HOW TO USE THIS MANUAL

IN01O-08

GENERAL INFORMATION

1. INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the section title and major heading are given at the top of every page.

2. PRECAUTION

At the beginning of each section, a PRECAUTION is given that pertains to all repair operations contained in that section.

Read these precautions before starting any repair task.

3. TROUBLESHOOTING

TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause. The fundamentals of how to proceed with troubleshooting are described on page IN-17 .

Be sure to read this before performing troubleshooting.

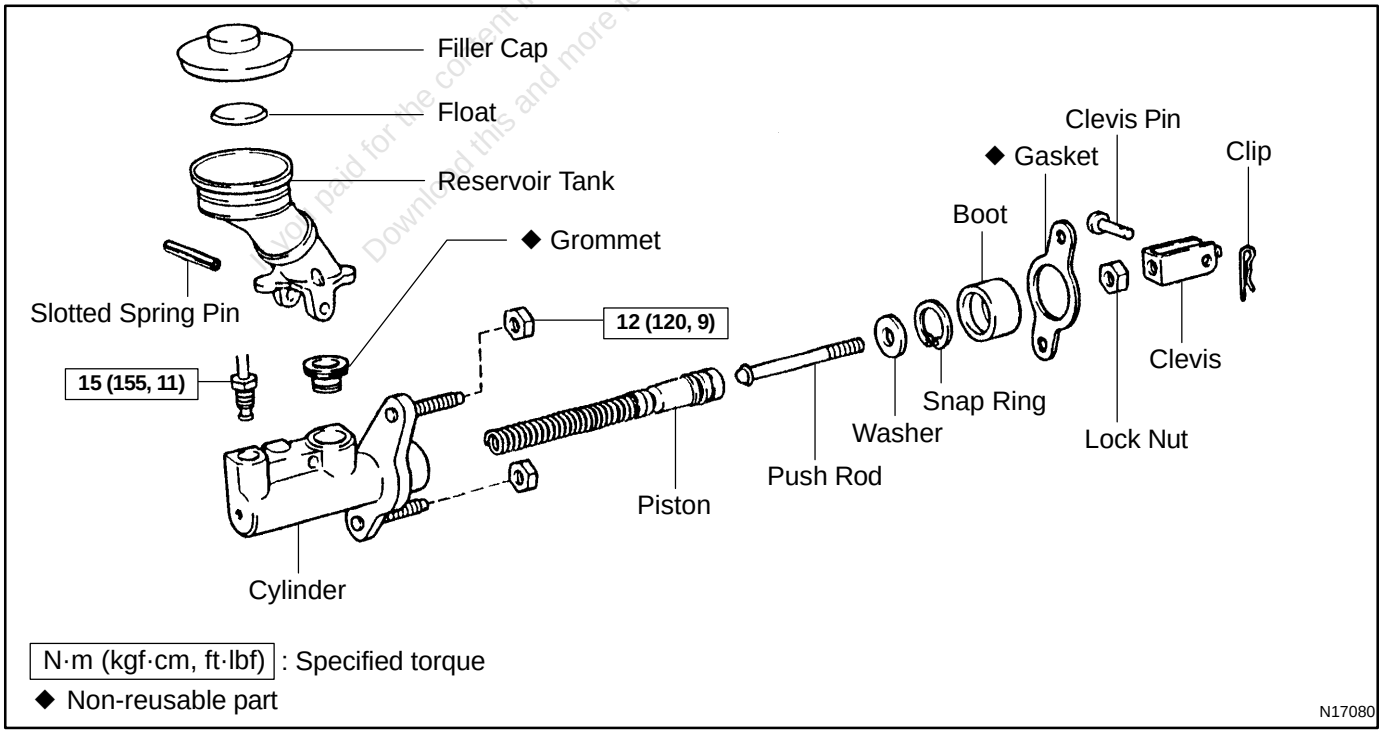
4. PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

5. REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

Example:



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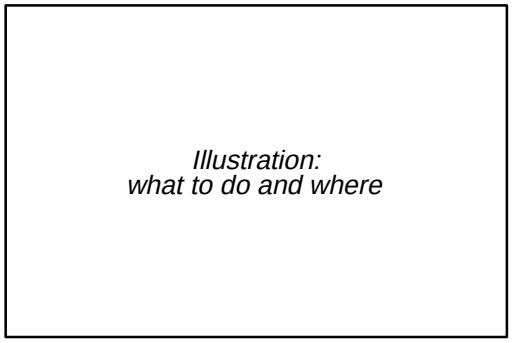
The procedures are presented in a step-by-step format:

- The illustration shows what to do and where to do it.
- The task heading tells what to do.
- The detailed text tells how to perform the task and gives other information such as specifications and warnings.

Example:



Task heading : what to do

21. CHECK PISTON STROKE OF OVERDRIVE BRAKE

(a) Place SST and a dial indicator onto the overdrive brake piston as shown in the illustration.

SST 09350-30020 (09350-06120)

Set part No. *Component part No.*

Detailed text : how to do task

(b) Measure the stroke applying and releasing the compressed air (392 — 785 kPa, 4 — 8 kgf/cm^2 or 57 — 114 psi) as shown in the illustration.

Piston stroke: 1.40 — 1.70 mm (0.0551 — 0.0669 in.)

Specification

This format provides the experienced technician with a FAST TRACK to the information needed. The upper case task heading can be read at a glance when necessary, and the text below it provides detailed information. Important specifications and warnings always stand out in bold type.

6. REFERENCES

References have been kept to a minimum. However, when they are required you are given the page to refer to.

7. SPECIFICATIONS

Specifications are presented in bold type throughout the text where needed. You never have to leave the procedure to look up your specifications. They are also found in Service Specifications section for quick reference.

8. CAUTIONS, NOTICES, HINTS:

- CAUTIONS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- NOTICES are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- HINTS are separated from the text but do not appear in bold. They provide additional information to help you perform the repair efficiently.

9. SI UNIT

The UNITS given in this manual are primarily expressed according to the SI UNIT (International System of Unit), and alternately expressed in the metric system and in the English System.

Example:

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

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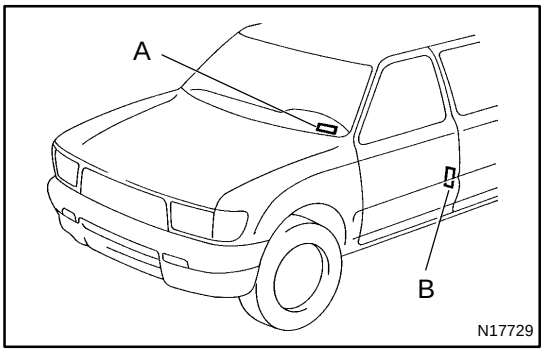
IDENTIFICATION INFORMATION

IN0I7-01

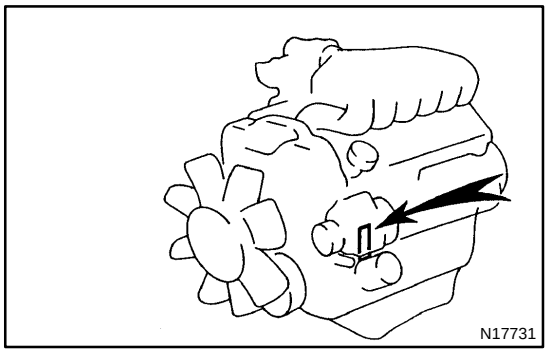
VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER



1. VEHICLE IDENTIFICATION NUMBER

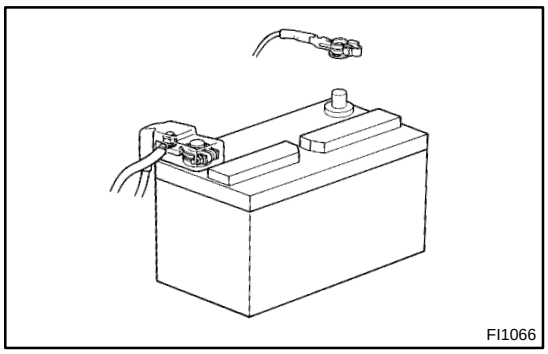
The vehicle identification number is stamped on the vehicle identification number plate and the certification label, as shown in the illustration.

A: Vehicle Identification Number Plate
B: Certification Label



2. ENGINE SERIAL NUMBER

The engine serial number is stamped on the engine block as shown in the illustration.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REPAIR INSTRUCTIONS

IN078-03

GENERAL INFORMATION

BASIC REPAIR HINT

(a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.

(b) During disassembly, keep parts in the appropriate order to facilitate reassembly.

(c) Installation and removal of battery terminal:

(1) Before performing electrical work, disconnect the negative (-) terminal cable from the battery.

(2) If it is necessary to disconnect the battery for inspection or repair, first disconnect the negative (-) terminal cable.

(3) When disconnecting the terminal cable, to prevent damage to battery terminal, loosen the cable nut and raise the cable straight up without twisting or prying it.

(4) Clean the battery terminals and cable ends with a clean shop rag. Do not scrape them with a file or other abrasive objects.

(5) Install the cable ends to the battery terminals after loosening the nut and tighten the nut after installation. Do not use a hammer to tap the cable ends onto the terminals.

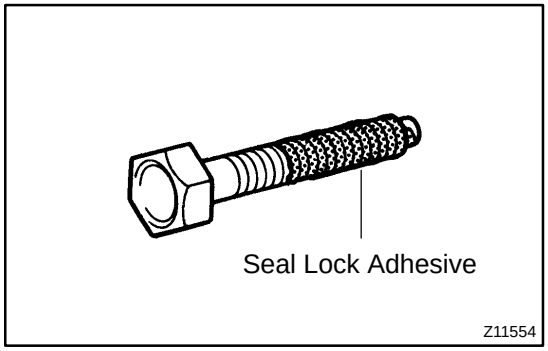
(6) Be sure the cover for the positive (+) terminal is properly in place.

(d) Check hose and wiring connectors to make sure that they are connected securely and correctly.

(e) Non-reusable parts

(1) Always replace cotter pins, gaskets, O-rings, oil seals, etc. with new ones.

(2) Non-reusable parts are indicated in the component illustrations by the "◆" symbol.



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(f) Precoated parts

Precoated parts are bolts, nuts, etc. that are coated with a seal lock adhesive at the factory.

(1) If a precoated part is retightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

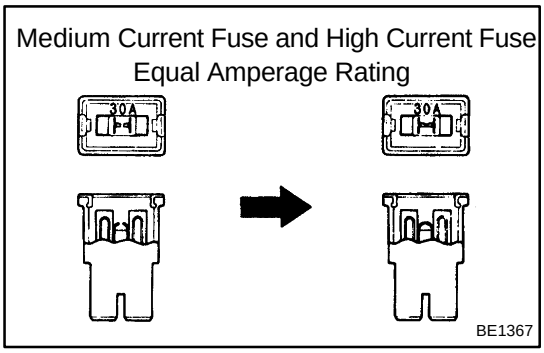
(2) When reusing precoated parts, clean off the old adhesive and dry with compressed air. Then apply the specified seal lock adhesive to the bolt, nut or threads.

(3) Precoated parts are indicated in the component illustrations by the "★" symbol.

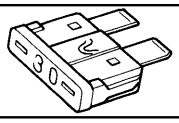
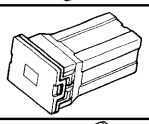
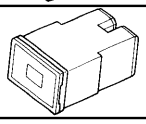
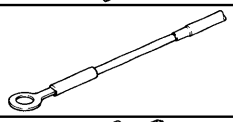
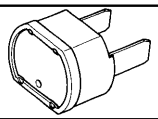
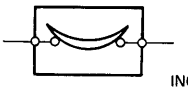
(g) When necessary, use a sealer on gaskets to prevent leaks.

(h) Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

(i) Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found in the Preparation section in this manual.



(j) When replacing fuses, be sure the new fuse has the correct amperage rating. DO NOT exceed the rating or use one with a lower rating.

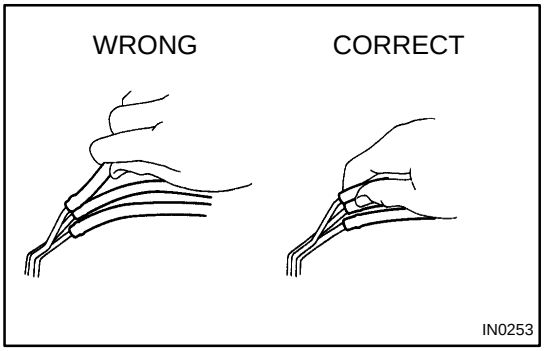
Illustration	Symbol	Part Name	Abbreviation
 BE5594	IN0365	FUSE	FUSE
 BE5595	IN0366	MEDIUM CURRENT FUSE	M-FUSE
 BE5596	IN0367	HIGH CURRENT FUSE	H-FUSE
 BE5597	IN0367	FUSIBLE LINK	FL
 BE5598	 IN0368	CIRCUIT BREAKER	CB

V00076

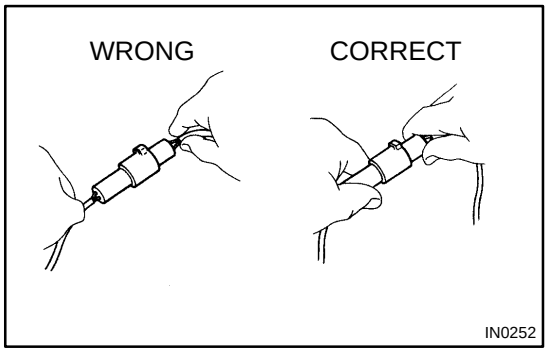
(k) Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN-8).
- Cancel the parking brake on the level place and shift the transmission in Neutral (or N position).
- When jacking up the front wheels of the vehicle, at first place stoppers behind the rear wheels.
- When jacking up the rear wheels of the vehicle, at first place stoppers before the front wheels.
- When either the front or rear wheels only should be jacked up, set rigid racks and place stoppers in front and behind the other wheels on the ground.
- After the vehicle is jacked up, be sure to support it on rigid racks. It is extremely dangerous to do any work on a vehicle raised on a jack alone, even for a small job that can be finished quickly.

(l) Observe the following precautions to avoid damage to the following parts:

(1) Do not open the cover or case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)



(2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.



(3) To pull apart electrical connectors, pull on the connector itself, not the wires.

(4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.

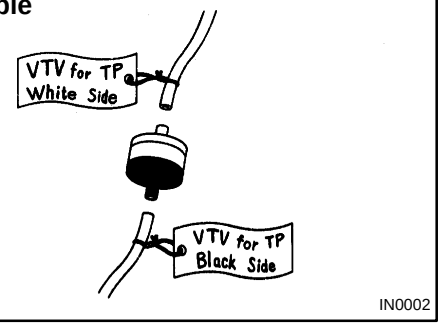
(5) When steam cleaning an engine, protect the electronic components, air filter and emission-related components from water.

(6) Never use an impact wrench to remove or install temperature switches or temperature sensors.

(7) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.

(8) When using a vacuum gauge, never force the hose onto a connector that is too large. Use a step-down adapter for adjustment. Once the hose has been stretched, it may leak air.

Example



(m) Installation and removal of vacuum hose:

(1) When disconnecting vacuum hoses, use tags to identify where they should be reconnected to.

(2) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

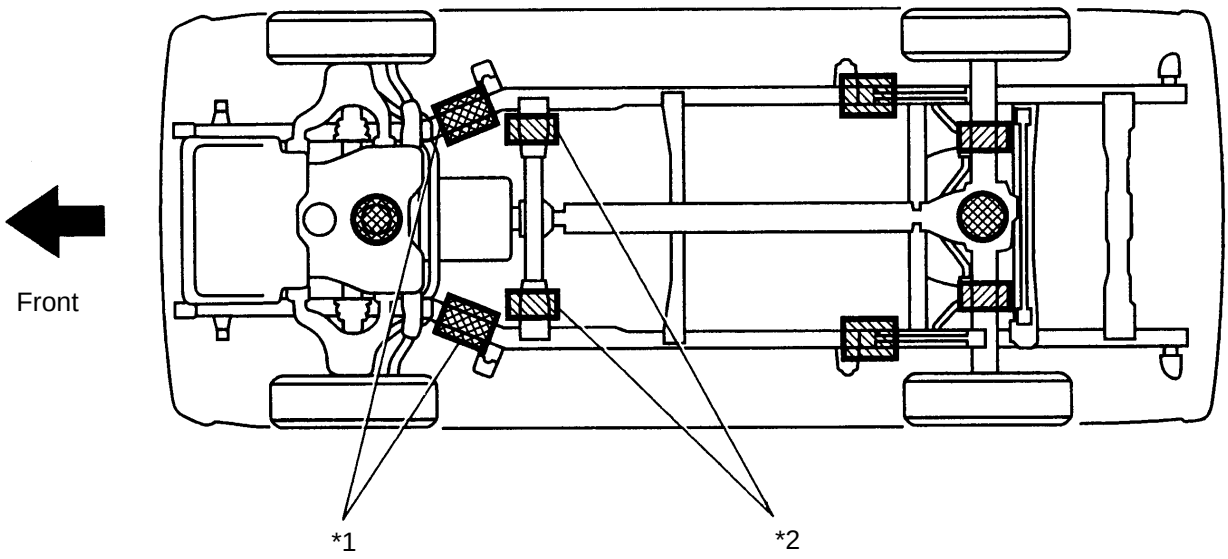
(n) Bleeding of hydraulic brake booster:

When repairing the hydraulic brake booster or ABS, TRAC and VSC system, bleeding the air out of the hydraulic brake booster (See page BR-4).

(o) Unless otherwise stated, all resistance is measured at an ambient temperature of 20˚C (68˚F). Because the resistance may be outside specifications if measured at high temperatures immediately after the vehicle has been running, measurement should be made when the engine has cooled down.

IN004-04

VEHICLE LIFT AND SUPPORT LOCATIONS



JACK POSITION . . . . . ●

Front . . . . . Center of crossmember

Rear . . . . . Center of rear axle housing

CAUTION: When jacking-up the front and rear make sure the car is not carrying any extra eight.

SUPPORT POSITION

Safety stand . . . . . ▨

Swing arm type lift . . . . . ▨

*1: Support position when equipping without side step.

*2: Support position when equipping with side step.

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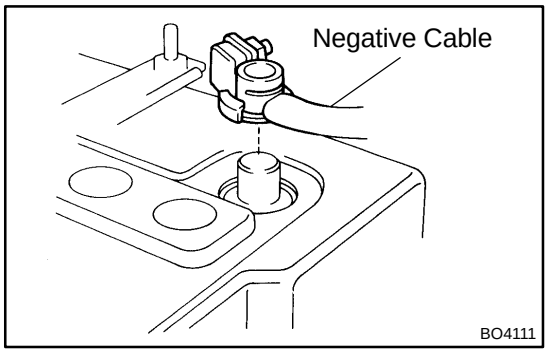
FOR ALL OF VEHICLES

IN0I8-01

PRECAUTION

1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG

(a) The 4RUNNER is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag and seat belt pretensioner.
Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to unexpectedly deploy during servicing, possibly leading to a serious accident.
Further, if a mistake is made in servicing the supplemental restraint system, it is possible the SRS may fail to operate when required. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in this manual.

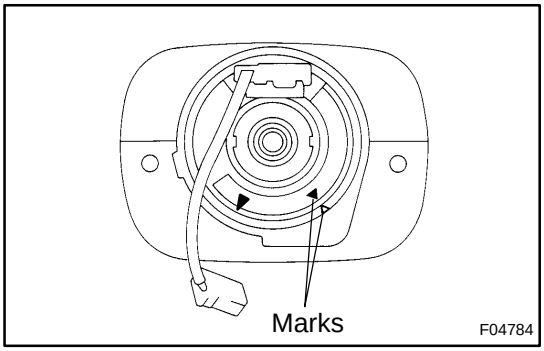


(b) GENERAL NOTICE

(1) Malfunction symptoms of the supplemental restraint system are difficult to confirm, so the diagnostic trouble codes become the most important source of information when troubleshooting. When troubleshooting the supplemental restraint system, always inspect the diagnostic trouble codes before disconnecting the battery (See page DI-377).

(2) Work must be started after 90 seconds from the time the ignition switch is turned to the ”LOCK” position and the negative (-) terminal cable is disconnected from the battery (The supplemental restraint system is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (-) terminal cable from the battery, the SRS may deploy.).
When the negative (-) terminal cable is disconnected from the battery, memory of the clock and audio systems will be cancelled. So before starting work, make a record of the contents memorized by the each memory system. Then when work is finished, reset the clock and audio systems as before.
To avoid erasing the memory of each memory system, never use a back-up power supply from another battery.

(3) Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger's airbag assembly and seat belt pretensioner should be inspected (See page RS-12 , RS-26 and BO-1 19).
(4) Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
(5) Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
(6) Never disassemble and repair the airbag sensor assembly, steering wheel pad, front passenger air bag or seat belt pretensioner.
(7) If the airbag sensor assembly, steering wheel pad, front passenger airbag or seat belt pretensioner has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
(8) Do not directly expose the airbag sensor assembly, steering wheel pad, front passenger airbag or seat belt pretensioner directly to hot air or flames.
(9) Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.
(10) Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
(11) After work on the supplemental restraint system is completed, check the SRS warning light (See page DI-377).



(c) SPIRAL CABLE (in Combination Switch)
The steering wheel must be fitted correctly to the steering column with the spiral cable at the neutral position, otherwise cable disconnection and other troubles may result. Refer to SR-20 concerning correct steering wheel installation.

(d) STEERING WHEEL PAD (with Airbag)

(1) When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.
Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag inflates for some reason. In addition do not store a steering wheel pad on top of another one.

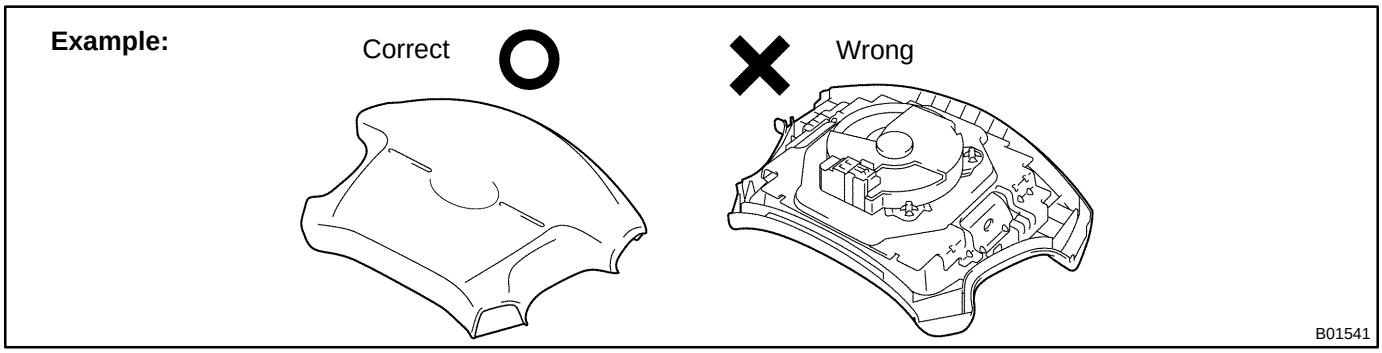
(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

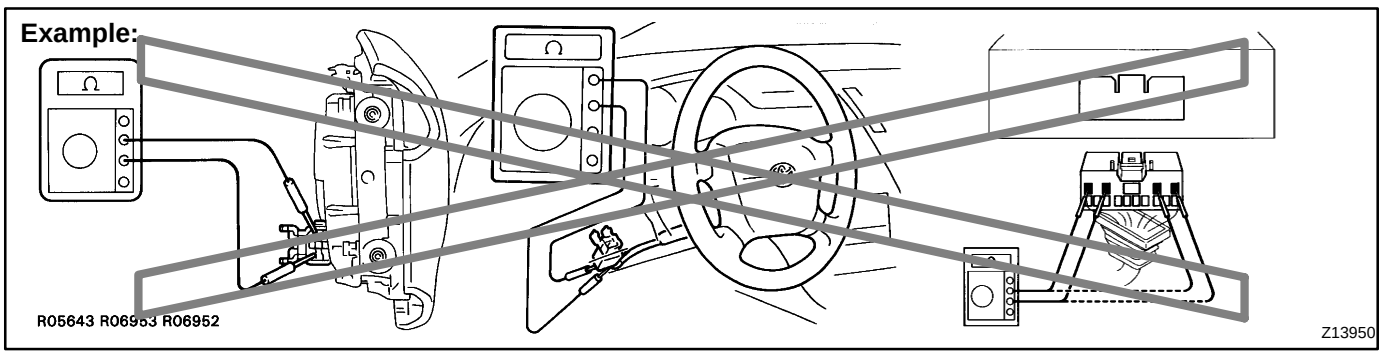
(3) Grease should not be applied to the steering wheel pad and the pad should not be cleaned with detergents of any kind.

(4) Store the steering wheel pad where the ambient temperature remains below 93˚C (200˚F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) under the steering column near the combination switch connector before starting work.

(6) When disposing of a vehicle or the steering wheel pad alone, the airbag should be deployed using an SST before disposal (See page RS-14).
Carry out the operation in a safe place away from electrical noise.





(e) FRONT PASSENGER AIRBAG ASSEMBLY

(1) Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.
Storing the airbag assembly with the airbag deployment direction facing down could cause a serious accident if the airbag deploys.

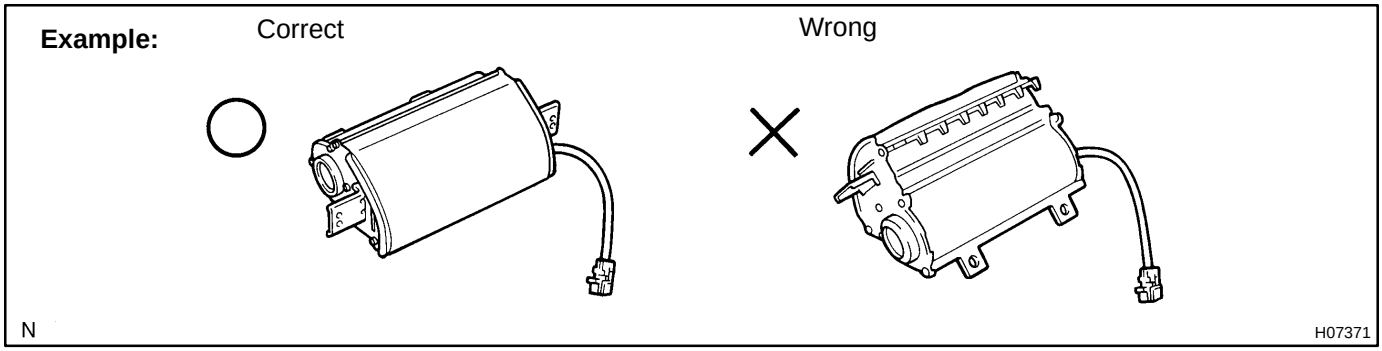
(2) Never measure the resistance of the airbag squib. (This may cause the airbag to deploy, which is very dangerous.)

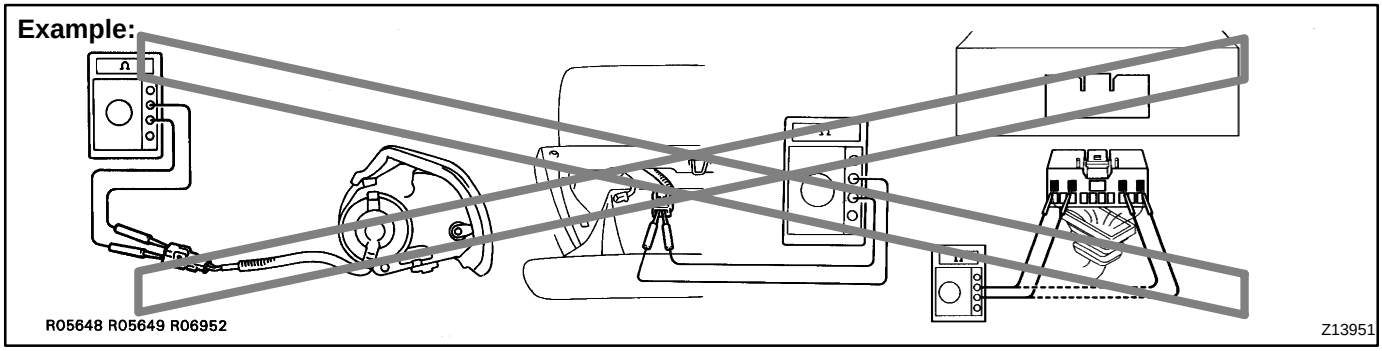
(3) Grease should not be applied to the front passenger airbag assembly and the airbag door should not be cleaned with detergents of any kind.

(4) Store the airbag assembly where the ambient temperature remains below 93˚C (200˚F), without high humidity and away from electrical noise.

(5) When using electric welding, first disconnect the airbag connector (yellow color and 2 pins) installed on assembly before starting work.

(6) When disposing of a vehicle or the airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS-14).
Perform the operation in a safe place away from electrical noise.





(f) SEAT BELT PRETENSIONER

(1) Never measure the resistance of the seat belt pretensioner. (This may cause the seat belt pretensioner to activate which is very dangerous.)

(2) Never disassemble the seat belt pretensioner.

(3) Never install the seat belt pretensioner in another vehicle.

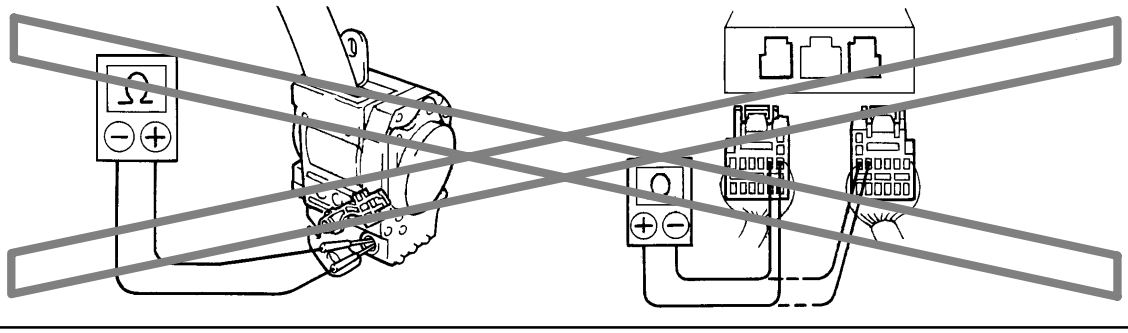
(4) Store the seat belt pretensioner where the ambient temperature remains below 80°C (176°F) and away from electrical noise without high humidity.

(5) When using electric welding, first disconnect the connector (yellow color and 2 pins) before starting work.

(6) When disposing of a vehicle or the seat belt pretensioner alone, the seat belt pretensioner should be activated before disposal (See page BO-123). Perform the operation in a safe place away from electrical noise.

(7) The seat belt pretensioner is hot after activation, so let it cool down sufficiently before the disposal. However never apply water to the seat belt pretensioner.

Example:



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(g) AIRBAG SENSOR ASSEMBLY

(1) Never reuse the airbag sensor assembly involved in a collision when the SRS has deployed.

(2) The connectors to the airbag sensor assembly should be connected or disconnected with the sensor mounted on the floor. If the connectors are connected or disconnected while the airbag sensor assembly is not mounted to the floor, it could cause undesired ignition of the supplemental restraint system.

(3) Work must be started after 90 seconds from the time the ignition switch is turned to the ”LOCK” position and the negative (-) terminal cable is disconnected from the battery, even if only loosening the set bolts of the airbag sensor assembly.

(h) WIRE HARNESS AND CONNECTOR

The SRS wire harness is integrated with the instrument panel wire harness assembly. All the connectors in the system are a standard yellow color. If the SRS wire harness becomes disconnected or the connector becomes broken due to an accident, etc., repair or replace it as shown on page RS-47 .

2. FOR VEHICLES EQUIPPED WITH A CATALYTIC CONVERTER

CAUTION:

If large amount of unburned gasoline flows into the converter, it may overheat and create a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

(a) Use only unleaded gasoline.

(b) Avoid prolonged idling.
Avoid running the engine at idle speed for more than 20 minutes.

(c) Avoid spark jump test.
(1) Perform spark jump test only when absolutely necessary. Perform this test as rapidly as possible.
(2) While testing, never race the engine.

(d) Avoid prolonged engine compression measurement.
Engine compression tests must be done as rapidly as possible.

(e) Do not run engine when fuel tank is nearly empty.
This may cause the engine to misfire and create an extra load on the converter.

(f) Avoid coasting with ignition turned off.

(g) Do not dispose of used catalyst along with parts contaminated with gasoline or oil.

3. IF VEHICLE IS EQUIPPED WITH MOBILE COMMUNICATION SYSTEM

For vehicles with mobile communication systems such as two-way radios and cellular telephones, observe the following precautions.

(1) Install the antenna as far as possible away from the ECU and sensors of the vehicle's electronic system.
(2) Install the antenna feeder at least 20 cm (7.87 in.) away from the ECU and sensors of the vehicle's electronic systems. For details about ECU and sensors locations, refer to the section on the applicable component.
(3) Avoid winding the antenna feeder together with other wiring as much as possible, and also avoid running the antenna feeder parallel with other wire harness.
(4) Check that the antenna and feeder are correctly adjusted.
(5) Do not install powerful mobile communications system.

4. FOR USING OBD II SCAN TOOL OR TOYOTA HAND-HELD TESTER

CAUTION:

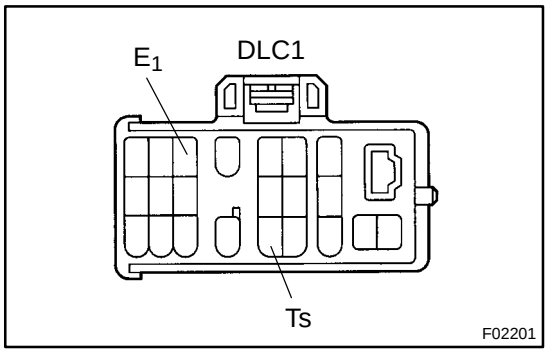
Observe the following for safety reasons:

- **Before using the OBD II scan tool or TOYOTA hand-held tester, the OBD II scan tool's instruction book or TOYOTA hand-held tester's operator manual should be read thoroughly.**
- **Be sure to route all cables securely when driving with the OBD II scan tool or TOYOTA hand-held tester connected to the vehicle. (i.e. Keep cables away from feet, pedals, steering wheel and shift lever.)**
- **Two persons are required when test driving with the OBD II scan tool or TOYOTA hand-held tester, one person to drive the vehicle and one person to operate the OBD II scan tool or TOYOTA hand-held tester.**

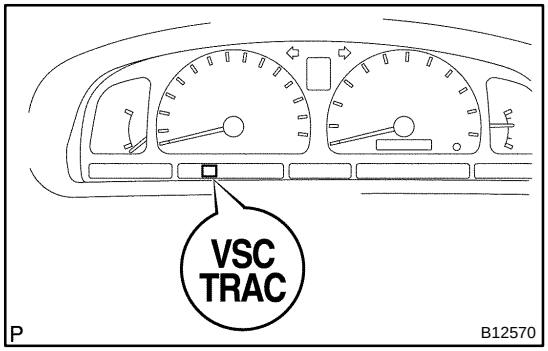
5. FOR VEHICLES EQUIPPED WITH VEHICLE SKID CONTROL (VSC) SYSTEM

NOTICE:

- **Even if TRAC is initially OFF, it automatically becomes ON when the vehicle speed becomes about 30 km/h (19 mph) or more. Therefore, please drive in the test mode to avoid dangerous situations caused by the TRAC control.**
- **VSC/ABS may be failed when the vehicle is driven on the two-wheel chassis dynamo. Therefore, after driving on the chassis dynamo, please clear DTC before normal driving. Please refer to the page DI-224 for the method of clearing DTC.**
- **Fasten the vehicle with the lock chain.**



(a) Confirm VSC system is OFF.
  (1) Turn the ignition switch OFF.
  (2) Using SST, connect terminals Ts and E1 of DLC1.
  SST 09843-18020
  (3) Start the engine.



  (4) Check that the VSC TRAC warning light blinks.
  (5) After the measurement, remove the SST and restart the engine. At this time make sure that the VSC TRAC warning light is off.

(b) Notice for VSC operation.
  (1) Remove and reinstall of VSC-related components may misadjust them. Do not remove or reinstll them without necessary.
  (2) When conducting VSC-related operations, do not fail to make sure that the preparation and the finishing of the operation are all performed in accordance with the direction in this text.

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

IN05Y-35

GENERAL INFORMATION

A large number of ECU controlled systems are used in the 4RUNNER. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. However, the fact is that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems:
The troubleshooting procedure and how to make use of it are described on the following pages.

System	Page
1. Engine	DI-1
2. Automatic Transmission	DI-157
3. ABS with EBD & BA & TRAC & VSC System	DI-221
4. Supplemental Restraint System	DI-375
5. Cruise Control System (DENSO Made)	DI-469
6. Engine Immobiliser System	DI-489
7. Body Control System	DI-511
8. Back Door Control System	DI-551
9. Air Conditioning System	DI-576

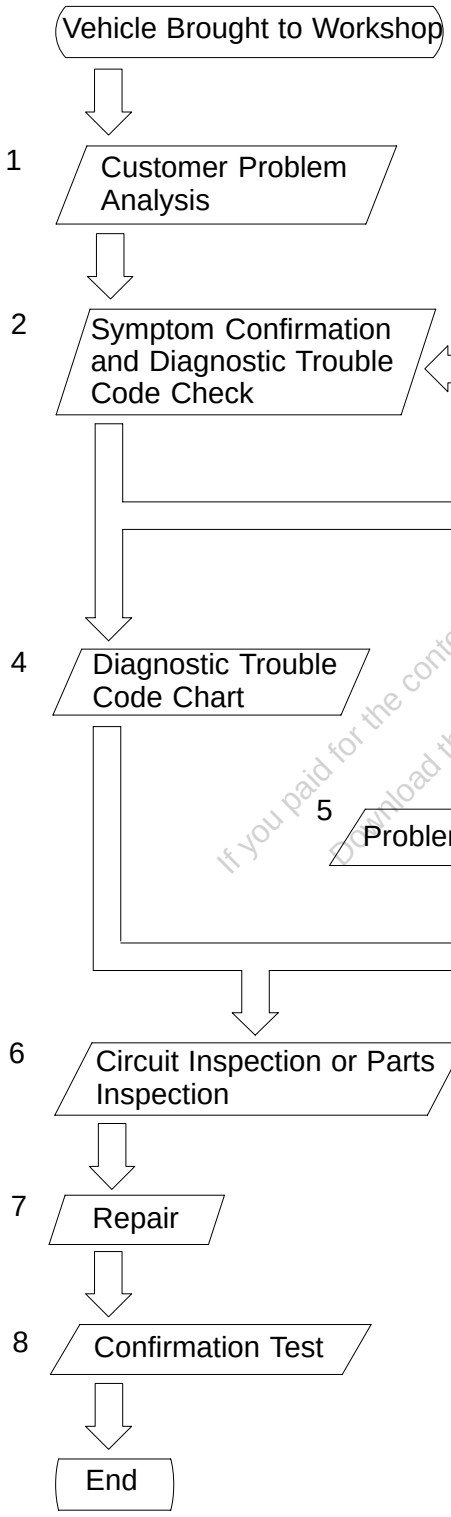
FOR USING OBD II SCAN TOOL OR HAND-HELD TESTER

- Before using the scan tool or tester, the scan tool's instruction book or tester's operator manual should be read thoroughly.
- If the scan tool or tester cannot communicate with ECU controlled systems when you have connected the cable of the scan tool or tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.
  (1) If communication is normal when the tool is connected to another vehicle, inspect the diagnosis data link line (Bus⊕line) or ECU power circuit of the vehicle.
  (2) If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so perform the Self Test procedures outline in the Tester Operator's Manual.

IN05W-33

HOW TO PROCEED WITH TROUBLESHOOTING

Carry out troubleshooting in accordance with the procedure on the following page. Here, only the basic procedure is shown. Details are provided in Diagnostics section, showing the most effective methods for each circuit. Confirm the troubleshooting procedures first for the relevant circuit before beginning troubleshooting of that circuit.



1

Ask the customer about the conditions and the environment when the problem occurred.

2, 3

Confirm the symptoms and the problem conditions, and check the diagnostic trouble codes.
(When the problem symptoms do not appear during confirmation, use the symptom simulation method described later on.)

4, 5, 6

Check the results obtained in Step 2, then confirm the inspection procedure for the system or the part which should be checked using the diagnostic trouble code chart or the problem symptoms table.

7

Check and repair the affected system or part in accordance with the instructions in Step 6.

8

After completing repairs, confirm that the problem has been eliminated.
(If the problem is not reproduced, perform the confirmation test under the same conditions and in the same environment as when it occurred for the first time.)

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1. CUSTOMER PROBLEM ANALYSIS

In troubleshooting, the problem symptoms must be confirmed accurately and all preconceptions must be cleared away in order to give an accurate judgment. To ascertain just what the problem symptoms are, it is extremely important to ask the customer about the problem and the conditions at the time it occurred.

Important Point in the Problem Analysis:

The following 5 items are important points in the problem analysis. Past problems which are thought to be unrelated and the repair history, etc. may also help in some cases, so as much information as possible should be gathered and its relationship with the problem symptoms should be correctly ascertained for reference in troubleshooting. A customer problem analysis table is provided in Diagnostics section for each system for your use.

Important Points in the Customer Problem Analysis

- What ----- Vehicle model, system name
- When ----- Date, time, occurrence frequency
- Where ----- Road conditions
- Under what conditions? ----- Running conditions, driving conditions, weather conditions
- How did it happen? ----- Problem symptoms

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(Sample) Engine control system check sheet.

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name _____

Customer's Name		**Model and Model Year**	
Driver's Name		**Frame No.**	
Data Vehicle Brought in		**Engine Model**	
License No.		**Odometer Reading**	km miles

Problem Symptoms	☐ **Engine does not Start**	☐ **Engine does not crank** ☐ **No initial combustion** ☐ **No complete combustion**
	☐ **Difficult to Start**	☐ **Engine cranks slowly** ☐ **Other** _____
	☐ **Poor Idling**	☐ **Incorrect first idle** ☐ **Idling rpm is abnormal** ☐ **High (rpm)** ☐ **Low (rpm)** ☐ **Rough idling** ☐ **Other** _____
	☐ **Poor Drive ability**	☐ **Hesitation** ☐ **Back fire** ☐ **Muffler explosion (after-fire)** ☐ **Surging** ☐ **Knocking** ☐ **Other** _____
	☐ **Engine Stall**	☐ **Soon after starting** ☐ **After accelerator pedal depressed** ☐ **After accelerator pedal released** ☐ **During A/C operation** ☐ **Shifting from N to D** ☐ **Other** _____
	☐ **Others**	

☐ **Constant** ☐ **Sometimes (times per day/month)**

2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the 4RUNNER fulfills various functions. The first function is the Diagnostic Trouble Code Check in which a malfunction in the signal circuits to the ECU is stored in code in the ECU memory at the time of occurrence, to be output by the technician during troubleshooting. Another function is the Input Signal Check which checks if the signals from various switches are sent to the ECU correctly.
By using these check functions, the problem areas can be narrowed down quickly and troubleshooting can be performed effectively. Diagnostic functions are incorporated in the following systems in the 4RUNNER.

