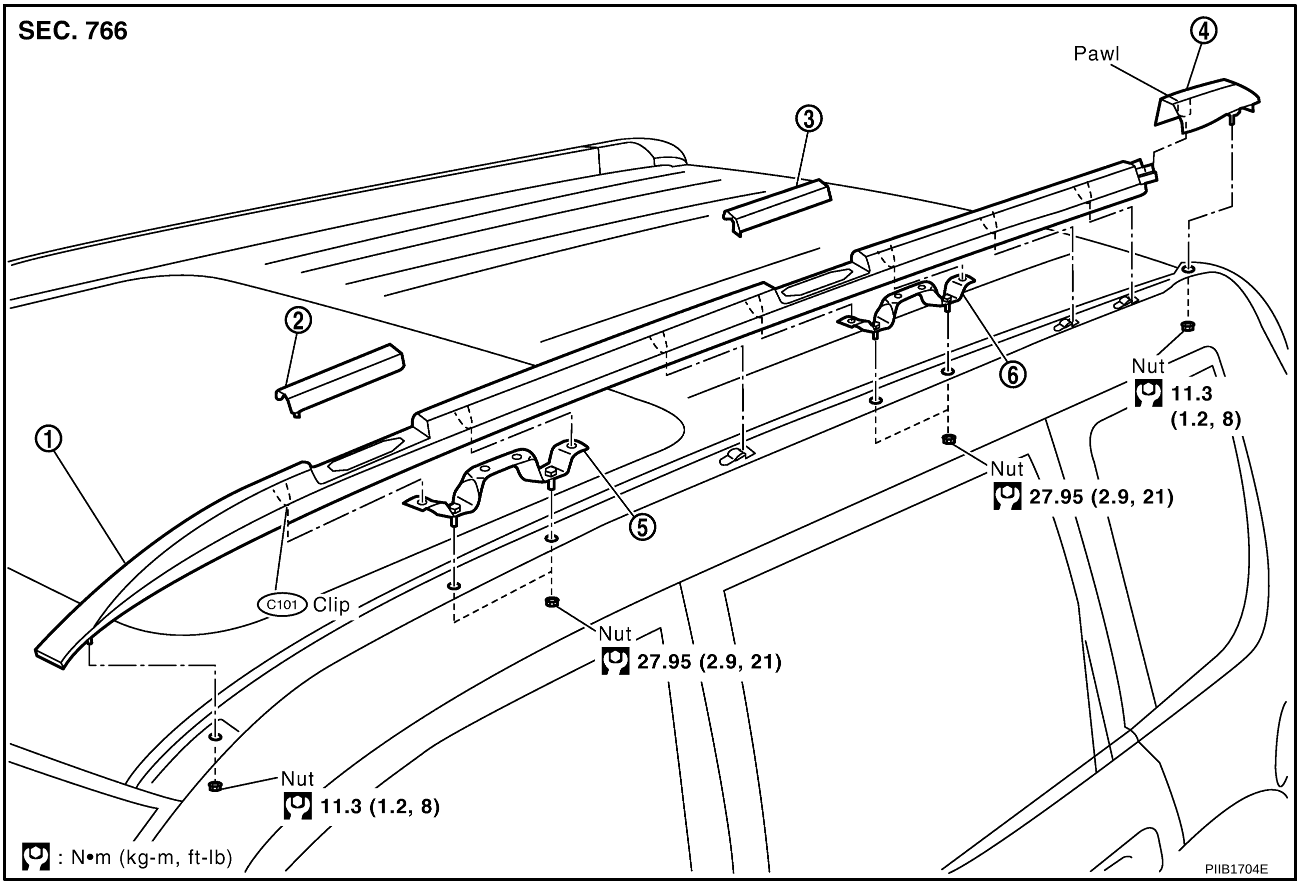
PFP:73820

Removal and Installation

AIS005SG

CAUTION:

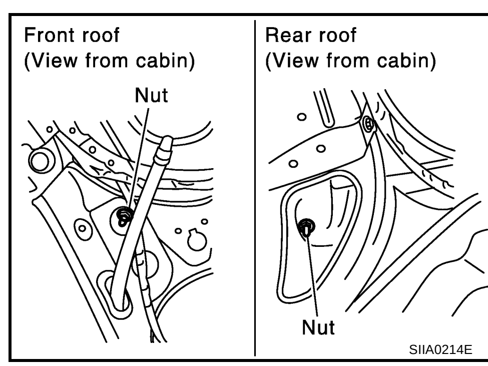
Be careful not to damage the body.



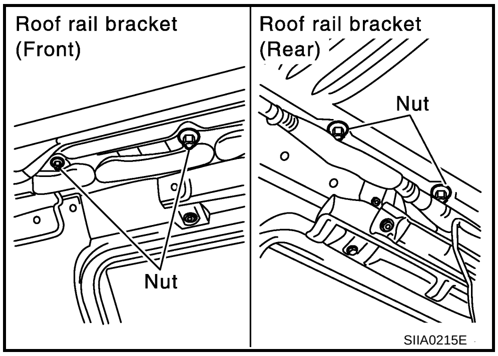
1. Roof rail	2. Front cap	3. Rear cap
4. Roof rail cover	5. Roof rail bracket (front)	6. Roof rail bracket (rear)

REMOVAL

1. Remove headlining. Refer to EI-40, "Removal and Installation" .
2. Remove roof rail mounting nuts and roof rail covers (or roof spoiler) mounting nuts.



3. Remove roof rail bracket mounting nuts (front and rear).



4. Remove roof rail covers (or roof spoiler). For removal of roof spoiler, refer to EI-30, "ROOF SPOILER" .
5. Remove roof rail mounting clips, and remove roof rails.

INSTALLATION

Install in the reverse order of removal.

ROOF SPOILER

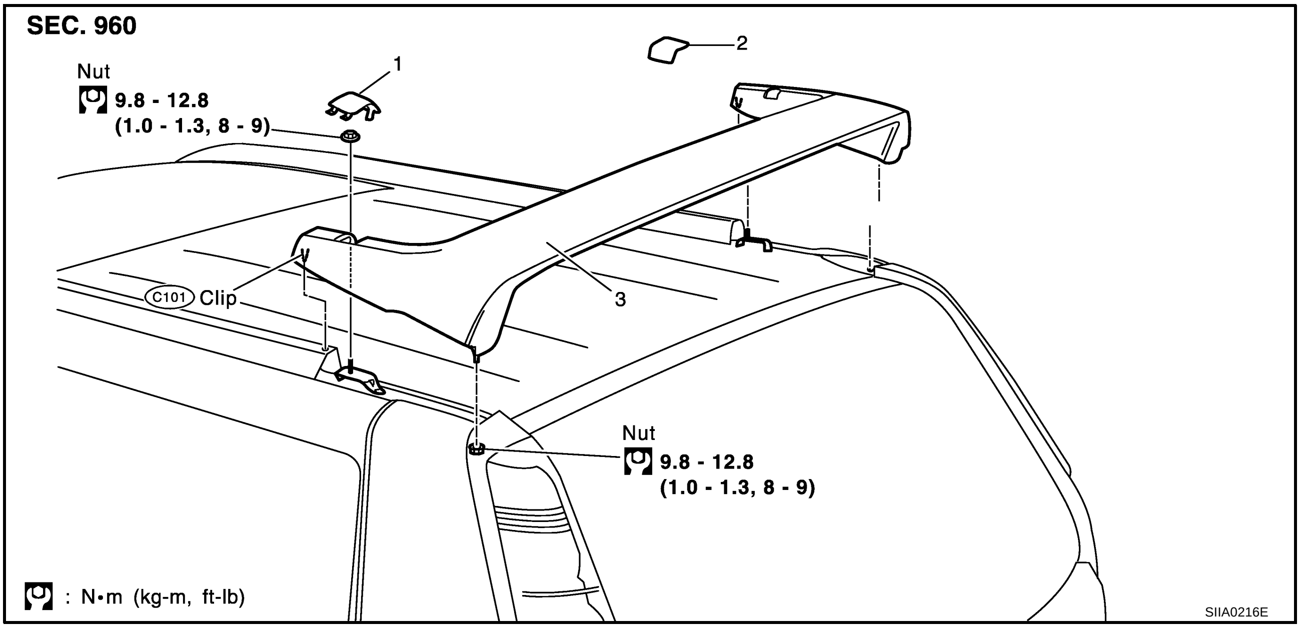
PFP:96030

Removal and Installation

AIS005SH

CAUTION:

Be careful not to damage the body.



1. Cover (left)
2. Cover (right)
3. Roof spoiler

REMOVAL

1. Remove headlining. Refer to EI-40, "Removal and Installation" .
2. Remove covers (left and right).
3. Remove roof spoiler mounting nuts (upper and lower roof surfaces).
4. Pull roof spoiler upwards. Remove pawls (1 each on left/right) which are engaged with the roof rails. Remove roof spoiler.

INSTALLATION

Install in the reverse order of removal.

LICENSE LAMP FINISHER

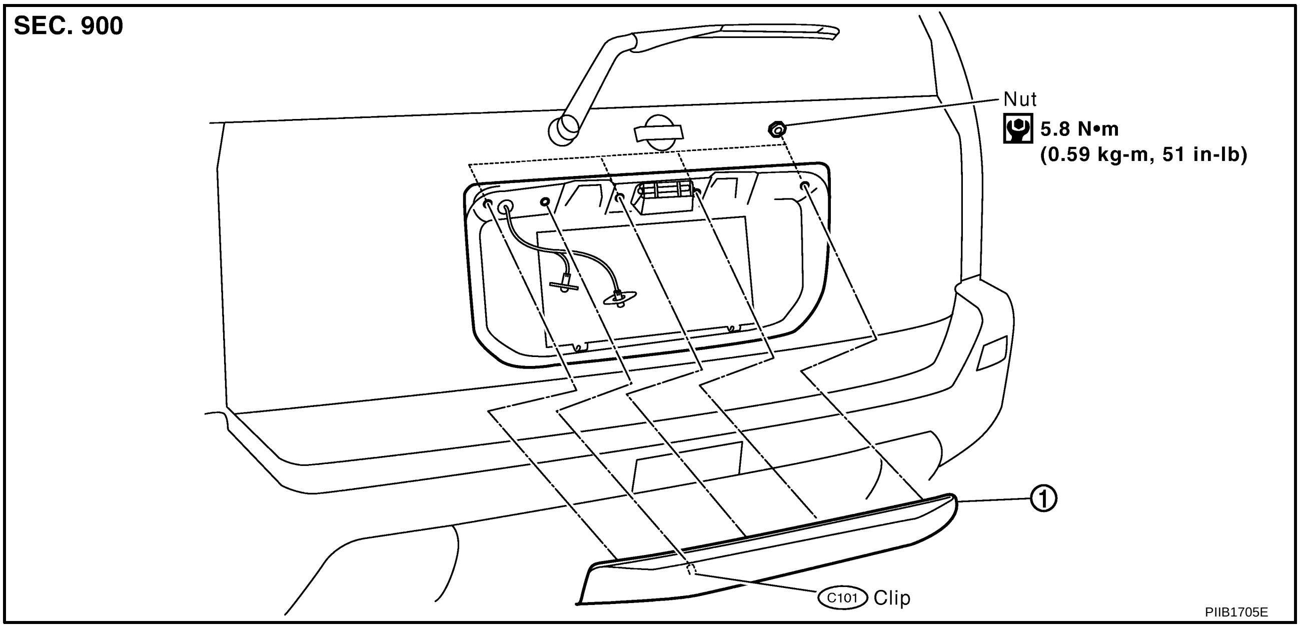
PFP:84810

Removal and Installation

AIS005SI

CAUTION:

Be careful not to damage the body.



1. License lamp finisher

REMOVAL

1. Remove back door finisher. Refer to EI-35, "Removal and Installation" .
2. Remove license plate lamp. Refer to LT-33, "Removal and Installation of License Plate Lamp" .
3. Remove license lamp finisher mounting nuts and clips. Then remove license lamp finisher.

INSTALLATION

Install in the reverse order of removal.

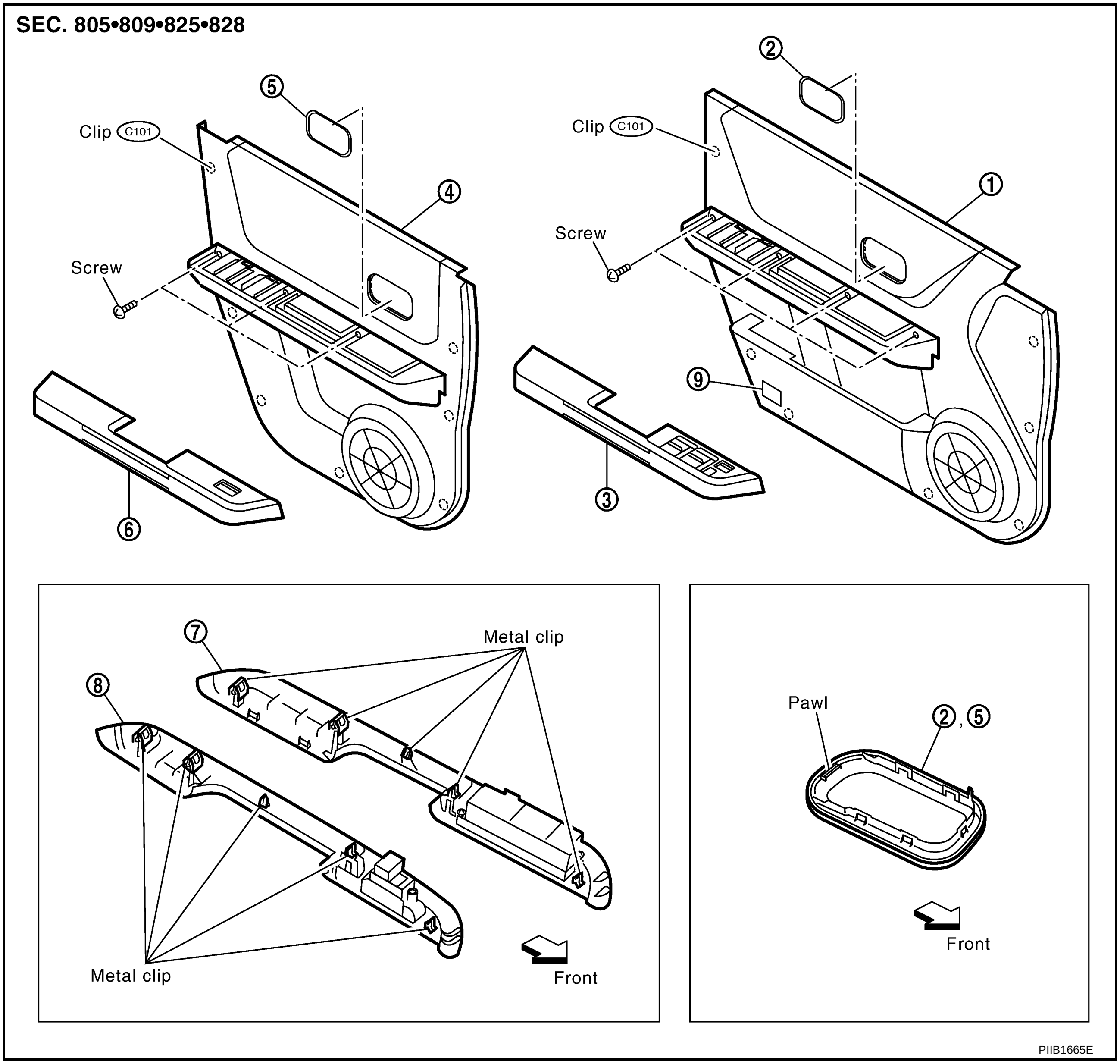
A B C D E F G H EI J K L M

DOOR FINISHER

PFP:80900

Removal and Installation

AIS005SJ

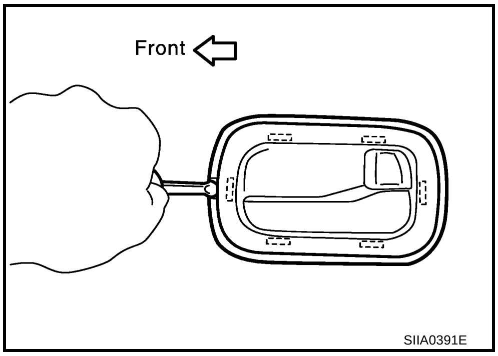


1.	Front door finisher	2.	Inside handle escutcheon	3.	Front door armrest assembly
4.	Rear door finisher	5.	Inside handle escutcheon	6.	Rear door armrest assembly
7.	Power window switch finisher (front)	8.	Power window switch finisher (rear)	9.	Step lamp

FRONT AND REAR DOOR FINISHER

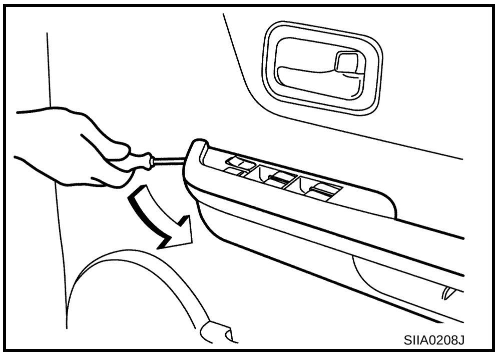
Removal

1. Insert a screwdriver, wrapped with a cloth, into door trim cutout on the inside handle escutcheon. Disengage the pawls on the front, upper side (2) and lower side (2). Slide frontwards and disengage the rear side pawls to remove.

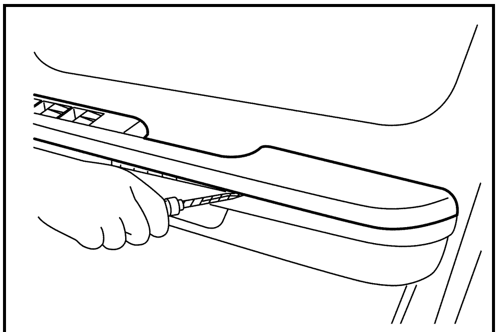


SIIA0391E

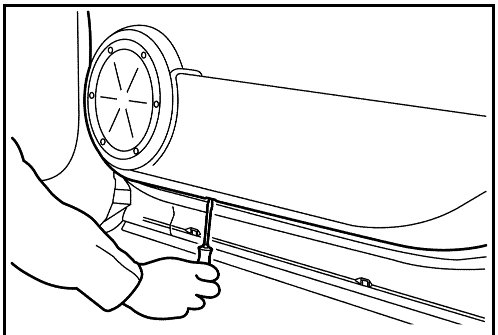
2. Insert a screwdriver, wrapped with a cloth, into the cutout on the front edge of front and rear door armrest assembly. Unfasten the metal clips on the front side.


SIIA0208J

3. Insert the screwdriver into the gap and remove metal clips on the rear edge of front and rear door armrest assembly.

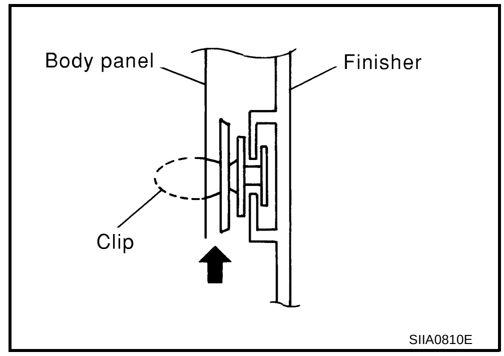

SIIA0211J

4. Disconnect and remove power window switch harness connector.
5. Remove front and rear door armrest assembly.
6. Remove power window switch finisher (front/rear).
7. Remove door finisher mounting screw.
8. Remove door finisher mounting clips.


SIIA0213J

CAUTION:

- **Insert a screwdriver or clip clamp remover into the part shown by the arrow (between the body side panel and the clips). Remove clips.**
- **When installing, confirm clips are surely aligned with the holes on the body side, then press in.**



9. Pull the front and rear door finisher upwards to remove.

Installation

Install in the reverse order of removal.

NOTE:

To install the finisher, confirm clips are surely aligned with the holes on the body side panel, then press in.

BACK DOOR TRIM

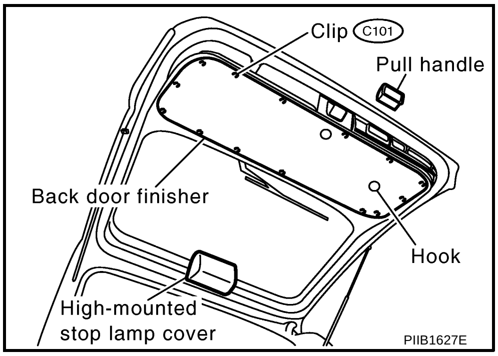
PFP:90900

Removal and Installation

AIS005SK

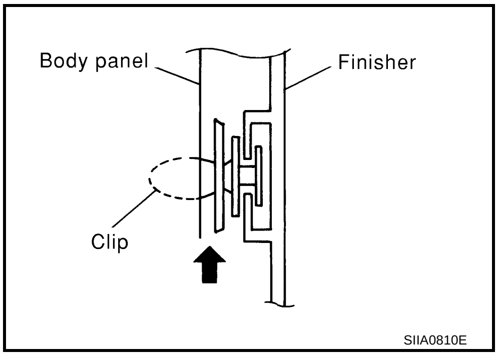
REMOVAL

1. Remove hook on back door finisher.
2. Remove clips of back door finisher.



CAUTION:

- **Insert a screwdriver or clip clamp remover into the part shown by the arrow (between the body side panel and the clips). Remove clips.**
- **When installing, confirm clips are surely aligned with the holes on the body side, then press in.**



3. Remove back door finisher.
4. Remove pull handle.

INSTALLATION

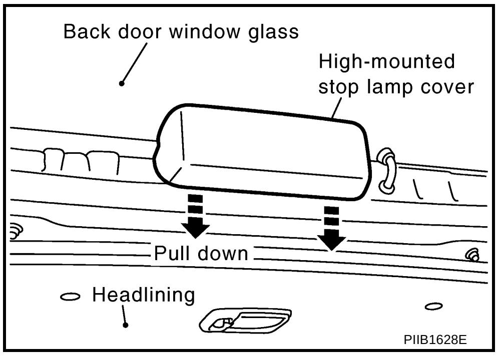
Install in the reverse order of removal.

NOTE:

When installing, confirm clips are surely aligned with the holes on the body side panel, then press in.

Removal of High-Mounted Stop Lamp Cover

Remove high-mounted stop lamp cover.



Installation of High-Mounted Stop Lamp Cover

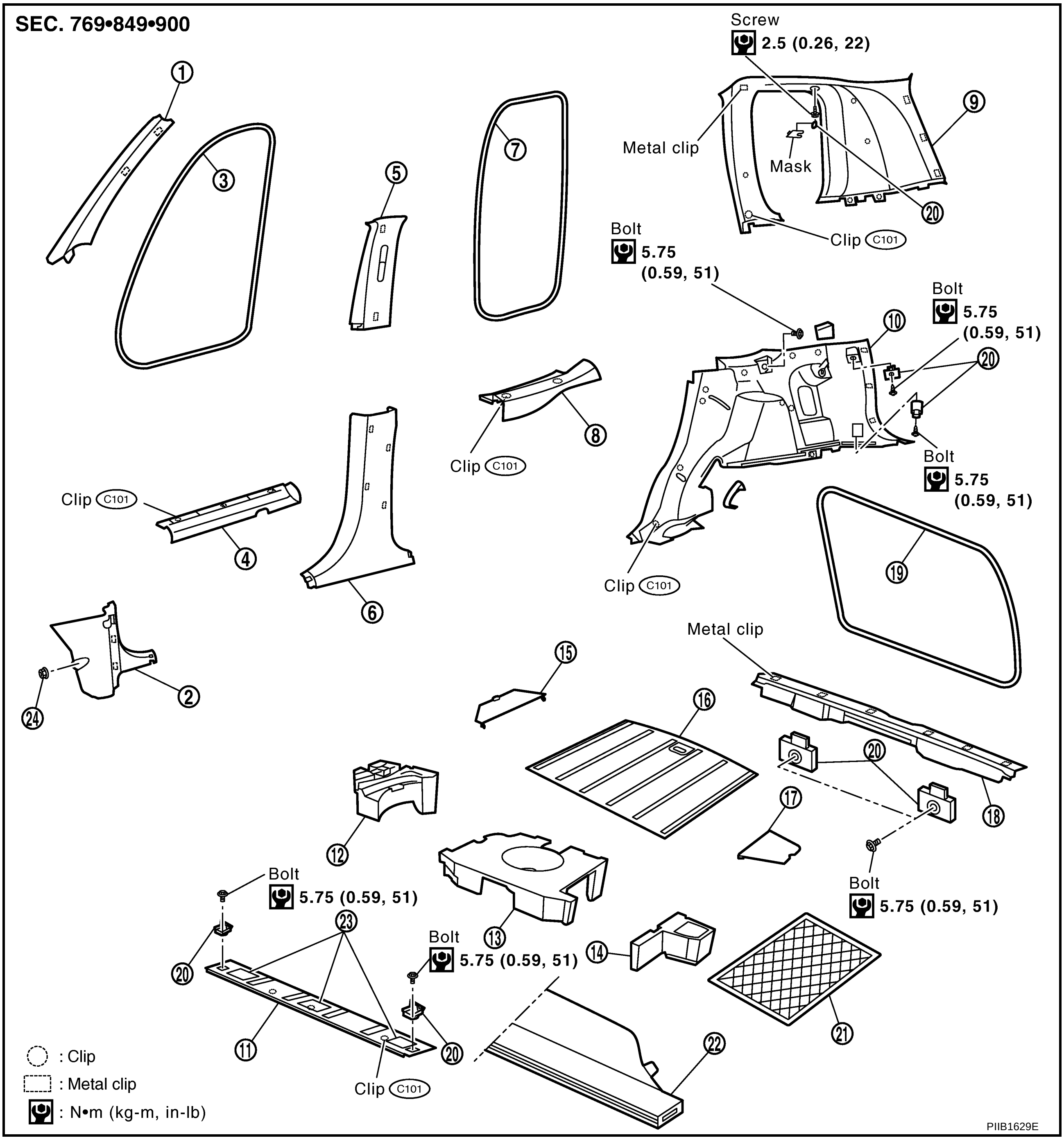
Install in the reverse order of removal.

BODY SIDE TRIM

PFP:76913

Removal and Installation

AIS005SL



1.	Front pillar garnish	2.	Dash side finisher	3.	Body side welt (front)
4.	Kicking plate (front)	5.	Center pillar upper garnish	6.	Center pillar lower garnish
7.	Body side welt (rear)	8.	Kicking plate (rear)	9.	Rear pillar finisher
10.	Luggage side lower finisher	11.	Luggage floor board (front)	12.	Luggage floor rear spacer (right) or tool box
13.	Luggage floor rear spacer (center)	14.	Luggage floor rear spacer (left)	15.	Luggage floor board (right)
16.	Luggage floor board (rear)	17.	Luggage floor board (left)	18.	Luggage rear plate
19.	Back door weatherstrip	20.	Hook	21.	Net
22.	Tonneau cover	23.	Top tether strap child restraint cover	24.	Resin nut

FRONT PILLAR GARNISH

Removal

Remove front pillar garnish mounting clips, and then remove front pillar garnish.

Installation

Install in the reverse order of removal.

DASH SIDE FINISHER

Removal

Remove dash side finisher mounting resin nut and clips, and then remove dash side finisher.

Installation

Install in the reverse order of removal.

KICKING PLATE (FRONT/REAR)

Removal

Remove kicking plate mounting clips, and then remove kicking plate (front/rear).

Installation

Install in the reverse order of removal.

CENTER PILLAR LOWER GARNISH

Removal

Remove kicking plate (front/rear).
Remove center pillar lower garnish mounting clips, and then remove center pillar lower garnish.

Installation

Install in the reverse order of removal.

CENTER PILLAR UPPER GARNISH

Removal

1. Remove front seat belt shoulder anchor bolt. Refer to SB-3, "Removal and Installation of Front Seat Belt" .
2. Remove kicking plate (front/rear).
3. Remove center pillar lower garnish.
4. Remove center pillar upper garnish mounting clips, and then remove center pillar upper garnish.

Installation

Install in the reverse order of removal.

BODY SIDE WELT (FRONT/REAR)

Removal

1. Remove front seat belt shoulder anchor bolt. Refer to SB-3, "Removal and Installation of Front Seat Belt" .
2. Remove kicking plate (front/rear).
3. Remove center pillar lower garnish.
4. Remove center pillar upper garnish.
5. Remove body side welt (front/rear).

Installation

Install in the reverse order of removal.

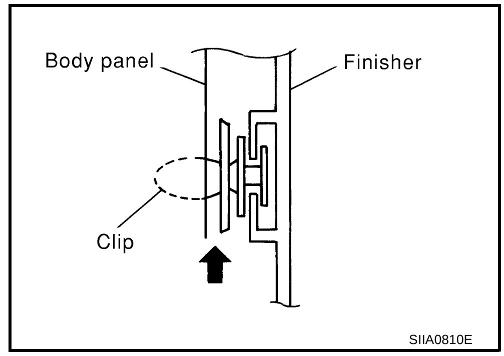
REAR PILLAR FINISHER

Removal

1. Remove kicking plate (rear).
2. Remove bolts from luggage side lower finisher of hook.
3. Remove clips of luggage side lower finisher and remove luggage side lower finisher.
4. Remove rear seat belt shoulder anchor bolt. Refer to SB-4, "Removal and Installation of Rear Seat Belt" .
5. Remove mask and screw from rear pillar finisher of hook.
6. Remove clips of rear pillar finisher and remove rear pillar finisher.

CAUTION:

- **Insert a screwdriver or clip clamp remover into the part shown by the arrow (between the body side panel and the clips). Remove clips.**
- **When installing, confirm clips are surely aligned with the holes on the body side, then press in.**



Installation

Install in the reverse order of removal.

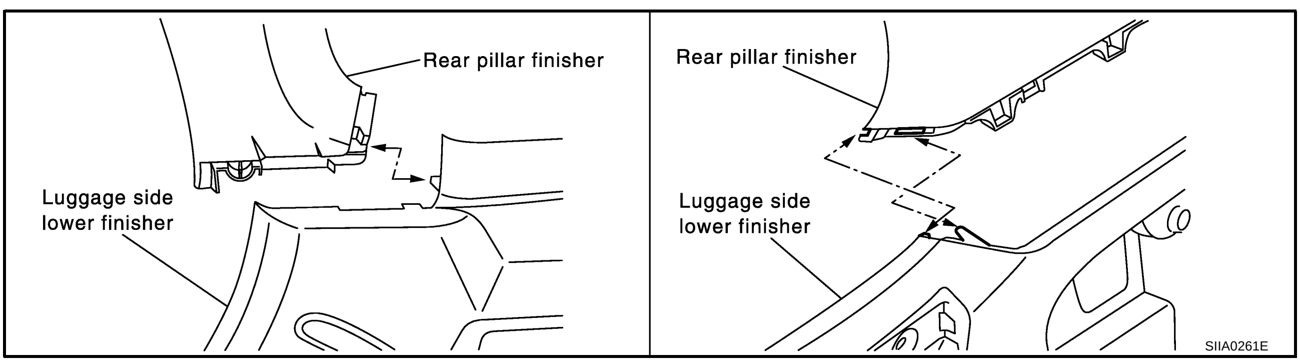
NOTE:

When installing, confirm clips are aligned with the body side panel holes, and then press in.

LUGGAGE SIDE LOWER FINISHER

Removal

1. Remove luggage floor boards and luggage floor spacers.
2. Remove luggage rear plate.
3. Remove kicking plate (rear).
4. Remove bolts from luggage side lower finisher of hook.
5. Remove luggage side lower finisher.



NOTE:

When removing or installing, pay attention to pawl engagement with the rear pillar finisher.

Installation

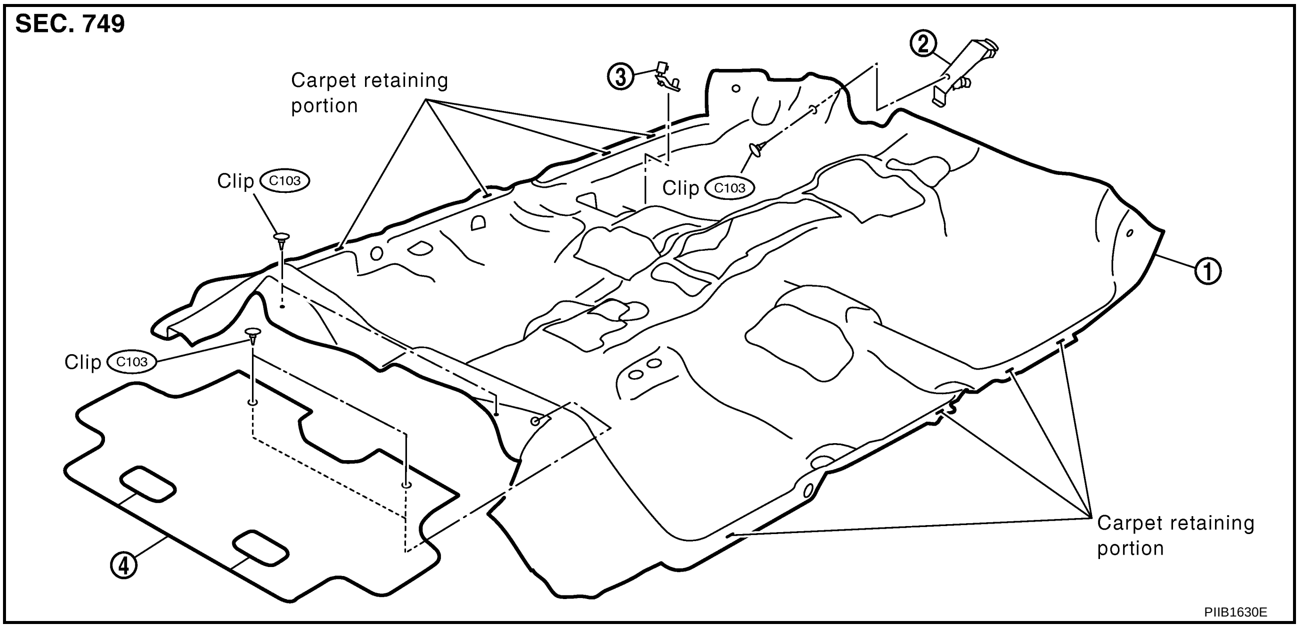
Install in the reverse order of removal.

FLOOR TRIM

PFP:74902

Removal and Installation

AIS005SM



1. Floor carpet
2. Footrest metal
3. Carpet hook
4. Rear floor carpet

REMOVAL

1. Remove front seat and rear seat cushions. Refer to SE-19, "Removal and Installation" and SE-26, "Removal and Installation" .
2. Remove clips and remove rear floor carpet.
3. Remove center console.
4. Remove lower instrument cover.
5. Remove lower instrument center panel.
6. Remove front seat belt floor anchor bolt. Refer to SB-3, "Removal and Installation of Front Seat Belt" .
7. Remove kicking plate (front/rear).
8. Remove center pillar lower garnish.
9. Remove body side welts (front/rear).
10. Remove the dash side finisher.
11. Remove carpet hooks and clips.
12. Remove carpet from the carpet anchor clips.
13. Remove floor carpet.

NOTE:

- For steps 3-5, refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
- For steps 7-10, refer to EI-36, "Removal and Installation" .

INSTALLATION

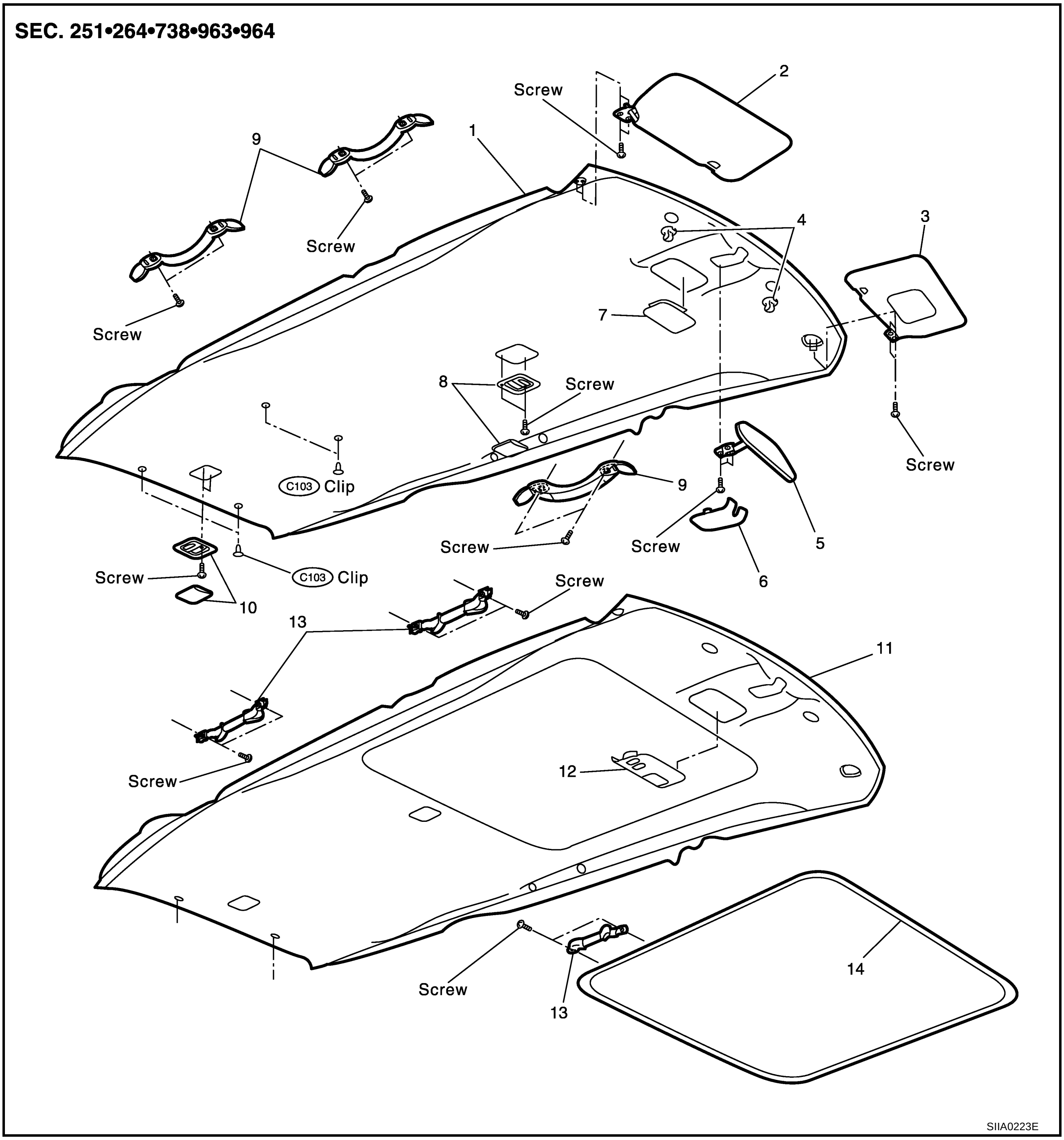
Install in the reverse order of removal.

HEADLINING

PFP:73910

Removal and Installation

AIS005SN



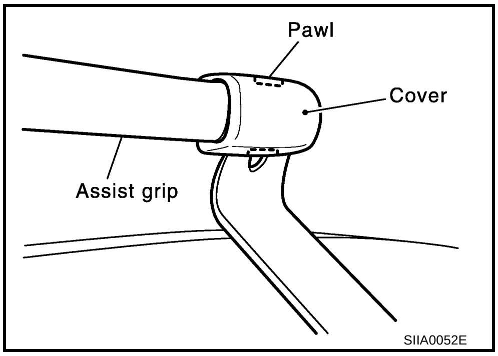
1.	Headlining (without sunroof)	2.	Sunvisor (right)	3.	Sunvisor (left)
4.	Sunvisor holder	5.	Inside mirror	6.	Inside mirror cover
7.	Map lamp	8.	Room lamp	9.	Assistance grip (fixed type)
10.	Luggage room lamp	11.	Headlining (with sunroof)	12.	Sunroof switch and map lamp
13.	Assistance grip (retractable type)	14.	Sunroof welt		

REMOVAL

1. Remove front pillar and center pillar garnish. Refer to EI-36, "Removal and Installation" .
2. Remove body side welt. Refer to EI-36, "Removal and Installation" .
3. Remove rear pillar finisher. Refer to EI-36, "Removal and Installation" .

4. Remove assistance grip.

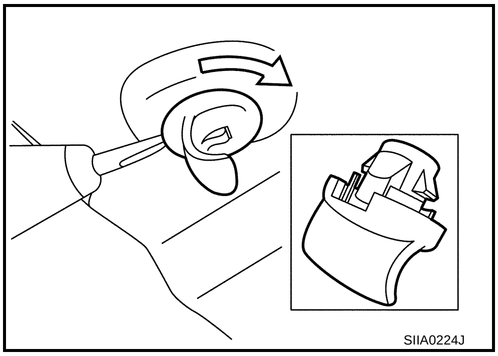
   NOTE:
   When removing the assistance grip cover from a car with a sunroof, use a clip clamp tool to disengage the upper and lower pawls, then slide inwards and remove screws (1 each on left/right).



SIIA0052E

5. Remove map lamp, room lamp, and luggage room lamp. Refer to LT-60, "Removal and Installation of Map Lamp (Without Sunroof)" , LT-60, "Removal and Installation of Map Lamp (With Sunroof)" , LT-56, "Removal and Installation of Interior Room Lamp" and LT-56, "Removal and Installation of Luggage Room Lamp" .
6. Remove inside mirror cover.
7. Remove mounting screw on inside mirror and remove inside mirror.
8. Remove sunvisor (driver side and passenger side).
9. Remove headlining rear clips.
10. Remove sunvisor holder.

    NOTE:
    Insert a screwdriver into the cutout and rotate 90 degreese to remove.
11. Remove headlining through the back door opening.

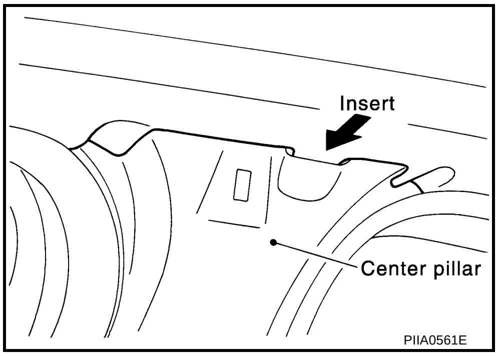

SIIA0224J

NOTE:
- Removal and installation must be performed by 2 persons.
- Do not strongly bend the headlining.

INSTALLATION

Install in the reverse order of removal.

NOTE:
When installing, insert the protrusions on the headlining into the holes in the upper part of center pillar.



PIIA0561E

SECTION EM
ENGINE MECHANICAL

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Drain Engine Coolant and Engine Oil

ABS00CIL

Drain engine coolant and engine oil when the engine is cooled.

Precautions for Disconnecting Fuel Piping

ABS00CIM

- Before starting work, make sure no fire or spark producing items are in the work area.
- Release fuel pressure before disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precautions for Removal and Disassembly

ABS00CIN

- When instructed to use special service tools, use the specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Cover openings of engine system with a tape or the equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and re-assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used where noted in the step.

Precautions for Inspection, Repair and Replacement

ABS00CIO

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Precautions for Assembly and Installation

ABS00CIP

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- Release air within route when refilling after draining engine coolant.
- Before starting the engine, apply fuel pressure to fuel lines with turning ignition switch “ON” (with the engine stopped). Then make sure there are no leaks at fuel line connections.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Precautions for Angle Tightening

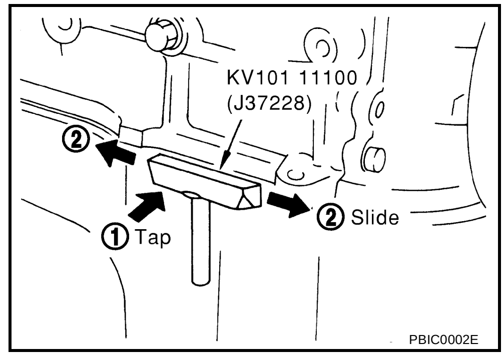
ABS00CIQ

- Use the angle wrench [SST: KV10112100 (BT8653-A)] for the final tightening of the following engine parts.
  - Cylinder head bolts
  - Lower cylinder block bolts
  - Connecting rod cap bolts
  - Crankshaft pulley bolt (No angle wrench is required as the bolt flange is provided with notches for angle tightening)
  - Balancer unit
- Do not use a torque value for final tightening.
- The torque value for these parts are for a preliminary step.
- Ensure thread and seat surfaces are clean and coated with engine oil.

Precautions for Liquid Gasket

ABS00CIR

REMOVAL OF LIQUID GASKET



- After removing the mounting nuts and bolts, separate the mating surface using a seal cutter [SST] and remove the old liquid gasket sealing.

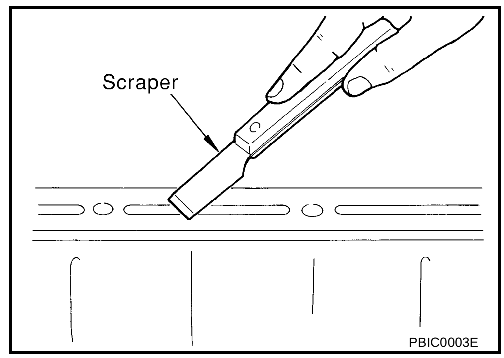
  CAUTION:

  Be careful not to damage the mating surfaces.
- Tap seal cutter to insert it, and then slide it by tapping on the side as shown in the figure.
- In areas where the seal cutter [SST] is difficult to use, use plastic hammer to lightly tap the parts, to remove it.

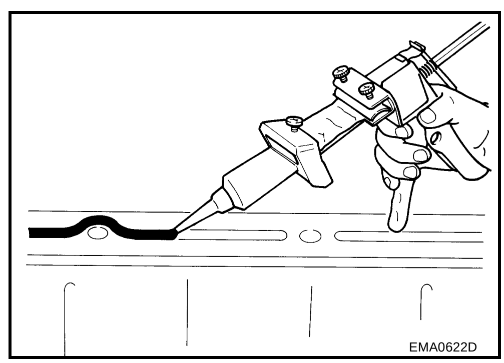
  CAUTION:

  If for some unavoidable reason a tool such as screwdriver is used, be careful not to damage the mating surfaces.

LIQUID GASKET APPLICATION PROCEDURE

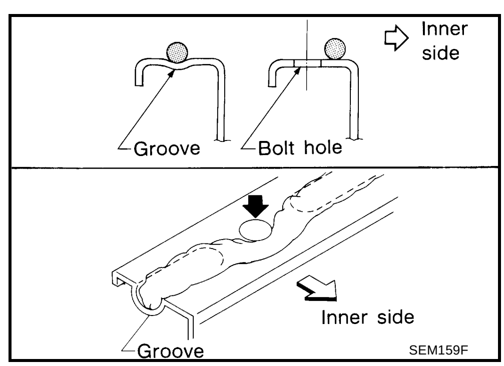


1. Using a scraper, remove the old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove the liquid gasket completely from the groove of the liquid gasket application surface, mounting bolts and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.



3. Attach liquid gasket tube to the tube presser [SST: WS39930000 (—)].

   Use Genuine RTV Silicone Sealant or equivalent. Refer to **GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"** **.**
4. Apply the liquid gasket without breaks to the specified location with the specified dimensions.
   - If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.



   - As for the bolt holes, normally apply the liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read the text of service manual.
   - Within 5 minutes of liquid gasket application, install the mating component.
   - If the liquid gasket protrudes, wipe it off immediately.
   - Do not retighten mounting nuts or bolts after the installation.
   - Wait 30 minutes or more after installation before refilling engine oil and engine coolant.

CAUTION:

If there are instructions in this manual, observe them.

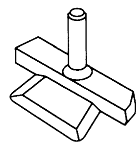
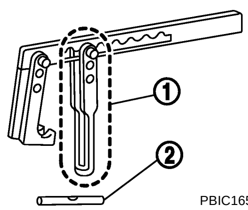
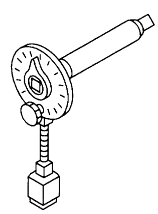
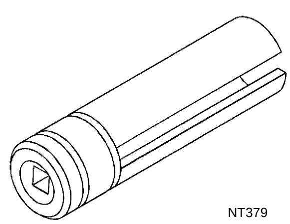
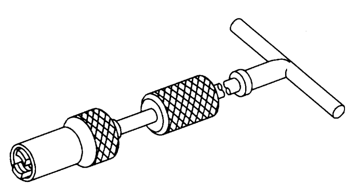
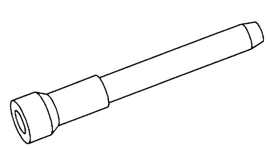
PREPARATION

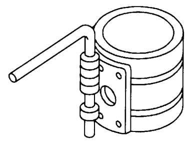
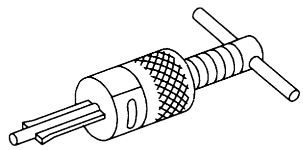
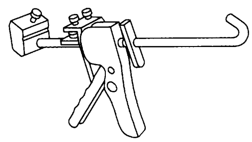
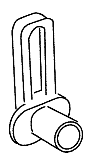
PFP:00002

Special Service Tools

ABS00CIS

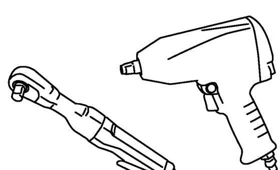
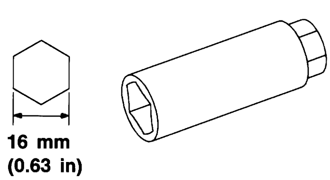
The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

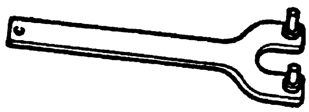
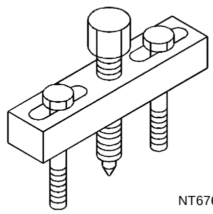
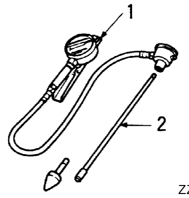
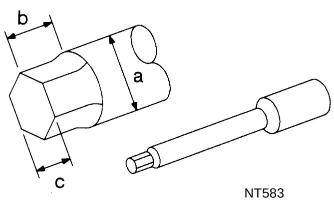
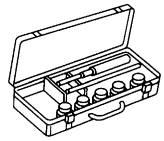
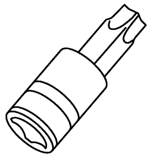
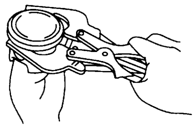
Tool number (Kent-Moore No.) Tool name	Description
KV10111100 (J37228) Seal cutter  S-NT046	Removing oil pan and front cover, etc.
KV10116200 (J26336-A) Valve spring compressor 1. KV10115900 (J26336-20) Attachment 2. KV10109220 (—) Adapter  PBIC1650E	Disassembling valve mechanism Part (1) is a component of KV10116200 (J26336-A), but Part (2) is not so.
KV10112100 (BT8653-A) Angle wrench  NT014	Tightening bolts for connecting rod bearing cap, cylinder head, etc. in angle
KV10117100 (J-3647-A) Heated oxygen sensor wrench  NT379	Loosening or tightening heated oxygen sensors **For 22 mm (0.87 in) width hexagon nut**
KV10107902 (J38959) Valve oil seal puller  NT011	Replacing valve oil seal
KV10115600 (J-38958) Valve oil seal drift  NT024	Installing valve oil seal

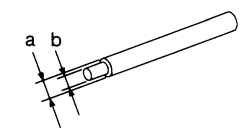
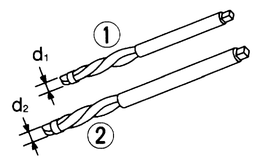
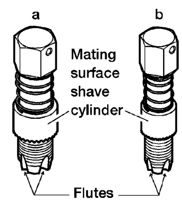
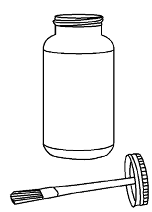
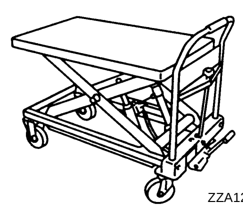
Tool number (Kent-Moore No.) Tool name		Description
EM03470000 (J-8037) Piston ring compressor	 NT044	Installing piston assembly into cylinder bore
ST16610001 (J-23907) Pilot bushing puller	 NT045	Removing pilot converter (A/T models)
WS39930000 (—) Tube presser	 NT052	Pressing the tube of liquid gasket
— (J-45488) Quick connector release	 PBIC0198E	Removing fuel tube quick connectors in engine room

Commercial Service Tools

ABS00CIT

(Kent-Moore No.) Tool name		Description
Power tool	 PBIC0190E	Loosening nuts and bolts
(—) Spark plug wrench	 S-NT047	Removing and installing spark plug

(Kent-Moore No.) Tool name		Description
(—) Pulley holder	 ZZA1010D	Removing and installing crankshaft pulley
(—) Pulley puller	 NT676	Removing crankshaft pulley
(—) 1. Compression tester 2. Adapter	 ZZA0008D	Checking compression pressure
(J24239-01) Cylinder head bolt wrench	 NT583	Loosening and tightening cylinder head bolt, and used with the angle wrench [SST: KV10112100 (BT8653-A)] **a: 13 (0.51) dia.** **b: 12 (0.47)** **c: 10 (0.39)** Unit: mm (in)
(—) Valve seat cutter set	 S-NT048	Finishing valve seat dimensions
TORX socket	 PBIC1113E	Removing and installing flywheel **Size: T55**
(—) Piston ring expander	 S-NT030	Removing and installing piston ring

(Kent-Moore No.) Tool name		Description
(—) Valve guide drift	 S-NT015	Removing and installing valve guide **Intake and Exhaust:** **a: 9.5 mm (0.374 in) dia.** **b: 5.5 mm (0.217 in) dia.**
(—) Valve guide reamer	 S-NT016	1: Reaming valve guide inner hole 2: Reaming hole for oversize valve guide **Intake and Exhaust:** **d1 : 6.0 mm (0.236 in) dia.** **d2 : 10.2 mm (0.402 in) dia.**
a: (J-43897-18) b: (J-43897-12) Oxygen sensor thread cleaner	 AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a = 18 mm (0.71 in) dia. for zirconia heated oxygen sensor** **b = 12 mm (0.47 in) dia. for titania heated oxygen sensor**
(—) Anti-seize lubricant i.e.: (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 AEM489	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads
(—) Manual lift table caddy	 ZZA1210D	Removing and installing the engine

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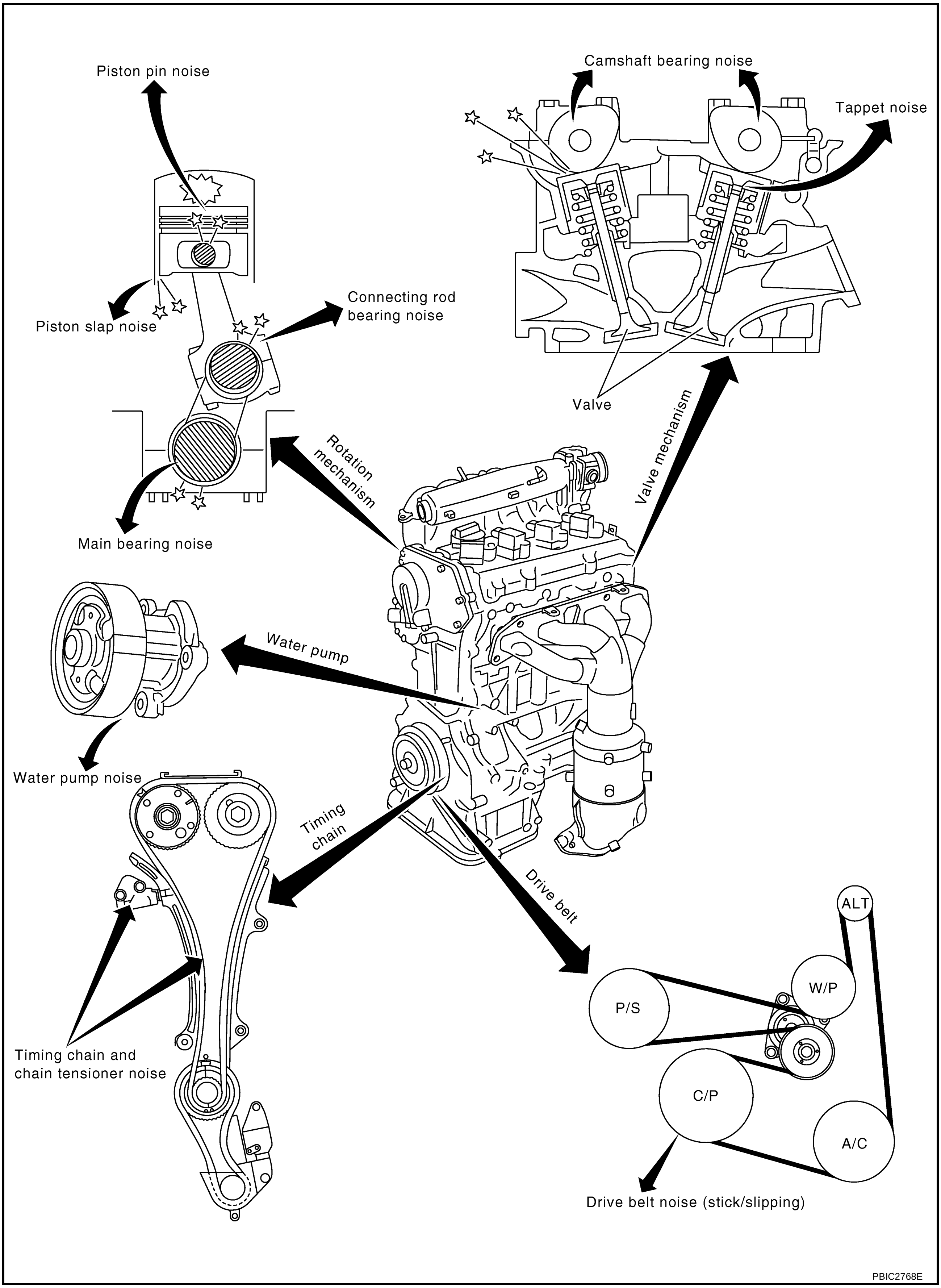
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting — Engine Noise

ABS00CIU



Use the Chart Below to Help You Find the Cause of the Symptom.

ABS00CIV

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-46
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft journal oil clearance Camshaft runout	EM-40 EM-40
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	Piston to piston pin oil clearance Connecting rod bushing oil clearance	EM-99 EM-101
	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston to cylinder bore clearance Piston ring side clearance Piston ring end gap Connecting rod bend and torsion	EM-103 EM-100 EM-100 EM-101
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod bushing oil clearance Connecting rod bearing oil clearance	EM-101 EM-105
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-106 EM-105
Front of engine Front cover	Tapping or ticking	A	A	—	B	B	B	Timing chain and chain tensioner noise	Timing chain cracks and wear Timing chain tensioner operation	EM-53 EM-49
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belt (Sticking or slipping)	Drive belt deflection	EM-11
	Creaking	A	B	A	B	A	B	Drive belt (Slipping)	Idler pulley bearing operation	
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-20, "WATER PUMP"

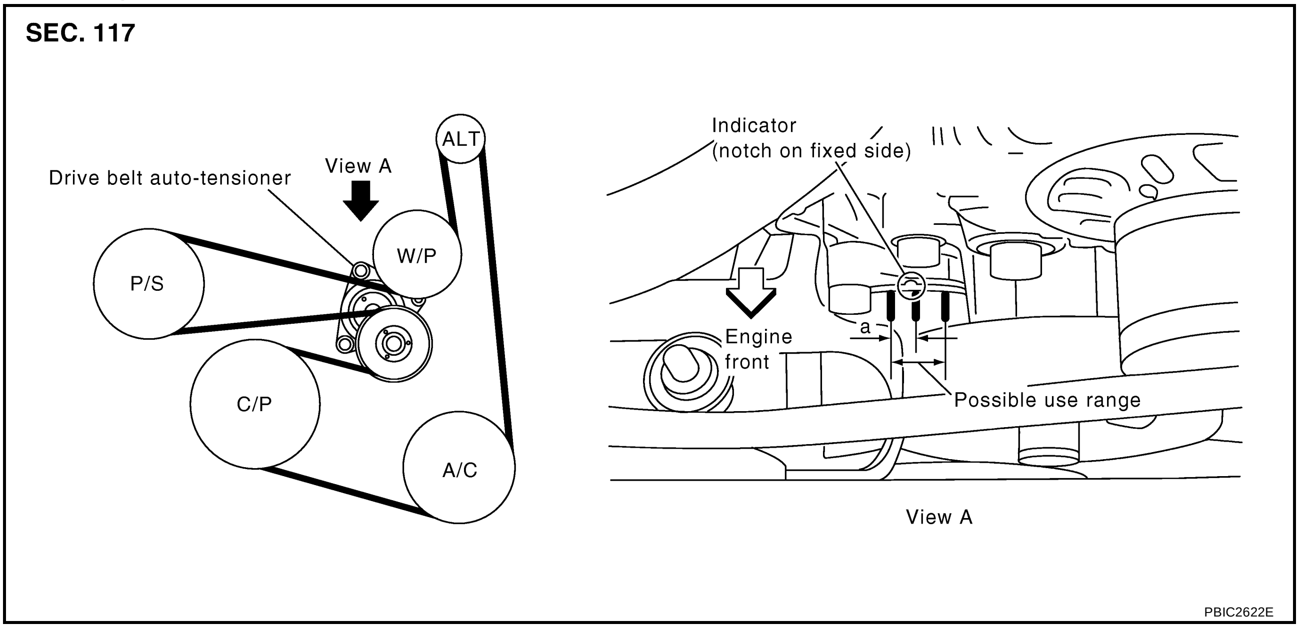
A: Closely related B: Related C: Sometimes related —: Not related

DRIVE BELTS

PFP:02117

Checking Drive Belt

ABS00CIW



PBIC2622E

WARNING:

Be sure to perform this step when the engine is stopped.

- Make sure that the indicator (notch on fixed side) of drive belt auto-tensioner is within the possible use range (between three line notches on moving side).

  NOTE:
  - Check the drive belt auto-tensioner indication when the engine is cold.
  - When new drive belt is installed, the indicator (notch on fixed side) should be within the range "a" in the figure.
- Visually check entire drive belt for wear, damage or cracks.
- If the indicator (notch on fixed side) is out of the possible use range or belt is damaged, replace drive belt.

Tension Adjustment

ABS00CIX

Belt tensioning is not necessary, as it is automatically adjusted by drive belt auto-tensioner.

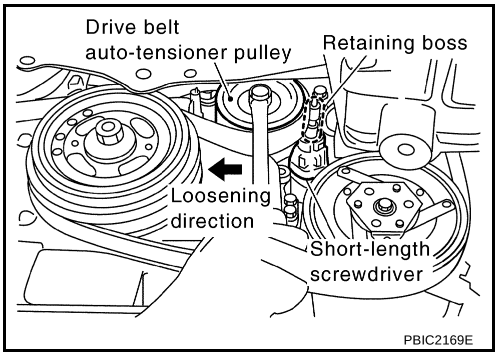
Removal and Installation

ABS00CIY

REMOVAL

1. Remove splash guard on RH undercover.
2. Hold the hexagonal part in center of drive belt auto-tensioner pulley with a box wrench securely. Then move the wrench handle in the direction of arrow (loosening direction of tensioner).

   CAUTION:
   - **Avoid placing hand in a location where pinching may occur if the holding tool accidentally comes off.**
   - **Do not loosen the hexagonal part in center of drive belt auto-tensioner pulley (Do not turn it counterclockwise). If turned counterclockwise, the complete drive belt auto-tensioner must be replaced as a unit, including the pulley.**



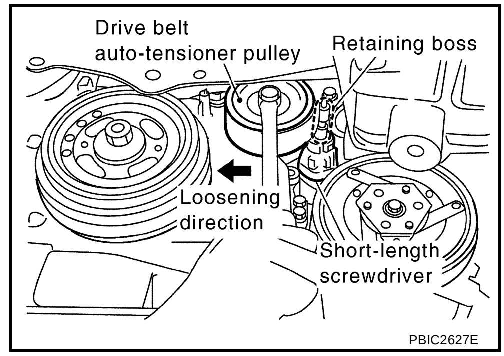
PBIC2169E

3. Insert a rod approximately 6 mm (0.24 in) in diameter such as short-length screwdriver into the hole of the retaining boss to fix drive belt auto-tensioner pulley.
4. Loosen drive belt from water pump pulley in sequence, and remove it.

INSTALLATION

1. Hold the hexagonal part in center of drive belt auto-tensioner pulley with a box wrench securely. Then move the wrench handle in the direction of arrow (loosening direction of tensioner).

   CAUTION:
   - **Avoid placing hand in a location where pinching may occur if the holding tool accidentally comes off.**
   - **Do not loosen the hexagonal part in center of drive belt auto-tensioner pulley (Do not turn it counterclockwise). If turned counterclockwise, the complete drive belt auto-tensioner must be replaced as a unit, including the pulley.**

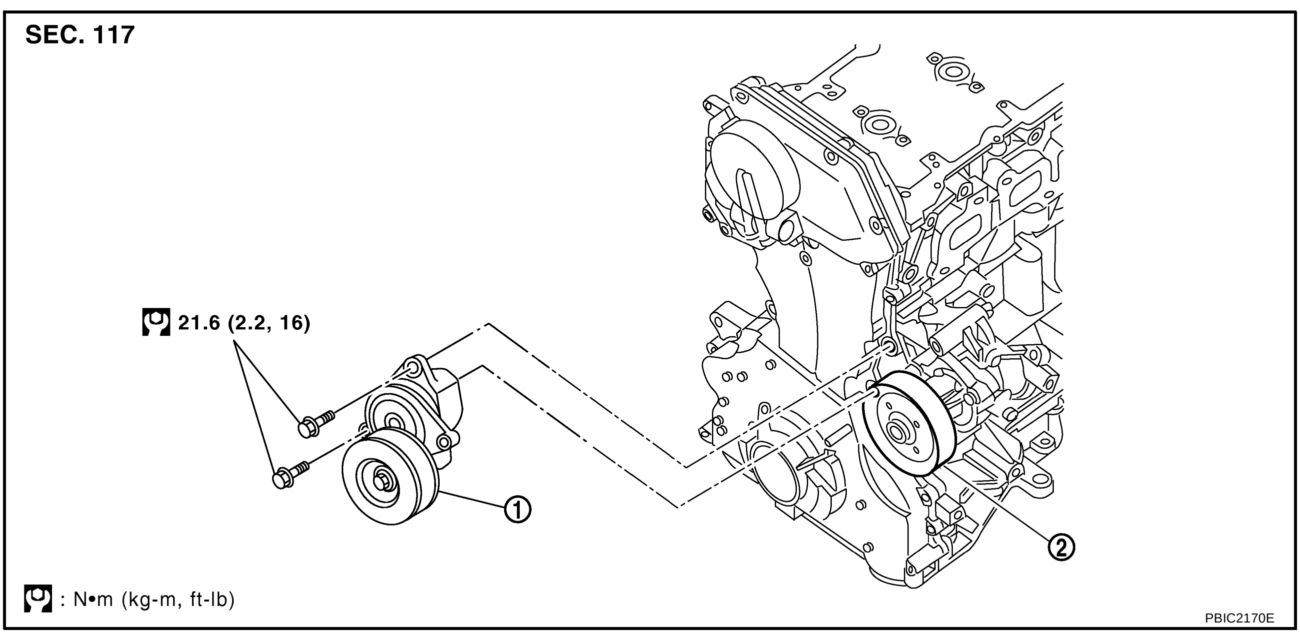


2. Insert a rod approximately 6 mm (0.24 in) in diameter such as short-length screwdriver into the hole of retaining boss to fix drive belt auto-tensioner pulley.
3. Hook drive belt onto all pulleys except for water pump, and then onto water pump pulley finally.

   CAUTION:
   - **Confirm drive belt is completely set to pulleys.**
   - **Check for engine oil, working fluid and engine coolant are not adhered to drive belt and each pulley groove.**
4. Release drive belt auto-tensioner, and apply tension to drive belt.
5. Turn crankshaft pulley clockwise several times to equalize tension between each pulley.
6. Confirm tension of drive belt at indicator (notch on fixed side) is within the possible use range. Refer to EM-11, "Checking Drive Belt" .

Removal and Installation of Drive Belt Auto-Tensioner

ABS00CIZ



1. Drive belt auto-tensioner
2. Water pump pulley

REMOVAL

CAUTION:

The complete drive belt auto-tensioner must be replaced as a unit, including the pulley.

1. Remove splash guard on RH undercover.
2. Remove drive belt. Refer to EM-11, "Removal and Installation" .
3. Release the fixed drive belt auto-tensioner pulley.
4. Remove drive belt auto-tensioner.

CAUTION:
Do not loosen the hexagonal part in center of drive belt auto-tensioner pulley (Do not turn it counter-clockwise). If turned counterclockwise, the complete drive belt auto-tensioner must be replaced as a unit, including the pulley.

INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing drive belt auto-tensioner, be careful not to interfere with water pump pulley.

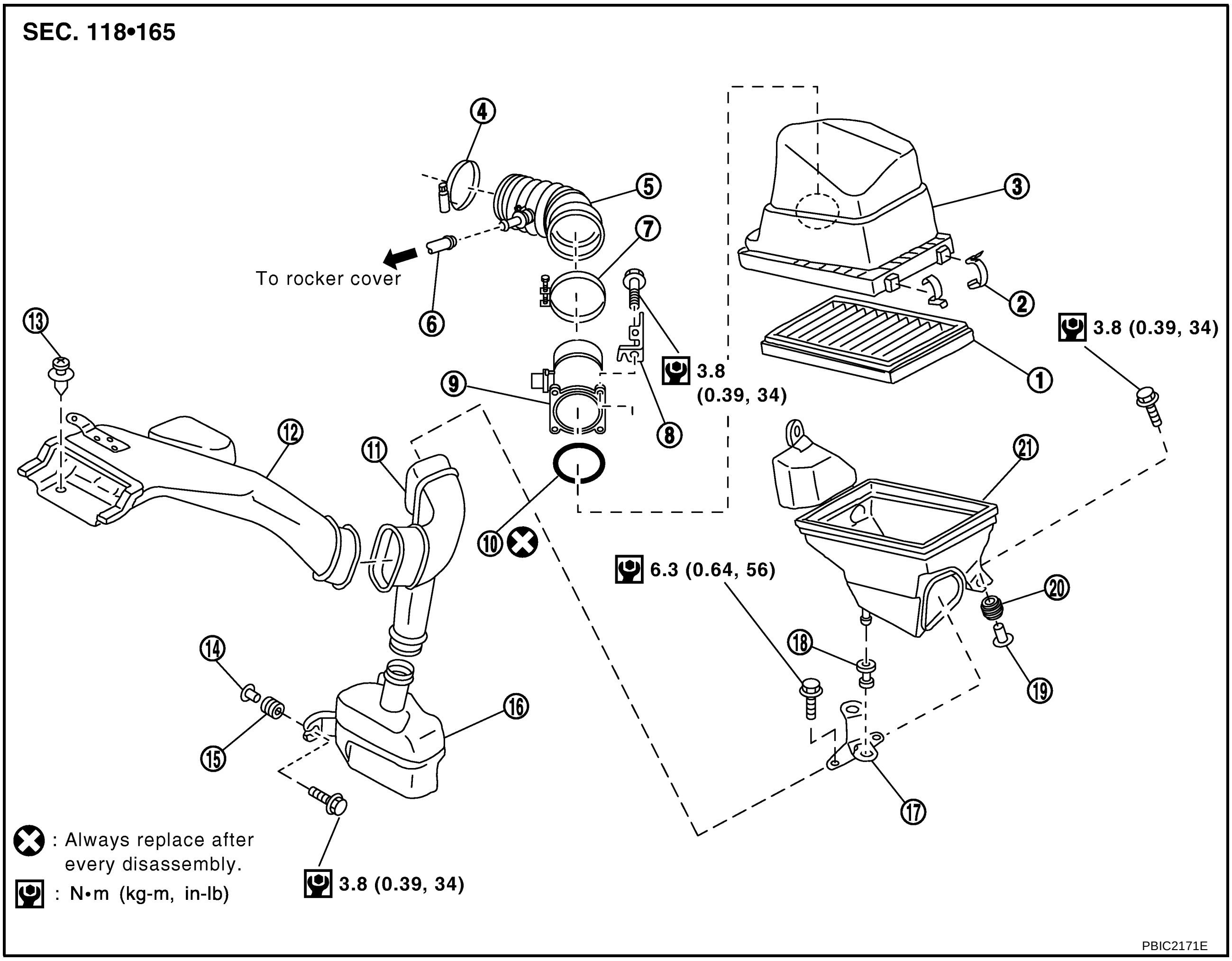
  CAUTION:
  - **If there is damage greater than peeled paint, replace drive belt auto-tensioner.**
  - **Do not swap the pulley between new and old drive belt auto-tensioner.**

AIR CLEANER AND AIR DUCT

PFP:16500

Removal and Installation

ABS00CJ0



1.	Air cleaner filter	2.	Clip	3.	Air cleaner case upper
4.	Clamp	5.	Air duct	6.	PCV hose
7.	Clamp	8.	Bracket	9.	Mass air flow sensor
10.	O-ring	11.	Air duct	12.	Air duct (inlet)
13.	Clip	14.	Collar	15.	Grommet
16.	Resonator	17.	Bracket (A/T models)	18.	Mounting rubber
19.	Collar	20.	Grommet	21.	Air cleaner case lower

REMOVAL

1. Remove mass air flow sensor harness clamp.
2. Disconnect harness connector from mass air flow sensor.
3. Disconnect PCV hose.
4. Remove air duct (inlet), air ducts and air cleaner case/mass air flow sensor assembly disconnecting their joints.
   - Add mating marks as necessary for easier installation.
5. Remove mass air flow sensor from air cleaner case upper, as necessary.

   CAUTION:
   Handle mass air flow sensor with the following cares.
   - **Do not shock it.**
   - **Do not disassemble it.**
   - **Do not touch its sensor.**

6. Remove resonator in fender lifting left fender protector, as necessary.

INSPECTION AFTER REMOVAL

Inspect air duct assembly for cracks or tear.

- Replace air duct assembly, if necessary.

INSTALLATION

Note the following, and install in the reverse order of removal.

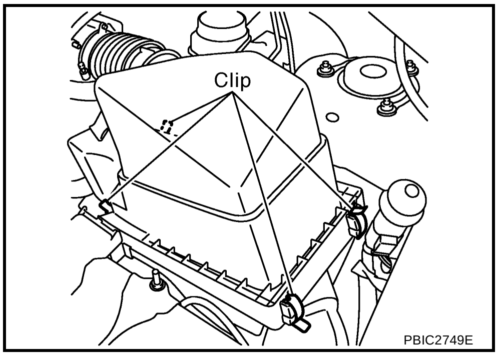
- Align marks. Attach each joint. Screw clamps firmly.

Changing Air Cleaner Filter

ABS00CJ1

REMOVAL

1. Unfasten clips and lift up air cleaner case upper.
2. Remove air cleaner filter.



INSTALLATION

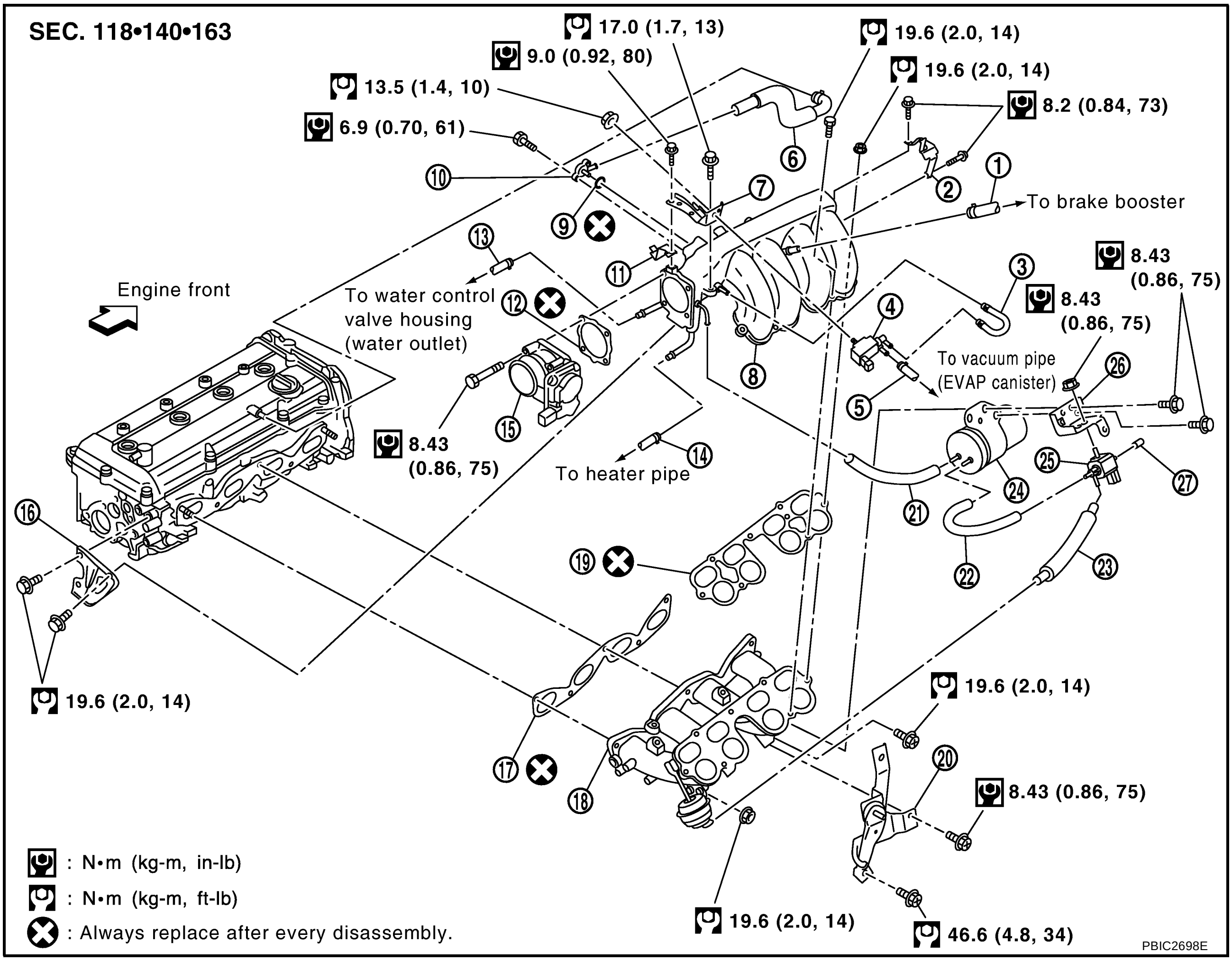
Install in the reverse order of removal.

INTAKE MANIFOLD

PFP:14003

Removal and Installation

ABS00E9L



1.	Vacuum hose	2.	Harness bracket	3.	Vacuum hose
4.	EVAP canister purge volume control solenoid valve	5.	Vacuum hose	6.	PCV hose
7.	Harness bracket	8.	Intake manifold collector	9.	O-ring
10.	Hose connector	11.	Hose bracket	12.	Gasket
13.	Water hose	14.	Water hose	15.	Electric throttle control actuator
16.	Intake manifold rear support	17.	Gasket	18.	Intake manifold
19.	Gasket	20.	Intake manifold support	21.	Vacuum hose
22.	Vacuum hose	23.	Vacuum hose	24.	Vacuum reservoir tank
25.	VIAS control solenoid valve	26.	Vacuum reservoir tank bracket	27.	Filter

CAUTION:

Do not remove or disassemble parts unless instructed as shown in the figure.

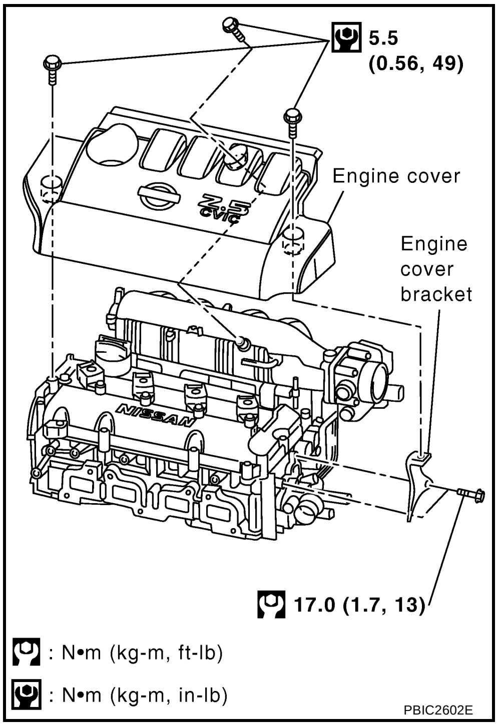
REMOVAL

1. Release fuel pressure. Refer to EC-90, "FUEL PRESSURE RELEASE" .

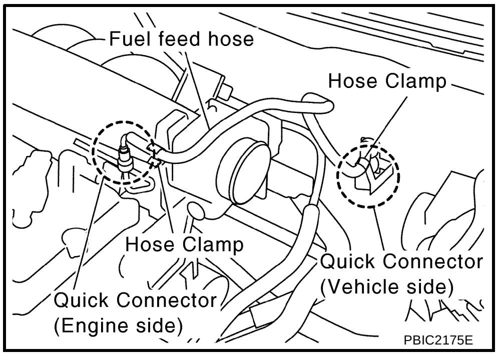
2. Remove engine cover.

   CAUTION:

   Be careful not to damage or scratch engine cover.



3. Remove air cleaner case upper, mass air flow sensor and air duct assembly. Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
4. Remove quick connector caps, and disconnect quick connector at the engine side. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .



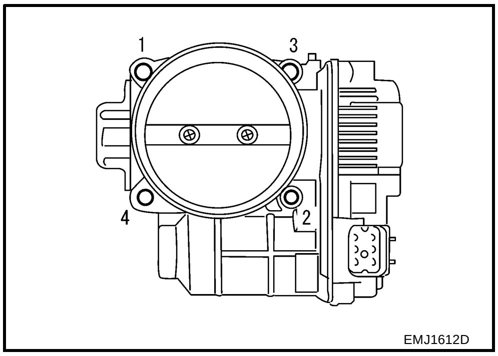
5. Remove electric throttle control actuator with the following procedure:

a. Disconnect harness connector.

b. Loosen mounting bolts in reverse order as shown in the figure, and remove electric throttle control actuator and gasket.

   CAUTION:

   - **Handle carefully to avoid any shock to electric throttle control actuator.**
   - **Do not disassemble.**

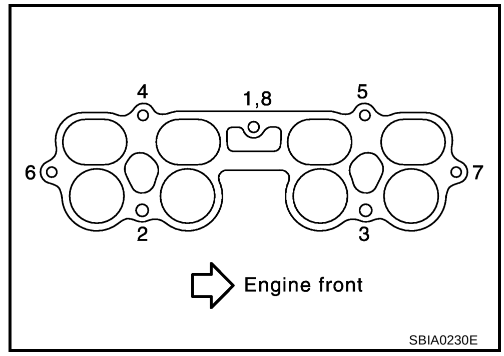


6. Disconnect harness, vacuum hoses and PCV hose from intake manifold collector, and move them aside.
7. Remove intake manifold rear support.

8. Loosen mounting nuts and bolts in reverse order as shown in the figure, and remove intake manifold collector and gasket.

   CAUTION:
   Cover engine openings to avoid entry of foreign materials.

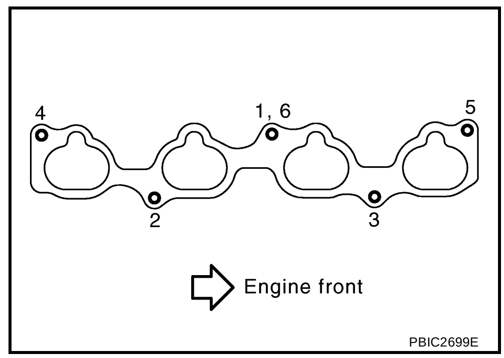
   NOTE:
   Disregard No. 8 when loosening.



9. Disconnect power steering piping from intake manifold, and move them aside. Refer to PS-33, "HYDRAULIC LINE" .
10. Remove intake manifold support.
11. Disconnect sub-harness from fuel injector. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
12. Remove fuel tube and fuel injector assembly from intake manifold. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
13. Loosen mounting nuts and bolts in reverse order as shown in the figure, and remove intake manifold and gasket.

    CAUTION:
    - **Cover engine openings to avoid entry of foreign materials.**
    - **Do not disassemble intake manifold.**

    NOTE:
    Disregard No. 6 when loosening.



14. Remove EVAP canister purge volume control solenoid valve from intake manifold collector, if necessary.
15. Remove vacuum reservoir tank and VIAS control solenoid valve from intake manifold, if necessary.

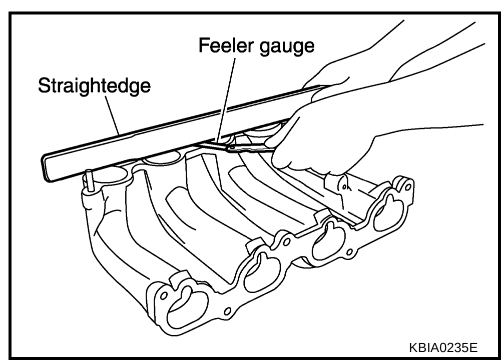
INSPECTION AFTER REMOVAL

Surface Distortion

- Using a straightedge and a feeler gauge, check the surface distortion of both the intake manifold collector mating surface and the intake manifold mating surfaces.

  Limit : 0.1 mm (0.004 in)

- If it exceeds the limit, replace intake manifold and/or intake manifold collector.



INSTALLATION

Note the following, and install in the reverse order of removal.

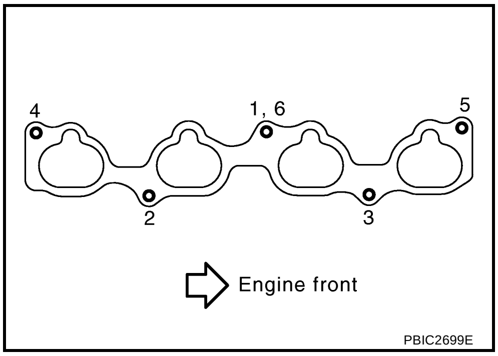
Intake Manifold

- If stud bolts were removed, install them and tighten to the specified torque below.

  : 10.8 N·m (1.1 kg-m, 8 ft-lb)

- Tighten in numerical order as shown in the figure.

  NOTE:
  No. 6 means double tightening of bolt No. 1.



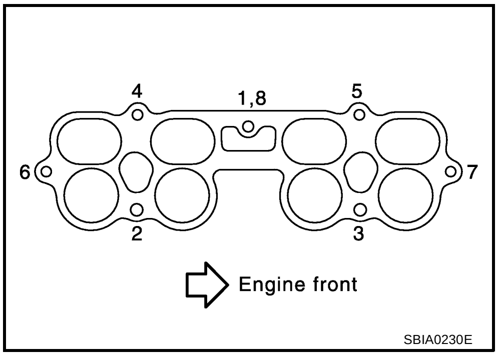
Intake Manifold Collector

- If stud bolts were removed, install them and tighten to the specified torque below.

  : 10.8 N·m (1.1 kg-m, 8 ft-lb)

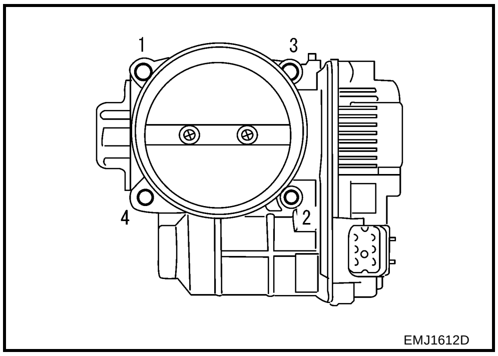
- Tighten in numerical order as shown in the figure.

  NOTE:
  No. 8 means double tightening of bolt No. 1.



Electric Throttle Control Actuator

- Tighten mounting bolts equally and diagonally in several steps and in numerical order as shown in the figure.
- Perform the “Throttle Valve Closed Position Learning” when harness connector of electric throttle control actuator is disconnected. Refer to EC-88, "Throttle Valve Closed Position Learning" .
- Perform the “Idle Air Volume Learning” and “Throttle Valve Closed Position Learning” when electric throttle control actuator is replaced. Refer to EC-88, "Idle Air Volume Learning" .



INSPECTION AFTER INSTALLATION

Make sure there are no fuel leaks at connections before installing engine cover with the following procedure:

1. Apply fuel pressure to fuel lines with turning ignition switch “ON” (with the engine stopped). Then make sure there are no fuel leaks at connections.

   NOTE:
   Use mirrors for checking on invisible points.

2. Start the engine. With engine speed increased, make sure again there are no fuel leaks at connections.

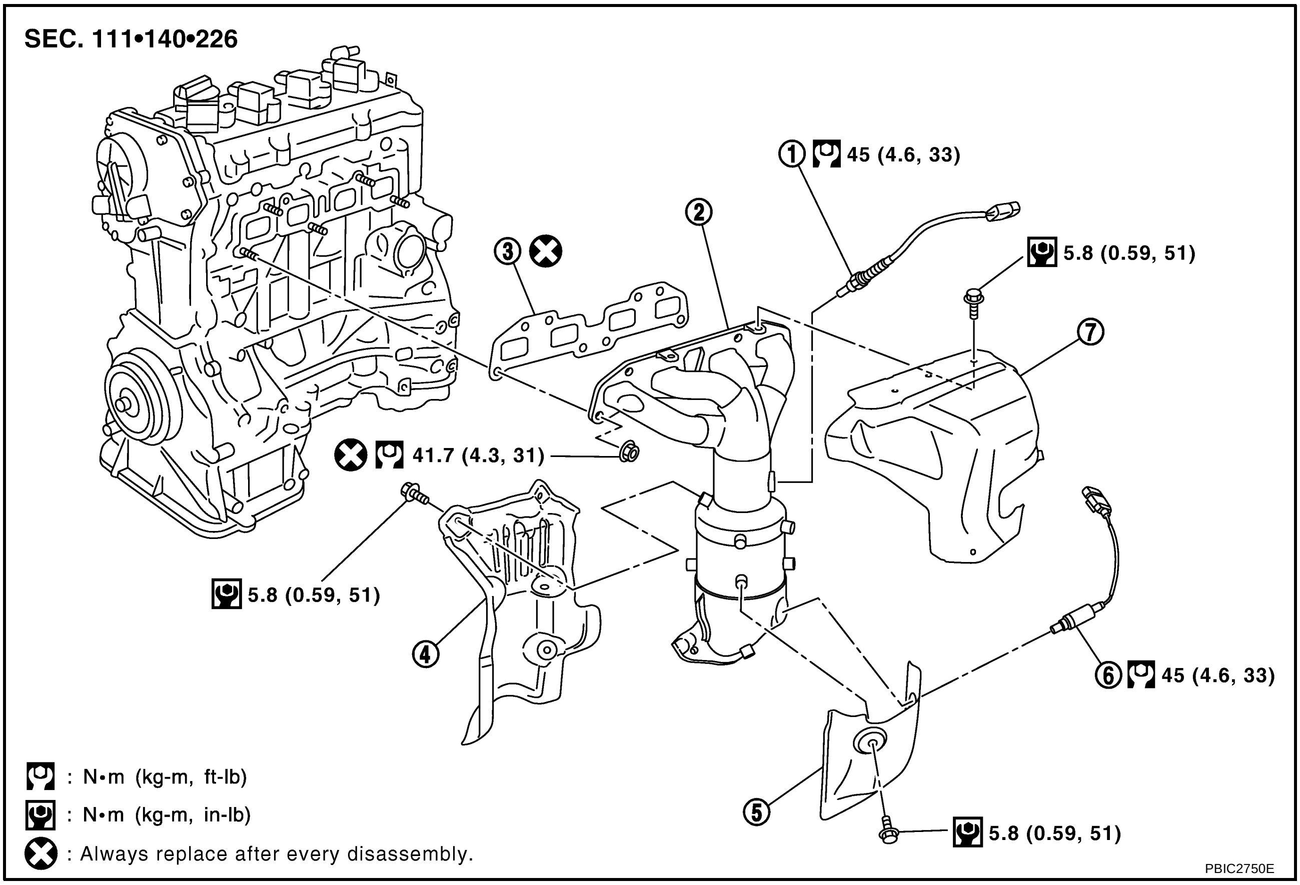
   CAUTION:
   Do not touch the engine immediately after stopped as the engine becomes extremely hot.

EXHAUST MANIFOLD AND THREE WAY CATALYST

PFP:14004

Removal and Installation

ABS00CJ4



1.	Heated oxygen sensor 1	2.	Exhaust manifold and three way catalyst assembly	3.	Gasket
4.	Three way catalyst cover	5.	Exhaust manifold cover (lower)	6.	Heated oxygen sensor 2
7.	Exhaust manifold cover (upper)				

REMOVAL

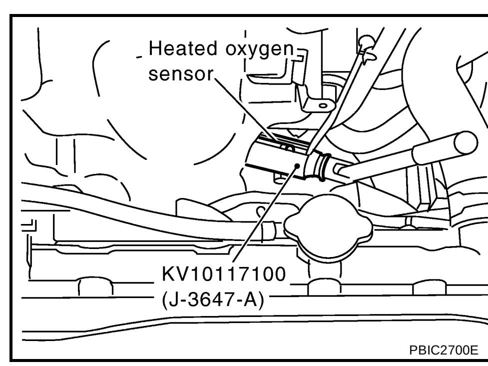
1. Remove heated oxygen sensors with the following procedure:

a. Disconnect harness connector of each heated oxygen sensor, and harness from bracket and middle clamp.

b. Using the heated oxygen sensor wrench [SST], remove heated oxygen sensors.

CAUTION:

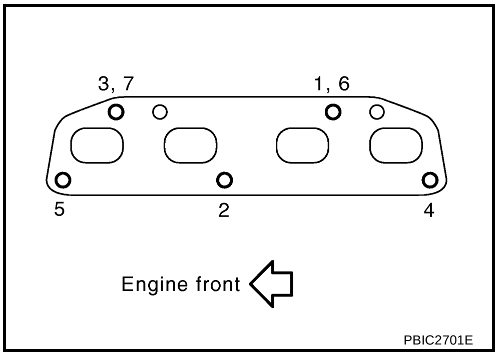
- **Be careful not to damage heated oxygen sensor.**
- **Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; replace with a new one.**



2. Remove exhaust front tube. Refer to EX-2, "EXHAUST SYSTEM" .
3. Remove drive belt. Refer to EM-11, "DRIVE BELTS" .
4. Remove alternator. Refer to SC-20, "CHARGING SYSTEM" .
5. Remove exhaust manifold cover (upper).

6. Loosen nuts in reverse order as shown in the figure to remove exhaust manifold and three way catalyst assembly.

   NOTE:
   Disregard No. 6 and 7 when loosening.



7. Remove gasket.

   CAUTION:
   Cover engine openings to avoid entry of foreign materials.

8. Remove exhaust manifold cover (lower) and three way catalyst cover from exhaust manifold and three way catalyst assembly.

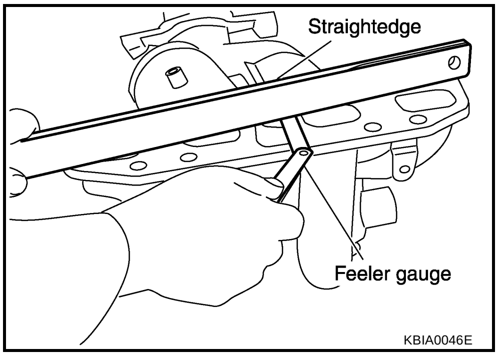
INSPECTION AFTER REMOVAL

Surface Distortion

- Using a straightedge and a feeler gauge, check the surface distortion of exhaust manifold and three way catalyst assembly mating surface.

  Limit : 0.3 mm (0.012 in)

- If it exceeds the limit, replace exhaust manifold and three way catalyst assembly.



INSTALLATION

Note the following, and install in the reverse order of removal.

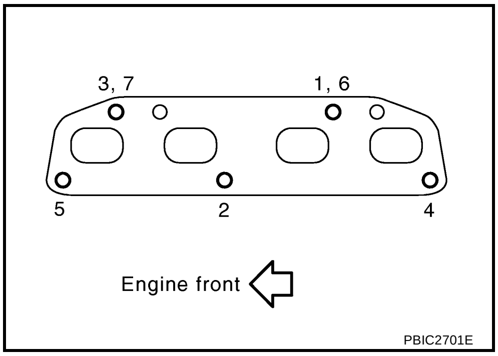
Exhaust Manifold

- If stud bolts were removed, install them and tighten to the specified torque below.

  : 14.7 N·m (1.5 kg-m, 11 ft-lb)

- Tighten nuts in numerical order as shown in the figure.

  NOTE:
  No. 6 and 7 mean double tightening of bolts No. 1 and 3.



Heated Oxygen Sensor

CAUTION:

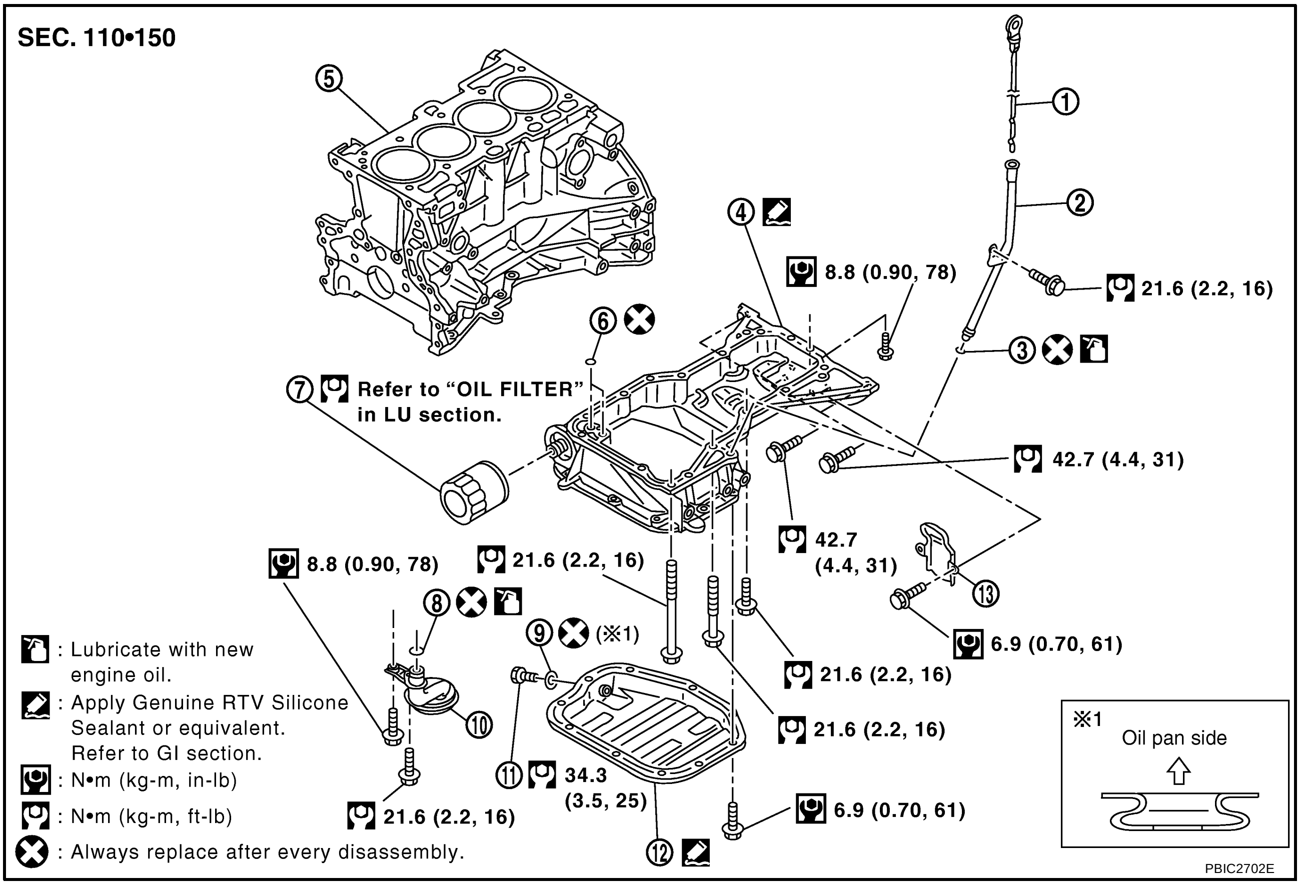
- **Before installing new heated oxygen sensor, clean exhaust system threads using a heated oxygen sensor thread cleaner (commercial service tool: J-43897-18 or J-43897-12) and apply anti-seize lubricant (commercial service tool).**
- **Do not over torque heated oxygen sensor. Doing so may cause damage to heated oxygen sensor, resulting in the “MIL” coming on.**

OIL PAN AND OIL STRAINER

PFP:11110

Removal and Installation

ABS00CJ5



1. Oil level gauge	2. Oil level gauge guide	3. O-ring
4. Oil pan (upper)	5. Cylinder block	6. O-ring
7. Oil filter	8. O-ring	9. Drain plug washer
10. Oil strainer	11. Drain plug	12. Oil pan (lower)
13. Rear plate cover		

REMOVAL

WARNING:

To avoid the danger of being scalded, do not drain the engine oil when the engine is hot.

1. Remove RH and LH undercovers.

   NOTE:

   When removing oil pan (lower) or oil strainer only, this step is unnecessary.

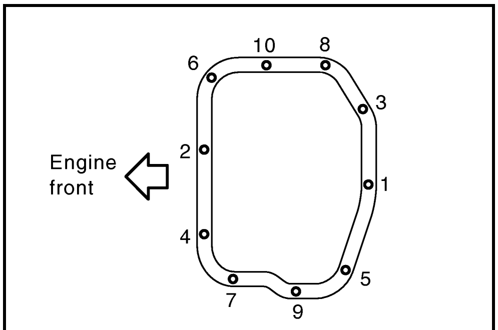
2. Drain engine oil. Refer to LU-7, "Changing Engine Oil" .

   CAUTION:

   - **Perform this step when the engine is cold.**
   - **Do not spill engine oil on drive belt.**

3. Remove oil pan (lower) with the following procedure:

a. Loosen mounting bolts in reverse order as shown in the figure with power tool.



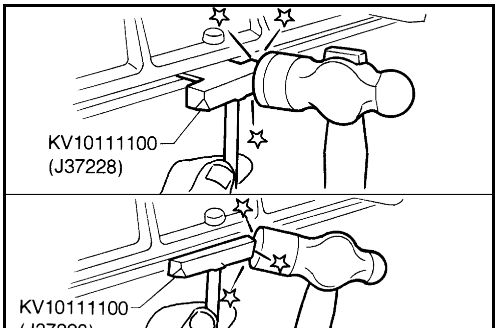
PBIC2703E

b. Insert the seal cutter [SST] between oil pan (upper) and oil pan (lower).

CAUTION:

- **Be careful not to damage the mating surfaces.**
- **Do not insert a screwdriver, this will damage the mating surfaces.**

c. Slide seal cutter by tapping on the side of the tool with a hammer. Remove oil pan (lower).



SEM365E

4. Remove oil strainer.
5. Remove oil pan (upper) with the following procedure:

a. Remove drive belt. Refer to EM-11, "DRIVE BELTS" .

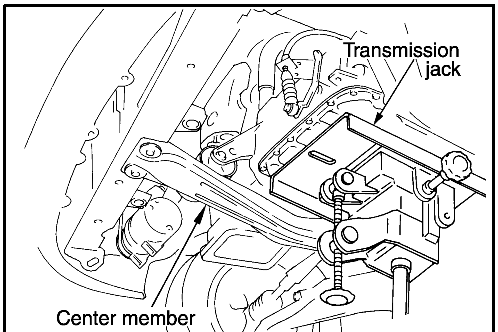
b. Remove oil filter. Refer to LU-9, "OIL FILTER" .

c. Remove A/C compressor with piping connected. And locate it aside temporarily with ropes or equivalent not to disturb the following work. Refer to ATC-122, "Removal and Installation of Compressor" (Automatic A/C models) or MTC-82, "Removal and Installation of Compressor" (Manual A/C models).

d. Remove oil level gauge guide.

e. Remove exhaust front tube and its support. Refer to EX-2, "EXHAUST SYSTEM" .

f. Set a suitable transmission jack under transaxle and hoist the engine with engine slinger, and then remove center member with power tool. Refer to EM-74, "Removal and Installation (2WD Models)" (2WD models) or EM-78, "Removal and Installation (AWD Models)" (AWD models).



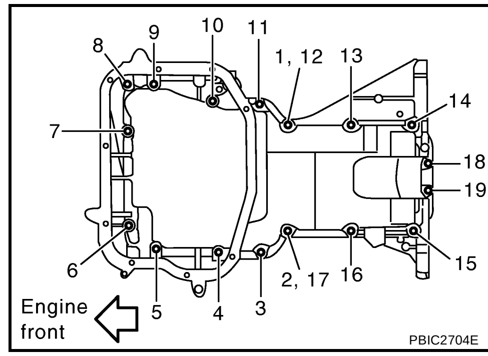
PBIC0257E

g. Remove rear engine mounting bracket (2WD models). Refer to EM-74, "Removal and Installation (2WD Models)" .

h. Remove rear plate cover, and four transaxle joint bolts which pierce oil pan (upper). Refer to MT-17, "TRANSAXLE ASSEMBLY" (M/T models) or AT-269, "TRANSAXLE ASSEMBLY" (A/T models).

i. Loosen bolts in reverse order as shown in the figure with power tool.

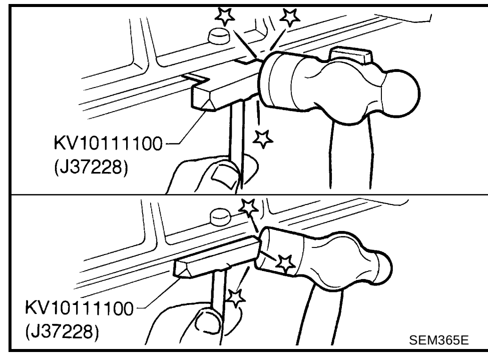
NOTE:
Disregard No.12 and 17 when loosening.



PBIC2704E

j. Insert the seal cutter [SST] between oil pan (upper) and cylinder block, and slide it by tapping on the side of the tool with a hammer. Remove oil pan (upper).

CAUTION:
- **Be careful not to damage the mating surfaces.**
- **Do not insert a screwdriver, this will damage the mating surfaces.**



SEM365E

6. Remove O-rings at front cover side.

INSPECTION AFTER REMOVAL

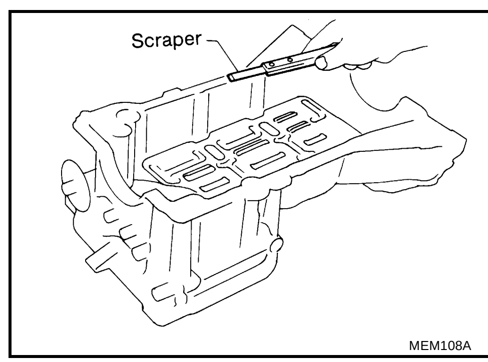
Clean oil strainer if any object attached.

INSTALLATION

1. Install oil pan (upper) with the following procedure:

a. Use a scraper to remove old liquid gasket from mating surfaces.
   - Also remove the old liquid gasket from mating surface of cylinder block.
   - Remove old liquid gasket from the bolt holes and threads.

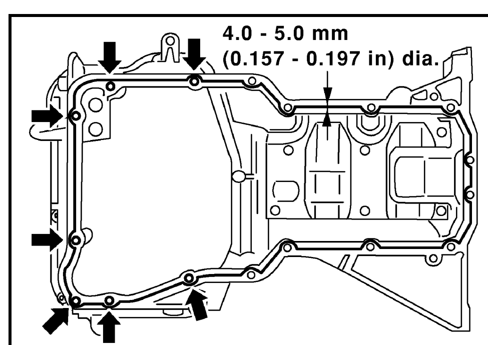
CAUTION:
Do not scratch or damage the mating surfaces when cleaning off old liquid gasket.



MEM108A

b. Apply a continuous bead of liquid gasket with the tube presser [SST: WS39930000 (—)] as shown in the figure.
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" **.**

CAUTION:
- **Apply liquid gasket to outside of bolt hole for the positions shown by arrows.**
- **Attaching should be done within 5 minutes after coating.**



SBIA0253E

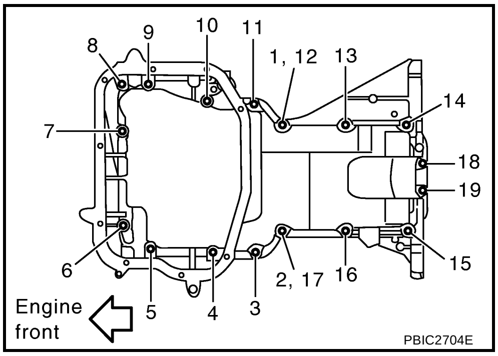
c. Install new O-rings at front cover side.

d. Tighten bolts in numerical order as shown in the figure.

NOTE:

- No. 12 and 17 mean double tightening of bolts No. 1 and 2.
- Refer to the following for locating bolts.

M6 × 20 mm (0.79 in)	**: No. 18, 19**
M8 × 25 mm (0.98 in)	**: No. 1, 2, 3, 11**
M8 × 45 mm (1.77 in)	**: No. 4, 10, 13, 14, 15, 16**
M8 × 100 mm (3.97 in)	**: No. 5, 6, 7, 8, 9**



e. Tighten transaxle joint bolts. Refer to MT-17, "TRANSAXLE ASSEMBLY" (M/T models) or AT-269, "TRANSAXLE ASSEMBLY" (A/T models).

f. Install rear plate cover.

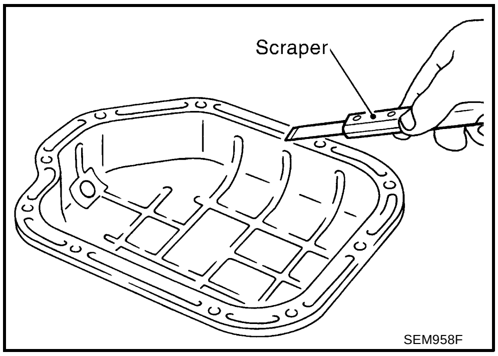
2. Install oil strainer.
3. Install oil pan (lower) with the following procedure:

a. Use a scraper to remove old liquid gasket from mating surfaces.

- Also remove old liquid gasket from mating surface of oil pan (upper).
- Remove old liquid gasket from the bolt holes and thread.

CAUTION:

Do not scratch or damage the mating surfaces when cleaning off old liquid gasket.

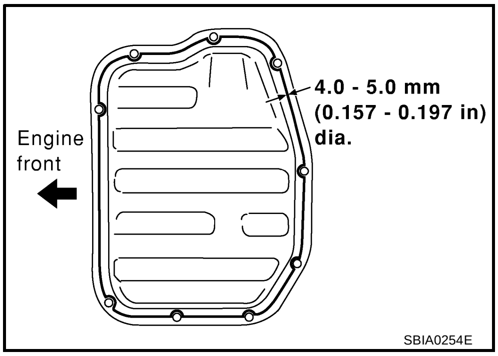


b. Apply a continuous bead of liquid gasket with the tube presser [SST: WS39930000 (—)] as shown in the figure.

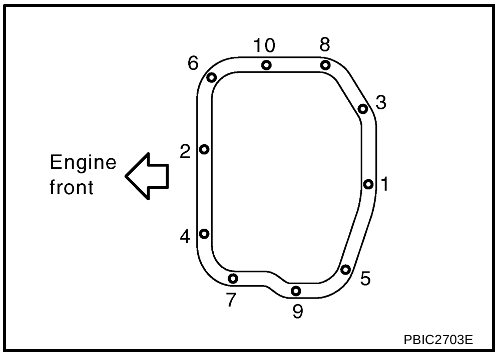
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .

CAUTION:

Attaching should be done within 5 minutes after coating.



c. Tighten bolts in numerical order as shown in the figure.



4. Install oil pan drain plug.
   - Refer to the figure of components of former page for installation direction of washer. Refer to EM-22, "Removal and Installation" .
5. Install in the reverse order of removal after this step.

NOTE:
Pour engine oil at least 30 minutes after oil pan is installed.

INSPECTION AFTER INSTALLATION

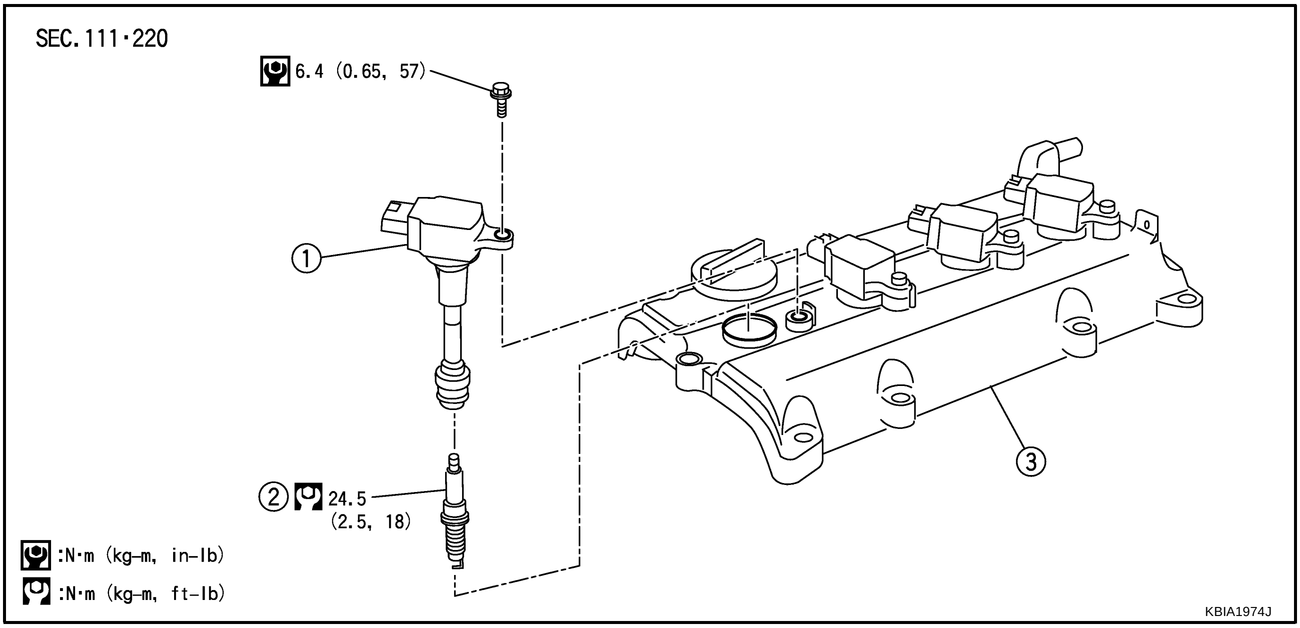
1. Check the engine oil level, and adjust the level. Refer to LU-6, "ENGINE OIL" .
2. Start the engine, and make sure there is no leaks of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level again. Refer to LU-6, "ENGINE OIL" .

IGNITION COIL

PFP:22448

Removal and Installation

ABS00CJ6



1. Ignition coil
2. Spark plug
3. Rocker cover

REMOVAL

1. Remove engine cover. Refer to EM-16, "INTAKE MANIFOLD" .
2. Disconnect harness connector from ignition coil.
3. Remove ignition coil.

   CAUTION:
   Do not drop or shock it.

INSTALLATION

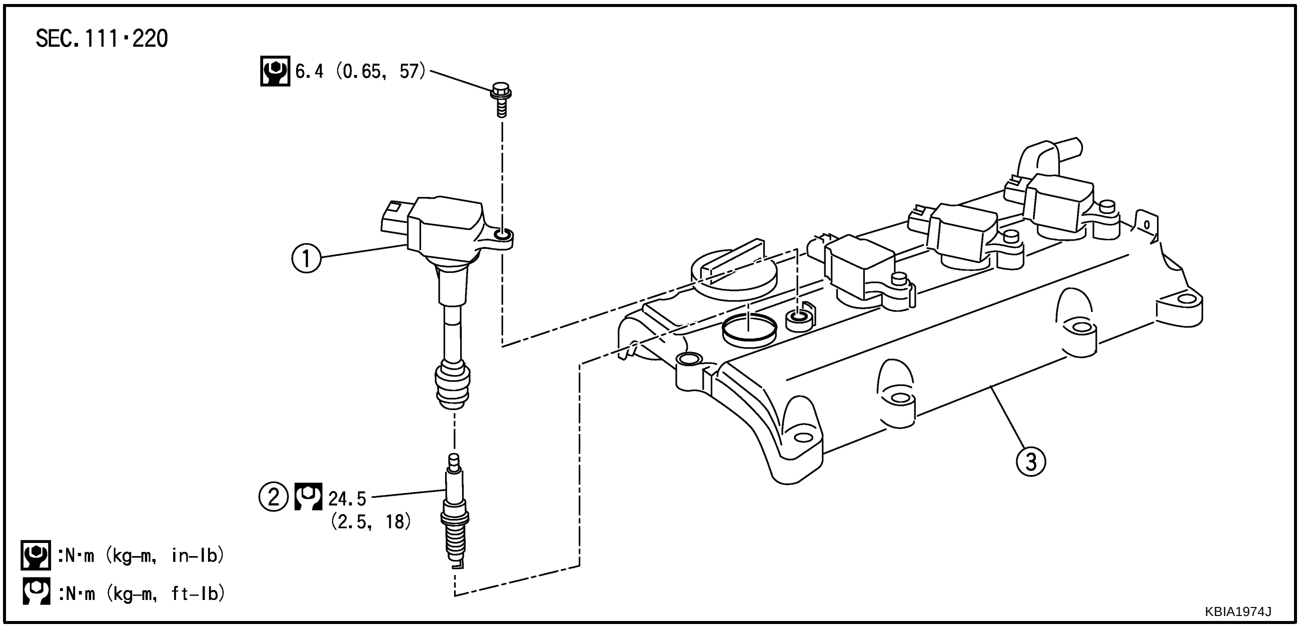
Install in the reverse order of removal.

SPARK PLUG (PLATINUM-TIPPED TYPE)

PFP:22401

Removal and Installation

ABS00DCN

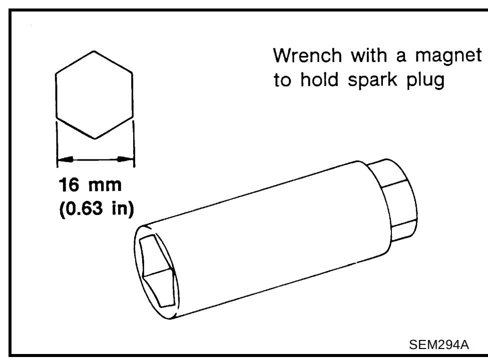


1. Ignition coil
2. Spark plug
3. Rocker cover

REMOVAL

1. Remove engine cover. Refer to EM-16, "INTAKE MANIFOLD" .
2. Remove ignition coil. Refer to EM-27, "IGNITION COIL" .
3. Remove spark plug with a spark plug wrench (commercial service tool).

   CAUTION:
   Do not drop or shock it.



INSPECTION AFTER REMOVAL

Use standard type spark plug for normal condition.

Hot type spark plug is suitable when fouling occurs with standard type spark plug under conditions such as:

- Frequent engine starts
- Low ambient temperatures

Cold type spark plug is suitable when spark plug knock occurs with standard type spark plug under conditions such as:

- Extended highway driving
- Frequent high engine revolution

Make	NGK
Standard type	PLFR5A-11
Hot type	PLFR4A-11
Cold type	PLFR6A-11

Gap (Nominal) : 1.1 mm (0.043 in)

CAUTION:

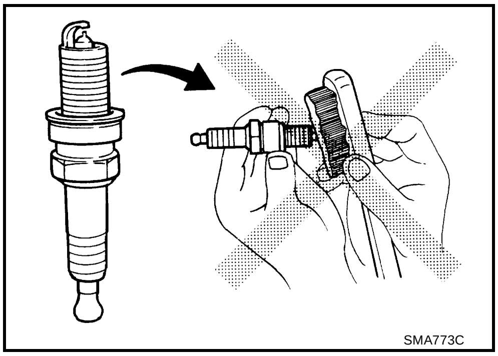
- **Do not drop or shock spark plug.**
- **Do not use wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

  Cleaner air pressure:

  Less than 588 kPa (6 kg/cm^2 , 85 psi)

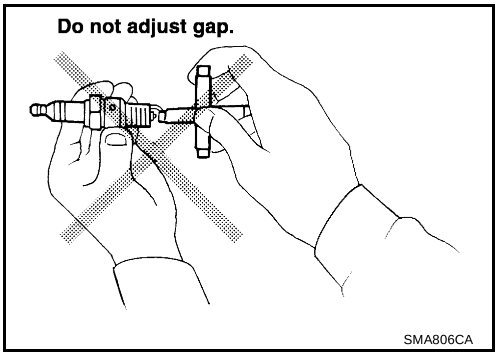
  Cleaning time:

  Less than 20 seconds



SMA773C

- **Checking and adjusting plug gap is not required between change intervals.**



SMA806CA

INSTALLATION

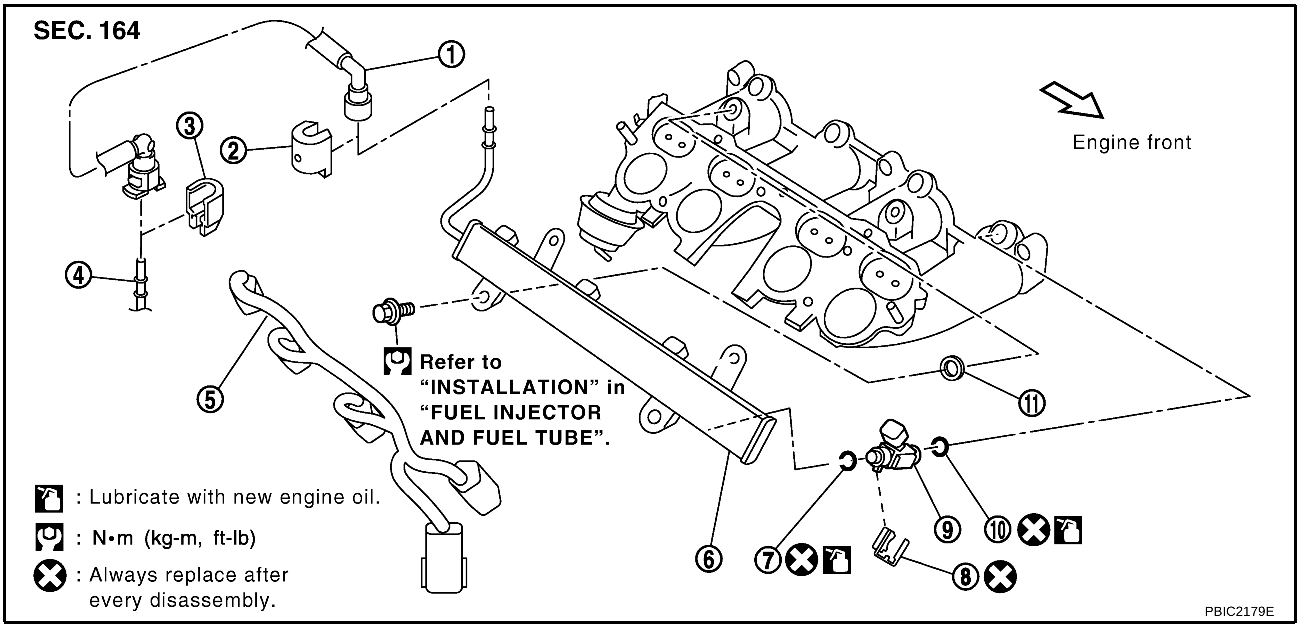
Install in the reverse order of removal.

FUEL INJECTOR AND FUEL TUBE

PFP:16600

Removal and Installation

ABS00CJ9



1. Fuel feed hose	2. Quick connector cap (engine side)	3. Quick connector cap (vehicle side)
4. Centralized under-floor piping	5. Sub-harness	6. Fuel tube
7. O-ring (black)	8. Clip	9. Fuel injector
10. O-ring (green)	11. Insulator	

CAUTION:

Do not remove or disassemble parts unless instructed as shown in the figure.

REMOVAL

WARNING:

- **Put a "CAUTION: INFLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from the work area.**

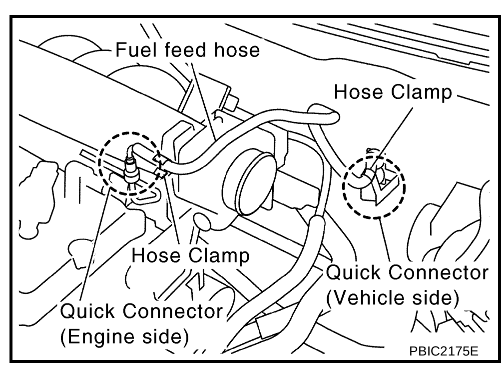
1. Release fuel pressure. Refer to EC-90, "FUEL PRESSURE RELEASE" .
2. Remove engine cover. Refer to EM-16, "INTAKE MANIFOLD" .
3. Remove air cleaner case upper, mass air flow sensor and air duct assembly. Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
4. Disconnect quick connectors at the engine side and the vehicle side as follows, and remove fuel feed hose.

   CAUTION:

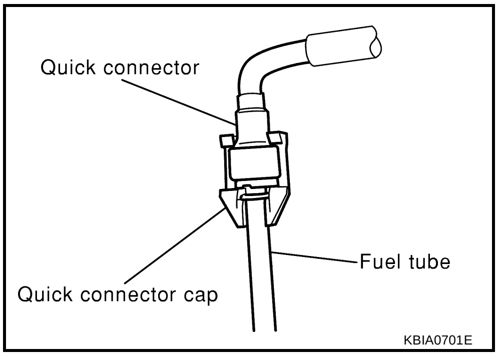
   Disconnect quick connector by using the quick connector release [SST: J-45488], not by picking out retainer tabs.

   NOTE:

   There is quick connector for the engine side and for the vehicle side, and they have different shapes. But disconnection is same procedure. The following procedure shows the engine side.



a. Remove quick connector cap (engine side).

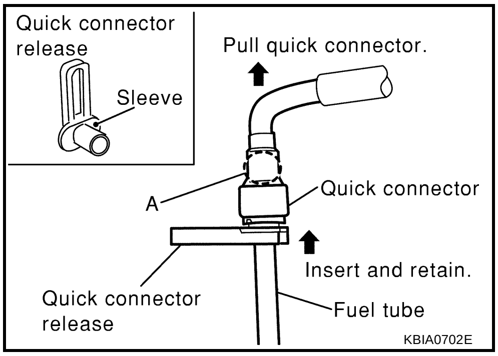


b. With the sleeve side of quick connector release facing quick connector, install quick connector release onto fuel tube.

c. Insert quick connector release into quick connector until sleeve contacts and goes no further. Hold quick connector release on that position.

CAUTION:

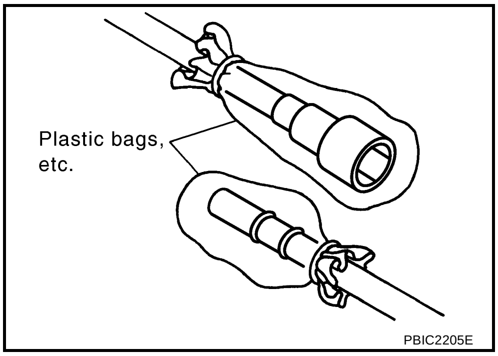
Inserting quick connector release hard will not disconnect quick connector. Hold quick connector release where it contacts and goes no further.



d. Draw and pull out quick connector straight from fuel tube.

CAUTION:

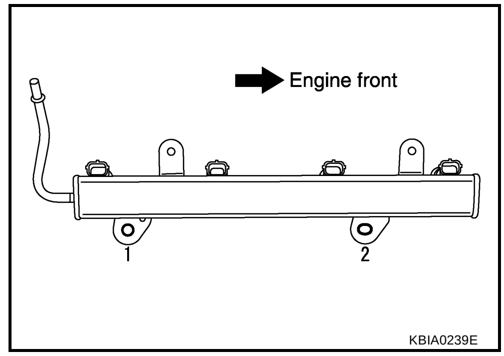
- **Pull quick connector holding “A” position in the figure.**
- **Do not pull with lateral force applied. O-ring inside quick connector may be damaged.**
- **Prepare container and cloth beforehand as fuel will leak out.**
- **Avoid fire and sparks.**
- **Keep parts away from heat source. Especially, be careful when welding is performed around them.**
- **Do not expose parts to battery electrolyte or other acids.**
- **Do not bend or twist connection between quick connector and fuel feed hose during installation/removal.**
- **To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**



5. Remove intake manifold collector. Refer to EM-16, "INTAKE MANIFOLD" .
6. Disconnect sub-harness for fuel injector.

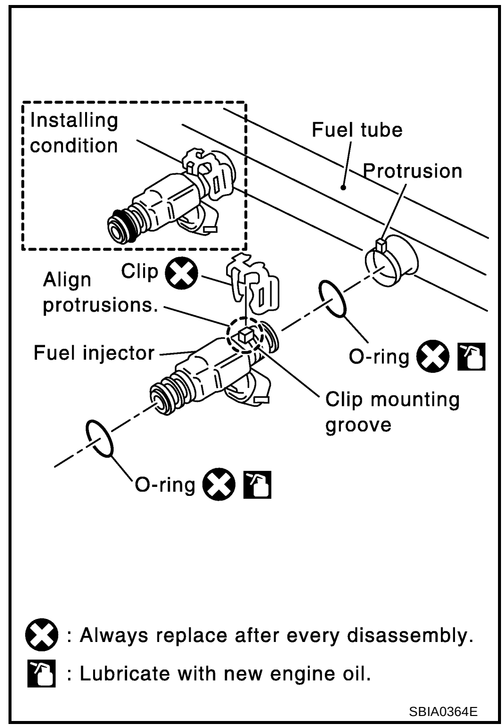
7. Loosen mounting bolts in reverse order as shown in the figure.
8. Remove fuel tube and fuel injector assembly and insulators.

CAUTION:
- **When removing, be careful to avoid any interference with fuel injector.**
- **Use a shop cloth to absorb any fuel leaks from fuel tube.**



9. Remove fuel injector from fuel tube with the following procedure:
a. Open and remove clip.
b. Remove fuel injector from fuel tube by pulling straight.

CAUTION:
- **Be careful with remaining fuel that may go out from fuel tube.**
- **Be careful not to damage fuel injector nozzle during removal.**
- **Do not bump or drop fuel injector.**
- **Do not disassemble fuel injector.**



INSTALLATION

1. Note the following, and install O-rings to fuel injector.

CAUTION:
- **Upper and lower O-rings are different. Be careful not to confuse them.**

Fuel tube side	**: Black**
Nozzle side	**: Green**

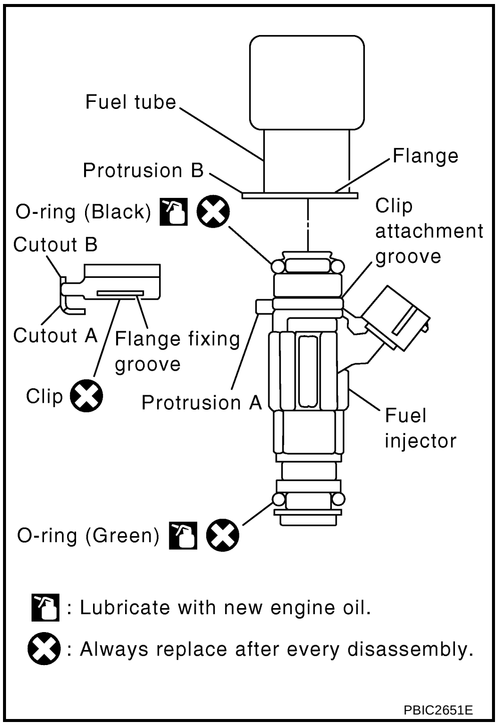
- **Handle O-ring with bare hands. Do not wear gloves.**
- **Lubricate O-ring with new engine oil.**
- **Do not clean O-ring with solvent.**
- **Make sure that O-ring and its mating part are free of foreign material.**
- **When installing O-ring, be careful not to scratch it with tool or fingernails. Also be careful not to twist or stretch O-ring. If O-ring was stretched while it was being attached, do not insert it quickly into fuel tube.**
- **Insert O-ring straight into fuel tube. Do not decenter or twist it.**

2. Install fuel injector to fuel tube with the following procedure:
a. Insert clip into clip attachment groove on fuel injector.
   - Insert clip so that protrusion “A” of fuel injector matches cutout “A” of clip.

   CAUTION:
   - **Do not reuse clip. Replace it with a new one.**
   - **Be careful to keep clip from interfering with O-ring. If interference occurs, replace O-ring.**

b. Insert fuel injector into fuel tube with clip attached.
   - Insert it while matching it to the axial center.
   - Insert fuel injector so that protrusion “B” of fuel tube matches cutout “B” of clip.
   - Make sure that fuel tube flange is securely fixed in flange fixing groove on clip.

c. Make sure that installation is complete by checking that fuel injector does not rotate or come off.
   - Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.



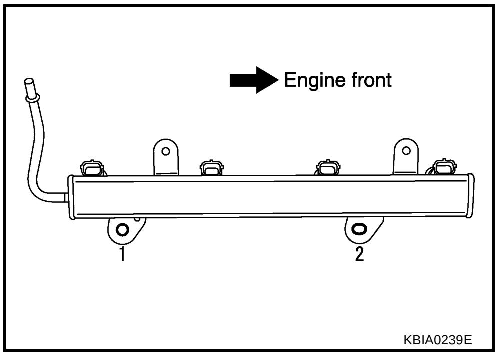
3. Install fuel tube and fuel injector assembly with the following procedure:

   CAUTION:
   When installing, be careful to avoid any interference with fuel injector.

a. Insert the tip of each fuel injector into intake manifold.
b. Tighten mounting bolts evenly in two steps in numerical order as shown in the figure.

   1st step
   : 10.1 N·m (1.0 kg-m, 7 ft-lb)

   2nd step
   : 23.6 N·m (2.4 kg-m, 17 ft-lb)



4. Connect sub-harness for fuel injector.
5. Install intake manifold collector. Refer to EM-16, "INTAKE MANIFOLD" .
6. Note the following, and connect quick connectors at the engine side and the vehicle side to install fuel feed hose.

   NOTE:
   There is quick connector for the engine side and for the vehicle side, and they have different shapes. But connection is same procedure. The following procedure shows the engine side.

a. Check the connection for foreign material and damage.

b. Align center to insert quick connector straightly into fuel tube.

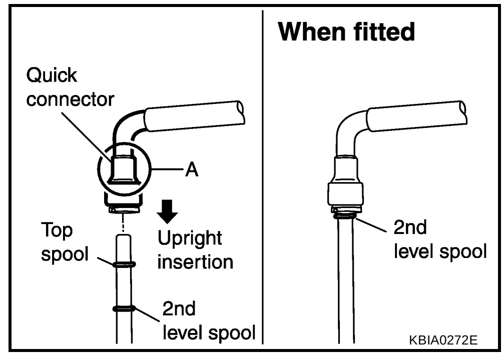
NOTE:

The figure shows the engine side as an example.

- Insert quick connector to fuel tube until the top spool on fuel tube is inserted completely and the second level spool is positioned slightly below quick connector bottom end.

CAUTION:

- **Hold "A" position in the figure when inserting fuel tube into quick connector.**
- **Carefully align center to avoid inclined insertion to prevent damage to O-ring inside quick connector.**
- **Insert until you hear a "click" sound and actually feel the engagement.**
- **To avoid misidentification of engagement with a similar sound, be sure to perform the next step.**



c. Before clamping fuel feed hose with hose clamps, pull quick connector hard by hand holding "A" position. Make sure it is completely engaged (connected) so that it does not come out from fuel feed tube.

d. Install quick connector cap to quick connector connection. (Both on the engine side and the vehicle side)

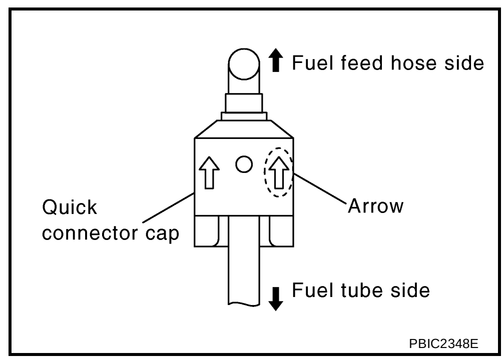
- Install so that the arrow mark on the side faces up.

CAUTION:

- **Make sure that quick connector and fuel tube are securely fit into quick connector cap installation groove.**
- **If quick connector cap cannot be installed smoothly, quick connector may have not been installed correctly. Check the connection again.**

NOTE:

There is quick connector cap for the engine side and for the vehicle side, and they have different shapes. The figure shows the engine side as an example.



7. Install fuel feed hose to hose clamp.
8. Install in the reverse order of removal after this step.

INSPECTION AFTER INSTALLATION

Check on Fuel Leaks

1. Apply fuel pressure to fuel lines with turning ignition switch "ON" (with the engine stopped). Then make sure there are no fuel leaks at connections.

   NOTE:

   Use mirrors for checking on invisible points.

2. Start the engine. With engine speed increased, make sure again there are no fuel leaks at connections.

   CAUTION:

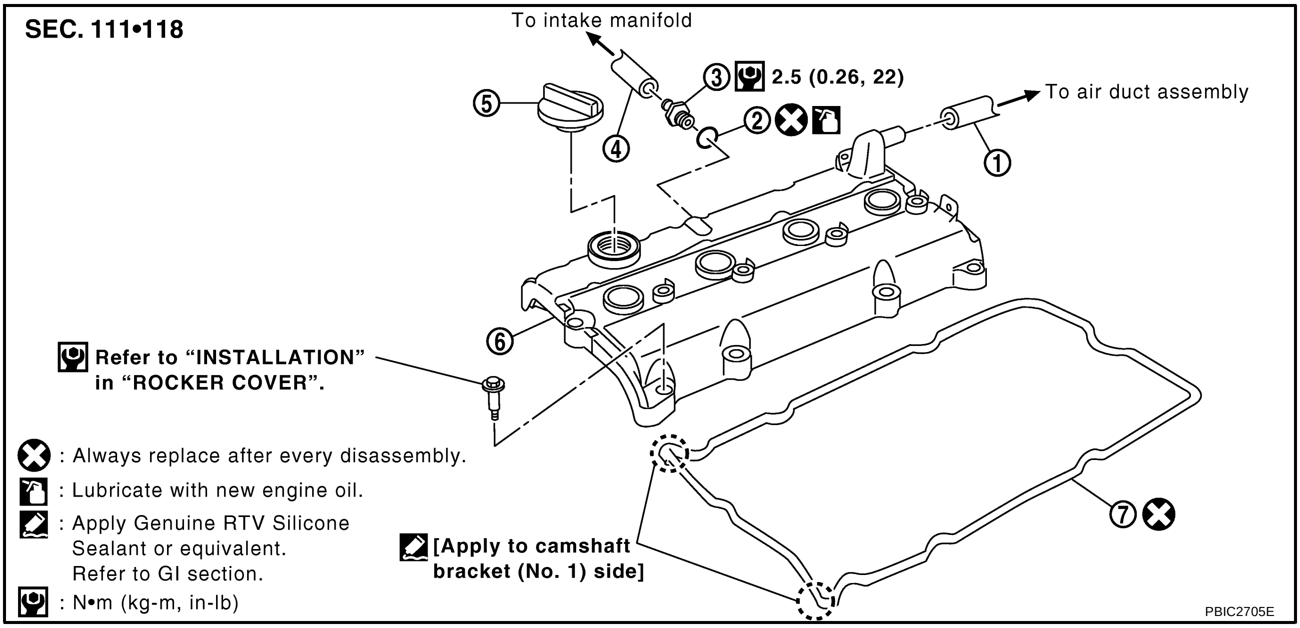
   Do not touch the engine immediately after stopped as the engine becomes extremely hot.

ROCKER COVER

PFP:13264

Removal and Installation

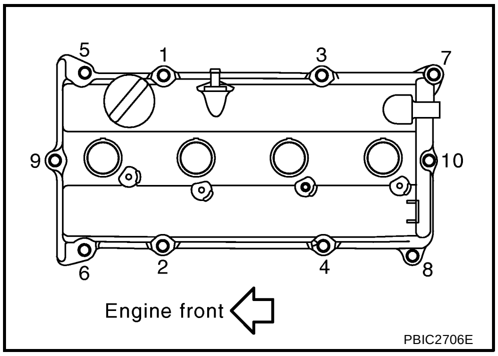
ABS00CJA



1.	PCV hose	2.	O-ring	3.	PCV valve
4.	PCV hose	5.	Oil filler cap	6.	Rocker cover
7.	Rocker cover gasket				

REMOVAL

1. Remove engine cover. Refer to EM-16, "INTAKE MANIFOLD" .
2. Disconnect PCV hose from rocker cover.
3. Remove ignition coil. Refer to EM-27, "IGNITION COIL" .
4. Remove PCV valve and O-ring from rocker cover, if necessary.
5. Remove oil filler cap from rocker cover, if necessary.
6. Loosen bolts in reverse order shown in the figure.



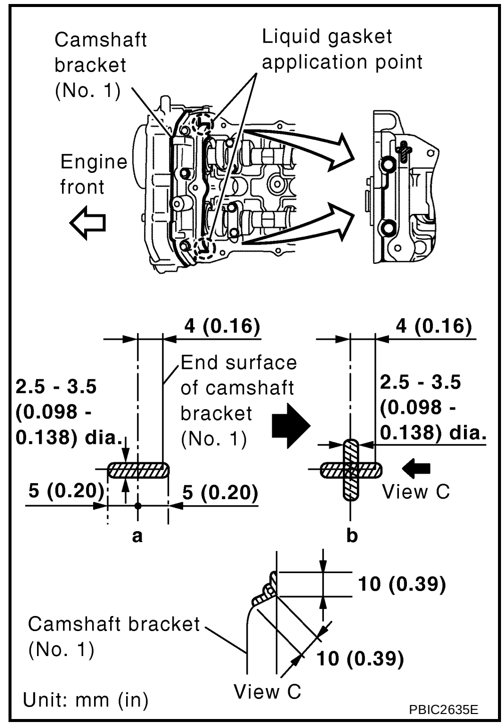
7. Remove rocker cover gasket from rocker cover.
8. Use scraper to remove all traces of liquid gasket from cylinder head and camshaft bracket (No. 1).

   CAUTION:

   Do not scratch or damage the mating surface when cleaning off old liquid gasket.

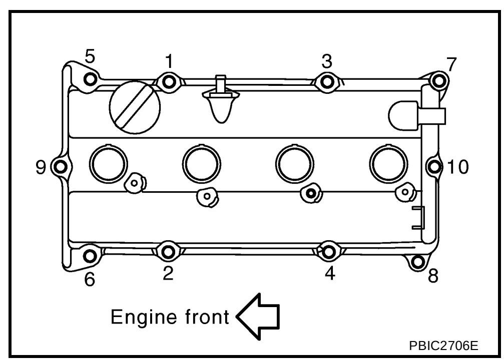
INSTALLATION

1. Apply liquid gasket to the position shown in the figure with the following procedure:



a. Refer to figure "a" to apply liquid gasket to joint part of camshaft bracket (No. 1) and cylinder head.
b. Refer to figure "b" to apply liquid gasket in 90 degrees to figure "a".
   Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" **.**

2. Install rocker cover gasket to rocker cover.
3. Install rocker cover.
   - Check if rocker cover gasket is not dropped from the installation groove of rocker cover.
4. Tighten bolts in two steps separately in numerical order as shown in the figure.



   1st step
   : 2.0 N·m (0.2 kg-m, 18 in-lb)

   2nd step
   : 8.3 N·m (0.85 kg-m, 73 in-lb)

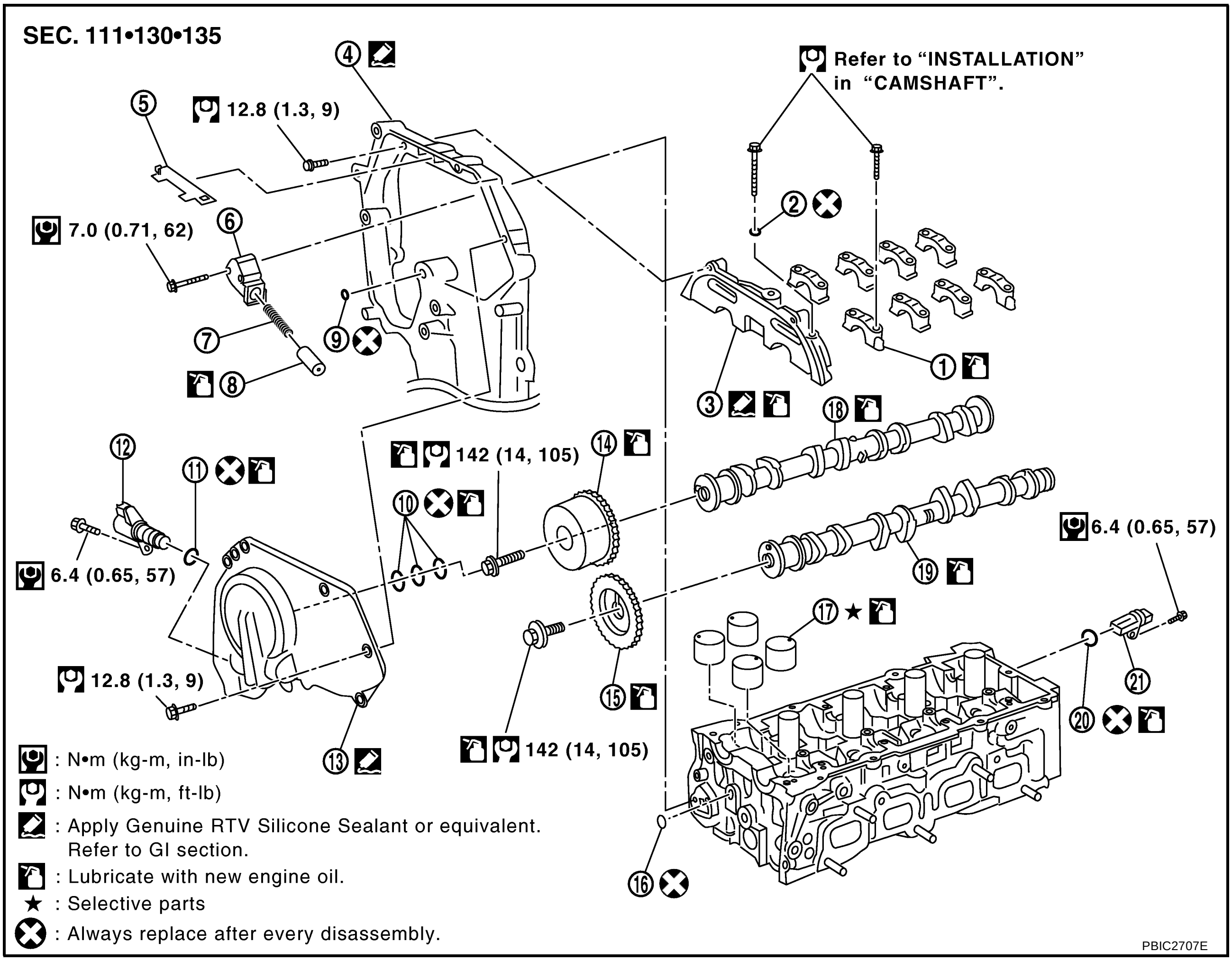
5. Install in the reverse order of removal after this step.

CAMSHAFT

PFP:13001

Removal and Installation

ABS00E9K



1.	Camshaft bracket (No. 2 to 5)	2.	Seal washer	3.	Camshaft bracket (No. 1)
4.	Front cover	5.	Chain guide	6.	Chain tensioner
7.	Spring	8.	Chain tensioner plunger	9.	O-ring
10.	Oil ring	11.	O-ring	12.	Intake valve timing control solenoid valve
13.	Intake valve timing control cover	14.	Camshaft sprocket (INT)	15.	Camshaft sprocket (EXH)
16.	O-ring	17.	Valve lifter	18.	Camshaft (INT)
19.	Camshaft (EXH)	20.	O-ring	21.	Camshaft position sensor (PHASE)

NOTE:
This section describes removal/installation procedure of camshaft without removing front cover. If front cover is removed or installed, removal of camshaft bracket (No. 1) is easier before step 9 and installation is easier after step 4. Regarding removal and installation of front cover, refer to EM-49, "TIMING CHAIN" .

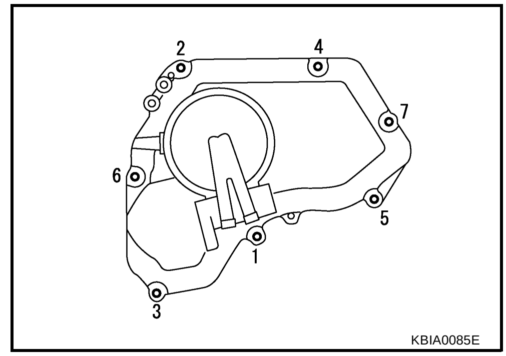
REMOVAL

1. Remove the following parts.
   - Engine cover; Refer to EM-16, "INTAKE MANIFOLD" .
   - Ignition coil; Refer to EM-27, "IGNITION COIL" .
   - Rocker cover; Refer to EM-35, "ROCKER COVER" .
2. Remove reservoir tank of radiator from bracket, and move it aside. Refer to CO-11, "RADIATOR" .
3. Remove power steering reservoir tank from bracket to move power steering piping. Refer to PS-33, "HYDRAULIC LINE" .

CAUTION:
To avoid power steering fluid leakage, temporarily fix reservoir tank of power steering oil pump vertically.

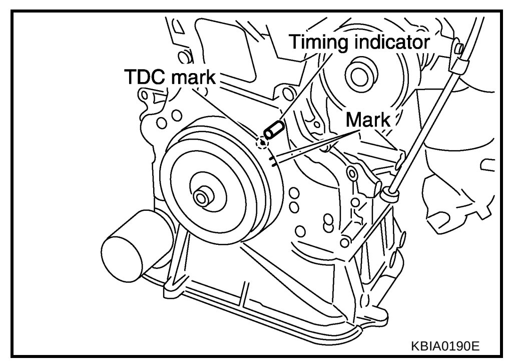
4. Remove intake valve timing control cover with the following procedure:
a. Disconnect intake valve timing control solenoid valve harness connector.
b. Disconnect ground cables and remove harness clip.
c. Remove intake valve timing control solenoid valve, if necessary.
d. Loosen bolts in reverse order as shown in the figure.
e. Use the seal cutter [SST: KV10111100 (J37228)] or suitable tool to cut liquid gasket for removal.

CAUTION:
Be careful not to damage the mating surfaces.



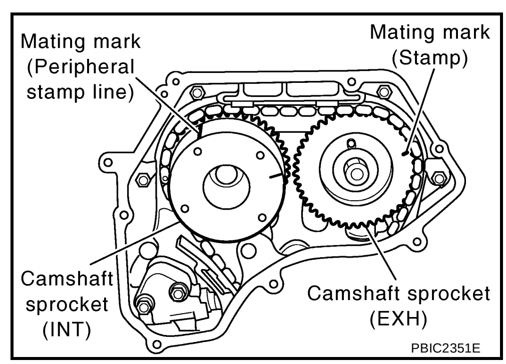
KBIA0085E

5. Pull chain guide between camshaft sprockets out through front cover.
6. Set No. 1 cylinder at TDC on its compression stroke with the following procedure:
a. Open splash guard on RH undercover.
b. Rotate crankshaft pulley clockwise and align TDC mark to timing indicator on front cover.



KBIA0190E

c. At the same time, make sure that the mating marks on camshaft sprockets are located as shown in the figure.
   - If not, rotate crankshaft pulley one more turn to align mating marks to the positions in the figure.



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7. Remove camshaft sprockets with the following procedure:
a. Put indelible paint marks on the timing chain link plates aligning with the mating marks on camshaft sprockets.

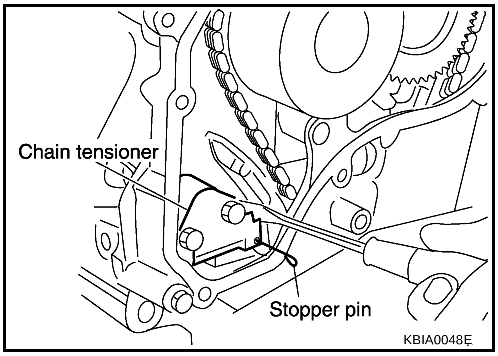
b. Push in chain tensioner plunger. Insert a stopper pin into hole on chain tensioner body to secure chain tensioner plunger and remove chain tensioner.

CAUTION:

Be careful not to drop mounting bolts inside front cover.

NOTE:

Use approximately 0.5 mm (0.02 in) dia. hard metal pin as a stopper pin.



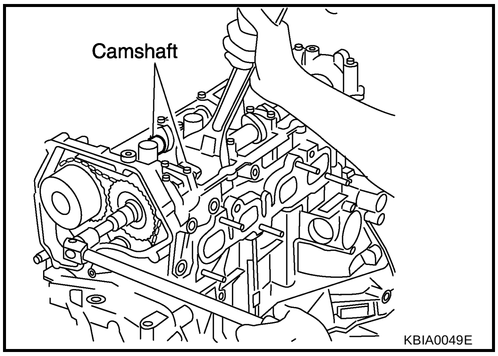
c. Secure hexagonal part of camshaft with a wrench. Loosen camshaft sprocket mounting bolts and remove camshaft sprockets.

CAUTION:

- **Do not loosen the mounting bolts with securing anything other than the camshaft hexagonal part or with tensioning timing chain.**
- **Do not rotate crankshaft or camshaft while timing chain is removed. It causes interference between valve and piston.**

NOTE:

Chain tension holding work is not necessary. Crankshaft sprocket and timing chain do not disconnect structurally while front cover is attached.

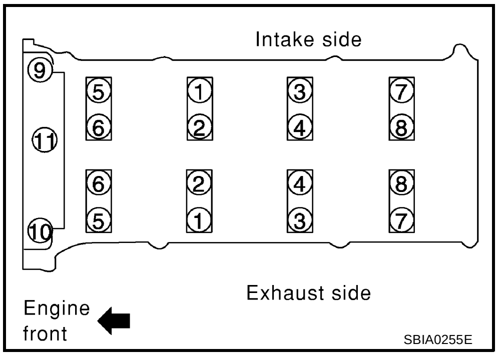


8. Remove camshaft position sensor (PHASE) from cylinder head back side.

CAUTION:

- **Handle carefully to avoid dropping and shocks.**
- **Do not disassemble.**
- **Do not allow metal powder to adhere to magnetic part at sensor tip.**
- **Do not place the sensor in a location where it is exposed to magnetism.**

9. Loosen mounting bolts in reverse order as shown in the figure, and remove camshaft brackets.
   - Remove camshaft bracket (No. 1) by slightly tapping it with a plastic hammer.



10. Remove camshafts.
11. Remove valve lifters.
    - Identify installation positions, and store them without mixing them up.

INSPECTION AFTER REMOVAL

Camshaft Runout

1. Put V-block on a precise flat table, and support No. 2 and 5 journals of camshaft.

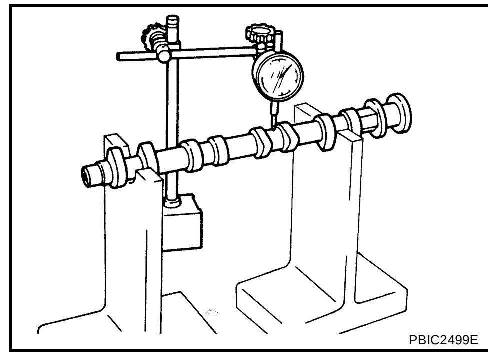
   CAUTION:

   Do not support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.

2. Set a dial indicator vertically to No. 3 journal.
3. Turn camshaft to one direction with hands, and measure the camshaft runout on the dial indicator. (Total indicator reading)

   Standard: Less than 0.02 mm (0.0008 in).

4. If out of the standard, replace camshaft.



Camshaft Cam Height

1. Measure the camshaft cam height with a micrometer.

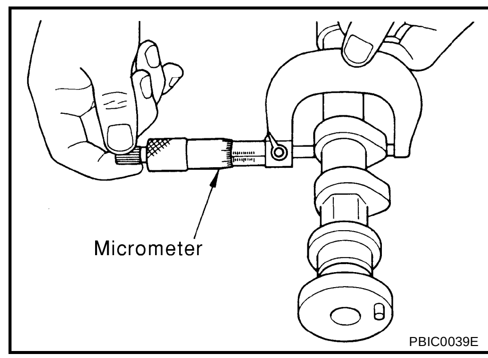
   Standard:

   Intake : 45.665 - 45.855 mm (1.7978 - 1.8053 in)

   Exhaust : 43.975 - 44.165 mm (1.7313 - 1.7388 in)

   Cam wear limit : 0.2 mm (0.008 in)

2. If wear is beyond the limit, replace camshaft.



Camshaft Journal Oil Clearance

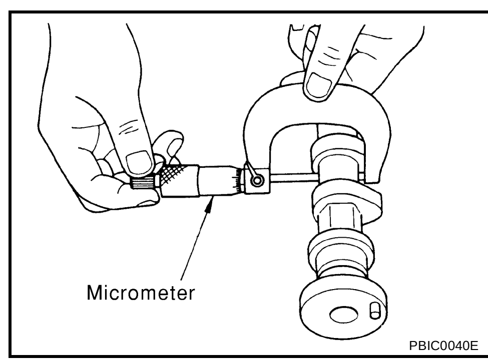
CAMSHAFT JOURNAL DIAMETER

Measure the outer diameter of camshaft journal with a micrometer.

Standard:

No. 1 : 27.935 - 27.955 mm (1.0998 - 1.1006 in)

No. 2, 3, 4, 5 : 23.435 - 23.455 mm (0.9226 - 0.9234 in)



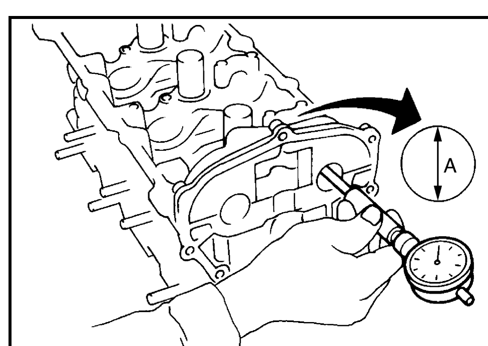
CAMSHAFT BRACKET INNER DIAMETER

- Tighten camshaft bracket bolts with the specified torque. Refer to EM-42, "INSTALLATION" for the tightening procedure.
- Measure inner diameter “A” of camshaft bracket with a bore gauge.

  Standard:

  No. 1 : 28.000 - 28.021 mm (1.1024 - 1.1032 in)

  No. 2, 3, 4, 5 : 23.500 - 23.521 mm (0.9252 - 0.9260 in)



CAMSHAFT JOURNAL OIL CLEARANCE

- (Oil clearance) = (Camshaft bracket inner diameter) – (Camshaft journal diameter)

  Standard : 0.045 - 0.086 mm (0.0018 - 0.0034 in)

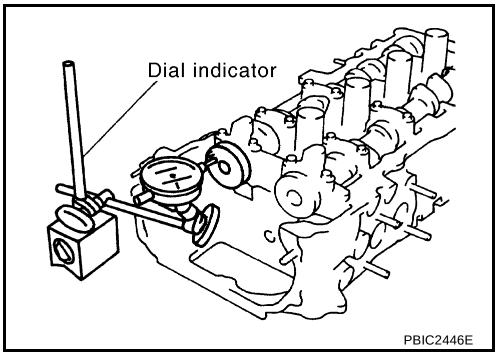
- If out of the standard, replace either or both camshaft and cylinder head.

  NOTE:
  Camshaft brackets cannot be replaced as single parts, because they are machined together with cylinder head. Replace whole cylinder head assembly.

Camshaft End Play

1. Install camshaft in cylinder head. Refer to EM-42, "INSTALLATION" for tightening procedure.
2. Install a dial indicator in thrust direction on front end of camshaft. Measure the camshaft end play on the dial indicator when camshaft is moved forward/backward (in direction to axis).

   Standard : 0.115 - 0.188 mm (0.0045 - 0.0074 in)



PBIC2446E

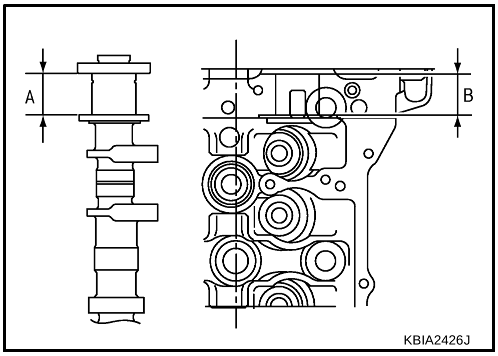
- Measure the following parts if out of the standard.
  - Dimension “A” for camshaft No. 1 journal

    Standard : 25.800 - 25.848 mm (1.0157 - 1.0176 in)

  - Dimension “B” for cylinder head No. 1 journal bearing

    Standard : 25.660 - 25.685 mm (1.0102 - 1.0112 in)

- Refer to the standards above, and then replace camshaft and/or cylinder head.



KBIA2426J

Camshaft Sprocket Runout

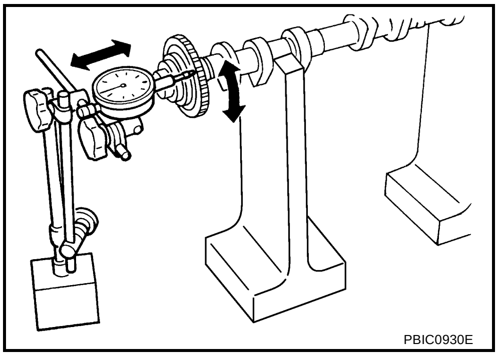
1. Put V-block on precise flat table, and support No. 2 and 5 journals of camshaft.

   CAUTION:
   Do not support No. 1 journal (on the side of camshaft sprocket) because it has a different diameter from the other four locations.

2. Measure the camshaft sprocket runout with a dial indicator. (Total indicator reading)

   Limit : 0.15 mm (0.0059 in)

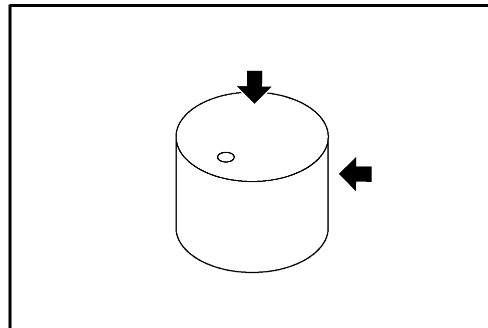
- If it exceeds the limit, replace camshaft sprocket.


PBIC0930E

Valve Lifter

Check if surface of valve lifter has any wear or cracks.

- If anything above is found, replace valve lifter. Refer to EM-46, "Valve Clearance" .



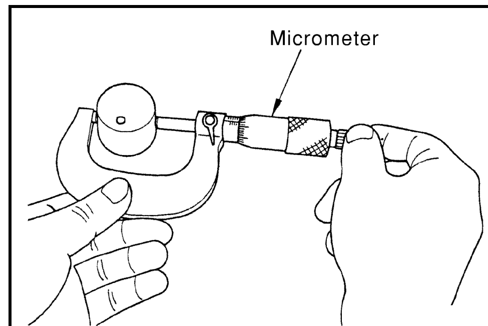
KBIA0182E

Valve Lifter Clearance

VALVE LIFTER OUTER DIAMETER

- Measure the outer diameter of valve lifter with a micrometer.

Standard : 33.965 - 33.980 mm (1.3372 - 1.3378 in)

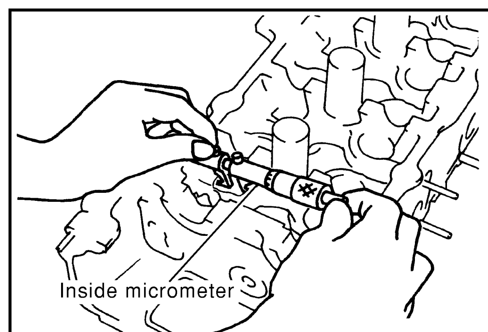


JEM798G

VALVE LIFTER HOLE DIAMETER

Measure the diameter of valve lifter hole of cylinder head with an inside micrometer.

Standard : 34.000 - 34.021 mm (1.3386 - 1.3394 in)



PBIC0043E

VALVE LIFTER CLEARANCE

- (Valve lifter clearance) = (Valve lifter hole diameter) – (Valve lifter outer diameter)

Standard : 0.020 - 0.056 mm (0.0008 - 0.0022 in)

- If out of the standard, referring to the each standard of valve lifter outer diameter and valve lifter hole diameter, replace either or both valve lifter and cylinder head.

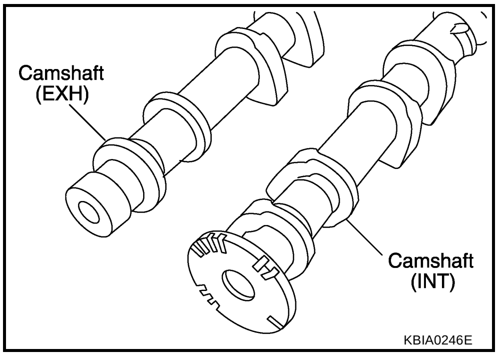
INSTALLATION

1. Install valve lifters.
   - Install them in the original positions.

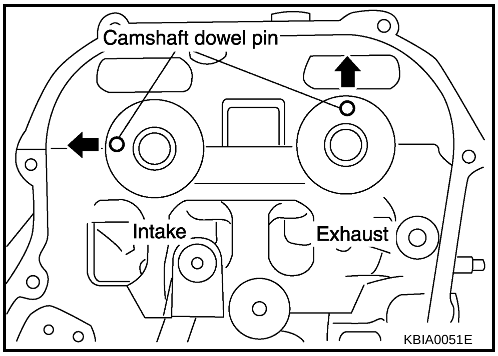
2. Install camshafts.
   - Distinction between intake and exhaust camshafts is performed with the different shapes of rear end.

     Intake : Signal plate shape for camshaft position sensor (PHASE)

     Exhaust : Cone end shape



   - Install camshafts so that camshaft dowel pins on the front side are positioned as shown in the figure.

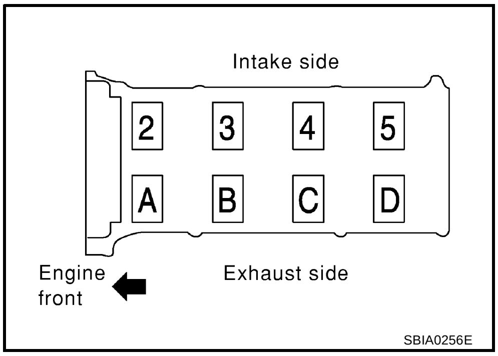


3. Install camshaft brackets with the following procedure:

a. Remove foreign material completely from camshaft bracket backside and from cylinder head installation face.

b. Install camshaft brackets (No. 2 to 5) aligning the identification marks on upper surface as shown in the figure.

   NOTE:
   Install so that identification mark can be correctly read when viewed from the exhaust side.

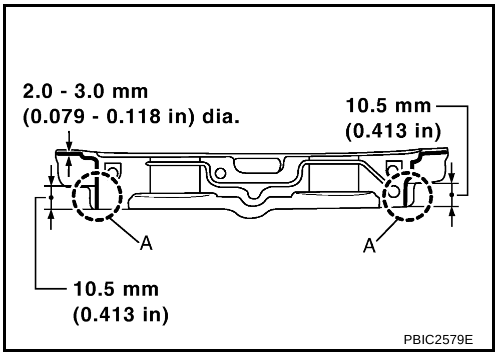


c. Install camshaft bracket (No. 1) with the following procedure:

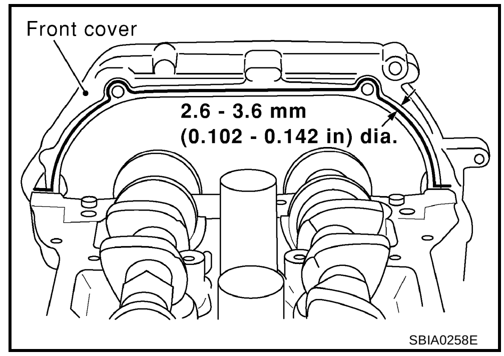
i. Apply liquid gasket to camshaft bracket (No. 1) as shown in the figure.

   Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .

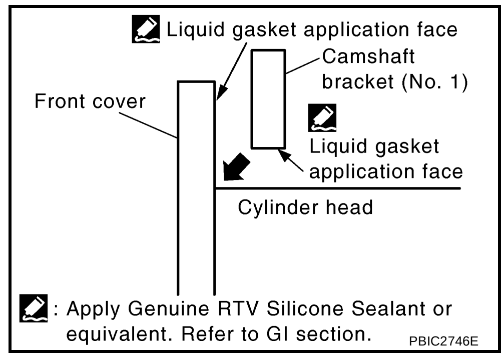
   CAUTION:
   After installation, be sure to wipe off any excessive liquid gasket leaking from part "A".



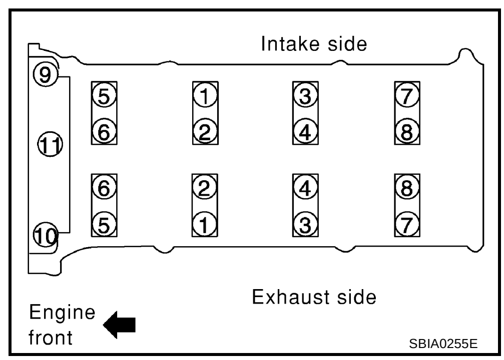
ii. Apply liquid gasket to camshaft bracket (No. 1) contact surface on the front cover backside.
Use Genuine RTV Silicone Sealant or equivalent. Refer to **GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"** **.**
- Apply liquid gasket to the outside of bolt hole on front cover.



iii. Locate camshaft bracket (No. 1) near installation position, and install it without disturbing the liquid gasket applied to the surfaces.



4. Tighten mounting bolts of camshaft brackets in the following steps, in numerical order as shown in the figure.



a. Tighten No. 9 to 11 in numerical order.

: 2.0 N·m (0.2 kg-m, 1 ft-lb)

b. Tighten No. 1 to 8 in numerical order.

: 2.0 N·m (0.2 kg-m, 1 ft-lb)

c. Tighten all bolts in numerical order.

: 5.9 N·m (0.6 kg-m, 4 ft-lb)

d. Tighten all bolts in numerical order.

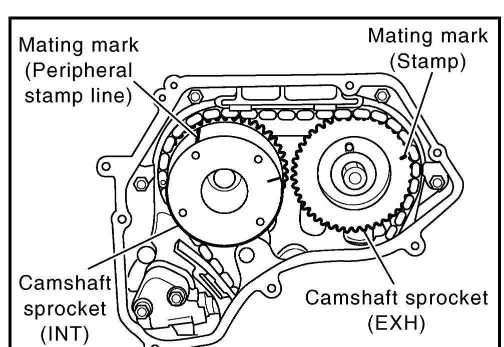
: 10.4 N·m (1.1 kg-m, 8 ft-lb)

CAUTION:
After tightening mounting bolts of camshaft brackets, be sure to wipe off excessive liquid gasket from the parts listed below.
- Mating surface of rocker cover
- Mating surface of front cover (When installed without front cover)

5. Install camshaft position sensor (PHASE).
6. Install camshaft sprockets.
   - Install them by aligning the mating marks on each camshaft sprocket with the paint marks on the timing chain link plates during removal.

   CAUTION:
   - **Aligned mating marks could slip. Therefore, after matching them, hold the timing chain in place by hand.**
   - **Before and after installing chain tensioner, make sure again that mating marks have not slipped.**

   NOTE:
   Before installation of chain tensioner, it is possible to re-match the marks on timing chain with the ones on each sprocket.



7. Install chain tensioner.

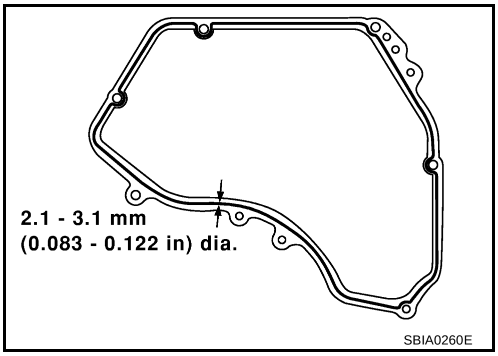
CAUTION:
After installation, pull the stopper pin off completely, and make sure that chain tensioner plunger is released.

8. Install chain guide.
9. Install intake valve timing control cover with the following procedure:

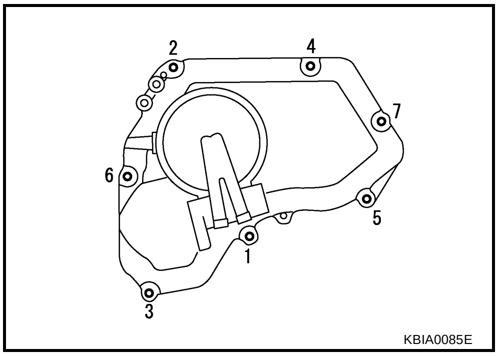
a. Install oil rings to the camshaft sprocket (INT) insertion points on backside of intake valve timing control cover.

b. Install O-ring to front cover.

c. Apply liquid gasket with the tube presser [SST: WS39930000 (—)] to intake valve timing control cover as shown in the figure.
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .



d. Tighten mounting bolts in numerical order as shown in the figure.



e. Install intake valve timing control solenoid valve to intake valve timing control cover if removed.

f. Connect ground cables, and install harness clip.

10. Check and adjust valve clearance. Refer to EM-46, "Valve Clearance" .
11. Install in the reverse order of removal after this step.

NOTE:
If hydraulic pressure inside timing chain tensioner drops after removal/installation, slack in the guide may generate a pounding noise during and just after the engine start. However, this is normal. Noise will stop after hydraulic pressure rises.

INSPECTION AFTER INSTALLATION

Inspection of Camshaft Sprocket (INT) Oil Groove

CAUTION:

- **Perform this inspection only when DTC P0011 is detected in self-diagnostic results of CONSULT-II and it is directed according to inspection procedure of EC section. Refer to EC-127, "SELF-DIAG RESULTS MODE" .**
- **Check when the engine is cold so as to prevent burns from any splashing engine oil.**

1. Check the engine oil level. Refer to LU-6, "ENGINE OIL" .
2. Perform the following procedure so as to prevent the engine from being unintentionally started while checking.

a. Release fuel pressure. Refer to EC-90, "FUEL PRESSURE RELEASE" .

b. Disconnect ignition coil and injector harness connectors.

3. Remove intake valve timing control solenoid valve. Refer to EM-37, "CAMSHAFT" .

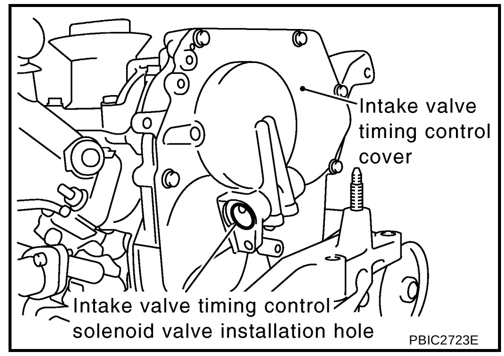
4. Crank the engine, and then make sure that engine oil comes out from intake valve timing control cover oil hole. End crank after checking.

   WARNING:

   Be careful not to touch rotating parts (drive belt, idler pulley, and crankshaft pulley, etc.).

   CAUTION:

   Engine oil may squirt from intake valve timing control solenoid valve installation hole during cranking. Use a shop cloth to prevent the engine components and the vehicle. Do not allow engine oil to get on rubber components such as drive belt or engine mount insulators. Immediately wipe off any splashed engine oil.



- Clean oil groove between oil strainer and intake valve timing control solenoid valve if engine oil does not come out from intake valve timing control cover oil hole. Refer to LU-4, "LUBRICATION SYSTEM" .

5. Remove components between intake valve timing control solenoid valve and camshaft sprocket (INT), and then check each oil groove for clogging.
   - Clean oil groove if necessary. Refer to LU-4, "LUBRICATION SYSTEM" .
6. After inspection, install removed parts.

Valve Clearance

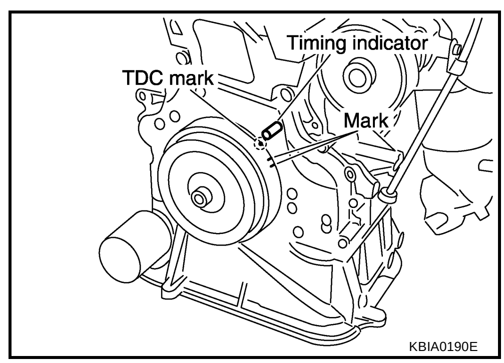
ABS00CJD

INSPECTION

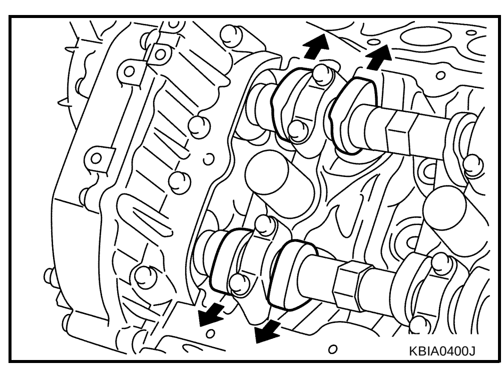
Perform inspection as follows after removal, installation or replacement of camshaft or valve-related parts, or if there is unusual engine conditions regarding valve clearance.

1. Remove rocker cover. Refer to EM-35, "ROCKER COVER" .
2. Open splash guard on RH undercover.
3. Measure the valve clearance with the following procedure:

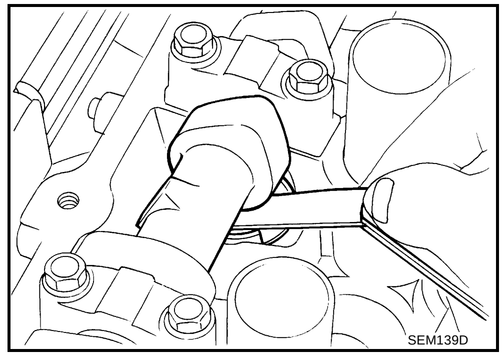
a. Set No. 1 cylinder at TDC of its compression stroke.
   - Rotate crankshaft pulley clockwise and align TDC mark to timing indicator on front cover.



   - At the same time, make sure that both intake and exhaust cam noses of No. 1 cylinder face outside as shown in the figure.
   - If they do not face outside, rotate crankshaft pulley once more (360 degrees) and align as shown in the figure.



b. Use a feeler gauge, measure the clearance between valve lifter and camshaft.


SEM139D

Valve clearance:

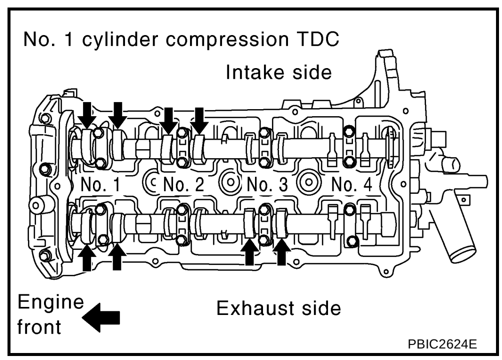
Unit: mm (in)

	Cold	Hot * (reference data)
Intake	0.24 - 0.32 (0.009 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.26 - 0.34 (0.010 - 0.013)	0.308 - 0.432 (0.012 - 0.017)

*:Approximately 80°C (176°F)

- By referring to the figure, measure the valve clearances at locations marked “×” as shown in the table below (locations indicated with black arrow in the figure) with a feeler gauge.
- No. 1 cylinder compression TDC

Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 1 cylinder at compression TDC	INT	×	×		
	EXH	×		×	



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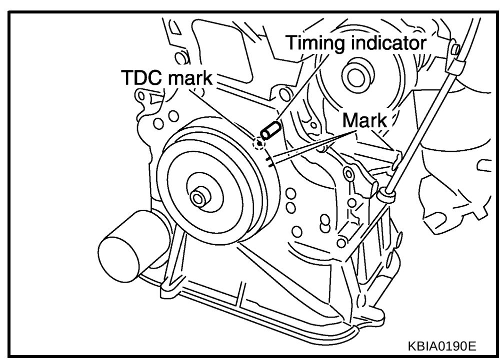
c. Rotate crankshaft pulley one revolution (360 degrees) and align TDC mark to timing indicator on front cover.



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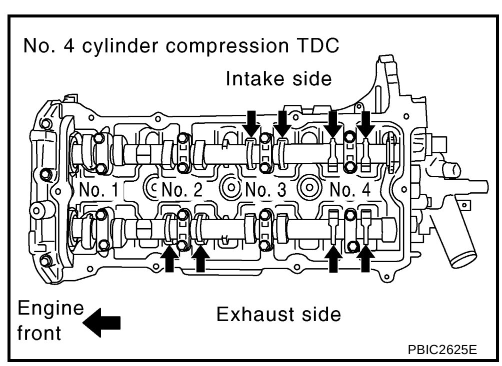
- By referring to the figure, measure the valve clearance at locations marked “×” as shown in the table below (locations indicated with black arrow in the figure) with a feeler gauge.
- No. 4 cylinder compression TDC

Measuring position		No. 1 CYL.	No. 2 CYL.	No. 3 CYL.	No. 4 CYL.
No. 4 cylinder at compression TDC	INT			×	×
	EXH		×		×



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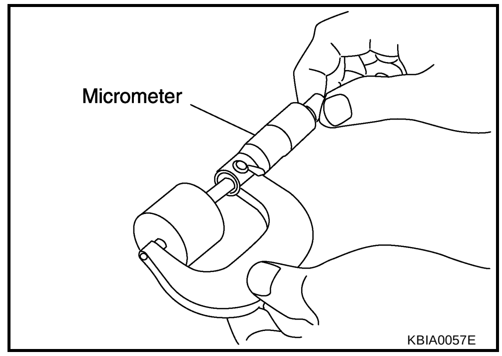
4. If out of standard, perform adjustment. Refer to EM-47, "ADJUSTMENT" .

ADJUSTMENT

- Perform adjustment depending on selected head thickness of valve lifter.

1. Remove camshaft. Refer to EM-37, "REMOVAL" .
2. Remove valve lifters at the locations that are out of the standard.
3. Measure the center thickness of the removed valve lifters with a micrometer.



4. Use the equation below to calculate valve lifter thickness for replacement.

Valve lifter thickness calculation: $t = t_1 + (C_1 - C_2)$

t = Valve lifter thickness to be replaced

t_1 = Removed valve lifter thickness

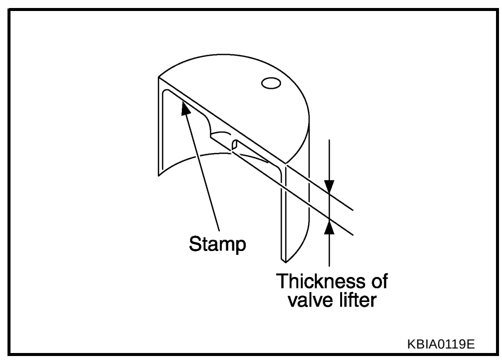
C_1 = Measured valve clearance

C_2 = Standard valve clearance:

Intake : 0.28 mm (0.011 in)

Exhaust : 0.30 mm (0.012 in)

- Thickness of new valve lifter can be identified by stamp mark on the reverse side (inside the cylinder).
  Stamp mark “696” indicates 6.96 mm (0.2740 in) in thickness.



NOTE:
Available thickness of valve lifter: 26 sizes range 6.96 to 7.46 mm (0.2740 to 0.2937 in) in steps of 0.02 mm (0.0008 in) (when manufactured at factory). Refer to EM-111, "Available Valve Lifter" .

5. Install the selected valve lifter.
6. Install camshaft. Refer to EM-42, "INSTALLATION" .
7. Manually rotate crankshaft pulley a few rotations.
8. Make sure that valve clearances for cold engine are within specifications by referring to the specified values. Refer to EM-46, "INSPECTION" .
9. Install all removed parts in the reverse order of removal. Refer to EM-42, "INSTALLATION" .
10. Warm up the engine, and check for unusual noise and vibration.

TIMING CHAIN

PFP:13028

Removal and Installation

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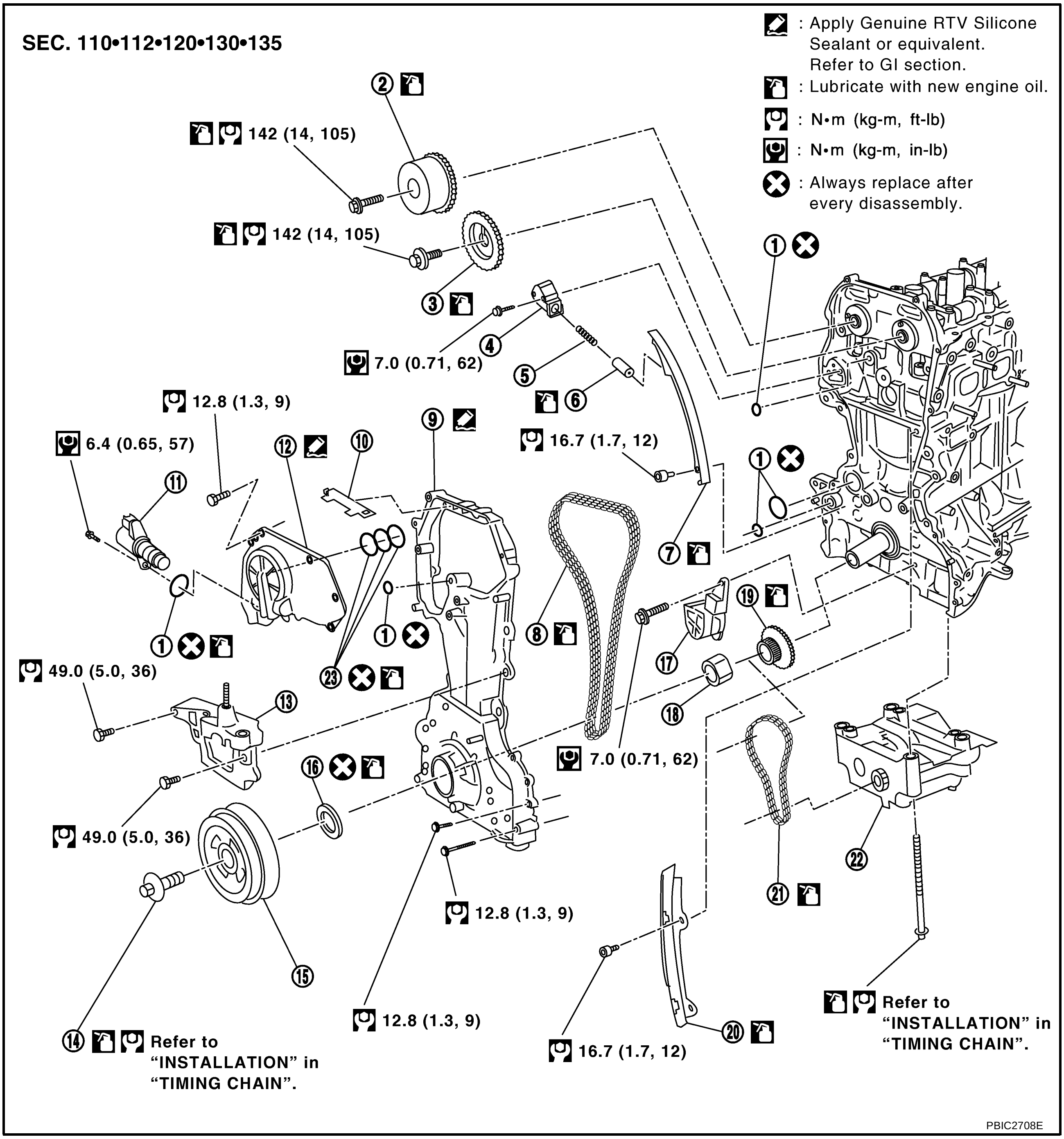


1.	O-ring	2.	Camshaft sprocket (INT)	3.	Camshaft sprocket (EXH)
4.	Chain tensioner	5.	Spring	6.	Chain tensioner plunger
7.	Timing chain slack guide	8.	Timing chain	9.	Front cover
10.	Chain guide	11.	Intake valve timing control solenoid valve	12.	Intake valve timing control cover
13.	RH engine mounting bracket	14.	Crankshaft pulley bolt	15.	Crankshaft pulley
16.	Front oil seal	17.	Balancer unit timing chain tensioner	18.	Oil pump drive spacer
19.	Crankshaft sprocket	20.	Timing chain tension guide	21.	Balancer unit timing chain
22.	Balancer unit	23.	Oil ring		

REMOVAL

1. Remove the following parts.

- Hood assembly; Refer to BL-12, "HOOD" .
- RH and LH undercovers
- Engine cover; Refer to EM-16, "INTAKE MANIFOLD" .
- PCV hose; Refer to EM-16, "INTAKE MANIFOLD" .
- Ignition coil; Refer to EM-27, "IGNITION COIL" .
- Rocker cover; Refer to EM-35, "ROCKER COVER" .
- Engine coolant reservoir tank; Refer to CO-11, "RADIATOR" .
- Drive belt; Refer to EM-11, "DRIVE BELTS" .
- Alternator; Refer to SC-20, "CHARGING SYSTEM" .
- Drive belt auto-tensioner; Refer to EM-12, "Removal and Installation of Drive Belt Auto-Tensioner" .
- Exhaust front tube; Refer to EX-2, "EXHAUST SYSTEM" .

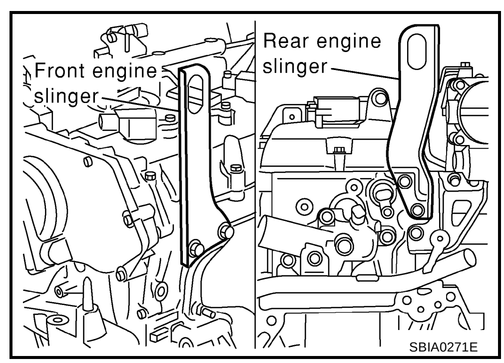
2. Drain engine oil. Refer to LU-7, "Changing Engine Oil" .

   CAUTION:

   Perform this step when the engine is cold.
3. Remove A/C compressor with piping connected. Temporarily secure A/C compressor to the vehicle side with a rope to avoid putting a load on them. Refer to ATC-122, "Removal and Installation of Compressor" (Automatic A/C models) or MTC-82, "Removal and Installation of Compressor" (Manual A/C models).
4. Remove bracket mounting bolts for fixing A/C piping near right strut housing and exhaust manifold cover. Doing so simplifies moving.
5. Remove power steering oil pump with piping connected, and secure it to the vehicle side temporarily. Refer to PS-33, "HYDRAULIC LINE" .
6. Remove power steering reservoir tank from bracket to move power steering piping. Refer to PS-33, "HYDRAULIC LINE" .

   CAUTION:

   To avoid power steering fluid leakage, temporarily fix power steering reservoir tank vertically.
7. Install engine slingers into front-left of cylinder head and rear-right of cylinder head.
   - Use alternator bracket mounting bolt holes for the front side.



Slinger bolts:

Front

: 57.9 N·m (5.9 kg-m, 43 ft-lb)

Rear

: 28.0 N·m (2.9 kg-m, 21 ft-lb)

8. Lift with a hoist, and support the engine posture.
9. Remove engine mounting related parts below with power tool. Refer to EM-74, "Removal and Installation (2WD Models)" (2WD models) or EM-78, "Removal and Installation (AWD Models)" (AWD models).
   - RH engine mounting insulator
   - Center member
   - Rear engine mounting bracket (2WD models)
10. Remove oil pan (upper and lower) with power tool, and oil strainer. Refer to EM-22, "OIL PAN AND OIL STRAINER" .
11. Remove intake valve timing control cover with the following procedure:

a. Disconnect intake valve timing control solenoid valve harness connector.

b. Disconnect ground cables and remove harness clip.

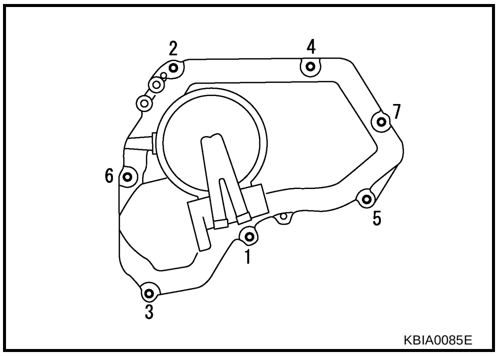
c. Remove intake valve timing control solenoid valve, if necessary.

d. Loosen bolts in reverse order as shown in the figure.

e. Use the seal cutter [SST: KV10111100 (J37228)] or suitable tool to cut liquid gasket for removal.

CAUTION:

Be careful not to damage the mating surfaces.



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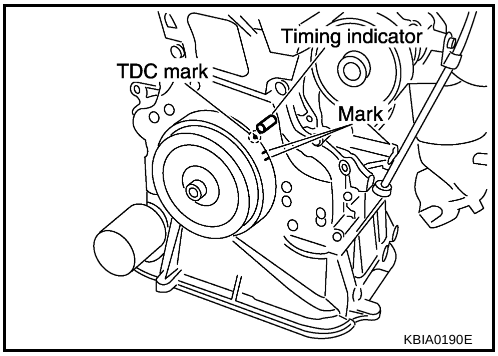
12. Pull chain guide between camshaft sprockets out through front cover.
13. Set No. 1 cylinder at TDC on its compression stroke with the following procedure:

a. Rotate crankshaft pulley clockwise and align TDC mark to timing indicator on front cover.



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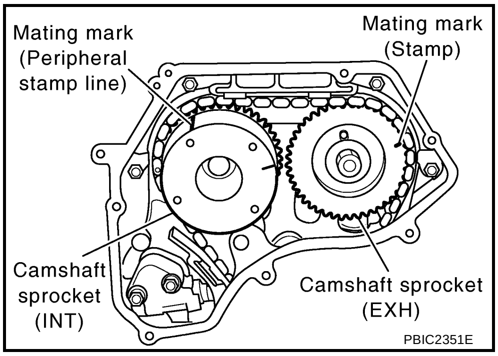
b. At the same time, make sure that the mating marks on camshaft sprockets are located as shown in the figure.
   - If not, rotate crankshaft pulley once more (360 degrees) to align mating marks to the positions in the figure.



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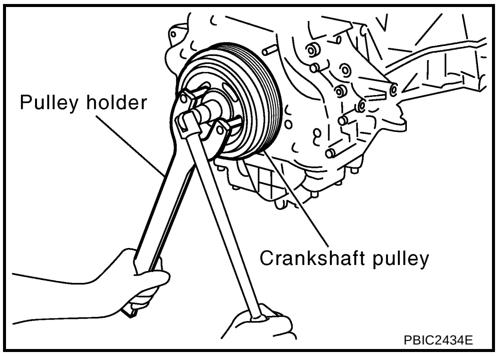
14. Remove crankshaft pulley with the following procedure:

a. Fix crankshaft pulley with a pulley holder (commercial service tool), loosen crankshaft pulley bolt, and locate bolt seating surface at 10 mm (0.39 in) from its original position.



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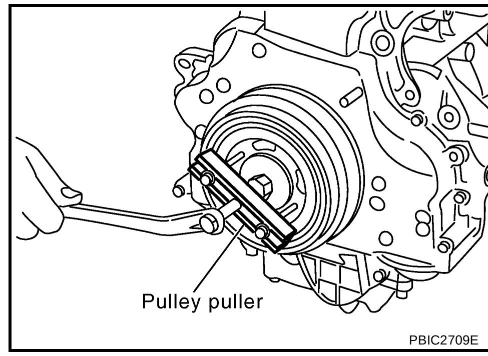
b. Attach a pulley puller (commercial service tool) in the M 6 thread hole on crankshaft pulley, and remove crankshaft pulley.



15. Remove front cover and RH engine mounting bracket with the following procedure:

a. Loosen mounting bolts in reverse order as shown in the figure, and remove RH engine mounting bracket.

b. Use the seal cutter [SST: KV10111100 (J37228)] or suitable tool to cut liquid gasket for removing front cover.

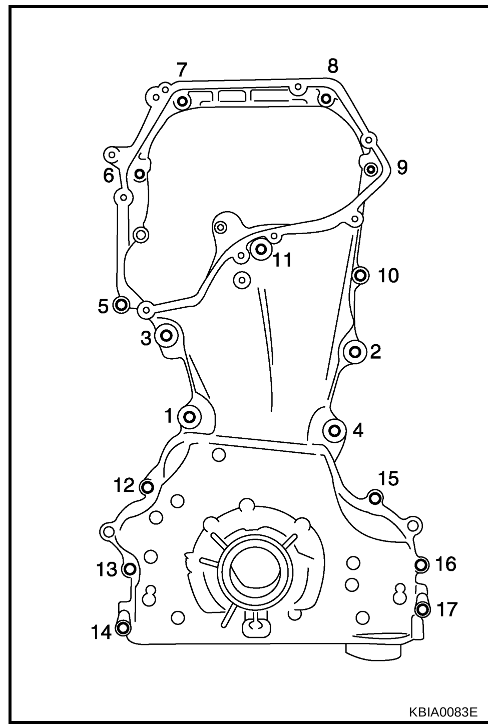
CAUTION:

Be careful not to damage the mating surfaces.

c. Pull out downward front cover.

CAUTION:

Do not let A/C and power steering pipings interfere with upper part of front cover.



16. Remove front oil seal from front cover using suitable tool.

CAUTION:

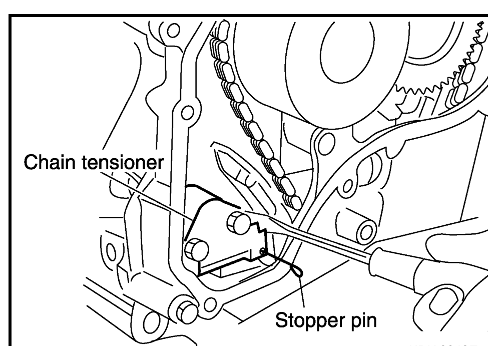
Be careful not to damage front cover.

17. Remove timing chain with the following procedure:

a. Push in chain tensioner plunger. Insert a stopper pin into hole on chain tensioner body to secure chain tensioner plunger and remove chain tensioner.

NOTE:

Use approximately 0.5 mm (0.02 in) dia. hard metal pin as a stopper pin.



b. Remove timing chain.

CAUTION:

Do not rotate crankshaft or camshaft while timing chain is removed. It causes interference between valve and piston.

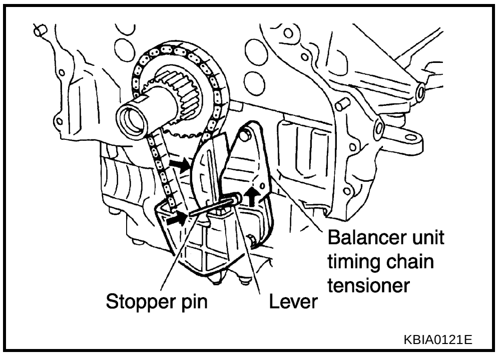
18. Remove camshaft sprockets. Refer to EM-37, "CAMSHAFT" .

19. Remove timing chain slack guide, timing chain tension guide and oil pump drive spacer.
20. Remove balancer unit timing chain tensioner with the following procedure:

a. Lift lever up, and release ratchet claw for return proof.
b. Push tensioner sleeve in, and hold it.
c. Matching the hole on lever with the one on body, insert a stopper pin to secure tensioner sleeve.

NOTE:
Use approximately 1 mm (0.04 in) dia. hard metal pin as a stopper pin.

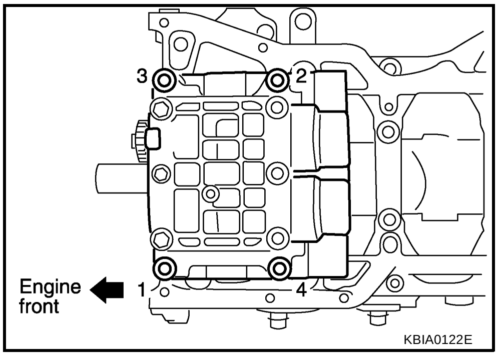
d. Remove balancer unit timing chain tensioner.



21. Remove balancer unit timing chain and crankshaft sprocket.
22. Loosen mounting bolts in reverse order as shown in the figure, and remove balancer unit.

CAUTION:
Do not disassemble balancer unit.

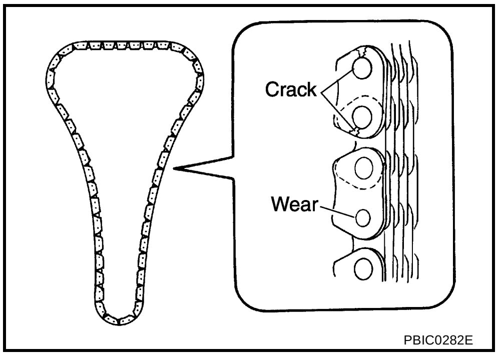
NOTE:
Use TORX socket (size E14).



INSPECTION AFTER REMOVAL

Timing Chain

Check timing chain for cracks and any excessive wear at the roller links of timing chain. Replace timing chain if necessary.

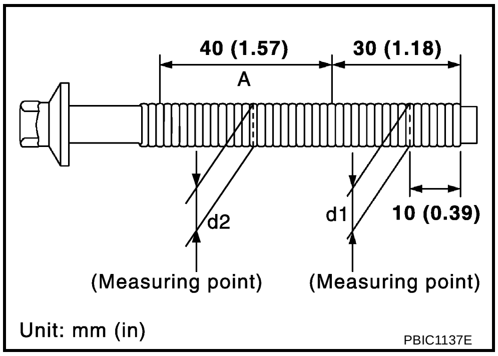


Balancer Unit Mounting Bolt Outer Diameter

- Measure outer diameters (“d1”, “d2”) at two positions as shown in the figure.
- If reduction appears in “A” range, regard it as “d2”.

Limit (“d1” – “d2”) : 0.15 mm (0.0059 in)

- If it exceeds the limit (large difference in dimensions), replace balancer unit mounting bolt with a new one.

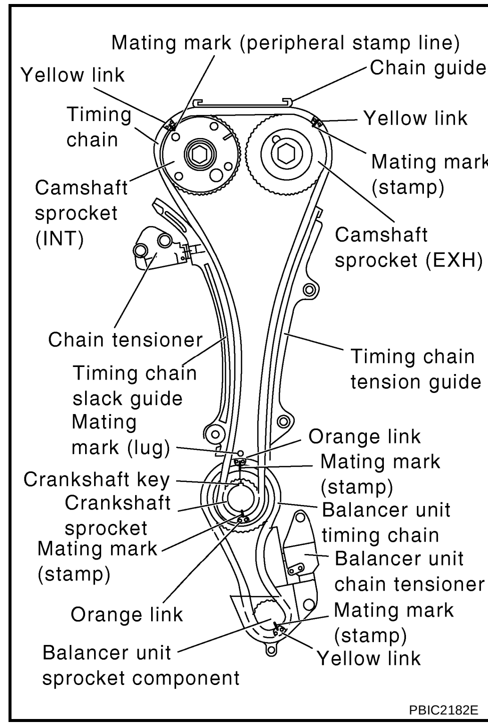


INSTALLATION

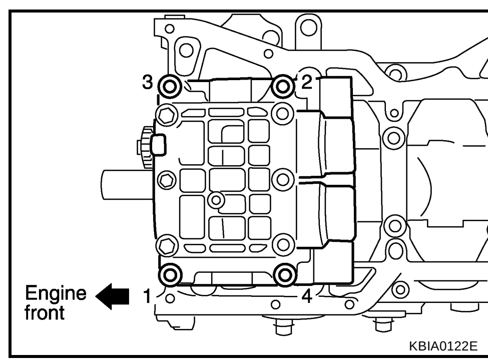
NOTE:

The figure shows the relationship between the mating mark on each timing chain and that on the corresponding sprocket, with the components installed.

1. Make sure that crankshaft key points straight up.



2. Tighten mounting bolts in numerical order as shown in the figure with the following procedure to install balancer unit.



CAUTION:

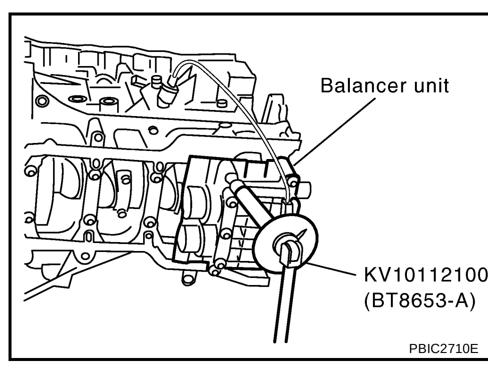
If mounting bolts are re-used, check their outer diameter before installation. Refer to **EM-53, "Balancer Unit Mounting Bolt Outer Diameter"** **.**

a. Apply new engine oil to threads and seat surfaces of mounting bolts.

b. Tighten all bolts.

: 48.1 N·m (4.9 kg-m, 35 ft-lb)

c. Turn all bolts 90 degrees clockwise (angle tightening).



CAUTION:

Check tightening angle with the angle wrench [SST] or a protractor. Do not make judgment by visual check alone.

d. Completely loosen.

: 0 N·m (0 kg-m, 0 ft-lb)

CAUTION:

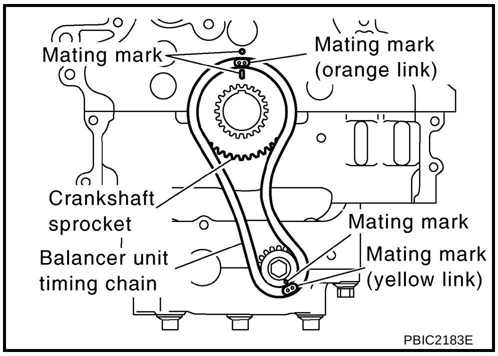
In this step, loosen bolts in reverse order as shown in the figure.

e. Tighten all bolts.

: 48.1 N·m (4.9 kg-m, 35 ft-lb)

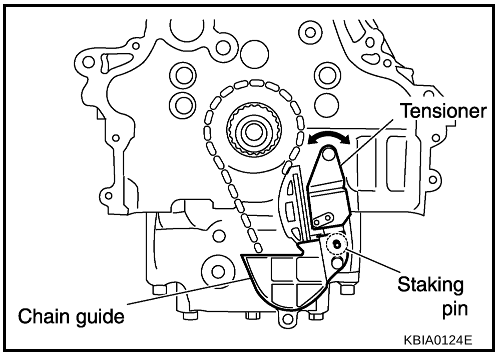
f. Turn them another 90 degrees clockwise (angle tightening).

3. Install crankshaft sprocket and balancer unit timing chain.
   - Make sure that crankshaft sprocket is positioned with mating marks on cylinder block and crankshaft sprocket meeting at the top.
   - Install it by aligning mating marks on each sprocket and balancer unit timing chain.



4. Install balancer unit timing chain tensioner.

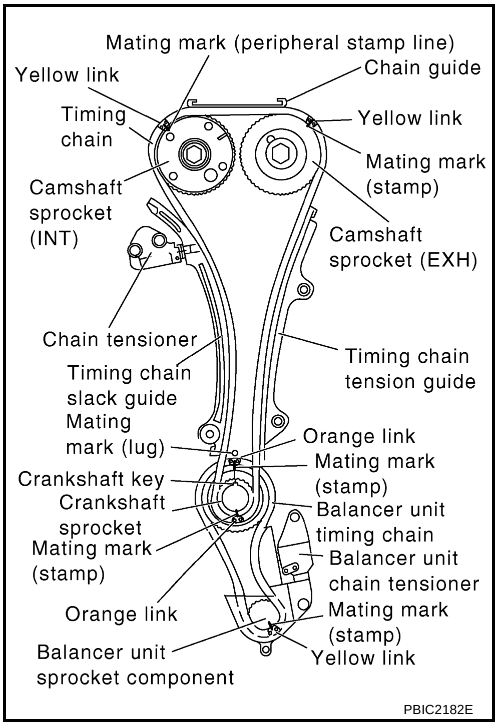
   NOTE:
   Chain guide and tensioner move freely with staking pin as the axle. Therefore, bolt hole position of the three points could be changed during removal. If points change, temporarily fix the two mounting bolts on chain guide, and move tensioner to mate the bolt holes.
   - Be careful not to let mating marks of each sprocket and timing chain slip.
   - After installation, make sure the mating marks have not slipped, then remove stopper pin and release tensioner sleeve.



5. Install timing chain and related parts.
   - Install by aligning mating marks on each sprocket and timing chain.
   - Before and after installing chain tensioner, check again to make sure that mating marks have not slipped.
   - After installing chain tensioner, remove stopper pin, and make sure that tensioner moves freely.

   CAUTION:
   - **For the following note, after the mating marks are aligned, keep them aligned by holding them with a hand.**
   - **To avoid skipped teeth, do not rotate crankshaft and camshaft until front cover is installed.**

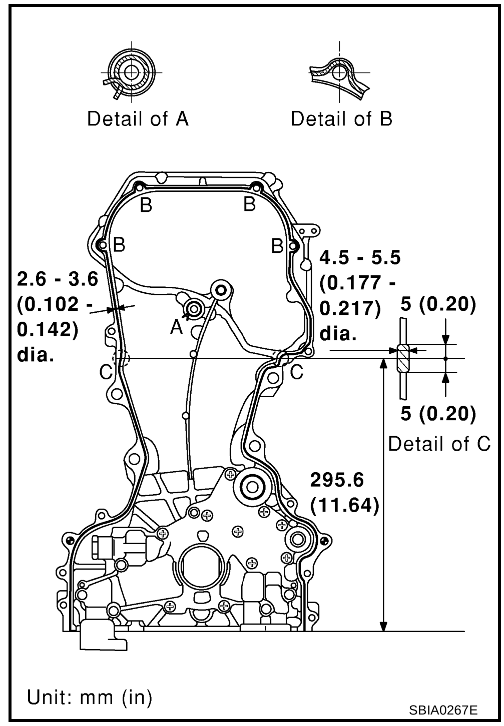
   NOTE:
   Before installing chain tensioner, it is possible to change the position of mating mark on timing chain for that on each sprocket for alignment.



6. Install front oil seal to front cover. Refer to EM-60, "Removal and Installation of Front Oil Seal" .
7. Install front cover and RH engine mounting bracket with the following procedure:
   a. Install O-rings to cylinder head and cylinder block.

b. Apply a continuous bead of liquid gasket with the tube presser [SST: WS39930000 (—)] to front cover as shown in the figure.
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" **.**
NOTE:
Application instruction differs depending on the position.

Detail of A	:	**Cross over the start of the application and the end.**
Detail of B	:	**Apply liquid gasket outside of bolt holes. (For all bolt holes other than B, apply to the inside.)**
Detail of C	:	**Between here only, apply 4.5 - 5.5 mm (0.177 - 0.217 in) dia.**



c. Make sure that mating marks of timing chain and each sprocket are still aligned. Then install front cover.
- When installing, align flat faces at oil pump drive spacer and oil pump inner rotor.

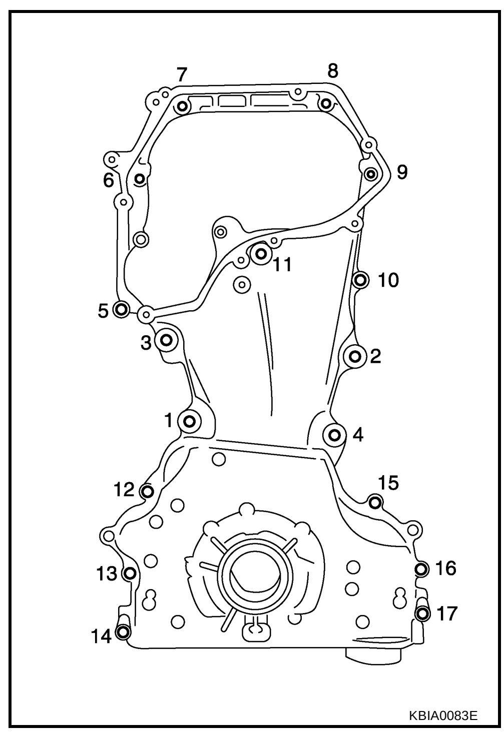
CAUTION:
- **Do not let A/C and power steering pipings interfere with upper part of front cover.**
- **Be careful not to damage front oil seal by interference with front end of crankshaft.**

d. Tighten mounting bolts in numerical order as shown in the figure.
- Refer to the following for locating M6 bolts.

Bolt length:		**Bolt position**
45 mm (1.77 in)	:	**5, 14, 17**
20 mm (0.79 in)	:	**Except the above (Except 1 to 4)**

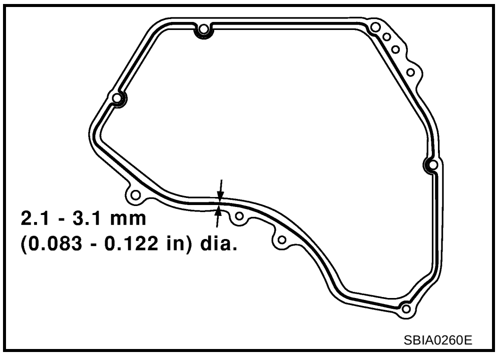
- At the same time, install RH engine mounting bracket. (Bolt positions 1 to 4 in the figure)

e. After all bolts are tightened, retighten them to the specified torque in numerical order as shown in the figure.
CAUTION:
Be sure to wipe off any excessive liquid gasket leaking to surface for fitting oil pan (upper).



8. Install chain guide between camshaft sprockets.
9. Install intake valve timing control cover with the following procedure:
a. Install oil rings to the camshaft sprocket (INT) insertion points on backside of intake valve timing control cover.
b. Install O-ring to front cover.

c. Apply a continuous bead of liquid gasket with the tube presser [SST: WS39930000 (—)] to intake valve timing control cover as shown in the figure.
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" **.**



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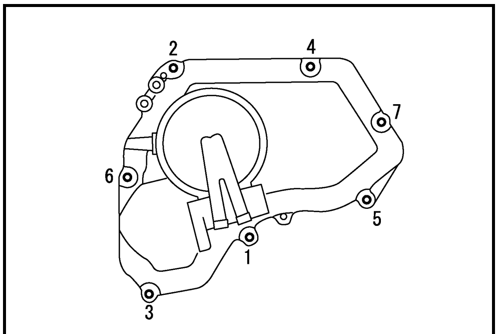
d. Tighten mounting bolts in numerical order as shown in the figure.



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e. Install intake valve timing control solenoid valve to intake valve timing control cover if removed.
f. Connect ground cables, and install harness clip.
10. Insert crankshaft pulley by aligning with crankshaft key.
- When inserting crankshaft pulley with a plastic hammer, tap on its center portion (not circumference).

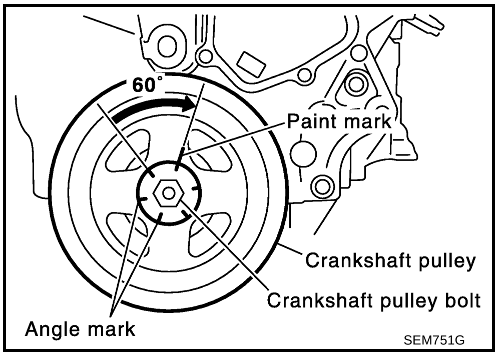
CAUTION:
Install protecting front oil seal lip section from any damage.

11. Tighten crankshaft pulley bolt with the following procedure.
- Secure crankshaft pulley with a pulley holder (commercial service tool), and tighten crankshaft pulley bolt.

a. Apply new engine oil to thread and seat surfaces of crankshaft pulley bolt.
b. Tighten crankshaft pulley bolt.

: 42.1 N·m (4.3 kg-m, 31 ft-lb)

c. Put a paint mark on crankshaft pulley, mating with any one of six easy to recognize angle marks on bolt flange.
d. Turn another 60 degrees clockwise (angle tightening).
- Check the tightening angle with movement of one angle mark.



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12. Install all removed parts in the reverse order of removal.

INSPECTION AFTER INSTALLATION

Inspection for Leaks

The following are procedures for checking fluids leak, lubricates leak and exhaust gases leak.

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .
- Use procedure below to check for fuel leakage.
  - Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
  - Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

  NOTE:
  If hydraulic pressure inside timing chain tensioner drops after removal/installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

OIL SEAL

PFP:12279

Removal and Installation of Valve Oil Seal

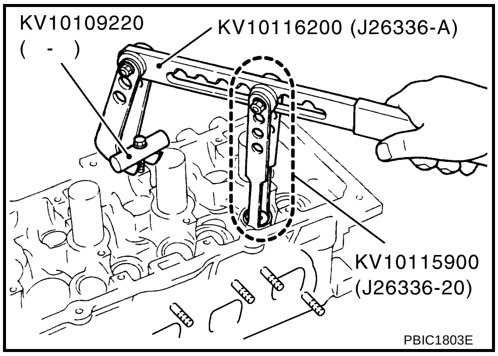
ABS00CJE

REMOVAL

1. Remove camshafts. Refer to EM-37, "CAMSHAFT" .
2. Remove valve lifters. Refer to EM-37, "CAMSHAFT" .
3. Rotate crankshaft, and set piston whose valve oil seal is to be removed to TDC. This will prevent valve from dropping into cylinder.

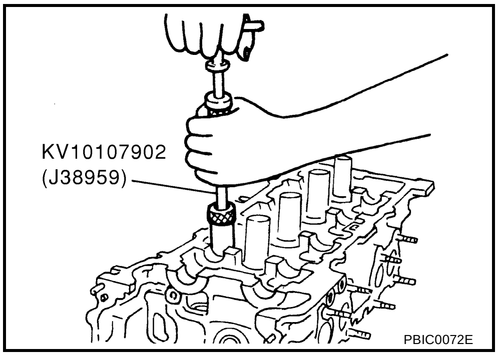
   CAUTION:
   When rotating crankshaft, be careful to avoid scarring front cover with timing chain.
4. Remove valve collet.
   - Compress valve spring with the valve spring compressor, the attachment and the adapter [SST]. Remove valve collet with a magnet hand.

   CAUTION:
   When working, be careful not to damage valve lifter holes.



5. Remove valve spring retainer and valve spring.

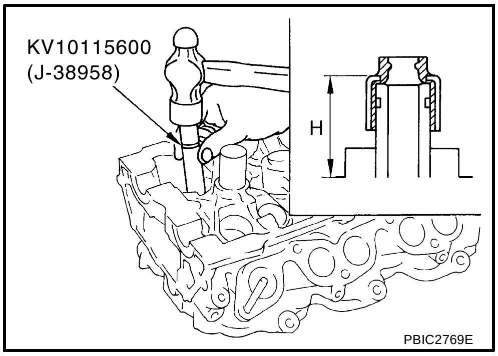
   CAUTION:
   Do not remove valve spring seat from valve spring.
6. Remove valve oil seal with the valve oil seal puller [SST].



INSTALLATION

1. Apply new engine oil to valve oil seal joint surface and seal lip.
2. Press in valve oil seal to the height “H” shown in the figure with the valve oil seal drift [SST].

   Height “H” : 11.8 - 12.4 mm (0.465 - 0.488 in)



3. Install in the reverse order of removal after this step.

Removal and Installation of Front Oil Seal

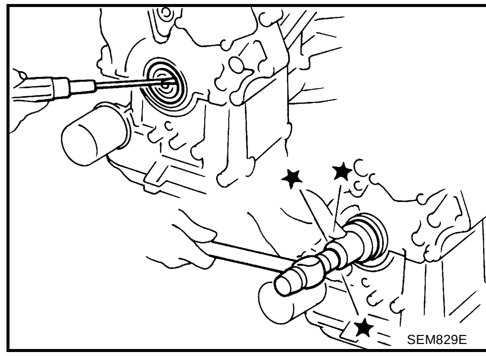
ABS00CJF

REMOVAL

1. Remove the following parts.
   - RH undercover
   - RH front road wheel and tire
   - Drive belt; Refer to EM-11, "DRIVE BELTS" .
   - Crankshaft pulley; Refer to EM-49, "TIMING CHAIN" .
2. Remove front oil seal with a suitable tool.

   CAUTION:

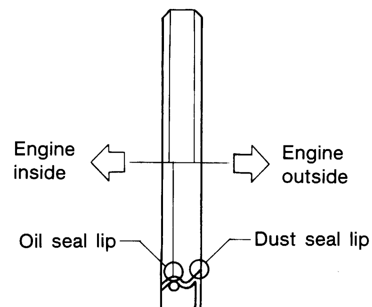
   Be careful not to damage front cover and crankshaft.



SEM829E

INSTALLATION

1. Apply new engine oil to new front oil seal joint surface and seal lip.
2. Install front oil seal so that each seal lip is oriented as shown in the figure.

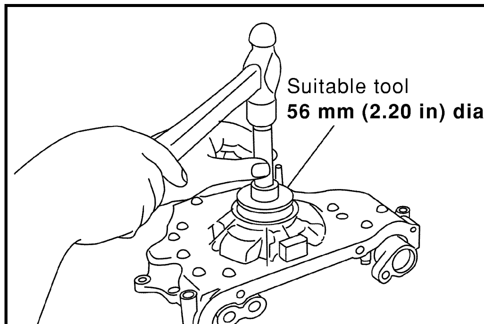


SEM715A

   - Press-fit front oil seal until it is flush with front end surface of front cover with a suitable tool.

     CAUTION:

     - **Be careful not to damage front cover and crankshaft.**
     - **Press-fit oil seal straight to avoid causing burrs or tilting.**



SBIA0266E

3. Install in the reverse order of removal after this step.

Removal and Installation of Rear Oil Seal

ABS00CJG

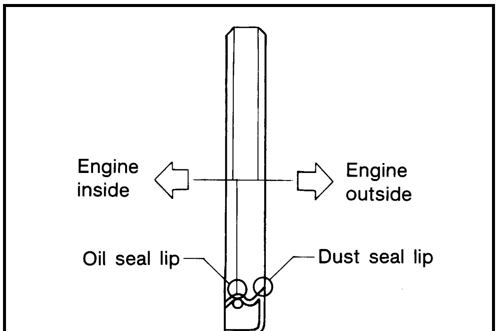
REMOVAL

1. Remove transaxle assembly. Refer to MT-17, "TRANSAXLE ASSEMBLY" (M/T models) or AT-269, "TRANSAXLE ASSEMBLY" (A/T models).
2. Remove clutch cover and clutch disk (M/T models). Refer to CL-14, "CLUTCH DISC, CLUTCH COVER AND FLYWHEEL" .
3. Remove drive plate (A/T models) or flywheel (M/T models) with power tool. Refer to EM-82, "CYLINDER BLOCK" .
4. Remove rear oil seal with a suitable tool.

   CAUTION:
   Be careful not to damage crankshaft and cylinder block.

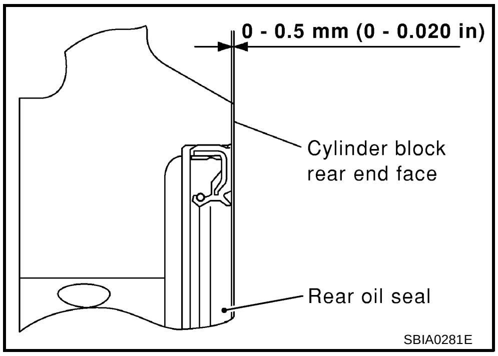
INSTALLATION

1. Apply new engine oil to new rear oil seal joint surface and seal lip.
2. Install rear oil seal so that each seal lip is oriented as shown in the figure.



SEM715A

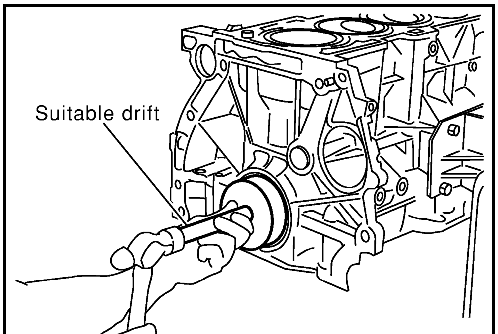
   - Press in rear oil seal to the position as shown in the figure.



SBIA0281E

   - Press-fit rear oil seal with a suitable drift [outside diameter 102 mm (4.02 in), inside diameter 86 mm (3.39 in)].

     CAUTION:
     - **Be careful not to damage crankshaft and cylinder block.**
     - **Press-fit oil seal straight to avoid causing burrs or tilting.**
     - **Do not touch grease applied onto oil seal lip.**



SBIA0280E

3. Install in the reverse order of removal after this step.

CYLINDER HEAD

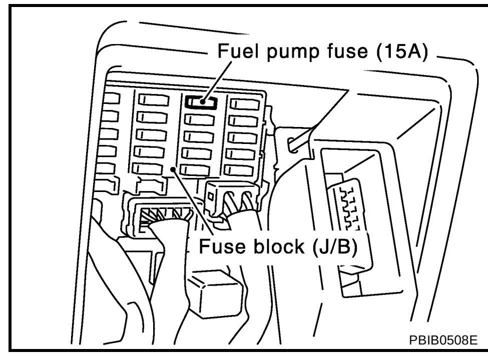
PFP:11041

On-Vehicle Service

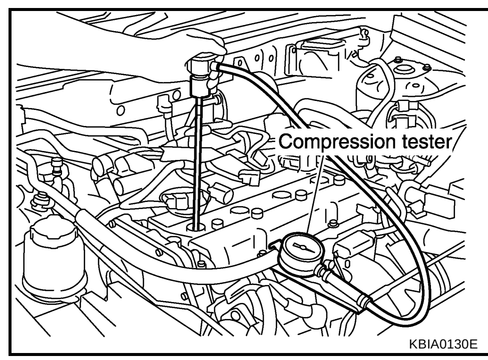
ABS00CJH

CHECKING COMPRESSION PRESSURE

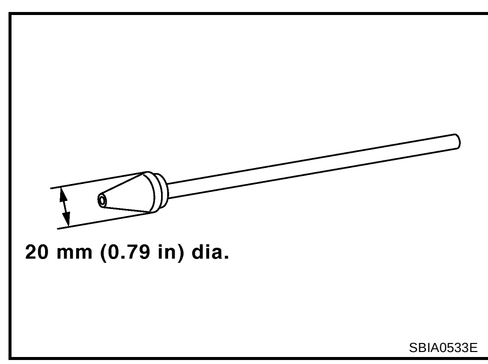
1. Warm up engine thoroughly. Then, stop it.
2. Release fuel pressure. Refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Disconnect fuel pump fuse to avoid fuel injection during measurement.



4. Remove engine cover. Refer to EM-16, "INTAKE MANIFOLD" .
5. Remove ignition coil and spark plug from each cylinder. Refer to EM-27, "IGNITION COIL" and EM-28, "SPARK PLUG (PLATINUM-TIPPED TYPE)" .
6. Connect an engine tachometer (not required in use of CONSULT-II).
7. Install a compression tester with an adapter (commercial service tool) onto spark plug hole.



- Use the adapter whose picking up end inserted to spark plug hole is smaller than 20 mm (0.79 in) in diameter. Otherwise, it may be caught by cylinder head during removal.



8. With accelerator pedal fully depressed, turn ignition switch to “START” for cranking. When the gauge pointer stabilizes, read the compression pressure and the engine rpm. Perform these steps to check each cylinder.

Compression pressure:

Unit: kPa (kg/cm^2 , psi) /rpm

Standard	Minimum	Differential limit between cylinders
1,250 (12.8, 181) / 250	1,060 (10.8, 154) / 250	100 (1.0, 14) / 250

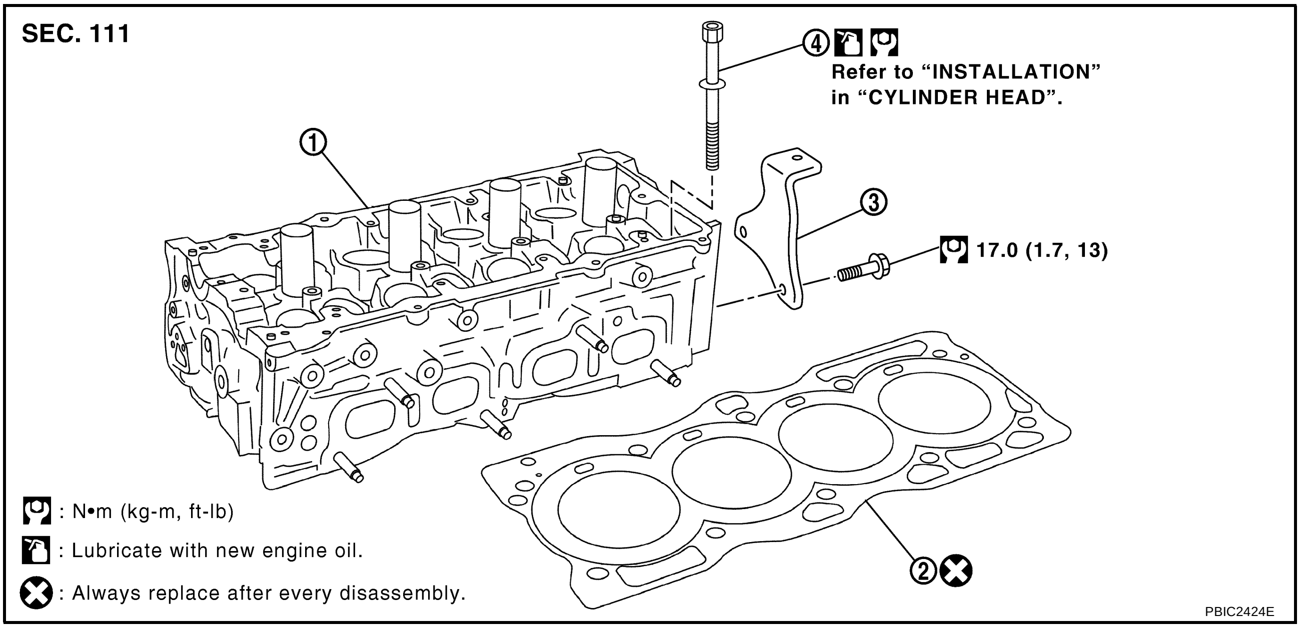
CAUTION:
Always use fully a changed battery to obtain the specified engine speed.

- If the engine speed is out of the specified range, check battery liquid for proper gravity. Check engine speed again with normal battery gravity.
- If compression pressure is below minimum value, check valve clearances and parts associated with combustion chamber (Valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After the checking, measure the compression pressure again.
- If some cylinder has low compression pressure, pour small amount of engine oil into the spark plug hole of the cylinder to re-check it for compression.
  - If the added engine oil improves the compression, piston rings may be worn out or damaged. Check piston rings and replace if necessary.
  - If the compression pressure remains at low level despite the addition of engine oil, valves may be malfunctioning. Check valves for damage. Replace valve or valve seat accordingly.
- If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil, cylinder head gasket is leaking. In such a case, replace cylinder head gasket.

9. After inspection is completed, install removed parts.
10. Start the engine, and confirm that the engine runs smoothly.
11. Perform trouble diagnosis. If DTC appears, erase it. Refer to EC-94, "TROUBLE DIAGNOSIS" .

Removal and Installation

ABS00CJI



1. Cylinder head assembly
2. Cylinder head gasket
3. Engine cover bracket
4. Cylinder head bolt

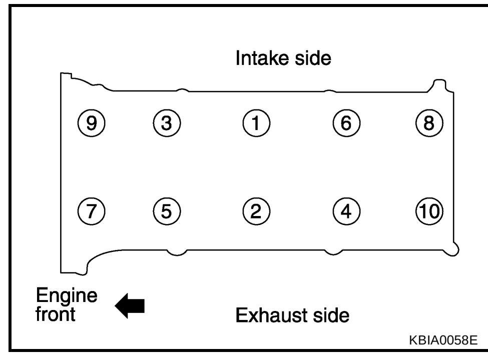
REMOVAL

1. Release fuel pressure. Refer to EC-90, "FUEL PRESSURE RELEASE" .
2. Drain engine coolant and engine oil. Refer to CO-8, "Changing Engine Coolant" and LU-7, "Changing Engine Oil" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant and engine oil on drive belt.**
3. Remove the following components and related parts.
   - Exhaust manifold and three way catalyst assembly; Refer to EM-20, "EXHAUST MANIFOLD AND THREE WAY CATALYST" .
   - Intake manifold collector, intake manifold and fuel tube assembly; Refer to EM-16, "INTAKE MANIFOLD" .
   - Water control valve and housing (water outlet); Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .

NOTE:
Can be removed and installed even when assembled with cylinder head.

4. Remove front cover and timing chain. Refer to EM-49, "TIMING CHAIN" .
5. Remove camshafts. Refer to EM-37, "CAMSHAFT" .
6. Securely support bottom of cylinder block with a jack or suitable tool, and release the hoist that was supporting it.
7. Remove cylinder head loosening bolts in reverse order as shown in the figure with power tool.



- Using the following tool, loosen cylinder head bolts.

Bolt with washer
: Cylinder head bolt wrench (commercial service tool: J24239-01)
Flange bolt
: TORX socket (size E20)

NOTE:
There are two types of cylinder head bolt because of parallel manufacture.

8. Remove cylinder head gasket.

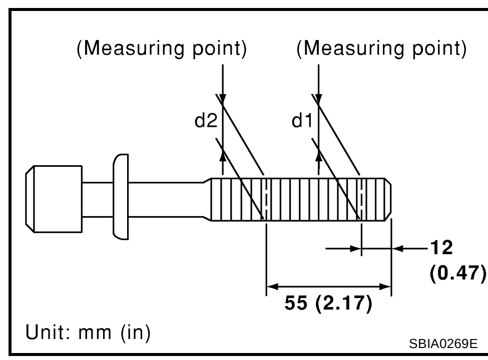
INSPECTION AFTER REMOVAL

Cylinder Head Bolts Outer Diameter

- Cylinder head bolts are tightened by plastic zone tightening method. Whenever the size difference between “d1” and “d2” exceeds the limit, replace them with a new one.

Limit (“d1” – “d2”): 0.23 mm (0.0091 in)

- If reduction of outer diameter appears in a position other than “d2”, use it as “d2” point.

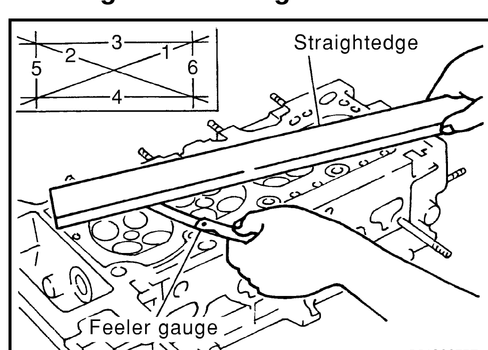


NOTE:
When replacing any cylinder head bolts, it is possible to use them with mixing flange bolt and bolt with washer.

Cylinder Head Distortion

NOTE:
When performing this inspection, cylinder block distortion should be also checking. Refer to EM-102, "CYLINDER BLOCK DISTORTION" .

1. Wipe off engine oil and remove water scale (like deposit), gasket, sealant, carbon, etc. with a scraper.
   CAUTION:
   Use utmost care not to allow gasket debris to enter passages for engine oil or engine coolant.
2. At each of several locations on bottom surface of cylinder head, measure the distortion in six directions.

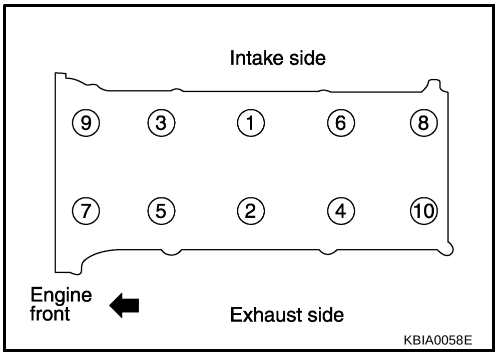


Limit : 0.1 mm (0.004 in)

- If it exceeds the limit, replace cylinder head.

INSTALLATION

1. Install new cylinder head gasket.
2. Tighten cylinder head bolts in numerical order as shown in the figure with the following procedure to install cylinder head.

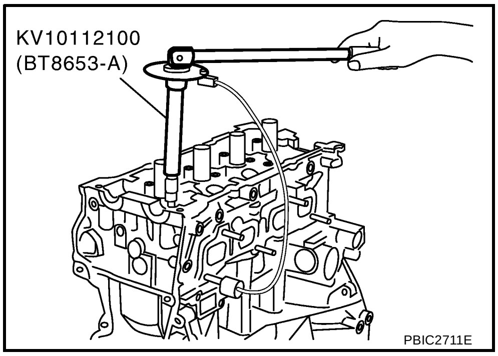


CAUTION:
If cylinder head bolts are re-used, check their outer diameters before installation. Refer to EM-64, "Cylinder Head Bolts Outer Diameter" .

a. Apply new engine oil to threads and seating surfaces of mounting bolts.
b. Tighten all bolts.

: 50.0 N·m (5.1 kg-m, 37 ft-lb)

c. Turn all bolts 60 degrees clockwise (angle tightening).



CAUTION:
Check and confirm the tightening angle by using the angle wrench [SST] or protractor. Avoid judgment by visual inspection without the tool.

d. Completely loosen.

: 0 N·m (0 kg-m, 0 ft-lb)

CAUTION:
In this step, loosen bolts in reverse order of that indicated in the figure.

e. Tighten all bolts.

: 39.2 N·m (4.0 kg-m, 29 ft-lb)

f. Turn all bolts 75 degrees clockwise (angle tightening).
g. Turn all bolts 75 degrees clockwise again (angle tightening).

3. Install in the reverse order of removal after this step.

INSPECTION AFTER INSTALLATION

Inspection for Leaks

The following are procedures for checking fluids leak, lubricates leak and exhaust gases leak.

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .
- Use procedure below to check for fuel leakage.
  - Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
  - Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.

  NOTE:
  If hydraulic pressure inside timing chain tensioner drops after removal/installation, slack in the guide may generate a pounding noise during and just after engine start. However, this is normal. Noise will stop after hydraulic pressure rises.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

Disassembly and Assembly

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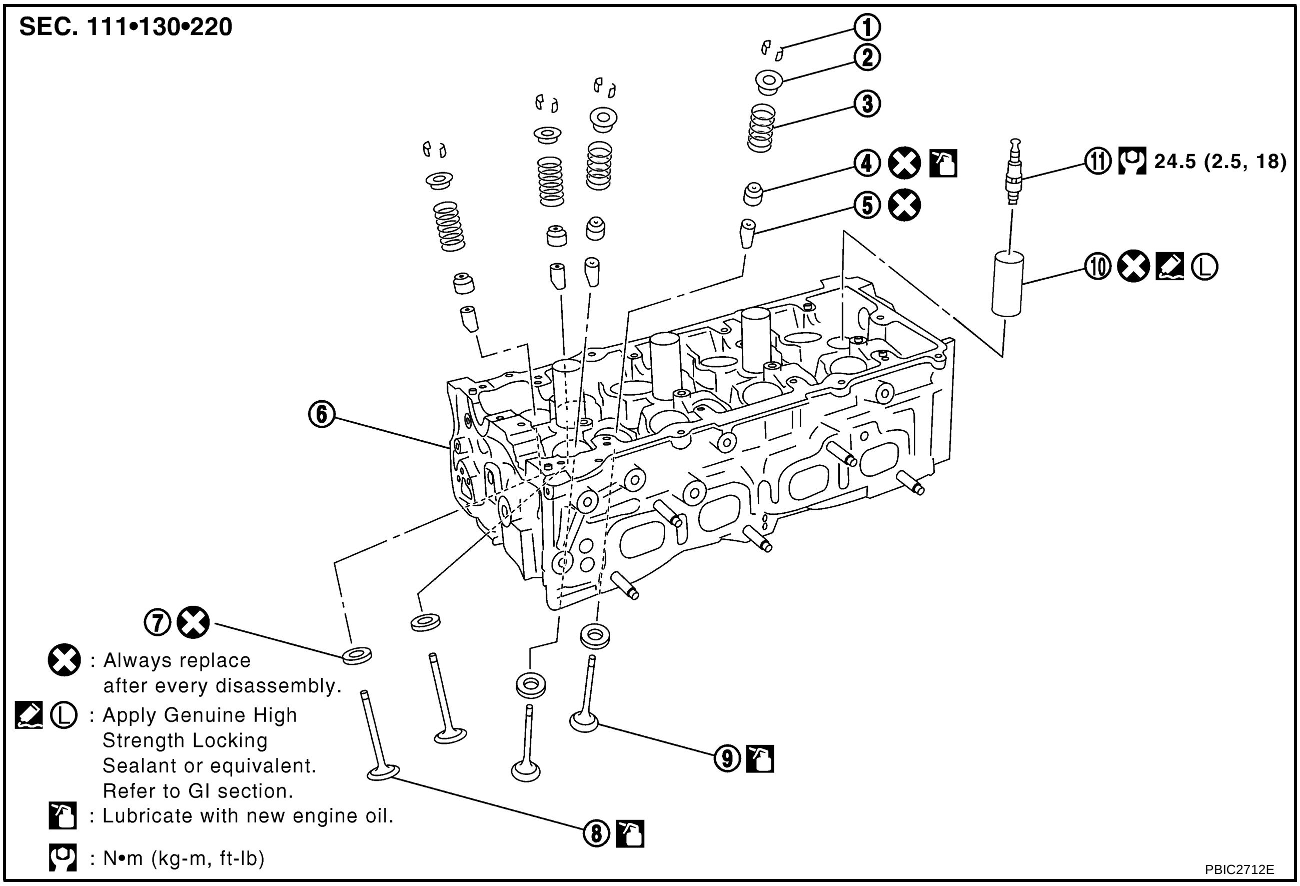
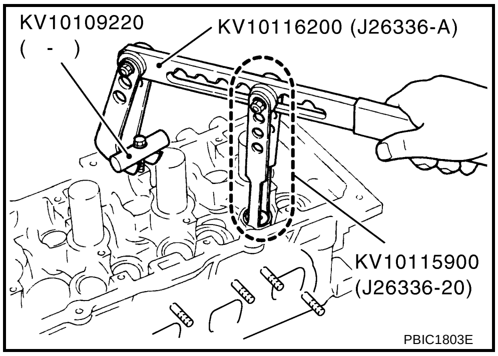


1. Valve collet	2. Valve spring retainer	3. Valve spring (with valve spring seat)
4. Valve oil seal	5. Valve guide	6. Cylinder head
7. Valve seat	8. Valve (INT)	9. Valve (EXH)
10. Spark plug tube	11. Spark plug	

DISASSEMBLY

1. Remove spark plug with a spark plug wrench (commercial service tool).
2. Remove valve lifter.
   - Identify installation positions, and store them without mixing them up.
3. Remove valve collet.
   - Compress valve spring with the valve spring compressor, the attachment and the adapter [SST]. Remove valve collet with a magnet hand.

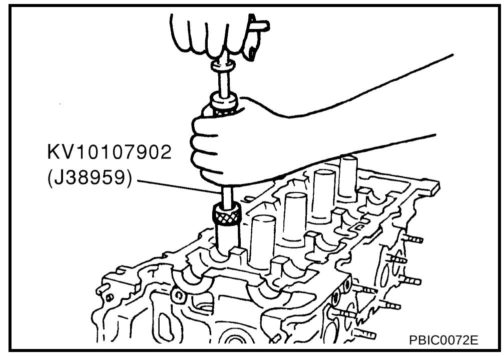
   CAUTION:
   When working, be careful not to damage valve lifter holes.



4. Remove valve spring retainer and valve spring (with valve spring seat).

   CAUTION:
   Do not remove valve spring seat from valve spring.
5. Push valve stem to combustion chamber side, and remove valve.
   - Identify installation positions, and store them without mixing them up.

6. Remove valve oil seal with the valve oil seal puller [SST].



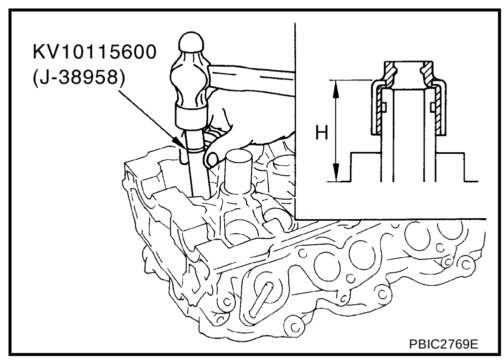
7. When valve seat must be replaced, refer to EM-72, "VALVE SEAT REPLACEMENT" to removal.
8. When valve guide must be replaced, refer to EM-70, "VALVE GUIDE REPLACEMENT" to removal.
9. Remove spark plug tube, if necessary.
   - Using pliers, remove it from cylinder head.

   CAUTION:
   - **Be careful not to damage cylinder head.**
   - **Do not remove spark plug tube if not necessary. Once removed, spark plug tube cannot be reused because of deformation.**

ASSEMBLY

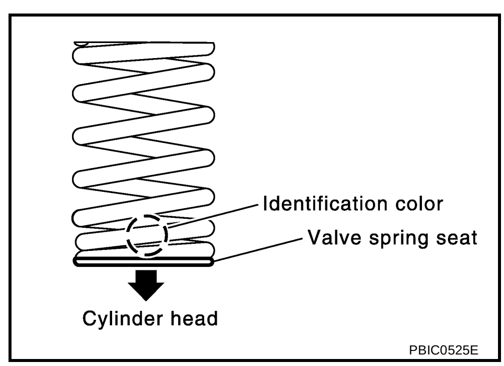
1. Install valve guide if removed. Refer to EM-70, "VALVE GUIDE REPLACEMENT" .
2. Install valve seat if removed. Refer to EM-72, "VALVE SEAT REPLACEMENT" .
3. Install valve oil seal.
   - Install with the valve oil seal drift [SST] to match dimension in the figure.

   Height "H" : 11.8 - 12.4 mm (0.465 - 0.488 in)

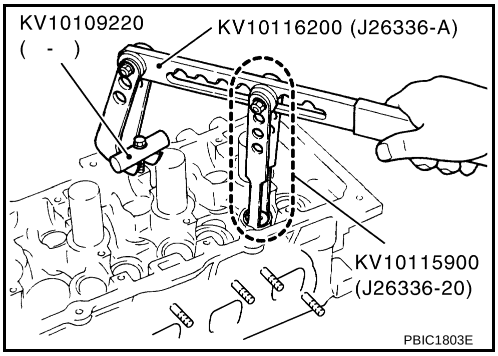


4. Install valve.
   - Install larger diameter to intake side.
5. Install valve spring (with valve spring seat).
   - Install smaller pitch (valve spring seat side) to cylinder head side.
   - Confirm identification color of valve spring.

   Intake : Blue
   Exhaust : Yellow



6. Install valve spring retainer.
7. Install valve collet.

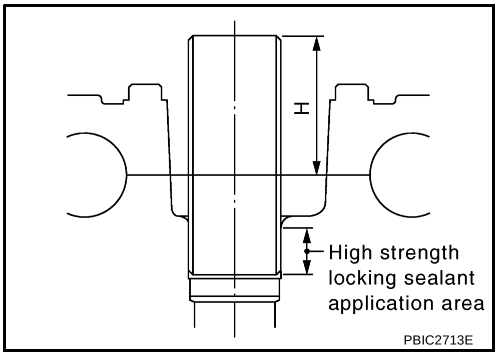


PBIC1803E

- Compress valve spring with the valve spring compressor, the attachment and the adapter [SST]. Install valve collet with a magnet hand.

  CAUTION:
  When working, be careful not to damage valve lifter holes.
- Tap valve stem edge lightly with a plastic hammer after installation to check its installed condition.

8. Install valve lifter.
9. Install spark plug tube if removed.
   - Press-fit it into cylinder head with the following procedure:



PBIC2713E

a. Remove old sealant from cylinder head side installation hole.

b. Apply sealant all round on spark plug tube within approximately 12 mm (0.47 in) width from edge of spark plug tube on the press-fit side.
Use Genuine High Strength Locking Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .

c. Using a drift, press-fit spark plug tube so that height is as same as "H" shown in the figure.

Standard press-fit height "H":

41.2 - 42.2 mm (1.622 - 1.661 in)

CAUTION:
- **When press-fitting, be careful not to deform spark plug tube.**
- **After press-fitting, wipe off any protruding sealant on top surface of cylinder head.**

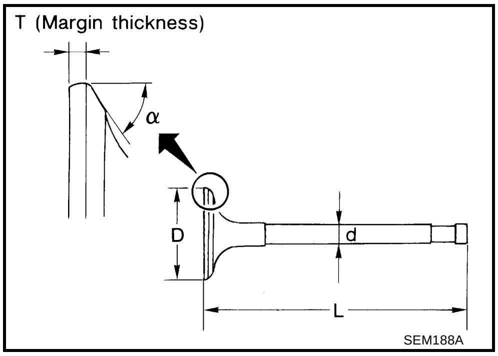
10. Install spark plug with a spark plug wrench (commercial service tool).

Inspection After Disassembly

ABS00CJK

VALVE DIMENSIONS

- Check dimensions of each valve. For dimensions, refer to EM-110, "Valve Dimensions" .
- If dimensions are out of the standard, replace valve.



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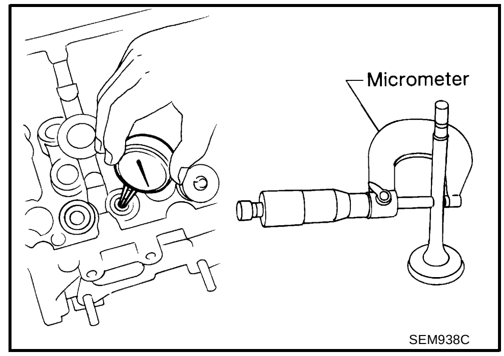
VALVE GUIDE CLEARANCE

Valve Stem Diameter

Measure the diameter of valve stem with a micrometer.



Standard

Intake : 5.965 - 5.980 mm (0.2348 - 0.2354 in)

Exhaust : 5.955 - 5.970 mm (0.2344 - 0.2350 in)

Valve Guide Inner Diameter

Measure the inner diameter of valve guide with a bore gauge.

Standard

Intake and Exhaust

: 6.000 - 6.018 mm (0.2362 - 0.2369 in)

Valve Guide Clearance

(Valve guide clearance) = (Valve guide inner diameter) – (Valve stem diameter).

Valve guide clearance:

Standard

Intake : 0.020 - 0.053 mm (0.0008 - 0.0021 in)

Exhaust : 0.030 - 0.063 mm (0.0012 - 0.0025 in)

Limit

Intake : 0.08 mm (0.003 in)

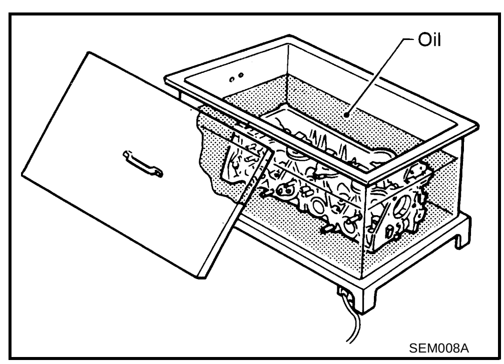
Exhaust : 0.09 mm (0.004 in)

- If it exceeds the limit, replace valve guide and/or valve. When valve guide must be replaced, refer to EM-70, "VALVE GUIDE REPLACEMENT" .

VALVE GUIDE REPLACEMENT

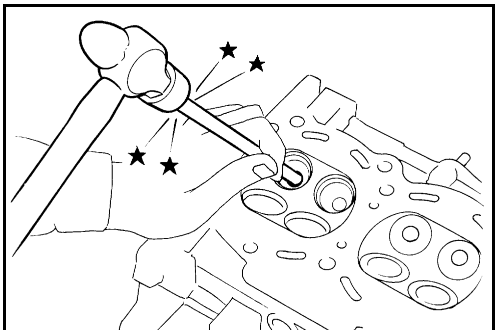
When valve guide is removed, replace with oversized [0.2 mm (0.008 in)] valve guide.

1. To remove valve guide, heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



2. Drive out valve guide with a press [under a 20 kN (2 ton, 2.2 US ton, 2.0 lmp ton) force] or hammer and valve guide drift (commercial service tool).

CAUTION:
Cylinder head contains heat, when working, wear protective equipment to avoid getting burned.

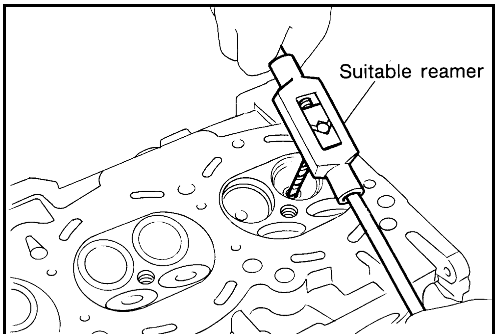

SEM931C

3. Ream cylinder head valve guide hole with a valve guide reamer (commercial service tool).

Valve guide hole diameter (for service parts):

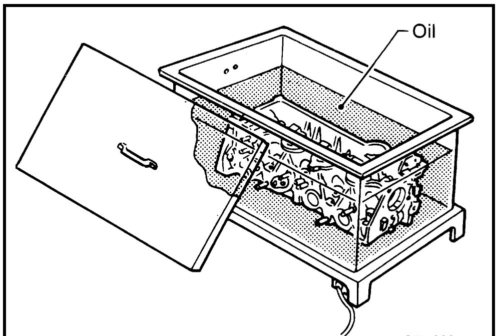
Intake and exhaust

: 10.175 - 10.196 mm (0.4006 - 0.4014 in)



SEM932C

4. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



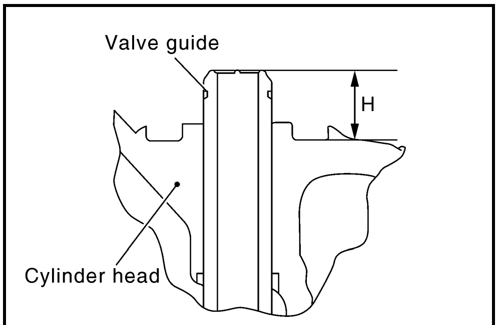
SEM008A

5. Using a valve guide drift (commercial service tool), press valve guide from camshaft side to dimensions as shown in the figure.

Projection "H":

Intake	**: 10.1 - 10.3 mm (0.398 - 0.406 in)**
Exhaust	**: 10.0 - 10.4 mm (0.394 - 0.409 in)**

CAUTION:
Cylinder head contains heat, when working, wear protective equipment to avoid getting burned.



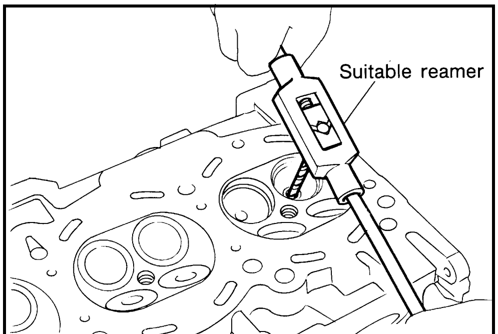
PBIC2187E

6. Apply reamer finish to valve guide with a valve guide reamer (commercial service tool).

Standard

Intake and exhaust:

6.000 - 6.018 mm (0.2362 - 0.2369 in)



SEM932C

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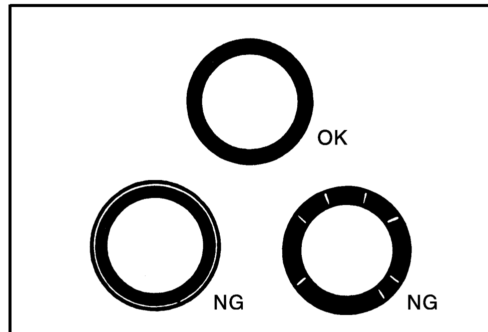
VALVE SEAT CONTACT

- After confirming that the dimensions of valve guides and valves are within specifications, perform this procedure.
- Apply prussian blue (or white lead) onto contacting surface of valve seat to check the condition of the valve contact on the surface.
- Check if the contact area band is continuous all around the circumference.
- If not, grind to adjust valve fitting and check again. If the contacting surface still has NG conditions even after the re-check, replace valve seat. Refer to EM-72, "VALVE SEAT REPLACEMENT" .



SBIA0322E

VALVE SEAT REPLACEMENT

When valve seat is removed, replace with oversized [0.5 mm (0.020 in)] valve seat.

1. Bore out old seat until it collapses. Boring should not continue beyond the bottom face of the seat recess in cylinder head. Set the machine depth stop to ensure this. Refer to EM-113, "Valve Seat" .

   CAUTION:

   Prevent to scratch cylinder head by excessive boring.

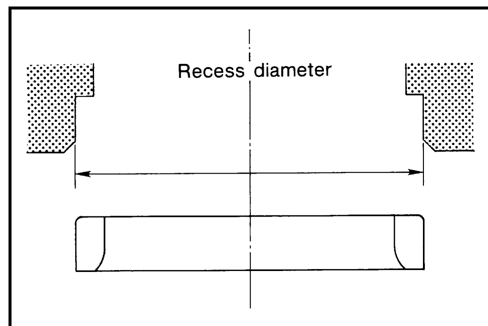
2. Ream cylinder head recess diameter for service valve seat.

   Oversize [0.5 mm (0.020 in)]

   Intake : 37.000 - 37.016 mm (1.4567 - 1.4573 in)

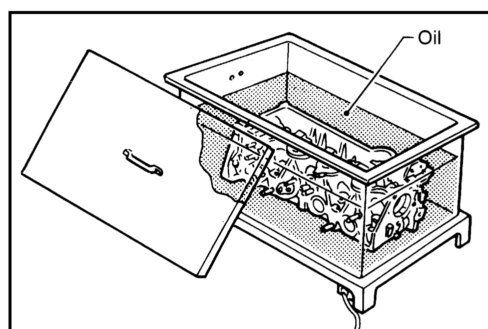
   Exhaust : 32.000 - 32.016 mm (1.2598 - 1.2605 in)

   - Be sure to ream in circles concentric to the valve guide center. This will enable valve seat to fit correctly.



SEM795A

3. Heat cylinder head to 110 to 130°C (230 to 266°F) by soaking in heated oil.



SEM008A

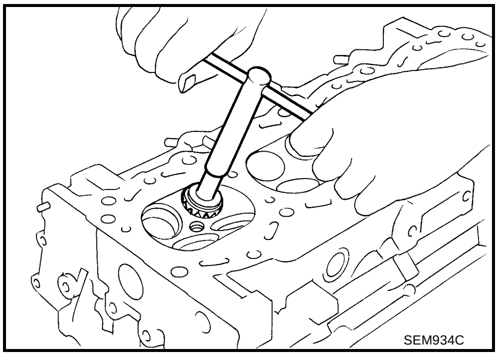
4. Provide valve seats cooled well with a dry ice. Press-fit valve seats into cylinder head.

   CAUTION:

   - **Avoid directly to touching cold valve seats.**
   - **Cylinder head contains heat, when working, wear protective equipment to avoid getting burned.**

5. Using a valve seat cutter set (commercial service tool) or a valve seat grinder, finish valve seat to the specified dimensions. For dimensions, refer to EM-113, "Valve Seat" .

CAUTION:
When using a valve seat cutter, firmly grip the cutter handle with both hands. Then, press on the contacting surface all around the circumference to cut in a single drive. Improper pressure on with the cutter or cutting many different times may result in stage valve seat.



6. Using compound, grind to adjust valve fitting.
7. Check again for normal contact. Refer to EM-72, "VALVE SEAT CONTACT" .

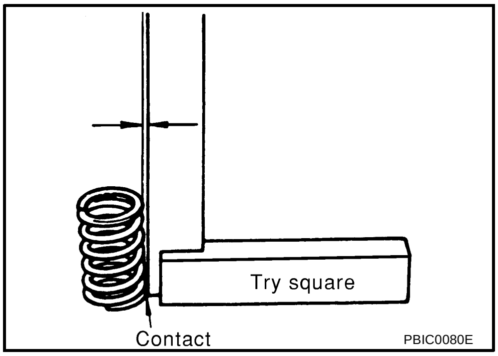
VALVE SPRING SQUARENESS

- Set a try square along the side of valve spring and rotate valve spring. Measure the maximum clearance between the top of valve spring and try square.

CAUTION:
Do not remove valve spring seat from valve spring.

Limit : 1.9 mm (0.075 in)

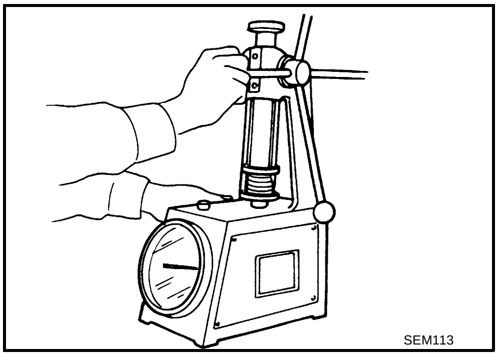
- If it exceeds the limit, replace valve spring (with valve spring seat).



VALVE SPRING DIMENSIONS AND VALVE SPRING PRESSURE LOAD

- Check valve spring pressure with valve spring seat installed at the specified spring height.

CAUTION:
Do not remove valve spring seat from valve spring.



Standard:

Items	Intake	Exhaust
Free height	44.84 - 45.34 mm (1.7654 - 1.7850 in)	45.28 - 45.78 mm (1.7827 - 1.8024 in)
Installation height	35.30 mm (1.390 in)	35.30 mm (1.390 in)
Installation load	151 - 175 N (15.4 - 17.8 kg, 34 - 39 lb)	151 - 175 N (15.4 - 17.8 kg, 34 - 39 lb)
Height during valve open	24.94 mm (0.9819 in)	26.39 mm (1.0390 in)
Load with valve open	358 - 408 N (36.5 - 41.6 kg, 80 - 92 lb)	325 - 371 N (33.1 - 37.8 kg, 73 - 83 lb)
Identification color	Blue	Yellow

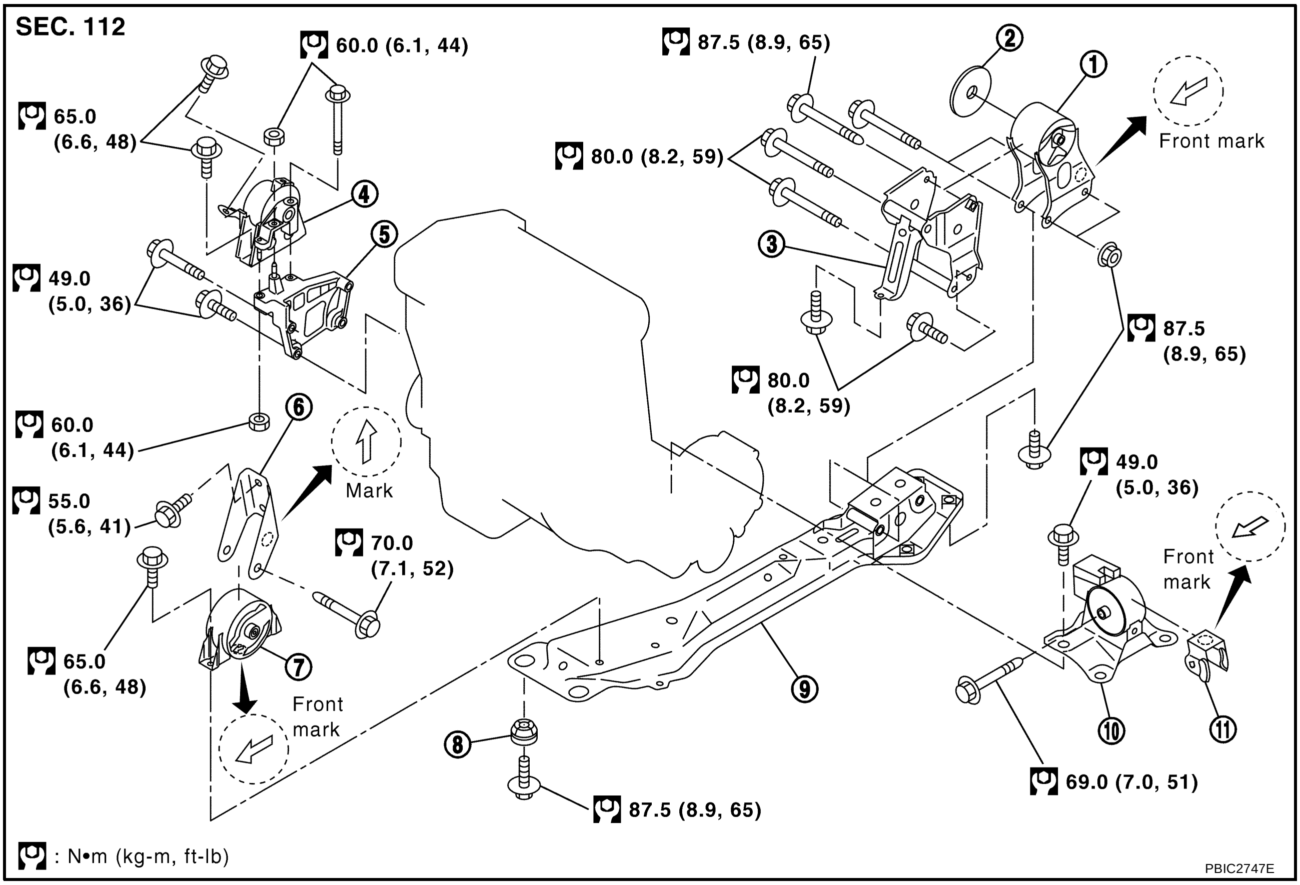
- If the installation load or load with valve open is out of the standard, replace valve spring (with valve spring seat).

ENGINE ASSEMBLY

PFP:10001

Removal and Installation (2WD Models)

ABS00DAN



1. Rear engine mounting insulator	2. Rubber seat	3. Rear engine mounting bracket
4. RH engine mounting insulator	5. RH engine mounting bracket	6. Front engine mounting bracket
7. Front engine mounting insulator	8. Grommet	9. Center member
10. LH engine mounting insulator	11. Stopper	

WARNING:

- **Situate the vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Attach proper slingers and bolts described in PARTS CATALOG if engine slingers are not equipped.**

CAUTION:

- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Do not start working until exhaust system and coolant are cool enough.**
- **If items or work required are not covered by the engine section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with a transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-40, "Garage Jack and Safety Stand" .**

REMOVAL

Outline

Remove the engine and the transaxle assembly from the vehicle downward. Separate the engine and the transaxle.

Preparation

1. Remove hood assembly. Refer to BL-12, "HOOD" .
2. Release fuel pressure.Refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Drain engine coolant from radiator. Refer to CO-8, "Changing Engine Coolant" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
4. Remove the following parts.
   - LH and RH undercovers
   - Front road wheels and tires
   - Battery and battery tray; Refer to SC-4, "BATTERY" .
   - Drive belt; Refer to EM-11, "DRIVE BELTS" .
   - Air duct and air cleaner case assembly; Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
   - Alternator and alternator bracket; Refer to SC-20, "CHARGING SYSTEM" .
   - Radiator and radiator cooling fan assembly; Refer to CO-11, "RADIATOR" .
5. Disconnect engine room harness from the engine side and set it aside for easier work.
6. Disconnect all vacuum hoses and air hoses connected to the vehicle side at the engine side.

Engine Room LH

1. Disconnect fuel feed hoses, and plug them to prevent fuel from draining. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE" .
2. Disconnect heater hoses, and install plugs them to prevent engine coolant from draining. Refer to CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .
3. Disconnect control cable from transaxle. Refer to AT-251, "SHIFT CONTROL SYSTEM" .
4. Disconnect B terminal harness of starter motor. Refer to SC-9, "STARTING SYSTEM" .

Engine Room RH

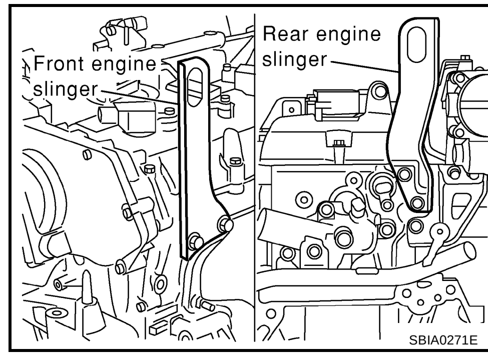
1. Remove reservoir tank of engine coolant. Refer to CO-11, "RADIATOR" .
2. Remove A/C compressor with piping connected from the engine. Temporarily secure it on the vehicle side with a rope to avoid putting load on it. Refer to ATC-122, "Removal and Installation of Compressor" (Automatic A/C models) or MTC-82, "Removal and Installation of Compressor" (Manual A/C models).
3. Remove power steering oil pump with piping connected from the engine. Temporarily secure it on the vehicle side with a rope to avoid putting load on it. Refer to PS-33, "HYDRAULIC LINE" .

Vehicle Underbody

1. Remove exhaust front tube. Refer to EX-2, "EXHAUST SYSTEM" .
2. Remove rear plate cover from oil pan (upper). Then remove bolts fixing drive plate to torque converter. Refer to EM-22, "OIL PAN AND OIL STRAINER" and AT-269, "TRANSAXLE ASSEMBLY" .
3. Remove transaxle joint bolts which pierce at oil pan (upper) lower rear side. Refer to AT-269, "TRANSAXLE ASSEMBLY" .
4. Remove front wheel sensor (LH and RH) for ABS from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .
5. Remove brake caliper assembly with piping connected from steering knuckle. Temporarily secure it on the vehicle side with a rope to avoid load on it. Refer to BR-25, "FRONT DISC BRAKE" .
6. Remove LH and RH drive shafts from steering knuckle. Refer to FAX-13, "FRONT DRIVE SHAFT" .

Removal

1. Install engine slingers into front-left of cylinder head and rear-right of cylinder head.



- Use alternator bracket mounting bolt holes for the front side.

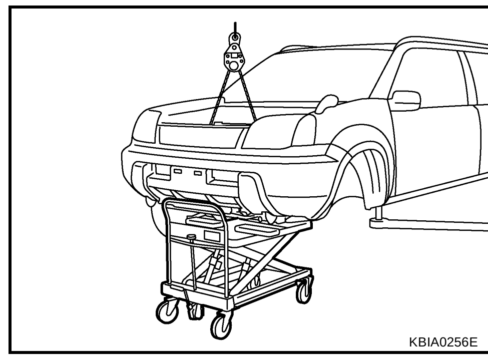
Slinger bolts:

Front

: 57.9 N·m (5.9 kg-m, 43 ft-lb)

Rear

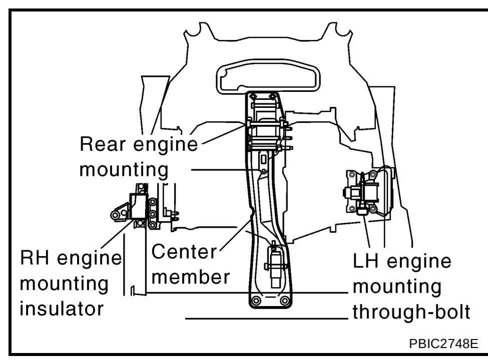
: 28.0 N·m (2.9 kg-m, 21 ft-lb)



2. Lift with a hoist and secure the engine in appropriate position.
3. Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a transmission jack. Securely support bottom of the engine and the transaxle, and simultaneously adjust hoist tension.

   CAUTION:

   Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.



4. Remove RH engine mounting insulator with power tool.
5. Remove LH engine mounting through-bolt with power tool.
6. Remove center member with power tool.
7. Remove the engine and the transaxle assembly from the vehicle downward by carefully operating supporting tools.

   CAUTION:

   - **During the operation, make sure that no part interferes with the vehicle side.**
   - **Before and during this lifting, always check if any harnesses are left connected.**
   - **During the removal operation, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
   - **If necessary, support the vehicle by setting jack or suitable tool at the rear.**
8. Remove starter motor. Refer to SC-9, "STARTING SYSTEM" .
9. Remove rear engine mounting bracket.
10. Separate the engine and the transaxle. Refer to AT-269, "TRANSAXLE ASSEMBLY" .

INSTALLATION

Note the following, and install in the reverse order of removal.

- Do not allow engine oil to get on engine mounting insulator. Be careful not to damage engine mounting insulator.
- When installation directions are specified, install parts according to the direction marks on them referring to the figure of components. Refer to EM-74, "Removal and Installation (2WD Models)" .
- Make sure that each mounting insulator is seated properly, and tighten mounting nuts and bolts.

INSPECTION AFTER INSTALLATION

Inspection for Leaks

The following are procedures for checking fluids leak, lubricates leak and exhaust gases leak.

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .
- Use procedure below to check for fuel leakage.
  - Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
  - Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

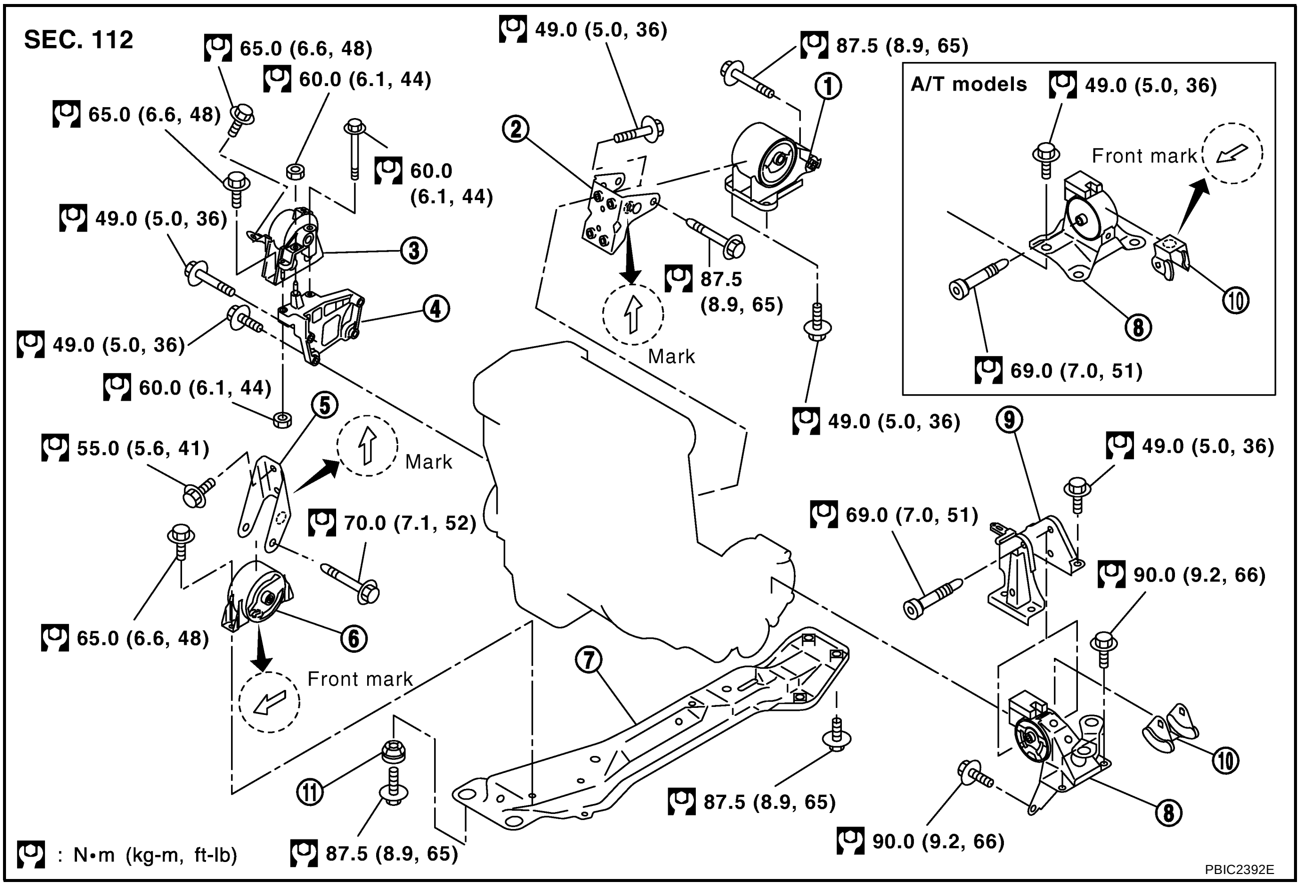
Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

Removal and Installation (AWD Models)

ABS00CJL



1.	Rear engine mounting insulator	2.	Rear engine mounting bracket	3.	RH engine mounting insulator
4.	RH engine mounting bracket	5.	Front engine mounting bracket	6.	Front engine mounting insulator
7.	Center member	8.	LH engine mounting insulator	9.	LH engine mounting bracket
10.	Stopper	11.	Grommet		

WARNING:

- **Situate the vehicle on a flat and solid surface.**
- **Place chocks at front and back of rear wheels.**
- **Attach proper slingers and bolts described in PARTS CATALOG if engine slingers are not equipped.**

CAUTION:

- **Always be careful to work safely, avoid forceful or uninstructed operations.**
- **Do not start working until exhaust system and engine coolant are cool enough.**
- **If items or work required are not covered by the engine section, refer to the applicable sections.**
- **Always use the support point specified for lifting.**
- **Use either 2-pole lift type or separate type lift as best you can. If board-on type is used for unavoidable reasons, support at the rear axle jacking point with a transmission jack or similar tool before starting work, in preparation for the backward shift of center of gravity.**
- **For supporting points for lifting and jacking point at rear axle, refer to GI-40, "Garage Jack and Safety Stand" .**

REMOVAL

Outline

Remove the engine, the transaxle and the transfer assembly with front suspension member from the vehicle downward. Separate front suspension member, and then separate the engine and the transaxle.

Preparation

1. Remove hood assembly. Refer to BL-12, "HOOD" .

2. Release fuel pressure. Refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Drain engine coolant from radiator. Refer to CO-8, "Changing Engine Coolant" .

   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Do not spill engine coolant on drive belt.**
4. Remove the following parts.
   - LH and RH undercovers
   - Front road wheels and tires
   - Battery and battery tray; Refer to SC-4, "BATTERY" .
   - Drive belt; Refer to EM-11, "DRIVE BELTS" .
   - Air duct and air cleaner case assembly; Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
   - Alternator; Refer to SC-20, "CHARGING SYSTEM" .
   - Radiator and radiator cooling fan assembly; Refer to CO-11, "RADIATOR" .
5. Disconnect engine room harness from the engine side and set it aside for easier work.
6. Disconnect all vacuum hoses and air hoses connected to the vehicle side at the engine side.

Engine Room LH

1. Disconnect fuel feed hose, and plug it to prevent fuel from draining. Refer to EM-30, "FUEL INJECTOR AND FUEL TUBE"
2. Disconnect heater hoses, and install plugs them to prevent engine coolant from draining.
3. Disconnect control cable from transaxle (A/T models). Refer to AT-251, "SHIFT CONTROL SYSTEM" .
4. Disconnect clutch operating cylinder from transaxle, and move it aside (M/T models). Refer to CL-10, "OPERATING CYLINDER" .
5. Disconnect shift and select cable from transaxle (M/T models). Refer to MT-14, "CONTROL LINKAGE" .
6. Disconnect B terminal harness of starter motor. Refer to SC-9, "STARTING SYSTEM" .

Engine Room RH

1. Remove reservoir tank of engine coolant. Refer to CO-11, "RADIATOR" .
2. Remove A/C compressor with piping connected from the engine. Temporarily secure it on the vehicle side with a rope to avoid putting load on it. Refer to ATC-122, "Removal and Installation of Compressor" (Automatic A/C models) or MTC-82, "Removal and Installation of Compressor" (Manual A/C models).

Vehicle Underbody

1. Remove exhaust front tube. Refer to EX-2, "EXHAUST SYSTEM" .
2. Remove propeller shaft. Refer to PR-3, "REAR PROPELLER SHAFT" .
3. Remove steering lower joint from steering gear. Refer to PS-12, "STEERING COLUMN" .
4. Disconnect power steering fluid piping at a point between the vehicle and the engine. Refer to PS-33, "HYDRAULIC LINE" .
5. Remove rear plate cover from oil pan (upper). Then remove bolts fixing drive plate to torque converter (A/T models). Refer to EM-22, "OIL PAN AND OIL STRAINER" and AT-269, "TRANSAXLE ASSEMBLY" .
6. Remove transaxle joint bolts which pierce at oil pan (upper) lower rear side. Refer to MT-17, "TRANSAXLE ASSEMBLY" (M/T models) or AT-269, "TRANSAXLE ASSEMBLY" (A/T models).
7. Remove front wheel sensor (LH and RH) for ABS from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" (ABS) or BRC-96, "WHEEL SENSORS" (VDC/TCS/ABS).
8. Remove brake caliper assembly with piping connected from steering knuckle. Temporarily secure it on the vehicle side with a rope to avoid load on it. Refer to BR-25, "FRONT DISC BRAKE" .
9. Remove lower ends of left and right strut from steering knuckle. Refer to FSU-6, "FRONT SUSPENSION ASSEMBLY" .

Removal

1. Install engine slingers into front-left of cylinder head and rear-right of cylinder head.

- Use alternator bracket mounting bolt holes for the front side.

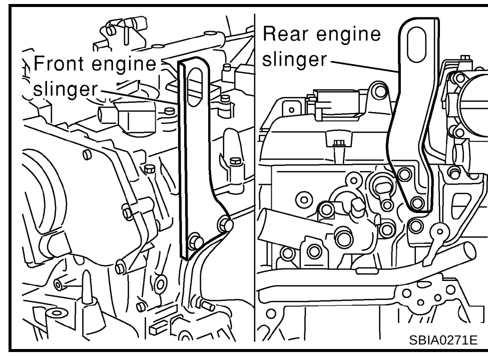
  Slinger bolts:

  Front

  : 57.9 N·m (5.9 kg-m, 43 ft-lb)

  Rear

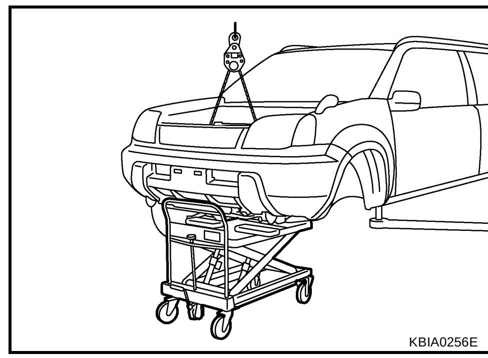
  : 28.0 N·m (2.9 kg-m, 21 ft-lb)



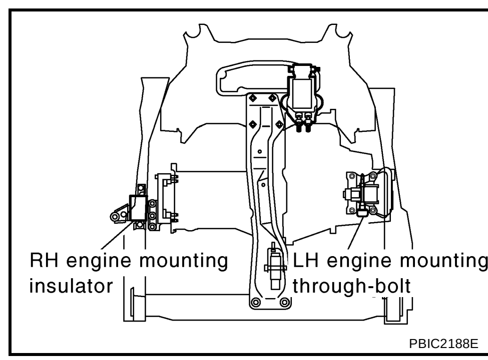
2. Lift with a hoist and secure the engine in appropriate position.
3. Use a manual lift table caddy (commercial service tool) or equivalently rigid tool such as a transmission jack. Securely support bottom of the engine and the transaxle, and simultaneously adjust hoist tension.

   CAUTION:

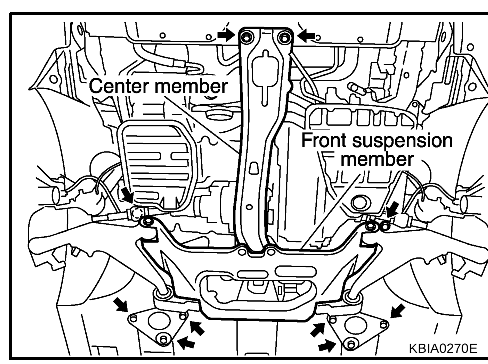
   Put a piece of wood or something similar as the supporting surface, secure a completely stable condition.



4. Remove RH engine mounting insulator with power tool.
5. Remove LH engine mounting through-bolt with power tool.



6. Remove mounting bolts at front end of center member with power tool.
7. Remove front suspension member mounting nuts and bolts. Refer to FSU-6, "FRONT SUSPENSION ASSEMBLY" .



8. Remove the engine, the transaxle and the transfer assembly with front suspension member and center member from the vehicle downward by carefully operating supporting tools.

   CAUTION:

   - **During the operation, make sure that no part interferes with the vehicle side.**
   - **Before and during this lifting, always check if any harnesses are left connected.**
   - **During the removal operation, always be careful to prevent the vehicle from falling off the lift due to changes in the center of gravity.**
   - **If necessary, support the vehicle by setting a jack or suitable tool at the rear.**

9. Remove power steering oil pump with piping connected from the engine. Move it aside on front suspension member. Refer to PS-33, "HYDRAULIC LINE" .
10. Remove front engine mounting and rear engine mounting through-bolts to remove front suspension member and center member with power tool.
11. Remove starter motor with power tool. Refer to SC-9, "STARTING SYSTEM" .
12. Separate the engine and transaxle. Refer to MT-17, "TRANSAXLE ASSEMBLY" (M/T models) or AT-269, "TRANSAXLE ASSEMBLY" (A/T models).

INSTALLATION

Note the following, and install in the reverse order of removal.

- Do not allow engine oil to get on engine mounting insulator. Be careful not to damage engine mounting insulator.
- When installation directions are specified, install parts according to the direction marks on them referring to figure of components. Refer to EM-78, "Removal and Installation (AWD Models)" .
- Make sure that each mounting insulator is seated properly, and tighten mounting nuts and bolts.

INSPECTION AFTER INSTALLATION

Inspection for Leaks

The following are procedures for checking fluids leak, lubricates leak and exhaust gases leak.

- Before starting engine, check oil/fluid levels including engine coolant and engine oil. If less than required quantity, fill to the specified level. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .
- Use procedure below to check for fuel leakage.
  - Turn ignition switch “ON” (with engine stopped). With fuel pressure applied to fuel piping, check for fuel leakage at connection points.
  - Start engine. With engine speed increased, check again for fuel leakage at connection points.
- Run engine to check for unusual noise and vibration.
- Warm up engine thoroughly to make sure there is no leakage of fuel, exhaust gases, or any oil/fluids including engine oil and engine coolant.
- Bleed air from lines and hoses of applicable lines, such as in cooling system.
- After cooling down engine, again check oil/fluid levels including engine oil and engine coolant. Refill to the specified level, if necessary.

Summary of the inspection items:

Item	Before starting engine	Engine running	After engine stopped
Engine coolant	Level	Leakage	Level
Engine oil	Level	Leakage	Level
Other oils and fluid*	Level	Leakage	Level
Fuel	Leakage	Leakage	Leakage
Exhaust gases	—	Leakage	—

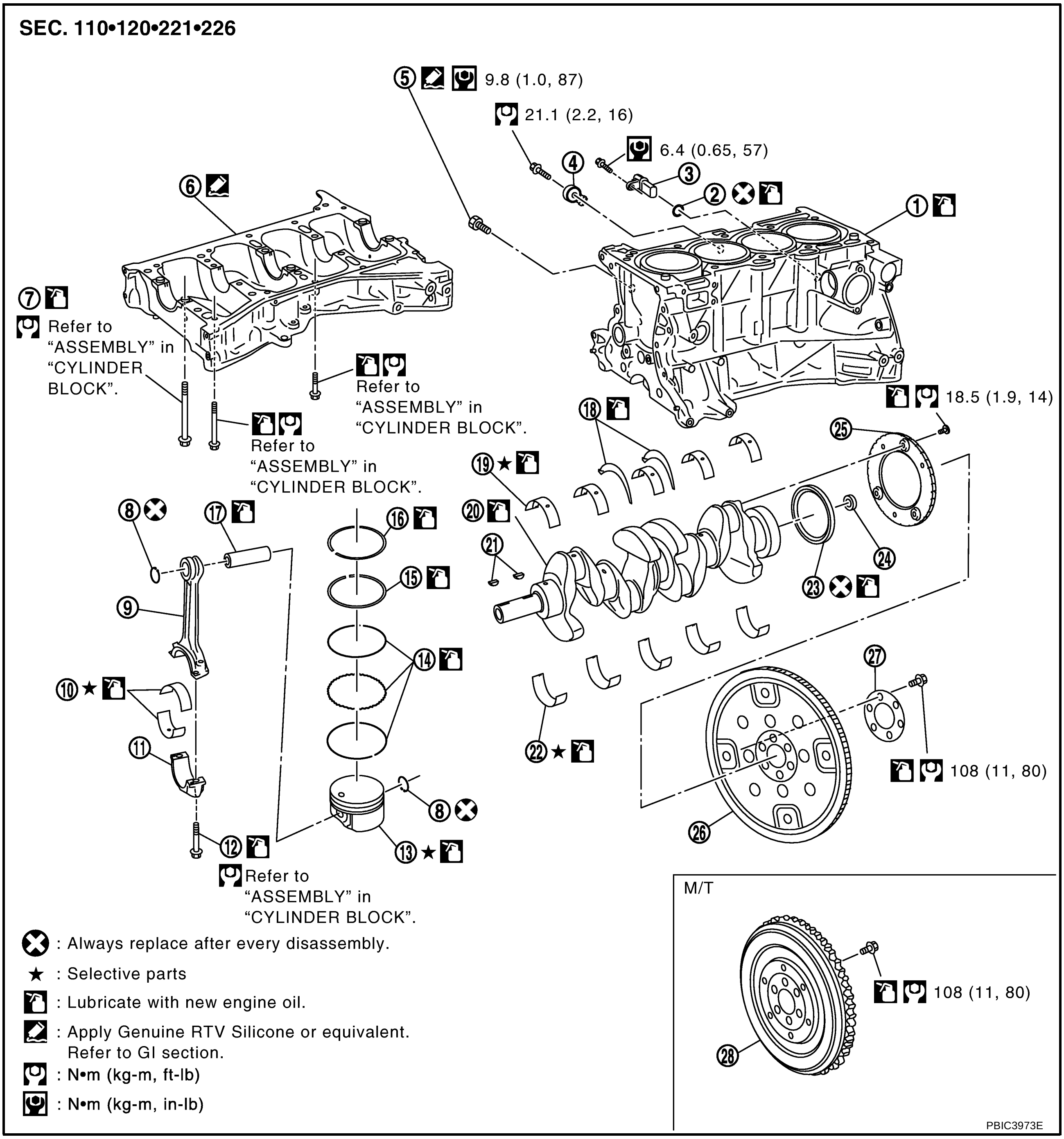
* Transmission/transaxle/CVT fluid, power steering fluid, brake fluid, etc.

CYLINDER BLOCK

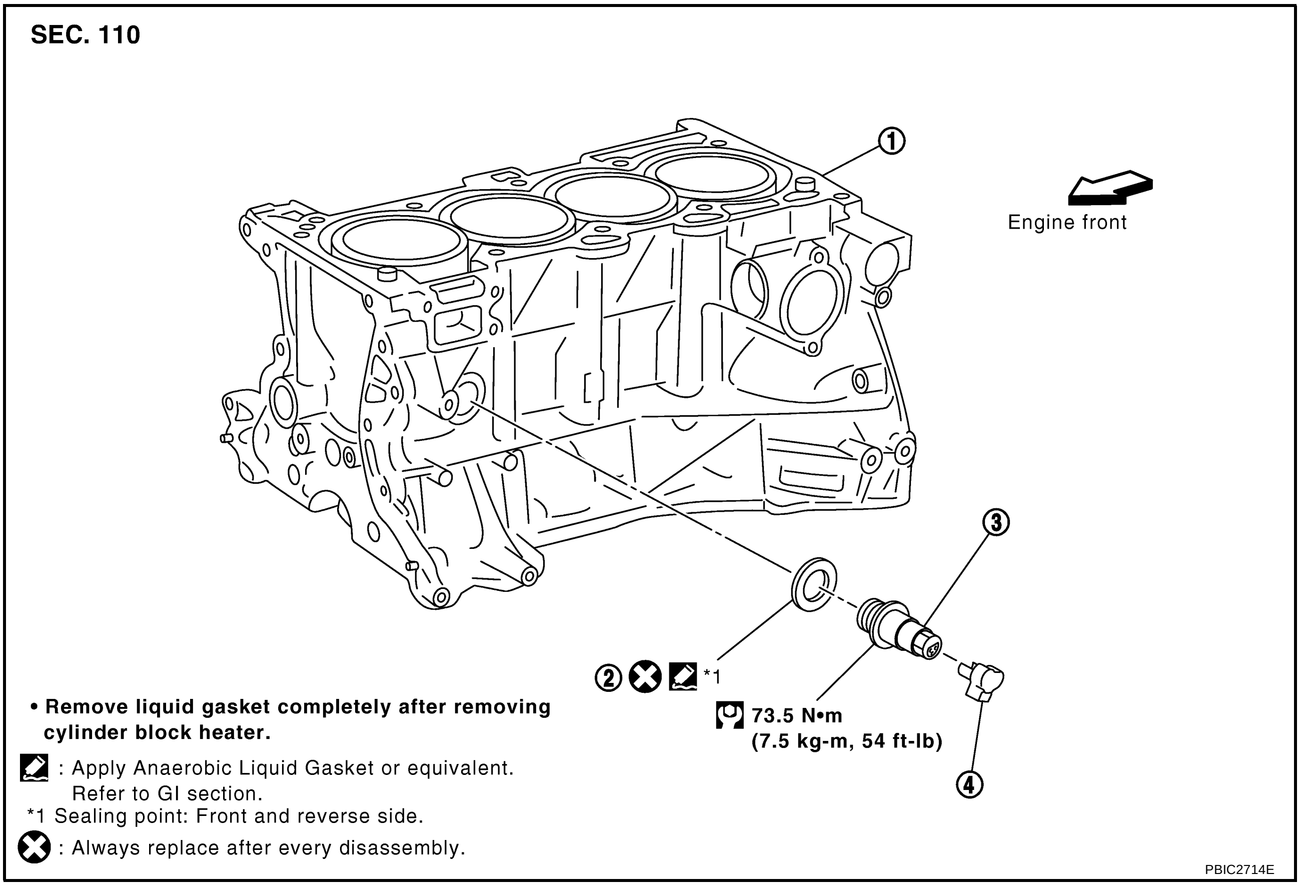
PFP:11010

Disassembly and Assembly

ABS00CJM



1. Cylinder block	2. O-ring	3. Crankshaft position sensor (POS)
4. Knock sensor	5. Water drain plug	6. Lower cylinder block
7. Lower cylinder block mounting bolt	8. Snap ring	9. Connecting rod
10. Connecting rod bearing	11. Connecting rod bearing cap	12. Connecting rod bolt
13. Piston	14. Oil ring	15. Second ring
16. Top ring	17. Piston pin	18. Thrust bearing
19. Main bearing upper	20. Crankshaft	21. Crankshaft key
22. Main bearing lower	23. Rear oil seal	24. Pilot convertor (A/T models)
25. Signal plate	26. Drive plate (A/T models)	27. Reinforce plate (A/T models)
28. Flywheel (M/T models)		



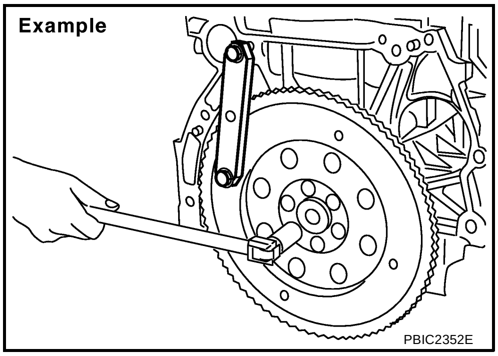
1. Cylinder block
2. Gasket
3. Cylinder block heater
4. Connector protector cap

DISASSEMBLY

NOTE:

Explained here is how to disassemble with an engine stand supporting mating surface of transaxle. When using different type of engine stand, note with difference in steps and etc.

1. Remove the engine, the transaxle and the transfer (AWD models) assembly from the vehicle, and separate the transaxle and the transfer (AWD models) assembly from the engine. Refer to EM-74, "ENGINE ASSEMBLY" .
2. Remove clutch cover and clutch disc (M/T models). Refer to CL-14, "CLUTCH DISC, CLUTCH COVER AND FLYWHEEL" .
3. Remove flywheel (M/T models) or drive plate (A/T models) with power tool.
   - Secure crankshaft with a stopper plate, and remove mounting bolts.
   - Using the following TORX socket, loosen mounting bolts.



Flywheel (M/T models)

: size T55 (commercial service tool)

Drive plate (A/T models)

: size E20

CAUTION:

Be careful not to damage or scratch drive plate (A/T models) and contact surface for clutch disc of flywheel (M/T models).

NOTE:

The flywheel, two block construction, allows movement in response to transaxle side pressure, or when twisted in its rotational direction. Therefore, some amount of noise is normal.

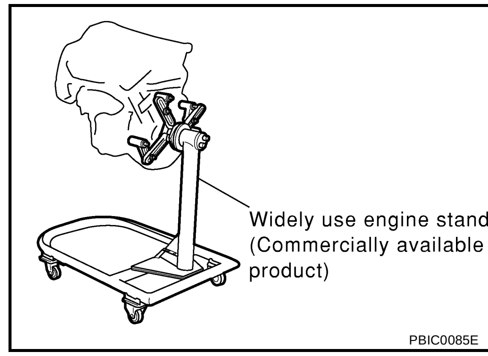
4. Lift the engine with a hoist to install it onto widely use engine stand.

   CAUTION:

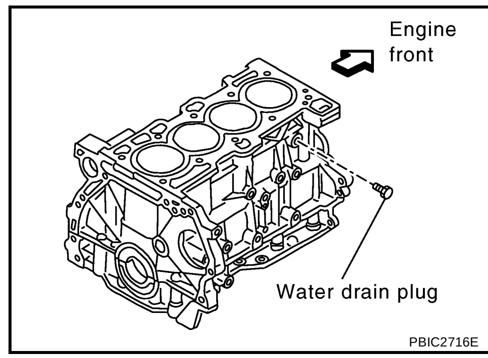
   - **Use the engine stand that has a load capacity [approximately 150kg (331 lb) or more] large enough for supporting the engine weight.**
   - **Before removing the hanging chains, make sure the engine stand is stable and there is no risk of overturning.**

   NOTE:

   The figure shows an example of widely use engine stand that can support mating surface of transaxle with flywheel (M/T models) or drive plate (A/T models) removed.



5. Drain engine oil. Refer to LU-7, "Changing Engine Oil" .
6. Drain engine coolant by removing water drain plug from inside of the engine.



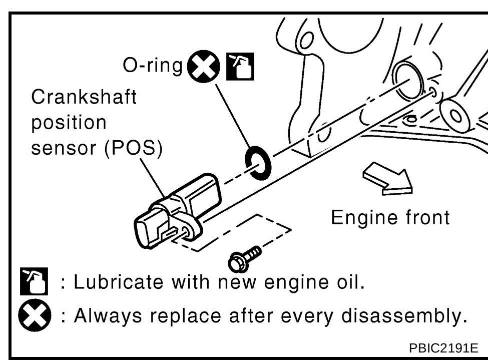
7. Remove cylinder head with power tool. Refer to EM-62, "CYLINDER HEAD" .
8. Remove knock sensor.

   CAUTION:

   Carefully handle knock sensor avoiding shocks.
9. Remove crankshaft position sensor (POS).

   CAUTION:

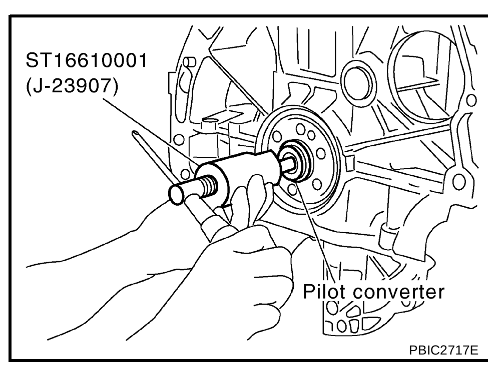
   - **Avoid impacts such as a dropping.**
   - **Do not disassemble.**
   - **Keep it away from metal particles.**
   - **Do not place the sensor in a location where it is exposed to magnetism.**



10. Remove pilot converter using the pilot bushing puller [SST] or suitable tool. (A/T models)

    NOTE:

    M/T models have no pilot bushing.



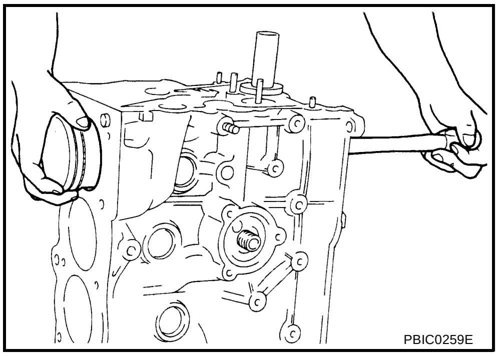
11. Remove piston and connecting rod assembly with the following procedure:
    - Before removing piston and connecting rod assembly, check the connecting rod side clearance. Refer to EM-99, "CONNECTING ROD SIDE CLEARANCE" .

a. Position crankshaft pin corresponding to connecting rod to be removed onto the bottom dead center.

b. Remove connecting rod cap.

c. Using a hammer handle or similar tool, push piston and connecting rod assembly out to the cylinder head side.

CAUTION:
Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.

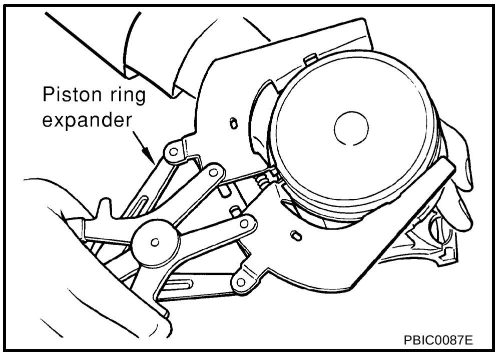

PBIC0259E

12. Remove connecting rod bearings.

CAUTION:
Identify installation positions, and store them without mixing them up.

13. Remove piston rings form piston.
- Before removing piston rings, check the piston ring side clearance. Refer to EM-100, "PISTON RING SIDE CLEARANCE" .
- Use a piston ring expander (commercial service tool).

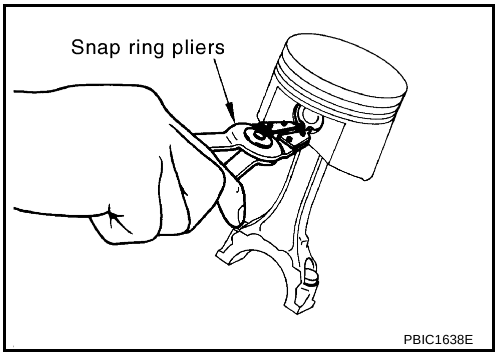
CAUTION:
- **When removing piston rings, be careful not to damage the piston.**
- **Be careful not to damage piston rings by expanding them excessively.**



PBIC0087E

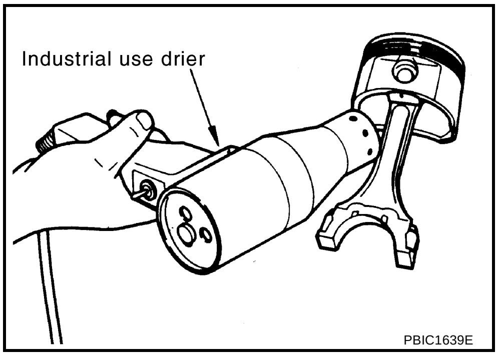
14. Remove piston from connecting rod with the following procedure:

a. Using snap ring pliers, remove snap rings.



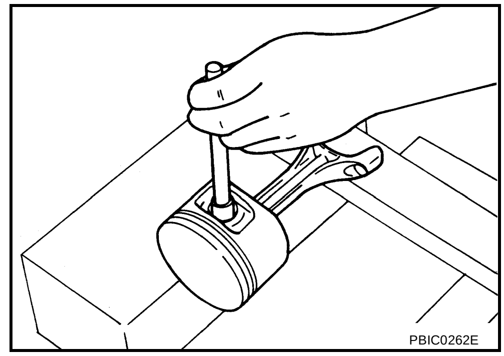
PBIC1638E

b. Heat piston to 60 to 70°C (140 to 158°F) with an industrial use drier or equivalent.



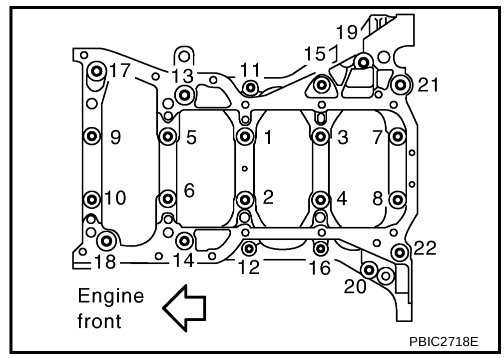
PBIC1639E

c. Push out piston pin with a stick of outer diameter approximately 19 mm (0.75 in).



15. Remove lower cylinder block mounting bolts.
    - Before loosening lower cylinder block mounting bolts, measure crankshaft end play. Refer to EM-99, "CRANKSHAFT END PLAY"
    - Loosen them in reverse order as shown in the figure, and remove them.

    NOTE:
    Use TORX socket (size E14) for bolts No. 1 to 10.

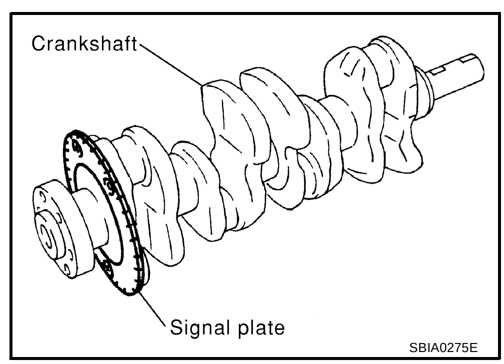


16. Remove lower cylinder block.
    - Use the seal cutter [SST: KV10111100 (J37228)] or suitable tool to cut liquid gasket for removal.

    CAUTION:
    Be careful not to damage the mounting surface.
17. Remove crankshaft.

    CAUTION:
    - **Be careful not damage or deform signal plate mounted on crankshaft.**
    - **When setting crankshaft on a flat floor surface, use a block of wood to avoid interference between signal plate and the floor surface.**
    - **Do not remove signal plate unless it is necessary to do so.**

    NOTE:
    When removing or installing signal plate, use TORX socket (size T30).



18. Pull rear oil seal out from rear end of crankshaft.

    NOTE:
    When replacing rear oil seal without removing lower cylinder block, use a screwdriver to pull the oil seal installed between crankshaft and cylinder block out.

    CAUTION:
    Be careful not to damage crankshaft and cylinder block.
19. Remove main bearings and thrust bearings from cylinder block and lower cylinder block.

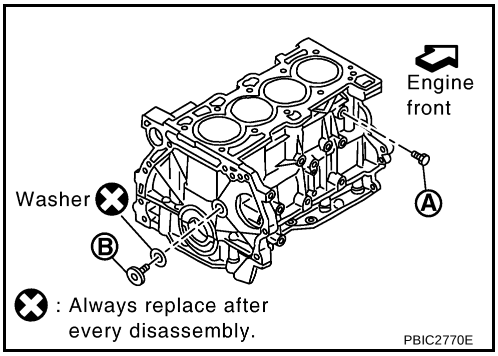
    CAUTION:
    Identify installation positions, and store them without mixing them up.

ASSEMBLY

1. Fully air-blow engine coolant and engine oil passages in cylinder block, cylinder bore and crankcase to remove any foreign material.

CAUTION:
Use a goggles to protect your eye.

2. Install each plug to cylinder block as shown in the figure.



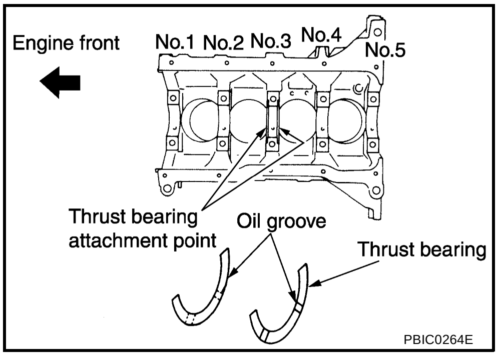
- Apply liquid gasket to the thread of water drain plug “A”.
  Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .
  NOTE:
  Do not apply liquid gasket to the thread of plug “B”.
- Tighten each plug as specified below.

Part	Washer	Tightening torque
A	No	9.8 N·m (1.0 kg-m, 87 in-lb)
B	Yes	53.9 N·m (5.5 kg-m, 40 ft-lb)

3. Install main bearings and thrust bearings with the following procedure:

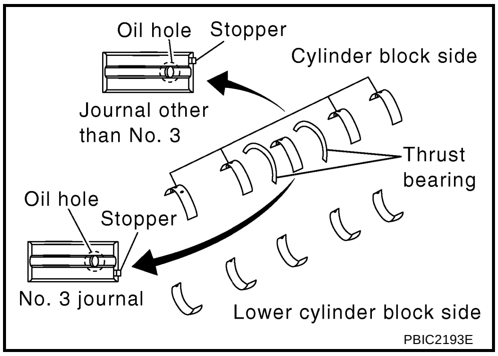
a. Remove dust, dirt, and engine oil on the bearing mating surfaces of cylinder block and lower cylinder block.

b. Install thrust bearings to the both sides of the No. 3 journal housing on cylinder block.



- Install thrust bearings with the oil groove facing crankshaft arm (outside).

c. Install the main bearings paying attention to the direction.



- Main bearing with an oil hole and groove goes on cylinder block. The one without them goes on lower cylinder block.
- Only main bearing (on cylinder block) for No. 3 journal has different specifications.
- Before installing main bearings, apply new engine oil to the bearing surface (inside). Do not apply engine oil to the back surface, but thoroughly clean it.
- When installing, align main bearing stopper to the notch.
- Ensure the oil holes on cylinder block and those on the corresponding bearing are aligned.

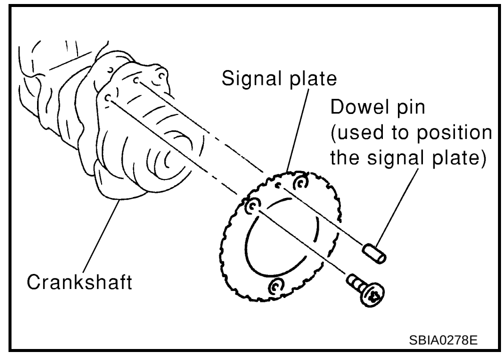
4. Install signal plate to crankshaft if removed.

a. Position crankshaft and signal plate using a dowel pin, and tighten mounting bolts.

NOTE:
Dowel pin of crankshaft and signal plate is provided as a set for each. If dowel pin is not available (when reusing crankshaft and signal plate), use M6 bolt [length 10 mm (0.39 in) or more] as a substitute.

b. Remove dowel pin.

CAUTION:
Be sure to remove dowel pin.



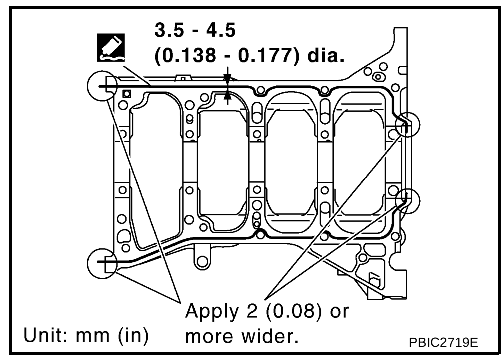
5. Install crankshaft to cylinder block.
   - While turning crankshaft by hand, make sure that it turns smoothly.

   CAUTION:
   Do not install rear oil seal yet.
6. Inspect outer diameter of lower cylinder block mounting bolts. Refer to EM-107, "LOWER CYLINDER BLOCK MOUNTING BOLT OUTER DIAMETER" .
7. Install lower cylinder block with the following procedure:

a. Apply liquid gasket with the tube presser [SST: WS39930000 (—)] to lower cylinder block as shown in the figure.
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .

CAUTION:
After liquid gasket is applied, rear oil seal installation must be finished within 5 minutes. Therefore, the following procedure must be performed quickly.

NOTE:
Lower cylinder block cannot be replaced as a single part, because it is machined together with cylinder block.



b. Tighten lower cylinder block mounting bolts with the following procedure:

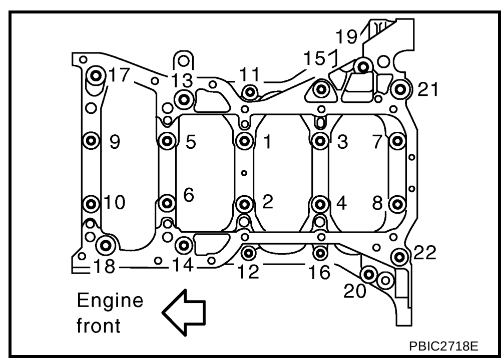
i. Apply new engine oil to threads and seat surfaces of the mounting bolts.

ii. Tighten M8 bolts in numerical order from No. 11 to 22 in the figure.

: 25.1 N·m (2.6 kg-m, 19 ft-lb)

CAUTION:
Wipe off completely any protruding liquid gasket on rear oil seal installation surface.

NOTE:
There are more processes to complete the tightening of mounting bolts. However stop procedure here to install rear oil seal.

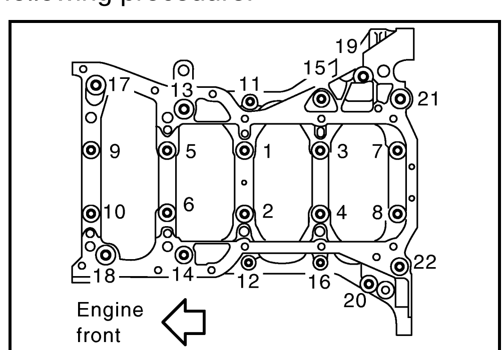


c. Install rear oil seal. Refer to EM-61, "Removal and Installation of Rear Oil Seal" .

d. Restart tightening of lower cylinder block mounting bolts with the following procedure:

i. Tighten M10 bolts in numerical order from No. 1 to 10 in the figure.

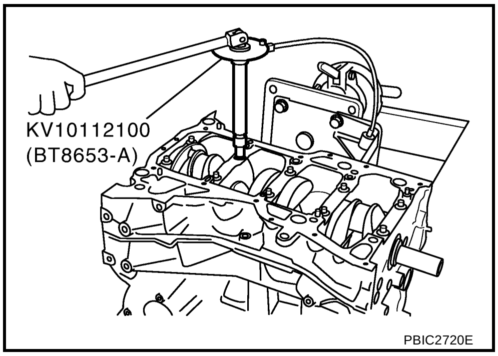
: 39.2 N·m (4.0 kg-m, 29 ft-lb)



ii. Turn M10 bolts 60 degrees clockwise (angle tightening) in numerical order from No. 1 to 10 in the figure.

CAUTION:

Check and confirm the tightening angle by using the angle wrench [SST] or protractor. Avoid judgment by visual inspection without the tool.



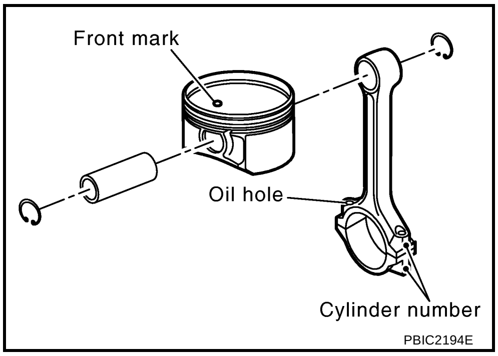
- After installing the mounting bolts, make sure that crankshaft can be rotated smoothly by hand.
- Wipe off completely any protruding liquid gasket on front side of the engine.
- Check crankshaft end play. Refer to EM-99, "CRANKSHAFT END PLAY" .

8. Install piston to connecting rod with the following procedure:

a. Using snap ring pliers, install new snap ring to the groove of the piston rear side.
   - Insert it fully into groove to install.

b. Assemble piston to connecting rod.
   - Using an industrial drier or similar tool, heat piston until piston pin can be pushed in by hand without excess force [approximately 60 to 70 °C (140 to 158 °F)]. From the front to the rear, insert piston pin into piston and connecting rod.
   - Assemble so that the front mark on the piston head and the oil holes and the cylinder number on connecting rod are positioned as shown in the figure.

c. Install new snap ring to the groove of the piston front side.
   - Insert it fully into groove to install.
   - After installing, make sure that connecting rod moves smoothly.



9. Using a piston ring expander (commercial service tool), install piston rings.

CAUTION:

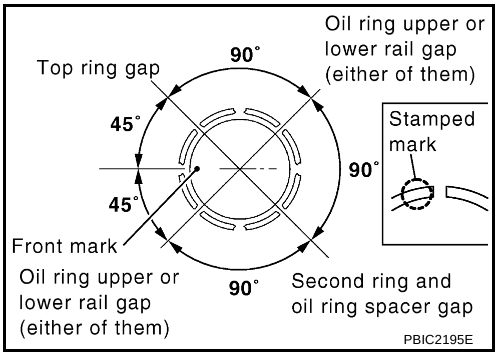
- **Be careful not to damage piston.**
- **Be careful not to damage piston rings by expanding them excessively.**
- Position each ring with the gap as shown in the figure referring to the piston front mark.
- Install second ring with the stamped surface facing upward.

Stamped mark:

Top ring	**: —**
Second ring	**: 2F**

NOTE:

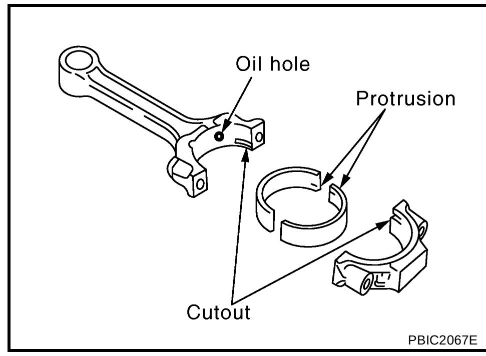
If there is no stamped mark on piston ring, no specific orientation is required for installation.



10. Inspect outer diameter of connecting rod bolts. Refer to EM-107, "CONNECTING ROD BOLT OUTER DIAMETER" .

11. Install connecting rod bearings to connecting rod and connecting rod cap.
   - When installing connecting rod bearings, apply new engine oil to the bearing surface (inside). Do not apply engine oil to the back surface, but thoroughly clean it.

- When installing, align the connecting rod bearing stopper protrusion with the cutout of connecting rod and connecting rod cap to install.
- Ensure the oil hole on connecting rod and that on the corresponding bearing are aligned.

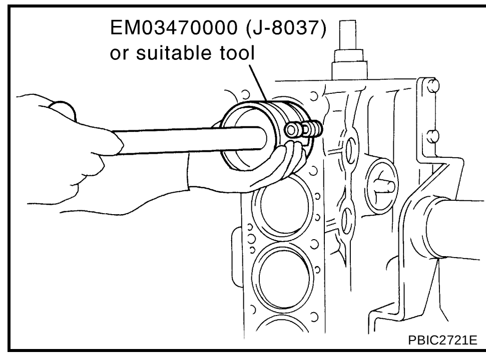


PBIC2067E

12. Install piston and connecting rod assembly to crankshaft.
    - Position crankshaft pin corresponding to connecting rod to be installed onto the bottom dead center.
    - Apply new engine oil sufficiently to the cylinder bore, piston and crankshaft pin.
    - Match the cylinder position with the cylinder number on connecting rod to install.
    - Using the piston ring compressor [SST] or suitable tool, install piston with the front mark on the piston head facing the front of the engine.

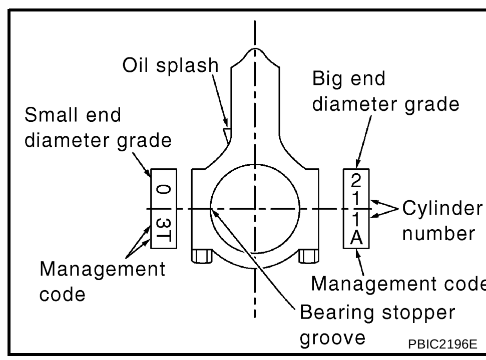
      CAUTION:

      Be careful not to damage the cylinder wall and crankshaft pin, resulting from an interference of the connecting rod big end.



PBIC2721E

13. Install connecting rod cap.
    - Match the stamped cylinder number marks on connecting rod with those on connecting rod cap to install.



PBIC2196E

14. Tighten connecting rod bolt with the following procedure:

a. Apply new engine oil to the threads and seats of connecting rod bolts.

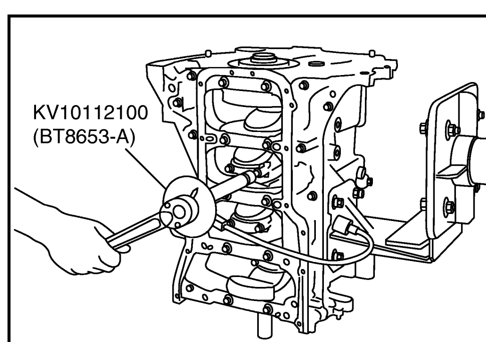
b. Tighten bolts in several steps.

: 19.6 N·m (2.0 kg-m, 14 ft-lb)

c. Then turn all bolts 90 degrees clockwise (angle tightening).

CAUTION:

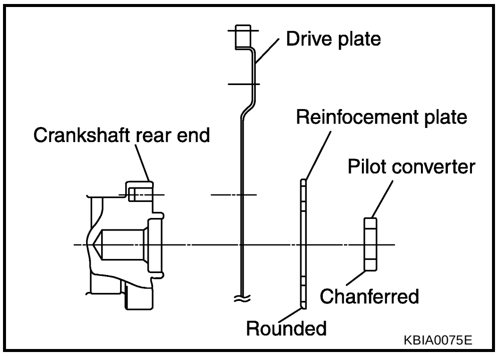
Check and confirm the tightening angle by using the angle wrench [SST] or protractor. Avoid judgement by visual inspection without the tool.



PBIC2722E

- After tightening connecting rod bolt, make sure that crankshaft rotates smoothly.
- Check the connecting rod side clearance. Refer to EM-99, "CONNECTING ROD SIDE CLEARANCE" .

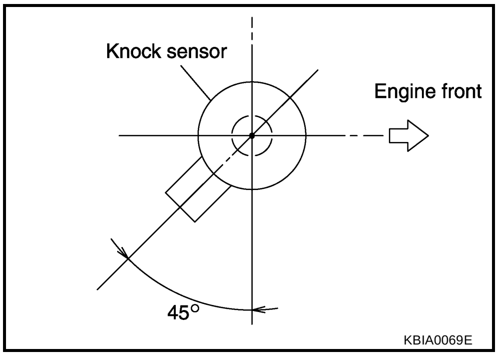
15. Install flywheel (M/T models) or drive plate (A/T models).
    - Secure crankshaft with a stopper plate, and tighten mounting bolts crosswise over several times.
    - Install drive plate, reinforcement plate and pilot converter as shown in figure (A/T models).
    - Using a drift of 33 mm (1.30 in) in diameter, press-fit pilot converter into the end of crankshaft until it stops (A/T models).



16. Install knock sensor.
    - Install knock sensor with connector facing lower left by 45 degrees as shown in the figure.

    CAUTION:
    - **Do not tighten mounting bolt while holding the connector.**
    - **If any impact by dropping is applied to knock sensor, replace it with a new one.**

    NOTE:
    - Make sure that there is no foreign material on the cylinder block mating surface and the back surface of knock sensor.
    - Make sure that knock sensor does not interfere with other parts.



17. Install crankshaft position sensor (POS).
18. Assemble in the reverse order of disassembly after this step.

How to Select Piston and Bearing

ABS00CJN

DESCRIPTION

Selection points	Selection parts	Selection items	Selection methods
Between cylinder block and crankshaft	Main bearing	Main bearing grade (bearing thickness)	Determined by match of cylinder block bearing housing grade (inner diameter of housing) and crankshaft journal grade (outer diameter of journal)
Between crankshaft and connecting rod	Connecting rod bearing	Connecting rod bearing grade (bearing thickness)	Combining service grades for connecting rod big end diameter and crankshaft pin outer diameter determine connecting rod bearing selection.
Between cylinder block and piston	Piston and piston pin assembly (piston is available together with piston pin as an assembly.)	Piston grade (piston skirt diameter)	Piston grade = cylinder bore grade (inner diameter of bore)
Between piston and connecting rod*	—	—	—

*For the service parts, the grade for fitting cannot be selected between piston pin and connecting rod. (Only grade “0” is available.) The information at the shipment from the plant is described as a reference.

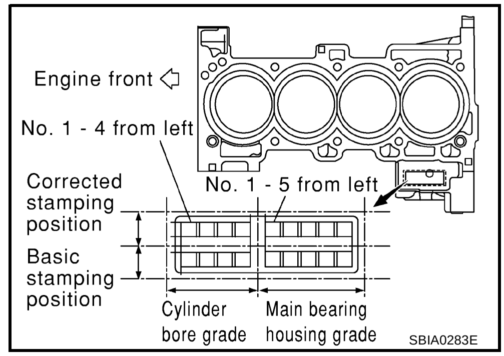
- The identification grade stamped on each part is the grade for the dimension measured in new condition. This grade cannot apply to reused parts.

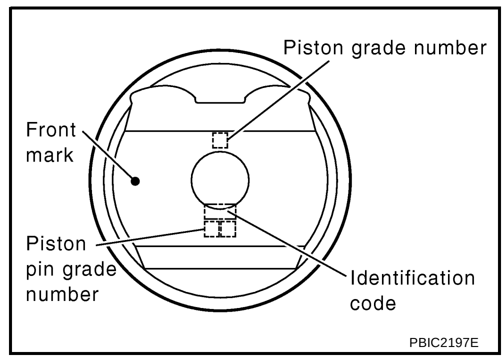
- For reused or repaired parts, measure the dimension accurately. Determine the grade by comparing the measurement with the values of each selection table.
- For details of the measurement method of each part, the reuse standards and the selection method of the selective fitting parts, refer to the text.

HOW TO SELECT PISTON

When New Cylinder Block Is Used

- Check the cylinder bore grade on rear-left side of cylinder block, and select piston of the same grade.
- If there is a corrected stamp mark on cylinder block, use it as a correct reference.





When Cylinder Block Is Reused

1. Measure the cylinder bore inner diameter. Refer to EM-103, "Cylinder Bore Inner Diameter" .
2. Determine the bore grade by comparing the measurement with the values under the cylinder bore inner diameter of the “Piston Selection Table”.
3. Select piston of the same grade.

Piston Selection Table

Unit: mm (in)

Grade number (Mark)	2 (or no mark)	3
Cylinder bore Inner diameter	89.010 - 89.020 (3.5043 - 3.5047)	89.020 - 89.030 (3.5047 - 3.5051)
Piston skirt diameter	88.990 - 89.000 (3.5035 - 3.5039)	89.000 - 89.010 (3.5039 - 3.5043)

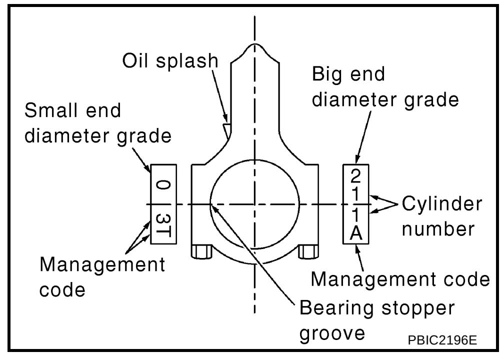
NOTE:

- There is no piston grade “1”.
- Piston is available together with piston pin as an assembly.
- The piston pin (piston pin hole) grade is provided only for the parts installed at the plant. For service parts, no grades can be selected. (Only grade “0” is available.)

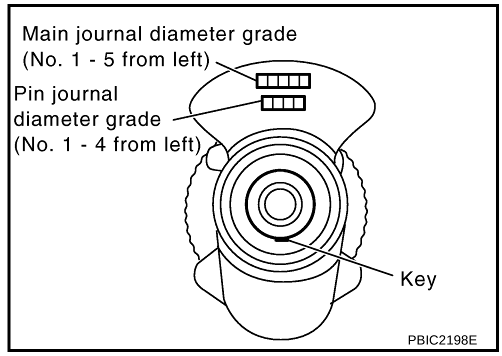
HOW TO SELECT CONNECTING ROD BEARING

When New Connecting Rod and Crankshaft Are Used

1. Apply connecting rod big end diameter grade stamped on connecting rod side face to the row in the “Connecting Rod Bearing Selection Table”.



2. Apply crankshaft pin journal diameter grade stamped on crankshaft front side to the column in the “Connecting Rod Bearing Selection Table”.



3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

When Crankshaft and Connecting Rod Are Reused

1. Measure the dimensions of the connecting rod big end diameter and crankshaft pin journal diameter individually. Refer to EM-101, "CONNECTING ROD BIG END DIAMETER" and EM-105, "CRANKSHAFT PIN JOURNAL DIAMETER" .
2. Apply the measured dimension to the “Connecting Rod Bearing Selection Table”.
3. Read the symbol at the cross point of selected row and column in the “Connecting Rod Bearing Selection Table”.
4. Apply the symbol obtained to the “Connecting Rod Bearing Grade Table” to select connecting rod bearing.

Connecting Rod Bearing Selection Table

Crankshaft pin journal diameter \ Connecting rod big end diameter	Mark	0	1	2	3	4	5	6	7	8	9	A	B	C
Mark	Outer diameter Unit: mm (in) \ Inner diameter Unit: mm (in)	48.000 - 48.001 (1.8898 - 1.8898)	48.001 - 48.002 (1.8898 - 1.8898)	48.002 - 48.003 (1.8898 - 1.8899)	48.003 - 48.004 (1.8899 - 1.8899)	48.004 - 48.005 (1.8899 - 1.8900)	48.005 - 48.006 (1.8900 - 1.8900)	48.006 - 48.007 (1.8900 - 1.8900)	48.007 - 48.008 (1.8900 - 1.8901)	48.008 - 48.009 (1.8901 - 1.8901)	48.009 - 48.010 (1.8901 - 1.8902)	48.010 - 48.011 (1.8902 - 1.8902)	48.011 - 48.012 (1.8902 - 1.8902)	48.012 - 48.013 (1.8902 - 1.8903)
A	44.974 - 44.973 (1.7706 - 1.7706)	0	0	0	0	0	0	0	0	1	1	1	1	1
B	44.973 - 44.972 (1.7706 - 1.7705)	0	0	0	0	0	0	0	1	1	1	1	1	1
C	44.972 - 44.971 (1.7705 - 1.7705)	0	0	0	0	0	0	1	1	1	1	1	1	1
D	44.971 - 44.970 (1.7705 - 1.7705)	0	0	0	0	0	1	1	1	1	1	1	1	1
E	44.970 - 44.969 (1.7705 - 1.7704)	0	0	0	0	1	1	1	1	1	1	1	1	2
F	44.969 - 44.968 (1.7704 - 1.7704)	0	0	0	1	1	1	1	1	1	1	1	2	2
G	44.968 - 44.967 (1.7704 - 1.7704)	0	0	1	1	1	1	1	1	1	1	2	2	2
H	44.967 - 44.966 (1.7704 - 1.7703)	0	1	1	1	1	1	1	1	1	2	2	2	2
J	44.966 - 44.965 (1.7703 - 1.7703)	1	1	1	1	1	1	1	1	2	2	2	2	2
K	44.965 - 44.964 (1.7703 - 1.7702)	1	1	1	1	1	1	1	2	2	2	2	2	2
L	44.964 - 44.963 (1.7702 - 1.7702)	1	1	1	1	1	1	2	2	2	2	2	2	2
M	44.963 - 44.962 (1.7702 - 1.7702)	1	1	1	1	1	2	2	2	2	2	2	2	2
N	44.962 - 44.961 (1.7702 - 1.7701)	1	1	1	1	2	2	2	2	2	2	2	2	3
P	44.961 - 44.960 (1.7701 - 1.7701)	1	1	1	2	2	2	2	2	2	2	2	3	3
R	44.960 - 44.959 (1.7701 - 1.7700)	1	1	2	2	2	2	2	2	2	2	3	3	3
S	44.959 - 44.958 (1.7700 - 1.7700)	1	2	2	2	2	2	2	2	2	3	3	3	3
T	44.958 - 44.957 (1.7700 - 1.7700)	2	2	2	2	2	2	2	2	3	3	3	3	3
U	44.957 - 44.956 (1.7700 - 1.7699)	2	2	2	2	2	2	2	3	3	3	3	3	3

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Connecting Rod Bearing Grade Table

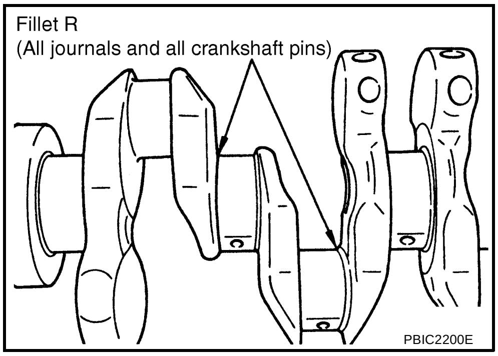
Unit: mm (in)

Grade number	0	1	2	3
Thickness	1.495 - 1.499 (0.0589 - 0.0590)	1.499 - 1.503 (0.0590 - 0.0592)	1.503 - 1.507 (0.0592 - 0.0593)	1.507 - 1.511 (0.0593 - 0.0595)
Identification color	Black	Brown	Green	Yellow

Undersize Bearings Usage Guide

- When the specified connecting rod bearing oil clearance is not obtained with standard size connecting rod bearings, use undersize (US) bearings.
- When using undersize (US) bearing, measure the connecting rod bearing inner diameter with bearing installed, and grind the crankshaft pin so that the connecting rod bearing oil clearance satisfies the standard.

CAUTION:
In grinding crankshaft pin to use undersize bearings, keep the fillet R [1.5 - 1.7 mm (0.059 - 0.067 in)].



Bearing undersize table

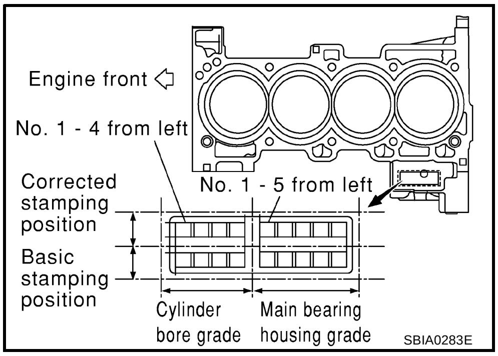
Unit: mm (in)

Size	Thickness
US 0.25 (0.0098)	1.624 - 1.632 (0.0639 - 0.0643)

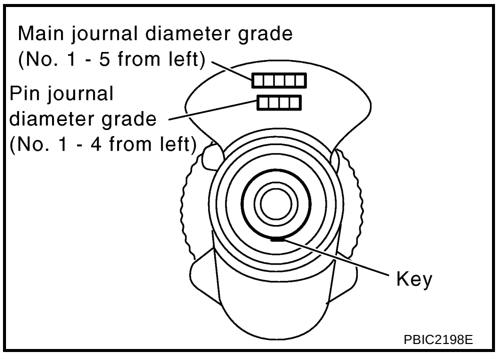
HOW TO SELECT MAIN BEARING

When New Cylinder Block and Crankshaft Are Used

1. “Main Bearing Selection Table” rows correspond to main bearing housing grade on rear-left side of cylinder block.
   - If there is a corrected stamp mark on cylinder block, use it as a correct reference.



2. Apply main journal diameter grade stamped on crankshaft front side to column in the “Main Bearing Selection Table”.



3. Read the symbol at the cross point of selected row and column in the “Main Bearing Selection Table”.
   CAUTION:
   There are two main bearing selection tables. One is for odd-numbered journals (No. 1, 3 and 5) and the other is for even-numbered journals (No. 2 and 4). Make certain to use the appropriate table. This is due to differences in the specified clearances.
4. Apply the symbol obtained to the “Main Bearing Grade Table” to select main bearing.
   NOTE:
   Service part is available as a set of both upper and lower.

When Cylinder Block and Crankshaft Are Reused

1. Measure the dimensions of the cylinder block main bearing housing inner diameter and crankshaft main journal diameter individually. Refer to EM-103, "MAIN BEARING HOUSING INNER DIAMETER" and EM-104, "CRANKSHAFT MAIN JOURNAL DIAMETER" .
2. Apply the measured dimension to the “Main Bearing Selection Table”.

3. Read the symbol at the cross point of selected row and column in the “Main Bearing Selection Table”.

   CAUTION:

   There are two main bearing selection tables. One is for odd-numbered journals (No. 1, 3 and 5) and the other is for even-numbered journals (No. 2 and 4). Make certain to use the appropriate table. This is due to differences in the specified clearances.

4. Apply the symbol obtained to the “Main Bearing Grade Table” to select main bearing.

   NOTE:

   Service part is available as a set of both upper and lower.

Main Bearing Selection Table (No. 1, 3 and 5 Journals)

Crankshaft main journal diameter / Cylinder block main bearing housing inner diameter	Mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	4	7
	Inner diameter Unit: mm (in)	58.944 - 58.945 (2.3206 - 2.3207)	58.945 - 58.946 (2.3207 - 2.3207)	58.946 - 58.947 (2.3207 - 2.3207)	58.947 - 58.948 (2.3207 - 2.3208)	58.948 - 58.949 (2.3208 - 2.3208)	58.949 - 58.950 (2.3208 - 2.3209)	58.950 - 58.951 (2.3209 - 2.3209)	58.951 - 58.952 (2.3209 - 2.3209)	58.952 - 58.953 (2.3209 - 2.3210)	58.953 - 58.954 (2.3210 - 2.3210)	58.954 - 58.955 (2.3210 - 2.3211)	58.955 - 58.956 (2.3211 - 2.3211)	58.956 - 58.957 (2.3211 - 2.3211)	58.957 - 58.958 (2.3211 - 2.3212)	58.958 - 58.959 (2.3212 - 2.3212)	58.959 - 58.960 (2.3212 - 2.3213)	58.960 - 58.961 (2.3213 - 2.3213)	58.961 - 58.962 (2.3213 - 2.3213)	58.962 - 58.963 (2.3213 - 2.3214)	58.963 - 58.964 (2.3214 - 2.3214)	58.964 - 58.965 (2.3214 - 2.3215)	58.965 - 58.966 (2.3215 - 2.3215)	58.966 - 58.967 (2.3215 - 2.3215)	58.967 - 58.968 (2.3215 - 2.3216)
Mark	Outer diameter Unit: mm (in)																								
A	54.979 - 54.978 (2.1645 - 2.1645)	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4
B	54.978 - 54.977 (2.1645 - 2.1644)	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4
C	54.977 - 54.976 (2.1644 - 2.1644)	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4
D	54.976 - 54.975 (2.1644 - 2.1644)	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
E	54.975 - 54.974 (2.1644 - 2.1643)	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
F	54.974 - 54.973 (2.1643 - 2.1643)	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
G	54.973 - 54.972 (2.1643 - 2.1642)	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
H	54.972 - 54.971 (2.1642 - 2.1642)	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
J	54.971 - 54.970 (2.1642 - 2.1642)	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
K	54.970 - 54.969 (2.1642 - 2.1641)	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56
L	54.969 - 54.968 (2.1641 - 2.1641)	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56
M	54.968 - 54.967 (2.1641 - 2.1641)	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56
N	54.967 - 54.966 (2.1641 - 2.1640)	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6
P	54.966 - 54.965 (2.1640 - 2.1640)	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6
R	54.965 - 54.964 (2.1640 - 2.1639)	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6
S	54.964 - 54.963 (2.1639 - 2.1639)	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67
T	54.963 - 54.962 (2.1639 - 2.1639)	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67
U	54.962 - 54.961 (2.1639 - 2.1638)	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67
V	54.961 - 54.960 (2.1638 - 2.1638)	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7
W	54.960 - 54.959 (2.1638 - 2.1637)	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7
X	54.959 - 54.958 (2.1637 - 2.1637)	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7
Y	54.958 - 54.957 (2.1637 - 2.1637)	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7
4	54.957 - 54.956 (2.1637 - 2.1636)	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7	7
7	54.956 - 54.955 (2.1636 - 2.1636)	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67	7	7	7	7	7	7

PBIC2201E

Main Bearing Selection Table (No. 2 and 4 Journals)

Cylinder block main bearing housing inner diameter / Crankshaft main journal diameter	Mark	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Y	4	7
	Inner diameter Unit: mm (in)	58.944 - 58.945 (2.3206 - 2.3207)	58.945 - 58.946 (2.3207 - 2.3207)	58.946 - 58.947 (2.3207 - 2.3207)	58.947 - 58.948 (2.3207 - 2.3208)	58.948 - 58.949 (2.3208 - 2.3208)	58.949 - 58.950 (2.3208 - 2.3209)	58.950 - 58.951 (2.3209 - 2.3209)	58.951 - 58.952 (2.3209 - 2.3209)	58.952 - 58.953 (2.3209 - 2.3210)	58.953 - 58.954 (2.3210 - 2.3210)	58.954 - 58.955 (2.3210 - 2.3211)	58.955 - 58.956 (2.3211 - 2.3211)	58.956 - 58.957 (2.3211 - 2.3211)	58.957 - 58.958 (2.3211 - 2.3212)	58.958 - 58.959 (2.3212 - 2.3212)	58.959 - 58.960 (2.3212 - 2.3213)	58.960 - 58.961 (2.3213 - 2.3213)	58.961 - 58.962 (2.3213 - 2.3213)	58.962 - 58.963 (2.3213 - 2.3214)	58.963 - 58.964 (2.3214 - 2.3214)	58.964 - 58.965 (2.3214 - 2.3215)	58.965 - 58.966 (2.3215 - 2.3215)	58.966 - 58.967 (2.3215 - 2.3215)	58.967 - 58.968 (2.3215 - 2.3216)
Mark	Outer diameter Unit: mm (in)																								
A	54.979 - 54.978 (2.1645 - 2.1645)	0	0	0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3
B	54.978 - 54.977 (2.1645 - 2.1644)	0	0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3
C	54.977 - 54.976 (2.1644 - 2.1644)	0	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3
D	54.976 - 54.975 (2.1644 - 2.1644)	0	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34
E	54.975 - 54.974 (2.1644 - 2.1643)	0	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34
F	54.974 - 54.973 (2.1643 - 2.1643)	0	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34
G	54.973 - 54.972 (2.1643 - 2.1642)	0	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4
H	54.972 - 54.971 (2.1642 - 2.1642)	0	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4
J	54.971 - 54.970 (2.1642 - 2.1642)	01	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4
K	54.970 - 54.969 (2.1642 - 2.1641)	01	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45
L	54.969 - 54.968 (2.1641 - 2.1641)	01	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45
M	54.968 - 54.967 (2.1641 - 2.1641)	1	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45
N	54.967 - 54.966 (2.1641 - 2.1640)	1	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5
P	54.966 - 54.965 (2.1640 - 2.1640)	1	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5
R	54.965 - 54.964 (2.1640 - 2.1639)	12	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5
S	54.964 - 54.963 (2.1639 - 2.1639)	12	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56
T	54.963 - 54.962 (2.1639 - 2.1639)	12	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56
U	54.962 - 54.961 (2.1639 - 2.1638)	2	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56
V	54.961 - 54.960 (2.1638 - 2.1638)	2	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6
W	54.960 - 54.959 (2.1638 - 2.1637)	2	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6
X	54.959 - 54.958 (2.1637 - 2.1637)	23	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6
Y	54.958 - 54.957 (2.1637 - 2.1637)	23	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67
4	54.957 - 54.956 (2.1637 - 2.1636)	23	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67
7	54.956 - 54.955 (2.1636 - 2.1636)	3	3	3	34	34	34	4	4	4	45	45	45	5	5	5	56	56	56	6	6	6	67	67	67

PBIC2202E

Main Bearing Grade Table (All Journals)

Unit: mm (in)

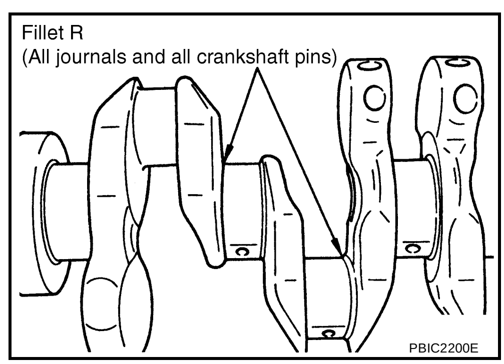
Grade number		Thickness	Identification color	Remarks
0		1.973 - 1.976 (0.0777 - 0.0778)	Black	Grade and color are the same for upper and lower bearings.
1		1.976 - 1.979 (0.0778 - 0.0779)	Brown	
2		1.979 - 1.982 (0.0779- 0.0780)	Green	
3		1.982 - 1.985 (0.0780 - 0.0781)	Yellow	
4		1.985 - 1.988 (0.0781 - 0.0783)	Blue	
5		1.988 - 1.991 (0.0783 - 0.0784)	Pink	
6		1.991 - 1.994 (0.0784 - 0.0785)	Purple	
7		1.994 - 1.997 (0.0785 - 0.0786)	White	
01	UPR	1.973 - 1.976 (0.0777 - 0.0778)	Black	Grade and color are different for upper and lower bearings.
	LWR	1.976 - 1.979 (0.0778 - 0.0779)	Brown	
12	UPR	1.976 - 1.979 (0.0778 - 0.0779)	Brown	
	LWR	1.979 - 1.982 (0.0779 - 0.0780)	Green	
23	UPR	1.979 - 1.982 (0.0779- 0.0780)	Green	
	LWR	1.982 - 1.985 (0.0780 - 0.0781)	Yellow	
34	UPR	1.982 - 1.985 (0.0780 - 0.0781)	Yellow	
	LWR	1.985 - 1.988 (0.0781 - 0.0783)	Blue	
45	UPR	1.985 - 1.988 (0.0781 - 0.0783)	Blue	
	LWR	1.988 - 1.991 (0.0783 - 0.0784)	Pink	
56	UPR	1.988 - 1.991 (0.0783 - 0.0784)	Pink	
	LWR	1.991 - 1.994 (0.0784 - 0.0785)	Purple	
67	UPR	1.991 - 1.994 (0.0784 - 0.0785)	Purple	
	LWR	1.994 - 1.997 (0.0785 - 0.0786)	White	

Use Undersize Bearing Usage Guide

- When the specified main bearing oil clearance is not obtained with standard size main bearings, use undersize (US) bearing.
- When using undersize (US) bearing, measure the main bearing inner diameter with bearing installed, and grind main journal so that the main bearing oil clearance satisfies the standard.

CAUTION:

In grinding crankshaft main journal to use undersize bearings, keep fillet R [1.5 - 1.7 mm (0.059 - 0.067 in)].



Bearing undersize table

Unit: mm (in)

Size	Thickness
US 0.25 (0.0098)	2.106 - 2.114 (0.0829 - 0.0832)

Inspection After Disassembly

ABS00CJO

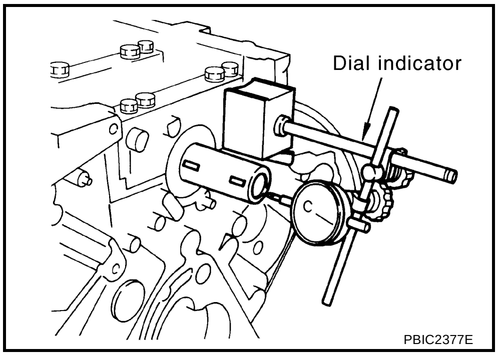
CRANKSHAFT END PLAY

- Measure the clearance between thrust bearings and crankshaft arm when crankshaft is moved fully forward or backward with a dial indicator.

Standard : 0.10 - 0.26 mm (0.0039 - 0.0102 in)

Limit : 0.30 mm (0.0118 in)

- If the measured value exceeds the limit, replace thrust bearings, and measure again. If it still exceeds the limit, replace crankshaft also.



PBIC2377E

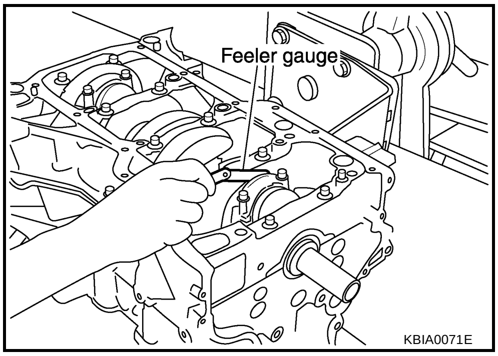
CONNECTING ROD SIDE CLEARANCE

- Measure the side clearance between connecting rod and crankshaft arm with a feeler gauge.

Standard : 0.20 - 0.35 mm (0.0079 - 0.0138 in)

Limit : 0.50 mm (0.0197 in)

- If the measured value exceeds the limit, replace connecting rod, and measure again. If it still exceeds the limit, replace crankshaft also.



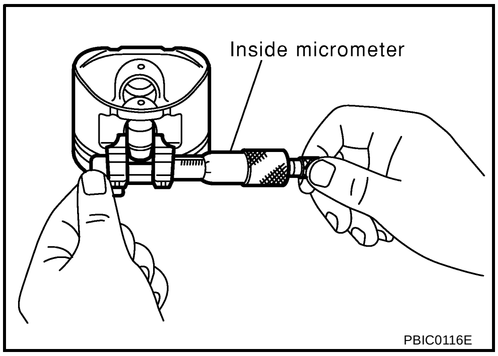
KBIA0071E

PISTON TO PISTON PIN OIL CLEARANCE

Piston Pin Hole Diameter

Measure the inner diameter of piston pin hole with an inside micrometer.

Standard: 19.993 - 20.005 mm (0.7871 - 0.7876 in)

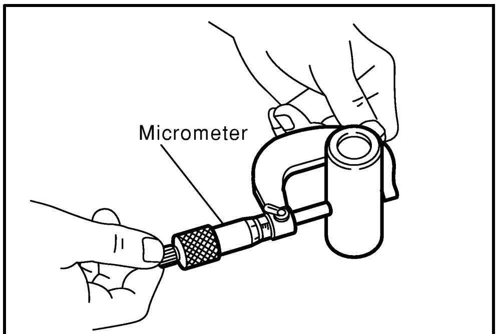


PBIC0116E

Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer.

Standard: 19.989 - 20.001 mm (0.7870 - 0.7874 in)



PBIC0117E

Piston to Piston Pin Oil Clearance

(Piston to piston pin oil clearance) = (Piston pin hole diameter) – (Piston pin outer diameter)

Standard: 0.002 - 0.006 mm (0.0001 - 0.0002 in)

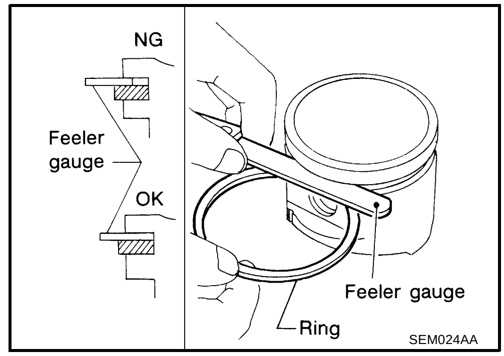
- If oil clearance is out of the standard, replace piston and piston pin assembly.

- When replacing piston and piston pin assembly, refer to EM-103, "PISTON TO CYLINDER BORE CLEARANCE" .

  NOTE:
  - Piston is available together with piston pin as assembly.
  - Piston pin (piston pin hole) grade is provided only for the parts installed at the plant. For service parts, no grades can be selected. (Only grade “0” is available.)

PISTON RING SIDE CLEARANCE

- Measure the side clearance of piston ring and piston ring groove with a feeler gauge.



Standard:

Top ring	**: 0.045 - 0.080 mm (0.0018 - 0.0031 in)**
2nd ring	**: 0.030 - 0.070 mm (0.0012 - 0.0028 in)**
Oil ring	**: 0.065 - 0.135 mm (0.0026 - 0.0053 in)**

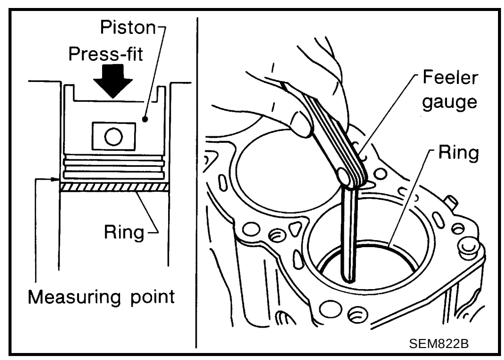
Limit:

Top ring	**: 0.11 mm (0.0043 in)**
2nd ring	**: 0.10 mm (0.0039 in)**

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, replace piston also.

PISTON RING END GAP

- Make sure that cylinder bore inner diameter is within the specification. Refer to EM-103, "Cylinder Bore Inner Diameter" .
- Lubricate with new engine oil to piston and piston ring, and then insert piston ring until middle of cylinder with piston, and measure piston ring end gap with a feeler gauge.



Standard:

Top ring	**: 0.21 - 0.31 mm (0.0083 - 0.0122 in)**
2nd ring	**: 0.32 - 0.47 mm (0.0126 - 0.0185 in)**
Oil ring (rail ring)	**: 0.20 - 0.60 mm (0.0079 - 0.0236 in)**

Limit:

Top ring	**: 0.54 mm (0.0213 in)**
2nd ring	**: 0.67 mm (0.0264 in)**
Oil ring (rail ring)	**: 0.95 mm (0.0374 in)**

- If the measured value exceeds the limit, replace piston ring, and measure again. If it still exceeds the limit, re-bore cylinder inner wall and use oversized piston and piston rings.

CONNECTING ROD BEND AND TORSION

- Check with a connecting rod aligner.

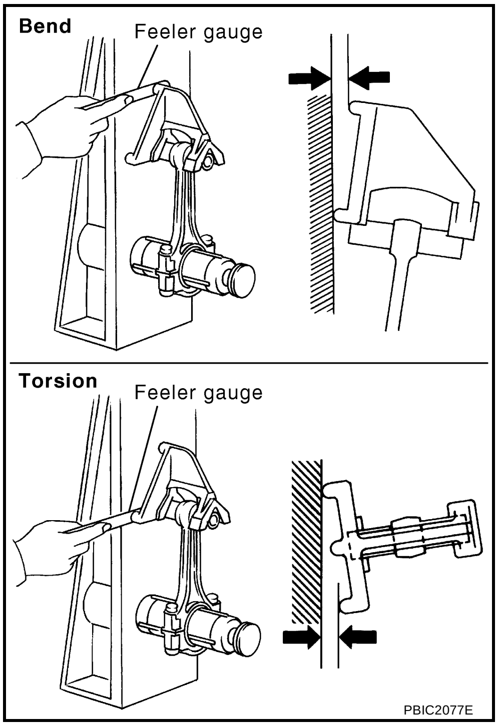
Bend:

Limit: 0.15 mm (0.0059 in) per 100 mm (3.94 in) length

Torsion:

Limit: 0.30 mm (0.0118 in) per 100 mm (3.94 in) length

- If it exceeds the limit, replace connecting rod assembly.



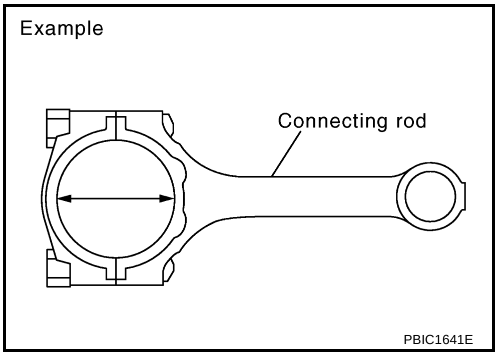
PBIC2077E

CONNECTING ROD BIG END DIAMETER

- Install connecting rod cap without connecting rod bearing installed, and tightening connecting rod bolts to the specified torque. Refer to EM-86, "ASSEMBLY" for the tightening procedure.
- Measure the inner diameter of connecting rod big end with an inside micrometer.

Standard: 48.000 - 48.013 mm (1.8898 - 1.8903 in)

- If out of the standard, replace connecting rod assembly.



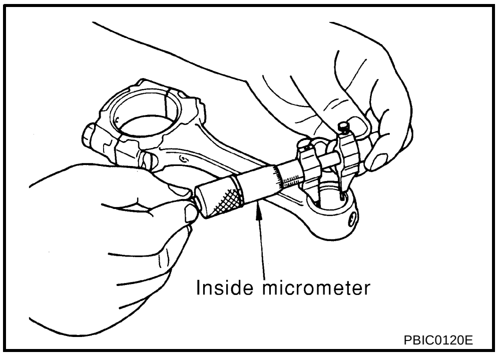
PBIC1641E

CONNECTING ROD BUSHING OIL CLEARANCE

Connecting Rod Bushing Inner Diameter

Measure the inner diameter of connecting rod bushing with an inside micrometer.

Standard: 20.000 - 20.012 mm (0.7874 - 0.7879 in)

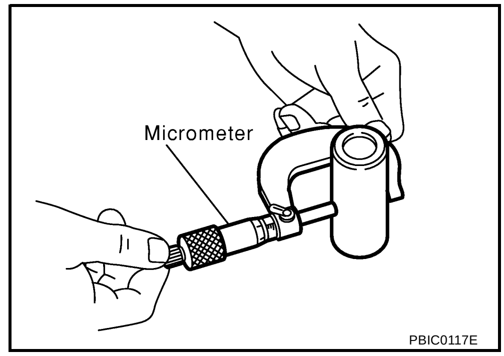


PBIC0120E

Piston Pin Outer Diameter

Measure the outer diameter of piston pin with a micrometer.

Standard: 19.989 - 20.001 mm (0.7870 - 0.7874 in)

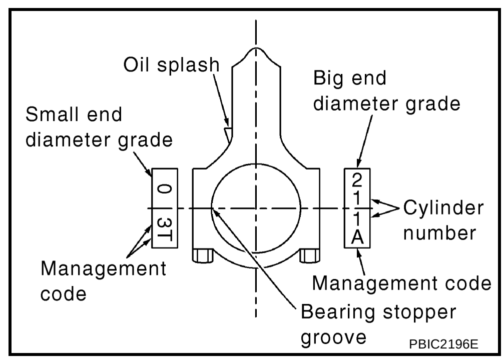


Connecting Rod Bushing Oil Clearance

(Connecting rod bushing oil clearance) = (Connecting rod bushing inner diameter) – (Piston pin outer diameter)

Standard: 0.005 - 0.017 mm (0.0002 - 0.0007 in)

- If the measured value is out of the standard, replace connecting rod assembly and/or piston and piston pin assembly.
- If replacing piston and piston pin assembly, refer to EM-103, "PISTON TO CYLINDER BORE CLEARANCE" .
- If replacing connecting rod assembly, refer to EM-105, "CONNECTING ROD BEARING OIL CLEARANCE" to select connecting rod bearing.



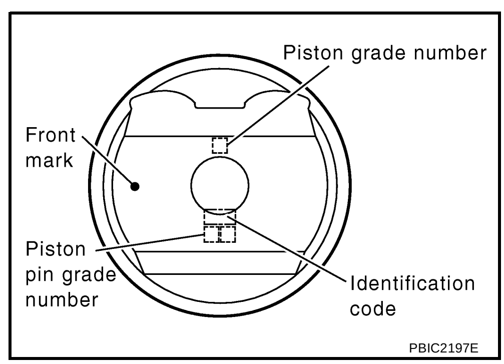
Factory installed parts grading:

- Service parts apply only to grade “0”.

Unit: mm (in)

Grade	0	1
Connecting rod bushing inner diameter*	20.000 - 20.006 (0.7874 - 0.7876)	20.006 - 20.012 (0.7876 - 0.7879)
Piston pin hole diameter	19.993 - 19.999 (0.7871 - 0.7874)	19.999 - 20. 005 (0.7874 - 0.7876)
Piston pin outer diameter	19.989 - 19.995 (0.7870 - 0.7872)	19.995 - 20.001 (0.7872 - 0.7874)

* : After installing in connecting rod.



CYLINDER BLOCK DISTORTION

- Using a scraper, remove gasket on the cylinder block surface, and also remove engine oil, scale, carbon, or other contamination.

  CAUTION:

  Be careful not to allow gasket flakes to enter engine oil or engine coolant passages.

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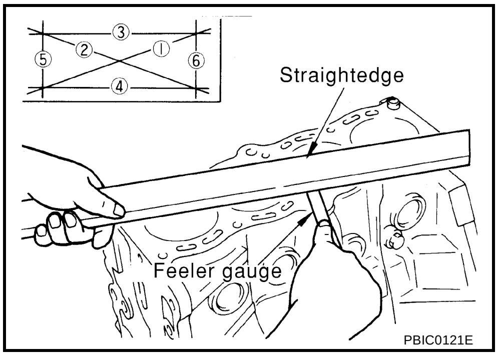


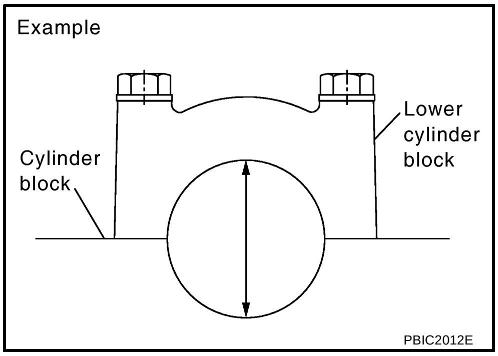
- Measure the distortion on the cylinder block upper face at some different points in six directions with a straight edge and a feeler gauge.

  Limit: 0.1 mm (0.004 in)

- If it exceeds the limit, replace cylinder block and lower cylinder block assembly.

  NOTE:
  Cylinder block cannot be replaced as a single, because it is machined together with lower cylinder block.

MAIN BEARING HOUSING INNER DIAMETER



- Install lower cylinder block without main bearings installed, and tighten lower cylinder block mounting bolts to the specified torque. Refer to EM-86, "ASSEMBLY" for the tightening procedure.
- Measure the inner diameter of main bearing housing with a bore gauge.

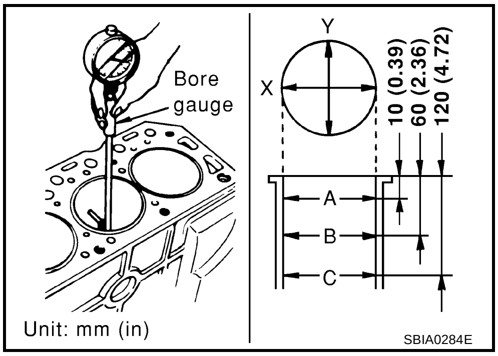
  Standard: 58.944 - 58.968 mm (2.3206 - 2.3216 in)

- If out of the standard, replace cylinder block and lower cylinder block assembly.

  NOTE:
  Cylinder block cannot be replaced as a single, because it is machined together with lower cylinder block.

PISTON TO CYLINDER BORE CLEARANCE

Cylinder Bore Inner Diameter



- Using a bore gauge, measure the cylinder bore for wear, out-of-round and taper at six different points on each cylinder. ("X" and "Y" directions at "A", "B" and "C") ("Y" is in longitudinal direction of the engine)

  NOTE:
  When determining cylinder bore grade, measure cylinder bore at "B" position.

  Standard inner diameter:
  89.010 - 89.030 mm (3.5043 - 3.5051 in)
  Wear limit:
  0.2 mm (0.008 in)
  Out-of-round (Difference between "X" and "Y"):
  0.015 mm (0.0006 in)
  Taper limit (Difference between "A" and "C"):
  0.01 mm (0.0004 in)

- If the measured value exceeds the limit, or if there are scratches and/or seizure on the cylinder inner wall, hone or re-bore the cylinder inner wall.
- Oversize piston is provided. When using oversize piston, re-bore the cylinder so that the clearance of the piston to cylinder bore satisfies the standard.

  CAUTION:
  When using an oversize piston, use oversize pistons for all cylinders with oversize piston rings.

  Oversize (OS): 0.2 mm (0.008 in)

Piston Skirt Diameter

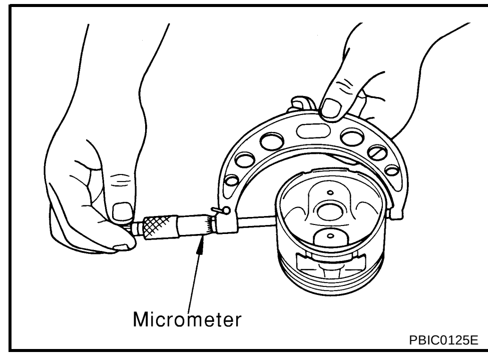
Measure the outer diameter of piston skirt with a micrometer.

Measure point

: Distance from the top 42.0 mm (1.654 in)

Standard

: 88.990 - 89.010 mm (3.5035 - 3.5043 in)



Piston to Cylinder Bore Clearance

Calculate by piston skirt diameter and cylinder bore inner diameter (direction “X”, position “B”).
(Clearance) = (Cylinder bore inner diameter) – (Piston skirt diameter)

Standard : 0.010 - 0.030 mm (0.0004 - 0.0012 in)

Limit : 0.08 mm (0.0031 in)

- If it exceeds the limit, replace piston and piston pin assembly. Refer to EM-92, "HOW TO SELECT PISTON" .

Re-boring Cylinder Bore

1. Cylinder bore size is determined by adding piston to cylinder bore clearance to piston skirt diameter.

   Re-bored size calculation: D = A + B - C

   where,

   D: Bored diameter

   A: Piston diameter as measured

   B: Piston - to - cylinder bore clearance (standard value)

   C: Honing allowance 0.02 mm (0.0008 in)

2. Install lower cylinder block, and tighten mounting bolts to the specified torque. Otherwise, cylinder bores may be distorted in final assembly. Refer to EM-86, "ASSEMBLY" for the tightening procedure.
3. Cut cylinder bores.

   NOTE:
   - When any cylinder needs boring, all other cylinders must also be bored.
   - Do not cut too much out of cylinder bore at a time. Cut only 0.05 mm (0.0020 in) or so in diameter at a time.
4. Hone cylinders to obtain the specified piston to cylinder bore clearance.
5. Measure the finished cylinder bore for out-of-round and taper.

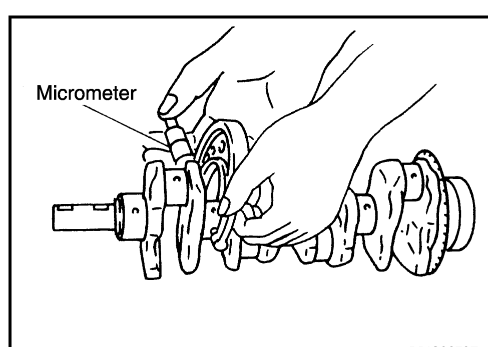
   NOTE:
   Measurement should be done after cylinder bore cools down.

CRANKSHAFT MAIN JOURNAL DIAMETER

- Measure the outer diameter of crankshaft main journals with a micrometer.

  Standard: 54.955 - 54.979 mm (2.1636 - 2.1645 in) dia.

- If out of the standard, measure the main bearing oil clearance. Then use undersize bearing. Refer to EM-106, "MAIN BEARING OIL CLEARANCE" .



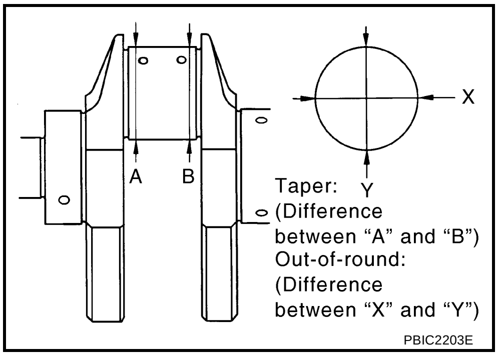
CRANKSHAFT PIN JOURNAL DIAMETER

- Measure the outer diameter of crankshaft pin journal with a micrometer.

Standard: 44.956 - 44.974 mm (1.7699-1.7706 in) dia.

- If out of the standard, measure the connecting rod bearing oil clearance. Then use undersize bearing. Refer to EM-105, "CONNECTING ROD BEARING OIL CLEARANCE" .

OUT-OF-ROUND AND TAPER OF CRANKSHAFT



PBIC2203E

- Measure the dimensions at four different points as shown in the figure on each main journal and pin journal with a micrometer.
- Out-of-round is indicated by the difference in dimensions between “X” and “Y” at “A” and “B”.
- Taper is indicated by the difference in dimension between “A” and “B” at “X” and “Y”.

Limit:

Out-of-round (Difference between “X” and “Y”)

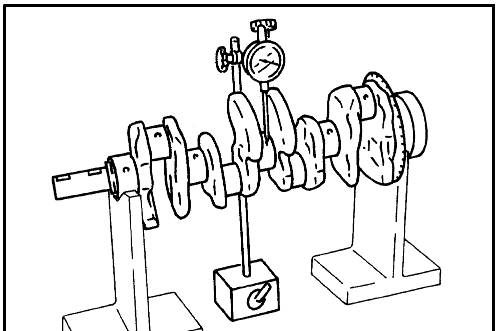
: 0.005 mm (0.0002 in)

Taper (Difference between “A” and “B”)

: 0.005 mm (0.0002 in)

- If the measured value exceeds the limit, correct or replace crankshaft.
- If corrected, measure the bearing oil clearance of the corrected main journal and/or pin journal. Then select main bearing and/or connecting rod bearing. Refer to EM-106, "MAIN BEARING OIL CLEARANCE" and/or EM-105, "CONNECTING ROD BEARING OIL CLEARANCE" .

CRANKSHAFT RUNOUT


PBIC2541E

- Place a V-block on a precise flat table to support the journals on the both end of crankshaft.
- Place a dial indicator straight up on the No. 3 journal.
- While rotating crankshaft, read the movement of the pointer on the dial indicator. (Total indicator reading)

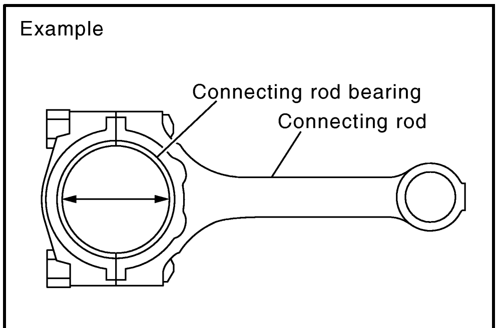
Limit : 0.05 mm (0.0020 in)

- If it exceeds the limit, replace crankshaft.