System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
Engine	○ (with Check Mode)	○	○
Automatic Transmission	○ (with Check Mode)	○	
ABS with EBD & BA & TRAC & VSC System	○	○	○
Supplemental Restraint System	○		
Cruise Control System (DENSO Made)	○	○	
Engine Immobiliser System	○		
Air Conditioning System	○		

In diagnostic trouble code check, it is very important to determine whether the problem indicated by the diagnostic trouble code is still occurring or occurred in the past but returned to normal at present. In addition, it must be checked in the problem symptom check whether the malfunction indicated by the diagnostic trouble code is directly related to the problem symptom or not. For this reason, the diagnostic trouble codes should be checked before and after the symptom confirmation to determine the current conditions, as shown in the table below. If this is not done, it may, depending on the case, result in unnecessary troubleshooting for normally operating systems, thus making it more difficult to locate the problem, or in repairs not pertinent to the problem. Therefore, always follow the procedure in correct order and perform the diagnostic trouble code check.

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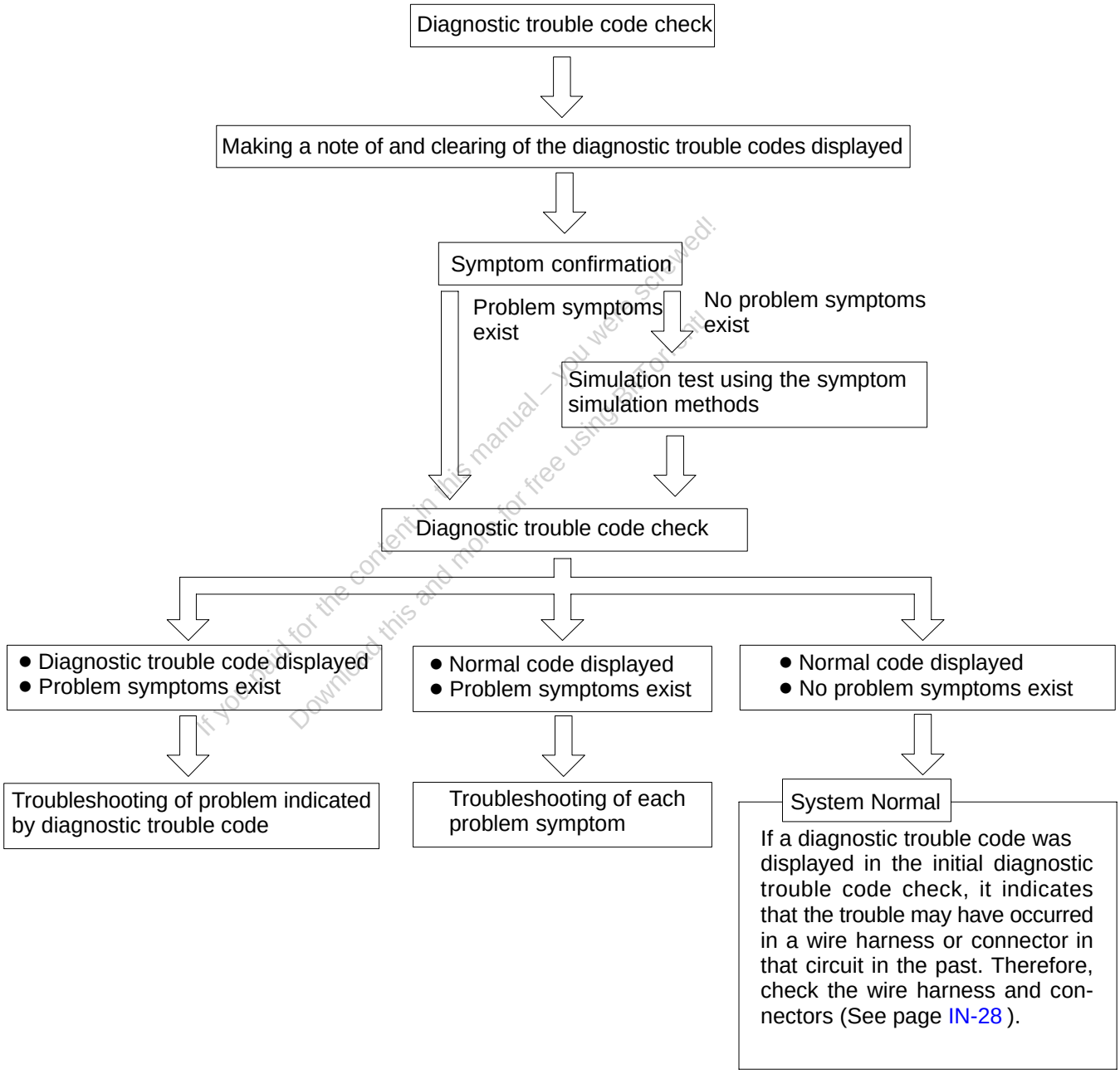
DIAGNOSTIC TROUBLE CODE CHECK PROCEDURE

Diagnostic Trouble Code Check (Make a note of and then clear)	**Confirmation of Symptoms**	**Diagnostic Trouble Code Check**	**Problem Condition**
Diagnostic Trouble Code Display	Problem symptoms exist	Same diagnostic trouble code is displayed	Problem is still occurring in the diagnostic circuit
⇨	⇨	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit (The diagnostic trouble code displayed first is either for a past problem or it is a secondary problem)
⇨	No problem symptoms exist	⇨	The problem occurred in the diagnostic circuit in the past
Normal Code Display ⇨	Problem symptoms exist	Normal code is displayed	The problem is still occurring in a place other than in the diagnostic circuit
⇨	No problem symptoms exist	Normal code is displayed	The problem occurred in a place other than in the diagnostic circuit in the past

Taking into account the points on the previous page, a flow chart showing how to proceed with troubleshooting using the diagnostic trouble code check is shown below. This flow chart shows how to utilize the diagnostic trouble code check effectively, then by carefully checking the results, indicates how to proceed either to diagnostic trouble code troubleshooting or to troubleshooting of problem symptoms table.



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3. SYMPTOM SIMULATION

The most difficult case in troubleshooting is when there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out, then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much experience a technician has, or how skilled he may be, if he proceeds to troubleshoot without confirming the problem symptoms he will tend to overlook something important in the repair operation and make a wrong guess somewhere, which will only lead to a standstill. For example, for a problem which only occurs when the engine is cold, or for a problem which occurs due to vibration caused by the road during driving, etc., the problem can never be determined so long as the symptoms are confirmed with the engine hot condition or the vehicle at a standstill. Since vibration, heat or water penetration (moisture) is likely cause for problem which is difficult to reproduce, the symptom simulation tests introduced here are effective measures in that the external causes are applied to the vehicle in a stopped condition.

Important Points in the Symptom Simulation Test:

In the symptom simulation test, the problem symptoms should of course be confirmed, but the problem area or parts must also be found out. To do this, narrow down the possible problem circuits according to the symptoms before starting this test and connect a tester beforehand. After that, carry out the symptom simulation test, judging whether the circuit being tested is defective or normal and also confirming the problem symptoms at the same time. Refer to the problem symptoms table for each system to narrow down the possible causes of the symptom.

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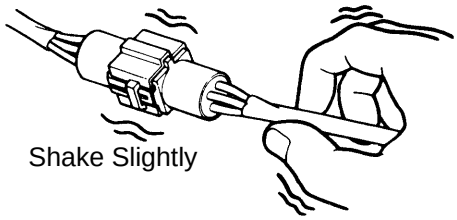
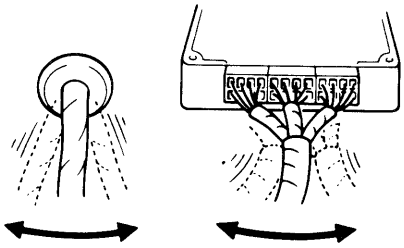
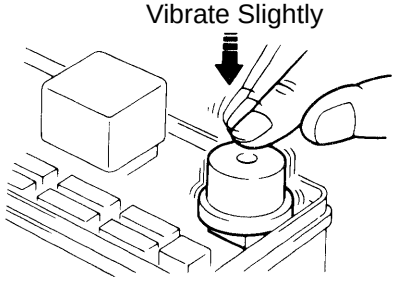
1	VIBRATION METHOD: When vibration seems to be the major cause.
CONNECTORS Slightly shake the connector vertically and horizontally. **WIRE HARNESS** Slightly shake the wire harness vertically and horizontally. The connector joint, fulcrum of the vibration, and body through portion are the major areas to be checked thoroughly.	  FI2331 FI2332
PARTS AND SENSOR Apply slight vibration with a finger to the part of the sensor considered to be the problem cause and check that the malfunction occurs. HINT: Applying strong vibration to relays may result in open relays.	 FI2330

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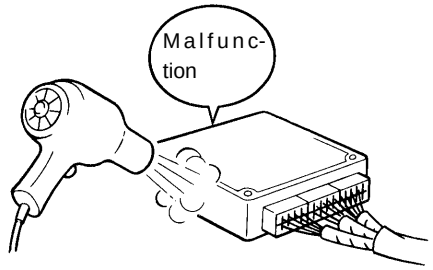
2	HEAT METHOD: When the problem seems to occur when the suspect area is heated.

Heat the component that is the likely cause of the malfunction with a hair dryer or similar object. Check to see if the malfunction occurs.

NOTICE:

(1) Do not heat to more than 60 ˚C (140 ˚F). (Temperature is limited not to damage the components.)

(2) Do not apply heat directly to parts in the ECU.



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3	WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.

Sprinkle water onto the vehicle and check to see if the malfunction occurs.

NOTICE:

(1) Never sprinkle water directly into the engine compartment, but indirectly change the temperature and humidity by applying water spray onto the radiator front surface.

(2) Never apply water directly onto the electronic components.

HINT:

If a vehicle is subject to water leakage, the leaked water may contaminate the ECU. When testing a vehicle with a water leakage problem, special caution must be taken.

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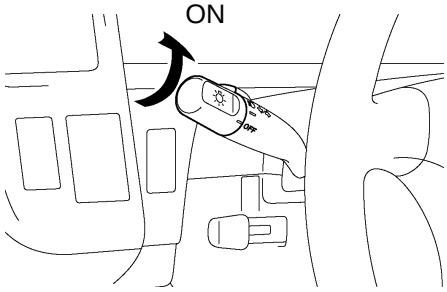
4	OTHER: When a malfunction seems to occur when electrical load is excessive.

Turn on all electrical loads including the heater blower, head lights, rear window defogger, etc. and check to see if the malfunction occurs.



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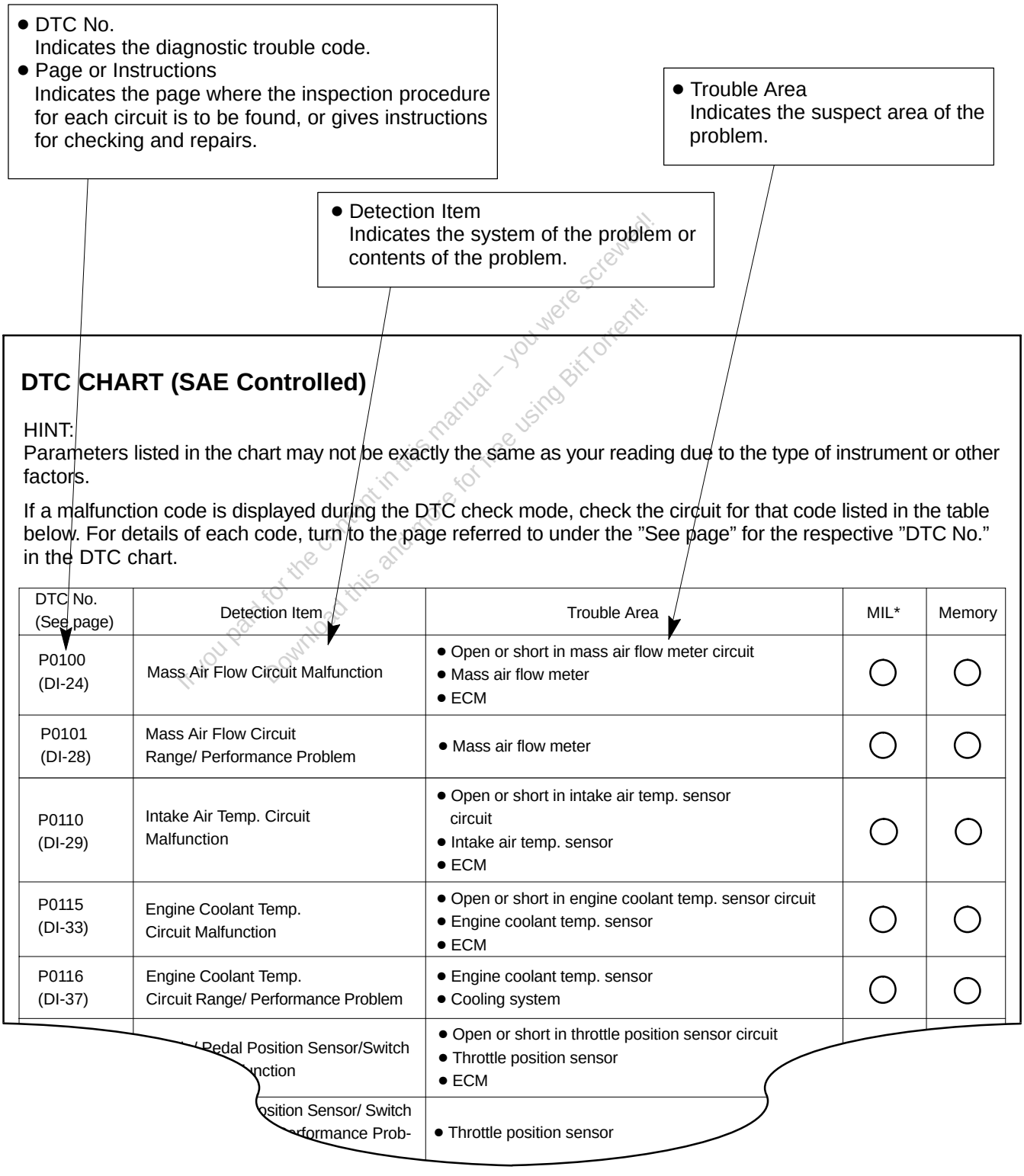
4. DIAGNOSTIC TROUBLE CODE CHART

The inspection procedure is shown in the table below. This table permits efficient and accurate troubleshooting using the diagnostic trouble codes displayed in the diagnostic trouble code check. Proceed with troubleshooting in accordance with the inspection procedure given in the diagnostic chart corresponding to the diagnostic trouble codes displayed. The engine diagnostic trouble code chart is shown below as an example.



DTC CHART (SAE Controlled)

HINT:
Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check mode, check the circuit for that code listed in the table below. For details of each code, turn to the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P0100 (DI-24)	Mass Air Flow Circuit Malfunction	● Open or short in mass air flow meter circuit ● Mass air flow meter ● ECM	○	○
P0101 (DI-28)	Mass Air Flow Circuit Range/ Performance Problem	● Mass air flow meter	○	○
P0110 (DI-29)	Intake Air Temp. Circuit Malfunction	● Open or short in intake air temp. sensor circuit ● Intake air temp. sensor ● ECM	○	○
P0115 (DI-33)	Engine Coolant Temp. Circuit Malfunction	● Open or short in engine coolant temp. sensor circuit ● Engine coolant temp. sensor ● ECM	○	○
P0116 (DI-37)	Engine Coolant Temp. Circuit Range/ Performance Problem	● Engine coolant temp. sensor ● Cooling system	○	○
	/Pedal Position Sensor/Switch nction	● Open or short in throttle position sensor circuit ● Throttle position sensor ● ECM		
	osition Sensor/ Switch rformance Prob-	● Throttle position sensor		

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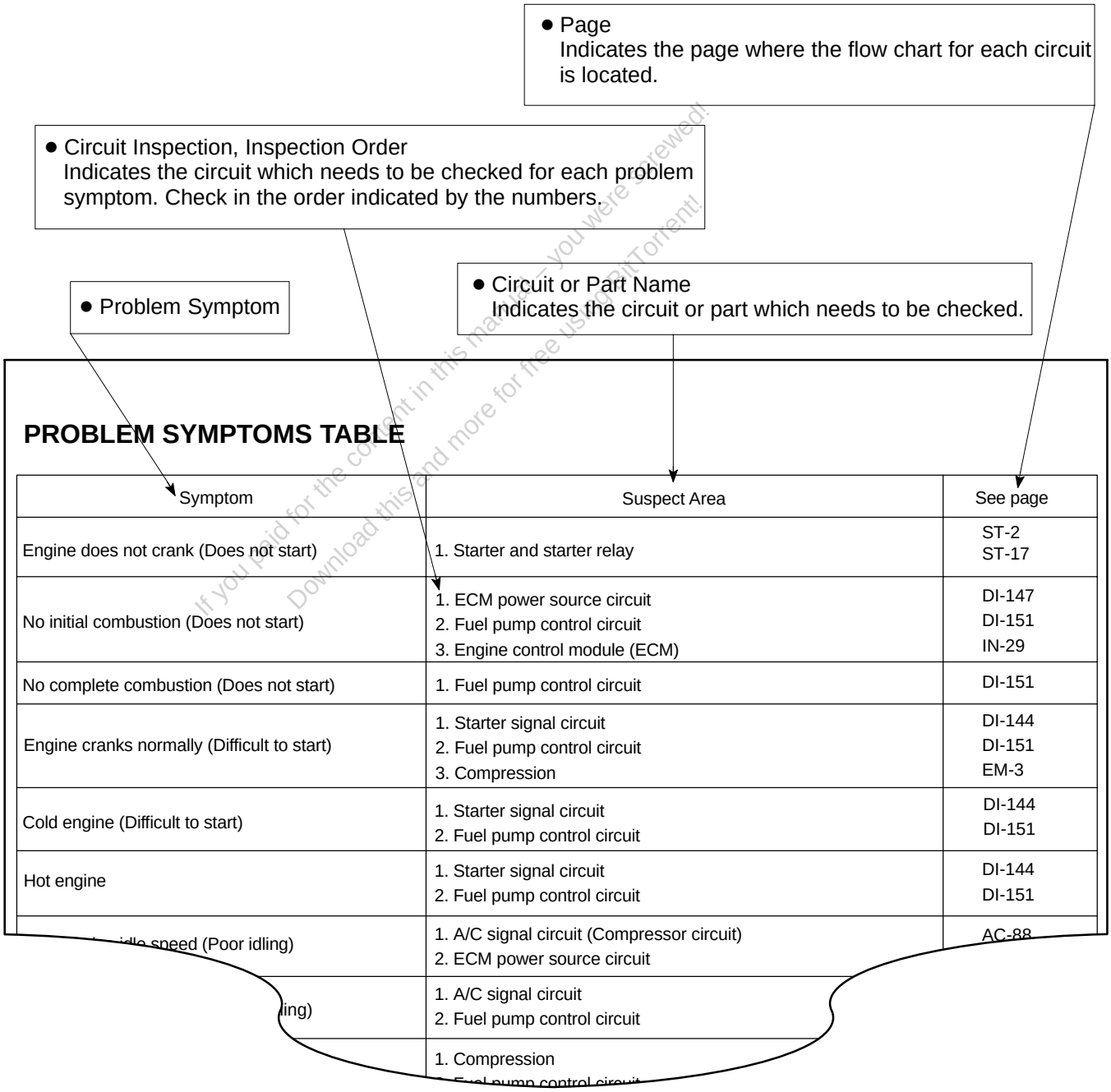
5. PROBLEM SYMPTOMS TABLE

The suspected circuits or parts for each problem symptom are shown in the table below. Use this table to troubleshoot the problem when a ”Normal” code is displayed in the diagnostic trouble code check but the problem is still occurring. Numbers in the table indicate the inspection order in which the circuits or parts should be checked.

HINT:

When the problem is not detected by the diagnostic system even though the problem symptom is present, it is considered that the problem is occurring outside the detection range of the diagnostic system, or that the problem is occurring in a system other than the diagnostic system.



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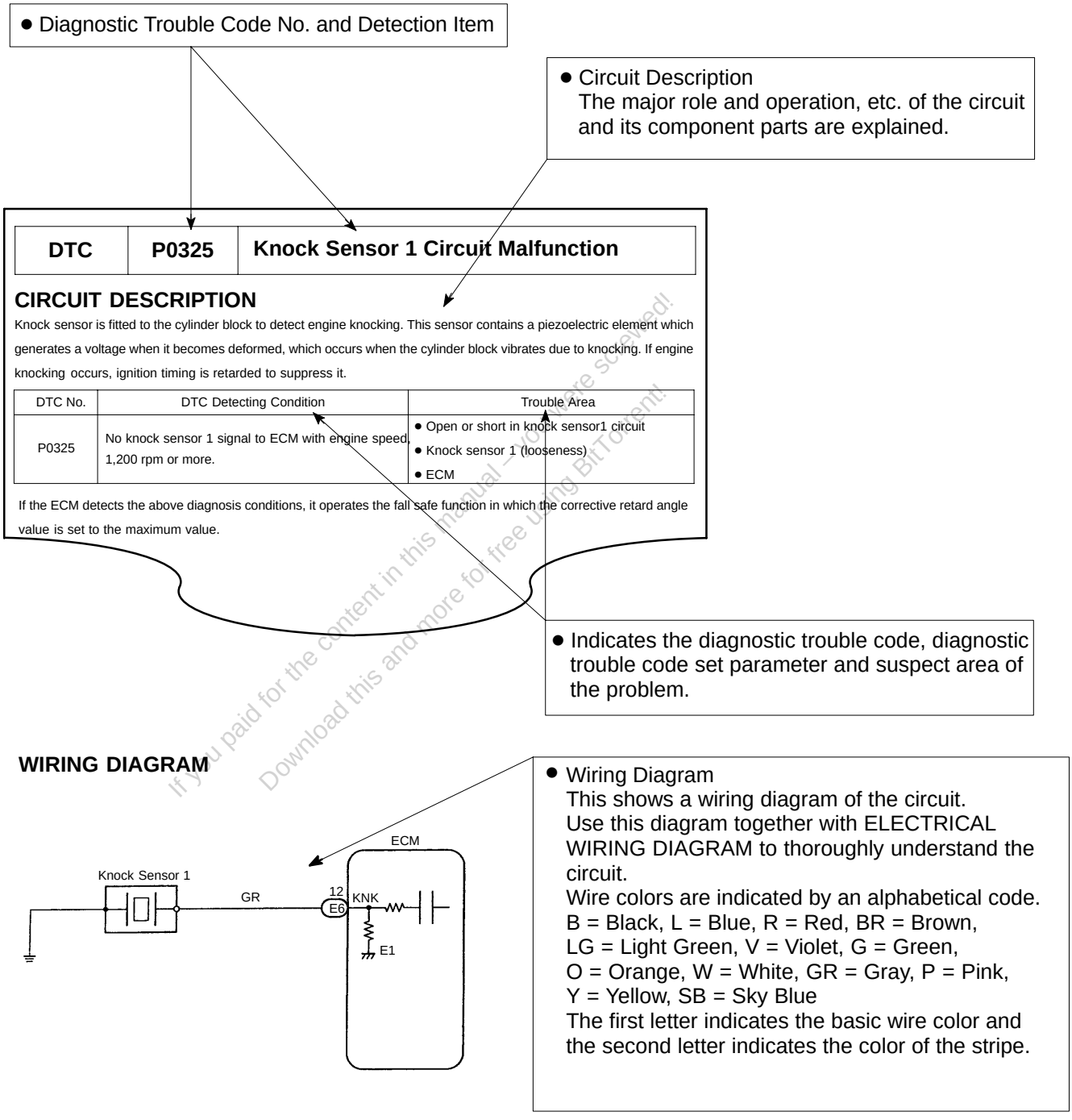
PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	1. Starter and starter relay	ST-2 ST-17
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. Engine control module (ECM)	DI-147 DI-151 IN-29
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-151
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-144 DI-151 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-144 DI-151
Hot engine	1. Starter signal circuit 2. Fuel pump control circuit	DI-144 DI-151
...idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	AC-88
...ling)	1. A/C signal circuit 2. Fuel pump control circuit	
	1. Compression 2. Fuel pump control circuit	

6. CIRCUIT INSPECTION

How to read and use each page is shown below.



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● Indicates the position of the ignition switch during the check.

LOCK
Ignition Switch LOCK (OFF)

ON
Ignition Switch ON

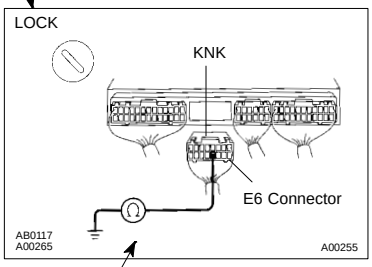
START
Ignition Switch START

ACC
Ignition Switch ACC

● Inspection Procedure
Use the inspection procedure to determine if the circuit is normal or abnormal, and, if it is abnormal, use it to determine whether the problem is located in the sensors, actuators, wire harness or ECU.

INSPECTION PROCEDURE

1	**Check continuity between terminal KNK of ECM connector and body ground.**



PREPARATION:
(a) Remove the glove compartment (See page SF-68).
(b) Disconnect the E6 connector of ECM.

CHECK:
Measure resistance between terminal KNK of ECM connector and body ground.

OK:
Resistance: 1 MΩ or higher

OK	**Go to step 3.**

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2	**Check knock sensor (See page SF-61).**

OK	**Replace knock sensor.**

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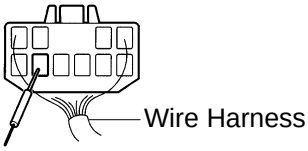
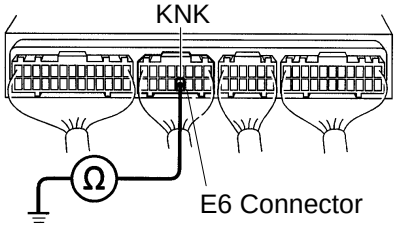
● Indicates the place to check the voltage or resistance.
● Indicates the connector position to be checked, from the front or back side.



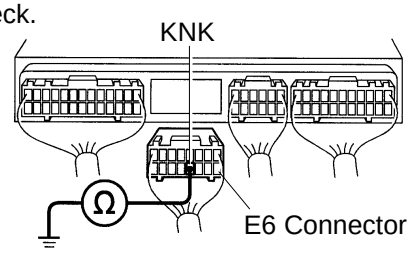
Check from the connector back side. (with harness)

Check from the connector front side. (without harness)
In this case, care must be taken not to bend the terminals.

● Indicates the condition of the connector of ECU during the check.



Connector being checked is connected.



Connector being checked is disconnected.

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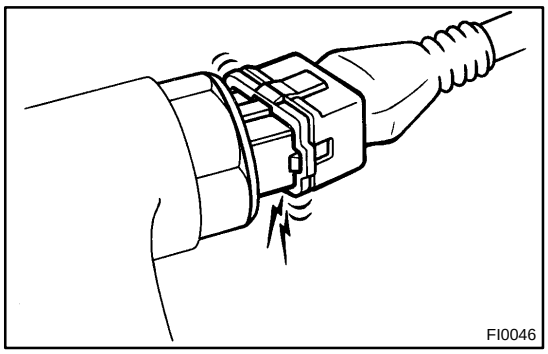
HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE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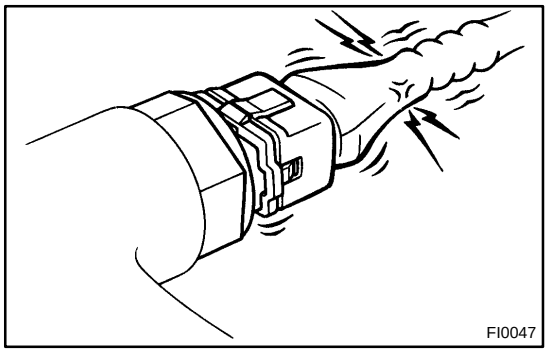
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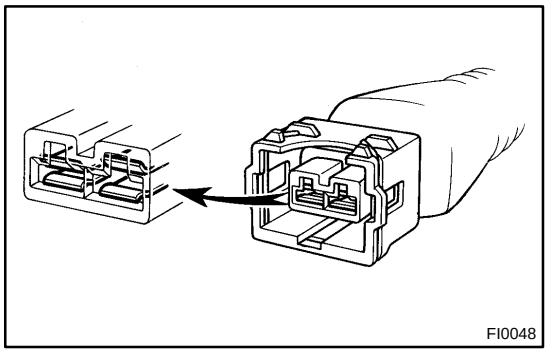
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1. CONNECTOR CONNECTION AND TERMINAL INSPECTION

- For troubleshooting, diagnostic trouble code charts or problem symptom table are provided for each circuit with detailed inspection procedures on the following pages.
- When all the component parts, wire harnesses and connectors of each circuit except the ECU are found to be normal in troubleshooting, then it is determined that the problem is in the ECU. Accordingly, if diagnosis is performed without the problem symptoms occurring, refer to Step 8 to replace the ECU. So always confirm that the problem symptoms are occurring, or proceed with inspection while using the symptom simulation method.
- The instructions ”Check wire harness and connector” and ”Check and replace ECU” which appear in the inspection procedure, are common and applicable to all diagnostic trouble codes. Follow the procedure outlined below whenever these instructions appear.

OPEN CIRCUIT:

This could be due to a disconnected wire harness, faulty contact in the connector, and a connector terminal pulled out, etc.

HINT:

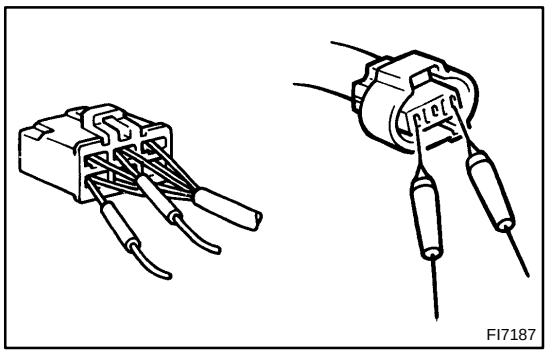
- It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators.
- Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of connector terminals. Simply disconnecting and reconnecting the connectors once changes the condition of the connection and may result in a return to normal operation. Therefore, in troubleshooting, if no abnormality is found in the wire harness and connector check, but the problem disappears after the check, then the cause is considered to be in the wire harness or connectors.

SHORT CIRCUIT:

This could be due to a contact between wire harness and the body ground or to a short circuit occurred inside the switch, etc.

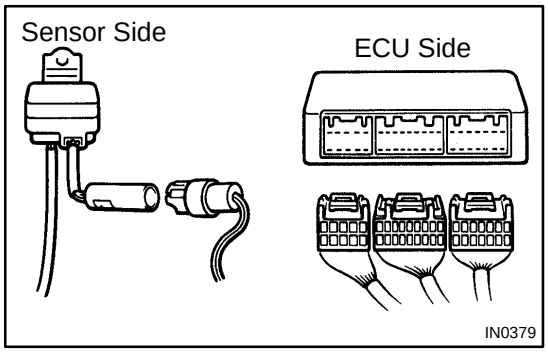
HINT:

When there is a short circuit between the wire harness and body ground, check thoroughly whether the wire harness is caught in the body or is clamped properly.



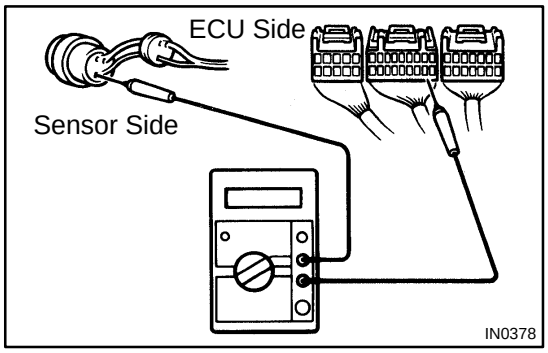
2. CONNECTOR HANDLING

When inserting tester probes into a connector, insert them from the rear of the connector. When necessary, use mini test leads. For water resistant connectors which cannot be accessed from behind, take good care not to deform the connector terminals.



3. CONTINUITY CHECK (OPEN CIRCUIT CHECK)

(a) Disconnect the connectors at both ECU and sensor sides.

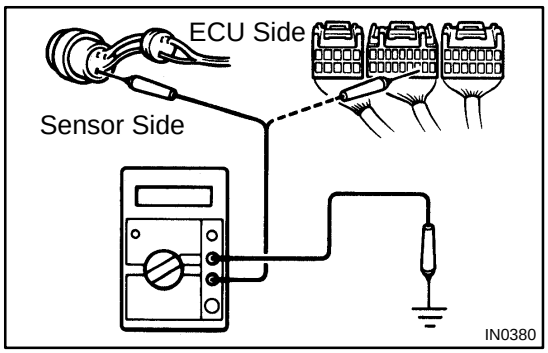


(b) Measure the resistance between the applicable terminals of the connectors.

Resistance: 1 Ω or less

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



4. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

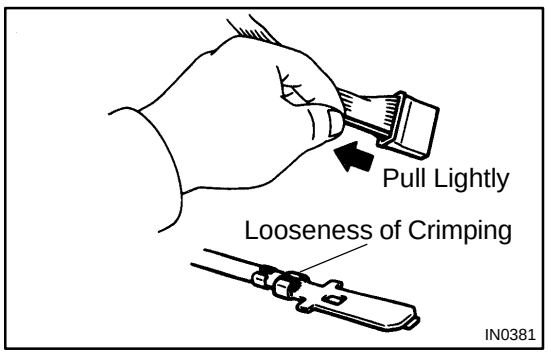
(a) Disconnect the connectors on both ends.

(b) Measure the resistance between the applicable terminals of the connectors and body ground. Be sure to carry out this check on the connectors on both ends.

Resistance: 1 MΩ or higher

HINT:

Measure the resistance while lightly shaking the wire harness vertically and horizontally.



5. VISUAL CHECK AND CONTACT PRESSURE CHECK

(a) Disconnect the connectors at both ends.

(b) Check for rust or foreign material, etc. in the terminals of the connectors.

(c) Check crimped portions for looseness or damage and check that the terminals are secured in lock portion.

HINT:

The terminals should not come out when pulled lightly from the back.

(d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

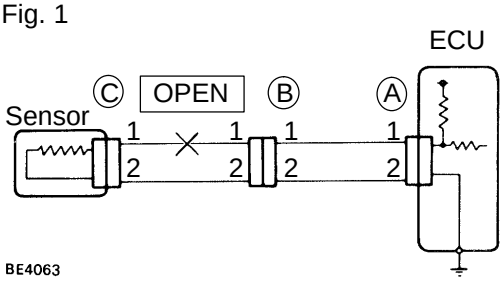
NOTICE:

When testing a gold-plated female terminal, always use a gold-plated male terminal.

HINT:

When the test terminal is pulled out more easily than others, there may be poor contact in that section.

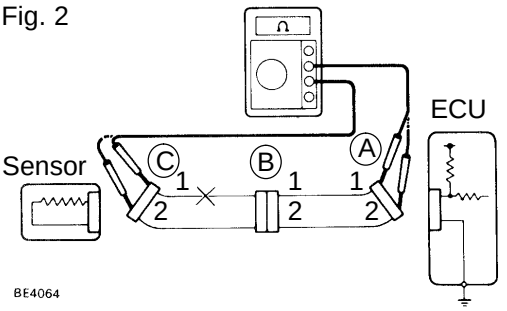
Fig. 1



6. CHECK OPEN CIRCUIT

For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.

Fig. 2



(a) Check the continuity.

(1) Disconnect connectors "A" and "C" and measure the resistance between them.

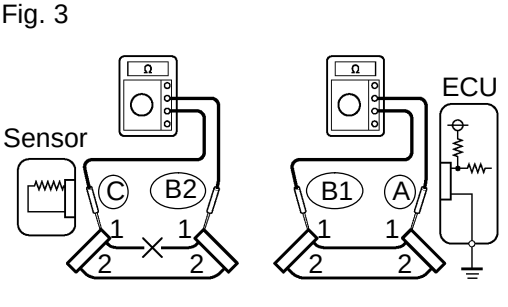
In the case of Fig. 2:

Between terminal 1 of connector "A" and terminal 1 of connector "C" → No continuity (open)

Between terminal 2 of connector "A" and terminal 2 of connector "C" → Continuity

Therefore, it is found out that there is an open circuit between terminal 1 of connector "A" and terminal 1 of connector "C".

Fig. 3



(2) Disconnect connector "B" and measure the resistance between the connectors.

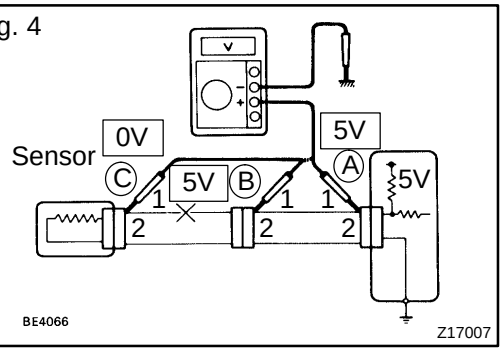
In the case of Fig. 3:

Between terminal 1 of connector "A" and terminal 1 of connector "B1" → Continuity

Between terminal 1 of connector "B2" and terminal 1 of connector "C" → No continuity (open)

Therefore, it is found out that there is an open circuit between terminal 1 of connector "B2" and terminal 1 of connector "C".

Fig. 4



(b) Check the voltage.

In a circuit in which voltage is applied (to the ECU connector terminal), an open circuit can be checked for by conducting a voltage check.

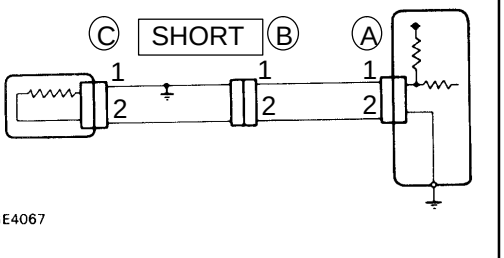
As shown in Fig. 4, with each connector still connected, measure the voltage between body ground and terminal 1 of connector "A" at the ECU 5V output terminal, terminal 1 of connector "B", and terminal 1 of connector "C", in that order.

If the results are:

5V: Between Terminal 1 of connector "A" and Body Ground
5V: Between Terminal 1 of connector "B" and Body Ground
0V: Between Terminal 1 of connector "C" and Body Ground

Then it is found out that there is an open circuit in the wire harness between terminal 1 of "B" and terminal 1 of "C".

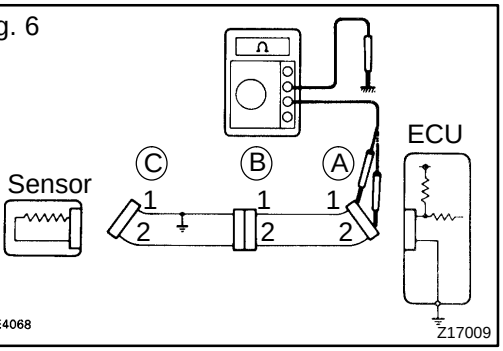
Fig. 5



7. CHECK SHORT CIRCUIT

If the wire harness is ground shorted as in Fig. 5, locate the section by conducting a "continuity check with ground".

Fig. 6



Check the continuity with ground.

(1) Disconnect connectors "A" and "C" and measure the resistance between terminal 1 and 2 of connector "A" and body ground.

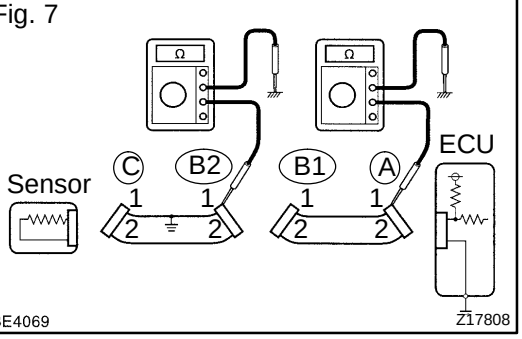
In the case of Fig. 6:

Between terminal 1 of connector "A" and body ground → Continuity (short)

Between terminal 2 of connector "A" and body ground → No continuity

Therefore, it is found out that there is a short circuit between terminal 1 of connector "A" and terminal 1 of connector "C".

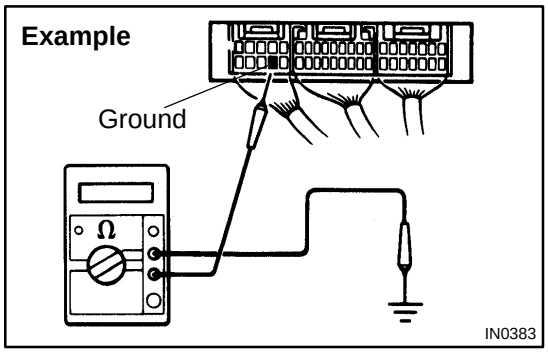
Fig. 7



(2) Disconnect connector ”B” and measure the resistance between terminal 1 of connector ”A” and body ground, and terminal 1 of connector ”B2” and body ground.
In the case of Fig. 7:
Between terminal 1 of connector ”A” and body ground → No continuity
Between terminal 1 of connector ”B2” and body ground → Continuity (short)
Therefore, it is found out that there is a short circuit between terminal 1 of connector ”B2” and terminal 1 of connector ”C”.

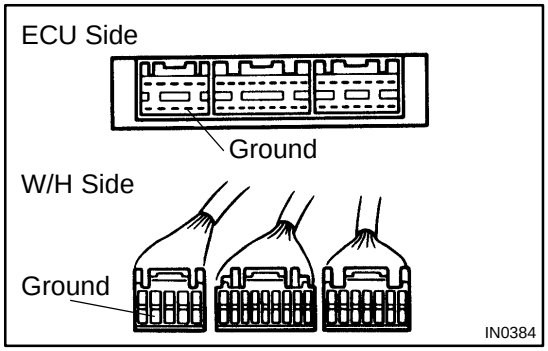
8. CHECK AND REPLACE ECU

First check the ECU ground circuit. If it is faulty, repair it. If it is normal, the ECU could be faulty, so replace the ECU with a normal functioning one and check that the symptoms appear.



(1) Measure the resistance between the ECU ground terminal and the body ground.

Resistance: 1 Ω or less



(2) Disconnect the ECU connector, check the ground terminals on the ECU side and the wire harness side for bend and check the contact pressure.

TERMS

IN04Q-07

ABBREVIATIONS USED IN THIS MANUAL

Abbreviations	Meaning
ABS	Anti-Lock Brake System
AC	Alternating Current
ACC	Accessory
ACIS	Acoustic Control Induction System
ACSD	Automatic Cold Start Device
A.D.D.	Automatic Disconnecting Differential
A/F	Air-Fuel Ratio
AHC	Active Height Control Suspension
ALR	Automatic Locking Retractor
ALT	Alternator
AMP	Amplifier
ANT	Antenna
APPROX.	Approximately
A/T	Automatic Transmission (Transaxle)
ATF	Automatic Transmission Fluid
AUTO	Automatic
AUX	Auxiliary
AVG	Average
AVS	Adaptive Variable Suspension
BA	Brake Assist
BACS	Boost Altitude Compensation System
BAT	Battery
BDC	Bottom Dead Center
B/L	Bi-Level
B/S	Bore-Stroke Ratio
BTDC	Before Top Dead Center
BVSV	Bimetallic Vacuum Switching Valve
Calif.	California
CB	Circuit Breaker
CCo	Catalytic Converter For Oxidation
CD	Compact Disc
CF	Cornering Force
CG	Center Of Gravity
CH	Channel
COMB.	Combination
CPE	Coupe
CPS	Combustion Pressure Sensor
CPU	Central Processing Unit
CRS	Child Restraint System
CTR	Center
C/V	Check Valve
CV	Control Valve

CW	Curb Weight
DC	Direct Current
DEF	Defogger
DFL	Deflector
DIFF.	Differential
DIFF. LOCK	Differential Lock
D/INJ	Direct Injection
DLI	Distributorless Ignition
DOHC	Double Over Head Cam
DP	Dash Pot
DS	Dead Soak
DSP	Digital Signal Processor
EBD	Electronic Brake Force Distribution
ECAM	Engine Control And Measurement System
ECD	Electronic Controlled Diesel
ECDY	Eddy Current Dynamometer
ECU	Electronic Control Unit
ED	Electro-Deposited Coating
EDIC	Electric Diesel Injection Control
EDU	Electronic Driving Unit
EFI	Electronic Fuel Injection
E/G	Engine
EGR-VM	Exhaust Gas Recirculation-Vacuum Modulator
ELR	Emergency Locking Retractor
ENG	Engine
ESA	Electronic Spark Advance
ETCS	Electronic Throttle Control System
EVP	Evaporator
E-VR V	Electric Vacuum Regulating Valve
EXH	Exhaust
FE	Fuel Economy
FF	Front-Engine Front-Wheel-Drive
F/G	Fuel Gage
FIPG	Formed In Place Gasket
FL	Fusible Link
F/P	Fuel Pump
FPU	Fuel Pressure Up
Fr	Front
FR	Front-Engine Rear-Wheel-Drive
F/W	Flywheel
FW/D	Flywheel Damper
FWD	Front-Wheel-Drive
GAS	Gasoline
GSA	Gear Shift Actuator
GND	Ground
HAC	High Altitude Compensator

H/B	Hatchback
H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Head Lamp)
HPU	Hydraulic Power Unit
HSG	Housing
HT	Hard Top
HWS	Heated Windshield System
IAC	Idle Air Control
IC	Integrated circuit
IDI	Indirect Diesel Injection
IFS	Independent Front Suspension
IG	Ignition
IIA	Integrated Ignition Assembly
IN	Intake (Manifold, Valve)
INT	Intermittent
I/P	Instrument Panel
IRS	Independent Rear Suspension
J/B	Junction Block
J/C	Junction Connector
KD	Kick-Down
LAN	Local Area Network
LB	Liftback
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LH	Left-Hand
LHD	Left-Hand Drive
L/H/W	Length, Height, Width
LLC	Long-Life Coolant
LNG	Liquified Natural Gas
LO	Low
LPG	Liquified Petroleum Gas
LSD	Limited Slip Differential
LSP & PV	Load Sensing Proportioning And Bypass Valve
LSPV	Load Sensing Proportioning Valve
MAX.	Maximum
M-FUSE	Medium Current Fuse
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MP	Multipurpose
MPX	Multiplex Communication System
M/T	Manual Transmission (Transaxle)
MT	Mount
MTG	Mounting
N	Neutral

NA	Natural Aspiration
No.	Number
O/D	Overdrive
OEM	Original Equipment Manufacturing
OHC	Overhead Camshaft
OHV	Overhead Valve
OPT	Option
O/S	Oversize
P & BV	Proportioning And Bypass Valve
PCS	Power Control System
PCV	Positive Crankcase Ventilation
PKB	Parking Brake
PPS	Progressive Power Steering
PS	Power Steering
PTO	Power Take-Off
R & P	Rack And Pinion
R/B	Relay Block
RBS	Recirculating Ball Type Steering
R/F	Reinforcement
RFS	Rigid Front Suspension
RH	Right-Hand
RHD	Right-Hand Drive
RLY	Relay
ROM	Read Only Memory
Rr	Rear
RR	Rear-Engine Rear-Wheel Drive
RRS	Rigid Rear Suspension
RWD	Rear-Wheel Drive
SDN	Sedan
SEN	Sensor
SICS	Starting Injection Control System
SMT	Sequential Manual Transmission
SOC	State Of Charge
SOHC	Single Overhead Camshaft
SPEC	Specification
SPI	Single Point Injection
SRS	Supplemental Restraint System
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
STJ	Cold-Start Fuel Injection
SW	Switch
SYS	System
T/A	Transaxle
TACH	Tachometer
TBI	Throttle Body Electronic Fuel Injection

TC	Turbocharger
TCCS	TOYOTA Computer-Controlled System
TCV	Timing Control Valve
TDC	Top Dead Center
TEMP.	Temperature
TEMS	TOYOTA Electronic Modulated Suspension
TIS	Total Information System For Vehicle Development
T/M	Transmission
TMC	TOYOTA Motor Corporation
TMMK	TOYOTA Motor Manufacturing Kentucky, Inc.
TRAC	Traction Control System
TURBO	Turbocharge
U/D	Underdrive
U/S	Undersize
VCV	Vacuum Control Valve
VENT	Ventilator
VIN	Vehicle Identification Number
VPS	Variable Power Steering
VSC	Vehicle Skid Control
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
w/	With
WGN	Wagon
W/H	Wire Harness
w/o	Without
1st	First
2nd	Second
2WD	Two Wheel Drive Vehicle (4x2)
4WD	Four Wheel Drive Vehicle (4x4)

IN07O-02

GLOSSARY OF SAE AND TOYOTA TERMS

This glossary lists all SAE-J1930 terms and abbreviations used in this manual in compliance with SAE recommendations, as well as their TOYOTA equivalents.

SAE ABBREVIATIONS	SAE TERMS	TOYOTA TERMS ( )--ABBREVIATIONS
A/C	Air Conditioning	Air Conditioner
ACL	Air Cleaner	Air Cleaner, A/CL
AIR	Secondary Air Injection	Air Injection (AI)
AP	Accelerator Pedal	-
B+	Battery Positive Voltage	+B, Battery Voltage
BARO	Barometric Pressure	HAC
CAC	Charge Air Cooler	Intercooler
CARB	Carburetor	Carburetor
CFI	Continuous Fuel Injection	-
CKP	Crankshaft Position	Crank Angle
CL	Closed Loop	Closed Loop
CMP	Camshaft Position	Cam Angle
CPP	Clutch Pedal Position	-
CTOX	Continuous Trap Oxidizer	-
CTP	Closed Throttle Position	LL ON, Idle ON
DFI	Direct Fuel Injection (Diesel)	Direct Injection (DI)
DI	Distributor Ignition	-
DLC1 DLC2 DLC3	Data Link Connector 1 Data Link Connector 2 Data Link Connector 3	1: Check Connector 2: Total Diagnosis Comunication Link (TDCL) 3: OBD II Diagnostic Connector
DTC	Diagnostic Trouble Code	Diagnostic Code
DTM	Diagnostic Test Mode	-
ECL	Engine Control Level	-
ECM	Engine Control Module	Engine ECU (Electronic Control Unit)
ECT	Engine Coolant Temperature	Coolant Temperature, Water Temperature (THW)
EEPROM	Electrically Erasable Programmable Read Only Memory	Electrically Erasable Programmable Read Only Memory (EEPROM), Erasable Programmable Read Only Memory (EPROM)
EFE	Early Fuel Evaporation	Cold Mixture Heater (CMH), Heat Control Valve (HCV)
EGR	Exhaust Gas Recirculation	Exhaust Gas Recirculation (EGR)
EI	Electronic Ignition	TOYOTA Distributorless Ignition (TDI)
EM	Engine Modification	Engine Modification (EM)
EPROM	Erasable Programmable Read Only Memory	Programmable Read Only Memory (PROM)
EVAP	Evaporative Emission	Evaporative Emission Control (EVAP)
FC	Fan Control	-
FEEPROM	Flash Electrically Erasable Programmable Read Only Memory	-
FEPROM	Flash Erasable Programmable Read Only Memory	-
FF	Flexible Fuel	-
FP	Fuel Pump	Fuel Pump
GEN	Generator	Alternator
GND	Ground	Ground (GND)

HO2S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO_2S)
IAC	Idle Air Control	Idle Speed Control (ISC)
IAT	Intake Air Temperature	Intake or Inlet Air Temperature
ICM	Ignition Control Module	-
IFI	Indirect Fuel Injection	Indirect Injection (IDL)
IFS	Inertia Fuel-Shutoff	-
ISC	Idle Speed Control	-
KS	Knock Sensor	Knock Sensor
MAF	Mass Air Flow	Air Flow Meter
MAP	Manifold Absolute Pressure	Manifold Pressure Intake Vacuum
MC	Mixture Control	Electric Bleed Air Control Valve (EBCV) Mixture Control Valve (MCV) Electric Air Control Valve (EACV)
MDP	Manifold Differential Pressure	-
MFI	Multiport Fuel Injection	Electronic Fuel Injection (EFI)
MIL	Malfunction Indicator Lamp	Check Engine Lamp
MST	Manifold Surface Temperature	-
MVZ	Manifold Vacuum Zone	-
NVRAM	Non-Volatile Random Access Memory	-
O2S	Oxygen Sensor	Oxygen Sensor, O_2 Sensor (O_2S)
OBD	On-Board Diagnostic	On-Board Diagnostic System (OBD)
OC	Oxidation Catalytic Converter	Oxidation Catalyst Convert (OC), CCo
OP	Open Loop	Open Loop
PAIR	Pulsed Secondary Air Injection	Air Suction (AS)
PCM	Powertrain Control Module	-
PNP	Park/Neutral Position	-
PROM	Programmable Read Only Memory	-
PSP	Power Steering Pressure	-
PTOX	Periodic Trap Oxidizer	Diesel Particulate Filter (DPF) Diesel Particulate Trap (DPT)
RAM	Random Access Memory	Random Access Memory (RAM)
RM	Relay Module	-
ROM	Read Only Memory	Read Only Memory (ROM)
RPM	Engine Speed	Engine Speed
SC	Supercharger	Supercharger
SCB	Supercharger Bypass	E-ABV
SFI	Sequential Multiport Fuel Injection	Electronic Fuel Injection (EFI), Sequential Injection
SPL	Smoke Puff Limiter	-
SRI	Service Reminder Indicator	-
SRT	System Readiness Test	-
ST	Scan Tool	-
TB	Throttle Body	Throttle Body
TBI	Throttle Body Fuel Injection	Single Point Injection Central Fuel Injection (Ci)
TC	Turbocharger	Turbocharger
TCC	Torque Converter Clutch	Torque Converter

TCM	Transmission Control Module	Transmission ECU, ECT ECU
TP	Throttle Position	Throttle Position
TR	Transmission Range	-
TVV	Thermal Vacuum Valve	Bimetallic Vacuum Switching Valve (BVSV) Thermostatic Vacuum Switching Valve (TVSV)
TWC	Three-Way Catalytic Converter	Three-Way Catalytic (TWC) Manifold Converter CC_{RO}
TWC+OC	Three-Way + Oxidation Catalytic Converter	CC_R + CCo
VAF	Volume Air Flow	Air Flow Meter
VR	Voltage Regulator	Voltage Regulator
VSS	Vehicle Speed Sensor	Vehicle Speed Sensor
WOT	Wide Open Throttle	Full Throttle
WU-OC	Warm Up Oxidation Catalytic Converter	-
WU-TWC	Warm Up Three-Way Catalytic Converter	-
3GR	Third Gear	-
4GR	Fourth Gear	-

OUTSIDE VEHICLE

MA001-21

GENERAL MAINTENANCE

These are maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.
These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do.
Items and procedures for general maintenance are as follows.

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

2. TIRES

(a) Check the pressure with a gauge. If necessary, adjust.
(b) Check for cuts, damage or excessive wear.

3. WHEEL NUTS

When checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

4. TIRE ROTATION

It is recommended that the tires be rotated every 6,200 miles (10,000 km).

5. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do not wipe clean. If necessary, replace.

6. FLUID LEAKS

(a) Check underneath for leaking fuel, oil, water or other fluid.
(b) If you smell gasoline fumes or notice any leak, have the cause found and corrected.

7. DOORS AND ENGINE HOOD

(a) Check that all doors and the tailgate operate smoothly, and that all latches lock securely.
(b) Check that the engine hood secondary latch secures the hood from opening when the primary latch is released.

INSIDE VEHICLE

MA002-26

GENERAL MAINTENANCE

These are maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or they can have them done at a service shop.
These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to do.
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- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

2. LIGHTS

(a) Check that the headlights, stop lights, taillights, turn signal lights, and other lights are all working.
(b) Check the headlight aim.

3. WARNING LIGHTS AND BUZZERS

Check that all warning lights and buzzers function properly.

4. HORN

Check that it is working.

5. WINDSHIELD GLASS

Check for scratches, pits or abrasions.

6. WINDSHIELD WIPER AND WASHER

(a) Check operation of the wipers and washer.
(b) Check that the wipers do not streak.

7. WINDSHIELD DEFROSTER

Check that air comes out from the defroster outlet when operating the heater or air conditioner.

8. REAR VIEW MIRROR

Check that it is mounted securely.

9. SUN VISORS

Check that they move freely and are mounted securely.

10. STEERING WHEEL

Check that it has the specified freeplay. Be alert for changes in steering condition, such as hard steering, excessive freeplay or strange noises.

11. SEATS

(a) Check that the seat adjusters operate smoothly.
(b) Check that all latches lock securely in any position.
(c) Check that the head restraints move up and down smoothly and that the locks hold securely in any latch position.
(d) For fold-down seat backs, check that the latches lock securely.

12. SEAT BELTS

(a) Check that the seat belt system such as the buckles, retractors and anchors operate properly and smoothly.
(b) Check that the belt webbing is not cut, frayed, worn or damaged.

13. ACCELERATOR PEDAL

Check the pedal for smooth operation and uneven pedal effort or catching.

14. BRAKE PEDAL (See page BR-9)

(a) Check the pedal for smooth operation.

(b) Check that the pedal has the proper reserve distance and freeplay.

(c) Check the brake booster function.

15. BRAKES

At a safe place, check that the brakes do not pull to one side when applied.

16. PARKING BRAKE (See page BR-1 1)

(a) Check that the lever has the proper travel.

(b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

17. AUTOMATIC TRANSMISSION ”PARK” MECHANISM

(a) Check the lock release button of the selector lever for proper and smooth operation.

(b) On a safe incline, check that the vehicle is held securely with the selector lever in ”P” position and all brakes released.

UNDER HOOD

MA003-25

GENERAL MAINTENANCE

1. GENERAL NOTES

- Maintenance items may vary from country to country. Check the owner's manual supplement in which the maintenance schedule is shown.
- Every service item in the periodic maintenance schedule must be performed.
- Periodic maintenance service must be performed according to whichever interval in the periodic maintenance schedule occurs first, the odometer reading (miles) or the time interval (months).
- Maintenance service after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item an cause the engine to run poorly and increase exhaust emissions.

2. WINDSHIELD WASHER FLUID

Check that there is sufficient fluid in the tank.

3. ENGINE COOLANT LEVEL

Check that the coolant level is between the "FULL" and "LOW" lines on the see-through reservoir.

4. RADIATOR AND HOSES

(a) Check that the front of the radiator is clean and not blocked with leaves, dirt or bugs.

(b) Check the hoses for cracks, kinks, rot or loose connections.

5. BATTERY ELECTROLYTE LEVEL

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case.

6. BRAKE FLUID LEVEL

Check that the brake fluid level is near the upper level line on the see-through reservoir.

7. ENGINE DRIVE BELTS

Check all drive belts for fraying, cracks, wear or oiliness.

8. ENGINE OIL LEVEL

Check the level on the dipstick with the engine turned off.

9. POWER STEERING FLUID LEVEL

- Check the level on the dipstick.
- The level should be in the "HOT" or "COLD"range depending on the fluid temperature.

10. AUTOMATIC TRANSMISSION FLUID LEVEL

(a) Park the vehicle on a level surface.

(b) With the engine idling and the parking brake applied, shift the selector into all positions from "P" to "L", and then shift into "P" position.

(c) Pull out the dipstick and wipe off the fluid with a clean rag. Re-insert the dipstick and check that the fluid level is in the HOT range.

(d) Do this check with the fluid at normal driving temperature (70 - 80˚C, 158 - 176˚F).

HINT:

Wait until the engine cools down (approx. 30 min.) before checking the fluid level after extended driving at high speeds, in hot weather, in heavy traffic or pulling a trailer.

11. EXHAUST SYSTEM

If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, have the cause located and corrected.

ENGINE

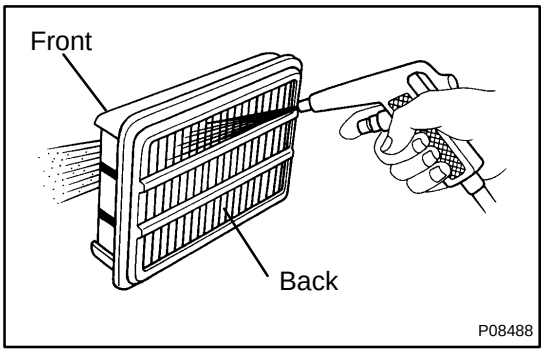
MA004-15

INSPECTION

HINT:

Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT**
   (See page EM-1 1)
2. **INSPECT DRIVE BELTS**
   (See page CH-1)
3. **REPLACE SPARK PLUGS**
   (See page IG-1)



4. **INSPECT AIR FILTER**

(a) Visually check that the air cleaner element is not excessively dirty, damaged or oily.

HINT:

Oiliness may indicate a stuck PCV valve.

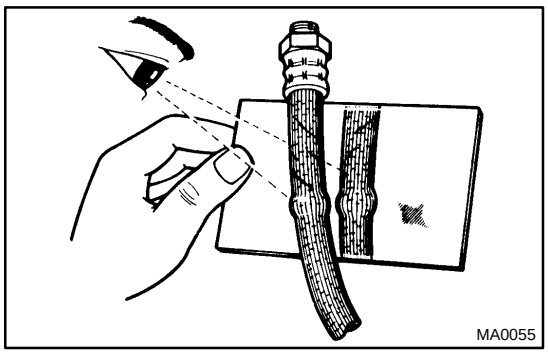
If necessary, replace the air cleaner element.

(b) Clean the element with compressed air.
First blow from back side thoroughly, then blow off the front side of the element.

5. **REPLACE AIR FILTER**

Replace the used air cleaner element with a new one.

6. **REPLACE ENGINE OIL AND OIL FILTER**
   (See page LU-3)
7. **REPLACE ENGINE COOLANT**
   (See page CO-2)
8. **REPLACE GASKET IN FUEL TANK CAP**
   (See page EC-6)
9. **INSPECT FUEL LINES AND CONNECTIONS**
   (See page SF-26)
10. **INSPECT EXHAUST PIPES AND MOUNTINGS**
    (See page EM-105)
11. **INSPECT VALVE CLEARANCE**
    (See page EM-4)



BRAKE

MA005-01

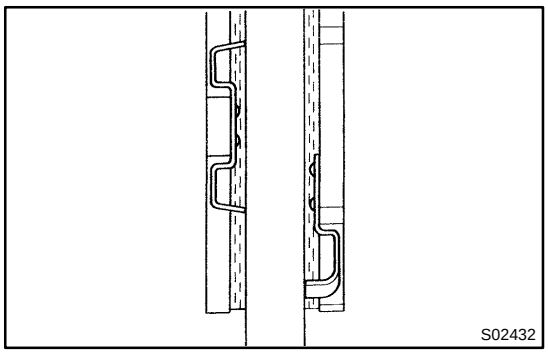
INSPECTION

1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

Inspect in a well-lighted area. Inspect the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before inspecting the front brake.

(a) Check the all brake lines and hoses for the Damage.
(b) Check the all brake lines and hoses for the Wear.
(c) Check the all brake lines and hoses for the Deformation.
(d) Check the all brake lines and hoses for the Cracks.
(e) Check the all brake lines and hoses for the Corrosion.
(f) Check the all brake lines and hoses for the Leaks.
(g) Check the all brake lines and hoses for the Bends.
(h) Check the all brake lines and hoses for the Twists.
(i) Check all clamps for tightness and connections for leakage.
(j) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.
(k) Check that the lines installed in grommets pass through the center of the grommets.



2. INSPECT FRONT BRAKE PADS AND DISCS

(See page BR-13 and BR-18)

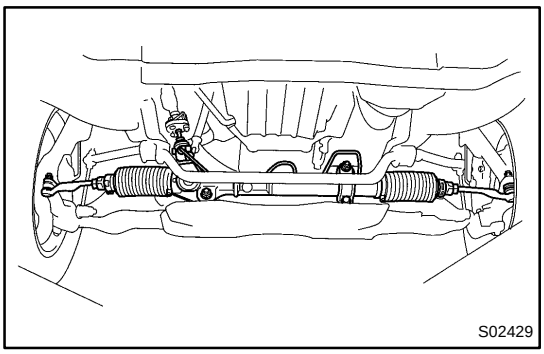
HINT:

If a squealing or scraping noise occurs from the brake during driving, check the pad wear indicator.

If there are traces of the indicator contacting the disc rotor, the disc pad should be replaced.

3. INSPECT REAR BRAKE LININGS AND DRUMS

(See page BR-24)


S02429

CHASSIS

MA054-01

INSPECTION

1. INSPECT STEERING LINKAGE

(a) Check the steering wheel freeplay (See page SR-8).

(b) Check the steering linkage for looseness or damage.
Check that:
- Tie rod ends do not have excessive play.
- Dust seals and boots are not damaged.
- Boot clamps are not loose.

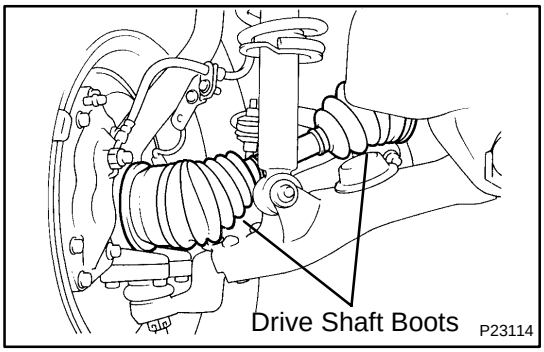
2. INSPECT STEERING GEAR HOUSING

Check the steering gear housing for oil leaks.
If leakage is found, check for cause and repair.

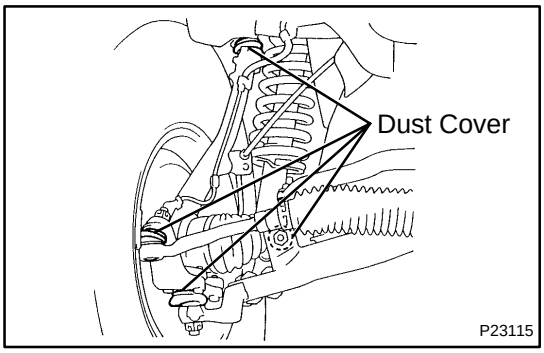
3. 4WD:

INSPECT DRIVE SHAFT BOOTS

Inspect the drive shaft boots for clamp looseness, grease leakage or damage.



P23114

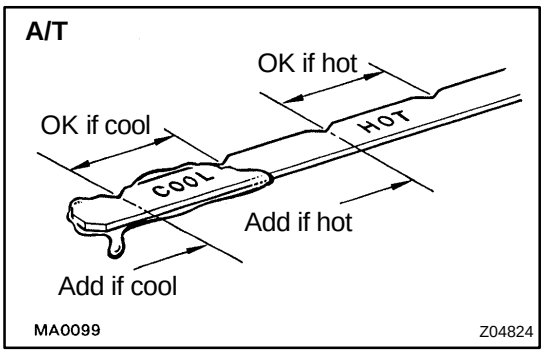


P23115

4. INSPECT BALL JOINTS AND DUST COVERS

(a) Inspect the ball joints for excessive looseness (See page SA-74).

(b) Inspect the dust cover for damage.



Z04824

5. 2WD:

CHECK OIL LEVEL IN AUTOMATIC TRANSMISSION AND DIFFERENTIAL

(a) Automatic transmission:
Check that the fluid level is in the ”HOT” range at the normal operating temperature (70 - 80˚C or 158 - 176˚F) and add as necessary.

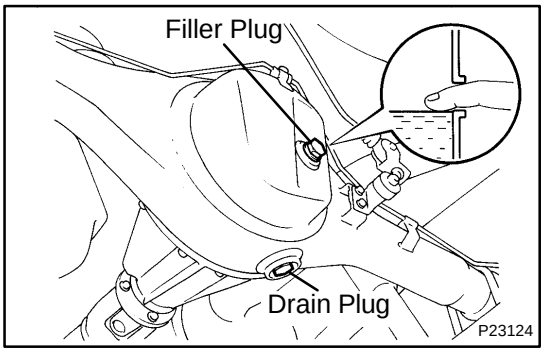
NOTICE:

Do not overfill.

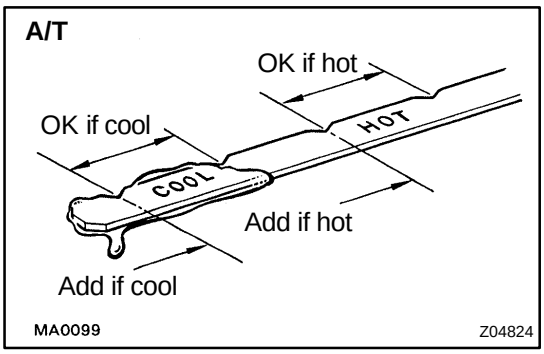
Transmission fluid (A/T): See page DI-159 .

(b) Differential:
Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

Differential oil: See page DI-159



P23124



6. 4WD:

CHECK OIL LEVEL IN AUTOMATIC TRANSMISSION, TRANSFER AND DIFFERENTIAL

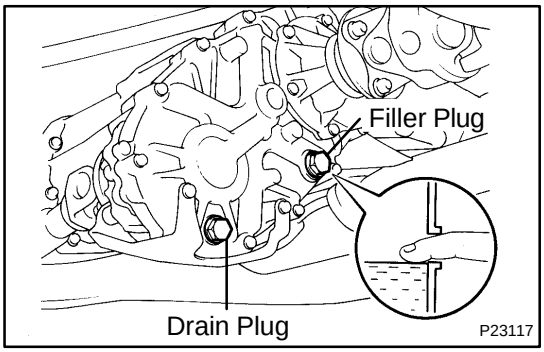
(a) Automatic transmission:

Check that the fluid level is in the "HOT" range at the normal operating temperature (70 - 80˚C or 158 - 176˚F) and add as necessary.

NOTICE:

Do not overfill.

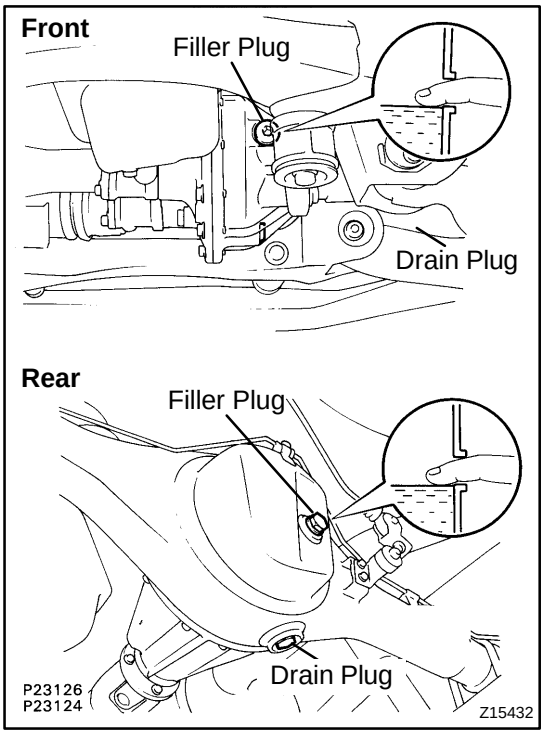
Transmission fluid (A/T): See page DI-159 .



(b) Transfer:

Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

Transfer oil: See page TR-4

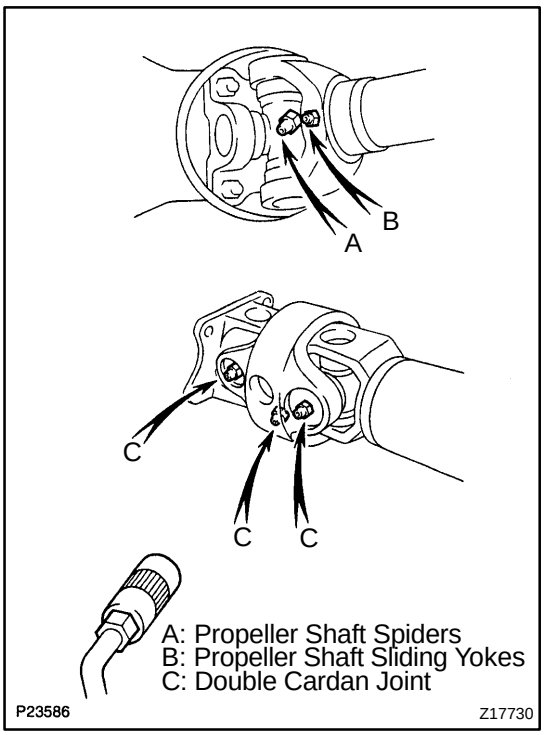


(c) Differential:

Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

Front differential: See page SA-24

Rear differential oil: See page SA-88



7. 4WD:

LUBRICATE PROPELLER SHAFT

Lubricate propeller shaft, referring to the lubrication chart. Before pumping in grease, wipe off any mud and dust on the grease fitting.

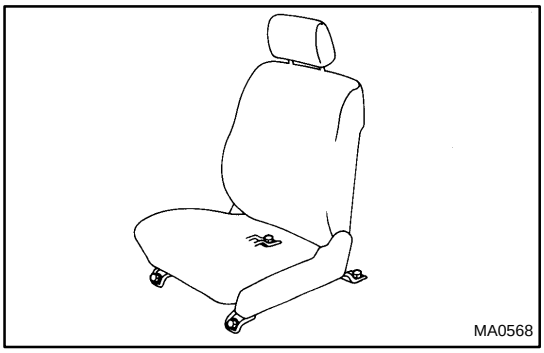
Grease grade:

Spiders: Lithium base chassis grease NLGI No.2

Slide yoke and double-cardan joint:

Molybdenum-disulphidelithium base chassis grease NLGI No.2

8. ROTATE TIRE (See page SA-4)



9. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

- Tighten these parts:
  Seat mounting bolts
  Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)
- Under severe conditions:
  In addition to the above maintenance items, check for loose or missing bolts and nuts on the following.
  - Steering system
  - Drive train
  - Suspension system
  - Fuel tank mounts
  - Engine mounts, etc.

MAINTENANCE

EQUIPMENT

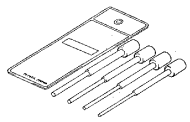
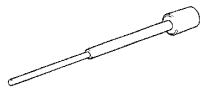
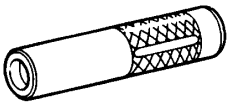
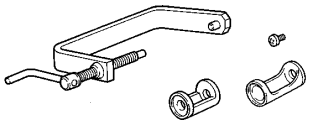
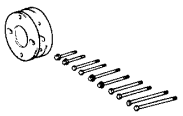
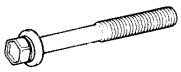
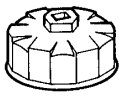
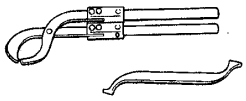
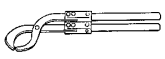
PP0CM-01

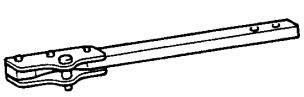
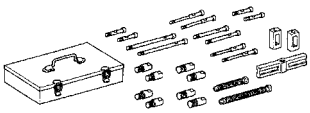
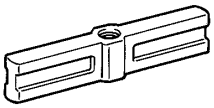
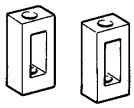
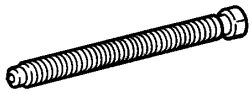
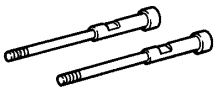
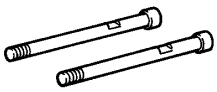
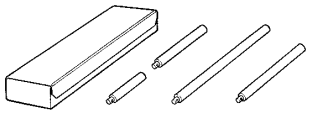
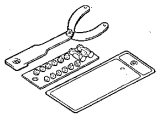
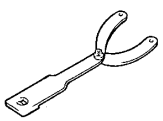
Mirror	Brake hose
Torque wrench	

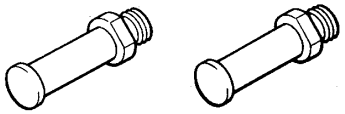
ENGINE MECHANICAL (5VZ-FE)

PP016-09

SST (Special Service Tools)

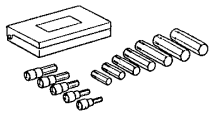
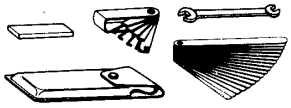
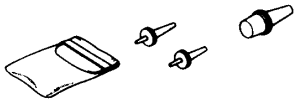
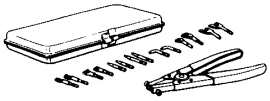
	09201-10000	Valve Guide Bushing Remover & Replacer Set	
	(09201-01060)	Valve Guide Bushing Remover & Replacer 6	
	09201-41020	Valve Stem Oil Seal Replacer	
	09202-70020	Valve Spring Compressor	
	09213-54015	Crankshaft Pulley Holding Tool	
	(90119-08216)	Bolt	
	09222-30010	Connecting Rod Bushing Remover & Replacer	
	09223-15030	Oil Seal & Bearing Replacer	Crankshaft rear oil seal
	09228-07501	Oil Filter Wrench	
	09248-55040	Valve Clearance Adjust Tool Set	
	(09248-05410)	Valve Lifter Press	
	(09248-05420)	Valve Lifter Stopper	

	09330-00021	Companion Flange Holding Tool	Crankshaft pulley
	09816-30010	Oil Pressure Switch Socket	Oil pressure switch
	09843-18020	Diagnosis Check Wire	
	09950-50013	Puller C Set	
	(09951-05010)	Hanger 150	Crankshaft pulley Crankshaft timing pulley
	(09952-05010)	Slide Arm	Crankshaft pulley Crankshaft timing pulley
	(09953-05020)	Center Bolt 150	Crankshaft pulley Crankshaft timing pulley
	(09954-0501 1)	Claw No.1	Crankshaft timing pulley
	(09954-05031)	Claw No.3	Crankshaft pulley
	09950-70010	Handle Set	
	(09951-07150)	Handle 150	Crankshaft rear oil seal Valve guide bushing
	09960-10010	Variable Pin Wrench Set	
	(09962-01000)	Variable Pin Wrench Arm Assy	Camshaft timing pulley Camshaft sub-gear

	(09963-01000) Pin 10	Camshaft timing pulley
	(09963-00600) Pin 6	Camshaft sub-gear

PP017-05

RECOMMENDED TOOLS

	09040-0001 1	Hexagon Wrench Set .	
	09090-04020	Engine Sling Device	For suspending engine
	09200-00010	Engine Adjust Kit .	
	09258-00030	Hose Plug Set .	Plug for the vacuum hose, fuel hose etc.
	09904-00010	Expander Set .	

PP018-02

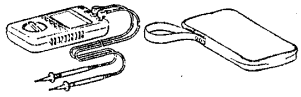
EQUIPMENT

Caliper gauge	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Timing light	Ignition timing
OBDII scan tool	Engine speed
Heater	
Magnetic finger	
Micrometer	
Piston ring compressor	
Piston ring expander	
Plastigage	
Precision straight edge	
Soft brush	
Spring tester	Valve spring
Steel square	Valve spring
Thermometer	
Torque wrench	
Valve seat cutter	
Vernier calipers	

EMISSION CONTROL (5VZ-FE)

PP014-01

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	

PP015-03

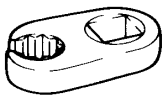
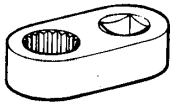
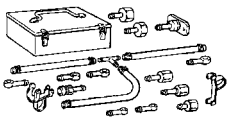
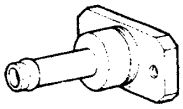
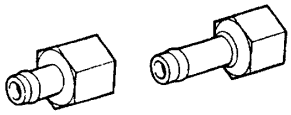
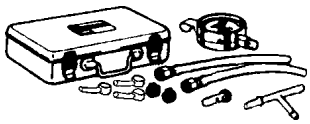
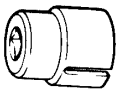
EQUIPMENT

Hose clipper	
OBDII scan tool	Engine speed
Torque wrench	
Vacuum gauge	

SFI (5VZ-FE)

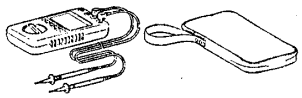
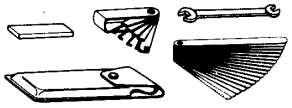
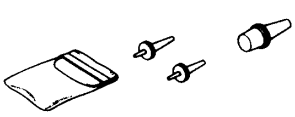
PP01D-09

SST (Special Service Tools)

	09023-38400	Union Nut Wrench 14mm	Fuel line flare nut
	09205-76030	Cylinder Head Setting Bolt Tightening Adaptor	ECT sensor
	09268-41047	Injection Measuring Tool Set	
	(09268-41091)	NO.7 Union	
	(09268-5201 1)	Injection Measuring Attachment	
	09268-45014	EFI Fuel Pressure Gauge	
	09817-1601 1	Back-up Light Switch Tool	Knock sensor
	09842-30070	Wiring ”F” EFI Inspection	
	09843-18020	Diagnosis Check Wire	

PP01E-01

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester.	
	09200-00010	Engine Adjust Kit .	
	09258-00030	Hose Plug Set .	Plug for vacuum hose, fuel hose, etc.

PP01F-01

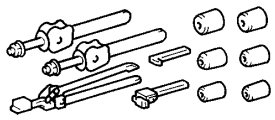
EQUIPMENT

Carburetor cleaner	Throttle body
Graduated cylinder	Injector
OBD II scan tool	Engine speed
Soft brush	Throttle body
Sound scope	Injector
Torque wrench	

COOLING (5VZ-FE)

PP01I-01

SST (Special Service Tools)

	09230-01010 Radiator Service Tool Set	

PP01J-01

EQUIPMENT

Heater	
Radiator cap tester	
Thermometer	
Torque wrench	

PP01K-03

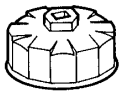
COOLANT

Item	Capacity	Classification
w/ Rear heater	9.0 liters (9.5 US qts, 7.9 lmp. qts)	”TOYOTA Long Life Coolant” or equivalent
w/o Rear heater	8.0 liters (8.5 US qts, 7.0 lmp. qts)	

LUBRICATION (5VZ-FE)

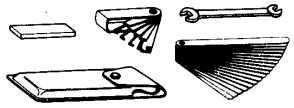
PP01R-01

SST (Special Service Tools)

	09032-00100	Oil Pan Seal Cutter	
	09228-07501	Oil Filter Wrench	
	09309-37010	Transmission Bearing Replacer	Camshaft front oil seal
	09816-30010	Oil Pressure Switch Socket	

PP01S-01

RECOMMENDED TOOLS

	09200-00010 Engine Adjust Kit .	

PP01T-01

EQUIPMENT

Oil pressure gauge	
Precision straight edge	Oil pump
Torque wrench	

PP01U-02

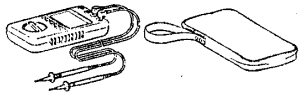
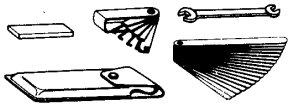
LUBRICANT

Item	Capacity	Classification
Engine oil		API grade SH, Energy-Conserving II multigrade engine oil or ILSAC multigrade engine oil and recommended viscosity oil, with SAE 5W-30 being preferred engine oil
Dry fill	5.9 liters (6.2 US qts, 5.2 lmp. qts)	
Drain and refill		
w/ Oil filter change	5.2 liters (5.5 US qts, 4.6 lmp. qts)	
w/o Oil filter change	4.9 liters (5.2 US qts, 4.3 lmp. qts)	

IGNITION (5VZ-FE)

PP01Z-01

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester.	
	09200-00010	Engine Adjust Kit .	

PP020-01

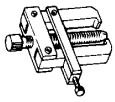
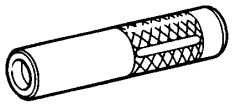
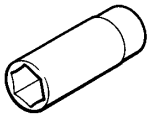
EQUIPMENT

Megger insulation resistance meter	Spark plug
Spark plug cleaner	

STARTING (5VZ-FE)

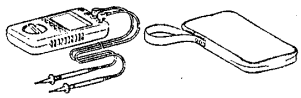
PP024-01

SST (Special Service Tools)

	09286-4601 1	Injection Pump Spline Shaft Puller	Armature bearing
	09201-41020	Valve Stem Oil Seal Replacer	Armature front bearing
	09810-38140	Starter Magnet Switch Nut Wrench 14	Terminal kit

PP025-01

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	

PP026-01

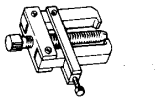
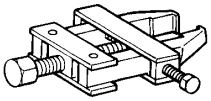
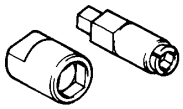
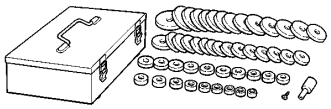
EQUIPMENT

Dial indicator	Commutator
Magnetic finger	Steel ball
Press	Magnetic switch terminal kit
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V-block	Commutator
Vernier calipers	Commutator Brush

CHARGING (5VZ-FE)

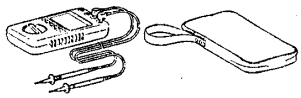
PP02A-02

SST (Special Service Tools)

	09285-76010	Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09286-4601 1	Injection Pump Spline Shaft Puller	Rectifier end frame
	09820-00021	Alternator Rear Bearing Puller	
	09820-00031	Alternator Rear Bearing Replacer	
	09820-6301 1	Alternator Pulley Set Nut Wrench Set	
	09950-60010	Replacer Set	Rotor front bearing
	(09951-00500)	Replacer 50	

PP02B-01

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	

PP02C-01

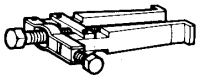
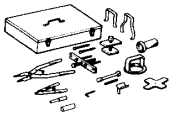
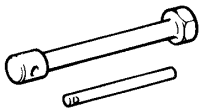
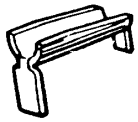
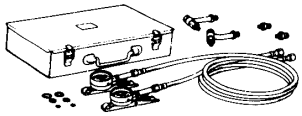
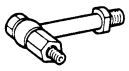
EQUIPMENT

Battery specific gravity gauge	Battery
Belt tension gauge	
Torque wrench	
Vernier calipers	Rotor (Slip ring)

AUTOMATIC TRANSMISSION

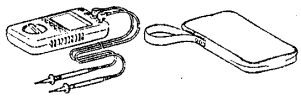
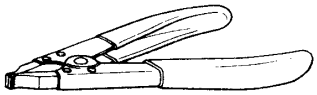
PP0DX-02

SST (Special Service Tools)

	09032-00100	Oil Pan Seal Cutter	
	09308-10010	Oil Seal Puller	
	09325-40010	Transmission Oil Plug	
	09350-30020	TOYOTA Automatic Transmission Tool Set	
	(09351-32010)	One-way Clutch Test Tool	
	(09351-32020)	Stator Stopper	
	09992-00095	Automatic Transmission Oil Pressure Gauge Set	
	(09992-00151)	Adaptor B	
	(09992-00271)	Gauge Assy	

PP0DY-02

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
	09905-00012 Snap Ring No.1 Expander .	