CONNECTING ROD BEARING OIL CLEARANCE

Method by Calculation

- Install connecting rod bearings to connecting rod and cap, and tighten connecting rod bolts to the specified torque. Refer to EM-86, "ASSEMBLY" for tightening procedure.



PBIC1642E

- Measure the inner diameter of connecting rod bearing with an inside micrometer.
  (Bearing oil clearance) = (Connecting rod bearing inner diameter) – (Crankshaft pin journal diameter)

Standard : 0.028 - 0.045 mm (0.0011 - 0.0018 in)

Limit : 0.10 mm (0.0039 in)

- If the clearance exceeds the limit, select proper connecting rod bearing according to connecting rod big end diameter and crankshaft pin journal diameter to obtain the specified bearing oil clearance. Refer to EM-93, "HOW TO SELECT CONNECTING ROD BEARING" .

Method of Using Plastigage

- Remove engine oil and dust on crankshaft pin and the surfaces of each bearing completely.

- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install connecting rod bearings to connecting rod and cap, and tighten connecting rod bolts to the specified torque. Refer to EM-86, "ASSEMBLY" for the tightening procedure.

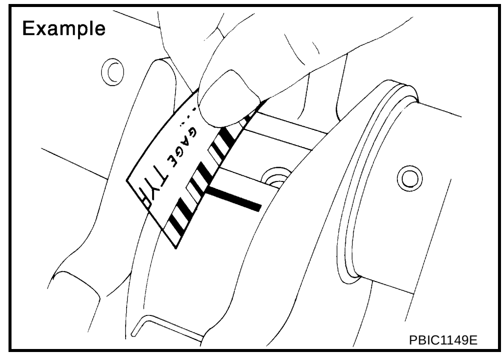
  CAUTION:

  Do not rotate crankshaft.

- Remove connecting rod cap and bearing, and using the scale on the plastigage bag, measure the plastigage width.

  NOTE:

  The procedure when the measured value exceeds the limit is same as that described in the "Method by Calculation".

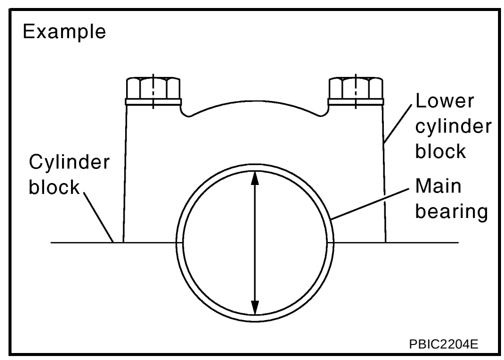


MAIN BEARING OIL CLEARANCE

Method by Calculation

- Install main bearings to cylinder block and lower cylinder block, and tighten lower cylinder block mounting bolts to the specified torque. Refer to EM-86, "ASSEMBLY" for the tightening procedure.
- Measure the inner diameter of main bearing with a bore gauge.

(Bearing oil clearance) = (Main bearing inner diameter) – (Crankshaft main journal diameter)



Standard:

No. 1, 3 and 5 journals

: 0.012 - 0.022 mm (0.0005 - 0.0009 in)

No. 2 and 4 journals

: 0.018 - 0.028 mm (0.0007 - 0.0011 in)

Limit : 0.1 mm (0.004 in)

- If the clearance exceeds the limit, select proper main bearing according to main bearing inner diameter and crankshaft main journal diameter to obtain the specified bearing oil clearance. Refer to EM-95, "HOW TO SELECT MAIN BEARING" .

Method of Using Plastigage

- Remove engine oil and dust on crankshaft main journal and the surfaces of each bearing completely.
- Cut a plastigage slightly shorter than the bearing width, and place it in crankshaft axial direction, avoiding oil holes.
- Install main bearings to cylinder block and lower cylinder block, and tighten lower cylinder block mounting bolts to the specified torque. Refer to EM-86, "ASSEMBLY" for the tightening procedure.

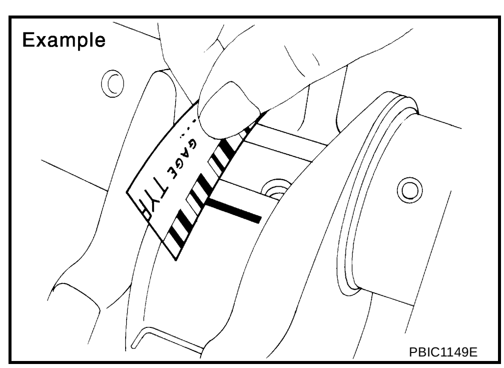
  CAUTION:

  Do not rotate crankshaft.

- Remove lower cylinder block and bearings, and using the scale on the plastigage bag, measure the plastigage width.

  NOTE:

  The procedure when the measured value exceeds the limit is same as that described in the "Method by Calculation".

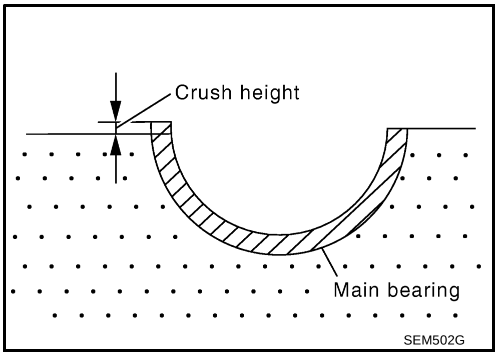


MAIN BEARING CRUSH HEIGHT

- When lower cylinder block is removed after being tightened to the specified torque with main bearings installed, the tip end of bearing must protrude. Refer to EM-86, "ASSEMBLY" for the tightening procedure.

Standard: There must be crush height.

- If the standard is not met, replace main bearings.



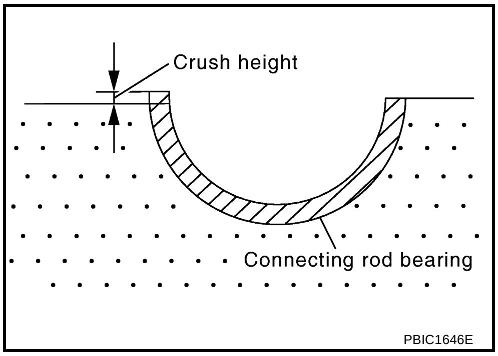
SEM502G

CONNECTING ROD BEARING CRUSH HEIGHT

- When connecting rod bearing cap is removed after being tightened to the specified torque with connecting rod bearings installed, the tip end of bearing must protrude. Refer to EM-86, "ASSEMBLY" for the tightening procedure.

Standard: There must be crush height.

- If the standard is not met, replace connecting rod bearings.



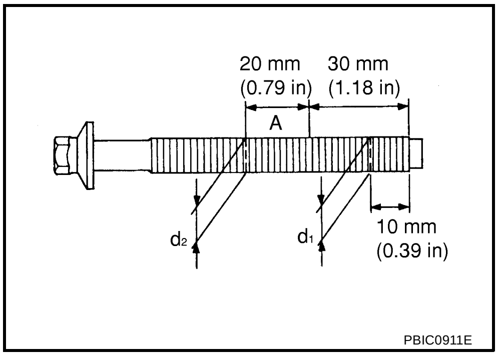
PBIC1646E

LOWER CYLINDER BLOCK MOUNTING BOLT OUTER DIAMETER

- Perform only with M10 bolts.
- Measure the outer diameters ("d_1", "d_2") at two positions as shown in the figure.
- If reduction appears in "A" range, regard it as "d_2".

Limit ("d_1" – "d_2") : 0.13 mm (0.0051 in)

- If it exceeds the limit (a large difference in dimensions), replace lower cylinder block mounting bolt with a new one.



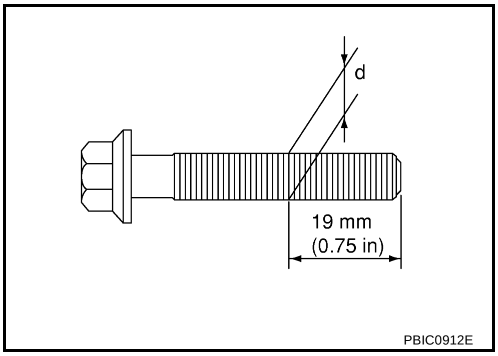
PBIC0911E

CONNECTING ROD BOLT OUTER DIAMETER

- Measure the outer diameter "d" at position as shown in the figure.
- If reduction appears in a position other than "d", regard it as "d".

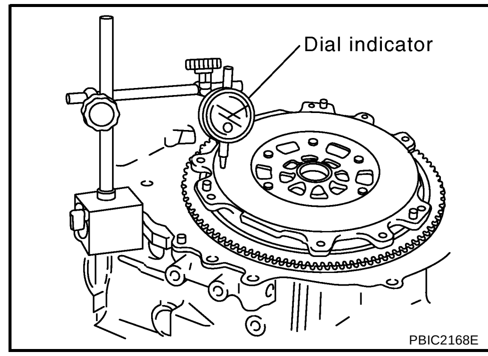
Limit : 7.75 mm (0.3051 in)

- When "d" falls below the limit (when it becomes thinner), replace connecting rod bolt with a new one.



PBIC0912E

FLYWHEEL DEFLECTION (M/T MODELS)



- Measure the deflection of flywheel contact surface to clutch with a dial indicator.
- Measure the deflection at 210 mm (8.27 in) dia.

Standard : 0.45 mm (0.0177 in) or less.

- If measured value is out of the standard, replace flywheel.

CAUTION:

When measuring, keep magnetic fields (such as dial indicator stand) away from signal plate of the rear end of crankshaft.

MOVEMENT AMOUNT OF FLYWHEEL (M/T MODELS)

CAUTION:

Do not disassemble double mass flywheel.

Movement Amount of Thrust (Fore-and-Aft) Direction

- Measure the movement amount of thrust (fore-and-aft) direction when 100 N (10.2 kg, 22 lb) force is added at the portion of 125 mm (4.92 in) radius from the center of flywheel.

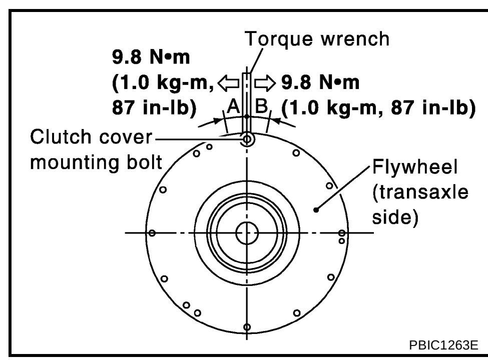
Standard : 1.3 mm (0.051 in) or less

- If measured value is out of the standard, replace flywheel.

Movement Amount in Radial (Rotation) Direction

Check the movement amount of radial (rotation) direction with the following procedure:

1. Install a bolt to clutch cover mounting hole, and place a torque wrench on the extended line of the flywheel center line.
   - Tighten bolt at a force of 9.8 N·m (1.0 kg-m, 87 in-lb) to keep it from loosening.



2. Put a mating mark on circumferences of the two flywheel masses without applying any load (Measurement standard points).
3. Apply a force of 9.8 N·m (1.0 kg-m, 87 in-lb) in each direction, and mark the movement amount on the mass on the transaxle side.
4. Measure the dimensions of movement amounts “A” and “B” on circumference of flywheel on the transaxle side.

Standard: 28.3 mm (1.114 in) or less.

- If measured value is out of the standard, replace flywheel.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

ABS00CJP

GENERAL SPECIFICATIONS

Cylinder arrangement		In-line 4
Displacement	cm^3 (cu in)	2,488 (151.82)
Bore and stroke	mm (in)	89.0 x 100.0 (3.504 x 3.937)
Valve arrangement		DOHC
Firing order		1-3-4-2
Number of piston rings	Compression	2
	Oil	1
Compression ratio		9.5
Compression pressure kPa (kg/cm^2 , psi) / 250 rpm	Standard	1,250 (12.8, 181)
	Minimum	1,060 (10.8, 154)
	Differential limit between cylinders	100 (1.0, 14)

DRIVE BELT

Tension of drive belt	Auto adjustment by auto-tensioner

INTAKE MANIFOLD AND EXHAUST MANIFOLD

Unit: mm (in)

Items		Limit
Surface distortion	Intake manifold collector	0.1 (0.004)
	Intake manifold	0.1 (0.004)
	Exhaust manifold and three way catalyst assembly	0.3 (0.012)

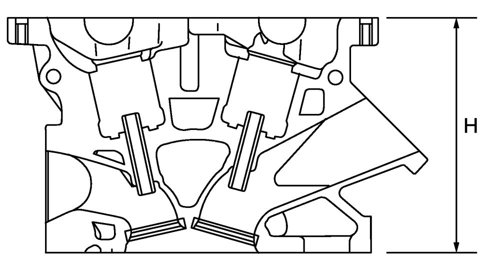
SPARK PLUG

Make	NGK
Standard type	PLFR5A-11
Hot type	PLFR4A-11
Cold type	PLFR6A-11
Gap (nominal)	1.1 mm (0.043 in)

CYLINDER HEAD

Unit: mm (in)

Items	Limit
Head surface distortion	0.1 (0.004)

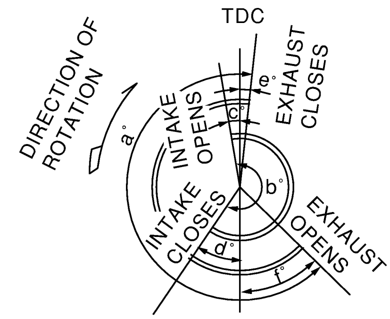


Nominal cylinder head height:
H = 129.4 mm (5.09 in)

PBIC0283E

VALVE

Valve Timing

Valve timing	 PBIC0187E

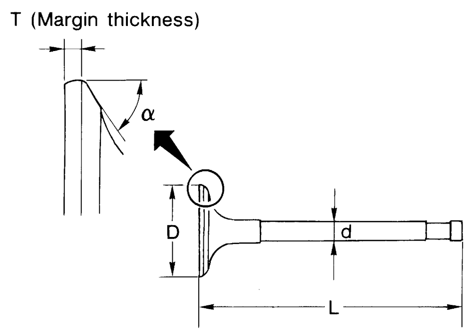
Unit: degree

a	b	c	d	e	f
224	244	0 (30)	64 (27)	3	41

(　): Valve timing control “ON”

Valve Dimensions

Unit: mm (in)



SEM188A

Valve head diameter “D”	Intake	35.5 - 35.8 (1.398 - 1.409)
	Exhaust	30.5 - 30.8 (1.201 - 1.213)
Valve length “L”	Intake	97.16 (3.8252)
	Exhaust	98.82 (3.8905)
Valve stem diameter “d”	Intake	5.965 - 5.980 (0.2348 - 0.2354)
	Exhaust	5.955 - 5.970 (0.2344 - 0.2350)
Valve seat angle “α”	Intake	45°15′ - 45°45′
	Exhaust	
Valve margin “T”	Intake	1.1 (0.043)
	Exhaust	1.3 (0.051)

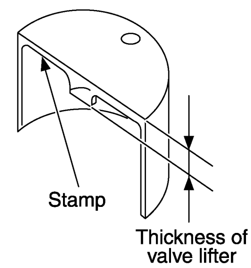
Valve Clearance

Unit: mm (in)

Items	Cold	Hot* (reference data)
Intake	0.24 - 0.32 (0.009 - 0.013)	0.304 - 0.416 (0.012 - 0.016)
Exhaust	0.26 - 0.34 (0.010 - 0.013)	0.308 - 0.432 (0.012 - 0.017)

*: Approximately 80°C (176°F)

Available Valve Lifter



KBIA0119E

Thickness mm (in)	Identification mark
6.96 (0.2740)	696
6.98 (0.2748)	698
7.00 (0.2756)	700
7.02 (0.2764)	702
7.04 (0.2772)	704
7.06 (0.2780)	706
7.08 (0.2787)	708
7.10 (0.2795)	710
7.12 (0.2803)	712
7.14 (0.2811)	714
7.16 (0.2819)	716
7.18 (0.2827)	718
7.20 (0.2835)	720
7.22 (0.2843)	722
7.24 (0.2850)	724
7.26 (0.2858)	726
7.28 (0.2866)	728
7.30 (0.2874)	730
7.32 (0.2882)	732
7.34 (0.2890)	734
7.36 (0.2898)	736
7.38 (0.2906)	738
7.40 (0.2913)	740
7.42 (0.2921)	742
744 (0.2929)	744
7.46 (0.2937)	746

Valve Spring

Items	Intake	Exhaust
Free height	44.84 - 45.34 mm (1.7654 - 1.7850 in)	45.28 - 45.78 mm (1.7827 - 1.8024 in)
Installation height	35.30 mm (1.390 in)	35.30 mm (1.390 in)
Installation load	151 - 175 N (15.4 - 17.8 kg, 34 - 39 lb)	151 - 175 N (15.4 - 17.8 kg, 34 - 39 lb)
Height during valve open	24.94 mm (0.9819 in)	26.39 mm (1.0390 in)
Load with valve open	358 - 408 N (36.5 - 41.6 kg, 80 - 92 lb)	325 - 371 N (33.1 - 37.8 kg, 73 - 83 lb)
Identification color	Blue	Yellow

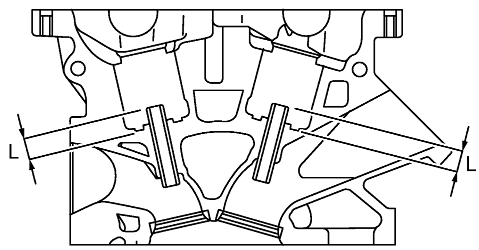
Valve Lifter

Unit: mm (in)

Items	Standard
Valve lifter outer diameter	33.965 - 33.980 (1.3372 - 1.3378)
Valve lifter hole diameter	34.000 - 34.021 (1.3386 - 1.3394)
Valve lifter clearance	0.020 - 0.056 (0.0008 - 0.0022)

Valve Guide

Unit: mm (in)



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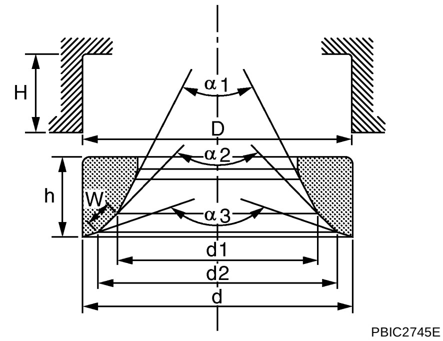
Items		Standard part	Service part
Valve guide	Outer diameter	10.023 - 10.034 (0.3946 - 0.3950)	10.223 - 10.234 (0.4025 - 0.4029)
	Inner diameter (Finished size)	6.000 - 6.018 (0.2362 - 0.2369)	
Cylinder head valve guide hole diameter		9.975 - 9.996 (0.3927 - 0.3935)	10.175 - 10.196 (0.4006 - 0.4014)
Interference fit of valve guide		0.027 - 0.059 (0.0011 - 0.0023)	
Items		Standard	Limit
Valve guide clearance	Intake	0.020 - 0.053 (0.0008 - 0.0021)	0.08 (0.003)
	Exhaust	0.030 - 0.063 (0.0012 - 0.0025)	0.09 (0.004)
Projection length “L”	Intake	10.1 - 10.3 (0.398 - 0.406)	
	Exhaust	10.0 - 10.4 (0.394 - 0.409)	

Valve Seat

Unit: mm (in)



Items		Standard	Oversize [0.5 (0.02)] (Service)
Cylinder head seat recess diameter "D"	Intake	36.500 - 36.516 (1.4370 - 1.4376)	37.000 - 37.016 (1.4567 - 1.4573)
	Exhaust	31.500 - 31.516 (1.2402 - 1.2408)	32.000 - 32.016(1.2598 - 1.2605)
Valve seat outer diameter "d"	Intake	36.597 - 36.613 (1.4408 - 1.4415)	37.097 - 37.113 (1.4605 - 1.4611)
	Exhaust	31.600 - 31.616 (1.2441 - 1.2447)	32.100 - 32.116 (1.2638 - 1.2644)
Valve seat interference fit	Intake	0.081 - 0.113 (0.0032 - 0.0044)	
	Exhaust	0.084 - 0.116 (0.0033 - 0.0046)	
Diameter "d1"*1	Intake	33.5 (1.319)	
	Exhaust	28.0 (1.102)	
Diameter "d2"*2	Intake	35.1 - 35.3 (1.382 - 1.390)	
	Exhaust	29.9 - 30.1 (1.177 - 1.185)	
Angle "α1"	Intake	60°	
	Exhaust	60°	
Angle "α2"	Intake	88°45′ - 90°15′	
	Exhaust	88°45′ - 90°15′	
Angle "α3"	Intake	120°	
	Exhaust	120°	
Contacting width "W"*3	Intake	1.05 - 1.35 (0.0413 - 0.0531)	
	Exhaust	1.25 - 1.55 (0.0492 - 0.0610)	
Height "h"	Intake	5.9 - 6.0 (0.232 - 0.236)	5.0 - 5.1 (0.197 - 0.201)
	Exhaust	5.9 - 6.0 (0.232 - 0.236)	4.91 - 5.01 (0.1933 - 0.1972)
Depth "H"		6.0 (0.236)	

*1 : Diameter made by intersection point of conic angles α1 and α2

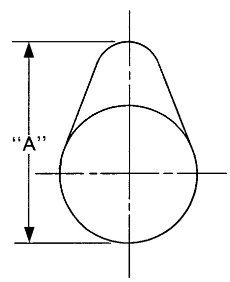
*2 : Diameter made by intersection point of conic angles α2 and α3

*3 : Machining data

CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (in)

Items		Standard	Limit
Camshaft journal oil clearance		0.045 - 0.086 (0.0018 - 0.0034)	—
Camshaft bracket inner diameter	No. 1	28.000 - 28.021 (1.1024 - 1.1032)	—
	No. 2, 3, 4, 5	23.500 - 23.521 (0.9252 - 0.9260)	—
Camshaft journal outer diameter	No. 1	27.935 - 27.955 (1.0998 - 1.1006)	—
	No. 2, 3, 4, 5	23.435 - 23.455 (0.9226 - 0.9234)	—
Camshaft end play		0.115 - 0.188 (0.0045 - 0.0074)	—
Camshaft cam height “A”	Intake	45.665 - 45.855 (1.7978 - 1.8053)	0.2 (0.008)*1
	Exhaust	43.975 - 44.165 (1.7313 - 1.7388)	
Camshaft runout [TIR*2]		Less than 0.02 (0.0008)	—
Camshaft sprocket runout [TIR*2]		—	0.15 (0.0059)



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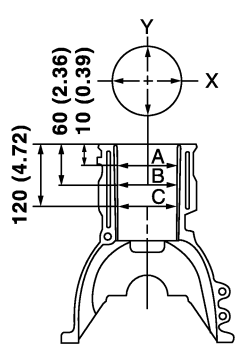
*1 : Cam wear limit

*2 : Total indicator reading

CYLINDER BLOCK

Unit: mm (in)



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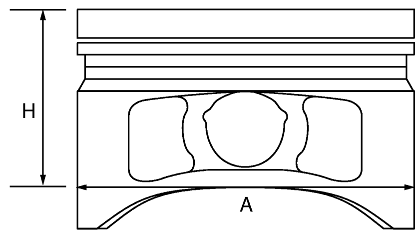
Surface distortion		Limit		0.1 (0.004)
Cylinder bore	Inner diameter	Standard	Grade No. 2	89.010 - 89.020 (3.5043 - 3.5047)
			Grade No. 3	89.020 - 89.030 (3.5047 - 3.5051)
		Wear limit		0.2 (0.008)
Out-of-round (Difference between “X” and “Y”)		Limit		0.015 (0.0006)
Taper (Difference between “A” and “C”)				0.01 (0.0004)

Main bearing housing inner diameter grade		Grade No. A	58.944 - 58.945 (2.3206 - 2.3207)
		Grade No. B	58.945 - 58.946 (2.3207 - 2.3207)
		Grade No. C	58.946 - 58.947 (2.3207 - 2.3207)
		Grade No. D	58.947 - 58.948 (2.3207 - 2.3208)
		Grade No. E	58.948 - 58.949 (2.3208 - 2.3208)
		Grade No. F	58.949 - 58.950 (2.3208 - 2.3209)
		Grade No. G	58.950 - 58.951 (2.3209 - 2.3209)
		Grade No. H	58.951 - 58.952 (2.3209 - 2.3209)
		Grade No. J	58.952 - 58.953 (2.3209 - 2.3210)
		Grade No. K	58.953 - 58.954 (2.3210 - 2.3210)
		Grade No. L	58.954 - 58.955 (2.3210 - 2.3211)
		Grade No. M	58.955 - 58.956 (2.3211 - 2.3211)
		Grade No. N	58.956 - 58.957 (2.3211 - 2.3211)
		Grade No. P	58.957 - 58.958 (2.3211 - 2.3212)
		Grade No. R	58.958 - 58.959 (2.3212 - 2.3212)
		Grade No. S	58.959 - 58.960 (2.3212 - 2.3213)
		Grade No. T	58.960 - 58.961 (2.3213 - 2.3213)
		Grade No. U	58.961 - 58.962 (2.3213 - 2.3213)
		Grade No. V	58.962 - 58.963 (2.3213 - 2.3214)
		Grade No. W	58.963 - 58.964 (2.3214 - 2.3214)
		Grade No. X	58.964 - 58.965 (2.3214 - 2.3215)
		Grade No. Y	58.965 - 58.966 (2.3215 - 2.3215)
		Grade No. 4	58.966 - 58.967 (2.3215 - 2.3215)
		Grade No. 7	58.967 - 58.968 (2.3215 - 2.3216)
Difference in inner diameter between cylinders	Standard		Less than 0.03 (0.0012)

PISTON, PISTON RING AND PISTON PIN

Available Piston

Unit: mm (in)



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Piston skirt diameter “A”	Standard	Grade No. 2	88.990 - 89.000 (3.5035 - 3.5039)
		Grade No. 3	89.000 - 89.010 (3.5039 - 3.5043)
		0.20 (0.008) oversize (Service)	89.180 - 89.210 (3.5110 - 3.5122)
Piston height “H” dimension			42.0 (1.654)
Piston pin hole diameter		Grade No. 0	19.993 - 19.999 (0.7871 - 0.7874)
		Grade No. 1	19.999 - 20.005 (0.7874 - 0.7876)
Piston to cylinder bore clearance		Standard	0.010 - 0.030 (0.0004 - 0.0012)
		Limit	0.08 (0.0031)

Piston Ring

Unit: mm (in)

Items		Standard	Limit
Side clearance	Top	0.045 - 0.080 (0.0018 - 0.0031)	0.11 (0.0043)
	2nd	0.030 - 0.070 (0.0012 - 0.0028)	0.10 (0.0039)
	Oil ring	0.065 - 0.135 (0.0026 - 0.0053)	—
End gap	Top	0.21- 0.31 (0.0083 - 0.0122)	0.54 (0.0213)
	2nd	0.32 - 0.47 (0.0126 - 0.0185)	0.67 (0.0264)
	Oil (rail ring)	0.20 - 0.60 (0.0079 - 0.0236)	0.95 (0.0374)

Piston Pin

Unit: mm (in)

Piston pin outer diameter	Grade No. 0	19.989 - 19.995 (0.7870 - 0.7872)
	Grade No. 1	19.995 - 20.001 (0.7872 - 0.7874)
Piston to piston pin oil clearance	Standard	0.002 - 0.006 (0.0001 - 0.0002)
Connecting rod bushing oil clearance	Standard	0.005 - 0.017 (0.0002 - 0.0007)

CONNECTING ROD

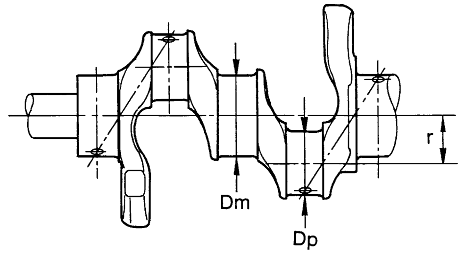
Unit: mm (in)

Center distance		143.00 - 143.10 (5.630 - 5.634)
Bend [per 100 (3.94)]	Limit	0.15 (0.0059)
Torsion [per 100 (3.94)]	Limit	0.30 (0.0118)
Connecting rod bushing inner diameter*	Grade No. 0	20.000 - 20.006 (0.7874 - 0.7876)
	Grade No. 1	20.006 - 20.012 (0.7876 - 0.7879)
Side clearance	Standard	0.20 - 0.35 (0.0079 - 0.0138)
	Limit	0.50 (0.0197)
Connecting rod big end diameter	Grade No. 0	48.000 - 48.001 (1.8898 - 1.8898)
	Grade No. 1	48.001 - 48.002 (1.8898 - 1.8898)
	Grade No. 2	48.002 - 48.003 (1.8898 - 1.8899)
	Grade No. 3	48.003 - 48.004 (1.8899 - 1.8899)
	Grade No. 4	48.004 - 48.005 (1.8899 - 1.8900)
	Grade No. 5	48.005 - 48.006 (1.8900 - 1.8900)
	Grade No. 6	48.006 - 48.007 (1.8900 - 1.8900)
	Grade No. 7	48.007 - 48.008 (1.8900 - 1.8901)
	Grade No. 8	48.008 - 48.009 (1.8901 - 1.8901)
	Grade No. 9	48.009 - 48.010 (1.8901 - 1.8902)
	Grade No. A	48.010 - 48.011 (1.8902 - 1.8902)
	Grade No. B	48.011 - 48.012 (1.8902 - 1.8902)
	Grade No. C	48.012 - 48.013 (1.8902 - 1.8903)

*: After installing in connecting rod

CRANKSHAFT

Unit: mm (in)



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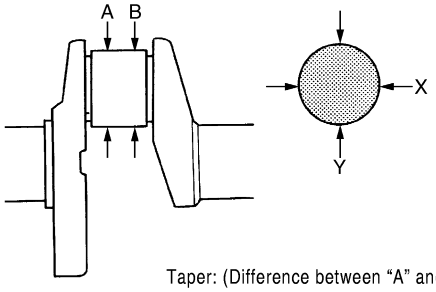


SBIA0535E

Center distance “r”		49.96 - 50.04 (1.9669 - 1.9701)
Out-of-round (Difference between “X” and “Y”)	Limit	0.005 (0.0002)
Taper (Difference between “A” and “B”)	Limit	0.005 (0.0002)
Runout [TIR*]	Limit	0.05 (0.0020)
Crankshaft end play	Standard	0.10 - 0.26 (0.0039 - 0.0102)
	Limit	0.30 (0.0118)

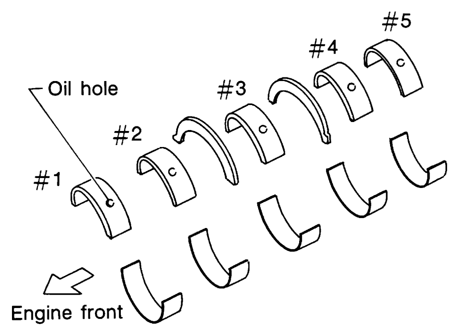
A
EM
C
D
E
F
G
H
I
J
K
L
M

Pin journal diameter grade. “DP”	Grade No. A	44.974 - 44.973 (1.7706 - 1.7706)
	Grade No. B	44.973 - 44.972 (1.7706 - 1.7705)
	Grade No. C	44.972 - 44.971 (1.7705 - 1.7705)
	Grade No. D	44.971 - 44.970 (1.7705 - 1.7705)
	Grade No. E	44.970 - 44.969 (1.7705 - 1.7704)
	Grade No. F	44.969 - 44.968 (1.7704 - 1.7704)
	Grade No. G	44.968 - 44.967 (1.7704 - 1.7704)
	Grade No. H	44.967 - 44.966 (1.7704 - 1.7703)
	Grade No. J	44.966 - 44.965 (1.7703 - 1.7703)
	Grade No. K	44.965 - 44.964 (1.7703 - 1.7702)
	Grade No. L	44.964 - 44.963 (1.7702 - 1.7702)
	Grade No. M	44.963 - 44.962 (1.7702 - 1.7702)
	Grade No. N	44.962 - 44.961 (1.7702 - 1.7701)
	Grade No. P	44.961 - 44.960 (1.7701 - 1.7701)
	Grade No. R	44.960 - 44.959 (1.7701 - 1.7700)
	Grade No. S	44.959 - 44.958 (1.7700 - 1.7700)
	Grade No. T	44.958 - 44.957 (1.7700 - 1.7700)
	Grade No. U	44.957 - 44.956 (1.7700 - 1.7699)
Main journal diameter grade. “Dm”	Grade No. A	54.979 - 54.978 (2.1645 - 2.1645)
	Grade No. B	54.978 - 54.977 (2.1645 - 2.1644)
	Grade No. C	54.977 - 54.976 (2.1644 - 2.1644)
	Grade No. D	54.976 - 54.975 (2.1644 - 2.1644)
	Grade No. E	54.975 - 54.974 (2.1644 - 2.1643)
	Grade No. F	54.974 - 54.973 (2.1643 - 2.1643)
	Grade No. G	54.973 - 54.972 (2.1643 - 2.1642)
	Grade No. H	54.972 - 54.971 (2.1642 - 2.1642)
	Grade No. J	54.971 - 54.970 (2.1642 - 2.1642)
	Grade No. K	54.970 - 54.969 (2.1642 - 2.1641)
	Grade No. L	54.969 - 54.968 (2.1641 - 2.1641)
	Grade No. M	54.968 - 54.967 (2.1641 - 2.1641)
	Grade No. N	54.967 - 54.966 (2.1641 - 2.1640)
	Grade No. P	54.966 - 54.965 (2.1640 - 2.1640)
	Grade No. R	54.965 - 54.964 (2.1640 - 2.1639)
	Grade No. S	54.964 - 54.963 (2.1639 - 2.1639)
	Grade No. T	54.963 - 54.962 (2.1639 - 2.1639)
	Grade No. U	54.962 - 54.961 (2.1639 - 2.1638)
	Grade No. V	54.961 - 54.960 (2.1638 - 2.1638)
	Grade No. W	54.960 - 54.959 (2.1638 - 2.1637)
	Grade No. X	54.959 - 54.958 (2.1637 - 2.1637)
	Grade No. Y	54.958 - 54.957 (2.1637 - 2.1637)
	Grade No. 4	54.957 - 54.956 (2.1637 - 2.1636)
	Grade No. 7	54.956 - 54.955 (2.1636 - 2.1636)

*: Total indicator reading

MAIN BEARING

Unit: mm (in)



SEM685D

Grade number		Thickness	Identification color	Remarks
0		1.973 - 1.976 (0.0777 - 0.0778)	Black	Grade and color are the same for upper and lower bearings.
1		1.976 - 1.979 (0.0778 - 0.0779)	Brown	
2		1.979 - 1.982 (0.0779 - 0.0780)	Green	
3		1.982 - 1.985 (0.0780 - 0.0781)	Yellow	
4		1.985 - 1.988 (0.0781 - 0.0783)	Blue	
5		1.988 - 1.991 (0.0783 - 0.0784)	Pink	
6		1.991 - 1.994 (0.0784 - 0.0785)	Purple	
7		1.994 - 1.997 (0.0785 - 0.0786)	White	
01	UPR	1.973 - 1.976 (0.0777 - 0.0778)	Black	Grade and color are different for upper and lower bearings.
	LWR	1.976 - 1.979 (0.0778 - 0.0779)	Brown	
12	UPR	1.976 - 1.979 (0.0778 - 0.0779)	Brown	
	LWR	1.979 - 1.982 (0.0779 - 0.0780)	Green	
23	UPR	1.979 - 1.982 (0.0779 - 0.0780)	Green	
	LWR	1.982 - 1.985 (0.0780 - 0.0781)	Yellow	
34	UPR	1.982 - 1.985 (0.0780 - 0.0781)	Yellow	
	LWR	1.985 - 1.988 (0.0781 - 0.0783)	Blue	
45	UPR	1.985 - 1.988 (0.0781 - 0.0783)	Blue	
	LWR	1.988 - 1.991 (0.0783 - 0.0784)	Pink	
56	UPR	1.988 - 1.991 (0.0783 - 0.0784)	Pink	
	LWR	1.991 - 1.994 (0.0784 - 0.0785)	Purple	
67	UPR	1.991 - 1.994 (0.0784 - 0.0785)	Purple	
	LWR	1.994 - 1.997 (0.0785 - 0.0786)	White	

Undersize

Unit: mm (in)

Item	Thickness	Main journal diameter
US 0.25 (0.0098)	2.106 - 2.114 (0.0829 - 0.0832)	Grind so that bearing clearance is the specified value.

Bearing Oil Clearance

Unit: mm (in)

Main bearing oil clearance	Standard	No. 1, 3 and 5	0.012 - 0.022 (0.0005 - 0.0009)
		No. 2 and 4	0.018 - 0.028 (0.0007 - 0.0011)
	Limit		0.1 (0.004)

CONNECTING ROD BEARING

Grade number	Thickness mm (in)	Identification color
0	1.495 - 1.499 (0.0589 - 0.0590)	Black
1	1.499 - 1.503 (0.0590 - 0.0592)	Brown
2	1.503 - 1.507 (0.0592 - 0.0593)	Green
3	1.507 - 1.511(0.0593 - 0.0595)	Yellow

Undersize

Unit: mm (in)

Item	Thickness	Crank pin journal diameter
US 0.25 (0.0098)	1.624 - 1.632 (0.0639 - 0.0643)	Grind so that bearing clearance is the specified value.

Bearing Oil Clearance

Unit: mm (in)

Connecting rod bearing oil clearance	Standard	0.028 - 0.045 (0.0011 - 0.0018)
	Limit	0.10 (0.0039)

SECTION EX

EXHAUST SYSTEM

CONTENTS

EXHAUST SYSTEM

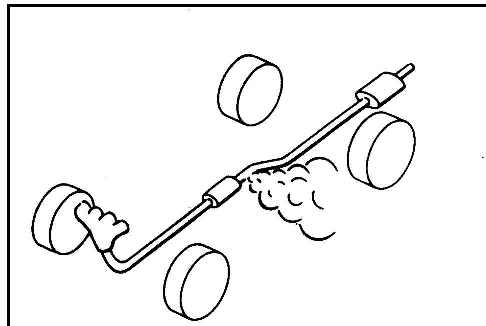
PFP:20100

Checking Exhaust System

ABS00D0S

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage or deterioration.

- If necessary, repair or replace damaged parts.



SMA211A

Removal and Installation

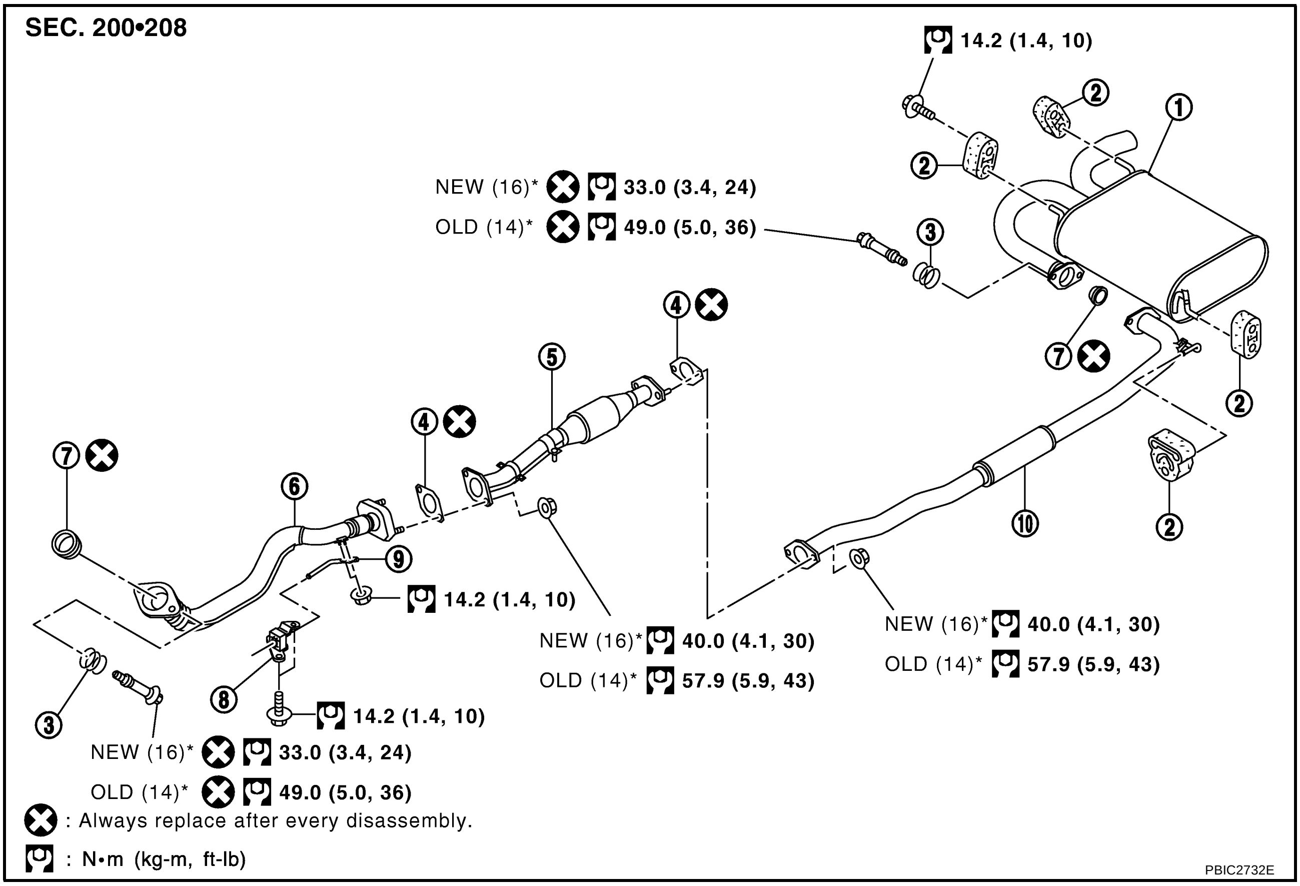
ABS00D0T

WARNING:

- **Be careful not to cut your hand on the insulator edge.**

CAUTION:

- **Be sure to use genuine exhaust system parts or equivalents which are specially designed for heat resistance, corrosion resistance and shape.**
- **Perform the operation with the exhaust system fully cooled down because the system will be hot just after engine stops.**



*: In regard to the notation of torque in the figure, "NEW" shows an ISO standard, "OLD" shows a conventional standard, and the measurements of hexagonal width across flats are in parentheses.

1. Main muffler
2. Mounting rubber
3. Spring
4. Gasket
5. Three way catalyst
6. Exhaust front tube
7. Seal bearing
8. Mounting rubber bracket
9. Mounting bracket
10. Exhaust center tube

REMOVAL

Disconnect each joint and mounting.

INSTALLATION

Note the following, and install in the reverse order of removal.

CAUTION:

- **Always replace exhaust tube gaskets and seal bearings with new ones when reassembling.**
- **If heat insulator is badly deformed, repair or replace it. If deposits such as mud pile up on the heat insulator, remove them.**
- **When installing heat insulator avoid large gaps or interference between heat insulator and each exhaust pipe.**
- **Remove deposits from the sealing surface of each connection. Connect them securely to avoid gas leakage.**

- **Temporarily tighten all mounting nuts and bolts. Check each part for unusual interference, and then tighten them to the specified torque.**
- **When installing each mounting rubber, avoid twisting or unusual extension in up/down and right/left directions.**

Install seal bearings at exhaust front tube and main muffler as follows.

CAUTION:

- **Do not mix the bolt and spring for seal bearing as the dimension is different for each seal bearing.**

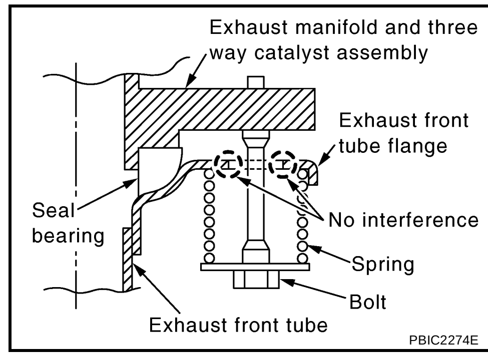
Seal Bearing (Exhaust Front Tube Side)

Insert seal bearing in the direction shown in the figure.

1. Securely insert seal bearing into exhaust manifold and three way catalyst assembly side in the direction as shown in the figure.

   CAUTION:

   Be careful not to damage seal bearing surface when installing.
2. Make sure that mounting bolts do not interference with flange of exhaust front tube.

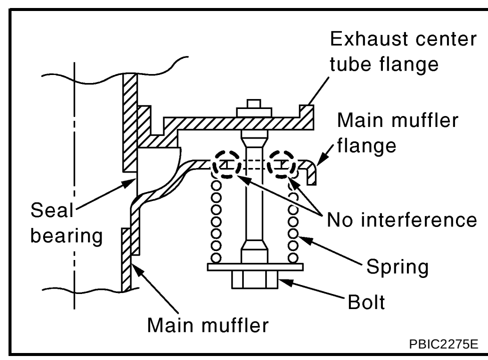


Seal Bearing (Main Muffler Side)

1. Securely insert seal bearing into exhaust center tube side in the direction as shown in the figure.

   CAUTION:

   Be careful not to damage seal bearing surface when installing.
2. Make sure that mounting bolts do not interference with flange of main muffler.



INSPECTION AFTER INSTALLATION

- With engine running, check exhaust tube joints for gas leakage and unusual noises.
- Make sure that mounting brackets and mounting rubbers are installed properly and free from undue stress. Improper installation could result in excessive noise and vibration.

SECTION FAX
FRONT AXLE

CONTENTS

PRECAUTIONS

PFP:00001

Caution

ADS0014Y

Observe the following precautions when disassembling and assembling drive shaft.

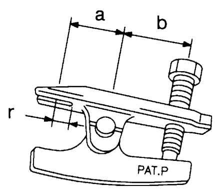
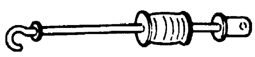
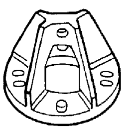
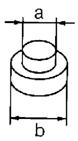
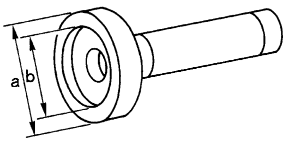
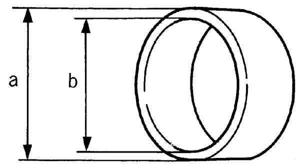
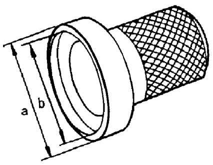
- Perform work in a location which is as dust-free as possible.
- Before disassembling and assembling, clean the outside of parts.
- Prevention of entry of foreign objects must be taken into account during disassembly of the service location.
- Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.
- Paper shop cloths must be used. Fabric shop cloths must not be used because of danger of lint adhering to parts.
- Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.

PREPARATION

PFP:00002

Special Service Tools [SST]

ADS0014Z

Tool number (Kent-Moore No.) Tool name		Description
HT72520000 (J-25730-A) Ball joint remover a: 33 mm (1.30 in) b: 50 mm (1.97 in) r: 11.5 mm (0.453 in)	 NT546	Removing steering outer socket and transverse link
ST36230000 (J-25840-A) Sliding hammer	 ZZA0803D	Removing wheel hub
KV40104100 (—) Attachment	 ZZA0804D	Removing wheel hub
ST33061000 (J-8107-2) Drift a: 28.5 mm (1.122 in) dia. b: 38.0 mm (1.50 in) dia.	 ZZA0969D	Removing wheel bearing outer side inner race
KV38100200 (—) Drift a: 65 mm (2.65 in) dia. b: 49 mm (1.93 in) dia.	 ZZA1143D	Removing wheel bearing
KV40106200 (—) Drift a: 114.3 mm (4.50 in) dia. b: 105.3 mm (4.15 in) dia.	 ZZA0936D	Removing wheel bearing and installing splash guard
ST35271000 (J-26091) Drift a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.	 ZZA0814D	Installing wheel bearing and support bearing

A
B
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FAX
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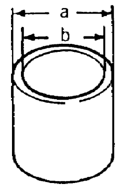
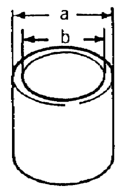
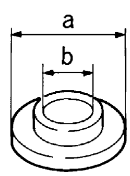
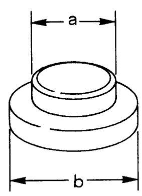
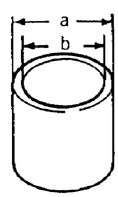
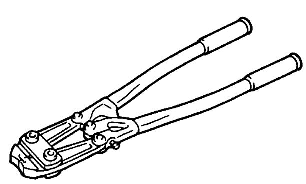
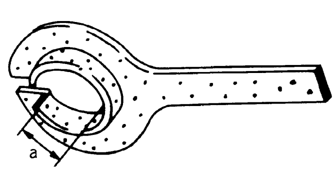
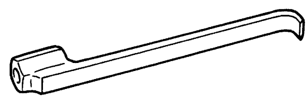
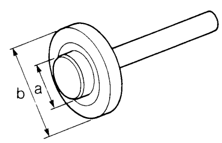
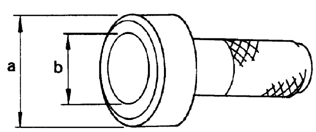
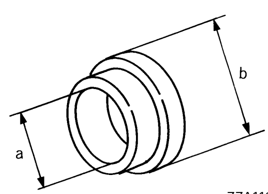
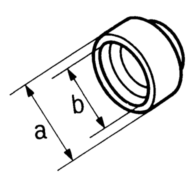
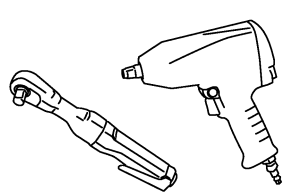
Tool number (Kent-Moore No.) Tool name		Description
KV40104710 (—) Drift a: 76.3 mm (3.004 in) dia. b: 67.9 mm (2.673 in) dia.	 ZZA0832D	Installing wheel bearing and splash guard
KV40105220 (—) Drift a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.	 ZZA0832D	Installing splash guard
ST30022000 (—) Drift a: 110 mm (4.33 in) dia. b: 46 mm (1.81 in) dia.	 ZZA0920D	Installing splash guard
ST35300000 (—) Drift a: 45.1 mm (1.776 in) dia. b: 59 mm (2.32 in) dia.	 ZZA0881D	Installing wheel hub
KV40105310 (—) Drift a: 89.1 mm (3.508 in) dia. b: 80.7 mm (3.177 in) dia.	 ZZA0832D	Installing wheel hub
KV40107300 (—) Boot band crimping tool	 ZZA1229D	Installing boot band
KV38105500 (J-33904) Protector a: 32 mm (1.26 in) dia	 ZZA0835D	Installing drive shaft

Tool number (Kent-Moore No.) Tool name		Description
KV40107500 (—) Drive shaft attachment	 ZZA1230D	Removing drive shaft
ST17130000 (—) Drift a: 32 mm (1.26 in) dia. b: 60 mm (1.57 in) dia.	 ZZA0836D	Removing support bearing
KV38100500 (—) Drift a: 80 mm (3.15 in) dia. b: 60 mm (2.36 in) dia.	 ZZA0701D	Installing sensor rotor
KV40101840 (—) Drift a: 67 mm (2.64 in) dia. b: 85 mm (3.35 in) dia.	 ZZA1113D	Installing sensor rotor
ST33252000 (—) Drift a: 82 mm (3.23 in) dia. b: 60 mm (2.36 in) dia.	 ZZA0838D	Installing support bearing

Commercial Service Tools

ADS0016W

Tool name		Description
Power tool	 PBIC0190E	● Removing wheel nuts ● Removing torque member fixing bolts ● Removing hub lock nut

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS00150

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	FAX-22, FAX-26, FAX-29	—	FAX-7	—	NVH in PR section	NVH in RFD section	NVH in FAX and FSU sections	Refer to Front axle in this chart	NVH in WT section	NVH in WT section	Refer to DRIVE SHAFT in this chart	NVH in BR section	NVH in PS section
Possible cause and Suspected parts			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	PROPELLER SHAFT	DIFFERENTIAL	FRONT AXLE AND FRONT SUSPENSION	FNONT AXLE	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	Drive Shaft	Noise	×	×				×	×	×	×	×	×		×	×
		Shake	×		×			×		×	×	×	×		×	×
	Front Axle	Noise				×	×	×	×	×		×	×	×	×	×
		Shake				×	×	×		×		×	×	×	×	×
		Vibration				×	×	×		×		×		×		×
		Shimmy				×	×			×		×	×		×	×
		Judder				×				×		×	×		×	×
		Poor quality ride or handling				×	×			×		×	×			

×: Applicable

FRONT WHEEL HUB AND KNUCKLE

PFP:40202

On-Vehicle Inspection and Service

ADS00151

Make sure that the mounting conditions (looseness, backlash) of each of the component and component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub in the axial direction by hand. Make sure there is no looseness of wheel bearing.

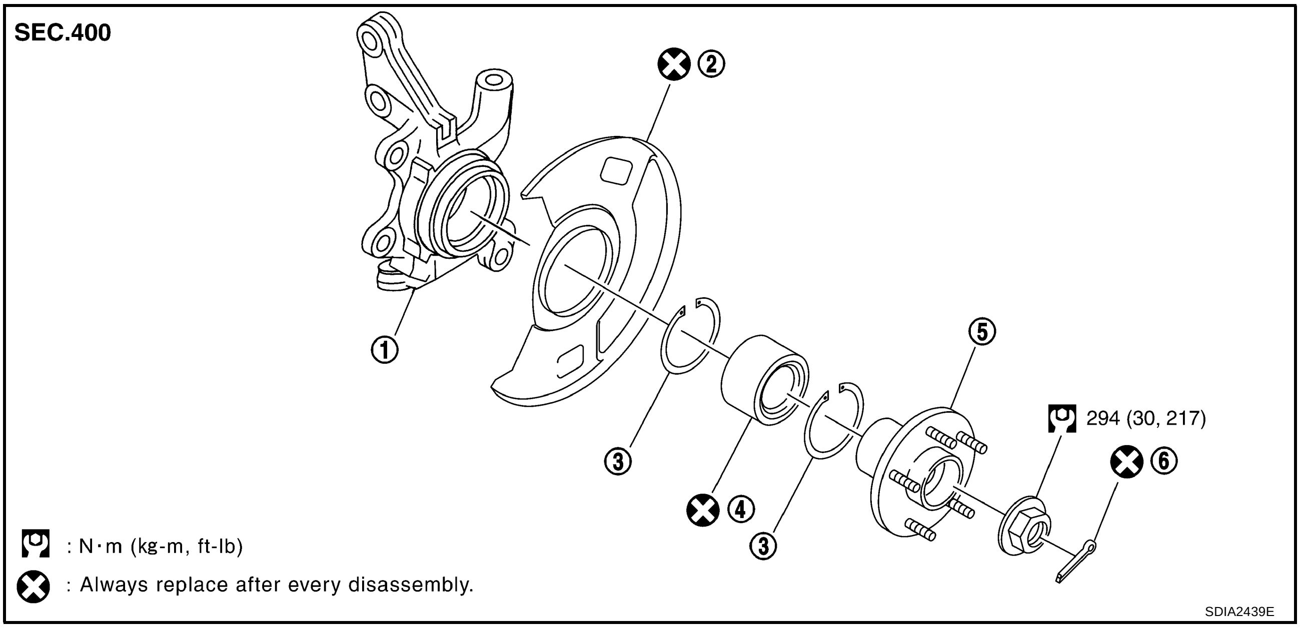
  Axial end play : 0.05 mm (0.002 in) or less

- Rotate wheel hub and make sure that is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel bearing.

Removal and Installation

ADS00152

COMPONENT



1. Steering knuckle	2. Splash guard	3. Snap ring
4. Wheel bearing	5. Wheel hub	6. Cotter pin

REMOVAL

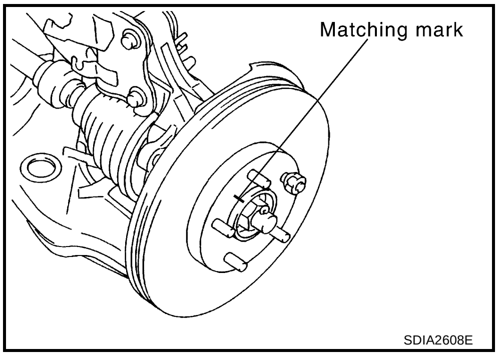
1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:

   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

   NOTE:

   Avoid depressing brake pedal while brake caliper is removed.
4. Put matching mark on disc rotor and wheel hub, then remove disc rotor.

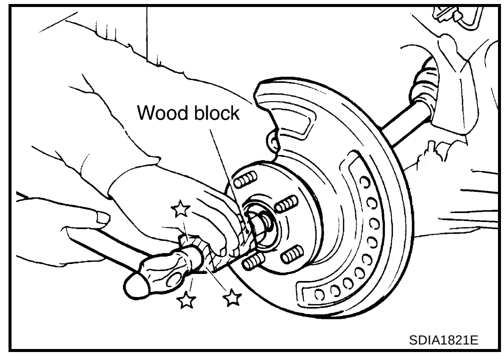


5. Remove cotter pin, then loosen hub lock nut with power tool.

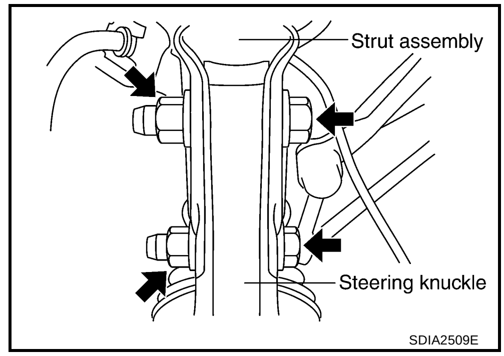
6. Separate wheel hub from drive shaft by lightly tapping the end with a hammer (suitable tool) and wood block, and then remove hub lock nut.·

   CAUTION:
   - **Do not place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Do not allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and other parts.**

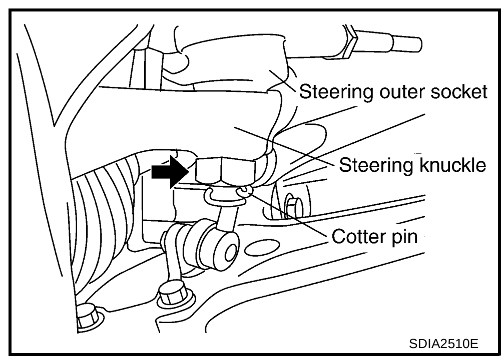
   NOTE:
   Use a puller (suitable tool) if wheel hub and drive shaft cannot be separated even after performing the above procedure.



7. Remove fixing bolts and nuts, and then remove steering knuckle from strut assembly. Refer to FSU-8, "Components" .
8. Remove drive shaft from wheel hub.

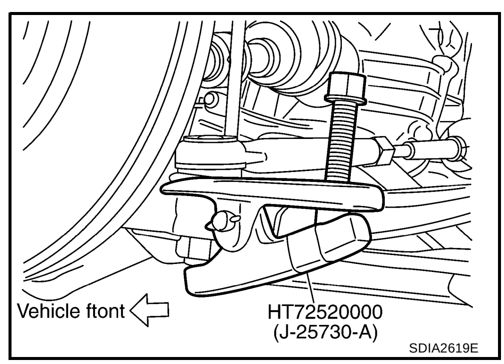


9. Remove cotter pin, and then loosen the nut. Refer to PS-17, "COMPONENT" .



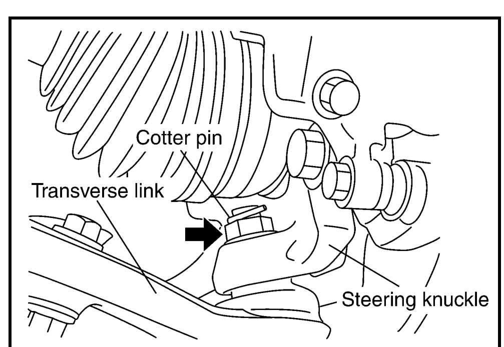
10. Remove steering outer socket from steering knuckle so as not to damage ball joint boot using the ball joint remover [SST].

    CAUTION:
    Temporarily tighten the nut to prevent damage to threads and to prevent ball joint remover [SST] from suddenly coming off.



11. Remove cotter pin, and then loosen the nut.
12. Remove transverse link from steering knuckle so as not to damage ball joint boot using the ball joint remover [SST: HT72520000 (J-25730-A)], then remove steering knuckle from vehicle.

    CAUTION:
    Temporarily tighten nut to prevent damage to threads and to prevent ball joint remover [SST: HT72520000 (J-25730-A)] from suddenly coming off.



INSPECTION AFTER REMOVAL

Check components for deformation, cracks and other damage. Replace if there are.

Ball Joint Inspection

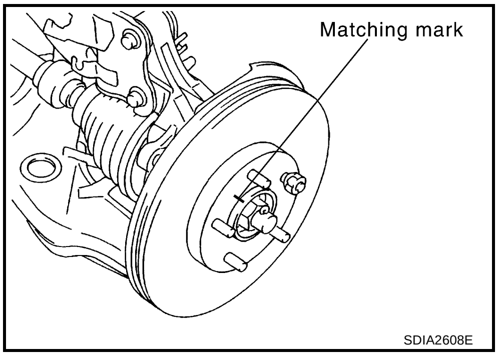
Check boots of transverse link and steering outer socket ball joint for breakage, axial play, and torque. Refer to FSU-15, "INSPECTION AFTER REMOVAL"FSU-15, "INSPECTION AFTER REMOVAL" , PS-22, "Outer Socket and Inner Socket" .

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, Refer to FAX-7, "COMPONENT" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing wheel hub and knuckle. Check the wheel alignment. Refer to FSU-18, "SERVICE DATA AND SPECIFICATIONS (SDS)" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for the models with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .
- Assembly disc rotor and wheel hub by aligning each matching mark as shown in the figure when installing disc rotor.

  NOTE:
  Refer to BR-25, "FRONT DISC BRAKE" for assembly when removing disc rotor without matching mark.



Disassembly and Assembly

ADS00153

DISASSEMBLY

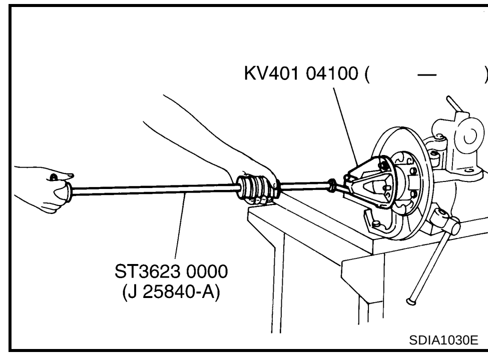
CAUTION:

Do not disassemble if wheel bearing has no malfunction.

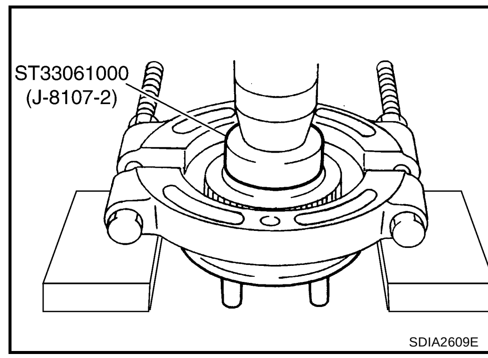
1. Secure steering knuckle on a vise at the part where strut is removed. Use the sliding hammer [SST] and attachment [SST], remove wheel hub from wheel bearing.

   CAUTION:

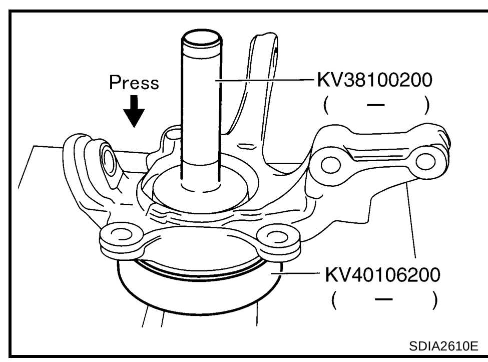
   When securing the knuckle on a vise, be careful not to damage strut mounting surface of steering knuckle. Use an aluminum plate or a suitable tool.



2. Remove snap ring (outer side) from steering knuckle using a flat-bladed screwdriver or similar tool.
3. Press wheel hub from wheel bearing outer side inner race using a drift [SST] and a puller (suitable tool), then remove it.



4. Remove splash guard from steering knuckle using a flat-bladed screwdriver and hammer.
5. Remove snap ring (inner side) from steering knuckle using a flat-bladed screwdriver or similar tool.
6. Press wheel bearing from steering knuckle using the drift [SST], then remove it.



INSPECTION AFTER DISASSEMBLY

Wheel Hub

Check wheel hub for deformation, cracks, and other damage. If any irregular conditions are found, replace wheel hub.

Steering Knuckle

Check steering knuckle for deformation, cracks, and other damage. If any irregular conditions are found, replace steering knuckle.

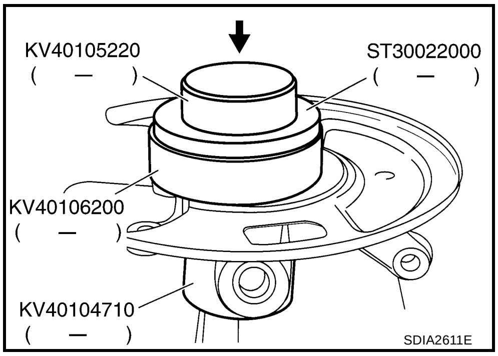
Snap Ring

Check snap ring for wear or other damage. If any irregular conditions are found, replace snap ring.

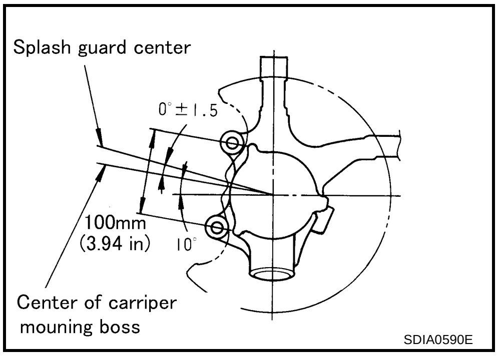
ASSEMBLY

1. Press splash guard onto steering knuckle using the drift [SST].

   NOTE:
   - Do not reuse splash guard.

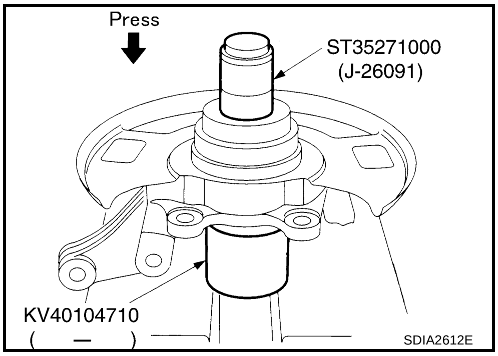


   - Position splash guard shown in the figure.



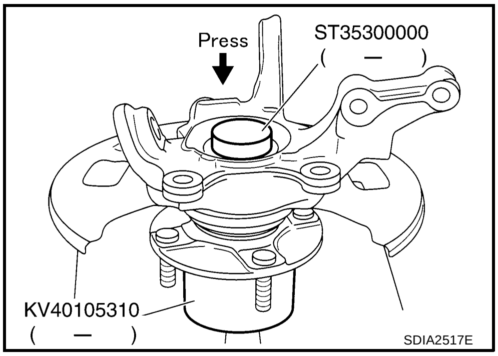
2. Install snap ring (inner side) securely to the ditch of steering knuckle inner side using a flat-bladed screwdriver or similar tool.
3. Use a drift [SST] to press wheel bearing securely from steering knuckle outer side as far as it will go.

   NOTE:
   - Do not reuse wheel bearing.
   - The final press load guideline is 29,420 N (3,000kg, 6,615 lb).
4. Install snap ring (outer side) securely to the ditch of steering knuckle outer side using a flat-bladed screwdriver or similar tool.



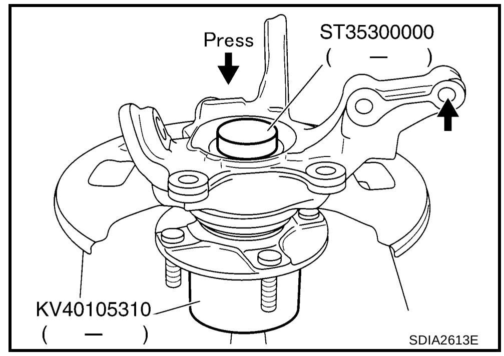
5. Press wheel hub onto wheel bearing using the drift [SST].

   NOTE:
   The final press load guideline is 49,033 N (5,000 kg, 11,000 lb).



INSPECTION AFTER ASSEMBLY

1. With wheel hub pressed into wheel bearing, apply 34,324 to 49,033 N (3,500 to 5,000 kg, 7,718 to 11,000 lb) to wheel hub and rotate both clockwise and counterclockwise 10 times to minimize resistance.
2. Attach a spring balance in the position shown in the figure and pull at rate of 10±2 rpm to measure rotating torque.



Rotating torque:

Less than 1.645 N·m (0.168 kg-m, 15 in-lb)

Spring balance reading:

Less than 10.6 N (1.1 kg, 2.4 lb)

FRONT DRIVE SHAFT

PFP:39100

On-Vehicle Inspection and Service

ADS00154

- Check drive shaft mounting point and joint for looseness and other damage.
- Check boot for cracks and other damage.

  CAUTION:
  Replace entire drive shaft assembly when noise or vibration occur from drive shaft.

DRIVE SHAFT BOOT REPLACEMENT

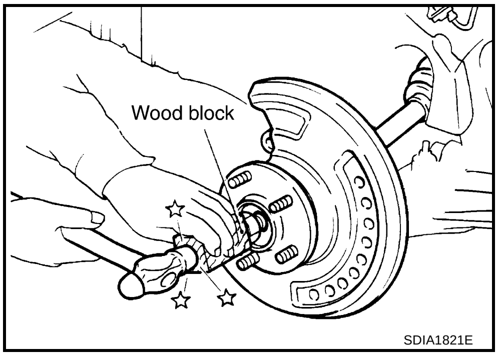
1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:
   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

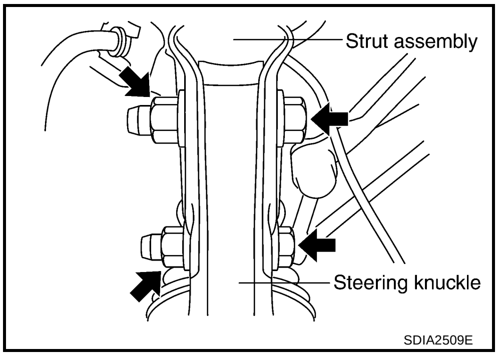
   NOTE:
   Avoid depressing brake pedal while brake caliper is removed.
4. Remove disc rotor. Refer to BR-25, "FRONT DISC BRAKE" .
5. Remove cotter pin, then loosen hub lock nut with power tool.
6. Separate wheel hub from drive shaft by lightly tapping the end with a hammer (suitable tool) and wood block, and then remove hub lock nut.

   CAUTION:
   - **Do not place drive shaft joints at an extreme angle. Also be careful not to overextend slide joint.**
   - **Do not allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

   NOTE:
   Use a puller (suitable tool) if wheel hub and drive shaft cannot be separated even after performing the above procedure.

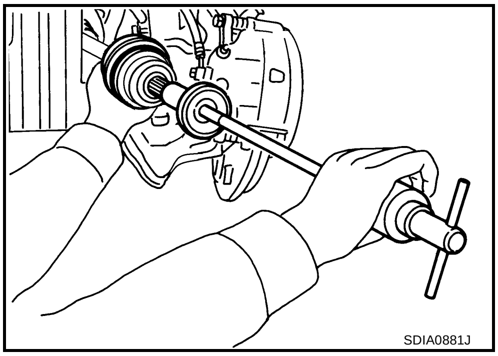


7. Remove fixing bolts and nuts, and then remove steering knuckle from strut assembly. Refer to FSU-8, "Components" .
8. Remove drive shaft from wheel hub.

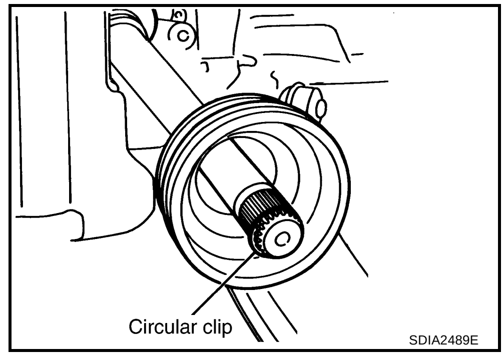


9. Remove boot bands, and then remove boot from joint sub-assembly.
10. Screw a drive shaft puller (suitable tool) into joint sub-assembly the screw part to a length of 30 mm (1.18 in) or more. Support drive shaft with one hand and pull out joint sub-assembly with a sliding hammer (suitable tool) from shaft.

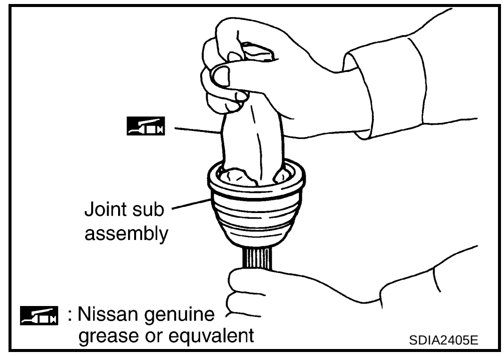
    CAUTION:
    - **Align a sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
    - **If joint sub-assembly cannot be pulled out, try after removing drive shaft from vehicle.**
11. Remove boot from shaft.



12. Remove the circular clip from shaft.
13. Clean the old grease on joint sub-assembly with paper towels.



14. Insert the specified amount grease (NISSAN genuine grease or equivalent) into joint sub-assembly serration hole until grease begins to ooze from ball groove and serration hole. After inserting grease, use a shop cloth to wipe off old grease that has oozed out.

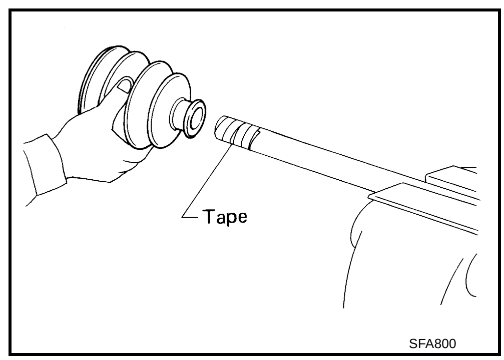


15. Wrap serration on shaft with tape to protect the boot from damage. Install new boot and boot bands to shaft.

NOTE:

Do not reuse boot bands and boot.

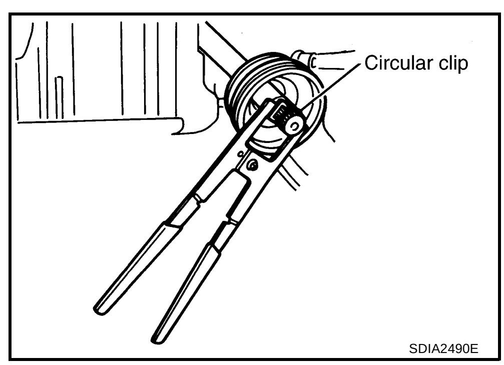
16. Remove the tape wrapped around the serration on shaft.



17. Position circular clip on groove at the shaft edge. Align both center axles of the shaft edge and joint sub-assembly. Then assemble shaft with circular clip onto joint sub-assembly.

NOTE:

- Do not reuse the circular clip.
- Drive joint inserter (suitable tool) is recommended when installing circular clip.



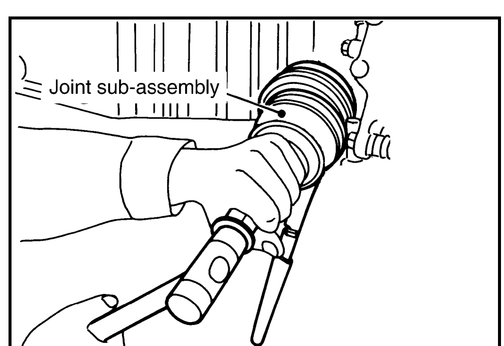
18. Install joint sub-assembly to shaft using plastic hammer.

CAUTION:

Confirm that joint sub-assembly is correctly engaged while rotating drive shaft.

19. Apply the specified amount of grease (NISSAN genuine grease or equivalent) to the boot from large end of boot.

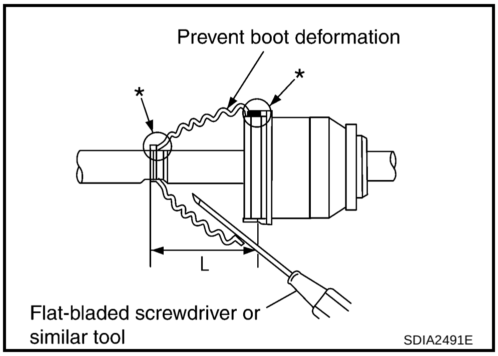
Grease amount : 115 - 125 g (4.06 - 4.41 oz)



20. Install the boot securely into grooves (indicated by * marks) shown in the figure.

CAUTION:

If grease adheres to the boot mounting surface (with * mark) on shaft and joint sub-assembly, the boot may come off. Remove all grease from the surface.



21. To prevent from the deformation of the boot, adjust the boot installation length to the specified value shown below (L) by inserting a flat-bladed screwdriver into inside of the boot from the large diameter side of the boot and discharging the inside air.

Boot installation length (L) : 100 - 106 mm (3.94 - 4.17 in)

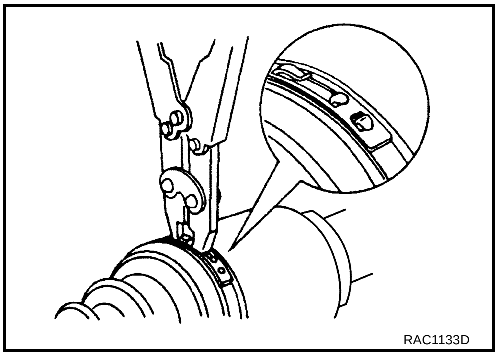
CAUTION:

- **If the boot mounting length is outside the standard, it may cause breakage in the boot.**
- **Be careful not to touch the inside of the boot with a tip of a flat-bladed screwdriver.**

22. Secure the large and small ends of the boot with new boot bands use the boot band crimping tool [SST: KV40107300 (—)] as shown in the figure.

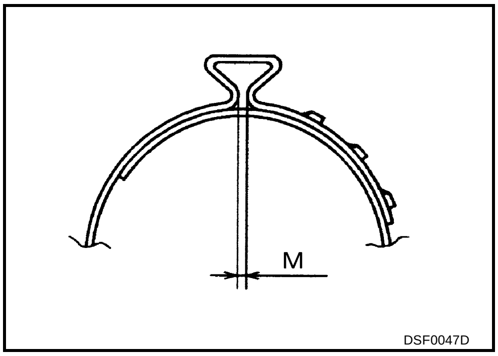
NOTE:

- Do not reuse boot bands.



- Secure boot band so that dimension “M” meets specification as shown.

Dimension “M” : 2.0 - 3.0 mm (0.079 - 0.118 in)



23. Secure joint sub-assembly and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when boot installation positions become incorrect.
24. Confirm that circular clip on the transaxle side is not pulled out.
25. Insert drive shaft to wheel hub, and then temporarily tighten hub lock nut.
26. Install nuts and bolts of steering knuckle and strut. Refer to FSU-8, "Components" . “FRONT SUSPENSION ASSEMBLY” for tightening torque.
27. Install disc rotor. Refer to BR-25, "FRONT DISC BRAKE" .
28. Install torque member fixing bolts to steering knuckle. Refer to BR-25, "FRONT DISC BRAKE" .
29. Install wheel sensor to steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .
30. Tighten hub lock nut to the specified torque. Refer to FAX-16, "COMPONENT" .
31. Install cotter pin.

NOTE:

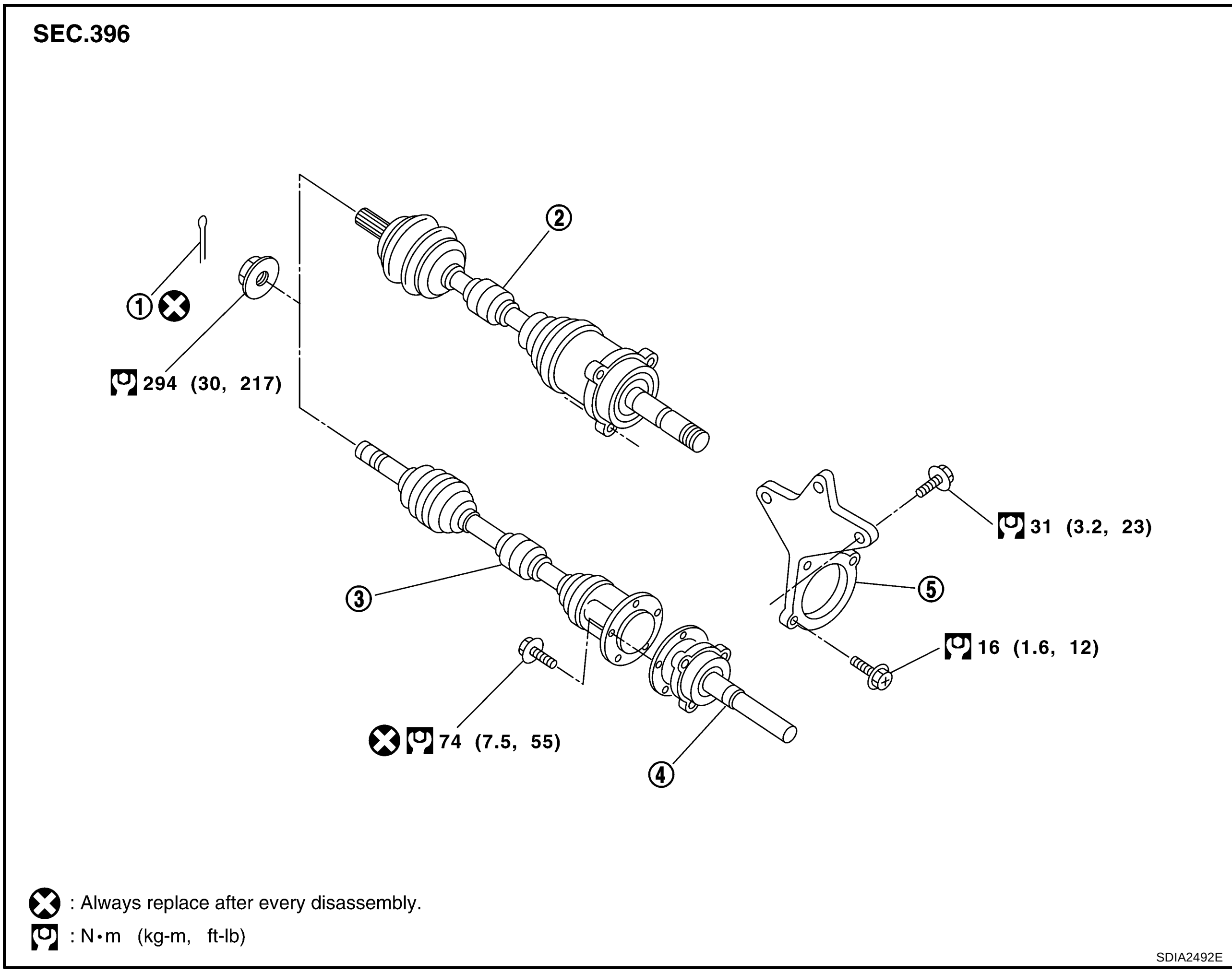
Do not reuse cotter pin.

32. Install tires to vehicle.

Removal and Installation (RH)

ADS00155

COMPONENT



1. Cotter pin	2. Drive shaft (2WD models)	3. Drive shaft (AWD models)
4. Side shaft (AWD models)	5. Support bearing bracket	

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:

   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

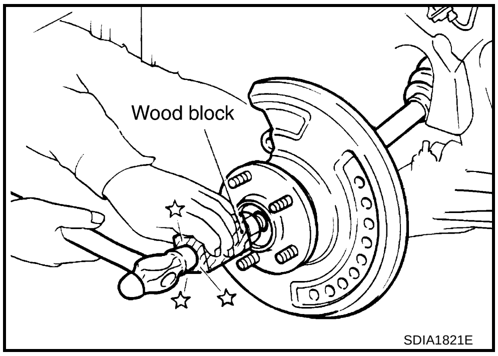
   NOTE:

   Avoid depressing brake pedal while brake caliper is removed.
4. Remove disc rotor. Refer to BR-25, "FRONT DISC BRAKE" .
5. Remove cotter pin, then loosen hub lock nut with a power tool.

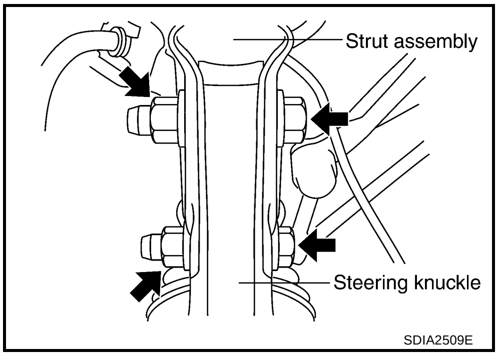
6. Separate wheel hub from drive shaft by lightly tapping the end with a hammer (suitable tool) and a wood block, and then remove hub lock nut.

   CAUTION:
   - **Do not place drive shaft joints at an extreme angle. Also be careful not to overextend slide joint.**
   - **Do not allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

   NOTE:
   Use a puller (suitable tool) if wheel hub and drive shaft cannot be separated even after performing the above procedure.



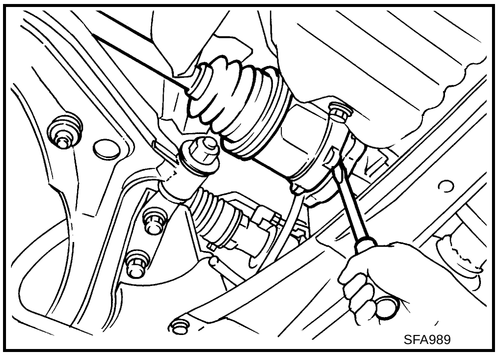
7. Remove fixing bolts and nuts, and then remove steering knuckle from strut assembly. Refer to FSU-8, "Components" .
8. Remove drive shaft from wheel hub.



9. Remove fixing bolts, and then separate drive shaft and support bearing bracket (2WD models). Remove fixing bolts, and then separate drive shaft and side shaft. (AWD models).
10. Remove drive shaft from transaxle using a flat-bladed screwdriver as shown in the figure. (2WD models)

    CAUTION:
    - **Do not place drive shaft joints at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.**
    - **Do not allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

11. Remove fixing bolts of support bearing bracket, then remove side shaft from transaxle. (AWD models)



INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial direction. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is a non-standard condition.

INSTALLATION

CAUTION:
Always replace transaxle side oil seal with new one when installing drive shaft or side shaft.

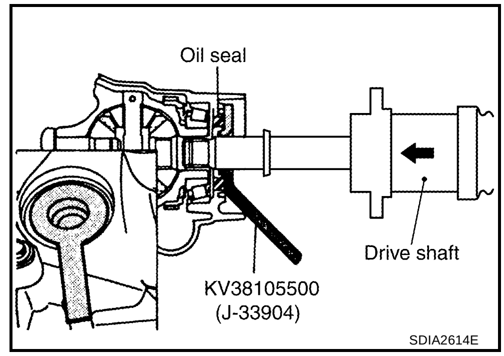
- Install in the reverse order of the removal. For tightening torque, refer to FAX-16, "COMPONENT" .

  NOTE:
  Do not reuse non-reusable parts.

- Press the protector [SST] onto transaxle to prevent damage to the oil seal while inserting drive shaft or side shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.

  CAUTION:

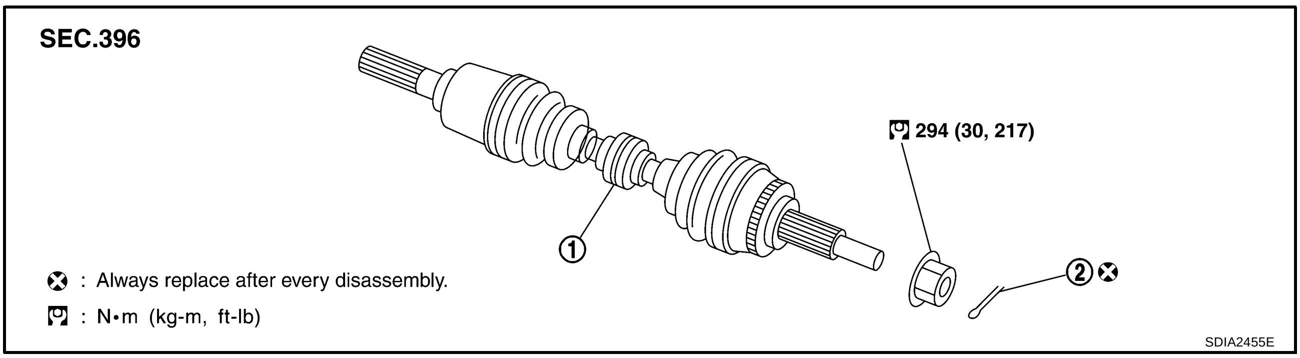
  Make sure that circular clip is completely engaged.



Removal and Installation (LH)

ADS00156

COMPONENT



1. Drive shaft
2. Cotter pin

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:

   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

   NOTE:

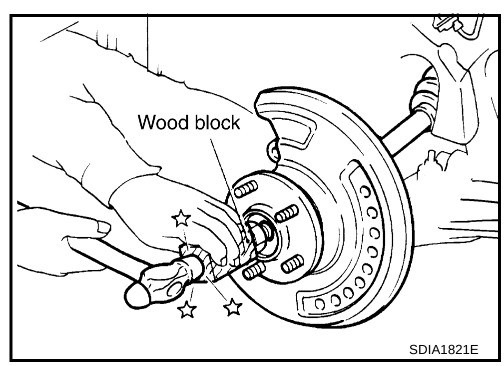
   Avoid depressing brake pedal while brake caliper is removed.
4. Remove disc rotor.BR-25, "FRONT DISC BRAKE" .
5. Remove cotter pin, then loosen hub lock nut with a power tool.
6. Separate wheel hub from drive shaft by lightly tapping the end with a hammer (suitable tool) and wood block, and then remove hub lock nut.

   CAUTION:

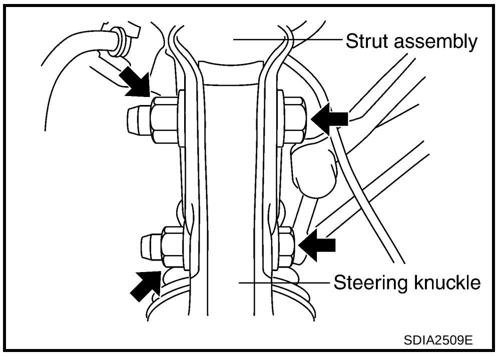
   - **Do not place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Do not allow drive shaft to hang down without support for housing (or joint sub-assembly), shaft and the other parts.**

   NOTE:

   Use a puller (suitable tool) if wheel hub and drive shaft cannot be separated even after performing the above procedure.

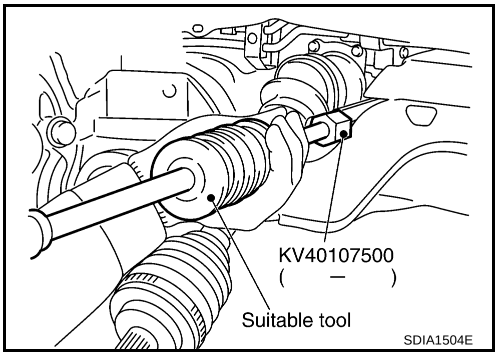


7. Remove fixing bolts and nuts, and then remove steering knuckle from strut assembly. Refer to FSU-8, "Components" .
8. Remove drive shaft from wheel hub.



9. Remove drive shaft from transaxle.
   - Remove drive shaft from transaxle using the drive shaft attachment [SST] and a drive shaft puller (suitable tool) while inserting tip of the drive shaft attachment [SST] between housing and transaxle as shown in the figure.
   - Make sure that circular clip is attached on the edge.

   CAUTION:
   Do not place drive shaft joint at an extreme angle when removing drive shaft. Also be careful not to overextend slide joint.



INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial direction. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is a non-standard condition.

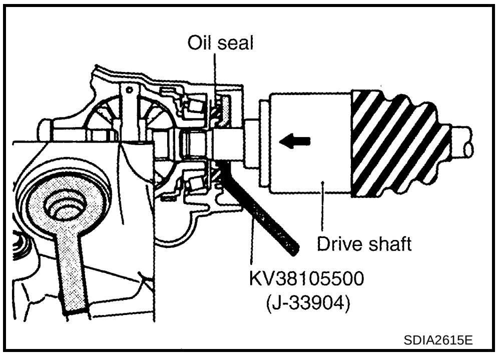
INSTALLATION

CAUTION:
Always replace transaxle side oil seal with new one when installing drive shaft.

- Install in the reverse order of the removal. For tightening torque, refer to FAX-18, "COMPONENT" .

  NOTE:
  Do not reuse non-reusable parts.
- Place the protector [SST] onto transaxle to prevent damage to the oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.

  CAUTION:
  Make sure that circular clip is completely engaged.

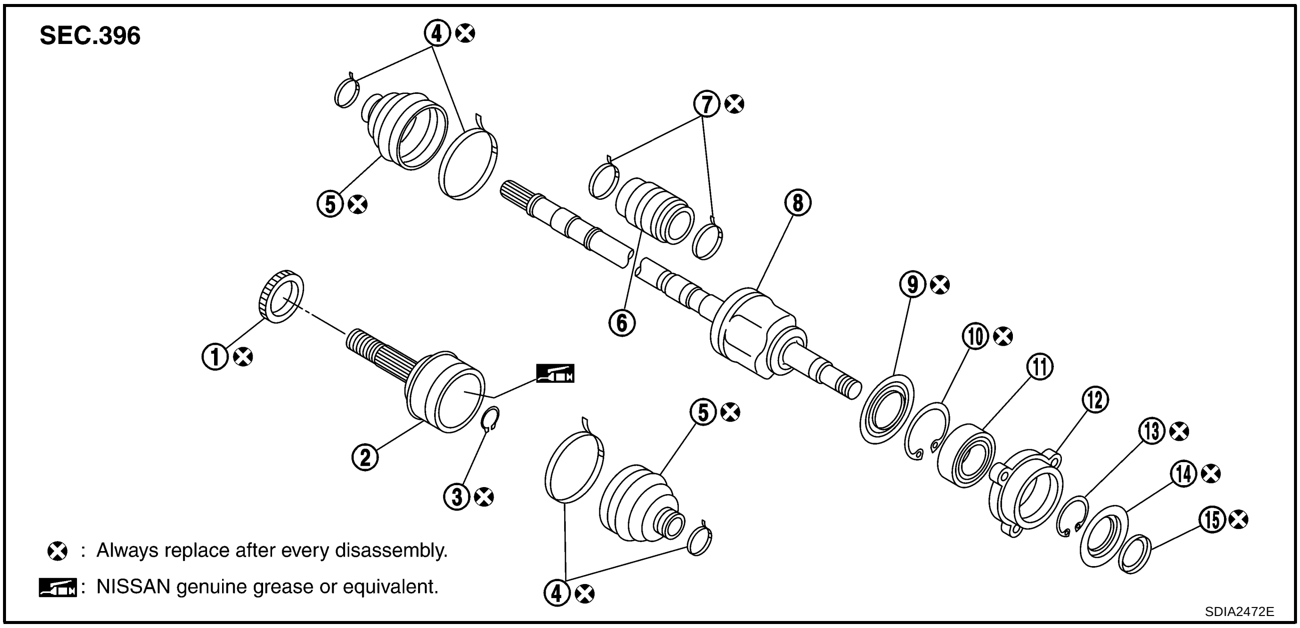


A B C FAX E F G H I J K L M

Disassembly and Assembly (Models with 2WD: RH)

ADS00157

COMPONENT



1. Sensor rotor	2. Joint sub-assembly	3. Circular clip
4. Boot band	5. Boot	6. Dynamic damper
7. Band	8. Housing assembly	9. Dust cover A
10. Snap ring	11. Support bearing	12. Retainer
13. Snap ring	14. Dust cover B	15. Dust cover C

DISASSEMBLY

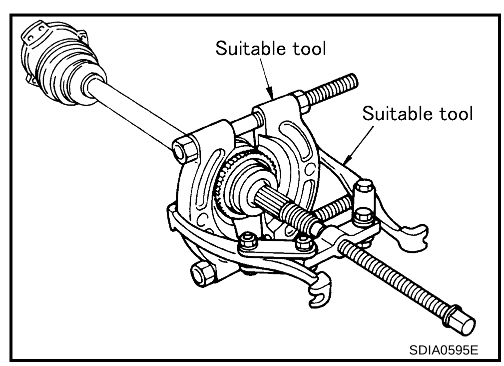
Transaxle Side

1. Housing on the side of transaxle cannot be disassembled. When removing boot, perform procedure 1 to 6 on the wheel side first. And then remove dynamic damper and band.
2. Remove boot bands, then remove boots from housing assembly, and remove boot from shaft after the above service.
3. Clean old grease on housing assembly with paper towels.

Wheel Side

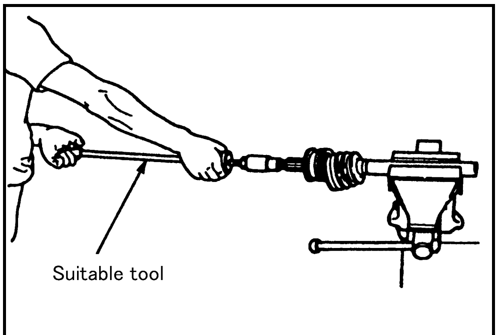
1. As shown in the figure, remove sensor rotor from drive shaft using a bearing replacer (suitable tool) and puller (suitable tool).
2. Secure shaft in a vise.

   CAUTION:
   Protect shaft when securing in a vise using aluminum or copper plates.
3. Remove boot bands, and then remove boot from joint sub-assembly.



4. Screw a drive shaft puller (suitable tool) 30 mm (1.18 in) or more onto the thread on joint sub-assembly, and pull joint sub-assembly out of shaft.

   CAUTION:
   - **Replace entire drive shaft assembly if joint sub-assembly cannot be removed after five or more unsuccessful attempts.**
   - **Align sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**

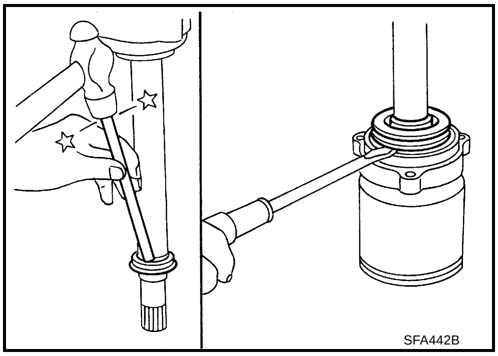


SDIA0606E

5. Remove boot from shaft.
6. Remove circular clip from shaft.
7. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.

Support Bearing

1. Remove dust cover B and C from housing assembly use a brass rod and flat-bladed screwdriver.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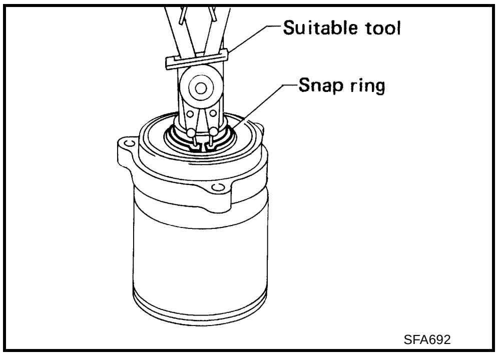
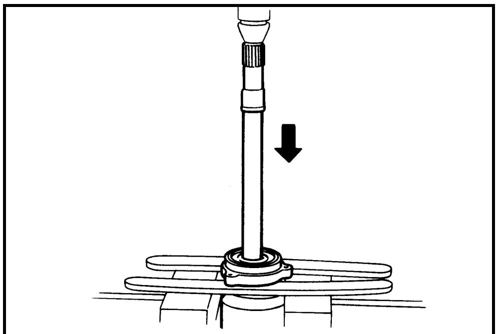
2. Remove snap ring from housing assembly using a snap ring plier (suitable tool).



SFA692

3. Press out retainer and support bearing from housing assembly.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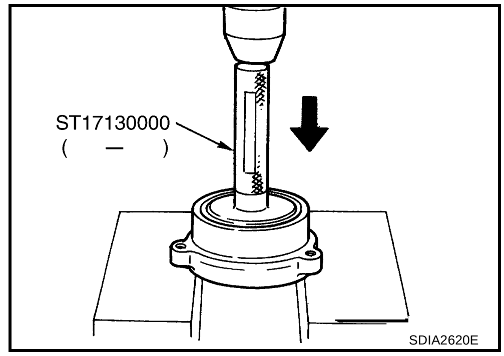
4. Remove snap ring, and then remove support bearing from retainer using the drift [SST].
5. Remove dust cover A from housing assembly.



INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace shaft and housing assembly in a set.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness.
- Inside the joint sub-assembly for entry of foreign material.
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly.

Replace joint sub-assembly if there is any of non-standard conditions.

Housing Assembly (Transaxle Side)

NOTE:
Housing assembly cannot be disassembled. If there is any of non-standard conditions, replace housing assembly.

Support Bearing and Retainer

- Check support bearing for wear and other damage.
- Check retainer for cracks and other damage.

Dynamic Damper

Check for cracks, and other damage. Replace if there are.

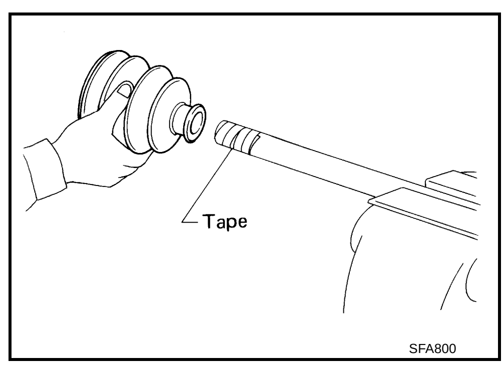
ASSEMBLY

Transaxle Side

1. Wrap serration on shaft with tape to protect boot from damage. Install new boot and boot bands to shaft.

   NOTE:
   Do not reuse boot bands and boot.
2. Remove the tape wrapped around the serration on shaft.
3. Apply the specified amount of grease (NISSAN genuine grease or equivalent) to housing assembly.

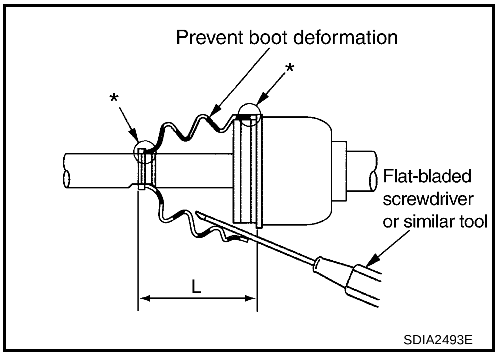
   Grease amount : 132 - 142 g (4.66 - 5.01 oz)



4. Install boot securely into grooves (indicated by * marks) shown in the figure.

   CAUTION:

   If grease adheres to the boot mounting surface (with * mark) on housing assembly, boot may come off. Remove all grease from surface.



5. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting a flat-bladed screwdriver or similar tool into the inside of boot from large diameter side of boot and discharging inside air.

   Boot installation length (L): 84 - 86 mm (3.31 - 3.39 in)

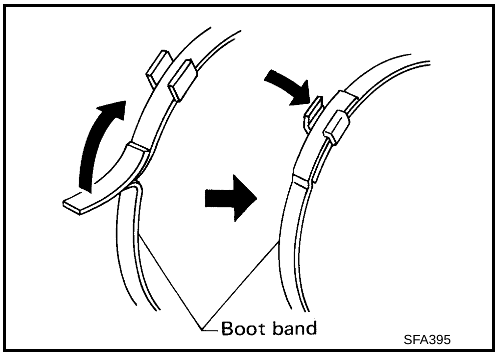
   CAUTION:

   - **If the boot installation length is outside the standard, it may cause breakage in boot.**
   - **Be careful not to touch inside of the boot with the tip of a flat-bladed screwdriver.**

6. Secure the large and small ends of the boot with new boot bands as shown in the figure.

   NOTE:

   Do not reuse boot bands.



7. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when boot installation positions become incorrect.

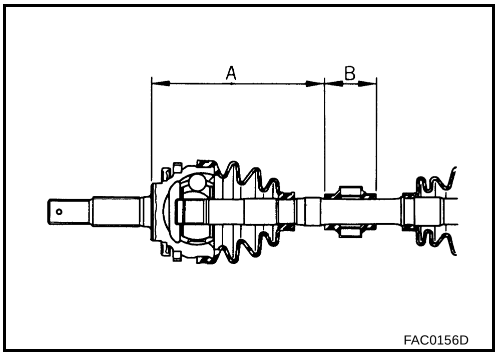
8. Secure dynamic damper with bands in the following specified position when removing.

   NOTE:

   Do not reuse bands.

   Dimension A : 207 - 213 mm (8.15 - 8.39 in)

   Dimension B : 70 mm (2.76 in)

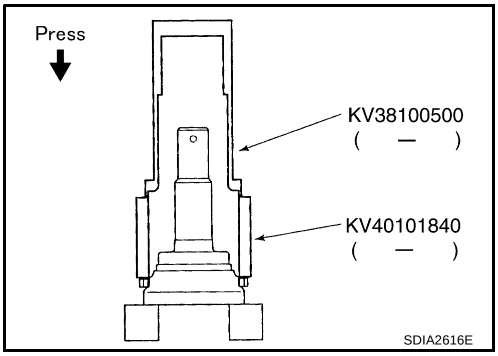


Wheel Side

1. Use the drift [SST] to press-fit sensor rotor into joint sub-assembly.

   NOTE:

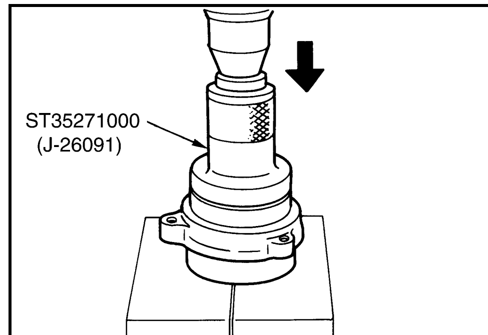
   Do not reuse sensor rotor.



2. Perform the step 14 to 24 of “On-Vehicle Inspection and Service”, after the above service. Refer to FAX-13, "DRIVE SHAFT BOOT REPLACEMENT" .

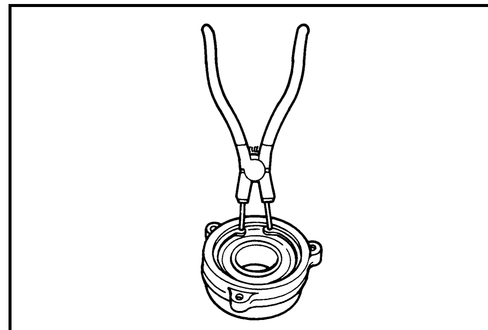
Support Bearing

1. Install support bearing into retainer use the drift [SST].

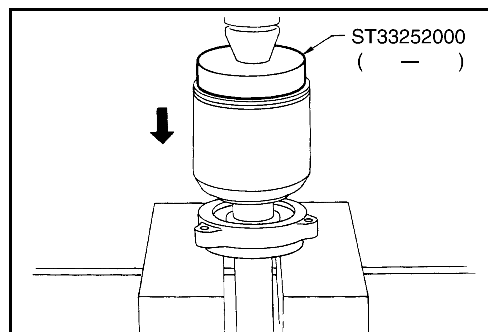


SDIA2617E

2. Install snap ring to retainer.
   NOTE:
   Do not reuse snap ring.
3. Install dust cover A to housing assembly.
   NOTE:
   Do not reuse dust cover A

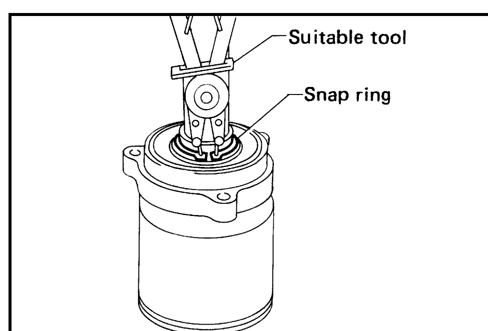

FAC0147D

4. Install support bearing and retainer to housing assembly use the drift [SST].



SDIA2618E

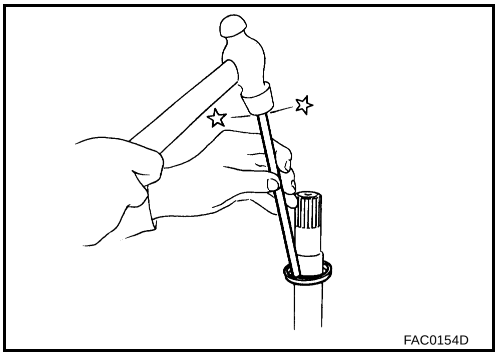
5. Install snap ring to housing assembly use a snap ring plier (suitable tool).
   NOTE:
   Do not reuse snap ring.



SFA692

6. Install dust cover B and C to housing assembly using a brass rod and flat-bladed screwdriver.

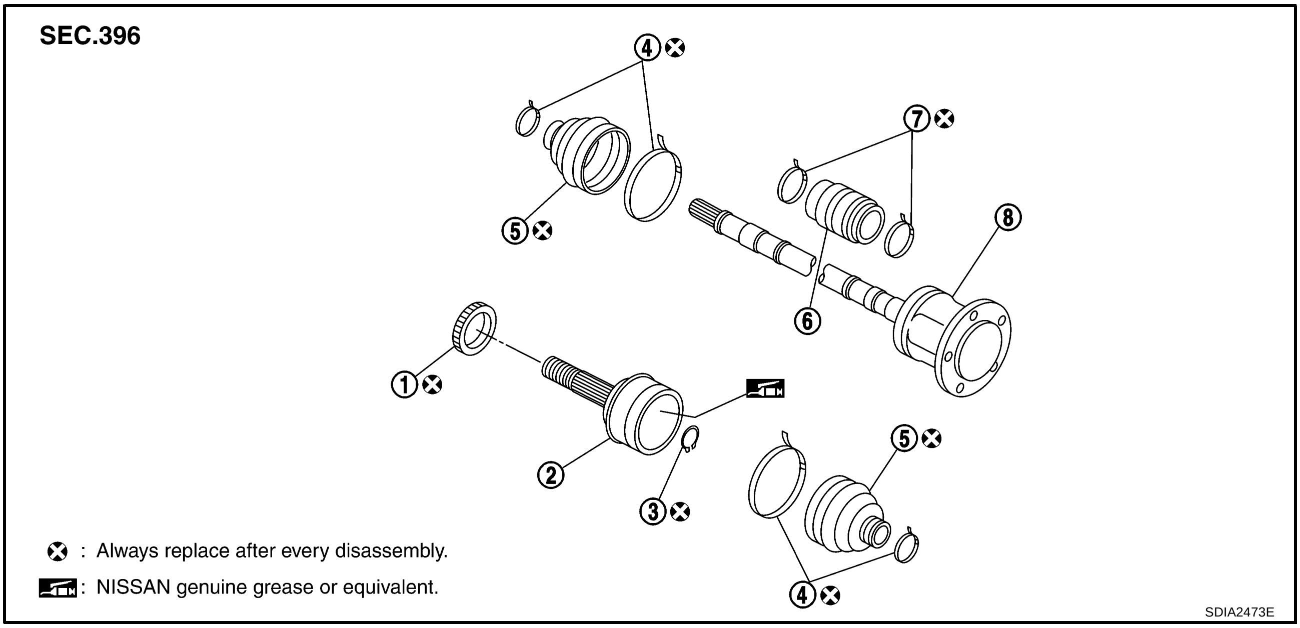
   NOTE:
   Do not reuse dust cover.


FAC0154D

Disassembly and Assembly (Models with AWD: RH)

ADS00158

COMPONENT



SDIA2473E

1.	Sensor rotor	2.	Joint sub-assembly	3.	Circular clip
4.	Boot band	5.	Boot	6.	Dynamic damper
7.	Band	8.	Housing assembly		

DISASSEMBLY

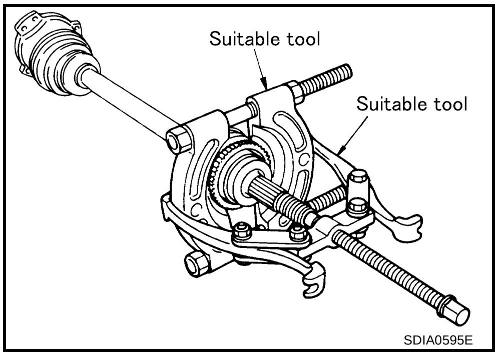
Transaxle Side

1. Housing on the side of transaxle cannot be disassembled. When removing boot, perform procedure 1 to 6 on the wheel side first. And then remove dynamic damper and band.
2. Remove boot bands, then remove boots from housing assembly, and remove boot from shaft after the above service.
3. Clean old grease on housing assembly with paper towels.

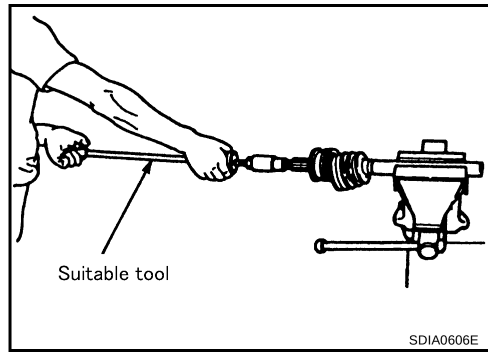
Wheel Side

1. As shown in the figure, use a bearing replacer (suitable tool) and puller (suitable tool) to remove sensor rotor from drive shaft.
2. Secure the shaft in a vise.

   CAUTION:
   Protect shaft when securing in a vise using aluminum or copper plates.
3. Remove boot bands, and then remove boot from joint sub-assembly.



SDIA0595E



4. Screw the drive shaft puller (suitable tool) 30 mm (1.18 in) or more onto the thread on joint sub-assembly, and pull joint sub-assembly out of the shaft.

   CAUTION:
   - **Replace entire drive shaft assembly if joint sub-assembly cannot be removed after five or more unsuccessful attempts.**
   - **Align sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
5. Remove boot from shaft.
6. Remove circular clip from shaft.
7. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.

INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace shaft and housing assembly in a set.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness.
- Inside the joint sub-assembly for entry of foreign material.
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly.

Replace joint sub-assembly if there is any of non-standard conditions.

Housing Assembly (Transaxle Side)

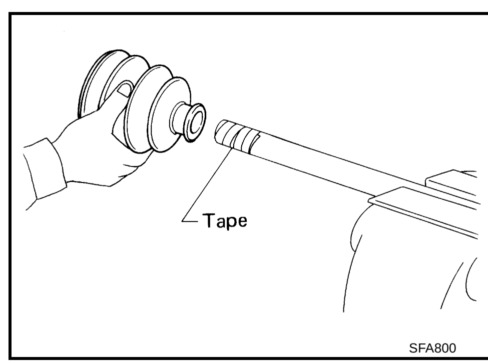
NOTE:
Housing assembly cannot be disassembled. If there is any of non-standard conditions, replace housing assembly.

Dynamic Damper

Check for cracks, and other damage. Replace if there are.

ASSEMBLY

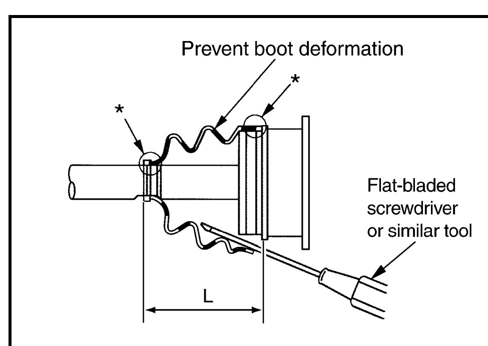
Transaxle Side



1. Wrap serration on shaft with tape to protect boot from damage. Install new boot and boot bands to shaft.

   NOTE:
   Do not reuse boot bands and boot.
2. Remove the tape wrapped around the serration on shaft.
3. Apply the specified amount of grease (NISSAN genuine grease or equivalent) to the housing assembly.

   Grease amount : 132 - 142 g (4.66 - 5.01 oz)



4. Install boot securely into grooves (indicated by * marks) shown in the figure.

   CAUTION:
   If grease adheres to the boot mounting surface (with * mark) on housing assembly, boot may come off. Remove all grease from surface.
5. To prevent from deformation of boot, adjust the boot installation length to the value shown below (L) by inserting flat-bladed screwdriver or similar tool into the inside of boot from the large diameter side of boot and discharging inside air.

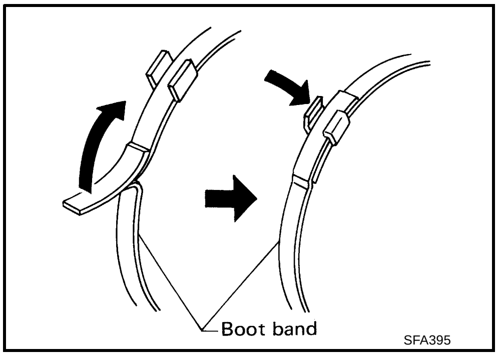
   Boot installation length (L): 84 - 86 mm (3.31 - 3.39 in)

CAUTION:

- **If the boot mounting length is outside the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of boot with a tip of a flat-bladed screwdriver.**

6. Secure the large and small ends of boot with new boot bands as shown in the figure.

   NOTE:
   Do not reuse boot bands.

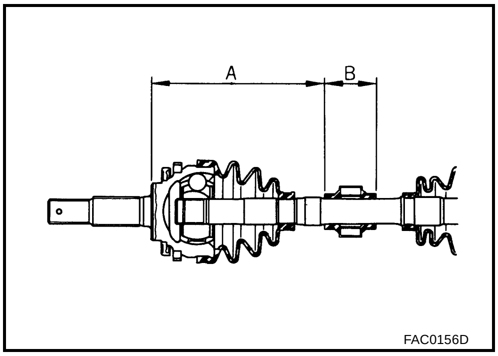


7. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when boot installation positions become incorrect.

8. Secure dynamic damper with bands in the following specified position when removing.

   NOTE:
   Do not reuse bands.

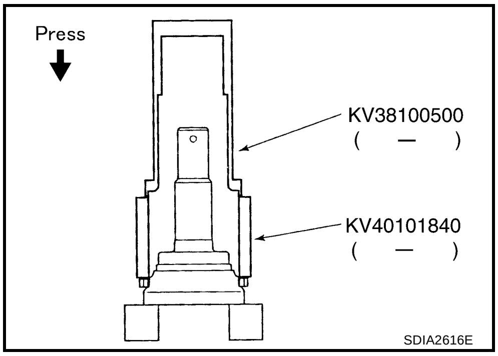
   Dimension A : 207 - 213 mm (8.15 - 8.39 in)
   Dimension B : 70 mm (2.76 in)



Wheel Side

1. Use the drift [SST] to press-fit sensor rotor into joint sub-assembly.

   NOTE:
   Do not reuse sensor rotor.

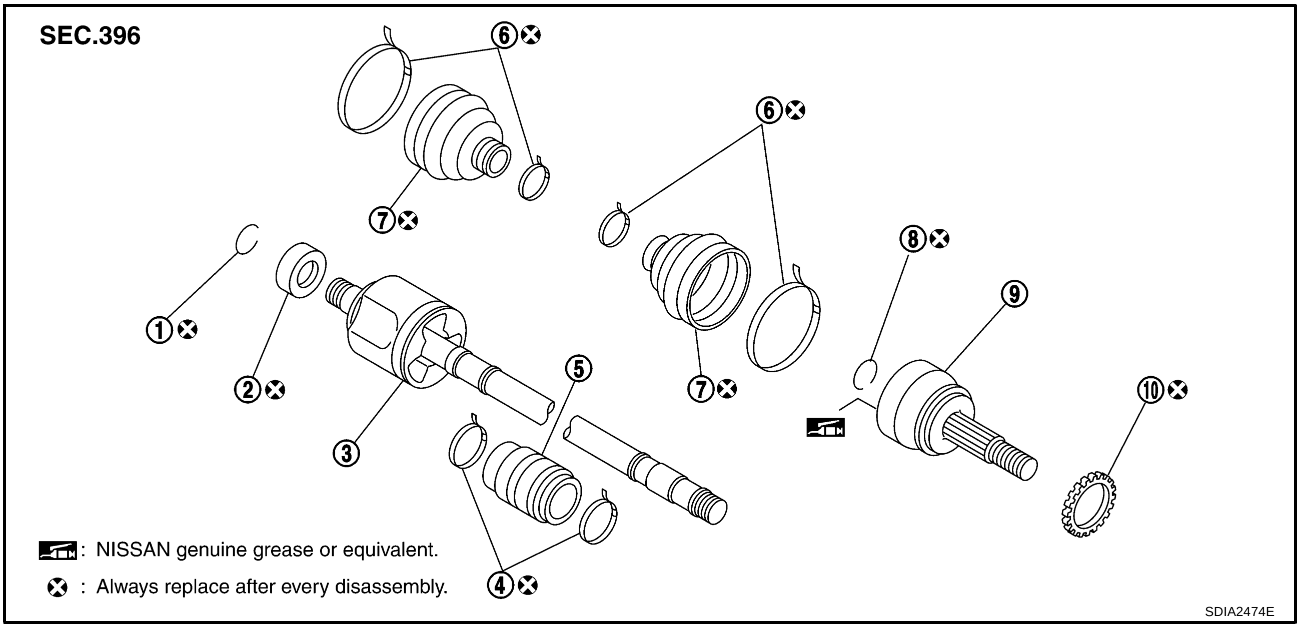


2. Perform the step 14 to 24 of “On-Vehicle Inspection and Service”, after the above service. Refer to FAX-13, "DRIVE SHAFT BOOT REPLACEMENT" .

Disassembly and Assembly (LH)

ADS00159

COMPONENT



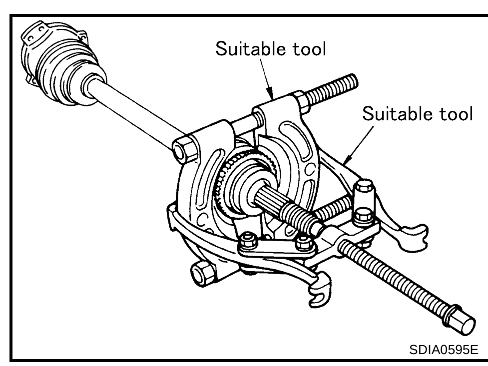
1.	Circular clip	2.	Dust cover	3.	Housing assembly
4.	Band	5.	Dynamic damper	6.	Boot band
7.	Boot	8.	Circular clip	9.	Joint sub-assembly
10.	Sensor rotor				

DISASSEMBLY

Transaxle Side

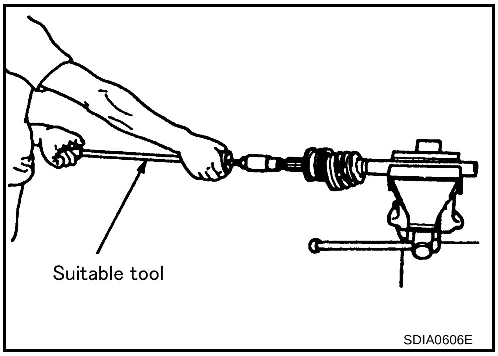
1. Housing on the side of transaxle cannot be disassembled. When removing boot, perform procedure 1 to 6 on the wheel side first. And then remove dynamic damper and band.
2. Remove boot bands, then remove boots from housing assembly, and remove boot from shaft after the above service.
3. Remove circular clip and dust cover from housing assembly.
4. Clean old grease on housing assembly with paper towels.

Wheel Side



1. As shown in the figure, use a bearing replacer (suitable tool) and puller (suitable tool) to remove sensor rotor from drive shaft.
2. Secure shaft in a vise.

   CAUTION:
   Protect shaft when securing in a vise using aluminum or copper plates.
3. Remove boot bands, and then remove boot from joint sub-assembly.



4. Screw a drive shaft puller (suitable tool) 30 mm (1.18 in) or more onto the thread on joint sub-assembly, and pull joint sub-assembly out of the shaft.

   CAUTION:
   - **Replace entire drive shaft assembly if joint sub-assembly cannot be removed after five or more unsuccessful attempts.**
   - **Align sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
5. Remove boot from shaft.
6. Remove circular clip from shaft.
7. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.

INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace shaft and housing assembly in a set.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness.
- Inside the joint sub-assembly for entry of foreign material.
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly.

Replace joint sub-assembly if there is any of non-standard conditions.

Housing Assembly (Transaxle Side)

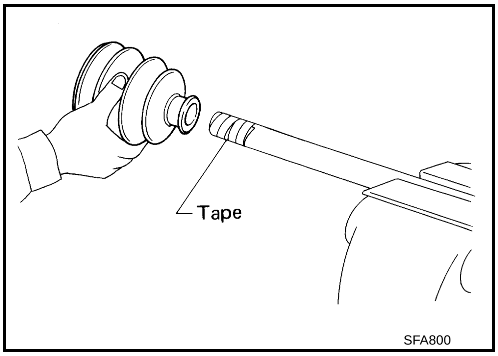
NOTE:
Housing assembly cannot be disassembled. If there is any of non-standard conditions, replace housing assembly.

Dynamic Damper

Check for cracks, and other damage. Replace if there are.

ASSEMBLY

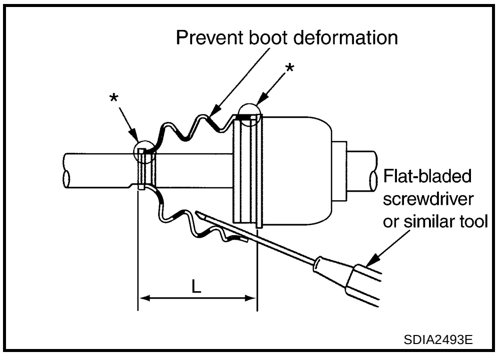
Transaxle Side



1. Wrap serration on shaft with tape to protect boot from damage. Install new boot and boot bands to shaft.

   NOTE:
   Do not reuse boot bands and boot.
2. Remove the tape wrapped around the serration on shaft.
3. Apply the specified amount of grease (NISSAN genuine grease or equivalent) to housing assembly.

   Grease amount : 132 - 142 g (4.66 - 5.01 oz)



4. Install boot securely into grooves (indicated by* marks) shown in the figure.

   CAUTION:
   If grease adheres to the boot mounting surface (with * mark) on housing assembly, boot may come off. Remove all grease from the surface.
5. To prevent from the deformation of the boot, adjust the boot installation length to value shown below (L) by inserting the flat-bladed screwdriver or similar tool into inside of boot from the large diameter side of the boot and discharging the inside air.

   Boot installation length (L): 84 - 86 mm (3.37 - 3.39 in)

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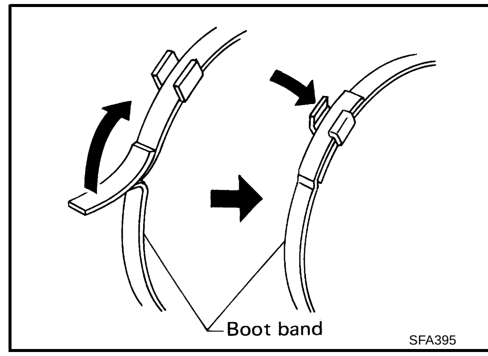
CAUTION:
- **If the boot installation length is outside the standard, it may cause breakage in the boot.**
- **Be careful not to touch the inside of boot with tip of a flat-bladed screwdriver.**

6. Secure the large and small ends of boot with new boot bands as shown in the figure.

   NOTE:
   Do not reuse boot bands.
7. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when boot installation positions become incorrect.

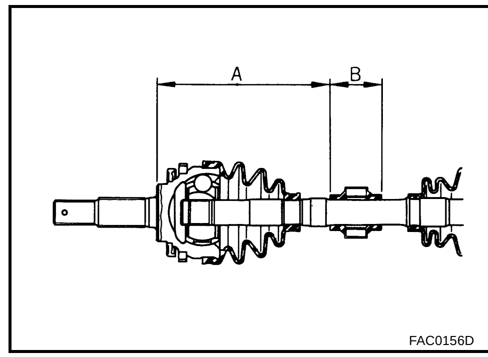


8. Secure dynamic damper with bands in the following specified position when removing.

   NOTE:
   Do not reuse bands.

   Dimension A : 207 - 213 mm (8.15 - 8.39 in)
   Dimension B : 70 mm (2.76 in)
9. Install circular clip and dust cover to housing.

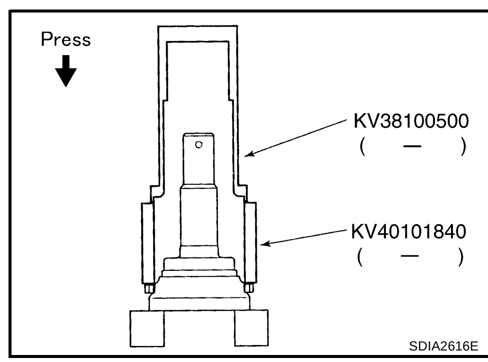
   NOTE:
   Do not reuse circular clip and dust cover.



Wheel Side

1. Use the drift [SST] to press-fit sensor rotor into joint sub-assembly.

   NOTE:
   Do not reuse sensor rotor.
2. Perform the step 14 to 24 of “On-Vehicle Inspection and Service”, after the above service. Refer to FAX-13, "DRIVE SHAFT BOOT REPLACEMENT" .

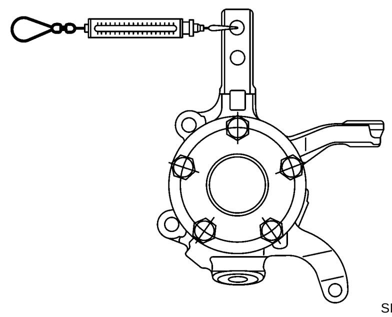


SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Bearing

ADS0015A

Axial end play	0.05 mm (0.002 in) or less
Rotating torque	Less than 1.645 N·m (0.168 kg-m, 15 in-lb)
Spring balance reading	Less than 10.6 N (1.1 kg, 2.4 lb)
Measuring point	 SDIA2518E

Drive Shaft

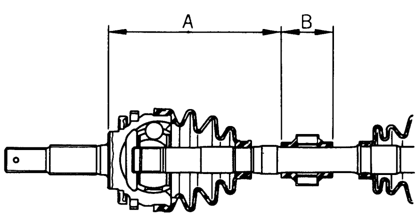
ADS0015B

Joint type	Wheel side	Transaxle side
Grease quantity	115 - 125 g (4.06 - 4.41 oz)	132 - 142 g (4.66 - 5.01 oz)
Boot installation length	100 - 106 mm (3.94 - 4.17 in)	84 - 86 mm (3.31 - 3.39 in)

Dynamic Damper

ADS0015C

Dimension A	Dimension B
207 – 213 mm (8.15 – 8.39 in)	70 mm (2.76 in)



FAC0156D

SECTION FL

FUEL SYSTEM

CONTENTS

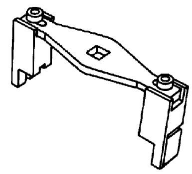
PREPARATION

PFP:00002

Commercial Service Tools

ABS00D0K

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

(Kent-Moore No.) Tool name		Description
(J-38879-A) Fuel tank lock ring wrench	 ZZA0122D	Removing and installing fuel tank lock ring

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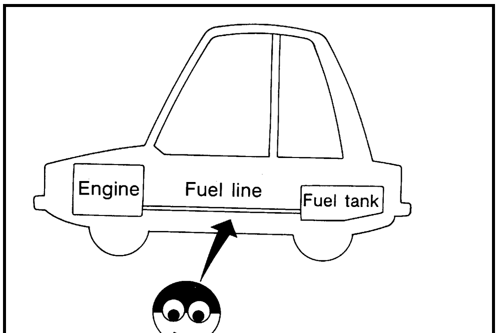
FUEL SYSTEM

PFP:17503

Checking Fuel Lines

ABS00D0L

Inspect fuel lines, fuel filler cap and fuel tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



SMA803A

General Precautions

ABS00D0M

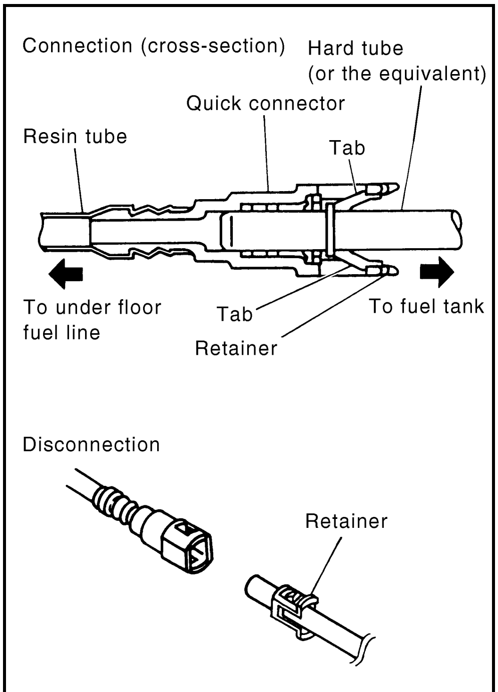
WARNING:

When replacing fuel line parts, be sure to observe the following.

- **Put a "CAUTION: INFLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Do not smoke while servicing fuel system. Keep open flames and sparks away from the work area.**
- **Put drained fuel in an explosion-proof container and put the lid on securely. Keep the container in safe area.**

CAUTION:

- **Use gasoline required by the regulations for octane number. Refer to GI-5, "Precautions for Fuel (Unleaded Regular Gasoline Recommended)" .**
- **Before removing fuel line parts, perform the following procedures:**
  - **Release fuel pressure from the fuel lines. Refer to EC-90, "FUEL PRESSURE RELEASE" .**
  - **Disconnect battery cable at negative terminal.**
- **Always replace clamps with new ones.**
- **Do not kink or twist tubes when they are being installed.**
- **Perform work on level place.**
- **Do not tighten hose clamps excessively to avoid damaging hoses.**
- **After connecting fuel tube quick connectors, make sure quick connectors are secure.**
  Ensure that connector and resin tube do not contact any adjacent parts.
- **After installing tubes, check if there are no fuel leakage at connections in the following steps.**
  - **Apply fuel pressure to fuel lines with turning ignition switch "ON" (with engine stopped). Then check for fuel leaks at connections.**
  - **Start engine and rev it up and check for fuel leaks at connections.**
- **For servicing "Evaporative Emission System" parts, refer to EC-30, "EVAPORATIVE EMISSION SYSTEM" .**
- **For servicing "On Board Refueling Vapor Recovery (ORVR) System" parts, refer to EC-37, "ON BOARD REFUELING VAPOR RECOVERY (ORVR)" .**

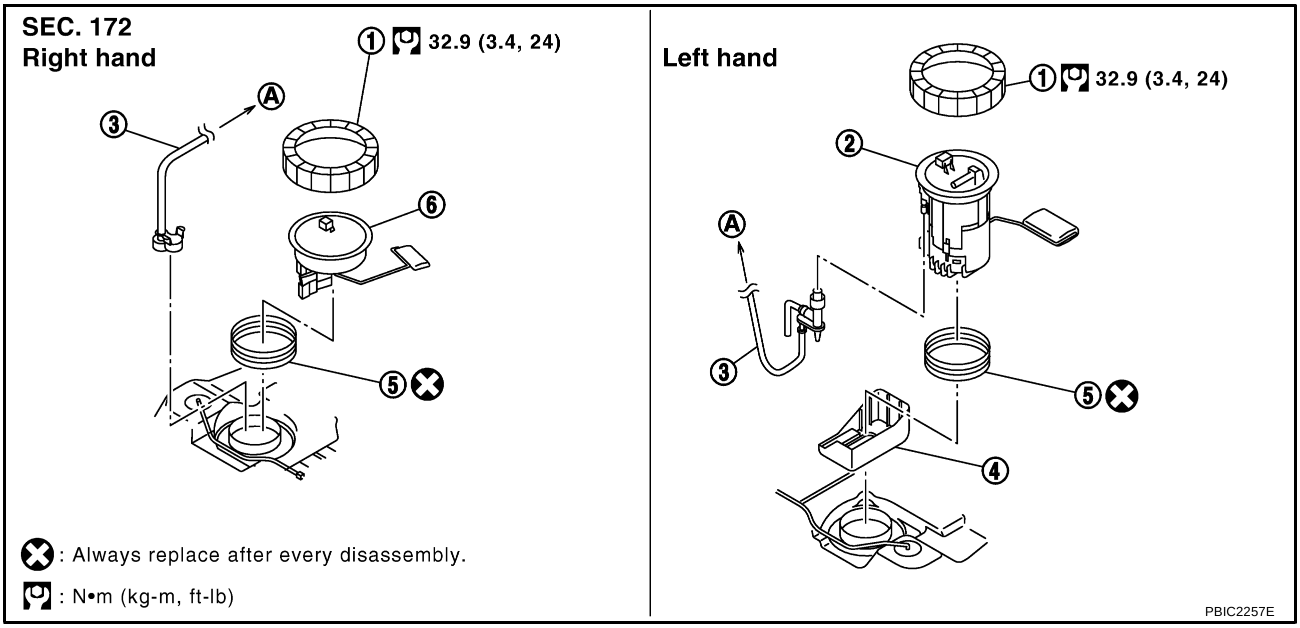


SBIA0504E

FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY PFP:17042

Removal and Installation

ABS00D0N

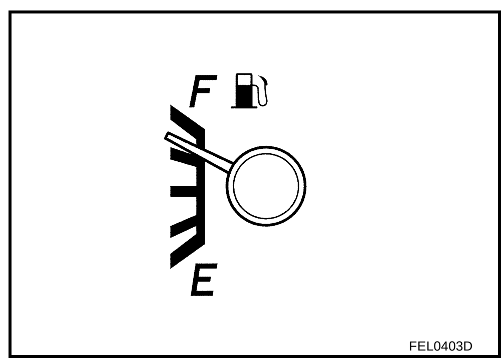


1. Lock ring	2. Main fuel level sensor unit, fuel filter and fuel pump assembly	3. Jet pump, fuel hose and jet pump inlet assembly
4. Chamber	5. Seal packing	6. Sub fuel level sensor unit

REMOVAL

WARNING:

Be sure to read "General Precautions" when working on the fuel system. Refer to FL-3, "General Precautions" .



1. Check fuel level on fuel gauge. If fuel gauge indicates more than the level as shown in the figure (full or almost full), drain fuel from fuel tank until fuel gauge indicates level as shown in the figure or below.

   NOTE:

   Fuel will be spilled when removing main and sub fuel level sensor units for the top of the fuel is above the main and sub fuel level sensor units installation surface.

   - As a guide, fuel level becomes the position as shown in the figure or below when approximately 15 ℓ (4 US gal, 3-1/4 Imp gal) of fuel are drained from fuel tank.
   - In a case that fuel pump does not operate, perform the following procedure.

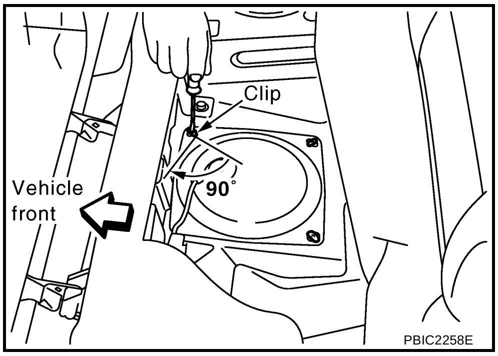
a. Insert hose of less than 20 mm (0.79 in) in diameter into fuel filler tube through fuel filler opening to draw fuel from fuel filler tube.

b. Disconnect fuel filler hose from fuel filler tube. Refer to FL-11, "FUEL TANK" .

c. Insert hose into fuel tank through fuel filler hose to draw fuel from fuel tank.

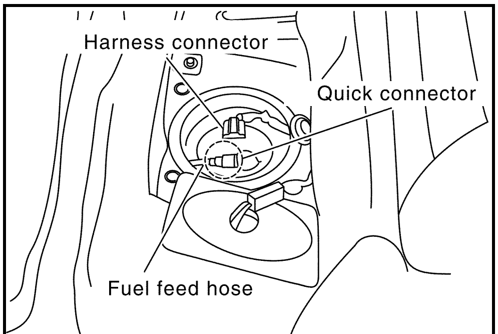
2. Release the fuel pressure from the fuel lines. Refer to EC-90, "FUEL PRESSURE RELEASE" .
3. Open fuel filler lid.
4. Open fuel filler cap and release the pressure inside fuel tank.
5. Lift to hold rear seat cushion up. Refer to SE-24, "REAR SEAT" .

6. Remove inspection hole cover for main and sub fuel level sensor units.
   - Remove cover by pushing it, then by turning clips clockwise by 90 degrees and by matching both cover hole and clip shape.



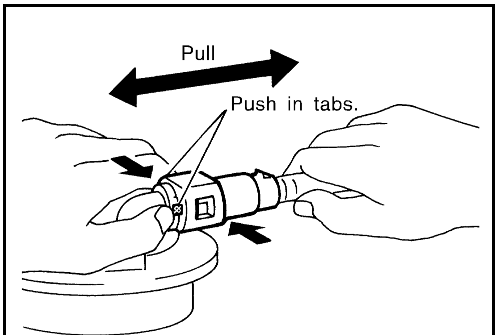
PBIC2258E

7. Disconnect harness connector and quick connector.



KBIA0280E

   - Disconnect quick connector as follows:
     - Hold the sides of connector, push in tabs and pull out fuel feed hose.
     - If quick connector sticks to tube of fuel level sensor unit, push and pull quick connector several times until it starts to move. Then disconnect quick connector by pulling.

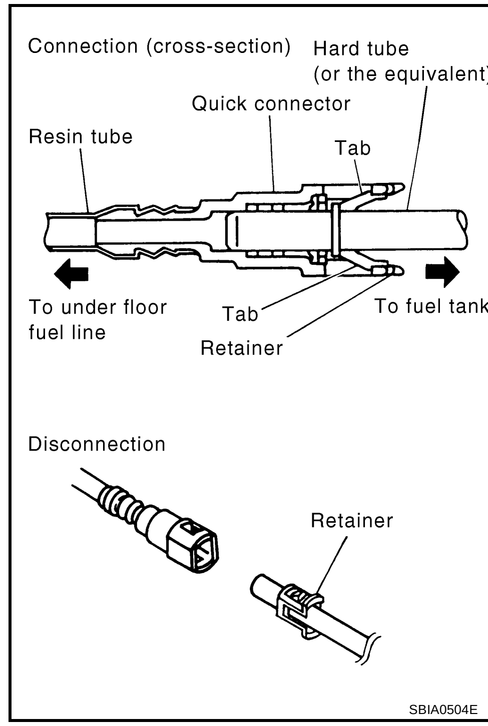


SFE562A

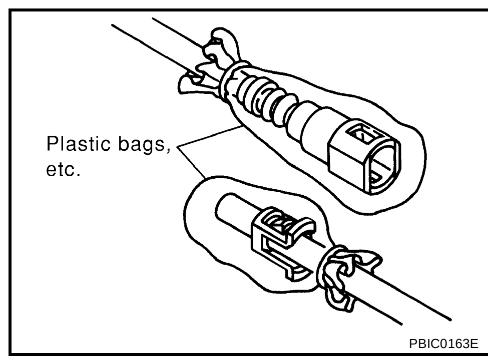
CAUTION:

- **Quick connector can be disconnected when the tabs are completely depressed. Do not twist it more than necessary.**
- **Do not use any tools to disconnect quick connector.**
- **Keep resin tube away from heat. Be especially careful when welding near the resin tube.**
- **Prevent acid liquid such as battery electrolyte, etc. from getting on resin tube.**
- **Do not bend or twist resin tube during installation and disconnection.**
- **Do not remove the remaining retainer on hard tube (or the equivalent) except when resin tube or retainer is replaced.**
- **When resin tube or hard tube (or the equivalent) is replaced, also replace retainer with a new one.**
- **Replace same color retainer as before replacing.**

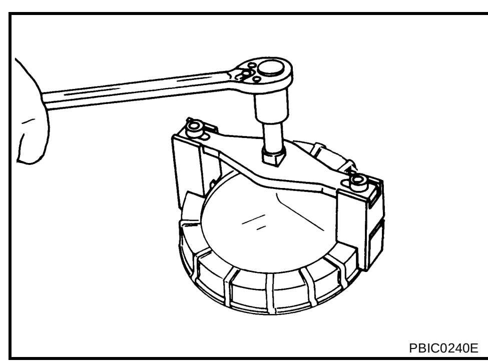
Retainer color: Green



- **To keep the connecting portion clean and to avoid damage and foreign materials, cover them completely with plastic bags or something similar.**



8. Using fuel tank lock ring wrench (commercial service tool: J-38879-A), remove lock ring.



9. Remove main fuel level sensor unit, fuel filter and fuel pump assembly, and sub fuel level sensor unit as follows.

   CAUTION:
   - **Do not bend float arm during removal.**
   - **Avoid polluting the inside by residue fuel. Draw out with avoiding inclination by supporting with a cloth.**
   - **Avoid impacts such as falling when handling components.**

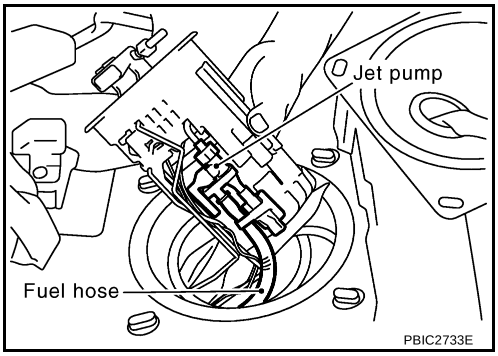
a. Removal of main fuel level sensor unit, fuel filter and fuel pump assembly:

i. Raise main fuel level sensor unit, fuel filter and fuel pump assembly, and disconnect jet pump.

ii. Leave jet pump on fuel tank with fuel hose.

CAUTION:
Do not separate jet pump and fuel hose.

iii. If necessary, remove chamber from the bottom of fuel tank by sliding toward the rear of the vehicle.



b. Removal of sub fuel level sensor unit:

i. Raise and release sub fuel level sensor unit to remove.

ii. If necessary, remove jet pump inlet with fuel hose from the bottom of fuel tank by pinching tabs.

CAUTION:
Do not separate jet pump inlet and fuel hose.

INSPECTION AFTER REMOVAL

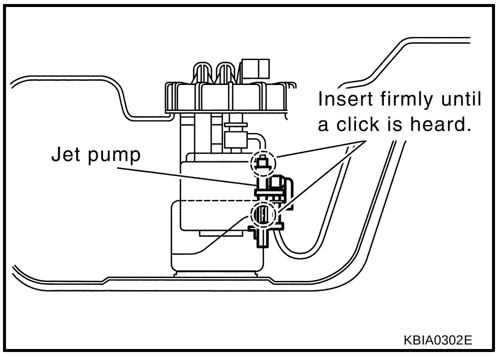
Make sure that fuel pump strainer is free from foreign materials. If any are found, remove them.

INSTALLATION

Note the following, and install in the reverse order of removal.

Chamber and Jet Pump

When installing chamber and jet pump, insert them fully until a click sound of full stopper engagement is heard (Ditto for jet pump inlet).

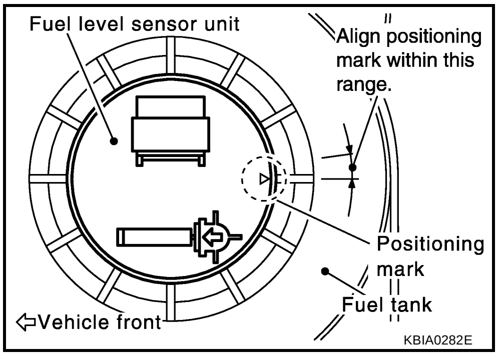


Main and Sub Fuel Level Sensor Unit

1. Install seal packing to fuel tank without any twist.
2. Face fuel level sensor unit, fuel filter and fuel pump assembly as shown in the figure, and install it to fuel tank. (Figure shows left side of fuel tank.)

   CAUTION:
   Do not bend float arm during installing.

   NOTE:
   On right side of fuel tank, there are three carved lines on fuel tank. Set mating mark between two outer carved lines.



3. Tighten rock ring with rock ring wrench (commercial service tool: J-38879-A).

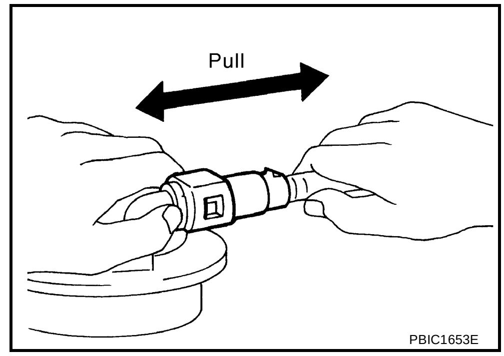
   CAUTION:
   Install rock ring horizontally.

Quick Connector

Connect quick connector of fuel feed hose as follows:

1. Check the connection for damage and foreign materials.

2. Align the connector with the tube, then insert the connector straight into the tube until a click sound is heard.
3. After connecting, make sure that the connection is secure by following method.
   - Visually confirm that the two tabs are connected to the connector.
   - Pull the tube and the connector to make sure they are securely connected.



Inspection Hole Cover

1. Install inspection hole covers with the front mark (arrow) facing front of the vehicle.
2. Lock clips by turning counterclockwise by 90 degrees.

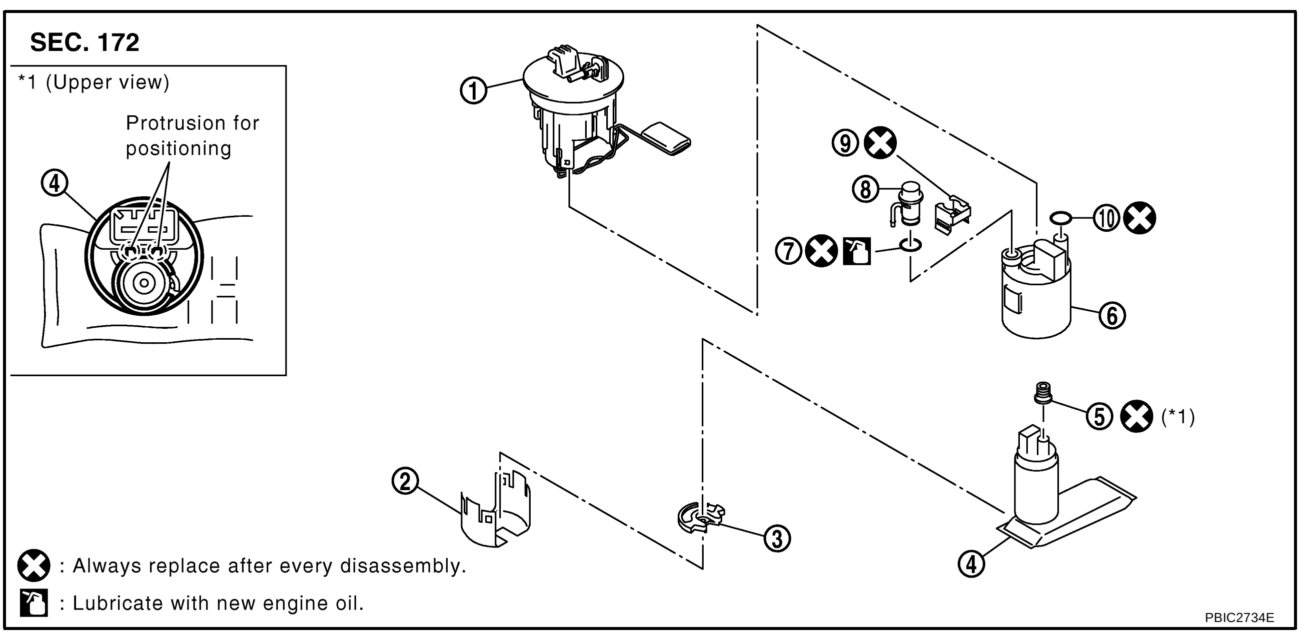
INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

1. Turn ignition switch “ON” (with engine stopped), then check connections for leaks by applying fuel pressure to fuel piping.
2. Start engine and rev it up and make sure there are no fuel leaks at the fuel system connections.

Disassembly and Assembly

ABS00D0O



1.	Main fuel level sensor unit	2.	Bracket	3.	Rubber
4.	Fuel pump	5.	Packing	6.	Fuel filter
7.	O-ring	8.	Pressure regulator	9.	Clip
10.	O-ring				

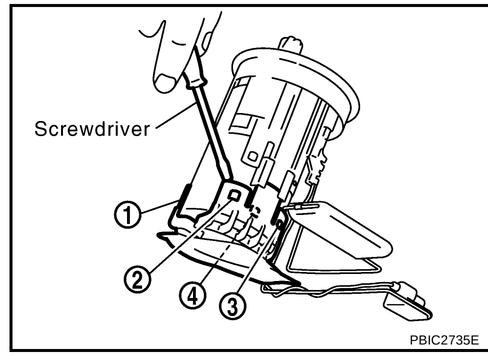
CAUTION:

Sub fuel level sensor unit cannot be disassembled and should be replaced as a unit.

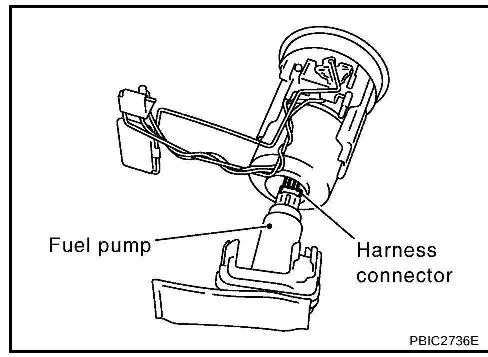
DISASSEMBLY

1. Separate fuel pump and bracket from fuel filter as follows:

a. Using flat-bladed screwdriver, separate the snap fit portion of bracket in the order of (1), (2), (3) and (4) as shown in the figure.



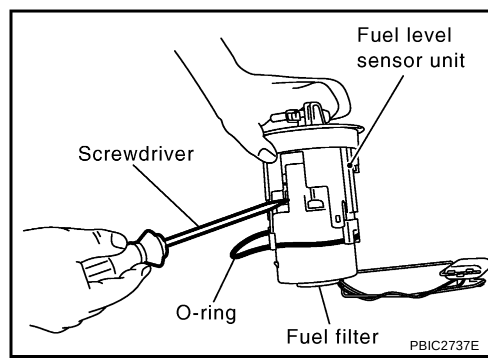
b. Pull out fuel pump, and disconnect harness connector.



2. Separate fuel filter and main fuel level sensor unit as follows:

a. Fit a used O-ring into space between fuel level sensor unit and fuel filter. Undo catches and separate main fuel level sensor and fuel filter.
   - For reference when reassembling, put a mating mark on outer edges of main fuel level sensor unit and fuel filter with some means which cannot be erased by fuel.

b. Insert flat-bladed screwdriver to the gap between fuel filter and main fuel level sensor unit to separate them.



CAUTION:
- **Put cloth or similar one on the edge of screwdriver not to damage the inserted portion.**
- **Separate main fuel level sensor unit by pulling it straight. If lateral force is applied, inner resin tube (between main fuel level sensor unit and fuel filter) may break.**

3. Remove pressure regulator from fuel filter as follows:

a. Open and remove the clip.

b. Pull pressure regulator straight out during removal.

CAUTION:
- **Handle fuel tube carefully and avoid damaging it.**
- **Avoid impacts such as falling during removal.**
- **Do not disassemble or adjust.**

ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

Fuel Filter and Fuel Pump

- Install fuel filter and fuel pump with the tabs aligned, make sure a click sound of secure engagement is heard.
- Securely connect harness connector of fuel pump.

Pressure Regulator

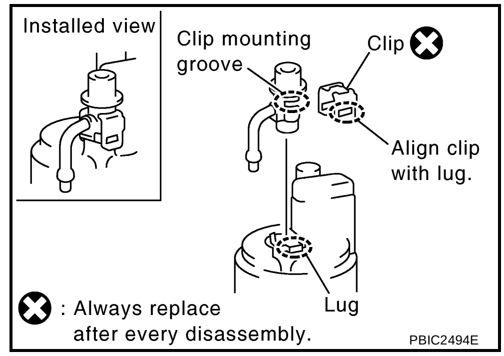
Install pressure regulator as follows:

1. Install O-ring.

CAUTION:

- **Do not reuse O-ring. Replace it with a new one.**
- **Handle O-ring with bare hands. Do not wear gloves.**
- **Visually check O-ring, mounting parts and mating parts for foreign materials and flaws.**
- **Before installing, lubricate new engine oil.**
- **To avoid damage, do not apply an excessive force (pulling or stretching).**

2. Insert the clip to the groove of pressure regulator.



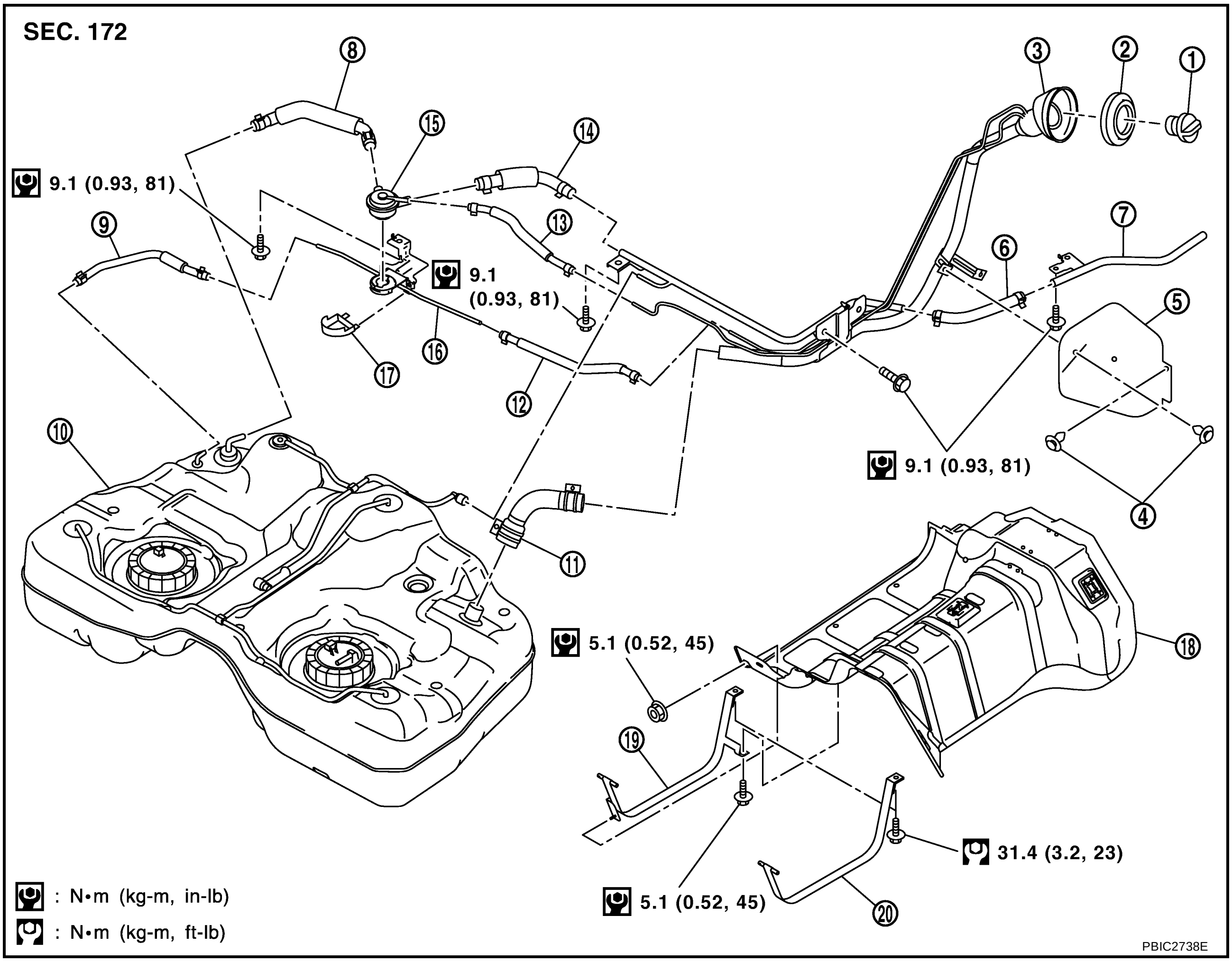
3. With the clip installed, insert pressure regulator straight by matching the fuel filter lug and the clip notch.
4. Make sure that the fuel filter lug and clip notch are securely engaged.

FUEL TANK

PFP:17202

Removal and Installation

ABS00D0P



1.	Fuel filler cap	2.	Grommet	3.	Fuel filler tube
4.	Clip	5.	Fuel filler tube protector	6.	Vent hose
7.	Vent tube	8.	Vent hose	9.	Recirculation hose
10.	Fuel tank	11.	Fuel filler hose	12.	Recirculation hose
13.	Signal hose	14.	Vent hose	15.	Refueling EVAP vapor cut valve
16.	Refueling EVAP vapor cut valve bracket	17.	Cover	18.	Fuel tank protector
19.	Fuel tank band	20.	Fuel tank band		

REMOVAL

WARNING:

Be sure to read “General Precautions” when working on the fuel system. Refer to FL-3, "General Precautions" .

1. Perform the steps 1 to 7 of “REMOVAL” in “ FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY”. Refer to FL-4, "REMOVAL" .

- Drain fuel from fuel tank if necessary. Refer to FL-4, "REMOVAL" .

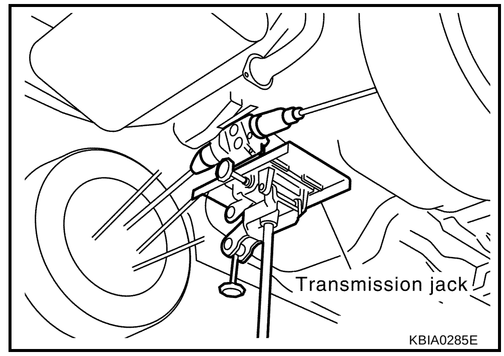
  CAUTION:

  Because fuel tank forwardly inclines and is not firmly affixed when installing/removing, fuel should be drained if there is any remaining quantity.

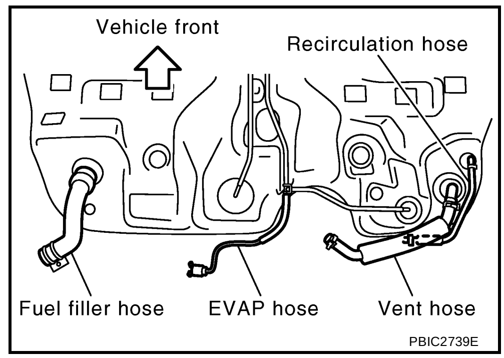
- Perform work on level place.

2. Remove exhaust center tube and insulator. Refer to EX-2, "EXHAUST SYSTEM" .
3. Remove propeller shaft. (AWD models) Refer to PR-3, "REAR PROPELLER SHAFT" .

4. Using a transmission jack, support the bottom of final drive assembly (AWD models) or rear suspension member (2WD models).
5. Remove mounting nuts on rear suspension member, and lower the transmission jack carefully until just before rear suspension member is removed from stud bolts on the vehicle. Refer to RSU-5, "REAR SUSPENSION ASSEMBLY" .



6. Remove fuel tank protector.
7. Disconnect fuel filler hose, EVAP hose, recirculation hose and vent hose at fuel tank side.
   - For disconnection procedure of quick connector on EVAP hose, refer to FL-4, "FUEL LEVEL SENSOR UNIT, FUEL FILTER AND FUEL PUMP ASSEMBLY" .



8. Remove fuel tank band mounting bolts while supporting fuel tank.

   CAUTION:

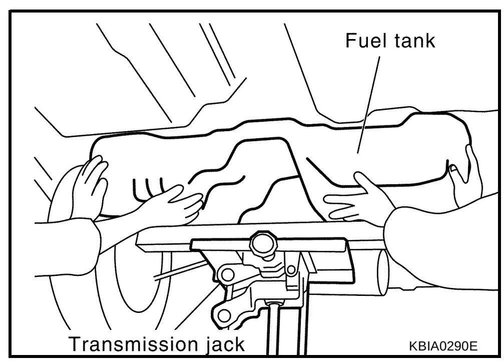
   Sustain the bottom of fuel tank by using plate or anything same.
9. Remove fuel tank.
   - After lifting down the front portion of fuel tank, remove fuel tank by pulling it from the upper front of final drive assembly, so that fuel tank can move forwardly. (AWD models)

   CAUTION:

   Pay attention not to drop fuel tank because it forwardly inclines and is not firmly affixed.

   NOTE:

   It is desirable that more than two technicians work together.



10. Remove fuel filler tube with the following procedure if necessary.

a. Remove fuel filler tube protector.

b. Remove bolts and nuts between strut and rear axle assembly. Refer to RSU-7, "Component" .

c. Remove fuel filler tube.

INSTALLATION

Note the following, and install in the reverse order of removal.

- Surely clamp fuel hoses and insert hose to the length below.

Fuel filler hose	**: 35mm (1.38 in)**
The other hoses	**: 25mm (0.98 in)**

- Be sure hose clamp is not placed on swelled area of fuel tube.
- Tighten fuel hose clamp so that the remaining length of screw thread becomes to the following.

Fuel tank side	**: 2 - 6 mm (0.08 - 0.24 in)**
Fuel filler tube side	**: 7 - 11 mm (0.28 - 0.43 in)**

- Fit fuel tank band pin to the vehicle side securely.

- Before fixing fuel tank, temporarily install fuel filler tube if removed.

  CAUTION:

  Use genuine fuel filler tube mounting bolts or equivalent. Make sure to tighten them to the specified torque.
- To connect quick connector, refer to FL-7, "Quick Connector" .

INSPECTION AFTER INSTALLATION

Use the following procedure to check for fuel leaks.

1. Turn ignition switch “ON” (with engine stopped), and check connections for leaks by applying fuel pressure to fuel piping.
2. Start engine and rev it up and make sure there are no fuel leaks at the fuel system tube and hose connections.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

ABS00D0Q

FUEL TANK

Fuel tank capacity	Approx. 60 ℓ (15-7/8 US gal, 13-1/4 Imp gal)
Fuel recommendation	Refer to GI-5

SECTION FSU
FRONT SUSPENSION

CONTENTS

PRECAUTIONS

PFP:00001

Caution

AES000WV

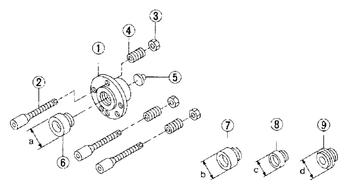
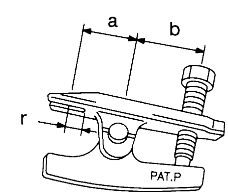
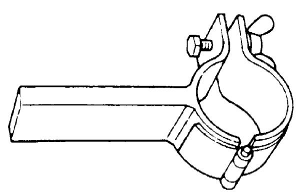
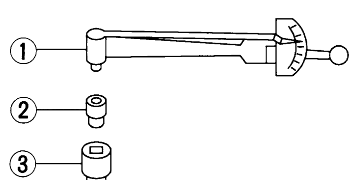
- When installing rubber bushings, final tightening must be performed under unladen conditions with tires on ground. Oil will shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
  - Unladen conditions mean that fuel, engine coolant and lubricant are full. A spare tire, a jack, hand tools and mats are in designated positions.
- After servicing suspension parts, be sure to check wheel alignment.
- Self-lock nut are not reusable. Always use new ones when installing. Since new self-lock nuts are pre-oiled, tighten as they are.

PREPARATION

PFP:00002

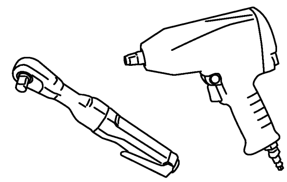
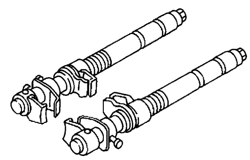
Special Service Tools [SST]

AES000WW

Tool number (Kent-Moore No.) Tool name	Description
KV991040S0 (–) CCK gauge attachment 1. Plate 2. Guide bolts 3. Nuts 4. Springs 5. Center plate 6. KV99104020 Adapter A a: 72 mm (2.83 in) dia. 7. KV99104030 Adapter B b: 65 mm (2.56 in) dia. 8. KV99104040 Adapter C c: 57 mm (2.24 in) dia. 9. KV99104050 Adapter D d: 53.4 mm (2.102 in) dia.  S-NT498	Measuring wheel alignment
HT72520000 (J-25730-A) Ball joint remover a: 33 mm (1.30 in) b: 50 mm (1.97 in) r: 11.5 mm (0.453 in)  NT546	Removing steering outer socket
ST35652000 (–) Strut attachment  ZZA0807D	Disassembling and assembling strut
ST3127S000 (See J-25742-1) Preload gauge 1. GG91030000 (J-25765) Torque wrench 2. HT62940000 (–) Socket adapter (1/2″) 3. HT62900000 (–) Socket adapter (3/8″)  NT124	Measuring rotating torque of ball joint

Commercial Service Tools

AES000WX

Tool name		Description
Power tool	 PBIC0190E	● Removing wheel nuts ● Removing torque member fixing bolts ● Removing stabilizer connecting rod
Spring compressor	 S-NT717	Removing and installing coil spring

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

AES000WY

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			FSU-8	FSU-12	—	—	—	FSU-8	FSU-6	FSU-16	NVH in PR section	NVH in RFD section	NVH in FAX and FSU sections	NVH in WT section	NVH in WT section	NVH in FAX section	NVH in BR section	NVH in PS section
Possible cause and Suspected parts			Improper installation, looseness	Strut deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	PROPELLER SHAFT	DIFFERENTIAL	FRONT AXLE AND FRONT SUSPENSION	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	Front suspension	Noise	×	×	×	×	×	×			×	×	×	×	×	×	×	×
		Shake	×	×	×	×		×			×		×	×	×	×	×	×
		Vibration	×	×	×	×	×				×		×	×		×		×
		Shimmy	×	×	×	×			×				×	×	×		×	×
		Judder	×	×	×								×	×	×		×	×
		Poor quality ride or handling	×	×	×	×	×		×	×			×	×	×			

×: Applicable

FRONT SUSPENSION ASSEMBLY

PFP:54010

On-Vehicle Inspection and Service

AES000WZ

Make sure that the mounting conditions (looseness, back lash) of each of the components and the component conditions (wear, damage) are normal.

INSPECTION OF TRANSVERSE LINK BALL JOINT END PLAY

1. Set front wheels in a straight-ahead position. Do not depress brake pedal.
2. Place an iron bar or similar tool between transverse link and steering knuckle.
3. Measure axial end play by prying it up and down.

   Axial end play : 0 mm (0 in)

   CAUTION:
   Be careful not to damage ball joint boot. Do not damage the installation position by applying excessive force.

STRUT INSPECTION

Check for oil leakage, damage, and breakage of installation positions.

Wheel Alignment Inspection

AES000X0

DESCRIPTION

Measure wheel alignment under unladen conditions.

NOTE:
“Unladen” conditions mean that fuel, engine coolant, and lubricant are full. A spare tire, a jack, hand tools and mats are in designated positions.

PRELIMINARY CHECK

Check the following:

1. Tires for improper air pressure and wear.
2. Road wheels for runout. Refer to WT-4, "ROAD WHEEL" .
3. Wheel bearing axial end play. Refer to FAX-7, "WHEEL BEARING INSPECTION" .
4. Transverse link ball joint axial end play. Refer to FSU-15, "INSPECTION AFTER REMOVAL" .
5. Strut operation.
6. Each mounting point of axle and suspension for looseness and deformation.
7. Each of suspension member, steering knuckle, strut and transverse link for cracks, deformation and other damage.
8. Vehicle height (posture).

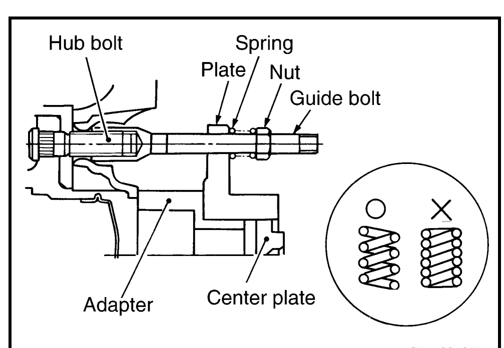
INSPECTION OF CAMBER, CASTER AND KINGPIN INCLINATION ANGLES

- Camber, caster, kingpin inclination angles cannot be adjusted.
- Before inspection, mount wheels onto turning radius gauge. Mount rear wheels onto a stand that has same height so vehicle will remain horizontal.

Using a CCK Gauge

Install the CCK gauge attachment [SST: KV991040S0 (–)] with the following procedure on wheel, then measure wheel alignment.

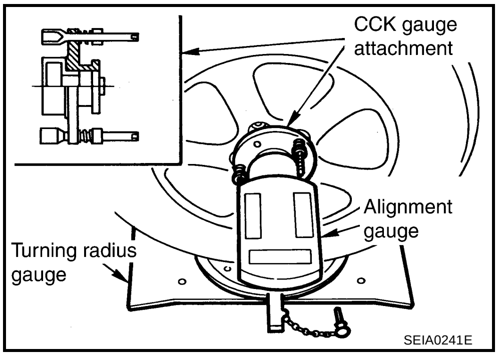
1. Remove three wheel nuts, and install the guide bolts to the hub bolt.
2. Screw the adapter into plate until it contacts the plate tightly.
3. Screw the center plate into the plate.
4. Insert the plate assembly on the guide bolt. Put the spring in, and then evenly screw the three guide nuts. When fastening the guide nuts, do not completely compress the spring.



5. Place the dent of alignment gauge onto the projection of the center plate and tightly contact them to measure.

Camber, caster, kingpin inclination angles:

Refer to FSU-18, "SERVICE DATA AND SPECIFICATIONS (SDS)" .



CAUTION:
If camber, caster, or kingpin inclination angle is outside the standard, check suspension member, steering knuckle, strut and transverse link for wear and damage. Replace suspect parts if necessary.

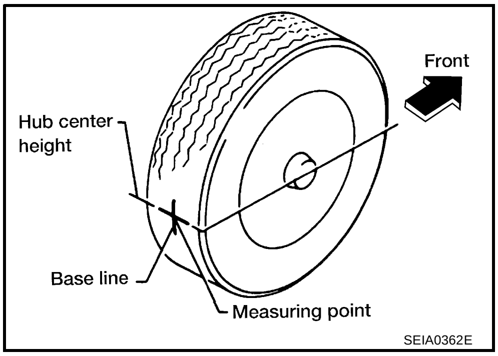
Toe-In Inspection

Measure toe-in using the following procedure.

WARNING:

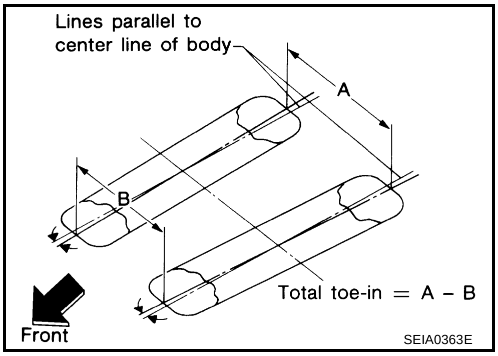
- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

1. Bounce front of vehicle up and down to stabilize vehicle height (posture).
2. Push vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of the tread (rear side) of both tires at the same height of hub center. These are measuring points.



4. Measure distance “A” (rear side).
5. Push vehicle slowly ahead to rotate wheels 180° degrees (1/2 turn).

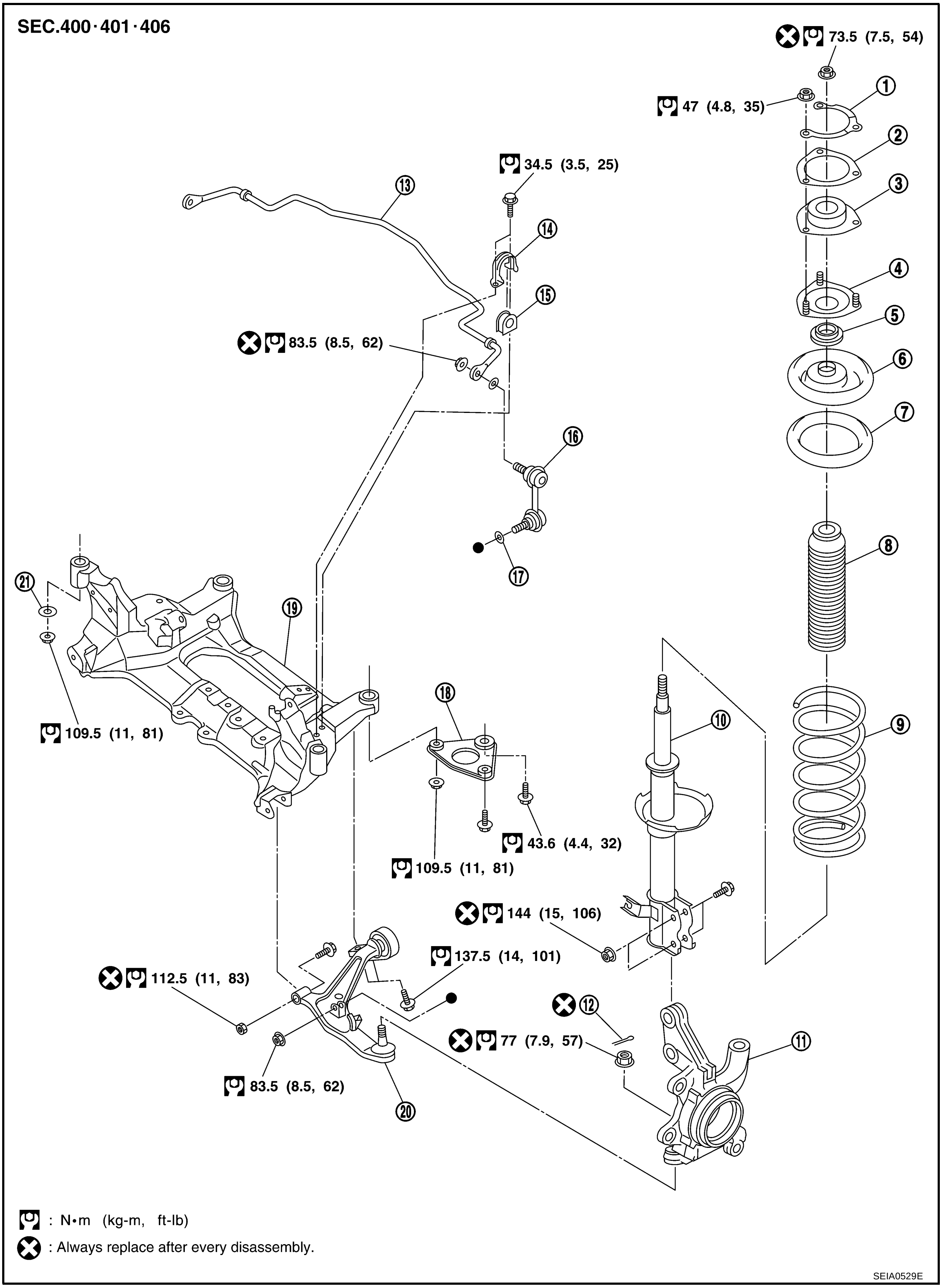
   NOTE:
   If the wheels have rotated more than 180° degrees (1/2 turn), start this procedure again from the beginning. Do not push vehicle backward.
6. Measure distance “B” (front side).



Total toe-in : Refer to FSU-18, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

Components

AES000X1



1. Strut upper plate
2. Strut spacer
3. Strut mounting insulator
4. Strut mounting insulator bracket
5. Mounting bearing
6. Spring upper seat
7. Spring upper rubber seat
8. Bound bumper
9. Coil spring
10. Strut
11. Steering knuckle
12. Cotter pin
13. Stabilizer bar
14. Stabilizer clamp
15. Stabilizer bushing
16. Stabilizer connecting rod
17. Washer
18. Member stay
19. Front suspension member
20. Transverse link
21. Stopper

A
B
C
D
FSU
F
G
H
I
J
K
L
M

Remove and Installation

AES000XZ

REMOVAL

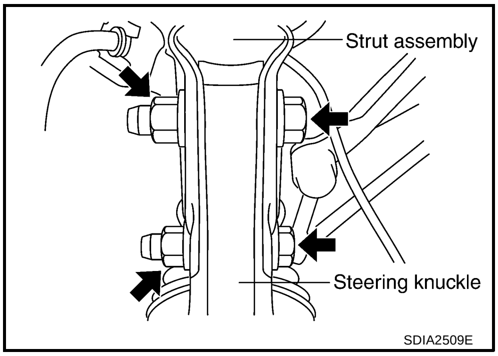
1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from steering knuckle. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:

   Do not pull wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

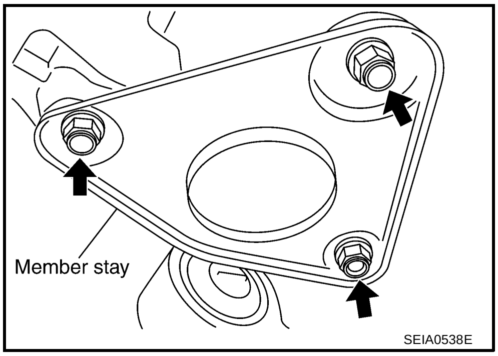
   NOTE:

   Avoid depressing brake pedal while brake caliper is removed.
4. Remove disc rotor. Refer to FAX-7, "FRONT WHEEL HUB AND KNUCKLE" .
5. Remove mounting rubber bracket from front suspension member. Refer to EX-2, "EXHAUST SYSTEM" .
6. Support engine or transmission with a jack.
7. Remove center member from vehicle. Refer to AT-269, "TRANSAXLE ASSEMBLY" .
8. Remove the fixing bolts and nuts, and then remove strut assembly from steering knuckle.
9. Remove drive shaft from vehicle. Refer to FAX-13, "FRONT DRIVE SHAFT" .
10. Remove stabilizer bar from suspension member. Refer to FSU-16, "Removal and Installation" .
11. Remove power steering tube bracket mounting bolts, nuts and steering outer socket, then hang steering gear on vehicle. Refer to PS-17, "POWER STEERING GEAR AND LINKAGE" .
12. Set a jack under front suspension member.
13. Remove rear engine mounting insulator from front suspension member. Refer to EM-74, "ENGINE ASSEMBLY" .



SDIA2509E

14. Remove mounting bolts and nut of member stay, and then remove member stay from vehicle.
15. Remove mounting nuts and stoppers between front suspension member and body. Gradually lower jack to remove front suspension assembly.



SEIA0538E

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to FSU-8, "Components" .

  NOTE:

  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing front suspension assembly. Check the wheel alignment. Refer to FSU-6, "Wheel Alignment Inspection" .

- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .

COIL SPRING AND STRUT

PFP:55302

Removal and Installation

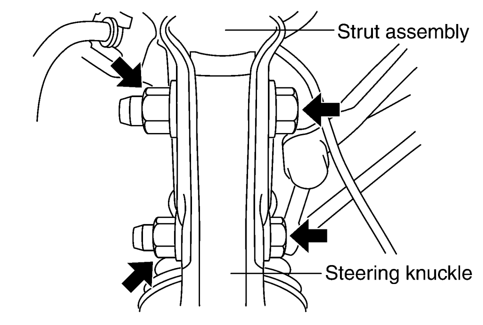
AES000X2

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove harness of wheel sensor from strut assembly. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:
   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

   NOTE:
   Avoid depressing brake pedal while brake caliper is removed.
4. Remove lock plate and brake hose from strut assembly. Refer to BR-12, "Removal and Installation of Front Brake Piping and Hose" .
5. Remove disc rotor. Refer to FAX-7, "FRONT WHEEL HUB AND KNUCKLE" .
6. Remove fixing bolts and nuts, and then remove strut assembly from steering knuckle.
7. Remove the mounting nuts of strut mounting insulator bracket, then remove strut assembly from vehicle.

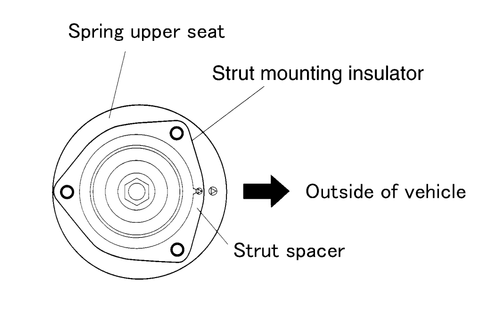


SDIA2509E

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to FSU-8, "Components" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing coil spring and strut. Check the wheel alignment. Refer to FSU-6, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .
- Be sure triangular marks on strut mounting insulator and spring upper seat are positioned as shown. Also be sure notch in strut spacer is positioned as shown.
- Assemble strut upper plate with it′s notch facing toward the outside of vehicle.



SEIA0123E

Disassembly and Assembly

AES000X3

DISASSEMBLY

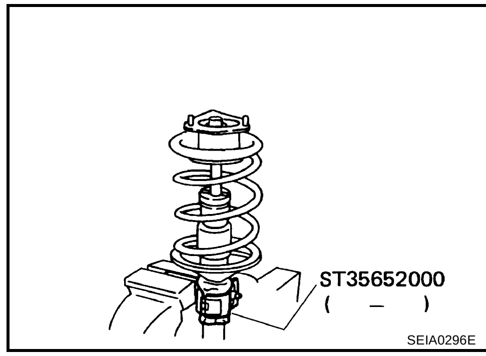
CAUTION:

Do not damage strut piston rod when removing components from strut.

1. Install the strut attachment [SST] to strut and secure it in a vise.

   CAUTION:

   Wrap a shop cloth around strut to protect it from damage when installing the strut attachment [SST] to strut.



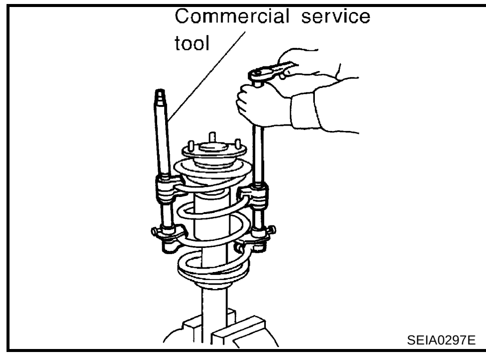
SEIA0296E

2. Compress coil spring using a spring compressor (commercial service tool) until coil spring with the compressor is free.

   CAUTION:

   Start compressing coil spring after making sure that the compressor is completely attached to coil spring.

3. Make sure that coil spring with the compressor is free between spring upper rubber seat and lower spring seat (strut), and then remove piston rod lock nut while securing the end of piston rod so as not to rotate piston rod.
4. Remove strut mounting insulator bracket, mounting bearing, spring upper seat, spring upper rubber seat, bound bumper from strut.



SEIA0297E

5. Remove coil spring with the compressor, and then gradually release the compressor.

   CAUTION:

   Loosen the compressor while checking installation position so that compressor is installed to the correct position.

6. Remove the strut attachment [SST] from strut.

INSPECTION AFTER DISASSEMBLY

Strut Inspection

Check the following:

- Strut for deformation, cracks, and damage. Replace if there are.
- Piston rod for damage, uneven wear, and distortion. Replace if there are.
- For oil leakage. Replace if there are.

Mounting Insulator and Rubber Parts Inspection

Check mounting insulator for cracks and rubber parts for wear. Replace if there are.

Coil Spring Inspection

Check coil spring for cracks, wear, and damage. Replace if there are.

ASSEMBLY

CAUTION:

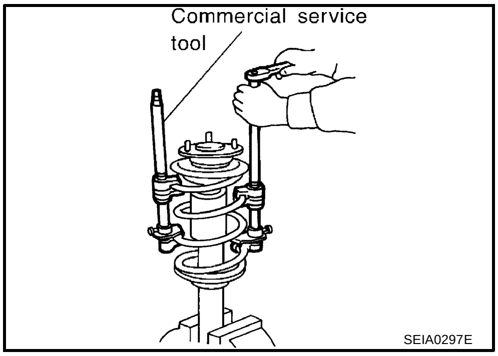
Do not damage strut piston rod when installing components to strut.

1. Install the strut attachment [SST: ST35652000 (–)] to strut and secure it in a vise.

   CAUTION:

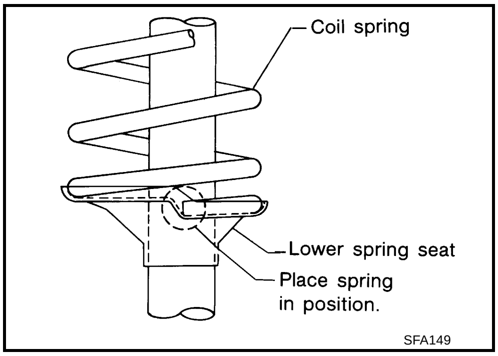
   Wrap a shop cloth around strut to protect it from damage when installing the strut attachment [SST] to strut.

2. Compress coil spring using a spring compressor (commercial service tool), and install it onto strut.



   CAUTION:

   - **Face large diameter side of coil spring downward. Align the lower end to lower spring seat as shown in the figure.**
   - **Start compressing coil spring after making sure that the compressor is completely attached to coil spring.**



3. Apply soapy water to bound bumper. Insert bound bumper into spring upper seat, and then install it to strut together with spring upper rubber seat.
4. Install mounting insulator bracket and mounting bearing to strut.
5. Secure end of piston rod so as not to rotate piston rod. Tighten piston rod lock nut to the specified torque.
6. Gradually release compressor, and remove it from coil spring.

   CAUTION:

   Loosen a spring compressor while checking installation position so that coil spring is installed to the correct position.

7. Remove the strut attachment [SST] from strut.

TRANSVERSE LINK

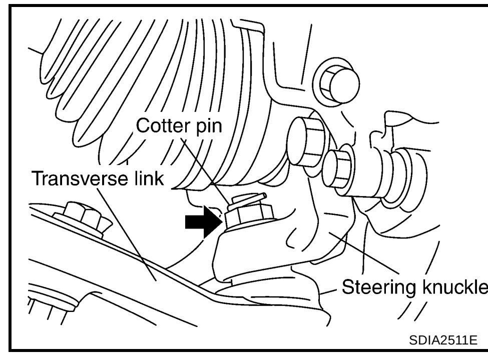
PFP:54500

Removal and Installation

AES000X4

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove cotter pin of transverse link and steering knuckle, and then loosen the nut.

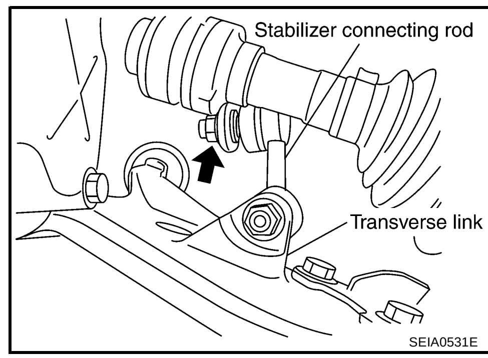


3. Remove transverse link from steering knuckle so as not to damage ball joint boot using a ball joint remover [SST: HT72520000 (J-25730-A)].

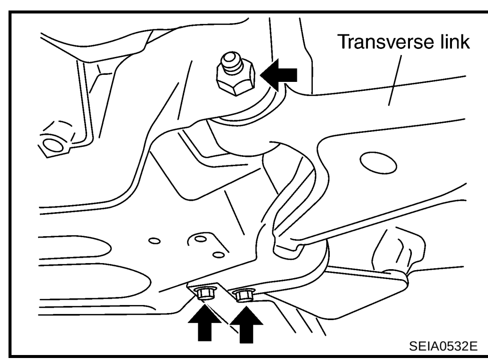
   CAUTION:

   Temporarily tighten the nut to prevent damage to threads and to prevent the ball joint remover [SST: HT72520000 (J-25730-A)] from suddenly coming off.

4. Remove the mounting nut and washer on the lower side of stabilizer connecting rod with a power tool. Remove stabilizer connecting rod from transverse link.



5. Remove mounting nut and bolts of transverse link.
6. Remove transverse link from vehicle.



INSPECTION AFTER REMOVAL

Visual Inspection

- Check transverse link and bushing for deformation, cracks, and other damage. Replace transverse link if there are.
- Check ball joint boot for cracks, damage, and leakage of grease. Replace transverse link if there are.

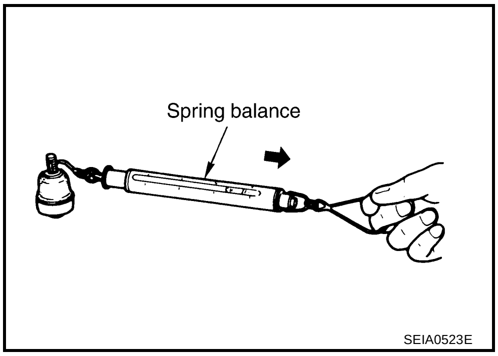
Ball Joint Inspection

Manually move ball stud to confirm it moves smoothly with no binding.

Swing Torque Inspection

CAUTION:
Move the ball joint at least ten times by hand to check for smooth movement before measuring.

- Hook a spring balance at the cotter pin mounting hole. Make sure that the spring balance measurement value is within the specified range when ball stud begins moving.

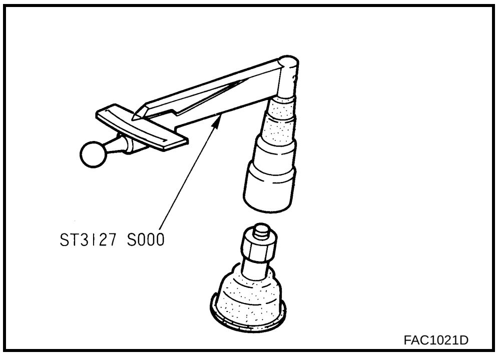


Swing torque
: 0.5 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Spring balance measurement
: 7.94 - 53.97 N (0.81 - 5.50 kg, 1.79 - 12.2 lb)

- Replace transverse link if value is outside standard.

Rotating Torque Inspection

- Install the nut to the ball stud, and make sure that rotating torque is within the standard using the preload gauge [SST].



Rotating torque
: 0.5 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)

- Replace transverse link if value is outside the standard.

Axial End Play Inspection

- Move tip of ball joint in the axial direction to check for looseness.

Axial end play : 0 mm (0 in)

- Replace transverse link if value is outside the standard.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to FSU-8, "Components" .
  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing transverse link. Check the wheel alignment. Refer to FSU-6, "Wheel Alignment Inspection" .
- Adjust the neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .

STABILIZER BAR

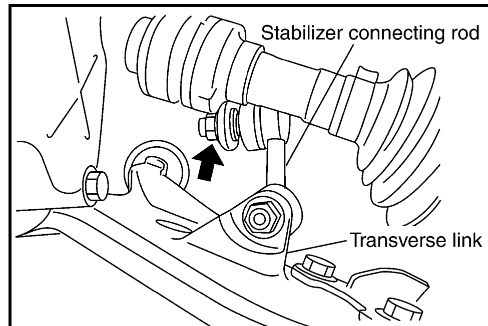
PFP:54611

Removal and Installation

AES000X5

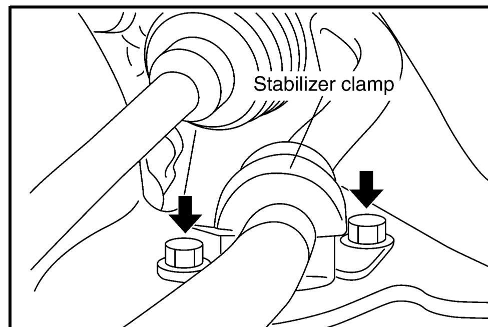
REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove the mounting nut and washer on the lower side of stabilizer connecting rod with power tool. Remove stabilizer connecting rod from transverse link.
3. If necessary, remove mounting nut and washer on the upper side of stabilizer connecting rod with a power tool. Remove stabilizer connecting rod from stabilizer bar.



SEIA0533E

4. Remove mounting bolts of stabilizer clamp, and then remove stabilizer clamp and stabilizer bushing.
5. Remove stabilizer bar from vehicle.



SEIA0534E

INSPECTION AFTER REMOVAL

Check stabilizer bar, stabilizer connecting rod, stabilizer bushing, and stabilizer clamp for deformation, cracks, and damage. Replace if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to FSU-8, "Components" .

FRONT SUSPENSION MEMBER

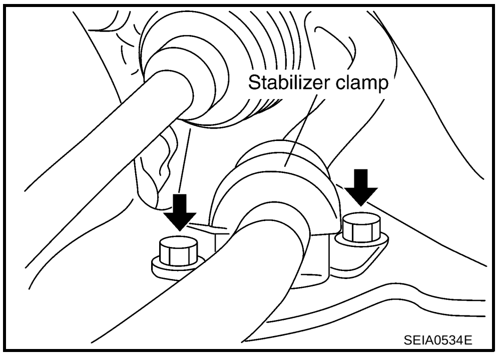
PFP:54401

Removal and Installation

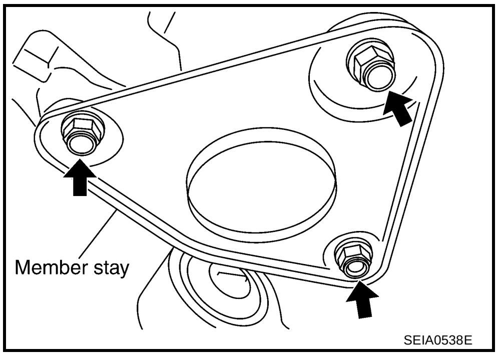
AES000X6

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove mounting bolts of stabilizer clamp, and then separate stabilizer bar and front suspension member, then hang stabilizer bar on vehicle.



3. Remove transverse link from front suspension member. Refer to FSU-14, "TRANSVERSE LINK" .
4. Remove mounting rubber bracket from front suspension member. Refer to EX-2, "EXHAUST SYSTEM" .
5. Support engine or transmission with a jack.
6. Remove center member from vehicle. Refer to AT-269, "TRANSAXLE ASSEMBLY" .
7. Remove power steering tube bracket mounting bolts. Hang steering gear on vehicle. Refer to PS-17, "POWER STEERING GEAR AND LINKAGE" .
8. Remove rear engine mounting insulator from front suspension member. Refer to EM-74, "ENGINE ASSEMBLY" .
9. Set a jack under front suspension member.
10. Remove mounting bolts and nut of member stay, and then remove member stay from vehicle.
11. Remove mounting nuts and stoppers between front suspension member and body. Gradually lower jack to remove front suspension member from vehicle.



INSPECTION AFTER REMOVAL

Check front suspension member for deformation, cracks, or other damage. Replace if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to FSU-8, "Components" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of part, under unladen conditions, which were removed when removing front suspension member. Check the wheel alignment. Refer FSU-6, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Alignment (Unladen)

AES000X7

Camber Degree minute (Decimal degree)		Minimum	– 0°54′ (– 0.9°)
		Nominal	– 0°24′ (– 0.4°)
		Maximum	0°36′ (0.6°)
		Left and right difference	45′ (0.75°)
Caster Degree minute (Decimal degree)		Minimum	1°42′ (1.7°)
		Nominal	2°27′ (2.45°)
		Maximum	3°12′ (3.2°)
		Left and right difference	45′ (0.75°)
Kingpin inclination Degree minute (Decimal degree)		Minimum	12°06′ (12.1°)
		Nominal	13°30′ (13.5°)
		Maximum	13°36′ (13.6°)
Total toe-in	Distance (A – B)	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (left plus right) Degree minute (degree)	Nominal	2′ (0.03°)

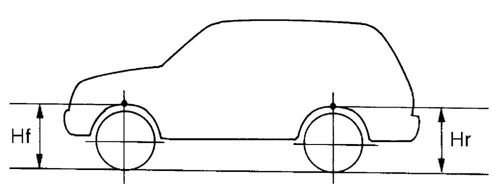
Ball Joint

AES000X8

Swing torque	0.5 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Measurement on spring balance (cotter pin hole position)	7.94 - 53.97 N (0.81 - 5.50 kg, 1.79 - 12.2 lb)
Rotating torque	0.5 - 3.4 N·m (0.06 - 0.34 kg-m, 5 - 30 in-lb)
Axial end play	0 mm (0 in)

Wheelarch Height (Unladen*)

AES000X9



SFA746B

Applied model	2WD	AWD
Front (Hf)	774 mm (30.47 in)	773 mm (30.43 in)
Rear (Hr)	786 mm (30.94 in)	785 mm (30.91 in)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats are in designated positions.

Edition: April 2004
Revision: March 2005
Publication No. SM5E-1T30U2

NISSAN X-TRAIL

MODEL T30 SERIES

QUICK REFERENCE INDEX

FOREWORD

This manual contains maintenance and repair procedure for the 2005 NISSAN X-TRAIL.

In order to assure your safety and the efficient functioning of the vehicle, this manual should be read thoroughly. It is especially important that the PRECAUTIONS in the GI section be completely understood before starting any repair task.

All information in this manual is based on the latest product information at the time of publication. The right is reserved to make changes in specifications and methods at any time without notice.

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the technician and the efficient functioning of the vehicle.
The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.
Service varies with the procedures used, the skills of the technician and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first be completely satisfied that neither personal safety nor the vehicle’s safety will be jeopardized by the service method selected.

NISSAN MOTOR CO., LTD.

PLEASE HELP MAKE THIS SERVICE MANUAL BETTER!

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Use this form to report any issues or comments you may have regarding our Service Manuals.
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Nissan North America, Inc.
Technical Service Information
39001 Sunrise Drive, P.O. Box 9200
Farmington Hills, MI USA 48331
FAX: (248) 488-3910

SERVICE MANUAL: Model: ____________________ **Year:** ____________________

PUBLICATION NO. (Refer to Quick Reference Index): ____________________________

Please describe any Service Manual issues or problems in detail:

Page number(s) ________________ *Note: Please include a copy of each page, marked with your comments.*

Are the trouble diagnosis procedures logical and easy to use? (circle your answer) YES NO

If no, what page number(s)?___________ *Note: Please include a copy of each page, marked with your comments.*

Please describe the issue or problem in detail: ______________________________

Is the organization of the manual clear and easy to follow? (circle your answer) YES NO

Please comment: ______________________________

What information should be included in NISSAN Service Manuals to better support you in servicing or repairing customer vehicles?

DATE: ______________ YOUR NAME: ______________________________ POSITION: ______________

DEALER: ____________________ DEALER NO.: ______________ ADDRESS: ______________________

CITY:______________________ STATE/PROV./COUNTRY: ______________ ZIP/POSTAL CODE: __________

INCH TO METRIC CONVERSION TABLE

(Rounded-off for automotive use)

inches	mm	inches	mm
.100	**2.54**	.610	**15.49**
.110	**2.79**	.620	**15.75**
.120	**3.05**	.630	**16.00**
.130	**3.30**	.640	**16.26**
.140	**3.56**	.650	**16.51**
.150	**3.81**	.660	**16.76**
.160	**4.06**	.670	**17.02**
.170	**4.32**	.680	**17.27**
.180	**4.57**	.690	**17.53**
.190	**4.83**	.700	**17.78**
.200	**5.08**	.710	**18.03**
.210	**5.33**	.720	**18.29**
.220	**5.59**	.730	**18.54**
.230	**5.84**	.740	**18.80**
.240	**6.10**	.750	**19.05**
.250	**6.35**	.760	**19.30**
.260	**6.60**	.770	**19.56**
.270	**6.86**	.780	**19.81**
.280	**7.11**	.790	**20.07**
.290	**7.37**	.800	**20.32**
.300	**7.62**	.810	**20.57**
.310	**7.87**	.820	**20.83**
.320	**8.13**	.830	**21.08**
.330	**8.38**	.840	**21.34**
.340	**8.64**	.850	**21.59**
.350	**8.89**	.860	**21.84**
.360	**9.14**	.870	**22.10**
.370	**9.40**	.880	**22.35**
.380	**9.65**	.890	**22.61**
.390	**9.91**	.900	**22.86**
.400	**10.16**	.910	**23.11**
.410	**10.41**	.920	**23.37**
.420	**10.67**	.930	**23.62**
.430	**10.92**	.940	**23.88**
.440	**11.18**	.950	**24.13**
.450	**11.43**	.960	**24.38**
.460	**11.68**	.970	**24.64**
.470	**11.94**	.980	**24.89**
.480	**12.19**	.990	**25.15**
.490	**12.45**	1.000	**25.40**
.500	**12.70**	2.000	**50.80**
.510	**12.95**	3.000	**76.20**
.520	**13.21**	4.000	**101.60**
.530	**13.46**	5.000	**127.00**
.540	**13.72**	6.000	**152.40**
.550	**13.97**	7.000	**177.80**
.560	**14.22**	8.000	**203.20**
.570	**14.48**	9.000	**228.60**
.580	**14.73**	10.000	**254.00**
.590	**14.99**	20.000	**508.00**
.600	**15.24**		

METRIC TO INCH CONVERSION TABLE

(Rounded-off for automotive use)

mm	inches	mm	inches
1	.0394	**51**	2.008
2	.079	**52**	2.047
3	.118	**53**	2.087
4	.157	**54**	2.126
5	.197	**55**	2.165
6	.236	**56**	2.205
7	.276	**57**	2.244
8	.315	**58**	2.283
9	.354	**59**	2.323
10	.394	**60**	2.362
11	.433	**61**	2.402
12	.472	**62**	2.441
13	.512	**63**	2.480
14	.551	**64**	2.520
15	.591	**65**	2.559
16	.630	**66**	2.598
17	.669	**67**	2.638
18	.709	**68**	2.677
19	.748	**69**	2.717
20	.787	**70**	2.756
21	.827	**71**	2.795
22	.866	**72**	2.835
23	.906	**73**	2.874
24	.945	**74**	2.913
25	.984	**75**	2.953
26	1.024	**76**	2.992
27	1.063	**77**	3.031
28	1.102	**78**	3.071
29	1.142	**79**	3.110
30	1.181	**80**	3.150
31	1.220	**81**	3.189
32	1.260	**82**	3.228
33	1.299	**83**	3.268
34	1.339	**84**	3.307
35	1.378	**85**	3.346
36	1.417	**86**	3.386
37	1.457	**87**	3.425
38	1.496	**88**	3.465
39	1.535	**89**	3.504
40	1.575	**90**	3.543
41	1.614	**91**	3.583
42	1.654	**92**	3.622
43	1.693	**93**	3.661
44	1.732	**94**	3.701
45	1.772	**95**	3.740
46	1.811	**96**	3.780
47	1.850	**97**	3.819
48	1.890	**98**	3.858
49	1.929	**99**	3.898
50	1.969	**100**	3.937

QUICK REFERENCE CHART X-TRAIL

PFP:00000

ENGINE TUNE-UP DATA (QR25DE)

ELS0003W

Engine model		QR25DE
Firing order		1-3-4-2
Idle speed rpm A/T (In P or N position) M/T (In Neutral position)		700±50
Ignition timing (BTDC at idle speed) A/T (In P or N position) M/T (In Neutral position)		15°± 5°
CO% at idle		0.3 - 9.5 % and engine runs smoothly
Drive Belt	Tension of drive belt	Auto adjustment by auto-tensioner
Radiater cap relief pressure kPa (kg/cm^2 , psi)	Standard	78 - 98 (0.8 - 1.0, 11 - 14)
	Limit	59 (0.6, 9)
Cooling system leakage testing pressure kPa (kg/cm^2 , psi)		157 (1.6, 23)
Compression pressure kPa (kg/cm^2 , psi)/rpm	Standard	1,250 (12.8, 181) /250
	Minimum	1,060 (10.8, 154) /250
Spark plug	Make	NGK
	Standard type	PLFR5A - 11
	Hot type	PLFR4A - 11
	Cold type	PLFR6A - 11
	Gap (Nominal) mm (in)	1.1 (0.043)

FRONT WHEEL ALIGNMENT (Unladen*)

ELS0003X

Camber	Degree minute (Decimal degree)	Minimum	– 0° 54′ (– 0.9°)
		Nominal	– 0° 24′ (– 0.4°)
		Maximum	0° 36′ (0.6°)
		Left and right difference	45′ (0.75°) or less
Caster	Degree minute (Decimal degree)	Minimum	1° 42′ (1.7°)
		Nominal	2° 27′ (2.45°)
		Maximum	3° 12′ (3.2°)
		Left and right difference	45′ (0.75°) or less
Kingpin inclination	Degree minute (Decimal degree)	Minimum	12° 06′ (12.1°)
		Nominal	13° 30′ (13.5°)
		Maximum	13° 36′ (13.6°)
Total toe-in	Distance (A – B)	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (left plus right) Degree minute (Degree)	Nominal	2′ (0.04°)
Wheel turning angle (Full turn)	Inside Degree minute (Decimal degree)	MInimum	36° 00′ (36.0°)
		Nominal	39° 00′ (39.0°)
		Maximum	40° 00′ (40.0°)
	Outside Degree minute (Decimal degree)	Nominal	31° 00′ (31.0°)

* : Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

REAR WHEEL ALIGNMENT (Unladen*)

ELS0003Y

Camber Degree minute (Decimal degree)		Minimum	– 1° 25′ (– 1.42°)
		Nominal	– 0° 40′ (– 0.67°)
		Maximum	0° 05′ (0.08°)
Total toe-in	Distance (A – B)	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (left plus right) Degree minute (Degree)	Nominal	2′ (0.04°)

* : Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

BRAKE

ELS0003Z

Front brake	Pad wear limit	2.0 mm (0.079 in)
	Rotor repair limit	26.0 mm (1.024 in)
Rear brake	Pad wear limit	2.0 mm (0.079 in)
	Rotor repair limit	14.0 mm (0.551 in)
Brake pedal height (front dash lower panel top surface)	M/T model	156 - 166 mm (6.14 - 6.54 in)
	A/T model	164 - 174 mm (6.46 - 6.85 in)
Pedal depressed height*	M/T model	80 mm (3.15 in) or more
	A/T model	85 mm (3.35 in) or more

* : Under force of 490 N(50 kg, 110 lb) with engine running.

REFILL CAPACITIES

ELS00040

UNIT			Liter	US measure	Imp measure
Fuel tank			60	15 - 7/8 gal	13 - 1/4 gal
Coolant (With reservoir tank at “MAX” level)			7.1	7 - 1/2 qt	6 - 1/4 qt
Engine	Drain and refill	With oil filter change	4.1	4 - 3/8 qt	3 - 5/8 qt
		Without oil filter change	3.7	3 - 7/8 qt	3 - 1/4qt
	Dry engine (Overhaul)		4.7	5 qt	4 - 1/8 qt
Transaxle	A/T		8.5	9 qt	7 - 1/2 qt
	M/T		2.2	2 - 3/8 qt	2 qt
Transfer			0.31	5/8 pt	1/2 pt
Differential carrier			0.55	1 - 1/8 pt	1 pt
Power steering system			1.0	1 - 1/8 qt	7/8 qt
Air conditioning system	Compressor oil		0.18	6.0 fl oz	6.3 fl oz
	Refrigerant		0.55 kg	1.21 lb	

SECTION GI
GENERAL INFORMATION

CONTENTS

PRECAUTIONS

PFP:00001

Description

AAS000NC

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AAS000OL

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for NVIS/IVIS (NISSAN/INFINITI VEHICLE IMMOBILIZER SYSTEM - NATS) (If Equipped)

AAS000NE

NVIS/IVIS (NATS) will immobilize the engine if someone tries to start it without the registered key of NVIS/IVIS (NATS).
Both of the originally supplied ignition key IDs have been NVIS/IVIS (NATS) registered.
The security indicator is located on the instrument panel. The indicator blinks when the immobilizer system is functioning.
Therefore, NVIS/IVIS (NATS) warns outsiders that the vehicle is equipped with the anti-theft system.

- When NVIS/IVIS (NATS) detects trouble, the security indicator lamp lights up while ignition switch is in "ON" position.
  This lighting up indicates that the anti-theft is not functioning, so prompt service is required.
- When servicing NVIS/IVIS (NATS) (trouble diagnoses, system initialization and additional registration of other NVIS/IVIS (NATS) ignition key IDs), CONSULT-II hardware and CONSULT-II NVIS/IVIS (NATS) software is necessary.
  Regarding the procedures of NVIS/IVIS (NATS) initialization and NVIS/IVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, NVIS/IVIS (NATS).

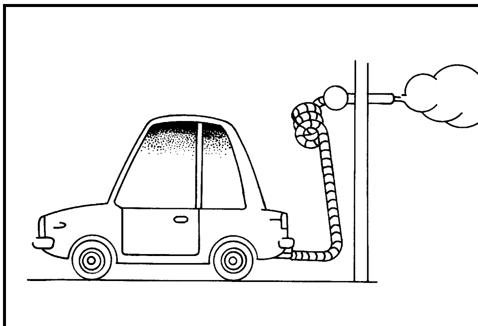
Therefore, CONSULT-II NVIS/IVIS (NATS) software (program card and operation manual) must be kept strictly confidential to maintain the integrity of the anti-theft function.

- When servicing NVIS/IVIS (NATS) (trouble diagnoses, system initialization and additional registration of other NVIS/IVIS (NATS) ignition key IDs), it may be necessary to re-register original key identification. Therefore, be sure to receive all keys from vehicle owner. A maximum of four or five key IDs can be registered into NVIS/IVIS (NATS).
- When failing to start the engine first time using the key of NVIS/IVIS (NATS), start as follows.

1. Leave the ignition key in "ON" position for approximately 5 seconds.
2. Turn ignition key to "OFF" or "LOCK" position and wait approximately 5 seconds.
3. Repeat step 1 and 2 again.
4. Restart the engine while keeping the key separate from any others on key-chain.

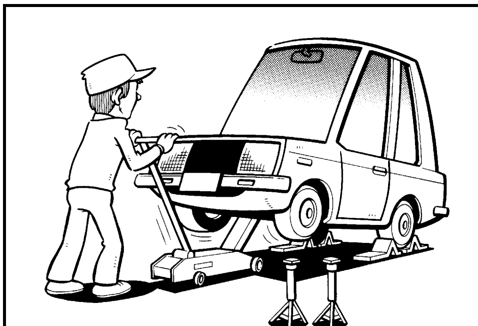
General Precautions

AAS000NF



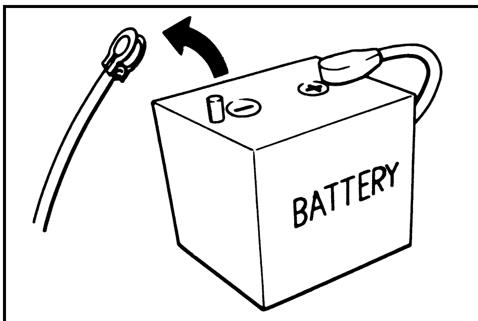
SGI285

- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.



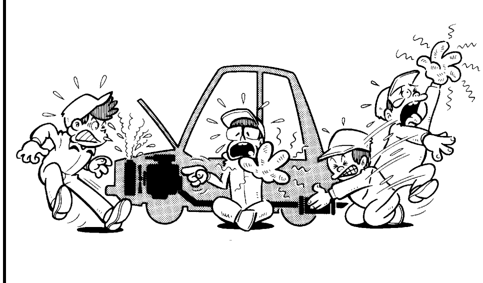
SGI231

- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.



SEF289H

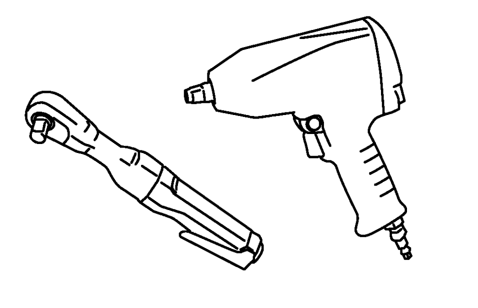
- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.



SGI233

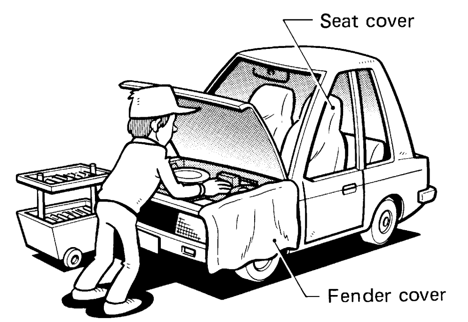
- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.
- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM).
  Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.

- Use approved bonding agent, sealants or their equivalents when required.
- Use hand tools, power tools (disassembly only) and recommended special tools where specified for safe and efficient service repairs.
- When repairing the fuel, oil, water, vacuum or exhaust systems, check all affected lines for leaks.



PBIC0190E

- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.



SGI234

WARNING:
To prevent ECM from storing the diagnostic trouble codes, do not carelessly disconnect the harness connectors which are related to the engine control system and TCM (transmission control module) system. The connectors should be disconnected only when working according to the WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

Precautions for Three Way Catalyst

AAS000NG

If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions.

- Use unleaded gasoline only. Leaded gasoline will seriously damage the three way catalyst.
- When checking for ignition spark or measuring engine compression, make tests quickly and only when necessary.
- Do not run engine when the fuel tank level is low, otherwise the engine may misfire, causing damage to the catalyst.

Do not place the vehicle on flammable material. Keep flammable material off the exhaust pipe and the three way catalyst.

Precautions for Fuel (Unleaded Regular Gasoline Recommended)

AAS000OQ

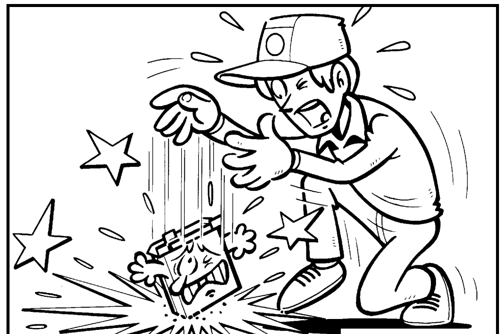
Use unleaded regular gasoline with an octane rating of at least 87 AKI (Anti-Knock Index) number (Research octane number 91).

CAUTION:
Do not use leaded gasoline. Using leaded gasoline will damage the three way catalyst. Using a fuel other than that specified could adversely affect the emission control devices and systems, and could also affect the warranty coverage validity.

Precautions for Multiport Fuel Injection System or Engine Control System

AAS000NI

- Before connecting or disconnecting any harness connector for the multiport fuel injection system or ECM:
  Turn ignition switch to “OFF” position.
  Disconnect negative battery terminal.
  Otherwise, there may be damage to ECM.
- Before disconnecting pressurized fuel line from fuel pump to injectors, be sure to release fuel pressure.
- Be careful not to jar components such as ECM and mass air flow sensor.

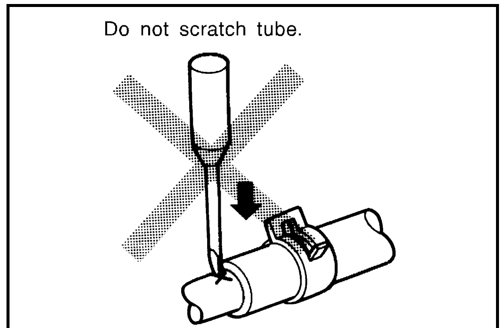

SGI787

Precautions for Hoses

AAS000NJ

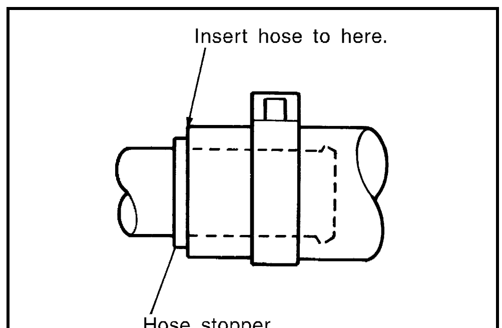
HOSE REMOVAL AND INSTALLATION

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.



SMA019D

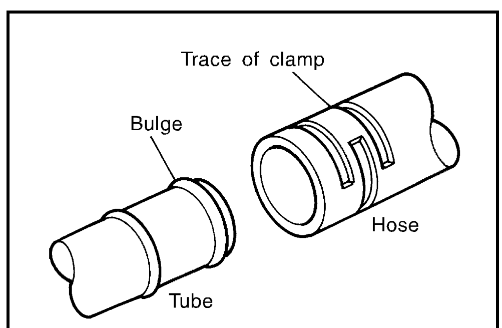
- To reinstall the rubber hose securely, make sure that hose insertion length and orientation is correct. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)



SMA020D

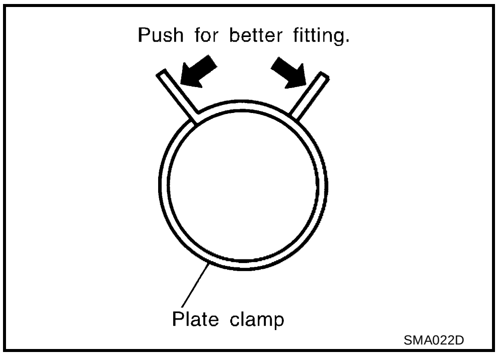
HOSE CLAMPING

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.



SMA021D

- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.



Precautions for Engine Oils

AAS000NK

Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used oil.
If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes, particularly underpants, with oil.
- Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practical, degrease components prior to handling.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

ENVIRONMENTAL PROTECTION PRECAUTIONS

Dispose of used oil and used oil filters through authorized waste disposal contractors to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the local authority for advice on disposal facilities.
It is illegal to pour used oil on to the ground, down sewers or drains, or into water sources.
The regulations concerning pollution vary between regions.

Precautions for Air Conditioning

AAS000NL

Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to ATC/MTC section “HFC-134a (R-134a) Service Procedure”, “REFRIGERANT LINES” for specific instructions.

HOW TO USE THIS MANUAL

PFP:00008

Description

AAS000NM

This volume explains “Removal, Disassembly, Installation, Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

AAS000NN

- The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
  Standard value:Tolerance at inspection and adjustment.
  Limit value:The maximum or minimum limit value that should not be exceeded at inspection and adjustment.

Units

AAS000NO

- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  Also with regard to tightening torque of bolts and nuts, there are descriptions both about range and about the standard tightening torque.

  “Example”
  Range

  Outer Socket Lock Nut : 59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

  Standard

  Drive Shaft Installation Bolt : 44.3 N·m (4.5 kg-m, 33 ft-lb)

Contents

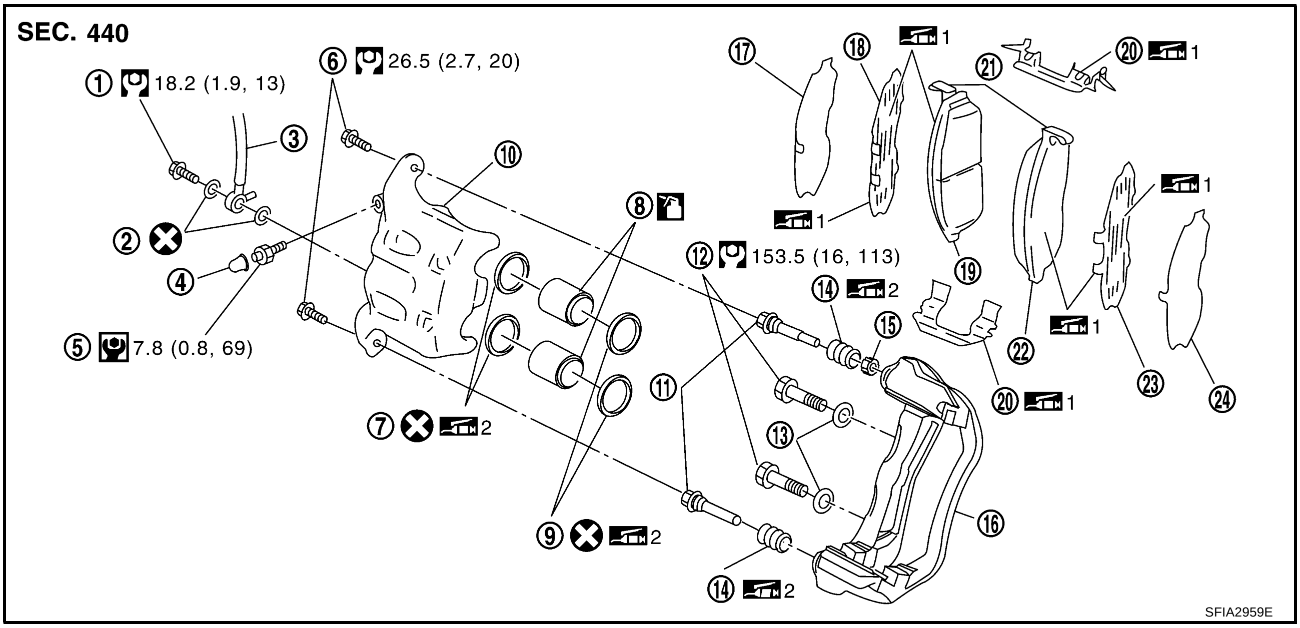
AAS000NP

- **ALPHABETICAL INDEX** is provided at the end of this manual so that you can rapidly find the item and page you are searching for.
- **A QUICK REFERENCE INDEX**, a black tab (e.g. **BR**) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two or three letters which designate the particular section and a number (e.g. “BR-5”).
- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

Components

AAS000NQ

- **THE LARGE ILLUSTRATIONS** are exploded views (see the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG** .
  Components shown in an illustration may be identified by a circled number. When this style of illustration is used, the text description of the components will follow the illustration.



1.	Union bolt	2.	Copper washer	3.	Brake hose
4.	Cap	5.	Bleed valve	6.	Sliding pin bolt
7.	Piston seal	8.	Piston	9.	Piston boot
10.	Cylinder body	11.	Sliding pin	12.	Torque member mounting bolt
13.	Washer	14.	Sliding pin boot	15.	Bushing
16.	Torque member	17.	Inner shim cover	18.	Inner shim
19.	Inner pad	20.	Pad retainer	21.	Pad wear sensor
22.	Outer pad	23.	Outer shim	24.	Outer shim cover
	1: PBC (Poly Butyl Cuprysil) grease or silicone-based grease		2: Rubber grease		: Brake fluid

Refer to GI section for additional symbol definitions.

SYMBOLS

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION
	Tightening torque The tightening torque specifications of bolts and nuts may be presented as either a range or a standard tightening torque.	: N•m (kg-m, ft-lb)		Always replace after every disassembly.
		: N•m (kg-m, in-lb)	P	Apply petroleum jelly.
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.		M	Apply molybdenum added petroleum jelly.
	Should be lubricated with oil.		ATF	Apply ATF.
	Sealing point		★	Select with proper thickness.
L	Sealing point with locking sealant.		☆	Adjustment is required.
	Checking point			

SAIA0749E

How to Follow Trouble Diagnoses

AAS000NR

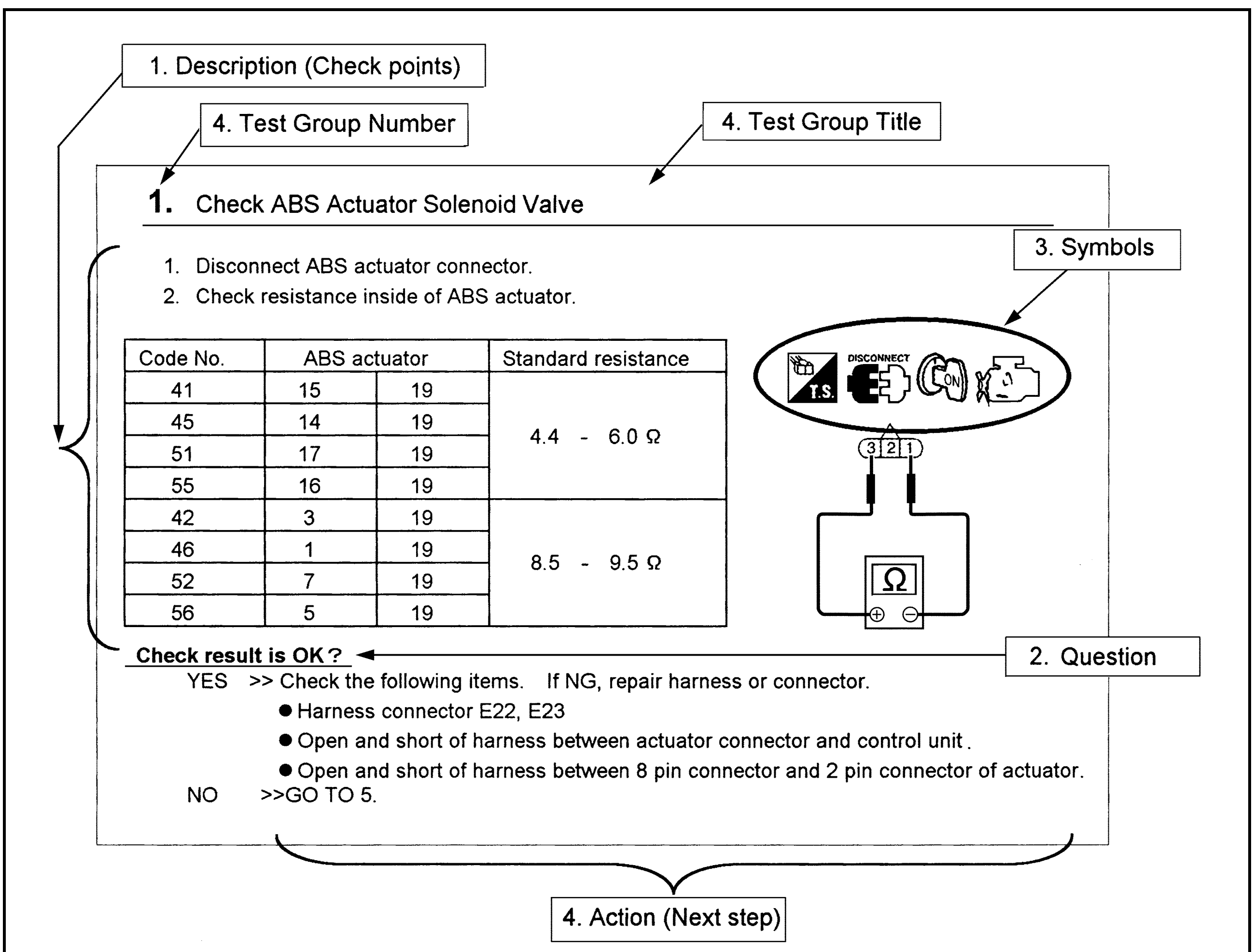
DESCRIPTION

NOTICE:

Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

1. **Before performing trouble diagnoses, read the "Preliminary Check", the "Symptom Chart" or the "Work Flow".**
2. **After repairs, re-check that the problem has been completely eliminated.**
3. **Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.**
4. **Refer to the Circuit Diagram for quick pinpoint check.**
   If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
5. **When checking circuit continuity, ignition switch should be OFF.**
6. **Before checking voltage at connectors, check battery voltage.**
7. **After accomplishing the Diagnostic Procedures and Electrical Components Inspection, make sure that all harness connectors are reconnected as they were.**

HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES



SAIA0256E

1. **Work and diagnostic procedure**
   Start to diagnose a problem using procedures indicated in enclosed test groups.
2. **Questions and required results**
   Questions and required results are indicated in bold type in test group.
   The meaning of are as follows:

a. Battery voltage → 11 - 14V or approximately 12V
b. Voltage : Approximately 0V → Less than 1V

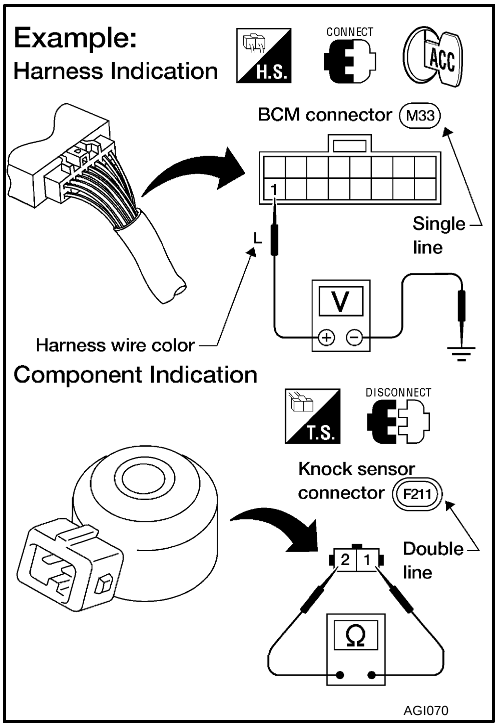
3. **Symbol used in illustration**
   Symbols included in illustrations refer to measurements or procedures. Before diagnosing a problem, familiarize yourself with each symbol. Refer to "Connector Symbols" in GI Section and "KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES" below.
4. **Action items**
   Next action for each test group is indicated based on result of each question. Test group number is shown in the left upper portion of each test group.

HARNESS WIRE COLOR AND CONNECTOR NUMBER INDICATION

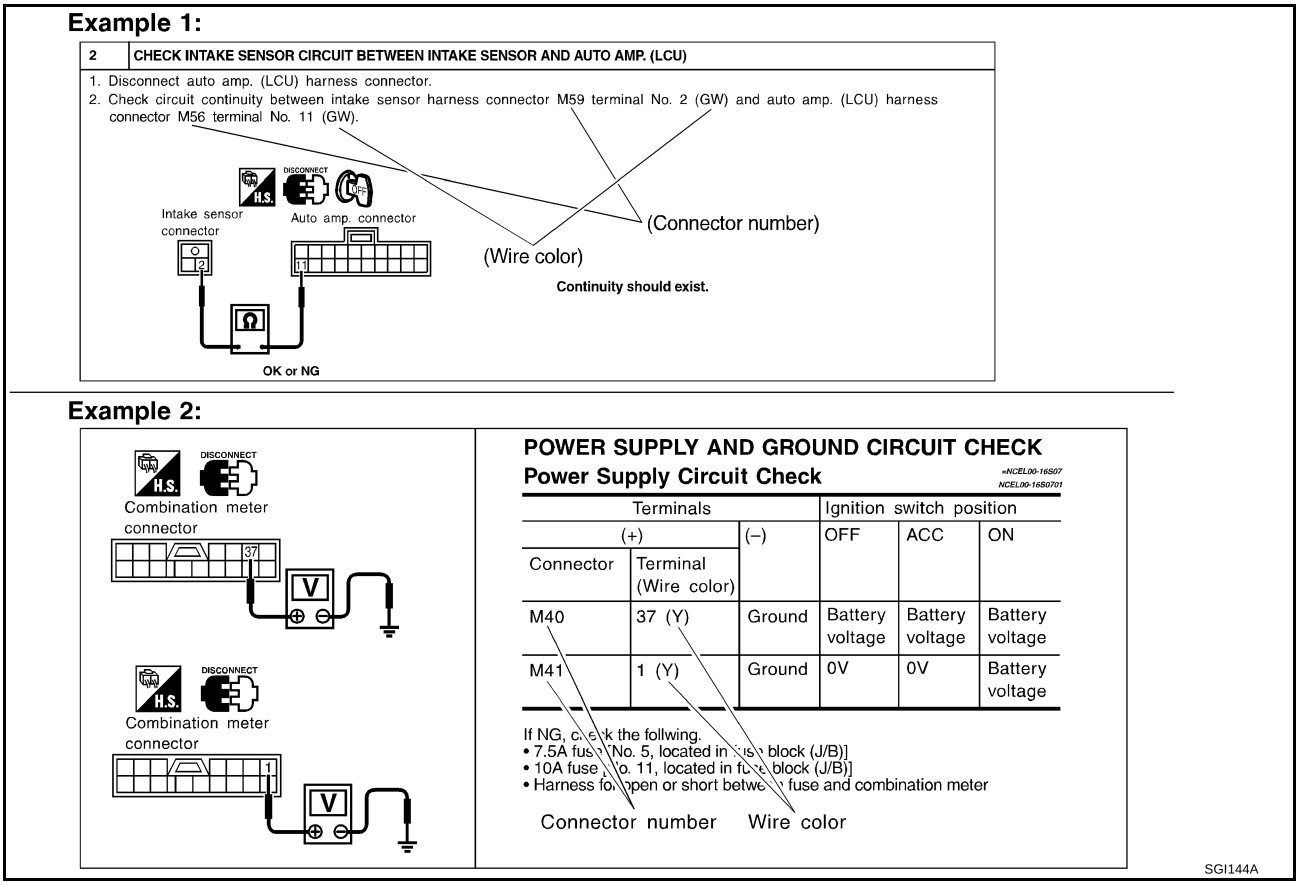
There are two types of harness wire color and connector number indication.

TYPE 1: Harness Wire Color and Connector Number are Shown in Illustration

- Letter designations next to test meter probe indicate harness wire color.
- Connector numbers in a single circle (e.g. M33) indicate harness connectors.
- Connector numbers in a double circle (e.g. F211) indicate component connectors.



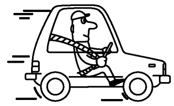
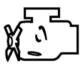
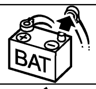
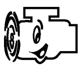
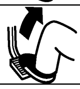
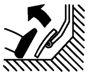
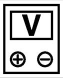
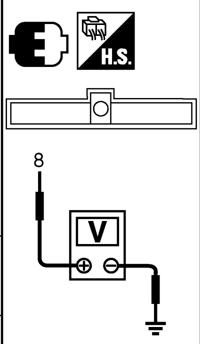
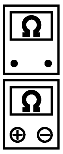
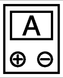
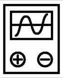
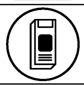
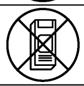
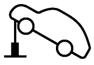
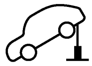
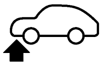
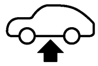
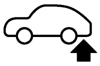
TYPE 2: Harness Wire Color and Connector Number are Shown in Text



KEY TO SYMBOLS SIGNIFYING MEASUREMENTS OR PROCEDURES

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Check after disconnecting the connector to be measured.	GST	Procedure with Generic Scan Tool. (GST, OBD-II scan tool)
	Check after connecting the connector to be measured.	NO TOOLS	Procedure without CONSULT, CONSULT-II or GST
	Insert key into ignition switch.	A/C OFF	A/C switch is "OFF".
	Remove key from ignition switch.	A/C ON	A/C switch is "ON".
	Insert and remove key repeatedly.		REC switch is "ON".
OFF	Turn ignition switch to "OFF" position.		REC switch is "OFF".
ACC	Turn ignition switch to "ACC" position.	0 1 2 3 4	Fan switch is "ON". (At any position except for "OFF" position)
ON	Turn ignition switch to "ON" position.	0 1 2 3 4	Fan switch is "OFF".
ST	Turn ignition switch to "START" position.	FUSE	Apply fuse.
OFF ACC	Turn ignition switch from "OFF" to "ACC" position.	FUSE BAT	Apply positive voltage from battery with fuse directly to components.
ACC ON	Turn ignition switch from "ACC" to "ON" position.		
ACC OFF	Turn ignition switch from "ACC" to "OFF" position.		

SAIA0750E

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Turn ignition switch from "OFF" to "ON" position.		Drive vehicle.
	Turn ignition switch from "ON" to "OFF" position.		
	Do not start engine, or check with engine stopped.		Disconnect battery negative cable.
	Start engine, or check with engine running.		Depress brake pedal.
	Apply parking brake.		Release brake pedal.
	Release parking brake.		Depress accelerator pedal.
	Check after engine is warmed up sufficiently.		Release accelerator pedal.
	Votage should be measured with a voltmeter.		Pin terminal check for SMJ type ECM or TCM connectors. **For details regarding the terminal arrangement, refer to the "ELECTRICAL UNITS" electrical reference page at the end of the manual.**
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Pulse signal should be checked with an oscilloscope.		
	Procedure with CONSULT-II		
	Procedure without CONSULT-II		
	Place selector lever in "P" position.		
	Place selector lever in "N" position.		
	Jack up front portion.		
	Jack up rear portion.		
	Inspect under engine room.		
	Inspect under floor.		
	Inspect rear under floor.		

SAIA0751E

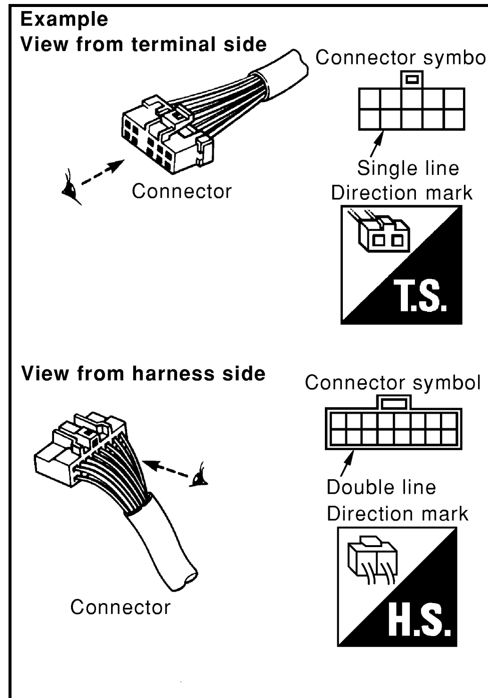
How to Read Wiring Diagrams

AAS000NS

CONNECTOR SYMBOLS

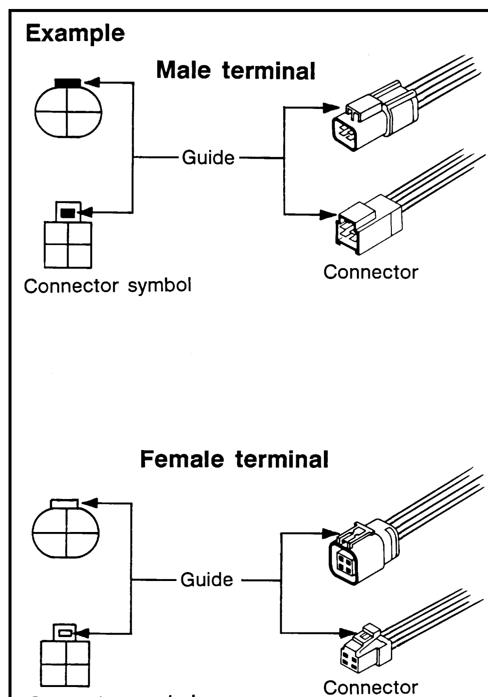
Most of connector symbols in wiring diagrams are shown from the terminal side.

- Connector symbols shown from the terminal side are enclosed by a single line and followed by the direction mark.
- Connector symbols shown from the harness side are enclosed by a double line and followed by the direction mark.
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG section, "Description", "HARNESS CONNECTOR".



SAIA0257E

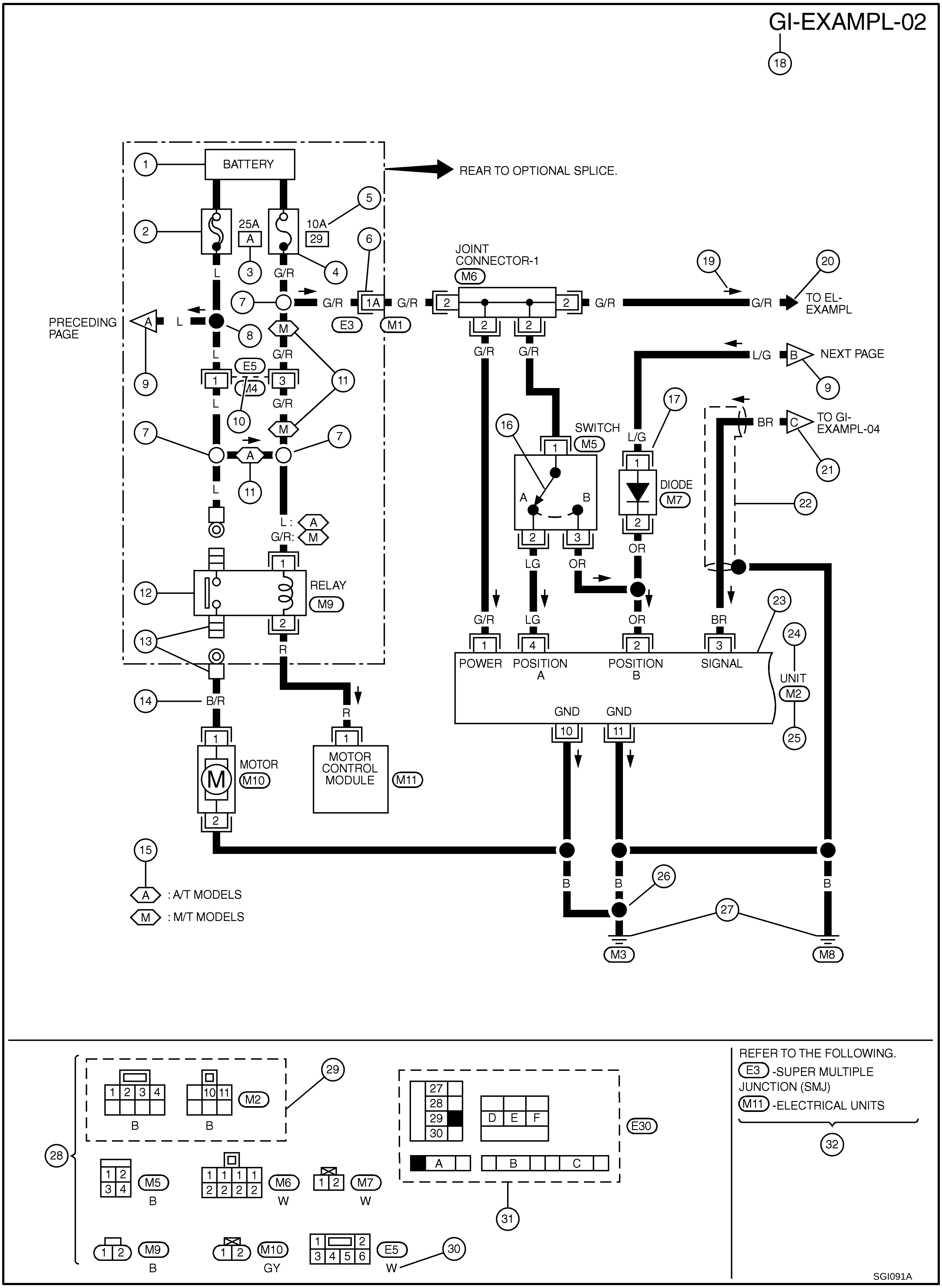
- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.



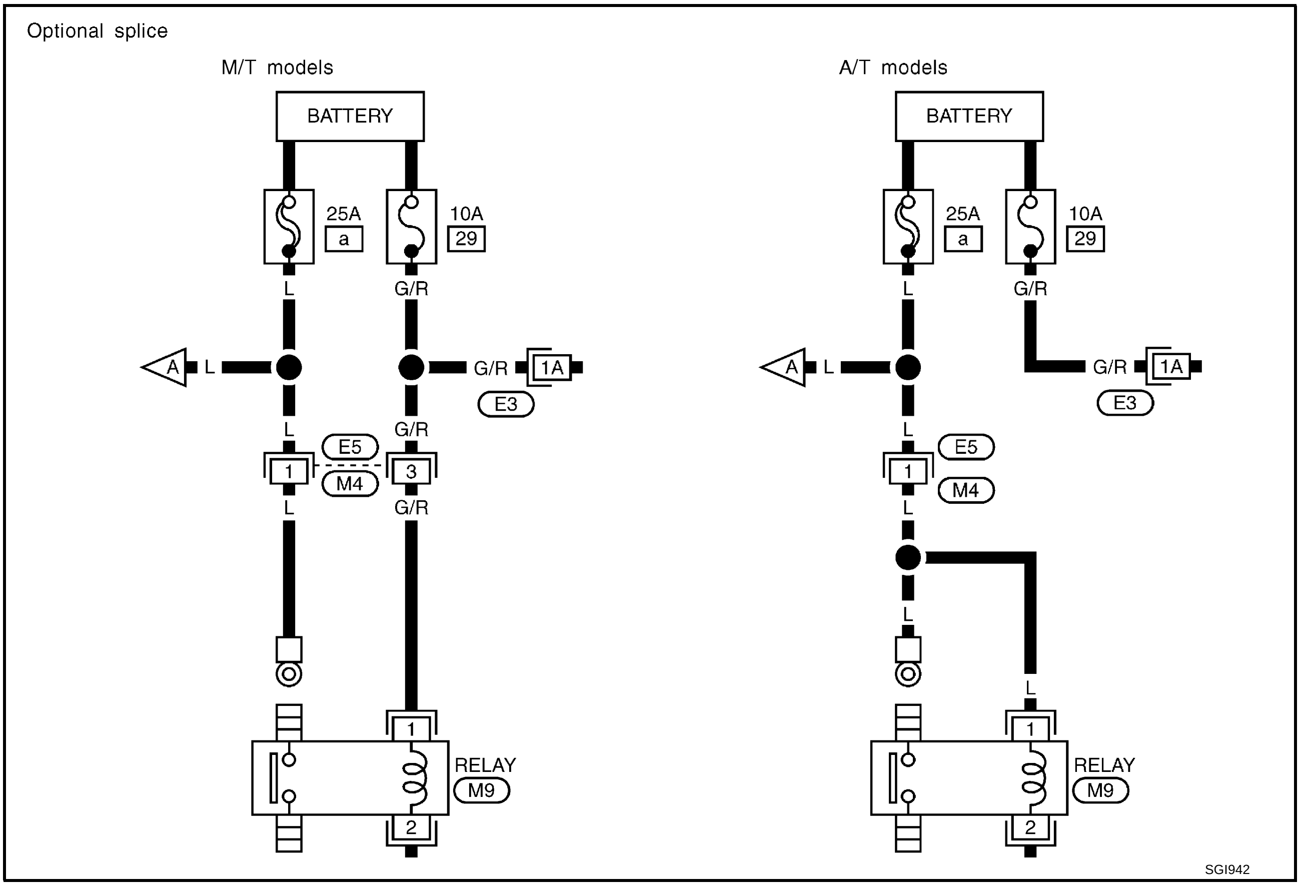
SGI363

SAMPLE/WIRING DIAGRAM - EXAMPL -

- For detail, refer to following “DESCRIPTION”.



Optional Splice



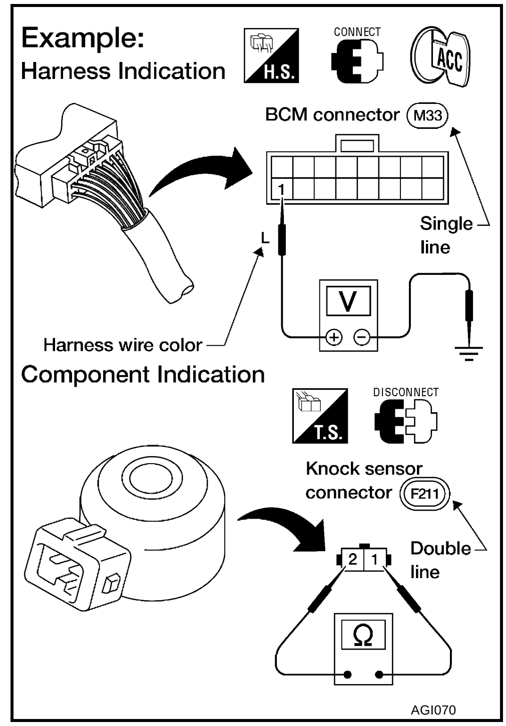
DESCRIPTION

Number	Item	Description
1	Power condition	● This shows the condition when the system receives battery positive voltage (can be operated).
2	Fusible link	● The double line shows that this is a fusible link. ● The open circle shows current flow in, and the shaded circle shows current flow out.
3	Fusible link/fuse location	● This shows the location of the fusible link or fuse in the fusible link or fuse box. For arrangement, refer to PG section, POWER SUPPLY ROUTING.
4	Fuse	● The single line shows that this is a fuse. ● The open circle shows current flow in, and the shaded circle shows current flow out.
5	Current rating	● This shows the current rating of the fusible link or fuse.
6	Connectors	● This shows that connector E3 is female and connector M1 is male. ● The G/R wire is located in the 1A terminal of both connectors. ● Terminal number with an alphabet (1A, 5B, etc.) indicates that the connector is SMJ connector. Refer to PG section, SMJ (SUPER MULTIPLE JUNCTION).
7	Optional splice	● The open circle shows that the splice is optional depending on vehicle application.
8	Splice	● The shaded circle shows that the splice is always on the vehicle.
9	Page crossing	● This arrow shows that the circuit continues to an adjacent page. ● The A will match with the A on the preceding or next page.
10	Common connector	● The dotted lines between terminals show that these terminals are part of the same connector.
11	Option abbreviation	● This shows that the circuit is optional depending on vehicle application.
12	Relay	● This shows an internal representation of the relay. For details, refer to PG section, STANDARDIZED RELAY.
13	Connectors	● This shows that the connector is connected to the body or a terminal with bolt or nut.

Number	Item	Description
14	Wire color	● This shows a code for the color of the wire. B = Black W = White R = Red G = Green L = Blue Y = Yellow LG = Light Green BR = Brown OR or O = Orange P = Pink PU or V (Violet) = Purple GY or GR = Gray SB = Sky Blue CH = Dark Brown DG = Dark Green When the wire color is striped, the base color is given first, followed by the stripe color as shown below: Example: L/W = Blue with White Stripe
15	Option description	● This shows a description of the option abbreviation used on the page.
16	Switch	● This shows that continuity exists between terminals 1 and 2 when the switch is in the A position. Continuity exists between terminals 1 and 3 when the switch is in the B position.
17	Assembly parts	● Connector terminal in component shows that it is a harness incorporated assembly.
18	Cell code	● This identifies each page of the wiring diagram by section, system and wiring diagram page number.
19	Current flow arrow	● Arrow indicates electric current flow, especially where the direction of standard flow (vertically downward or horizontally from left to right) is difficult to follow. ● A double arrow "↔" shows that current can flow in either direction depending on circuit operation.
20	System branch	● This shows that the system branches to another system identified by cell code (section and system).
21	Page crossing	● This arrow shows that the circuit continues to another page identified by cell code. ● The C will match with the C on another page within the system other than the next or preceding pages.
22	Shielded line	● The line enclosed by broken line circle shows shield wire.
23	Component box in wave line	● This shows that another part of the component is also shown on another page (indicated by wave line) within the system.
24	Component name	● This shows the name of a component.
25	Connector number	● This shows the connector number. ● The letter shows which harness the connector is located in. ● Example: **M** : main harness. For detail and to locate the connector, refer to PG section "Main Harness", "Harness Layout". A coordinate grid is included for complex harnesses to aid in locating connectors.
26	Ground (GND)	● The line spliced and grounded under wire color shows that ground line is spliced at the grounded connector.
27	Ground (GND)	● This shows the ground connection. For detailed ground distribution information, refer to "Ground Distribution" in PG section.
28	Connector views	● This area shows the connector faces of the components in the wiring diagram on the page.
29	Common component	● Connectors enclosed in broken line show that these connectors belong to the same component.
30	Connector color	● This shows a code for the color of the connector. For code meaning, refer to wire color codes, Number 14 of this chart.
31	Fusible link and fuse box	● This shows the arrangement of fusible link(s) and fuse(s), used for connector views of "POWER SUPPLY ROUTING" in PG section. The open square shows current flow in, and the shaded square shows current flow out.
32	Reference area	● This shows that more information on the Super Multiple Junction (SMJ) and Joint Connectors (J/C) exists on the PG section. Refer to "Reference Area" for details.

Harness Indication

- Letter designations next to test meter probe indicate harness (connector) wire color.
- Connector numbers in a single circle M33 indicate harness connectors.



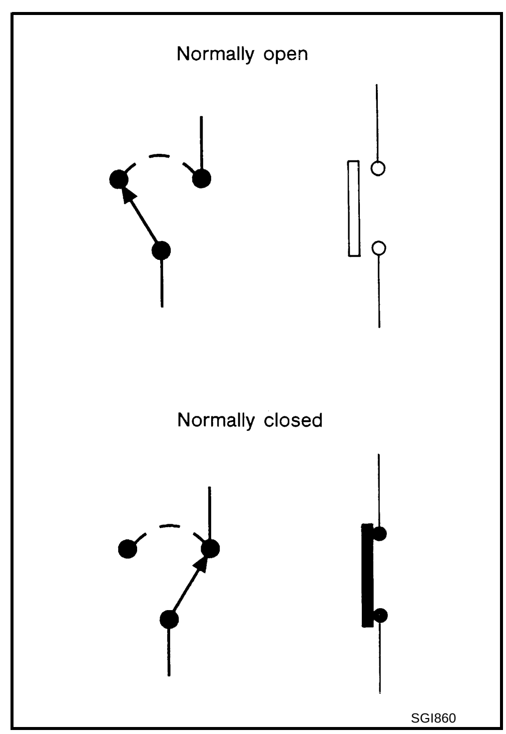
Component Indication

Connector numbers in a double circle F211 indicate component connectors.

Switch Positions

Switches are shown in wiring diagrams as if the vehicle is in the “normal” condition.
A vehicle is in the “normal” condition when:

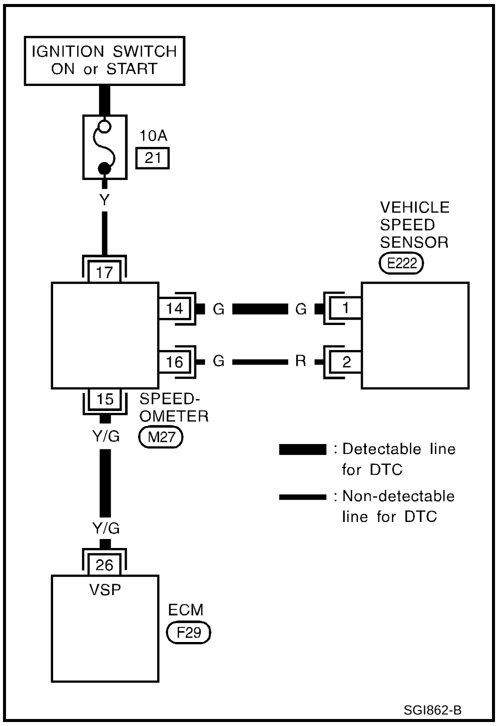
- ignition switch is “OFF”,
- doors, hood and trunk lid/back door are closed,
- pedals are not depressed, and
- parking brake is released.



Detectable Lines and Non-Detectable Lines

In some wiring diagrams, two kinds of lines, representing wires, with different weight are used.

- A line with regular weight (wider line) represents a “detectable line for DTC (Diagnostic Trouble Code)”. A “detectable line for DTC” is a circuit in which ECM can detect its malfunctions with the on board diagnostic system.
- A line with less weight (thinner line) represents a “non-detectable line for DTC”. A “non-detectable line for DTC” is a circuit in which ECM cannot detect its malfunctions with the on board diagnostic system.



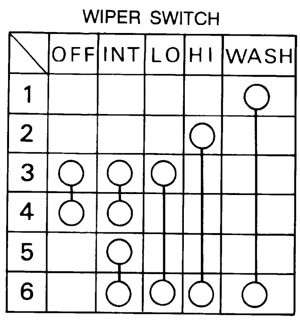
Multiple Switch

The continuity of multiple switch is described in two ways as shown below.

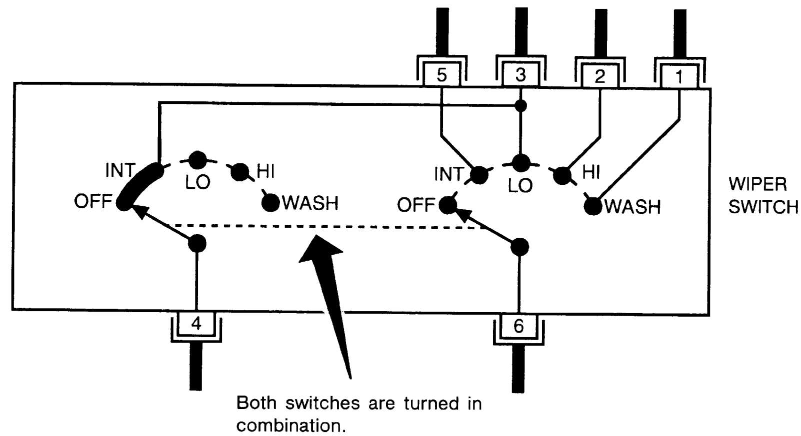
- The switch chart is used in schematic diagrams.
- The switch diagram is used in wiring diagrams.

Example

(SWITCH CHART)



(SWITCH DIAGRAM)



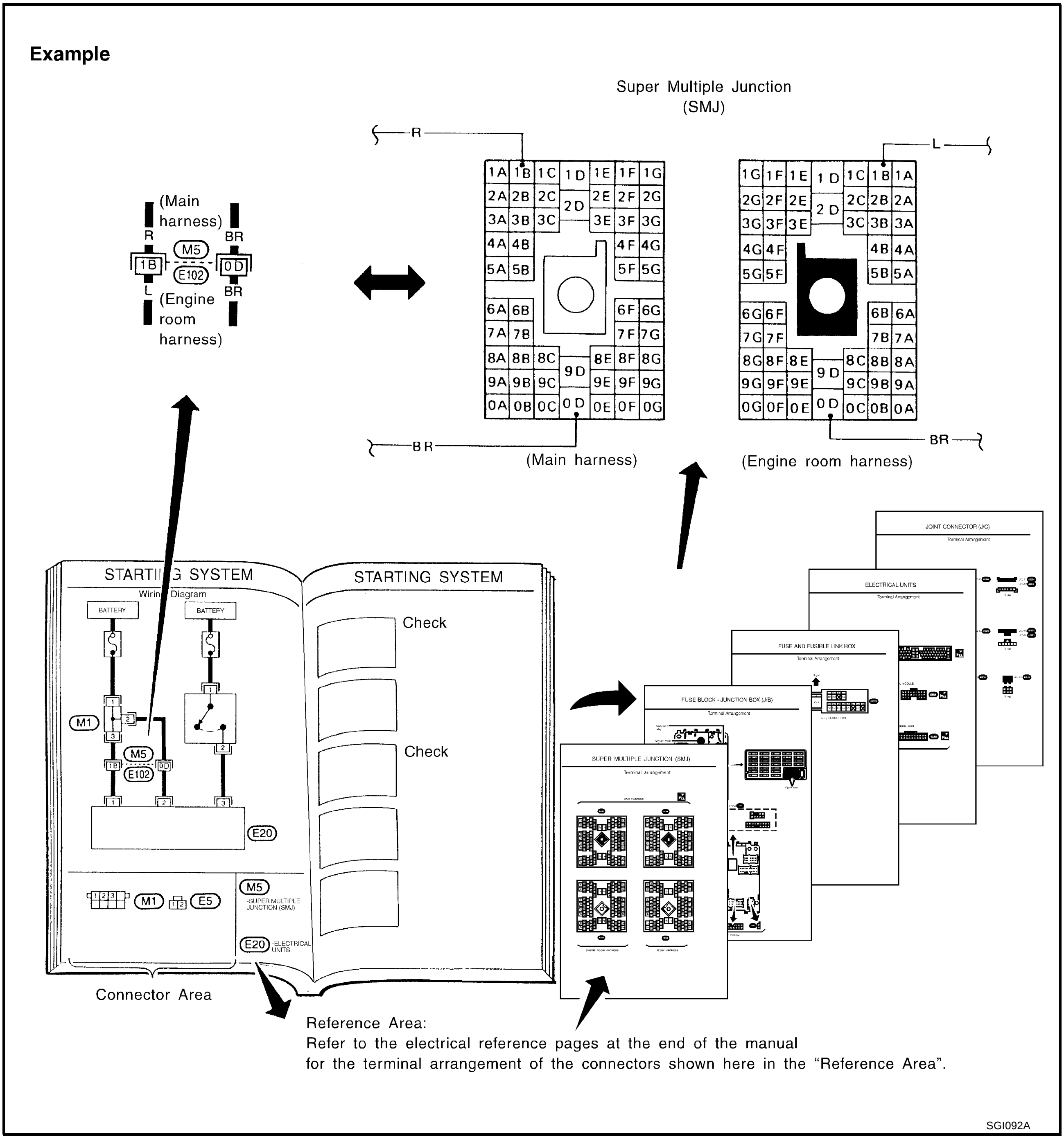
Continuity circuit of wiper switch

SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3-4
INT	3-4, 5-6
LO	3-6
HI	2-6
WASH	1-6

SGI875

Reference Area

The Reference Area of the wiring diagram contains references to additional electrical reference pages at the end of the manual. If connector numbers and titles are shown in the Reference Area of the wiring diagram, these connector symbols are not shown in the Connector Area.



Abbreviations

AAS000NT

The following **ABBREVIATIONS** are used:

ABBREVIATION	DESCRIPTION
A/C	Air Conditioner
A/T	Automatic Transaxle/Transmission
ATF	Automatic Transmission Fluid
D_1	Drive range 1st gear
D_2	Drive range 2nd gear
D_3	Drive range 3rd gear
D_4	Drive range 4th gear
FR, RR	Front, Rear
LH, RH	Left-Hand, Right-Hand
M/T	Manual Transaxle/Transmission
OD	Overdrive
P/S	Power Steering
SAE	Society of Automotive Engineers, Inc.
SDS	Service Data and Specifications
SST	Special Service Tools
2WD	2-Wheel Drive
2_2	2nd range 2nd gear
2_1	2nd range 1st gear
1_2	1st range 2nd gear
1_1	1st range 1st gear

SERVICE INFORMATION FOR ELECTRICAL INCIDENT

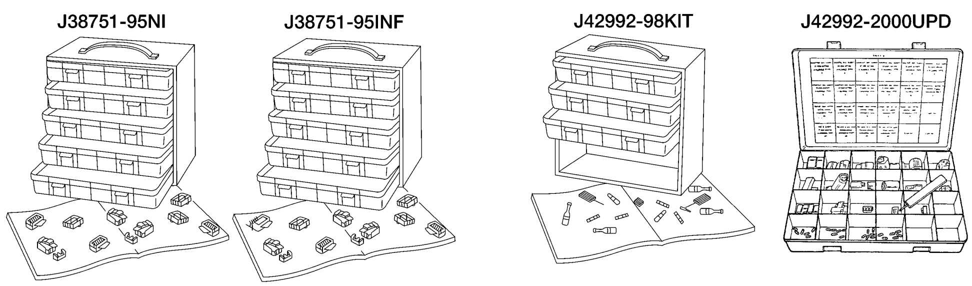
PFP:00000

How to Check Terminal

AAS000NU

CONNECTOR AND TERMINAL PIN KIT

Use the connector and terminal pin kits listed below when replacing connectors or terminals.
The connector and terminal pin kits contain some of the most commonly used NISSAN/INFINITI connectors and terminals. For detailed connector and terminal pin replacement procedures, refer to the latest NISSAN/INFINITI CONNECTOR AND TERMINAL PIN SERVICE MANUAL.

Tool number (Kent-Moore No.) Tool name	Description
- (J38751-95NI) Connector and terminal pin kit (NISSAN) - (J38751-95INF) Connector and terminal pin kit (INFINITI) - (J42992-98KIT) OBD and terminal repair kit - (J42992-2000UPD) OBD-II Connector Kit Update	 WAIA0004E WAIA0005E

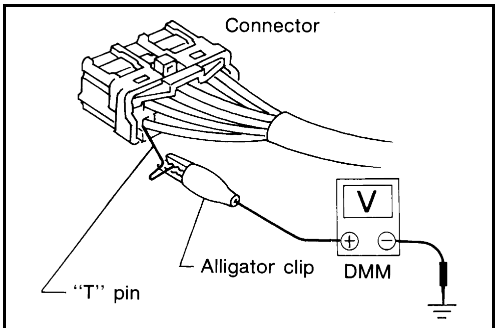
HOW TO PROBE CONNECTORS

Connector damage and an intermittent connection can result from improperly probing of the connector during circuit checks.
The probe of a digital multimeter (DMM) may not correctly fit the connector cavity. To correctly probe the connector, follow the procedures below using a “T” pin. For the best contact grasp the “T” pin using an alligator clip.

Probing from Harness Side

Standard type (not waterproof type) connector should be probed from harness side with “T” pin.

- If the connector has a rear cover such as a ECM connector, remove the rear cover before probing the terminal.
- Do not probe waterproof connector from harness side. Damage to the seal between wire and connector may result.

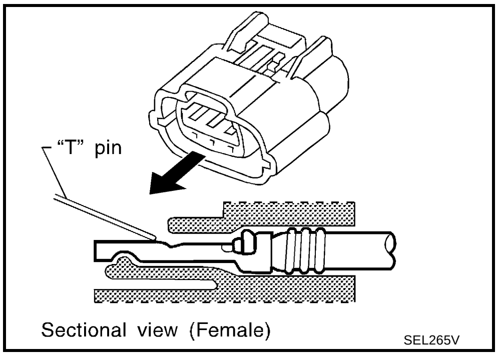


SGI841

Probing from Terminal Side

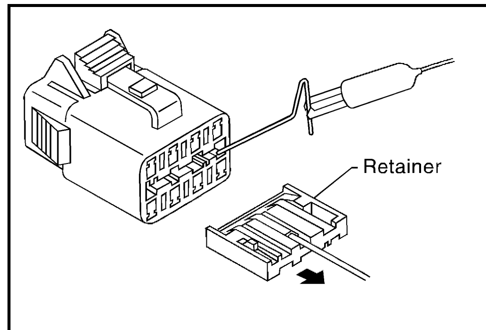
FEMALE TERMINAL

- There is a small notch above each female terminal. Probe each terminal with the “T” pin through the notch.
  Do not insert any object other than the same type male terminal into female terminal.



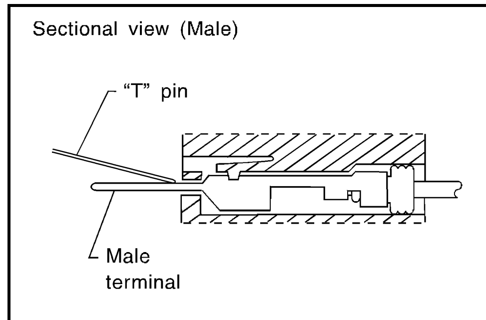
SEL265V

- Some connectors do not have a notch above each terminal. To probe each terminal, remove the connector retainer to make contact space for probing.



SEL266V

MALE TERMINAL
Carefully probe the contact surface of each terminal using a “T” pin.
Do not bend terminal.

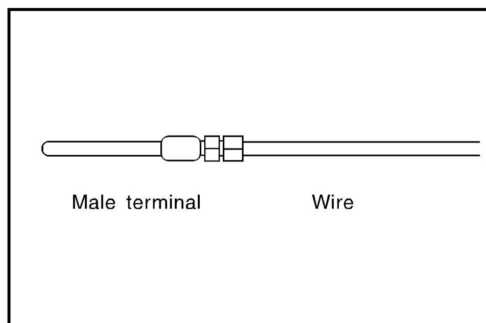


SEL267V

How to Check Enlarged Contact Spring of Terminal

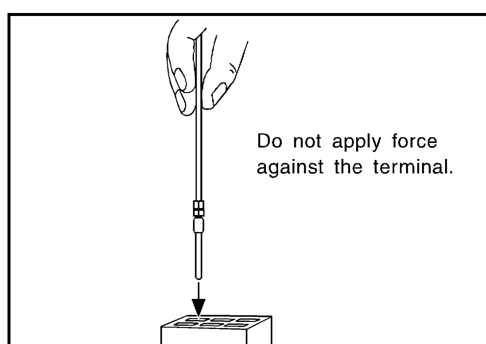
An enlarged contact spring of a terminal may create intermittent signals in the circuit.
If the intermittent open circuit occurs, follow the procedure below to inspect for open wires and enlarged contact spring of female terminal.

1. Assemble a male terminal and approx. 10 cm (3.9 in) of wire.
   Use a male terminal which matches the female terminal.
2. Disconnect the suspected faulty connector and hold it terminal side up.



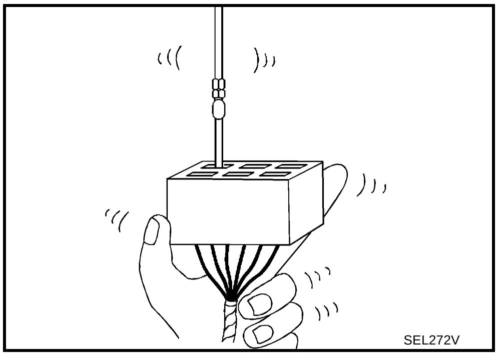
SEL270V

3. While holding the wire of the male terminal, try to insert the male terminal into the female terminal.
   Do not force the male terminal into the female terminal with your hands.

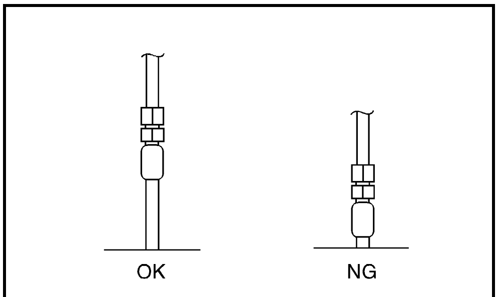


SEL271V

4. While moving the connector, check whether the male terminal can be easily inserted or not.


SEL272V

- If the male terminal can be easily inserted into the female terminal, replace the female terminal.



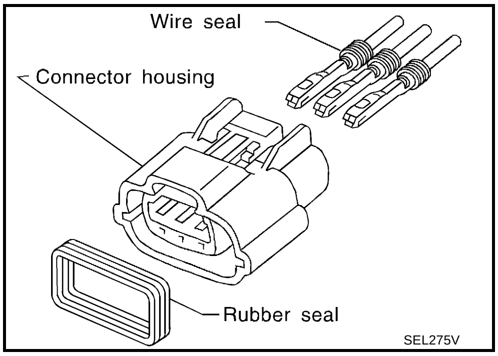
SEL273V

Waterproof Connector Inspection

If water enters the connector, it can short interior circuits. This may lead to intermittent problems.
Check the following items to maintain the original waterproof characteristics.

RUBBER SEAL INSPECTION

- Most waterproof connectors are provided with a rubber seal between the male and female connectors. If the seal is missing, the waterproof performance may not meet specifications.
- The rubber seal may come off when connectors are disconnected. Whenever connectors are reconnected, make sure the rubber seal is properly installed on either side of male or female connector.



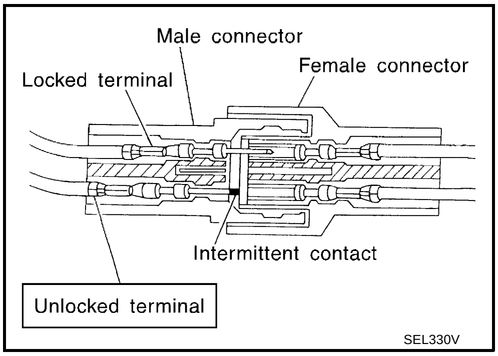
SEL275V

WIRE SEAL INSPECTION

The wire seal must be installed on the wire insertion area of a waterproof connector. Be sure that the seal is installed properly.

Terminal Lock Inspection

Check for unlocked terminals by pulling wire at the end of connector.
An unlocked terminal may create intermittent signals in the circuit.

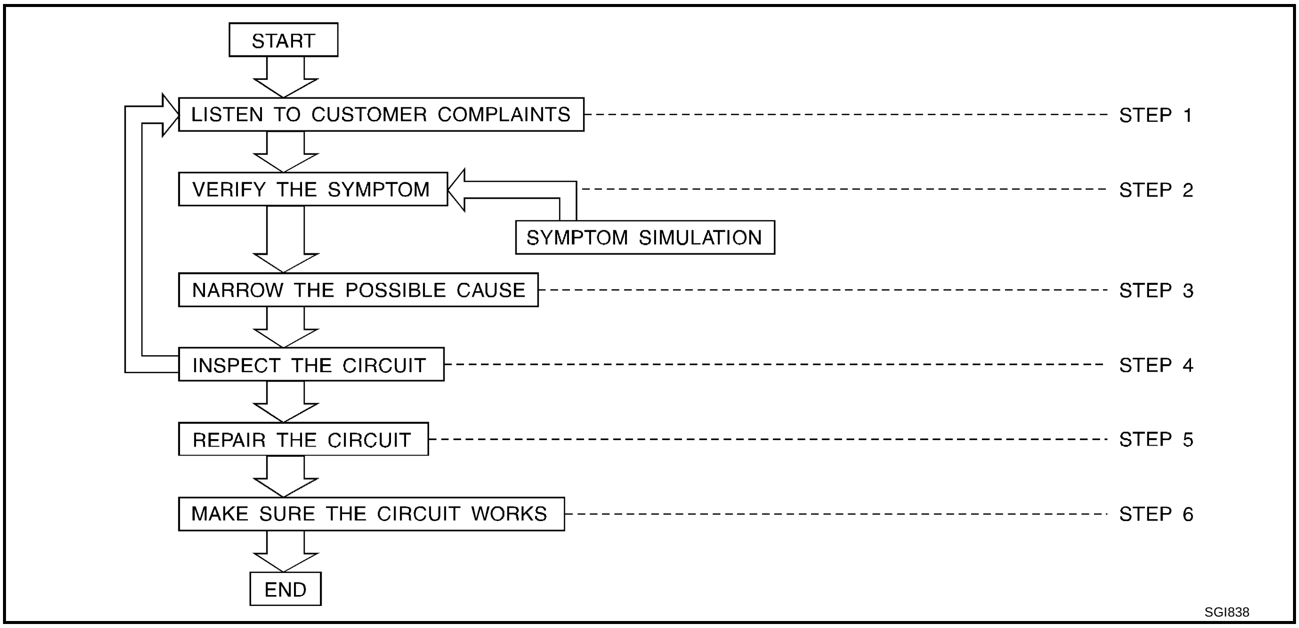


SEL330V

How to Perform Efficient Diagnosis for an Electrical Incident

AAS000NV

WORK FLOW



STEP	DESCRIPTION	
STEP 1	Get detailed information about the conditions and the environment when the incident occurred. The following are key pieces of information required to make a good analysis:	
	WHAT	Vehicle Model, Engine, Transmission/Transaxle and the System (i.e. Radio).
	WHEN	Date, Time of Day, Weather Conditions, Frequency.
	WHERE	Road Conditions, Altitude and Traffic Situation.
	HOW	System Symptoms, Operating Conditions (Other Components Interaction). Service History and if any After Market Accessories have been installed.
STEP 2	Operate the system, road test if necessary. Verify the parameter of the incident. If the problem cannot be duplicated, refer to “Incident Simulation Tests”.	
STEP 3	Get the proper diagnosis materials together including: ● Power Supply Routing ● System Operation Descriptions ● Applicable Service Manual Sections ● Check for any Service Bulletins Identify where to begin diagnosis based upon your knowledge of the system operation and the customer comments.	
STEP 4	Inspect the system for mechanical binding, loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the Power Supply Routing and Harness Layouts.	
STEP 5	Repair or replace the incident circuit or component.	
STEP 6	Operate the system in all modes. Verify the system works properly under all conditions. Make sure you have not inadvertently created a new incident during your diagnosis or repair steps.	

INCIDENT SIMULATION TESTS

Introduction

Sometimes the symptom is not present when the vehicle is brought in for service. If possible, re-create the conditions present at the time of the incident. Doing so may help avoid a No Trouble Found Diagnosis. The following section illustrates ways to simulate the conditions/environment under which the owner experiences an electrical incident.

The section is broken into the six following topics:

- Vehicle vibration
- Heat sensitive

- Freezing
- Water intrusion
- Electrical load
- Cold or hot start up

Get a thorough description of the incident from the customer. It is important for simulating the conditions of the problem.

Vehicle Vibration

The problem may occur or become worse while driving on a rough road or when engine is vibrating (idle with A/C on). In such a case, you will want to check for a vibration related condition. Refer to the following illustration.

CONNECTORS & HARNESS

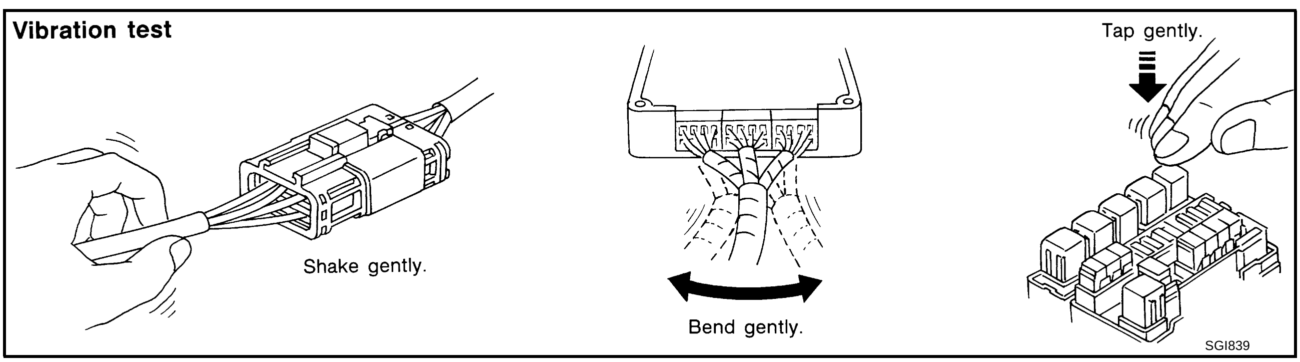
Determine which connectors and wiring harness would affect the electrical system you are inspecting. Gently shake each connector and harness while monitoring the system for the incident you are trying to duplicate. This test may indicate a loose or poor electrical connection.

HINT

Connectors can be exposed to moisture. It is possible to get a thin film of corrosion on the connector terminals. A visual inspection may not reveal this without disconnecting the connector. If the problem occurs intermittently, perhaps the problem is caused by corrosion. It is a good idea to disconnect, inspect and clean the terminals on related connectors in the system.

SENSORS & RELAYS

Gently apply a slight vibration to sensors and relays in the system you are inspecting.
This test may indicate a loose or poorly mounted sensor or relay.



ENGINE COMPARTMENT

There are several reasons a vehicle or engine vibration could cause an electrical complaint. Some of the things to check for are:

- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibrations or rocking.
- Wires laying across brackets or moving components.
- Loose, dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to Ground Inspection described later.) First check that the system is properly grounded. Then check for loose connection by gently shaking the wiring or components as previously explained. Using the wiring diagrams inspect the wiring for continuity.

BEHIND THE INSTRUMENT PANEL

An improperly routed or improperly clamped harness can become pinched during accessory installation. Vehicle vibration can aggravate a harness which is routed along a bracket or near a screw.

UNDER SEATING AREAS

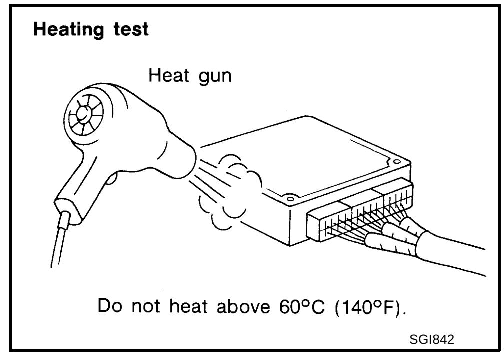
An unclamped or loose harness can cause wiring to be pinched by seat components (such as slide guides) during vehicle vibration. If the wiring runs under seating areas, inspect wire routing for possible damage or pinching.

Heat Sensitive

The customer's concern may occur during hot weather or after car has sat for a short time. In such cases you will want to check for a heat sensitive condition.

To determine if an electrical component is heat sensitive, heat the component with a heat gun or equivalent.

Do not heat components above 60°C (140°F). If incident occurs while heating the unit, either replace or properly insulate the component.

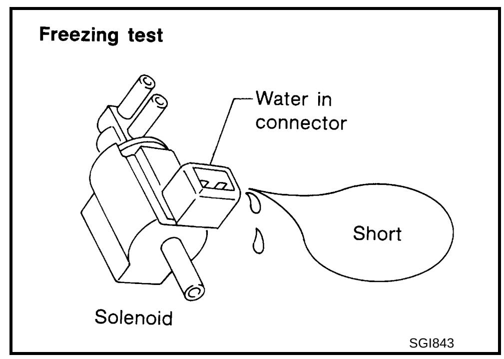


Freezing

The customer may indicate the incident goes away after the car warms up (winter time). The cause could be related to water freezing somewhere in the wiring/electrical system.

There are two methods to check for this. The first is to arrange for the owner to leave his car overnight. Make sure it will get cold enough to demonstrate his complaint. Leave the car parked outside overnight. In the morning, do a quick and thorough diagnosis of those electrical components which could be affected.

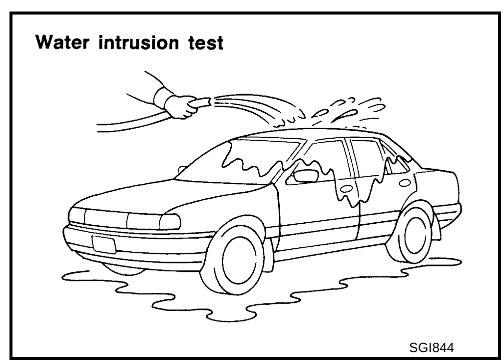
The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.



Water Intrusion

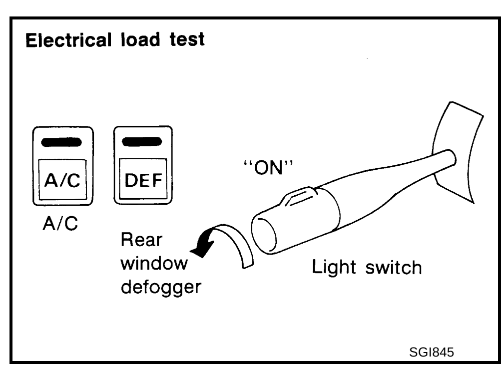
The incident may occur only during high humidity or in rainy/snowy weather. In such cases the incident could be caused by water intrusion on an electrical part. This can be simulated by soaking the car or running it through a car wash.

Do not spray water directly on any electrical components.



Electrical Load

The incident may be electrical load sensitive. Perform diagnosis with all accessories (including A/C, rear window defogger, radio, fog lamps) turned on.



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Cold or Hot Start Up

On some occasions an electrical incident may occur only when the car is started cold, or it may occur when the car is restarted hot shortly after being turned off. In these cases you may have to keep the car overnight to make a proper diagnosis.

CIRCUIT INSPECTION

Introduction

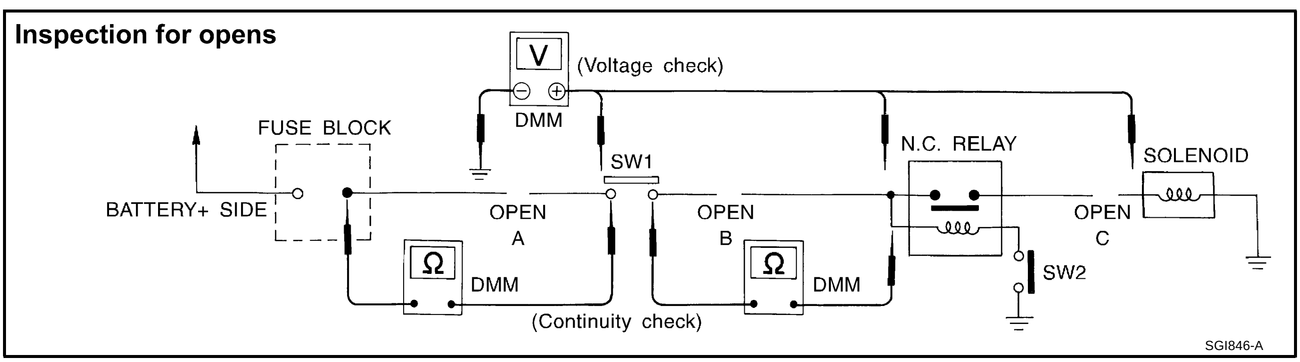
In general, testing electrical circuits is an easy task if it is approached in a logical and organized method. Before beginning it is important to have all available information on the system to be tested. Also, get a thorough understanding of system operation. Then you will be able to use the appropriate equipment and follow the correct test procedure.
You may have to simulate vehicle vibrations while testing electrical components. Gently shake the wiring harness or electrical component to do this.

OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	● SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	● SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

NOTE:
Refer to “How to Check Terminal” to probe or check terminal.

Testing for “Opens” in the Circuit

Before you begin to diagnose and test the system, you should rough sketch a schematic of the system. This will help you to logically walk through the diagnosis process. Drawing the sketch will also reinforce your working knowledge of the system.



CONTINUITY CHECK METHOD
The continuity check is used to find an open in the circuit. The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol). Make sure to always start with the DMM at the highest resistance level.
To help in understanding the diagnosis of open circuits, please refer to the previous schematic.

- Disconnect the battery negative cable.
- Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
- Connect one probe of the DMM to the fuse block terminal on the load side.
- Connect the other probe to the fuse block (power) side of SW1. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point A)
- Connect the probes between SW1 and the relay. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point B)
- Connect the probes between the relay and the solenoid. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point C)

Any circuit can be diagnosed using the approach in the previous example.

VOLTAGE CHECK METHOD

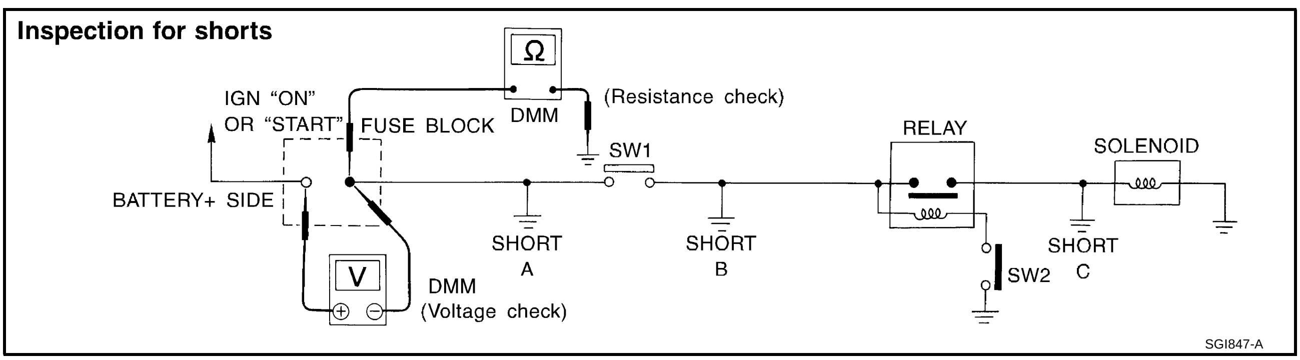
To help in understanding the diagnosis of open circuits please refer to the previous schematic.
In any powered circuit, an open can be found by methodically checking the system for the presence of voltage. This is done by switching the DMM to the voltage function.

- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and work your way to the other end.
- With SW1 open, probe at SW1 to check for voltage.
  voltage; open is further down the circuit than SW1.
  no voltage; open is between fuse block and SW1 (point A).
- Close SW1 and probe at relay.
  voltage; open is further down the circuit than the relay.
  no voltage; open is between SW1 and relay (point B).
- Close the relay and probe at the solenoid.
  voltage; open is further down the circuit than the solenoid.
  no voltage; open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the previous example.

Testing for "Shorts" in the Circuit

To simplify the discussion of shorts in the system, please refer to the following schematic.



RESISTANCE CHECK METHOD

- Disconnect the battery negative cable and remove the blown fuse.
- Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal. Connect the other probe to a known good ground.
- With SW1 open, check for continuity.
  continuity; short is between fuse terminal and SW1 (point A).
  no continuity; short is further down the circuit than SW1.
- Close SW1 and disconnect the relay. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between SW1 and the relay (point B).
  no continuity; short is further down the circuit than the relay.
- Close SW1 and jump the relay contacts with jumper wire. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity; short is between relay and solenoid (point C).
  no continuity; check solenoid, retrace steps.

VOLTAGE CHECK METHOD

- Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the ignition key to the ON or START position. Verify battery voltage at the battery + side of the fuse terminal (one lead on the battery + terminal side of the fuse block and one lead on a known good ground).
- With SW1 open and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between fuse block and SW1 (point A).

no voltage; short is further down the circuit than SW1.

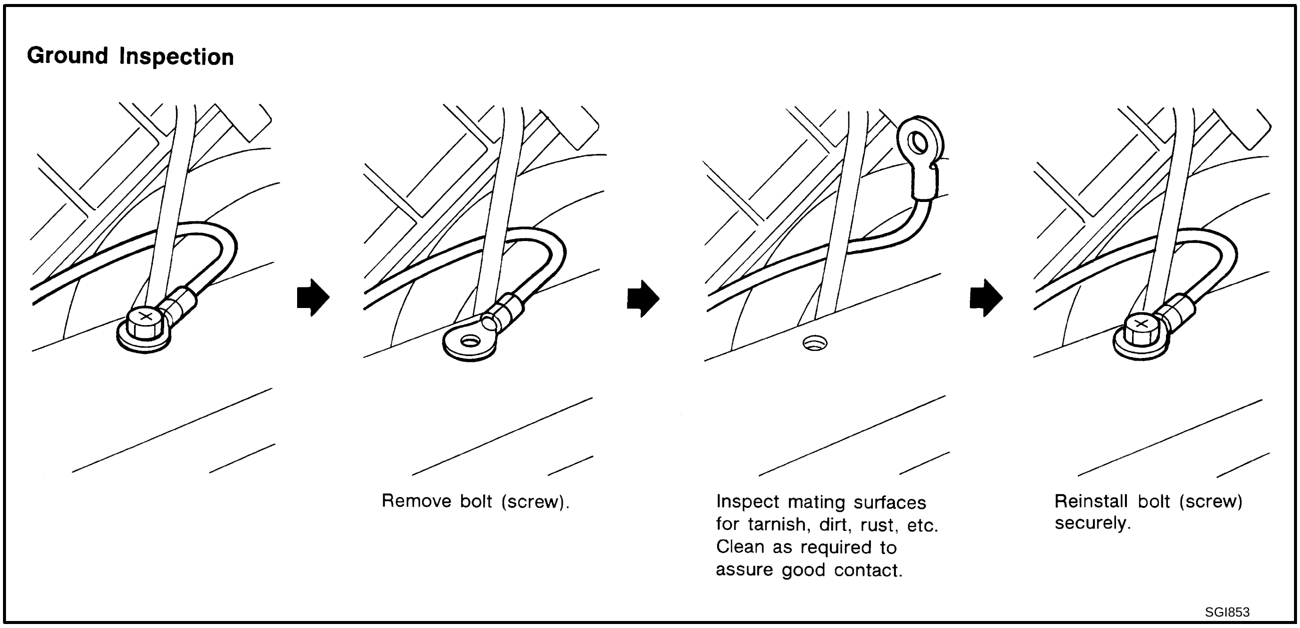
- With SW1 closed, relay and solenoid disconnected and the DMM leads across both fuse terminals, check for voltage.
  voltage; short is between SW1 and the relay (point B).
  no voltage; short is further down the circuit than the relay.
- With SW1 closed, relay contacts jumped with fused jumper wire check for voltage.
  voltage; short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).
  no voltage; retrace steps and check power to fuse block.

Ground Inspection

Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.
When inspecting a ground connection follow these rules:

- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Make sure all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet make sure no ground wires have excess wire insulation.

For detailed ground distribution information, refer to “Ground Distribution” in PG section.



Voltage Drop Tests

Voltage drop tests are often used to find components or circuits which have excessive resistance. A voltage drop in a circuit is caused by a resistance when the circuit is in operation.
Check the wire in the illustration. When measuring resistance with DMM, contact by a single strand of wire will give reading of 0 ohms. This would indicate a good circuit. When the circuit operates, this single strand of wire is not able to carry the current. The single strand will have a high resistance to the current. This will be picked up as a slight voltage drop.
Unwanted resistance can be caused by many situations as follows:

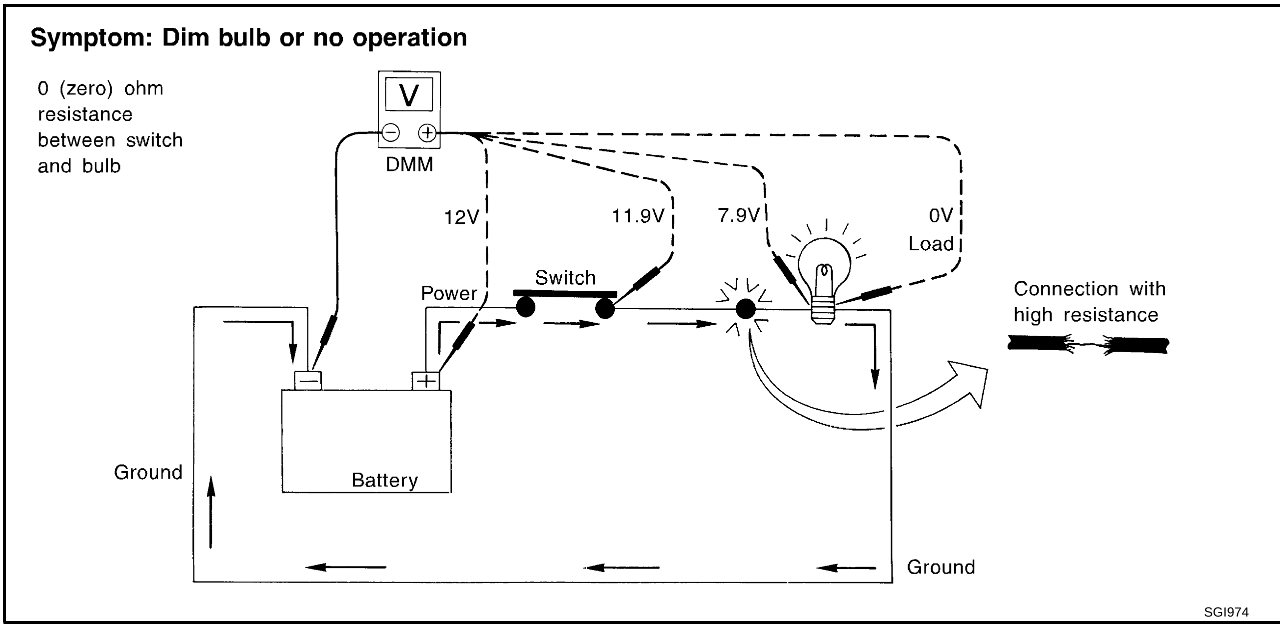
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.

If repairs are needed always use wire that is of the same or larger gauge.

MEASURING VOLTAGE DROP — ACCUMULATED METHOD

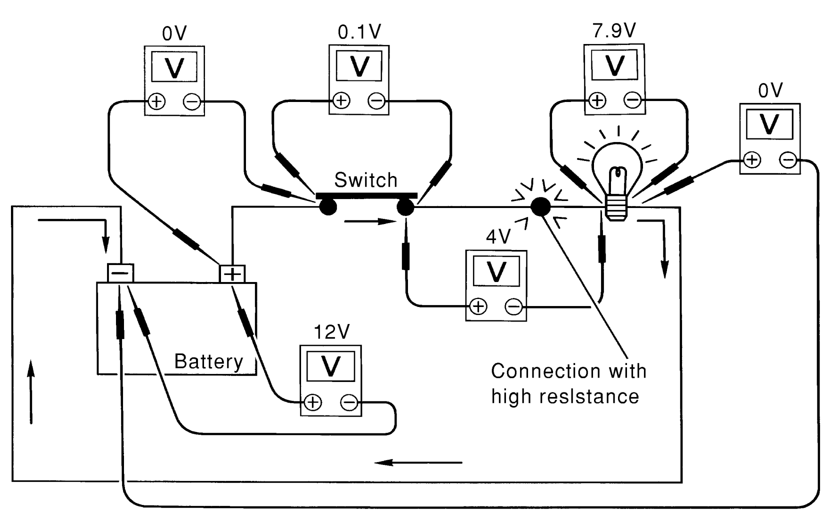
- Connect the DMM across the connector or part of the circuit you want to check. The positive lead of the DMM should be closer to power and the negative lead closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts are being used to “push” current through that part of the circuit.

Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.



MEASURING VOLTAGE DROP — STEP-BY-STEP

The step-by-step method is most useful for isolating excessive drops in low voltage systems (such as those in “Computer Controlled Systems”).
Circuits in the “Computer Controlled System” operate on very low amperage.
The (Computer Controlled) system operations can be adversely affected by any variation in resistance in the system. Such resistance variation may be caused by poor connection, improper installation, improper wire gauge or corrosion.
The step by step voltage drop test can identify a component or wire with too much resistance.



1. Connect the DMM as shown, starting at the battery and working your way around the circuit.
2. An unusually large voltage drop will indicate a component or wire that needs to be repaired, As you can see the illustration above, the poor connection causes a 4 volt drop.

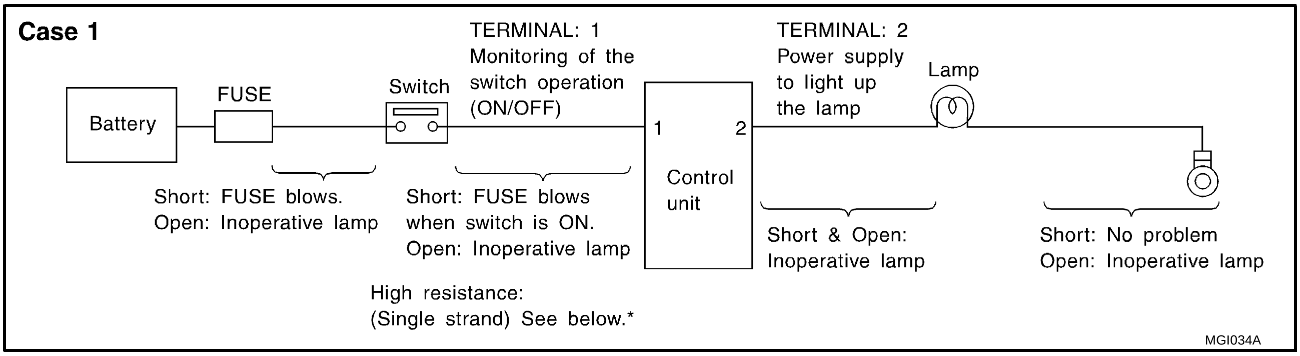
The chart that follows illustrates some maximum allowable voltage drops. These values are given as a guideline, the exact value for each component may vary.

COMPONENT	VOLTAGE DROP
Wire	negligible < .001 volts
Ground Connections	Approx. 0.1 volts
Switch Contacts	Approx. 0.3 volts

SAIA0258E

Control Unit Circuit Test

System Description:When the switch is ON, the control unit lights up the lamp.

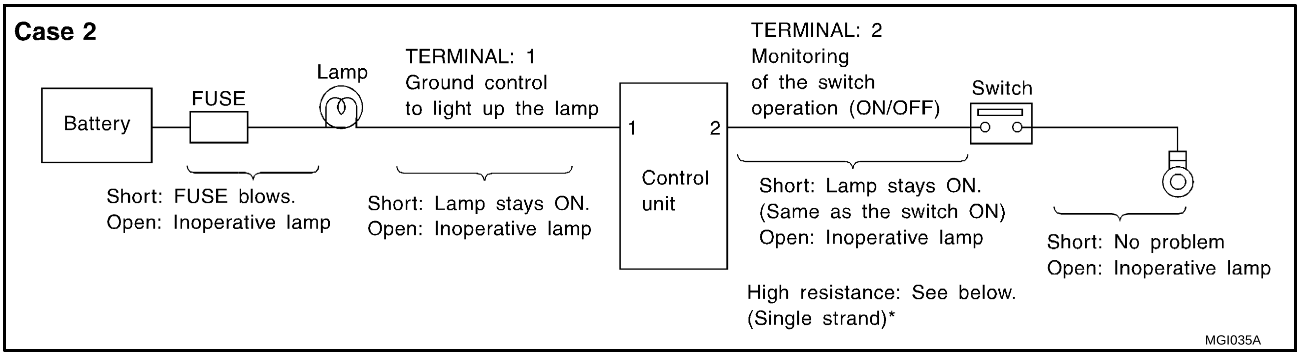


INPUT-OUTPUT VOLTAGE CHART

Pin No.	Item	Condition	Voltage value [V]	In case of high resistance such as single strand [V] *
1	Switch	Switch ON	Battery voltage	Lower than battery voltage Approx. 8 (Example)
		Switch OFF	Approx. 0	Approx. 0
2	Lamp	Switch ON	Battery voltage	Approx. 0 (Inoperative lamp)
		Switch OFF	Approx. 0	Approx. 0

The voltage value is based on the body ground.

*:If high resistance exists in the switch side circuit (caused by a single strand), terminal 1 does not detect battery voltage. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not supply power to light up the lamp.



INPUT-OUTPUT VOLTAGE CHART

Pin No.	Item	Condition	Voltage value [V]	In case of high resistance such as single strand [V] *
1	Lamp	Switch ON	Approx. 0	Battery voltage (Inoperative lamp)
		Switch OFF	Battery voltage	Battery voltage
2	Switch	Switch ON	Approx. 0	Higher than 0 Approx. 4 (Example)
		Switch OFF	Approx. 5	Approx. 5

The voltage value is based on the body ground.

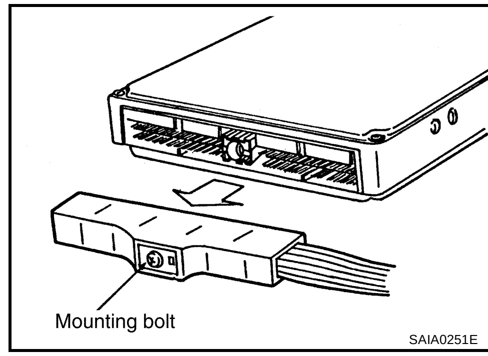
*:If high resistance exists in the switch side circuit (caused by a single strand), terminal 2 does not detect approx. 0V. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not control ground to light up the lamp.

Control Units and Electrical Parts

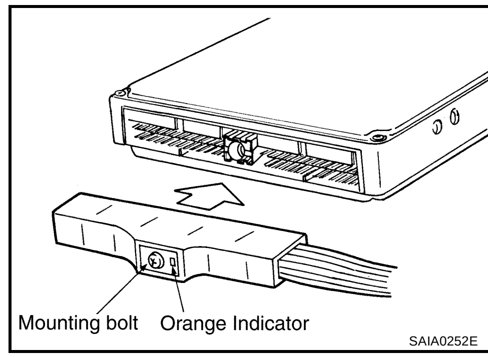
AAS000NW

PRECAUTIONS

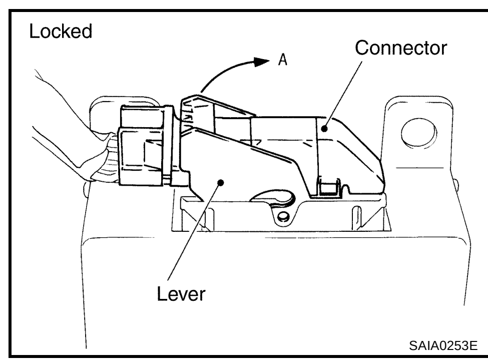
- Never reverse polarity of battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit, check the input and output and functions of the component parts.
- Do not apply excessive force when disconnecting a connector.
- If a connector is installed by tightening bolts, loosen bolt mounting it, then take it out by hand.



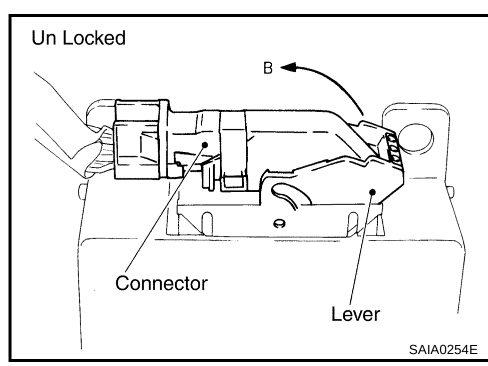
- Before installing a connector, make sure the terminal is not bent or damaged, and then correctly connect it.
  When installing a connector by tightening bolts, fix it by tightening the mounting bolt until the painted projection of the connector becomes even with the surface.



- For removal of the lever type connector, pull the lever up to the direction pointed to by the arrow A in the figure, and then remove the connector.



- For installation of the lever type connector, pull down the lever to the direction pointed by the arrow B in the figure, and then push the connector until a clicking noise is heard.



- Do not apply excessive shock to the control unit by dropping or hitting it.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it. If water is found in the control unit, dry it fully and then install it in the vehicle.
- Be careful not to let oil to get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit, and do not remove the upper and lower covers.

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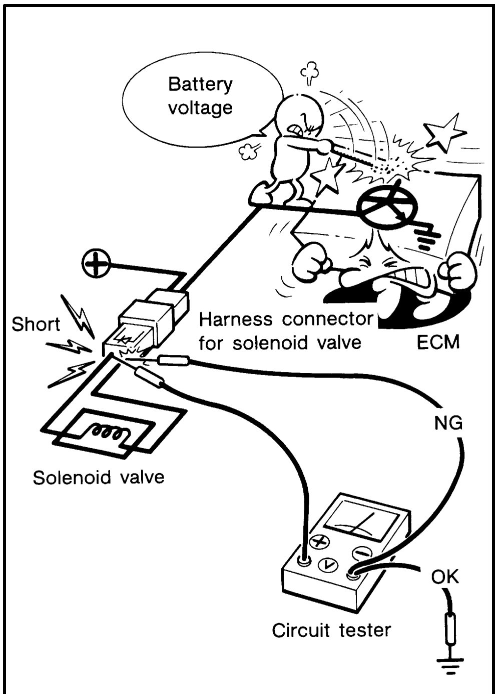
- When using a DMM, be careful not to let test probes get close to each other to prevent the power transistor in the control unit from damaging battery voltage because of short circuiting.
- When checking input and output signals of the control unit, use the specified check adapter.



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CONSULT-II CHECKING SYSTEM

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Description

AAS000NX

- CONSULT-II is a hand-held type tester. When it is connected with a diagnostic connector equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests.
- Refer to “CONSULT-II Software Operation Manual” for more information.

Function and System Application

AAS000NY

Diagnostic test mode	Function	ENGINE	A/T	ALL MODE AWD/ 4WD	AIR BAG	ABS	ABS (Including VDC)	NVIS (NATS)
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on CONSULT-II.	x	x	-	-	-	x	-
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.	x	x	x	x	x	x	x
Trouble diagnostic record	Current self-diagnostic results and all trouble diagnostic records previously stored can be read.	-	-	-	x	-	-	-
Data monitor	Input/Output data in the ECM can be read.	x	x	x	-	x	x	-
CAN diagnosis support monitor	The communication condition of CAN communication line can be indicated.	x	x	x	-	x	x	-
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.	x	-	x	-	x	x	-
DTC confirmation	The results of SRT (System Readiness Test) and the self-diagnosis status/result can be confirmed.	x	-	-	-	-	-	-
DTC work support	The operating condition to confirm Diagnosis Trouble Codes can be selected.	x	x	-	-	-	-	-
ECM (ECU, TCM) part number	ECM (ECU, TCM) part number can be read.	x	x	x	-	x	x	-
ECU discriminated No.	Classification number of a replacement ECU can be read to prevent an incorrect ECU from being installed.	-	-	-	x	-	-	-
Function test	This mode can show results of self-diagnosis of ECU with either “OK” or “NG”. For engines,more practical tests regarding sensors / switches and / or actuators are available.	x	x	-	x	x	x	-
Control unit initialization	All registered ignition key IDs in NATS components can be initialized and new IDs can be registered.	-	-	-	-	-	-	x
CALIB data	Characteristic information for TCM and CVT assembly can be read. Do not use, but displayed.	-	-	-	-	-	-	-

x: Applicable

Nickel Metal Hydride Battery Replacement

AAS000NZ

CONSULT-II contains a nickel metal hydride battery. When replacing the battery obey the following:

WARNING:

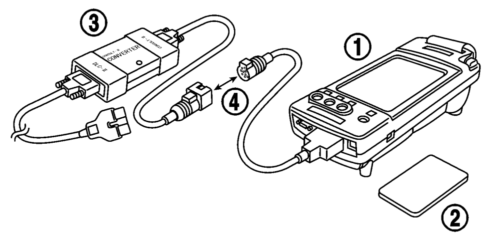
Replace the nickel metal hydride battery with Genuine CONSULT-II battery only. Use of another battery may present a risk of fire or explosion. The battery may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble or dispose of in fire.

Keep the battery out of reach of children and discard used battery conforming to the local regulations.

Checking Equipment

AAS000O0

When ordering the following equipment, contact your NISSAN/INFINITI distributor.

Tool name	Description
NISSAN CONSULT-II 1. CONSULT-II unit (Tester internal soft: Resident version 3.3.0) and accessories 2. Program card AED04C and AEN02C-1 (For NATS) 3. CONSULT-II CONVERTER 4. "CONSULT-II Pigtail" Cable	 SAIA0363E

NOTE:

- The CONSULT-II must be used in conjunction with a program card.
  CONSULT-II does not require loading (Initialization) procedure.
- Be sure the CONSULT-II is turned off before installing or removing a program card.

CAUTION:

- **If CONSULT-II is used with no connection of CONSULT-II CONVERTER, malfunctions might be detected in self-diagnosis depending on control unit which carry out CAN communication.**
- **If CONSULT-II CONVERTER is not connected with CONSULT-II, vehicle occur the "FAIL SAFE MODE" which is "LIGHT UP the HEAD LIGHT" and/or "COOLING FAN ROTATING" when CON-SULT-II is started.**
- **Previous CONSULT-II "I" and "Y" DLC-I and DLC-II cables should NOT be used anymore because their DDL connector pins can be damaged during cable swapping.**

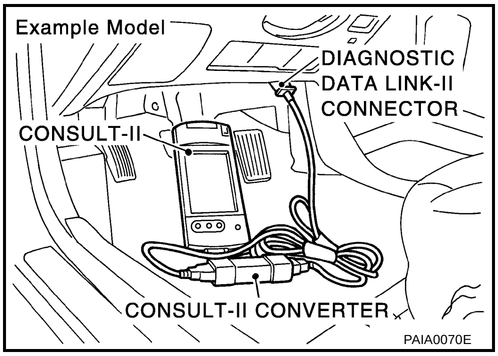
CONSULT-II Start Procedure

AAS000O1

NOTE:

Turning ignition switch off when performing CAN diagnosis could cause CAN memory to be erased.

1. Connect CONSULT-II and CONSULT-II CONVERTER to the data link connector.



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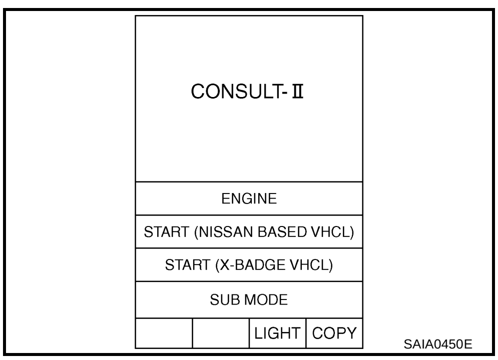
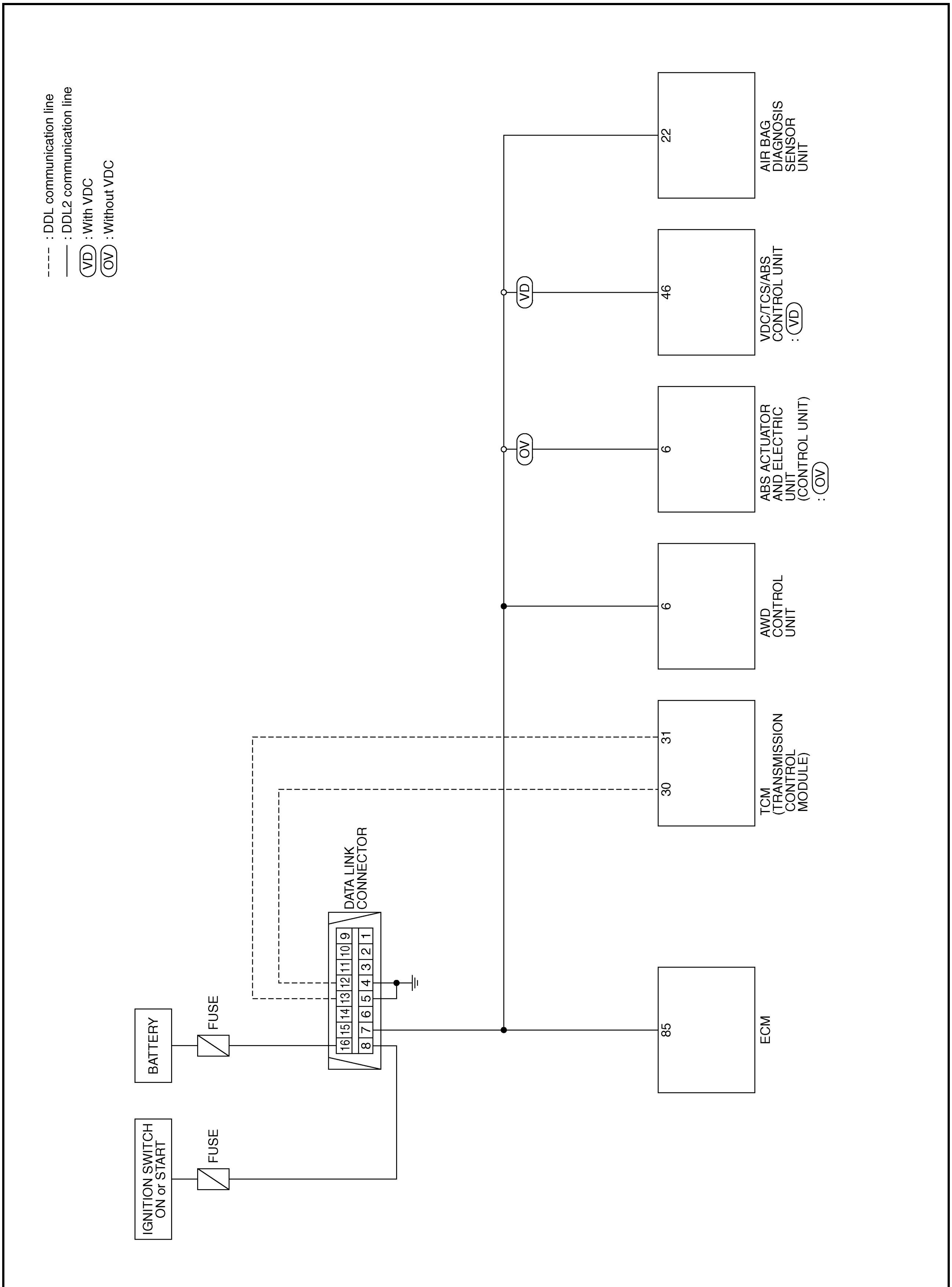
2. When the ignition switch OFF, turn ignition switch ON.
3. Touch "START (NISSAN BASED VHCL)" key.



SAIA0450E

CONSULT-II Data Link Connector (DLC) Circuit

AAS000O2



INSPECTION PROCEDURE

If the CONSULT-II cannot diagnose the system properly, check the following items.

Symptom	Check item
CONSULT-II cannot access any system.	● CONSULT-II DLC power supply circuit (Terminal 8) and ground circuit (Terminal 4) (For detailed circuit, refer to EC-659, "MIL AND DATA LINK CONNECTOR" in EC section.) ● CONSULT-II DLC cable and CONSULT-II CONVERTER
CONSULT-II cannot access individual system. (Other systems can be accessed.)	● CONSULT-II program card (Check the appropriate CONSULT-II program card for the system. Refer to GI-37, "Checking Equipment" .) ● Power supply and ground circuit for the control unit of the system (For detailed circuit, refer to wiring diagram for each system.) ● Open or short circuit between the system and CONSULT-II DLC (For detailed circuit, refer to wiring diagram for each system.) ● Open or short circuit CAN communication line. Refer to LAN-3, "Precautions for Harness Repair" .

NOTE:
The DDL1 and DDL2 circuits from DLC pins 12, 13, 14 and 15 may be connected to more than one system. A short in a DDL circuit connected to a control unit in one system may affect CONSULT-II access to other systems.

LIFTING POINT

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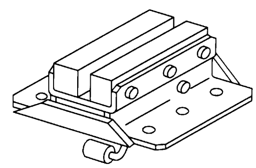
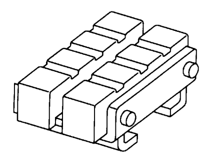
Special Service Tools

AAS000O3

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
LM4086-0200 (-) Board on attachment	 S-NT001
LM4519-0000 (-) Safety stand attachment	 S-NT002

CAUTION:

- **Every time the vehicle is lifted up, maintain the complete vehicle curb condition.**
- **Since the vehicle's center of gravity changes when removing main parts on the front side (engine, transmission, suspension etc.), support a jack up point on the rear side garage jack with a mission jack or equivalent.**
- **Since the vehicle's center of gravity changes when removing main parts on the rear side (rear axle, suspension, etc.), support a jack up point on the front side garage jack with a mission jack or equivalent.**
- **Be careful not to smash or do not do anything that would affect piping parts.**

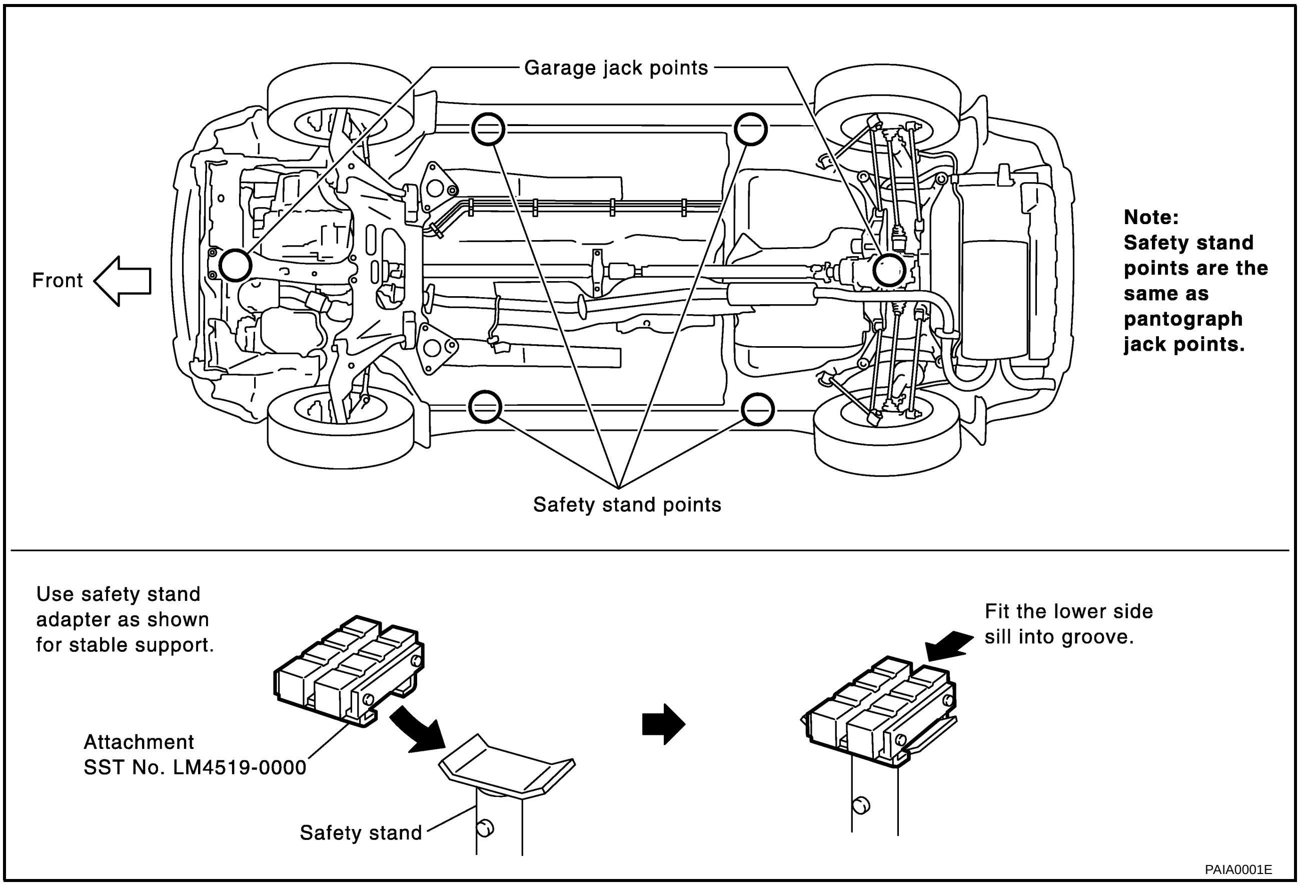
Garage Jack and Safety Stand

AAS000O4

WARNING:

- **Park the vehicle on a level surface when using the jack. Make sure to avoid damaging pipes, tubes, etc. under the vehicle.**
- **Never get under the vehicle while it is supported only by the jack. Always use safety stands when you have to get under the vehicle.**

- **Place wheel chocks at both front and back of the wheels on the ground.**



CAUTION:

There is canister just behind Garage jack point rear. Jack up be carefully.

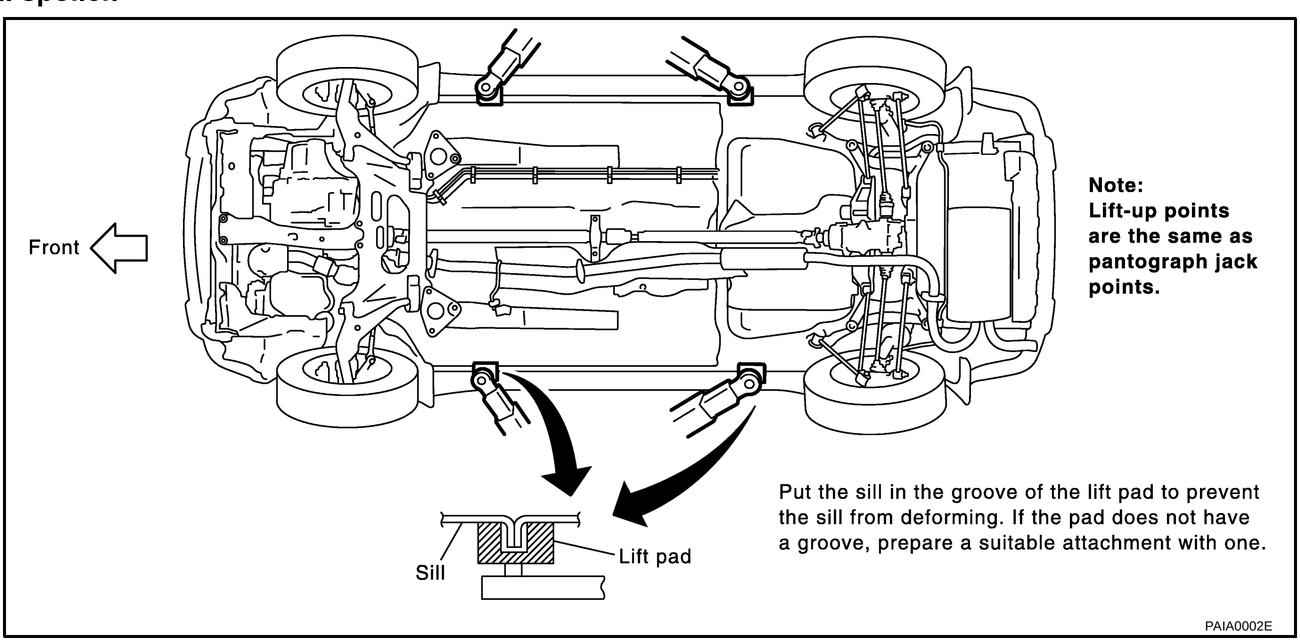
2-Pole Lift

AAS000O5

WARNING:

When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.

When setting the lift arm, do not allow the arm to contact the brake tubes, brake cable, fuel lines and sill spoiler.



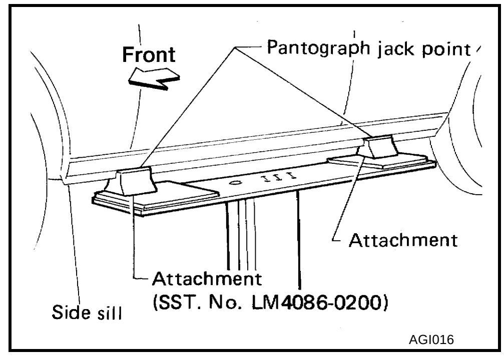
Board- On Lift

AAS000O6

CAUTION:

Make sure vehicle is empty when lifting.

- **The board-on lift attachment (LM4086-0200) set at front end of vehicle should be set on the front of the sill under the front door opening.**
- **Position attachments at front and rear ends of board-on lift.**



TOW TRUCK TOWING

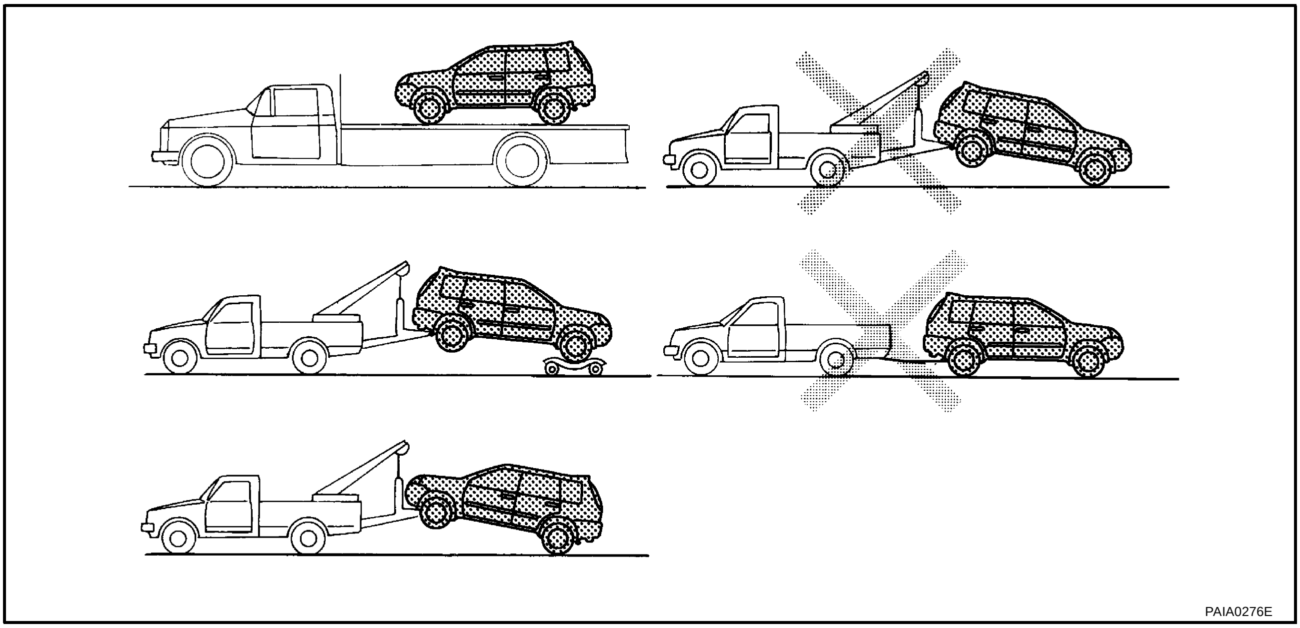
PFP:00000

Tow Truck Towing

AAS000O7

CAUTION:

- **All applicable state or Provincial (in Canada) laws and local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, make sure that the transmission, steering system and power train are in good order. If any unit is damaged, dollies must be used.**
- **Never tow an automatic transmission model from the rear (that is backward) with four wheels on the ground. This may cause serious and expensive damage to the transmission.**



PAIA0276E

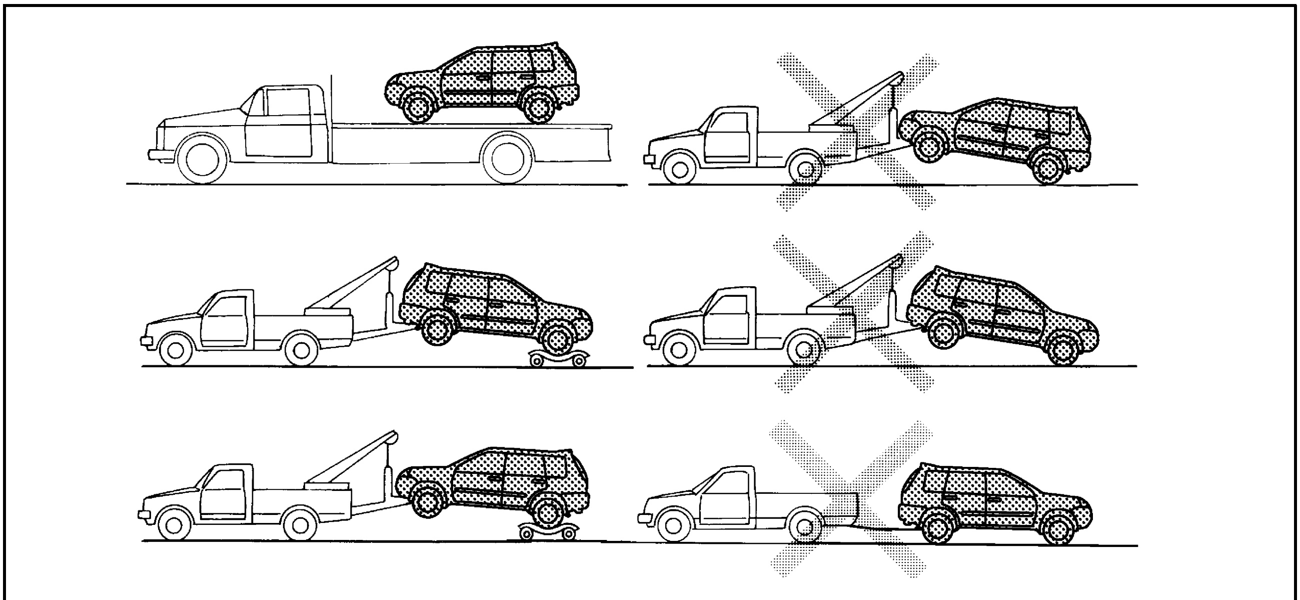
2WD MODELS

NISSAN recommends that vehicle be towed with the driving (front) wheels off the ground or that a dolly be used as illustrated.

CAUTION:

- **Never tow automatic transmission models with the front wheels on the ground or four wheels on the ground (forward or backward) as this may cause serious and expensive damage to the transmission.**
  If it is necessary to tow the vehicle with the rear wheels raised, always use towing dollies under the front wheels.
- **When towing automatic transmission models with the front wheels on towing dollies:**
  - **Turn the ignition key to the OFF position, and secure the steering wheel in a straight ahead position with a rope or similar device.**
    Never secure the steering wheel by turning the ignition key to the LOCK position. This may damage the steering lock mechanism.
  - **Move the selector lever to the N (Neutral) position.**

- **When towing two wheel drive automatic transmission model with the rear wheels on the ground (if you do not use towing dollies): Always release the parking brake.**



PAIA0275E

AWD MODELS

NISSAN recommends that a dolly be used as illustrated when towing AWD models.

CAUTION:

Never tow automatic transmission AWD models with any of the wheels on the ground as this may cause serious and expensive damage to the drive train.

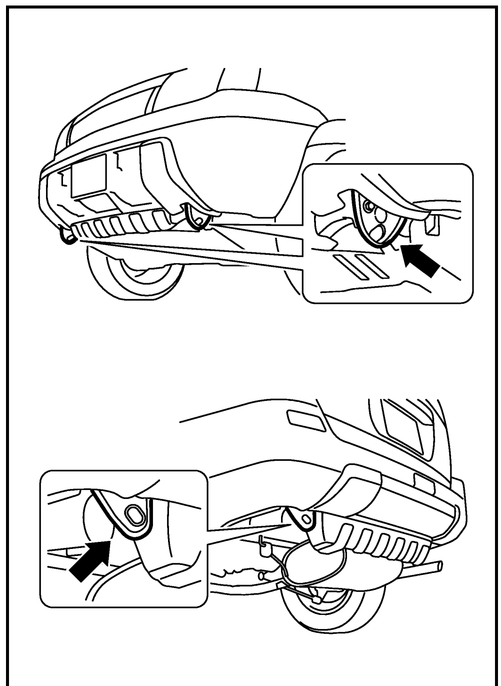
Vehicle Recovery (Freeing a Stuck Vehicle)

AAS000O8

- Use the towing hooks only, not other parts of the vehicle. Otherwise, the vehicle body will be damaged.
- Use the towing hook only to free a vehicle stuck in sand, snow, mud, etc. Never tow the vehicle for a long distance using only the towing hook.
- The towing hook is under tremendous force when used to free a stuck vehicle. Always pull the cable straight out from the front or rear of the vehicle. Never pull on the hook at an angle.
- Stand clear of a stuck vehicle.

WARNING:

- **Do not spin the tires at high speed. This could cause them to explode and result in serious injury. Parts of the vehicle could also overheat and be damaged.**



PAIA0014E

TIGHTENING TORQUE OF STANDARD BOLTS

PFP:00000

Description

AAS000ON

This vehicle has both new standard based on ISO* and previous standard bolts/nuts. There are some differences between these two types of bolts/nuts; shape of the head, grade of strength, hexagonal width across flats and the standard tightening torque.

- For guidance in discriminating, refer to GI-45, "Tightening Torque Table (New Standard Included)" .
- The new standard machine screws and tapping screws have a head of ISO standard torx recess.
- If the tightening torque is not described in the description or figure, refer to GI-45, "Tightening Torque Table (New Standard Included)" .

*ISO: International Organization for Standardization

Tightening Torque Table (New Standard Included)

AAS000OP

CAUTION:

- **The special parts are excluded.**
- **The bolts/nuts in these tables have a strength (discrimination) number/symbol assigned to the head or the like. As to the relation between the strength grade in these tables and the strength (discrimination) number/symbol, refer to “DISCRIMINATION OF BOLTS AND NUTS”.**

PREVIOUS STANDARD

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque (Without lubricant)							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	12	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	14	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	17	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	19	1.5	80	8.2	59	—	100	10	74	—
7T	M6	6.0	10	1.0	9	0.92	7	80	11	1.1	8	97
	M8	8.0	12	1.25	22	2.2	16	—	28	2.9	21	—
				1.0	22	2.2	16	—	28	2.9	21	—
	M10	10.0	14	1.5	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	55	5.6	41	—
	M12	12.0	17	1.75	80	8.2	59	—	100	10	74	—
				1.25	80	8.2	59	—	100	10	74	—
	M14	14.0	19	1.5	130	13	96	—	170	17	125	—
9T	M6	6.0	10	1.0	11	1.1	8	—	13.5	1.4	10	—
	M8	8.0	12	1.25	28	2.9	21	—	35	3.6	26	—
				1.0	28	2.9	21	—	35	3.6	26	—
	M10	10.0	14	1.5	55	5.6	41	—	80	8.2	59	—
				1.25	55	5.6	41	—	80	8.2	59	—
	M12	12.0	17	1.75	100	10	74	—	130	13	96	—
				1.25	100	10	74	—	130	13	96	—
	M14	14.0	19	1.5	170	17	125	—	210	21	155	—

CAUTION:

The parts with aluminum or the cast iron washer surface/screw surface are excluded.

TIGHTENING TORQUE OF STANDARD BOLTS

NEW STANDARD BASED ON ISO

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4.8 (Without lubricant)	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	13	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	16	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	18	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	21	1.5	80	8.2	59	—	100	10	74	—
4.8 (With lubricant)	M6	6.0	10	1.0	4	0.41	3	35	5.5	0.56	4	49
	M8	8.0	13	1.25	11	1.1	8	—	13.5	1.4	10	—
				1.0	11	1.1	8	—	13.5	1.4	10	—
	M10	10.0	16	1.5	22	2.2	16	—	28	2.9	21	—
				1.25	22	2.2	16	—	28	2.9	21	—
	M12	12.0	18	1.75	35	3.6	26	—	45	4.6	33	—
				1.25	35	3.6	26	—	45	4.6	33	—
	M14	14.0	21	1.5	65	6.6	48	—	80	8.2	59	—
8.8 (With lubricant)	M6	6.0	10	1.0	8	0.82	6	71	10	1.0	7	89
	M8	8.0	13	1.25	21	2.1	15	—	25	2.6	18	—
				1.0	21	2.1	15	—	25	2.6	18	—
	M10	10.0	16	1.5	40	4.1	30	—	50	5.1	37	—
				1.25	40	4.1	30	—	50	5.1	37	—
	M12	12.0	18	1.75	70	7.1	52	—	85	8.7	63	—
				1.25	70	7.1	52	—	85	8.7	63	—
	M14	14.0	21	1.5	120	12	89	—	140	14	103	—
10.9 (With lubricant)	M6	6.0	10	1.0	10	1.0	7	89	12	1.2	9	106
	M8	8.0	13	1.25	27	2.8	20	—	32	3.3	24	—
				1.0	27	2.8	20	—	32	3.3	24	—
	M10	10.0	16	1.5	55	5.6	41	—	62	6.3	46	—
				1.25	55	5.6	41	—	62	6.3	46	—
	M12	12.0	18	1.75	95	9.7	70	—	105	11	77	—
				1.25	95	9.7	70	—	105	11	77	—
	M14	14.0	21	1.5	160	16	118	—	180	18	133	—

CAUTION:

1. **Use tightening torque with lubricant for the new standard bolts/nuts in principle. Friction coefficient stabilizer is applied to the new standard bolts/nuts.**
2. **However, use tightening torque without lubricant for the following cases. Friction coefficient stabilizer is not applied to the following bolts/nuts.**

- **Grade 4.8, M6 size bolt, Conical spring washer installed**
- **Paint removing nut (Size M6 and M8) for fixing with weld bolt**

DISCRIMINATION OF BOLTS AND NUTS

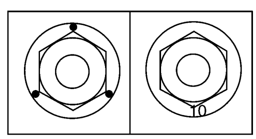
BOLTS

	Grade (Strength)	Discrimination	
Previous standard	4T (392N/mm²)	4	(No number/ symbol)
	7T (686N/mm²)	7	
	9T (883N/mm²)	9	
New Standard	4.8 (420N/mm²)	4.8	(No number/ symbol)
	8.8 (800N/mm²)	8.8	
	10.9 (1040N/mm²)	10.9	

NUTS

	Grade (Proof load stress)	Discrimination		
Previous standard	7N (686N/mm²)	(No number/ symbol)		
	9N (883N/mm²)	·9		
New Standard	8 (800N/mm²)	8		(No number/ symbol)
	10 (1040N/mm²)	10		

NOTICE:
- A number is assigned on the side of the nuts in some cases.
- A number or symbol is assigned on the upper surface of the flange for the nut with flange.



MACHINE SCREWS AND TAPPING SCREWS

Shape of the head :

Cross recess for the previous standard

Torx recess for the new standard

Screw size	Screw diameter	Torx size
M4	4.0	T20
M5	5.0	T20
M6	6.0	T30

NOTICE:
Use torx size T20 (united with M4 screw) for M5 screw although ISO standard specifies T25.

SAIA0453E

RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS

PFP:00000

Recommended Chemical Products and Sealants

AAS000OA

Refer to the following chart for help in selecting the appropriate chemical product or sealant.

	Product Description	Purpose	Nissan North America Part No. (USA)	Nissan Canada Part No. (Canada)	Aftermarket Cross-reference Part Nos.
1	Rear View Mirror Adhesive	Used to permanently remount rear view mirrors to windows.	999MP-AM000P	99998-50505	Permatex 81844
2	Anaerobic Liquid Gasket	For metal-to-metal flange sealing. Can fill a 0.38 mm (0.015 inch) gap and provide instant sealing for most powertrain applications.	999MP-AM001P	99998-50503	Permatex 51813 and 51817
3	High Performance Thread Sealant	Provides instant sealing on any threaded straight or parallel threaded fitting. (Thread sealant only, no locking ability.) ● Do not use on plastic.	999MP-AM002P	999MP-AM002P	Permatex 56521
4	Silicone RTV	Gasket Maker	999MP-AM003P (Ultra Grey)	99998-50506 (Ultra Grey)	Permatex Ultra Grey 82194; Three Bond 1207,1215, 1216, 1217F, 1217G and 1217H Nissan RTV Part No. 999MP-A7007
		Gasket Maker for Maxima/ Quest 5-speed automatic transmission (RE5F22A)	–	–	Three Bond 1281B or exact equivalent in its quality
5	High Temperature, High Strength Thread Locking Sealant (Red)	Threadlocker	999MP-AM004P	999MP-AM004P	Permatex 27200; Three Bond 1360, 1360N, 1305 N&P, 1307N, 1335, 1335B, 1363B, 1377C, 1386B, D&E and 1388
6	Medium Strength Thread Locking Sealant (Blue)	Threadlocker (service tool removable)	999MP-AM005P	999MP-AM005P	Permatex 24200, 24206, 24240, 24283 and 09178; Three Bond 1322, 1322N, 1324 D&N, 1333D, 1361C, 1364D, 1370C and 1374

IDENTIFICATION INFORMATION

PFP:00010

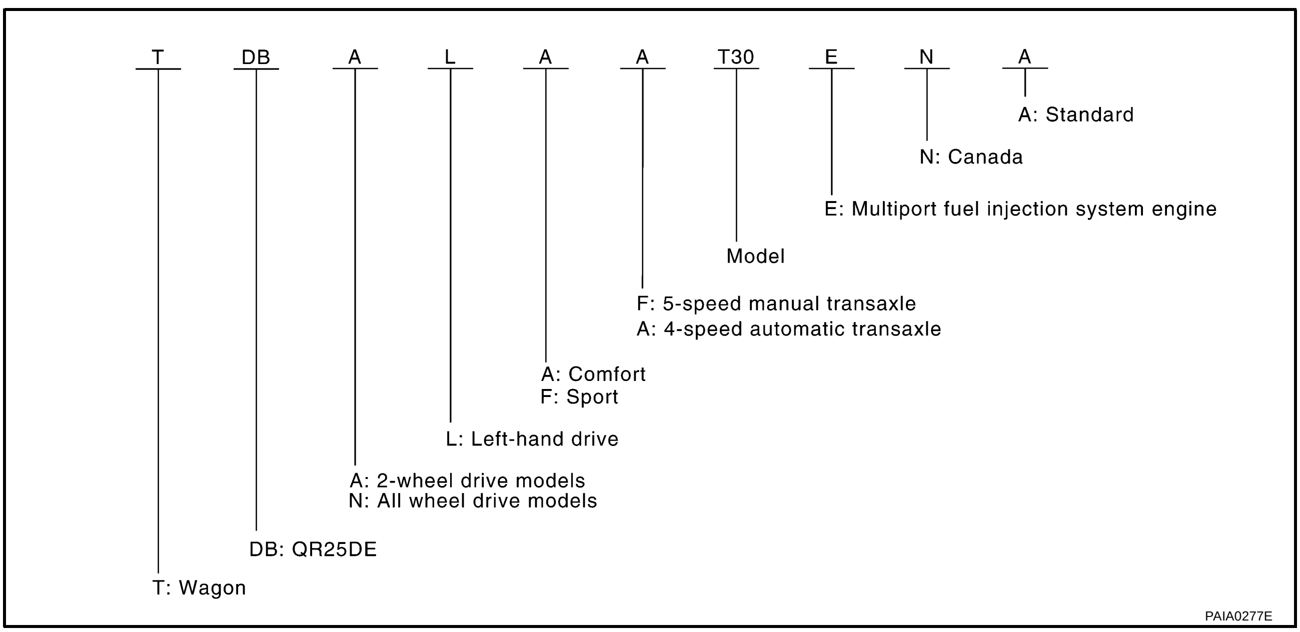
Model Variation

AAS000OB

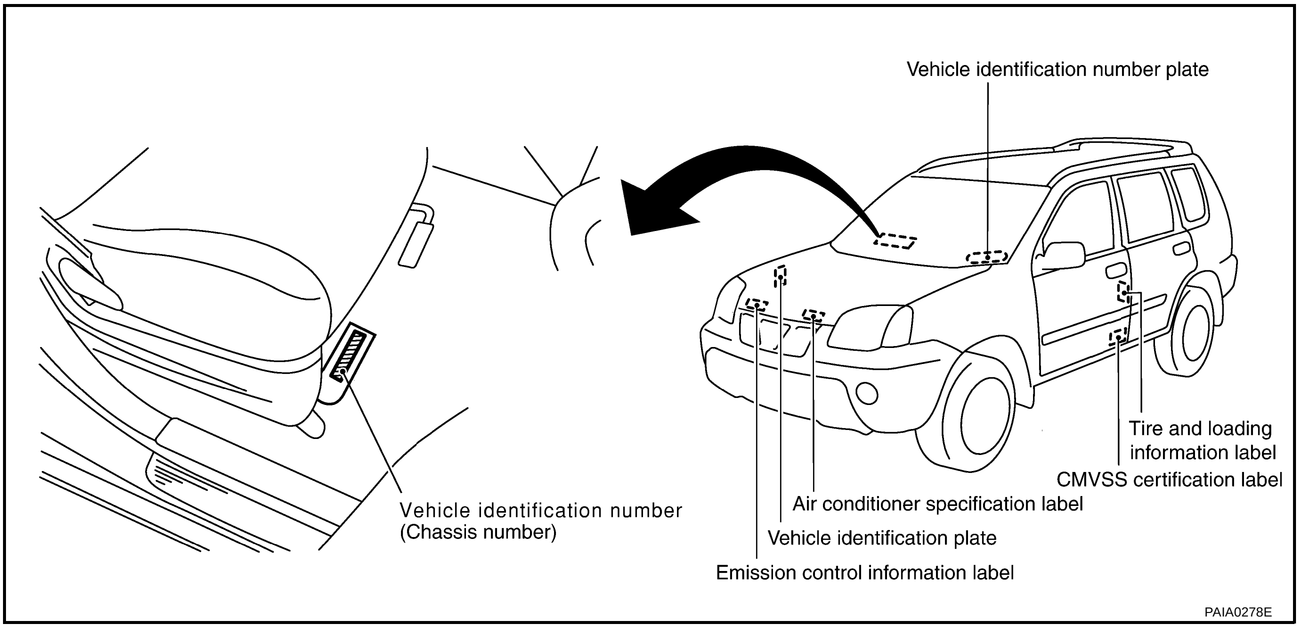
Body	Engine	Axle	Transaxle	Model	Destination
Wagon	QR25DE	2WD*1	RE4F04B (4AT)	TDBALAA-ENA	CANADA
				TDBALFA-ENA	
		AWD*2	RE4F04B (4AT)	TDBNLAA-ENA	
				TDBNLFA-ENA	
			RS5F51A (5MT)	TDBNLAF-ENA	
				TDBNLFF-ENA	

*1: 2WD model stands for FWD model.
*2: AWD model stands for all wheel drive model.

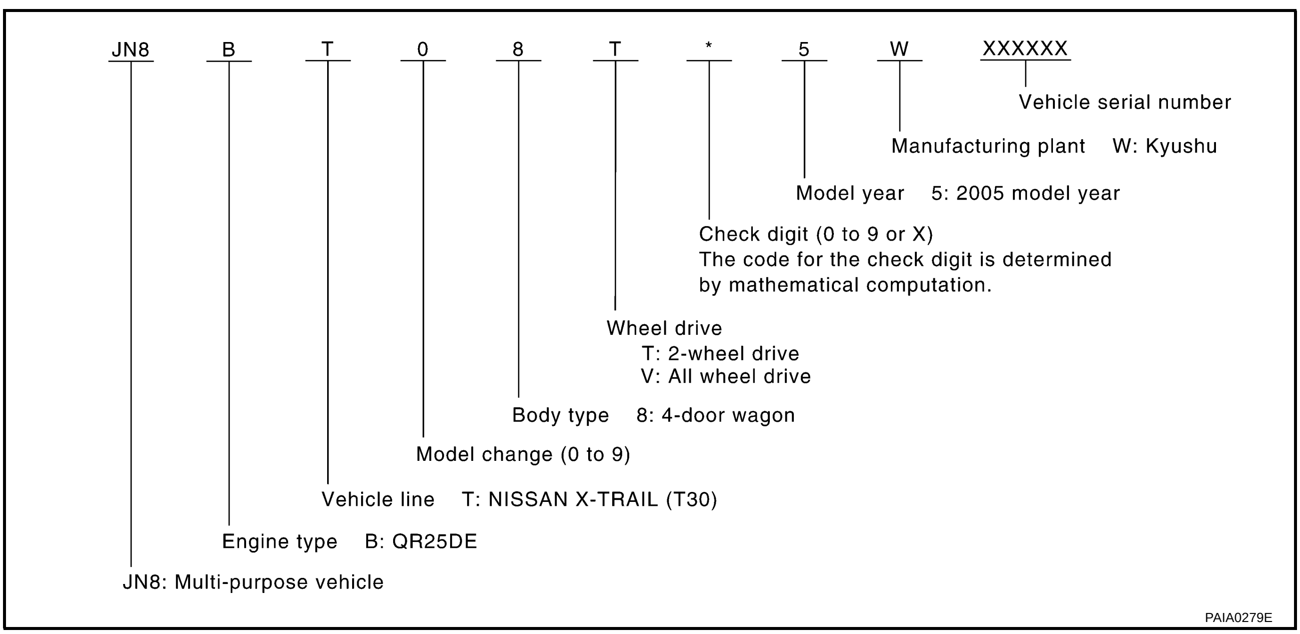
Prefix and suffix designations:



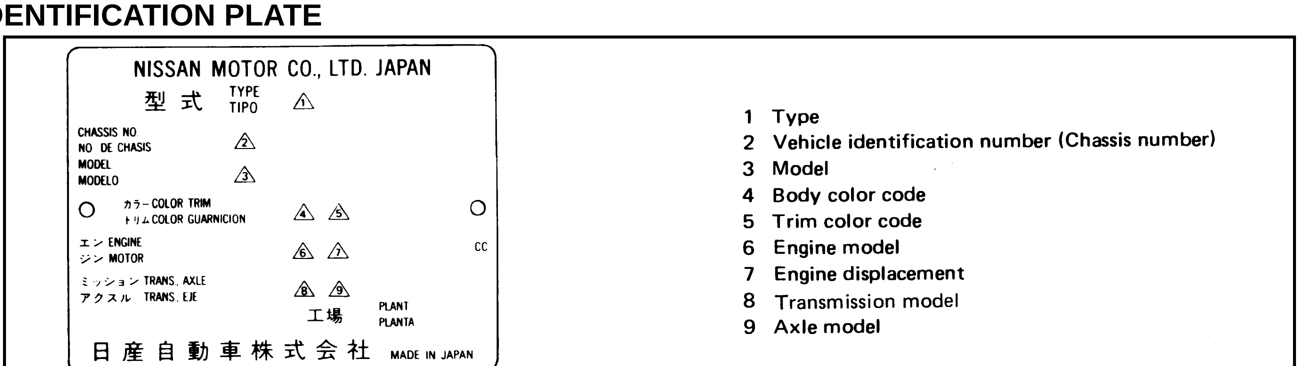
IDENTIFICATION NUMBER



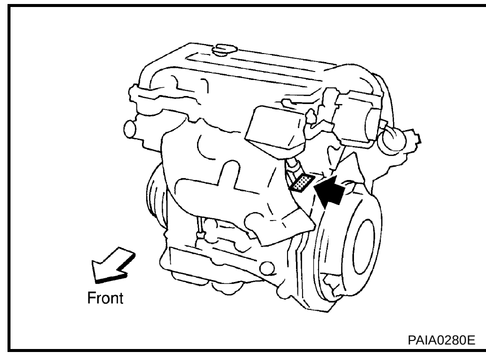
VEHICLE Identification Number ARRANGEMENT



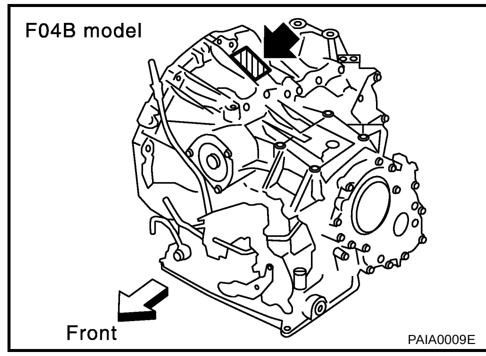
IDENTIFICATION PLATE



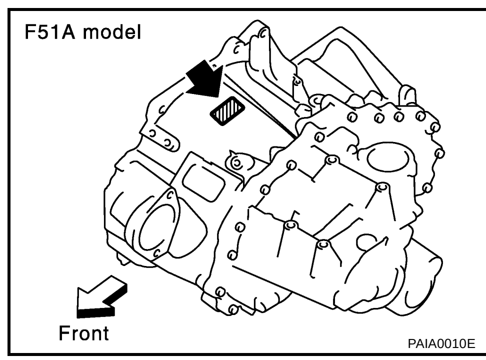
ENGINE SERIAL NUMBER



AUTOMATIC TRANSAXLE NUMBER



MANUAL TRANSAXLE NUMBER



Dimensions

AAS000OC

Unit: mm (in)

Overall length		4,455 (175.4)
Overall width		1,765 (69.5)
Overall height	with roof rack rail	1,675 (65.9)
	with rear spoiler	1,750 (68.9)
Front tread		1,530 (60.2)
Rear tread		1,530 (60.2)
Wheelbase		2,625 (103.3)

Wheels & Tires

AAS000OD

	Conventional	Spare
Road wheel/offset mm (in)	16 X 6.5JJ Steel/40 (1.57) 16 X 6.5JJ Aluminum/40 (1.57)	Conventional
Tire size	215/65 R16	Conventional

TERMINOLOGY

PFP:00011

SAE J1930 Terminology List

AAS000OE

All emission related terms used in this publication in accordance with SAE J1930 are listed. Accordingly, new terms, new acronyms/abbreviations and old terms are listed in the following chart.

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Air cleaner	ACL	Air cleaner
Barometric pressure	BARO	***
Barometric pressure sensor-BCDD	BAROS-BCDD	BCDD
Camshaft position	CMP	***
Camshaft position sensor	CMPS	Crank angle sensor
Canister	***	Canister
Carburetor	CARB	Carburetor
Charge air cooler	CAC	Intercooler
Closed loop	CL	Closed loop
Closed throttle position switch	CTP switch	Idle switch
Clutch pedal position switch	CPP switch	Clutch switch
Continuous fuel injection system	CFI system	***
Continuous trap oxidizer system	CTOX system	***
Crankshaft position	CKP	***
Crankshaft position sensor	CKPS	***
Data link connector	DLC	***
Data link connector for CONSULT-II	DLC for CONSULT-II	Diagnostic connector for CONSULT-II
Diagnostic test mode	DTM	Diagnostic mode
Diagnostic test mode selector	DTM selector	Diagnostic mode selector
Diagnostic test mode I	DTM I	Mode I
Diagnostic test mode II	DTM II	Mode II
Diagnostic trouble code	DTC	Malfunction code
Direct fuel injection system	DFI system	***
Distributor ignition system	DI system	Ignition timing control
Early fuel evaporation-mixture heater	EFE-mixture heater	Mixture heater
Early fuel evaporation system	EFE system	Mixture heater control
Electrically erasable programmable read only memory	EEPROM	***
Electronic ignition system	EI system	Ignition timing control
Engine control	EC	***
Engine control module	ECM	ECCS control unit
Engine coolant temperature	ECT	Engine temperature
Engine coolant temperature sensor	ECTS	Engine temperature sensor
Engine modification	EM	***
Engine speed	RPM	Engine speed
Erasable programmable read only memory	EPROM	***
Evaporative emission canister	EVAP canister	Canister
Evaporative emission system	EVAP system	Canister control solenoid valve
Exhaust gas recirculation valve	EGR valve	EGR valve

TERMINOLOGY

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Exhaust gas recirculation control-BPT valve	EGRC-BPT valve	BPT valve
Exhaust gas recirculation control-solenoid valve	EGRC-solenoid valve	EGR control solenoid valve
Exhaust gas recirculation temperature sensor	EGRT sensor	Exhaust gas temperature sensor
EGR temperature sensor		
Flash electrically erasable programmable read only memory	FEEPROM	***
Flash erasable programmable read only memory	FEPROM	***
Flexible fuel sensor	FFS	***
Flexible fuel system	FF system	***
Fuel pressure regulator	***	Pressure regulator
Fuel pressure regulator control solenoid valve	***	PRVR control solenoid valve
Fuel trim	FT	***
Heated Oxygen sensor	HO2S	Exhaust gas sensor
Idle air control system	IAC system	Idle speed control
Idle air control valve-air regulator	IACV-air regulator	Air regulator
Idle air control valve-auxiliary air control valve	IACV-AAC valve	Auxiliary air control (AAC) valve
Idle air control valve-FICD solenoid valve	IACV-FICD solenoid valve	FICD solenoid valve
Idle air control valve-idle up control solenoid valve	IACV-idle up control solenoid valve	Idle up control solenoid valve
Idle speed control-FI pot	ISC-FI pot	FI pot
Idle speed control system	ISC system	***
Ignition control	IC	***
Ignition control module	ICM	***
Indirect fuel injection system	IFI system	***
Intake air	IA	Air
Intake air temperature sensor	IAT sensor	Air temperature sensor
Knock	***	Detonation
Knock sensor	KS	Detonation sensor
Malfunction indicator lamp	MIL	Check engine light
Manifold absolute pressure	MAP	***
Manifold absolute pressure sensor	MAPS	***
Manifold differential pressure	MDP	***
Manifold differential pressure sensor	MDPS	***
Manifold surface temperature	MST	***
Manifold surface temperature sensor	MSTS	***
Manifold vacuum zone	MVZ	***
Manifold vacuum zone sensor	MVZS	***
Mass air flow sensor	MAFS	Air flow meter
Mixture control solenoid valve	MC solenoid valve	Air-fuel ratio control solenoid valve
Multiport fuel injection System	MFI system	Fuel injection control

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Nonvolatile random access memory	NVRAM	***
On board diagnostic system	OBD system	Self-diagnosis
Open loop	OL	Open loop
Oxidation catalyst	OC	Catalyst
Oxidation catalytic converter system	OC system	***
Oxygen sensor	O2S	Exhaust gas sensor
Park position switch	***	Park switch
Park/neutral position switch	PNP switch	Park/neutral switch Inhibitor switch Neutral position switch
Periodic trap oxidizer system	PTOX system	***
Positive crankcase ventilation	PCV	Positive crankcase ventilation
Positive crankcase ventilation valve	PCV valve	PCV valve
Powertrain control module	PCM	***
Programmable read only memory	PROM	***
Pulsed secondary air injection control solenoid valve	PAIRC solenoid valve	AIV control solenoid valve
Pulsed secondary air injection system	PAIR system	Air induction valve (AIV) control
Pulsed secondary air injection valve	PAIR valve	Air induction valve
Random access memory	RAM	***
Read only memory	ROM	***
Scan tool	ST	***
Secondary air injection pump	AIR pump	***
Secondary air injection system	AIR system	***
Sequential multiport fuel injection system	SFI system	Sequential fuel injection
Service reminder indicator	SRI	***
Simultaneous multiport fuel injection system	***	Simultaneous fuel injection
Smoke puff limiter system	SPL system	***
Supercharger	SC	***
Supercharger bypass	SCB	***
System readiness test	SRT	***
Thermal vacuum valve	TVV	Thermal vacuum valve
Three way catalyst	TWC	Catalyst
Three way catalytic converter system	TWC system	***
Three way + oxidation catalyst	TWC + OC	Catalyst
Three way + oxidation catalytic converter system	TWC + OC system	***
Throttle body	TB	Throttle chamber SPI body
Throttle body fuel injection system	TBI system	Fuel injection control
Throttle position	TP	Throttle position
Throttle position sensor	TPS	Throttle sensor
Throttle position switch	TP switch	Throttle switch
Torque converter clutch solenoid valve	TCC solenoid valve	Lock-up cancel solenoid Lock-up solenoid

TERMINOLOGY

NEW TERM	NEW ACRONYM / ABBREVIATION	OLD TERM
Transmission control module	TCM	A/T control unit
Turbocharger	TC	Turbocharger
Vehicle speed sensor	VSS	Vehicle speed sensor
Volume air flow sensor	VAFS	Air flow meter
Warm up oxidation catalyst	WU-OC	Catalyst
Warm up oxidation catalytic converter system	WU-OC system	***
Warm up three way catalyst	WU-TWC	Catalyst
Warm up three way catalytic converter system	WU-TWC system	***
Wide open throttle position switch	WOTP switch	Full switch

***: Not applicable

SECTION GW

GLASSES, WINDOW SYSTEM & MIRRORS

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

AIS005Q1

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Handling for Adhesive and Primer

AIS0061X

- Do not use an adhesive which is past its usable date. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.
- Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.
- Open the seal of the primer and adhesive just before application. Discard the remainder.
- Before application, be sure to shake the primer container to stir the contents. If any floating material is found, do not use it.
- If any primer or adhesive contacts the skin, wipe it off with gasoline or equivalent and wash the skin with soap.
- When using primer and adhesive, always observe the precautions in the instruction manual.

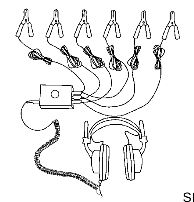
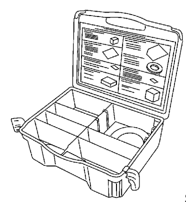
PREPARATION

PFP:00002

Special Service Tools

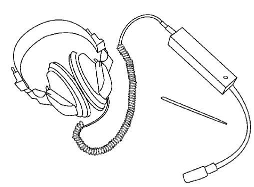
AIS0061Z

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
(J-39570) Chassis ear	 SIIA0993E	Locating the noise
(J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of noise

Commercial Service Tools

AIS005Q3

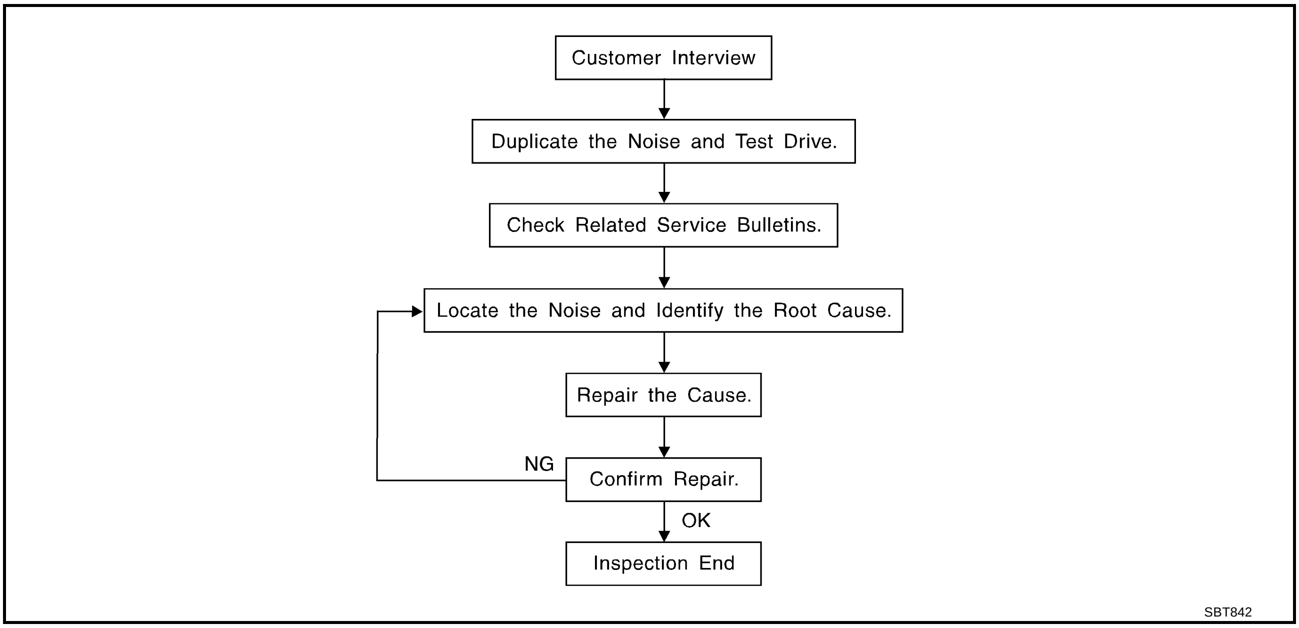
Tool name		Description
Engine ear	 SIIA0995E	Locating the noise

SQUEAK AND RATTLE TROUBLE DIAGNOSES

PFP:00000

Work Flow

AIS00611



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to GW-9, "Diagnostic Worksheet" . This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces=higher pitch noise/softer surfaces=lower pitch noises/edge to surface=chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T models, drive position on A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.

If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to GW-7, "Generic Squeak and Rattle Troubleshooting" .

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
  - separate components by repositioning or loosening and retightening the component, if possible.
  - insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:

Do not use excessive force as many components are constructed of plastic and may be damaged.

NOTE:

Always check with the Parts Department for the latest parts information.

The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.

URETHANE PADS [1.5 mm (0.059 in) thick]

Insulates connectors, harness, etc.

76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)

INSULATOR (Foam blocks)

Insulates components from contact. Can be used to fill space behind a panel.

73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)

INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTHTAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit. Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

AIS00612

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

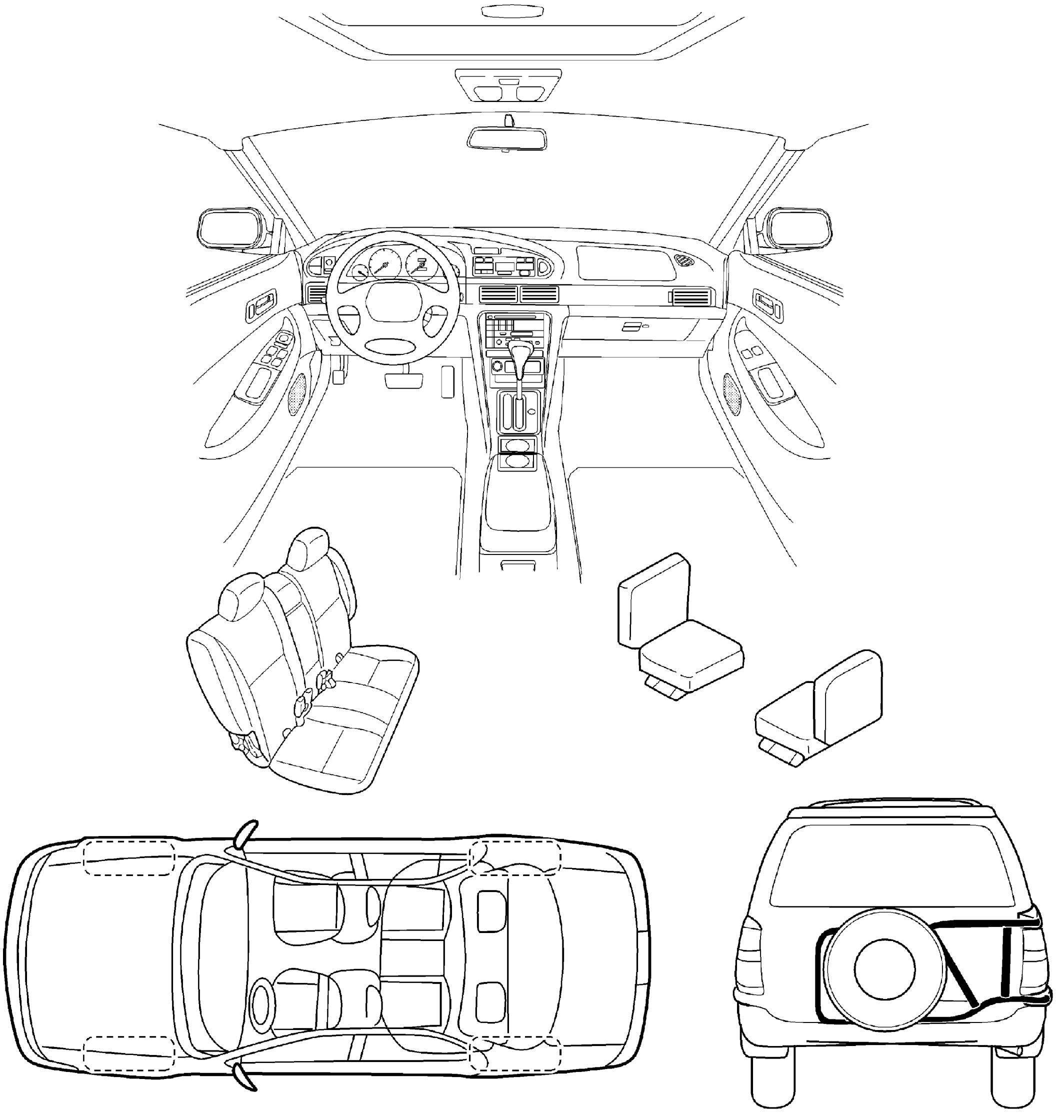
Diagnostic Worksheet

AIS00613

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB0723E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

____

____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

❑ anytime
❑ 1st time in the morning
❑ only when it is cold outside
❑ only when it is hot outside
❑ after sitting out in the sun
❑ when it is raining or wet
❑ dry or dusty conditions
❑ other: ________________________________

III. WHEN DRIVING:

❑ through driveways
❑ over rough roads
❑ over speed bumps
❑ only at about ____ mph
❑ on acceleration
❑ coming to a stop
❑ on turns : left, right or either (circle)
❑ with passengers or cargo
❑ other: ______________________
❑ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

❑ squeak (like tennis shoes on a clean floor)
❑ creak (like walking on an old wooden floor)
❑ rattle (like shaking a baby rattle)
❑ knock (like a knock on a door)
❑ tick (like a clock second hand)
❑ thump (heavy, muffled knock noise)
❑ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

____

____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❑	❑	______
- Noise verified on test drive	❑	❑	
- Noise source located and repaired	❑	❑	______
- Follow up test drive performed to confirm repair	❑	❑	______

VIN: ____________________ Customer Name: ______________________________

W.O. #: __________________ Date: __________

This form must be attached to Work Order

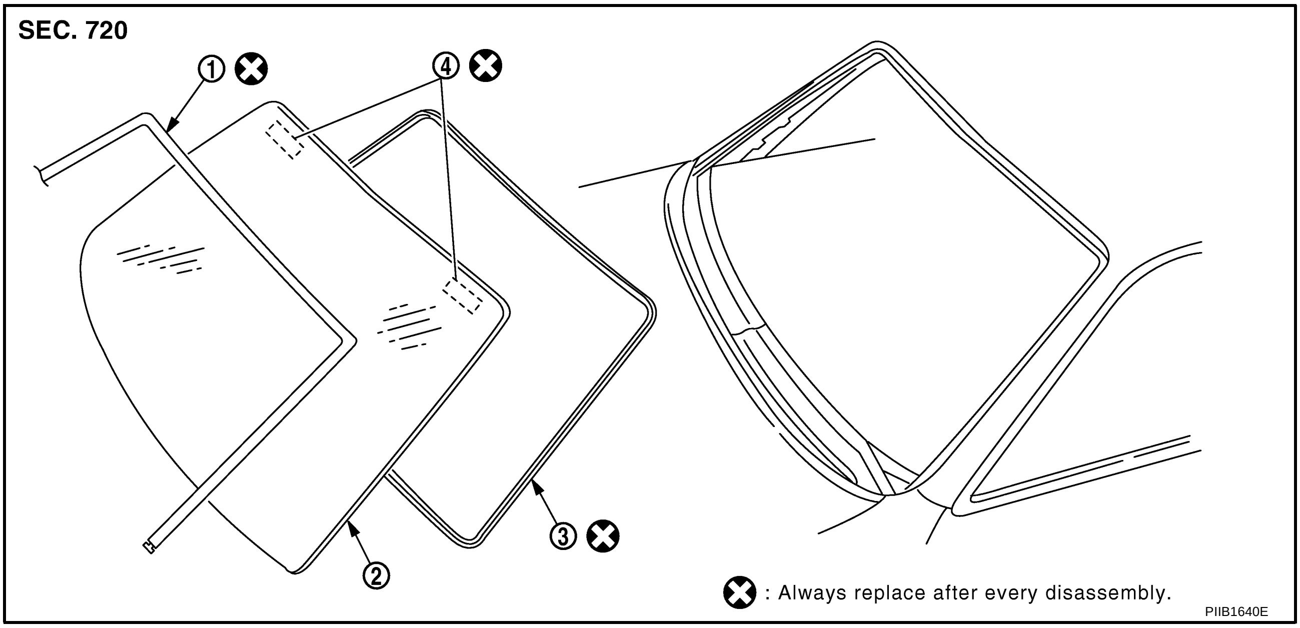
SBT844

WINDSHIELD GLASS AND MOLDING

PFP:72700

Removal and Installation

AIS005Q7



1. Windshield molding
2. Windshield glass
3. Open cell foam dam
4. Spacer

REMOVAL

1. Remove the front pillar garnish and the headlining. Refer to EI-36, "BODY SIDE TRIM" and EI-40, "HEADLINING" .
2. Partially remove the roof rail. Refer to EI-28, "ROOF RAIL" .
3. Remove the cowl top cover. Refer to EI-19, "COWL TOP" .
4. Apply a protective tape around the windshield glass to protect the painted surface from damage.
5. Cut the windshield molding with a cutting knife.

After removing moldings using pliers, remove glass using piano wire or power cutting tool and an inflatable pump bag.

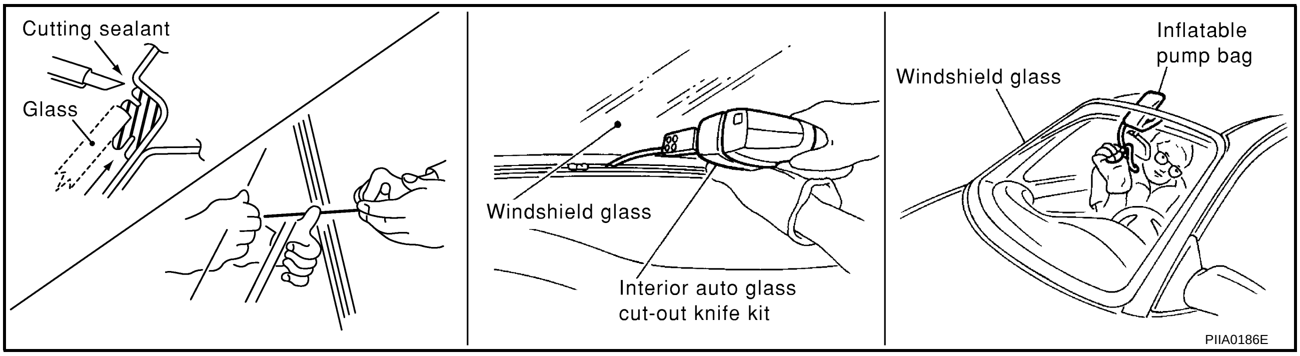
- If a windshield glass is to be reused, mark the body and the glass with mating marks.

WARNING:

When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:

- **When a windshield glass is to be reused, do not use a cutting knife or power cutting tool.**
- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**



INSTALLATION

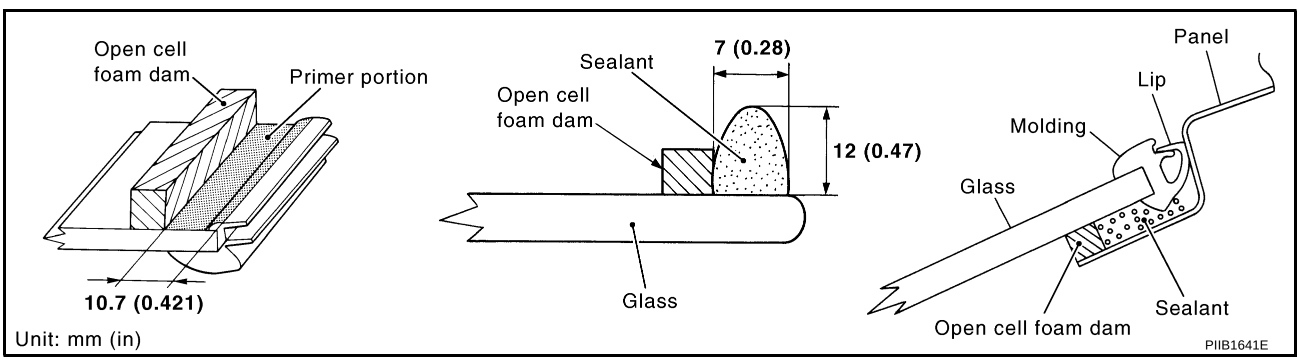
- Use a genuine Nissan Urethane Adhesive Kit or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger compartment air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the windshield in case of an accident.**

CAUTION:

- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**



Repairing Water Leaks

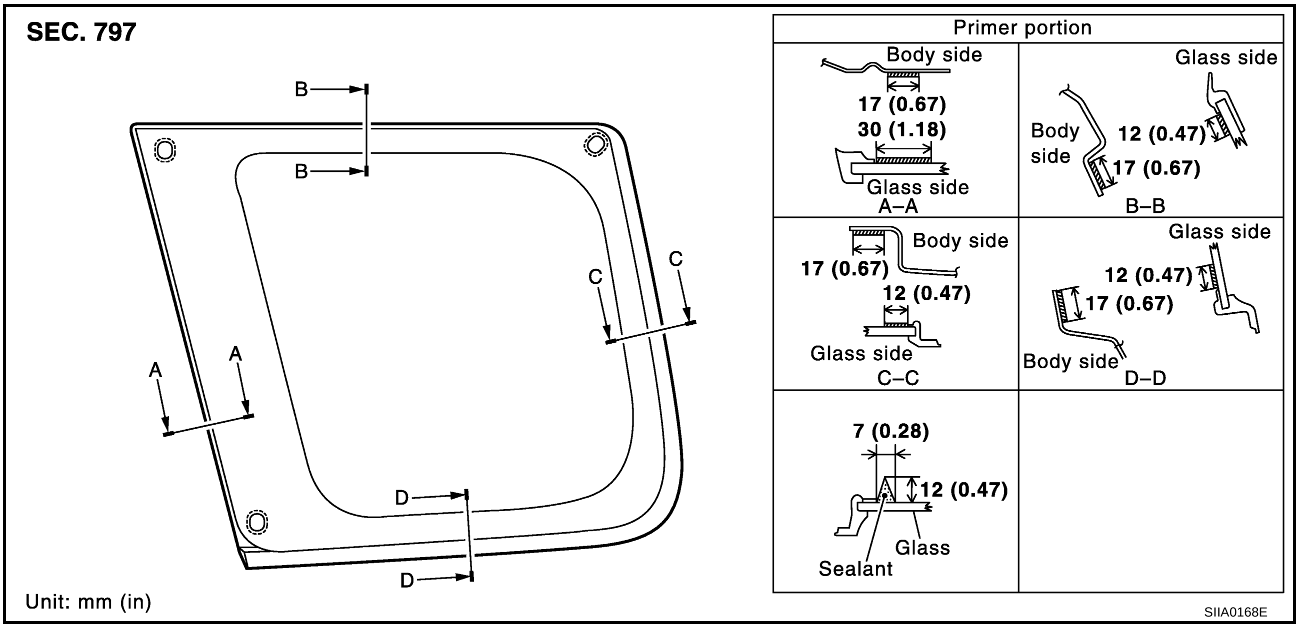
Leaks can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the windshield area while pushing glass outward.
To stop the leak, apply primer (if necessary) and then urethane adhesive to the leak point.

SIDE WINDOW GLASS

PFP:83300

Removal and Installation

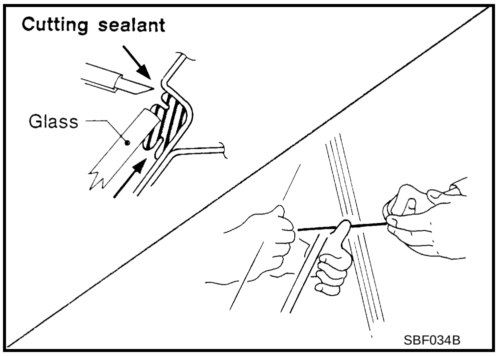
AIS005Q8



SIIA0168E

REMOVAL

1. Remove luggage side lower finisher and rear pillar finisher. Refer to EI-36, "BODY SIDE TRIM" .
2. Apply protective tape on body panels around side window glass to protect painted surfaces from damage.
   - Remove glass using piano wire or power cutting tool and an inflatable pump bag.
   - If a side window glass is to be reused, mark the body and the glass with mating marks.



SBF034B

WARNING:

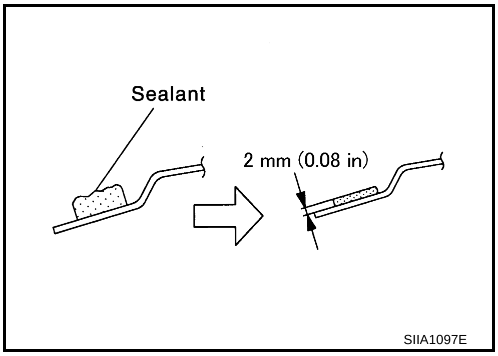
When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

CAUTION:

- **Be careful not to scratch the glass when removing.**
- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**

INSTALLATION

- With a knife, scrape off remaining adhesive left around on the side of vehicle body to as thin and flat as 2 mm (0.08 in).



SIIA1097E

- Use a genuine Nissan Urethane Adhesive Kit or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger compartment air pressure when a door is closed.
- The molding must be installed securely so that it is in position and leaves no gap.
- Inform the customer that the vehicle should remain stationary unit the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the Kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. if affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the side window in case of an accident.**

CAUTION:

- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**

REPAIRING WATER LEAKS

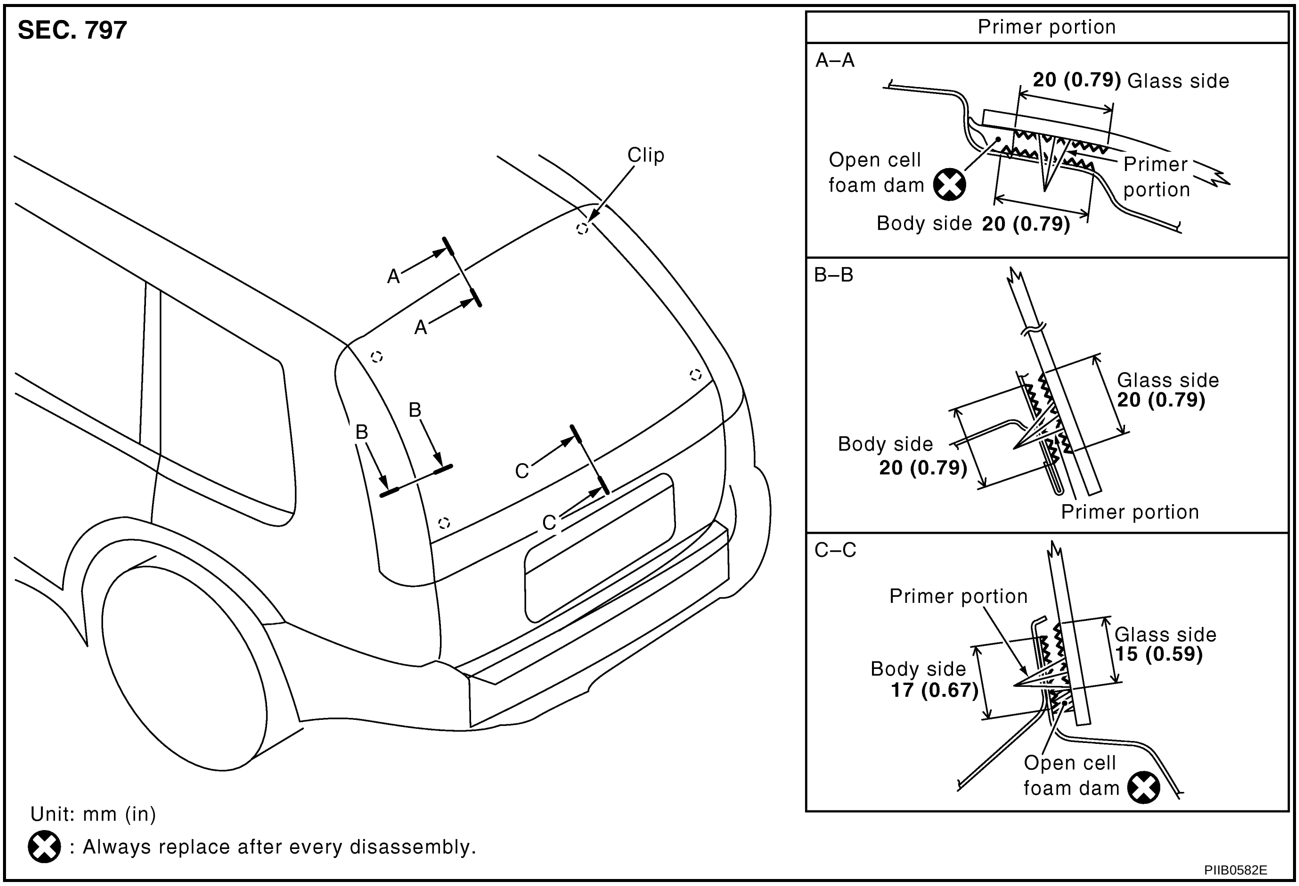
Leaks can be repaired without removing and reinstalling glass.
If water is leaking between the urethane adhesive material and body or glass, determine the extent of leakage. This can be done by applying water to the side window area while pushing glass outward.
To stop the leak, apply primer (if necessary) and then urethane adhesive to the leak point.

BACK DOOR WINDOW GLASS

PFP:90300

Removal and Installation

AIS005Q9



REMOVAL

1. Remove rear wiper arm. Refer to WW-14, "Removal and Installation of Rear Wiper Arms, Adjustment for Wiper Arms Stop Location" .
2. Remove rear washer nozzle. Refer to WW-16, "Removal and Installation of Rear Washer Nozzle" .
3. Remove rear window defogger connectors.
4. Remove high-mounted stop lamp. Refer to LT-27, "Removal and Installation of High-Mounted Stop Lamp"
5. Apply a protective tape around the back door window glass to prevent the painted surface from being damaged.
6. Cut adhesive using piano wire or power cutting tool and an inflatable pump bag.

- If a back door window glass is to be reused, mark the body and the glass with matching marks.

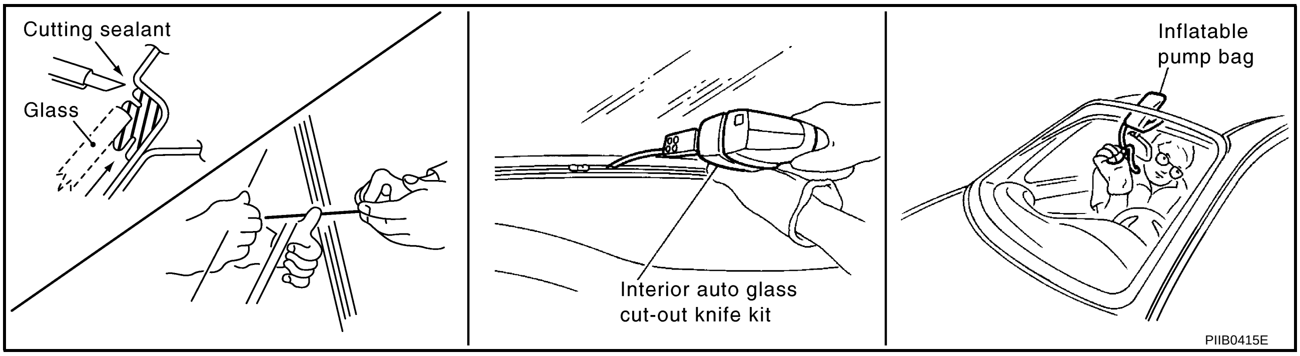
WARNING:

When cutting the glass from the vehicle, always wear safety glasses and heavy gloves to help prevent glass splinters from entering your eyes or cutting your hands.

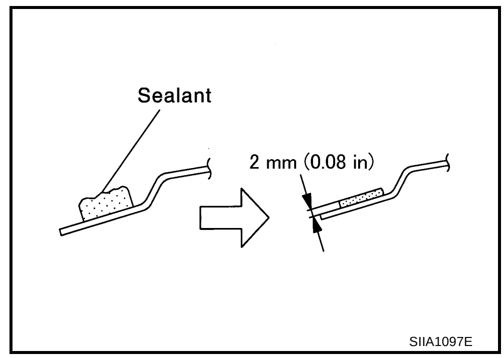
CAUTION:

- **When a back door window glass is to be reused, do not use a cutting knife or power cutting tool.**
- **Be careful not to scratch the glass when removing.**

- **Do not set or stand the glass on its edge. Small chips may develop into cracks.**



INSTALLATION



- With a knife, scrape off remaining adhesive left around on the side of vehicle body to as thin and flat as 2 mm (0.08 in).
- Use a genuine Nissan Urethane Adhesive Kit or equivalent and follow the instructions furnished with it.
- While the urethane adhesive is curing, open a door window. This will prevent the glass from being forced out by passenger compartment air pressure when a door is closed.
- Inform the customer that the vehicle should remain stationary until the urethane adhesive has completely cured (preferably 24 hours). Curing time varies with temperature and humidity.

WARNING:

- **Keep heat and open flames away as primers and adhesive are flammable.**
- **The materials contained in the kit are harmful if swallowed, and may irritate skin and eyes. Avoid contact with the skin and eyes.**
- **Use in an open, well ventilated location. Avoid breathing the vapors. They can be harmful if inhaled. If affected by vapor inhalation, immediately move to an area with fresh air.**
- **Driving the vehicle before the urethane adhesive has completely cured may affect the performance of the back door window in case of an accident.**

CAUTION:

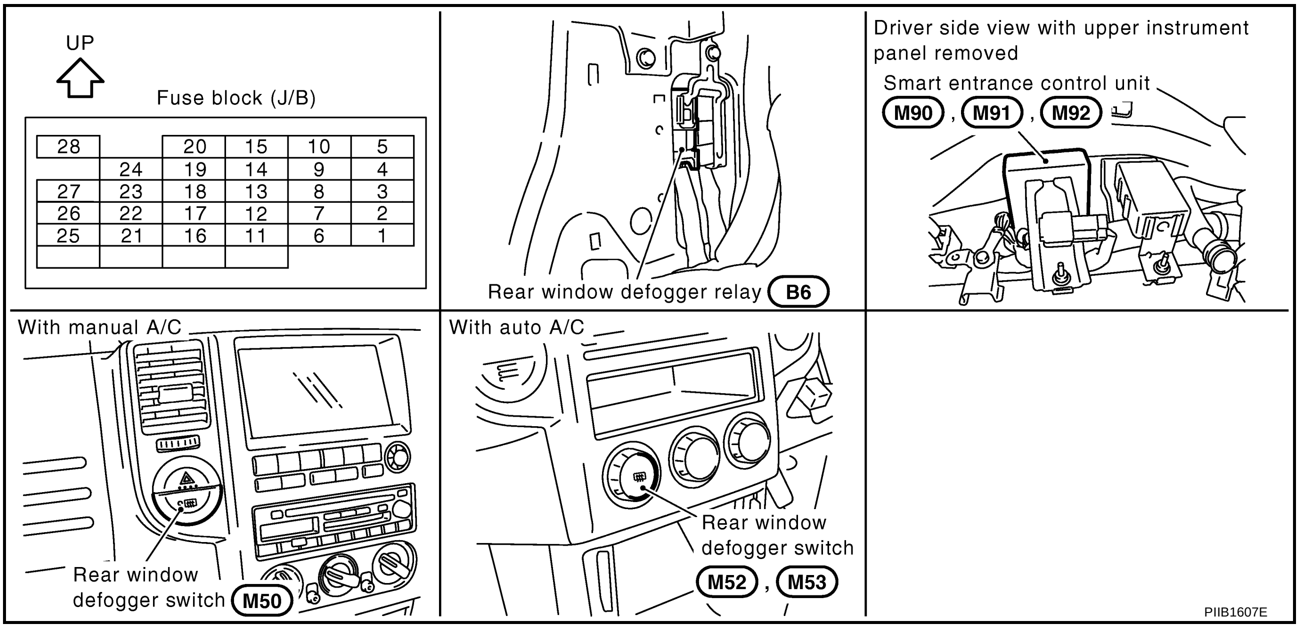
- **Do not use an adhesive which is past its usable term. Shelf life of this product is limited to six months after the date of manufacture. Carefully adhere to the expiration or manufacture date printed on the box.**
- **Keep primers and adhesive in a cool, dry place. Ideally, they should be stored in a refrigerator.**
- **Do not leave primers or adhesive cartridge unattended with their caps open or off.**
- **The vehicle should not be driven for at least 24 hours or until the urethane adhesive has completely cured. Curing time varies depending on temperature and humidity. The curing time will increase under lower temperature and lower humidity.**

REAR WINDOW DEFOGGER

PFP:25350

Component Parts and Harness Connector Location

AIS005QA



System Description

AIS0062J

The rear window defogger system is controlled by smart entrance control unit.The rear window defogger operates only for approximately 15 minutes.
Power is supplied at all times

- through 20A fuse [No.25, located in the fuse block (J/B)]
- to rear window defogger relay terminal 3
- through 10A fuse [No.27, located in the fuse block (J/B)]
- to rear window defogger relay terminal 6 (with door mirror defogger)
- through 10A fuse [No.26, located in the fuse block (J/B)]
- to smart entrance control unit terminal 49

With the ignition switch in the ON or START position,
Power is supplied

- through 10A fuse [No.5, located in the fuse block (J/B)]
- to rear window defogger relay terminal 1 and
- to smart entrance control unit terminal 27.

Ground is supplied

- to smart entrance control unit terminals 43 and 64
- through body ground M27 and M70.
- to rear window defogger switch terminals 2 and 4 (with manual A/C) or
- to A/C auto amp. terminal 3 (with auto A/C)
- through body ground M27 and M70.

When the rear window defogger switch is turned ON,
Ground is supplied

- to smart entrance control unit terminal 14
- through rear window defogger switch 1 (with manual A/C) or
- through A/C auto amp. terminal 22 (with auto A/C)

Terminal 37 of the smart entrance control unit then supplies ground to the rear window defogger relay terminal 2.
With power and ground supplied, the rear window defogger relay is energized.
Power is supplied

- through rear window defogger relay terminal 5 and 7

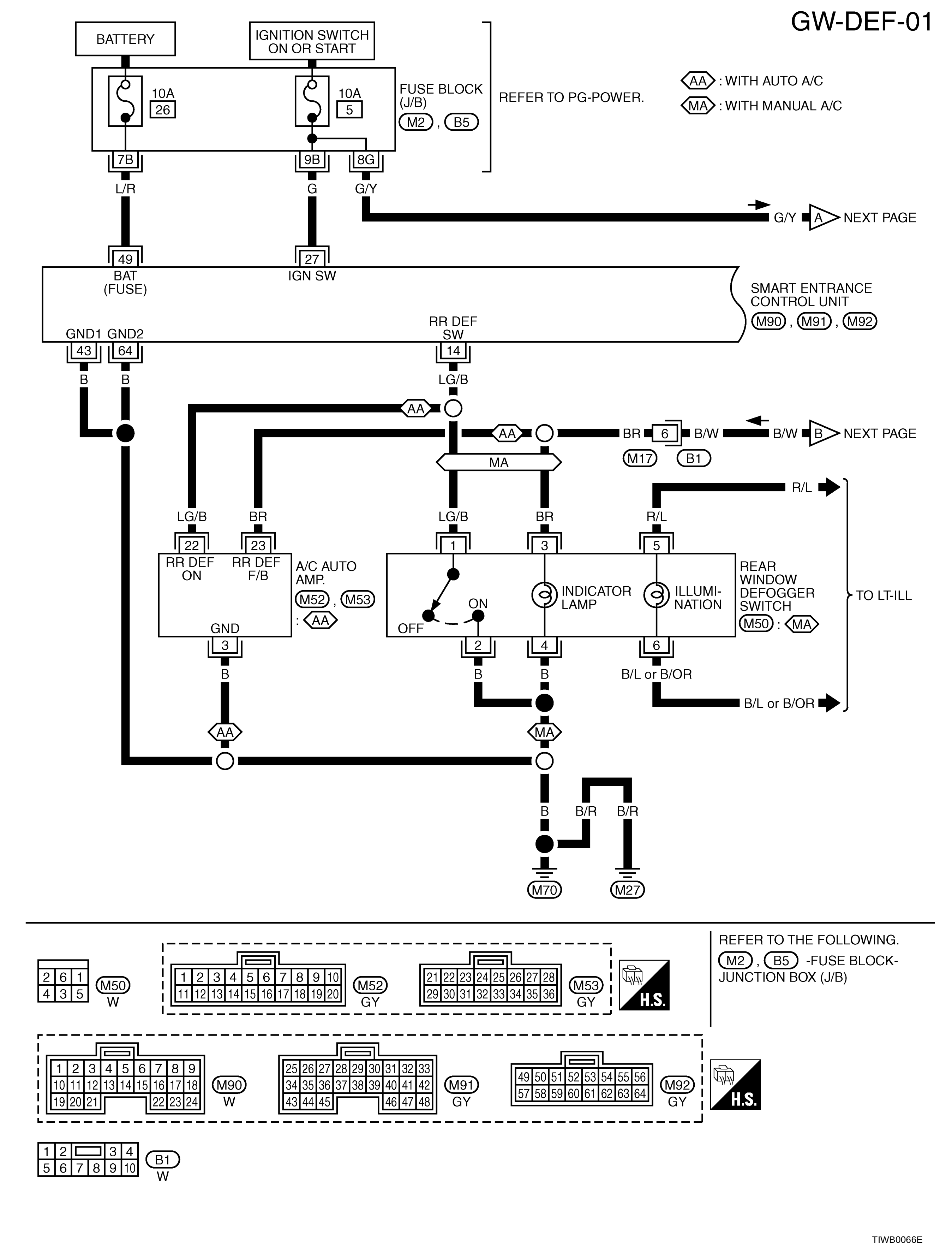
- to the rear window defogger and door mirror defogger.

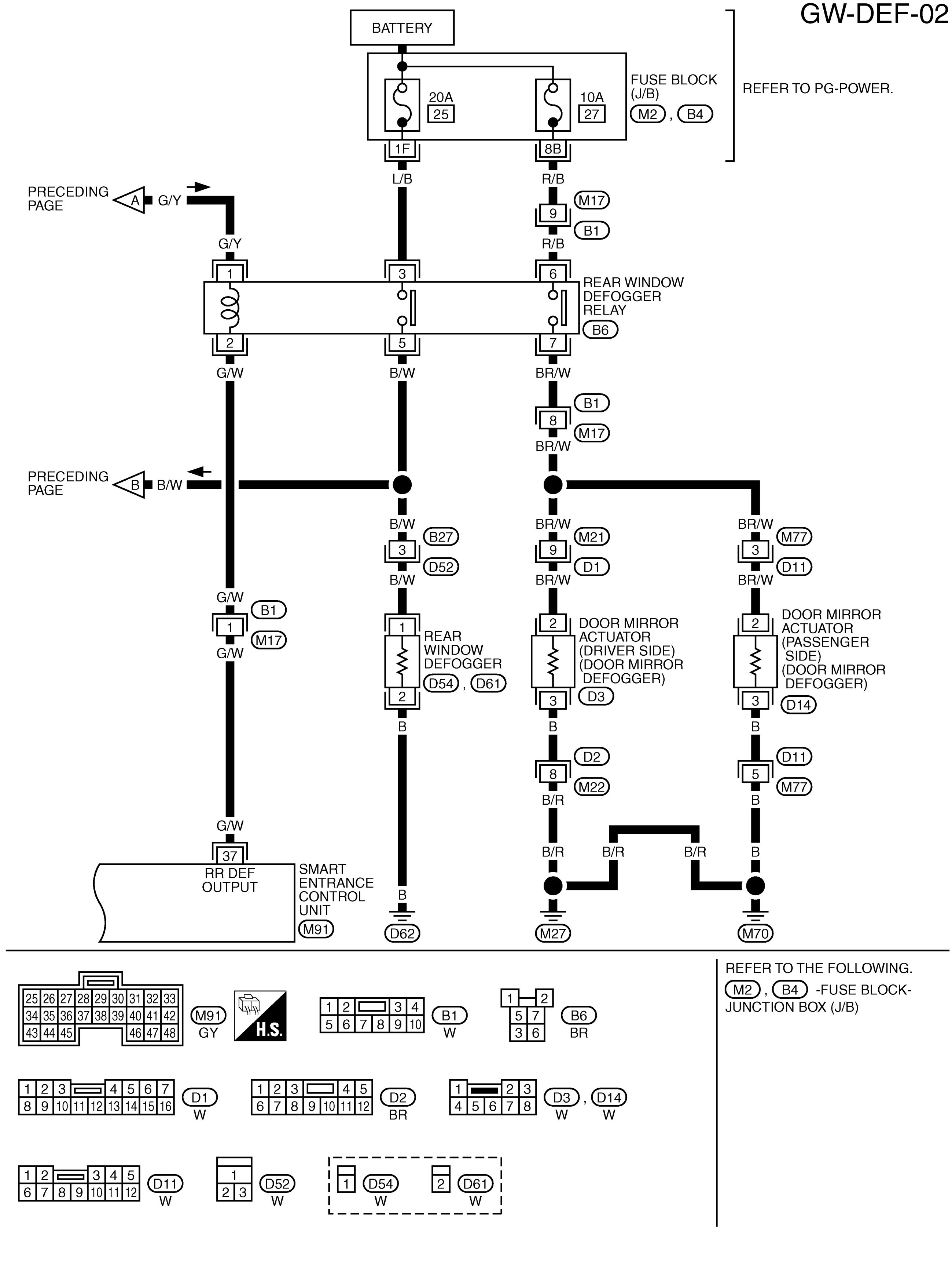
The rear window defogger has an independent ground.
With power and ground supplied, the rear window defogger filaments heat and defog the rear window.
When the system is activated, the rear window defogger indicator illuminates in the rear window defogger switch.
Power is supplied

- through rear window defogger relay terminal 5
- to rear window defogger switch terminal 3 (with manual A/C) or
- to A/C auto amp. terminal 23 (with auto A/C).

Wiring Diagram — DEF —

AIS005QD




GW-DEF-02
BATTERY
20A
25
10A
27
FUSE BLOCK
(J/B)
M2 , B4
REFER TO PG-POWER.
1F
8B
L/B
R/B
PRECEDING PAGE
A
G/Y
M17
9
B1
6
REAR WINDOW DEFOGGER RELAY
B6
1
3
2
5
7
G/W
B/W
BR/W
B1
8
M17
PRECEDING PAGE
B
B/W
B27
3
D52
M21
D1
M77
D11
1
M17
REAR WINDOW DEFOGGER
D54 , D61
DOOR MIRROR ACTUATOR (DRIVER SIDE) (DOOR MIRROR DEFOGGER)
D3
DOOR MIRROR ACTUATOR (PASSENGER SIDE) (DOOR MIRROR DEFOGGER)
D14
B
D2
M22
B/R
5
37
RR DEF OUTPUT
SMART ENTRANCE CONTROL UNIT
M91
D62
M27
M70
GY
H.S.
W
BR
REFER TO THE FOLLOWING.
M2 , B4 -FUSE BLOCK-JUNCTION BOX (J/B)
TIWB0067E

Terminals and Reference Value for Smart Entrance Control Unit

AIS005QF

TERMINAL	WIRE COLOR	ITEM	CONDITION		VOLTAGE (V) (Approx.)
14	LG/B	Rear window defogger switch signal	Rear window defogger switch	: ON	0
				: OFF	Battery voltage
27	G	Ignition switch ON	Ignition switch position (ON or START)		Battery voltage
37	G/W	Rear window defogger relay control signal	Rear window defogger switch	: ON	0
				: OFF	Battery voltage
43	B	Ground	—		0
49	L/R	Power source (Fuse)	—		Battery voltage
64	B	Ground	—		0

Work Flow

AIS0062Q

1. Check the symptom and customer's requests.
2. Understand the outline of system. Refer to GW-17, "System Description"
3. According to the trouble diagnosis chart, repair or replace the cause of the malfunction. Refer to GW-21, "Trouble Diagnoses"
4. Does rear window defogger operate normally? YES: GO TO 5, NO: GO TO 3.
5. INSPECTION END.

Trouble Diagnoses

AIS0062K

- Make sure that other systems using the signal of the following systems operate normally.

Symptom	Diagnoses / Service procedure	Refer to page
Rear window defogger and door mirror defogger does not operate.	1. Check rear window defogger relay power supply	GW-21
	2. Check smart entrance control unit power supply and ground	GW-23
	3. Check rear window defogger switch circuit	GW-24
Rear window defogger alone does not operate.	1. Check rear window defogger circuit	GW-26
Door mirror defogger alone does not operate.	1. Check door mirror defogger circuit	GW-27
Rear window defogger switch does not light, but rear window defogger operates.	1. Check rear window defogger indicator lamp circuit	GW-29

Check Rear Window Defogger Relay Power Supply

AIS0062R

1. CHECK FUSE

- Check 10A fuse [No. 5, located in the fuse block (J/B)]
- Check 10A fuse [No. 27, located in the fuse block (J/B)]
- Check 20A fuse [No. 25, located in the fuse block (J/B)]

NOTE:
Refer to GW-17, "Component Parts and Harness Connector Location"

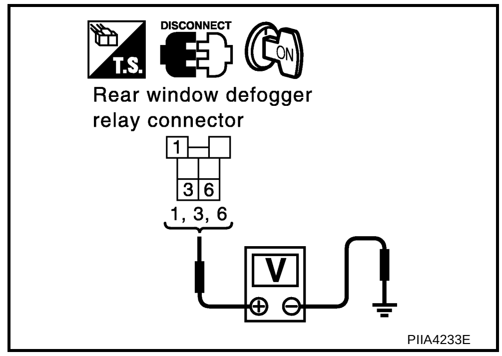
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING"

2. CHECK REAR WINDOW DEFOGGER RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Remove rear window defogger relay.
3. Turn ignition switch ON.
4. Check voltage between rear window defogger relay harness connector B6 terminal 1, 3, 6 and ground.

1 (G/Y) - Ground : Battery voltage
3 (L/B) - Ground : Battery voltage
6 (R/B) - Ground : Battery voltage



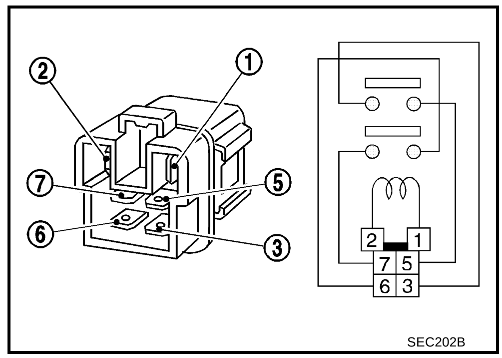
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness between fuse block (J/B) and rear window defogger relay.

3. CHECK REAR WINDOW DEFOGGER RELAY

Check continuity between rear window defogger relay terminal 3 and 5, 6 and 7.

Terminal		Condition	Continuity
3	5	12V direct current supply between terminal 1 and 2	Yes
		Not current supply	No
6	7	12V direct current supply between terminal 1 and 2	Yes
		Not current supply	No



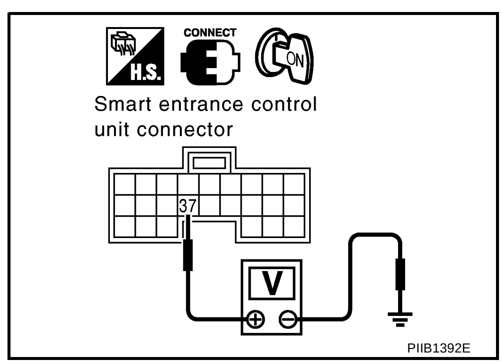
OK or NG

OK >> GO TO 4.
NG >> Replace rear window defogger relay

4. CHECK REAR WINDOW DEFOGGER RELAY GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Install rear window defogger relay.
3. Turn ignition switch ON.
4. Check voltage between smart entrance control unit harness connector M91 terminal 37 and ground.

37 (G/W) - Ground : Battery voltage

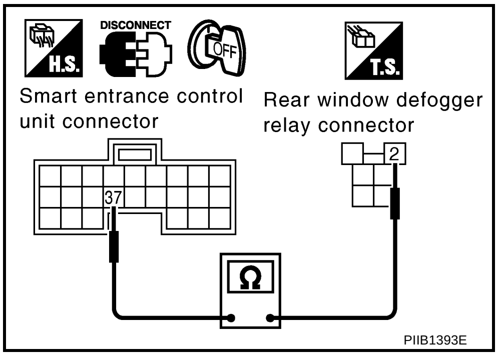


OK or NG

OK >> Rear window defogger relay power supply is OK.
NG >> GO TO 5.

5. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector and rear window defogger relay.
3. Check continuity between smart entrance control unit harness connector M91 terminal 37 and rear window defogger relay harness connector B6 terminal 2.



37 (G/W) - 2 (G/W) : Continuity should exist.

OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between smart entrance control unit and rear window defogger relay.

Check Smart Entrance Control Unit Power Supply and Ground

AIS0062L

1. CHECK FUSE

- Check 10A fuse [No. 5, located in the fuse block (J/B)]
- Check 10A fuse [No. 26, located in the fuse block (J/B)]

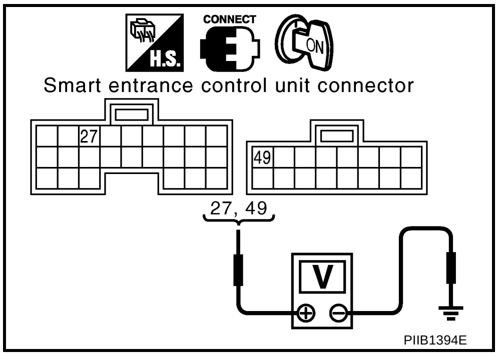
NOTE:
Refer to GW-17, "Component Parts and Harness Connector Location"

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING"

2. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between smart entrance control unit harness connector M91, M92 terminal 27, 49 and ground.



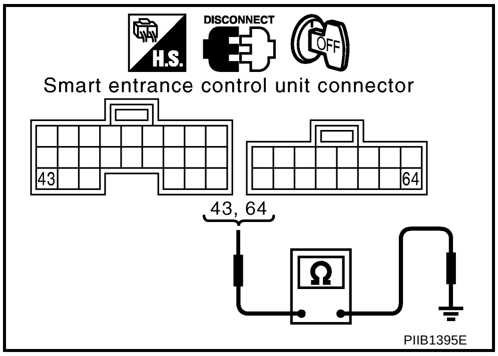
27 (G) - Ground : Battery voltage
49 (L/R) - Ground : Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Check smart entrance control unit power supply circuit for open or short.

3. CHECK GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check continuity between smart entrance control unit harness connector M91, 92 terminal 43, 64 and ground.



43 (B) - Ground : Continuity should exist.
64 (B) - Ground : Continuity should exist.

OK or NG

OK >> Power supply and ground circuit are OK.
NG >> Check smart entrance control unit ground circuit for open or short.

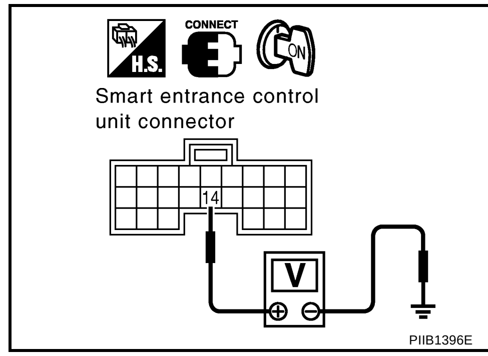
Check Rear Window Defogger Switch Circuit

AIS0062M

1. CHECK REAR WINDOW DEFOGGER SWITCH OPERATION

1. Turn ignition switch ON.
2. Check voltage between smart entrance control unit connector and ground.

Connector	Terminal (Wire color) (+)	Terminal (Wire color) (-)	Condition		Voltage (V) (Approx.)
M90	14 (LG/B)	Ground	Rear window defogger switch	: ON	0
				: OFF	Battery voltage



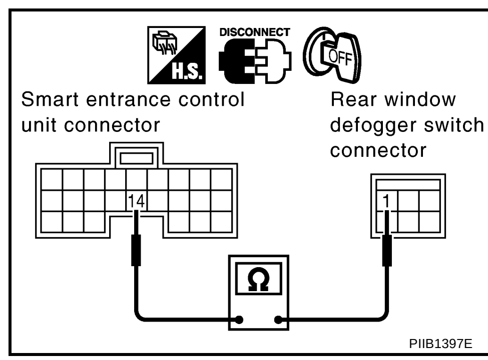
OK or NG

OK >> Rear window defogger switch is OK.
NG >> GO TO 2.

2. CHECK REAR WINDOW DEFOGGER SWITCH CIRCUIT

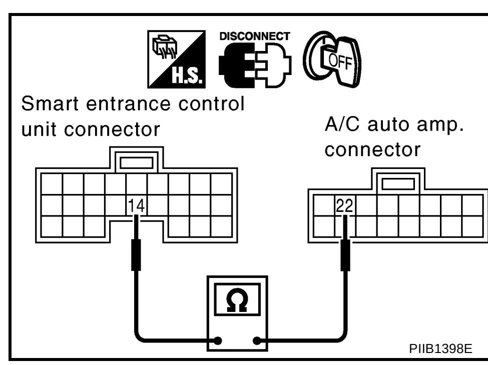
1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit and rear window defogger switch (with manual A/C) or A/C auto amp, (with auto A/C) connector.
3. **(With manual A/C)**
   Check continuity between smart entrance control unit harness connector M90 terminal 14 and rear window defogger switch harness connector M50 terminal 1.

   14 (LG/B) - 1 (LG/B) : Continuity should exist.



   (With auto A/C)
   Check continuity between smart entrance control unit harness connector M90 terminal 14 and A/C auto amp, harness connector M53 terminal 22.

   14 (LG/B) - 22 (LG/B) : Continuity should exist.



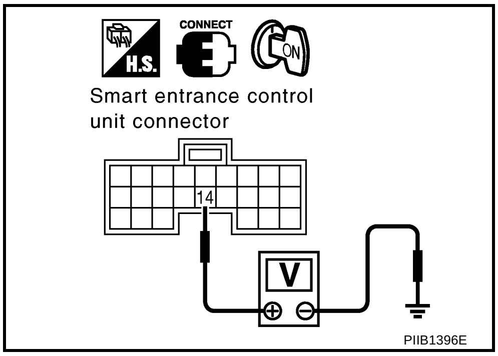
OK >> GO TO 3.
NG >> Repair or replace harness between smart entrance control unit and rear window defogger relay (without auto A/C) or A/C auto amp, (with auto A/C).

A B C D E F G H GW J K L M

3. CHECK SMART ENTRANCE CONTROL UNIT OUTPUT SIGNAL

1. Connect smart entrance control unit connector.
2. Turn ignition switch ON.
3. Check voltage between smart entrance control unit harness connector M90 terminal 14 and ground.

14 (LG/B) - Ground : Battery voltage



OK or NG

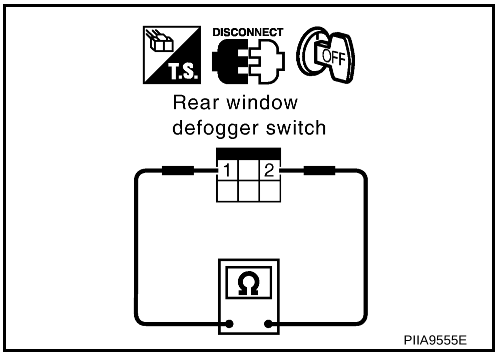
OK >>
- GO TO 4. (without auto A/C)
- Check A/C auto amp. (with auto A/C). Refer to ATC-32

NG >> Replace smart entrance control unit.

4. CHECK REAR WINDOW DEFOGGER SWITCH

Rear window defogger switch operate, check continuity between rear window defogger switch connector M50 terminal 1 and 2.

Connector	Terminal		Condition		Continuity
M50	1	2	Rear window: defogger switch	: ON	Yes
				: OFF	No



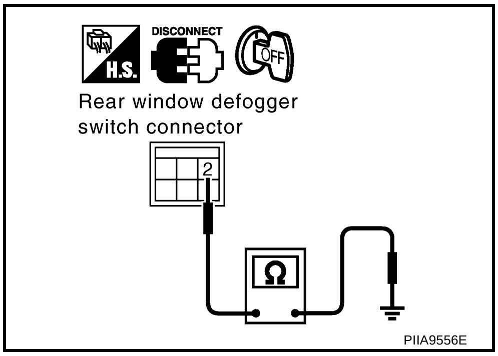
OK or NG

OK >> GO TO 5.
NG >> Replace rear window defogger switch.

5. CHECK REAR WINDOW DEFOGGER SWITCH GROUND

Check continuity between rear window defogger switch harness connector M50 terminal 2 and ground.

2 (B) - Ground : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between rear window defogger switch and ground.

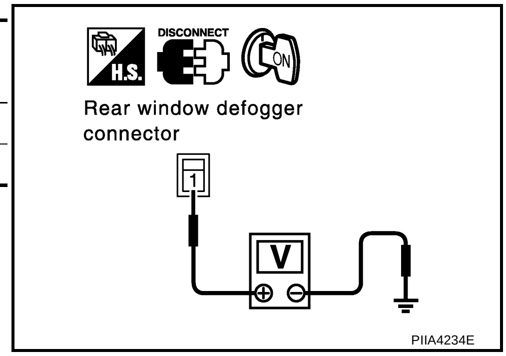
Check Rear Window Defogger Circuit

AIS0062N

1. CHECK REAR WINDOW DEFOGGER POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect rear window defogger connector.
3. Turn ignition switch ON.
4. Check voltage between rear window defogger harness connector and ground.

Connector	Terminal (Wire color)		Condition		Voltage (V) (Approx.)
	(+)	(-)			
D54	1 (B/W)	Ground	Rear window defogger switch	: ON	Battery voltage
				: OFF	0



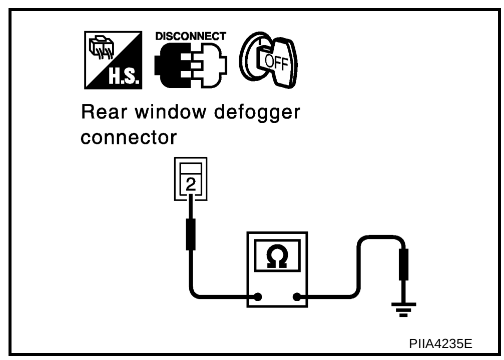
OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. CHECK REAR WINDOW DEFOGGER GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Check continuity between rear window defogger harness connector D61 terminal 2 and ground.

2 (B) - Ground : Continuity should exist.



OK or NG

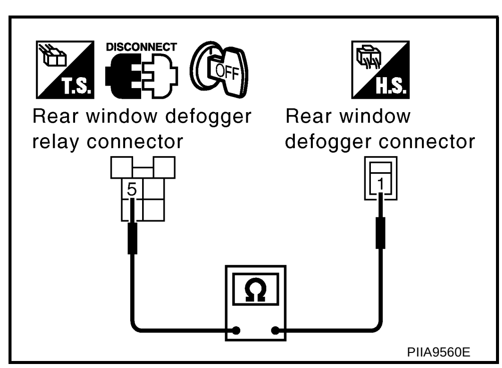
OK >> Check filament, Refer to GW-31, "Filament Check"
- If filament is OK
  Check condition of harness and connector.
- If filament is NG
  Repair filament.

NG >> Repair or replace harness between rear window defogger and ground.

3. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Remove the rear window defogger relay.
3. Check continuity between rear window defogger relay harness connector B6 terminal 5 and rear window defogger harness connector D54 terminal 1.

5 (B/W) - 1 (B/W) : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between rear window defogger relay and rear window defogger.

Check Door Mirror Defogger Circuit

AIS0062O

1. CHECK FUSE

- Check 10A fuse [No.27, located in fuse block (J/B)]

NOTE:
Refer to GW-17, "Component Parts and Harness Connector Location"

OK or NG

OK >> GO TO 2.
NG >> If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING"

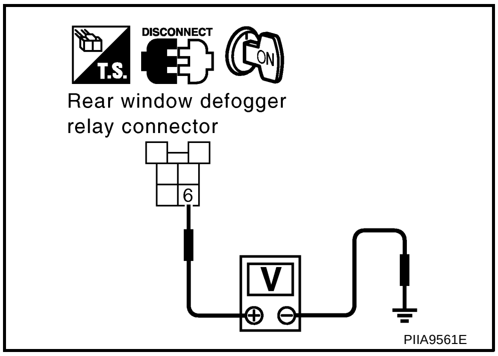
2. CHECK REAR WINDOW DEFOGGER RELAY POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Remove rear window defogger relay.
3. Turn ignition switch ON.
4. Check voltage between rear window defogger relay harness connector B6 terminal 6 and ground.

6 (R/B) - Ground : Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness between fuse block (J/B) and rear window defogger relay.



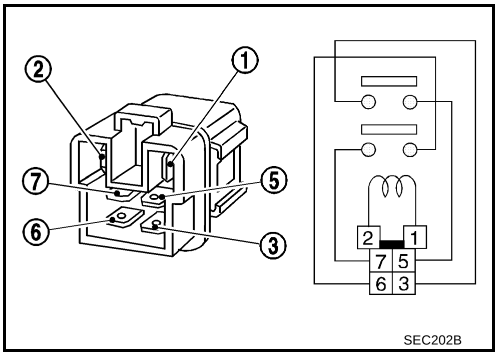
3. CHECK REAR WINDOW DEFOGGER RELAY

Check continuity between rear window defogger relay terminal 6 and 7.

Terminal		Condition	Continuity
6	7	12V direct current supply between terminals 1 and 2	Yes
		No current supply	No

OK or NG

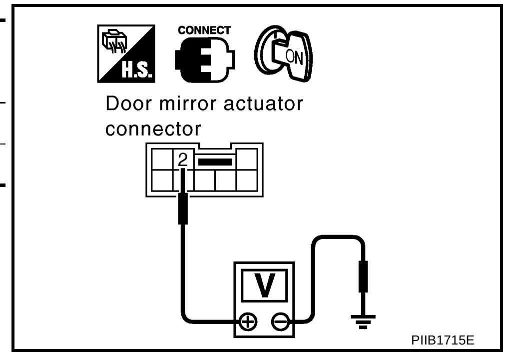
OK >> GO TO 4.
NG >> Replace rear window defogger relay.



4. CHECK DOOR MIRROR DEFOGGER POWER SUPPLY

1. Turn ignition switch OFF.
2. Installation rear window defogger relay.
3. Turn ignition switch ON.
4. Check voltage between door mirror actuator harness connector D3 (driver side), D14 (passenger side) terminal 2 and ground.

Connector	Terminal (Wire color)		Condition		Voltage (V) (Approx.)
	(+)	(-)			
D3 D14	2 (BR/W)	Ground	Rear window defogger switch	: ON	Battery voltage
				: OFF	0



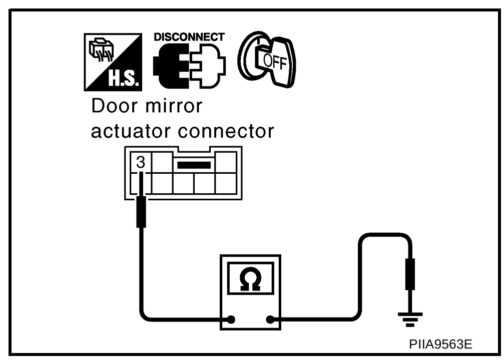
OK or NG

OK >> GO TO 5.
NG >> GO TO 6.

5. CHECK DOOR MIRROR DEFOGGER GROUND

1. Turn ignition switch OFF.
2. Disconnect door mirror actuator connector.
3. Check continuity between door mirror actuator harness connector D3 (driver side), D14 (passenger side) terminal 3 and ground.

3 (B) - Ground : Continuity should exist.



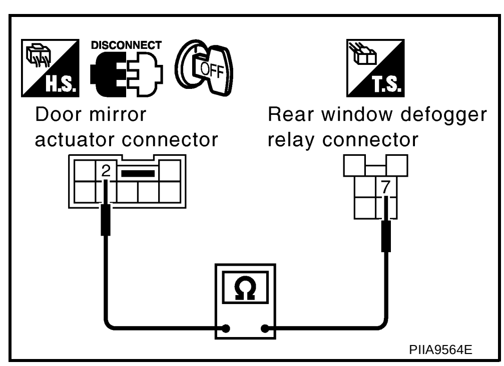
OK or NG

OK >> Replace malfunction door mirror actuator.
NG >> Repair or replace harness between door mirror actuator and ground.

6. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect door mirror actuator connector and rear window defogger relay.
3. Check continuity between door mirror actuator harness connector D3 (driver side), D14 (passenger side) terminal 2 and rear window defogger relay harness connector B6 terminal 7.

2 (BR/W) - 7 (BR/W) : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between door mirror actuator and rear window defogger relay.

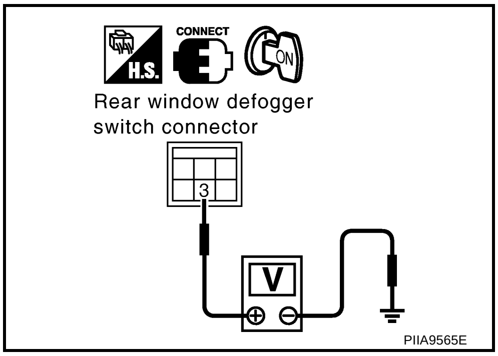
Check Rear Window Defogger Indicator Lamp Circuit

AIS0062P

1. CHECK REAR WINDOW DEFOGGER SIGNAL

1. Turn both ignition switch and rear window defogger switch ON.
2. **(With manual A/C)**
   Check voltage between rear window defogger switch harness connector M50 terminal 3 and ground.

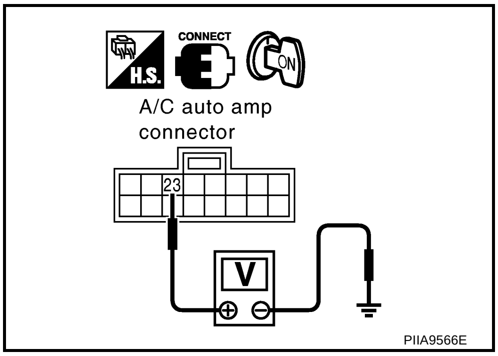
3 (BR) - Ground : Battery voltage



PIIA9565E

(With auto A/C)
Check voltage between A/C auto amp, harness connector M53 terminal 23 and ground.

23 (BR) - Ground : Battery voltage



PIIA9566E

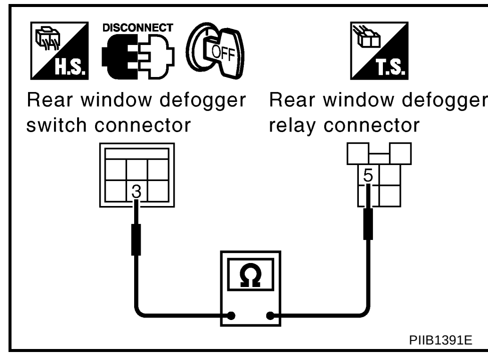
OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

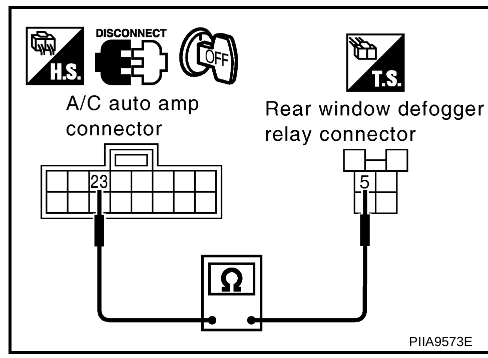
1. Turn ignition switch OFF.
2. Disconnect rear window defogger switch (without auto A/C) or A/C auto amp, (with auto A/C) connector and rear window defogger relay.
3. **(With manual A/C)**
   Check continuity between rear window defogger switch harness connector M50 terminal 3 and rear window defogger relay harness connector B6 terminal 5.

   3 (BR) - 5 (B/W) : Continuity should exist.



(With auto A/C)
Check continuity between A/C auto amp, harness connector M53 terminal 23 and rear window defogger relay harness connector B6 terminal 5.

23 (BR) - 5 (B/W) : Continuity should exist.



OK or NG

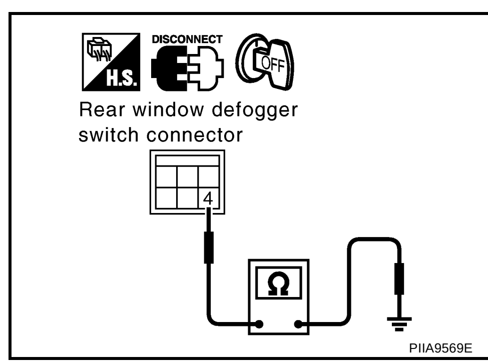
OK >>
- GO TO 3. (without auto A/C)
- Check A/C auto amp. (with auto A/C). Refer to ATC-32

NG >> Repair or replace harness between rear window defogger switch (without auto A/C) or A/C auto amp, (with auto A/C) and rear window defogger relay.

3. CHECK REAR WINDOW DEFOGGER INDICATOR LAMP GROUND

Check continuity between rear window defogger switch harness connector M50 terminal 4 and ground.

4 (B) - Ground : Continuity should exist.



OK or NG

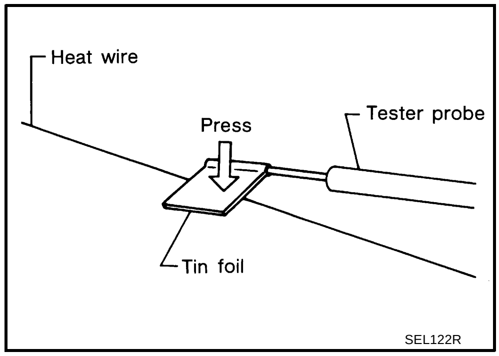
OK >> Replace indicator lamp bulb.

NG >> Repair or replace harness between rear window defogger switch and ground.

Filament Check

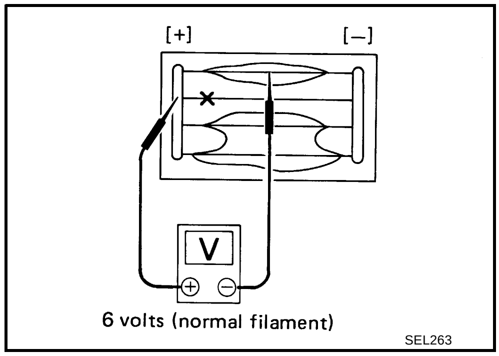
AIS005QQ

1. When measuring voltage, wrap tin foil around the top of the negative probe.Then press the foil against the wire with your finder.



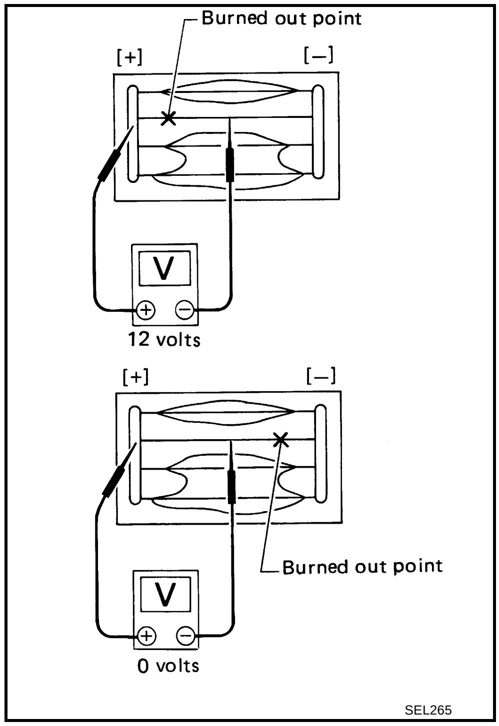
SEL122R

2. Attach probe circuit tester (in Volt range) to middle portion of each filament.



SEL263

3. If a filament is burned out, circuit tester registers 0 or battery voltage.
4. To locate burned out point, move probe to left and right along filament. Test needle will swing abruptly when probe passes the point.



SEL265

Filament Repair

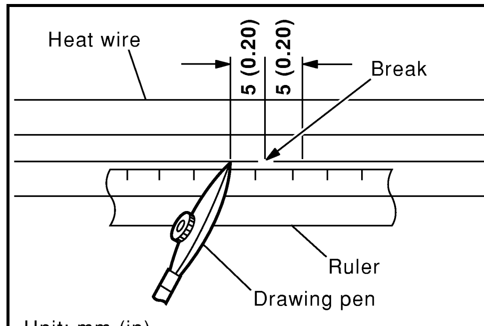
AIS005QR

REPAIR EQUIPMENT

- Conductive silver composition (Dupont No. 4817 or equivalent)
- Ruler 30 cm(11.8in) long
- Drawing pen
- Heat gun
- Alcohol
- Cloth

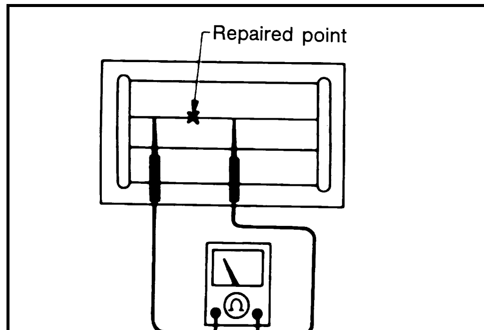
REPAIRING PROCEDURE

1. Wipe broken heat wire and its surrounding area clean with a cloth dampened alcohol.
2. Apply a small amount of conductive silver composition to tip of drawing pen.
   Shake silver composition container before use.
3. Place ruler on glass along broken line. Deposit conductive silver composition on break with drawing pen. Slightly overlap existing heat wire on both sides [preferably 5 mm(0.20in)] of the break.



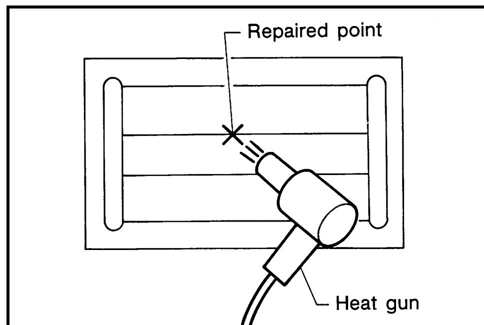
PIIA0215E

4. After repair has been completed, check repaired wire for continuity. This check should be performed 10 minutes after silver composition is deposited.
   Do not touch repaired area while test is being performed.



SEL012D

5. Apply a constant stream of hot air directly to the repaired area for approximately 20 minutes with a heat gun. A minimum distance of 3cm(1.2in) should be kept between repaired area and hot air outlet.
   If a heat gun is not available, let the repaired area dry for 24 hours.



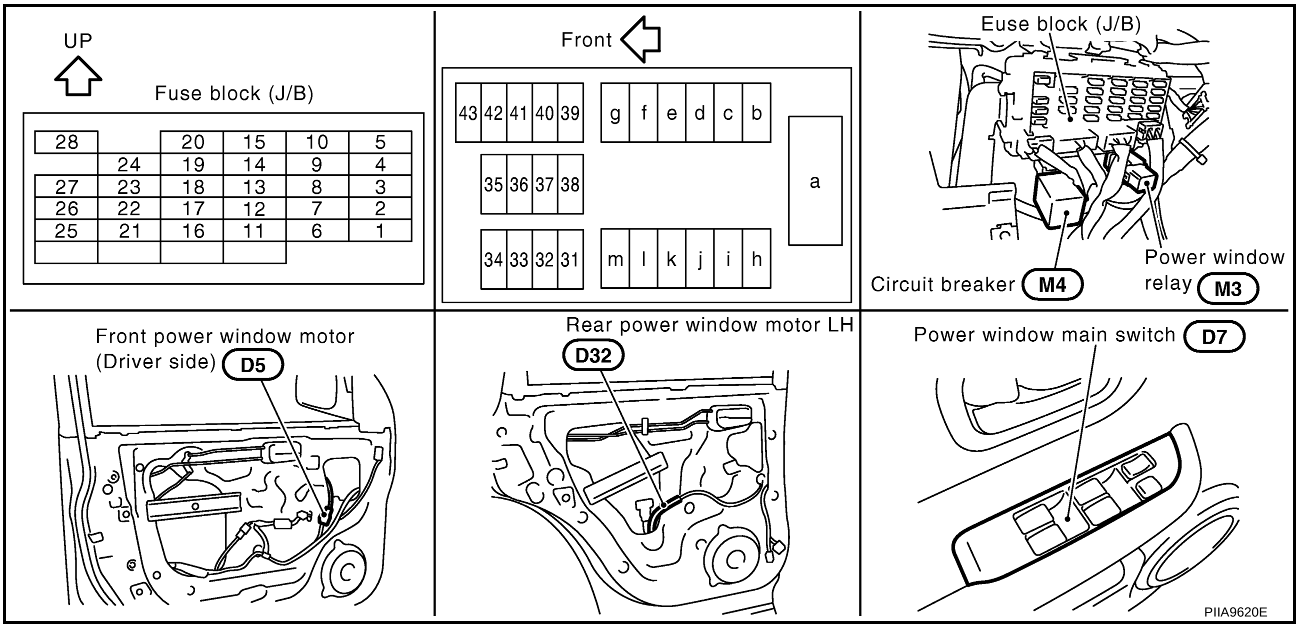
SEL013D

POWER WINDOW SYSTEM

PFP:25401

Component Parts and Harness Connector Location

AIS005QS



System Description

AIS005QT

Power is supplied at all times

- from 40A fusible link (letter **B** , located in the fuse and fusible link box)
- through circuit breaker terminal 1
- through circuit breaker terminal 2
- to power window relay terminal 3 and
- to power window main switch terminal 5.

With ignition switch in ON or START position, power is supplied

- through 10A fuse [No. 5, located in the fuse block (J/B)]
- to power window relay terminal 1

Ground is supplied

- to power window relay terminal 2
- through body grounds M27 and M70,
- to power window main switch terminal 19
- through body grounds M27 and M70.

When power and ground are supplied, the power window relay is energized and then power is supplied

- through power window relay terminal 5
- to power window main switch terminal 12,
- to front power window switch (passenger side) terminal 5,
- to rear power window switch LH and RH terminals 5.

MANUAL OPERATION

Front Door (Driver Side)

WINDOW UP
When the driver side switch in the power window main switch is pressed in the up position,
Power is supplied

- through power window main switch terminal 2
- to front power window motor (driver side) terminal 1.

Ground is supplied

- to front power window motor (driver side) terminal 3
- through power window main switch terminal 1.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the driver's window switch in the power window main switch is pressed in the down position,
Power is supplied

- through power window main switch terminal 1
- to front power window motor (driver side) terminal 3

Ground is supplied

- to front power window motor (driver side) terminal 1
- through power window main switch terminal 2.

Then, the motor lowers the window until the switch is released.

Front Door (Passenger Side)

POWER WINDOW MAIN SWITCH OPERATION

WINDOW UP
When the passenger side switch in the power window main switch is pressed in the up position,
Power is supplied

- through power window main switch terminal 4
- through front power window switch (passenger side) terminal 3
- through front power window switch (passenger side) terminal 1
- to front power window motor (passenger side) terminal 1.

Ground is supplied

- to front power window motor (passenger side) terminal 2
- through front power window switch (passenger side) terminal 2
- through front power window switch (passenger side) terminal 4
- through power window main switch terminal 3.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the passenger side switch in the power window main switch is pressed in the down position,
Power is supplied

- through power window main switch terminal 3
- through front power window switch (passenger side) terminal 4
- through front power window switch (passenger side) terminal 2
- to front power window motor (passenger side) terminal 2.

Ground is supplied

- to front power window motor (passenger side) terminal 1
- through front power window switch (passenger side) terminal 1
- through front power window switch (passenger side) terminal 3
- through power window main switch terminal 4.

Then, the motor lowers the window until the switch is released.

FRONT POWER WINDOW SWITCH (PASSENGER SIDE) OPERATION

WINDOW UP
When the front power window switch (passenger side) is pressed in the up position,

Power is supplied
- through front power window switch (passenger side) terminal 1
- to front power window motor (passenger side) terminal 1

Ground is supplied
- to front power window motor (passenger side) terminal 2
- through front power window switch (passenger side) terminal 2
- through front power window switch (passenger side) terminal 4
- through power window main switch terminal 3.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the front power window switch (passenger side) is pressed in the down position,
Power is supplied
- through front power window switch (passenger side) terminal 2
- to front power window motor (passenger side) terminal 2

Ground is supplied
- to front power window motor (passenger side) terminal 1
- through front power window switch (passenger side) terminal 1
- through front power window switch (passenger side) terminal 3
- through power window main switch terminal 4.

Then, the motor lowers the window until the switch is released.

Rear Door LH

POWER WINDOW MAIN SWITCH OPERATION
WINDOW UP
When the rear LH switch in the power window main switch is pressed in the up position,
Power is supplied
- through power window main switch terminal 14
- through rear power window switch LH terminal 3
- through rear power window switch LH terminal 1
- to rear power window motor LH terminal 1

Ground is supplied
- to rear power window motor LH terminal 2
- through rear power window switch LH terminal 2
- through rear power window switch LH terminal 4
- through power window main switch terminal 15.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the rear LH switch in the power window main switch is pressed in the down position,
Power is supplied
- through power window main switch terminal 15
- through rear power window switch LH terminal 4
- through rear power window switch LH terminal 2
- to rear power window motor LH terminal 2.

Ground is supplied
- to rear power window motor LH terminal 1
- through rear power window switch LH terminal 1
- through rear power window switch LH terminal 3
- through power window main switch terminal 14.

Then, the motor lowers the window until the switch is released.
REAR POWER WINDOW SWITCH LH OPERATION
WINDOW UP
When the rear power window switch LH is pressed in the up position,

Power is supplied

- through rear power window switch LH terminal 1
- to rear power window motor LH terminal 1.

Ground is supplied

- to rear power window motor LH terminal 2
- through rear power window switch LH terminal 2
- through rear power window switch LH terminal 4
- through power window main switch terminal 15.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the rear power window switch LH is pressed in the down position,
Power is supplied

- through rear power window switch LH terminal 2
- to rear power window motor LH terminal 2.

Ground is supplied

- to rear power window motor LH terminal 1
- through rear power window switch LH terminal 1
- through rear power window switch LH terminal 3
- through power window main switch terminal 14.

Then, the motor lowers the window until the switch is released.

Rear Door RH

POWER WINDOW MAIN SWITCH OPERATION
WINDOW UP
When the rear RH switch in the power window main switch is pressed in the up position,
Power is supplied

- through power window main switch terminal 10
- through rear power window switch RH terminal 3
- through rear power window switch RH terminal 1
- to rear power window motor RH terminal 1

Ground is supplied

- to rear power window motor RH terminal 2
- through rear power window switch RH terminal 2
- through rear power window switch RH terminal 4
- through power window main switch terminal 11.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the rear RH switch in the power window main switch is pressed in the down position,
Power is supplied

- through power window main switch terminal 11
- through rear power window switch RH terminal 4
- through rear power window switch RH terminal 2
- to rear power window motor RH terminal 2

Ground is supplied

- to rear power window motor RH terminal 1
- through rear power window switch RH terminal 1
- through rear power window switch RH terminal 3
- through power window main switch terminal 10.

Then, the motor lowers the window until the switch is released.
REAR POWER WINDOW SWITCH LH OPERATION
WINDOW UP
When the rear power window switch RH is pressed in the up position,

Power is supplied

- through rear power window switch RH terminal 1
- to rear power window motor RH terminal 1.

Ground is supplied

- to rear power window motor RH terminal 2
- through rear power window switch RH terminal 2
- through rear power window switch RH terminal 4
- through power window main switch terminal 11.

Then, the motor raises the window until the switch is released.
WINDOW DOWN
When the rear power window switch RH is pressed in the down position,
Power is supplied

- through rear power window switch RH terminal 2
- to rear power window motor RH terminal 2.

Ground is supplied

- to rear power window motor RH terminal 1
- through rear power window switch RH terminal 1
- through rear power window switch RH terminal 3
- through power window main switch terminal 10.

Then, the motor lowers the window until the switch is released.

AUTO OPERATION

The power window AUTO feature enables the driver to open or close the driver's window without holding the window switch in the down or up position.
The AUTO feature operates on the driver's window.

POWER WINDOW LOCK

The power window lock is designed to lock operation of all windows except for driver's window.
When the lock switch is pressed to lock position, ground of the sub–switches in the power window main switch is disconnected. This prevents the power window motors from operating.

TIMER FUNCTION

With the timer function, driver power window can be operated for approximately 15 minutes after ignition switch is turned OFF (positions other than ON). However, the timer will be cancel when a specific signal, such as driver door close (door switch OFF) → open (door switch ON), or ignition switch OFF → ON, is input.

DRIVER WINDOW ANTI–PINCH FUNCTION

During raising operation of driver power window, if power window main switch detects that foreign object is pinched, power window lowers approximately 150 mm (5.91 in).

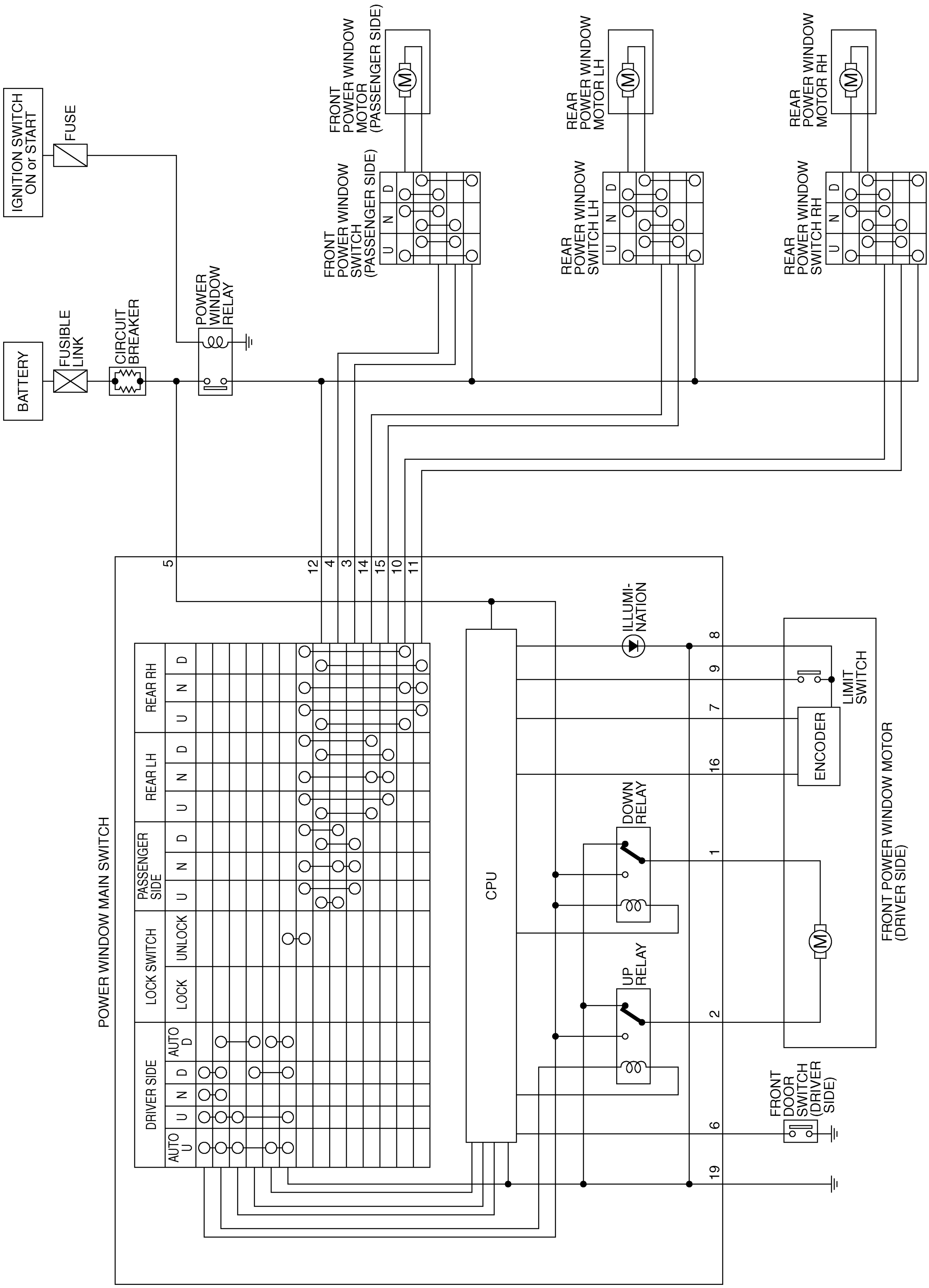
NOTE:
Depending on environment and driving conditions, if a similar impact or load is applied to power window, it may lower.

Operation Conditions

- Driver door window is between fully-open and just before fully-closed position (when the limit switch is ON).
- During automatic operation when ignition switch is turned ON.
- During automatic or manual operation when ignition switch is other than ON position (when the timer operates).

Schematic

AIS005QU

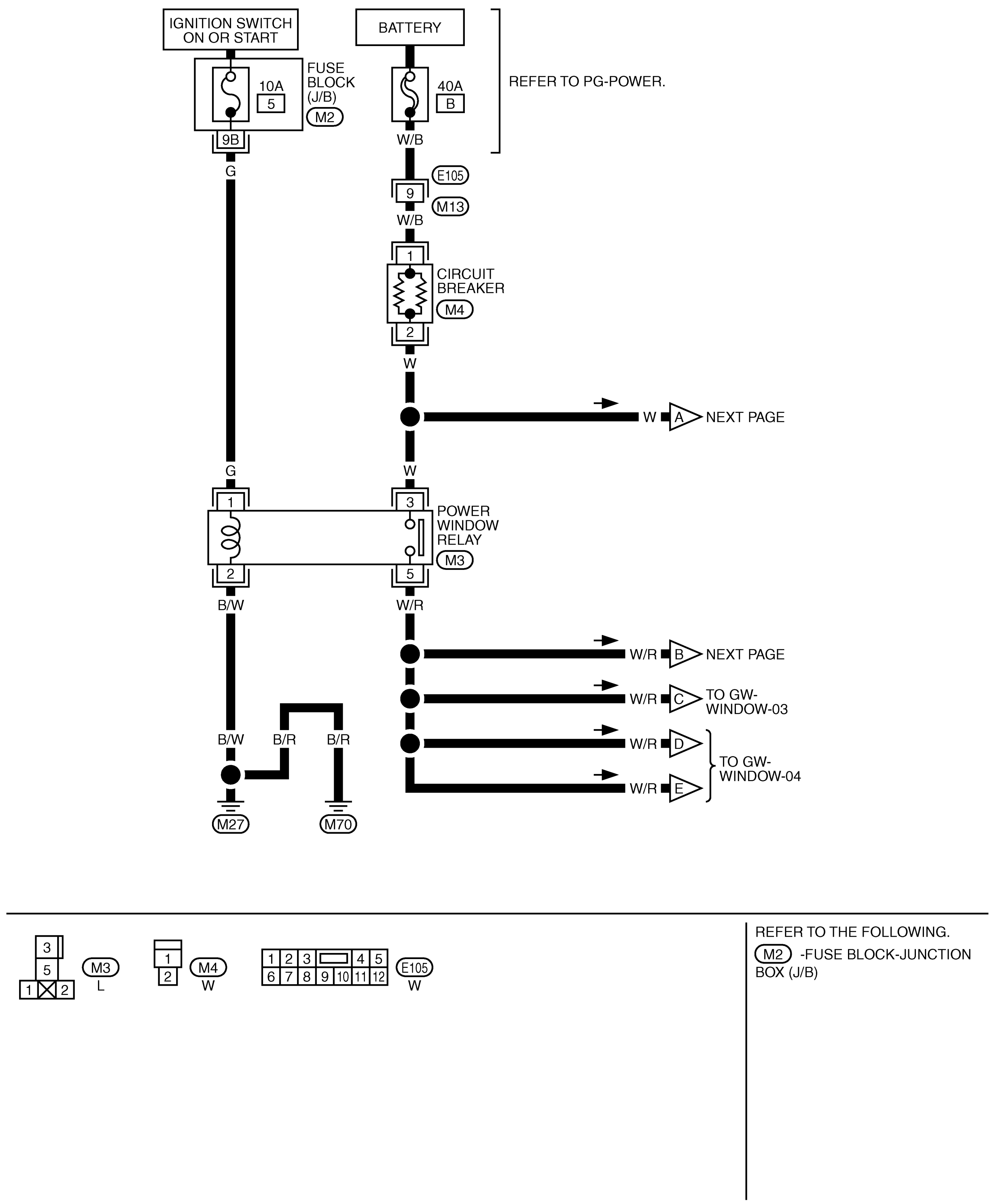


TIWB0062E

Wiring Diagram – WINDOW –

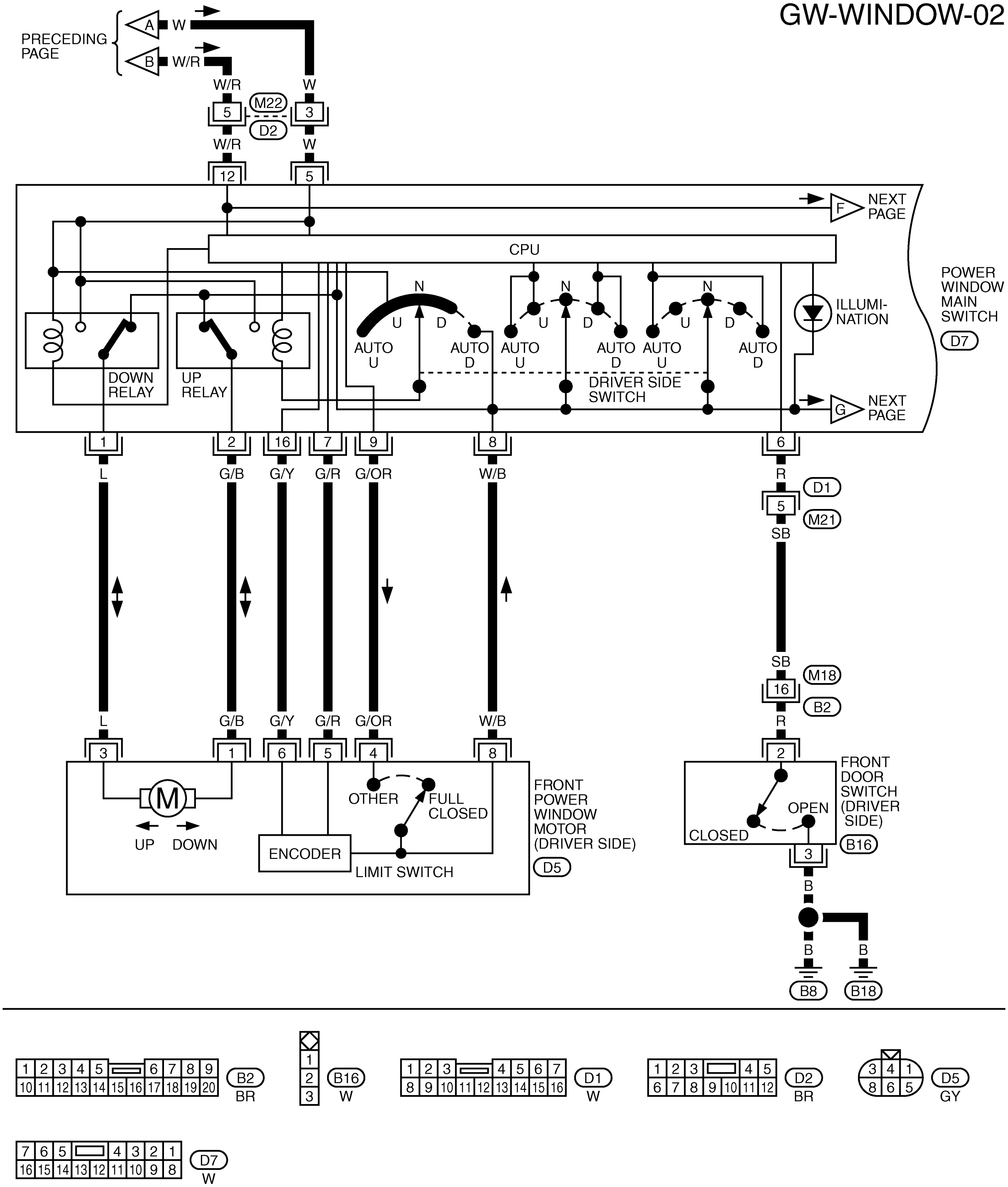
AIS005QV

GW-WINDOW-01

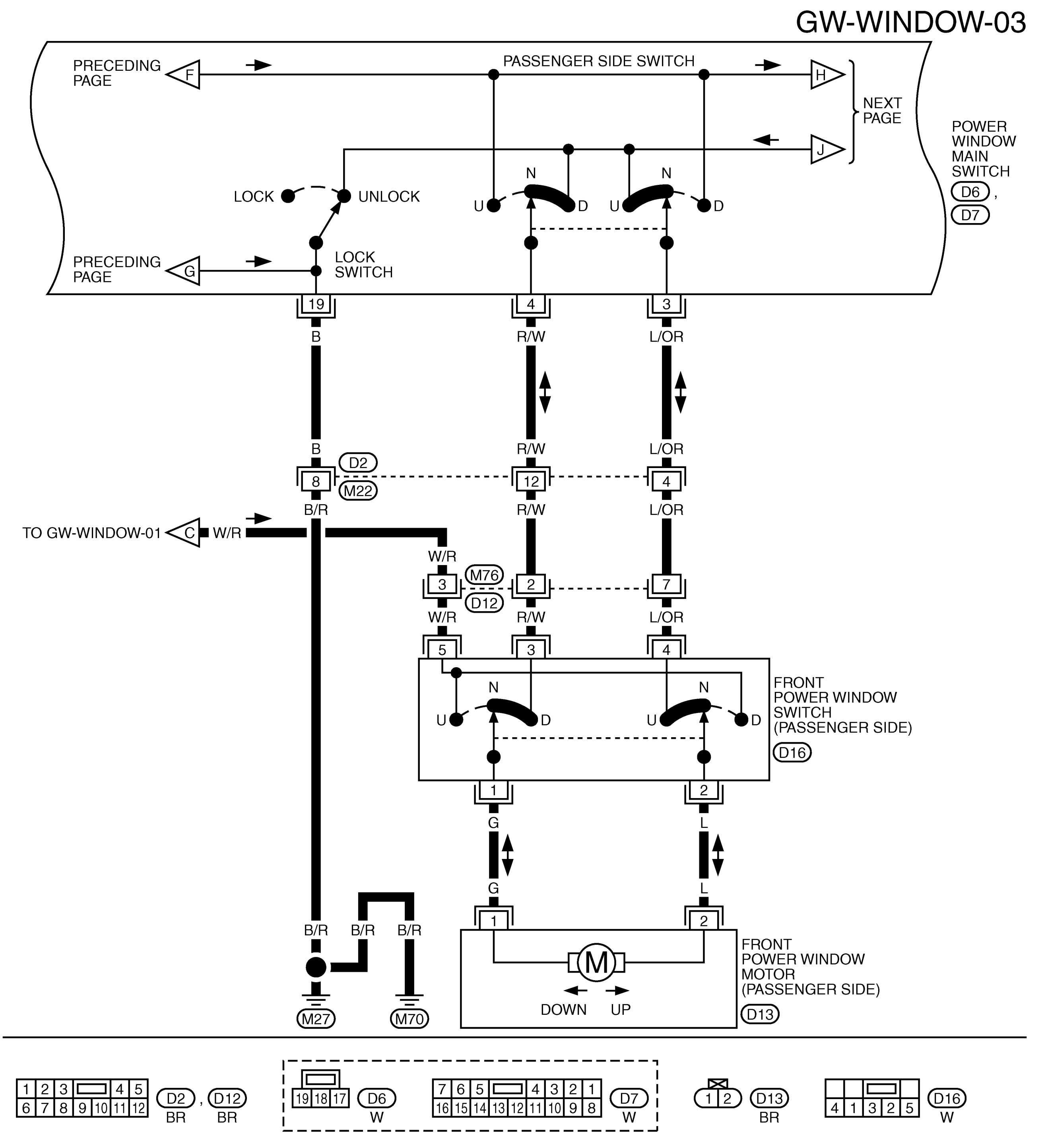


TIWA0449E

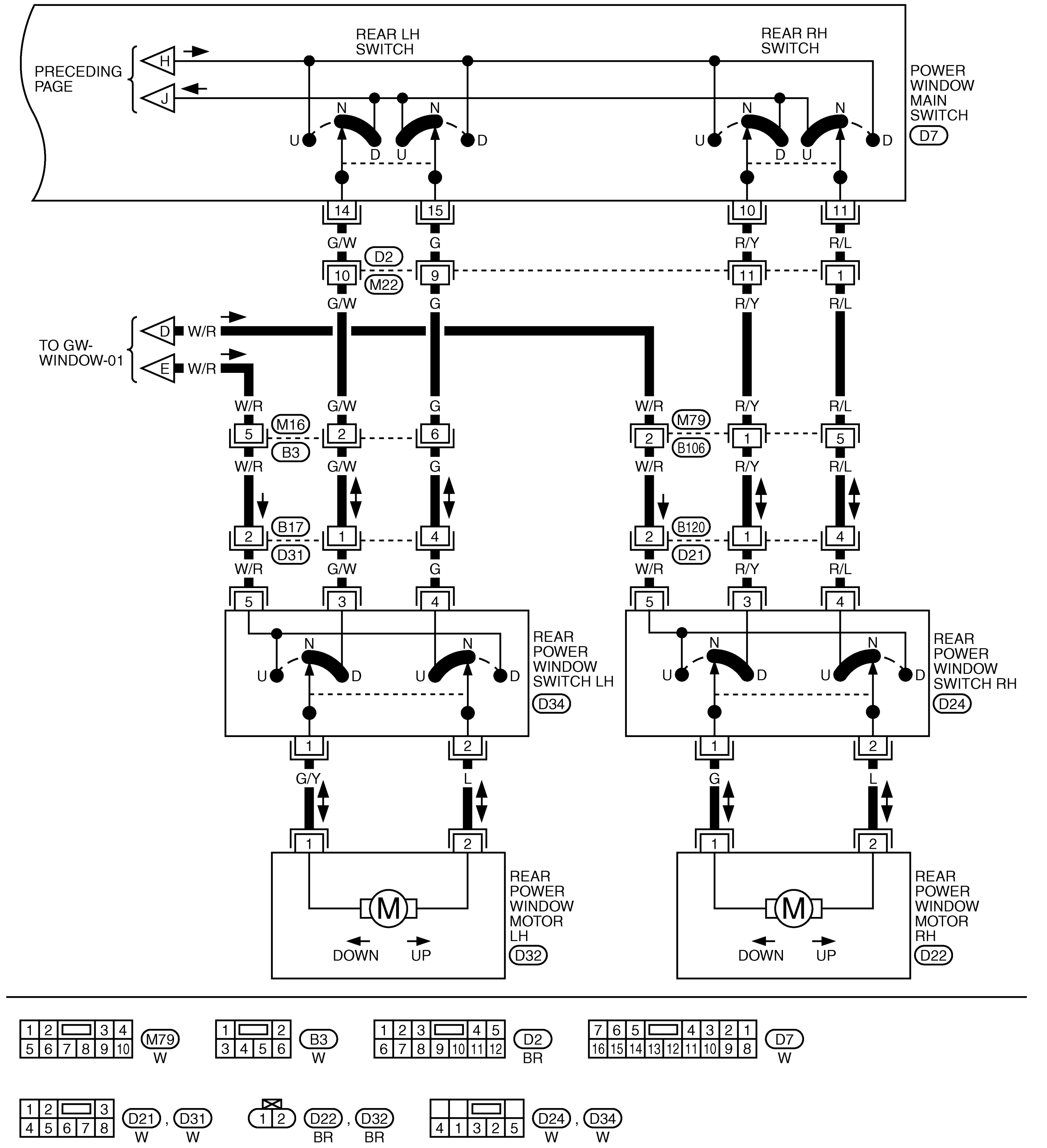
GW-WINDOW-02



TIWB0063E


GW-WINDOW-03
PRECEDING PAGE
F
PASSENGER SIDE SWITCH
H
NEXT PAGE
J
POWER WINDOW MAIN SWITCH
D6, D7
LOCK
UNLOCK
N
U
D
PRECEDING PAGE
G
LOCK SWITCH
19
4
3
B
R/W
L/OR
D2
M22
8
12
B/R
TO GW-WINDOW-01
C
W/R
M76
D12
2
7
5
FRONT POWER WINDOW SWITCH (PASSENGER SIDE)
D16
1
G
L
FRONT POWER WINDOW MOTOR (PASSENGER SIDE)
M
DOWN
UP
D13
M27
M70
BR
W
TIWB0064E

GW-WINDOW-04

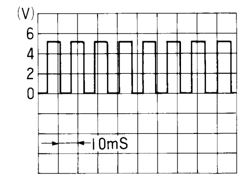


TIWA0452E

Terminal and Reference Value for Power Window Main Switch

AIS005QW

TERMINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) (Approx.)
1	L	Driver side power window motor DOWN signal	When power window motor is DOWN at operated.	Battery voltage
			Other than above.	0
2	G/B	Driver side power window motor UP signal	When power window motor is UP at operated.	Battery voltage
			Other than above.	0
3	L/OR	Passenger side power window motor DOWN signal	When passenger switch in power window main switch is DOWN at operated.	Battery voltage
			Other than above.	0
4	R/W	Passenger side power window motor UP signal	When passenger switch in power window main switch is UP at operated.	Battery voltage
			Other than above.	0
5	W	Power source (fusible link)	—	Battery voltage
6	R	Driver side door switch signal	ON (open)	0
			OFF (close)	Battery voltage
7	G/R	Encoder power supply	Ignition switch position ON and timer operating	10
8	W/B	Limit switch and encoder ground	—	0
9	G/OR	Limit switch signal	Driver side door window is between fully-open and just before fully-closed position (ON).	0
			Driver side door window is between just before fully-closed position and fully-closed position (OFF).	5
10	R/Y	Rear RH side power window motor UP signal	When rear RH switch in power window main switch is UP at operated.	Battery voltage
			Other than above.	0
11	R/L	Rear RH side power window motor DOWN signal	When rear RH switch in power window main switch is DOWN at operated.	Battery voltage
			Other than above.	0
12	W/R	Power window relay	Ignition switch position (ON or START)	Battery voltage
14	G/W	Rear LH side power window motor UP signal	When rear LH switch in power window main switch is UP at operated.	Battery voltage
			Other than above.	0
15	G	Rear LH side power window motor DOWN signal	When rear LH switch in power window main switch is DOWN at operated.	Battery voltage
			Other than above.	0

TERMINAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) (Approx.)
16	G/Y	Encoder pulse signal	When power window motor operates.	 OCC3383D
19	B	Ground	—	0

Trouble Diagnoses Symptom Chart

AIS005R0

Make sure other systems using the signal of the following systems operate normally.

Symptom	Repair order	Refer to page
None of the power window can be operated using by any switch	1. Check power window relay power supply and ground	GW-45
	2. Check power window main switch power supply and ground circuit	GW-46
Driver side power window does not operate.	1. Check power window motor (driver side) circuit	GW-46
Passenger side power window does not operate.	1. Check power window motor circuit	GW-47
	2. Check power window switch circuit	GW-48
	3. Check power window (passenger side) circuit	GW-49
Rear LH power window does not operate.	1. Check power window motor circuit	GW-47
	2. Check power window switch circuit	GW-48
	3. Check power window (rear LH) circuit	GW-49
Rear RH power window does not operate.	1. Check power window motor circuit	GW-47
	2. Check power window switch circuit	GW-48
	3. Check power window (rear RH) circuit	GW-50
Anti-pinch system does not operate normally (driver side)	1. Door window sliding part malfunction ● A foreign adheres to window glass or glass run rubber ● Glass run rubber wear or deformation. ● Sash is tilted to much, or no enough.	—
	2. Limit switch adjusting	GW-58
	3. Check limit switch circuit	GW-51
	4. Check encoder circuit	GW-52
Auto operation does not operate but manual operate normally	1. Check encoder circuit	GW-52
Power window retained power operation does not operate properly	1. Check door switch circuit	GW-54

Check Power Window Relay Power Supply and Ground Circuit

AIS005R1

1. CHECK FUSE

- Check 10A fuse [No. 5, located in fuse block (J/B)]
- Check 40A fusible link (litter **B** , located in the fuse and fusible link box.)

NOTE:
Refer to GW-33, "Component Parts and Harness Connector Location" .

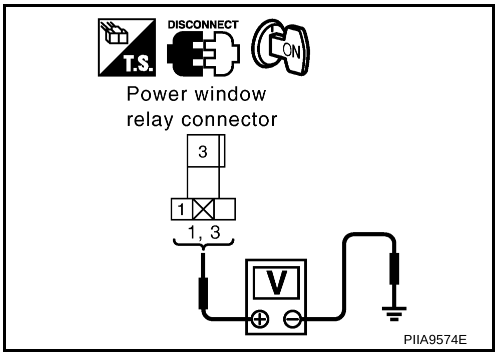
OK or NG

OK >> GO TO 2.
NG >> If fuse is blown out, be sure to eliminate cause of malfunction before installing new fuse. Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK POWER WINDOW RELAY POWER SUPPLY

1. Turn ignition switch OFF.
2. Remove power window relay.
3. Turn ignition switch ON.
4. Check voltage between power window relay harness connector M3 terminal 1, 3 and ground.

1 (G) - Ground : Battery voltage
3 (W) - Ground : Battery voltage



PIIA9574E

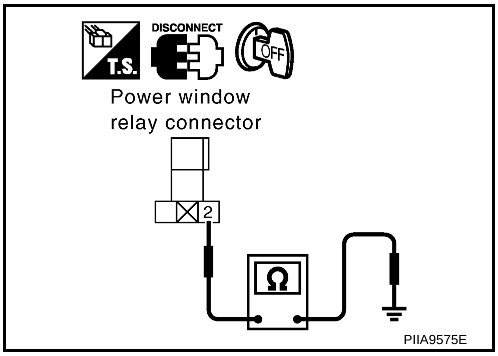
OK or NG

OK >> GO TO 3.
NG >> Check power window relay power supply circuit for open or short.

3. CHECK POWER WINDOW RELAY GROUND

1. Turn ignition switch OFF.
2. Check continuity between power window relay harness connector M3 terminal 2 and ground.

2 (B/W) - Ground : Continuity should exist.



PIIA9575E

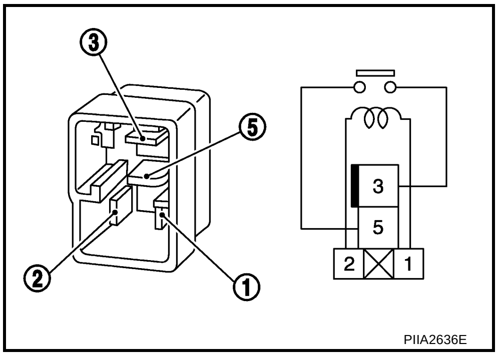
OK or NG

OK >> GO TO 4.
NG >> Check power window relay ground circuit for open or short.

4. CHECK POWER WINDOW RELAY

Check continuity between power window relay terminal 3 and 5.

Terminal		Condition	Continuity
3	5	12V direct current supply between terminals 1 and 2	Yes
		No current supply	No



PIIA2636E

OK or NG

OK >> Check condition of harness and connector.
NG >> Replace power window relay.

A B C D E F G H GW J K L M

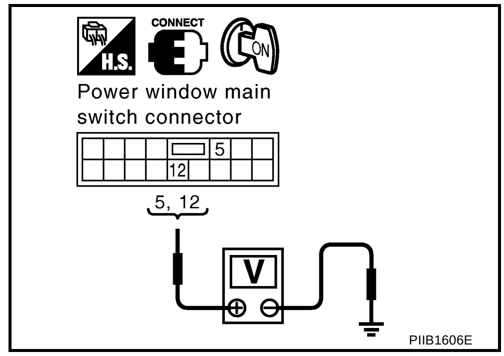
Check Power Window Main Switch Power Supply and Ground Circuit

AIS005R2

1. CHECK POWER SUPPLY CIRCUIT

1. Turn ignition switch ON.
2. Check voltage between power window main switch harness connector D7 terminal 5, 12 and ground.

5 (W) - Ground : Battery voltage
12 (W/R) - Ground : Battery voltage



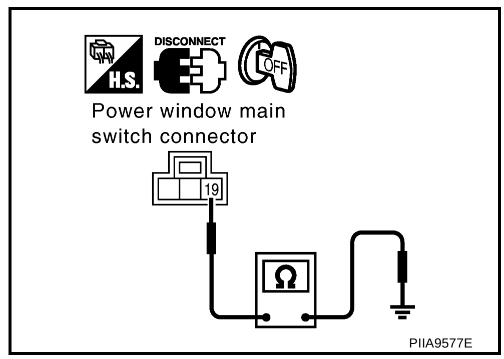
OK or NG

OK >> GO TO 2.
NG >> Repair or replace harness between power window main switch power supply circuit.

2. CHECK POWER WINDOW MAIN SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch harness connector.
3. Check continuity between power window main switch harness connector D6 terminal 19 and ground.

19 (B) - Ground : Continuity should exist.



OK or NG

OK >> Power window main switch power supply and ground circuit are OK.
NG >> Repair or replace harness between power window main switch and ground.

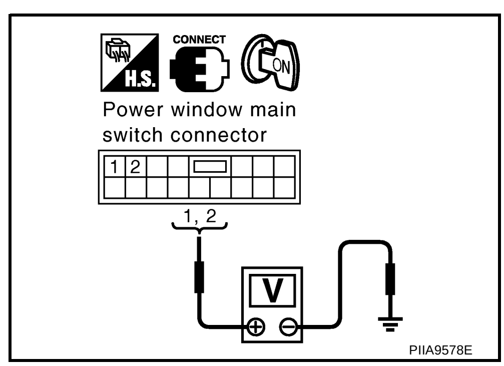
Check Power Window Motor (Driver Side) Circuit

AIS005R3

1. CHECK POWER WINDOW MAIN SWITCH SIGNAL

1. Turn ignition switch ON.
2. Driver side switch in power window main switch operated, check voltage between power window main switch harness connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	1 (L)	Ground	Closing	0
			Opening	Battery voltage
	2 (G/B)		Closing	Battery voltage
			Opening	0



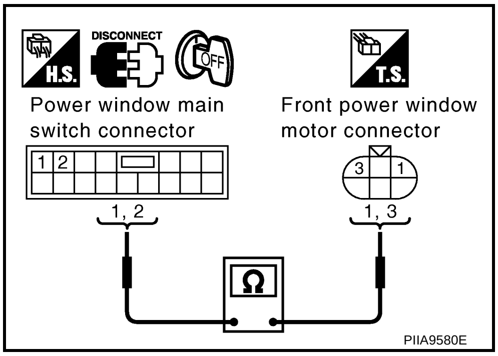
OK or NG

OK >> GO TO 2.
NG >> Replace power window main switch.

2. CHECK POWER WINDOW MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front power window motor (driver side) connector.
3. Check continuity between power window main switch harness connector D7 terminal 1, 2 and front power window motor (driver side) harness connector D5 terminal 1, 3.

1 (L) - 3 (L) **: Continuity should exist.**
2 (G/B) - 1 (G/B) **: Continuity should exist.**



OK or NG

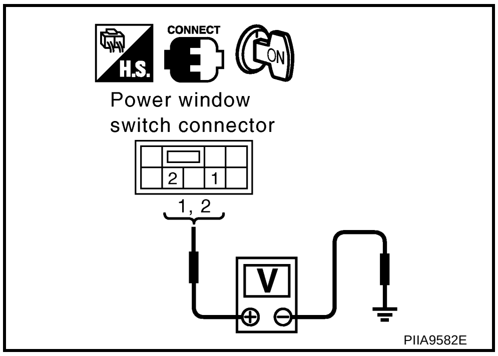
OK >> Replace front power window motor (driver side).
NG >> Repair or replace harness between power window main switch and front power window motor (driver side).

Check Power Window Motor Circuit

AIS005R4

1. CHECK POWER WINDOW SWITCH SIGNAL

1. Turn ignition switch ON.
2. Power window switch operated, check voltage between power window switch harness connector and ground.



Connector	Terminal (Wire color) (+)	Terminal (Wire color) (-)	Condition	Voltage (V) (Approx.)
D16 (Passenger side)	1 (G or G/Y)	Ground	Closing	Battery voltage
			Opening	0
D24 (Rear RH)	2 (L)		Closing	0
D34 (Rear LH)			Opening	Battery voltage

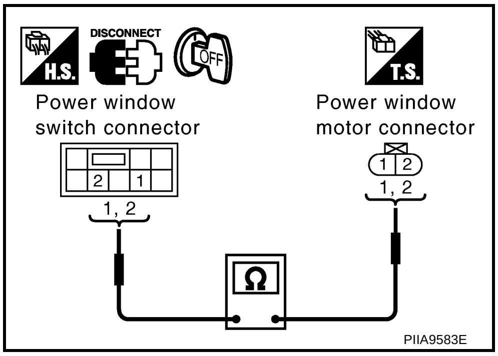
OK or NG

OK >> GO TO 2.
NG >> Check power window switch. Refer to GW-48 .

2. CHECK POWER WINDOW MOTOR CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window switch and power window motor connector.
3. Check continuity between power window switch harness connector D16 (passenger side), D24 (rear RH), D34 (rear LH) terminal 1, 2 and power window motor harness connector D13 (passenger side), D 22 (rear RH), D32 (rear LH) terminal 1, 2.

1 (G or G/Y) - 1 (G or G/Y) **: Continuity should exist.**
2 (L) - 2 (L) **: Continuity should exist.**



OK or NG

OK >> Replace malfunction power window motor.
NG >> Repair or replace harness between power window switch and power window motor.

Check Power Window Switch Circuit

AIS005R5

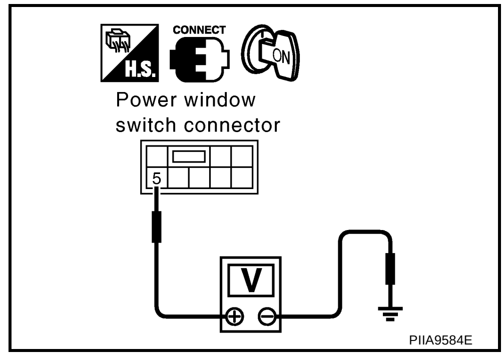
1. CHECK POWER WINDOW SWITCH POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between power window switch harness connector D16 (passenger side), D24 (rear RH), D34 (rear LH) terminal 5 and ground.

5 (W/R) - Ground : Battery voltage

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.



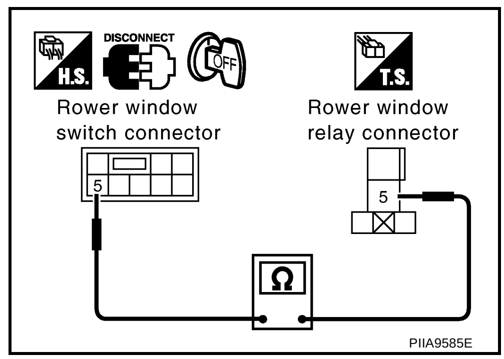
2. CHECK POWER WINDOW SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window switch connector and power window relay.
3. Check continuity between power window switch harness connector D16 (passenger side), D24 (rear RH), D34 (rear LH) terminal 5 and power window relay harness connector M3 terminal 5.

5 (W/R) - 5 (W/R) : Continuity should exist.

OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between power window switch and power window relay.



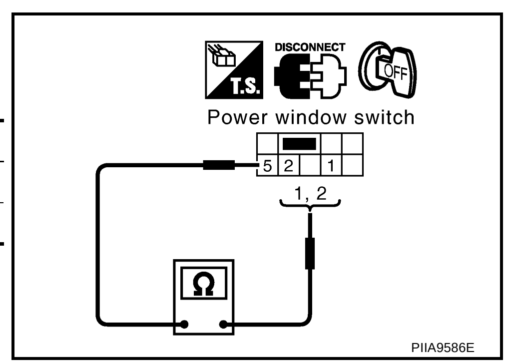
3. CHECK POWER WINDOW SWITCH

1. Turn ignition switch OFF.
2. Disconnect power window switch connector.
3. Power window switch operated, check continuity between power window switch connector D16 (passenger side), D24 (rear RH), D34 (rear LH) terminal 1, 2 and 5.

Terminal		Condition	Continuity
1	5	UP	Yes
2		DOWN	Yes

OK or NG

OK >> Power window switch is OK.
NG >> Replace malfunction power window switch.



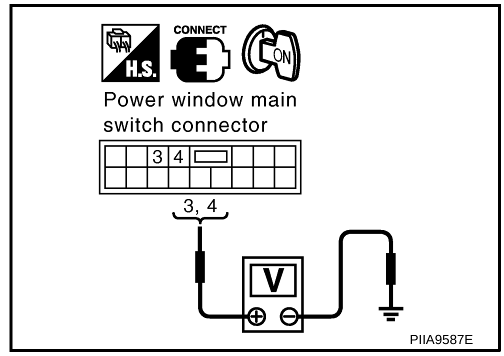
Check Power Window (Passenger Side) Circuit

AIS005R6

1. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Passenger side switch in power window main switch operated, check voltage between power window main switch harness connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	3 (L/OR)	Ground	Closing	0
			Opening	Battery voltage
	4 (R/W)		Closing	Battery voltage
			Opening	0



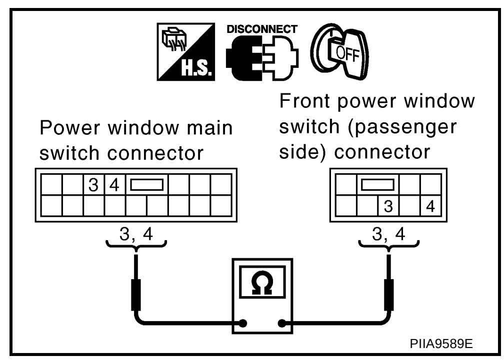
OK or NG

OK >> GO TO 2.
NG >> Replace power window main switch.

2. CHECK POWER WINDOW SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch and font power window switch (passenger side) connector.
3. Check continuity between power window main switch harness connector D7 terminal 3, 4 and front power window switch (passenger side) harness connector D16 terminal 3, 4.

3 (L/OR) - 4 (L/OR) : Continuity should exist.
4 (R/W) - 3 (R/W) : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between power window main switch and front power window switch (passenger side).

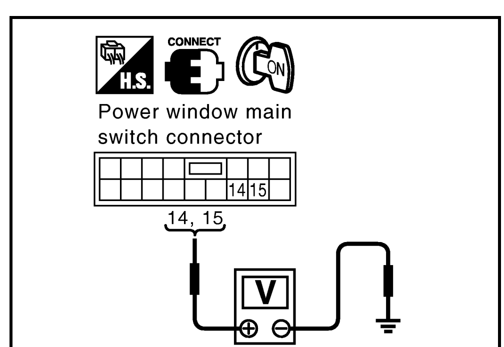
Check Power Window (Rear LH) Circuit

AIS005R7

1. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Rear LH switch in power window main switch operated, check voltage between power window main switch harness connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	14 (G/W)	Ground	Closing	Battery voltage
			Opening	0
	15 (G)		Closing	0
			Opening	Battery voltage



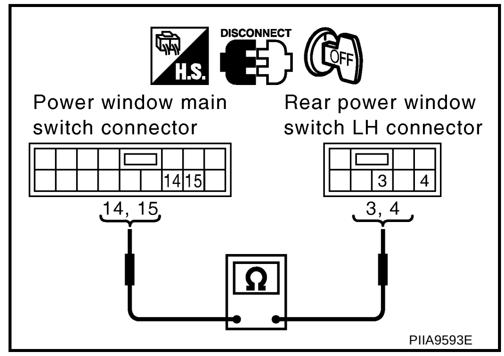
OK or NG

OK >> GO TO 2.
NG >> Replace power window main switch.

2. CHECK POWER WINDOW SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch and rear power window switch LH connector.
3. Check continuity between power window main switch harness connector D7 terminal 14, 15 and rear power window switch LH harness connector D34 terminal 3, 4.

14 (G/W) - 3 (G/W) : Continuity should exist.
15 (G) - 4 (G) : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between power window main switch and rear power window switch LH.

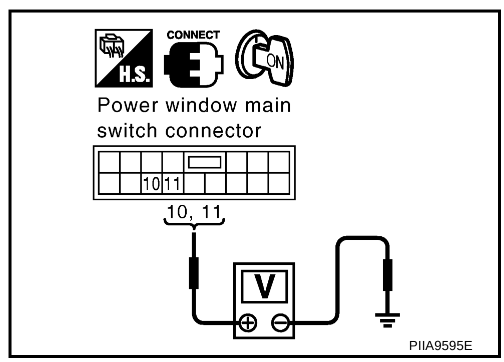
Check Power Window (Rear RH) Circuit

AIS005R8

1. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Rear RH switch in power window main switch operated, check voltage between power window main switch harness connector and ground.

Connector	Terminal (Wire color) (+)	Terminal (Wire color) (-)	Condition	Voltage (V) (Approx.)
D7	10 (R/Y)	Ground	Closing	Battery voltage
			Opening	0
	11 (R/L)		Closing	0
			Opening	Battery voltage



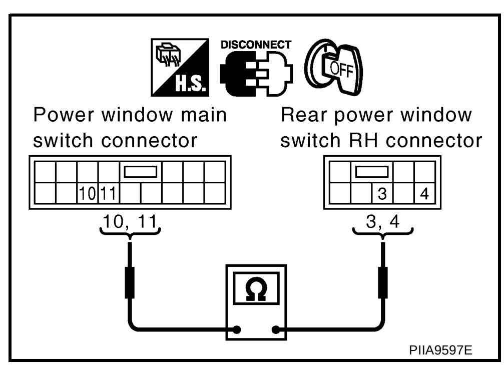
OK or NG

OK >> GO TO 2.
NG >> Replace power window main switch.

2. CHECK POWER WINDOW SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch and rear power window switch LH connector.
3. Check continuity between power window main switch harness connector D7 terminal 10, 11 and rear power window switch RH harness connector D24 terminal 3, 4.

10 (R/Y) - 3 (R/Y) : Continuity should exist.
11 (R/L) - 4 (R/L) : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Repair or replace harness between power window main switch and rear power window switch RH.

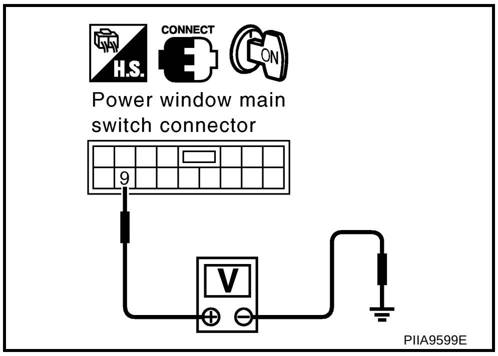
Check Limit Switch Circuit

AIS005R9

1. CHECK LIMIT SWITCH SIGNAL

1. Turn ignition switch ON.
2. Check voltage between power window main switch harness connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	9 (G/OR)	Ground	Driver side door window is Between fully-open and Just before fully-closed Position (ON)	0
			Driver side door window is Between just before fully-Closed position and fully-Closed position (OFF)	5



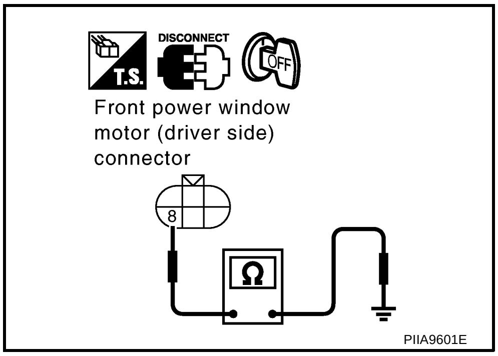
OK or NG

OK >> Limit switch is OK.
NG >> GO TO 2.

2. CHECK LIMIT SWITCH GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect front power window motor (driver side) connector.
3. Check continuity between front power window motor (driver side) harness connector D5 terminal 8 and ground.

8 (W/B) - Ground : Continuity should exist.



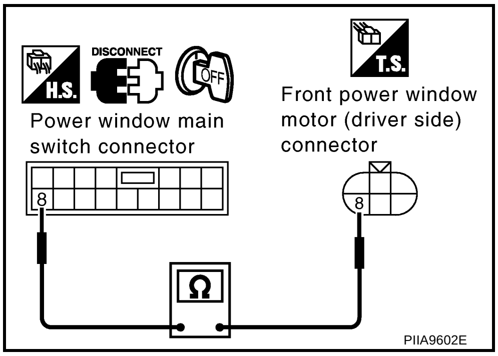
OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK HARNESS CONTINUITY

1. Disconnect power window main switch connector.
2. Check continuity between power window main switch harness connector D7 terminal 8 and front power window motor (driver side) harness connector D5 terminal 8.

8 (W/B) - 8 (W/B) : Continuity should exist.



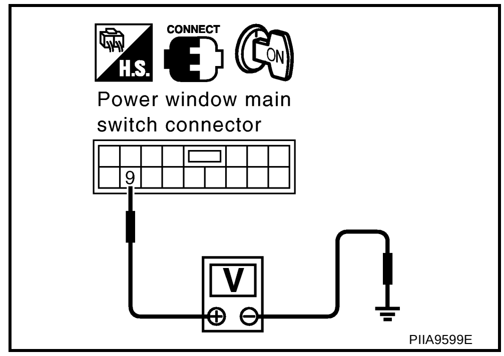
OK or NG

OK >> Replace power window main switch.
NG >> Repair or replace harness between power window main switch and front power window motor (driver side).

4. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Turn ignition switch ON.
2. Check voltage between power window main switch harness connector D7 terminal 9 and ground.

9 (G/OR) - Ground : Approx. 5V



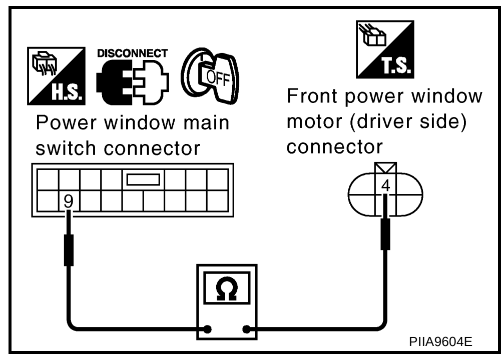
OK or NG

OK >> GO TO 5.
NG >> Replace power window main switch.

5. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector.
3. Check continuity between power window main switch harness connector D7 terminal 9 and front power window motor (driver side) harness connector D5 terminal 4.

9 (G/OR) - 4 (G/OR) : Continuity should exist.



OK or NG

OK >> Check condition of harness and connector.
NG >> Replace power window motor (driver side).

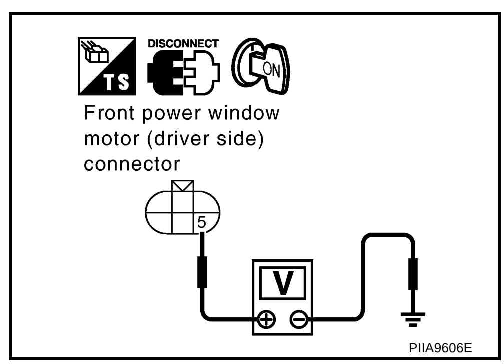
Check Encoder Circuit

AIS005RA

1. CHECK ENCODER POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect front power window motor (driver side) connector.
3. Turn ignition switch ON.
4. Check voltage between front power window motor (driver side) harness connector D5 terminal 5 and ground.

5 (G/R) - Ground : Approx. 10V



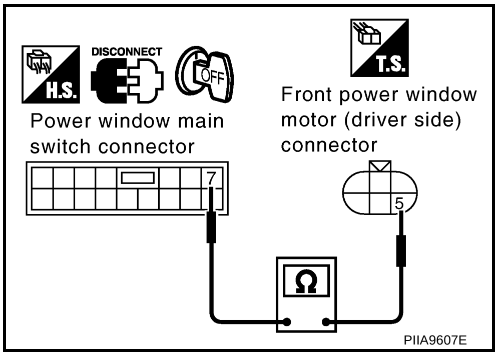
OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK HARNESS CONTINUITY

1. Turn ignition switch OFF.
2. Disconnect power window main switch connector.
3. Check continuity between power window main switch harness connector D7 terminal 7 and front power window motor (driver side) harness connector D5 terminal 5.

7 (G/R) - 5 (G/R) : Continuity should exist.



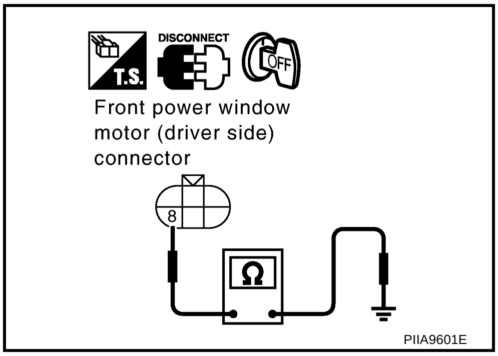
OK or NG

OK >> Replace power window main switch.
NG >> Repair or replace harness between power window main switch and front power window motor (driver side).

3. CHECK ENCODER GROUND

1. Turn ignition switch OFF.
2. Check continuity between front power window motor (driver side) harness connector D5 terminal 8 and ground.

8 (W/B) - Ground : Continuity should exist.



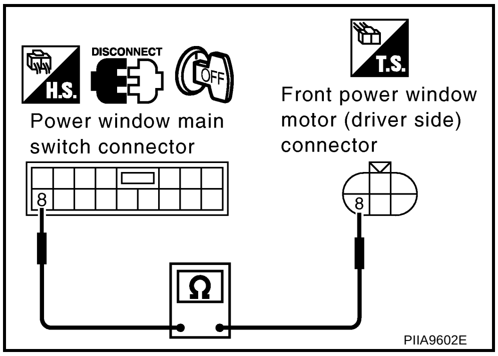
OK or NG

OK >> GO TO 5.
NG >> GO TO 4.

4. CHECK ENCODER GROUND CIRCUIT

1. Disconnect power window main switch connector.
2. Check continuity between power window main switch harness connector D7 terminal 8 and front power window motor (driver side) harness connector D5 terminal 8.

8 (W/B) - 8 (W/B) : Continuity should exist.

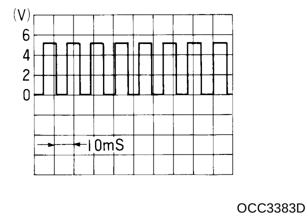


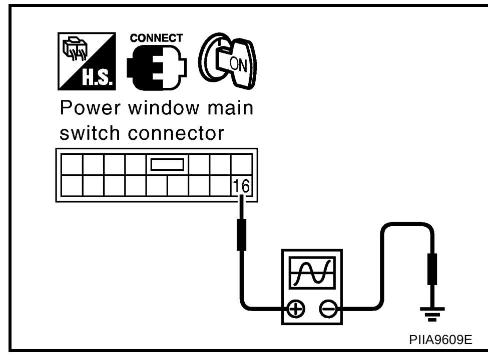
OK or NG

OK >> Replace power window main switch.
NG >> Repair or replace harness between power window main switch and front power window motor (driver side).

5. CHECK ENCODER SIGNAL

1. Connect front power window motor (driver side) connector.
2. Turn ignition switch ON.
3. Check signal between power window main switch connector and ground with oscilloscope.

Connector	Terminal (Wire color)		Condition	Signal (Reference value)
	(+)	(-)		
D7	16 (G/Y)	Ground	opening	



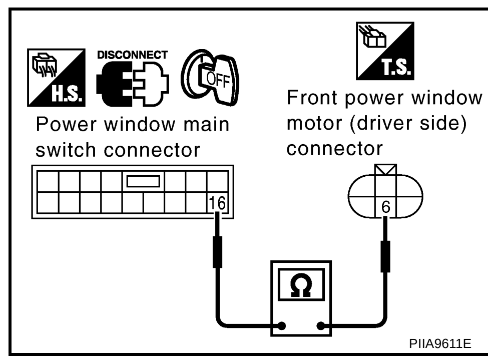
OK or NG

OK >> Replace power window main switch.
NG >> GO TO 6.

6. CHECK ENCODER CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front power window motor (driver side) connector.
3. Check continuity between power window main switch harness connector D7 terminal 16 and front power window motor (driver side) harness connector D5 terminal 6.

16 (G/Y) - 6 (G/Y) : Continuity should exist.



OK or NG

OK >> Replace front power window motor (driver side).
NG >> Repair or replace harness between power window main switch and front power window motor (driver side).

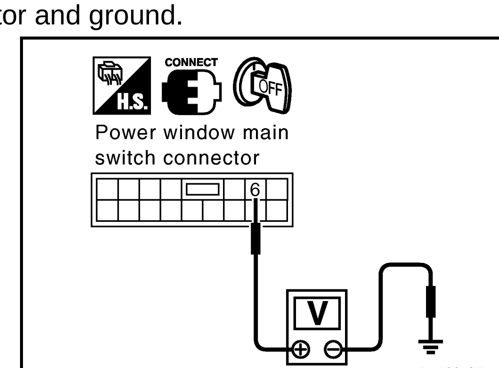
Check Door Switch Circuit

AIS005RB

1. CHECK DOOR SWITCH INPUT SIGNAL

Check voltage between power window main switch harness connector and ground.

Connector	Terminal (Wire color)		Condition	Voltage (V) (Approx.)
	(+)	(-)		
D7	6 (R)	Ground	OPEN	0
			CLOSE	Battery voltage



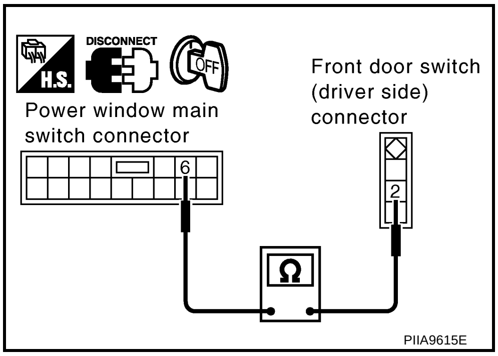
OK or NG

OK >> Replace power window main switch.
NG >> GO TO 2.

2. CHECK DOOR SWITCH CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect power window main switch and front door switch (driver side) connector.
3. Check continuity between power window main switch harness connector D7 terminal 6 and front door switch (driver side) harness connector B16 terminal 2.

6 (R) - 2 (R) : Continuity should exist.



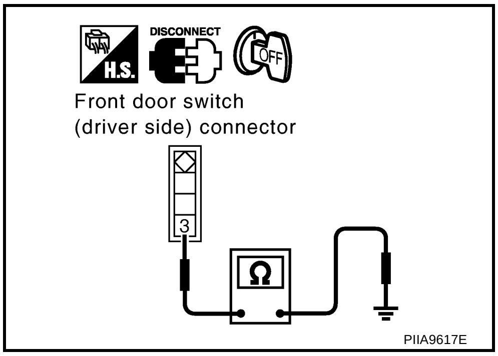
OK or NG

OK >> GO TO 3.
NG >> Repair or replace harness between power window main switch and front door switch (driver side).

3. CHECK DOOR SWITCH GROUND CIRCUIT

Check continuity between front door switch (driver side) harness connector B16 terminal 3 and ground.

3 (B) - Ground : Continuity should exist.



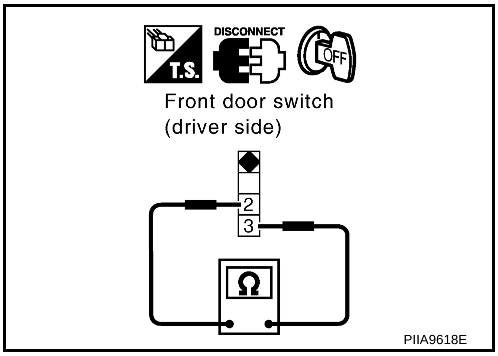
OK or NG

OK >> GO TO 4.
NG >> Repair or replace harness between front door switch (driver side) and ground.

4. CHECK DOOR SWITCH

Check continuity between front door switch (driver side) terminal 2 and 3.

Terminal		Door switch	Continuity
2	3	Pushed	No
		Released	Yes



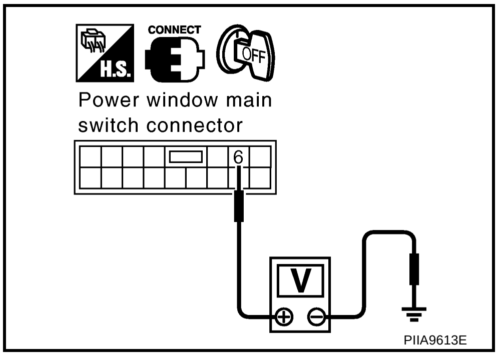
OK or NG

OK >> GO TO 5.
NG >> Replace front door switch (driver side).

5. CHECK POWER WINDOW MAIN SWITCH OUTPUT SIGNAL

1. Connect power window main switch connector.
2. Check voltage between power window main switch harness connector D7 terminal 6 and ground.

6 (R) - Ground : Battery voltage



OK or NG

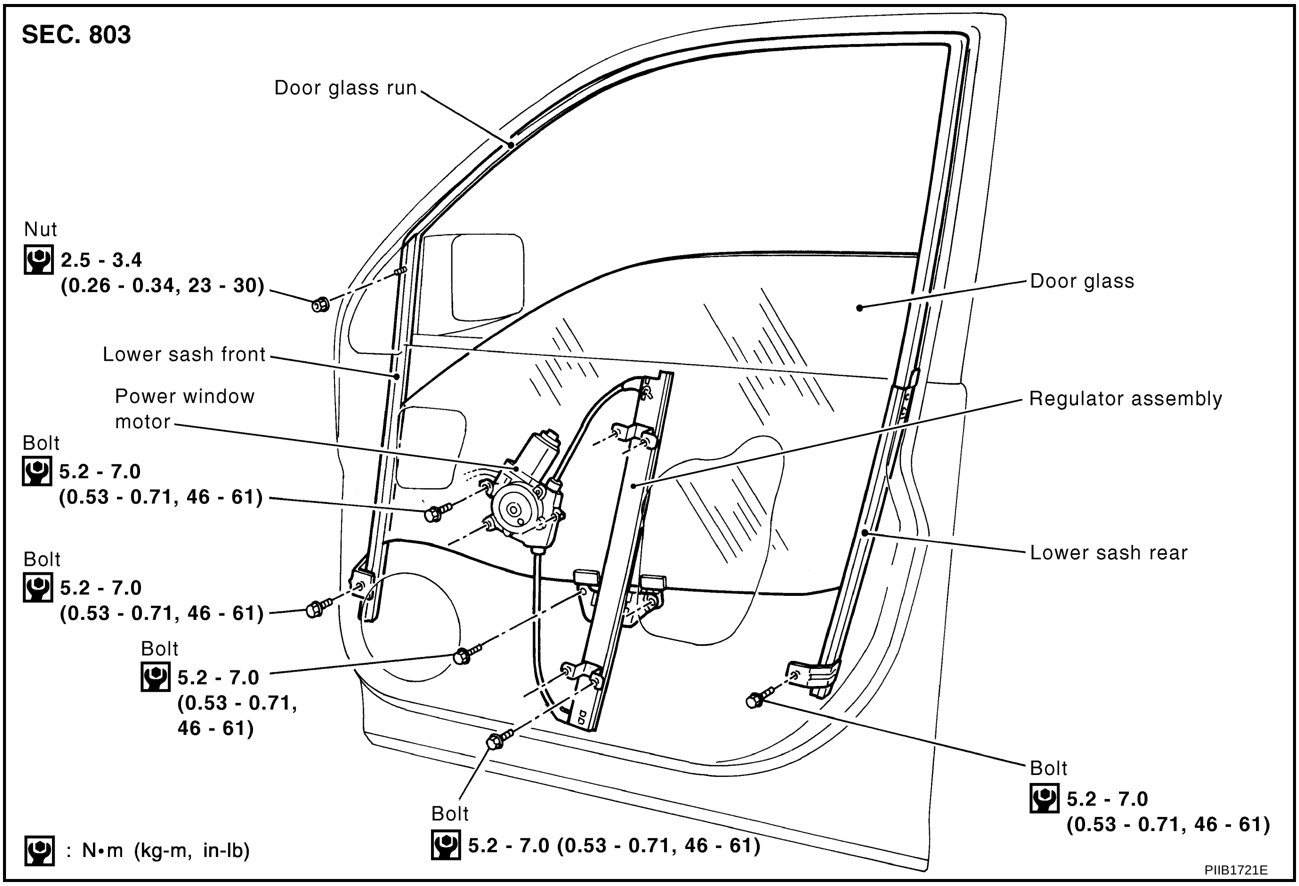
OK >> Check condition of harness and connector.
NG >> Replace power window main switch.

FRONT DOOR GLASS AND REGULATOR

PFP:80300

Removal and Installation

AIS005RC



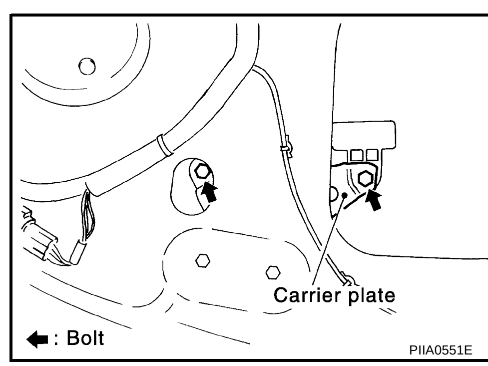
FRONT DOOR GLASS

Removal

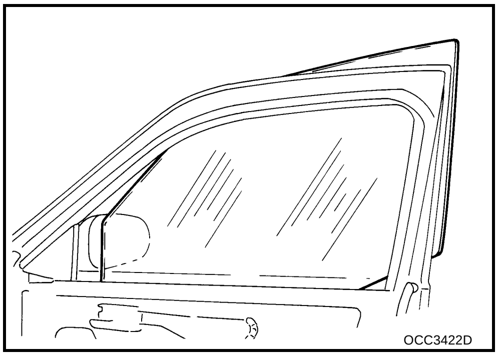
1. Remove front door finisher. Refer to EI-32, "Removal and Installation" .
2. Remove sealing screen.

   NOTE:

   If sealing screen is reused, cut the butyl-tape so that a part of butyl-tape remains on the sealing screen.
3. Operate power window main switch to raise or lower the door window until the carrier plate mounting bolts appear.
4. Remove carrier plate mounting bolts.



5. While holding door glass, raise it at the rear end to pull glass out of the sash toward the outside of door.



Installation

Install in the reverse order of removal.

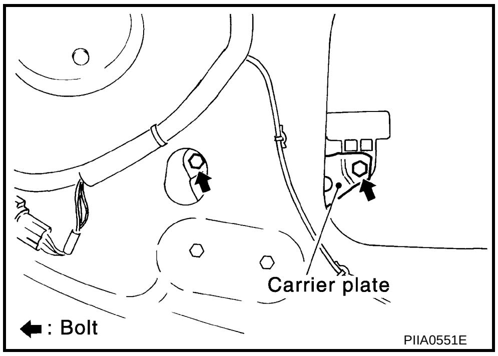
FRONT DOOR REGULATOR ASSEMBLY

Removal

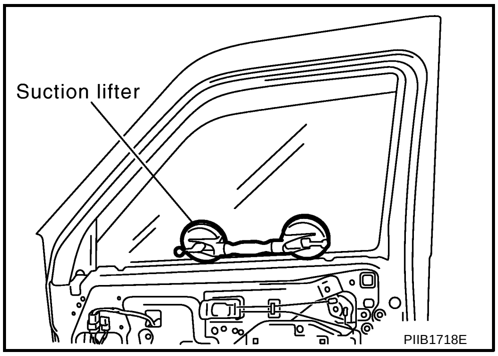
1. Remove front door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove sealing screen.

   NOTE:

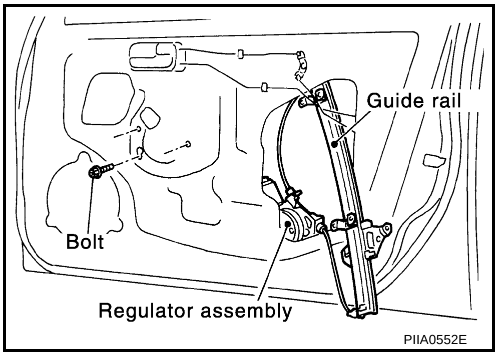
   If sealing screen is reused, cut the butyl-tape so that a part of butyl-tape remains on the sealing screen.
3. Operate power window main switch to raise or lower the door window until the carrier plate mounting bolts appear.
4. Remove carrier plate mounting bolts.



5. Raise up the door glass and hold with the suction lifter.



6. Disconnect power window motor harness connector.
7. Remove regulator assembly and guide rail mounting bolts, and remove regulator assembly through the access hole.



Installation

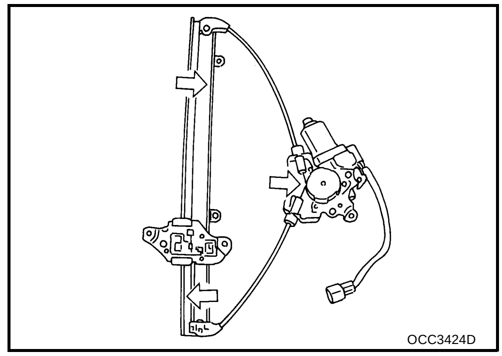
Install in the reverse order of removal.

Inspection after Removal

Check regulator assembly for the following. If a malfunction is detected, replace or grease it.

- Wire wear
- Regulator deformation
- Grease condition for each sliding part

The arrows in the figure show body grease application points of the multi-purpose grease.


OCC3424D

Disassembly

Remove power window motor from regulator assembly.

Assembly

Assemble in the reverse order of disassembly.

Inspection after Installation

SETTING OF LIMIT SWITCH (DRIVER SIDE)

If any of the following work has been done, set the limit switch (integrated in the motor).

- Removal and installation of regulator assembly
- Removal and installation of power window motor from the regulator assembly
- Operate regulator assembly as a unit
- Removal and installation of door glass
- Removal and installation of door glass run

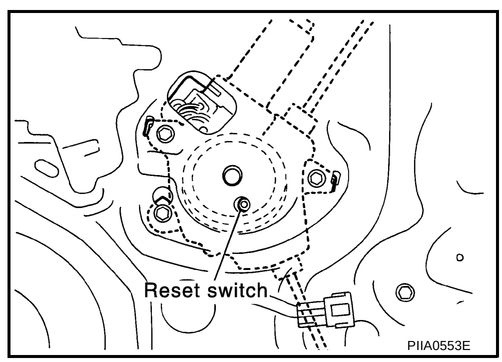
RESET OPERATION

After installing each component to the vehicle, follow the steps below.

1. Raise door glass to the top position.
2. While pressing and holding reset switch, lower door glass to the bottom position.
3. Release reset switch, and check that reset switch returns to the original position. Then raise door glass to the top position.

CAUTION:

Do not operate door glass automatically to raise door glass to the top position.



PIIA0553E

Fitting Inspection

AIS0065T

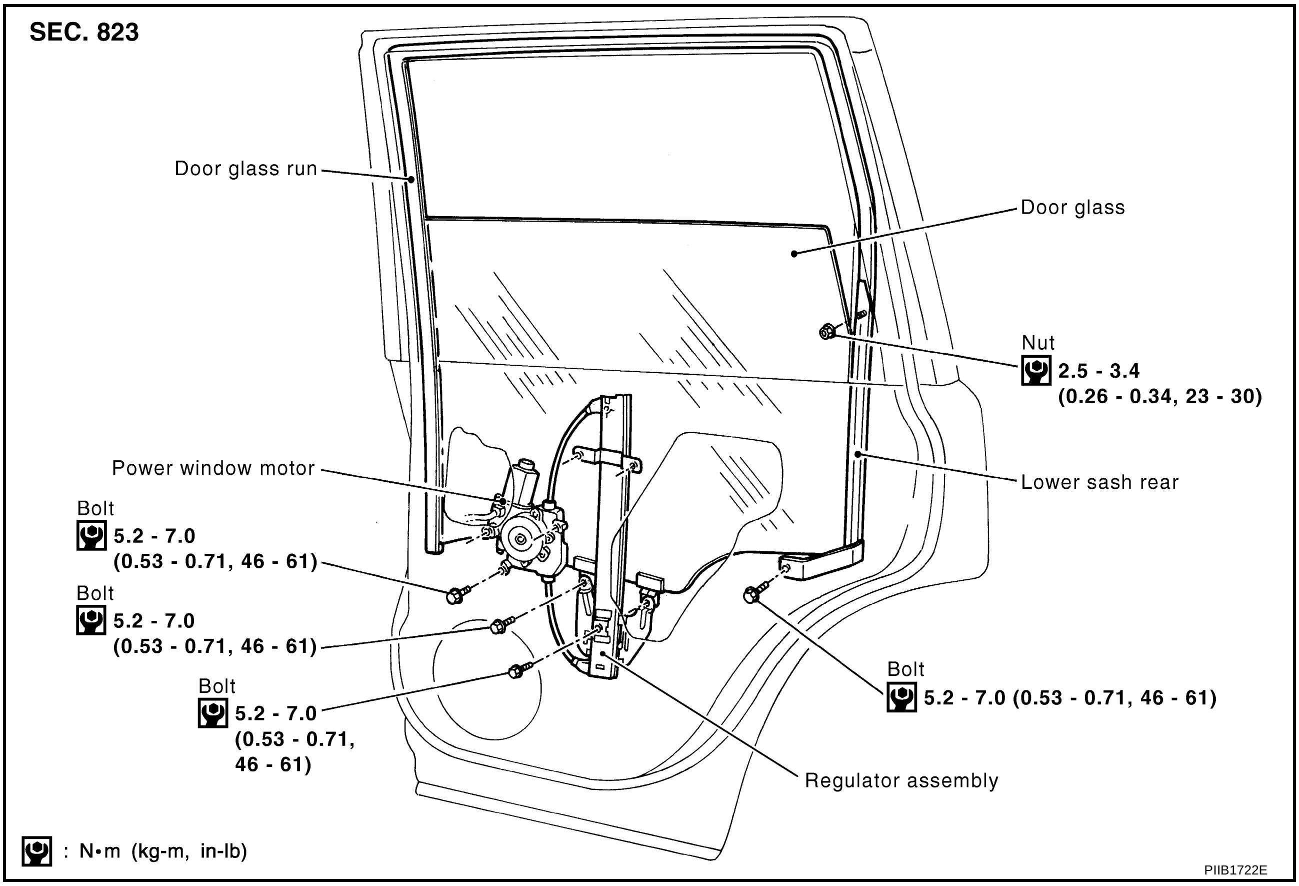
- Check that door glass is securely fit into door glass run groove.
- While raising and lowering the window, check for abnormal operation.
- Lower the door glass slightly [approx. 10 to 20 mm (0.39 to 0.79 in)], and check that the clearance to the sash is parallel. If the clearance between the door glass and sash is not parallel, loosen the regulator assembly mounting bolts, guide rail mounting bolts, and door glass & carrier plate mounting bolts to correct the door glass position.

REAR DOOR GLASS AND REGULATOR

PFP:82300

Removal and Installation

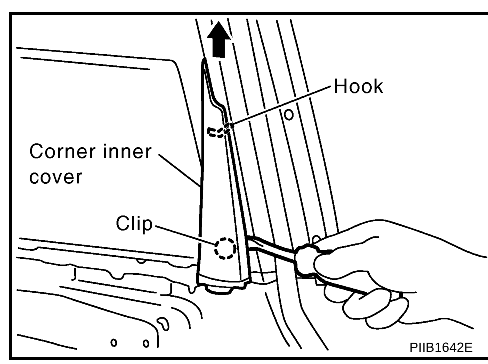
AIS005RD



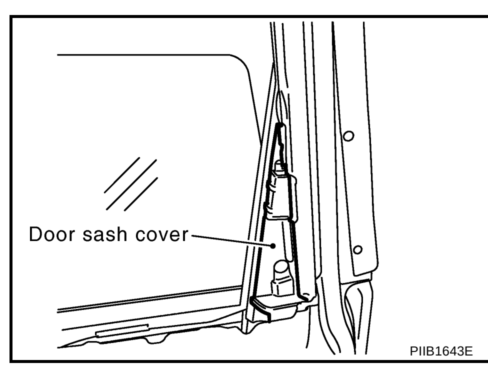
REAR DOOR GLASS

Removal

1. Remove rear door finisher. Refer to EI-32, "Removal and Installation" .
2. Using a slotted screwdriver or similar tool, remove clip on the corner inner cover. Slide the corner inner cover upward to disconnect the upper hook, and remove the cover.

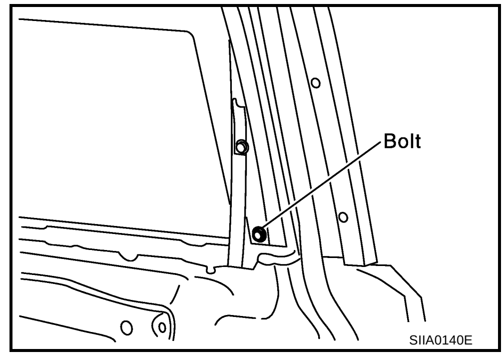


3. Slide the door sash cover forward to remove.



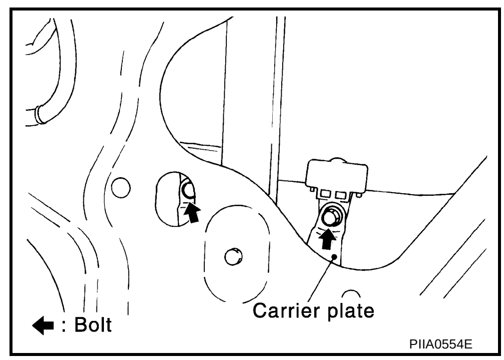
4. Remove corner outer cover mounting bolt. Disconnect upper hook, and remove the cover.

   : 3.0 N·m (0.31 kg-m, 27 in-lb)

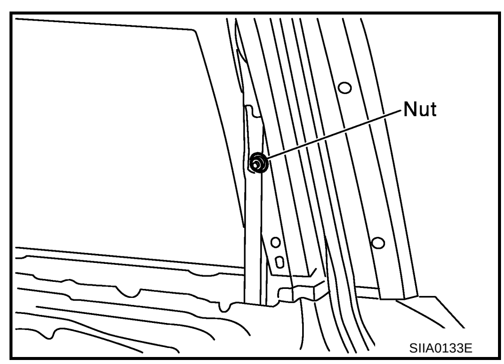


5. Remove door outside molding. Refer to EI-21, "Removal and Installation" .
6. Remove sealing screen.

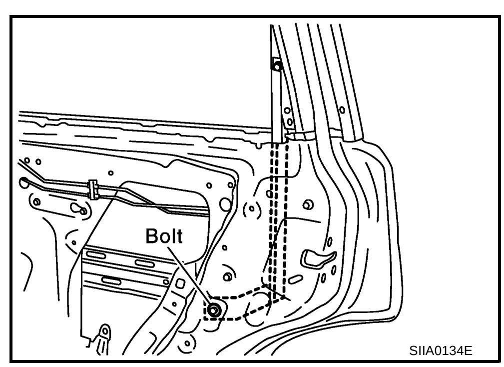
   NOTE:
   If sealing screen is reused, cut the butyl-tape so that a part of butyl-tape remains on the sealing screen.
7. Operating power window switch, raise or lower the door window until the carrier plate mounting bolts appear.
8. Remove carrier plate mounting bolts.



9. Remove mounting nut on upper portion of lower sash rear.



10. Remove mounting bolt from lower portion of lower sash rear.
11. Rotate lower sash rear, and remove door glass from door glass run.
12. Pull out the door glass toward the outside of the door to remove.
13. Remove door glass run from lower sash rear.
14. Remove lower sash rear.



Installation

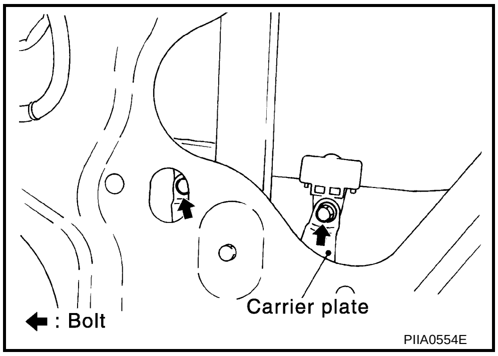
Install in the reverse order of removal.

REAR DOOR REGULATOR ASSEMBLY

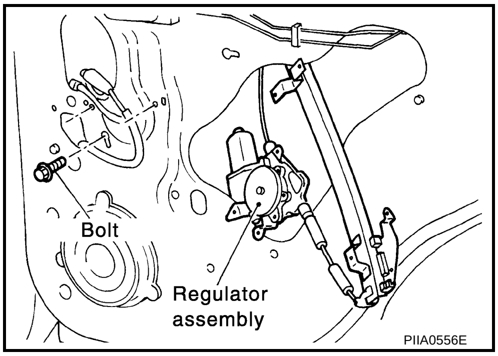
Removal

1. Remove rear door finisher. Refer to EI-32, "DOOR FINISHER" .
2. Remove sealing screen.

   NOTE:
   If sealing screen is reused, cut the butyl-tape so that a part of butyl-tape remains on the sealing screen.
3. Operating power window switch, raise or lower the door glass until the carrier plate mounting bolts appear.
4. Remove carrier plate mounting bolts.



5. Raise up the door glass and hold with the suction lifter.
6. Disconnect power window motor harness connector.
7. Remove mounting bolts, and then remove regulator assembly through the access hole.



Installation

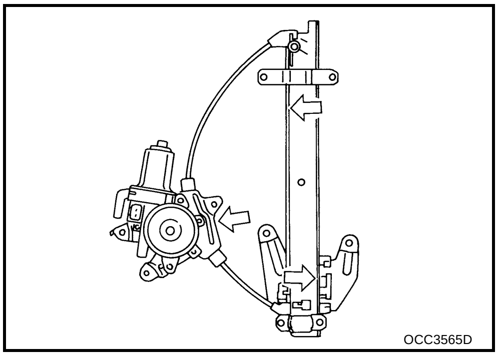
Install in the reverse order of removal.

Inspection After Removal

Check regulator assembly for the following. If a malfunction is detected, replace or grease it.

- Wire wear
- Regulator deformation
- Grease condition for each sliding part

The arrows in the figure show application points of the multi-purpose grease.



Disassembly

Remove power window motor from regulator assembly.

Assembly

Assemble in the reverse order of disassembly.

Fitting Inspection

AIS0065U

- Check that door glass is securely fit into door glass run groove.
- While raising and lowering the door glass, check for abnormal operation.

- Lower the door glass slightly [approx. 10 to 20 mm (0.39 to 0.79 in)], and check that the clearance to the sash is parallel. If the clearance between the door glass and sash is not parallel, loosen the regulator assembly mounting bolts and glass & carrier plate mounting bolts to correct the glass position.

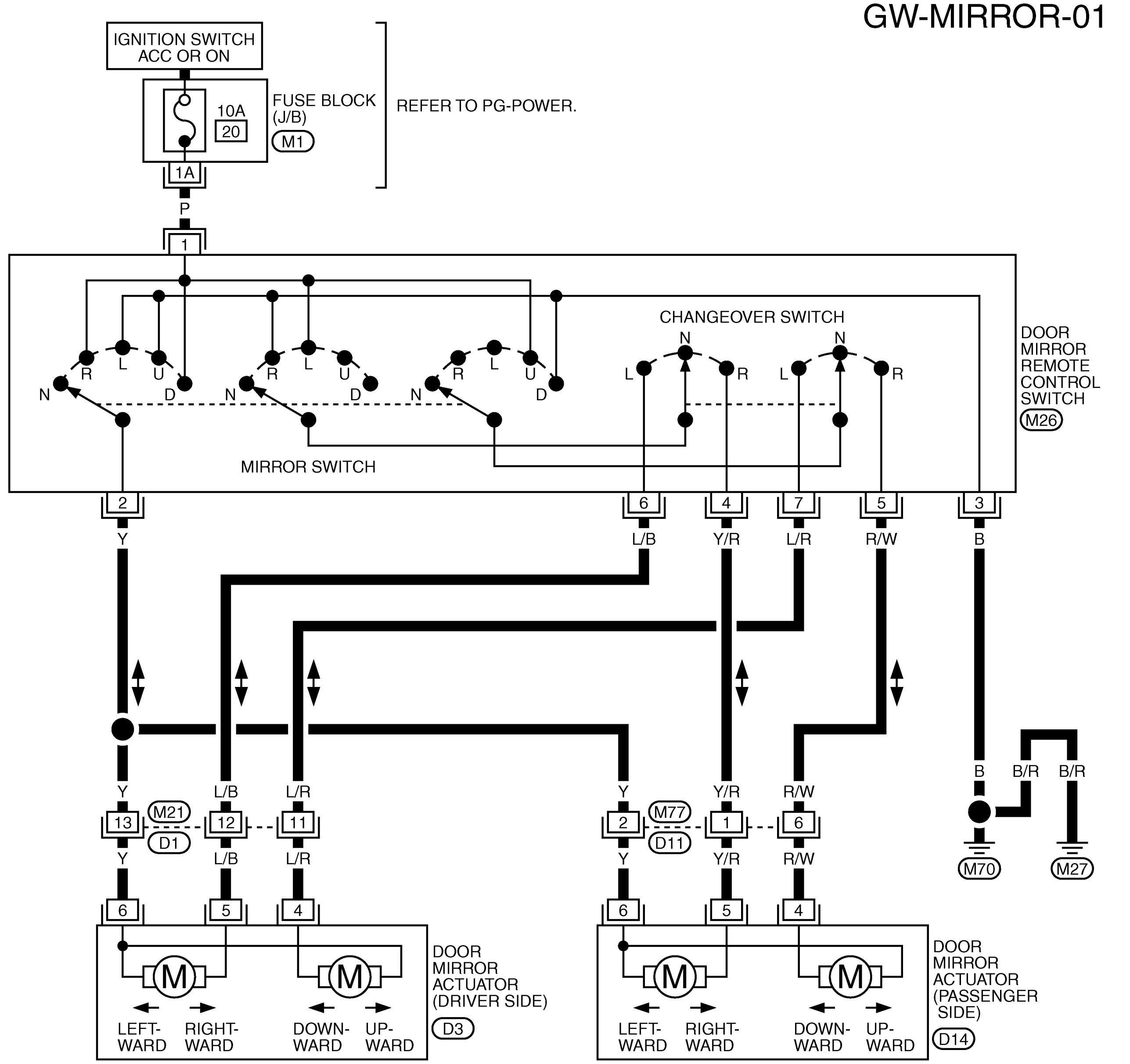
DOOR MIRROR

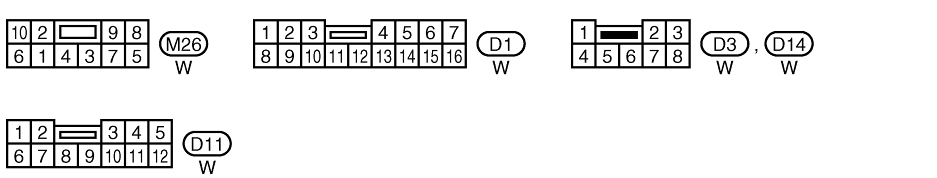
PFP:96301

Wiring Diagram — MIRROR —

AIS005RF

GW-MIRROR-01





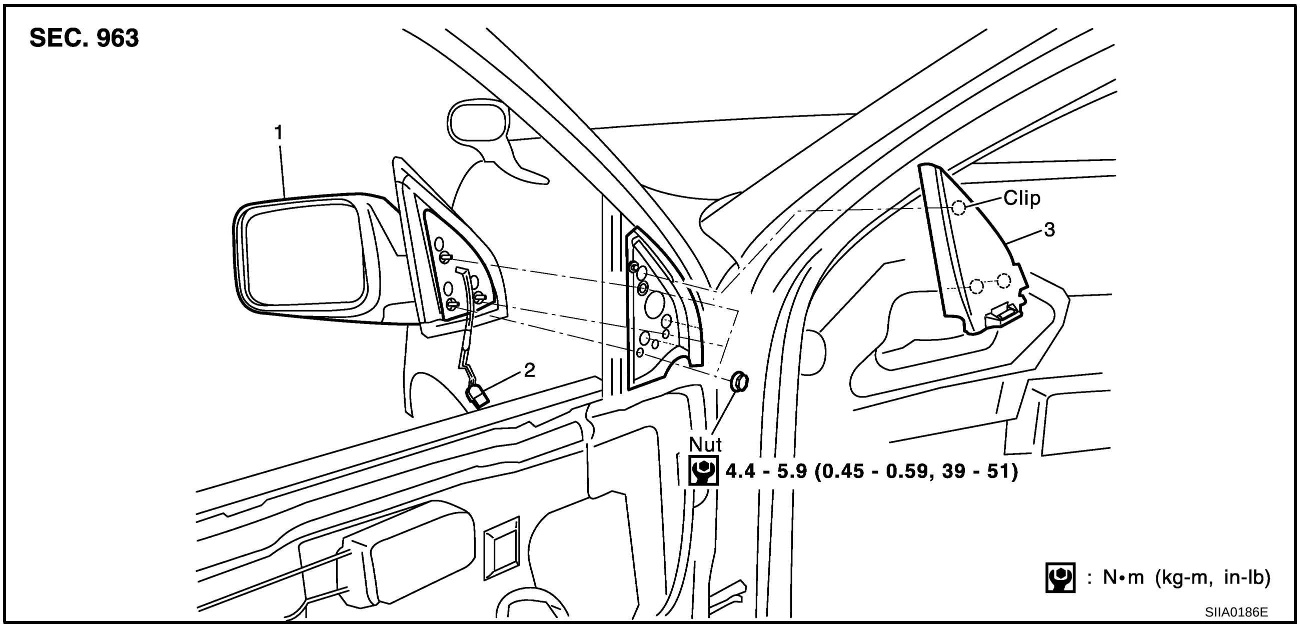
REFER TO THE FOLLOWING.

M1 -FUSE BLOCK-JUNCTION BOX (J/B)

TIWB0065E

Removal and Installation

AIS005RH



1. Door mirror
2. Connector
3. Corner cover

REMOVAL

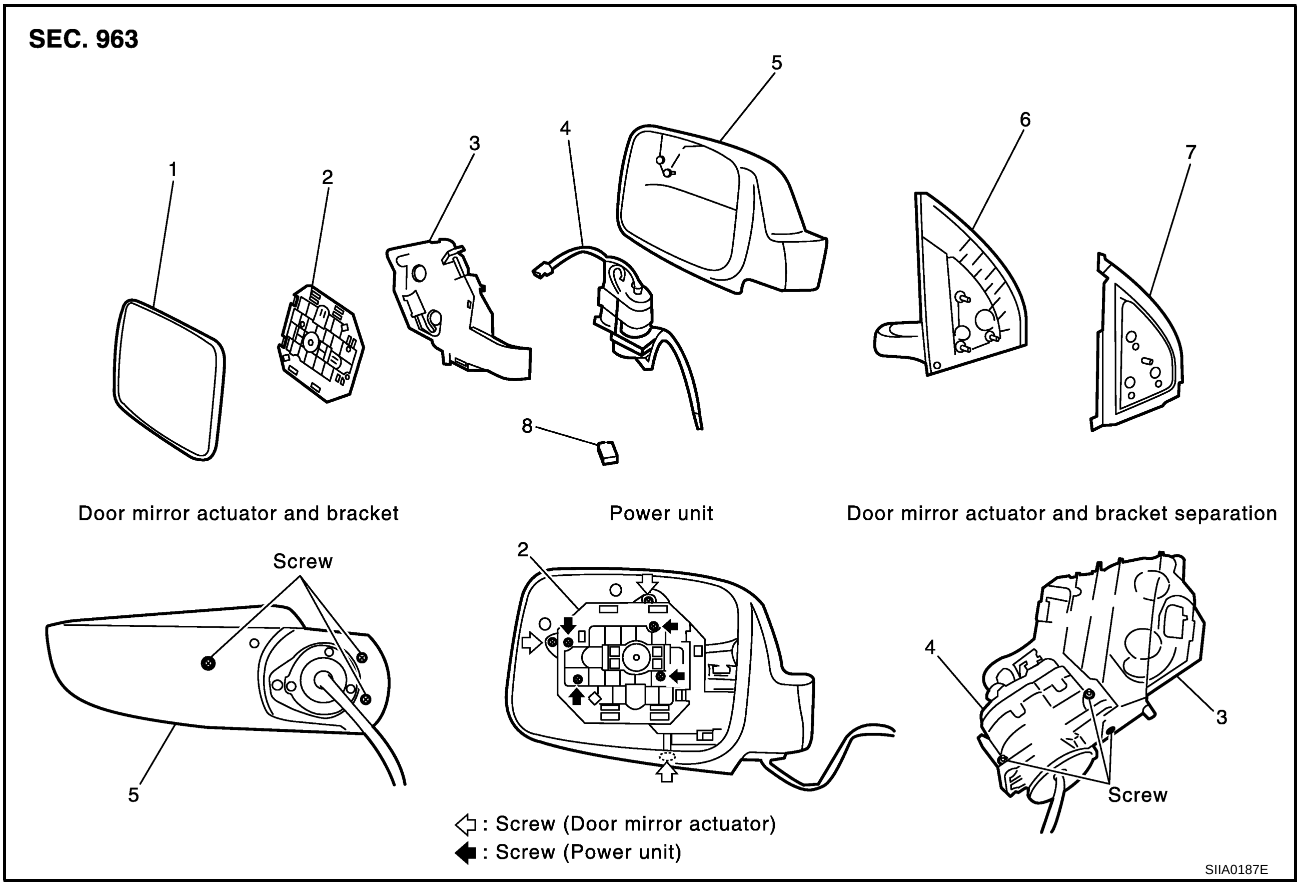
1. Remove front door finisher. Refer to EI-32, "Removal and Installation" .
2. Remove corner cover.
3. Disconnect door mirror harness connector.
4. Remove door mirror mounting nuts, and remove door mirror assembly.

INSTALLATION

Install in the reverse order of removal.

Disassembly and Assembly

AIS005RI



1.	Mirror body	2.	Power unit	3.	Bracket
4.	Door mirror actuator	5.	Housing	6.	Base
7.	Packing	8.	Connector		

DISASSEMBLY

1. Pull out all the terminals from the connector.

   NOTE:
   Before pulling out the terminal, note the connector terminal arrangement.
2. Turn the mirror glass surface upward.
3. Apply a protective tape to the housing.
4. Insert a narrow slotted screwdriver wrapped with tape in the concave gap between mirror glass and power unit to push up tabs (2 locations) on mirror holder to disengage lower part of mirror holder, and remove mirror body assembly.

   NOTE:
   When pushing up the tabs, do not forcefully push up only 1 concave but try to push up using 2 concave positions.
5. Remove packing.
6. Remove base.
7. Remove door mirror actuator and bracket from housing.
8. Remove power unit from bracket, and disconnect connector.
9. Separate the door mirror actuator from the bracket.

ASSEMBLY

1. Install door mirror actuator to the bracket.
2. Connect power unit connector. Install power unit to the door mirror actuator (bracket).
3. Install door mirror actuator (bracket) and base to the housing.
4. Set power unit and mirror body assembly in a horizontal position.
5. Engage upper tabs of mirror glass with power unit. Then, press lower part of mirror glass down until the lower part snaps to allow engagement of lower tabs.

   NOTE:
   After installation, visually check that the lower tabs are securely engaged when viewed from the bottom of mirror surface.
6. Install the packing to the base.
7. Insert the harness terminal into the connector.

   NOTE:
   Make sure to insert the harness terminal into the correct connector. Do not confuse the locations.

INSIDE MIRROR

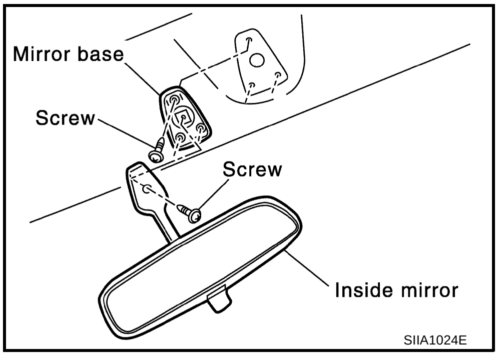
PFP:96321

Removal and Installation

AIS005RJ

REMOVAL

1. Remove inside mirror cover. Refer to EI-40, "HEADLINING" .
2. Remove the screws securing inside mirror assembly and mirror base as shown in the figure.



INSTALLATION

Install in the reverse order of removal.

SECTION IDX

ALPHABETICAL INDEX

ALPHABETICAL INDEX

Numerics

A

B

C

D

E

F

G

H

P

R

S

T

V

W

SECTION IP

INSTRUMENT PANEL

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AIS005SO

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions

AIS005SP

- Disconnect both battery cables in advance.
- Disconnect air bag system line in advance.
- Never tamper with or force air bag lid open, as this may adversely affect air bag performance.
- Be careful not to scratch pad and other parts.
- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

- Do not use any organic solvent, such as thinner or benzine.

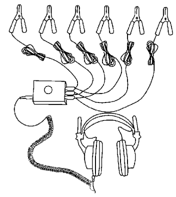
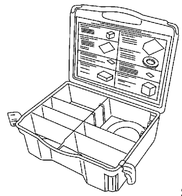
PREPARATION

PFP:00002

Special Service Tools

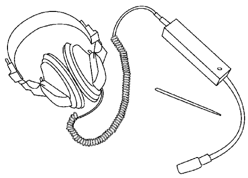
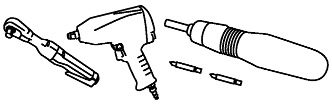
AIS00661

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
(J-39570) Chassis ear	 SIIA0993E	Locating the noise
(J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of noise

Commercial Service Tools

AIS005SQ

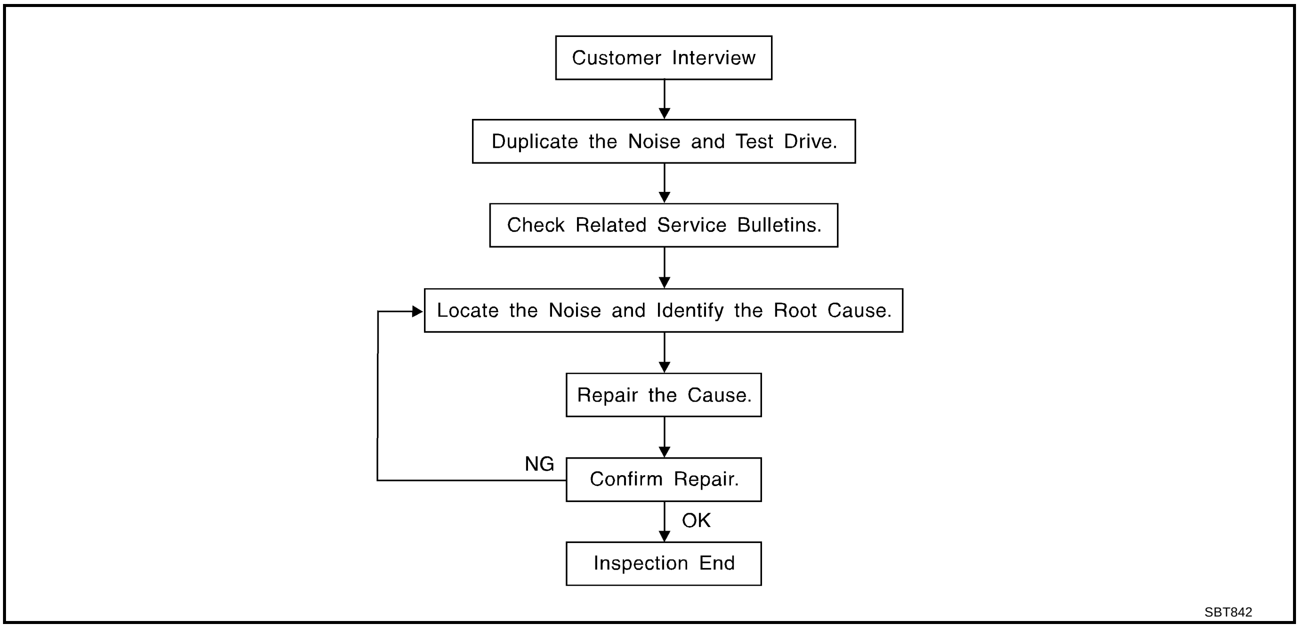
Tool name		Description
Engine ear	 SIIA0995E	Locating the noise
Power tool	 PIIB1407E	

SQUEAK AND RATTLE TROUBLE DIAGNOSES

PFP:00000

Work Flow

AIS0061A



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to IP-8, "Diagnostic Worksheet" . This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces=higher pitch noise/softer surfaces=lower pitch noises/edge to surface=chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T models, drive position on A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.

If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to IP-6, "Generic Squeak and Rattle Troubleshooting" .

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
  - separate components by repositioning or loosening and retightening the component, if possible.
  - insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:

Do not use excessive force as many components are constructed of plastic and may be damaged.

NOTE:

Always check with the Parts Department for the latest parts information.

The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.

URETHANE PADS [1.5 mm (0.059 in) thick]

Insulates connectors, harness, etc.

76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)

INSULATOR (Foam blocks)

Insulates components from contact. Can be used to fill space behind a panel.

73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)

INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTHTAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit. Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

AIS0061B

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

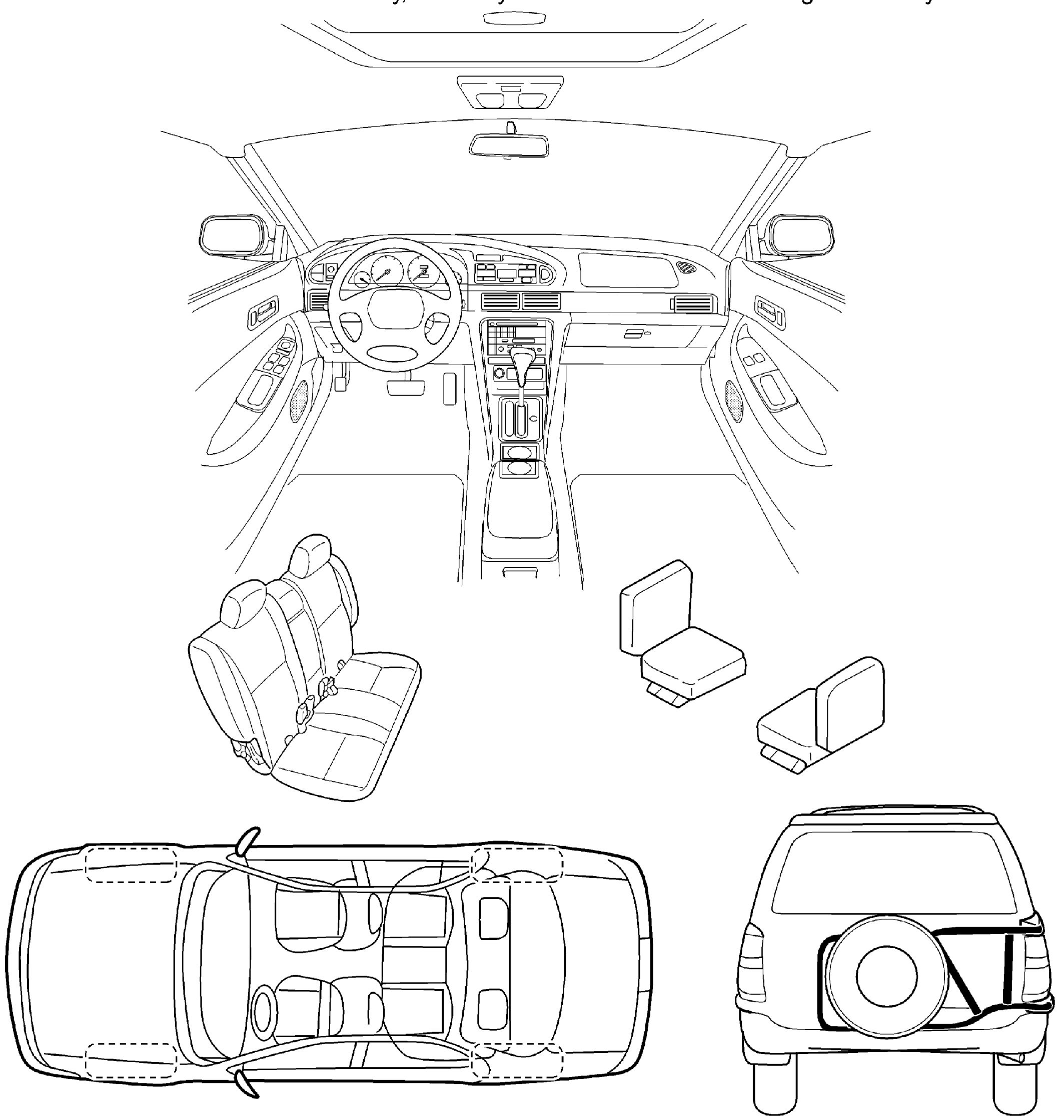
Diagnostic Worksheet

AIS0061C

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB0723E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

____

____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

- ❑ anytime
- ❑ 1st time in the morning
- ❑ only when it is cold outside
- ❑ only when it is hot outside
- ❑ after sitting out in the sun
- ❑ when it is raining or wet
- ❑ dry or dusty conditions
- ❑ other: ____________________

III. WHEN DRIVING:

- ❑ through driveways
- ❑ over rough roads
- ❑ over speed bumps
- ❑ only at about ____ mph
- ❑ on acceleration
- ❑ coming to a stop
- ❑ on turns : left, right or either (circle)
- ❑ with passengers or cargo
- ❑ other: ____________________
- ❑ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

- ❑ squeak (like tennis shoes on a clean floor)
- ❑ creak (like walking on an old wooden floor)
- ❑ rattle (like shaking a baby rattle)
- ❑ knock (like a knock on a door)
- ❑ tick (like a clock second hand)
- ❑ thump (heavy, muffled knock noise)
- ❑ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

____

____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❑	❑	______
- Noise verified on test drive	❑	❑	
- Noise source located and repaired	❑	❑	______
- Follow up test drive performed to confirm repair	❑	❑	______

VIN: ____________________ Customer Name: ____________________

W.O. #: ____________________ Date: ____________

This form must be attached to Work Order

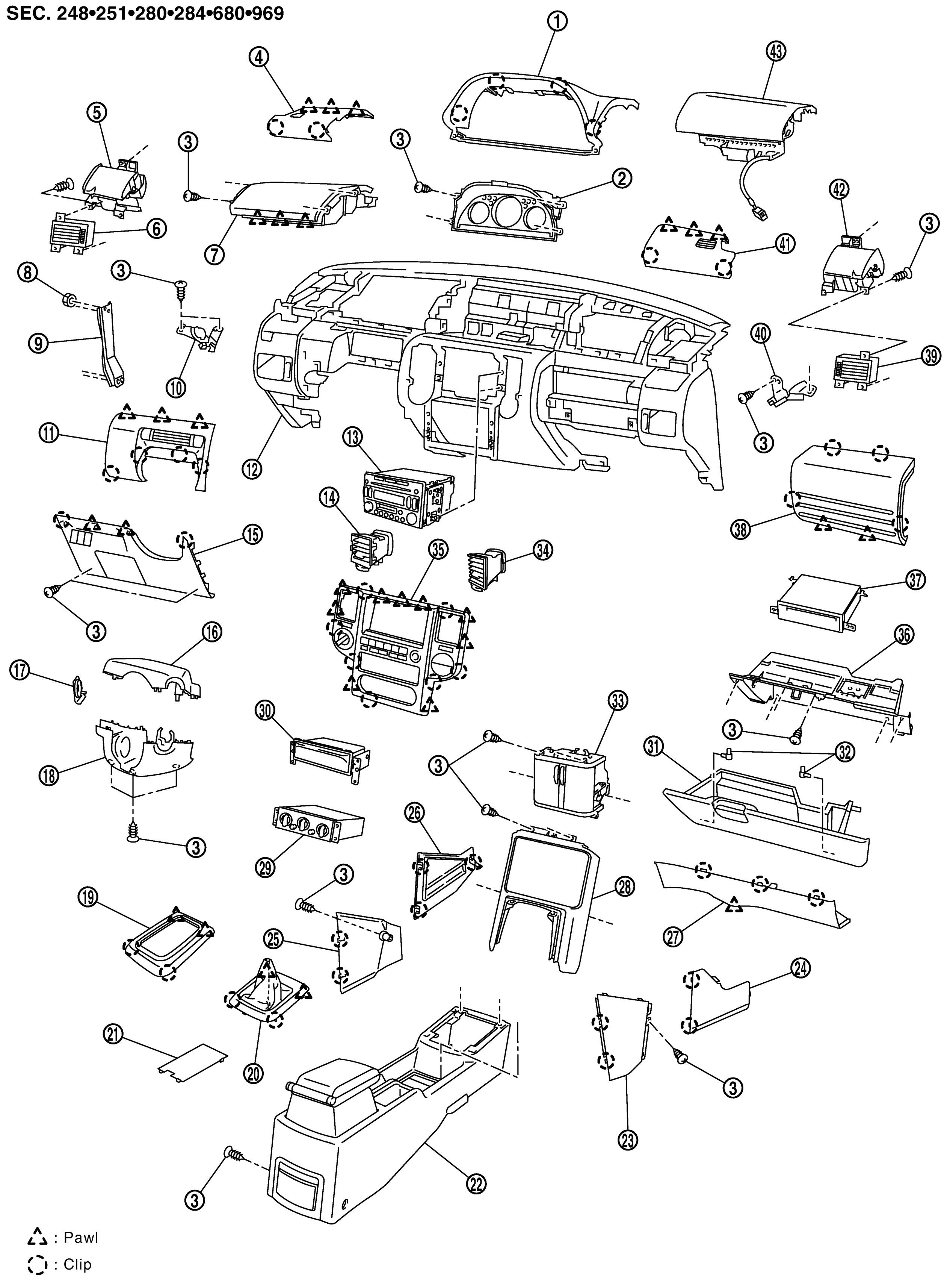
SBT844

INSTRUMENT PANEL ASSEMBLY

PFP:68200

Component Parts Location

AIS005SU



1. Cluster lid A	2. Combination meter	3. Screw
4. Front speaker grille (LH)	5. Cup holder (LH)	6. Side ventilator grille (LH)
7. Driver box	8. Nut	9. Instrument stay
10. Tweeter (LH)	11. Instrument panel finisher	12. Instrument panel
13. Display unit	14. Center ventilator grille (LH)	15. Instrument driver lower panel
16. Steering column cover (upper)	17. Steering lock escutcheon	18. Steering column cover (lower)
19. A/T control finisher (A/T)	20. Console boot (M/T)	21. Console mask
22. Center console	23. Instrument panel stay cover (RH)	24. Instrument panel lower cover (RH)
25. Instrument panel stay cover (LH)	26. Instrument panel lower cover (LH)	27. Instrument lower panel
28. Cluster lid finisher	29. A/C controller	30. Pocket deck
31. Glove box	32. Glove box pin	33. Instrument center lower panel
34. Center ventilator grille (RH)	35. Cluster lid C	36. Glove box cover
37. NAVI control unit	38. Upper glove box	39. Side ventilator grille (RH)
40. Tweeter (RH)	41. Front speaker grille (RH)	42. Cup holder (RH)
43. Front passenger air bag module		

Removal and Installation

AIS005SV

WORK ITEM TABLE

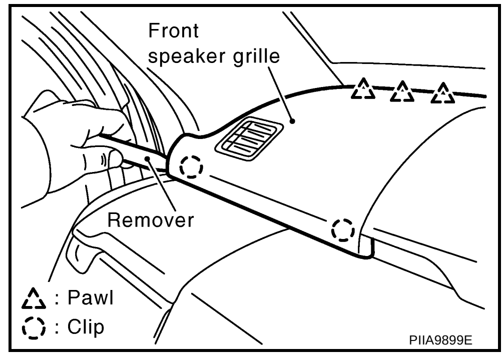
Component Parts Location	Refer to	Instrument panel	Combination meter	Console
Front speaker grille (LH/RH)	AV-10	[1]		
Cluster lid “A”	IP-12	[2]	[1]	
Combination meter	IP-12	[3]	[2]	
Driver box	IP-13	[4]		
Steering lock escutcheon, steering column cover (upper/lower)	IP-13	[5]		
Instrument driver lower panel	IP-13	[6]		
Instrument panel finisher	IP-13	[7]		
A/T control finisher (A/T)/Console boot (M/T)	IP-14 IP-14	[8]		[1]
Center console	IP-14	[9]		[2]
Cluster lid “C”	IP-15	[10]		
Pocket deck	IP-15	[11]		
A/C controller	MTC-63	[12]		
Instrument lower panel	IP-15	[14]		
Instrument panel lower cover (LH/RH)	IP-15	[15]		
Instrument panel stay cover (LH/RH)	IP-16	[16]		
Cluster lid finisher	IP-16	[17]		
Instrument center lower panel	IP-16	[18]		
Glove box	IP-16	[19]		
Glove box cover	IP-17	[20]		
Upper glove box	IP-17	[21]		
Front passenger air bag module	SRS-36	[23]		
Front pillar garnish	EI-37	[24]		
Instrument panel	IP-17	[25]		
Side ventilator grille (LH/RH)	ATC-117	[26]		
Cup holder (LH/RH)	IP-18	[27]		

[ ]: The number shows the removal order.

REMOVAL

Front Speaker Grille (LH/RH)

1. Insert a remover into front speaker grille door side edge, and then disengage pawls and clips.
2. Pull forward and remove.

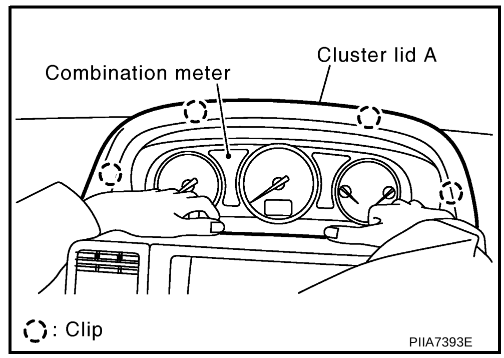


Cluster Lid A

Disengage clips by pulling cluster lid A frontward to remove.

CAUTION:

During removal or installation, use shop cloth to protect surrounding area from damage.

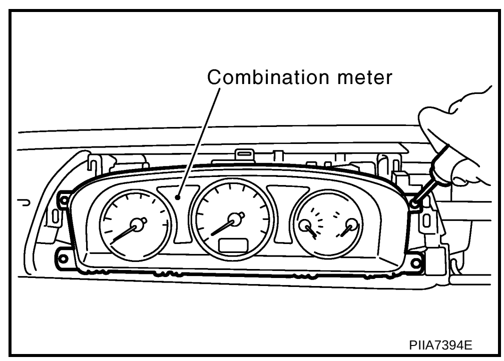


Combination Meter

1. Remove screw.
2. Disconnect connector on back and remove combination meter.

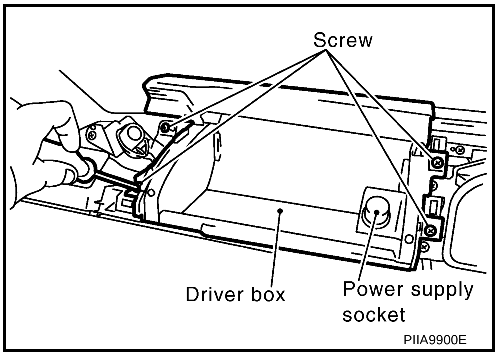
   CAUTION:

   During removal or installation, use shop cloth to protect surrounding area from damage.

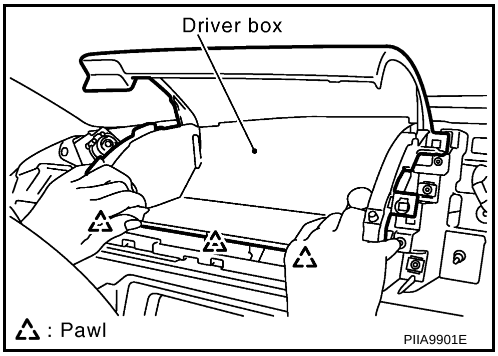


Driver Box

1. Remove screws.



2. Hold driver box up, and then remove pawls.
3. Pull driver box forward to remove.
4. Disconnect power supply socket connector and lamp connector.

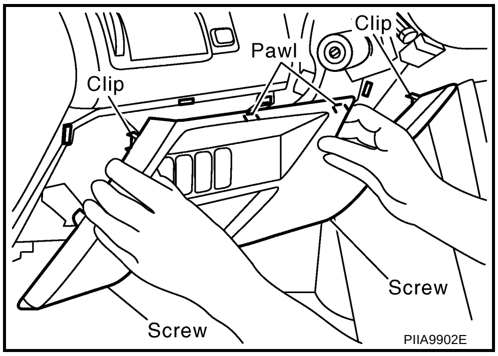


Steering Lock Escutcheon, Steering Column Cover (Upper/Lower)

1. Remove steering lock escutcheon.
2. Remove screw from the bottom of steering column cover (lower).
3. Remove steering column cover (lower) and steering column cover (upper).

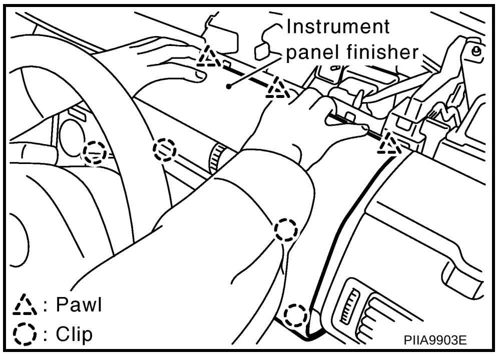
Instrument Driver Lower Panel

1. Remove fuse block lid.
2. Remove screws with power tool, and pull instrument driver lower panel straight forward to disengage pawls and clips.
3. Insert a screwdriver wrapped with a shop cloth from back to lower side of each switch to disengage lower tabs, and then remove each switch.
4. Disconnect connector from each switch.



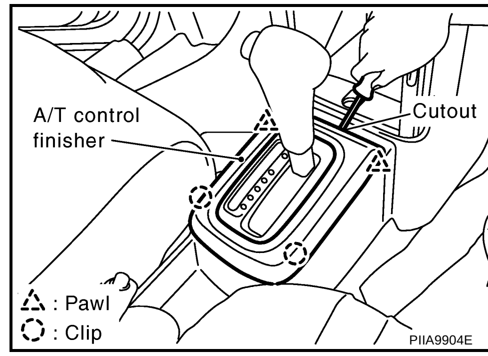
Instrument Panel Finisher

1. Disengage pawl and clips, and then pull instrument panel finisher straight forward.
2. Remove screws on back of instrument panel finisher, and then remove driver ventilator grille. Refer to ATC-117, "Removal of Driver Ventilator Grille" .



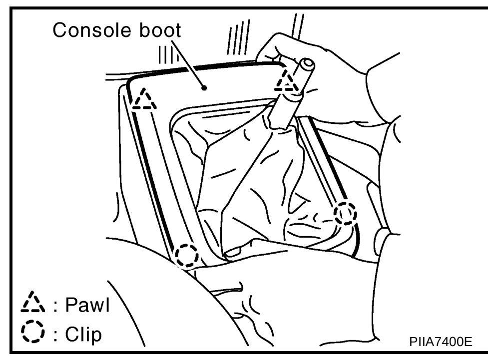
A/T Control Finisher (A/T Models)

1. Insert a screwdriver wrapped with a shop cloth into cutout of finisher front end and hold it up, and then disengage clips of side surface rear end.
2. Pull up and remove.



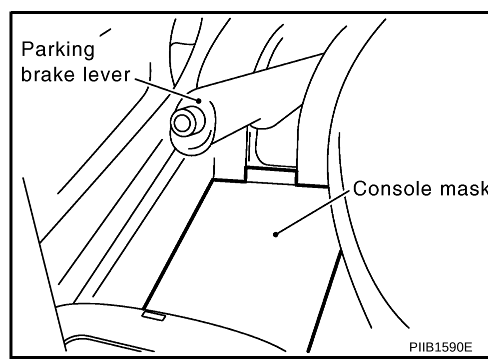
Console Boot (M/T Models)

1. Remove by rotating shift knob.
2. Hold it from console boot inside and pull up to remove.

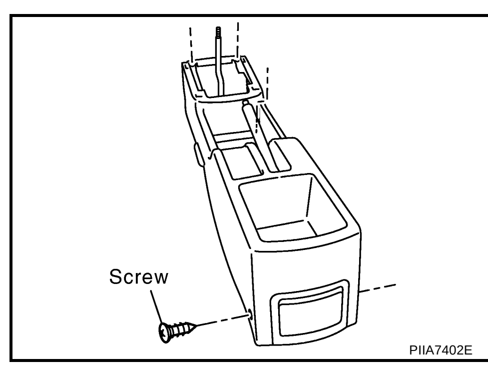


Center Console

1. Hold the protrusion of console mask from the bottom of parking brake lever, and then remove console mask.



2. Remove screw.
3. Disengage center console front pawls, and then remove center console while avoiding parking lever.



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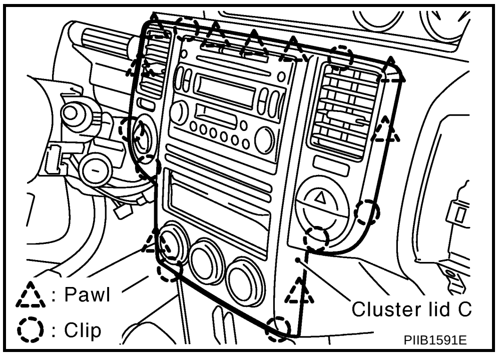
Cluster Lid C

1. Insert a remover into the bottom of cluster lid “C”, and then disengage pawls and clips.
2. Pull cluster lid C straight frontward to remove.
3. Disconnect all connectors.
4. Remove center ventilator grille (LH/RH). Refer to ATC-117, "Removal of Center Ventilator Grille" .



Pocket Deck

Remove screws, and then remove pocket deck.

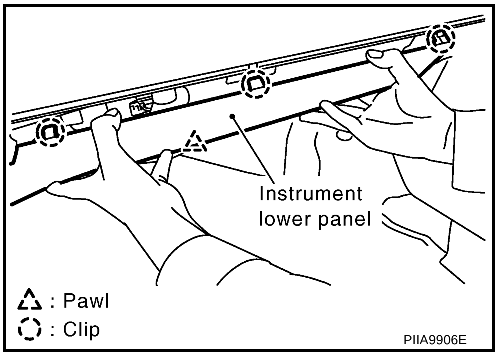
Audio, A/C Controller

Remove screws, and then remove A/C controller. Refer to MTC-63, "CONTROLLER" .

CAUTION:
During removal or installation, use shop cloth to protect surrounding area from damage.

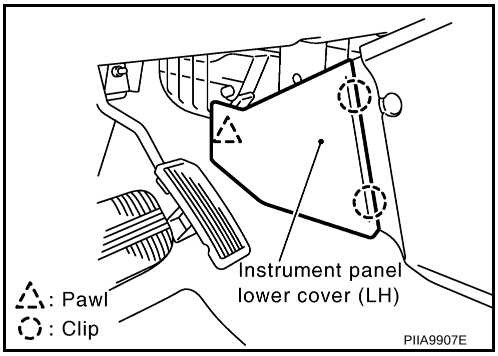
Instrument Lower Panel

1. Disengage pawls and clips, and then pull instrument panel finisher straight forward.
2. Remove screws from the back and remove harness bracket.



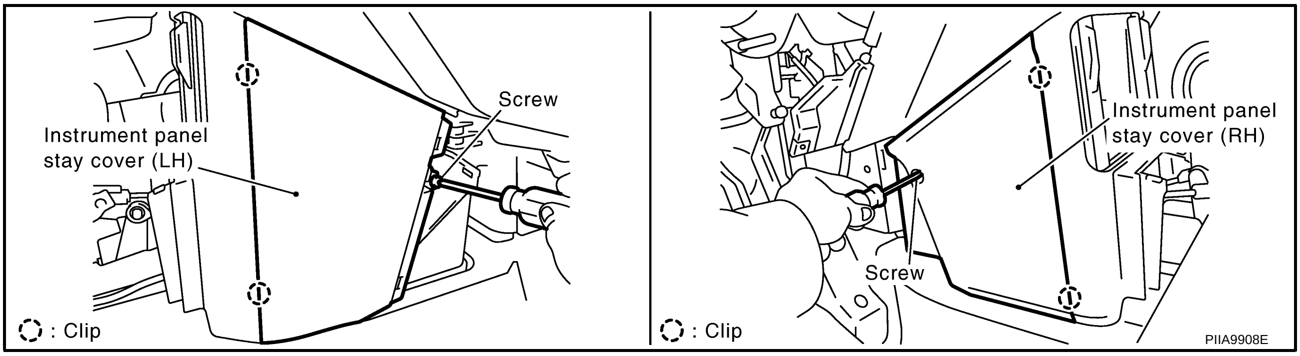
Instrument Panel Lower Cover (LH/RH)

Disengage pawl and clips, and then pull it to rear of vehicle.



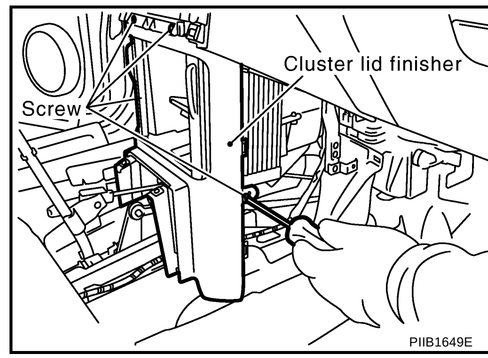
Instrument Panel Stay Cover (LH/RH)

1. Remove screws.
2. Disengage pawls and pull it to outside of vehicle.



Cluster Lid Finisher

1. Remove screws.
2. Pull the bottom of cluster lid finisher to the rearward of the vehicle, and remove it so as to avoid interference around upper screw holes.

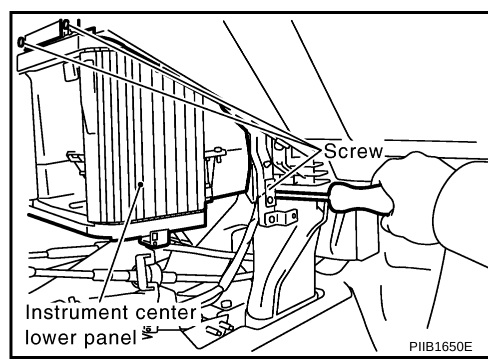


Instrument Center Lower Panel

Remove screws, and then pull it forward to remove.

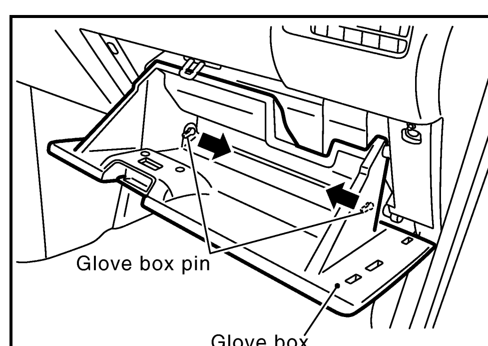
CAUTION:

During removal or installation, use shop cloth to protect surrounding area from damage.



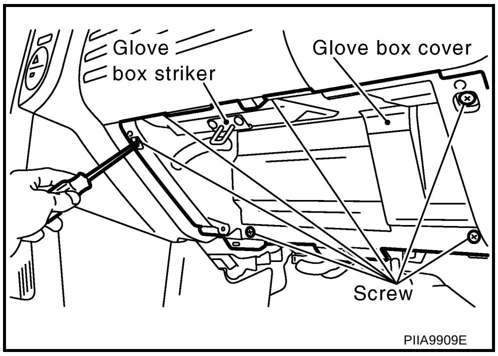
Glove Box

Open glove box, and remove glove box pin from inside.



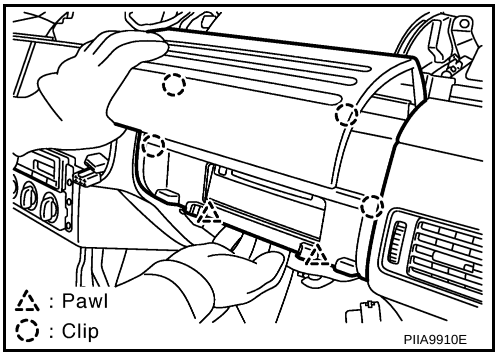
Glove Box Cover

1. Remove screw.
2. Remove relay clamp installed to back of glove box cover.
3. Pull it forward to remove.



Upper Glove Box

Disengage pawls and clips, and then pull it straight forward.



Front Passenger Air Bag Module

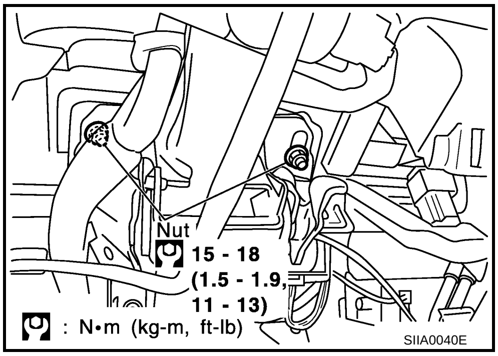
Remove passenger air bag module after removing bolts. Refer to SRS-36, "FRONT PASSENGER AIR BAG MODULE" .

Front Pillar Garnish

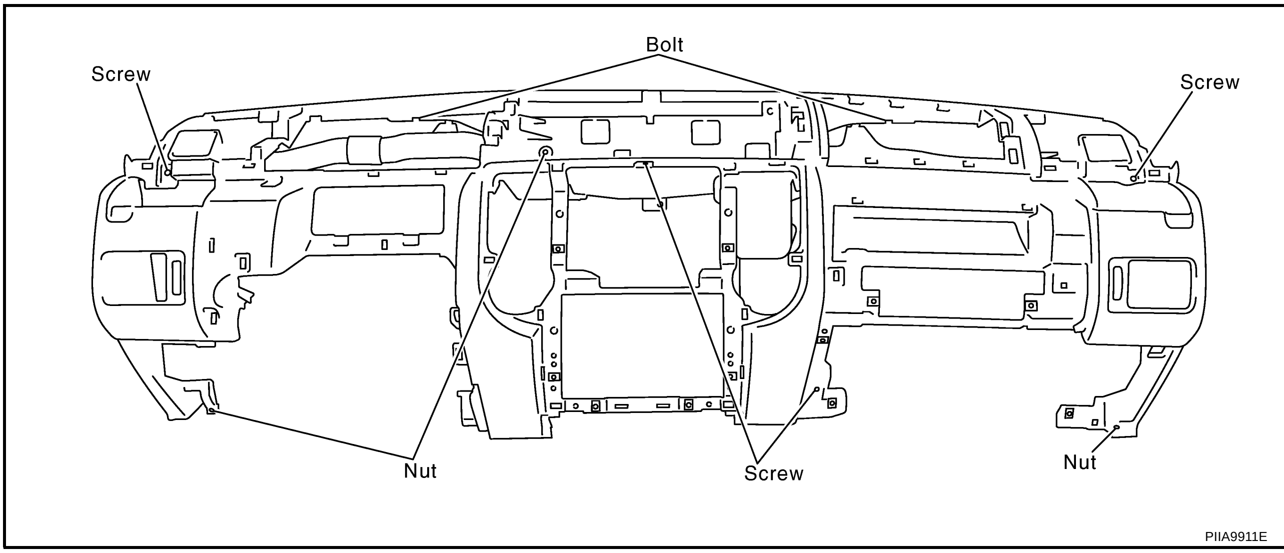
Pull straight front pillar garnish toward vehicle inside of right and left. Remove metal clip to remove.
Refer to EI-37, "FRONT PILLAR GARNISH" .

Instrument Panel

1. Remove nuts, and lower steering column.



2. Remove instrument panel by removing all harnesses, bolts, nuts, and screw.



Side Ventilator Grille (LH/RH)

1. Remove front driver side ventilator duct and front passenger side ventilator duct. Refer to ATC-118, "Removal of Defroster Nozzle, Duct and Side Ventilator Duct" .
2. Remove front driver side ventilator and front passenger side ventilator. Refer to ATC-117, "Removal of Side Ventilator Grille" .

Cup Holder (LH/RH)

Remove screws and remove cup holder.

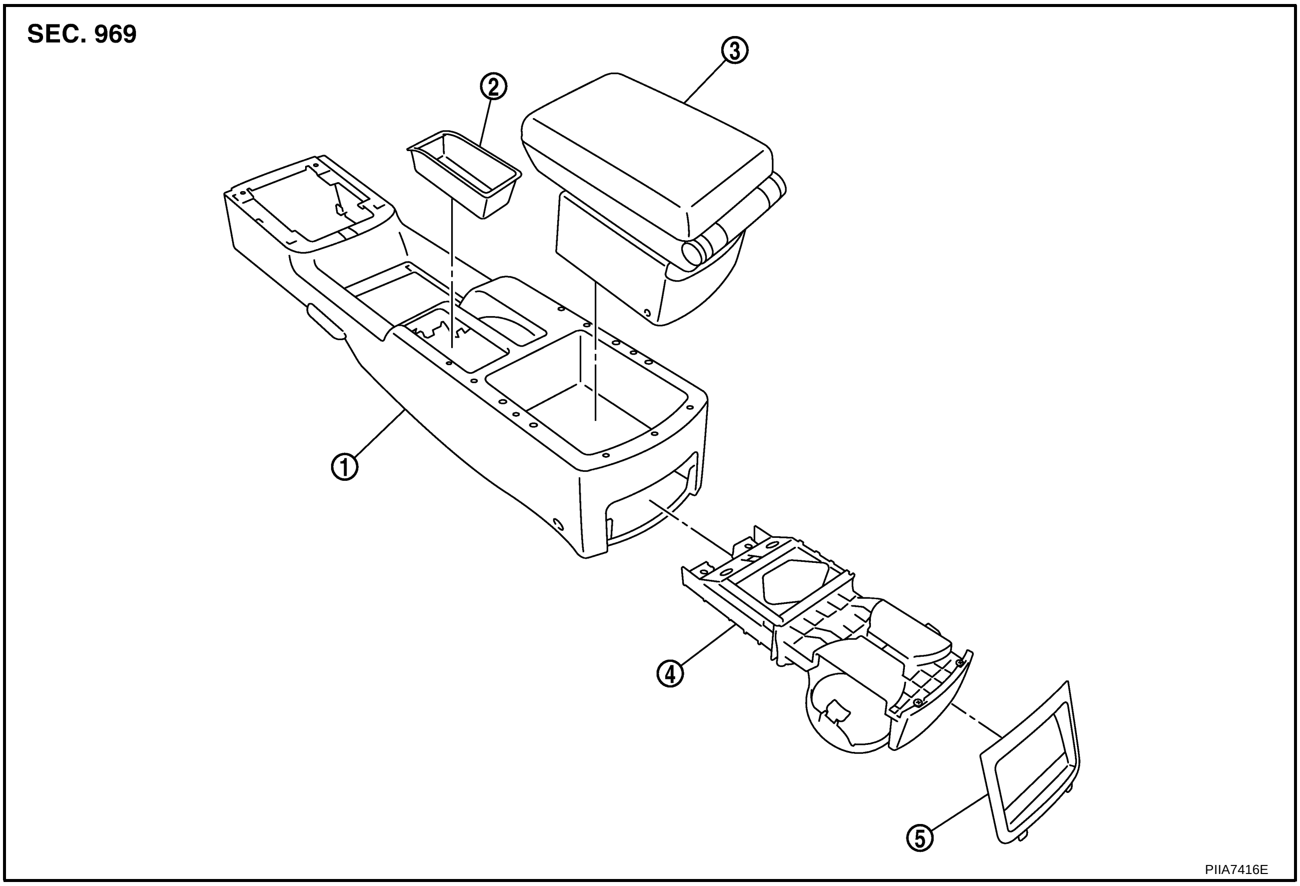
INSTALLATION

Install in the reverse order of removal.

Disassembly and Assembly

AIS005SW

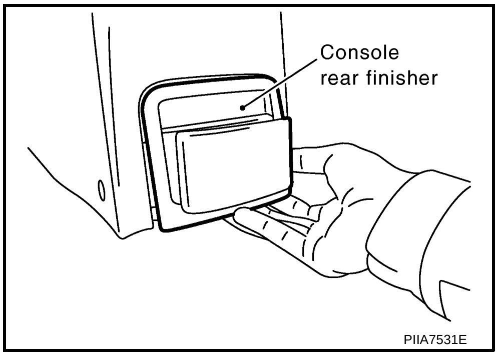
CENTER CONSOLE



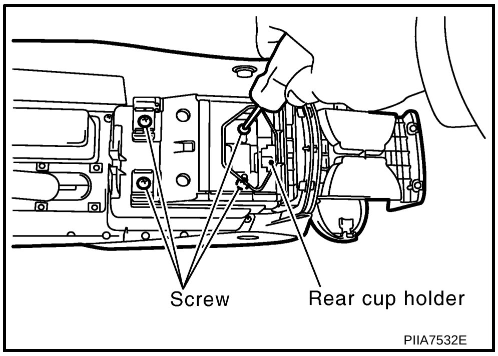
1. Console box	2. Console pocket / switch panel	3. Console lid
4. Rear cup holder	5. Console rear finisher	

Disassembly

1. Remove console rear finisher by pulling rear cup holder out approximately 5 mm (0.2 in) rearward.



2. Remove screws from back of center console, and then pull rear cup holder rearward to remove.



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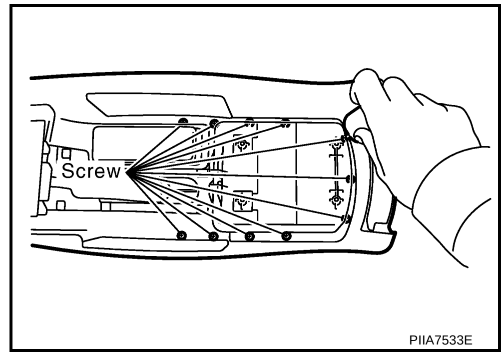
3. Remove screws from back of center console, and then remove console lid.



4. Remove console pocket.

Assembly

Assemble in the reverse order of disassembly.

SECTION LAN
LAN SYSTEM

CONTENTS

CAN

PRECAUTIONS
PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”
AKS00BCH

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Trouble Diagnosis
AKS00BCI

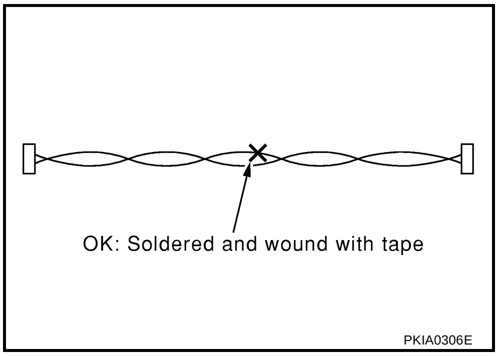
CAN SYSTEM

- Do not apply voltage of 7.0 V or higher to the measurement terminals.
- Use the tester with its open terminal voltage being 7.0 V or less.
- Be sure to turn ignition switch off and disconnect battery cable at negative terminal before checking the circuit.

Precautions for Harness Repair
AKS00BCJ

CAN SYSTEM

- Solder the repaired parts, and wrap with tape. [Frays of twisted line must be within 110 mm (4.33 in)]



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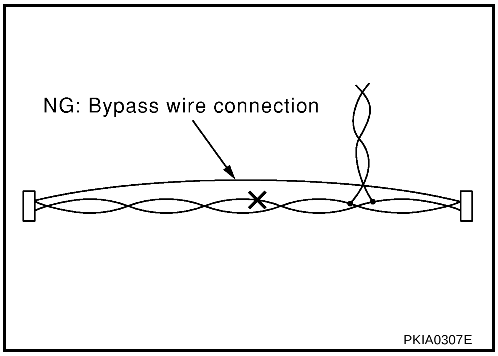
- Do not perform bypass wire connections for the repair parts. (The spliced wire will become separated and the characteristics of twisted line will be lost.)



PKIA0307E

TROUBLE DIAGNOSES WORK FLOW

PFP:00004

When Displaying CAN Communication System Errors

AKS00BQF

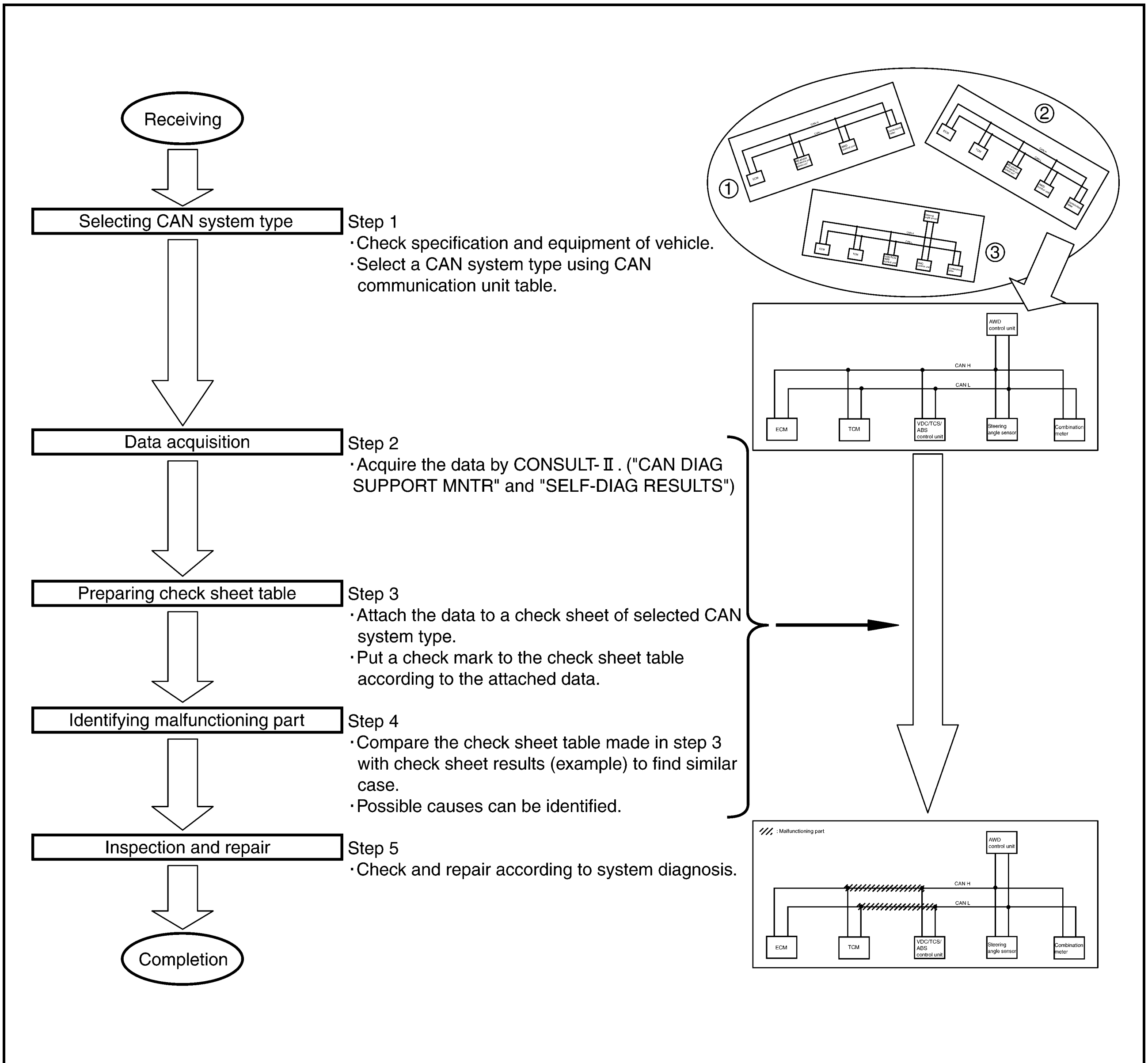
WHEN A MALFUNCTION IS DETECTED BY CAN COMMUNICATION SYSTEM

- CAN communication line is open. (CAN H, CAN L, or both)
- CAN communication line is shorted. (Ground, between CAN lines, or other harnesses)
- The areas related to CAN communication of unit is malfunctioning.

WHEN A MALFUNCTION IS DETECTED EXCEPT CAN COMMUNICATION SYSTEM

- Removal and installation of parts: When the units that perform CAN communication or the sensors related to CAN communication are removed and installed, malfunction may be detected (or DTC other than CAN communication may be detected).
- Fuse blown out (removed): CAN communication of the unit may be stopped at such time.
- Low voltage: If the voltage decreases because of battery discharge when IGN is ON, malfunction may be detected by self-diagnosis according to the units.

TROUBLE DIAGNOSIS FLOW CHART



PKIA8959E

- Step 1: Refer to LAN-6, "SELECTING CAN SYSTEM TYPE (HOW TO USE SPECIFICATION TABLE)" .
- Step 2: Refer to LAN-7, "ACQUISITION OF DATA BY CONSULT-II" .
- Step 3: Refer to LAN-8, "HOW TO USE CHECK SHEET TABLE" .
- Step 4: Refer to LAN-9, "Example of Filling in Check Sheet When Initial Conditions Are Reproduced" .
- Step 5: Check and repair according to system diagnosis.

A B C D E F G H I J LAN L M

Diagnosis Procedure

AKS00BQG

SELECTING CAN SYSTEM TYPE (HOW TO USE SPECIFICATION TABLE)

Determine CAN system type from the equipment of the vehicle to select applicable check sheet.

(Example) Wagon/AWD/QR25DE/AT/VDC

CAN Communication Unit

Go to CAN system, when selecting your CAN system type from the following table.

Body type	Wagon				
Axle	2WD	AWD			
Engine	QR25DE				
Transmission	A/T	M/T	A/T	M/T	A/T
Brake control	ABS			VDC	
CAN system type	1	2	3	4	5
CAN system trouble diagnosis	XX-XX	XX-XX	XX-XX	XX-XX	XX-XX

Check basic specification of the vehicle.

Which number is selected when sequentially selecting from the top of the specification table?
The number is "CAN system type" of the applicable vehicle.

In the case of this example:
It corresponds to type 5.

PKIA8960E

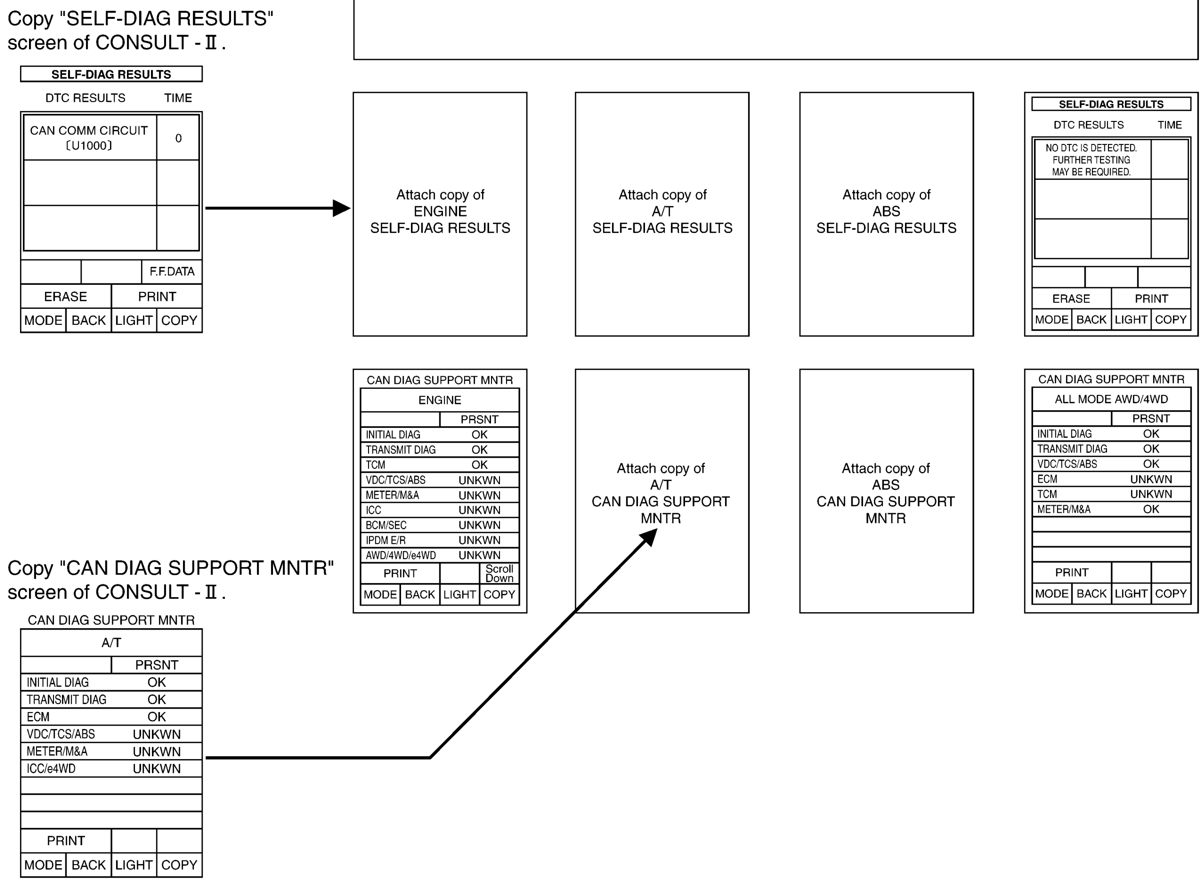
ACQUISITION OF DATA BY CONSULT-II

Attach the data acquired by CONSULT-II on the check sheet determined according to CAN system type.

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS/ABS	STRG	AWD/4WD	METER/M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

Symptoms :



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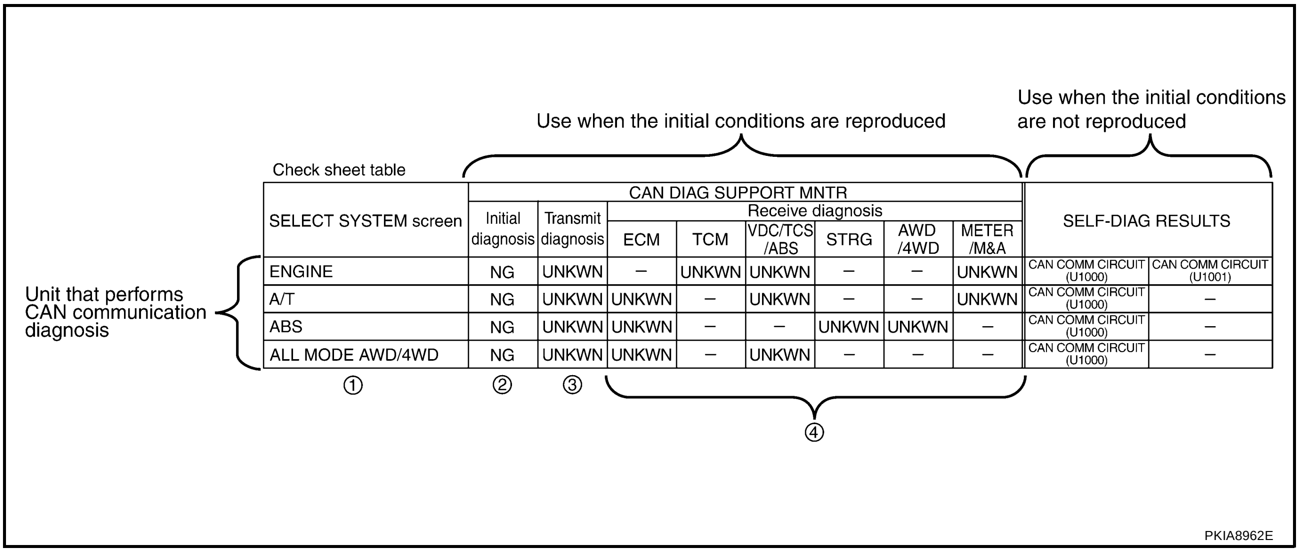
HOW TO USE CHECK SHEET TABLE



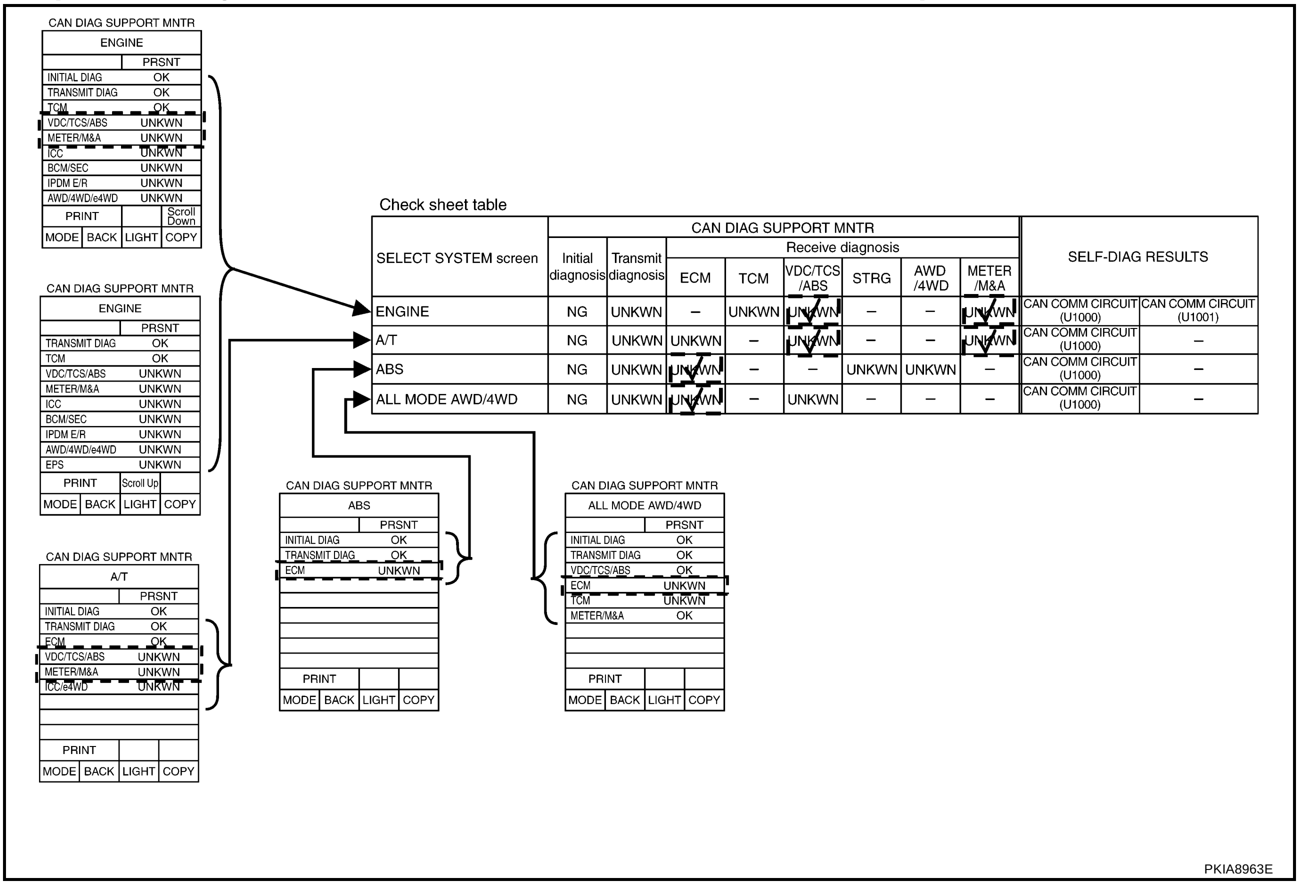
SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

1. Unit names displayed on CONSULT-II
2. “NG”: Display “NG” when malfunction is detected in the initial diagnosis of the diagnosed unit. Replace the unit if “NG” is displayed.
   “–”: Column not used (Initial diagnosis is not performed.)
3. “UNKWN”: Display “UNKWN” when the diagnosed unit does not transmit the data normally. Put a check mark to it if “UNKWN” is displayed on CONSULT-II.
4. “UNKWN”: Display “UNKWN” when the diagnosed unit does not receive the data normally. Put a check mark to it if “UNKWN” is displayed on CONSULT-II.
   “–”: Column not used (It is not necessary for CAN communication trouble diagnosis.)

NOTE:
CAN communication diagnosis checks if CAN communication works normally. (Contents of data are not diagnosed.)

- Refer to LAN-9, "Example of Filling in Check Sheet When Initial Conditions Are Reproduced" when the initial conditions are reproduced.
- Refer to LAN-11, "Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced" when the initial conditions are not reproduced.

Example of Filling in Check Sheet When Initial Conditions Are Reproduced

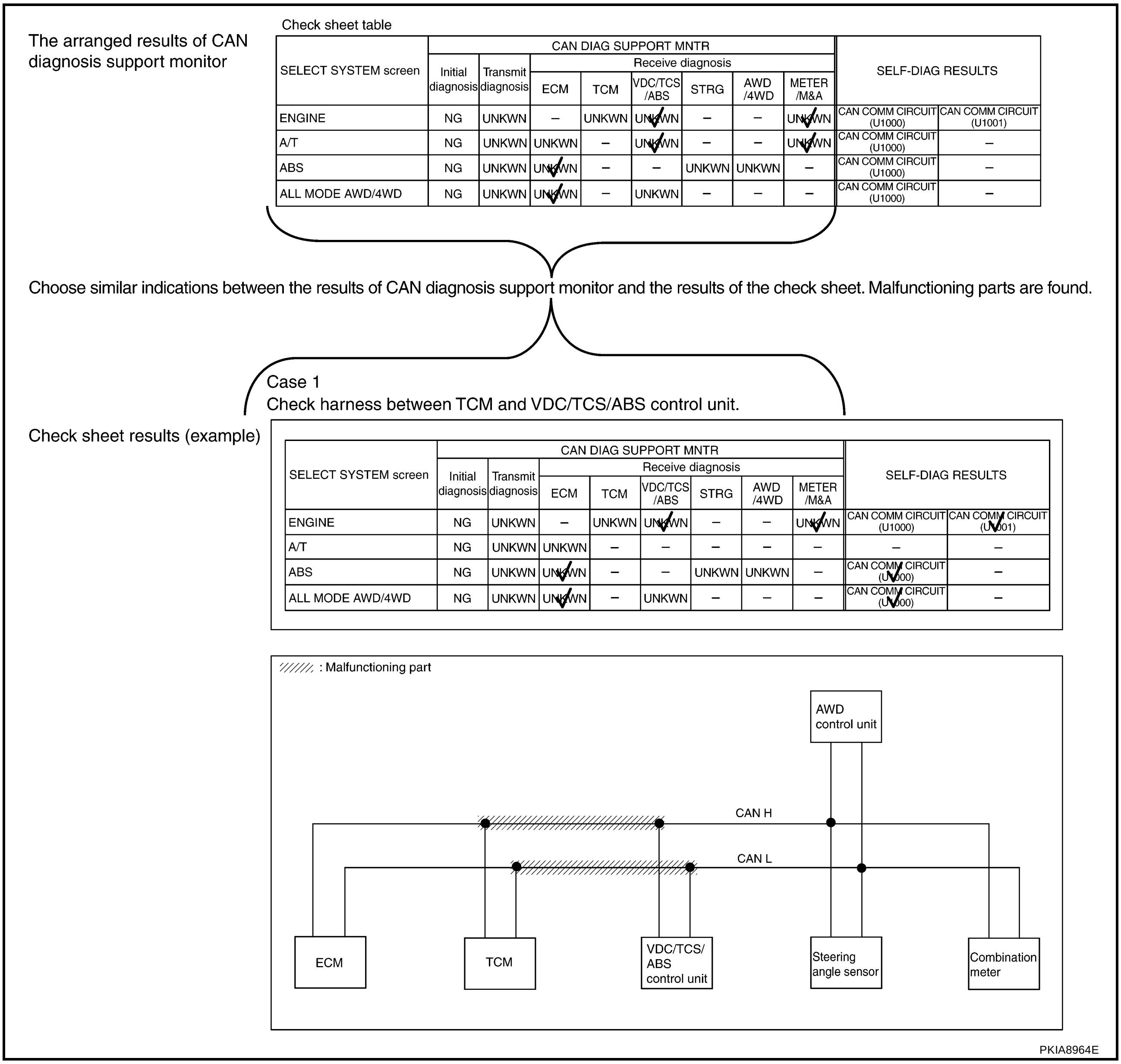


1. Confirm the unit name that “UNKWN” is displayed from the copy of “CAN DIAG SUPPORT MNTR” screen of “ENGINE” attached to the check sheet, and then put a check mark to the check sheet table.

   NOTE:
   In “CAN DIAG SUPPORT MNTR” screen, “UNKWN” is displayed on “VDC/TCS/ABS”, “METER/M&A”, “ICC”, “BCM/SEC”, “IPDM E/R”, “AWD/4WD/e4WD” and “EPS”. But put a check mark to “VDC/TCS/ABS” and “METER/M&A” because “UNKWN” is listed on the column of reception diagnosis of the check sheet table.

2. Confirm the unit name that “UNKWN” is displayed on the copy of “CAN DIAG SUPPORT MNTR” screen of “A/T”, “ABS”, and “ALL MODE AWD/4WD” as well as “ENGINE”. And then, put a check mark to the check sheet table.

   NOTE:
   - For “A/T”, “UNKWN” is displayed on “VDC/TCS/ABS”, “METER/M&A” and “ICC/e4WD”. Put a check mark to “VDC/TCS/ABS” and “METER/M&A” columns of reception diagnosis on the check sheet table. (It is not necessary to put a check mark for “ICC/e4WD”, which is not listed on the check sheet table.)
   - For “ABS”, “UNKWN” is displayed on “ECM”. Put a check mark to it.
   - For “ALL MODE AWD/4WD”, “UNKWN” is displayed on “ECM” and “TCM”. Put a check mark to “ECM” columns of reception diagnosis on the check sheet table. (It is not necessary to put a check mark for “TCM”, which is not listed on the check sheet table.)



NOTE:

There is a check mark both in “VDC/TCS/ABS” and “METER/M&A” of “A/T” in “The arranged results of CAN diagnosis support monitor” sheet. Also, there is a mark of “–” both in “VDC/TCS/ABS” and “METER/M&A” of “A/T” in the check sheet results (example). Therefore, ignore a check mark both in “VDC/TCS/ABS” and “METER/M&A” of “A/T” in “The arranged results of CAN diagnosis support monitor” sheet.

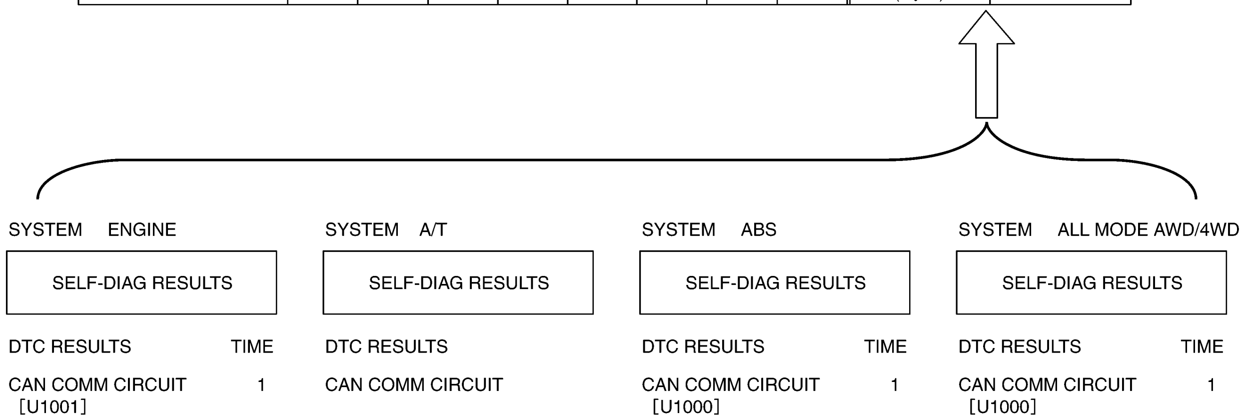
3. Perform system diagnosis for possible causes identified.
4. Perform diagnosis again after inspection and repair. Make sure that repair is completely performed, and then end the procedure.

Start CAN system trouble diagnosis if this procedure can be confirmed. LAN-16, "CAN Communication Unit"

Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001) ✓
A/T	NG	UNKWN	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000) ✓	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000) ✓	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000) ✓	–



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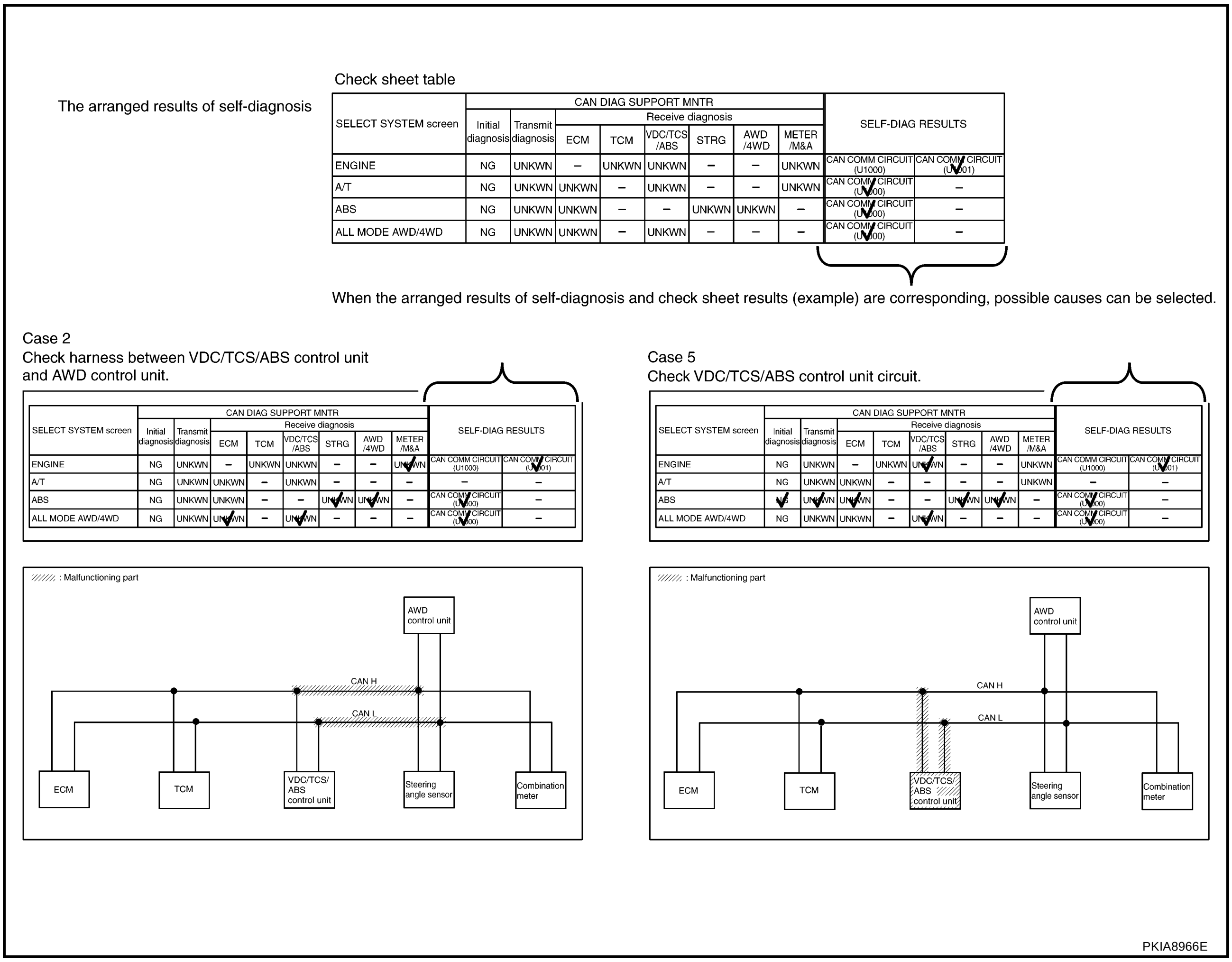
1. See “SELF-DIAG RESULTS” of all units attached to the check sheet. If “CAN COMM CIRCUIT”, “CAN COMM CIRCUIT [U1000]” or “CAN COMM CIRCUIT [U1001]” is displayed, put a check mark to the applicable column of self-diagnostic results of the check sheet table.

NOTE:

- For “ENGINE”, “CAN COMM CIRCUIT [U1001]” are displayed. Put a check mark to it.
- For “A/T”, “CAN COMM CIRCUIT” is displayed. Put a check mark to it.
- For “ABS”, “CAN COMM CIRCUIT [U1000]” is displayed. Put a check mark to it.
- For “ALL MODE AWD/4WD”, “CAN COMM CIRCUIT [U1000]” is displayed. Put a check mark to it.



NOTE:

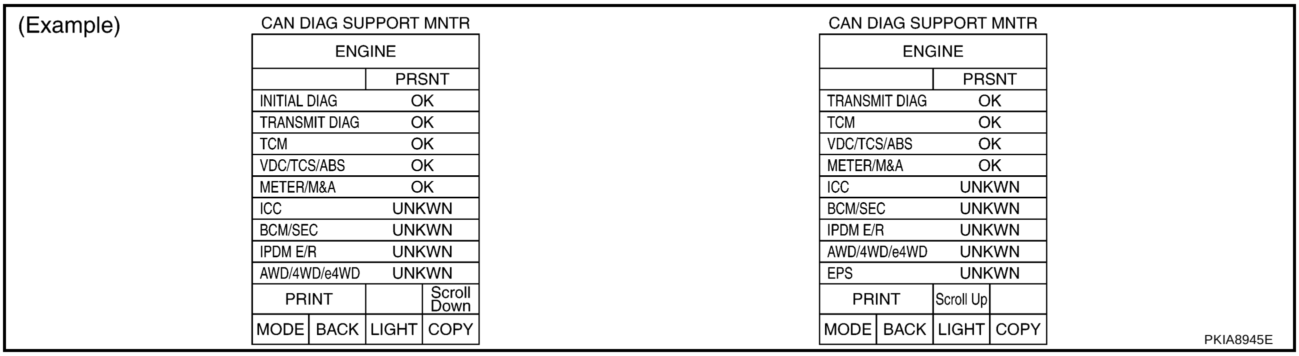
There is a check mark in “CAN COMM CIRCUIT (U1000)” of “A/T” in “The arranged results of self-diagnosis” sheet. Also, there is a mark of “–” in “CAN COMM CIRCUIT (U1000)” of “A/T” in “The arranged results of self-diagnosis” sheet. Therefore, ignore a check mark in “CAN COMM CIRCUIT (U1000)” of “A/T” in “The arranged results of self-diagnosis” sheet.

2. For the selected possible causes, it is expected that malfunctions have been found in the past.

CAN Diagnostic Support Monitor

AKS00BQH

DESCRIPTION OF “CAN DIAG SUPPORT MNTR” SCREEN FOR ECM

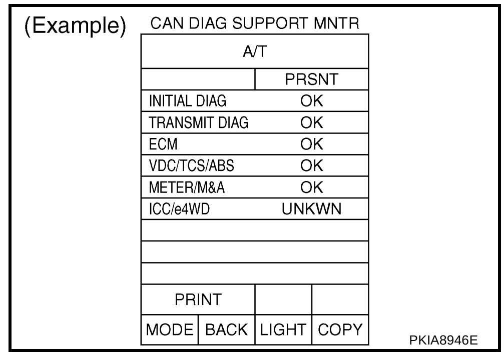


“SELECT SYSTEM” screen	“CAN DIAG SUPPORT MNTR” screen	Description	Present
ENGINE	INITIAL DIAG	Make sure that microcomputer in ECU works normally.	OK/NG
	TRANSMIT DIAG	Make sure of normal transmission.	OK/UNKWN
	TCM	Make sure of normal reception from TCM.	OK/UNKWN
	VDC/TCS/ABS	VDC/TCS/ABS is not diagnosed. (ABS models)	UNKWN
		Make sure of normal reception from VDC/TCS/ABS control unit. (VDC models)	OK/UNKWN
	METER/M&A	Make sure of normal reception from combination meter.	OK/UNKWN
	ICC	ICC is not diagnosed.	UNKWN
	BCM/SEC	BCM/SEC is not diagnosed.	UNKWN
	IPDM E/R	IPDM E/R is not diagnosed.	UNKWN
	AWD/4WD/e4WD	AWD/4WD/e4WD is not diagnosed.	UNKWN
	EPS	EPS is not diagnosed.	UNKWN

Display Results (Present)

- OK: Normal
- NG: Malfunction
- UNKWN: The diagnosed unit does not transmit or receive the applicable data normally.

DESCRIPTION OF “CAN DIAG SUPPORT MNTR” SCREEN FOR TCM



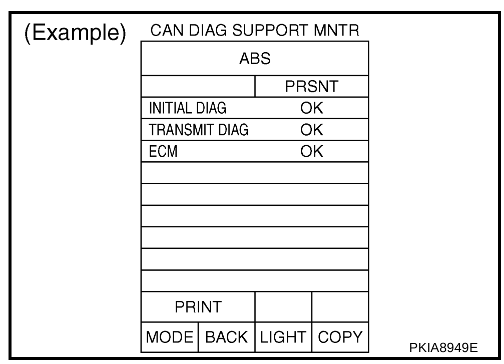
PKIA8946E

“SELECT SYSTEM” screen	“CAN DIAG SUPPORT MNTR” screen	Description	Present
A/T	INITIAL DIAG	Make sure that microcomputer in ECU works normally.	OK/NG
	TRANSMIT DIAG	Make sure of normal transmission.	OK/UNKWN
	ECM	Make sure of normal reception from ECM.	OK/UNKWN
	VDC/TCS/ABS	VDC/TCS/ABS is not diagnosed. (ABS models)	UNKWN
		Make sure of normal reception from VDC/TCS/ABS control unit. (VDC models)	OK/UNKWN
	METER/M&A	Make sure of normal reception from combination meter.	OK/UNKWN
	ICC/e4WD	ICC/e4WD is not diagnosed.	UNKWN

Display Results (Present)

- OK: Normal
- NG: Malfunction
- UNKWN: The diagnosed unit does not transmit or receive the applicable data normally.

DESCRIPTION OF “CAN DIAG SUPPORT MNTR” SCREEN FOR ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)



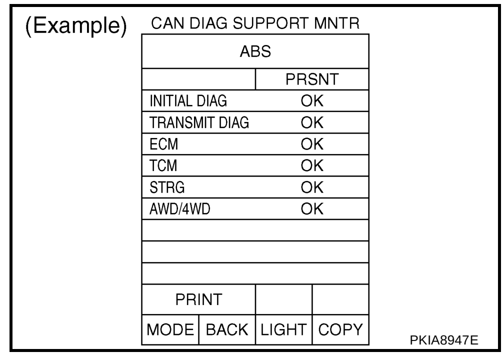
PKIA8949E

“SELECT SYSTEM” screen	“CAN DIAG SUPPORT MNTR” screen	Description	Present
ABS	INITIAL DIAG	Make sure that microcomputer in ECU works normally.	OK/NG
	TRANSMIT DIAG	Make sure of normal transmission.	OK/UNKWN
	ECM	Make sure of normal reception from ECM.	OK/UNKWN

Display Results (Present)

- OK: Normal
- NG: Malfunction
- UNKWN: The diagnosed unit does not transmit or receive the applicable data normally.

DESCRIPTION OF “CAN DIAG SUPPORT MNTR” SCREEN FOR VDC/TCS/ABS CONTROL UNIT

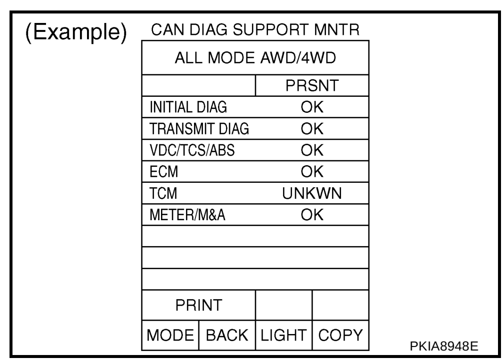


“SELECT SYSTEM” screen	“CAN DIAG SUPPORT MNTR” screen	Description	Present
ABS	INITIAL DIAG	Make sure that microcomputer in ECU works normally.	OK/UNKWN
	TRANSMIT DIAG	Make sure of normal transmission.	OK/UNKWN
	ECM	Make sure of normal reception from ECM.	OK/UNKWN
	TCM	Make sure of normal reception from TCM. (Not available for CAN system diagnosis.)	OK/UNKWN
	STRG	Make sure of normal reception from Steering angle sensor.	OK/UNKWN
	AWD/4WD	Make sure of normal reception from AWD control unit.	OK/UNKWN

Display Results (Present)

- OK: Normal
- NG: Malfunction
- UNKWN: The diagnosed unit does not transmit or receive the applicable data normally.

DESCRIPTION OF “CAN DIAG SUPPORT MNTR” SCREEN FOR AWD CONTROL UNIT



“SELECT SYSTEM” screen	“CAN DIAG SUPPORT MNTR” screen	Description	Present
ALL MODE AWD/4WD	INITIAL DIAG	Make sure that microcomputer in ECU works normally.	OK/NG
	TRANSMIT DIAG	Make sure of normal transmission.	OK/UNKWN
	VDC/TCS/ABS	Make sure of normal reception from ABS actuator and electric unit (control unit).	OK/UNKWN
		Make sure of normal reception from VDC/TCS/ABS control unit.	OK/UNKWN
	ECM	Make sure of normal reception from ECM.	OK/UNKWN
	TCM	TCM is not diagnosed.	UNKWN
	METER/M&A	Make sure of normal reception from combination meter. (Not available for CAN system diagnosis.)	OK/UNKWN

Display Results (Present)

- OK: Normal
- NG: Malfunction
- UNKWN: The diagnosed unit does not transmit or receive the applicable data normally.

CAN COMMUNICATION

PFP:23710

System Description

AKS00BCK

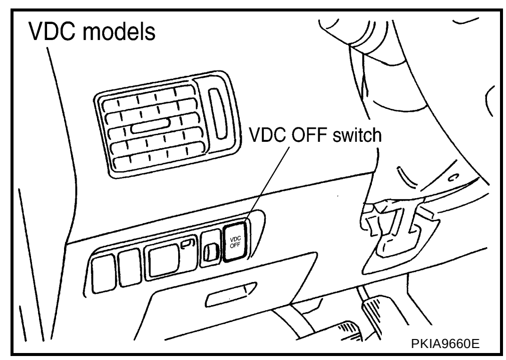
CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

CAN Communication Unit

AKS00BCL

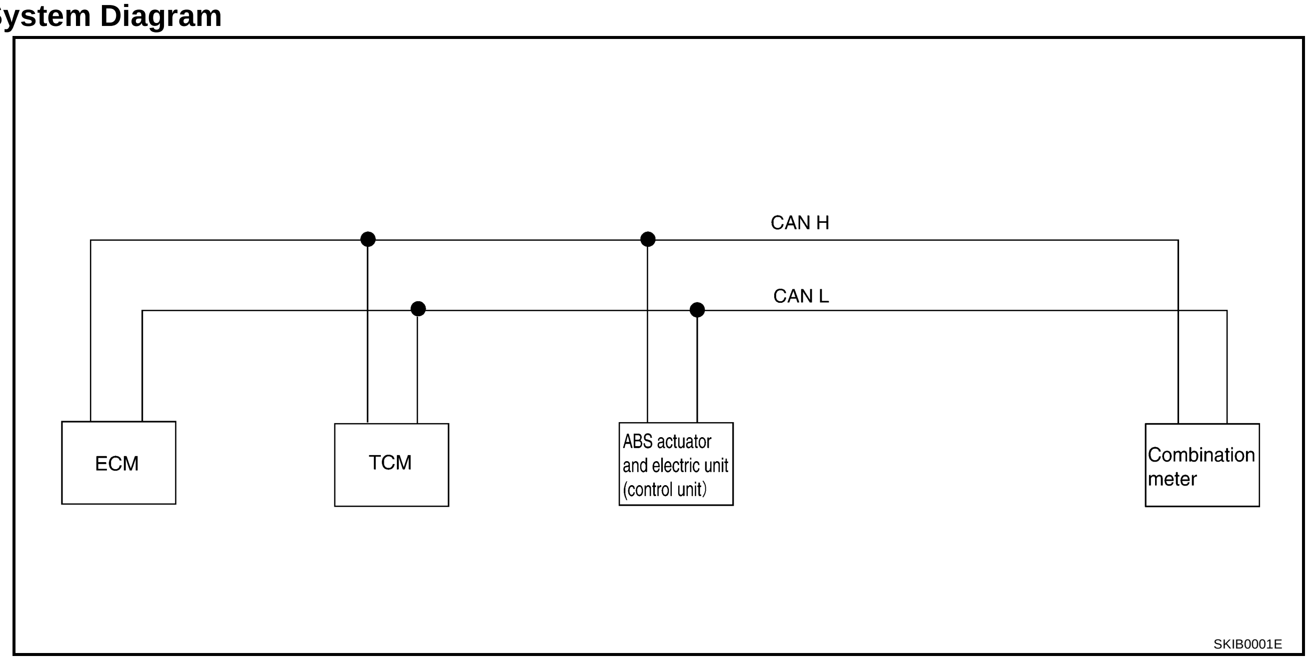
Go to CAN system, when selecting your CAN system type from the following table.

Body type	Wagon				
Axle	2WD	AWD			
Engine	QR25DE				
Transmission	A/T	M/T	A/T	M/T	A/T
Brake control	ABS			VDC	
CAN system type	1	2	3	4	5
CAN system trouble diagnosis	LAN-22	LAN-39	LAN-55	LAN-76	LAN-93



TYPE 1

System Diagram



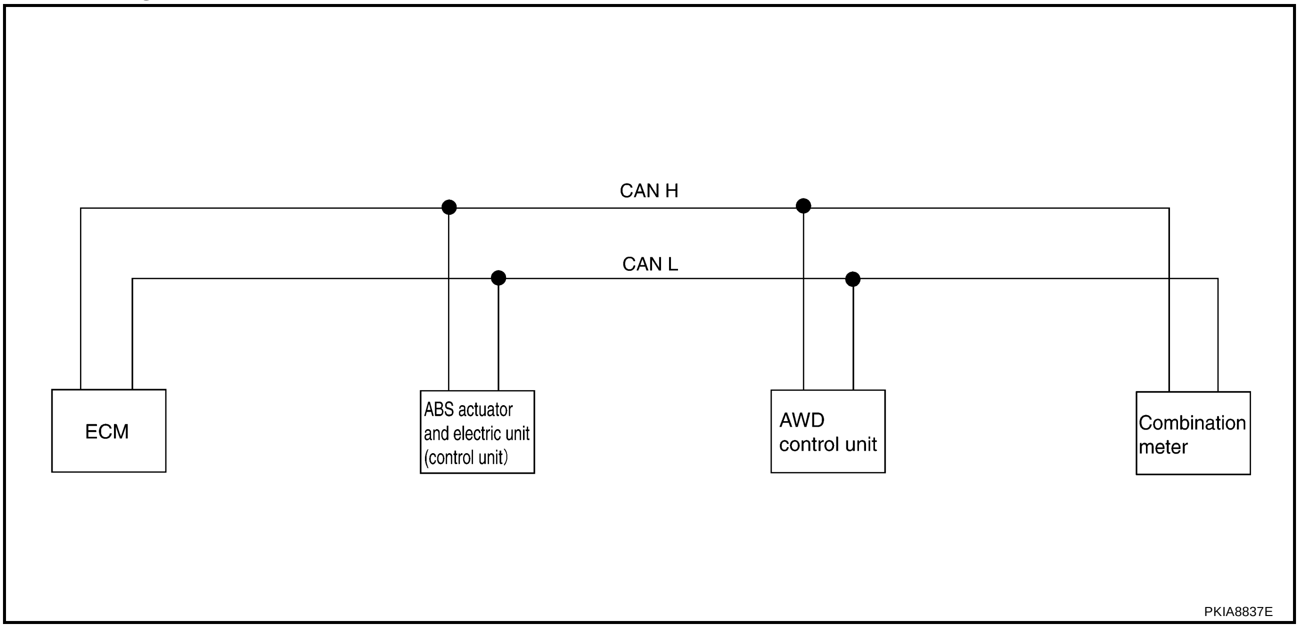
Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	TCM	ABS actuator and electric unit (control unit)	Combination meter
Stop lamp switch signal		R		T
A/T self-diagnosis signal	R	T		
A/T position indicator lamp signal		T		R
Overdrive control switch signal		R		T
O/D OFF indicator signal		T		R
Closed throttle position signal	T	R		
Wide open throttle position signal	T	R		
Engine speed signal	T			R
Engine coolant temperature signal	T			R
Output shaft revolution signal	R	T		
A/C compressor feedback signal	T			R
Vehicle speed signal			T	R
	R			T
ABS warning lamp signal			T	R
Fuel level sensor signal	R			T
Malfunction indicator lamp signal	T			R
ASCD SET lamp signal	T			R
ASCD CRUISE lamp signal	T			R
Engine A/T integrated control signal	T	R		
	R	T		
Snow mode switch signal	R			T

TYPE 2

System Diagram



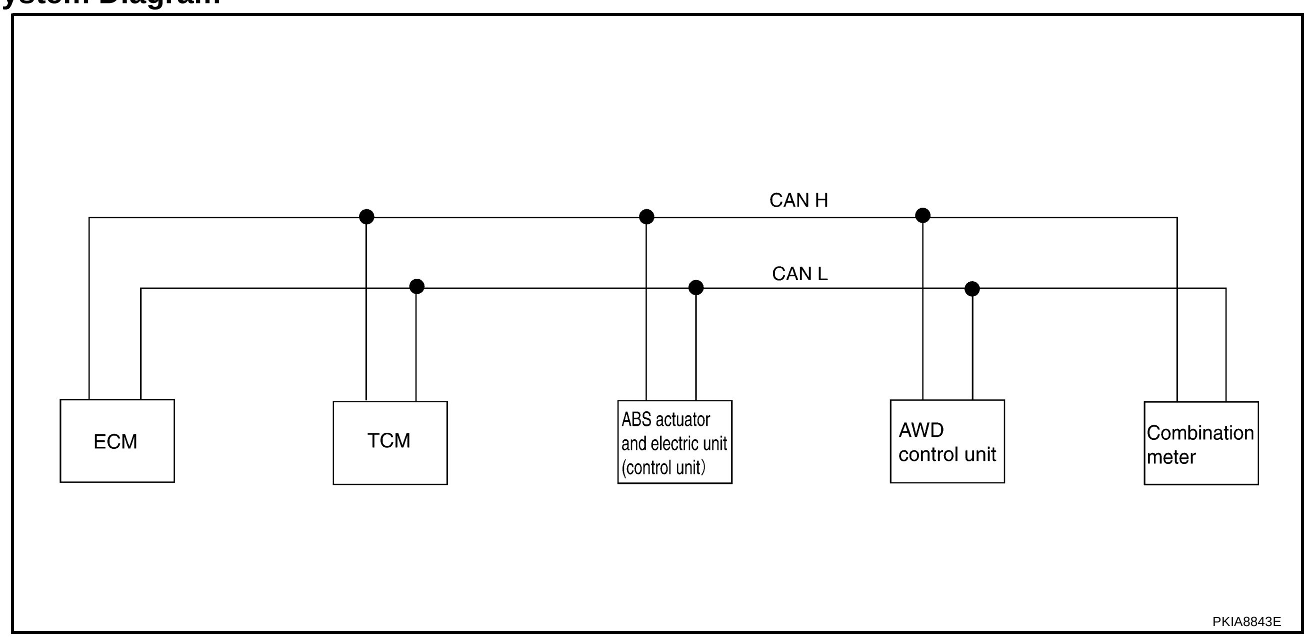
Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	ABS actuator and electric unit (control unit)	AWD control unit	Combination meter
Stop lamp switch signal		T	R	
Engine speed signal	T		R	R
Engine coolant temperature signal	T			R
Accelerator pedal position signal	T		R	
A/C compressor feedback signal	T			R
Vehicle speed signal		T	R	R
	R			T
ABS warning lamp signal		T		R
AWD warning lamp signal			T	R
AWD mode indicator lamp signal			T	R
Parking brake switch signal			R	T
Fuel level sensor signal	R			T
Malfunction indicator lamp signal	T			R
ASCD SET lamp signal	T			R
ASCD CRUISE lamp signal	T			R

TYPE 3

System Diagram



Input/Output Signal Chart

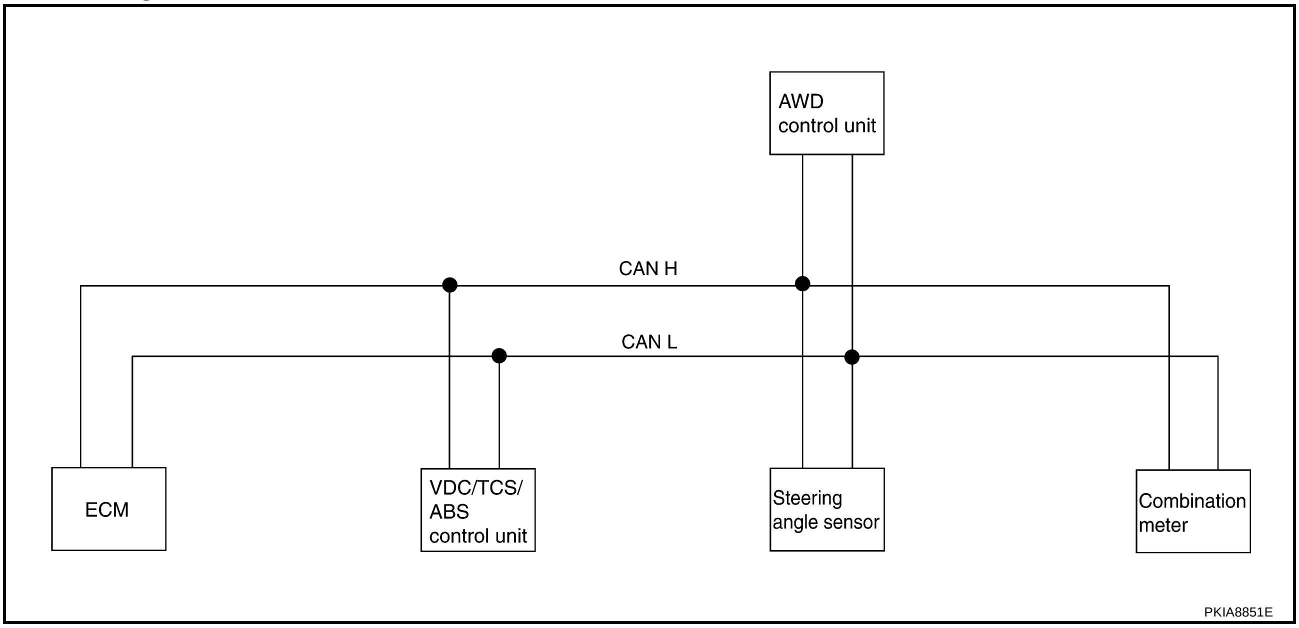
T: Transmit R: Receive

Signals	ECM	TCM	ABS actuator and electric unit (control unit)	AWD control unit	Combination meter
Stop lamp switch signal		R			T
			T	R	
A/T self-diagnosis signal	R	T			
A/T position indicator lamp signal		T			R
Overdrive control switch signal		R			T

Signals	ECM	TCM	ABS actuator and electric unit (control unit)	AWD control unit	Combination meter
O/D OFF indicator signal		T			R
Closed throttle position signal	T	R			
Wide open throttle position signal	T	R			
Engine speed signal	T			R	R
Engine coolant temperature signal	T				R
Output shaft revolution signal	R	T			
A/C compressor feedback signal	T				R
Vehicle speed signal			T	R	R
	R				T
ABS warning lamp signal			T		R
AWD warning lamp signal				T	R
AWD mode indicator lamp signal				T	R
Parking brake switch signal				R	T
Fuel level sensor signal	R				T
Malfunction indicator lamp signal	T				R
ASCD SET lamp signal	T				R
ASCD CRUISE lamp signal	T				R
Engine A/T integrated control signal	T	R			
	R	T			

TYPE 4

System Diagram



Input/Output Signal Chart

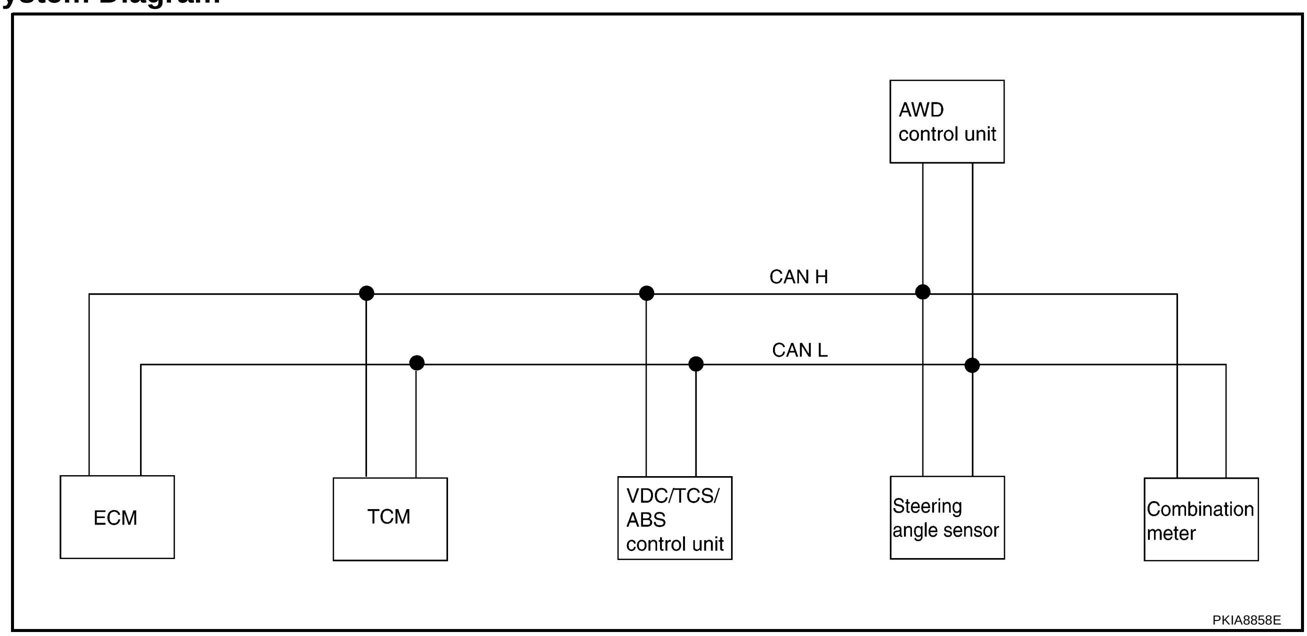
T: Transmit R: Receive

Signals	ECM	VDC/TCS/ABS control unit	Steering angle sensor	AWD control unit	Combination meter
Stop lamp switch signal		T		R	
Engine speed signal	T	R		R	R
Engine coolant temperature signal	T				R

Signals	ECM	VDC/TCS/ABS control unit	Steering angle sensor	AWD control unit	Combination meter
Accelerator pedal position signal	T	R		R	
A/C compressor feedback signal	T				R
Vehicle speed signal		T		R	R
	R				T
ABS warning lamp signal		T			R
Brake warning lamp signal		T			R
SLIP indicator lamp signal		T			R
VDC OFF indicator lamp signal		T			R
AWD warning lamp signal				T	R
AWD mode indicator lamp signal				T	R
Parking brake switch signal				R	T
Fuel level sensor signal	R				T
Malfunction indicator lamp signal	T				R
ASCD SET lamp signal	T				R
ASCD CRUISE lamp signal	T				R
Steering angle sensor signal		R	T		

TYPE 5

System Diagram



Input/Output Signal Chart

T: Transmit R: Receive

Signals	ECM	TCM	VDC/TCS/ ABS control unit	Steering angle sensor	AWD control unit	Combination meter
Stop lamp switch signal		R				T
			T		R	
A/T position indicator lamp signal		T	R			R
O/D OFF indicator signal		T				R
Overdrive control switch signal		R				T
Closed throttle position signal	T	R				

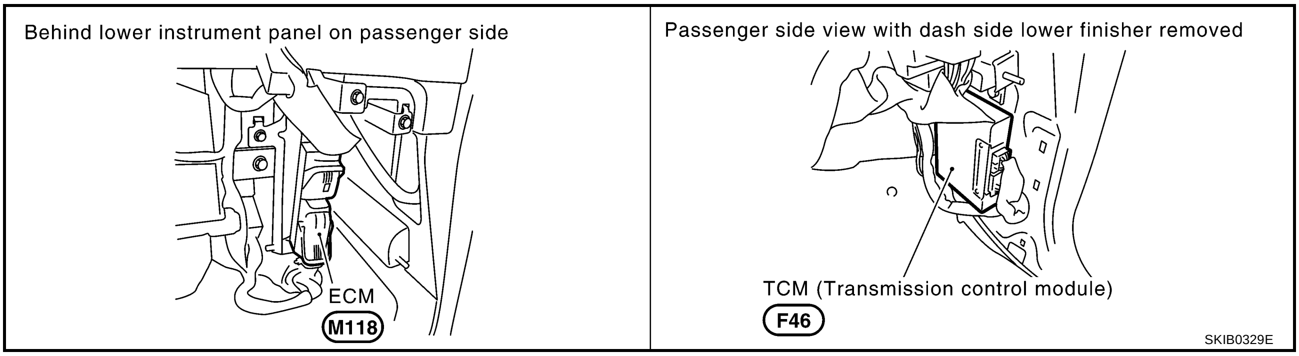
Signals	ECM	TCM	VDC/TCS/ ABS control unit	Steering angle sensor	AWD control unit	Combination meter
Wide open throttle position signal	T	R				
Engine speed signal	T		R		R	R
Engine coolant temperature signal	T					R
Accelerator pedal position signal	T		R		R	
Output shaft revolution signal	R	T				
A/C compressor feedback signal	T					R
Vehicle speed signal			T		R	R
	R					T
ABS warning lamp signal			T			R
Brake warning lamp signal			T			R
SLIP indicator lamp signal			T			R
VDC OFF indicator lamp signal			T			R
AWD warning lamp signal					T	R
AWD mode indicator lamp signal					T	R
Parking brake switch signal					R	T
Fuel level sensor signal	R					T
Malfunction indicator lamp signal	T					R
ASCD SET lamp signal	T					R
ASCD CRUISE lamp signal	T					R
Steering angle sensor signal			R	T		
Engine and A/T integrated control signal	T	R				
	R	T				
A/T self-diagnosis signal	R	T				

CAN SYSTEM (TYPE 1)

PFP:23710

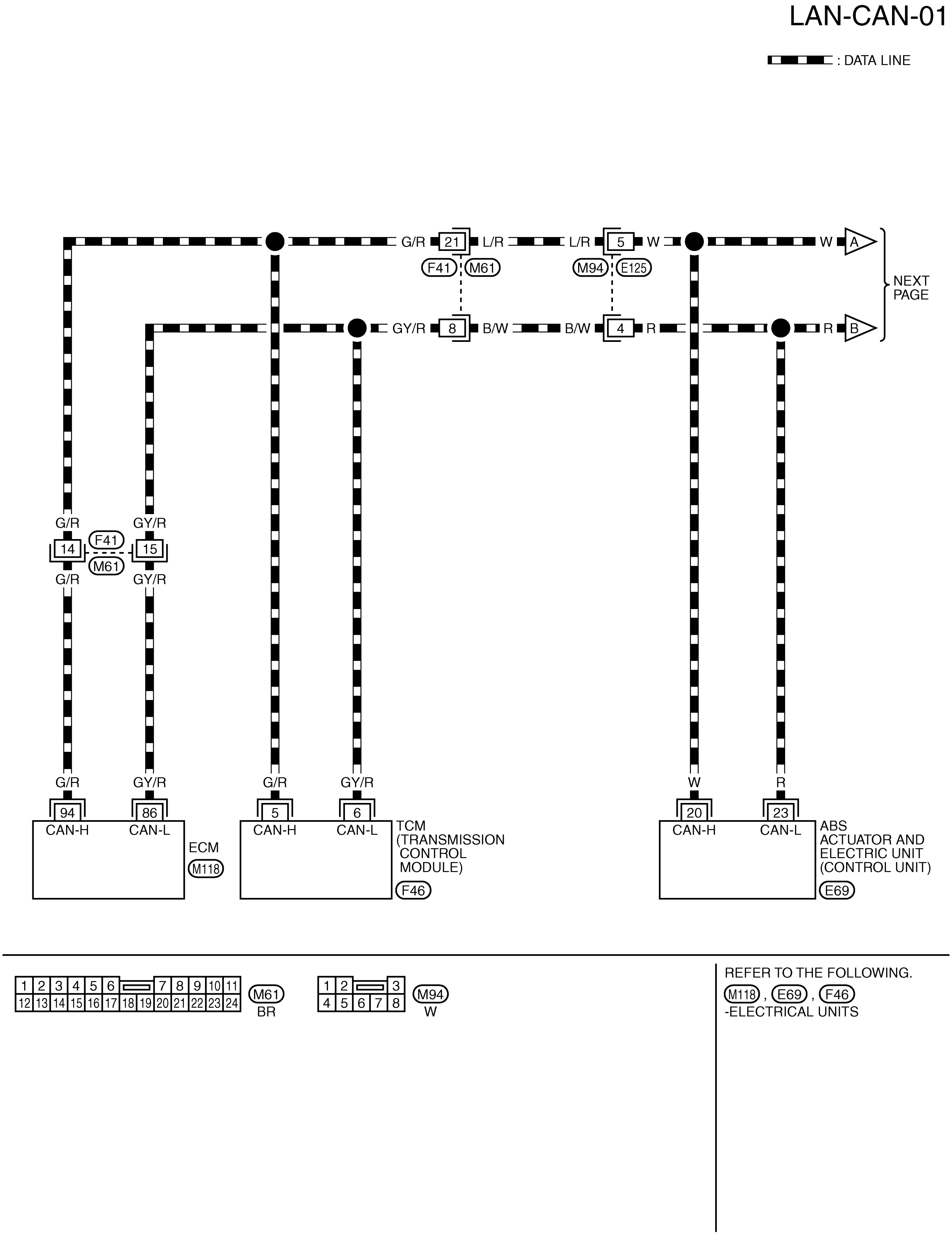
Component Parts and Harness Connector Location

AKS00BK2



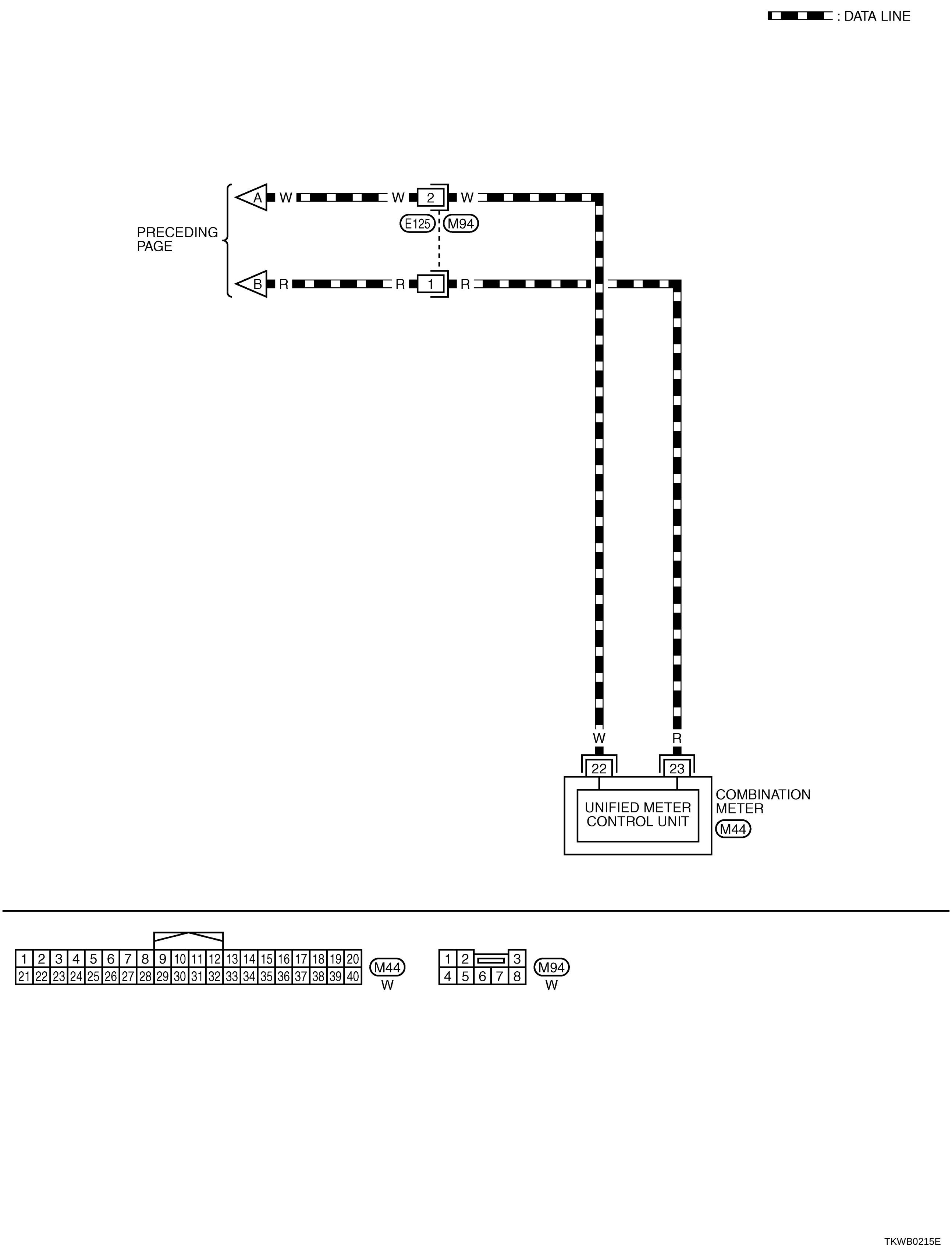
Wiring Diagram — CAN —

AKS00BK3



TKWB0214E

LAN-CAN-02


: DATA LINE
PRECEDING PAGE
A
B
W
R
2
1
E125
M94
22
23
UNIFIED METER CONTROL UNIT
COMBINATION METER
M44
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
M44
W
1 2 3
4 5 6 7 8
M94
W
TKWB0215E

Check Sheet

AKS00BK4

NOTE:

If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	UNKWN	CAN COMM CIRCUIT (U1000)	—
ABS	NG	UNKWN	UNKWN	—	—	CAN COMM CIRCUIT (U1000)	—

Symptoms :

Attach copy of ENGINE SELF-DIAG RESULTS

Attach copy of A/T SELF-DIAG RESULTS

Attach copy of ABS SELF-DIAG RESULTS

Attach copy of ENGINE CAN DIAG SUPPORT MNTR

Attach copy of A/T CAN DIAG SUPPORT MNTR

Attach copy of ABS CAN DIAG SUPPORT MNTR

PKIA8754E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

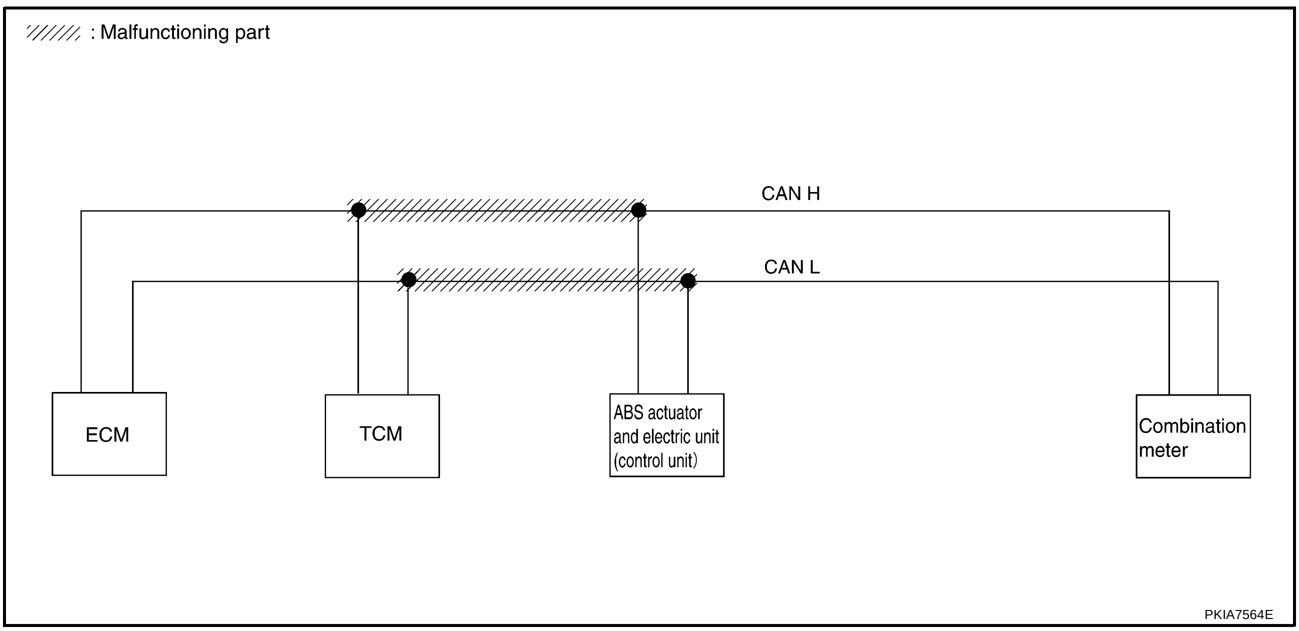
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Case 1

Check harness between TCM and ABS actuator and electric unit (control unit). Refer to LAN-31, "Between TCM and ABS Actuator and Electric Unit (Control Unit) Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN ✓	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001) ✓
A/T	NG	UNKWN	UNKWN	–	–	–	–
ABS	NG	UNKWN	UNKWN ✓	–	–	CAN COMM CIRCUIT (U1000) ✓	–

PKIA8755E



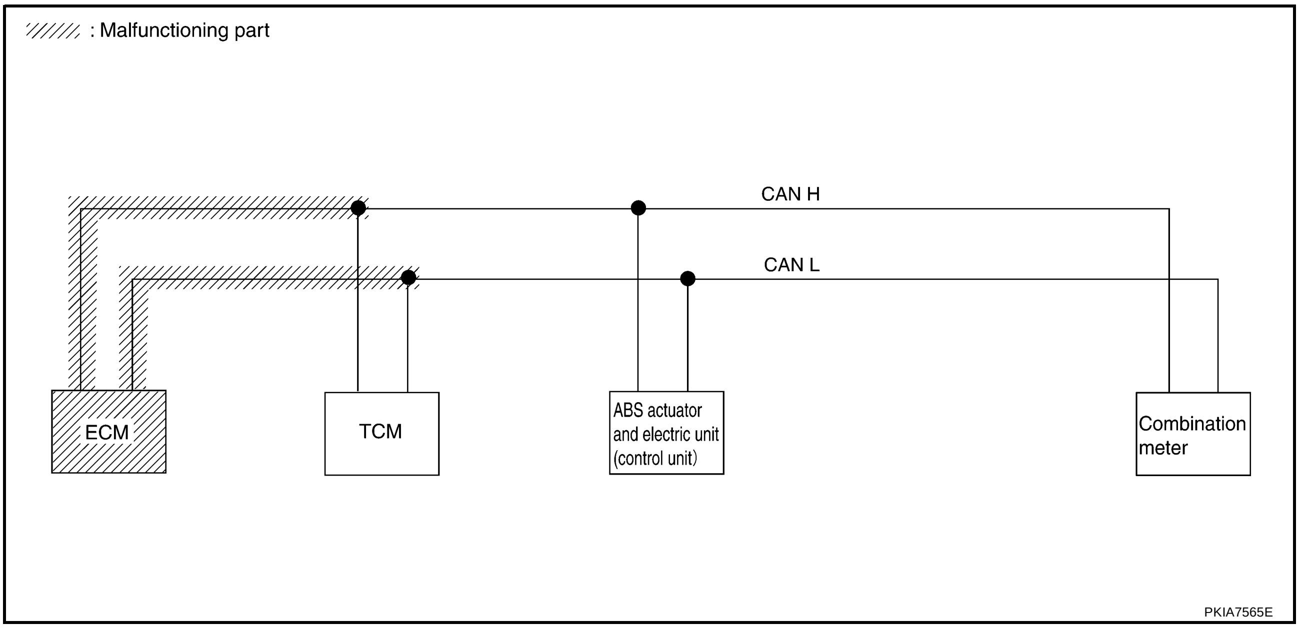
PKIA7564E

Case 2

Check ECM circuit. Refer to LAN-32, "ECM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	–	–	UNKWN	–	–
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8756E

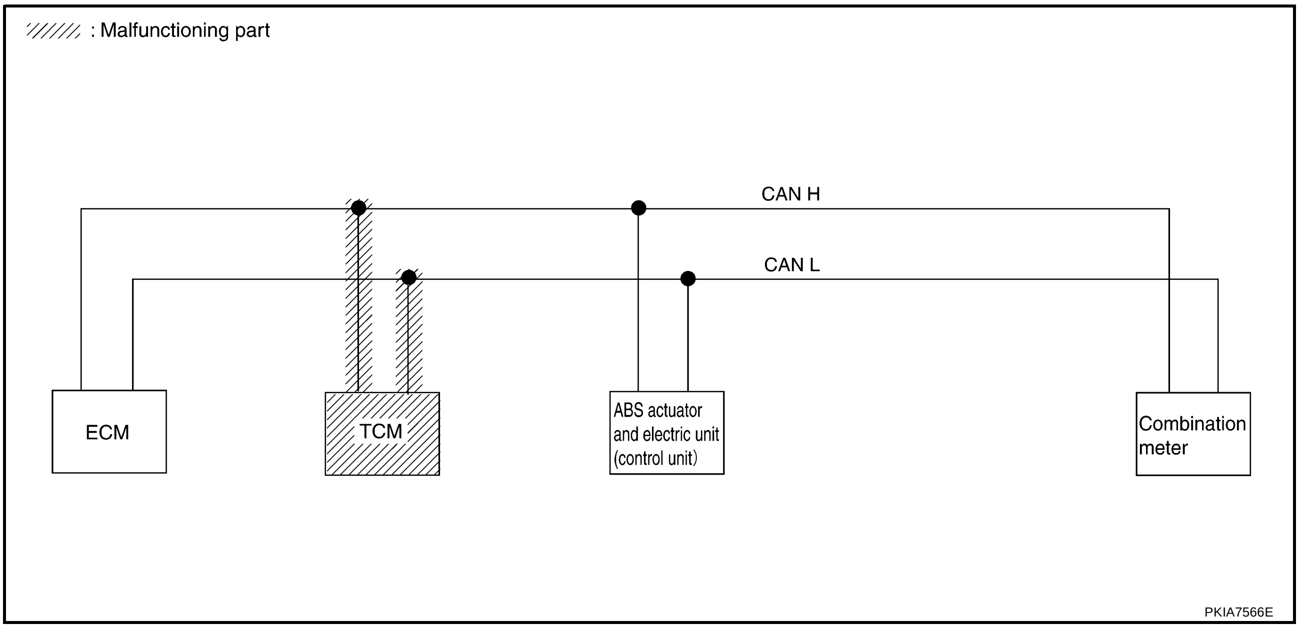


Case 3

Check TCM circuit. Refer to LAN-33, "TCM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8757E

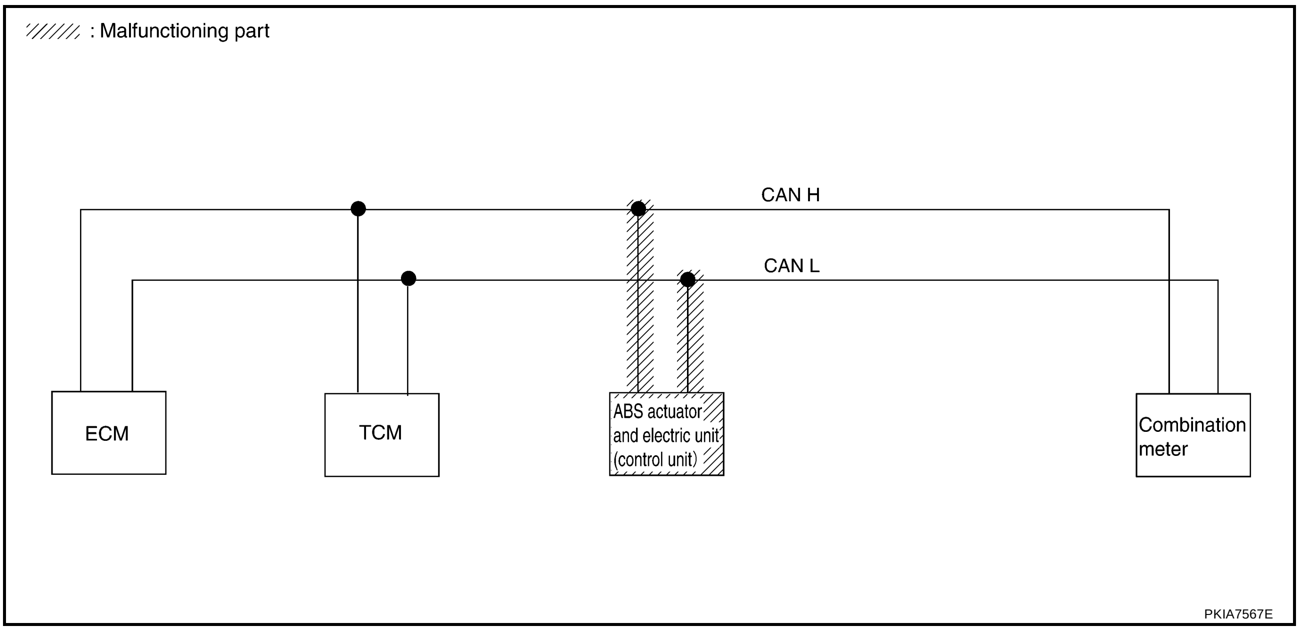


Case 4

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-33, "ABS Actuator and Electric Unit (Control Unit) Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	UNKWN	CAN COMM CIRCUIT (U1000)	—
ABS	NG	UNKWN	UNKWN	—	—	CAN COMM CIRCUIT (U1000)	—

PKIA8758E

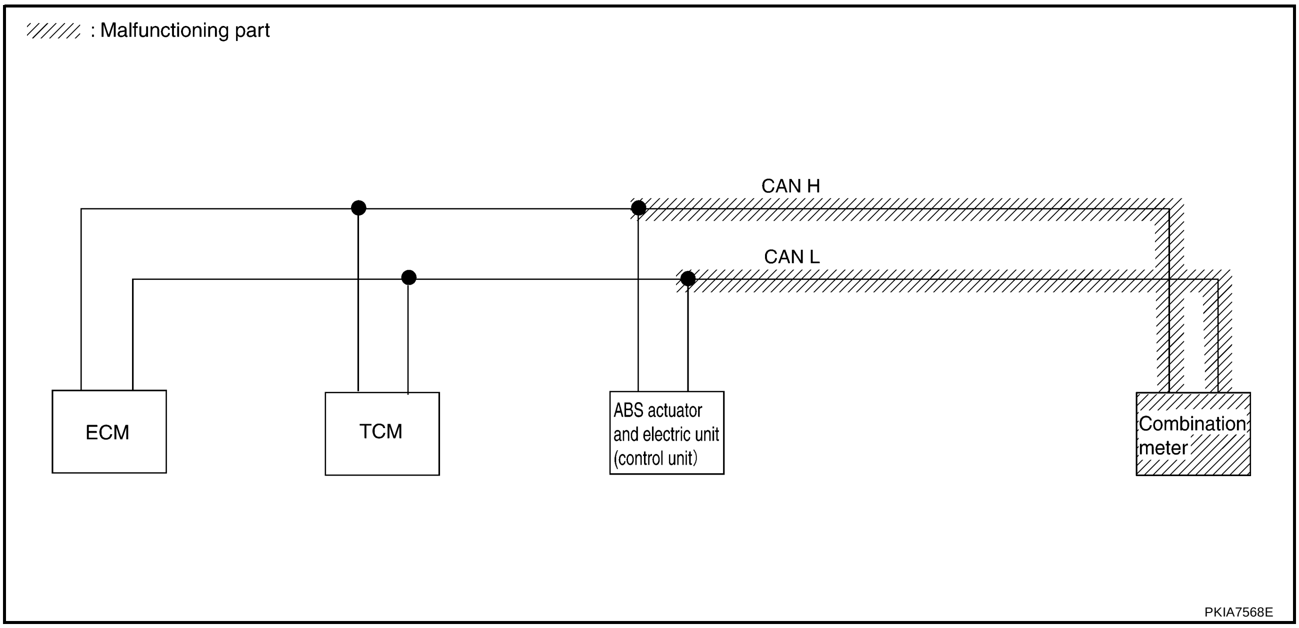


Case 5

Check combination meter circuit. Refer to LAN-34, "Combination Meter Circuit Inspection" .

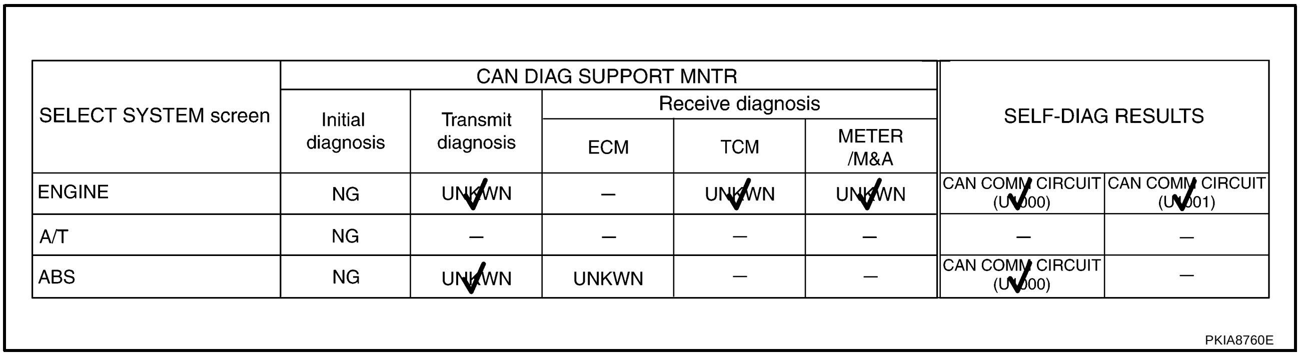
SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8759E



Case 6

Check CAN communication circuit. Refer to LAN-35, "CAN Communication Circuit Inspection" .



SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	TCM	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8760E

Between TCM and ABS Actuator and Electric Unit (Control Unit) Circuit Inspection

AKS00BK5

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).
- Harness connector F41
- Harness connector M61
- Harness connector M94
- Harness connector E125

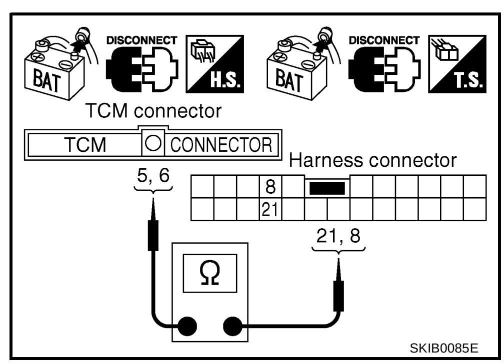
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector and harness connector F41.
2. Check continuity between TCM harness connector F46 terminals 5 (G/R), 6 (GY/R) and harness connector F41 terminals 21 (G/R), 8 (GY/R).

5 (G/R) – 21 (G/R) : Continuity should exist.
6 (GY/R) – 8 (GY/R) : Continuity should exist.



SKIB0085E

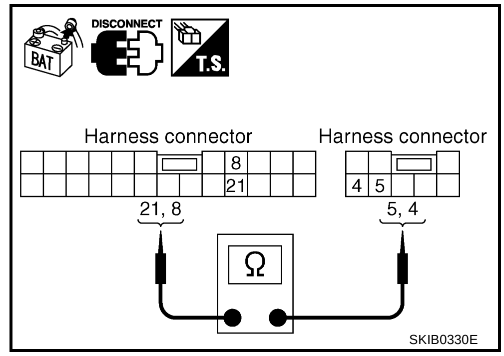
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect harness connector M94.
2. Check continuity between harness connector M61 terminals 21 (L/R), 8 (B/W) and harness connector M94 terminals 5 (L/R), 4 (B/W).

21 (L/R) – 5 (L/R) : Continuity should exist.
8 (B/W) – 4 (B/W) : Continuity should exist.



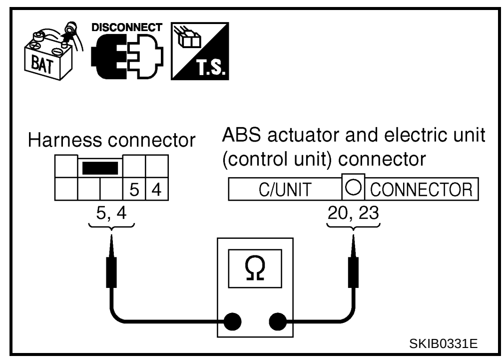
OK or NG

OK >> GO TO 4.
NG >> Repair harness.

4. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between harness connector E125 terminals 5 (W), 4 (R) and ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R).

5 (W) – 20 (W) : Continuity should exist.
4 (R) – 23 (R) : Continuity should exist.



OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .
NG >> Repair harness.

ECM Circuit Inspection

AKS00BK6

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).
- ECM connector
- Harness connector M61
- Harness connector F41

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

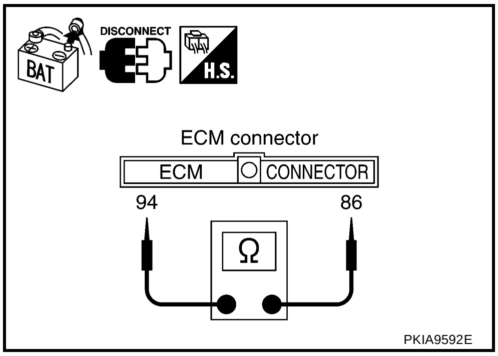
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Approx. 108 – 132Ω

OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and TCM.



TCM Circuit Inspection

AKS00BK7

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

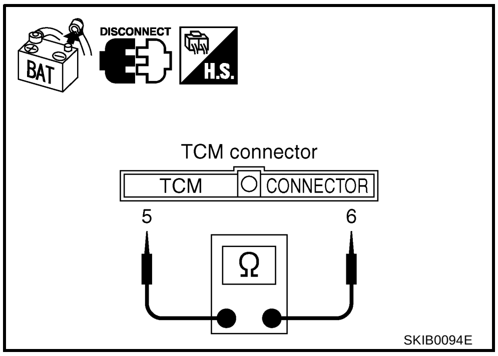
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector F46 terminals 5 (G/R) and 6 (GY/R).

5 (G/R) – 6 (GY/R) : Approx. 54 – 66Ω

OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and harness connector F41.



ABS Actuator and Electric Unit (Control Unit) Circuit Inspection

AKS00BK8

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

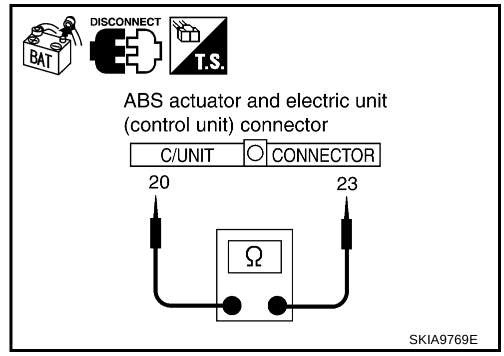
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W) and 23 (R).

20 (W) – 23 (R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E125.

Combination Meter Circuit Inspection

AKS00BK9

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (meter side and harness side).
- Combination meter connector
- Harness connector M94
- Harness connector E125

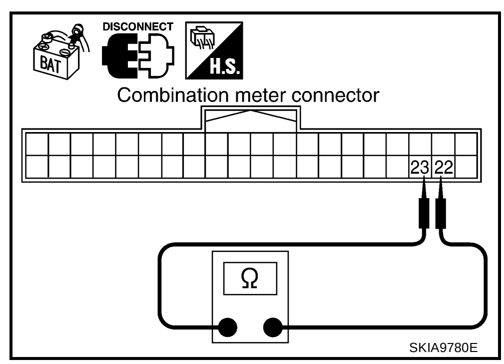
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and ABS actuator and electric unit (control unit).

CAN Communication Circuit Inspection

AKS00BKA

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, control unit side, meter side, connector side and harness side).

- ECM
- TCM
- ABS actuator and electric unit (control unit)
- Combination meter
- Between ECM and combination meter

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

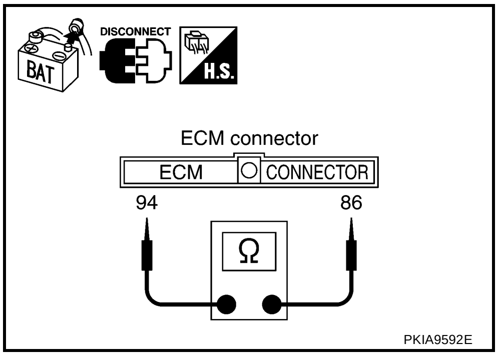
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector M61.
2. Check continuity between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector M61.



PKIA9592E

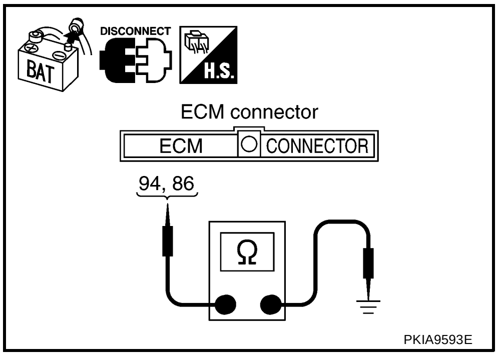
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector M118 terminals 94 (G/R), 86 (GY/R) and ground.

94 (G/R) – Ground : Continuity should not exist.
86 (GY/R) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector M61.

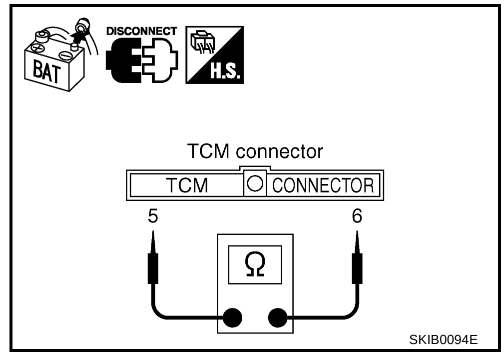


PKIA9593E

4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect TCM connector.
2. Check continuity between TCM harness connector F46 terminals 5 (G/R) and 6 (GY/R).

5 (G/R) – 6 (GY/R) : Continuity should not exist.



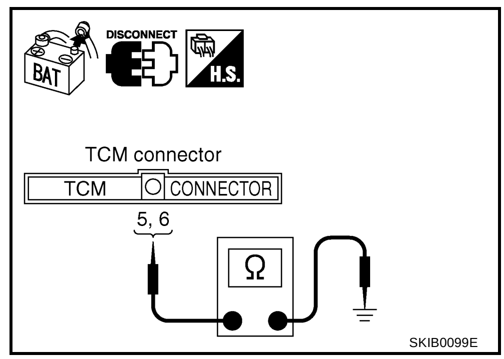
OK or NG

OK >> GO TO 5.
NG >> Repair harness between TCM and harness connector F41.

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between TCM harness connector F46 terminals 5 (G/R), 6 (GY/R) and ground.

5 (G/R) – Ground : Continuity should not exist.
6 (GY/R) – Ground : Continuity should not exist.



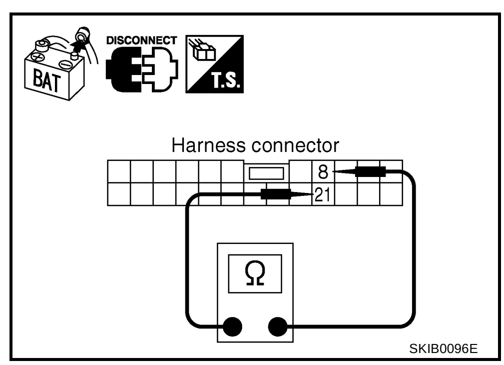
OK or NG

OK >> GO TO 6.
NG >> Repair harness between TCM and harness connector F41.

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect harness connector M94.
2. Check continuity between harness connector M61 terminals 21 (L/R) and 8 (B/W).

21 (L/R) – 8 (B/W) : Continuity should not exist.



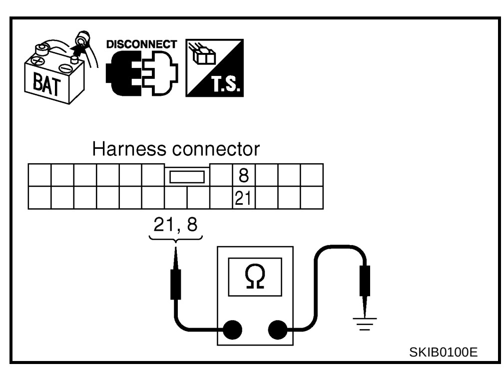
OK or NG

OK >> GO TO 7.
NG >> Repair harness between harness connector M61 and harness connector M94.

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between harness connector M61 terminals 21 (L/R), 8 (B/W) and ground.

21 (L/R) – Ground : Continuity should not exist.
8 (B/W) – Ground : Continuity should not exist.



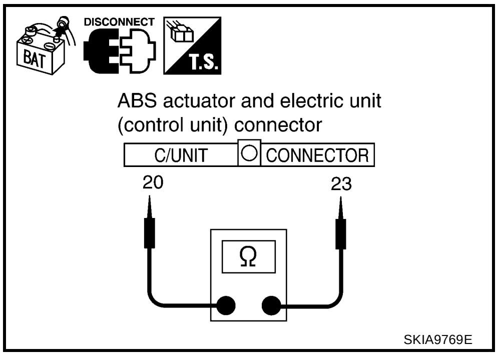
OK or NG

OK >> GO TO 8.
NG >> Repair harness between harness connector M61 and harness connector M94.

8. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W) and 23 (R).

20 (W) – 23 (R) : Continuity should not exist.



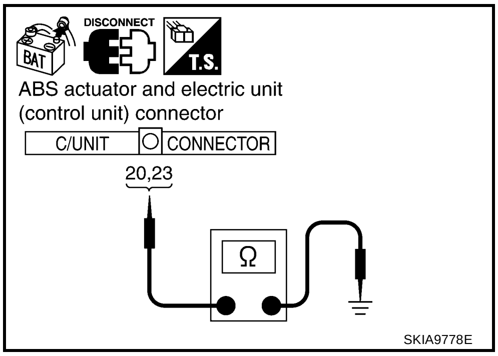
OK or NG

OK >> GO TO 9.
NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E125.

9. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R) and ground.

20 (W) – Ground : Continuity should not exist.
23 (R) – Ground : Continuity should not exist.



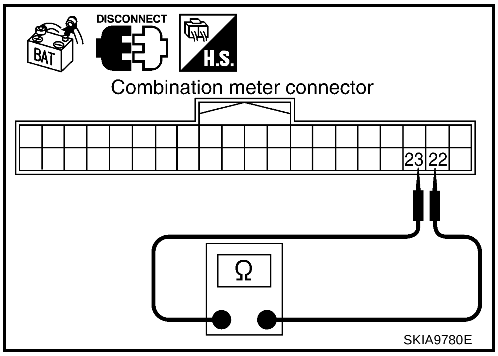
OK or NG

OK >> GO TO 10.
NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E125.

10. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect combination meter connector.
2. Check continuity between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Continuity should not exist.



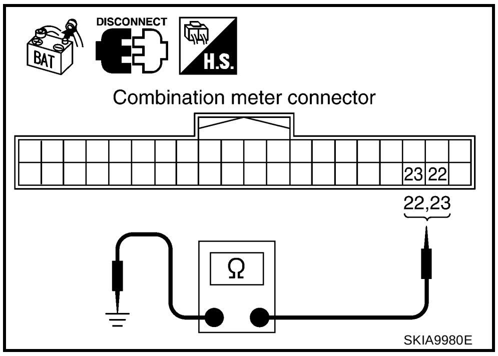
OK or NG

OK >> GO TO 11.
NG >> Repair harness between combination meter and harness connector M94.

11. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between combination meter harness connector M44 terminals 22 (W), 23 (R) and ground.

22 (W) – Ground : Continuity should not exist.
23 (R) – Ground : Continuity should not exist.

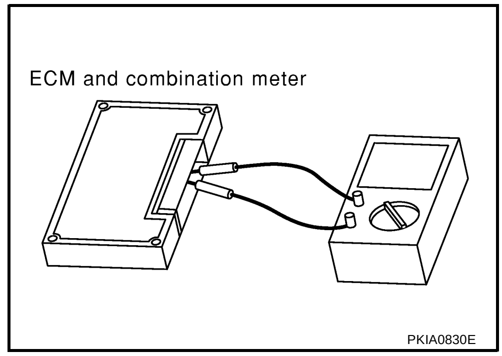


OK or NO

OK >> GO TO 12.
NG >> Repair harness between combination meter and harness connector M94.

12. CHECK ECM AND COMBINATION METER INTERNAL CIRCUIT

1. Remove ECM and combination meter from vehicle.
2. Check resistance between ECM terminals 94 and 86.
3. Check resistance between combination meter terminals 22 and 23.



Unit	Terminal	Resistance (Ω) (Approx.)
ECM	94 – 86	108 – 132
Combination meter	22 – 23	

OK or NG

OK >> GO TO 13.
NG >> Replace ECM and/or combination meter.

13. CHECK SYMPTOM

1. Fill in described symptoms on the column “Symptom” in the check sheet.
2. Connect all connectors, and then make sure that the symptom is reproduced.

OK or NG

OK >> GO TO 14.
NG >> Refer to LAN-11, "Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced" .

14. CHECK UNIT REPRODUCIBILITY

Performs the following procedure for each unit, and then perform reproducibility test.

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Disconnect the unit connector.
4. Connect battery cable at negative terminal.
5. Make sure that the symptom filled in the “Symptom” of the check sheet is reproduced. (Do not confuse it with the symptom related to removed unit.)
6. Make sure that the same symptom is reproduced.

- TCM
- ABS actuator and electric unit (control unit)
- ECM
- Combination meter

Check results

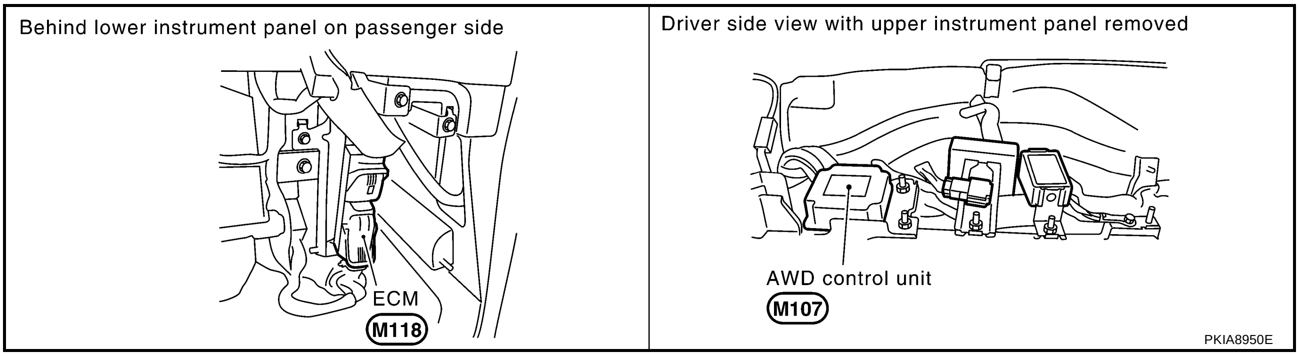
Reproduce>>Install removed unit, and then check the other units.
Not reproduced>>Replace removed unit.

CAN SYSTEM (TYPE 2)

PFP:23710

Component Parts and Harness Connector Location

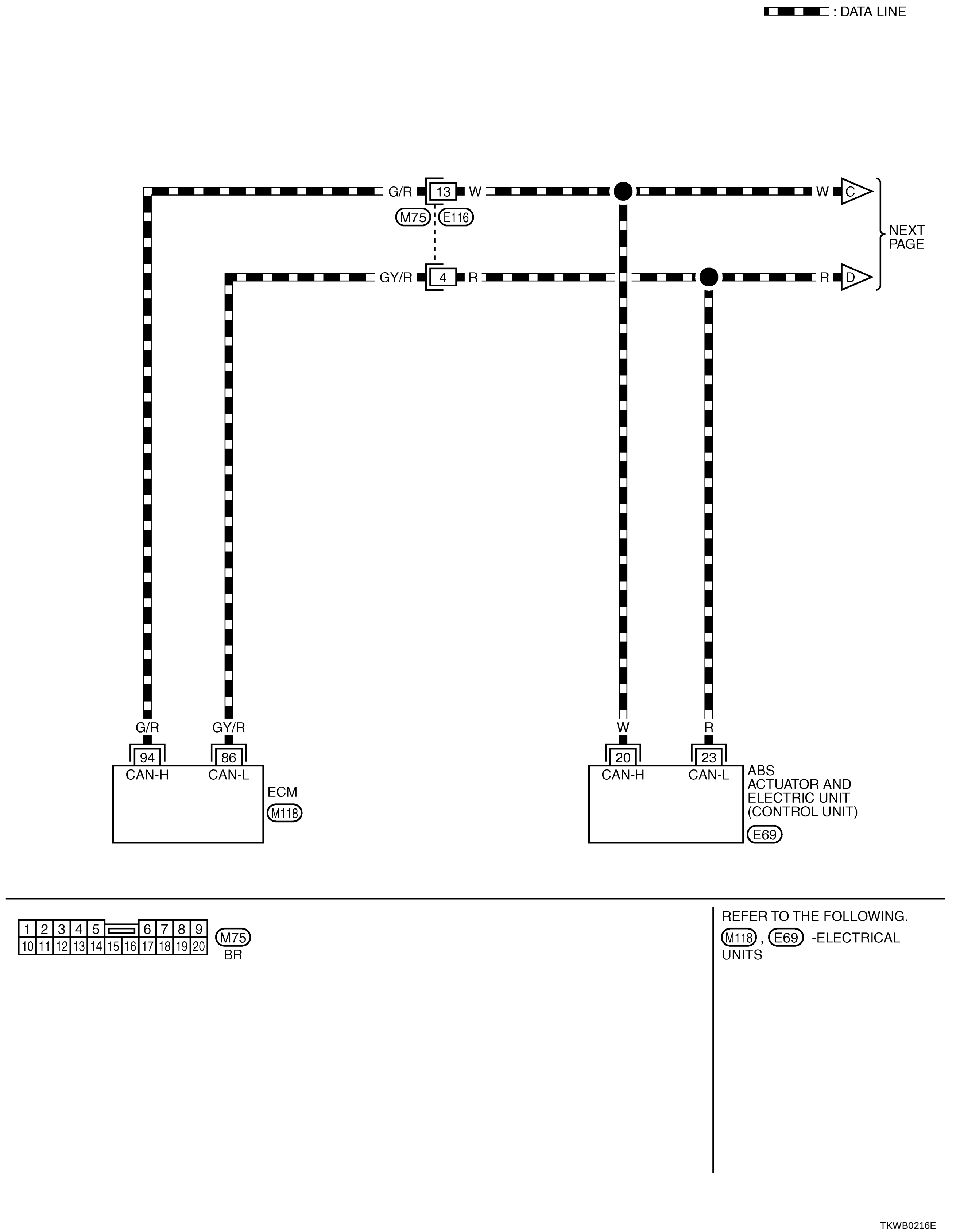
AKS00BKD



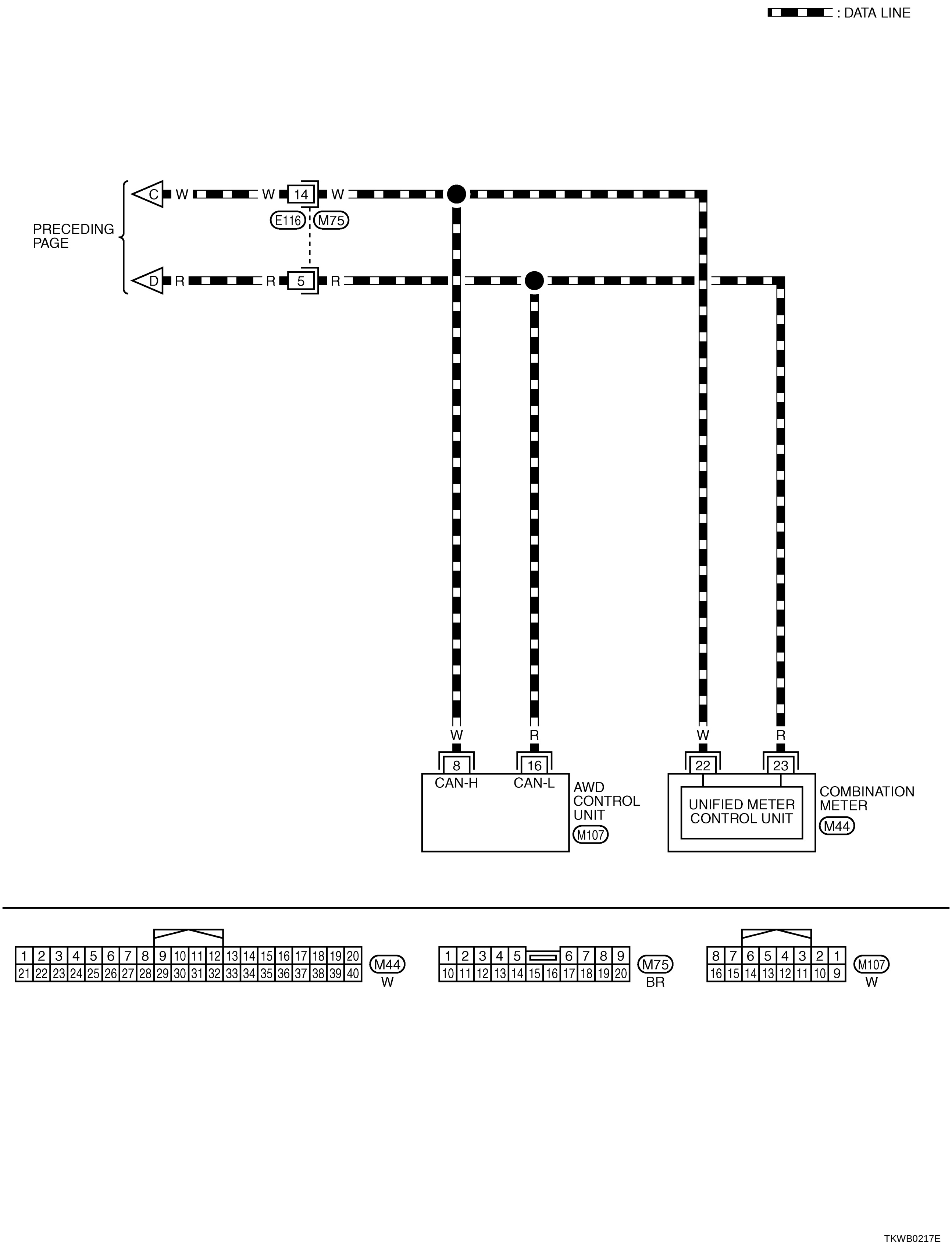
Wiring Diagram — CAN —

AKS00BKE

LAN-CAN-03



LAN-CAN-04


: DATA LINE
PRECEDING PAGE
C
D
W
R
14
5
E116
M75
8
16
CAN-H
CAN-L
AWD CONTROL UNIT
M107
22
23
UNIFIED METER CONTROL UNIT
COMBINATION METER
M44
W
BR
TKWB0217E

Check Sheet

AKS00BKF

NOTE:
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

Symptoms :

Attach copy of
ENGINE
SELF-DIAG RESULTS

Attach copy of
ABS
SELF-DIAG RESULTS

Attach copy of
ALL MODE AWD/4WD
SELF-DIAG RESULTS

Attach copy of
ENGINE
CAN DIAG SUPPORT
MNTR

Attach copy of
ABS
CAN DIAG SUPPORT
MNTR

Attach copy of
ALL MODE AWD/4WD
CAN DIAG SUPPORT
MNTR

PKIA8761E

CHECK SHEET RESULTS (EXAMPLE)

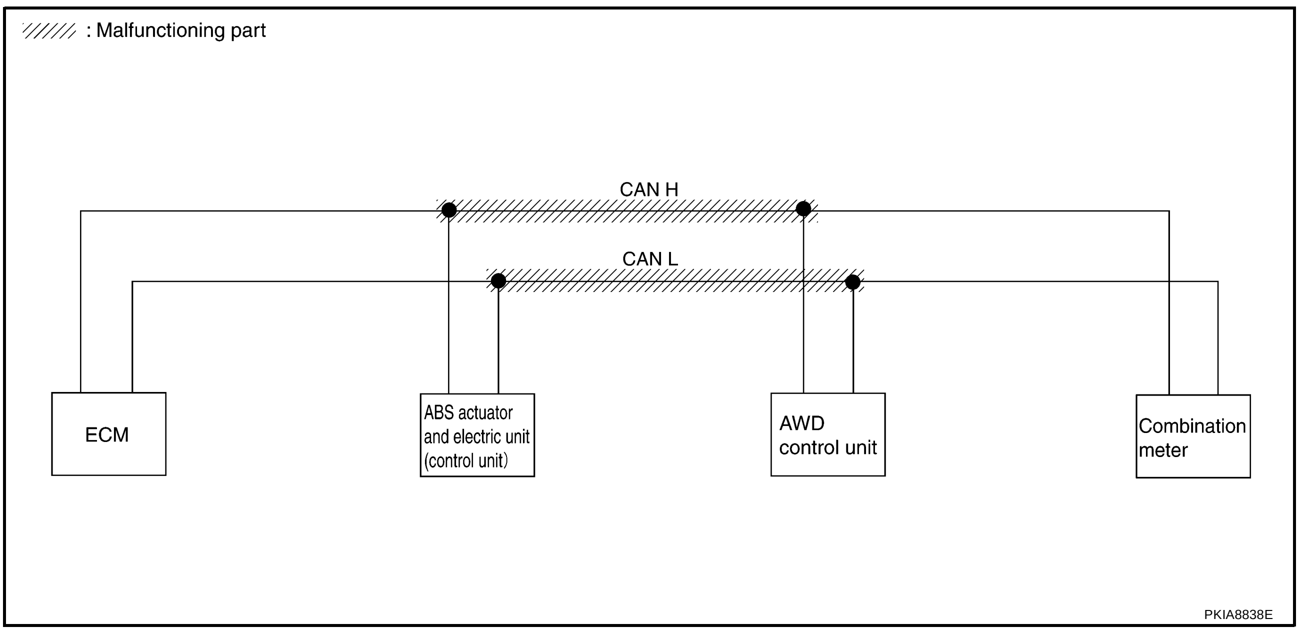
NOTE:
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Case 1

Check harness between ABS actuator and electric unit (control unit) and AWD control unit. Refer to LAN-48, "Between ABS Actuator and Electric Unit (Control Unit) and AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	–	UNKWN ✓	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001) ✓
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN ✓	UNKWN ✓	–	CAN COMM CIRCUIT (U1000) ✓	–

PKIA8762E

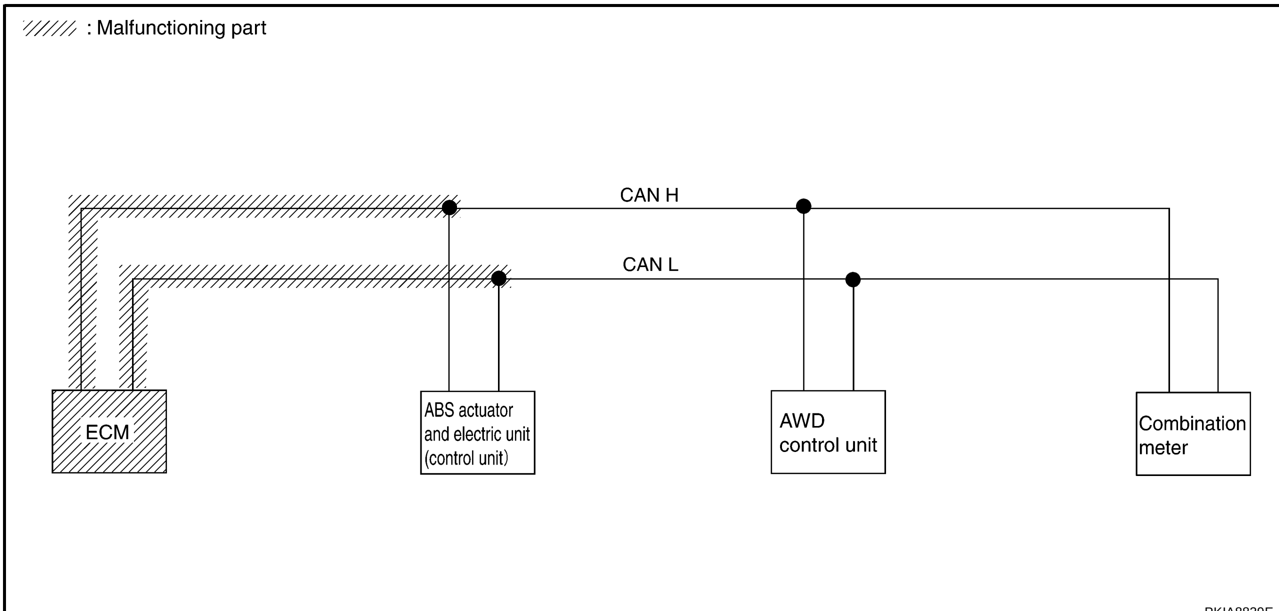


Case 2

Check ECM circuit. Refer to LAN-49, "ECM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8763E



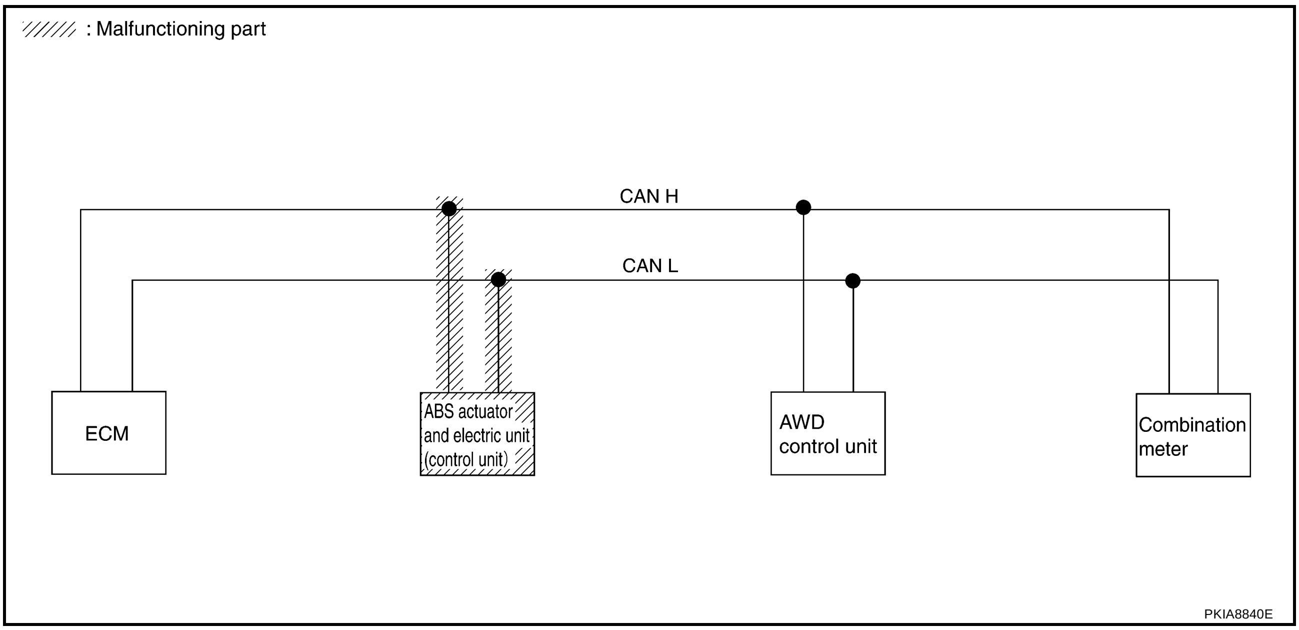
PKIA8839E

Case 3

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-49, "ABS Actuator and Electric Unit (Control Unit) Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	—	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	—	CAN COMM CIRCUIT (U1000)	—

PKIA8764E

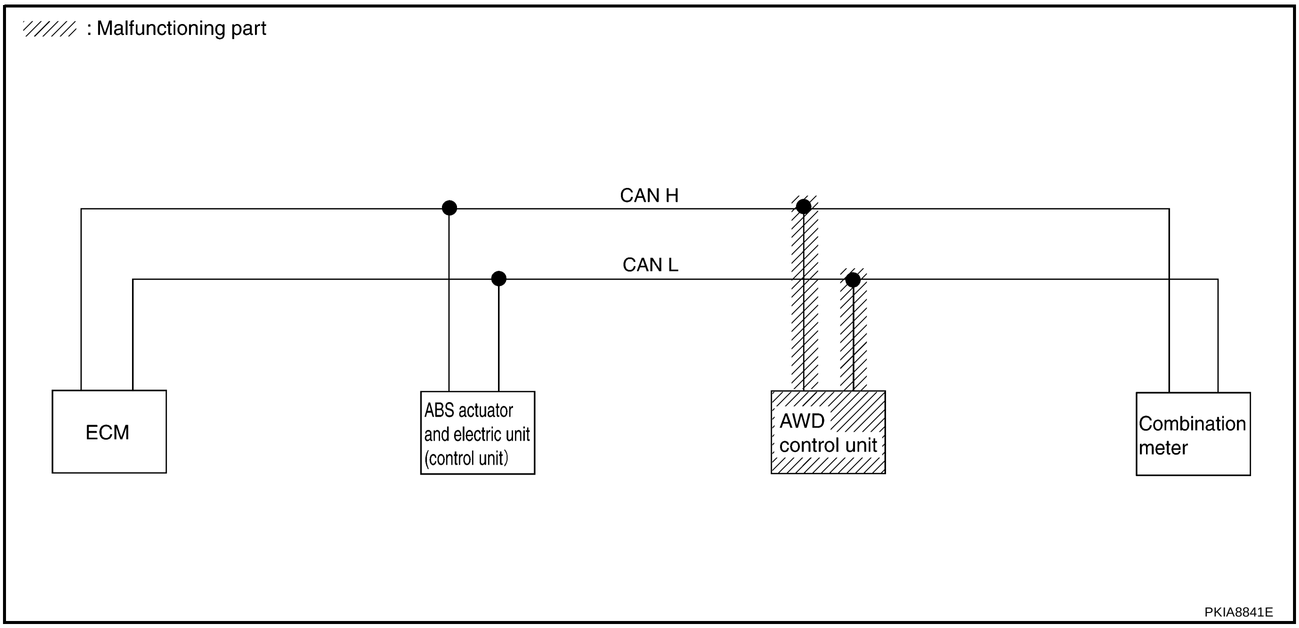


Case 4

Check AWD control unit circuit. Refer to LAN-50, "AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	—	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN ✓	UNKWN	UNKWN	—	CAN COMM CIRCUIT (U1000) ✓	—

PKIA8765E



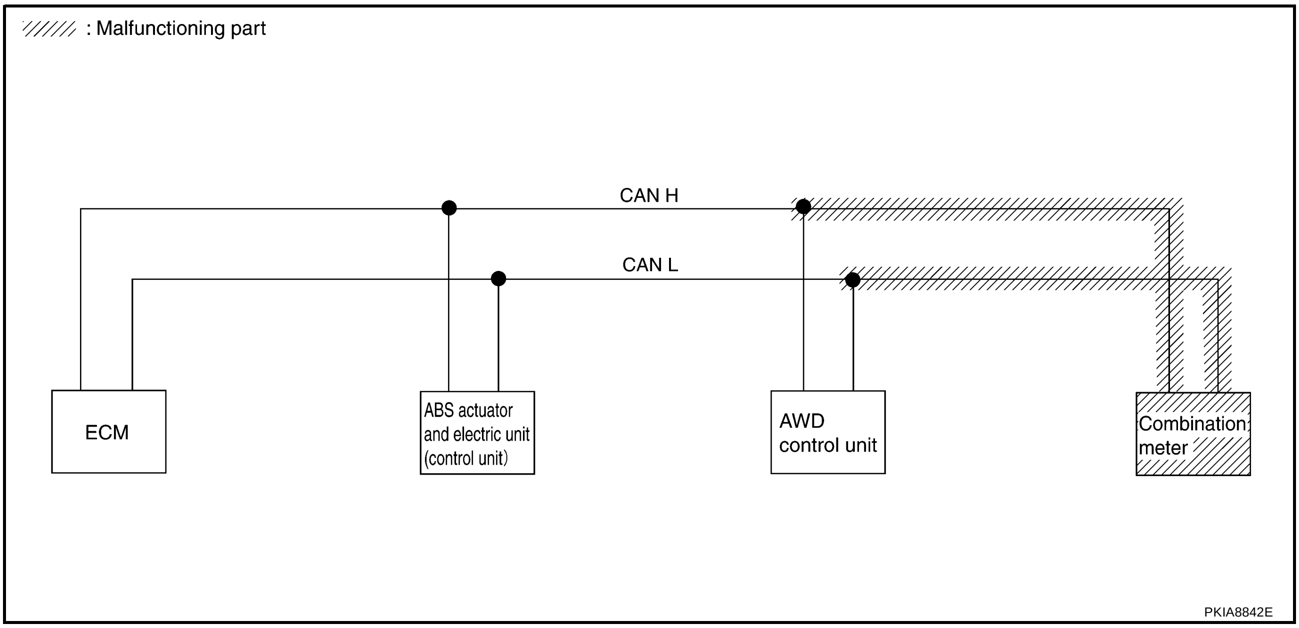
PKIA8841E

Case 5

Check combination meter circuit. Refer to LAN-50, "Combination Meter Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8766E



PKIA8842E

Case 6

Check CAN communication circuit. Refer to LAN-51, "CAN Communication Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR					SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis				
			ECM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8767E

Between ABS Actuator and Electric Unit (Control Unit) and AWD Control Unit Circuit Inspection

AKS00BKG

1. CHECK CONNECTOR

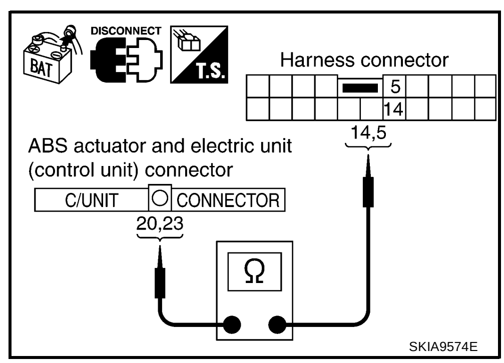
1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).
   - Harness connector E116
   - Harness connector M75

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector and harness connector E116.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R) and harness connector E116 terminals 14 (W), 5 (R).



SKIA9574E

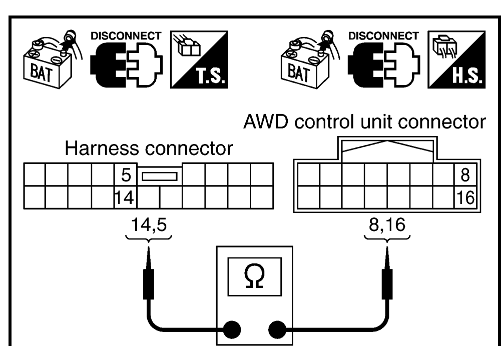
20 (W) – 14 (W) : Continuity should exist.
23 (R) – 5 (R) : Continuity should exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check continuity between harness connector M75 terminals 14 (W), 5 (R) and AWD control unit harness connector M107 terminals 8 (W), 16 (R).



PKIA8951E

14 (W) – 8 (W) : Continuity should exist.
5 (R) – 16 (R) : Continuity should exist.

OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .
NG >> Repair harness.

ECM Circuit Inspection
AKS00BKH

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).
- ECM connector
- Harness connector M75
- Harness connector E116

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

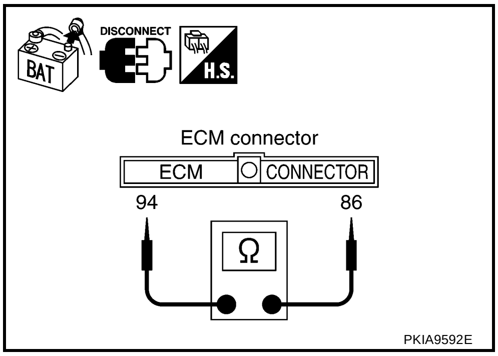
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Approx. 108 – 132Ω

OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and ABS actuator and electric unit (control unit).



PKIA9592E

ABS Actuator and Electric Unit (Control Unit) Circuit Inspection
AKS00BKI

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

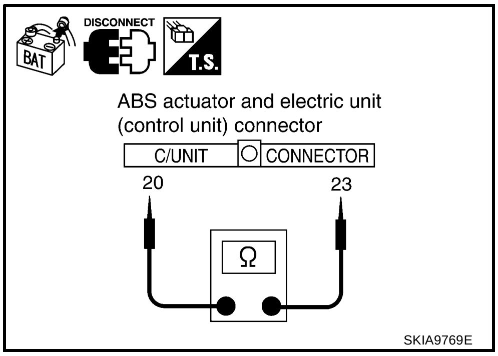
2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W) and 23 (R).

20 (W) – 23 (R) : Approx. 54 – 66Ω

OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E116.



SKIA9769E

AWD Control Unit Circuit Inspection

AKS00BKJ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of AWD control unit for damage, bend and loose connection (control unit side and harness side).

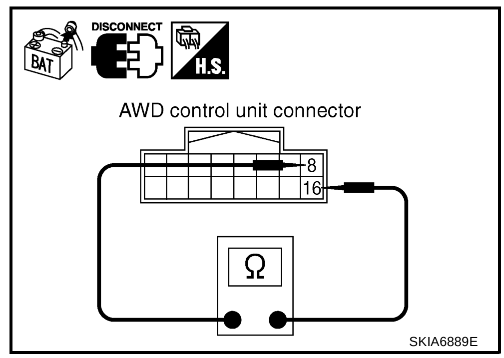
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check resistance between AWD control unit harness connector M107 terminals 8 (W) and 16 (R).

8 (W) – 16 (R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace AWD control unit.
NG >> Repair harness between AWD control unit and combination meter.

Combination Meter Circuit Inspection

AKS00BKK

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

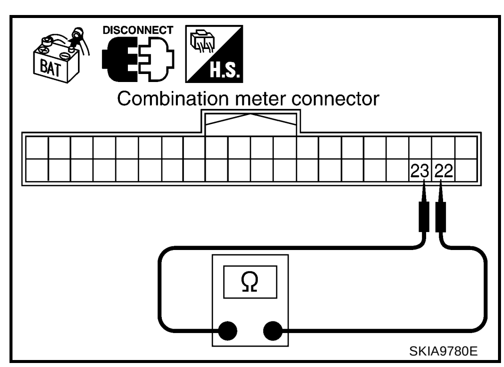
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and AWD control unit.

CAN Communication Circuit Inspection

AKS00BKL

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, control unit side, meter side, connector side and harness side).

- ECM
- ABS actuator and electric unit (control unit)
- AWD control unit
- Combination meter
- Between ECM and combination meter

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

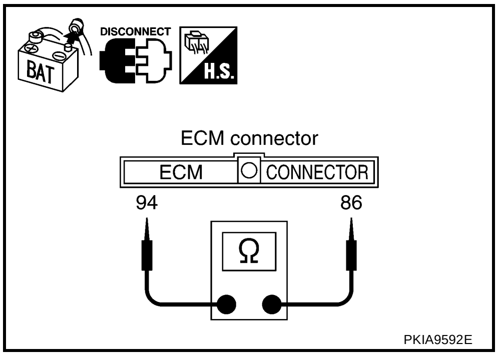
2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector M75.
2. Check continuity between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Continuity should not exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector M75.



PKIA9592E

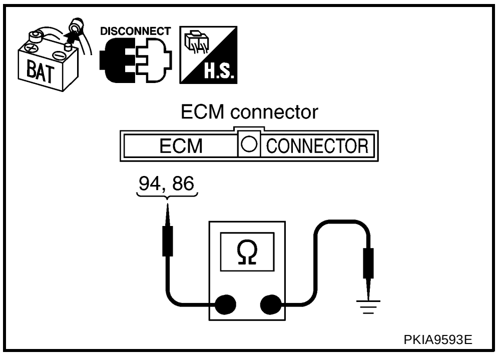
3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector M118 terminals 94 (G/R), 86 (GY/R) and ground.

94 (G/R) – Ground : Continuity should not exist.
86 (GY/R) – Ground : Continuity should not exist.

OK or NG

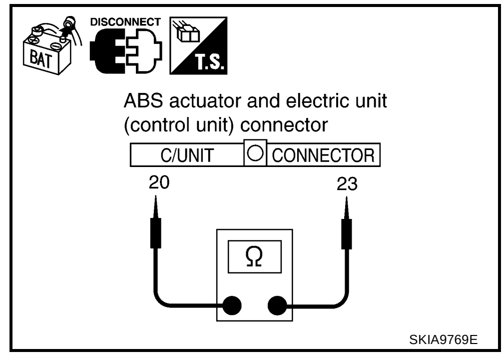
OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector M75.



PKIA9593E

4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W) and 23 (R).



20 (W) – 23 (R) : Continuity should not exist.

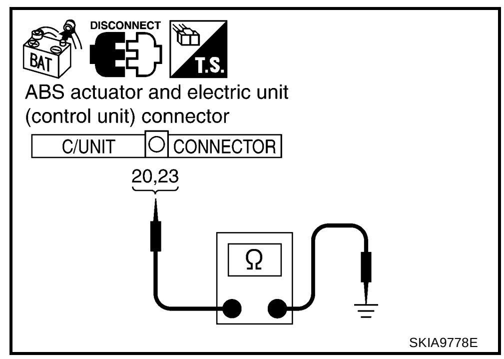
OK or NG

OK >> GO TO 5.

NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E116.

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R) and ground.



20 (W) – Ground : Continuity should not exist.

23 (R) – Ground : Continuity should not exist.

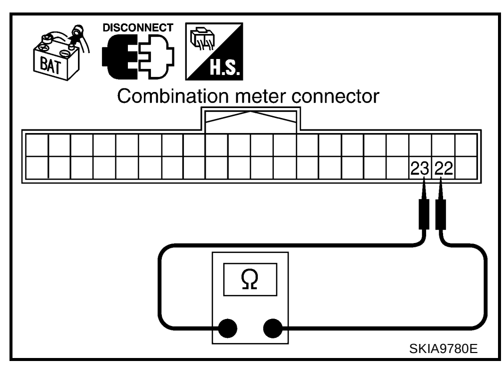
OK or NG

OK >> GO TO 6.

NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E116.

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect AWD control unit connector and combination meter connector.
2. Check continuity between combination meter harness connector M44 terminals 22 (W) and 23 (R).



22 (W) – 23 (R) : Continuity should not exist.

OK or NG

OK >> GO TO 7.

NG >> Check the following harness. If any harness is damaged, repair the harness.

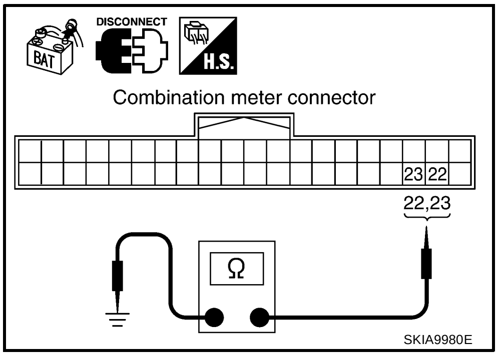
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between combination meter harness connector M44 terminals 22 (W), 23 (R) and ground.

22 (W) – Ground : Continuity should not exist.

23 (R) – Ground : Continuity should not exist.



SKIA9980E

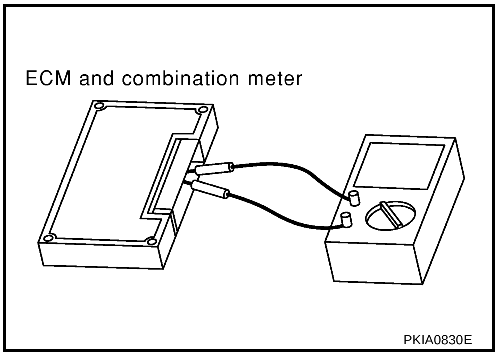
OK or NO

OK >> GO TO 8.

NG >> Check the following harness. If any harness is damaged, repair the harness.
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

8. CHECK ECM AND COMBINATION METER INTERNAL CIRCUIT

1. Remove ECM and combination meter from vehicle.
2. Check resistance between ECM terminals 94 and 86.
3. Check resistance between combination meter terminals 22 and 23.



PKIA0830E

Unit	Terminal	Resistance (Ω) (Approx.)
ECM	94 – 86	108 – 132
Combination meter	22 – 23	

OK or NG

OK >> GO TO 9.

NG >> Replace ECM and/or combination meter.

9. CHECK SYMPTOM

1. Fill in described symptoms on the column “Symptom” in the check sheet.
2. Connect all connectors, and then make sure that the symptom is reproduced.

OK or NG

OK >> GO TO 10.

NG >> Refer to LAN-11, "Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced" .

10. CHECK UNIT REPRODUCIBILITY

Performs the following procedure for each unit, and then perform reproducibility test.

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Disconnect the unit connector.
4. Connect battery cable at negative terminal.
5. Make sure that the symptom filled in the “Symptom” of the check sheet is reproduced. (Do not confuse it with the symptom related to removed unit.)
6. Make sure that the same symptom is reproduced.

- ABS actuator and electric unit (control unit)
- AWD control unit
- ECM
- Combination meter

Check results

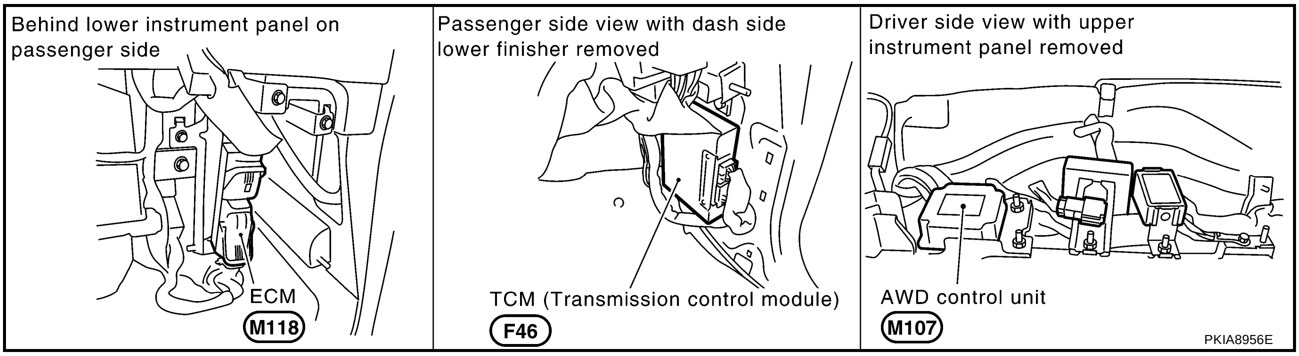
Reproduce>>Install removed unit, and then check the other units.
Not reproduced>>Replace removed unit.

CAN SYSTEM (TYPE 3)

PFP:23710

Component Parts and Harness Connector Location

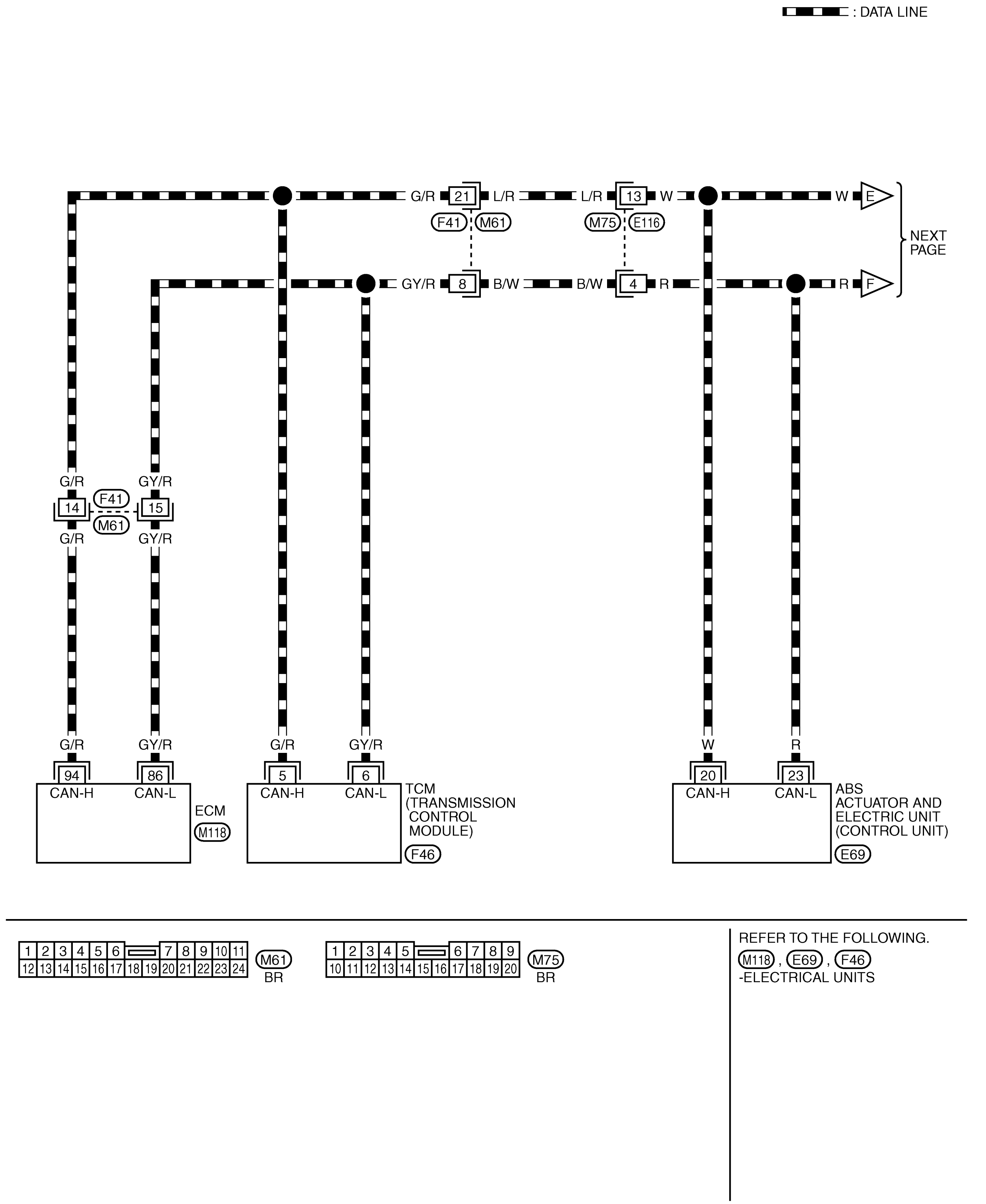
AKS00BKO



Wiring Diagram — CAN —

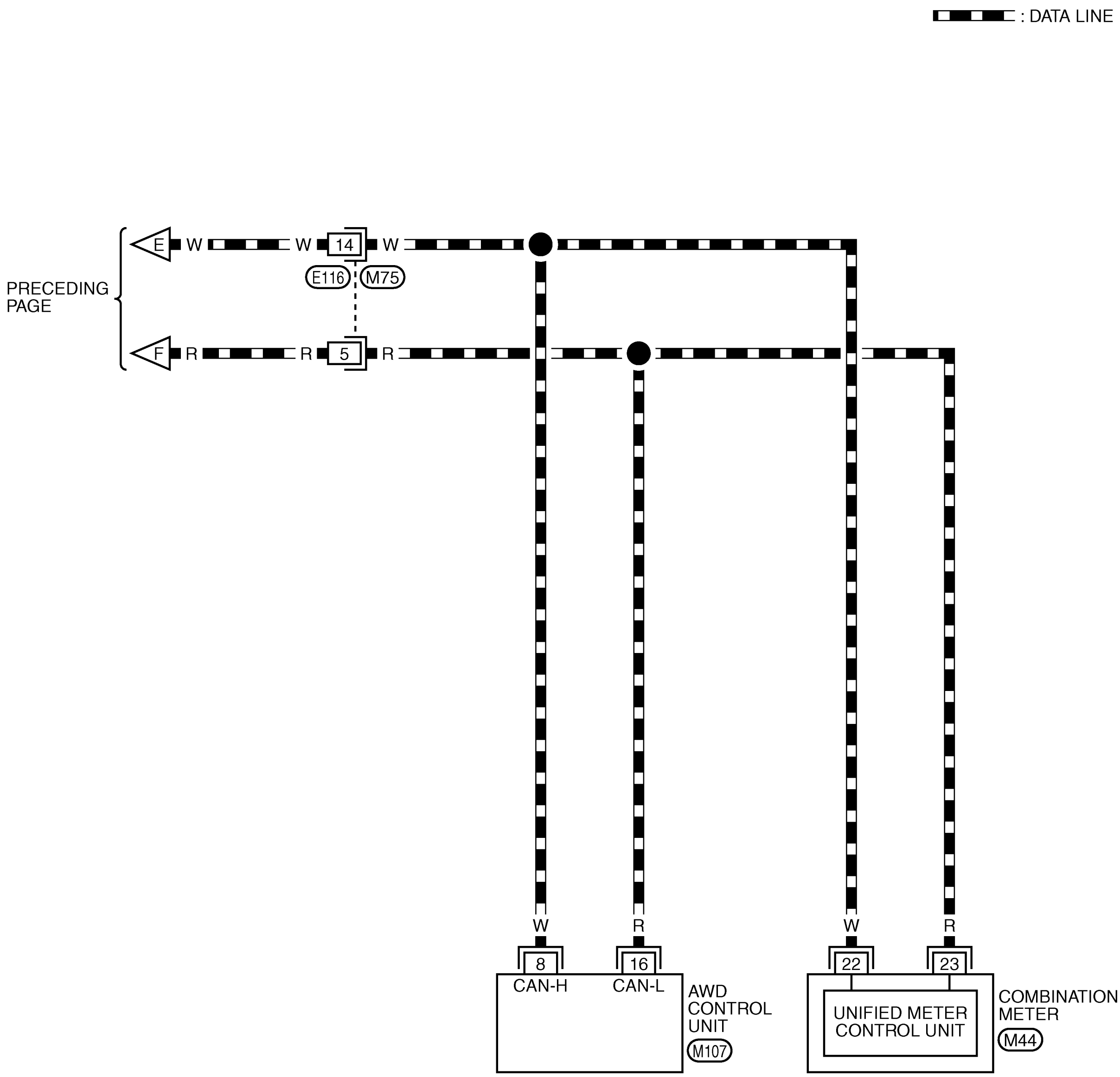
AKS00BKP

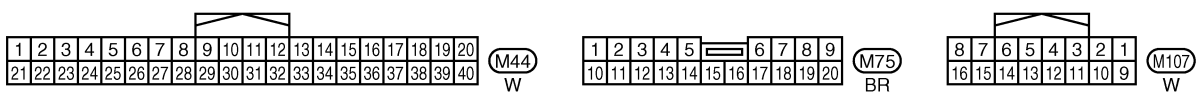
LAN-CAN-05



TKWB0218E

LAN-CAN-06





TKWB0219E

Check Sheet

AKS00BKQ

NOTE:

If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	—
ABS	NG	UNKWN	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	—	UNKWN	—	CAN COMM CIRCUIT (U1000)	—

Symptoms :

Attach copy of ENGINE SELF-DIAG RESULTS	Attach copy of A/T SELF-DIAG RESULTS	Attach copy of ABS SELF-DIAG RESULTS	Attach copy of ALL MODE AWD/4WD SELF-DIAG RESULTS
Attach copy of ENGINE CAN DIAG SUPPORT MNTR	Attach copy of A/T CAN DIAG SUPPORT MNTR	Attach copy of ABS CAN DIAG SUPPORT MNTR	Attach copy of ALL MODE AWD/4WD CAN DIAG SUPPORT MNTR

PKIA8768E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

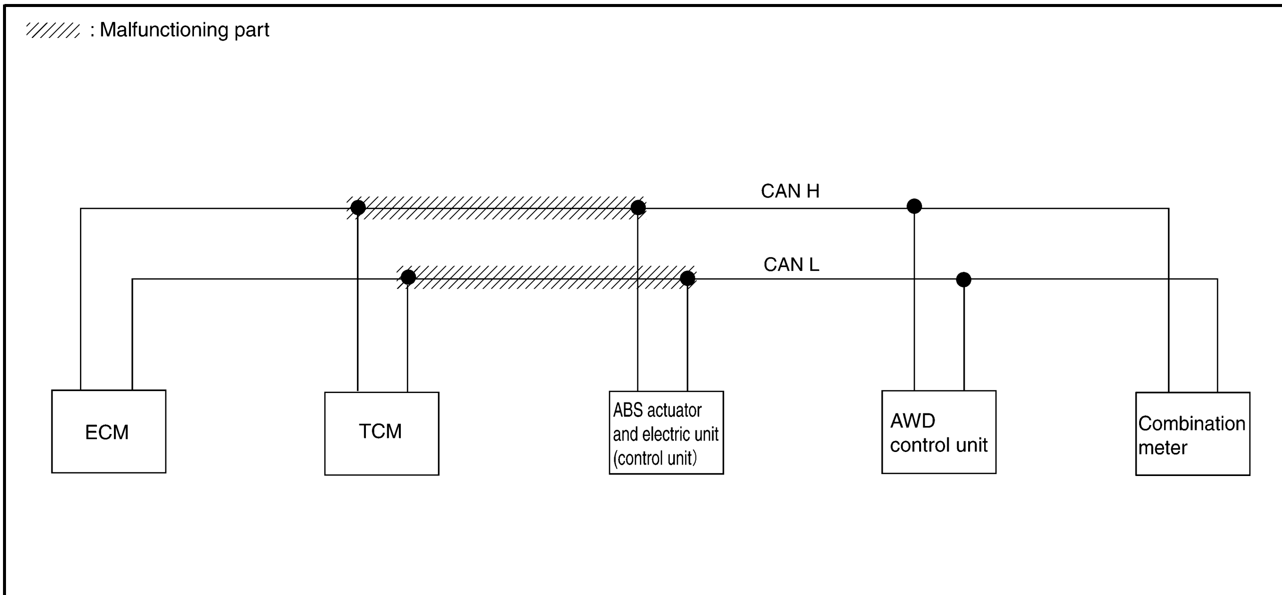
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Case 1

Check harness between TCM and ABS actuator and electric unit (control unit). Refer to LAN-66, "Between TCM and ABS Actuator and Electric Unit (Control Unit) Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	TCM	VDC/TCS /ABS	METER /M&A			
ENGINE	NG	UNKWN	–	UNKWN	–	UNKWN		CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	–	–		–	–
ABS	NG	UNKWN	UNKWN	–	–	–		CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–		CAN COMM CIRCUIT (U1000)	–

PKIA8769E



PKIA8844E

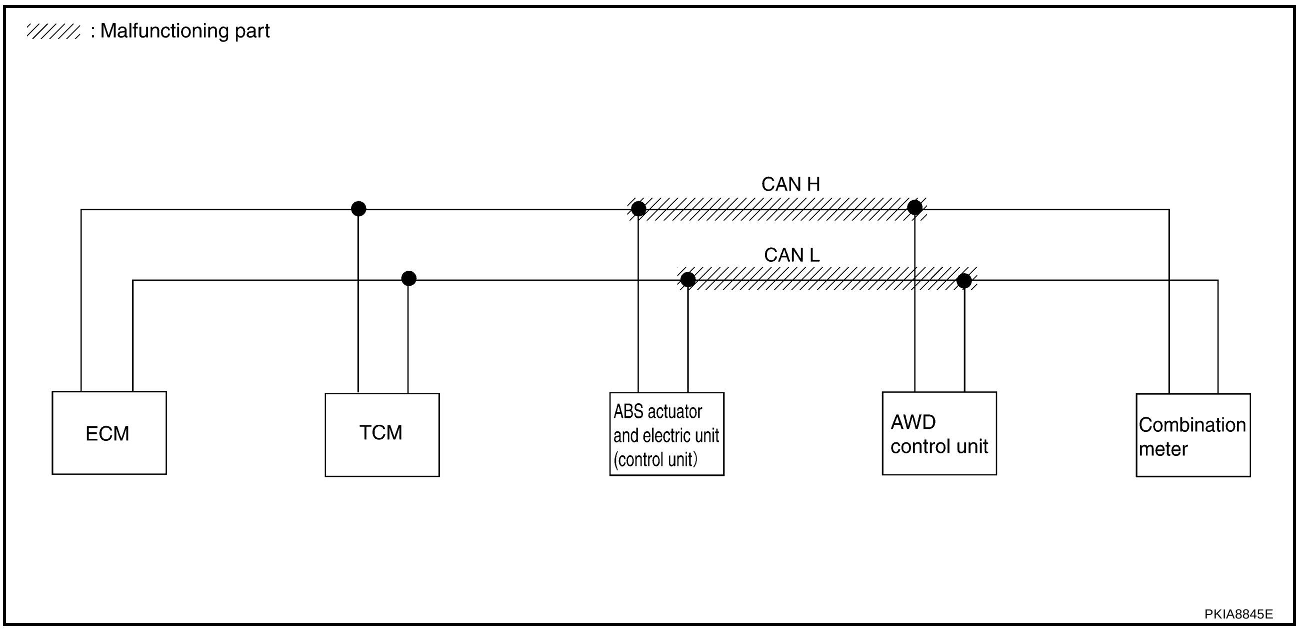
A B C D E F G H I J LAN L M

Case 2

Check harness between ABS actuator and electric unit (control unit) and AWD control unit. Refer to LAN-67, "Between ABS Actuator and Electric Unit (Control Unit) and AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8770E

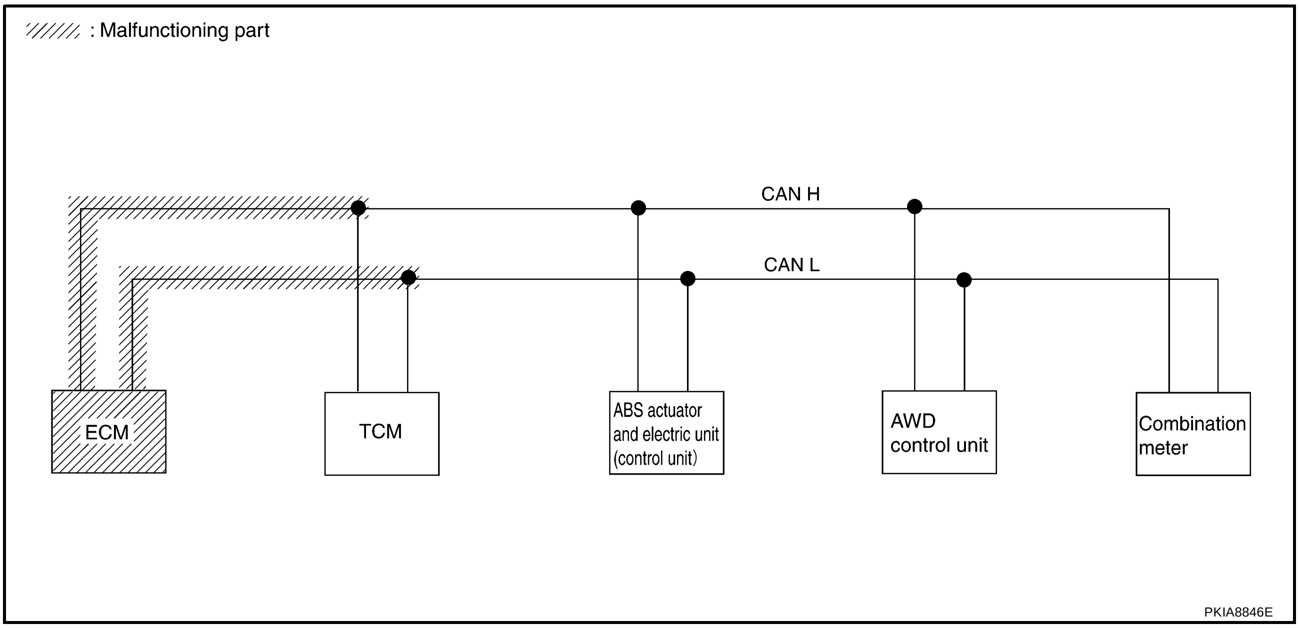


Case 3

Check ECM circuit. Refer to LAN-68, "ECM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	—	—	—	UNKWN	—	—
ABS	NG	UNKWN	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	—	UNKWN	—	CAN COMM CIRCUIT (U1000)	—

PKIA8771E

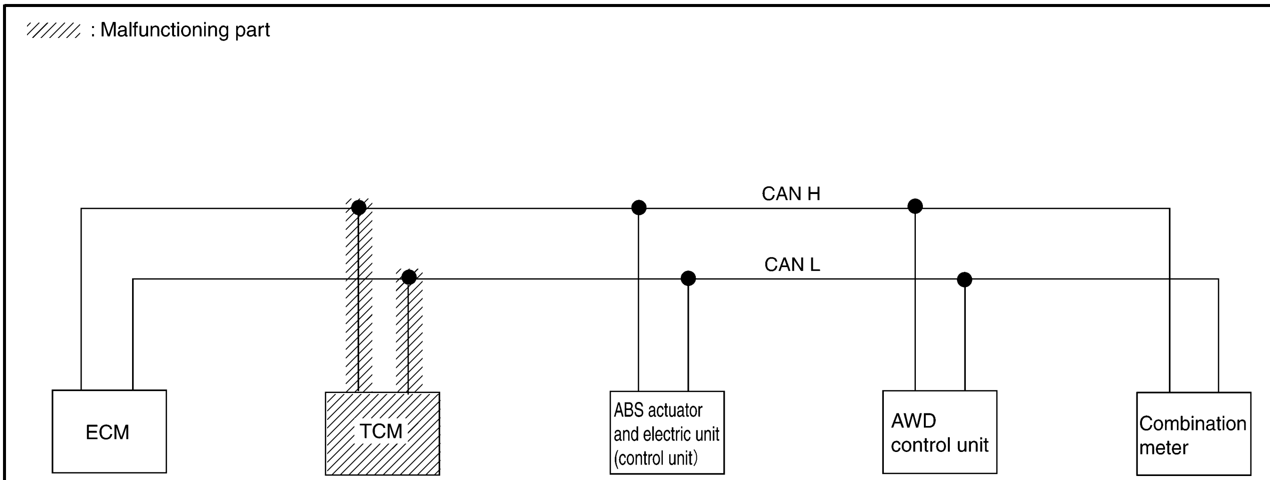


Case 4

Check TCM circuit. Refer to LAN-69, "TCM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN ✓	–	UNKWN	CAN COMM CIRCUIT (U1000) ✓	CAN COMM CIRCUIT (U1001) ✓
A/T	NG	–	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8772E



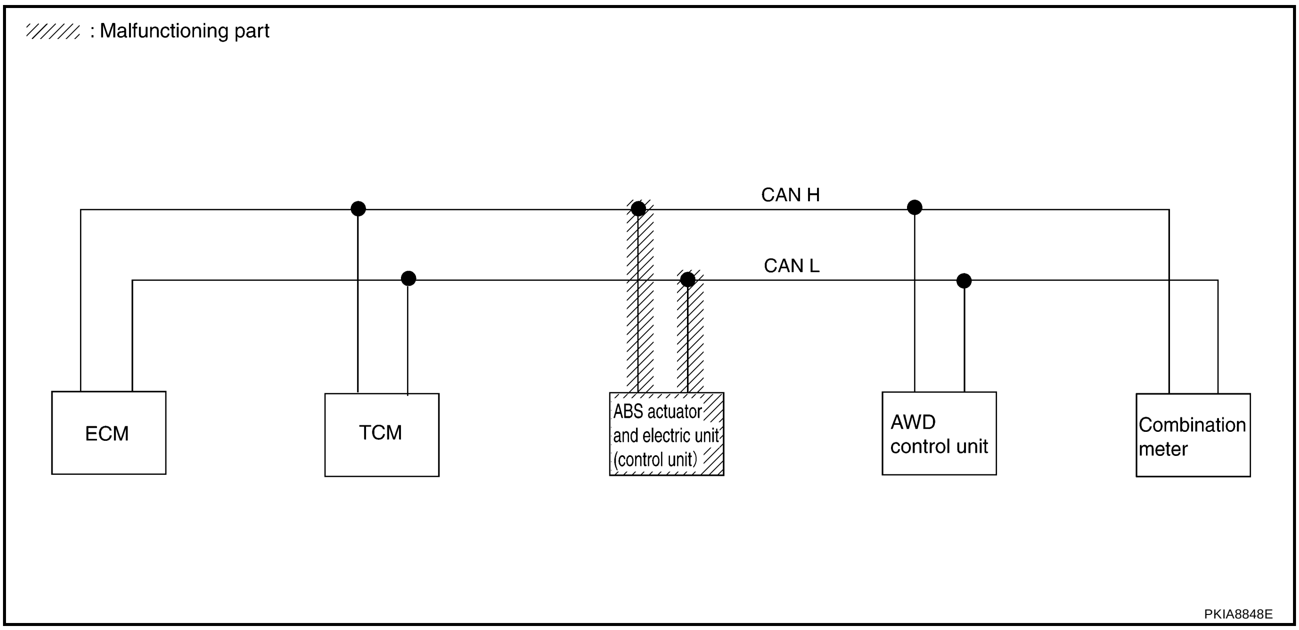
PKIA8847E

Case 5

Check ABS actuator and electric unit (control unit) circuit. Refer to LAN-69, "ABS Actuator and Electric Unit (Control Unit) Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	–
ABS	NG	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8773E

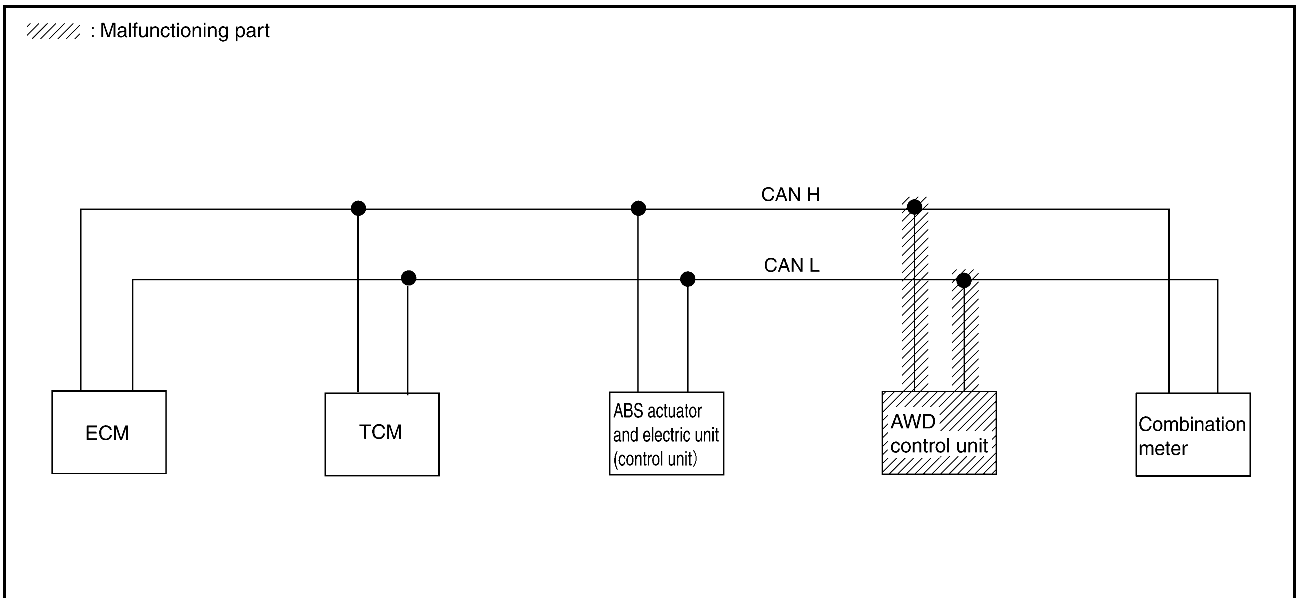


Case 6

Check AWD control unit circuit. Refer to LAN-70, "AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	—
ABS	NG	UNKWN	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	—	UNKWN	—	CAN COMM CIRCUIT (U1000)	—

PKIA8774E



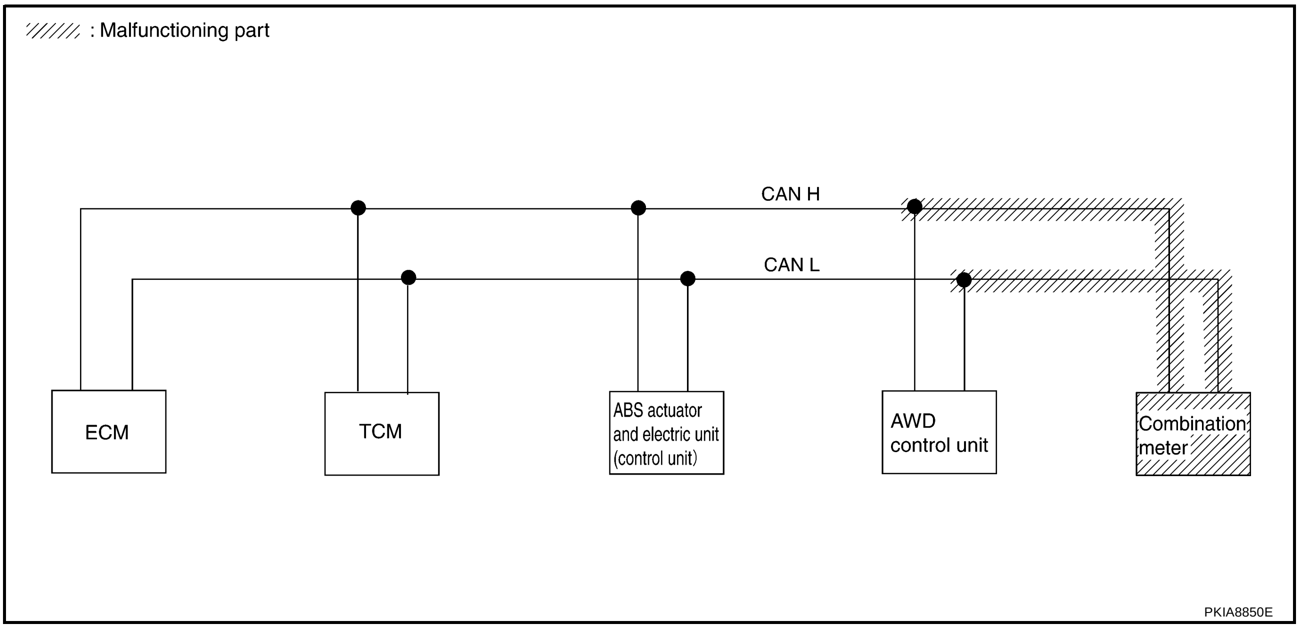
PKIA8849E

Case 7

Check combination meter circuit. Refer to LAN-70, "Combination Meter Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8775E



Case 8

Check CAN communication circuit. Refer to LAN-71, "CAN Communication Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR						SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis					
			ECM	TCM	VDC/TCS /ABS	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	–	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	CAN COMM CIRCUIT (U1000)	–

PKIA8776E

Between TCM and ABS Actuator and Electric Unit (Control Unit) Circuit Inspection

AKS00BKR

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).