PP0DZ-01

EQUIPMENT

OBDII scan tool	
Torque wrench	
Dial indicator with magnetic base	Drive plate runout
Vernier calipers	Torque converter clutch
Straight edge	Torque converter clutch

PP0E0-01

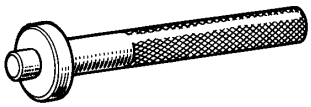
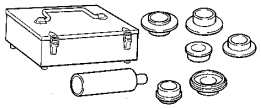
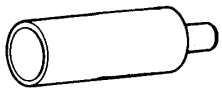
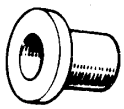
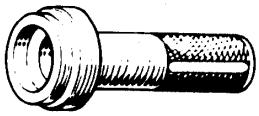
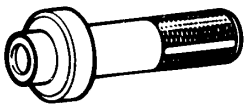
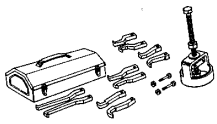
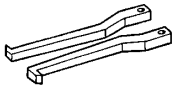
LUBRICANT

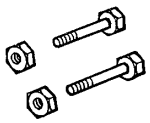
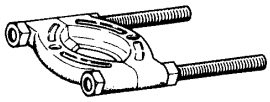
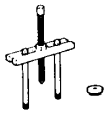
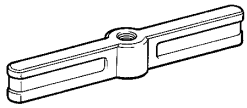
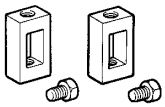
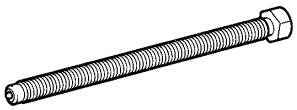
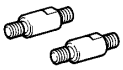
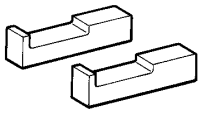
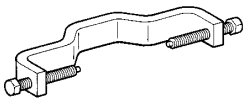
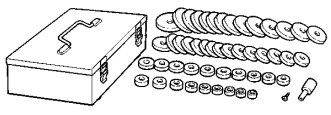
Item	Capacity	Classification
Automatic transmission fluid		
A340E:		
Dry fill	7.2 liters (7.6 US qts, 6.3 Imp.qts)	
Drain and refill	1.6 liters (1.7 US qts, 1.4 Imp.qts)	ATF D-II or DEXRON®III (DEXRON®II)
A340F:		
Dry fill	10.2 liters (10.8 US qts, 9.0 Imp.qts)	
Drain and refill	2.0 liters (2.1 US qts, 1.8 Imp.qts)	

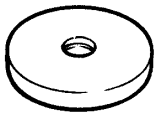
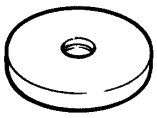
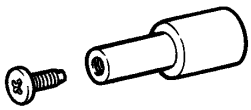
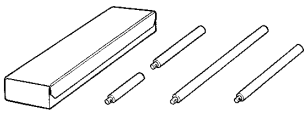
TRANSFER (VF3AM)

PP1ZO-02

SST (Special Service Tools)

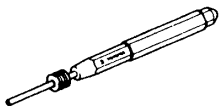
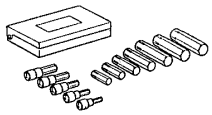
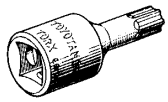
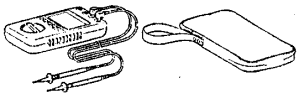
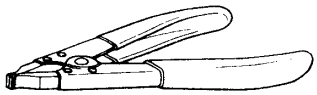
	09223-15020	Oil Seal & Bearing Replacer	Planetary gear outer bearing
	09304-12012	Input Shaft Front Bearing Replacer	Shift fork shaft oil seal
	09316-6001 1	Transmission & Transfer Bearing Replacer	
	(09316-0001 1)	Replacer Pipe	Output shaft radial ball bearing Front case oil seal
	(09316-00071)	Replacer "F"	Output shaft radial ball bearing
	09330-00021	Companion Flange Holding Tool	Companion flange
	09515-30010	Rear Wheel Bearing Replacer	Planetary gear outer bearing
	09554-22010	Differential Oil Seal Replacer	Extension housing oil seal
	09554-3001 1	Differential Oil Seal Replacer	Planetary gear outer bearing
	09555-55010	Differential Drive Pinion Bearing Replacer	Driven sprocket rear bearing Planetary gear outer bearing
	09612-65014	Steering Worm Bearing Puller	
	(09612-01030)	Claw "C"	Planetary gear inner bearing

	(09612-01050)	Hanger Pin with Nut	Planetary gear inner bearing
	09950-00020	Bearing Remover	Output shaft radial ball bearing
	09950-00030	Bearing Remover Attachment	Output shaft radial ball bearing
	09950-4001 1	Puller B Set	
	(09951-04020)	Hanger 200	Companion flange
	(09952-04010)	Slide Arm	Companion flange
	(09953-04030)	Center Bolt 200	Companion flange
	(09954-04010)	Arm 25	Companion flange
	(09955-04051)	Claw No.5	Companion flange
	(09957-04010)	Attachment	Companion flange Output shaft radial ball bearing
	(09958-0401 1)	Holder	Companion flange
	09950-60010	Replacer Set	
	(09951-00220)	Replacer 22	Companion flange oil seal

	(09951-00350)	Replacer 35	Companion flange oil seal
	(09951-00570)	Replacer 57	Planetary gear inner bearing
	(09951-00590)	Replacer 59	Case cover oil seal
	(09952-06010)	Adapter	Companion flange oil seal
	09950-70010	Handle Set	
	(09951-07100)	Handle 100	Case cover oil seal Planetary gear outer bearing Planetary gear inner bearing Companion flange oil seal

PP1ZP-02

RECOMMENDED TOOLS

	09031-00030	Pin Punch .	
	09040-0001 1	Hexagon Wrench Set .	
	09042-00010	Torx Socket T30 .	
	09082-00040	TOYOTA Electrical Tester.	
	09905-00012	Snap Ring No.1 Expander .	

PP1ZQ-01

EQUIPMENT

Dial indicator	
Micrometer	
Torque wrench	
Feeler gauge	
Magnetic finger	
Steel square	
Vernier calipers	
Ohmmeter	

PP1ZR-01

LUBRICANT

Item	Capacity	Classification
Transfer oil	1.2 liters (1.3 US qts, 1.1 lmp.qts)	API GL-4 or GL-5 SAE 75W-90

PP1ZS-02

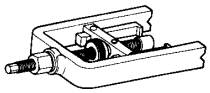
SSM (Special Service Materials)

08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Front case x Rear case Extension housing x Rear case Front bearing retainer x Front case
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Straight screw plug Head screw plug Extension housing set bolt Front bearing retainer set bolt

PROPELLER SHAFT

PP0EF-01

SST (Special Service Tools)

	09325-20010	Transmission Oil Plug	Transmission oil leakage prevention
	09332-25010	Universal Joint Bearing Remover & Replacer	Spider bearing replacement

PP0EG-01

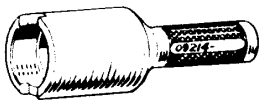
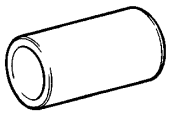
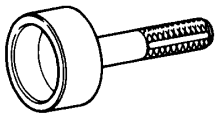
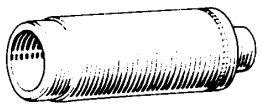
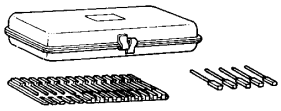
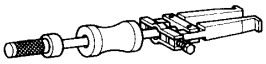
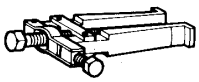
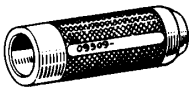
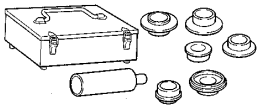
EQUIPMENT

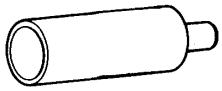
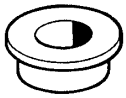
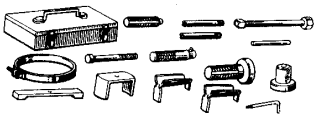
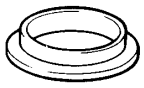
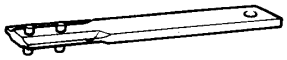
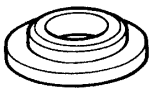
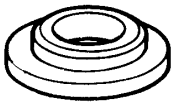
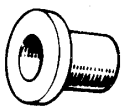
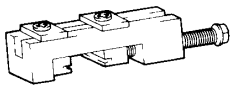
Dial indecator	
Torque wrench	

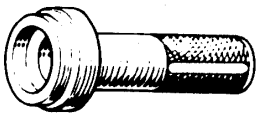
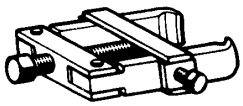
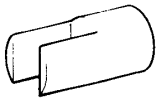
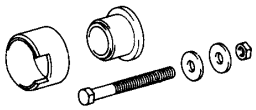
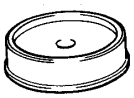
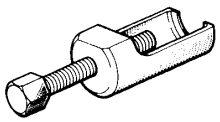
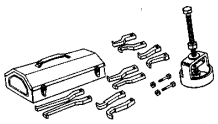
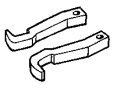
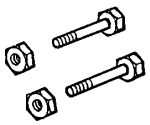
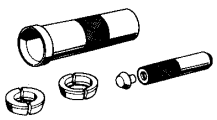
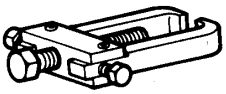
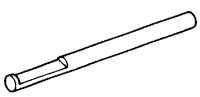
SUSPENSION AND AXLE

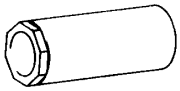
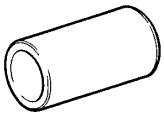
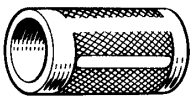
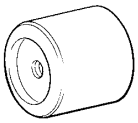
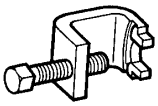
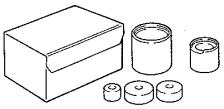
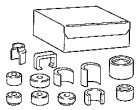
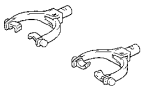
PP3GO-02

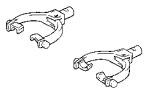
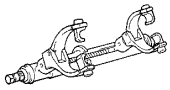
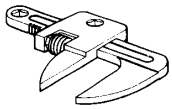
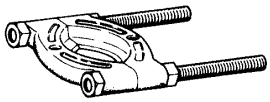
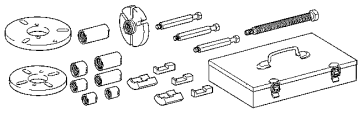
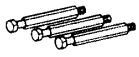
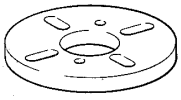
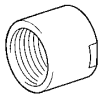
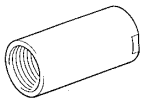
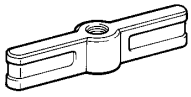
SST (Special Service Tools)

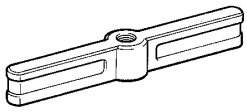
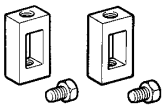
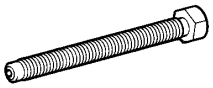
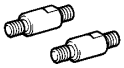
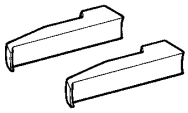
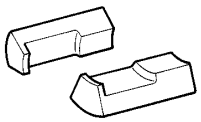
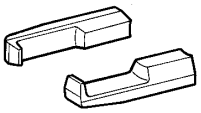
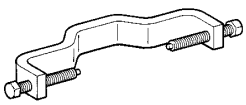
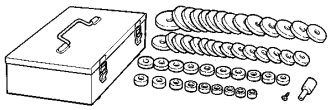
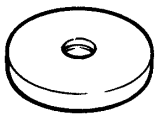
	09214-7601 1	Crankshaft Pulley Replacer	Rear differential
	09223-00010	Cover & Seal Replacer	Front suspension
	09223-15020	Oil Seal & Bearing Replacer	Front differential Rear differential
	09223-15030	Oil Seal & Bearing Replacer	Front axle
	09223-56010	Crankshaft Rear Oil Seal Replacer	Rear axle
	09226-10010	Crankshaft Front & Rear Bearing Replacer	Front differential
	09240-00020	Wire Gauge Set	Front drive shaft
	09308-00010	Oil Seal Puller	Front differential Rear axle Rear differential
	09308-10010	Oil Seal Puller	Front differential Rear differential
	09309-37010	Transmission Bearing Replacer	Front differential Front suspension
	09316-2001 1	Transfer Bearing Replacer	Front suspension
	09316-6001 1	Transmission & Transfer Bearing Replacer	

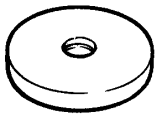
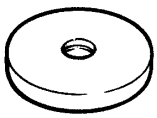
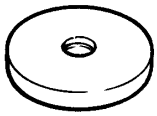
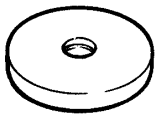
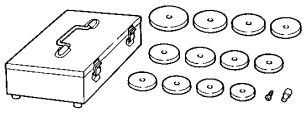
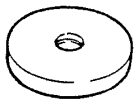
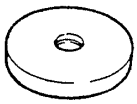
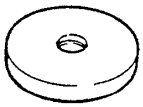
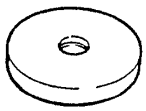
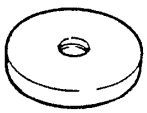
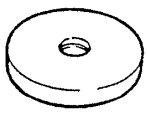
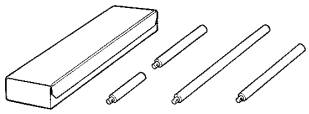
	(09316-0001 1)	Replacer Pipe	Rear differential
	(09316-00021)	Replacer "A"	Rear differential
	(09316-00051)	Replacer "D"	Rear axle Rear differential
	09330-00021	Companion Flange Holding Tool	Front differential Rear differential
	09350-20015	TOYOTA Automatic Transmission Tool Set	
	(09369-20040)	Piston Spring Compressor Set	Front differential
	09502-12010	Differential Bearing Replacer	Front differential
	09504-0001 1	Differential Side Bearing Adjusting Nut Wrench	Rear differential
	09506-30012	Differential Drive Pinion Rear Bearing Cone Replacer	Front differential
	09506-35010	Differential Drive Pinion Rear Bearing Replacer	Front suspension Rear suspension
	09515-30010	Rear Wheel Bearing Replacer	Rear axle
	09521-24010	Drive Shaft Boot Clamping Tool	Front drive shaft
	09521-2501 1	Rear Axle Shaft Puller	Rear axle

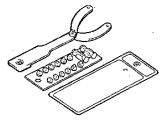
	09527-1701 1	Rear Axle Shaft Bearing Remover	Front axle
	09554-22010	Differential Oil Seal Replacer	Front differential
	09556-22010	Drive Pinion Front Bearing Remover	Front differential Rear differential
	09564-3201 1	Differential Preload Adaptor	Front differential
	09570-2201 1	Differential Mounting Cushion Remover & Replacer	Front differential
	09608-32010	Steering Knuckle Oil Seal Replacer	Front differential
	09610-20012	Pitman Arm Puller	Front suspension
	09612-65014	Steering Worm Bearing Puller	Front differential
	(09612-01020)	Claw "B"	
	(09612-01050)	Hanger Pin with Nut	
	09613-26010	Steering Worm Bearing Cone Remover	Front suspension
	09628-6201 1	Ball Joint Puller	Front drive shaft Front suspension
	09631-10030	Oil Seal Remover	Front drive shaft

	09631-20060	Bearing Guide Nut Wrench	Front suspension
	09632-36010	Steering Vane Pump Bearing Replacer	Front suspension
	09636-20010	Upper Ball Joint Dust Cover Replacer	Front differential
	09649-17010	Steering Knuckle Tool	Front axle
	09650-1701 1	Hub Bolt Remover	Front axle Rear axle
	09710-14013	Rear Suspension Bushing Tool Set	Rear suspension
	(09710-00021)	Pipe	
	(09710-00061)	Replacer	
	09710-30021	Suspension Bushing Tool Set	
	(09710-03051)	Bushing Replacer	Front axle
	(09710-03121)	Bushing Remover Base	Front suspension
	09726-40010	Lower Control Shaft Bearing Replacer	Rear differential
	09727-00060	Arm Set "C"	Front suspension

	09727-00060	Arm Set "C"	Front suspension
	09727-30021	Coil Spring Compressor	Front suspension
	09922-10010	Variable Open Wrench	Front suspension
	09950-00020	Bearing Remover	Front suspension Front differential Rear differential
	09950-30012	Puller A Set	
	(09951-03010)	Upper Plate	Front differential Rear differential
	(09953-03010)	Center Bolt	Front differential Rear differential
	(09954-03010)	Arm	Front differential Rear differential
	(09955-03030)	Lower Plate 130	Front differential Rear differential
	(09956-03020)	Adapter 18	Front differential
	(09956-03030)	Adaptor 20	Rear differential
	09950-4001 1	Puller B Set	
	(09951-04010)	Hanger 150	Front axle Front suspension Front differential Rear differential

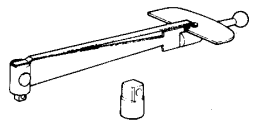
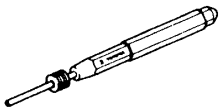
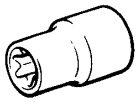
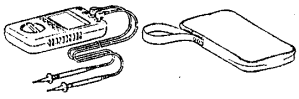
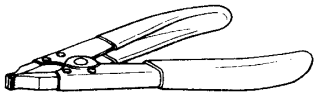
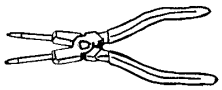
	(09951-04020) Hanger 200	Front axle
	(09952-04010) Slide Arm	Front axle Front suspension Front differential Rear differential
	(09953-04020) Center Bolt 150	Front axle Front suspension Front differential Rear differential
	(09954-04010) Arm 25	Front axle Front suspension Front differential Rear differential
	(09955-0401 1) Claw No.1	Front differential
	(09955-04031) Claw No.3	Front axle Front suspension
	(09955-04061) Claw No.6	Front differential Rear differential
	(09957-04010) Attachment	Front axle Front suspension Front differential Rear differential
	(09958-0401 1) Holder	Front axle Front suspension Front differential Rear differential
	09950-60010 Replacer Set	
	(09951-00380) Replacer 38	Front differential
	(09951-00480) Replacer 48	Front differential Rear differential
	(09951-00540) Replacer 54	Front differential

	(09951-00550)	Replacer 55	Rear differential
	(09951-00560)	Replacer 56	Rear axle
	(09951-00610)	Replacer 61	Rear axle
	(09951-00650)	Replacer 65	Front axle Front differential
	09950-60020	Replacer Set No.2	
	(09951-00710)	Replacer 71	Rear axle
	(09951-00730)	Replacer 73	Rear differential
	(09951-00790)	Replacer 79	Front differential
	(09951-00810)	Replacer 81	Front axle
	(09951-00890)	Replacer 89	Rear axle
	(09951-00910)	Replacer 91	Front axle
	09950-70010	Handle Set	Front axle Front differential Rear axle Rear suspension
	(09951-07150)	Handle 150	

	09960-10010 Variable Pin Wrench Set	Rear differential

PP08G-01

RECOMMENDED TOOLS

	09025-00010	Torque Wrench (30 kgf-cm)	
	09031-00030	Pin Punch .	
	09044-00010	Torx Socket E14 .	
	09082-00040	TOYOTA Electrical Tester.	
	09905-00012	Snap Ring No.1 Expander .	
	09905-00013	Snap Ring Pliers .	

PP08H-01

EQUIPMENT

Dial indicator or dial indicator with magnetic base	
Micrometer	
Torque wrench	
Drill	

PP08I-02

LUBRICANT

Item	Capacity	Classification
Outboard joint grease Inboard joint grease	176 - 186 g (6.20 - 6.56 oz.) 255- 265 g (8.99 - 9.34 oz.)	
Front differential oil (w/o A.D.D.)	1.10 liters (1.16 US qts, 0.97 lmp.qts)	Hypoid gear oil API GL-5 Above -18 ˚C (0 ˚F): SAE 90 Below -18 ˚C (0 ˚F): SAE 80W - 90 or 80W
Front differential oil (w/ A.D.D.)	1.15 liters (1.22 US qts, 1.01 lmp.qts)	Hypoid gear oil API GL-5 75W - 90
Rear differential oil (2WD)	2.75 liters (2.91 US qts, 2.42 lmp.qts)	Hypoid gear oil API GL-5 Above -18 ˚C (0 ˚F): SAE 90 Below -18 ˚C (0 ˚F): SAE 80W - 90 or 80W
Rear differential oil (4WD, w/o Diff. lock)	2.45 liters (2.59 US qts, 2.16 lmp.qts)	Hypoid gear oil API GL-5 Above -18 ˚C (0 ˚F): SAE 90 Below -18 ˚C (0 ˚F): SAE 80W - 90 or 80W
Rear differential oil (4WD, w/ Diff. lock)	2.75 liters (2.91 US qts, 2.42 lmp.qts)	Hypoid gear oil API GL-5 Above -18 ˚C (0 ˚F): SAE 90 Below -18 ˚C (0 ˚F): SAE 80W - 90 or 80W

PP3GP-01

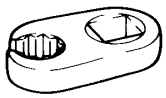
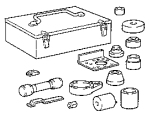
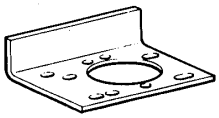
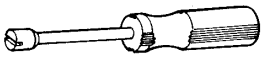
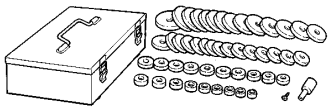
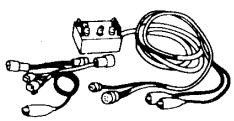
SSM (Special Service Materials)

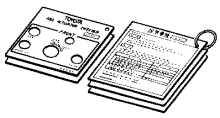
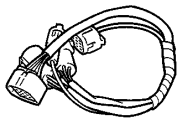
08826-00090	Seal Packing 1281, THREE BOND 1281 or equivalent (FIPG)	Front differential Rear differential
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	Front differential
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Rear differential

BRAKE

PP3GQ-01

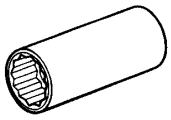
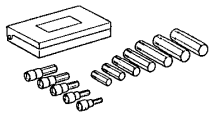
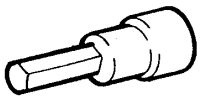
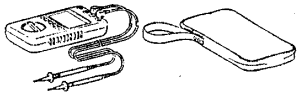
SST (Special Service Tools)

	09023-00100	Union Nut Wrench 10 mm	
	09318-12010	Transfer Bearing Adjusting Nut Wrench	
	09630-00014	Power Steering Gear Housing Overhaul Tool Set	
	(09631-00142)	Overhaul Stand	
	09703-30010	Brake Shoe Return Spring Tool	
	09709-29018	LSPV Gauge Set	
	09718-00010	Shoe Hold Down Spring Driver	
	09843-18020	Diagnosis Check Wire	
	09950-60010	Replacer Set	
	(09951-00180)	Replacer 18	
	(09951-00190)	Replacer 19	
	09990-00150	ABS Actuator Checker and Sub-harness	

	09990-00240	ABS Actuator Checker Sheet ”G”	
	09990-00480	ABS Actuator Checker Sub-harness ”S”	

PP3GR-01

RECOMMENDED TOOLS

	09017-12301	Deep Socket Wrench 30 mm .	
	09040-0001 1	Hexagon Wrench Set .	
	(09043-20050)	Socket Hexagon Wrench 5.	
	09082-00040	TOYOTA Electrical Tester.	

PP0F2-02

EQUIPMENT

Torque wrench	
Micrometer	Brake disc
Dial indicator	Brake disc
Vernier calipers	
Effort gauge	
Brake drum gauge	

PP0F3-02

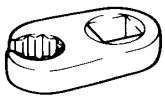
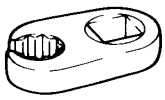
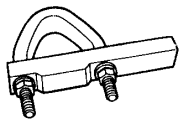
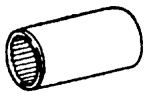
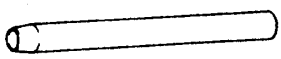
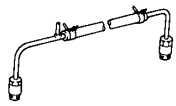
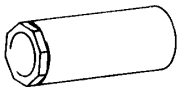
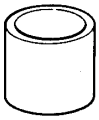
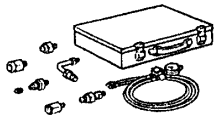
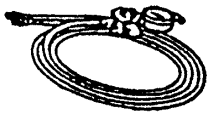
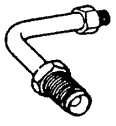
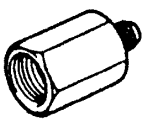
LUBRICANT

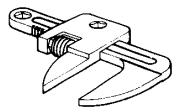
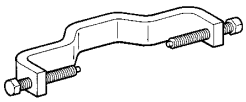
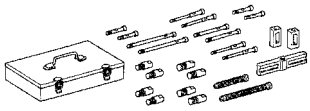
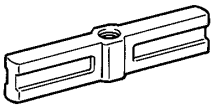
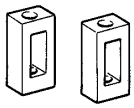
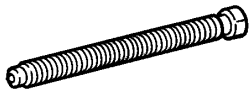
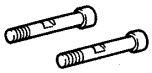
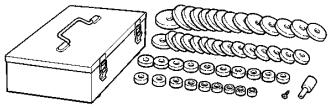
Item	Capacity	Classification
Brake fluid	-	SAE J1703 or FMVSS No. 116 DOT3

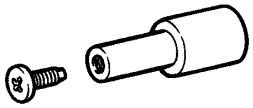
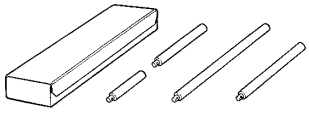
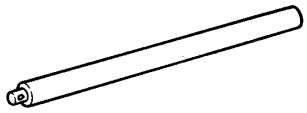
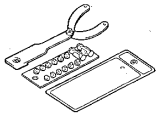
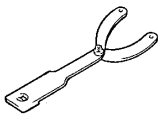
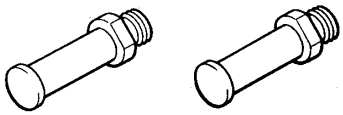
STEERING

PP3GS-02

SST (Special Service Tools)

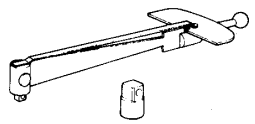
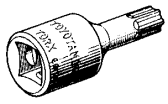
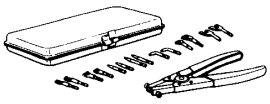
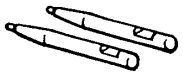
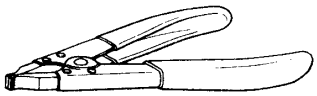
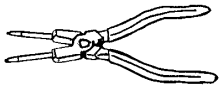
	09023-38200	Union Nut Wrench 12mm	PS gear
	09023-38400	Union Nut Wrench 14mm	PS gear
	09612-00012	Rack & Pinion Steering Rack Housing Stand	PS gear
	09616-0001 1	Steering Worm Bearing Adjusting Socket	PS gear
	09631-00350	Steering Rack Cover 35	PS gear
	09631-12071	Steering Rack Oil Seal Test Tool	PS gear
	09631-20060	Bearing Guide Nut Wrench	PS gear
	09631-20081	Seal Ring Tool	PS gear
	09640-10010	Power Steering Pressure Gauge Set	
	(09641-01010)	Gauge Assy	Power steering fluid
	(09641-01030)	Attachment B	Power steering fluid
	(09641-01060)	Attachment E	Power steering fluid

	09922-10010	Variable Open Wrench	PS gear
	09950-4001 1	Puller B Set	
	(09958-0401 1)	Holder	Tilt steering column
	09950-50013	Puller C Set	
	(09951-05010)	Hanger 150	Non-tilt steering column Tilt steering column
	(09952-05010)	Slide Arm	Non-tilt steering column Tilt steering column
	(09953-05020)	Center Bolt 150	Non-tilt steering column Tilt steering column
	(09954-05021)	Claw No.2	Non-tilt steering column Tilt steering column
	09950-60010	Replacer Set	
	(09951-00180)	Replacer 18	PS gear
	(09951-00260)	Replacer 26	PS gear
	(09951-00280)	Replacer 28	PS gear
	(09951-00320)	Replacer 32	PS gear

	(09951-00330)	Replacer 33	PS vane pump PS gear
	(09951-00360)	Replacer 36	PS gear
	(09951-00490)	Replacer 49	PS gear
	(09952-06010)	Adapter	PS gear
	09950-70010	Handle Set	
	(09951-07100)	Handle 100	PS vane pump PS gear
	(09951-07150)	Handle 150	PS gear
	(09951-07360)	Handle 360	PS gear
	09960-10010	Variable Pin Wrench Set	
	(09962-01000)	Variable Pin Wrench Arm Assy	PS vane pump
	(09963-01000)	Pin 10	PS vane pump

PP00U-03

RECOMMENDED TOOLS

	09025-00010	Small Torque Wrench (30 kgf-cm)	PS vane pump PS gear
	09042-00010	Torx Socket T30 .	Non-tilt steering column Tilt steering column
	09904-00010	Expander Set .	
	(09904-00050)	No. 4 Claw	
	09905-00012	Snap Ring No.1 Expander .	
	09905-00013	Snap Ring Pliers .	

PP00V-03

EQUIPMENT

Belt tension gauge	Drive belt
Caliper gauge	PS vane pump
Vernier calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

PP00W-02

LUBRICANT

Item	Capacity	Classification
Power steering fluid Total	0.8 liters (0.9 US qts, 0.7 lmp.qts)	ATF DEXRON® II or III

PP1B9-06

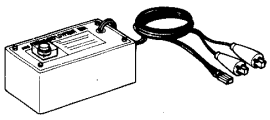
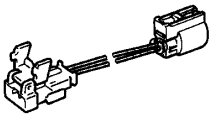
SSM (Special Service Materials)

08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	PS gear

SUPPLEMENTAL RESTRAINT SYSTEM

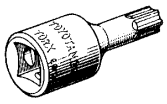
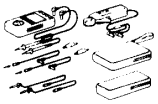
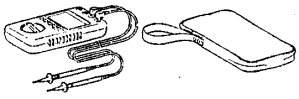
PP0EK-01

SST (Special Service Tools)

	09082-00700	SRS Airbag Deployment Tool	
	09082-00760	Airbag Deployment Wire Sub-harness No.4	
	09843-18020	Diagnosis Check Wire	

PP0EL-01

RECOMMENDED TOOLS

	09042-00020	Torx Socket T40 .	
	09082-00050	TOYOTA Electrical Tester Set.	
	09082-00040	TOYOTA Electrical Tester.	

PP0EM-01

EQUIPMENT

Torque wrench	
Bolt: Length: 35 mm (1.38 in.) Pitch: 1.0 mm (0.039 in.) Diam: 6.0 mm (0.236 in.)	Airbag disposal
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Tire with disc wheel Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Airbag disposal
Vinyl bag	Airbag disposal

BODY ELECTRICAL

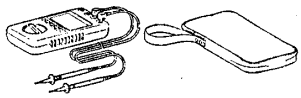
PP0O0-06

SST (Special Service Tools)

09843-18020 Diagnosis Check Wire	

PP0EH-02

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	

PP0EI-01

EQUIPMENT

Bulb (3.4 W)	Fuel sender gauge, Seat belt warning relay
Bulb (21 W)	Turn signal flasher relay
Dry cell battery	Fuel sender gauge
Masking tape	Rear window defogger wire
Syphon	Brake fluid level warning switch
Test lead	
Tin foil	Rear window defogger wire
Torque wrench	

PP0T6-01

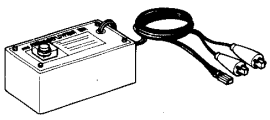
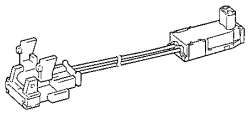
SSM (Special Service Materials)

	08888-88888	DuPont Paste No. 4817 or equivalent	Rear window defogger

BODY

PP1ZU-01

SST (Special Service Tools)

	09812-00010	Door Hinge Set Bolt Wrench	
	09082-00700	SRS Airbag Deployment Tool	
	09082-00740	Airbag Deployment Wire Sub-harness No.2	

PP1EI-01

RECOMMENDED TOOLS

	09070-20010 Moulding Remover .	

PP0AZ-07

EQUIPMENT

Clip remover	
Torque wrench	
Hexagon wrench (6 mm)	
Torx driver	
Hog ring pliers	
Hand riveter	
Tape	To avoid surface damage
Adhesive tape	To avoid surface damage
Double-stick tape	
Adhesive	
Cleaner	
Shop rag	
Knife	
Sealer gun	
Brush	
Putty spatula	
Wooden block or similar object	For tying both piano wire ends
Plastic sheet	To avoid surface damage
Heat light	
Piano wire	
Rope (no projections, difficult to break)	Seat belt pretensioner disposal
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner disposal
Tire with disc wheel Width: 185mm (7.28 in.) Inner diam 360 mm (14.17 in.)	Seat belt pretensioner disposal
Vinyl bag	Seat belt pretensioner disposal

PP0EW-01

LUBRICANT

Item	Capacity	Classification
MP grease	-	-

PP1ZV-01

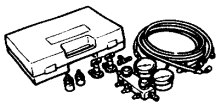
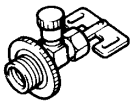
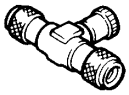
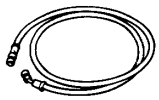
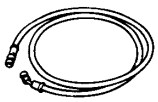
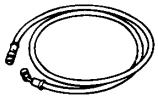
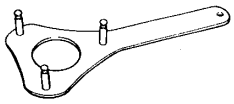
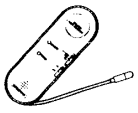
SSM (Special Service Materials)

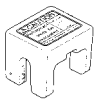
08833-00030	Three cement black or equivalent	
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	
08850-00801	Windshield Glass Adhesive Set or equivalent	

AIR CONDITIONING

PP3GT-01

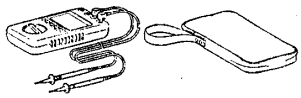
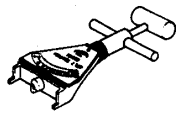
SST (Special Service Tools)

	07110-58060	Air Conditioner Service Tool Set	
	(07117-58060)	Refrigerant Drain Service Valve	
	(07117-58070)	T-Joint	
	(07117-58080)	Quick Disconnect Adapter	
	(07117-58090)	Quick Disconnect Adapter	
	(07117-88060)	Refrigerant Charging Hose	
	(07117-88070)	Refrigerant Charging Hose	
	(07117-88080)	Refrigerant Charging Hose	
	07112-66040	Magnetic Clutch Remover	
	07112-76060	Magnetic Clutch Stopper	
	95994-10020	Snap Ring Pliers (DENSO Part No.)	
	07116-38360	Gas Leak Detector Assembly	

	09870-00025 A/C Quick Joint Puller No.2	Liquid tube

PP0E3-01

RECOMMENDED TOOLS

	09082-00040	TOYOTA Electrical Tester.	
	09216-00021	Belt Tension Gauge .	
	09216-00030	Belt Tension Gauge Cable .	

PP0E4-01

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Thermistor
Torque wrench	
Dial indicator	Magnetic clutch
Plastic hammer	Magnetic clutch
Hexagon wrench	Expansion valve

PP0E5-01

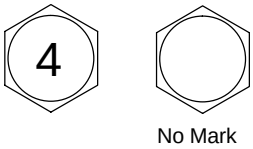
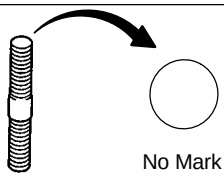
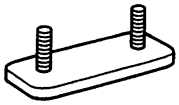
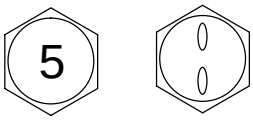
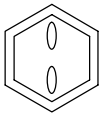
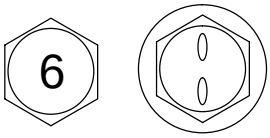
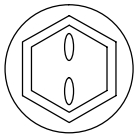
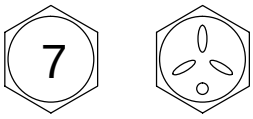
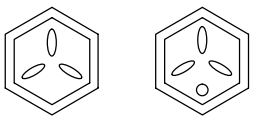
LUBRICANT

Item	Capacity	Classification
Compressor oil	-	ND-OIL 8 or equivalent
When replacing receiver	20 cc (0.71 fl.oz.)	
When replacing condenser	40 cc (1.4 fl. oz.)	
When replacing evaporator	40 - 50 cc (1.4 - 1.7 fl. oz.)	

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS0ZS-01

Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
 No Mark	No Mark	 No Mark		4T
				5T
 w/ Washer	 w/ Washer			6T
				7T
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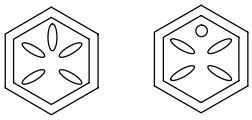
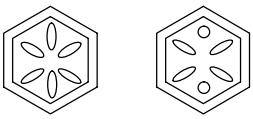
				10T
				11T

B06431

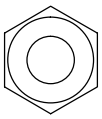
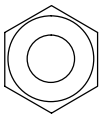
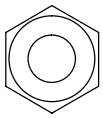
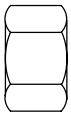
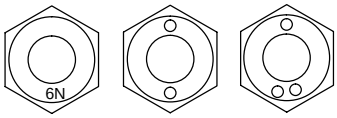
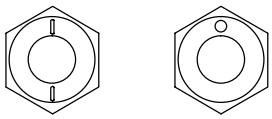
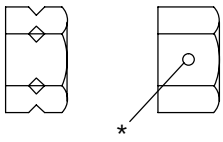
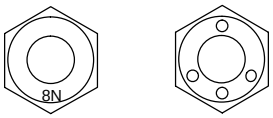
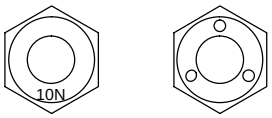
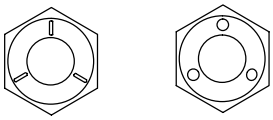
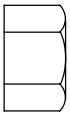
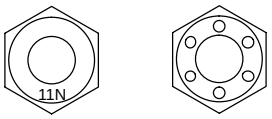
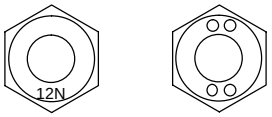
SS0ZT-01

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	-	-	-
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	-	-	-
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	-	-	-
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	-	-	-
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

SS0ZU-01

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
 6N			6N
		 *	7N (5T)
 8N			8N
 10N		 No Mark	10N (7T)
 11N			11N
 12N			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

MAINTENANCE

SS065-01

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Front seat mount bolts	37	375	27

ENGINE MECHANICAL (5VZ-FE)

SS00O-04

SERVICE DATA

Compression pressure		at 250 rpm STD	1,200 kPa (12.2 kgf/cm^2, 174 psi) or more
		Minimum	1,000 kPa (10.2 kgf/cm^2, 145 psi)
	Difference of pressure between each cylinder		100 kPa (1.0 kgf/cm^2, 15 psi) or less
Valve clearance		at cold Intake	0.13 - 0.23 mm (0.006 - 0.009 in.)
		Exhaust	0.27 - 0.37 mm (0.011 - 0.014 in.)
	Adjusting shim for repair part	Mark 2.500	2.500 mm (0.0984 in.)
		Mark 2.550	2.550 mm (0.1004 in.)
		Mark 2.600	2.600 mm (0.1024 in.)
		Mark 2.650	2.650 mm (0.1043 in.)
		Mark 2.700	2.700 mm (0.1063 in.)
		Mark 2.750	2.750 mm (0.1083 in.)
		Mark 2.800	2.800 mm (0.1102 in.)
		Mark 2.850	2.850 mm (0.1122 in.)
		Mark 2.900	2.900 mm (0.1142 in.)
		Mark 2.950	2.950 mm (0.1161 in.)
		Mark 3.000	3.000 mm (0.1181 in.)
		Mark 3.050	3.050 mm (0.1201 in.)
		Mark 3.100	3.100 mm (0.1220 in.)
		Mark 3.150	3.150 mm (0.1240 in.)
		Mark 3.200	3.200 mm (0.1260 in.)
		Mark 3.250	3.250 mm (0.1280 in.)
		Mark 3.300	3.300 mm (0.1299 in.)
Ignition timing	w/ Terminals TE1 and E1 connected of DLC1		8 - 12˚ BTDC @ idle
Idle speed	-		700 ± 50 rpm
Intake manifold vacuum		at idle speed	60 kPa (450 mmHg, 17.7 in.Hg) or more
Timing belt tensioner	Protrusion from housing side		10.0 - 10.8 mm (0.394 - 0.425 in.)
Cylinder head	Warpage	Maximum	0.10 mm (0.039 in.)
	Valve seat		
	Refacing angle		30˚, 45˚, 60˚
	Contacting angle		45˚
	Contacting width		1.0 - 1.4 mm (0.039 - 0.055 in.)
	Valve guide bushing bore diameter	STD	10.985 - 11.027 mm (0.4325 - 0.4341 in.)
		O/S 0.05	11.050 - 11.077 mm (0.4350 - 0.4361 in.)
Valve guide bushing	Inside diameter		6.010 - 6.030 mm (0.2366 - 0.2374 in.)
	Outside diameter for repair part	STD	11.033 - 11.044 mm (0.4344 - 0.4348 in.)
		O/S 0.05	11.083 - 11.094 mm (0.4363 - 0.4368 in.)
Valve	Valve overall length	STD Intake	95.15 mm (3.7461 in.)
		Exhaust	94.90 mm (3.7362 in.)
		Minimum Intake	94.60 mm (3.7244 in.)
		Exhaust	94.40 mm (3.7165 in.)
	Valve face angle		44.5˚
	Stem diameter	Intake	5.970 - 5.985 mm (0.2350 - 0.2356 in.)
		Exhaust	5.965 - 5.980 mm (0.2348 - 0.2354 in.)
	Stem oil clearance	STD Intake	0.025 - 0.060 mm (0.0010 - 0.0024 in.)
		Exhaust	0.030 - 0.065 mm (0.0012 - 0.0026 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
		Exhaust	0.10 mm (0.0039 in.)
	Margin thickness	STD	1.0 mm (0.039 in.)
		Minimum	0.5 mm (0.020 in.)

Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
	Free length		44.78 mm (1.7630 in.)
	Installed tension	at 33.3 mm (1.311 in.)	186 - 206 N (19.0 - 21.0 kgf, 41.9 - 46.3 lbf)
Valve lifter	Lifter diameter		30.966 - 30.976 mm (1.2191 - 2.2195 in.)
	Lifter bore diameter		31.000 - 31.018 mm (1.2205 - 1.2212 in.)
	Oil clearance	STD	0.024 - 0.052 mm (0.0009 - 0.0020 in.)
		Maximum	0.08 mm (0.0031 in.)
Camshaft	Thrust clearance	STD	0.033 - 0.080 mm (0.0013 - 0.0031 in.)
		Maximum	0.12 mm (0.0047 in.)
	Journal oil clearance	STD	0.035 - 0.072 mm (0.0014 - 0.0028 in.)
		Maximum	0.10 mm (0.0039 in.)
	Journal diameter		26.949 - 26.965 mm (1.0610 - 1.0616 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Cam lobe height	STD Intake	42.31 - 42.41 mm (1.6657 - 1.6697 in.)
		Exhaust	41.96 - 42.06 mm (1.6520 - 1.6559 in.)
		Minimum Intake	42.16 mm (1.6598 in.)
		Exhaust	41.81 mm (1.6461 in.)
	Camshaft gear backlash	STD	0.020 - 0.200 mm (0.0008 - 0.0079 in.)
		Maximum	0.30 mm (0.0188 in.)
	Camshaft gear spring end free distance		18.2 - 18.8 mm (0.712 - 0.740 in.)
Air intake chamber	Warpage	Maximum	0.10 mm (0.0039 in.)
Intake air connector	Warpage	Maximum	0.10 mm (0.0039 in.)
Intake manifold	Warpage	Maximum	0.10 mm (0.0039 in.)
Exhaust manifold	Warpage	Maximum	1.00 mm (0.0394 in.)
Cylinder block	Cylinder head surface warpage	Maximum	0.05 mm (0.0020 in.)
	Cylinder bore diameter	STD Mark 1	93.500 - 93.510 mm (3.6811 - 3.6815 in.)
		Mark 2	93.510 - 93.520 mm (3.6815 - 3.6819 in.)
		Mark 3	93.520 - 93.530 mm (3.6819 - 3.6823 in.)
		Maximum STD	93.730 mm (3.6902 in.)
		O/S 0.50	94.230 mm (3.7098 in.)
Piston and piston ring	Piston diameter	STD Mark 1	93.356 - 93.366 mm (3.6754 - 3.6758 in.)
		Mark 2	93.367 - 93.376 mm (3.6759 - 3.6762 in.)
		Mark 3	93.377 - 93.386 mm (3.6763 - 3.6766 in.)
		O/S 0.50	93.856 - 93.886 mm (3.6951 - 3.6963 in.)
	Piston oil clearance	STD	0.134 - 0.154 mm (0.0053 - 0.0060 in.)
		Maximum	0.174 mm (0.0069 in.)
	Piston ring groove clearance	No.1	0.040 - 0.080 mm (0.0016 - 0.0031 in.)
		No.2	0.030 - 0.070 mm (0.0012 - 0.0028 in.)
	Piston ring end gap	STD No.1	0.300 - 0.500 mm (0.0118 - 0.0197 in.)
		No.2	0.400 - 0.600 mm (0.0157 - 0.0236 in.)
		Oil	0.150 - 0.550 mm (0.0059 - 0.0217 in.)
		Maximum No.1	1.100 mm (0.0433 in.)
		No.2	1.200 mm (0.0472 in.)
		Oil	1.150 mm (0.0453 in.)

Connecting rod	Thrust clearance	STD	0.150 - 0.330 mm (0.0059 - 0.0130 in.)
		Maximum	0.380 mm (0.0150 in.)
	Connecting rod bearing center wall thickness		
	Reference	Mark 1	1.484 - 1.488 mm (0.0584 - 0.0586 in.)
		Mark 2	1.488 - 1.492 mm (0.0586 - 0.0587 in.)
		Mark 3	1.492 - 1.496 mm (0.0587 - 0.0589 in.)
	Connecting rod oil clearance	STD	0.024 - 0.053 mm (0.0009 - 0.0021 in.)
		O/S 0.25	0.023 - 0.069 mm (0.0009 - 0.0027 in.)
		Maximum	0.08 mm (0.0031 in.)
	Rod bend	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)
	Bushing inside diameter		22.005 - 22.017 mm (0.8663 - 0.8668 in.)
	Piston pin diameter		21.997 - 22.009 mm (0.8660 - 0.8665 in.)
	Bushing oil clearance	STD	0.005 - 0.011 mm (0.0002 - 0.0004 in)
		Maximum	0.05 mm (0.0020 in.)
	Connecting rod bolt outer diameter	STD	7.860 - 8.000 mm (0.3094 - 0.3150 in.)
		Minimum	7.600 mm (0.2992 in.)
Crankshaft	Thrust clearance	STD	0.020 - 0.220 mm (0.0008 - 0.0087 in.)
		Maximum	0.300 mm (0.0118 in.)
	Thrust washer thickness		2.440 - 2.490 mm (0.0961 - 0.0980 in.)
	Main journal oil clearance	No.1 STD	0.020 - 0.038 mm (0.0008 - 0.0015 in.)
		U/S 0.25	0.019 - 0.059 mm (0.0007 - 0.0023 in.)
		Others STD	0.024 - 0.042 mm (0.0009 - 0.0017 in.)
		U/S 0.25	0.023 - 0.063 mm (0.0009 - 0.0025 in.)
		Maximum	0.08 mm (0.0031 in.)
	Main journal diameter	STD	63.985 - 64.000 mm (2.5191 - 2.5197 in.)
		U/S 0.25	63.745 - 63.755 mm (2.5096 - 2.5100 in.)
	Main bearing center wall thickness		
	Reference	No.1 Mark 1	1.991 - 1.994 mm (0.0784 - 0.0785 in.)
		Mark 2	1.994 - 1.997 mm (0.0785 - 0.0786 in.)
		Mark 3	1.997 - 2.000 mm (0.0786 - 0.0787 in.)
		Mark 4	2.000 - 2.003 mm (0.0787 - 0.0789 in.)
		Mark 5	2.003 - 2.006 mm (0.0789 - 0.0790 in.)
		Others Mark 1	1.989 - 1.992 mm (0.0783 - 0.0784 in.)
		Mark 2	1.992 - 1.995 mm (0.0784 - 0.0785 in.)
		Mark 3	1.995 - 1.998 mm (0.0785 - 0.0787 in.)
		Mark 4	1.998 - 2.001 mm (0.0787 - 0.0788 in.)
		Mark 5	2.001 - 2.004 mm (0.0788 - 0.0789 in.)
	Crank pin diameter	STD	54.987 - 55.000 mm (2.1648 - 2.1654 in.)
		U/S 0.25	54.745 - 54.755 mm (2.1553 - 2.1557 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
	Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)

SS00P-08

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
No.1 idler pulley x Oil pump		35	350	26
No.2 idler pulley x No.2 idler pulley bracket		40	400	30
No.1 timing belt cover x Oil pump		9	90	80 in.·lbf
Crankshaft pulley x Crankshaft		295	2,950	213
Camshaft timing pulley x Camshaft		110	1,100	81
Timing belt tensioner x Oil pump		27	280	20
No.2 timing belt cover x No.3 timing belt cover		9	90	80 in.·lbf
Oil dipstick guide x Generator bracket		8	80	71 in.·lbf
Fluid coupling x Fan bracket		5.4	54	48 in.·lbf
A/C compressor bracket x Cylinder block		47	479	35
A/C compressor x A/C compressor bracket		25	250	18
PS pump x PS pump bracket		43	440	31
Camshaft bearing cap x Cylinder head		16	160	12
Rear plate x Cylinder head		8	80	71 in.·lbf
Cylinder head x Cylinder block	12 pointed head 1st 2nd 3rd Recessed head	34 Turn 90° Turn 90° 18	350 Turn 90° Turn 90° 185	25 Turn 90° Turn 90° 13
Cylinder head cover x Cylinder head		6	60	53 in.·lbf
Exhaust manifold x Cylinder head		40	400	30
Exhaust crossover pipe x Exhaust manifold		45	450	33
Generator bracket x LH cylinder head		18.5	185	14
PS pump bracket x RH cylinder head		18.5	185	14
Intake manifold, Intake manifold stay x Cylinder head		18	180	13
No.3 timing belt cover x Cylinder head		9	90	80 in.·lbf
Camshaft position sensor x RH cylinder head		8	80	71 in.·lbf
Intake air connector x Intake manifold		18	180	13
Air intake chamber x Intake air connector		18	180	13
Air intake chamber stay x LH cylinder head Air intake chamber stay x Air intake chamber		40 18	408 184	30 13
Engine hanger No.2 x RH cylinder head		45	459	33
Frame crossmember x Engine rear mounting bracket		58	590	43
Engine rear mounting bracket x Engine rear mounting insulator		18	183	13
Engine front mounting insulator x Frame		38	387	28
Connecting rod cap x Connecting rod	1st 2nd	25 Turn 90°	250 Turn 90°	18 Turn 90°
Main bearing cap x Cylinder block	1st 2nd	61 Turn 90°	625 Turn 90°	45 Turn 90°
Rear oil seal retainer x Cylinder block		8	80	71 in.·lbf
Engine coolant drain cock x Cylinder block		39	400	29
Engine mounting bracket x Cylinder block		44	440	32
Oil filter union x Cylinder block		25	250	18
Oil pressure switch x Cylinder block		15	150	11
Generator adjusting bar x Cylinder block		42	420	31
No.2 idler pulley bracket x Cylinder block		38	380	28

Water bypass pipe x Cylinder block		8.5	85	75 in.·lbf
Rear end plate x Cylinder block		7.5	75	66 in.·lbf
Drive plate x Crankshaft	A/T	83	850	61
Flywheel x Crankshaft	M/T	85	850	63
No.2 support bracket x Body		19	195	14
No.3 support bracket x Body		19	195	14
No.1 front exhaust pipe x Exhaust manifold		62	630	41
No.1 front exhaust pipe x No.2 front exhaust manifold		48	495	35
A/F sensor x No.1 front exhaust pipe		20	200	14
Heated oxygen sensor (Bank 1 sensor 2) x No.2 front exhaust pipe		44	449	32

EMISSION CONTROL (5VZ-FE)

TORQUE SPECIFICATION

SS00R-08

Part tightened	N·m	kgf·cm	ft·lbf
No. 1 front exhaust pipe x Exhaust crossover pipe	62	630	46
No. 1 front exhaust pipe x No. 2 front exhaust pipe	48	495	35
No.2 Front exhaust pipe x Center exhaust pipe	48	495	35
A/F sensor x No. 1 front exhaust pipe	20	200	14
Support bracket x Body	19	195	14

SFI (5VZ-FE)

SERVICE DATA

SS00U-09

Fuel pressure regulator	Fuel pressure	at no vacuum	265 - 304 kPa (2.7 - 3.1 kgf/cm^2, 38 - 44 psi)
Fuel pump	Resistance	at 20˚C (68˚F)	0.2 - 3.0 Ω
Injector	Resistance Injection volume Difference between each cylinder Fuel leakage		Approx. 13.8 Ω 60 - 73 cm^3 (3.4 - 4.5 cu in.) per 15 sec. 13 cm^3 (0.8 cu in.) or less 1 drop or less per 12 minutes
MAF meter	Resistance (THA - E2)	at -20˚C (-4˚F) at 20˚C (68˚F) at 60˚C (140˚F)	13.6 - 18.4 kΩ 2.2 - 2.7 kΩ 0.5 - 0.7 kΩ
Throttle control motor	Motor resistance Clutch resistance	at 20˚C (68˚F) at 20˚C (68˚F)	0.3 - 100 Ω 4.2 - 5.2 Ω
Throttle position sensor	Resistance	at 20˚C (68˚F)	1.2 - 3.2 Ω
Accelerator pedal position sensor	Resistance Standard throttle valve opening percentage Sensor lever full-open position	at 20˚C (68˚F)	1.2 - 3.2 Ω 60 % or more
VSV for EVAP	Resistance	at 20˚C (68˚F)	30 - 34 Ω
VSV for CCV	Resistance	at 20˚C (68˚F) at 120˚C (248˚F)	25 - 30 Ω 33 - 42 Ω
VSV for pressure switching valve	Resistance	at 20˚C (68˚F) at 120˚C (248˚F)	37 - 44 Ω 51 - 62 Ω
ECT sensor	Resistance	at -20˚C (-4˚F) at 0˚C (32˚F) at 20˚C (68˚F) at 40˚C (104˚F) at 60˚C (140˚F) at 80˚C (176˚F)	10 - 20 kΩ 4 - 7 kΩ 2 - 3 kΩ 0.9 - 1.3 kΩ 0.4 - 0.7 kΩ 0.2 - 0.4 kΩ
Vapor pressure sensor	Power source voltage (VC - E2) Power output voltage (PTNK - E2)		4.5 - 5.5 V 3.0 - 3.6 V
A/F sensor	Heater Resistance	at 20˚C (68˚F) at 800˚C (1,472˚F)	0.8 - 1.4 Ω 1.8 - 3.2 Ω
Heated oxygen sensor	Heater resistance	at 20˚C (68˚F) at 800˚C (1,472˚F)	11 - 16 Ω 23 - 32 Ω
Fuel cut rpm	Fuel return rpm		1,500 rpm

SS00V-07

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fuel line (Union bolt type)	34.3	350	25
Fuel line (Flare nut type) using SST	24	245	18
SST (Pressure gauge) x RH delivery pipe	34.3	350	25
No.2 timing belt cover x No.3 timing belt cover	9	90	80 in.·lbf
Fuel pump and sender gauge assembly x Fuel tank	3.5	35	30 in.·lbf
Air intake chamber x Intake air connector	18	180	13
Intake air connector x Intake manifold	18	180	13
Fuel pressure regulator x LH delivery pipe	8	80	71 in.·lbf
Fuel inlet pipe x RH delivery pipe	34.3	350	25
Delivery pipe x Intake manifold	13	130	10
Fuel inlet pipe x Intake manifold	8	80	71 in.·lbf
Fuel evaporation vent tube x Fuel tank	1.5	15	13 in.·lbf
Fuel pipe x Body	20	200	14
Fuel tank band x Body	40	410	30
Fuel tank protector x Fuel tank, Body	30	310	22
Fuel tube clamp bracket x Fuel tank	5.5	55	48 in.·lbf
Throttle body x Air intake chamber	18	180	13
Emission control valve assembly x Body	7.5	77	66 in.·lbf
Charcoal canister assembly x Body	20	204	15
VSV for pressure switching valve x Charcoal canister assembly	2.0	12.2	18 in.·lbf
Charcoal canister assembly x No. 2 charcoal canister bracket	5.4	55	48 in.·lbf
No. 2 charcoal canister bracket x Body	20	204	15
ECT sensor x Intake manifold	20	200	14
Fuel pipe x RH and LH delivery pipe	34.3	350	25
Intake manifold, Intake manifold stay x Cylinder head	18	180	13
Air intake chamber stay x LH cylinder head Air intake chamber stay x Air intake chamber	40 18	408 184	30 13
Knock sensor x Cylinder block	39	400	29
A/F sensor x No.1 front exhaust pipe	20	200	14
Heated oxygen sensor x No.2 front exhaust pipe	20	200	14

COOLING (5VZ-FE)

SS00Y-01

SERVICE DATA

Thermostat	Valve opening pressure		80 - 84˚C (176 - 183˚F)
	Valve lift	at 95˚C (203˚F)	8.5 mm (0.335 in .) or more
Radiator cap	Relief valve opening pressure	STD	74 - 103 kPa (0.75 - 1.05 kgf/cm^2, 10.7 - 14.9 psi)
		Minimum	59 kPa (0.6 kgf/cm^2, 8.8 psi)

SS00Z-02

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fan x Fluid coupling	7.4	75	65 in.·lbf
Water pump x Cylinder block	20	200	14
Water inlet x Water pump	20	200	14
Radiator support x Body	12	120	9
Radiator support x Radiator	12.7	130	9

LUBRICATION (5VZ-FE)

SS012-02

SERVICE DATA

Oil pressure	At idle speed (normal operating temperature)		29 kPa (0.3 kgf/cm^2, 4.3 psi) or more
	At 3,000 rpm (normal operating temperature)		245 - 520 kPa (2.5 - 5.3 kgf/cm^2, 36 - 75 psi)
Oil pump	Body clearance	STD	0.10 - 0.18 mm (0.0039 - 0.0069 in.)
		Maximum	0.30 mm (0.0118 in.)
	Tip clearance	STD	0.11 - 0.24 mm (0.0043 - 0.0094 in.)
		Maximum	0.35 mm (0.0138 in.)
	Side clearance	STD	0.03 - 0.09 mm (0.0012 - 0.0035 in.)
		Maximum	0.15 mm (0.0059 in.)

SS013-02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder block		15	150	11
Oil pump x Oil pump body cover		10	105	8
Oil pump x Cylinder block	A	20	200	15
	B	42	420	31
Oil strainer x Cylinder block		7.5	76	66 in.·lbf
Oil pan x Cylinder block		7.6	78	67 in.·lbf
Oil cooler x Cylinder block		59	600	43

IGNITION (5VZ-FE)

SS016-02

SERVICE DATA

High-tension cord	Resistance	Maximum	25 kΩ per cord
Spark plug	Recommended spark plug	ND	K16TR11
		NGK	BKR5EKB-11
	Correct electrode gap		1.1 mm (0.043 in.)
Ignition coil	Resistance	Primary at cold	0.67 - 1.05 Ω
		at hot	0.85 - 1.23 Ω
		Secondary at cold	9.3 -16.0 kΩ
		at hot	11.7 - 18.8 kΩ
Camshaft position sensor	Resistance	at cold	835 - 1,400 Ω
		at hot	1,060 - 1,645 Ω
Crankshaft position sensor	Resistance	at cold	1,630 - 2,740 Ω
		at hot	2,065 - 3,225 Ω

SS017-02

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	18	180	13
Ignition coil x Cylinder head	7.8	80	69 in.·lbf
Camshaft position sensor x Cylinder head	7.8	80	69 in.·lbf
Crankshaft position sensor x Oil pump	7.8	80	69 in.·lbf

STARTING (5VZ-FE)

SS01A-02

SERVICE DATA

Starter (1.4 kW type)	Rated voltage and output power		12 V 1.4 kW
	No-load characteristics	Current	90 A or less at 11.5 V
		rpm	3,000 rpm or more
	Brush length	STD	15.5 mm (0.610 in.)
		Minimum	10.0 mm (0.394 in.)
	Spring installed load	STD	17.6 - 23.5 N (1.80 - 2.40 kgf, 4.0 - 5.3 lbf)
		Minimum	11.8 N (1.20 kgf, 2.6 lbf)
	Commutator		
	Diameter	STD	30 mm (1.180 in.)
		Minimum	29 mm (1.140 in.)
	Undercut depth	STD	0.6 mm (0.024 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Magnetic switch		
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)
Starter (1.8 kW type)	Rated voltage and output power		12 V 1.8 kW
	No-load characteristics	Current	100 A or less at 11.5 V
		rpm	2,500 rpm or more
	Shunt coil resistance	at 20˚C (68˚F)	1.4 - 1.9 Ω
	Brush length	STD	15.0 mm (0.591 in.)
		Minimum	9.0 mm (0.354 in.)
	Spring installed load	STD	21.5 - 27.5 N (2.20 - 2.80 kgf, 4.9 - 6.2 lbf)
		Minimum	12.7 N (1.30 kgf, 2.7 lbf)
	Commutator		
	Diameter	STD	35 mm (1.378 in.)
		Minimum	34 mm (1.339 in.)
	Undercut depth	STD	0.7 mm (0.028 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Magnetic switch		
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)

SS01B-02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Starter wire x Starer		8.8	90	78 in.·lbf
Starter x Transaxle		39	400	29
Lead wire x Terminal C of starter		5.9	60	52 in.·lbf
Field frame, Magnetic switch x Starter housing	1.4 kW type	5.9	60	52 in.·lbf
	1.8 kW type	9.3	95	82 in.·lbf
End cover x Field frame	1.4 kW type	1.5	15	13 in.·lbf
	1.8 kW type	3.8	39	34 in.·lbf
Terminal nut x Terminal C of starter, Terminal 30 of starter		17	170	12
Magnetic switch end cover x Magnetic switch	1.4 kW type	2.5	26	23 in.·lbf
	1.8 kW type	3.6	37	32 in.·lbf

CHARGING (5VZ-FE)

SS01E-02

SERVICE DATA

Battery	Voltage	at 20˚C (68˚F)	12.7 - 12.9 V
Drive belt	Tension	New belt	160 ± 20 lbf
		Used belt	100 ± 20 lbf
Generator	Rated output ampere		12 V 60 A
	Rotor coil resistance	at 20˚C (68˚F)	2.1 - 2.5 Ω
	Slip ring diameter	STD	14.2 - 14.4 mm (0.559 - 0.567 in.)
		Minimum	12.8 mm (0.504 in.)
	Brush exposed length	STD	10.5 mm (0.413 in.)
		Minimum	1.5 mm (0.059 in.)
Generator regulator	Regulating voltage	at 25˚C (77˚F)	13.7 - 14.7 V
		at 115˚C (239˚F)	13.2 - 14.0 V

SS01F-02

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Generator x Generator bracket	51	520	38
Generator x Adjusting lever	18.5	189	25
Rectifier end frame x Drive end frame	4.5	45	39 in.·lbf
Generator pulley x Rotor	110	1,125	81
Drive end frame x Voltage regulator	2.0	20	17 in.·lbf
Generator rear end cover x Rectifier end frame	4.5	45	39 in.·lbf
Terminal insulator x Rectifier Holder	4.1	42	36 in.·lbf

AUTOMATIC TRANSMISSION

SS01M-03

SERVICE DATA

(A340E)		
Line pressure (wheel locked)	Engine idling	
	D position	382 - 441 kPa (3.9 - 4.5 kgf/cm^2, 55 - 64 psi)
	R position	598 - 696 kPa (6.1 - 7.1 kgf/cm^2, 87 - 101 psi)
	AT stall (Throttle valve fully opened)	
	D position	1,196 - 1,334 kPa (12.2 - 13.6 kgf/cm^2, 174 - 193 psi)
	R position	1,598 - 1,942 kPa (16.3 - 19.8 kgf/cm^2, 232 - 282 psi)
Engine stall revolution	D and R positions	2,250 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	700 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch runout	Max.	0.30 mm (0.0118 in.)
Torque converter clutch installation distance		More than 17.95 mm (More than 0.7067 in.)
Shift point		
D position		
(Throttle valve fully opened)	1→2	59 - 67 km/h (37 - 42 mph)
	2→3	112 - 122 km/h (70 - 76 mph)
	3→O/D	151 - 159 km/h (94 - 99 mph)
	O/D→3	144 - 152 km/h (89 - 94 mph)
	3→2	103 - 113 km/h (64 - 70 mph)
	2→1	47 - 54 km/h (29 - 34 mph)
(Throttle valve fully closed)	3→O/D	44 - 48 km/h (27 - 30 mph)
	O/D→3	23 - 28 km/h (14 - 17 mph)
2 position		
(Throttle valve fully opened)	1→2	59 - 67 km/h (37 - 42 mph)
	3→2	119 - 127 km/h (74 - 79 mph)
	2→1	47 - 54 km/h (29 - 34 mph)
L position		
(Throttle valve fully opened)	2→1	58 - 62 km/h (36 - 39 mph)
Lock-up point	(Throttle valve opening 5%)	
O/D gear (NORM and PWR)	Lock-up ON	75 - 80 km/h (47 - 50 mph)
	Lock-up OFF	68 - 73 km/h (42 - 45 mph)

(A340F)		
Line pressure (wheel locked)	Engine idling	
	D position	382 - 441 kPa (3.9 - 4.5 kgf/cm^2, 55 - 64 psi)
	R position	598 - 696 kPa (6.1 - 7.1 kgf/cm^2, 87- 101 psi)
	AT stall (Throttle valve fully opened)	
	D position	1,196 - 1,334 kPa (12.2 - 13.6 kgf/cm^2, 174 - 193 psi)
	R position	1,598 - 1,942 kPa (16.3 - 19.8 kgf/cm^2, 232 - 282 psi)
Engine stall revolution	D and R positions	2,250 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	700 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch runout	Max.	0.30 mm (0.0118 in.)
Torque converter clutch installation distance		More than 17.95 mm (More than 0.7067 in.)

Shift point		
D position		
(Throttle valve fully opened)	1→2	57 - 65 km/h (35 - 40 mph)
	2→3	107 - 120 km/h (66 - 75 mph)
	3→O/D	144 - 156 km/h (89 - 97 mph)
	O/D→3	137 - 149 km/h (85 - 93 mph)
	3→2	98 - 111 km/h (61 - 69 mph)
	2→1	45 - 53 km/h (28 - 33 mph)
(Throttle valve fully closed)	3→O/D	41 - 47 km/h (25 - 29 mph)
	O/D→3	22 - 27 km/h (14 - 17 mph)
2 position		
(Throttle valve fully opened)	1→2	57 - 65 km/h (35 - 40 mph)
	3→2	114 - 125 km/h (71 - 78 mph)
	2→1	45 - 53 km/h (28 - 33 mph)
L position		
(Throttle valve fully opened)	2→1	55 - 61 km/h (34 - 38 mph)
Lock-up point	(Throttle valve opening 5%)	
O/D gear (NORM and PWR)	Lock-up ON	72 - 78 km/h (45 - 48 mph)
	Lock-up OFF	65 - 71 km/h (40 - 44 mph)

SS01N-04

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Shift solenoid valve x Valve body		10	100	7
Valve body x Transmission case		10	100	7
Oil strainer x Valve body		10	100	7
Oil pan x Transmission case		7.4	75	65 in.·lbf
Drain plug		20	205	15
Parking lock pawl bracket x Transmission case		7.4	75	65 in.·lbf
Extension housing x Transmission case (A340E)		36	370	27
Transmission shift lever assembly		5.9	60	52
Transmission control rod x Shift lever		13	130	10
Rear mounting insulator x Transmission (A340E)		65	660	48
Rear mounting insulator x Transfer (A340F)		65	660	48
Rear mounting insulator x Rear mounting bracket (A340E)		18	185	13
Rear mounting insulator x Crossmember (A340F)		18	185	13
Frame x No. 3 Crossmember		72	730	53
Frame x No. 4 Crossmember		72	730	53
Drive plate x Crankshaft		83	850	61
Torque converter clutch x Drive plate		41	420	30
Oil filler pipe		12	120	9
Oil cooler pipe clamp	10 mm head bolt	5.0	51	44 in.·lbf
	12 mm head bolt	12	120	9
Oil cooler pipe union nut		34	350	25
Transmission x Engine		71	730	53
Transmission x Starter		39	400	29
Rear end plate x Transmission		18	185	13
Front exhaust pipe x Exhaust manifold		62	630	46
Front exhaust pipe x Tail pipe		48	490	35
Stabilizer bar bracket x Frame		25	260	19
Stabilizer bar link x Lower suspension arm		69	700	51
Exhaust pipe support bracket x Transmission		44	450	33
Exhaust pipe support bracket x Exhaust pipe		44	450	33
Propeller shaft x Differential (A340E)		74	750	54
Front differential x Front propeller shaft (A340F)		74	750	54
Front propeller shaft x Transfer (A340F)		74	750	54
Rear propeller shaft x Rear differential (A340F)		74	750	54
Rear propeller shaft x Transfer (A340F)		74	750	54
Park/neutral position switch	Nut	3.9	40	35 in.·lbf
	Bolt	13	130	10
No. 2 vehicle speed sensor		5.4	55	48 in.·lbf
ATF temperature sensor x Transmission case		15	150	11

TRANSFER (VF3AM)

SS086-03

SERVICE DATA

Transfer unit		
Hose insertion depth		13 mm (0.51 in.) or more
Oil pump body		
Body clearance	STD	0.09 - 0.16 mm (0.0035 - 0.0063 in.)
	Max.	0.16 mm (0.0063 in.)
Tip clearance	STD	0.05 - 0.15 mm (0.0020 - 0.0059 in.)
	Max.	0.15 mm (0.0059 in.)
Side clearance	STD	0.03 - 0.10 mm (0.0012 - 0.0039 in.)
	Max.	0.10 mm (0.0039 in.)
Rear output shaft		
Drive sprocket thrust clearance	STD	0.10 - 0.25 mm (0.0039 - 0.0098 in.)
	Max.	0.25 mm (0.0098 in.)
Drive sprocket radial clearance	STD	0.01 - 0.06 mm (0.0004 - 0.0024 in.)
	Max.	0.06 mm (0.0024 in.)
No. 2 shift fork claw thickness		11.85 mm (0.4665 in.)
High and low clutch sleeve groove distance		12.00 mm (0.4724 in.)
No. 2 shift fork to high and low clutch sleeve clearance	STD	0.15 - 0.35 mm (0.0059 - 0.138 in.)
	Max.	0.35 mm (0.138 in.)
Center differential lock fork claw thickness		10.2 mm (0.4016 in.)
Center differential lock sleeve groove distance		10.5 mm (0.4134 in.)
Center differential lock fork to center differential lock sleeve clearance		
	STD	0.26 - 0.84 mm (0.0102 - 0.0331 in.)
	Max.	0.84 mm (0.0331 in.)
No. 1 gear shift fork claw thickness		11.85 mm (0.4665 in.)
Front drive clutch sleeve groove distance		12.00 mm (0.4724 in.)
No. 1 gear shift fork to front drive clutch sleeve clearance	STD	0.15 - 0.35 mm (0.0059 - 0.0138 in.)
	Max.	0.35 mm (0.0138 in.)
Rear output shaft journal outer diameter		
Part A	STD	36.98 - 37.00 mm (1.4559 - 1.4567 in.)
	Min.	36.98 mm (1.4559 in.)
Part B	STD	27.98 - 27.99 mm (1.1016 - 1.1020 in.)
	Min.	27.98 mm (1.1016 in.)
Center differential planetary gear radial clearance	STD	0.01 - 0.04 mm (0.0004 - 0.0016 in.)
	Max.	0.04 mm (0.0016 in.)
Center differential planetary gear backlash	STD	0.01 - 0.04 mm (0.0004 - 0.0016 in.)
Center differential planetary gear thrust clearance	STD	0.15 - 0.70 mm (0.0059 - 0.0276 in.)
	Max.	0.70 mm (0.0276 in.)
Clutch hub snap ring thickness	Mark	
	K	2.00 - 2.05 mm (0.0787 - 0.0807 in.)
	L	2.05 - 2.10 mm (0.0807 - 0.0827 in.)
	A	2.10 - 2.15 mm (0.0827 - 0.0846 in.)
	B	2.15 - 2.20 mm (0.0846 - 0.0866 in.)
	C	2.20 - 2.25 mm (0.0866 - 0.0886 in.)
	D	2.25 - 2.30 mm (0.0886 - 0.0906 in.)
	E	2.30 - 2.35 mm (0.0906 - 0.0925 in.)
	F	2.35 - 2.40 mm (0.0925 - 0.0945 in.)
	G	2.40 - 2.45 mm (0.0945 - 0.0965 in.)
	H	2.45 - 2.50 mm (0.0965 - 0.0984 in.)
	J	2.50 - 2.55 mm (0.0984 - 0.1004 in.)

Input shaft		
Input shaft journal outer diameter	Min.	47.59 mm (1.8736 in.)
Input shaft bushing diameter	Max.	39.14 mm (1.5409 in.)
Input gear stopper snap ring thickness	Mark	
	A	2.10 - 2.15 mm (0.0827 - 0.0846 in.)
	B	2.15 - 2.20 mm (0.0846 - 0.0866 in.)
	C	2.20 - 2.25 mm (0.0866 - 0.0886 in.)
	D	2.25 - 2.30 mm (0.0886 - 0.0906 in.)
	E	2.30 - 2.35 mm (0.0906 - 0.0925 in.)
	F	2.35 - 2.40 mm (0.0925 - 0.0945 in.)
	G	2.40 - 2.45 mm (0.0945 - 0.0965 in.)
	H	2.45 - 2.50 mm (0.0965 - 0.0984 in.)
	J	2.50 - 2.55 mm (0.0984 - 0.1004 in.)
	K	2.55 - 2.60 mm (0.1004 - 0.1024 in.)
	L	2.60 - 2.65 mm (0.1024 - 0.1043 in.)
	M	2.65 - 2.70 mm (0.1043 - 0.1063 in.)
	N	2.70 - 2.75 mm (0.1063 - 0.1083 in.)
	P	2.75 - 2.80 mm (0.1083 - 0.1102 in.)
	Q	2.80 - 2.85 mm (0.1102 - 0.1122 in.)
	R	2.85 - 2.90 mm (0.1122 - 0.1142 in.)
	S	2.90 - 2.95 mm (0.1142 - 0.1161 in.)
	T	2.95 - 3.00 mm (0.1161 - 0.1181 in.)
	U	3.00 - 3.05 mm (0.1181 - 0.1201 in.)
Planetary gear		
Pinion gear thrust clearance	STD	0.11 - 0.84 mm (0.0043 - 0.0331 in.)
	Max.	0.84 mm (0.0331 in.)
Pinion gear radial clearance	STD	0.009 - 0.038 mm (0.0004 - 0.0015 in.)
	Max.	0.038 mm (0.0015 in.)
Outer bearing snap ring thickness	Mark	
	1	1.45 - 1.50 mm (0.0571 - 0.0591 in.)
	2	1.50 - 1.55 mm (0.0591 - 0.0610 in.)
	3	1.55 - 1.60 mm (0.0610 - 0.0630 in.)
	4	1.60 - 1.65 mm (0.0630 - 0.0650 in.)
	5	1.65 - 1.70 mm (0.0650 - 0.0669 in.)
Inner bearing press in depth		7.7 - 8.3 mm (0.0303 - 0.327 in.)
Oil seal		
Shift fork shaft drive in depth		-0.5 - 0.5 mm (-0.020 - 0.020 in.)
One touch 2-4 selector system		
Motor actuator		
2-3	STD resistance	0.3 - 100 Ω
2 or 3-body ground	STD resistance	More than 0.5 MΩ

SS087-07

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Transfer x Transfer adaptor	24	240	17
No. 4 crossmember x Frame	72	730	53
Engine rear mounting x Transmission	65	650	48
No. 3 crossmember x Frame	72	730	53
Engine rear mounting x No. 3 crossmember	18	185	13
Dynamic damper x Transfer	38	380	28
Drain and filler plugs	37	380	27
Transmission shift lever assembly	5.9	60	52 in.·lbf
Shift control rod x Transmission shift lever assembly	13	130	9
Vehicle speed sensor assembly	11	115	8
L4 position switch x Front case	37	380	27
Neutral position switch x Front case	37	380	27
Straight screw plug x Front case	37	380	27
Front bearing retainer x Front case	11	115	8
Control shift lever retainer x Front case	18	185	13
Front companion flange lock nut	118	1,200	87
Rear companion flange lock nut	118	1,200	87
Extension housing x Rear case	12	120	9
Front case x Rear case	28	285	21
Shift shaft stopper	19	190	14
Straight screw plug x Rear case	19	190	14
Actuator assembly x Rear case	20	200	14
No. 1 and No. 2 4WD position switches	37	380	27
Oil separator x Front case	7.5	80	69 in.·lbf
Oil pump body assembly x Front case	7.5	80	69 in.·lbf
Head screw plug for ring gear	19	190	14
Relief valve x Oil pump body	29	300	21
Oil pump plate x Oil pump body	7.4	75	65 in.·lbf

PROPELLER SHAFT

SS07Q-01

SERVICE DATA

Propeller shaft runout	Max.	0.8 mm (0.031 in.)
Spider bearing axial play		0.05 mm (0.0020 in.)
Spider bearing selection	Mark	
Bearing cup outer diameter	None	29.008 - 29.021 mm (1.1420 - 1.1426 in.)
	Red	29.028 - 29.041 mm (1.1428 - 1.1433 in.)
Bearing hole inner diameter	None	29.000 - 29.020 mm (1.1417 - 1.1425 in.)
	Drill	29.021 - 29.042 mm (1.1426 - 1.1434 in.)
Snap ring thickness	Mark or Color	
	1	2.100 - 2.150 mm (0.0827 - 0.0846 in.)
	2	2.150 - 2.200 mm (0.0846 - 0.0866 in.)
	3	2.200 - 2.250 mm (0.0866 - 0.0886 in.)
	Brown	2.250 - 2.300 mm (0.0886 - 0.0906 in.)
	Blue	2.300 - 2.350 mm (0.0906 - 0.0925 in.)
	6	2.350 - 2.400 mm (0.0925 - 0.0945 in.)
	7	2.400 - 2.450 mm (0.0945 - 0.0965 in.)
	8	2.450 - 2.500 mm (0.0965 - 0.0984 in.)

SS07R-01

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Propeller shaft x Differential	2WD	74	750	54
Front differential x Front propeller shaft	4WD	74	750	54
Front propeller shaft x Transfer	4WD	74	750	54
Propeller shaft x Rear differential	4WD	74	750	54
Propeller shaft x Transfer	4WD	74	750	54

SUSPENSION AND AXLE

SS04N-03

SERVICE DATA

Cold tire inflation pressure	Tire size		
	P225/75R15	Front	200 kPa (2.0 kgf/cm^2, 29 psi)
		Rear	200 kPa (2.0 kgf/cm^2, 29 psi)
	P265/70R16	Front	220 kPa (2.2 kgf/cm^2, 32 psi)
		Rear	220 kPa (2.2 kgf/cm^2, 32 psi)
Wheel alignment	Vehicle height		
	2WD	A*1 - B*2	72.2 mm (2.843 in.)
		C*3 - D*4	52.0 mm (2.047 in.)
	4WD	A*1 - B*2	69.9 mm (2.752 in.)
		C*3 - D*4	50.7 mm (1.996 in.)
	Camber		-0 °15' ± 45' (-0.25° ± 0.75°)
		Left-right error	30' (0.5°) or less
	Caster	2WD	3°15' ± 45' (3.25° ± 0.75°)
		4WD	3°05' ± 45' (3.06° ± 0.75°)
		Left-right error	30' (0.5°) or less
	Steering axis inclination		11°00' ± 45' (11° ± 0.75°)
		Left-right error	30' (0.5°) or less
	Toe-in (total)		0°12' ± 12' (0.2° ± 0.2°, 2 ± 2 mm, 0.08 ± 0.08in.)
		Tie rod end length difference	1.5 mm (0.059 in.) or less
	Wheel angle (Max.)		
		Inside wheel	35° (33° - 36°)
		Outside wheel	31°
Front drive shaft	Front drive shaft length		530.8 ± 5.0 mm (20.898 ± 0.197 in.)
Front suspension	Upper suspension ball joint turning torque		0.7 - 4.4 N·m (7 - 45 kgf·cm, 6 - 39 in.·lbf)
	Lower suspension ball joint turning torque		0.1 - 2.5 N·m (1 - 25 kgf·cm, 0.8 - 21.7 in.·lbf)
	Stabilizer bar link ball joint turning torque		0.05 - 2.0 N·m (0.5 - 20 kgf·cm, 0.4 - 17 in.·lbf)
	Lower suspension ball joint excessive play	Max.	0.5 mm (0.020 in.)
Rear axle shaft	Shaft runout	Max.	2.0 mm (0.079 in.)
	Flange runout	Max.	0.1 mm (0.004 in.)
	Axle shaft bearing backlash	Max.	0.7 mm (0.027 in.)

*1: Ground clearance of spindle center
*2: Ground clearance of front adjusting cam bolt center
*3: Ground clearance of rear axle shaft center
*4: Ground clearance of lower control arm front bushing center

Front differential	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)
	Drive pinion preload (at starting)	New bearing	1.2 - 1.9 N·m (12 - 19 kgf·cm, 10.4 - 16.5 in.·lbf)
		Reused bearing	0.6 - 1.0 N·m (6 - 10 kgf·cm, 5.2 - 8.7 in.·lbf)
	Total preload (at starting)		Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)
	Drive pinion to ring gear backlash		0.10 - 0.18 mm (0.0039 - 0.0071 in.)
	Side gear backlash		0 - 0.20 mm (0 - 0.0079 in.)
	Rear oil seal drive in depth		4.5 mm (0.177 in.)
	Side oil seal drive in depth		0 mm (0 in.)
	Side tube oil seal drive in depth		5.5 mm (0.217 in.)
	Side gear thrust washer thickness		0.96 - 1.04 mm (0.0378 - 0.0409 in.) 1.06 - 1.14 mm (0.0417 - 0.0449 in.) 1.16 - 1.24 mm (0.0457 - 0.0488 in.) 1.26 - 1.34 mm (0.0496 - 0.0528 in.)
	Side bearing adjusting washer thickness		2.00 - 2.02 mm (0.0787 - 0.0795 in.) 2.03 - 2.05 mm (0.0799 - 0.0807 in.) 2.06 - 2.08 mm (0.0811 - 0.0819 in.) 2.09 - 2.11 mm (0.0823 - 0.0831 in.) 2.12 - 2.14 mm (0.0835 - 0.0843 in.) 2.15 - 2.17 mm (0.0846 - 0.0854 in.) 2.18 - 2.20 mm (0.0858 - 0.0866 in.) 2.21 - 2.23 mm (0.0870 - 0.0878 in.) 2.24 - 2.26 mm (0.0882 - 0.0890 in.) 2.27 - 2.29 mm (0.0894 - 0.0902 in.) 2.30 - 2.32 mm (0.0906 - 0.0913 in.) 2.33 - 2.35 mm (0.0917 - 0.0925 in.) 2.36 - 2.38 mm (0.0929 - 0.0937 in.) 2.39 - 2.41 mm (0.0941 - 0.0949 in.) 2.42 - 2.44 mm (0.0953 - 0.0961 in.) 2.45 - 2.47 mm (0.0965 - 0.0972 in.) 2.48 - 2.50 mm (0.0976 - 0.0984 in.) 2.51 - 2.53 mm (0.0988 - 0.0996 in.) 2.54 - 2.56 mm (0.1000 - 0.1008 in.) 2.57 - 2.59 mm (0.1012 - 0.1020 in.) 2.60 - 2.62 mm (0.1024 - 0.1031 in.) 2.63 - 2.65 mm (0.1035 - 0.1043 in.) 2.66 - 2.68 mm (0.1047 - 0.1055 in.) 2.69 - 2.71 mm (0.1059 - 0.1067 in.) 2.72 - 2.74 mm (0.1071 - 0.1079 in.) 2.75 - 2.77 mm (0.1083 - 0.1091 in.) 2.78 - 2.80 mm (0.1094 - 0.1102 in.)