– Harness connector F41
– Harness connector M61
– Harness connector M75
– Harness connector E116

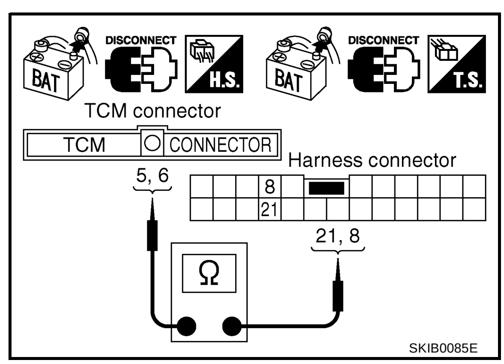
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector and harness connector F41.
2. Check continuity between TCM harness connector F46 terminals 5 (G/R), 6 (GY/R) and harness connector F41 terminals 21 (G/R), 8 (GY/R).

5 (G/R) – 21 (G/R) : Continuity should exist.
6 (GY/R) – 8 (GY/R) : Continuity should exist.



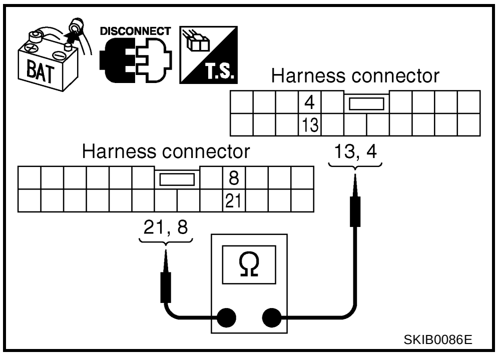
SKIB0085E

OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect harness connector M75.
2. Check continuity between harness connector M61 terminals 21 (L/R), 8 (B/W) and harness connector M75 terminals 13 (L/R), 4 (B/W).



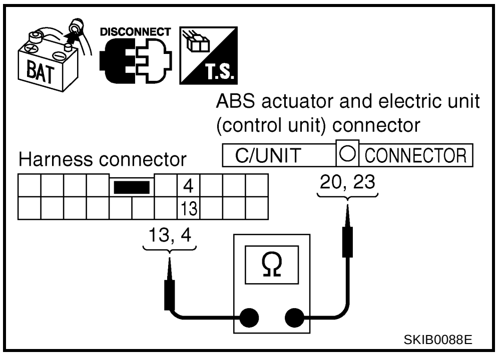
21 (L/R) – 13 (L/R) : Continuity should exist.
8 (B/W) – 4 (B/W) : Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness.

4. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between harness connector E116 terminals 13 (W), 4 (R) and ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R).



13 (W) – 20 (W) : Continuity should exist.
4 (R) – 23 (R) : Continuity should exist.

OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .
NG >> Repair harness.

Between ABS Actuator and Electric Unit (Control Unit) and AWD Control Unit Circuit Inspection

AKS00BKS

1. CHECK CONNECTOR

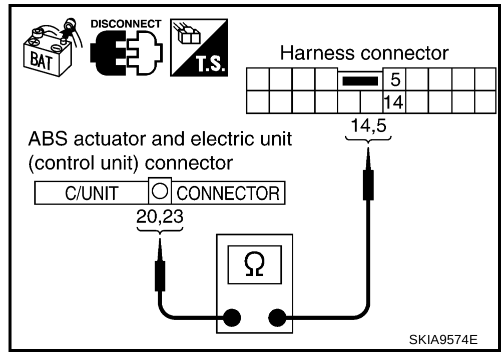
1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).
– Harness connector E116
– Harness connector M75

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector and harness connector E116.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R) and harness connector E116 terminals 14 (W), 5 (R).



SKIA9574E

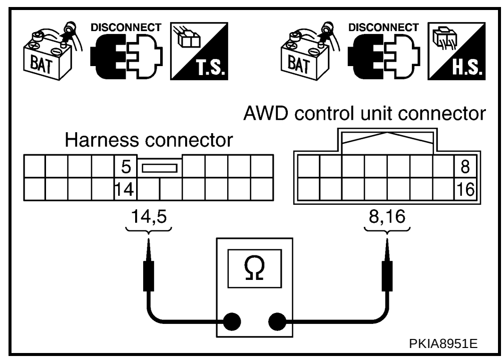
20 (W) – 14 (W) : **Continuity should exist.**
23 (R) – 5 (R) : **Continuity should exist.**

OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check continuity between harness connector M75 terminals 14 (W), 5 (R) and AWD control unit harness connector M107 terminals 8 (W), 16 (R).



PKIA8951E

14 (W) – 8 (W) : **Continuity should exist.**
5 (R) – 16 (R) : **Continuity should exist.**

OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .
NG >> Repair harness.

ECM Circuit Inspection

AKS00BKT

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M61
- Harness connector F41

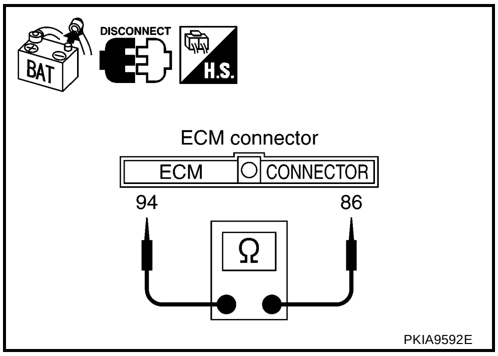
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and TCM.

TCM Circuit Inspection

AKS00BKU

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

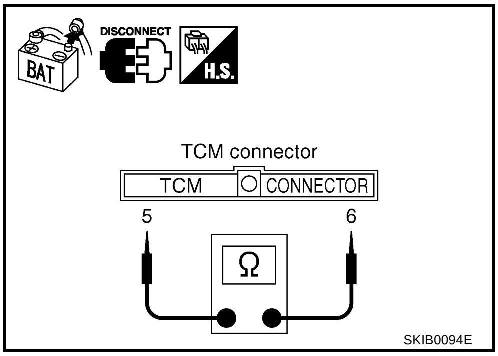
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector F46 terminals 5 (G/R) and 6 (GY/R).

5 (G/R) – 6 (GY/R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and harness connector F41.

ABS Actuator and Electric Unit (Control Unit) Circuit Inspection

AKS00BKV

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of ABS actuator and electric unit (control unit) for damage, bend and loose connection (control unit side and harness side).

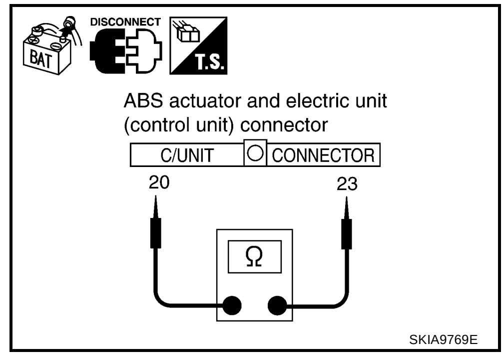
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check resistance between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W) and 23 (R).

20 (W) – 23 (R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace ABS actuator and electric unit (control unit).
NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E116.

AWD Control Unit Circuit Inspection

AKS00BKW

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of AWD control unit for damage, bend and loose connection (control unit side and harness side).

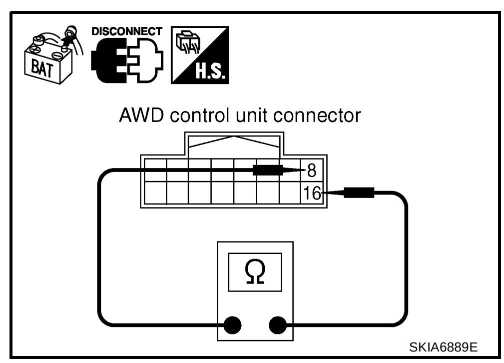
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check resistance between AWD control unit harness connector M107 terminals 8 (W) and 16 (R).

8 (W) – 16 (R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace AWD control unit.
NG >> Repair harness between AWD control unit and combination meter.

Combination Meter Circuit Inspection

AKS00BKX

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

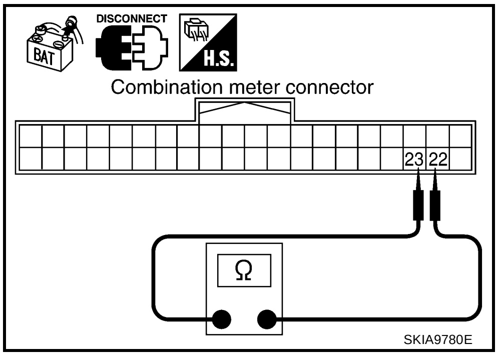
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and AWD control unit.

CAN Communication Circuit Inspection

AKS00BKY

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, control unit side, meter side, connector side and harness side).

- ECM
- TCM
- ABS actuator and electric unit (control unit)
- AWD control unit
- Combination meter
- Between ECM and combination meter

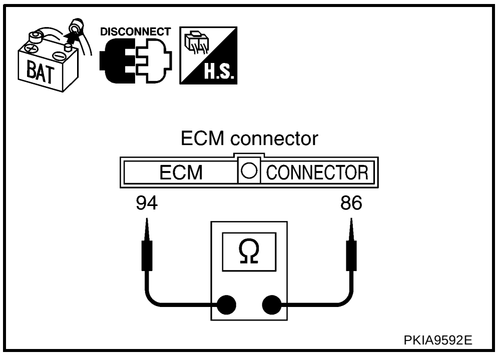
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector M61.
2. Check continuity between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

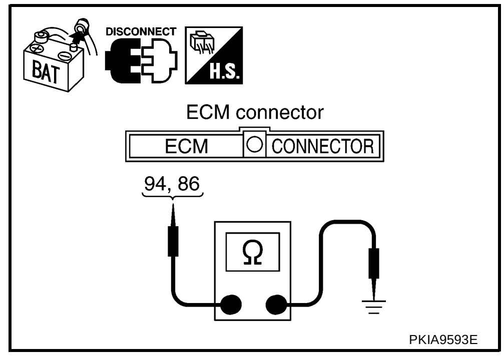
94 (G/R) – 86 (GY/R) : Continuity should not exist.



OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector M61.

3. CHECK HARNESS FOR SHORT CIRCUIT



Check continuity between ECM harness connector M118 terminals 94 (G/R), 86 (GY/R) and ground.

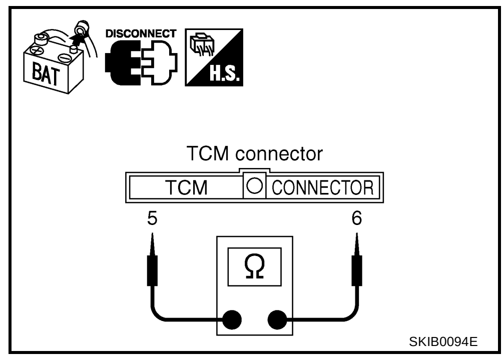
94 (G/R) – Ground : Continuity should not exist.
86 (GY/R) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector M61.

4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect TCM connector.
2. Check continuity between TCM harness connector F46 terminals 5 (G/R) and 6 (GY/R).



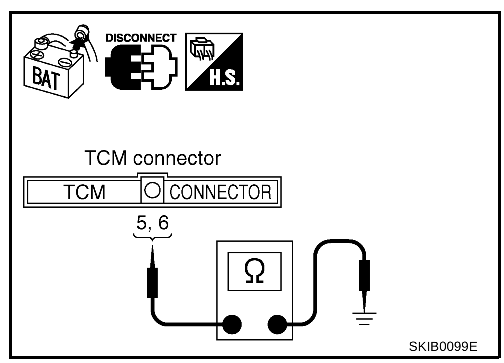
5 (G/R) – 6 (GY/R) : Continuity should not exist.

OK or NG

OK >> GO TO 5.
NG >> Repair harness between TCM and harness connector F41.

5. CHECK HARNESS FOR SHORT CIRCUIT

1. Check continuity between TCM harness connector F46 terminals 5 (G/R), 6 (GY/R) and ground.



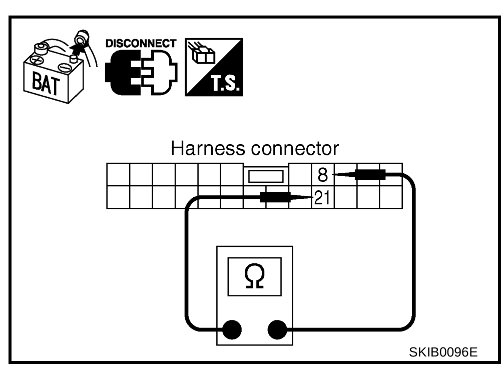
5 (G/R) – Ground : Continuity should not exist.
6 (GY/R) – Ground : Continuity should not exist.

OK or NG

OK >> GO TO 6.
NG >> Repair harness between TCM and harness connector F41.

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect harness connector M75.
2. Check continuity between harness connector M61 terminals 21 (L/R) and 8 (B/W).



21 (L/R) – 8 (B/W) : Continuity should not exist.

OK or NG

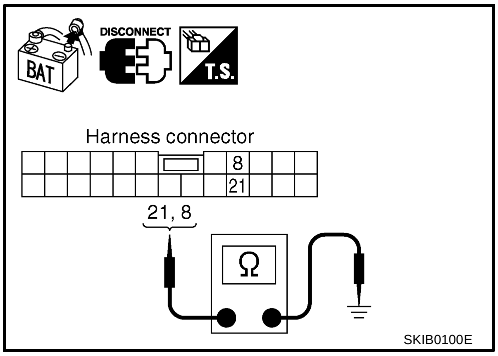
OK >> GO TO 7.
NG >> Repair harness between harness connector M61 and harness connector M75.

7. CHECK HARNESS FOR SHORT CIRCUIT

1. Check continuity between harness connector M61 terminals 21 (L/R), 8 (B/W) and ground.

21 (L/R) – Ground : Continuity should not exist.

8 (B/W) – Ground : Continuity should not exist.



OK or NG

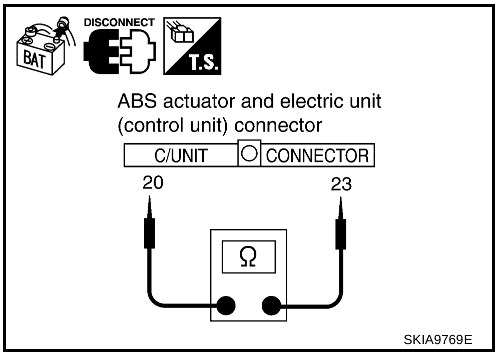
OK >> GO TO 8.

NG >> Repair harness between harness connector M61 and harness connector M75.

8. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ABS actuator and electric unit (control unit) connector.
2. Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W) and 23 (R).

20 (W) – 23 (R) : Continuity should not exist.



OK or NG

OK >> GO TO 9.

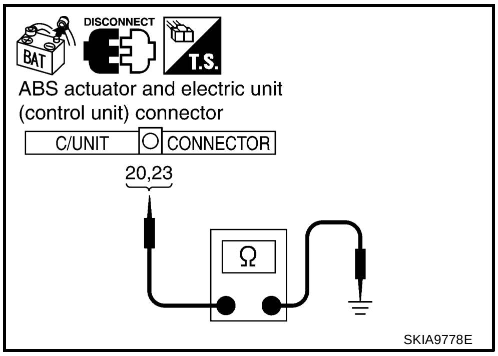
NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E116.

9. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ABS actuator and electric unit (control unit) harness connector E69 terminals 20 (W), 23 (R) and ground.

20 (W) – Ground : Continuity should not exist.

23 (R) – Ground : Continuity should not exist.



OK or NG

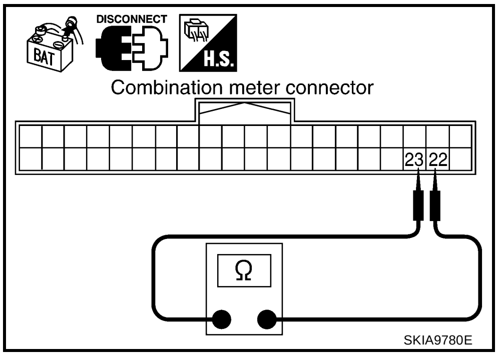
OK >> GO TO 10.

NG >> Repair harness between ABS actuator and electric unit (control unit) and harness connector E116.

10. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect AWD control unit connector and combination meter connector.
2. Check continuity between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Continuity should not exist.



OK or NG

OK >> GO TO 11.

NG >> Check the following harness. If any harness is damaged, repair the harness.

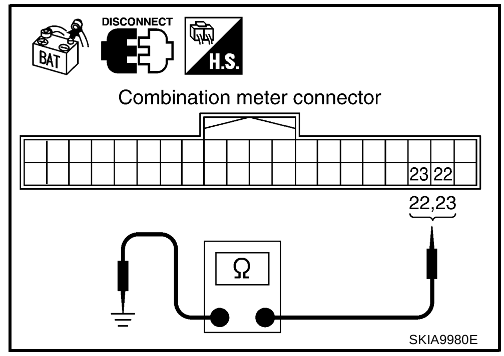
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

11. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between combination meter harness connector M44 terminals 22 (W), 23 (R) and ground.

22 (W) – Ground : Continuity should not exist.

23 (R) – Ground : Continuity should not exist.



OK or NO

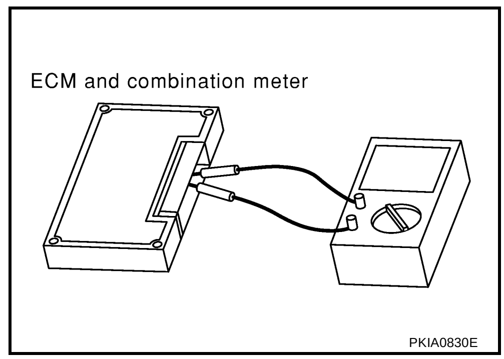
OK >> GO TO 12.

NG >> Check the following harness. If any harness is damaged, repair the harness.

- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

12. CHECK ECM AND COMBINATION METER INTERNAL CIRCUIT

1. Remove ECM and combination meter from vehicle.
2. Check resistance between ECM terminals 94 and 86.
3. Check resistance between combination meter terminals 22 and 23.



Unit	Terminal	Resistance (Ω) (Approx.)
ECM	94 – 86	108 – 132
Combination meter	22 – 23	

OK or NG

OK >> GO TO 13.

NG >> Replace ECM and/or combination meter.

13. CHECK SYMPTOM

1. Fill in described symptoms on the column “Symptom” in the check sheet.
2. Connect all connectors, and then make sure that the symptom is reproduced.

OK or NG

OK >> GO TO 14.

NG >> Refer to LAN-11, "Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced" .

14. CHECK UNIT REPRODUCIBILITY

Performs the following procedure for each unit, and then perform reproducibility test.

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Disconnect the unit connector.
4. Connect battery cable at negative terminal.
5. Make sure that the symptom filled in the “Symptom” of the check sheet is reproduced. (Do not confuse it with the symptom related to removed unit.)
6. Make sure that the same symptom is reproduced.

- TCM
- ABS actuator and electric unit (control unit)
- AWD control unit
- ECM
- Combination meter

Check results

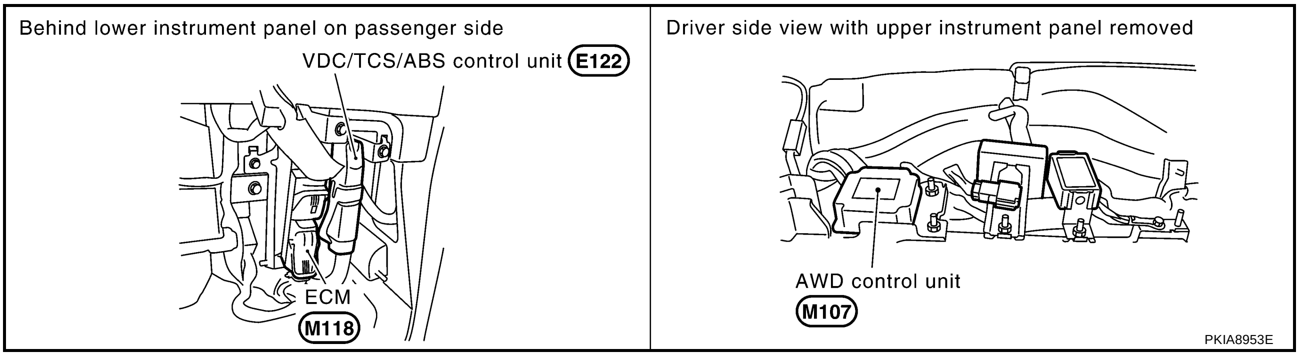
Reproduce>>Install removed unit, and then check the other units.
Not reproduced>>Replace removed unit.

CAN SYSTEM (TYPE 4)

PFP:23710

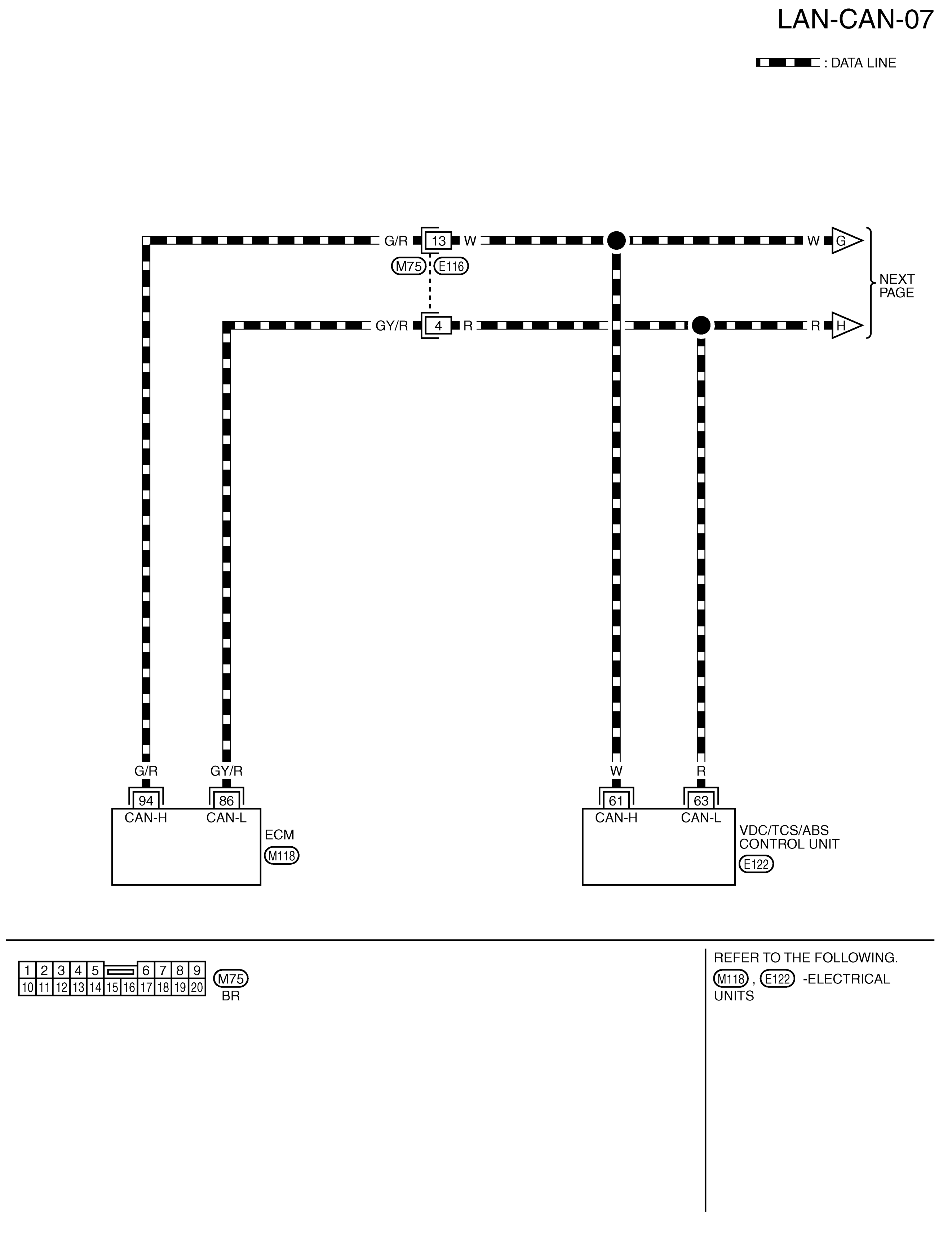
Component Parts and Harness Connector Location

AKS00BL1

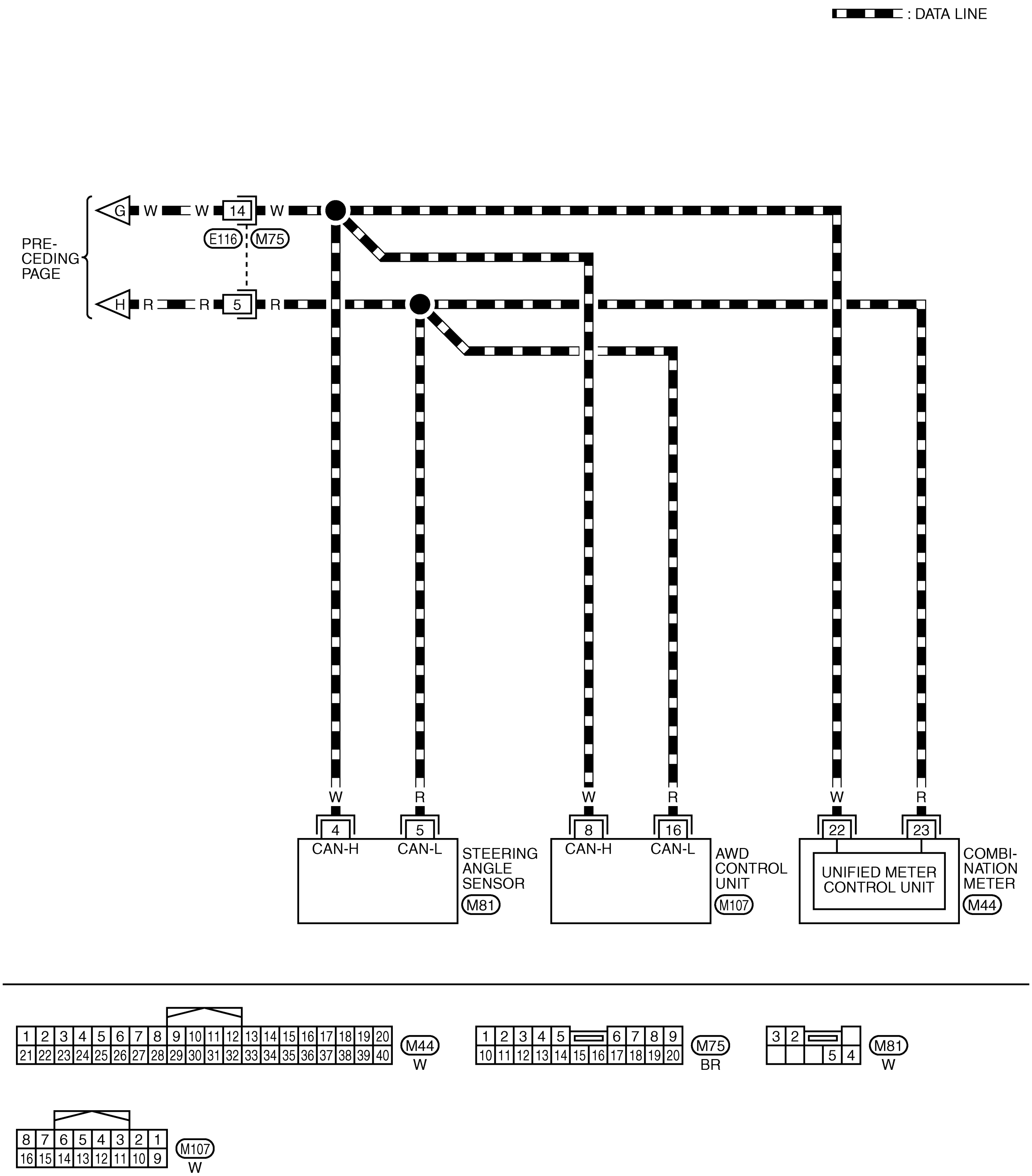


Wiring Diagram — CAN —

AKS00BL2



LAN-CAN-08



TKWB0221E

Check Sheet

AKS00BL3

NOTE:
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	—	UNKWN	UNKWN	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—

Symptoms :

Attach copy of
ENGINE
SELF-DIAG RESULTS

Attach copy of
ABS
SELF-DIAG RESULTS

Attach copy of
ALL MODE AWD/4WD
SELF-DIAG RESULTS

Attach copy of
ENGINE
CAN DIAG SUPPORT MNTR

Attach copy of
ABS
CAN DIAG SUPPORT MNTR

Attach copy of
ALL MODE AWD/4WD
CAN DIAG SUPPORT MNTR

PKIA8777E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

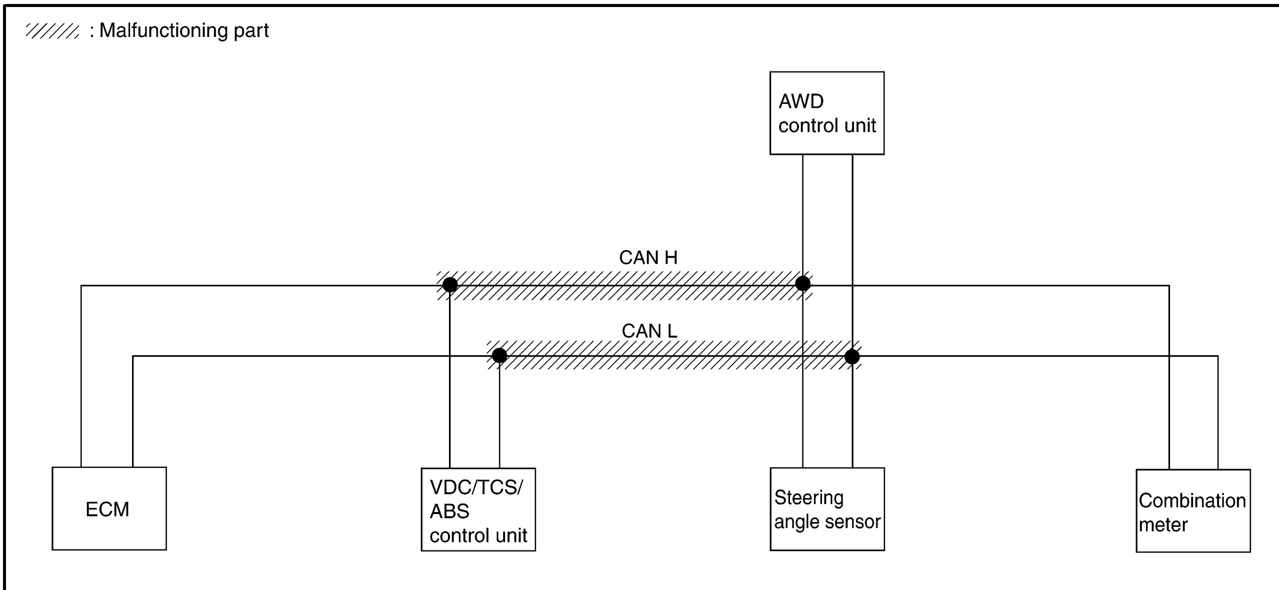
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Case 1

Check harness between VDC/TCS/ABS control unit and AWD control unit. Refer to LAN-86, "Between VDC/TCS/ABS Control Unit and AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	–	UNKWN ✓	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001) ✓
ABS	NG	UNKWN	UNKWN	–	UNKWN ✓	UNKWN ✓	–	CAN COMM CIRCUIT (U1000) ✓	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN ✓	UNKWN ✓	–	–	–	CAN COMM CIRCUIT (U1000) ✓	–

PKIA8778E



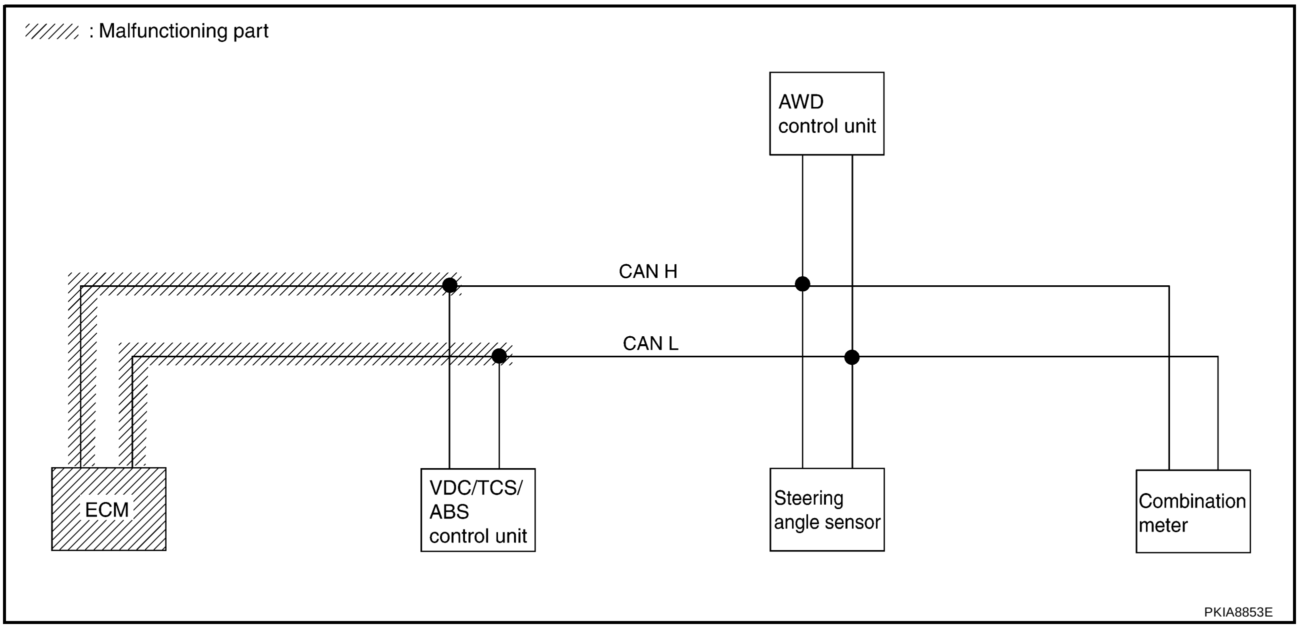
PKIA8852E

Case 2

Check ECM circuit. Refer to LAN-87, "ECM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8779E

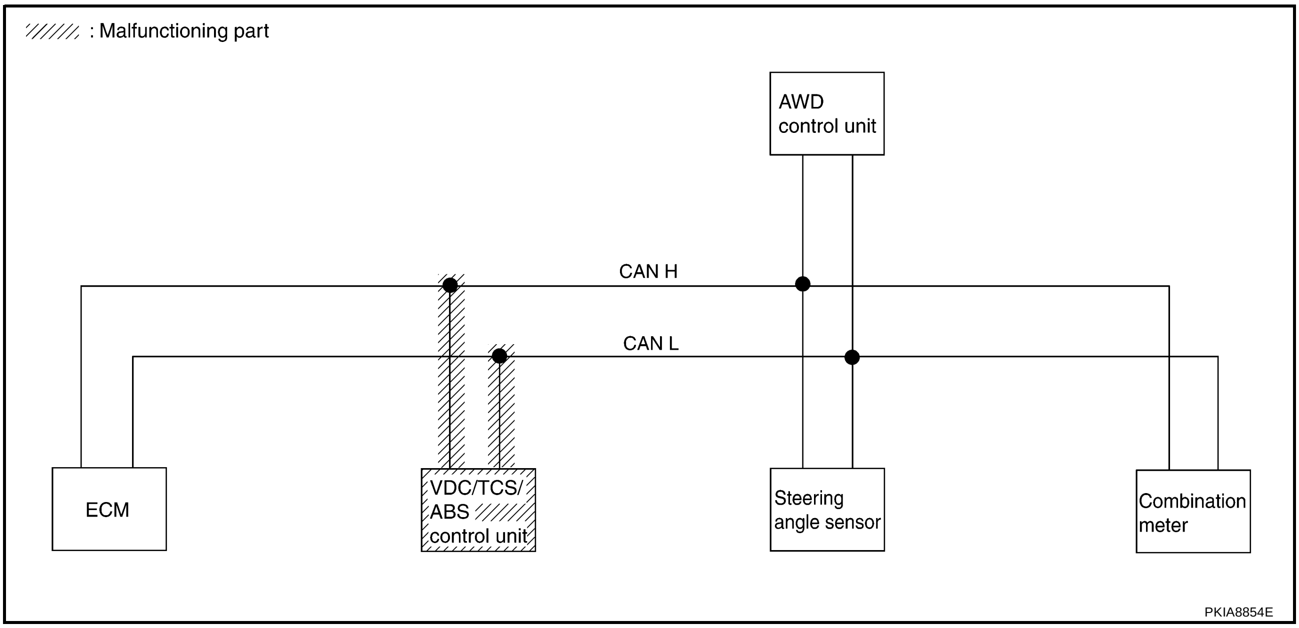


Case 3

Check VDC/TCS/ABS control unit circuit. Refer to LAN-87, "VDC/TCS/ABS Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8780E

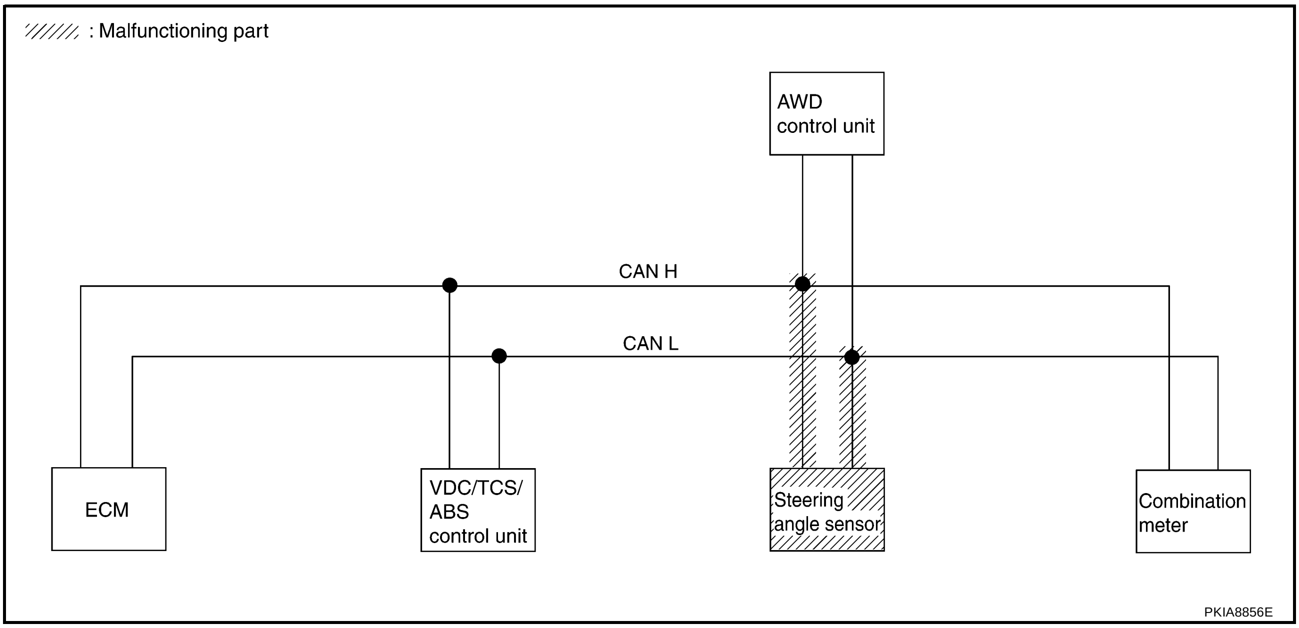


Case 4

Check steering angle sensor circuit. Refer to LAN-88, "Steering Angle Sensor Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8781E

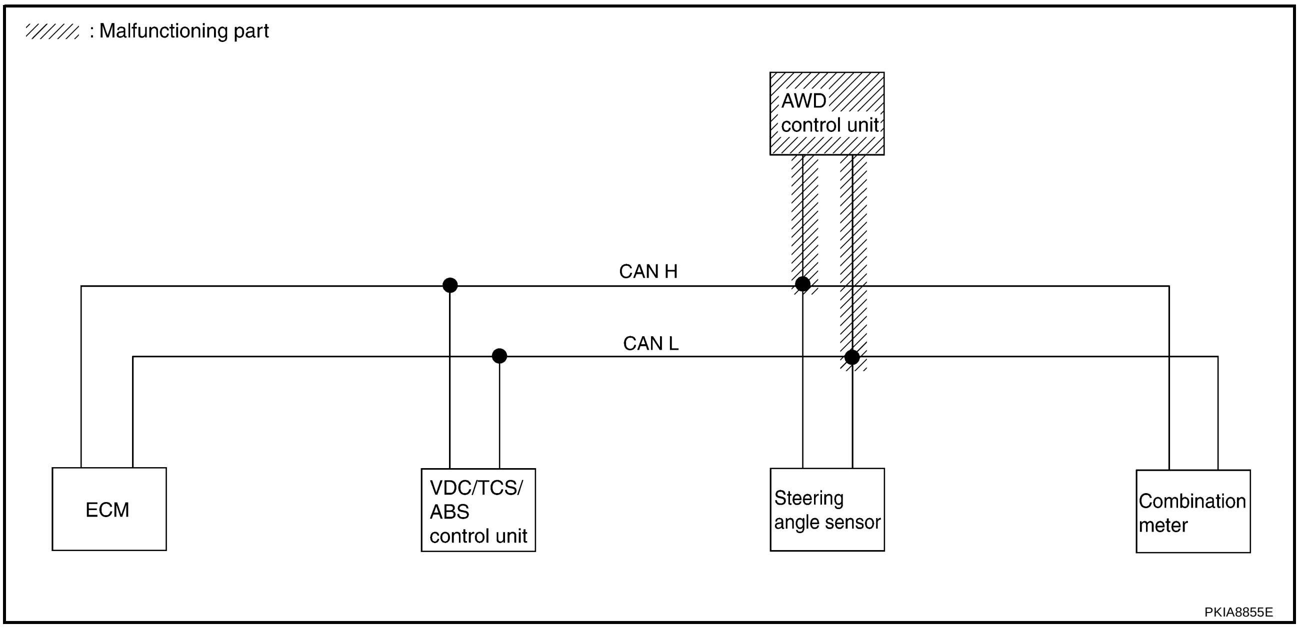


Case 5

Check AWD control unit circuit. Refer to LAN-88, "AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8782E

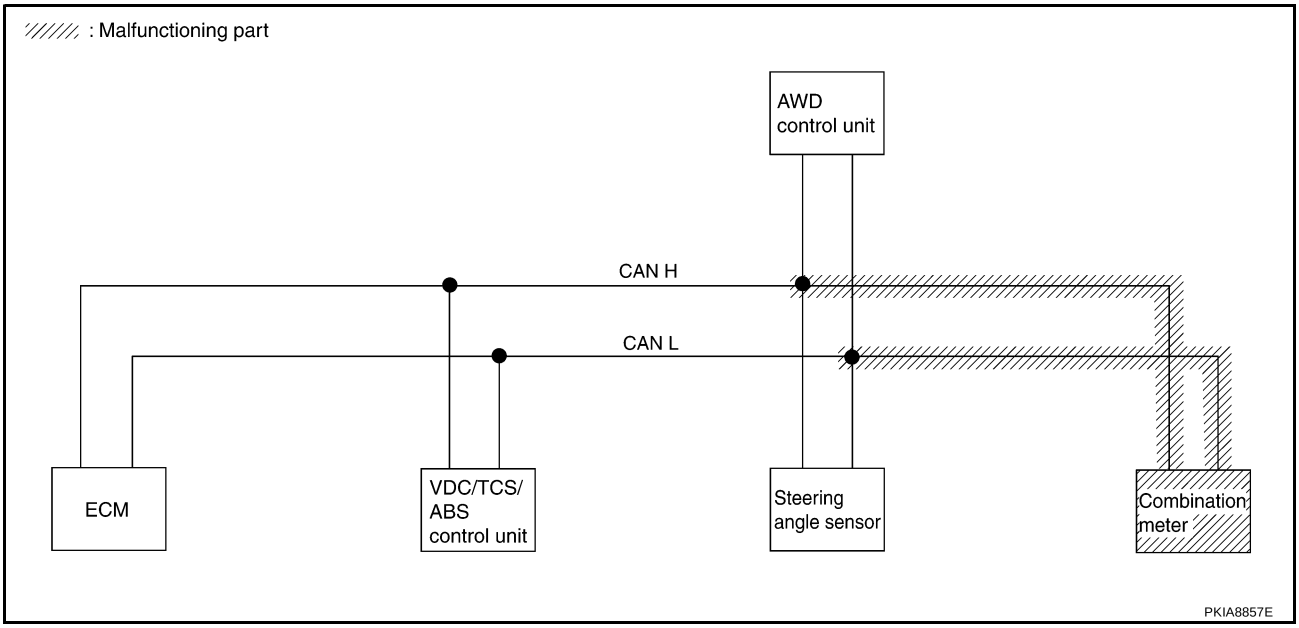


Case 6

Check combination meter circuit. Refer to LAN-89, "Combination Meter Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	VDC/TCS/ABS	STRG	AWD/4WD	METER/M&A			
ENGINE	NG	UNKWN	—	UNKWN	—	—	UNKWN		CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	—	UNKWN	UNKWN	—		CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	—	—	—		CAN COMM CIRCUIT (U1000)	—

PKIA8783E



Case 7

Check CAN communication circuit. Refer to LAN-89, "CAN Communication Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR							SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis						
			ECM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
ABS	NG	UNKWN	UNKWN	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8784E

Between VDC/TCS/ABS Control Unit and AWD Control Unit Circuit Inspection

AKS00BL4

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connector for damage, bend and loose connection (connector side and harness side).

– Harness connector E116

– Harness connector M75

OK or NG

OK >> GO TO 2.

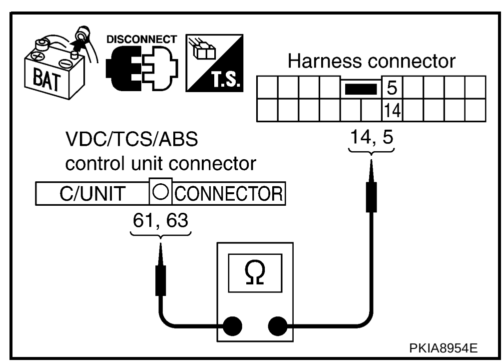
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector and harness connector E116.
2. Check continuity between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W), 63 (R) and harness connector E116 terminals 14 (W), 5 (R).

61 (W) – 14 (W) **: Continuity should exist.**

63 (R) – 5 (R) **: Continuity should exist.**



PKIA8954E

OK or NG

OK >> GO TO 3.

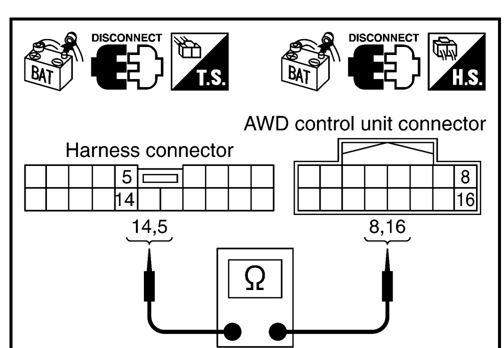
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check continuity between harness connector M75 terminals 14 (W), 5 (R) and AWD control unit harness connector M107 terminals 8 (W), 16 (R).

14 (W) – 8 (W) **: Continuity should exist.**

5 (R) – 16 (R) **: Continuity should exist.**



PKIA8951E

OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .

NG >> Repair harness.

ECM Circuit Inspection

AKS00BL5

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side and harness side).

- ECM connector
- Harness connector M75
- Harness connector E116

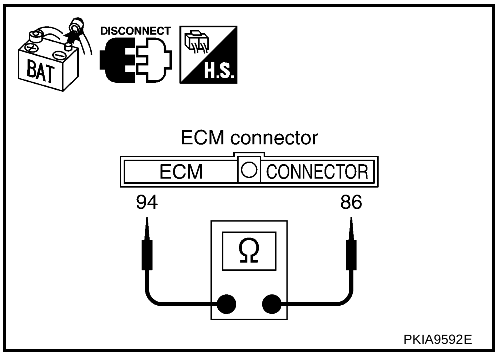
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and VDC/TCS/ABS control unit.

VDC/TCS/ABS Control Unit Circuit Inspection

AKS00BL6

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of VDC/TCS/ABS control unit for damage, bend and loose connection (control unit side and harness side).

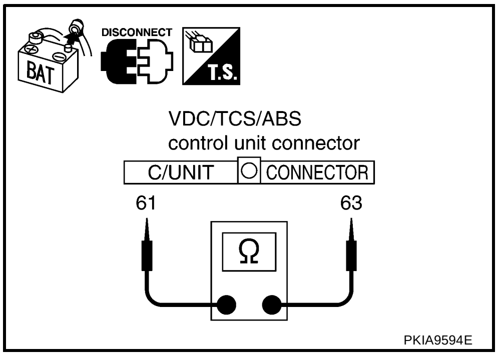
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector.
2. Check resistance between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W) and 63 (R).

61 (W) – 63 (R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace VDC/TCS/ABS control unit.
NG >> Repair harness between VDC/TCS/ABS control unit and harness connector E116.

Steering Angle Sensor Circuit Inspection

AKS00BL7

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of steering angle sensor for damage, bend and loose connection (sensor side and harness side).

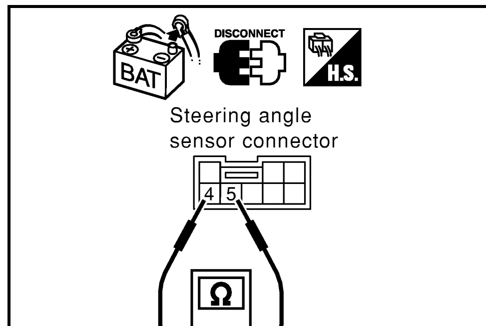
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect steering angle sensor connector.
2. Check resistance between steering angle sensor harness connector M81 terminals 4 (W) and 5 (R).

4 (W) – 5 (R) : Approx. 54 – 66Ω



SKIA6870E

OK or NG

OK >> Replace steering angle sensor.
NG >> Repair harness between steering angle sensor and AWD control unit.

AWD Control Unit Circuit Inspection

AKS00BL8

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of AWD control unit for damage, bend and loose connection (control unit side and harness side).

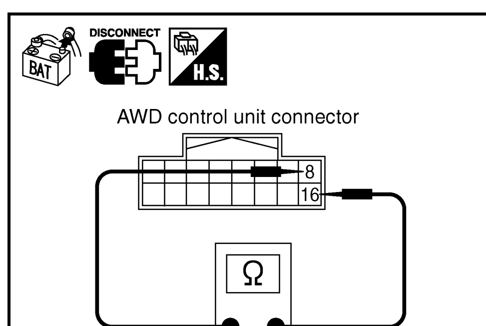
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check resistance between AWD control unit harness connector M107 terminals 8 (W) and 16 (R).

8 (W) – 16 (R) : Approx. 54 – 66Ω



SKIA6889E

OK or NG

OK >> Replace AWD control unit.
NG >> Repair harness between AWD control unit and steering angle sensor.

Combination Meter Circuit Inspection

AKS00BL9

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

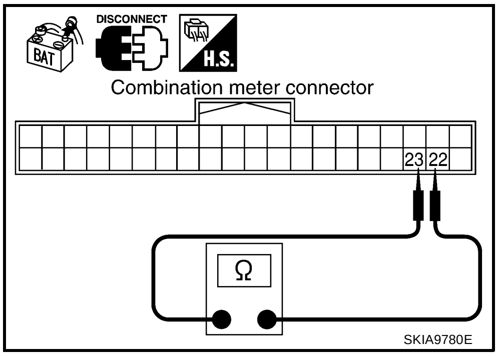
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and AWD control unit.

CAN Communication Circuit Inspection

AKS00BLA

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (control module side, control unit side, sensor side, meter side, connector side and harness side).

- ECM
- VDC/TCS/ABS control unit
- Steering angle sensor
- AWD control unit
- Combination meter
- Between ECM and combination meter

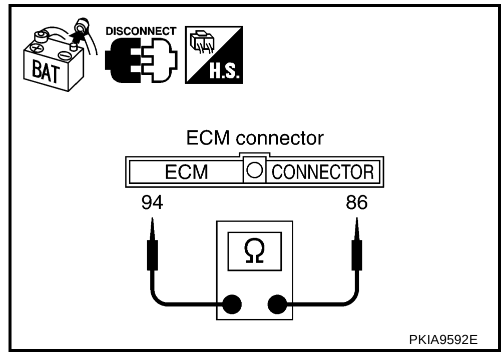
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector M75.
2. Check continuity between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Continuity should not exist.



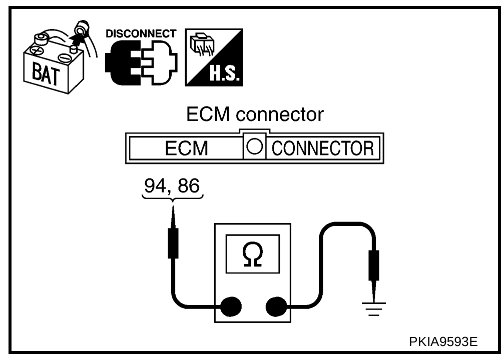
OK or NG

OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector M75.

3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector M118 terminals 94 (G/R), 86 (GY/R) and ground.

94 (G/R) – Ground : Continuity should not exist.
86 (GY/R) – Ground : Continuity should not exist.



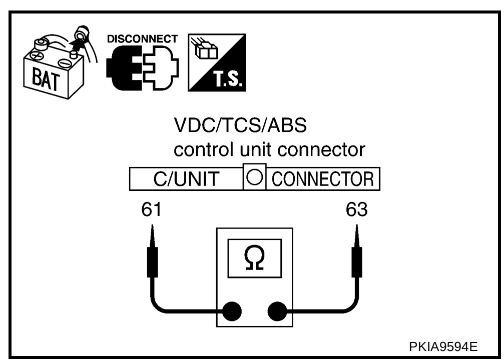
OK or NG

OK >> GO TO 4.
NG >> Repair harness between ECM and harness connector M75.

4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector.
2. Check continuity between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W) and 63 (R).

61 (W) – 63 (R) : Continuity should not exist.



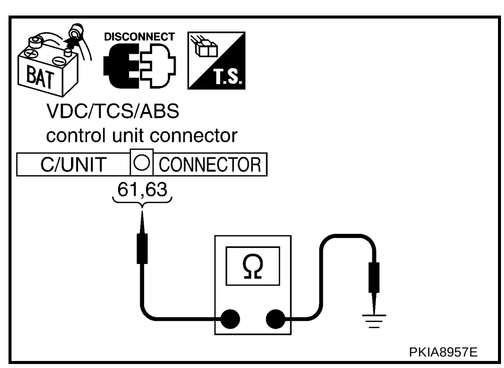
OK or NG

OK >> GO TO 5.
NG >> Repair harness between VDC/TCS/ABS control unit and harness connector E116.

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W), 63 (R) and ground.

61 (W) – Ground : Continuity should not exist.
63 (R) – Ground : Continuity should not exist.



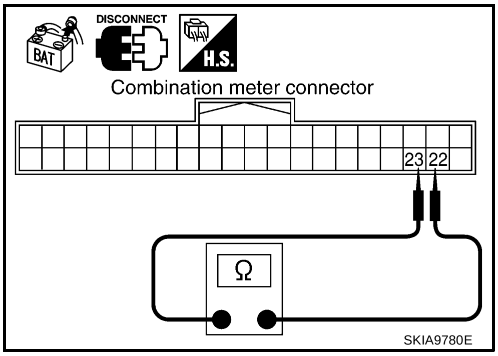
OK or NG

OK >> GO TO 6.
NG >> Repair harness between VDC/TCS/ABS control unit and harness connector E116.

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
– Steering angle sensor connector
– AWD control unit connector
– combination meter connector
2. Check continuity between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Continuity should not exist.



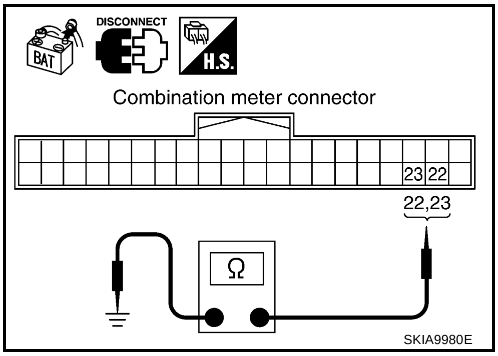
OK or NG

OK >> GO TO 7.
NG >> Check the following harness. If any harness is damaged, repair the harness.
- Harness between combination meter and steering angle sensor
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between combination meter harness connector M44 terminals 22 (W), 23 (R) and ground.

22 (W) – Ground : Continuity should not exist.
23 (R) – Ground : Continuity should not exist.



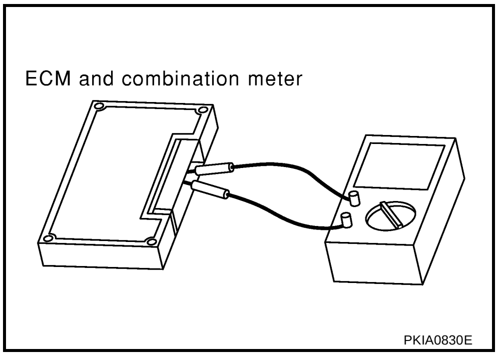
OK or NO

OK >> GO TO 8.
NG >> Check the following harness. If any harness is damaged, repair the harness.
- Harness between combination meter and steering angle sensor
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

8. CHECK ECM AND COMBINATION METER INTERNAL CIRCUIT

1. Remove ECM and combination meter from vehicle.
2. Check resistance between ECM terminals 94 and 86.
3. Check resistance between combination meter terminals 22 and 23.

Unit	Terminal	Resistance (Ω) (Approx.)
ECM	94 – 86	108 – 132
Combination meter	22 – 23	



OK or NG

OK >> GO TO 9.
NG >> Replace ECM and/or combination meter.

9. CHECK SYMPTOM

1. Fill in described symptoms on the column “Symptom” in the check sheet.
2. Connect all connectors, and then make sure that the symptom is reproduced.

OK or NG

OK >> GO TO 10.
NG >> Refer to LAN-11, "Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced".

10. CHECK UNIT REPRODUCIBILITY

Performs the following procedure for each unit, and then perform reproducibility test.

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Disconnect the unit connector.
4. Connect battery cable at negative terminal.
5. Make sure that the symptom filled in the “Symptom” of the check sheet is reproduced. (Do not confuse it with the symptom related to removed unit.)
6. Make sure that the same symptom is reproduced.

- VDC/TCS/ABS control unit
- Steering angle sensor
- AWD control unit
- ECM
- Combination meter

Check results

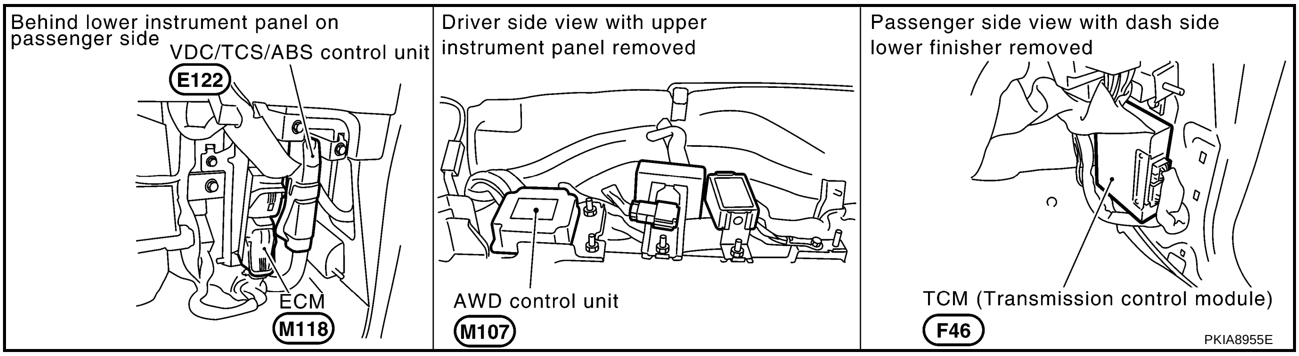
Reproduce>>Install removed unit, and then check the other units.
Not reproduced>>Replace removed unit.

CAN SYSTEM (TYPE 5)

PFP:23710

Component Parts and Harness Connector Location

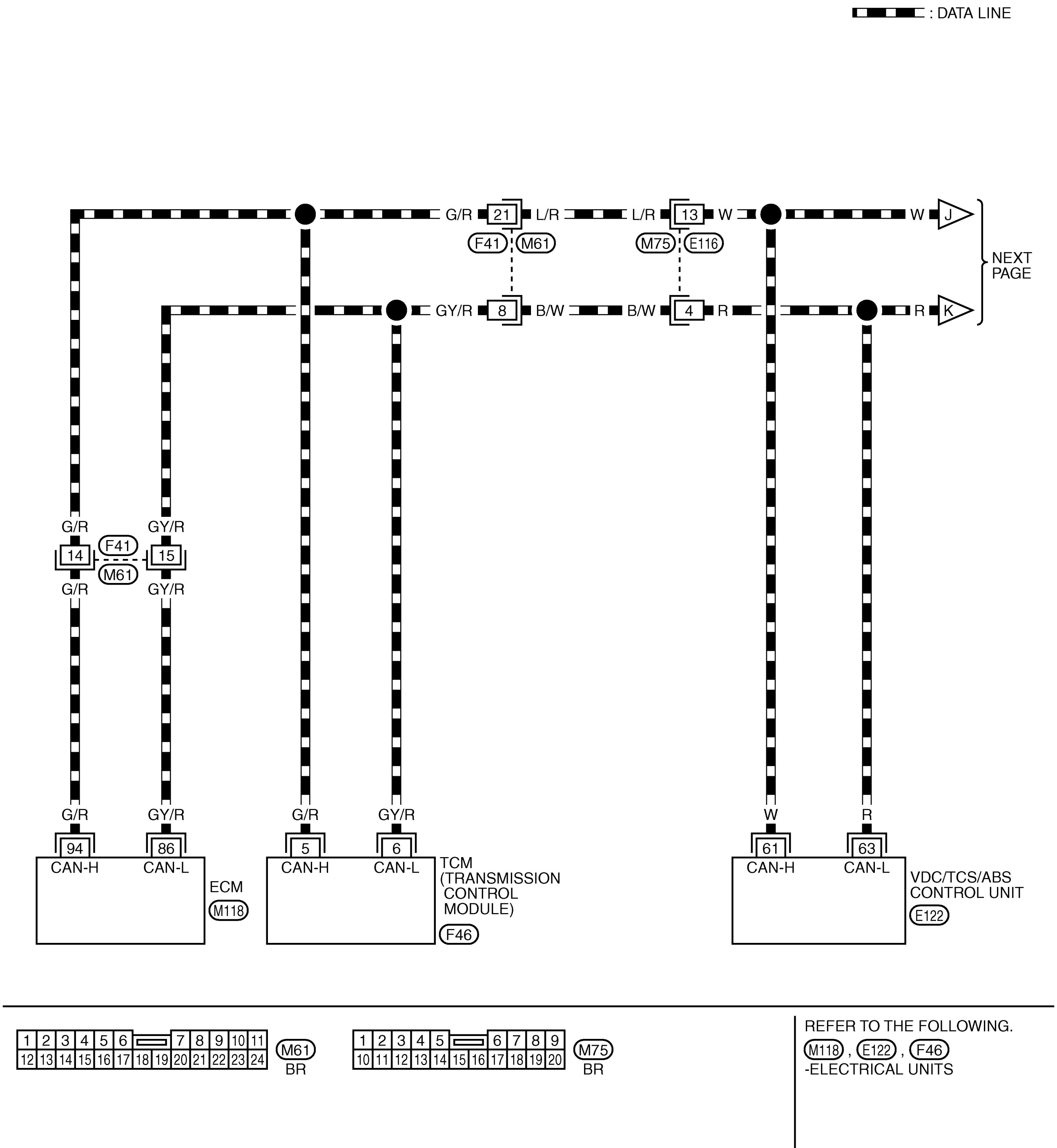
AKS00BLD



Wiring Diagram — CAN —

AKS00BLE

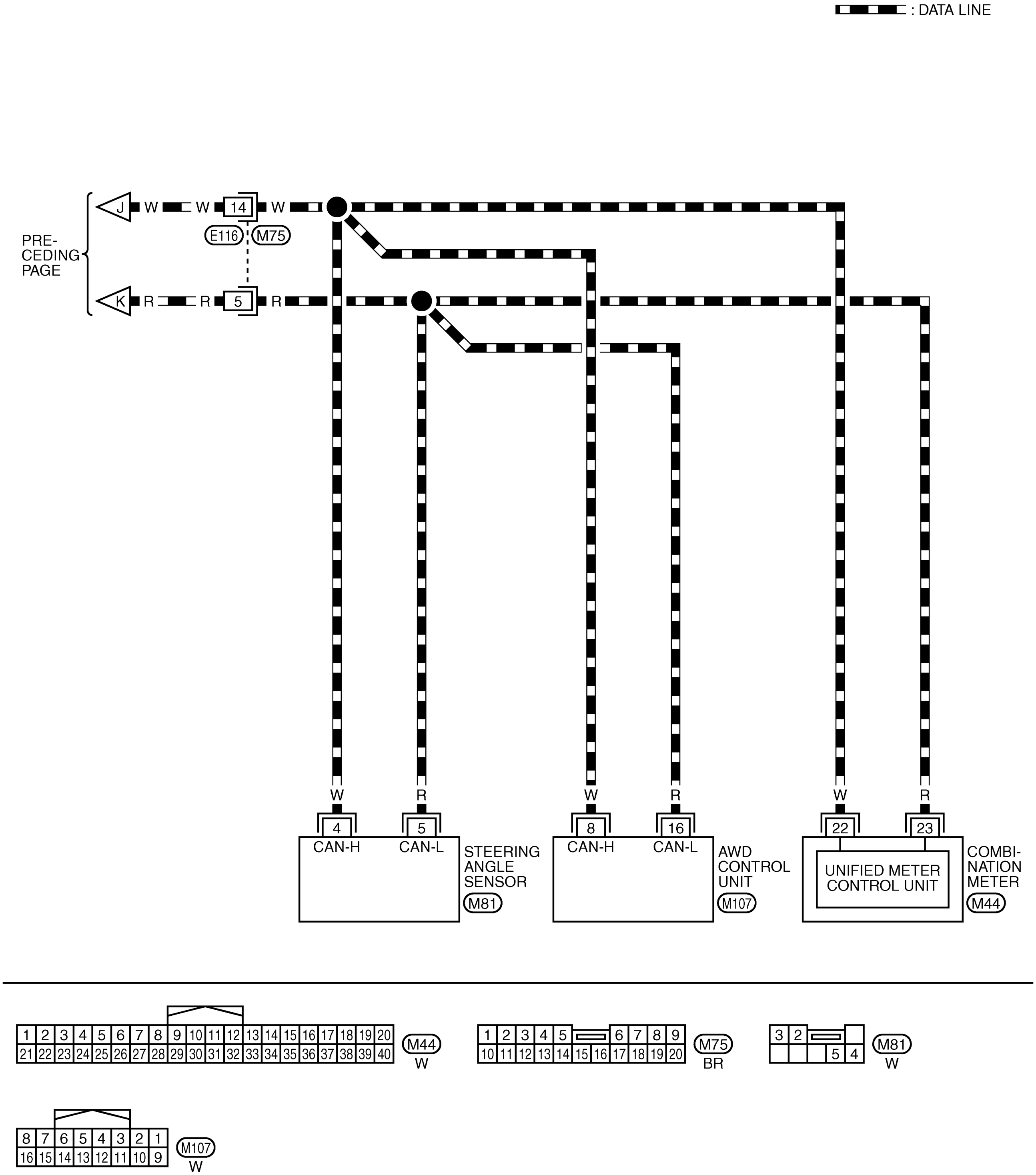
LAN-CAN-09



REFER TO THE FOLLOWING.
M118, E122, F46
-ELECTRICAL UNITS

TKWB0222E

LAN-CAN-10


: DATA LINE
PRE-
CEDING
PAGE
J
K
W
R
14
5
E116
M75
4
5
CAN-H
CAN-L
STEERING
ANGLE
SENSOR
M81
8
16
AWD
CONTROL
UNIT
M107
22
23
UNIFIED METER
CONTROL UNIT
COMBI-
NATION
METER
M44
BR
TKWB0223E

Check Sheet

AKS00BLF

NOTE:

If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Check sheet table

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	—
ABS	NG	UNKWN	UNKWN	—	—	UNKWN	UNKWN	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	—	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—

Symptoms :

Attach copy of
ENGINE
SELF-DIAG RESULTS

Attach copy of
A/T
SELF-DIAG RESULTS

Attach copy of
ABS
SELF-DIAG RESULTS

Attach copy of
ALL MODE AWD/4WD
SELF-DIAG RESULTS

Attach copy of
ENGINE
CAN DIAG SUPPORT
MNTR

Attach copy of
A/T
CAN DIAG SUPPORT
MNTR

Attach copy of
ABS
CAN DIAG SUPPORT
MNTR

Attach copy of
ALL MODE AWD/4WD
CAN DIAG SUPPORT
MNTR

PKIA8785E

CHECK SHEET RESULTS (EXAMPLE)

NOTE:

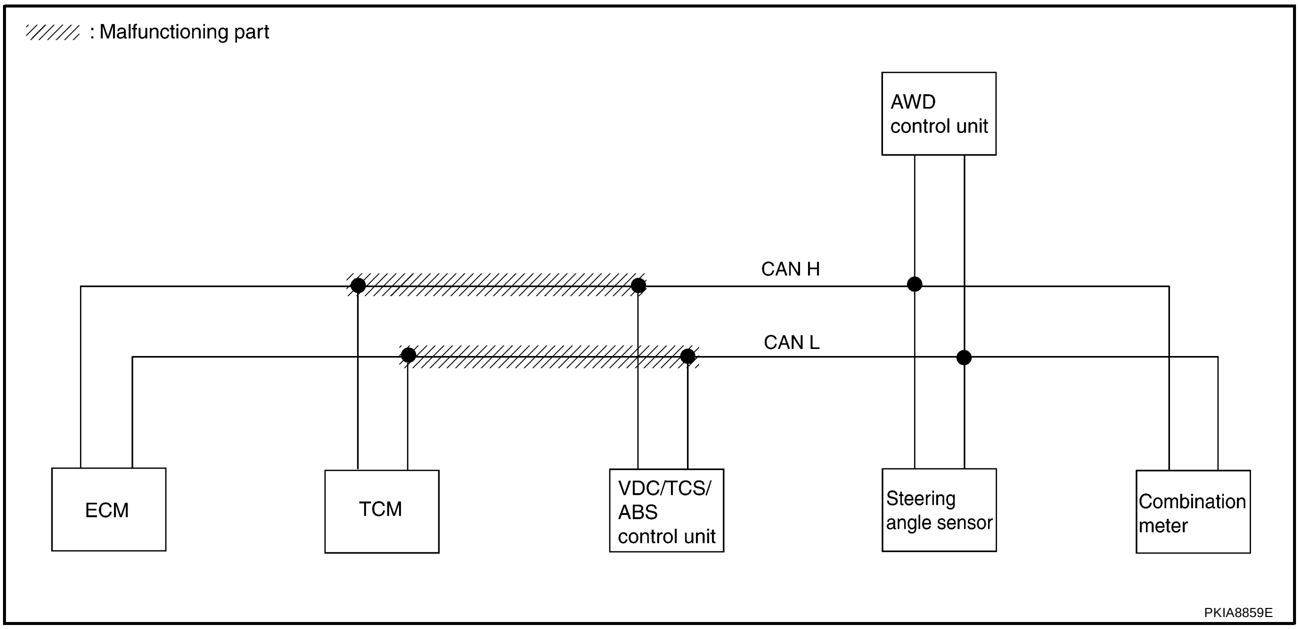
If a check mark is put on “NG” on “INITIAL DIAG (Initial diagnosis)”, replace the control unit.

Case 1

Check harness between TCM and VDC/TCS/ABS control unit. Refer to LAN-105, "Between TCM and VDC/TCS/ABS Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN ✓	–	–	UNKWN ✓	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001) ✓
A/T	NG	UNKWN	UNKWN	–	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN ✓	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000) ✓	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN ✓	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000) ✓	–

PKIA8786E

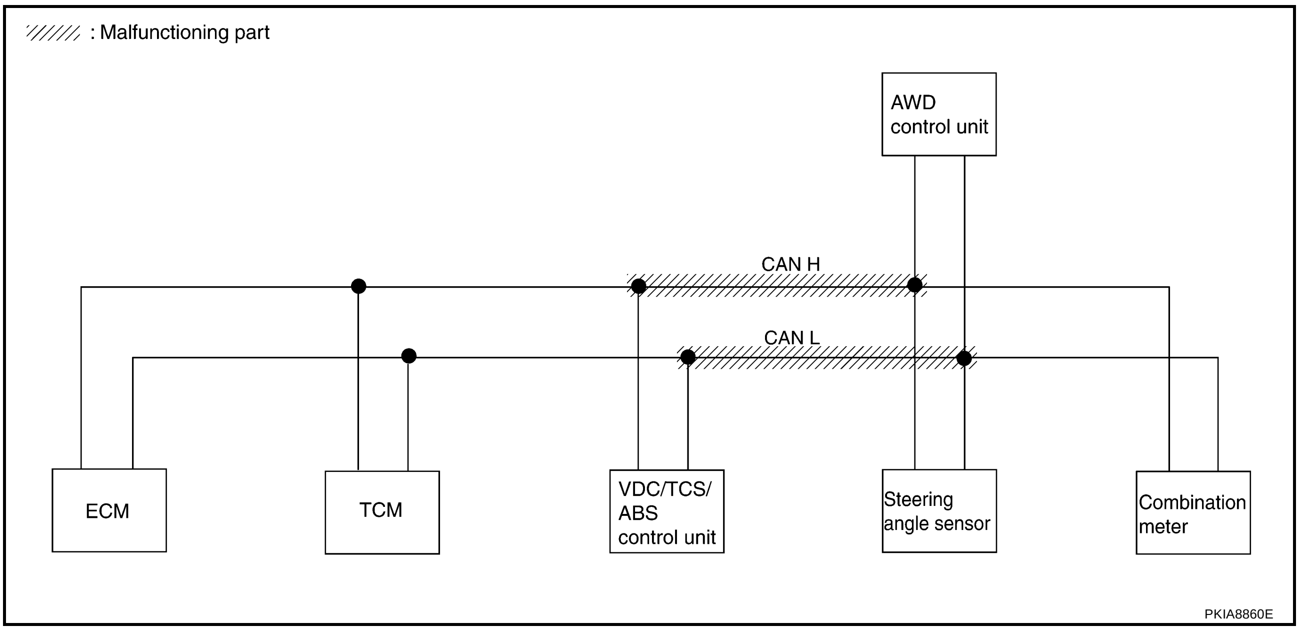


Case 2

Check harness between VDC/TCS/ABS control unit and AWD control unit. Refer to LAN-106, "Between VDC/ TCS/ABS Control Unit and AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8787E

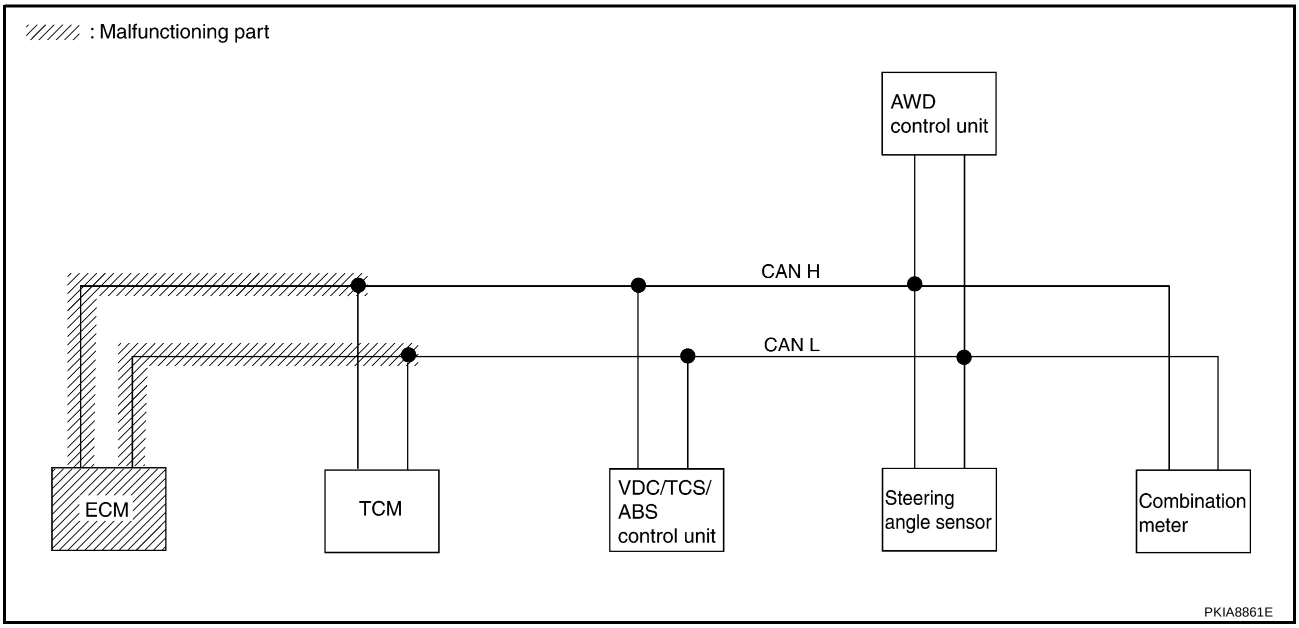


Case 3

Check ECM circuit. Refer to LAN-107, "ECM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	–	–	UNKWN	–	–	UNKWN	–	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8788E

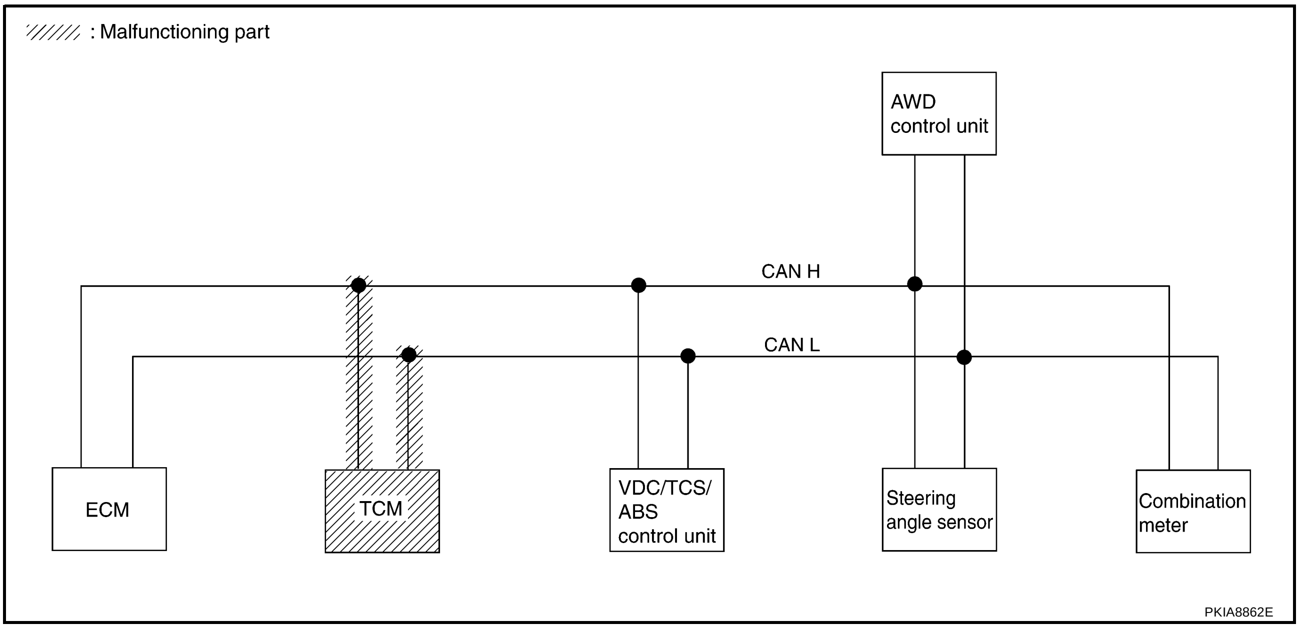


Case 4

Check TCM circuit. Refer to LAN-107, "TCM Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS/ABS	STRG	AWD/4WD	METER/M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	–	–	–	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8789E



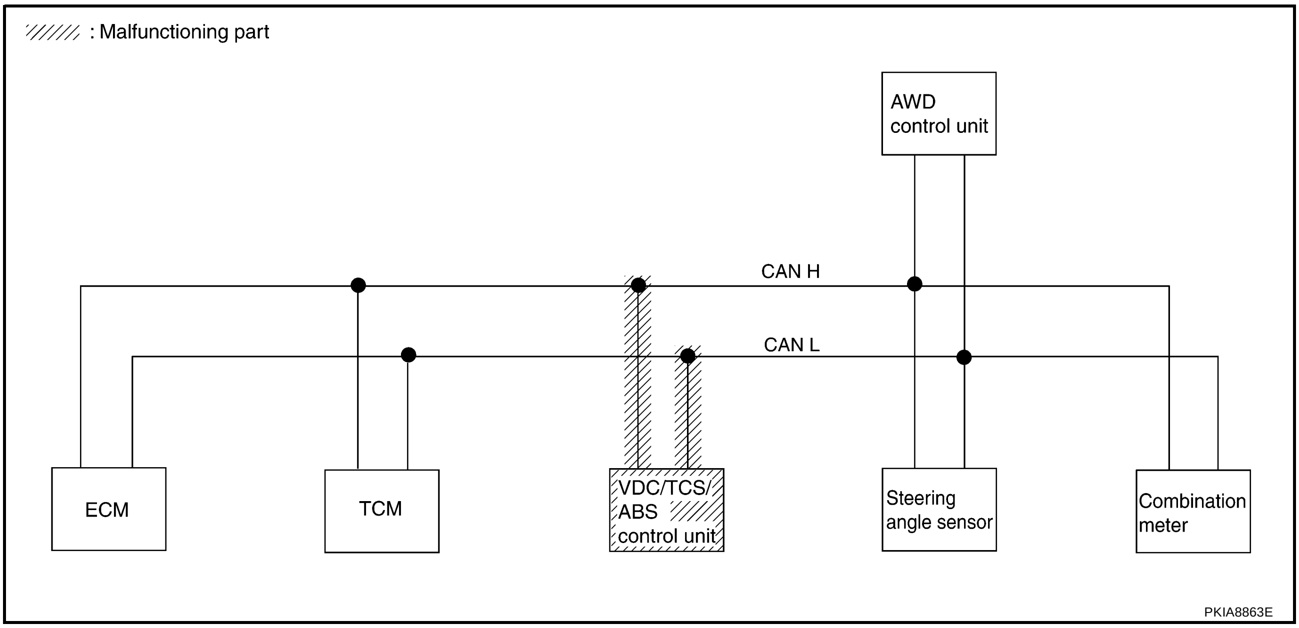
PKIA8862E

Case 5

Check VDC/TCS/ABS control unit circuit. Refer to LAN-108, "VDC/TCS/ABS Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS/ABS	STRG	AWD/4WD	METER/M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	–	–	–	UNKWN	–	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8790E

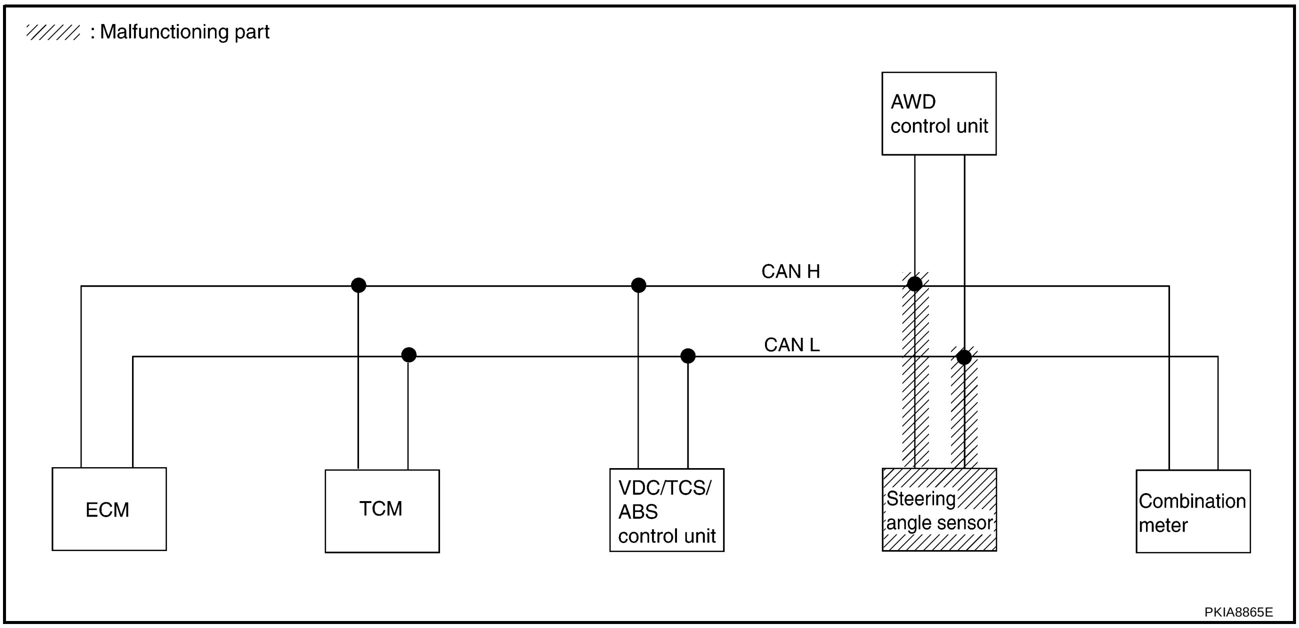


Case 6

Check steering angle sensor circuit. Refer to LAN-108, "Steering Angle Sensor Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS/ABS	STRG	AWD/4WD	METER/M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	–	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8791E

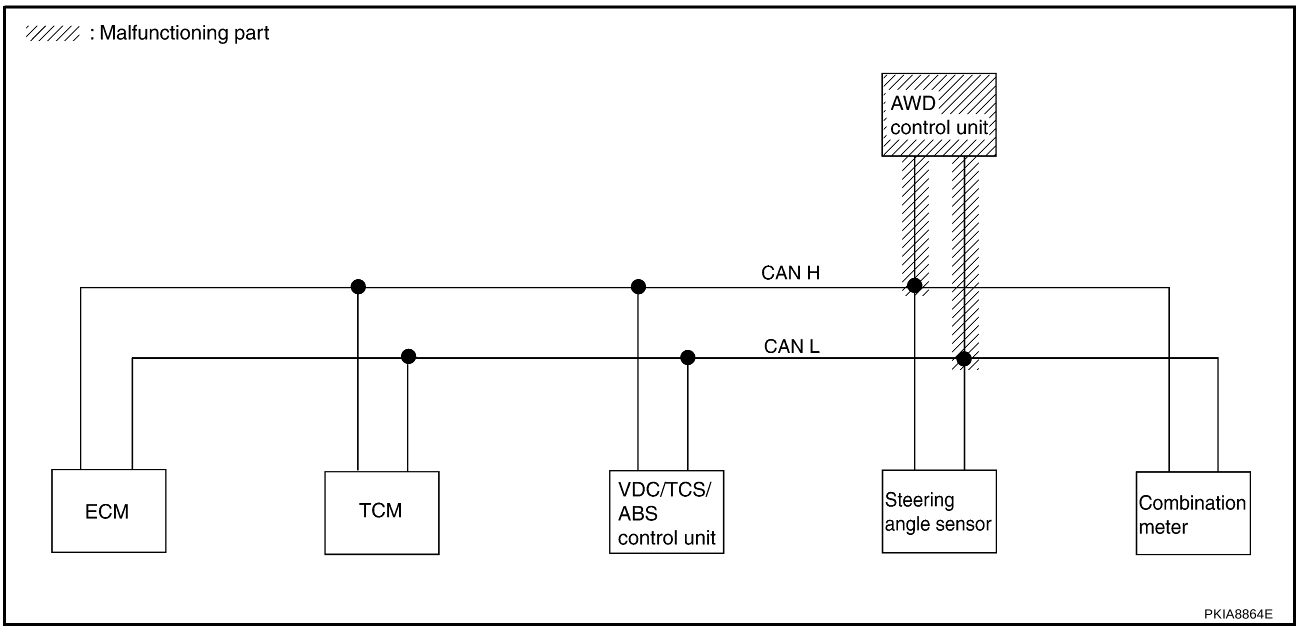


Case 7

Check AWD control unit circuit. Refer to LAN-109, "AWD Control Unit Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	—
ABS	NG	UNKWN	UNKWN	—	—	UNKWN	UNKWN	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	—	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—

PKIA8792E



PKIA8864E

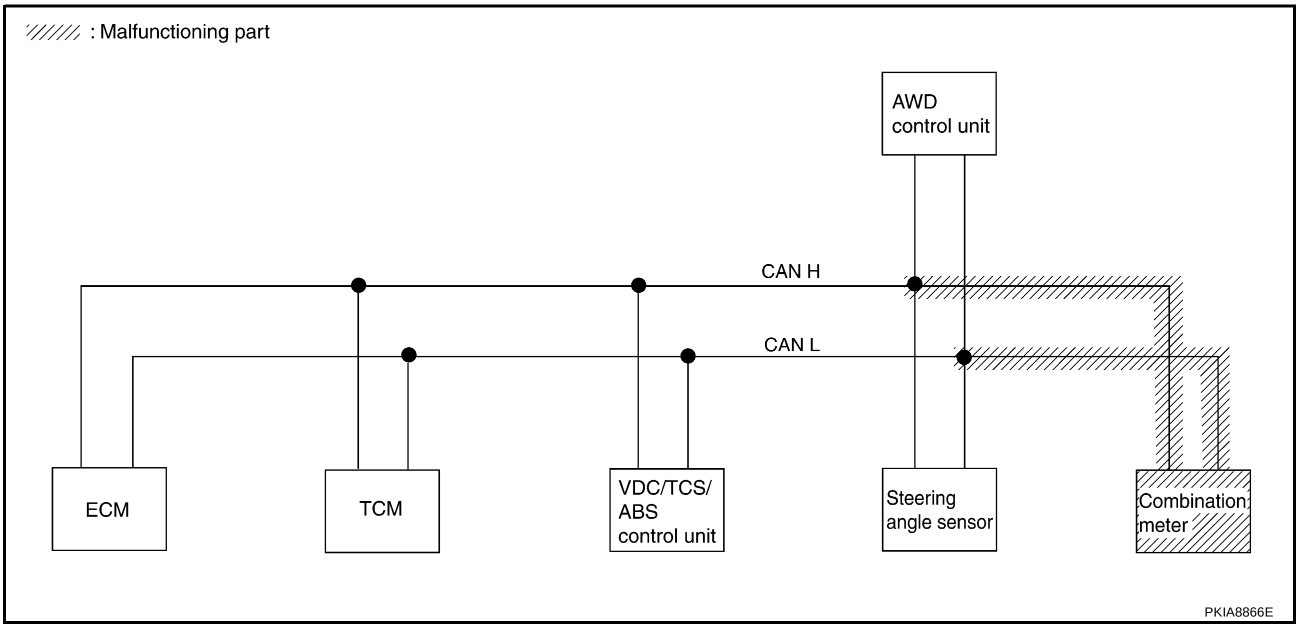
A B C D E F G H I J LAN L M

Case 8

Check combination meter circuit. Refer to LAN-109, "Combination Meter Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	—	UNKWN	UNKWN	—	—	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	UNKWN	UNKWN	—	UNKWN	—	—	—	—	—
ABS	NG	UNKWN	UNKWN	—	—	UNKWN	UNKWN	—	CAN COMM CIRCUIT (U1000)	—
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	—	UNKWN	—	—	—	CAN COMM CIRCUIT (U1000)	—

PKIA8793E



Case 9

Check CAN communication circuit. Refer to LAN-110, "CAN Communication Circuit Inspection" .

SELECT SYSTEM screen	CAN DIAG SUPPORT MNTR								SELF-DIAG RESULTS	
	Initial diagnosis	Transmit diagnosis	Receive diagnosis							
			ECM	TCM	VDC/TCS /ABS	STRG	AWD /4WD	METER /M&A		
ENGINE	NG	UNKWN	–	UNKWN	UNKWN	–	–	UNKWN	CAN COMM CIRCUIT (U1000)	CAN COMM CIRCUIT (U1001)
A/T	NG	–	–	–	–	–	–	–	–	–
ABS	NG	UNKWN	UNKWN	–	–	UNKWN	UNKWN	–	CAN COMM CIRCUIT (U1000)	–
ALL MODE AWD/4WD	NG	UNKWN	UNKWN	–	UNKWN	–	–	–	CAN COMM CIRCUIT (U1000)	–

PKIA8794E

Between TCM and VDC/TCS/ABS Control Unit Circuit Inspection

AKS00BLG

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connector for damage, bend and loose connection (connector side and harness side).

- Harness connector F41
- Harness connector M61
- Harness connector M75
- Harness connector E116

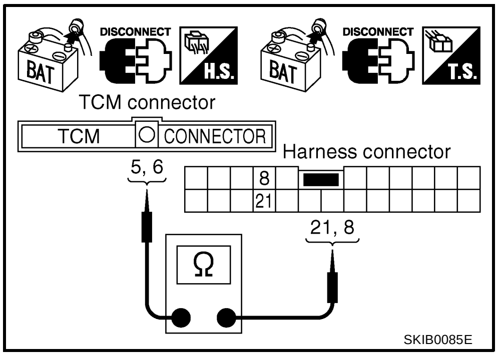
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector and harness connector F41.
2. Check continuity between TCM harness connector F46 terminals 5 (G/R), 6 (GY/R) and harness connector F41 terminals 21 (G/R), 8 (GY/R).

5 (G/R) – 21 (G/R) : Continuity should exist.
6 (GY/R) – 8 (GY/R) : Continuity should exist.

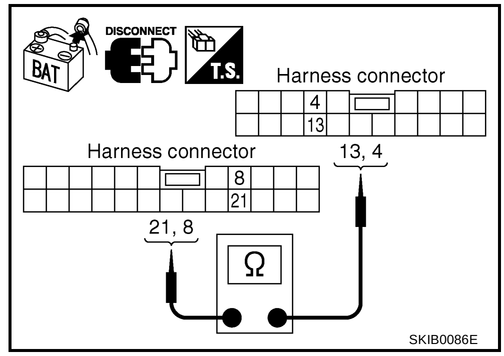


OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect harness connector M75.
2. Check continuity between harness connector M61 terminals 21 (L/R), 8 (B/W) and harness connector M75 terminals 13 (L/R), 4 (B/W).



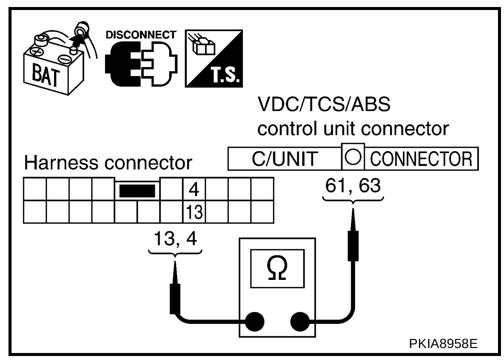
21 (L/R) – 13 (L/R) : Continuity should exist.
8 (B/W) – 4 (B/W) : Continuity should exist.

OK or NG

OK >> GO TO 4.
NG >> Repair harness.

4. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector.
2. Check continuity between harness connector E116 terminals 13 (W), 4 (R) and VDC/TCS/ABS control unit harness connector E122 terminals 61 (W), 63 (R).



13 (W) – 61 (W) : Continuity should exist.
4 (R) – 63 (R) : Continuity should exist.

OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .
NG >> Repair harness.

Between VDC/TCS/ABS Control Unit and AWD Control Unit Circuit Inspection

AKS00BLH

1. CHECK CONNECTOR

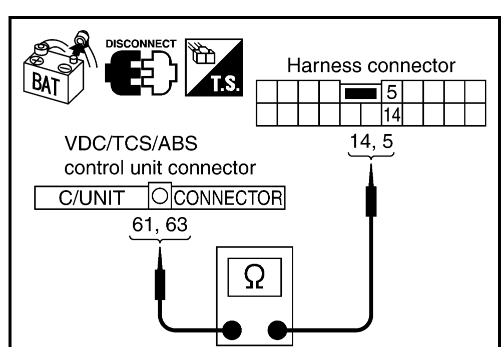
1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connectors for damage, bend and loose connection (connector side and harness side).
– Harness connector E116
– Harness connector M75

OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector and harness connector E116.
2. Check continuity between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W), 63 (R) and harness connector E116 terminals 14 (W), 5 (R).



61 (W) – 14 (W) : Continuity should exist.
63 (R) – 5 (R) : Continuity should exist.

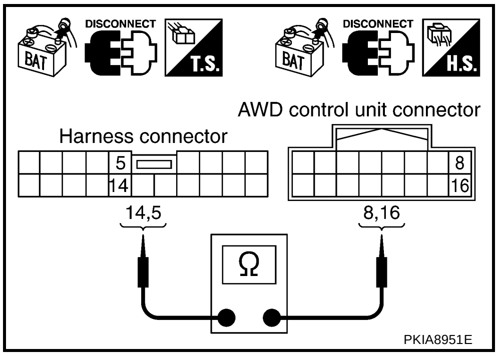
OK or NG

OK >> GO TO 3.
NG >> Repair harness.

3. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check continuity between harness connector M75 terminals 14 (W), 5 (R) and AWD control unit harness connector M107 terminals 8 (W), 16 (R).

14 (W) – 8 (W) : Continuity should exist.
5 (R) – 16 (R) : Continuity should exist.



OK or NG

OK >> Connect all the connectors and diagnose again. Refer to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .
NG >> Repair harness.

ECM Circuit Inspection

AKS00BLI

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connector for damage, bend and loose connection (control module side and harness side).
- ECM connector
- Harness connector M61
- Harness connector F41

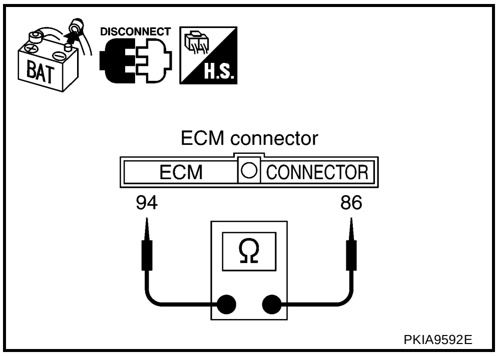
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect ECM connector.
2. Check resistance between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace ECM.
NG >> Repair harness between ECM and TCM.

TCM Circuit Inspection

AKS00BLJ

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of TCM for damage, bend and loose connection (control module side and harness side).

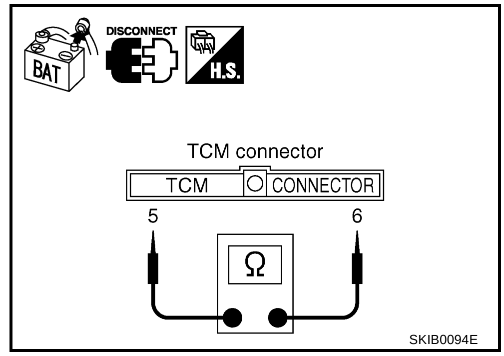
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect TCM connector.
2. Check resistance between TCM harness connector F46 terminals 5 (G/R) and 6 (GY/R).

5 (G/R) – 6 (GY/R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace TCM.
NG >> Repair harness between TCM and harness connector F41.

VDC/TCS/ABS Control Unit Circuit Inspection

AKS00BLK

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of VDC/TCS/ABS control unit for damage, bend and loose connection (control unit side and harness side).

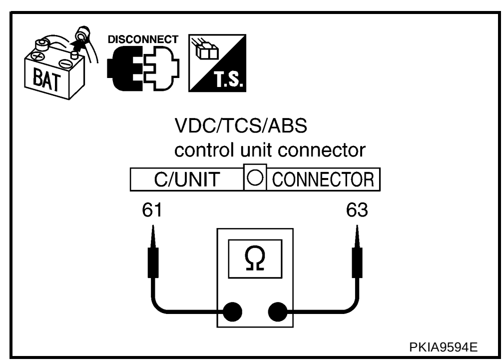
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector.
2. Check resistance between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W) and 63 (R).

61 (W) – 63 (R) : Approx. 54 – 66Ω



OK or NG

OK >> Replace VDC/TCS/ABS control unit.
NG >> Repair harness between VDC/TCS/ABS control unit and harness connector E116.

Steering Angle Sensor Circuit Inspection

AKS00BLL

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of steering angle sensor for damage, bend and loose connection (sensor side and harness side).

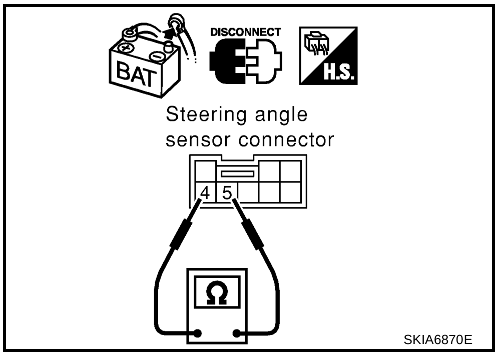
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect steering angle sensor connector.
2. Check resistance between steering angle sensor harness connector M81 terminals 4 (W) and 5 (R).

4 (W) – 5 (R) : Approx. 54 – 66Ω



SKIA6870E

OK or NG

OK >> Replace steering angle sensor.
NG >> Repair harness between steering angle sensor and AWD control unit.

AWD Control Unit Circuit Inspection

AKS00BLM

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of AWD control unit for damage, bend and loose connection (control unit side and harness side).

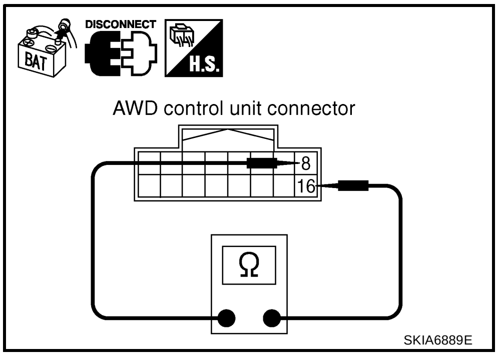
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect AWD control unit connector.
2. Check resistance between AWD control unit harness connector M107 terminals 8 (W) and 16 (R).

8 (W) – 16 (R) : Approx. 54 – 66Ω



SKIA6889E

OK or NG

OK >> Replace AWD control unit.
NG >> Repair harness between AWD control unit and steering angle sensor.

Combination Meter Circuit Inspection

AKS00BLN

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check terminals and connector of combination meter for damage, bend and loose connection (meter side and harness side).

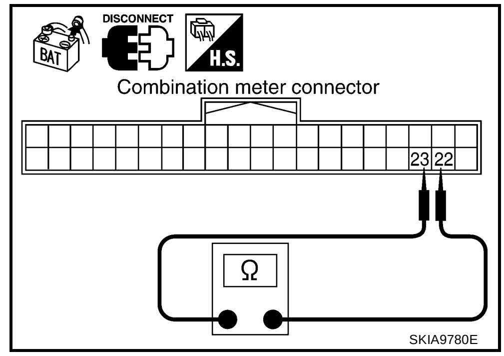
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect combination meter connector.
2. Check resistance between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Approx. 108 – 132Ω



OK or NG

OK >> Replace combination meter.
NG >> Repair harness between combination meter and AWD control unit.

CAN Communication Circuit Inspection

AKS00BLO

1. CHECK CONNECTOR

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Check following terminals and connector for damage, bend and loose connection (control module side, control unit side, sensor side, meter side, connector side and harness side).

- ECM
- TCM
- VDC/TCS/ABS control unit
- Steering angle sensor
- AWD control unit
- Combination meter
- Between ECM and combination meter

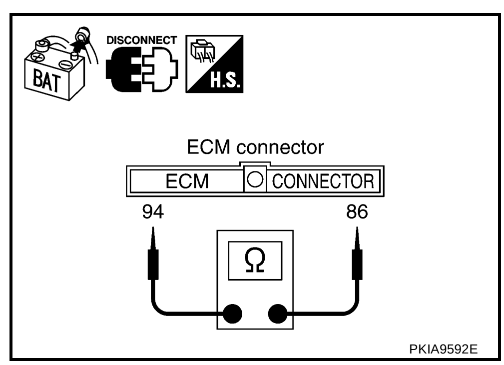
OK or NG

OK >> GO TO 2.
NG >> Repair terminal or connector.

2. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect ECM connector and harness connector M61.
2. Check continuity between ECM harness connector M118 terminals 94 (G/R) and 86 (GY/R).

94 (G/R) – 86 (GY/R) : Continuity should not exist.



OK or NG

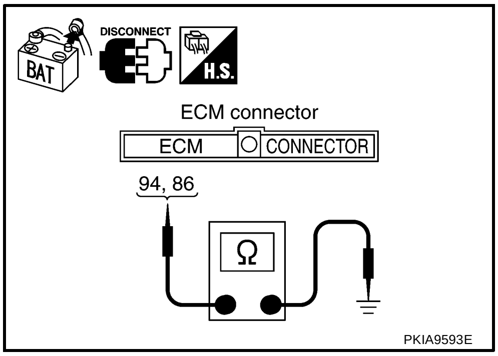
OK >> GO TO 3.
NG >> Repair harness between ECM and harness connector M61.

3. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between ECM harness connector M118 terminals 94 (G/R), 86 (GY/R) and ground.

94 (G/R) – Ground : Continuity should not exist.

86 (GY/R) – Ground : Continuity should not exist.



OK or NG

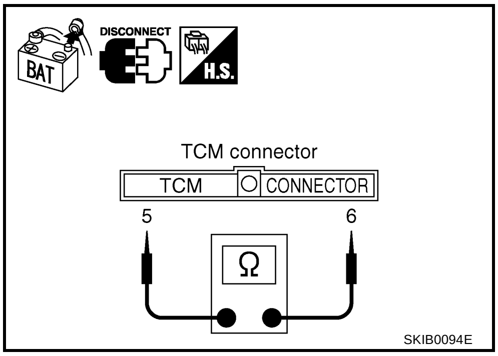
OK >> GO TO 4.

NG >> Repair harness between ECM and harness connector M61.

4. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect TCM connector.
2. Check continuity between TCM harness connector F46 terminals 5 (G/R) and 6 (GY/R).

5 (G/R) – 6 (GY/R) : Continuity should not exist.



OK or NG

OK >> GO TO 5.

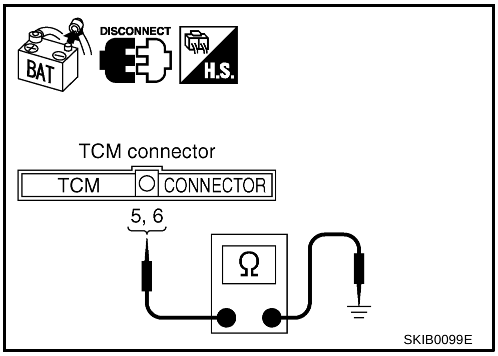
NG >> Repair harness between TCM and harness connector F41.

5. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between TCM harness connector F46 terminals 5 (G/R), 6 (GY/R) and ground.

5 (G/R) – Ground : Continuity should not exist.

6 (GY/R) – Ground : Continuity should not exist.



OK or NG

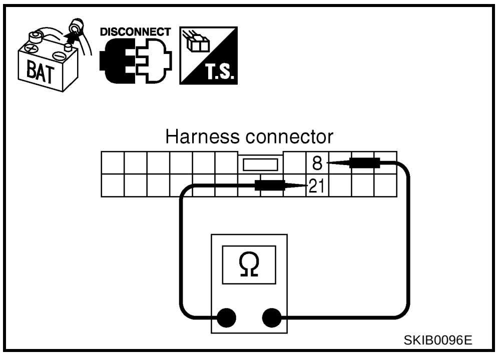
OK >> GO TO 6.

NG >> Repair harness between TCM and harness connector F41.

6. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect harness connector M75.
2. Check continuity between harness connector M61 terminals 21 (L/R) and 8 (B/W).

21 (L/R) – 8 (B/W) : Continuity should not exist.



OK or NG

OK >> GO TO 7.

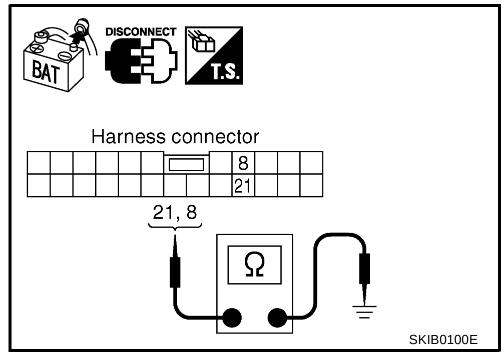
NG >> Repair harness between harness connector M61 and harness connector M75.

7. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between harness connector M61 terminals 21 (L/R), 8 (B/W) and ground.

21 (L/R) – Ground : Continuity should not exist.

8 (B/W) – Ground : Continuity should not exist.



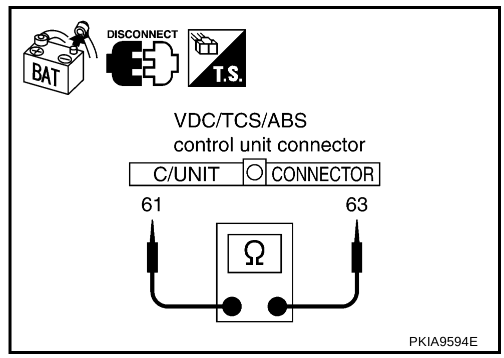
OK or NG

OK >> GO TO 8.
NG >> Repair harness between harness connector M61 and harness connector M75.

8. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect VDC/TCS/ABS control unit connector.
2. Check continuity between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W) and 63 (R).

61 (W) – 63 (R) : Continuity should not exist.



OK or NG

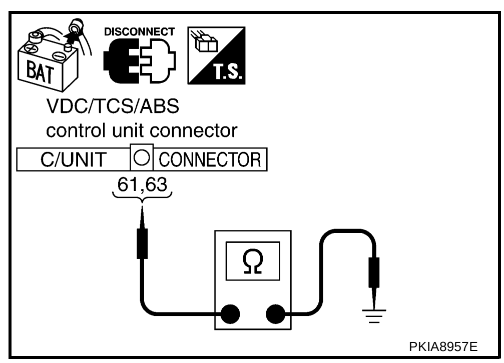
OK >> GO TO 9.
NG >> Repair harness between VDC/TCS/ABS control unit and harness connector E116.

9. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between VDC/TCS/ABS control unit harness connector E122 terminals 61 (W), 63 (R) and ground.

61 (W) – Ground : Continuity should not exist.

63 (R) – Ground : Continuity should not exist.



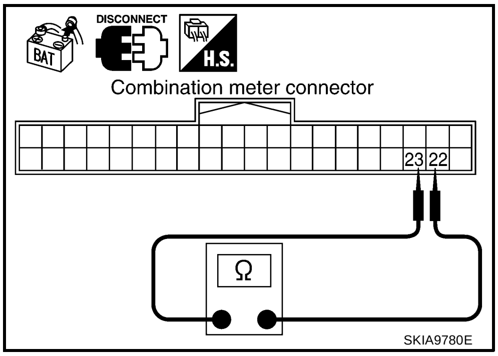
OK or NG

OK >> GO TO 10.
NG >> Repair harness between VDC/TCS/ABS control unit and harness connector E116.

10. CHECK HARNESS FOR SHORT CIRCUIT

1. Disconnect following connectors.
- Steering angle sensor connector
- AWD control unit connector
- Combination meter connector
2. Check continuity between combination meter harness connector M44 terminals 22 (W) and 23 (R).

22 (W) – 23 (R) : Continuity should not exist.



OK or NG

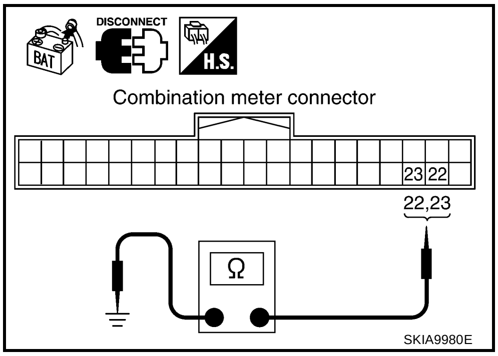
OK >> GO TO 11.

NG >> Check the following harness. If any harness is damaged, repair the harness.
- Harness between combination meter and steering angle sensor
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

11. CHECK HARNESS FOR SHORT CIRCUIT

Check continuity between combination meter harness connector M44 terminals 22 (W), 23 (R) and ground.

22 (W) – Ground : Continuity should not exist.
23 (R) – Ground : Continuity should not exist.



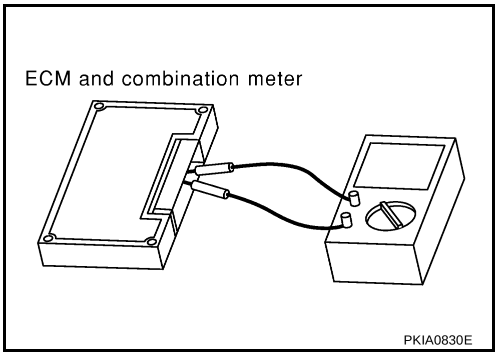
OK or NO

OK >> GO TO 12.

NG >> Check the following harness. If any harness is damaged, repair the harness.
- Harness between combination meter and steering angle sensor
- Harness between combination meter and AWD control unit
- Harness between combination meter and harness connector M75

12. CHECK ECM AND COMBINATION METER INTERNAL CIRCUIT

1. Remove ECM and combination meter from vehicle.
2. Check resistance between ECM terminals 94 and 86.
3. Check resistance between combination meter terminals 22 and 23.



Unit	Terminal	Resistance (Ω) (Approx.)
ECM	94 – 86	108 – 132
Combination meter	22 – 23	

OK or NG

OK >> GO TO 13.

NG >> Replace ECM and/or combination meter.

13. CHECK SYMPTOM

1. Fill in described symptoms on the column “Symptom” in the check sheet.
2. Connect all connectors, and then make sure that the symptom is reproduced.

OK or NG

OK >> GO TO 14.
NG >> Refer to LAN-11, "Example of Filling in Check Sheet When Initial Conditions Are Not Reproduced".

14. CHECK UNIT REPRODUCIBILITY

Performs the following procedure for each unit, and then perform reproducibility test.

1. Turn ignition switch OFF.
2. Disconnect battery cable at negative terminal.
3. Disconnect the unit connector.
4. Connect battery cable at negative terminal.
5. Make sure that the symptom filled in the “Symptom” of the check sheet is reproduced. (Do not confuse it with the symptom related to removed unit.)
6. Make sure that the same symptom is reproduced.

- TCM
- VDC/TCS/ABS control unit
- Steering angle sensor
- AWD control unit
- ECM
- Combination meter

Check results

Reproduce>>Install removed unit, and then check the other units.
Not reproduced>>Replace removed unit.

SECTION LT
LIGHTING SYSTEM

CONTENTS

PRECAUTION

PFP:00011

Precautions for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

AKS00B7A

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precaution

AKS00B7B

- Do not touch the glass of bulb directly by hand. Keep grease and other oily matters away from it. Do not touch bulb by hand while it is lit or right after being turned off. Burning may result.
- Do not leave bulb out of headlamp reflector for a long time because dust, moisture, smoke, etc. may affect the performance of the headlamp. When replacing the bulb, be sure to replace it with a new one.
- Adjust aiming by tightening aiming screw. (To adjust it toward loosening side, first loosen adjusting screw, and then make adjustment by tightening.)
- To remove soil or sealant of bulbs, do not use organic solvent (thinner, gasoline, etc.)
- When replacing bulb, be sure to hold bulb socket and pull it out straight. If wiring harness of the bulb is pulled at an angle, the bulb may be caught in the lamp, making it difficult to take out.

Wiring Diagrams and Trouble Diagnosis

AKS00B7C

When you read wiring diagrams, refer to the followings:

- Refer to GI-14, "How to Read Wiring Diagrams" in GI section.
- Refer to PG-2, "POWER SUPPLY ROUTING" for power distribution circuit in PG section.

When you perform trouble diagnosis, refer to the followings:

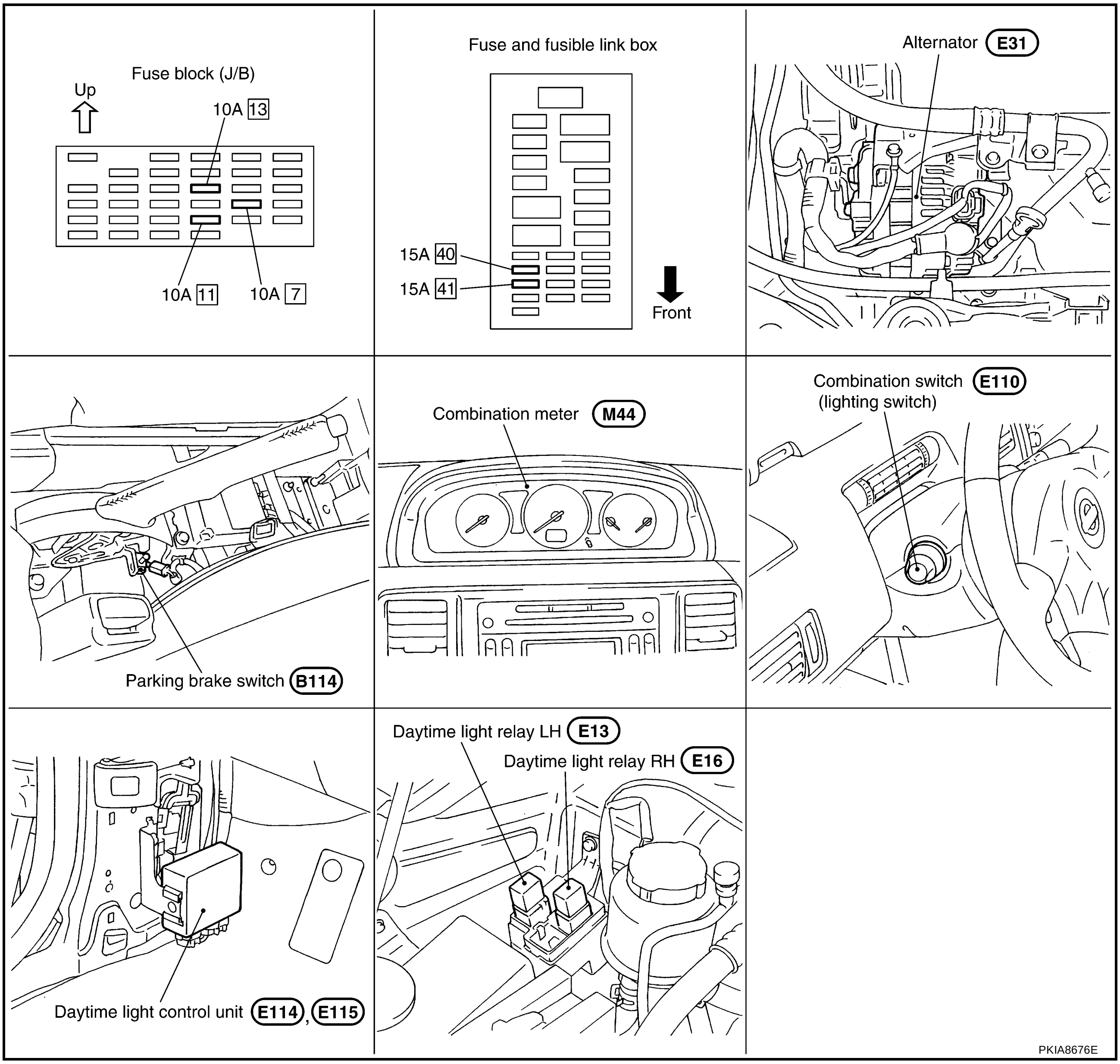
- Refer to GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section.
- Refer to GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section.

HEADLAMP - DAYTIME LIGHT SYSTEM -

PFP:26010

Component Parts and Harness Connector Location

AKS00BPX



System Description

AKS00BPJ

DESCRIPTION

- Daytime light system is a system that turns on HIGH beam as dimmer blinking automatically while driving with lighting switch OFF or 1ST position (including temporary stop at an intersection).
- HIGH beam dimmer blinks automatically reducing the amount of light when starting engine and taking off the parking brake.
- Daytime light system does not start unless the parking brake is turned off (drive theater mode).
- Daytime light system is not released by putting on the parking brake when making a stop at an intersection.
- Put on the parking brake, stop the engine, and restart the engine to select drive theater mode.
- Daytime light system stops when shifting lighting switch to the 2ND or PASS position.
- Daytime light control unit performs dimmer blinking, opening the circuit that connects bilateral HIGH beams in series.

OUTLINE

Power is supplied at all times

- through 15A fuse (No. 40, located in fuse and fusible link box)
- to daytime light control unit terminal 3
- to combination switch (lighting switch) terminal 8 and
- to daytime light relay LH terminal 5
- through 15A fuse (No. 41, located in fuse and fusible link box)
- to daytime light control unit terminal 2
- to combination switch (lighting switch) terminal 5 and
- to daytime light relay RH terminal 5.

When the ignition switch is ON or START position, power is supplied

- through 10A fuse [No.13, located in fuse block (J/B)]
- to daytime light control unit terminal 12
- through 10A fuse [No.11, located in fuse block (J/B)]
- to combination meter (charge) terminal 2.

When the ignition switch is START position, power is supplied

- through 10A fuse [No.7, located in fuse block (J/B)]
- to daytime light control unit terminal 1.

Ground is supplied

- to daytime light control unit terminal 9
- to headlamp RH terminal 2
- to daytime light relay LH terminal 2
- to daytime light relay RH terminal 2
- through grounds E24 and E50
- to combination meter (HIGH beam indicator) terminal 19
- through grounds M27 and M70.

DAYTIME LIGHT OPERATION

With the engine running, the lighting switch is OFF or 1ST position and parking brake released, the daytime light control unit controls internal relay. When internal relay, power is supplied

- through daytime light control unit terminal 6
- to headlamp LH terminal 1
- through headlamp LH terminal 2
- to daytime light control unit terminal 7
- through daytime light control unit terminal 8
- to headlamp RH terminal 1.

Ground is supplied

- to headlamp RH terminal 2
- through grounds E24 and E50.

With power and grounds supplied, the daytime light illuminate. The HIGH beam headlamps are now wired in series and illuminate at a reduce intensity.

HEADLAMP OPERATION (DAYTIME LIGHT CANCEL OPERATION)

HEADLAMP RH

When the combination switch (lighting switch) is turned to the 2ND position and placed in LOW position, power is supplied

- from combination switch (lighting switch) terminal 7
- to headlamp RH terminal 3.

When the combination switch (lighting switch) is turned to the 2ND position and placed in HIGH or PASS position, power is supplied

- from combination switch (lighting switch) terminal 6
- to daytime light relay RH terminal 1
- through daytime light relay RH terminal 3
- to headlamp RH terminal 1.

HEADLAMP LH

When the combination switch (lighting switch) is turned to the 2ND position and placed in LOW position, power is supplied

- from combination switch terminal 10
- to daytime light relay LH terminal 1
- through daytime light relay LH terminal 3
- to headlamp LH terminal 3.

When the combination switch (lighting switch) is turned to the 2ND position and placed in HIGH or PASS position, power is supplied

- from combination switch (lighting switch) terminal 9
- to daytime light control unit terminal 5
- through daytime light control unit terminal 6
- to headlamp LH terminal 1.

At the same time, power is supplied

- from combination switch (lighting switch) terminal 9
- to combination meter (HIGH beam indicator) terminal 20, and then indicator illuminates.

When the combination switch is shifted to HIGH or PASS, daytime light system is released after the signal is sent to the daytime light control unit terminal 5.
Also, when the combination switch is shifted to LOW, daytime light system is released after the signal is sent to the daytime control unit terminal 4.

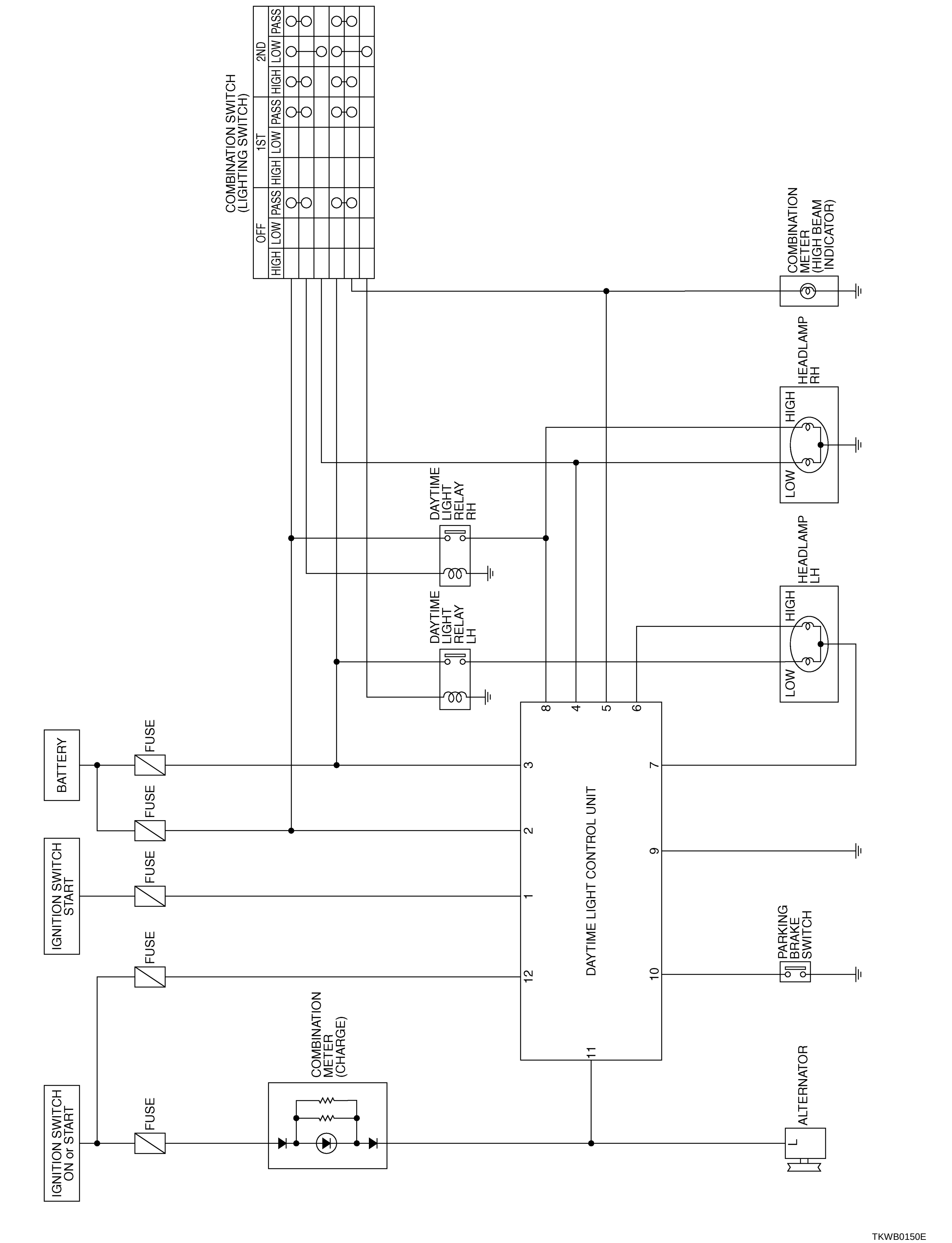
OPERATION TABLE

Engine		Engine stopped									Engine running								
Lighting switch		OFF			1ST			2ND			OFF			1ST			2ND		
		Hi	Lo	P	Hi	Lo	P	Hi	Lo	P	Hi	Lo	P	Hi	Lo	P	Hi	Lo	P
Headlamp	HIGH beam	–	–	×	–	–	×	×	–	×	●*	●*	×	●*	●*	×	×	–	×
	LOW beam	–	–	–	–	–	–	–	×	–	–	–	–	–	–	–	–	×	–
Parking (clearance), side marker and tail lamp		–	–	–	×	×	×	×	×	×	–	–	–	×	×	×	×	×	×
License and instrument illumination lamp		–	–	–	×	×	×	×	×	×	–	–	–	×	×	×	×	×	×

- Hi: “HIGH beam” position
- Lo: “LOW beam” position
- P: “FLASH TO PASS” position
- ×: Lamp “ON”
- –: Lamp “OFF”
- ●: Lamp dims. (Added functions)
- *: When starting the engine with the parking brake released, the daytime light will come ON.
  When starting the engine with the parking brake pulled, the daytime light will not come ON.

Schematic

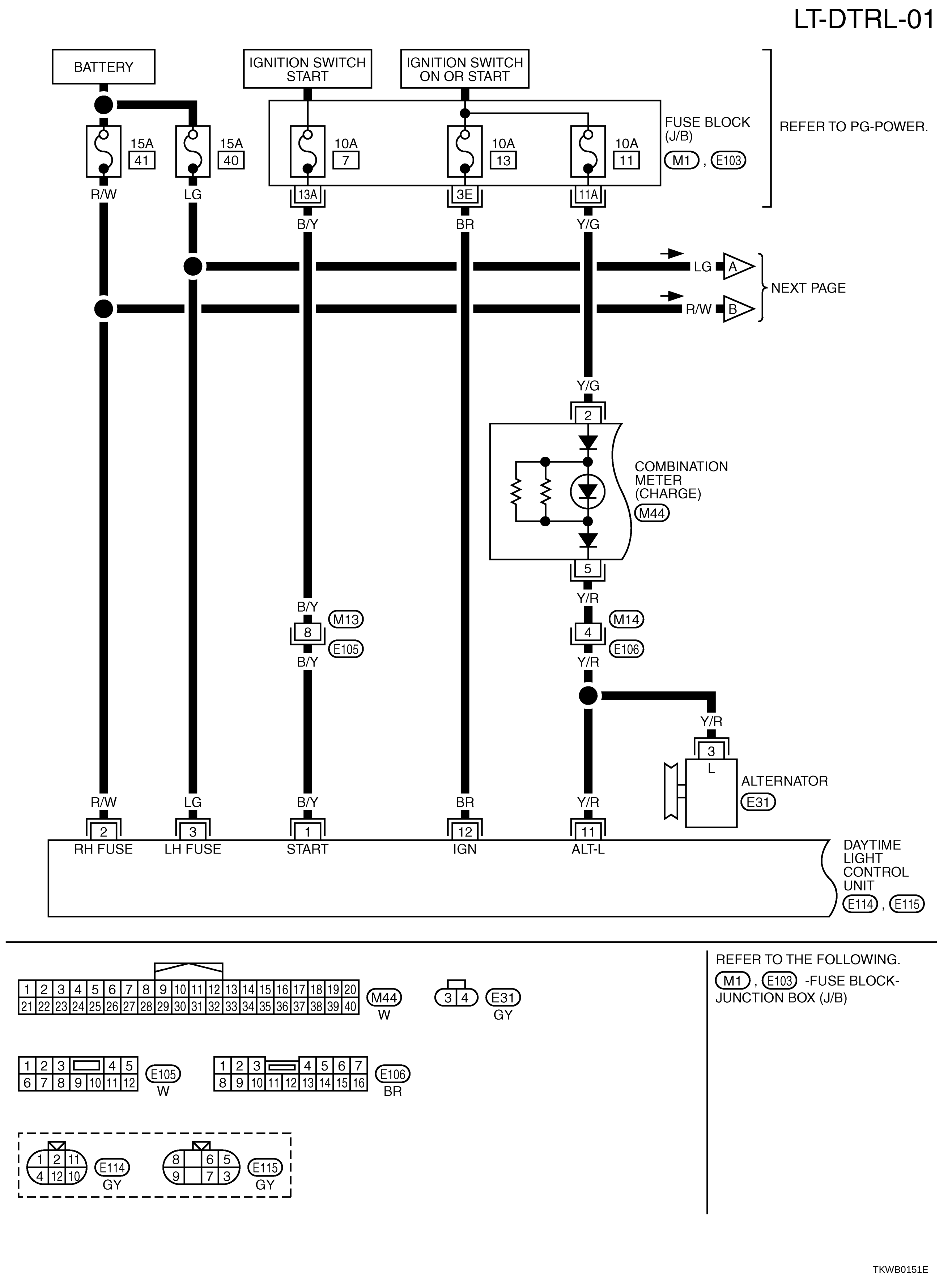
AKS00BPK

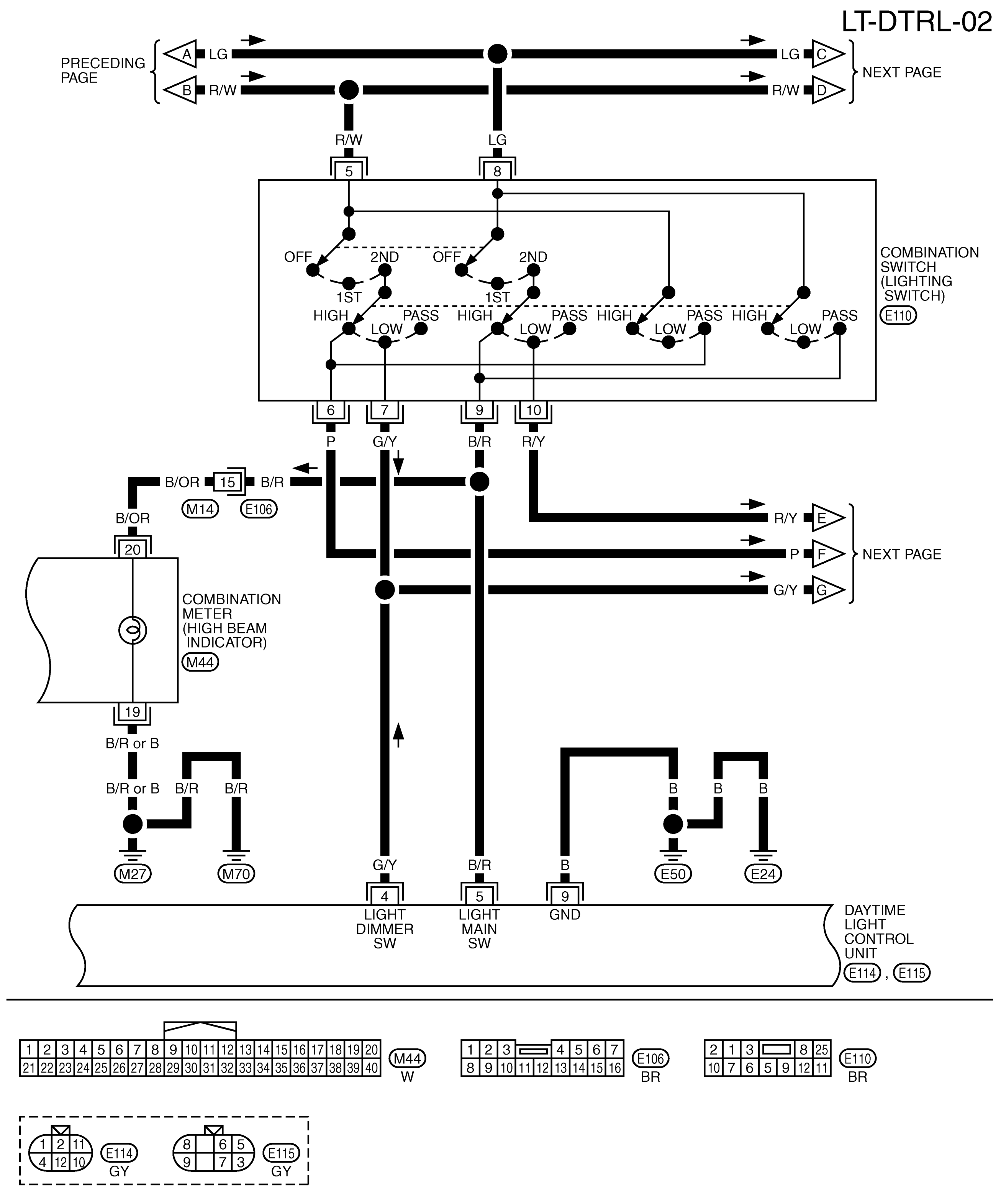


TKWB0150E

Wiring Diagram — H/LAMP —

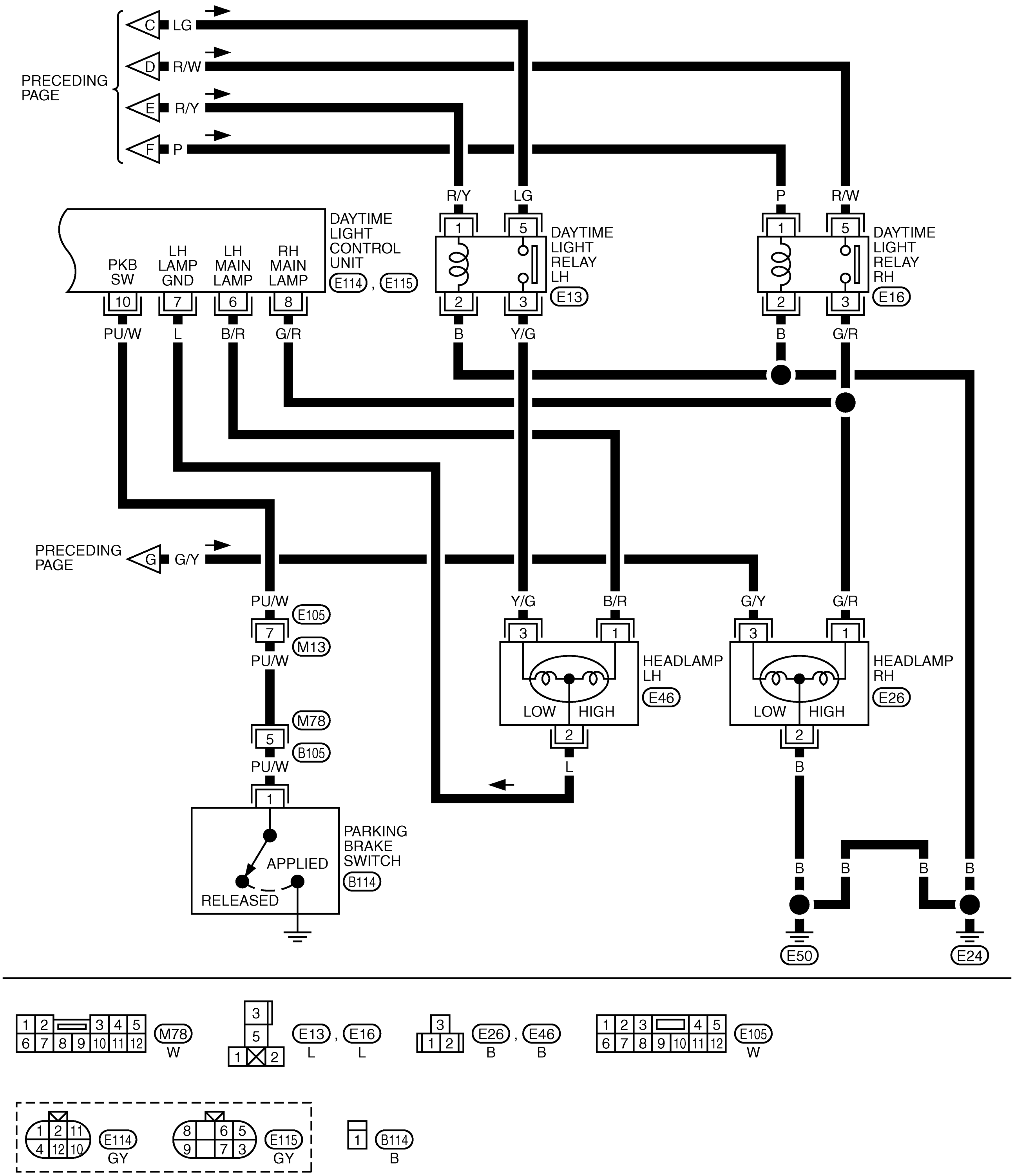
AKS00BPL




LT-DTRL-02
PRECEDING PAGE
A LG
B R/W
LG C
R/W D
NEXT PAGE
R/W
LG
5
8
OFF 2ND OFF 2ND
1ST 1ST
HIGH LOW PASS HIGH LOW PASS HIGH LOW PASS HIGH LOW PASS
COMBINATION SWITCH (LIGHTING SWITCH)
E110
6 7 9 10
P G/Y B/R R/Y
B/OR 15 B/R
M14 E106
B/OR
20
COMBINATION METER (HIGH BEAM INDICATOR)
M44
19
B/R or B
R/Y E
P F
G/Y G
NEXT PAGE
B/R or B B/R B/R
B B B
M27 M70 E50 E24
G/Y B/R B
4 5 9
LIGHT DIMMER SW
LIGHT MAIN SW
GND
DAYTIME LIGHT CONTROL UNIT
E114 , E115
M44 W
E106 BR
E110 BR
E114 GY
E115 GY

TKWB0152E

LT-DTRL-03


PRECEDING PAGE
C LG
D R/W
E R/Y
F P
R/Y
LG
P
R/W
DAYTIME LIGHT CONTROL UNIT
E114 , E115
PKB SW
LH LAMP GND
LH MAIN LAMP
RH MAIN LAMP
10 7 6 8
PU/W L B/R G/R
DAYTIME LIGHT RELAY LH
E13
DAYTIME LIGHT RELAY RH
E16
B Y/G B G/R
PRECEDING PAGE
G G/Y
PU/W
E105
M13
M78
B105
PARKING BRAKE SWITCH
B114
APPLIED
RELEASED
Y/G B/R G/Y G/R
HEADLAMP LH
E46
HEADLAMP RH
E26
LOW HIGH
L
B
E50
E24
M78 W
E13 , E16 L L
E26 , E46 B B
E105 W
E114 GY
E115 GY
B114 B
TKWB0153E

Terminals and Reference Value for Daytime Light Control Unit

AKS00BPY

Terminal No.	Wire color	Signal name	Operation or condition		Reference value
1	B/Y	Engine start signal	Ignition switch	START	Battery voltage
				ON, ACC or OFF	Approx. 0V
2	R/W	Power source for headlamp RH	—		Battery voltage
3	LG	Power source for headlamp LH	—		Battery voltage
4	G/Y	Headlamp LOW beam signal	Lighting switch	LOW	Approx. 12V
				Except LOW	Approx. 0V
5	B/R	Headlamp HIGH beam or PASS signal	Lighting switch	HIGH or PASS	Approx. 12V
				Except above	Approx. 0V
6	B/R	Headlamp LH HIGH	Drive theater mode		Approx. 0V
			Lighting switch HIGH, PASS or daytime light operating*		Approx. 12V
7	L	Headlamp LH ground	Daytime light operating*		Approx. 6V
			Lighting switch LOW and HIGH position		Approx. 0V
8	G/R	Headlamp RH HIGH	Daytime light operating*		Approx. 6V
			Lighting switch LOW position		Approx. 0V
			Lighting switch HIGH position		Approx. 12V
9	B	Ground for daytime light control unit	—		Approx. 0V
10	PU/W	Parking brake switch signal	Brake switch (Ignition switch is ON)	ON	Approx. 0V
				Released	Approx. 12V
11	Y/R	Alternator "L" terminal	Engine	Running	Approx. 12V
				Stopped	Approx. 0V
12	BR	Power source for daytime light control unit	Ignition switch	ON or START	Battery voltage
				Except above	Approx. 0V

* Daytime light operating: Lighting switch in OFF position with engine running and parking brake is released.

Trouble Diagnoses

AKS00BQ5

Inoperative System (or lamp)							Possible cause	Repair order
Theater mode	Daytime light	LOW beam		HIGH beam		High beam indicator		
		RH	LH	RH	LH			
	×						● 10A fuse ● Harness and connector ● parking brake switch ● Daytime light control unit	● Check 10A fuse [No.11, located in fuse block (J/B)]. ● Check harness between 15A fuse (No.41, located in fuse and fusible link box) and daytime light control unit terminal 2. ● Check harness between 15A fuse (No.40, located in fuse and fusible link box) and daytime light control unit terminal 3. ● Check harness between daytime light control unit terminal 8 and headlamp RH terminal 1. ● Check harness between daytime light control unit terminal 11 and alternator terminal 3. ● Check harness between 10A fuse [No.13, located in fuse block (J/B)] and daytime light control unit terminal 12. ● Check parking brake switch. ● Check daytime light control unit. Refer to LT-11, "Terminals and Reference Value for Daytime Light Control Unit" .
	×				×		● Bulb ● Harness and connector ● Daytime light control unit	● Check headlamp bulb LH (HIGH). ● Check continuity between daytime light control unit terminal 6 and headlamp LH terminal 1. ● Check daytime light control unit. Refer to LT-11, "Terminals and Reference Value for Daytime Light Control Unit"
	×			×			● Bulb	● Check headlamp bulb RH (HIGH).
	×		×		×		● Grounds E24 and E50 ● Harness and connector ● Daytime light control unit	● Check grounds E24 and E50. ● Check continuity between daytime light control unit terminal 7 and headlamp LH terminal 2. ● Check continuity between daytime light control unit terminal 9 and ground. ● Check daytime light control unit. Refer to LT-11, "Terminals and Reference Value for Daytime Light Control Unit" .
	×		×		×	×	● 15A fuse ● Harness and connector	● Check 15A fuse (No.40, located in fuse and fusible link box). ● Check harness between 15A fuse (No.40, located in fuse and fusible link box) and daytime light control unit terminal 3.
	×	×		×			● 15A fuse ● Harness and connector	● Check 15A fuse (No.41, located in fuse and fusible link box). ● Check harness between 15A fuse (No.41, located in fuse and fusible link box) and daytime light control unit terminal 2.
	×*	×	●**	×			● Harness and connector	● Check continuity between headlamp RH terminal 2 and ground.

Inoperative System (or lamp)							Possible cause	Repair order
Theater mode	Daytime light	LOW beam		HIGH beam		High beam indicator		
		RH	LH	RH	LH			
×							● Parking brake switch ● Harness and connector ● Daytime light control unit	● Check parking brake switch. ● Check continuity between daytime light control unit terminal 10 and parking brake switch terminal 1. ● Check daytime light control unit. Refer to LT-11, "Terminals and Reference Value for Daytime Light Control Unit" .
			×				● Bulb ● Combination switch ● Harness and connector ● Daytime light relay LH ● Daytime light control unit	● Check headlamp bulb LH (LOW). ● Check combination switch. Refer to LT-42, "Switch Circuit Inspection" . ● Check continuity between combination switch terminal 10 and daytime light relay LH terminal 1. ● Check continuity between daytime light relay LH terminal 2 and ground. ● Check continuity between combination switch terminal 7 and daytime light control unit terminal 4. ● Check daytime light relay LH. Refer to LT-14, "Check Daytime Light Relay" . ● Check daytime light control unit. Refer to LT-11, "Terminals and Reference Value for Daytime Light Control Unit" .
		×					● Bulb	● Check headlamp bulb RH (LOW).
					×		● Harness and connector ● Daytime light control unit	● Check continuity between combination switch terminal 9 and daytime light control unit terminal 5. ● Check daytime light control unit. Refer to LT-11, "Terminals and Reference Value for Daytime Light Control Unit" .
				×			● Combination switch ● Harness and connector ● Daytime light relay RH	● Check voltage between combination switch terminal 6 and ground. ● Check combination switch. Refer to LT-42, "Switch Circuit Inspection" . ● Check continuity between combination switch terminal 6 and daytime light relay RH terminal 1. ● Check continuity between daytime light relay RH terminal 2 and ground. ● Check daytime light relay RH. Refer to LT-14, "Check Daytime Light Relay" .
			●**				● Combination switch ● Harness and connector	● Check voltage between combination switch terminal 7 and ground. ● Check combination switch. Refer to LT-42, "Switch Circuit Inspection" . ● Check continuity between combination switch terminal 7 and headlamp RH terminal 3.
			●**	×			● Combination switch ● Harness and connector	● Check voltage between combination switch terminal 5 and ground. ● Check combination switch. Refer to LT-42, "Switch Circuit Inspection" . ● Check continuity between 15A fuse (No.41, located in fuse and fusible link box) and combination switch terminal 5.

Inoperative System (or lamp)							Possible cause	Repair order
Theater mode	Daytime light	LOW beam		HIGH beam		High beam indicator		
		RH	LH	RH	LH			
					×	×	● Combination switch ● Harness and connector	● Check voltage between combination switch terminal 9 and ground. ● Check combination switch. Refer to LT-42, "Switch Circuit Inspection" . ● Check continuity between combination switch terminal 9 and combination meter terminal 20.
			×		×	×	● Combination switch ● Harness and connector	● Check voltage between combination switch terminal 8 and ground. ● Check combination switch. Refer to LT-42, "Switch Circuit Inspection" . ● Check continuity between 15A fuse (No.40, located in fuse and fusible link box) and combination switch terminal 8.

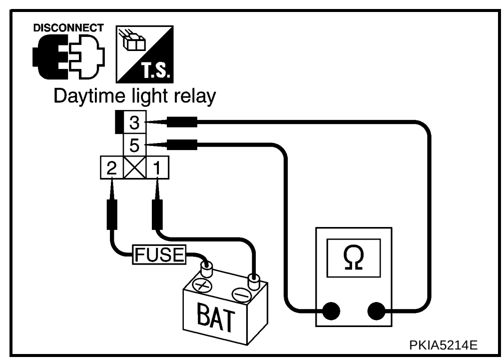
*: Chattering noise can be heard from daytime light control unit when daytime light system is ON.
**: ● shows a condition that a lamp is lighted quite dimly.

Check Daytime Light Relay

AKS00C3G

1. Apply battery voltage to between terminal 1 and 2.
2. Check continuity between terminal 3 and 5.

3 – 5 :Continuity should exist.



Aiming Adjustment of Headlamp

AKS00BPN

PREPARATION BEFORE ADJUSTING

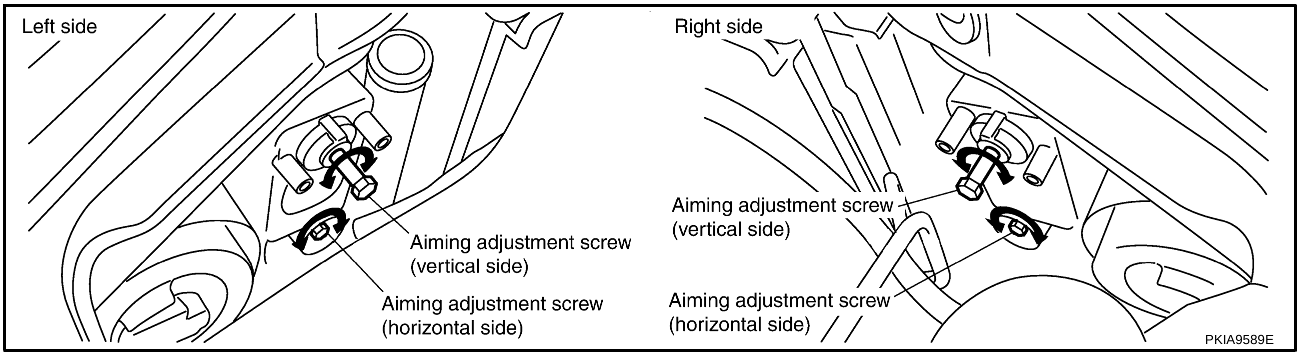
For details, refer to the regulations in your country.
Before performing aiming adjustment, check the following.

- Keep all tires inflated to correct pressures.
- Place vehicle and tester on one and same flat surface.
- See that there is no-load in vehicle (coolant, engine oil filled up to correct level and full fuel tank) other than the driver (or equivalent weight placed in driver's position).

LOW BEAM AND HIGH BEAM

1. Turn headlamp low beam on.
2. Use aiming adjustment screws to perform aiming adjustment.

   NOTE:
   Vertical side must be adjusted finally, if horizontal side has been adjusted.



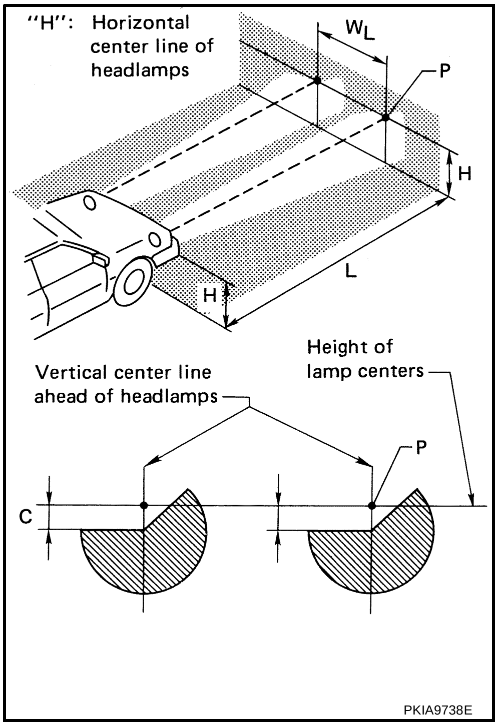
- First tighten aiming adjustment screw all the way and then make adjustment by loosening the screw.

If the vehicle front body has been repaired and/or the headlamp assembly has been replaced, check aiming. Use the aiming chart shown in the figure.

- Adjust headlamps so that main axis of light is parallel to center line of body and is aligned with point P shown in the figure.
- Figure shows headlamp aiming pattern for driving on right side of road; for driving on left side of road, aiming pattern is reversed.
- Dotted lines to point P in the figure show center of headlamp.

"H"	**: Horizontal center line of headlamps**
"WL "	**: Distance between each headlamp center**
"L"	**: 10,000 mm (393.70 in)**
"C"	**: 135 mm (5.31 in)**

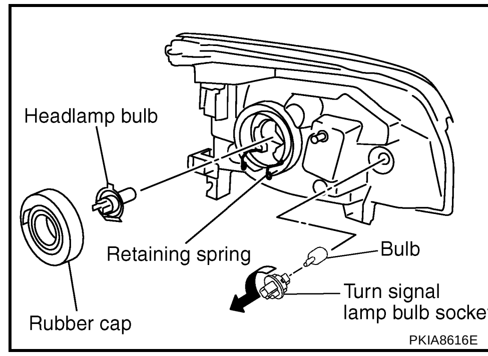
- Basic illuminating area for adjustment should be within the range shown in the figure. Adjust headlamps accordingly.



Bulb Replacement

AKS00BPP

HEADLAMP



1. Disconnect headlamp connector.
2. Remove rubber cap.
3. Unlock retaining spring, then remove bulb.
4. Installation is the reverse of removal.

Headlamp (High/Low) : 12V - 60/55W (H4)

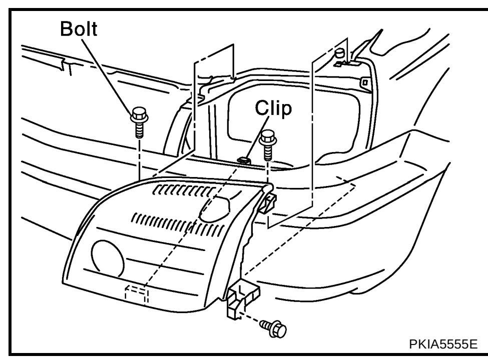
CAUTION:

- **Do not touch glass of bulb directly by hand. Keep grease and other oily matters away from it.**
- **Do not touch bulb by hand while it is lit or right after being turned off. Burning may result.**
- **When replacing bulb, prepare new bulb first of all. Do not leave bulb out of headlamp housing for a long period, because dust, moisture, or smoke will cause performance lowering (fouling, cloud, etc.) of headlamp reflector and lens.**
- **When bulb is installed, be sure to lock rubber cap to ensure watertightness.**

Removal and Installation of Headlamp

AKS00BPR

REMOVAL



1. Remove parking lamp. Refer to LT-32, "Removal and Installation of Parking Lamp" .
2. Disconnect headlamp connector and turn signal lamp connector.
3. Remove fender protector. Refer to EI-20, "FENDER PROTECTOR" in “EXTERIOR & INTERIOR (EI)” section.
4. Disconnect front side marker lamp connector and front fog lamp connector (with front fog lamp).
5. Remove front grille. Refer to EI-18, "FRONT GRILLE" in “EXTERIOR & INTERIOR (EI)” section.
6. Remove front bumper. Refer to EI-14, "FRONT BUMPER" in “EXTERIOR & INTERIOR (EI)” section.
7. Remove headlamp mounting bolts (3).
8. Pull headlamp toward the front of the vehicle.

INSTALLATION

Installation is the reverse of removal. Note the tightening torque shown below.

Headlamp mounting bolt : 5.5 N·m (0.56 kg-m, 49 in-lb)

TURN SIGNAL AND HAZARD WARNING LAMPS

PFP:26120

System Description

AKS00B83

TURN SIGNAL OPERATION

With the hazard switch in OFF position and ignition switch is in ON or START position,
power is supplied

- through 10A fuse [No. 2, located in fuse block (J/B)]
- to hazard switch terminal 2
- through hazard switch terminal 1
- to combination flasher unit terminal 1
- through combination flasher unit terminal 3
- to combination switch (turn signal) terminal 1.

Ground is supplied

- to combination flasher unit terminal 2
- through grounds M27 and M70.

LH Turn

When the combination switch (turn signal switch) is moved to LH position,
power is supplied

- through combination switch (turn signal switch) terminal 3
- to front turn signal lamp LH terminal 1
- to side turn signal lamp LH terminal 1
- to combination meter (turn signal) terminal 52 and
- to rear combination lamp LH terminal 2.

Ground is supplied

- to front turn signal lamp LH terminal 2
- through grounds E24 and E50
- to side turn signal lamp LH terminal 2
- through grounds E24 and E50
- to rear combination lamp LH terminal 4
- through grounds B8 and B18
- to combination meter (turn signal) terminal 64
- through grounds M27 and M70.

With power and ground supplied, combination flasher unit controls flashing of LH turn signal lamps.

RH Turn

When combination switch (turn signal switch) is moved to RH position,
power is supplied

- through combination switch (turn signal switch) terminal 2
- to front turn signal lamp RH terminal 1
- to side turn signal lamp RH terminal 1
- to combination meter (turn signal) terminal 18 and
- to rear combination lamp RH terminal 2.

Ground is supplied

- to front turn signal lamp RH terminal 2
- through grounds E24 and E50
- to side turn signal lamp RH terminal 2
- through grounds E24 and E50
- to rear combination lamp RH terminal 4
- through grounds B8 and B18
- to combination meter (turn signal) terminal 64

- through grounds M27 and M70.

With power and ground supplied, combination flasher unit controls flashing of RH turn signal lamps.

HAZARD LAMP OPERATION

Power is supplied at all times

- through 10A fuse (No. 35, located in fuse and fusible link box)
- to hazard switch terminal 3.

With the hazard switch in ON position,
power is supplied

- through hazard switch terminal 1
- to combination flasher unit terminal 1
- through combination flasher unit terminal 3
- to hazard switch terminal 4.

Ground is supplied

- to combination flasher unit terminal 2
- through grounds M27 and M70.

Power is supplied (LH side)

- through hazard switch terminal 5
- to front turn signal lamp LH terminal 1
- to side turn signal lamp LH terminal 1
- to combination meter (turn signal) terminal 52 and
- to rear combination lamp LH terminal 2.

Power is supplied (RH side)

- through hazard switch terminal 6
- to front turn signal lamp RH terminal 1
- to side turn signal lamp RH terminal 1
- to combination meter terminal 18 and
- to rear combination lamp RH terminal 2.

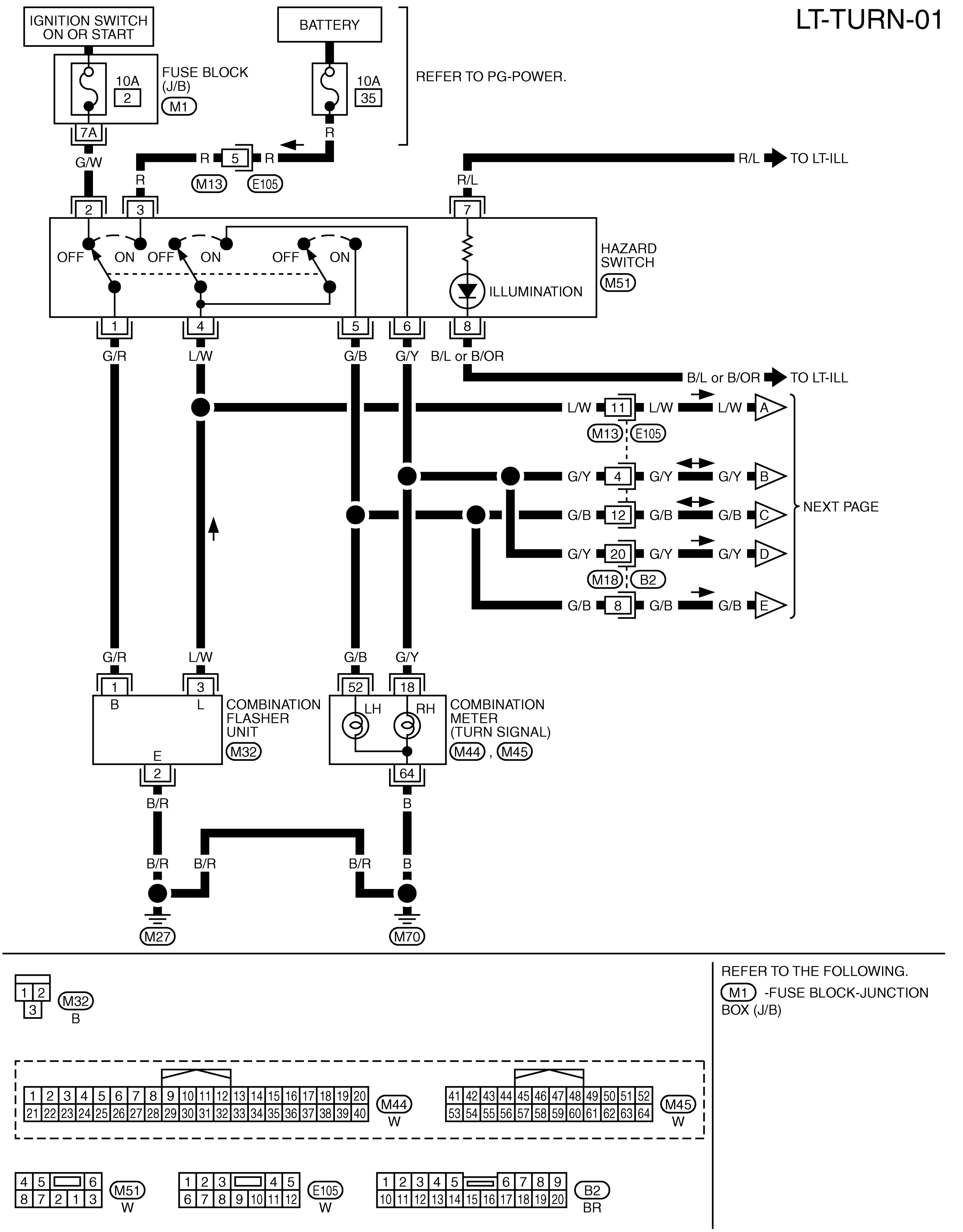
Ground is supplied

- to front turn signal lamp LH and RH terminals 2 and
- to side turn signal lamp LH and RH terminals 2
- through grounds E24 and E50
- to rear combination lamp LH and RH terminals 4
- through grounds B8 and B18
- to combination meter (turn signal) terminal 64
- through grounds M27 and M70.

With power and ground supplied, combination flasher unit controls flashing of hazard warning lamps.

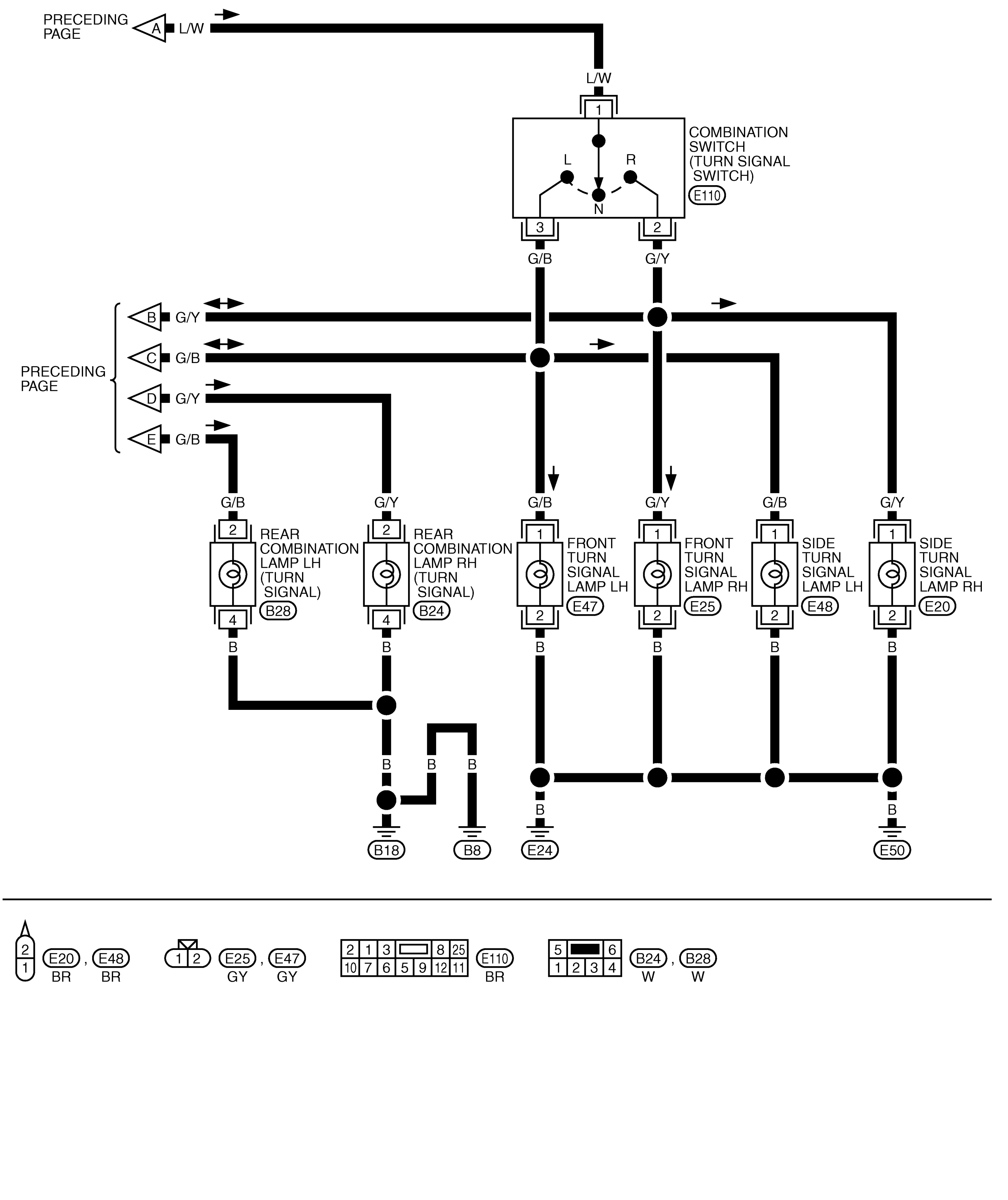
Wiring Diagram — TURN —

AKS00B84



TKWB0261E

LT-TURN-02


PRECEDING PAGE
A
L/W
L/W
1
COMBINATION SWITCH (TURN SIGNAL SWITCH)
E110
L
R
N
3
2
G/B
G/Y
B
C
D
E
PRECEDING PAGE
G/Y
G/B
G/Y
G/B
REAR COMBINATION LAMP LH (TURN SIGNAL)
B28
REAR COMBINATION LAMP RH (TURN SIGNAL)
B24
FRONT TURN SIGNAL LAMP LH
E47
FRONT TURN SIGNAL LAMP RH
E25
SIDE TURN SIGNAL LAMP LH
E48
SIDE TURN SIGNAL LAMP RH
E20
B
B18
B8
E24
E50
E20, E48 BR BR
E25, E47 GY GY
E110 BR
B24, B28 W W
TKWA0073E

Trouble Diagnoses

AKS00B85

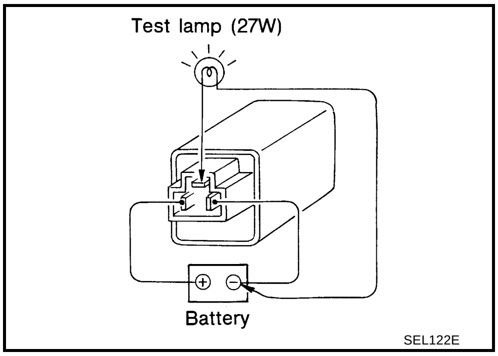
Symptom	Possible cause	Repair order
Turn signal and hazard warning lamps do not operate.	1. Hazard switch 2. Combination flasher unit 3. Open in combination flasher unit circuit	1. Check hazard switch. Refer to LT-22, "HAZARD SWITCH CHECK" . 2. Refer to LT-21, "COMBINATION FLASHER UNIT CHECK" . 3. Check wiring to combination flasher unit for open circuit.
Turn signal lamps do not operate but hazard warning lamps operate.	1. 10A fuse 2. Hazard switch 3. Turn signal switch 4. Open in turn signal switch circuit	1. Check 10A fuse [No. 2, located in fuse block (J/B)]. Turn ignition switch ON and verify battery positive voltage is present at terminal 2 of hazard switch. 2. Check hazard switch. Refer to LT-22, "HAZARD SWITCH CHECK" . 3. Check turn signal switch. Refer to LT-42, "Switch Circuit Inspection" . 4. Check wire between combination flasher unit terminal 3 and turn signal switch terminal 1 for open circuit.
Hazard warning lamps do not operate but turn signal lamps operate.	1. 10A fuse 2. Hazard switch 3. Open in hazard switch circuit	1. Check 10A fuse (No. 35, located in fuse and fusible link box). Verify battery positive voltage is present at terminal 3 of hazard switch. 2. Check hazard switch. Refer to LT-22, "HAZARD SWITCH CHECK" . 3. Check wire between combination flasher unit terminal 3 and hazard switch terminal 4 for open circuit.
Front turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds E24 and E50	1. Check bulb. 2. Check grounds E24 and E50.
Rear turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds B8 and B18	1. Check bulb. 2. Check grounds B8 and B18.
Side turn signal lamp LH or RH does not operate.	1. Bulb 2. Grounds E24 and E50	1. Check bulb. 2. Check grounds E24 and E50.
LH and RH turn indicators do not operate.	1. Ground	1. Check grounds M27 and M70.
LH or RH turn indicator does not operate.	1. Bulb	1. Check bulb in combination meter.

Electrical Components Inspection

AKS00B86

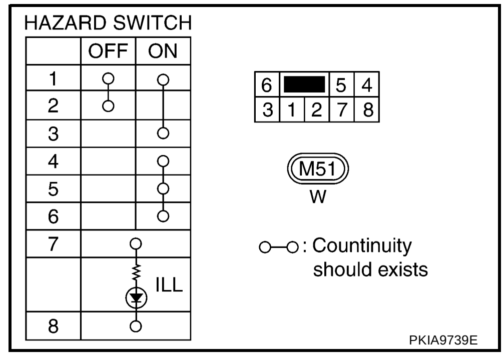
COMBINATION FLASHER UNIT CHECK

- Before checking, ensure that bulbs meet specifications.
- Connect a battery and test lamp to combination flasher unit, as shown. Combination flasher unit is properly functioning if it blinks when power is supplied to circuit.



HAZARD SWITCH CHECK

- Check continuity between the terminals of hazard switch when hazard switch is turned ON and/or OFF.



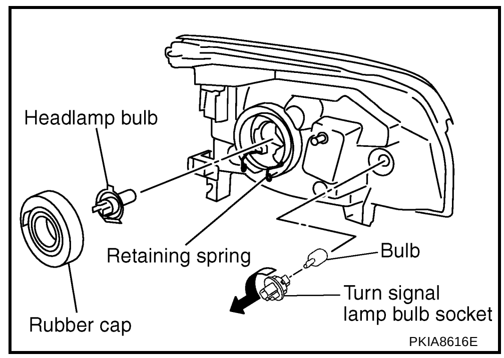
Bulb Replacement

AKS00B87

FRONT TURN SIGNAL LAMP

1. Turn bulb socket counterclockwise and unlock it.
2. Remove bulb from its socket.
3. Installation is the reverse of removal.

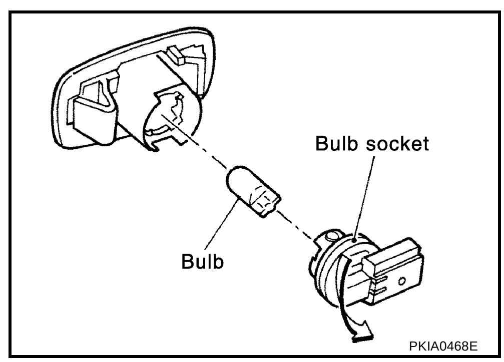
Front turn signal lamp : 12V - 21W (amber)



SIDE TURN SIGNAL LAMP

1. Remove side turn signal lamp. Refer to LT-22, "Removal and Installation of Side Turn Signal Lamp" .
2. Turn bulb socket counterclockwise and unlock it.
3. Remove bulb from its socket.
4. Installation is the reverse of removal.

Side turn signal lamp : 12V - 5W (amber)



REAR TURN SIGNAL LAMP

Refer to LT-41, "Bulb Replacement" .

Removal and Installation of Front Turn Signal Lamp

AKS00B88

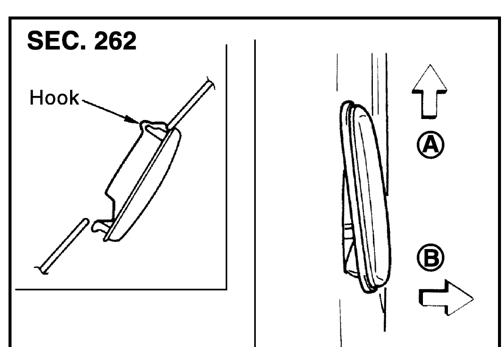
Refer to LT-16, "Removal and Installation of Headlamp" .

Removal and Installation of Side Turn Signal Lamp

AKS00B89

REMOVAL

1. Push side turn signal lamp toward A direction in the figure, and pull up B direction in the figure.
2. Disconnect side turn signal lamp connector.



INSTALLATION

Installation is the reverse of removal.

Removal and Installation of Rear Turn Signal Lamp

AKS00B8A

Refer to LT-41, "Removal and Installation" .

LIGHTING AND TURN SIGNAL SWITCH

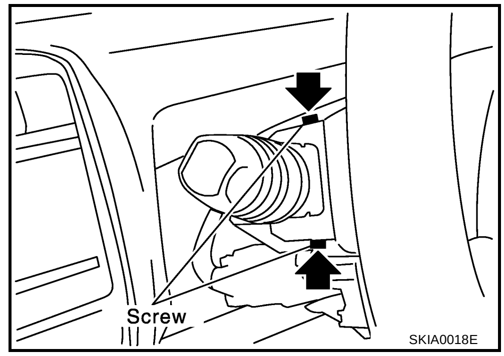
PFP:25540

Removal and Installation

AKS00B8B

REMOVAL

1. Remove steering column cover. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" in “INSTRUMENT PANEL (EI)” section.
2. Remove screws (2), then remove lighting and turn signal switch from spiral cable.
3. Disconnect lighting and turn signal switch connector.



SKIA0018E

INSTALLATION

Installation is the reverse of removal.

HAZARD SWITCH

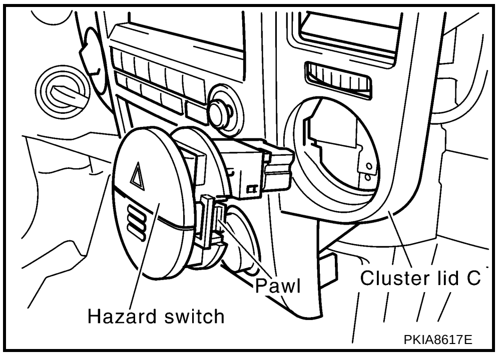
PFP:25290

Removal and Installation

AKS00B8D

REMOVAL

1. Remove cluster lid C. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" in “INSTRUMENT PANEL (IP)” section.
2. Disconnect hazard switch connector.
3. Press hazard switch fixing pawls and remove it from cluster lid C.



PKIA8617E

INSTALLATION

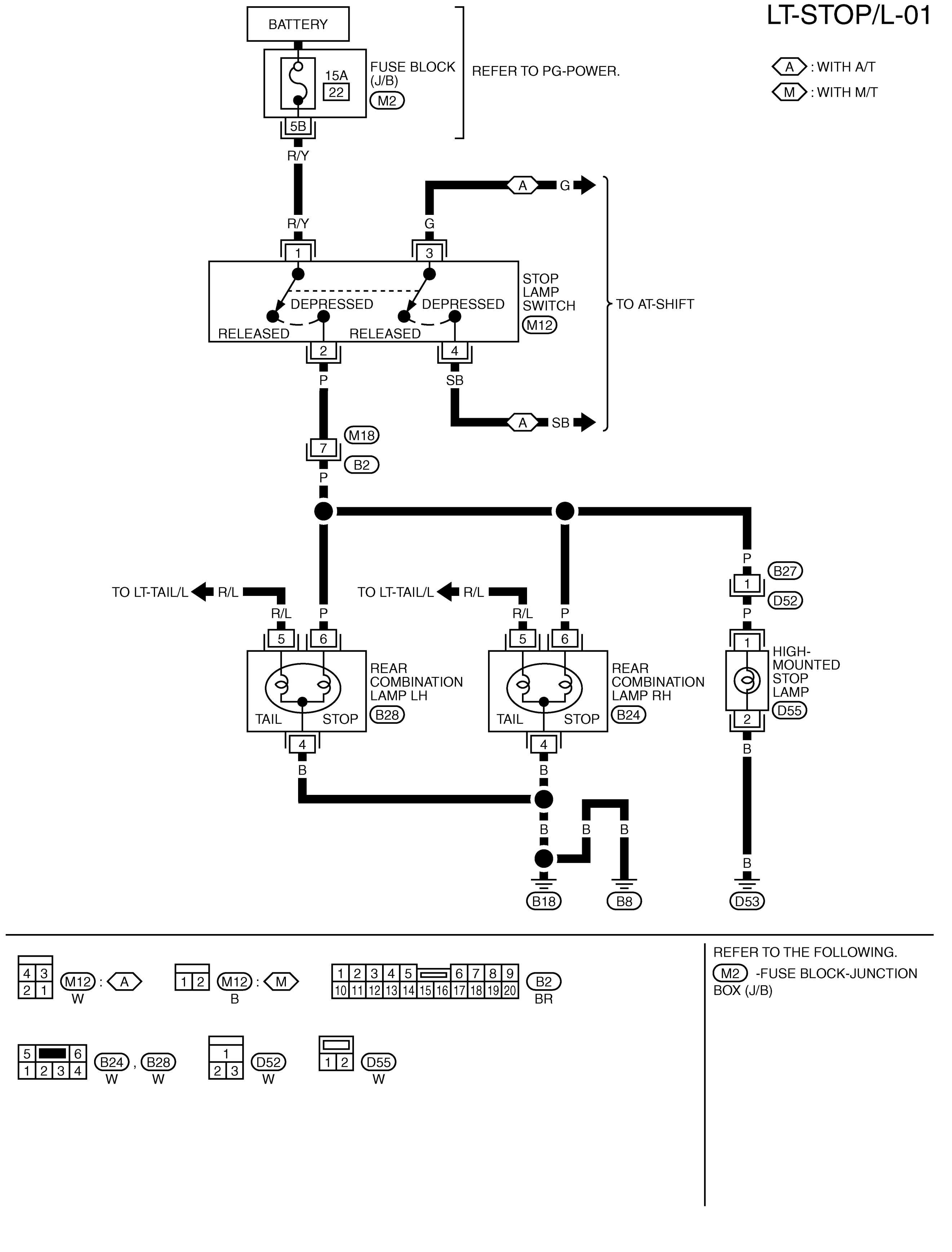
Installation is the reverse of removal.

STOP LAMP

PFP:26550

Wiring Diagram — STOP/L —

AKS00B8E



Bulb Replacement

AKS00B8F

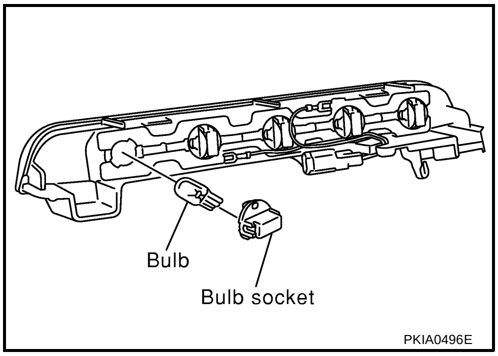
STOP LAMP

Refer to LT-41, "Bulb Replacement" .

HIGH-MOUNTED STOP LAMP

1. Remove high-mounted stop lamp cover. Refer to LT-27, "REMOVAL" .
2. Turn high-mounted stop lamp bulb socket counterclockwise and unlock it.
3. Remove bulb from its socket.
4. Installation is the reverse of removal.

High-mounted Stop Lamp : 12V - 5W



Removal and Installation of Stop Lamp

AKS00B8G

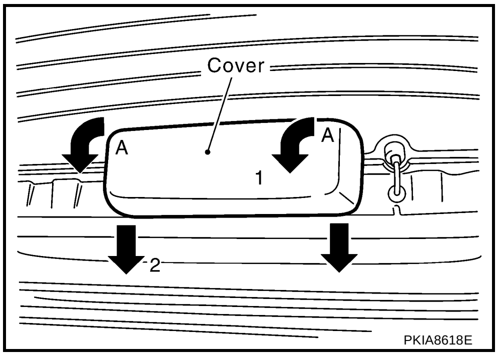
Refer to LT-41, "Removal and Installation" .

Removal and Installation of High-Mounted Stop Lamp

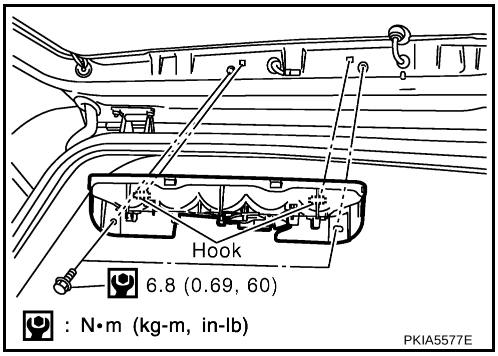
AKS00BQA

REMOVAL

1. Pull the edge of cover (A in the figure) to each side in turn downward until pawls inside cover are released.
2. Pull down cover toward under the vehicle.



3. Remove high-mounted stop lamp mounting bolts (2).
4. Disconnect high-mounted stop lamp connector and remove high-mounted stop lamp from the vehicle.



INSTALLATION

Installation is the reverse of removal. Note the tightening torque shown below.

High-mounted stop lamp mounting bolt : 6.8 N·m (0.69kg-m, 60 in-lb)

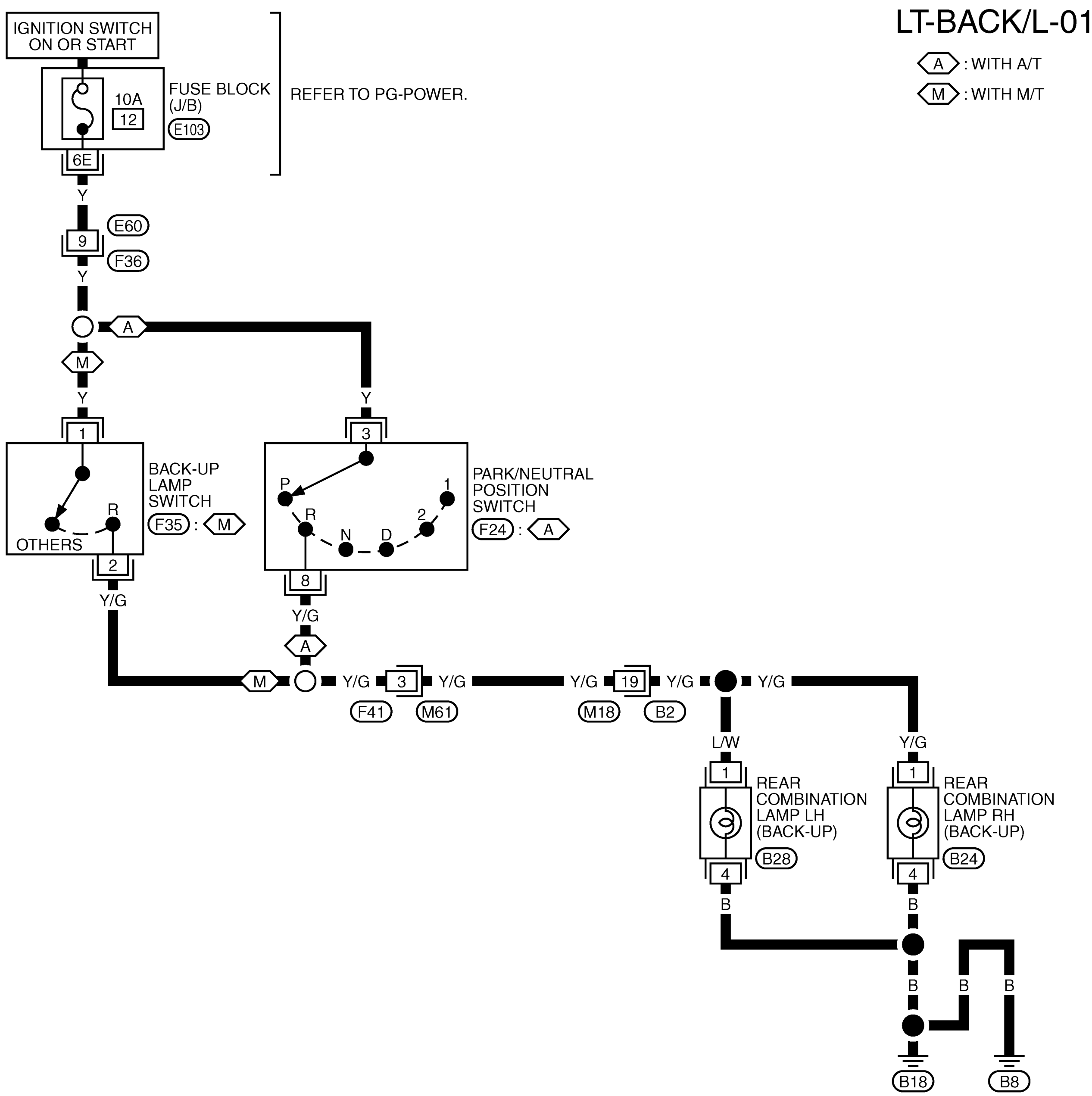
A B C D E F G H I J LT L M

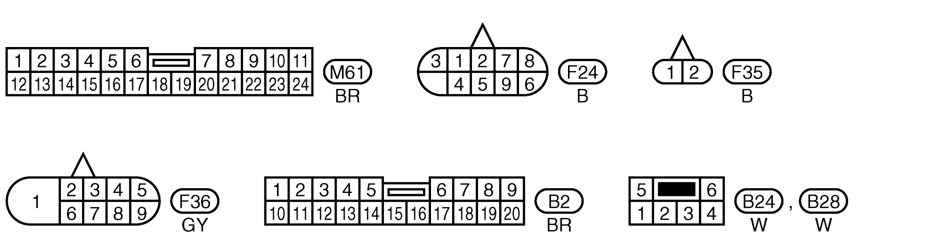
BACK-UP LAMP

PFP:26550

Wiring Diagram — BACK/L —

AKS00B8H





REFER TO THE FOLLOWING.
E103 -FUSE BLOCK-JUNCTION BOX (J/B)

TKWB0154E

Bulb Replacement

AKS00B8I

Refer to LT-41, "Bulb Replacement" .

Removal and Installation

AKS00B8J

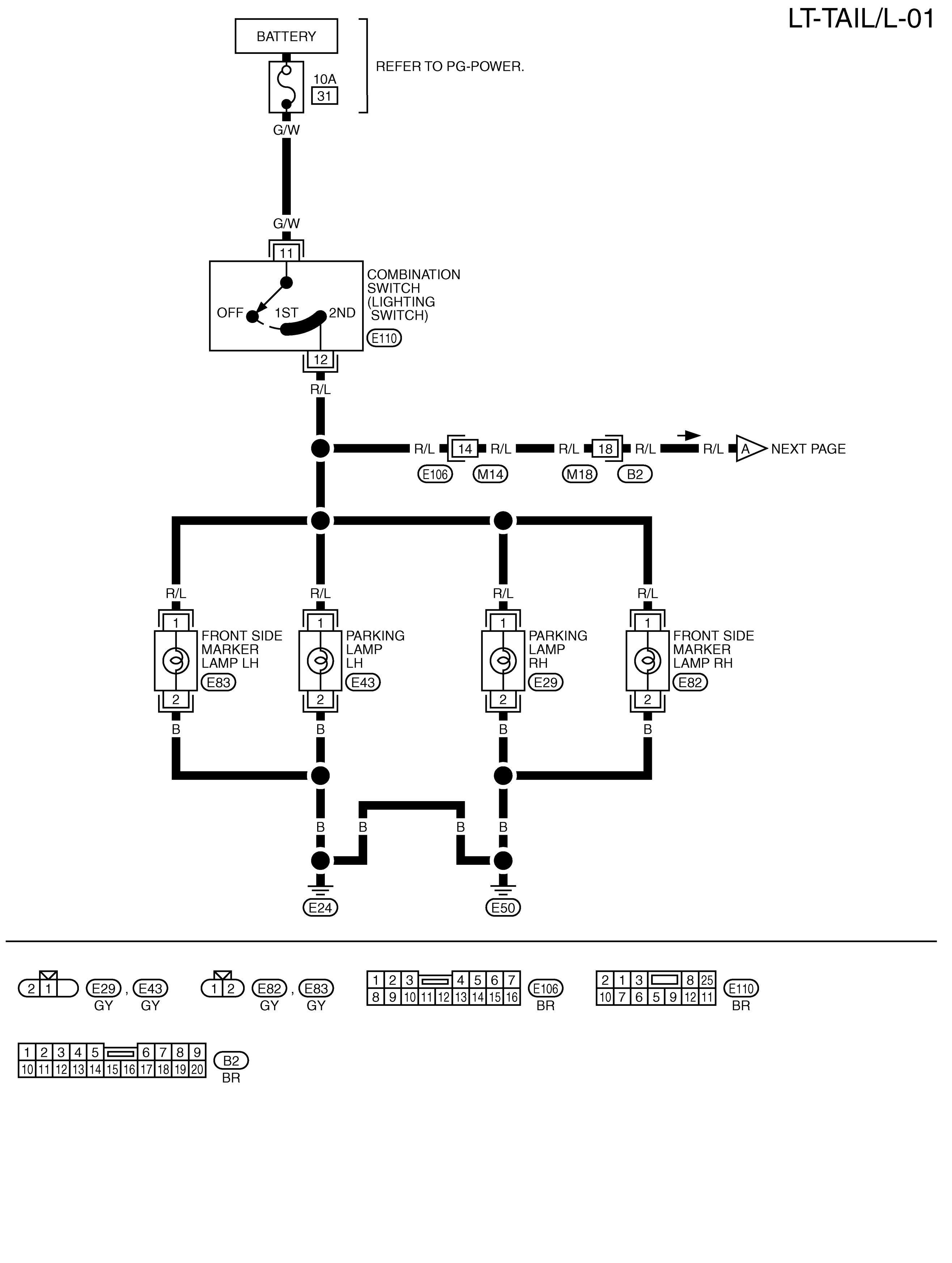
Refer to LT-41, "Removal and Installation" .

PARKING, LICENSE PLATE AND TAIL LAMPS

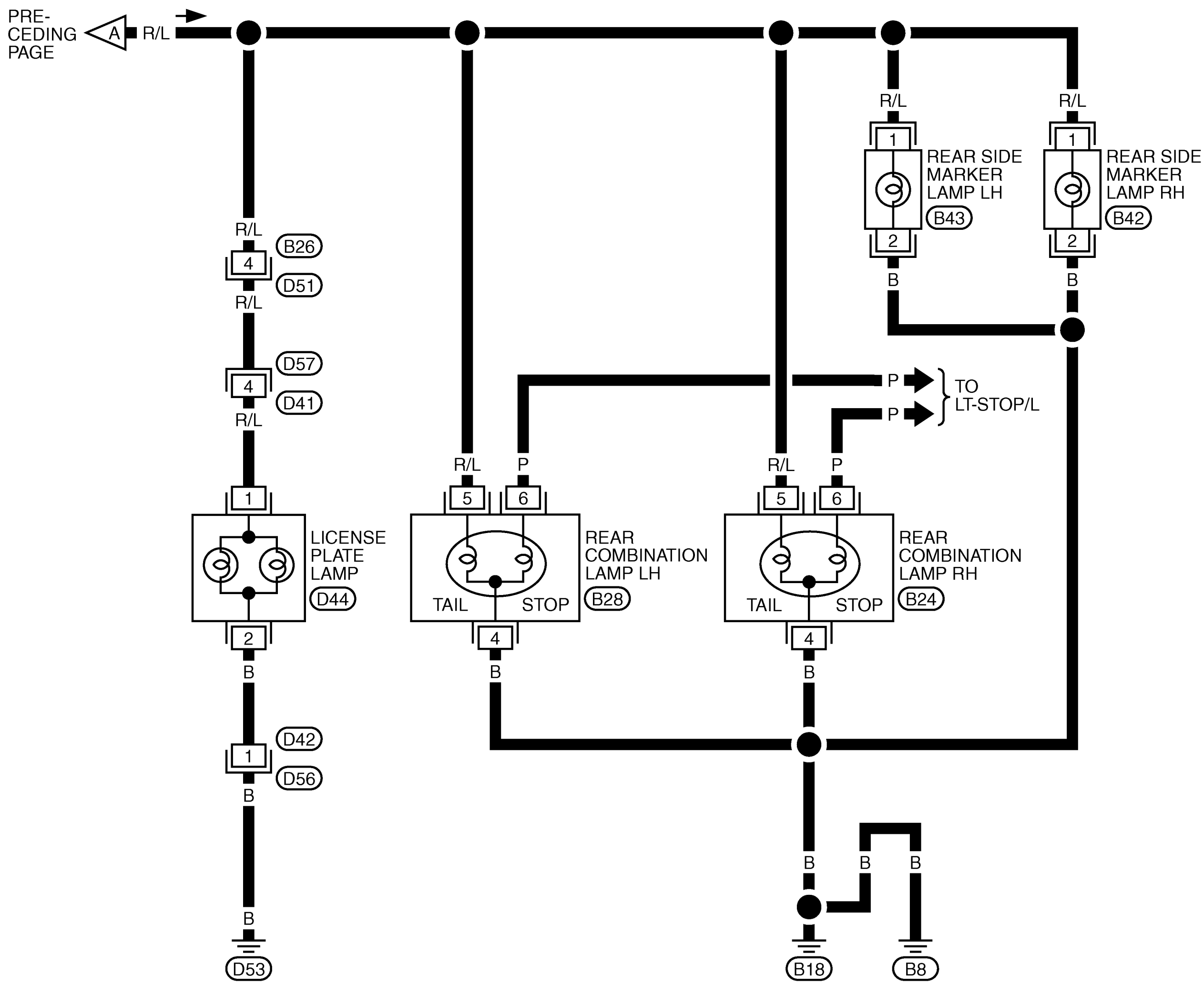
PFP:26550

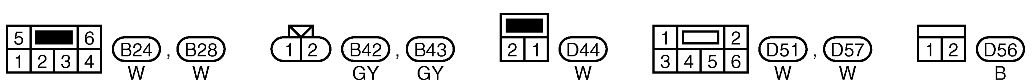
Wiring Diagram — TAIL/L —

AKS00B8K



LT-TAIL/L-02





TKWB0156E

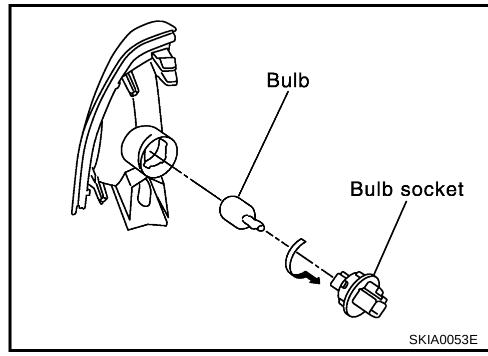
Bulb Replacement

AKS00B8L

PARKING LAMP

1. Remove parking lamp. Refer to LT-32, "Removal and Installation of Parking Lamp" .
2. Turn RH and LH bulb sockets counterclockwise and unlock them.
3. Remove bulb from its socket.
4. Installation is the reverse of removal.

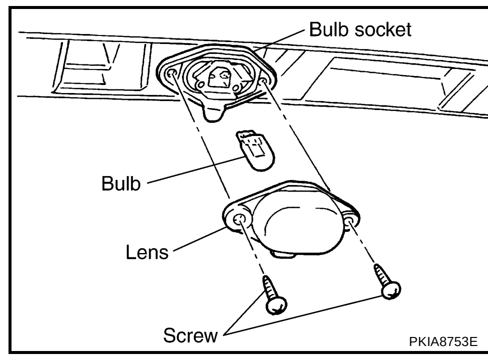
Parking lamp : 12V - 21/5W (21W: Disuse)



LICENSE PLATE LAMP

1. Remove license plate lamp mounting screws (2).
2. Remove lens of license plate lamp.
3. Remove bulb from its socket.
4. Installation is the reverse of removal.

License plate lamp : 12V - 5W



TAIL LAMP

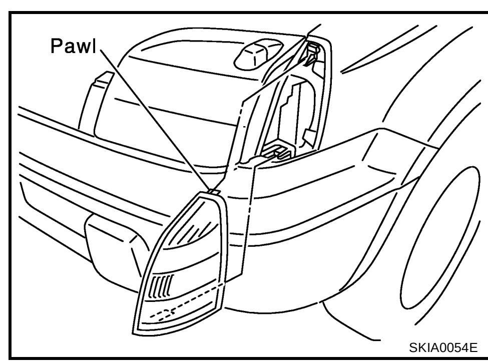
Refer to LT-41, "Bulb Replacement" .

Removal and Installation of Parking Lamp

AKS00C39

REMOVAL

1. Press upper pawl to remove parking lamp toward the front of the vehicle.
2. Disconnect parking lamp connector.



INSTALLATION

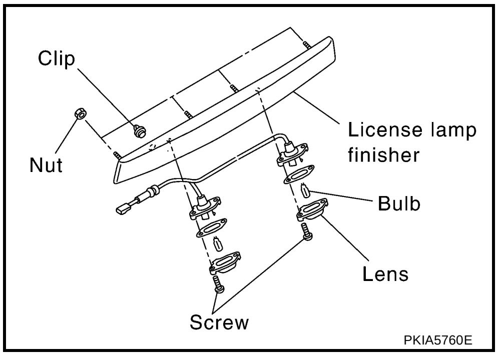
1. Connect parking lamp connector.
2. Insert pawl into headlamp hole, and install parking lamp.

Removal and Installation of License Plate Lamp

AKS00BQB

REMOVAL

1. Remove license lamp finisher. Refer to EI-31, "LICENSE LAMP FINISHER" in "EXTERIOR & INTERIOR (EI)" section.
2. Remove harness from installation pawl for harness.
3. Remove license plate lamp mounting screws (2 each, RH and LH).
4. Pull out license plate lamp from license lamp finisher.



INSTALLATION

Installation is the reverse order of removal. Note the tightening torque shown below.

License plate lamp mounting screw : 1.4 N·m (0.14 kg-m, 12 in-lb)

Removal and Installation of Tail Lamp

AKS00C3B

Refer to LT-41, "Removal and Installation" .

SIDE MARKER LAMP

PFP:26180

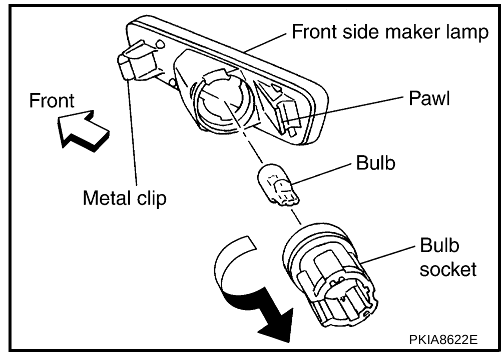
Bulb Replacement

AKS00BQN

FRONT SIDE MARKER LAMP

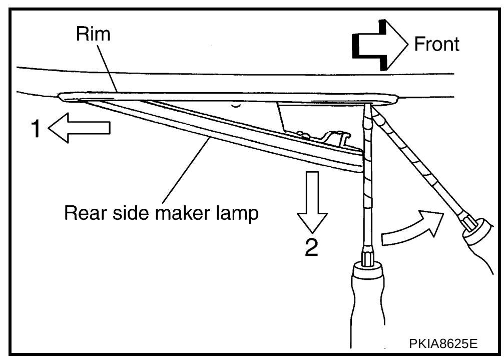
1. Turn lighting switch OFF.
2. Remove fender protector (front). Refer to EI-20, "FENDER PROTECTOR" in “EXTERIOR & INTERIOR (EI) ” section.
3. Turn bulb socket counterclockwise and unlock it.
4. Remove bulb from its socket.
5. Installation is the reverse of removal.

Front side marker lamp : 12V - 5W



REAR SIDE MARKER LAMP

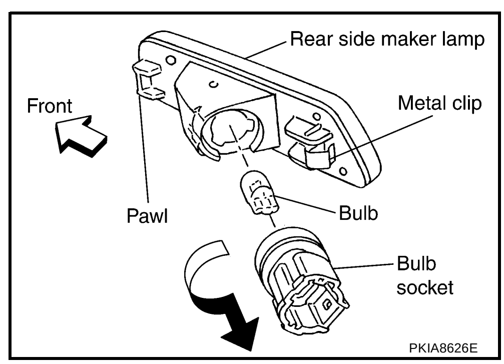
1. Turn lighting switch OFF.
2. Insert a screwdriver in the chink between rear side marker lamp and rim, and remove rear side marker lamp.



3. Turn bulb socket counterclockwise and unlock it.
4. Remove bulb from its socket.
5. Installation is the reverse of removal. Note the following.

NOTE:
To install rear side marker lamp into rim, put pawl side of rear side marker lamp into rim. Push metal clip side of rear side marker lamp.

Rear side marker lamp : 12V - 5W

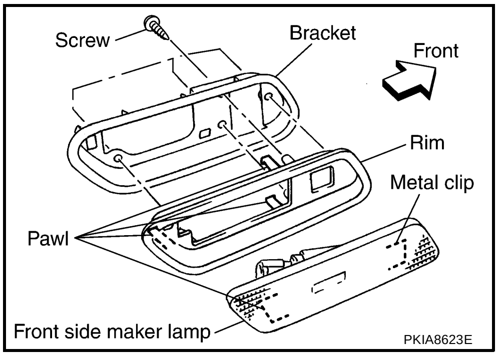


Removal and Installation of Front Side Marker Lamp

AKS00BQO

REMOVAL

1. Turn lighting switch OFF.
2. Remove fender protector (front). Refer to EI-20, "FENDER PROTECTOR" in “EXTERIOR & INTERIOR (EI)” section.
3. Disconnect front side marker lamp connector and front fog lamp connector (with front fog lamp).
4. Remove front grille. Refer to EI-18, "FRONT GRILLE" in “EXTERIOR & INTERIOR (EI)” section.
5. Remove front bumper. Refer to EI-14, "FRONT BUMPER" in “EXTERIOR & INTERIOR (EI)” section.
6. Remove front side marker lamp mounting screws (4).
7. Remove rim from bracket.
8. Remove front side marker lamp from rim.



INSTALLATION

Installation is the reverse of removal. Note the following.

NOTE:

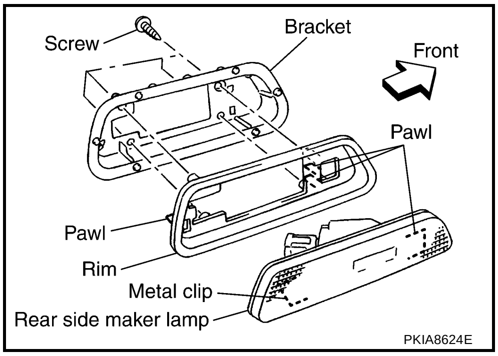
To install front side marker lamp into rim, put pawl side of front side marker lamp into rim. Push metal clip side of front side marker lamp.

Removal and Installation of Rear Side Marker Lamp

AKS00BQP

REMOVAL

1. Turn lighting switch OFF.
2. Remove rear bumper. Refer to EI-16, "REAR BUMPER" in “EXTERIOR & INTERIOR (EI)” section.
3. Disconnect rear side marker lamp connector.
4. Remove rear side marker lamp mounting screws (4).
5. Remove rim from bracket.
6. Remove rear side marker lamp from rim.



INSTALLATION

Installation is the reverse of removal. Note the following.

NOTE:

To install rear side marker lamp into rim, put pawl side of rear side marker lamp into rim. Push metal clip side of rear side marker lamp.

FRONT FOG LAMP

PFP:00011

System Description

AKS00B8O

DESCRIPTION

Power is supplied at all times

- through 10A fuse (No. 31, located in fuse and fusible link box)
- to combination switch (lighting switch) terminal 11
- through 15A fuse (No. 42, located in fuse and fusible link box)
- to front fog lamp relay terminal 3.

With lighting switch in the 1ST or 2ND position,
power is supplied

- through 10A fuse (No. 31, located in fuse and fusible link box)
- to combination switch (lighting switch) terminal 11
- through combination switch (lighting switch) terminal 12
- to combination switch (front fog lamp switch) terminal 32
- through combination switch (front fog lamp switch) terminal 31
- to front fog lamp relay terminal 2.

FOG LAMP OPERATION

The front fog lamp switch is built in combination switch. The lighting switch must be in the 1st or 2nd position for front fog lamp operation.
With front fog lamp switch in the ON position,
ground is supplied

- to front fog lamp relay terminal 1
- through grounds E24 and E50.

Front fog lamp relay is energized and power is supplied

- from front fog lamp relay terminal 5
- to front fog lamp LH and RH terminals 1 and
- to combination meter terminal 15.

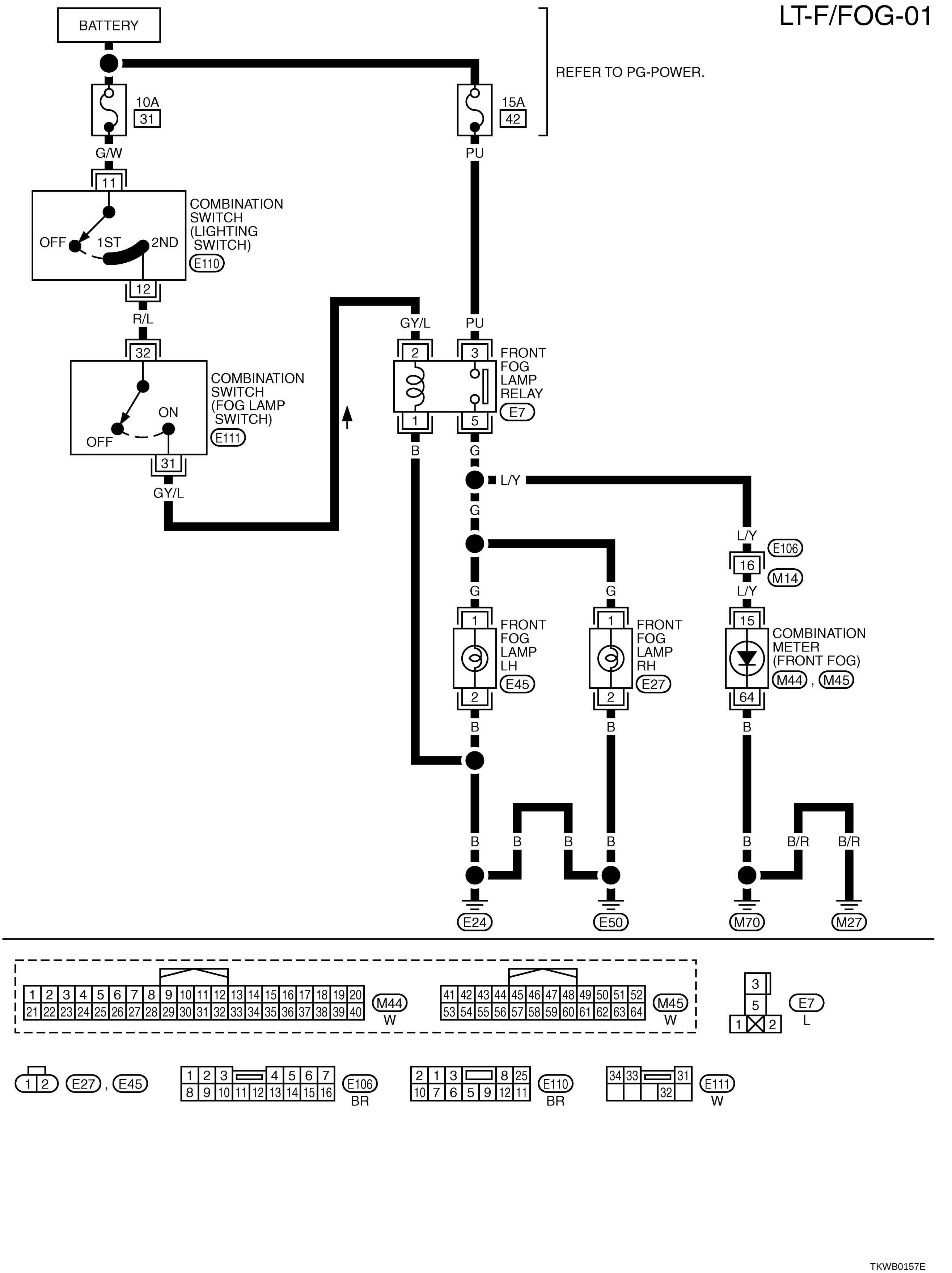
Ground is supplied

- to front fog lamp LH and RH terminals 2
- through grounds E24 and E50
- to combination meter (front fog) terminal 64
- through grounds M27 and M70.

With power and ground supplied, front fog lamps illuminate.

Wiring Diagram — F/FOG —

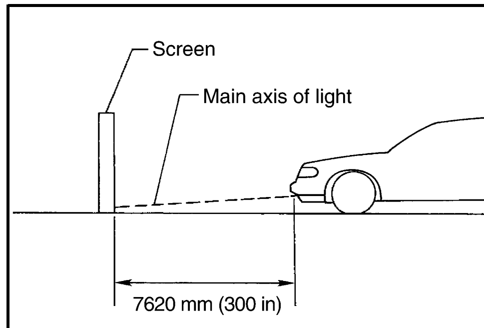
AKS00B8P



Aiming Adjustment

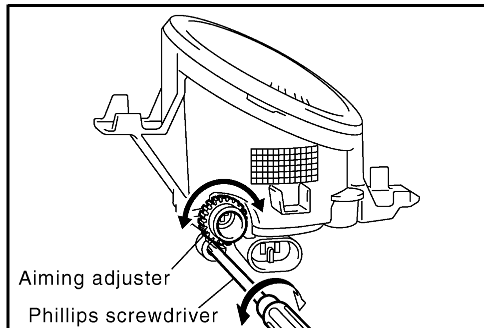
AKS00B8Q

1. Set the distance between the screen and the center of front fog lamp lens as shown in the figure.
2. Turn front fog lamps ON.



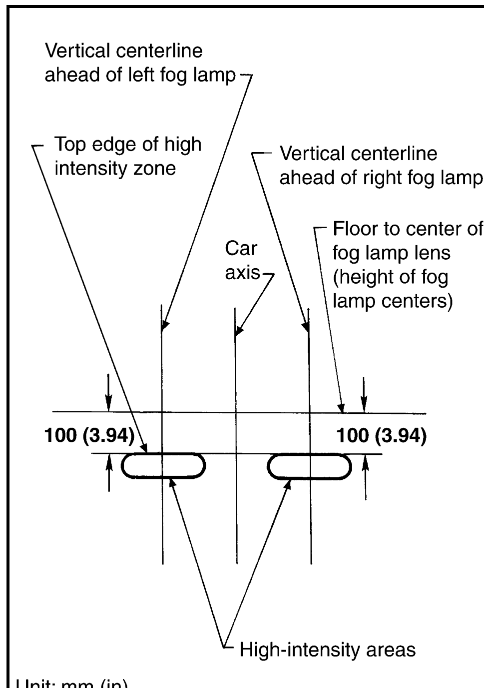
PKIB1672E

3. Insert a phillips screwdriver into the access hole and engage the tip of screwdriver with the gear of the adjuster as shown in the figure. Aiming adjuster can now be turned by turning screwdriver.



PKIA5558E

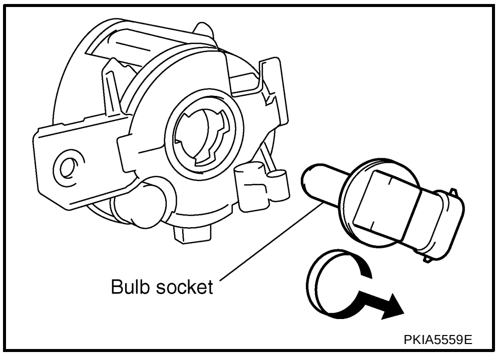
4. Adjust front fog lamps so that the top edge of the high intensity zone is 100 mm (3.94 in) below the height of front fog lamp centers as shown in the figure.
   - When performing adjustment, if necessary, cover headlamps and opposite front fog lamp.



PKIB1673E

Bulb Replacement

AKS00B8R



1. Remove front fog lamp. Refer to LT-39, "Removal and Installation" .
2. Turn bulb socket counterclockwise and unlock it.
3. Remove bulb from its socket.
4. Installation is the reverse of removal.

Front fog lamp : 12V - 55W (H11)

CAUTION:

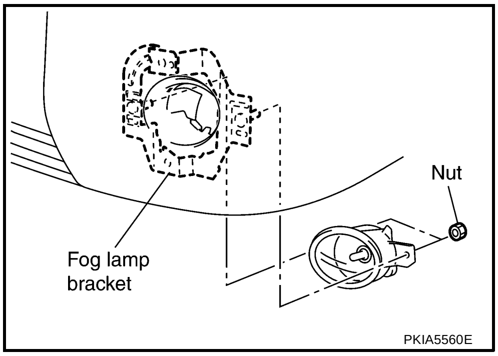
- **Do not touch glass of bulb directly by hand. Keep grease and other oily matters away from it. Do not touch bulb by hand while it is lit or right after being turned off. Burning may result.**
- **Do not leave bulb out of fog lamp housing for a long time because dust, moisture, smoke, etc. May affect the performance of front fog lamp. When replacing bulb, be sure to replace it with new one.**

Removal and Installation

AKS00B8S

REMOVAL

1. Remove fender protector. Refer to EI-20, "FENDER PROTECTOR" .
2. Disconnect front fog lamp connector.
3. Remove front fog lamp mounting nuts (2) from fog lamp bracket.
4. Pull out front fog lamp from vehicle and disconnect connector.



INSTALLATION

Installation is the reverse of removal. Note the tightening torque shown below.

Front fog lamp mounting nut : 5.5 N·m (0.56 kg-m, 49 in-lb)

A B C D E F G H I J LT L M

HIGH-MOUNTED STOP LAMP

PFP:26590

Bulb Replacement

AKS00B90

Refer to LT-27, "HIGH-MOUNTED STOP LAMP" .

Removal and Installation

AKS00B91

Refer to LT-27, "REMOVAL" .

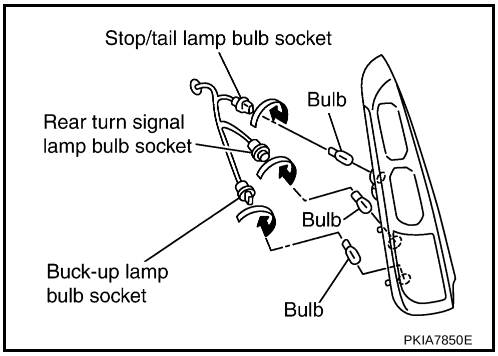
REAR COMBINATION LAMP

PFP:26554

Bulb Replacement

AKS00B93

1. Remove rear combination lamp mounting bolts (2).
2. Pull rear combination lamp toward rear of vehicle. Disengage locating pins (3).
3. Turn bulb socket counterclockwise and unlock it.
4. Remove bulb from its socket.
5. Installation is the reverse of removal.



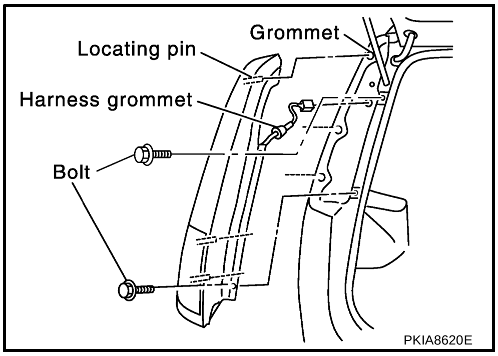
Stop/tail lamp	**: 12V - 21/5W**
Rear turn signal lamp	**: 12V - 21W**
Back-up lamp	**: 12V - 21W**

Removal and Installation

AKS00B94

REMOVAL

1. Remove luggage-side lower finisher. Refer to EI-36, "BODY SIDE TRIM" in “EI EXTERIOR & INTERIOR” section.
2. Disconnect rear combination lamp connector.
3. Remove rear combination lamp mounting bolts (2).
4. Pull rear combination lamp toward rear of vehicle. Disengage locating pins (3).
5. From outside the vehicle, pull harness grommet rearward, and remove harness.



INSTALLATION

Installation is the reverse of removal. Note the tightening torque shown below.

Rear combination lamp mounting bolt : **5.5 N·m (0.56 kg-m, 49 in-lb)**

COMBINATION SWITCH

PFP:25567

Removal and Installation

AKS00B95

Refer to LT-24, "Removal and Installation" in “LIGHTING AND TURN SIGNAL SWITCH (LT)” section.

Switch Circuit Inspection

AKS00C3X

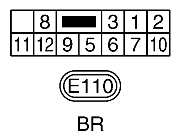
- Using circuit tester, check continuity between lighting and turn signal switch connector terminals in each operation status of switch.
  Lighting switch refers to LT-8, "Wiring Diagram — H/LAMP —" .
  Turn signal switch refers to LT-19, "Wiring Diagram — TURN —" .
  Fog lamp switch refers to LT-37, "Wiring Diagram — F/FOG —" .

LIGHTING SWITCH

	OFF			1ST			2ND		
	HIGH	LOW	PASS	HIGH	LOW	PASS	HIGH	LOW	PASS
5			O			O	O	O	O
6			O			O	O		O
7								O	
8			O			O	O	O	O
9			O			O	O		O
10								O	
11				O	O	O	O	O	O
12				O	O	O	O	O	O

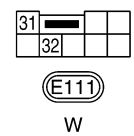
TURN SIGNAL LAMP SWITCH

	L	N	R
1	O		O
2			O
3	O		



FRONT FOG LAMP SWITCH (with FRONT FOG LAMP)

	ON	OFF
31	O	
32	O	



O-O :countinuity should exists.

PKIA8896E

- If any malfunction is found, replace switch. Refer to LT-24, "Removal and Installation" .

INTERIOR ROOM LAMP

PFP:26410

System Description

AKS00B9C

POWER SUPPLY AND GROUND

Power is supplied at all times

- through 10A fuse [No. 28, located in fuse block (J/B)]
- to key switch terminal 1 and
- through 10A fuse [No. 26, located in fuse block (J/B)]
- to smart entrance control unit terminal 49.

When key is withdrawn from ignition key cylinder,
power is interrupted

- through key switch terminal 2
- to smart entrance control unit terminal 25.

With ignition key switch in ON or START position,
power is supplied

- through 10A fuse [No. 5, located in fuse block (J/B)]
- to smart entrance control unit terminal 27.

Ground is supplied

- to smart entrance control unit terminals 43 and 64
- through grounds M27 and M70.

When front driver side door is opened,
ground is supplied

- through grounds B8 and B18
- to front door switch (driver side) terminal 3
- from front door switch (driver side) terminal 2
- to smart entrance control unit terminal 1.

When any door (except back door) is opened,
ground is supplied

- through case ground of each door switch
- to each door switch terminal 1
- to smart entrance control unit terminal 2.

When back door is opened,
ground is supplied

- through ground D53
- to back door switch terminal 3
- from back door switch terminal 1
- to smart entrance control unit terminal 2.

When power window main switch (door lock/unlock switch) is unlocked, smart entrance control unit receives a ground signal

- through grounds M27 and M70
- to power window main switch (door lock/unlock switch) terminal 19
- from power window main switch (door lock/unlock switch) terminal 18
- to smart entrance control unit terminal 4.

When driver side or passenger side door key cylinder switch is unlocked, smart entrance control unit receives a ground signal

- through grounds M27 and M70
- to door key cylinder switch (driver side and passenger side) terminal 2
- from door key cylinder switch terminal 3 (driver side) or terminal 1 (passenger side)
- to smart entrance control unit terminal 10.

When a signal or combination of signals is received by smart entrance control unit,
ground is supplied

- through smart entrance control unit terminal 31
- to interior room lamp terminal 2
- to map lamp terminal 3 (with sunroof).

With power and ground supplied, interior room lamp and map lamp (with sunroof) illuminates.

SWITCH OPERATION

When interior room lamp switch is ON,
ground is supplied

- through case grounds of interior room lamp
- to interior room lamp.

And power is supplied

- to interior room lamp terminal 1
- from smart entrance control unit terminal 50.

When map lamp switch is ON (with sunroof),
ground is supplied

- through grounds M27 and M70
- to map lamp terminal 2.

And power is supplied

- to map lamp terminal 1
- from smart entrance control unit terminal 50.

When luggage room lamp switch is ON,
ground is supplied

- through case grounds of luggage room lamp
- to luggage room lamp.

And power is supplied

- to luggage room lamp terminal 1
- from smart entrance control unit terminal 50.

When front door switch (driver side) is ON (door is opened),
ground is supplied

- through case ground of front door switch (driver side)
- from front door switch (driver side) terminal 1
- to luggage room lamp terminal 2.

And power is supplied

- to luggage room lamp terminal 1
- from smart entrance control unit terminal 50.

When front door switch (passenger side) is ON (door is opened),
ground is supplied

- through case ground of front door switch (passenger side)
- from front door switch (passenger side) terminal 1
- to luggage room lamp terminal 2.

And power is supplied

- to luggage room lamp terminal 1
- from smart entrance control unit terminal 50.

When rear door switch (LH and/or RH) is ON (door is opened),
ground is supplied

- through case ground of rear door switch
- from rear door switch terminal 1
- to luggage room lamp terminal 2.

And power is supplied

- to luggage room lamp terminal 1
- from smart entrance control unit terminal 50.

When back door switch is ON (door is opened),
ground is supplied

- through ground D53
- to back door switch terminal 3
- from back door switch terminal 1
- to luggage room lamp terminal 2.

And power is supplied

- to luggage room lamp terminal 1
- from smart entrance control unit terminal 50.

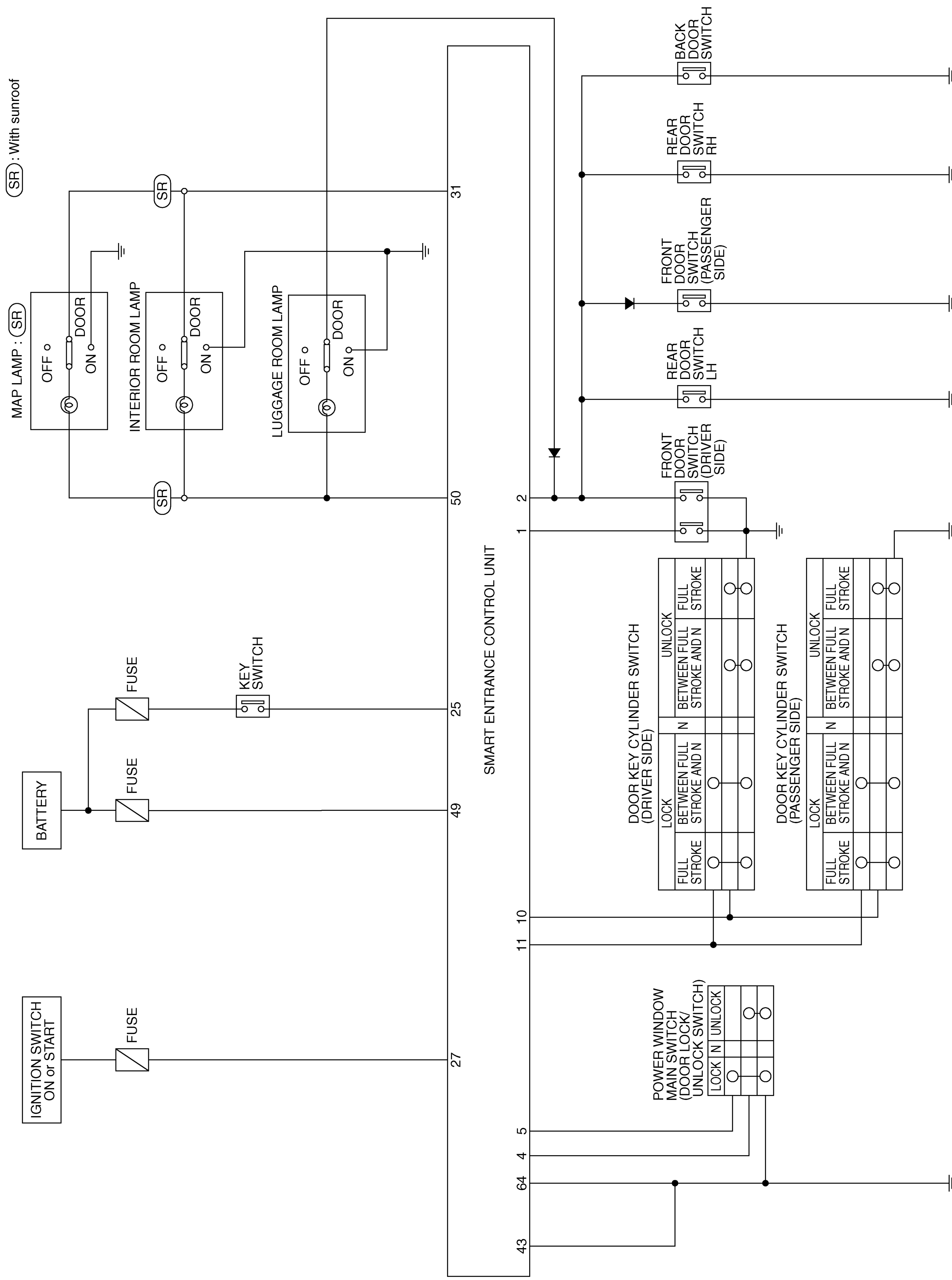
BATTERY SAVER

The lamp turns OFF automatically when interior room lamp, map lamp (with sunroof) and/or luggage room lamp is illuminated with ignition key is in OFF position. If the lamp remains lit by door switch open signal or if lamp switch is in ON position for more than 30 minutes.
After lamps turn OFF by battery saver system, lamps illuminate again when

- driver door is locked or unlocked,
- door is opened or closed,
- key is removed from ignition key switch or inserted in ignition key switch,
- door key cylinder is locked or unlocked.

Schematic

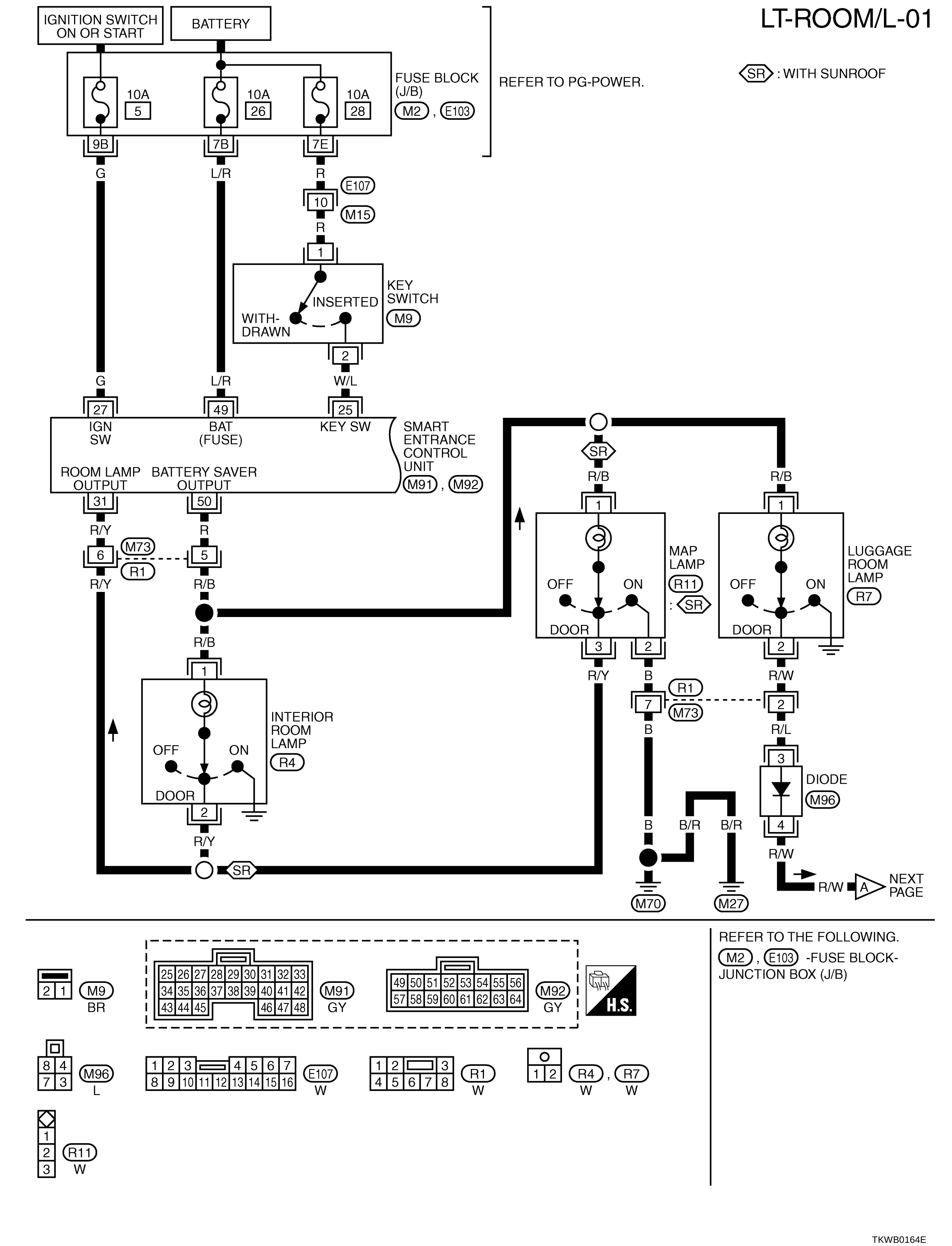
AKS00B9E



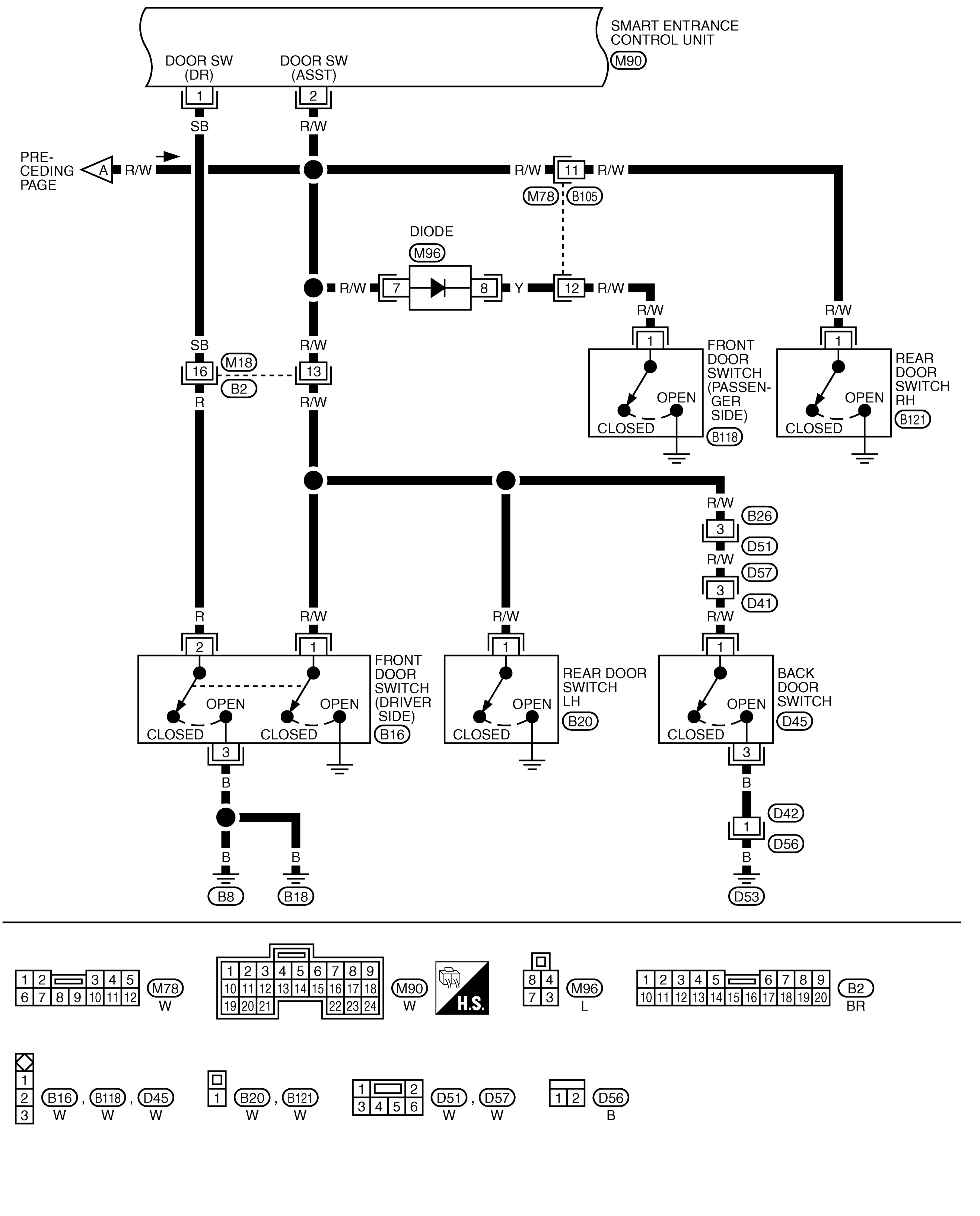
TKWB0163E

Wiring Diagram —ROOM/L—

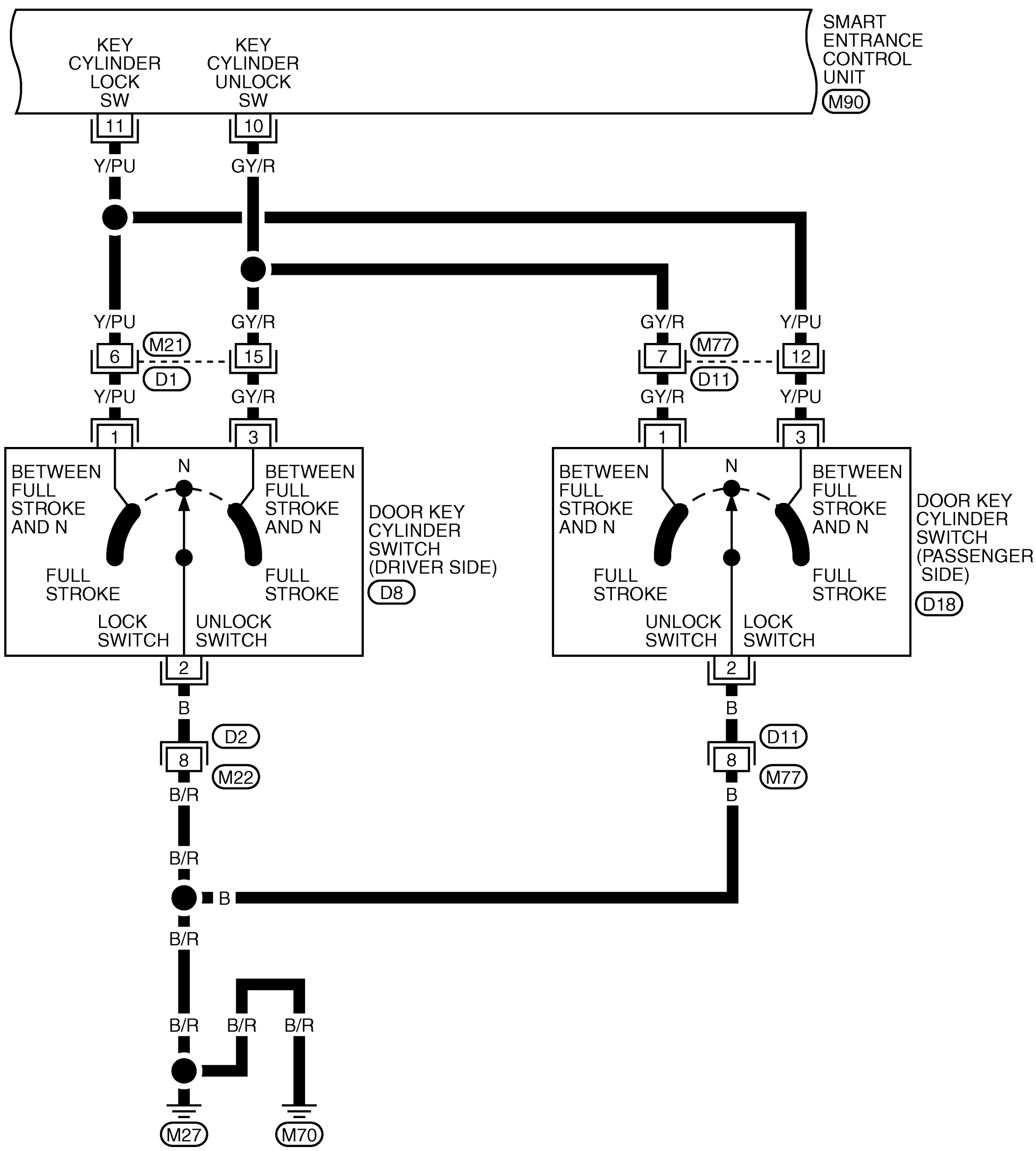
AKS00B9F

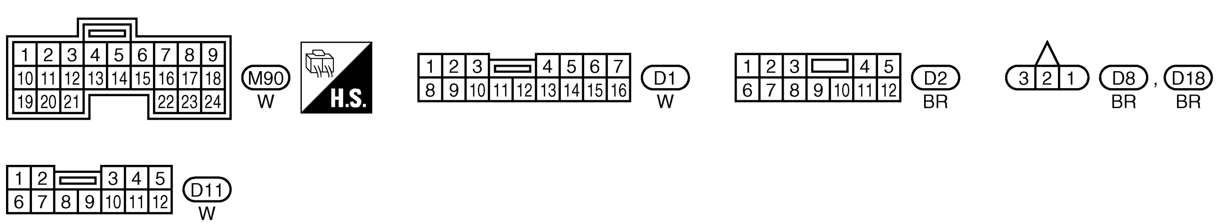


LT-ROOM/L-02


SMART ENTRANCE CONTROL UNIT
M90
DOOR SW (DR)
DOOR SW (ASST)
PRE-CEDING PAGE
A
SB
R/W
M78
B105
DIODE
M96
Y
M18
B2
R
FRONT DOOR SWITCH (PASSEN-GER SIDE)
B118
REAR DOOR SWITCH RH
B121
OPEN
CLOSED
B26
D51
D57
D41
FRONT DOOR SWITCH (DRIVER SIDE)
B16
REAR DOOR SWITCH LH
B20
BACK DOOR SWITCH
D45
B
D42
D56
B8
B18
D53
W
H.S.
L
BR
B16, B118, D45
B20, B121
D51, D57
TKWB0165E

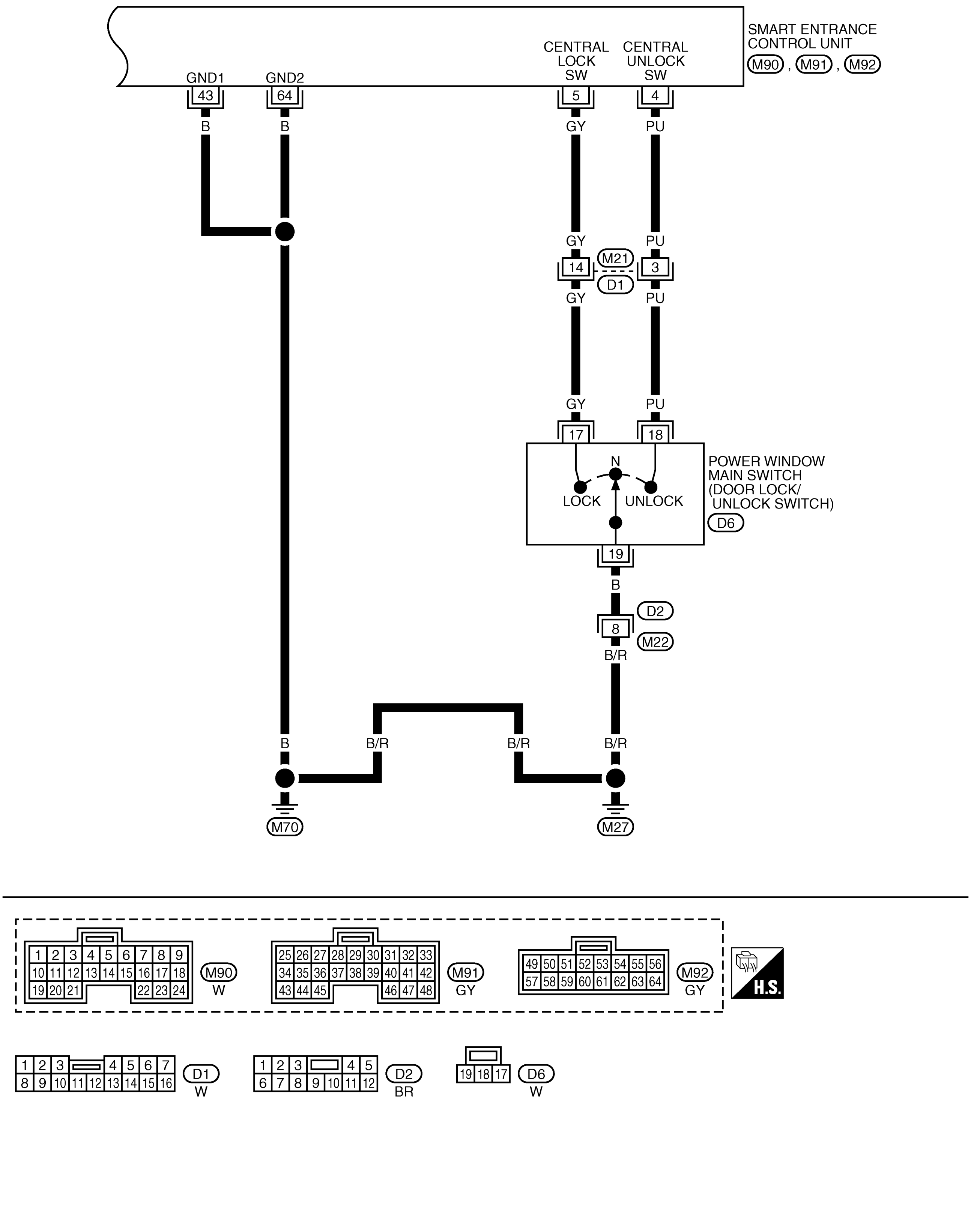
LT-ROOM/L-03





TKWB0166E

LT-ROOM/L-04

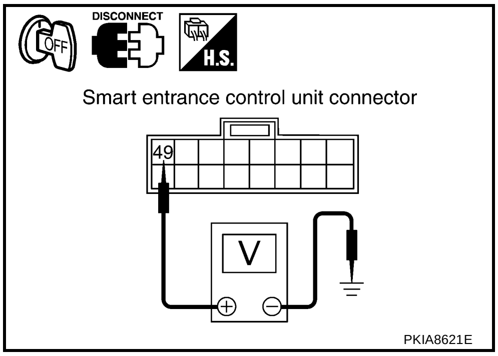

SMART ENTRANCE CONTROL UNIT
M90 , M91 , M92
GND1
GND2
CENTRAL LOCK SW
CENTRAL UNLOCK SW
43
64
5
4
B
GY
PU
M21
14
3
D1
17
18
N
LOCK
UNLOCK
POWER WINDOW MAIN SWITCH (DOOR LOCK/ UNLOCK SWITCH)
D6
19
D2
8
M22
B/R
M70
M27
M90
W
M91
GY
M92
GY
H.S.
D1
W
D2
BR
D6
W
TKWB0167E

Interior Room Lamp Timer Does Not Operate

AKS00B9I

1. CHECK POWER SUPPLY SIGNAL

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check voltage between smart entrance control unit harness connector and ground.



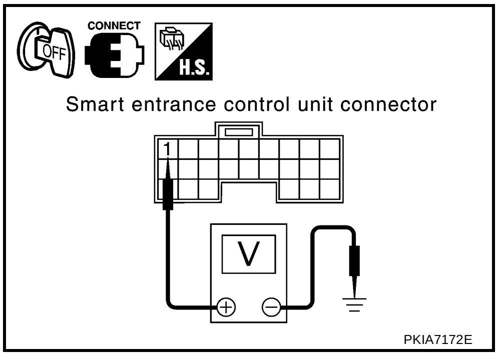
Terminals			Ignition switch position
(+)		(-)	OFF
Connector	Terminal (Wire color)		
M92	49 (L/R)	Ground	Battery voltage

OK or NG

OK >> GO TO 2.
NG >> Check harness for open or short between smart entrance control unit and fuse No. 26 (10A).

2. CHECK FRONT DOOR SWITCH (DRIVER SIDE) INPUT SIGNAL

1. Connect smart entrance control unit connector.
2. Check voltage between smart entrance control unit harness connector and ground.



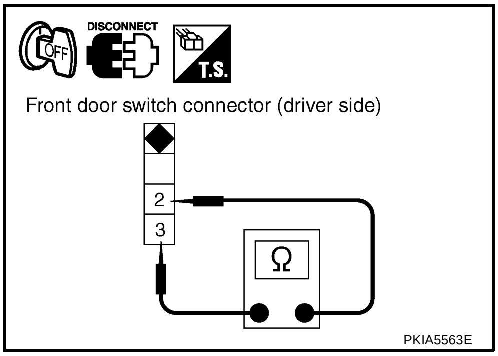
Terminals			Condition (driver door)	Voltage
(+)		(-)		
Connector	Terminal (Wire color)			
M90	1 (SB)	Ground	Open	Approx. 0V
			Closed	Approx. 5V

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK FRONT DOOR SWITCH (DRIVER SIDE)

1. Disconnect front door switch connector (driver side).
2. Check continuity between front door switch (driver side) terminals.



Connector	Terminals		Condition	Continuity
B16	2	3	Pushed (door closed)	No
			Released (door open)	Yes

OK or NG

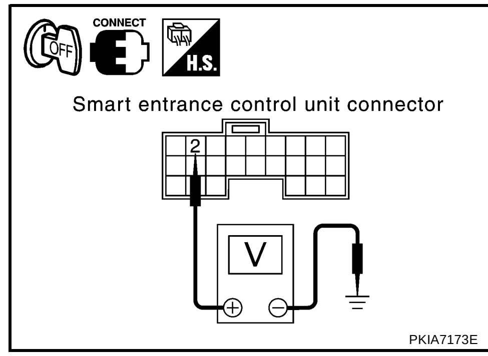
OK >> Check the following.

- Front door switch (driver side) ground circuit condition
- Harness for open or short between smart entrance control unit and front door switch (driver side)

NG >> Replace front door switch (driver side).

4. CHECK DOOR SWITCHES INPUT SIGNAL

Check voltage between smart entrance control unit harness connector and ground.



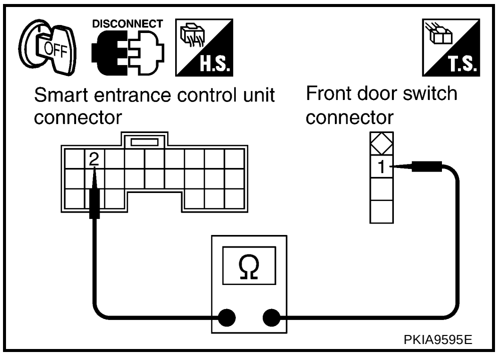
Terminals			Condition (All doors)	Voltage
(+)		(-)		
Connector	Terminal (Wire color)			
M90	2 (R/W)	Ground	Open	Approx. 0V
			Closed	Approx. 5V

OK or NG

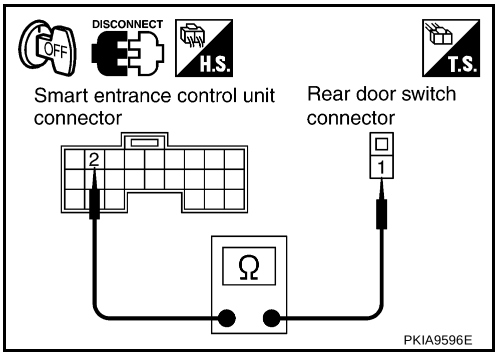
OK >> GO TO 6.
NG >> GO TO 5.

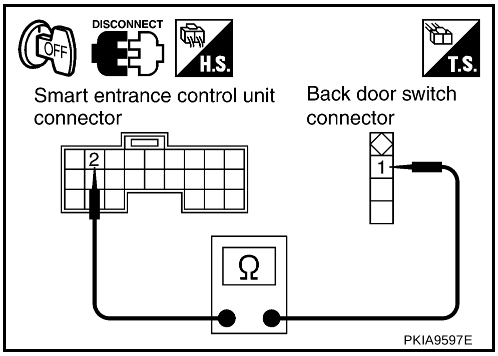
5. CHECK DOOR SWITCHES

1. Disconnect each door switch harness connector and smart entrance control unit harness connector.
2. Check continuity between each door switch terminal and smart entrance control unit terminal.



Terminals					Continuity
Smart entrance control unit		Door switch			
Connector	Terminal (Wire color)	Connector		Terminal (Wire color)	
M90	2 (R/W)	B16	Front door switch (driver side)	1 (R/W)	Yes
		B20	Rear door switch (LH)		
		B118	Front door switch (passenger side)		
		B121	Rear door switch (RH)		
		D45	Back door switch		





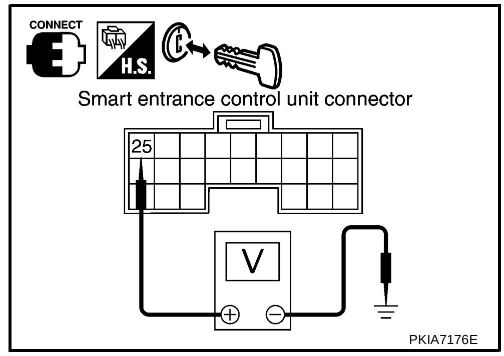
<u>OK or NG</u>

OK >> Check the following.
- Door switch ground condition.
- Replace door switch.

NG >> Harness for open or short between smart entrance control unit and each door switch.

6. CHECK KEY SWITCH INPUT SIGNAL

Check voltage between smart entrance control unit harness connector and ground.



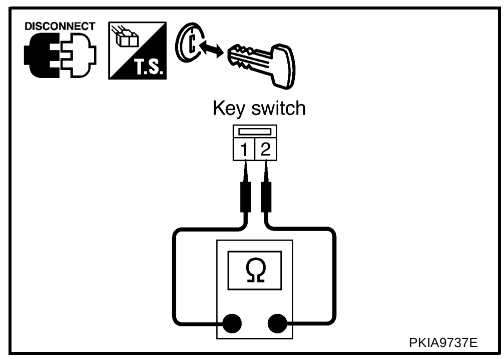
Terminals			Condition (Key switch)	Voltage
(+)		(-)		
Connector	Terminal (Wire color)			
M91	25 (W/L)	Ground	Inserted	Battery voltage
			withdrawn	Approx. 0V

OK or NG

OK >> Replace smart entrance control unit.
NG >> GO TO 7.

7. CHECK KEY SWITCH (INSERT)

1. Disconnect key switch connector.
2. Check continuity between key switch terminals.



Connector	Terminals		Condition (Key switch)	Continuity
M9	1	2	Inserted	Yes
			withdrawn	No

OK or NG

OK >> Check the following.
- 10A fuse [No.28, located in fuse block (J/B)]
- Harness for open or short between key switch and fuse
- Harness for open or short between smart entrance control unit and key switch

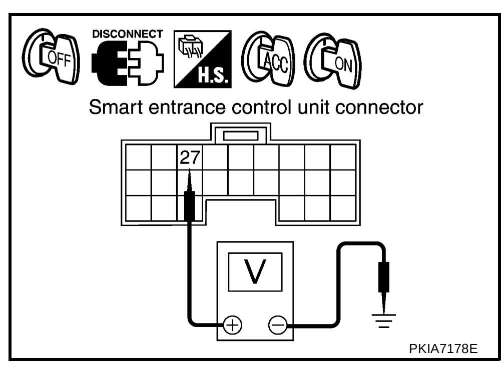
NG >> Replace key switch.

Interior Room Lamp Timer Does Not Cancel

AKS00B9J

1. CHECK IGNITION ON SIGNAL

1. Turn ignition switch OFF.
2. Disconnect smart entrance control unit connector.
3. Check voltage between smart entrance control unit harness connector and ground.



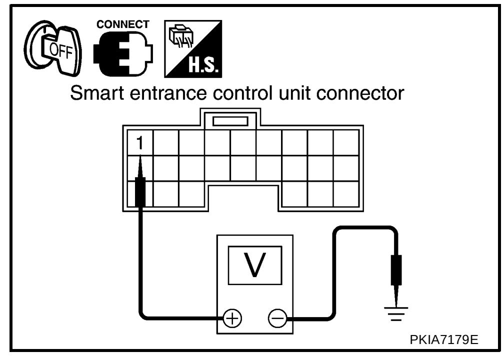
Terminals			Ignition switch position		
(+)		(-)	OFF	ACC	ON
Connector	Terminal (Wire color)				
M91	27 (G)	Ground	Approx. 0V	Approx. 0V	Battery voltage

OK or NG

OK >> GO TO 2.
NG >> Check the following.
- 10A fuse [No. 5, located in fuse block (J/B)]
- Harness for open or short between smart entrance control unit and fuse

2. CHECK DOOR SWITCH INPUT SIGNAL

1. Connect smart entrance control unit connector.
2. Check voltage between smart entrance control unit harness connector and ground.



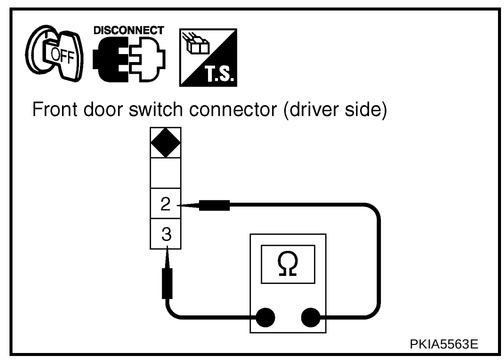
Terminals			Condition (driver door)	Voltage
(+)		(-)		
Connector	Terminal (Wire color)			
M90	1 (SB)	Ground	Open	Approx.0V
			Closed	Approx.5V

OK or NG

OK >> Replace smart entrance control unit.
NG >> GO TO 3.

3. CHECK FRONT DOOR SWITCH

1. Disconnect front door switch (driver side) connector.
2. Check continuity between front door switch (driver side) terminals.



Connector	Terminals		Condition	Continuity
B16	2	3	Pushed (door closed)	No
			Released (door open)	Yes

OK or NG

OK >> Check the following.
- Front door switch (driver side) ground circuit condition
- Harness for open or short between smart entrance control unit and front door switch (driver side)

NG >> Replace front door switch (driver side).

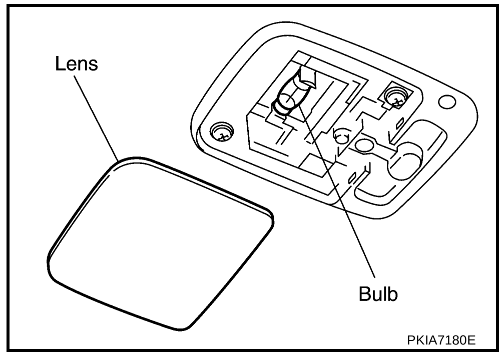
Bulb Replacement

AKS00B9K

INTERIOR ROOM LAMP

1. Insert a narrow slotted screwdriver in the cutout, and remove lens.
2. Remove bulb.
3. Installation is the reverse of removal.

Room lamp : 12V - 10W



PKIA7180E

LUGGAGE ROOM LAMP

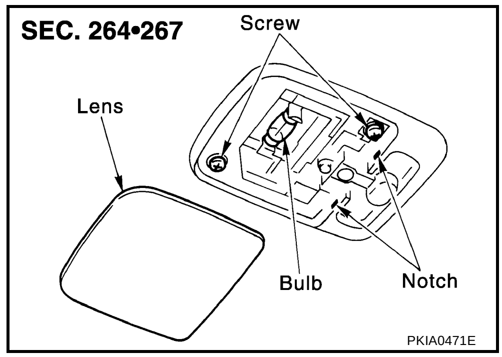
Refer to LT-56, "INTERIOR ROOM LAMP" .

Removal and Installation of Interior Room Lamp

AKS00B9L

REMOVAL

1. Insert a narrow slotted screwdriver in the cutout, and remove lens.
2. Remove room lamp mounting screws (2), and remove room lamp.
3. Disconnect interior room lamp connector.



PKIA0471E

INSTALLATION

Installation is the reverse of removal.

Removal and Installation of Luggage Room Lamp

AKS00BQC

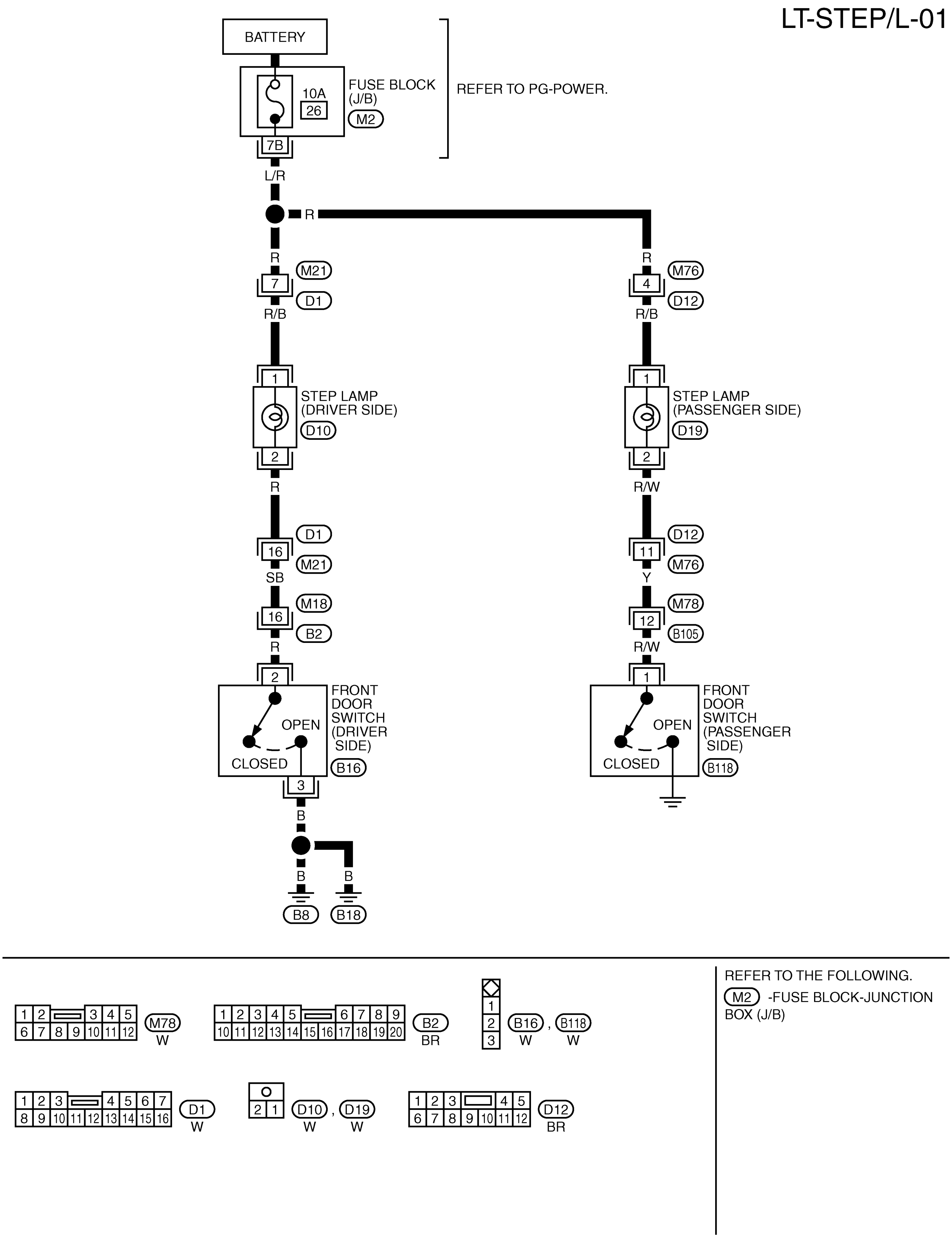
Refer to LT-56, "Removal and Installation of Interior Room Lamp" .

STEP LAMP

PFP:26420

Wiring Diagram — STEP/L —

AKS00B9M



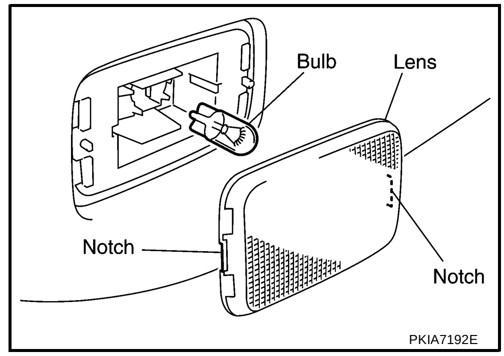
TKWB0169E

Bulb Replacement

AKS00B9N

1. Remove lens using a clip driver or a suitable tool.
2. Remove bulb.
3. Installation is the reverse of removal.

Step lamp **:12V - 2.7W**

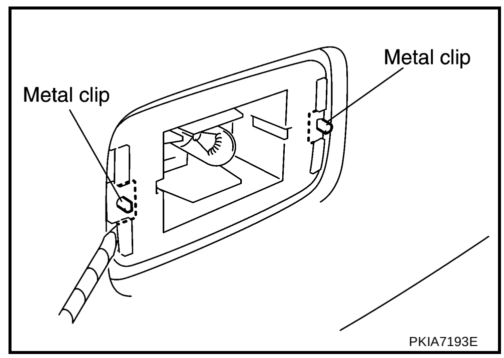


Removal and Installation

AKS00B9O

REMOVAL

1. Remove lens.
2. Using a clip driver or a suitable tool, press and remove metal clip of step lamp.
3. Disconnect step lamp connector.



INSTALLATION

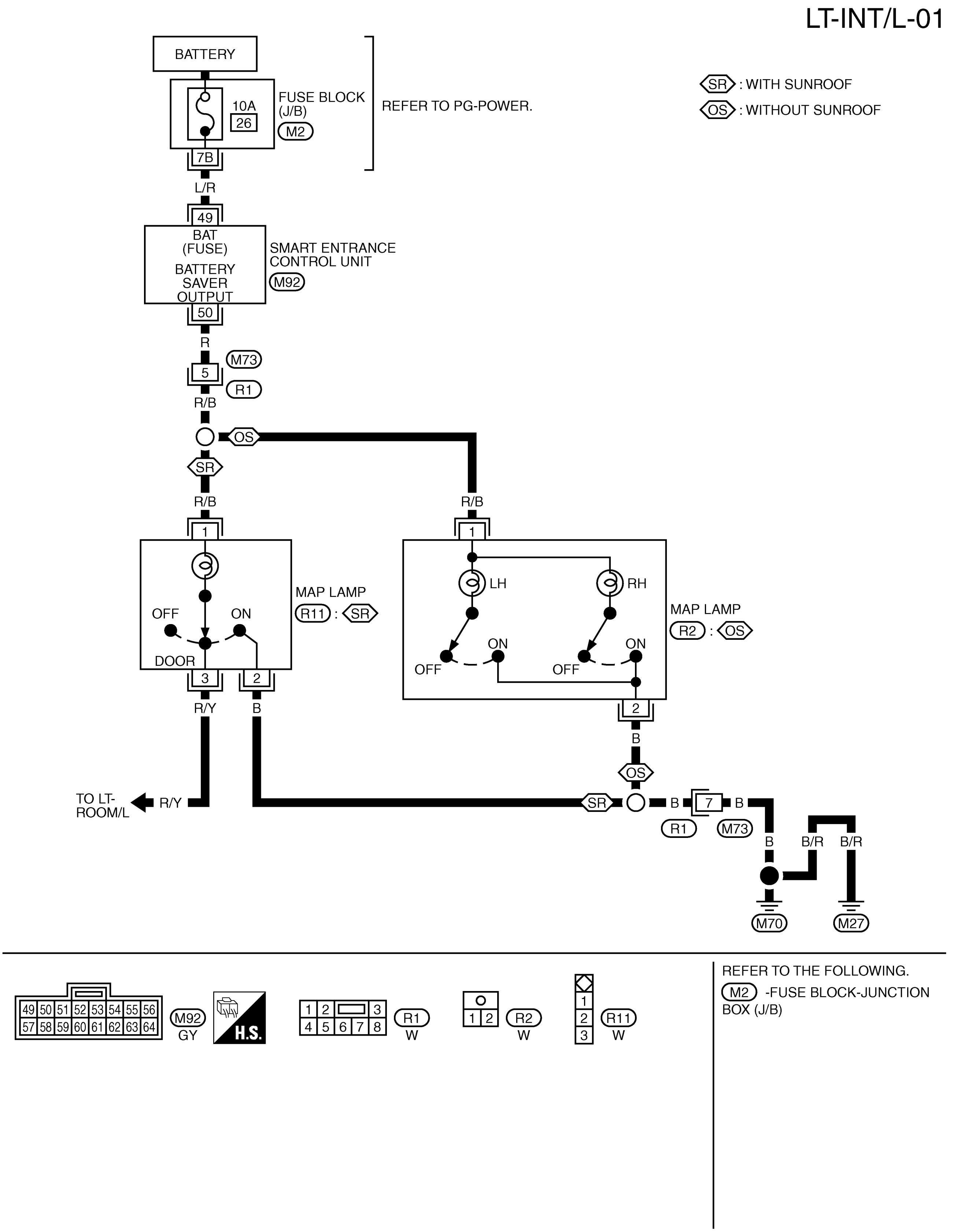
Install in the reverse order of removal.

MAP LAMP

PFP:26430

Wiring Diagram —INT/L—

AKS00B9P



TKWB0168E

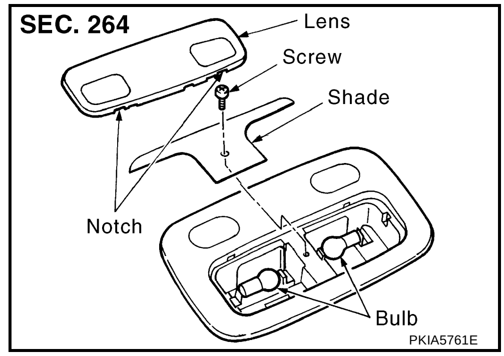
Bulb Replacement

AKS00B9Q

MAP LAMP (WITHOUT SUNROOF)

1. Remove lens using a clip driver or a suitable tool.
2. Remove shade mounting screw and remove shade from map lamp.
3. Remove bulb.
4. Installation is the reverse of removal.

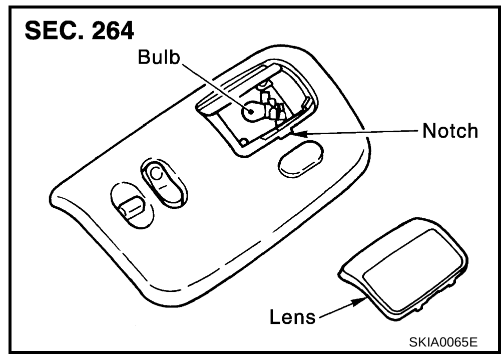
Map lamp (Without sunroof) : 12V - 8W



MAP LAMP (WITH SUNROOF)

1. Remove lens using a clip driver or a suitable tool.
2. Remove bulb.
3. Installation is the reverse of removal.

Map lamp (With sunroof) : 12V - 10W

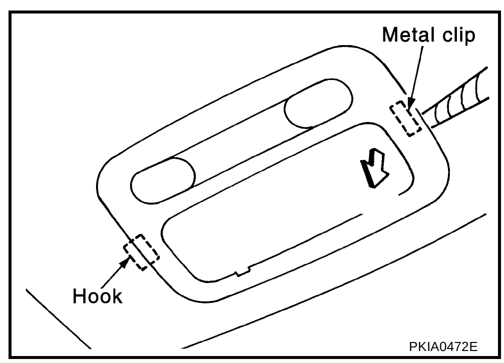


Removal and Installation of Map Lamp (Without Sunroof)

AKS00BQD

REMOVAL

1. Using a clip driver or a suitable tool, press and remove metal clip of map lamp.
2. Disconnect map lamp connector.



INSTALLATION

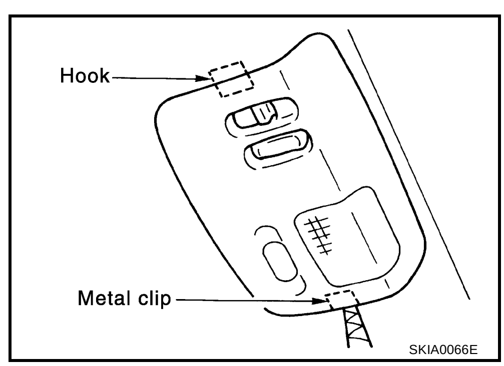
Installation is the reverse of removal.

Removal and Installation of Map Lamp (With Sunroof)

AKS00BQE

REMOVAL

1. Using a clip driver or a suitable tool, press and remove metal clip of map lamp.
2. Disconnect map lamp connector and sunroof connector.



INSTALLATION

Installation is the reverse of removal.

ILLUMINATION

PFP:27545

System Description

AKS00B98

Power is supplied at all times

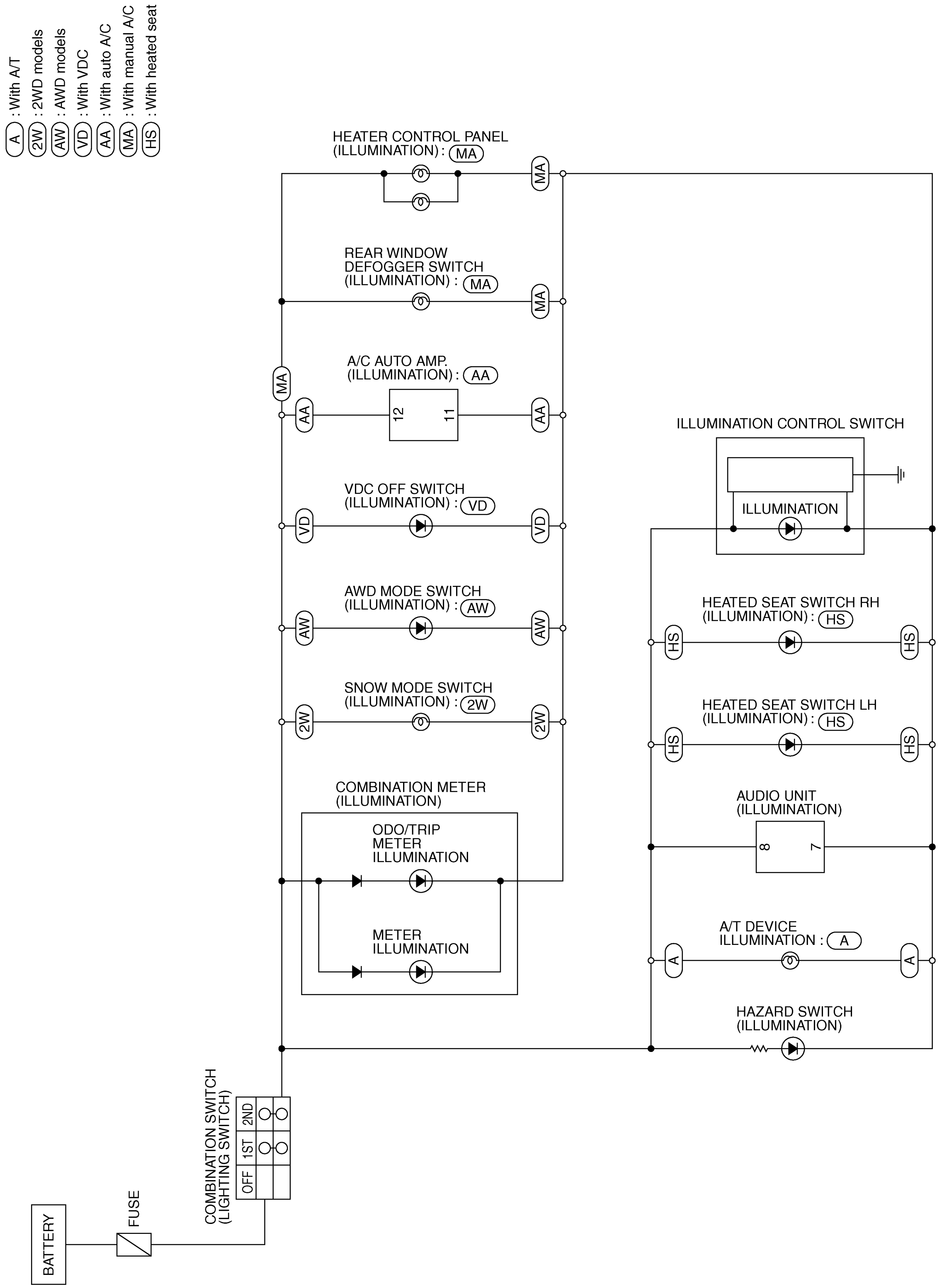
- through 10A fuse [No. 31, located in fuse and fusible link box]
- to combination switch (lighting switch) terminal 11.

The lighting switch must be in the 1ST or 2ND position for illumination.
The following chart shows the power and ground connector terminals for the components included in the illumination system.

Component	Connector No.	Power terminal	Ground terminal
Combination meter	M45	60	63
Snow mode switch (2WD models)	M122	5	6
AWD mode switch (AWD models)	M39	5	6
VDC OFF switch (with VDC)	M25	3	4
A/C auto amp. (with AUTO A/C)	M52	12	11
Rear window defogger switch (with MANUAL A/C)	M50	5	6
Heater control panel (with MANUAL A/C)	M55	2	6
Hazard switch	M51	7	8
A/T device illumination (with A/T)	M58	3	4
Audio unit	M108	8	7
Heated seat switch LH (with heated seat)	B212	5	6
Heated seat switch RH (with heated seat)	B213	5	6
Illumination control switch	M89	1	3

Schematic

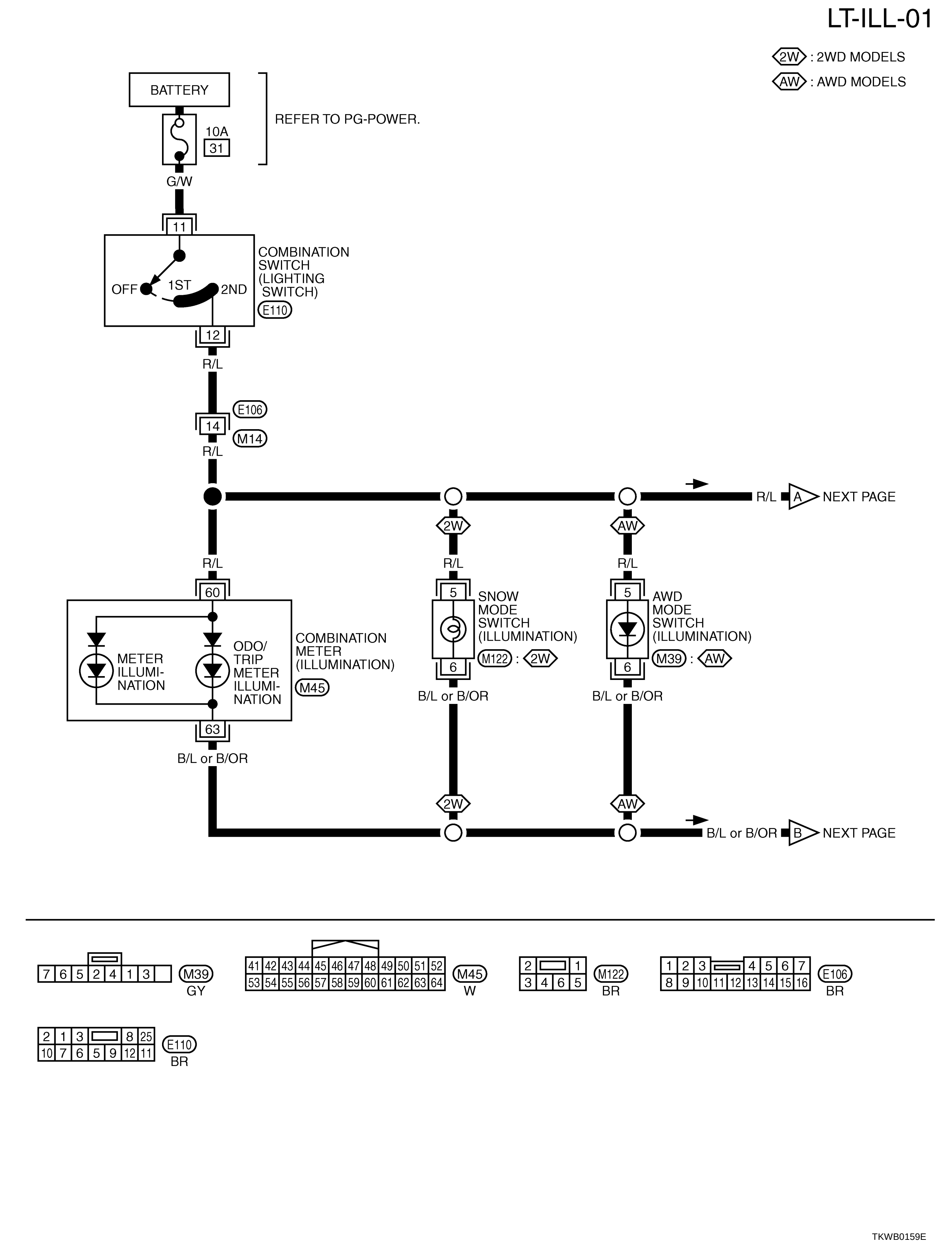
AKS00B99



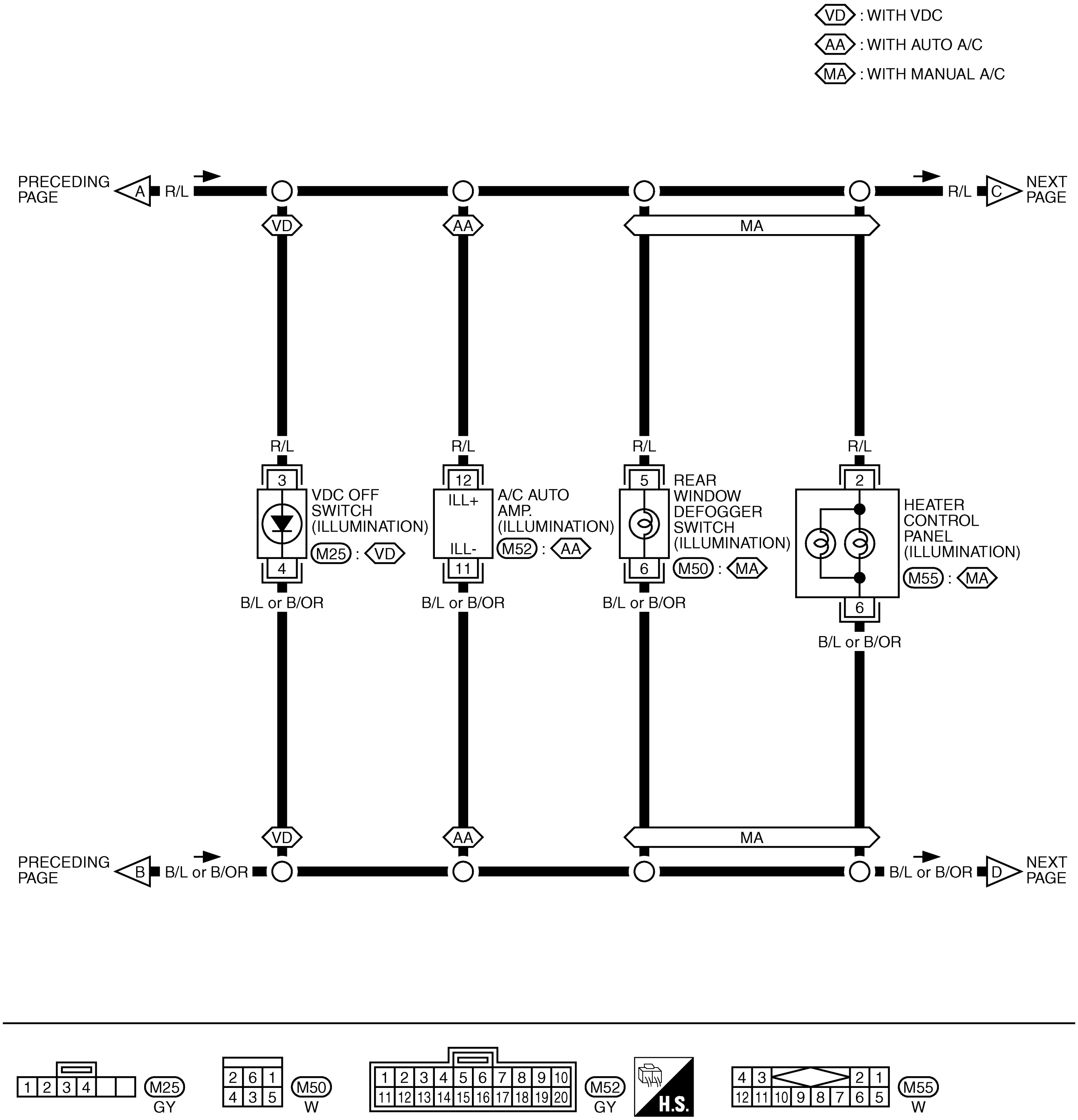
TKWB0158E

Wiring Diagram -ILL-

AKS00B9A

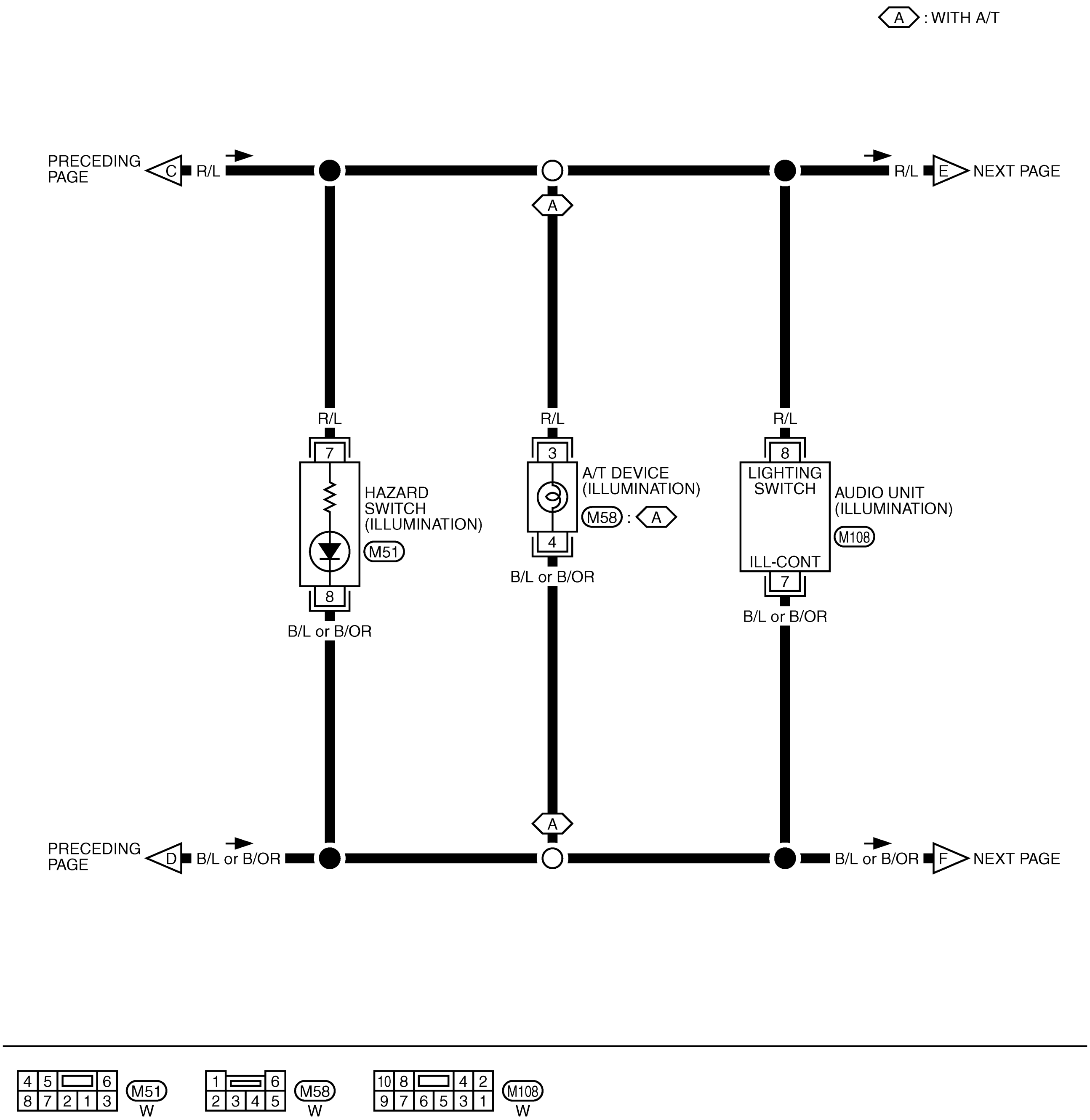


LT-ILL-02

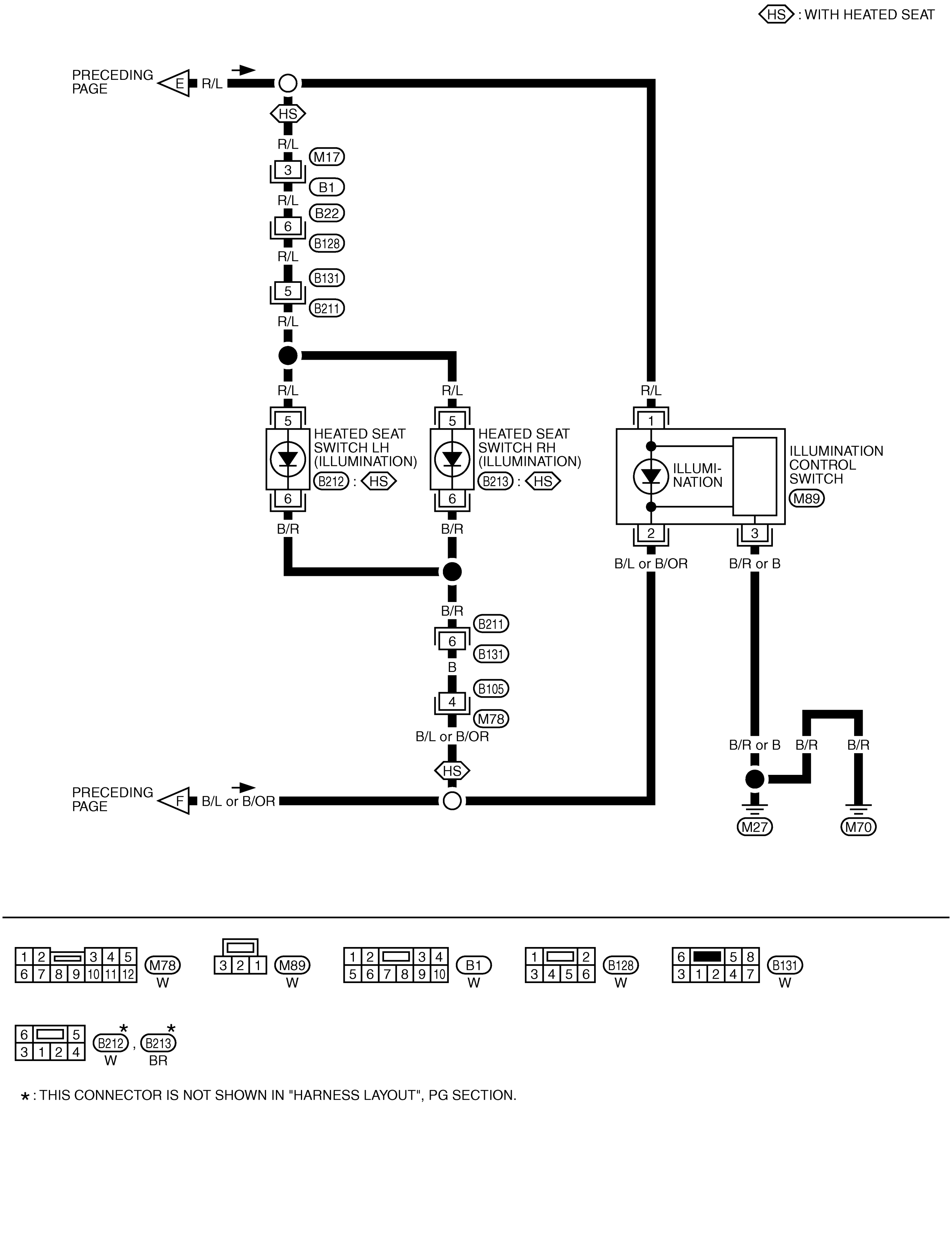


TKWB0160E

LT-ILL-03


A : WITH A/T
PRECEDING PAGE
C
R/L
R/L
E
NEXT PAGE
A
R/L
R/L
R/L
7
HAZARD SWITCH (ILLUMINATION)
M51
8
B/L or B/OR
3
A/T DEVICE (ILLUMINATION)
M58 : A
4
B/L or B/OR
8
LIGHTING SWITCH
AUDIO UNIT (ILLUMINATION)
M108
ILL-CONT
7
B/L or B/OR
A
PRECEDING PAGE
D
B/L or B/OR
B/L or B/OR
F
NEXT PAGE
4 5 6
8 7 2 1 3
M51
W
1 6
2 3 4 5
M58
W
10 8 4 2
9 7 6 5 3 1
M108
W
TKWB0161E

LT-ILL-04


HS : WITH HEATED SEAT
PRECEDING PAGE
E
R/L
HS
M17
3
B1
B22
6
B128
B131
5
B211
HEATED SEAT SWITCH LH (ILLUMINATION)
B212 : HS
HEATED SEAT SWITCH RH (ILLUMINATION)
B213 : HS
B/R
ILLUMI- NATION
ILLUMINATION CONTROL SWITCH
M89
1
2
3
B/L or B/OR
B/R or B
B211
6
B131
B
B105
4
M78
F
M27
M70
1 2 3 4 5 6 7 8 9 10 11 12
M78 W
3 2 1
M89 W
1 2 3 4 5 6 7 8 9 10
B1 W
1 2 3 4 5 6
B128 W
6 5 8 3 1 2 4 7
B131 W
6 5 3 1 2 4
B212 *, B213 *
W BR
*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.
TKWB0162E

BULB SPECIFICATIONS

PFP:26297

Headlamp

AKS00B9S

Item		Wattage (W)
Headlamp	High/Low	60/55 (H4)

Exterior Lamp

AKS00B9T

Item		Wattage (W)
Clearance lamp		21/5 (21W: Disuse)
Front turn signal lamp		21 (amber)
Side turn signal lamp		5 (amber)
Front side marker lamp		5
Rear side marker lamp		5
Front fog lamp		55 (H11)
Rear combination lamp	Stop/tail lamp	21/5
	Turn signal lamp	21
	Back-up lamp	21
License plate lamp		5
High-mounted stop lamp		5

Interior Lamp/Illumination

AKS00B9U

Item		Wattage (W)
Interior room lamp		10
Map lamp	Without sunroof	8
	With sunroof	10
Luggage room lamp		10
Step lamp		2.7

SECTION LU
ENGINE LUBRICATION SYSTEM

CONTENTS

PRECAUTIONS

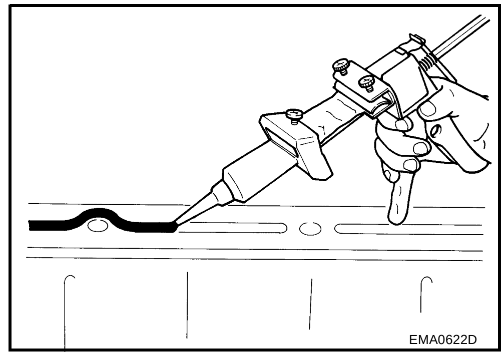
PFP:00001

Precautions for Liquid Gasket

ABS00CJR

LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Attach liquid gasket tube to the tube presser [SST: WS39930000 (—)].
   Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .
   - Within 5 minutes of liquid gasket application, install the mating component.
   - If liquid gasket protrudes, wipe it off immediately.
   - Do not retighten mounting bolts or nuts after the installation.
   - Wait 30 minutes or more after installation before refilling engine oil and engine coolant.



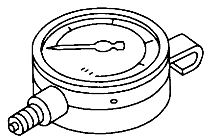
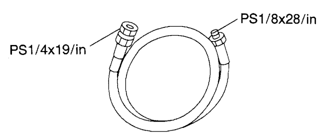
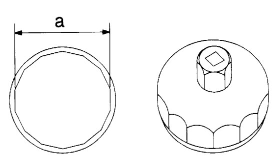
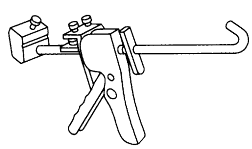
PREPARATION

PFP:00002

Special Service Tools

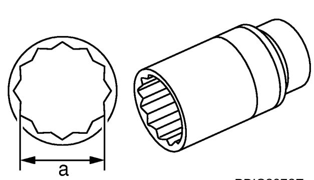
ABS00CJS

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
ST25051001 (J25695-1) Oil pressure gauge	 NT050	Measuring oil pressure **Maximum measuring range: 2,452 kPa (25 kg/cm^2 , 356 psi)**
ST25052000 (J25695-2) Hose	 S-NT559	Adapting oil pressure gauge to oil pan (upper)
KV10115801 (J-38956) Oil filter wrench	 S-NT375	Removing and installing oil filter **a: 64.3 mm (2.531 in)**
WS39930000 (—) Tube presser	 NT052	Pressing the tube of liquid gasket

Commercial Service Tools

ABS00CJT

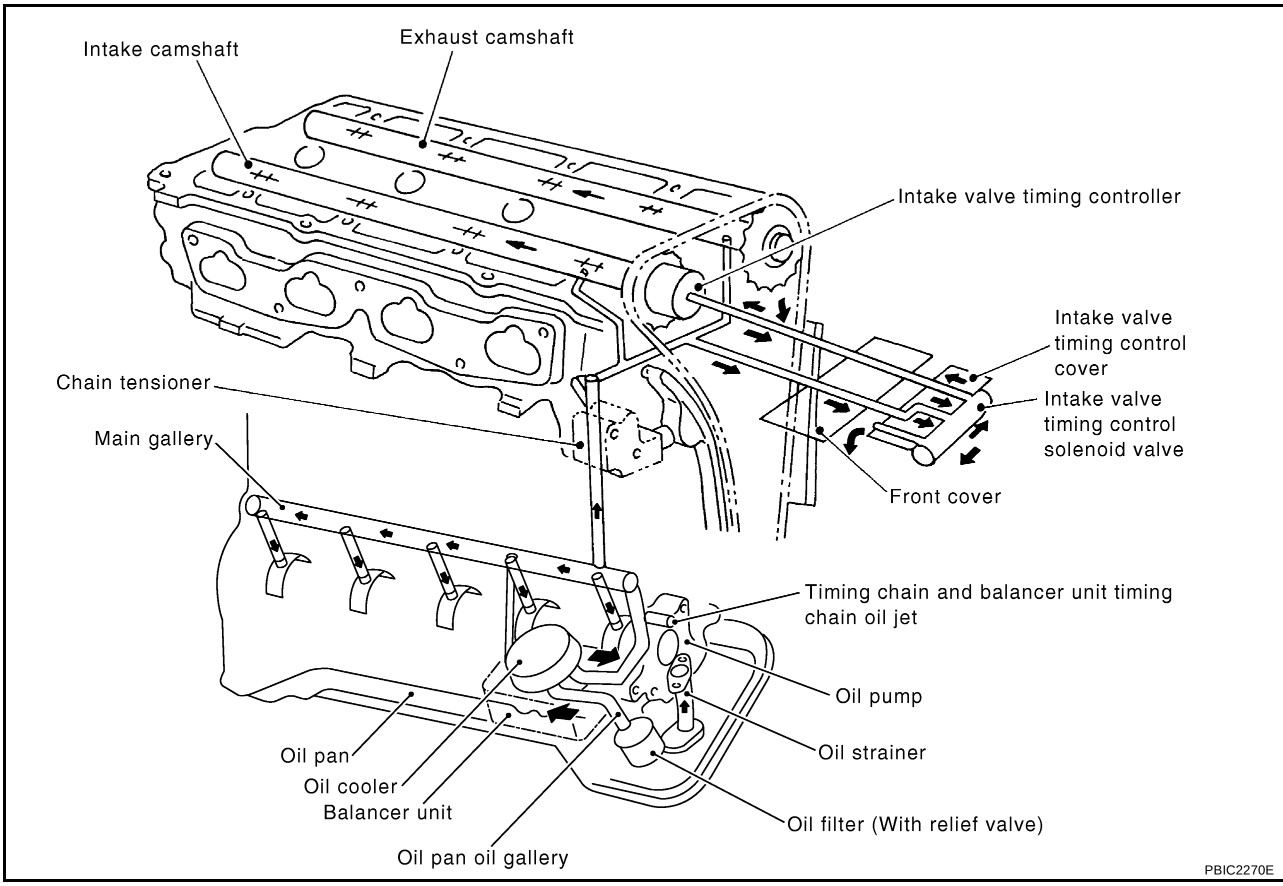
Tool name		Description
Deep socket	 PBIC2072E	Removing and installing oil pressure switch **a: 27 mm (1.06 in)**

LUBRICATION SYSTEM

PFP:15010

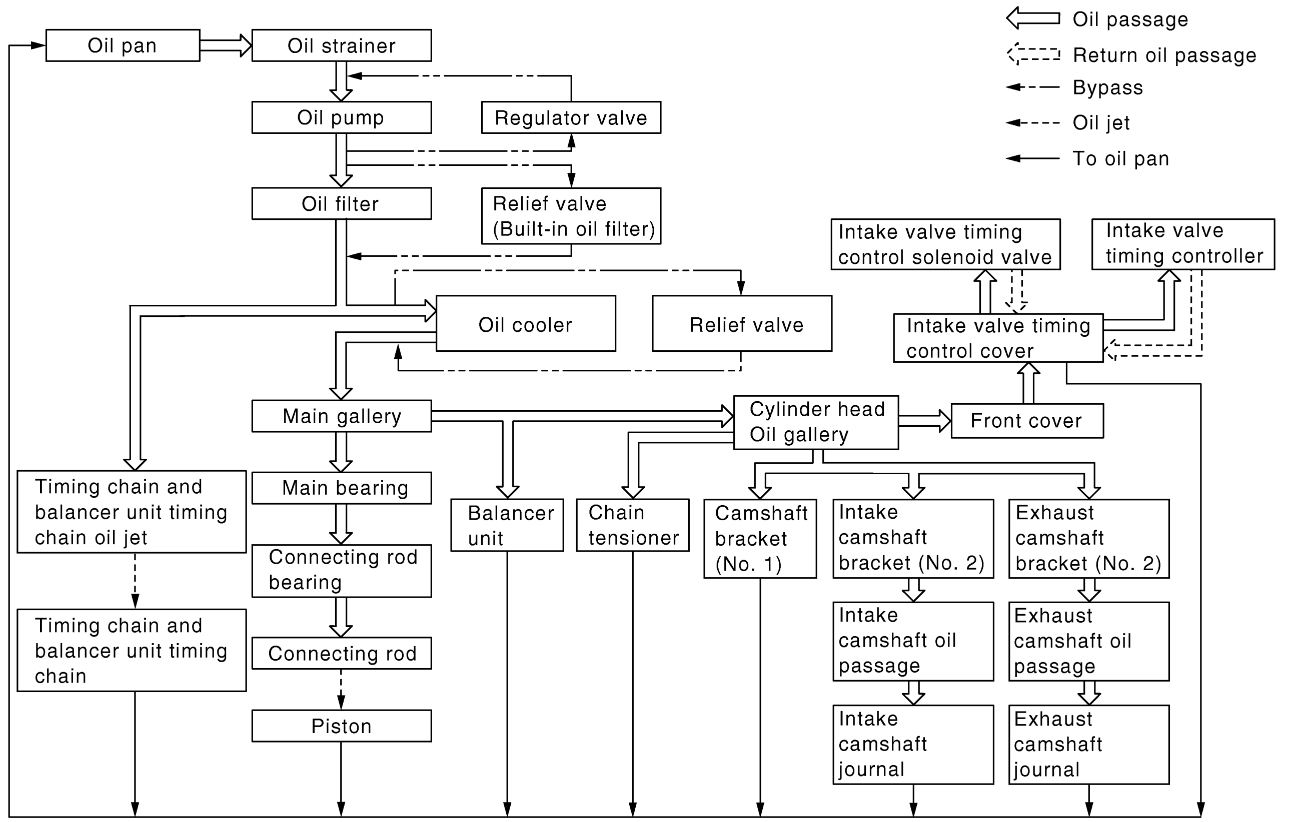
Lubrication Circuit

ABS00CJU



System Chart

ABS00CJV



PBIC2753E

ENGINE OIL

PFP:KLA92

Inspection

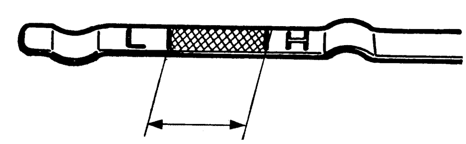
ABS00CJW

ENGINE OIL LEVEL

NOTE:

Before starting the engine, put the vehicle horizontally and check the engine oil level. If the engine is already started, stop it and allow 10 minutes before checking.

1. Pull out oil level gauge and wipe it clean.
2. Insert oil level gauge and make sure the engine oil level is within the range shown in the figure.
3. If it is out of range, adjust it.



PBIC0249E

ENGINE OIL APPEARANCE

- Check engine oil for white turbidity or heavy contamination.
- If engine oil becomes turbid and white, it is highly probable that it is contaminated with engine coolant. Repair or replace damaged parts.

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following area.

- Oil pans (lower and upper)
- Oil pan drain plug
- Oil pressure switch
- Oil filter
- Oil cooler
- Intake valve timing control cover and intake valve timing control solenoid valve
- Front cover
- Mating surface between cylinder block and lower cylinder block
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seals (front and rear)

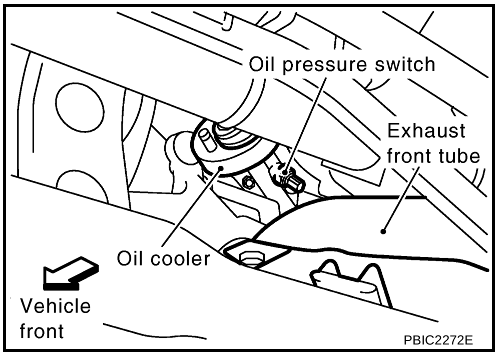
OIL PRESSURE CHECK

WARNING:

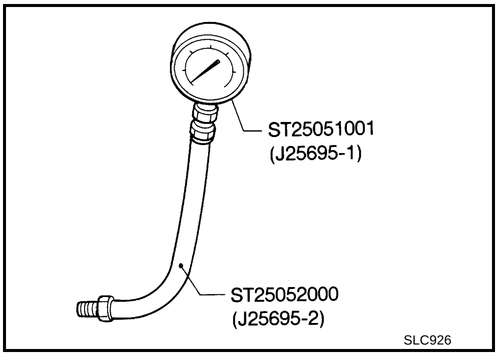
- **Be careful not to burn yourself, as engine oil may be hot.**
- **Engine oil pressure check should be in “ Parking position” (A/T models) or “Neutral position” (M/T models), and should apply parking brake securely.**

1. Check the engine oil level. Refer to LU-6, "ENGINE OIL LEVEL" .
2. Remove RH undercover.

3. Disconnect harness connector at oil pressure switch, and remove oil pressure switch using a deep socket (commercial service tool).
   CAUTION:
   Do not drop or shock oil pressure switch.



4. Install the oil pressure gauge and the hose [SST].



5. Start the engine and warm it up to normal operating temperature.
6. Check oil pressure with the engine running under no-load.
   NOTE:
   When engine oil temperature is low, engine oil pressure becomes high.

Engine oil pressure [Engine oil temperature at 80°C (176°F)]

Engine speed rpm	Approximate discharge pressure kPa (kg/cm^2 , psi)
Idle speed	More than 98 (1.0, 14)
2,000	More than 294 (3.0, 43)

If difference is extreme, check for oil leakage in oil passages and oil pump malfunction.

7. After the inspections, install oil pressure switch as follows:
a. Remove old liquid gasket adhering to oil pressure switch and the engine.
b. Apply liquid gasket and tighten oil pressure switch to the specification.
   Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .

   : 14.8 N·m (1.5 kg-m, 11 ft-lb)

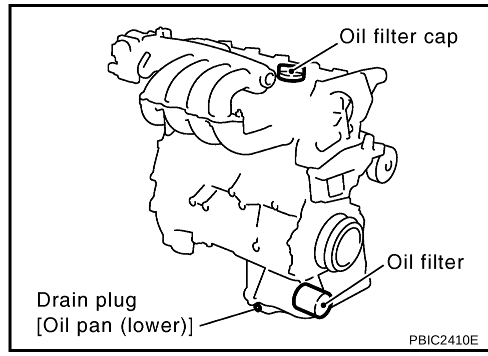
c. After warming up the engine, make sure there is no leaks of engine oil with running the engine.

Changing Engine Oil

ABS00CJX

WARNING:
- **Be careful not to burn yourself, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer; try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, put the vehicle horizontally and check for oil leakage from the engine components. Refer to LU-6, "ENGINE OIL LEAKAGE" .
2. Stop the engine and wait for 10 minutes.



3. Loosen oil filler cap and then remove drain plug.
4. Drain engine oil.
5. Install drain plug with new washer. Refer to EM-22, "OIL PAN AND OIL STRAINER" .

   CAUTION:
   Be sure to clean drain plug and install with new washer.

   Oil pan drain plug:

   : 34.3 N·m (3.5 kg-m, 25 ft-lb)
6. Refill with new engine oil.
   Engine oil specification and viscosity:
   Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

   Engine oil capacity (Approximate):

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.1 (4-3/8, 3-5/8)
	Without oil filter change	3.7 (3-7/8, 3-1/4)
Dry engine (Overhaul)		4.7 (5, 4-1/8)

CAUTION:
- **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
- **Always use oil level gauge to determine the proper amount of engine oil in the engine.**

7. Warm up the engine and check area around drain plug and oil filter for oil leakage.
8. Stop the engine and wait for 10 minutes.
9. Check the engine oil level. Refer to LU-6, "ENGINE OIL LEVEL" .

OIL FILTER

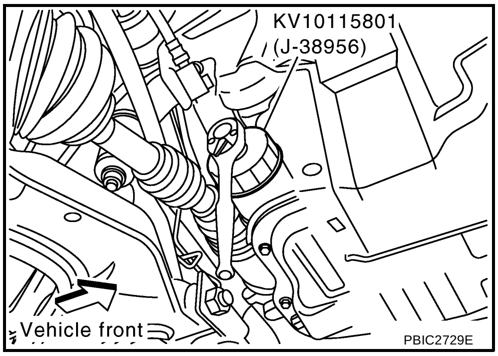
PFP:15208

Removal and Installation

ABS00CJY

REMOVAL

1. Open oil filter installation/removal cover on RH undercover.
2. Using the oil filter wrench [SST], remove oil filter.



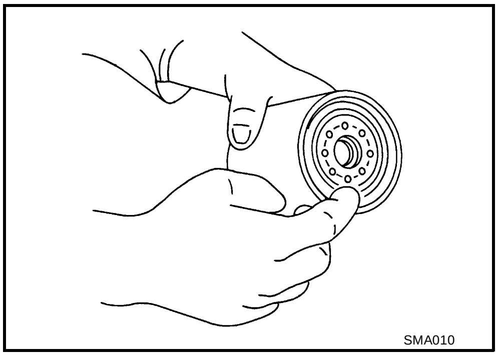
PBIC2729E

CAUTION:

- **Oil filter is provided with relief valve. Use Genuine Nissan Oil Filter or equivalent.**
- **Be careful not to get burned when the engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Do not allow engine oil to adhere to drive belt.**
- **Completely wipe off any engine oil that adheres to the engine and the vehicle.**

INSTALLATION

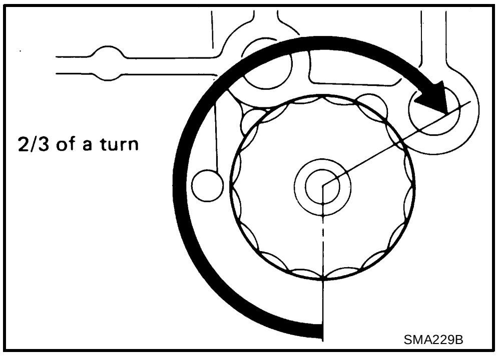
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.


SMA010

3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to the specification.

Oil filter:

: 17.6 N·m (1.8 kg-m, 13 ft-lb)



SMA229B

INSPECTION AFTER INSTALLATION

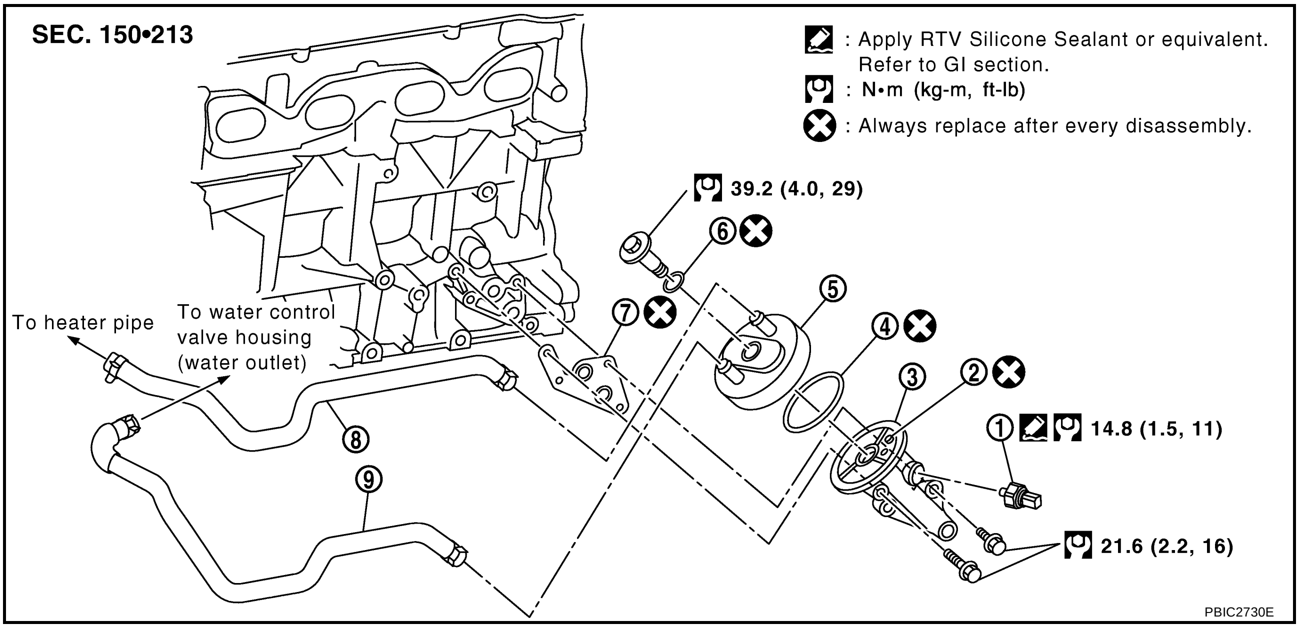
1. Check the engine oil level. Refer to LU-6, "ENGINE OIL" .
2. Start the engine, and check there is no leaks of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to LU-6, "ENGINE OIL" .

OIL COOLER

PFP:21305

Removal and Installation

ABS00CJZ



1. Oil pressure switch	2. Relief valve	3. Oil cooler bracket
4. O-ring	5. Oil cooler	6. O-ring
7. Gasket	8. Water hose	9. Water hose

WARNING:

Be careful not to get burned when engine coolant and engine oil may be hot.

CAUTION:

- **When removing oil cooler and oil cooler bracket, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Completely wipe off any engine oil that adhere to the engine and the vehicle.**

REMOVAL

1. Remove RH front road wheel and tire and RH undercover.
2. Drain engine coolant from radiator drain plug at the bottom of radiator and from water drain plug on cylinder block. Refer to CO-8, "Changing Engine Coolant" and EM-82, "CYLINDER BLOCK" .
3. Disconnect water hoses from oil cooler.
4. Remove oil cooler and oil cooler bracket.

   NOTE:

   For reference when installing, put a mating mark on oil cooler and oil cooler bracket.

INSPECTION AFTER REMOVAL

Oil Cooler

- Check oil cooler for cracks.
- Check oil cooler for clogging by blowing through engine coolant inlet.

If necessary, replace oil cooler assembly.

Relief Valve

Inspect relief valve for movement, cracks and breaks by pushing the ball. If replacement is necessary, remove valve by prying it out with a suitable tool. Install the new valve in place by tapping it.

INSTALLATION

Install in the reverse order of removal.

INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level, and adjust the levels. Refer to LU-6, "ENGINE OIL" and CO-8, "ENGINE COOLANT" .

2. Start the engine, and make sure there is no leaks of engine oil or engine coolant.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level and the engine coolant level again. Refer to LU-6, "ENGINE OIL" and CO-8, "ENGINE COOLANT" .

OIL PUMP

PFP:15010

Removal and Installation

ABS00CK0

REMOVAL

Remove front cover. Refer to EM-49, "TIMING CHAIN" .

NOTE:

Oil pump is built into front cover.

INSTALLATION

Note the following, and install in the reverse order of removal.

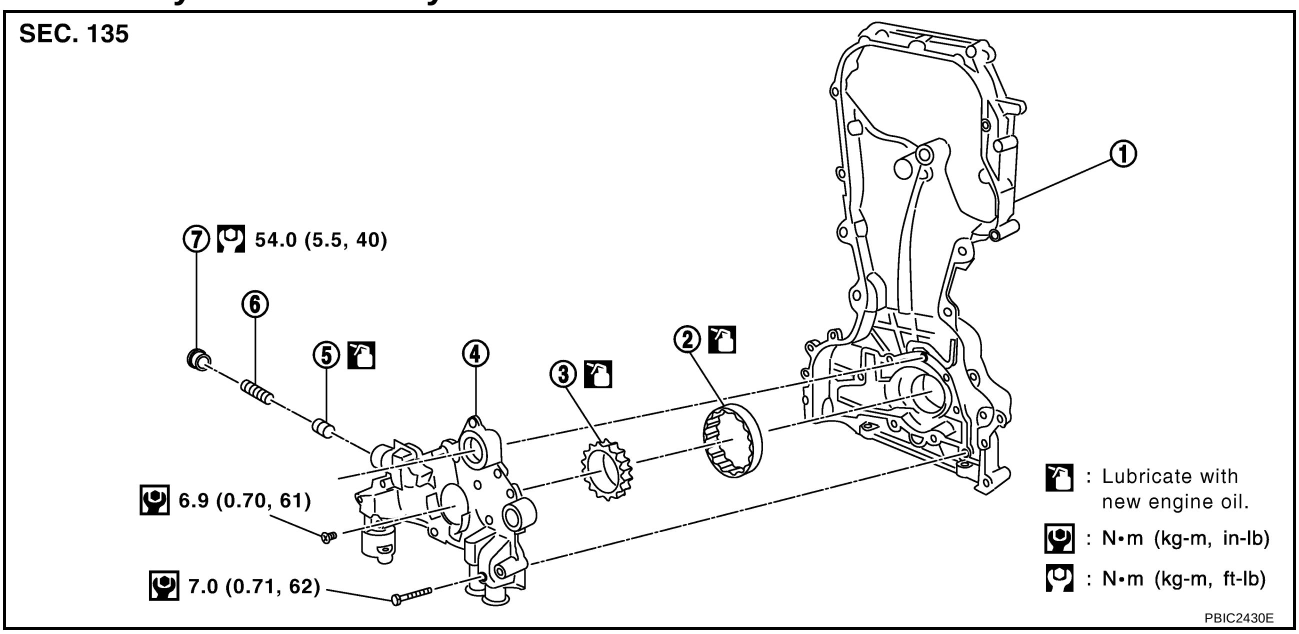
- When installing, align crankshaft flat faces with inner rotor flat faces.

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-6, "ENGINE OIL" .
2. Start the engine, and check there is no leaks of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level and adjust engine oil. Refer to LU-6, "ENGINE OIL" .

Disassembly and Assembly

ABS00CK1



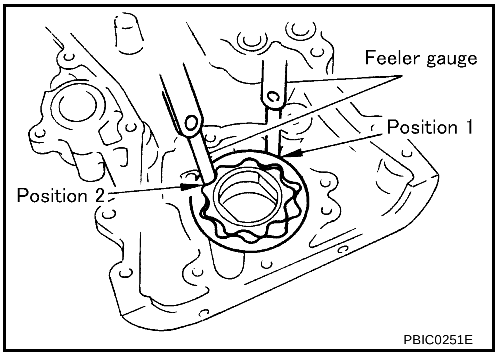
1. Front cover (Oil pump body is united)
2. Outer rotor
3. Inner rotor
4. Oil pump cover
5. Regulator valve
6. Regulator valve spring
7. Regulator valve plug

DISASSEMBLY

1. Remove oil pump cover.
2. Remove inner rotor and outer rotor from front cover.
3. After removing regulator valve plug, remove regulator valve spring and regulator valve.

INSPECTION AFTER DISASSEMBLY

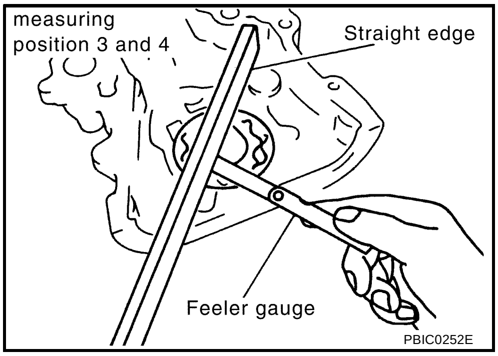
Clearance of Oil Pump Parts



- Measure the clearance with a feeler gauge.
  - Clearance between outer rotor and front cover (position 1)

    Standard : 0.114 - 0.179 mm (0.0045 - 0.0070 in)
  - If out of the standard, replace oil pump assembly.
  - Tip clearance between inner rotor and outer rotor (position 2)

    Standard : Below 0.220 mm (0.0087 in)
  - If out of the standard, replace inner rotor and outer rotor.

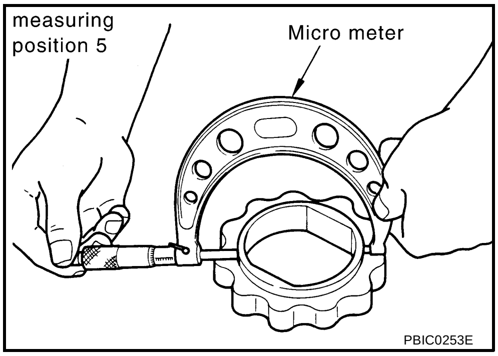


- Measure the clearance with a feeler gauge and a straightedge.
  - Side clearance between inner rotor and front cover (position 3)

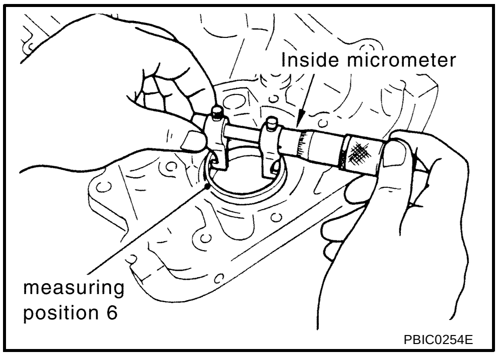
    Standard : 0.030 - 0.070 mm (0.0012 - 0.0028 in)
  - If out of the standard, replace oil pump assembly.
  - Side clearance between outer rotor and front cover (position 4)

    Standard : 0.060 - 0.110 mm (0.0024 - 0.0043 in)
  - If out of the standard, replace oil pump assembly.

- Calculate the clearance between inner rotor and front cover with the following procedure:
  - Measure the outer diameter of protruded portion of inner rotor with a micrometer. (position 5)



  - Measure the inner diameter of front cover with an inside micrometer. (position 6)

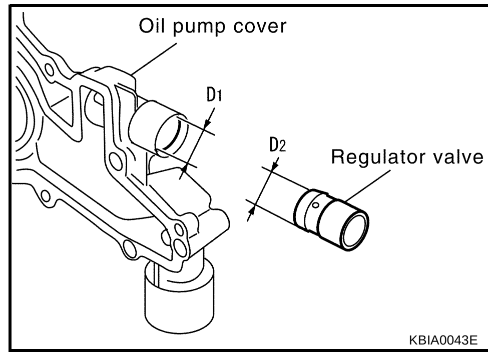


  - (Clearance) = (Inner diameter of front cover) – (Outer diameter of inner rotor)

    Standard : 0.035 - 0.070 mm (0.0014 - 0.0028 in)
  - If out of the standard, replace oil pump assembly.

Regulator Valve Clearance

(Clearance) = (Valve hole diameter “D1”) – (Regulator valve outer diameter “D2”)



Standard : 0.040 - 0.097 mm (0.0016 - 0.0038 in)

- If out of the standard, replace oil pump assembly.

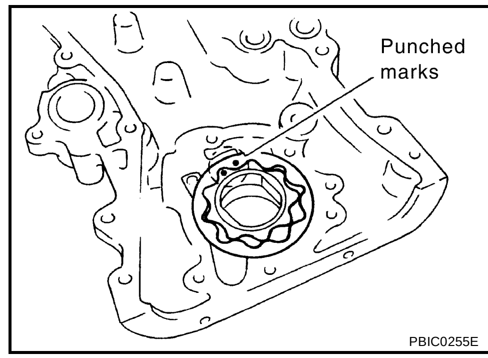
CAUTION:

- **Coat regulator valve with new engine oil.**
- **Make sure that it falls smoothly into valve hole by its own weight.**

ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

- Install inner rotor and outer rotor with the punched marks on the oil pump cover side.



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

ABS00CK2

OIL PRESSURE

Engine speed rpm	Approximate discharge pressure* kPa (kg/cm^2 , psi)
Idle speed	More than 98 (1.0, 14)
2,000	More than 294 (3.0, 43)

*: Engine oil temperature at 80° (176°F)

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.1 (4-3/8, 3-5/8)
	Without oil filter change	3.7 (3-7/8, 3-1/4)
Dry engine (Overhaul)		4.7 (5, 4-1/8)

OIL PUMP

Unit: mm (in)

Front cover to outer rotor radial clearance	0.114 - 0.179 (0.0045 - 0.0070)
Inner rotor to outer rotor tip clearance	Below 0.220 (0.0087)
Front cover to inner rotor side clearance	0.030 - 0.070 (0.0012 - 0.0028)
Front cover to outer rotor side clearance	0.060 - 0.110 (0.0024 - 0.0043)
Inner rotor to front cover clearance	0.035 - 0.070 (0.0014 - 0.0028)

REGULATOR VALVE

Unit: mm (in)

Regulator valve to valve hole clearance	0.040 - 0.097 (0.0016 - 0.0038)

SECTION MA
MAINTENANCE

CONTENTS

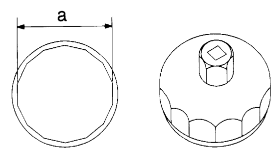
PREPARATION

PFP:00002

Special Service Tools

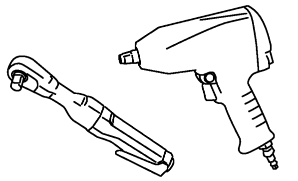
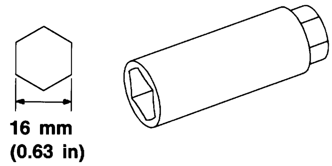
ALS000RV

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
KV10115801 (J-38956) Oil filter wrench	 S-NT375	Removing and installing oil filter **a: 64.3 mm (2.531 in)**

Commercial Service Tools

ALS000RW

(Kent-Moore No.) Tool name		Description
(—) Power tool	 PBIC0190E	Loosening nuts and bolts
(—) Spark plug wrench	 S-NT047	Removing and installing spark plug

A B C D E F G H I J K MA M

GENERAL MAINTENANCE

PFP:00000

Explanation of General Maintenance

ALS000RX

General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform checks and inspections themselves or have their NISSAN dealers do them.

OUTSIDE THE VEHICLE

The maintenance items listed here should be performed from time to time, unless otherwise specified.

Item		Reference page
Tires	Check the pressure with a gauge, including the spare, at least once a month and always prior to a long distance trips. Adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	—
Wheel nuts	When checking the tires, make sure no nuts are missing, and check for any loose nuts. Tighten if necessary.	—
Windshield	Clean the windshield on a regular basis. Check the windshield at least every six months for cracks or other damage. Repair as necessary.	—
Tire rotation	Tires should be rotated every 12,000 km (7,500 miles).	MA-25
Wheel alignment and balance	If the vehicle pulls to either side while driving on a straight and level road, or if you detect uneven or abnormal tire wear, there may be a need for wheel alignment. If the steering wheel or seat vibrates at normal highway speeds, wheel balancing may be needed.	MA-24, FSU-6
Windshield wiper blades	Check for cracks or wear if they do not wipe properly.	—
Doors and engine hood	Check that all doors and the engine hood operate smoothly as well as the trunk lid and back hatch. Also make sure that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released. When driving in areas using road salt or other corrosive materials, check lubrication frequently.	MA-29
Lamps	Make sure that the headlamps, stop lamps, tail lamps, turn signal lamps, and other lamps are all operating properly and installed securely. Also check headlamp aim. Clean the headlamps on a regular basis.	—

INSIDE THE VEHICLE

The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.

Item		Reference page
Warning lamps and chimes	Make sure that all warning lamps and chimes are operating properly.	—
Windshield wiper and washer	Check that the wipers and washer operate properly and that the wipers do not streak.	—
Windshield defroster	Check that the air comes out of the defroster outlets properly and in sufficient quantity when operating the heater or air conditioner.	—
Steering wheel	Check that it has the specified play. Be sure to check for changes in the steering condition, such as excessive play, hard steering or strange noises. **Free play: Less than 35 mm (1.38 in)**	—
Seats	Check seat position controls such as seat adjusters, seatback recliner, etc. to make sure they operate smoothly and that all latches lock securely in every position. Check that the head restrains move up and down smoothly and that the locks (if equipped) hold securely in all latched positions. Check that the latches lock securely for folding-down rear seatbacks.	—
Seat belts	Check that all parts of the seat belt system (e.g. buckles, anchors, adjusters and retractors) operate properly and smoothly, and are installed securely. Check the belt webbing for cuts, fraying, wear or damage.	MA-29
Clutch pedal	Make sure the pedal operates smoothly and check that it has proper clearance.	CL-5
Accelerator pedal	Check the pedal for smooth operation and make sure the pedal does not catch or require uneven effort. Keep the floor mats away from the pedal.	—

Item		Reference page
Brakes	Check that the brake does not pull the vehicle to one side when applied.	—
Brake pedal and booster	Check the pedal for smooth operation and make sure it has the proper distance under it when depressed fully. Check the brake booster function. Be sure to keep the floor mats away from the pedal.	BR-6, BR-21
Parking brake	Check that the lever has the proper travel and make sure that the vehicle is held securely on a fairly steep hill when only the parking brake is applied.	PB-3
Automatic transmission P (Park) position mechanism	On a fairly steep hill check that the vehicle is held securely with the selector lever in the P (Park) position without applying any brakes.	—

UNDER THE HOOD AND VEHICLE

The maintenance items listed here should be checked periodically (e.g. each time you check the engine oil or refuel).

Item		Reference page
Windshield washer fluid	Check that there is adequate fluid in the tank.	—
Engine coolant level	Check the coolant level when the engine is cold.	MA-13
Radiator and hoses	Check the front of the radiator and clean off any dirt, insects, leaves, etc., that may have accumulated. Make sure the hoses have no cracks, deformation, deterioration or loose connections.	—
Brake and clutch fluid levels	Make sure that the brake and clutch fluid levels are between the “MAX” and “MIN” lines on the reservoirs.	MA-20, MA-26
Battery	Check the fluid level in each cell. It should be between the “MAX” and “MIN” lines. Vehicles operated in high temperatures or under severe conditions require frequent checks of the battery fluid level.	—
Engine drive belts	Make sure that no belt is frayed, worn, cracked or oily.	MA-13
Engine oil level	Check the level on the dipstick after parking the vehicle on a level spot and turning off the engine.	MA-16
Power steering fluid level and lines	Check the level on the dipstick with the engine off. Check the lines for improper attachment, leaks, cracks, etc.	MA-27
Exhaust system	Make sure there are no loose supports, cracks or holes. If the sound of the exhaust seems unusual or there is a smell of exhaust fumes, immediately locate the trouble and correct it.	MA-20
Underbody	The underbody is frequently exposed to corrosive substances such as those used on icy roads or to control dust. It is very important to remove these substances, otherwise rust will form on the floor pan, frame, fuel lines and around the exhaust system. At the end of winter, the underbody should be thoroughly flushed with plain water, being careful to clean those areas where mud and dirt can easily accumulate.	—
Fluid leaks	Check under the vehicle for fuel, oil, water or other fluid leaks after the vehicle has been parked for a while. Water dripping from the air conditioner after use is normal. If you should notice any leaks or gasoline fumes are evident, check for the cause and correct it immediately.	—

PERIODIC MAINTENANCE

PFP:00026

Introduction of Periodic Maintenance

ALS000RY

Two different maintenance schedules are provided, and should be used, depending upon the conditions in which the vehicle is mainly operated. **After 60,000 miles (96,000 km) or 48 months, continue the periodic maintenance at the same mileage/time intervals.**

Schedule 1	Follow Periodic Maintenance Schedule 1 if the driving habits frequently include one or more of the following driving conditions: ● Repeated short trips of less than 5 miles (8 km). ● Repeated short trips of less than 10 miles (16 km) with outside temperatures remaining below freezing. ● Operating in hot weather in stop-and-go “rush hour” traffic. ● Extensive idling and/or low speed driving for long distances, such as police, taxi or door-to-door delivery use. ● Driving in dusty conditions. ● Driving on rough, muddy, or salt spread roads. ● Towing a trailer, using a camper or a car-top carrier.	Emission Control System Maintenance	MA-7
		Chassis and Body Maintenance	MA-8
Schedule 2	Follow Periodic Maintenance Schedule 2 if none of driving conditions shown in Schedule 1 apply to the driving habits.	Emission Control System Maintenance	MA-9
		Chassis and Body Maintenance	MA-9

Schedule 1

ALS000RZ

EMISSION CONTROL SYSTEM MAINTENANCE

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.75 (6) 3	7.50 (12) 6	11.25 (18) 9	15 (24) 12	18.75 (30) 15	22.5 (36) 18	26.25 (42) 21	30 (48) 24	
Drive belts	NOTE (1)									MA-13
Air cleaner filter	NOTE (2)								[R]	MA-15
EVAP vapor lines									I*	MA-19
Fuel lines									I*	MA-15
Fuel filter	NOTE (3)									-
Engine coolant	NOTE (4)									MA-13
Engine oil		R	R	R	R	R	R	R	R	MA-16
Engine oil filter (Use part No. 15208 31U00 or 15208 65F00 or equivalent.)		R	R	R	R	R	R	R	R	MA-17
Spark plugs (PLATINUM-TIPPED type)		Replace every 105,000 miles (169,000 km).								MA-18
Intake & exhaust valve clearance*	NOTE (5)									EM-46, "Valve Clearance"

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	33.75 (54) 27	37.5 (60) 30	41.25 (66) 33	45 (72) 36	48.75 (78) 39	52.5 (84) 42	56.25 (90) 45	60 (96) 48	
Drive belts	NOTE (1)								I*	MA-13
Air cleaner filter	NOTE (2)								[R]	MA-15
EVAP vapor lines									I*	MA-19
Fuel lines									I*	MA-15
Fuel filter	NOTE (3)									-
Engine coolant	NOTE (4)								R*	MA-13
Engine oil		R	R	R	R	R	R	R	R	MA-16
Engine oil filter (Use part No. 15208 31U00 or 15208 65F00 or equivalent.)		R	R	R	R	R	R	R	R	MA-17
Spark plugs (PLATINUM-TIPPED type)		Replace every 105,000 miles (169,000 km).								MA-18
Intake & exhaust valve clearance*	NOTE (5)									EM-46, "Valve Clearance"

NOTE:

(1) After 60,000 miles (96,000 km) or 48 months, inspect every 15,000 miles (24,000 km) or 12 months. Replace the drive belts if found damaged or if the auto belt tensioner reading of QR25DE engine reaches the maximum limit.
(2) If operating mainly in dusty conditions, more frequent maintenance may be required.
(3) Maintenance-free item. For service procedures, refer to FL section.
(4) After 60,000 miles (96,000 km) or 48 months, replace every 30,000 miles (48,000 km) or 24 months.
(5) If valve noise increases, inspect valve clearance.
* Maintenance items and intervals with "*" are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required.

CHASSIS AND BODY MAINTENANCE

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	3.75 (6) 3	7.50 (12) 6	11.25 (18) 9	15 (24) 12	18.75 (30) 15	22.5 (36) 18	26.25 (42) 21	30 (48) 24	
Brake lines & cables					I				I	MA-26
Brake pads & rotors			I		I		I		I	MA-26
Automatic transaxle fluid, manual transaxle gear oil, transfer oil & differential gear oil	NOTE (1)		I		I		I		I	MA-21, MA-20 , MA-22 , MA-23
Steering gear & linkage, axle & suspension parts			I		I		I		I	MA-27, MA-28
Tire rotation	NOTE (2)									MA-4, MA-25
Drive shaft boots and propeller shaft (AWD models)			I		I		I		I	MA-28, MA-23
Exhaust system			I		I		I		I	MA-20
In-cabin microfilter					R				R	ATC-109, MTC-69

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	33.75 (54) 27	37.5 (60) 30	41.25 (66) 33	45 (72) 36	48.75 (78) 39	52.5 (84) 42	56.25 (90) 45	60 (96) 48	
Brake lines & cables					I				I	MA-26
Brake pads & rotors			I		I		I		I	MA-26
Automatic transaxle fluid, manual transaxle gear oil, transfer oil & differential gear oil	NOTE (1)		I		I		I		I	MA-21, MA-20 , MA-22 , MA-23
Steering gear & linkage, axle & suspension parts			I		I		I		I	MA-27, MA-28
Tire rotation	NOTE (2)									MA-4, MA-25
Drive shaft boots and propeller shaft (AWD models)			I		I		I		I	MA-28, MA-23
Exhaust system			I		I		I		I	MA-20
In-cabin microfilter					R				R	ATC-109, MTC-69

NOTE:

(1) If towing a trailer, using a camper or a car-top carrier, or driving on rough or muddy roads, change (not just inspect) oil at every 30,000 miles (48,000) or 24 months.

(2) Refer to “Tire rotation” under the “General maintenance” heading earlier in this section.

Schedule 2

ALS000S0

EMISSION CONTROL SYSTEM MAINTENANCE

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary. [ ]: At the mileage intervals only

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	7.5 (12) 6	15 (24) 12	22.5 (36) 18	30 (48) 24	37.5 (60) 30	45 (72) 36	52.5 (84) 42	60 (96) 48	
Drive belts	NOTE (1)								I*	MA-13
Air cleaner filter					[R]				[R]	MA-15
EVAP vapor lines					I*				I*	MA-19
Fuel lines					I*				I*	MA-15
Fuel filter	NOTE (2)									-
Engine coolant	NOTE (3)								R*	MA-13
Engine oil		R	R	R	R	R	R	R	R	MA-16
Engine oil filter (Use part No. 15208 31U00 or 15208 65F00 or equivalent.)		R	R	R	R	R	R	R	R	MA-17
Spark plugs (PLATINUM-TIPPED type)		Replace every 105,000 miles (169,000 km).								MA-18
Intake & exhaust valve clearance*	NOTE (4)									EM-46, "Valve Clearance"

NOTE:

(1) After 60,000 miles (96,000 km) or 48 months, inspect every 15,000 miles (24,000 km) or 12 months. Replace the drive belts if found damaged.

(2) Maintenance-free item. For service procedures, refer to FL section.

(3) After 60,000 miles (96,000 km) or 48 months, replace every 30,000 miles (48,000 km) or 24 months.

(4) If valve noise increases, inspect valve clearance.

* Maintenance items and intervals with "*" are recommended by NISSAN for reliable vehicle operation. The owner need not perform such maintenance in order to maintain the emission warranty or manufacturer recall liability. Other maintenance items and intervals are required

CHASSIS AND BODY MAINTENANCE

Abbreviations: R = Replace. I = Inspect. Correct or replace if necessary.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference Section - Page or - Content Title
Perform at number of miles, kilometers or months, whichever comes first.	Miles x 1,000 (km x 1,000) Months	7.5 (12) 6	15 (24) 12	22.5 (36) 18	30 (48) 24	37.5 (60) 30	45 (72) 36	52.5 (84) 42	60 (96) 48	
Brake lines & cables			I		I		I		I	MA-26
Brake pads & rotors			I		I		I		I	MA-26
Automatic transaxle fluid, manual transaxle gear oil, transfer oil & differential gear oil			I		I		I		I	MA-21, MA-20 , MA-22 , MA-23
Steering gear & linkage, axle & suspension parts					I				I	MA-27, MA-28
Tire rotation	NOTE (1)									MA-4, MA-25
Drive shaft boots and propeller shaft (AWD models)			I		I		I		I	MA-28, MA-23
Exhaust system					I				I	MA-20
In-cabin microfilter			R		R		R		R	ATC-109, MTC-69

NOTE:

(1) Refer to “Tire rotation” under the “General maintenance” heading earlier in this section.

RECOMMENDED FLUIDS AND LUBRICANTS

PFP:00000

Fluids and Lubricants

ALS000S1

		Capacity (Approximate)			Recommended Fluids/Lubricants
		US measure	Imp measure	Liter	
Engine oil Drain and refill	With oil filter change	4-3/8 qt	3-5/8 qt	4.1	● API Certification Mark*1 ● API grade SG/SH, Energy Conserving I & II or API grade SJ or SL, Energy Conserving*1 ● ILSAC grade GF-I, GF-II & GF-III *1
	Without oil filter change	3-7/8 qt	3-1/4 qt	3.7	
Dry engine (Overhaul)		5 qt	4-1/8 qt	4.7	
Cooling system	With reservoir tank	7-1/2 qt	6-1/4 qt	7.1	Genuine NISSAN Long Life Antifreeze/Coolant or equivalent
	Reservoir tank	3/4 qt	5/8 qt	0.7	
Manual transaxle gear oil		2-3/8 qt	2 qt	2.2	Genuine NISSAN Manual Transmission fluid (MTF) HQ Multi 75W-85 or API GL-4, Viscosity SAE 75W-85
Automatic transaxle fluid		9 qt	7-1/2 qt	8.5	NISSAN Automatic Transmission Fluid (ATF), DEXRON™ III/ MERCON™, or equivalent ATF
Differential gear oil		1-1/8 pt	1 pt	0.55	API GL-5, Viscosity SAE 80 W-90 *2
Transfer oil		5/8 pt	1/2 pt	0.31	API GL-5, Viscosity SAE 80 W-90
Power steering fluid (PSF)		1-1/8 qt	7/8 qt	1.0	Genuine NISSAN PSF or equivalent*3
Brake and clutch fluids		—	—	—	DOT 3 (US FMVSS No. 116)
Multi-purpose grease		—	—	—	NLGI No. 2 (Lithium soap base)
Windshield washer fluid		—	—	—	Genuine NISSAN Windshield Washer Concentrate Cleaner & Antifreeze Fluid or equivalent
Fuel recommendation		—	—	—	Refer to GI-5, "Precautions for Fuel (Unleaded Regular Gasoline Recommended)" .

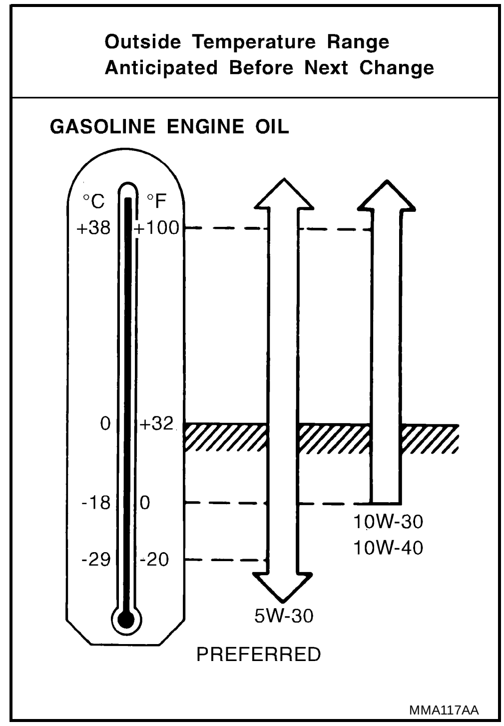
*1: For further details, see “SAE Viscosity Number”.
*2: For hot climates, viscosity SAE 90 is suitable for ambient temperatures above 0°C (32°F).
*3:NISSAN Automatic Transmission Fluid (ATF), DEXRON™ III/ MERCON™ or equivalent ATF may also be used.

SAE Viscosity Number

ALS000S2

GASOLINE ENGINE OIL

SAE 5W-30 viscosity oil is preferred for all temperatures. SAE 10W-30 and 10W-40 viscosity oil may be used if the ambient temperature is above -18°C(0°F)



Anti-Freeze Coolant Mixture Ratio

ALS000S3

The engine cooling system is filled at the factory with a high-quality, year-round, anti-freeze coolant solution. The anti-freeze solution contains rust and corrosion inhibitors. Therefore, additional cooling system additives are not necessary.

CAUTION:

When adding or replacing coolant, be sure to use only Genuine NISSAN Long Life Antifreeze/Coolant or equivalent with the proper mixture ratio of 50% anti-freeze and 50% demineralized water/distilled water.

Other types of coolant solutions may damage your cooling system.

Outside temperature down to		Anti-freeze	Demineralized water or distilled water
°C	°F		
–35	–30	50%	50%

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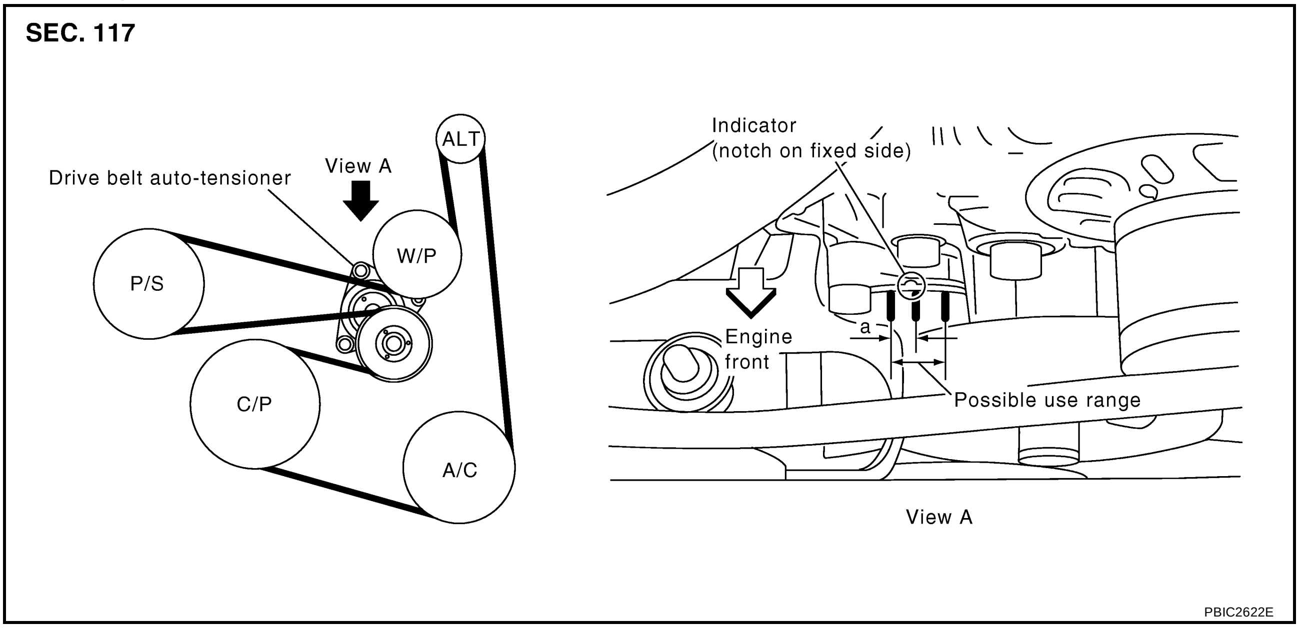
ENGINE MAINTENANCE

PFP:00000

Checking Drive Belt

ALS000S4



WARNING:

Be sure to perform this step when the engine is stopped.

- Make sure that the indicator (notch on fixed side) of drive belt auto-tensioner is within the possible use range (between three line notches on moving side).

  NOTE:
  - Check the drive belt auto-tensioner indication when the engine is cold.
  - When new drive belt is installed, the indicator (notch on fixed side) should be within the range “a” in the figure.
- Visually check entire drive belt for wear, damage or cracks.
- If the indicator (notch on fixed side) is out of the possible use range or belt is damaged, replace drive belt.

Tension Adjustment

ALS000S5

Belt tensioning is not necessary, as it is automatically adjusted by drive belt auto-tensioner.

Changing Engine Coolant

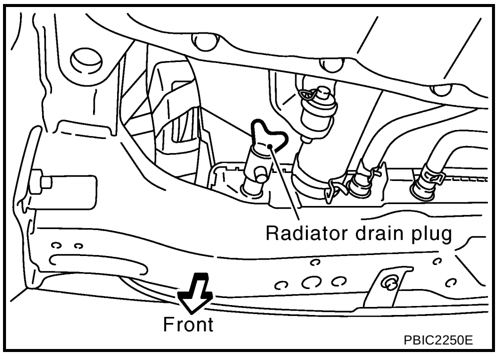
ALS000S6

WARNING:

- **To avoid being scalded, do not change engine coolant when the engine is hot.**
- **Wrap a thick cloth around radiator cap and carefully remove the cap. First, turn the cap a quarter of a turn to release built-up pressure. Then turn the cap all the way.**
- **Be careful not to allow engine coolant to contact drive belt.**

DRAINING ENGINE COOLANT

1. Remove RH and LH undercovers.
2. Open radiator drain plug at the bottom of radiator, and then remove radiator cap.



When drain all of engine coolant in the system, open water drain plug on cylinder block. Refer to **EM-82, "CYLINDER BLOCK"** **.**

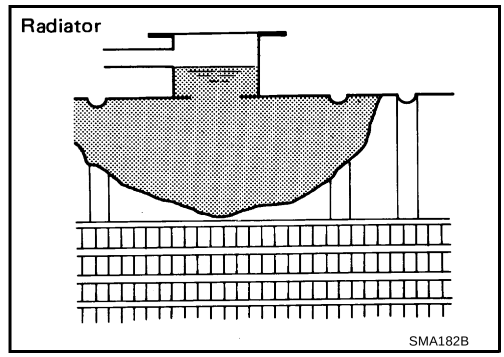
3. Remove reservoir tank as necessary, and drain engine coolant and clean reservoir tank before installing.
4. Check drained engine coolant for contaminants such as rust, corrosion or discoloration. If contaminated, flush the engine cooling system. Refer to MA-15, "FLUSHING COOLING SYSTEM" .

REFILLING ENGINE COOLANT

1. Install reservoir tank if removed, and radiator drain plug.

   CAUTION:

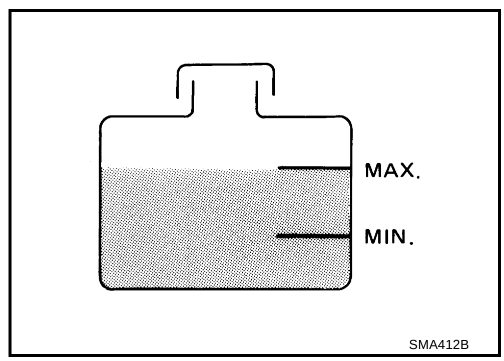
   Be sure to clean drain plug and install with new O-ring.
   If water drain plug on cylinder block is removed, close and tighten it. Refer to **EM-82, "CYLINDER BLOCK"** **.**
2. Make sure that each hose clamp has been firmly tightened.
3. Fill radiator and reservoir tank to the specified level.



   - **Pour engine coolant through engine coolant filler neck slowly of less than 2 ℓ (2-1/8 US qt, 1-3/4 Imp qt) a minute to allow air in system to escape.**
   - **Use Genuine NISSAN Long Life Antifreeze/ Coolant or equivalent mixed with water (distilled or demineralized). Refer to** **MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS"** **.**

   Engine coolant capacity (With reservoir tank at “MAX” level)
   : Approx. 7.1 ℓ (7-1/2 US qt, 6-1/4 Imp qt)

   Reservoir tank engine coolant capacity (At “MAX” level)
   : 0.7 ℓ (3/4 US qt, 5/8 Imp qt)



4. Install radiator cap.
5. Warm up until opening thermostat and water control valve. Standard for warming-up time is approximately 10 minutes at 3,000 rpm.
   - Make sure thermostat opening condition by touching radiator hose (lower) to see a flow of warm water.

   CAUTION:

   Watch water temperature gauge so as not to overheat the engine.
6. Stop the engine and cool down to less than approximately 50°C (122°F).
   - Cool down using fan to reduce the time.
   - If necessary, refill radiator up to filler neck with engine coolant.
7. Refill reservoir tank to “MAX” level line with engine coolant.
8. Repeat steps 3 through 6 two or more times with radiator cap installed until the engine coolant level no longer drops.
9. Check cooling system for leaks with the engine running.
10. Warm up the engine, and check for sound of engine coolant flow while running the engine from idle up to 3,000 rpm with heater temperature controller set at several position between “COOL” and “WARM”.
    - Sound may be noticeable at heater unit.
11. Repeat step 10 three times.

12. If sound is heard, bleed air from cooling system by repeating step 3 through 6 until the engine coolant level no longer drops.
    - **Clean excess engine coolant from the engine.**

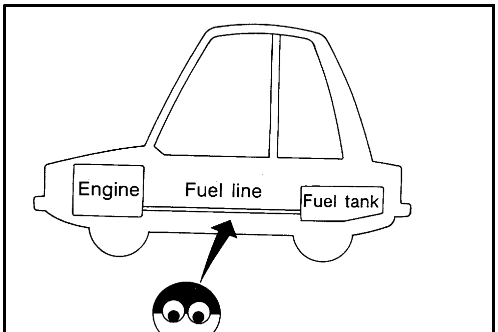
FLUSHING COOLING SYSTEM

1. Install reservoir tank if removed, and radiator drain plug.
   CAUTION:
   Be sure to clean drain plug and install with new O-ring.
   If water drain plug on cylinder block is removed, close and tighten it. Refer to EM-82, "CYLINDER BLOCK" .
2. Fill radiator and reservoir tank with water and reinstall radiator cap.
3. Run the engine and warm it up to normal operating temperature.
4. Rev the engine two or three times under no-load.
5. Stop the engine and wait until it cools down.
6. Drain water from the system. Refer to MA-13, "DRAINING ENGINE COOLANT" .
7. Repeat steps 1 through 6 until clear water begins to drain from radiator.

Checking Fuel Lines

ALS000S7

Inspect fuel lines, filler cap and tank for improper attachment, leaks, cracks, damage, loose connections, chafing or deterioration.
If necessary, repair or replace damaged parts.



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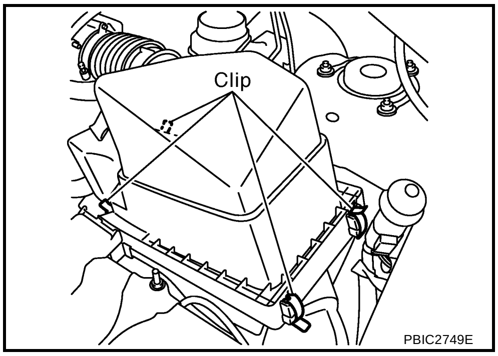
Changing Air Cleaner Filter

ALS000S8

VISCOUS PAPER TYPE

The viscous paper type filter does not need cleaning between replacement intervals. Refer to MA-6, "PERIODIC MAINTENANCE" .

1. Unfasten clips and lift up air cleaner case upper.
2. Remove air cleaner filter.



PBIC2749E

Changing Engine Oil

ALS000S9

WARNING:

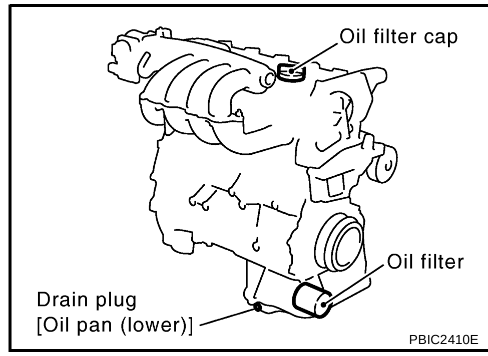
- **Be careful not to burn yourself, as engine oil may be hot.**
- **Prolonged and repeated contact with used engine oil may cause skin cancer; try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.**

1. Warm up the engine, put the vehicle horizontally and check for oil leakage from the engine components. Refer to LU-6, "ENGINE OIL LEAKAGE" .
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap and then remove drain plug.
4. Drain engine oil.
5. Install drain plug with new washer. Refer to EM-22, "OIL PAN AND OIL STRAINER" .

   CAUTION:
   Be sure to clean drain plug and install with new washer.

   Oil pan drain plug:

   : 34.3 N·m (3.5 kg-m, 25 ft-lb)



6. Refill with new engine oil.
   Engine oil specification and viscosity:
   Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

   Engine oil capacity (Approximate):

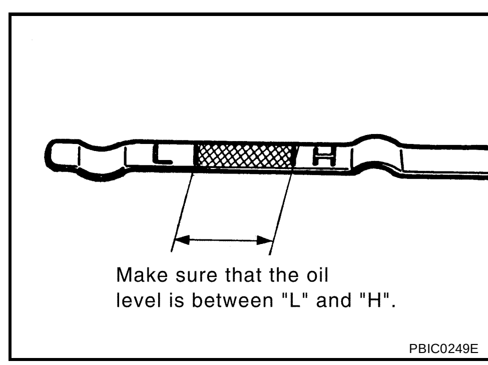
Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.1 (4-3/8, 3-5/8)
	Without oil filter change	3.7 (3-7/8, 3-1/4)
Dry engine (Overhaul)		4.7 (5, 4-1/8)

CAUTION:

- **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
- **Always use oil level gauge to determine the proper amount of engine oil in the engine.**

7. Warm up the engine and check area around drain plug and oil filter for oil leakage.
8. Stop the engine and wait for 10 minutes.
9. Check the engine oil level.

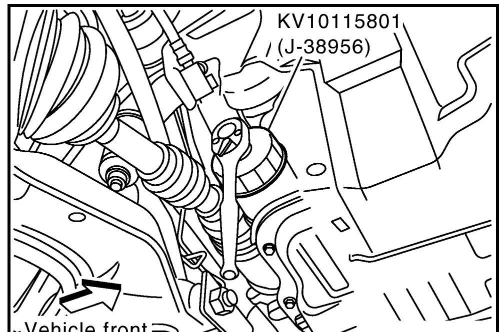


Changing Oil Filter

ALS000SA

REMOVAL

1. Open oil filter installation/removal cover on RH undercover.
2. Using the oil filter wrench [SST], remove oil filter.

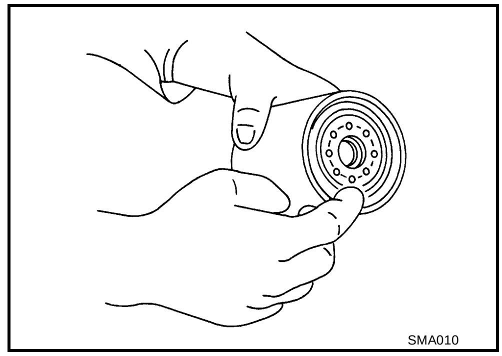


PBIC2729E

CAUTION:
- **Oil filter is provided with relief valve. Use Genuine Nissan Oil Filter or equivalent.**
- **Be careful not to get burned when the engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Do not allow engine oil to adhere to drive belt.**
- **Completely wipe off any engine oil that adheres to the engine and the vehicle.**

INSTALLATION

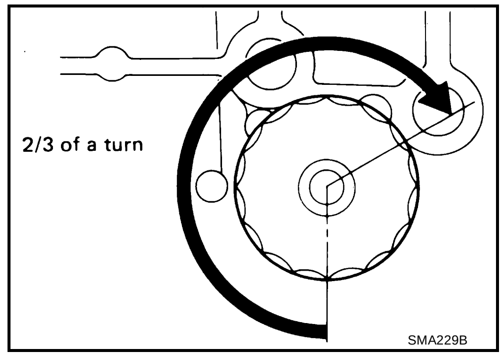
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.


SMA010

3. Screw oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to the specification.

Oil filter:

: 17.6 N·m (1.8 kg-m, 13 ft-lb)



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INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to MA-16, "Changing Engine Oil" .
2. Start the engine, and check there is no leaks of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to MA-16, "Changing Engine Oil" .

Changing Spark Plugs (Platinum-Tipped Type)

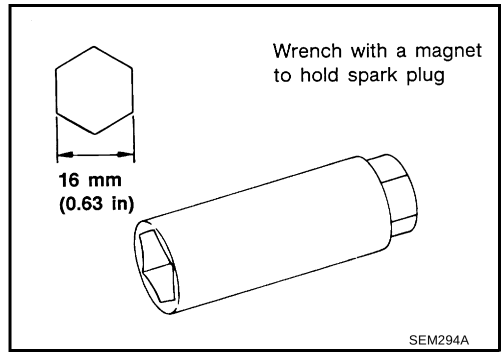
ALS000SB

REMOVAL

1. Remove engine cover. Refer to EM-16, "INTAKE MANIFOLD" .
2. Remove ignition coil. Refer to EM-27, "IGNITION COIL" .
3. Remove spark plug with a spark plug wrench (commercial service tool).

   CAUTION:

   Do not drop or shock it.



SEM294A

INSPECTION AFTER REMOVAL

Use standard type spark plug for normal condition.

Hot type spark plug is suitable when fouling occurs with standard type spark plug under conditions such as:

- Frequent engine starts
- Low ambient temperatures

Cold type spark plug is suitable when spark plug knock occurs with standard type spark plug under conditions such as:

- Extended highway driving
- Frequent high engine revolution

Make	NGK
Standard type	PLFR5A-11
Hot type	PLFR4A-11
Cold type	PLFR6A-11

Gap (Nominal) : 1.1 mm (0.043 in)

CAUTION:

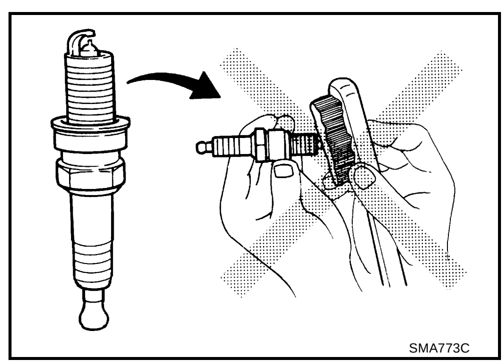
- **Do not drop or shock spark plug.**
- **Do not use wire brush for cleaning.**
- **If plug tip is covered with carbon, spark plug cleaner may be used.**

  Cleaner air pressure:

  Less than 588 kPa (6 kg/cm^2 , 85 psi)

  Cleaning time:

  Less than 20 seconds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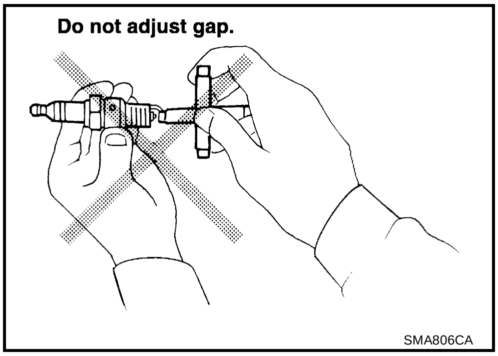
- **Checking and adjusting plug gap is not required between change intervals.**



SMA806CA

INSTALLATION

Install in the reverse order of removal.

: 24.5 N·m (2.5 kg-m, 18 ft-lb)

Checking EVAP Vapor Lines

ALS000SC

1. Visually inspect EVAP vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Inspect fuel tank filler cap vacuum relief valve for clogging, sticking, etc.
   Refer to EC-30, "EVAPORATIVE EMISSION SYSTEM" **.**

CHASSIS AND BODY MAINTENANCE

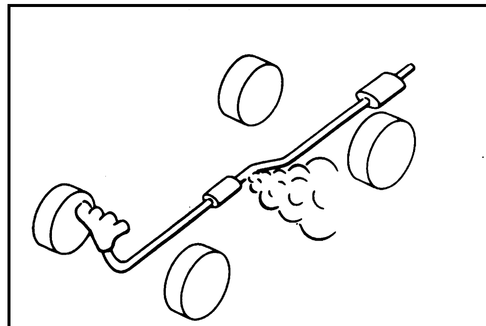
PFP:00100

Checking Exhaust System

ALS000SD

Check exhaust pipes, muffler and mounting for improper attachment, leaks, cracks, damage, chafing or deterioration.

- If anything is found, repair or replace damaged parts.

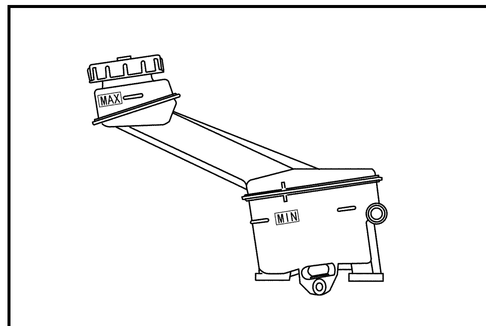


SMA211A

Checking Clutch Fluid Level and Leaks

ALS000TC

If fluid level is extremely low, check clutch system for leaks.



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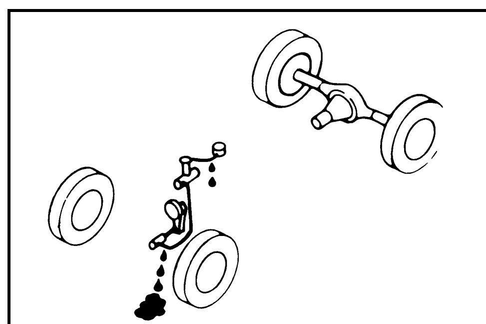
Checking Clutch System

ALS000TD

Check fluid lines and operating cylinder for improper attachment, cracks, damage, loose connections, chafing and deterioration.



SMA859

Checking M/T Oil

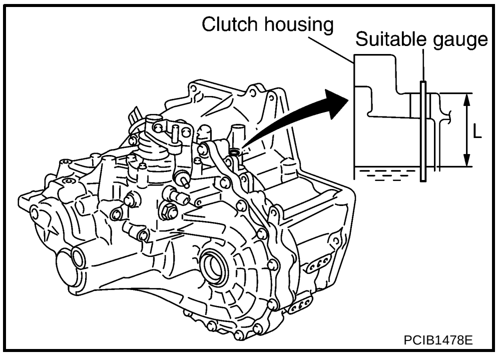
ALS000TE

Check for oil leakage.
(For details, refer to MT-11, "Checking M/T Oil" .)

Changing M/T Oil

ALS000TF

1. Drain oil from drain plug and refill with new gear oil.
   (For details, refer to MT-11, "Changing M/T Oil" .)
2. Check oil level.



Oil grade and viscosity:

Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Oil level “L”: 168.0 - 174.0 mm (6.61 - 6.85 in)

Oil capacity (reference): Approx. 2.2 ℓ (2-3/8 US qt, 2 Imp qt)

Drain plug:

: 34.5 N·m (3.5 kg-m, 25 ft-lb)

CAUTION:
Do not reuse gasket.

Checking A/T Fluid

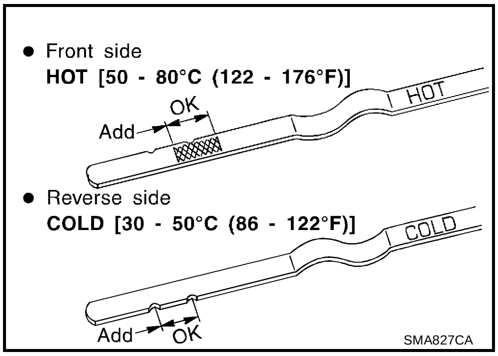
ALS000SE

1. Warm up engine.
2. Check for A/T fluid leakage.
3. Before driving, A/T fluid level can be checked at A/T fluid temperatures of 30 to 50°C (86 to 122°F) using “COLD” range on A/T fluid level gauge.

a. Park vehicle on level surface and set parking brake.

b. Start engine and move selector lever through each gear position. Leave selector lever in “P” position.

c. Check A/T fluid level with engine idling.

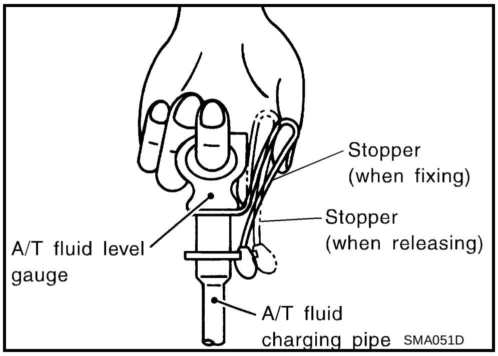


d. Remove A/T fluid level gauge and note reading. If level is at low side of either range, and A/T fluid to the A/T fluid charging pipe.

CAUTION:
When wiping away the A/T fluid level gauge, always use lint-free paper, not a cloth one.

e. Re-insert A/T fluid level gauge into A/T fluid charging pipe as far as it will go.

CAUTION:
Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.



f. Remove A/T fluid level gauge and note reading. If reading is at low side of range, add A/T fluid to the A/T fluid charging pipe.

CAUTION:
Do not overfill.

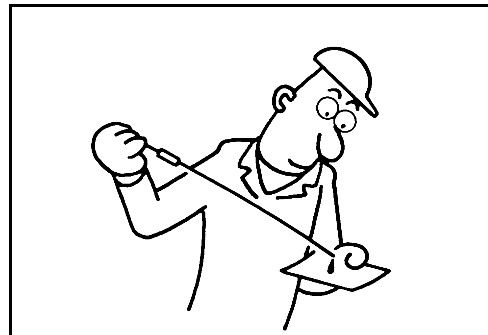
4. Drive vehicle for approximately 5 minutes in urban areas.
5. Recheck A/T fluid level at A/T fluid temperatures of 50 to 80°C (122 to 176°F) using “HOT” range on A/T fluid level gauge.

CAUTION:
- **When wiping away the A/T fluid level gauge, always use lint-free paper, not a cloth one.**
- **Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.**

6. Check A/T fluid condition.
   - If A/T fluid is very dark or smells burned, checking operation of A/T. Flush cooling system after repair of A/T.
   - If A/T fluid contains frictional material (clutches, bands, etc.), replace radiator and flush cooler line using cleaning solvent and compressed air after repair of A/T. Refer to CO-11, "RADIATOR" , CO-14, "RADIATOR (ALUMINUM TYPE)" .
7. Install the removed A/T fluid level gauge in the A/T fluid charging pipe.

   CAUTION:

   Firmly fix the A/T fluid level gauge to the A/T fluid charging pipe using a stopper attached.



SAT638A

Changing A/T Fluid

ALS000SF

1. Warm up A/T fluid.
2. Stop engine.
3. Drain A/T fluid from drain plug and refill with new A/T fluid. Always refill same volume with drained fluid.

   CAUTION:

   Do not reuse drain plug gasket.

   Fluid grade:

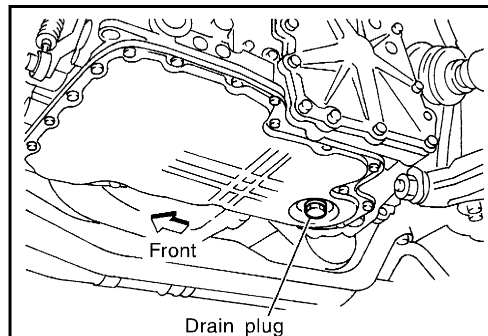
   Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

   Fluid capacity (With torque converter):

   Approx. 8.5 ℓ (9 US qt, 7-1/2 Imp qt)

   Drain plug:

   : 34 N·m (3.5 kg-m, 25 ft-lb)



SMA027D

4. Run engine at idle speed for 5 minutes.
5. Check A/T fluid level and condition. Refer to AT-17, "Checking A/T Fluid" . If A/T fluid is still dirty, repeat steps 2 through 5.

Checking Transfer Oil

ALS000SG

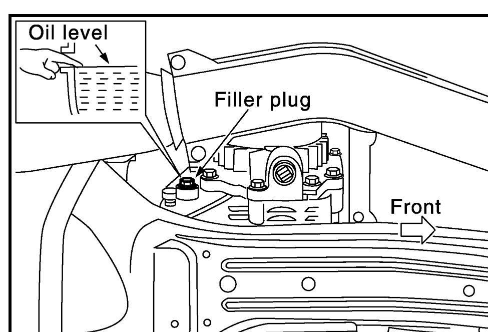
Check for oil leakage and oil level.
(For details, refer to TF-9, "Changing Transfer Oil" .)

CAUTION:

Do not start engine while checking oil level.

Filler plug:

: 14.7 N·m (1.5 kg-m, 11 ft-lb)



SDIA0513E

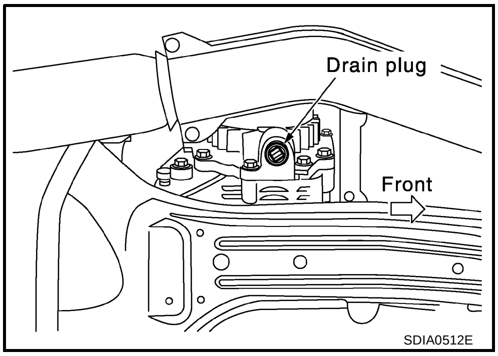
Changing Transfer Oil

ALS000SH

CAUTION:

When draining oil, protect exhaust tube flange with cover.

1. Drain oil from drain plug and refill with new gear oil.
   (For details, refer to TF-9, "Changing Transfer Oil" .)



SDIA0512E

2. Check oil level.

   CAUTION:

   Carefully fill the oil. (Fill up for Approx. 3 minutes.)

Oil grade and viscosity:

Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Oil capacity:

: Approx. 0.31 ℓ (5/8 US pt, 1/2 Imp pt)

Drain plug:

: 14.7 N·m (1.5 kg-m, 11 ft-lb)

Filler plug:

: 14.7 N·m (1.5 kg-m, 11 ft-lb)

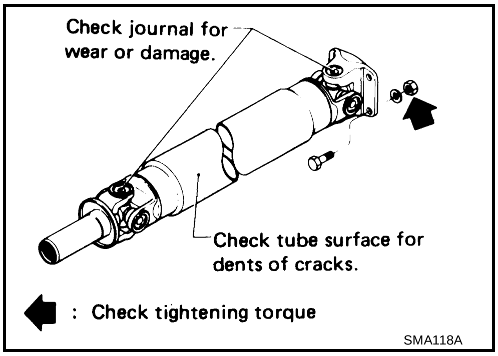
Checking Propeller Shaft

ALS000SI

Check propeller shaft for damage, looseness or grease leakage.

Tightening torque:

Refer to PR-3, "REAR PROPELLER SHAFT" .

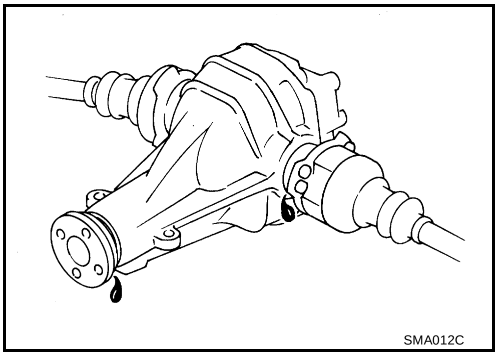


SMA118A

Checking Differential Gear Oil

ALS000SJ

Check for oil leakage and oil level.
(For details, refer to RFD-8, "Checking Differential Gear Oil" .)


SMA012C

Filler plug:

: 34.5 N·m (3.5 kg-m, 25 ft-lb)

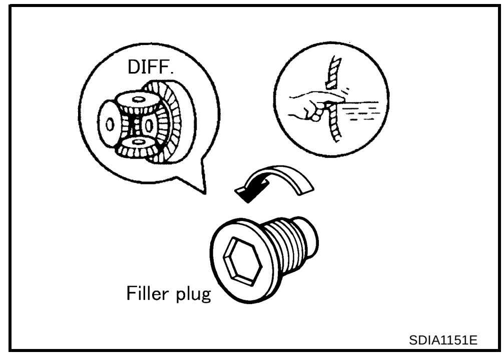
CAUTION:

Do not reuse gasket.

Changing Differential Gear Oil

ALS000SK

1. Drain oil from drain plug and refill with new gear oil.
   (For details, refer to RFD-8, "Changing Differential Gear Oil" .)
2. Check oil level.



SDIA1151E

Oil grad and Viscosity:

Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

Capacity:

0.55 ℓ (1-1/8 US pt, 1 Imp pt)

Drain plug:

: 34.5 N·m (3.5 kg-m, 25 ft-lb)

Filler plug:

: 34.5 N·m (3.5 kg-m, 25 ft-lb)

CAUTION:
Do not reuse gaskets.

Balancing Wheels (Bonding Weight Type)

ALS000SL

REMOVAL

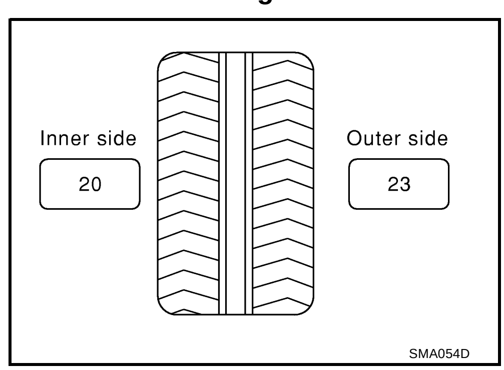
1. Remove inner and outer balance weights from the road wheel.
   CAUTION:
   Be careful not to scratch the road wheel during removal.
2. Using releasing agent, remove double-faced adhesive tape from the road wheel.
   CAUTION:
   - **Be careful not to scratch the road wheel during removal.**
   - **After removing double-faced adhesive tape, wipe clean traces of releasing agent from the road wheel.**

WHEEL BALANCE ADJUSTMENT

- If a tire balance machine has adhesion balance weight mode settings and drive-in weight mode setting, select and adjust a drive-in weight mode suitable for road wheels.

1. Set road wheel on wheel balancer using the center hole as a guide. Start the tire balance machine.
2. When inner and outer unbalance values are shown on the wheel balancer indicator, multiply outer unbalance value by 5/3 to determine balance weight that should be used. Select the outer balance weight with a value closest to the calculated value above and install it to the designated outer position of, or at the designated angle in relation to the road wheel.
   CAUTION:
   - **Do not install the inner balance weight before installing the outer balance weight.**
   - **Before installing the balance weight, be sure to clean the mating surface of the road wheel.**

   Indicated unbalance value × 5/3 = balance weight to be installed
   Calculation example:
   23 g (0.81 oz) × 5/3 = 38.33 g (1.35 oz) = 40 g (1.41 oz) balance weight (closer to calculated balance weight value)
   Note that balance weight value must be closer to the calculated balance weight value.
   Example:
   37.4 = 35 g (1.23 oz)
   37.5 = 40 g (1.41 oz)



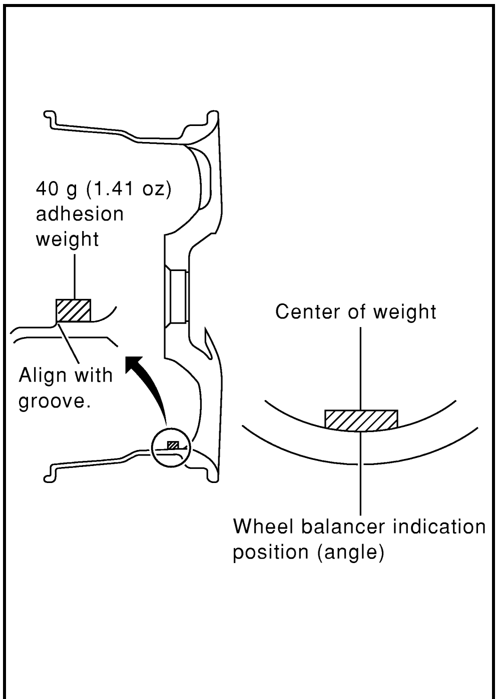
SMA054D

a. Install balance weight in the position shown in the figure at right.

b. When installing balance weight to road wheels, set it into the grooved area on the inner wall of the road wheel as shown in the figure so that the balance weight center is aligned with the wheel balancer indication position (angle).

CAUTION:

- **Always use genuine Nissan adhesion balance weights.**
- **Balance weights are unreusable; always replace with new ones.**
- **Do not install more than three sheets of balance weight.**

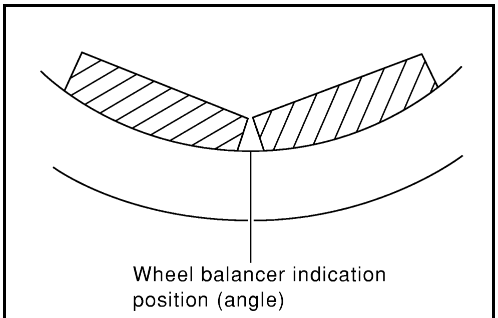


SEIA0166E

c. If calculated balance weight value exceeds 50 g (1.76 oz), install two balance weight sheets in line with each other (as shown in the figure).

CAUTION:

Do not install one balance weight sheet on top of another.



SMA056D

3. Start wheel balancer again.
4. Install drive-in balance weight on inner side of road wheel in the wheel balancer indication position (angle).

CAUTION:

Do not install more than two balance weights.

5. Start wheel balancer. Make sure that inner and outer residual unbalance values are 10 g (0.35 oz) each or below.
   - If either residual unbalance value exceeds 10 g (0.35 oz), repeat installation procedures.

Wheel balance (Maximum allowable unbalance):

Maximum allowable unbalance	Dynamic (At rim flange)	Less than 10 g (0.35 oz) (one side)
	Static (At rim flange)	Less than 20 g (0.70 oz)

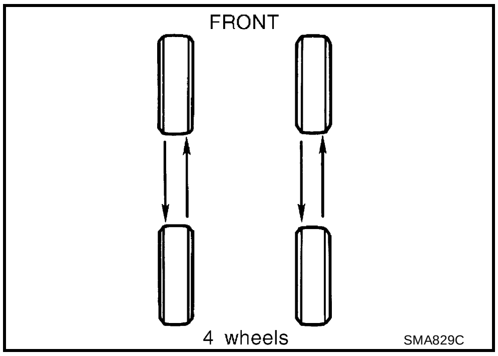
Tire Rotation

ALS000SM

Do not include the T-type spare tire when rotating the tires.

Wheel nuts

: 98.1 - 127 N·m (10 - 12 kg-m, 73 - 93 ft-lb)

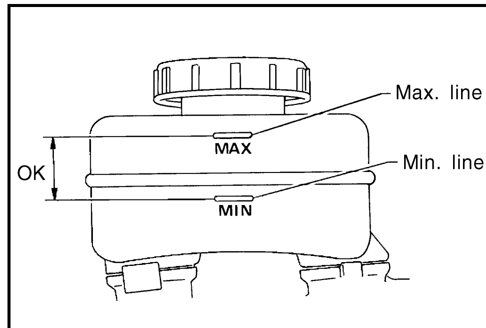


SMA829C

Checking Brake Fluid Level and Leaks

ALS000SN

- If fluid level is extremely low, check brake system for leaks.

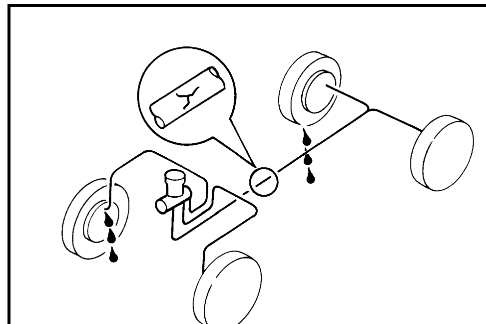


SBR451D

Checking Brake Lines and Cables

ALS000SO

- Check brake fluid lines and parking brake cables for improper attachment, leaks, chafing, abrasions, deterioration, etc.

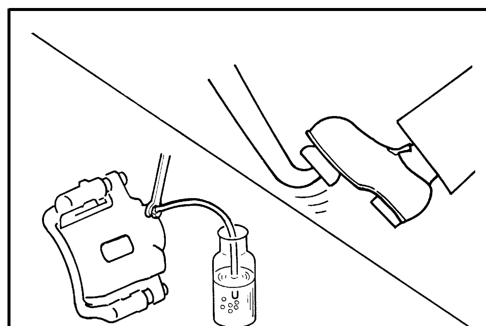


SBR389C

Changing Brake Fluid

ALS000SP

1. Drain brake fluid from each bleed valve.
2. Refill until new brake fluid comes out from each bleed valve.
   Use same procedure as in bleeding hydraulic system to refill brake fluid.
   Refer to BR-10, "Bleeding Brake System" .
   - Refill with recommended Genuine Brake Fluid or equivalent DOT 3 (US FMVSS No. 116).
     Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .
   - Never reuse drained brake fluid.
   - Be careful not to splash brake fluid on painted areas.



SBR419C

Checking Disc Brake

ALS000SQ

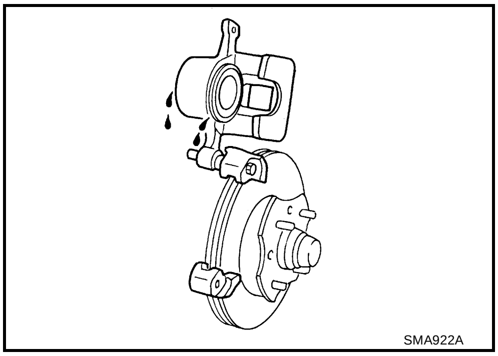
ROTOR

Check condition, wear, and damage.

	Front	Rear
Brake model	AD31VD	AD9VA
Standard thickness	28.0 mm (1.102 in)	16.0 mm (0.630 in)
Maximum runout	0.06 mm (0.0024 in)	0.1 mm (0.0039 in)
Minimum thickness (Wear limit)	26.0 mm (1.024 in)	14.0 mm (0.551 in)

CALIPER

- Check for leakage.

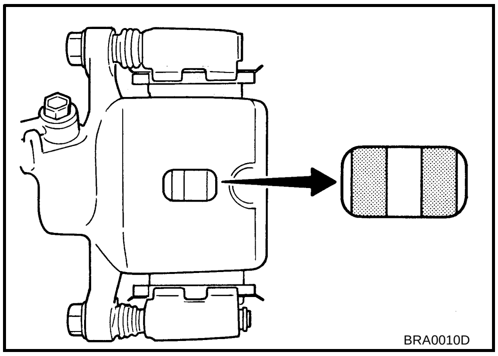

SMA922A

A B C D E F G H I J K MA M

PAD

- Check for wear or damage.

Brake model	AD31VD	AD9VA
Standard thickness	11.0 mm (0.433 in)	8.5 mm (0.335 in)
Minimum thickness (Wear limit)	2.0 mm (0.079 in)	2.0 mm (0.079 in)

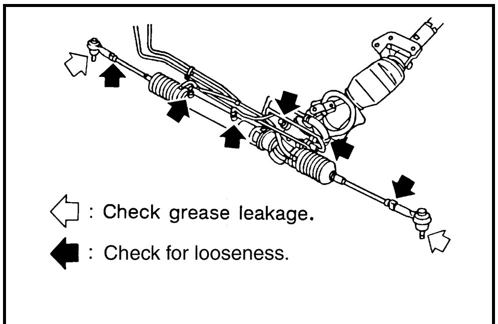

BRA0010D

Checking Steering Gear and Linkage

ALS000SR

STEERING GEAR

- Check gear housing and boots for looseness, damage and grease leakage.
- Check connection with steering column for looseness.



SLIA0014E

STEERING LINKAGE

Check ball joint, dust cover and other component parts for looseness, wear, damage and grease leakage.

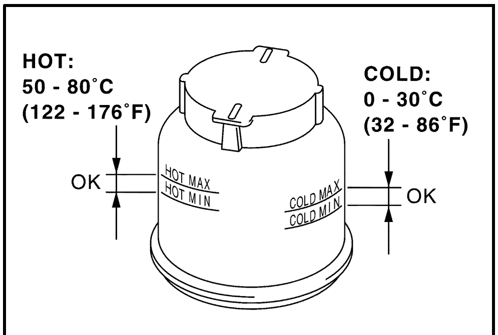
Checking Power Steering Fluid and Lines

ALS000SS

Check fluid level in reservoir tank with engine off.
Use “HOT” range at fluid temperatures of 50 to 80°C (122 to 176°F) or “COLD” range at fluid temperatures of 0 to 30°C (32 to 86°F).

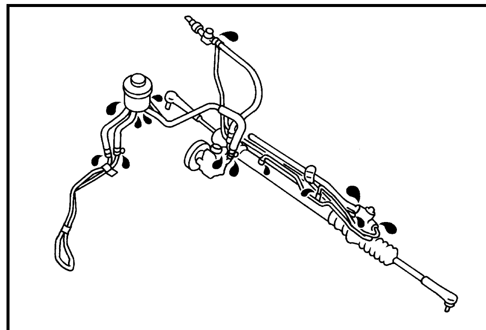
CAUTION:

- **Do not overfill.**
- **Recommended fluid is Genuine NISSAN PSF or equivalent. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .**



SST850C

- **Check lines for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.**
- **Check rack boots for accumulation of power steering fluid.**



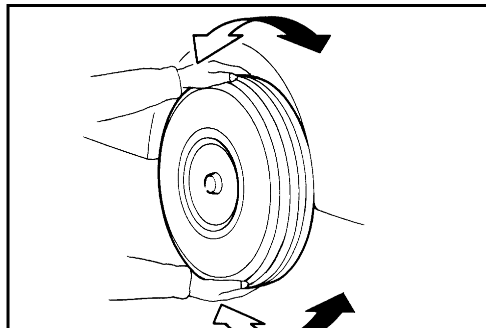
SST851C

Axle and Suspension Parts

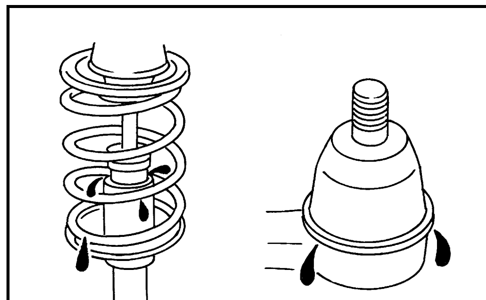
ALS000ST

Check front and rear axle and suspension parts for excessive play, cracks, wear or other damage.

- Shake each wheel to check for excessive play.
- Check wheel bearings for smooth operation.
- Check axle and suspension nuts and bolts for looseness.
- Check strut (shock absorber) for oil leakage or other damage.
- Check suspension ball joint for grease leakage and ball joint dust cover for cracks or other damage.



SMA525A

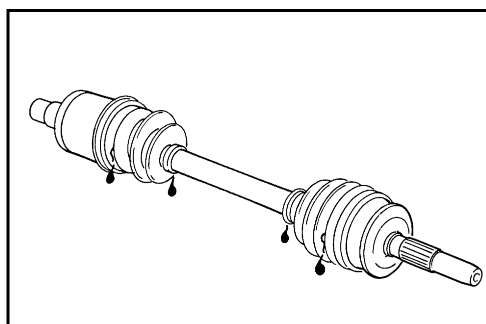


SFA392B

Drive Shaft

ALS000SU

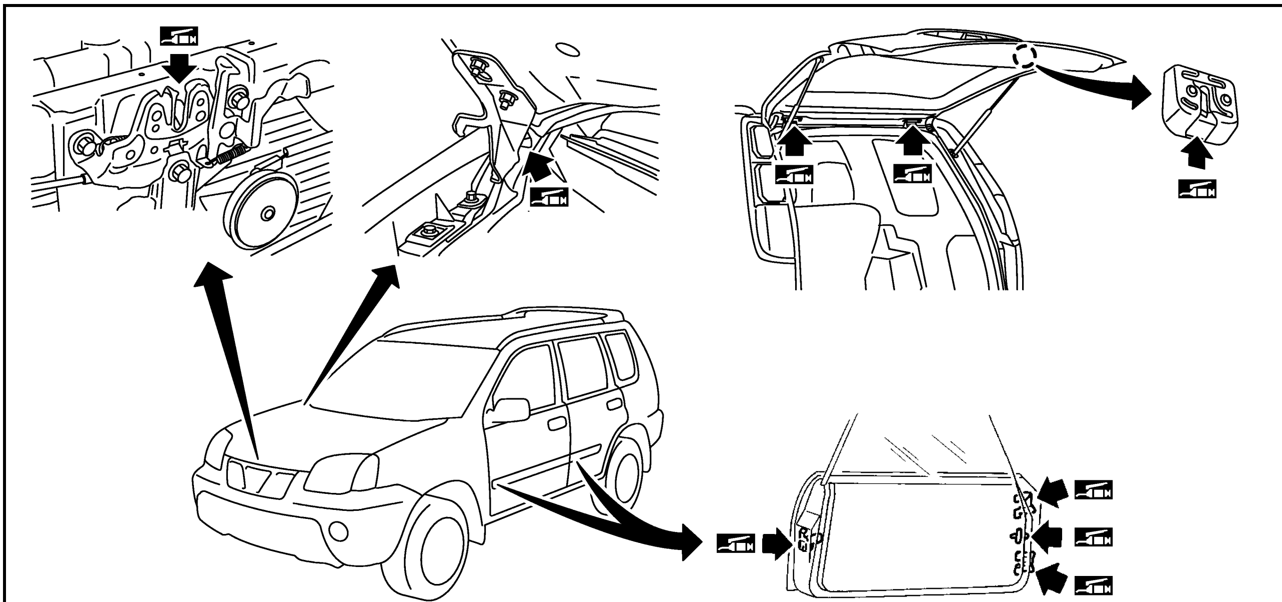
Check boot and drive shaft for cracks, wear, damage and grease leakage.



SFA108A

Lubricating Locks, Hinges and Hood Latch

ALS000SV



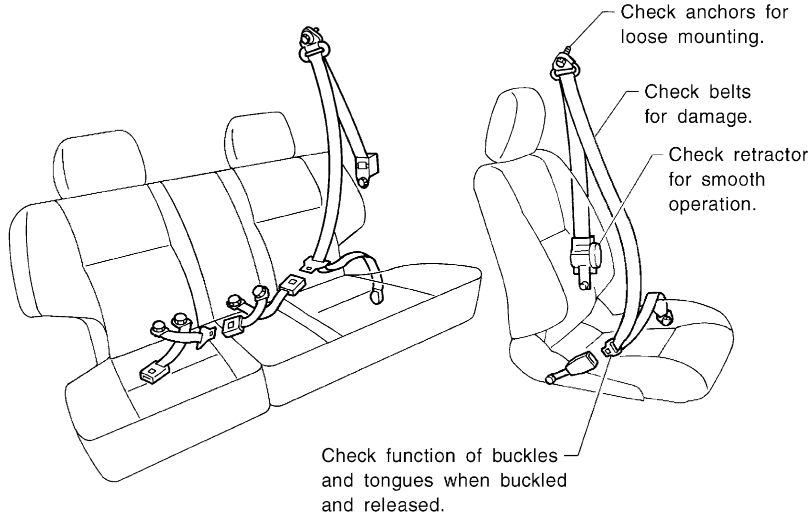
PIIB1670E

Checking Seat Belt, Buckles, Retractors, Anchors and Adjusters

ALS000SW

CAUTION:

- **After any collision, inspect all seat belt assemblies, including retractors and other attached hardwares (i.e. guide rail set). Nissan recommends to replace all seat belt assemblies in use during a collision, unless not damaged and properly operating after minor collision. Also inspect seat belt assemblies not in use during a collision, and replace if damaged or improperly operating.**
- **If any component of seat belt assembly is questionable, do not repair. Replace as seat belt assembly.**
- **If webbing is cut, frayed, or damaged, replace belt assembly.**
- **Never oil tongue and buckle.**
- **Use a genuine seat belt assembly.**



Anchor bolt
43 - 55 N•m (4.4 - 5.6 kg-m, 32 - 41 ft-lb)

SMA854C

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Standard and Limit

ALS000SX

BELT DEFLECTION AND TENSION

Tension of drive belt	Auto adjustment by auto-tensioner

ENGINE COOLANT CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Coolant capacity (With reservoir tank at “MAX” level)	7.1 (7-1/2, 6-1/4)
Reservoir tank coolant capacity (At “MAX” level)	0.7 (3/4, 5/8)

RADIATOR

Unit: kPa (kg/cm^2 , psi)

Cap relief pressure	Standard	78 - 98 (0.8 - 1.0, 11 - 14)
	Limit	59 (0.6, 9)
Leakage test pressure		157 (1.6, 23)

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.1 (4-3/8, 3-5/8)
	Without oil filter change	3.7 (3-7/8, 3-1/4)
Dry engine (Overhaul)		4.7 (5, 4-1/8)

SPARK PLUG (PLATINUM-TIPPED TYPE)

Make	NGK
Standard type	PLFR5A-11
Hot type	PLFR4A-11
Cold type	PLFR6A-11
Gap (nominal)	1.1 mm (0.043 in)

WHEEL BALANCE

Maximum allowable unbalance	Dynamic (At rim flange)	Less than 10 g (0.35 oz) (one side)
	Static (At rim flange)	Less than 20 g (0.71 oz)

SECTION MT

MANUAL TRANSAXLE

CONTENTS

PRECAUTIONS

PFP:00001

Service Notice or Precautions

ACS007XX

- Do not reuse transaxle oil, once it has been drained.
- Check oil level or replace oil with vehicle on level surface.
- During removal or installation, keep inside of transaxle clear of dust or dirt.
- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts they are applied.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.
- Be careful not to damage sliding surfaces and mating surfaces.

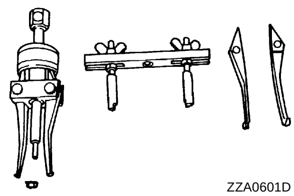
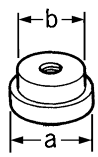
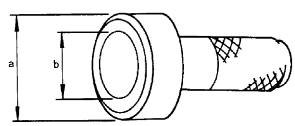
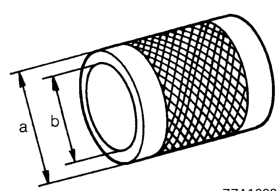
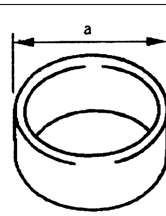
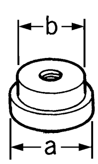
PREPARATION

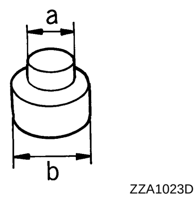
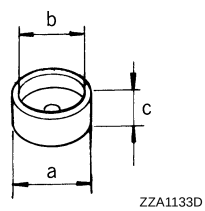
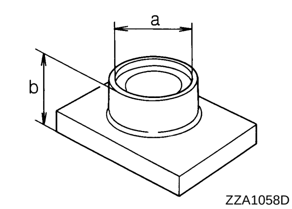
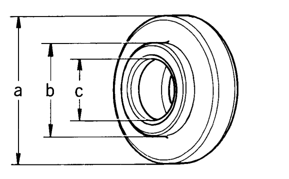
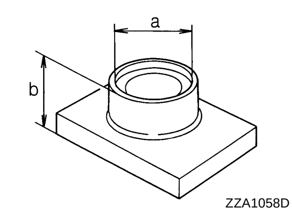
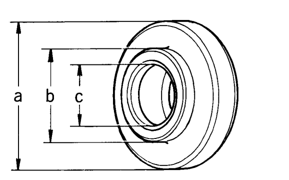
PFP:00002

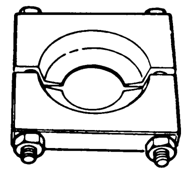
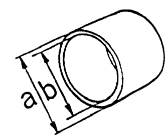
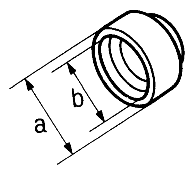
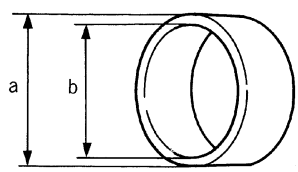
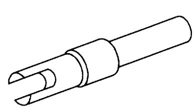
Special Service Tools

ACS007XY

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

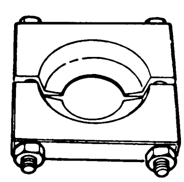
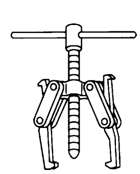
Tool number (Kent-Moore No.) Tool name		Description
KV381054S0 (J-34286) Puller	 ZZA0601D	● Removing differential side bearing outer race ● Removing mainshaft front bearing
ST35321000 (—) Drift a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia.	 ZZA1000D	● Installing input shaft oil seal ● Installing reverse main gear ● Installing 1st main gear bushing ● Installing 1st-2nd synchronizer hub assembly ● Installing 2nd main gear bushing ● Installing 3rd main gear ● Removing differential side bearing (clutch housing side)
ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.	 ZZA0811D	● Installing differential side oil seal ● Installing differential side bearing outer race ● Installing mainshaft rear bearing ● Installing differential side bearing
ST33200000 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	 ZZA1002D	● Installing mainshaft front bearing ● Installing 4th main gear ● Installing 5th main gear
KV40105320 (—) Drift a: 88 mm (3.46 in) dia.	 ZZA0898D	Installing differential side bearing outer race
ST33061000 (J-8107-2) Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.	 ZZA1000D	● Installing bore plug ● Removing differential side bearing (transaxle case side)

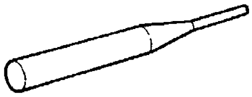
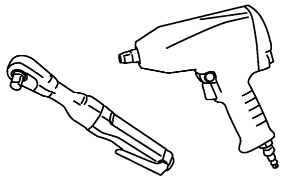
Tool number (Kent-Moore No.) Tool name		Description
ST33052000 (—) Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.		● Installing welch plug ● Removing input shaft rear bearing ● Removing input shaft bearing spacer and 5th stopper ● Removing 5th input gear bushing, thrust washer, 4th input gear, 4th input gear bushing, 3rd-4th synchronizer hub assembly and 3rd input gear ● Installing input shaft front bearing ● Removing mainshaft rear bearing ● Removing 4th main gear and 5th main gear
KV40105020 (—) Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia. c: 15 mm (0.59 in)		● Removing 5th input gear and 5th synchronizer hub assembly ● Removing 3rd main gear, 2nd main gear, 2nd main gear bushing, 1st-2nd synchronizer hub assembly, 1st main gear, reverse main gear and 1st main gear bushing
KV40105710 (—) Press stand a: 46 mm (1.81 in) dia. b: 41 mm (1.61 in)		● Installing 3rd-4th synchronizer hub assembly ● Installing 4th input gear bushing ● Installing 5th input gear bushing ● Installing 5th synchronizer hub assembly ● Installing 2nd main gear bushing ● Installing 3rd main gear
ST30032000 (J-26010-01) Drift a: 80 mm (3.15 in) dia. b: 38 mm (1.50 in) dia. c: 31 mm (1.22 in) dia.		● Installing 5th stopper and input shaft bearing spacer ● Installing input shaft front bearing
ST38220000 (—) Press stand a: 63 mm (2.48 in) dia. b: 65 mm (2.56 in)		● Installing reverse main gear ● Installing 1st main gear bushing ● Installing 1st-2nd synchronizer hub assembly
ST30901000 (J-26010-01) Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.		● Installing input shaft rear bearing ● Installing 4th main gear ● Installing 5th main gear ● Installing mainshaft rear bearing

Tool number (Kent-Moore No.) Tool name	Description
ST30031000 (J-22912-01) Puller  ZZA0537D	Measuring wear of inner baulk ring
KV40101630 (J-35870) Drift a: 68 mm (2.68 in) dia. b: 60 mm (2.36 in) dia.  ZZA1003D	Installing reverse main gear
KV38102510 (—) Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.  ZZA0838D	● Installing 1st main gear bushing ● Installing 1st-2nd synchronizer hub assembly ● Installing differential side bearing (transaxle case side)
KV40104830 (—) Drift a: 70 mm (2.76 in) dia. b: 63.5 mm (2.500 in) dia.  ZZA0936D	Installing differential side bearing (clutch housing side)
(J-39713) Preload adapter  NT087	Measuring end play of side gear

Commercial Service Tools

ACS007XZ

Tool name	Description
Puller  ZZA0537D	Removing each bearing, gear and bushing
Puller  NT077	Removing each bearing, gear and bushing

Tool name	Description
Pin punch Tip diameter: 4.5 mm (0.177 in) dia.  ZZA0815D	Removing and installing each retaining pin
Power tool  PBIC0190E	Loosening bolts and nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ACS007Y0

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

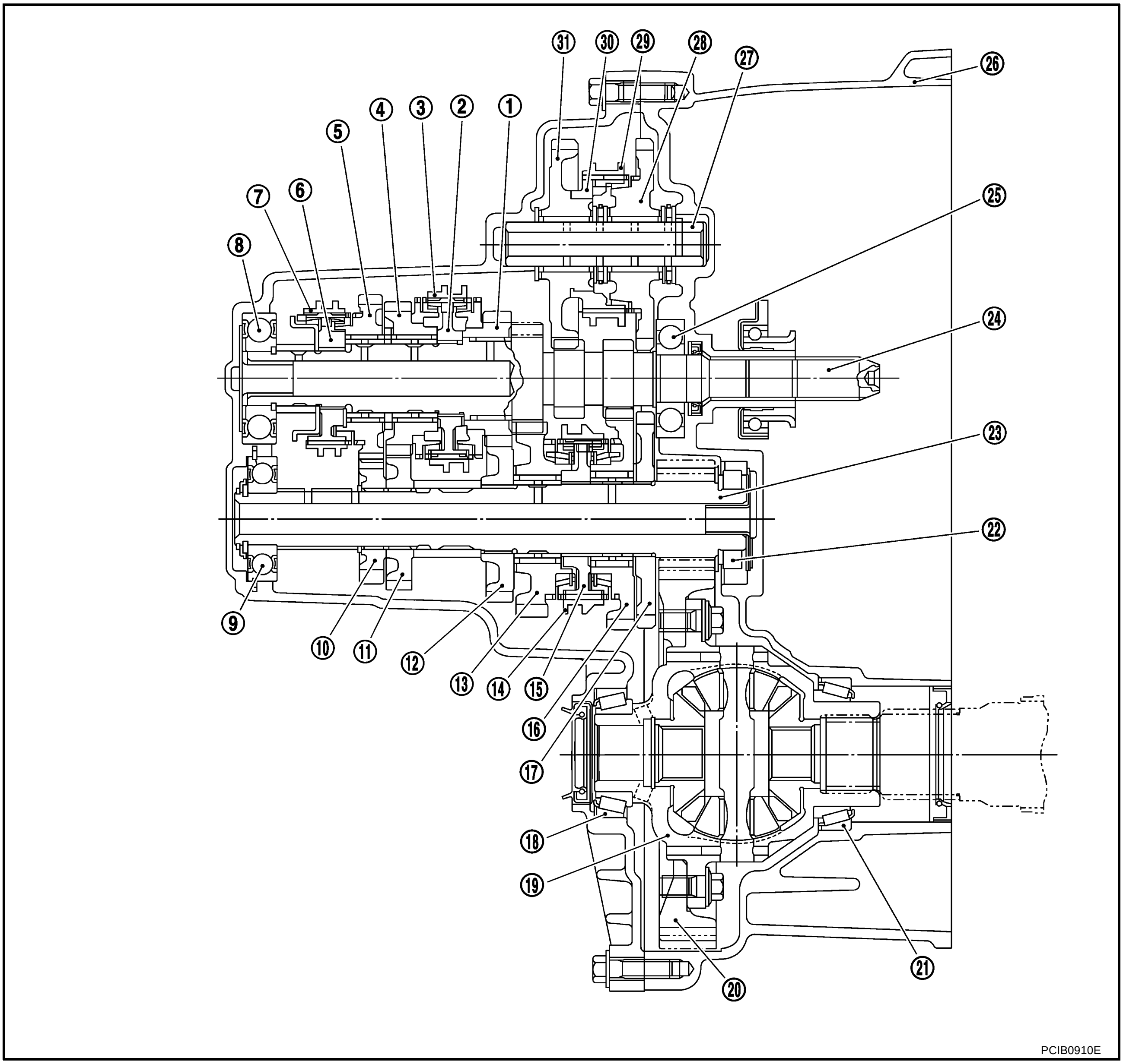
Reference page		MA-20			MT-19	MT-19	MT-22	MT-14	MT-22	MT-22	MT-20	MT-20	MT-20	MT-20
SUSPECTED PARTS (Possible cause)		OIL (Oil level is low.)	OIL (Wrong oil.)	OIL (Oil level is high.)	GASKET (Damaged)	OIL SEAL (Worn or damaged)	O-RING (Worn or damaged)	SHIFT CONTROL LINKAGE (Worn)	CHECK PLUG RETURN SPRING AND CHECK BALL (Worn or damaged)	SHIFT FORK (Worn)	GEAR (Worn or damaged)	BEARING (Worn or damaged)	BAULK RING (Worn or damaged)	INSERT SPRING (Damaged)
Symptoms	Noise	1	2								3	3		
	Oil leakage		3	1	2	2	2							
	Hard to shift or will not shift		1	1				2					3	3
	Jumps out of gear							1	2	3	3			

DESCRIPTION

PFP:00000

Cross-Sectional View

ACS007Y1



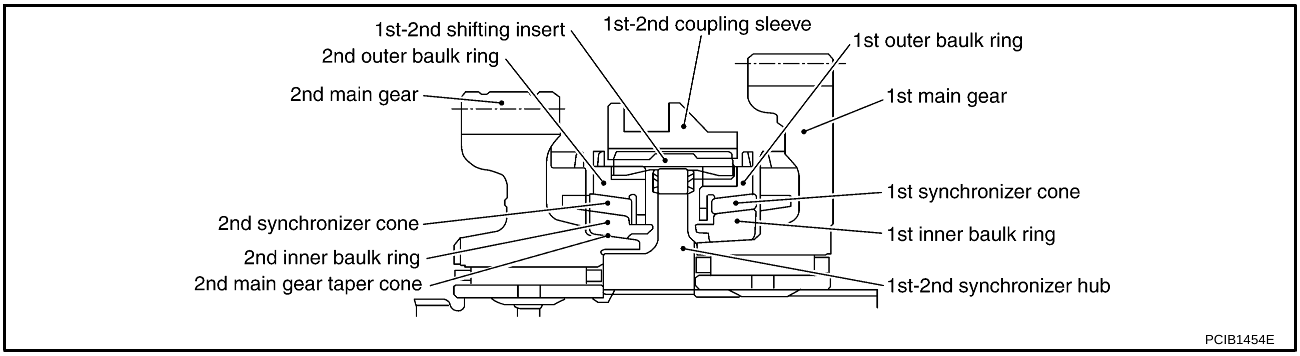
1. 3rd input gear
2. 3rd-4th synchronizer hub
3. 3rd-4th coupling sleeve
4. 4th input gear
5. 5th input gear
6. 5th synchronizer hub
7. 5th coupling sleeve
8. Input shaft rear bearing
9. Mainshaft rear bearing
10. 5th main gear
11. 4th main gear
12. 3rd main gear
13. 2nd main gear
14. 1st-2nd coupling sleeve
15. 1st-2nd synchronizer hub
16. 1st main gear
17. Reverse main gear
18. Differential side bearing
19. Differential case
20. Final gear
21. Differential side bearing
22. Mainshaft front bearing
23. Mainshaft
24. Input shaft
25. Input shaft front bearing
26. Clutch housing
27. Reverse idler shaft
28. Reverse idler gear (Front)
29. Reverse coupling sleeve
30. Reverse synchronizer hub
31. Reverse idler gear (Rear)

DOUBLE-CONE SYNCHRONIZER

- Double-cone synchronizer is adopted for 1st gear to reduce operating force of the shift lever. (Serial number: up to JN8BT08V5W103964)
- Double-cone synchronizer is adopted for 3rd gear to reduce operating force of the shift lever. (Serial number: from JN8BT08V5W103964)

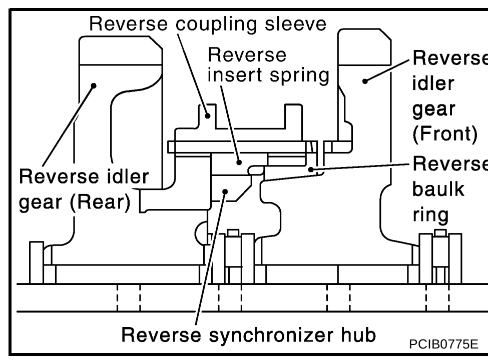
TRIPLE-CONE SYNCHRONIZER

- Triple-cone synchronizer is adopted for 2nd gears to reduce operating force of the shift lever. (Serial number: up to JN8BT08V5W103964)
- Triple-cone synchronizer is adopted for 1st and 2nd gears to reduce operating force of the shift lever. (Serial number: from JN8BT08V5W103964)



REVERSE GEAR NOISE PREVENTION FUNCTION (SYNCHRONIZING METHOD)

Reverse gear can be matched smoothly in a structure by setting synchronizer hub, coupling sleeve, baulk ring and insert spring to reverse gear, and letting reverse gear be synchronized.



M/T OIL
PFP:KLD20

Changing M/T Oil
ACS007Y2

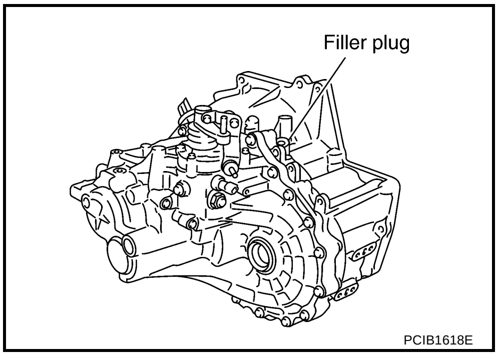
DRAINING

1. Start engine and let it run to warm up transaxle.
2. Stop engine. Remove drain plug and drain oil.
3. Set a gasket on drain plug and install it to transaxle, and tighten to the specified torque. Refer to MT-19, "Case and Housing Components" .

   CAUTION:
   Do not reuse gasket.

FILLING

1. Remove filler plug. Fill with new oil to transaxle.



Oil grade and viscosity: **Refer to MA-11, "Fluids and Lubricants" .**

Oil capacity (reference): **Approx. 2.2 ℓ (2-3/8 US qt, 2 Imp qt)**

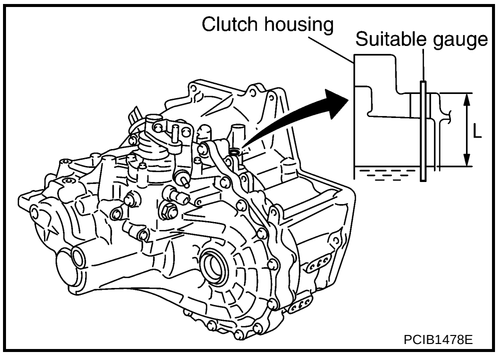
2. After refilling oil, check oil level.
3. Set a gasket on filler plug and then install it to clutch housing. Tighten filler plug to the specified torque. Refer to MT-19, "Case and Housing Components" .

   CAUTION:
   Do not reuse gasket.

Checking M/T Oil
ACS007Y3

OIL LEAKAGE AND OIL LEVEL

- Make sure that oil is not leaking from transaxle or around it.
- Remove filler plug.
- Measure oil level using a suitable gauge as shown in the figure, and then check if it is within the specifications.



Oil level "L" **: 168.0 - 174.0 mm (6.61 - 6.85 in)**

CAUTION:
Do not start engine while checking oil level.

- Set a gasket on filler plug and then install it to transaxle. Tighten filler plug to the specified torque. Refer to MT-19, "Case and Housing Components" .

  CAUTION:
  Do not reuse gasket.

A B MT D E F G H I J K L M

SIDE OIL SEAL

PFP:32113

Removal and Installation

ACS007Y4

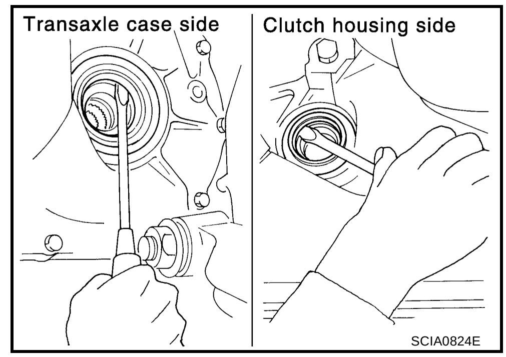
REMOVAL

- **Clutch housing side oil seal used on AWD vehicles is attached to transfer. Be sure to replace it when transfer is removed.**

1. Remove drive shaft from transaxle. Refer to FAX-13, "FRONT DRIVE SHAFT" .
2. Remove oil seal with a flat-bladed screwdriver.

   CAUTION:

   Be careful not to damage the case surface when removing oil seal.



INSTALLATION

1. Using the drift, drive the oil seal straight until it protrudes from the case end equal to the dimension A shown in the figure.

   Dimension "A":

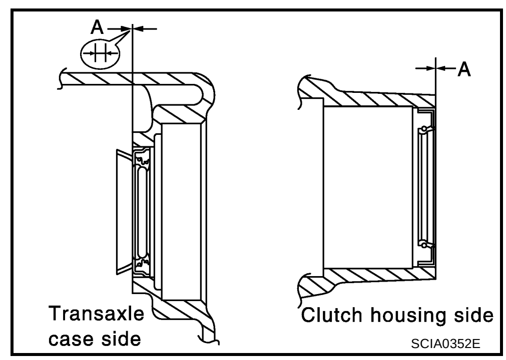
   Within 0.5 mm (0.020 in) of flush with the case.

   Drift to be used:

Transaxle case side	**: ST30720000 (J-25405)**
Clutch housing side	**: ST30720000 (J-25405)**

   CAUTION:

   - **Apply multi-purpose grease onto oil seal lip. (For clutch housing side)**
   - **Do not reuse oil seal.**



2. Install all parts in the reverse order of removal and check oil level after installation. Refer to MT-11, "Checking M/T Oil" .

POSITION SWITCH

PFP:32005

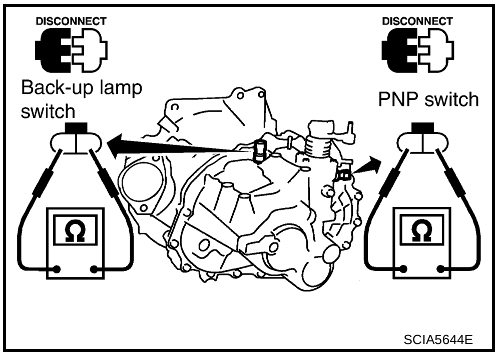
Checking

ACS007Y5

BACK-UP LAMP SWITCH

- Check continuity.

Gear position	Continuity
Reverse	Yes
Except reverse	No



SCIA5644E

PARK/NEUTRAL POSITION (PNP) SWITCH

- Check continuity.

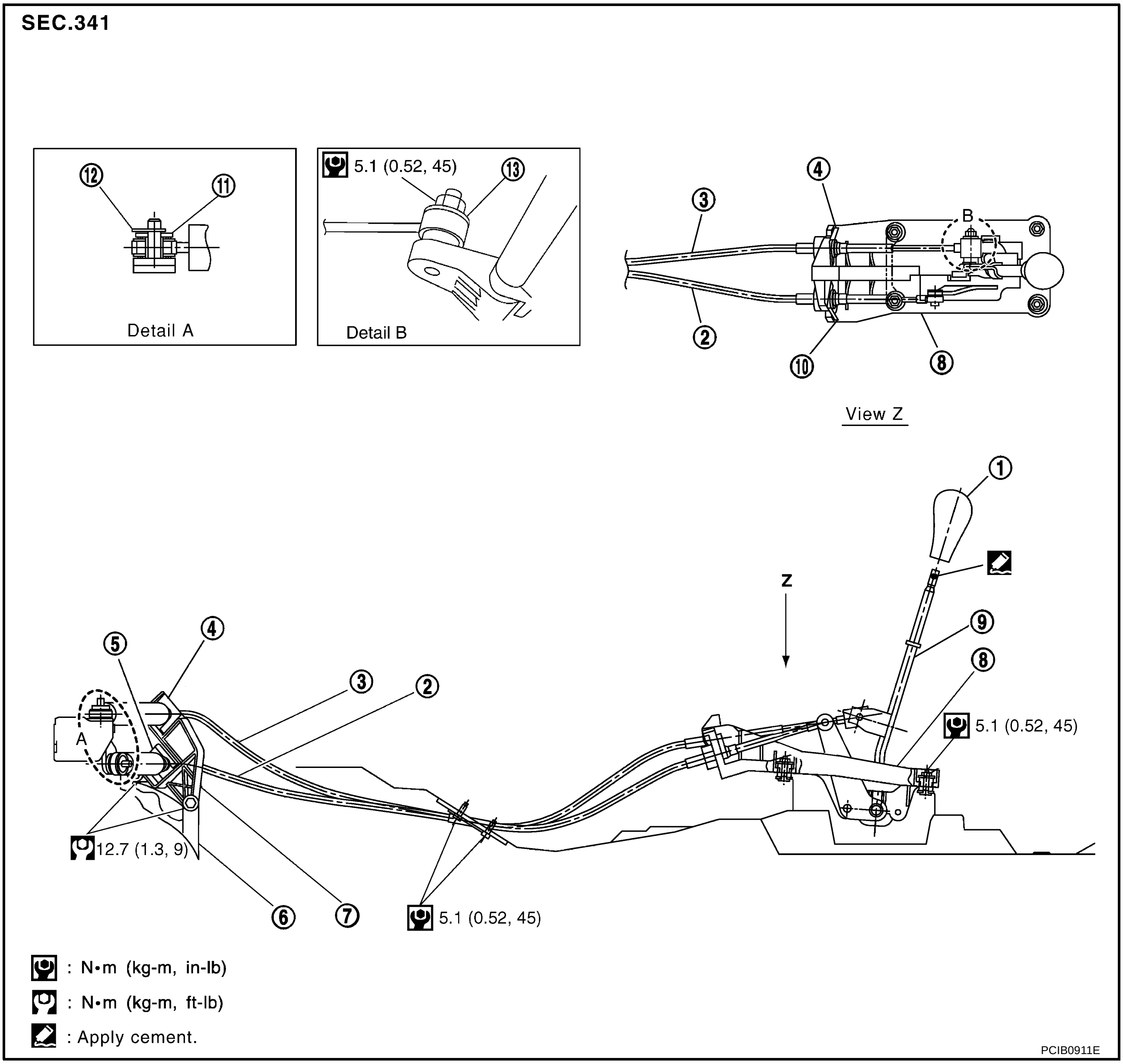
Gear position	Continuity
Neutral	Yes
Except neutral	No

CONTROL LINKAGE

PFP:34103

Components of Control Device and Cable

ACS007Y6



1. Control lever knob	2. Select cable	3. Shift cable
4. Lock plate (shift side)	5. Lock plate (select side)	6. Clutch housing
7. Cable mounting bracket	8. Control device assembly	9. Control lever
10. Lock plate	11. Washer	12. Snap pin
13. Washer		

Removal and Installation

ACS007Y7

Note the following, when removal and installation.

- Shift the control lever to the neutral position for removal.
- Keep in mind that the select side lock plate for securing control cable is different from the shift side lock plate.
- After assembly, make sure selector lever automatically returns to Neutral when it is moved to 1st-2nd or Reverse.

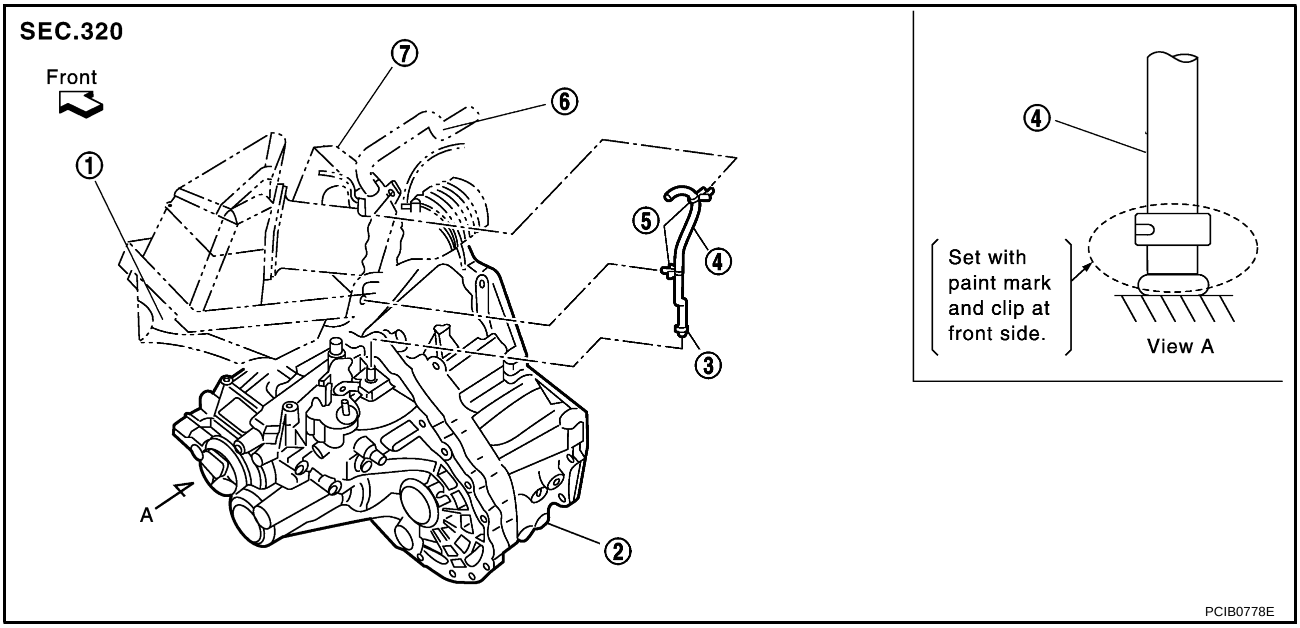
AIR BREATHER HOSE

PFP:31098

Removal and Installation

ACS007Y8

Refer to the figure for air breather hose removal and installation information.



1.	Air cleaner case	2.	Transaxle	3.	Clip
4.	Air breather hose	5.	Clip	6.	PCV hose
7.	Resonator				

CAUTION:

- **Make sure there are no pinched or restricted areas on air breather hose caused by bending or winding when installing it.**
- **Be sure to insert air breather hose into air breather tube until overlap area reaches the spool.**

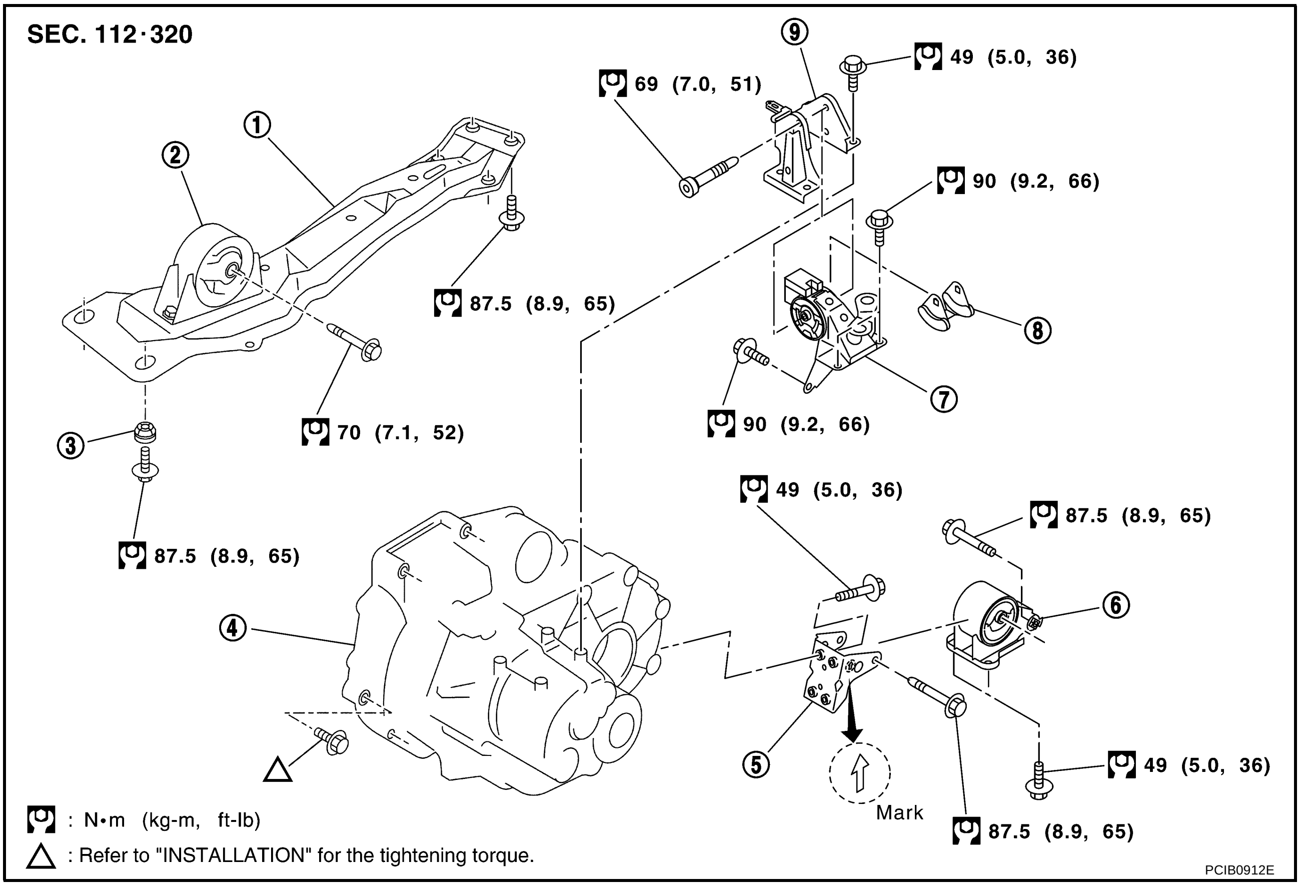
TRANSAXLE ASSEMBLY

PFP:32010

Removal and Installation

ACS007Y9

COMPONENTS



1. Center member	2. Front engine mounting insulator	3. Grommet
4. Transaxle assembly	5. Rear engine mounting bracket	6. Rear engine mounting insulator
7. LH engine mounting insulator	8. Stopper	9. LH engine mounting bracket

REMOVAL

1. Remove air cleaner, air duct and battery. Refer to EM-14, "Removal and Installation" .
2. Remove air breather hose. Refer to MT-16, "Removal and Installation" .
3. Remove clutch operating cylinder. Refer to CL-10, "Removal and Installation" .

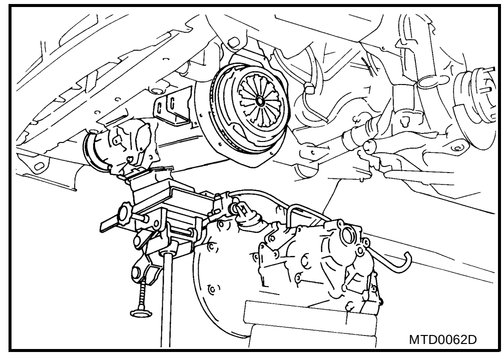
   CAUTION:
   Do not depress clutch pedal during removal procedure.
4. Disconnect control cable from transaxle assembly. Refer to MT-15, "Removal and Installation" .
5. Drain gear oil. Refer to MT-11, "Changing M/T Oil" .
6. Disconnect park/neutral position switch, back-up lamp switch and ground harness connectors.
7. Remove exhaust front tube. Refer to EX-3, "Removal and Installation" .
8. Remove drive shaft. Refer to FAX-13, "FRONT DRIVE SHAFT" .
9. Remove transfer with power tool. Refer to TF-48, "Removal and Installation" .
10. Remove starter motor with power tool. Refer to SC-16, "Removal and Installation" .
11. Support transaxle assembly with a jack.

    CAUTION:
    When setting a jack, be careful not to bring it into contact with switches.
12. Remove center member, engine insulator and engine mount bracket with power tool. Refer to EM-78, "Removal and Installation (AWD Models)" .
13. Remove suspension members with power tool. Refer to FSU-17, "Removal and Installation" .
14. Support engine with a jack under oil pan.

15. Remove bolts fixing transaxle assembly to engine with power tool.
16. Remove transaxle assembly from vehicle.

    CAUTION:

    Secure transaxle assembly to a jack while removing it.



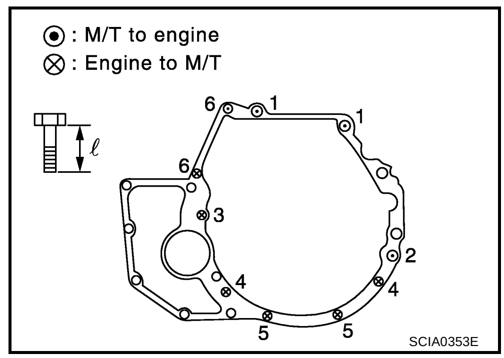
INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing the transaxle assembly to the engine, install the mounting bolts following the standard below.

  CAUTION:

  When installing transaxle assembly, be careful not to bring transaxle input shaft into contact with clutch cover.



Bolt No.	1	2	3	4	5	6
Quantity	2	1	1	2	2	2
Bolt length " ℓ " mm (in)	40 (1.57)	75 (2.95)	45 (1.77)	40 (1.57)	30 (1.18)	40 (1.57)
Tightening torque N·m (kg-m, ft-lb)	74.5 (7.6, 55)			42.7 (4.4, 31)		35.3 (3.6, 26)

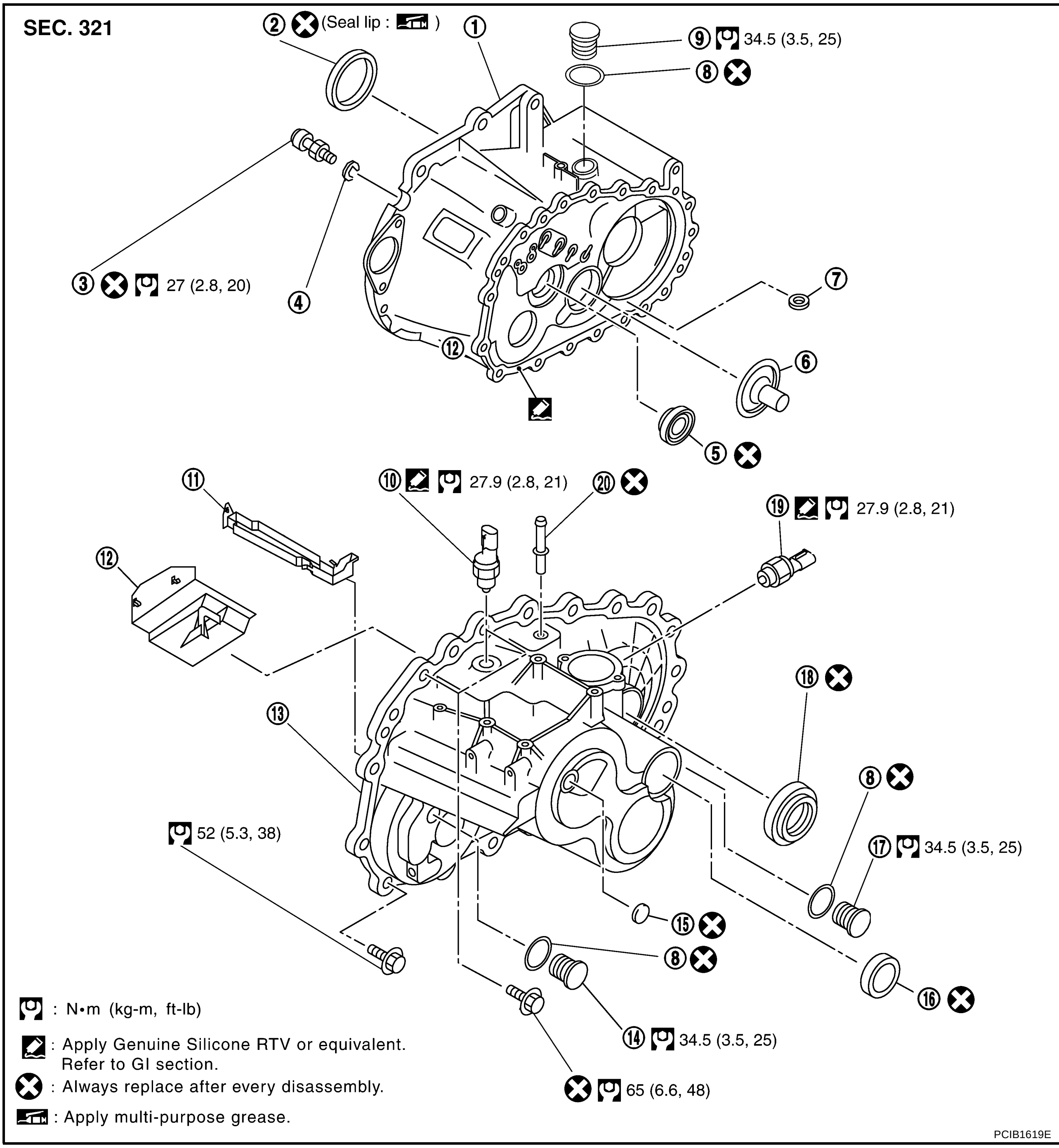
- After installation, check oil level and check for leaks and loose mechanisms. Refer to MT-11, "Checking M/T Oil" .

Disassembly and Assembly

ACS008HV

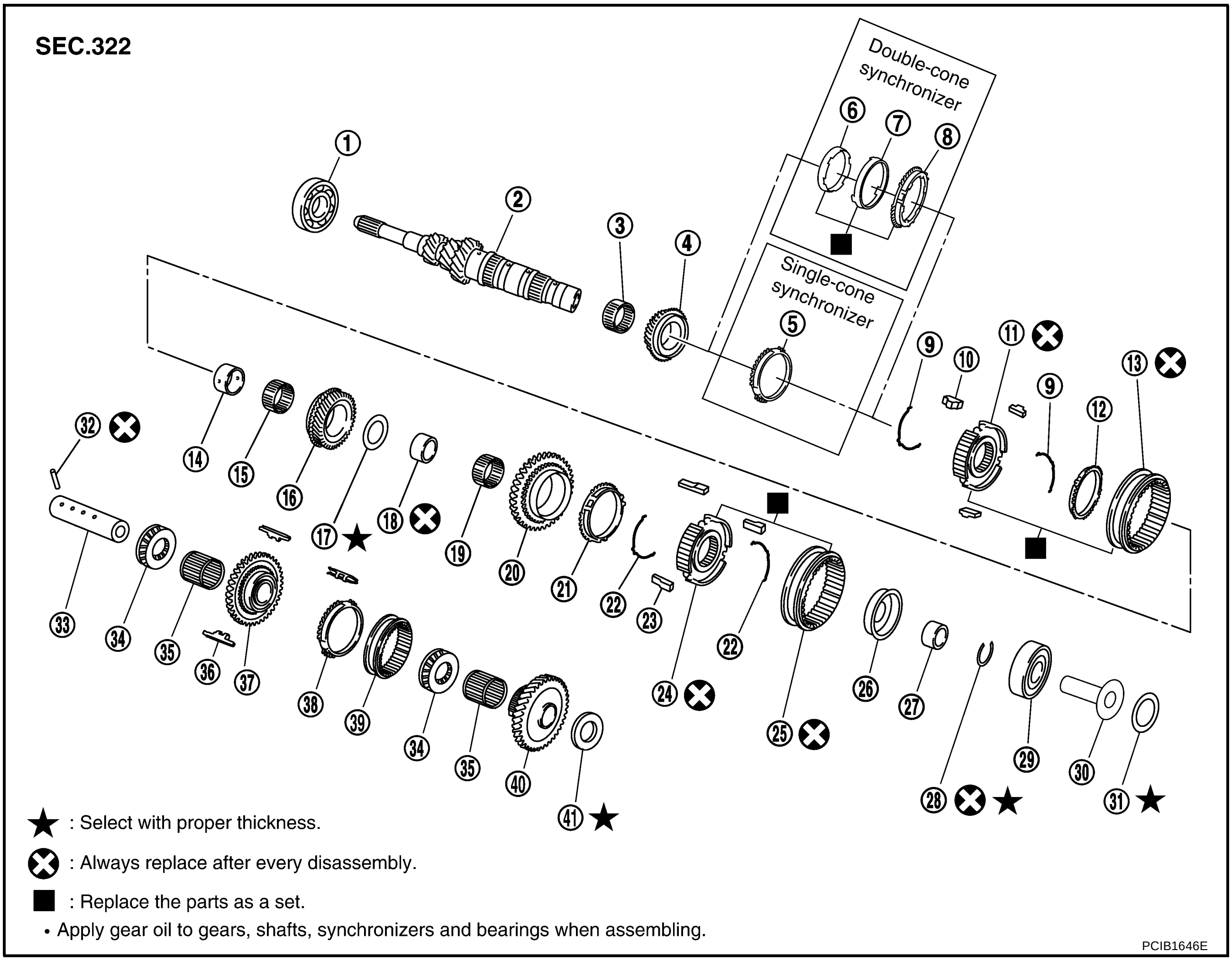
COMPONENTS

Case and Housing Components



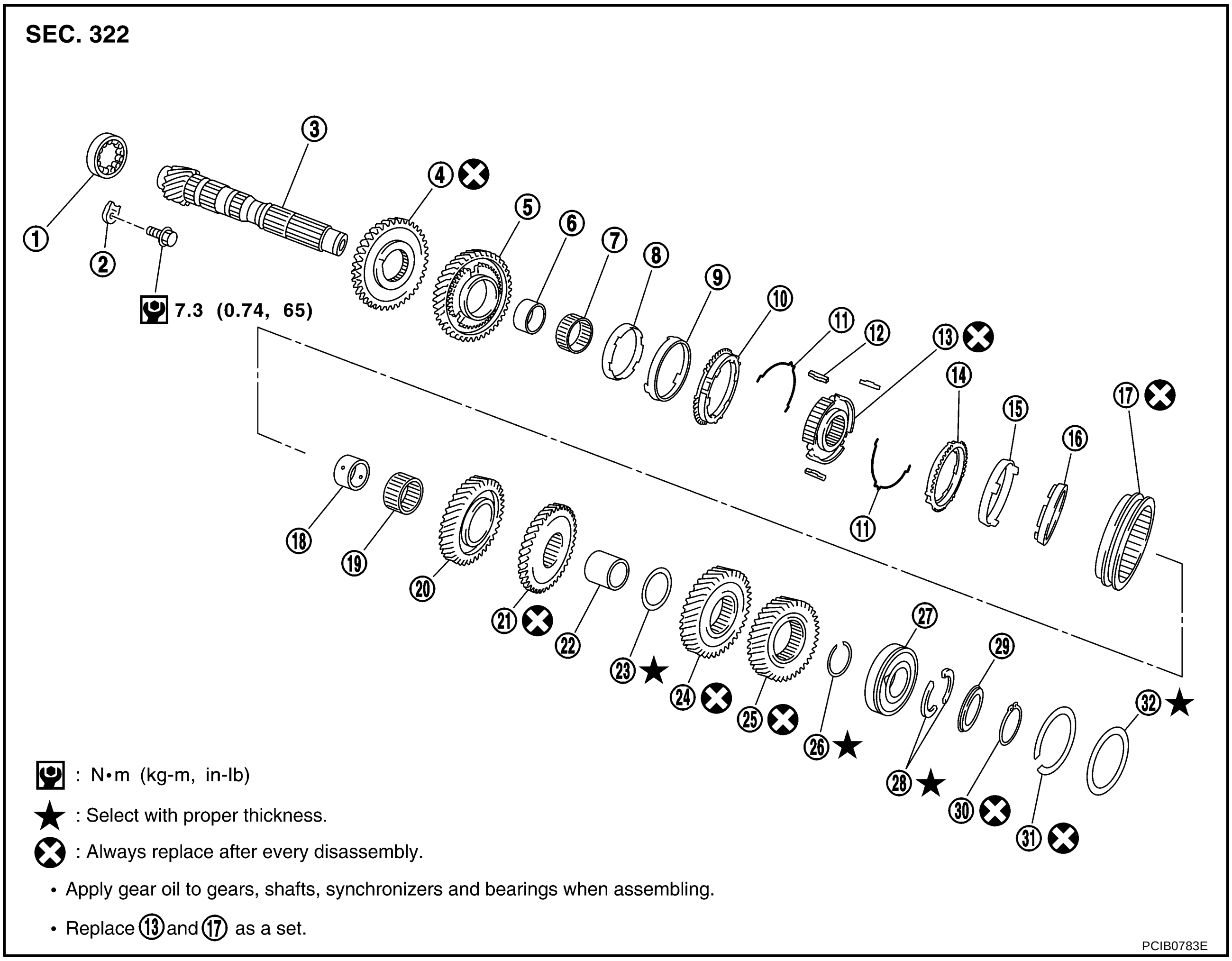
1. Clutch housing	2. Differential side oil seal	3. Ball pin
4. Washer	5. Input shaft oil seal	6. Oil channel
7. Magnet	8. Gasket	9. Filler plug
10. Back-up lamp switch	11. Oil gutter	12. Baffle plate
13. Transaxle case	14. Plug	15. Welch plug
16. Bore plug	17. Drain plug	18. Differential side oil seal
19. Park/Neutral position (PNP) switch	20. Air breather tube	

Gear Components



1. Input shaft front bearing
2. Input shaft
3. 3rd needle bearing
4. 3rd input gear
5. 3rd baulk ring
6. 3rd inner baulk ring
7. 3rd synchronizer cone
8. 3rd outer baulk ring
9. 3rd-4th spread spring
10. 3rd-4th shifting insert
11. 3rd-4th synchronizer hub
12. 4th baulk ring
13. 3rd-4th coupling sleeve
14. 4th input gear bushing
15. 4th needle bearing
16. 4th input gear
17. Thrust washer
18. 5th input gear bushing
19. 5th needle bearing
20. 5th input gear
21. 5th baulk ring
22. 5th spread spring
23. 5th shifting insert
24. 5th synchronizer hub
25. 5th coupling sleeve
26. 5th stopper
27. Input shaft bearing spacer
28. Snap ring
29. Input shaft rear bearing
30. Oil channel
31. Input shaft rear bearing adjusting shim
32. Retaining pin
33. Reverse idler shaft
34. Thrust needle bearing
35. Reverse idler gear needle bearing
36. Reverse insert spring
37. Reverse idler gear (Front)
38. Reverse baulk ring
39. Reverse coupling sleeve
40. Reverse idler gear (Rear)
41. Reverse idler gear adjusting shim

NOTE:
- 3rd single-cone synchronizer (Serial number: Up to JN8BT08V5W103964)
- 3rd double-cone synchronizer (Serial number: From JN8BT08V5W103964)

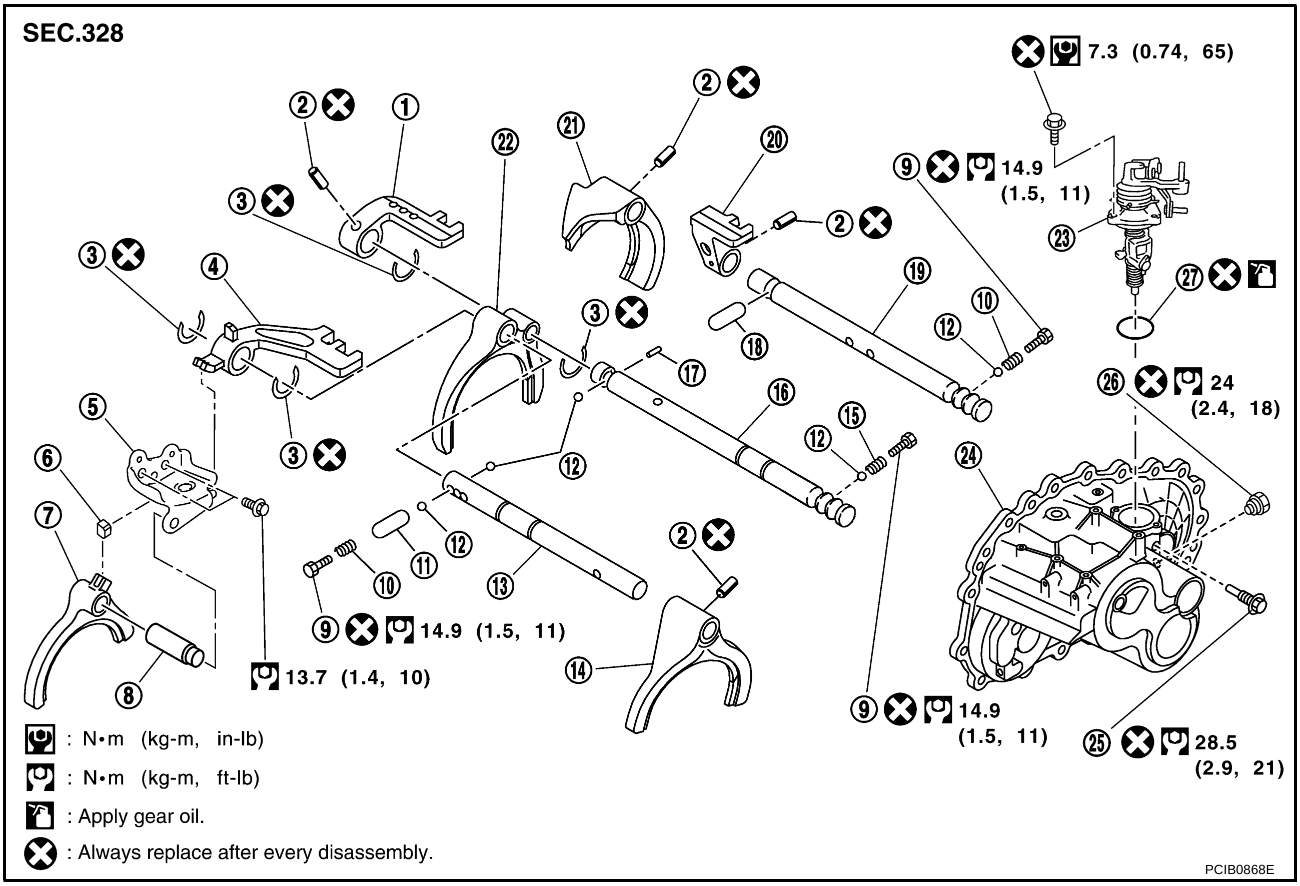


1. Mainshaft front bearing	2. Mainshaft bearing retainer	3. Mainshaft
4. Reverse main gear	5. 1st main gear	6. 1st main gear bushing
7. 1st needle bearing	8. 1st inner baulk ring	9. 1st synchronizer cone
10. 1st outer baulk ring	11. 1st-2nd spread spring	12. 1st-2nd shifting insert
13. 1st-2nd synchronizer hub	14. 2nd outer baulk ring	15. 2nd synchronizer cone
16. 2nd inner baulk ring	17. 1st-2nd coupling sleeve	18. 2nd main gear bushing
19. 2nd needle bearing	20. 2nd main gear	21. 3rd main gear
22. 3rd-4th mainshaft spacer	23. 4th main gear adjusting shim	24. 4th main gear
25. 5th main gear	26. Snap ring	27. Mainshaft rear bearing
28. Mainshaft C-ring	29. C-ring holder	30. Snap ring
31. Snap ring	32. Mainshaft rear bearing adjusting shim	

NOTE:

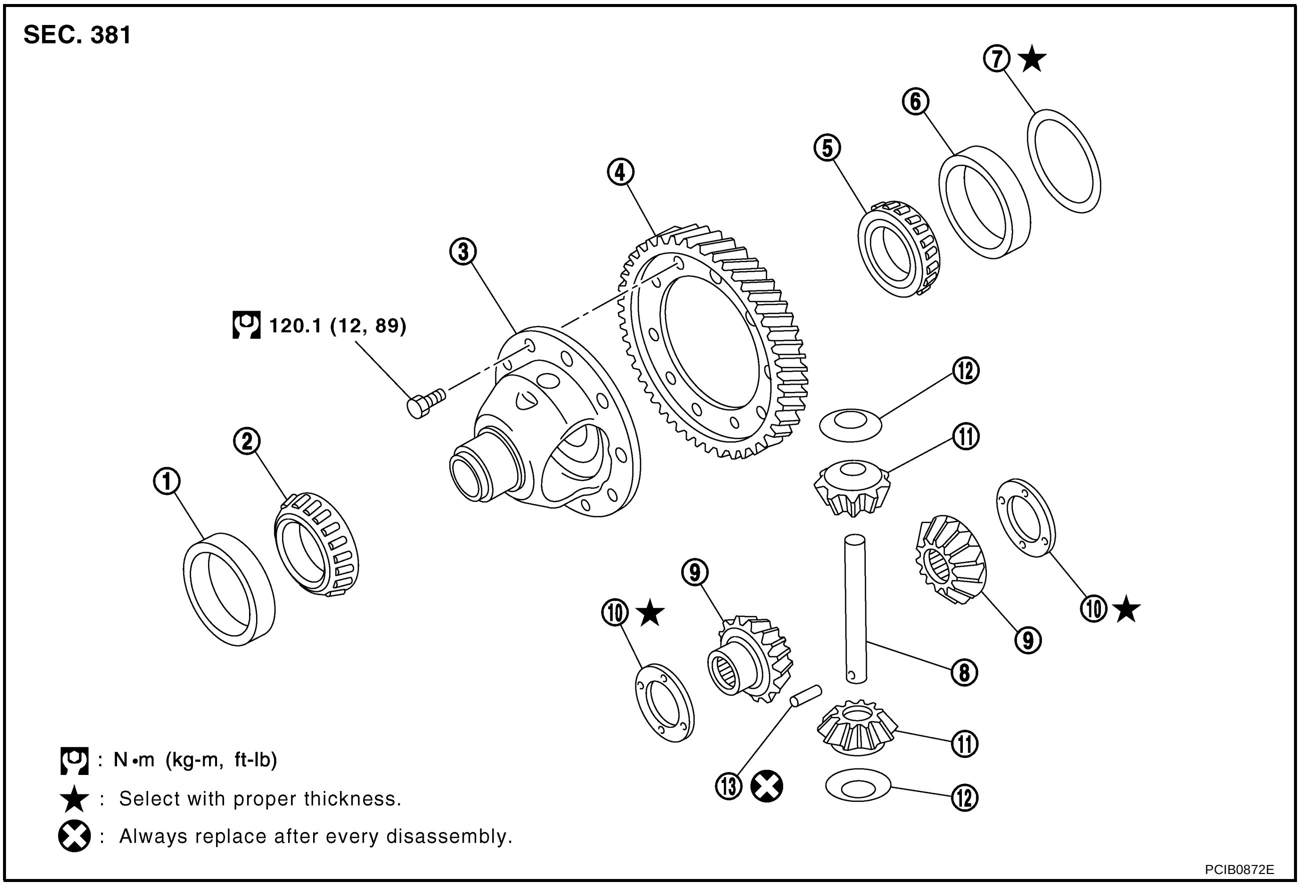
- 1st triple-cone synchronizer (Serial number: Up to JN8BT08V5W103964)
- 1st triple-cone synchronizer (Serial number: From JN8BT08V5W103964)

Shift Control Components



1.	3rd-4th bracket	2.	Retaining pin	3.	Stopper ring
4.	5th-reverse bracket	5.	Reverse lever assembly	6.	Shifter cap
7.	Reverse shift fork	8.	Reverse fork rod	9.	Check plug
10.	Check spring	11.	Shift check sleeve	12.	Check ball
13.	5th-reverse fork rod	14.	5th shift fork	15.	Check spring
16.	3rd-4th fork rod	17.	Interlock pin	18.	Shift check sleeve
19.	1st-2nd fork rod	20.	1st-2nd bracket	21.	1st-2nd shift fork
22.	3rd-4th shift fork	23.	Control assembly	24.	Transaxle case
25.	Stopper bolt	26.	Shift check	27.	O-ring

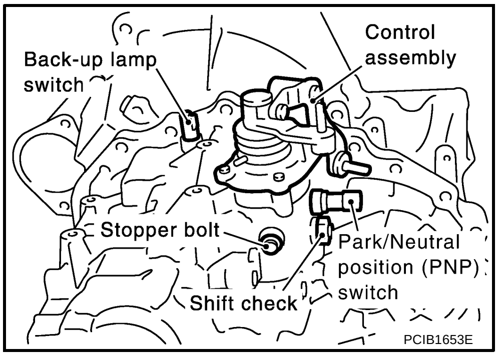
Final Drive Components



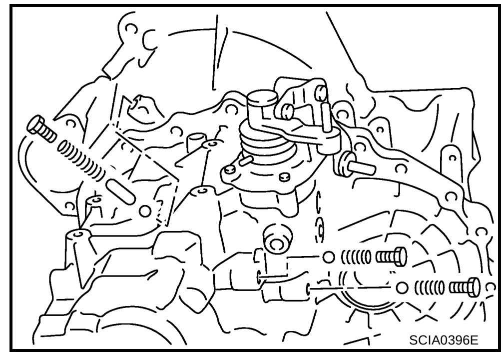
1.	Differential side bearing outer race (clutch housing side)	2.	Differential side bearing (clutch housing side)	3.	Differential case
4.	Final gear	5.	Differential side bearing (transaxle case side)	6.	Differential side bearing outer race (transaxle case side)
7.	Differential side bearing adjusting shim	8.	Pinion mate shaft	9.	Side gear
10.	Side gear thrust washer	11.	Pinion mate gear	12.	Pinion mate thrust washer
13.	Retaining pin				

DISASSEMBLY

1. Remove filler plug from clutch housing.
2. Remove drain plug and plug from transaxle case.
3. Remove park/neutral position (PNP) switch and back-up lamp switch from transaxle case.
4. Remove shift check and stopper bolt from transaxle case, and then remove control assembly from transaxle case.



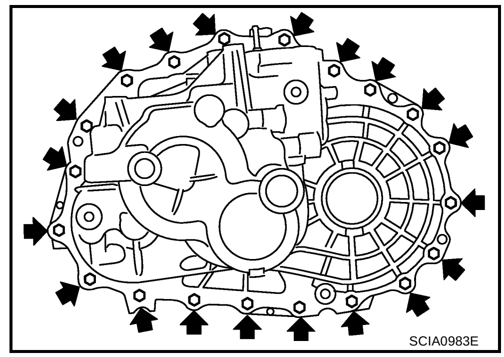
5. Remove check plugs (3 pieces), check springs (3 pieces), check balls (3 pieces) and shift check sleeve (1 piece).



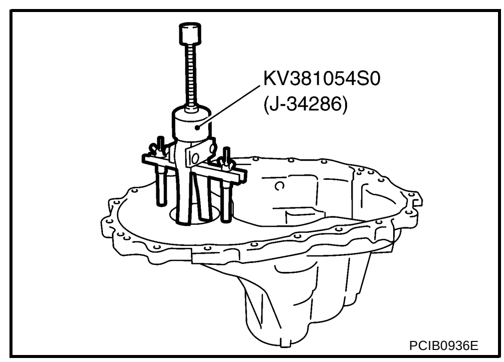
6. Remove transaxle case mounting bolts.
7. Remove bore plug from transaxle case.

   CAUTION:

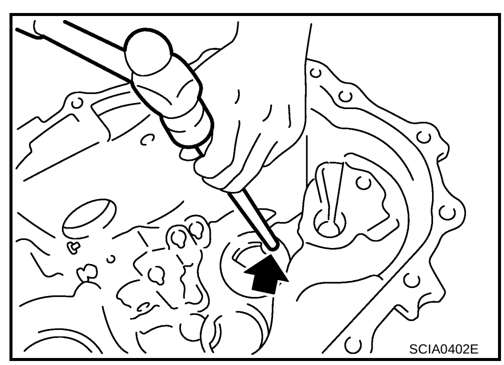
   Be careful not to damage transaxle case.
8. While spreading the snap ring of mainshaft rear bearing located at bore plug hole, remove transaxle case from clutch housing.
9. Remove oil gutter, baffle plate from transaxle case.
10. Remove snap ring, mainshaft rear bearing adjusting shim from transaxle case.
11. Remove input shaft rear bearing adjusting shim and reverse idler gear adjusting shim.



12. Remove differential side bearing outer race from transaxle case using the puller, and then remove differential side bearing adjusting shim from transaxle case.



13. Remove welch plug from transaxle case.

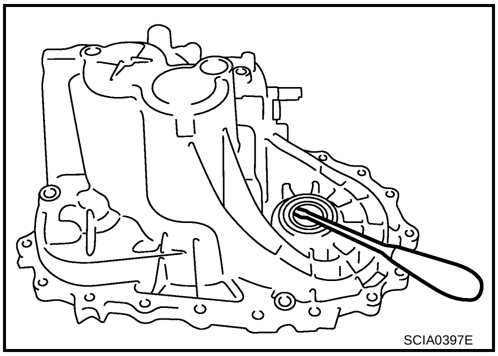


14. Remove differential side oil seal from transaxle case.

    CAUTION:

    Be careful not to damage transaxle case.

15. Remove magnet from clutch housing.

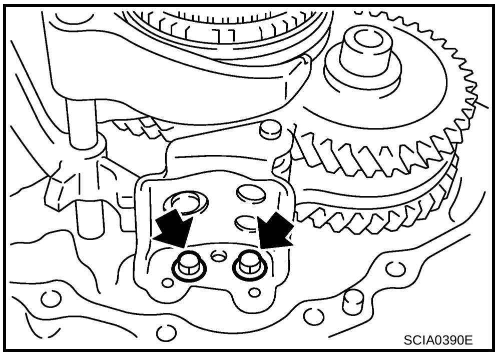


16. With shift lever in 5th position, remove mounting bolts from reverse lever assembly. Lift reverse lever assembly to remove.

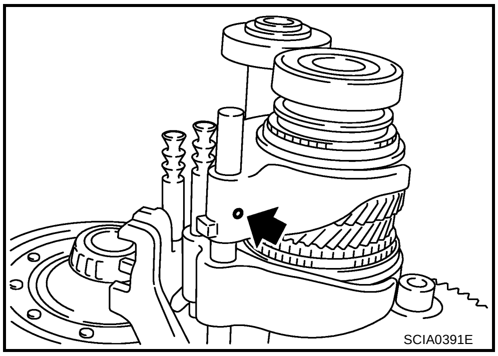
    CAUTION:

    Be careful not to lose shifter cap.

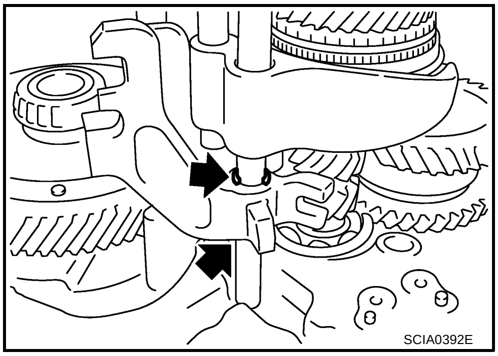
17. Pull out reverse fork rod then remove reverse shift fork.



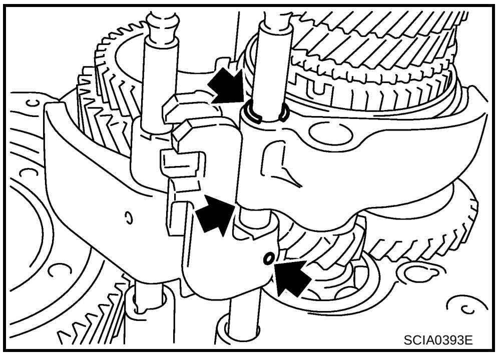
18. Shift 3rd-4th fork rod to 3rd position. Remove retaining pin of 5th shift fork using a pin punch.



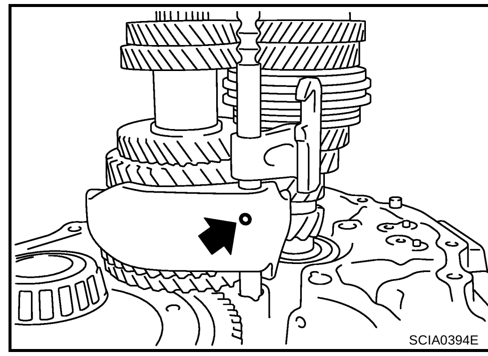
19. Remove stopper rings for 5th-reverse bracket.
20. Pull out 5th-reverse fork rod and remove 5th shift fork and 5th-reverse bracket.
21. Remove check balls (2 pieces) from clutch housing.



22. Remove retaining pin of 3rd-4th bracket using a pin punch.
23. Remove stopper rings for 3rd-4th shift fork.
24. Pull out 3rd-4th fork rod and remove 3rd-4th shift fork and 3rd-4th bracket.
25. Remove interlock pin and shift check sleeve from clutch housing.



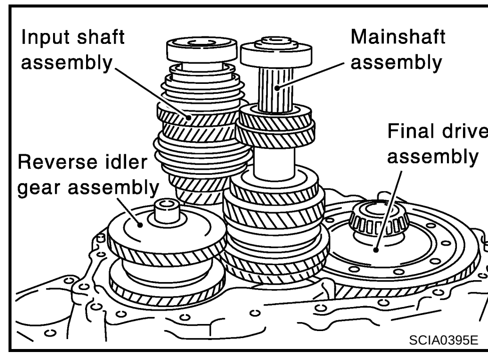
26. Remove retaining pin of 1st-2nd shift fork using a pin punch.
27. Pull out 1st-2nd fork rod with 1st-2nd bracket.
28. Remove 1st-2nd shift fork.
29. Remove retaining pin of 1st-2nd bracket using a pin punch and separate 1st-2nd fork rod and 1st-2nd bracket.



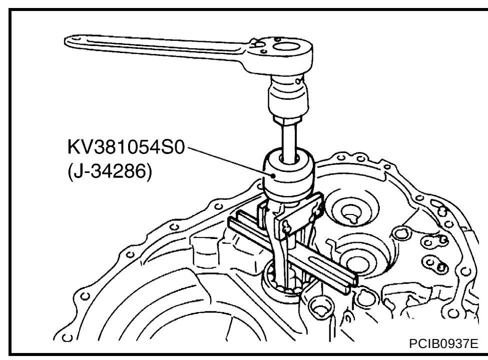
30. Remove gear components from clutch housing in the following procedure.
a. Remove input shaft assembly, mainshaft assembly and reverse idler gear assembly as a set, tapping input shaft with plastic hammer.

CAUTION:
Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.

b. Remove final drive assembly.

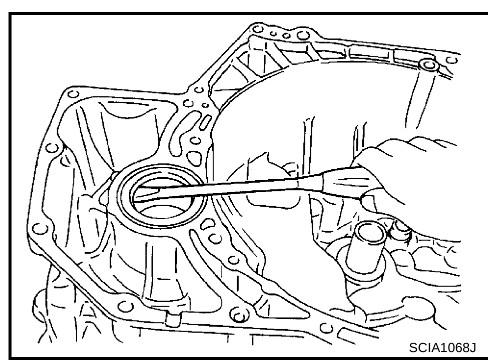


31. Remove mainshaft bearing retainer and then mainshaft front bearing from clutch housing using the puller.
32. Remove oil channel from clutch housing.

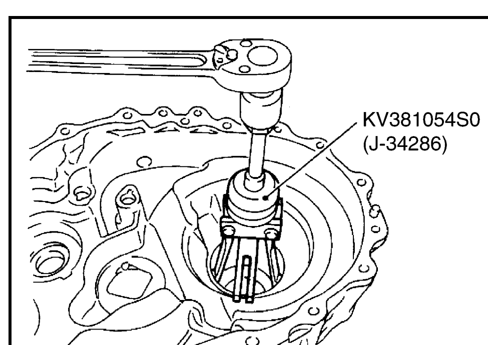


33. Remove differential side oil seal from clutch housing.

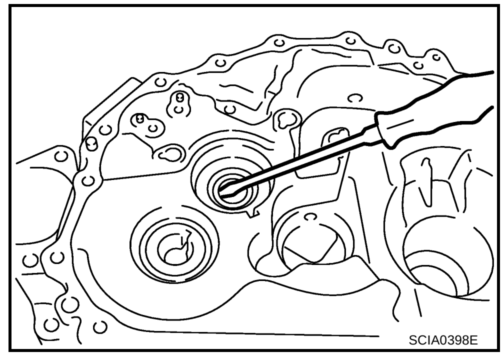
CAUTION:
Be careful not to damage clutch housing.



34. Remove differential side bearing outer race from clutch housing using the puller.



35. Remove input shaft oil seal from clutch housing.
CAUTION:
Be careful not to damage clutch housing.

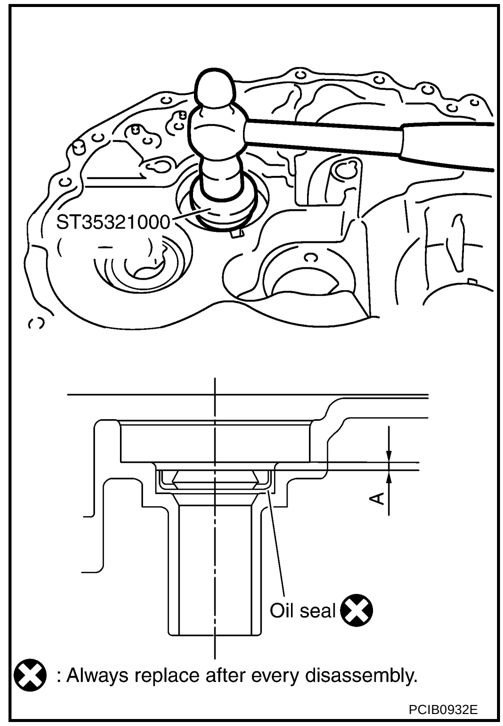


ASSEMBLY

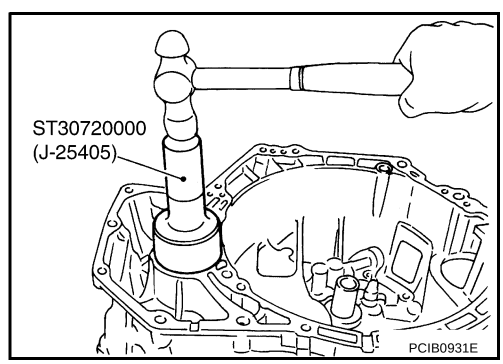
1. Install input shaft oil seal to clutch housing using the drift.

Dimension **A: 1.8 - 2.8 mm (0.071 - 0.110 in)**

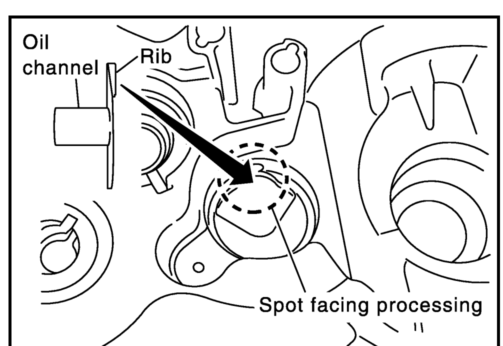
CAUTION:
Do not reuse input shaft oil seal.



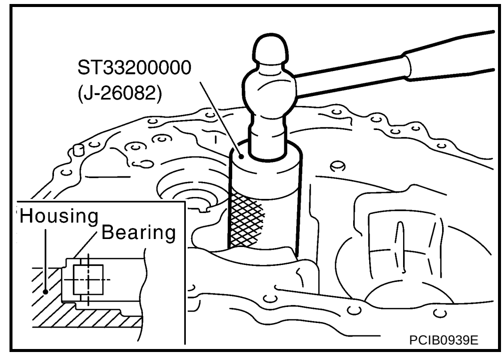
2. Install differential side oil seal until it become flush with end face of clutch housing using the drift.
CAUTION:
- **Do not reuse differential side oil seal.**
- **Apply multi-purpose grease onto oil seal lip.**



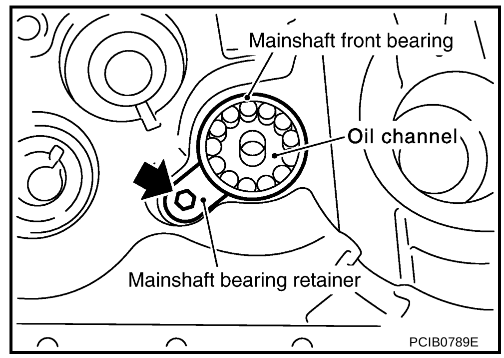
3. Install oil channel on mainshaft side.
CAUTION:
Be careful with the orientation of installation.



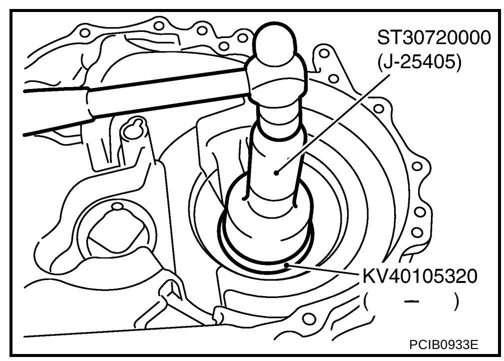
4. Install mainshaft front bearing to clutch housing using the drift.
   CAUTION:
   Be careful with the orientation of installation.



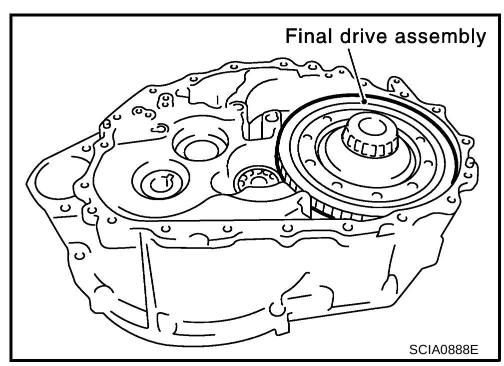
5. Install mainshaft bearing retainer to clutch housing and tighten mounting bolt to the specified torque. Refer to MT-20, "Gear Components" .
   CAUTION:
   Install with punched surface facing up.



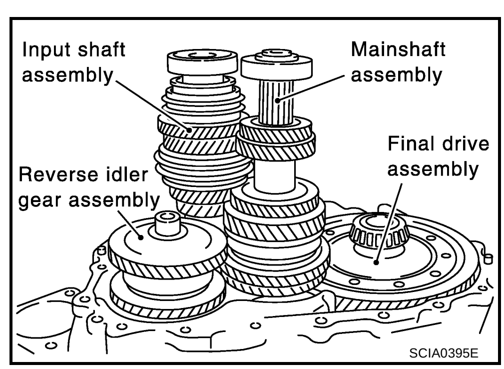
6. Install differential side bearing outer race to clutch housing using the drifts.



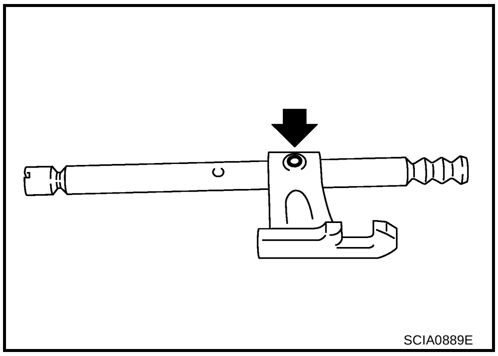
7. Install final drive assembly into clutch housing.



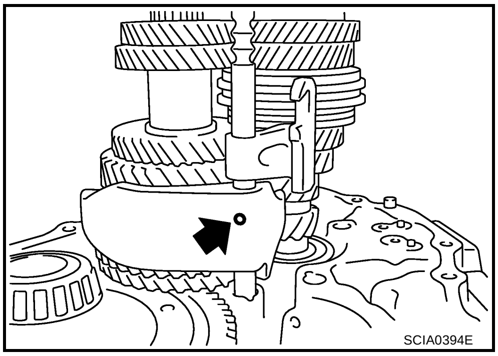
8. Install input shaft assembly, mainshaft assembly, and reverse idler gear assembly into clutch housing.
   CAUTION:
   Be sure not to damage input shaft oil seal.



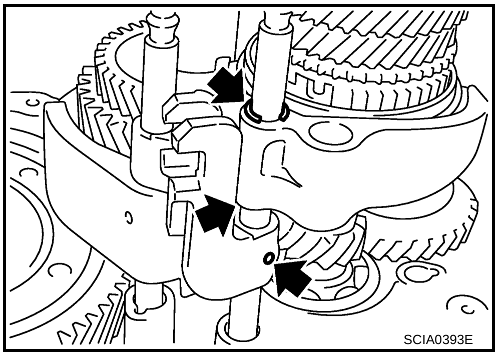
9. Install 1st-2nd bracket onto 1st-2nd fork rod, and then install retaining pin to 1st-2nd bracket.
   CAUTION:
   Do not reuse retaining pin.



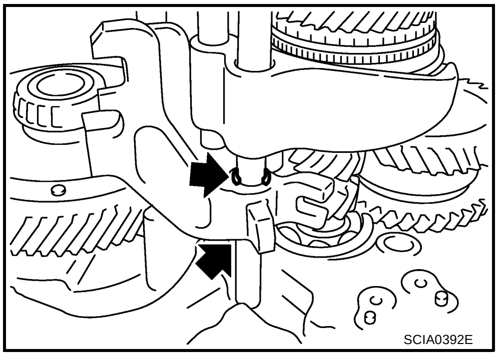
10. Install 1st-2nd fork rod and 1st-2nd shift fork, and then install retaining pin to1st-2nd shift fork.
    CAUTION:
    Do not reuse retaining pin.
11. Install shift check sleeve to clutch housing.



12. Install interlock pin to 3rd-4th fork rod.
13. Install 3rd-4th bracket, 3rd-4th shift fork, and 3rd-4th fork rod.
14. Install stopper rings onto 3rd-4th shift fork.
    CAUTION:
    Do not reuse stopper ring.
15. Install retaining pin onto 3rd-4th bracket.
    CAUTION:
    Do not reuse retaining pin.
16. Install 2 check balls to clutch housing.

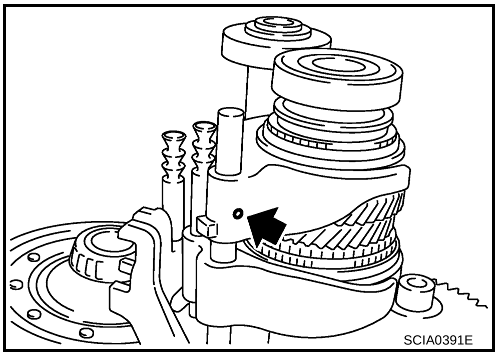


17. Install 5th-reverse bracket, 5th shift fork, and 5th-reverse fork rod.
18. Install stopper rings onto 5th-reverse bracket.
    CAUTION:
    Do not reuse stopper ring.

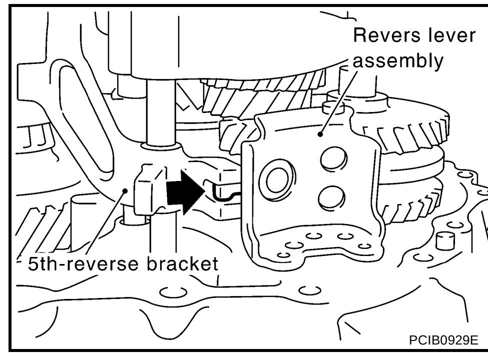


19. Install retaining pin onto 5th shift fork.
    CAUTION:
    Do not reuse retaining pin.
20. Install reverse shift fork and reverse fork rod.
21. Install reverse lever assembly following the procedures below.

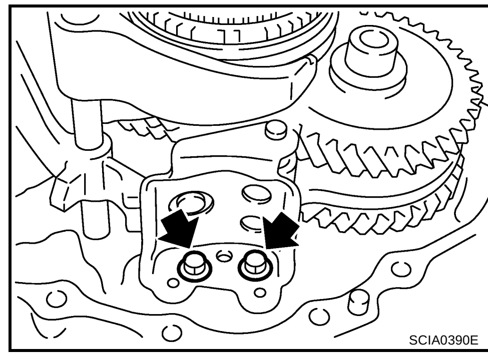
a. Install shifter cap onto reverse lever assembly cam, and then install them onto reverse shift fork.
   CAUTION:
   Do not drop shifter cap.



b. While lifting reverse shift fork, align cam with 5th-reverse bracket.



c. Install reverse lever assembly to clutch housing, and then tighten mounting bolts to the specified torque. Refer to MT-22, "Shift Control Components" .

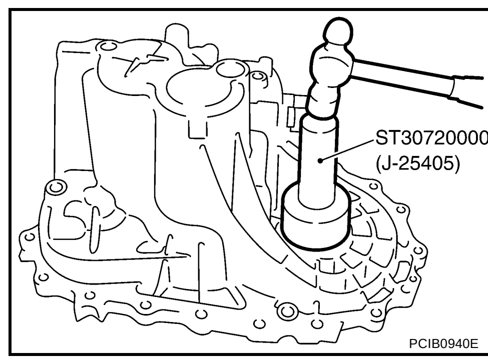


22. Install check ball, shift check sleeve, check spring and check plug to clutch housing.

CAUTION:

- **Do not reuse check plug.**
- **Do not drop check ball.**

23. Install the magnet onto clutch housing.



24. Install differential side oil seal until it is flush with end face of transaxle case using the drift.

CAUTION:

Do not reuse differential side oil seal.

25. Install selected differential side bearing adjusting shim and differential side bearing outer race.
    - For selection of adjusting shim, refer to MT-33, "Differential Side Bearing Preload" .
26. Install selected reverse idler gear adjusting shim onto reverse idler gear assembly.
    - For selection of adjusting shims, refer to MT-34, "Reverse Idler Gear End Play" .
27. Install selected input shaft rear bearing adjusting shim onto input shaft.
    - For selection of adjusting shims, refer to MT-34, "Input Shaft End Play" .
28. Install baffle plate and oil gutter to transaxle case.
29. Install transaxle case following the procedures below.

a. Install selected mainshaft rear bearing adjusting shim into transaxle case.
- For selection of adjusting shims, refer to MT-35, "Mainshaft End Play" .

b. Temporarily install snap ring of mainshaft rear bearing into transaxle case.

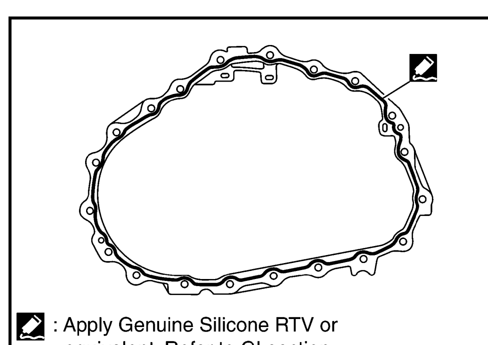
CAUTION:

Do not reuse snap ring.

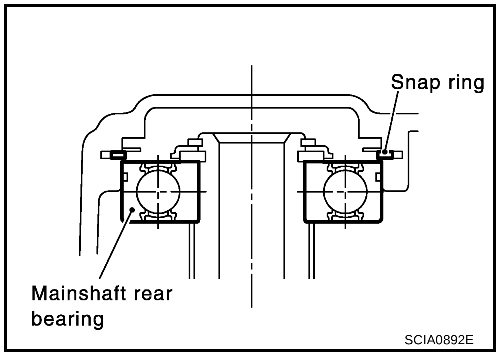
c. Apply recommended sealant to mating surfaces of transaxle case and clutch housing.
- **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**

CAUTION:

Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to both mounting surfaces.

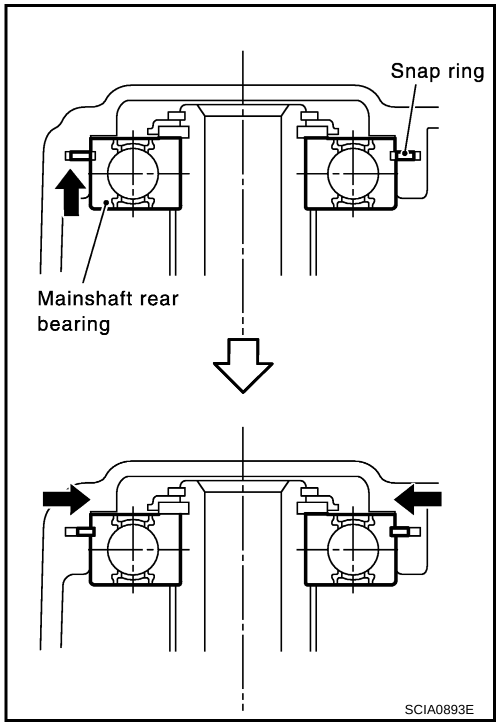


d. With snap ring of mainshaft rear bearing temporarily installed, place transaxle case over clutch housing.



e. Lift up mainshaft assembly from the control assembly mounting hole through the bore plug mounting hole with snap ring stretched.

f. Securely install snap ring onto mainshaft rear bearing.



g. Tighten the mounting bolts to the specified torque.

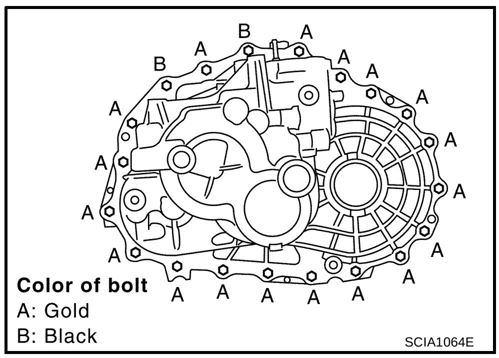
Bolt A:

: 52 N·m (5.3 kg-m, 38 ft-lb)

Bolt B:

: 65 N·m (6.6 kg-m, 48 ft-lb)

CAUTION:
Always replace bolts B as they are self-sealing bolts.



h. Apply gear oil to O-ring and install it to control assembly. Then install control assembly to transaxle case. Tighten bolts to the specified torque. Refer to MT-22, "Shift Control Components" .

CAUTION:
Do not reuse O-ring.

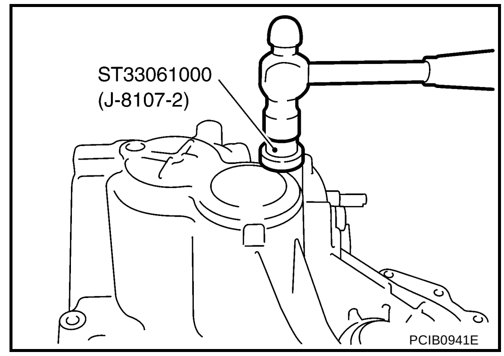
i. Install shift check to transaxle case, and then tighten shift check to the specified torque. Refer to MT-22, "Shift Control Components" .

CAUTION:
Do not reuse shift check.

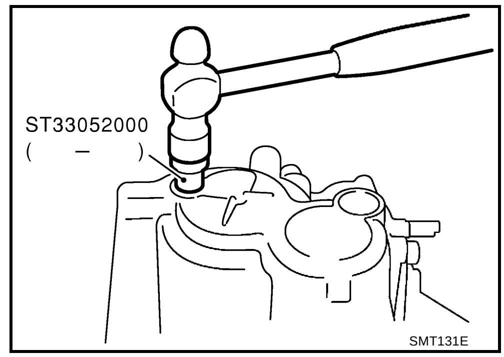
j. Install stopper bolt to transaxle case, and then tighten stopper bolt to the specified torque. Refer to MT-22, "Shift Control Components" .

CAUTION:
Do not reuse stopper bolt.

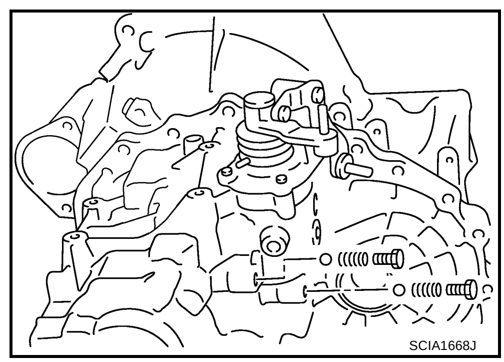
30. Install bore plug to transaxle case using the drift.
    CAUTION:
    Do not reuse bore plug.



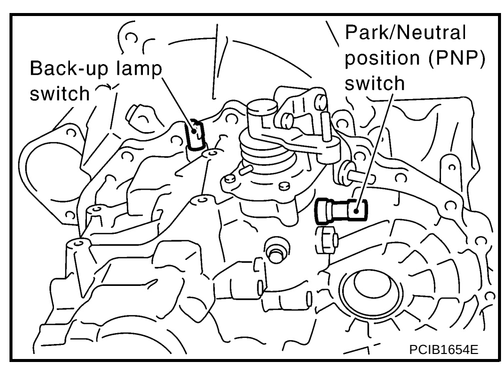
31. Install welch plug to transaxle case using the drift.
    CAUTION:
    Do not reuse welch plug.



32. Install 2 check balls, 2 check springs and 2 check plugs to transaxle case, and then tighten check plug to the specified torque. Refer to MT-22, "Shift Control Components" .
    CAUTION:
    Do not reuse check plug.



33. Apply recommended sealant to threads of park/neutral position (PNP) switch and back-up lamp switch. Then install them to transaxle case and tighten to the specified torque. Refer to MT-19, "Case and Housing Components" .
    - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**



34. Install gaskets onto drain plug and plug, and then install them to transaxle case. Refer to MT-19, "Case and Housing Components" .
    CAUTION:
    Do not reuse gasket.
35. Install gasket onto filler plug, and then install it to clutch housing. Refer to MT-19, "Case and Housing Components" .
    CAUTION:
    - **Do not reuse gasket.**
    - **After oil is filled, tighten filler plug to specified torque.**

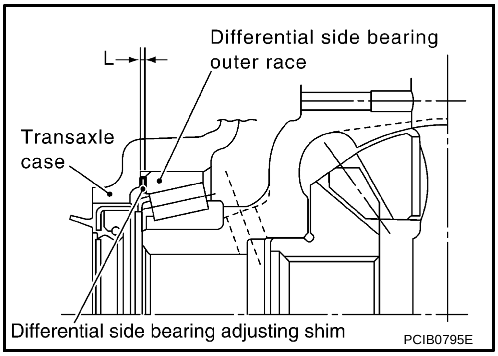
ADJUSTMENT

Differential Side Bearing Preload

- When adjusting differential side bearing preload, select adjusting shim for differential side bearing. To select adjusting shim, measure the clearance "L" between transaxle case and differential side bearing outer race. Refer to MT-67, "DIFFERENTIAL SIDE BEARING ADJUSTING SHIM(S)" .

  CAUTION:

  Up to 2 adjusting shims can be selected.



PCIB0795E

- Calculate the dimension "L" (thickness of adjusting shim) using the following procedure to satisfy specification of preload for differential side bearing.

Preload: 0.15 - 0.21 mm (0.0059 - 0.0083 in)

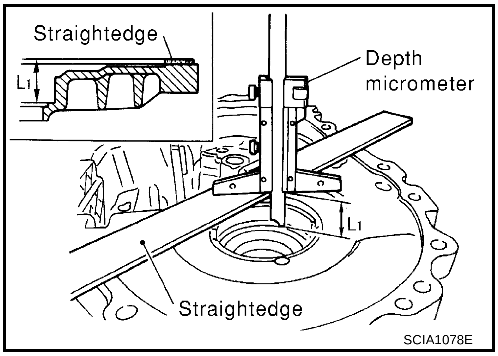
Dimension "L" = (L_1 - L_2) + Preload

L: Thickness of adjusting shim

L_1 : Distance between transaxle case end face and mounting face of adjusting shim

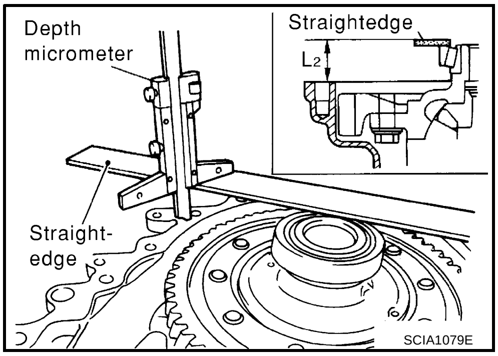
L_2 : Distance between differential side bearing outer race and clutch housing end face

1. Using depth micrometer and straightedge, measure the dimension "L_1 " between transaxle case end face and mounting face of adjusting shim.
2. Install differential side bearing outer race onto differential side bearing on final gear side. Holding lightly differential side bearing outer race horizontally by hand, rotate final gear five times or more (for smooth movement of bearing roller).



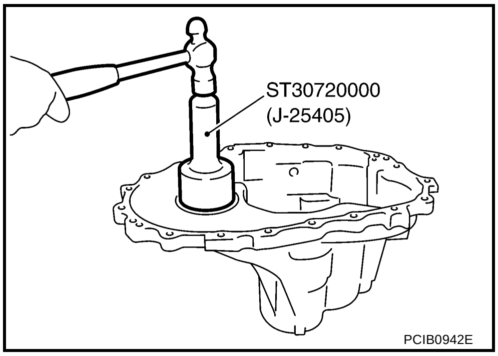
SCIA1078E

3. Using depth micrometer and straightedge as shown in the figure, measure the dimension "L_2 " between differential side bearing outer race and clutch housing end face.



SCIA1079E

4. Install selected differential side bearing adjusting shim, and then install differential side bearing outer race using the drift.



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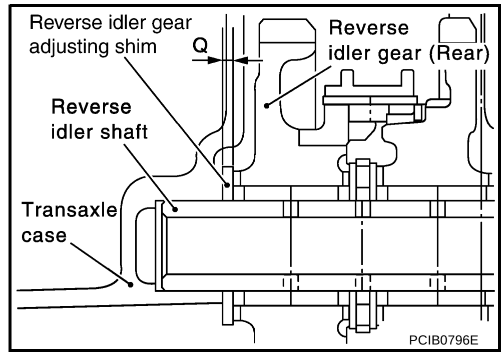
Reverse Idler Gear End Play

- When adjusting reverse idler gear end play, select adjusting shim for reverse idler gear. To select adjusting shim, measure the clearance between transaxle case and reverse idler gear. Refer to MT-67, "REVERSE IDLER GEAR ADJUSTING SHIM" .

  CAUTION:

  Only 1 adjusting shim can be selected.



- Calculate the dimension “Q” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for reverse idler gear.

End play: 0.04 - 0.10 mm (0.0016 - 0.0039 in)

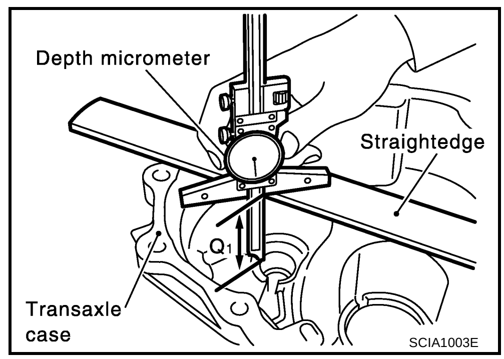
Dimension“Q” = (Q_1 - Q_2) - End play

Q: Thickness of adjusting shim

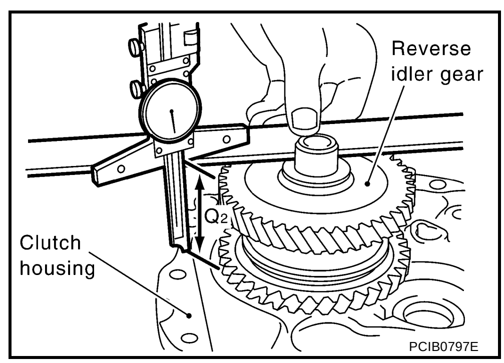
Q_1 : Distance between transaxle case end face and mounting face of adjusting shim

Q_2 : Distance between clutch housing end face and end face of reverse idler gear (Rear)

1. Using depth micrometer and straightedge, measure the dimension “Q_1 ” between transaxle case end face and mounting face of adjusting shim.



2. Using depth micrometer and straightedge as shown in the figure, measure the dimension “Q_2 ” between clutch housing end face and end face of reverse idler gear (Rear).
3. Install selected reverse idler gear adjusting shim onto reverse idler gear assembly.

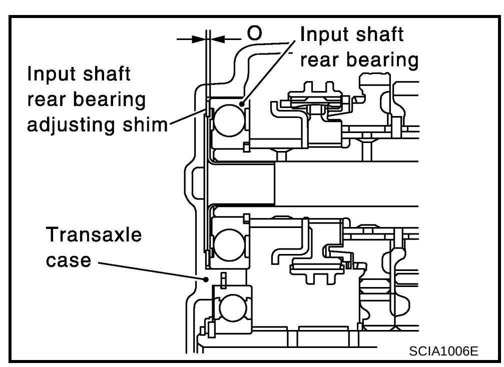


Input Shaft End Play

- When adjusting input shaft end play, select adjusting shim for input shaft rear bearing. To select adjusting shim, measure the clearance between transaxle case and input shaft rear bearing. Refer to MT-66, "INPUT SHAFT REAR BEARING ADJUSTING SHIM" .

  CAUTION:

  Only 1 adjusting shim can be selected.



- Calculate the dimension “O” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for input shaft rear bearing.

End play: 0 - 0.06 mm (0 - 0.0024 in)

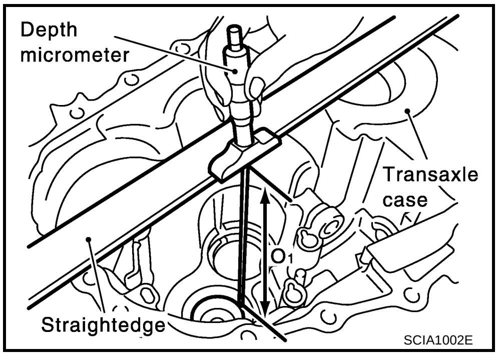
Dimension“O” = (O_1 - O_2) - End play

O: **Thickness of adjusting shim**

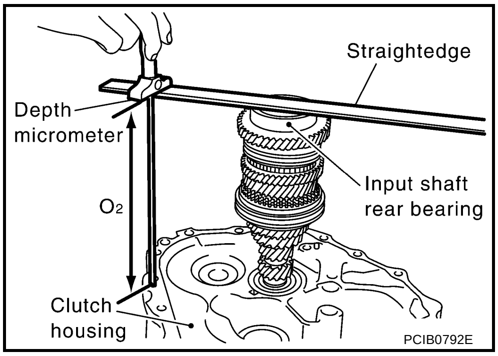
O_1 : **Distance between transaxle case end face and mounting face of adjusting shim**

O_2 : **Distance between clutch housing end face and end face of input shaft rear bearing**

1. Using depth micrometer and straightedge, measure the dimension “O_1 ” between transaxle case end face and mounting face of adjusting shim.



2. Using depth micrometer and straightedge as shown in the figure, measure the dimension “O_2 ” between clutch housing end face and end face of input shaft rear bearing.
3. Install selected input shaft rear bearing adjusting shim onto input shaft.

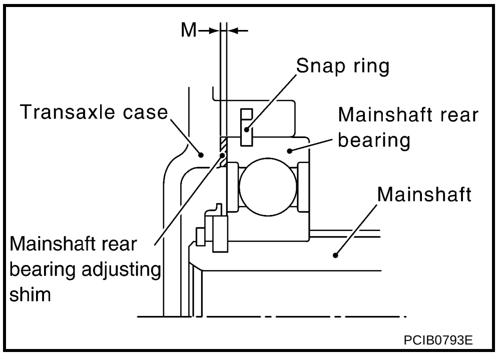


Mainshaft End Play

- When adjusting mainshaft end play, select adjusting shim for mainshaft rear bearing. To select adjusting shim, measure the clearance “M” between transaxle case and mainshaft rear bearing. Refer to MT-66, "MAINSHAFT REAR BEARING ADJUSTING SHIM" .

  CAUTION:

  Only 1 adjusting shim can be selected.
- Calculate the dimension “P” (thickness of adjusting shim) using the following procedure to satisfy specification of end play for mainshaft rear bearing.



End play: 0 - 0.06 mm (0 - 0.0024 in)

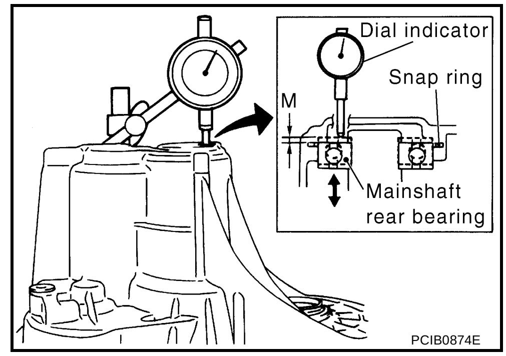
Dimension“P” = “M” - End play

P: **Thickness of adjusting shim**

M: **Distance between mainshaft rear bearing end face and transaxle case end face**

1. Install mainshaft assembly to clutch housing.
2. Install snap ring to transaxle case.
3. Install transaxle case to clutch housing, and temporarily assemble them with fixing bolts. Install temporarily snap ring to mainshaft rear bearing.

4. Install dial indicator to bore plug mounting hole, and expand snap ring. Lift mainshaft assembly through control assembly installation hole, and push it against transaxle case. This state shall be defined as base. Moving distance of mainshaft assembly, with snap ring fit on main rear bearing, becomes “M”.



INPUT SHAFT AND GEARS

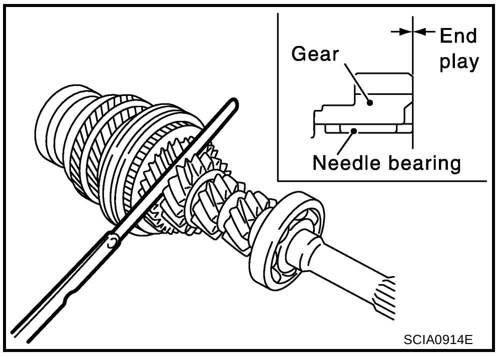
PFP:32200

Disassembly and Assembly

ACS007YG

DISASSEMBLY

1. Before disassembling, measure end play for 3rd, 4th, and 5th input gears.

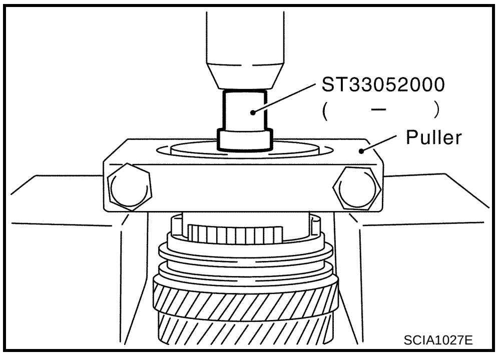


SCIA0914E

End play standard value

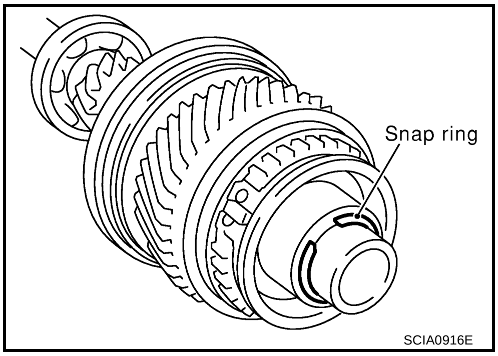
3rd input gear	**: 0.18 - 0.31 mm (0.0071 - 0.0122 in)**
4th input gear	**: 0.20 - 0.30 mm (0.0079 - 0.0118 in)**
5th input gear	**: 0.06 - 0.16 mm (0.0024 - 0.0063 in)**

2. Remove oil channel.
3. Press out input shaft rear bearing using the drift and a puller.



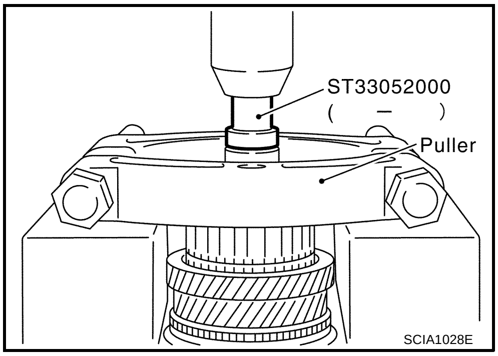
SCIA1027E

4. Remove snap ring.



SCIA0916E

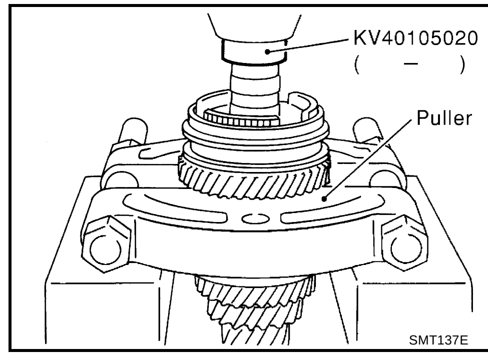
5. Press out input shaft bearing spacer and 5th stopper using the drift and a puller.



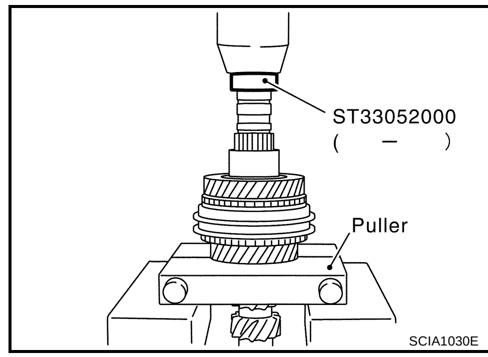
SCIA1028E

A B MT D E F G H I J K L M

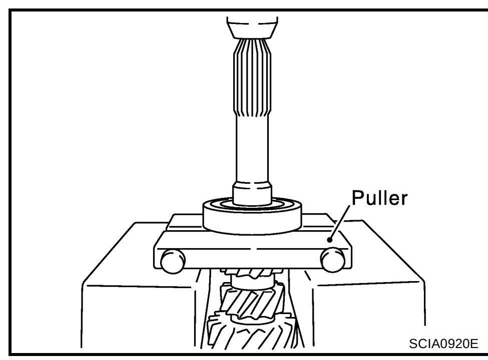
6. Press out 5th input gear and 5th synchronizer hub assembly using the drift and a puller.
7. Remove 5th needle bearing.



8. Press out 5th input gear bushing, thrust washer, 4th input gear, 4th needle bearing, 4th input gear bushing, 3rd-4th synchronizer hub assembly and 3rd input gear using the drift and a puller.
9. Remove 3rd needle bearing.



10. Press out input shaft front bearing using a puller.

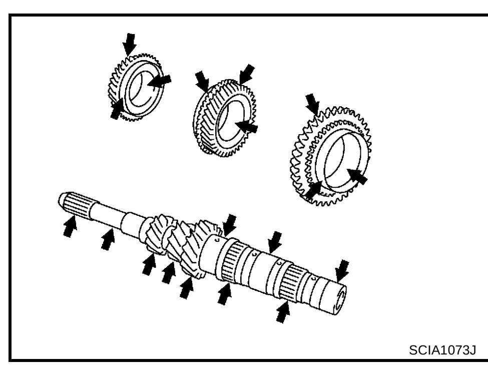


INSPECTION AFTER DISASSEMBLY

Input Shaft and Gears

Check items below. If necessary, replace them with new ones.

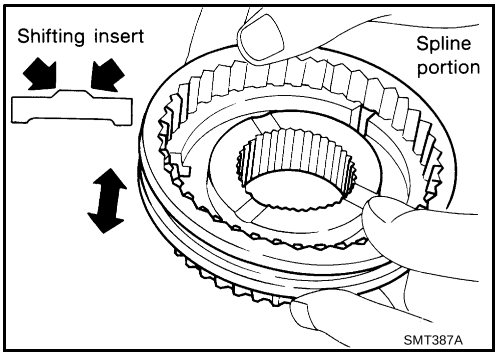
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



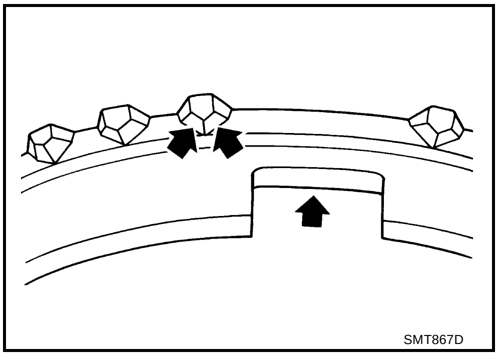
Synchronizer

Check items below. If necessary, replace them with new ones.

- Damage and excessive wear of contact surfaces of coupling sleeve, synchronizer hub and shifting insert
- Coupling sleeve and synchronizer hub must move smoothly.



- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



BAULK RING CLEARANCE

Serial number: Up to JN8BT08V5W103964

Single-cone synchronizer	**: 3rd, 4th and 5th**
Double-cone synchronizer	**: Not applicable**

Serial number: From JN8BT08V5W103964

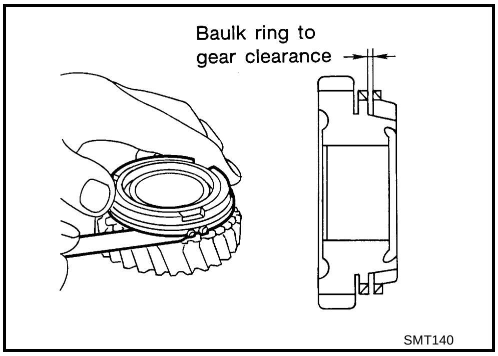
Single-cone synchronizer	**: 4th and 5th**
Double-cone synchronizer	**: 3rd**

- **Single-cone synchronizer**
  Push baulk ring on the cone, and measure the clearance between baulk ring and cone. If measurement is below limit, replace it with a new one.

  Clearance

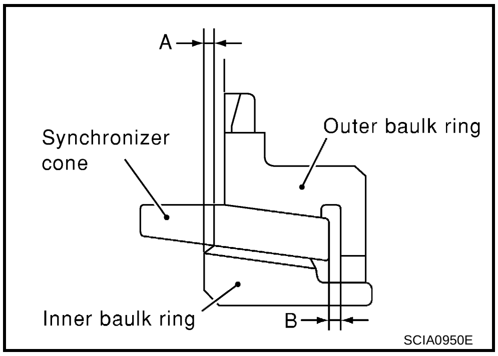
  Standard value

3rd and 4th	**: 0.9 - 1.45 mm (0.035 - 0.057 in)**
5th	**: 0.95 - 1.4 mm (0.037 - 0.055 in)**
Limit value	**: 0.7 mm (0.028 in)**



- **Double-cone synchronizer**
  Check the clearance between outer baulk ring, synchronizer cone and inner baulk ring as follows.

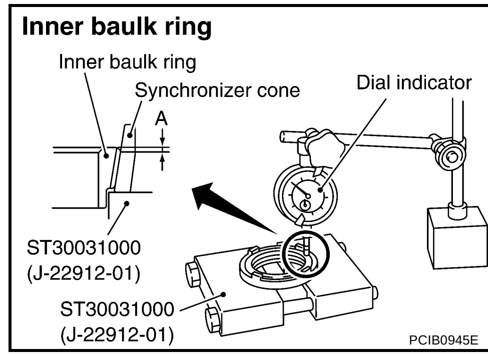
  CAUTION:
  The clearances “A” and “B” are controlled with outer baulk ring, synchronizer cone and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance “A” at 2 points or more diagonally opposite using a dial indicator. And then calculate mean value.

   Clearance “A”

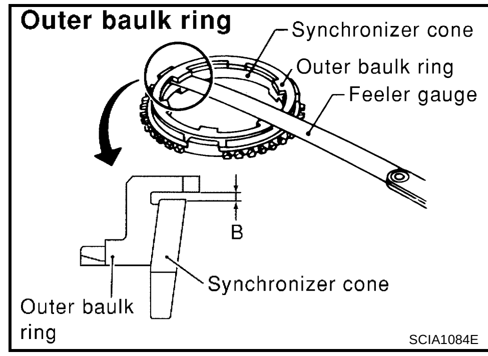
Standard value	**: 0.6 - 0.8 mm (0.024 - 0.031 in)**
Limit value	**: 0.2 mm (0.008 in)**



2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

   Clearance “B”

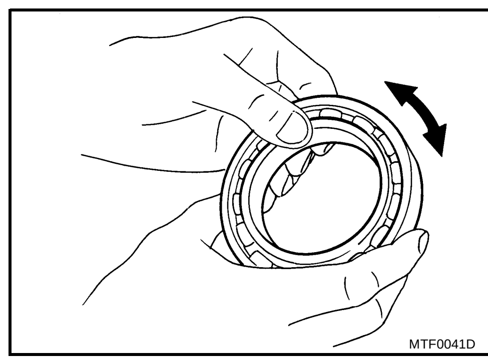
Standard value	**: 0.6 - 1.1 mm (0.024 - 0.043 in)**
Limit value	**: 0.2 mm (0.008 in)**



Bearing

Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing

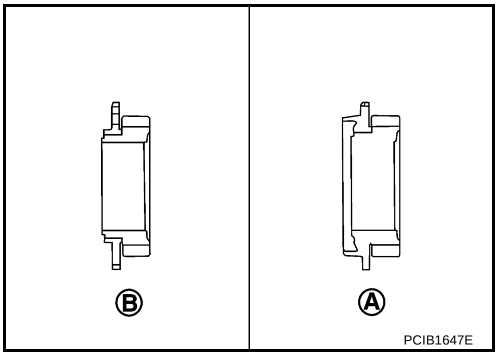


ASSEMBLY

1. Install 3rd needle bearing to input shaft.
2. Install 3rd input gear to input shaft.

   NOTE:

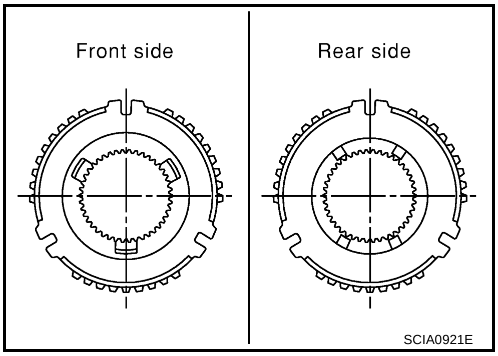
   The shape of the 3rd input gear of a single-cone synchronizer (A) is different from that of a double-cone synchronizer (B).



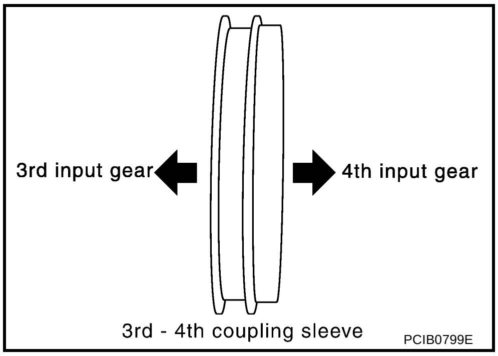
3. Install 3rd baulk ring (single-cone synchronizer) or 3rd inner baulk ring, 3rd synchronizer cone and 3rd outer baulk ring (double-cone synchronizer).
4. Install 3rd-4th spread spring, 3rd-4th shifting insert and 3rd-4th synchronizer hub onto 3rd-4th coupling sleeve.

   CAUTION:

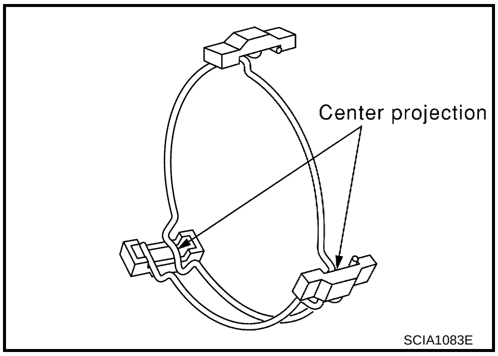
   - **Be careful with the orientation of 3rd-4th synchronizer hub.**
   - **Do not reuse 3rd-4th synchronizer hub.**



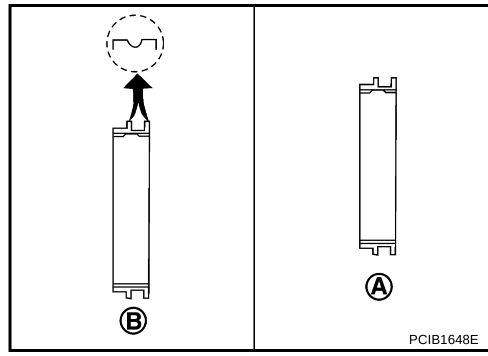
   - **Be careful with the orientation of 3rd-4th coupling sleeve.**
   - **Do not reuse 3rd-4th coupling sleeve.**



   - **Be sure not to hook center projection of 2 spread springs on same shifting insert.**



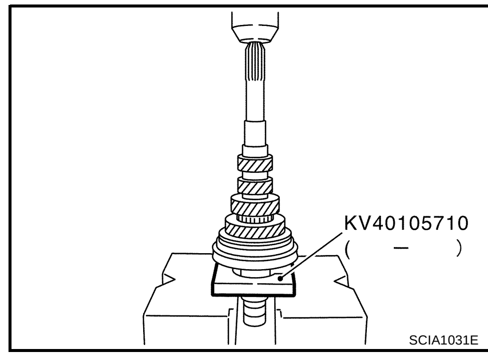
NOTE:
The shape of the 3rd-4th coupling sleeve of a single-cone synchronizer (A) is different from that of a double-cone synchronizer (B).



PCIB1648E

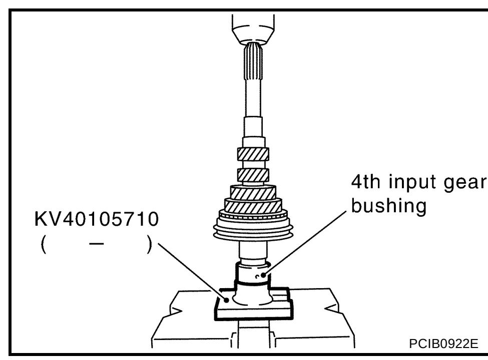
5. Press in 3rd-4th synchronizer hub assembly using the press stand.

CAUTION:
Align grooves of 3rd-4th shifting insert and 3rd baulk ring (single-cone synchronizer) or 3rd outer baulk ring (double-cone synchronizer).



SCIA1031E

6. Press in 4th input gear bushing using the press stand.
7. Install 4th baulk ring.
8. Install 4th needle bearing and 4th input gear to input shaft.



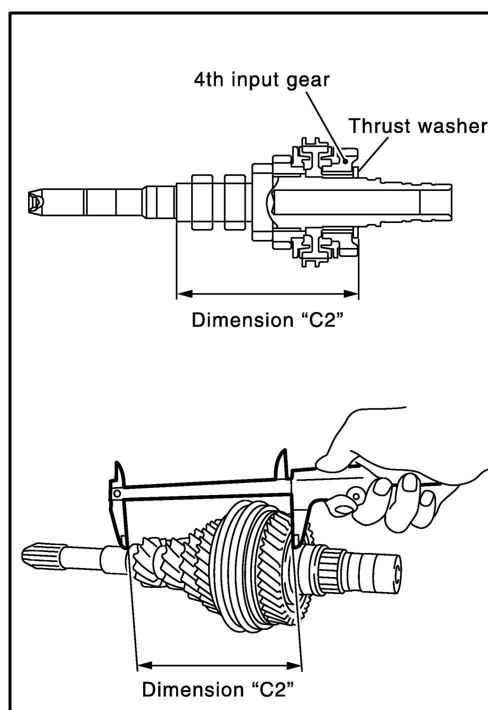
PCIB0922E

9. Select thrust washer so that the dimension “C2” satisfies the standard value below. Then install thrust washer onto input shaft. Refer to MT-65, "INPUT SHAFT THRUST WASHER" .

Standard for dimension C2

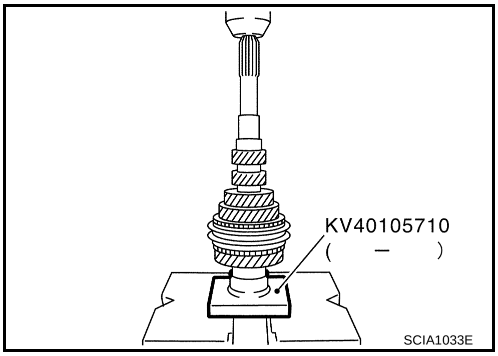
: 154.7 - 154.8 mm (6.091 - 6.094 in)

CAUTION:
Only one thrust washer can be selected.

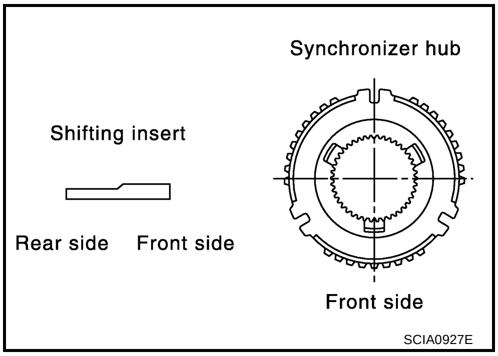


SCIA0925E

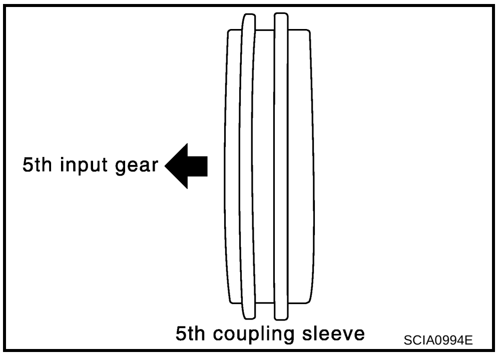
10. Press in 5th input gear bushing using the press stand.
    CAUTION:
    Do not reuse 5th input gear bushing.
11. Install 5th needle bearing and 5th input gear to input shaft.
12. Install 5th baulk ring.



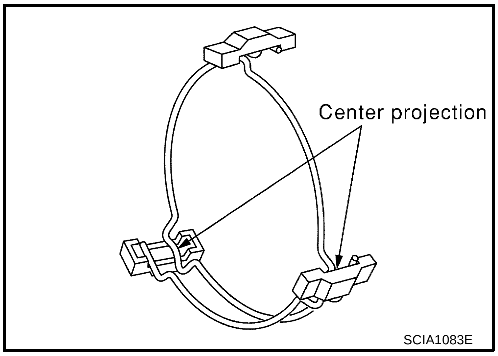
13. Install 5th synchronizer hub and 5th spread spring, 5th shifting insert onto 5th coupling sleeve.
    CAUTION:
    - **Be careful with the orientation of 5th synchronizer hub and shifting insert.**
    - **Do not reuse 5th synchronizer hub.**



- **Be careful with the orientation of 5th coupling sleeve.**
- **Do not reuse 5th coupling sleeve.**

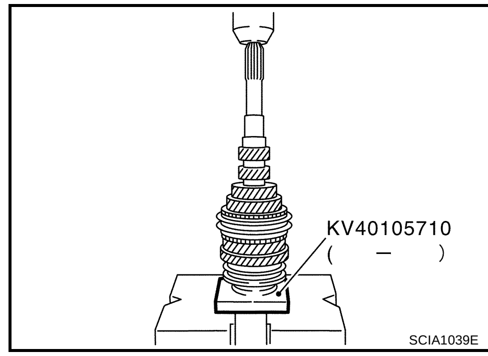


- **Be sure not to hook center projection of 2 spread springs on same shifting insert.**

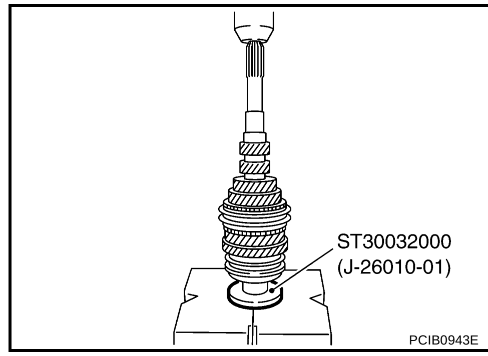


14. Press in 5th synchronizer hub assembly using the press stand.

CAUTION:
Align grooves of 5th shifting insert and 5th baulk ring.



15. Press in 5th stopper and then input shaft bearing spacer using the drift.

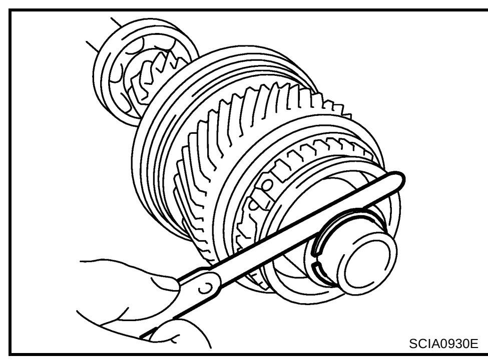


16. Install snap ring onto input shaft, and make sure that end play (gap between snap ring and groove) of input shaft bearing spacer satisfies the standard value.

End play standard value : 0 - 0.1 mm (0 - 0.004 in)

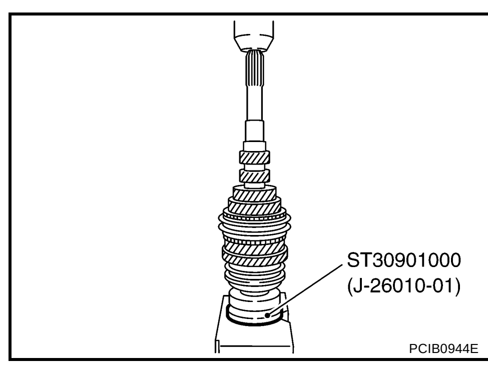
- If the measurement is outside the standard range, select snap ring. Refer to MT-64, "INPUT SHAFT BEARING SPACER" .

  CAUTION:
  Do not reuse snap ring.

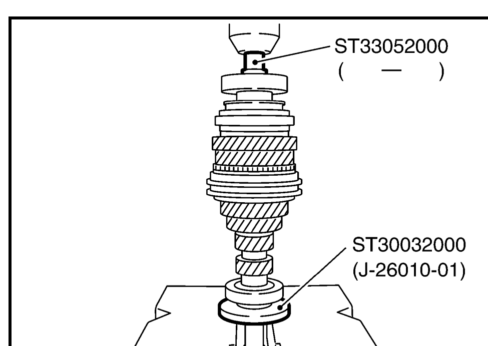


17. Press in input shaft rear bearing using the drift.

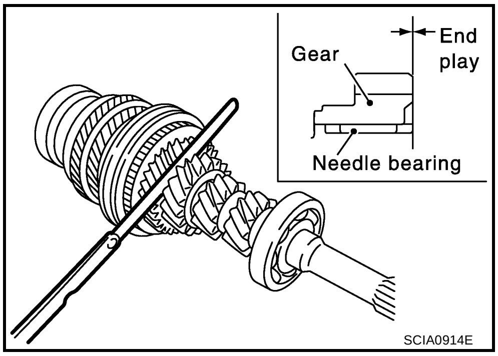
CAUTION:
Install input shaft rear bearing with its brown surface facing the input gear side.



18. Press in input shaft front bearing using the drifts.
19. Install oil channel onto input shaft.



20. Check end play of 3rd, 4th, and 5th input gears.



End play standard value

3rd input gear	**: 0.18 - 0.31 mm (0.0071 - 0.0122 in)**
4th input gear	**: 0.20 - 0.30 mm (0.0079 - 0.0118 in)**
5th input gear	**: 0.06 - 0.16 mm (0.0024 - 0.0063 in)**

MAINSHAFT AND GEARS

PFP:32241

Disassembly and Assembly

ACS007YI

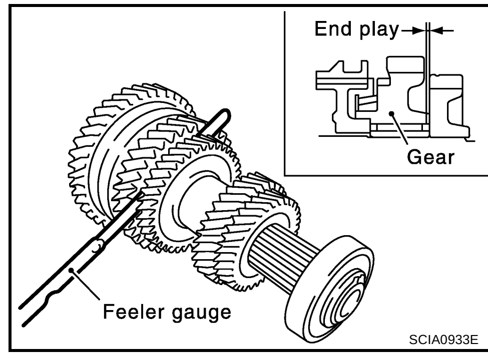
DISASSEMBLY

1. Before disassembling, measure the end play of 1st and 2nd main gears.

   End play standard value

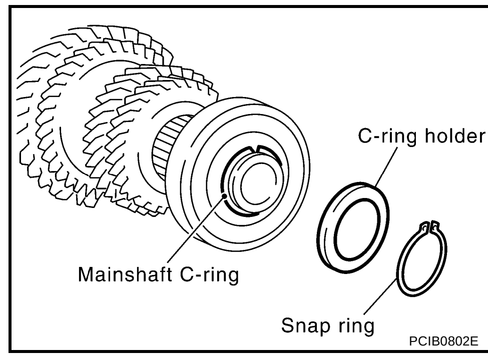
   1st main gear : 0.20 - 0.30 mm (0.0079 - 0.0118 in)

   2nd main gear : 0.06 - 0.16 mm (0.0024 - 0.0063 in)



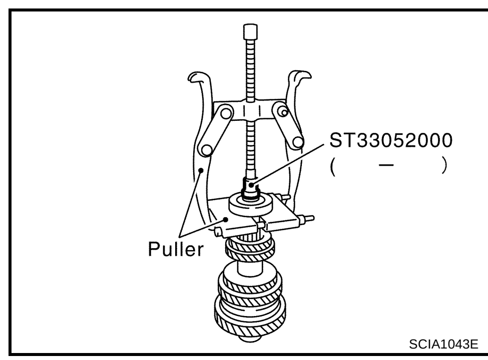
SCIA0933E

2. Remove snap ring.
3. Remove C-ring holder, and then remove mainshaft C-ring.



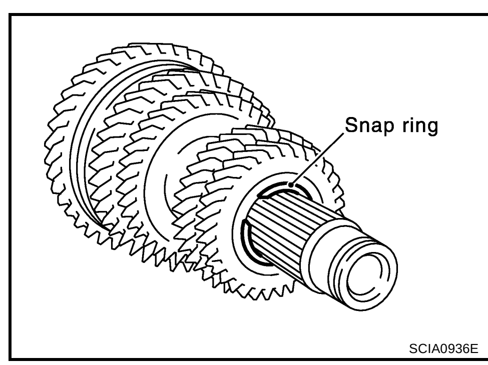
PCIB0802E

4. Remove mainshaft rear bearing using the drift and pullers.



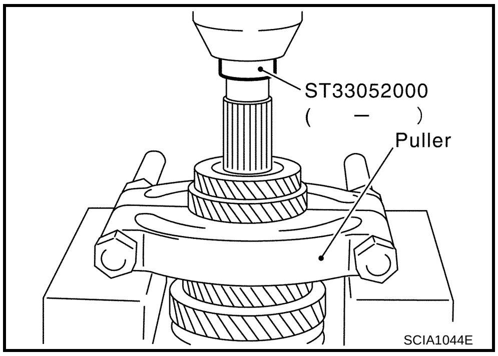
SCIA1043E

5. Remove snap ring.

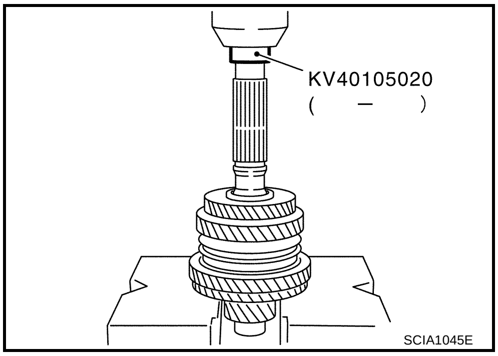


SCIA0936E

6. Press out 4th main gear and 5th main gear using the drift and a puller.
7. Remove 4th main gear adjusting shim.
8. Remove 3rd-4th mainshaft spacer.



9. Press out 3rd main gear, 2nd main gear, 2nd needle bearing, 2nd main gear bushing, 1st-2nd synchronizer hub assembly, 1st main gear, 1st needle bearing, and 1st main gear bushing reverse main gear using the drift.

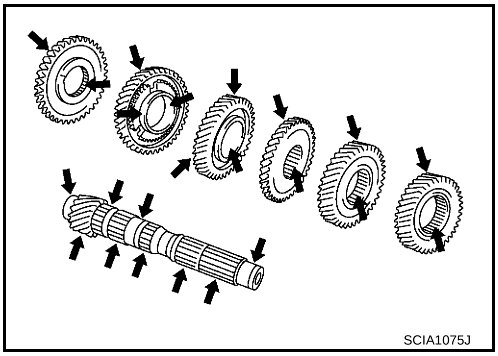


INSPECTION AFTER DISASSEMBLY

Mainshaft and Gears

Check items below. If necessary, replace them with new ones.

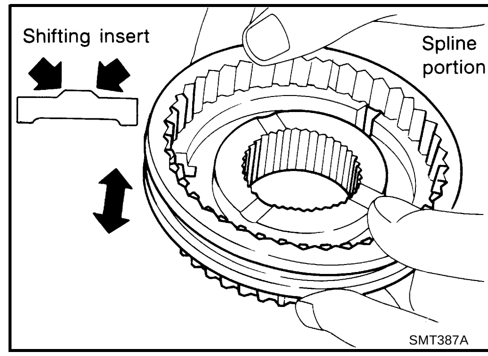
- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.



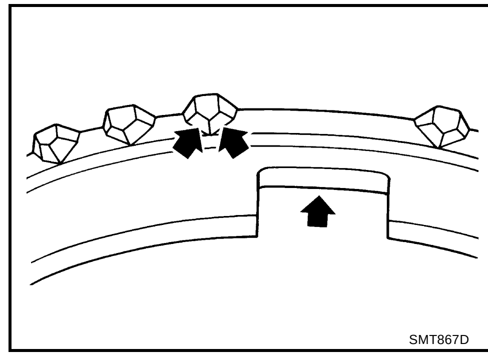
Synchronizer

Check items below. If necessary, replace them with new ones.

- Damage and unusual wear on contact surfaces of coupling sleeve, synchronizer hub, and shifting insert.
- Coupling sleeve and synchronizer hub must move smoothly.



- If any crack, damage, or excessive wear is found on cam face of baulk ring or working face of insert, replace it.



BAULK RING CLEARANCE

Serial number: Up to JN8BT08V5W103964

Double-cone synchronizer	**: 1st**
Triple-cone synchronizer	**: 2nd**

Serial number: From JN8BT08V5W103964

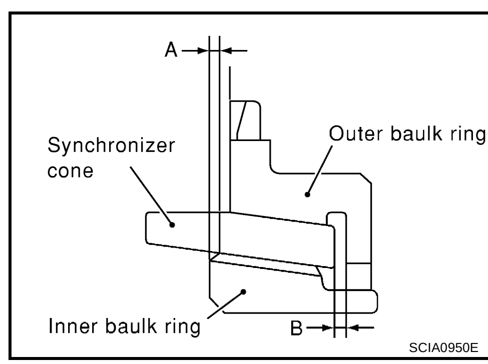
Double-cone synchronizer	**: Not applicable**
Triple-cone synchronizer	**: 1st and 2nd**

Double-cone synchronizer

- Check the clearance between outer baulk ring, synchronizer cone and inner baulk ring as follows.

  CAUTION:

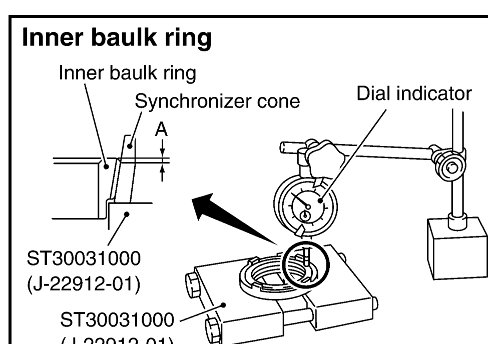
  The clearances “A” and “B” are controlled with outer baulk ring, synchronizer cone and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.



1. Measure the clearance “A” at 2 points or more diagonally opposite using a dial indicator. And then calculate mean value.

Clearance “A”

Standard value	**: 0.6 - 0.8 mm (0.024 - 0.031 in)**
Limit value	**: 0.2 mm (0.008 in)**

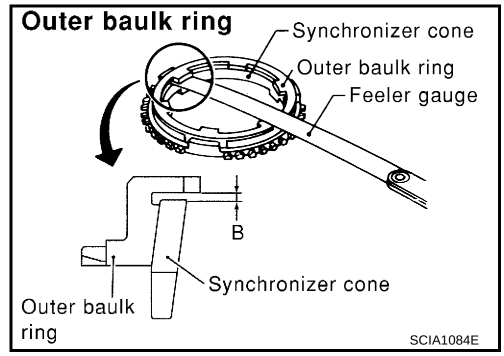


2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

Standard value : 0.6 - 1.1 mm (0.024 - 0.043 in)

Limit value : 0.2 mm (0.008 in)

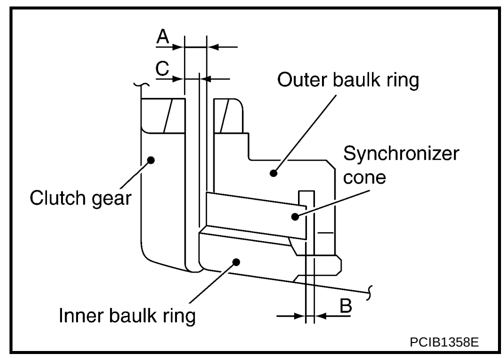


Triple-cone synchronizer

- Check the clearance between outer baulk ring, synchronizer cone and inner baulk ring as follows.

CAUTION:

The clearances “A”, “B” and “C” are controlled with outer baulk ring, synchronizer cone and inner baulk ring as a set. Replace them as a set if the clearances are outside the limit value.

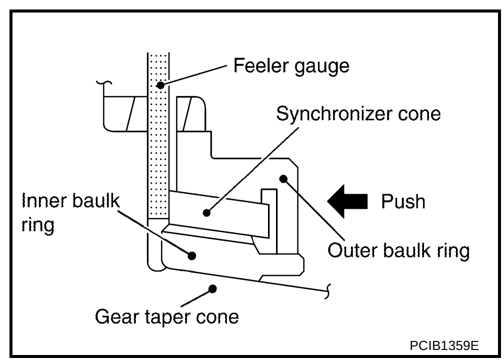


1. Measure the clearance “A” at 2 points or more diagonally opposite using a feeler gauge when pressing baulk ring toward clutch gear taper cone. And then calculate mean value.

Clearance “A”

Standard value : 0.6 - 1.2 mm (0.024 - 0.047 in)

Limit value : 0.3 mm (0.012 in)

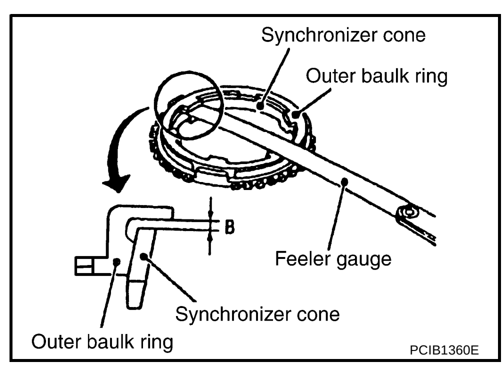


2. Measure the clearance “B” at 2 points or more diagonally opposite using a feeler gauge. And then calculate mean value.

Clearance “B”

Standard value : 0.6 - 1.1 mm (0.024 - 0.043 in)

Limit value : 0.2 mm (0.008 in)

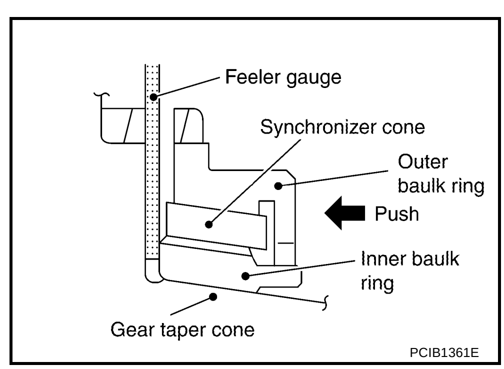


3. Measure the clearance “C” at 2 points or more diagonally opposite using a feeler gauge when pressing baulk ring toward clutch gear taper cone. And then calculate mean value.

Clearance “C”

Standard value : 0.7 - 1.1 mm (0.028 - 0.043 in)

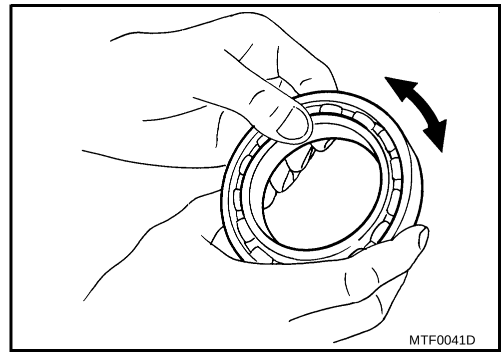
Limit value : 0.3 mm (0.012 in)



Bearing

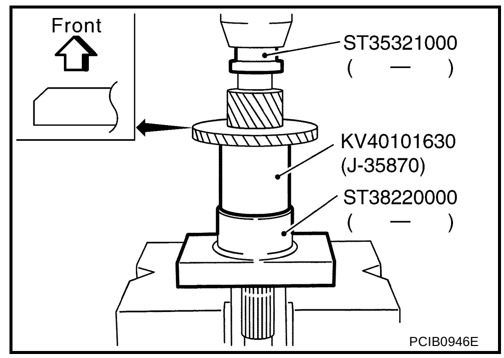
Check items below. If necessary, replace them with new ones.

- Damage and rough rotation of bearing



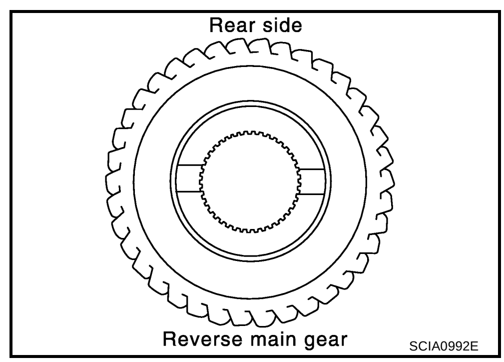
ASSEMBLY

1. Press in reverse main gear using the drifts and the press stand.

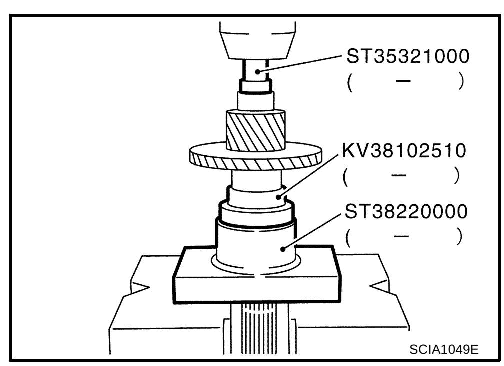


CAUTION:

- **Be careful with the orientation of reverse main gear.**
- **Do not reuse reverse main gear.**

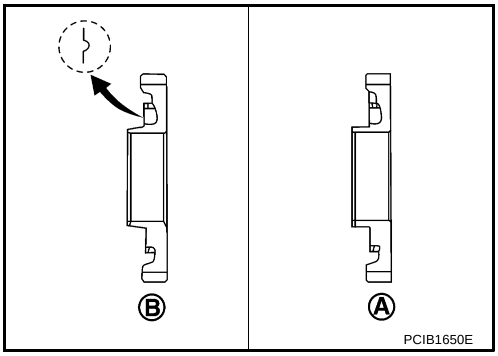


2. Press in 1st main gear bushing using the drifts and the press stand.
3. Install 1st needle bearing, and then 1st main gear.



NOTE:

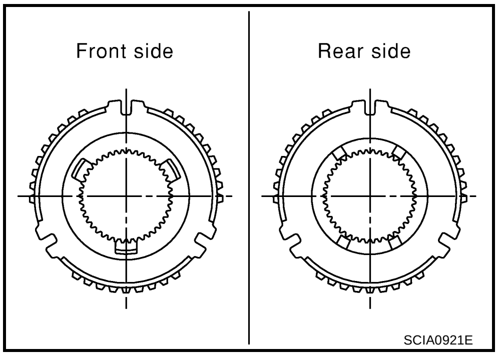
The shape of the 1st main gear of a double-cone synchronizer (A) is different from that of a triple-cone synchronizer (B).



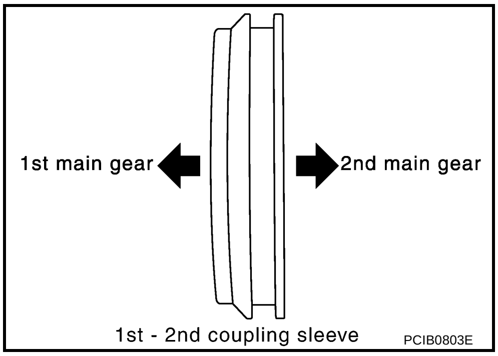
4. Install 1st-2nd spread spring, 1st-2nd shifting insert and 1st-2nd synchronizer hub onto 1st-2nd coupling sleeve.

CAUTION:

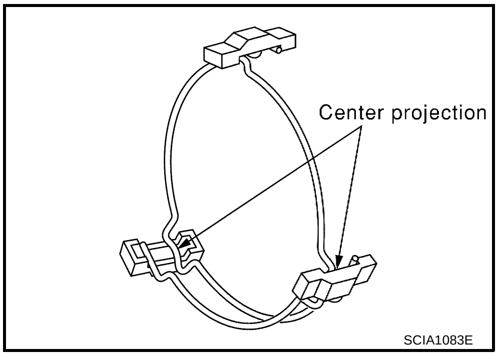
- **Be careful with the orientation of 1st-2nd synchronizer hub.**
- **Do not reuse 1st-2nd synchronizer hub.**



- **Be careful with the orientation of 1st-2nd coupling sleeve.**
- **Do not reuse 1st-2nd coupling sleeve.**



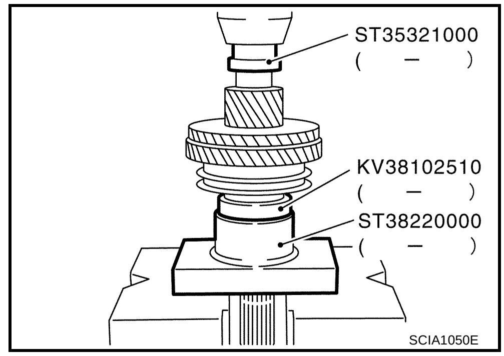
- **Be sure not to hook center projection of 2 spread springs on same 1st-2nd shifting insert.**



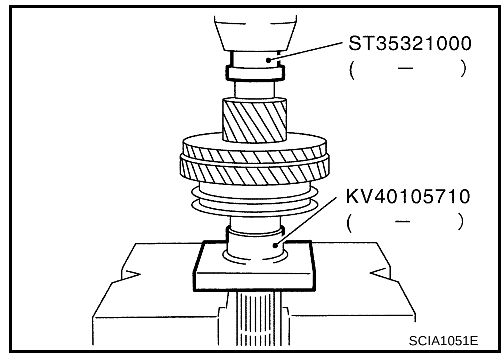
5. Install 1st inner baulk ring, 1st synchronizer cone, 1st outer baulk ring onto mainshaft, and then press in 1st-2nd synchronizer hub assembly onto mainshaft using the drifts and the press stand.

CAUTION:

- **Outer baulk ring, synchronizer cone, and inner baulk ring on 2nd gear-side must have been removed.**
- **Be careful with the orientation of coupling sleeve.**

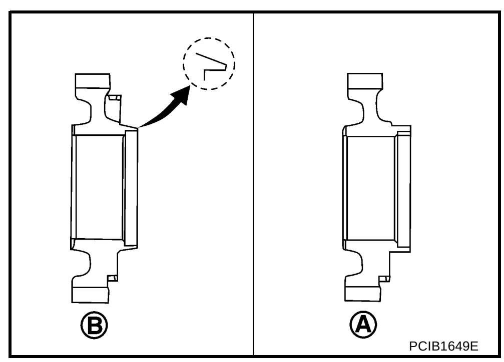


6. Press in 2nd main gear bushing using the drift and the press stand.
7. Install 2nd outer baulk ring, 2nd synchronizer cone, and 2nd inner baulk ring.
8. Install 2nd needle bearing and 2nd main gear.



NOTE:

The shape of the 2nd main gear of a double-cone synchronizer (A) is different from that of a triple-cone synchronizer (B).

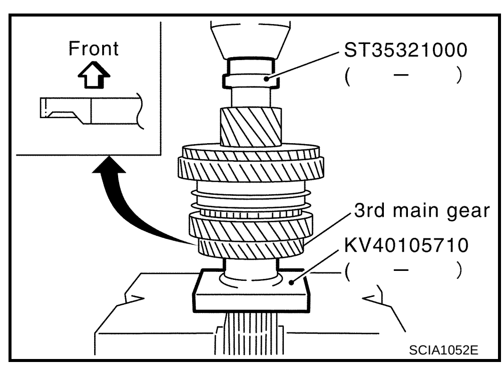


9. Press in 3rd main gear using the drift and the press stand.

CAUTION:

- **Be careful with the orientation of 3rd main gear.**
- **Do not reuse 3rd main gear.**

10. Install 3rd-4th mainshaft spacer.



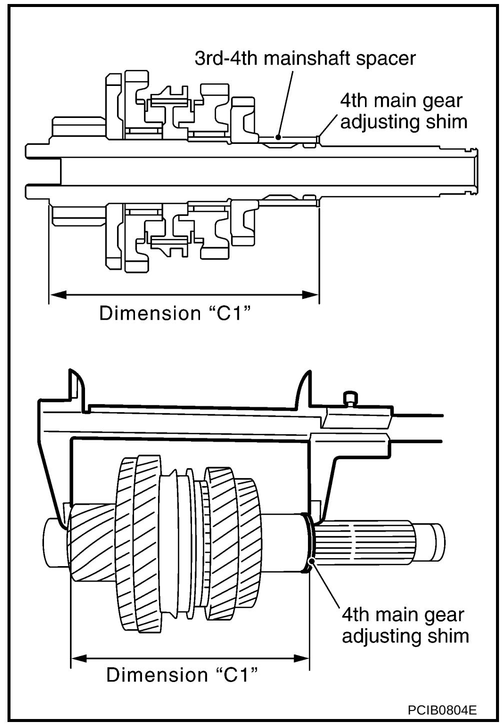
11. Select 4th main gear adjusting shim so that the dimension "C1" satisfies the standard value below, and install 4th main gear adjusting shim onto mainshaft. Refer to MT-66, "4TH MAIN GEAR ADJUSTING SHIM" .

Standard value for dimension C1

: 173.85 - 173.95 mm (6.844 - 6.848 in)

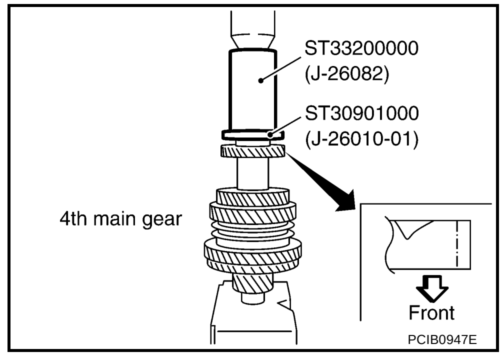
CAUTION:

Only one adjusting shim can be selected.



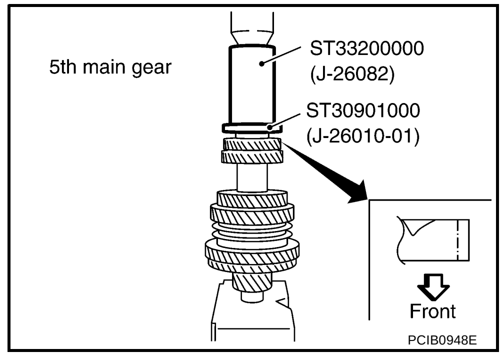
12. Press in 4th main gear using the drifts.

CAUTION:
- **Be careful with the orientation of 4th main gear.**
- **Do not reuse 4th main gear.**



13. Press in 5th main gear using the drifts.

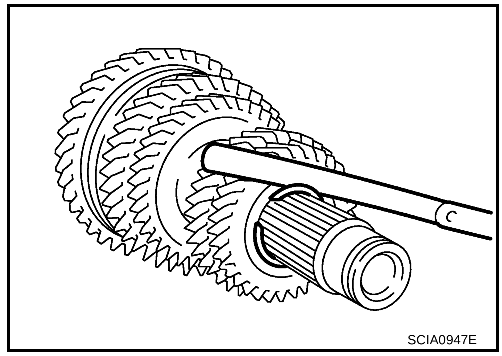
CAUTION:
- **Be careful with the orientation of 5th main gear.**
- **Do not reuse 5th main gear.**



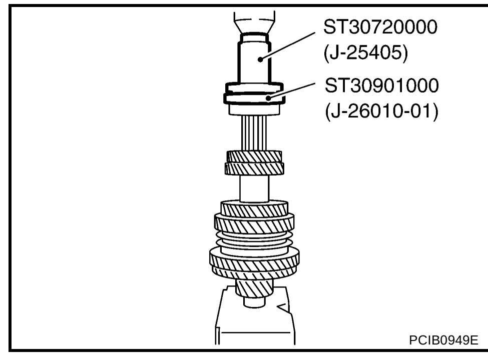
14. Install snap ring onto mainshaft, and make sure that end play of 5th main gear satisfies the standard value.

End play standard value : 0 - 0.1 mm (0 - 0.004 in)

- If the measurement is outside the standard range, reselect snap ring. Refer to MT-64, "5TH MAIN GEAR" .



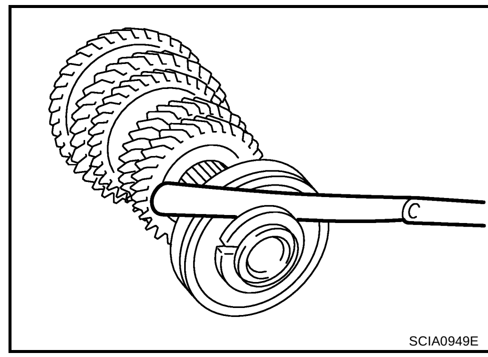
15. Press in mainshaft rear bearing using the drifts.



16. Install mainshaft C-ring onto mainshaft, and make sure that end play of mainshaft rear bearing satisfies the standard value.

End play standard value : 0 - 0.06 mm (0 - 0.0024 in)

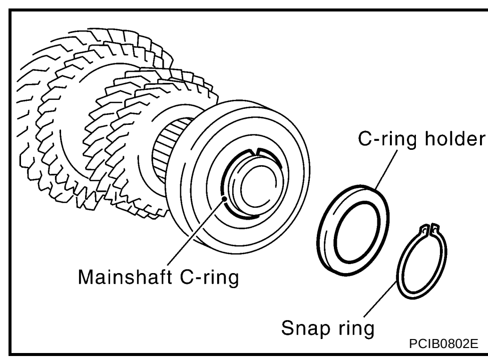
- If the measurement is outside the standard range, reselect mainshaft C-ring. Refer to MT-65, "MAINSHAFT C-RING" .



17. Install C-ring holder, and then install snap ring.

CAUTION:

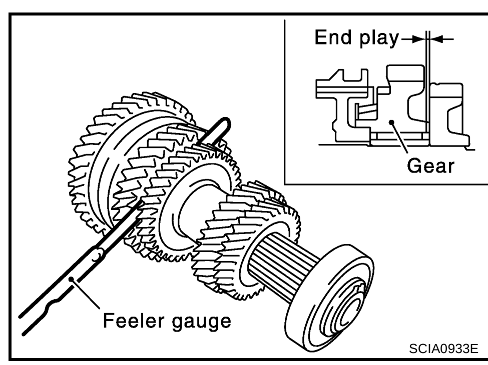
Do not reuse snap ring.



18. Check end play of 1st and 2nd main gears.

End play standard value

1st main gear	**: 0.20 - 0.30 mm (0.0079 - 0.0118 in)**
2nd main gear	**: 0.06 - 0.16 mm (0.0024 - 0.0063 in)**



REVERSE IDLER SHAFT AND GEARS

PFP:32281

Disassembly and Assembly

ACS007YK

DISASSEMBLY

1. Remove reverse idler gear (rear), reverse coupling sleeve and reverse insert spring simultaneously.
2. Remove reverse idler gear needle bearing.
3. Remove thrust needle bearing.
4. Remove reverse baulk ring.
5. Remove reverse idler gear (front).
6. Remove reverse idler gear needle bearing.
7. Remove thrust needle bearing.
8. Remove retaining pin from reverse idler shaft.

   CAUTION:

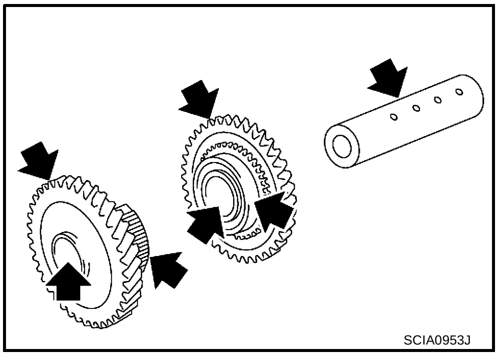
   Do not reuse retaining pin.

INSPECTION AFTER DISASSEMBLY

Reverse Idler Shaft and Gears

Check items below. If necessary, replace them with new ones.

- Damage, peeling, dent, uneven wear, bending, and other non-standard conditions of the shaft.
- Excessive wear, damage, peeling, and other non-standard conditions of the gears.

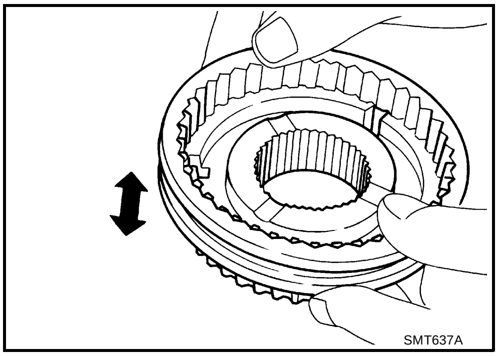


SCIA0953J

Synchronizer

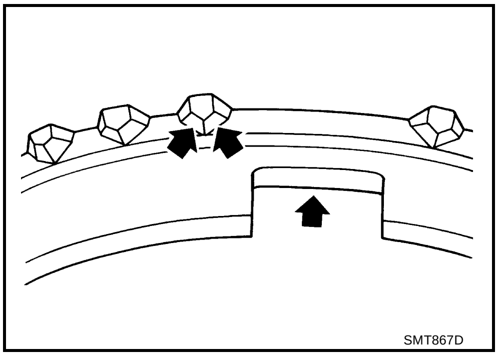
Check items below. If necessary, replace them with new ones.

- Damage and unusual wear on contact surfaces of reverse coupling sleeve, reverse synchronizer hub, and reverse insert spring.
- Reverse coupling sleeve and reverse synchronizer hub must move smoothly.



SMT637A

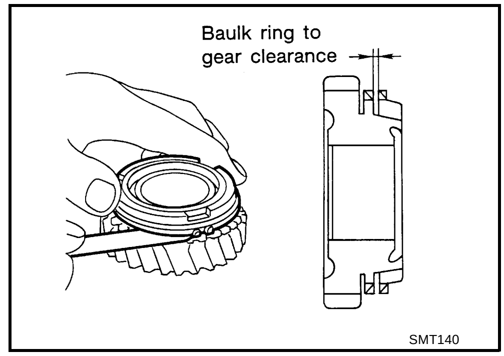
- If any crack, damage, or excessive wear is found on cam face of reverse baulk ring or working face of insert, replace it.



SMT867D

BAULK RING CLEARANCE

- Push baulk ring on the cone, and measure the clearance between baulk ring and cone. If the measurement is below limit, replace it with a new one.



Clearance

Standard value : 0.95 - 1.4 mm (0.037 - 0.055 in)

Limit value : 0.7 mm (0.028 in)

Bearing

Check items below. If necessary, replace them with new ones.

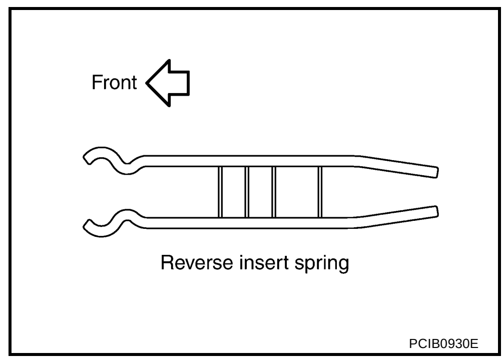
- Damage and rough rotation of bearing.

ASSEMBLY

Paying attention to the following caution, assemble in the reverse order of disassembly.

CAUTION:

- **Be careful with the orientation of reverse insert spring.**



FINAL DRIVE

PFP:38411

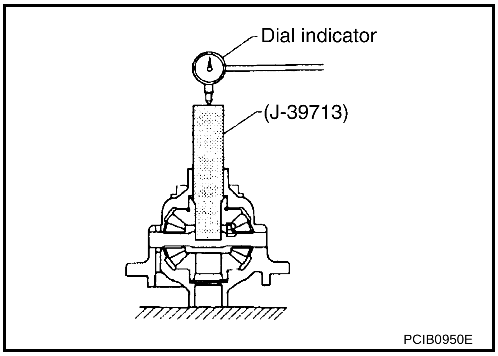
Disassembly and Assembly

ACS007YM

PRE-INSPECTION

- Check the clearance between side gear and differential case as follows.

1. Clean final drive assembly sufficiently to prevent side gear thrust washer, differential case, side gear, and other parts from sticking by gear oil.



PCIB0950E

2. Put differential case vertically so that side gear to be measured faces upward.
3. Place the preload adapter and a dial indicator onto side gear. Move side gear up and down, and measure the clearance.

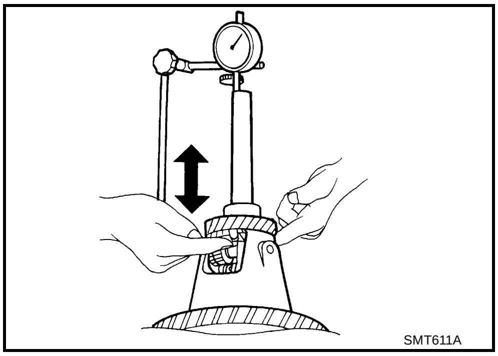
Clearance between side gear and differential case

: 0.1 - 0.2 mm (0.004 - 0.008 in)

CAUTION:

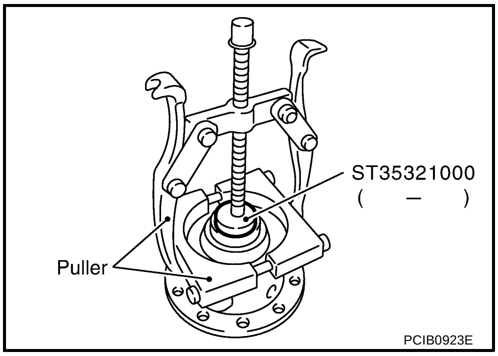
There should be no resistance and gears should rotate freely.

4. If not within specification, adjust the clearance by changing side gear thrust washer thickness.
5. Turn differential case upside down, and measure the clearance between side gear and differential case on the other side in the same way.


SMT611A

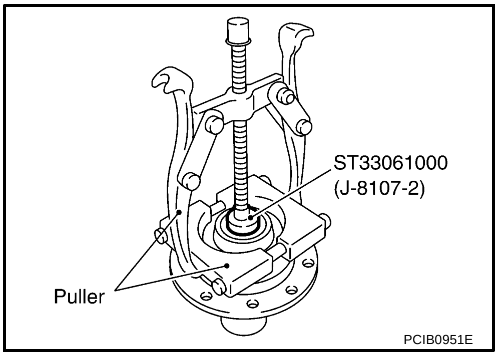
DISASSEMBLY

1. Remove final gear mounting bolts, and then separate the final gear from differential case.
2. Remove differential side bearing (clutch housing side) using the drift and pullers.



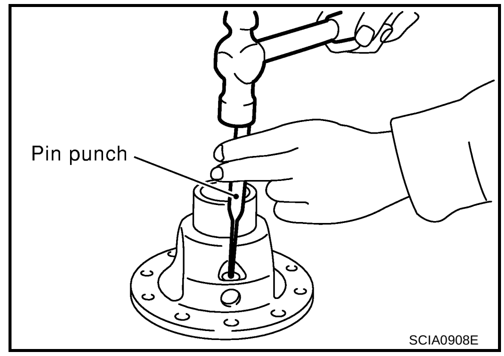
PCIB0923E

3. Remove differential side bearing (transaxle case side) using the drift and pullers.



PCIB0951E

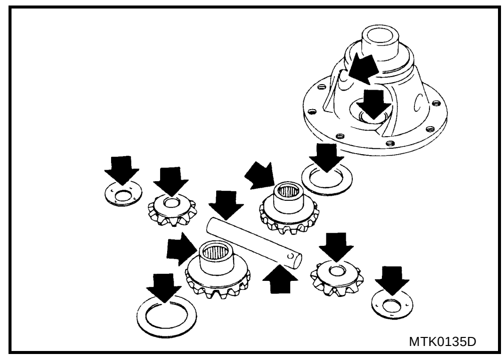
4. Remove retaining pin from differential case using a pin punch, and then remove pinion mate shaft.
5. Rotate pinion mate gears, and remove pinion mate gears, pinion mate thrust washers, side gears, and side gear thrust washers from differential case.



INSPECTION AFTER DISASSEMBLY

Gear, Washer, Shaft and Case

- Check side gears, side gear thrust washers, pinion mate shaft, pinion mate gears, pinion mate thrust washers and differential case. If necessary, replace with a new one.

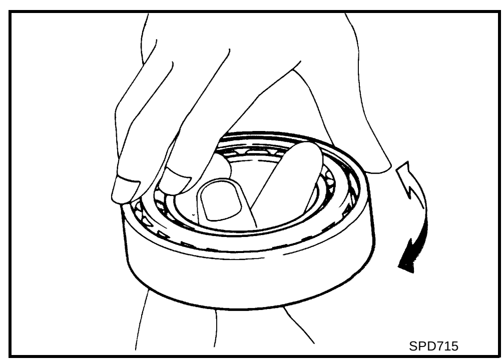


Bearing

- Check for bearing damage and rough rotation. If necessary, replace with a new one.

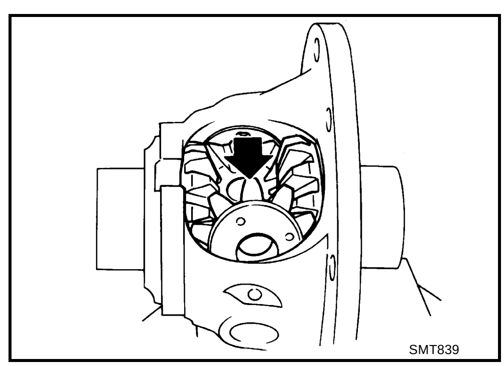
CAUTION:

When replacing tapered roller bearing, replace outer and inner races as a set.

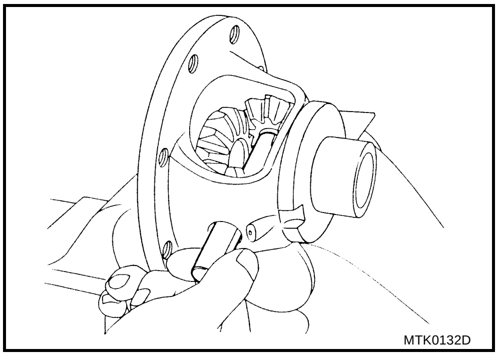


ASSEMBLY

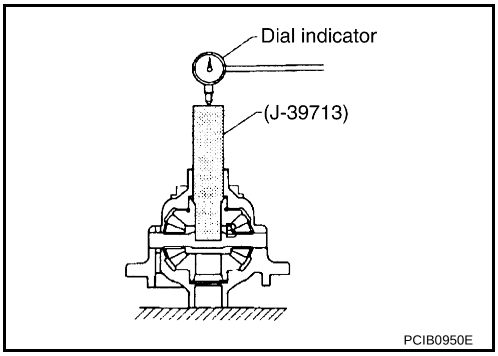
1. Apply gear oil to sliding area of differential case, each gear, and thrust washer.
2. Install side gear thrust washers and side gears into differential case.
3. While rotating pinion mate thrust washers and pinion mate gears, aligning them diagonally, install them into differential case.



4. Insert pinion mate shaft into differential case.
   CAUTION:
   Be sure not to damage pinion mate thrust washers.



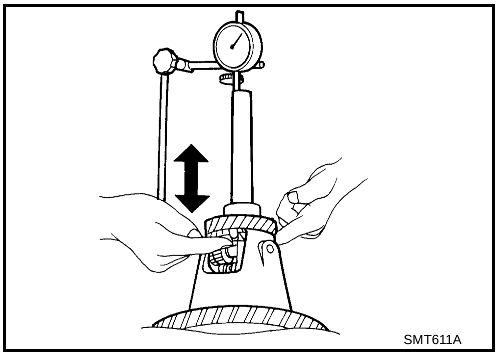
5. Measure end play of side gears following the procedure below. Then select side gear thrust washer.
   a. Put differential case vertically so that its side gear to be measured faces upward.
   b. Place the preload adapter and a dial indicator onto side gears.



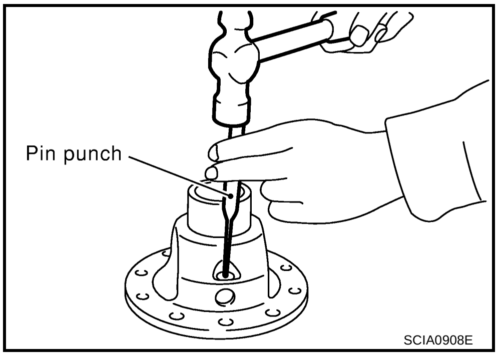
   c. Move side gears up and down to measure end play, and select thrust washer so that it satisfies the standard value. Refer to MT-65, "DIFFERENTIAL SIDE GEAR THRUST WASHER" .

   End play standard value
   : 0.1 - 0.2 mm (0.004 - 0.008 in)

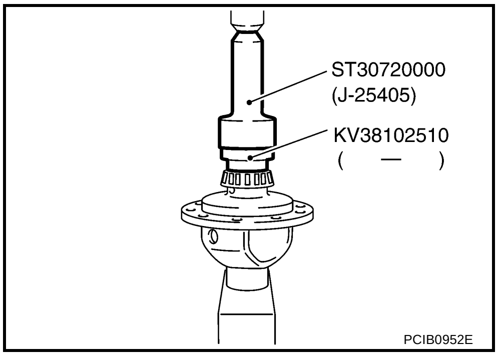
   CAUTION:
   - **There should be no resistance and gears should rotate freely.**
   - **Place differential case upside down. Measure the end play for opposite side-gears likewise securely.**
   - **Only one thrust washer can be selected.**



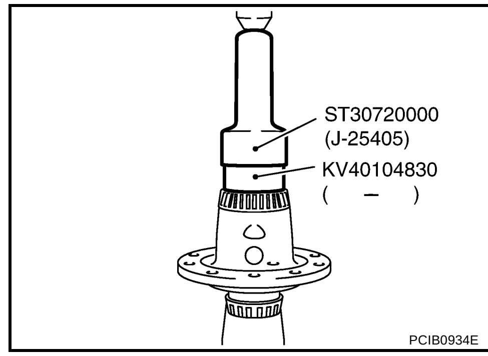
6. Install retaining pin into pinion mate shaft using a pin punch.
   CAUTION:
   Do not reuse retaining pin.



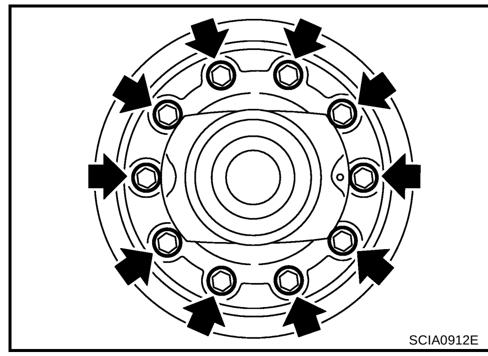
7. Press in differential side bearing (transaxle case side) to differential case using the drifts.



8. Press in differential side bearing (clutch housing side) to differential case using the drifts.



9. Install final gear into differential case, and tighten final gear mounting bolts to the specified torque. Refer to MT-23, "Final Drive Components" .

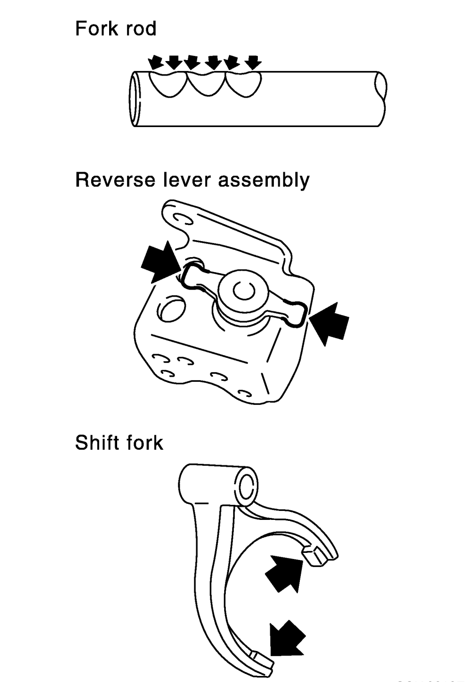


SHIFT CONTROL

PFP:32982

Inspection

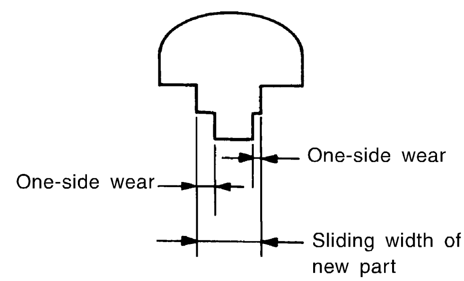
ACS007YO



SCIA0913E

- Check contact surfaces and sliding area for wear, damage, bending, etc. If necessary, replace parts.

SHIFT FORK



SMT801D

- Check if the width of shift fork hook (sliding area with coupling sleeve) is within allowable specification below.

Item	One-side wear specification	Sliding width of new part
1st-2nd	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
3rd-4th	0.2 mm (0.008 in)	7.80 - 7.93 mm (0.3071 - 0.3122 in)
5th	0.2 mm (0.008 in)	6.10 - 6.23 mm (0.2402 - 0.2453 in)
Reverse	0.2 mm (0.008 in)	12.80 - 12.93 mm (0.5039 - 0.5091 in)

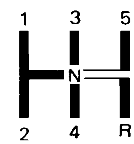
SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ACS007YQ

TRANSAXLE

Engine type			QR25DE
Transaxle model			RS5F51A
Model code number			EQ008
Number of speed			5
Synchromesh type			Warner
Shift pattern			SCIA0821E
Gear ratio	1st		3.416
	2nd		1.944
	3rd		1.258
	4th		0.947
	5th		0.733
	Reverse		3.252
Number of teeth	Input gear	1st	12
		2nd	18
		3rd	31
		4th	38
		5th	45
		Reverse	12
	Main gear	1st	41
		2nd	35
		3rd	39
		4th	36
		5th	33
		Reverse	38
	Reverse idler gear	Front	37
		Rear	38
Oil level mm (in)			168.0 - 174.0 (6.61 - 6.85)
Oil capacity (Reference) ℓ (US qt, Imp qt)			2.2 (2-3/8, 2)
Remarks	Reverse synchronizer		Installed
	Double-cone synchronizer	Serial number: Up to JN8BT08V5W103964	1st
		Serial number: From JN8BT08V5W103964	3rd
	Triple-cone synchronizer	Serial number: Up to JN8BT08V5W103964	2nd
		Serial number: From JN8BT08V5W103964	1st and 2nd

FINAL GEAR

Engine type		QR25DE
Transaxle model		RS5F51A
Model code number		EQ008
Final gear ratio		4.428
Number of teeth	Final gear/Pinion	62/14
	Side gear/Pinion mate gear	14/10

Gear End Play

ACS007YR

Unit: mm (in)

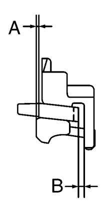
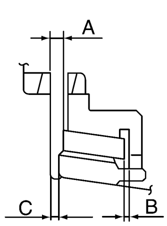
Gear	End play
1st main gear	0.20 - 0.30 (0.0079 - 0.0118)
2nd main gear	0.06 - 0.16 (0.0024 - 0.0063)
3rd input gear	0.18 - 0.31 (0.0071 - 0.0122)
4th input gear	0.20 - 0.30 (0.0079 - 0.0118)
5th input gear	0.06 - 0.16 (0.0024 - 0.0063)

Baulk Ring Clearance

ACS007YS

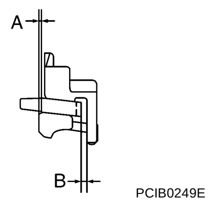
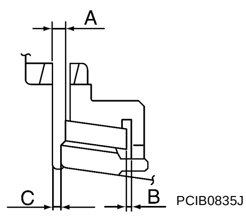
Serial number: Up to JN8BT08V5W103964

Unit: mm (in)

Measurement point		Standard value	Limit value
1st (Double-cone synchronizer)	Clearance between synchronizer cone and inner baulk ring end face “A”	0.6 - 0.8 (0.024 - 0.031)	0.2 (0.008)
 PCIB0249E	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 -0.043)	0.2 (0.008)
2nd (Triple-cone synchronizer)	Clearance between synchronizer cone and clutch gear end face “A”	0.6 - 1.2 (0.024 - 0.047)	0.3 (0.012)
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 - 0.043)	0.2 (0.008)
 PCIB0835J	Clearance between inner baulk ring and clutch gear end face “C”	0.7 - 1.1 (0.028 - 0.043)	0.3 (0.012)
3rd and 4th		0.9 - 1.45 (0.035 - 0.057)	0.7 (0.028)
5th		0.95 - 1.4 (0.037 - 0.055)	0.7 (0.028)
Reverse		0.95 - 1.4 (0.037 - 0.055)	0.7 (0.028)

Serial number: From JN8BT08V5W103964

Unit: mm (in)

Measurement point		Standard value	Limit value
3rd (Double-cone synchronizer)	Clearance between synchronizer cone and inner baulk ring end face “A”	0.6 - 0.8 (0.024 - 0.031)	0.2 (0.008)
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 -0.043)	0.2 (0.008)
1st and 2nd (Triple-cone synchronizer)	Clearance between synchronizer cone and clutch gear end face “A”	0.6 - 1.2 (0.024 - 0.047)	0.3 (0.012)
	Clearance between outer baulk ring pawl and synchronizer cone “B”	0.6 - 1.1 (0.024 - 0.043)	0.2 (0.008)
	Clearance between inner baulk ring and clutch gear end face “C”	0.7 - 1.1 (0.028 - 0.043)	0.3 (0.012)
4th		0.9 - 1.45 (0.035 - 0.057)	0.7 (0.028)
5th		0.95 - 1.4 (0.037 - 0.055)	0.7 (0.028)
Reverse		0.95 - 1.4 (0.037 - 0.055)	0.7 (0.028)

Available Snap Rings

ACS007YT

INPUT SHAFT BEARING SPACER

End play		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.71 (0.0673)	32204 8H510	2.01 (0.0791)	32204 8H516
1.76 (0.0693)	32204 8H511	2.06 (0.0811)	32204 8H517
1.81 (0.0713)	32204 8H512	2.11 (0.0831)	32204 8H518
1.86 (0.0732)	32204 8H513	2.16 (0.0850)	32204 8H519
1.91 (0.0752)	32204 8H514	2.21 (0.0870)	32204 8H520
1.96 (0.0772)	32204 8H515	2.26 (0.0890)	32204 8H521

*: Always check with the Parts Department for the latest parts information.

5TH MAIN GEAR

End play		0 - 0.1 mm (0 - 0.004 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.85 (0.0728)	32204 8H500	2.05 (0.0807)	32204 8H504
1.90 (0.0748)	32204 8H501	2.10 (0.0827)	32204 8H505
1.95 (0.0768)	32204 8H502	2.15 (0.0846)	32204 8H506
2.00 (0.0787)	32204 8H503	2.20 (0.0866)	32204 8H507

*: Always check with the Parts Department for the latest parts information.

Available C-Rings

ACS007YU

MAINSHAFT C-RING

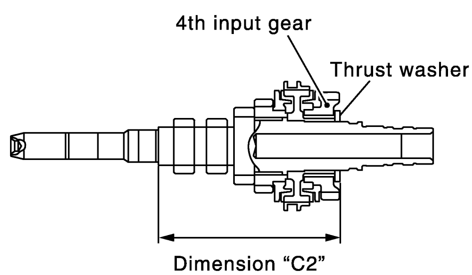
End play		0 - 0.06 mm (0 - 0.0024 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
2.535 (0.0998)	32348 8H800	2.835 (0.1116)	32348 8H810
2.565 (0.1010)	32348 8H801	2.865 (0.1128)	32348 8H811
2.595 (0.1022)	32348 8H802	2.895 (0.1140)	32348 8H812
2.625 (0.1033)	32348 8H803	2.925 (0.1152)	32348 8H813
2.655 (0.1045)	32348 8H804	2.955 (0.1163)	32348 8H814
2.685 (0.1057)	32348 8H805	2.985 (0.1175)	32348 8H815
2.715 (0.1069)	32348 8H806	3.015 (0.1187)	32348 8H816
2.745 (0.1081)	32348 8H807	3.045 (0.1199)	32348 8H817
2.775 (0.1093)	32348 8H808	3.075 (0.1211)	32348 8H818
2.805 (0.1104)	32348 8H809		

*: Always check with the Parts Department for the latest parts information.

Available Thrust Washer

ACS007YV

INPUT SHAFT THRUST WASHER



SCIA1008E

Standard length “C2”		154.7 - 154.8 mm (6.091 - 6.094 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
3.84 (0.1512)	32347 8H500	4.02 (0.1583)	32347 8H503
3.90 (0.1535)	32347 8H501	4.08 (0.1606)	32347 8H504
3.96 (0.1559)	32347 8H502	4.14 (0.1630)	32347 8H505

*: Always check with the Parts Department for the latest parts information.

DIFFERENTIAL SIDE GEAR THRUST WASHER

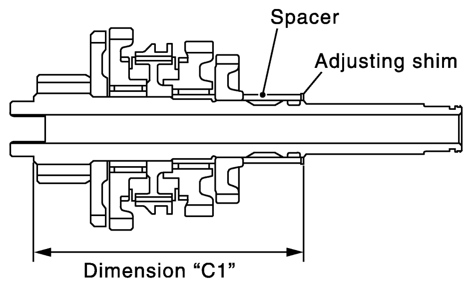
Allowable clearance between side gear and differential case with washer	0.1 - 0.2 mm (0.004 - 0.008 in)
Thickness mm (in)	Part number*
0.75 (0.0295)	38424 81X00
0.80 (0.0315)	38424 81X01
0.85 (0.0335)	38424 81X02
0.90 (0.0354)	38424 81X03
0.95 (0.0374)	38424 81X04

*: Always check with the Parts Department for the latest parts information.

Available Adjusting Shims

ACS007YW

4TH MAIN GEAR ADJUSTING SHIM



SCIA1009E

Standard length "C1"		173.85 - 173.95 mm (6.844 - 6.848 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.52 (0.0205)	32238 8H500	0.84 (0.0331)	32238 8H504
0.60 (0.0236)	32238 8H501	0.92 (0.0362)	32238 8H505
0.68 (0.0268)	32238 8H502	1.00 (0.0394)	32238 8H506
0.76 (0.0299)	32238 8H503	1.08 (0.0425)	32238 8H507

*: Always check with the Parts Department for the latest parts information.

INPUT SHAFT REAR BEARING ADJUSTING SHIM

End play			0 - 0.06 mm (0 - 0.0024 in)		
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.40 (0.0157)	32225 8H500	0.88 (0.0346)	32225 8H512	1.36 (0.0535)	32225 8H524
0.44 (0.0173)	32225 8H501	0.92 (0.0362)	32225 8H513	1.40 (0.0551)	32225 8H560
0.48 (0.0189)	32225 8H502	0.96 (0.0378)	32225 8H514	1.44 (0.0567)	32225 8H561
0.52 (0.0205)	32225 8H503	1.00 (0.0394)	32225 8H515	1.48 (0.0583)	32225 8H562
0.56 (0.0220)	32225 8H504	1.04 (0.0409)	32225 8H516	1.52 (0.0598)	32225 8H563
0.60 (0.0236)	32225 8H505	1.08 (0.0425)	32225 8H517	1.56 (0.0614)	32225 8H564
0.64 (0.0252)	32225 8H506	1.12 (0.0441)	32225 8H518	1.60 (0.0630)	32225 8H565
0.68 (0.0268)	32225 8H507	1.16 (0.0457)	32225 8H519	1.64 (0.0646)	32225 8H566
0.72 (0.0283)	32225 8H508	1.20 (0.0472)	32225 8H520	1.68 (0.0661)	32225 8H567
0.76 (0.0299)	32225 8H509	1.24 (0.0488)	32225 8H521	1.72 (0.0677)	32225 8H568
0.80 (0.0315)	32225 8H510	1.28 (0.0504)	32225 8H522		
0.84 (0.0331)	32225 8H511	1.32 (0.0520)	32225 8H523		

*: Always check with the Parts Department for the latest parts information.

MAINSHAFT REAR BEARING ADJUSTING SHIM

End play		0 - 0.06 mm (0 - 0.0024 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.44 (0.0173)	32238 8H510	0.80 (0.0315)	32238 8H519
0.48 (0.0189)	32238 8H511	0.84 (0.0331)	32238 8H520
0.52 (0.0205)	32238 8H512	0.88 (0.0346)	32238 8H521
0.56 (0.0220)	32238 8H513	0.92 (0.0362)	32238 8H522
0.60 (0.0236)	32238 8H514	0.96 (0.0378)	32238 8H523
0.64 (0.0252)	32238 8H515	1.00 (0.0394)	32238 8H524
0.68 (0.0268)	32238 8H516	1.04 (0.0409)	32238 8H560
0.72 (0.0283)	32238 8H517	1.08 (0.0425)	32238 8H561
0.76 (0.0299)	32238 8H518		

*: Always check with the Parts Department for the latest parts information.

REVERSE IDLER GEAR ADJUSTING SHIM

End play		0.04 - 0.10 mm (0.0016 - 0.0039 in)	
Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
1.76 (0.0693)	32237 8H800	2.24 (0.0882)	32237 8H812
1.80 (0.0709)	32237 8H801	2.28 (0.0898)	32237 8H813
1.84 (0.0724)	32237 8H802	2.32 (0.0913)	32237 8H814
1.88 (0.0740)	32237 8H803	2.36 (0.0929)	32237 8H815
1.92 (0.0756)	32237 8H804	2.40 (0.0945)	32237 8H816
1.96 (0.0772)	32237 8H805	2.44 (0.0961)	32237 8H817
2.00 (0.0787)	32237 8H806	2.48 (0.0976)	32237 8H818
2.04 (0.0803)	32237 8H807	2.52 (0.0992)	32237 8H819
2.08 (0.0819)	32237 8H808	2.56 (0.1008)	32237 8H820
2.12 (0.0835)	32237 8H809	2.60 (0.1024)	32237 8H821
2.16 (0.0850)	32237 8H810	2.64 (0.1039)	32237 8H822
2.20 (0.0866)	32237 8H811		

*: Always check with the Parts Department for the latest parts information.

Available Shims

ACS007YX

— Differential Side Bearing Preload and Adjusting Shim

BEARING PRELOAD

Differential side bearing preload: L*	0.15 - 0.21 mm (0.0059 - 0.0083 in)

*: Install shims which are “deflection of differential case” + “L” in thickness.

DIFFERENTIAL SIDE BEARING ADJUSTING SHIM(S)

Thickness mm (in)	Part number*	Thickness mm (in)	Part number*
0.48 (0.0189)	31438 80X00	0.72 (0.0283)	31438 80X06
0.52 (0.0205)	31438 80X01	0.76 (0.0299)	31438 80X07
0.56 (0.0220)	31438 80X02	0.80 (0.0315)	31438 80X08
0.60 (0.0236)	31438 80X03	0.84 (0.0331)	31438 80X09
0.64 (0.0252)	31438 80X04	0.88 (0.0346)	31438 80X10
0.68 (0.0268)	31438 80X05	0.92 (0.0362)	31438 80X11

*: Always check with the Parts Department for the latest parts information.

SECTION MTC

MANUAL AIR CONDITIONER

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AJS001M5

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Working with HFC-134a (R-134a)

AJS001OH

WARNING:

- **CFC-12 (R-12) refrigerant and HFC-134a (R-134a) refrigerant are not compatible. If the refrigerants are mixed and compressor malfunction is likely to occur, refer to “CONTAMINATED REFRIGERANT” below. To determine the purity of HFC-134a (R-134a) in the vehicle and recovery tank, use Refrigerant Recovery/Recycling Recharging equipment and Refrigerant identifier.**
- **Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.**
- **The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:**
  - **When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.**
  - **When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.**
  - **Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.**
  - **Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment], or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.**
  - **Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.**

CONTAMINATED REFRIGERANT

If a refrigerant other than pure HFC-134a (R-134a) is identified in a vehicle, your options are:

- Explain to the customer that environmental regulations prohibit the release of contaminated refrigerant into the atmosphere.
- Explain that recovery of the contaminated refrigerant could damage your service equipment and refrigerant supply.
- Suggest the customer return the vehicle to the location of previous service where the contamination may have occurred.
- If you choose to perform the repair, recover the refrigerant using only **dedicated equipment and containers. Do not recover contaminated refrigerant into your existing service equipment.** If your facility does not have dedicated recovery equipment, you may contact a local refrigerant product retailer for available service. This refrigerant must be disposed of in accordance with all federal and local regulations. In addition, replacement of all refrigerant system components on the vehicle is recommended.
- If the vehicle is within the warranty period, the air conditioner warranty is void. Please contact Nissan Customer Affairs for further assistance.

General Refrigerant Precautions

AJS001M7

WARNING:

- **Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.**
- **Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.**
- **Do not store or heat refrigerant containers above 52°C (125°F).**
- **Do not heat a refrigerant container with an open flame; if container warming is required, place the bottom of the container in a warm pail of water.**
- **Do not intentionally drop, puncture, or incinerate refrigerant containers.**
- **Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.**
- **Refrigerant will displace oxygen, therefore be certain to work in well ventilated areas to prevent suffocation.**
- **Do not pressure test or leak test HFC-134a (R-134a) service equipment and/or vehicle air conditioning systems with compressed air during repair. Some mixtures of air and HFC-134a (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.**

Lubricant Precautions

AJS001M8

- Use only specified lubricant for the HFC-134a (R-134a) A/C system and HFC-134a (R-134a) components. If lubricant other than that specified is used, compressor malfunction is likely to occur.
- The specified HFC-134a (R-134a) lubricant rapidly absorbs moisture from the atmosphere. The following handling precautions must be observed:
  - When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
  - When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
  - Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
- Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from the A/C system, using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
- Do not allow lubricant (Nissan A/C System Oil Type S) to come in contact with styrofoam parts. Damage may result.

Precautions for Refrigerant Connection

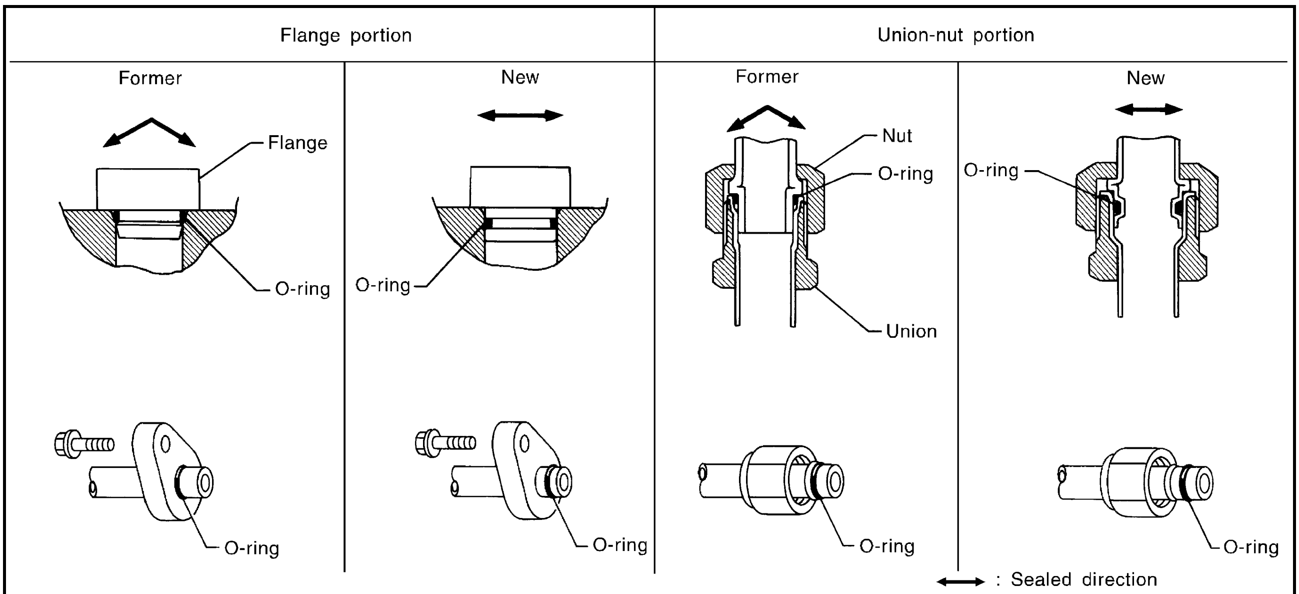
AJS001M9

A new type refrigerant connection has been introduced to all refrigerant lines except the following location.

- Expansion valve to cooling unit
- Refrigerant pressure sensor to liquid tank

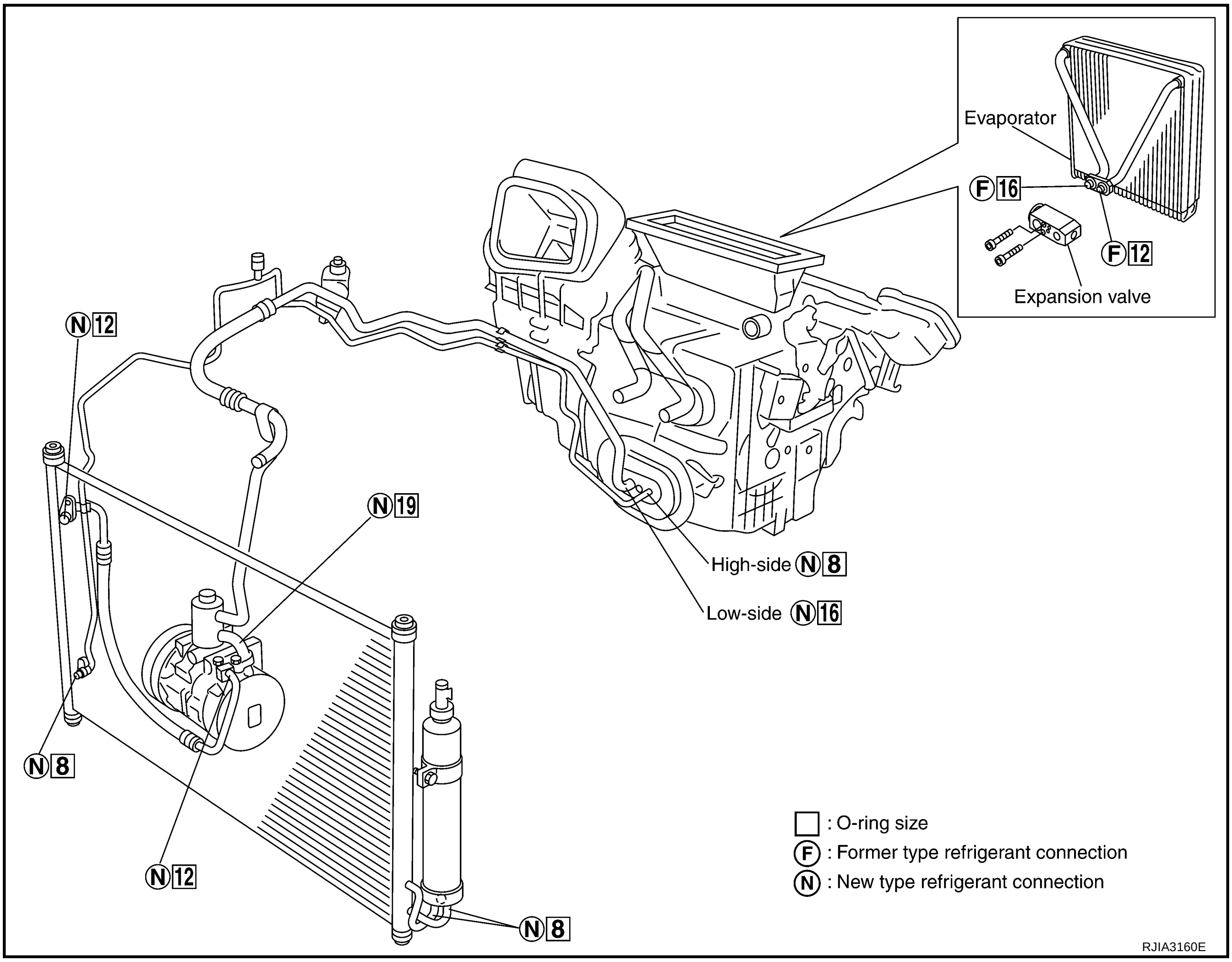
FEATURES OF NEW TYPE REFRIGERANT CONNECTION

- The O-ring has been relocated. It has also been provided with a groove for proper installation. This eliminates the chance of the O-ring being caught in, or damaged by, the mating part. The sealing direction of the O-ring is now set vertically in relation to the contacting surface of the mating part to improve sealing characteristics.
- The reaction force of the O-ring will not occur in the direction that causes the joint to pull out, thereby facilitating piping connections.



SHA815E

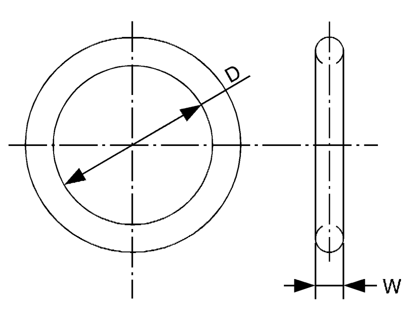
O-RING AND REFRIGERANT CONNECTION



CAUTION:

The new and former refrigerant connections use different O-ring configurations. Do not confuse O-rings since they are not interchangeable. If a wrong O-ring is installed, refrigerant will leak at, or around, the connection.

O-Ring Part Numbers and Specifications



Connection type	O-ring size	Part number	D mm (in)	W mm (in)
New	8	92471 N8210	6.8 (0.268)	1.85 (0.0728)
Former		92470 N8200	6.07 (0.2390)	1.78 (0.0701)
Former	10	J2476 89956	9.25 (0.3642)	1.78 (0.0701)
New	12	92472 N8210	10.9 (0.429)	2.43 (0.0957)
Former		92475 71L00	11.0 (0.433)	2.4 (0.094)
New	16	92473 N8210	13.6 (0.535)	2.43 (0.0957)
Former		92475 72L00	14.3 (0.563)	2.3 (0.091)
New	19	92474 N8210	16.5 (0.650)	2.43 (0.0957)
Former		92477 N8200	17.12 (0.6740)	1.78 (0.0701)

WARNING:

Make sure all refrigerant is discharged into the recycling equipment and the pressure in the system is less than atmospheric pressure. Then gradually loosen the discharge side hose fitting and remove it.

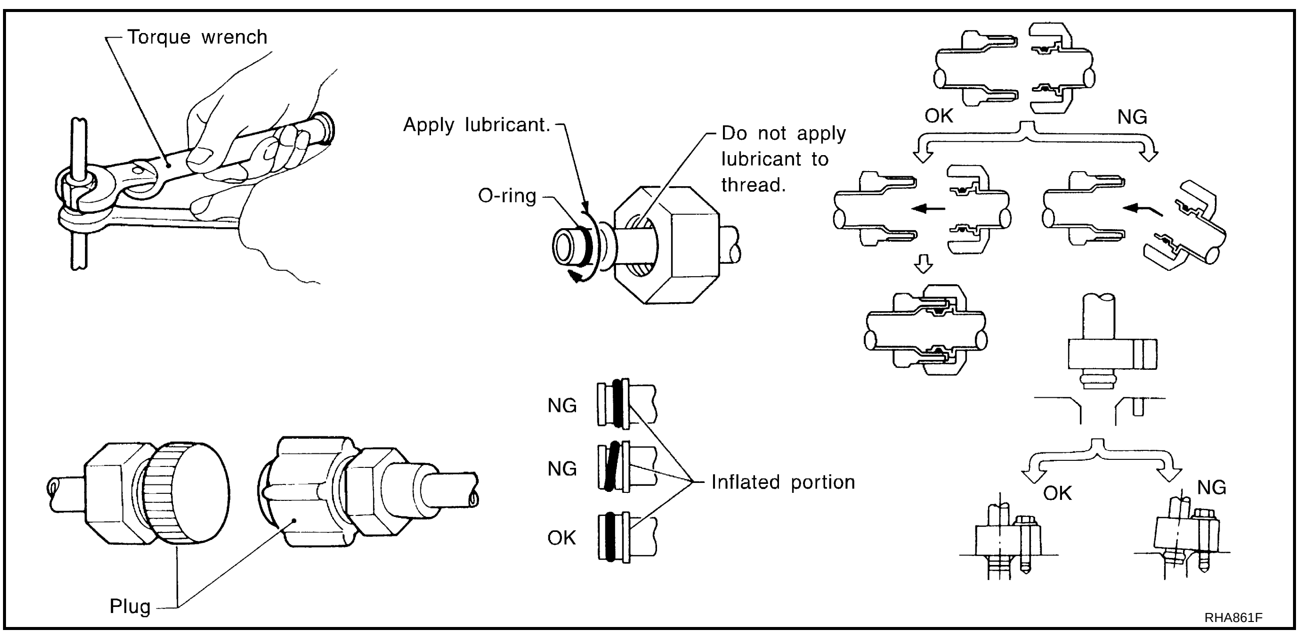
CAUTION:

When replacing or cleaning refrigerant cycle components, observe the following.

- **When the compressor is removed, store it in the same position as it is when mounted on the car. Malfunction to do so will cause lubricant to enter the low-pressure chamber.**
- **When connecting tubes, always use a torque wrench and a back-up wrench.**
- **After disconnecting tubes, immediately plug all openings to prevent entry of dirt and moisture.**
- **When installing an air conditioner in the vehicle, connect the pipes as the final stage of the operation. Do not remove the seal caps of pipes and other components until just before required for connection.**
- **Allow components stored in cool areas to warm to working area temperature before removing seal caps. This prevents condensation from forming inside A/C components.**
- **Thoroughly remove moisture from the refrigeration system before charging the refrigerant.**
- **Always replace used O-rings.**
- **When connecting tube, apply lubricant to circle of the O-rings shown in illustration. Be careful not to apply lubricant to threaded portion.**

Lubricant name : Nissan A/C System Oil Type S
Part number : KLH00-PAGS0

- **O-ring must be closely attached to dented portion of tube.**
- **When replacing the O-ring, be careful not to damage O-ring and tube.**
- **Connect tube until you hear it click, then tighten the nut or bolt by hand until snug. Make sure that the O-ring is installed to tube correctly.**
- **After connecting line, conduct leak test and make sure that there is no leakage from connections. When the refrigerant leaking point is found, disconnect that line and replace the O-ring. Then tighten connections of seal seat to the specified torque.**



Precautions for Servicing Compressor

AJS001MA

- **Plug all openings to prevent moisture and foreign matter from entering.**
- **When the compressor is removed, store it in the same position as it is when mounted on the car.**
- **When replacing or repairing compressor, follow “Maintenance of Lubricant Quantity in Compressor” exactly. Refer to MTC-22, "Maintenance of Lubricant Quantity in Compressor" .**
- **Keep friction surfaces between clutch and pulley clean. If the surface is contaminated, with lubricant, wipe it off by using a clean waste cloth moistened with thinner.**
- **After compressor service operation, turn the compressor shaft by hand more than five turns in both directions. This will equally distribute lubricant inside the compressor. After the compressor is installed, let the engine idle and operate the compressor for one hour.**
- **After replacing the compressor magnet clutch, apply voltage to the new one and check for usual operation.**

Precautions for Service Equipment

AJS001MB

RECOVERY/RECYCLING EQUIPMENT

Be certain to follow the manufacturer’s instructions for machine operation and machine maintenance. Never introduce any refrigerant other than that specified into the machine.

ELECTRONIC LEAK DETECTOR

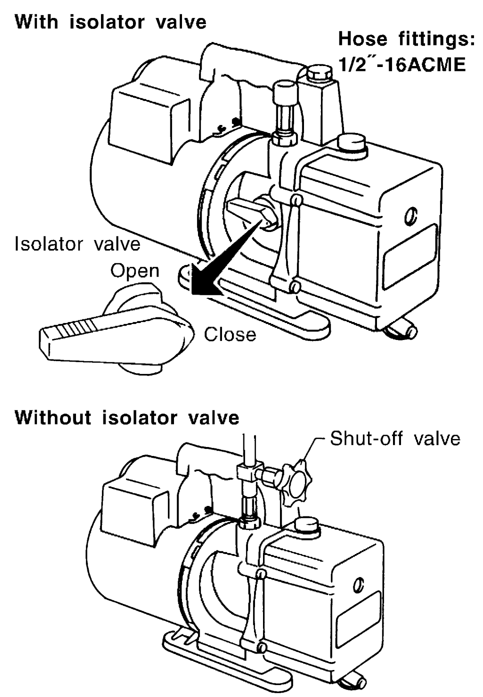
Be certain to follow the manufacturer’s instructions for tester operation and tester maintenance.

VACUUM PUMP

The lubricant contained inside the vacuum pump is not compatible with the specified lubricant for HFC-134a (R-134a) A/C systems. The vent side of the vacuum pump is exposed to atmospheric pressure. So the vacuum pump lubricant may migrate out of the pump into the service hose. This is possible when the pump is switched off after evacuation (vacuuming) and hose is connected to it.
To prevent this migration, use a manual valve placed near the hose-to-pump connection, as follows.

- Usually vacuum pumps have a manual isolator valve as part of the pump. Close this valve to isolate the service hose from the pump.
- For pumps without an isolator, use a hose equipped with a manual shut-off valve near the pump end. Close the valve to isolate the hose from the pump.
- If the hose has an automatic shut-off valve, disconnect the hose from the pump. As long as the hose is connected, the valve is open and lubricating oil may migrate.

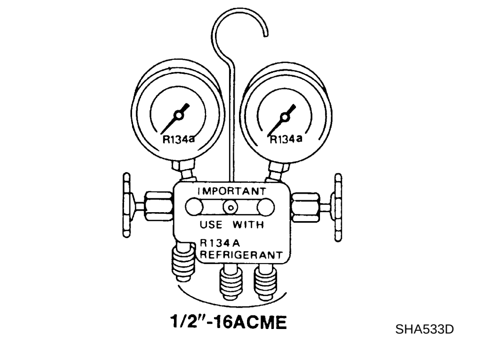
Some one-way valves open when vacuum is applied and close under a no vacuum condition. Such valves may restrict the pump’s ability to pull a deep vacuum and are not recommended.



RHA270DA

MANIFOLD GAUGE SET

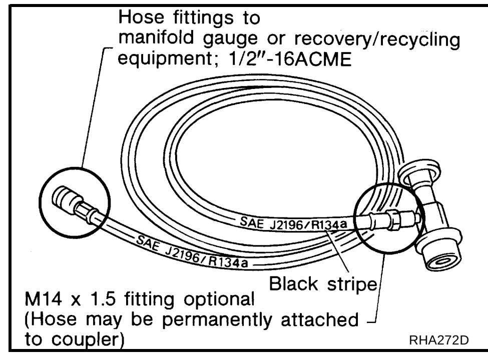
Be certain that the gauge face indicates HFC-134a or R-134a. Be sure the gauge set has 1/2″-16 ACME threaded connections for service hoses. Confirm the set has been used only with refrigerant HFC-134a (R-134a) and specified lubricants.



SHA533D

SERVICE HOSES

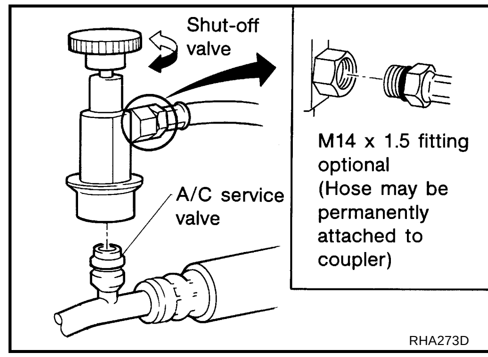
Be certain that the service hoses display the markings described (colored hose with black stripe). All hoses must include positive shut-off devices (either manual or automatic) near the end of the hoses opposite the manifold gauge.



SERVICE COUPLERS

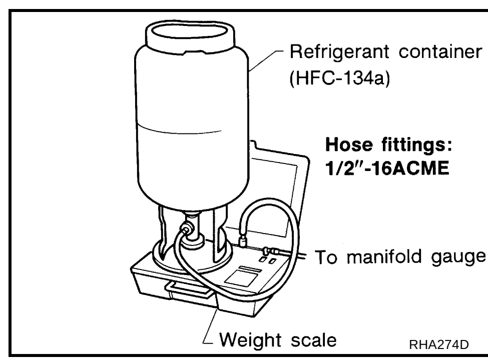
Never attempt to connect HFC-134a (R-134a) service couplers to a CFC-12 (R-12) A/C system. The HFC-134a (R-134a) couplers will not properly connect to the CFC-12 (R-12) system. However, if an improper connection is attempted, discharging and contamination may occur.

Shut-off valve rotation	A/C service valve
Clockwise	Open
Counterclockwise	Close



REFRIGERANT WEIGHT SCALE

Verify that no refrigerant other than HFC-134a (R-134a) and specified lubricants have been used with the scale. If the scale controls refrigerant flow electronically, the hose fitting must be 1/2″-16 ACME.



CHARGING CYLINDER

Using a charging cylinder is not recommended. Refrigerant may be vented into air from cylinder's top valve when filling the cylinder with refrigerant. Also, the accuracy of the cylinder is generally less than that of an electronic scale or of quality recycle/recharge equipment.

Precautions for Leak Detection Dye

AJS001MC

- The A/C system contains a fluorescent leak detection dye used for locating refrigerant leaks. An ultraviolet (UV) lamp is required to illuminate the dye when inspecting for leaks.
- Always wear fluorescence enhancing UV safety goggles to protect your eyes and enhance the visibility of the fluorescent dye.
- The fluorescent dye leak detector is not a replacement for an electronic refrigerant leak detector. The fluorescent dye leak detector should be used in conjunction with an electronic refrigerant leak detector to (J-41995) pin-point refrigerant leaks.
- For your safety and your customer's satisfaction, read and follow all manufacture's operating instructions and precautions prior to performing the work.
- A compressor shaft seal should not be repaired because of dye seepage. The compressor shaft seal should only be repaired after confirming the leak with an electronic refrigerant leak detector (J-41995).
- Always remove any remaining dye from the leak area after repairs are complete to avoid a misdiagnosis during a future service.

- Do not allow dye to come into contact with painted body panels or interior components. If dye is spilled, clean immediately with the approved dye cleaner. Fluorescent dye left on a surface for an extended period of time cannot be removed.
- Do not spray the fluorescent dye cleaning agent on hot surfaces (engine exhaust manifold, etc.).
- Do not use more than one refrigerant dye bottle (1/4 ounce / 7.4 cc) per A/C system.
- Leak detection dyes for HFC-134a (R-134a) and CFC-12 (R-12) A/C systems are different. Do not use HFC-134a (R-134a) leak detection dye in CFC-12 (R-12) A/C system or CFC-12 (R-12) leak detection dye in HFC-134a (R-134a) A/C system or A/C system damage may result.
- The fluorescent properties of the dye will remain for over three (3) years unless a compressor malfunction occurs.

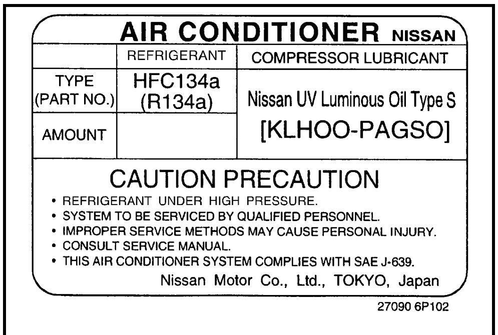
IDENTIFICATION

NOTE:

Vehicles with factory installed fluorescent dye have a green label.
Vehicles without factory installed fluorescent dye have a blue label.

IDENTIFICATION LABEL FOR VEHICLE

Vehicles with factory installed fluorescent dye have this identification label on the front side of hood.



SHA436FA

Wiring Diagrams and Trouble Diagnosis

AJS001MD

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section.
- PG-3, "Wiring Diagram - POWER -" in PG section.

When you perform trouble diagnosis, refer to the following:

- GI-10, "How to Follow Trouble Diagnoses" in GI section.
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section.

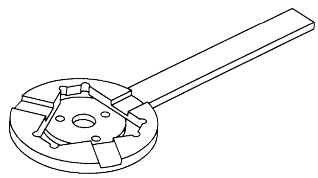
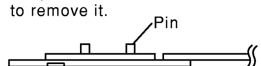
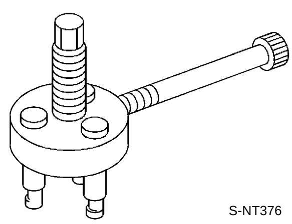
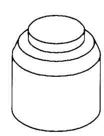
PREPARATION

PFP:00002

Special Service Tools

AJS001O8

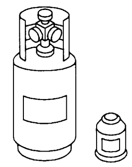
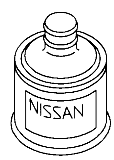
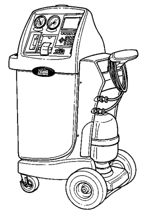
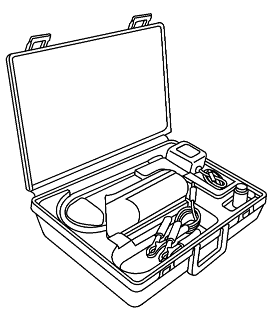
The actual shapes of Kent-Moore tool may differ from those of special service tools illustrated here.

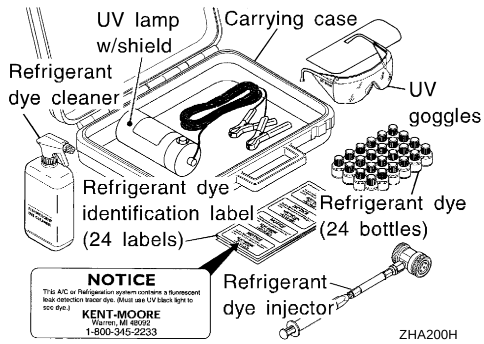
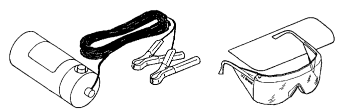
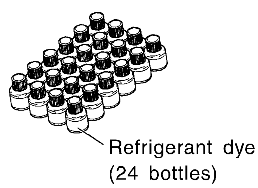
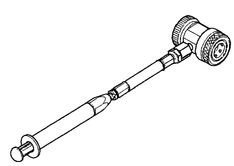
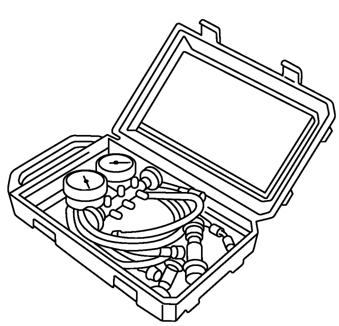
Tool number (Kent-Moore No.) Tool name		Description
KV99106100 (J-41260) Clutch disc wrench	 S-NT232  RJIA0194E	Removing shaft nut and clutch disc
KV99232340 (J-38874) Clutch disc puller	 S-NT376	Removing clutch disc
KV99106200 (J-41261) Pulley installer	 S-NT235	Installing pulley

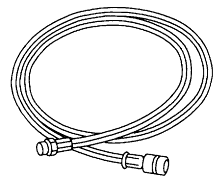
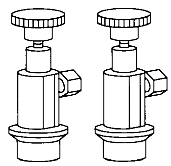
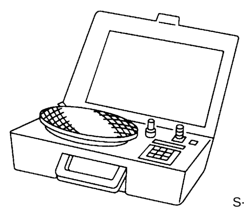
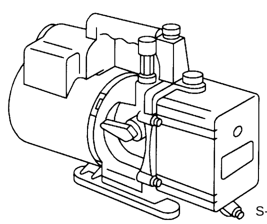
HFC-134a (R-134a) Service Tools and Equipment

AJS001O9

Never mix HFC-134a (R-134a) refrigerant and/or its specified lubricant with CFC-12 (R-12) refrigerant and/or its lubricant.
Separate and non-interchangeable service equipment must be used for handling each type of refrigerant/lubricant.
Refrigerant container fittings, service hose fittings and service equipment fittings (equipment which handles refrigerant and/or lubricant) are different between CFC-12 (R-12) and HFC-134a (R-134a). This is to avoid mixed use of the refrigerants/lubricant.
Adapters that convert one size fitting to another must never be used: refrigerant/lubricant contamination will occur and compressor malfunction will result.

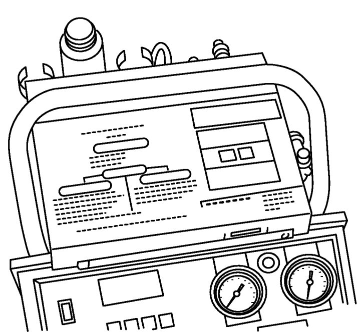
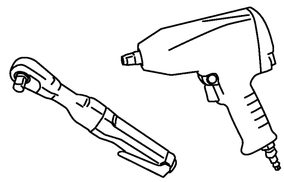
Tool number (Kent-Moore No.) Tool name		Description
HFC-134a (R-134a) refrigerant	 S-NT196	Container color: Light blue Container marking: HFC-134a (R-134a) Fitting size: Thread size ● Large container 1/2″-16 ACME
KLH00-PAGS0 Nissan A/C System Oil Type S (DH-PS)	 S-NT197	Type: Polyalkylene glycol oil (PAG), type S (DH-PS) Application: HFC-134a (R-134a) wobble (swash) plate compressors (Nissan only) Lubricity: 40 mℓ (1.4 Imp fl oz)
(ACR2005-NI) ACR5 A/C Service Center	 WJIA0293E	Function: Refrigerant recovery, recycling and recharging
(J-41995) Electrical leak detector	 AHA281A	Power supply: DC 12V (Battery terminal)

Tool number (Kent-Moore No.) Tool name		Description
(J-43926) Refrigerant dye leak detection kit Kit includes: (J-42220) UV lamp and UV safety goggles (J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle (J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles) (J-43872) Refrigerant dye cleaner	 ZHA200H	Power supply: DC 12V (Battery terminal)
(J-42220) UV lamp and UV safety goggles	 SHA438F	Power supply: DC 12V (Battery terminal) For checking refrigerant leak when fluorescent dye is installed in A/C system Includes: UV lamp and UV safety goggles
(J-41447) HFC-134a (R-134a) fluorescent leak detection dye (Box of 24, 1/4 ounce bottles)	 SHA439F	Application: For HFC-134a (R-134a) PAG oil Container: 1/4 ounce (7.4cc) bottle (Includes self-adhesive dye identification labels for affixing to vehicle after charging system with dye.)
(J-41459) HFC-134a (R-134a) dye injector Use with J-41447, 1/4 ounce bottle	 SHA440F	For injecting 1/4 ounce of fluorescent leak detection dye into A/C system
(J-43872) Refrigerant dye cleaner	 SHA441F	For cleaning dye spills
(J-39183) Manifold gauge set (with hoses and couplers)	 RJIA0196E	Identification: ● The gauge face indicates HFC-134a (R-134a). Fitting size: Thread size ● 1/2″-16 ACME

Tool number (Kent-Moore No.) Tool name		Description
Service hoses ● (J-39501-72) High-pressure side hose ● (J-39502-72) Low-pressure side hose ● (J-39476-72) Utility hose	 S-NT201	Hose color: ● Low hose: Blue with black stripe ● High hose: Red with black stripe ● Utility hose: Yellow with black stripe or green with black stripe Hose fitting to gauge: ● 1/2″-16 ACME
Service couplers ● (J-39500-20) High-pressure side coupler ● (J-39500-24) Low-pressure side coupler	 S-NT202	Hose fitting to service hose: M14 x 1.5 fitting is optional or permanently attached.
(J-39650) Refrigerant weight scale	 S-NT200	For measuring of refrigerant Fitting size: Thread size 1/2″-16 ACME
(J-39649) Vacuum pump (Including the isolator valve)	 S-NT203	Capacity: ● Air displacement: 4 CFM ● Micron rating: 20 microns ● Oil capacity: 482 g (17 oz) Fitting size: Thread size 1/2″-16 ACME

Commercial Service Tools

AJS001OA

Tool name		Description
Refrigerant identifier equipment	 RJIA0197E	Checking for refrigerant purity and system contamination
Power tool	 PBIC0190E	For loosening bolts and nuts

REFRIGERATION SYSTEM

PFP:KA990

Refrigerant Cycle

AJS001MG

REFRIGERANT FLOW

The refrigerant flows in the standard pattern, that is, through the compressor, the condenser with liquid tank, through the evaporator, and back to the compressor. The refrigerant evaporation through the evaporator is controlled by an externally equalized expansion valve, located inside the evaporator case.

FREEZE PROTECTION

Under usual operating conditions, when the A/C is switched on, the compressor runs continuously, and the evaporator pressure, and therefore, temperature is controlled by the V-6 variable displacement compressor to prevent freeze up.

Refrigerant System Protection

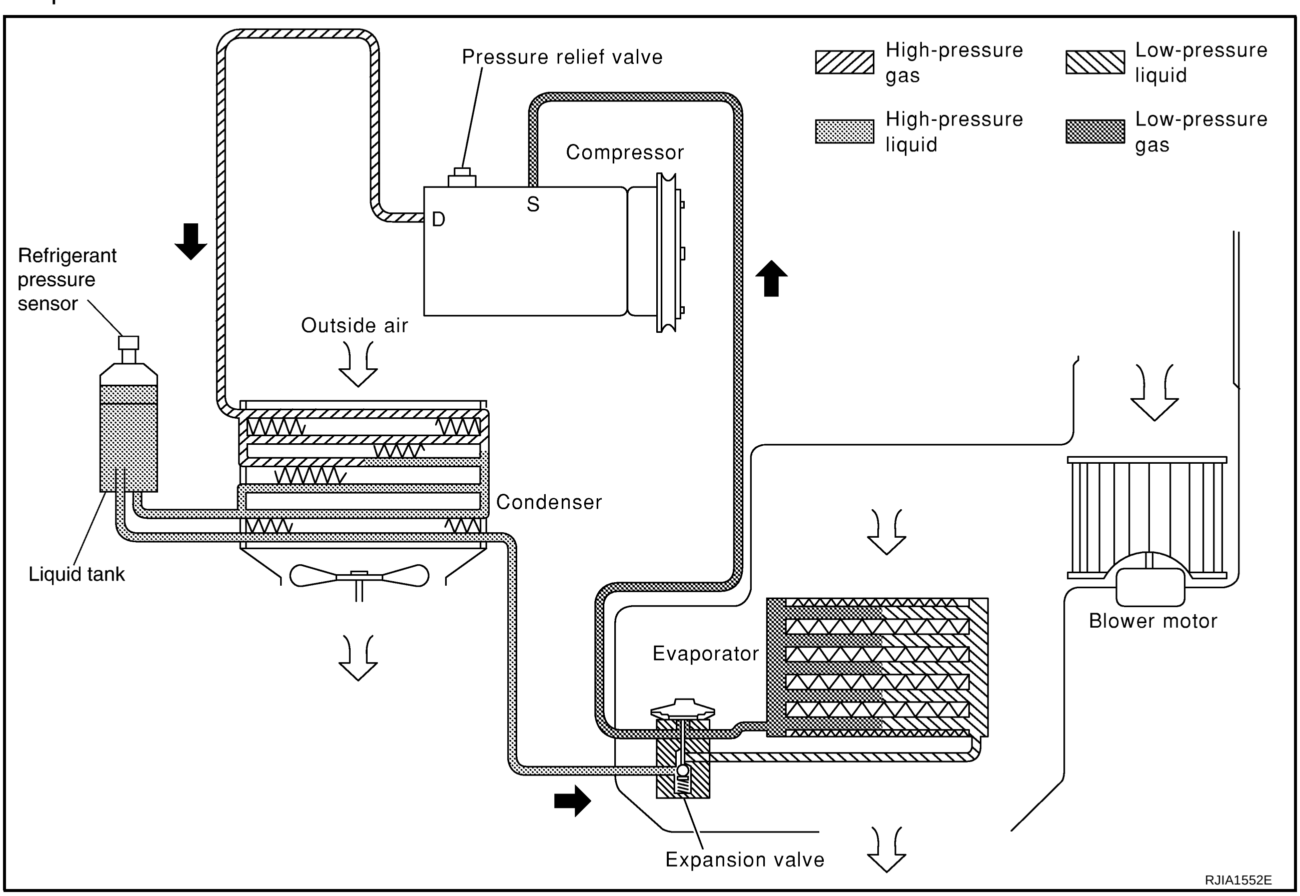
AJS001MH

REFRIGERANT PRESSURE SENSOR

The refrigerant system is protected against excessively high- or low-pressures by the refrigerant pressure sensor, located on the liquid tank. If the system pressure rises above, or falls below the specifications, the refrigerant pressure sensor detects the pressure inside the refrigerant line and sends the voltage signal to the ECM. ECM makes the A/C relay go OFF and stops the compressor when pressure on the high-pressure side detected by refrigerant pressure sensor is over about 2,746 kPa (28 kg/cm^2 , 398 psi), or below about 134 kPa (1.4 kg/cm^2 , 20 psi).

PRESSURE RELIEF VALVE

The refrigerant system is also protected by a pressure relief valve, located in the rear head of the compressor. When the pressure of refrigerant in the system increases to an unusual level [more than 3,727 kPa (38 kg/cm^2 , 540 psi)], the release port on the pressure relief valve automatically opens and releases refrigerant into the atmosphere.



V-6 Variable Displacement Compressor

AJS001MI

GENERAL INFORMATION

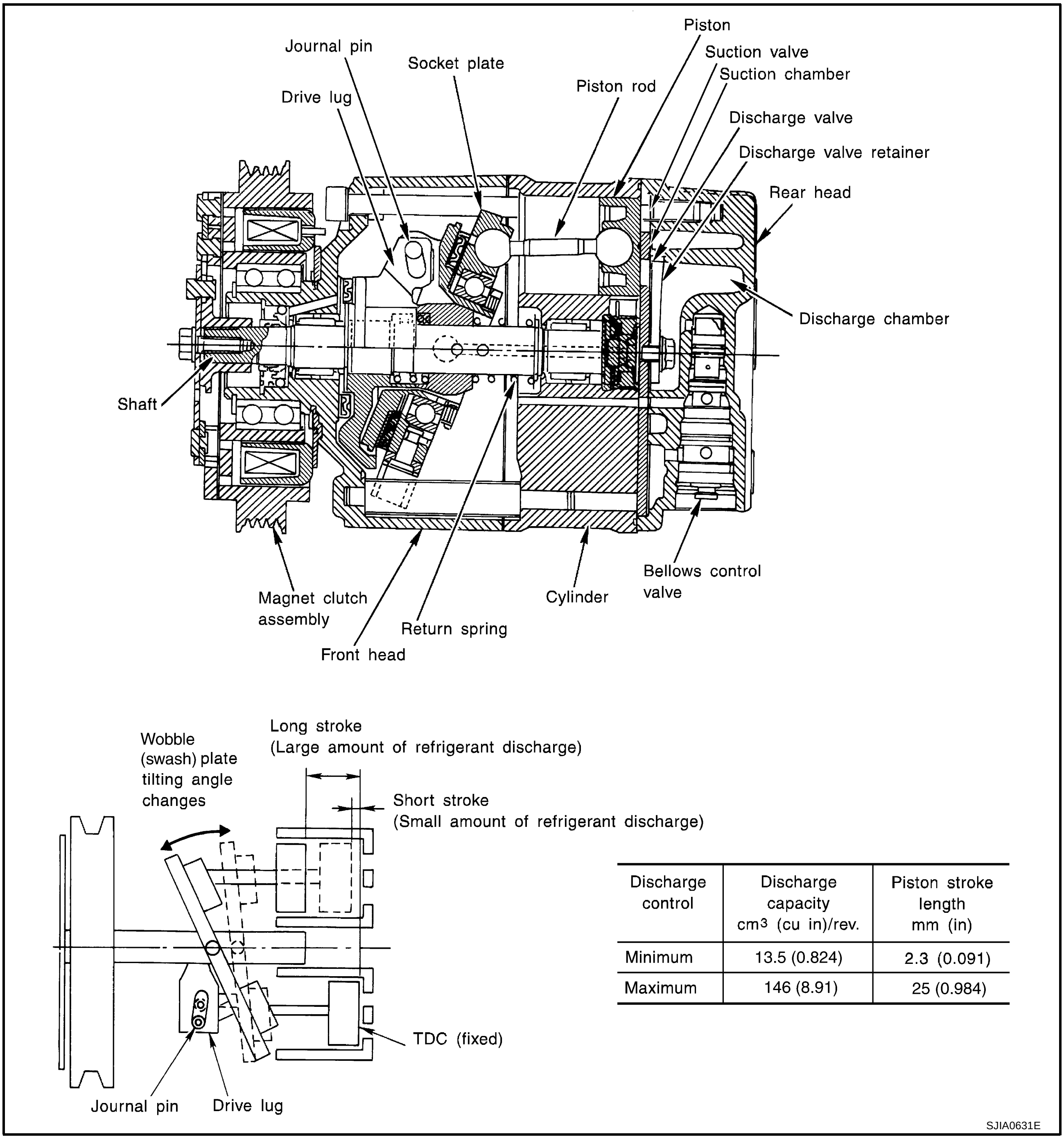
1. The V-6 variable compressor differs from previous units. The vent temperatures of the V-6 variable compressor do not drop too far below 5°C (41°F) when:
   Evaporator intake air temperature is less than 20°C (68°F).
   Engine is running at speeds less than 1,500 rpm.
   This is because the V-6 compressor provides a means of “capacity” control.
2. The V-6 variable compressor provides refrigerant control under varying conditions. During cold winters, it may not produce high refrigerant pressure discharge (compared to previous units) when used with air conditioning systems.
3. A “clanking” sound may occasionally be heard during refrigerant charge. The sound indicates that the tilt angle of the wobble (swash) plate has changed and is not a malfunction.
4. For air conditioning systems with the V-6 compressor, the clutch remains engaged unless: the system main switch, fan switch or ignition switch is turned OFF. When ambient (outside) temperatures are low or when the amount of refrigerant is insufficient, the clutch is disengaged to protect the compressor.
5. A constant range of suction pressure is maintained when engine speed is greater than a certain value. It normally ranges from 147 to 177 kPa (1.5 to 1.8 kg/cm^2 , 21 to 26 psi) under varying conditions.
   In previous compressors, however, suction pressure was reduced with increases in engine speed.

DESCRIPTION

General

The variable compressor is basically a swash plate type that changes piston stroke in response to the required cooling capacity.

The tilt of the wobble (swash) plate allows the piston’s stroke to change so that refrigerant discharge can be continuously changed from 13.5 to 146 cm^3 (0.824 to 8.91 cu in).

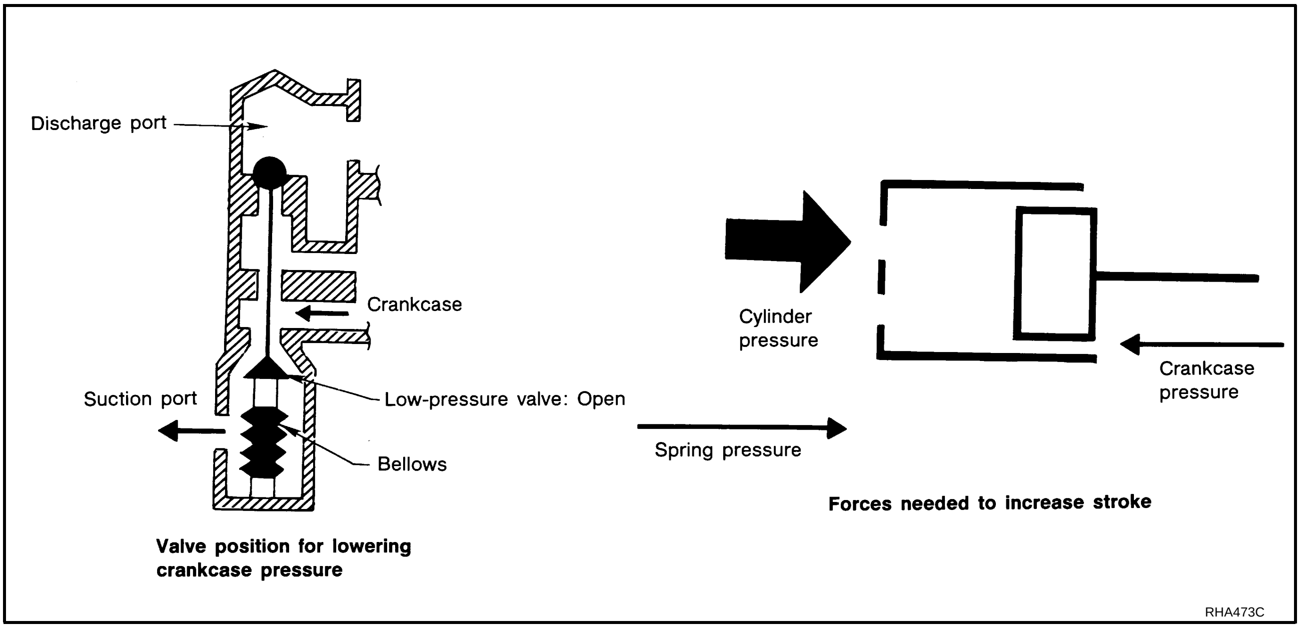


Discharge control	Discharge capacity cm^3 (cu in)/rev.	Piston stroke length mm (in)
Minimum	13.5 (0.824)	2.3 (0.091)
Maximum	146 (8.91)	25 (0.984)

Operation

1. Operation Control Valve
   Operation control valve is located in the suction port (low-pressure) side, and opens or closes in response to changes in refrigerant suction pressure.
   Operation of the valve controls the internal pressure of the crankcase.
   The angle of the wobble (swash) plate is controlled between the crankcase's internal pressure and the piston cylinder pressure.
2. Maximum Cooling
   Refrigerant pressure on the low-pressure side increases with an increase in heat loads.
   When this occurs, the control valve's bellows compress to open the low-pressure side valve and close the high-pressure side valve.
   This causes the following pressure changes:
   - The crankcase's internal pressure to equal the pressure on the low-pressure side;
   - The cylinder's internal pressure to be greater than the crankcase's internal pressure.

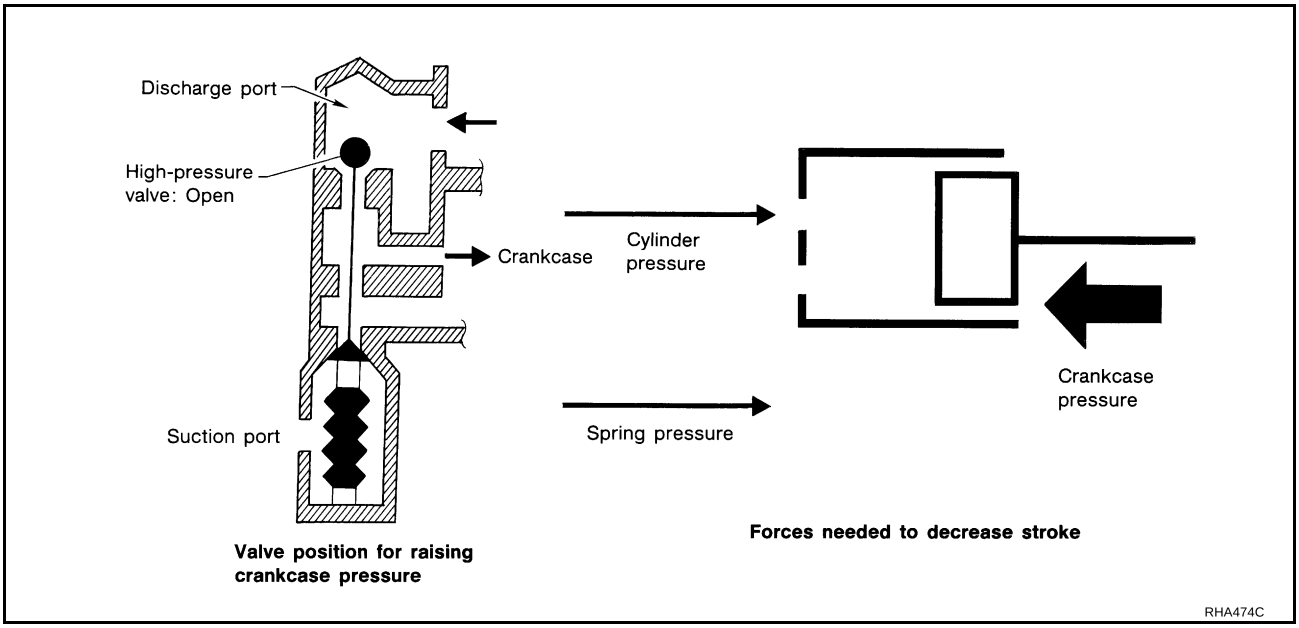
   Under this condition, the wobble (swash) plate is set to the maximum stroke position.



3. Capacity Control
   - Refrigerant pressure on suction side is low during high speed driving or when ambient or interior temperature is low.
   - The bellows expands when refrigerant pressure on the suction pressure side drops below approximately 177 kPa (1.8 kg/cm^2 , 26 psi).

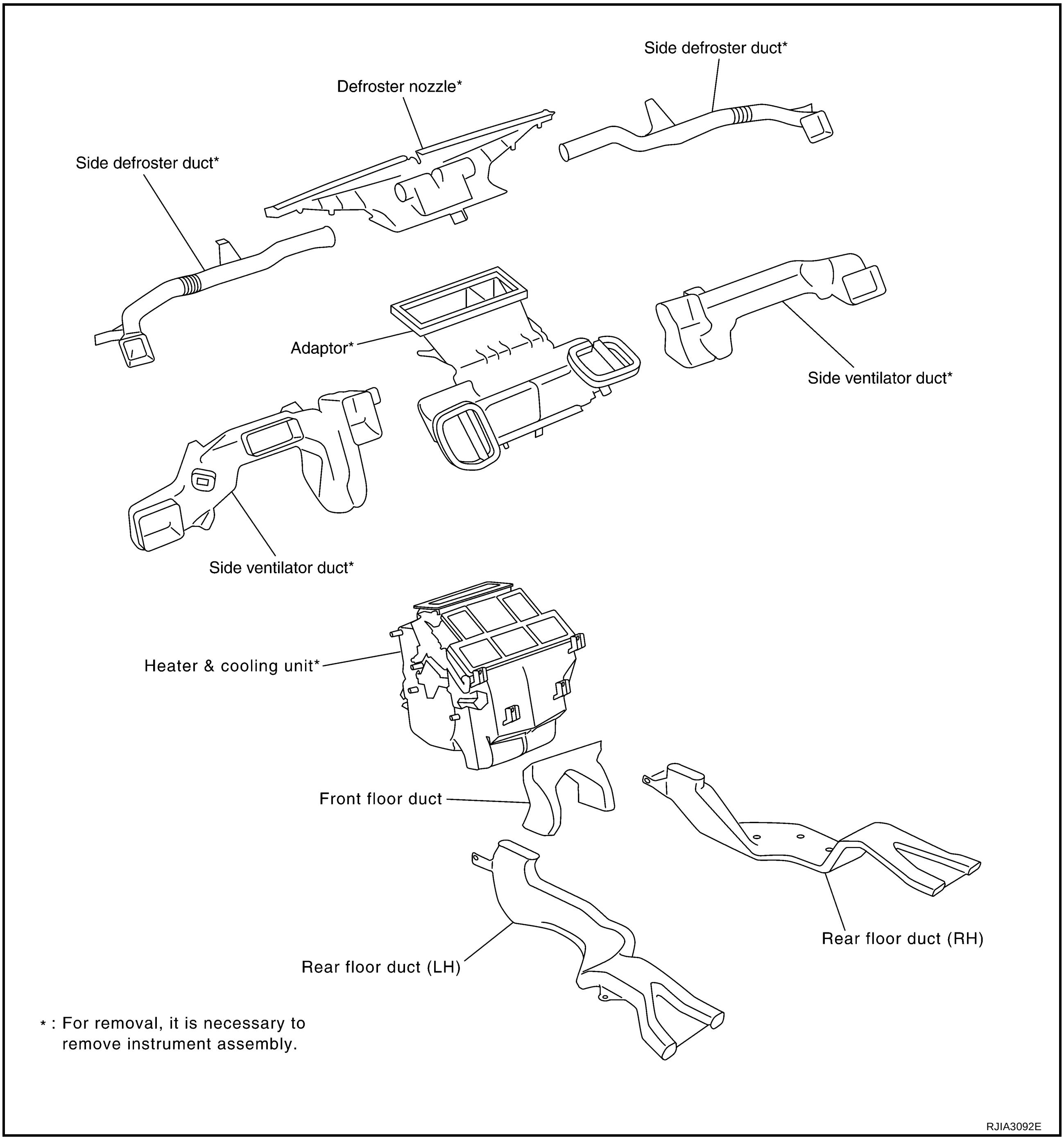
   Since suction pressure is low, it makes the suction port close and the discharge port open. Thus, crankcase pressure becomes high as high-pressure enters the crankcase.
   - The force acts around the journal pin near the wobble (swash) plate, and is generated by the pressure difference between before and behind the piston.

   The drive lug and journal pin are located where the piston generates the highest pressure. Piston pressure is between suction pressure Ps and discharge pressure Pd, which is near suction pressure Ps. If crankcase pressure Pc rises due to capacity control, the force around the journal pin makes the wobble (swash) plate angle decrease and also the piston stroke decrease. In other words, crankcase pressure increase triggers pressure difference between the piston and the crankcase. The pressure difference changes the angle of the wobble (swash) plate.


Discharge port
High-pressure valve: Open
Crankcase
Cylinder pressure
Suction port
Spring pressure
Crankcase pressure
Valve position for raising crankcase pressure
Forces needed to decrease stroke
RHA474C

Component Layout

AJS001MJ



LUBRICANT

PFP:KLG00

Maintenance of Lubricant Quantity in Compressor

AJS001MK

The lubricant in the compressor circulates through the system with the refrigerant. Add lubricant to compressor when replacing any component or after a large refrigerant leakage occurred. It is important to maintain the specified amount.
If lubricant quantity is not maintained properly, the following malfunctions may result:

- Lack of lubricant: May lead to a seized compressor.
- Excessive lubricant: Inadequate cooling (thermal exchange interference)

LUBRICANT

Name : Nissan A/C System Oil Type S
Part number : KLH00-PAGS0

LUBRICANT RETURN OPERATION

Adjust the lubricant quantity according to the test group shown below.

1. **CHECK LUBRICANT RETURN OPERATION**

Can lubricant return operation be performed?

- A/C system works properly.
- There is no evidence of a large amount of lubricant leakage.

CAUTION:
If excessive lubricant leakage is noted, do not perform the lubricant return operation.

OK or NG

OK >> GO TO 2.
NG >> GO TO 3.

2. **PERFORM LUBRICANT RETURN OPERATION, PROCEEDING AS FOLLOWS**

1. Start engine, and set the following conditions:
   - Engine speed: Idling to 1,200 rpm
   - A/C switch: ON
   - Blower speed: Max. position
   - Temp. control: Optional [Set so that intake air temperature is 25 to 30°C (77 to 86°F).]
   - Intake position: Recirculation (REC)
2. Perform lubricant return operation for about 10 minutes.
3. Stop engine.

>> GO TO 3.

3. **CHECK REPLACEMENT PART**

Should the compressor be replaced?

YES >> GO TO MTC-23, "LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT" .
NO >> GO TO MTC-23, "LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR" .

LUBRICANT ADJUSTING PROCEDURE FOR COMPONENTS REPLACEMENT EXCEPT COMPRESSOR

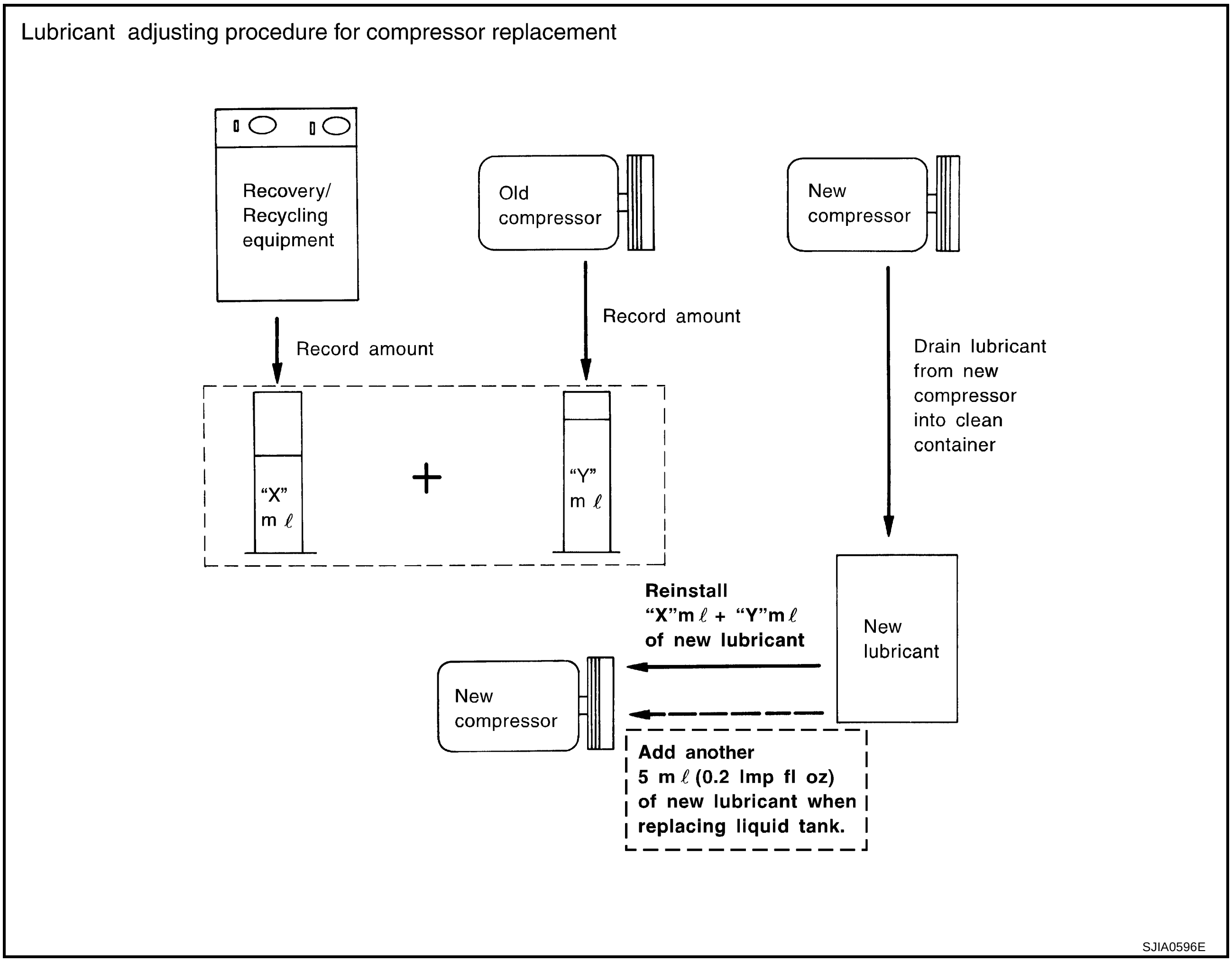
After replacing any of the following major components, add the correct amount of lubricant to the system.
Amount of lubricant to be added

Part replaced	Lubricant to be added to system	Remarks
	Amount of lubricant m ℓ (Imp fl oz)	
Evaporator	75 (2.6)	-
Condenser	35 (1.2)	-
Liquid tank	10 (0.4)	-
In case of refrigerant leak	30 (1.1)	Large leak
	-	Small leak *1

*1: If refrigerant leak is small, no addition of lubricant is needed.

LUBRICANT ADJUSTING PROCEDURE FOR COMPRESSOR REPLACEMENT

1. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If NG, recover refrigerant from equipment lines.
2. Connect recovery/recycling recharging equipment to vehicle. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to MTC-5, "CONTAMINATED REFRIGERANT" .
3. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier. If NG, refer to MTC-5, "CONTAMINATED REFRIGERANT" .
4. Discharge refrigerant into the refrigerant recovery/recycling equipment. Measure lubricant discharged into the recovery/recycling equipment.
5. Drain the lubricant from the old (removed) compressor into a graduated container and recover the amount of lubricant drained.
6. Drain the lubricant from the new compressor into a separate, clean container.
7. Measure an amount of new lubricant installed equal to amount drained from old compressor. Add this lubricant to new compressor through the suction port opening.
8. Measure an amount of new lubricant equal to the amount recovered during discharging. Add this lubricant to new compressor through the suction port opening.
9. If the liquid tank also needs to be replaced, add another 5 m ℓ (0.2 Imp fl oz) of lubricant at this time.
   Do not add this 5 m ℓ (0.2 Imp fl oz) of lubricant only when replaces the compressor.

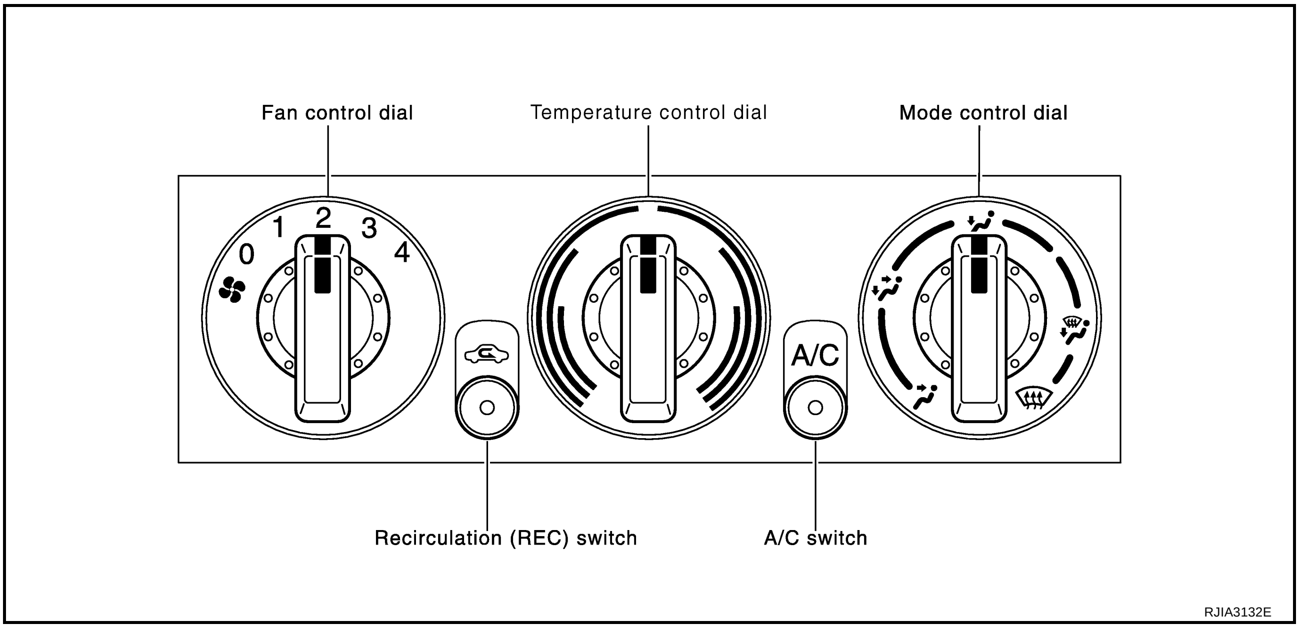

Lubricant adjusting procedure for compressor replacement
Recovery/ Recycling equipment
Old compressor
New compressor
Record amount
Record amount
Drain lubricant from new compressor into clean container
"X" m ℓ
+
"Y" m ℓ
Reinstall "X"m ℓ + "Y"m ℓ of new lubricant
New lubricant
New compressor
Add another 5 m ℓ (0.2 Imp fl oz) of new lubricant when replacing liquid tank.
SJIA0596E

AIR CONDITIONER CONTROL

PFP:27500

Control Operation

AJS001ML



FAN CONTROL DIAL

This dial turns the fan ON and OFF, and controls fan speed.

TEMPERATURE CONTROL DIAL

This dial allows you to adjust the temperature of the discharge air.

MODE CONTROL DIAL

This dial controls the outlet air flow.

RECIRCULATION (REC) SWITCH

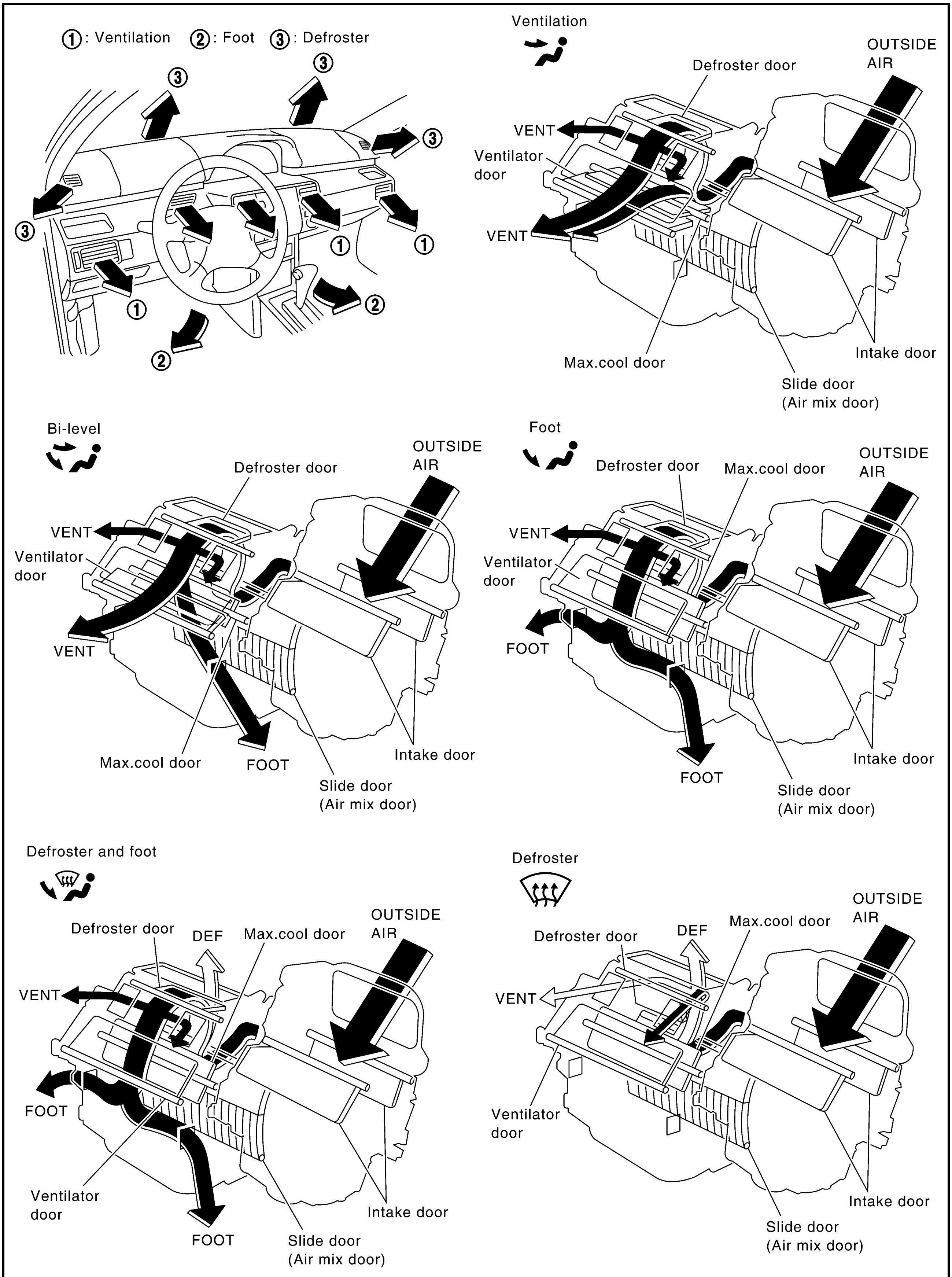
Recirculation (REC) position: Interior air is recirculated inside the vehicle. (The indicator lamp will light.)
Fresh (FRE) position: Outlet air is drawn into the passenger compartment. (The indicator lamp will not light.)

A/C SWITCH

The A/C switch controls the air conditioner system. When the switch is depressed with the fan ON, the compressor will turn ON. The indicator lamp will also light.
The air conditioner cooling function operates only when the engine is running.

Discharge Air Flow

AJS001MM

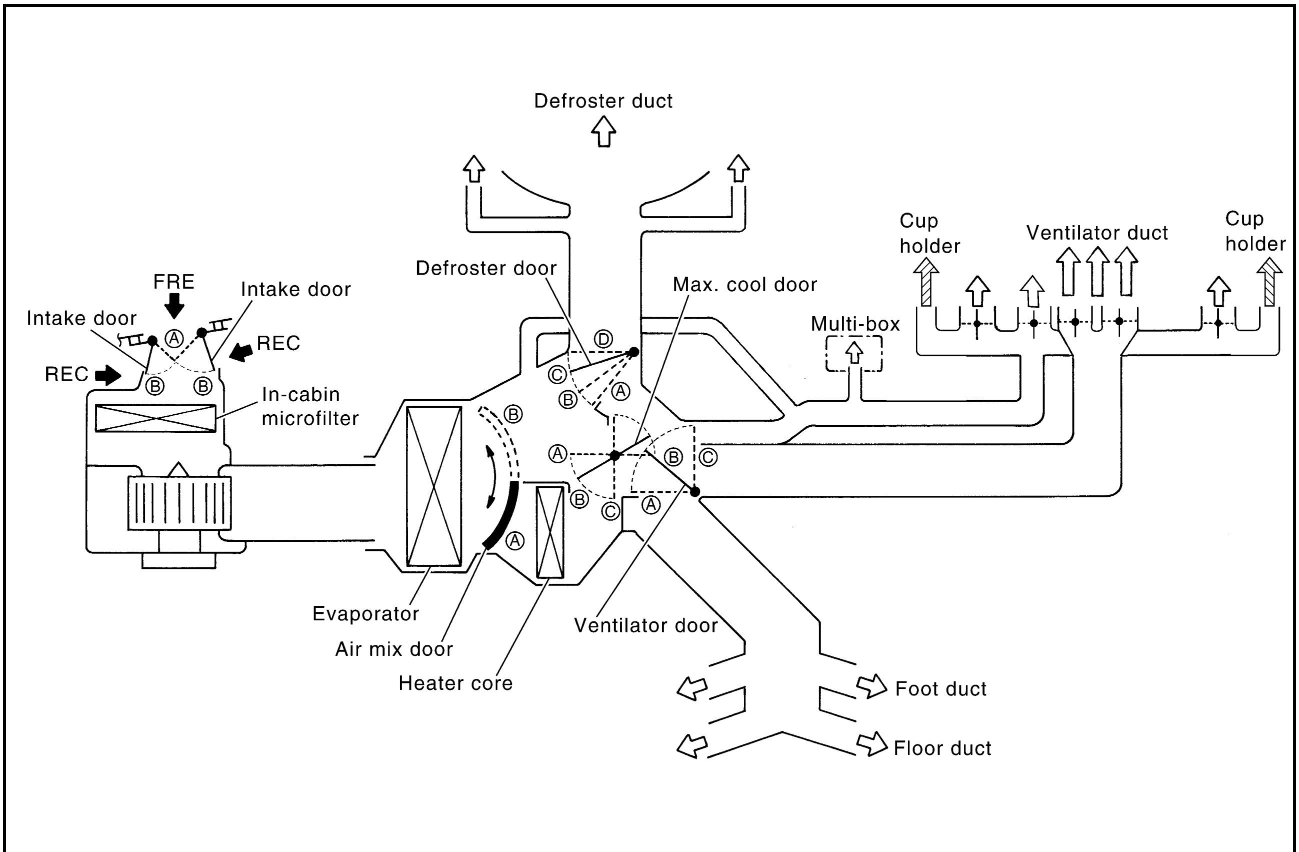


SJIA0441E

System Description

AJS001MN

SWITCHES AND THEIR CONTROL FUNCTION



RJIA3183E

Door / Mode control dial (D/F*)	MODE position						REC SW		Temperature control dial		
	VENT	B/L	FOOT	D/F*	D/F	DEF	REC	FRE			
				Not displayed					Full cold	←→	Full hot
Ventilator door	Ⓐ	Ⓑ	Ⓒ	Ⓒ	Ⓒ	Ⓒ	—		—		
Max.cool door	Ⓐ	Ⓑ	Ⓑ	Ⓑ	Ⓑ	Ⓒ	—		—		
Defroster door	Ⓓ	Ⓓ	Ⓓ	Ⓒ	Ⓑ	Ⓐ	—		—		
Intake door	—						Ⓐ	Ⓑ	—		
Air mix door	—						—		Ⓐ	Ⓐ~Ⓑ	Ⓑ

RJIA0701E

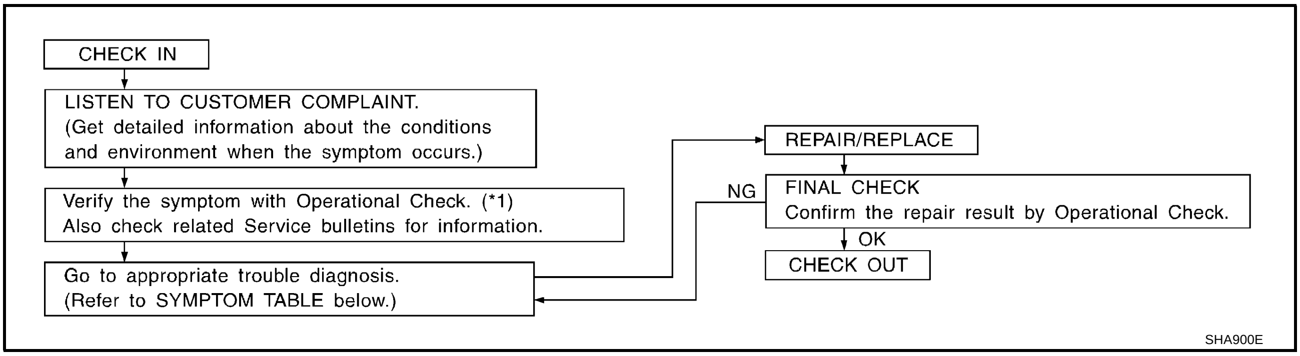
TROUBLE DIAGNOSIS

PFP:00004

How to Perform Trouble Diagnoses for Quick and Accurate Repair

AJS001MO

WORK FLOW



*1 MTC-36, "Operational Check"

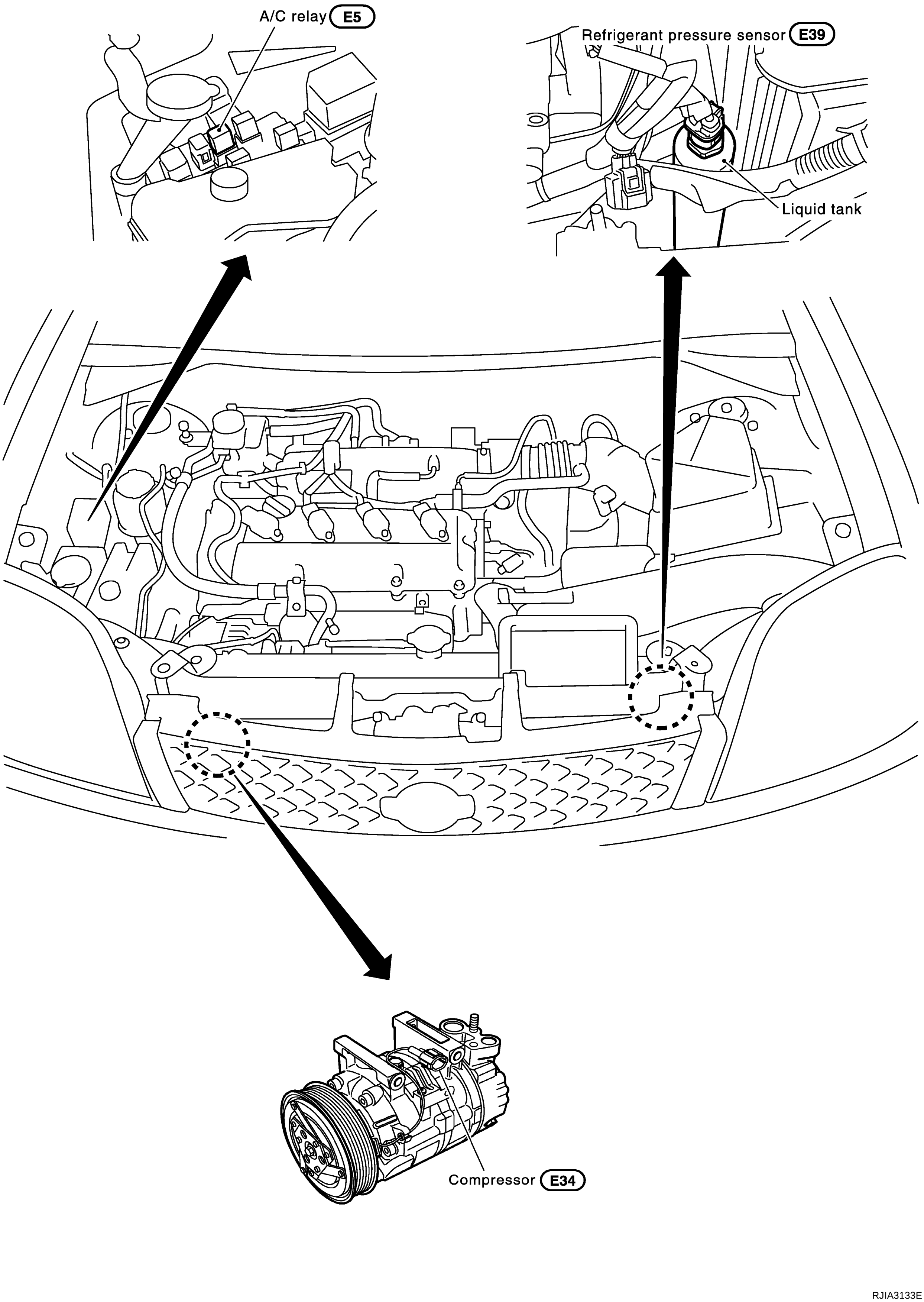
SYMPTOM TABLE

Symptom	Reference Page	
Air outlet does not change.	Go to Trouble Diagnosis Procedure for Mode Door.	MTC-38, "Mode Door"
Discharge air temperature does not change.	Go to Trouble Diagnosis Procedure for Air Mix Door.	MTC-39, "Air Mix Door"
Intake door does not change.	Go to Trouble Diagnosis Procedure for Intake Door Motor.	MTC-40, "Intake Door Motor Circuit"
Intake door motor does not operate normally.		
Blower motor operation is malfunctioning.	Go to Trouble Diagnosis Procedure for Blower Motor.	MTC-43, "Blower Motor Circuit"
Magnet clutch does not operate when A/C switch and fan switch are ON.	Go to Trouble Diagnosis Procedure for Magnet Clutch.	MTC-47, "Magnet Clutch Circuit"
Insufficient cooling	Go to Trouble Diagnosis Procedure for Insufficient Cooling.	MTC-54, "Insufficient Cooling"
Insufficient heating	Go to Trouble Diagnosis Procedure for Insufficient Heating.	MTC-61, "Insufficient Heating"
Noise	Go to Trouble Diagnosis Procedure for Noise.	MTC-62, "Noise"

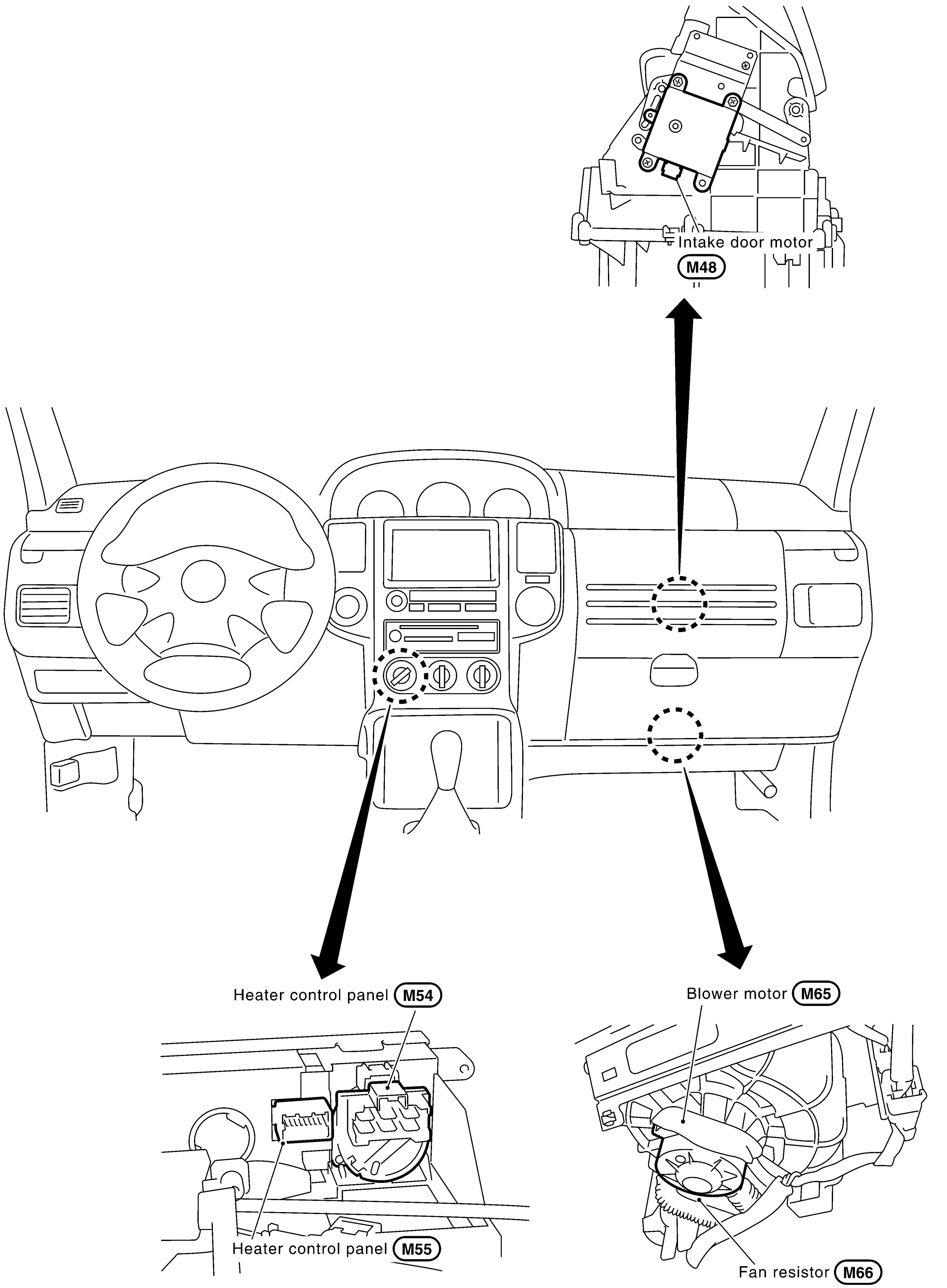
Component Parts and Harness Connector Location

AJS001MP

ENGINE COMPARTMENT

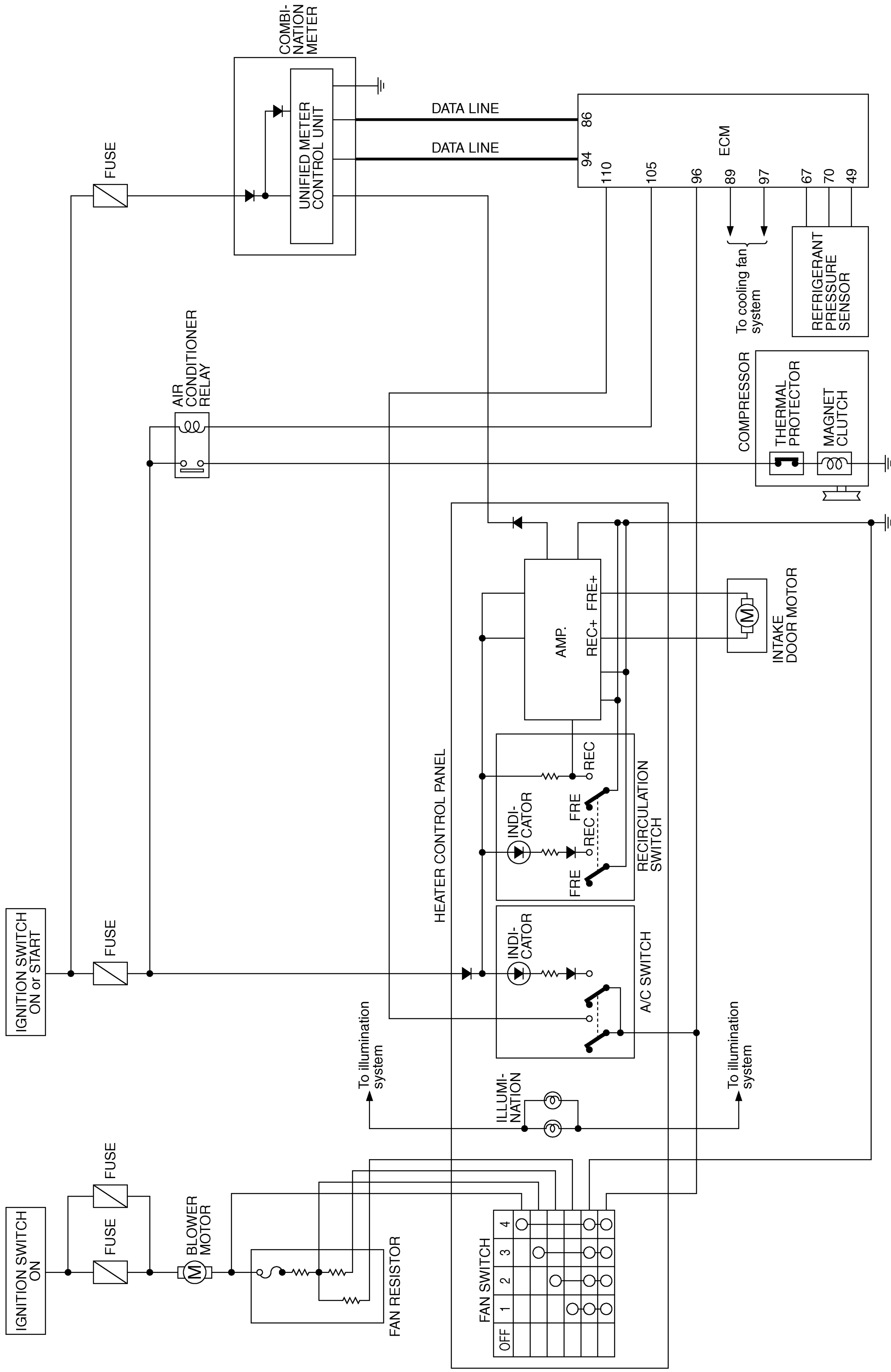


PASSENGER COMPARTMENT



Schematic —A/C, M—

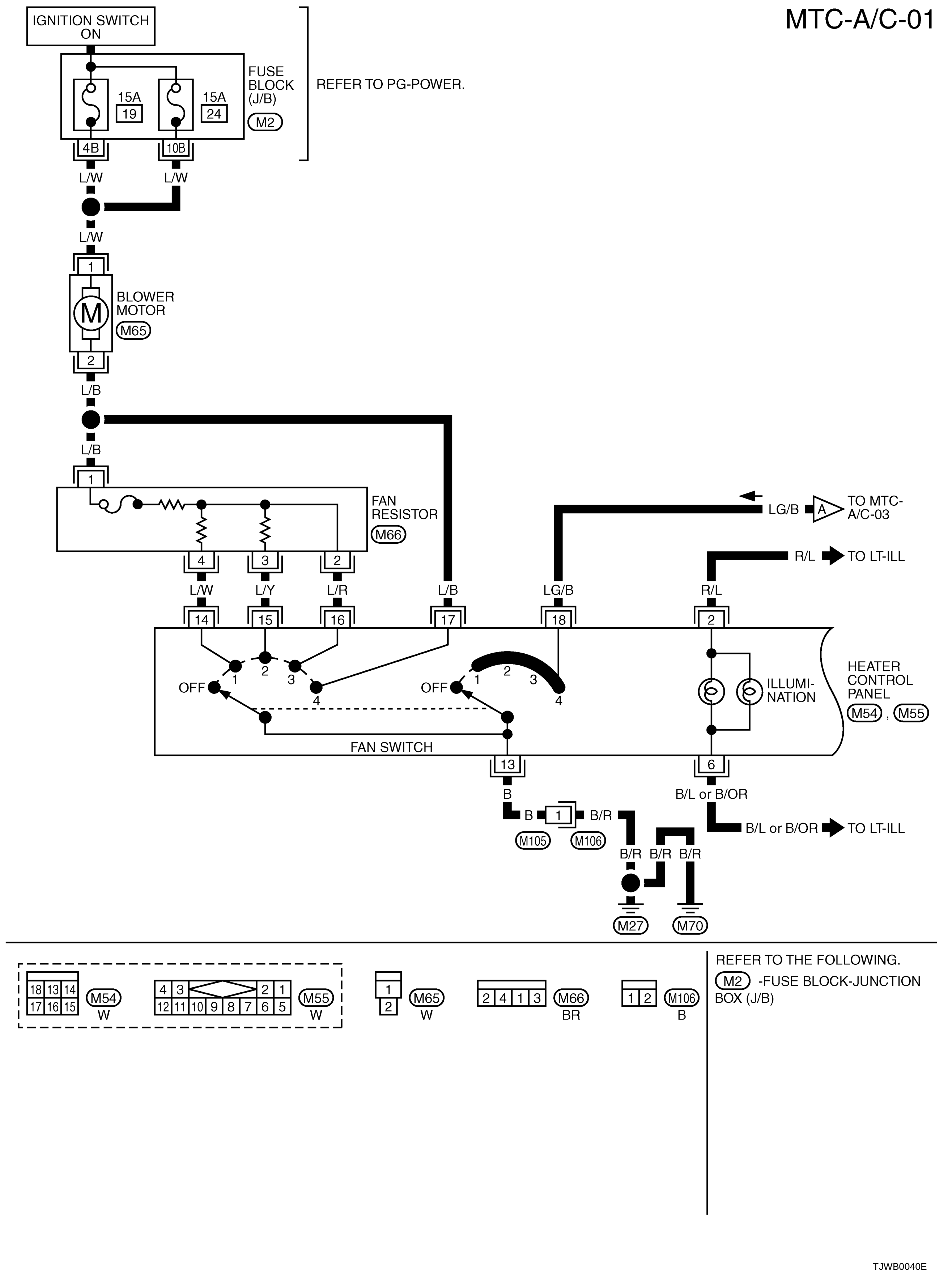
AJS001MQ

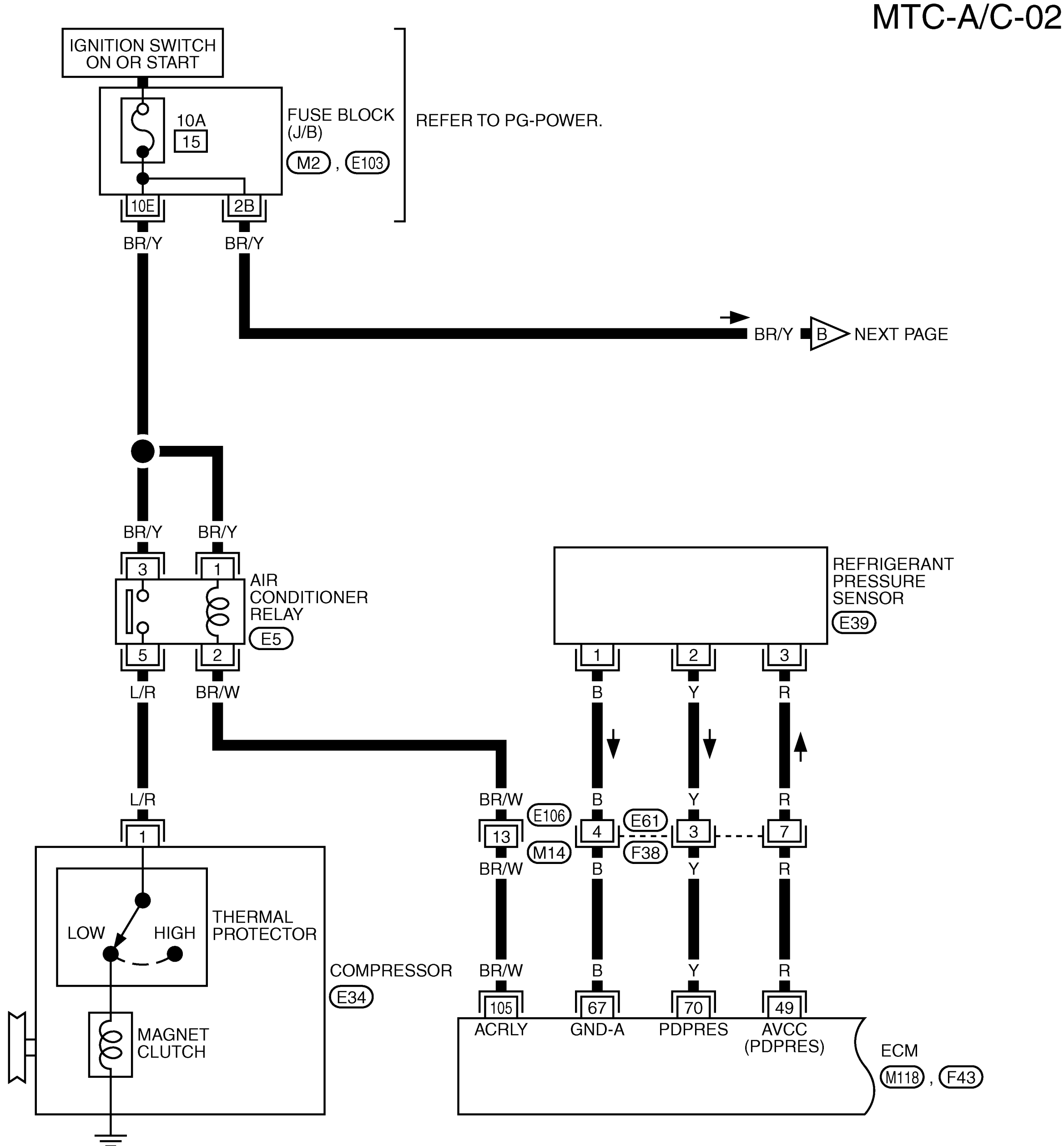


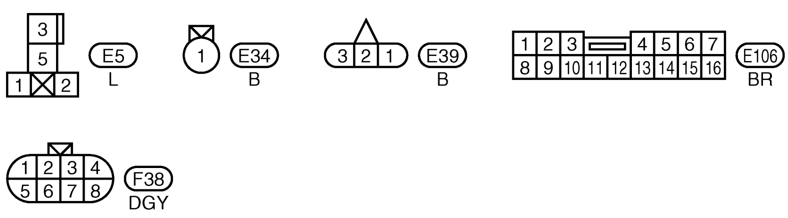
TJWB0039E

Wiring Diagram — A/C, M —

AJS001OB



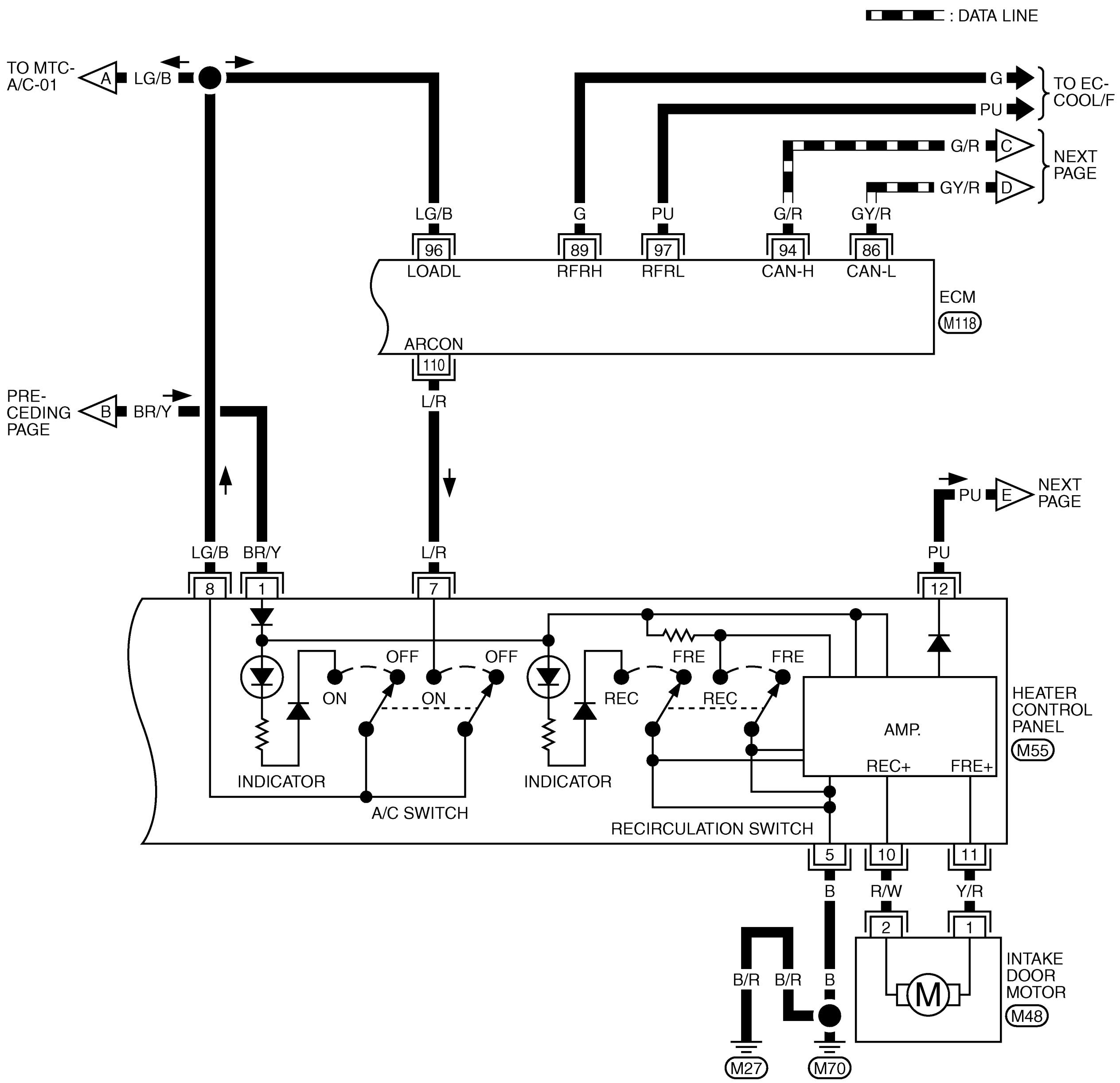


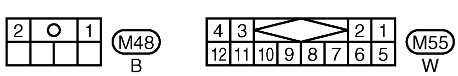


REFER TO THE FOLLOWING.
M2 , E103 -FUSE BLOCK-JUNCTION BOX (J/B)
M118 , F43 -ELECTRICAL UNITS

TJWB0041E

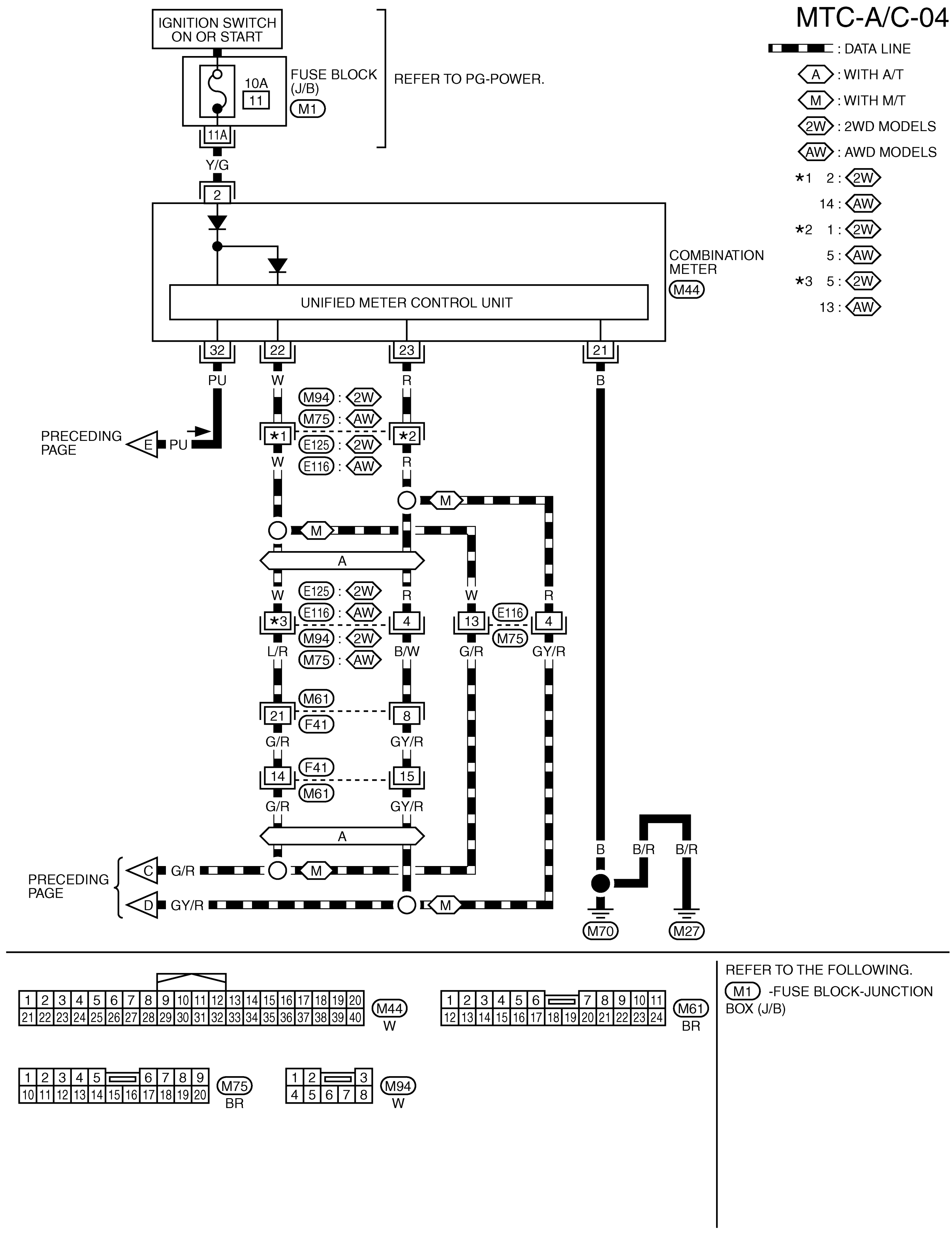
MTC-A/C-03





REFER TO THE FOLLOWING.
M118 -ELECTRICAL UNITS

TJWB0042E


MTC-A/C-04
: DATA LINE
A : WITH A/T
M : WITH M/T
2W : 2WD MODELS
AW : AWD MODELS
*1 2 : 2W
14 : AW
*2 1 : 2W
5 : AW
*3 5 : 2W
13 : AW
IGNITION SWITCH ON OR START
10A
11
FUSE BLOCK (J/B)
M1
REFER TO PG-POWER.
11A
Y/G
COMBINATION METER
M44
UNIFIED METER CONTROL UNIT
32 22 23 21
PU W R B
PRECEDING PAGE
E PU
M94 : 2W
M75 : AW
E125 : 2W
E116 : AW
A
E116
M75
L/R B/W G/R GY/R
M61
F41
PRECEDING PAGE
C G/R
D GY/R
B/R
M70
M27
M44 W
M61 BR
M75 BR
M94 W
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)
TJWB0043E

Operational Check

AJS001MS

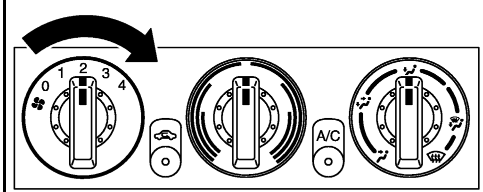
The purpose of the operational check is to confirm that the system operates properly.

Conditions : Engine running at usual operating temperature

CHECKING BLOWER

1. Turn fan control dial to 1-speed. Blower should operate on low speed.
2. Then turn fan control dial to 2nd speed, and continue checking blower speed until all speeds are checked.
3. Leave blower on Max. speed.

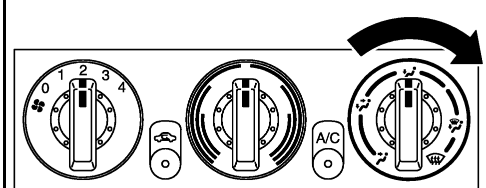
If NG, go to trouble diagnosis procedure for MTC-43, "Blower Motor Circuit" .
If OK, continue the check.



RJIA3135E

CHECKING DISCHARGE AIR

1. Turn mode control dial to each position.



RJIA3136E

2. Confirm that discharge air comes out according to the air distribution table. Refer to MTC-26, "Discharge Air Flow" .

If NG, go to trouble diagnosis procedure for MTC-38, "Mode Door" .
If OK, continue the check.

Discharge air flow

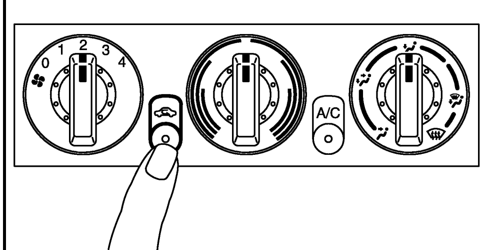
Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	24%	76%	–
	18%	54%	28%
	20%	–	80%

RJIA0492E

CHECKING RECIRCULATION

1. Press REC switch. Recirculation indicator should illuminate.
2. Press REC switch again. Recirculation indicator should not illuminate.
3. Listen for intake door position change (you should hear blower sound change slightly).

If NG, go to trouble diagnosis procedure for MTC-40, "Intake Door Motor Circuit" .
If OK, continue the check.

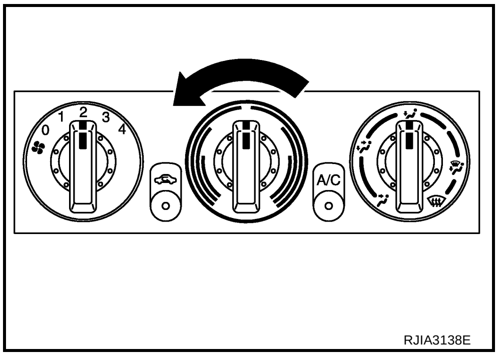


RJIA3137E

CHECKING TEMPERATURE DECREASE

1. Turn temperature control dial to full cold position.
2. Check for cold air at discharge air outlets.

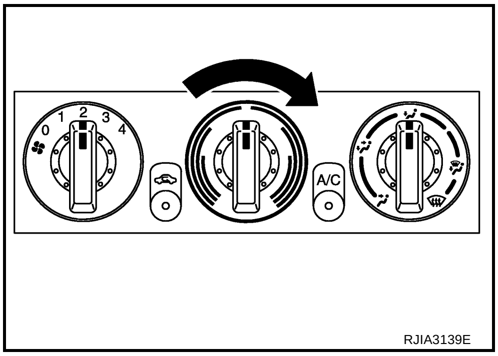
If NG, go to trouble diagnosis procedure for MTC-54, "Insufficient Cooling" .
If OK, continue the check.



CHECKING TEMPERATURE INCREASE

1. Turn temperature control dial to full hot position.
2. Check for hot air at discharge air outlets.

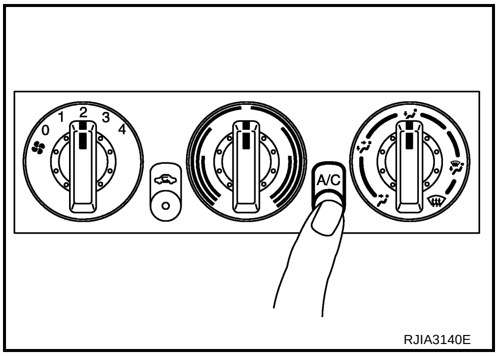
If NG, go to trouble diagnosis procedure for MTC-61, "Insufficient Heating" .
If OK, continue the check.



CHECKING A/C SWITCH

1. Turn fan control dial to the desired (1 to 4 speed) position and push the A/C switch to turn ON air conditioner.
2. The indicator lamp should come on when air conditioner is ON.
   - Confirm that the compressor clutch engages (sound or visual inspection).

If NG, go to trouble diagnosis procedure for MTC-47, "Magnet Clutch Circuit" .
If all operational checks are OK (symptom cannot be duplicated), go to Incident Simulation Tests in GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" and perform tests as outlined to simulate driving conditions environment. If symptom appears, refer to MTC-28, "SYMPTOM TABLE" and perform applicable trouble diagnosis procedures.



A
B
C
D
E
F
G
H
I
MTC
K
L
M

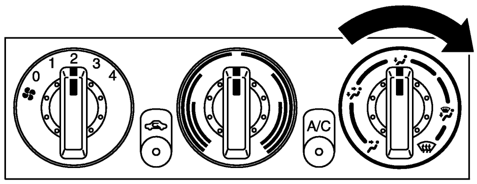
Mode Door

AJS001MT

SYMPTOM: Air outlet does not change.

INSPECTION FLOW

1. Confirm symptom by performing the following operation.



Discharge air flow

Mode door position	Air outlet/distribution		
	Face	Foot	Defroster
	100%	–	–
	60%	40%	–
	24%	76%	–
	18%	54%	28%
	20%	–	80%

OPERATIONAL CHECK – Mode door

a. Turn the mode control dial to each. position.

b. Confirm that discharge air comes out according to the distribution table at left. Refer to “Discharge Air Flow”, (*1).

Note:
If OK (symptom cannot be duplicated), perform complete operational check (*2).
If NG (symptom is confirmed), continue the check.

↓

2. Check for any service bulletins.

↓

3. Check mode door control cable. (*3)

↓ OK

4. If the symptom still exists, perform a complete operational check (*2) and check for other symptoms. [Refer to symptom table, (*4).] Does another symptom exist?

YES → Go to Trouble Diagnosis for related symptom.

[Another symptom exists.]

↓ NO

INSPECTION END

RJIA3141E

*1 MTC-26, "Discharge Air Flow"

*2 MTC-36, "Operational Check"

*3 MTC-73, "Control Linkage Adjustment"

*4 MTC-28, "SYMPTOM TABLE"

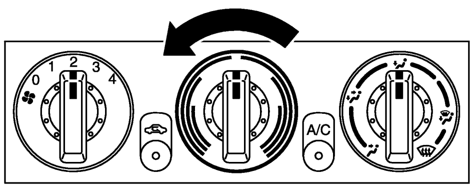
Air Mix Door

AJS001MU

SYMPTOM: Air mix door does not change.

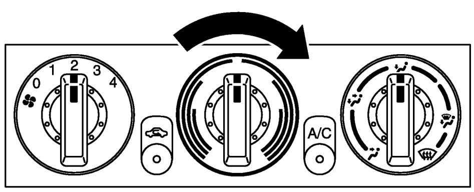
INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature decrease and increase

1. Check Temperature Decrease
1) Turn temperature control dial to full cold.
2) Check for cold air at discharge air outlets.



2. Check Temperature Increase
1) Turn temperature control dial to full hot.
2) Check for hot air at discharge air outlets.

If OK (symptom cannot be duplicated). Perform complete operational check. (*1)
If NG (symptom is confirmed), continue the check.

2. Check for any service bulletins.

3. Check air mix door control cable. (*2)

OK

If the symptom still exists, perform a complate operational check (*1) and check for other symptoms.
[Refer to symptom table, (*3).]
Does another symptom exist?

NO → INSPECTION END

YES → Go to Trouble Diagnosis for related symptom.

[Another symptom exists.]

RJIA3142E

*1 MTC-36, "Operational Check"   *2 MTC-74, "Control Linkage Adjustment"   *3 MTC-28, "SYMPTOM TABLE"

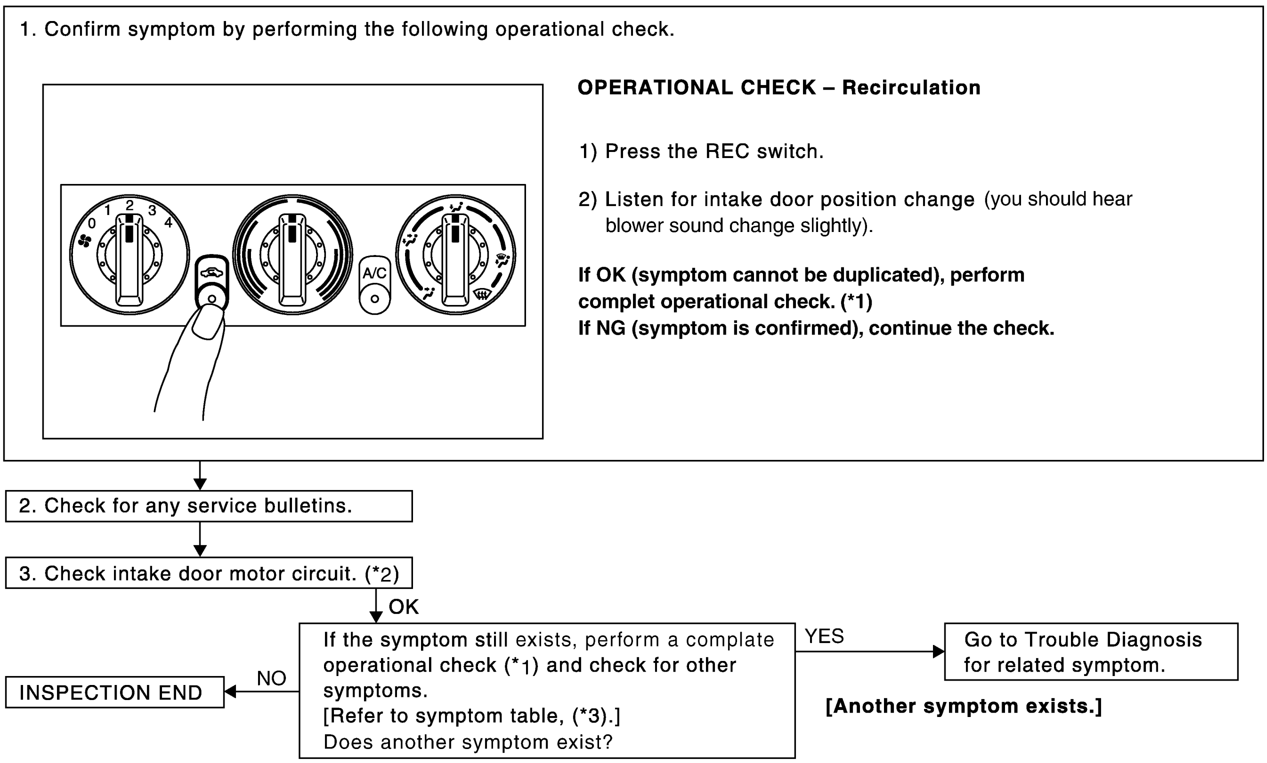
Intake Door Motor Circuit

AJS001MV

SYMPTOM:

- Intake door does not change.
- Intake door motor does not operate normally.

INSPECTION FLOW



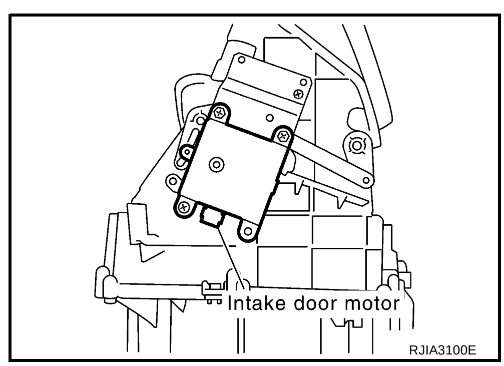
RJIA3143E

*1 MTC-36, "Operational Check" *2 MTC-40, "Intake Door Motor Circuit" *3 MTC-28, "SYMPTOM TABLE"

COMPONENT DESCRIPTION

Intake Door Motor

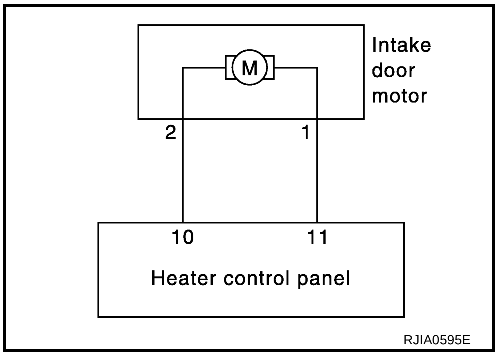
The intake door motor is attached to the intake unit. It rotates so that air is drawn from inlets set by the heater control panel. Motor rotation is conveyed to a lever which activates the intake door.



RJIA3100E

DIAGNOSTIC PROCEDURE FOR INTAKE DOOR MOTOR

SYMPTOM: Intake door does not operate normally.



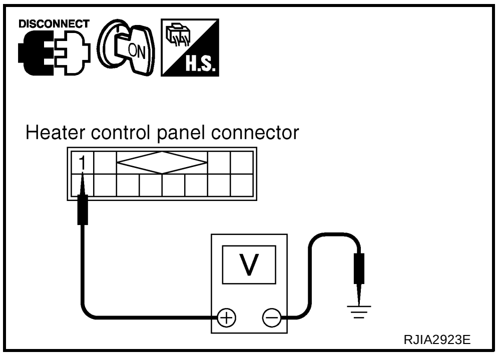
1. CHECK POWER SUPPLY FOR HEATER CONTROL PANEL

1. Disconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between heater control panel harness connector M55 terminal 1 (BR/Y).

1 – Ground : Battery voltage

OK or NG

OK >> GO TO 2.
NG >> Check power supply circuit and 10 A fuse [No. 15, located in the fuse block (J/B)]. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .
- If fuse is OK, check harness for open circuit. Repair or replace if necessary.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.



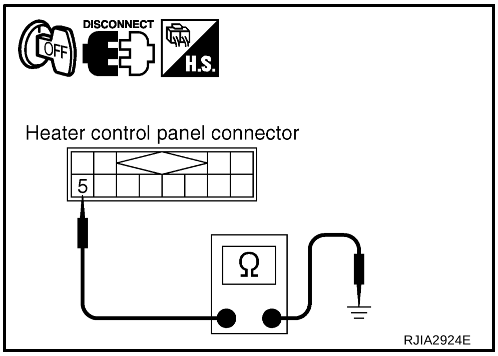
2. CHECK GROUND CIRCUIT FOR HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Check continuity between heater control panel harness connector M55 terminal 5 (B).

5 – Ground : Continuity should exist.

OK or NG

OK >> GO TO 3.
NG >> Repair harness or connector.



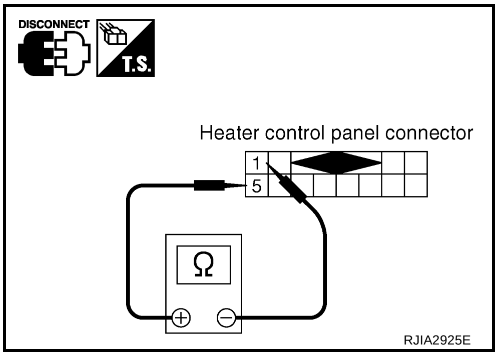
3. CHECK RECIRCULATION SWITCH CIRCUIT

1. Press REC (recirculation) switch.
2. Check continuity between heater control panel harness connector M55 terminal 1 (BR/Y) and 5 (B).

1(–) – 5(+) : Continuity should exist.

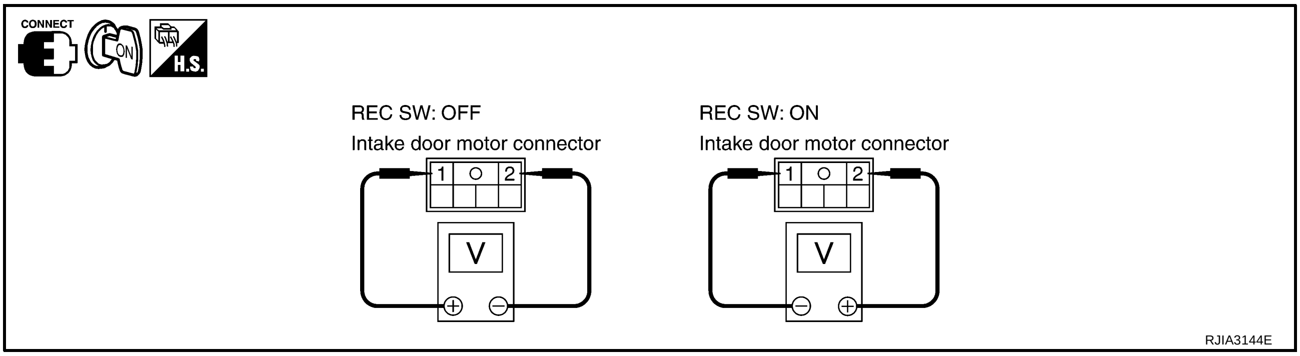
OK or NG

OK >> GO TO 4.
NG >> Replace heater control panel.



4. CHECK POWER SUPPLY FOR INTAKE DOOR MOTOR

1. Reconnect heater control panel connector.
2. Turn ignition switch ON.
3. Check voltage between intake door motor harness connector M48 terminal 1 (Y/R) and 2 (R/W).



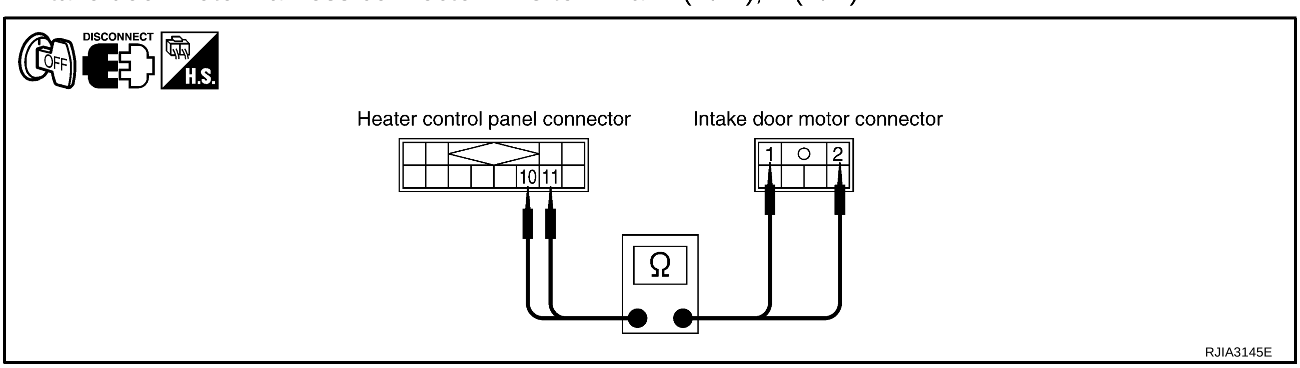
Terminals				Condition	Voltage
(+)		(–)			
Intake door motor connector	Terminal No. (wire color)	Intake door motor connector	Terminal No. (wire color)		
M48	2 (R/W)	M48	1 (Y/R)	REC SW: ON	Approx. 12V
M48	1 (Y/R)	M48	2 (R/W)	REC SW: OFF	

OK or NG

OK >> Replace intake door motor.
NG >> GO TO 5.

5. CHECK CIRCUIT CONTINUITY BETWEEN HEATER CONTROL PANEL AND INTAKE DOOR MOTOR

1. Turn ignition switch OFF.
2. Disconnect the heater control panel connector and intake door motor connector.
3. Check continuity between heater control panel harness connector M55 terminal 10 (R/W), 11 (Y/R) and intake door motor harness connector M48 terminal 2 (R/W), 1 (Y/R).



10 – 2 : Continuity should exist.
11 – 1 : Continuity should exist.

OK or NG

OK >> Replace heater control panel.
NG >> Repair harness or connector.

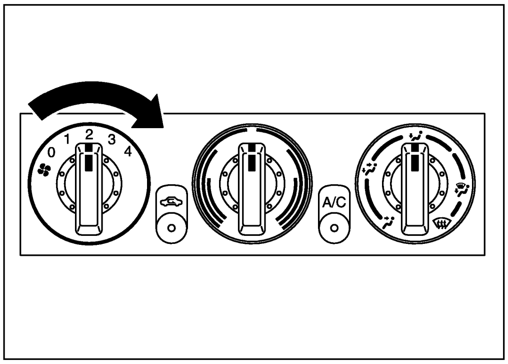
Blower Motor Circuit

AJS001MW

SYMPTOM: Blower motor operation is malfunctioning.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Blower motor

1) Turn fan control dial to 1-speed.
   Blower should operate on 1-speed.
2) Then turn fan control dial to 2-speed.
3) Continue checking blower speed until all four speeds are checked.
4) Leave blower on 4-speed.

If OK (symptom cannot be duplicated), perform complete operational check (*1).
If NG (symptom is confirmed), continue the check.

↓

2. Check for any service bulletins.

↓

3. Check blower motor circuit. (*2)

↓ OK

If the symptom still exist, perform a complete operational check (*1) and check for other symptoms.
[Refer to symptom table, (*3).]
Does another symptom exist?

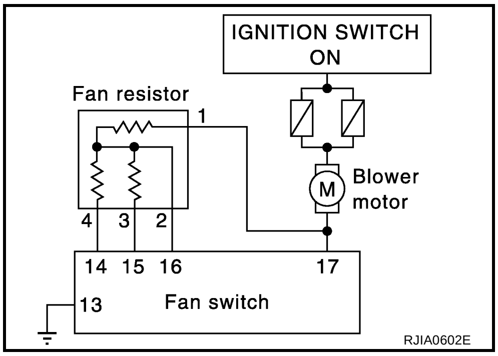
- YES → Go to Trouble Diagnosis for related symptom. **[Another symptom exists.]**
- NO → INSPECTION END

RJIA3146E

*1 MTC-36, "Operational Check" *2 MTC-43, "DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR" *3 MTC-28, "SYMPTOM TABLE"

DIAGNOSTIC PROCEDURE FOR BLOWER MOTOR

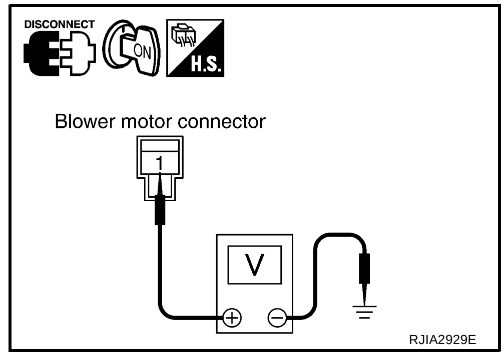
SYMPTOM: Blower motor operation is malfunctioning.



1. CHECK POWER SUPPLY FOR BLOWER MOTOR

1. Disconnect blower motor connector.
2. Turn ignition switch ON.
3. Check voltage between blower motor harness connector M65 terminal 1 (L/W) and ground.

1 – Ground : Battery voltage



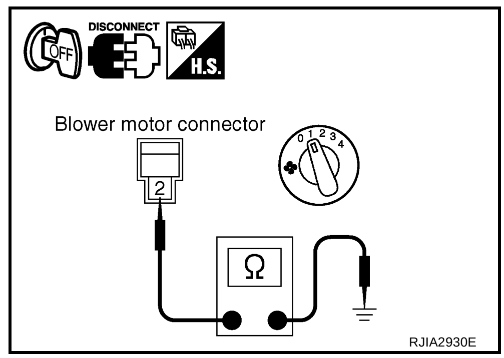
OK or NG

OK >> GO TO 2.
NG >> Check power supply circuit and 15A fuses [Nos. 19 and 24, located in the fuse block (J/B)]. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .
- If fuse are OK, check harness for open circuit. Repair or replace if necessary.
- If fuse are NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

2. CHECK GROUND CIRCUIT FOR BLOWER MOTOR

1. Turn ignition switch OFF.
2. Turn fan control dial to 1-speed.
3. Check continuity between blower motor harness connector M65 terminal 2 (L/B) and ground.

2 – Ground : Continuity should exist.



OK or NG

OK >> GO TO 3.
NG >> GO TO 4.

3. CHECK BLOWER MOTOR

Refer to MTC-46, "Blower Motor" .

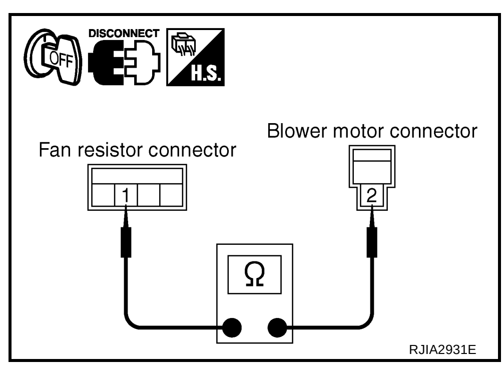
OK or NG

OK >> INSPECTION END
NG >> Replace blower motor.

4. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND FAN RESISTOR

1. Disconnect fan resistor connector.
2. Check continuity between fan resistor harness connector M66 terminal 1 (L/B) and blower motor harness connector M65 terminal 2 (L/B).

1 – 2 : Continuity should exist.



OK or NG

OK >> GO TO 5.
NG >> Repair harness or connector.

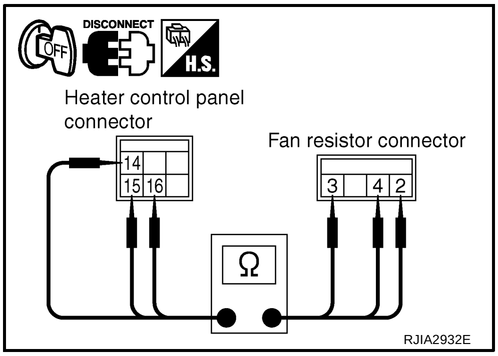
5. CHECK FAN RESISTOR

Refer to MTC-46, "Fan Resistor" .

OK or NG

OK >> GO TO 6.
NG >> Replace fan resistor.

6. CHECK CIRCUIT CONTINUITY BETWEEN FAN RESISTOR AND HEATER CONTROL PANEL



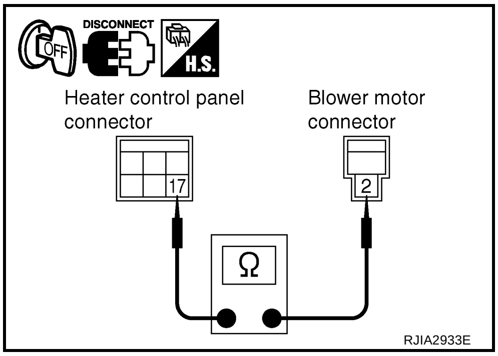
1. Disconnect heater control panel connector.
2. Check continuity between fan resistor harness connector M66 terminal 2 (L/R), 3 (L/Y) or 4 (L/W) and heater control panel harness connector M54 terminal 16 (L/R), 15 (L/Y) or 14 (L/W).

2 – 16 : Continuity should exist.
3 – 15 : Continuity should exist.
4 – 14 : Continuity should exist.

OK or NG

OK >> GO TO 7.
NG >> Repair harness or connector.

7. CHECK CIRCUIT CONTINUITY BETWEEN BLOWER MOTOR AND HEATER CONTROL PANEL



Check continuity between blower motor harness connector M65 terminal 2 (L/B) and heater control panel harness connector M54 terminal 17 (L/B).

2 – 17 : Continuity should exist.

OK or NG

OK >> GO TO 8.
NG >> Repair harness or connector.

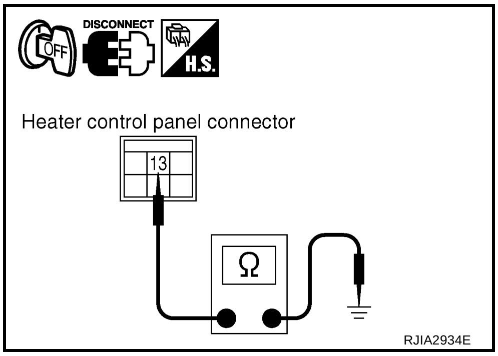
8. CHECK FAN SWITCH

Refer to MTC-46, "Fan Switch" .

OK or NG

OK >> GO TO 9.
NG >> Replace fan switch.

9. CHECK GROUND CIRCUIT



Check continuity between heater control panel harness connector M54 terminal 13 (B) and ground.

13 – Ground : Continuity should exist.

OK or NG

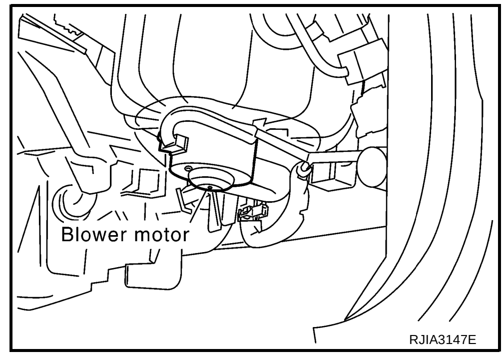
OK >> INSPECTION END
NG >> Repair harness or connector.

COMPONENT INSPECTION

Blower Motor

Confirm smooth rotation of the blower motor.

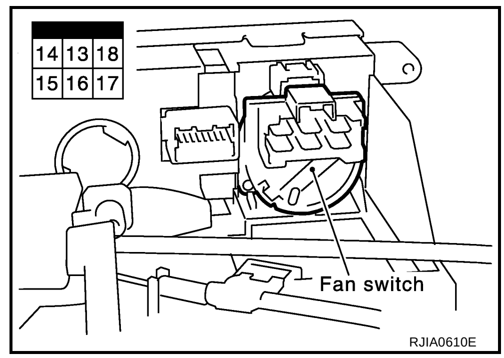
- Ensure that there are no foreign particles inside the intake unit.



Fan Switch

Check continuity between heater control connector M54 terminals at each switch position.

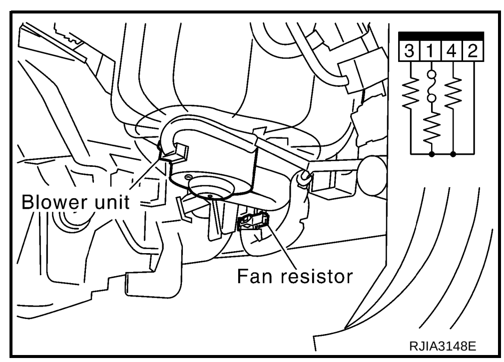
Switch position	Terminals	Continuity
OFF	13 - 14, 15, 16, 17	No
1	13 - 14	Yes
2	13 - 15	
3	13 - 16	
4	13 - 17	



Fan Resistor

Check resistance between fan resistor connector M66 terminals.

Terminals		Resistance (Ω)
1	2	0.25 - 0.31
	3	0.58 - 0.70
	4	1.33 - 1.63



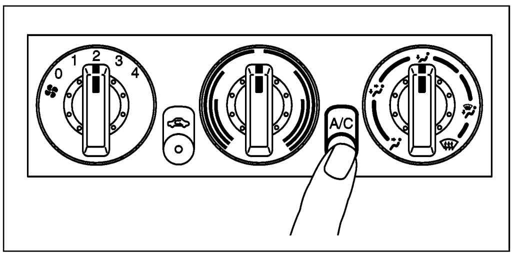
Magnet Clutch Circuit

AJS001MX

SYMPTOM: Magnet clutch does not operate when A/C switch and fan switch are ON.

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK - A/C switch

Turn fan control dial to the desired (1 to 4-speed) position and push the A/C switch to turn ON the air conditioner.
The indicator light should come on when air conditioner is ON.

If OK (symptom cannot be duplicated), perform complete operational check. (*1)
If NG (symptom is confirmed), continue the check.

↓

2. Check for any service bulletins.

↓

3. Check compressor belt tension.
   Refer to (*2), “Checking Drive Belts”.
   - NG → Adjust or replace compressor belt.
   - OK ↓

4. Check refrigerant.
   Connect manifold gauge then check system pressure.
   - NG → Check for refrigerant leaks. Refer to (*5).
   - OK ↓

5. Check magnet clutch circuit. (*3)
   - OK ↓

If the symptom still exist, perform a complete Operational check (*1) and check for other symptoms.
[Refer to symptom table, (*4).]
Does another symptom exist?
- YES → Go to Trouble Diagnosis for related symptom. **[Another symptom exists.]**
- NO → INSPECTION END

RJIA3149E

*1 MTC-36, "Operational Check"

*2 EM-11, "Checking Drive Belt"

*3 MTC-48, "DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH"

*4 MTC-28, "SYMPTOM TABLE"

*5 MTC-92, "Checking for Refrigerant Leaks"

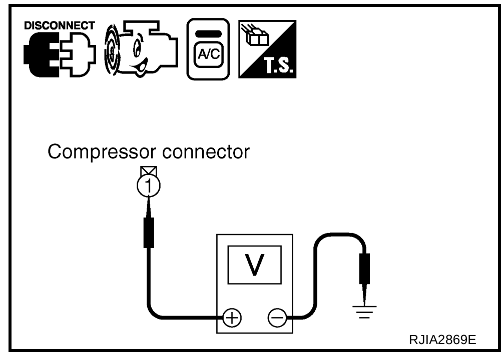
DIAGNOSTIC PROCEDURE FOR MAGNET CLUTCH

SYMPTOM: Magnet clutch does not engage when A/C switch and fan control dial are ON.

1. CHECK POWER SUPPLY FOR COMPRESSOR

1. Disconnect compressor connector.
2. Start the engine.
3. Turn fan control dial and A/C switch to ON.
4. Check voltage between compressor harness connector E34 terminal 1 (L/R) and ground.

1 – Ground : Battery voltage

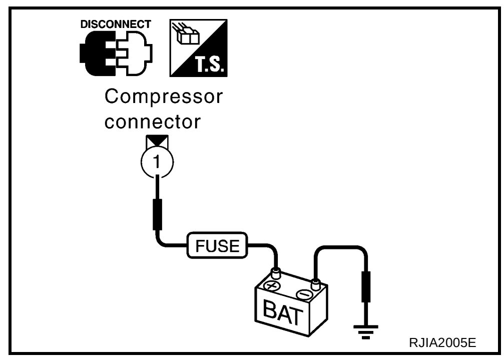


OK or NG

OK >> GO TO 2.
>> GO TO 3.

2. CHECK MAGNET CLUTCH CIRCUIT

Check for operation sound when applying battery voltage direct current to terminal.



OK or NG

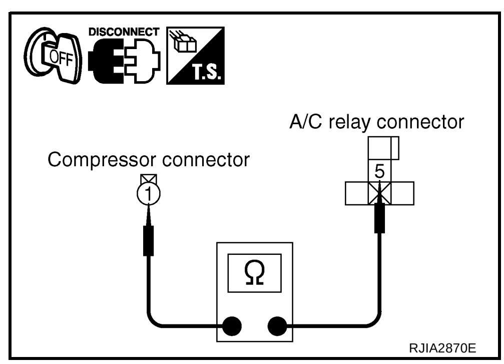
OK >> 1. Repair harness or connector.
2. Go to operational check. Refer to MTC-37, "CHECKING A/C SWITCH" . Confirm that magnet clutch operation is usual.

NG >> 1. Replace magnet clutch. Refer to MTC-84, "Removal and Installation of Compressor Clutch" .
2. Go to operational check. Refer to MTC-37, "CHECKING A/C SWITCH" . Confirm that magnet clutch operation is usual.

3. CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY AND COMPRESSOR

1. Turn ignition switch OFF.
2. Disconnect A/C relay connector.
3. Check continuity between A/C relay harness connector E5 terminal 5 (L/R) and compressor harness connector E34 terminal 1 (L/R).

5 – 1 : Continuity should exist.

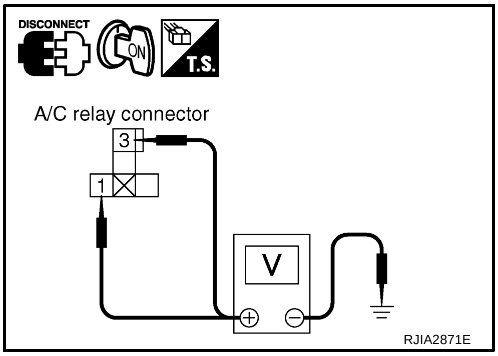


OK or NG

OK >> GO TO 4.
NG >> Repair harness or connector.

4. CHECK POWER SUPPLY FOR A/C RELAY

1. Turn ignition switch ON.
2. Check voltage between A/C relay harness connector E5 terminal 1 (BR/Y) and ground, and also terminal 3 (BR/Y) and ground.



1 – Ground : Battery voltage
3 – Ground : Battery voltage

OK or NG

OK >> GO TO 5.
NG >> Check power supply circuit and 10A fuse [No. 15 located in the fuse block (J/B)]. Refer to PG-49, "FUSE BLOCK - JUNCTION BOX (J/B)" .
- If fuse is OK, check harness for open circuit. Repair or replace if necessary.
- If fuse is NG, replace fuse and check harness for short circuit. Repair or replace if necessary.

5. CHECK A/C RELAY

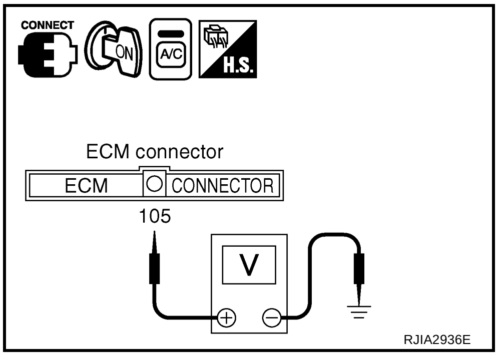
Refer to MTC-52, "A/C Relay" .

OK or NG

OK >> GO TO 6.
NG >> Replace A/C relay.

6. CHECK COIL SIDE CIRCUIT OF A/C RELAY

1. Turn ignition switch OFF.
2. Reconnect A/C relay connector.
3. Turn ignition switch ON.
4. Check voltage between ECM harness connector M118 terminal 105 (BR/W) and ground.



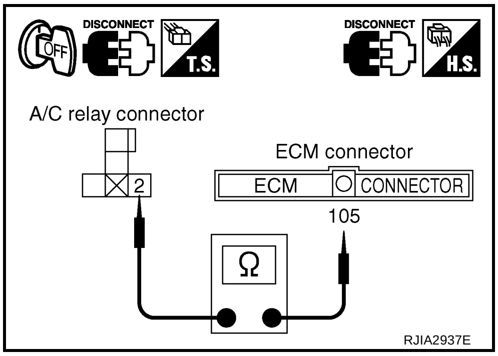
105 – Ground : Approx. 12V

OK or NG

OK >> GO TO 8.
NG >> GO TO 7.

7. CHECK CIRCUIT CONTINUITY BETWEEN A/C RELAY AND ECM

1. Turn ignition switch OFF.
2. Disconnect A/C relay connector and ECM connector.
3. Check continuity between A/C relay connector E5 terminal 2 (BR/W) and ECM harness connector M118 terminal 105 (BR/W).



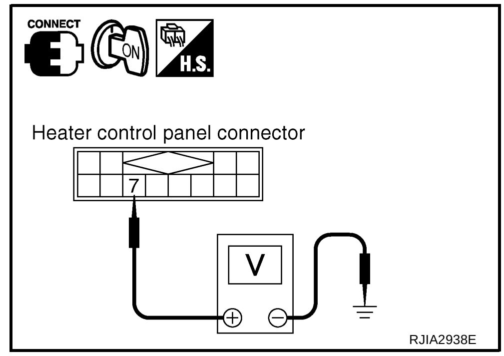
2 – 105 : Continuity should exist.

OK or NG

OK >> Check ECM. Refer to EC-115, "ECM Terminals and Reference Value" .
NG >> Repair harness or connector.

8. CHECK COMPRESSOR ON SIGNAL

Check voltage between heater control panel harness connector M55 terminal 7 (L/R) and ground.



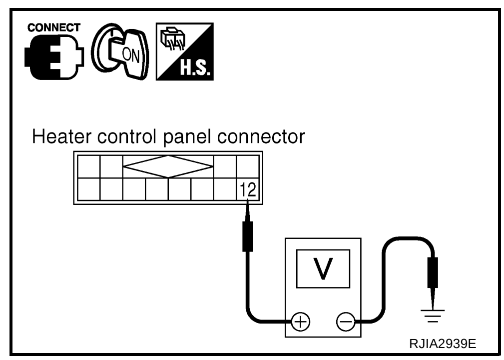
Terminals			Condition	Voltage
(+)		(–)		
Heater control panel connector	Terminal No. (wire color)			
M55	7 (L/R)	Ground	A/C switch: ON (Blower motor operates.)	Approx. 0V
			A/C switch: OFF	Approx. 5V

OK or NG

OK >> GO TO 9.
NG >> GO TO 15.

9. CHECK COMPRESSOR FEEDBACK SIGNAL

Check voltage between heater control panel harness connector M55 terminal 12 (PU) and ground.



12 – Ground : Approx. 0V

OK or NG

OK >> GO TO 10.
NG >> GO TO 16.

10. CHECK REFRIGERANT PRESSURE SENSOR

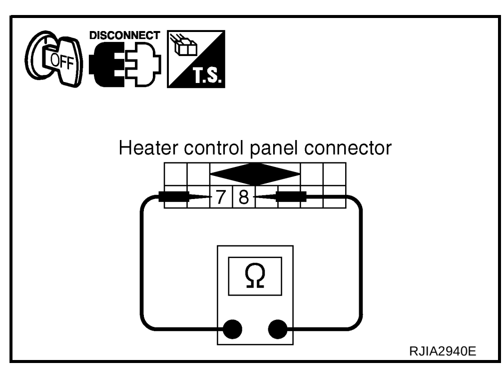
Refer to EC-619, "REFRIGERANT PRESSURE SENSOR" .

OK or NG

OK >> GO TO 11.
NG >> Replace refrigerant pressure sensor.

11. CHECK A/C SWITCH

1. Turn ignition switch OFF.
2. Disconnect heater control panel connector.
3. Press A/C switch.
4. Check continuity between heater control panel connector M55 terminal 7 and 8.



7 – 8 : Continuity should exist.