Front differential (cont'd)	Drive pinion bearing adjusting washer thickness	1.69 - 1.71 mm (0.0665 - 0.0673 in.) 1.72 - 1.74 mm (0.0677 - 0.0685 in.) 1.75 - 1.77 mm (0.0689 - 0.0697 in.) 1.78 - 1.80 mm (0.0701 - 0.0709 in.) 1.81 - 1.83 mm (0.0713 - 0.0720 in.) 1.84 - 1.86 mm (0.0724 - 0.0732 in.) 1.87 - 1.89 mm (0.0736 - 0.0744 in.) 1.90 - 1.92 mm (0.0748 - 0.0756 in.) 1.93 - 1.95 mm (0.0760 - 0.0768 in.) 1.96 - 1.98 mm (0.0772 - 0.0780 in.) 1.99 - 2.01 mm (0.0783 - 0.0791 in.) 2.02 - 2.04 mm (0.0795 - 0.0803 in.) 2.05 - 2.07 mm (0.0807 - 0.0815 in.) 2.08 - 2.10 mm (0.0819 - 0.0827 in.) 2.11 - 2.13 mm (0.0831 - 0.0839 in.) 2.14 - 2.16 mm (0.0843 - 0.0850 in.) 2.17 - 2.19 mm (0.0854 - 0.0862 in.) 2.20 - 2.22 mm (0.0866 - 0.0874 in.) 2.23 - 2.25 mm (0.0878 - 0.0886 in.) 2.26 - 2.28 mm (0.0890 - 0.0898 in.) 2.29 - 2.31 mm (0.0902 - 0.0909 in.) 2.32 - 2.34 mm (0.0913 - 0.0921 in.)
	w/ A.D.D. A.D.D. sleeve fork to clutch sleeve clearance	0.35 mm (0.0138 in.)
	Differential case needle bearing press in depth	0.3 ± 0.3 mm (0.012 ± 0.012 in.)

Rear differential	Companion flange vertical runout	Max.	0.10 mm (0.0039 in.)
	Companion flange lateral runout	Max.	0.10 mm (0.0039 in.)
	Ring gear runout	Max.	0.07 mm (0.0028 in.)
	Differential case runout	Max.	0.07 mm (0.0028 in.)
	Drive pinion preload (at starting)	New bearing Reused bearing	0.9 - 1.6 N·m (10 - 16 kgf·cm, 8.7 - 13.9 in.·lbf) 0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in.·lbf)
	Total preload (at starting)		Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)
	Drive pinion to ring gear backlash		0.13 - 0.18 mm (0.0051- 0.0071 in.)
	Side gear backlash		0.05 - 0.20 mm (0.0020 - 0.0079 in.)
	Shift fork to sleeve clearance		0.15 - 0.35 mm (0.006 - 0.0014 in.)
	Oil seal drive in depth		1.0 mm (0.039 in.)
	Side gear thrust washer thickness		0.9 mm (0.035 in.) 1.0 mm (0.039 in.) 1.1 mm (0.043 in.) 1.2 mm (0.047 in.) 1.3 mm (0.051 in.)
	Drive pinion preload adjusting shim thickness		1.70 mm (0.0669 in.) 1.73 mm (0.0681 in.) 1.76 mm (0.0693 in.) 1.79 mm (0.0705 in.) 1.82 mm (0.0717 in.) 1.85 mm (0.0728 in.) 1.88 mm (0.0740 in.) 1.91 mm (0.0752 in.) 1.94 mm (0.0764 in.) 1.97 mm (0.0776 in.) 2.00 mm (0.0787 in.) 2.03 mm (0.0799 in.) 2.06 mm (0.0811 in.) 2.09 mm (0.0823 in.) 2.12 mm (0.0835 in.) 2.15 mm (0.0846 in.) 2.18 mm (0.0858 in.) 2.21 mm (0.0870 in.) 2.24 mm (0.0882 in.) 2.27 mm (0.0894 in.) 2.30 mm (0.0906 in.) 2.33 mm (0.0917 in.)

SS04O-03

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
FRONT			
Hub nut	110	1,150	83
Rack end lock nut	55	560	41
Steering knuckle x Lower ball joint	50	510	37
Tie rod end x Lower ball joint	91	930	67
Steering knuckle x Brake caliper	123	1,250	90
Steering knuckle x Brake line bracket	28	285	21
Steering knuckle x Brake dust cover	18	185	13
Drive shaft lock nut	235	2,400	174
Upper suspension arm x Upper ball joint	105	1,100	80
Lower suspension arm x Frame	130	1,325	96
Upper suspension arm x Frame	115	1,200	87
Lower suspension arm x Lower ball joint	140	1,450	103
Lower suspension arm x No.1, No.2 spring bumper	23 (31)	235 (316)	17 (23)
Frame x Suspension support	64	650	47
Shock absorber x Suspension support	25	250	18
Lower suspension arm x Shock absorber	135	1,400	101
Lower suspension arm x Stabilizer bar link	69	700	51
Stabilizer bar x Stabilizer bar link	19	190	14
Stabilizer bar bracket x Frame	25	260	19
ABS speed sensor x Steering knuckle	8.0	82	71 in.·lbf
ABS speed sensor wire harness clamp x Steering knuckle	8.0	82	71 in.·lbf
ABS speed sensor wire harness clamp x Upper suspension arm	8.0	82	71 in.·lbf
Differential x Propeller shaft	74	750	54
Drive pinion nut	See page SA-37		
Differential front mounting cushion x Frame	137	1,400	101
Differential rear mounting cushion x Frame	87	890	64
Differential front mounting cushion x Differential	157	1,600	116
Differential rear mounting cushion x Differential	108	1,100	80
Ring gear x differential case	97	985	71
Differential carrier x Differential tube	105	1,070	77
Differential carrier x Side bearing retainer	69	700	51
A.D.D. clutch case x Differential	78	800	58
A.D.D. clutch case x Differential case tube	78	800	58
A.D.D. actuator x A.D.D. clutch case	21	210	15
Screw plug x Clutch case cover	20	200	14
Screw plug x A.D.D. actuator	13	130	9
A.D.D. switch x Clutch case cover	40	410	30
Drain plug	65	660	48
Filler plug	39	400	29

( ): For use without SST

Part tightened		N·m	kgf·cm	ft·lbf
REAR				
Hub nut		110	1,150	83
Axle housing x Backing plate		66	670	48
Brake line		15	155	11
Parking brake bellcrank bracket x Backing plate		13	130	9
Shock absorber x Axle housing		65	650	47
Piston rod set nut		20	200	14
Upper control arm x Frame		86	880	64
Upper control arm x Axle housing		86	880	64
Lower control arm x Frame		145	1,480	107
Lower control arm x Axle housing		145	1,480	107
Lateral control rod x Frame		86	880	64
Lateral control rod x Axle housing		86	880	64
Stabilizer bar x Stabilizer bar link		69	700	51
Stabilizer bar bracket x Axle housing		19	195	14
Stabilizer bar link x Frame		20	200	14
LSP & BV x Lateral control rod		13	130	9
Parking brake cable bracket x Axle housing		13	130	9
ABS speed sensor x Axle housing		8.0	82	71 in.·lbf
Differential x Propeller shaft		74	750	54
Drive pinion nut	Maximum torque	See page SA-103		
Differential carrier x Axle housing	w/o Diff. lock	73	740	54
	w/ Diff. lock	25	250	18
Differential carrier x Bearing cap		85	870	63
Differential case x Ring gear		97	985	71
Adjusting nut lock nut x Bearing cap		13	130	9
Differential RH case x Differential LH case		47	480	35
Differential carrier x Diff. lock indicator switch		40	410	31
Differential carrier x Shaft retainer		24	240	17
Differential carrier x Screw plug		22	220	16
Differential carrier x Actuator		26	270	20
Drain plug and filler plug		49	500	36

BRAKE

SS080-02

SERVICE DATA

Brake pedal height (from asphalt sheet)		158.1 - 168.1 mm (6.224 - 6.618 in.)
Brake pedal freeplay		1 - 6 mm (0.12 - 0.24 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)		More than 75 mm (2.83 in.)
Front brake pad thickness	STD	11.5 mm (0.453 in.)
	Minimum	1.0 mm (0.039 in.)
Disc thickness	STD	22.0 mm (0.866 in.)
	Minimum	20.0 mm (0.787 in.)
Disc runout	Maximum	0.07 mm (0.0028 in.)
Rear brake drum inside diameter	STD	295.0 mm (11.614 in.)
	Maximum	297.0 mm (11.693 in.)
Rear brake shoe lining thickness	STD	6.0 mm (0.236 in.)
	Minimum	1.0 mm (0.039 in.)
Rear brake drum to shoe clearance		0.5 mm (0.020 in.)
Parking brake lever travel at 196 N (20 kgf, 44 lbf)		7 - 9 clicks

SS081-02

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Brake line union nut		15	155	11
Hydraulic brake booster clevis lock nut		25	260	19
Hydraulic brake booster x Pedal bracket		14	140	10
Bleeder plug		11	110	8
Front disc brake caliper x Steering knuckle		123	1,250	90
Front disc brake caliper x Brake line union nut		15	155	11
Parking brake bellcrank bracket x Backing plate		13	130	9
Rear drum brake wheel cylinder x Backing plate		10	100	7
Reservoir set screw		1.7	18	16 in.·lbf
Union bolt		32	320	23
Oil pressure sensor x Hydraulic brake booster		81	830	60
Accumulator x Booster pump motor		54	550	36
No. 1 hanger set bolt		7.8	80	69 in.·lbf
No. 2 hanger set bolt		7.8	80	69 in.·lbf
Fluid level warning switch connector clamp set bolt		7.8	80	69 in.·lbf
Speed sensor harness x Steering knuckle and upper arm		8.0	82	71 in.·lbf
Speed sensor harness x Side rail		12	122	9
Speed sensor installation bolt	front	8.0	82	71 in.·lbf
	rear	10	100	7

STEERING

SERVICE DATA

SS00J-03

DRIVE BELT		
Drive belt tension	New belt	135-180 lbf
Drive belt tension	Used belt	85-120 lbf
POWER STEERING FLUID		
Oil level rise	Maximum	5 mm (0.20 in.)
Oil pressure at idle speed with valve closed	Minimum	8,336 kPa (85 kgf/cm^2, 1,209 psi)
STEERING WHEEL		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering effort at idle speed	Reference:	4.9 N·m (50 kgf·cm, 43 in.·lbf)
PS VANE PUMP		
Pump rotating torque	Maximum	0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less
Pump shaft and front housing bushing oil clearance	STD	0.03-0.05 mm (0.0012-0.0020 in.)
Pump shaft and front housing bushing oil clearance	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.6 mm (0.339 in.)
Vane plate thickness	Minimum	1.397 mm (0.0550 in.)
Vane plate length	Minimum	14.991 mm (0.5902 in.)
Vane plate and pump rotor groove clearance	Maximum	0.035 mm (0.0014 in.)
Vane plate length	Pump rotor and cam ring mark	
	None	14.999 - 15.001 mm (0.59051 - 0.59059 in.)
	1	14.997 - 14.999 mm (0.59043 - 0.59051 in.)
	2	14.995 - 14.997 mm (0.59035 - 0.59043 in.)
	3	14.993 - 14.995 mm (0.59027 - 0.59035 in.)
	4	14.991 - 14.993 mm (0.59020 - 0.59027 in.)
Flow control valve spring length	Minimum	33.2 mm (1.307 in.)
PS GEAR		
Steering rack runout	Maximum	0.03 mm (0.0118 in.)
Total preload	Turning	0.5 - 1.7 N·m (4.7 - 17.2 kgf·cm, 4.1 - 14.9 in.·lbf)

SS00K-03

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
NON-TILT AND TILT STEERING COLUMN				
Steering wheel set nut		50	510	37
Steering wheel pad set screw (Torx screw)		8.8	90	78 in.·lbf
Steering column assembly set nut		26	260	19
Main shaft assembly x Universal joint No. 2		35	360	26
Universal joint No. 2 x Intermadiate shaft No. 2		35	360	26
Control valve shaft x Intermediate shaft No. 2		35	360	26
Column hole cover No. 2 x Column hole cover x Body		8.0	80	69 in.·lbf
Tilt lever retainer set bolt	Tilt steering column	20	200	14
PS VANE PUMP				
Union bolt x Pressure feed tube		47	475	34
Pressure port union x Pump housing		83	850	61
Bracket x Pump assembly		43	440	32
Oil reservoir set bolt	Front	13	130	9
	Rear	24	240	17
Vane pump pulley set nut		43	440	32
Front housing x Rear housing		24	240	17
Vane pump assembly with bracket set bolt and nut		43	440	32
Oil pressure switch x Pressure feed tube		21	210	15
PS GEAR				
Cylinder end stopper		58 (78)	590 (800)	43 (58)
Bearing guide nut x Control valve housing		25	250	18
Control valve housing set bolt		18	180	13
Rack guide spring cap lock nut		51 (69)	520 (700)	38 (51)
Rack x Rack end		76 (103)	770 (1,050)	56 (76)
Tie rod end lock nut		55	560	41
Turn pressure tube union nut		23 (25)	230 (250)	17 (18)
PS gear assembly set bolt		165	1,700	123
PS gear assembly set bolt and nut		190	1,950	141
Bracket x Body		165	1,700	123
Pressure feed tube x Control valve housing		41 (45)	420 (460)	30 (33)
Return tube x Control valve housing		45 (49)	460 (500)	33 (36)
Universal joint No. 2 x Intermediate shaft No. 2		35	360	26
Control valve shaft x Intermediate shaft No. 2		35	360	26
Steering wheel set nut		34	350	25
Stabilizer bar link set nut	Upper	19	190	14
	Lower	69	700	51
Stabilizer bar Bracket set bolt and nut		25	260	19
Tie rod end x Lower arm		91	930	67

( ): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

SS01W-06

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	34	350	25
Steering wheel pad	9.0	90	78 in.·lbf
Front passenger airbag assembly x Instrument panel reinforcement	19	195	14
Front passenger airbag assembly assembly x Instrument panel	5.4	55	48 in.·lbf
Airbag sensor assembly	21	210	15

BODY ELECTRICAL

SERVICE DATA

SS07S-02

SPEEDOMETER (Using a speedometer tester)	
USA:	
Standard indication (mph)	Allowable range (mph)
20	18 - 24
40	38 - 44
60	58 - 66
80	78 - 88
100	98 - 110
120	118 - 132
CANADA:	
Standard indication (km/h)	Allowable range (km/h)
20	17 - 24
40	38 - 46
60	57.5 - 67
80	77 - 88
100	96 - 109
120	115 - 130
140	134 - 151.5
160	153 - 173
TACHOMETER (On-Vehicle)	
Standard indication (rpm)	Allowable range (rpm)
700	630 - 770
1,000	900 - 1,100
2,000	1,850 - 2,150
3,000	2,800 - 3,200
4,000	3,800 - 4,200
5,000	4,800 - 5,200
6,000	5,750 - 6,250
ENGINE COOLANT TEMPERATURE SENDER GAUGE	
50˚C (122.0˚F)	234 - 314 Ω
120˚C (248.0˚F)	24.0 - 30.5 Ω

BODY

TORQUE SPECIFICATION

SS07X-04

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER	-	-	-
Front bumper reinforcement set bolt	58	590	43
Front bumper arm set nut	12	120	9
Front bumper arm set bolt	58	590	43
Front bumper x Side mounting bracket	12	120	9
Side mounting bracket x Body	25	250	18
Front balance panel x Front bumper extension (Over fender type)	5.0	50	43 in.·lbf
REAR BUMPER	-	-	-
Rear bumper arm x Body	18	180	13
Rear bumper arm x Rear bumper bar	18	180	13
Rear bumper side bracket set bolt	18	180	13
Rear bumper bar set bolt	18	180	13
Rear bumper extension set bolt	18	180	13
Rear bumper side stay set bolt	18	180	13
HOOD	-	-	-
Hood hinge x Hood	13	130	9
Hood lock x Body	7.8	80	69 in.·lbf
FRONT DOOR	-	-	-
Door hinge x Body	23	230	17
Door hinge x Door panel	23	230	17
Door lock striker x Body	13	130	9
Door lock x Door panel	5.0	50	43 in.·lbf
Window regulator x Door panel	5.0	50	43 in.·lbf
Outside handle x Door panel	5.0	50	43 in.·lbf
REAR DOOR	-	-	-
Door hinge x Body	23	230	17
Door hinge x Door panel	23	230	17
Door lock striker x Body	13	130	9
Door lock x Door panel	5.0	50	43 in.·lbf
Window regulator x Door panel	5.0	50	43 in.·lbf
Outside handle x Door panel	5.0	50	43 in.·lbf
BACK DOOR	-	-	-
Door hinge x Body (Nut)	33	330	25
Door hinge x Door panel (Bolt)	23	230	17
Glass guide rail x Door panel	5.0	50	43 in.·lbf
Door lock x Door panel	7.0	70	61 in.·lbf
Window regulator x Door panel	5.0	50	43 in.·lbf
Damper stay	17.5	170	12
FRONT WIPER AND WASHER	-	-	-
Wiper arm x Wiper link	20	205	15
Wiper link x Body	5.4	55	48 in.·lbf
Wiper motor x Body	5.4	55	48 in.·lbf

REAR WIPER AND WASHER		-	-	-
Wiper arm x Wiper motor		5.4	55	48 in.·lbf
Wiper motor x Body		5.4	55	48 in.·lbf
BODY OUTSIDE MOULDING		-	-	-
Over fender type:		-	-	-
Front bumper extension set nut		5.0	50	43 in.·lbf
Front wheel opening extension retainer set bolt		5.0	50	43 in.·lbf
Rocker panel moulding retainer set nut		5.0	50	43 in.·lbf
Rocker panel moulding set bolt		5.0	50	43 in.·lbf
Rear door outside moulding x Body		5.0	50	43 in.·lbf
Quarter garnish front retainer x Body		5.0	50	43 in.·lbf
Wheel arch moulding type:		-	-	-
Front fender wheel opening moulding x Body		5.0	50	43 in.·lbf
Quarter wheel opening moulding x Body		5.0	50	43 in.·lbf
SLIDING ROOF		-	-	-
Sliding roof housing x Body	Nut	7.4	75	65 in.·lbf
	Bolt	7.4	75	65 in.·lbf
INSTRUMENT PANEL		-	-	-
Front passenger airbag assembly x Instrument panel reinforcement		19	195	14
Front passenger airbag assembly x Instrument panel		5.4	55	48 in.·lbf
SIDE STEP		-	-	-
No. 1 side step bracket x Body		18	184	13
No. 2 side step bracket x Body		18	184	13
No. 3 side step bracket x Body		18	184	13
Step plate x No. 1 side step bracket		5.0	51	44 in.·lbf
Step plate x No. 2 side step bracket		5.0	51	44 in.·lbf
Step plate x No. 3 side step bracket		5.0	51	44 in.·lbf
FRONT SEAT		-	-	-
Seat truck x Seat cushion frame		18	185	13
Seat truck x Seatback frame		43	440	32
Inner belt x Seat truck		42	430	31
Seat truck x Body		37	375	27
w/ Power seat:		-	-	-
Seat support screw x Seat truck		25	260	19
Seat support screw x Slide motor support bracket		4.4	45	39 in.·lbf
Slide motor support bracket x Seat truck		19	195	14
REAR NO. 1 SEAT		-	-	-
Seatback lock control x Seatback frame		18	185	13
Seat hinge x Body		18	185	13
REAR NO. 2 SEAT		-	-	-
Seat lock striker x Body	Front side	18	185	13
	Rear side	42	430	31
Reclining adjuster x Seatback frame		29	300	22
Rear No. 2 seat lap belt x Hinge		42	430	31
Hinge x Body		39	400	29

SEAT BELT		-	-	-
Adjustable anchor x Body		42	430	31
Front seat outer belt shoulder anchor x Body		42	430	31
Front seat outer belt floor anchor x Body		42	430	31
Front seat outer belt retractor x Body	Upper bolt	8.5	85	74 in.·lbf
	Lower bolt	42	430	31
Front seat inner belt x Seat track		42	430	31
Rear No. 1 seat outer belt shoulder anchor x Body		42	430	31
Rear No. 1 seat outer belt floor anchor x Body		42	430	31
Rear No. 1 seat outer belt retractor x Body		42	430	31
Rear seat center belt x Body		42	430	31
Rear No. 2 seat outer belt shoulder anchor x Body		42	430	31
Rear No. 2 seat outer belt floor anchor x Body		42	430	31
Rear No. 2 seat outer belt retractor x Body		42	430	31

AIR CONDITIONING

SERVICE DATA

SS072-01

Refrigerant charge volume	650 ± 50 g (22.92 ± 1.76 oz.)
Drive belt tension	-
New belt	160 ± 25 lbf
Used belt	100 ± 20 lbf
Idle-up speed (3RZ-FE)	-
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	900 ± 50 rpm
Idle-up speed (5VZ-FE)	-
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	850 ± 50 rpm
Magnetic clutch clearance	0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

SS073-02

TORQUE SPECIFICATION

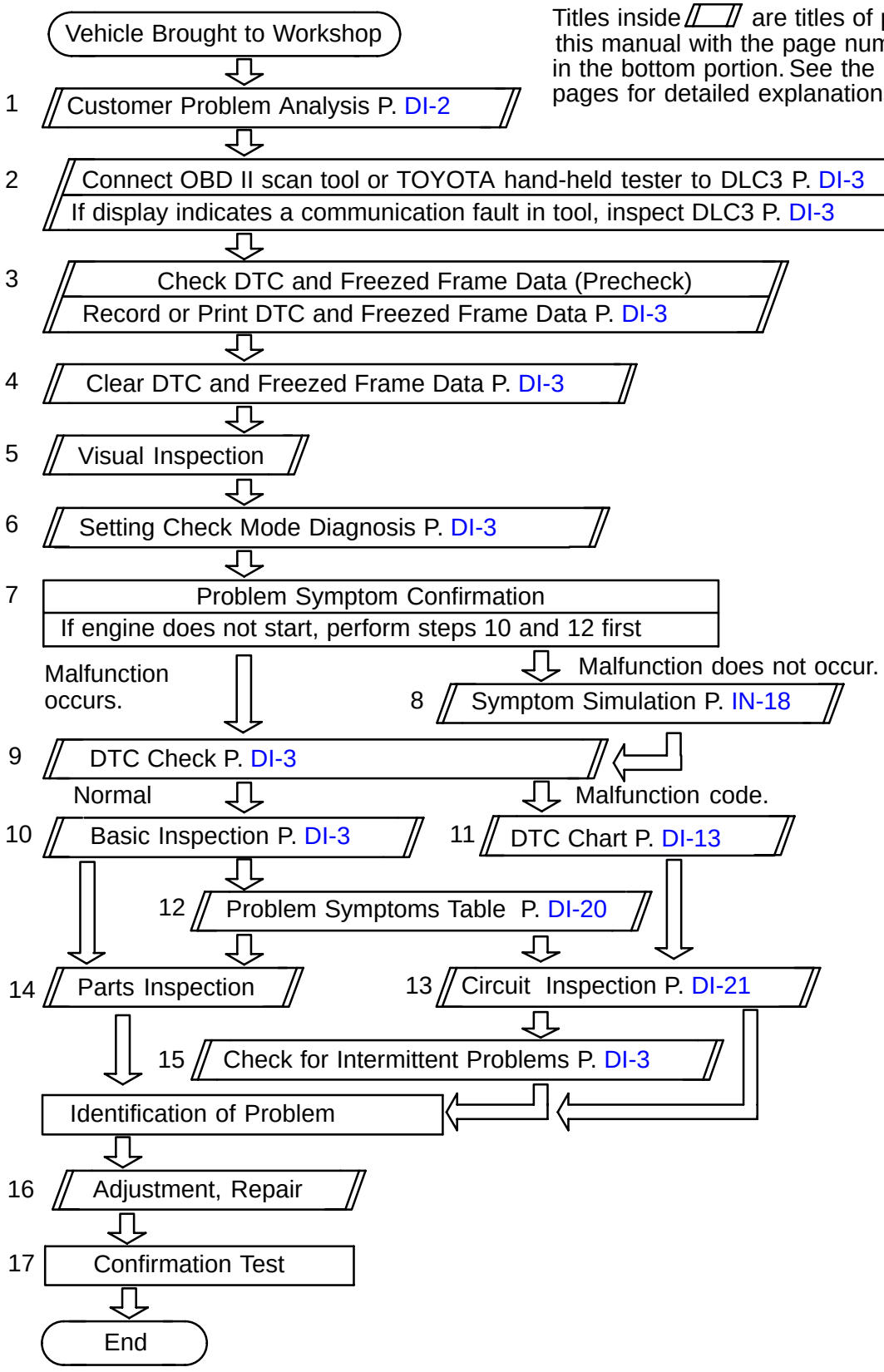
Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Compressor bracket	25	250	18
Compressor bracket x Engine	37	375	27
Idle pulley lock nut	39	400	29
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Cooling unit x Suction tube	32	330	24
Expansion valve x Evaporator	5.4	55	48in.·lbf
Receiver x Liquied tube	5.4	55	48 in.·lbf
Condenser x Liquid tube	10	100	7
Condenser x Discharge hose	10	100	7
Pressure switch x Liquied tube	10	100	7
Pressure plate x Compressor	13.2	135	9

ENGINE (5VZ-FE)

DI0RJ-07

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



Titles inside ▱ are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

DI0RK-06

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE CONTROL SYSTEM Check Sheet

Inspector's Name

Customer's Name		Model and Model Year	
Driver's Name		Frame No.	
Date Vehicle Brought in		Engine Model	
License No.		Odometer Reading	km miles

Problem Symptoms	☐ Engine does not Start	☐ Engine does not crank ☐ No initial combustion ☐ No complete combustion
	☐ Difficult to Start	☐ Engine cranks slowly ☐ Other _____
	☐ Poor Idling	☐ Incorrect first idle ☐ Idling rpm is abnormal ☐ High (rpm) ☐ Low (rpm) ☐ Rough idling ☐ Other _____
	☐ Poor Driveability	☐ Hesitation ☐ Back fire ☐ Muffler explosion (after-fire) ☐ Surging ☐ Knocking ☐ Other _____
	☐ Engine Stall	☐ Soon after starting ☐ After accelerator pedal depressed ☐ After accelerator pedal released ☐ During A/C operation ☐ Shifting from N to D ☐ Other _____
	☐ Others	

Dates Problem Occurred		
Problem Frequency		☐ Constant ☐ Sometimes (times per day/month) ☐ Once only ☐ Other _____
Condition When Problem Occurs	Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/Other _____
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (approx. ____°F/____°C)
	Place	☐ Highway ☐ Suburbs ☐ Inner city ☐ Uphill ☐ Downhill ☐ Rough road ☐ Other _____
	Engine Temperature	☐ Cold ☐ Warming up ☐ After warming up ☐ Any temperature ☐ Other _____
	Engine Operation	☐ Starting ☐ Just after starting (min.) ☐ Idling ☐ Racing ☐ Driving ☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ A/C switch ON/OFF ☐ Other _____

Condition of MIL		☐ Remains on ☐ Sometimes lights up ☐ Does not light up
DTC Inspection	Normal Mode (Precheck)	☐ Normal ☐ Malfunction code(s) (code) ☐ Freezed frame data ( )
	Check Mode	☐ Normal ☐ Malfunction code(s) (code) ☐ Freezed frame data ( )

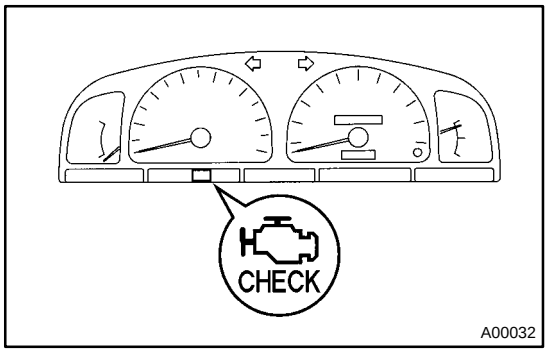
DI8XG-01

PRE-CHECK

1. DIAGNOSIS SYSTEM

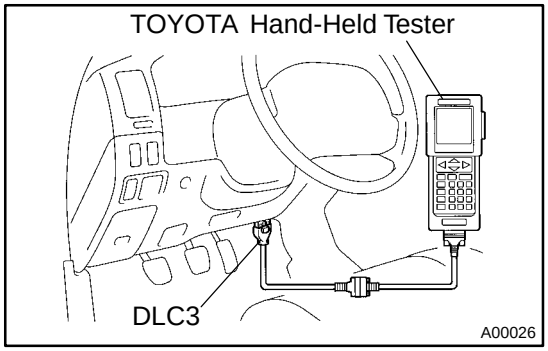
(a) Description

- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect the vehicle to the OBD II scan tool complying with SAE J1978 or TOYOTA hand-held tester, and read off various data output from the vehicle's ECM.



- OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the emission control system/components or in the powertrain control components which affect vehicle emissions, or a malfunction in the computer. In addition to the MIL lighting up when a malfunction is detected, the applicable Diagnostic Trouble Codes (DTCs) prescribed by SAE J2012 are recorded in the ECM memory (See page DI-13).

If the malfunction does not reoccur in 3 consecutive trips, the MIL goes off but the DTCs remain recorded in the ECM memory.



- To check the DTC, connect the OBD II scan tool or TOYOTA hand-held tester to the Data Link Connector 3 (DLC3) on the vehicle. The OBD II scan tool or TOYOTA hand-held tester also enables you to erase the DTC and check freezed frame data and various forms of engine data (For operating instructions, see the OBD II scan tool's instruction book.). DTC include SAE controlled codes and manufacturer controlled codes. SAE controlled codes must be set as prescribed by the SAE, while manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI-13).

- The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most DTC use 2 trip detection logic* to prevent erroneous detection, and ensure thorough malfunction detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily (TOYOTA hand-held tester only). (See step 2)
- *2 trip detection logic:
  When a malfunction is 1st detected, the malfunction is temporarily stored in the ECM memory. (1st trip)

If the same malfunction is detected again during the second drive test, this second detection causes the MIL to light up. (2nd trip) (However, the ignition switch must be turned OFF between the 1st trip and 2nd trip.).

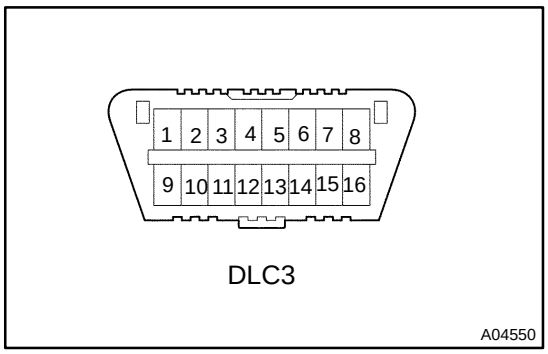
- Freeze frame data:
  Freeze frame data records the engine condition when a misfire (DTCs P0300 - P0306) or fuel trim malfunction (DTCs P0171,P0172, P0174 and P0175) or other malfunction (first malfunction only), is detected. Because freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Priorities for troubleshooting:

If troubleshooting priorities for multiple DTC are given in the applicable DTC chart, these should be followed.

If no instructions are given, troubleshoot DTC according to the following priorities.

(1) DTC other than fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175) and misfire (DTCs P0300 - P0306).
(2) Fuel trim malfunction (DTCs P0171, P0172, P0174 and P0175).
(3) Misfire (DTCs P0300 - P0306).

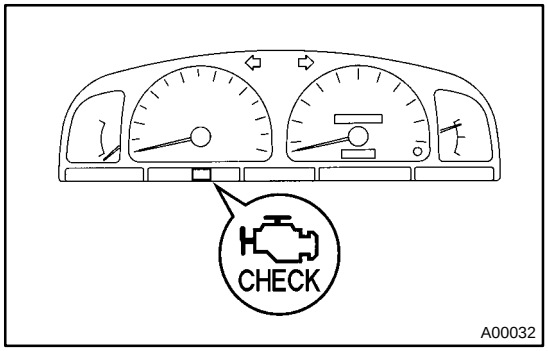


(b) Check the DLC3.
The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 9141-2 format.

Terminal No.	Connection/Voltage or Resistance	Condition
7	Bus ⊕ Line/Pulse generation	During transmission
4	Chassis Ground ↔ Body Ground/1 Ω or less	Always
5	Signal Ground ↔ Body Ground/1 Ω or less	Always
16	Battery Positive ↔ Body Ground/9 - 14 V	Always

HINT:
If your display shows UNABLE TO CONNECT TO VEHICLE when you have connected the cable of the OBD II scan tool or TOYOTA hand-held tester to the DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect the DLC3 on the original vehicle.
- If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



2. INSPECT DIAGNOSIS (Normal Mode)

(a) Check the MIL.

(1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

HINT:
If the MIL does not light up, troubleshoot the combination meter (See page BE-2).

(2) When the engine started, the MIL should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(b) Check the DTC.

NOTICE:

- **If there is no DTC in the normal mode, check the 1st trip DTC using Continuous Test Results function (Mode 7 for SAE J1979) on the OBDII scan tool or TOYOTA hand-held tester.**

- **TOYOTA hand-held tester only:**
  When the diagnosis system is switched from the normal mode to the check mode, it erases all DTC and freezed frame data recorded in the normal mode. So before switching modes, always check the DTC and freezed frame data, and note them down.
  (1) Prepare the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester.
  (2) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3 at the lower center of the instrument panel.
  (3) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester switch ON.
  (4) Use the OBD II scan tool or TOYOTA hand-held tester to check the DTC and freezed frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book.).

If there is no DTC in the normal mode, check the 1st trip DTC using Continuous Test Results function (Mode 7 for SAE J1979) on the OBDII scan tool or TOYOTA hand-held tester.

(5) See page DI-3 to confirm the details of the DTC.

NOTICE:

- **When simulating symptoms with an OBD II scan tool (excluding TOYOTA hand-held tester) to check the DTC, use the normal mode. For code on the DTC chart subject to "2 trip detection logic", performe the following either action.**
- **Turn the ignition switch OFF after the symptom is simulated the 1st time. Then repeat the simulation process again. When the problem has been simulated twice, the MIL lights up and the DTCs are recorded in the ECM.**
- **Check the 1st trip DTC using Mode 7 (Continuous Test Results) for SAE J1979.**

(c) Clear the DTC.
The DTCs and freezed frame data will be erased by either action.

- Operating the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
- Disconnecting the battery terminals or EFI fuse.

NOTICE:

If the TOYOTA hand-held tester switches the ECM from the normal mode to the check mode or vice-versa, or if the ignition switch is turned from ON to ACC or OFF during the check mode, the DTCs and freezed frame data will be erased.

3. INSPECT DIAGNOSIS (Check Mode)

HINT:

TOYOTA hand-held tester only:

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.

(a) Check the DTC.

(1) Initial conditions.

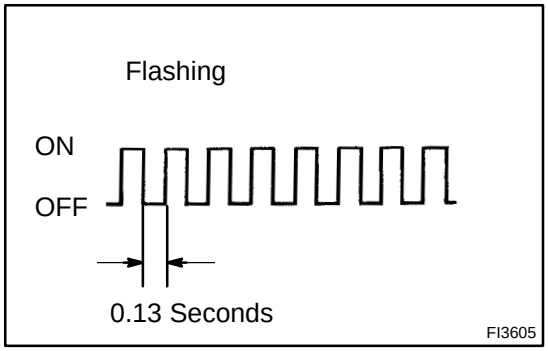
- Battery positive voltage 11 V or more
- Throttle valve fully closed
- Transmission in P or N position
- A/C switched OFF

(2) Turn the ignition switch OFF.

(3) Prepare the TOYOTA hand-held tester.

(4) Connect the TOYOTA hand- held tester to the DLC3 at the lower center of the instrument panel.

(5) Turn the ignition switch ON and push the TOYOTA hand-held tester switch ON.



(6) Switch the TOYOTA hand-held tester from the normal mode to the check mode (Check that the MIL flashes.).

NOTICE:

If the TOYOTA hand-held tester switches the ECM from the normal mode to the check mode or vice-versa, or if the ignition switch is turned from ON to ACC or OFF during the check mode, the DTC and freezed frame data will be erased.

(7) Start the engine (The MIL goes out after the engine start.).

(8) Simulate the conditions of the malfunction described by the customer.

NOTICE:

Leave the ignition switch ON until you have checked the DTC, etc.

(9) After simulating the malfunction conditions, use the TOYOTA hand-held tester diagnosis selector to check the DTC and freezed frame data, etc.

HINT:
Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check mode to normal mode. So all DTC, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

4. FAIL-SAFE CHART

If any of the following codes is recorded, the ECM enters fail-safe mode.

DTC No.	Fail-Safe Operation	Fail-Safe Deactivation Conditions
P0100	Ignition timing fixed at 10° BTDC	Returned to normal condition
P0110	Intake air temp. is fixed at 20°C (68°F)	Returned to normal condition
P0115	Engine coolant temp. is fixed at 80°C (176°F)	Returned to normal condition
P0120	VTA is fixed at 0°	Following condition must be repeated at least 2 times consecutively: (a) VTA ≧ 0.1 V and ≦ 0.95 V, Vehicle speed= 0 km/h (only ECT) (b) Vehicle speed: 0 km/h (0 mph) (only for A/T)
P0135 P0141	The heater circuit in witch an abnormality is detected is turned off	Ignition switch OFF
P0325 P0330	Max. timing retardation	Ignition switch OFF
P1300	Fuel cut	Returned to normal condition

5. CHECK FOR INTERMITTENT PROBLEMS

HINT:
TOYOTA hand-held tester only:
By putting the vehicle's ECM in the check mode, 1 trip detection logic is possible instead of 2 trip detection logic and sensitivity to detect open circuits is increased. This makes it easier to detect intermittent problems.

(a) Clear the DTCs (See step 2).
(b) Set the check mode (See step 3).
(c) Perform a simulation test (See page IN-18).
(d) Check the connector and terminal (See page IN-28).
(e) Handle the connector (See page IN-28)

6. BASIC INSPECTION

When the malfunction code is not confirmed in the DTC check, troubleshooting should be performed in order for all possible circuits to be considered as the causes of the problems. In many cases, by carrying out the basic engine check shown in the following flow chart, the location causing the problem can be found quickly and efficiently. Therefore, use of this check is essential in engine troubleshooting.

1	**Is battery positive voltage 11 V or more when engine is stopped?**

NO → **Charge or replace battery.**

YES

2	**Is engine cranked?**

NO	**Proceed to page ST-15 , and continue to trouble-shoot.**

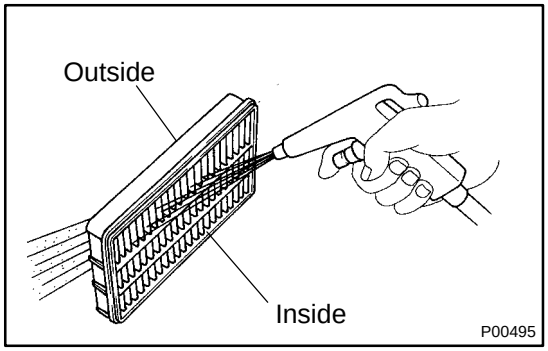
YES

3	**Does engine start?**

NO	**Go to step 7.**

YES

4	**Check air filter.**



PREPARATION:
Remove the air filter.
CHECK:
Visually check that the air filter is not dirty or excessive oily.
HINT:
If necessary, clean the air filter with compressed air. First blow from inside thoroughly, then blow from outside of the air filter.

NG	**Repair or replace.**

OK

5	**Check idle speed (See page EM-10).**

OK:

Idle speed: 650 - 750 rpm

NG	**Proceed to problem symptoms table on page DI-20 .**

OK

6	**Check ignition timing (See page EM-9).**

NG → **Proceed to page IG-1 , and continue to trouble-shoot.**

OK →

Proceed to problem symptoms table on page DI-20 .

7	**Check fuel pressure (See page SF-7).**

NG → **Proceed to page SF-7 , and continue to trouble-shoot.**

OK →

8	**Check for spark (See page IG-1).**

NG → **Proceed to page IG-1 , and continue to trouble-shoot.**

OK →

Proceed to problem symptoms table on page DI-20 .

7. ENGINE OPERATING CONDITION

NOTICE:

The values given below for ”Normal Condition” are representative values, so a vehicle may still be normal even if its value varies differ from those listed here. So do not decide whether a part is faulty or not solely according to the ”Normal Condition” here.

(a) CARB mandated signals.

TOYOTA hand-held tester display	Measurement Item	Normal Condition*
FUEL SYS #1	Fuel System Bank 1 OPEN: Air-fuel ratio feedback stopped CLOSED: Air-fuel ratio feedback operating	Idling after warming up: CLOSED

CALC LOAD	Calculator Load: Current intake air volume as a proportion of max. intake air volume	Idling: 14.9 - 21.3 % Racing without load (2,500rpm): 16.6 - 23.5 %
COOLANT TEMP	Engine Coolant Temp. Sensor Value	After warming up: 80 - 95˚C (176 - 203˚F)
SHORT FT #1	Short-term Fuel Trim Bank 1	0 ± 20 %
LONG FT #1	Long-term Fuel Trim Bank 1	0 ± 20 %
SHORT FT #2	Short-term Fuel Trim Bank 2	0 ± 20 %
LONG FT #2	Long-term Fuel Trim Bank 2	0 ± 20 %
ENGINE SPD	Engine Speed	Idling: 650 - 750 rpm
VEHICLE SPD	Vehicle Speed	Vehicle stopped: 0 km/h (0 mph)
IGN ADVANCE	Ignition Advance: Ignition Timing of Cylinder No.1	Idling: BTDC 12.5 - 22.0˚
INTAKE AIR	Intake Air Temp. Sensor Value	Equivalent to ambient temp.
MAF	Air Flow Rate Through Mass Air Flow Meter	Idling: 3.3 - 4.7 gm/sec. Racing without load (2,500 rpm): 12.9 - 18.3 gm/sec.
THROTTLE POS	Voltage Output of Throttle Position Sensor Calculated as a percentage: 0 V → 0 %, 5 V → 100 %	Throttle valve fully closed: 7 - 11 % Throttle valve fully open: 65 - 75 %
AFS B1 S1	Voltage Output of Oxygen Sensor Bank 1 Sensor 1	Idling: 0.1 - 0.9 V
AFFT B1 S1	Oxygen Sensor Fuel Trim Bank 1 Sensor 1 (Same as SHORT FT #1)	0 ± 20 %
O2S B1 S2	Voltage Output of Oxygen Sensor Bank 1 Sensor 2	Driving 50 km/h (31 mph): 0.1 - 0.9 V

*: If no conditions are specifically stated for ”ldling”, it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

(b) TOYOTA Enhanced Signals.