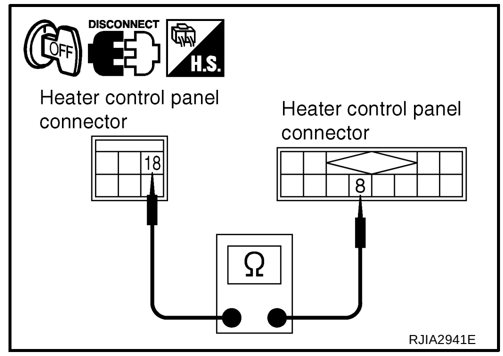
OK or NG

OK >> GO TO 12.
NG >> Replace heater control panel.

12. CHECK HEATER CONTROL PANEL CIRCUIT

Check continuity between heater control panel harness connector M55 terminal 8 (LG/B) and heater control panel harness connector M54 terminal 18 (LG/B).

8 – 18 **: Continuity should exist.**

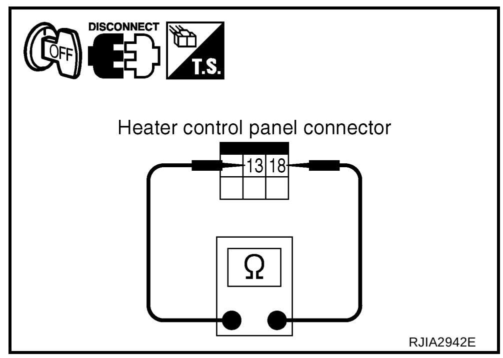


OK or NG

OK >> GO TO 13.
NG >> Repair harness or connector.

13. CHECK FAN SWITCH

Check continuity between heater control panel connector M54 terminal 18 and 13.



Terminals				Condition	Continuity
Heater control panel connector	Terminal No.	Heater control panel connector	Terminal No.		
M54	18	M54	13	Fan control dial: ON (Blower motor operates.)	Yes
				Fan control dial: OFF	No

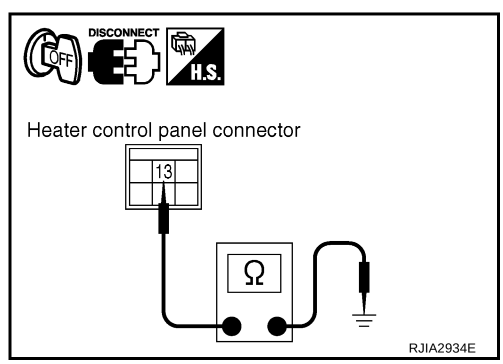
OK or NG

OK >> GO TO 14.
NG >> Replace fan switch.

14. CHECK GROUND CIRCUIT

Check continuity between heater control panel harness connector M54 terminal 13 (B) and ground.

13 – Ground **: Continuity should exist.**



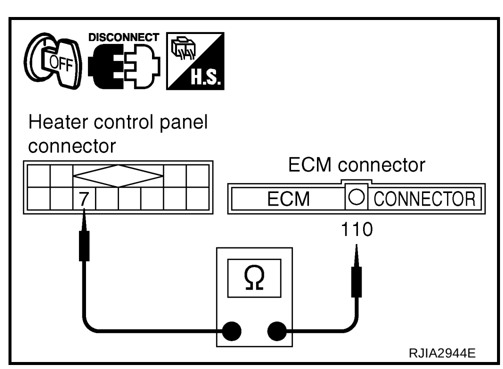
OK or NG

OK >> INSPECTION END
NG >> Repair harness or connector.

15. CHECK CIRCUIT CONTINUITY BETWEEN ECM AND HEATER CONTROL PANEL

1. Turn ignition switch OFF.
2. Disconnect ECM and heater control panel connector.
3. Check continuity between heater control panel harness connector M55 terminal 7 (L/R) and ECM harness connector M118 terminal 110 (L/R).

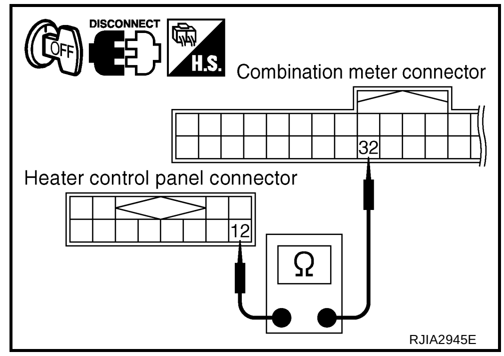
7 – 110 **: Continuity should exist.**



OK or NG

OK >> Replace ECM.
NG >> Repair harness or connector.

16. CHECK CIRCUIT CONTINUITY BETWEEN COMBINATION METER AND HEATER CONTROL PANEL



1. Turn ignition switch OFF.
2. Disconnect combination meter connector and heater control panel connector.
3. Check continuity between heater control panel harness connector M55 terminal 12 (PU) and combination meter harness connector M44 terminal 32 (PU).

12 – 32 : Continuity should exist.

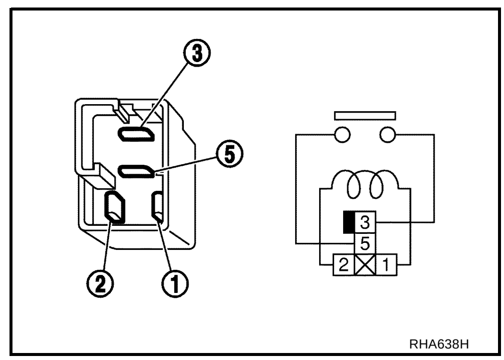
OK or NG

OK >> Replace combination meter.
NG >> Repair harness or connector.

ELECTRICAL COMPONENT INSPECTION

A/C Relay

Check circuit continuity between terminal Nos. 3 and 5.



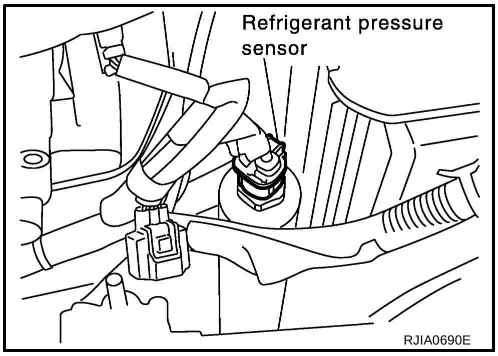
Conditions	Continuity
12V direct current supply between terminal Nos. 1 and 2.	Yes
No current supply.	No

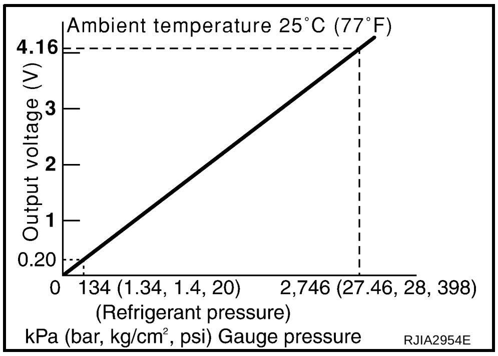
If NG, replace A/C relay.

Refrigerant Pressure Sensor

The refrigerant pressure sensor is attached to the liquid tank.

Make sure that the A/C refrigerant pressure and the sensor output voltage are within the specified range as shown in the A/C operating condition figure. Refer to EC-619, "REFRIGERANT PRESSURE SENSOR" .





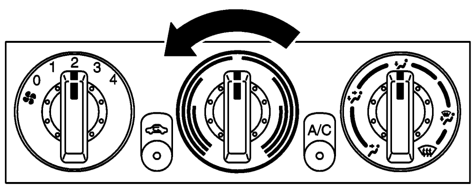
Insufficient Cooling

AJS001MY

SYMPTOM: Insufficient cooling

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK - Temperature decrease

1) Turn temperatre control dial to full cold.
2) Check for cold air at discharge air outlets.

If OK (symptom cannot be duplicated), operform complete operational check. (*1)
If NG (symptom is confirmed), continue the check.

2. Check for any service bulletins.

3. Check compressor belt tension. Refer to (*2), “Checking Drive Belts”.
   - NG → Adjust or replace compressor belt.
   - OK ↓

4. Check air mix door. (*3)
   - NG → Adjust or replace air mix door.
   - OK ↓

5. Check cooling fan motor operation.
   - NG → Refer to (*6).“System Description”.
   - OK ↓

6. Confirm refrigerant purity in supply tank using Recovery/Recycling Recharging equipment and refgerant identifier.
   - NG → Refer to contaminated refrigerant. (*8).
   - OK ↓

7. Connect Recovery/Recycling/Recharging equipment to vehicle. Confirm refrigerant purity in vehicle A/C system using Recovery/ Recycling/Recharging equipment and refrigerant identifier.
   - NG → Refer to contaminated refrigerant. (*8).
   - OK ↓

8. Check for evaporator core freeze up.
   - NG (Freeze up) → Perform Performance Test Diagnosis. Refer to (*7).
   - OK ↓

9. Check refrigeration cycle pressure with manifold gauge connected. Refer to (*4)
   - NG → Perform Performance Test Diagnosis. Refer to (*7).
   - (Does not freeze up.) OK ↓

10. Check ducts for air leaks.
    - NG → Repair air leaks.
    - OK ↓

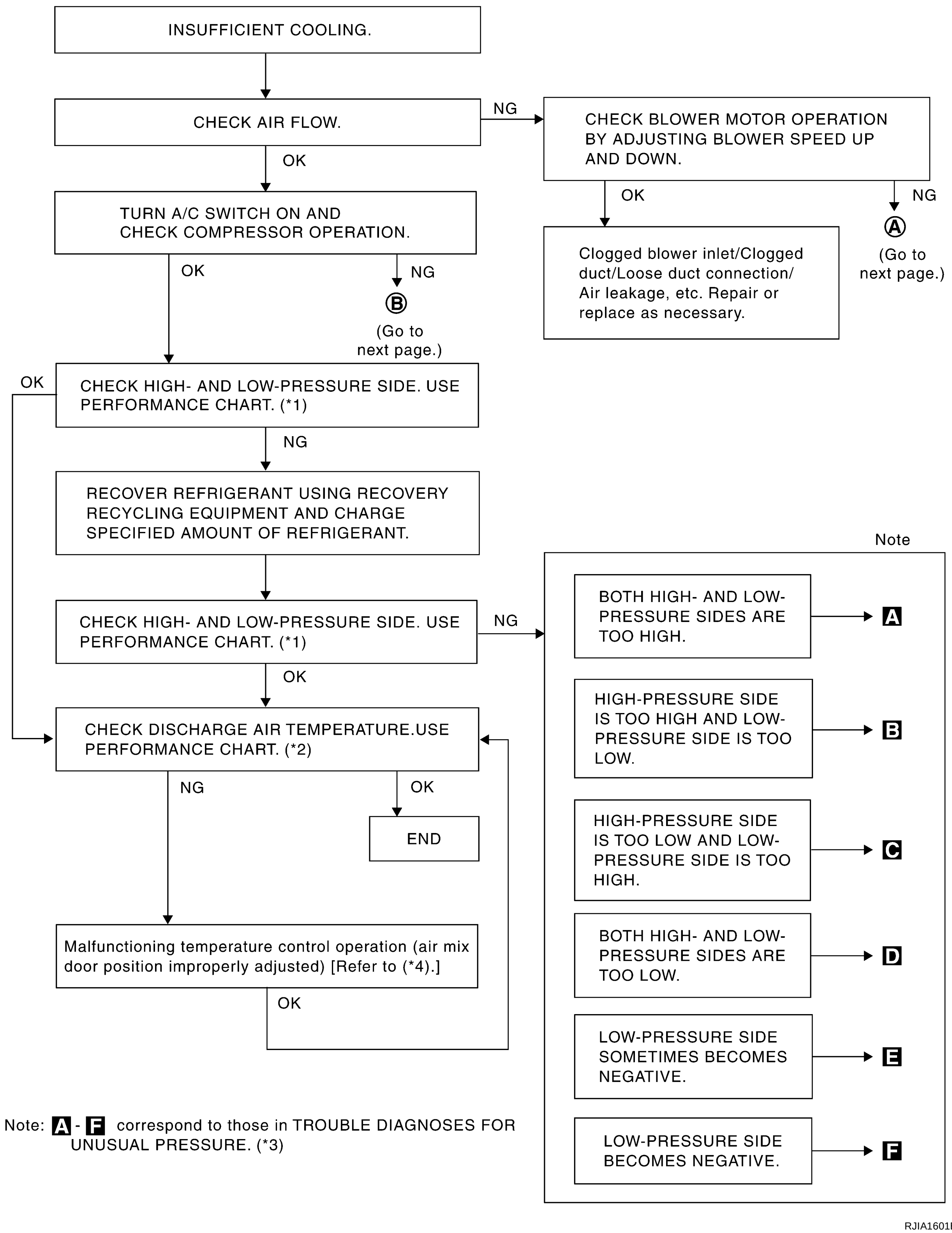
If the symptom still exists, perform a complete operational check (*1) and check for other symptoms. [Refer to symptom table, (*5).] Does another symptom exist?
- YES → Go to Trouble Diagnosis for related symptom. **[Another symptom exists.]**
- NO ↓

INSPECTION END

RJIA3150E

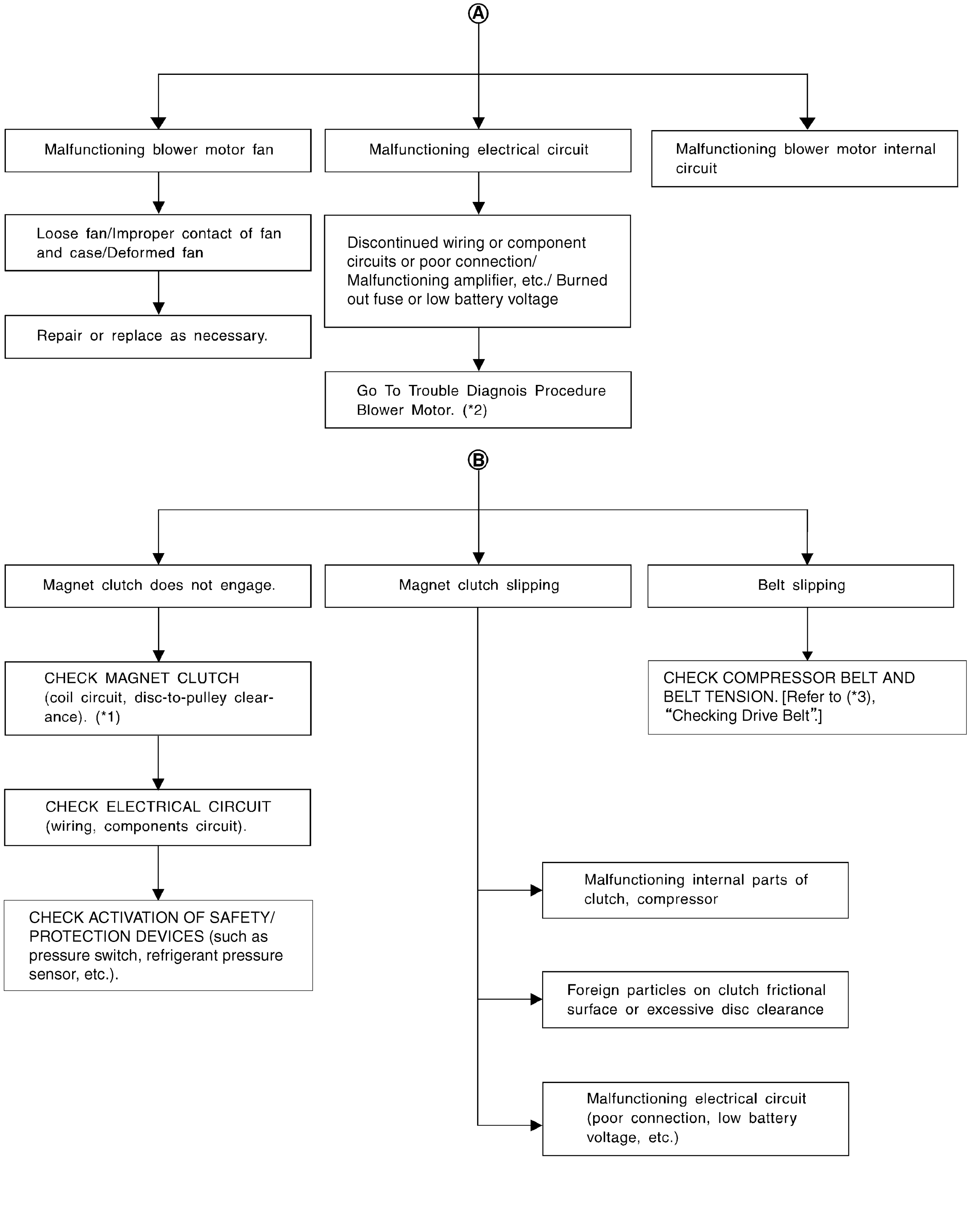
*1 MTC-36, "Operational Check"
*2 EM-11, "Checking Drive Belt"
*3 MTC-39, "Air Mix Door"
*4 MTC-58, "TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE"
*5 MTC-28, "SYMPTOM TABLE"
*6 EC-480, "SYSTEM DESCRIPTION"
*7 MTC-55, "PERFORMANCE TEST DIAGNOSIS"
*8 MTC-5, "CONTAMINATED REFRIG-ERANT"

PERFORMANCE TEST DIAGNOSIS



*1 MTC-57, "PERFORMANCE CHART" *2 MTC-57, "PERFORMANCE CHART" *3 MTC-58, "TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE"

*4 MTC-39, "Air Mix Door"



*1 MTC-84, "Removal and Installation of Compressor Clutch"
*2 MTC-43, "Blower Motor Circuit"
*3 EM-11, "Checking Drive Belt"

PERFORMANCE CHART

Test Condition

Testing must be performed as follows:

Vehicle location	Indoors or in the shade (in a well-ventilated place)
Doors	Closed
Door windows	Open
Hood	Open
TEMP.	Max. COLD
Mode control dial	(Ventilation) set
Recirculation (REC) switch	(Recirculation) set
Fan (blower) speed	Max. speed set
Engine speed	Idle speed
Operate the air conditioning system for 10 minutes before taking measurements.	

Test Reading

Recirculating-to-discharge Air Temperature Table

Inside air (Recirculating air) at blower assembly inlet		Discharge air temperature at center ventilator °C (°F)
Relative humidity %	Air temperature °C (°F)	
50 - 60	25 (77)	10.0 - 11.6 (50 - 53)
	30 (86)	13.9 - 16.2 (57 - 61)
	35 (95)	17.8 - 21.4 (64 - 71)
60 - 70	25 (77)	11.6 - 13.9 (53 - 57)
	30 (86)	16.2 - 18.9 (61- 66)
	35 (95)	21.4 - 24.5 (71 - 76)

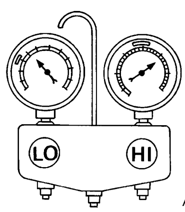
Ambient Air Temperature-to-operating Pressure Table

Ambient air		High-pressure (Discharge side) kPa (kg/cm^2 , psi)	Low-pressure (Suction side) kPa (kg/cm^2 , psi)
Relative humidity %	Air temperature °C (°F)		
50 - 70	30 (86)	980 - 1,180 (9.99 - 12.04, 142 - 171)	230 - 270 (2.35 - 2.75, 33 - 39)
	35 (95)	1,180 - 1,390 (12.04 - 14.18, 171 - 202)	260 - 310 (2.65 - 3.16, 38 - 45)
	40 (104)	1,400 - 1,580 (14.28 - 16.12, 203 - 229)	300 - 350 (3.06 - 3.57, 44 - 51)

TROUBLE DIAGNOSIS FOR UNUSUAL PRESSURE

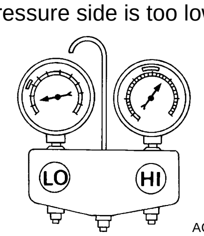
Whenever system’s high and/or low side pressure(s) is/are unusual, diagnose using a manifold gauge. The marker above the gauge scale in the following tables indicates the standard (usual) pressure range. Since the standard (usual) pressure, however, differs from vehicle to vehicle, refer to above table (Ambient air temperature-to-operating pressure table).

Both High and Low-pressure Sides are Too High

<table>
<tr><th>Gauge indication</th><th>Refrigerant cycle</th><th>Probable cause</th><th>Corrective action</th></tr>
<tr><td rowspan="5">Both high- and low-pressure sides are too high.


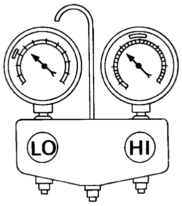
AC359A</td><td>Pressure is reduced soon after water is splashed on condenser.</td><td>Excessive refrigerant charge in refrigeration cycle</td><td>Reduce refrigerant until specified pressure is obtained.</td></tr>
<tr><td>Air suction by cooling fan is insufficient.</td><td>Insufficient condenser cooling performance
↓
1. Condenser fins are clogged.
2. Improper fan rotation of cooling fan</td><td>● Clean condenser.
● Check and repair cooling fan as necessary.</td></tr>
<tr><td>● Low-pressure pipe is not cold.
● When compressor is stopped high-pressure value quickly drops by approximately 196 kPa (2 kg/cm^2 , 28 psi). It then decreases gradually thereafter.</td><td>Poor heat exchange in condenser
(After compressor operation stops, high-pressure decreases too slowly.)
↓
Air in refrigeration cycle</td><td>Evacuate repeatedly and recharge system.</td></tr>
<tr><td>Engine tends to overheat.</td><td>Engine cooling systems malfunction.</td><td>Check and repair each engine cooling system.</td></tr>
<tr><td>● An area of the low-pressure pipe is colder than areas near the evaporator outlet.
● Plates are sometimes covered with frost.</td><td>● Excessive liquid refrigerant on low-pressure side
● Excessive refrigerant discharge flow
● Expansion valve is open a little compared with the specification.
↓
Improper expansion valve installation</td><td>Replace expansion valve.</td></tr>
</table>

High-pressure Side is Too High and Low-pressure Side is Too Low

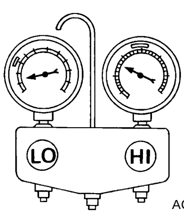
<table>
<tr><th>Gauge indication</th><th>Refrigerant cycle</th><th>Probable cause</th><th>Corrective action</th></tr>
<tr><td>High-pressure side is too high and low-pressure side is too low.


AC360A</td><td>Upper side of condenser and high-pressure side are hot, however, liquid tank is not so hot.</td><td>High-pressure tube or parts located between compressor and condenser are clogged or crushed.</td><td>● Check and repair or replace malfunctioning parts.
● Check lubricant for contamination.</td></tr>
</table>

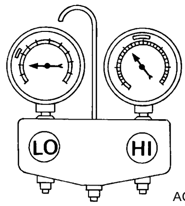
High-pressure Side is Too Low and Low-pressure Side is Too High

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
High-pressure side is too low and low-pressure side is too high.  AC356A	High- and low-pressure sides become equal soon after compressor operation stops.	Compressor pressure operation is improper. ↓ Damaged inside compressor packings	Replace compressor.
	No temperature difference between high- and low-pressure sides	Compressor pressure operation is improper. ↓ Damaged inside compressor packings.	Replace compressor.

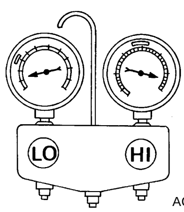
Both High and Low-pressure Sides are Too Low

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Both high- and low-pressure sides are too low.  AC353A	● There is a big temperature difference between liquid tank outlet and inlet. Outlet temperature is extremely low. ● Liquid tank inlet and expansion valve are frosted.	Liquid tank inside is slightly clogged.	● Replace liquid tank. ● Check lubricant for contamination.
	● Temperature of expansion valve inlet is extremely low as compared with areas near liquid tank. ● Expansion valve inlet may be frosted. ● Temperature difference occurs somewhere in high-pressure side.	High-pressure pipe located between liquid tank and expansion valve is clogged.	● Check and repair malfunctioning parts. ● Check lubricant for contamination.
	Expansion valve and liquid tank are warm or only cool when touched.	Low refrigerant charge ↓ Leaking fittings or components	Check refrigerant for leaks. Refer to MTC-92, "Checking for Refrigerant Leaks" .
	There is a big temperature difference between expansion valve inlet and outlet while the valve itself is frosted.	Expansion valve closes a little compared with the specification. ↓ 1. Improper expansion valve adjustment 2. Malfunctioning expansion valve 3. Outlet and inlet may be clogged.	● Remove foreign particles by using compressed air. ● Replace expansion valve. ● Check lubricant for contamination.
	An area of the low-pressure pipe is colder than areas near the evaporator outlet.	Low-pressure pipe is clogged or crushed.	● Check and repair malfunctioning parts. ● Check lubricant for contamination.
	Air flow volume is not enough or is too low.	Evaporator is frozen.	● Replace compressor. ● Repair evaporator fins. ● Replace evaporator. ● Refer to MTC-43, "Blower Motor Circuit" .

Low-pressure Side Sometimes Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side sometimes becomes negative.  AC354A	● Air conditioning system does not function and does not cyclically cool the compartment air. ● The system constantly functions for a certain period of time after compressor is stopped and restarted.	Refrigerant does not discharge cyclically. ↓ Moisture is frozen at expansion valve outlet and inlet. ↓ Water is mixed with refrigerant.	● Drain water from refrigerant or replace refrigerant. ● Replace liquid tank.

Low-pressure Side Becomes Negative

Gauge indication	Refrigerant cycle	Probable cause	Corrective action
Low-pressure side becomes negative.  AC362A	Liquid tank or front/rear side of expansion valve's pipe is frosted or dewed.	High-pressure side is closed and refrigerant does not flow. ↓ Expansion valve or liquid tank is frosted.	Leave the system at rest until no frost is present. Start it again to check whether or not the malfunction is caused by water or foreign particles. ● If water is the cause, initially cooling is okay. Then the water freezes causing a blockage. Drain water from refrigerant or replace refrigerant. ● If due to foreign particles, remove expansion valve and remove the particles with dry and compressed air (not shop air). ● If either of the above methods cannot correct the malfunction, replace expansion valve. ● Replace liquid tank. ● Check lubricant for contamination.

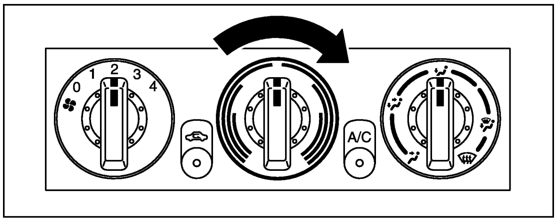
Insufficient Heating

AJS001MZ

SYMPTOM: Insufficient heating

INSPECTION FLOW

1. Confirm symptom by performing the following operational check.



OPERATIONAL CHECK – Temperature increase

1) Turn temperature control dial to full hot.
2) Check for hot air at discharge air outlets.

If OK (symptom cannot be duplicated), perform complete operational check. (*1)
If NG (symptom is confirmed), continue the check.

2. Check for any service bulletins.

3. Check the following:
- Engine coolant level [Refer to (*2), “Changing Engine Coolant”.]
- Hoses for leaks or kinks.
- Radiator cap. Refer to (*3), “System Check”.
- Air in cooling system.

NG → Repair/replace if necessary.

OK

4. Visually inspect air mix door.
   Access by removing instrument panel.

NG → Adjust or replace air mix door.

OK

5. Check ducts for air leaks.

NG → Repair leaks.

OK

6. Check the heater inlet and outlet hose temperatures by touching.

Hot inlet
Warm outlet → Check water temperature sensor or thermostat (*4)

NG

OK → System OK

Both hoses warm → Check heater hoses for proper installation. → Repair or replace if necessary. Retest.

OK

Note

Back flush heater core, drain and refill coolant.
[Refer to (*2), “Charging Engine Coolant”.] Retest.

Hot inlet
Warm outlet → System OK

Both hoses warm → Refill engine coolant.
[Refer to (*2) "Changing Engine Coolant".] Retest.

Hot inlet
Warm outlet → System OK

If the symptom still exist, perform a complete operational check (*1) and check for other symptoms.
[Refer to symptom table, (*5).] Does another symptom exist?

YES → Go to Trouble Diagnosis for related symptom.

[Another symptom exists.]

RJIA3151E

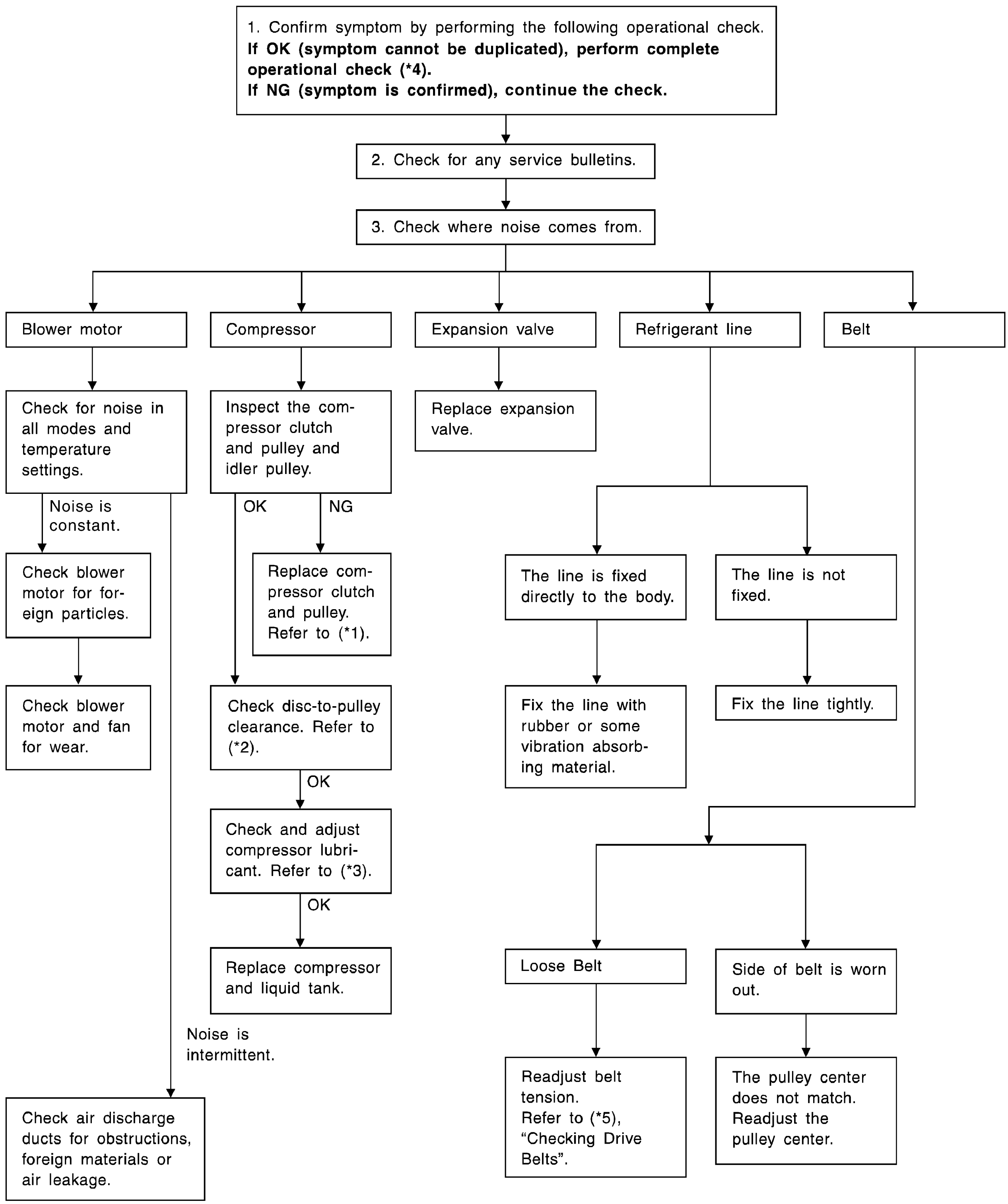
*1 MTC-36, "Operational Check"
*2 CO-8, "Changing Engine Coolant"
*3 CO-12, "Checking Radiator Cap"
*4 EC-205, "DTC P0117, P0118 ECT SENSOR" and CO-22, "THERMOSTAT AND WATER CONTROL VALVE" .
*5 MTC-28, "SYMPTOM TABLE"

Noise

AJS001N0

SYMPTOM: Noise

INSPECTION FLOW



RJIA3152E

*1 Compressor clutch, MTC-84, "REMOVAL" .

*2 Compressor clutch, MTC-84, "REMOVAL" .

*3 MTC-22, "Maintenance of Lubricant Quantity in Compressor"

*4 MTC-36, "Operational Check"

*5 EM-11, "Checking Drive Belt"

CONTROLLER

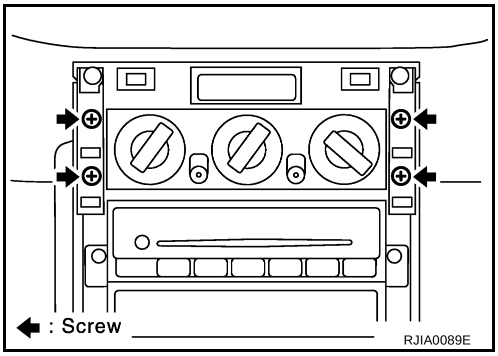
PFP:27500

Removal and Installation

AJS001N1

REMOVAL

1. Remove mode door cable and air mix door cable from heater unit.
2. Remove cluster lid C. Refer to IP-11, "Removal and Installation" .
3. Remove mounting screws from heater control panel.
4. Remove heater control panel, and then remove heater control panel connector.

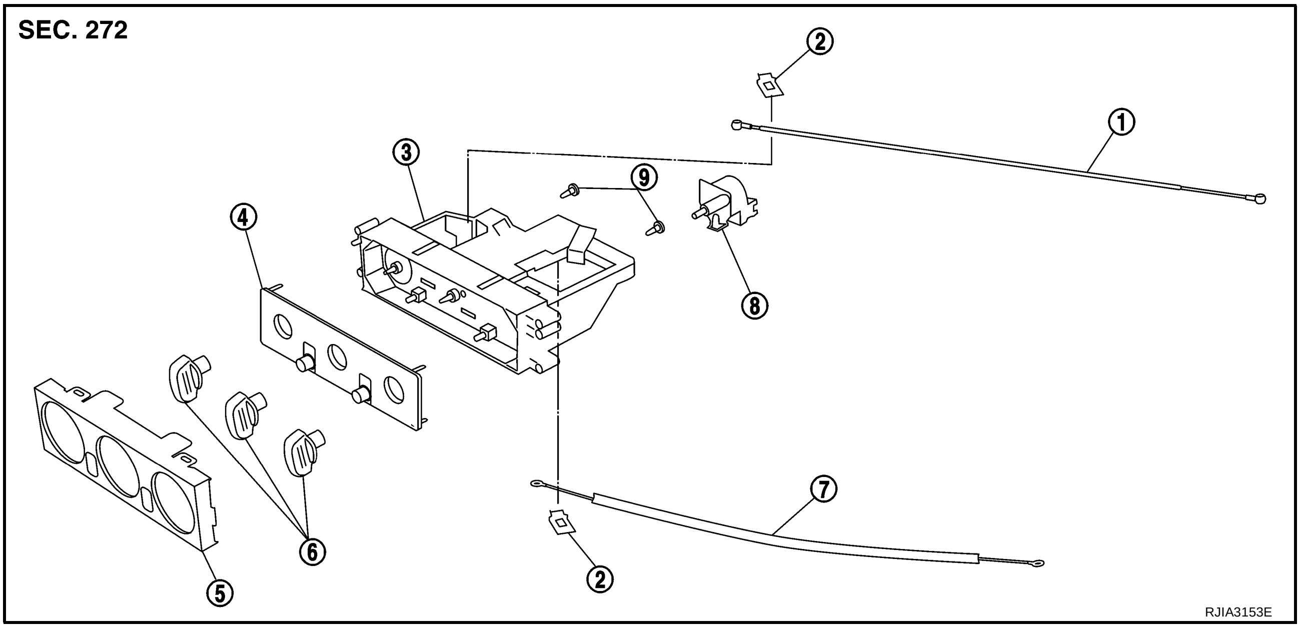


INSTALLATION

Installation is basically the reverse order of removal.

Disassembly and Assembly

AJS001N2



1. Mode door cable	2. Clamp	3. Case assembly
4. Heater panel	5. Finisher	6. Dial
7. Air mix door cable	8. Fan switch	9. Bulb

BLOWER UNIT

PFP:27200

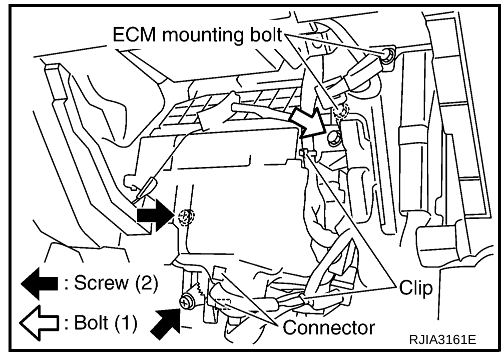
Removal and Installation

AJS001N3

REMOVAL

1. Remove glove box assembly.
2. Remove glove box cover, instrument passenger lower panel and instrument reinforcement. Refer to IP-11, "Removal and Installation" .
3. Remove ECM with ECM bracket attached.
4. Remove instrument panel mounting screw.
5. Remove blower unit mounting bolt and screw.
6. Disconnect blower motor connector and fan resistor connector.
7. Disconnect intake door motor connector and harness clips.
8. Remove blower unit.

   CAUTION:
   Slide the blower unit toward the right, remove location pins (2 parts), then move it downward.



INSTALLATION

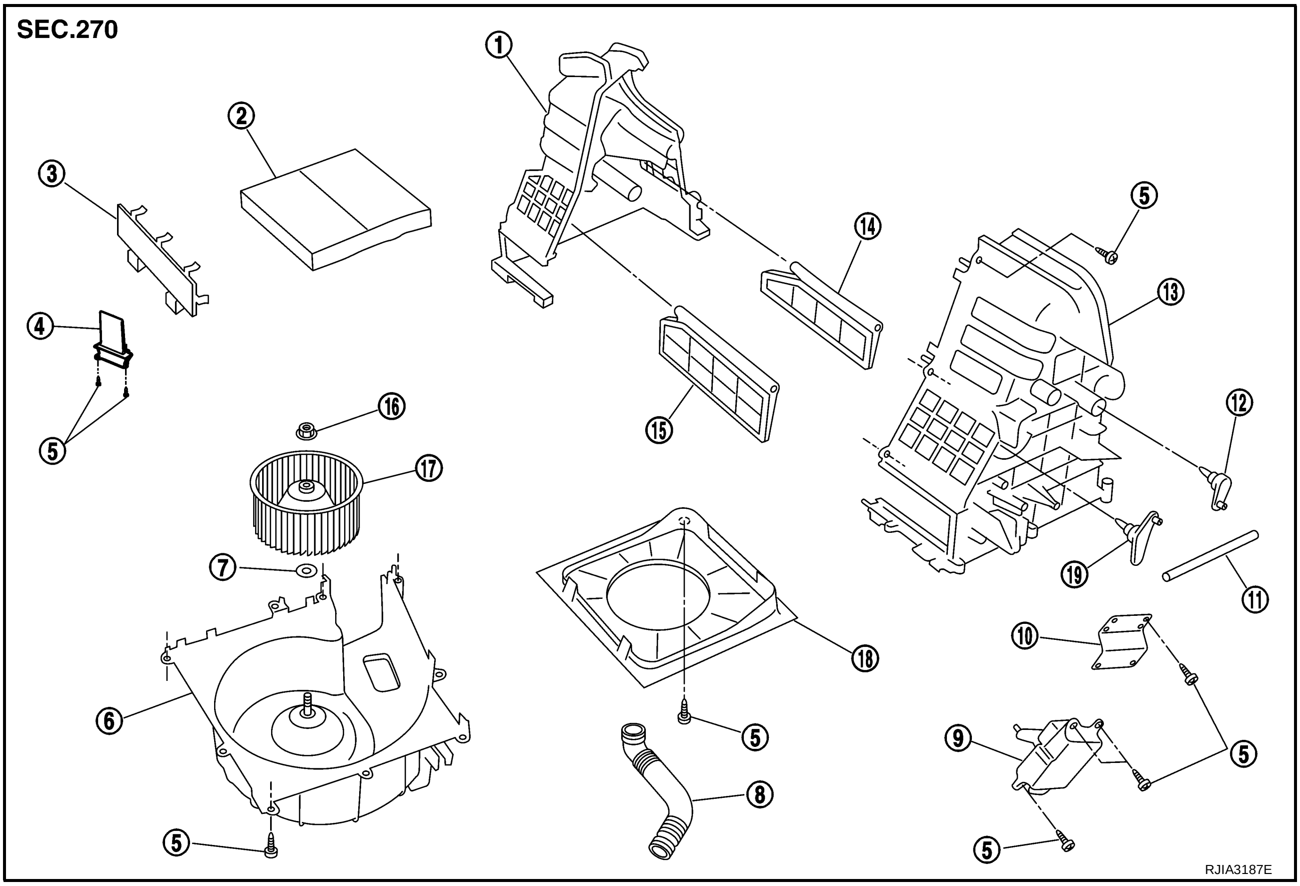
Installation is basically the reverse order of removal.

CAUTION:

- **Make sure location pins (2 parts) are securely installed.**

Disassembly and Assembly

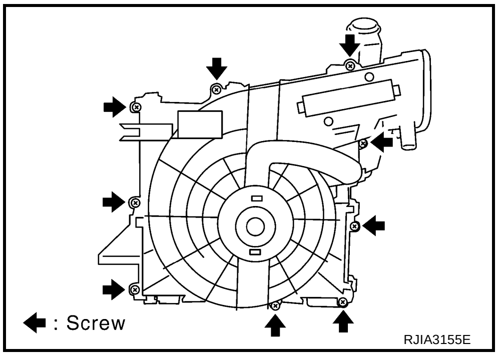
AJS001N4



1. Upper case 2	2. In-cabin microfilter	3. Filter cover
4. Fan resistor	5. Screw	6. Blower fan motor assembly
7. Washer	8. Cooling hose	9. Intake door motor
10. Motor bracket	11. Intake door link	12. Intake door lever 2
13. Upper case 1	14. Intake door 2	15. Intake door 1
16. Nut	17. Blower fan	18. Bell mouth
19. Intake door lever 1		

CAUTION:

If retaining tabs are damaged while disassembling blower unit, use 9 screws (27111-2Y000) to assemble blower unit.



BLOWER MOTOR

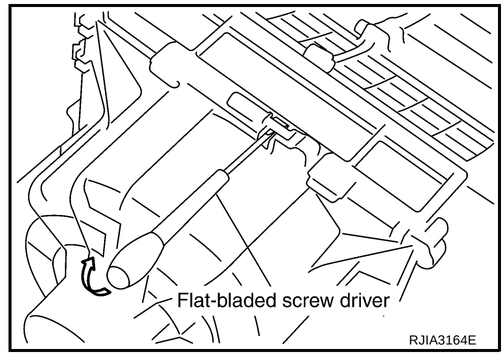
PFP:27226

Removal and Installation

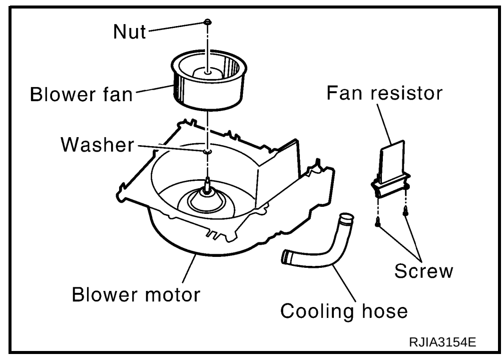
AJS001N5

REMOVAL

1. Remove blower unit. Refer to MTC-64, "BLOWER UNIT" .
2. Separate blower unit.



3. Remove cooling hose, blower fan resistor and blower fan.

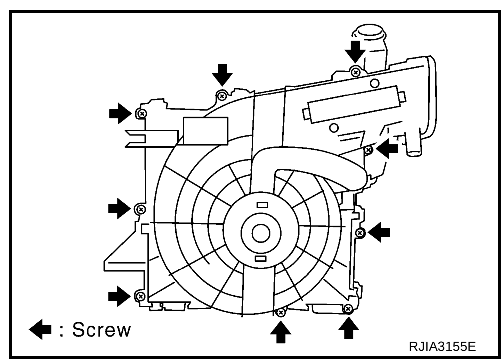


INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

If retaining tabs are damaged while disassembling blower unit, use 9 screws (27111-2Y000) to assemble blower unit.



INTAKE DOOR MOTOR

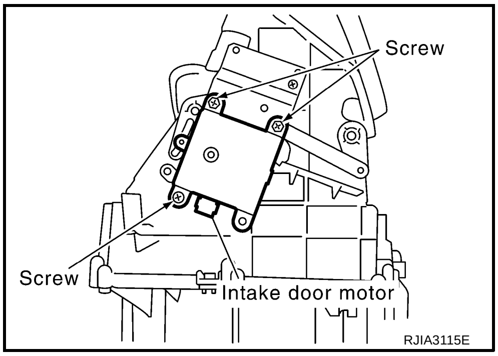
PFP:27730

Removal and Installation

AJS001N7

REMOVAL

1. Remove blower unit. Refer to MTC-64, "BLOWER UNIT" .
2. Remove mounting screws, and then remove intake door motor from blower unit.



INSTALLATION

Installation is basically the reverse order of removal.

BLOWER FAN RESISTOR

PFP:27150

Removal and Installation

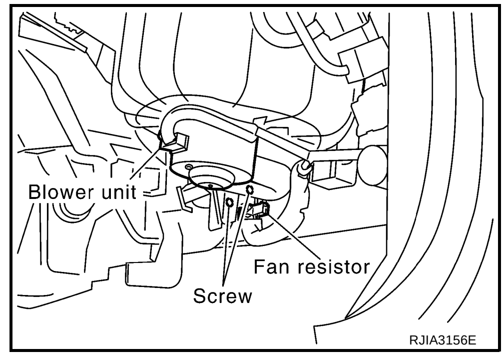
AJS001N6

REMOVAL

1. Remove glove box cover. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then remove fan resistor.

   CAUTION:

   Do not repair the thermal fuse of the fan resistor.



INSTALLATION

Installation is basically the reverse order of removal.

IN-CABIN MICROFILTER

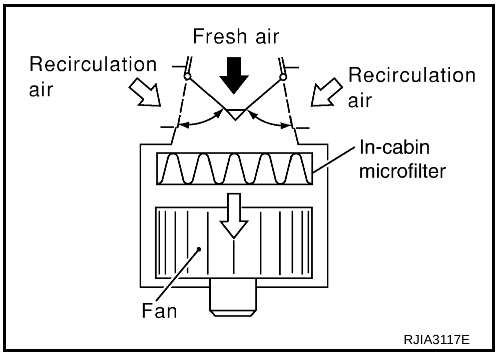
PFP:27277

Removal and Installation

AJS001N8

FUNCTION

Air inside passenger compartment is kept clean at either recirculation or fresh mode by installing in-cabin microfilter into blower unit.

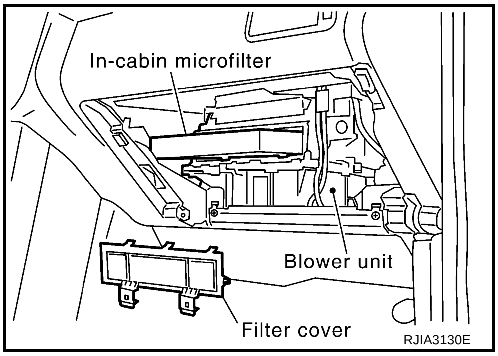


REPLACEMENT TIMING

Replace in-cabin microfilter.
Refer to MA-8, "CHASSIS AND BODY MAINTENANCE" in Schedule 1 and MA-9, "CHASSIS AND BODY MAINTENANCE" Schedule 2.
Caution label is fixed inside glove box.

REPLACEMENT PROCEDURES

1. Remove glove box. Refer to IP-11, "Removal and Installation" .
2. Remove filter cover.
3. Take out in-cabin microfilter from blower unit.
4. Replace with new one and reinstall on blower unit.
5. Reinstall glove box.



HEATER & COOLING UNIT ASSEMBLY

PFP:27110

Removal and Installation

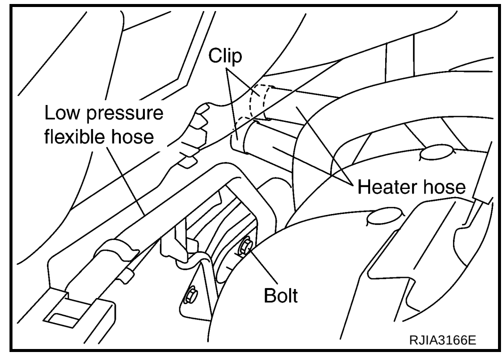
AJS001N9

REMOVAL

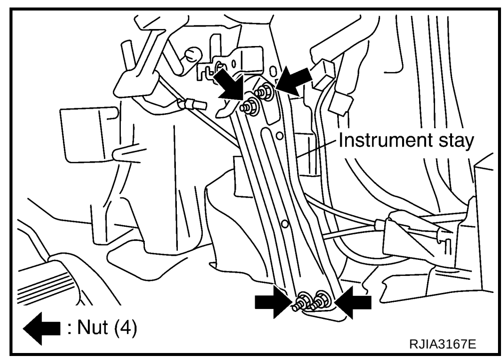
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Drain coolant from cooling system. Refer to CO-8, "Changing Engine Coolant" .
3. Disconnect two heater hoses from heater core pipe.
4. Remove mounting bolt from low-pressure flexible hose.

   CAUTION:

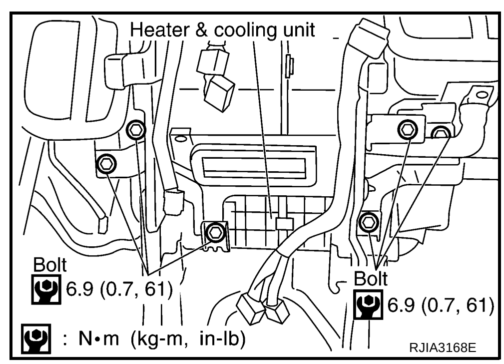
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



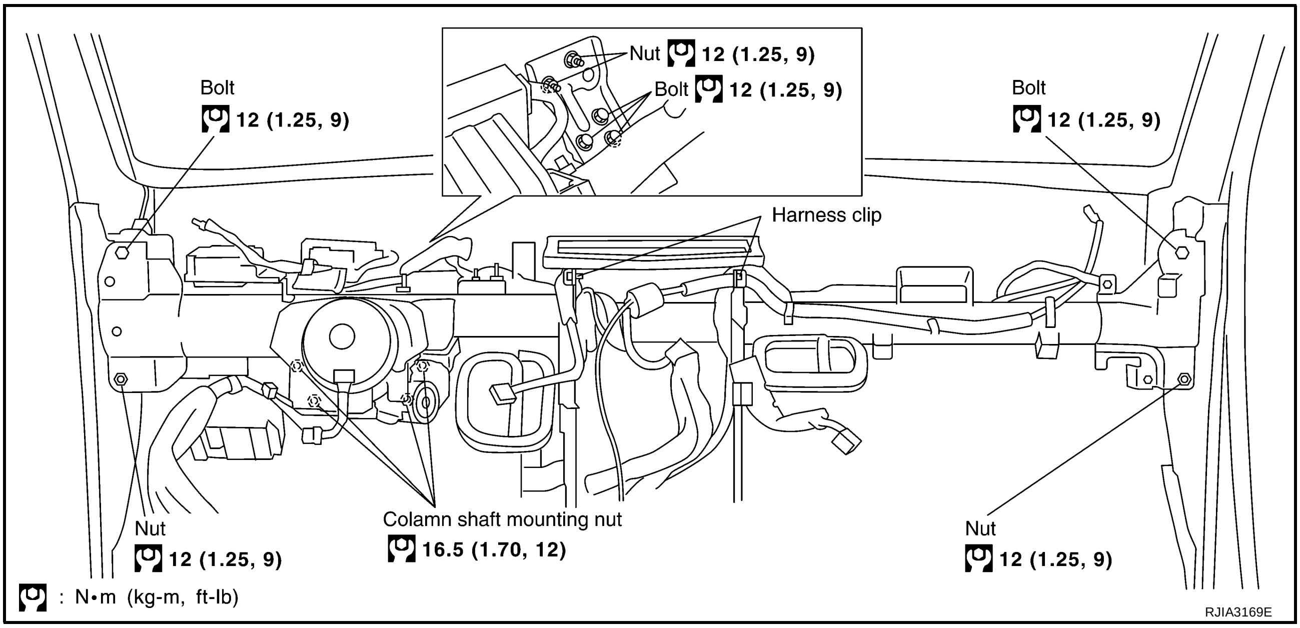
5. Remove blower unit. Refer to MTC-64, "BLOWER UNIT" .
6. Remove clips of vehicle harness from steering member.
7. Remove mounting nuts, and then remove instrument stay.



8. Remove mounting bolts from heater & cooling unit.



9. Remove steering member.



10. Remove heater & cooling unit.

    CAUTION:

    Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.

INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

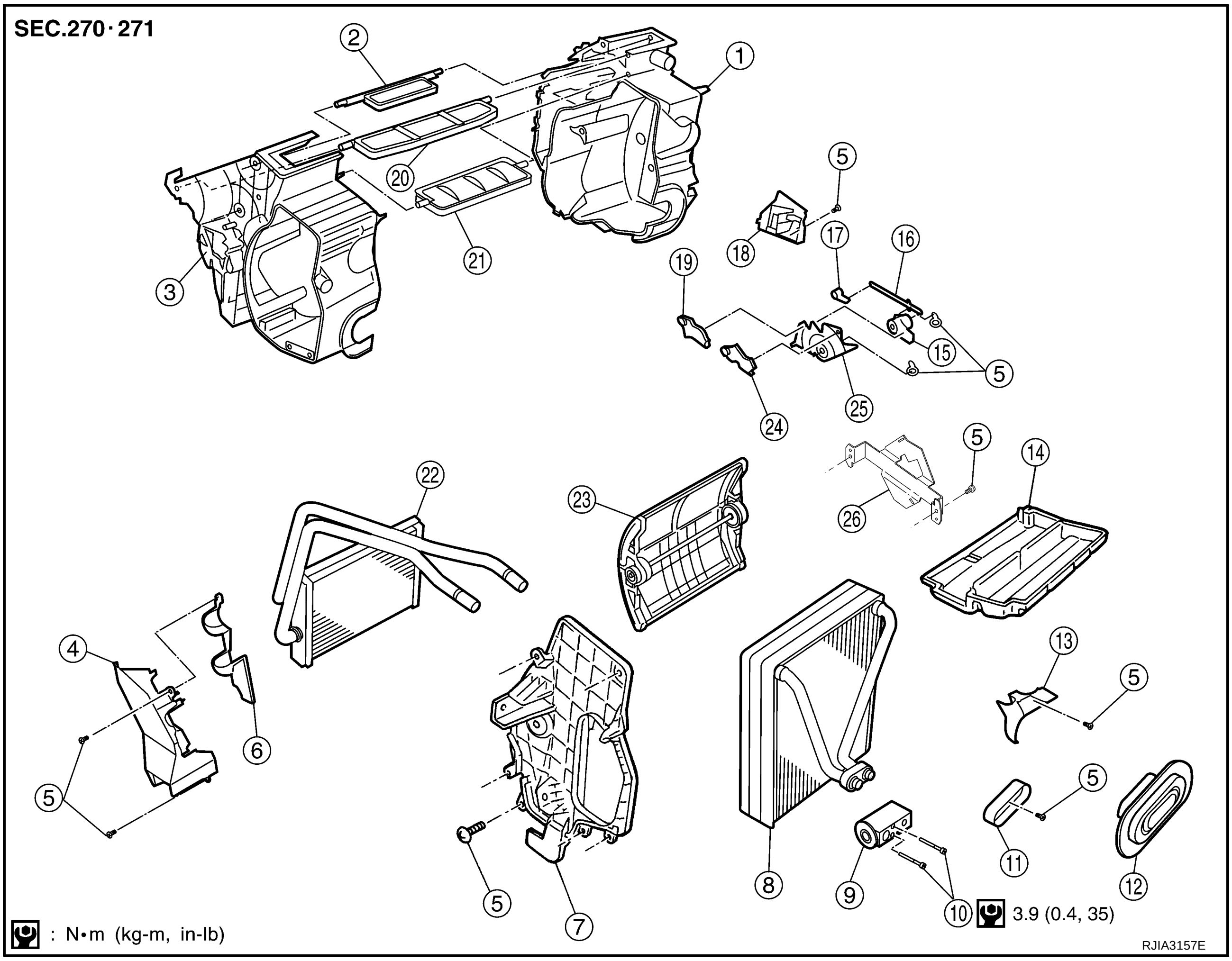
- **Replace O-rings of low-pressure flexible hose and the high-pressure pipe with a new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

NOTE:

When filling radiator with coolant, refer to CO-8, "Changing Engine Coolant" .

Disassembly and Assembly

AJS001NA



1.	Heater & cooling unit case (left)	2.	Defroster door	3.	Heater & cooling unit case (right)
4.	Foot duct (right)	5.	Screw	6.	Heater core cover
7.	Evaporator cover	8.	Evaporator	9.	Expansion valve
10.	Bolt	11.	Expansion valve cover	12.	Cooler grommet
13.	Heater pipe support	14.	Insulator	15.	Ventilator door link 2
16.	Ventilator door link 1	17.	Ventilator door lever	18.	Foot duct (left)
19.	Defroster door lever	20.	Ventilator door	21.	Max. cool door
22.	Heater core	23.	Slide door unit (Air mix door)	24.	Max. cool door lever
25.	Main link	26.	Harness bracket		

MODE DOOR

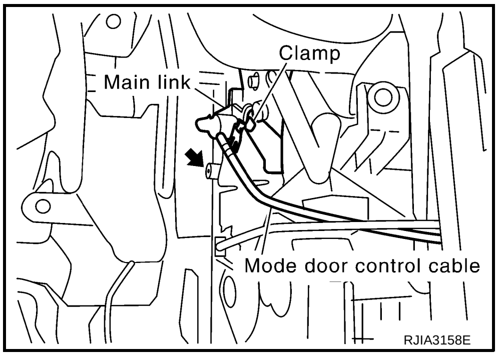
PFP:27181

Control Linkage Adjustment

AJS001NC

MODE DOOR CONTROL CABLE

1. Turn the mode control dial to VENT position.
2. Move side link by hand and hold mode door in VENT position.
3. Pull on the cable cover in the direction of the arrow, and then clamp it.



NOTE:
After positioning control cable, make sure it operates properly.

AIR MIX DOOR

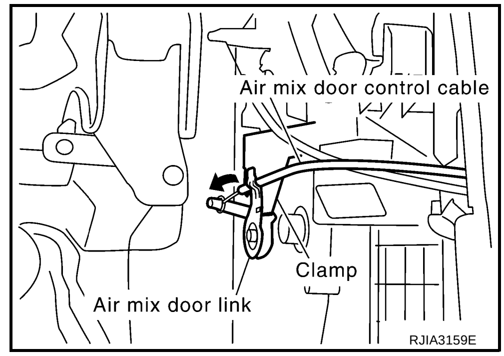
PFP:27180

Control Linkage Adjustment

AJS001ND

AIR MIX DOOR CONTROL CABLE

1. Turn the temperature control dial to full cold position.
2. Move air mix door lever by hand and hold it at the full cold position.
3. Pull on the cable cover in the direction of the arrow, and then clamp it.



NOTE:
After positioning control cable, make sure it operates properly.

HEATER CORE

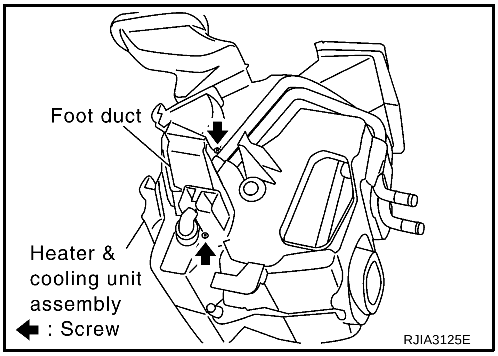
PFP:27140

Removal and Installation

AJS001NB

REMOVAL

1. Remove heater & cooling unit assembly. Refer to MTC-70, "HEATER & COOLING UNIT ASSEMBLY" .
2. Remove heater pipe support.
3. Remove mounting screws, and then remove foot duct and heater core cover.
4. Remove heater core from heater & cooling unit assembly.



INSTALLATION

Installation is basically the reverse order of removal.

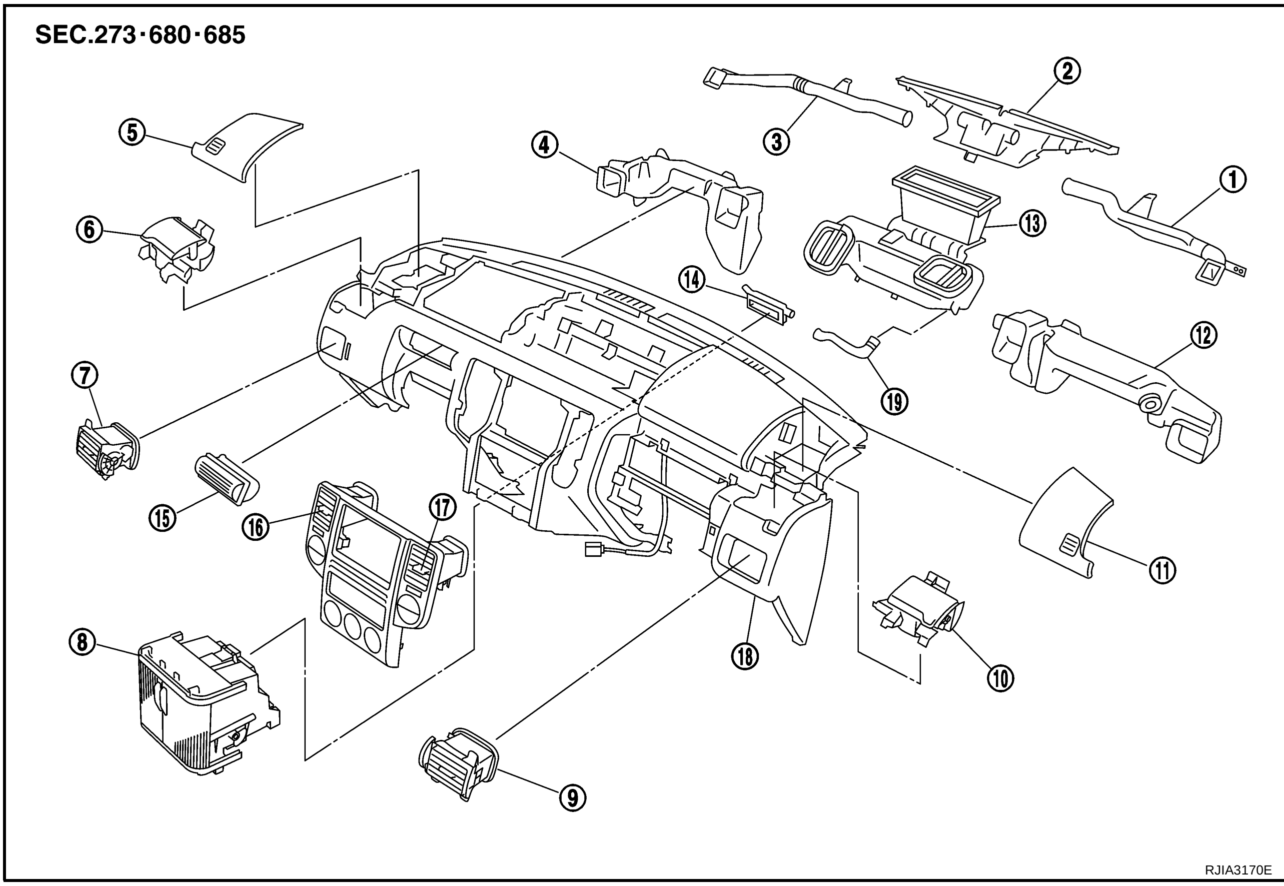
DUCTS AND GRILLES

PFP:27860

Removal and Installation

AJS001NE

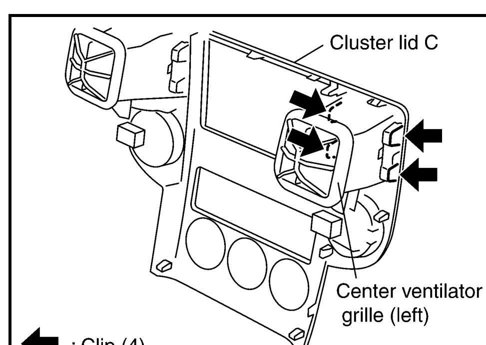
REMOVAL



1. Side defroster duct (right)	2. Defroster nozzle	3. Side defroster duct (left)
4. Side ventilator duct (left)	5. Front speaker grille (left)	6. Cup holder (left)
7. Side ventilator grille (left)	8. Multi-box (Instrument center lower panel)	9. Side ventilator grille (right)
10. Cup holder (right)	11. Front speaker grille (right)	12. Side ventilator duct (right)
13. Adaptor	14. Multi-box duct 2	15. Driver ventilator grille
16. Center ventilator grille (left)	17. Center ventilator grille (right)	18. Instrument panel
19. Multi-box duct 1		

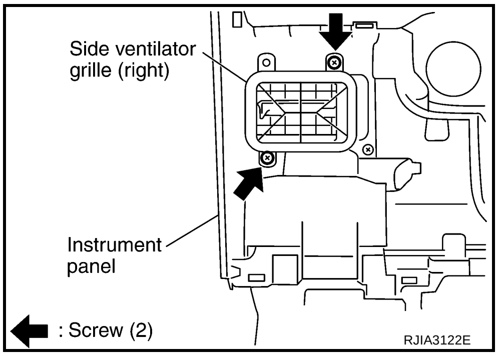
Removal of Center Ventilator Grille

1. Remove cluster lid C. Refer to IP-11, "Removal and Installation" .
2. Remove mounting clips, and then remove center ventilator grille.



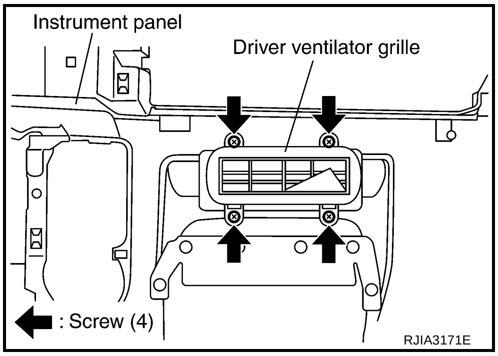
Removal of Side Ventilator Grille

1. Remove instrument panel. Refer to IP-11, "Removal and Installation" .
2. Remove side ventilator ducts. Refer to MTC-77, "Removal of Defroster Nozzle, Duct and Side Ventilator Duct" .
3. Remove mounting screws, and then remove side ventilator grille.



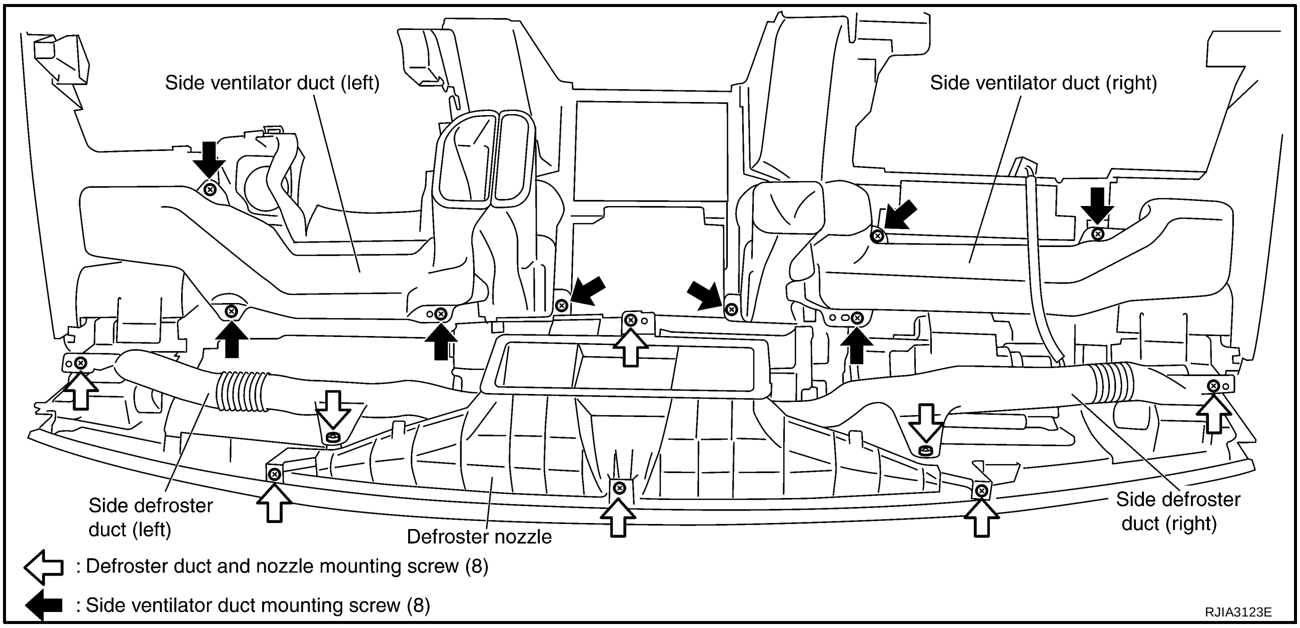
Removal of Driver Ventilator Grille

1. Remove instrument finisher. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then remove driver ventilator grille.



Removal of Defroster Nozzle, Duct and Side Ventilator Duct

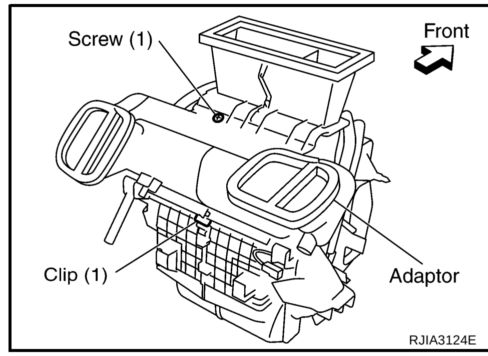
1. Remove instrument panel. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then remove side defroster ducts with defroster nozzle.



3. Remove mounting screws, and then remove side ventilator ducts.

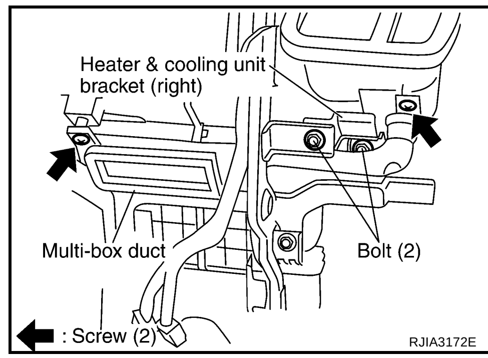
Removal of Adaptor

1. Remove heater & cooling unit assembly. Refer to MTC-70, "HEATER & COOLING UNIT ASSEMBLY" .
2. Remove mounting screw and clip.
3. Slide adaptor toward vehicle front, and then remove adaptor.



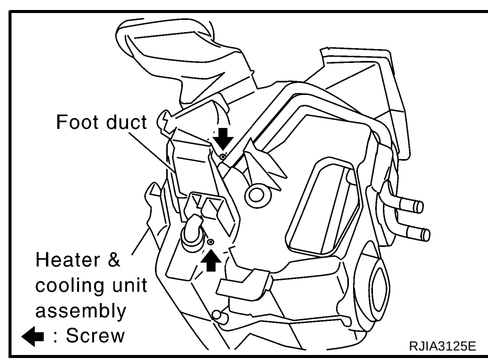
Removal of Multi-Box Duct

1. Remove instrument panel. Refer to IP-11, "Removal and Installation" .
2. Remove mounting screws, and then disconnect multi-box duct from heater & cooling unit assembly.
3. Remove mounting bolts, and then remove heater & cooling unit bracket.
4. Remove multi-box duct from passenger side.



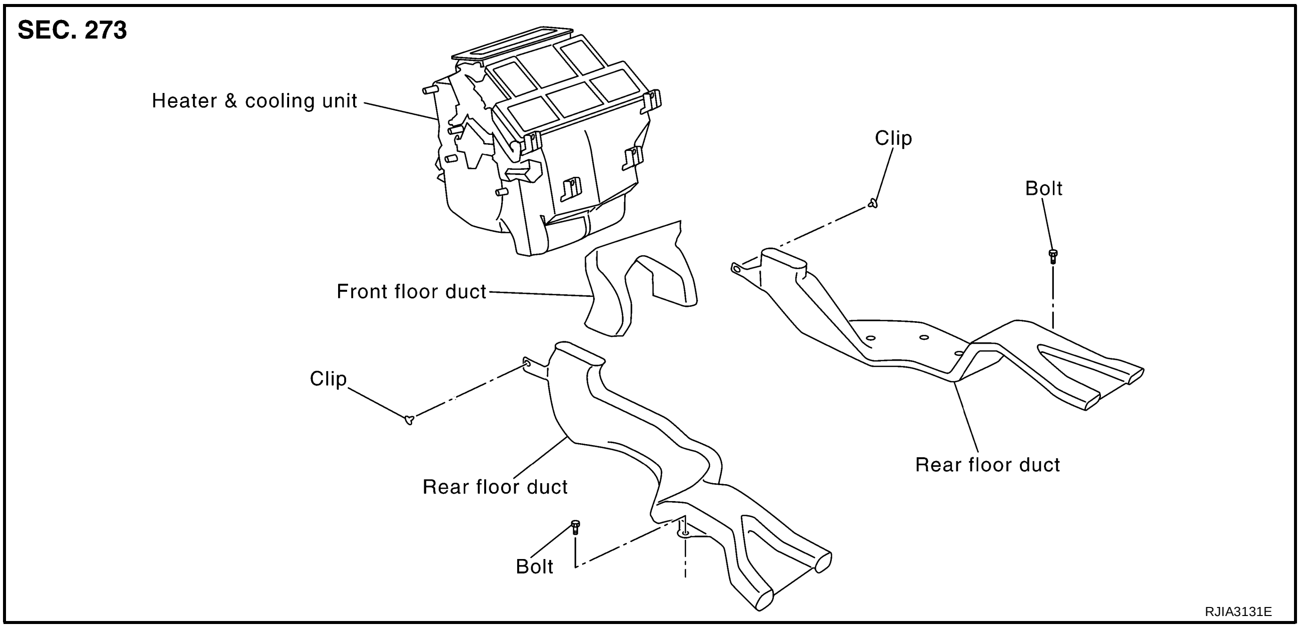
Removal of Foot Duct

1. Remove multi-box duct.
2. Remove mounting screws, and then remove foot duct.

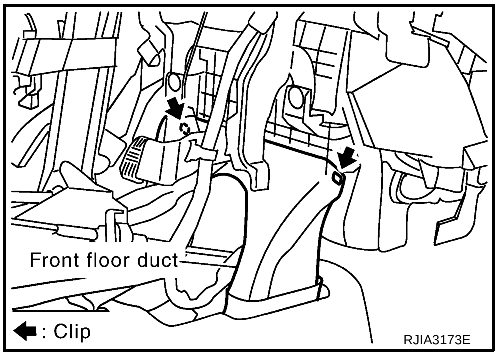


Removal of Floor Duct

1. Remove the front seats. Refer to SE-17, "FRONT SEAT" .
2. Remove multi-box (Instrument center lower panel). Refer to IP-11, "Removal and Installation" .
3. Peel back the floor trim to a point where the floor duct is visible.
4. Remove mounting bolt and clip, and then remove rear floor duct.



5. Remove mounting clips, and then remove front floor duct.



INSTALLATION

Installation is basically the reverse order of removal.

REFRIGERANT LINES

PFP:92600

HFC-134a (R-134a) Service Procedure

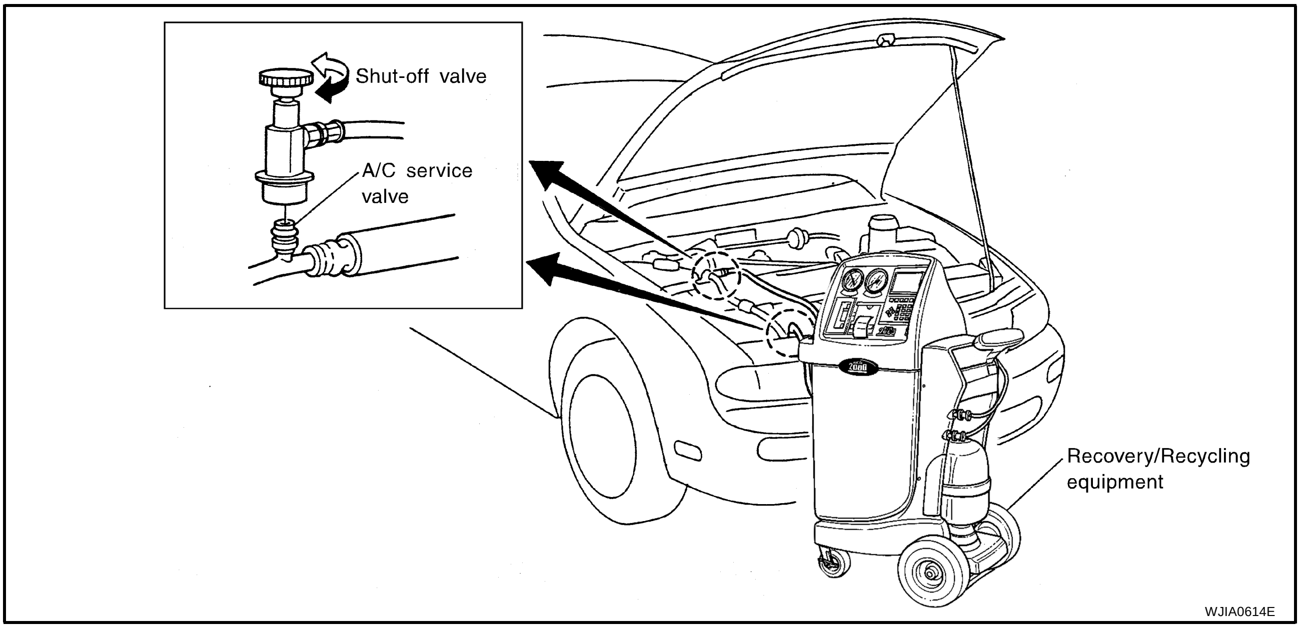
AJS001NF

SETTING OF SERVICE TOOLS AND EQUIPMENT

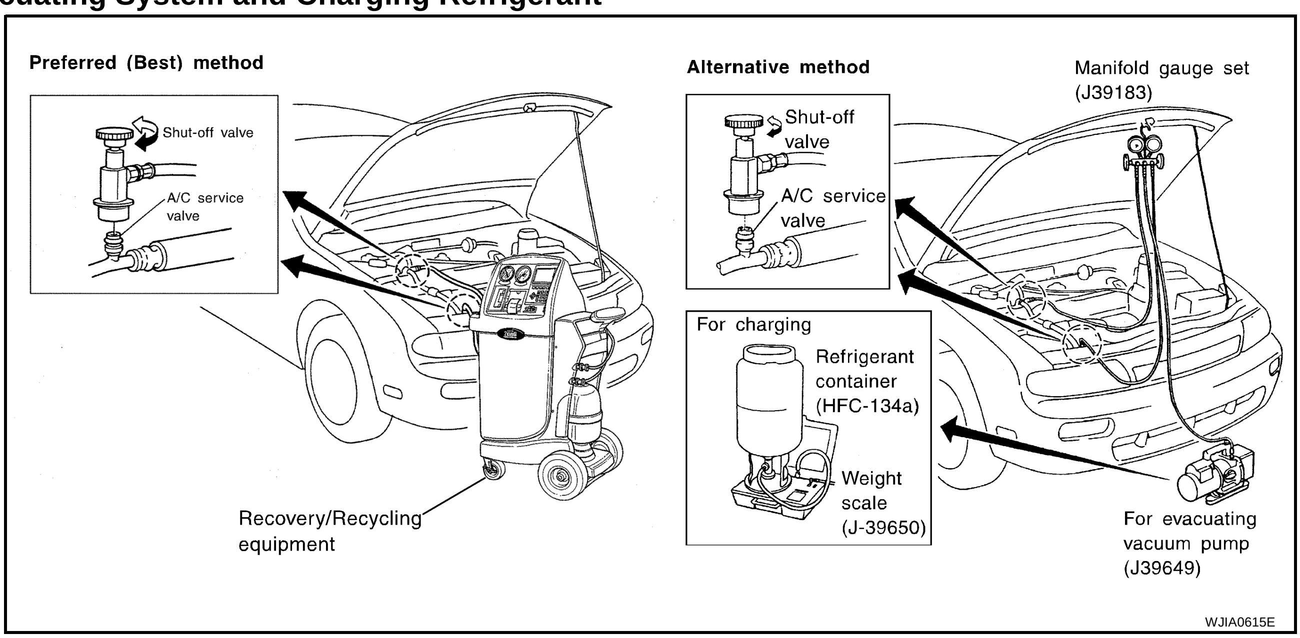
Discharging Refrigerant

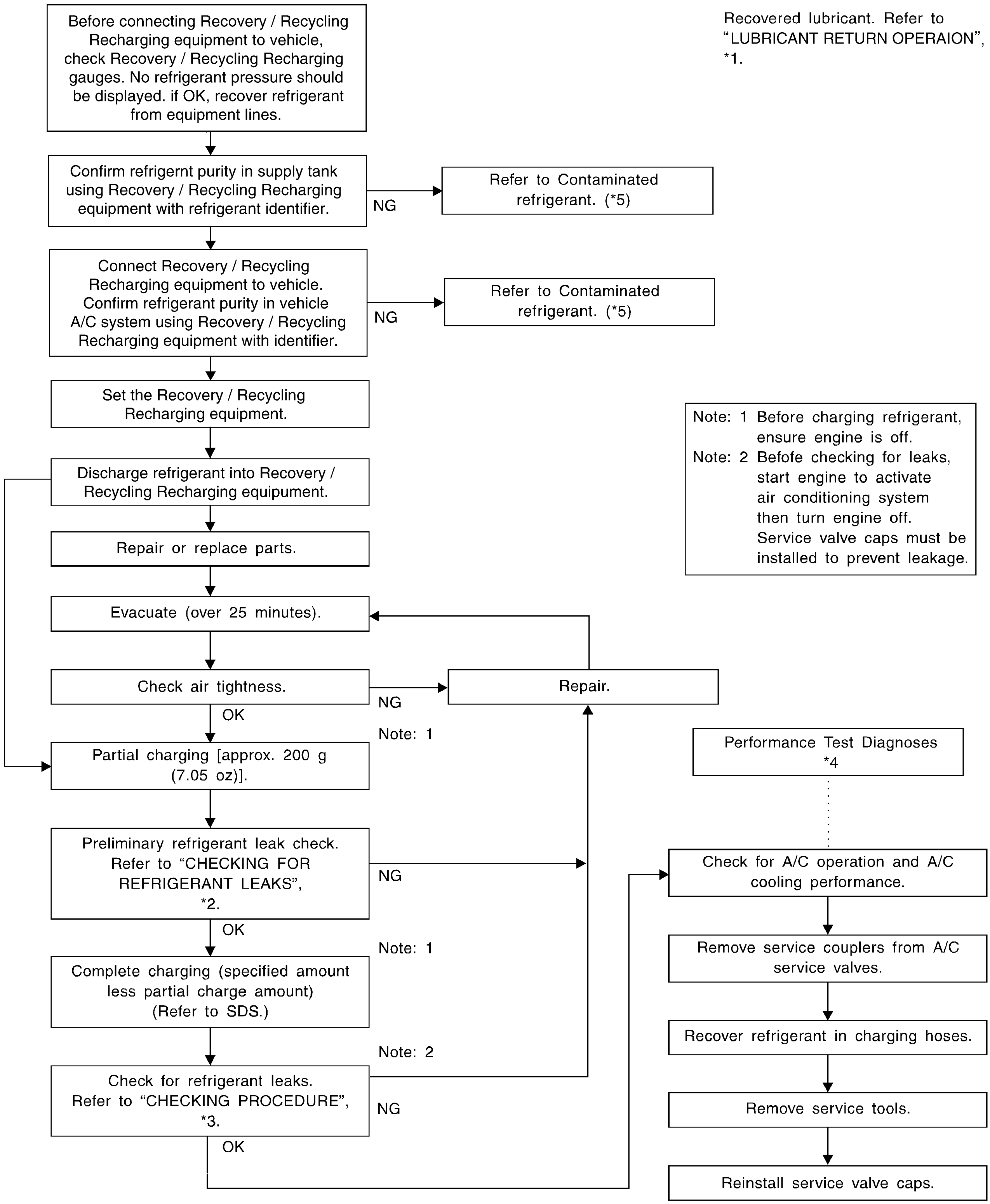
WARNING:

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Remove HFC-134a (R-134a) from A/C system, using certified service equipment meeting requirements of SAE J-2210 [HFC-134a (R-134a) recycling equipment] or J-2209 [HFC-134a (R-134a) recovery equipment]. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.



Evacuating System and Charging Refrigerant





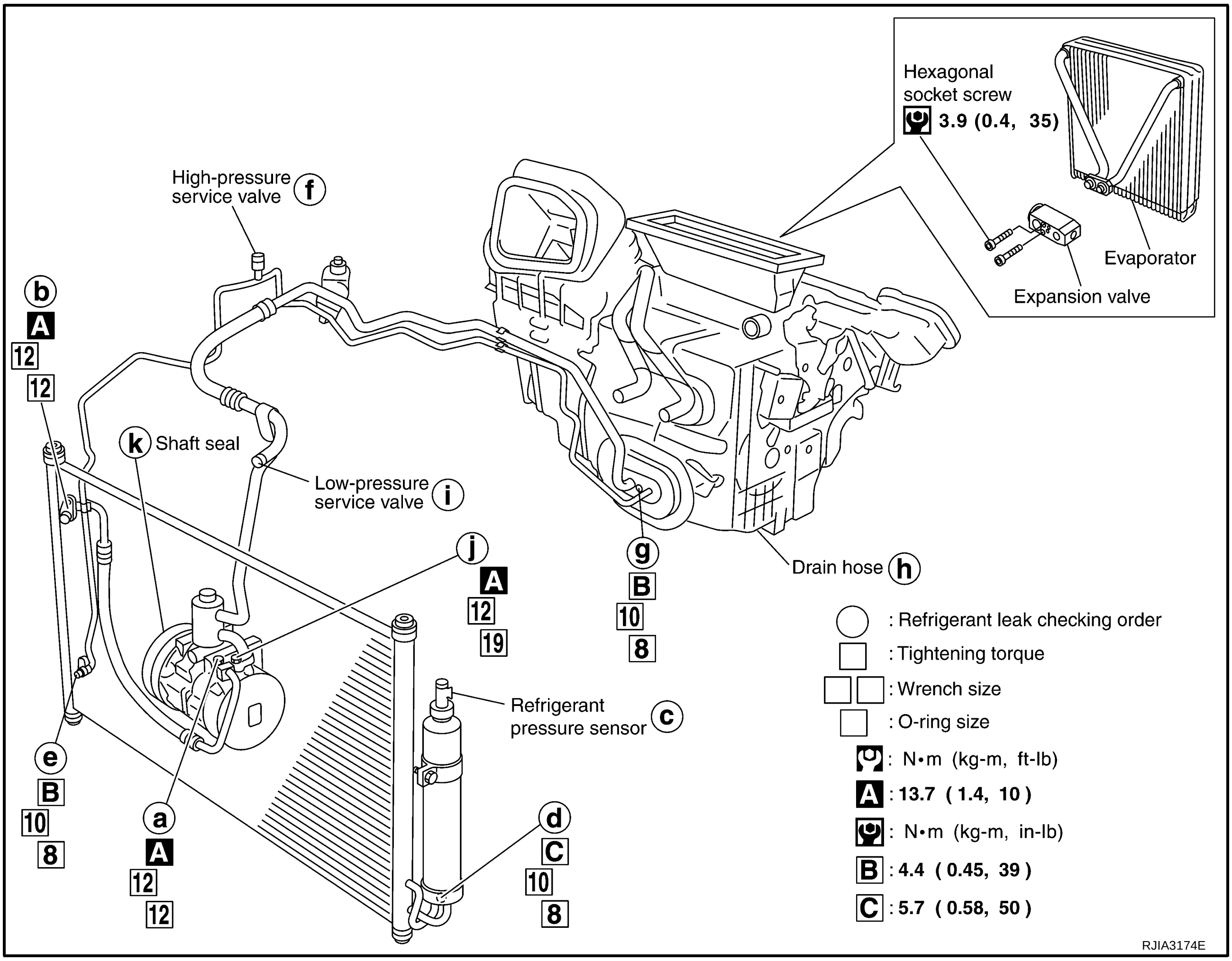
RJIA3006E

*1 MTC-22, "LUBRICANT RETURN OPERATION"
*2 MTC-92, "Checking for Refrigerant Leaks"
*3 MTC-94, "CHECKING PROCEDURE"
*4 MTC-55, "PERFORMANCE TEST DIAGNOSIS"
*5 MTC-5, "CONTAMINATED REFRIGERANT"

Components

AJS001NG

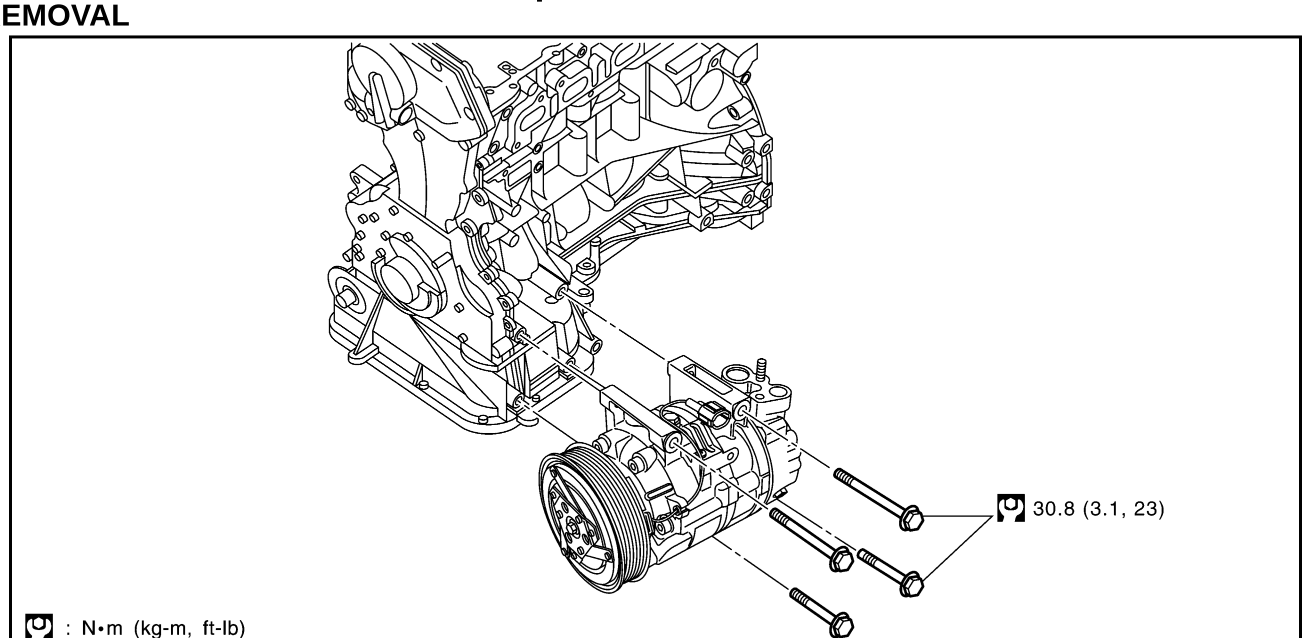
Refer to MTC-6, "Precautions for Refrigerant Connection" .



Removal and Installation of Compressor

AJS001NH

REMOVAL

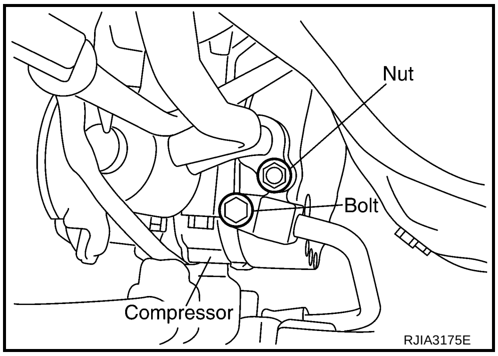


1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove engine undercover, using power tool.

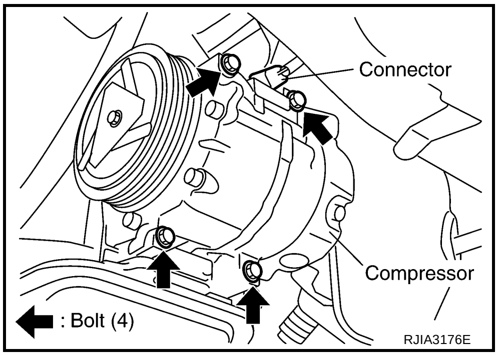
3. Remove compressor-alternator belt. Refer to EM-11, "Removal and Installation" or EM-12, "Removal and Installation of Drive Belt Auto-Tensioner" .
4. Remove mounting nut (bolt) from high-pressure flexible hose and low-pressure flexible hose.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Disconnect compressor connector.



6. Remove mounting bolts from compressor.
7. Remove compressor from the lower side of the vehicle.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure flexible hose with a new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

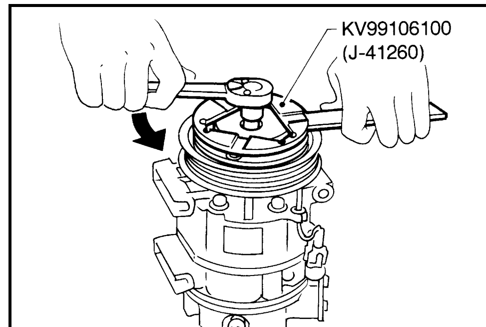
Removal and Installation of Compressor Clutch

AJS001OJ

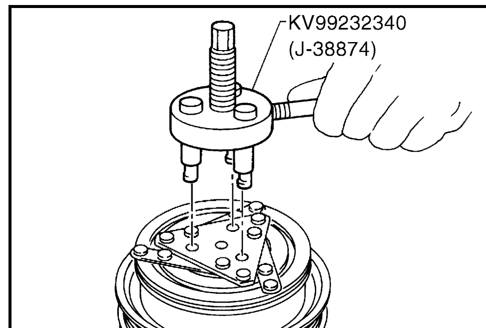
REMOVAL

Overhaul

1. When removing center bolt, hold clutch disc with clutch disc wrench (SST).

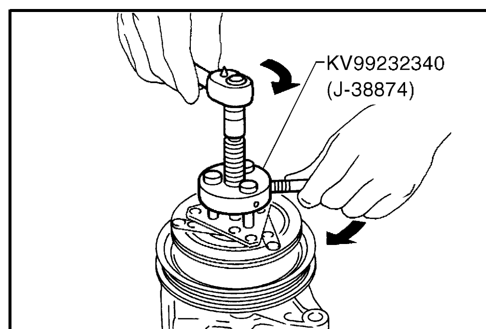


RHA136EB



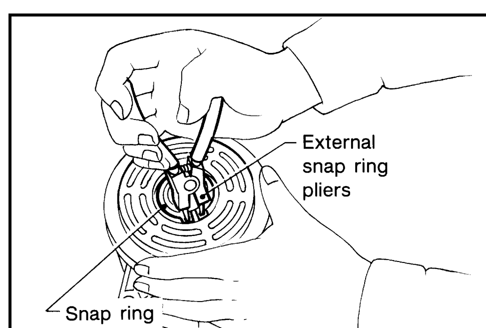
RHA399F

2. Remove clutch disc using clutch disc puller (SST).



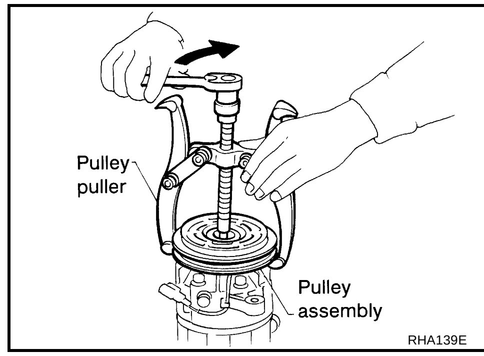
RHA124F

3. Remove snap ring using external snap ring pliers.

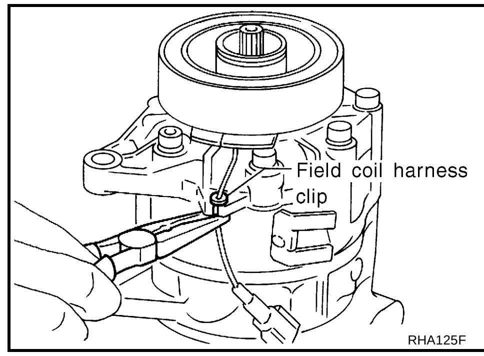


RHA138E

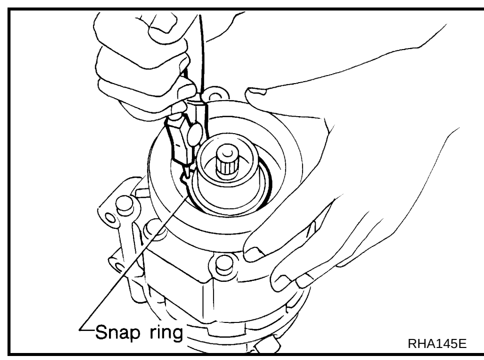
4. Position the center pulley puller on the end of the drive shaft, and remove pulley assembly using any commercially available pulley puller.
   To prevent the pulley groove from being deformed, the puller claws should be positioned into the edge of the pulley assembly.



5. Remove field coil harness clip using a pair of pliers.



6. Remove snap ring using external snap ring pliers.

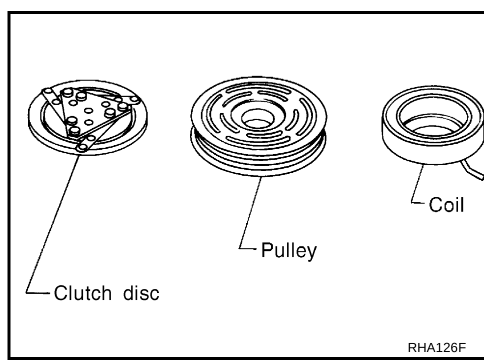


Inspection

Clutch disc
If the contact surface shows signs of damage due to excessive heat, replace clutch disc and pulley.

Pulley
Check the appearance of the pulley assembly. If the contact surface of pulley shows signs of excessive grooving, replace clutch disc and pulley. The contact surfaces of the pulley assembly should be cleaned with a suitable solvent before reinstallation.

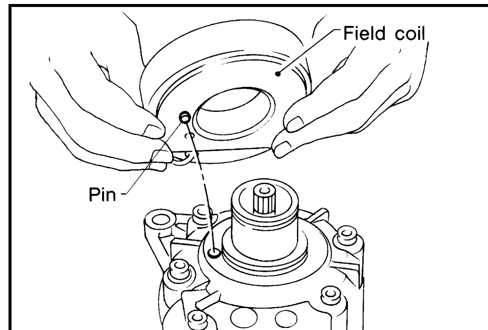
Coil
Check coil for loose connection or cracked insulation.



A B C D E F G H I MTC K L M

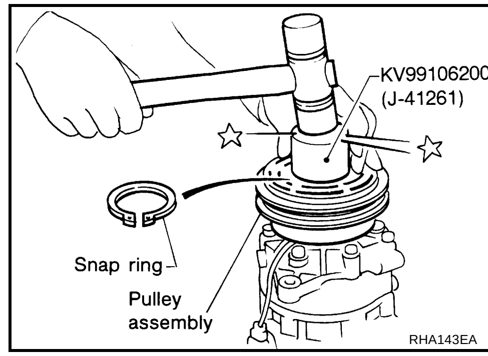
INSTALLATION

1. Install field coil.
   Be sure to align the coil's pin with the hole in the compressor's front head.
2. Install field coil harness clip using a screwdriver.



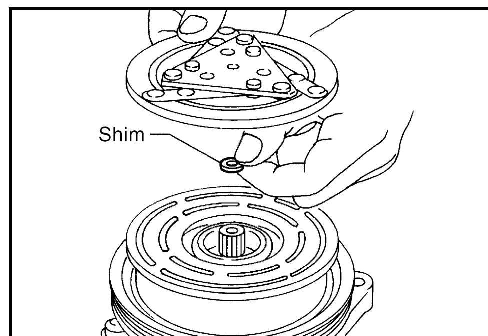
RHA142E

3. Install pulley assembly using pulley installer (SST) and a hand press, and then install snap ring using snap ring pliers.



RHA143EA

4. Install clutch disc on drive shaft, together with original shim(s). Press the clutch disc down by hand.

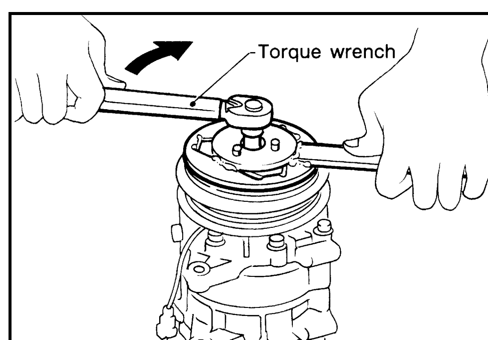


RHA127F

5. Using the holder to prevent clutch disc rotation.

   : 14 N·m (1.4 kg-m, 10 ft-lb)

   After tightening the bolt, check that the pulley rotates smoothly.

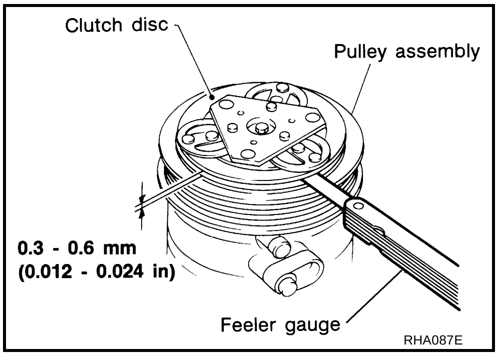


RHA086E

6. Check clearance around the entire periphery of clutch disc.

   Disc to pulley clearance : 0.3 - 0.6 mm (0.012 - 0.024 in)

   If the specified clearance is not obtained, replace adjusting spacer and readjust.



Break-In Operation

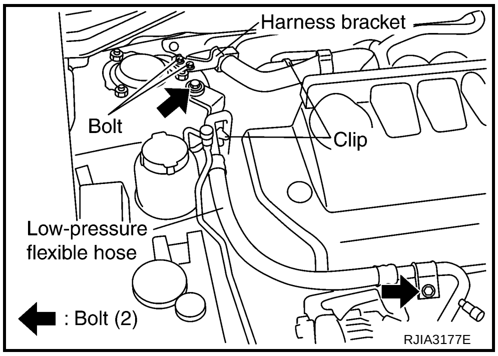
When replacing compressor clutch assembly, always carry out the break-in operation. This is done by engaging and disengaging the clutch about thirty times. Break-in operation raises the level of transmitted torque.

Removal and Installation of Low-Pressure Flexible Hose

AJS001NJ

REMOVAL

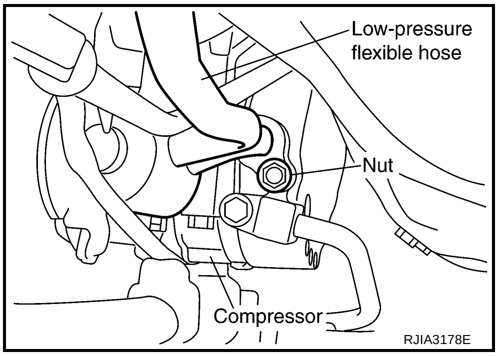
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove extension cowl top panel.
3. Remove the clips from low-pressure flexible hose.
4. Remove mounting bolts from low-pressure flexible hose bracket.
5. Remove harness bracket mounting bolt.



6. Remove mounting nut from low-pressure flexible hose.

   CAUTION:

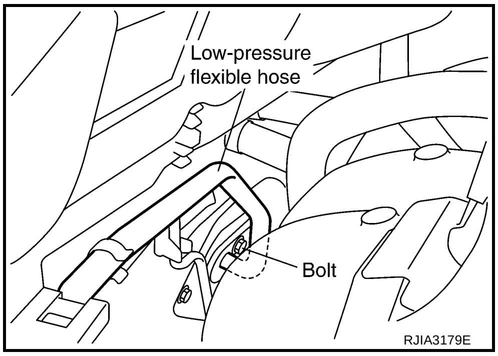
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



7. Remove mounting bolt, and then remove low-pressure flexible hose.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose with a new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of High-Pressure Flexible Hose

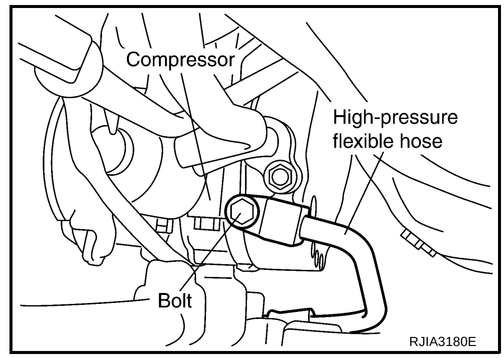
AJS001NK

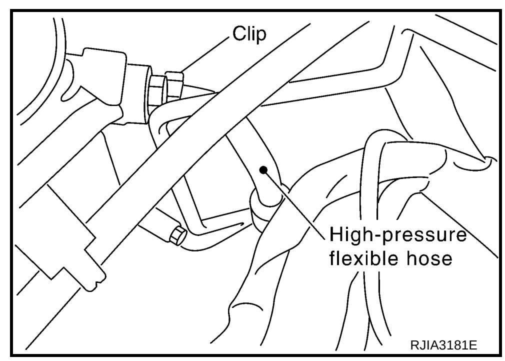
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove high-pressure flexible hose mounting clip.
3. Remove mounting bolt from high-pressure flexible hose, and then remove it.

   CAUTION:

   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.





INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

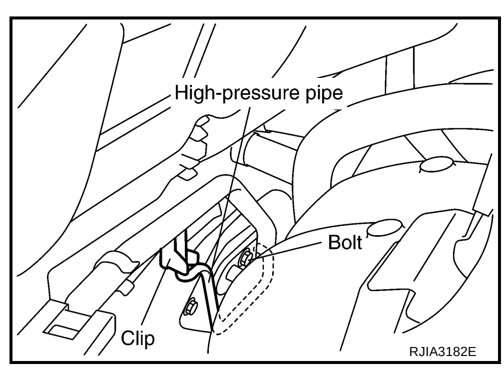
- **Replace O-rings of high-pressure flexible hose with a new ones, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of High-Pressure Pipe

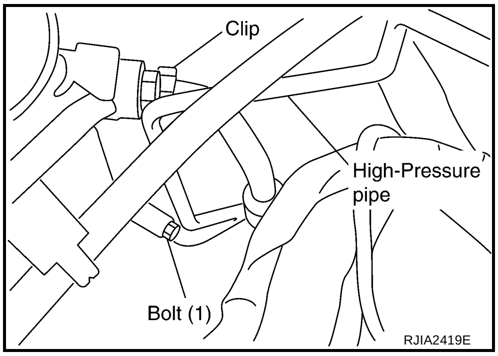
AJS001NL

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove low-pressure flexible hose. Refer to MTC-87, "Removal and Installation of Low-Pressure Flexible Hose" .
3. Remove high-pressure pipe from clip.



4. Remove mounting bolt from high-pressure pipe.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
5. Remove high-pressure pipe.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

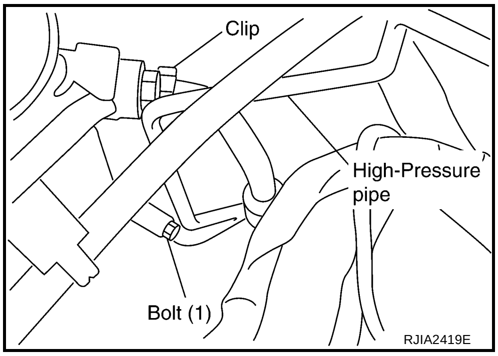
- **Replace O-ring of high-pressure pipe with a new one, and then apply compressor oil to it when installing it.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Condenser

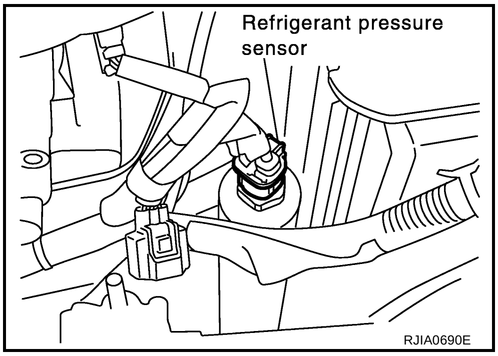
AJS001NM

REMOVAL

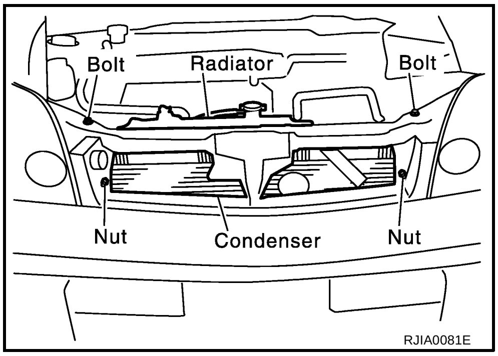
1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Disconnect high-pressure flexible hose and high-pressure pipe from the condenser.
   CAUTION:
   Cap or wrap the joint of the pipe with suitable material such as vinyl tape to avoid the entry of air.
3. Remove air duct (inlet). Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
4. Remove battery and battery tray.



5. Disconnect refrigerant pressure sensor connector.



6. Remove front grille and radiator mounting bracket.
7. Remove mounting nuts from condenser.
8. Remove radiator from lower mount, move it to engine side, and then remove condenser between radiator and radiator core support.
   CAUTION:
   Be careful not to damage the core surface of condenser and radiator.



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INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of high-pressure pipe and high-pressure flexible hose with new ones, and then apply compressor oil to them after installing them.**
- **When recharging refrigerant, check for leaks.**

Condenser mounting nuts

: 4.2 N·m (0.43 kg-m, 37 in-lb)

Removal and Installation of Liquid Tank

AJS001NN

REMOVAL

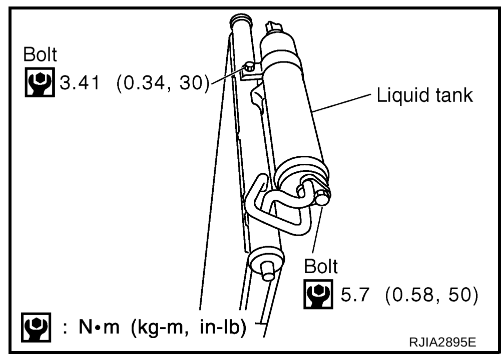
1. Remove condenser. Refer to MTC-89, "Removal and Installation of Condenser" .
2. Clean liquid tank and its surrounding area, and remove dirt and rust from liquid tank.

   CAUTION:

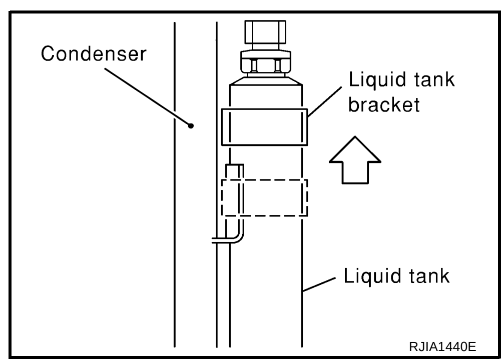
   Be sure to clean carefully.
3. Remove mounting bolts, and then remove liquid tank.

   CAUTION:

   Cap or wrap the joint of condenser pipe with a suitable material such as a vinyl tape to avoid the entry of air.



4. Lift liquid tank upward. Remove bracket from protruding part of condenser.
5. Slide liquid tank upward, and then remove liquid tank.

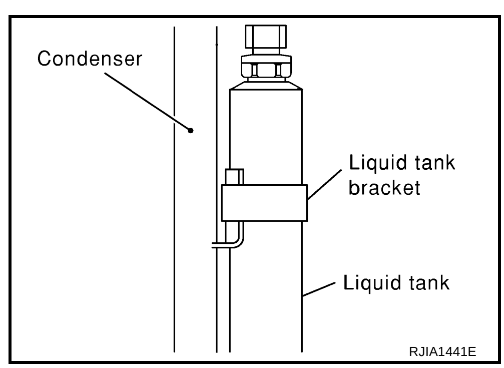


INSTALLATION

Install liquid tank, and then install liquid tank bracket on condenser.

CAUTION:

- **Make sure liquid tank bracket is securely installed at protrusion of condenser. (Make sure liquid tank bracket does not move to position below center of liquid tank.)**
- **Replace O-rings of the condenser pipe with new ones, and then apply compressor oil to them when installing them.**
- **When recharging refrigerant, check for leaks.**

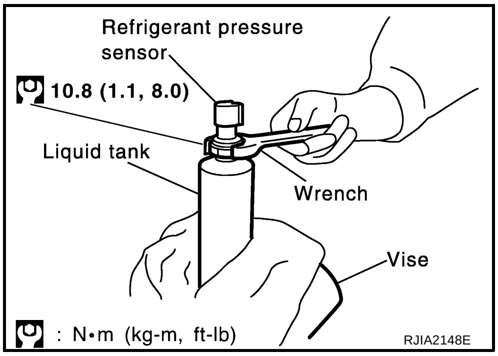


Removal and Installation for Refrigerant Pressure Sensor

AJS001NO

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove liquid tank. Refer to MTC-90, "Removal and Installation of Liquid Tank" .
3. Using a vise, secure liquid tank, and remove refrigerant pressure sensor.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Apply compressor oil to O-ring of refrigerant pressure sensor when installing it.**
- **When recharging refrigerant, check for leaks.**

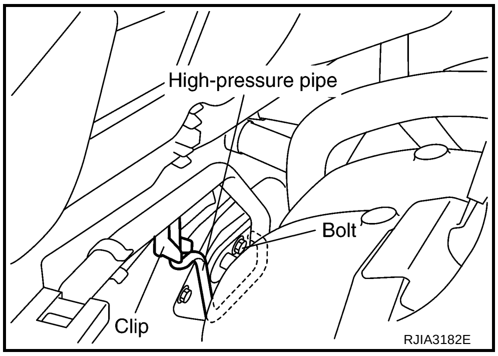
Removal and Installation of Evaporator

AJS001NQ

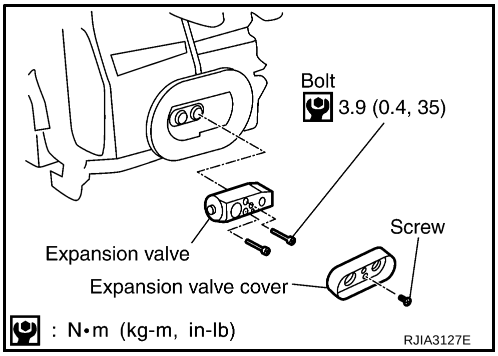
REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove extension cowl top panel.
3. Disconnect low-pressure flexible hose and high-pressure pipe from evaporator.

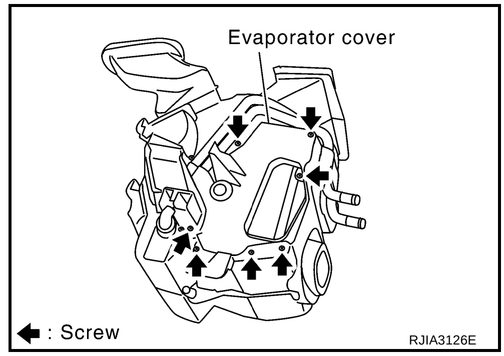
   CAUTION:
   Cap or wrap the joint of low-pressure flexible hose and high-pressure pipe with a suitable material such as a vinyl tape to avoid the entry of air.



4. Remove mounting screw, and then remove expansion valve cover.
5. Remove mounting bolts, and then remove expansion valve.
6. Remove blower unit. Refer to MTC-64, "BLOWER UNIT" .



7. Remove foot duct (passenger side).
8. Remove mounting screws, and then remove evaporator cover.
9. Slide evaporator, and then remove it from heater & cooling unit assembly.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of low-pressure flexible hose and high-pressure pipe with new ones, and then apply compressor oil to them when installing them.**
- **When recharging refrigerant, check for leaks.**

Removal and Installation of Expansion Valve

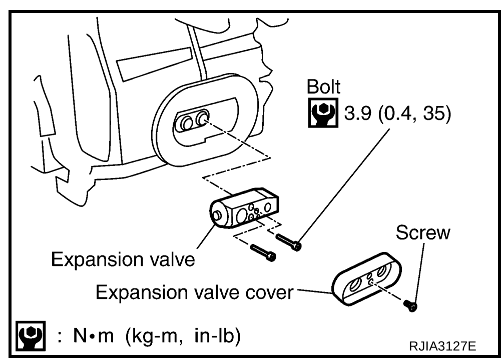
AJS001OD

REMOVAL

1. Use a refrigerant collecting equipment (for HFC-134a) to discharge the refrigerant.
2. Remove extension cowl top panel.
3. Disconnect low-pressure flexible hose and high-pressure pipe from evaporator.

   CAUTION:

   Cap or wrap the joint of low-pressure flexible hose and high-pressure pipe with a suitable material such as a vinyl tape to avoid the entry of air.
4. Remove mounting screw, and then remove expansion valve cover.
5. Remove mounting bolts, and then remove expansion valve.



INSTALLATION

Installation is basically the reverse order of removal.

CAUTION:

- **Replace O-rings of expansion valve and piping with new ones, and then apply compressor oil to them when installing them.**
- **When recharging refrigerant, check for leaks.**

Checking for Refrigerant Leaks

AJS001NS

Perform a visual inspection of all refrigeration parts, fittings, hoses and components for signs of A/C lubricant leakage, damage and corrosion. A/C lubricant leakage may indicate an area of refrigerant leakage. Allow extra inspection time in these areas when using either an electronic refrigerant leak detector or fluorescent dye leak detector.

If dye is observed, confirm the leak with an electronic refrigerant leak detector. It is possible a prior leak was repaired and not properly cleaned.

When searching for leaks, do not stop when one leak is found but continue to check for additional leaks at all system components and connections.

When searching for refrigerant leaks using an electronic leak detector, move the probe along the suspected leak area at 1 to 2 inches per second and no further than 1/4 inch from the component.

CAUTION:

Moving the electronic leak detector probe slower and closer to the suspected leak area will improve the chances of finding a leak.

Checking System for Leaks Using the Fluorescent Leak Detector

AJS001NT

1. Check A/C system for leaks using the UV lamp and safety goggles [SST: J-42220] in a low sunlight area (area without windows preferable). Illuminate all components, fittings and lines. The dye will appear as a bright green/yellow area at the point of leakage. Fluorescent dye observed at the evaporator drain opening indicates an evaporator core assembly (tubes, core or expansion valve) leak.
2. If the suspected area is difficult to see, use an adjustable mirror or wipe the area with a clean shop rag or cloth, with the UV lamp for dye residue.
3. After the leak is repaired, remove any residual dye using dye cleaner [SST: J-43872] to prevent future misdiagnosis.
4. Perform a system performance check and verify the leak repair with an approved electronic refrigerant leak detector.

NOTE:

Other gases in the work area or substances on the A/C components, for example, anti-freeze, windshield washer fluid, solvents and lubricants, may falsely trigger the leak detector. Make sure the surfaces to be checked are clean.
Clean with a dry cloth or blow off with shop air.
Do not allow the sensor tip of the detector to contact with any substance. This can also cause false readings and may damage the detector.

Dye Injection

AJS001NU

(This procedure is only necessary when recharging the system or when the compressor has seized and was replaced.)

1. Check A/C system static (at rest) pressure. Pressure must be at least 345 kPa (3.52 kg/cm^2 , 50 psi).
2. Pour one bottle (1/4 ounce / 7.4 cc) of the A/C refrigerant dye into the injector tool [SST: J-41459].
3. Connect the injector tool to the A/C LOW-PRESSURE side service fitting.
4. Start engine and switch A/C ON.
5. When the A/C operating (compressor running), inject one bottle (1/4 ounce / 7.4 cc) of fluorescent dye through the low-pressure service valve using dye injector tool J-41459 (refer to the manufacture's operating instructions).
6. With the engine still running, disconnect the injector tool from the service fitting.

   CAUTION:

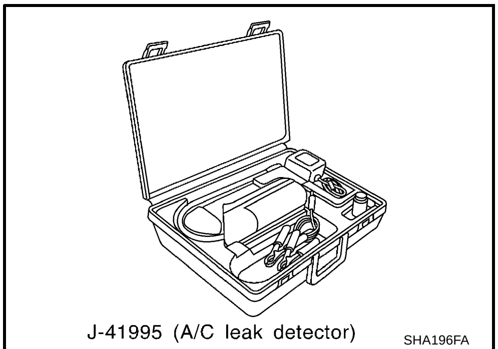
   Be careful the A/C system or replacing a component, pour the dye directly into the open system connection and proceed with the service procedures.
7. Operate the A/C system for a minimum of 20 minutes to mix the dye with the system oil. Depending on the leak size, operating conditions and location of the leak, it may take from minutes to days for the dye to penetrate a leak and become visible.

Electronic Refrigerant Leak Detector

AJS001NV

PRECAUTIONS FOR HANDLING LEAK DETECTOR

When performing a refrigerant leak check, use an A/C electrical leak detector [SST: J-41995] or equivalent. Ensure that the instrument is calibrated and set properly per the operating instructions.
The leak detector is a delicate device. In order to use the leak detector properly, read the operating instructions and perform any specified maintenance.

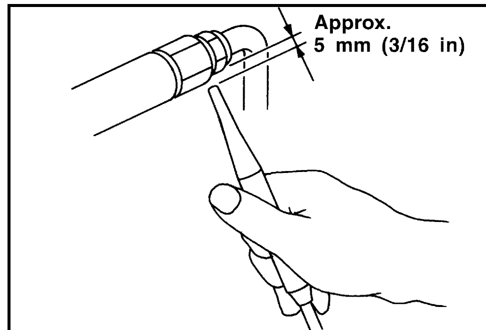


J-41995 (A/C leak detector)

SHA196FA

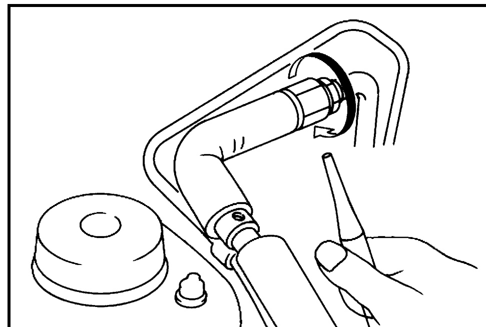
A B C D E F G H I MTC K L M

1. Position probe approximately 5 mm (3/16 in) away from point to be checked.

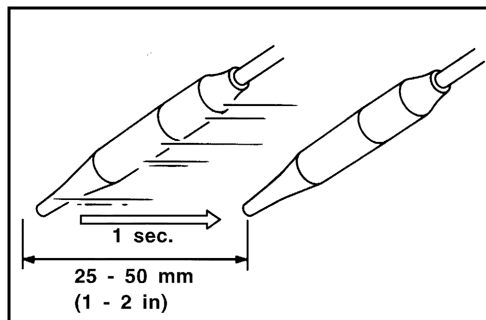


SHA707EA

2. When testing, circle each fitting completely with probe.


SHA706E

3. Move probe along component approximately 25 to 50 mm (1 to 2 in)/sec.



SHA708EA

CHECKING PROCEDURE

To prevent inaccurate or false readings, make sure there is no refrigerant vapor, shop chemicals, or cigarette smoke in the vicinity of the vehicle. Perform the leak test in calm area (low air/wind movement) so that the leaking refrigerant is not dispersed.

1. Turn engine OFF.
2. Connect a suitable A/C manifold gauge set [SST: J-39183] to the A/C service valves.
3. Check if the A/C refrigerant pressure is at least 345 kPa (3.52 kg/cm^2 , 50 psi) above 16°C (61°F). If less than specification, recover/evacuate and recharge the system with the specified amount of refrigerant.

   NOTE:

   At temperatures below 16°C (61°F), leaks may not be detected since the system may not reach 345 kPa (3.52 kg/cm^2 , 50 psi).
4. Perform the leak test from the high-pressure side (compressor discharge a to evaporator inlet g) to the low-pressure side (evaporator drain hose h to shaft seal k). Refer to MTC-82, "Components" . Perform a leak check for the following areas carefully. Clean the component to be checked and move the leak detected probe completely around the connection/component.

   Compressor

   Check the fitting of high- and low-pressure hoses, relief valve and shaft seal.

   Liquid tank

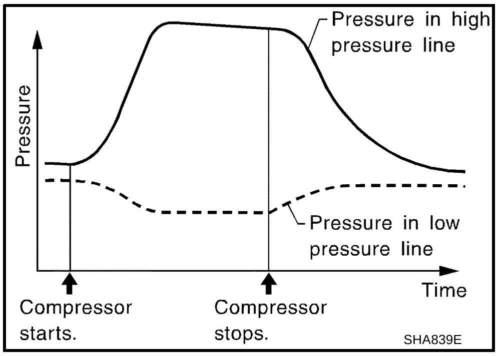
   Check the refrigerant pressure sensor.

   Service valves

   Check all around the service valves. Ensure service valve caps are secured on the service valves (to prevent leaks).

NOTE:
After removing A/C manifold gauge set from service valves, wipe any residue from valves to prevent any false readings by leak detector.
Cooling unit (Evaporator)
With engine OFF, turn blower fan on “High” for at least 15 seconds to dissipate any refrigerant trace in the cooling unit. Wait a minimum of 10 minutes accumulation time (refer to the manufacturer’s recommended procedure for actual wait time) before inserting the leak detector probe into the drain hose.
Keep the probe inserted for at least 10 seconds. Use caution not to contaminate the probe tip with water or dirt that may be in the drain hose.

5. If a leak detector detects a leak, verify at least once by blowing compressed air into area of suspected leak, then repeat check as outlined above.
6. Do not stop when one leak is found. Continue to check for additional leaks at all system components.
   If no leaks are found, perform steps 7 - 10.
7. Start engine.
8. Set the heater A/C control as follows;
   a. A/C switch: ON
   b. Mode control dial: VENT (ventilation)
   c. Intake door position: Recirculation
   d. Temperature control dial: Max. cool
   e. Fan speed: High
9. Run engine at 1,500 rpm for at least 2 minutes.
10. Turn engine off and perform leak check again following steps 4 through 6 above.
    Refrigerant leaks should be checked immediately after stopping the engine. Begin with the leak detector at the compressor. The pressure on the high-pressure side will gradually drop after refrigerant circulation stops and pressure on the low-pressure side will gradually rise, as shown in the graph. Some leaks are more easily detected when pressure is high.



11. Before connecting recovery/recycling recharging equipment to vehicle, check recovery/recycling recharging equipment gauges. No refrigerant pressure should be displayed. If pressure is displayed, recover refrigerant from equipment lines and then check refrigerant purity.
12. Confirm refrigerant purity in supply tank using recovery/recycling recharging equipment and refrigerant identifier.
13. Confirm refrigerant purity in vehicle A/C system using recovery/recycling recharging equipment and refrigerant identifier.
14. Discharge A/C system using approved refrigerant recovery equipment. Repair the leaking fitting or component as necessary.
15. Evacuate and recharge A/C system and perform the leak test to confirm no refrigerant leaks.
16. Conduct A/C performance test to ensure system works properly.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Compressor

AJS001NW

Model		Calsonic Kansei make CWV-615M
Type		V-6 variable displacement
Displacement cm^3 (cu in)/rev	Max.	146 (8.91)
	Min.	13.5 (0.824)
Cylinder bore × stroke mm (in)		35.2 (1.386) × [2.3 - 25.0 (0.091 - 0.984)]
Direction of rotation		Clockwise (viewed from drive end)
Drive belt		Poly V

Lubricant

AJS001NX

Model		Calsonic Kansei make CWV-615M
Name		Nissan A/C System Oil Type S (DH-PS)
Part number		KLH00-PAGS0
Capacity m ℓ (Imp fl oz)	Total in system	180 (6.3)
	Compressor (Service part) charging amount	180 (6.3)

Refrigerant

AJS001NY

Type	HFC-134a (R-134a)
Capacity kg (lb)	0.55 (1.21)

Engine Idling Speed

AJS001NZ

Refer to EC-75, "Idle Speed and Ignition Timing Check" .

Belt Tension

AJS001O0

Refer to EM-11, "DRIVE BELTS" .

SECTION PB
PARKING BRAKE SYSTEM

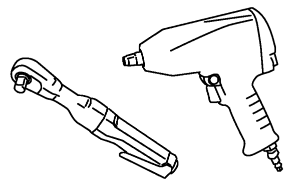
CONTENTS

PREPARATION

PFP:00002

Commercial Service Tools

AFS002PM

Tool name	Description
Power tool  PBIC0190E	Removing nuts and bolts, tires

PARKING BRAKE SYSTEM

PFP:36010

On-Vehicle Service

AFS002LH

LEVER STROKE

- Operate parking brake lever with a force of 196 N (20 kg, 44 lb), make sure lever stroke is within the specified number of notches. (Check it by listening and counting ratchet clicks.)

Lever stroke : 6 - 7 notches

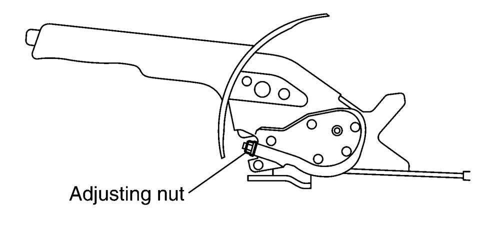
INSPECT COMPONENTS

- Make sure that the mounting conditions (looseness, backlash, etc.) of each component are normal.
- Check the following:
  - Device assembly for bend, damage and cracks. Replace if there are.
  - Cables and equalizer for wear and damage. Replace if there are.
  - Parking brake warning lamp switch. Replace if it does not work correctly.

ADJUSTMENT

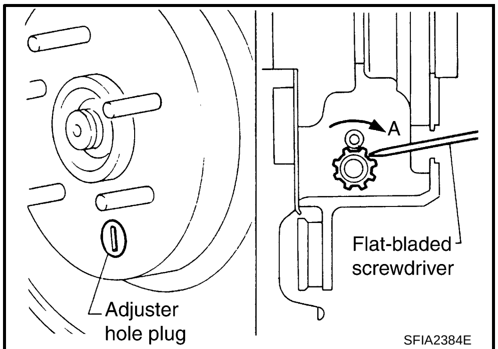
- To perform adjustment operations, remove rear tires from vehicle with a power tool.

1. Insert a deep socket wrench onto adjusting nut. Rotate adjusting nut to fully loosen cable, and then release parking brake lever.
2. Secure disc rotor to hub using wheel nut so as not to tilt disc rotor.



SFIA2453E

3. Remove adjuster hole plug installed on disc rotor. Turn the adjuster in direction “A” using a flat-bladed screwdriver as shown, until disc rotor is locked. Turn the adjuster in the opposite direction by 5 or 6 notches after locking.
4. Rotate disc rotor to make sure that there is no drag. Install the adjuster hole plug.
5. Adjust parking brake cable with the following procedure.



SFIA2384E

a. Operate parking brake lever 10 or more times with the force 294 N (30 kg, 66 lb).

b. Rotate adjusting nut to adjust parking brake lever stroke using a deep socket wrench.

CAUTION:
Do not reuse the adjusting nut after removing it.

c. Operate parking brake lever with a force of 196 N (20 kg, 44 lb), make sure the lever stroke is within the specified number of notches. (Check it by listening and counting ratchet clicks.)

Lever stroke : 6 - 7 notches

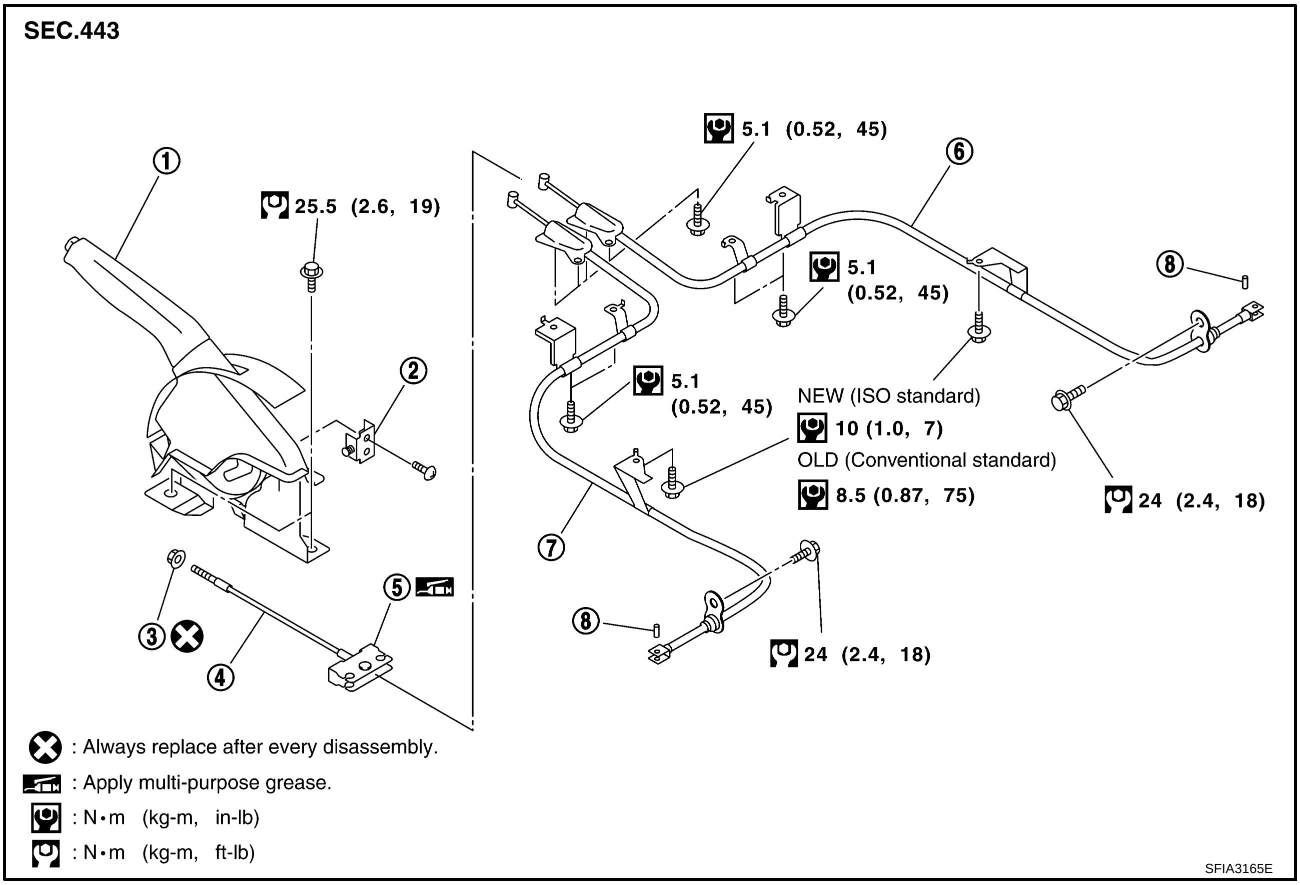
d. Make sure that there is no drag on rear brake with parking brake lever completely released.

PARKING BRAKE CONTROL

PFP:36010

Components

AFS002LI



1.	Device assembly	2.	Parking brake warning lamp switch	3.	Adjusting nut
4.	Front cable	5.	Equalizer	6.	RH rear cable
7.	LH rear cable	8.	Pin		

NOTE:
In regard to the notation of torque in the illustration, NEW shows an ISO standard, OLD shows a conventional standard, and the measurements of hexagonal width across flats are in parentheses.

Removal and Installation

AFS002LJ

REMOVAL

1. Remove rear tires from vehicle with a power tool.
2. Release parking brake lever.
3. Remove center console. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY"
4. Disconnect parking brake warning lamp switch connector.
5. Remove adjusting nut and loosen front cable.
6. Remove device assembly mounting bolts and remove device assembly from vehicle.
7. Separate rear cable from front cable, remove front cable from vehicle.
8. Remove heat insulator of the three way catalyst and the exhaust center tube from vehicle.
9. Remove parking brake shoe, and remove rear cable from toggle lever. Refer to PB-5, "PARKING BRAKE SHOE"
10. Remove rear cable mounting bolts, pull out rear cable from vehicle.

INSTALLATION

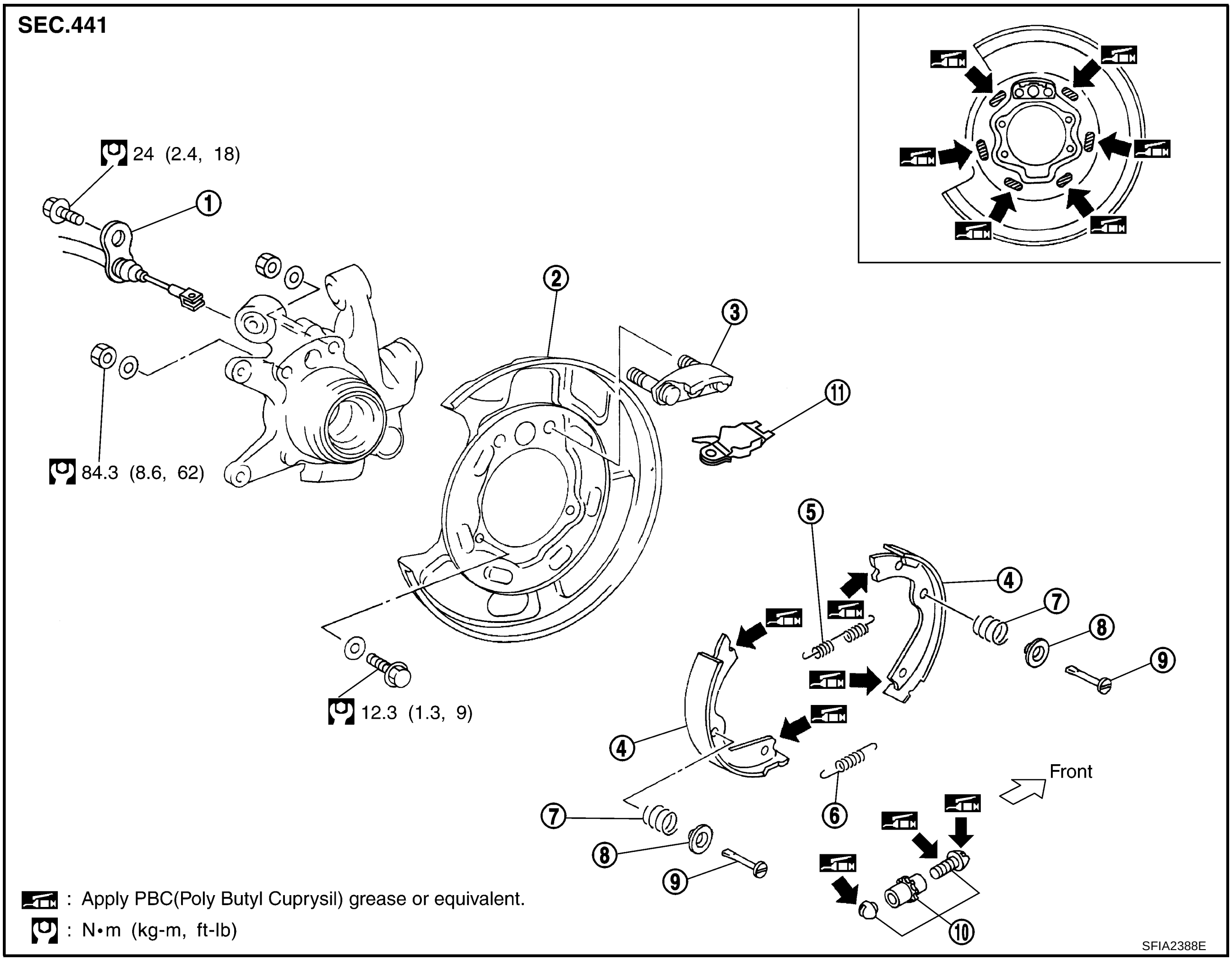
1. Install in the reverse order of the removal. Refer to PB-4, "Components" for tightening torque.
   CAUTION:
   Do not reuse adjusting nut.
2. Adjust parking brake. Refer to PB-3, "ADJUSTMENT" .

PARKING BRAKE SHOE

PFP:44060

Components

AFS002LK



1. Parking cable	2. Back plate	3. Anchor block
4. Brake shoe	5. Return spring	6. Return spring
7. Anti-rattle spring	8. Retainer	9. Anti-rattle pin
10. Adjuster assembly	11. Toggle lever	

Removal and Installation

AFS002LL

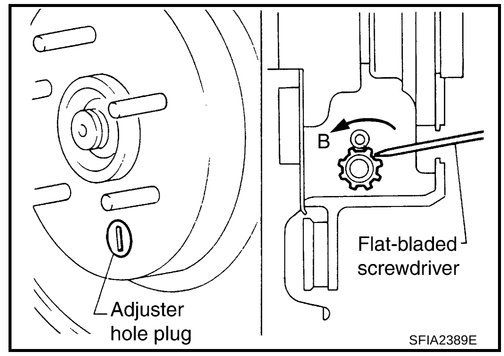
REMOVAL

CAUTION:

- **Clean dust on disc rotor and back plate using a vacuum dust collector. Do not blow with compressed air.**
- **Put matching marks on both disc rotor and wheel hub when removing disc rotor.**

1. Remove rear tires from vehicle with a power tool.
2. Remove disc rotor with parking brake lever completely in the released position. Refer to BR-32, "Removal and Installation of Brake Caliper Assembly" .
3. If disc rotor cannot be removed, remove as follows:
a. Secure the disc rotor in place with wheel nuts and remove adjuster hole plug.

b. Using a flat-bladed screwdriver, rotate adjuster in direction “B” to retract and loosen brake shoe.
4. Remove anti-rattle pins, retainers, anti-rattle springs, and return springs.
5. Remove parking brake shoes, adjuster assembly, and toggle lever.
6. About the removal of back plate, refer to RAX-7, "Disassembly and Assembly" .

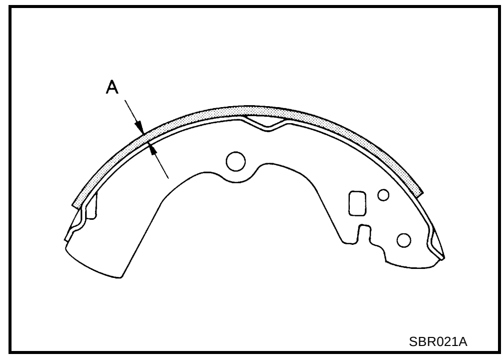


INSPECTION AFTER REMOVAL

Lining Thickness Inspection

- Check thickness of lining.

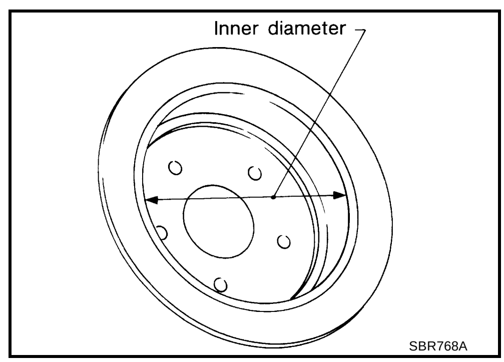
Standard thickness (new) “A”	**: 3.5 mm (0.138 in)**
Repair limit thickness “A”	**: 1.5 mm (0.059 in)**



Drum Inner Diameter Inspection

- Check inner diameter of drum.

Standard inner diameter (new)	**: 172 mm (6.77 in) dia.**
Maximum inner diameter	**: 173 mm (6.81 in) dia.**

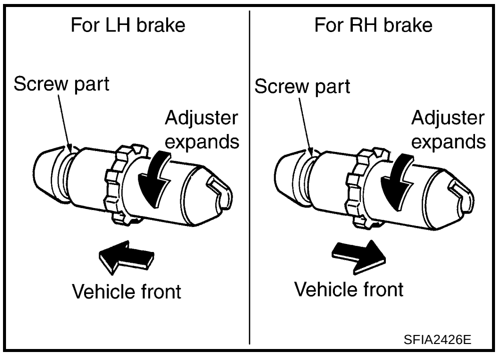


Other Inspections

- Check the following:
  - Lining for excessive wear, damage, and peeling.
  - Shoe sliding surface for excessive wear and damage.
  - Anti-rattle pin for excessive wear and corrosion.
  - Return spring for sagging.
- Make sure that adjuster moves smoothly.
- Visually check the inside of drum for excessive wear, cracks, and damage. Check the inside of drum using a pair of vernier calipers.
- Replace with new part if the above part is malfunction.
- When disassembling adjuster, apply PBC (Poly Butyl Cuprysil) grease or equivalent to the threads. Refer to MA-11, "RECOMMENDED FLUIDS AND LUBRICANTS" .

INSTALLATION

Be careful of the following, and install in the reverse order of the removal.



- Refer to PB-5, "Components" and apply PBC (Poly Butyl Cuprysil) grease or equivalent to the specified points during assembly.
- Assemble adjusters so that threaded part is expanded when rotating it in the direction shown by arrow.
- Shorten adjuster by rotating it.
- Check shoe sliding surface and drum inner surface for grease. Wipe it off if it adhere on the surfaces.
- Perform break-in operation as follows after replacing brake shoes or disc rotors, or if brakes do not function well.

1. Adjust parking brake lever stroke to the specified amount. Refer to PB-3, "ADJUSTMENT" .
2. Perform parking brake break-in (drag run) operation by driving vehicle under the following conditions:

   Drive forward
   - **Vehicle speed: Approx. 5 km/h (3 MPH) set (constant and forward)**
   - **Parking brake operating force: Approx. 250 N (26 kg, 112 lb) set constant**
   - **Time: Approx. 30 sec.**
3. Check parking brake lever stroke of parking brake. Adjust again if it is outside the standard.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Parking Drum Brake

AFS002LM

Type		DS17H
Brake lining	Standard thickness (new)	3.5 mm (0.138 in)
	Wear limit thickness	1.5 mm (0.059 in)
Drum (disc)	Standard inner diameter (new)	172 mm (6.77 in) dia.
	Wear limit of inner diameter	173 mm (6.81 in) dia.

Parking Brake Control

AFS002LN

Control type	Center lever
Number of notches [under force of 196 N (20 kg, 44 lb)]	6 – 7 notches
Number of notches when parking brake warning lamp switch comes on	1 notch

SECTION PG

POWER SUPPLY, GROUND & CIRCUIT ELEMENTS

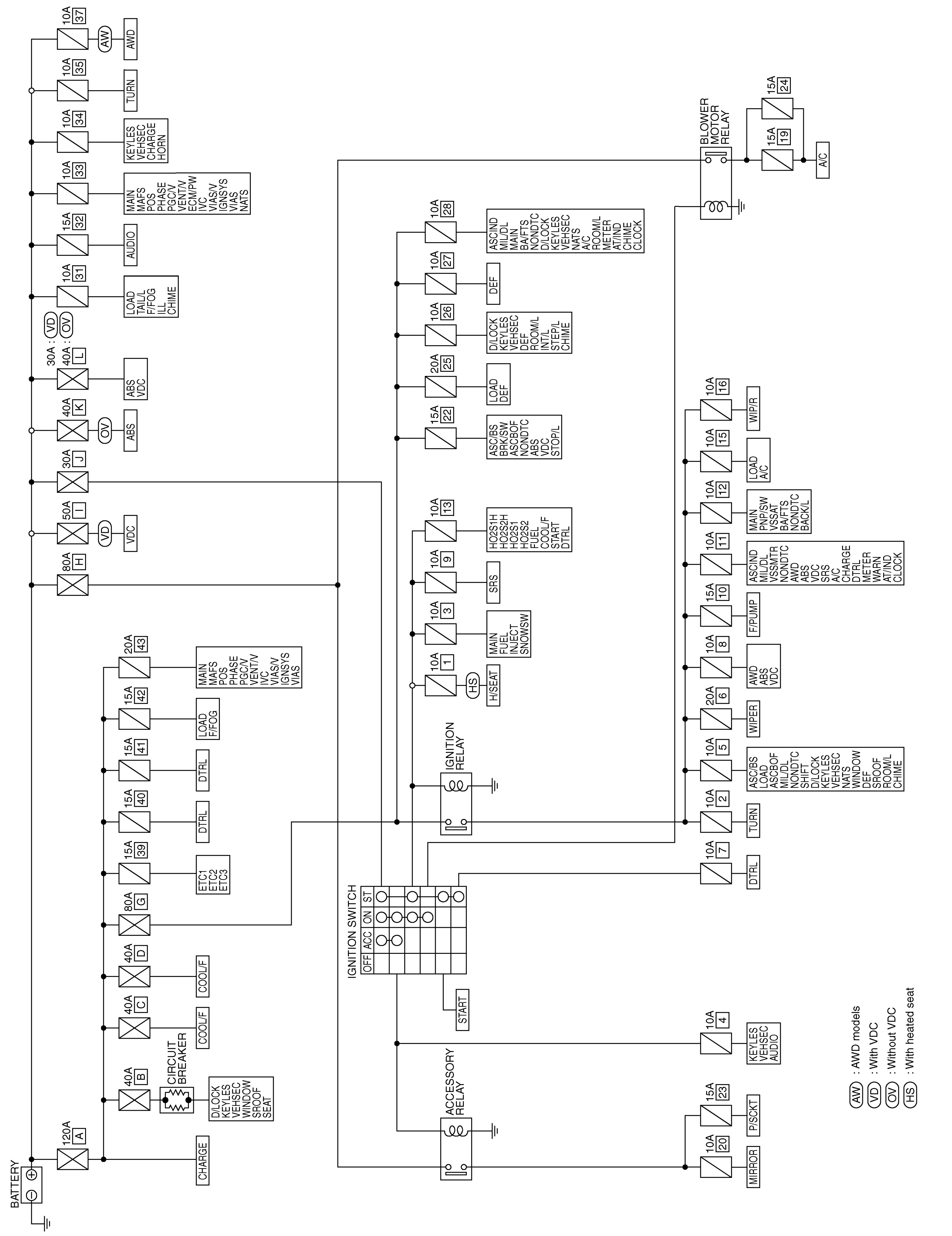
CONTENTS

POWER SUPPLY ROUTING

PFP:00011

Schematic

AKS00BER



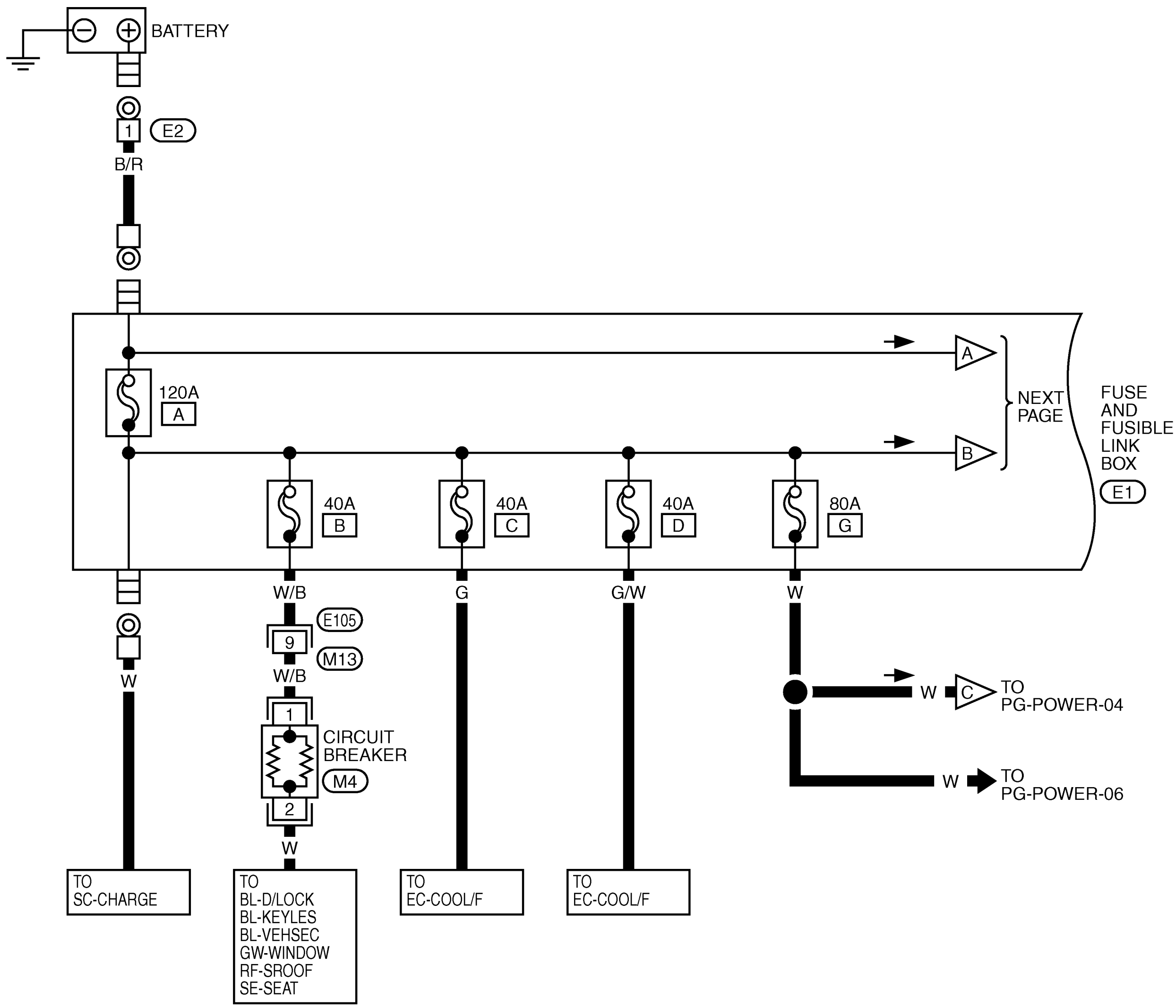
TKWB0202E

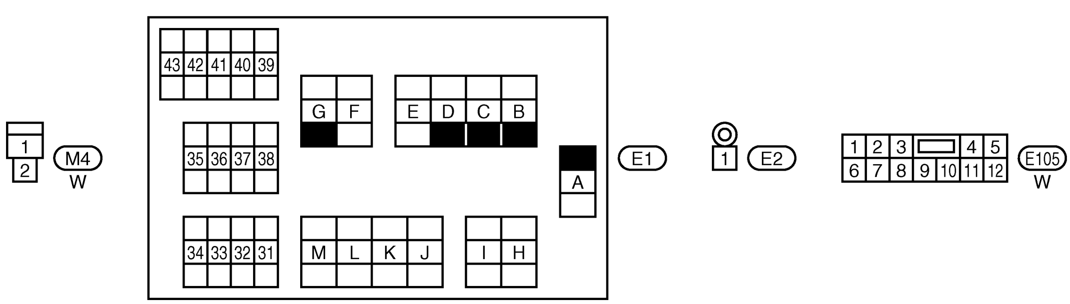
Wiring Diagram - POWER -

AKS00BES

BATTERY POWER SUPPLY - IGNITION SW. IN ANY POSITION

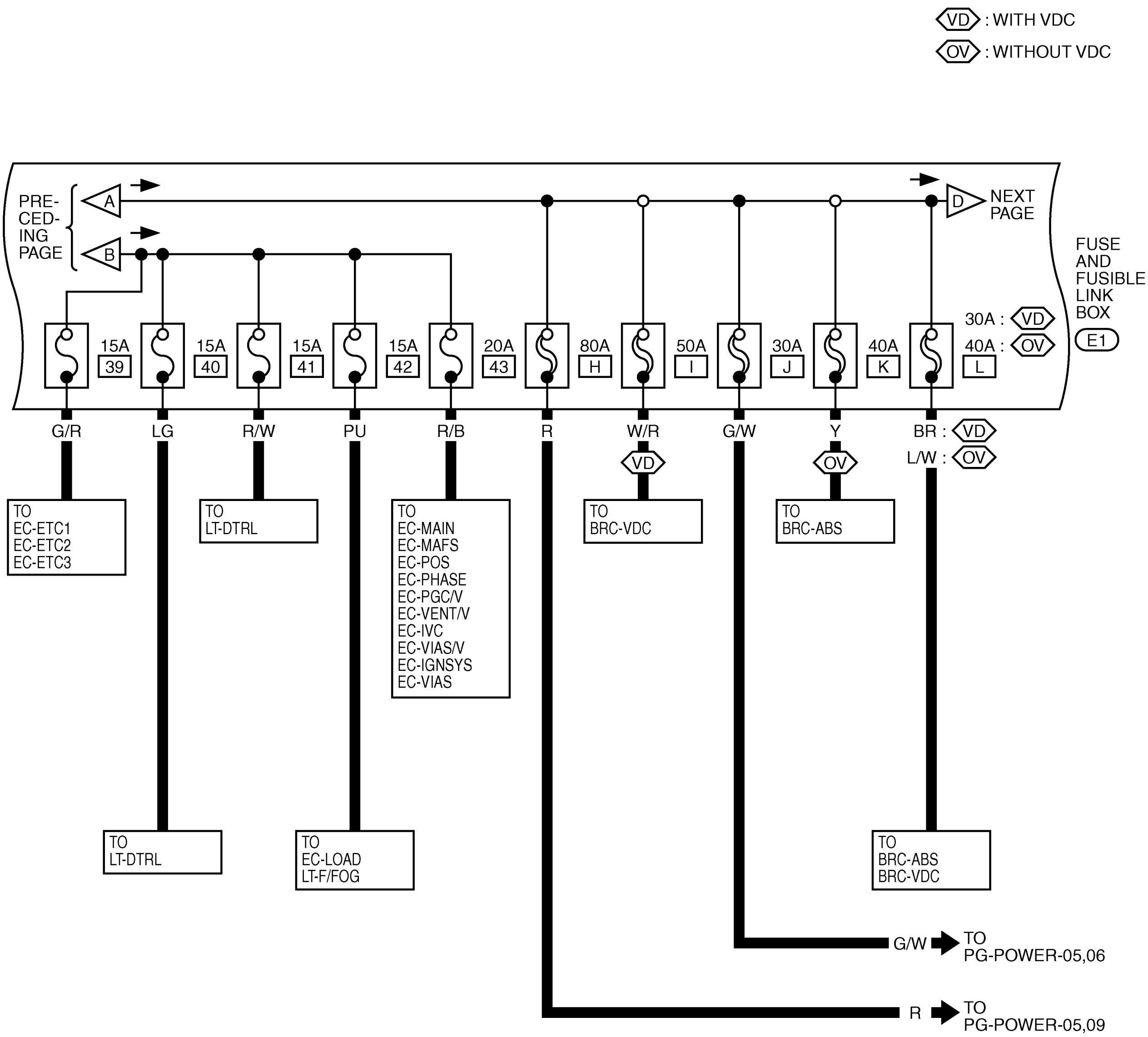
PG-POWER-01

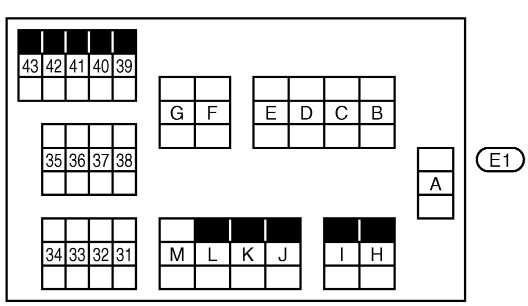




TKWB0203E

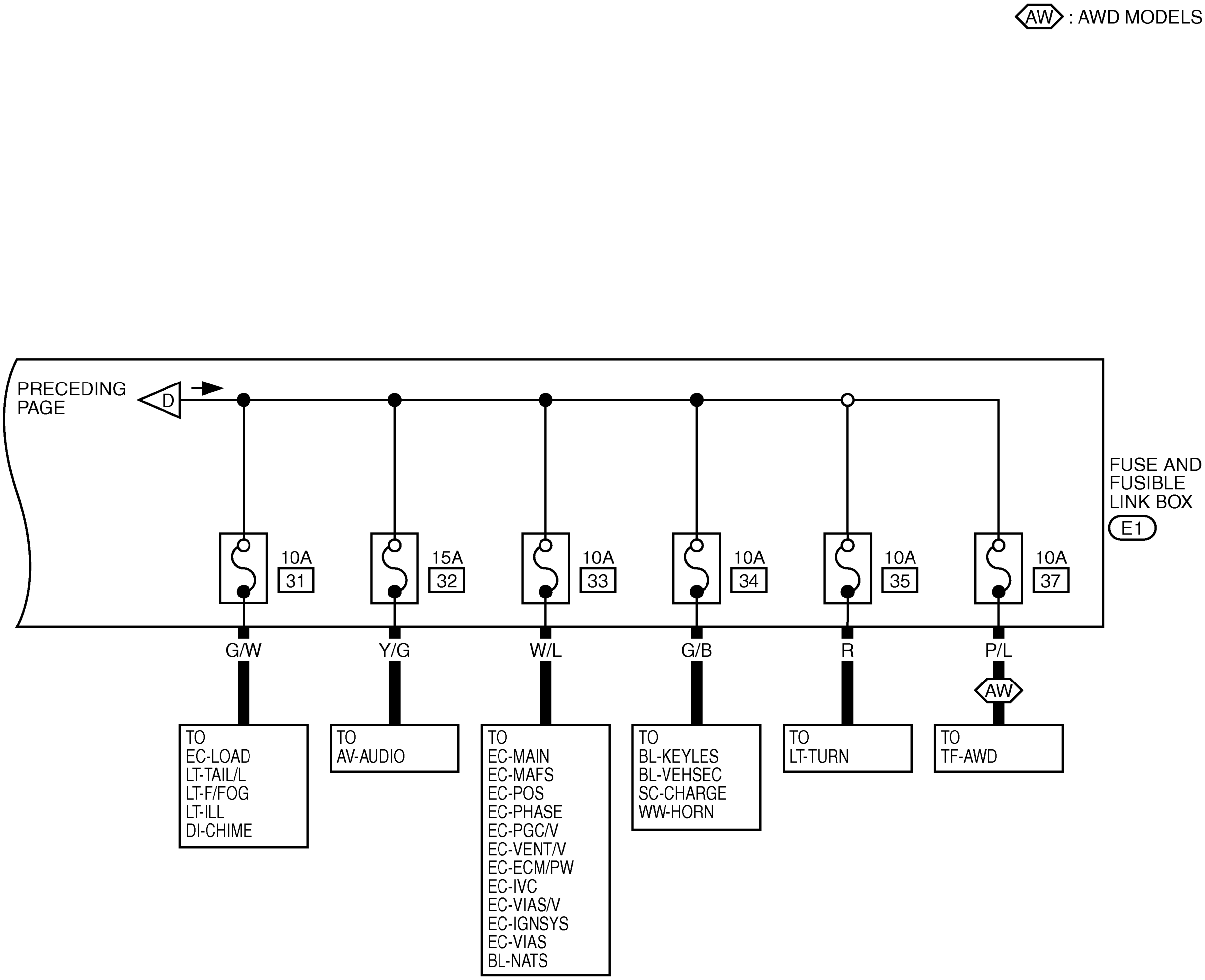
PG-POWER-02

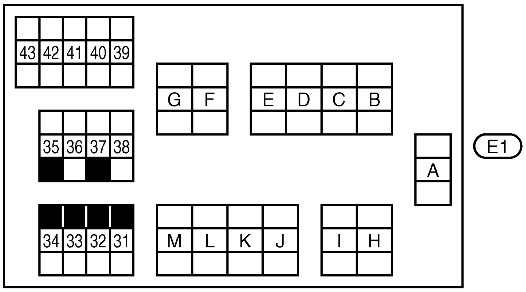




TKWB0204E

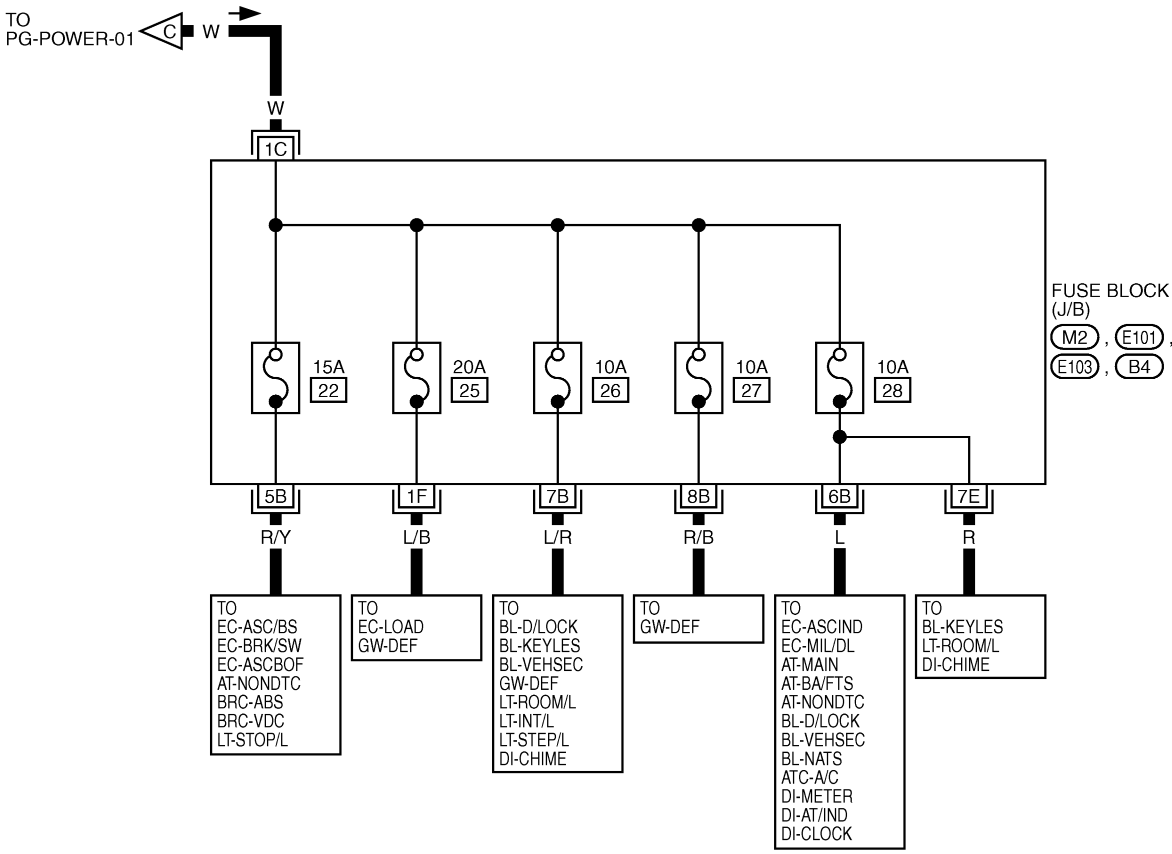
PG-POWER-03





TKWB0205E

PG-POWER-04



REFER TO THE FOLLOWING.

M2 , E101 , E103 , B4
-FUSE BLOCK-JUNCTION BOX
(J/B)

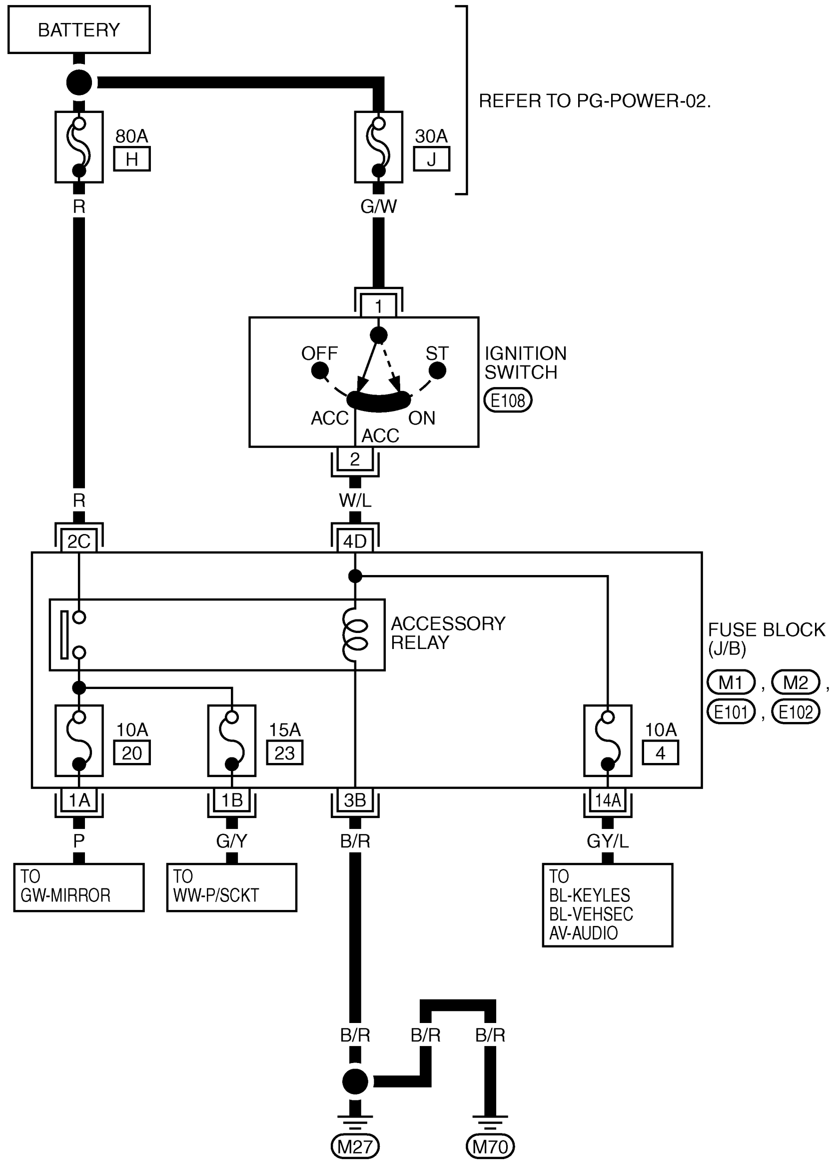
28		20	15	10	5
	24	19	14	9	4
27	23	18	13	8	3
26	22	17	12	7	2
25	21	16	11	6	1

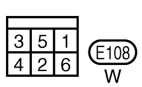
UP

TKWB0206E

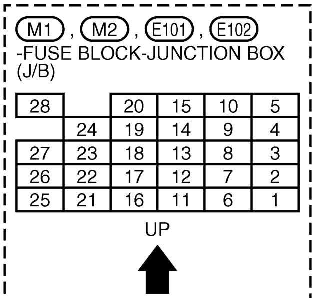
ACCESSORY POWER SUPPLY - IGNITION SW. IN “ACC” OR “ON”

PG-POWER-05



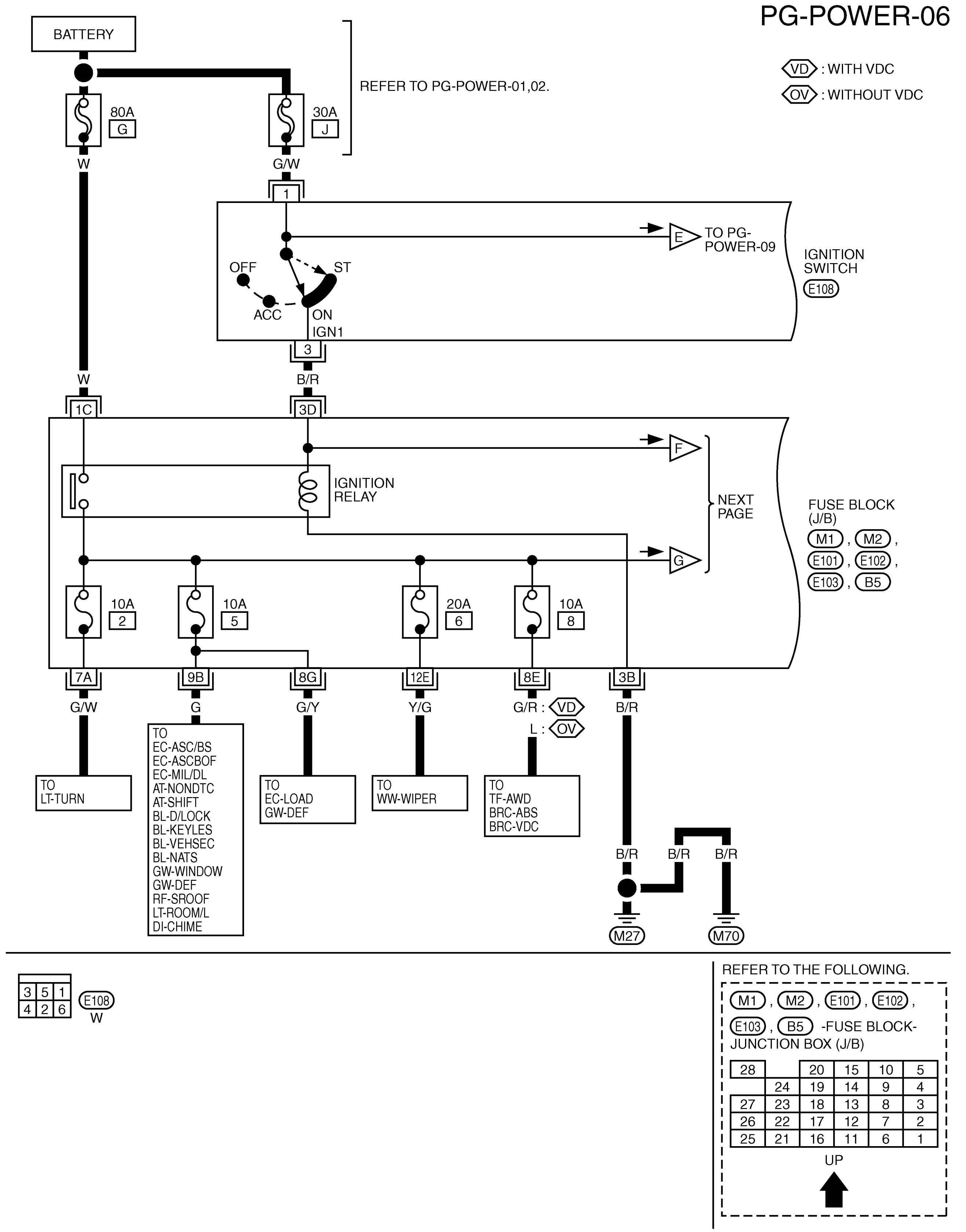


REFER TO THE FOLLOWING.

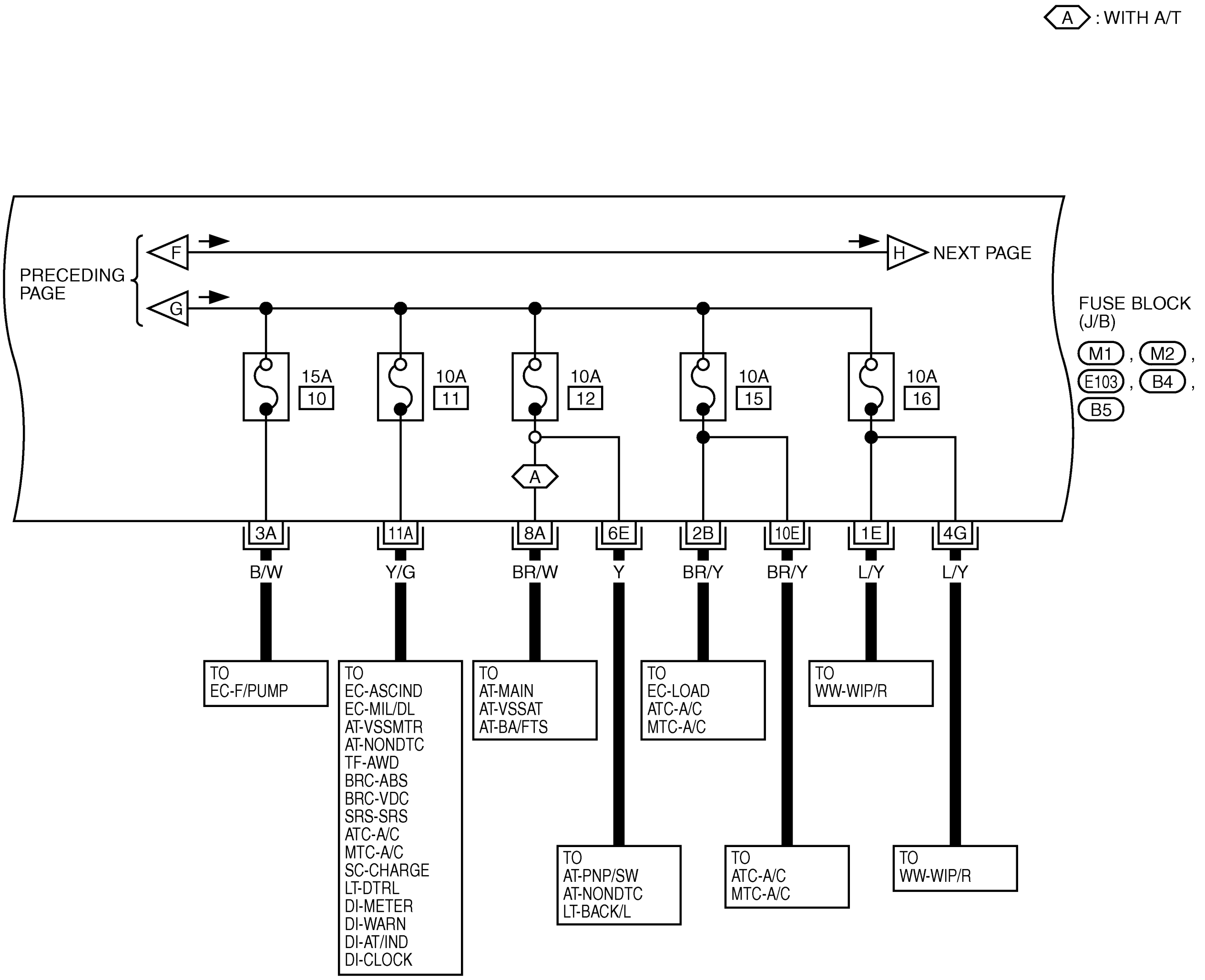


TKWB0207E

IGNITION POWER SUPPLY - IGNITION SW. IN “ON” AND/OR “START”



PG-POWER-07



REFER TO THE FOLLOWING.

M1 , M2 , E103 , B4 , B5 -FUSE BLOCK-JUNCTION BOX (J/B)

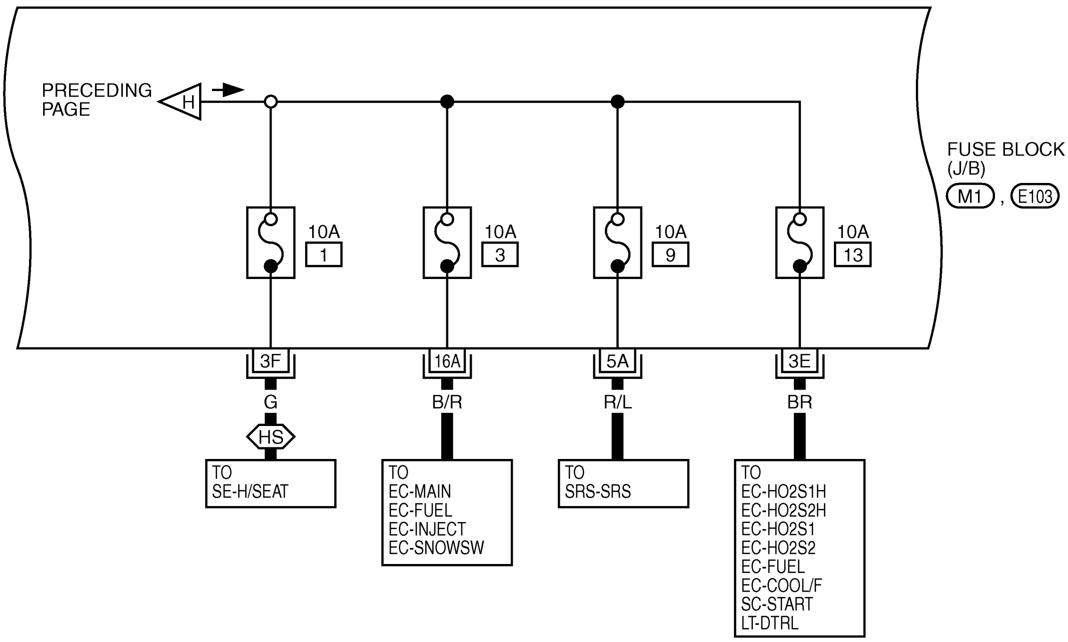
28		20	15	10	5
	24	19	14	9	4
27	23	18	13	8	3
26	22	17	12	7	2
25	21	16	11	6	1

UP

TKWB0209E

PG-POWER-08

HS : WITH HEATED SEAT



REFER TO THE FOLLOWING.

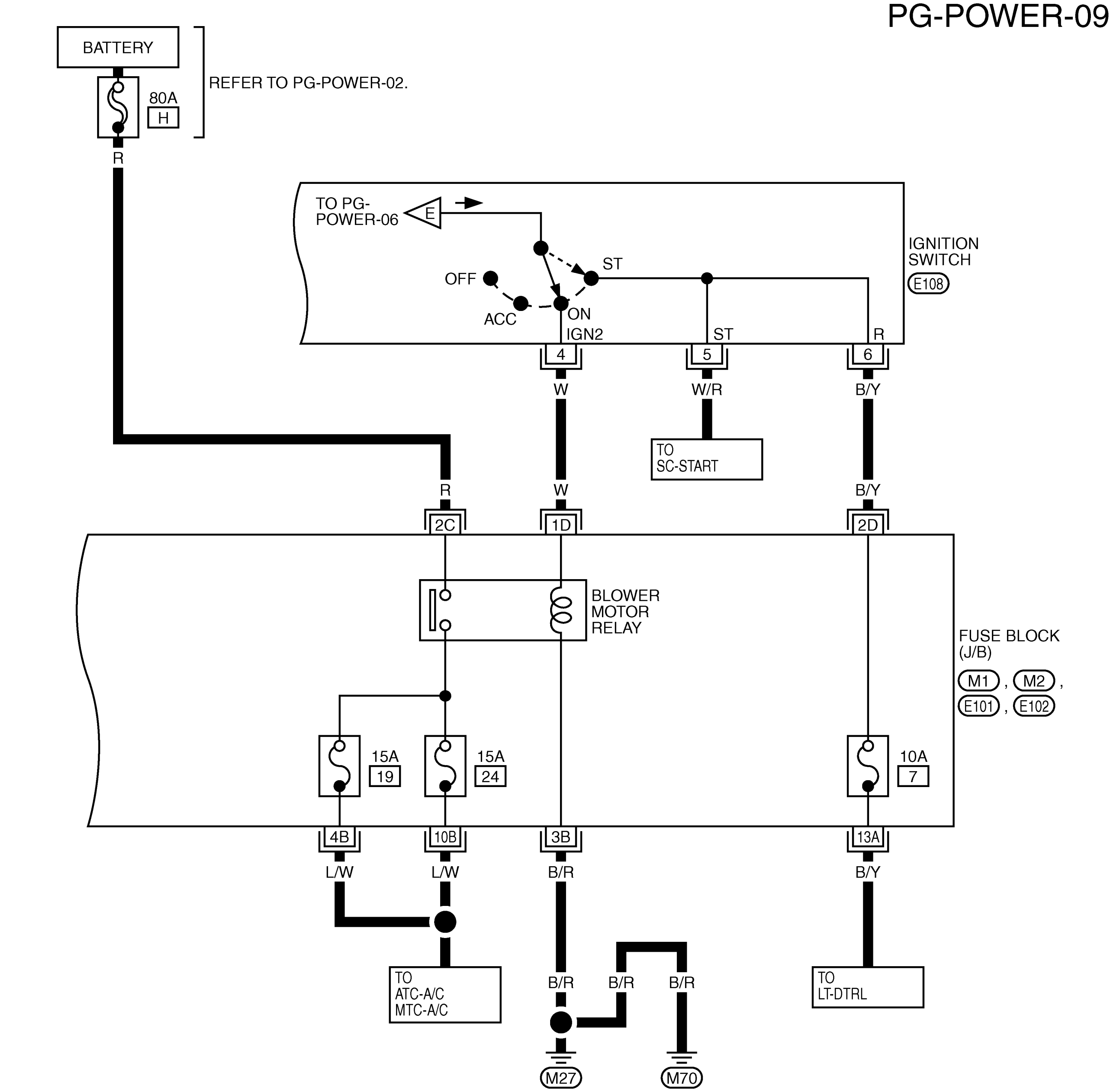
M1 , E103 -FUSE BLOCK-JUNCTION BOX (J/B)

28		20	15	10	5
	24	19	14	9	4
27	23	18	13	8	3
26	22	17	12	7	2
25	21	16	11	6	1

UP

TKWB0210E

PG-POWER-09



3	5	1
4	2	6

E108
W

REFER TO THE FOLLOWING.

M1 , M2 , E101 , E102
-FUSE BLOCK-JUNCTION BOX (J/B)

28		20	15	10	5
	24	19	14	9	4
27	23	18	13	8	3
26	22	17	12	7	2
25	21	16	11	6	1

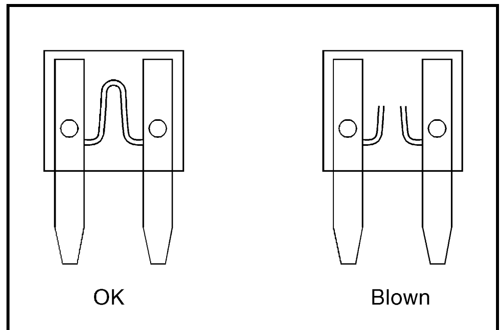
UP

TKWB0211E

Fuse

AKS00BET

- If fuse is blown, be sure to eliminate cause of malfunction before installing new fuse.
- Use fuse of specified rating. Never use fuse of more than specified rating.
- Do not partially install fuse; always insert it into fuse holder properly.
- Remove fuse for “ELECTRICAL PARTS (BAT)” if vehicle is not used for a long period of time.



CEL083

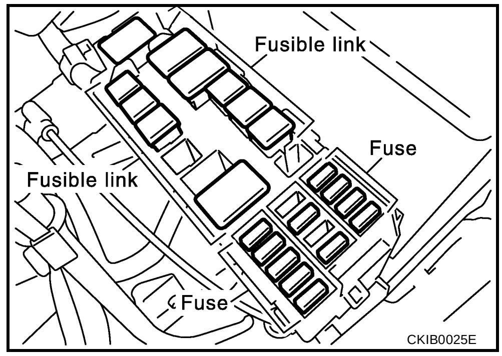
Fusible Link

AKS00BEU

A melted fusible link can be detected either by visual inspection or by feeling with finger tip. If its condition is questionable, use circuit tester or test lamp.

CAUTION:

- **If fusible link should melt, it is possible that critical circuit (power supply or large current carrying circuit) is shorted. In such a case, carefully check and eliminate cause of malfunction.**
- **Never wrap outside of fusible link with vinyl tape. Important: Never let fusible link touch any other wiring harness, vinyl or rubber parts.**

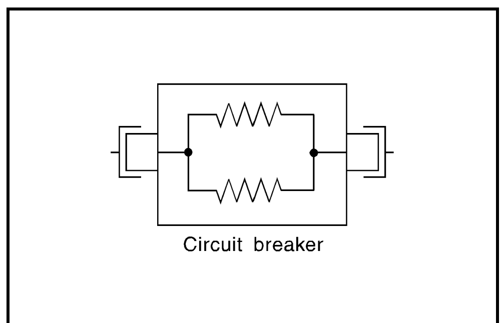


CKIB0025E

Circuit Breaker

AKS00BEV

The PTC thermistor generates heat in response to current flow. The temperature (and resistance) of the thermistor element varies with current flow. Excessive current flow will cause the element's temperature to rise. When the temperature reaches a specified level, the electrical resistance will rise sharply to control the circuit current.
Reduced current flow will cause the element to cool. Resistance falls accordingly and normal circuit current flow is allowed to resume.



SEL109W

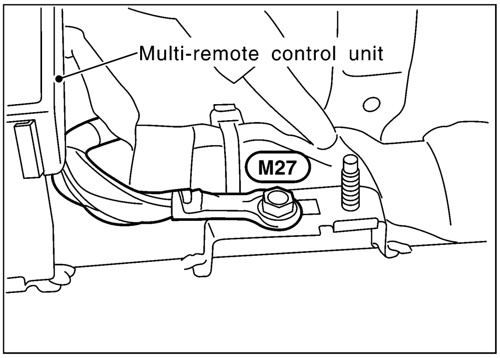
GROUND

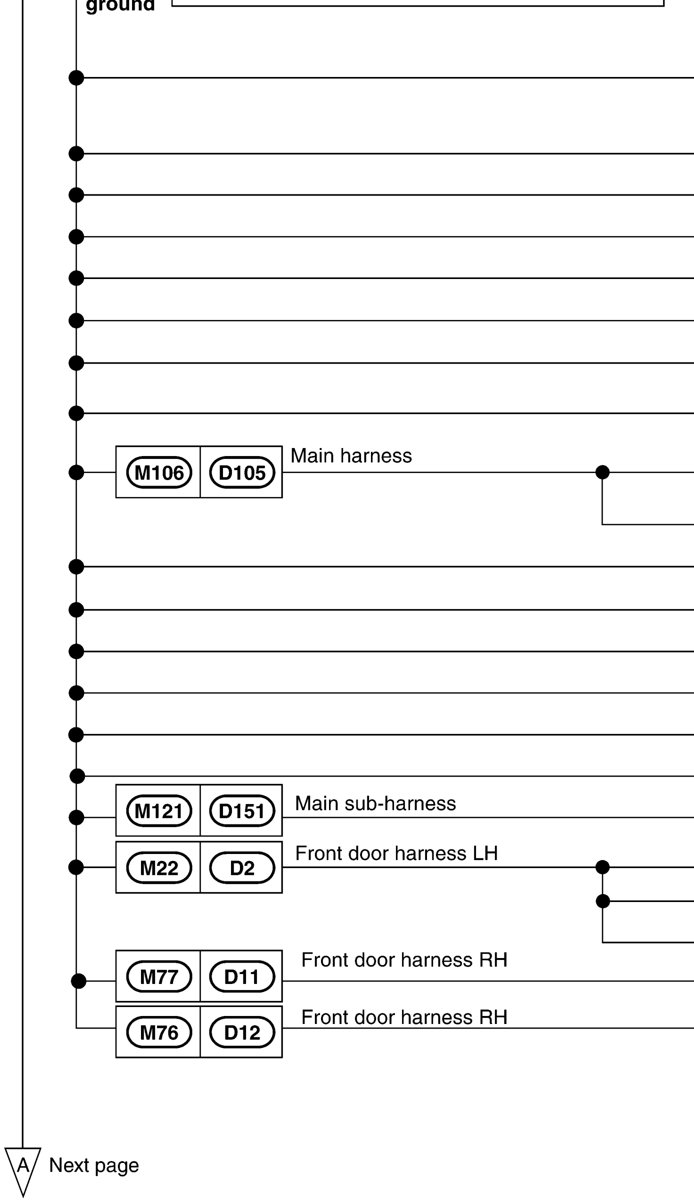
PFP:00011

Ground Distribution

AKS00BEW

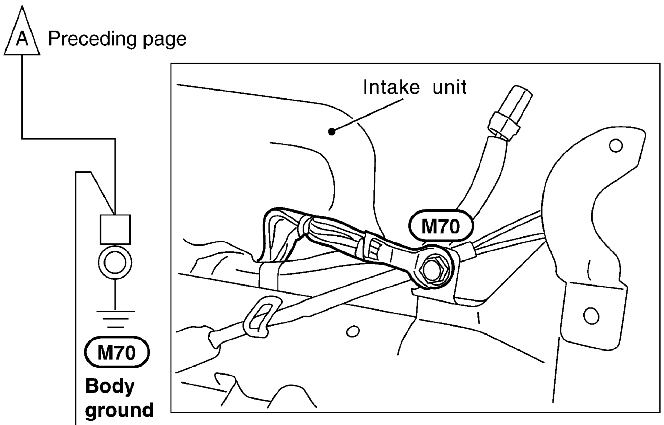
MAIN HARNESS





CON-NECTOR NUMBER	CONNECT TO
M2	Fuse block (J/B) (Terminal No.3B) • Accessory relay • Ignition relay • Blower motor relay
M3	Power window relay
M5	Data link connector (Terminal No.4)
M5	Data link connector (Terminal No.5)
M25	VDC offswitch (With VDC)
M32	Combination flasher unit
M39	AWD mode switch
M44	Combination meter (Terminal No.19) • High beam indicator
M54	Heater control panel (Terminal No.13) (With manual A/C)
M67	Fan control amp. (With auto A/C)
M59	Air bag diagnosis sensor unit (Terminal No.2)
M81	Steering angle sensor (With VDC)
M89	Illumination control swith
M107	AWD control unit (Terminal No.10)
M107	AWD control unit (Terminal No.11)
M122	Snow mode switch
M152	Clutch interlock swith (With M/T)
D3	Door mirror actuator (Driver side)
D6	Power window main switch
D8	Door key cylinder switch (Driver side)
D18	Door key cylinder switch (Passenger side)
D20	Door lock/unlock switch (Passenger side)

CKIB0026E



CON-NECTOR NUMBER	CONNECT TO
M26	Door mirror remote control switch
M35	Front power socket
M37	Mode door motor (With auto A/C)
M38	Air mix door motor (With auto A/C)
M44	Combination meter (Terminal No.21) • CPU
M45	Combination meter (Terminal No.64) • Turn signal • Front fog
M47	Intake door motor (With auto A/C)
M50	Rear window defogger switch (Terminal No.2)
M50	Rear window defogger switch (Terminal No.4)
M52	A/C auto amp. (With auto A/C)
M55	Heater control panel (Terminal No.5) (With manual A/C)
M58	A/T device (Terminal No.6)
M58	A/T device (Terminal No.2)
M91	Smart entrance control unit (Terminal No.43)
M92	Smart entrance control unit (Terminal No.64)
M118	ECM (Terminal No.115)
M118	ECM (Terminal No.116)
E109	NATS IMMU
F13	Shield wire (Knock sensor)
B31	Fuel level sensor unit
R2	Map lamp (Without sunroof)
R3	Sunroof switch
R11	Map lamp (With sunroof)
D14	Door mirror actuator (Passenger side)

M15 E107 Engine room harness

M62 F42 Engine control harness

M18 B2 Body harness

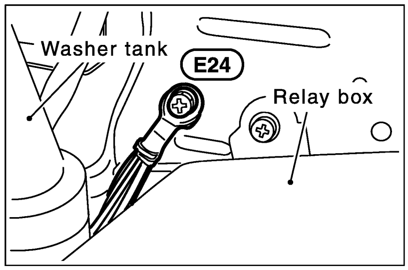
M73 R1 Room lamp harness

M77 D11 Front door harness RH

CKIB0027E

ENGINE ROOM HARNESS

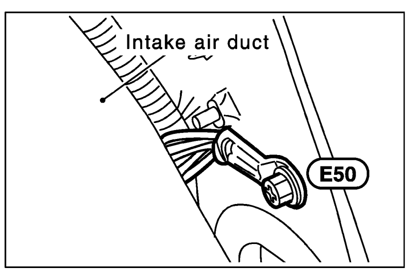
E24
Body ground



CON-NECTOR NUMBER	CONNECT TO
E7	Front fog lamp relay
E11	Cooling fan relay-3
E13	Daytime light relay LH
E16	Daytime light relay RH
E43	Parking lamp LH
E45	Front fog lamp LH
E83	Front side markerlamp LH

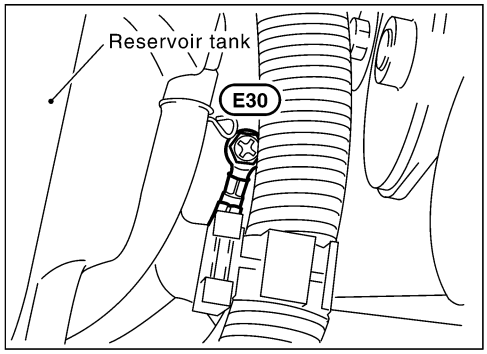
CON-NECTOR NUMBER	CONNECT TO
E19	Brake fluid level switch
E20	Side turn signal lamp RH
E25	Front turn signal lamp RH
E47	Front turn signal lamp LH
E48	Side turn signal lamp LH

E50
Body ground



CON-NECTOR NUMBER	CONNECT TO
E18	Front wiper motor
E26	Headlamp RH
E27	Front fog lamp RH
E29	Parking lamp RH
E41	Cooling fan motor-1
E42	Cooling fan motor-2
E54	Hood switch
E81	Washer level sensor
E82	Front side makerlamp RH
E112	Combination switch (Terminal No.17) (Front wiper and washer switch)
E112	Combination switch (Terminal No.24) (Rear wiper and washer switch)
E115	Daytime light control unit

CKIB0028E



E30

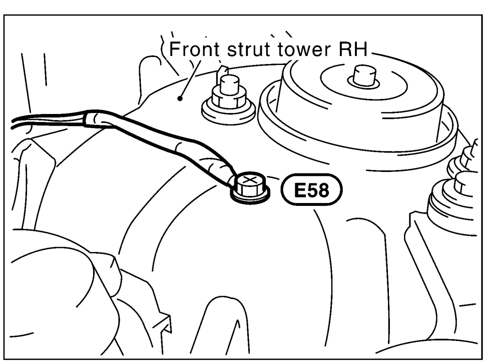
Body ground

CON-NECTOR NUMBER	CONNECT TO
E33	Alternator (E)

E58

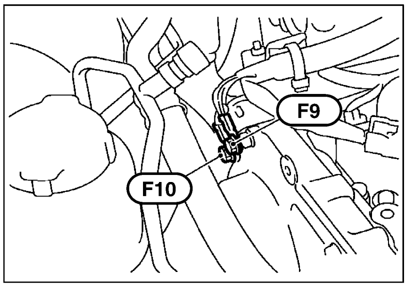
Body ground

CON-NECTOR NUMBER	CONNECT TO
E69	ABS actuator and electric unit (Control unit) (Without VDC) (Terminal No. 16)
E69	ABS actuator and electric unit (Control unit) (Without VDC) (Terminal No. 30)
E122	VDC/TCS/ABS control unit (With VDC) (Terminal No. 28)
E122	VDC/TCS/ABS control unit (With VDC) (Terminal No. 29)



CKIB0029E

ENGINE CONTROL HARNESS



F9
Engine ground

CON-NECTOR NUMBER	CONNECT TO
F16	Shield wire [Electric throttle control actuator (Throttle position sensor)] (For circuit from terminal No.1)
F16	Shield wire [Electric throttle control actuator (Throttle position sensor)] (For circuit from terminal No.2, 4, 5)
F16	Shield wire [Electric throttle control actuator (Throttle control motor)] (For circuit from terminal No.3, 6)
F47	TCM (Transmission control module) (Terminal No.25)
F47	TCM (Transmission control module) (Terminal No.48)

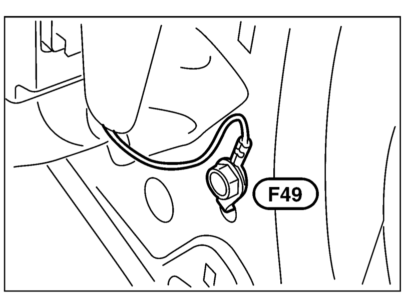
CON-NECTOR NUMBER	CONNECT TO
F24	Park/Neutral position switch (With A/T)
F26	Park/Neutral position switch (With M/T)

F10
Engine ground

CON-NECTOR NUMBER	CONNECT TO
F4	Ignition coil No.1 (With power transistor)
F5	Ignition coil No.2 (With power transistor)
F6	Ignition coil No.3 (With power transistor)
F7	Ignition coil No.4 (With power transistor)
F8	Condenser

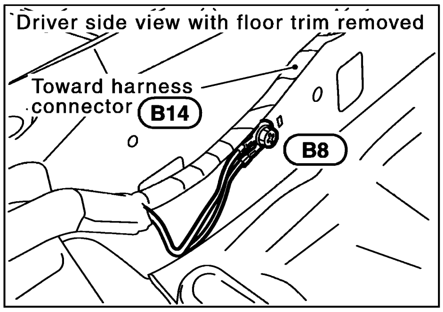
CON-NECTOR NUMBER	CONNECT TO
F43	ECM (Terminal No.1)
F14	Crankshaft position sensor (POS)
F20	Camshaft position sensor (PHASE)

F49
Engine ground



CKIB0030E

BODY HARNESS



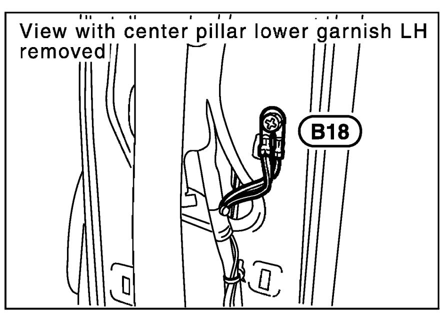
B8
Body ground

CON-NECTOR NUMBER	CONNECT TO
B10	Seat belt buckle switch (Driver side) (Without power seat)
B11	Heated seat LH (Without power seat)
B16	Front door switch (Driver side)
B23	Rear power socket
B31	Fuel pump
B33	Condenser
B302	Seat belt buckle switch (Driver side) (With power seat)
B303	Heated seat LH (With power seat)
B308	Power seat switch (Driver side) (With power seat)

B41 B301 Front power seat (Driver side) sub-harness*

B41 B301 Front power seat (Driver side) sub-harness*

*: This sub-harness is not shown in "HARNESS LAYOUT".

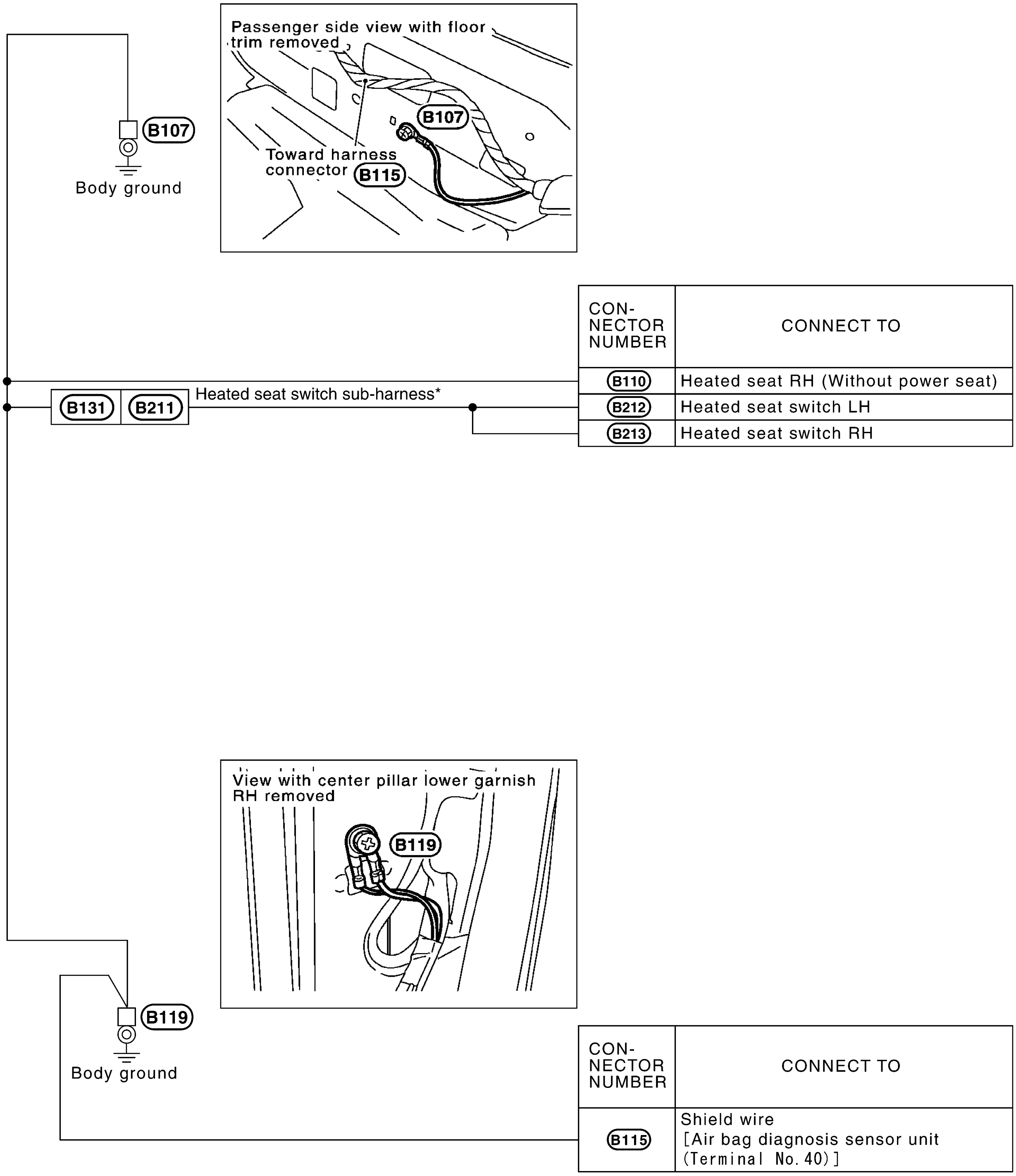


B18
Body ground

CON-NECTOR NUMBER	CONNECT TO
B14	Shield wire [Air bag]diagnosis sensor unit (Terminal No. 44)]
B24	Rear combination lamp RH • Stop lamp • Tail lamp • Turn signal • Back-up
B28	Rear combination lamp LH • Stop lamp • Tail lamp • Turn signal • Back-up
B42	Rearside markerlamp RH
B43	Rearside markerlamp LH

CKIB0031E

BODY NO. 2 HARNESS



CON-NECTOR NUMBER	CONNECT TO
B110	Heated seat RH (Without power seat)
B212	Heated seat switch LH
B213	Heated seat switch RH

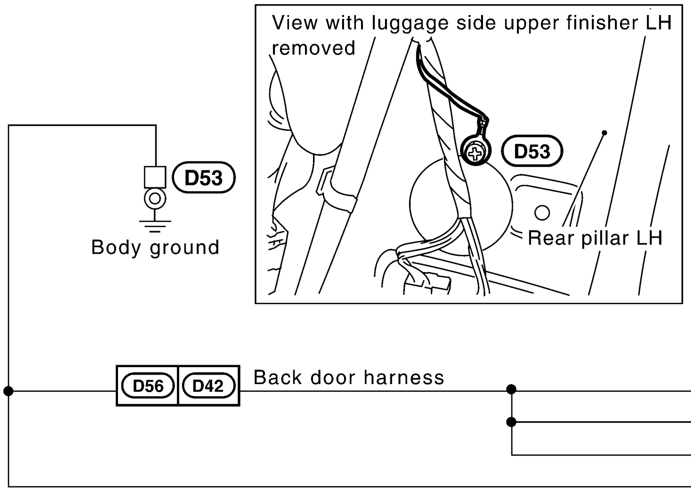
CON-NECTOR NUMBER	CONNECT TO
B115	Shield wire [Air bag diagnosis sensor unit (Terminal No. 40)]

* : This sub-harness is not shown in "HARNESS LAYOUT".

CKIB0032E

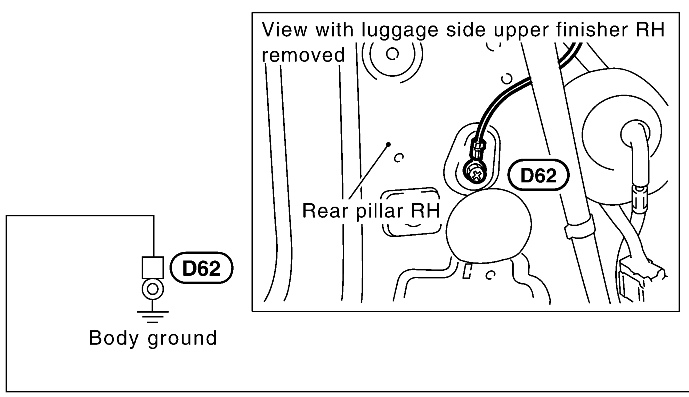
BACK DOOR SUB HARNESS/REAR WINDOW DEFOGGER HARNESS

BACK DOOR SUB-HARNESS



CONNECTOR NUMBER	CONNECT TO
D43	Rear wiper motor
D44	License plate lamp
D45	Back door switch
D55	High-mounted stop lamp

REAR WINDOW DEFOGGER HARNESS



CONNECTOR NUMBER	CONNECT TO
D61	Rear window defogger (–)

CKIA0376E

HARNESS

PFP:00011

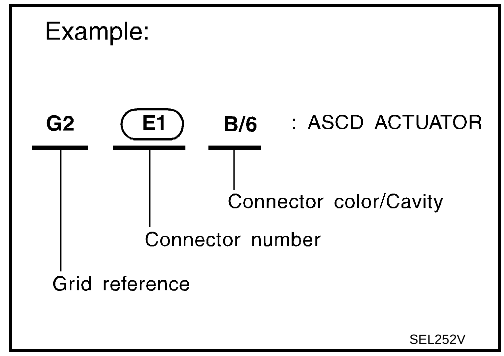
Harness Layout

AKS00BEX

HOW TO READ HARNESS LAYOUTS

The following Harness Layouts use a map style grid to help locate connectors on the figures:

- Main Harness
- Engine Room Harness (Engine Compartment)



SEL252V

To Use the Grid Reference

1. Find the desired connector number on the connector list.
2. Find the grid reference.
3. On the figure, find the crossing of the grid reference letter column and number row.
4. Find the connector number in the crossing zone.
5. Follow the line (if used) to the connector.

CONNECTOR SYMBOL

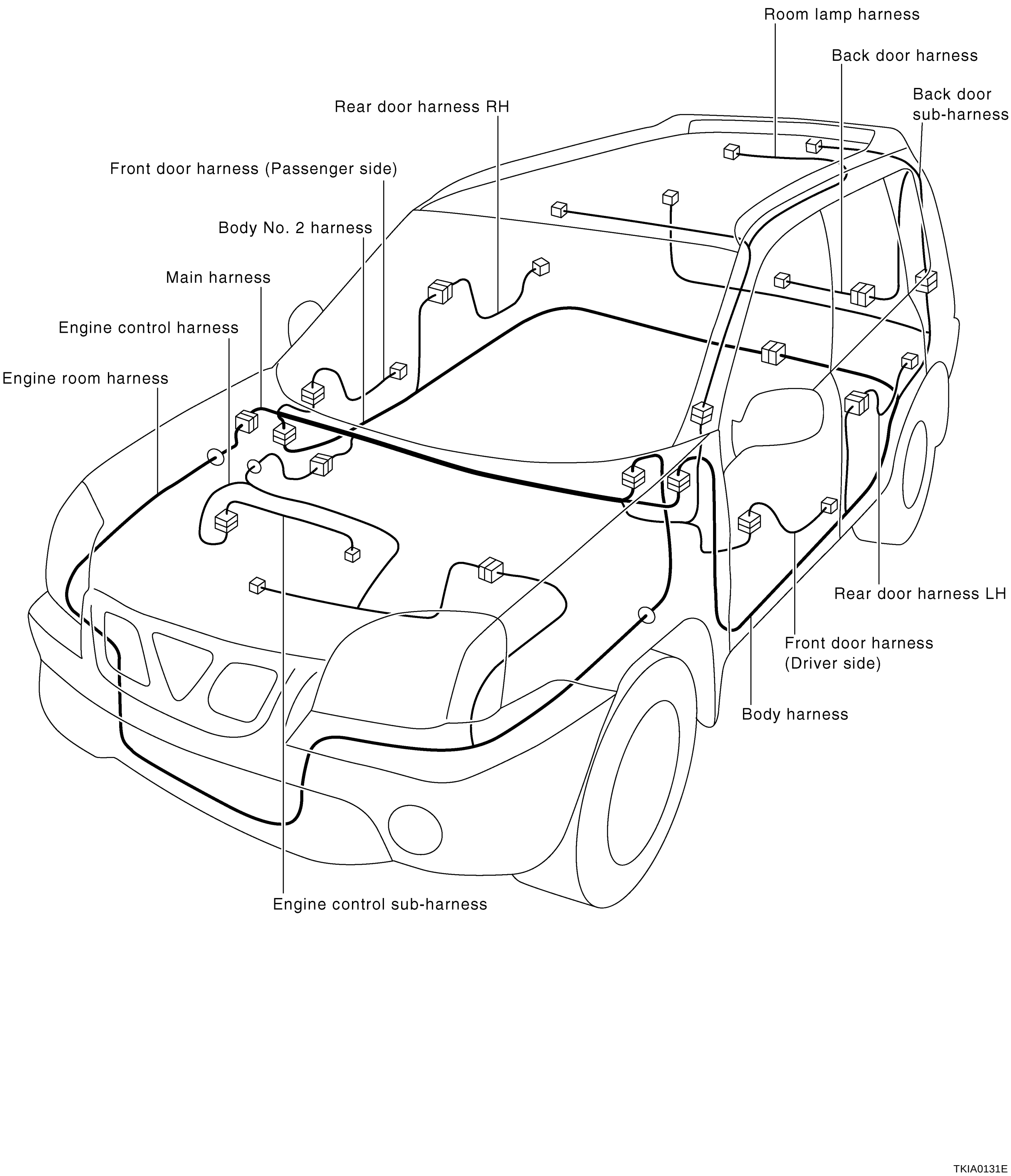
Main symbols of connector (in Harness Layout) are indicated in the below.

Connector type	Water proof type		Standard type	
	Male	Female	Male	Female
• Cavity: Less than 4 • Relay connector				
• Cavity: From 5 to 8				
• Cavity: More than 9	—	—		
• Ground terminal etc.	—			

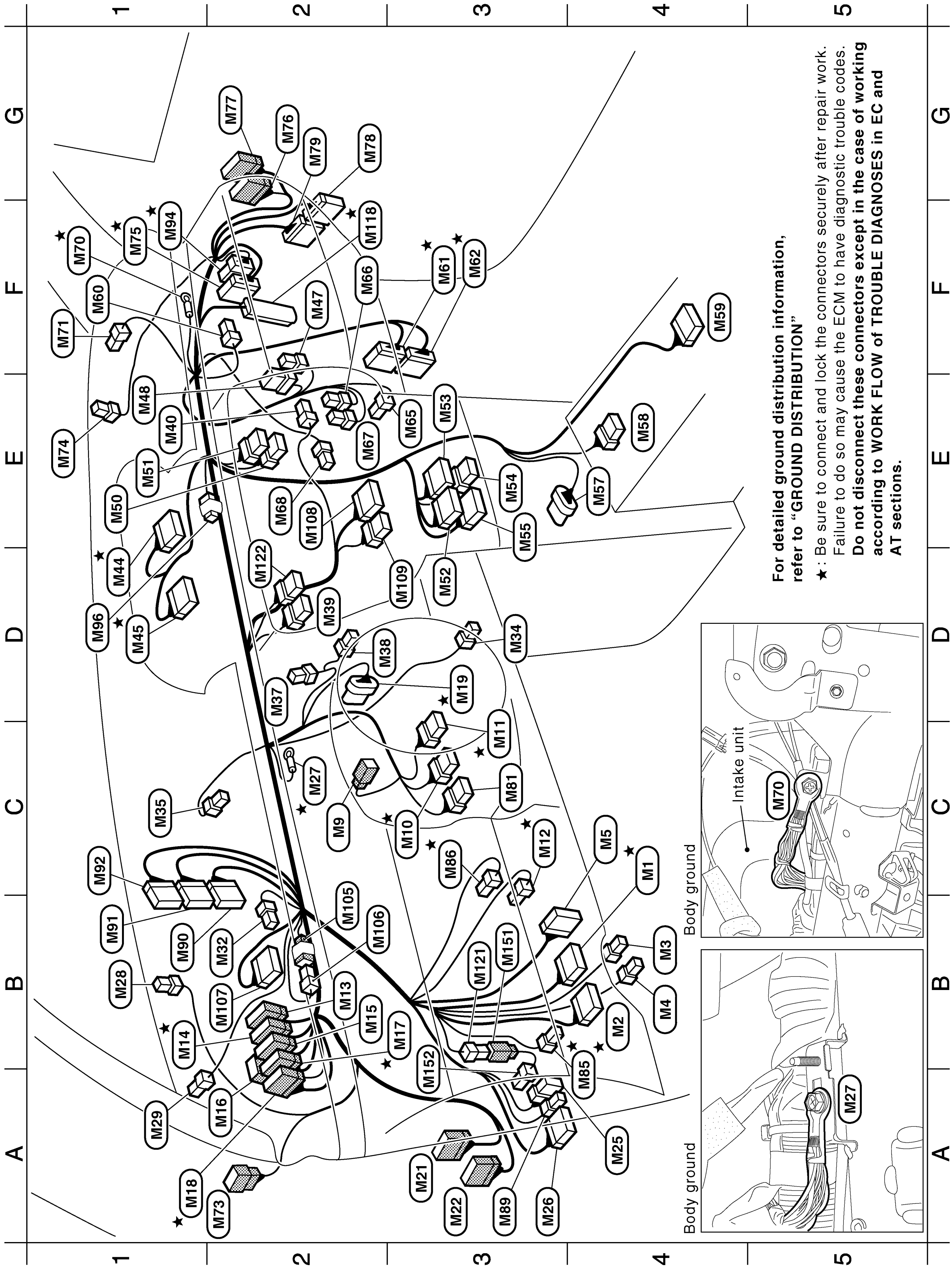
SKIA0404E

A B C D E F G H I J PG L M

OUTLINE


Room lamp harness
Back door harness
Back door sub-harness
Rear door harness RH
Front door harness (Passenger side)
Body No. 2 harness
Main harness
Engine control harness
Engine room harness
Rear door harness LH
Front door harness (Driver side)
Body harness
Engine control sub-harness
TKIA0131E

MAIN HARNESS



TKIB0041E

C4	★M1	W/16	Fuse block (J/B)
B4	★M2	W/10	Fuse block (J/B)
B4	M3	L/4	Power window relay
B4	M4	W/2	Circuit breaker (PTC)
C4	M5	W/16	Data link connector
C2	M9	BR/2	Key switch
C3	★M10	Y/6	Combination switch (Spiral cable)
C3	★M11	GY/8	Combination switch (Spiral cable)
C3	★M12	W/4	Stop lamp switch (With A/T)
		B/2	Stop lamp switch (With M/T)
B2	M13	W/12	To E105
B1	★M14	BR/16	To E106
B2	M15	W/16	To E107
A2	M16	W/6	To B3
B3	★M17	W/10	To B1
A1	★M18	BR/20	To B2
D3	★M19	GY/6	Accelerator pedal position sensor
A3	M21	W/16	To D1
A3	M22	BR/12	To D2
A4	M25	GY/6	VDC off switch (With VDC)
A3	M26	W/10	Door mirror remote control switch
C2	★M27	–	Body ground
B1	M28	BR/2	Security indicator lamp
A1	M29	BR/2	Tweeter LH
B2	M32	B/3	Combination flasher unit
D3	M34	W/2	In-vehicle sensor (With auto A/C)

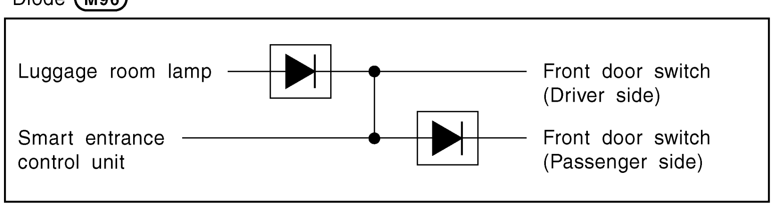
C1	M35	B/2	Front power socket
D2	M37	W/3	Mode door motor (With auto A/C)
D2	M38	W/3	Air mix door motor (With auto A/C)
D2	M39	GY/8	AWD mode switch (AWD models)
E1	M40	W/2	Roof antenna (Via sub-harness)
D1	★M44	W/40	Combination meter
D1	★M45	W/24	Combination meter
F2	M47	W/3	Intake door motor (With auto A/C)
E1	M48	B/6	Intake door motor (With manual A/C)
E1	M50	W/6	Rear window defogger switch (With manual A/C)
E1	M51	W/8	Hazard switch
D3	M52	GY/20	A/C auto amp. (With auto A/C)
E3	M53	GY/16	A/C auto amp. (With auto A/C)
E3	M54	W/6	Fan switch (With manual A/C)
E3	M55	W/12	Heater control panel (With manual A/C)
E4	M57	W/5	G sensor (AWD models)
E4	M58	W/6	A/T device (With A/T)
F4	M59	Y/20	Air bag diagnosis sensor unit
F1	M60	Y/2	Front passenger air bag module
F3	★M61	BR/24	To F41
F3	★M62	W/16	To F42
E3	M65	W/2	Blower motor
F2	M66	BR/4	Fan resistor (With manual A/C)
E2	M67	W/4	Fan control amp. (With auto A/C)
E2	M68	W/4	Intake sensor (With auto A/C)
F1	★M70	–	Body ground
F1	M71	BR/2	Tweeter RH

A2	M73	W/8	To R1
E1	M74	B/2	Sunload sensor (With auto A/C)
F1	★M75	BR/20	To E116 (AWD models)
G2	M76	BR/12	To D12
G2	M77	W/12	To D11
G2	M78	W/12	To B105
G2	M79	W/10	To B106
C3	M81	W/8	Steering angle sensor (With VDC)
A4	★M85	L/2	ASCD clutch switch (With M/T)
C3	★M86	BR/2	ASCD brake switch
A3	M89	W/3	Illumination control switch
B1	M90	W/24	Smart entrance control unit
B1	M91	GY/24	Smart entrance control unit
C1	M92	GY/16	Smart entrance control unit
F1	★M94	W/8	To E125 (2WD models)
D1	M96	L/4	Diode
B2	M105	B/2	To M106
B2	M106	B/2	To M105
B2	M107	W/16	AWD control unit (AWD models)
E2	M108	W/10	Audio unit
D3	M109	W/6	Audio unit
F2	★M118	SMJ	ECM
B3	M121	W/2	To M151 (With M/T)
D2	M122	BR/6	Snow mode switch (2WD models)

Main sub-harness

B3	M151	W/2	To M121 (With M/T)
B3	M152	L/2	Clutch inter lock switch (With M/T)

Diode M96

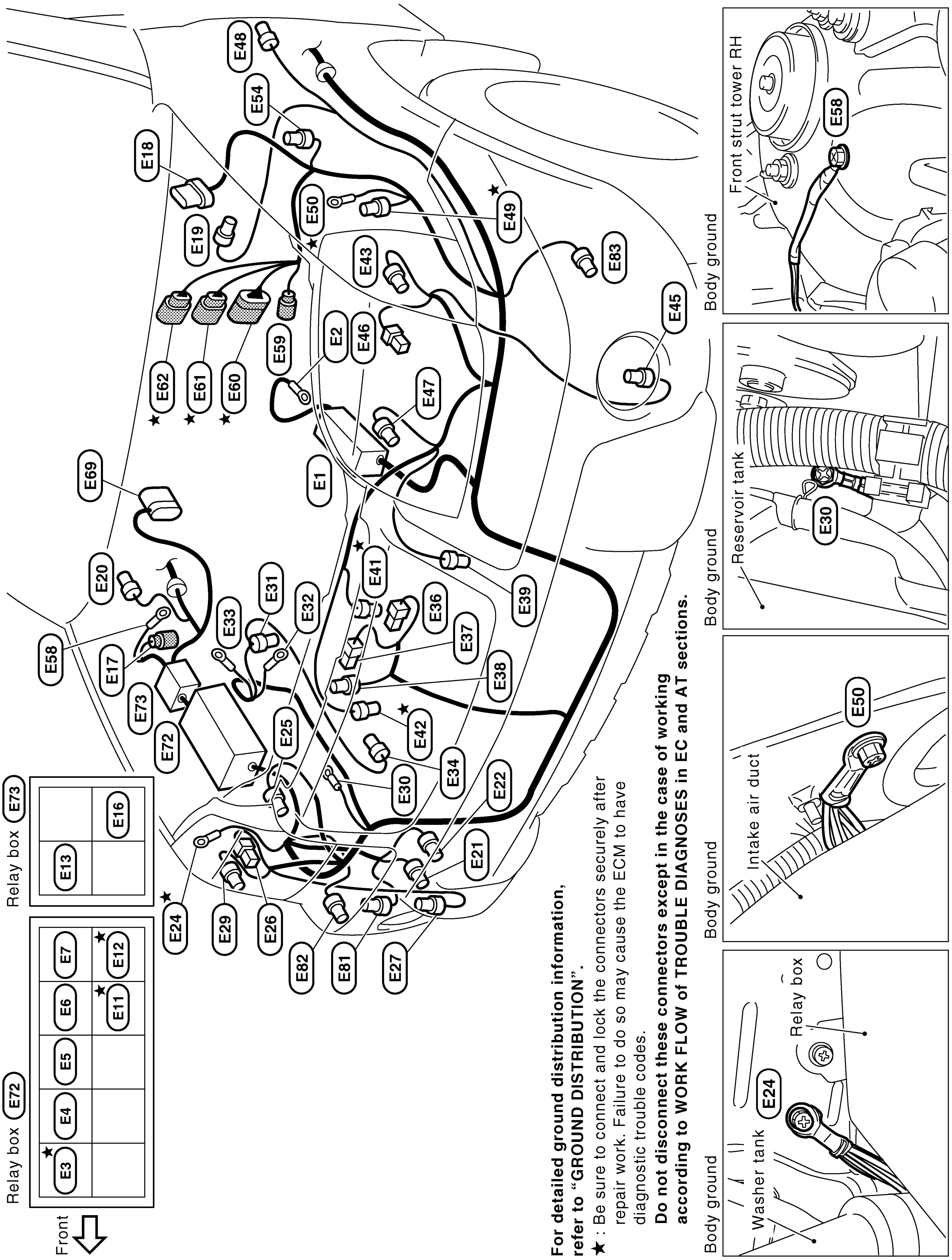


★ : Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes. **Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.**

TKIB0042E

ENGINE ROOM HARNESS

Engine Compartment for 2WD Models



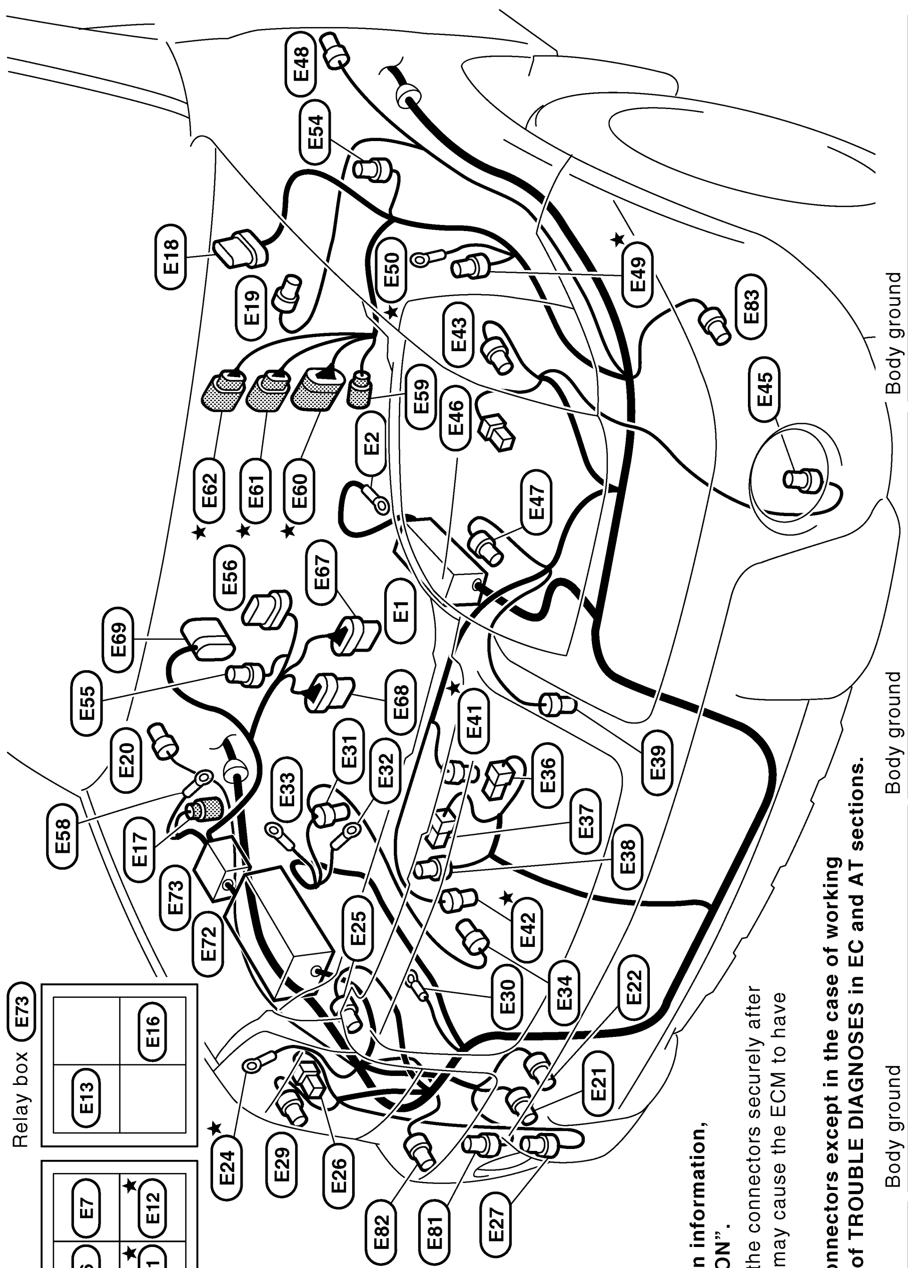
TKIB0045E

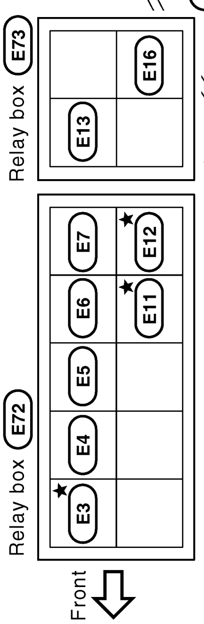
E2		E1	–	Fuse and Fusible link box
F2		E2	–	Battery (+)
A1	★	E3	BR/6	Cooling fan relay-1
A1		E4	W/3	Horn relay
B1		E5	L/4	Air conditioner relay
B1		E6	L/4	Park/Neutral position relay
B1		E7	L/4	Front fog lamp relay
B1	★	E11	BR/6	Cooling fan relay-3
B1	★	E12	L/4	Throttle control motor relay
C1		E13	L/4	Daytime light relay LH
C1		E16	L/4	Daytime light relay RH
D1		E17	GY/2	Front wheel sensor RH
G1		E18	GY/5	Front wiper motor
F2		E19	GY/2	Brake fluid level switch
D1		E20	BR/2	Side turn signal lamp RH
C3		E21	GY/2	Front washer motor
C3		E22	BR/2	Rear washer motor
B1	★	E24	–	Body ground
C2		E25	GY/2	Front turn signal lamp RH
B2		E26	B/3	Headlamp RH
B3		E27	–/2	Front fog lamp RH
B2		E29	GY/3	Parking lamp RH
C3		E30	–	Body ground
D2		E31	GY/2	Alternator
D2		E32	–	Alternator
D2		E33	–	Alternator
C3		E34	B/1	Compressor
D3		E36	B/1	Horn high
D3		E37	B/1	Horn low
D3		E38	B/2	Ambient sensor
D3		E39	B/3	Refrigerant pressure sensor
D2	★	E41	GY/2	Cooling fan motor-1
C3	★	E42	GY/4	Cooling fan motor-2
F2		E43	GY/3	Parking lamp LH
F4		E45	–/2	Front fog lamp LH
F2		E46	B/3	Headlamp LH
E3		E47	GY/2	Front turn signal lamp LH
G2		E48	BR/2	Side turn signal lamp LH
F3	★	E49	GY/2	Dropping resistor
F2	★	E50	–	Body ground
G2		E54	GY/2	Hood switch
D1		E58	–	Body ground
F2		E59	L/2	Front wheel sensor LH
E2	★	E60	GY/9	To F36
E2	★	E61	DGY/8	To F38
E1	★	E62	GY/8	To F37
E1		E69	SMJ	ABS actuator and electric unit
A1, C1		E72	–	Relay box
C1, D1		E73	–	Relay box
B2		E81	BR/2	Washer level sensor
B2		E82	GY/2	Front side marker lamp RH
F4		E83	GY/2	Front side marker lamp LH

★: Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes. **Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.**

TKIB0046E

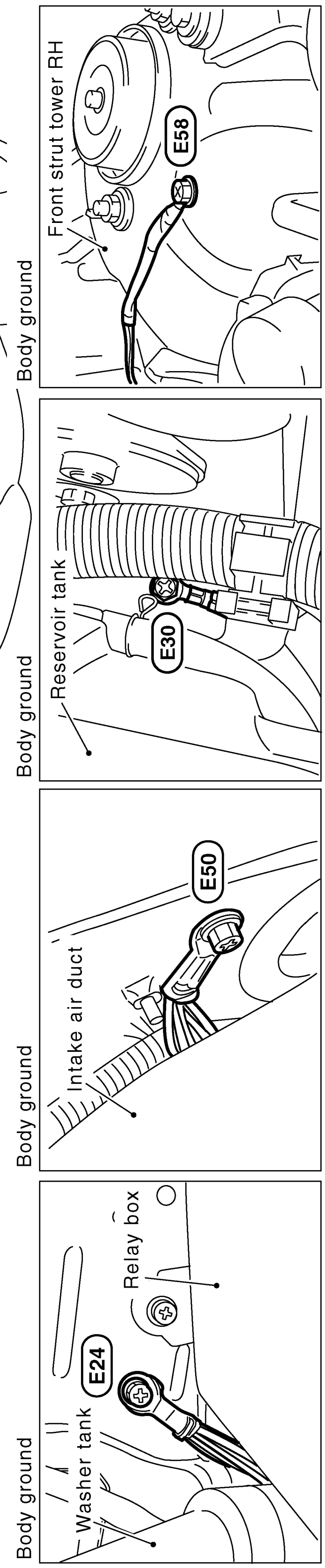
Engine Compartment for AWD Models





For detailed ground distribution information, refer to "GROUND DISTRIBUTION".

★ : Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes.
Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.



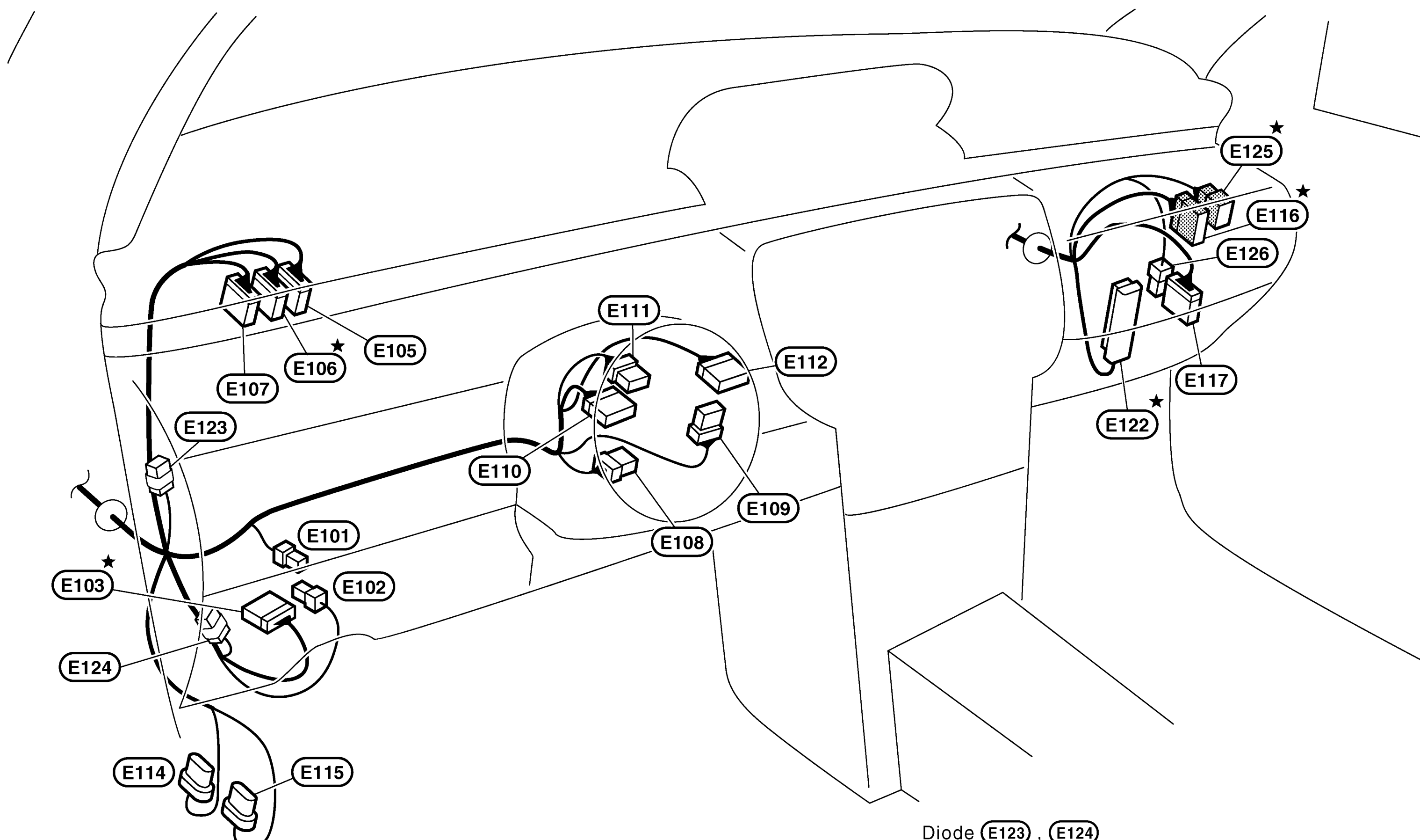
TKIB0043E

E2		E1	–	Fuse and Fusible link box
F2		E2	–	Battery (+)
A1	★	E3	BR/6	Cooling fan relay-1
A1		E4	W/3	Horn relay
B1		E5	L/4	Air conditioner relay
B1		E6	L/4	Park/Neutral position relay
B1		E7	L/4	Front fog lamp relay
B1	★	E11	BR/6	Cooling fan relay-3
B1	★	E12	L/4	Throttle control motor relay
C1		E13	L/4	Daytime light relay LH
C1		E16	L/4	Daytime light relay RH
D1		E17	GY/2	Front wheel sensor RH
F1		E18	GY/5	Front wiper motor
F2		E19	GY/2	Brake fluid level switch
D1		E20	BR/2	Side turn signal lamp RH
C3		E21	GY/2	Front washer motor
C3		E22	BR/2	Rear washer motor
B1	★	E24	–	Body ground
C2		E25	GY/2	Front turn signal lamp RH
B2		E26	B/3	Headlamp RH
B3		E27	–/2	Front fog lamp RH
B2		E29	GY/3	Parking lamp RH
C3		E30	–	Body ground
D2		E31	GY/2	Alternator
D2		E32	–	Alternator
D2		E33	–	Alternator
C3		E34	B/1	Compressor
D3		E36	B/1	Horn high
D3		E37	B/1	Horn low
D3		E38	B/2	Ambient sensor
D3		E39	B/3	Refrigerant pressure sensor
D2	★	E41	GY/2	Cooling fan motor-1
C3	★	E42	GY/4	Cooling fan motor-2
F2		E43	GY/3	Parking lamp LH
F4		E45	–/2	Front fog lamp LH
F2		E46	B/3	Headlamp LH
E3		E47	GY/2	Front turn signal lamp LH
G2		E48	BR/2	Side turn signal lamp LH
F3	★	E49	GY/2	Dropping resistor (With A/T)
F2	★	E50	–	Body ground
G2		E54	GY/2	Hood switch
D1		E55	B/2	VDC relay box (With VDC)
E1		E56	B/8	VDC relay box (With VDC)
D1		E58	–	Body ground
F2		E59	L/2	Front wheel sensor LH
E2	★	E60	GY/9	To F36
E2	★	E61	DGY/8	To F38
E1	★	E62	GY/8	To F37 (With A/T)
E2		E67	DGY/8	VDC actuator (With VDC)
D2		E68	SB/8	VDC actuator (With VDC)
E1		E69	SMJ	ABS actuator and electric unit (Without VDC)
A1, C1		E72	–	Relay box
C1, D1		E73	–	Relay box
B2		E81	BR/2	Washer level sensor
B2		E82	GY/2	Front side marker lamp RH
F4		E83	GY/2	Front side marker lamp LH

★: Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes. **Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.**

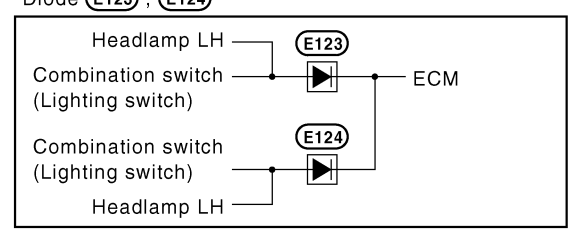
TKIB0044E

Passenger Compartment



E101	B/2	:	Fuse block (J/B)
E102	W/4	:	Fuse block (J/B)
★ E103	W/12	:	Fuse block (J/B)
E105	W/12	:	To M13
★ E106	BR/16	:	To M14
E107	W/16	:	To M15
E108	W/6	:	Ignition switch
E109	W/8	:	NATS IMMU
E110	BR/12	:	Combination switch (Lighting switch)
E111	W/8	:	Combination switch (Fog lamp switch)
E112	GY/12	:	Combination switch (Wiper and washer switch)
E114	GY/6	:	Daytime light control unit
E115	GY/8	:	Daytime light control unit
★ E116	BR/20	:	To M75 (AWD models)
E117	W/10	:	To B101 (AWD models)
★ E122	SMJ	:	VDC/TCS/ABS control unit (With VDC)
E123	W/2	:	Diode
E124	W/2	:	Diode
★ E125	W/8	:	To M94 (2WD models)
E126	W/4	:	To B133 (2WD models)

Diode E123 , E124



★: Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes. **Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.**

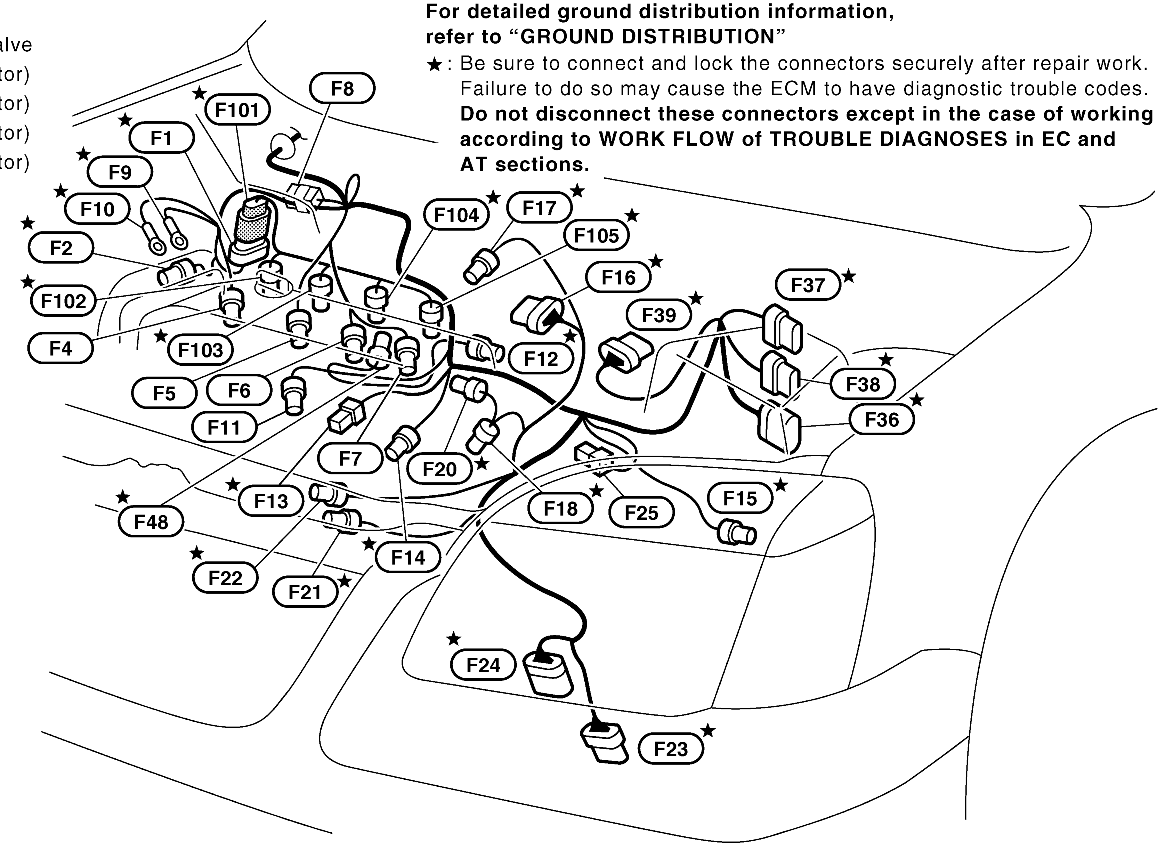
TKIB0047E

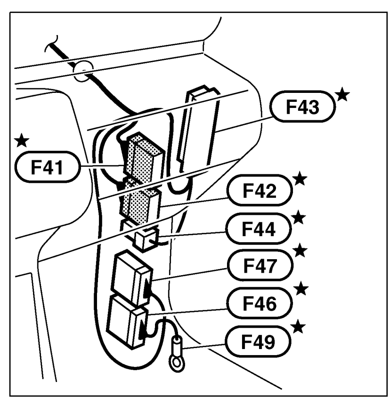
ENGINE CONTROL HARNESS

A/T Models

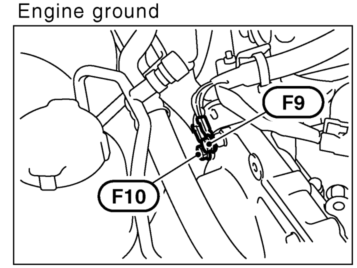
For detailed ground distribution information, refer to "GROUND DISTRIBUTION"

★: Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes. **Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.**

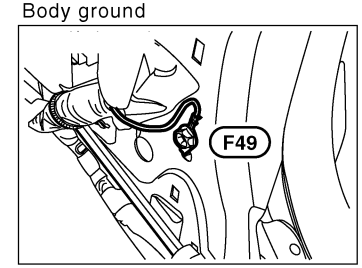




Engine ground



Body ground



★	F1	DGY/6	To F101
★	F2	G/2	Intake valve timing control solenoid valve
	F4	GY/3	Ignition coil No. 1 (With power transistor)
	F5	GY/3	Ignition coil No. 2 (With power transistor)
	F6	GY/3	Ignition coil No. 3 (With power transistor)
	F7	GY/3	Ignition coil No. 4 (With power transistor)
	F8	GY/2	Condenser
★	F9	–	Engine ground
★	F10	–	Engine ground
	F11	GY/1	Oil pressure switch
★	F12	B/3	Power steering pressure sensor
★	F13	B/2	Knock sensor
★	F14	B/3	Crankshaft position sensor (POS)
★	F15	B/3	Revolution sensor
★	F16	G/6	Electronic throttle control actuator
★	F17	L/2	EVAP canister purge volume control solenoid valve
★	F18	GY/2	Engine coolant temperature sensor
★	F20	B/3	Camshaft position sensor (PHASE)
★	F21	G/4	Heated oxygen sensor 1
★	F22	L/4	Heated oxygen sensor 2
★	F23	B/8	A/T solenoid valve
★	F24	B/10	Park/Neutral position switch
	F25	B/1	Starter motor
★	F36	GY/9	To E60
★	F37	GY/8	To E62
★	F38	DGY/8	To E61
★	F39	B/6	Mass air flow sensor
★	F41	BR/24	To M61
★	F42	W/16	To M62
★	F43	SMJ	ECM
★	F44	BR/6	ECM relay
★	F46	W/24	TCM (Transmission control module)
★	F47	GY/24	TCM (Transmission control module)
★	F48	BR/2	VIAS control solenoid valve
★	F49	–	Body ground

Engine control sub-harness

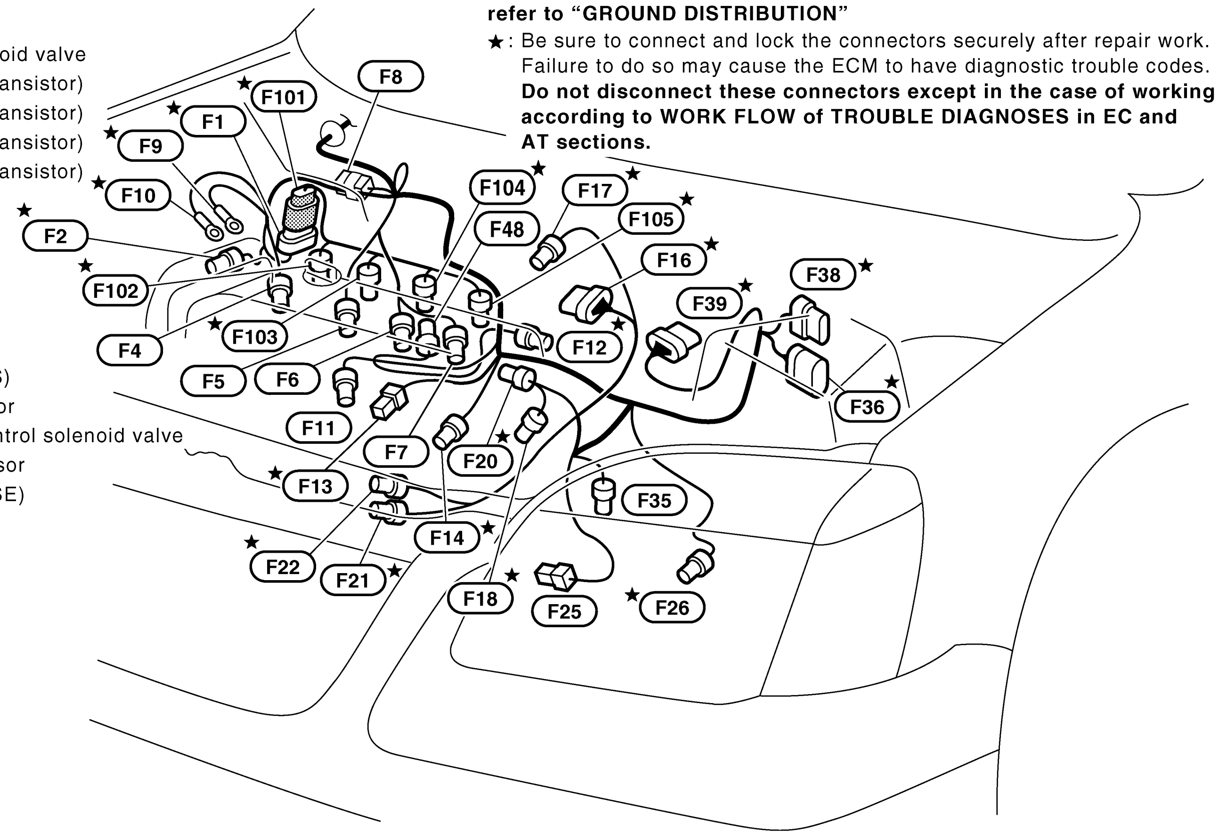
★	F101	B/6	To F1
★	F102	GY/2	Injector No. 1
★	F103	GY/2	Injector No. 2
★	F104	GY/2	Injector No. 3
★	F105	GY/2	Injector No. 4

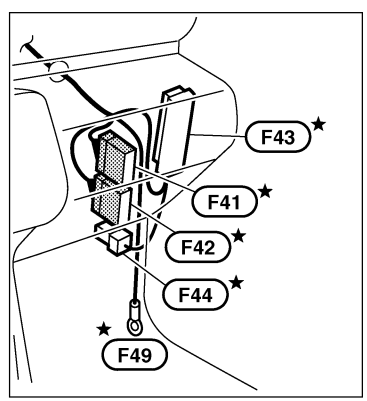
TKIB0048E

M/T Models

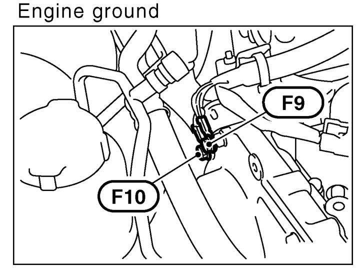
For detailed ground distribution information, refer to "GROUND DISTRIBUTION"

★: Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes. **Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.**

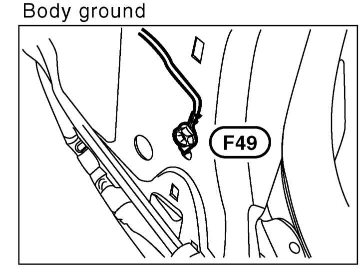




Engine ground



Body ground



★	F1	DGY/6	:	To F101
★	F2	G/2	:	Intake valve timing control solenoid valve
	F4	GY/3	:	Ignition coil No. 1 (With power transistor)
	F5	GY/3	:	Ignition coil No. 2 (With power transistor)
	F6	GY/3	:	Ignition coil No. 3 (With power transistor)
	F7	GY/3	:	Ignition coil No. 4 (With power transistor)
	F8	GY/2	:	Condenser
★	F9	–	:	Engine ground
★	F10	–	:	Engine ground
	F11	GY/1	:	Oil pressure switch
★	F12	B/3	:	Power steering pressure sensor
★	F13	B/2	:	Knock sensor
★	F14	B/3	:	Crankshaft position sensor (POS)
★	F16	G/6	:	Electronic throttle control actuator
★	F17	L/2	:	EVAP canister purge volume control solenoid valve
★	F18	GY/2	:	Engine coolant temperature sensor
★	F20	B/3	:	Camshaft position sensor (PHASE)
★	F21	G/4	:	Heated oxygen sensor 1
★	F22	L/4	:	Heated oxygen sensor 2
	F25	B/1	:	Starter motor
★	F26	B/2	:	Park/Neutral position switch
	F35	B/2	:	Back-up lamp switch
★	F36	GY/9	:	To E60
★	F38	DGY/8	:	To E61
★	F39	B/6	:	Mass air flow sensor
★	F41	BR/24	:	To M61
★	F42	W/16	:	To M62
★	F43	SMJ	:	ECM
★	F44	BR/6	:	ECM relay
	F48	BR/2	:	VIAS control solenoid valve
★	F49	–	:	Body ground

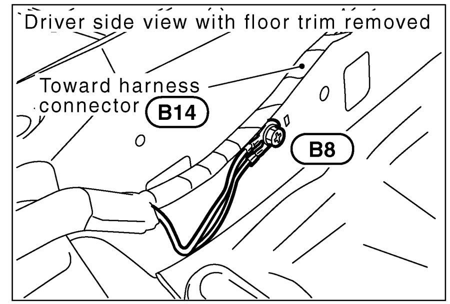
Engine control sub-harness

★	F101	B/6	:	To F1
★	F102	GY/2	:	Injector No. 1
★	F103	GY/2	:	Injector No. 2
★	F104	GY/2	:	Injector No. 3
★	F105	GY/2	:	Injector No. 4

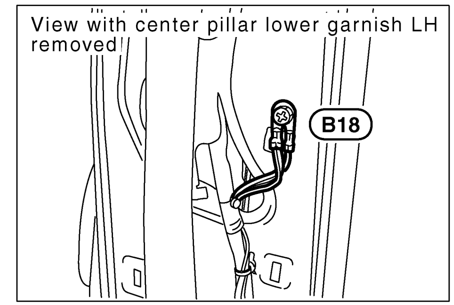
TKIB0049E

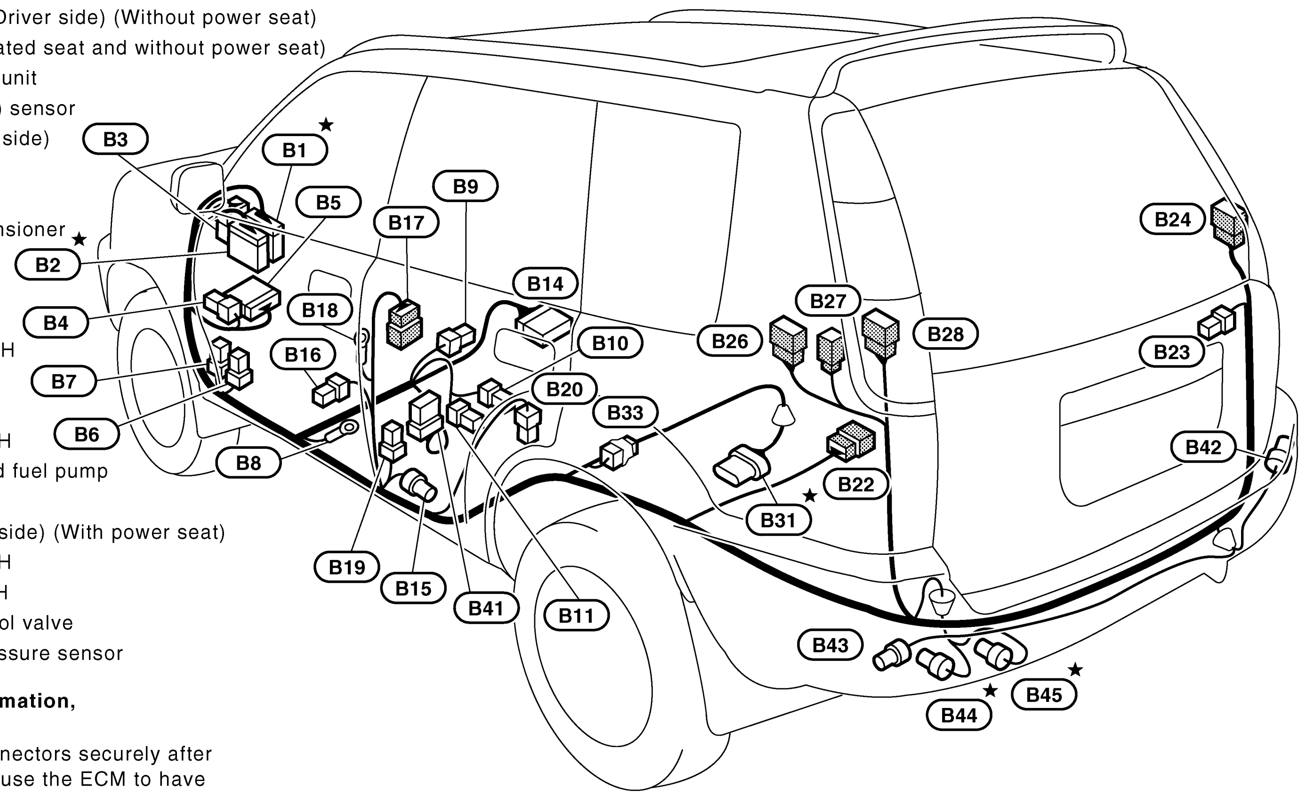
BODY HARNESS

Body ground



Body ground





★	B1	W/10	: To M17
★	B2	BR/20	: To M18
	B3	W/6	: To M16
	B4	W/3	: Fuse block (J/B)
	B5	W/10	: Fuse block (J/B)
	B6	BR/6	: Rear window defogger relay
	B7	L/4	: Fuel pump relay
	B8	–	: Body ground
	B9	Y/2	: Front LH side air bag module
	B10	W/3	: Seat belt buckle switch (Driver side) (Without power seat)
	B11	GY/3	: Heated seat LH (With heated seat and without power seat)
	B14	Y/12	: Air bag diagnosis sensor unit
	B15	Y/2	: LH side air bag (Satellite) sensor
	B16	W/3	: Front door switch (Driver side)
	B17	W/8	: To D31
	B18	–	: Body ground
	B19	Y/2	: Front LH seat belt pre-tensioner
	B20	W/1	: Rear door switch LH
	B22	W/6	: To B128
	B23	B/2	: Rear power socket
	B24	W/6	: Rear combination lamp RH
	B26	W/6	: To D51
	B27	W/3	: To D52
	B28	W/6	: Rear combination lamp LH
★	B31	GY/5	: Fuel level sensor unit and fuel pump
	B33	W/2	: Condenser
	B41	W/6	: Front power seat (Driver side) (With power seat)
	B42	GY/2	: Rear side marker lamp RH
	B43	GY/2	: Rear side marker lamp LH
★	B44	B/2	: EVAP canister vent control valve
★	B45	GY/3	: EVAP control system pressure sensor

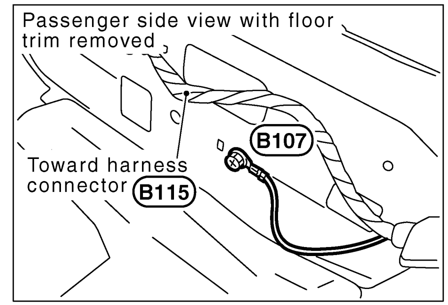
For detailed ground distribution information, refer to "GROUND DISTRIBUTION".

★ : Be sure to connect and lock the connectors securely after repair work. Failure to do so may cause the ECM to have diagnostic trouble codes.
Do not disconnect these connectors except in the case of working according to WORK FLOW of TROUBLE DIAGNOSES in EC and AT sections.

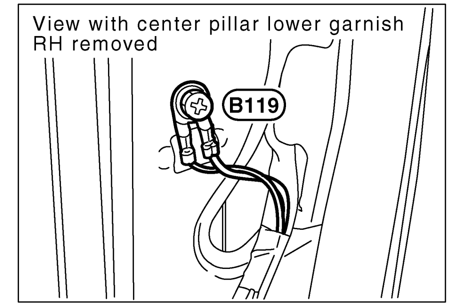
TKIB0050E

BODY NO. 2 HARNESS

Body ground



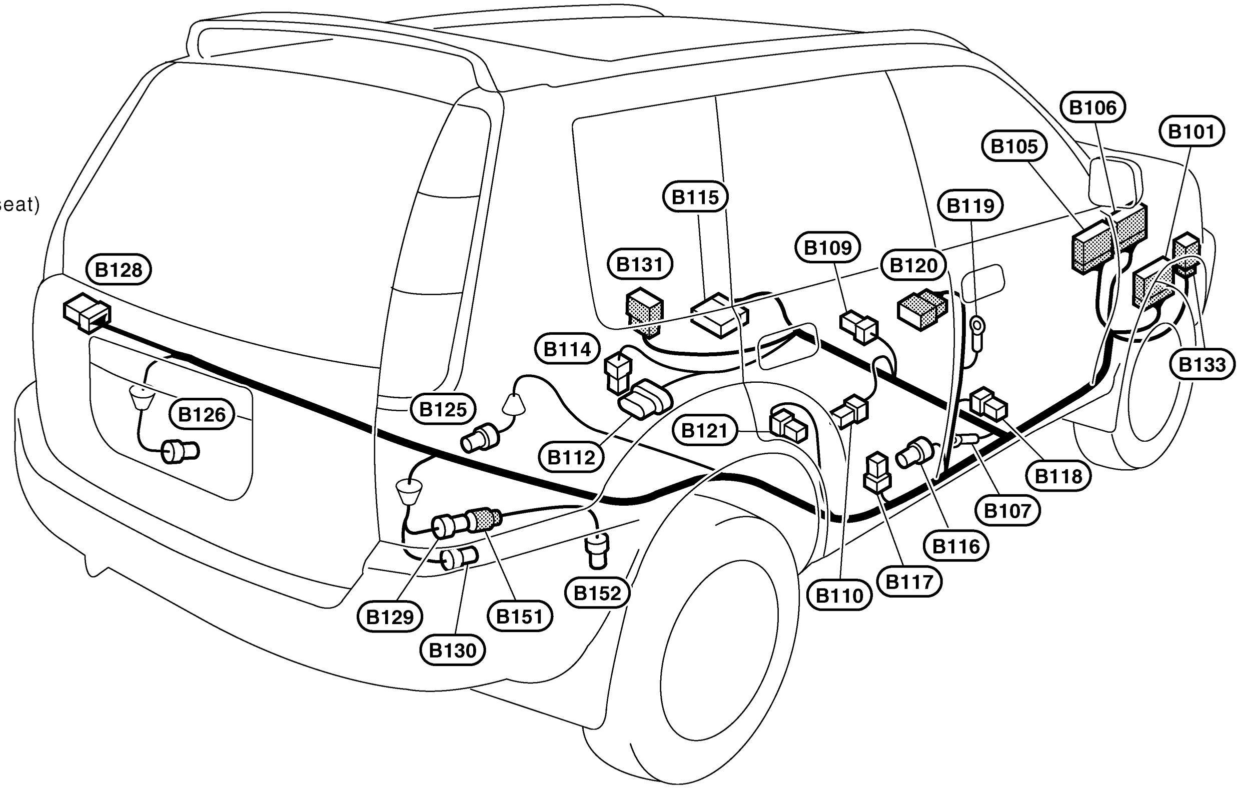
Body ground



B101	W/10	:	To E117 (AWD models)
B105	W/12	:	To M78
B106	W/10	:	To M79
B107	–	:	Body ground
B109	Y/2	:	Front RH side air bag module
B110	GY/3	:	Heated seat RH (With heated seat)
B112	B/6	:	Yaw rate/side G sensor (With VDC)
B114	B/1	:	Parking brake switch
B115	Y/12	:	Air bag diagnosis sensor unit
B116	Y/2	:	RH side air bag (Satellite) sensor
B117	Y/2	:	Front RH seat belt pre-tensioner
B118	W/3	:	Front door switch (Passenger side)
B119	–	:	Body ground
B120	W/8	:	To D21
B121	W/1	:	Rear door switch RH
B125	GY/4	:	Sub fuel level sensor unit
B126	L/2	:	Rear wheel sensor LH
B128	W/6	:	To B22
B129	B/2	:	To B151 (AWD models)
B130	GY/2	:	Rear wheel sensor RH
B131	W/8	:	Heated seat switch (With heated seat)
B133	W/4	:	To E126 (2WD models)

Transmission sub-harness

B151	B/2	:	To B129 (AWD models)
B152	GY/2	:	AWD solenoid (AWD models)

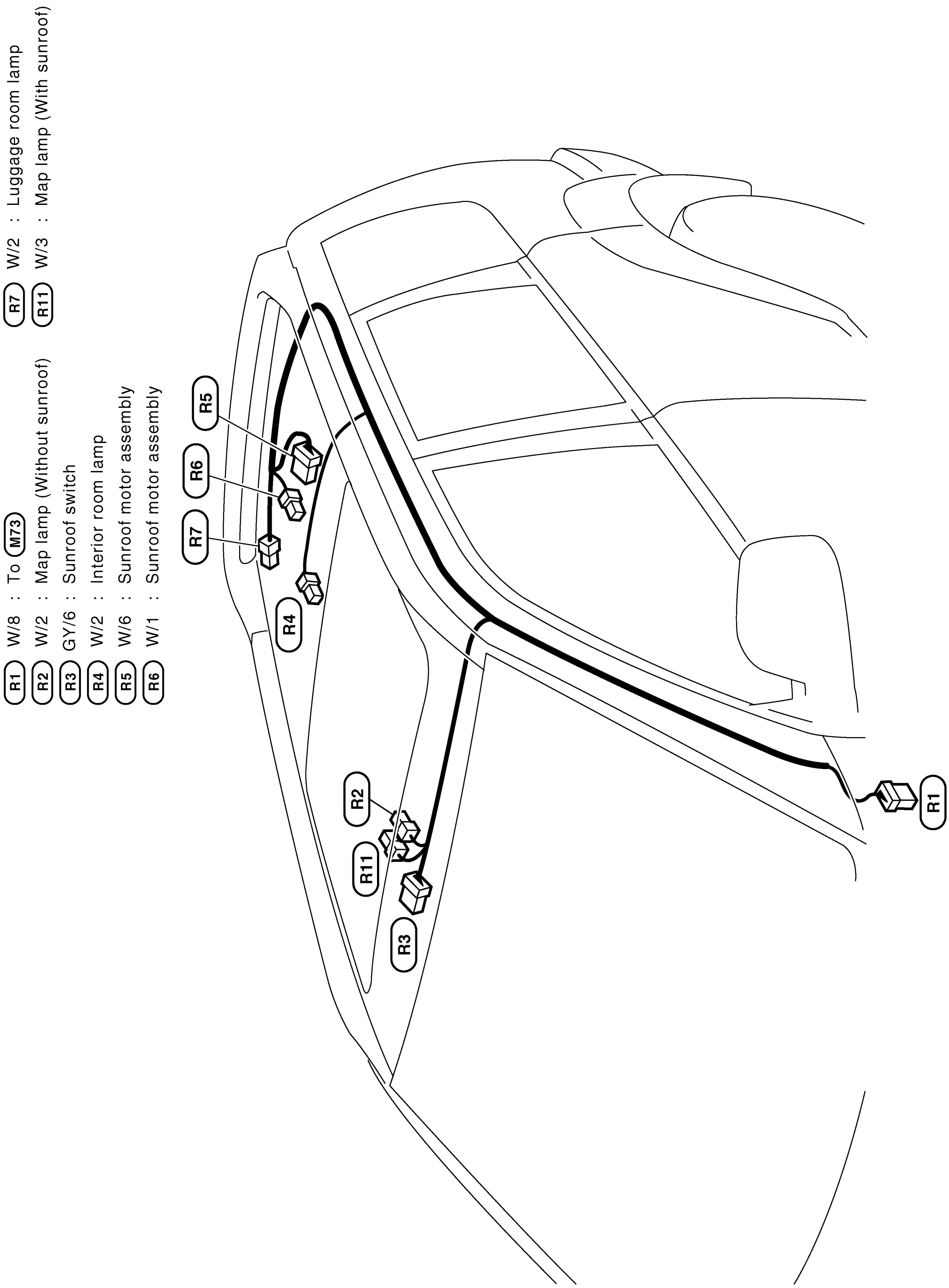


For detailed ground distribution information, refer to "GROUND DISTRIBUTION".

TKIB0051E

A B C D E F G H I J PG L M

ROOM LAMP HARNESS

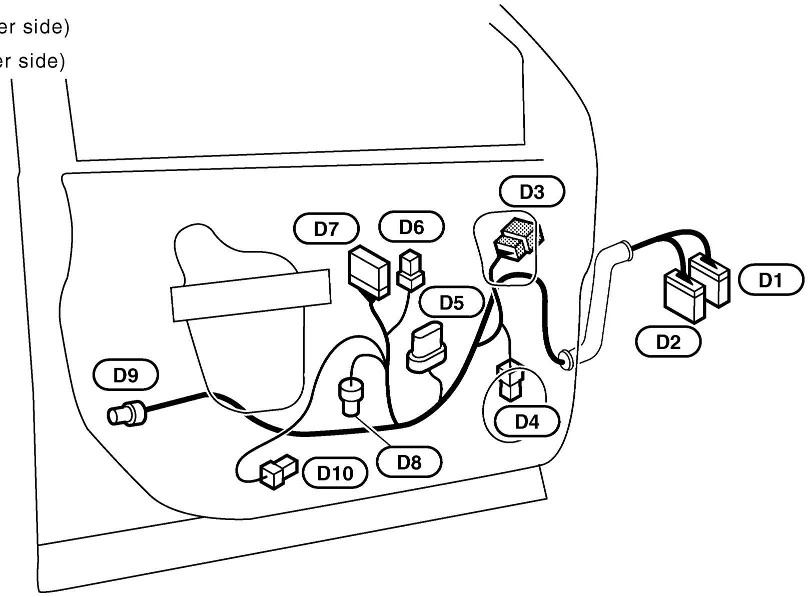


TKIB0052E

FRONT DOOR HARNESS

LH Side

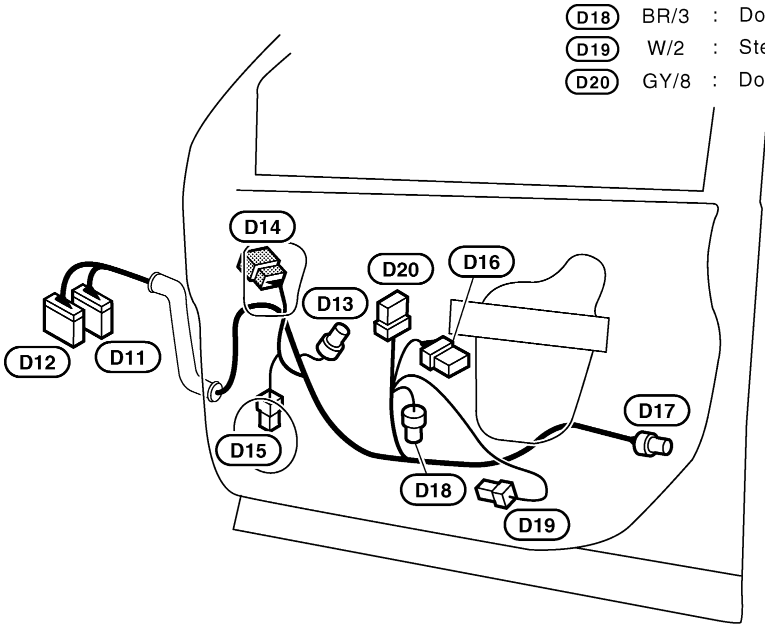
D1 W/16 : To M21
D2 BR/12 : To M22
D3 W/8 : Door mirror actuator (Driver side)
D4 W/2 : Front door speaker LH
D5 GY/6 : Front power window motor (Driver side)
D6 W/3 : Power window main switch
D7 W/16 : Power window main switch
D8 BR/3 : Door key cylinder switch (Driver side)
D9 GY/4 : Front door lock actuator (Driver side)
D10 W/2 : Step lamp (Driver side)



TKIB0031E

RH Side

D11 W/12 : To M77
D12 BR/12 : To M76
D13 BR/2 : Front power window motor (Passenger side)
D14 W/8 : Door mirror actuator (Passenger side)
D15 W/2 : Front door speaker RH
D16 W/8 : Front power window switch (Passenger side)
D17 GY/4 : Front door lock actuator (Passenger side)
D18 BR/3 : Door key cylinder switch (Passenger side)
D19 W/2 : Step lamp (Passenger side)
D20 GY/8 : Door lock/unlock switch (Passenger side)

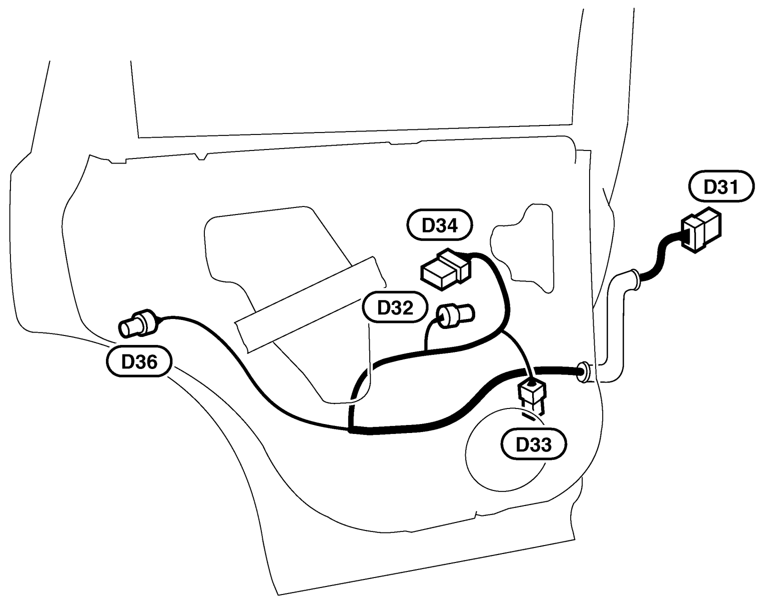


TKIB0053E

REAR DOOR HARNESS

LH Side

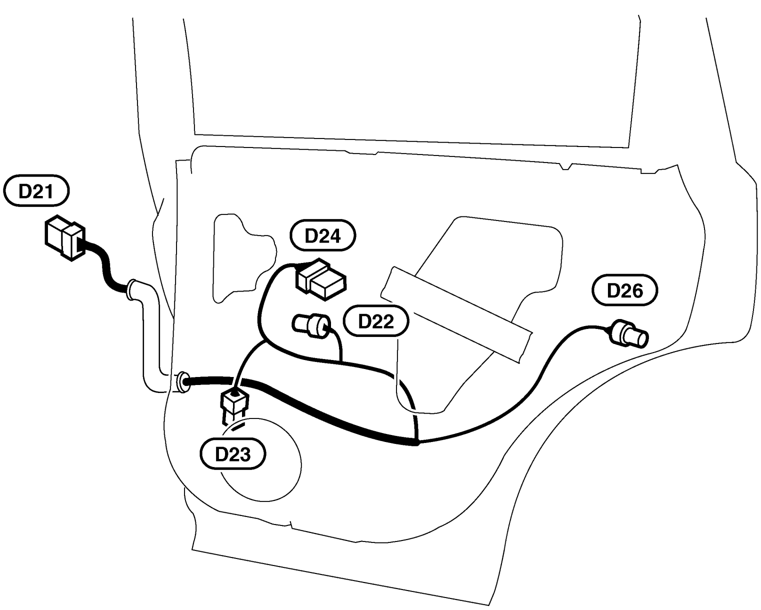
D31	W/8	:	To B17
D32	BR/2	:	Rear power window motor LH
D33	W/2	:	Rear door speaker LH
D34	W/8	:	Rear power window switch LH
D36	GY/4	:	Rear door lock actuator LH



TKIB0054E

RH Side

D21	W/8	:	To B120
D22	BR/2	:	Rear power window motor RH
D23	W/2	:	Rear door speaker RH
D24	W/8	:	Rear power window switch RH
D26	GY/4	:	Rear door lock actuator RH



TKIB0055E

BACK DOOR HARNESS

Back door haarness

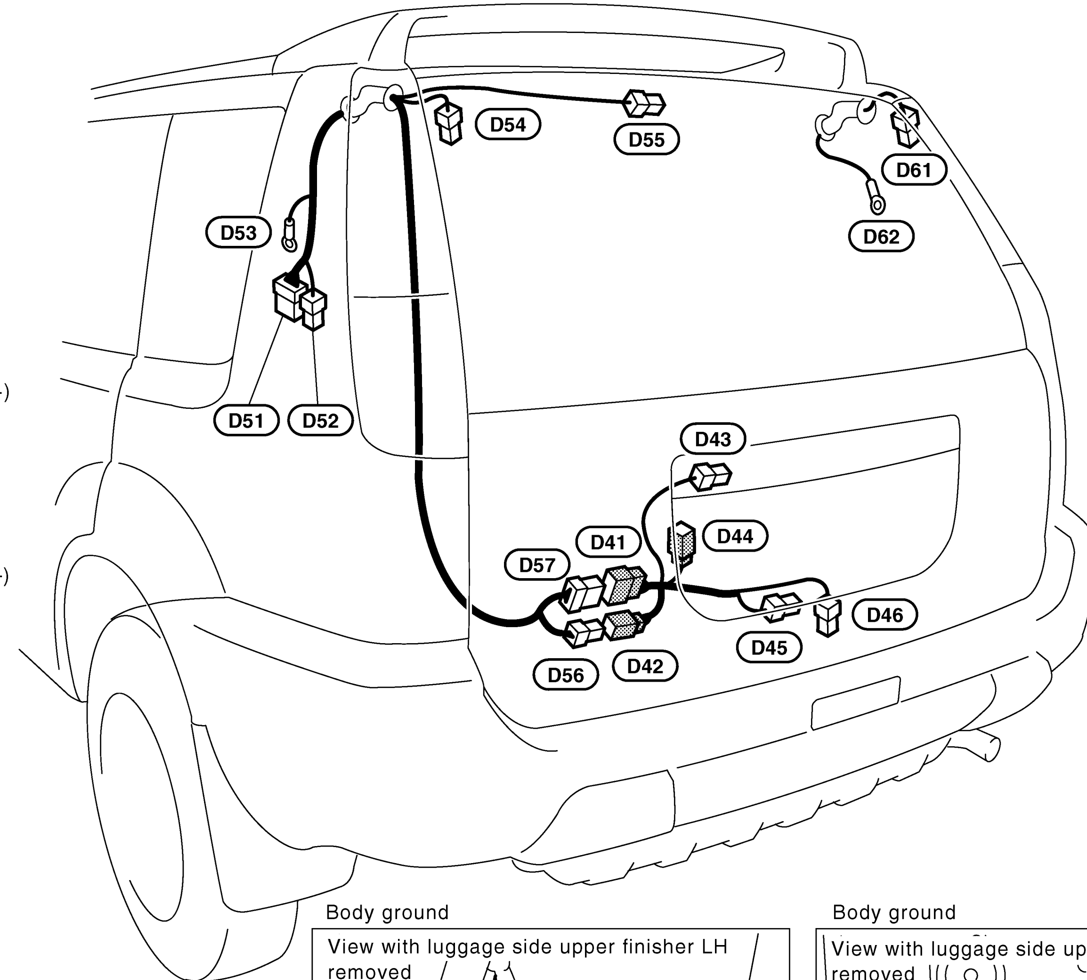
- D41 W/6 : To D57
- D42 B/2 : To D56
- D43 W/4 : Rear wiper motor
- D44 W/2 : License plate lamp
- D45 W/3 : Back door switch
- D46 W/4 : Back door lock actuator

Back door sub-harness

- D51 W/6 : To B26
- D52 W/3 : To B27
- D53 – : Body ground
- D54 W/1 : Rear window defogger (+)
- D55 W/2 : High-mounted stop lamp
- D56 B/2 : To D42
- D57 W/6 : To D41

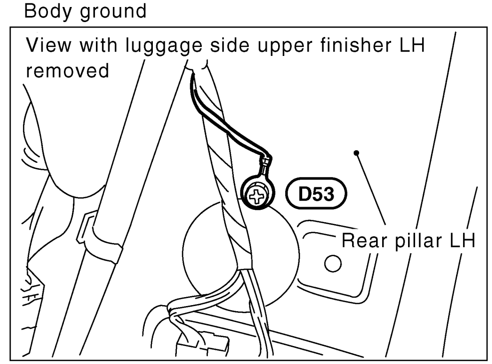
Rear window defogger harness

- D61 W/1 : Rear window defogger (–)
- D62 – : Body ground

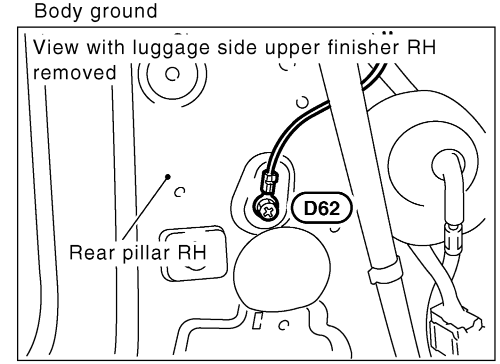


For detailed ground distribution information, refer to “GROUND DISTRIBUTION”.

Body ground



Body ground



TKIB0056E

Wiring Diagram Codes (Cell Codes)

AKS00BEY

Use the chart below to find out what each wiring diagram code stands for.
Refer to the wiring diagram code in the alphabetical index to find the location (page number) of each wiring diagram.

Code	Section	Wiring Diagram Name
1STSIG	AT	A/T 1st Signal
2NDSIG	AT	A/T 2nd Signal
3RDSIG	AT	A/T 3rd Signal
4THSIG	AT	A/T 4th Signal
A/C	ATC	Auto Air Conditioner
A/C	MTC	Manual Air Conditioner
ABS	BRC	Anti-Lock Brake System
APPS1	EC	Accelerator Pedal Position Sensor
APPS2	EC	Accelerator Pedal Position Sensor
APPS3	EC	Accelerator Pedal Position Sensor
ASC/BS	EC	Automatic Speed Control Device (ASCD) Brake Switch
ASC/SW	EC	Automatic Speed Control Device (ASCD) Steering Switch
ASCBOF	EC	Automatic Speed Control Device (ASCD) Brake Switch
ASCIND	DI	Automatic Speed Control Device (ASCD) Indicator
AT/IND	DI	A/T Indicator Lamp
AUDIO	AV	Audio
AWD	TF	AWD System
BA/FTS	AT	A/T Fluid Temperature Sensor and TCM Power Supply
BACK/L	LT	Back-Up Lamp
BRK/SW	EC	Brake Switch
CAN	AT	CAN Communication Line
CAN	EC	CAN Communication Line
CAN	LAN	CAN System
CHARGE	SC	Charging System
CHIME	DI	Warning Chime
CLOCK	DI	Clock
COOL/F	EC	Cooling Fan Control
D/LOCK	BL	Power Door Lock
DEF	GW	Rear Window Defogger
DTRL	LT	Headlamp - With Daytime Light System
ECM/PW	EC	ECM Power Supply for Back-Up
ECTS	EC	Engine Coolant Temperature Sensor
ENGSS	AT	Engine Speed Signal
ETC1	EC	Electric Throttle Control Function
ETC2	EC	Electric Throttle Control Motor Relay
ETC3	EC	Electric Throttle Control Motor
F/FOG	LT	Front Fog Lamp
F/PUMP	EC	Fuel Pump
FTS	AT	A/T Fluid Temperature Sensor Circuit
FTTS	EC	Fuel Tank Temperature Sensor
FUEL	EC	Fuel Injection System Function

Code	Section	Wiring Diagram Name
HO2S1	EC	Heated Oxygen Sensor 1
HO2S1H	EC	Heated Oxygen Sensor 1 Heater
HO2S2	EC	Heated Oxygen Sensor 2
HO2S2H	EC	Heated Oxygen Sensor 2 Heater
HORN	WW	Horn
HSEAT	SE	Heated Seat
IATS	EC	Intake Air Temperature Sensor
IGNSYS	EC	Ignition System
ILL	LT	Illumination
INJECT	EC	Injector
INT/L	LT	Map Lamp
IVC	EC	Intake Valve Timing Control Solenoid Valve
KEYLES	BL	Remote Keyless Entry System
KS	EC	Knock Sensor
LOAD	EC	Electrical Load Signal
LPSV	AT	Line Pressure Solenoid Valve
MAFS	EC	Mass Air Flow Sensor
MAIN	AT	Main Power Supply and Ground Circuit
MAIN	EC	Main Power Supply and Ground Circuit
METER	DI	Speedometer, Tachometer, Temp. and Fuel Gauges
MIL/DL	EC	MIL & Data Link Connector
MIRROR	GW	Door Mirror
NATS	BL	Nissan Anti-Theft System
NONDTC	AT	Non-Detective Items
OVRCSV	AT	Overrun Clutch Solenoid Valve
P/SCKT	WW	Power Socket
PGC/V	EC	EVAP Canister Purge Volume Control Solenoid Valve
PHASE	EC	Camshaft Position Sensor (PHASE)
PNP/SW	AT	Park/Neutral Position Switch
PNP/SW	EC	Park/Neutral Position Switch
POS	EC	Crankshaft Position Sensor (CKPS) (POS)
POWER	PG	Power Supply Routing
PRE/SE	EC	EVAP Control System Pressure Sensor
PS/SEN	EC	Power Steering Pressure Sensor
ROOM/L	LT	Interior Room Lamp
RP/SEN	EC	Refrigerant Pressure Sensor
SEAT	SE	Power Seat
SEN/PW	EC	Sensor Power Supply
SHIFT	AT	A/T Shift Lock System
SNOWSW	EC	Snow Mode Switch
SROOF	RF	Sunroof
SRS	SRS	Supplemental Restraint System
SSV/A	AT	Shift Solenoid Valve A
SSV/B	AT	Shift Solenoid Valve B

Code	Section	Wiring Diagram Name
START	SC	Starting System
STEP/L	LT	Step Lamp
STOP/L	LT	Stop Lamp
TAIL/L	LT	Parking, License and Tail Lamps
TCCSIG	AT	A/T Tcc S/V Function (Lock-Up)
TCV	AT	Torque Converter Clutch Solenoid Valve
TPS	AT	Throttle Position Sensor
TPS1	EC	Throttle Position Sensor (Sensor 1)
TPS2	EC	Throttle Position Sensor (Sensor 2)
TPS3	EC	Throttle Position Sensor
TURN	LT	Turn Signal and Hazard Warning Lamp
VDC	BRC	Vehicle Dynamics Control System
VEHSEC	BL	Vehicle Security System
VENT/V	EC	EVAP Canister Vent Control Valve
VIAS	EC	Variable Induction Air Control System
VIAS/V	EC	VIAS Control Solenoid Valve
VSSA/T	AT	Vehicle Speed Sensor A/T (Revolution Sensor)
VSSMTR	AT	Vehicle Speed Sensor MTR
WARN	DI	Warning Lamps
WINDOW	GW	Power Window
WIP/R	WW	Rear Wiper and Washer
WIPER	WW	Front Wiper and Washer

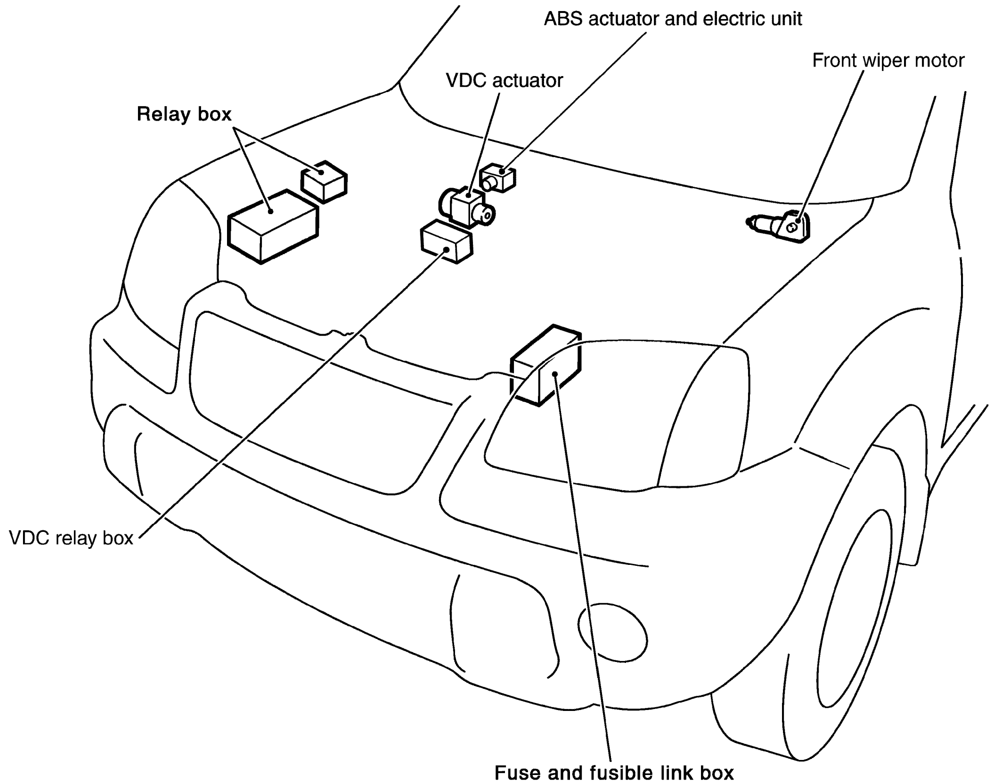
ELECTRICAL UNITS LOCATION

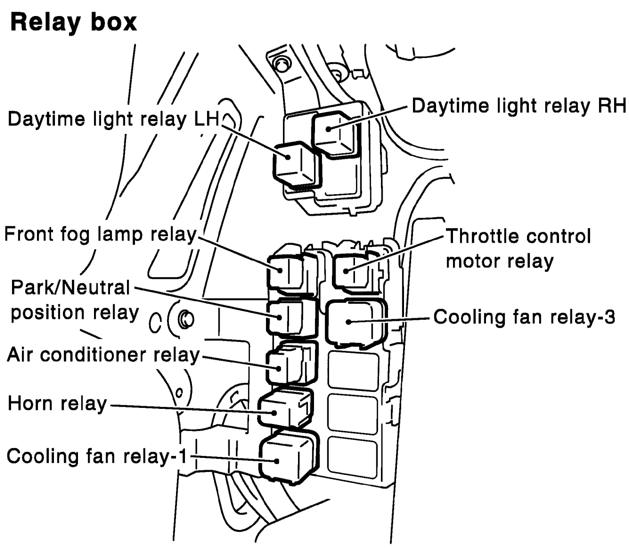
PFP:25230

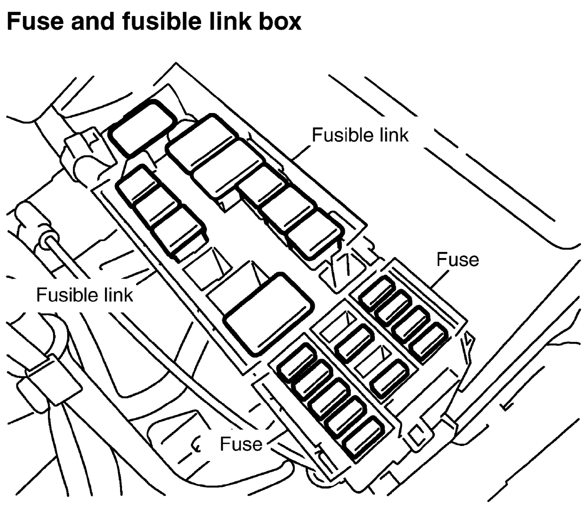
Electrical Units Location

AKS00BEZ

ENGINE COMPARTMENT

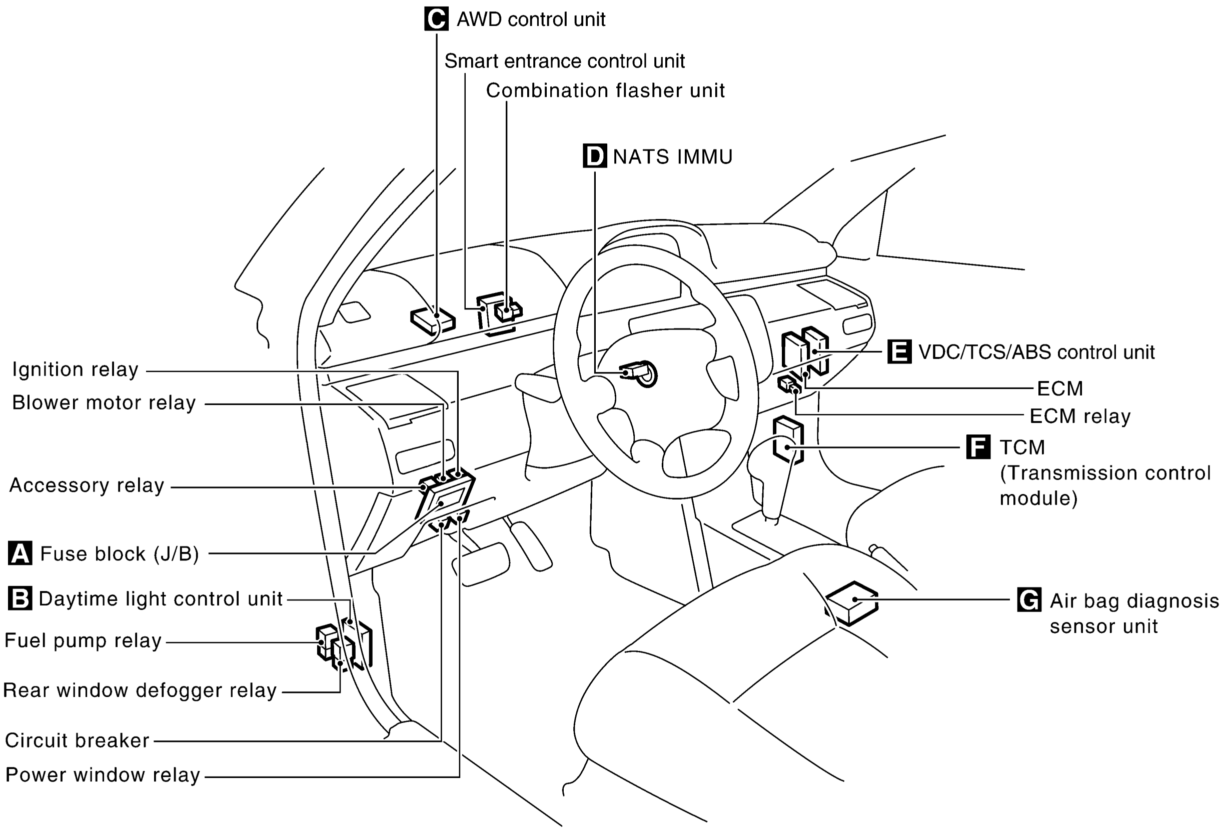


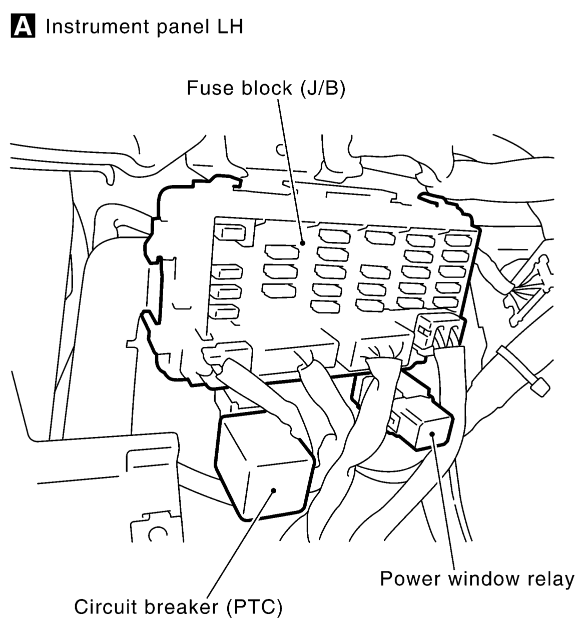


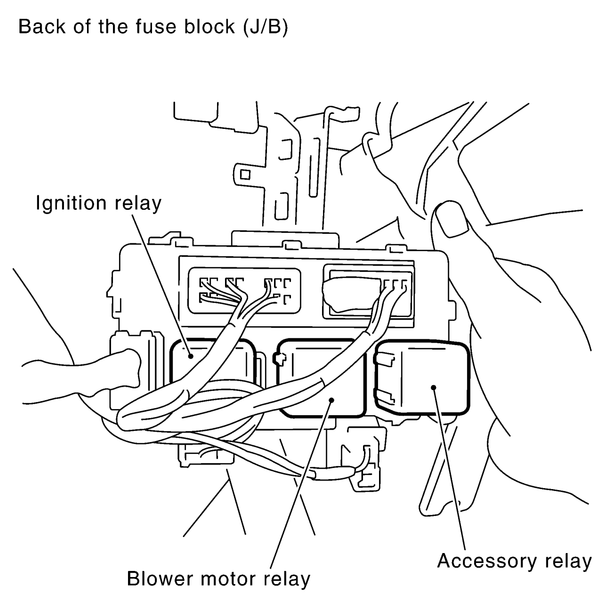


CKIB0033E

PASSENGER COMPARTMENT

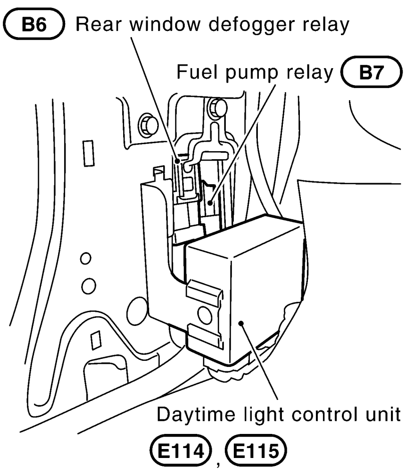




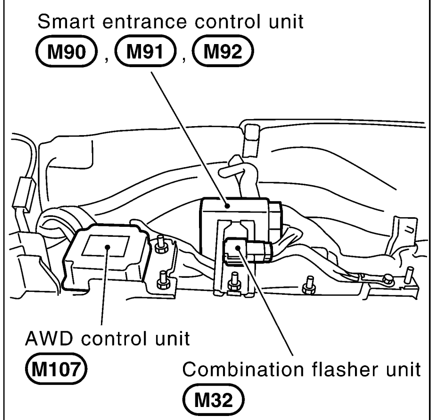


CKIB0034E

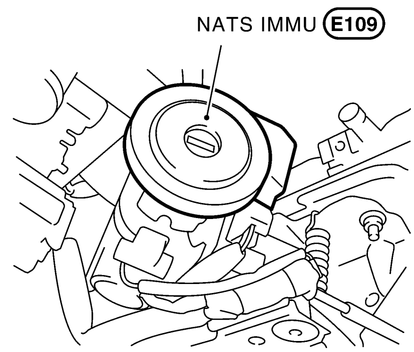
B Driver side view with dash side lower finisher removed



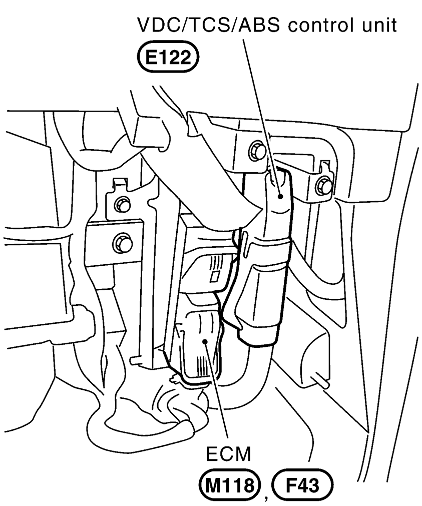
C Driver side view with upper instrument panel removed



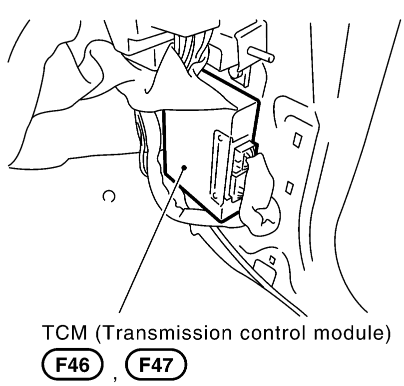
D



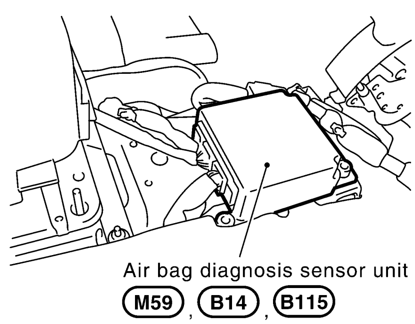
E Behind lower instrument panel on passenger side



F Passenger side view with dash side lower finisher removed



G Behind the console box assembly



CKIB0035E

HARNESS CONNECTOR

PFP:00011

Description

AKS00BF0

HARNESS CONNECTOR (TAB-LOCKING TYPE)

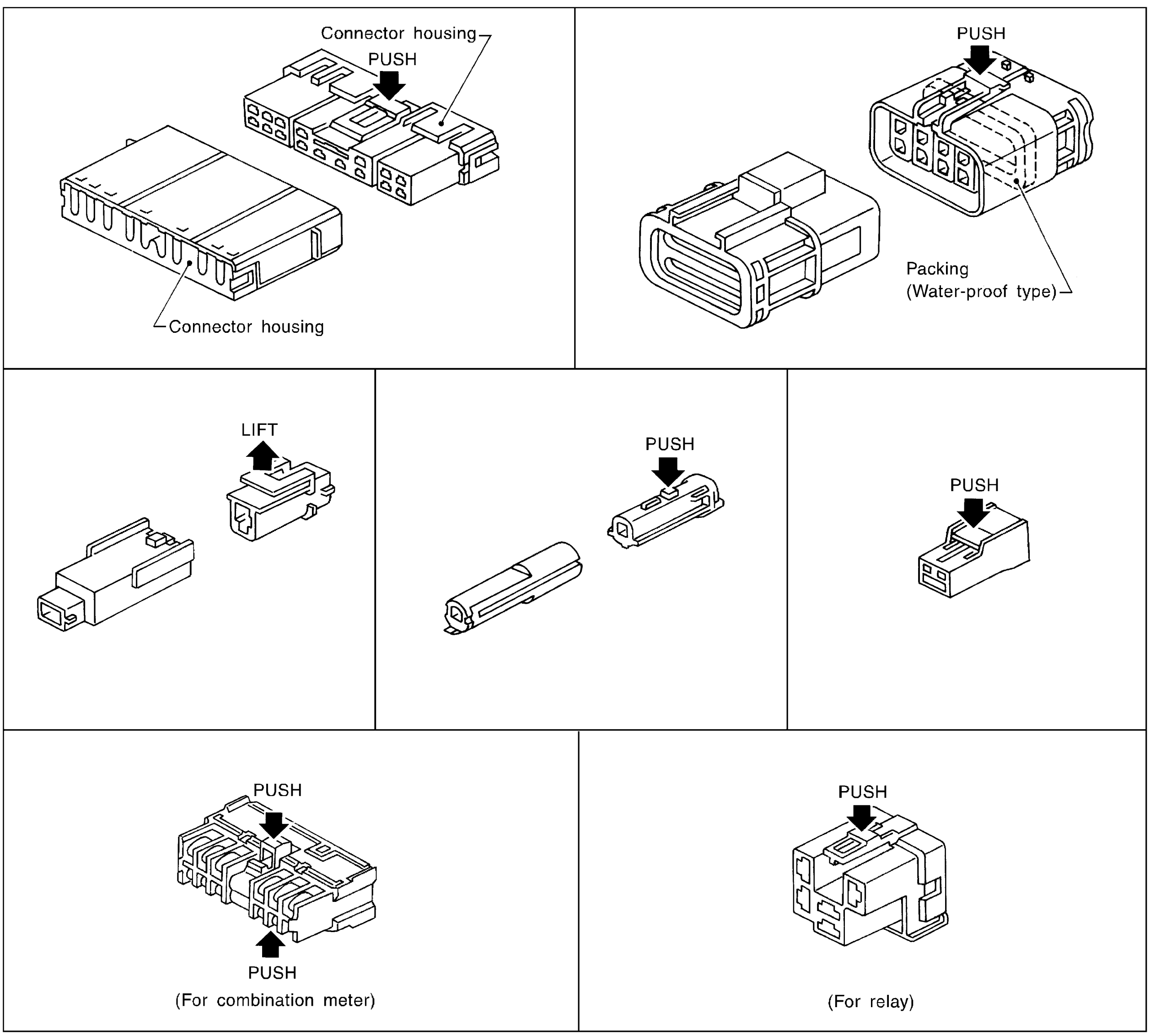
- The tab-locking type connectors help prevent accidental looseness or disconnection.
- The tab-locking type connectors are disconnected by pushing or lifting the locking tab(s). Refer to the figure below.

Refer to the next page for description of the slide-locking type connector.

CAUTION:

Do not pull the harness or wires when disconnecting the connector.

[Example]



SEL769DA

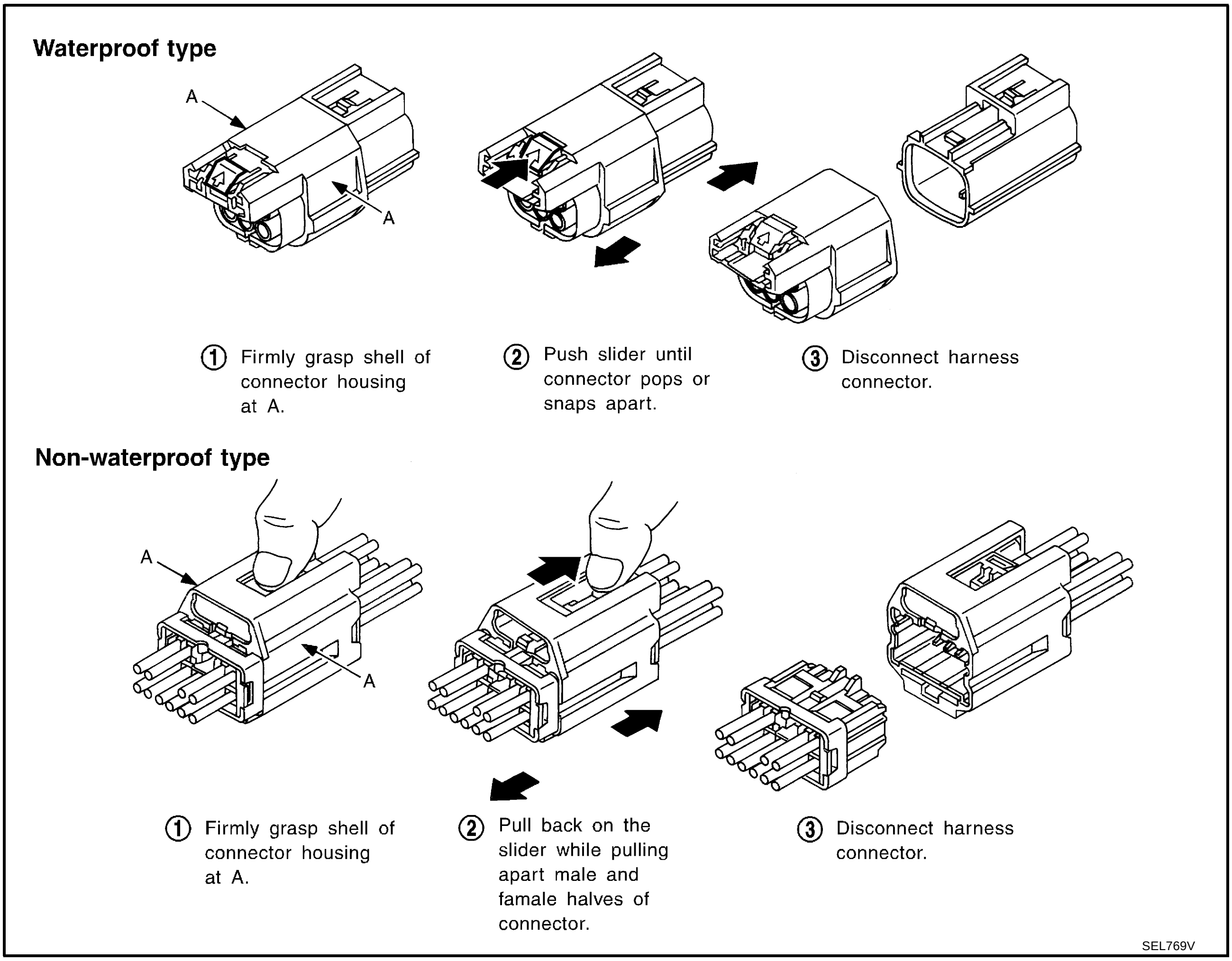
HARNESS CONNECTOR (SLIDE-LOCKING TYPE)

- A new style slide-locking type connector is used on certain systems and components, especially those related to OBD.
- The slide-locking type connectors help prevent incomplete locking and accidental looseness or disconnection.
- The slide-locking type connectors are disconnected by pushing or pulling the slider. Refer to the figure below.

CAUTION:

- **Do not pull the harness or wires when disconnecting the connector.**
- **Be careful not to damage the connector support bracket when disconnecting the connector.**

[Example]

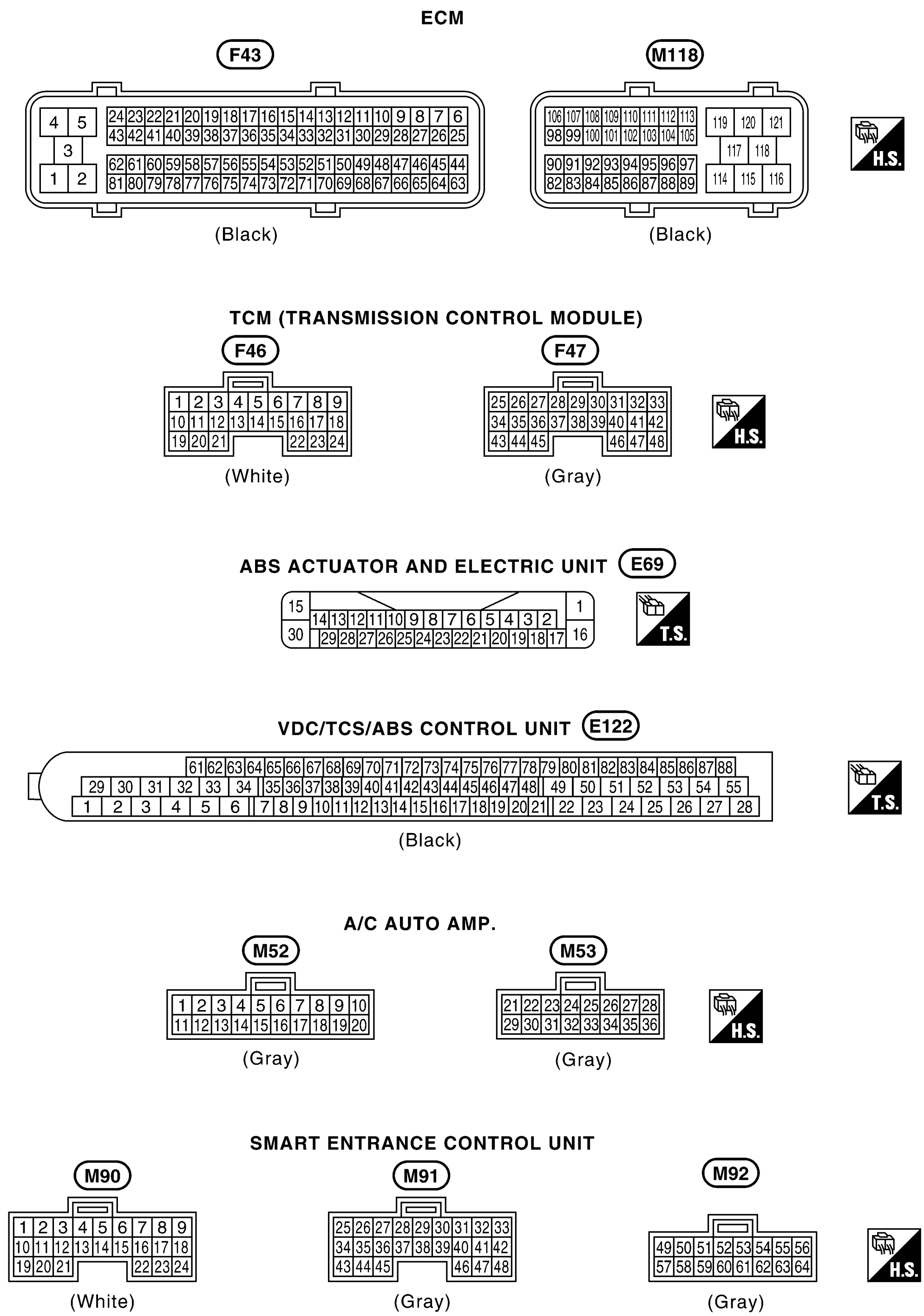


ELECTRICAL UNITS

PFP:00011

Terminal Arrangement

AKS00BF1



CKIB0036E

STANDARDIZED RELAY

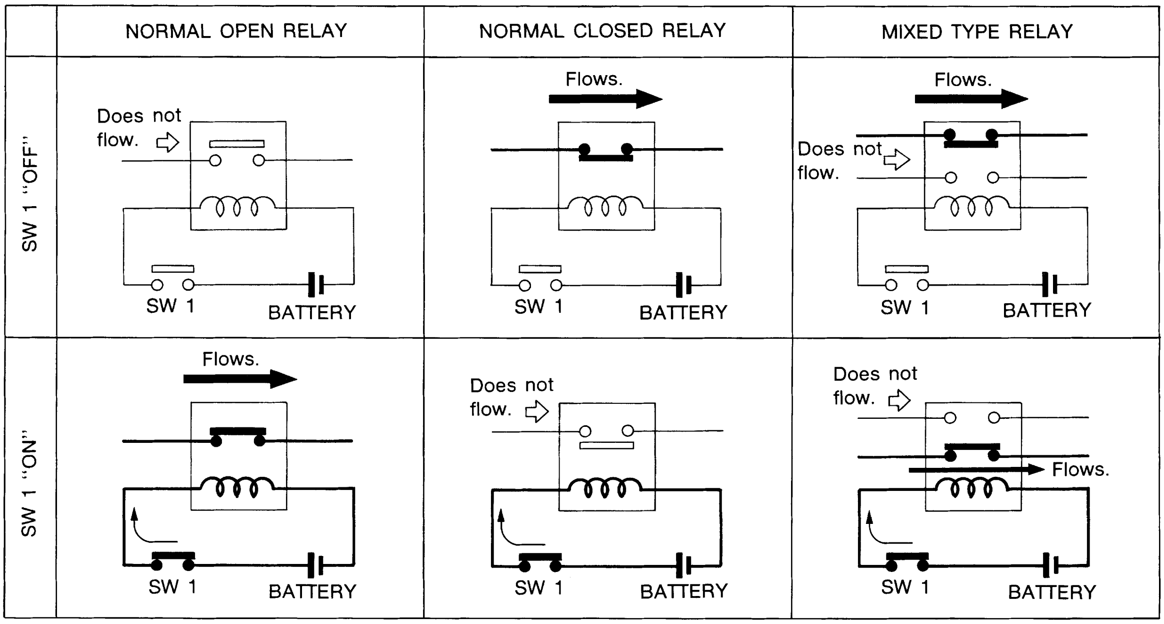
PFP:00011

Description

AKS00BF2

NORMAL OPEN, NORMAL CLOSED AND MIXED TYPE RELAYS

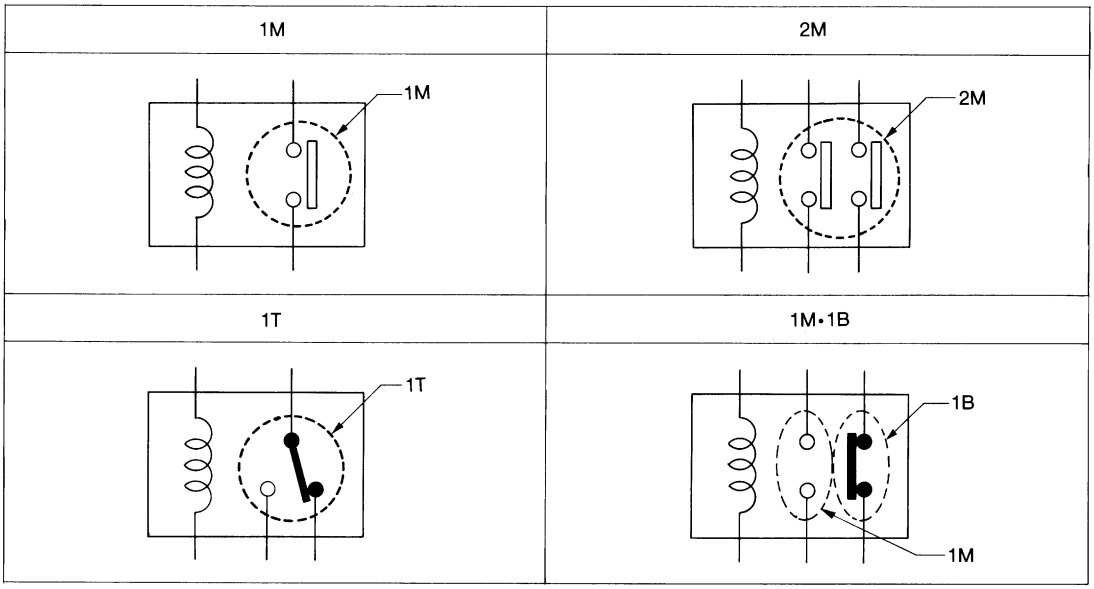
Relays can mainly be divided into three types: normal open, normal closed and mixed type relays.



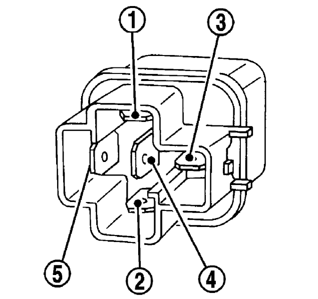
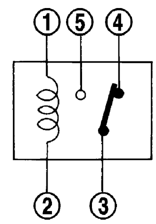
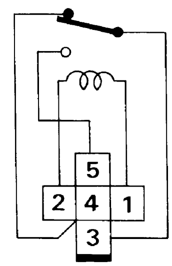
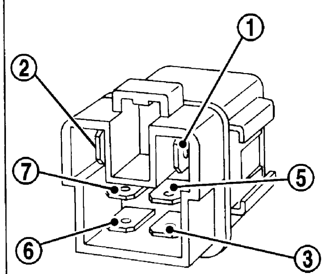
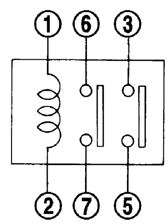
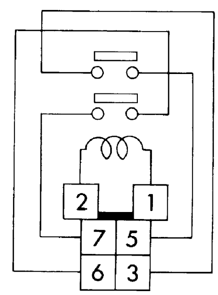
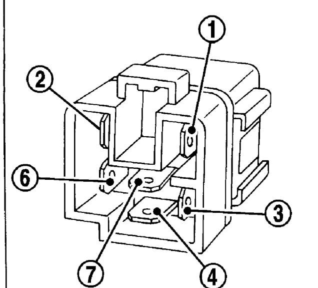
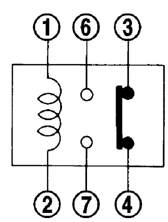
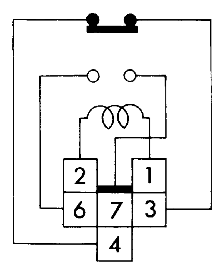
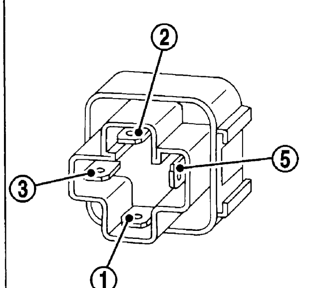
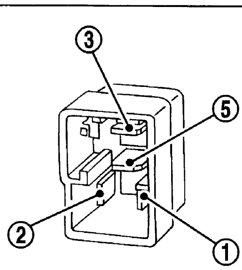
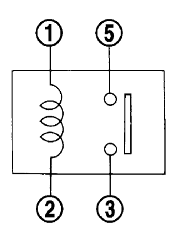
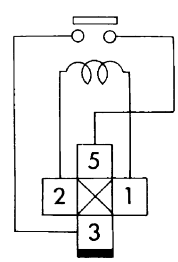
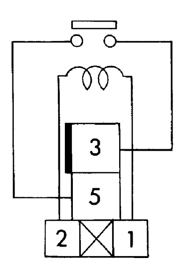
SEL881H

TYPE OF STANDARDIZED RELAYS

1M	1 Make	2M	2 Make
1T	1 Transfer	1M·1B	1 Make 1 Break



SEL882H

Type	Outer view	Circuit	Connector symbol and connection	Case color
1T				BLACK
2M				BROWN
1M•1B				GRAY
1M	 		 	BLUE

The arrangement of terminal numbers on the actual relays may differ from those shown above.

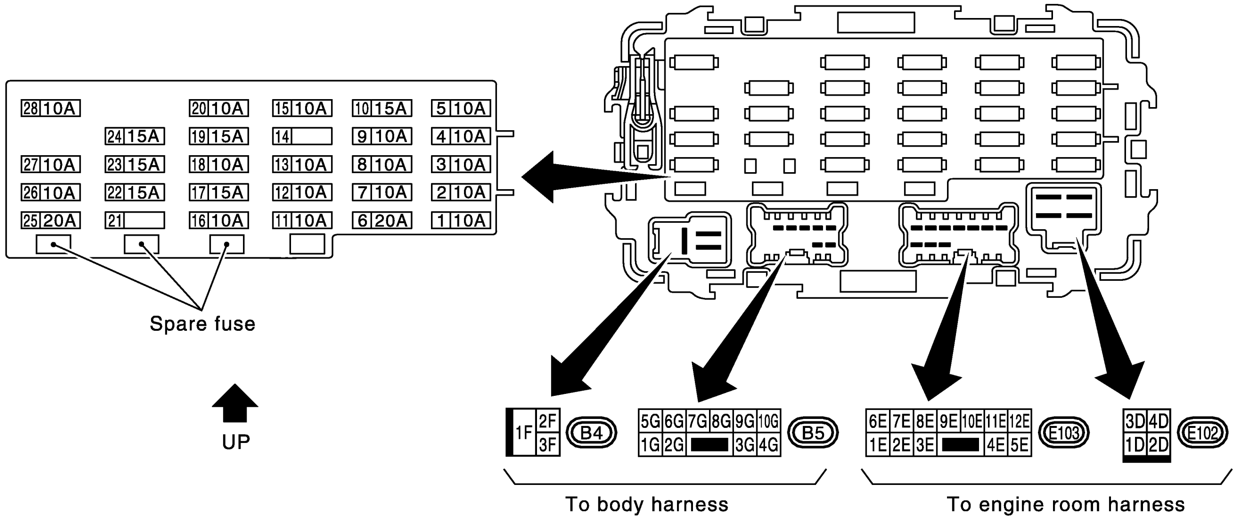
SEL188W

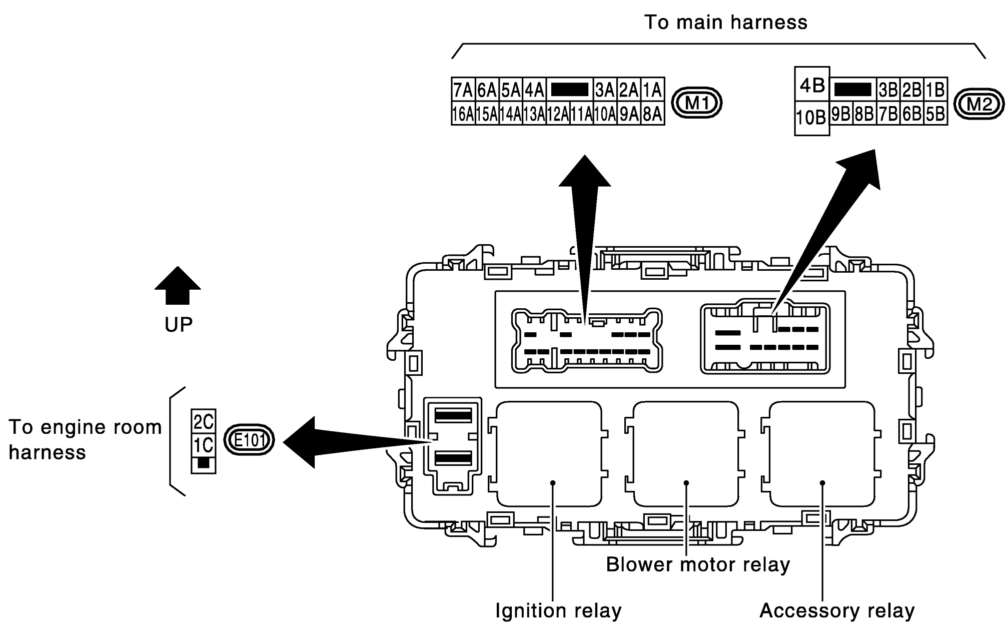
FUSE BLOCK - JUNCTION BOX (J/B)

PFP:24350

Terminal Arrangement

AKS00BF3





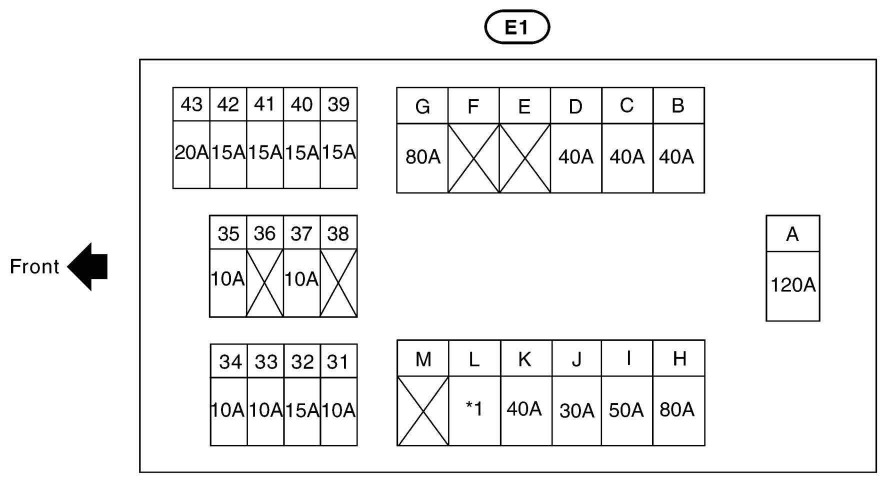
CKIB0038E

FUSE AND FUSIBLE LINK BOX

PFP:24381

Terminal Arrangement

AKS00BF4



No. 31 to 43 : FUSE A to M : FUSIBLE LINK

*1 30A : With VDC
40A : Without VDC

CKIB0037E

SECTION PR
PROPELLER SHAFT

CONTENTS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS0015R

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		PR-3	PR-6	—	PR-4	—	PR-3	PR-5	NVH in RFD section	NVH in FAX, RAX, FSU, and RSU section	NVH in WT section	NVH in WT section	NVH in FAX and RAX section	NVH in BR section	NVH in PS section
Possible cause and SUSPECTED PARTS		Uneven rotating torque	Center bearing improper installation	Excessive center bearing axial end play	Center bearing mounting (insulator) cracks, damage or deterioration	Excessive joint angle	Rotation imbalance	Excessive runout	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×	×
	Shake		×			×				×	×	×	×	×	×
	Vibration	×	×	×	×	×	×	×		×	×		×		×

×: Applicable

REAR PROPELLER SHAFT

PFP:37000

On-Vehicle Inspection

ADS0015S

APPEARANCE AND NOISE INSPECTION

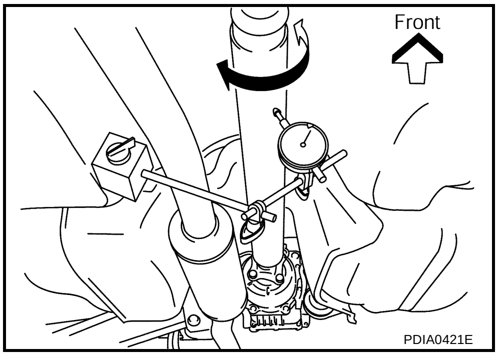
- Check the propeller shaft tube surface for dents or cracks. If damaged, replace propeller shaft assembly.
- If center bearing is noisy or damaged, replace propeller shaft assembly.

PROPELLER SHAFT VIBRATION

If vibration is present at high speed, inspect propeller shaft runout first.

1. Measure propeller shaft runout at runout measuring points by rotating final drive companion flange with hands.

   Propeller shaft runout limit : 0.6 mm (0.024 in) or less



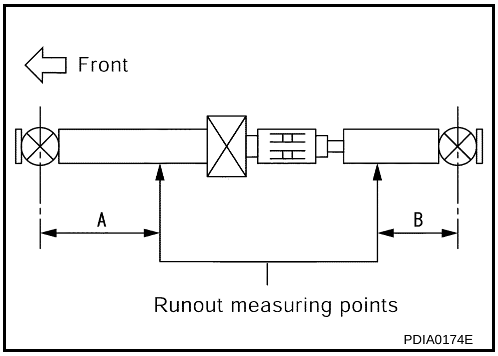
PDIA0421E

- **3F63A-DOJ87 TYPE**
  (Serial number: up to JN8BT08V95W108626)

  Propeller shaft runout measuring points
  Dimension A: 469.5 mm (18.48 in)
  B: 414.5 mm (16.32 in)

- **3F63A-DOJ75 TYPE**
  (Serial number: from JN8BT08V95W108626)

  Propeller shaft runout measuring points
  Dimension A: 469.5 mm (18.48 in)
  B: 429.0 mm (16.89 in)



PDIA0174E

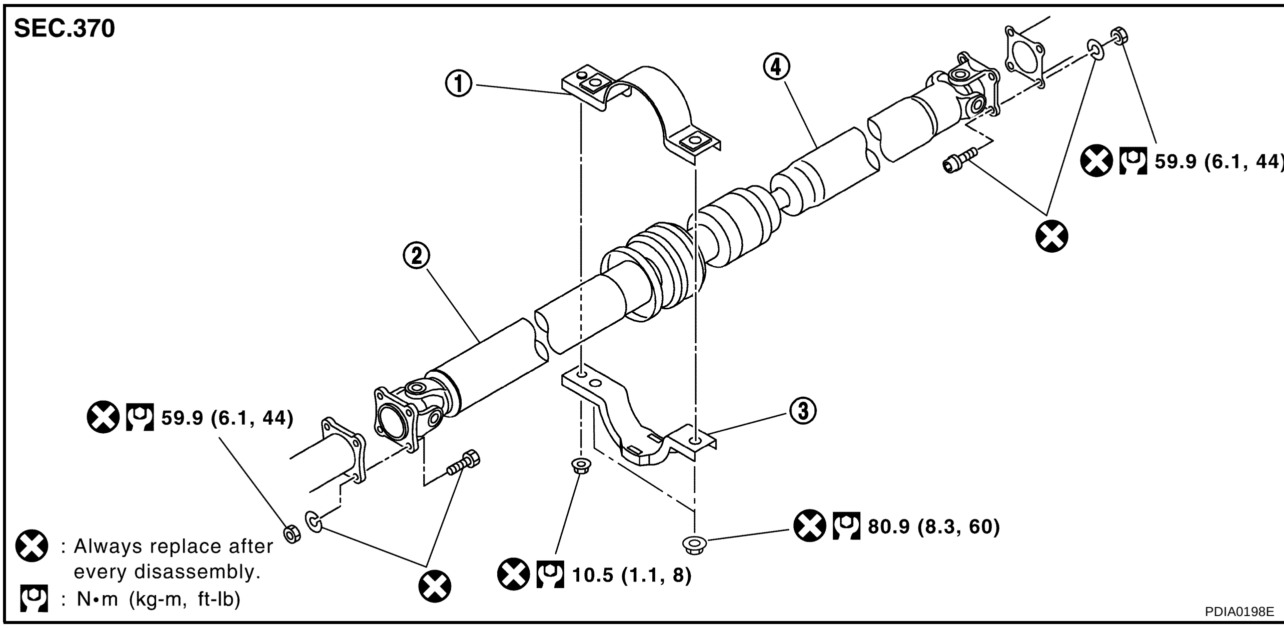
2. If runout still exceeds specifications, separate propeller shaft at final drive companion flange or transfer companion flange; then rotate companion flange 90, 180, 270 degrees and install propeller shaft.
3. Check runout again. If runout still exceeds specifications, replace propeller shaft assembly.
4. Check the vibration by driving vehicle.

A B C PR E F G H I J K L M

Removal and Installation

ADS0015T

COMPONENTS



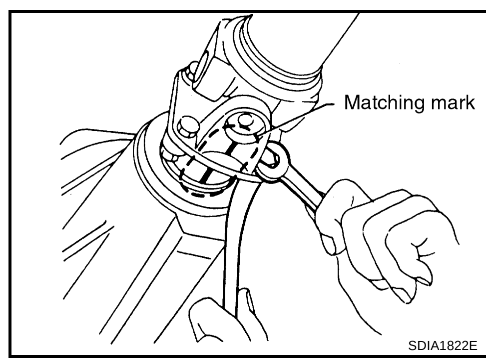
1. Center bearing mounting bracket (Upper)
2. Propeller shaft (1st shaft)
3. Center bearing mounting bracket (Lower)
4. Propeller shaft (2nd shaft)

REMOVAL

1. Move A/T selector lever to N position or set M/T shift lever to neutral position.
2. Release parking brake.
3. Put matching marks onto propeller shaft flange yoke and final drive and transfer companion flanges.

   CAUTION:

   For matching mark, use paint. Do not damage propeller shaft flange and companion flanges.



4. Loosen mounting nuts of center bearing mount brackets.
5. Remove fixing nuts and bolts from propeller shaft companion flanges.
6. Remove center bearing mounting bracket fixing nuts.
7. Remove propeller shaft.

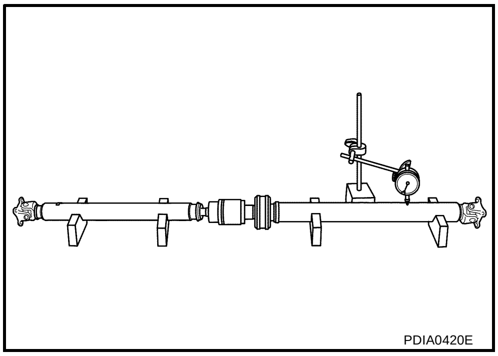
   CAUTION:

   If constant velocity joint was bent during propeller shaft assembly removal, installation, or transportation, its boot may be damaged. Wrap boot interference area to metal part with shop cloth or rubber to protect boot from breakage.

INSPECTION

- Inspect propeller shaft runout at measuring points. If runout exceeds specifications, replace propeller shaft assembly.

  Propeller shaft runout limit : 0.6 mm (0.024 in) or less



- **3F63A-DOJ87 TYPE**
  (Serial number: up to JN8BT08V95W108626)

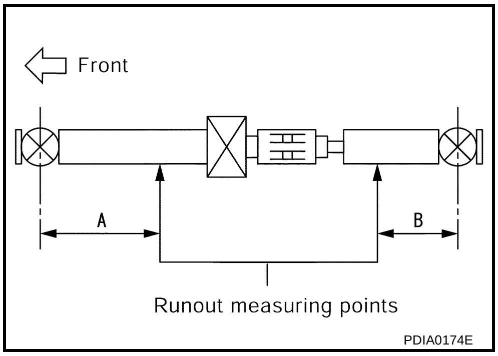
  Propeller shaft runout measuring points

  Dimension A: 469.5 mm (18.48 in)
  B: 414.5 mm (16.32 in)

- **3F63A-DOJ75 TYPE**
  (Serial number: from JN8BT08V95W108626)

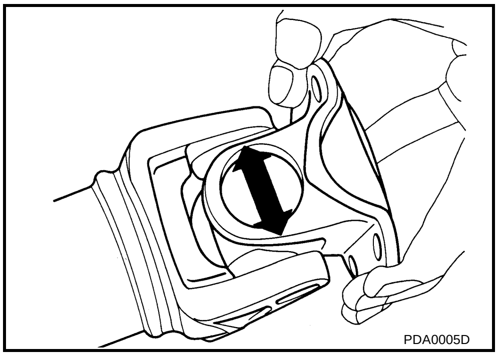
  Propeller shaft runout measuring points

  Dimension A: 469.5 mm (18.48 in)
  B: 429.0 mm (16.89 in)



- As shown in the figure, while fixing yoke on one side, check axial play of joint. If outside the standard, replace propeller shaft assembly.

  Journal axial play : 0 mm (0 in)



- Check propeller shaft for bend and damage. If damage is detected, replace propeller shaft assembly.

  CAUTION:
  Do not disassemble joints.

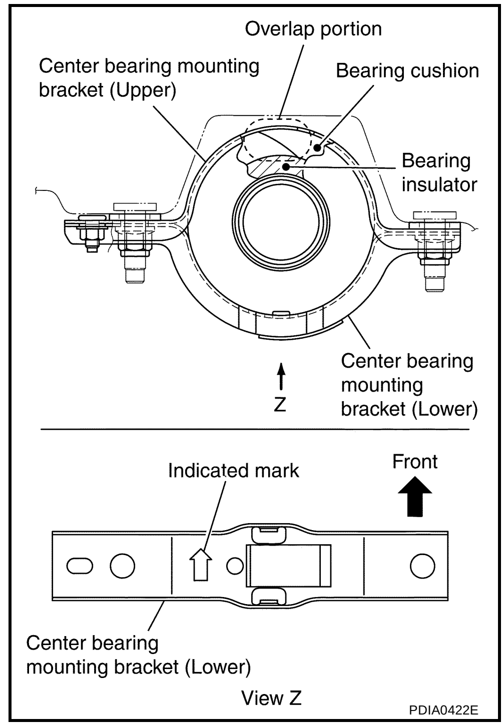
- Check center bearing for noise and damage. If noise or damage is detected, replace propeller shaft assembly.

  CAUTION:
  Do not disassemble center bearing.

INSTALLATION

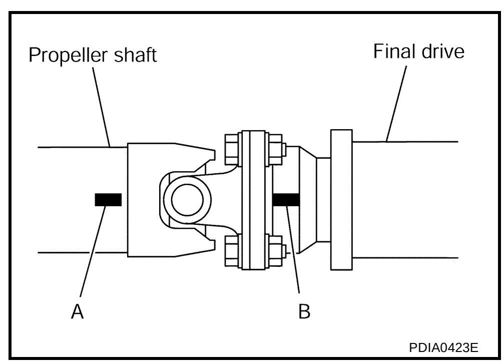
Note the following, and install in the reverse order of removal.

- Align matching marks to install propeller shaft to final drive and transfer companion flanges, and then tighten to specified torque. Refer to PR-4, "COMPONENTS" .
- When installing center bearing, position bearing cushion overlap upward as shown in the figure.
- Install center bearing mounting bracket (Lower) with its arrow mark facing forward.
- Adjust position of mounting bracket sliding back and forth to prevent play in thrust direction of center bearing insulator. Install bracket to vehicle.
- After assembly, perform a driving test to check propeller shaft vibration. If vibration occurred, separate propeller shaft from final drive or transfer. Reinstall companion flange after rotating it by 90, 180, 270 degrees. Then perform driving test and check propeller shaft vibration again at each point.

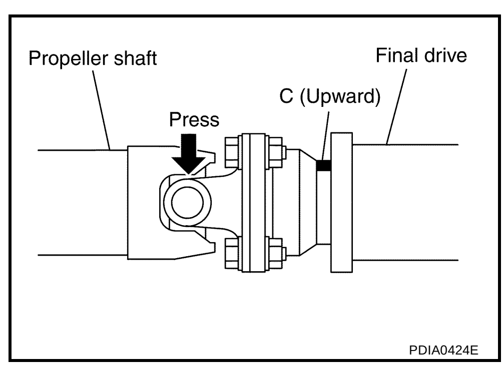


- If propeller shaft or final drive has been replaced, install them as follows;

1. Install propeller shaft while aligning its matching mark A with the matching mark B on the joint as close as possible.
2. Temporarily tighten bolts and nuts.



3. Press down propeller shaft with matching mark C facing upward. Then tighten fixing bolts and nuts to the specified torque. Refer to PR-4, "COMPONENTS" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ADS0015U

Applied model		QR25DE	
Propeller shaft model (Serial number)		3F63A-DOJ87 (Up to JN8BT08V95W108626)	3F63A-DOJ75 (From JN8BT08V95W108626)
Number of joints		3	
Coupling method with transfer		Flange type	
Type of journal bearings		Shell type (Non-disassembly type)	
Shaft length	1st (Spider to cardan joint center)	1,067 mm (42.01 in)	1,041 mm (40.98 in)
	2nd (Cardan joint center to spider)	908 mm (35.75 in)	934 mm (36.77 in)
Shaft outer diameter	1st	63.5 mm (2.500 in)	
	2nd	63.5 mm (2.500 in)	70.0 mm (2.756 in)

Journal Axial Play

ADS0015X

Model (Serial number)	3F63A-DOJ87 (Up to JN8BT08V95W108626)	3F63A-DOJ75 (From JN8BT08V95W108626)
Journal axial play	0 mm (0 in)	

Propeller Shaft Runout

ADS0015Y

Model (Serial number)	3F63A-DOJ87 (Up to JN8BT08V95W108626)	3F63A-DOJ75 (From JN8BT08V95W108626)
Propeller shaft runout limit	0.6 mm (0.024 in) or less	

SECTION RAX
REAR AXLE

CONTENTS

2WD

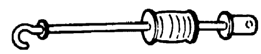
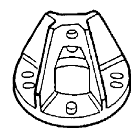
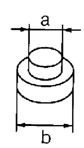
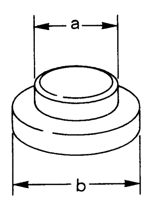
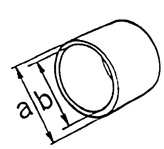
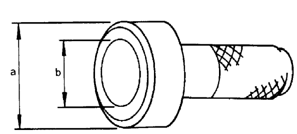
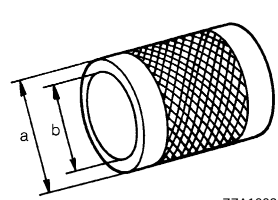
AWD

PREPARATION

PFP:00002

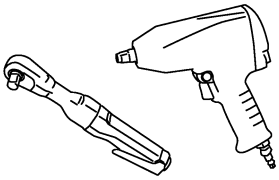
Special Service Tools [SST]

ADS0015E

Tool number (Kent-Moore No.) Tool name		Description
ST36230000 (J-25840-A) Sliding hammer	 ZZA0803D	Removing wheel hub
KV40104100 (–) Attachment	 ZZA0804D	Removing wheel hub
ST33061000 (J-8107-2) Drift a: 28.5 mm (1.122 in) dia. b: 38.0 mm (1.496 in) dia.	 ZZA0969D	Removing wheel bearing outer side inner race
ST15242000 (–) Drift a: 47.7 mm (1.878 in) dia. b: 69 mm (2.72 in) dia.	 ZZA0881D	Removing wheel bearing
KV40105310 (–) Drift a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.	 ZZA1003D	● Removing wheel bearing ● Installing wheel hub
ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.	 ZZA0811D	Installing wheel bearing
ST33200000 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	 ZZA1002D	Installing wheel hub

Commercial Service Tools

ADS0016X

Tool name	Description
Power tool  PBIC0190E	● Removing wheel nuts ● Removing torque member fixing bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS0015F

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			RAX-5	—	NVH in RAX and RSU sections	NVH in WT section	NVH in WT section	
Possible cause and Suspected parts			Improper installation, looseness	Parts interference	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEELS	BRAKES
Symptom	Rear axle	Noise	×	×	×	×	×	×
		Shake	×	×	×	×	×	×
		Vibration	×	×	×	×		
		Shimmy	×	×	×	×	×	×
		Judder	×		×	×	×	×
		Poor quality ride or handling	×	×	×	×	×	

×: Applicable

WHEEL HUB

PFP:43202

On-Vehicle Inspection and Service

ADS0015G

Make sure that the mounting conditions (looseness, backlash) of each of the components and the component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub in the axial direction by hand. Make sure there is no looseness of wheel bearing.

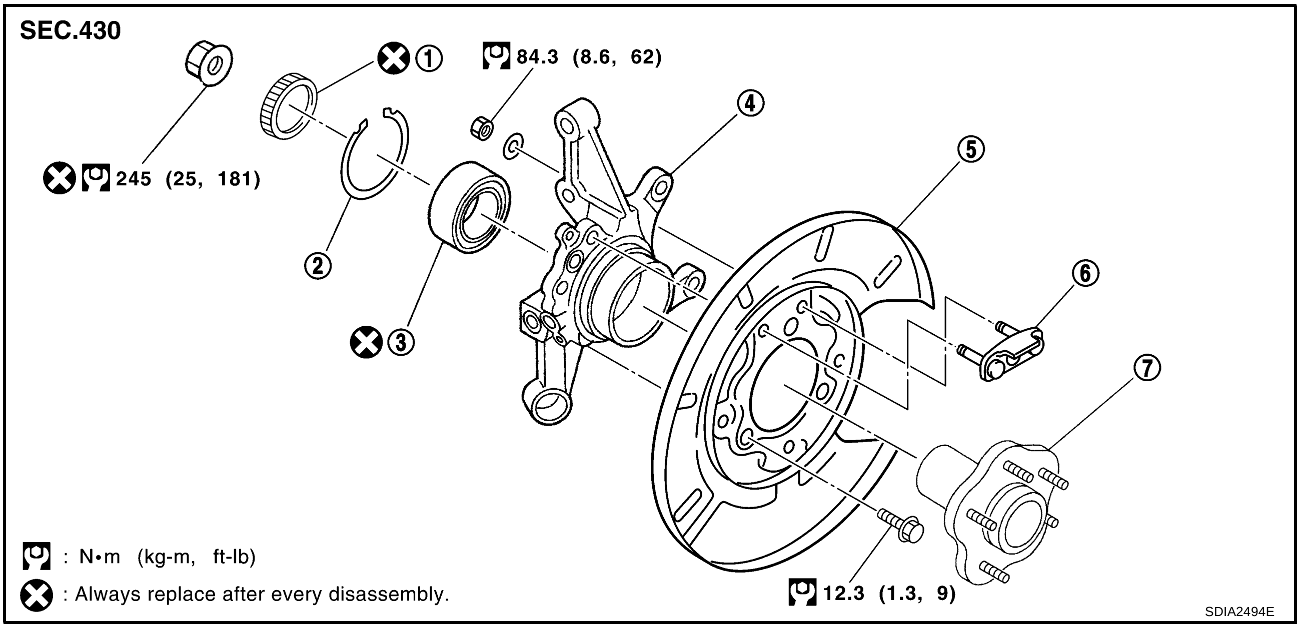
  Axial end play : 0.05 mm (0.002 in) or less

- Rotate wheel hub and make sure that is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel bearing.

Removal and Installation

ADS0015H

COMPONENT



1. Sensor rotor	2. Snap ring	3. Wheel bearing
4. Axle housing	5. Back plate	6. Anchor block
7. Wheel hub		

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from axle housing. Refer to BRC-36, "WHEEL SENSORS" .

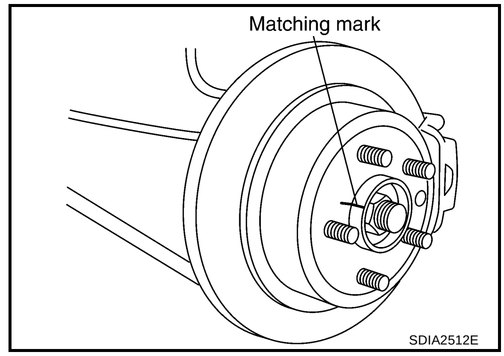
   CAUTION:

   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-25, "FRONT DISC BRAKE" .

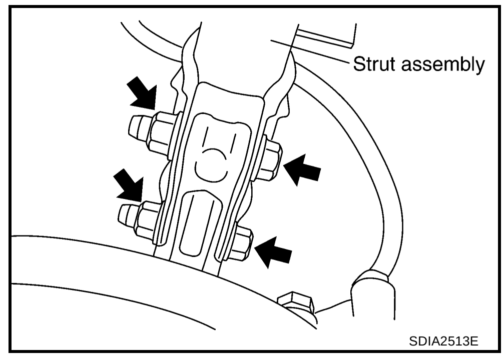
   NOTE:

   Avoid depressing brake pedal while brake caliper is removed.

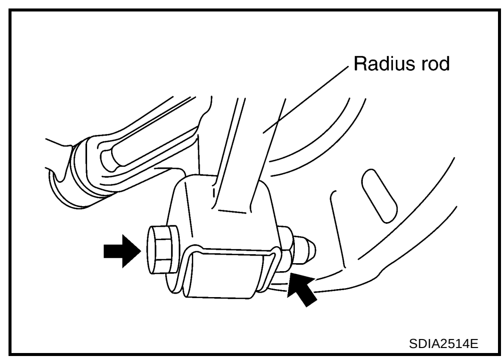
4. Put matching mark on disc rotor and wheel hub, then remove disc rotor.
5. Remove parking brake shoe and parking brake cable from back plate. Refer to BR-31, "REAR DISC BRAKE" .



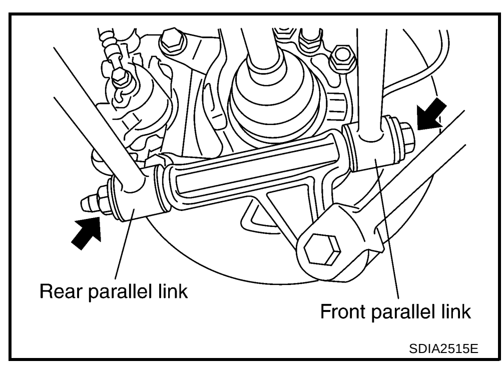
6. Remove fixing bolts and nuts, and then remove axle housing from strut assembly. Refer to RSU-7, "Component" .



7. Remove fixing nut and bolt of axle housing side of radius rod, and then remove radius rod from axle housing. Refer to RSU-7, "Component" .



8. Remove fixing bolt, washer and nut of axle housing side of front and rear parallel links, and then remove front and rear parallel links from axle housing.
9. Remove axle housing from vehicle.



INSPECTION AFTER REMOVAL

Check the components for deformation, cracks and other damage. Replace if there.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RAX-5, "COMPONENT" .

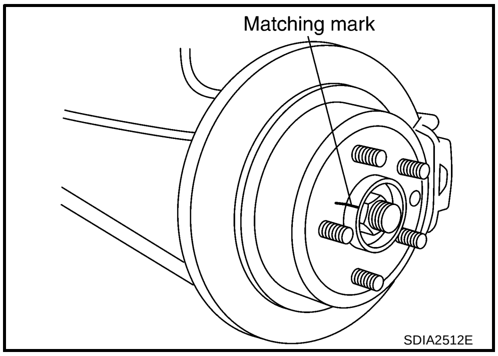
  NOTE:

  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen condition, which were removed when removing wheel hub and axle housing. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .

- Adjust neutral position of steering angle sensor after the checking wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .
- Assembly disc rotor and wheel hub by aligning each matching mark as shown in the figure when installing disc rotor.

  NOTE:

  Refer to BR-31, "REAR DISC BRAKE" for assembly when removing disc rotor without matching mark.



Disassembly and Assembly

ADS0015I

DISASSEMBLY

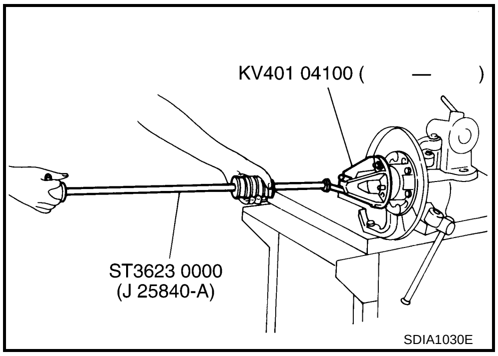
CAUTION:

Do not disassemble if wheel bearing has no malfunction.

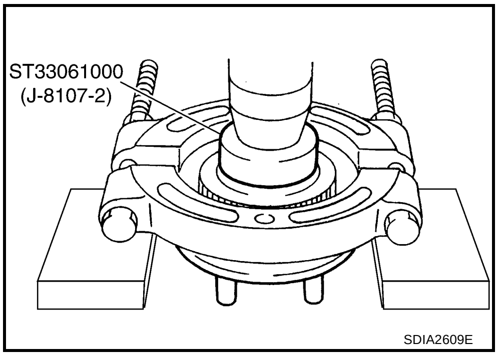
1. Remove hub lock nut from axle housing.
2. Remove sensor rotor from axle housing.
3. Set axle housing on a vise at point where strut is attached. Use the sliding hammer [SST] and the attachment [SST] to remove wheel hub from axle housing.

   CAUTION:

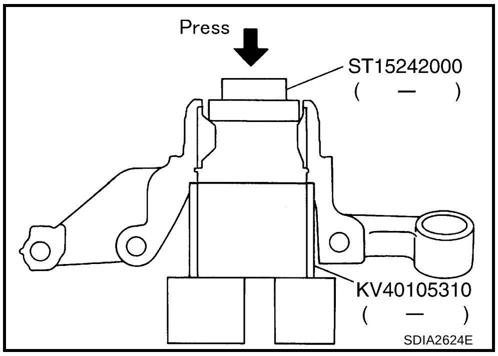
   When placing on a vise, be careful not to damage strut mounting surface of axle housing. Use an aluminum plate or a suitable tool.



4. Remove anchor block mounting nuts and washers, then remove anchor block from axle housing.
5. Remove fixing bolt of back plate, and then remove back plate from axle housing.
6. Press wheel hub using the drift [SST] and a puller (suitable tool). Then remove wheel bearing outer side inner race from wheel hub.
7. Remove snap ring from axle housing using a flat-bladed screw-driver or similar tool.



8. Press wheel bearing using the drift [SST]. Then remove it from axle housing.



INSPECTION AFTER DISASSEMBLY

Wheel Hub

Check wheel hub for deformation, cracks, and other damage. If any irregular conditions are found, replace wheel hub.

Axle Housing

Check axle housing for deformation, cracks, and other damage. If any irregular conditions are found, replace axle housing.

Snap Ring

Check snap ring for wear or other damage. If any irregular conditions are found, replace snap ring.

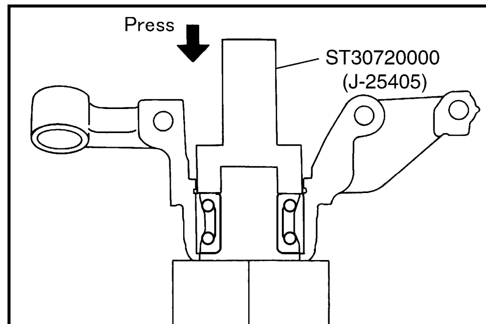
Back Plate

Check back plate for deformation, cracks, and other damage. If any irregular conditions are found, replace back plate.

ASSEMBLY

1. Using the drift [SST], press wheel bearing securely onto axle housing as far as it will go.

   NOTE:
   - Do not reuse wheel bearing.
   - The final press load guideline is 49,030 N (5,000 kg, 11,025 lb).
2. Using a flat-bladed screwdriver or a similar tool, install snap ring securely to the ditch of the axle housing inner side.
3. Install back plate to axle housing.



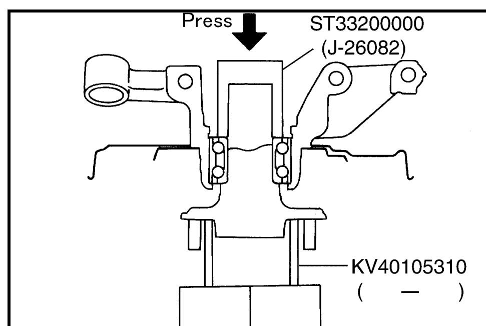
SDIA2625E

4. Using the drift [SST], press wheel hub onto axle housing.

   NOTE:
   The final press load guideline is 49,030 N (5,000 kg, 11,025 lb).
5. Set sensor rotor to axle housing.

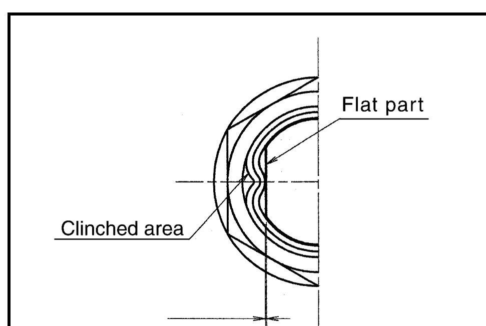
   NOTE:
   Do not reuse sensor rotor.
6. Install hub lock nut to axle housing.

   NOTE:
   Do not reuse hub lock nut.



SDIA2626E

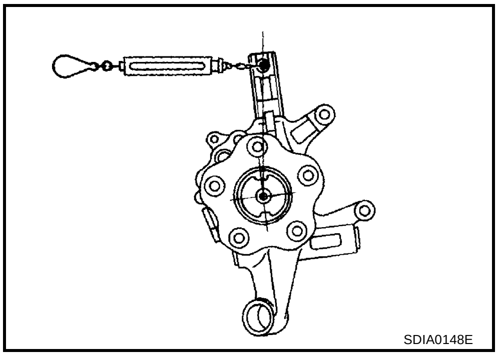
7. After installation of hub lock nut, be sure to perform clinching. Refer to figure for clinching procedure.



SDIA2627E

INSPECTION AFTER ASSEMBLY

1. With wheel hub pressed into wheel bearing, apply 49,030 N (5,000 kg, 11,025 lb) to wheel hub and rotate both clockwise and counterclockwise 10 times to minimize resistance.
2. Attach spring balance in the position shown in the figure and pull at a rate of 10±2 rpm to measure rotating torque.



Rotating torque
: Less than 1.96 N·m (0.20 kg-m, 17 in-lb)

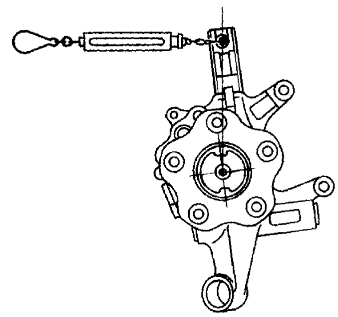
Spring balance reading
: Less than 12.8 N (1.30 kg, 2.87 lb)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Bearing

ADS0015O

Axial end play	0.05 mm (0.002 in) or less
Rotating torque	Less than 1.96 N·m (0.20 kg-m, 17 in-lb)
Spring balance reading	Less than 12.8 N (1.30 kg, 2.87 lb)
Measuring point	 SDIA0148E

PRECAUTIONS

PFP:00001

Caution

ADS0016M

Observe the following precautions when disassembling and assembling drive shaft.

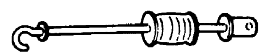
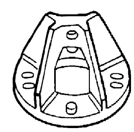
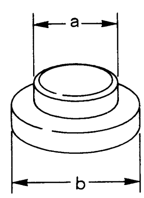
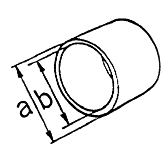
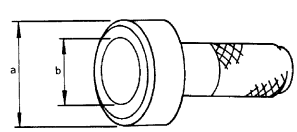
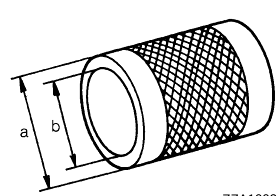
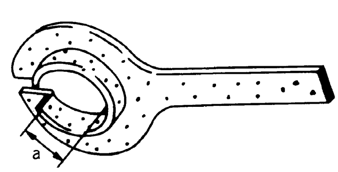
- Joint sub-assembly does not disassemble because it is non-overhaul parts.
- Perform work in a location which is as dust-free as possible.
- Before disassembling and assembling, clean the outside of parts.
- Prevention of the entry of foreign objects must be taken into account during disassembling and assembling of the service location.
- Disassembled parts must be carefully reassembled in the correct order. If work is interrupted, a clean cover must be placed over parts.
- Paper shop cloths must be used. Fabric shop cloths must not be used because of danger of lint adhering to parts.
- Disassembled parts (except for rubber parts) should be cleaned with kerosene which shall be removed by blowing with air or wiping with paper shop cloths.

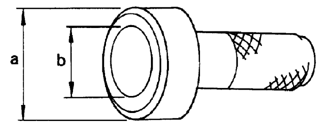
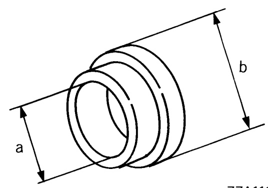
PREPARATION

PFP:00002

Special Service Tools [SST]

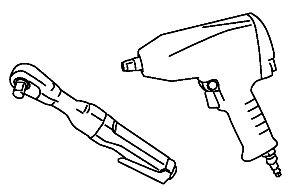
ADS0016N

Tool number (Kent-Moore No.) Tool name		Description
ST36230000 (J-25840-A) Sliding hammer	 ZZA0803D	Removing wheel hub
KV40104100 (–) Attachment	 ZZA0804D	Removing wheel hub
ST15242000 (–) Drift a: 47.7 mm (1.878 in) dia. b: 69 mm (2.72 in) dia.	 ZZA0881D	Removing wheel bearing
KV40105310 (–) Drift a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.	 ZZA1003D	● Removing wheel bearing ● Installing wheel hub
ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.	 ZZA0811D	Installing wheel bearing
ST33200000 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.	 ZZA1002D	Installing wheel hub
KV38107800 (–) Protector a: 29 mm (1.41 in) dia.	 ZZA0835D	Installing drive shaft

Tool number (Kent-Moore No.) Tool name		Description
KV38100500 (–) Drift a: 80 mm (3.15 in) dia. b: 60 mm (2.36 in) dia.	 ZZA0701D	Installing sensor rotor
KV40101840 (–) Drift a: 67 mm (2.64 in) dia. b: 85 mm (3.35 in) dia.	 ZZA1113D	Installing sensor rotor

Commercial Service Tools

ADS0016Y

Tool name		Description
Power tool	 PBIC0190E	● Removing wheel nuts ● Removing torque member fixing bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS0016O

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			—	RAX-23	—	RAX-15	—	NVH in PR section	NVH in RFD section	NVH in RAX and RSU sections	Refer to Rear axle in this chart	NVH in WT section	NVH in WT section	Refer to DRIVE SHAFT in this chart	NVH in BR section	NVH in PS section
Possible cause and Suspected			Excessive joint angle	Joint sliding resistance	Imbalance	Improper installation, looseness	Parts interference	PROPELLER SHAFT	DIFFERENTIAL	REAR AXLE AND REAR SUSPENSION	REAR AXLE	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	DRIVE SHAFT	Noise	×	×				×	×	×	×	×	×		×	×
		Shake	×		×			×		×	×	×	×		×	×
	REAR AXLE	Noise				×	×	×	×	×		×	×	×	×	×
		Shake				×	×	×		×		×	×	×	×	×
		Vibration				×	×	×		×		×		×		×
		Shimmy				×	×			×		×	×		×	×
		Judder				×				×		×	×		×	×
		Poor quality ride or handling				×	×			×		×	×			

×: Applicable

WHEEL HUB

PFP:43202

On-Vehicle Inspection and Service

ADS0016P

Make sure that the mounting conditions (looseness, backlash) of each of the components and the component conditions (wear, damage) are normal.

WHEEL BEARING INSPECTION

- Move wheel hub in the axial direction by hand. Make sure there is no looseness of wheel bearing.

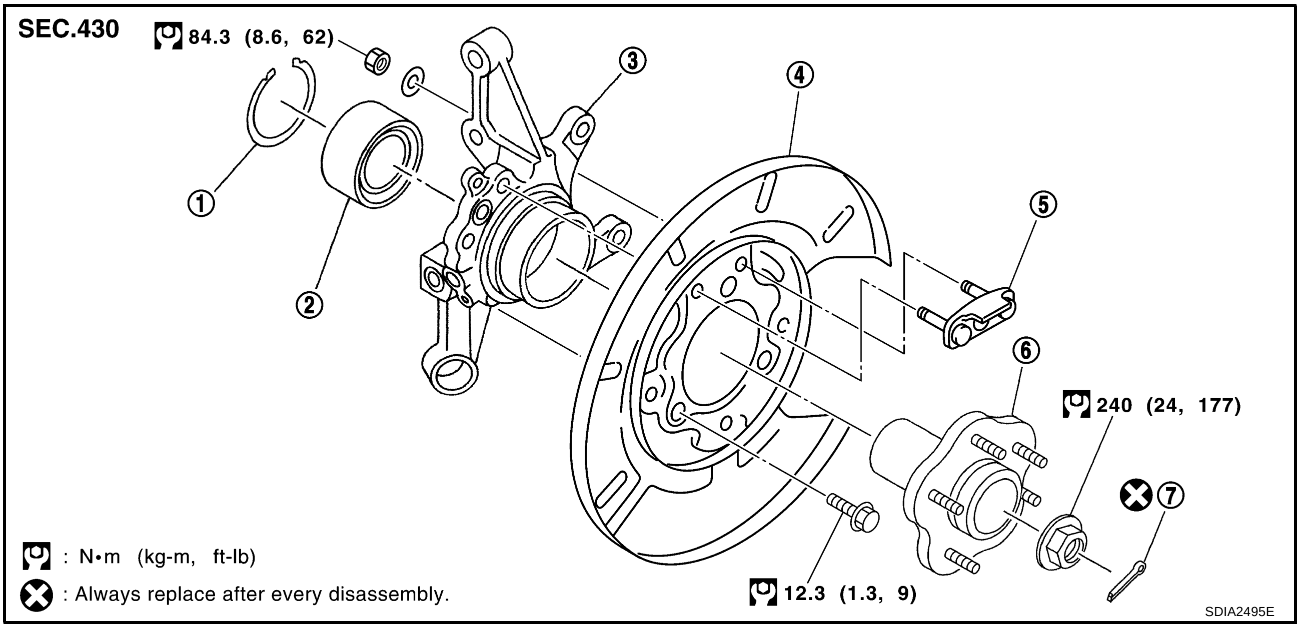
  Axial end play : 0.05 mm (0.002 in) or less

- Rotate wheel hub and make sure that is no unusual noise or other irregular conditions. If there is any of irregular conditions, replace wheel bearing.

Removal and Installation

ADS0016Q

COMPONENT



1. Snap ring	2. Wheel bearing	3. Axle housing
4. Back plate	5. Anchor block	6. Wheel hub
7. Cotter pin		

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove wheel sensor from axle housing. Refer to BRC-36, "WHEEL SENSORS" .

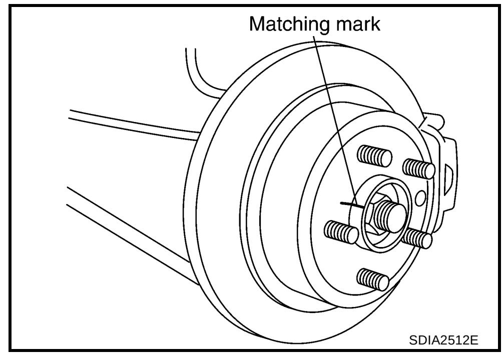
   CAUTION:

   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-31, "REAR DISC BRAKE" .

   NOTE:

   Avoid depressing brake pedal while brake caliper is removed.

4. Put matching mark on disc rotor and wheel hub, then remove disc rotor.
5. Remove parking brake shoe and parking brake cable from back plate. Refer to BR-31, "REAR DISC BRAKE" .
6. Remove cotter pin, then loosen hub lock nut with power tool.



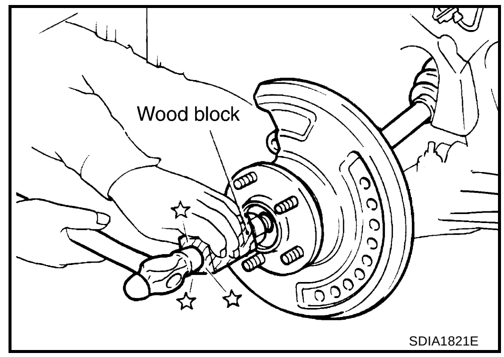
7. Separate wheel hub from drive shaft by lightly tapping the end with a hammer (suitable tool) and wood block, and then remove hub lock nut.

   CAUTION:

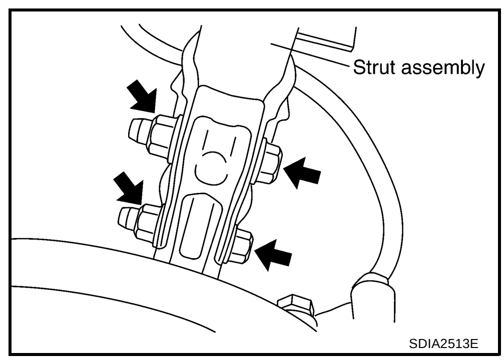
   - **Do not place drive shaft joint at an extreme angle. Also be careful not to overextend slide joint.**
   - **Do not allow dive shaft to hang down without support for housing (or joint sub-assembly), shaft and other parts.**

   NOTE:

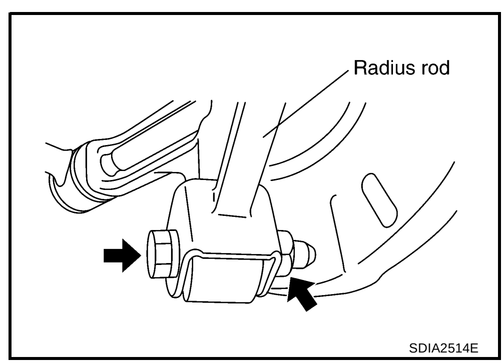
   Using a puller (suitable tool) if wheel hub and drive shaft cannot be separated even after performing the above procedure.



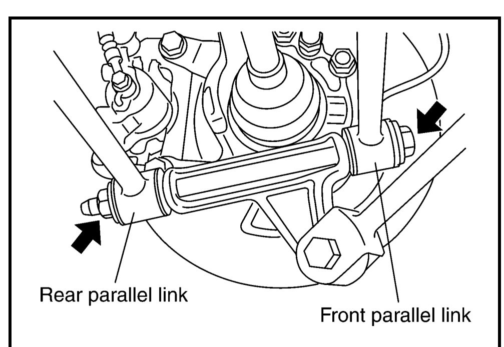
8. Remove the fixing bolts and nuts, and then remove axle housing from strut assembly. Refer to RSU-7, "Component" .
9. Remove drive shaft from axle housing.



10. Remove fixing nut and bolt of axle housing side of radius rod, and then remove radius rod from axle housing. Refer to RSU-7, "Component" .



11. Remove fixing bolt, washer and nut of axle housing side of front and rear parallel links, and then remove front and rear parallel links from axle housing.
12. Remove axle housing from vehicle.



INSPECTION AFTER REMOVAL

Check components for deformation, cracks and other damage. Replace if there are.

INSTALLATION

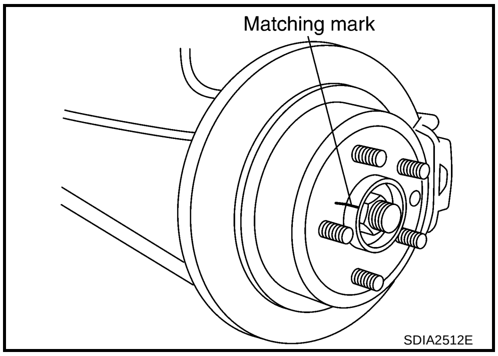
- Install in the reverse order of the removal. For tightening torque, refer to RAX-15, "COMPONENT" .

  NOTE:

  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing wheel hub and axle housing. Check the wheel alignment. Refer to RSU-18, "SERVICE DATA AND SPECIFICATIONS (SDS)" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .
- Assembly disc rotor and wheel hub by aligning each matching mark as shown in the figure when installing disc rotor.

  NOTE:

  Refer to BR-31, "REAR DISC BRAKE" for assembly when removing disc rotor without matching mark.



Disassembly and Assembly

ADS0016R

DISASSEMBLY

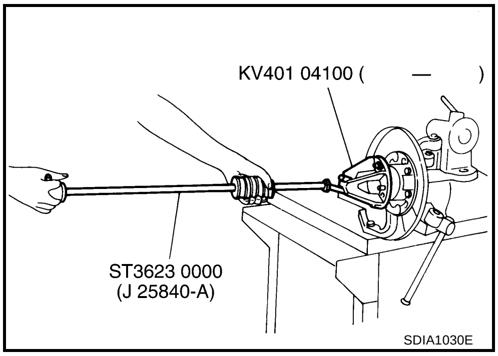
CAUTION:

Do not disassemble if wheel bearing has no malfunction.

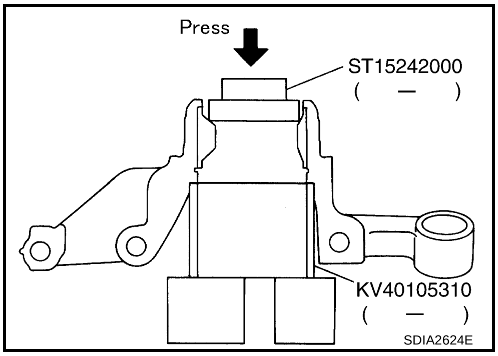
1. Secure axle housing on a vise at the part where strut is removed. Use the sliding hammer [SST] and attachment [SST], remove wheel hub from axle housing.

   CAUTION:

   When securing the axle housing on a vise, be careful not to damage strut mounting surface of axle housing, Use an aluminum plate or a suitable tool.



2. Remove anchor block mounting nuts and washers then remove anchor block from axle housing.
3. Remove fixing bolt of back plate, and then remove back plate from axle housing.
4. Remove snap ring from axle housing using a flat-bladed screwdriver or similar tool.
5. Press wheel bearing using the drift [SST]. Then remove it from axle housing.



INSPECTION AFTER DISASSEMBLY

Wheel Hub

Check wheel hub for deformation, cracks, and other damage. If any irregular conditions are found, replace wheel hub.

Axle Housing

Check axle housing for deformation, cracks, and other damage. If any irregular conditions are found, replace axle housing.

Snap Ring

Check snap ring for wear or other damage. If any irregular conditions are found, replace snap ring.

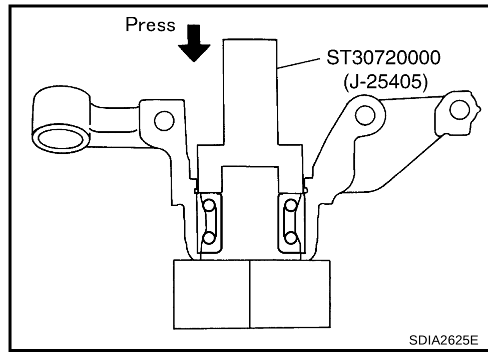
Back Plate

Check back plate for deformation, cracks, and other damage. If any irregular conditions are found, replace back plate.

ASSEMBLY

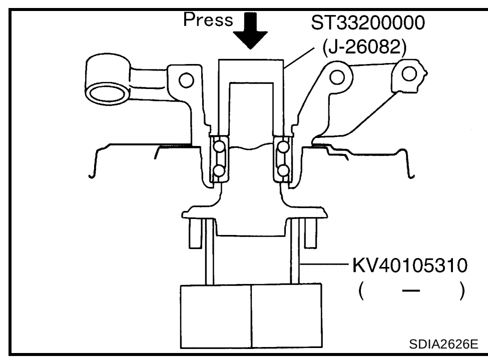
1. Using the drift [SST], press wheel bearing securely onto axle housing as far as it will go.

   NOTE:
   - Do not reuse wheel bearing.
   - The final press load guideline is 49,030 N (5,000 kg, 11,025 lb).
2. Using a flat-bladed screwdriver or a similar tool, install snap ring securely to the ditch of the axle housing inner side.
3. Install back plate to axle housing.



4. Using the drift [SST], press wheel hub onto axle housing.

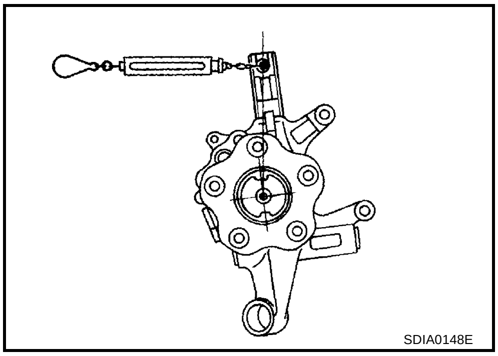
   NOTE:
   The final press load guide line is 49,030 N (5,000 kg, 11,025 lb).



INSPECTION AFTER ASSEMBLY

1. With wheel hub pressed into wheel bearing, apply 49,030 N (5,000 kg, 11,025 lb) to wheel hub and rotate both clockwise and counterclockwise 10 times to minimize resistance.
2. Attach spring balance in the position shown in the figure and pull at a rate of 10±2 rpm to measure rotating torque.

Rotating torque
: Less than 1.96 N·m (0.20 kg-m, 17 in-lb)
Spring balance reading
: Less than 12.8 N (1.30 kg, 2.87 lb)



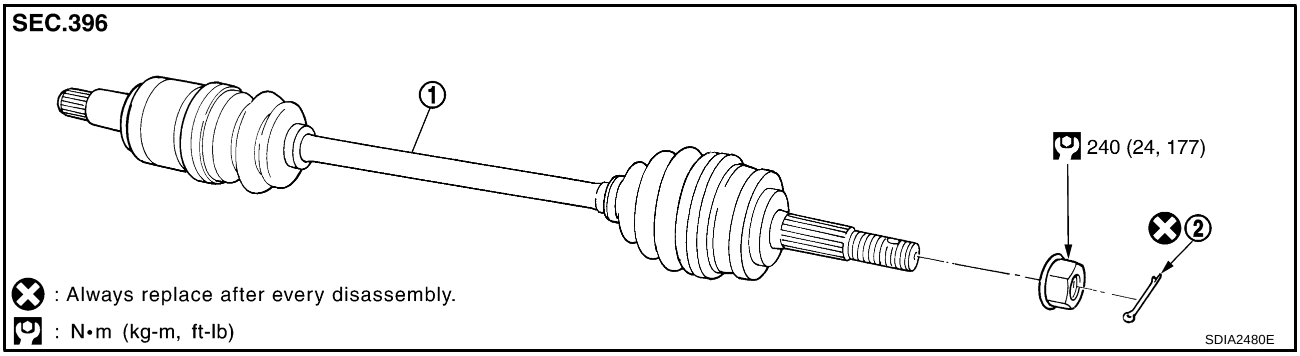
REAR DRIVE SHAFT

PFP:39600

Removal and Installation

ADS0016S

COMPONENT



1. Drive shaft
2. Cotter pin

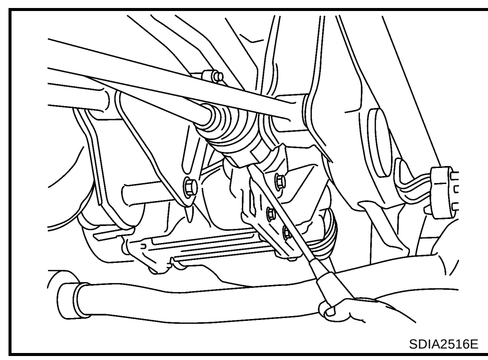
REMOVAL

1. Remove axle housing. Refer to RAX-15, "Removal and Installation" .

   NOTE:

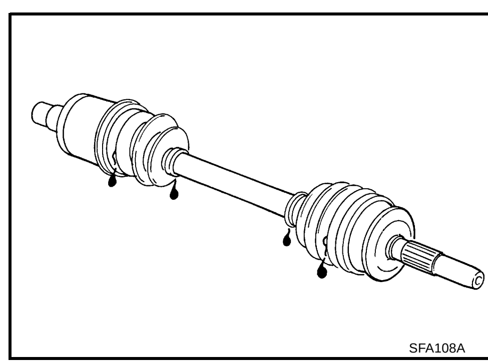
   In order to remove drive shaft, axle housing is removed. At this time it is recommended that front and rear parallel links on axle side be loosened (not removed). This will facilitate wheel alignment inspection and adjustment which are performed later.

2. Remove drive shaft from rear final drive using a flat-bladed screwdriver as shown in the figure.



INSPECTION AFTER REMOVAL

- Move joint up/down, left/right, and in the axial direction. Check for motion that is not smooth and for significant looseness.
- Check boot for cracks, damage, and leakage of grease.
- Disassemble drive shaft and exchange malfunctioning part if there is non-standard condition.



INSTALLATION

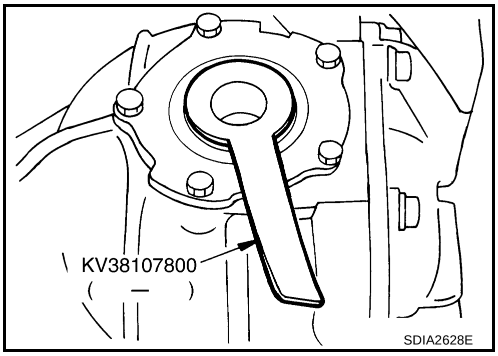
- Install in the reverse order of the removal. For tightening torque, refer to RAX-20, "COMPONENT"

  NOTE:

  Do not reuse non-reusable parts.

- Place the protector [SST] onto rear final drive to prevent damage to the side oil seal while inserting drive shaft. Slide drive shaft sliding joint and tap with a hammer to install securely.

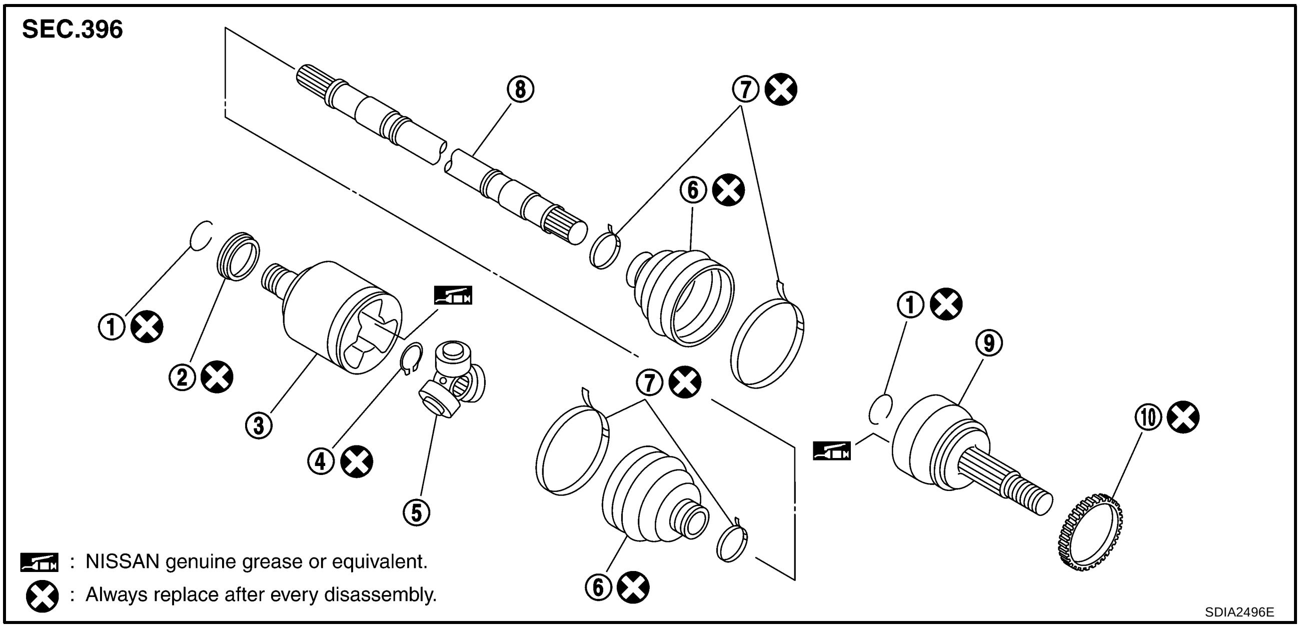
  CAUTION:
  Make sure that circular clip is completely engaged.



Disassembly and Assembly

ADS0016T

COMPONENT



1.	Circular clip	2.	Dust cover	3.	Housing
4.	Snap ring	5.	Spider assembly	6.	Boot
7.	Boot band	8.	Shaft	9.	Joint sub-assembly
10.	Sensor rotor				

DISASSEMBLY

Final Drive Side

1. Secure shaft in a vise.

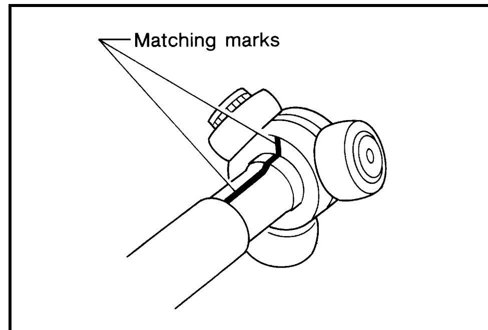
   CAUTION:
   Protect shaft when securing in a vise using aluminum or copper plates.
2. Remove boot bands, and then remove boot from housing.
3. Put matching marks onto housing and shaft, and then pull out housing from shaft.

   CAUTION:
   Use paint or similar substance for matching marks. Do not scratch the surface.

4. Put matching marks onto the shaft and spider assembly.

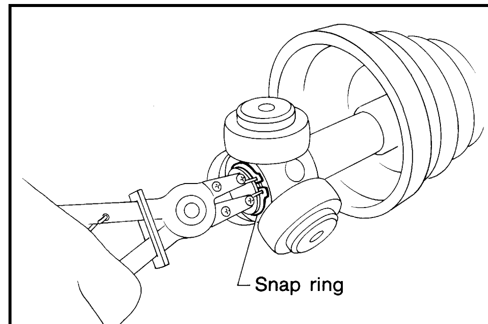
   CAUTION:

   Use paint or similar substance for matching marks. Do not scratch the surfaces.



SFA963

5. Remove snap ring. Remove spider assembly from the shaft.
6. Remove boot from the shaft.
7. Remove circular clip and dust cover from housing.
8. Clean old grease on housing with paper towels.



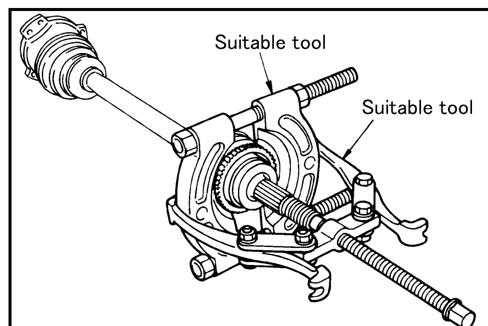
SFA612

Wheel Side

1. As shown in the figure, remove sensor rotor from drive shaft using a bearing replacer (suitable tool) and puller (suitable tool).
2. Secure shaft in a vise.

   CAUTION:

   Protect shaft when securing in a vise using aluminum or copper plates.
3. Remove boot bands, and then remove boot from joint sub-assembly.

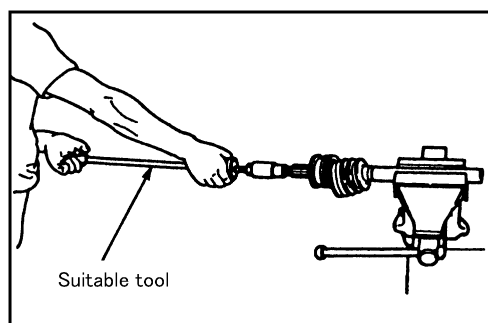


SDIA0595E

4. Screw a drive shaft puller (suitable tool) 30 mm (1.18 in) or more onto the thread on joint sub-assembly, and pull joint sub-assembly out of shaft.

   CAUTION:

   - **Replace entire drive shaft assembly if joint sub-assembly cannot be removed after five or more unsuccessful attempts.**
   - **Align sliding hammer and drive shaft and remove them by pulling firmly and uniformly.**
5. Remove boot from shaft.
6. Remove circular clip from shaft.
7. Clean old grease on joint sub-assembly with paper towels while rotating ball cage.



SDIA0606E

INSPECTION AFTER DISASSEMBLY

Shaft

Check shaft for runout, cracks, or other damage. Replace if there are.

Joint Sub-Assembly (Wheel Side)

Check the following:

- Joint sub-assembly for rough rotation and excessive axial looseness.
- Inside the joint sub-assembly for entry of foreign material.
- Joint sub-assembly for compression scars, cracks, and fractures inside of joint sub-assembly.

Replace joint sub-assembly if there are any non-standard conditions.

Housing and Spider Assembly (Final Drive Side)

- Replace housing and spider assembly if there is scratching or wear of housing roller contact surface or spider roller contact surface.

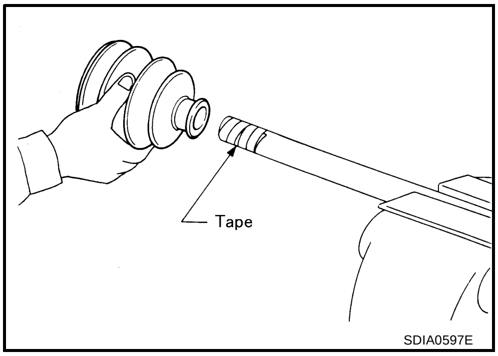
  NOTE:
  Housing and spider assembly are used in a set.

ASSEMBLY

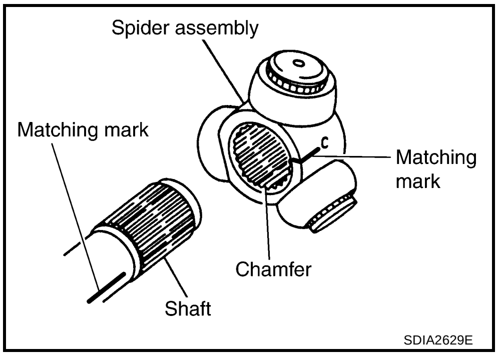
Final Drive Side

1. Wrap serration on shaft with tape to protect boot from damage. Install new boot and boot bands to shaft.

   NOTE:
   Do not reuse boot bands and boot.
2. Remove the tape wrapped around the serration on shaft.



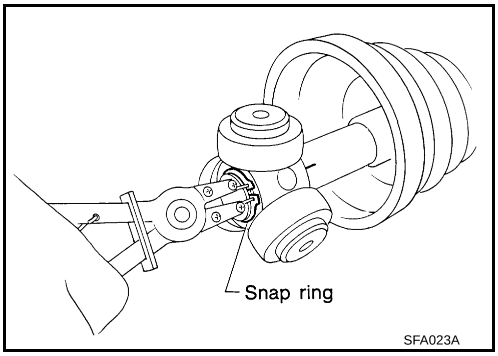
3. Align matching marks painted when spider assembly was removed. Install spider assembly with chamfer facing shaft.



4. Secure spider assembly onto shaft with snap ring.

   NOTE:
   Do not reuse snap ring.
5. Apply the specified amount of grease (NISSAN genuine grease or equivalent) onto spider assembly and sliding surface.
6. Assemble the housing onto spider assembly, and apply the specified amount of grease (NISSAN genuine grease or equivalent).

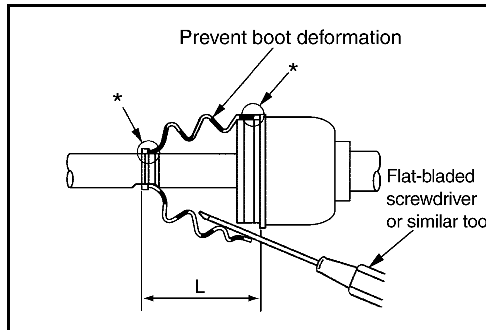
   Grease amount : 40 - 50 g (1.41 - 1.77 oz)



7. Install boot securely into grooves (indicated by * marks) shown in the figure.

   CAUTION:

   If grease adheres to the boot mounting surface (with * mark) on shaft and housing, boot may come off. Remove all grease from the surface.



SDIA2493E

8. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting a flat-bladed screwdriver or similar tool into the inside of boot from the large diameter side of boot and discharging inside air.

   Boot installation length (L) : 78.6 - 80.6 mm (3.094 - 3.173 in)

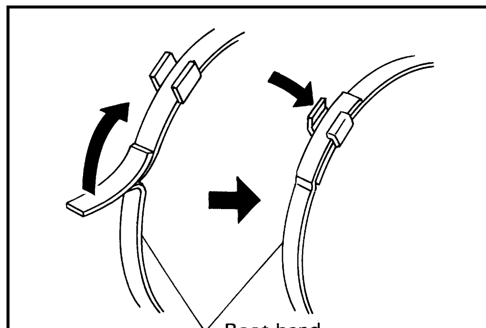
   CAUTION:

   - **If the boot installation length is outside the standard, it may cause breakage in boot.**
   - **Be careful not to touch the inside of the boot with a tip of a flat-bladed screwdriver.**

9. Secure the large and small ends of a boot with new boot bands as shown in the figure.

   NOTE:

   Do not reuse boot bands.



SFA395

10. Secure housing and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.
11. Install circular clip and dust cover to housing.

    NOTE:

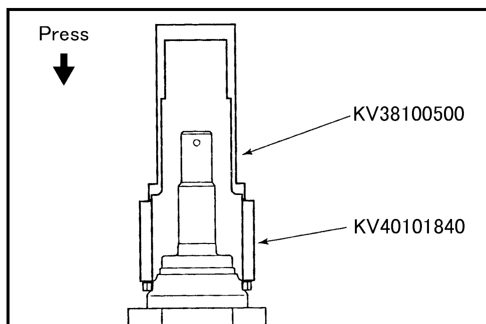
    Do not reuse circular clip and dust cover.

Wheel Side

1. Use the drift [SST] to press-fit sensor rotor into joint sub-assembly.

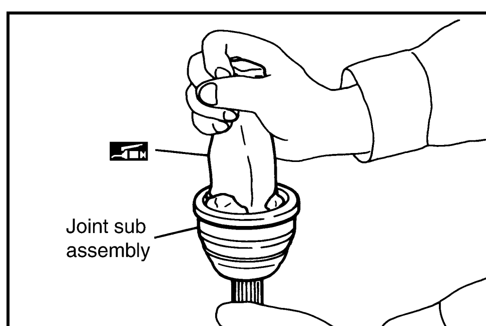
   NOTE:

   Do not reuse sensor rotor.



SDIA0602E

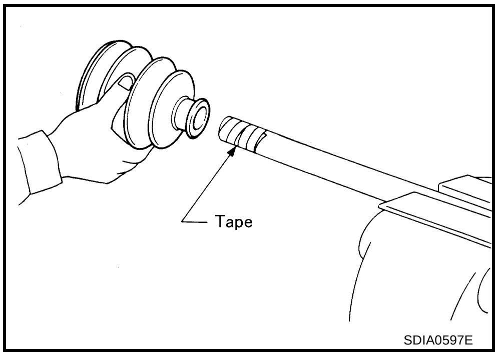
2. Insert the specified amount of grease (NISSAN genuine grease or equivalent) into joint sub-assembly serration hole until grease begins to ooze from ball groove and serration hole. After inserting grease, use a shop cloth to wipe off old grease that has oozed out.



SDIA1127E

3. Wrap serration on shaft with tape to protect the boot from damage. Install new boot and boot bands to shaft.

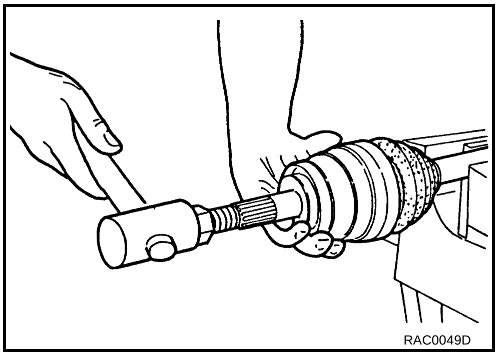
   NOTE:
   Do not reuse boot bands and boot.
4. Remove the tape wrapped around the serration on shaft.



5. Attach circular clip to shaft. At this time, circular clip must fit securely into the shaft groove. Attach nut to joint sub-assembly. Use a wooden hammer to press-fit.

   NOTE:
   Do not reuse circular clip.
6. Apply the remainder of the specified amount of grease (NISSAN genuine grease or equivalent) to joint sub-assembly from large end of boot.

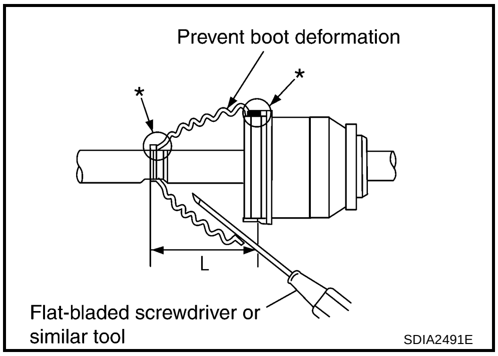
   Grease amount : 35 - 45 g (1.23 - 1.59 oz)



7. Install boot securely into grooves (indicated by * marks) shown in the figure.

   CAUTION:
   If grease adheres to the boot mounting surface (with * mark) on shaft and joint sub-assembly, boot may come off. Remove all grease from the surface.
8. To prevent from deformation of the boot, adjust the boot installation length to the value shown below (L) by inserting a flat-bladed screwdriver or similar tool into the inside of boot from the large diameter side of boot and discharging inside air.

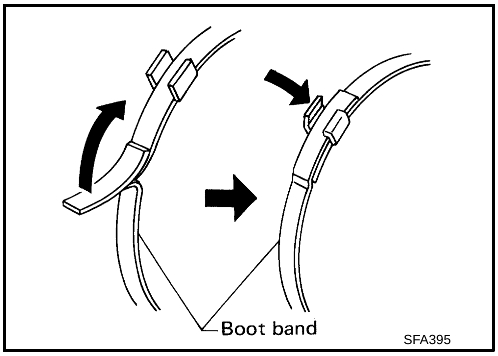
   Boot installation length (L) : 66.7 - 68.7 mm (2.626 - 2.705 in)



CAUTION:
- **If the boot installation length is outside the standard, it may cause breakage in boot.**
- **Be careful not to touch the inside of the boot with tip of a flat-bladed screwdriver.**

9. Secure the large and small ends of boot with new boot bands as shown in the figure.

   NOTE:
   Do not reuse boot bands.
10. Secure joint sub-assembly and shaft, and then make sure that they are in the correct position when rotating boot. Install them with new boot band when the mounting positions become incorrect.

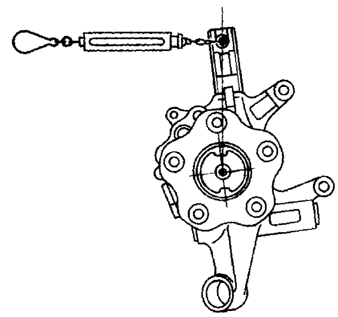


SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Wheel Bearing

ADS0016U

Axial end play	0.05 mm (0.002 in) or less
Rotating torque	Less than 1.96 N·m (0.20 kg-m, 17 in-lb)
Spring balance reading	Less than 12.8 N (1.30 kg, 2.87 lb)
Measuring point	

Drive Shaft

ADS0016V

Joint type	Wheel side	Final drive side
Grease quantity	35 - 45 g (1.23 - 1.59 oz)	40 - 50 g (1.41 - 1.77 oz)
Boots installation length	66.7 - 68.7 mm (2.626 - 2.705 in)	78.6 - 80.6 mm (3.094 - 3.173 in)

SECTION RF

ROOF

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AIS005RK

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions

AIS005RL

- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping them with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

- Do not use any organic solvent, such as thinner or benzine.
- If sunroof motor operation sound is noted but sunroof does not operate, replace motor assembly with glass lid fully closed.
- If sunroof (glass lid and motor) does not operate when using sunroof switch then remove the front cover of the luggage compartment, and rotate motor gear box drive shaft with the emergency handle (in the tool box).

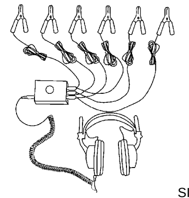
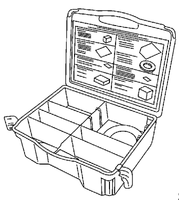
PREPARATION

PFP:00002

Special Service Tools

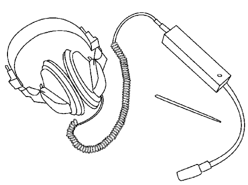
AIS00662

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
(J-39570) Chassis ear	 SIIA0993E	Locating the noise
(J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of noise

Commercial Service Tools

AIS005RM

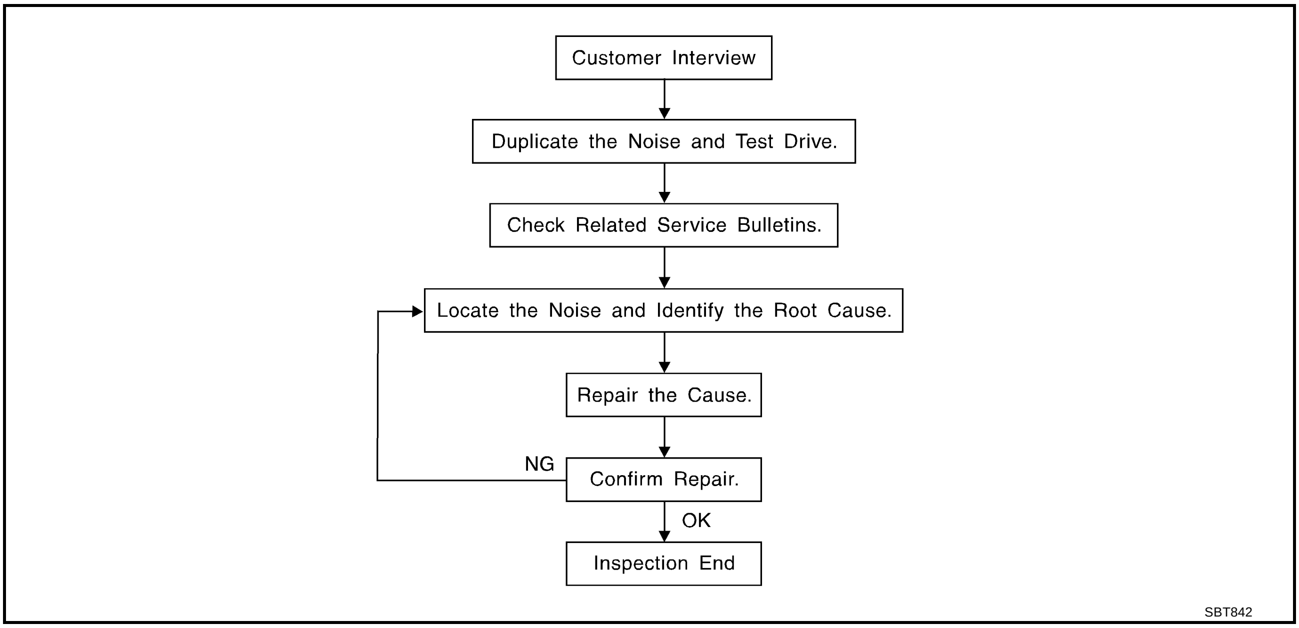
Tool name		Description
Engine ear	 SIIA0995E	Locating the noise

SQUEAK AND RATTLE TROUBLE DIAGNOSES

PFP:00000

Work Flow

AIS00614



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to RF-8, "Diagnostic Worksheet" . This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces=higher pitch noise/softer surfaces=lower pitch noises/edge to surface=chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.
If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T models, drive position on A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.
If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to RF-6, "Generic Squeak and Rattle Troubleshooting" .

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
  - separate components by repositioning or loosening and retightening the component, if possible.
  - insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:
Do not use excessive force as many components are constructed of plastic and may be damaged.

NOTE:
Always check with the Parts Department for the latest parts information.
The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.
URETHANE PADS [1.5 mm (0.059 in) thick]
Insulates connectors, harness, etc.
76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)
INSULATOR (Foam blocks)
Insulates components from contact. Can be used to fill space behind a panel.
73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)

INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTHTAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit. Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

AIS00615

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:
Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

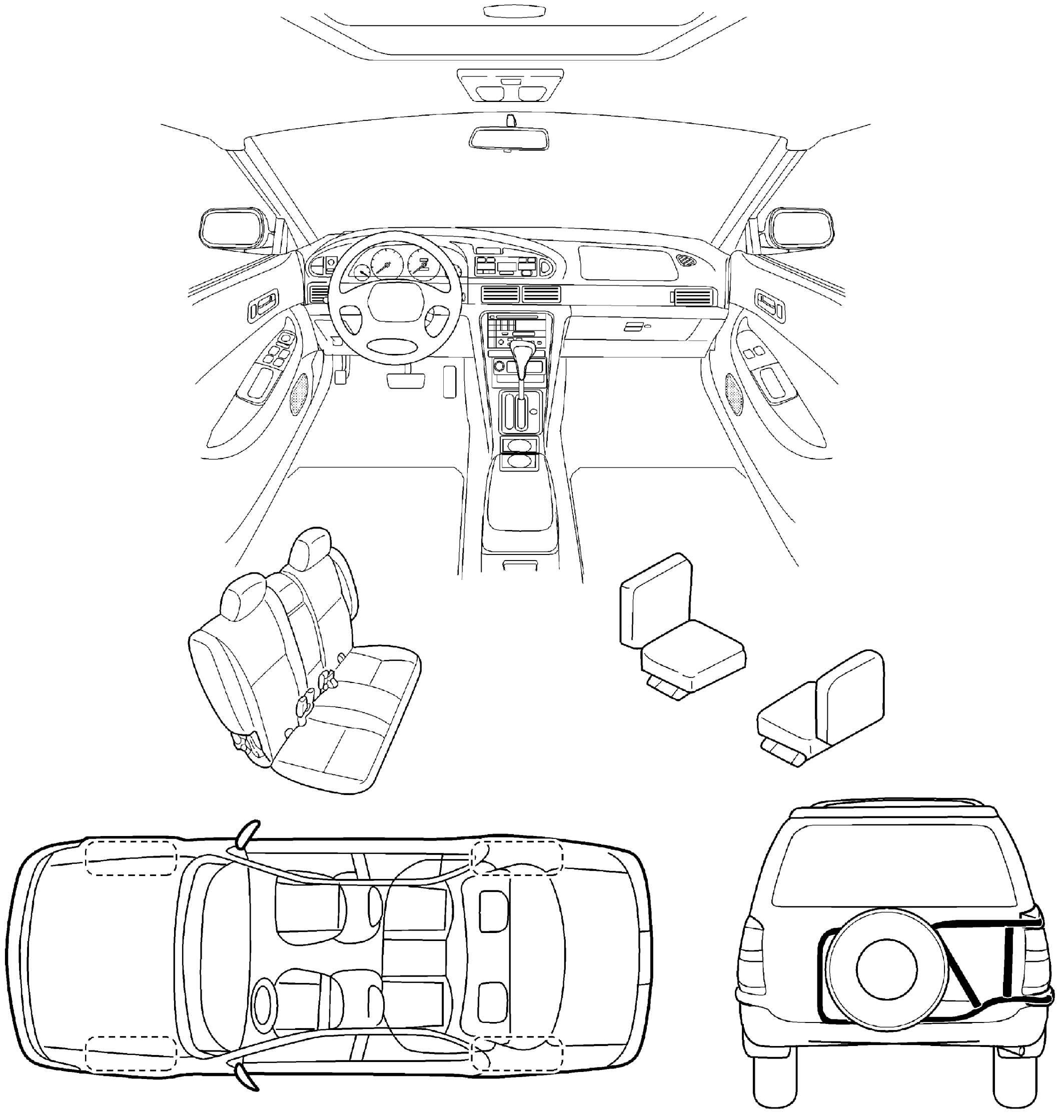
Diagnostic Worksheet

AIS00616

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB0723E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

____

____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

- ❏ anytime
- ❏ 1st time in the morning
- ❏ only when it is cold outside
- ❏ only when it is hot outside
- ❏ after sitting out in the sun
- ❏ when it is raining or wet
- ❏ dry or dusty conditions
- ❏ other: ________________________________

III. WHEN DRIVING:

- ❏ through driveways
- ❏ over rough roads
- ❏ over speed bumps
- ❏ only at about ____ mph
- ❏ on acceleration
- ❏ coming to a stop
- ❏ on turns : left, right or either (circle)
- ❏ with passengers or cargo
- ❏ other: ______________________
- ❏ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

- ❏ squeak (like tennis shoes on a clean floor)
- ❏ creak (like walking on an old wooden floor)
- ❏ rattle (like shaking a baby rattle)
- ❏ knock (like a knock on a door)
- ❏ tick (like a clock second hand)
- ❏ thump (heavy, muffled knock noise)
- ❏ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

____

____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❏	❏	_______
- Noise verified on test drive	❏	❏	
- Noise source located and repaired	❏	❏	_______
- Follow up test drive performed to confirm repair	❏	❏	_______

VIN: ______________________ Customer Name: ________________________________

W.O. #: ____________________ Date: ___________

This form must be attached to Work Order

SBT844

SUNROOF

PFP:91210

System Description

AIS005RQ

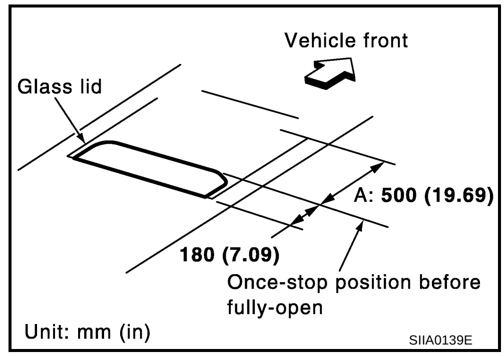
- Operating sunroof switch allows glass lid slide OPEN/CLOSE, and tilt UP/DOWN.
- When sunroof slide switch is pressed firmly toward the OPEN side, glass lid automatically opens and automatic operation is stopped at a point 180 mm (7.09 in)to the fully open position.

  NOTE:
  After the emergency handle is used to rotate the motor drive shaft, sunroof switch operation may not correspond to actual glass lid movement. When this happens, conduct resuming operation to restore normal operation.

RESUMING OPERATION

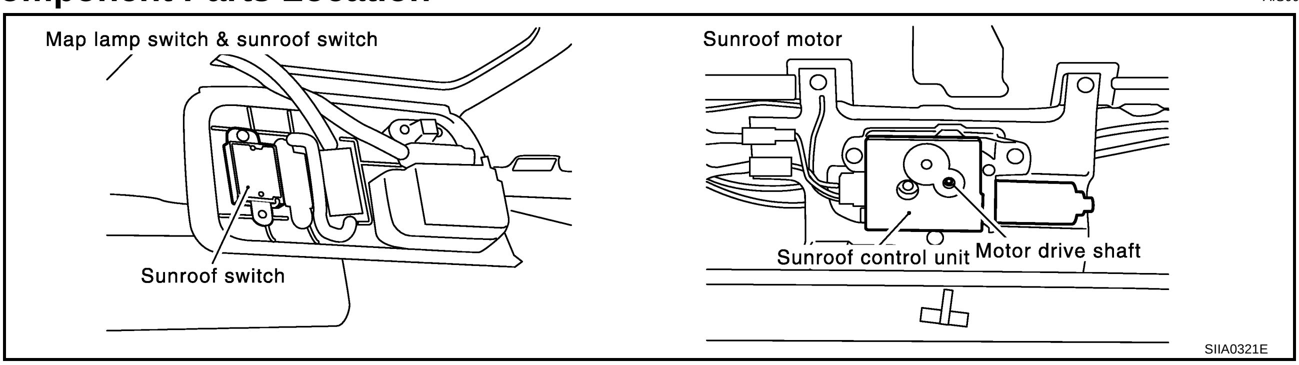
If actual glass lid operation does not correspond to expected operation, operate sunroof switch to slide glass lid toward area A in the figure. This should result in resumption of normal operation.

CAUTION:
Before normal operation is resumed, expected sunroof switch operation and actual glass lid movement may not correspond. Make sure that neither head nor hands protrude from sunroof and conduct resuming operation.



Component Parts Location

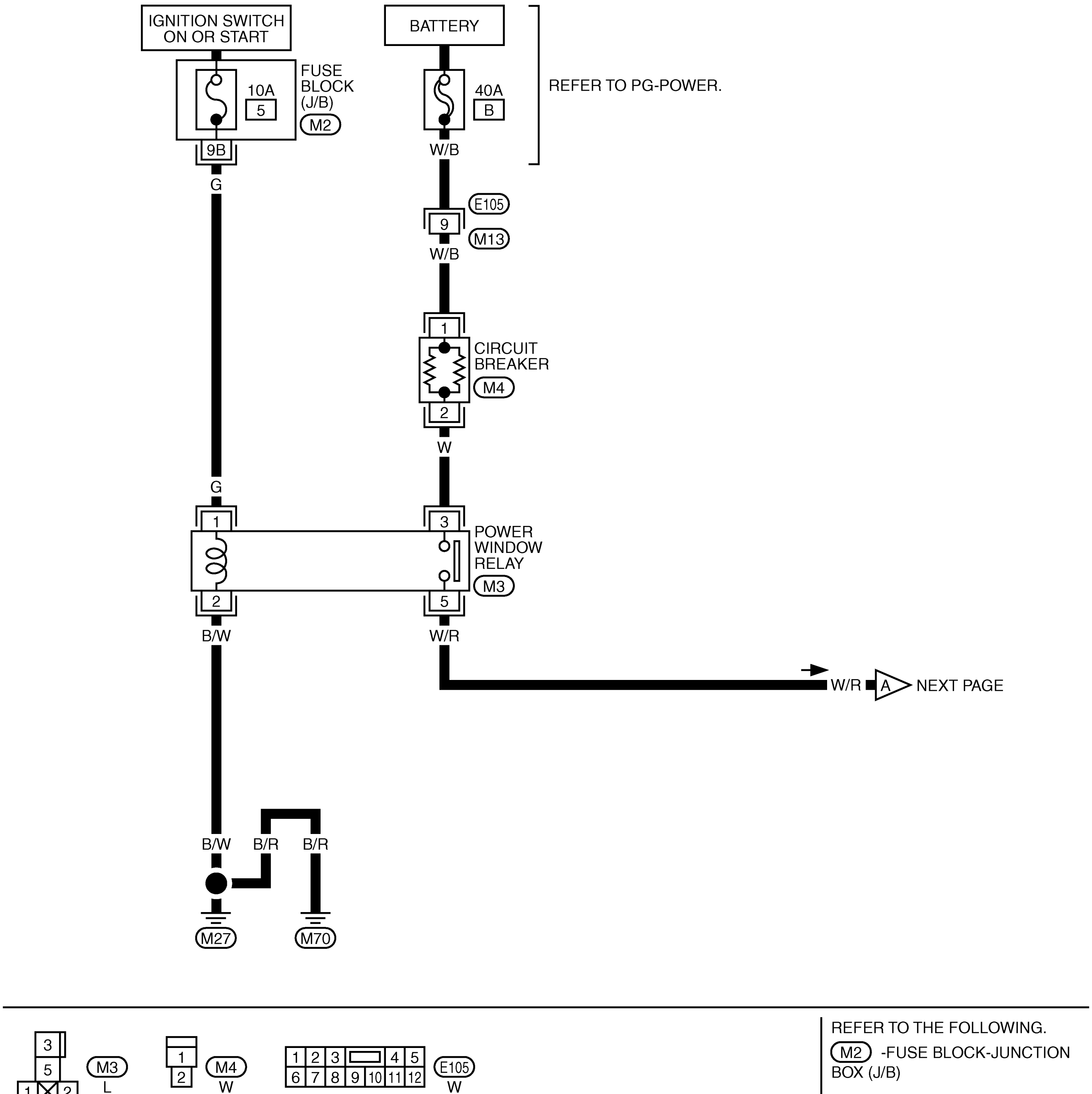
AIS005RR



Wiring Diagram — SROOF —

AIS005RS

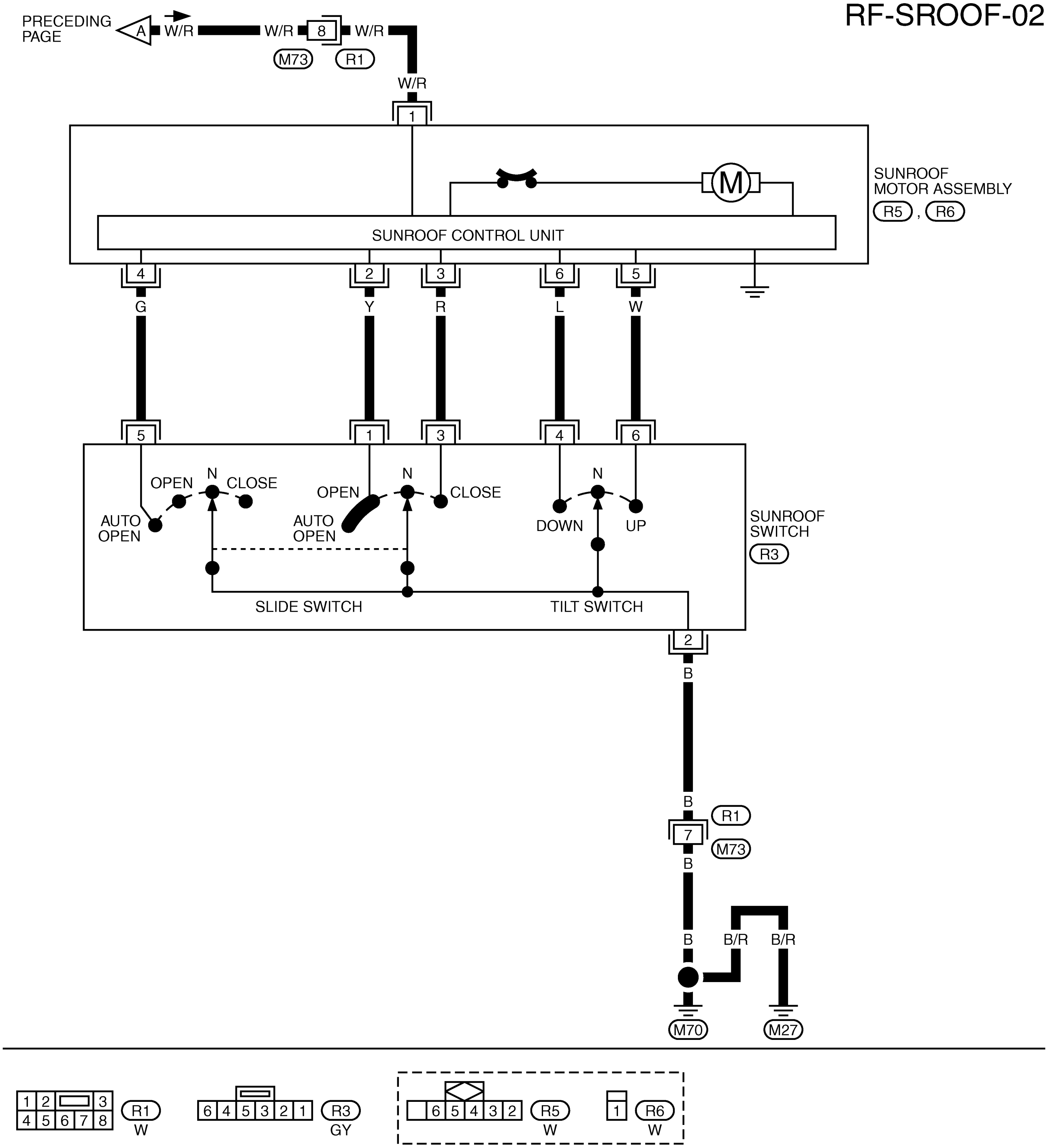
RF-SROOF-01



REFER TO THE FOLLOWING.
M2 -FUSE BLOCK-JUNCTION BOX (J/B)

TIWB0068E

RF-SROOF-02



TIWA0484E

Terminal and Reference Value for Sunroof Switch

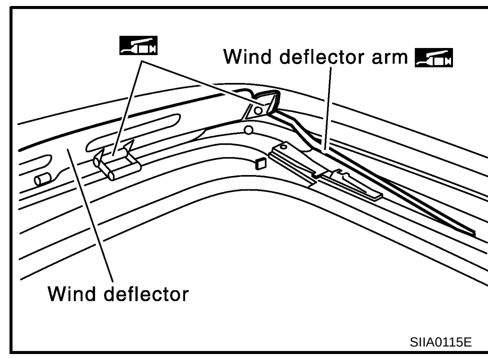
AIS005RT

TERMI-NAL	WIRE COLOR	ITEM	CONDITION	VOLTAGE (V) (Approx)
1	Y	Sunroof OPEN signal	Sunroof switch OPEN operation	Battery voltage
2	B	Ground	—	0
3	R	Sunroof CLOSE signal	Sunroof switch CLOSE operation	Battery voltage
4	L	Sunroof TILT DOWN signal	Sunroof switch TILT DOWN operation	Battery voltage
5	G	Sunroof AUTO OPEN signal	Sunroof switch AUTO OPEN operation	Battery voltage
6	W	Sunroof TILT UP signal	Sunroof switch TILT UP operation	Battery voltage

Wind Deflector Inspection

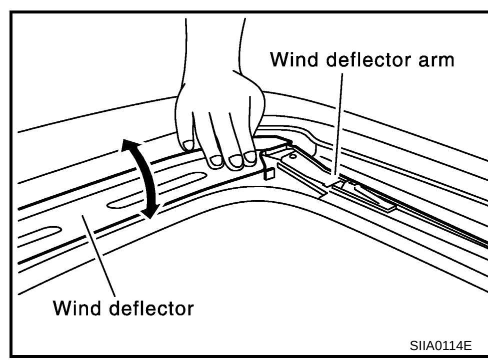
AIS005RU

1. Open glass lid.
2. Visually confirm that the mounting condition is correct.
3. Confirm wind deflector connection is properly greased. If necessary, apply body grease.



SIIA0115E

4. Confirm wind deflector can be properly raised by hand. If excess wear or damage is detected, remove and visually check it. If it is damaged, replace it with a new one. If no damage is found, reinstall it properly.



SIIA0114E

Glass Lid Weatherstrip Inspection

AIS005RV

If there is water leakage around glass lid, close glass lid and flush with water to determine whether it is from damaged parts or a gap.

1. Remove glass lid.
2. Visually check weatherstrip for damage, deterioration, or deformation. If excess wear or damage is detected, replace glass lid.

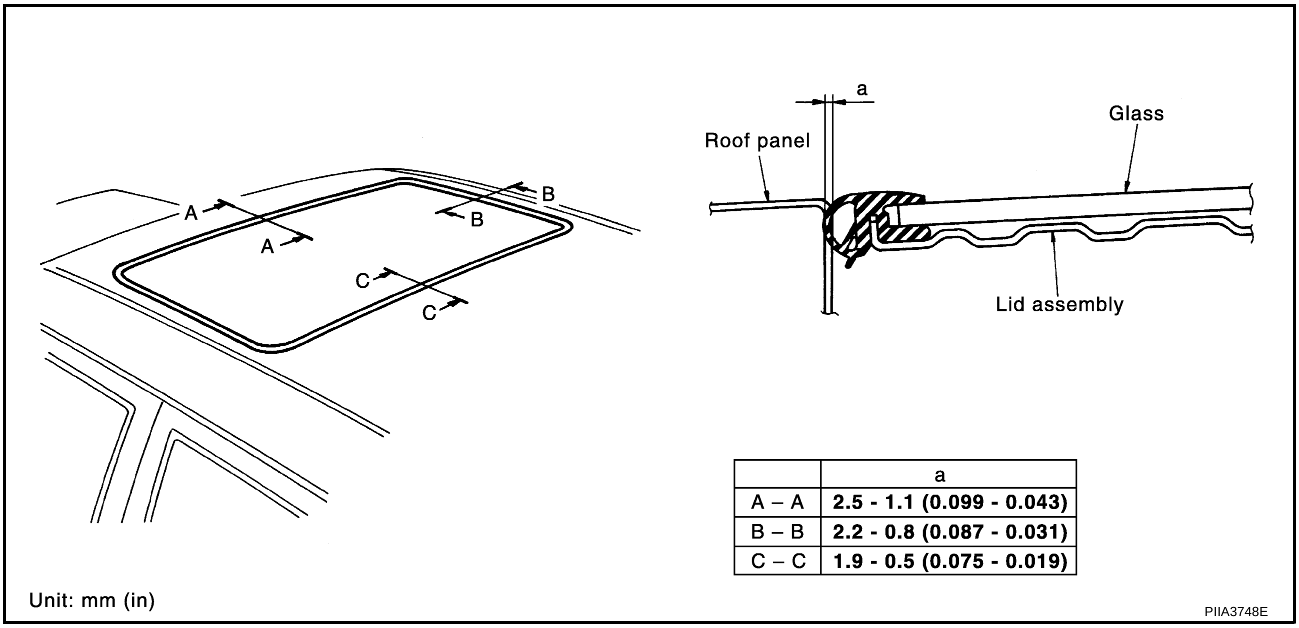
Link and Wire Assembly Inspection

AIS005RW

1. If the link coating peels off to show the base material and an abnormal noise is heard, replace it.
2. Visually confirm the wire and rail groove are properly greased. If necessary, apply body grease.

Fitting Adjustment

AIS005RX



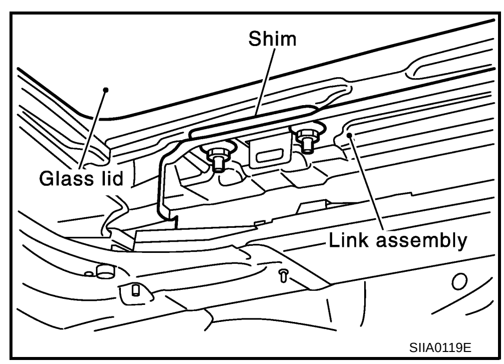
	a
A – A	**2.5 - 1.1 (0.099 - 0.043)**
B – B	**2.2 - 0.8 (0.087 - 0.031)**
C – C	**1.9 - 0.5 (0.075 - 0.019)**

LONGITUDINAL/LATERAL CLEARANCE ADJUSTMENT

1. Tilt up glass lid and then remove side trim.
2. After loosening glass lid mounting nuts, tilt down glass lid.
3. Adjust glass lid according to sections A–A, B–B, C–C as shown in the figure.
4. After adjusting glass lid, tighten nuts to the specified torque.
5. Tilt glass lid 4 to 5 times to check that it smoothly goes up and down.

SURFACE MISMATCH ADJUSTMENT

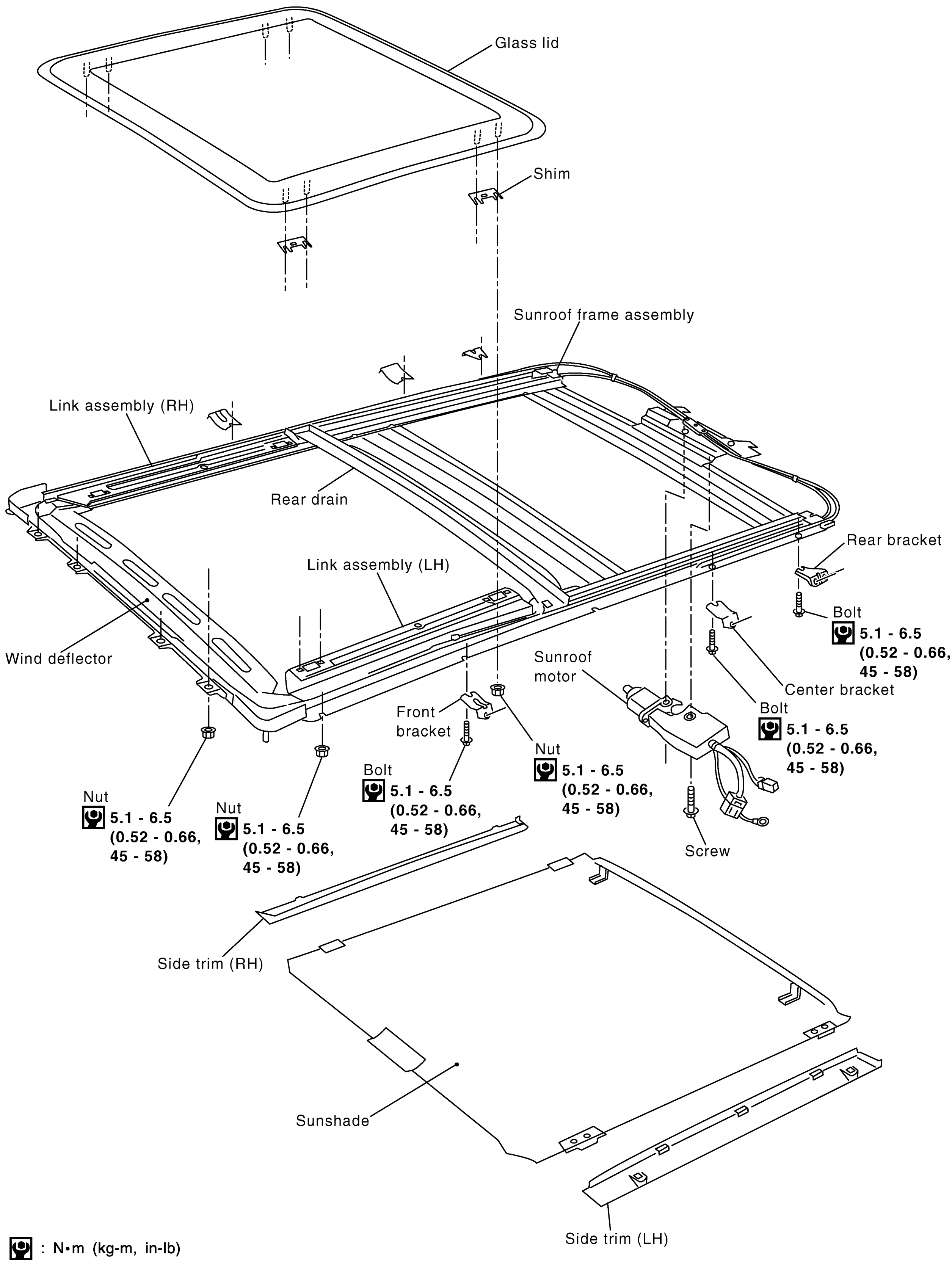
1. Adjust surface height of glass lid and roof panel to 0 ± 1.5 mm (0 ± 0.059 in) by altering the number of shims between glass lid and link assembly. (Standard: 2, max: 4)
2. After fitting adjustment, use a hose to flush the entire surface of the roof with water to check for leaks.



Removal and Installation

AIS005RY

SEC. 736



PIIB1401E

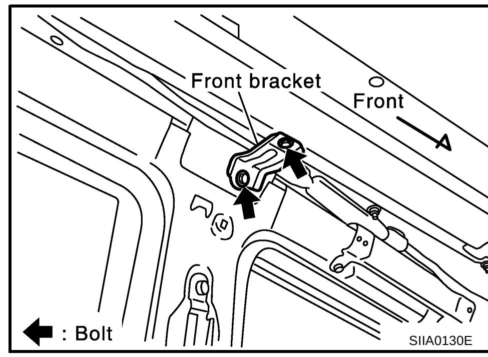
SUNROOF UNIT

Removal

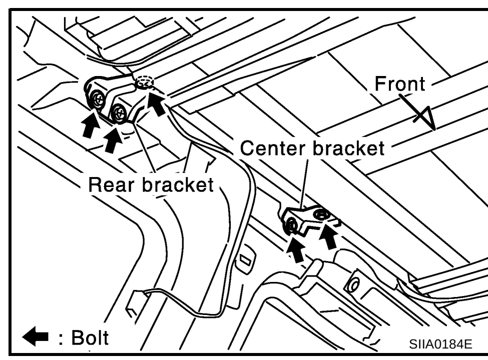
CAUTION:

- **Removal and installation of sunroof unit require 2 workers.**
- **When taking sunroof unit out, use shop cloths to protect seats and trim from damage.**
- **After installing sunroof unit and glass lid, be sure to carry out the leak test to confirm there is no more leakage.**

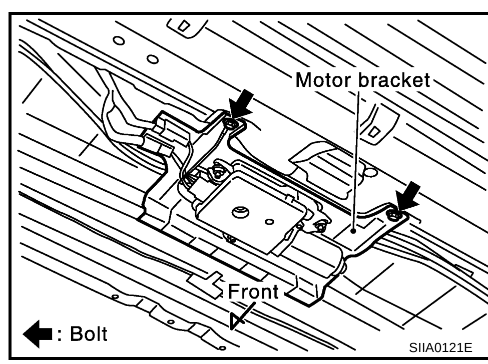
1. Remove headlining. Refer to EI-40, "HEADLINING"
2. Disconnect drain hoses.
3. Disconnect interior lamp harness.
4. Remove both sunroof unit-side and body-side front bracket mounting bolts.



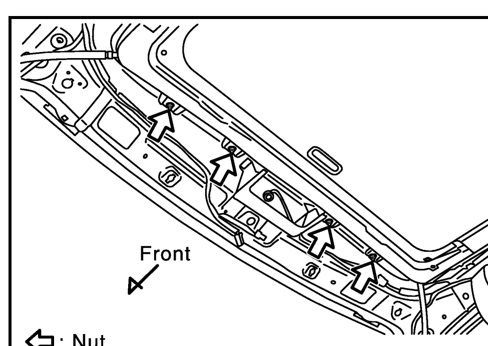
5. Remove both sunroof unit-side and body-side center and rear bracket mounting bolts.



6. Disconnect connector from sunroof motor and then remove sunroof motor bracket mounting bolts.

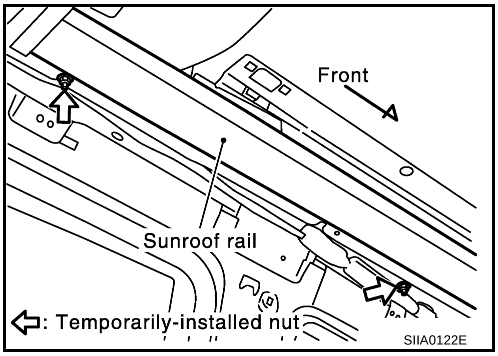


7. Remove mounting nuts from the front end and side rails, then remove sunroof unit from the roof panel.
8. Take out the sunroof unit from the passenger compartment while being careful not to damage the seats and trim.



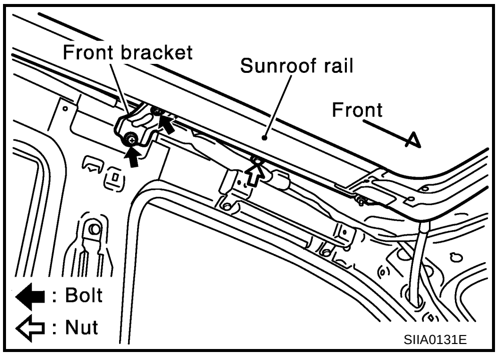
Installation

1. After bringing sunroof unit into the passenger compartment, tighten mounting nuts on the side rails start from the one at the front reference point.
2. Tighten mounting nuts of the front end.



3. Align the front bracket to lower face of the rail and roof side mounting face. Tighten bolts of the sunroof unit side and then tighten bolts of the body side.
4. Align the center and rear brackets to lower face of the rail and roof side mounting face. Tighten bolts of the sunroof unit side and then tighten bolts of the body side.

   NOTE:
   Install the sunroof bracket evenly so that the roof surface has no distortion.
5. Tighten bolts of sunroof motor bracket.
6. Connect the sunroof motor harness connector.
7. Connect the interior lamp harness connector.

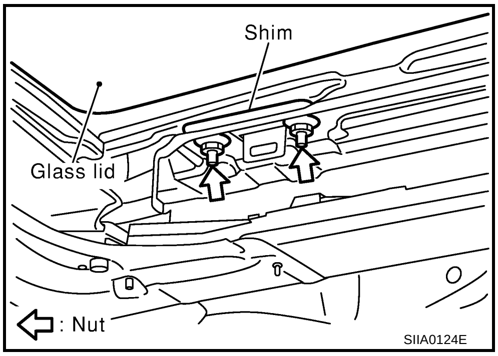


GLASS LID

Removal

1. Tilt up glass lid.
2. Remove side trim.
3. Confirm the number of shims between glass lid and link.

   NOTE:
   Number of shims. Standard: 2, max: 4.
4. Remove mounting nut and then remove glass lid.



Installation

Install in the reverse order of removal.

NOTE:

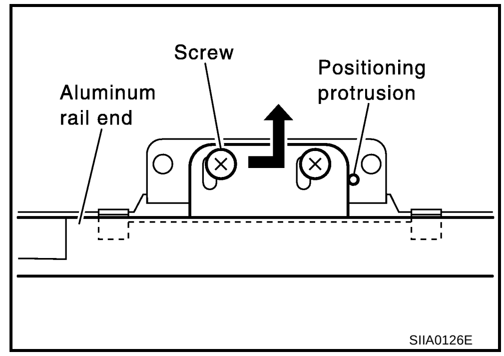
- Tighten nuts on glass lid diagonally.
- After installation, adjust the fit.

SUNSHADE

Removal

1. Remove glass lid.
2. Remove rear drain.
3. Move link assembly to the fully open position.
4. Loosen the mounting screws of the front LH shade slide.

5. As shown in the figure, slide sunshade and then remove it from the aluminum rail.
6. Swivel sunshade toward the left, then remove RH sunshade from the aluminum rail.
7. Slide sunshade forward, then remove rear sunshade sliders as well.



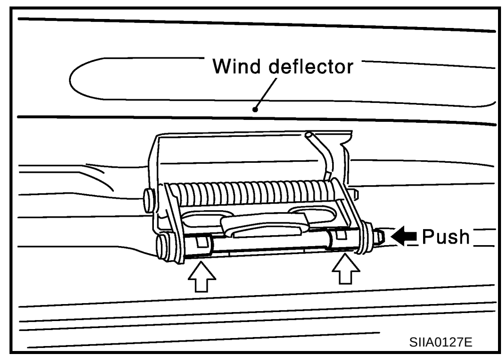
Installation

Install in the reverse order of removal.

WIND DEFLECTOR

Removal

1. Remove deflector arm mounting screws.
2. Using a pointed tool, pull up the tabs on the bushing.
   NOTE:
   Do not reuse the bushing after its tabs are pulled up.
3. Press and pull off the shaft.



Installation

Install in the reverse order of removal.

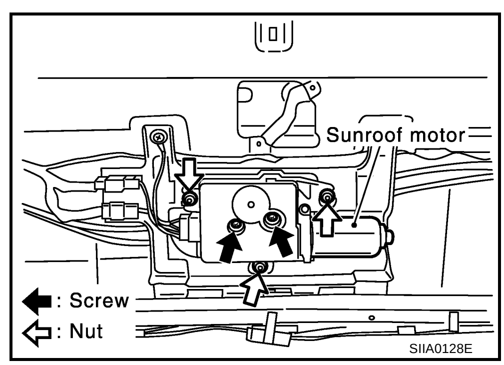
SUNROOF MOTOR

Removal

1. Remove headlining. Refer to EI-40, "HEADLINING" .
2. Remove motor mounting screws and mounting nuts.
3. Remove the harness connector from sunroof motor, then remove the sunroof motor.

NOTE:

- Remove the sunroof motor when the sunroof is in the fully-closed position.
- Do not rotate the removed sunroof motor as a single unit.



Installation

Install in the reverse order of removal.

NOTE:

- Move sunroof motor laterally little by little until the gear is completely engaged onto the wire on sunroof unit and the mounting surface becomes parallel. Then secure sunroof motor with screws and nuts.
- Before installing sunroof motor, be sure to place the link and wire assembly in the symmetrical and fully closed position.

SECTION RFD
REAR FINAL DRIVE

CONTENTS

PRECAUTIONS

PFP:00001

Service Notice or Precautions

ADS0015Z

- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.
- Overhaul should be done in a clean work area, it is preferable to work in dustproof area.
- Before disassembly, using steam or white gasoline, completely remove sand and mud from the exterior of the unit, preventing them from entering into the unit during disassembly or assembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new ones if necessary.
- Gaskets, seals and O-rings should be replaced any time when the unit is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, observe it.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- When applying sealant, remove the old sealant from the mounting surface; then remove any moisture, oil, and foreign materials from the application and mounting surfaces.
- Always use shop paper for cleaning the inside of components.
- Avoid using cotton gloves or shop rags to prevent entering of lint.
- During assembly, observe the specified tightening torque, and apply new differential oil, petroleum jelly, or multi-purpose grease as specified for each vehicle, if necessary.

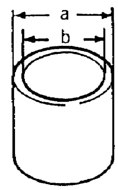
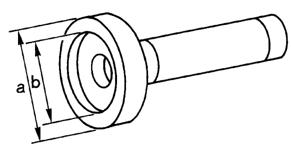
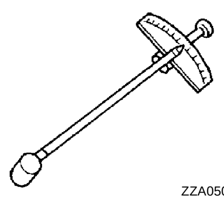
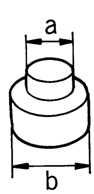
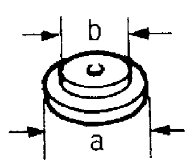
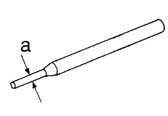
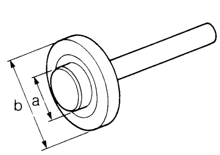
PREPARATION

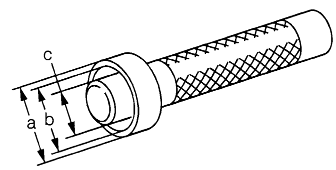
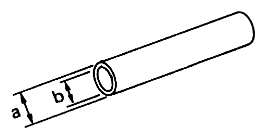
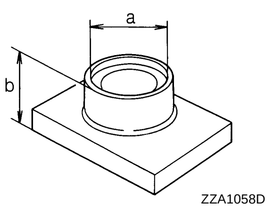
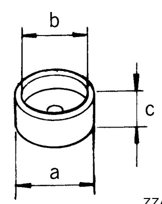
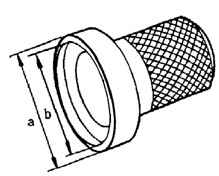
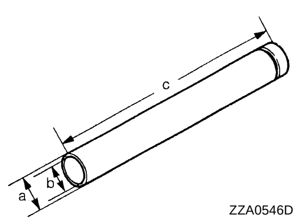
PFP:00002

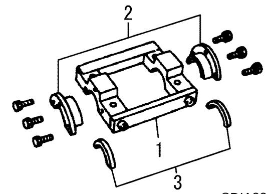
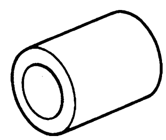
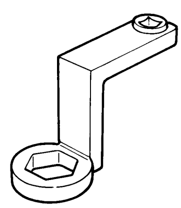
Special Service Tools

ADS00160

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

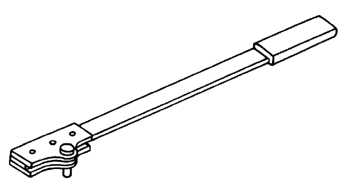
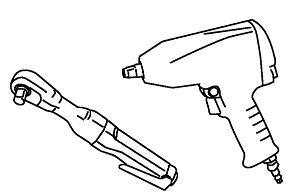
Tool number (Kent-Moore No.) Tool name		Description
ST27861000 (　—　) Drift a: 62 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.	 ZZA0832D	Installing final drive front oil seal
KV38100200 (J-26233) Drift a: 65 mm (2.56 in) dia. b: 49 mm (1.93 in) dia.	 ZZA1143D	● Installing final drive front oil seal ● Installing final drive side oil seal
ST3127S000 (J-25765-A) Preload gauge	 ZZA0503D	Measuring preload torque
ST33052000 (　—　) Drift a: 22 mm (0.87 in) dia. b: 28 mm (1.10 in) dia.	 ZZA1023D	Removing side bearing inner race
KV40100610 (J-26089) Drift a: 63 mm (2.48 in) dia. b: 54.3 mm (2.138 in) dia.	 ZZA0810D	● Removing and installing gear carrier and rear cover (2 pieces are used) ● Installing pinion front bearing inner race
ST23550000 (　—　) Pin punch a: 4.5 mm (0.177 in) dia.	 NT410	Removing and installing lock pin
ST17130000 (　—　) Drift a: 31.8 mm (1.252 in) dia. b: 58 mm (2.28 in) dia.	 ZZA0836D	Installing pinion rear bearing outer race

Tool number (Kent-Moore No.) Tool name		Description
ST33230000 (J-25805-01) Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.	 ZZA1046D	Installing pinion front bearing outer race
ST23860000 (—) Drift a: 38 mm (1.50 in) dia. b: 33 mm (1.30 in) dia.	 ZZA0534D	● Installing pinion rear bearing inner race ● Installing pinion front bearing inner race
ST38220000 (—) Press stand a: 63 mm (2.48 in) dia. b: 65 mm (2.56 in)	 ZZA1058D	Installing pinion front bearing inner race
KV40105020 (—) Drift a: 39.7 mm (1.563 in) dia. b: 35 mm (1.38 in) dia. c: 15 mm (0.59 in)	 ZZA1133D	Installing side bearing inner race
ST35271000 (J-26091) Drift a: 72 mm (2.83 in) dia. b: 63 mm (2.48 in) dia.	 ZZA0814D	Installing center oil seal
ST22360002 (J-25679-01) Drift a: 29 mm (1.14 in) dia. b: 23 mm (0.91 in) dia. c: 150 mm (5.91 in)	 ZZA0546D	Installing coupling front bearing

Tool number (Kent-Moore No.) Tool name		Description
KV381086S1 (—) Dummy cover set 1. KV38108610 (—) Dummy cover 2. KV38108621 (—) Dummy cover spacer 3. KV38108630 (—) Dummy cover shim	 SDIA2313E	● Checking backlash ● Checking drive gear runout ● Checking tooth contact
KV38108500 (—) Drive pinion socket	 ZZA1205D	● Measuring preload torque ● Removing and installing drive pinion nut
KV38108400 (—) Pinion nut wrench	 ZZA1206D	● Measuring preload torque ● Removing drive pinion nut

Commercial Service Tools

ADS0018A

Tool name		Description
Flange wrench	 NT771	Removing and installing companion flange lock nut
Power tool	 PBIC0190E	Loosening nuts and bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS00161

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page		Refer to RFD-24, "INSPECTION AFTER DISASSEMBLY" .	Refer to RFD-18, "Tooth Contact" .	Refer to RFD-24, "INSPECTION AFTER DISASSEMBLY" .	Refer to RFD-20, "Backlash" .	Refer to RFD-20, "Companion Flange Runout" .	Refer to RFD-8, "Checking Differential Gear Oil" .	NVH in PR section.	NVH in FAX, RAX, FSU and RSU sections.	NVH in WT section.	NVH in WT section.	NVH in FAX and RAX section.	NVH in BR section.	NVH in PS section.
Possible cause and SUSPECTED PARTS		Gear tooth rough	Gear contact improper	Tooth surfaces worn	Backlash incorrect	Companion flange excessive runout	Gear oil improper	PROPELLER SHAFT	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKES	STEERING
Symptom	Noise	×	×	×	×	×	×	×	×	×	×	×	×	×

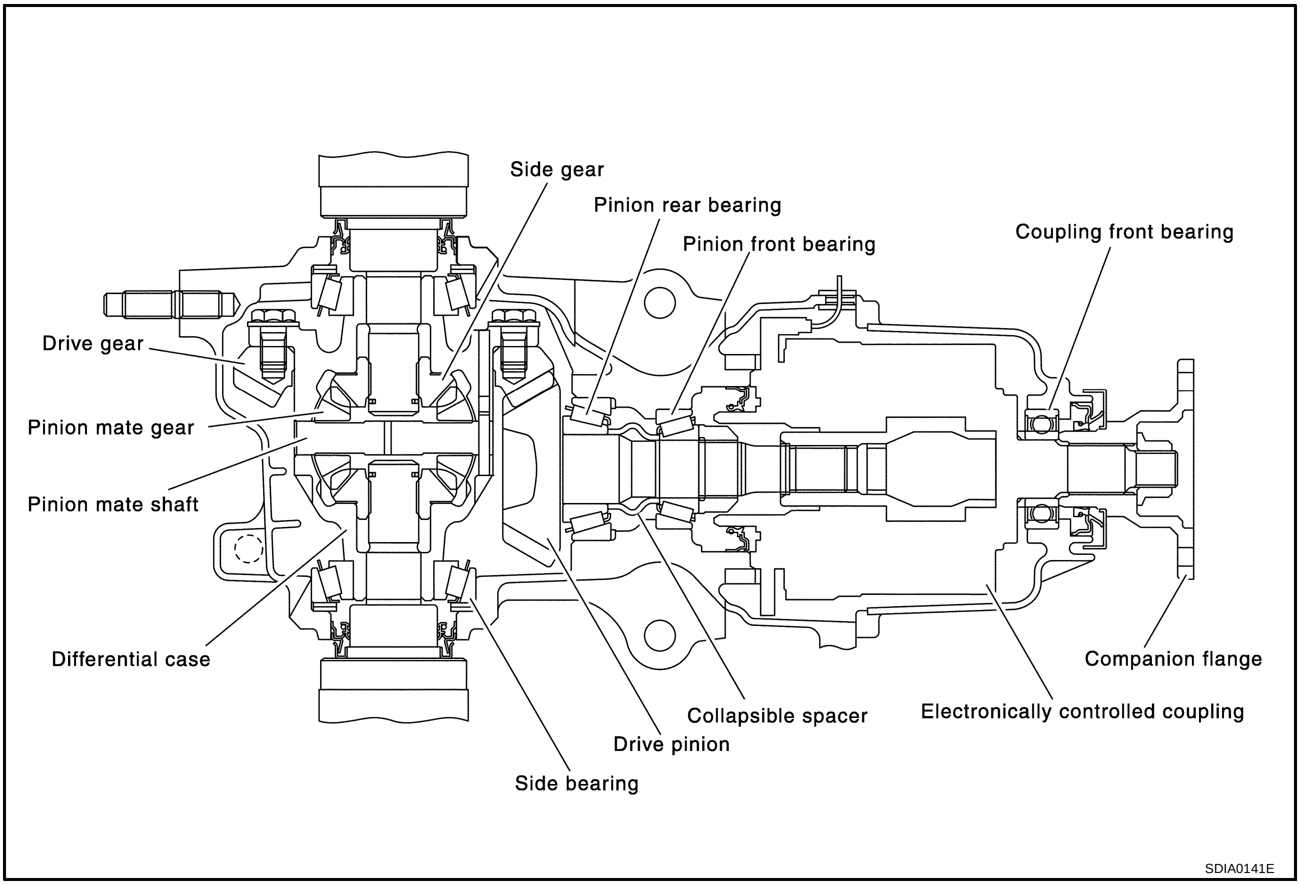
×: Applicable

DESCRIPTION

PFP:00000

Cross-Sectional View

ADS0018B



DIFFERENTIAL GEAR OIL

PFP:KLD30

Changing Differential Gear Oil

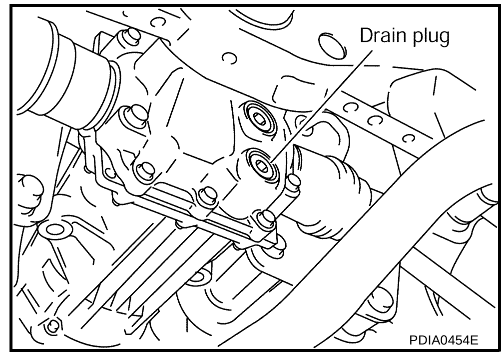
ADS0018C

DRAINING

1. Stop engine.
2. Remove drain plug and drain oil.
3. Set a gasket on drain plug and install it to final drive assembly and tighten to the specified torque. Refer to RFD-16, "COMPONENTS" .

CAUTION:

Do not reuse gasket.



PDIA0454E

FILLING

1. Remove filler plug. Fill with new oil until oil level reaches the specified level near filler plug mounting hole.

Oil grade and Viscosity:

Refer to MA-11, "Fluids and Lubricants" .

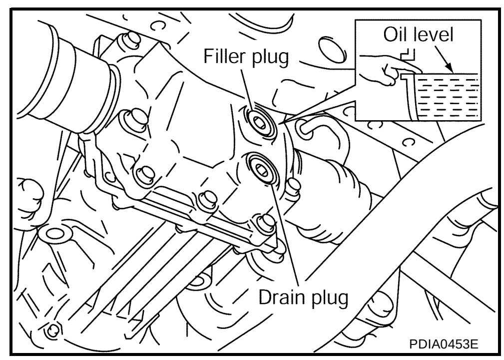
Oil capacity:

Approx. 0.55 ℓ (1-1/8 US pt, 1 Imp pt)

2. After refilling oil, check oil level. Set a gasket to filler plug, then install it to final drive assembly. Refer to RFD-16, "COMPONENTS" .

CAUTION:

Do not reuse gasket.



PDIA0453E

Checking Differential Gear Oil

ADS0018D

OIL LEAKAGE AND OIL LEVEL

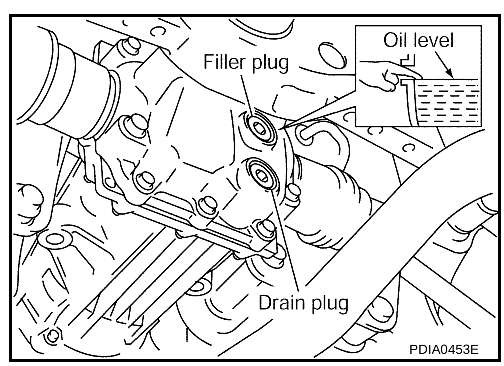
- Make sure that oil is not leaking from final drive assembly or around it.
- Check oil level from filler plug mounting hole as shown in the figure.

  CAUTION:

  Do not start engine while checking oil level.
- Set a gasket on filler plug and install it on final drive assembly. Refer to RFD-16, "COMPONENTS" .

  CAUTION:

  Do not reuse gasket.



PDIA0453E

FRONT OIL SEAL

PFP:38189

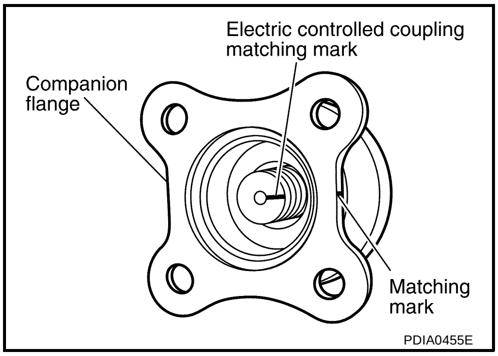
Removal and Installation

ADS0016K

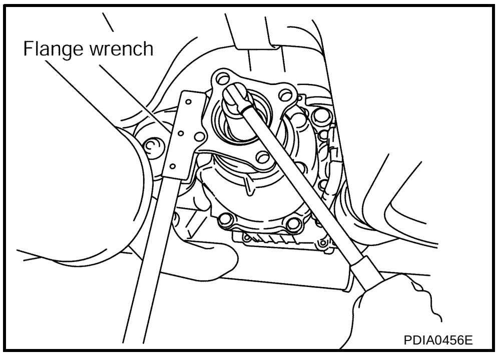
REMOVAL

1. Remove propeller shaft. Refer to PR-4, "Removal and Installation" .
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.

   CAUTION:
   For matching mark, use paint. Do not damage electric controlled coupling.

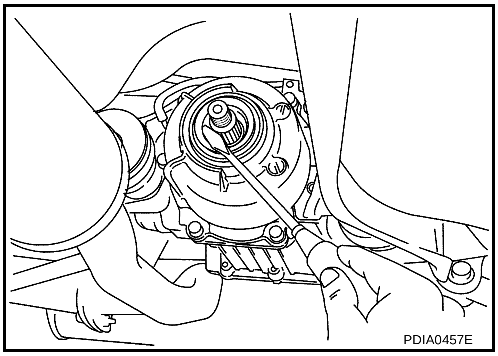


3. Remove companion flange lock nut, using a flange wrench. Then remove companion flange.



4. Remove front oil seal from coupling cover, using a flat-bladed screwdriver.

   CAUTION:
   Be careful not to damage coupling cover.

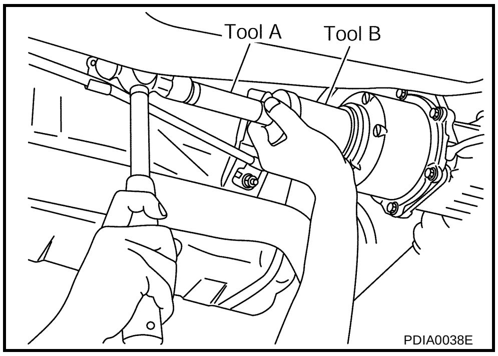


INSTALLATION

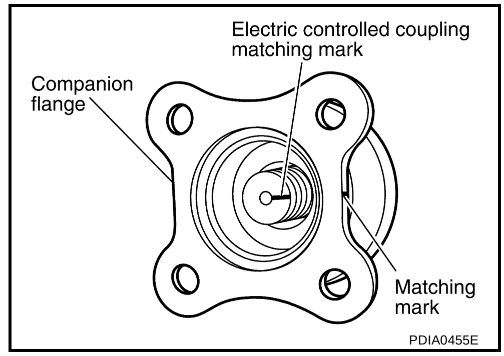
1. Apply multi-purpose grease to front oil seal lips.
2. Install front oil seal until it becomes flush with the case end, using the drifts.

   Tool number A: KV38100200 (J-26233)
   B: ST27861000 (—)

   CAUTION:
   - **Do not reuse oil seal.**
   - **When installing, do not incline oil seal.**



3. Align the matching mark of electric controlled coupling with the matching mark of companion flange, then install the companion flange.



4. Install companion flange lock nut with a flange wrench, tighten the to the specified torque. Refer to RFD-16, "COMPONENTS" .

   CAUTION:

   Do not reuse companion flange lock nut.

5. Install propeller shaft. Refer to PR-4, "Removal and Installation" .

SIDE OIL SEAL

PFP:38343

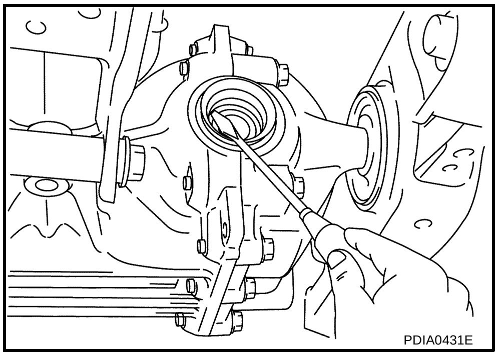
Removal and Installation

ADS0016L

REMOVAL

1. Remove rear drive shaft with power tool. Refer to RAX-20, "REAR DRIVE SHAFT" .
2. Remove side oil seal, using a flat-bladed screwdriver.

   CAUTION:
   Be careful not to damage gear carrier and rear cover.



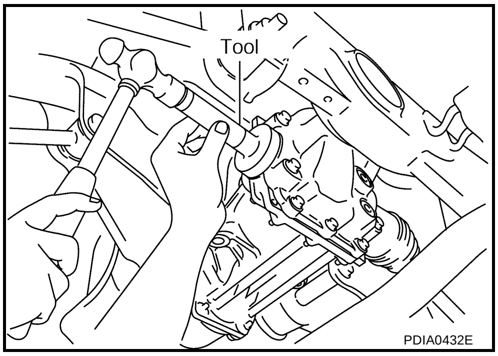
PDIA0431E

INSTALLATION

1. Apply multi-purpose grease to side oil seal lips.
2. Install side oil seal until it becomes flush with the case end, using the drift.

   Tool number : KV38100200 (J-26233)

   CAUTION:
   - **Do not reuse oil seal.**
   - **When installing, do not incline oil seal.**
3. Install rear drive shaft. Refer to RAX-20, "REAR DRIVE SHAFT" .



PDIA0432E

ELECTRIC CONTROLLED COUPLING

PFP:38760

Removal and Installation

ADS0018E

REMOVAL

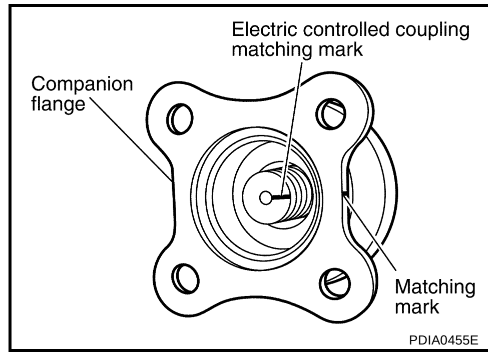
1. Remove propeller shaft. Refer to PR-4, "Removal and Installation" .
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on the companion flange.

   CAUTION:

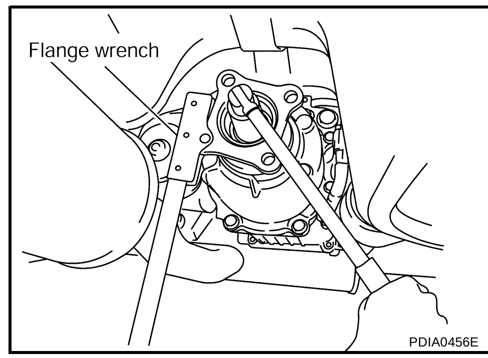
   For matching mark, use paint. Do not damage electric controlled coupling.

   NOTE:

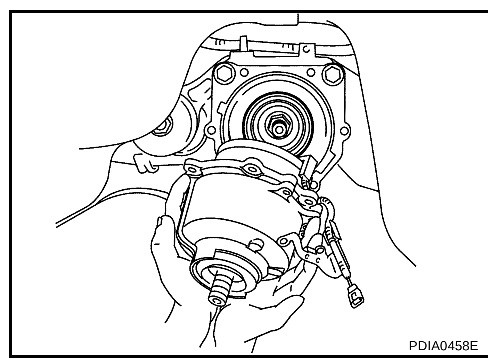
   When replacing electric controlled coupling, matching mark is not necessary.



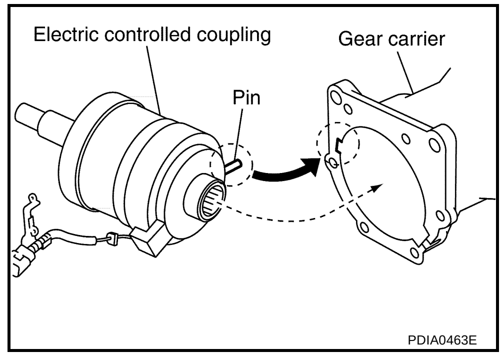
3. Remove companion flange lock nut, using a flange wrench.
4. Remove companion flange.
5. Disconnect AWD solenoid harness connector and remove connector bracket.
6. Remove electric controlled coupling breather hose from coupling cover.



7. Remove coupling cover with electric controlled coupling from gear carrier.
8. Remove electric controlled coupling from coupling cover.

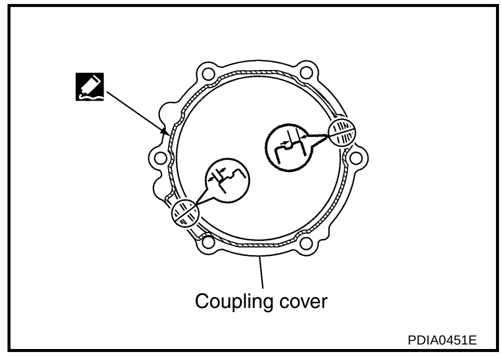


INSTALLATION



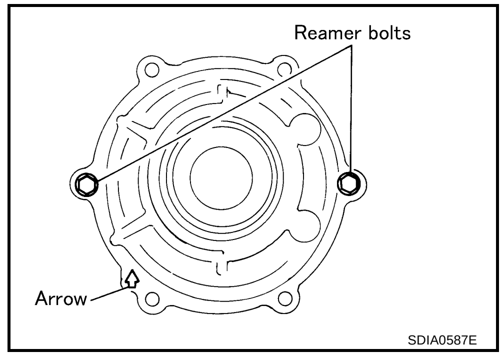
1. Install electric controlled coupling to spline of drive pinion inside gear carrier.

   CAUTION:
   - **Align the pin on electric controlled coupling with the groove of gear carrier.**
   - **Be careful not to damage center oil seal.**
2. Set AWD solenoid harness guide to gear carrier.



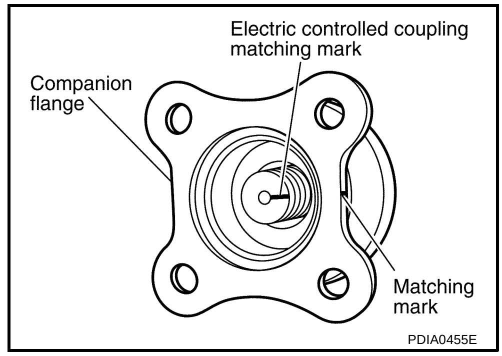
3. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEAL-ANTS" .**

   CAUTION:
   Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.



4. Install coupling cover to gear carrier with arrow facing upward, temporarily tighten reamer bolts to the positions shown in the figure.
5. Tighten reamer bolts and coupling cover mounting bolts to the specified torque. Refer to RFD-16, "COMPONENTS" .
6. Install electric controlled coupling breather hose to coupling cover.
7. Install connector bracket and connect AWD solenoid harness connector.
8. Install companion flange.

   NOTE:
   When reusing electric controlled coupling, align the matching mark of electric controlled coupling with the matching mark of companion flange, then install companion flange.



9. Install companion flange lock nut with flange wrench, tighten to the specified torque. Refer to RFD-16, "COMPONENTS" .

   CAUTION:
   Do not reuse companion flange lock nut.
10. Install propeller shaft. Refer to PR-4, "Removal and Installation" .

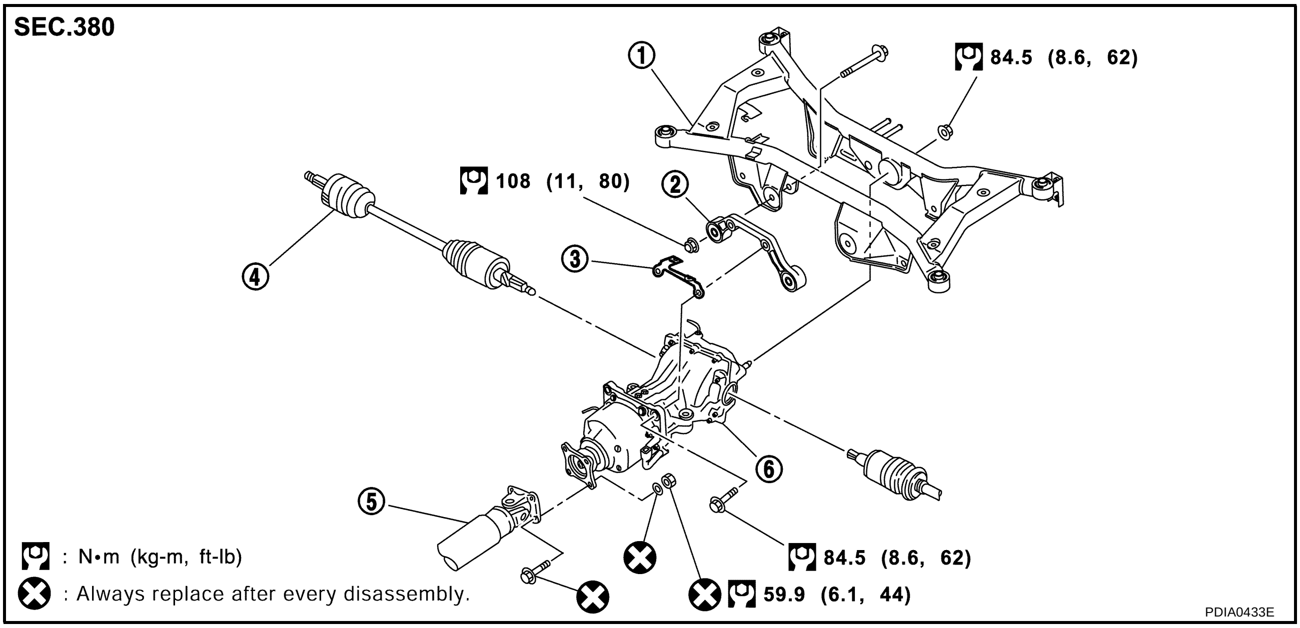
REAR FINAL DRIVE ASSEMBLY

PFP:38300

Removal and Installation

ADS00166

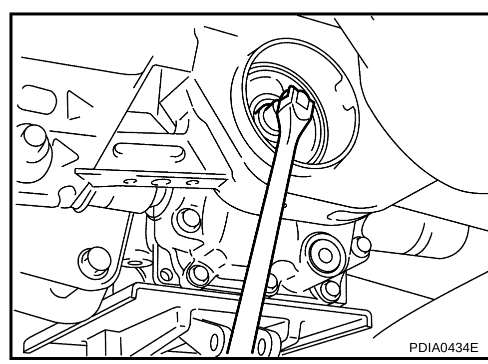
COMPONENTS



1.	Rear suspension member	2.	Final drive mounting bracket	3.	Harness bracket
4.	Drive shaft	5.	Propeller shaft	6.	Rear final drive assembly

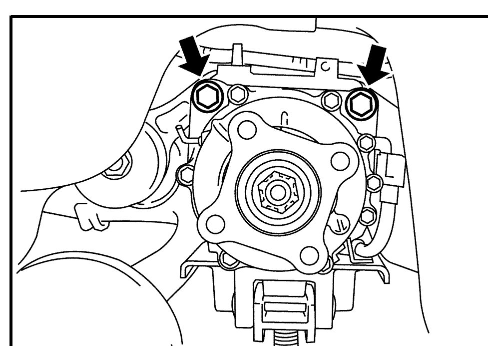
REMOVAL

1. Remove propeller shaft. Refer to PR-4, "Removal and Installation" .
2. Remove drive shaft with power tool. Refer to RAX-20, "Removal and Installation" .
3. Disconnect AWD solenoid harness connector.
4. Remove rear final drive breather hose and electric controlled coupling breather hose.
5. Support rear final drive assembly with a suitable jack.
6. Remove rear final drive mounting nut at rear suspension member.



7. Remove rear final drive mounting bolts at final drive mounting bracket, and then remove rear final drive assembly.
   If necessary, remove final drive mounting bracket.

   CAUTION:
   Secure rear final drive assembly to a suitable jack while removing it.



INSTALLATION

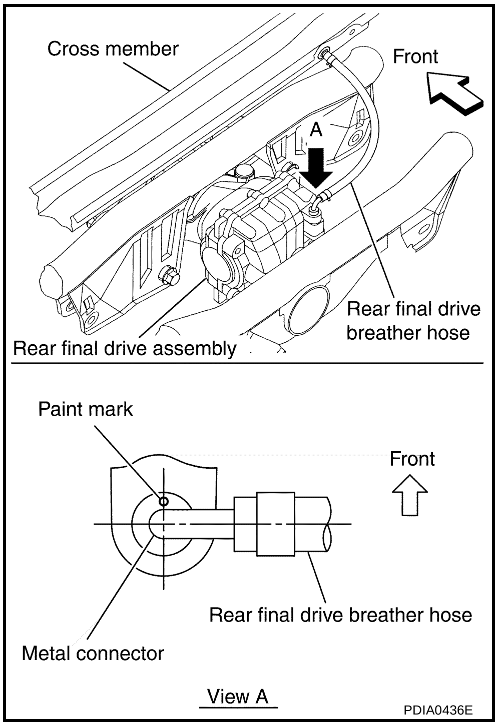
Note the following, and install in the reverse order of removal.

- Refer to RFD-14, "COMPONENTS" about each tightening torque.
- When installing breather hoses, refer to the figure and following.

  CAUTION:

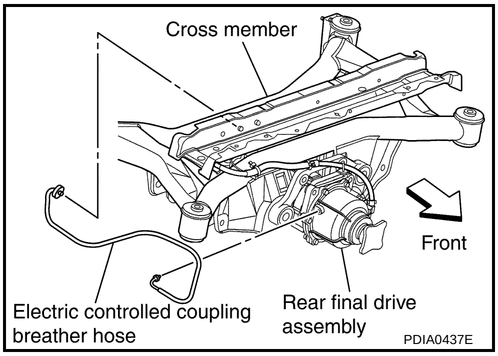
  Make sure there are no pinched or restricted areas on the breather hose caused by bending or winding when installing it.

  – For installation of rear final drive breather hose, the vehicle side end shall be inserted to cross member. Install metal connector side of this hose to rear cover by inserting it with aiming painted marking to the front of vehicle.



  – For installation of electric controlled coupling breather hose, the vehicle side end shall be inserted to cross member. Install its metal tube to rear final drive assembly and direct the metal tube hose side end to the front of vehicle.

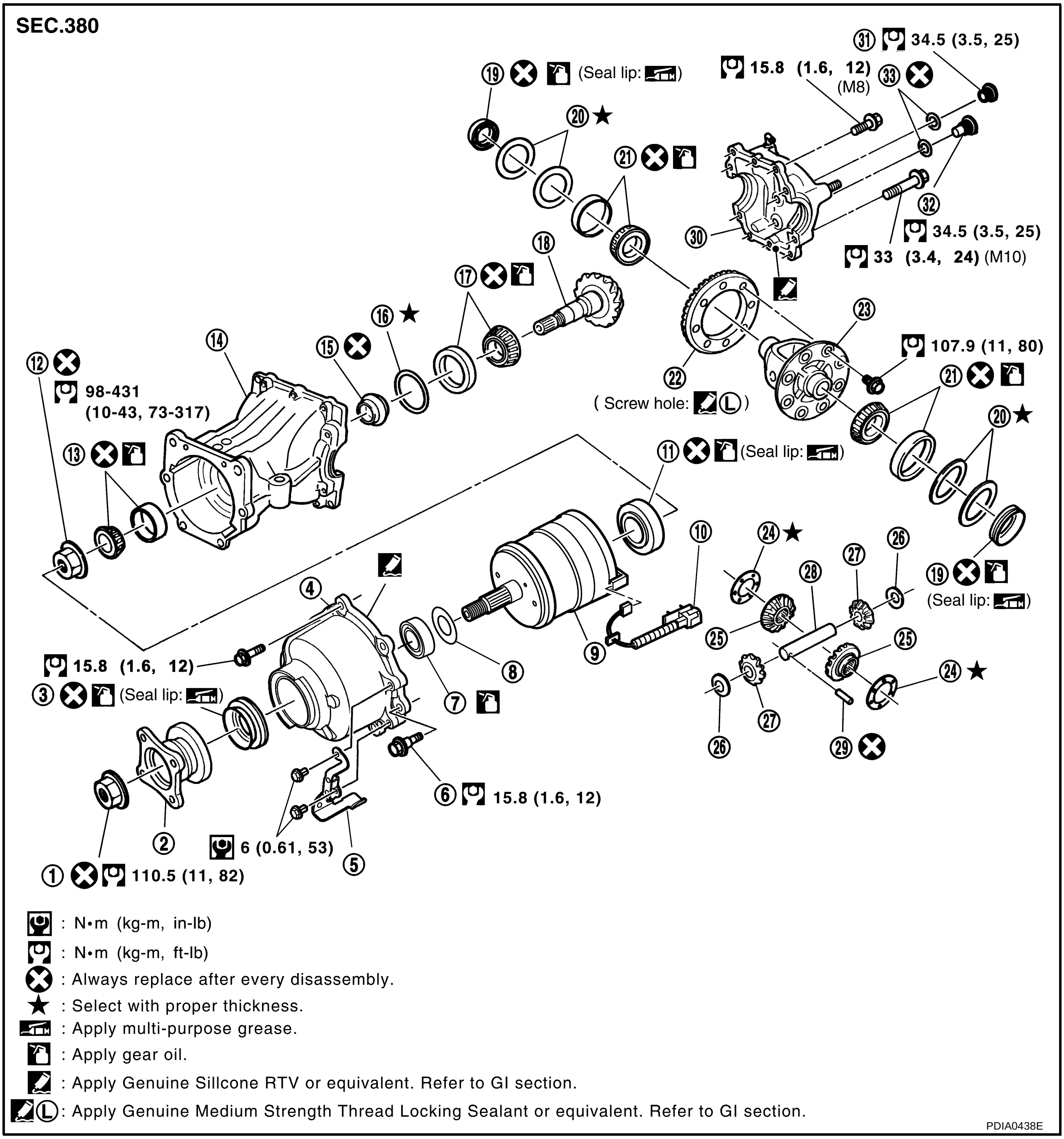
- When oil leaks while removing final drive assembly, check oil level after the installation. Refer to RFD-8, "Checking Differential Gear Oil" .



Disassembly and Assembly

ADS00169

COMPONENTS



1. Companion flange lock nut	2. Companion flange	3. Front oil seal
4. Coupling cover	5. Connector bracket	6. Reamer bolt
7. Coupling front bearing	8. Bearing shim	9. Electric controlled coupling
10. AWD solenoid harness	11. Center oil seal	12. Drive pinion nut
13. Pinion front bearing	14. Gear carrier	15. Collapsible spacer
16. Drive pinion adjusting shim	17. Pinion rear bearing	18. Drive pinion
19. Side oil seal	20. Side bearing adjusting shim	21. Side bearing
22. Drive gear	23. Differential case	24. Side gear thrust washer
25. Side gear	26. Pinion mate thrust washer	27. Pinion mate gear
28. Pinion mate shaft	29. Lock pin	30. Rear cover
31. Filler plug	32. Drain plug	33. Gasket

A
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RFD
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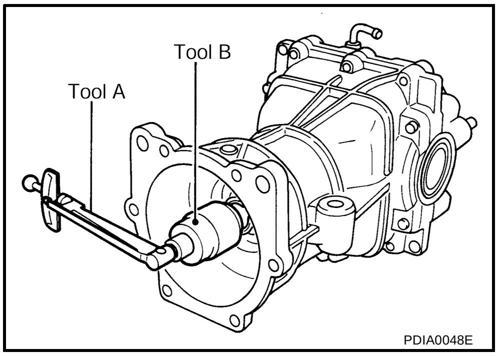
ASSEMBLY INSPECTION AND ADJUSTMENT

Total Preload Torque

1. Remove electric controlled coupling assembly. Refer to RFD-21, "Electric Controlled Coupling Assembly" .
2. Rotate drive pinion back and forth 2 to 3 times to check for unusual noise and rotation malfunction.
3. Rotate drive pinion at least 20 times to check for smooth operation of the bearing.
4. Fit drive pinion socket onto drive pinion spline. Measure the total preload, using the preload gauge.



Tool number A: ST3127S000 (J-25765-A)
B: KV38108500 (—)

Total preload torque:
1.33 - 2.15 N·m (0.14 - 0.21 kg-m, 12 - 19 in-lb)

NOTE:
Total preload torque = Pinion bearing torque + Side bearing torque

- If measured value is out of the specification, disassemble it to check and adjust each part. Adjust the pinion bearing preload and side bearing preload.
  Adjust the pinion bearing preload first, then adjust the side bearing preload.

When the preload torque is large

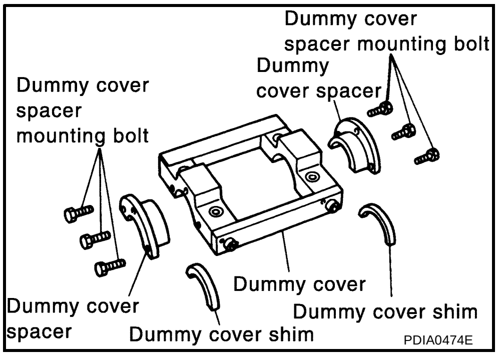
On pinion bearings:	**Replace the collapsible spacer.**
On side bearings:	**Use thinner side bearing adjusting shims. Refer to RFD-35, "Side Bearing Adjusting Shim" .**

When the preload is small

On pinion bearings:	**Tighten the drive pinion nut.**
On side bearings:	**Use thicker side bearing adjusting shims. Refer to RFD-35, "Side Bearing Adjusting Shim" .**

Drive Gear Runout

1. Remove rear cover. Refer to RFD-22, "Differential Assembly" .
2. Following the procedure below, install a dummy cover set to gear carrier.



Tool number : KV381086S1 (—)

a. Set dummy cover shims to the right and left side bearing adjusting shims.
b. Temporarily tighten dummy cover to gear carrier.
c. Position dummy cover spacer to dummy cover.
d. Tighten rear cover mounting bolts to the specified torque. Refer to RFD-16, "COMPONENTS" .
e. Tighten dummy cover spacer mounting bolts evenly to the specified torque.

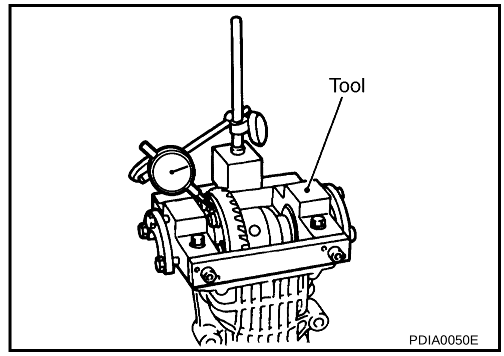
: 5.9 N·m (0.6 kg-m, 52 in-lb)

3. Fit a dial indicator to the drive gear back face.
4. Rotate the drive gear to measure runout.

Runout limit: 0.05 mm (0.0020 in) or less

- If the runout is outside of the repair limit, check drive gear assembly condition; foreign material may be caught between drive gear and differential case, or differential case or drive gear may be deformed, etc.

  CAUTION:
  Replace drive gear and drive pinion gear as a set.



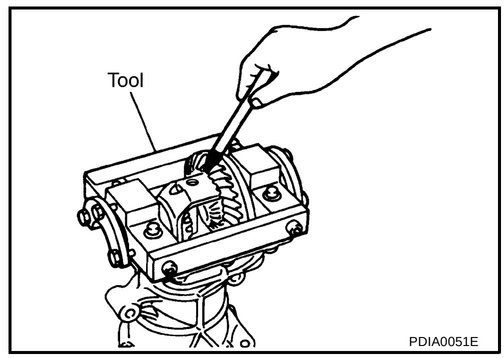
Tooth Contact

1. Remove rear cover. Refer to RFD-22, "Differential Assembly" .
2. Attach dummy cover set. For dummy cover installation, refer to RFD-17, "Drive Gear Runout" .

Tool number : KV381086S1 (—)

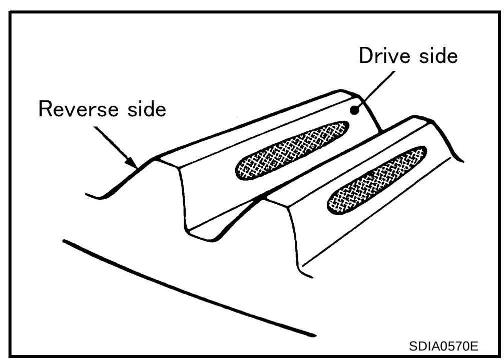
3. Apply red lead to drive gear.

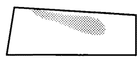
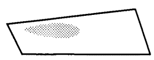
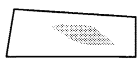
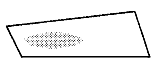
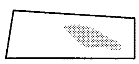
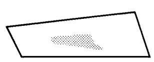
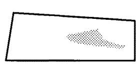
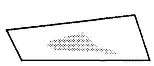
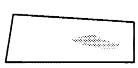
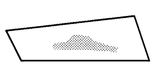
   CAUTION:
   Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.



4. Rotate drive gear back and forth several times, check drive pinion gear to drive gear tooth contact.

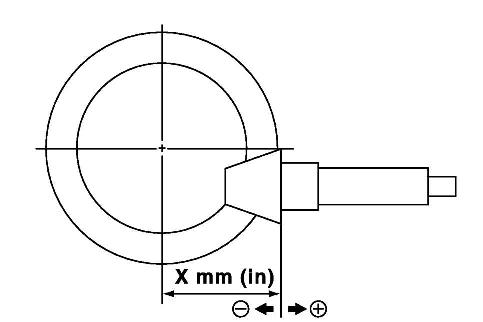
   CAUTION:
   Check tooth contact on drive side and reverse side.



Tooth contact condition: Drive side	Tooth contact condition: Back side	Drive pinion adjusting shim selection value [mm (in)]		Adjustment (Yes/No)	Possible cause
Heel side Toe side 	Toe side Heel side 	Thicker	+0.09 (+0.0035)	Yes	Occurrence of noise and scoring sound in all speed ranges.
			+0.06 (+0.0024)		Occurrence of noise when accelerating.
			+0.03 (+0.0012)	No	–
			0		
		Thinner	−0.03 (−0.0012)		
			−0.06 (−0.0024)	Yes	Occurrence of noise at constant speed and decreasing speed.
			−0.09 (−0.0035)		Occurrence of noise and scoring sound in all speed ranges.

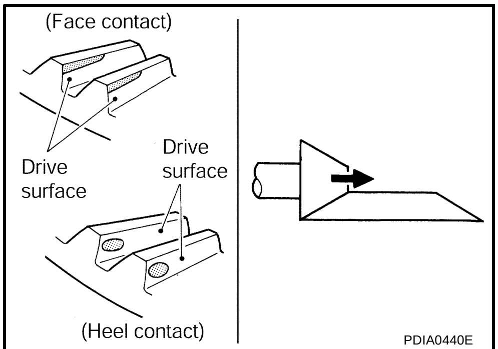
SDIA2549E

5. If tooth contact is improperly adjusted, follow the procedure below to adjust the pinion height (dimension X).



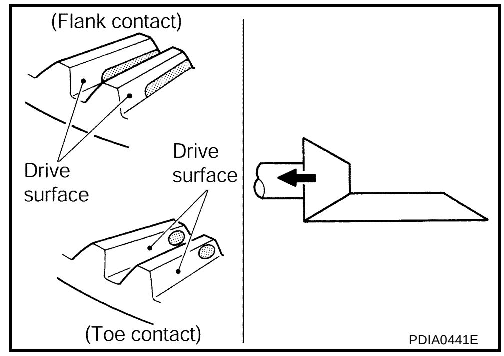
SDIA0517E

- If the tooth contact is near the face (face contact), or near the heal (heel contact), thicken drive pinion gear adjusting shims to move drive pinion closer to drive gear.
Refer to RFD-35, "Drive Pinion Adjusting Shim" .



PDIA0440E

- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thin drive pinion gear adjusting shims to move drive pinion farther from drive gear.
  Refer to RFD-35, "Drive Pinion Adjusting Shim" .

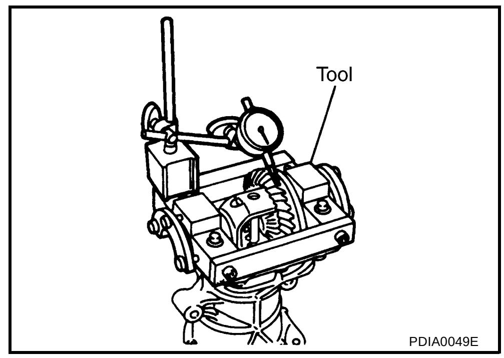


Backlash

1. Remove rear cover. Refer to RFD-22, "Differential Assembly" .
2. Attach dummy cover set. For dummy cover installation, refer to RFD-17, "Drive Gear Runout" .

Tool number : KV381086S1 (—)

3. Fit a dial indicator to the drive gear face to measure the backlash.



Backlash: 0.10 - 0.15 mm (0.0039 - 0.0059 in)

- If the backlash is outside of the specified value, change the thickness of side bearing adjusting shims.

When the backlash is large:

Make drive gear back adjusting shims thicker, and drive gear front adjusting shims thinner. Refer to RFD-35, "Side Bearing Adjusting Shim" .

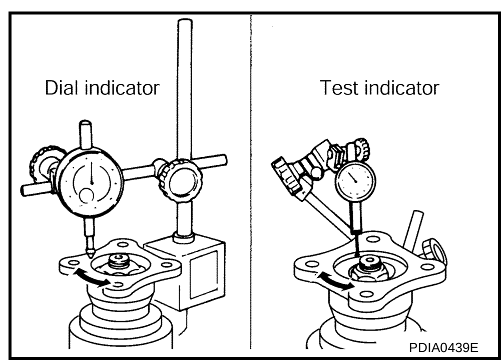
When the backlash is small:

Make drive gear back adjusting shims thinner, and drive gear front adjusting shims thicker. Refer to RFD-35, "Side Bearing Adjusting Shim" .

Companion Flange Runout

1. Fit a dial indicator onto the companion flange face (inner side of the propeller shaft mounting bolt holes).
2. Rotate companion flange to check for runout.

Runout limit: 0.13 mm (0.0051 in) or less



3. Fit a test indicator to the inner side of companion flange (socket diameter).
4. Rotate companion flange to check for runout.

Runout limit: 0.19 mm (0.0075 in) or less

5. If the runout value is outside the runout limit, follow the procedure below to adjust.

a. Check for runout while changing the phase between companion flange and drive pinion by 90° step, and search for the position where the runout is the minimum.
b. If the runout value is still outside of the limit after the phase has been changed, replace companion flange.
c. If the runout value is still outside of the limit after companion flange has been replaced, possible cause will be an assembly malfunction of drive pinion and electric controlled coupling, malfunctioning coupling bearing, or malfunctioning of electric controlled coupling.

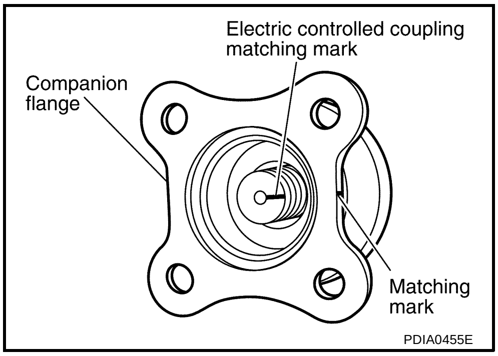
DISASSEMBLY

Electric Controlled Coupling Assembly

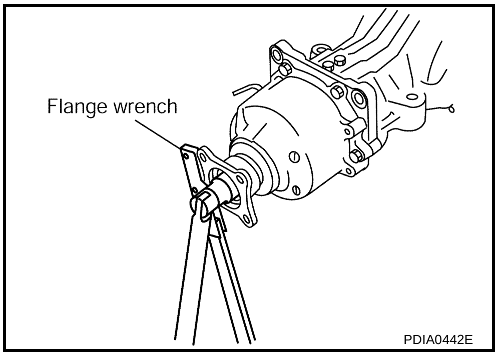
1. Remove connector bracket.
2. Put matching mark on the thread edge of electric controlled coupling. The matching mark should be in line with the matching mark on companion flange.

   CAUTION:
   For matching mark, use paint. Do not damage electric controlled coupling.

   NOTE:
   When replacing electric controlled coupling, matching mark is not necessary.

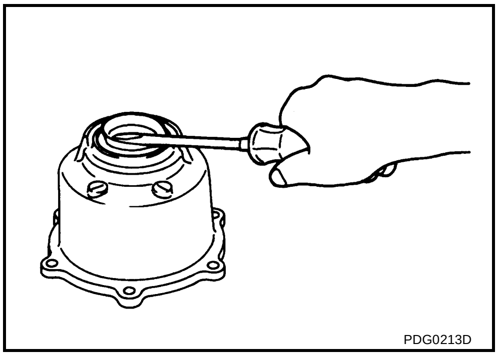


3. Remove companion flange lock nut, using a flange wrench.
4. Remove companion flange.
5. Remove coupling cover.

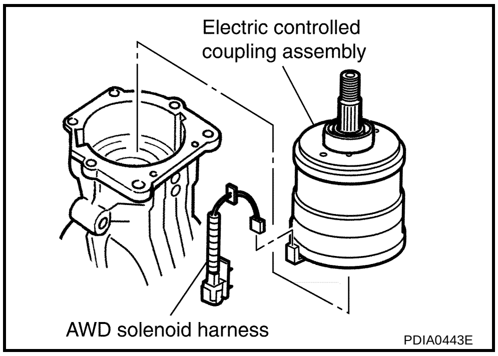


6. Remove front oil seal from coupling cover, using flat-bladed screwdriver.

   CAUTION:
   Be careful not to damage coupling cover.

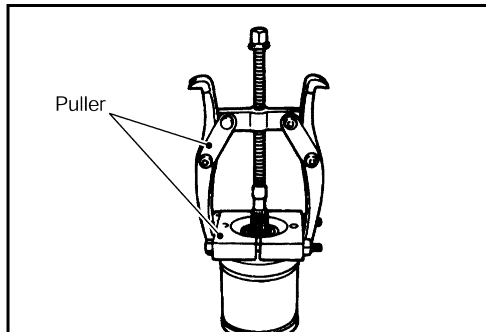


7. Remove electric controlled coupling assembly from drive pinion in gear carrier.
8. Remove AWD solenoid harness.



A B C RFD E F G H I J K L M

9. Remove coupling front bearing, using pullers and then take off bearing shim from electric controlled coupling.
10. Remove center oil seal from gear carrier.



PDIA0444E

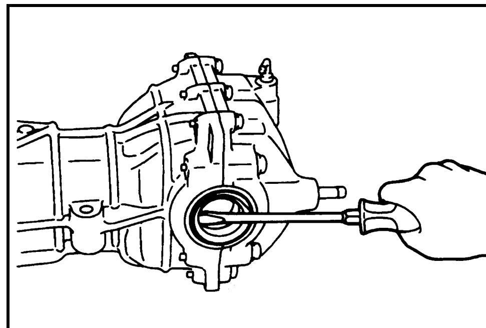
Differential Assembly

1. Remove side oil seal from gear carrier and rear cover, using flat-bladed screwdriver.

   CAUTION:

   Be careful not to damage gear carrier and rear cover.

2. Remove rear cover mounting bolts.



PDG0216D

3. Set drifts to the right and left side bearing adjusting shims individually. Press differential case assembly with side bearing to remove gear carrier assembly and rear cover assembly.

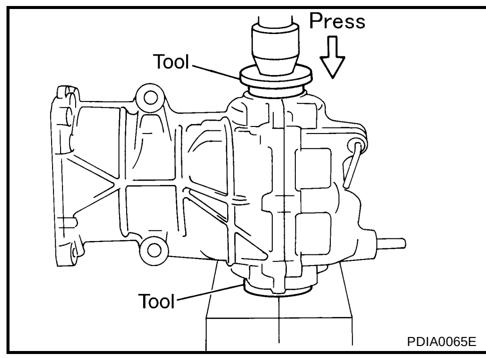
   Tool number : KV40100610 (J-26089)

   CAUTION:

   The pressure shall be as low as possible to remove gear carrier assembly and rear cover assembly. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

   NOTE:

   Differential case assembly, side bearings, and adjusting shims are compressed and integrated in gear carrier and rear cover.



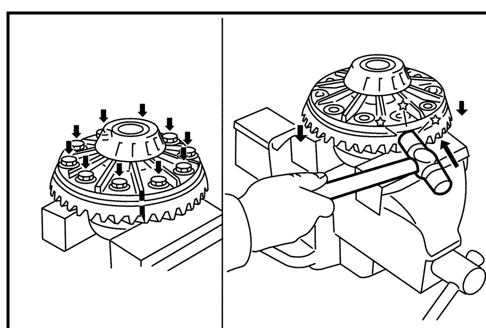
PDIA0065E

4. Remove drain plug and filler plug.
5. Remove side bearing adjusting shims and side bearing outer races.

   CAUTION:

   Mark the side bearing adjusting shims so that the original mounting positions (right/left) can be identified later.

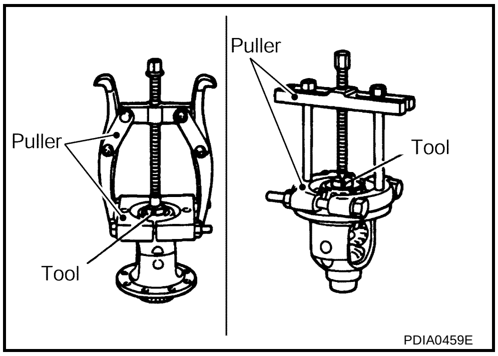
6. Remove drive gear mounting bolts and then remove drive gear from differential case.



PDIA0446E

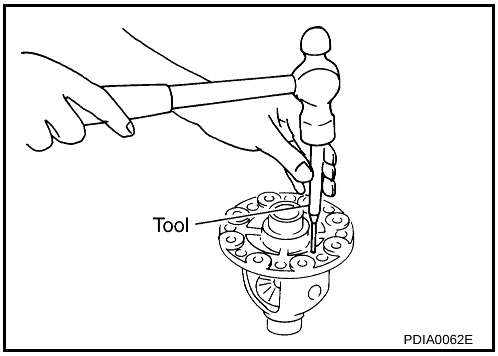
7. Remove side bearing inner races, using pullers and the drift.

   Tool number : ST33052000 (—)

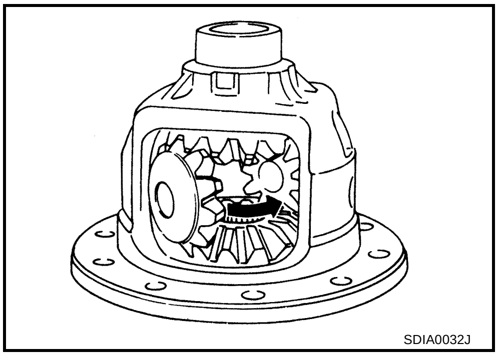


8. Pull the lock pin out of pinion mate shaft, using the pin punch.

   Tool number : ST23550000 (—)



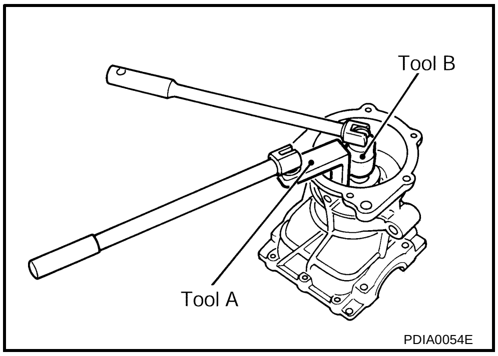
9. Remove pinion mate shaft, pinion mate gears, pinion mate thrust washers, side gears, side gear thrust washers from differential case.



Drive Pinion Assembly

1. Remove electric controlled coupling assembly. Refer to RFD-21, "Electric Controlled Coupling Assembly" .
2. Remove differential case assembly. Refer to RFD-22, "Differential Assembly" .
3. Fit drive pinion socket onto drive pinion spline. Remove drive pinion nut, using the pinion nut wrench.

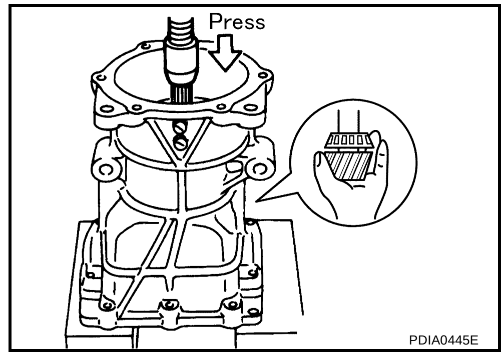
   Tool number A: KV38108400 (—)
   B: KV38108500 (—)



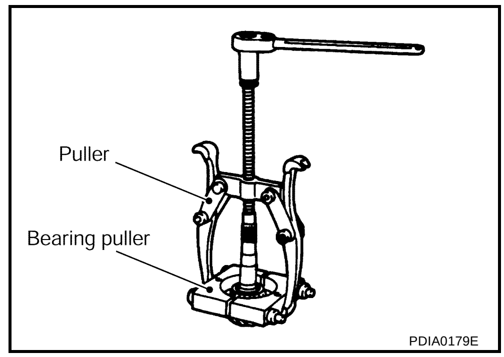
4. Press drive pinion assembly out of gear carrier.

   CAUTION:

   Do not drop drive pinion assembly.
5. Remove pinion front bearing inner race.
6. Remove collapsible spacer.



7. Remove pinion rear bearing inner race from drive pinion, using pullers.



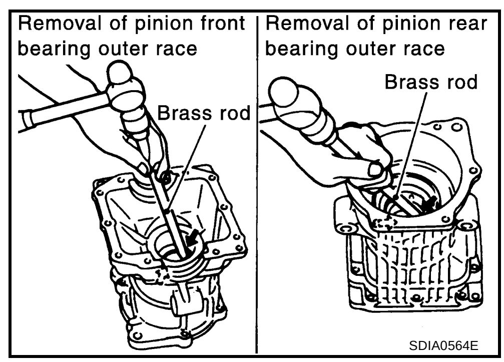
8. Using a brass rod, tap pinion front bearing outer race evenly from the 2 cutouts on gear carrier and remove pinion front bearing outer race.

   CAUTION:

   Be careful not to damage gear carrier.
9. Using a brass rod, tap drive pinion adjusting shim evenly from the 2 cutouts on gear carrier and remove drive pinion adjusting shims and pinion rear bearing outer race.

   CAUTION:

   Be careful not to damage the gear carrier.



INSPECTION AFTER DISASSEMBLY

Clean up the disassembled parts. Then, inspect if the parts are worn or damaged. If so, follow the measures below.

Content	Conditions and Measures
Hypoid gear	● If the gear teeth do not mesh or line-up correctly, determine the cause and adjust or replace as necessary. ● If the gears are worn, cracked, damaged, pitted or chipped (by friction) noticeably, replace with new drive gear and drive pinion as a set.
Bearing	● If any chipped (by friction), pitted, worn, rusted or scratched mark, or unusual noise from the bearing is observed, replace as a bearing assembly (as a new set).
Side gear and Pinion mate gear	● If any cracks or damage on the surface of the tooth is found, replace. ● If any worn or chipped mark on the contact sides of the thrust washer is found, replace.
Side gear thrust washer and pinion mate thrust washer	● If it is chipped (by friction), damaged, or unusually worn, replace.
Oil seal	● Whenever disassembled, replace. ● If wear, deterioration of adherence (sealing force lips), or damage is detected on the lips, replace them.
Differential case	● If any wear or crack on the contact sides of the differential case is found, replace.
Companion flange	● If any chipped mark (about 0.1 mm, 0.004 in) or other damage on the contact sides of the lips of the companion flange is found, replace.

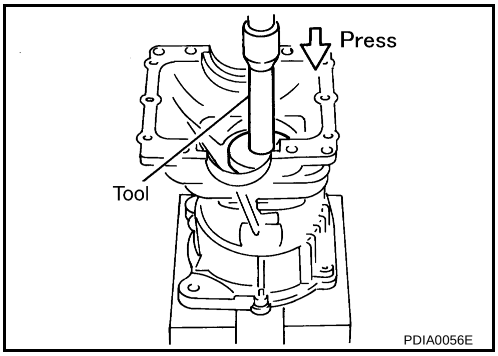
ASSEMBLY

Drive Pinion Assembly

1. Install a drive pinion adjusting shim of the same thickness as was installed prior to disassembly. Press pinion rear bearing outer race into gear carrier, using the drift.

   Tool number : ST17130000 (—)

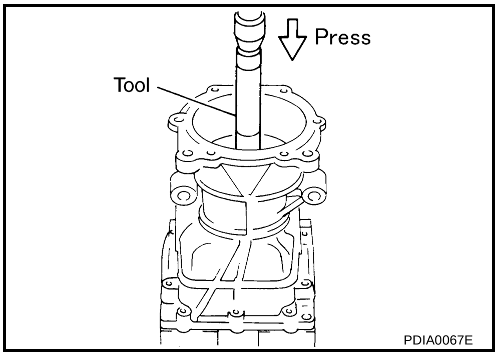
   CAUTION:
   - **At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.**
   - **Do not reuse pinion rear bearing outer race.**



2. Press pinion front bearing outer race into gear carrier, using the drift.

   Tool number : ST33230000 (J-25805-01)

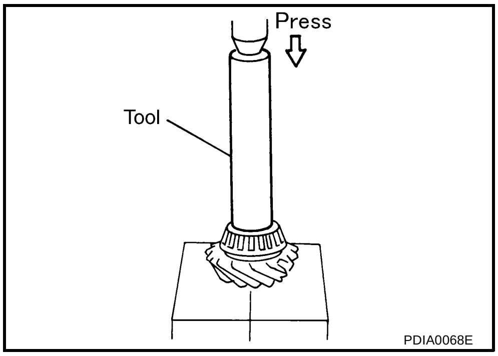
   CAUTION:
   - **At first, using a hammer, tap bearing outer race until it becomes flush to gear carrier.**
   - **Do not reuse pinion front bearing outer race.**



3. Press pinion rear bearing inner race to drive pinion, using the drift.

   Tool number : ST23860000 (—)

   CAUTION:
   Do not reuse pinion rear bearing inner race.



4. After checking and adjusting the tooth contact and backlash of the hypoid gear following the procedure below.

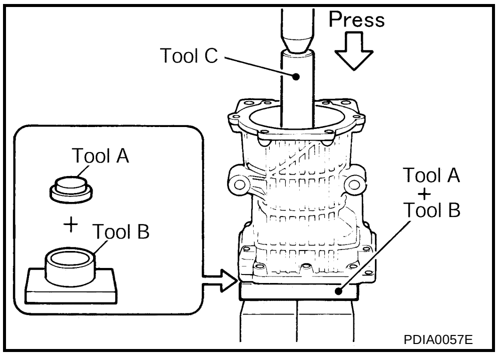
a. Apply gear oil to the drive pinon rear bearing, and assemble the drive pinion to the gear carrier.

   CAUTION:
   Do not assemble a collapsible spacer.

b. Apply gear oil to drive pinon front bearing, and assemble pinion front bearing inner race to drive pinion. Using the drifts and press stand, press pinion front bearing inner race to drive pinon as far as drive pinion nut can be tightened.

   Tool number A: KV40100610 (J-26089)
   B: ST38220000 (—)
   C: ST23860000 (—)

   CAUTION:
   Do not reuse pinion front bearing inner race.



c. Temporarily tighten removed drive pinon nut to drive pinion.

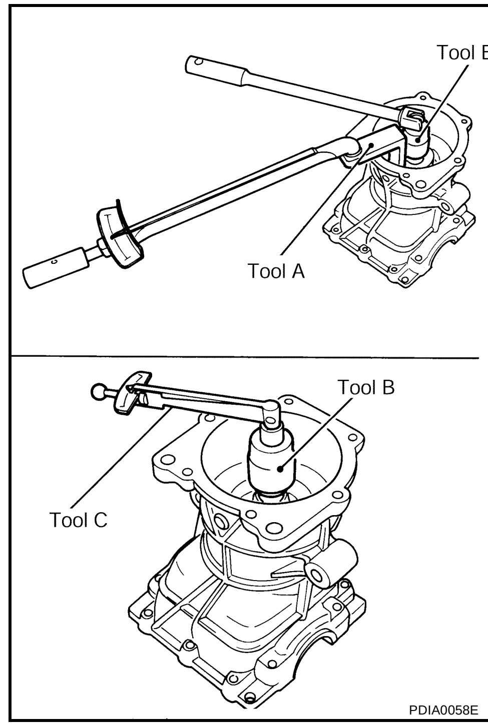
   NOTE:
   Use removed drive pinon nut only for the preload measurement.

d. Fit the drive pinon socket onto the drive pinion spline. Using the pinon nut wrench, tighten drive pinon nut to the specified preload torque.

Tool number **A: KV38108400 (—)**
B: KV38108500 (—)
C: ST3127S000 (J-25765-A)

Drive pinion bearing preload:
0.69 - 1.17 N·m (0.07 - 0.11 kg-m, 7 - 10 in-lb)

CAUTION:
Drive pinon nut is tightened with no collapsible spacer. Be careful not to overtighten it. While measuring the preload, tighten it by 5° to 10°.

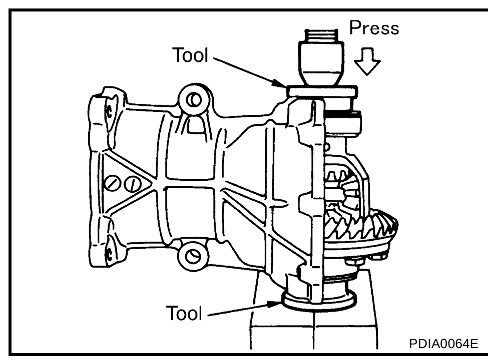


PDIA0058E

e. Apply gear oil to side bearings, and install new side bearing adjusting shims with the same thickness or re-install the old ones to the same mounting position they were in prior to disassembly. Install differential case assembly to gear carrier.

Tool number : KV40100610 (J-26089)

CAUTION:
- **The drifts shall be placed on the center of the adjusting shims.**
- **The pressure shall be as low as possible to install gear carrier assembly to differential assembly. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**
- **If adjusting shims are installed by tapping, gear carrier may be damaged. Avoid tapping.**

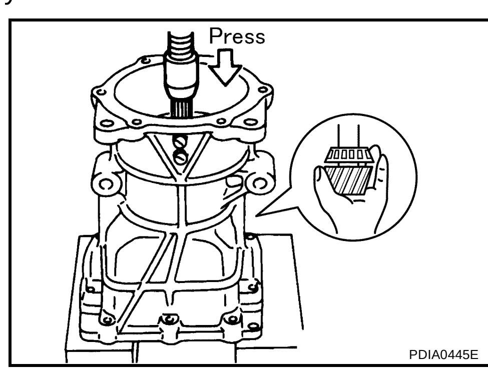


PDIA0064E

f. Check and adjust the tooth contact. Refer to RFD-18, "Tooth Contact" .
g. Check and adjust the backlash. Refer to RFD-20, "Backlash" .
h. Remove dummy cover set, and remove differential case assembly.
i. Remove drive pinion nut and press drive pinion assembly out of gear carrier.

CAUTION:
Do not drop drive pinion assembly.

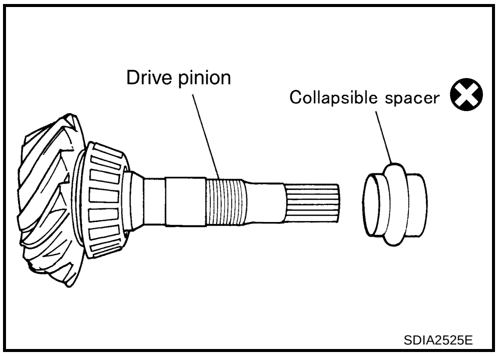
j. Remove pinion front bearing inner race.



PDIA0445E

5. Assemble collapsible spacer to drive pinion.

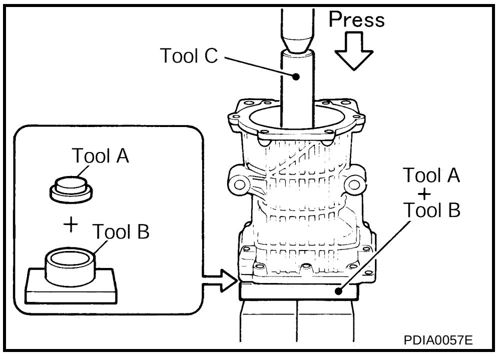
CAUTION:
- **Be careful of the mounting direction of collapsible spacer.**
- **Do not reuse collapsible spacer.**



6. Apply gear oil to drive pinon front bearing, and assemble pinion front bearing inner race to drive pinion. Using the drifts and press stand, press the pinion front bearing inner race to drive pinon as far as drive pinion nut can be tightened.

Tool number A: KV40100610 (J-26089)
B: ST38220000 (—)
C: ST23860000 (—)

CAUTION:
Do not reuse pinion front bearing inner race.



7. Apply anti-corrosive oil to the thread and seat of drive pinion nut, and temporarily tighten drive pinion nut to drive pinion.

CAUTION:
Do not reuse drive pinion nut.

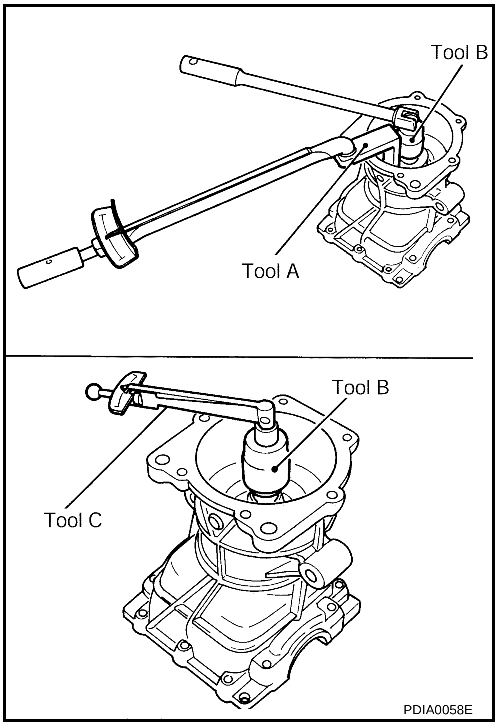
8. Fit drive pinon socket onto drive pinion spline. Using the pinon nut wrench, adjust the drive pinion nut tightening torque and pinion bearing preload torque.

Tool number A: KV38108400 (—)
B: KV38108500 (—)
C: ST3127S000 (J-25765-A)

Drive pinion nut tightening torque:
98 - 431 N·m (10 - 43 kg-m, 73 - 317 ft-lb)

Drive pinion bearing preload:
0.69 - 1.17 N·m (0.07 - 0.11 kg-m, 7 - 10 in-lb)

CAUTION:
- **Adjust the lower limit of the drive pinion nut tightening torque first.**
- **If the preload torque exceeds the specified value, replace collapsible spacer and tighten it again to adjust. Never loosen drive pinion nut to adjust the preload torque.**
- **After adjustment, rotate drive pinion back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**



9. Install differential case assembly. Refer to RFD-28, "Differential Assembly" .

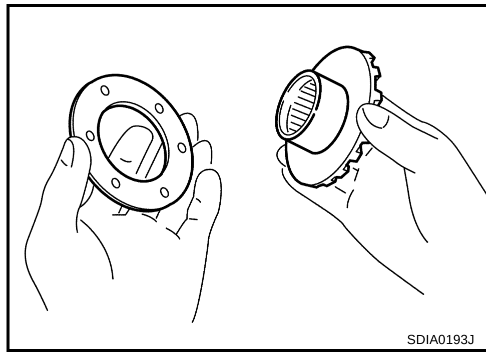
CAUTION:
Do not install rear cover.

10. Install dummy cover set, and check drive gear runout, tooth contact, and backlash. Refer to RFD-17, "Drive Gear Runout" , RFD-18, "Tooth Contact" , RFD-20, "Backlash" .
11. Remove dummy cover set, then install rear cover, and side oil seal. Refer to RFD-28, "Differential Assembly" .

12. Check total preload torque. Refer to RFD-17, "Total Preload Torque" .
13. Install electric controlled coupling assembly. Refer to RFD-31, "Electric Controlled Coupling Assembly" .
14. Check companion flange runout. Refer to RFD-20, "Companion Flange Runout" .

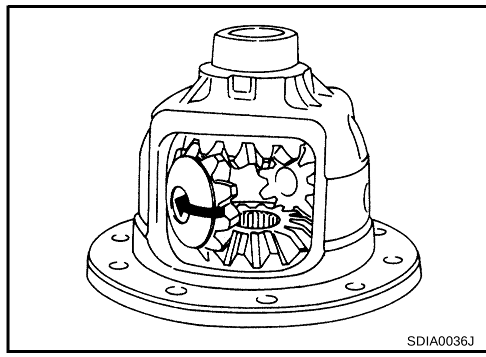
Differential Assembly

1. Install side gear thrust washers with the same thickness as the ones installed prior to disassembly or reinstall the old ones on the side gears.
2. Install side gear and thrust washer into differential case.



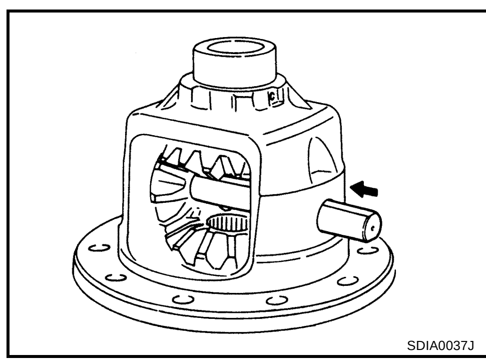
SDIA0193J

3. Align 2 pinion mate gears in diagonally opposite positions, then rotate and install them into differential case after installing thrust washer to pinion mate gear.



SDIA0036J

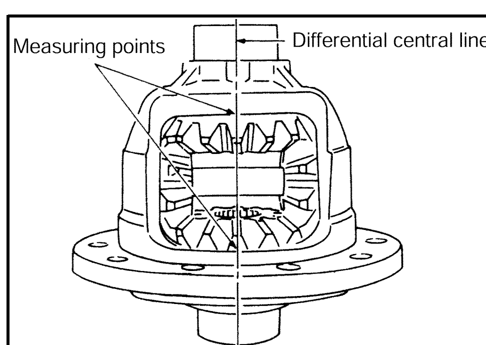
4. Align the lock pin holes on differential case with shaft, and install pinion mate shaft.



SDIA0037J

5. Measure side gear end play following the procedure below, and select the appropriate side gear thrust washers.

a. Place differential case straight up so that side gear to be measured comes upward.



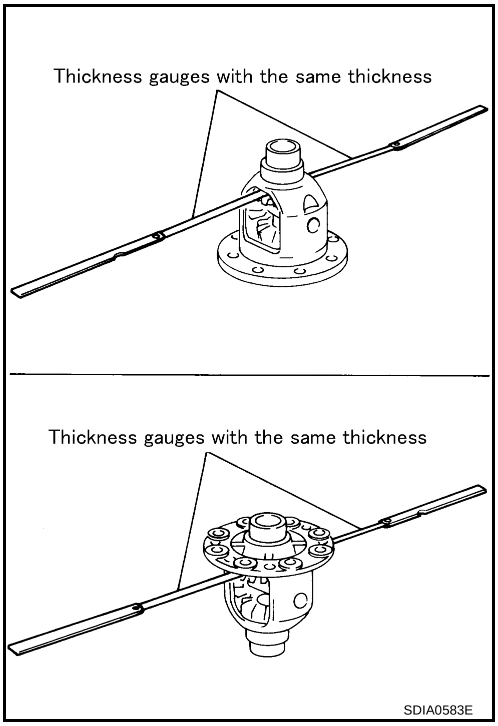
PDIA0460E

b. Using thickness gauges, measure the clearance between side gear back and differential case at 3 different positions, while rotating side gear. Average the 3 readings, and then measure the clearance. (Measure the clearance of the other side as well.)

Side gear back clearance specification:

0.2 mm (0.008 in) or less.
(Each gear should rotate smoothly without excessive resistance during differential motion.)

CAUTION:
To prevent side gear from tilting, insert thickness gauges with the same thickness from both sides.



c. If the back clearance is outside the specification, use a thicker/ thinner side gear thrust washer to adjust. Refer to RFD-34, "Side Gear Thrust Washer" .

When the back clearance is large:

Use a thicker thrust washer.

When the back clearance is small:

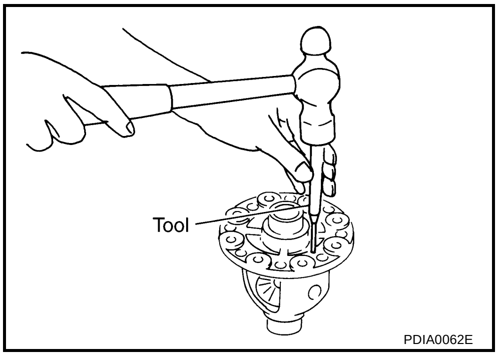
Use a thinner thrust washer.

CAUTION:
Select a side gear thrust washer for right and left individually.

6. Drive a lock pin into pinion mating shaft, using the pin punch.

Tool number : ST23550000 (—)

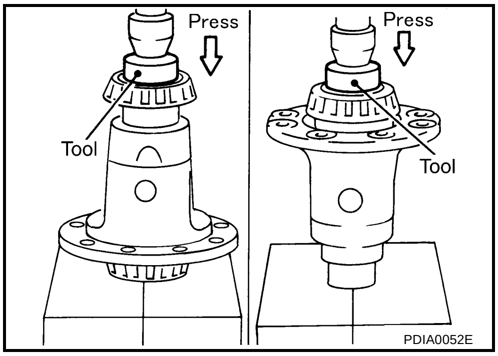
CAUTION:
Do not reuse lock pin.



7. Press side bearing inner races to differential case, using the drift.

Tool number : KV40105020 (—)

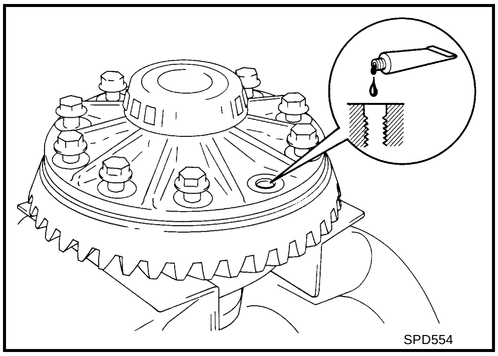
CAUTION:
Do not reuse side bearing inner race.



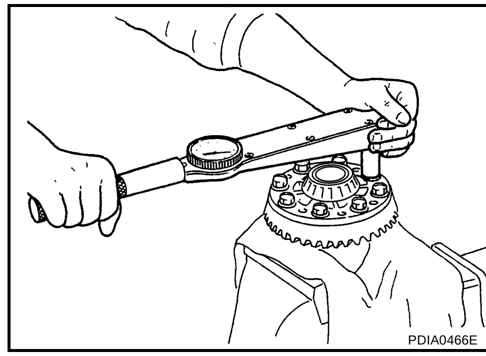
8. Apply thread locking sealant into the thread hole of drive gear.

- **Use Genuine Medium Strength Thread Locking Sealant or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .**

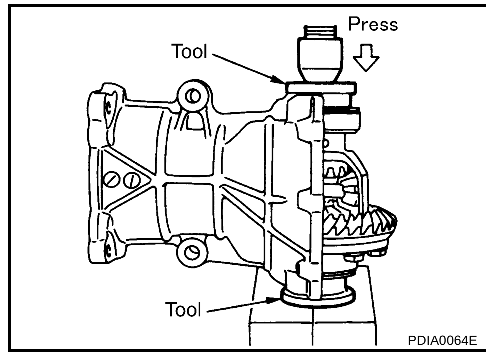
CAUTION:
The drive gear back and threaded holes shall be cleaned and decreased sufficiently.



9. Install drive gear to the differential case, and apply anti-corrosive oil onto threads and seats on the mounting bolts, and then tighten to the specified torque. Refer to RFD-16, "COMPONENTS" .


PDIA0466E

10. Apply gear oil to side bearings, and install new side bearing adjusting shims (2 pieces for one side) with the same thickness as the ones installed prior to disassembly or re-install the old ones, with side bearing outer race to differential case.
If side bearing adjusting shims have been already selected, use them.
CAUTION:
Do not reuse side bearing outer race.
11. Set the drifts to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install gear carrier assembly to differential case assembly.

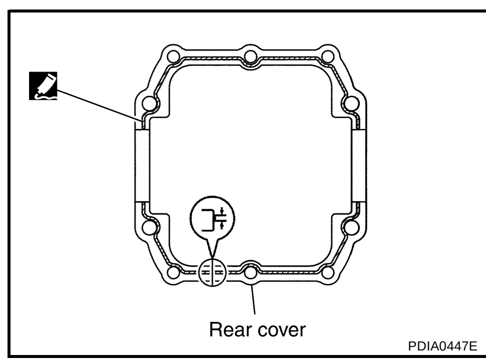


PDIA0064E

Tool number : KV40100610 (J-26089)

CAUTION:
- **The drift shall be placed on the center of the adjusting shims.**
- **The pressure shall be as low as possible to install differential assembly into gear carrier assembly. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**
- **If the adjusting shims are installed by tapping, the gear carrier may be damaged. Avoid tapping.**

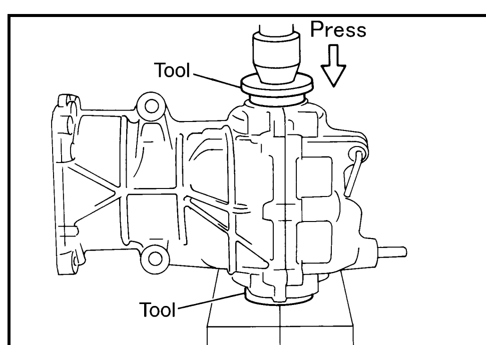
12. Install dummy cover set, check and adjust drive gear runout, tooth contact, backlash, and total preload torque. Refer to RFD-17, "Drive Gear Runout" , RFD-18, "Tooth Contact" , RFD-20, "Backlash" , RFD-17, "Total Preload Torque" .
13. Remove dummy cover set.
14. Apply liquid gasket to mating surface of rear cover. Overlap both ends of the bead for at least 3 mm (0.12 in).
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .**



PDIA0447E

CAUTION:
Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.

15. Set the drifts to the right and left side bearing adjusting shims individually. Compress differential case assembly and side bearing to install rear cover.



PDIA0065E

Tool number : KV40100610 (J-26089)

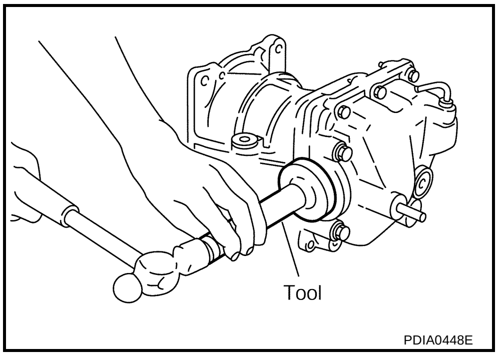
CAUTION:
- **The drift shall be placed on the center of the adjusting shims.**
- **The pressure shall be as low as possible to install the rear cover. The maximum pressure shall be 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).**
- **If rear cover is forced in by tapping, rear cover may be damaged by adjusting shims. Avoid tapping.**

16. Tighten rear cover mounting bolts to the specified torque. Refer to RFD-16, "COMPONENTS" .

17. Using the drift, drive side oil seals until it becomes flush with the case end.

    Tool number : KV38100200 (J-26233)

    CAUTION:
    - **Do not reuse oil seal.**
    - **When installing, do not incline oil seal.**
    - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



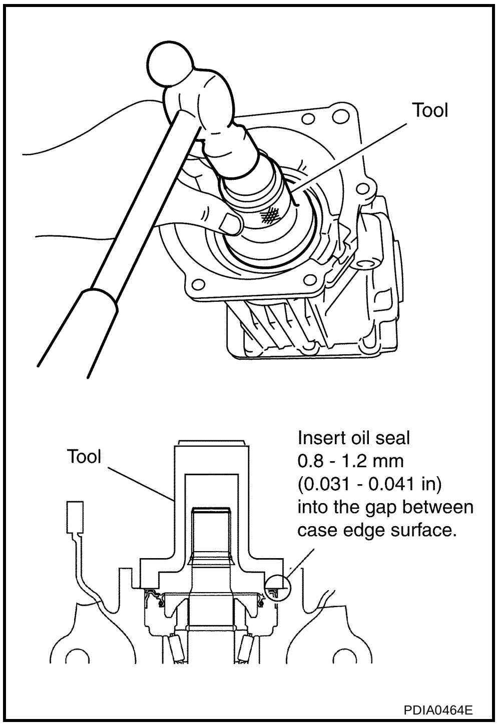
18. Check total preload torque. Refer to RFD-17, "Total Preload Torque" .

Electric Controlled Coupling Assembly

1. Using the drift, install center oil seal as shown in the figure.

    Tool number : ST35271000 (J-26091)

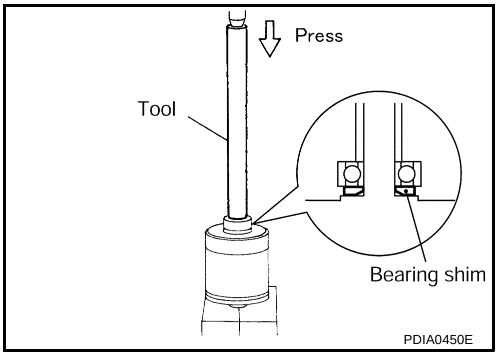
    CAUTION:
    - **Do not reuse the oil seal.**
    - **When installing, do not incline oil seal.**
    - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



2. Install bearing shim and coupling front bearing to electric controlled coupling, using the drift.

    Tool number : ST22360002 (J-25679-01)

    CAUTION:
    When assembling bearing shim, shim chamfer side should face electric controlled coupling side.



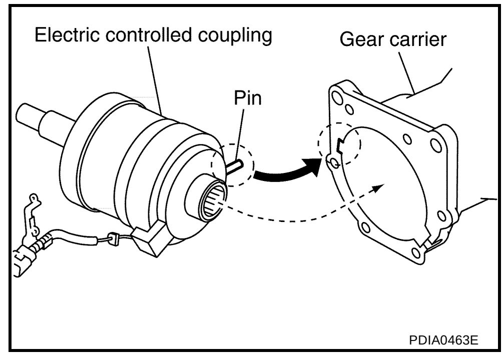
3. Connect AWD solenoid harness to electric controlled coupling.

4. Install electric controlled coupling to drive pinion.

   CAUTION:

   - **Align the pin on electric controlled coupling with the groove of gear carrier.**
   - **Be careful not to damage center oil seal.**

5. Set AWD solenoid harness guide to gear carrier.

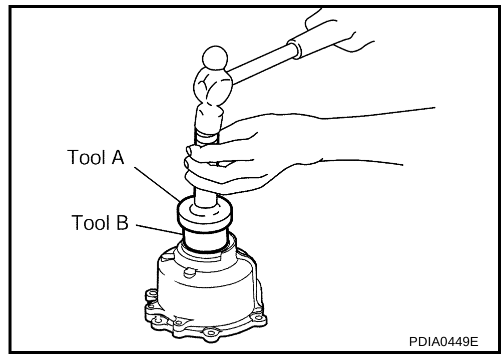


6. Using the drifts, drive front oil seal until it becomes flush with the case end.

   Tool number **A: KV38100200 (J-26233)**
   B: ST27861000 (—)

   CAUTION:

   - **Do not reuse oil seal.**
   - **When installing, do not incline oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**

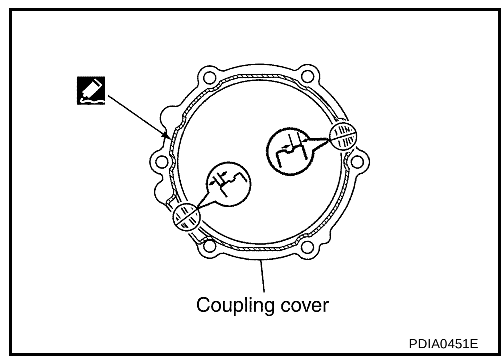


7. Apply liquid gasket to mating surface of coupling cover. Overlap both ends of the bead for at least 3 mm (0.12 in).

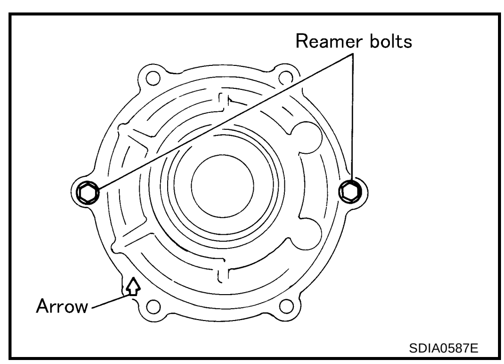
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS" .**

   CAUTION:

   Remove old sealant adhering to the mounting surfaces. Also remove any moisture, oil, or foreign material adhering to the mounting surfaces.



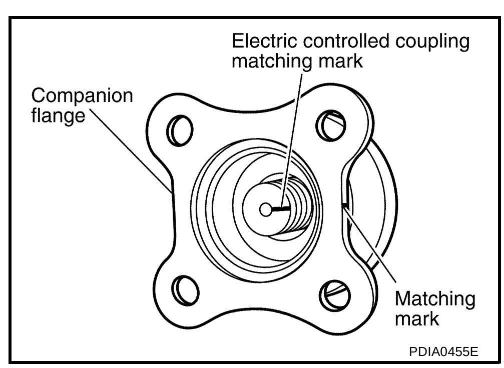
8. Install coupling cover to gear carrier with the arrow facing upward, temporarily tighten reamer bolts to the positions shown in the figure.
9. Tighten reamer bolts and coupling cover mounting bolts to the specified torque. Refer to RFD-16, "COMPONENTS" .



10. Install companion flange.

    NOTE:

    When reusing electric controlled coupling, align the matching mark of electric controlled coupling with the matching mark of companion flange, then install companion flange.

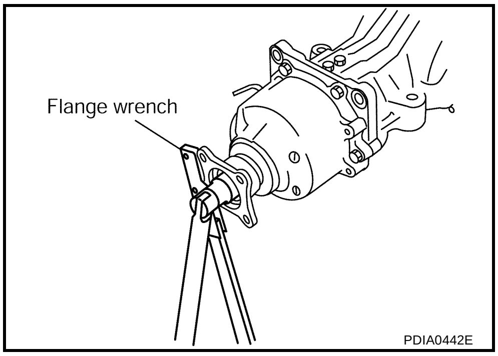


11. Install companion flange lock nut using a flange wrench, tighten to the specified torque. Refer to RFD-16, "COMPONENTS" .

    CAUTION:

    Do not reuse companion flange lock nut.

12. Check companion flange runout. Refer to RFD-20, "Companion Flange Runout" .
13. Install connector bracket, and tighten bolts to the specified torque. Refer to RFD-16, "COMPONENTS" .



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ADS0016A

Applied model	QR25DE
Final drive model	R145
Gear ratio	2.466
Number of teeth (Drive gear/Drive pinion)	37/15
Oil capacity (Approx.) ℓ (US pt, Imp pt)	0.55 (1-1/8, 1)
Number of pinion gears	2
Drive pinion adjustment spacer type	Collapsible

Inspection and Adjustment

ADS0018F

DRIVE GEAR RUNOUT

Unit: mm (in)

Item	Runout limit
Drive gear back face	0.05 (0.0020) or less

DIFFERENTIAL SIDE GEAR CLEARANCE

Unit: mm (in)

Item	Specification
Side gear backlash (Clearance between side gear and differential case)	0.2 (0.008) or less. (Each gear should rotate smoothly without excessive resistance during differential motion.)

PRELOAD TORQUE

Unit: N·m (kg-m, in-lb)

Item	Specification
Pinion bearing (P_1)	0.69 - 1.17 (0.07 - 0.11, 7 - 10)
Side bearing (P_2)	0.64 - 0.98 (0.07 - 0.09, 6 - 8)
Side bearing to pinion bearing (Total preload) (Total preload = P_1 + P_2)	1.33 - 2.15 (0.14 - 0.21, 12 - 19)

BACKLASH

Unit: mm (in)

Item	Specification
Drive gear to drive pinion gear	0.10 - 0.15 (0.0039 - 0.0059)

COMPANION FLANGE RUNOUT

Unit: mm (in)

Item	Runout limit
Companion flange face	0.13 (0.0051) or less
Inner side of the companion flange	0.19 (0.0075) or less

SELECTIVE PARTS

Side Gear Thrust Washer

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
0.74 (0.0291) 0.77 (0.0303) 0.80 (0.0315)	38424 4N200 38424 4N201 38424 4N202	0.83 (0.0327) 0.86 (0.0339)	38424 4N203 38424 4N204

*: Always check with the Parts Department for the latest parts information.

Drive Pinion Adjusting Shim

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
1.70 (0.0669)	38154 4N200	2.00 (0.0787)	38154 4N210
1.73 (0.0681)	38154 4N201	2.03 (0.0799)	38154 4N211
1.76 (0.0693)	38154 4N202	2.06 (0.0811)	38154 4N212
1.79 (0.0705)	38154 4N203	2.09 (0.0823)	38154 4N213
1.82 (0.0717)	38154 4N204	2.12 (0.0835)	38154 4N214
1.85 (0.0728)	38154 4N205	2.15 (0.0846)	38154 4N215
1.88 (0.0740)	38154 4N206	2.18 (0.0858)	38154 4N216
1.91 (0.0752)	38154 4N207	2.21 (0.0870)	38154 4N217
1.94 (0.0764)	38154 4N208	2.24 (0.0882)	38154 4N218
1.97 (0.0776)	38154 4N209		

*: Always check with the Parts Department for the latest parts information.

Side Bearing Adjusting Shim

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*
1.85 (0.0728)	38453 4N200	2.05 (0.0807)	38453 4N204
1.90 (0.0748)	38453 4N201	2.10 (0.0827)	38453 4N205
1.95 (0.0768)	38453 4N202	2.15 (0.0854)	38453 4N206
2.00 (0.0787)	38453 4N203	2.20 (0.0866)	38453 4N207

*: Always check with the Parts Department for the latest parts information.

SECTION RSU
REAR SUSPENSION

CONTENTS

PRECAUTIONS

PFP:00001

Caution

AES000XA

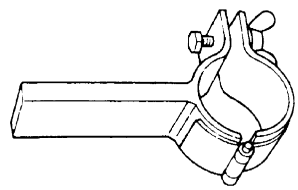
- When installing rubber bushings, final tightening must be performed under unladen conditions with tires on ground. Oil will shorten the life of rubber bushings. Be sure to wipe off any spilled oil.
  - Unladen conditions mean that fuel, engine coolant and lubricant are full. A spare tire, a jack, hand tools and mats are in designated positions.
- After servicing suspension parts, be sure to check wheel alignment.
- Self-lock nuts are not reusable. Always use new ones when installing. Since new self-lock nuts are pre-oiled, tighten as they are.

PREPARATION

PFP:00002

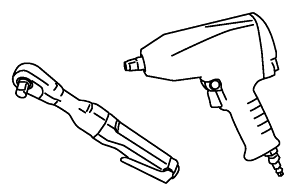
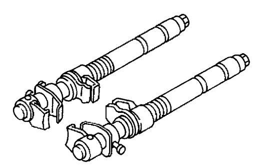
Special Service Tools [SST]

AES000XB

Tool number (Kent-Moore No.) Tool name		Description
ST35652000 (–) Strut attachment	 ZZA0807D	Disassembling and assembling strut

Commercial Service Tools

AES000XC

Tool name		Description
Power tool	 PBIC0190E	● Removing wheel nuts ● Removing torque member fixing bolts ● Removing stabilizer component parts. ● Removing strut assembly lower side
Spring compressor	 S-NT717	Removing coil spring

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

AES000XD

Use chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			RSU-7	RSU-11	—	—	—	RSU-7	RSU-5	RSU-16	NVH in PR section	NVH in RFD section	NVH in RAX and RSU sections	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in BR section	NVH in PS section
Possible cause and Suspected parts			Improper installation, looseness	Strut deformation, damage or deflection	Bushing or mounting deterioration	Parts interference	Spring fatigue	Suspension looseness	Incorrect wheel alignment	Stabilizer bar fatigue	PROPELLER SHAFT	DIFFERENTIAL	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEELS	DRIVE SHAFT	BRAKES	STEERING
Symptom	Rear suspension	Noise	×	×	×	×	×	×			×	×	×	×	×	×	×	×
		Shake	×	×	×	×		×			×		×	×	×	×	×	×
		Vibration	×	×	×	×	×				×		×	×		×		×
		Shimmy	×	×	×	×			×				×	×	×		×	×
		Judder	×	×	×								×	×	×		×	×
		Poor quality ride or handling	×	×	×	×	×		×	×			×	×	×			

×: Applicable

REAR SUSPENSION ASSEMBLY

PFP:55020

On-Vehicle Inspection and Service

AES000XE

Make sure that the mounting conditions (looseness, back lash) of each of the components and the component conditions (wear, damage) are normal.

STRUT INSPECTION

Check for oil leakage, damage, and breakage of installation positions.

Wheel Alignment Inspection

AES000XF

DESCRIPTION

Measure wheel alignment under unladen conditions.

NOTE:
"Unladen conditions" mean that fuel, engine coolant, and lubricant are full. A spare tire, a jack, hand tools and mats are in designated positions.

PREMINARY CHECK

Check the following:

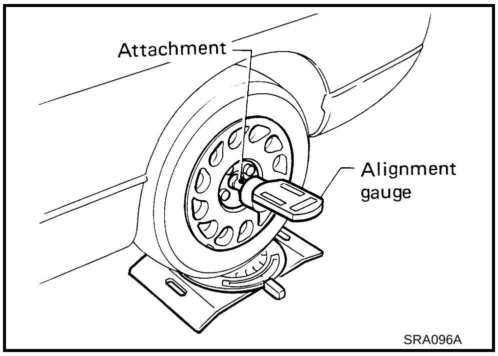
1. Tires for improper air pressure and wear.
2. Road wheels for runout. Refer to WT-4, "ROAD WHEEL" .
3. Wheel bearing axial end play. Refer to RAX-5, "WHEEL BEARING INSPECTION" .
4. Strut operation.
5. Each of mounting points of axle housing and suspension for looseness and deformation.
6. Each of rear parallel link, front parallel link, suspension member, radius rod and strut for cracks, deformation, and other damage.
7. Vehicle height under unladen conditions (posture).

CAMBER INSPECTION

- Measure camber of both right and left wheels with a suitable alignment gauge.
- Adjust in accordance with the following procedures.

Camber : Refer to RSU-18, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

- If camber is not within the specification, inspect and replace any damaged or worn rear suspension parts.



SRA096A

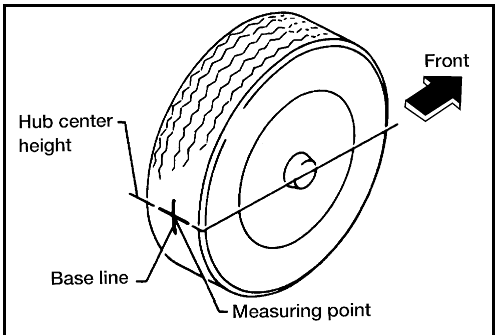
TOE-IN

Measure toe-in using following procedure. If out of the specification, inspect and replace any damaged or worn rear suspension parts.

WARNING:

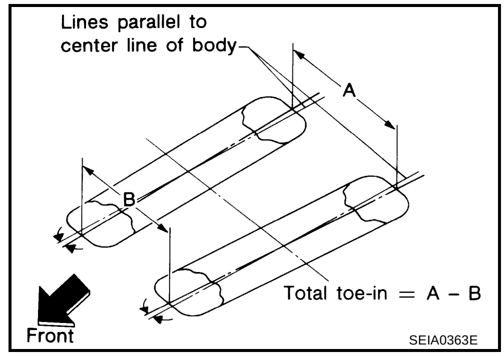
- **Always perform the following procedure on a flat surface.**
- **Make sure that no person is in front of vehicle before pushing it.**

1. Bounce rear of vehicle up and down to stabilize the vehicle height (posture).
2. Push vehicle straight ahead about 5 m (16 ft).
3. Put a mark on base line of the tread (rear side) of both tires at the same height of hub center. These are measuring points.



SEIA0362E

4. Measure distance “A” (rear side).

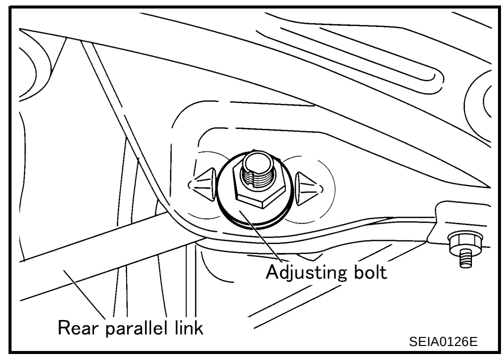


5. Push vehicle slowly ahead to rotate wheels 180° degrees (1/2 turn).

   NOTE:
   If the wheels have rotated more than 180° degrees (1/2 turn), start this procedure again from the beginning. Do not push the vehicle backward.
6. Measure distance “B” (front side).

   Total toe-in : Refer to RSU-18, "SERVICE DATA AND SPECIFICATIONS (SDS)" .

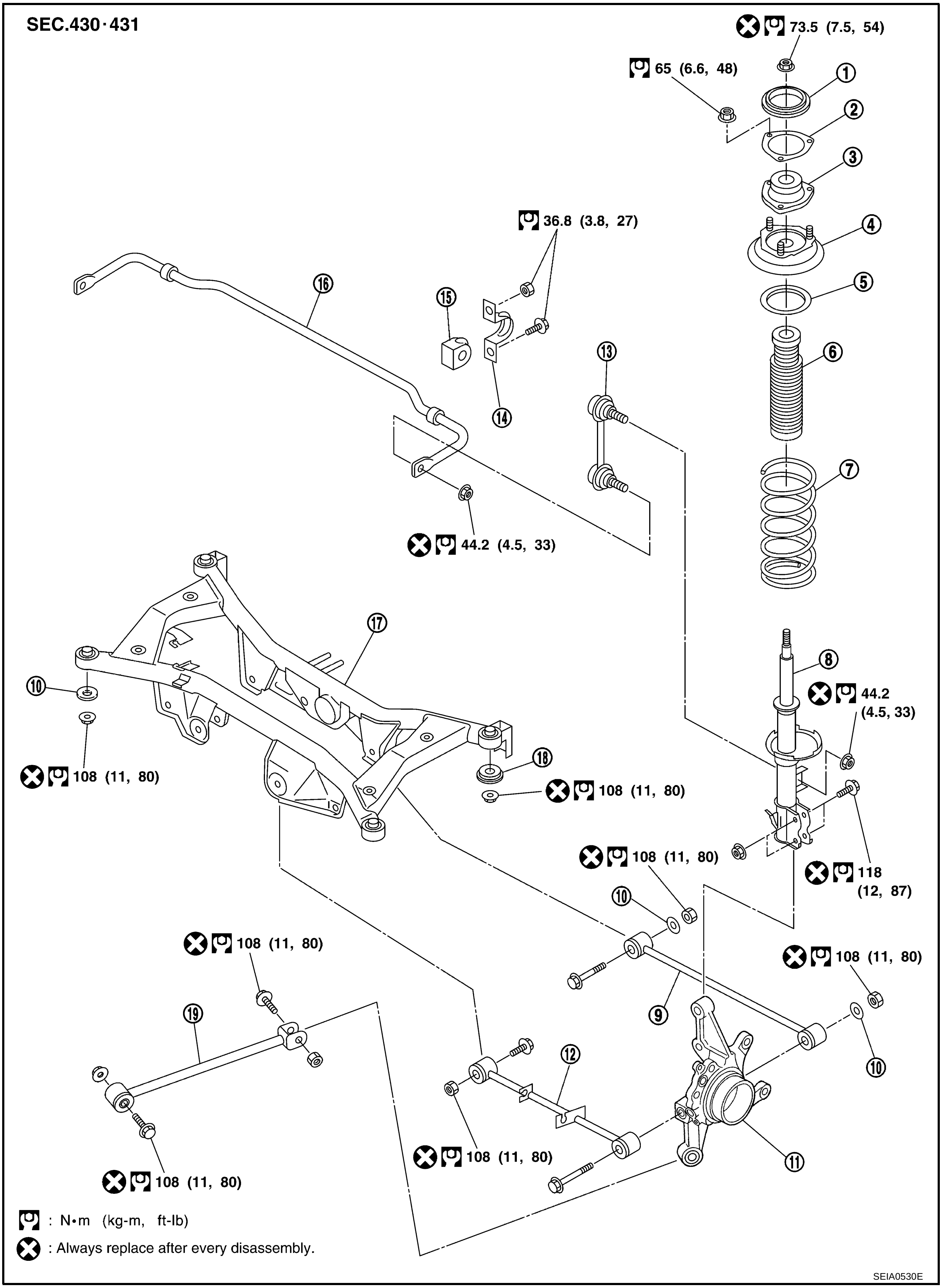
7. If toe-in is not within the specification, adjust by turning the adjusting bolt of rear parallel link.



   CAUTION:
   When adjusting toe-in, set the both sides to the same values.

Component

AES000XG



1.	Strut seal	2.	Strut spacer	3.	Mounting insulator
4.	Mounting insulator bracket	5.	Spring upper seat	6.	Bound bumper
7.	Coil spring	8.	Strut	9.	Rear parallel link
10.	Washer	11.	Axle housing	12.	Front parallel link
13.	Stabilizer connecting rod	14.	Stabilizer clamp	15.	Stabilizer bushing
16.	Stabilizer bar	17.	Rear suspension member	18.	Stopper
19.	Radius rod				

Removal and Installation

AES000XY

REMOVAL

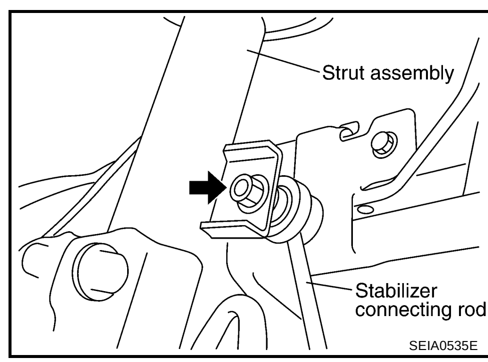
1. Remove tires from vehicle with a power tool.
2. Remove harness of wheel sensor from rear suspension member, front parallel link and axle housing. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:

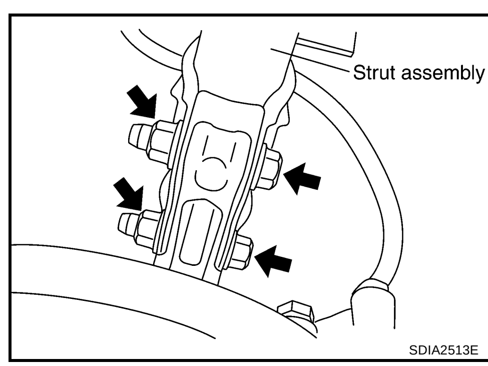
   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-31, "REAR DISC BRAKE" .

   NOTE:

   Avoid depressing brake pedal while brake caliper is removed.
4. Remove disc rotor. Refer to BR-31, "REAR DISC BRAKE" .
5. Remove lock plate and brake hose from strut assembly. Refer to PB-3, "PARKING BRAKE SYSTEM" .
6. Remove parking brake cable from axle housing. Refer to PB-4, "PARKING BRAKE CONTROL" .
7. Remove main muffler and exhaust center tube. Refer to EX-2, "EXHAUST SYSTEM" .
8. Remove rear final drive (AWD models). Refer to RFD-14, "REAR FINAL DRIVE ASSEMBLY" .
9. Remove electric controlled coupling harness connector from rear suspension member (AWD models).
10. Remove the mounting nut on the upper side of stabilizer connecting rod with a power tool. Remove stabilizer connecting rod from strut assembly.
11. Set jack under rear suspension member.



12. Remove fixing bolts and nuts on the lower side of strut assembly with a power tool. Remove axle housing from strut assembly.
13. Remove the fixing bolt and nut on the vehicle side of radius rod.
14. Remove rear suspension member mounting nuts, and then remove washers and stoppers.
15. Slowly lower jack to remove rear suspension assembly.



INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing rear suspension assembly. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .

COIL SPRING AND STRUT

PFP:55302

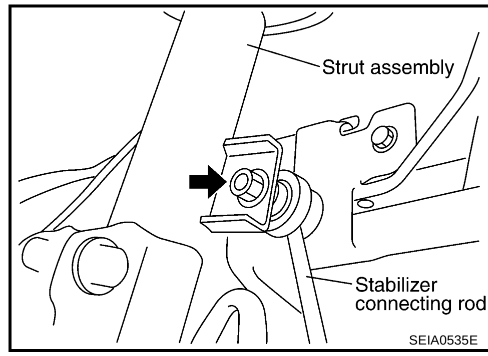
Removal and Installation

AES000XH

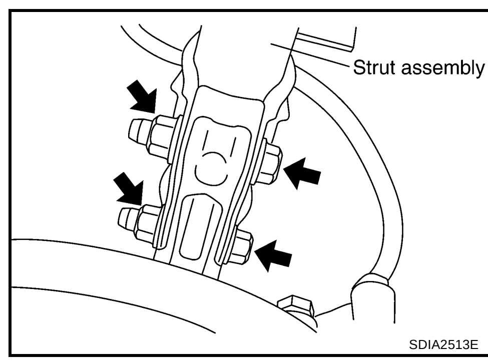
REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-31, "REAR DISC BRAKE" .

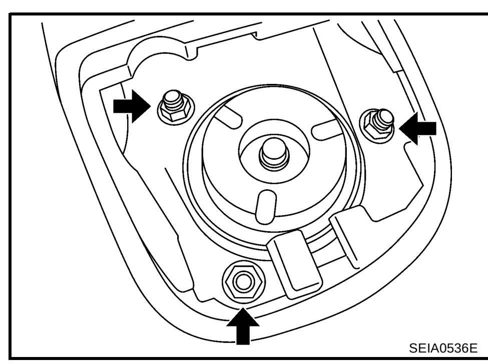
   NOTE:
   Avoid depressing brake pedal while brake caliper is removed.
3. Remove lock plate and brake hose from strut assembly. Refer to BR-11, "BRAKE PIPING AND HOSE" .
4. Remove disc rotor. Refer to RAX-5, "Removal and Installation" .
5. Remove the mounting nut on the upper side of stabilizer connecting rod with a power tool. Remove stabilizer connecting rod from strut assembly.



6. Remove fixing bolts and nuts on the lower side of strut assembly with a power tool. Remove axle housing from strut assembly.
7. Remove luggage side lower finisher in luggage room. Refer to EI-36, "BODY SIDE TRIM" .



8. Remove the mounting nuts of mounting insulator bracket, and then remove strut assembly from vehicle.

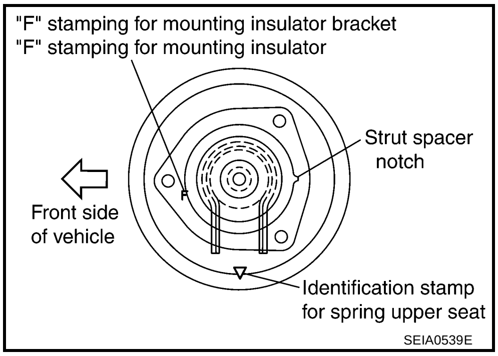


INSTALLATION

- Install in the reverse order of removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing coil spring and strut. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .

- Install strut spacer and mounting insulator with positioning “F” stamp for mounting insulator bracket as shown in the figure.



Disassembly and Assembly

AES000XI

DISASSEMBLY

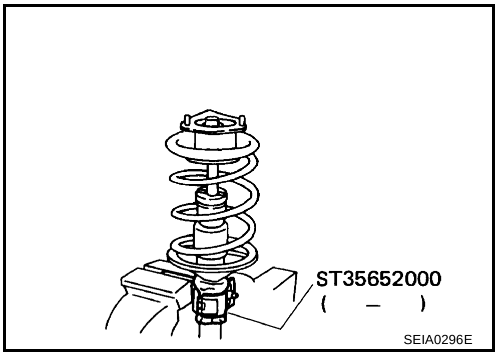
CAUTION:

Do not damage strut piston rod when removing components from strut.

1. Install the strut attachment [SST] to strut and secure it in a vise.

   CAUTION:

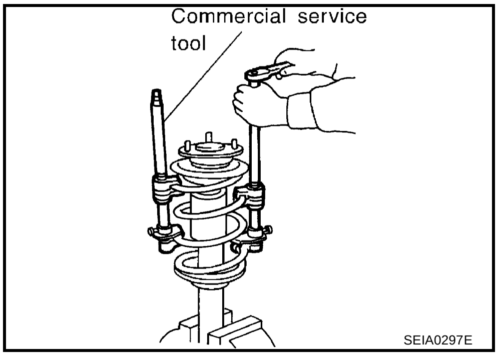
   Wrap a shop cloth around strut to protect it from damage when installing the strut attachment [SST] to strut.



2. Compress coil spring using a spring compressor (commercial service tool) until coil spring with the compressor is free.

   CAUTION:

   Start compressing coil spring after making sure that the compressor is completely attached to coil spring.



3. Make sure that coil spring with the compressor is free between spring upper seat and lower spring seat (strut), and then remove piston rod lock nut while securing the end of piston rod so as not to rotate piston rod.
4. Remove mounting insulator bracket, spring upper seat and bound bumper from strut.
5. Remove coil spring with the compressor, and then gradually release the compressor.

   CAUTION:

   Loosen the compressor while checking installation position so that compressor is installed to the correct position.
6. Remove the strut attachment [SST] from strut.

INSPECTION AFTER DISASSEMBLY

Strut Inspection

Check the following:

- Strut for deformation, cracks, and damage. Replace if there are.
- Piston rod for damage, uneven wear, and distortion. Replace if there are.
- For oil leakage. Replace if there are.

Mounting Insulator and Rubber Parts Inspection

Check mounting insulator for cracks and rubber parts for wear. Replace if there are.

Coil Spring Inspection

Check coil spring for cracks, wear, and damage. Replace if there are.

ASSEMBLY

CAUTION:

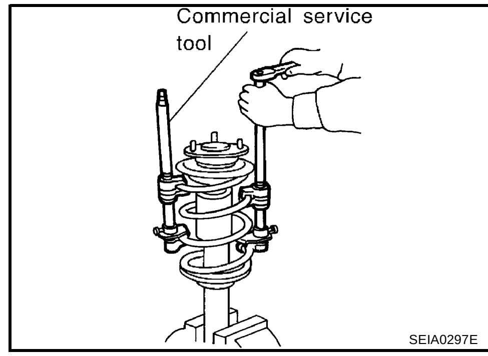
Do not damage strut piston rod when installing components to strut.

1. Install the strut attachment [SST: ST35652000 (–)] to strut and secure it in a vise.

   CAUTION:

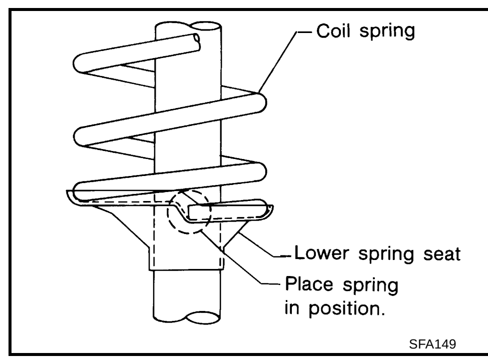
   Wrap a shop cloth around strut to protect it from damage when installing the strut attachment [SST] to strut.

2. Compress coil spring using a spring compressor (commercial service tool), and install it onto strut.



   CAUTION:

   - **Face the large diameter side of coil spring downward. Align the lower end to lower spring seat as shown in the figure.**
   - **Start compressing coil spring after making sure that the compressor is completely attached to coil spring.**



3. Apply soapy water to bound bumper. Insert bound bumper into spring upper seat, and then install it to strut.
4. Install mounting insulator bracket to strut.
5. Secure end of piston rod so as not to rotate piston rod. Tighten piston rod lock nut to the specified torque.
6. Gradually release the compressor, and remove it from coil spring.

   CAUTION:

   Loosen the compressor while checking installation position so that coil spring is installed to the correct position.

7. Remove the strut attachment [SST] from strut.

FRONT PARALLEL LINK

PFP:55120

Removal and Installation

AES000XJ

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove harness of wheel sensor from front parallel link. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:

   Do not pull on wheel sensor harness.
3. Remove the fixing bolt and nut on the rear suspension member side of front parallel link.
4. Remove the fixing bolt, nut and washer on the axle housing side of front parallel link.
5. Remove front parallel link from vehicle.

INSPECTION AFTER REMOVAL

Check front parallel link and bushing for deformation, cracks, and other damage. Replace front parallel link if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:

  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing front parallel link. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .

REAR PARALLEL LINK

PFP:55121

Removal and Installation

AES000XK

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove the fixing bolt, nut and washer on the rear suspension member side of rear parallel link.
3. Remove the fixing bolt, nut and washer on the axle housing side of rear parallel link.
4. Remove rear parallel link from vehicle.

INSPECTION AFTER REMOVAL

Check rear parallel link and bushing for deformation, cracks, and other damage. Replace rear parallel link if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing rear parallel link. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .

RADIUS ROD

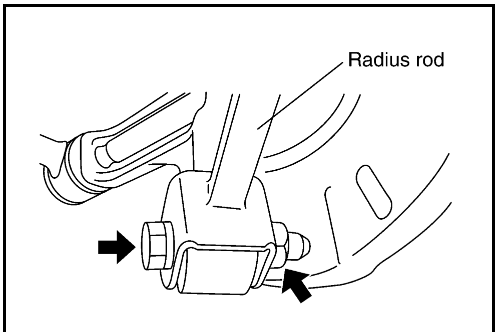
PFP:55110

Removal and Installation

AES000XL

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove the fixing bolt and nut on the vehicle side of radius rod.
3. Remove the fixing bolt and nut on the axle housing side of radius rod.
4. Remove radius rod from vehicle.



SDIA2514E

INSPECTION AFTER REMOVAL

Check radius rod and bushing for deformation, cracks, and other damage. Replace radius rod if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing radius rod. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .
- Adjust neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .

STABILIZER BAR

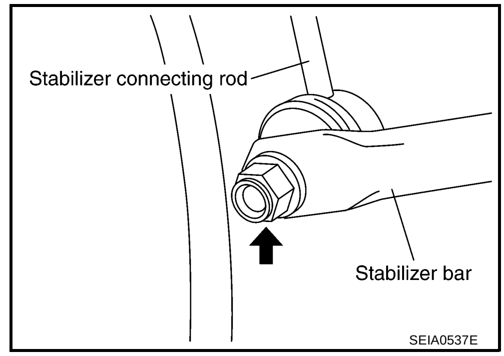
PFP:54611

Removal and Installation

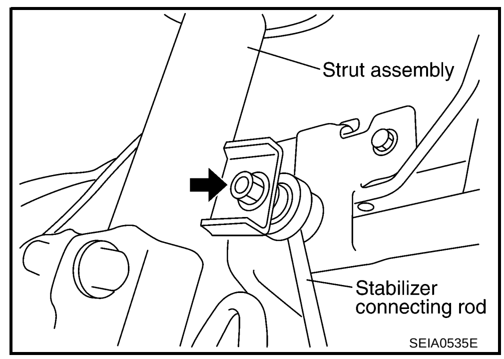
AES000XM

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove the mounting nut on the lower side of stabilizer connecting rod with power tool. Remove stabilizer connecting rod from stabilizer bar.



3. If necessary remove the mounting nut on the upper side of stabilizer connecting rod with a power tool. Remove stabilizer connecting rod from strut assembly.
4. Remove the mounting bolt and nut, and then remove stabilizer clamp and stabilizer bushing with a power tool.
5. Remove stabilizer bar from vehicle.



INSPECTION AFTER REMOVAL

Check stabilizer bar, stabilizer bushing, stabilizer clamp and stabilizer connecting rod for deformation, cracks, and damage. Replace if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:
  Do not reuse non-reusable parts.

REAR SUSPENSION MEMBER

PFP:55501

Removal and Installation

AES000XN

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove harness of wheel sensor from rear suspension member. Refer to BRC-36, "WHEEL SENSORS" .

   CAUTION:
   Do not pull on wheel sensor harness.
3. Remove torque member fixing bolts with a power tool. Hang torque member in a place where it will not interfere with work. Refer to BR-31, "REAR DISC BRAKE" .

   NOTE:
   Avoid depressing brake pedal while brake caliper is removed.
4. Remove disc rotor. Refer to BR-31, "REAR DISC BRAKE" .
5. Remove lock plate and brake hose from strut assembly. Refer to BR-11, "BRAKE PIPING AND HOSE" .
6. Remove main muffler and exhaust center tube. Refer to EX-2, "EXHAUST SYSTEM" .
7. Remove rear final drive (AWD models). Refer to RFD-14, "REAR FINAL DRIVE ASSEMBLY" .
8. Remove electric controlled coupling harness connector from rear suspension member (AWD models).
9. Remove stabilizer bar. Refer to RSU-16, "STABILIZER BAR" .
10. Set a jack under rear suspension member
11. Remove rear suspension member side mounting bolts, nuts and washers of parallel link (front and rear).
12. Remove parallel link (front and rear) from rear suspension member.
13. Remove rear suspension member mounting nuts, and then remove washers and stoppers.
14. Slowly lower jack to remove rear suspension member from vehicle.

INSPECTION AFTER REMOVAL

Check rear suspension member for deformation, cracks, or other damage. Replace if there are.

INSTALLATION

- Install in the reverse order of the removal. For tightening torque, refer to RSU-7, "Component" .

  NOTE:
  Do not reuse non-reusable parts.
- Perform the final tightening of each of parts, under unladen conditions, which were removed when removing rear suspension member. Check the wheel alignment. Refer to RSU-5, "Wheel Alignment Inspection" .
- Adjust the neutral position of steering angle sensor after checking the wheel alignment for model with VDC. Refer to BRC-43, "Adjustment of Steering Angle Sensor Neutral Position" .
- Check wheel sensor harness for proper connection. Refer to BRC-36, "WHEEL SENSORS" .

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

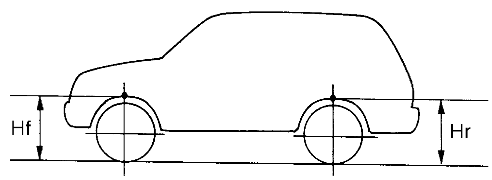
Wheel Alignment (Unladen)

AES000XO

Camber Degree minute (Decimal degree)		Minimum	– 1°25′ (– 1.42°)
		Nominal	– 0°40′ (– 0.67°)
		Maximum	0°05′ (0.08°)
Total Toe-in	Distance (A – B)	Minimum	0 mm (0 in)
		Nominal	1 mm (0.04 in)
		Maximum	2 mm (0.08 in)
	Angle (left plus right) Degree minute (degree)	Nominal	2′ (0.03°)

Wheelarch Height (Unladen*)

AES000XP



SFA746B

Applied model	2WD	AWD
Front (Hf)	774 mm (30.47 in)	773 mm (30.43 in)
Rear (Hr)	786 mm (30.94 in)	785 mm (30.91 in)

*: Fuel, engine coolant and engine oil full. Spare tire, jack, hand tools and mats are in designated positions.

SECTION SB
SEAT BELTS

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AHS000PQ

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Seat Belt Service

AHS000RE

CAUTION:

- **Before removing the seat belt pre-tensioner assembly, turn the ignition switch off, disconnect the both battery cables and wait at least 3 minutes.**
- **Do not use electrical test equipment for seat belt pre-tensioner connector.**
- **After replacing or reinstalling seat belt pre-tensioner assembly, or reconnecting front seat belt pre-tensioner connector, check the system function. Refer to SRS-13, "SRS Operation Check" .**
- **Do not use disassembled buckle or seat belt assembly.**
- **Replace anchor bolts if they are deformed or worn out.**
- **Never oil tongue and buckle.**
- **If any component of seat belt assembly is questionable, do not repair. Replace the whole seat belt assembly.**
- **If webbing is cut, frayed, or damaged, replace seat belt assembly.**
- **When replacing seat belt assembly, use a genuine NISSAN seat belt assembly.**

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attaching hardware after any collision.
NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pre-tensioner should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident. (i.e. torn webbing, bent retractor or guide).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

SEAT BELTS

PFP:86884

System Description

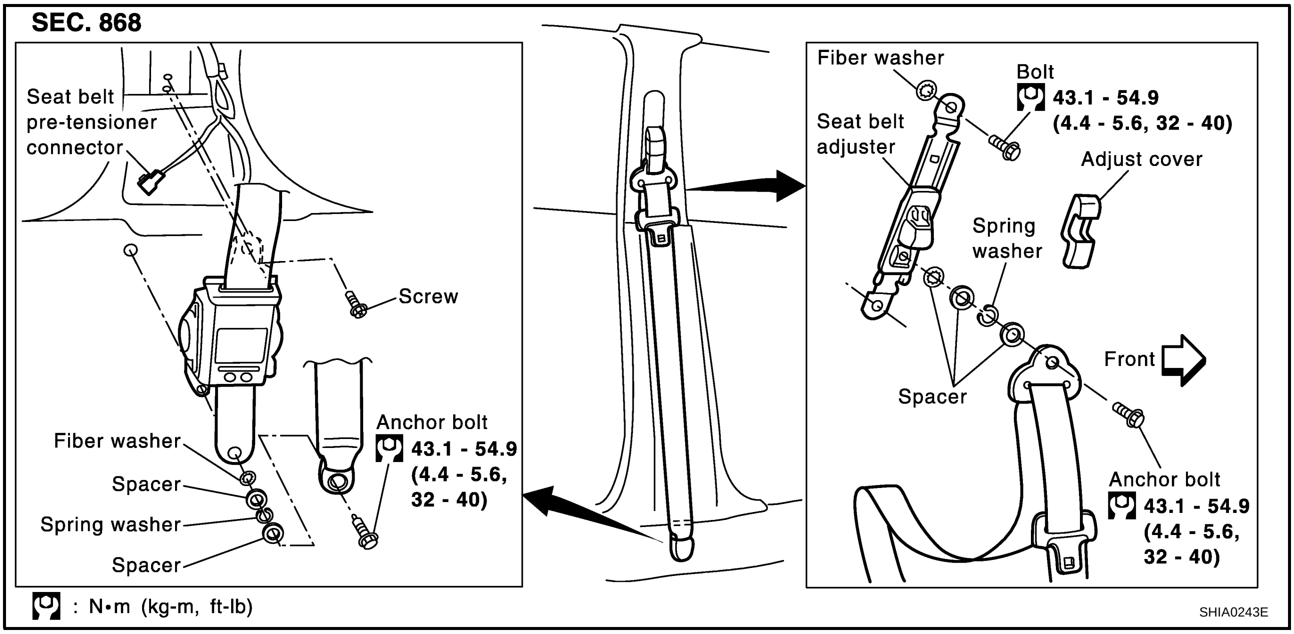
AHS000RF

SEAT BELT WARNING LAMP

- Fasten driver's seat belt.
- The seat belt warning lamp should go out.
- If the seat belt warning lamp does not go out. Refer to DI-26, "Wiring Diagram — WARN —" .

Removal and Installation of Front Seat Belt

AHS000RG



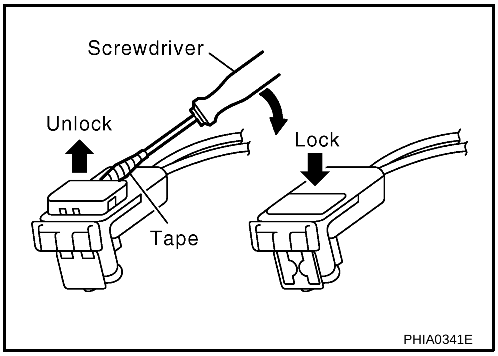
CAUTION:

Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.

REMOVAL OF SEAT BELT RETRACTOR

1. Remove adjust cover.
2. Remove shoulder anchor bolt.
3. Slide the floor anchor cover.
4. Remove floor anchor bolt.
5. Remove center pillar upper and lower garnish. Refer to EI-36, "Removal and Installation" .
6. Disconnect the seat belt pre-tensioner connector.

   CAUTION:
   - **For connecting/disconnecting seat belt pre-tensioner connector, insert thin screwdriver wrapped in tape into notch, lift lock and disconnect connector.**
   - **Connect connector with lock raised, and push lock into connector.**



7. Remove seat belt pre-tensioner retractor fixing screws to remove seat belt assembly.

INSTALLATION OF SEAT BELT RETRACTOR

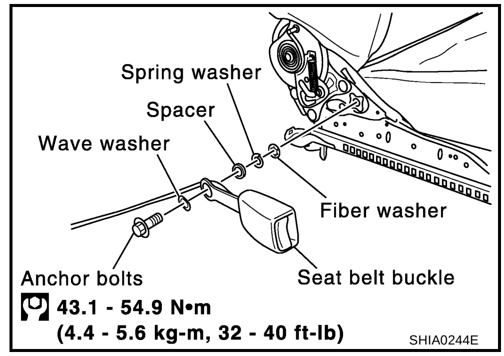
CAUTION:

Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.

Install in the reverse order of removal.

REMOVAL OF SEAT BELT BUCKLE

1. Remove front seat. Refer to SE-19, "REMOVAL" .
2. Remove screw, and remove seat cushion inner finisher. Refer to SE-17, "Component Parts Drawing" .
3. Remove anchor bolt to remove seat belt buckle.

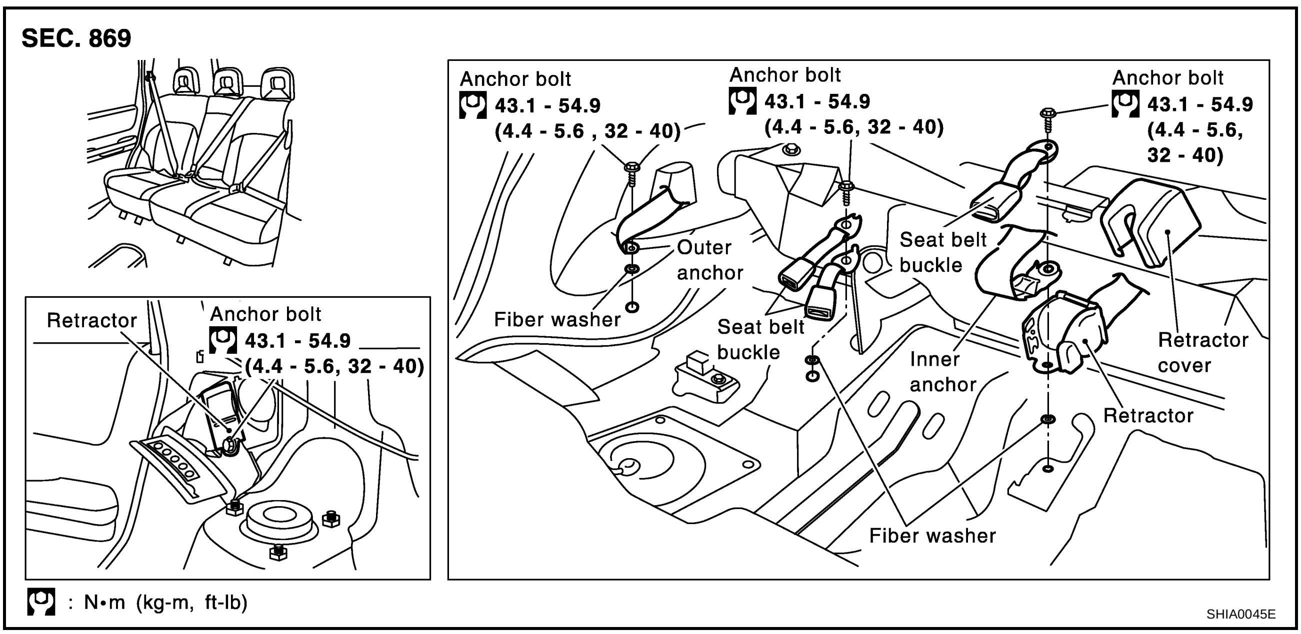


INSTALLATION OF SEAT BELT BUCKLE

Install in the reverse order of removal.

Removal and Installation of Rear Seat Belt

AHS000RH



REMOVAL OF LH/RH SEAT BELT

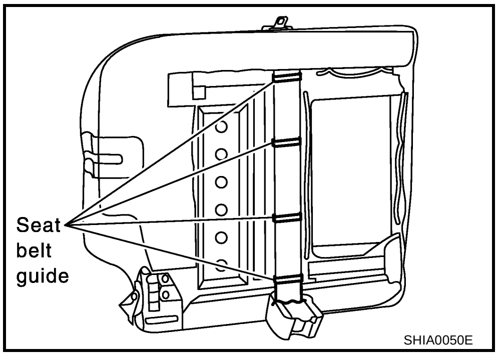
1. Fold rear seat cushion up.
2. Remove luggage side lower finisher. Refer to EI-36, "Removal and Installation" .
3. Remove outer and inner anchor bolts.
4. Remove rear seat belt retractor.

INSTALLATION OF LH/RH SEAT BELT

Install in the reverse order of removal.

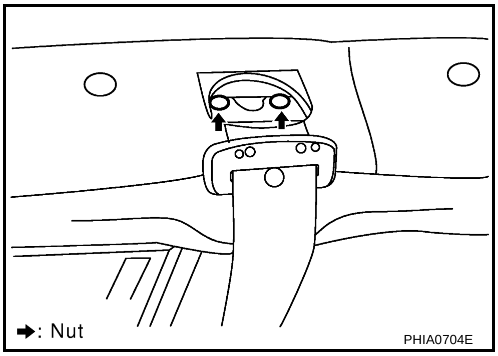
REMOVAL OF CENTER SEAT BELT

1. Fold rear seat cushion up.
2. Remove seat belt retractor cover.
3. Remove anchor bolts securing center seat belt retractor.
4. Remove rear seatback. Refer to SE-26, "SEATBACK" .
5. Remove rear seatback board.
6. Remove hog ring securing upper portion of rear seatback trim.
7. Remove rear seat belt guide.



8. Remove nuts securing rear seat belt.

   : 9.6 N·m (0.98 kg-m, 85 in-lb)



9. Remove rear center seat belt assembly from rear seatback.

INSTALLATION OF CENTER SEAT BELT

Install in the reverse order of removal.

Seat Belt Inspection

AHS000RI

AFTER A COLLISION

WARNING:

Inspect all seat belt assemblies including retractors and attaching hardware after any collision. NISSAN recommends that all seat belt assemblies in use during a collision be replaced unless the collision was minor and the belts show no damage and continue to operate properly. Failure to do so could result in serious personal injury in an accident. Seat belt assemblies not in use during a collision should also be replaced if either damage or improper operation is noted. Seat belt pre-tensioned should be replaced even if the seat belts are not in use during a frontal collision in which the air bags are deployed.

Replace any seat belt assembly (including anchor bolts) if:

- The seat belt was in use at the time of a collision (except for minor collisions and the belts, retractors and buckles show no damage and continue to operate properly).
- The seat belt was damaged in an accident (i.e. torn webbing, bent retractor or guide, etc).
- The seat belt attaching point was damaged in an accident. Inspect the seat belt attaching area for damage or distortion and repair as necessary before installing a new seat belt assembly.
- Anchor bolts are deformed or worn out.
- The seat belt pre-tensioner should be replaced even if the seat belts are not in use during the collision in which the air bags are deployed.

PRELIMINARY CHECKS

1. Check the seat belt warning lamp/chime for proper operation as follows:

a. Switch ignition ON. The seat belt warning lamp should illuminate. Also, the seat belt warning chime should sound for about seven seconds.

b. Fasten driver's seat belt. The seat belt warning lamp should go out and the chime (if sounding) should stop.

2. If the air bag warning lamp is blinking, conduct self-diagnosis using CONSULT-II, and air bag warning lamp. Refer to SRS-13, "SRS Operation Check" .

3. Check that the seat belt retractor, seat belt anchor and buckle bolts are securely attached.

4. Check the shoulder seat belt guide and shoulder belt height adjuster for front seats. Ensure guide swivels freely and that webbing lays flat and does not bind in guide. Ensure height adjuster operates properly and holds securely.

5. Check retractor operation:

a. Fully extend the seat belt webbing and check for twists, tears or other damage.

b. Allow the seat belt to retract. Ensure that webbing returns smoothly and completely into the retractor. If the seat belt does not return smoothly, wipe the inside of the loops with a clean paper cloth. Because dirt built up in the loops of the upper anchors can cause the seat belts to retract slowly.

c. Fasten the seat belt. Check the seat belt returns smoothly and completely to the retractor. If the webbing does not return smoothly, the cause may be an accumulation of dust or dirt. Use the “SEAT BELT TAPE SET” and perform the following steps.

Inspect the front seat belt though-anchor

1. Pull the seat belt out to a length of 500 mm (19.69 in) or more.
2. Use a clip or other device to the fix the seat belt at the center pillar webbing opening.
3. Pass a thin wire though the though-anchor webbing opening. Hold both ends of the wire and pull taut while moving it up and down several times along the webbing opening surface to move matter stuck there.
4. Any dirt that can not be removed with the wire can be removed by cleaning the opening with a clean cloth.
5. Apply tape at the point where the webbing contacts the though-anchor webbing opening.

   NOTE:

   Apply the tape so that there is no looseness or wrinkling.
6. Remove the clip fixing the seat belt and check that the webbing returns smoothly.

6. Repeat steps above as necessary to check the other seat belts.

SEAT BELT RETRACTOR ON-VEHICLE CHECK

Emergency Locking Retractors (ELR) and Automatic Locking Retractors (ALR)

NOTE:

All seat belt retractors are of the Emergency Locking Retractors (ELR) type. In an emergency (sudden stop) the retractor will lock and prevent the webbing from extending any further. All 3-point type seat belt retractors except the driver's seat belt also have an Automatic Locking Retractors (ALR) mode. The ALR mode (also called child restraint mode) is used when installing child seats. The ALR mode is activated when the seat belt is fully extended. When the webbing is then retracted partially, the ALR mode automatically locks the seat belt in a specific position so the webbing cannot be extended any further. To cancel the ALR mode, allow the seat belt to fully wind back into the retractor.

Check the seat belt retractors using the following test(s) to determine if a retractor assembly is operating properly.

ELR Function Stationary Check

Grasp the shoulder webbing and pull forward quickly. The retractor should lock and prevent the belt from extending further.

ALR Function Stationary Check

1. Pull out entire length of seat belt from retractor until a click is heard.
2. Retract the webbing partially. A clicking noise should be heard as the webbing retracts indicating that the retractor is in the Automatic Locking Retractors (ALR) mode.
3. Grasp the seat belt and try to pull out the retractor. The webbing must lock and not extend any further. If NG, replace the retractor assembly.
4. Allow the entire length of the webbing to retract to cancel the automatic locking mode.

ELR Function Moving Check

WARNING:

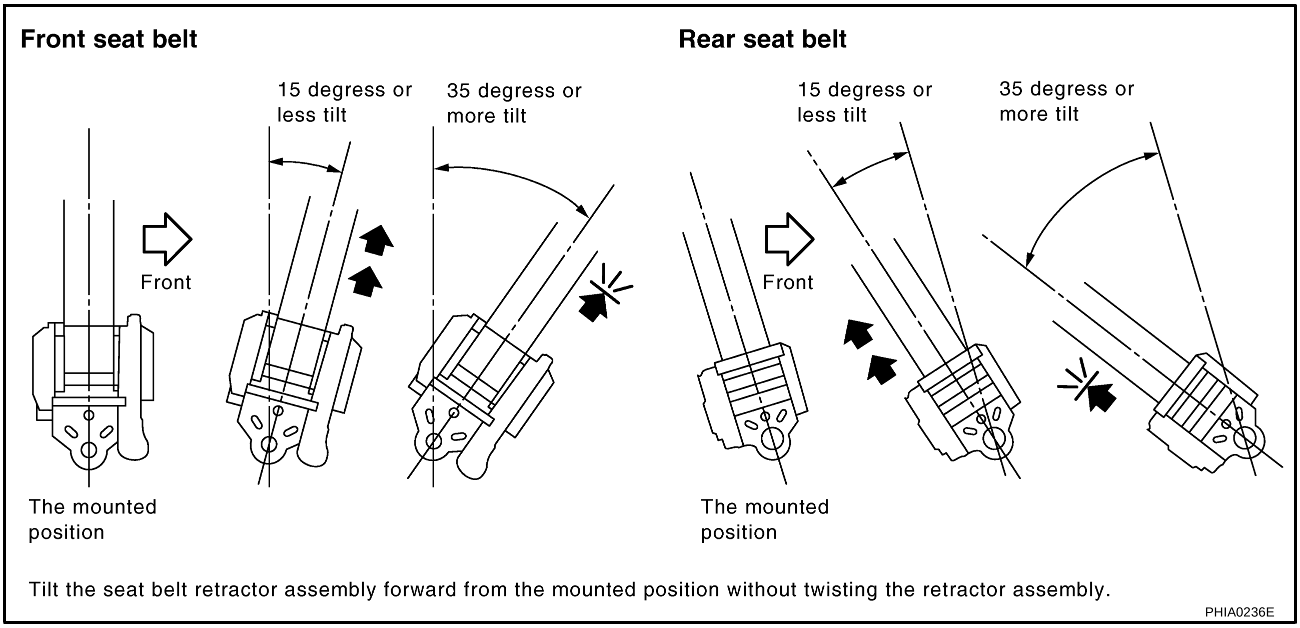
Perform the following test in a safe, open area clear of other vehicles and obstructions (for example, a large, empty parking lot). Road surface must be paved and dry. DO NOT perform the following test on wet or gravel roads or on public streets and highways. This could result in an accident and serious personal injury. The driver and passenger must be prepared to brace themselves in the event the retractor does not lock.

1. Fasten driver's seat belt. Buckle a passenger into the seat for the belt that is to be tested.
2. Proceed to the designated safe area.
3. Drive the vehicle at approximately 16 km/h (10 MPH). Notify any passengers of a pending sudden stop and the driver and passenger must be prepared to brace themselves in the event the retractor does not lock, apply brakes firmly and make a very hard stop.

During stop, seat belts should lock and not be extended. If the seat belt retractor assembly does not lock, perform the retractor off-vehicle check.

SEAT BELT RETRACTOR OFF-VEHICLE CHECK

1. Remove the seat belt retractor assembly.
2. Slowly pull out webbing while tilting the retractor assembly forward from the mounted position without twisting the retractor assembly as shown in the illustration.



15 degrees or less tilt : Webbing can be pulled out.

35 degrees or more tilt : Webbing locks and cannot be pulled out.

If NG, replace the retractor assembly.

TOP TETHER STRAP CHILD RESTRAINT

PFP:88000

Removal and Installation

AHS000RJ

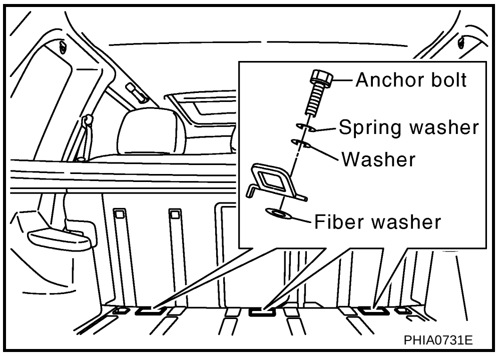
CAUTION:

Replace anchor bolts if they are deformed or worn out.

REMOVAL

1. Remove the luggage floor board (front). Refer to EI-36, "Removal and Installation" .
2. Remove the top tether strap child restraint.

   :24.0 N·m (2.4 kg-m, 18 ft-lb)



INSTALLATION

Install in the reverse order of removal.

SECTION SC

STARTING & CHARGING SYSTEM

CONTENTS

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AKS00B6K

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Wiring Diagrams and Trouble Diagnosis

AKS00B6L

When reading wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-2, "POWER SUPPLY ROUTING" for power distribution circuit in PG section

When performing trouble diagnosis, refer to the following:

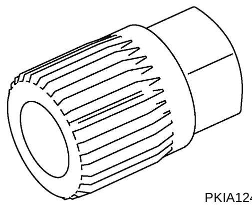
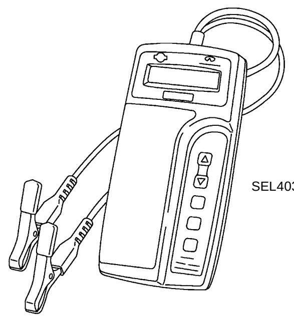
- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

PREPARATION

PFP:00002

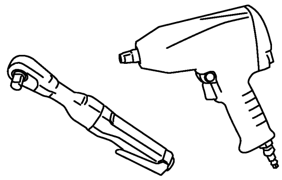
Special Service Tools

AKS00B6M

Tool number (Kent-Moore No.) Tool name		Description
KV10118200 (—) Alternator pulley adapter	 PKIA1241E	Removing alternator pulley
— (J-44373 Model 620) Battery/Starting/Charging system tester	 SEL403X	

Commercial Service Tools

AKS00BHE

Tool number Tool name		Description
Power tool	 PBIC0190E	Loosening bolts and nuts

BATTERY

PFP:00011

How to Handle Battery

AKS00BHF

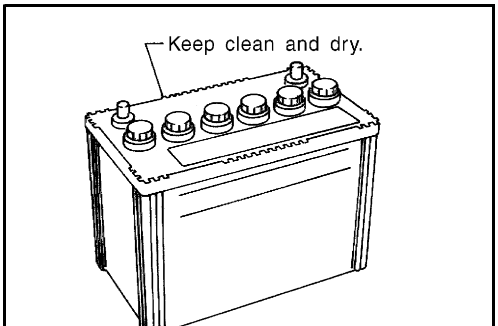
CAUTION:

- **If it becomes necessary to start the engine with a booster battery and jumper cables, use a 12-volt booster battery.**
- **After connecting battery cables, ensure that they are tightly clamped to battery terminals for good contact.**

METHODS OF PREVENTING OVER-DISCHARGE

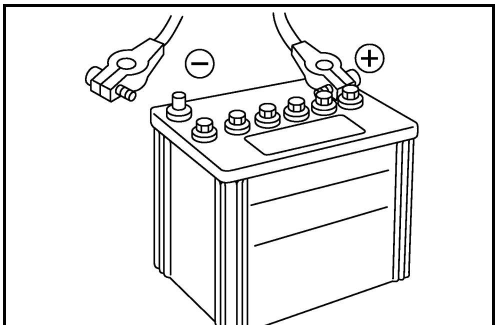
The following precautions must be taken to prevent over-discharging a battery.

- The battery surface (particularly its top) should always be kept clean and dry.
- The terminal connections should be clean and tight.
- At every routine maintenance, check the electrolyte level.
  This also applies to batteries designated as “low maintenance” and “maintenance-free”.



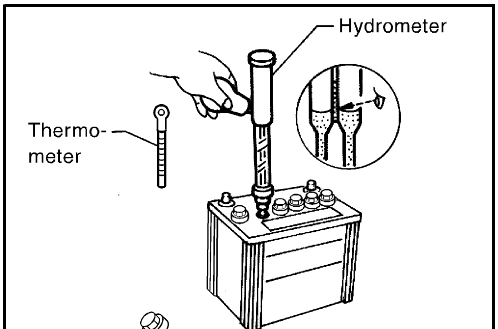
MEL040F

- When the vehicle is not going to be used over a long period of time, disconnect battery cable at negative terminal.



ELA0349D

- Check the charge condition of the battery.
  Periodically check the specific gravity of the electrolyte. Keep a close check on charge condition to prevent over-discharge.



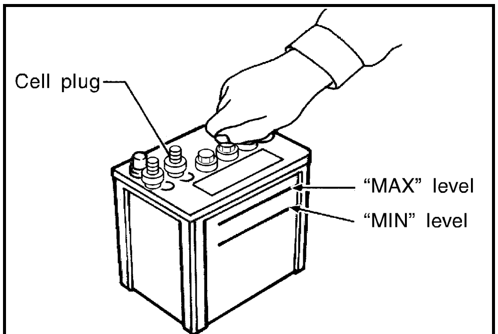
MEL042F

CHECKING ELECTROLYTE LEVEL

WARNING:

Do not allow battery fluid to come in contact with skin, eyes, fabrics, or painted surfaces. After touching a battery, do not touch or rub your eyes until you have thoroughly washed your hands. If acid contacts eyes, skin or clothing, immediately flush with water for 15 minutes and seek medical attention.

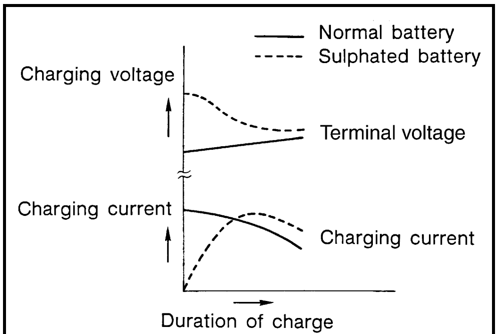
- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



MEL043F

Sulphation

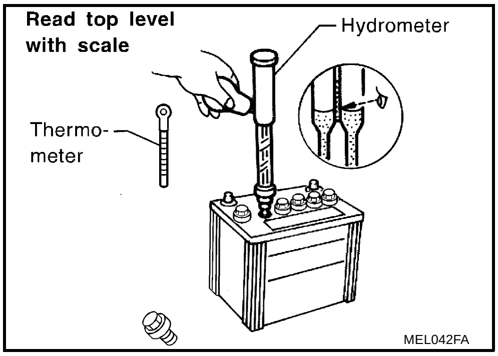
A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.
To determine if a battery has been "sulphated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.
A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.



PKIA2353E

SPECIFIC GRAVITY CHECK

1. Read hydrometer and thermometer indications at eye level.
2. Use the chart below to correct your hydrometer reading according to electrolyte temperature.



MEL042FA

Hydrometer Temperature Correction

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
71 (160)	0.032
66 (150)	0.028
60 (140)	0.024
54 (130)	0.020
49 (120)	0.016
43 (110)	0.012
38 (100)	0.008
32 (90)	0.004
27 (80)	0
21 (70)	–0.004

Battery electrolyte temperature °C (°F)	Add to specific gravity reading
16 (60)	–0.008
10 (50)	–0.012
4 (40)	–0.016
–1 (30)	–0.020
–7 (20)	–0.024
–12 (10)	–0.028
–18 (0)	–0.032

Corrected specific gravity	Approximate charge condition
1.260 - 1.280	Fully charged
1.230 - 1.250	3/4 charged
1.200 - 1.220	1/2 charged
1.170 - 1.190	1/4 charged
1.140 - 1.160	Almost discharged
1.110 - 1.130	Completely discharged

CHARGING THE BATTERY

CAUTION:

- **Do not “quick charge” a fully discharged battery.**
- **Keep the battery away from open flame while it is being charged.**
- **When connecting the charger, connect the leads first, then turn on the charger. Do not turn on the charger first, as this may cause a spark.**
- **If battery electrolyte temperature rises above 55 °C (131 °F), stop charging. Always charge battery at a temperature below 55 °C (131 °F).**

Charging Rates

Amps	Time
50	1 hour
25	2 hours
10	5 hours
5	10 hours

Do not charge at more than 50 ampere rate.

NOTE:

The ammeter reading on your battery charger will automatically decrease as the battery charges. This indicates that the voltage of the battery is increasing normally as the state of charge improves. The charging amps indicated above refer to initial charge rate.

- If, after charging, the specific gravity of any two cells varies more than 0.050, the battery should be replaced.

Trouble Diagnoses with Battery/Starting/Charging System Tester

AKS00BHG

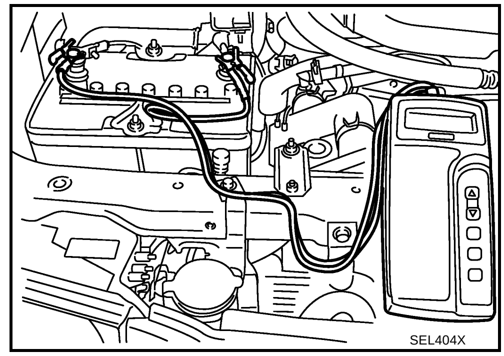
CAUTION:

When working with batteries, always wear appropriate eye protection.

NOTE:

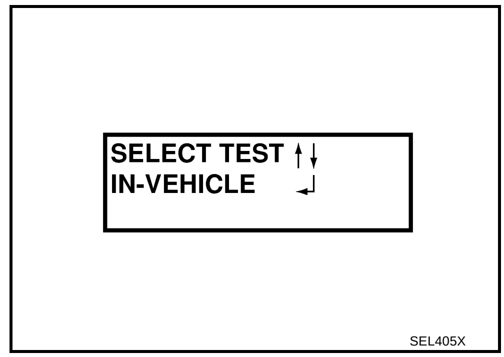
- To ensure a complete and thorough diagnosis, the battery, starter and generator test segments must be done as a set from start to finish.
- If battery surface charge is detected while testing, the tester will prompt you to turn on the headlamps to remove the surface charge.
- If necessary, the tester will prompt you to determine if the battery temperature is above or below 0 °C (32 °F). Choose the appropriate selection by pressing the up or down arrow button, then press “ENTER” to make the selection.

1. Turn off all loads on the vehicle electrical system. Clean or repair as necessary.


SEL404X

2. Visually inspect the battery, battery terminals and cable ends with ignition switch in “OFF” position.

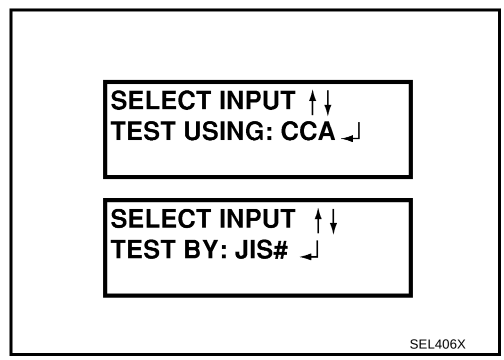
   NOTE:
   The contact surface between the battery terminals, cable ends and tester leads must be clean for a valid test. A poor connection will prevent testing and a “CHECK CONNECTION” message will appear during the test procedures. If this occurs, clean the battery terminals, reconnect them and restart the test.
3. Connect the red tester lead clamp to the positive battery terminal, and the black to the negative battery terminal.
4. The tester will turn on automatically. Using the arrow keys, select “IN-VEHICLE” on the tester and then press the “ENTER” key.



SEL405X

5. Locate the battery type and rating stamped or written on the top case of the battery to be tested.

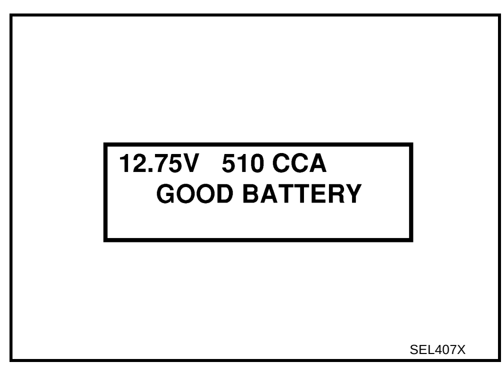
   NOTE:
   The battery type and rating will have either of the following.
   CCA: Cold Cranking Amps (490 CCA, 550 CCA, etc.)
   JIS: Japanese Industrial Standard.
   Battery is stamped with a number such as:
   80D26L: 80 (rank of output), D (physical size-depth), 26 (width in cm). The last character L (post configuration) is not input into the tester.
   The tester requires the rating for the battery be entered exactly as it is written or stamped on the battery. Do not attempt a CCA conversion for JIS stamped batteries. JIS must be input directly.



SEL406X

6. Using the arrow and “ENTER” keys alternately, select the battery type and rating.

   NOTE:
   The tester lists five choices; CCA, JIS, IEC, DIN, and EN. Only use CCA or JIS.
7. Press “ENTER” to begin the test. Diagnosis results are displayed on the tester. Refer to SC-8, "DIAGNOSTIC RESULT ITEM CHART" .

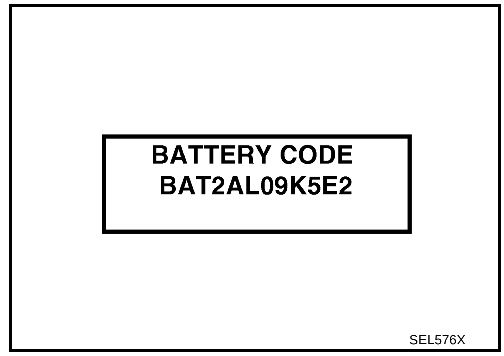


SEL407X

8. Press “ENTER”, then test output code is displayed. Record the test output code on the repair order.
9. Toggle back to the “DIAGNOSTIC SCREEN” for test results.

NOTE:

- If necessary, the tester will ask the user to determine if the battery has just been charged. Choose the appropriate selection by pressing the up or down arrow button and then press the “ENTER” button to make the selection.
- When testing a battery installed in a vehicle that has recently been driven, select “BEFORE CHARGE”.
- If the battery has just been slow charged due to a “CHARGE & RETEST” decision by the tester, and the tester asks the user “BEFORE CHARGE/AFTER CHARGE”, select “AFTER CHARGE”.



SEL576X

DIAGNOSTIC RESULT ITEM CHART

Diagnostic item	Service procedure
GOOD BATTERY	Battery is OK, go to “Trouble Diagnoses”, “STARTING SYSTEM”. Refer to SC-12, "Trouble Diagnoses with Battery/Starting/Charging System Tester" .
REPLACE BATTERY	Replace battery. Before replacing battery, clean the battery cable clamps and battery terminals. Perform battery test again with Battery/Starting/Charging system tester. If second test result is “Replace Battery”, then do so. Perform battery test again to confirm repair.
BAD CELL-REPLACE	Replace the battery. Perform battery test again with Battery/Starting/Charging system tester to confirm repair.
GOOD-RECHARGE	Perform the slow battery charging procedure. (Initial rate of charge is 10 A for 12 hours.)
CHARGE & RETEST	Perform the slow battery charging. (Initial rate of charge is 10 A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester to confirm repair. **NOTE:** **If the tester asks the user “BEFORE CHARGE/AFTER CHARGE”, select “AFTER CHARGE”.**

Removal and Installation

AKS00B6P

Observe the following to ensure proper servicing.

CAUTION:

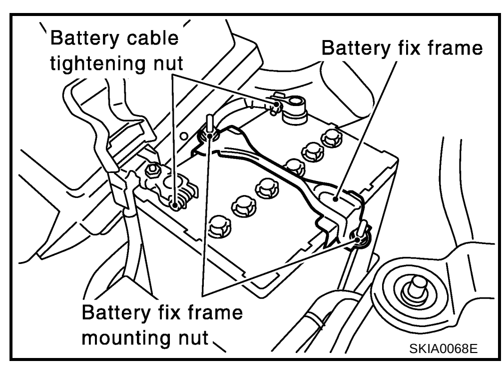
- **When removing, disconnect battery cable at negative terminal first. But for installation, connect battery cable to positive terminal first.**
- **Tighten parts to the specified torque shown below.**

Battery fix frame mounting nut:

: 4.4 N·m (0.45 kg-m, 39 in-lb)

Battery cable tightening nut:

: 4.0 N·m (0.41 kg-m, 35 in-lb)



SKIA0068E

STARTING SYSTEM

PFP:00011

System Description

AKS00B6Z

M/T MODELS

Power is supplied at all times

- through 30A fusible link (letter J, located in the fuse and fusible link box)
- to ignition switch terminal 1.

With the ignition switch in the START position, power is supplied

- from ignition switch terminal 5
- to park/neutral position relay terminal 5.

With the ignition switch in the ON or START position, power is supplied

- through 10A fuse [No,13 located in the fuse block (J/B)]
- to park/neutral position relay terminal 1.

With the clutch interlock switch is depressed, ground is supplied

- to park/neutral position relay terminal 2
- through clutch interlock switch terminals 1 and 2, and
- through grounds M27 and M70.

Then park/neutral position relay is energized and power is supplied

- from park/neutral position relay terminal 3
- to starter motor harness connector terminal 1.

The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to engine block. With power and ground supplied, cranking occurs and the engine starts.

A/T MODELS

Power is supplied at all times

- through 30 A fusible link (letter J, located in fuse and fusible link box)
- to ignition switch terminal 1.

With the ignition switch in the START position, power is supplied

- from ignition switch terminal 5
- to park/neutral position relay terminal 5.

With the ignition switch in the ON or START position, power is supplied

- through 10 A fuse [No,13 located in the fuse block (J/B)]
- to park/neutral position relay terminal 1.

With the selector lever in the P or N position, ground is supplied

- to park/neutral position relay terminal 2
- through park/neutral position switch terminals 1 and 2, and
- through grounds F9 and F10.

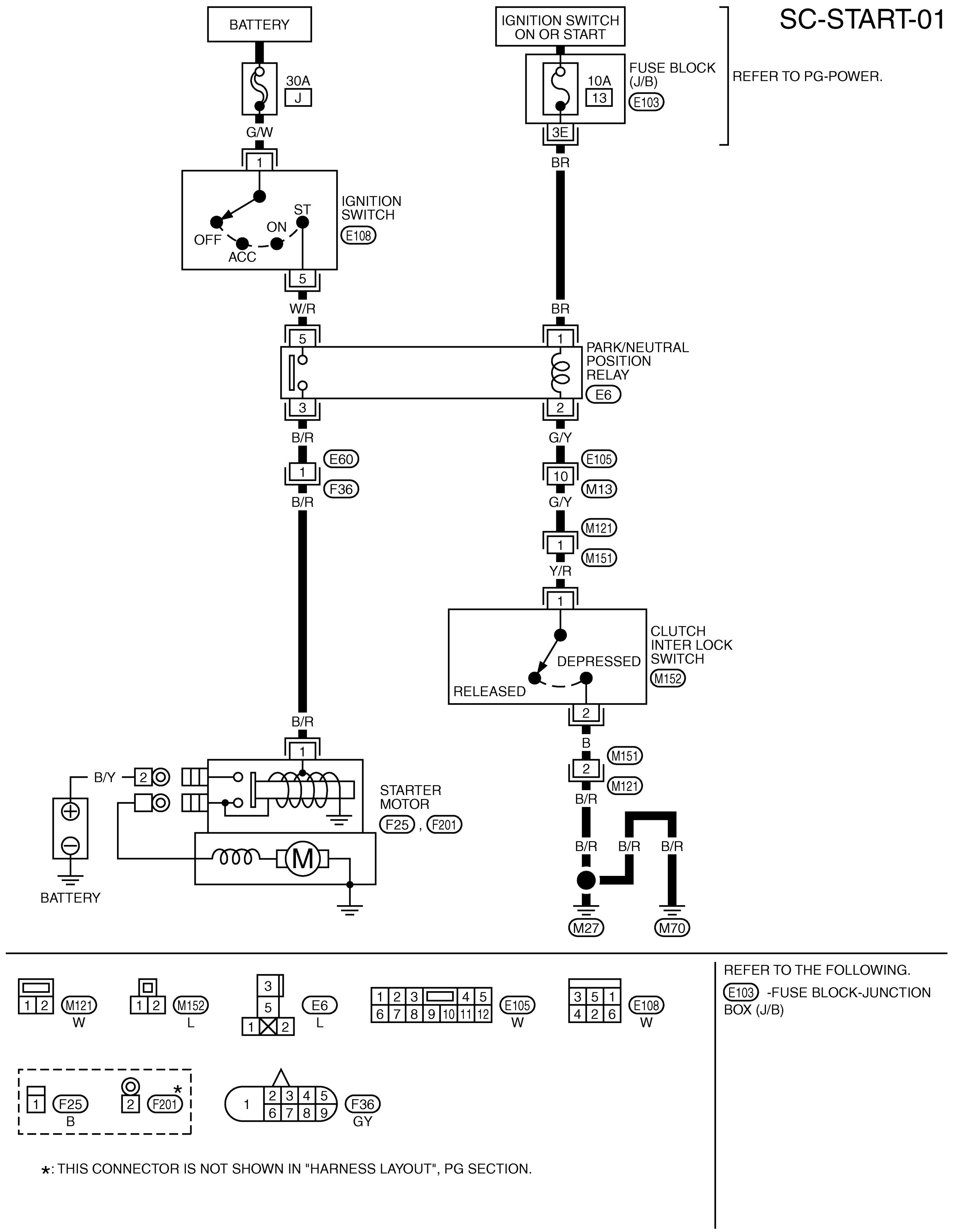
Then park/neutral position relay is energized and power is supplied

- from park/neutral position relay terminal 3
- to starter motor harness connector terminal 1.

The starter motor plunger closes and provides a closed circuit between the battery and starter motor. The starter motor is grounded to engine block. With power and ground supplied, cranking occurs and the engine starts.

Wiring Diagram — START — / M/T Models

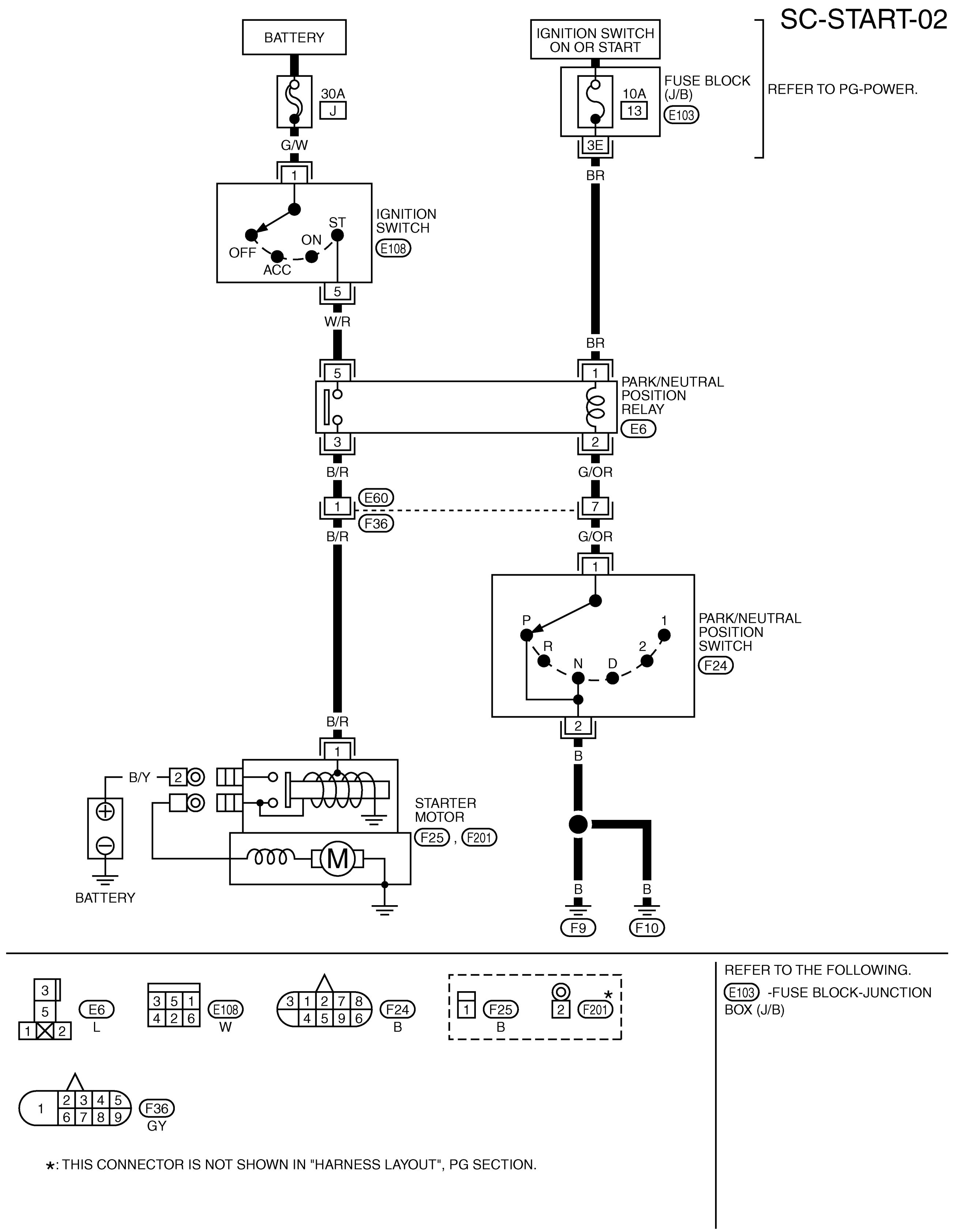
AKS00B70



TKWB0147E

Wiring Diagram — START — / A/T Models

AKS00B71



TKWB0148E

A
B
C
D
E
F
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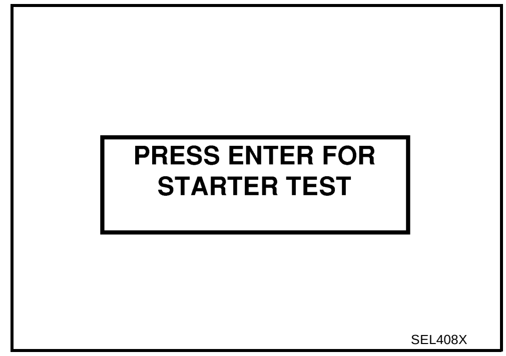
H
I
J
SC
L
M

Trouble Diagnoses with Battery/Starting/Charging System Tester

AKS00BHH

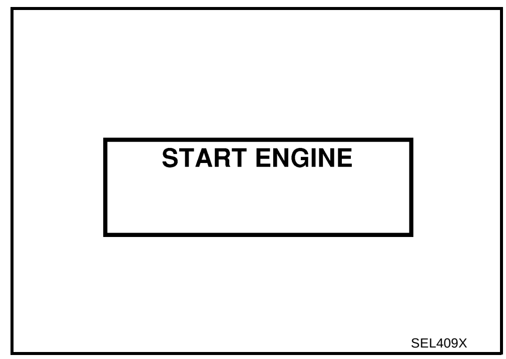
NOTE:
To ensure a complete and thorough diagnosis, battery, starter and generator test segments must be done as a set from start to finish.

1. Turn off all loads on the vehicle electrical system.
2. Perform battery test with Battery/Starting/Charging system tester. Refer to SC-6, "Trouble Diagnoses with Battery/Starting/Charging System Tester" .
3. Press “ENTER” to begin the starting system test.



SEL408X

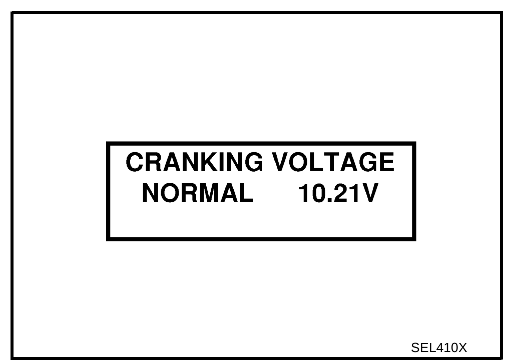
4. Start the engine.



SEL409X

5. Diagnosis result is displayed on the tester. Refer to SC-12, "DIAGNOSTIC RESULT ITEM CHART" .

   NOTE:
   - If starter performs normally but the engine does not start, perform engine diagnosis.
   - For intermittent “NO CRANK” or “NO STARTER OPERATION” incidents, refer to SC-15, "DIAGNOSTIC PROCEDURE 2" .

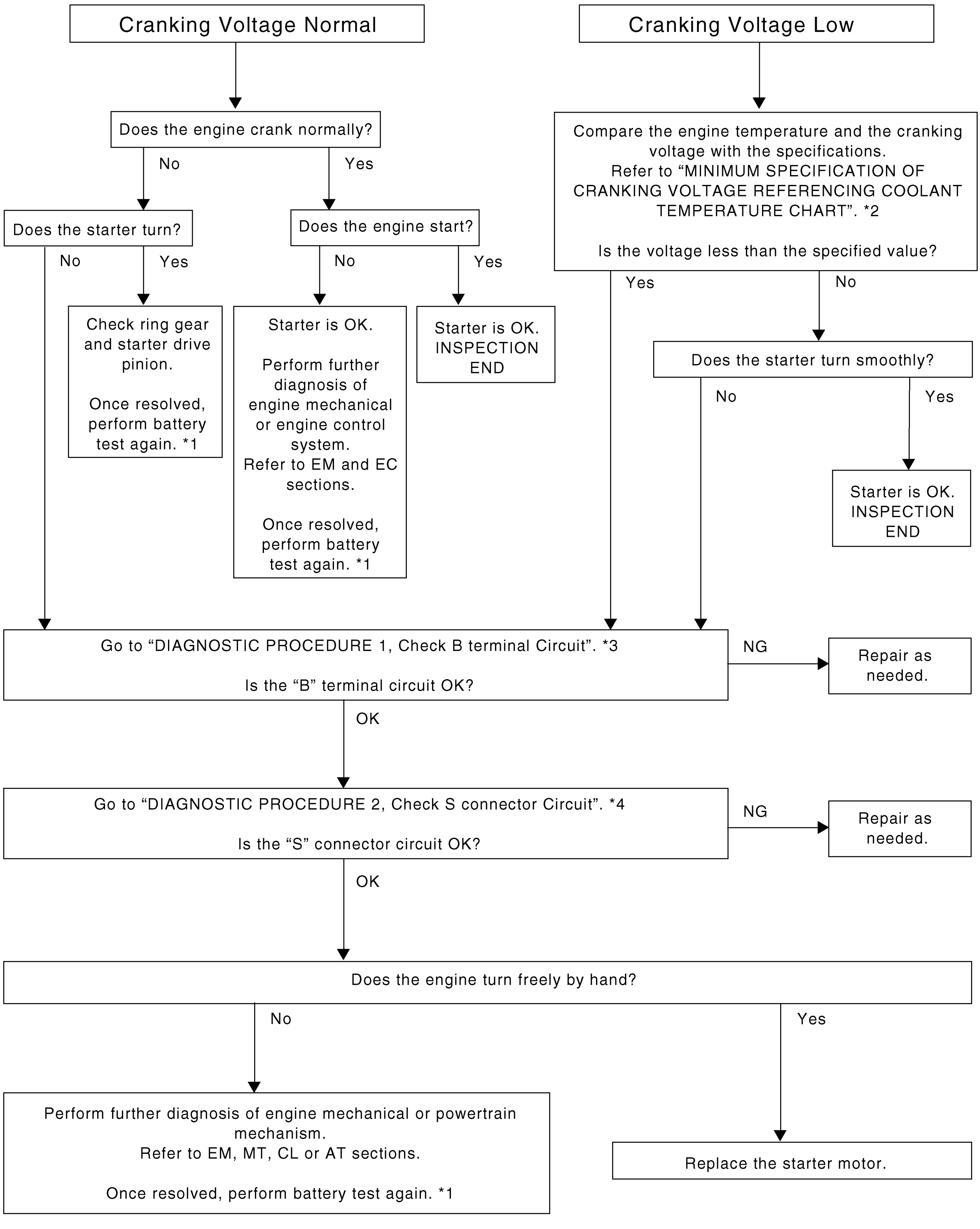


SEL410X

DIAGNOSTIC RESULT ITEM CHART

Diagnostic item	Service procedure
CRANKING VOLTAGE NORMAL	Go to SC-13, "WORK FLOW" .
CRANKING VOLTAGE LOW	
CHARGE BATTERY	Perform the slow battery charging procedure. (Initial rate of charge is 10 A for 12 hours.) Perform battery test again with Battery/Starting/Charging system tester. Refer to SC-6, "Trouble Diagnoses with Battery/Starting/Charging System Tester" .
REPLACE BATTERY	Before replacing battery, clean the battery cable clamps and battery posts. Perform battery test again with Battery/Starting/Charging system tester. Refer to SC-6, "Trouble Diagnoses with Battery/Starting/Charging System Tester" . If second test result is “REPLACE BATTERY”, then do so. Perform battery test again to confirm repair.

WORK FLOW



*1 SC-12, "Trouble Diagnoses with Battery/Starting/Charging System Tester"

*2 SC-15, "MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE"

*3 SC-14, "Check “B” Terminal Circuit"

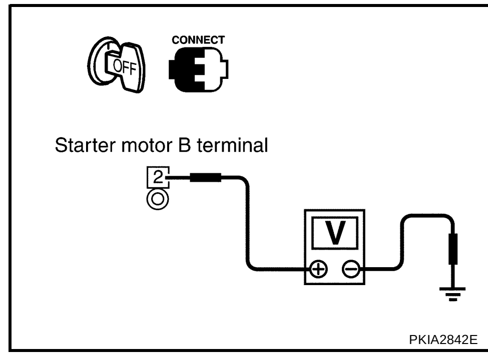
*4 SC-15, "Check “S” Connector Circuit"

DIAGNOSTIC PROCEDURE 1

Check “B” Terminal Circuit

1. CHECK POWER SUPPLY FOR STARTER MOTOR “B” TERMINAL

1. Remove fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn ignition switch OFF.
4. Make sure that starter motor B terminal F201 terminal 2 (B/Y) connection is clean and tight.
5. Check voltage between starter motor B terminal F201 terminal 2 (B/Y) and ground using a digital circuit tester.



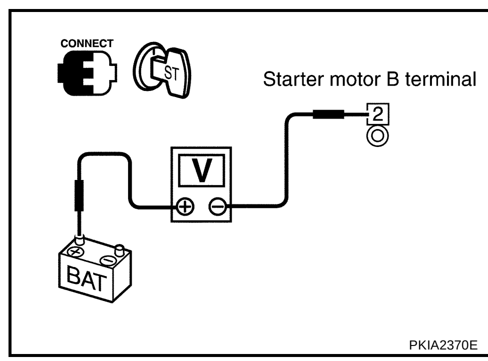
2 (B/Y) – Ground : Battery voltage

OK or NG

OK >> GO TO 2.
NG >> Check harness between battery and starter motor for open circuit.

2. CHECK BATTERY CABLE CONNECTION (VOLTAGE DROP TEST)

1. Shift A/T selector lever to “P” or “N” position. (A/T models)
   Keep depressing clutch pedal fully. (M/T models)
2. Check voltage between starter motor B terminal F201 terminal 2 (B/Y) and battery positive terminal using a digital circuit tester.



2 (B/Y) – Battery positive terminal

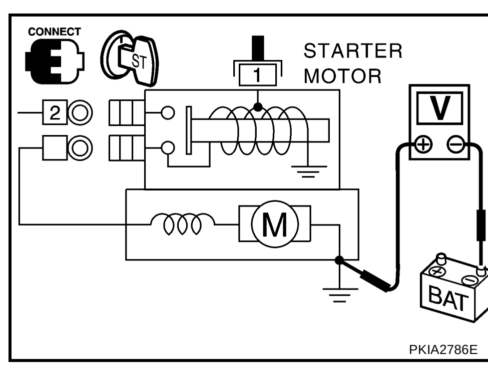
When ignition switch is in START position : Less than 0.5 V

OK or NG

OK >> GO TO 3.
NG >> Check harness between battery and starter motor for poor continuity.

3. CHECK STARTER MOTOR GROUND CIRCUIT (VOLTAGE DROP TEST)

1. Shift A/T selector lever to “P” or “N” position. (A/T models)
   Keep depressing clutch pedal fully. (M/T models)
2. Check voltage between starter motor case and battery negative terminal using a digital circuit tester.



Starter motor case – Battery negative terminal

When ignition switch is in START position : Less than 0.2 V

OK or NG

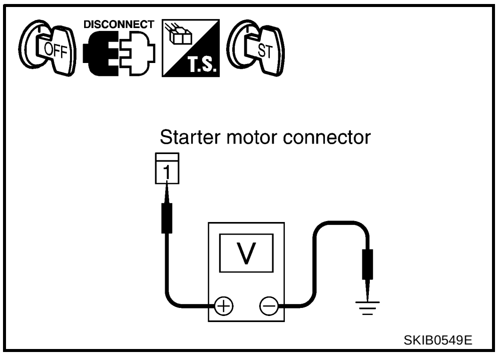
OK >> Starter motor “B” terminal circuit is OK. Further inspection necessary. Refer to SC-13, "WORK FLOW" .
NG >> Check starter motor case and ground for poor continuity.

DIAGNOSTIC PROCEDURE 2

Check “S” Connector Circuit

1. CHECK POWER SUPPLY FOR STARTER MOTOR “S” TERMINAL

1. Remove fuel pump fuse.
2. Crank or start the engine (where possible) until the fuel pressure is released.
3. Turn ignition switch OFF.
4. Disconnect starter motor “S” connector.
5. Shift A/T selector lever to “P” or “N” position. (A/T models)
   Keep depressing clutch pedal fully. (M/T models)
6. Check voltage between starter motor harness connector F25 terminal 1 (B/R) and ground using a digital circuit tester.



1 (B/R) – Ground

When ignition switch is in START position : Battery voltage

OK or NG

OK >> Starter motor “S” connector circuit is OK. Further inspection necessary. Refer to SC-13, "WORK FLOW" .

NG >> Check the following.
- 30 A fusible link (letter J , located in fuse and fusible link block)
- Ignition switch
- Park/neutral position relay
- Harness for open or short

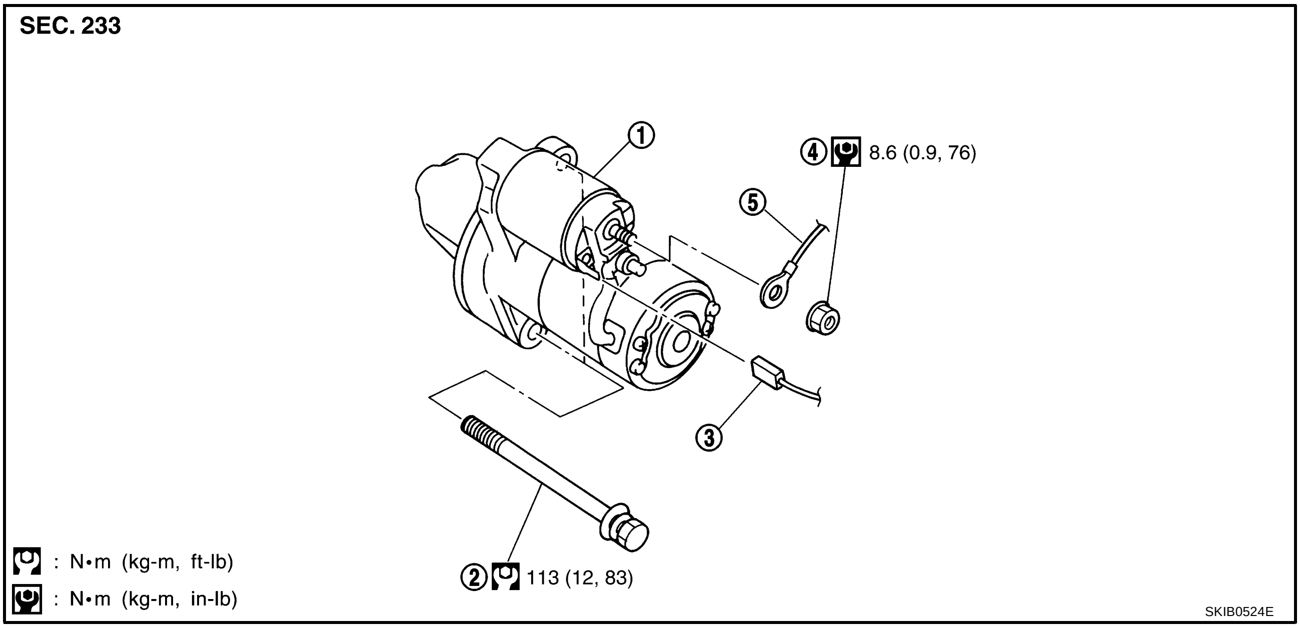
MINIMUM SPECIFICATION OF CRANKING VOLTAGE REFERENCING COOLANT TEMPERATURE

Engine coolant temperature	Voltage [V]
–30 °C to –20 °C (–22 °F to –4 °F)	8.4
–19 °C to –10 °C (–2 °F to 14 °F)	8.9
–9 °C to 0 °C (16 °F to 32 °F)	9.3
1 °C and higher (34 °F and higher)	9.7

Removal and Installation

AKS00B73

M/T MODELS



1. Starter motor assembly
2. Starter motor mounting bolt
3. S connector
4. B terminal nut
5. B terminal

Removal

1. Disconnect battery cable at negative terminal.
2. Remove air duct. Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
3. Disconnect “S” connector and “B” terminal from starter motor.
4. Remove starter motor mounting bolts.
5. Remove starter motor upward.

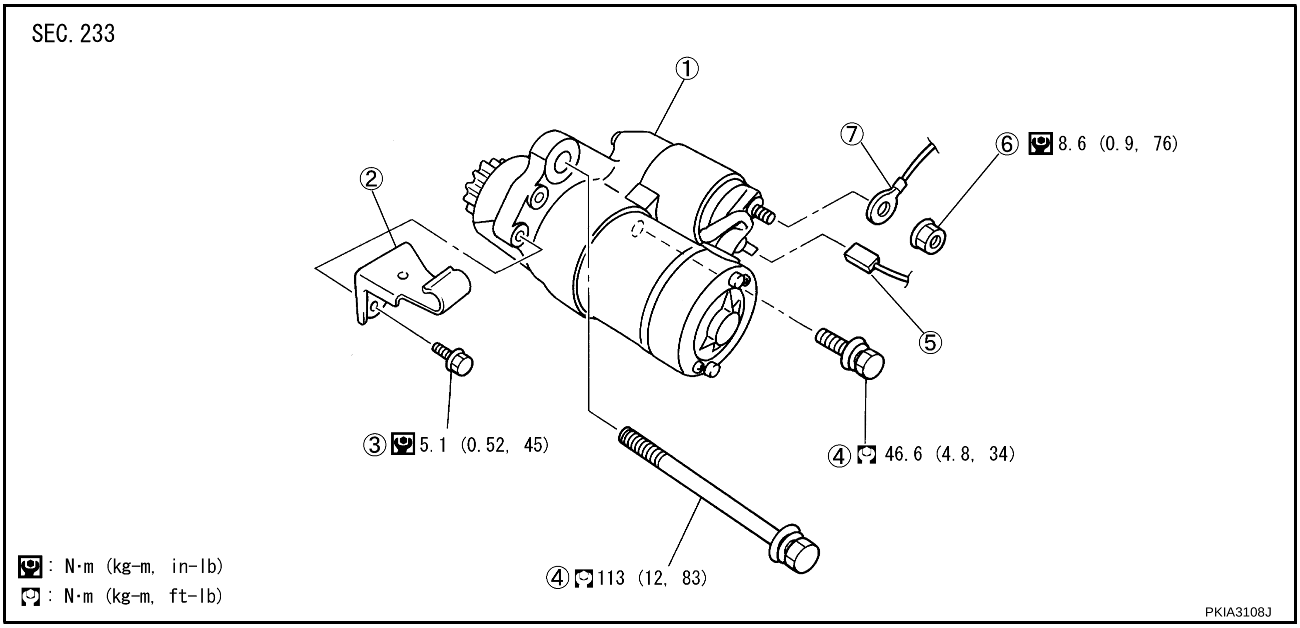
Installation

Installation is the reverse order of removal.

CAUTION:

Be sure to tighten B terminal nut carefully.

A/T MODELS



1.	Starter motor assembly	2.	Bracket	3.	Bracket bolt
4.	Starter motor mounting bolt	5.	S connector	6.	B terminal nut
7.	B terminal				

Removal

1. Disconnect battery cable at negative terminal.
2. Remove air duct and air cleaner assembly. Refer to EM-14, "AIR CLEANER AND AIR DUCT" .
3. Remove A/T selector cable and harness from bracket.
4. Disconnect “S” connector and “B” terminal from starter motor.
5. Remove starter motor upward.

Installation

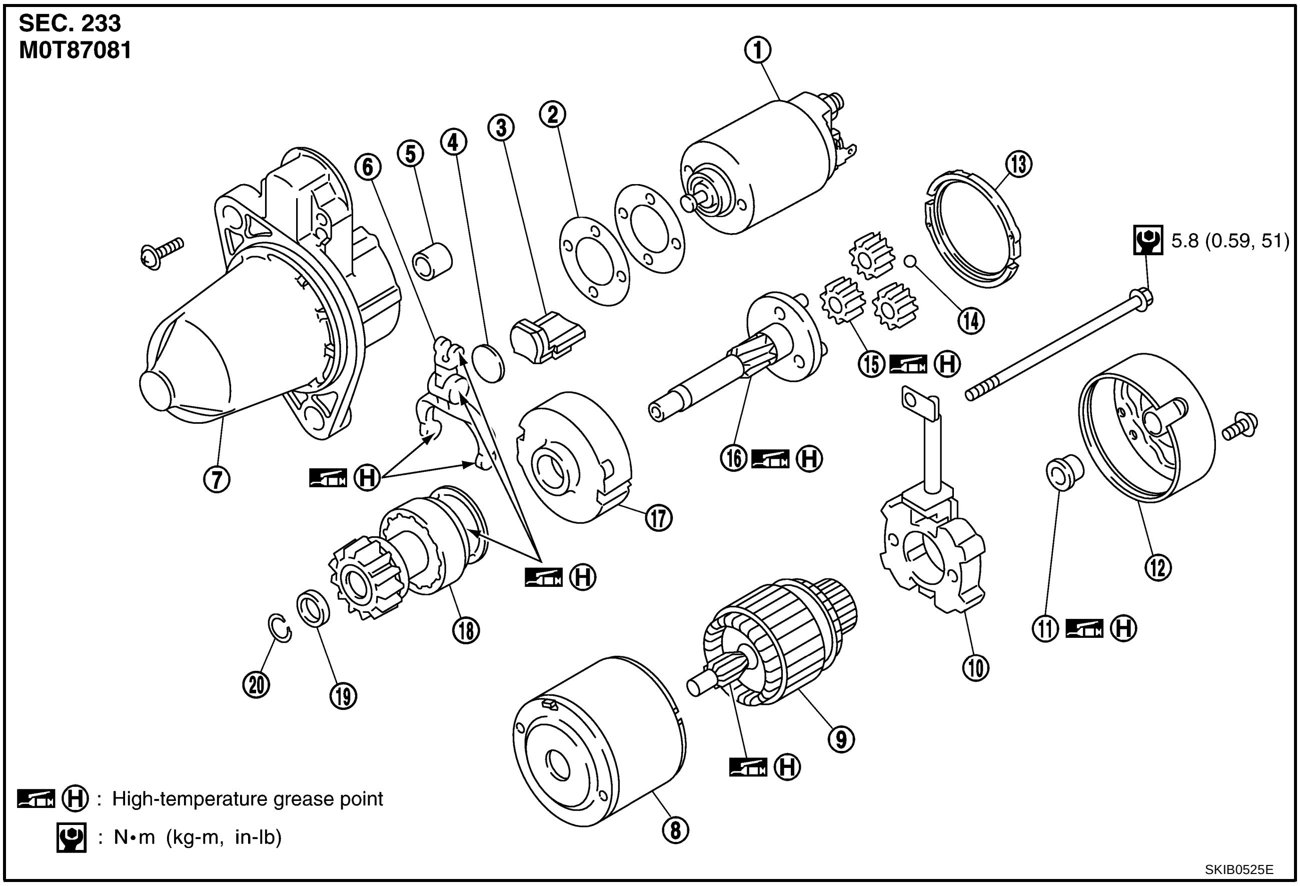
Installation is the reverse order of removal.

CAUTION:

Be sure to tighten B terminal nut carefully.

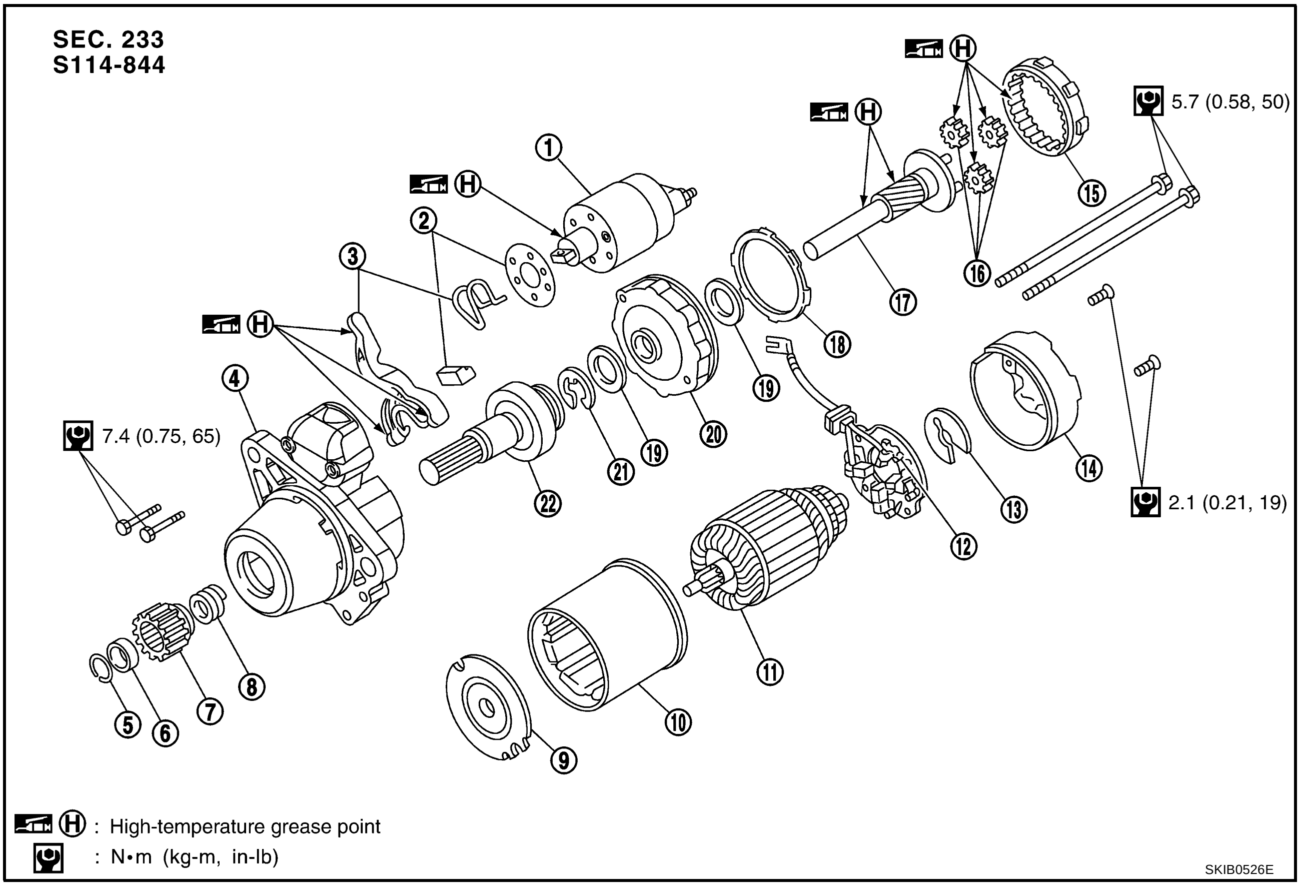
Disassembly and Assembly
AKS00C3E

M/T MODELS



1. Magnetic switch assembly	2. Adjusting plate	3. Packing
4. Plate	5. Sleeve bearing	6. Shift lever
7. Gear case	8. Yoke	9. Armature
10. Brush holder assembly	11. Rear bearing	12. Rear cover
13. Packing	14. Ball	15. Planetary gear
16. Pinion shaft	17. Internal gear	18. Pinion assembly
19. Pinion stopper	20. Stopper clip	

A/T MODELS



1. Magnetic switch assembly	2. Dust cover kit	3. Shift lever set
4. Gear case	5. Pinion stopper clip	6. Pinion stopper
7. Pinion	8. Pinion spring	9. Center bracket (A)
10. Yoke	11. Armature	12. Brush holder assembly
13. Thrust washer	14. Rear cover	15. Internal gear
16. Planetary gear	17. Pinion shaft	18. Packing
19. Thrust washer	20. Center bracket (P)	21. E-ring
22. Clutch assembly		

INSPECTION AFTER DISASSEMBLY

Pinion/Clutch Check

1. Inspect pinion teeth.
   - Replace pinion if teeth are worn or damaged. (Also check condition of ring gear teeth.)
2. Inspect reduction gear teeth.
   - Replace reduction gear if teeth are worn or damaged. (Also check condition of armature shaft gear teeth.)
3. Check to see if pinion locks in one direction and rotates smoothly in the opposite direction.
   - If it locks or rotates in both directions, or unusual resistance is evident, replace.

CHARGING SYSTEM

PFP:00011

System Description

AKS00B6Q

DESCRIPTION

The alternator provides DC voltage to operate the vehicle's electrical system and to keep the battery charged. The voltage output is controlled by the IC regulator.
Power is supplied at all times

- through 10 A fuse (No. 34, located in the fuse and fusible link box)
- to alternator terminal 4 (“S” terminal).

“B” terminal supplies power to charge the battery and operate the vehicle's electrical system. Output voltage is controlled by the IC regulator at terminal 4 (“S” terminal) detecting the input voltage. The charging circuit is protected by the 120 A fusible link (letter A, located in the fuse and fusible link box).
The alternator is grounded to the engine block.
With the ignition switch in the ON or START position, power is supplied

- through 10 A fuse [No. 11, located in the fuse block (J/B)]
- to combination meter terminal 2 for the charge warning lamp.

Ground is supplied with power and ground supplied

- to terminal 5 of combination meter
- through alternator terminal 3 (“L” terminal)
- to alternator terminal 2 (“E” terminal)
- through ground E30.

The charge warning lamp will illuminate. When the alternator is providing sufficient voltage with the engine running, the ground is opened and the charge warning lamp will go off.
If the charge warning lamp illuminates with the engine running, a malfunction is indicated.

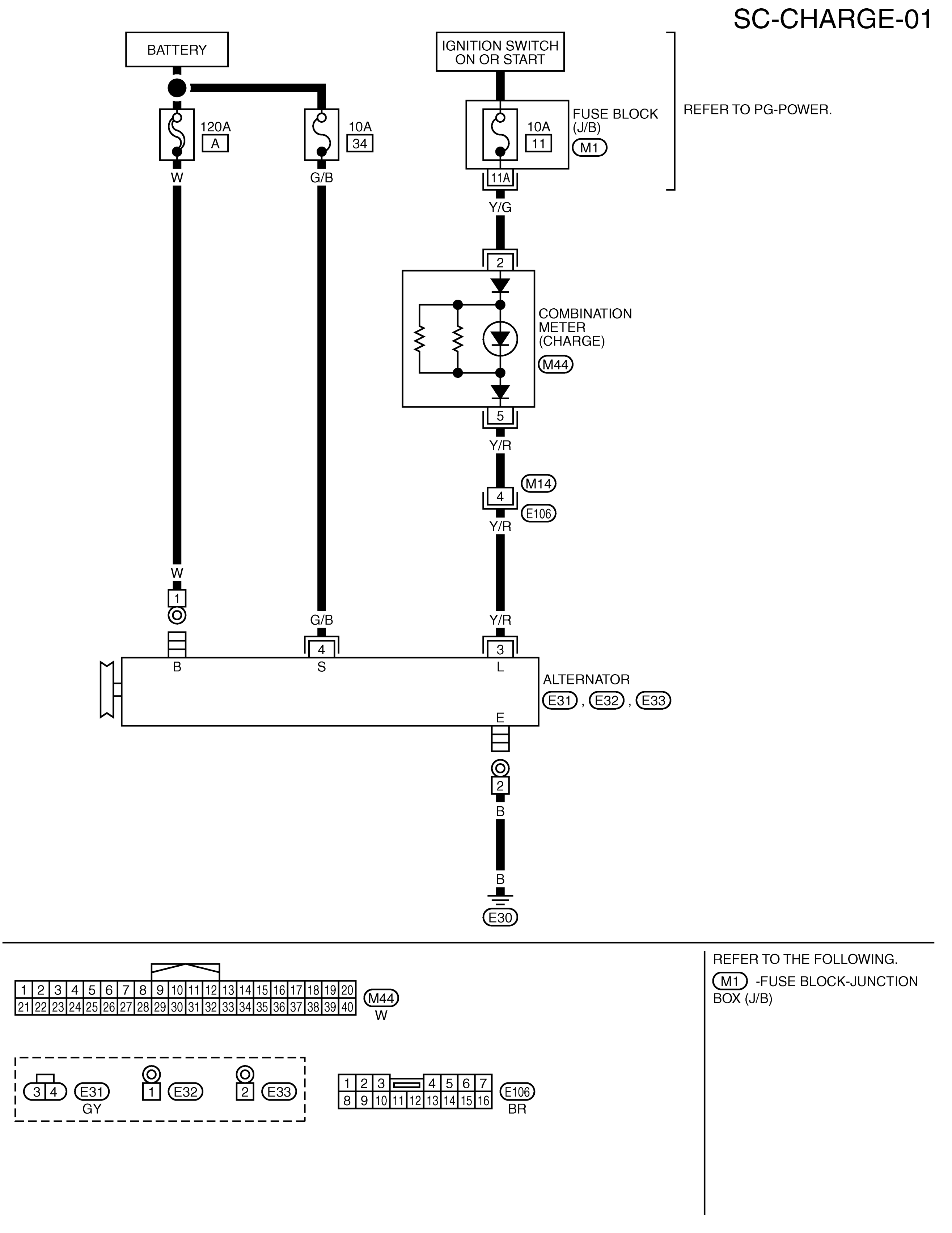
MALFUNCTION INDICATOR

The IC regulator warning function activates to illuminate the charge warning lamp, if any of the following symptoms occur while alternator is operating:

- Excessive voltage is produced.
- No voltage is produced.

Wiring Diagram — CHARGE —

AKS00B6R



Trouble Diagnoses with Battery/Starting/Charging System Tester

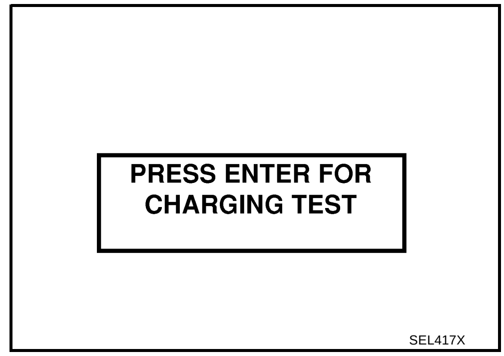
AKS00BHJ

NOTE:

To ensure a complete and thorough diagnosis, battery, starter and alternator test segments must be done as a set from start to finish.

Before starting, perform the preliminary inspection. Refer to SC-25, "PRELIMINARY INSPECTION" .

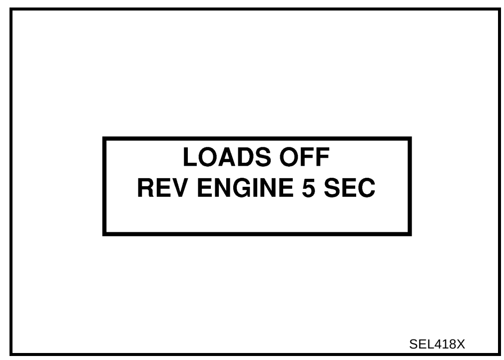
1. Turn off all loads on the vehicle electrical system.
2. Perform battery and starting system test with Battery/Starting/Charging system tester.
3. Press “ENTER” to begin charging system test.
4. Start engine.



SEL417X

5. Press “ENTER” until “LOADS OFF REV ENGINE 5 SEC” is displayed.
6. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle.
   Once the increase in engine rpm is detected, press “ENTER” to continue.

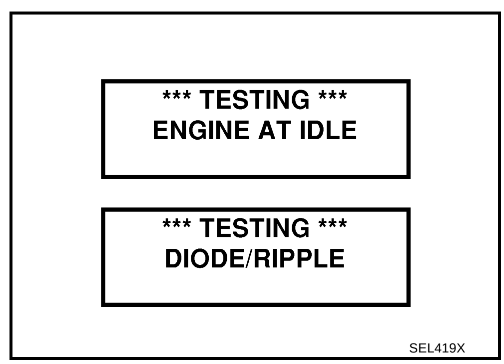
   NOTE:
   - If after 30 seconds an increase in engine idle speed is not detected, “RPM NOT DETECTED” will display.
   - Some engines may have a higher idle initially after starting, particularly when the engine is cold. The tester may detect this without any other action being taken. If this occurs, continue on with the testing process. The final results will not be affected.



SEL418X

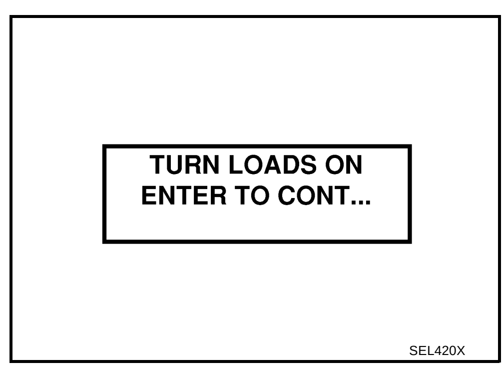
7. The tester now checks the engine at idle and performs the DIODE/RIPPLE check.
8. When complete, the tester will prompt you to turn on the following electrical loads.
   - Heater fan set to highest speed. Do not run the A/C or windshield defroster.
   - Headlamp high beam
   - Rear window defogger

   NOTE:
   Do not run the windshield wipers or any other cyclical loads.



SEL419X

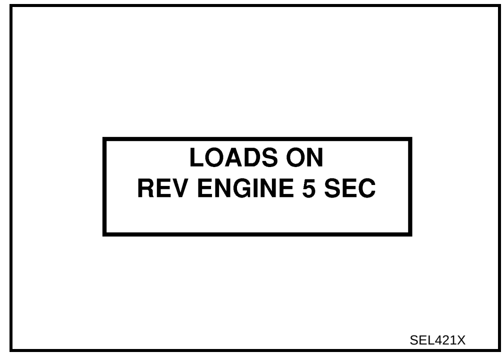
9. Press “ENTER” to continue.



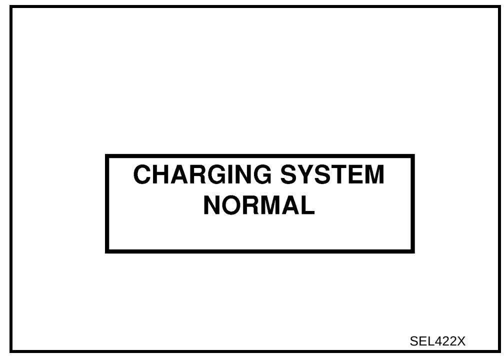
SEL420X

10. Raise and hold the engine speed at 1,500 to 2,000 rpm for about 5 seconds, then return the engine to idle. Once the increase in engine rpm is detected, press “ENTER” to continue.

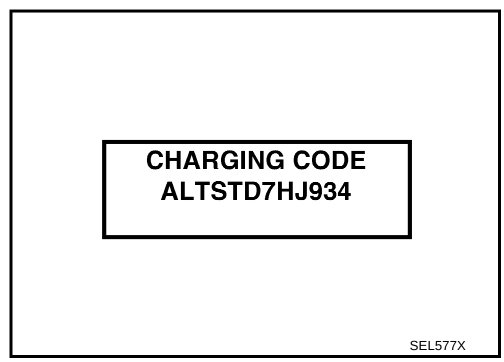
    NOTE:
    If after 30 seconds an increase in engine idle speed is not detected, “RPM NOT DETECTED” will be displayed. Press “ENTER” to restart the test.



11. Diagnostic result is displayed on the tester. Refer to SC-23, "DIAGNOSTIC RESULT ITEM CHART" .



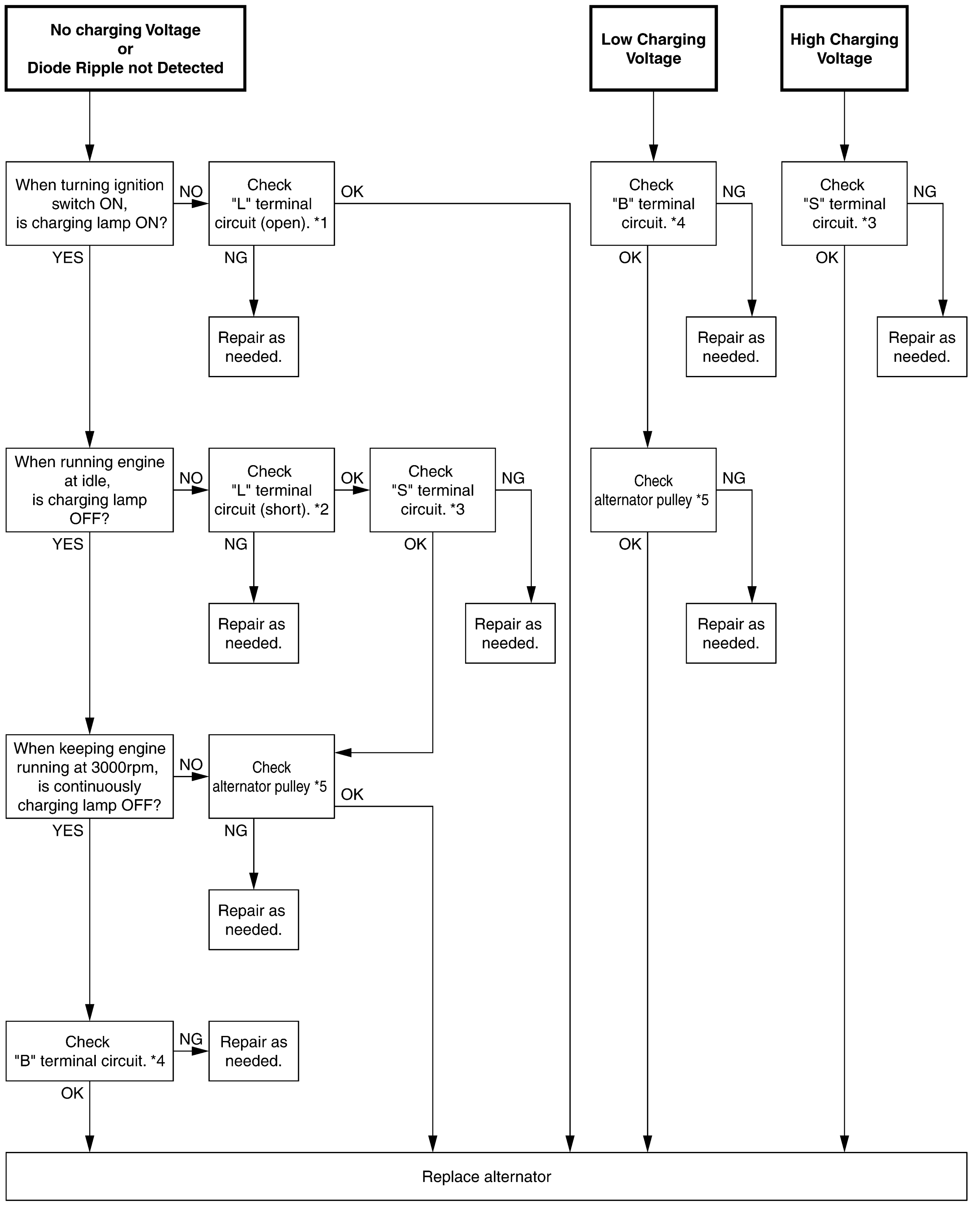
12. Press “ENTER” then test output code is displayed. Record the test output code on the repair order.
13. Toggle back to the “DIAGNOSTIC SCREEN” for test results.



DIAGNOSTIC RESULT ITEM CHART

Diagnostic item	Service procedure
CHARGING SYSTEM NORMAL	Charging system is normal and will also show DIODE RIPPLE test result.
NO CHARGING VOLTAGE	Go to SC-24, "WORK FLOW" .
LOW CHARGING VOLTAGE	
HIGH CHARGING VOLTAGE	
DIODE RIPPLE NORMAL	Diode ripple is OK and will also show CHARGING VOLTAGE test result.
EXCESS RIPPLE DETECTED	Replace alternator. Perform “DIODE RIPPLE” test again using Battery/Starting/Charging system tester to confirm repair.
DIODE RIPPLE NOT DETECTED	Go to SC-24, "WORK FLOW" .

WORK FLOW



*1 SC-26, "Check “L” Terminal Circuit (Open)"
*2 SC-26, "Check “L” Terminal Circuit (Short)"
*3 SC-27, "Check “S” Terminal Circuit"
*4 SC-28, "Check “B” Terminal Circuit"
*5 SC-29, "ALTERNATOR PULLEY INSPECTION"

PRELIMINARY INSPECTION

1. CHECK BATTERY TERMINALS CONNECTION

Check if battery terminals is clean and tight.

OK or NG

OK >> GO TO 2.
NG >> Repair battery terminals connection.

2. CHECK FUSE AND FUSIBLE LINK

Check for blown fuse and fusible link. Refer to PG-50, "FUSE AND FUSIBLE LINK BOX" .

Unit	Power source (Power supply terminals)	Fuse and fusible link No.
Alternator	Battery (“B” terminal)	A
	Battery (“S” terminal)	34
Combination meter	Ignition switch ON (“L” terminal)	11

OK or NG

OK >> GO TO 3.
NG >> If fuse is blown, be sure eliminate cause of malfunction before installing new fuse.

3. CHECK “E” TERMINAL CONNECTION

Check if “E” terminal is clean and tight.

OK or NG

OK >> GO TO 4.
NG >> Repair “E” terminal connection.

4. CHECK ALTERNATOR DRIVE BELT TENSION

Check alternator drive belt tension. Refer to EM-11, "Checking Drive Belt" .

OK or NG

OK >> INSPECTION END
NG >> Repair as needed.

DIAGNOSTIC PROCEDURE 1

Check “L” Terminal Circuit (Open)

1. CHECK “L” TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if “L” terminal is clean and tight.

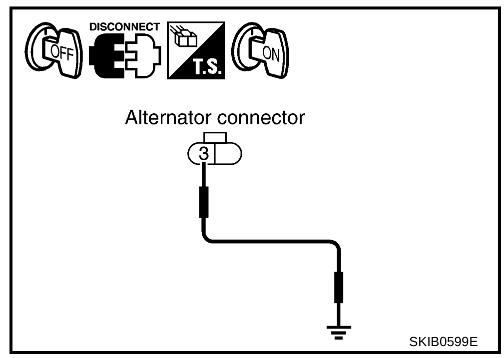
OK or NG

OK >> GO TO 2.
NG >> Repair “L” terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2. CHECK “L” TERMINAL CIRCUIT (OPEN)

1. Disconnect alternator connector.
2. Apply ground to alternator harness connector E31 terminal 3 (Y/R) with ignition switch in the ON position.

3 (Y/R) – Ground : Charge warning lamp should light up.



OK or NG

OK >> Go to SC-24, "WORK FLOW" .
NG >> Check the following.
- Harness for open between combination meter and alternator
- Harness for open between combination meter and fuse
- Charge warning lamp (Combination meter)

DIAGNOSTIC PROCEDURE 2

Check “L” Terminal Circuit (Short)

1. CHECK “L” TERMINAL CIRCUIT (SHORT)

1. Turn ignition switch OFF.
2. Disconnect alternator connector.
3. Turn ignition switch ON.

Charge warning lamp should light up?

YES >> Check the following.
- Harness for short between combination meter and alternator
- Charge warning lamp (Combination meter)

NO >> Go to SC-24, "WORK FLOW" .

DIAGNOSTIC PROCEDURE 3

Check “S” Terminal Circuit

1. CHECK “S” TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if “S” terminal is clean and tight.

OK or NG

OK >> GO TO 2.
NG >> Repair “S” terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

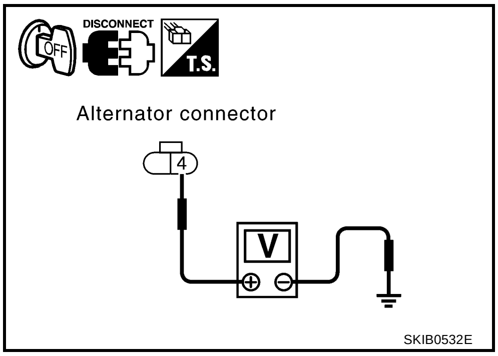
2. CHECK ALTERNATOR “S” TERMINAL CIRCUIT

Check voltage between alternator harness connector E31 terminal 4 (G/B) and ground using a digital circuit tester.

4 (G/B) – Ground : Battery voltage

OK or NG

OK >> Go to SC-24, "WORK FLOW" .
NG >> Harness for open between alternator and fuse.



DIAGNOSTIC PROCEDURE 4

Check “B” Terminal Circuit

1. CHECK “B” TERMINAL CONNECTION

1. Turn ignition switch OFF.
2. Check if “B” terminal is clean and tight.

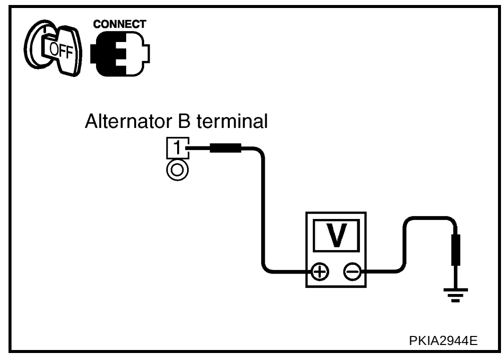
OK or NG

OK >> GO TO 2.
NG >> Repair “B” terminal connection. Confirm repair by performing complete Battery/Starting/Charging system test.

2. CHECK ALTERNATOR “B” TERMINAL CIRCUIT

Check voltage between alternator “B” terminal E32 terminal 1 (W) and ground using a digital circuit tester.

1 (W) – Ground : Battery voltage



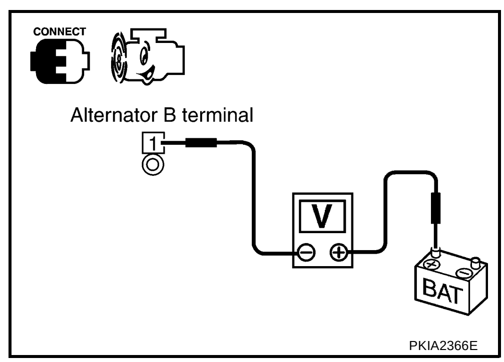
OK or NG

OK >> GO TO 3.
NG >> Check harness for open between alternator and fusible link.

3. CHECK “B” TERMINAL CONNECTION (VOLTAGE DROP TEST)

1. Start engine.
2. When engine running at idle and warm, check voltage between alternator “B” terminal E32 terminal 1 (W) and battery positive terminal using a digital circuit tester.

1 (W) – Battery positive terminal : Less than 0.2 V

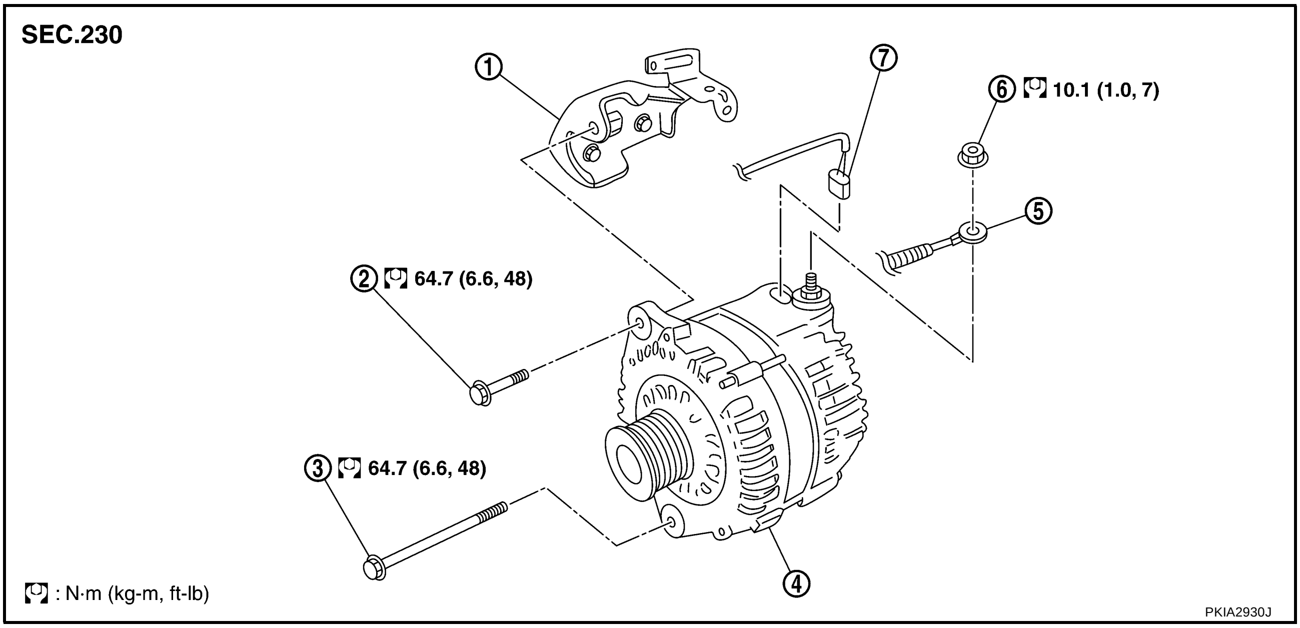


OK or NG

OK >> Go to SC-24, "WORK FLOW" .
NG >> Check harness between battery and alternator for poor continuity.

Removal and Installation

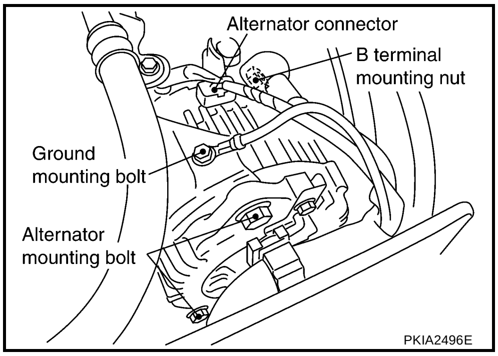
AKS00C3D



1.	Alternator bracket	2.	Alternator mounting bolt	3.	Alternator mounting bolt
4.	Alternator assembly	5.	B terminal	6.	B terminal mounting nut
7.	Alternator connector				

REMOVAL

1. Disconnect battery cable at negative terminal.
2. Remove alternator drive belt. Refer to EM-11, "Checking Drive Belt" .
3. Remove alternator harness mounting bolt, ground mounting bolt, alternator connector and “B” terminal mounting nut.
4. Remove alternator mounting bolts.
5. Remove alternator bracket.
6. Remove alternator assembly upward.



ALTERNATOR PULLEY INSPECTION

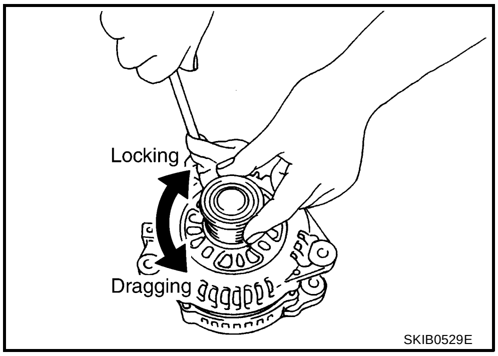
One-Way Clutch Pulley Check

Fix rotor with inserting a suitable tool rolled with a cloth.

CAUTION:

Be careful not to damage the rotor.

1. Check for locking. (Outer ring is turned clockwise when viewed from the front.)
   - If it rotates in both directions... Replace pulley.
2. Check for dragging. (Outer ring is turned counterclockwise when viewed from the front.)
   - If it locks or unusual resistance is felt... Replace pulley.



INSTALLATION

Note the following, and installation is the reverse order of removal.

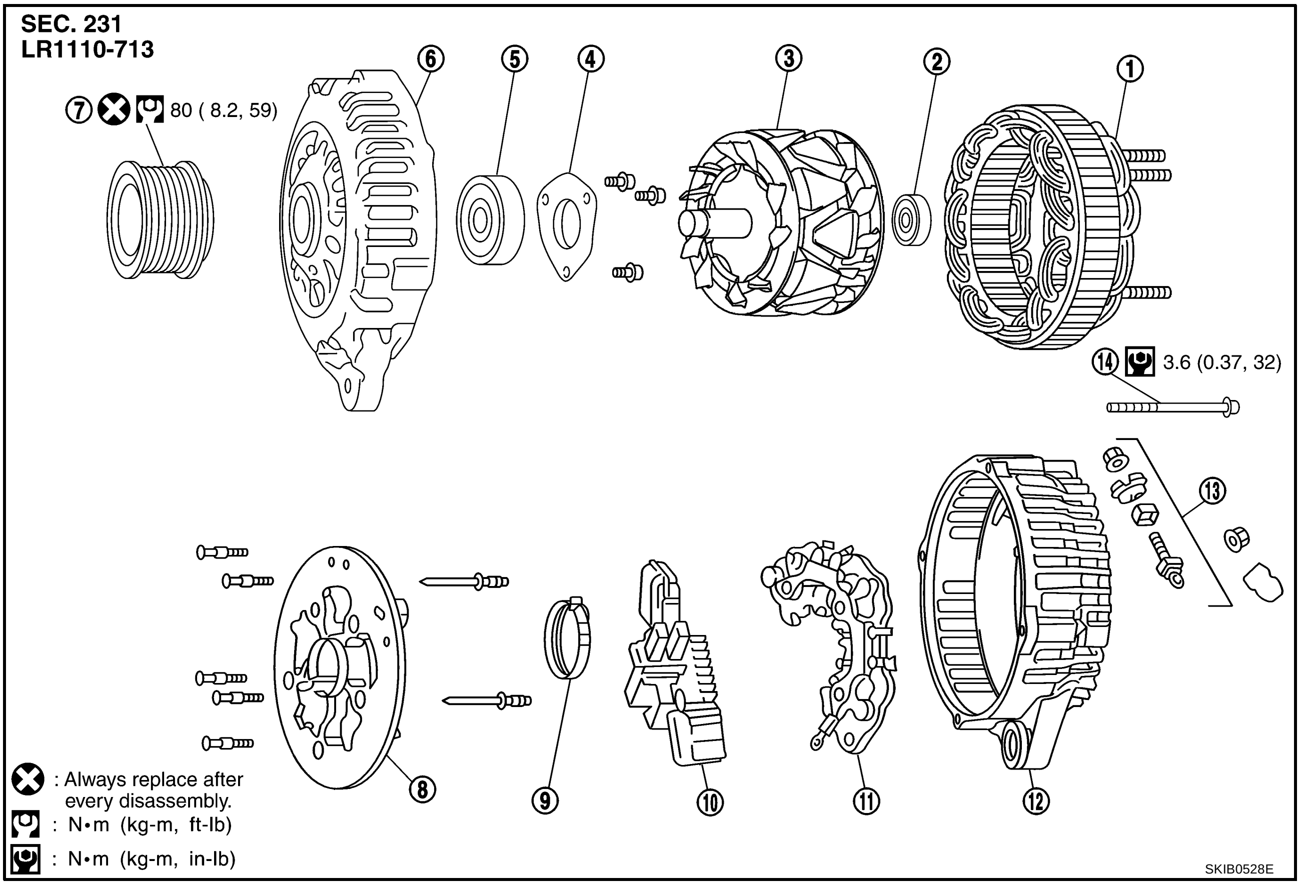
- Install alternator, and check tension of belt. Refer to EM-11, "Tension Adjustment" .

CAUTION:

Be sure to tighten B terminal mounting nut carefully.

Disassembly and Assembly

AKS00C3C



1.	Stator	2.	Rear bearing	3.	Rotor
4.	Retainer	5.	Front bearing	6.	Front cover
7.	Pulley	8.	Fan guide	9.	Labyrinth seal
10.	IC voltage regulator assembly	11.	Diode assembly	12.	Rear cover
13.	Terminal assembly	14.	Through-bolt		

DISASSEMBLY FOR ALTERNATOR PULLEY

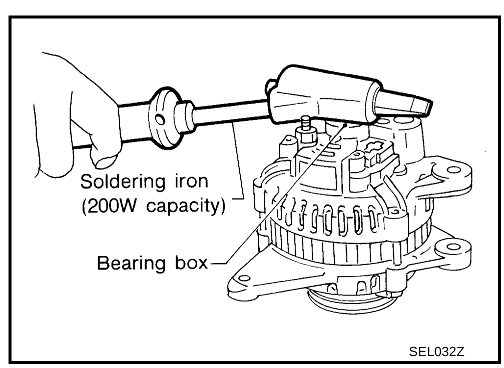
1. Remove through-bolt (4).
2. Remove rear cover.

NOTE:

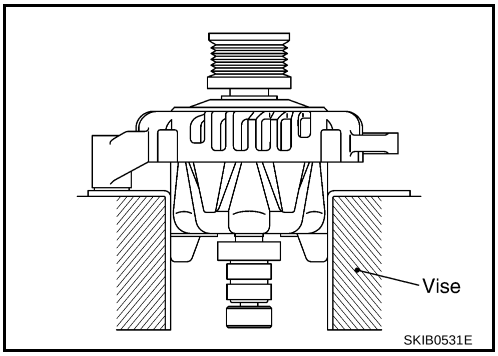
Rear cover may be hard to remove because a ring is used to lock outer race of rear bearing. To facilitate removal of rear cover, heat just bearing box section with a 200 W soldering iron until the temperature increases by about 30 °C.

CAUTION:

Do not use a heat gun, as it can damage diode assembly.

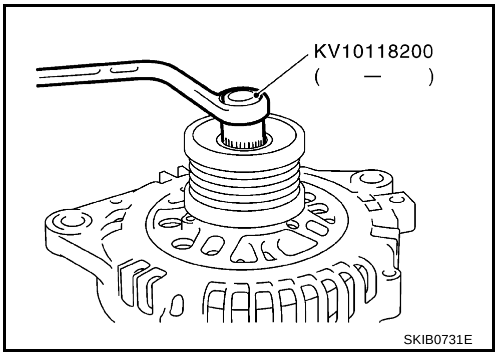


3. Set rotor to the vise.
   CAUTION:
   - **Be careful not to damage the rotor.**
   - **Use copper plate or thick cloth for rotor in the vise.**
4. Remove pulley cap, using suitable tool.



SKIB0531E

5. Remove alternator pulley, using alternator pulley adaptor [SST].



SKIB0731E

ASSEMBLY FOR ALTERNATOR PULLEY

Assembly is the reverse order of disassemble.

CAUTION:

Note the tightening torque shown, in the figure.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Battery

AKS00B77

Applied mode		QR25 engine
Type		80D23L
Capacity	[V - AH]	12 - 52
Cold cranking current (For reference value)	[A]	589

Starter

AKS00B78

Applied model			QR25 engine	
			A/T	M/T
Type			S114-844	M0T87081
			HITACHI make	MITSUBISHI make
			Reduction	
System voltage		[V]	12	
No-load	Terminal voltage	[V]	11.0	
	Current	[A]	Less than 90	
	Revolution	[rpm]	More than 2,700	More than 2,500
Minimum diameter of commutator		[mm (in)]	28.0 (1.102)	28.8 (1.134)
Minimum length of brush		[mm (in)]	10.5 (0.413)	7.0 (0.276)
Brush spring tension		[N (kg, lb)]	16.2 (1.65, 3.64)	21.7 (2.2, 4.9)
Clearance between bearing metal and armature shaft		[mm (in)]	Less than 0.2 (0.008)	
Clearance between pinion front edge and pinion stopper		[mm (in)]	—	0.5 - 2.0 (0.020 - 0.079)
Movement in height of pinion assembly		[mm (in)]	0.3 - 2.5 (0.012 - 0.098)	—

Alternator

AKS00B79

Applied model		QR25 engine
Type		LR1110-713
		HITACHI make
Nominal rating	[V - A]	12 - 110
Ground polarity		Negative
Minimum revolutions under no-load (When 13.5 V is applied)	[rpm]	Less than 1,100
Hot output current (When 13.5V is applied)	[A/rpm]	(More than 35/1,300) More than 70/1,800 More than 91/2,500 More than 110/5,000
Regulated output voltage	[V]	14.1 - 14.7
Minimum length of brush	[mm (in)]	More than 6.0 (0.236)
Brush spring pressure	[N (kg, lb)]	1.0 - 3.43 (102 - 350, 3.60 - 12.34)
Slip ring minimum diameter	[mm (in)]	More than 26.0 (1.024)
Rotor coil resistance at 20°C (68°F)	[Ω]	2.31

SECTION SE

SEAT

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AIS005SX

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Service Notice

AIS005SY

- When removing or installing various parts, place a cloth or padding onto the vehicle body to prevent scratches.
- Handle trim, molding instruments, grille, etc. carefully during removing or installing. Be careful not to oil or damage them.
- Apply sealing compound where necessary when installing parts.
- When applying sealing compound, be careful that the sealing compound does not protrude from parts.
- When replacing any metal parts (for example body outer panel, member, etc.), be sure to take rust prevention measures.

Precautions

AIS005SZ

- When removing or disassembling any part, be careful not to damage or deform it. Protect parts, which may get in the way with cloth.
- When removing parts with a screwdriver or other tool, protect parts by wrapping tools with vinyl or tape.
- Keep removed parts protected with cloth.
- If a clip is deformed or damaged, replace it.
- If an unreusable part is removed, replace it with a new one.
- Tighten bolts and nuts firmly to the specified torque.
- After re-assembly has been completed, make sure each part functions correctly.
- Remove stains in the following way.

Water-soluble stains:
Dip a soft cloth in warm water, and then squeeze it tightly. After wiping the stain, wipe with a soft dry cloth.
Oil stain:
Dissolve a synthetic detergent in warm water (density of 2 to 3% or less), dip the cloth, then clean off the stain with the cloth. Next, dip the cloth in fresh water and squeeze it tightly. Then clean off the detergent completely. Then wipe the area with a soft dry cloth.

- Do not use any organic solvent, such as thinner or benzine.

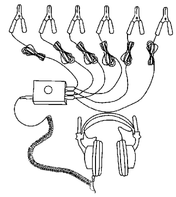
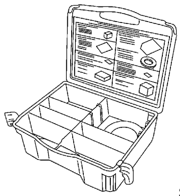
PREPARATION

PFP:00002

Special Service Tools

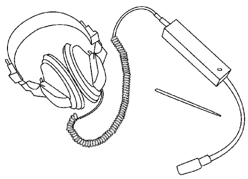
AIS0065W

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name		Description
(J-39570) Chassis ear	 SIIA0993E	Locating the noise
(J-43980) NISSAN Squeak and Rattle Kit	 SIIA0994E	Repairing the cause of the noise

Commercial Service Tools

AIS005T0

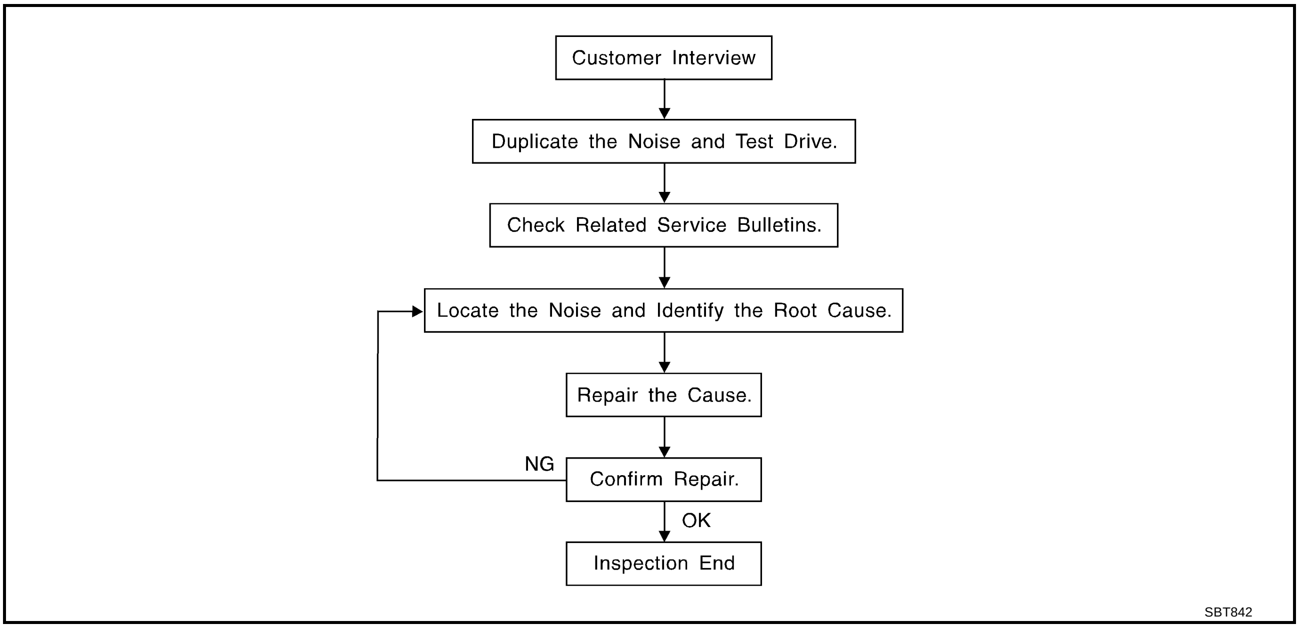
Tool name		Description
Engine ear	 SIIA0995E	Location the noise

SQUEAK AND RATTLE TROUBLE DIAGNOSES

PFP:00000

Work Flow

AIS0061D



CUSTOMER INTERVIEW

Interview the customer if possible, to determine the conditions that exist when the noise occurs. Use the Diagnostic Worksheet during the interview to document the facts and conditions when the noise occurs and any customer's comments; refer to SE-8, "Diagnostic Worksheet" . This information is necessary to duplicate the conditions that exist when the noise occurs.

- The customer may not be able to provide a detailed description or the location of the noise. Attempt to obtain all the facts and conditions that exist when the noise occurs (or does not occur).
- If there is more than one noise in the vehicle, be sure to diagnose and repair the noise that the customer is concerned about. This can be accomplished by test driving the vehicle with the customer.
- After identifying the type of noise, isolate the noise in terms of its characteristics. The noise characteristics are provided so the customer, service adviser and technician are all speaking the same language when defining the noise.
- Squeak —(Like tennis shoes on a clean floor)
  Squeak characteristics include the light contact/fast movement/brought on by road conditions/hard surfaces=higher pitch noise/softer surfaces=lower pitch noises/edge to surface=chirping
- Creak—(Like walking on an old wooden floor)
  Creak characteristics include firm contact/slow movement/twisting with a rotational movement/pitch dependent on materials/often brought on by activity.
- Rattle—(Like shaking a baby rattle)
  Rattle characteristics include the fast repeated contact/vibration or similar movement/loose parts/missing clip or fastener/incorrect clearance.
- Knock —(Like a knock on a door)
  Knock characteristics include hollow sounding/sometimes repeating/often brought on by driver action.
- Tick—(Like a clock second hand)
  Tick characteristics include gentle contacting of light materials/loose components/can be caused by driver action or road conditions.
- Thump—(Heavy, muffled knock noise)
  Thump characteristics include softer knock/dead sound often brought on by activity.
- Buzz—(Like a bumble bee)
  Buzz characteristics include high frequency rattle/firm contact.
- Often the degree of acceptable noise level will vary depending upon the person. A noise that you may judge as acceptable may be very irritating to the customer.
- Weather conditions, especially humidity and temperature, may have a great effect on noise level.

DUPLICATE THE NOISE AND TEST DRIVE

If possible, drive the vehicle with the customer until the noise is duplicated. Note any additional information on the Diagnostic Worksheet regarding the conditions or location of the noise. This information can be used to duplicate the same conditions when you confirm the repair.

If the noise can be duplicated easily during the test drive, to help identify the source of the noise, try to duplicate the noise with the vehicle stopped by doing one or all of the following:

1) Close a door.
2) Tap or push/pull around the area where the noise appears to be coming from.
3) Rev the engine.
4) Use a floor jack to recreate vehicle “twist”.
5) At idle, apply engine load (electrical load, half-clutch on M/T models, drive position on A/T models).
6) Raise the vehicle on a hoist and hit a tire with a rubber hammer.

- Drive the vehicle and attempt to duplicate the conditions the customer states exist when the noise occurs.
- If it is difficult to duplicate the noise, drive the vehicle slowly on an undulating or rough road to stress the vehicle body.

CHECK RELATED SERVICE BULLETINS

After verifying the customer concern or symptom, check ASIST for Technical Service Bulletins (TSBs) related to that concern or symptom.

If a TSB relates to the symptom, follow the procedure to repair the noise.

LOCATE THE NOISE AND IDENTIFY THE ROOT CAUSE

1. Narrow down the noise to a general area. To help pinpoint the source of the noise, use a listening tool (Chassis Ear: J-39570, Engine Ear and mechanics stethoscope).
2. Narrow down the noise to a more specific area and identify the cause of the noise by:

- removing the components in the area that you suspect the noise is coming from.
  Do not use too much force when removing clips and fasteners, otherwise clips and fastener can be broken or lost during the repair, resulting in the creation of new noise.
- tapping or pushing/pulling the component that you suspect is causing the noise.
  Do not tap or push/pull the component with excessive force, otherwise the noise will be eliminated only temporarily.
- feeling for a vibration with your hand by touching the component(s) that you suspect is (are) causing the noise.
- placing a piece of paper between components that you suspect are causing the noise.
- looking for loose components and contact marks.
  Refer to SE-6, "Generic Squeak and Rattle Troubleshooting" .

REPAIR THE CAUSE

- If the cause is a loose component, tighten the component securely.
- If the cause is insufficient clearance between components:
  - separate components by repositioning or loosening and retightening the component, if possible.
  - insulate components with a suitable insulator such as urethane pads, foam blocks, felt cloth tape or urethane tape. A Nissan Squeak and Rattle Kit (J-43980) is available through your authorized Nissan Parts Department.

CAUTION:

Do not use excessive force as many components are constructed of plastic and may be damaged.

NOTE:

Always check with the Parts Department for the latest parts information.

The following materials are contained in the Nissan Squeak and Rattle Kit (J-43980). Each item can be ordered separately as needed.

URETHANE PADS [1.5 mm (0.059 in) thick]

Insulates connectors, harness, etc.

76268-9E005: 100 × 135 mm (3.94 × 5.31 in)/76884-71L01: 60 × 85 mm (2.36 × 3.35 in)/76884-71L02: 15 × 25 mm (0.59 × 0.98 in)

INSULATOR (Foam blocks)

Insulates components from contact. Can be used to fill space behind a panel.

73982-9E000: 45 mm (1.77 in) thick, 50 × 50 mm (1.97 × 1.97 in)/73982-50Y00: 10 mm (0.39 in) thick, 50 × 50 mm (1.97 × 1.97 in)

INSULATOR (Light foam block)
80845-71L00: 30 mm (1.18 in) thick, 30 × 50 mm (1.18 × 1.97 in)
FELT CLOTHTAPE
Used to insulate where movement does not occur. Ideal for instrument panel applications.
68370-4B000: 15 × 25 mm (0.59 × 0.98 in) pad/68239-13E00: 5 mm (0.20 in) wide tape roll
The following materials, not found in the kit, can also be used to repair squeaks and rattles.
UHMW (TEFLON) TAPE
Insulates where slight movement is present. Ideal for instrument panel applications.
SILICONE GREASE
Used in place of UHMW tape that will be visible or not fit. Will only last a few months.
SILICONE SPRAY
Use when grease cannot be applied.
DUCT TAPE
Use to eliminate movement.

CONFIRM THE REPAIR

Confirm that the cause of a noise is repaired by test driving the vehicle. Operate the vehicle under the same conditions as when the noise originally occurred. Refer to the notes on the Diagnostic Worksheet.

Generic Squeak and Rattle Troubleshooting

AIS0061E

Refer to Table of Contents for specific component removal and installation information.

INSTRUMENT PANEL

Most incidents are caused by contact and movement between:

1. The cluster lid A and instrument panel
2. Acrylic lens and combination meter housing
3. Instrument panel to front pillar garnish
4. Instrument panel to windshield
5. Instrument panel mounting pins
6. Wiring harnesses behind the combination meter
7. A/C defroster duct and duct joint

These incidents can usually be located by tapping or moving the components to duplicate the noise or by pressing on the components while driving to stop the noise. Most of these incidents can be repaired by applying felt cloth tape or silicon spray (in hard to reach areas). Urethane pads can be used to insulate wiring harness.

CAUTION:

Do not use silicone spray to isolate a squeak or rattle. If you saturate the area with silicone, you will not be able to recheck the repair.

CENTER CONSOLE

Components to pay attention to include:

1. Shifter assembly cover to finisher
2. A/C control unit and cluster lid C
3. Wiring harnesses behind audio and A/C control unit

The instrument panel repair and isolation procedures also apply to the center console.

DOORS

Pay attention to the:

1. Finisher and inner panel making a slapping noise
2. Inside handle escutcheon to door finisher
3. Wiring harnesses tapping
4. Door striker out of alignment causing a popping noise on starts and stops

Tapping or moving the components or pressing on them while driving to duplicate the conditions can isolate many of these incidents. You can usually insulate the areas with felt cloth tape or insulator foam blocks from the Nissan Squeak and Rattle Kit (J-43980) to repair the noise.

TRUNK

Trunk noises are often caused by a loose jack or loose items put into the trunk by the owner.
In addition look for:

1. Trunk lid dumpers out of adjustment
2. Trunk lid striker out of adjustment
3. The trunk lid torsion bars knocking together
4. A loose license plate or bracket

Most of these incidents can be repaired by adjusting, securing or insulating the item(s) or component(s) causing the noise.

SUNROOF/HEADLINING

Noises in the sunroof/headlining area can often be traced to one of the following:

1. Sunroof lid, rail, linkage or seals making a rattle or light knocking noise
2. Sunvisor shaft shaking in the holder
3. Front or rear windshield touching headlining and squeaking

Again, pressing on the components to stop the noise while duplicating the conditions can isolate most of these incidents. Repairs usually consist of insulating with felt cloth tape.

SEATS

When isolating seat noise it's important to note the position the seat is in and the load placed on the seat when the noise is present. These conditions should be duplicated when verifying and isolating the cause of the noise.
Cause of seat noise include:

1. Headrest rods and holder
2. A squeak between the seat pad cushion and frame
3. The rear seatback lock and bracket

These noises can be isolated by moving or pressing on the suspected components while duplicating the conditions under which the noise occurs. Most of these incidents can be repaired by repositioning the component or applying urethane tape to the contact area.

UNDERHOOD

Some interior noise may be caused by components under the hood or on the engine wall. The noise is then transmitted into the passenger compartment.
Causes of transmitted underhood noise include:

1. Any component mounted to the engine wall
2. Components that pass through the engine wall
3. Engine wall mounts and connectors
4. Loose radiator mounting pins
5. Hood bumpers out of adjustment
6. Hood striker out of adjustment

These noises can be difficult to isolate since they cannot be reached from the interior of the vehicle. The best method is to secure, move or insulate one component at a time and test drive the vehicle. Also, engine RPM or load can be changed to isolate the noise. Repairs can usually be made by moving, adjusting, securing, or insulating the component causing the noise.

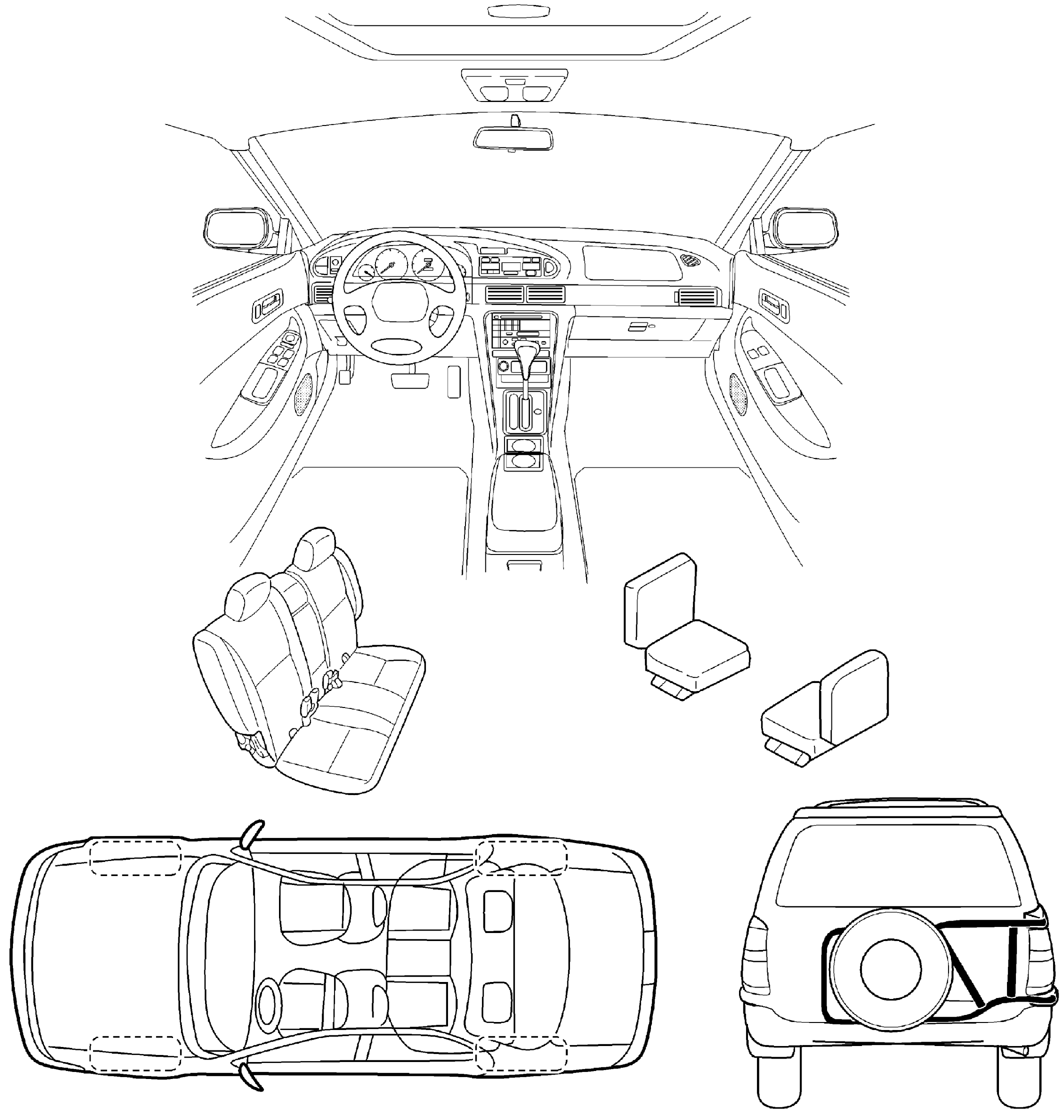
Diagnostic Worksheet

AIS0061F

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET

Dear Nissan Customer:
We are concerned about your satisfaction with your Nissan vehicle. Repairing a squeak or rattle sometimes can be very difficult. To help us fix your Nissan right the first time, please take a moment to note the area of the vehicle where the squeak or rattle occurs and under what conditions. You may be asked to take a test drive with a service advisor or technician to ensure we confirm the noise you are hearing.

I. WHERE DOES THE NOISE COME FROM? (circle the area of the vehicle)
The illustrations are for reference only, and may not reflect the actual configuration of your vehicle.



Continue to the back of the worksheet and briefly describe the location of the noise or rattle. In addition, please indicate the conditions which are present when the noise occurs.

PIIB0723E

SQUEAK & RATTLE DIAGNOSTIC WORKSHEET- page 2

Briefly describe the location where the noise occurs:

____

____

II. WHEN DOES IT OCCUR? (check the boxes that apply)

- ❏ anytime
- ❏ 1st time in the morning
- ❏ only when it is cold outside
- ❏ only when it is hot outside
- ❏ after sitting out in the sun
- ❏ when it is raining or wet
- ❏ dry or dusty conditions
- ❏ other: ____________________________

III. WHEN DRIVING:

- ❏ through driveways
- ❏ over rough roads
- ❏ over speed bumps
- ❏ only at about ____ mph
- ❏ on acceleration
- ❏ coming to a stop
- ❏ on turns : left, right or either (circle)
- ❏ with passengers or cargo
- ❏ other: ____________________
- ❏ after driving ____ miles or ____ minutes

IV. WHAT TYPE OF NOISE?

- ❏ squeak (like tennis shoes on a clean floor)
- ❏ creak (like walking on an old wooden floor)
- ❏ rattle (like shaking a baby rattle)
- ❏ knock (like a knock on a door)
- ❏ tick (like a clock second hand)
- ❏ thump (heavy, muffled knock noise)
- ❏ buzz (like a bumble bee)

TO BE COMPLETED BY DEALERSHIP PERSONNEL
Test Drive Notes:

____

____

	YES	NO	Initials of person performing
Vehicle test driven with customer	❏	❏	______
- Noise verified on test drive	❏	❏	
- Noise source located and repaired	❏	❏	______
- Follow up test drive performed to confirm repair	❏	❏	______

VIN: ____________________ Customer Name: ______________________________

W.O. #: __________________ Date: __________

This form must be attached to Work Order

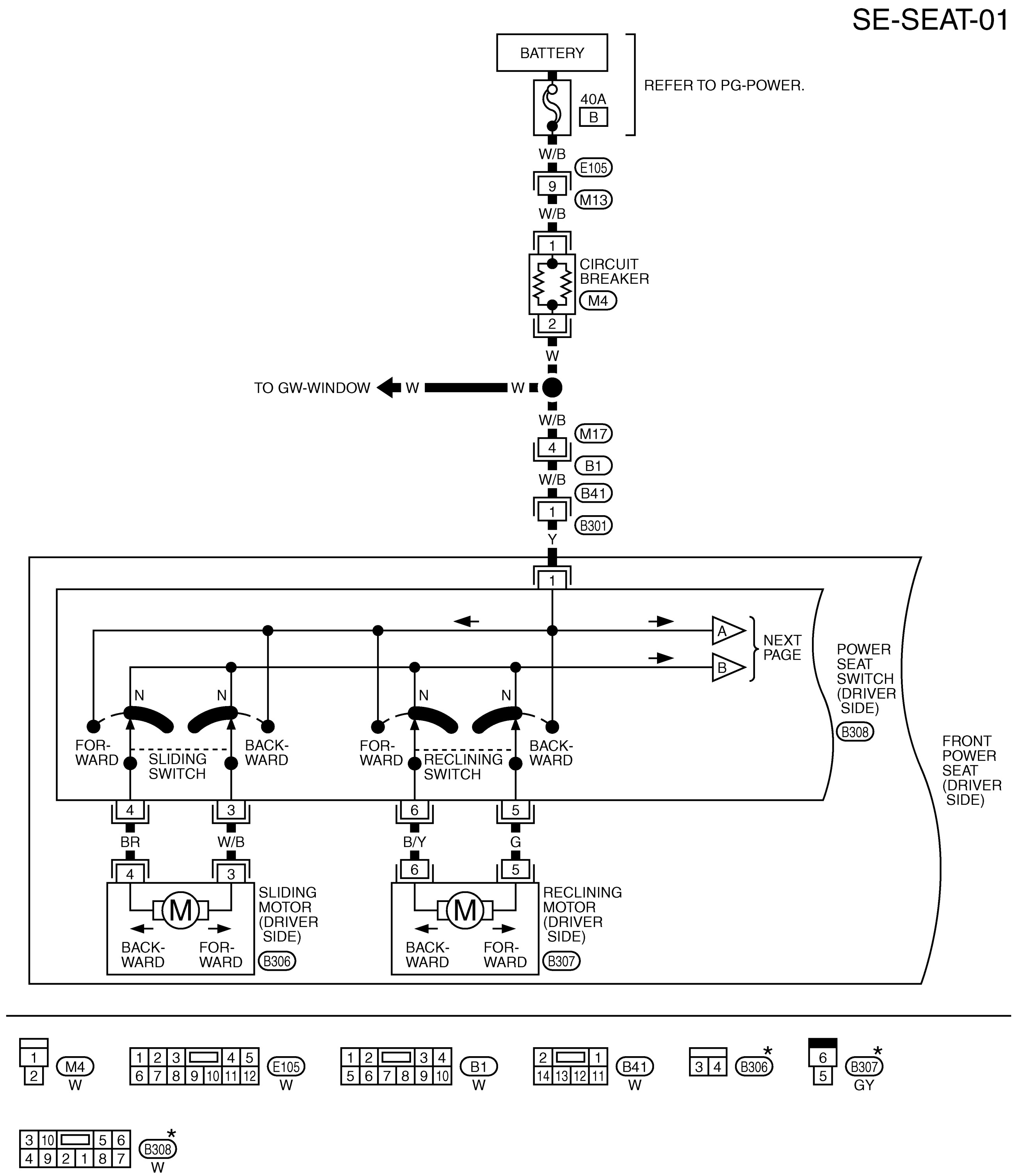
SBT844

POWER SEAT

PFP:87016

Wiring Diagram — SEAT —

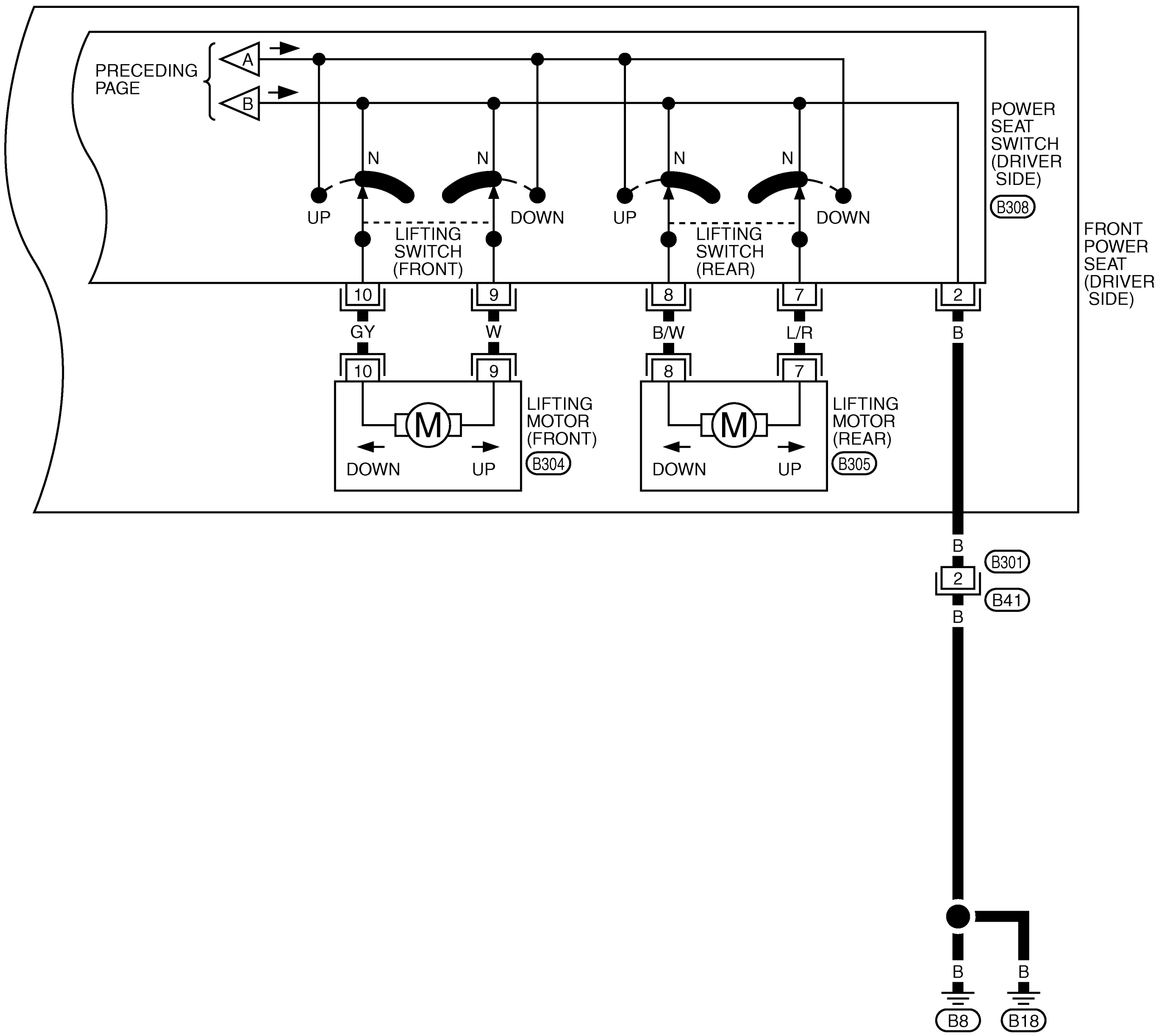
AIS005T5

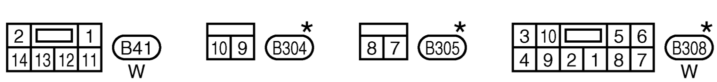


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TIWB0073E

SE-SEAT-02





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

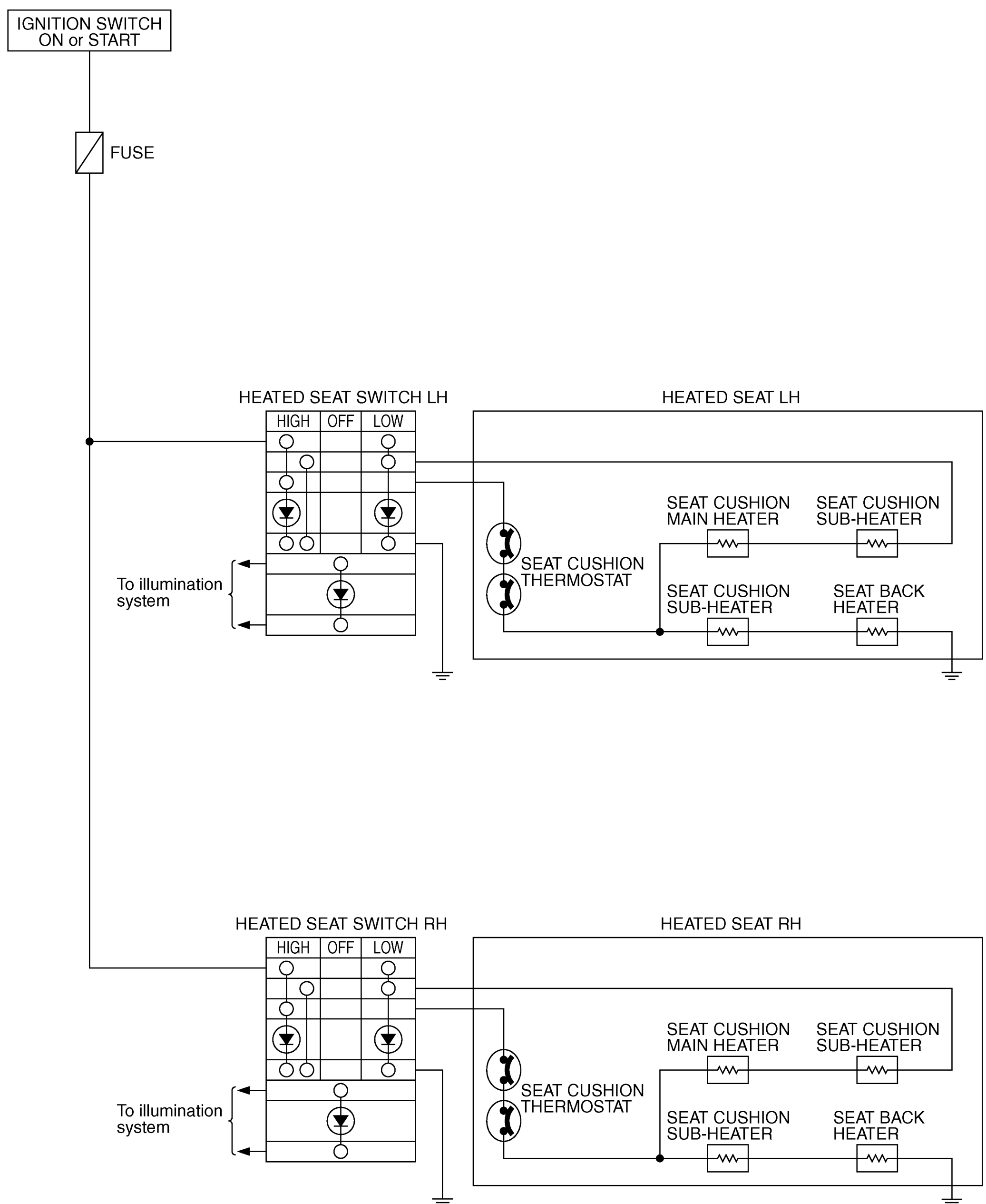
TIWB0074E

HEATED SEAT

PFP:87335

Schematic

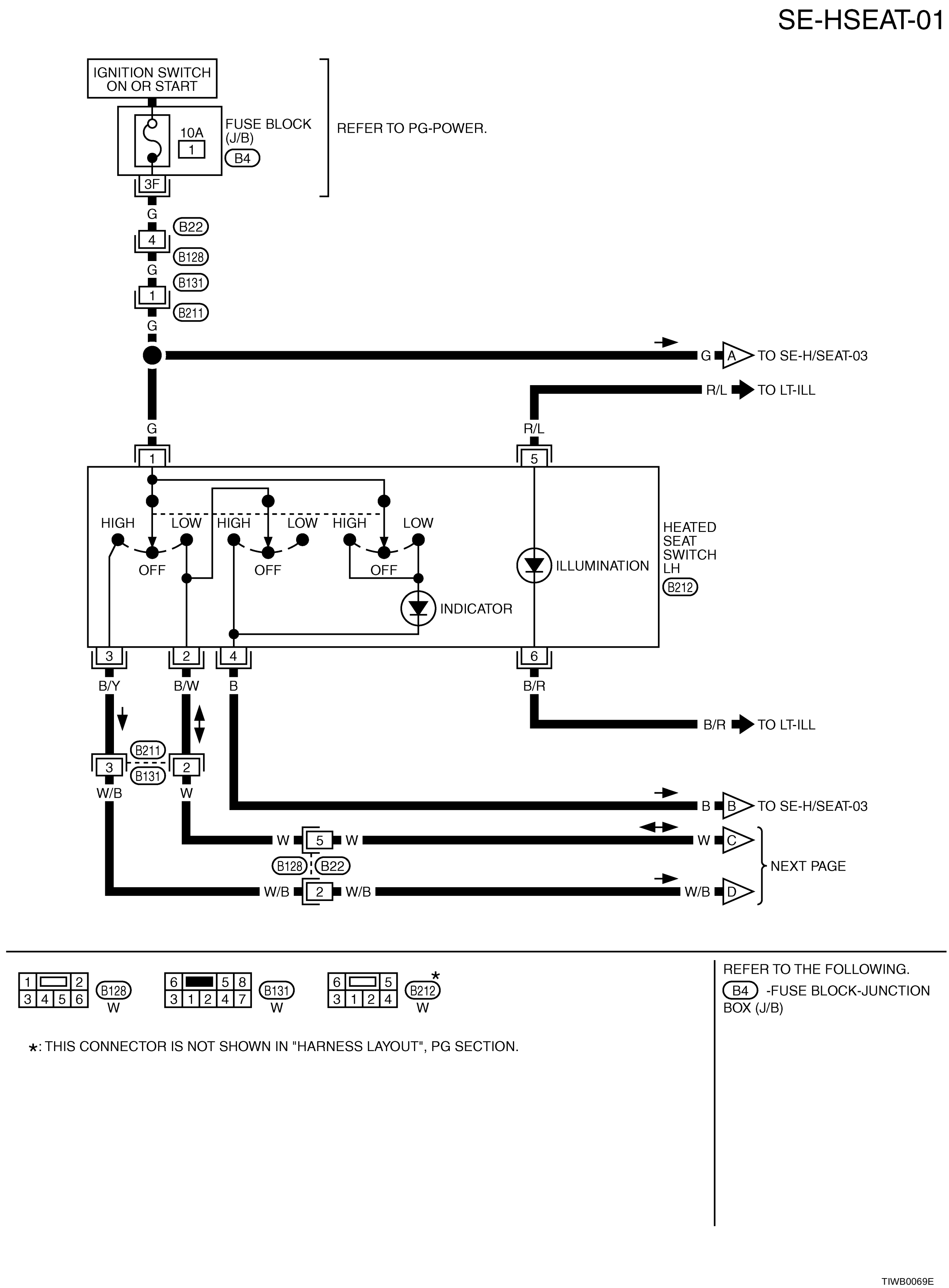
AIS005T7



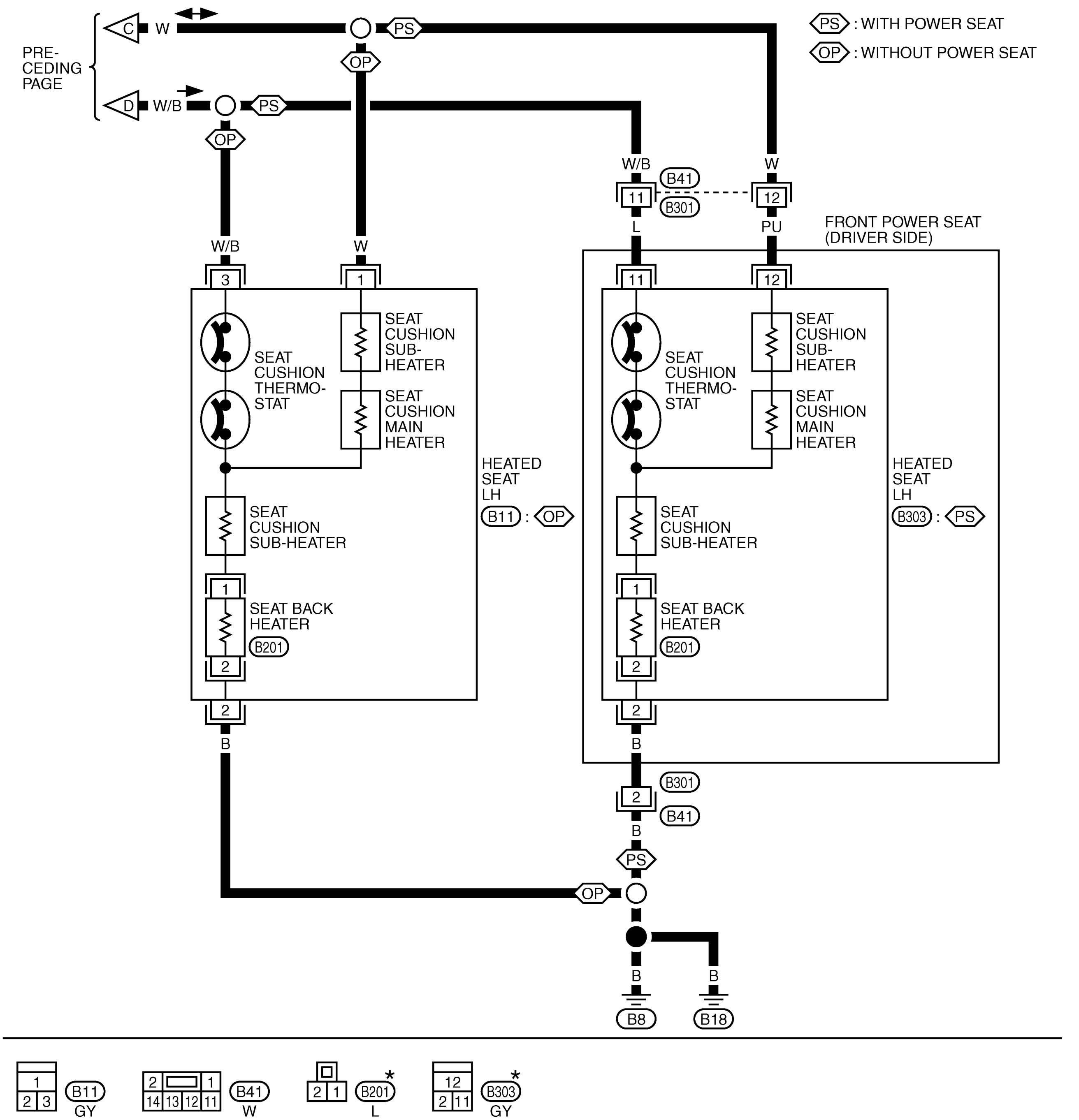
TIWB0031E

Wiring Diagram — HSEAT —

AIS005T8



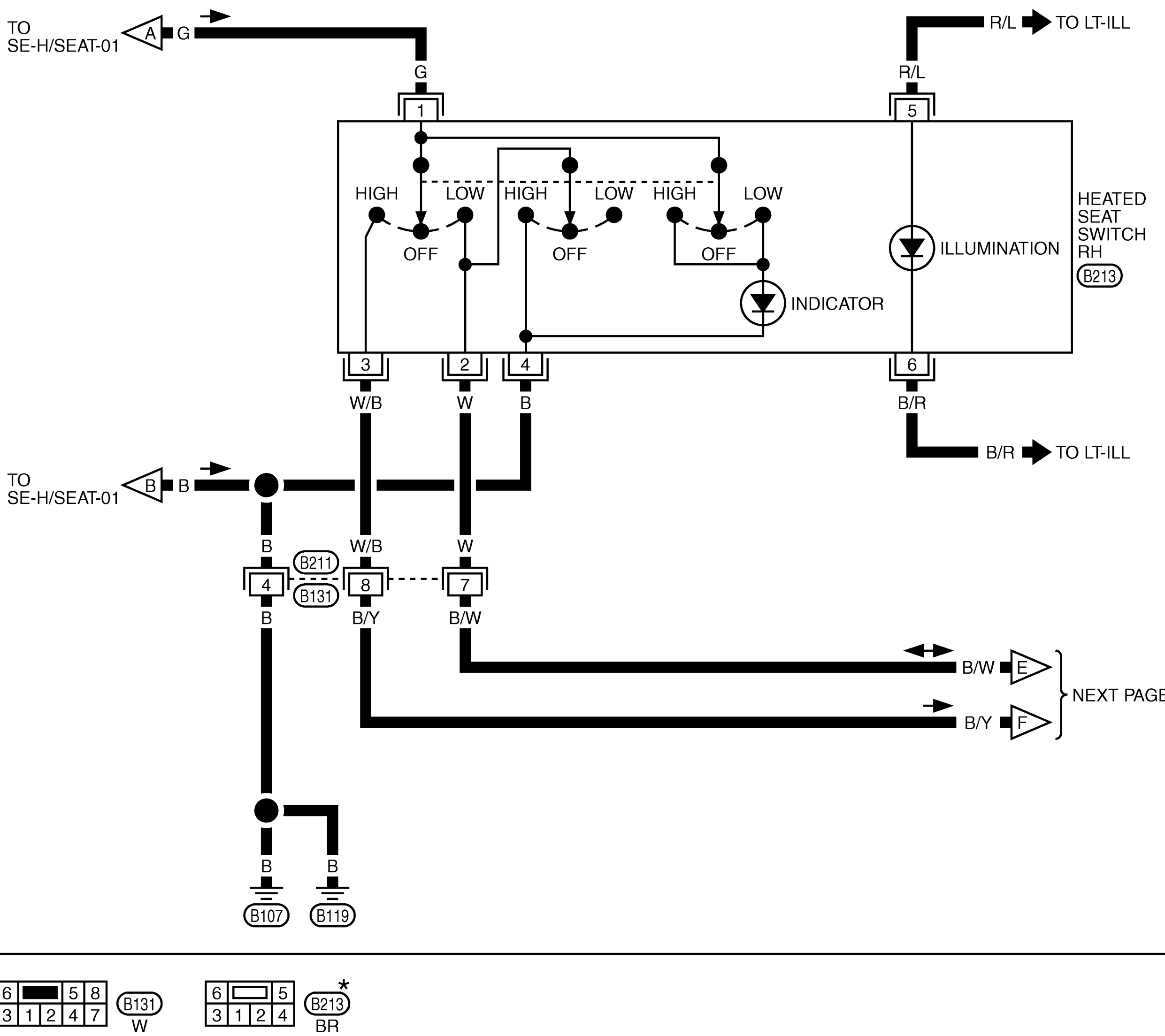
SE-HSEAT-02



*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TIWB0070E

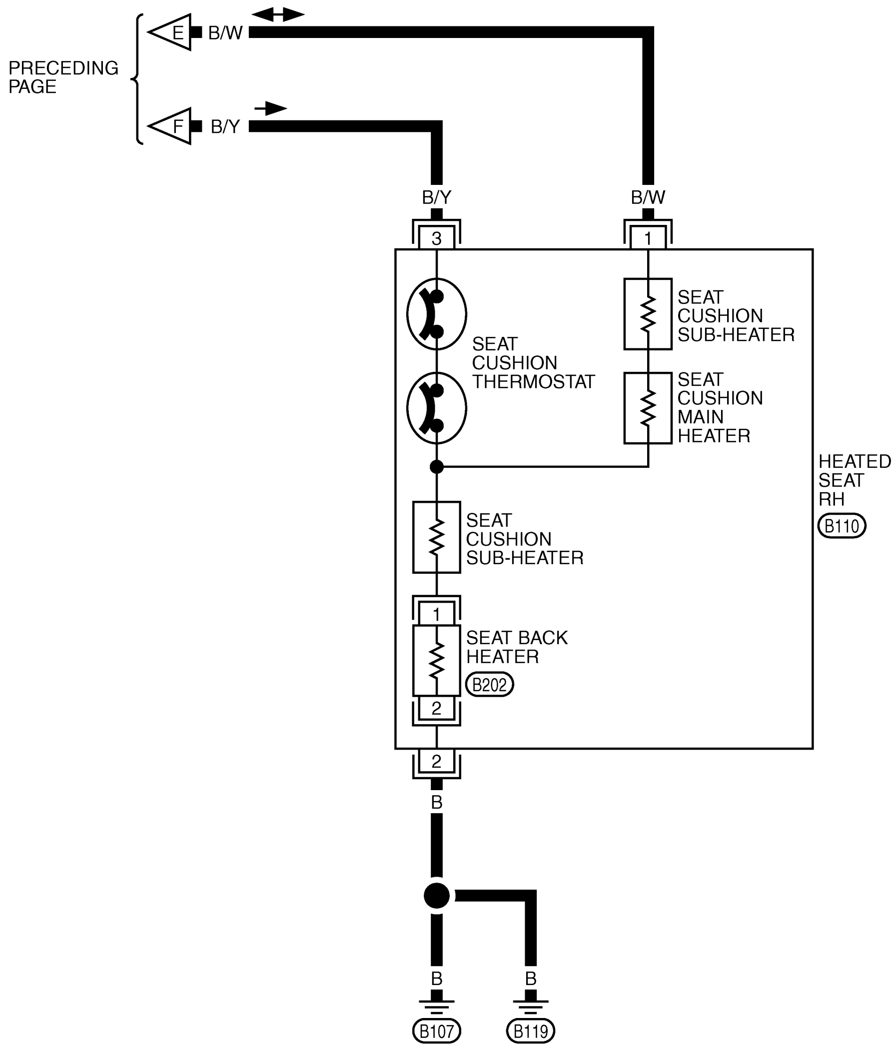
SE-HSEAT-03

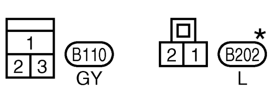


*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TIWB0071E

SE-HSEAT-04





*: THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT", PG SECTION.

TIWB0072E

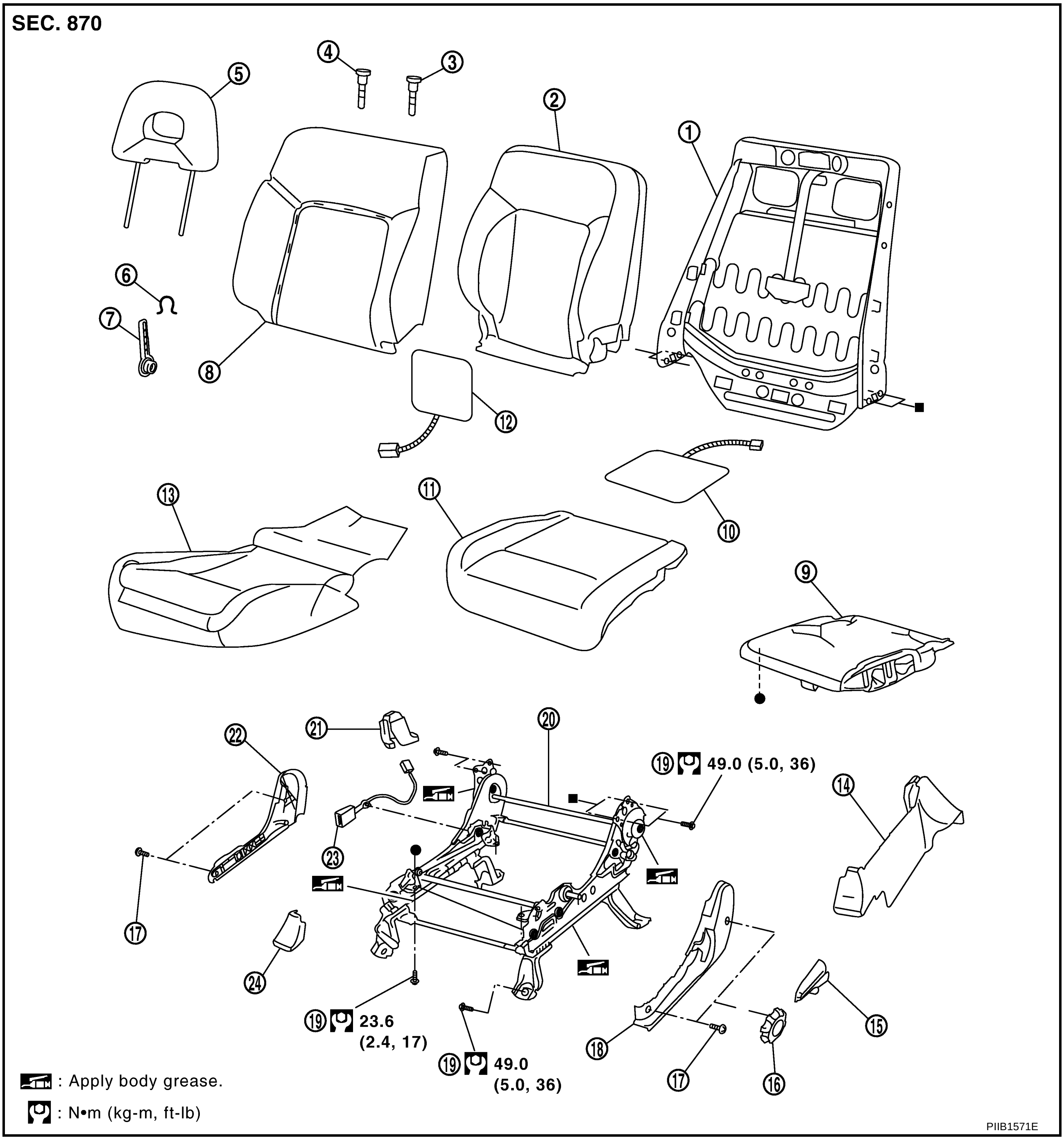
FRONT SEAT

PFP:87000

Component Parts Drawing

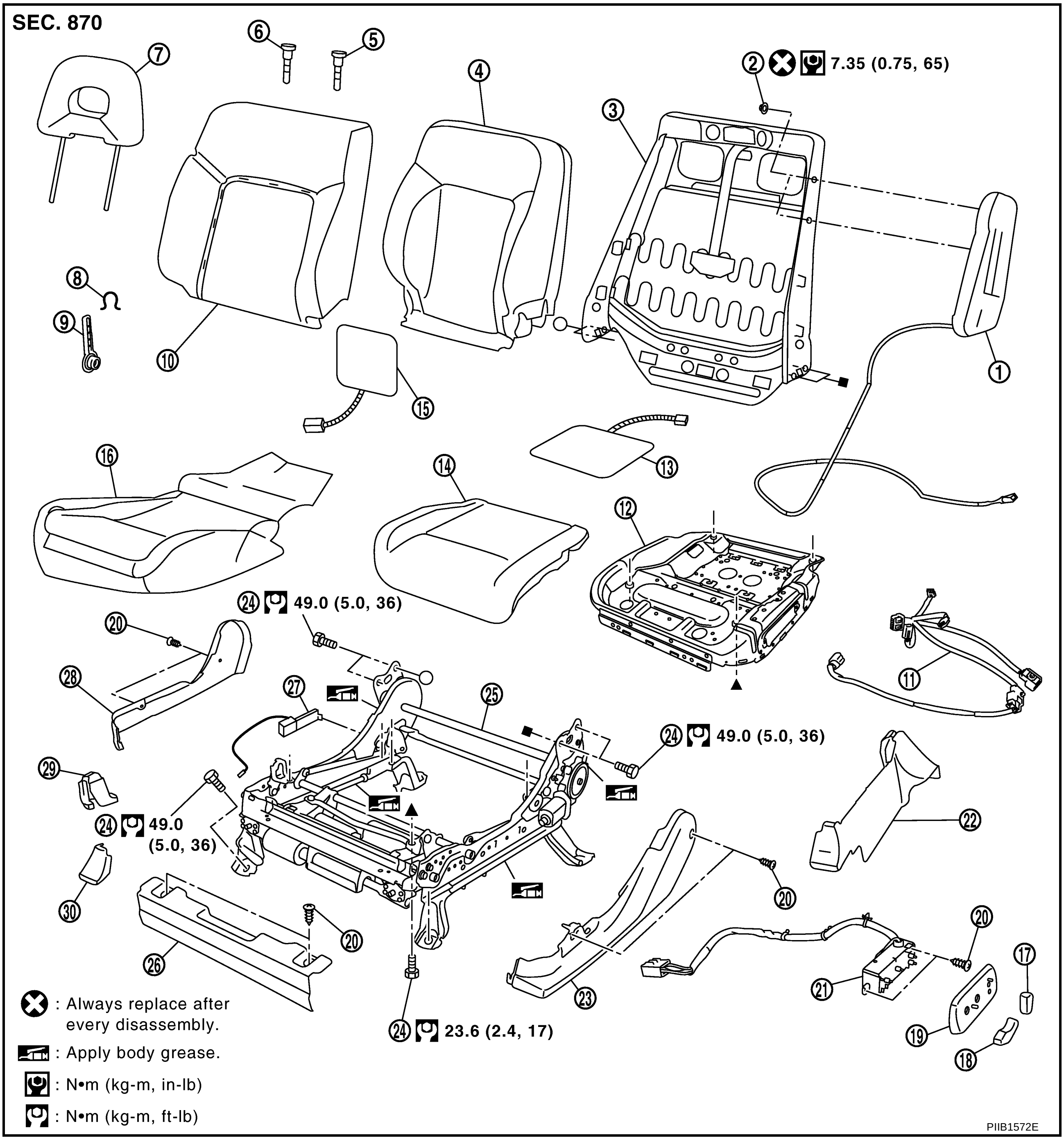
AIS005TA

MANUAL SEAT



1.	Seatback frame	2.	Seatback trim	3.	Headrest holder (locked)
4.	Headrest holder (free)	5.	Headrest	6.	Snap pin
7.	Lumbar support lever knob	8.	Seatback pad	9.	Seat cushion frame
10.	Seat cushion heater unit	11.	Seat cushion pad	12.	Seatback heater unit
13.	Seat cushion trim	14.	Outer slide cover	15.	Reclining lever knob
16.	Lifter dial	17.	Screw	18.	Seat cushion outer finisher
19.	Bolt	20.	Front seat adjuster	21.	Rear inner slide cover
22.	Seat cushion inner finisher	23.	Seat belt buckle	24.	Front inner slide cover

POWER SEAT

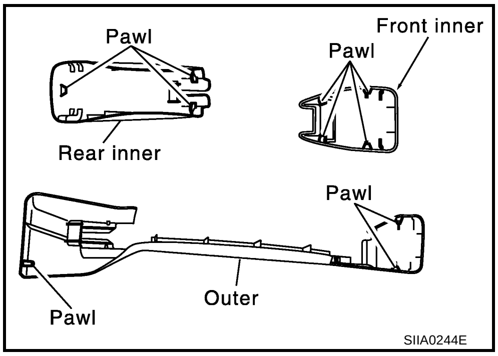


1. Side air bag module	2. Nut	3. Seatback frame
4. Seatback trim	5. Headrest holder (locked)	6. Headrest holder (free)
7. Headrest	8. Snap pin	9. Lumbar support lever knob
10. Seatback pad	11. Power seat harness	12. Seat cushion frame
13. Seat cushion heater unit	14. Seat cushion pad	15. Seatback heater unit
16. Seat cushion trim	17. Seat reclining switch	18. Seat slide & lifter switch
19. Seat switch escutcheon	20. Screw	21. Power seat switch
22. Outer slide cover	23. Seat cushion outer finisher	24. Bolt
25. Front seat adjuster	26. Seat cushion front finisher	27. Seat belt buckle
28. Seat cushion inner finisher	29. Rear inner slide cover	30. Front inner slide cover

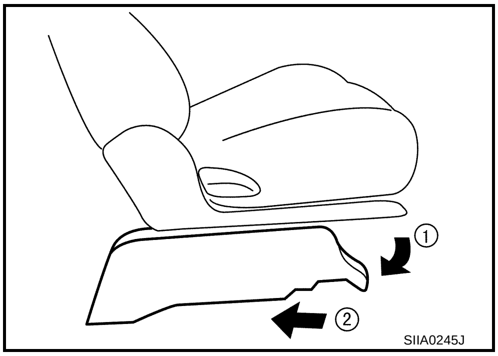
Removal and Installation
AIS005TB

REMOVAL

1. Remove slide cover.



NOTE:
1. Slide the seat forward.
2. Remove the outer slide cover front fitting and then remove the rear fitting.
3. Pull cover up rearward.



2. Remove vehicle mounting bolts.
3. Disconnect the connector and remove seat.

NOTE:
When removing and installing, using clothes, protect the parts from damage where it may interfere with others.

INSTALLATION

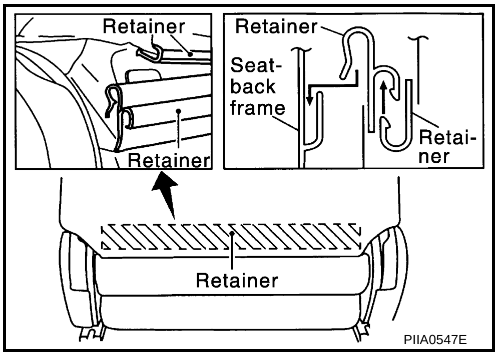
Install in the reverse order of removal.

Disassembly and Assembly of Seatback
AIS005TC

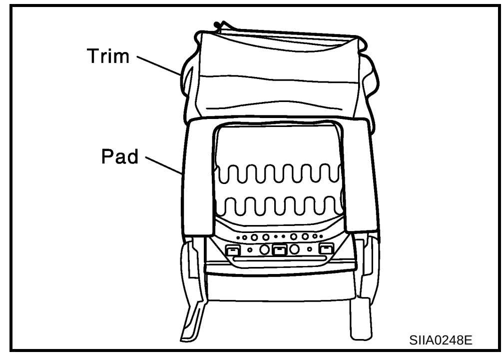
MANUAL SEAT

Disassembly

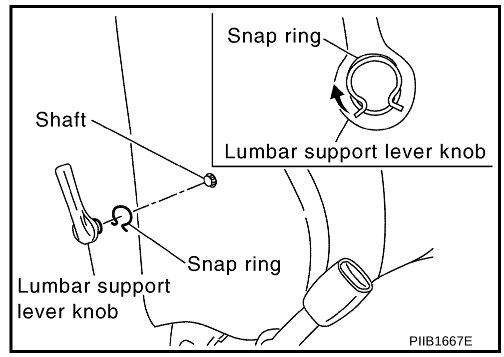
1. Disengage retainers in the lower part at the back of seatback.



2. Pull off seatback trim.

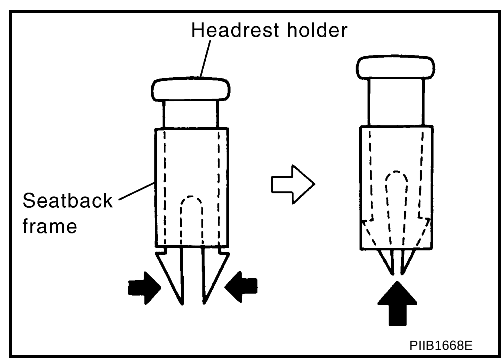


3. Pull snap ring upward, and remove lumbar support lever knob front seatback frame (for driver seat).



4. Pick up and push up the headrest holder tab to remove.

   NOTE:
   Before installing the headrest holder, check its front, rear, right and left orientation for correct installation.



5. Remove seatback trim.

Assembly

Assemble in the reverse order of disassembly.

Removal of Seatback Assembly

To remove seatback assembly, follow steps 1 - 2. After that, remove bolts.

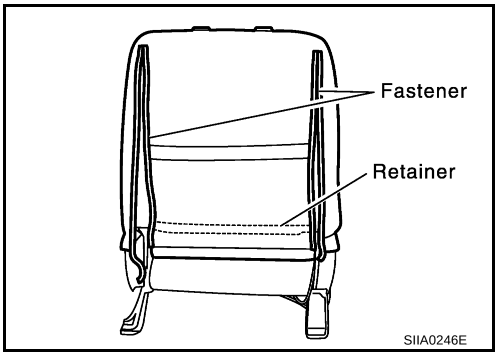
NOTE:
When assembling the seatback frame, make sure that the reclining device are locked on both sides, and be sure to temporarily tighten the bolts and make sure that the seatback frame is not warped, then tighten them finally.

Installation of Seatback Assembly

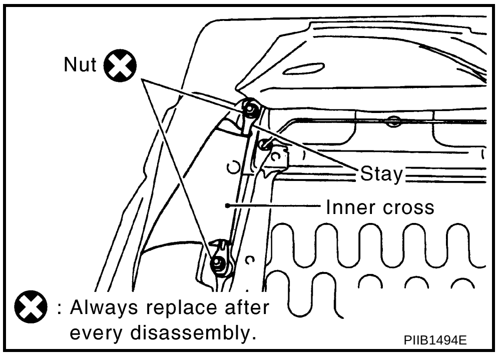
Install in the reverse order of removal.

POWER SEAT
Disassembly

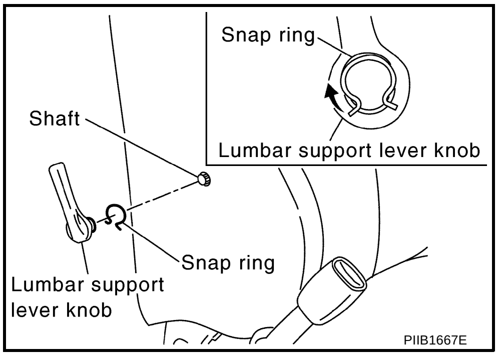
1. Unfasten fastener on the back of seatback.
2. Remove lower retainer.



3. Remove nuts, and remove inner cross fixed stay.

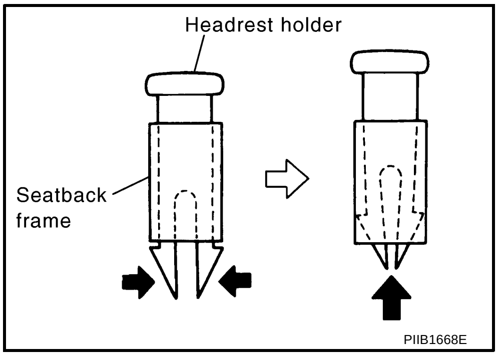


4. Pull snap ring upward, and remove lumbar support lever knob front seatback frame (for driver seat).



5. Pick up and push up the headrest holder tab to remove.

   NOTE:
   Before installing the headrest holder, check its front, rear, right and left orientation for correct installation.



6. After removing seatback trim & pad, remove hog rings to separate pad and trim.

Assembly

Assemble in the reverse order of disassembly.

Removal of Seatback Assembly

To remove seatback assembly, follow steps 1 - 2. After that, disconnect side air bag connector and remove bolts.

A B C D E F G H SE J K L M

NOTE:
When assembling the seatback frame, make sure that the reclining device are locked on both sides, and be sure to temporarily tighten the bolts and make sure that the seatback frame is not warped, then tighten them finally.

Installation of Seatback Assembly

Install in the reverse order of removal.