TOYOTA hand-held tester display	Measurement Item	Normal Condition*
MISFIRE RPM	Engine RPM for first misfire range	Misfire 0: 0 rpm
MISFIRE LOAD	Engine load for first misfire range	Misfire 0: 0 g/r
INJECTOR	Fuel injection time for cylinder No.1	Idling: 1.82 - 3.15 ms
STARTER SIG	Starter Signal	Cranking: ON
CTP SIG	Closed Throttle Position Signal	Throttle Fully Closed: ON
PS OIL PRESS SW	Power Steering Oil Pressure Switch Signal	Turn steering wheel: ON
A/C SW	A/C Switch Signal	A/C ON: ON
PNP SW	Park/Neutral Position Switch Signal	P or N position: ON
STOP LIGHT SW	Stop Light Switch Signal	Stop light switch ON: ON
FC IDL	Fuel Cut Idle: Fuel cut when throttle valve fully closed, during deceleration	Fuel cut operating: ON
FC TAU	Fuel Cut TAU: Fuel cut during very light load	Fuel cut operating: ON
CYL#1 - CYL#6	Abnormal revolution variation for each cylinder	0 %
IGNITION	Total number of ignition for every 1,000 revolutions	0 - 3,000
A/C CUT SIG	A/C Cut Signal	A/C SW OFF: ON
FUEL PUMP / SPD	Fuel Pump Signal	Idling: ON
EVAP VSV	EVAP VSV Signal	VSV operating: ON
VAPOR PRESS VSV	Vapor Pressure VSV Signal	VSV operating: ON (TANK)
THROTTLE POS #2	Throttle position sensor No.2 output voltage	Throttle fully closed: 2.0 - 2.9 V Throttle fully open: 4.7 - 5.1 V

ACCEL POS #1	Accelerator pedal position sensor No.1 output voltage	Accelerator pedal released: 0.3 - 0.9 V Accelerator pedal depressed: 3.2 - 4.8 V
ACCEL POS #2	Accelerator pedal position sensor No.2 output voltage	Accelerator pedal released: 1.8 - 2.7 V Accelerator pedal depressed: 4.7 - 5.1 V
THROTTLE TARGET	Target position of throttle valve	Idling: 0.4 - 1.1 V
DUTY	Throttle motor opening duty ratio	Throttle fully closed: 0 % When accelerator pedal is depressed, duty ratio is increased
THROTL CLS DUTY	Throttle motor closed duty ratio	Throttle fully closed: 0 % When accelerator pedal is quick released, duty ratio is increased
THROTTLE MOT	Whether or not throttle motor control is permitted	Idling: ON
CLUTCH	Whether or not magnetic clutch control is permitted	Idling: ON
+BM	Whether or not electric throttle control system power is inputted	Idling: ON
ACCEL IDL POS	Whether or not accelerator pedal position sensor is detecting idle	Idling: ON
THROTTL IDL POS	Whether or not throttle position sensor is detecting idle	Idling: ON
FAIL #1	Whether or not fail safe function is executed	ETCS is failed: ON
FAIL #2	Whether or not fail safe function is executed	ETCS is failed: ON
THROTTLE INITIAL	Throttle fully closed learning value	0.4 - 0.8 V
ACCEL LEARN VAL	Accelerator fully closed learning value	0.4 - 0.8 V
THROTTLE MOT	Throttle motor control current	Idling: 0 - 3.0 A
CLUTCH	Magnetic clutch control current	0.8 - 1.0 A
TOTAL FT #1	Total Fuel Trim Bank 1: Average value for fuel trim system of bank 1	Idling: 0.8 - 1.2 V
O2 LR B1 S1	Oxygen Sensor Lean Rich Bank 1 Sensor 1: Response time for oxygen sensor output to switch from lean to rich	Idling after warmed up: 0 - 1,000 msec.
O2 RL B1 S1	Oxygen Sensor Rich Lean Bank 1 Sensor 1: Response time for oxygen sensor output to switch from rich to lean	Idling after warmed up: 0 - 1,000 msec.

*: If no conditions are specifically stated for ”Idling”, it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

DI0RM-16

DIAGNOSTIC TROUBLE CODE CHART

HINT:

Parameters listed in the chart may not be exactly the same as your reading due to the type of instrument or other factors.

If a malfunction code is displayed during the DTC check in check mode, check the circuit for the codes listed in the table below. For details of each code, turn to the page referred to under the "See page" for the respective "DTC No." in the DTC chart.

SAE CONTROLLED

DTC No. (See page)	Detection Item	Trouble Area	MIL*1	Memory
P0100 (DI-21)	Mass Air Flow Circuit Malfunction	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM	○	○
P0101 (DI-25)	Mass Air Flow Circuit Range/Performance Problem	• Mass air flow meter	○	○
P0110 (DI-26)	Intake Air Temp. Circuit Malfunction	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (built into mass air flow meter) • ECM	○	○
P0115 (DI-30)	Engine Coolant Temp. Circuit Malfunction	• Open or short in engine coolant temp. sensor circuit • Engine coolant temp. sensor • ECM	○	○
P0116 (DI-34)	Engine Coolant Temp. Circuit Range/Performance Problem	• Cooling system • Engine coolant temp. sensor	○	○
P0120 (DI-36)	Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction	• Open or short in throttle position sensor circuit • Throttle position sensor • ECM	○	○
P0121 (DI-41)	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem	• Throttle position sensor	○	○
P0125 (DI-42)	Insufficient Coolant Temp. for Closed Loop Fuel Control	• Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • PCV valve and hose • ECM	○	○
P0128 (DI-47)	Thermostat Malfunction	• Thermostat • Cooling system • Engine Coolant temp. sensor • ECM	○	○
P0136 (DI-48)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)	• Open or short in heated oxygen sensor circuit • Heated oxygen sensor	○	○
P0141 (DI-50)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)	• Same as DTC No. P0135	○	○

P0171 (DI-52)	System too Lean (Fuel Trim)	• Air induction system • Injector blockage • Mass air flow meter • Engine coolant temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • PCV valve and hose • ECM	○	○
P0172 (DI-52)	System too Rich (Fuel Trim)	• Injector leak, blockage • Mass air flow meter • Engine coolant temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • ECM	○	○
P0300 (DI-57)	Random/Multiple Cylinder Misfire Detected	• Open or short in engine wire • Connector connection • Vacuum hose connector • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temp. sensor • Compression pressure • Valve clearance • Valve timing • PCV valve and hose • ECM	○*2	○
P0301 (DI-57)	Cylinder 1 Misfire Detected			
P0302 (DI-57)	Cylinder 2 Misfire Detected			
P0303 (DI-57)	Cylinder 3 Misfire Detected			
P0304 (DI-57)	Cylinder 4 Misfire Detected			
P0305 (DI-57)	Cylinder 5 Misfire Detected			
P0306 (DI-57)	Cylinder 6 Misfire Detected			
P0325 (DI-63)	Knock Sensor 1 Circuit Malfunction (Bank 1)	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • ECM	○	○
P0330 (DI-63)	Knock Sensor 2 Circuit Malfunction (Bank 2)	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • ECM	○	○
P0335 (DI-66)	Crankshaft Position Sensor ”A” Circuit Malfunction	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • ECM	○	○
P0340 (DI-68)	Camshaft Position Sensor Circuit Malfunction	• Open or short in camshaft position sensor circuit • Camshaft position sensor • RH camshaft timing pulley • ECM	○	○
P0420 (DI-70)	Catalyst System Efficiency Below Threshold (Bank 1)	• Gas leakage on exhaust system • A/F sensor (bank 1 sensor 1) • Heated oxygen sensor (bank 1 sensor 2) • Three-way catalytic converter	○	○

P0440 (DI-73)	Evaporative Emission Control System Malfunction	• Hose or tube cracked, holed, damaged or loose seal ((3) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Vacuum hose cracked, holed, blocked, damaged or disconnected ((1) or (2) in Fig. 1) • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM	○	○
P0441 (DI-83)	Evaporative Emission Control System Incorrect Purge Flow	• Vacuum hose cracks, holed, damaged or disconnected ((1), (4), (5), (6) and (7) in Fig. 1) • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for vapor pressure sensor • VSV for vapor pressure sensor • Charcoal canister cracks, holed or damaged • ECM	○	○
P0442 (DI-73)	Evaporative Emission Control System Leak detected (Small Leak)	• Same as DTC No. P0440	○	○
P0446 (DI-83)	Evaporative Emission Control System Vent Control Malfunction	• Vacuum hose cracks, holed, damaged or disconnected ((1), (4), (5), (6) and (7) in Fig. 1) • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for vapor pressure sensor • VSV for vapor pressure sensor • Charcoal canister cracks, holed or damaged • ECM	○	○
P0450 (DI-101)	Evaporative Emission Control System Pressure Sensor Malfunction	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM	○	○
P0451 (DI-101)	Evaporative Emission Control System Pressure Sensor Range/ Performance			
P0500 (DI-103)	Vehicle Speed Sensor Malfunction	• Speedometer cable • Open or short in speed signal circuit • ECM	○	○
P0505 (DI-105)	Idle Control System Malfunction	• Air induction system • Electric throttle control system • PCV valve and hose	○	○

*1: MIL lights up.
*2: MIL lights up or blinking.

MANUFACTURER CONTROLLED

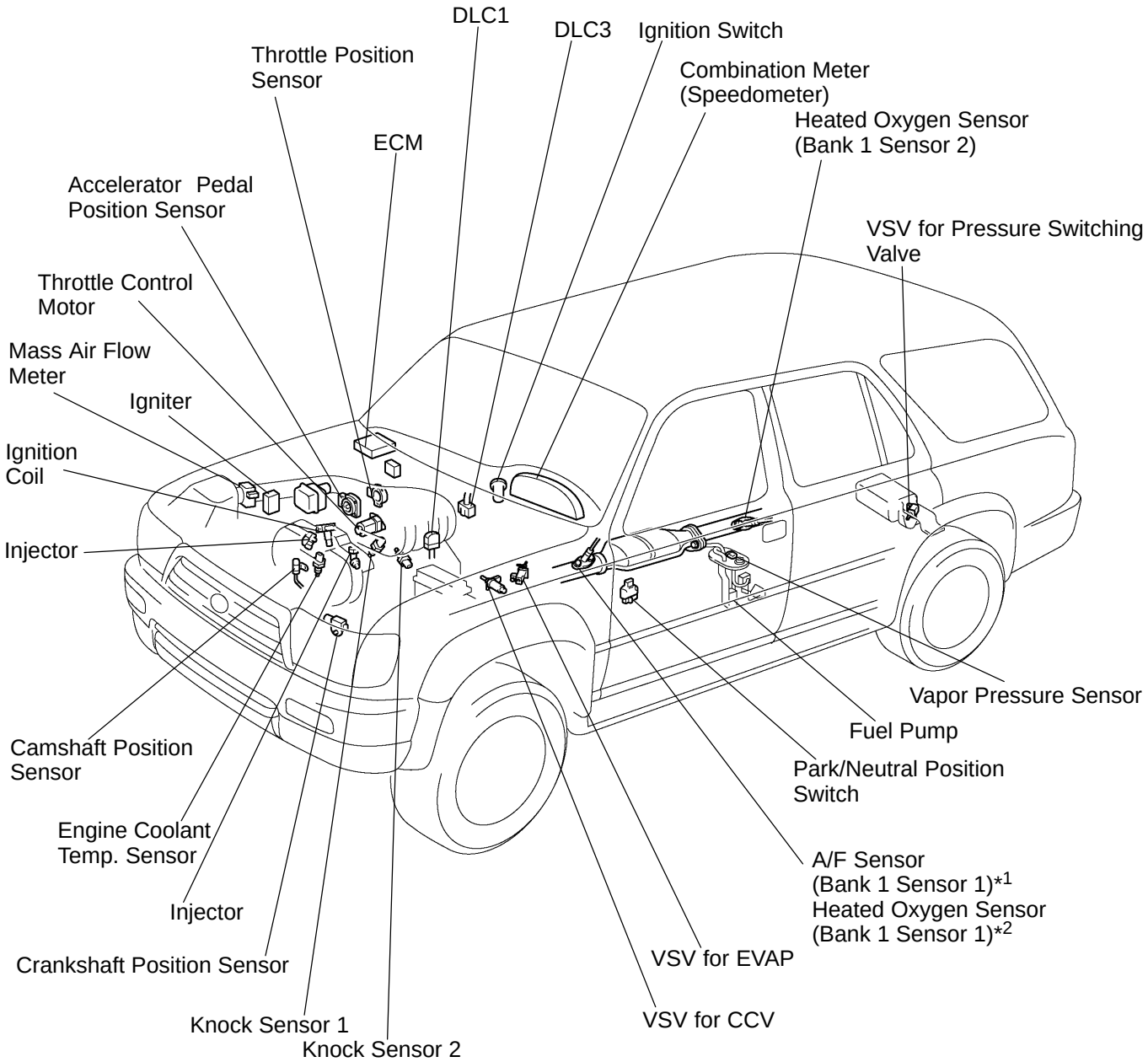
DTC No. (See page)	Detection Item	Trouble Area	MIL*	Memory
P1120 (DI-107)	Accelerator Pedal Position Sensor Circuit Malfunction	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM	○	○

P1121 (DI-112)	Accelerator Pedal Position Sensor Range/Performance Problem	• Accelerator pedal position sensor	○	○
P1125 (DI-113)	Throttle Control Motor Circuit Malfunction	• Open or short in throttle control motor circuit • Throttle control motor • ECM	○	○
P1126 (DI-115)	Magnetic Clutch Circuit Malfunction	• Open or short in magnetic clutch circuit • Magnetic clutch • ECM	○	○
P1127 (DI-118)	ETCS Actuator Power Source Circuit Malfunction	• Open in ETCS power source circuit • ECM	○	○
P1128 (DI-121)	Throttle Control Motor Lock Malfunction	• Throttle control motor • Throttle body assembly	○	○
P1129 (DI-121)	Electric Throttle Control System Malfunction	• Electric throttle control system • ECM	○	○
P1130 (DI-122)	A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM	○	○
P1133 (DI-126)	A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM	○	○
P1135 (DI-130)	A/F Sensor Heater Circuit Malfunction (Bank1 Sensor 1)	• Open or short in heater circuit of A/F sensor • A/F sensor heater • ECM	○	○
P1300 (DI-132)	Igniter Circuit Malfunction	• Ignition system • Open or short in IGF and IGT circuits from igniter to ECM • Igniter • Ignition coil • ECM	○	○
P1335 (DI-137)	Crankshaft Position Sensor Circuit Malfunction (During engine running)	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Signal plate • ECM	-	○
P1520 (DI-138)	Stop Light Switch Signal Malfunction	• Short in stop light switch signal circuit • Stop light switch • ECM	○	○
P1600 (DI-141)	ECM BATT Malfunction	• Open in back up power source circuit • ECM	○	○
P1633 (DI-143)	ECM Malfunction (ETCS Circuit)	• ECM	○	○
P1780 (DI-144)	Park/Neutral Position Switch Malfunction (Only for A/T)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	○	○

*: ○ ... MIL lights up. - ... MIL does not light up.

DI0RN-11

PARTS LOCATION



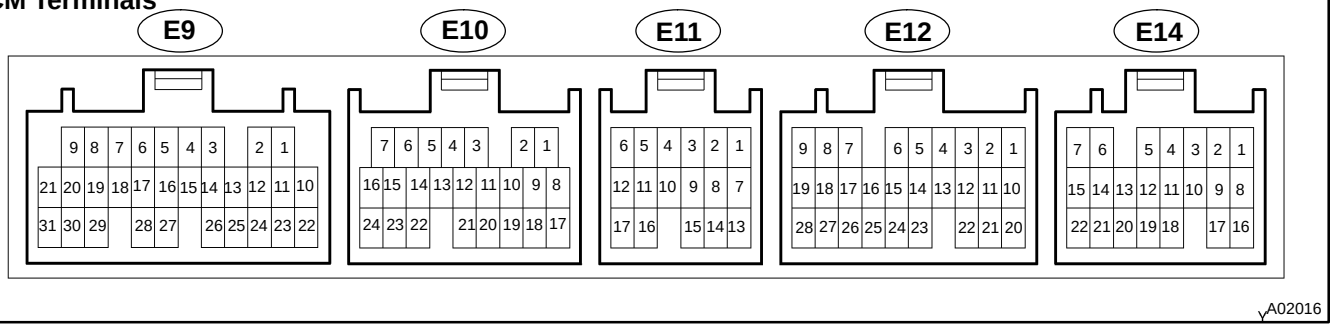
*1: California Spec.
*2: Except California Spec.

A15328

DI4DE-03

TERMINALS OF ECM

ECM Terminals



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
BATT (E14-16) - E1 (E10-17)	L-R ↔ BR	Always	9 - 14
+B (E14-1) - E1 (E10-17)	W-L ↔ BR	IG switch ON	9 - 14
VC (E9-25) - E2 (E9-11)	G-B ↔ L-B	IG switch ON	4.5 - 5.5
VTA (E9-15) - E2 (E9-11)	B-Y ↔ L-B	IG switch ON, Throttle valve fully closed	0.3 - 1.0
		IG switch ON, Throttle valve fully open	2.7 - 5.2
VTA2 (E11-4) - E2 (E9-11)	G-Y ↔ L-B	IG switch ON, Throttle valve fully closed	0.3 - 1.0
		IG switch ON, Throttle valve fully open	2.7 - 5.2
VG (E9-12) - E2G (E9-10)	R-W ↔ B-W	Idling, A/C switch OFF	1.1 - 1.5
NE+ (E10-12) - NE- (E10-21)	L ↔ G	Idling	Pulse generation (See page DI-66)
G2 (E10-13) - NE- (E10-21)	R ↔ G	Idling	Pulse generation (See page DI-66)
THA (E9-13) - E2 (E9-11)	Y-G ↔ L-B	Idling, Intake air temp. 20°C (68°F)	0.5 - 3.4
THW (E9-18) - E2 (E9-11)	G ↔ L-B	Idling, Engine coolant temp. 80°C (176°F)	0.2 - 1.0
STA (E14-7) - E1 (E10-17)	B-W ↔ BR	Cranking	6.0 or more
#10 (E10-6) - E01 (E9-4) #20 (E10-5) - E01 (E9-4) #30 (E10-4) - E01 (E9-4) #40 (E10-3) - E01 (E9-4) #50 (E10-1) - E01 (E9-4) #60 (E10-8) - E01 (E9-4)	R ↔ W-B W ↔ W-B G ↔ W-B R-B ↔ W-B L ↔ W-B Y ↔ W-B	IG switch ON	9 - 14
		Idling	Pulse generation (See page DI-57)
IGT1 (E10-11) - E1 (E10-17)	B-L ↔ BR	Idling	Pulse generation (See page DI-132)
IGT2 (E10-10) - E1 (E10-17)	L-Y ↔ BR		
IGT3 (E10-9) - E1 (E10-17)	G-W ↔ BR		
IGF (E10-2) - E1 (E10-17)	B-Y ↔ BR	IG switch ON	4.5 - 5.5
		Idling	Pulse generation (See page DI-132)
FC (E14-22) - E01 (E9-4)	G-Y ↔ W-B	IG switch ON	9 - 14
		Idling	0 - 3.0
EVP1 (E10-14) - E01 (E9-4)	W-G ↔ W-B	IG switch ON	9 - 14
CCV (E10-19) - E01 (E9-4)	L-B ↔ W-B	IG switch ON	9 - 14
OX2B (E9-27) - E1 (E10-17)	B ↔ BR	Maintain engine speed at 2,500 rpm for 3 min. after warming up	Pulse generation (See page DI-70)
HT2B (E9-29) - E03 (E9-7)	G-Y ↔ W-B	Idling	Below 3.0
		IG switch ON	9 - 14
KNK1 (E9-23) - E1 (E10-17)	B ↔ BR	Idling	Pulse generation (See page DI-63)
KNK2 (E9-22) - E1 (E10-17)	GR ↔ BR		

NSW (E12-3) - E1 (E10-17)	B ↔ BR	IG switch ON, Other shift position in P, N	9 - 14
		IG switch ON, Shift position in P, N	0
TBP (E10-20) - E01 (E9-4)	R-Y ↔ W-B	IG switch ON, Disconnect vacuum hose from vapor pressure sensor	9 - 14
PTNK (E9-24) - E2 (E9-11)	Y ↔ L-B	IG switch ON	2.9 - 3.7
		IG switch ON, Apply vacuum 4.0 kPa (30 mmHg, 1.18 in.Hg)	0.5 or less
SIL (E14-14) - E1 (E10-17)	W ↔ BR	During transmission	Pulse generation
STP (E14-20) - E1 (E10-17)	G-W ↔ BR	IG switch ON, Brake pedal depressed	7.5 - 14
		IG switch ON, Brake pedal released	Below 1.5
AF1+ (E9-14) - E1 (E10-17)	W ↔ BR	IG switch ON	3.0 - 3.6
AF1- (E9-26) - E1 (E10-17)	B ↔ BR	IG switch ON	2.7 - 3.3
HAFF (E9-21) - E04 (E9-8)	L ↔ W-B	Idling	Below 3.0
		IG switch ON	9 - 14
KSW (E14-11) - E1 (E10-17)	Y-R ↔ BR	At time of inserting key	Below 1.5
		In condition without key inserted	4 - 5
CODE (E14-5) - E1 (E10-17)	GR-R ↔ BR	At time of inserting key	Pulse generation
IGSW (E14-15) - E1 (E10-17)	B-L ↔ BR	IG switch ON	9 - 14
TXCT (E14-19) - E1 (E10-17)	P-B ↔ BR	At time of inserting key	Pulse generation
IMLD (E14-12) - E1 (E10-17)	L ↔ BR	In condition without key inserted	Pulse generation
MREL (E14-4) - E1 (E10-17)	GR-B ↔ BR	IG switch ON	9 - 14

DI0RP-10

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Engine does not crank (Does not start)	10. Starter 11. Starter relay	ST-15 ST-17
No initial combustion (Does not start)	1. ECM power source circuit 2. Fuel pump control circuit 3. ECM	DI-148 DI-151 IN-28
No complete combustion (Does not start)	1. Fuel pump control circuit	DI-151
Engine cranks normally (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit 3. Compression	DI-145 DI-151 EM-3
Cold engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-145 DI-151
Hot engine (Difficult to start)	1. Starter signal circuit 2. Fuel pump control circuit	DI-145 DI-151
High engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	DI-632 AC-89 DI-148
Low engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. Fuel pump control circuit	DI-632 AC-89 DI-151
Rough idling (Poor idling)	1. Compression 2. Fuel pump control circuit	EM-3 DI-151
Hunting (Poor idling)	1. ECM power source circuit 2. Fuel pump control circuit	DI-148 DI-151
Hesitation/Poor acceleration (Poor driveability)	1. Fuel pump control circuit 2. A/T faulty	DI-151 DI-175
Surging (Poor driveability)	1. Fuel pump control circuit	DI-151
Soon after starting (Engine stall)	1. Fuel pump control circuit	DI-151
During A/C operation (Engine stall)	1. A/C signal circuit (Compressor circuit) 2. ECM	DI-632 AC-89 IN-28

DI0RQ-16

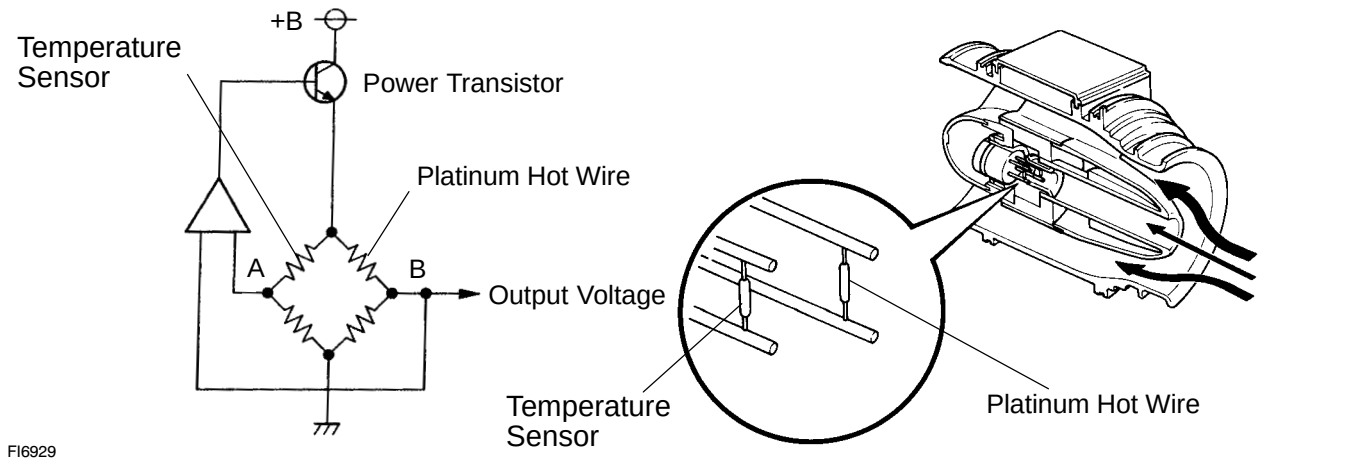
CIRCUIT INSPECTION

DTC	P0100	Mass Air Flow Circuit Malfunction

CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, temperature sensor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and temperature sensor located in the intake air bypass of the housing detect any changes in the intake air temperature. The hot wire is maintained at the set temperature by controlling the current flow through the hot wire. This current flow is then measured as the output voltage of the mass air flow meter.

The circuit is constructed so that the platinum hot wire and temperature sensor provide a bridge circuit, with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



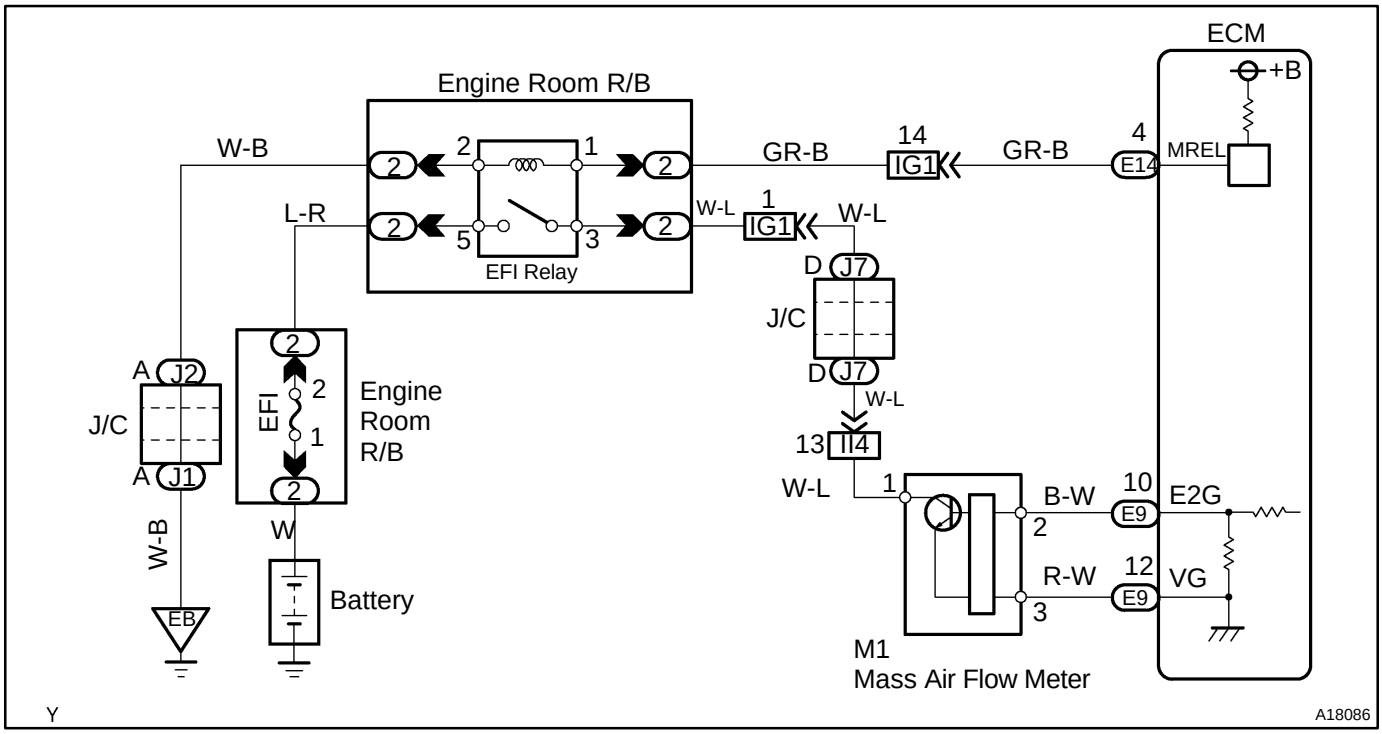
DTC No.	DTC Detecting Condition	Trouble Area
P0100	Open or short in mass air flow meter circuit with engine speed 4,000 rpm or less	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM
	Open or short in mass air flow meter circuit with engine speed 4,000 rpm or more (2 trip detection logic)	

HINT:

After confirming DTC P0100, use the OBD II scan tool or TOYOTA hand-held tester to confirm the mass air flow ratio from the CURRENT DATA.

Mass Air Flow Value (gm/sec.)	Malfunction
Approx. 0	• Mass air flow meter power source circuit open • VG circuit open or short
11.0 - 25.1 (idling after warmed up)	• E3 circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect OBD II scan tool or TOYOTA hand-held tester, and read value of mass air flow rate.**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.

(c) Start the engine.

CHECK:

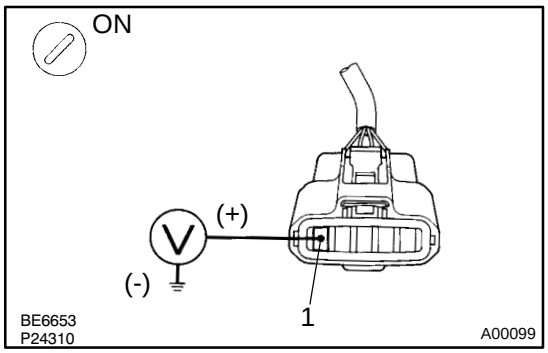
Read the mass air flow rate on the OBD II scan tool or TOYOTA hand-held tester.

RESULT:

	Type I	Type II
Mass Air Flow Rata (gm/sec.)	Approx. 0	11.0 ~ 25.1 (idling after warmed up)

Type I	**Go to step 2.**
Type II	**Go to step 5.**

2	Check voltage of mass air flow meter power source.



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal 1 of the mass air flow meter connector and body ground.

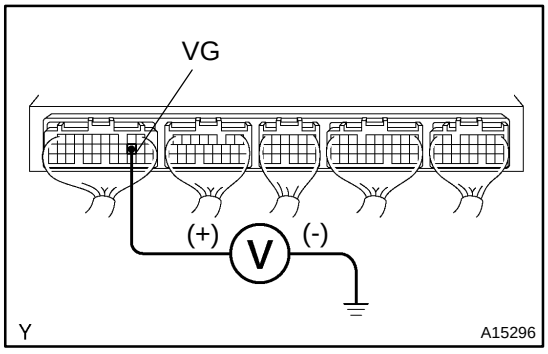
OK:

Voltage: 9 - 14 V

NG	Check for open in harness and connector between EFI main relay (Marking: EFI) and mass air flow meter (See page IN-28).

OK

3	Check voltage between terminal VG of ECM connector and body ground.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Start the engine.

CHECK:

Measure the voltage between terminal VG of the ECM connector and body ground while the engine is idling.

OK:

Voltage:
1.1 - 1.5 V (P or N position and A/C switch OFF)

OK	Check and replace ECM (See page IN-28).

NG

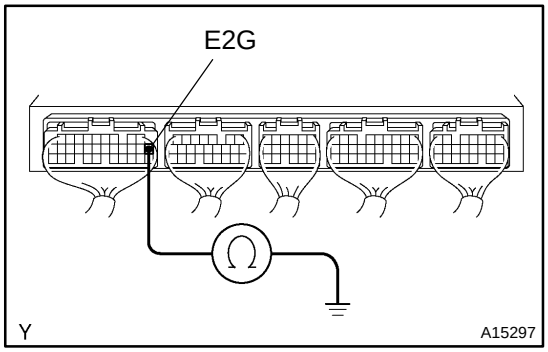
4	Check for open and short in harness and connector between mass air flow meter and ECM (See page IN-28).

NG	Repair or replace harness or connector.

OK

Replace mass air flow meter.

5	Check continuity between terminal E2G of ECM connector and body ground.



PREPARATION:
Remove the glove compartment (See page SF-54).
CHECK:
Check the continuity between terminal E2G of the ECM connector and body ground.
OK:
Continuity (1 Ω or less)

NG → **Check and replace ECM (See page IN-28).**

OK

6	Check for open in harness and connector between mass air flow meter and ECM (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Replace mass air flow meter.

DI0RR-09

DTC	P0101	Mass Air Flow Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0100 on page DI-21 .

DTC No.	DTC Detecting Condition	Trouble Area
P0101	After engine is warmed up, conditions (a) and (b) continue with engine speed 900 rpm or less: (2 trip detection logic) (a) Throttle valve fully closed (b) Mass air flow meter output > 2.2 V	• Mass air flow meter
	Conditions (a) and (b) continue with engine speed 1,500 rpm or more: (2 trip detection logic) (a) VTA ≧ 0.63 V (b) Mass air flow meter output < 1.06 V	

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0101) being output?

NO → Replace mass air flow meter.

YES

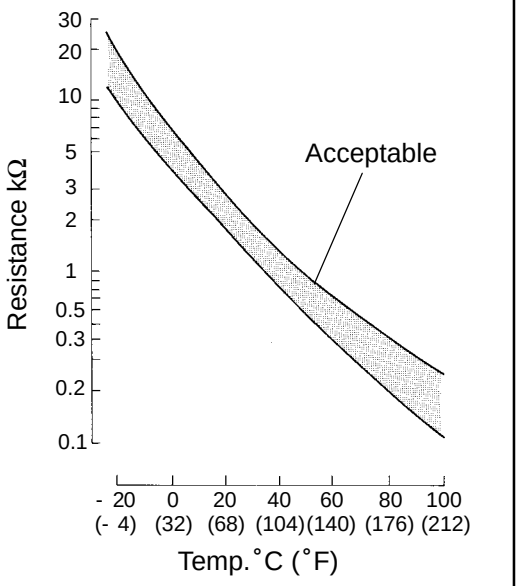
Go to relevant DTC chart (See page DI-13).

DI0RS-16

DTC	P0110	Intake Air Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

Fig. 1



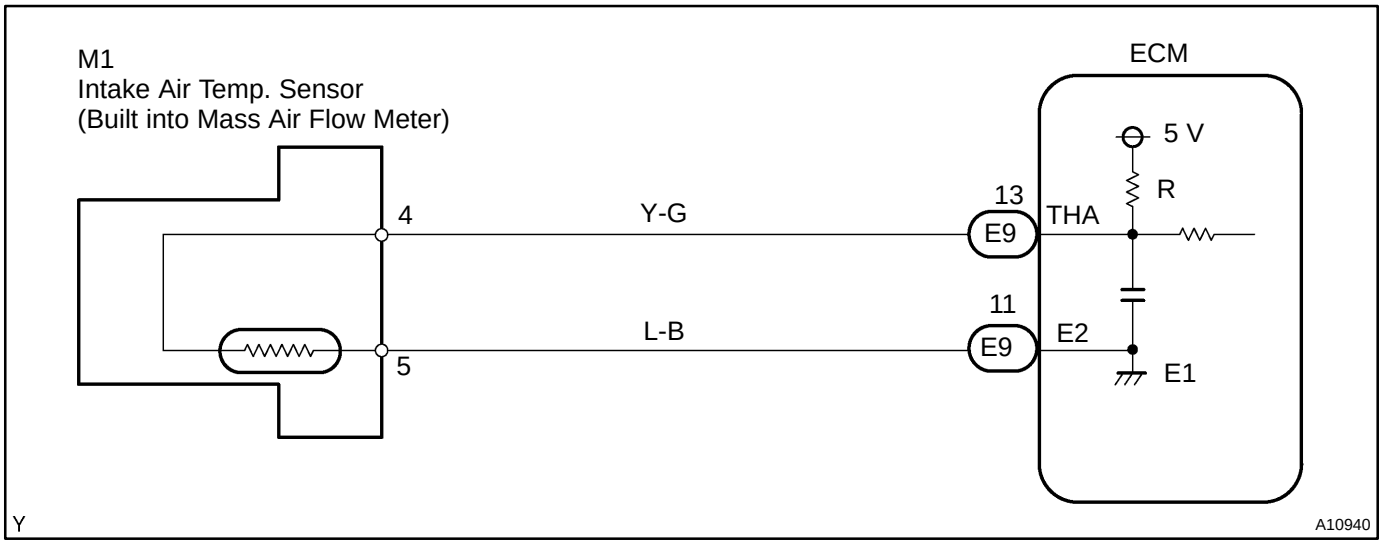
The intake air temperature sensor is built into the mass air flow meter and senses the intake air temperature.
A thermistor built in the sensor changes the resistance value according to the intake air temperature.
The lower the intake air temperature, the greater the thermistor resistance value, and the higher the intake air temperature, the lower the thermistor resistance value (See Fig. 1).
The intake air temperature sensor is connected to the ECM (See below). The 5 V power source voltage in the ECM is applied to the intake air temp. sensor from terminal THA via resistor R.
That is, resistor R and the intake air temperature sensor are connected in series. When the resistance value of the intake air temperature sensor changes in accordance with changes in the intake air temperature, the potential at terminal THA also changes. Based on this signal, the ECM increases the fuel injection volume to improve driveability during cold engine operation. If the ECM detects the DTC P0110, it operates the fail safe function in which the intake air temperature is assumed to be 20˚C (68˚F).

DTC No.	DTC Detecting Condition	Trouble Area
P0110	Open or short in intake air temp. sensor circuit	• Open or short in intake air temp. sensor circuit • Intake air temp. sensor (built into mass air flow meter) • ECM

HINT:
After confirming DTC P0110, use the OBD II scan tool or TOYOTA hand-held tester to confirm the intake air temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
-40 ˚C (-40˚F)	Open circuit
140˚C (284˚F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115 and P0120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connector OBD II scan tool or TOYOTA hand-held tester, and read value of intake air temperature**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Same as actual intake air temperature.

HINT:

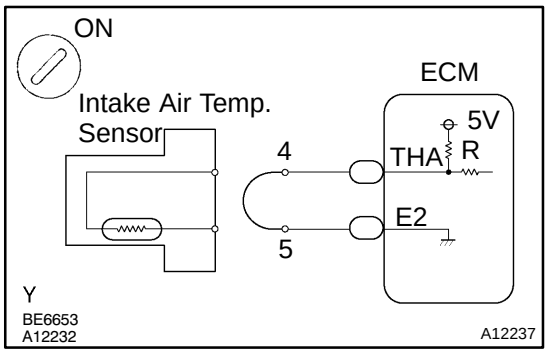
- If there is open circuit, OBD II scan tool or TOYOTA hand-held tester indicates -40˚C (−40˚F).
- If there is short circuit, OBD II scan tool or TOYOTA hand-held tester indicates 140˚C (284˚F) or more.

NG → **-40 ˚C (-40˚F) ... Go to step 2.**
140˚C (284˚F) or more ... Go to step 4.

OK

Check for intermittent problems
(See page DI-3).

2	Check for open in harness or ECM.



PREPARATION:

(a) Disconnect the mass air flow meter connector.
(b) Connect the sensor wire harness terminals together.
(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

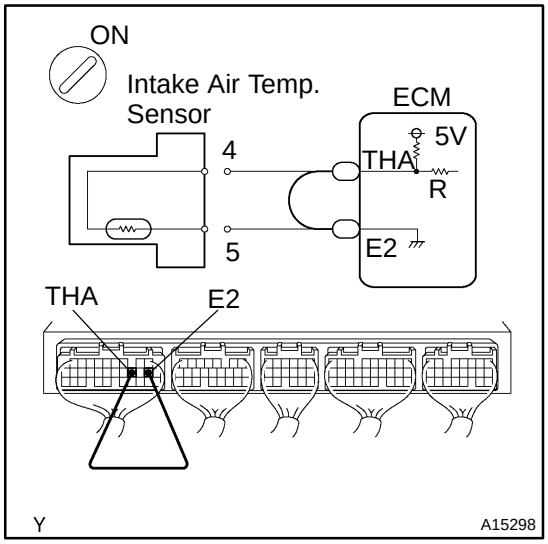
OK:

Temperature value: 140°C (284°F) or more

OK	Confirm good connection at sensor. If OK, replace mass air flow meter.

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).
(b) Connect between terminals THA and E2 of the ECM connector.

HINT:

The mass air flow meter connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page IN-28).

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

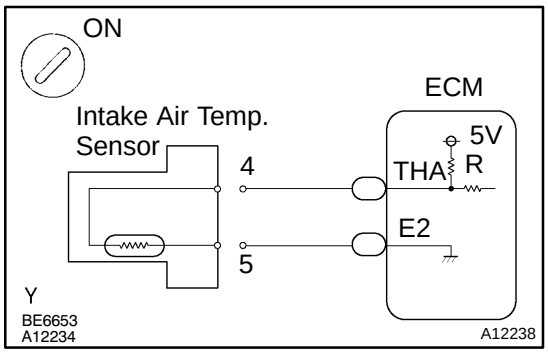
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 and THA, repair or replace harness.

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page IN-28).

4	Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the mass air flow meter connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

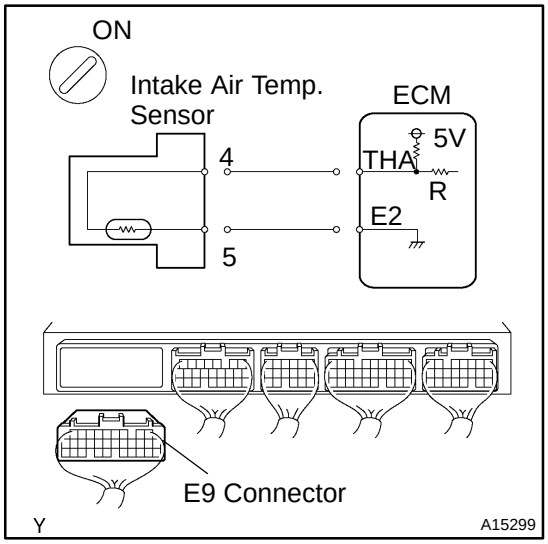
OK:

Temperature value: -40°C (-40°F)

OK	Replace mass air flow meter.

NG

5	Check for short in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Disconnect the E9 connector from the ECM.

HINT:

The mass air flow meter connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Temperature value: -40°C (-40°F)

OK	Repair or replace harness or connector.

NG

Check and replace ECM (See page IN-28).