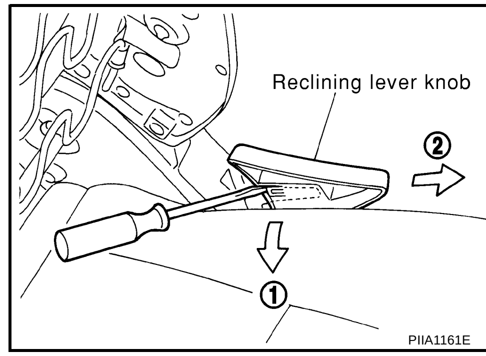
Disassembly and Assembly of Seat Cushion

AIS0065X

MANUAL SEAT

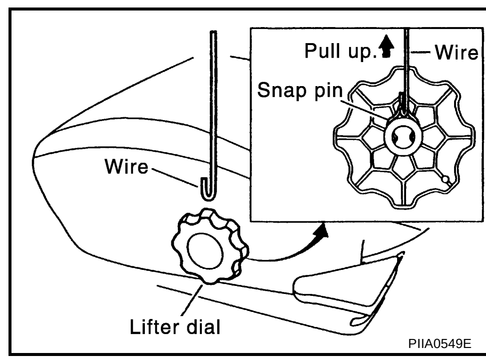
Disassembly

1. Pull up tabs of reclining lever from inside. Slide the knob forward for removal.



PIIA1161E

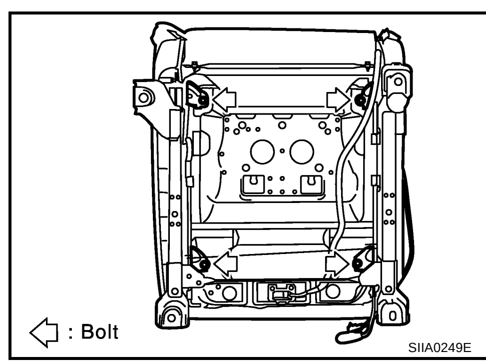
2. Hang a wire on the snap ring, and pull upward to remove. Remove lifter dial.



PIIA0549E

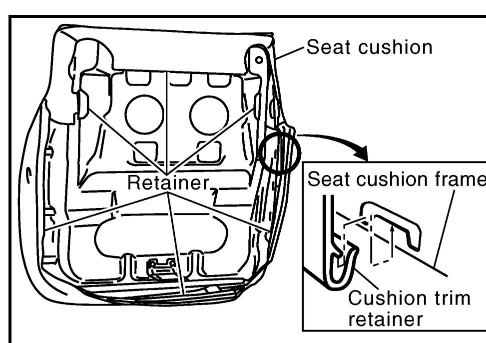
3. Remove seat harness and bolts from back of seat cushion.

   NOTE:
   When installing bolts, make sure both sides of the slide are locked. Be sure to temporarily tighten the bolts before final tightening.



SIIA0249E

4. Remove retainer from back side of the cushion.



PIIB0589E

5. Pull off trim and remove hog rings.

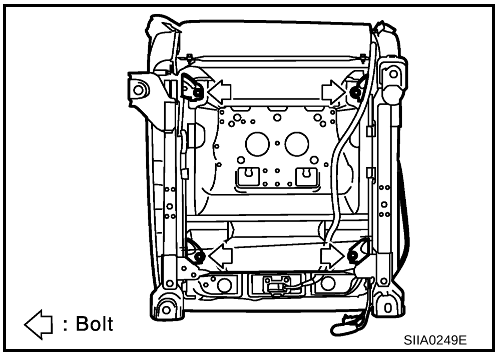
Assembly

Assemble in the reverse order of disassembly.

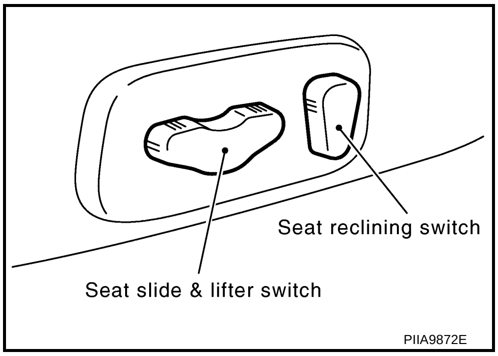
POWER SEAT

Disassembly

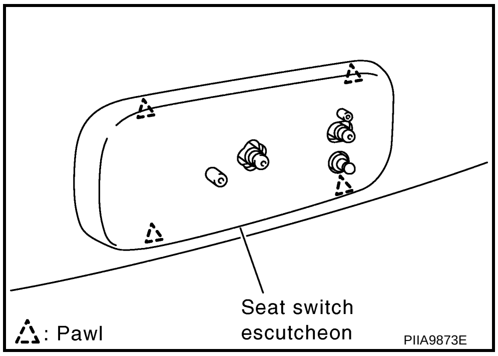
1. Remove seat harness and bolts from back of seat cushion.



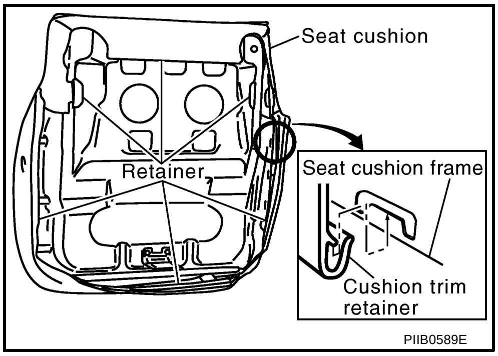
2. Remove the seat reclining switch and seat slide & lifter switch.



3. Remove the seat switch escutcheon.



4. Remove retainer from back side of the cushion.



5. Pull off trim and remove hog rings.

Assembly

Assemble in the reverse order of disassembly.

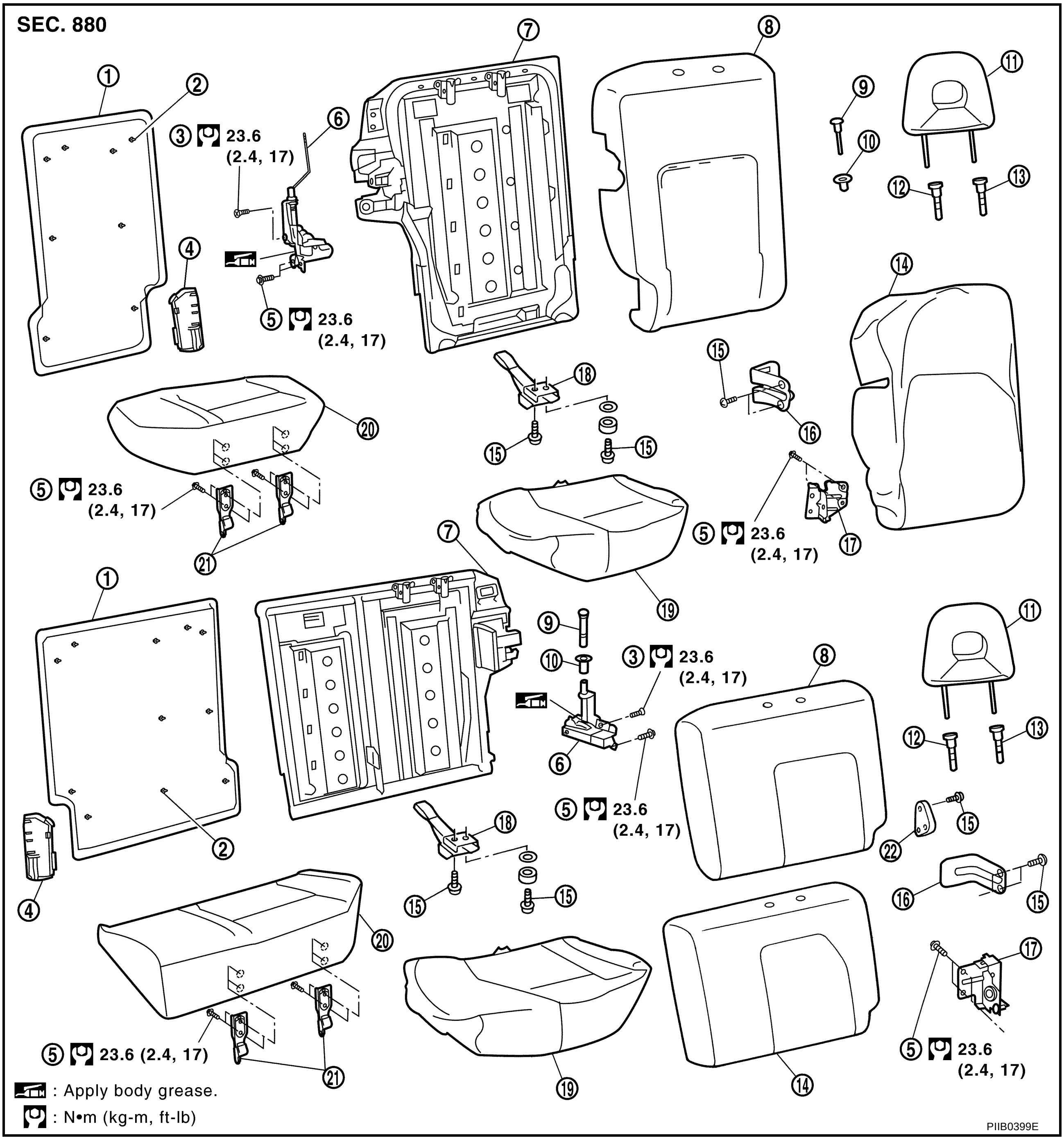
REAR SEAT

PFP:88300

Component Parts Drawing

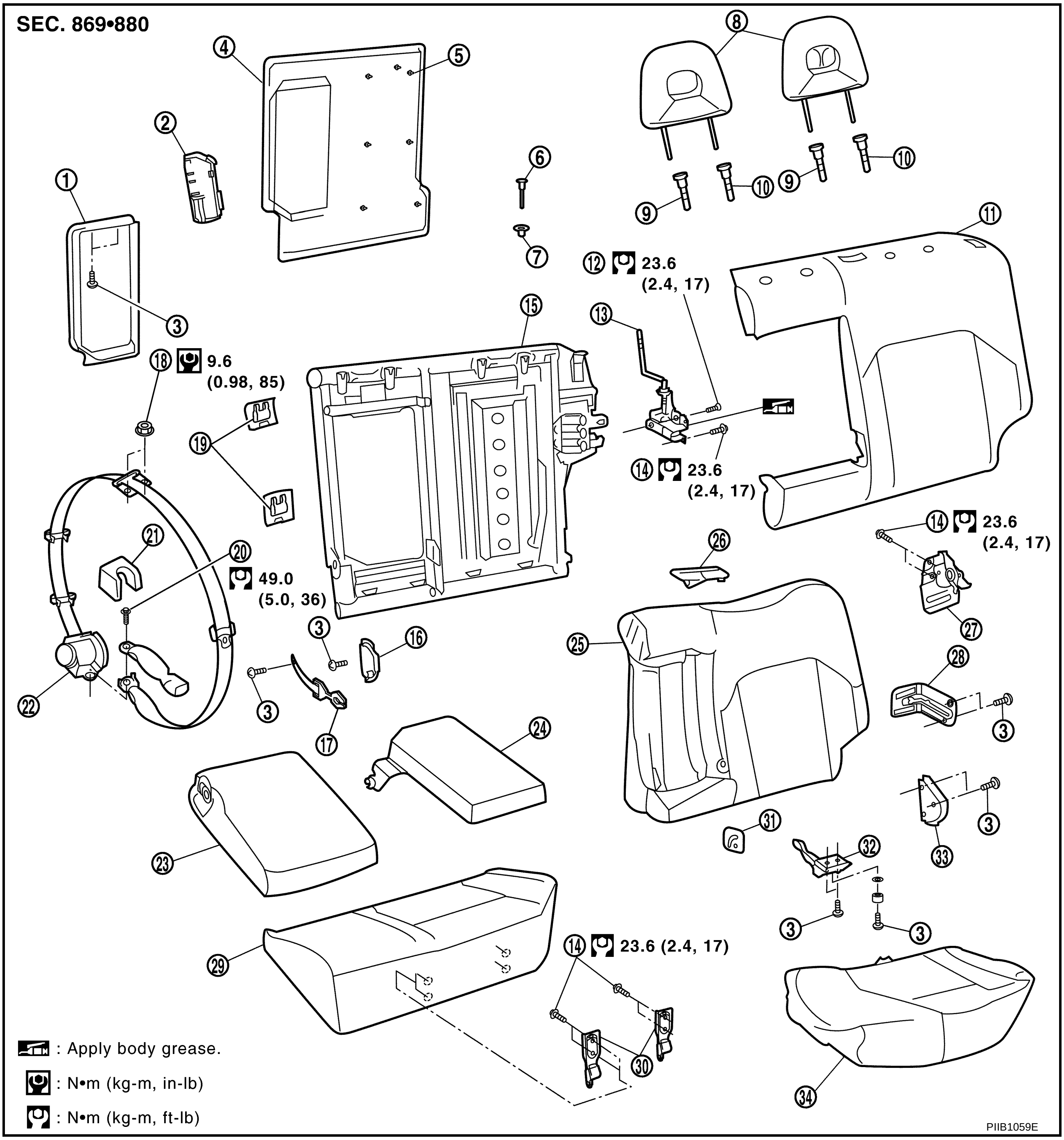
AIS005TF

STANDARD SEAT



1. Seatback board	2. Clip (C101)	3. TORX bolt
4. Inner hinge cover	5. Bolt	6. Seat lock
7. Seatback frame	8. Seatback pad	9. Seatback lock knob
10. Seatback lock knob finisher	11. Headrest	12. Headrest holder (free)
13. Headrest holder (locked)	14. Seatback trim	15. Screw
16. Seat lock protector	17. Seatback side bracket	18. Seat cushion lock
19. Seat cushion trim	20. Seat cushion pad	21. Seat cushion stay
22. Side hinge cover		

SEAT WITH ARMREST



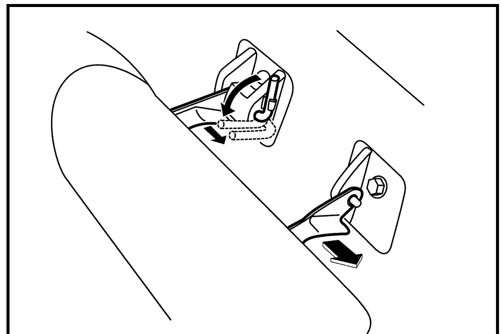
1. Seatback board finisher	2. Inner hinge cover	3. Screw
4. Seatback board	5. Clip (C101)	6. Seatback lock knob
7. Seatback knob finisher	8. Headrest	9. Headrest holder (free)
10. Headrest holder (locked)	11. Seatback pad	12. TORX bolt
13. Seat lock	14. Bolt	15. Seatback frame
16. Armrest bracket cover (RH)	17. Clip	18. Nut
19. Tonneau cover hook	20. Anchor bolt	21. Retractor cover
22. Seat belt (center)	23. Armrest	24. Armrest lid board
25. Seatback trim	26. Seat belt escutcheon	27. Seatback side bracket
28. Seat lock protector	29. Seat cushion pad	30. Seat cushion stay
31. Armrest bracket cover (LH)	32. Seat cushion lock	33. Side hinge cover
34. Seat cushion trim		

Removal and Installation

AIS005TG

SEAT CUSHION

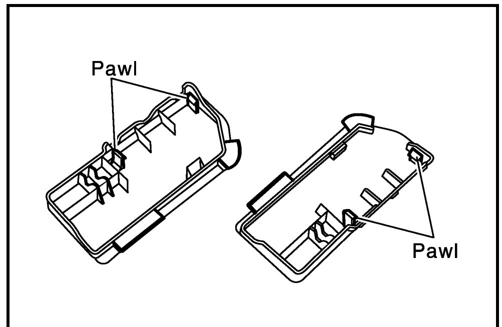
1. Lift to fold seat cushion up.
2. Pivot pin on rear seat striker downward. Slide it to left of vehicle.
3. Slide the cushion to the left side of the vehicle. Remove it from the striker.



SIIA0250J

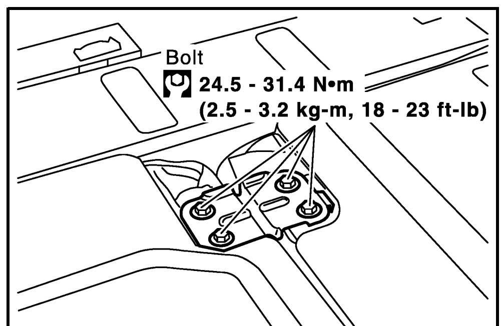
SEATBACK

1. Remove inner hinge cover.



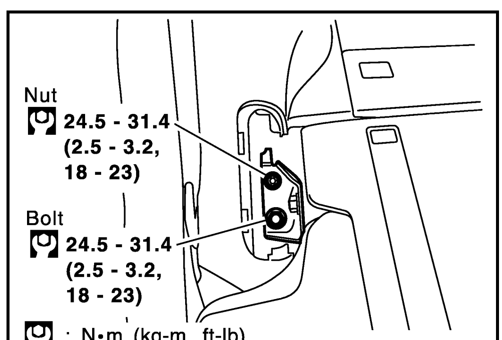
SIIA0251E

2. Remove bolts on rear seat center bracket.



SIIA0252E

3. Remove seatback side bracket nuts and bolts from body inside panel.

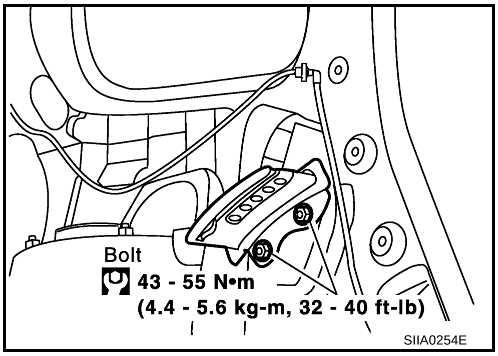


SIIA0253E

4. Remove seatback.

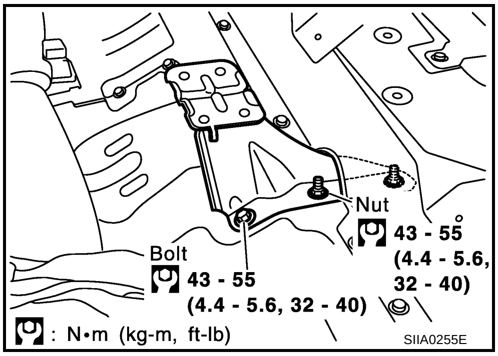
REAR SEAT STRIKER (SIDE)

1. Remove luggage side lower finisher. Refer to EI-36, "Removal and Installation" .
2. Remove bolts.
3. Remove rear seat striker.



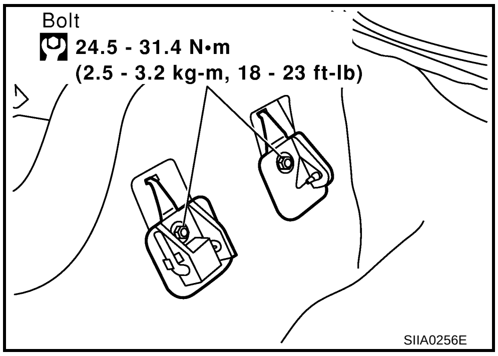
REAR SEAT CENTER BRACKET

1. Remove rear seatback.
2. Remove nuts and bolt.
3. Remove rear seat center bracket.



REAR SEAT STRIKER (FLOOR)

1. Remove rear seat cushion.
2. Remove bolt.
3. Remove rear seat striker.

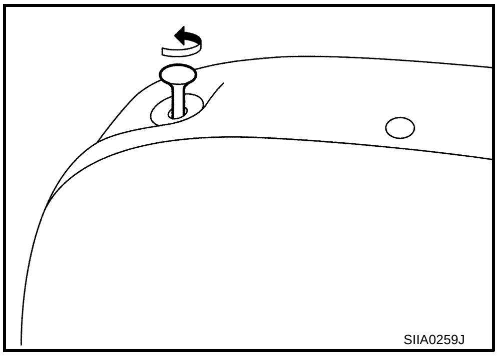


Disassembly and Assembly

AIS005TH

REAR SEATBACK LOCK KNOB

Turn knob counterclockwise to remove.

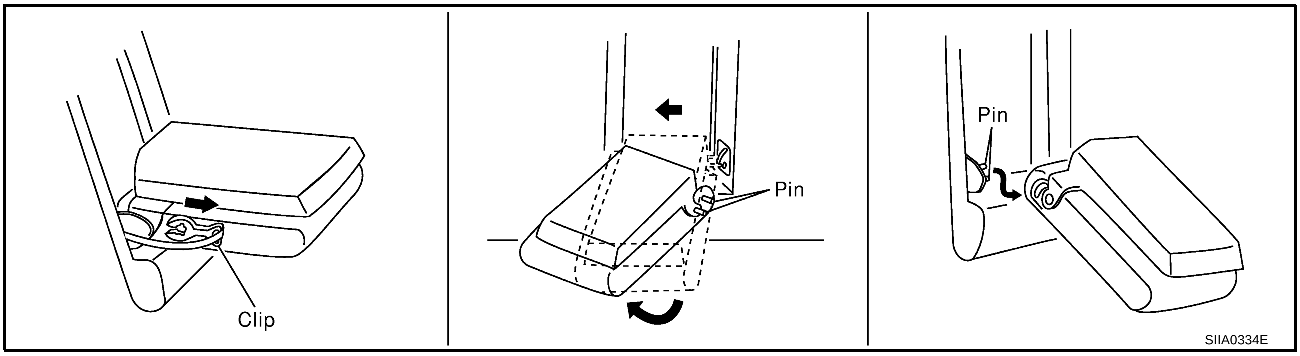


ARMREST

1. Push armrest and lid forward. Remove clip.
2. Slide armrest and lid to the left, and pull out the pin from the hole on the seatback.

A B C D E F G H SE J K L M

3. Slide armrest and lid to the right and remove from the seatback pin.



SECTION SRS

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AHS000QA

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for SRS “AIR BAG” and “SEAT BELT PRE-TENSIONER” Service

AHS000QB

- Do not use electrical test equipment to check SRS circuits unless instructed to in this Service Manual.
- Before servicing the SRS, turn ignition switch OFF, disconnect both battery cables and wait at least 3 minutes.
  For approximately 3 minutes after the cables are removed, it is still possible for the air bag and seat belt pre-tensioner to deploy. Therefore, do not work on any SRS connectors or wires until at least 3 minutes have passed.
- Diagnosis sensor unit must always be installed with their arrow marks “⇐” pointing towards the front of the vehicle for proper operation. Also check diagnosis sensor unit for cracks, deformities or rust before installation and replace as required.
- The spiral cable must be aligned with the neutral position since its rotations are limited. Do not attempt to turn steering wheel or column after removal of steering gear.
- Handle air bag module carefully. Always place driver and front passenger air bag modules with the pad side facing upward and place front side air bag module standing with stud bolt side setting bottom.
- Conduct self-diagnosis to check entire SRS for proper function after replacing any components.
- After air bag inflates, the front instrument panel assembly should be replaced if damaged.

Wiring Diagrams and Trouble Diagnosis

AHS000R4

When you read wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams" in GI section
- PG-2, "POWER SUPPLY ROUTING" in PG section

When you perform trouble diagnosis, refer to the following:

- GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section

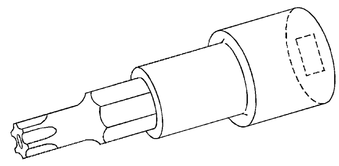
Check for any service bulletins before servicing the vehicle.

PREPARATION

PFP:00002

Commercial Service Tools

AHS000QE

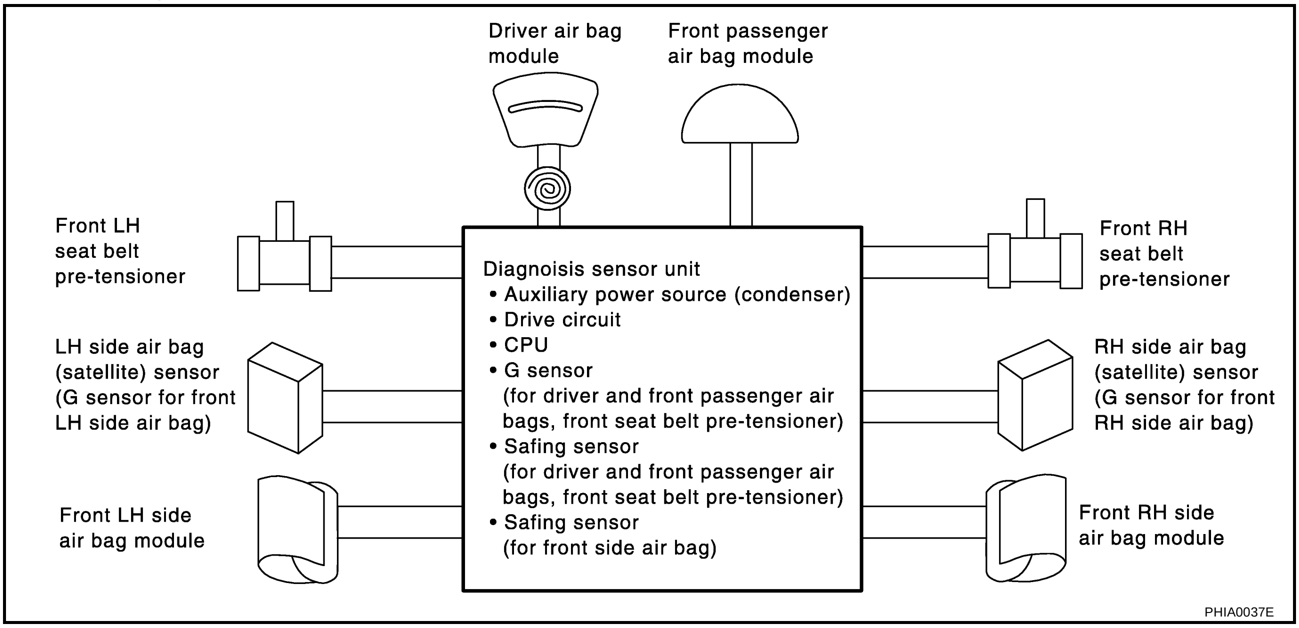
Tool name		Description
Tamper resistant TORX bit		Size: T30

SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

PFP:28556

SRS Configuration

AHS000QF



The air bag deploys if the diagnosis sensor unit activates while the ignition switch is in the ON or START position.

The collision modes for which supplemental restraint systems are activated are different among the SRS systems. For example, the driver air bag module and front passenger air bag module are activated in a frontal collision but not in a side collision.

SRS configurations which are activated for some collision modes are as follows;

SRS configuration	Frontal collision	Left side collision	Right side collision
Driver air bag module	×	—	—
Front passenger air bag module	×	—	—
Front LH seat belt pre-tensioner	×	—	—
Front RH seat belt pre-tensioner	×	—	—
Front LH side air bag module	—	×	—
Front RH side air bag module	—	—	×

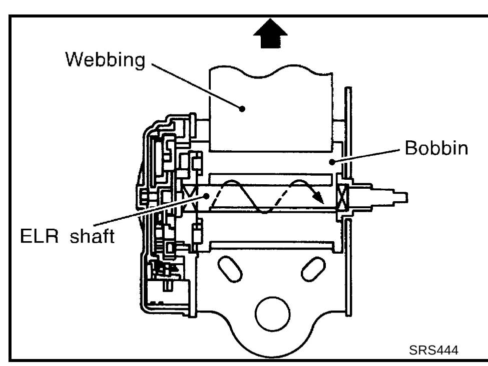
Front Seat Belt Pre-Tensioner with Load Limiter

AHS000QG

The seat belt pre-tensioner system with load limiter is installed to both the driver's seat and the front passenger's seat. It operates simultaneously with the SRS air bag system in the event of a frontal collision with an impact exceeding a specified level.

When the frontal collision with an impact exceeding a specified level occurs, seat belt slack resulting from clothing or other factors is immediately taken up by the pre-tensioner. Vehicle passengers are securely restrained.

When passengers in a vehicle are thrown forward in a collision and the restraining force of the seat belt exceeds a specified level, the load limiter permits the specified extension of the seat belt by the twisting of the ELR shaft, and a relaxation of the chest-area seat belt web tension while maintaining force.

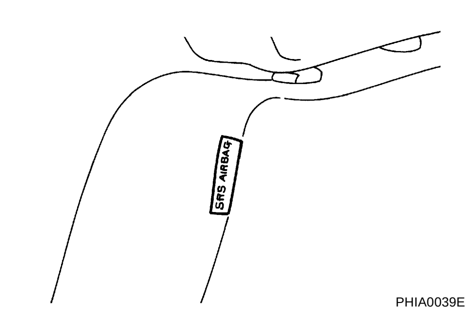


Front Side Air Bag

AHS000QH

Front side air bag is built-in type.
The front seatbacks with built-in type side air bag have the labels shown in figure at right.

Front seat back with front side air bag



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TROUBLE DIAGNOSIS

PFP:00004

Trouble Diagnosis Introduction

AHS000QI

CAUTION:

- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harness can be identified by yellow and/or orange harnesses or harness connector.**
- **Do not attempt to repair, splice or modify the SRS wiring harness. If the harness is damaged, replace it with a new one.**
- **Keep ground portion clean.**

DIAGNOSIS FUNCTION

The SRS self-diagnosis results can be read by using “AIR BAG” warning lamp and/or CONSULT-II.
The User mode is exclusively prepared for the customer (driver). This mode warns the driver of a system malfunction through the operation of the “AIR BAG” warning lamp.
The Diagnosis mode allows the technician to locate and inspect the malfunctioning part.
The mode applications for the “AIR BAG” warning lamp and CONSULT-II are as follows:

	User mode	Diagnosis mode	Display type
“AIR BAG” warning lamp	X	X	ON-OFF operation
CONSULT-II	—	X	Monitoring

NOTE:
Seat belt pre-tensioner malfunction is indicated by “AIR BAG” warning lamp.

HOW TO PERFORM TROUBLE DIAGNOSES FOR QUICK AND ACCURATE REPAIR

A good understanding of the malfunction conditions can make troubleshooting faster and more accurate.
In general, each customer feels differently about a malfunction. It is important to fully understand the symptoms or conditions for a customer complaint.

Information from Customer

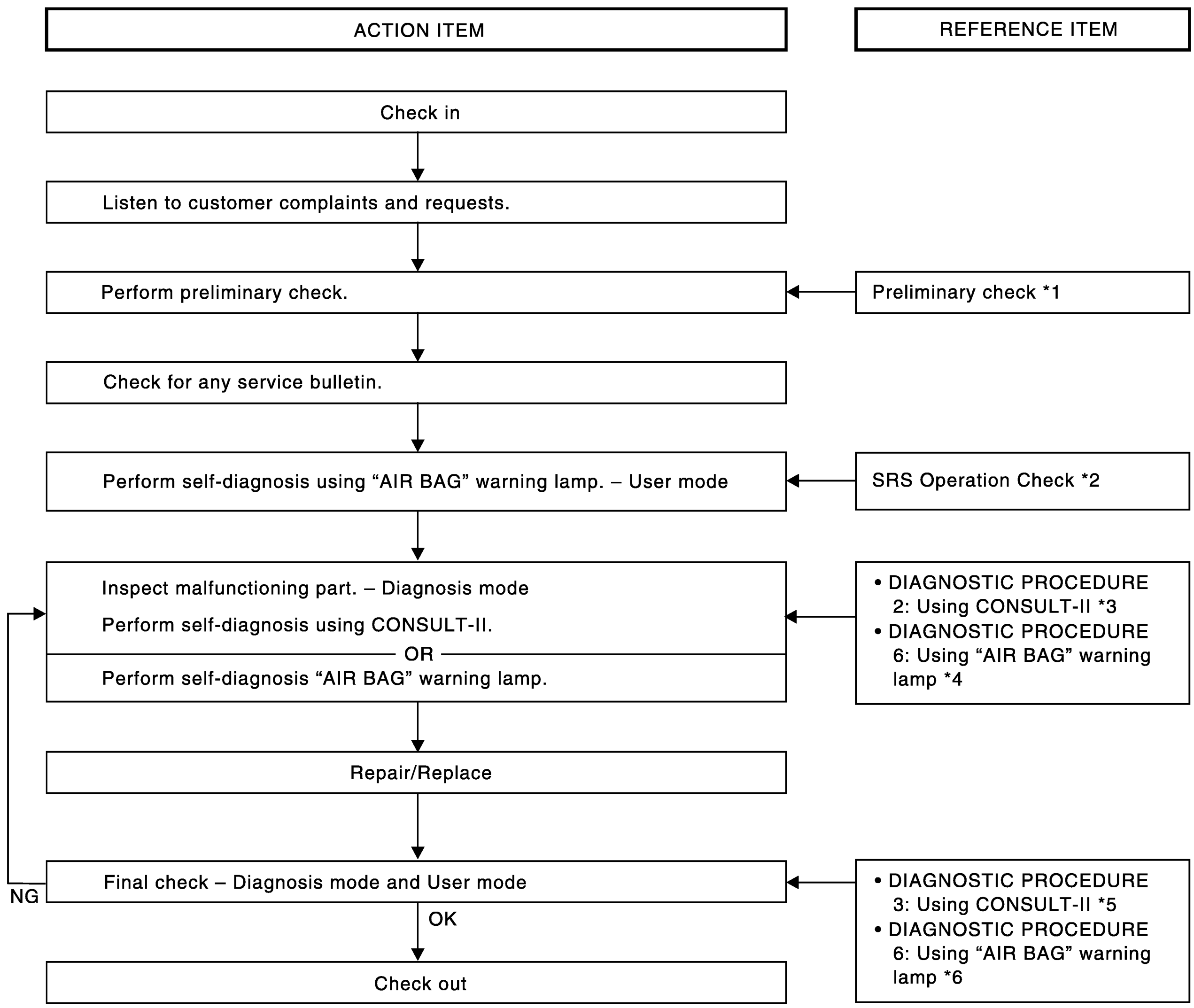
WHAT..... Vehicle model
WHEN..... Date, Frequencies
WHERE..... Road conditions
HOW..... Operating conditions, Symptoms

Preliminary Check

Check that the following parts are in good order.

- Battery (Refer to SC-4, "How to Handle Battery" .)
- Fuse (Refer to SRS-9, "Wiring Diagram — SRS —" .)
- System component-to-harness connections

WORK FLOW



PHIA0217E

*1: SRS-6, "Preliminary Check".
*2: SRS-13, "SRS Operation Check".
*3: SRS-15, "DIAGNOSTIC PROCEDURE 2".
*4: SRS-24, "DIAGNOSTIC PROCEDURE 6".
*5: SRS-19, "DIAGNOSTIC PROCEDURE 3".
*6: SRS-24, "DIAGNOSTIC PROCEDURE 6".

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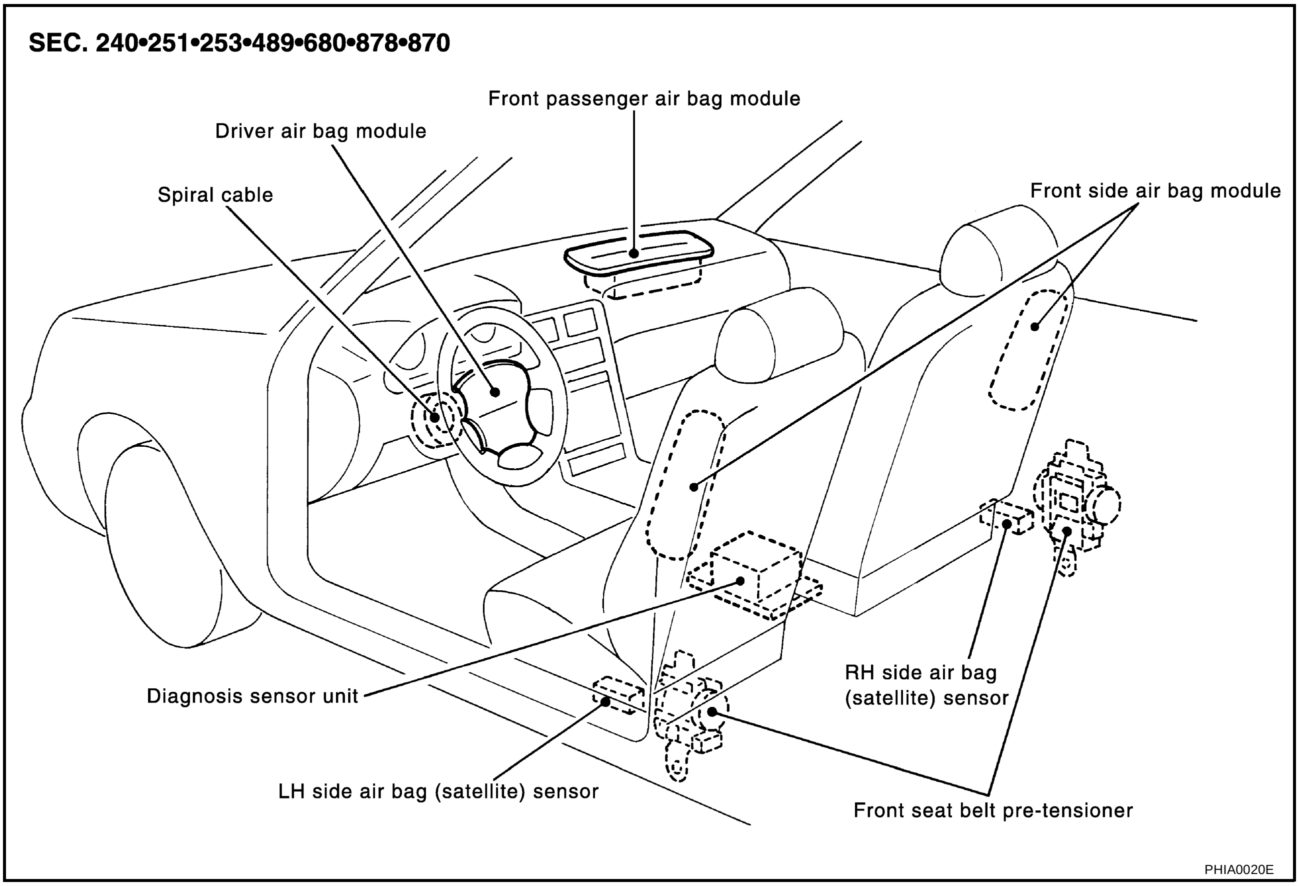
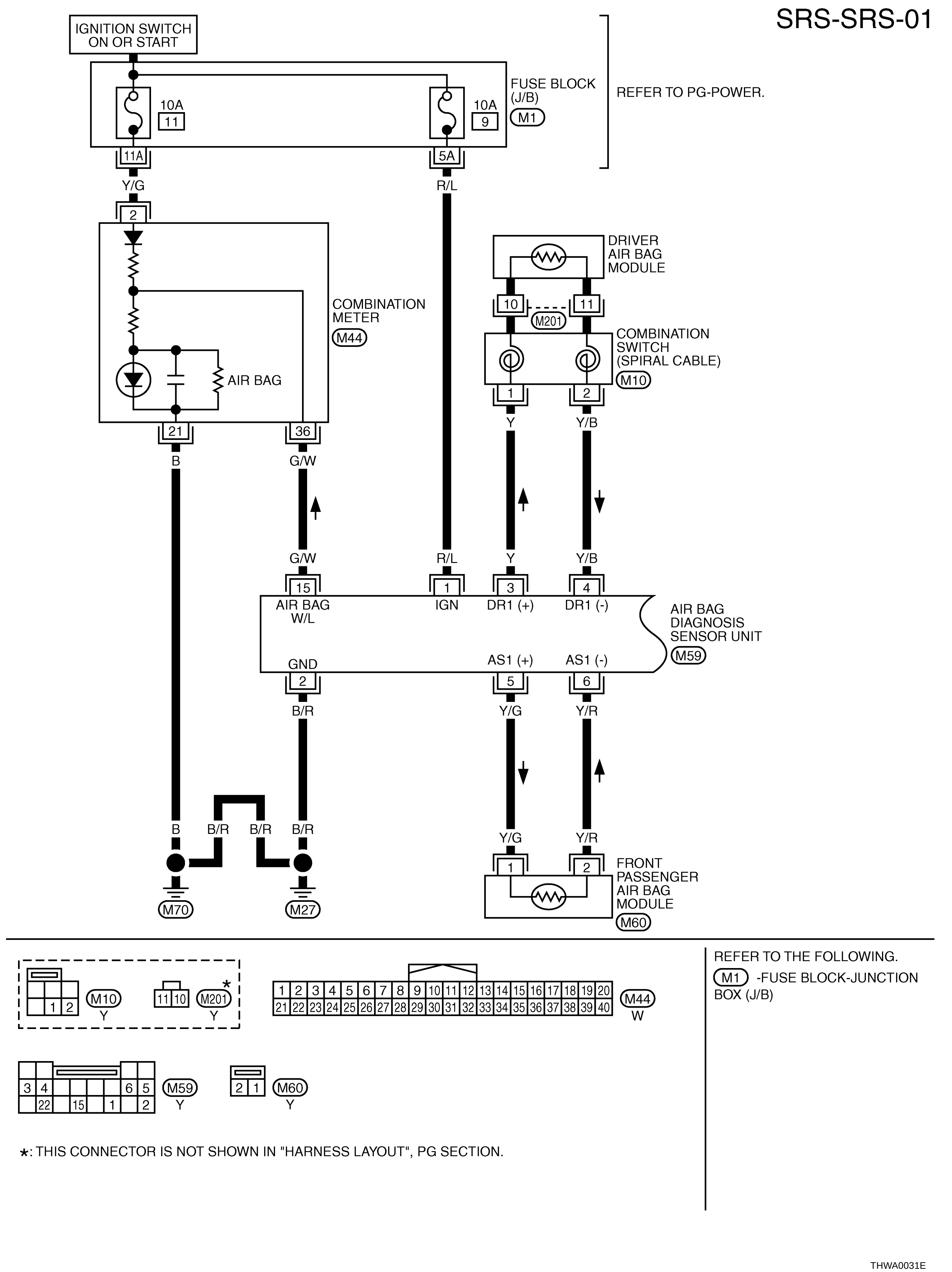
Component Parts Location

AHS000QJ

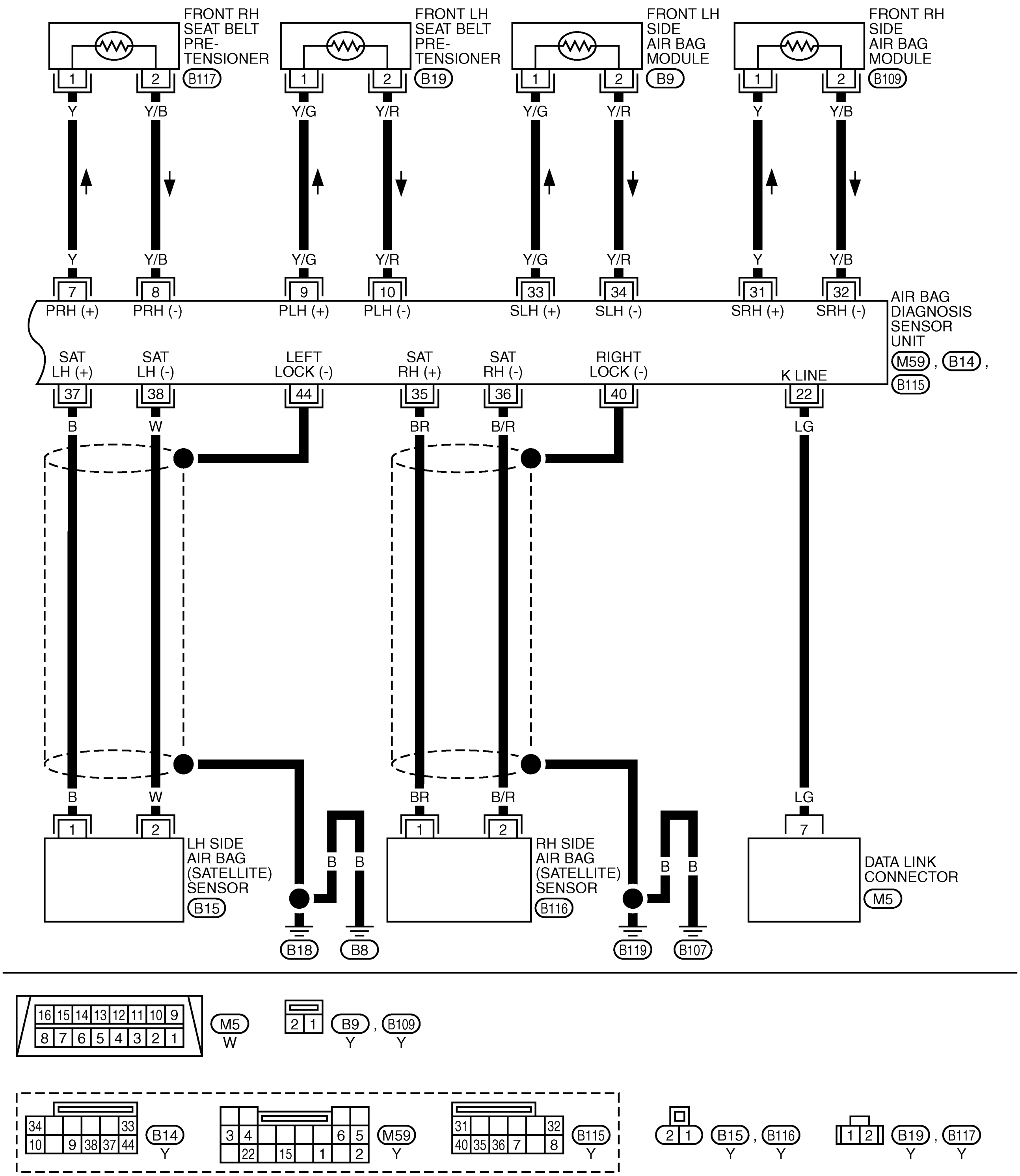


Wiring Diagram — SRS —

AHS000QK



SRS-SRS-02



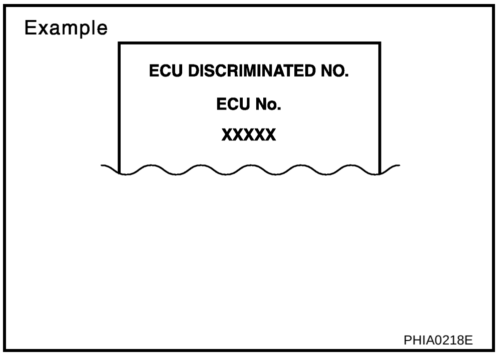
THWA0032E

CONSULT-II Function

AHS000QM

DIAGNOSIS MODE FOR CONSULT-II

- "SELF-DIAG [CURRENT]"
  A current Self-diagnosis result (also indicated by the number of warning lamp flashes in the Diagnosis mode) is displayed on the CONSULT-II screen in real time. This refers to a malfunctioning part requiring repairs.
- "SELF-DIAG [PAST]"
  Diagnosis results previously stored in the memory are displayed on the CONSULT-II screen. The stored results are not erased until memory erasing is executed.
- "TROUBLE DIAG RECORD"
  With TROUBLE DIAG RECORD, diagnosis results previously erased by a reset operation can be displayed on the CONSULT-II screen.
- "ECU DISCRIMINATED NO."
  The diagnosis sensor unit for each vehicle model is assigned with its own, individual classification number. This number will be displayed on the CONSULT-II screen, as shown. When replacing the diagnosis sensor unit, refer to the part number for the compatibility. After installation, replacement with a correct unit can be checked by confirming this classification number on the CONSULT-II screen.
  After repair, make sure the discriminated number of diagnosis sensor unit installed to vehicle are same. Refer to SRS-39, "ECU DISCRIMINATED NO." .

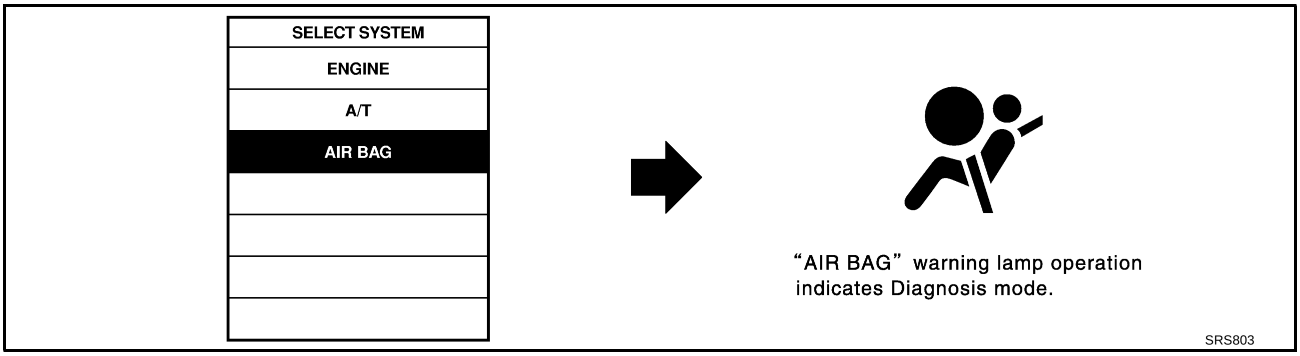


PHIA0218E

HOW TO CHANGE SELF-DIAGNOSIS MODE WITH CONSULT-II

From User Mode to Diagnosis Mode

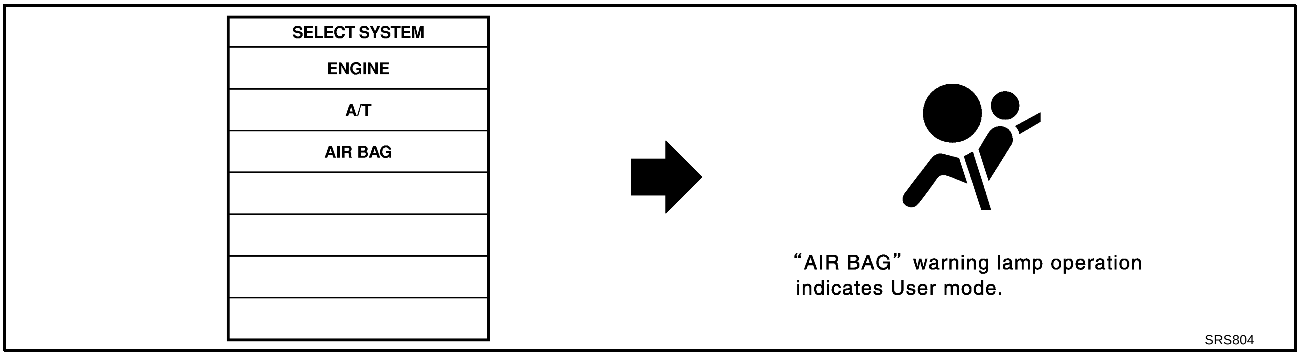
After selecting "AIR BAG" on the "SELECT SYSTEM" screen, User mode automatically changes to Diagnosis mode.



SRS803

From Diagnosis Mode to User Mode

To return to User mode from Diagnosis mode, touch "BACK" key of CONSULT-II until "SELECT SYSTEM" appears, then diagnosis mode automatically changes to User mode.

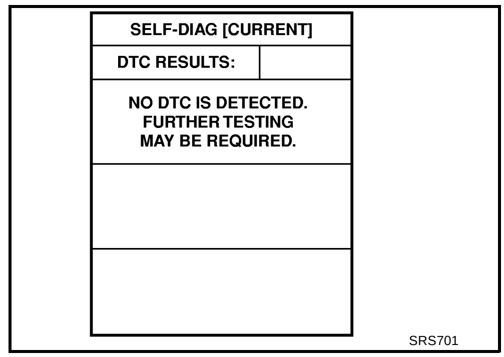


SRS804

HOW TO ERASE SELF-DIAGNOSIS RESULTS

- "SELF-DIAG [CURRENT]"
  A current Self-diagnosis result is displayed on the CONSULT-II screen in real time.
  After the malfunction is repaired completely, no malfunction is detected on "SELF-DIAG [CURRENT]".
- "SELF-DIAG [PAST]"
  Return to the "SELF-DIAG [CURRENT]" CONSULT-II screen by touching "BACK" key of CONSULT-II and select "SELF-DIAG [CURRENT]" in SELECT DIAG MODE. Touch "ERASE" in "SELF-DIAG [CURRENT]" mode.

  NOTE:
  If the memory of the malfunction in "SELF-DIAG [PAST]" is not erased, the User mode shows the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.
- "TROUBLE DIAG RECORD"
  The memory of "TROUBLE DIAG RECORD" cannot be erased.



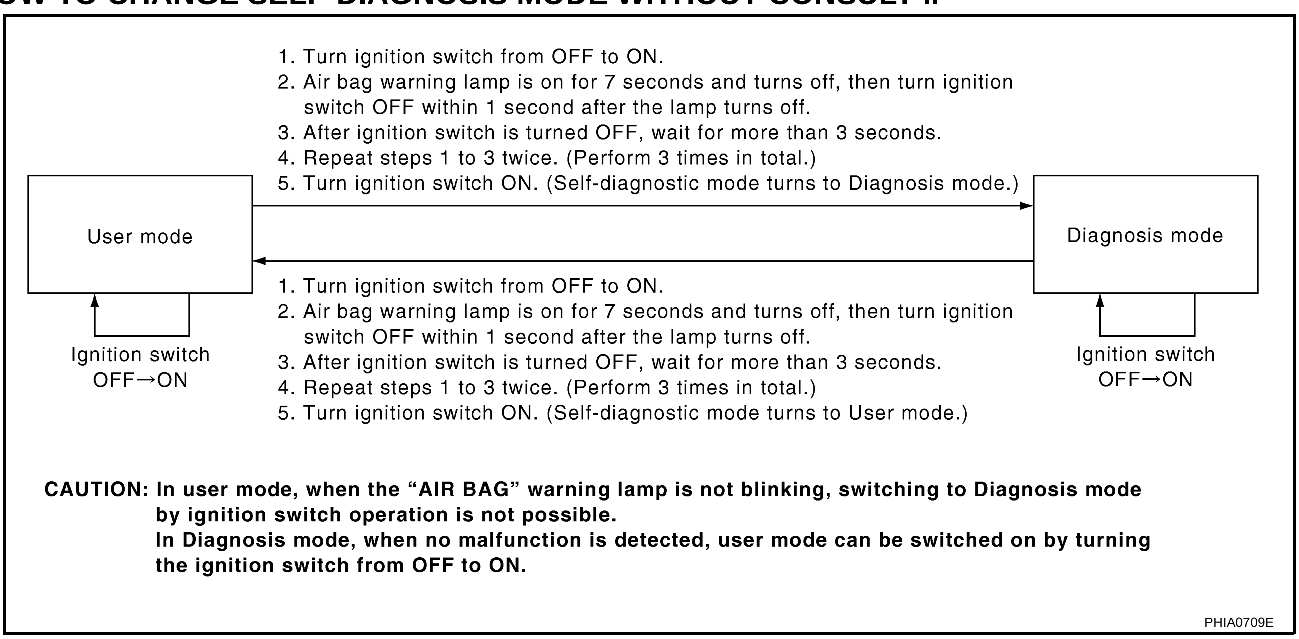
SRS701

Self-Diagnosis Function (Without CONSULT-II)

AHS000QN

- The reading of these results is accomplished "User mode" and "Diagnosis mode".
- After a malfunction is repaired, turn ignition switch ON. Diagnosis mode returns to the User mode. At that time, the self-diagnostic result is cleared.

HOW TO CHANGE SELF-DIAGNOSIS MODE WITHOUT CONSULT-II



PHIA0709E

HOW TO ERASE SELF-DIAGNOSIS RESULTS

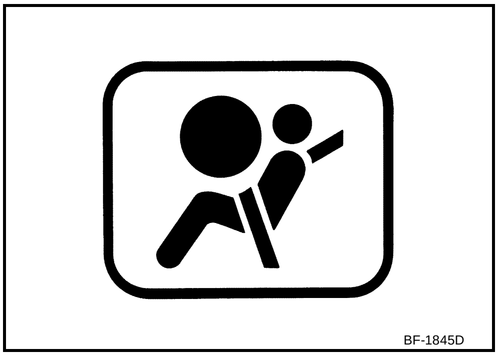
After a malfunction is repaired, turn the ignition switch OFF for at least one second, then back ON. Diagnosis mode returns to the User mode. At that time, the self-diagnostic result is cleared.

SRS Operation Check
AHS000QO

DIAGNOSTIC PROCEDURE 1

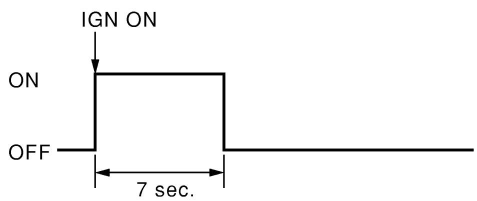
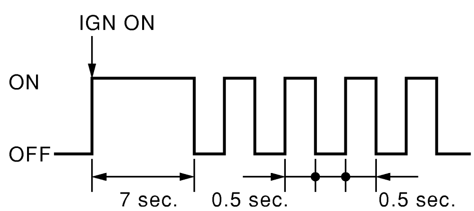
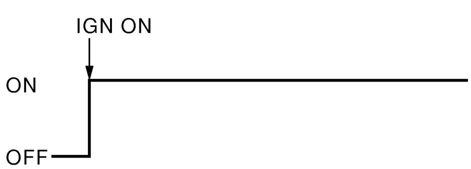
Checking Air Bag Operation by Using “AIR BAG” Warning Lamp — User Mode

1. Turn the ignition switch from OFF to ON, and check that the air bag warning lamp blinks.
2. Compare the SRS air bag warning lamp blinking pattern with the examples.



BF-1845D

Warning lamp examples

“AIR BAG” warning lamp operation-User mode-	SRS condition	Reference item
 SHIA0011E	• No malfunction is detected. • No further action is necessary.	—
 SHIA0012E	• The system is malfunctioning and needs to be repaired as indicated.	Go to SRS-15, "DIAGNOSTIC PROCEDURE 2" or SRS-21, "DIAGNOSTIC PROCEDURE 5" .
 SHIA0013E	• Air bag is deployed. • Seat belt pre-tensioner is deployed.	Go to SRS-40, "COLLISION DIAGNOSIS" .
	• Diagnosis sensor unit is malfunctioning. • Air bag power supply circuit is malfunctioning. • SRS air bag warning lamp circuit is malfunctioning.	Go to SRS-29, "Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn OFF" .
 SHIA0014E	• Diagnosis sensor unit is malfunctioning. • Air bag warning lamp circuit is malfunctioning.	Go to SRS-30, "Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn ON" .

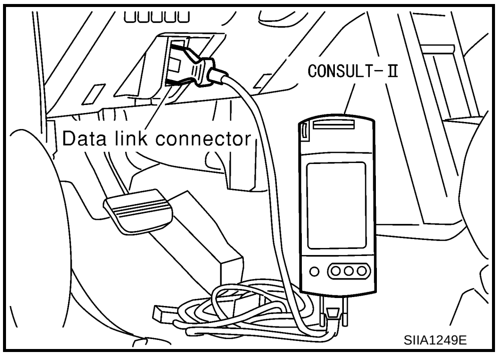
Trouble Diagnosis with CONSULT–II

AHS000QP

DIAGNOSTIC PROCEDURE 2

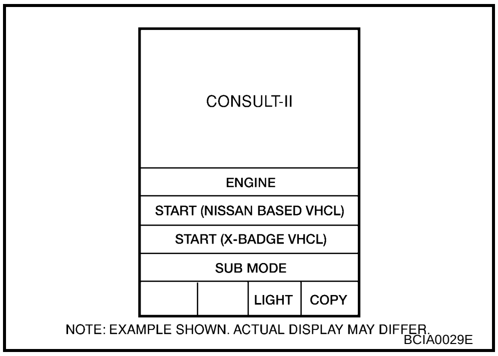
Inspecting SRS Malfunctioning Parts by Using CONSULT-II — DIAGNOSIS MODE

1. Turn ignition switch OFF.
2. Connect CONSULT-II to the data link connector.



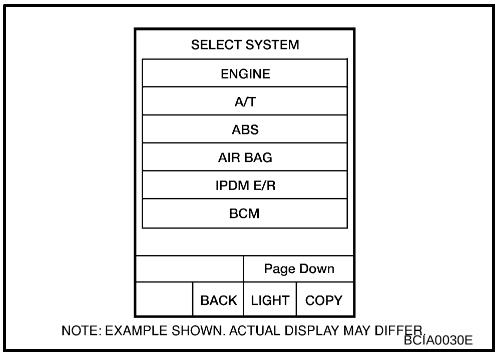
SIIA1249E

3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



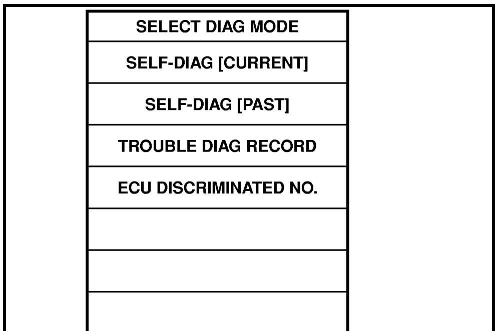
BCIA0029E

5. Touch “AIR BAG”.
   If “AIR BAG” is not indicated, GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .



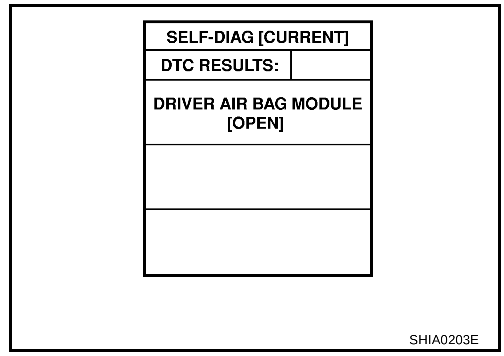
BCIA0030E

6. Touch “SELF-DIAG [CURRENT]”.



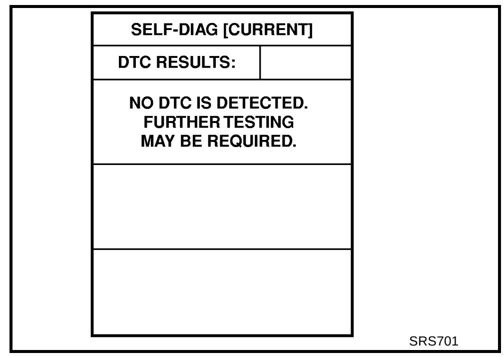
SRS697

7. Diagnostic code is displayed on “SELF-DIAG [CURRENT]”.



If no malfunction is detected on “SELF-DIAG [CURRENT]” even though malfunction is detected in “SRS Operation Check”, check the battery voltage. If the battery voltage is less than 9V, charge or replace the battery. Then go to SRS-19, "DIAGNOSTIC PROCEDURE 3" . If the battery voltage is OK, go to SRS-21, "DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)" to diagnose the following cases:

- Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair.
- The SRS system malfunctions intermittently.



CONSULT-II Diagnostic Code Chart (“SELF-DIAG [CURRENT]”)

Diagnostic item	Explanation		Repair order “Recheck SRS at each replacement”
NO DTC IS DETECTED.	When malfunction is indicated by the “AIR BAG” warning lamp in User mode.	● Low battery voltage (Less than 9V)	● Go to SRS-19, "DIAGNOSTIC PROCEDURE 3" after charging the battery.
		● Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. ● Intermittent malfunction has been detected in the past.	● Go to SRS-21, "DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)" . ● Go to SRS-21, "DIAGNOSTIC PROCEDURE 5" .
	● No malfunction is detected.		—
DRIVER AIRBAG MODULE [OPEN]	● Driver air bag module circuit is open (including the spiral cable).		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit. 6. Replace the related harness.
DRIVER AIRBAG MODULE [VB-SHORT]	● Driver air bag module circuit is shorted to a power supply circuit (including the spiral cable).		
DRIVER AIRBAG MODULE [GND-SHORT]	● Driver air bag module circuit is shorted to ground (including the spiral cable).		
DRIVER AIRBAG MODULE [SHORT]	● Driver air bag module circuit is shorted between lines.		
ASSIST A/B MODULE [OPEN]	● Front passenger air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
ASSIST A/B MODULE [VB-SHORT]	● Front passenger air bag module circuit is shorted to a power supply circuit.		
ASSIST A/B MODULE [GND-SHORT]	● Front passenger air bag module circuit is shorted to ground.		
ASSIST A/B MODULE [SHORT]	● Front passenger air bag module circuit is shorted between lines.		

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
SIDE MODULE LH [OPEN]	● Front LH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH setback assembly (front LH side air bag module). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [VB-SHORT]	● Front LH side air bag module circuit is shorted to a power supply circuit.	
SIDE MODULE LH [GND-SHORT]	● Front LH side air bag module circuit is shorted to ground.	
SIDE MODULE LH [SHORT]	● Front LH side air bag module circuit is shorted between lines.	
SIDE MODULE RH [OPEN]	● Front RH side air bag module circuit is open.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH setback assembly (front RH side air bag module). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE RH [VB-SHORT]	● Front RH side air bag module circuit is shorted to a power supply circuit.	
SIDE MODULE RH [GND-SHORT]	● Front RH side air bag module circuit is shorted to ground.	
SIDE MODULE RH [SHORT]	● Front RH side air bag module circuit is shorted between lines.	
SATELLITE SENS LH [UNIT FAIL] SATELLITE SENS LH [COMM FAIL]	● LH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SATELLITE SENS RH [UNIT FAIL] SATELLITE SENS RH [COMM FAIL]	● RH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [OPEN]	● Front LH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [VB-SHORT]	● Front LH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT]	● Front LH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT LH [SHORT]	● Front LH pre-tensioner circuit is shorted between lines.	
PRE-TEN FRONT RH [OPEN]	● Front RH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT RH [VB-SHORT]	● Front RH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT]	● Front RH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT RH [SHORT]	● Front RH pre-tensioner circuit is shorted between lines.	

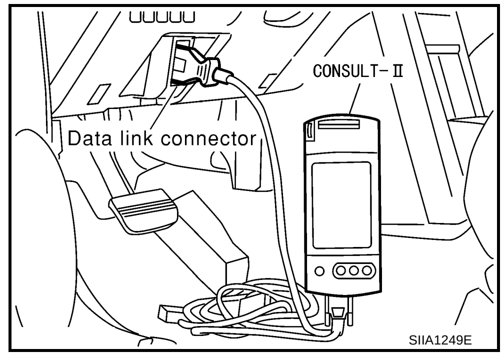
Diagnostic item	Explanation	Repair order “Recheck SRS at each replacement”
CONTROL UNIT	● Diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the diagnosis sensor unit.
FRONTAL COLLISION DETECTION	● Seat belt pre-tensioner and front air bag are deployed.	● Go to SRS-40, "For Frontal Collision" .
SIDE COLLISION DETECTION	● Front side air bag is deployed.	● Go to SRS-41, "For Side Collision" .

- Follow the procedures in numerical order when repairing malfunctioning parts. Confirm whether malfunction is eliminated using air bag warning lamp or CONSULT-II each time repair is finished. If malfunction is still observed, proceed to the next step. When malfunction is eliminated, further repair work is not required.

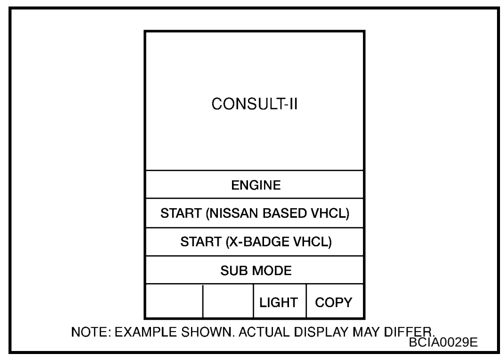
DIAGNOSTIC PROCEDURE 3

Final inspection after repairing SRS by using CONSULT-II — Diagnosis mode

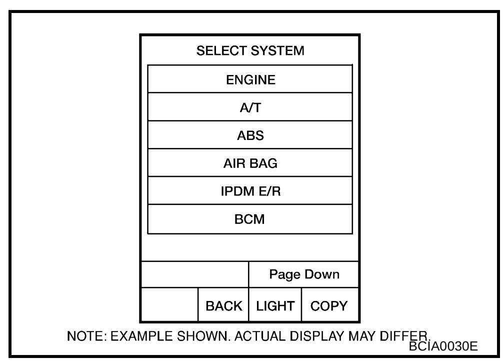
1. After repairing SRS, connect both battery cables.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.



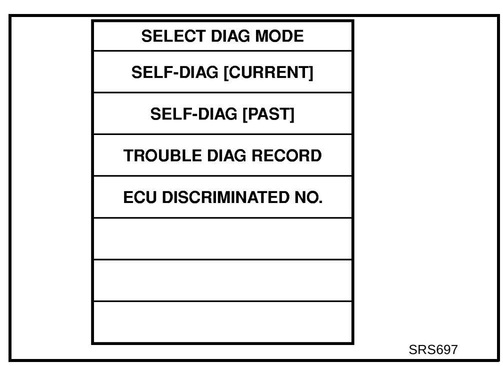
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



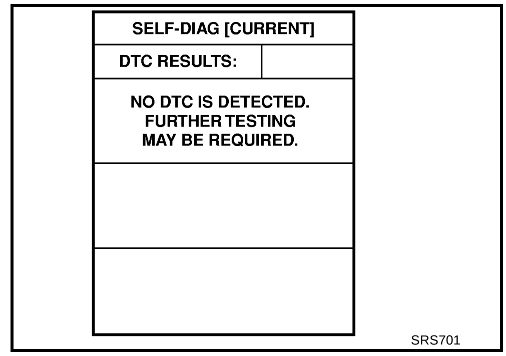
5. Touch “AIR BAG”.
   If “AIR BAG” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .



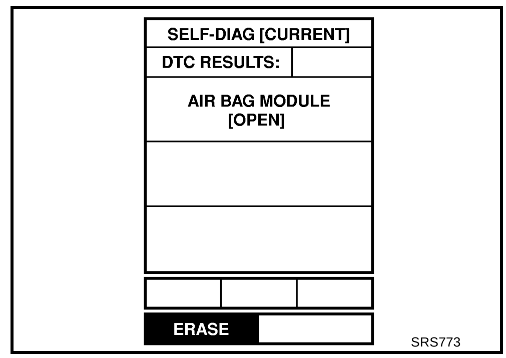
6. Touch “SELF-DIAG [CURRENT]”.



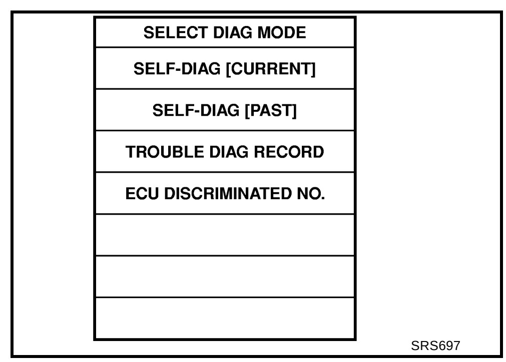
7. If no malfunction is detected on “SELF-DIAG [CURRENT]”, repair of SRS is completed. Go to step 8.
If any malfunction is detected on “SELF-DIAG [CURRENT]”, the malfunctioning part is not repaired completely or another malfunctioning part is detected. Go to SRS-15, "DIAGNOSTIC PROCEDURE 2" , and repair malfunctioning part completely.



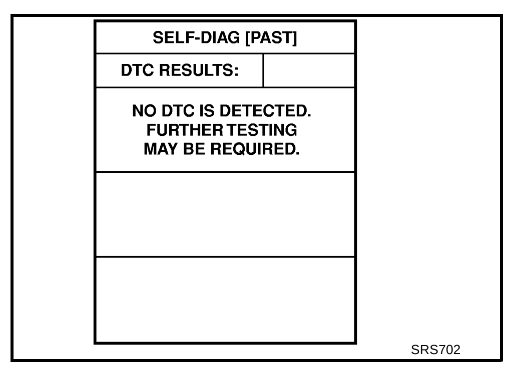
8. Touch “ERASE”.
NOTE:
Touch “ERASE” to clear the memory of the malfunction (“SELF-DIAG [PAST]”).
If the memory of the malfunction in “SELF-DIAG [PAST]” is not erased, the User mode shows the system malfunction by the operation of the warning lamp even if the malfunction is repaired completely.



9. Touch “BACK” key of CONSULT-II to “SELECT DIAG MODE” screen. Touch “SELF-DIAG [PAST]”.



10. Make sure no malfunction is detected on “SELF-DIAG [PAST]”.
11. Touch “BACK” key of CONSULT-II until “SELECT SYSTEM” appears in order to return to User mode from Diagnosis mode.
12. Turn ignition switch OFF then turn off and disconnect CONSULT-II. Go to SRS-13, "Checking Air Bag Operation by Using “AIR BAG” Warning Lamp — User Mode" .



DIAGNOSTIC PROCEDURE 4 (CONTINUED FROM DIAGNOSTIC PROCEDURE 2)

Inspecting SRS malfunctioning record

1. CONSIDER POSSIBILITY OF NOT ERASING SELF-DIAGNOSTIC RESULT AFTER REPAIRING

Is it the first time for maintenance of SRS?

YES or NO

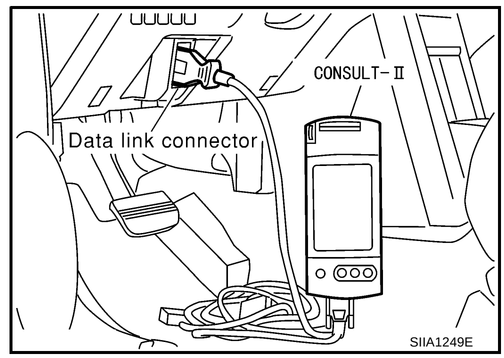
YES >> Go to SRS-15, "DIAGNOSTIC PROCEDURE 2" .

NO >> Self-diagnostic result “SELF-DIAG [PAST]” (previously stored in the memory) might not be erased after repair. Go to SRS-19, "DIAGNOSTIC PROCEDURE 3" .

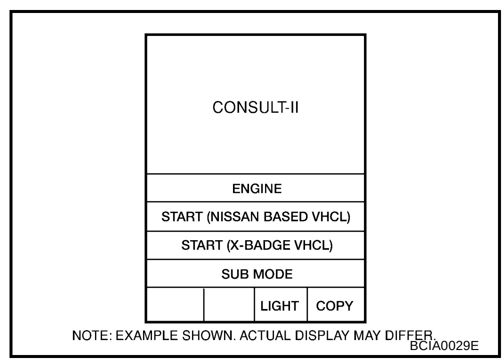
DIAGNOSTIC PROCEDURE 5

Inspecting SRS intermittent malfunction by using CONSULT-II — Diagnosis mode

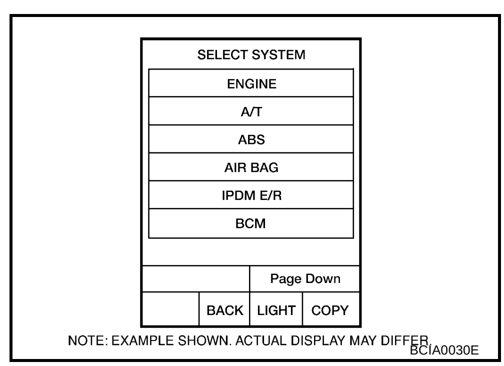
1. Turn ignition switch OFF.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector.



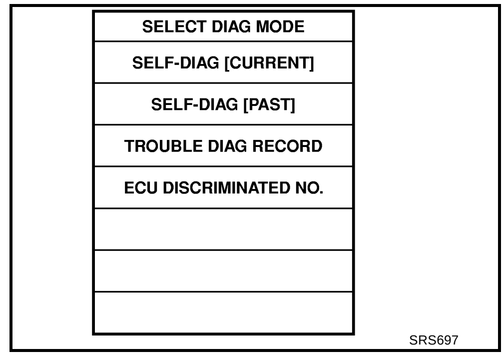
3. Turn ignition switch ON.
4. Touch “START (NISSAN BASED VHCL)”.



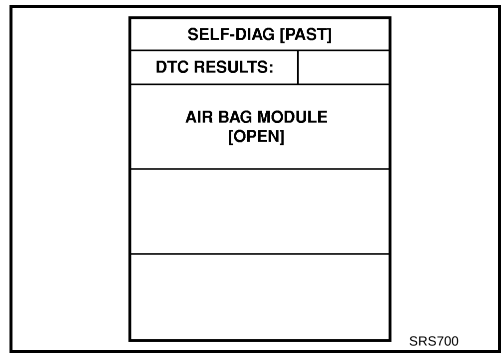
5. Touch “AIR BAG”.
   If “AIR BAG” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .



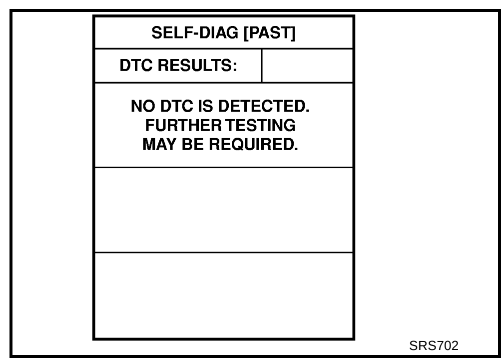
6. Touch “SELF-DIAG [PAST]”.



7. If diagnostic codes are displayed on “SELF-DIAG [PAST]”, go to step 10.

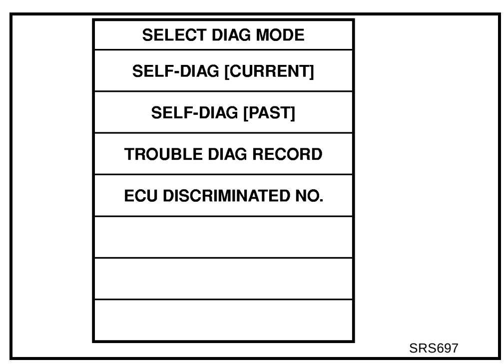


If no malfunction is detected on “SELF-DIAG [PAST]”, touch “BACK” and go back to “SELECT DIAG MODE”.

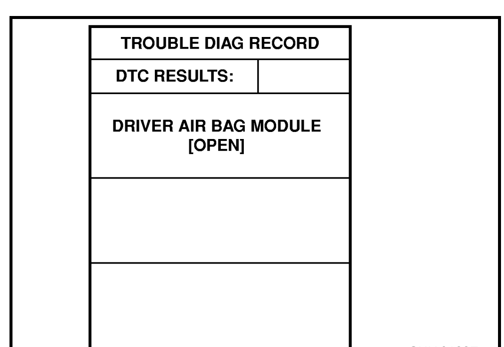


8. Touch “TROUBLE DIAG RECORD”.

NOTE:
With “TROUBLE DIAG RECORD”, diagnosis results previously erased by a reset operation can be displayed.



9. Diagnostic code is displayed on “TROUBLE DIAG RECORD”.
10. Touch “PRINT”.
11. Compare diagnostic codes to SRS-23, "CONSULT-II Diagnostic Code Chart (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)" .
12. Touch “BACK” key of CONSULT-II until “SELECT SYSTEM” appears.
13. Turn ignition switch OFF, then turn off and disconnect CONSULT-II, and both battery cables.



14. Repair the system as outlined by the “Repair order” in “Intermittent Malfunction Diagnostic Code Chart”, that corresponds to the self-diagnostic result. For replacement procedure of component parts, refer to the Removal and Installation procedure for the appropriate component.
15. Go to SRS-19, "DIAGNOSTIC PROCEDURE 3" , for final checking.

CONSULT-II Diagnostic Code Chart (“SELF-DIAG [PAST]” or “TROUBLE DIAG RECORD”)

Diagnostic item	Explanation		Repair order “Recheck SRS at each replacement”
NO DTC IS DETECTED.	When malfunction is indicated by the “AIR BAG” warning lamp in User mode.	● Low battery voltage (Less than 9V)	● Go to SRS-19, "DIAGNOSTIC PROCEDURE 3" after charging the battery.
	● No malfunction is detected.		● Go to SRS-19, "DIAGNOSTIC PROCEDURE 3" .
DRIVER AIRBAG MODULE [OPEN]	● Driver air bag module circuit is open (including the spiral cable).		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the driver air bag module. 4. Replace the spiral cable. 5. Replace the diagnosis sensor unit. 6. Replace the related harness.
DRIVER AIRBAG MODULE [VB-SHORT]	● Driver air bag module circuit is shorted to a power supply circuit (including the spiral cable).		
DRIVER AIRBAG MODULE [GND-SHORT]	● Driver air bag module circuit is shorted to ground (including the spiral cable).		
DRIVER AIRBAG MODULE [SHORT]	● Driver air bag module circuit is shorted between lines.		
ASSIST A/B MODULE [OPEN]	● Front passenger air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front passenger air bag module. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
ASSIST A/B MODULE [VB-SHORT]	● Front passenger air bag module circuit is shorted to a power supply circuit.		
ASSIST A/B MODULE [GND-SHORT]	● Front passenger air bag module circuit is shorted to ground.		
ASSIST A/B MODULE [SHORT]	● Front passenger air bag module circuit is shorted between lines.		
SIDE MODULE LH [OPEN]	● Front LH side air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front LH setback assembly (front LH side air bag module). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE LH [VB-SHORT]	● Front LH side air bag module circuit is shorted to a power supply circuit.		
SIDE MODULE LH [GND-SHORT]	● Front LH side air bag module circuit is shorted to ground.		
SIDE MODULE LH [SHORT]	● Front LH side air bag module circuit is shorted between lines.		
SIDE MODULE RH [OPEN]	● Front RH side air bag module circuit is open.		1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the front RH setback assembly (front RH side air bag module). 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SIDE MODULE RH [VB-SHORT]	● Front RH side air bag module circuit is shorted to a power supply circuit.		
SIDE MODULE RH [GND-SHORT]	● Front RH side air bag module circuit is shorted to ground.		
SIDE MODULE RH [SHORT]	● Front RH side air bag module circuit is shorted between lines.		

Diagnostic item	Explanation	Repair order "Recheck SRS at each replacement"
SATELLITE SENS LH [UNIT FAIL] SATELLITE SENS LH [COMM FAIL]	● LH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
SATELLITE SENS RH [UNIT FAIL] SATELLITE SENS RH [COMM FAIL]	● RH side air bag (Satellite) sensor	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [OPEN]	● Front LH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front LH seat belt. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT LH [VB-SHORT]	● Front LH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT LH [GND-SHORT]	● Front LH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT LH [SHORT]	● Front LH pre-tensioner circuit is shorted between lines.	
PRE-TEN FRONT RH [OPEN]	● Front RH pre-tensioner circuit is open.	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace the front RH seat belt. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.
PRE-TEN FRONT RH [VB-SHORT]	● Front RH pre-tensioner circuit is shorted to a power supply circuit.	
PRE-TEN FRONT RH [GND-SHORT]	● Front RH pre-tensioner circuit is shorted to ground.	
PRE-TEN FRONT RH [SHORT]	● Front RH pre-tensioner circuit is shorted between lines.	
CONTROL UNIT	● Diagnosis sensor unit is malfunctioning.	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the diagnosis sensor unit.
FRONTAL COLLISION DETECTION	● Seat belt pre-tensioner and front air bag are deployed.	● Go to SRS-40, "For Frontal Collision" .
SIDE COLLISION DETECTION	● Front side air bag is deployed.	● Go to SRS-41, "For Side Collision" .

Trouble Diagnosis without CONSULT-II

AHS000RM

DIAGNOSTIC PROCEDURE 6

Inspecting SRS Malfunctioning Parts By Using "AIR BAG" Warning Lamp — Diagnosis Mode

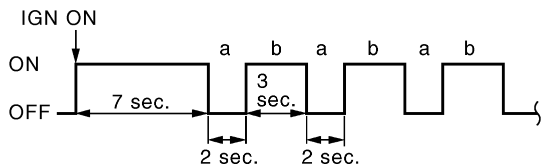
NOTE:

SRS will not enter Diagnosis mode if no malfunction is detected in User mode.

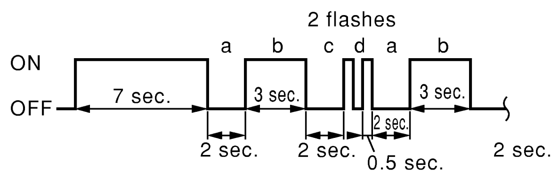
1. Turn ignition switch ON.
2. After "AIR BAG" warning lamp lights for 7 seconds, turn ignition switch OFF within 1 second.
3. Wait more than 3 seconds.
4. Repeat the steps 1 to 3 twice. (Perform three times in all.)
5. Turn ignition switch ON.

SRS is now in Diagnosis mode.
“AIR BAG” warning lamp operates in Diagnosis mode as follows:

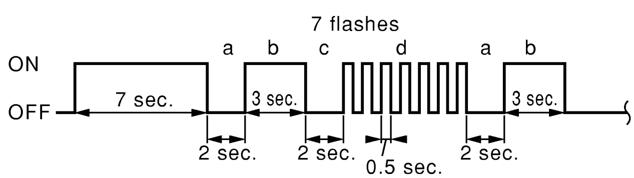
WARNING LAMP FLASH CODE CHART

<table>
<tr><td colspan="2"><Diagnosis results (previously stored in the memory) might not be erased after repair or intermittent malfunctions have been detected in the past.></td></tr>
<tr><td>Flash pattern</td><td>Repair order</td></tr>
<tr><td>a through b are repeated.

</td><td>1. Erase memory. (Once key switch is turned from OFF to ON, TROUBLE DIAG RECORD will be erased.)</td></tr>
</table>

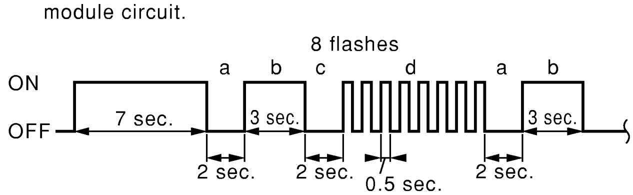
PHIA0532E

<table>
<tr><td colspan="2"><Driver air bag module></td></tr>
<tr><td>Flash pattern</td><td>Repair order</td></tr>
<tr><td>a through d are repeated.
d: Two flashes indicates malfunctioning driver air bag module circuit.

</td><td>1. Visually check the wiring harness connection.
2. Replace the harness if it has visible damage.
3. Replace the spiral cable.
4. Replace driver air bag module.
(Before disposal, it must be deployed.)
5. Replace the diagnosis sensor unit.
6. Replace the related harness.</td></tr>
</table>

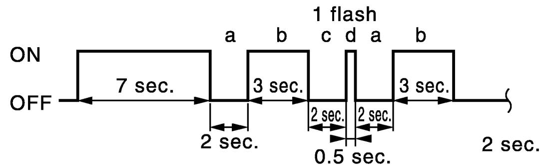
PHIA0185E

<table>
<tr><td colspan="2"><Diagnosis sensor unit></td></tr>
<tr><td>Flash pattern</td><td>Repair order</td></tr>
<tr><td>a through d are repeated.
d: Seven flashes indicate malfunctioning diagnosis sensor unit circuit.

</td><td>1. Visually check the wiring harness connections.
2. Replace the harness if it has visible damage.
3. Replace the diagnosis sensor unit.
4. Replace the related harness.</td></tr>
</table>

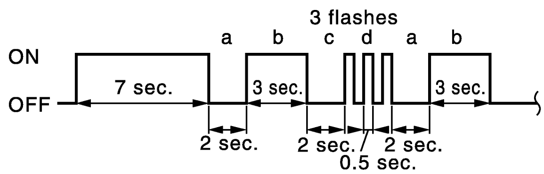
SHIA0028E

<table>
<tr><td colspan="2"><Front passenger air bag module></td></tr>
<tr><td>Flash pattern</td><td>Repair order</td></tr>
<tr><td>a through d are repeated.
d: Eight flashes indicate malfunctioning front passenger air bag module circuit.

</td><td>1. Visually check the wiring harness connection.
2. Replace the harness if it has visible damage.
3. Replace front passenger air bag module.
(Before disposal, it must be deployed.)
4. Replace the diagnosis sensor unit.
5. Replace the related harness.</td></tr>
</table>

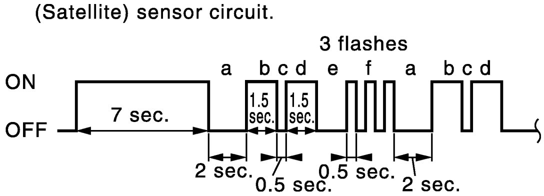
SHIA0029E

<Front RH seat belt pre-tensioner>	
Flash pattern	Repair order
a through d are repeated. d: One flash indicates malfunctioning front RH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front RH seat belt pre-tensioner. (Before disposal, it must be activated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

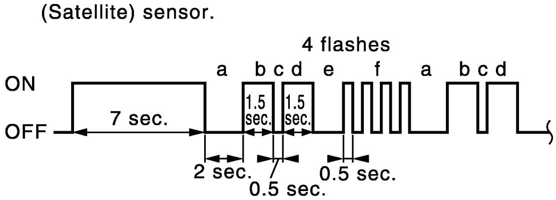
SHIA0030E

<Front LH seat belt pre-tensioner>	
Flash pattern	Repair order
a through d are repeated. d: Three flashes indicate malfunctioning front LH seat belt pre-tensioner circuit. 	1. Visually check the wiring harness connections. 2. Replace the harness if it has visible damage. 3. Replace front LH seat belt pre-tensioner. (Before disposal, it must be activated.) 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

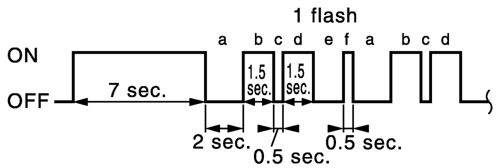
SHIA0031E

<RH side air bag (Satellite) sensor>	
Flash pattern	Repair order
a through f are repeated. f: Three flashes indicate malfunctioning RH side air bag (Satellite) sensor circuit. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the RH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

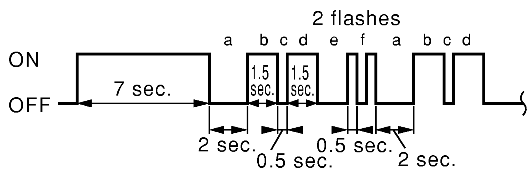
SHIA0032E

<LH side air bag (Satellite) sensor>	
Flash pattern	Repair order
a through f are repeated. f: Four flashes indicate malfunctioning LH side air bag (Satellite) sensor. 	1. Visually check the wiring harness connection. 2. Replace the harness if it has visible damage. 3. Replace the LH side air bag (Satellite) sensor. 4. Replace the diagnosis sensor unit. 5. Replace the related harness.

SHIA0033E

<table>
<tr><th colspan="2"><Front RH side air bag module></th></tr>
<tr><th>Flash pattern</th><th>Repair order</th></tr>
<tr><td>a through f are repeated.
f: One flash indicate malfunctioning front RH side air bag module circuit.

</td><td>1. Visually check the wiring harness connection.
2. Replace the harness if it has visible damage.
3. Replace front RH side air bag module.
(Before disposal, it must be deployed.)
4. Replace the diagnosis sensor unit.
5. Replace the related harness.</td></tr>
</table>

SHIA0034E

<table>
<tr><th colspan="2"><Front LH side air bag module></th></tr>
<tr><th>Flash pattern</th><th>Repair order</th></tr>
<tr><td>a through f are repeated.
f: Two flashes indicate malfunctioning front LH side air bag module circuit.

</td><td>1. Visually check the wiring harness connection.
2. Replace the harness if it has visible damage.
3. Replace front LH side air bag module.
(Before disposal, it must be deployed.)
4. Replace the diagnosis sensor unit.
5. Replace the related harness.</td></tr>
</table>

SHIA0035E

Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn OFF

AHS000RN

DIAGNOSTIC PROCEDURE 7

1. CHECK THE DEPLOYMENT OF AIR BAG MODULE

Is air bag module deployed?

YES or NO

YES >> Refer to SRS-40, "COLLISION DIAGNOSIS" .
NO >> GO TO 2.

2. CHECK THE AIR BAG FUSE

Check 10A fuse [No.9, located in fuse block (J/B)].
Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK AIR BAG FUSE AGAIN

Replace “AIR BAG” fuse and turn ignition switch ON.

Does the “AIR BAG” fuse blow again?

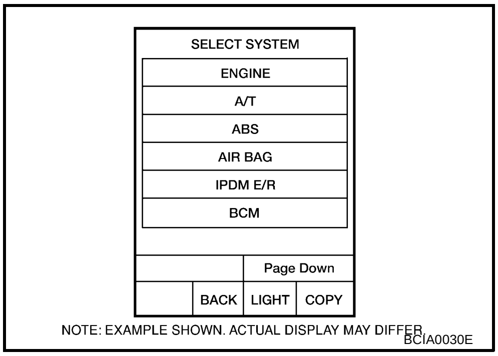
YES >> Repair or replace main harness.
NO >> **INSPECTION END**

4. CHECK DIAGNOSIS SENSOR UNIT

Connect CONSULT-II and touch “START”.
Is “AIR BAG” displayed on CONSULT-II?

YES or NO

YES >> GO TO 5.
NO >> Visually check the wiring harness connection of diagnosis sensor unit. If the harness connection check result is OK, replace diagnosis sensor unit.



BCIA0030E

5. CHECK HARNESS CONNECTION

Is harness connection between warning lamp and diagnosis sensor unit OK?

OK or NG

OK >> Replace diagnosis sensor unit.
NG >> Connect “AIR BAG” warning lamp and diagnosis sensor unit connector properly. If “AIR BAG” warning lamp still does not go off, replace harness.

Trouble Diagnosis: “AIR BAG” Warning Lamp Does Not Turn ON

AHS000RO

DIAGNOSTIC PROCEDURE 8

1. CHECK METER FUSE

Check 10A fuse [No.11, located in fuse block (J/B)].
Refer to PG-2, "POWER SUPPLY ROUTING" .

OK or NG

OK >> GO TO 3.
NG >> GO TO 2.

2. CHECK METER FUSE AGAIN

Replace 10A fuse [No.11, located in fuse block (J/B)] and turn ignition switch ON.

Does the meter fuse blow again?

YES >> Repair or replace the related harness.
NO >> **INSPECTION END**

3. CHECK HARNESS CONNECTION BETWEEN DIAGNOSIS SENSOR UNIT AND COMBINATION METER

Disconnect diagnosis sensor unit connector and turn ignition switch ON.
Does “AIR BAG” warning lamp turn ON?

YES or NO

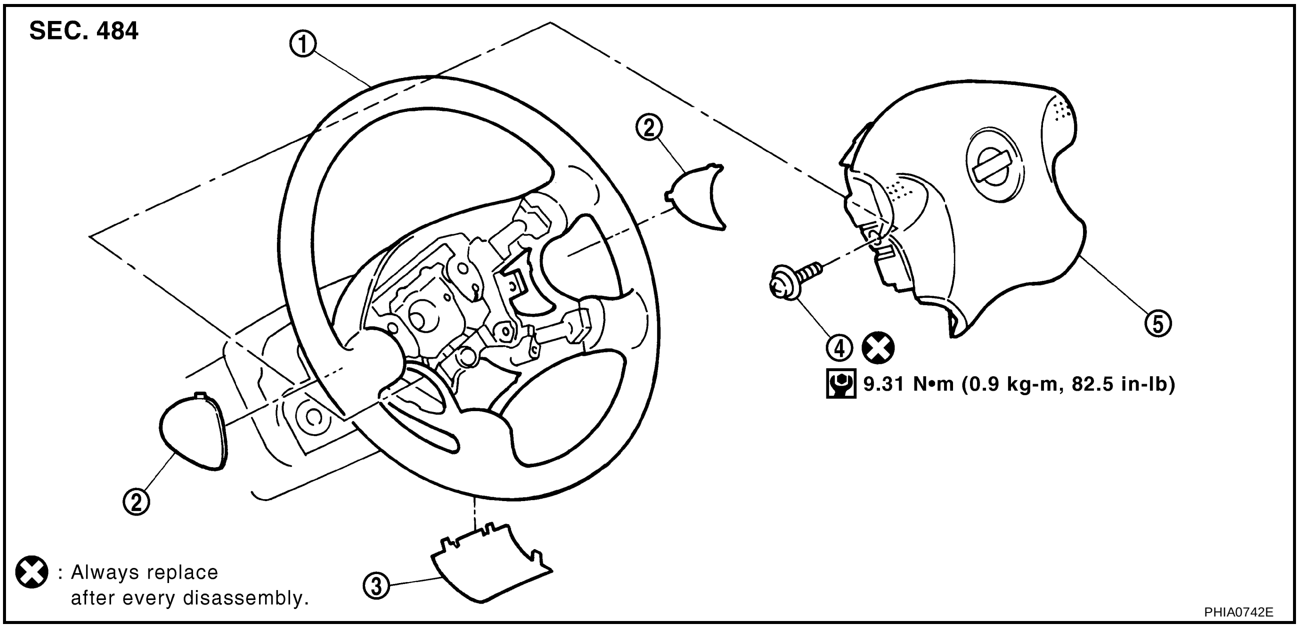
YES >> Replace diagnosis sensor unit.
NO >> Replace combination meter assembly.

DRIVER AIR BAG MODULE

PFP:K8510

Removal and Installation

AHS000QU



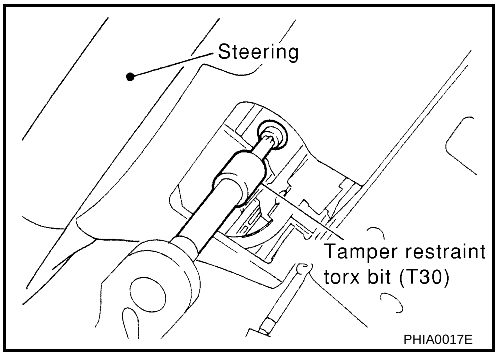
1. Steering wheel	2. Side lid	3. Lower lid
4. Special bolt	5. Driver air bag module	

REMOVAL

CAUTION:

- **Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.**
- **Always work from the side of driver air bag module.**

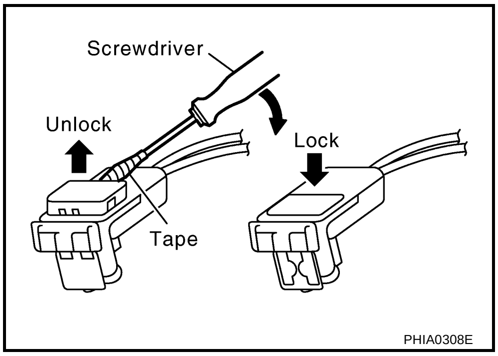
1. Remove the side lids.
2. Using Tamper resistant TORX bit (T30), remove the special bolts at right and left.



3. Disconnect the air bag harness connector, and remove the driver air bag module.

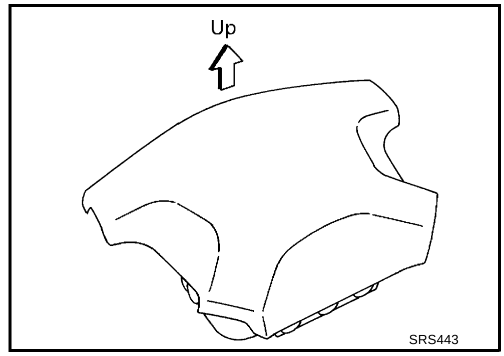
   CAUTION:

   - **For installing / removing driver air bag module connector, insert thin screwdriver wrapped in tape into notch, lift lock and remove connector.**
   - **Install connector with lock raised, and push lock into connector.**



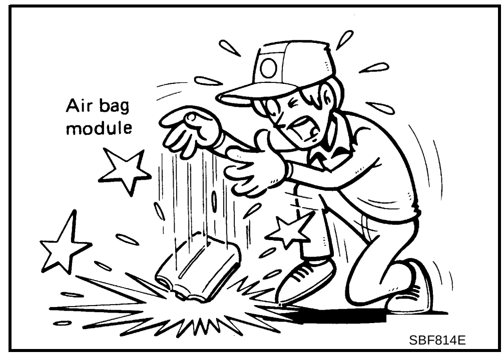
CAUTION:

- **Always work from the side of driver air bag module.**
- **Always place driver air bag module with pad side facing upward.**
- **Do not insert any foreign objects (screwdriver, etc.) into driver air bag module.**
- **Do not attempt to disassemble driver air bag module.**
- **Do not use old bolts after removal; replace with new bolts.**
- **Do not expose the driver air bag module to temperatures exceeding 90°C (194°F).**



SRS443

- **Replace driver air bag module if it has been dropped or sustained an impact.**
- **Do not allow oil, grease or water to come in contact with the front passenger air bag module.**

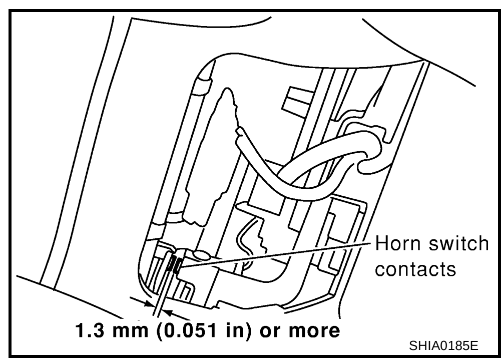


SBF814E

INSTALLATION

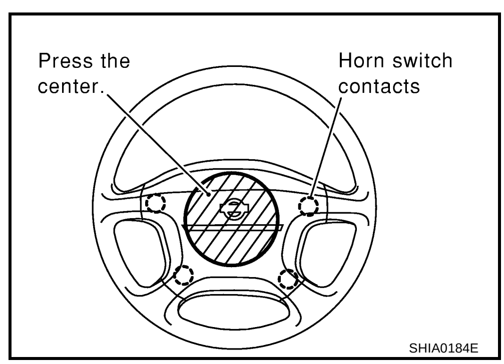
Install in the reverse order of removal paying attention to the following.

- After installing the air bag module, check that the contact clearance of the horn switch is in the specified range in the right.



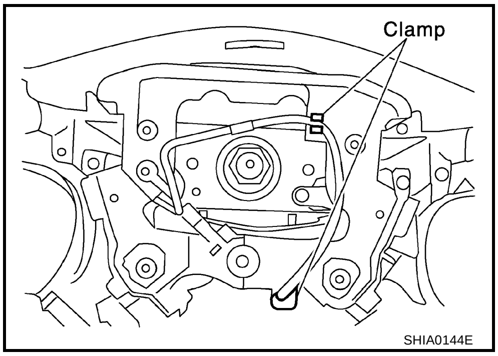
SHIA0185E

- For installing the air bag module, tighten the special bolts with the center of the horn pad pressed to make the contacts (RH/LH) ON.



SHIA0184E

- When installing driver air bag module, fix driver air bag module harness and harness connector to clip.
- After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-13, "SRS Operation Check" .

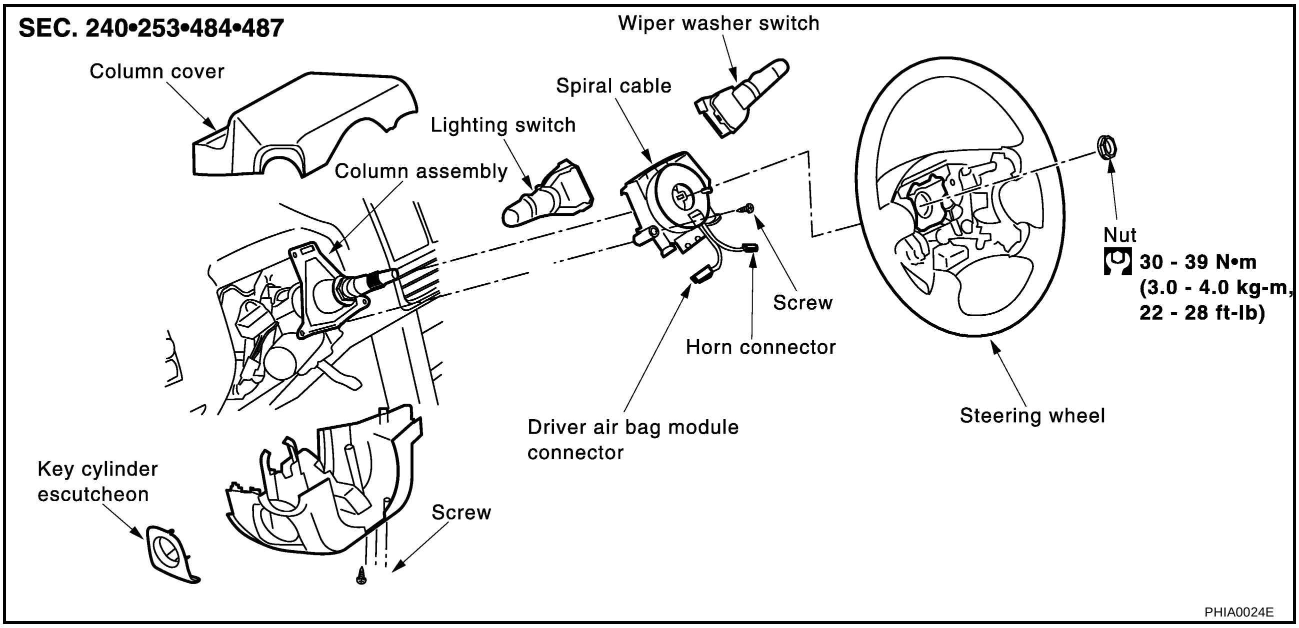


SPIRAL CABLE

PFP:25554

Removal and Installation

AHS000QV



REMOVAL

CAUTION:

Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.

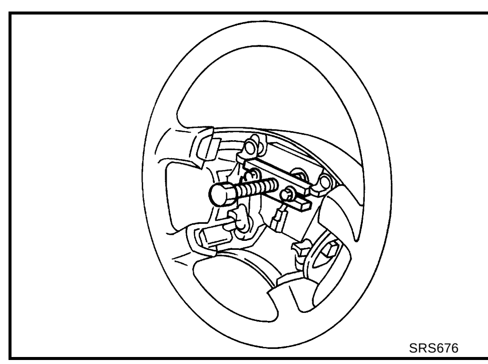
1. Remove driver air bag module. Refer to SRS-31, "Removal and Installation" .
2. Set the steering wheel in the neutral position.
3. Remove steering column cover. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
4. Disconnect the horn connector and the driver air bag module connector.

   CAUTION:

   Do not tap or bump the steering wheel.
5. Remove steering wheel nut.
6. Remove steering wheel with steering wheel puller.

   CAUTION:

   Be careful not to over-tighten puller on steering wheel.



7. Remove the spiral cable fixing screws, and while pushing the upper plastic tab, remove the spiral cable.

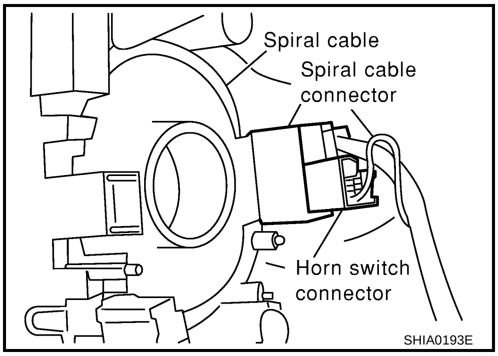
   CAUTION:

   - **Do not attempt to disassemble spiral cable.**
   - **Do not apply lubricant to the spiral cable.**
8. Remove the wiper washer switch and lighting switch from the spiral cable.

9. Disconnect the horn switch connector and then the spiral cable connector.

   CAUTION:

   Also, with the steering linkage disconnectedly cable may snap by turning the steering wheel beyond the limited number of turns.

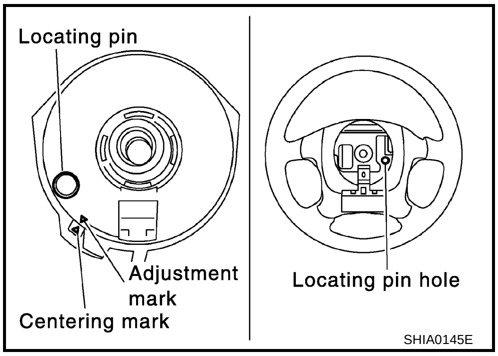


INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **The spiral cable may snap due to steering operation if the cable is installed in an improper position.**
- **Also, with the steering linkage disconnectedly cable may snap by turning the steering wheel beyond the limited number of turns. The spiral cable can be turned to the left about 2.5 turns from the right end position.**
- **After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-13, "SRS Operation Check" .**



FRONT PASSENGER AIR BAG MODULE

PFP:K8515

Removal and Installation

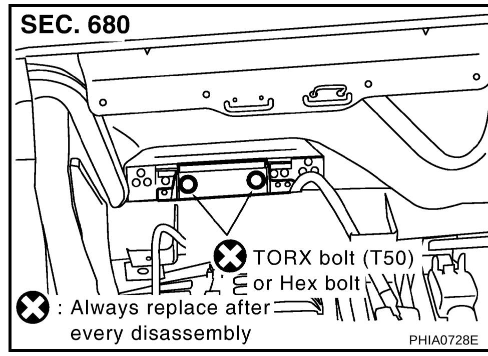
AHS000QW

REMOVAL

CAUTION:

- **Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.**
- **Always work from the side of or under front passenger air bag module.**

1. Remove the glove box. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect the front passenger air bag harness connector.
3. Remove front passenger air bag fixing bolts.
   Use Tamper resistant TORX bit (T50) to remove TORX bolts (T50).



PHIA0728E

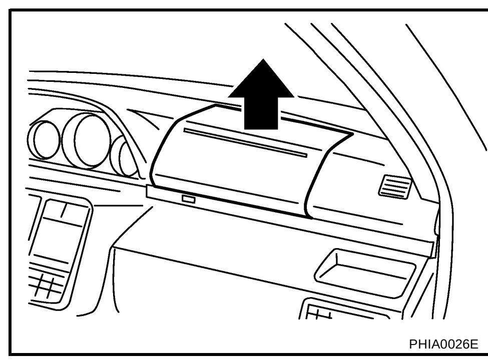
TORX bolt (size T50):

: 19.6 N·m (2.0 kg-m, 14.5 ft-lb)

Hex bolt:

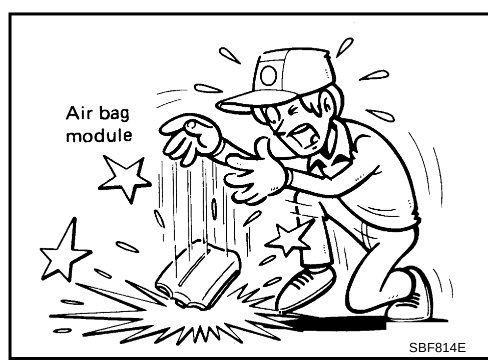
: 24.5 N·m (2.5 kg-m, 18.1 ft-lb)

4. Pull front passenger air bag module upward. Then remove front passenger air bag module from instrument panel.


PHIA0026E

CAUTION:

- **Always place front passenger air bag module with warning label side facing upward.**
- **Do not insert any foreign objects (screwdriver, etc.) into front passenger air bag module.**
- **Do not attempt to disassemble front passenger air bagmod-ule.**
- **Do not use old bolts after removal; replace with new bolts.**
- **Replace front passenger air bag module if it has been dropped or sustained an impact.**
- **Do not expose the front passenger air bag module to tem-peratures exceeding 90°C (194°F).**
- **Do not allow oil, grease or water to come in contact with the front passenger air bag module.**
- **After front passenger air bag module inflates, the instrument panel assembly should be replaced.**



SBF814E

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Always work from the side of or under front passenger air bag module.**
- **After the work is completed, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-13, "SRS Operation Check" .**

SIDE AIR BAG (SATELLITE) SENSOR

PFP:98830

Removal and Installation

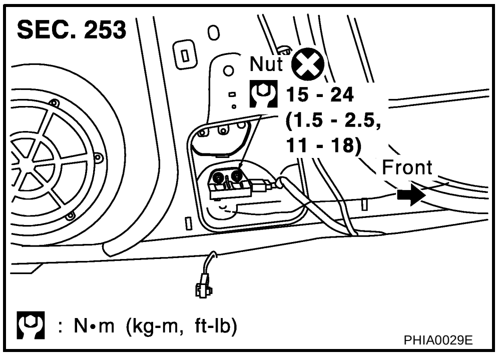
AHS000QY

REMOVAL

CAUTION:

Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.

1. Remove seat belt pre-tensioner seat belt. Refer to SB-3, "Removal and Installation of Front Seat Belt" .
2. Remove side air bag (Satellite) sensor fixing nuts.
3. Remove the side air bag (Satellite) sensor connector.



CAUTION:

- **Do not use old nuts, replace with new ones.**
- **Check side air bag (Satellite) sensor to ensure they are free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with new one.**
- **Do not attempt to disassemble side air bag (Satellite) sensor.**
- **Replace side air bag (Satellite) sensor if it has been dropped or sustained an impact.**
- **When the front side air bag deploys, always replace it with a new one.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check side air bag (Satellite) sensor for proper installation.**
- **After replacement of side air bag (Satellite) sensor, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-13, "SRS Operation Check" .**

FRONT SEAT BELT PRE-TENSIONER

PFP:86884

Removal and Installation

AHS000QZ

To removal and installation procedures, refer to SB-3, "Removal and Installation of Front Seat Belt" .

DIAGNOSIS SENSOR UNIT

PFP:28556

Removal and Installation

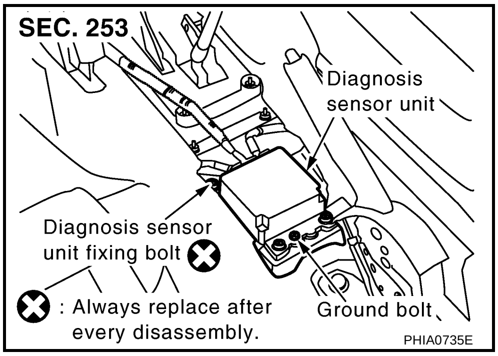
AHS000R0

REMOVAL

CAUTION:

Before servicing SRS, turn the ignition switch off, disconnect both battery cables and wait at least 3 minutes.

1. Disconnect each harness connector for the air bag module and seat belt pre-tensioner.
2. Remove center console. Refer to IP-11, "Removal and Installation" .
3. Disconnect diagnosis sensor unit connector.
4. Remove ground bolt and diagnosis sensor unit fixing bolts.



Ground bolt:

: 6.9 N·m (0.7 kg-m, 61 in-lb)

Diagnosis sensor unit fixing bolt:

: 24.5 N·m (2.5 kg-m, 18.1 ft-lb)

CAUTION:

- **Do not use old bolts. Replace with new ones.**
- **Check diagnosis sensor unit brackets to ensure it is free of deformities, dents, cracks or rust. If it shows any visible signs of damage, replace it with new one.**
- **Replace diagnosis sensor unit if it has been dropped or sustained an impact.**

INSTALLATION

Install in the reverse order of removal.

CAUTION:

- **Check the diagnosis sensor unit for proper installation.**
- **After replacement of diagnosis sensor unit, perform self-diagnosis to check that no malfunction is detected. Refer to SRS-13, "SRS Operation Check" .**

ECU DISCRIMINATED NO.

After replacing the diagnosis sensor unit, make sure that the diagnosis sensor unit identification is correct for the vehicle as equipped.

Specification	ECU discriminated No.
Model with driver and passenger air bags and seat belt pre-tensioner	AA12
Model with driver and passenger air bags, seat belt pre-tensioner and front side air bag	AA01

COLLISION DIAGNOSIS

PFP:00015

For Frontal Collision

AHS000R2

To repair the SRS, perform the following steps.

When SRS (except the front side air bag) is activated in a collision:

1. Replace the diagnosis sensor unit.
2. Remove the air bag modules (except the front side air bag modules), crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
3. Check the SRS components using the table below:
   – Replace any SRS components showing visible signs of damage (dents, cracks and deformation).
4. Install new air bag modules (except the front side air bag modules) crash zone sensor assembly, bracket and seat belt pre-tensioner assemblies.
5. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-13, "SRS Operation Check" for details. Ensure entire SRS operates properly.

When SRS is not activated in a collision:

1. Check the SRS components using the table below:
   – Replace any SRS components showing visible signs of damage (dents, cracks and deformation).
2. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-13, "SRS Operation Check" for details. Ensure entire SRS operates properly.

When only one front air bag module is activated in a collision:

1. Replace the following components:
   – Diagnosis sensor unit
   – Activated front air bag and seat belt pre-tensioner.
2. Check the other SRS components using the table below. (Refer to “SRS is NOT activated”.)
   – Replace any SRS components showing visible signs of damage (dents, cracks and deformation).
3. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-13, "SRS Operation Check" for details. Ensure entire SRS operates properly.

Only one front air bag may inflate a crash, depending on the crash severity and whether the front occupants are belted or unbelted. This does not indicate improper performance of the system. Perform self-diagnosis to make sure the entire SRS operates properly.

SRS INSPECTION (FOR FRONTAL COLLISION)

Part	SRS is activated	SRS is NOT activated
Air bag module (driver or front passenger air bag module)	Replace Install with new bolts.	1. Remove air bag module. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. – Install driver air bag module into the steering wheel to check fit and alignment with the wheel. – Install passenger air bag module into the instrument panel to check fit with the instrument panel. 3. No damage found, reinstall with new bolts. 4. If damaged—Replace. Install air bag modules with new special bolts.
Seat belt pre-tensioner assembly	Replace Install seat belt pre-tensioner with new bolts.	1. Remove seat belt pre-tensioners. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 2. Check belts for damage and anchors for loose mounting. 3. Check retractor for smooth operation. 4. If no damage is found, reinstall seat belt pre-tensioner assembly. 5. If damaged—Replace. Install the seat belt pre-tensioners with new bolts.
Diagnosis sensor unit	Replace Install with new bolts.	1. Check case for dents, cracks or deformities. 2. Check connectors for damage, and terminals for deformities. 3. If no damage is found, reinstall with new bolts and ground bolt. 4. If damaged—Replace. Install diagnosis sensor unit with new bolts and ground bolt.

<table>
<tr><th>Part</th><th>SRS is activated</th><th>SRS is NOT activated</th></tr>
<tr><td>Steering wheel</td><td colspan="2">1. Visually check steering wheel for deformities.
2. Check harness (built into steering wheel) and connectors for damage, and terminals for deformities.
3. Install air bag module to check fit or alignment with steering wheel.
4. Check steering wheel for excessive free play.
5. If no damage is found, reinstall with bolts.
6. If damaged—Replace.</td></tr>
<tr><td>Spiral cable</td><td colspan="2">1. Visually check spiral cable and combination switch for damage.
2. Check connectors and protective tape for damage.
3. Check steering wheel for noise, binding or heavy operation.
4. If no damage is found, reinstall with bolts.
5. If damaged—Replace.</td></tr>
<tr><td>Harness and Connectors</td><td colspan="2">1. Check connectors for poor connection, damage, and terminals for deformities.
2. Check harness for binding, chafing, cuts, or deformities.
3. If no damage is found, reinstall the harness and connectors.
4. Damaged—Replace damaged section of harness. Do not attempt to repair, splice or modify any SRS harness.</td></tr>
<tr><td>Instrument panel</td><td colspan="2">1. Visually check instrumental panel for damage.
2. If no damage is found, reinstall the instrument panel.
3. If damaged—Replace the instrument panel with bolts.</td></tr>
</table>

For Side Collision

AHS000R3

WHEN THE SIDE AIR BAG IS ACTIVATED IN THE SIDE COLLISION:

1. Replace the following component:
   - All parts of front seatback (including front seatback frame) with front side air bag module (on the side on which front side air bag is activated)
   - Diagnosis sensor unit
   - Side air bag (Satellite) sensor
2. Check the SRS components and the related parts using the table shown below.
   - Replace any SRS components and the related parts showing visible signs of damage (dents, cracks, deformation).
3. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-13, "SRS Operation Check" . Ensure entire SRS operation properly.

WHEN SRS IS NOT ACTIVATED IN THE SIDE COLLISION:

1. Check the SRS components and the related parts using the table shown below.
   - Replace any SRS components and the related parts showing visible signs of damage (dents, cracks, deformation).
2. Conduct self-diagnosis using CONSULT-II or “AIR BAG” warning lamp. Refer to SRS-13, "SRS Operation Check" . Ensure entire SRS operation properly.

SRS INSPECTION (FOR SIDE COLLISION)

Part	Front side air bag is activated	Front side air bag is NOT activated
Front LH or RH side air bag module	Replace all parts of seatback with deployed front side air bag module.	1. Check for visible signs of damage (dents, tears, deformation) of the seatback on the collision side. 2. If damaged—Replace the damaged seat parts with new bolts and remove the front side air bag module. 3. Check for visible signs of damaged (tears etc.) of the front LH or RH side air bag module. 4. Check harness and connectors for damage, and terminals for deformities. 5. If no damaged is found, reinstall the front LH or RH side air bag module with new nuts. 6. If damaged—Replace the front LH or RH side air bag module with new nut.
LH or RH side air bag (Satellite) sensor	Replace the side air bag (Satellite) sensor on the collision side with new nuts. (Repair the center pillar inner, etc. before installing new one if damaged.)	1. Remove the LH or RH side air bag (Satellite) sensor on the collision side. Check harness connectors for damage, terminals for deformities, and harness for binding. 2. Check for visible signs of damage (dents, cracks, deformation) of the LH or RH side air bag (Satellite) sensor. 3. Install the LH or RH side air bag (Satellite) sensor to check fit. 4. If no damage is found, reinstall the LH or RH side sir bag (Satellite) sensor with new nuts. 5. If damaged—Replace the LH or RH side air bag (Satellite) sensor with new nuts.
Diagnosis sensor unit	Replace the diagnosis sensor unit with the new bolts.	1. Check case and bracket for dents, cracks or deformities. 2. Check connectors for damage, and terminals for deformities. 3. If no damage is found, reinstall the diagnosis sensor unit with new bolts and ground bolt. 4. If damaged—Replace the diagnosis sensor unit with new bolts and ground bolt.
Seat belt pre-tensioner assembly	1. Check if the seat belt can be extended smoothly. If the seat belt cannot be extended smoothly, – Check for deformities of the center pillar inner. – If the center pillar inner has no damage, Replace the seat belt pre-tensioner assembly. 2. Remove the seat belt pre-tensioner assembly on the collision side. Check harness cover and connectors for damage, terminals for deformities, and harness for binding. 3. Check for visible signs of damage (dents, cracks, deformation) of the seat belt pre-tensioner assembly. 4. If no damage is found, reinstall the seat belt pre-tensioner assembly. 5. If damaged—Replace the seat belt pre-tensioner assembly with new bolts.	
Seat with front side air bag	Replace all parts of front seatback (including front seatback frame)	1. Visually check the seat on the collision side. 2. Remove the seat on the collision side and check the following for damage and deformities. – Harness, connectors and terminals – Frame and recliner (for front and rear seat), and also adjuster and slides (for front seat) 3. If no damage is found, reinstall the seat. 4. If damaged—Replace the damaged seat parts with new bolts.
Center pillar inner	1. Check the center pillar inner on the collision side for damage (dents, cracks, deformation). 2. If damaged—Repair the center pillar inner.	
Trim	1. Check for visible signs of damage (dents, cracks, deformation) of the interior trim on the collision side. 2. If damaged—Replace the damaged trim parts.	

SECTION TF
TRANSFER

CONTENTS

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

ADS0016Z

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

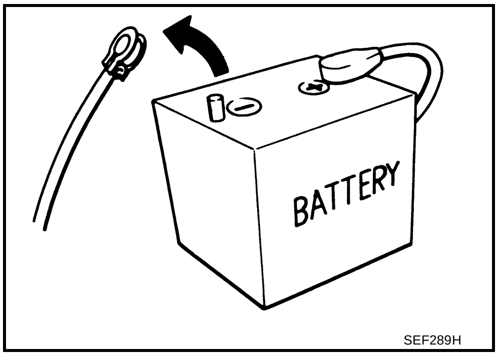
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions

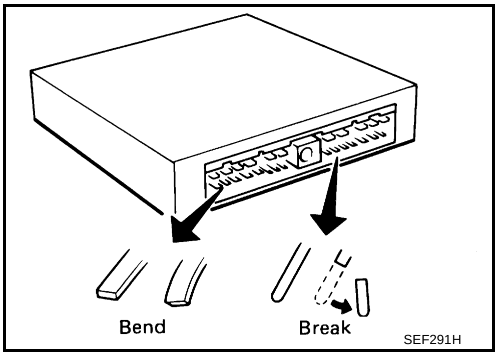
ADS00170

- **Before connecting or disconnecting the AWD control unit harness connector, turn ignition switch “OFF” and disconnect battery negative cable from battery negative terminal. Because battery voltage is applied to AWD control unit even if ignition switch is turned “OFF”.**



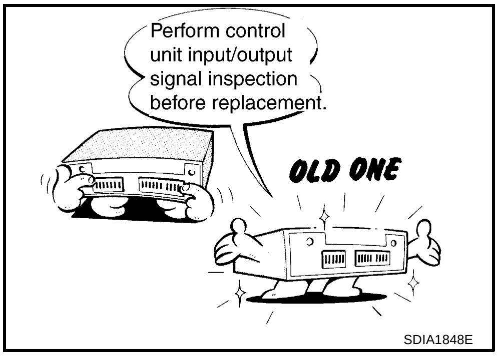
SEF289H

- **When connecting or disconnecting pin connectors into or from AWD control unit, take care not to damage pin terminals (bend or break).**
  When connecting pin connectors, make sure that there are no bends or breaks on AWD control unit pin terminal.



SEF291H

- **Before replacing AWD control unit, perform AWD control unit input/output signal inspection and make sure whether AWD control unit functions properly or not. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .**



SDIA1848E

Service Notice or Precautions

ADS00171

- After overhaul refill the transfer with new transfer oil.
- Check the oil level or replace oil only with the vehicle parked on level surface.
- During removal or installation, keep inside of transfer clear of dust or dirt.
- Replace all tires at the same time. Always use tires of the proper size and the same brand and pattern. Fitting improper size and/or unusual wear tires applies excessive force to vehicle mechanism and can cause longitudinal vibration.
- Disassembly should be done in a clean work area.
- Before proceeding with disassembly, thoroughly clean the transfer. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Check for the correct installation status prior to removal or disassembly. If matching marks are required, be certain they do not interfere with the function of the parts when applied.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Check appearance of the disassembled parts for damage, deformation, and unusual wear. Replace them with a new ones if necessary.
- Gaskets, seals, O-rings and lock nuts should be replaced any time when the transfer is disassembled.
- In principle, tighten bolts or nuts gradually in several steps working diagonally from inside to outside. If tightening sequence is specified, use it.
- Observe the specified torque when assembling.
- Clean and flush the parts sufficiently and blow-dry them.
- Be careful not to damage sliding surfaces and mating surfaces.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transfer.

Wiring Diagrams and Trouble Diagnosis

ADS00172

When reading wiring diagrams, refer to the following:

- GI-14, "How to Read Wiring Diagrams".
- PG-2, "POWER SUPPLY ROUTING".

When performing trouble diagnosis, refer to the following:

- GI-10, "How to Follow Trouble Diagnoses".
- GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident".

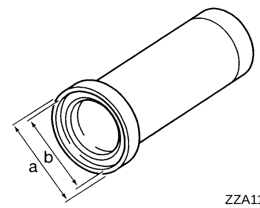
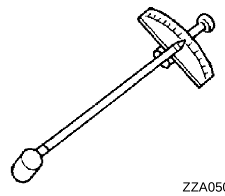
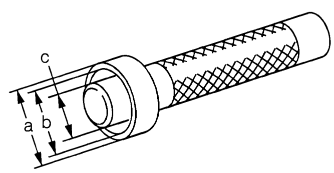
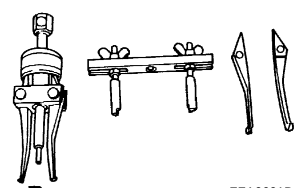
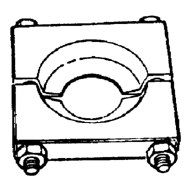
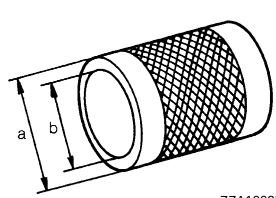
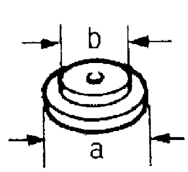
PREPARATION

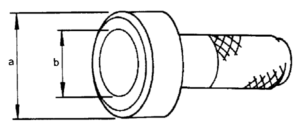
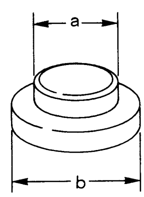
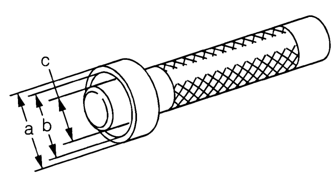
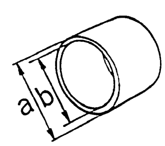
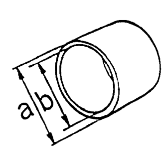
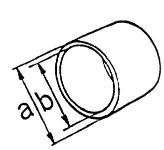
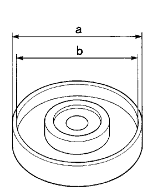
PFP:00002

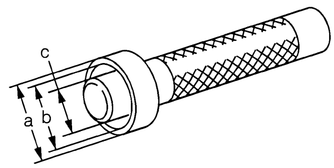
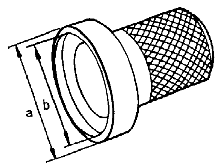
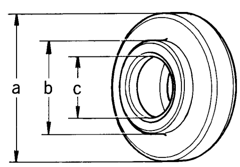
Special Service Tools

ADS00173

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

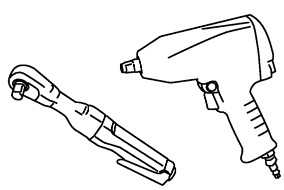
Tool number (Kent-Moore No.) Tool name	Description
KV38101700 (—) Drift a: 82 mm (3.23 in) dia. b: 78 mm (3.07 in) dia.  ZZA1149D	Installing side oil seal (installing adapter case oil seal)
ST3127S000 (J-25765-A) Preload gauge  ZZA0503D	Measuring preload torque
ST33220000 (J-25804-01) Drift a: 37 mm (1.46 in) dia. b: 31 mm (1.22 in) dia. c: 22 mm (0.87 in) dia.  ZZA1046D	Removing drive pinion
KV381054S0 (J-34286) Puller  ZZA0601D	● Removing pinion rear bearing outer race ● Removing pinion front bearing outer race ● Removing gear ring oil seal
ST30031000 (J-22912-01) Replacer  ZZA0700D	Removing pinion front bearing inner race
ST33200000 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 44.5 mm (1.752 in) dia.  ZZA1002D	● Removing gear ring bearing inner race (adapter case side) ● Installing companion flange
ST33061000 (J-8107-2) Drift a: 38 mm (1.50 in) dia. b: 28.5 mm (1.122 in) dia.  ZZA0810D	Removing gear ring bearing inner race (transfer case side)

Tool number (Kent-Moore No.) Tool name	Description
ST30720000 (J-25405) Drift a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.  ZZA0811D	● Installing gear ring bearing outer race (transfer case side) ● Installing gear ring bearing inner race (transfer case side) ● Installing gear ring bearing inner race (adapter case side) ● Installing gear ring bearing outer race (adapter case side) ● Installing transfer case oil seal
KV40101840 (—) Drift a: 77 mm (3.03 in) dia. b: 85 mm (3.35 in) dia.  ZZA0881D	Installing gear ring bearing outer race (transfer case side)
ST33230000 (J-25805-01) Drift a: 51 mm (2.01 in) dia. b: 41 mm (1.61 in) dia. c: 28.5 mm (1.122 in) dia.  ZZA1046D	Installing gear ring oil seal
ST27863000 (—) Drift a: 74.5 mm (2.933 in) dia. b: 62.5 mm (2.461 in) dia.  ZZA1003D	Installing gear ring bearing inner race (transfer case side)
KV40101630 (J-35870) Drift a: 68 mm (2.68 in) dia. b: 60 mm (2.36 in) dia.  ZZA1003D	Installing gear ring bearing inner race (transfer case side)
KV38102510 (—) Drift a: 71 mm (2.80 in) dia. b: 65 mm (2.56 in) dia.  ZZA1003D	Installing gear ring bearing inner race (adapter case side)
KV40105230 (—) Drift a: 92 mm (3.62 in) dia. b: 86 mm (3.39 in) dia.  ZZA1141D	Installing gear ring bearing outer race (adapter case side)

Tool number (Kent-Moore No.) Tool name	Description
KV38100300 (J-25523) Drift a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia.  ZZA1046D	Installing pinion rear bearing outer race
ST33400001 (J-26082) Drift a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.  ZZA0814D	● Installing pinion front bearing outer race ● Installing pinion sleeve oil seal
ST30901000 (J-26010-01) Drift a: 79 mm (3.11 in) dia. b: 45 mm (1.77 in) dia. c: 35.2 mm (1.386 in) dia.  ZZA0978D	● Installing pinion front bearing outer race ● Installing pinion front bearing inner race

Commercial Service Tools

ADS00189

Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

ADS00174

Use the chart below to help you find the cause of the symptom. The numbers indicate the order of the inspection. If necessary, repair or replace these parts.

Reference page		TF-9			TF-50	TF-50	TF-50	TF-59	TF-59
SUSPECTED PARTS (Possible cause)		TRANSFER OIL (Level low)	TRANSFER OIL (Wrong)	TRANSFER OIL (Level too high)	LIQUID GASKET (Damaged)	O-RING (Worn or damaged)	OIL SEAL (Worn or damaged)	GEAR (Worn or damaged)	BEARING (Worn or damaged)
Symptom	Noise	1	2					3	3
	Transfer oil leakage		3	1	2	2	2		

TRANSFER OIL

PFP:KLD30

Changing Transfer Oil

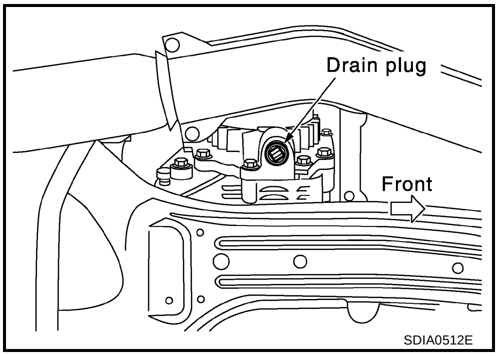
ADS00175

DRAINING

CAUTION:

When draining oil, protect exhaust tube with cover.

1. Run vehicle to warm up transfer body sufficiently.
2. Stop engine, and remove drain plug to drain transfer oil.
3. Apply sealant to drain plug. Install drain plug on transfer and tighten to the specified torque. Refer to TF-50, "COMPONENTS" .
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**



FILLING

1. Remove filler plug and add gear oil until oil level reaches the specified limit near filler plug mounting hole.

   Oil grade and Viscosity:

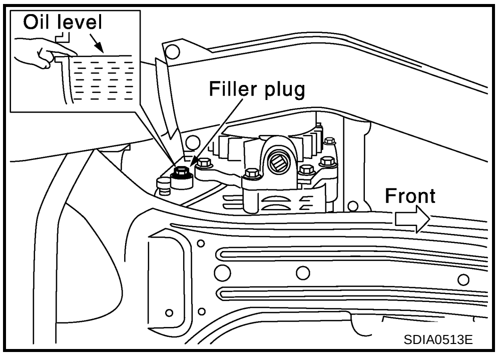
   Refer to MA-11, "Fluids and Lubricants" .

   Oil capacity:

   Approx. 0.31 ℓ (5/8 US pt, 1/2 Imp pt)

   CAUTION:

   Carefully fill oil. (Fill up for approx. 3 minutes)
2. Leave vehicle for 3 minutes, and check oil level again.
3. Apply sealant to filler plug. Install filler plug on transfer and tighten to the specified torque. Refer to TF-50, "COMPONENTS" .
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**



Checking Transfer Oil

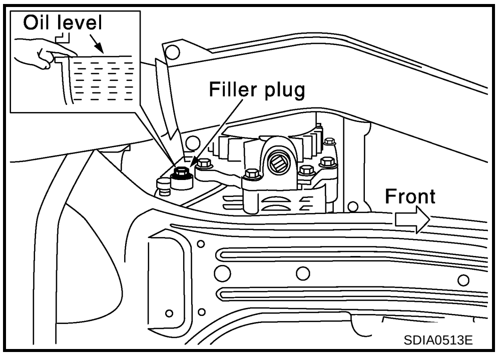
ADS00176

OIL LEAKAGE AND OIL LEVEL

1. Check oil level from filler plug mounting hole as shown in the figure.

   CAUTION:

   Do not start engine while checking oil level.
2. Before installing filler plug, apply sealant. Install filler plug on transfer and tighten to the specified torque. Refer to TF-50, "COMPONENTS" .
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**

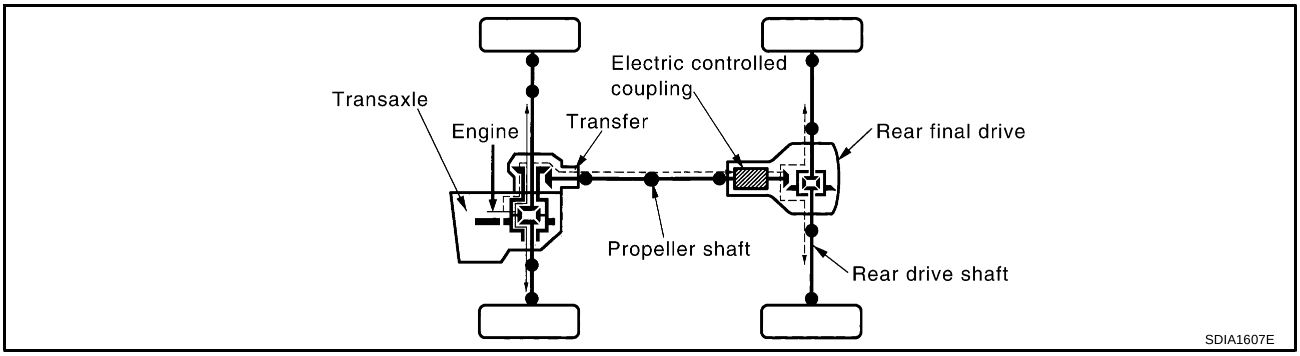


AWD SYSTEM

PFP:41650

Power Transfer Diagram

ADS00177



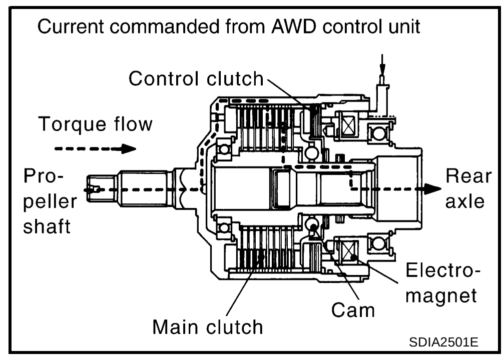
System Description

ADS00178

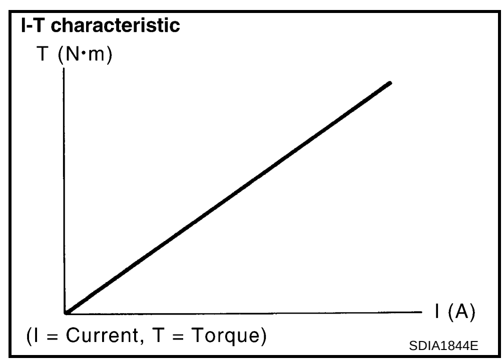
ELECTRIC CONTROLLED COUPLING

Operation Principle

1. The AWD control unit supplies command current to the electric controlled coupling (AWD solenoid).
2. The control clutch is engaged by the electromagnet and torque is detected in control clutch.
3. The cam operates in response to the control clutch torque and applies pressure to the main clutch.
4. The main clutch transmits torque to front wheels according to pressing power.

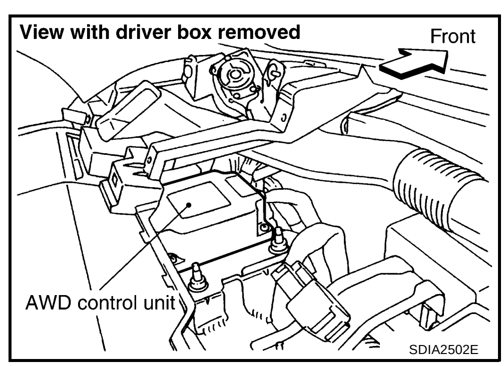


- Transmission torque to the rear wheels is determined according to command current.



AWD CONTROL UNIT

- AWD control unit controls distribution of drive power between front-wheel drive (100:0) and AWD (50:50) conditions according to the signals from the sensors.
- Self-diagnosis results can be read with CONSULT-II.



AWD MODE SWITCH

AUTO Mode

- Electronic control allows optimal distribution of torque to front/rear wheels to match road conditions.
- AWD mode makes possible stable driving, with no wheel spin, on snowy roads or other slippery surfaces.
- On roads which do not require AWD, AUTO mode contributes to improved fuel economy by driving in conditions close to front-wheel drive.
- Sensor inputs determine the vehicle's turning condition, and tight cornering/braking are controlled by distributing optimum torque to the rear wheels.

LOCK Mode

- Front/rear wheel torque distribution is fixed, ensuring stable driving when climbing slopes.
- AWD control unit will switch automatically to AUTO mode if vehicle speed increases. If vehicle speed then decreases, the vehicle automatically returns to direct 4-wheel driving conditions.
- LOCK mode will change to AUTO mode automatically, when the vehicle speed exceeds approx. 30 km/h (19 MPH). The LOCK indicator light keeps illuminating.

NOTE:
If there is a significant difference in pressure or wear between tires, full vehicle performance is not available. LOCK mode may be prohibited, or speeds at which LOCK mode is enabled may be restricted detecting tire conditions.

2WD Mode

Vehicle is in front-wheel drive.

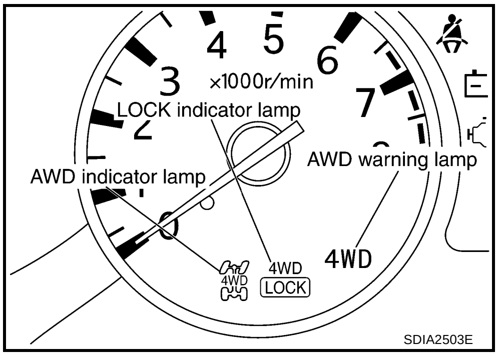
NOTE:

- If front wheels are slipping in 2WD mode, do not switch to AUTO or LOCK. This can cause difficulties for the system.
- Even if the AWD mode switch is in 2WD mode, the AWD control unit occasionally automatically change to AUTO mode depending on the driving condition (For example; Depressing the acceleration firmly). This is not malfunction. However, AWD indicator lamp dose not illuminate.

AWD INDICATOR LAMP AND LOCK INDICATOR LAMP

The following is the indications of indicator lamp.

Condition	AWD indicator lamp	LOCK indicator lamp
AUTO mode	ON	OFF
LOCK mode	ON	ON
2WD mode	OFF	OFF
Lamp check	Turns ON for approx. 1 second when ignition switch is turned ON.	



SDIA2503E

AWD WARNING LAMP

Turns ON when there is a malfunction in AWD system. It indicates that the vehicle is in fail-safe mode and changes to front-wheel drive or shifting driving force-AWD (Rear-wheels still have some driving torque).
Also turns ON when ignition switch is turned ON, for purpose of lamp check.
Turns OFF approximately for 1 second after the engine starts if system is normal.

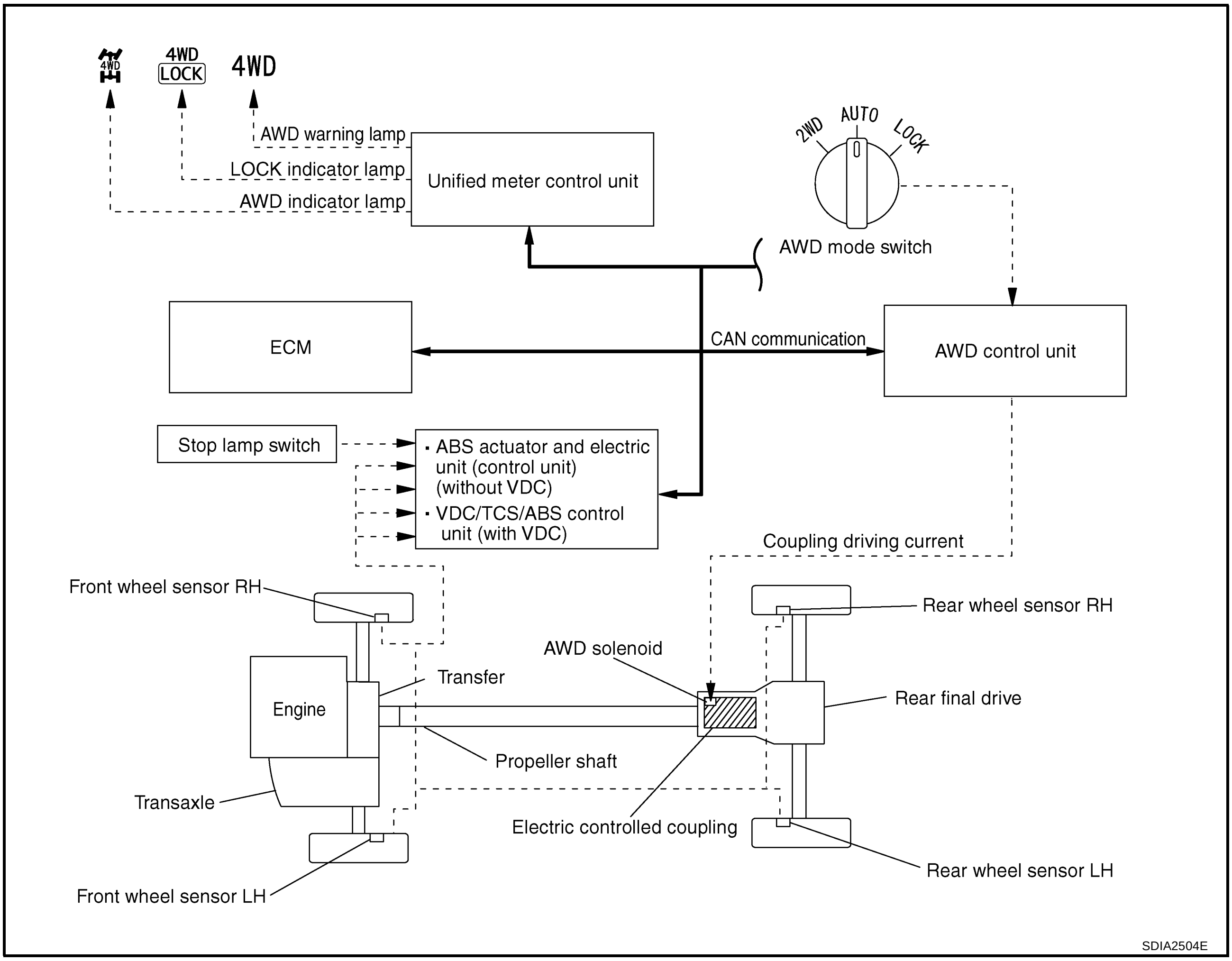
AWD Warning Lamp Indication

Condition	AWD warning lamp
Lamp check	Turns ON when ignition switch is turned ON. Turns OFF approx. 1 seconds after engine start.
AWD system malfunction	ON
Protection function is activated due to heavy load to electric controlled coupling. (AWD system is not malfunctioning and AWD system changes to 2WD mode.)	Rapid flashing: 2 times/second (Flashing in approx. 1 minute and then turning OFF.)

Condition	AWD warning lamp
Large difference in diameter of front/rear tires	Slow flashing: 1 time/2 seconds (Continuing to flash until turning ignition switch OFF)
Other than above (system normal)	OFF

System Diagram

ADS00179



COMPONENTS FUNCTION DESCRIPTION

Component parts	Function
AWD control unit	● Controls driving force distribution by signals from each sensor and switches from front wheel driving mode (100:0) to AWD mode (50:50). ● 2WD mode is available by fail-safe function if malfunction is detected in electrical system.
Wheel sensors	Detects wheel speed.
AWD solenoid	Controls electric controlled coupling by operation signal from AWD control unit.
Electric controlled coupling	Transmits driving force to rear final drive.
AWD mode switch	Able to select from 2WD, AUTO or LOCK mode.
AWD warning lamp	● Illuminates if malfunction is detected in electrical system of AWD system. ● There is 1 blink in 2 seconds if rotation difference of front wheels and rear wheels is large. ● There are 2 blinks in 1 second if load is still applied to driving parts.
AWD indicator lamp	Indicates operation with optimal distribution of torque to front/rear wheels.
LOCK indicator lamp	Indicates that AWD system is under direct 4-wheel driving mode.
ABS actuator and electric unit (control unit) (without VDC) or VDC/TCS/ABS control unit (with VDC)	Transmits the following signals via CAN communication to AWD control unit. ● Vehicle speed signal ● Stop lamp switch signal (brake signal)
ECM	Transmits the following signals via CAN communication to AWD control unit. ● Accelerator pedal position signal ● Engine speed signal
Unified meter control unit	Transmits conditions of parking brake switch via CAN communication to AWD control unit.

CAN Communication

ADS0017A

SYSTEM DESCRIPTION

CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN H line, CAN L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
For details, refer to LAN-16, "CAN Communication Unit" .

TROUBLE DIAGNOSIS

PFP:00004

Fail-Safe Function

ADS0017B

- If any malfunction occurs in AWD electrical system, and control unit detects the malfunction, AWD warning lamp on combination meter turns ON to indicate system malfunction.
- When AWD warning lamp is ON, vehicle changes to front-wheel drive or shifting driving force-AWD (Rear-wheels still have some driving torque).

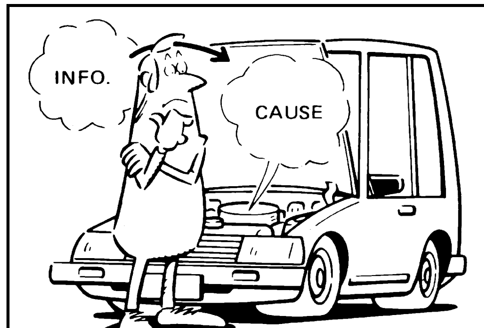
How to Perform Trouble Diagnosis

ADS0017C

BASIC CONCEPT

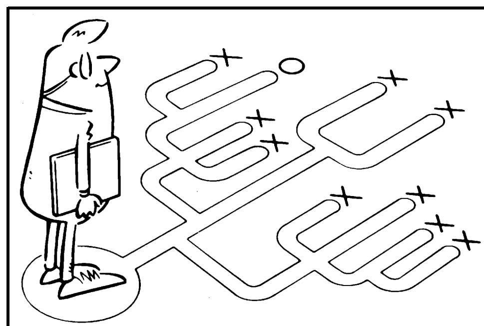
- To perform trouble diagnosis, it is the most important to have understanding about vehicle systems (control and mechanism) thoroughly.
- It is also important to clarify customer complaints before inspection.
  First of all, reproduce symptoms, and understand them fully.
  Ask customer about his/her complaints carefully. In some cases, it will be necessary to check symptoms by driving vehicle with customer.

  CAUTION:
  Customers are not professional. It is dangerous to make an easy guess like "maybe the customer means that...," or "maybe the customer mentions this symptom".



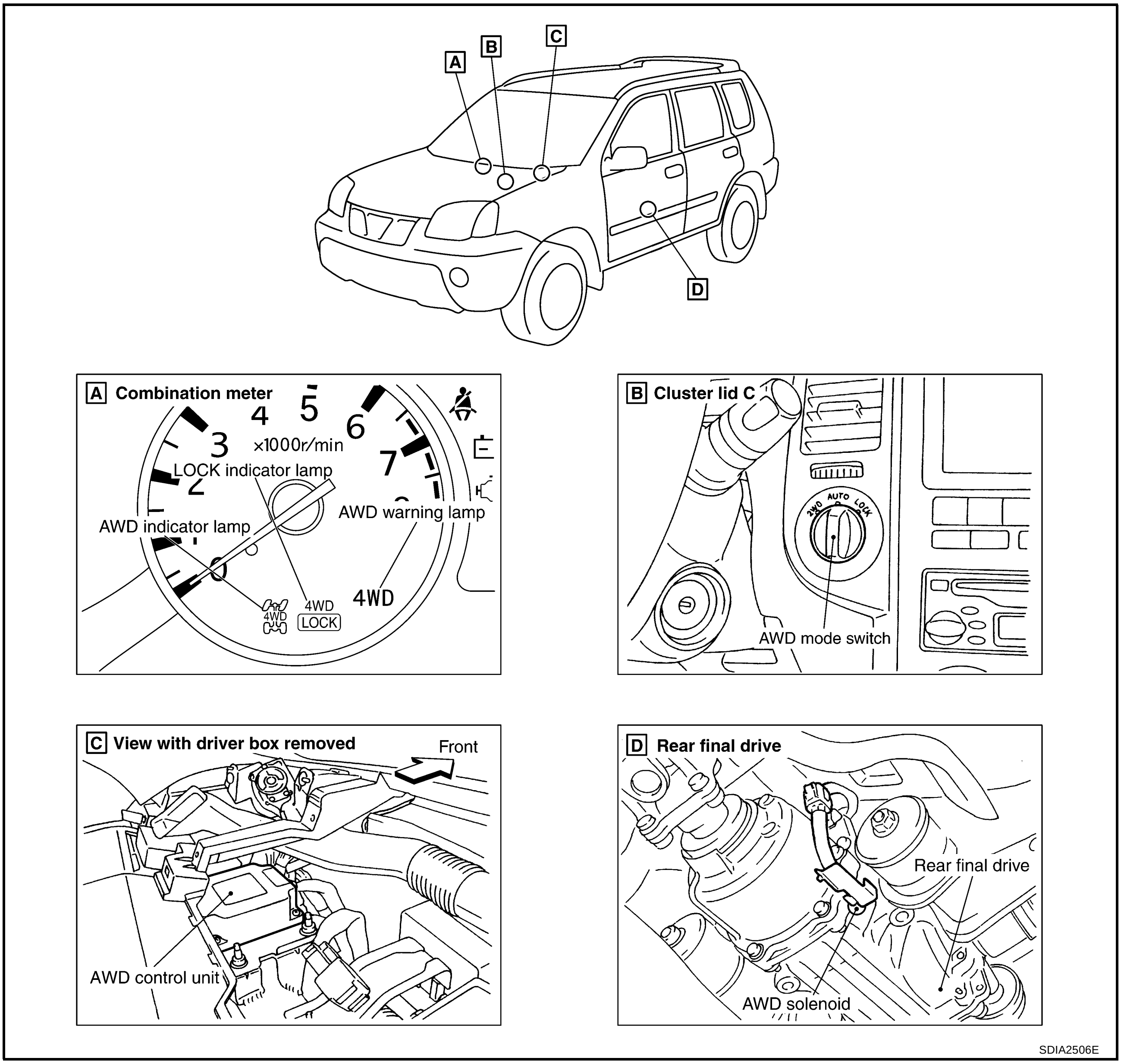
SEF233G

- It is essential to check symptoms right from the beginning in order to repair malfunctions completely.
  For intermittent malfunctions, reproduce symptoms based on interview with customer and past examples. Do not perform inspection on ad hoc basis. Most intermittent malfunctions are caused by poor contacts. In this case, it will be effective to shake suspected harness or connector by hand. When repairing without any symptom diagnosis, you cannot judge if malfunctions have actually been eliminated.
- After completing diagnosis, always erase diagnostic memory. Refer to TF-24, "How to Erase Self-Diagnosis Results" .
- For intermittent malfunctions, move harness or harness connector by hand. Then check for poor contact or reproduced open circuit.


SEF234G

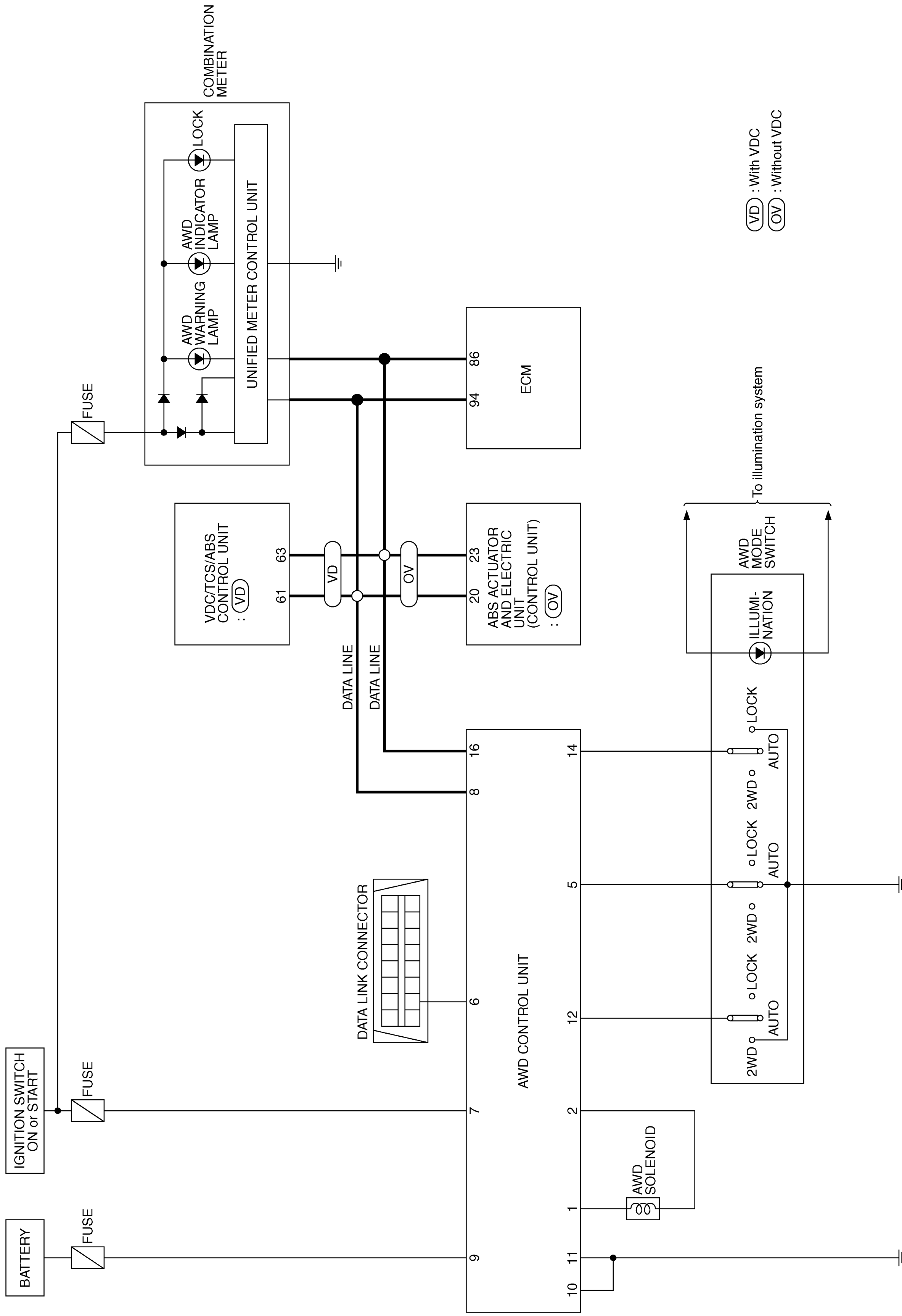
Location of Electrical Parts

ADS0017D



Circuit Diagram

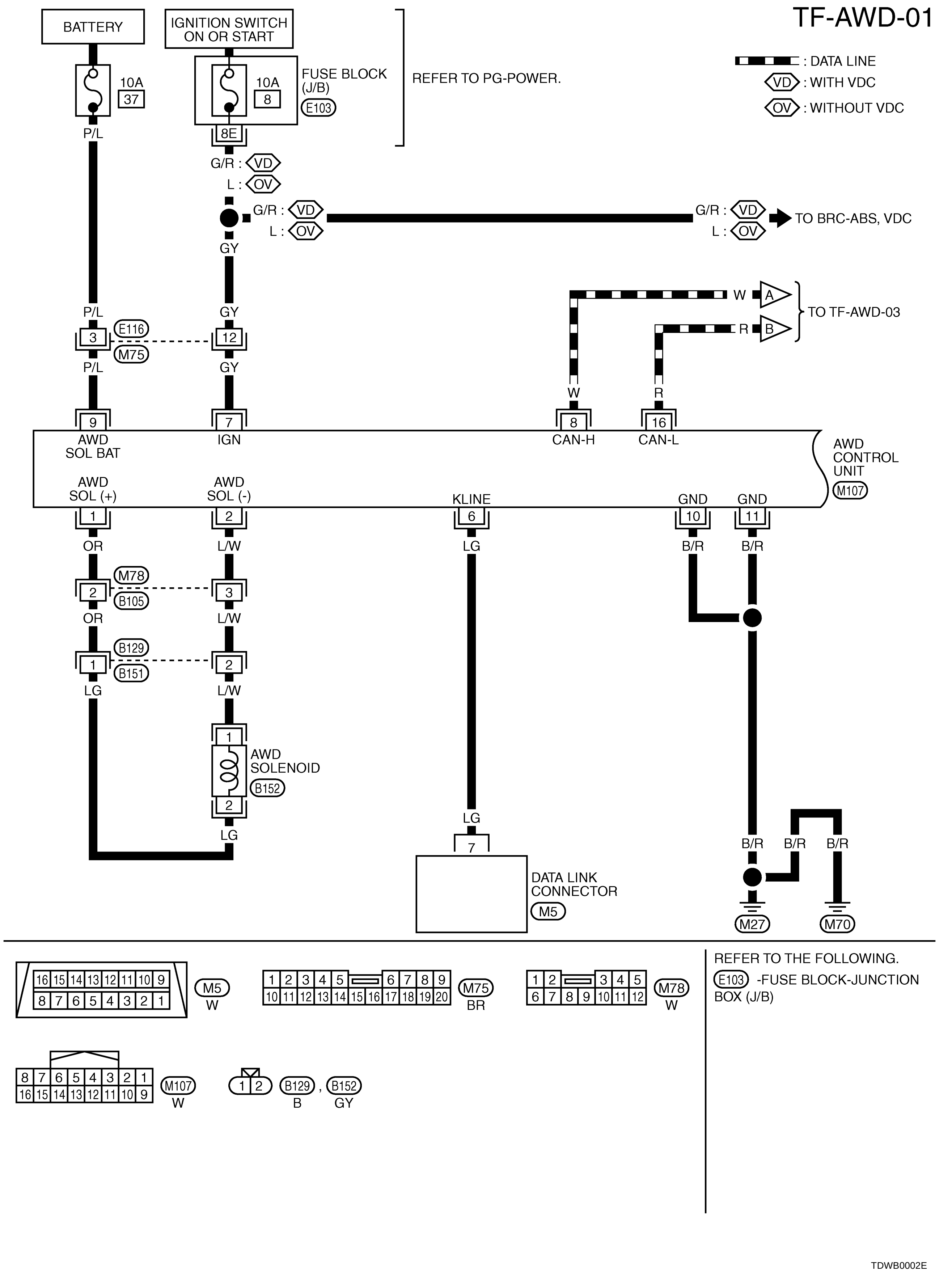
ADS0017E

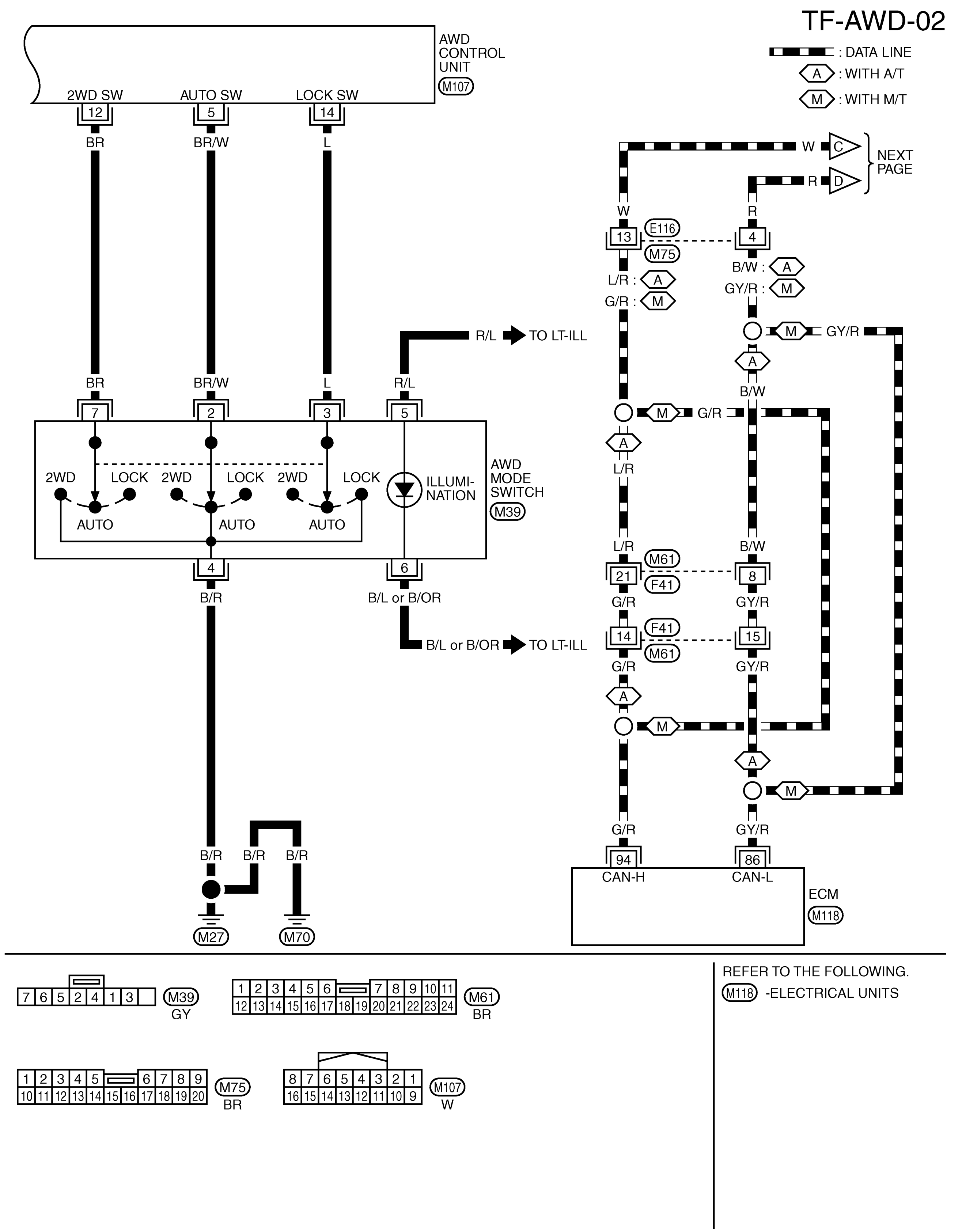


TDWB0001E

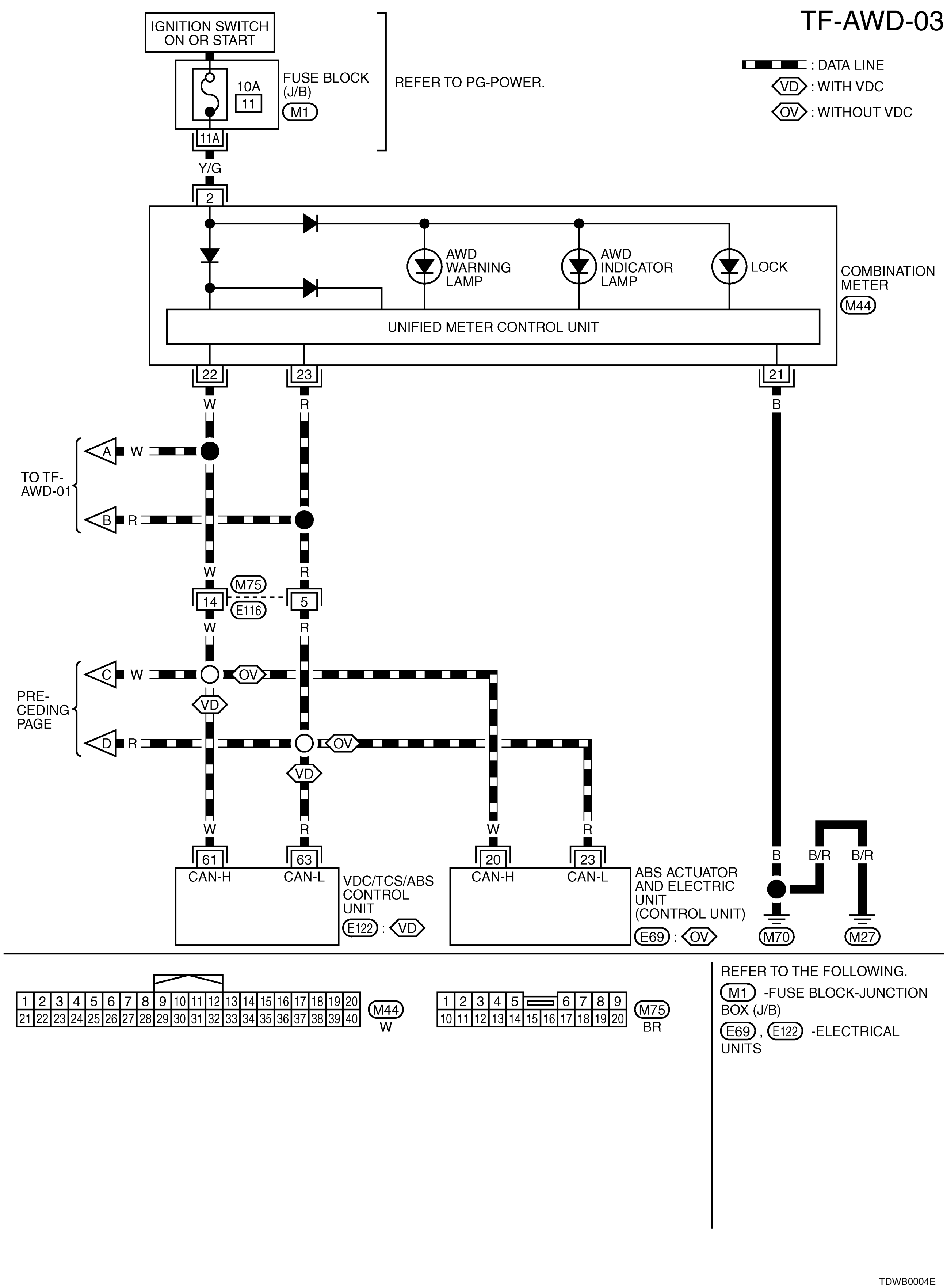
Wiring Diagram — AWD —

ADS0017F





TF-AWD-02
: DATA LINE
A : WITH A/T
M : WITH M/T
AWD CONTROL UNIT
M107
2WD SW
AUTO SW
LOCK SW
12
5
14
BR
BR/W
L
W
C
R
D
NEXT PAGE
E116
M75
13
4
L/R : A
G/R : M
B/W : A
GY/R : M
R/L
TO LT-ILL
GY/R
G/R
7
2
3
5
2WD
LOCK
AUTO
ILLUMI-NATION
AWD MODE SWITCH
M39
4
6
B/R
B/L or B/OR
M61
F41
21
8
14
15
G/R
GY/R
94
86
CAN-H
CAN-L
ECM
M118
M27
M70
7 6 5 2 4 1 3
GY
1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22 23 24
BR
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20
8 7 6 5 4 3 2 1
16 15 14 13 12 11 10 9
W
REFER TO THE FOLLOWING.
M118 -ELECTRICAL UNITS
TDWB0003E


TF-AWD-03
: DATA LINE
VD : WITH VDC
OV : WITHOUT VDC
IGNITION SWITCH ON OR START
10A
11
FUSE BLOCK (J/B)
M1
11A
REFER TO PG-POWER.
Y/G
2
AWD WARNING LAMP
AWD INDICATOR LAMP
LOCK
COMBINATION METER
M44
UNIFIED METER CONTROL UNIT
22
23
21
W
R
B
TO TF-AWD-01
A
B
M75
14
5
E116
PRE-CEDING PAGE
C
D
OV
VD
61
63
CAN-H
CAN-L
VDC/TCS/ABS CONTROL UNIT
E122 : VD
20
23
ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
E69 : OV
B/R
M70
M27
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40
M44
W
1 2 3 4 5 6 7 8 9
10 11 12 13 14 15 16 17 18 19 20
M75
BR
REFER TO THE FOLLOWING.
M1 -FUSE BLOCK-JUNCTION BOX (J/B)
E69 , E122 -ELECTRICAL UNITS
TDWB0004E

Trouble Diagnosis Chart for Symptoms

ADS0017G

If AWD warning lamp turns ON, perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Symptom	Condition	Check item	Reference page
AWD indicator lamp and LOCK indicator lamp do not turn ON for approx. 1 second when ignition switch is turned to ON. (AWD indicator lamp and LOCK indicator lamp check)	Ignition switch: ON	CAN communication line	TF-37
		Power supply and ground for AWD control unit	
		Unified meter control unit	
AWD warning lamp does not turn ON when ignition switch is turned to ON. (AWD warning lamp check)	Ignition switch: ON	CAN communication line	TF-38
		Unified meter control unit	
AWD warning lamp does not turn OFF several seconds after engine started.	Engine running	CAN communication line	TF-39
		Power supply and ground for AWD control unit	
		Unified meter control unit	
		AWD solenoid	
		AWD actuator relay (integrated in AWD control unit)	
		Wheel sensor	
AWD mode cannot be switched after engine is started.	Engine running	AWD mode switch	TF-40
		CAN communication line	
		Unified meter control unit	
Heavy tight-corner braking symptom occurs when vehicle is driven in AUTO mode and steering wheel is turned fully to either side after engine is started. (See NOTE.)	● While driving ● AUTO mode ● Steering wheel is turned fully to either sides	CAN communication line	TF-41
		AWD mode switch	
		Accelerator pedal position signal	
		AWD solenoid	
		Mechanical malfunction of electric controlled coupling (clutch sticking etc.)	
Vehicle does not enter AWD mode even though AWD warning lamp turned to OFF.	Vehicle speed: 10 km/h (6 MPH) or less	AWD solenoid	TF-42
		Mechanical malfunction of electric controlled coupling (Mechanical engagement of clutch is not possible.)	
	Vehicle speed: 10 km/h (6 MPH) or more	Operating condition of parking brake	
		AWD solenoid	
		Mechanical malfunction of electric controlled coupling (Mechanical engagement of clutch is not possible.)	
While driving, AWD warning lamp flashes rapidly. (When flashing in approx. 1 minute and then turning OFF.) Rapid flashing: 2 times/second	● While driving ● AUTO mode and LOCK mode	Protection function is activated due to heavy load to electric controlled coupling. (AWD system is not malfunctioning.)	TF-43
While driving, AWD warning lamp flashes slowly. (When continuing to flash until turning ignition switch OFF) Slow flashing: 1 time/2 seconds	● While driving ● Vehicle speed: 20 km/h (12 MPH) or more	Tire size is different between front and rear of vehicle.	TF-43

NOTE:
- **Light tight-corner braking symptom may occur depending on driving conditions in AUTO mode. This is not malfunction.**
- **Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: LOCK mode, steering wheel is turned fully to either side, and accelerator pedal was depressed.**

AWD Control Unit Input/Output Signal Reference Values

ADS0017H

AWD CONTROL UNIT INSPECTION TABLE

Specifications with CONSULT-II

Monitor item [Unit]	Content	Condition		Display value
FR RH SENSOR [km/h] or [mph]	Wheel speed (Front wheel right)	Vehicle stopped		0.00 km/h (0.00 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
FR LH SENSOR [km/h] or [mph]	Wheel speed (Front wheel left)	Vehicle stopped		0.00 km/h (0.00 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
RR RH SENSOR [km/h] or [mph]	Wheel speed (Rear wheel right)	Vehicle stopped		0.00 km/h (0.00 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
RR LH SENSOR [km/h] or [mph]	Wheel speed (Rear wheel left)	Vehicle stopped		0.00 km/h (0.00 mph)
		Vehicle running **CAUTION:** **Check air pressure of tire under standard condition.**		Approximately equal to the indication on speedometer (Inside of ±10%)
BATTERY VOLT [V]	Power supply voltage for AWD control unit	Ignition switch: ON		Battery voltage
THRTL POS SEN [%]	Throttle opening condition	When depressing accelerator pedal (Value rises gradually in response to throttle position.)		0 - 100%
ETS SOLENOID [A]	Monitored value of current at AWD solenoid	Engine speed : At idle	2WD	Approx. 0.000A
			AUTO	Approx. 0.000A
			LOCK	Approx. 0.000A
		Engine speed : 3,000 rpm or more constant	2WD	Approx. 0.000A
			AUTO	Approx. 0.000 - 1.500A*
			LOCK	Approx. 2.800A
STOP LAMP SW [ON/OFF]	Condition of brake pedal operation	Brake pedal: Depressed		ON
		Brake pedal: Released		OFF
ENG SPEED SIG [RUN/STOP]	Condition of engine running	Engine stopped (Engine speed: Less than 400 rpm)		STOP
		Engine running (Engine speed: 400 rpm or more)		RUN
ETS ACTUATOR [ON/OFF]	Operating condition of AWD actuator relay (integrated in AWD control unit)	Engine stopped (Ignition switch: ON)		OFF
		Engine running		ON
4WD WARN LAMP [ON/OFF]	AWD warning lamp condition	AWD warning lamp: ON		ON
		AWD warning lamp: OFF		OFF
4WD MODE SW [2WD/AUTO/LOCK]	Input condition from AWD mode switch	AWD mode switch	2WD	2WD
			AUTO	AUTO
			LOCK	LOCK

Monitor item [Unit]	Content	Condition		Display value
4WD MODE MON [2WD/AUTO/LOCK]	Control status of AWD (Output condition of AWD indicator lamp and LOCK indicator lamp signal)	AWD mode switch (Engine running)	2WD	2WD
			AUTO	AUTO
			LOCK	LOCK
DIS-TIRE MONI [mm]	Improper size tire installed condition	Vehicle running with normal size tire installed		0-4 mm
		Vehicle running with improper size tire installed (Front/rear tire size difference, wear condition)		4-8 mm, 8- mm
P BRAKE SW [ON/OFF]	Condition of parking brake	Parking brake operated		ON
		Parking brake not operated		OFF

*: The values are changed by throttle opening and engine speed.

CONSULT-II Function (ALL MODE AWD/4WD)

ADS0017I

FUNCTION

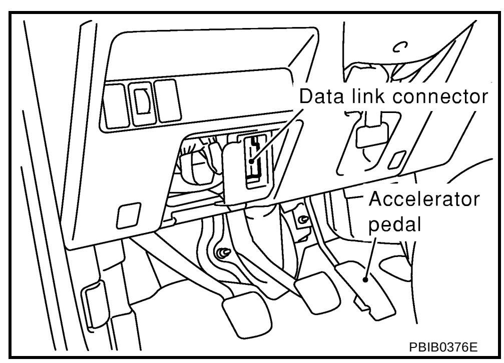
CONSULT-II can display each diagnostic item using the diagnostic test modes shown following.

Diagnostic test mode	Function	Reference page
Self-diagnosis results	● Self-diagnosis results can be read and erased quickly.	TF-23
Data monitor	● Input/Output data in the AWD control unit can be read.	TF-24
CAN diagnostic support monitor	● The results of transmit/receive diagnosis of CAN communication can be read.	LAN-13
Active test	● Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the AWD control unit and also shifts some parameters in a specified range.	TF-25
ECU part number	● AWD control unit part number can be read.	TF-25

CONSULT-II SETTING PROCEDURE

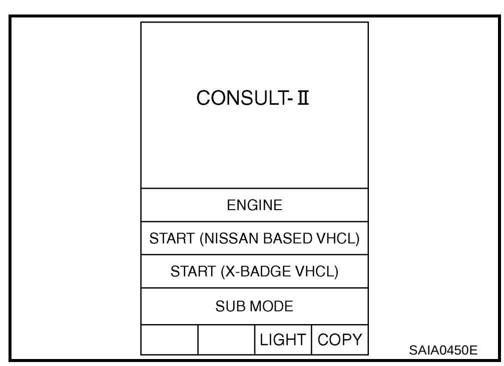
- For details, refer to the separate “CONSULT-II Operations Manual”.

1. Turn ignition switch “OFF”.
2. Connect CONSULT-II and CONSULT-II CONVERTER to data link connector on vehicle.
3. Turn ignition switch “ON”.



PBIB0376E

4. Touch “START (NISSAN BASED VHCL)”.



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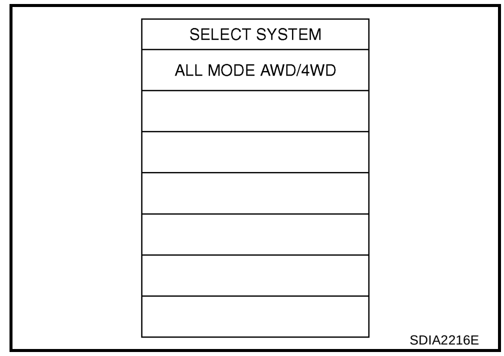
5. Touch “ALL MODE AWD/4WD”.
   If “ALL MODE AWD/4WD” is not indicated, go to GI-38, "CONSULT-II Data Link Connector (DLC) Circuit" .
6. Perform each diagnostic test mode according to each service procedure.

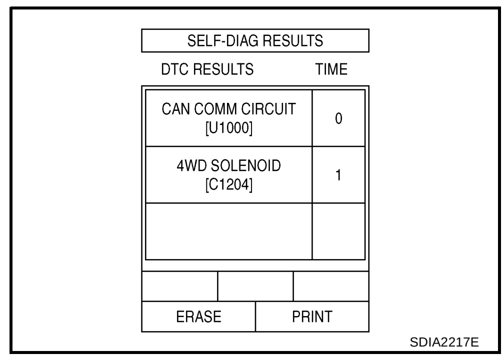


SELF-DIAG RESULTS MODE

Operation Procedure

1. Perform “CONSULT-II SETTING PROCEDURE”. Refer to TF-22, "CONSULT-II SETTING PROCEDURE" .
2. Start engine and drive at 30 km/h (19 MPH) or more for approx. 1 minute.
3. Stop vehicle. With engine at idle, touch “SELF-DIAG RESULTS”. Display shows malfunction experienced since the last erasing operation.

   NOTE:
   - **The details for “TIME” are as follow:**
     - **“0”: Error currently detected with AWD control unit.**
     - **Except for “0”: Error detected in the past and memorized with AWD control unit.** Detects frequency of driving after DTC occurs (frequency of turning ignition switch “ON/OFF”).



Display Item List

Items (CONSULT-II screen terms)	Diagnostic item is detected when...	Check item
CONTROLLER FAILURE [C1201]	Malfunction has occurred inside AWD control unit.	TF-27, "AWD Control Unit"
ABS SYSTEM [C1203]	Malfunction related to wheel sensor has been detected by ABS actuator and electric unit (control unit) (without VDC) or VDC/TCS/ABS control unit (with VDC).	TF-28, "ABS System"
4WD SOLENOID [C1204]	Malfunction related to AWD solenoid has been detected.	TF-28, "AWD Solenoid"
4WD ACTUATOR RLY [C1205]	Malfunction has been detected from AWD actuator relay integrated with AWD control unit, or malfunction related to AWD solenoid has been detected.	TF-32, "AWD Actuator Relay" or TF-28, "AWD Solenoid"
MODE SW [C1209]	More than two switch inputs are simultaneously detected due to short circuit of AWD mode switch.	TF-33, "AWD Mode Switch"
ENGINE SIGNAL 1 [C1210]	Malfunction has been detected from ECM.	TF-35, "Engine Control Signal"
CAN COMM CIRCUIT [U1000]	Malfunction has been detected from CAN communication line.	TF-36, "CAN Communication Line"
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	No NG item has been detected.	—

CAUTION:
- **If “CAN COMM CIRCUIT [U1000]” is displayed with other DTCs, first perform the trouble diagnosis for CAN communication line.**
- **Make sure that ABS warning lamp turns OFF by driving for a minute at vehicle speed of 30 km/h (19 MPH) or more after turning ignition switch "OFF" if AWD warning lamp turns ON with system malfunction of “ABS SYSTEM [C1203]”. AWD warning lamp may not turn OFF if it is normal unless ignition switch turns OFF at once and engine restarts after that.**

How to Erase Self-Diagnosis Results

1. Perform applicable inspection of malfunctioning item and then repair or replace.
2. Start engine and drive at 30 km/h (19 MPH) or more for approx. 1 minute.
3. Make sure that ABS warning lamp turns OFF.

   NOTE:
   Make sure that ABS warning lamp turns OFF by driving for a minute at vehicle speed of 30 km/h (19 MPH) or more after turning ignition switch "OFF" if AWD warning lamp turns ON with system malfunction of "ABS SYSTEM [C1203]". AWD warning lamp may not turn OFF if it is normal unless ignition switch turns OFF at once and engine restarts after that.
4. Turn ignition switch "OFF" to erase memory.
5. Start engine and select "SELF-DIAG RESULTS" mode for "ALL MODE AWD/4WD" with CONSULT-II.
6. Touch "ERASE" on CONSULT-II screen to erase DTC memory.

   CAUTION:
   If memory cannot be erased, perform applicably diagnosis.
7. Drive at 30 km/h (19 MPH) or more for approx. 1 minute. Be sure AWD warning lamp is OFF.

DATA MONITOR MODE

Operation Procedure

1. Perform "CONSULT-II SETTING PROCEDURE". Refer to TF-22, "CONSULT-II SETTING PROCEDURE" .
2. Touch "DATA MONITOR".
3. Select from "SELECT MONITOR ITEM", screen of data monitor mode is displayed.

   NOTE:
   When malfunction is detected, CONSULT-II performs REAL-TIME DIAGNOSIS.
   Also, any malfunction detected while in this mode will be displayed at real time.

Display Item List

×: Standard –: Not applicable

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
FR RH SENSOR [km/h] or [mph]	×	×	×	Wheel speed calculated by front wheel sensor RH signal is displayed.
FR LH SENSOR [km/h] or [mph]	×	×	×	Wheel speed calculated by front wheel sensor LH signal is displayed.
RR RH SENSOR [km/h] or [mph]	×	×	×	Wheel speed calculated by rear wheel sensor RH signal is displayed.
RR LH SENSOR [km/h] or [mph]	×	×	×	Wheel speed calculated by rear wheel sensor LH signal is displayed.
BATTERY VOLT [V]	–	–	×	Power supply voltage for AWD control unit.
THRTL POS SEN [%]	–	–	×	Throttle opening status is displayed.
ETS SOLENOID [A]	–	–	×	Monitored value of current at AWD solenoid.
STOP LAMP SW [ON/OFF]	–	–	×	Stop lamp switch signal status via CAN communication line is displayed.
ENG SPEED SIG [RUN/STOP]	–	–	×	Engine status is displayed.
ETS ACTUATOR [ON/OFF]	–	–	×	Operating condition of AWD actuator relay (integrated in AWD control unit) is displayed.
4WD WARN LAMP [ON/OFF]	–	–	×	Control status of AWD warning lamp is displayed.
4WD MODE SW [2WD/AUTO/LOCK]	–	–	×	AWD mode switch signal status via CAN communication line is displayed.

Monitor item (Unit)	SELECT MONITOR ITEM			Remarks
	ECU INPUT SIGNALS	MAIN SIGNALS	SELECTION FROM MENU	
4WD MODE MON [2WD/AUTO/LOCK]	–	–	×	Control status of AWD is displayed. (Output condition of AWD indicator lamp and LOCK indicator lamp signal)
DIS-TIRE MONI [mm]	–	–	×	Improper size tire installed condition is displayed.
P BRAKE SW [ON/OFF]	–	–	×	Parking switch signal status via CAN communication line is displayed.
Voltage [V]	–	–	×	The value measured by the voltage probe is displayed.
Frequency [Hz]	–	–	×	The value measured by the pulse probe is displayed.
DUTY-HI (high) [%]	–	–	×	
DUTY-LOW (low) [%]	–	–	×	
PLS WIDTH-HI [msec]	–	–	×	
PLS WIDTH-LOW [msec]	–	–	×	

ACTIVE TEST MODE

Description

Use this mode to determine and identify the details of a malfunction based on self-diagnosis results or data monitor. AWD control unit gives drive signal to actuator with receiving command from CONSULT-II to check operation of actuator.

Test Item

Test item	Condition	Description
ETS S/V (Detects AWD solenoid)	● Vehicle stopped ● Engine running ● No DTC detected	● Change command current value to AWD solenoid, and then change driving mode. (Monitor value is normal if it is within approximately ±10% of command value.) Qu: Increase current value in increments of 0.20A Qd: Decrease current value in increments of 0.20A UP: Increase current value in increments of 0.02A DOWN: Decrease current value in increments of 0.02A

CAUTION:

Do not continuously energize for a long time.

AWD CONTROL UNIT PART NUMBER

Ignore the AWD control unit part number displayed in the “ECU PART NUMBER”.
Refer to parts catalog to order the AWD control unit.

TROUBLE DIAGNOSIS FOR SYSTEM

PFP:00000

Power Supply Circuit for AWD Control Unit

ADS0017J

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Data are reference value.

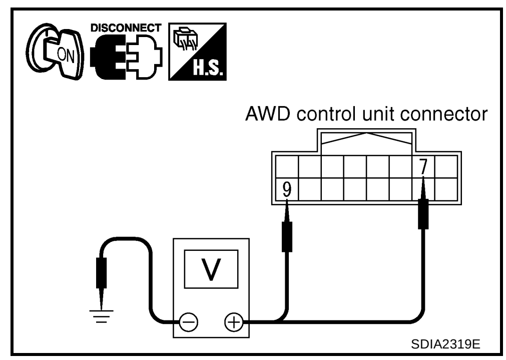
Monitor item [Unit]	Condition	Display value (Approx.)
BATTERY VOLT [V]	Ignition switch: ON	Battery voltage

DIAGNOSTIC PROCEDURE

1. CHECK POWER SUPPLY

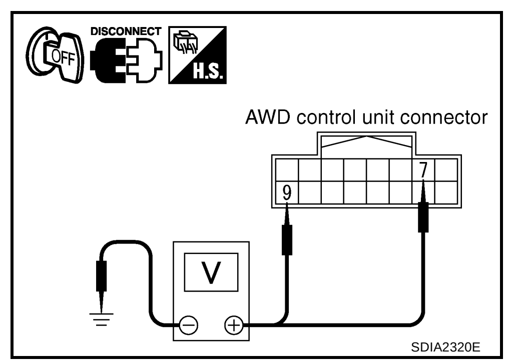
1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Turn ignition switch “ON”. (Do not start engine.)
4. Check voltage between AWD control unit harness connector terminals and ground.

Connector	Terminal (Wire color)	Voltage (Approx.)
M107	7 (GY) - Ground	Battery voltage
	9 (P/L) - Ground	



5. Turn ignition switch “OFF”.
6. Check voltage between AWD control unit harness connector terminals and ground.

Connector	Terminal (Wire color)	Voltage (Approx.)
M107	7 (GY) - Ground	0V
	9 (P/L) - Ground	Battery voltage



OK or NG

OK >> GO TO 2.

NG >> Check the following. If any item is damaged, repair or replace damaged parts.

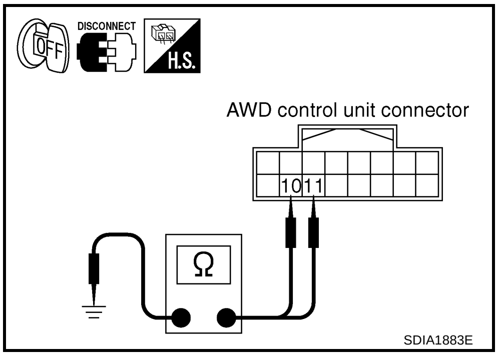
- 10A fuse [No. 8, located in the fuse block (J/B) or No. 37, located in the fuse and fusible link box]
- Harness for short or open between battery and AWD control unit harness connector terminal 9
- Harness for short or open between ignition switch and AWD control unit harness connector terminal 7
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

2. CHECK GROUND CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Check continuity between AWD control unit harness connector M107 terminals 10 (B/R), 11 (B/R) and ground.

Continuity should exist.

Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

3. CHECK DTC

Start engine.

Does AWD warning lamp turn OFF?

YES >> **INSPECTION END**
NO >> Perform the self-diagnosis, repair or replace damaged parts. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

AWD Control Unit

ADS0017K

DIAGNOSTIC PROCEDURE

- Check the following if “CONTROLLER FAILURE [C1201]” is displayed in self-diagnosis results of CONSULT-II.

1. PERFORM SELF-DIAGNOSIS

With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “SELF-DIAG RESULTS” mode for “ALL MODE AWD/4WD” with CONSULT-II.
3. Touch “ERASE”.
4. Turn ignition switch “OFF” and wait at least 10 seconds.
5. Perform the self-diagnosis again.

Is “CONTROLLER FAILURE [C1201]” displayed?

YES >> Replace AWD control unit. Refer to TF-45, "AWD CONTROL UNIT" .
NO >> **INSPECTION END**

ABS System
ADS0017L

DIAGNOSTIC PROCEDURE

- Check the following if “ABS SYSTEM [C1203]” is displayed in self-diagnosis results of CONSULT-II.

1. CHECK DTC WITH ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT) OR VDC/TCS/ABS/ CONTROL UNIT

Perform self-diagnosis with ABS actuator and electric unit (control unit) (without VDC) or VDC/TCS/ABS control unit (with VDC). Refer to BRC-19, "Self-Diagnosis" (without VDC) or BRC-62, "Self-Diagnosis" (with VDC).

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 2.

2. CHECK DTC AFTER DRIVING

1. Turn ignition switch “OFF”.
2. Start engine and drive vehicle at 30 km/h (19 MPH) for at least 1 minute.
3. Make sure that ABS warning lamp turns OFF.
4. Perform erase self-diagnosis results. Refer to TF-24, "How to Erase Self-Diagnosis Results" .
5. Stop vehicle and turn ignition switch “OFF”.
6. Turn ignition switch “ON”.
7. Perform self-diagnosis.

Is “ABS SYSTEM [C1203]” displayed?

YES >> GO TO 3.
NO >> **INSPECTION END**

3. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 4.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

4. CHECK DTC

Perform the self-diagnosis, after driving a vehicle for a while.

OK or NG

OK >> **INSPECTION END**
NG >> Perform self-diagnosis with ABS actuator and electric unit (control unit) (without VDC) or VDC/TCS/ABS control unit (with VDC) again. Refer to BRC-19, "Self-Diagnosis" (without VDC) or BRC-62, "Self-Diagnosis" (with VDC).

AWD Solenoid
ADS0017M

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Data are reference value.

Monitor item [Unit]	Condition		Display value
ETS SOLENOID [A]	Engine speed: At idle	2WD mode	Approx. 0.000A
		AUTO mode	
		LOCK mode	
	Engine speed: 3,000 rpm or more constant	2WD mode	Approx. 0.000A
		AUTO mode	Approx. 0.000 - 1.500A*
		LOCK mode	Approx. 2.800A

*: The values are changed by throttle opening and engine speed.

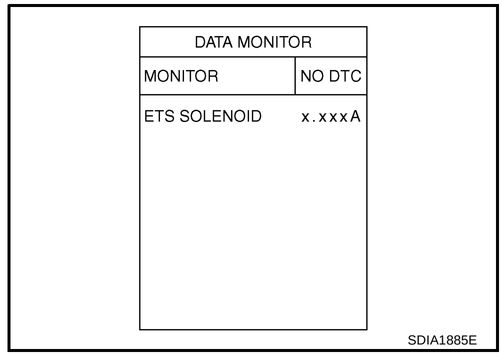
DIAGNOSTIC PROCEDURE

- Check the following if “4WD SOLENOID [C1204]” is displayed in self-diagnosis results of CONSULT-II.

1. CHECK AWD SOLENOID SIGNAL

With CONSULT-II

1. Start engine.
2. Select “DATA MONITOR” mode for “ALL MODE AWD/4WD” with CONSULT-II.
3. Read out the value of “ETS SOLENOID”.



Condition		Display value
Engine speed: At idle	2WD mode	Approx. 0.000A
	AUTO mode	
	LOCK mode	
Engine speed: 3,000 rpm or more constant	2WD mode	Approx. 0.000A
	AUTO mode	Approx. 0.000 - 1.500A*
	LOCK mode	Approx. 2.800A

*: The values are changed by throttle opening and engine speed.

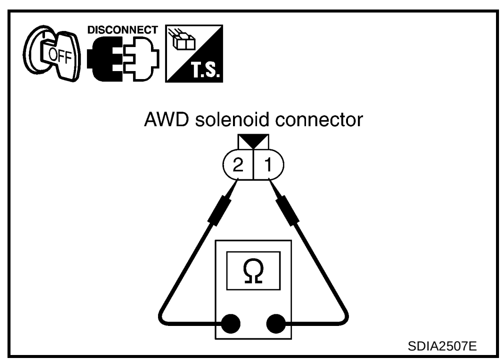
OK or NG

OK >> GO TO 6.
NG >> GO TO 2.

2. CHECK AWD SOLENOID

1. Turn ignition switch “OFF”.
2. Disconnect AWD solenoid harness connector.
3. Check resistance between AWD solenoid harness connector B152 terminals 1 and 2.

1 - 2: Approx. 2.45Ω



OK or NG

OK >> GO TO 3.
NG >> AWD solenoid is malfunctioning. Replace electric controlled coupling. Refer to RFD-16, "Disassembly and Assembly" .

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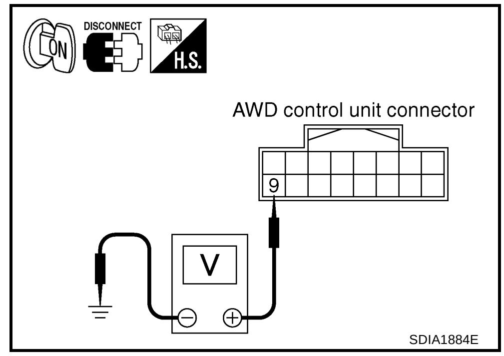
3. CHECK POWER SUPPLY

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Turn ignition switch “ON”. (Do not start engine.)
4. Check voltage between AWD control unit harness connector terminal 9 and ground.



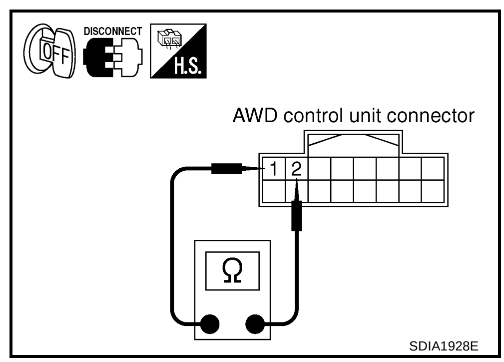
Connector	Terminal (Wire color)	Voltage (Approx.)
M107	9 (P/L) - Ground	Battery voltage

OK or NG

OK >> GO TO 4.
NG >> Check the following. If any item is damaged, repair or replace damaged parts.
- 10A fuse (No. 37, located in the fuse and fusible link box)
- Harness for short or open between battery and AWD control unit harness connector terminal 9

4. CHECK AWD SOLENOID CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Check resistance between AWD control unit harness connector terminals 1 and 2.



Connector	Terminal (Wire color)	Resistance (Approx.)
M107	1 (OR) - 2 (L/W) (Ground)	2.45 Ω

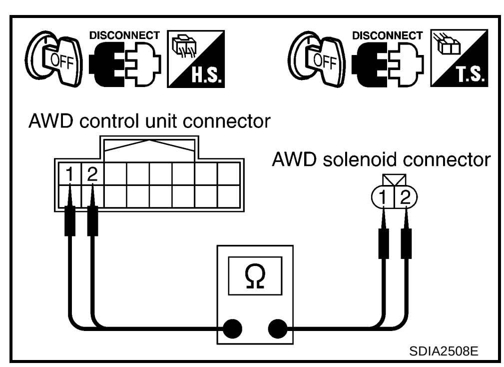
OK or NG

OK >> GO TO 6.
NG >> GO TO 5.

5. CHECK HARNESS BETWEEN AWD CONTROL UNIT AND AWD SOLENOID

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector and AWD solenoid harness connector.
3. Check continuity between the following terminals.

- AWD control unit harness connector M107 terminal 1 (OR) and AWD solenoid harness connector B152 terminal 2 (LG).
- AWD control unit harness connector M107 terminal 2 (L/W) and AWD solenoid harness connector B152 terminal 1 (L/W).



1 (OR) - 2 (LG): Continuity should exist.
2 (L/W) - 1 (L/W): Continuity should exist.

Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 6.
NG >> Repair or replace damaged parts.

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6. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 7.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

7. CHECK DTC

Perform the self-diagnosis, after driving a vehicle for a while.

OK or NG

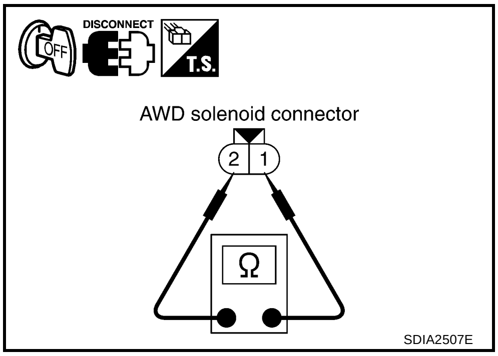
OK >> **INSPECTION END**
NG >> Replace AWD control unit.

COMPONENT INSPECTION

1. Turn ignition switch “OFF”.
2. Disconnect AWD solenoid harness connector.
3. Check resistance between AWD solenoid harness connector B152 terminals 1 and 2.

   1 - 2: Approx. 2.45Ω

4. If NG, replace the electric controlled coupling. Refer to RFD-16, "Disassembly and Assembly" .



AWD Actuator Relay

ADS0017N

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Data are reference value.

Monitor item	Condition	Display value
ETS ACTUATOR [ON/OFF]	Engine stopped (Ignition switch: ON)	OFF
	Engine running	ON

DIAGNOSTIC PROCEDURE

- Check the following if “4WD ACTUATOR RLY [C1205]” is displayed in self-diagnosis results of CONSULT-II.

1. CHECK AWD SOLENOID SYSTEM

Perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Is “4WD SOLENOID [C1204]” displayed?

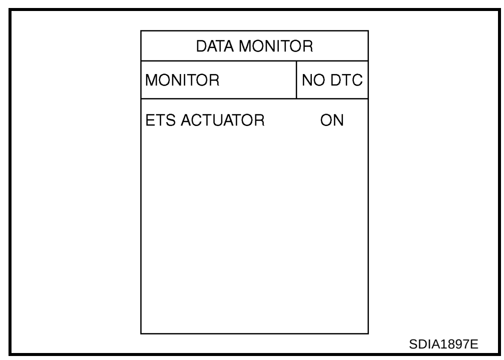
YES >> Perform trouble diagnosis for AWD solenoid. Refer to TF-28, "AWD Solenoid" .
NO >> GO TO 2.

2. CHECK AWD ACTUATOR RELAY SIGNAL

With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “ALL MODE AWD/4WD” with CONSULT-II.
3. Start engine and read out ON/OFF signaling action of “ETS ACTUATOR”.

Monitor item	Condition	Display value
ETS ACTUATOR	Engine stopped (Ignition switch: ON)	OFF
	Engine running	ON



OK or NG

OK >> GO TO 4.
NG >> GO TO 3.

3. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 4.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

4. CHECK DTC

Perform the self-diagnosis, after driving a vehicle for a while.

OK or NG

OK >> **INSPECTION END**
NG >> Replace AWD control unit.

AWD Mode Switch

ADS00187

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

Data are reference value.

Monitor item	Condition		Display value
4WD MODE SW [2WD/AUTO/LOCK]	AWD mode switch	2WD	2WD
		AUTO	AUTO
		LOCK	LOCK

DIAGNOSTIC PROCEDURE

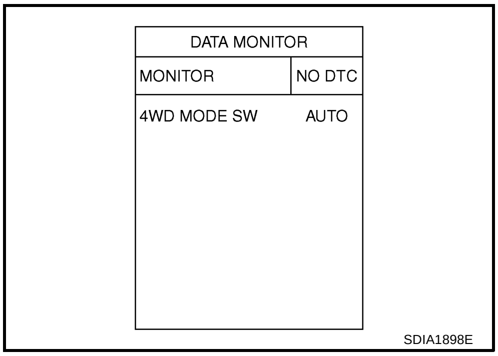
- Check the following if “MODE SW [C1209]” is detected in self-diagnosis results of CONSULT-II.

1. CHECK AWD MODE SWITCH SIGNAL

With CONSULT-II

1. Turn ignition switch “ON”. (Do not start engine.)
2. Select “DATA MONITOR” mode for “ALL MODE AWD/4WD” with CONSULT-II.
3. Read out monitor “4WD MODE SW” with operating AWD mode switch.

Monitor item	Condition		Display value
4WD MODE SW	AWD mode switch	2WD	2WD
		AUTO	AUTO
		LOCK	LOCK



SDIA1898E

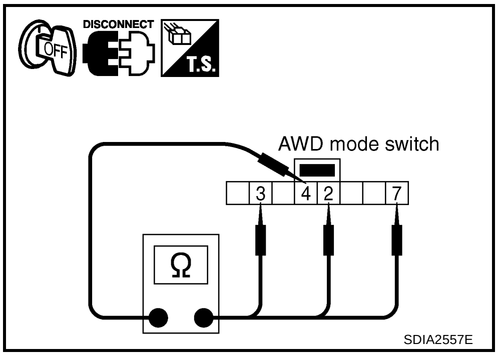
OK or NG

OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK AWD MODE SWITCH

1. Turn ignition switch “OFF”.
2. Disconnect AWD mode switch harness connector.
3. Operate AWD mode switch and check continuity between AWD mode switch harness connector terminals.

Connector	Terminal	Condition	Continuity
M39	2 - 4	AWD mode switch: AUTO	Yes
		Except the above	No
	3 - 4	AWD mode switch: LOCK	Yes
		Except the above	No
	4 - 7	AWD mode switch: 2WD	Yes
		Except the above	No



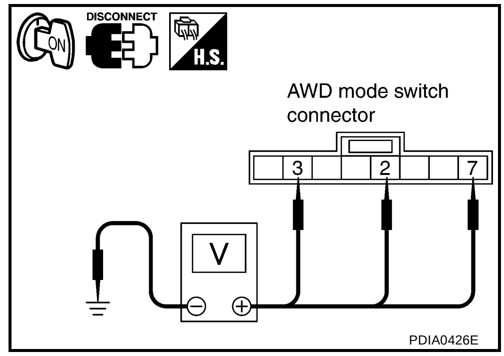
SDIA2557E

OK or NG

OK >> GO TO 3.
NG >> Replace AWD mode switch.

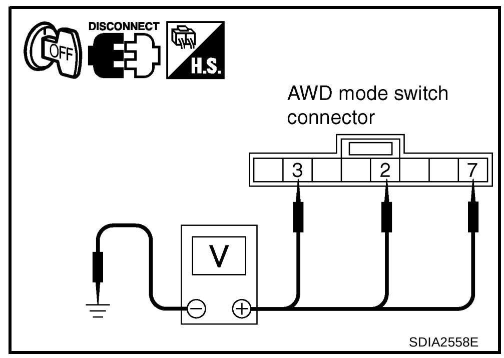
3. CHECK AWD MODE SWITCH POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD mode switch harness connector.
3. Turn ignition switch “ON”. (Do not start engine.)
4. Check voltage between AWD mode switch harness connector terminals and ground.



Connector	Terminal (Wire color)	Voltage (Approx.)
M39	2 (BR/W) - Ground	Battery voltage
	3 (L) - Ground	
	7 (BR) - Ground	

5. Turn ignition switch “OFF”.
6. Check voltage between AWD mode switch harness connector terminals and ground.



Connector	Terminal (Wire color)	Voltage (Approx.)
M39	2 (BR/W) - Ground	0V
	3 (L) - Ground	
	7 (BR) - Ground	

OK or NG

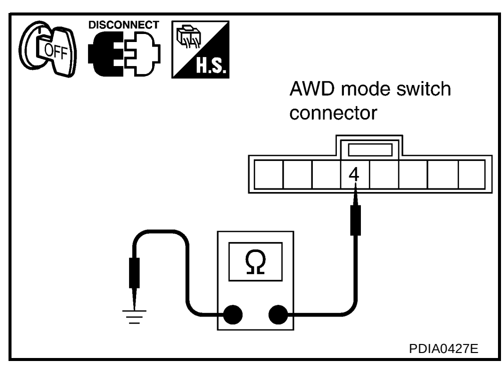
OK >> GO TO 4.
NG >> Check harness for short or open between AWD mode switch harness connector terminals and AWD control unit harness connector terminals. If any item is damaged, repair or replace damaged parts.

4. CHECK AWD MODE SWITCH GROUND CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD mode switch harness connector.
3. Check continuity between AWD mode switch harness connector M39 terminal 4 (B/R) and ground.

Continuity should exist.

Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 5.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

5. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 6.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

6. CHECK AWD INDICATOR LAMP AND LOCK INDICATOR LAMP

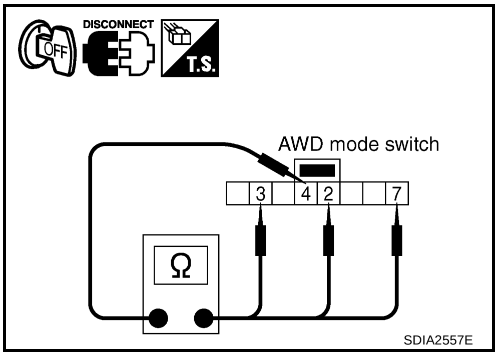
1. Turn ignition switch “OFF”.
2. Check AWD indicator lamp and LOCK indicator lamp “ON” for approx. 1 second when the ignition switch is turned “ON”.

Do AWD indicator lamp and LOCK indicator lamp “ON” for approx. 1 second?

YES >> **INSPECTION END**
NO >> Go to TF-37, "AWD Indicator Lamp and LOCK Indicator Lamp Do Not Turn ON for Approx. 1 Second When Ignition Switch Is Turned to ON" .

COMPONENT INSPECTION

1. Turn ignition switch “OFF”.
2. Disconnect AWD mode switch harness connector.
3. Operate AWD mode switch and check continuity between AWD mode switch harness connector terminals.



Connector	Terminal	Condition	Continuity
M39	2 - 4	AWD mode switch: AUTO	Yes
		Except the above	No
	3 - 4	AWD mode switch: LOCK	Yes
		Except the above	No
	4 - 7	AWD mode switch: 2WD	Yes
		Except the above	No

4. If NG, replace AWD mode switch.

Engine Control Signal

ADS00186

DIAGNOSTIC PROCEDURE

- Check the following if “ENGINE SIGNAL 1 [C1210]” is displayed in self-diagnosis results of CONSULT-II.

1. CHECK DTC WITH ECM

Perform self-diagnosis with ECM. Refer to EC-48, "Emission-Related Diagnostic Information" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 2.

2. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 3.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

3. CHECK DTC

Perform the self-diagnosis, after driving a vehicle for a while.

OK or NG

OK >> **INSPECTION END**
NG >> Perform self-diagnosis with ECM again. Refer to EC-48, "Emission-Related Diagnostic Information" .

CAN Communication Line

ADS0017O

DIAGNOSTIC PROCEDURE

- Check the following if “CAN COMM CIRCUIT [U1000]” is detected in self-diagnosis results of CONSULT-II.

1. CHECK CAN COMMUNICATION CIRCUIT

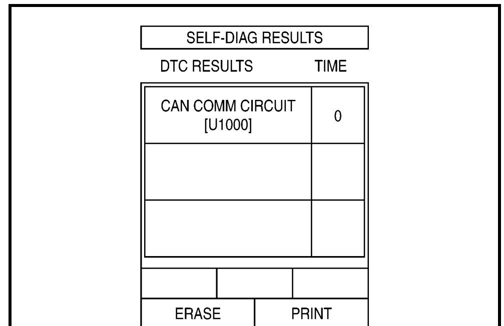
With CONSULT-II

1. Turn ignition switch “ON” and start engine.
2. Select “SELF-DIAG RESULTS” mode for “ALL MODE AWD/4WD” with in CONSULT-II.
3. Perform the self-diagnosis.

Is “CAN COMM CIRCUIT [U1000]” displayed?

YES >> Print out CONSULT-II screen and go to LAN-4, "TROUBLE DIAGNOSES WORK FLOW" .

NO >> **INSPECTION END**



SDIA1850E

TROUBLE DIAGNOSIS FOR SYMPTOMS

PFP:00007

AWD Indicator Lamp and LOCK Indicator Lamp Do Not Turn ON for Approx. 1 Second When Ignition Switch Is Turned to ON

ADS0017Q

DIAGNOSTIC PROCEDURE

1. CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Is “CAN COMM CIRCUIT [U1000]” displayed?

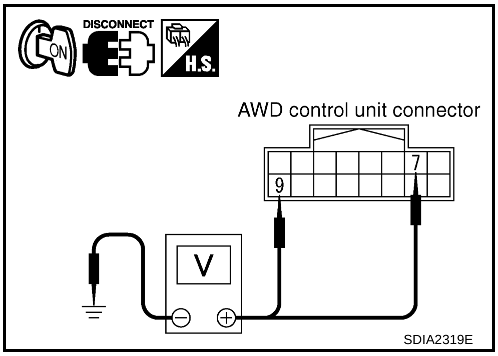
YES >> Perform trouble diagnosis for CAN communication line. Refer to TF-36, "CAN Communication Line" .

NO >> GO TO 2.

2. CHECK AWD CONTROL UNIT POWER SUPPLY CIRCUIT

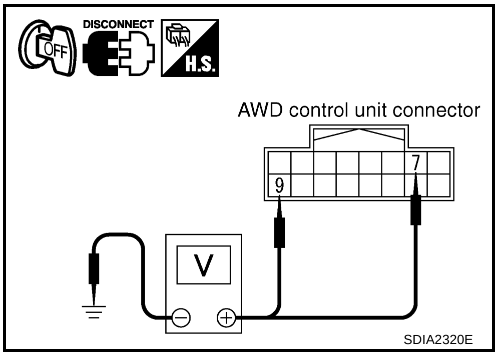
1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Turn ignition switch “ON”. (Do not start engine.)
4. Check voltage between AWD control unit harness connector terminals and ground.

Connector	Terminal (Wire color)	Voltage (Approx.)
M107	7 (GY) - Ground	Battery voltage
	9 (P/L) - Ground	



5. Turn ignition switch “OFF”.
6. Check voltage between AWD control unit harness connector terminals and ground.

Connector	Terminal (Wire color)	Voltage (Approx.)
M107	7 (GY) - Ground	0V
	9 (P/L) - Ground	Battery voltage



OK or NG

OK >> GO TO 3.

NG >> Check the following. If any item is damaged, repair or replace damaged parts.

- 10A fuse [No. 8, located in the fuse block (J/B) or No. 37, located in the fuse and fusible link box]
- Harness for short or open between battery and AWD control unit harness connector terminal 9
- Harness for short or open between ignition switch and AWD control unit harness connector terminal 7
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

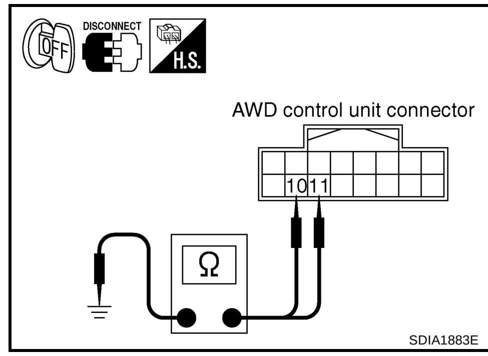
A B C TF E F G H I J K L M

3. CHECK AWD CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Check continuity between AWD control unit harness connector M107 terminals 10 (B/R), 11 (B/R) and ground.

   Continuity should exist.

   Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 5.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

5. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> Replace unified meter control unit assembly. Refer to DI-24, "Disassembly and Assembly for Combination Meter" .

AWD Warning Lamp Does Not Turn ON When Ignition Switch Is Turned to ON

ADS0017R

DIAGNOSTIC PROCEDURE

1. CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Is “CAN COMM CIRCUIT [U1000]” displayed?

YES >> Perform trouble diagnosis for CAN communication line. Refer to TF-36, "CAN Communication Line" .
NO >> GO TO 2.

2. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 3.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

3. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> Replace unified meter control unit assembly. Refer to DI-24, "Disassembly and Assembly for Combination Meter" .

AWD Warning Lamp Does Not Turn OFF Several Seconds After Engine Started

ADS0017S

DIAGNOSTIC PROCEDURE

1. CHECK SELF-DIAGNOSIS RESULTS

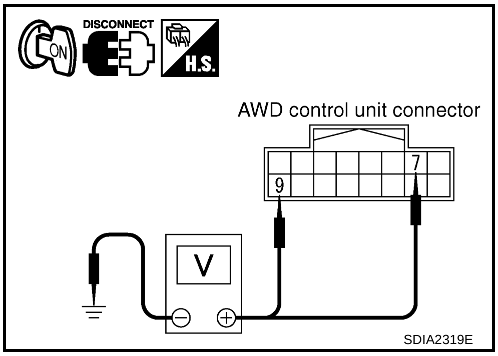
Perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 2.

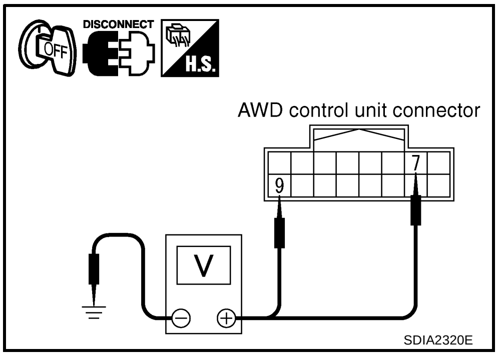
2. CHECK AWD CONTROL UNIT POWER SUPPLY CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Turn ignition switch “ON”. (Do not start engine.)
4. Check voltage between AWD control unit harness connector terminals and ground.



Connector	Terminal (Wire color)	Voltage (Approx.)
M107	7 (GY) - Ground	Battery voltage
	9 (P/L) - Ground	

5. Turn ignition switch “OFF”.
6. Check voltage between AWD control unit harness connector terminals and ground.



Connector	Terminal (Wire color)	Voltage (Approx.)
M107	7 (GY) - Ground	0V
	9 (P/L) - Ground	Battery voltage

OK or NG

OK >> GO TO 3.
NG >> Check the following. If any item is damaged, repair or replace damaged parts.

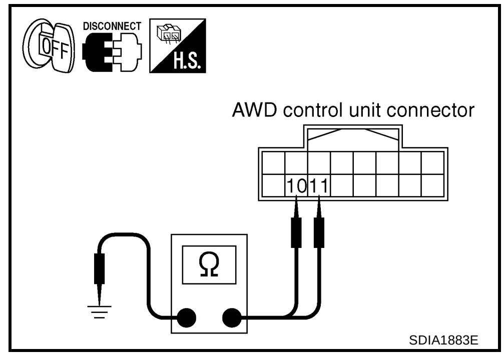
- 10A fuse [No. 8, located in the fuse block (J/B) or No. 37, located in the fuse and fusible link box]
- Harness for short or open between battery and AWD control unit harness connector terminal 9
- Harness for short or open between ignition switch and AWD control unit harness connector terminal 7
- Ignition switch. Refer to PG-2, "POWER SUPPLY ROUTING" .

3. CHECK AWD CONTROL UNIT GROUND CIRCUIT

1. Turn ignition switch “OFF”.
2. Disconnect AWD control unit harness connector.
3. Check continuity between AWD control unit harness connector M107 terminals 10 (B/R), 11 (B/R) and ground.

Continuity should exist.

Also check harness for short to ground and short to power.



OK or NG

OK >> GO TO 4.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

4. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 5.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

5. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> Replace unified meter control unit assembly. Refer to DI-24, "Disassembly and Assembly for Combination Meter" .

AWD Mode Cannot Be Switched After Engine Is Started

ADS0017T

DIAGNOSTIC PROCEDURE

1. CHECK AWD WARNING LAMP

Confirm AWD warning lamp.

Does AWD warning lamp turn on?

YES >> Go to TF-39, "AWD Warning Lamp Does Not Turn OFF Several Seconds After Engine Started" .
NO >> GO TO 2.

2. CHECK SYSTEM FOR AWD MODE SWITCH

Perform trouble diagnosis for AWD mode switch system. Refer to TF-33, "AWD Mode Switch" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Is “CAN COMM CIRCUIT [U1000]” displayed?

YES >> Perform trouble diagnosis for CAN communication line. Refer to TF-36, "CAN Communication Line" .
NO >> GO TO 4.

A B C TF E F G H I J K L M

4. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 5.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

5. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> Replace unified meter control unit assembly. Refer to DI-24, "Disassembly and Assembly for Combination Meter" .

Heavy Tight-Corner Braking Symptom Occurs When Vehicle Is Driven in AUTO Mode and Steering Wheel Is Turned Fully to Either Side after Engine Is Started

ADS0017U

NOTE:

- **Light tight-corner braking symptom may occur depending on driving conditions in AUTO mode. This is not malfunction.**
- **Heavy tight-corner braking symptom occurs when vehicle is driven in the following conditions: LOCK mode, steering wheel is turned fully to either side, and accelerator pedal was depressed.**

DIAGNOSTIC PROCEDURE

1. CHECK SYSTEM FOR CAN COMMUNICATION LINE

Perform self-diagnosis. Refer to TF-23, "SELF-DIAG RESULTS MODE" .

Is "CAN COMM CIRCUIT [U1000]" displayed?

YES >> Perform trouble diagnosis for CAN communication line. Refer to TF-36, "CAN Communication Line" .
NO >> GO TO 2.

2. CHECK SYSTEM FOR AWD MODE SWITCH

Perform trouble diagnosis for AWD mode switch system. Refer to TF-33, "AWD Mode Switch" .

OK or NG

OK >> GO TO 3.
NG >> Repair or replace damaged parts.

3. CHECK ACCELERATOR PEDAL POSITION SIGNAL CIRCUIT

Perform self-diagnosis for ECM. Refer to EC-48, "Emission-Related Diagnostic Information" .

Is any malfunction detected by self-diagnosis?

YES >> Check the malfunctioning system.
NO >> GO TO 4.

4. CHECK SYSTEM FOR AWD SOLENOID

Perform trouble diagnosis for AWD solenoid system. Refer to TF-28, "AWD Solenoid" .

OK or NG

OK >> GO TO 5.
NG >> Repair or replace damaged parts.

5. CHECK ELECTRIC CONTROLLED COUPLING

1. Turn ignition switch “OFF”.
2. Set selector lever (shift lever) to “N” (neutral) position and disengage the parking brake.
3. Lift up vehicle.
4. Rotate propeller shaft by hand.
5. Hold both the right and left rear wheel lightly.

Does rear wheel rotate?

YES >> Replace electric controlled coupling for mechanical malfunction (clutch sticking etc.). Refer to RFD-16, "Disassembly and Assembly" .
NO >> GO TO 6.

6. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> GO TO 7.

7. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> **INSPECTION END**
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

Vehicle Does Not Enter AWD Mode Even Though AWD Warning Lamp Turned to OFF

ADS0017V

CAUTION:
Make sure that parking brake is securely released if the symptom has occurred at vehicle speed of 10 km/h (6 MPH) or more.

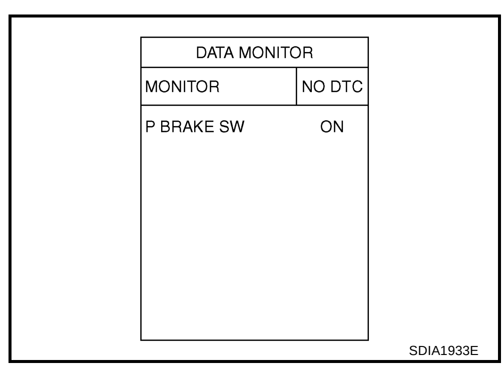
DIAGNOSTIC PROCEDURE

1. CHECK PARKING BRAKE SWITCH SIGNAL

With CONSULT-II

1. Turn ignition switch “ON”.
2. Select “DATA MONITOR” mode for “ALL MODE AWD/4WD” with CONSULT-II.
3. Operate parking brake and read out monitor “P BRAKE SW”.

Monitor item	Condition	Display value
P BRAKE SW	Parking brake operated	ON
	Parking brake not operated	OFF



OK or NG

OK >> GO TO 2.
NG >> Check the following. If any item is damaged, repair or replace damaged parts.
- Parking brake switch
- Brake warning lamp circuit. Refer to DI-26, "Wiring Diagram — WARN —" .

2. CHECK AWD SOLENOID

Check AWD solenoid. Refer to TF-31, "COMPONENT INSPECTION" .

OK or NG

OK >> GO TO 3.
NG >> Replace electric controlled coupling for malfunction of AWD solenoid. Refer to RFD-16, "Disassembly and Assembly" .

3. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 4.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

4. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> Replace electric controlled coupling for mechanical malfunction (mechanical engagement of clutch is not possible.). Refer to RFD-16, "Disassembly and Assembly" .

While Driving, AWD Warning Lamp Flashes Rapidly (When Flashing in Approx. 1 Minute and Then Turning OFF)

ADS0017W

NOTE:
Rapid flashing: 2 times/second
This symptom protects drivetrain parts when a heavy load is applied to the electric controlled coupling and multiple disc clutch temperature increases. It is not a malfunction.
When this symptom occurs, stop vehicle and allow it to idle for some times. Flashing will stop and system will be restored.

While Driving, AWD Warning Lamp Flashes Slowly (When Continuing to Flash Until Turning Ignition Switch OFF)

ADS0017X

NOTE:
Slow flashing: 1 time/2 seconds

DIAGNOSTIC PROCEDURE

1. CHECK TIRE

Check the following.

- Tire pressure
- Wear condition
- Front and rear tire size (There shall be no difference of tire size between front and rear tires.)

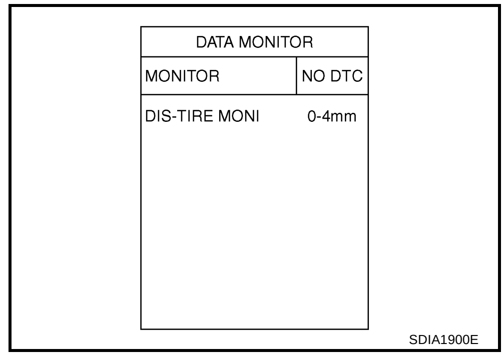
OK or NG

OK >> GO TO 2.
NG >> Drive at vehicle speed of 20 km/h (12 MPH) or more for 5 seconds or more after repairing or replacing damaged parts. (Initialize improper size tire information.)

2. CHECK INPUT SIGNAL OF TIRE DIAMETER

With CONSULT-II

1. Start engine.
2. Drive at 20 km/h (12 MPH) or more for approx. 200 seconds.
3. Select “DATA MONITOR” mode for “ALL MODE AWD/4WD” with CONSULT-II.
4. Check monitor “DIS-TIRE MONI”.



Display of “DIS-TIRE MONI”

“0-4mm”>>**INSPECTION END**
Except for “0-4mm”>>GO TO 3.

3. CHECK AWD CONTROL UNIT

Check AWD control unit input/output signal. Refer to TF-21, "AWD Control Unit Input/Output Signal Reference Values" .

OK or NG

OK >> GO TO 4.
NG >> Check AWD control unit pin terminals for damage or loose connection with harness connector. If any item is damaged, repair or replace damaged parts.

4. SYMPTOM CHECK

Check again.

OK or NG

OK >> **INSPECTION END**
NG >> Replace AWD control unit.

AWD CONTROL UNIT

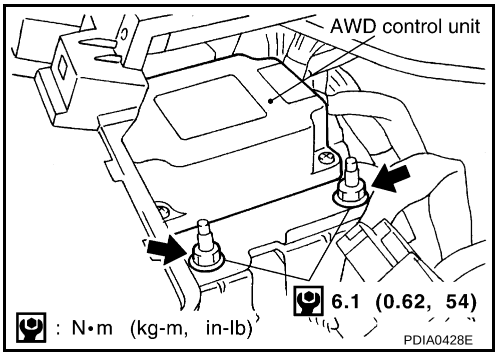
PFP:41650

Removal and Installation

ADS0017Y

REMOVAL

1. Remove cluster lid “A”. Refer to IP-11, "Removal and Installation" .
2. Remove front speaker grille. Refer to IP-11, "Removal and Installation" .
3. Remove driver box. Refer to IP-11, "Removal and Installation" .
4. Disconnect AWD control unit connector.
5. Remove AWD control unit.



INSTALLATION

Install in the reverse order of removal.

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SIDE OIL SEAL

PFP:33142

Removal and Installation

ADS0017Z

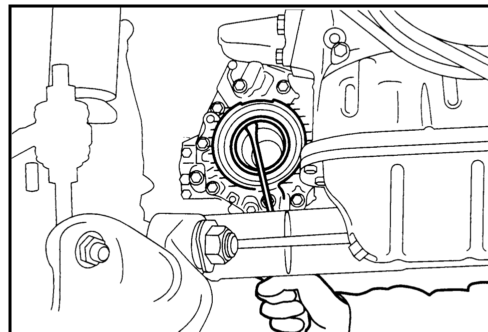
NOTE:
Transfer side oil seal is attached to transaxle assembly. Replace it when tranfer assembly is removed from vehicle.

REMOVAL

1. Remove drive shaft. Refer to FAX-16, "Removal and Installation (RH)" .
2. Remove side shaft. Refer to FAX-16, "Removal and Installation (RH)" .

   CAUTION:
   Be careful not to damage gear ring oil seal in transfer.
3. Remove oil seal with a flat-bladed screwdriver.

   CAUTION:
   Be careful not to damage adapter case.



TFB0202D

INSTALLATION

1. Apply multi-purpose grease to oil seal lips. As shown in the figure, install oil seal so that it becomes flush with the case end surface, using the drift.

   Tool number : KV38101700 (—)

   CAUTION:
   - **Do not reuse oil seal.**
   - **When installing, do not incline oil seal.**

SDIA2559E

2. Install side shaft. Refer to FAX-16, "Removal and Installation (RH)" .

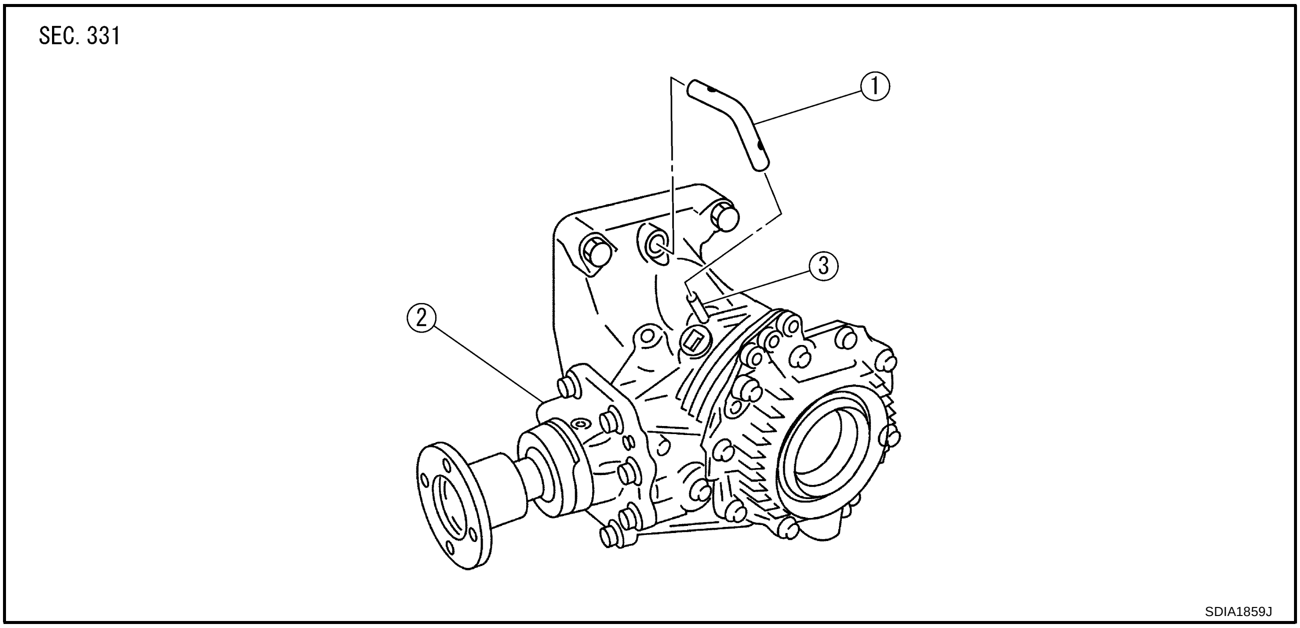
   CAUTION:
   Be careful not to damage gear ring oil seal in transfer.
3. Install drive shaft. Refer to FAX-16, "Removal and Installation (RH)" .
4. Check oil level. Refer to TF-9, "Checking Transfer Oil" .

AIR BREATHER HOSE

PFP:31098

Components

ADS00180



1. Air breather hose
2. Transfer assembly
3. Breather tube

Removal and Installation

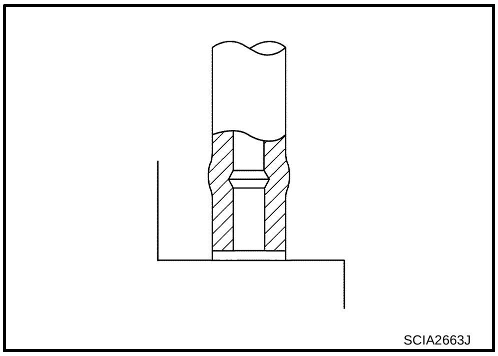
ADS00181

Note the following, when removal and installation.

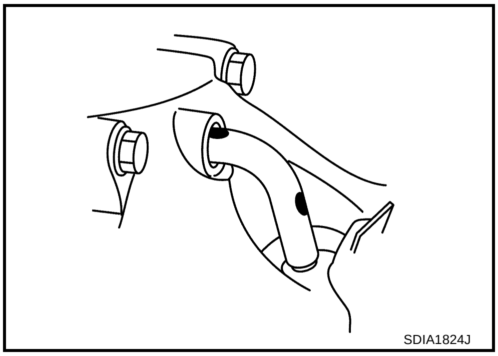
CAUTION:

Make sure there are no pinched or restricted areas on the air breather hose caused by bending or winding when installing it.

- Be sure to insert air breather hose into breather tube (metal connector) until hose end reaches the tube's base.



- Be sure to insert the hose till the paint mark.



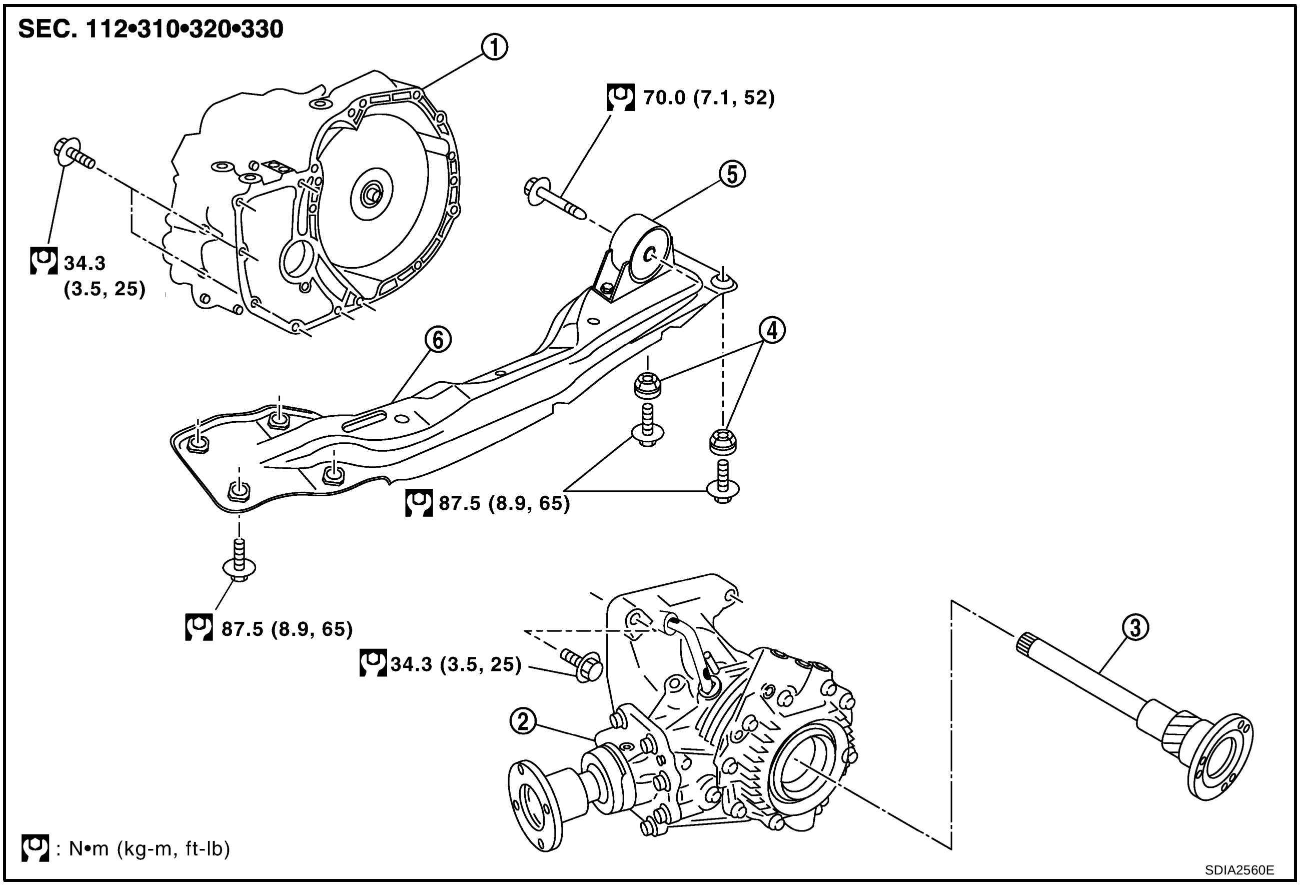
TRANSFER ASSEMBLY

PFP:33100

Removal and Installation

ADS00182

COMPONENTS



1.	Transaxle assembly	2.	Transfer assembly	3.	Side shaft
4.	Grommet	5.	Front engine mounting insulator	6.	Center member

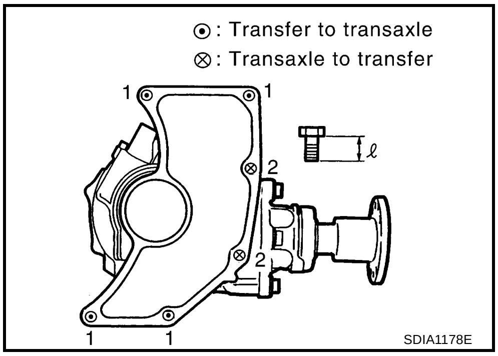
REMOVAL

1. Remove exhaust front tube. Refer to EX-3, "Removal and Installation" .
2. Remove propeller shaft. Refer to PR-4, "Removal and Installation" .
3. Remove front drive shaft (RH). Refer to FAX-16, "Removal and Installation (RH)" .
4. Remove side shaft. Refer to FAX-16, "Removal and Installation (RH)" .
   CAUTION:
   Be careful not to damage oil seal.
5. Remove air breather hose. Refer to TF-47, "AIR BREATHER HOSE" .
6. Support transaxle assembly with a jack.
7. Remove center member with power tool. Refer to EM-74, "ENGINE ASSEMBLY" .
8. Remove suspension member with power tool. Refer to FSU-17, "FRONT SUSPENSION MEMBER" .
9. Remove rear engine mounting bracket with power tool. Refer to EM-74, "ENGINE ASSEMBLY" .
10. Support transfer assembly with a jack.
11. Remove bolts fixing transaxle assembly and transfer assembly with power tool.
12. Remove the transfer assembly from vehicle.
    CAUTION:
    Be careful not to damage oil seal of transaxle.

INSTALLATION

Note the following, and install in the reverse order of removal.

- When installing transfer to transaxle, install the mounting bolts following the specification below.



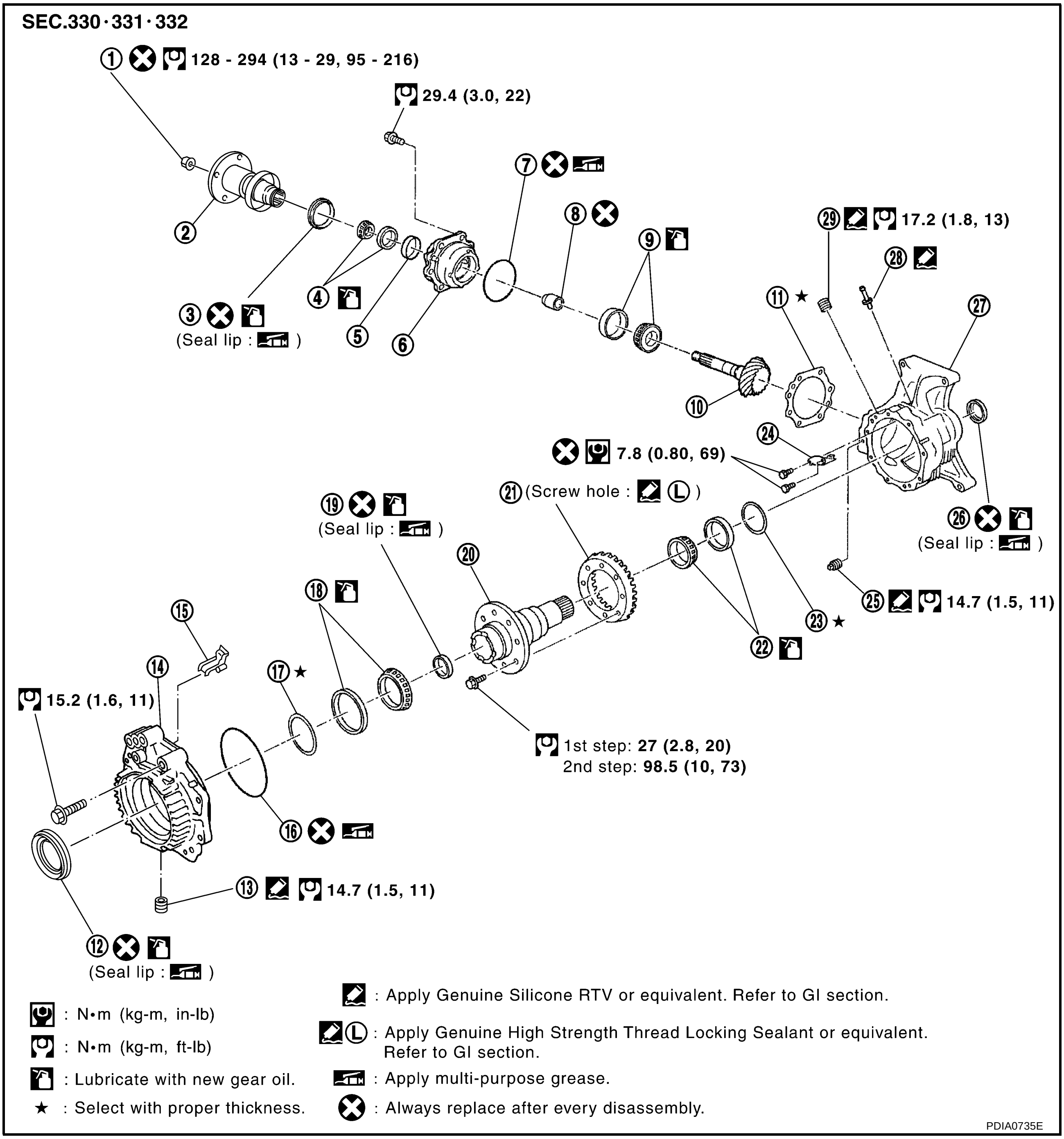
Bolt No.	1	2
Quantity	4	2
Bolt length "ℓ" mm (in)	65 (2.56)	40 (1.57)
Tightening torque N·m (kg-m, ft-lb)	34.3 (3.5, 25)	

CAUTION:
When installing transfer to transaxle, be careful not to damage oil seal of transaxle.

- After the installation, check the oil level and oil leakage. Refer to TF-9, "Checking Transfer Oil" .

Disassembly and Assembly
ADS00183

COMPONENTS



1. Pinion lock nut
2. Companion flange
3. Pinion sleeve oil seal
4. Pinion rear bearing
5. Dust cover
6. Pinion sleeve
7. O-ring
8. Collapsible spacer
9. Pinion front bearing
10. Drive pinion
11. Pinion sleeve shim
12. Adapter case oil seal
13. Drain plug
14. Adapter case
15. Oil gutter
16. O-ring
17. Gear ring bearing adjusting shim (Adapter case side)
18. Gear ring bearing (Adapter case side)
19. Gear ring oil seal
20. Gear ring
21. Drive gear
22. Gear ring bearing (Transfer case side)
23. Gear ring bearing adjusting shim (Transfer case side)
24. Oil defense
25. Filler plug
26. Transfer case oil seal
27. Transfer case
28. Breather tube
29. Plug

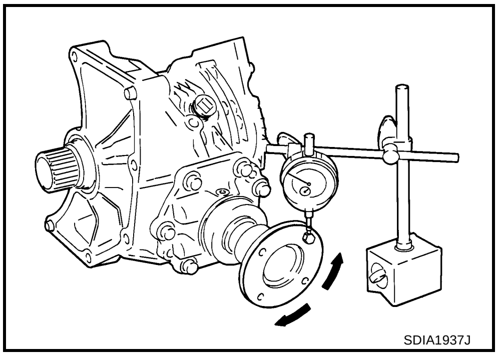
ASSEMBLY INSPECTION

Backlash

1. Install a bolt to companion flange.
2. Fit a dial indicator onto the bolt.
3. Measure the circumference backlash of companion flange, and make sure it satisfies the specification below.

   Backlash: 0.13 - 0.19 mm (0.0051 - 0.0075 in)

   - If measured value is out of the specification, disassemble it to check and adjust each part.

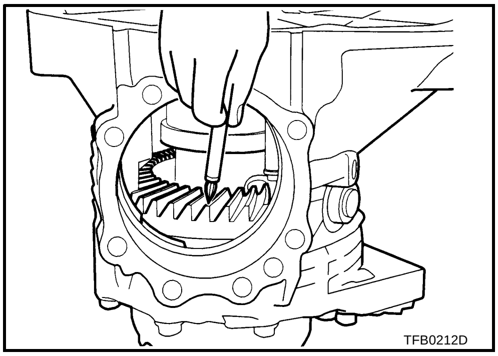


SDIA1937J

Tooth Contact

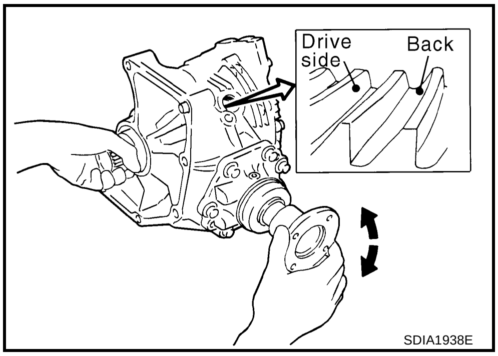
1. Remove pinion sleeve assembly. Refer to TF-55, "Pinion Sleeve Assembly" .
2. Apply red lead to drive gear.

   CAUTION:
   Apply red lead to both the faces of 3 to 4 gears at 4 locations evenly spaced on drive gear.



TFB0212D

3. Install pinion sleeve shims and pinion sleeve assembly. Refer to TF-65, "Pinion Sleeve Assembly" .
4. Remove the plug on the upper side of transfer case.
   When installing plug, apply sealant on screw part, and tighten it at the specified torque. Refer to TF-50, "COMPONENTS" .
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**
5. Rotate companion flange back and forth several times, and check drive pinion gear to drive gear tooth contact by viewing from the plug hole.



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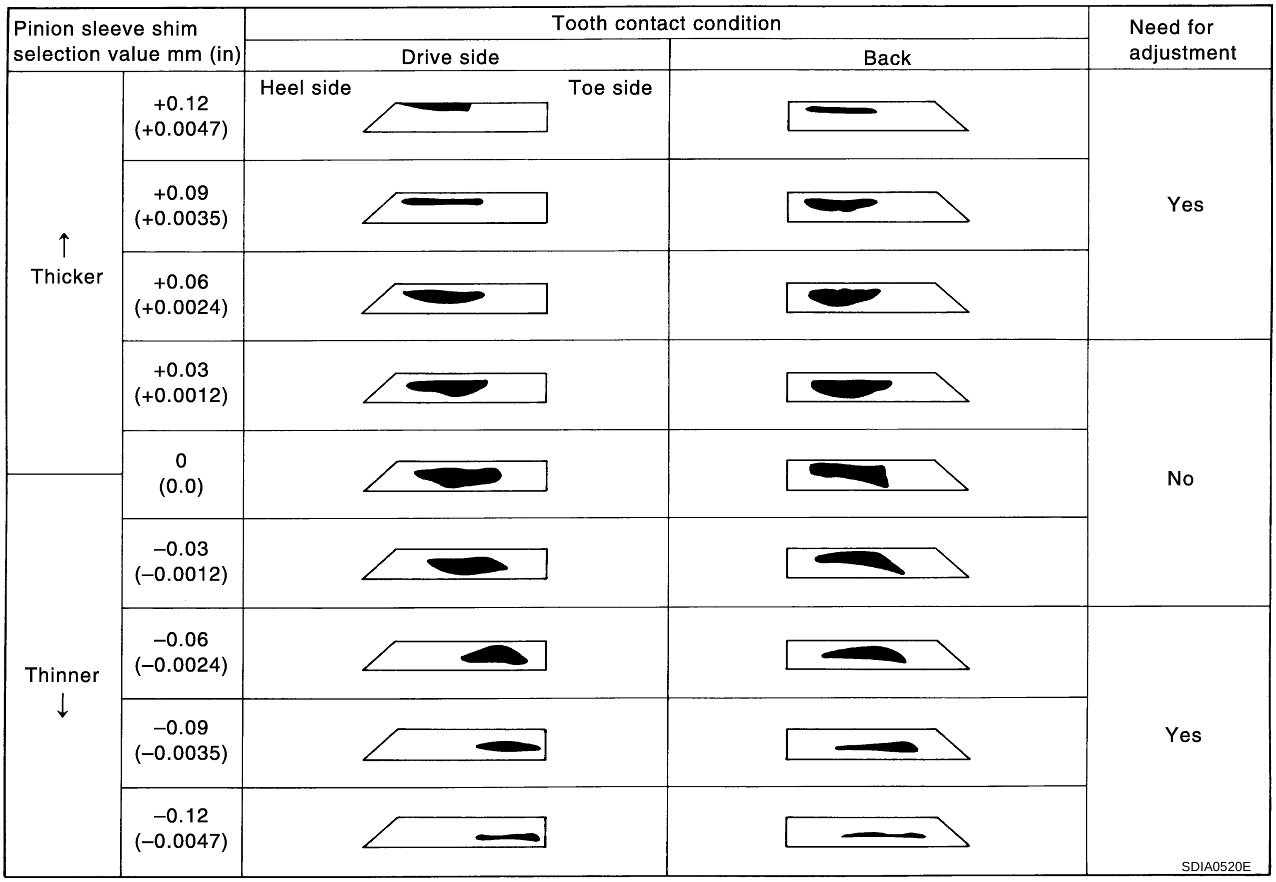
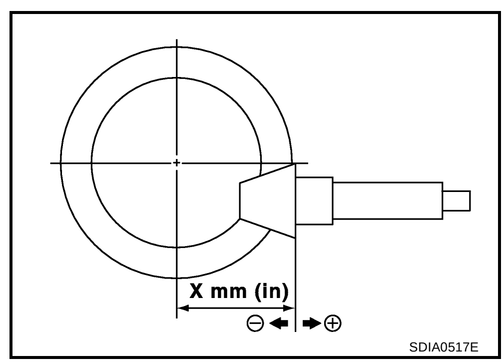


Pinion sleeve shim selection value mm (in)		Tooth contact condition: Drive side (Heel side – Toe side)	Tooth contact condition: Back	Need for adjustment
↑ Thicker	+0.12 (+0.0047)			Yes
	+0.09 (+0.0035)			
	+0.06 (+0.0024)			
	+0.03 (+0.0012)			No
	0 (0.0)			
Thinner ↓	−0.03 (−0.0012)			
	−0.06 (−0.0024)			Yes
	−0.09 (−0.0035)			
	−0.12 (−0.0047)			

SDIA0520E

6. If tooth contact is poorly adjusted, adjust pinion height (dimension X) in the following manner.



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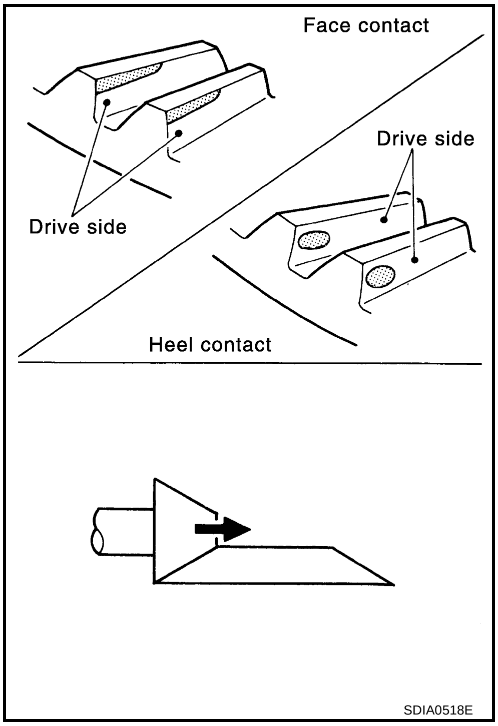
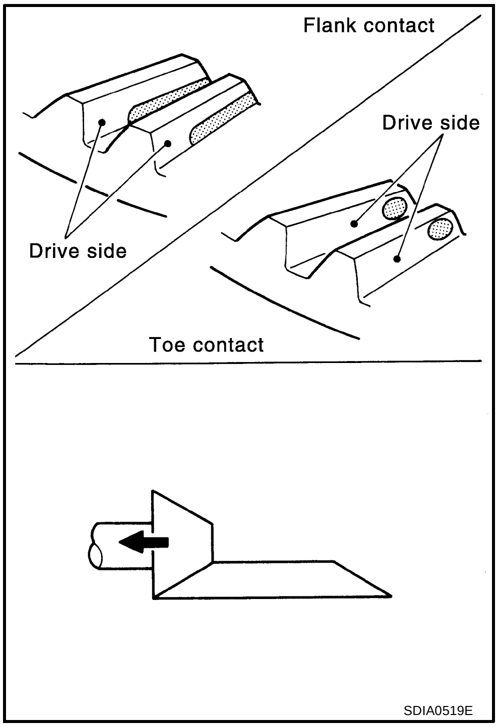
- If the tooth contact is near the face (face contact), or near the heal (heel contact), thin pinion sleeve shims to move drive pinion closer to drive gear.
  Refer to TF-68, "Pinion Sleeve Shim" .



- If the tooth contact is near the flank (flank contact), or near the toe (toe contact), thicken pinion sleeve shims to move drive pinion farther from drive gear.
  Refer to TF-68, "Pinion Sleeve Shim" .



Pinion Bearing Preload Torque

1. Remove pinion sleeve assembly. Refer to TF-55, "Pinion Sleeve Assembly" .
2. Rotate companion flange back and forth 2 to 3 times. Check for unusual noise, rotation malfunction, and other malfunctions.
3. Rotate companion flange at least 20 times to check for smooth operation of the bearing.

4. Measure the preload torque of pinion bearing, using the preload gauge.

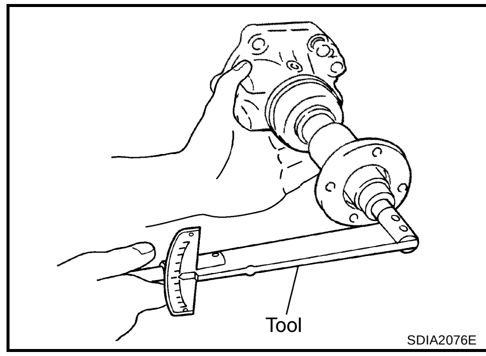
   Tool number : ST3127S000 (J-25765-A)

   Preload torque:

   0.10 - 0.39 N·m (0.01 - 0.04 kg-m, 1 - 3 in-lb)

   CAUTION:
   Every rotational part shall rotate smoothly with specified gear oil.

   - If measured value is out of the specification, disassemble pinion sleeve assembly to check and adjust each part.



SDIA2076E

Total Preload Torque

1. Measure pinion bearing preload torque (P_1). Refer to TF-53, "Pinion Bearing Preload Torque" .

   Pinion bearing preload torque (P1):

   0.10 - 0.39 N·m (0.01 - 0.04 kg-m, 1 - 3 in-lb)

2. Install pinion sleeve shims and pinion sleeve assembly.
3. Rotate companion flange at least 20 times to check for smooth operation of the bearing.
4. Measure the total preload torque, sing the preload gauge.

   Tool number : ST3127S000 (J-25765-A)

   Total preload torque

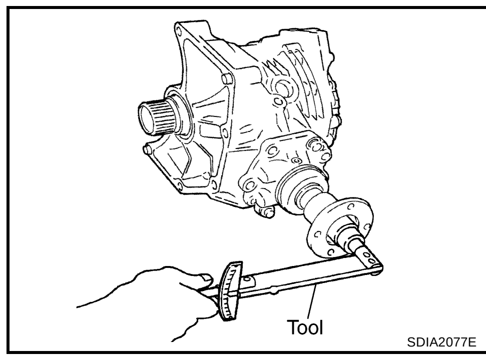
   With all oil seals:

   P_1 + 0.16 - 0.22 N·m (0.016 - 0.023 kg-m, 1.4 - 1.9 in-lb)

   Without transfer case oil seal and adapter case oil seal:

   P_1 + 0.06 - 0.12 N·m (0.006 - 0.013 kg-m, 0.6 - 1.1 in-lb)

   - If measured value is out of the specification, disassemble it to check and adjust each part. When measuring the total preload torque after the disassembly, measure it with the transfer case oil seals and gear ring oil seals removed, then install the oil seals.



SDIA2077E

Companion Flange Runout

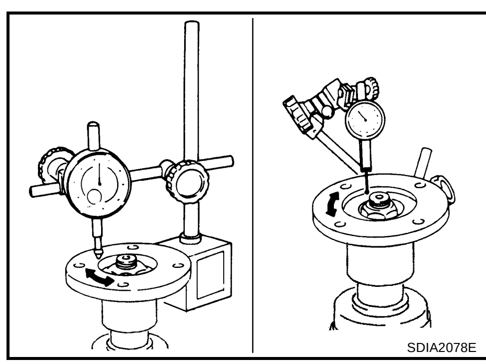
1. Fit a dial indicator onto companion flange face (inner side of the propeller shaft mounting bolt holes).
2. Rotate companion flange to check for runout.

   Runout limit: 0.1 mm (0.004 in)

3. Fit a test indicator to the inner side of companion flange (socket diameter).
4. Rotate companion flange to check for runout.

   Runout limit: 0.1 mm (0.004 in)

5. If the runout value is outside the repair limit, follow the procedure below to adjust.

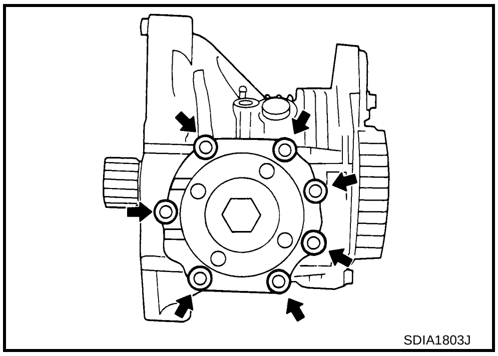

SDIA2078E

a. While changing the phase between companion flange and drive pinion gear by 90° at a time, check runout and determine which phase angle minimizes the runout.
b. If the runout value is still outside of the limit after the phase has been changed, replace the companion flange.
c. If the runout is out of the specification after replacement of companion flange, adjust the assembly status of pinion bearings and drive pinion gear, or replace pinion bearings.

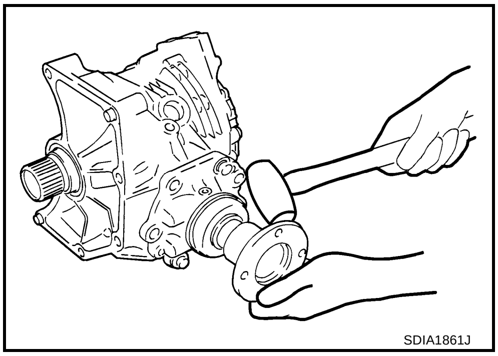
DISASSEMBLY

Pinion Sleeve Assembly

1. Remove pinion sleeve mounting bolts.


SDIA1803J

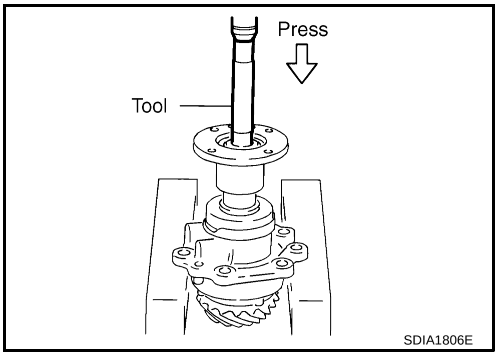
2. Tap companion flange to remove pinion sleeve assembly, using a plastic hammer.
3. Remove the pinion sleeve shim.
4. Remove the pinion lock nut.


SDIA1861J

5. Remove drive pinion assembly from pinion sleeve with a press, using the drift.

   Tool number : ST33220000 (J-25804-01)

6. Remove companion flange.
7. Remove the O-ring from pinion sleeve.

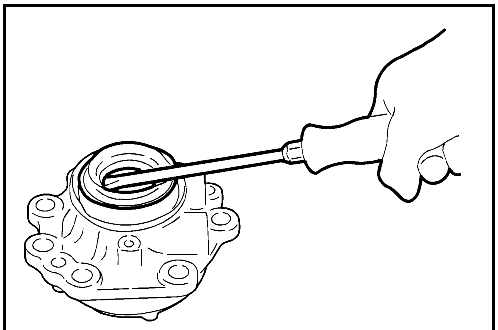


SDIA1806E

8. Remove the pinion sleeve oil seal, using a flat-bladed screw-driver.

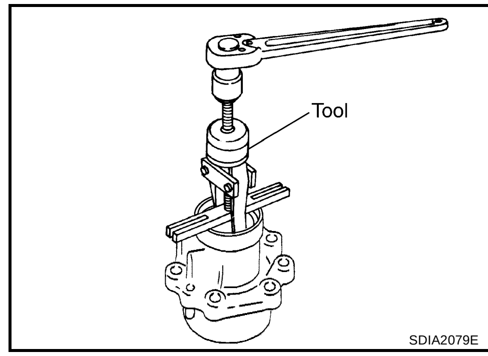
   CAUTION:
   Be careful not to damage pinion sleeve.

9. Remove pinion rear bearing inner race.


TFB0286D

10. Remove pinion rear bearing outer race, using the puller.

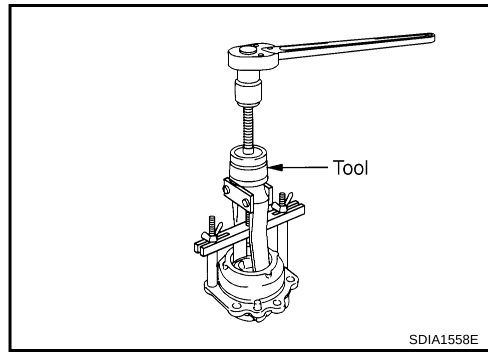
    Tool number : KV381054S0 (J-34286)



11. Remove pinion front bearing outer race, using the puller.

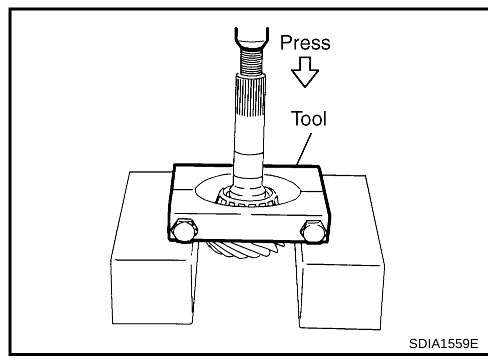
    Tool number : KV381054S0 (J-34286)

12. Remove dust cover.



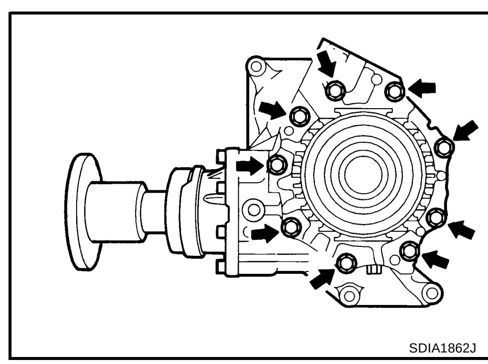
13. Remove collapsible spacer from drive pinion.
14. Press pinion front bearing inner race out of drive pinion, using the replacer.

    Tool number : ST30031000 (J-22912-01)

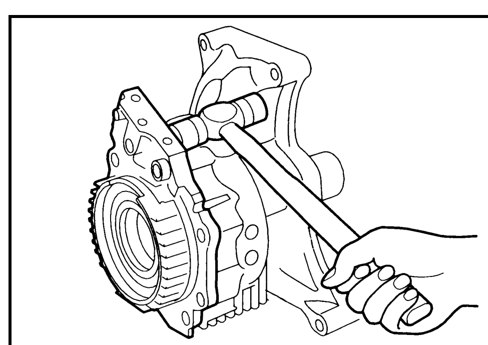


Adapter Case

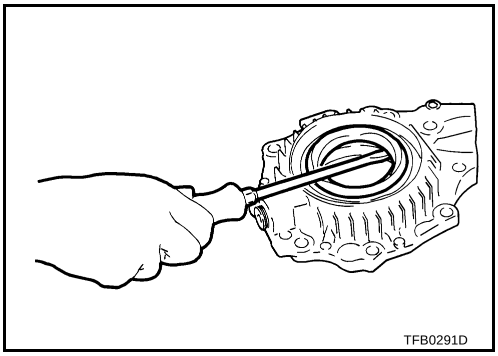
1. Remove adapter case mounting bolts.



2. Tap adapter case to remove, using a plastic hammer.
3. Remove O-ring.

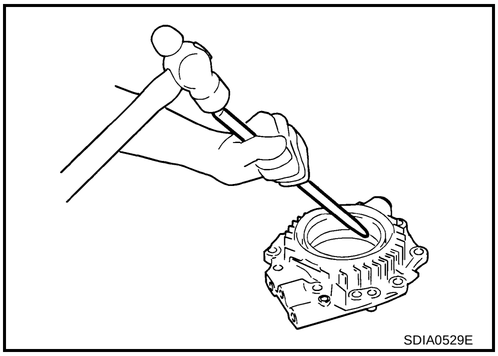


4. Remove adapter case oil seal, using a flat-bladed screwdriver.
   CAUTION:
   Be careful not to damage adapter case.



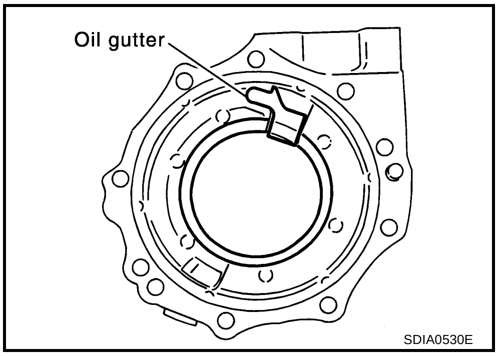
TFB0291D

5. Tap gear ring bearing adjusting shim from the cutout on adapter case, using a brass rod. Remove gear ring bearing adjusting shim and gear ring bearing outer race.



SDIA0529E

6. Remove oil gutter.
7. Remove drain plug.

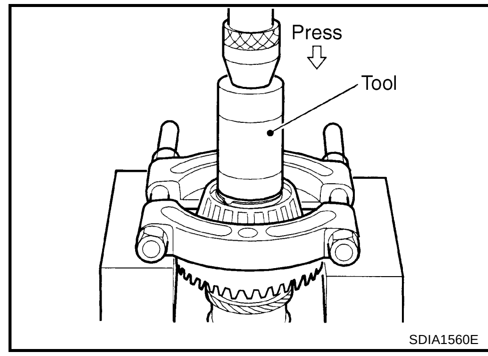


SDIA0530E

Drive Gear Assembly

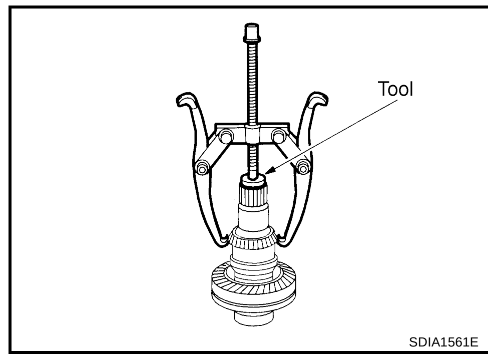
1. Remove adapter case. Refer to TF-56, "Adapter Case" .
2. Remove drive gear assembly from transfer case.
3. Remove gear ring bearing inner race (adapter case side) on gear ring, using the drift and replacer.

   Tool number : ST33200000 (J-26082)

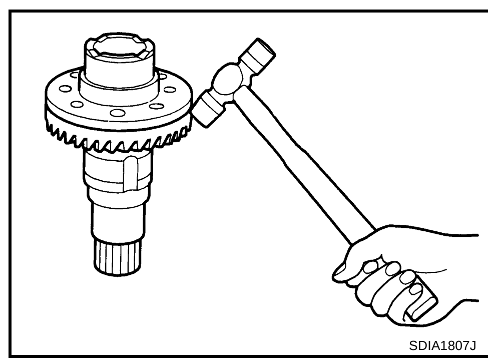


4. Remove gear ring bearing inner race (transfer case side) on gear ring, using the drift and replacer.

   Tool number : ST33061000 (J-8107-2)

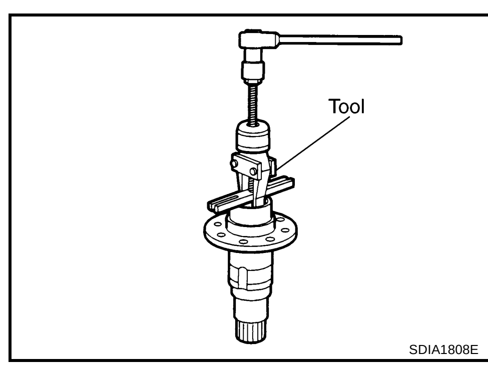


5. Remove drive gear mounting bolts.
6. Tap drive gear to remove drive gear from gear ring, using a plastic hammer.



7. Remove gear ring oil seal from gear ring, using the puller.

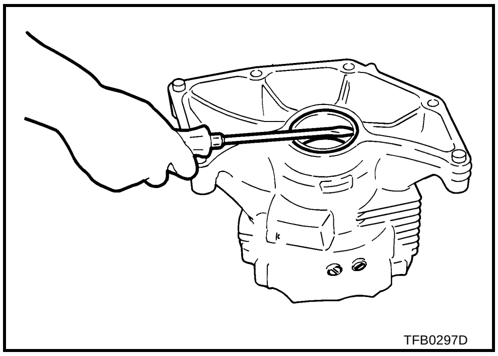
   Tool number : KV381054S0 (J-34286)



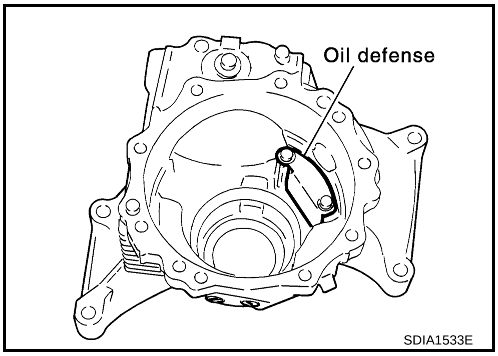
Transfer Case

1. Remove pinion sleeve assembly. Refer to TF-55, "Pinion Sleeve Assembly" .
2. Remove adapter case. Refer to TF-56, "Adapter Case" .
3. Remove drive gear assembly from transfer case. Refer to TF-58, "Drive Gear Assembly" .

4. Remove transfer case oil seal, using a flat-bladed screwdriver.
   CAUTION:
   Be careful not to damage transfer case.

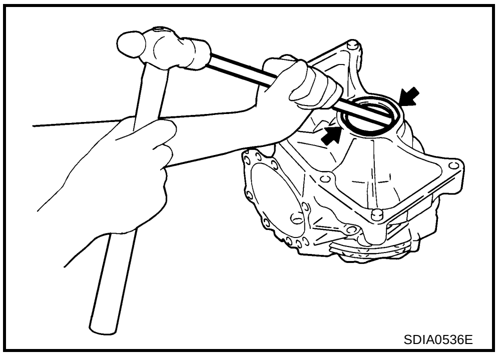

TFB0297D

5. Remove oil defense.



SDIA1533E

6. Tap gear ring bearing adjusting shim evenly from the 2 cutouts on transfer case, using a brass rod. Remove gear ring bearing adjusting shim and gear ring bearing outer race.
7. Remove filler plug, plug and breather tube.


SDIA0536E

INSPECTION AFTER DISASSEMBLY

Gears

- Check the gear faces and shaft for wear, cracks, damage, and seizure.

CAUTION:
If malfunction is detected on drive gear or drive pinion, replace drive gear and drive pinion as a set.

Bearings

- Check for seizure, peeling, wear, corrosion, sticking/unusual noise/roughness in hand turning, and other damage.

CAUTION:
When replacing the bearing, always replace inner race and outer race as a pair.

Washers and Shims

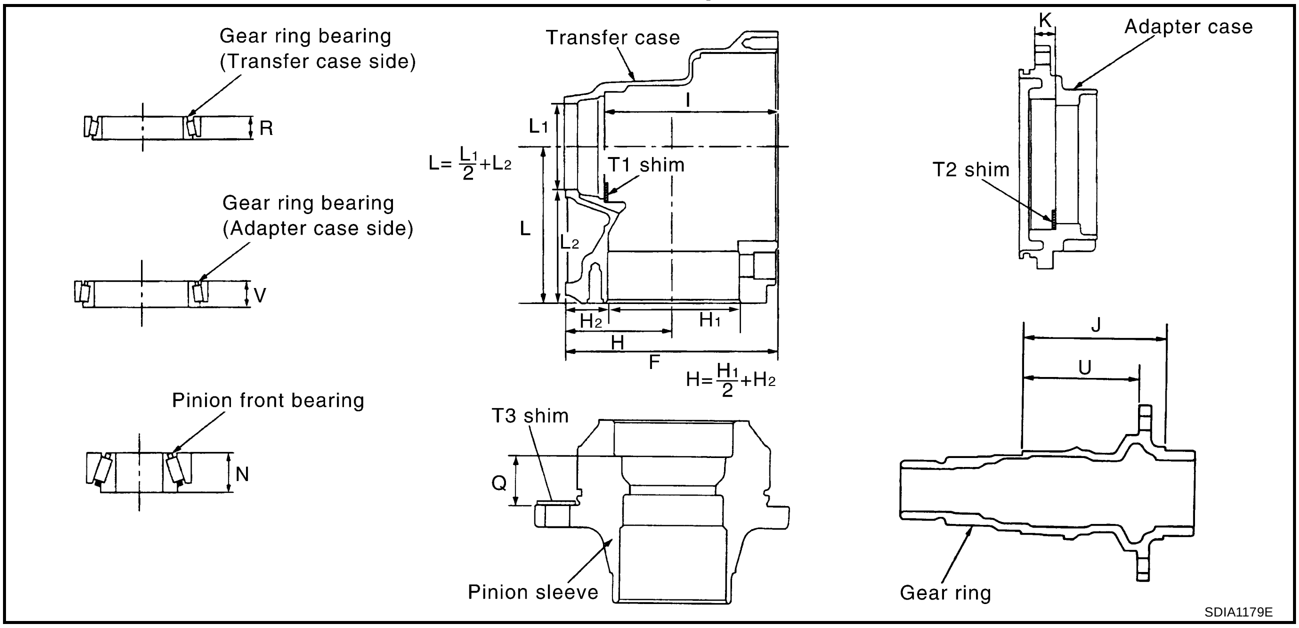
- Check for seizure, damage, and unusual wear.

Oil Seals

- Discard old oil seals, replace with new ones.
- If wear, deterioration of adherence (sealing force of lips), or damage is detected on the lips, replace them.

SELECTING ADJUSTING SHIMS

Measurement points



Gear Ring Bearing Adjusting Shim (Transfer Case Side)

1. Measure the points F, H, I, R and U shown in the measurement points.
2. Convert the values F, H, I, R and U according to the procedures below.

F: Value obtained by subtracting 163.00 mm (6.42 in) from the reading [in increments of 0.01 mm (0.0004 in)].

H: Value obtained by subtracting 83.00 mm (3.27 in) from the reading [in increments of 0.01 mm (0.0004 in)].

I: Value obtained by subtracting 131.90 mm (5.19 in) from the reading [in increments of 0.01 mm (0.0004 in)].

R: Value obtained by subtracting 17.00 mm (0.67 in) from the reading [in increments of 0.01 mm (0.0004 in)].

U: Value obtained by subtracting 89.50 mm (3.524 in) from the reading [in increments of 0.01 mm (0.0004 in)].

3. Check dimension Z on the drive gear side face.

   NOTE:
   Dimension Z indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01mm (0.0004 in) written on the drive gear side face.

4. Use the formula below to calculate gear ring bearing adjusting shim (transfer case side) thickness T_1 .

T_1 = (I - F + H + Z - U - R) × 0.01 mm (0.0004 in) + 1.49 mm (0.0587 in)

5. Select the gear ring bearing adjusting shim (transfer case side).
   - For information on selecting an adjusting shim, refer to TF-67, "Gear Ring Bearing Adjusting Shim (Transfer Case Side)" .

   CAUTION:
   - **Only one adjusting shim can be selected.**
   - **If no adjusting shim with the calculated value is available, select the thicker and closest one.**

Gear Ring Bearing Adjusting Shim (Adapter Case Side)

1. Measure the points F, H, J, K, U and V shown in the measurement points.
2. Convert the values F, H, J, K, U and V according to the procedures below.

A
B
C
TF
E
F
G
H
I
J
K
L
M

F: **Value obtained by subtracting 163.00 mm (6.42 in) from the reading [in increments of 0.01 mm (0.0004 in)].**

H: **Value obtained by subtracting 83.00 mm (3.27 in) from the reading [in increments of 0.01 mm (0.0004 in)].**

J: **Value obtained by subtracting 109.50 mm (4.31 in) from the reading [in increments of 0.01 mm (0.0004 in)].**

K: **Value obtained by subtracting 14.40 mm (0.5669 in) from the reading [in increments of 0.01 mm (0.0004 in)].**

U: **Value obtained by subtracting 89.50 mm (3.524 in) from the reading [in increments of 0.01 mm (0.0004 in)].**

V: **Value obtained by subtracting 17.00 mm (0.67 in) from the reading [in increments of 0.01 mm (0.0004 in)].**

3. Check dimension Z on the drive gear side face.

   NOTE:
   Dimension Z indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01mm (0.0004 in) written on the drive gear side face.

4. Use the formula below to calculate gear ring bearing adjusting shim (adapter case side) thickness T_2 .

   $$T_2 = (K + F - H - Z + U - J - V) \times 0.01 \text{ mm } (0.0004 \text{ in}) + 1.49 \text{ mm } (0.0587 \text{ in})$$

5. Select the gear ring bearing adjusting shim (adapter case side).
   - For information on selecting an adjusting shim, refer to TF-68, "Gear Ring Bearing Adjusting Shim (Adapter Case Side)" .

   CAUTION:
   - **Only one adjusting shim can be selected.**
   - **If no adjusting shim with the calculated value is available, select the thicker and closest one.**

Pinion Sleeve Shim

1. Measure the points L, N and Q shown in the measurement points.
2. Check the dimension S written on the gear end of drive pinion.

   NOTE:
   The dimension S indicates the difference between the optimum engagement and the standard dimensions in increments of 0.01 mm (0.0004 in) written on the gear end of drive pinion.

3. Use the formula below to calculate pinion sleeve shim thickness T_3 .

   $$T_3 = [74.6 \text{ mm } (2.937 \text{ in}) + S] + N + Q - L$$

4. Select the pinion sleeve shim.
   - For information on selecting a pinion sleeve shim, refer to TF-68, "Pinion Sleeve Shim" .

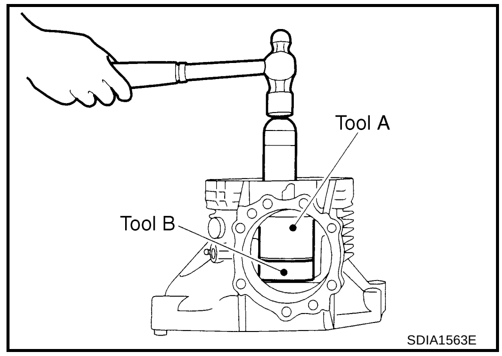
   CAUTION:
   Only one pinion sleeve shim can be selected.

ASSEMBLY

Transfer Case

1. Select gear ring bearing adjusting shim (transfer case side). Refer to TF-60, "SELECTING ADJUSTING SHIMS" .
2. Install selected gear ring bearing adjusting shim (transfer case side) and gear ring bearing outer race (transfer case side), using the drifts

   Tool number A: ST30720000 (J-25405)
   B: KV40101840 (—)

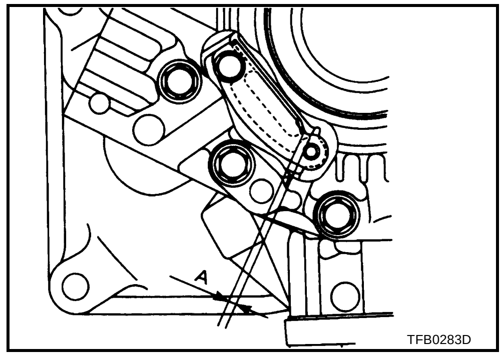


SDIA1563E

3. Install oil defense, and tighten the mounting bolts to the specified torque. Refer to TF-50, "COMPONENTS" . The clearance between oil defense and transfer case (dimension A) should be the following.

   Clearance between oil defense and transfer case
   Dimension A: 1.0 - 3.5 mm (0.04 - 0.138 in)

   CAUTION:
   Do not reuse the mounting bolts.

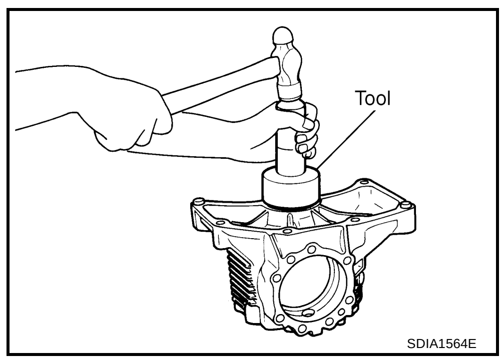


TFB0283D

4. Drive transfer case oil seal until it becomes flush with the case end, using the drift.

   Tool number : ST30720000 (J-25405)

   CAUTION:
   - **When checking the total preload torque, measure it without oil seal, then install oil seal.**
   - **Do not reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



SDIA1564E

5. Apply sealant to filler plug and plug before installing them to transfer case. Refer to TF-50, "COMPONENTS" .
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**
6. Apply sealant to breather tube and install it to transfer case.
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**
7. Install drive gear assembly. Refer to TF-63, "Drive Gear Assembly" .
8. Install adapter case. Refer to TF-64, "Adapter Case" .
9. Install pinion sleeve assembly. Refer to TF-65, "Pinion Sleeve Assembly" .
10. Check backlash, preload torque, tooth contact, and companion flange runout. Refer to TF-51, "ASSEMBLY INSPECTION" .

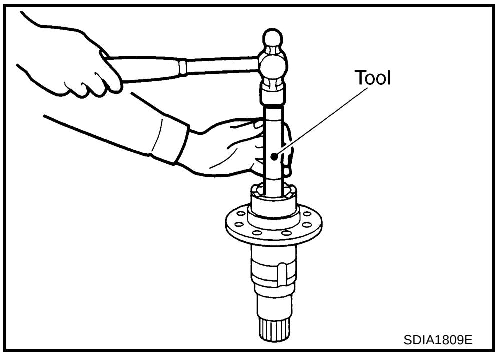
    CAUTION:
    Measure the total preload torque without oil seal.

Drive Gear Assembly

1. Drive gear ring oil seal into gear ring, using the drift.

   Tool number : ST33230000 (J-25805-01)

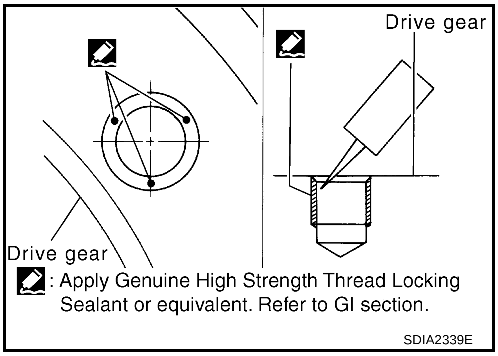
   CAUTION:
   - **Do not reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**
   - **The oil seal back position after the installation shall be 56.5 mm (2.22 in) from the gear ring end.**



2. Apply thread locking sealant into thread hole for drive gear.
   - **Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**

a. Completely clean and degrease the drive gear back face, thread holes, and drive gear mounting bolts.

b. Apply thread locking sealant onto the first and second threads under thread hole chamfering of drive gear on 3 or more different points.
   - **Use Genuine High Strength Thread Locking Sealant or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**

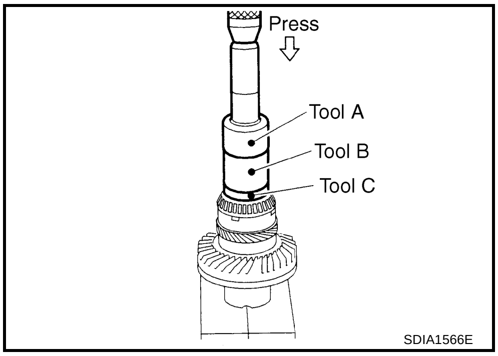


3. Install drive gear to gear ring, and apply anti-corrosive oil onto threads and seats on the mounting bolts. Tighten to the specified torque. Refer to TF-50, "COMPONENTS" .

   CAUTION:
   - **Temporary installation before tightening the bolts through to the completion of the tightening should be within 90 seconds.**
   - **If the thread locking sealant is applied aside, quickly wipe it off.**

4. Apply gear oil to gear ring bearing inner race (transfer case side). Install gear ring bearing inner race, using the drifts.

Tool number	**A: ST30720000 (J-25405)**
	B: ST27863000 (—)
	C: KV40101630 (J-35870)

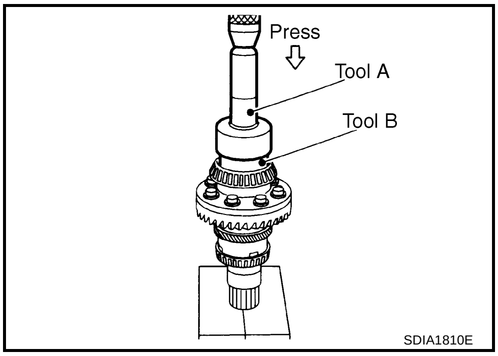


5. Apply gear oil to gear ring bearing inner race (adapter case side). Install gear ring bearing inner race, using the drifts.

Tool number	**A: ST30720000 (J-25405)**
	B: KV38102510 (—)

6. Install drive gear assembly to transfer case.
7. Install adapter case.
8. Check backlash, preload torque, tooth contact, and companion flange runout. Refer to TF-51, "ASSEMBLY INSPECTION" .

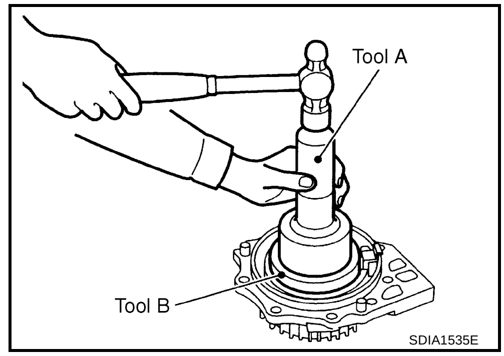
   CAUTION:
   Measure the total preload torque without oil seal.



Adapter Case

1. Select gear ring bearing adjusting shim (adapter case side). Refer to TF-60, "SELECTING ADJUSTING SHIMS" .
2. Install oil gutter.
3. Install selected gear ring bearing adjusting shim (adapter case side) and gear ring bearing outer race (adapter case side), using the drifts.

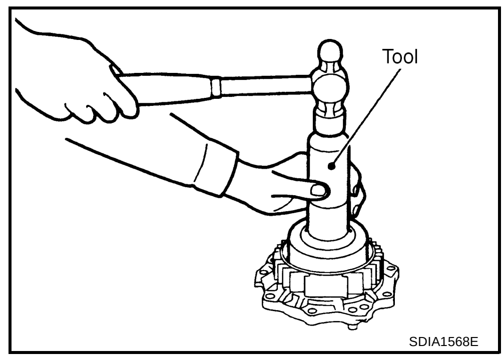
   Tool number   A: ST30720000 (J-25405)
   B: KV40105230 (—)



4. Drive adapter case oil seal until it becomes flush with the case end, using the drift.

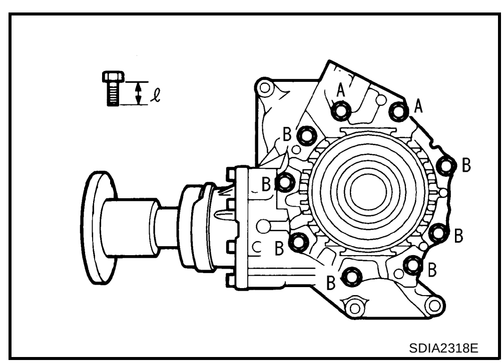
   Tool number   : KV38101700 (—)

   CAUTION:
   - **When checking the total preload torque, measure it without oil seal, then install oil seal.**
   - **Do not reuse oil seal.**
   - **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



5. Apply sealant on drain plug and install it to the adapter case. Refer to TF-50, "COMPONENTS" .
   - **Use Genuine Silicone RTV or equivalent. Refer to GI-48, "Recommended Chemical Products and Sealants" .**
6. Apply multi-purpose grease lightly and evenly onto O-ring, and install it to the adapter case.

   CAUTION:
   Do not reuse the O-ring.
7. Install adapter case to transfer case, and apply anti-corrosive oil onto threads and seats on the mounting bolts. Tighten to the specified torque.



Bolt symbol	Bolt length " ℓ " mm (in)	Tightening torque N·m (kg-m, ft-lb)
A	35 (1.38)	15.2 (1.6, 11)
B	30 (1.18)	

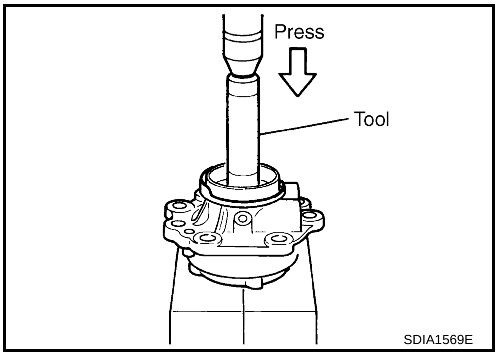
8. Check backlash, preload torque, tooth contact, and companion flange runout. Refer to TF-51, "ASSEMBLY INSPECTION" .

   CAUTION:
   Measure the total preload torque without oil seal.

Pinion Sleeve Assembly

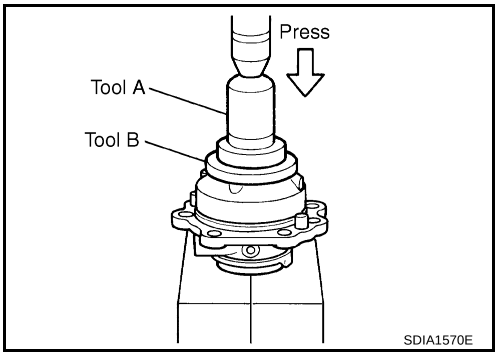
1. Select pinion sleeve shim. Refer to TF-60, "SELECTING ADJUSTING SHIMS" .
2. Install dust cover.
3. Install pinion rear bearing outer race, using the drift.

Tool number : KV38100300 (J-25523)



4. Install pinion front bearing outer race, using the drifts.

Tool number A: ST33400001 (J-26082)
B: ST30901000 (J-26010-01)



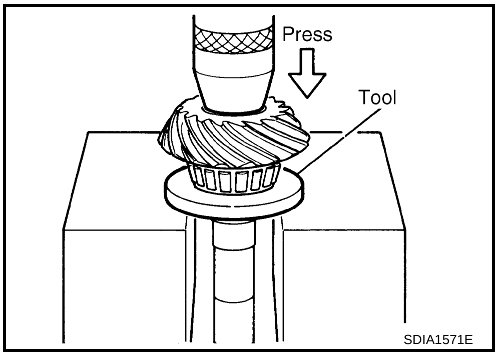
5. Apply gear oil to pinion front bearing inner race and mating position on drive pinion. Install pinion front bearing inner race to drive pinion, using the drift.

Tool number : ST30901000 (J-26010-01)

6. Install collapsible spacer to drive pinion.

CAUTION:
Do not reuse collapsible spacer.

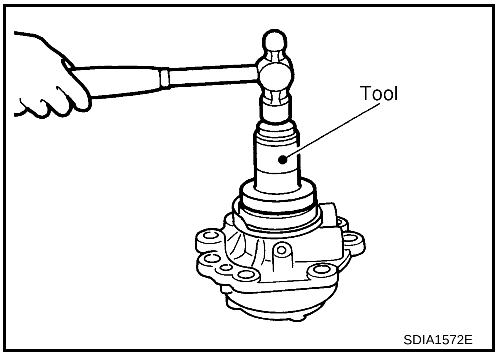
7. Apply gear oil to pinion rear bearing inner race and install it to pinion sleeve.



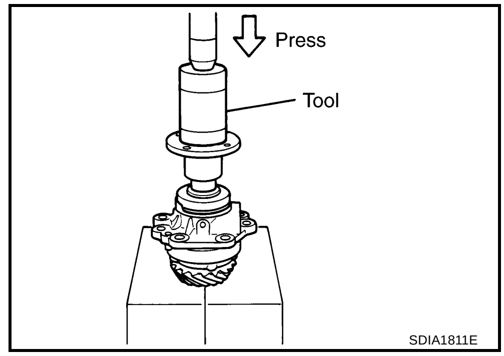
8. Install pinion sleeve oil seal to pinion sleeve, using the drift.

Tool number : ST33400001 (J-26082)

CAUTION:
- **Do not reuse oil seal.**
- **Apply multi-purpose grease onto oil seal lips, and gear oil onto the circumference of oil seal.**



9. Press in companion flange, using the drift.



Tool number : ST33200000 (J-26082)

10. Apply anti-corrosion oil onto threads and seat of pinion lock nut. Adjust pinion lock nut tightening torque and pinion bearing preload torque (P'1), using the preload gauge.

Pinion lock nut tightening torque

: 128 - 294 N·m (13 - 29 kg-m, 95 - 216 ft-lb)

Pinion bearing preload torque (P'1):

0.40 - 0.78 N·m (0.04 - 0.08 kg-m, 4 - 6 in-lb)

CAUTION:
- **Do not reuse pinion lock nut.**
- **Adjust the lower limit of the pinion lock nut tightening torque first.**
- **While confirming the preload torque, tighten pinion lock nut by 5° to 10°. Because preload will increase suddenly.**
- **If specified preload torque is exceeded, replace collapsible spacer and tighten again. Do not loosen pinion lock nut for further preload torque adjustment.**
- **After the adjustment, rotate companion flange back and forth 2 to 3 times to check for unusual noise, rotation malfunction, and other malfunctions.**

11. Apply multi-purpose grease lightly and evenly onto O-ring, and install it to pinion sleeve.

CAUTION:
Do not reuse old O-ring.

12. Assemble selected pinion sleeve shim.
13. Install pinion sleeve assembly, and apply anti-corrosive oil onto threads and seats on the mounting bolts. Tighten to the specified torque. Refer to TF-50, "COMPONENTS" .
14. Check backlash, preload torque, tooth contact and companion flange runout. Refer to TF-51, "ASSEMBLY INSPECTION" .
The total preload torque is as follows:

Total preload torque

With all oil seals:

P'1 + 0.45 - 0.47 N·m (0.045 - 0.048 kg-m, 3.9 - 4.1 in-lb)

Without transfer case oil seal and adapter case oil seal:

P'1 + 0.35 - 0.37 N·m (0.035 - 0.038 kg-m, 3.1 - 3.2 in-lb)

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

ADS00184

Applied model		QR25DE
Transfer model		TY20A
Oil capacity (Approx.) ℓ (US pt, Imp pt)		0.31 (5/8, 1/2)
Gear ratio		0.404
Number of teeth	Drive pinion	17
	Drive gear	42

Inspection and Adjustment

ADS00185

PRELOAD TORQUE BEFORE DISASSEMBLY

Item		Specification [N·m (kg-m, in-lb)]
Pinion bearing (P_1)		0.10 - 0.39 (0.01 - 0.04, 1 - 3)
Gear ring bearing to pinion bearing (Total preload)	With all oil seals	P_1 + 0.16 - 0.22 (0.016 - 0.023, 1.4 - 1.9)
	Without transfer case oil seal and adapter case oil seal	P_1 + 0.06 - 0.12 (0.006 - 0.013, 0.6 - 1.1)

PRELOAD TORQUE AFTER DISASSEMBLY AND REASSEMBLY

Item		Specification [N·m (kg-m, in-lb)]
Pinion bearing (P'_1)		0.40 - 0.78 (0.04 - 0.08, 4 - 6)
Gear ring bearing to pinion bearing (Total preload)	With all oil seals	P'_1 + 0.45 - 0.47 (0.045 - 0.048, 3.9 - 4.1)
	Without transfer case oil seal and adapter case oil seal	P'_1 + 0.35 - 0.37 (0.035 - 0.038, 3.1 - 3.2)

BACKLASH

Unit: mm (in)

Item	Specification
Drive gear to drive pinion gear	0.13 - 0.19 (0.0051 - 0.0075)

COMPANION FLANGE RUNOUT

Unit: mm (in)

Item	Runout limit
Companion flange face	0.1 (0.004)
Inner side of the companion flange	0.1 (0.004)

SELECTIVE PARTS

Gear Ring Bearing Adjusting Shim (Transfer Case Side)

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*	Thickness	Part number*
0.80 (0.0315)	33147 AD300	1.22 (0.0480)	33147 AD314	1.64 (0.0646)	33147 AD363
0.83 (0.0327)	33147 AD301	1.25 (0.0492)	33147 AD315	1.67 (0.0657)	33147 AD364
0.86 (0.0339)	33147 AD302	1.28 (0.0504)	33147 AD316	1.70 (0.0669)	33147 AD365
0.89 (0.0350)	33147 AD303	1.31 (0.0516)	33147 AD317	1.73 (0.0681)	33147 AD366
0.92 (0.0362)	33147 AD304	1.34 (0.0528)	33147 AD318	1.76 (0.0693)	33147 AD367
0.95 (0.0374)	33147 AD305	1.37 (0.0539)	33147 AD319	1.79 (0.0705)	33147 AD368
0.98 (0.0386)	33147 AD306	1.40 (0.0551)	33147 AD320	1.82 (0.0717)	33147 AD369
1.01 (0.0398)	33147 AD307	1.43 (0.0563)	33147 AD321	1.85 (0.0728)	33147 AD370
1.04 (0.0409)	33147 AD308	1.46 (0.0575)	33147 AD322	1.88 (0.0740)	33147 AD371
1.07 (0.0421)	33147 AD309	1.49 (0.0587)	33147 AD323	1.91 (0.0752)	33147 AD372
1.10 (0.0433)	33147 AD310	1.52 (0.0598)	33147 AD324	1.94 (0.0764)	33147 AD373
1.13 (0.0445)	33147 AD311	1.55 (0.0610)	33147 AD360	1.97 (0.0776)	33147 AD374
1.16 (0.0457)	33147 AD312	1.58 (0.0622)	33147 AD361	2.00 (0.0787)	33147 AD375
1.19 (0.0469)	33147 AD313	1.61 (0.0634)	33147 AD362	2.03 (0.0799)	33147 AD376

*: Always check with the Parts Department for the latest parts information.

Gear Ring Bearing Adjusting Shim (Adapter Case Side)

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*	Thickness	Part number*
0.80 (0.0315)	33147 5V200	1.25 (0.0492)	33147 5V215	1.70 (0.0669)	33123 5V265
0.83 (0.0327)	33147 5V201	1.28 (0.0504)	33147 5V216	1.73 (0.0681)	33123 5V266
0.86 (0.0339)	33147 5V202	1.31 (0.0516)	33147 5V217	1.76 (0.0693)	33123 5V267
0.89 (0.0350)	33147 5V203	1.34 (0.0528)	33123 5V218	1.79 (0.0705)	33123 5V268
0.92 (0.0362)	33147 5V204	1.37 (0.0539)	33123 5V219	1.82 (0.0717)	33123 5V269
0.95 (0.0374)	33147 5V205	1.40 (0.0551)	33123 5V220	1.85 (0.0728)	33123 5V270
0.98 (0.0386)	33147 5V206	1.43 (0.0563)	33123 5V221	1.88 (0.0740)	33123 5V271
1.01 (0.0398)	33147 5V207	1.46 (0.0575)	33123 5V222	1.91 (0.0752)	33123 5V272
1.04 (0.0409)	33147 5V208	1.49 (0.0587)	33123 5V223	1.94 (0.0764)	33123 5V273
1.07 (0.0421)	33147 5V209	1.52 (0.0598)	33123 5V224	1.97 (0.0776)	33123 5V274
1.10 (0.0433)	33147 5V210	1.55 (0.0610)	33123 5V260	2.00 (0.0787)	33123 5V275
1.13 (0.0445)	33147 5V211	1.58 (0.0622)	33123 5V261	2.03 (0.0799)	33123 5V276
1.16 (0.0457)	33147 5V212	1.61 (0.0634)	33123 5V262	2.06 (0.0811)	33123 5V277
1.19 (0.0469)	33147 5V213	1.64 (0.0646)	33123 5V263	2.09 (0.0811)	33123 5V278
1.22 (0.0480)	33147 5V214	1.67 (0.0657)	33123 5V264		

*: Always check with the Parts Department for the latest parts information.

Pinion Sleeve Shim

Unit: mm (in)

Thickness	Part number*	Thickness	Part number*	Thickness	Part number*
0.77 (0.0303)	33155 5V214	0.98 (0.0386)	33155 5V206	1.19 (0.0469)	33155 5V213
0.80 (0.0315)	33155 5V200	1.01 (0.0398)	33155 5V207	1.22 (0.0480)	33155 5V215
0.83 (0.0327)	33155 5V201	1.04 (0.0409)	33155 5V208	1.25 (0.0492)	33155 5V216
0.86 (0.0339)	33155 5V202	1.07 (0.0421)	33155 5V209	1.28 (0.0504)	33155 5V217
0.89 (0.0350)	33155 5V203	1.10 (0.0433)	33155 5V210	1.31 (0.0516)	33155 5V218
0.92 (0.0362)	33155 5V204	1.13 (0.0445)	33155 5V211	1.34 (0.0528)	33155 5V219
0.95 (0.0374)	33155 5V205	1.16 (0.0457)	33155 5V212		

*: Always check with the Parts Department for the latest parts information.

SECTION WT
ROAD WHEELS & TIRES

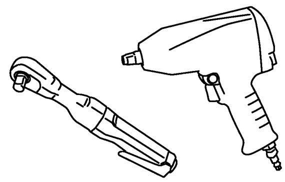
CONTENTS

PREPARATION

PFP:00002

Commercial Service Tools

AES000XX

Tool name		Description
Power tool	 PBIC0190E	Removing wheel nuts

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

AES000XW

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			FAX-7, FSU-6	WT-4	—	—	—	—	—	—	NVH in PR section	NVH in RFD section	NVH in FAX and FSU sections	NVH in RAX and RSU sections	Refer to TIRES in this chart	Refer to ROAD WHEEL in this chart	NVH in FAX, RAX section	NVH in BR section	NVH in PS section
Possible cause and SUSPECTED PARTS			Improper installation, looseness	Out-of-round	Imbalance	Incorrect tire pressure	Uneven tire wear	Deformation or damage	Non-uniformity	Incorrect tire size	PROPELLER SHAFT	DIFFERENTIAL	FRONT AXLE AND FRONT SUSPENSION	REAR AXLE AND REAR SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	BRAKE	STEERING
Symptom	TIRES	Noise	×	×	×	×	×	×	×		×	×	×	×		×	×	×	×
		Shake	×	×	×	×	×	×		×	×		×	×		×	×	×	×
		Vibration				×				×	×		×	×			×		×
		Shimmy	×	×	×	×	×	×	×	×			×	×		×		×	×
		Judder	×	×	×	×	×	×		×			×	×		×		×	×
		Poor quality ride or handling	×	×	×	×	×	×		×			×	×		×			
	ROAD WHEEL	Noise	×	×	×			×			×	×	×	×	×		×	×	×
		Shake	×	×	×			×			×		×	×	×		×	×	×
		Shimmy, judder	×	×	×			×					×	×	×			×	×
		Poor quality ride or handling	×	×	×			×					×	×	×				

×: Applicable

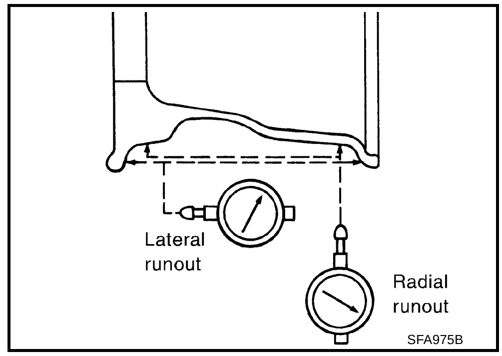
ROAD WHEEL

PFP:40300

Inspection

AES000XR

ALUMINUM WHEEL

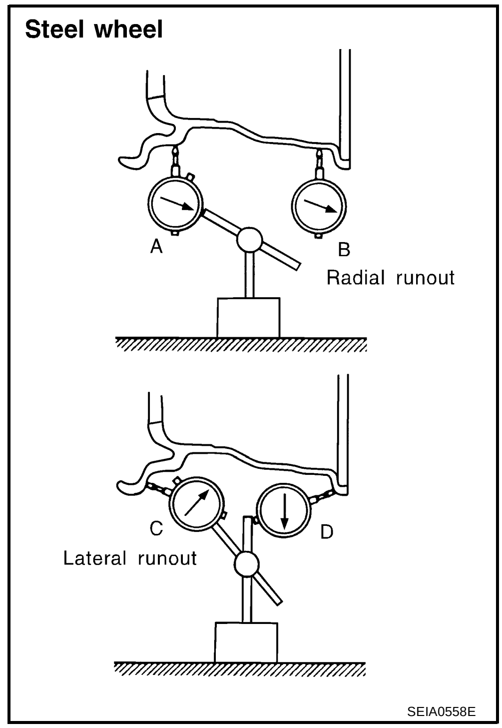


1. Check tires for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.
a. Remove tire from aluminum wheel and mount on a tire balance machine.
b. Set dial indicator as shown in the figure.

Wheel runout (Dial indicator value):

Refer to WT-7, "SERVICE DATA AND SPECIFICATIONS (SDS)"

STEEL WHEEL



1. Check tires for wear and improper inflation.
2. Check wheels for deformation, cracks and other damage. If deformed, remove wheel and check wheel runout.
a. Remove tire from steel wheel and mount wheel on a tire balance machine.
b. Set two dial indicators as shown in the figure.
c. Set each dial indicator to 0.
d. Rotate wheel and check dial indicators at several points around the circumference of the wheel.
e. Calculate runout at each point as shown below.

Radial runout = (A + B)/2

Lateral runout = (C + D)/2

f. Select maximum positive runout value and the maximum negative value.
Add the two values to determine total runout.
In case a positive or negative value is not available, use the maximum value (negative or positive) for total runout.
If the total runout value exceeds the limit, replace steel wheel.

Wheel runout : Refer to WT-7, "SERVICE DATA AND SPECIFICATIONS (SDS)"

ROAD WHEEL TIRE ASSEMBLY

PFP:40300

Balancing Wheels (Bonding Weight Type)

AES000XS

REMOVAL

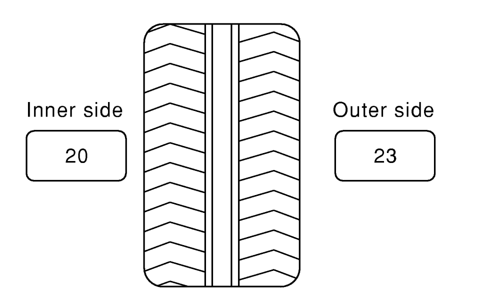
1. Remove inner and outer balance weights from the road wheel.
   CAUTION:
   Be careful not to scratch the road wheel during removal.
2. Using releasing agent, remove double-faced adhesive tape from the road wheel.
   CAUTION:
   - **Be careful not to scratch the road wheel during removal.**
   - **After removing double-faced adhesive tape, wipe clean traces of releasing agent from the road wheel.**

WHEEL BALANCE ADJUSTMENT

- If a tire balance machine has adhesion balance weight mode settings and drive-in weight mode setting, select and adjust a drive-in weight mode suitable for road wheels.

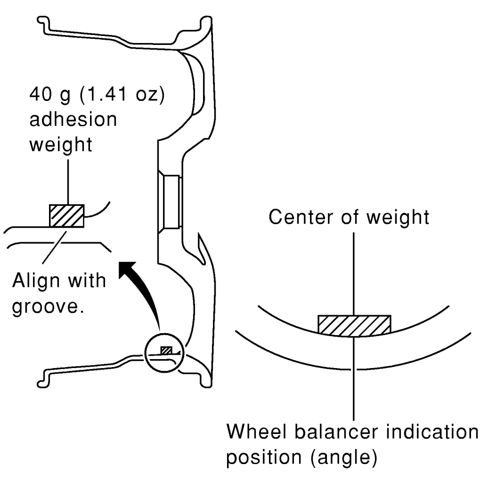
1. Set road wheel on wheel balancer using the center hole as a guide. Start the tire balance machine.
2. When inner and outer unbalance values are shown on the wheel balancer indicator, multiply outer unbalance value by 5/3 to determine balance weight that should be used. Select the outer balance weight with a value closest to the calculated value above and install it to the designated outer position of, or at the designated angle in relation to the road wheel.
   CAUTION:
   - **Do not install the inner balance weight before installing the outer balance weight.**
   - **Before installing the balance weight, be sure to clean the mating surface of the road wheel.**

   Indicated unbalance value × 5/3 = balance weight to be installed
   Calculation example:
   23 g (0.81 oz) × 5/3 = 38.33 g (1.35 oz) = 40 g (1.41 oz) balance weight (closer to calculated balance weight value)
   Note that balance weight value must be closer to the calculated balance weight value.
   Example:
   37.4 = 35 g (1.23 oz)
   37.5 = 40 g (1.41 oz)



SMA054D

a. Install balance weight in the position shown in the figure.
b. When installing balance weight to road wheels, set it into the grooved area on the inner wall of the road wheel as shown in the figure so that the balance weight center is aligned with the wheel balancer indication position (angle).
   CAUTION:
   - **Always use genuine Nissan adhesion balance weights.**
   - **Balance weights are unreusable; always replace with new ones.**
   - **Do not install more than three sheets of balance weights.**



SEIA0271E

c. If calculated balance weight value exceeds 50 g (1.76 oz), install two balance weight sheets in line with each other (as shown in the figure).

CAUTION:

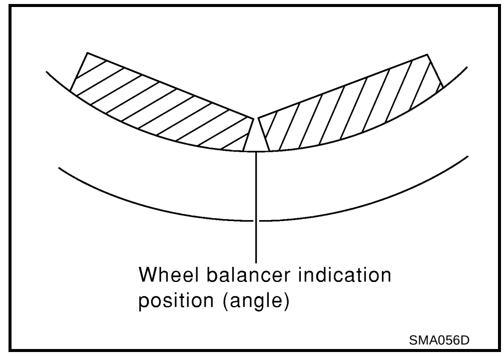
Do not install one balance weight sheet on top of another.

3. Start wheel balancer again.
4. Install drive-in balance weight on inner side of road wheel in the wheel balancer indication position (angle).

CAUTION:

Do not install more than two balance weights.

5. Start wheel balancer. Make sure that inner and outer residual unbalance values are 10 g (0.35 oz) each or below.
   - If either residual unbalance value exceeds 10 g (0.35 oz), repeat installation procedures.



Wheel balance (Maximum allowable unbalance):

Maximum allowable unbalance	Dynamic (At rim flange)	Less than 10 g (0.35 oz) (one side)
	Static (At rim flange)	Less than 20 g (0.70 oz)

Rotation

AES000XT

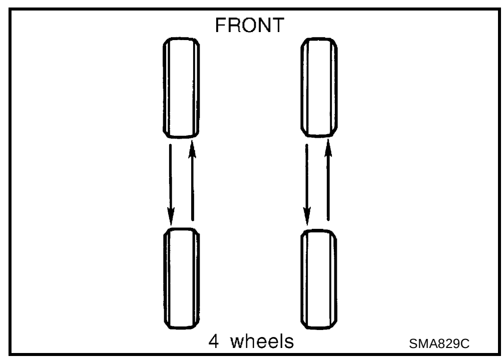
- Follow the maintenance schedule for tire rotation service intervals. Refer to MA-6, "PERIODIC MAINTENANCE" .
- Do not include the spare tire when rotating tires.

CAUTION:

When installing wheels, tighten them diagonally by dividing the work two to three times in order to prevent the wheels from developing any distortion.

Tightening torque of wheel nut:

113 N·m (12 kg-m, 83 ft-lb)



SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Road Wheel

AES000XU

Kind of wheel		Aluminum	Steel
Deflection limit	Lateral deflection	Less than 0.3 mm (0.012 in)	Less than 0.5 mm (0.020 in)
	Vertical deflection	Less than 0.3 mm (0.012 in)	Less than 0.8 mm (0.031 in)
Allowable quantity of residual unbalance	Dynamic (At rim flange)	Less than 10 g (0.35 oz) (per side)	
	Static (At rim flange)	Less than 20 g (0.70 oz)	

Tire

AES000XV

Unit: kPa (kg/cm^2 , psi)

Tire size	Air pressure	
	Front tire	Rear tire
P215/65R16 96H	220 (2.2, 32)	220 (2.2, 32)

SECTION WW

WIPER, WASHER & HORN

CONTENTS

PRECAUTIONS

PFP:00011

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AKS00BBD

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Wiring Diagrams and Trouble Diagnosis

AKS00BBE

When you read wiring diagrams, refer to the followings:

- Refer to GI-14, "How to Read Wiring Diagrams" in GI section.
- Refer to PG-2, "POWER SUPPLY ROUTING" for power distribution circuit in PG section.

When you perform trouble diagnosis, refer to the followings:

- Refer to GI-10, "HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES" in GI section.
- Refer to GI-26, "How to Perform Efficient Diagnosis for an Electrical Incident" in GI section.

FRONT WIPER AND WASHER SYSTEM

PFP:28810

System Description

AKS00BBF

WIPER OPERATION

The wiper switch is controlled by a lever built in combination switch.
There are three wiper switch positions

- LO speed
- HI speed
- INT (Intermittent)

With the ignition switch in ON or START position, power is supplied

- through 20A fuse [No. 6, located in fuse block (J/B)]
- to front wiper motor terminal 2
- to combination switch (front wiper and washer switch) terminal 15.

Low and High Speed Wiper Operation

Ground is supplied

- to combination switch (front wiper and washer switch) terminal 17
- through grounds E24 and E50.

When the wiper switch is placed in the LO position, ground is supplied

- through combination switch (front wiper and washer switch) terminal 14
- to front wiper motor terminal 3.

With power and ground supplied, the wiper motor operates at low speed.
When the wiper switch is placed in the HI position, ground is supplied

- through combination switch (front wiper and washer switch) terminal 16
- to front wiper motor terminal 5.

With power and ground supplied, the wiper motor operates at high speed.

Auto Stop Operation

With wiper switch turned OFF, wiper motor will continue to operate until wiper arms reach windshield base.
When wiper arms are not located at base of windshield with wiper switch OFF, ground is provided

- from combination switch (front wiper and washer switch) terminal 14
- to front wiper motor terminal 3, in order to continue wiper motor operation at low speed.

Ground is also supplied

- through combination switch (front wiper and washer switch) terminal 13
- to front wiper motor terminal 4
- through front wiper motor terminal 1
- through grounds E24 and E50.

When wiper arms reach base of windshield, front wiper motor terminals 2 and 4 are connected instead of terminals 1 and 4. Wiper motor will then stop wiper arms at the STOP position.

Intermittent Operation

The front wiper motor operates the wiper arms one time at low speed at a set interval of approximately 1 to 13 seconds. This feature is controlled by the wiper amplifier (INT SW) combined with front wiper and washer switch.
When the wiper switch is placed in the INT position, ground is supplied to wiper amplifier.
The desired interval time is input to wiper amplifier (INT VR) from variable intermittent wiper volume combined with front wiper and washer switch.
Then intermittent ground is supplied

- through wiper amplifier (OUTPUT) and
- through combination switch (front wiper and washer switch) terminal 14
- to front wiper motor terminal 3.

The wiper motor operates at low speed at the desired interval.

WASHER OPERATION

With the ignition switch in the ON or START position, power is supplied

- through 20A fuse [No. 6, located in fuse block (J/B)]
- to front washer motor terminal 1.

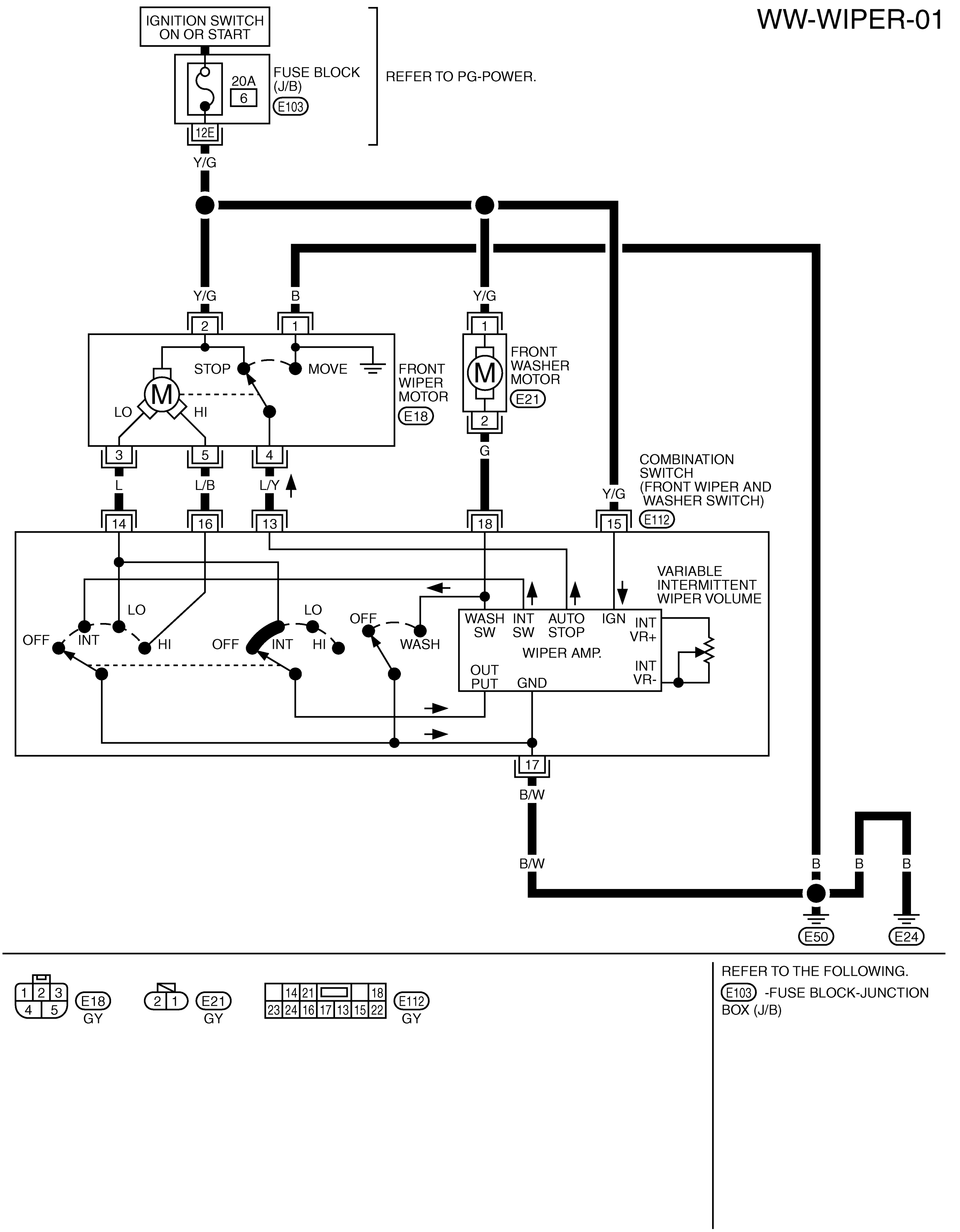
When the lever is pulled to the WASH position, ground is supplied

- from grounds E24 and E50
- through combination switch (front wiper and washer switch) terminal 17, and
- through combination switch (front wiper and washer switch) terminal 18
- to front washer motor terminal 2.

With power and ground supplied, the washer motor operates.
When the lever is pulled to the WASH position for one second or more, the wiper motor operates at low speed for approximately 3 seconds to clean windshield. This feature is controlled by the wiper amplifier in the same manner as the intermittent operation.

Wiring Diagram — WIPER —

AKS00BBG



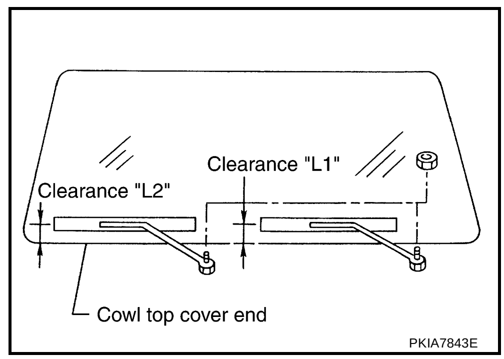
Terminal and Reference Values for Combination Switch

AKS00BBH

Terminal No.	Wire color	Item	Condition			Voltage
			Ignition switch	Condition or operation		
13	L/Y	Front wiper auto stop signal	ON	Wiper operating		Approx. 0V
				Wiper stopped		Battery voltage
14	L	Front wiper motor operation signal (LO)	ON	Wiper switch	OFF	Battery voltage
					LO	Approx. 0V
15	Y/G	Ignition ON signal	ON	—		Battery voltage
16	L/B	Front wiper motor operation signal (HI)	ON	Wiper switch	OFF	Battery voltage
					HI	Approx. 0V
17	B/W	Ground	OFF	—		Approx. 0V
18	G	Front washer switch signal	ON	Washer switch	ON	Approx. 0V
					OFF	Battery voltage

Removal and Installation of Front Wiper Arms, Adjustment of Wiper Arms Stop Location

AKS00BBI

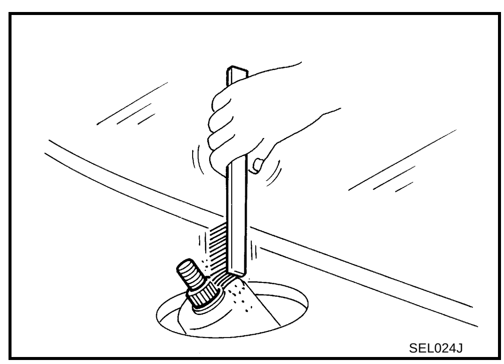


1. Prior to wiper arm installation, turn on wiper switch to operate wiper motor and then turn it “OFF” (Auto Stop).
2. Lift the blade up and then set it down onto glass surface to set the blade center to clearance “L1” & “L2” immediately before tightening nut.
3. Eject washer fluid. Turn on wiper switch to operate wiper motor and then turn it “OFF”.
4. Ensure that wiper blades stop within clearance “L1” & “L2”.
   - **Clearance “L1” : 49.2 - 64.2 mm (1.937 - 2.528 in)**
   - **Clearance “L2” : 39.3 - 54.3 mm (1.547 - 2.138 in)**

- **Tighten wiper arm nuts to specified torque.**

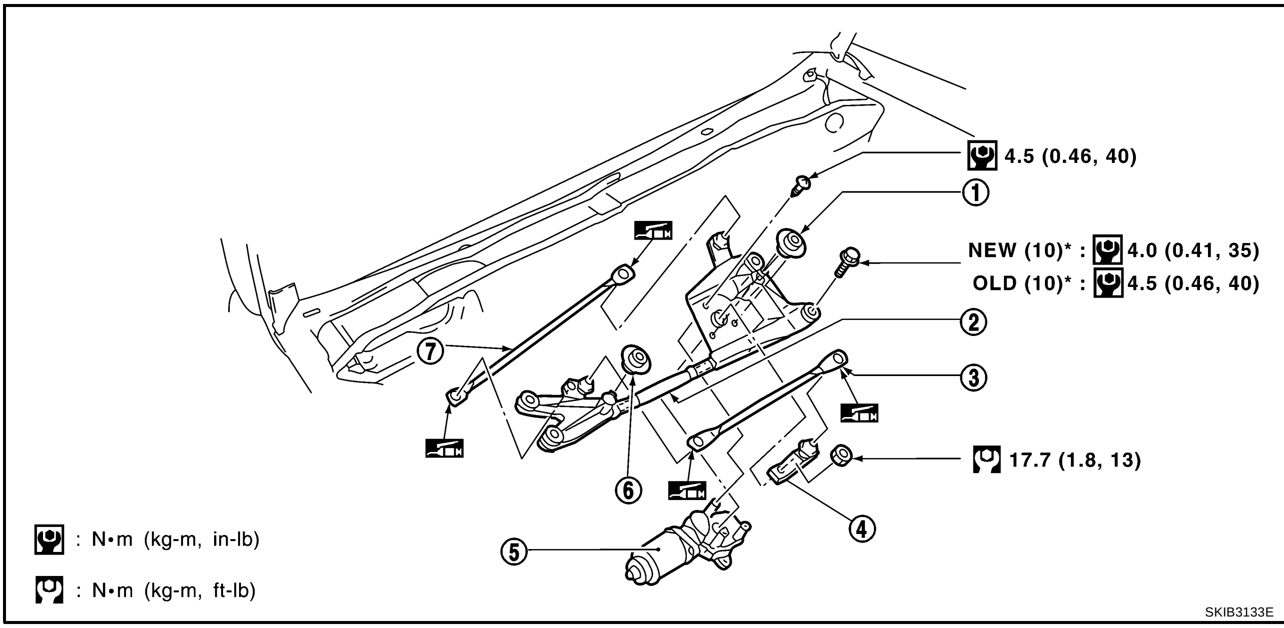
  Front wiper arm nut : 23.6 N·m (2.4 kg-m, 17 ft-lb)

- Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.



Removal and Installation of Wiper Motor and Linkage

AKS00BBJ

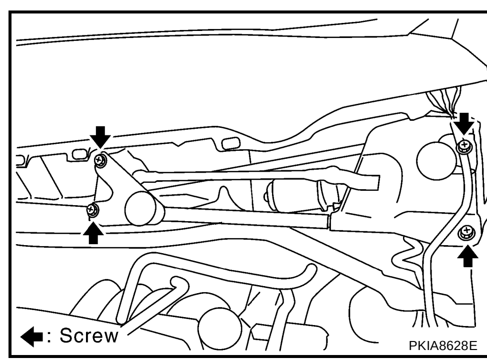


*: In regard to the notation of torque in the illustration, "NEW" shows an ISO standard, "OLD" shows a conventional standard, and the measurements of hexagonal width across flats are in parentheses. For the identification in case of the same width across flats, refer to GI-45, "Tightening Torque Table (New Standard Included)" .

1. Rubber
2. Wiper frame
3. Wiper link
4. Motor arm
5. Wiper motor
6. Rubber
7. Wiper link

REMOVAL

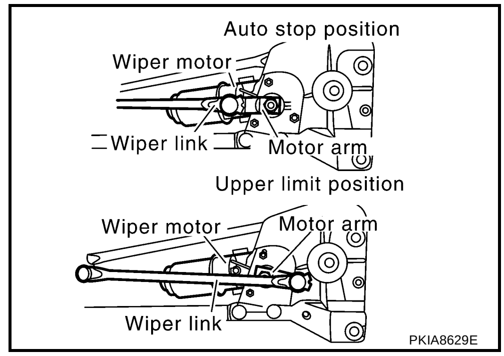
1. Operate wiper motor, and stop it at the upper limit position.
2. Remove wiper arm from the vehicle.
3. Remove cowl top cover. Refer to EI-19, "COWL TOP" .
4. Remove screws (4) and remove wiper motor assembly from the vehicle.
5. Disconnect wiper motor connector.
6. Remove wiper link from wiper frame.
7. Remove wiper motor from wiper frame.



INSTALLATION

1. Connect wiper motor to connector. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
2. Disconnect wiper motor connector.
3. Install wiper motor to wiper frame.
4. Install wiper motor assembly to the vehicle.

5. Install wiper link to wiper motor arm.
6. Connect wiper motor connector. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
7. Rotate motor arm to the upper limit position.
8. Install wiper motor assembly to the vehicle.
9. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
10. Install cowl top cover. Refer to EI-19, "COWL TOP" .
11. Install wiper arm to the vehicle. Refer to WW-6, "Removal and Installation of Front Wiper Arms, Adjustment of Wiper Arms Stop Location" .
    - **Tighten wiper arm nuts to specified torque.**



Front wiper arm nut : 23.6 N·m (2.4 kg-m, 17 ft-lb)

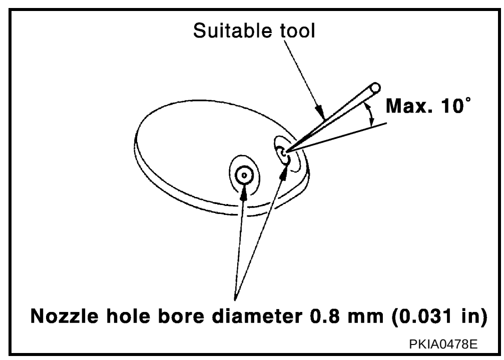
CAUTION:
- **Do not drop wiper motor or cause it to contact other parts.**
- **Check grease conditions of motor arm and wiper link joint (at retainer). Apply grease if necessary.**

Front Washer Nozzle Adjustment

AKS00BBK

Adjust washer nozzle with suitable tool as shown in the figure.

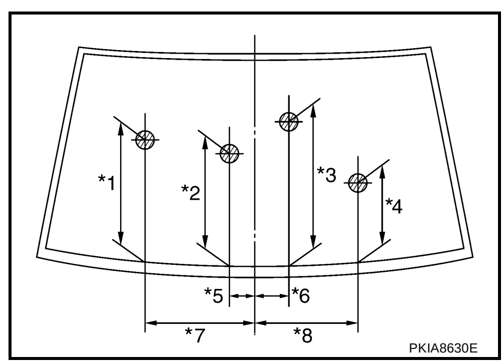
Adjustable range : ±10° (In any direction)



Unit: mm (in)

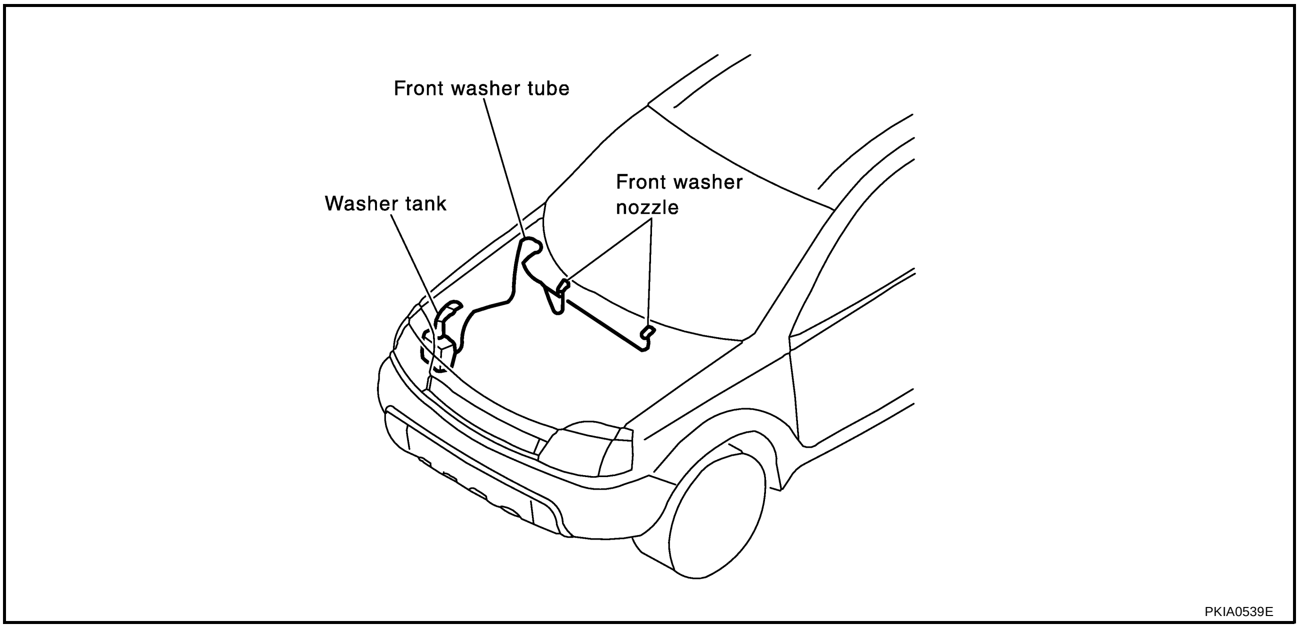
*1	342 (13.46)	*5	138 (5.43)
*2	325 (12.80)	*6	155 (6.10)
*3	433 (17.05)	*7	386 (15.20)
*4	238 (9.37)	*8	378 (14.88)

*: The diameters of these circles are less than 80 mm (3.15 in).



Front Washer Tube Layout

AKS00BBL

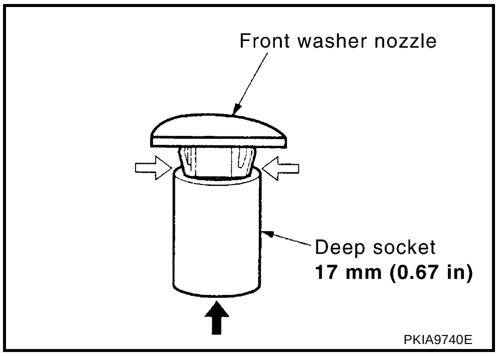


Removal and Installation of Front Washer Nozzle

AKS00BBM

REMOVAL

Push front washer nozzle pawl toward engine hood to pull out.



INSTALLATION

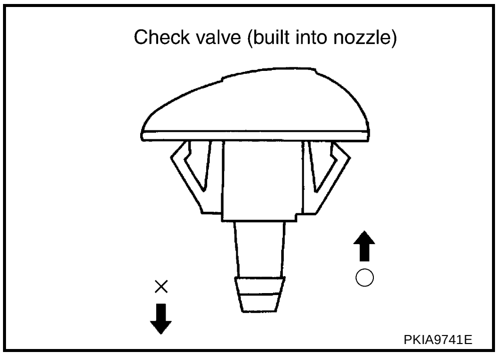
1. After connecting washer hose, press nozzle from cowl top cover surface.
2. Assemble nozzle and socket.
3. Adjust nozzle injection position.

Inspection of Front Washer Nozzle

AKS00BBN

CHECK VALVE

Blow air in the injection direction, and check that air flows only one way. Make sure that the reverse direction (inhale) is not possible.

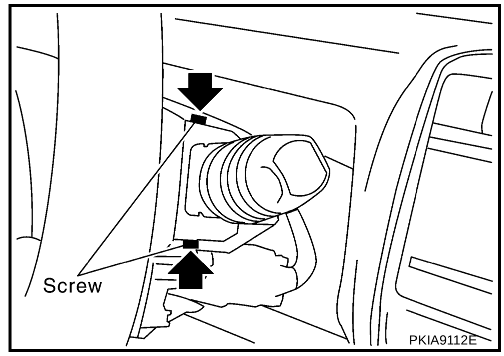


Removal and Installation of Wiper and Washer Switch

AKS00BBO

REMOVAL

1. Remove steering column cover. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect combination switch (front wiper and washer switch) connector.
3. Remove screws (2) then remove wiper washer switch from the base.



INSTALLATION

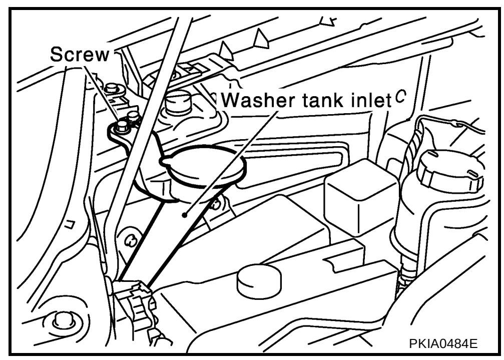
Installation is the reverse of removal.

Removal and Installation of Washer Tank

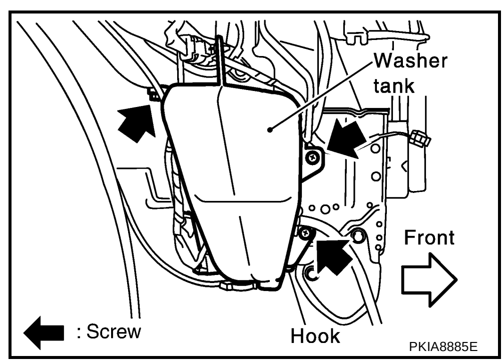
AKS00BBP

REMOVAL

1. Remove washer tank inlet installation screw and pull out washer tank inlet.
2. Remove fender protector. Refer to EI-20, "FENDER PROTECTOR" .
3. Disconnect washer pump connector and washer level sensor connector.



4. Remove washer tank mounting screws (3) and pawl.
5. Remove washer hose, and remove washer tank from the vehicle.



INSTALLATION

Installation is the reverse of removal. Note the following.

CAUTION:

After installation, add water up to the upper level of the washer tank inlet, and check for water leaks.

Washer tank mounting screw : 4.5N·m (0.46 kg-m, 40 in-lb)

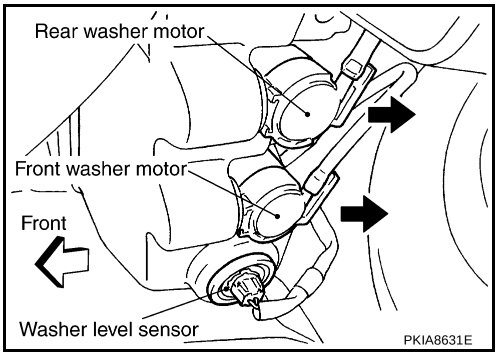
Removal and Installation of Washer Motor

AKS00BBQ

REMOVAL

1. Remove fender protector. Refer to EI-20, "FENDER PROTECTOR" .
2. Disconnect washer motor connector and hose.

3. Pull out washer motor in the direction of the arrow in the figure, and remove washer motor from washer tank.



INSTALLATION

Installation is the reverse of removal. Note the following.

CAUTION:

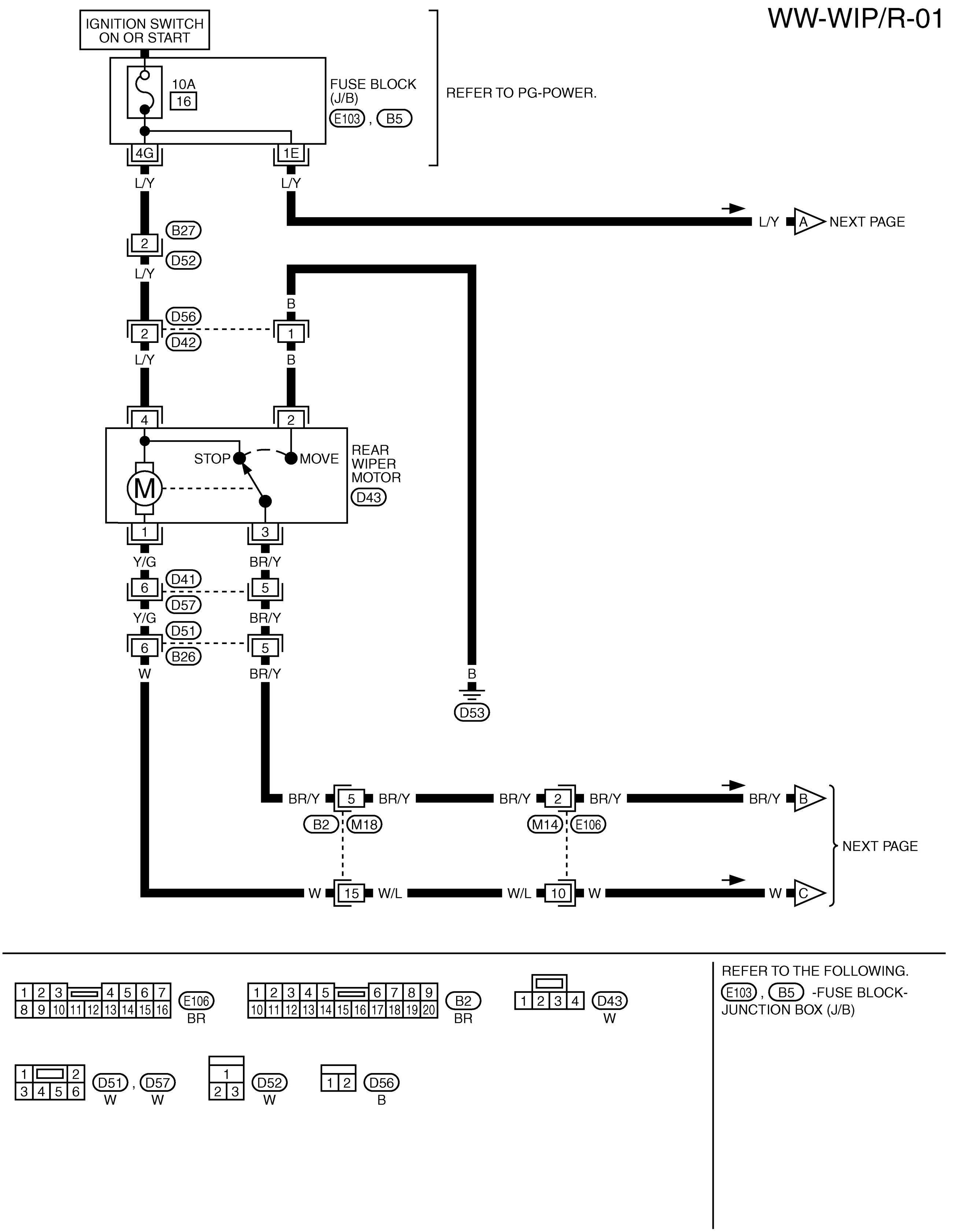
When installing washer motor, there should be no packing twists, etc.

REAR WIPER AND WASHER SYSTEM

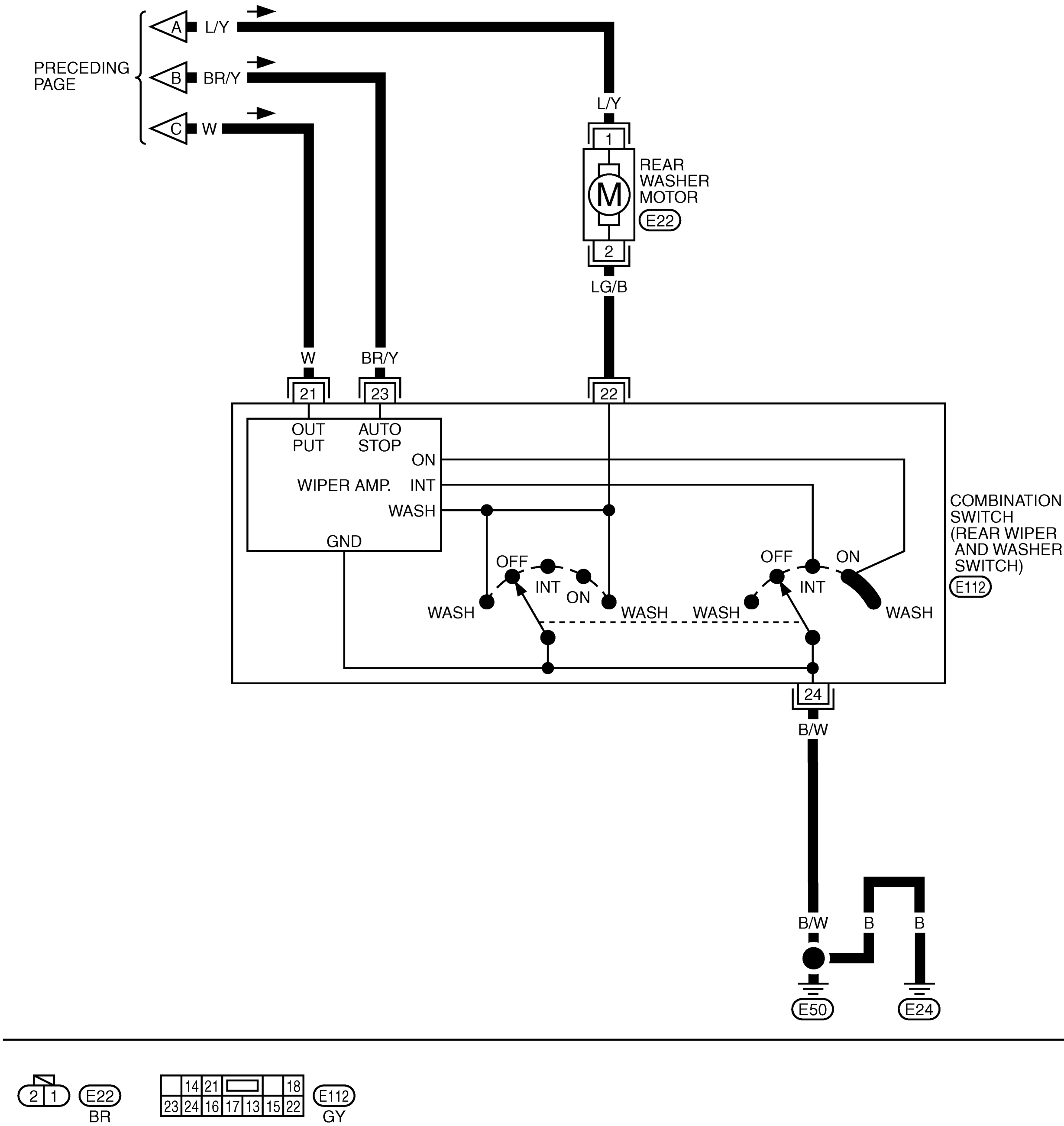
PFP:28710

Wiring Diagram — WIP/R —

AKS00BBR



WW-WIP/R-02



TKWB0192E

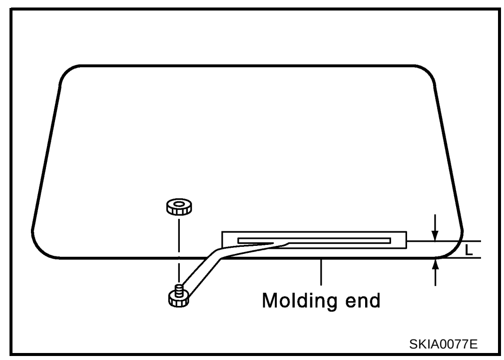
Terminal and Reference Values for Combination Switch

AKS00BBS

Terminal No.	Wire color	Item	Condition			Voltage
			Ignition switch	Condition or operation		
21	W	Rear wiper motor operation signal (ON)	ON	Wiper switch	OFF	Battery voltage
					ON	Approx. 0V
22	LG/B	Rear washer switch signal	ON	Washer switch	ON	Approx. 0V
					OFF	Battery voltage
23	BR/Y	Rear wiper auto stop signal	ON	Wiper operating		Approx. 0V
				Wiper stopped		Battery voltage
24	B/W	Ground	OFF	—		Approx. 0V

Removal and Installation of Rear Wiper Arms, Adjustment for Wiper Arms Stop Location

AKS00BBT



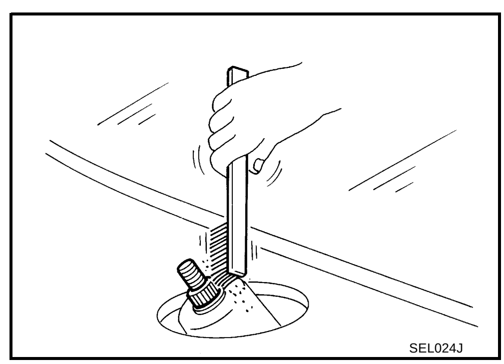
1. Turn on wiper switch to operate wiper motor and then turn it "OFF" (Auto Stop).
2. Lift the blade up and then set it down onto glass surface. Set the black center to clearance "L" immediately before tightening the nut.
3. Eject washer fluid. Turn on wiper switch to operate wiper motor and then turn it "OFF".
4. Ensure that wiper blades stop on the lowest heat wire.
   - **Center to clearance "L".**

     "L" : 55.6 - 70.6 mm (2.189 - 2.780 in)

   - **Tighten wiper arm nut to specified torque.**

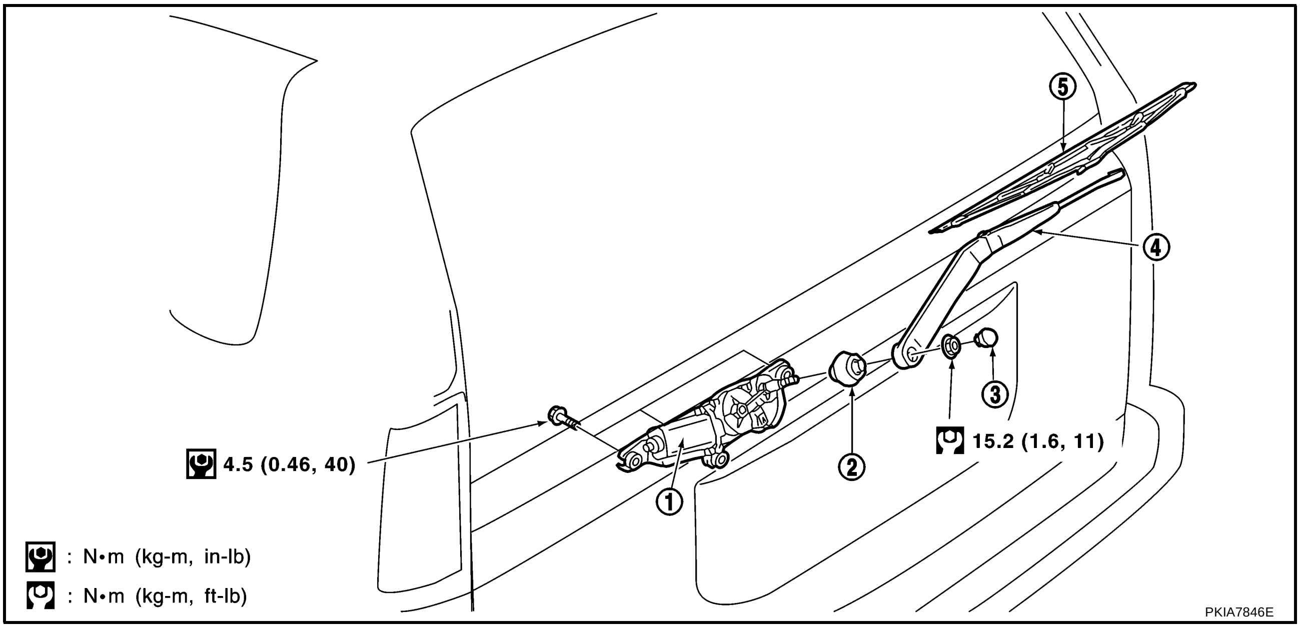
     Rear wiper arm nut : 15.2 N·m (1.6 kg-m, 11 ft-lb)

   - **Before reinstalling wiper arm, clean up the pivot area as illustrated. This will reduce possibility of wiper arm looseness.**



Removal and Installation of Wiper Motor and Linkage

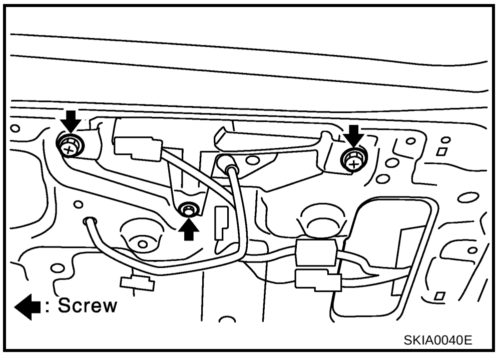
AKS00BBU



1.	Wiper motor	2.	Rubber	3.	Nut cover
4.	Wiper arm	5.	Wiper blade		

REMOVAL

1. Remove back door finisher. Refer to EI-35, "BACK DOOR TRIM" in "EXTERIOR & INTERIOR (EI)" section.
2. Operate wiper motor, and stop it at the auto stop position.
3. Disconnect wiper motor connector.
4. Remove wiper arm from the vehicle.
5. Remove wiper motor mounting screws (3).
6. Remove wiper motor from the vehicle.
7. Remove rubber from the vehicle.



INSTALLATION

1. Install rubber to the vehicle.
2. Install wiper motor to the vehicle.
3. Connect wiper motor to connector. Turn wiper switch ON to operate wiper motor, then turn wiper switch OFF (auto stop).
4. Install wiper arm to the vehicle. Refer to WW-14, "Removal and Installation of Rear Wiper Arms, Adjustment for Wiper Arms Stop Location" .
5. Install back door finisher. Refer to EI-35, "BACK DOOR TRIM" in "EXTERIOR & INTERIOR (EI)" section.
   - **Tighten wiper arm nuts to specified torque.**

     Rear wiper arm nut : 15.2 N·m (1.6 kg-m, 11 ft-lb)

   - **Tighten wiper motor screws to specified torque.**

     Rear wiper motor screw : 4.5 N·m (0.46 kg-m, 40 in-lb)

CAUTION:

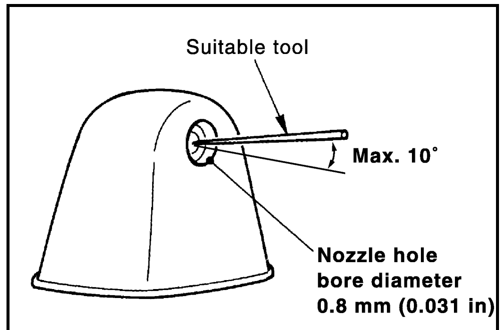
- **Do not drop wiper motor or cause it to contact other parts.**
- **Check grease conditions of motor arm and wiper link joint (at retainer). Apply grease if necessary.**

Washer Nozzle Adjustment

AKS00BBV

Adjust washer nozzle with suitable tool as shown in the figure.

Adjustable range : ±10° (In any direction)

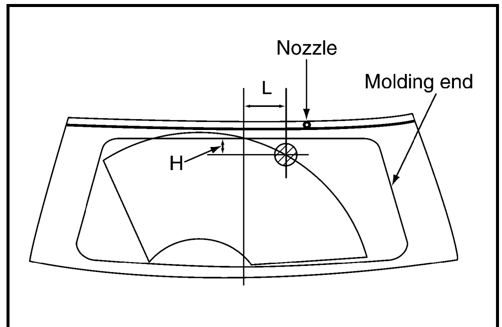


PKIA0487E

Unit: mm (in)

*H	90 (3.54)
* L	150 (5.91)

*: The diameter of this circle is less than 40 mm (1.57 in).



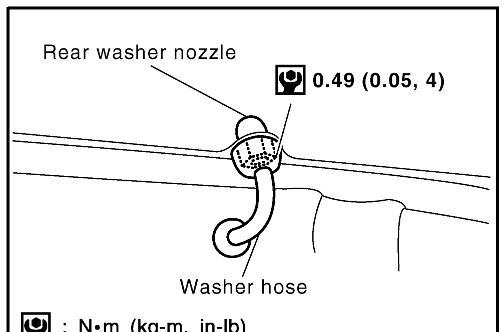
PKIA9742E

Removal and Installation of Rear Washer Nozzle

AKS00BBW

REMOVAL

1. Remove washer hose from washer nozzle.
2. Remove washer nozzle installation screw and remove rear washer nozzle.



PKIA5552E

INSTALLATION

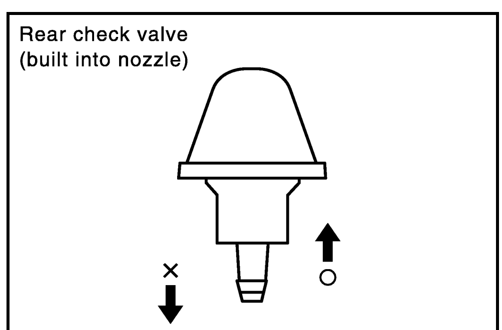
1. After connecting washer hose, press nozzle from cowl top cover surface.
2. Assemble nozzle and socket.
3. Adjust nozzle injection position.

Inspection of Rear Washer Nozzle

AKS00BBX

CHECK VALVE

Blow air in the injection direction, and check that air flows only one way. Make sure that the reverse direction (inhale) is not possible.



SKIA0042E

Removal and Installation of Wiper and Washer Switch
AKS00BBY

Refer to WW-10, "Removal and Installation of Wiper and Washer Switch" .

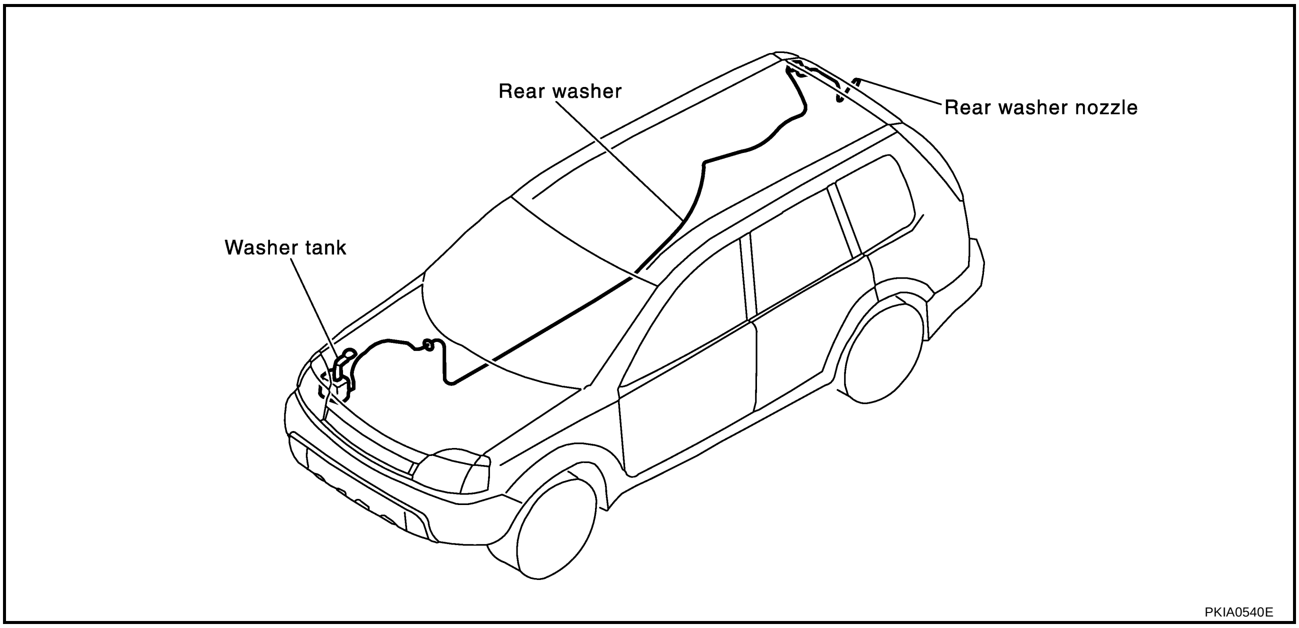
Removal and Installation of Washer Tank
AKS00BBZ

Refer to WW-10, "Removal and Installation of Washer Tank" .

Removal and Installation of Washer Motor
AKS00BC0

Refer to WW-10, "Removal and Installation of Washer Motor" .

Rear Washer Tube Layout
AKS00BC1



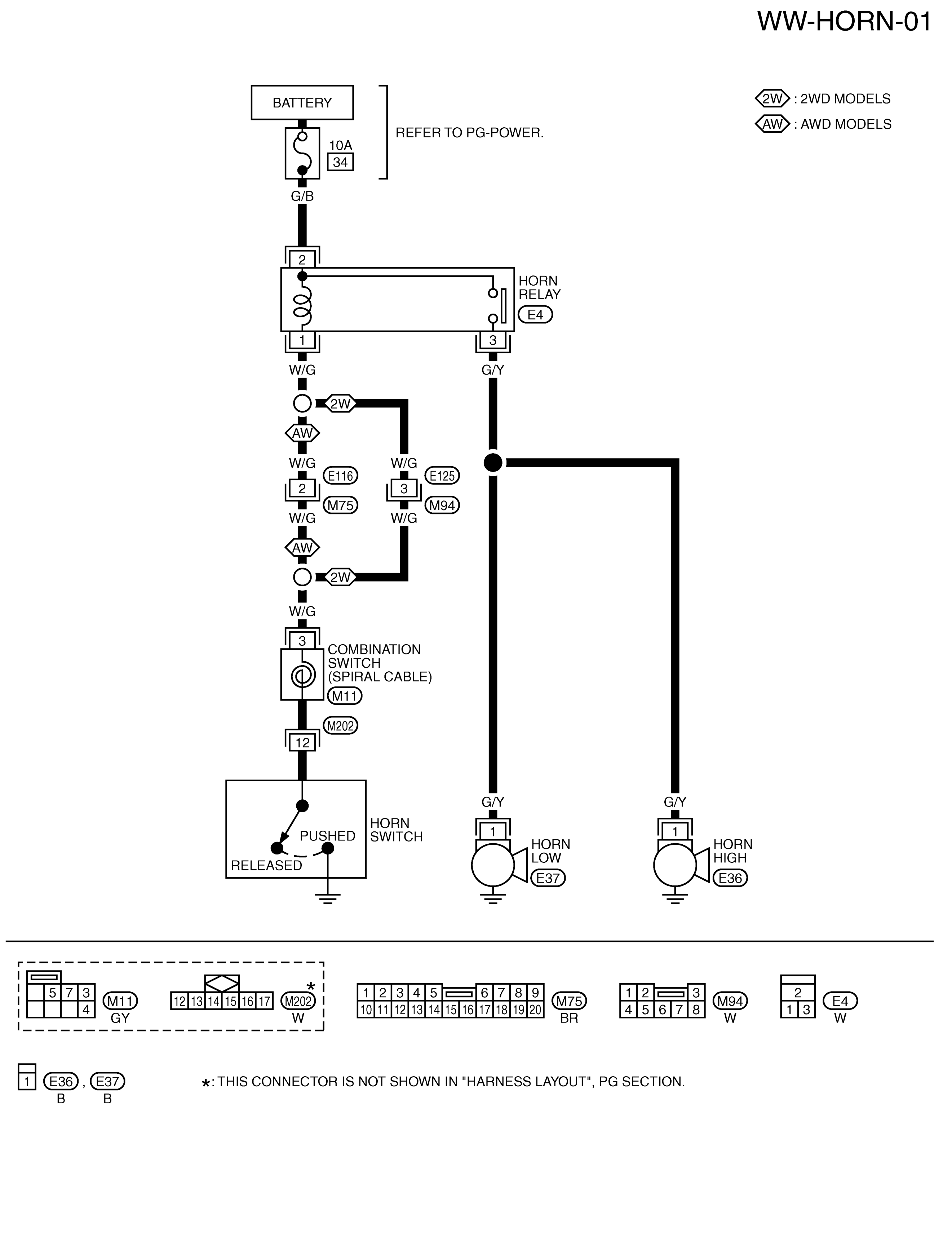
A
B
C
D
E
F
G
H
I
J
WW
L
M

HORN

PFP:25610

Wiring Diagram — HORN —

AKS00BC2

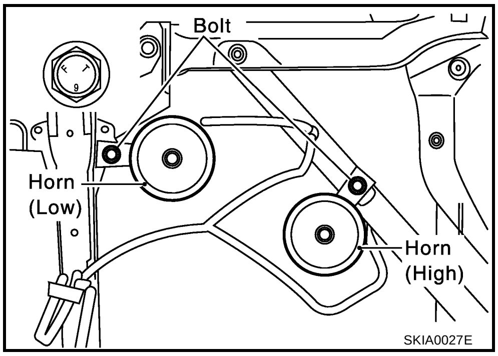


Removal and Installation

AKS00BC3

REMOVAL

1. Remove front grille. Refer to EI-18, "FRONT GRILLE" .
2. Disconnect horn connector.
3. Remove horn mounting bolts.
4. Remove horn from vehicle.



INSTALLATION

Installation is the reverse of removal. Note the tightening torque shown below.

Horn mounting bolt : 17.2 N·m (1.8 kg-m, 13 ft-lb)

A B C D E F G H I J WW L M

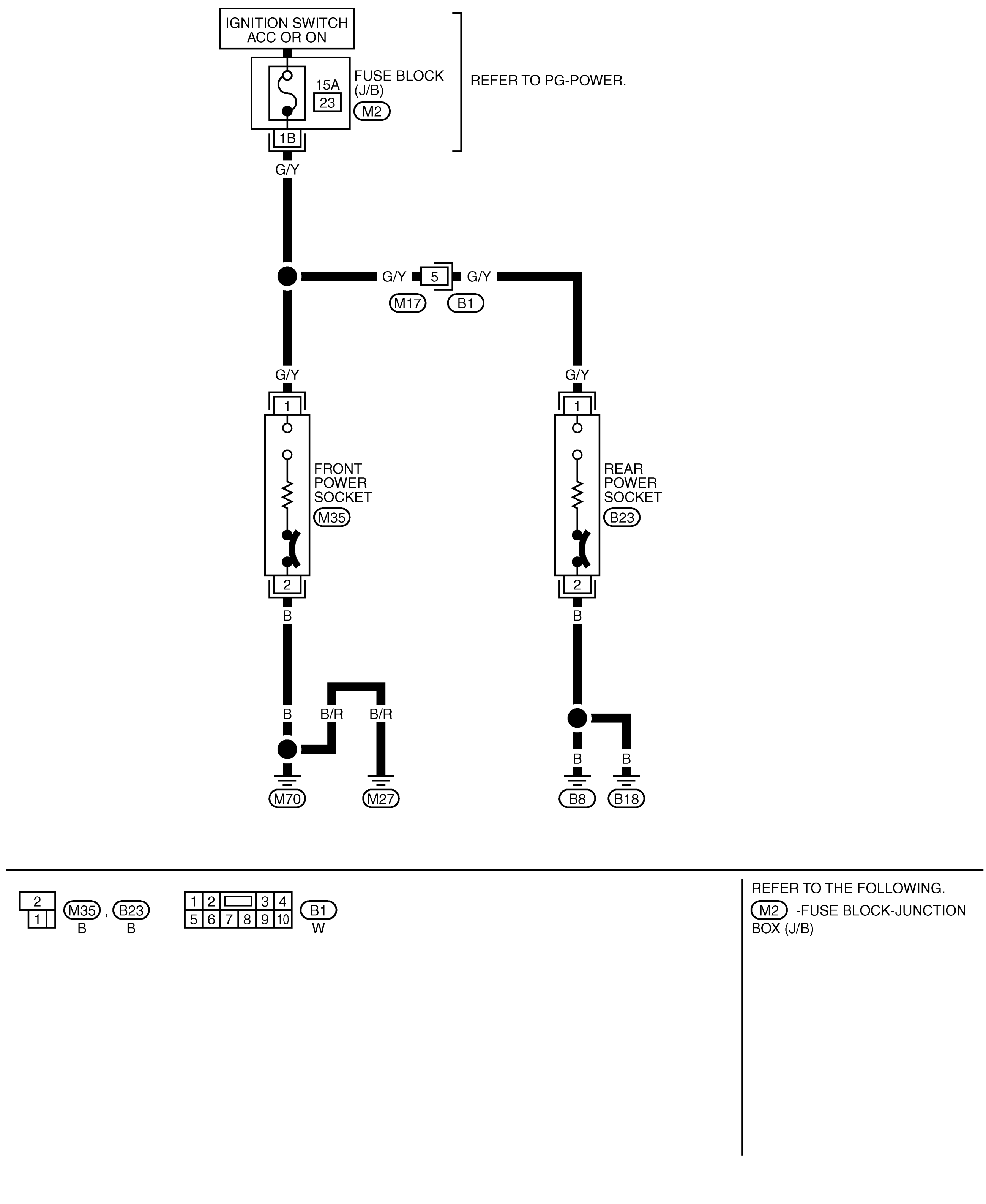
POWER SOCKET

PFP:253A2

Wiring Diagram –POWER SOCKET–

AKS00BC6

WW-P/SCKT-01

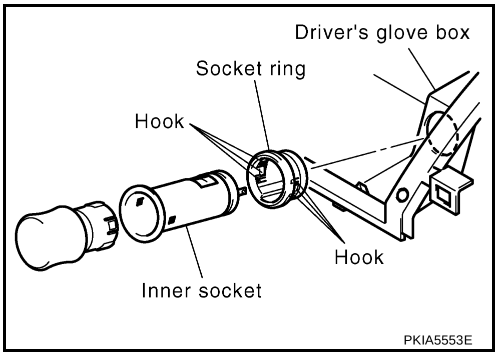


Removal and Installation of Front Power Socket

AKS00BC7

REMOVAL

1. Remove driver's glove box. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Disconnect power socket connector.
3. Pull out inner socket from socket ring.
4. Pull out socket ring from driver's glove box.



INSTALLATION

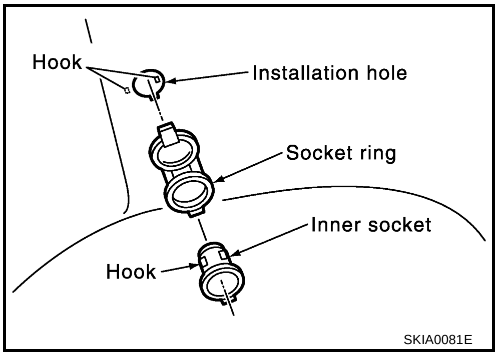
Installation is the reverse of removal.

Removal and Installation of Rear Power Socket

AKS00BC8

REMOVAL

1. Remove luggage side lower finisher. Refer to EI-38, "LUGGAGE SIDE LOWER FINISHER" .
2. Disconnect power socket connector.
3. Pull out inner socket from luggage side lower finisher.



INSTALLATION

Installation is the reverse of removal.