DI0RT-11

DTC	P0115	Engine Coolant Temp. Circuit Malfunction

CIRCUIT DESCRIPTION

A thermistor built into the engine coolant temp. sensor changes the resistance value according to the engine coolant temperature.

The structure of the sensor and connection to the ECM is the same as in the DTC P0110 shown on page DI-26

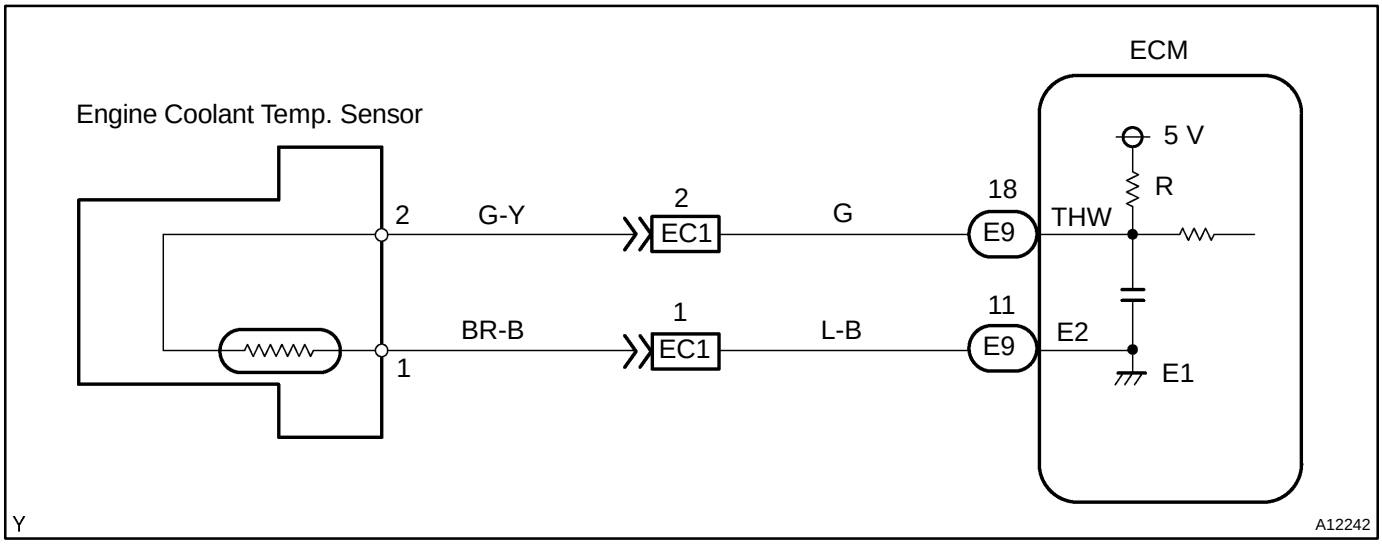
DTC No.	DTC Detecting Condition	Trouble Area
P0115	Open or short in engine coolant temp. sensor circuit	• Open or short in engine coolant temp. sensor circuit • Engine coolant temp. sensor • ECM

HINT:

After confirming DTC P0115, use the OBD II scan tool or TOYOTA hand-held tester to confirm the engine coolant temperature from the CURRENT DATA.

Temperature Displayed	Malfunction
-40 °C (-40°F)	Open circuit
140° (284°F) or more	Short circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115 and P0120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBDII scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect OBD II scan tool or TOYOTA hand-held tester, and read value of engine coolant temperature.**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the OBD II scan tool or TOYOTA hand-held tester main switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Same as actual engine coolant temperature.

HINT:

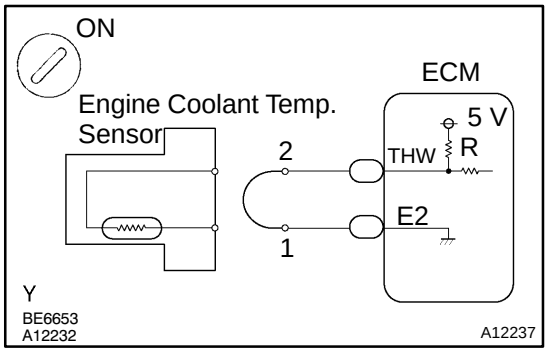
- If there is open circuit, OBD II scan tool or TOYOTA hand-held tester indicates -40˚C (-40˚F).
- If there is open circuit, OBD II scan tool or TOYOTA hand−held tester indicates 140˚C (284˚F) or more.

NG	**-40 ˚C (-40˚F) ... Go to step 2.** **140˚C (284˚F) or more ... Go to step 4.**

OK

Check for intermittent problems (See page DI-3).

2	**Check for open in harness or ECM.**



PREPARATION:

(a) Disconnect the engine coolant temp. sensor connector.

(b) Connect the sensor wire harness terminals together.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

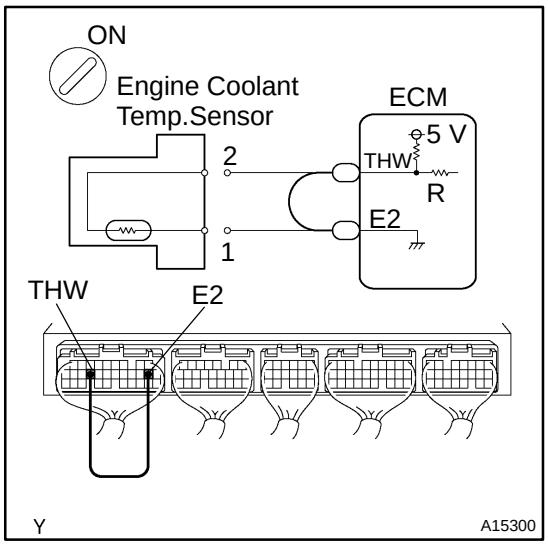
OK:

Temperature value: 140°C (284°F) or more

OK	**Confirm good connection at sensor. If OK, replace engine coolant temperature sensor.**

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Connect between terminals THW and E2 of the ECM connector.

HINT:

The engine coolant temperature sensor connector is disconnected. Before checking, do a visual and contact pressure check for the ECM connector (See page IN-28).

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

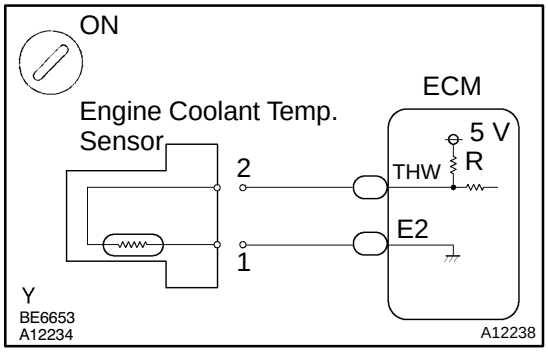
Temperature value: 140°C (284°F) or more

OK	Open in harness between terminals E2 and THW, repair or replace harness.

NG

Confirm good connection at ECM. If OK, check and replace ECM (See page IN-28).

4	Check for short in harness and ECM.



PREPARATION:

(a) Disconnect the engine coolant temperature sensor connector.

(b) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

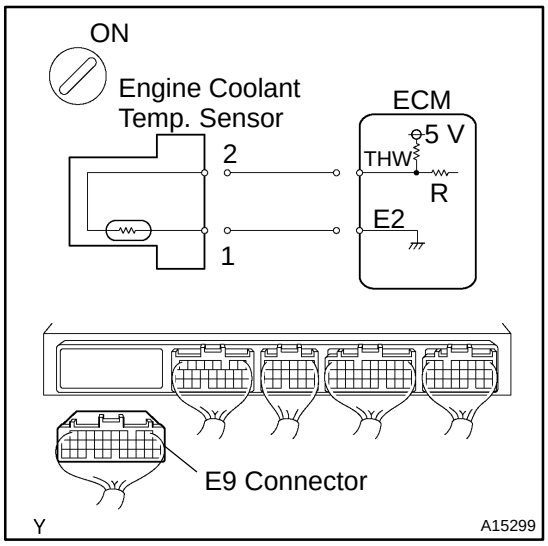
OK:

Temperature value: -40°C (-40°F)

OK	Replace engine coolant temperature sensor (See page SF-43).

NG

5	Check for short in harness or ECM.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Disconnect the E9 connector from the ECM.

HINT:

The engine coolant temperature sensor connector is disconnected.

(c) Turn the ignition switch ON.

CHECK:

Read the temperature value on the OBD II scan tool or TOYOTA hand-held tester.

OK:

Temperature value: -40°C (-40°F)

OK	Repair or replace harness or connector.

NG

Check and replace ECM (See page IN-28).

DI0RU-11

DTC	P0116	Engine Coolant Temp. Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0115 on page DI−30.

DTC No.	DTC Detecting Condition	Trouble Area
P0116	If THW ⍰ -7˚C (19.4˚F) at engine start, 20 min. or more after starting engine, engine coolant temp. sensor value is 15˚C (59˚F) or less (2 trip detection logic)	• Cooling system • Engine coolant temp. sensor
	If THW ⍰ -7˚C (19.4˚F) and ⍰ 10˚C (50˚F) at engine start, 5 min. or more after starting engine, engine coolant temp. sensor value is 17˚C (62.6˚F) or less (2 trip detection logic) If THW ≧ 10˚C (50˚F) at engine start, 2 min. or more after starting engine, engine coolant temp. sensor value is 35˚C (95˚F) or less. (2 trip detection logic)	
	When THW ≧ 35˚C (95˚F) and < 60˚C (140˚F), and THA ≧ -6.7 ˚C (19.9˚F), and when starting engine, conditions (a) and (b) continue: (2 trip detection logic) (a) Vehicle speed is changing (Not stable) (b) THW change is lower than 3˚C (5.4˚F) from THW since when starting engine	

INSPECTION PROCEDURE

HINT:

- If DTCs P0115 and P0116 are output simultaneously, engine coolant temp. sensor circuit may be open. Perform troubleshooting of DTC P0115 first.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Are there any other codes (besides DTC P0116) being output?

YES → Go to relevant DTC chart (See page DI-13).

NO

2	Check thermostat (See page CO-11).

NG → Replace thermostat.

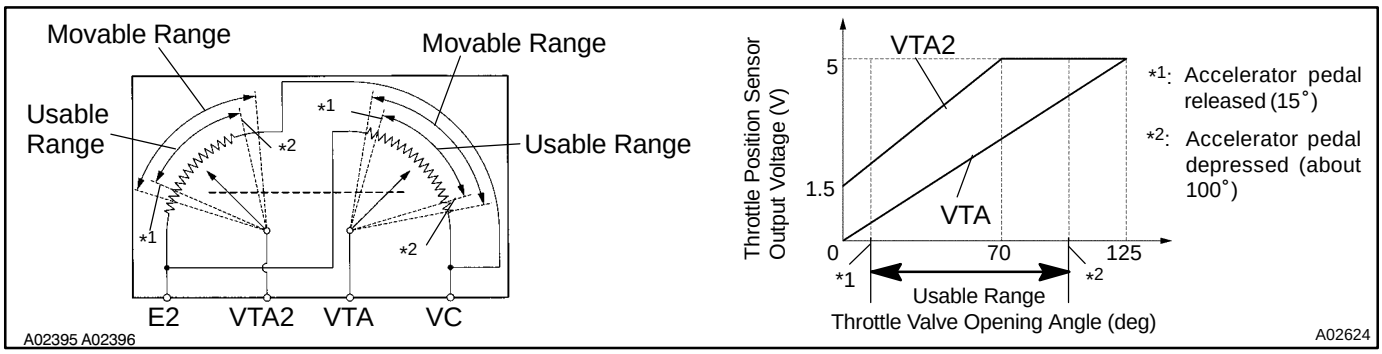
OK →

Replace engine coolant temperature sensor.

DTC	P0120	Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction

CIRCUIT DESCRIPTION

Throttle position sensor is mounted on the throttle body and it have the 2 sensors to detect the throttle opening angle and the malfunction of the throttle position sensor's own.
The voltage applied to the terminals VTA and VTA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the throttle valve.
The ECM judges the current opening angle of the throttle valve from these signals input from terminals VTA and VTA2, and the ECM controls the throttle motor to make the throttle valve angle properly in response to driving condition.
If this DTC is stored, the ECM shuts down the power for the throttle motor and the electromagnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

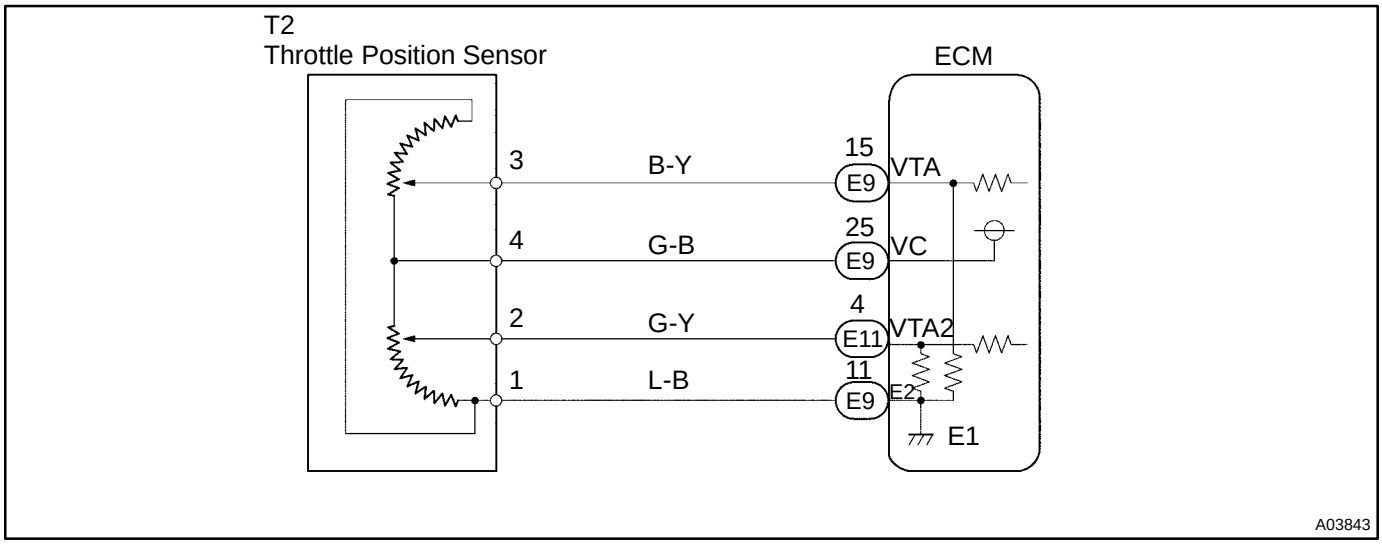


DTC No.	DTC Detecting Condition	Trouble Area
P0120	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (a) VTA ≦ 0.2 V (b) VTA2 ≦ 0.5 V (c) VTA ≧ 4.8 V (d) When VTA ≧ 0.2 V and ≦ 2.0 V, and VTA2 ≧ 4.97 V (e) VTA-VTA2 ≦ 0.02 V, or VTA2-VTA ≧ 0.02V	• Open or short in throttle position sensor circuit • Throttle position sensor • ECM
	Condition (a) continues for 0.4 seconds: (a) VTA ≦ 0.2 V and VTA2 ≦ 0.5 V	

HINT:
After confirming DTC P0120, use the OBD II scan tool or TOYOTA hand-held tester to confirm the throttle valve opening percentage and closed throttle position switch condition.

Throttle valve opening position expressed as percentage and voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
THROTTLE POS	THROTTLE POS #2	THROTTLE POS	THROTTLE POS #2	
0 %	0 V	0 %	0 V	VC circuit open
0 %	2.0 - 2.9 V	0 %	4.7 - 5.1 V	VTA circuit open or ground short
8 - 20 %	0 V	64 - 96 %	0 V	VTA2 circuit open or ground short
100 %	5 V	100 %	5 V	E2 circuit open

WIRING DIAGRAM



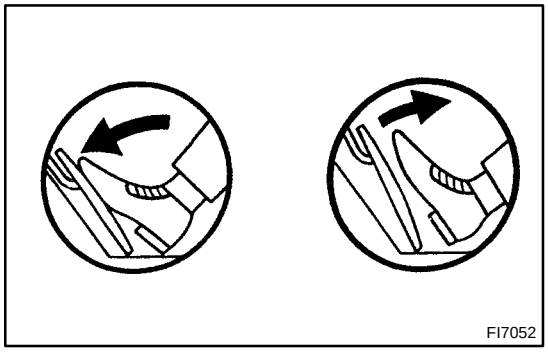
INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

TOYOTA hand-held tester:

1	**Connect TOYOTA hand-held tester, and read throttle valve opening percentage.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to DLC3.

(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.

CHECK:

Read the throttle valve opening percentage for the VTA circuit and read the voltage for the VTA2 circuit.

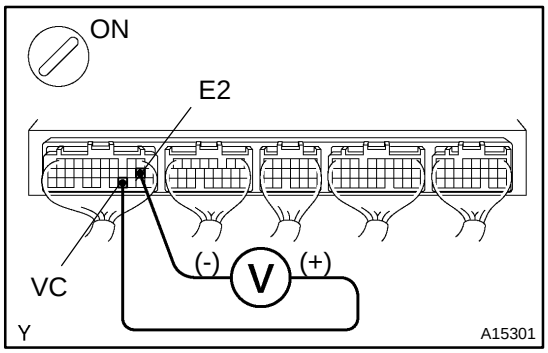
OK:

Accelerator pedal	Throttle valve opening position expressed as percentage (VTA)	Voltage (VTA2)
Released	8 - 20 %	2.0 - 2.9 V
Depressed	64 - 96 %	4.7 - 5.1 V

OK	**Check and replace ECM (See page IN-28).**

NG

2	**Check voltage between terminals VC and E2 of ECM connector.**



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

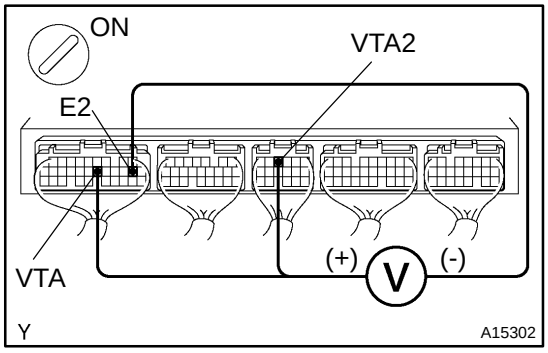
CHECK:
Measure the voltage between terminals VC and E2 of the ECM connector.

OK:
Voltage: 4.5 - 5.5 V

NG	**Check and replace ECM (See page IN-28).**

OK

3	**Check voltage between terminals VTA and E2, and VTA2 and E2 of ECM connector.**



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the ECM connector.

OK:

Accelerator pedal	Voltage	
	VTA - E2	VTA2 - E2
Released	0.4 - 1.0 V	2.0 - 2.9 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK	**Check and replace ECM (See page IN-28).**

NG

4	**Check throttle position sensor (See page SF-30).**

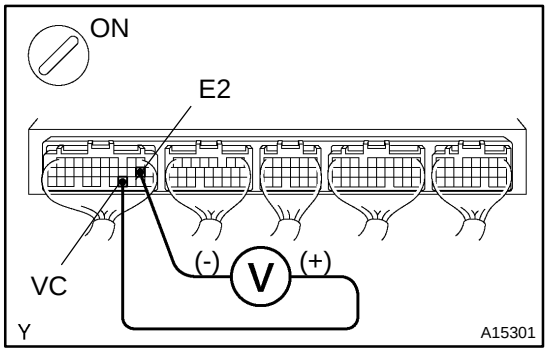
NG	**Replace throttle position sensor (See page SF-32).**

OK

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between ECM and throttle position sensor (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	**Check voltage between terminals VC and E2 of ECM connector.**



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the ECM connector.

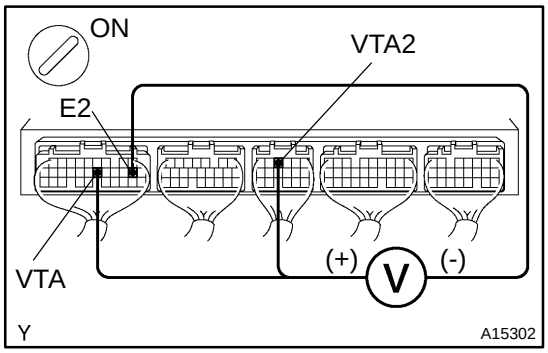
OK:

Voltage: 4.5 - 5.5 V

NG	**Check and replace ECM (See page IN-28).**

OK

2	**Check voltage between terminals VTA and E2, and VTA2 and E2 of ECM connector.**



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VTA and E2, and VTA2 and E2 of the ECM connector.

OK:

Accelerator pedal	Voltage	
	VTA - E2	VTA2 - E2
Released	0.4 - 1.0 V	2.0 - 2.9 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK	**Check and replace ECM (See page IN-28).**

NG

3	Check throttle position sensor (See page SF-30).

NG → Replace throttle position sensor (See page SF-32).

OK →

Check for open and short in harness and connector in VC, VTA, VTA2 and E2 circuits between ECM and throttle position sensor (See page IN-28).

DI0RW-07

DTC	P0121	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P0120 on page DI−36.

DTC No.	DTC Detecting Condition	Trouble Area
P0121	While vehicle speed drops from 30 km/h (19 mph) or more to 0 km/h (0 mph), output value of throttle position sensor is out of applicable range (2 trip detection logic)	• Throttle position sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0121) being output?**

YES → **Go to relevant DTC chart (See page DI−13).**

NO

Replace throttle position sensor.

DI5C4-08

DTC	P0125	Insufficient Coolant Temp. for Closed Loop Fuel Control

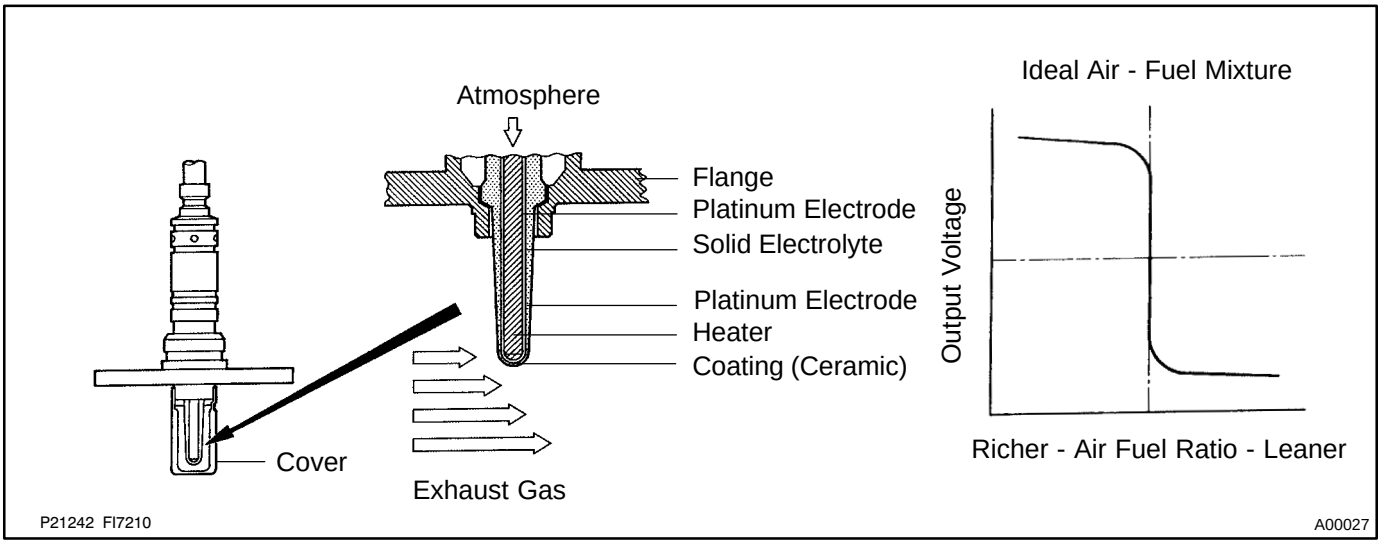
CIRCUIT DESCRIPTION

To obtain a high purification rate for the CO, HC and NOx components of the exhaust gas, a three-way catalytic converter is used, but for the most efficient use of the three-way catalytic converter, the air-fuel ratio must be precisely controlled so that it is always close to the stoichiometric air-fuel ratio.

The A/F sensor has the characteristic that provides output voltage* approximately proportional to the existing air-fuel ratio. The A/F sensor output voltage* is used to provide feedback for the ECM to control the air-fuel ratio. By the A/F sensor output, the ECM can determine the deviation amount from the stoichiometric air-fuel ratio and control the proper injection time immediately. If the A/F sensor is malfunctioning, ECM is unable to perform accurate air-fuel ratio control.

The A/F sensor is equipped with a heater which heats the zirconia element. The heater is controlled by the ECM. When the intake air volume is low (the temp. of the exhaust gas is low), current flows to the heater to heat the sensor for accurate oxygen concentration detection.

*: The voltage value changes at the inside of the ECM only.

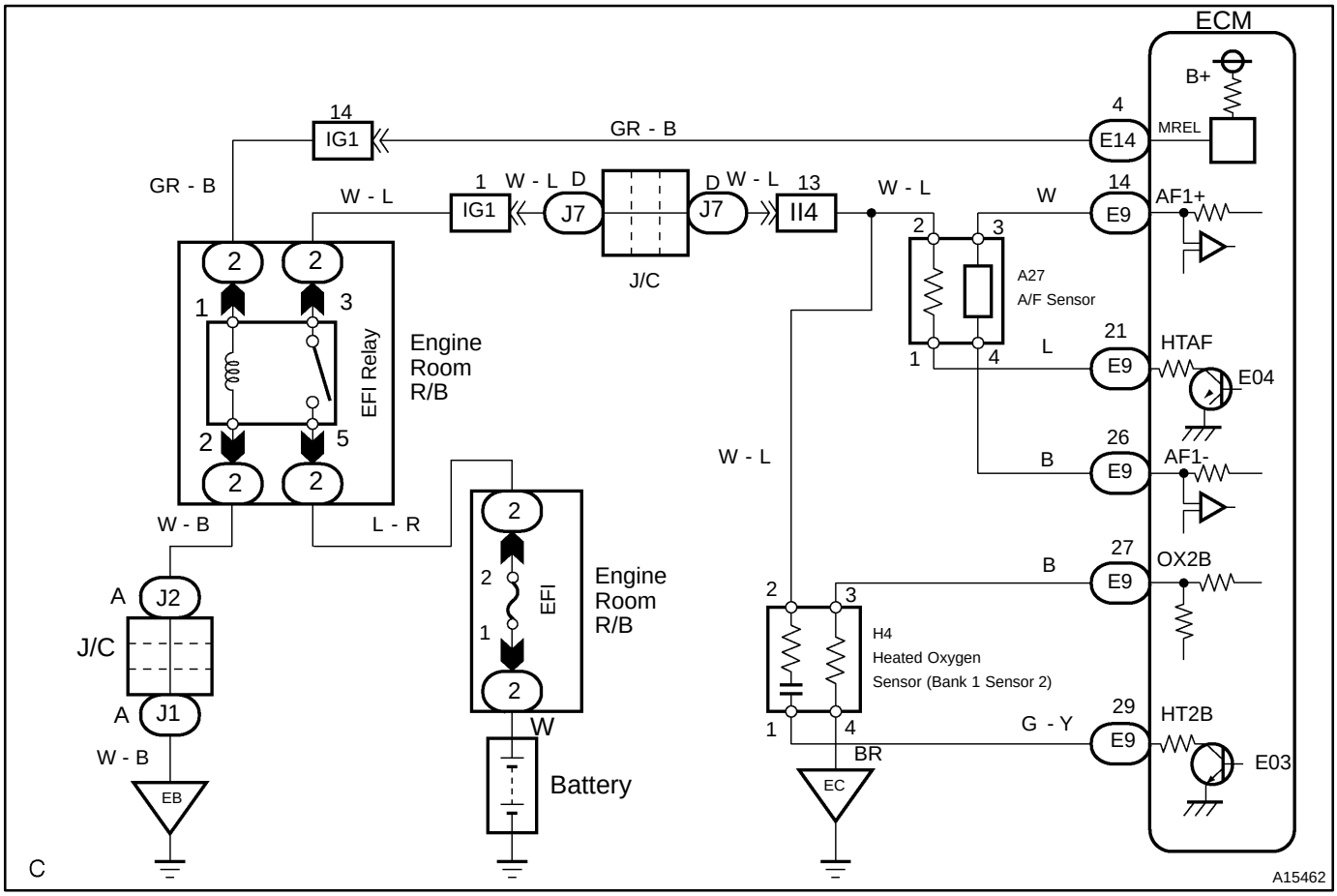


DTC No.	DTC Detecting Condition	Trouble Area
P0125	After engine is warmed up, A/F sensor output* does not change when conditions (a), (b) and (c) continue for at least 1.5 min.: *: Output value changes at inside of ECM only (a) Engine speed: 1,500 rpm or more (b) Vehicle speed: 40 - 100 km/h (25 - 62 mph) (c) Throttle valve does not fully closed (d) After starting engine ≧ 140 sec.	• Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • Air induction system • Fuel pressure • Injector • Gas leakage on exhaust system • PCV valve and hose • ECM

HINT:

- After confirming DTC P0125, use the OBD II scan tool or TOYOTA hand−held tester to confirm voltage output of the heated oxygen sensor (bank 1 sensor 1) from the CURRENT DATA.
- The ECM controls the voltage of the AF1+ and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0125) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check connection of PCV valve and hose**

NG → **Repair or replace PCV valve and hose**

OK ↓

3	**Connect OBD II scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor (bank 1 sensor 1).**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.

(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage value of the A/F sensor on the screen of the OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of AF1+ terminal of the ECM is 3.3 fixed and the AF1- terminal is 3.0 V fixed. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.3. V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding TOYOTA hand-held tester)
Engine idling	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or move, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76 V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding TOYOTA hand-held tester).

OK → **Go to step 9.**

NG ↓

4	Check for open and short in harness and connector between ECM and A/F sensor (bank 1 sensor 1) (See page IN-28).

NG → Repair or replace harness or connector.

OK

5	Check resistance of A/F sensor heater (bank 1 sensor 1) (See page SF-51).

NG → Replace A/F sensor.

OK

6	Check air induction system (See page SF-1).

NG → Repair or replace.

OK

7	Check fuel pressure (See page SF-7).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page SF-1).

OK

8	Check injector injection (See page SF-21).

NG → Replace injector.

OK

9	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

Replace A/F sensor (bank 1 sensor 1).

10	Perform confirmation driving pattern (See page DI-122).

Go

11	Is there DTC P0125 being output again?

YES → Check and replace ECM (See page IN-28).

NO

12	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI-3).

YES

DTC P0125 is caused by running out of fuel.

DI6I2-06

DTC	P0128	Thermostat Malfunction

CIRCUIT DESCRIPTION

If the water temperature doesn't get to 75˚C (167˚F) even after warming up, it is abnormal.

DTC No.	DTC Detection Condition	Trouble Area
P0128	Condition (a), (b) and (c): (a) Cold start (b) After engine is warmed up (c) Engine coolant temp. < 75˚C (167˚F)	• Thermostat • Cooling system • Engine coolant temp. sensor • ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check thermostat. (See page CO-11)**

NG → **Replace thermostat.**

YES

2	**Are there any other codes (besides DTC P0128) being output?**

YES → **Go to relevant DTC chart. (See page DI–13)**

NG

Check and replace ECM. (See page IN-28)

DI0S1-11

DTC	P0136	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P0136	Voltage output of heated oxygen sensor remains at 0.45 *1V/0.4 V*2 or more or 0.60 V*1/0.5 V*2 or less when vehicle is driven at 50 km/h (31 mph) or more after engine is warmed up (2 trip detection logic) *1: California Spec. *2: Except California Spec.	• Open or short in Heated oxygen sensor circuit • Heated oxygen sensor

HINT:

Sensor 2 refer to the sensor farther away from the engine body.

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0136) being output?**

YES → **Go to relevant DTC chart (See page IN-28).**

NO

2	**Check for open and short in harness and connector between ECM and heated oxygen sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

3	**Check output voltage of heated oxygen sensor.**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.

(b) Warm up the engine to normal operating temperature.

CHECK:

Read the voltage output of the heated oxygen sensor when the engine is suddenly raced.

HINT:

Perform quick racing to 4,000 rpm 3 min. using the accelerator pedal.

OK:

Heated oxygen sensor output voltage:

Alternates from 0.45 V*1/0.4 V*2 or less to 0.60 V*1/0.5 V*2 or more.

***1: California Spec.**

***2: Except California Spec.**

OK → **Check that each connector is properly connected.**

NG

Replace heated oxygen sensor.

DI0S0-11

DTC	P0141	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P0141	When heater operates, heater current exceeds 2.35 A (2 trip detection logic)	• Open or short in heater circuit of heated oxygen sensor • Heated oxygen sensor heater • ECM
	Heater current of 0.2 A or less when heater operates (2 trip detection logic)	

HINT:

- Sensor 1 refer to the sensor closer to the engine body.
- Sensor 2 refer to the sensor farther away from the engine body.

WIRING DIAGRAM

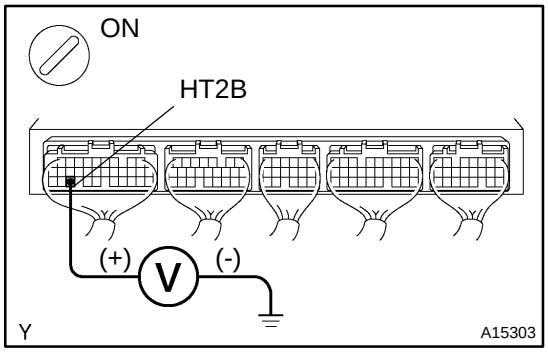
Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunctions is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check voltage between terminals HT2B of ECM connectors and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals HT2B of the ECM connectors and body ground.

OK:

Voltage: 9 - 14 V

OK → **Check and replace ECM (See page IN-28).**

NG

2	Check resistance of heated oxygen sensor heater (See page SF-52).

NG → Replace heated oxygen sensor.

OK →

Check and repair harness or connector between EFI main relay (Marking: EFI) and heated oxygen sensor, and heated oxygen sensor and ECM (See page IN-28).

DI5C7-08

DTC	P0171	System too Lean (Fuel Trim)

DTC	P0172	System too Lean (Fuel Trim)

CIRCUIT DESCRIPTION

Fuel trim refers to the feedback compensation value compared to the basic injection time. 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 air-fuel ratio at its ideal theoretical value. The signal from the A/F sensor is approximately proportional to the existing air-fuel ratio, and ECM comparing it with the ideal theoretical value, the ECM reduces fuel volume immediately if the air-fuel ratio is rich and increases fuel volume if it is lean.

Long-term fuel trim compensates for the deviation from the central value of the short-term fuel trim stored up by each engine tolerance, and the deviation from the central value due to the passage of time and changes of environment.

If both the short-term fuel trim and long-term fuel trim exceed a certain value, it is detected as a malfunction and the MIL lights up.

DTC No.	DTC Detecting Condition	Trouble Area
P0171	When air fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on RICH side (2 trip detection logic)	• Air induction system • Injector blockage • Mass air flow meter • Engine coolant temp. sensor • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • PCV valve and hose • ECM
P0172	When air fuel ratio feedback is stable after engine warming up, fuel trim is considerably in error on LEAN side (2 trip detection logic)	• Injector leak, blockage • Mass air flow meter • Engine coolant temp. sensor • Ignition system • Fuel pressure • Gas leakage on exhaust system • Open or short in A/F sensor (bank 1 sensor 1) circuit • A/F sensor (bank 1 sensor 1) • ECM

HINT:

- When the DTC P0171 is recorded, the actual air-fuel ratio is on the LEAN side. When DTC P0172 is recorded, the actual air-fuel ratio is on the RICH side.
- If the vehicle runs out of fuel, the air-fuel ratio is lean and DTC P0171 is recorded. The MIL then comes on.
- If the total of the short-term fuel trim value and long-term fuel trim value is within ±35 % (80˚C (176˚F) or more), the system is functioning normally.
- The A/F sensor (bank 1 sensor 1) output voltage and the short-term fuel trim value can be read using the OBD II scan tool or TOYOTA hand-held tester.

- The ECM controls the voltage of the AF1- and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check connection of PCV valve and hose.**

NG → **Repair or replace PCV valve and hose.**

OK

2	**Check air induction system (See page SF-1).**

NG → **Repair or replace.**

OK

3	**Check injector injection (See page SF-21).**

NG → **Replace injector.**

OK

4	Check mass air flow meter (See page SF-28) and engine coolant temperature sensor (See page SF-44).

NG → Repair or replace.

OK

5	Check for spark and ignition (See page IG-1).

NG → Repair or replace.

OK

6	Check fuel pressure (See page SF-7).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page SF-1).

OK

7	Check gas leakage on exhaust system.

NG → Repair or replace.

OK

8	Check output voltage A/F sensor (bank 1 sensor 1).

PREPARATION:

(a) Connect the OBDII scan tool or TOYOTA hand-held tester to the DLC3.

(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage value of the A/F sensor on the screen of the OBDII scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of the AF1+ terminal of the ECM is 3.3 fixed and AF1- terminal is 3.0 V fixed. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBDII scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25mph) or more, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76 V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBDII scan tool (excluding TOYOTA hand-held tester).

OK → **Go to step 9.**

NG

9	Check for open and short in harness and connector between ECM and A/F sensor (bank 1 sensor 1) (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Replace A/F sensor.

10	Perform confirmation driving pattern (See page DI-122).

Go

11	Is there DTC P0171 or P0172 being output again?

YES → Check and replace ECM (See page IN-28).

NO

12	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI-3).

YES

DTC P0171 or P0172 is caused by running out of fuel.

DI8XH-02

DTC	P0300	Random/Multiple Cylinder Misfire Detected

DTC	P0301	Cylinder 1 Misfire Detected

DTC	P0302	Cylinder 2 Misfire Detected

DTC	P0303	Cylinder 3 Misfire Detected

DTC	P0304	Cylinder 4 Misfire Detected

DTC	P0305	Cylinder 5 Misfire Detected

DTC	P0306	Cylinder 6 Misfire Detected

CIRCUIT DESCRIPTION

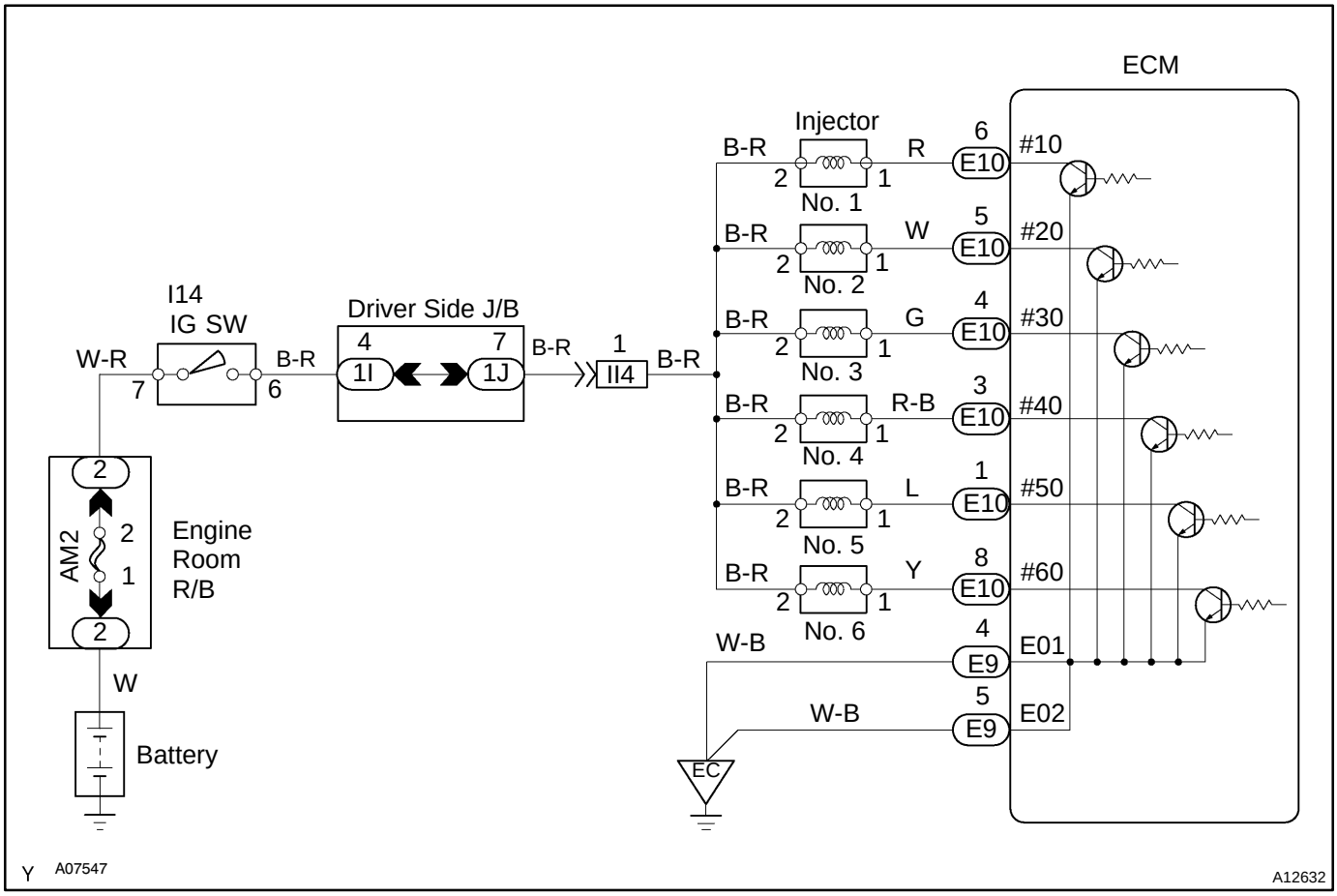
Misfire: The ECM uses the crankshaft position sensor and camshaft position sensor to monitor changes in the crankshaft rotation for each cylinder. The ECM counts the number of times the engine speed change rate indicates that misfire has occurred. When the misfire rate equals or exceeds the count indicating that the engine condition has deteriorated, the MIL lights up.

If the misfire rate is high enough and the driving conditions will cause catalyst overheating, the MIL blinks when misfiring occurs.

DTC No.	DTC Detecting Condition	Trouble Area
P0300	Misfiring of random cylinders is detected during any particular 200 or 1,000 revolutions	• Open or short in engine wire • Connector connection • Vacuum hose connector • Ignition system • Injector • Fuel pressure • Mass air flow meter • Engine coolant temp. sensor • Compression pressure • Valve clearance • Valve timing • PCV valve and hose • ECM
P0301 P0302 P0303 P0304 P0305 P0306	For any particular 200 revolutions for engine, misfiring is detected which can cause catalyst overheating (This causes MIL to blink)	
	For any particular 1,000 revolutions of engine, misfiring is detected which causes a deterioration in emission (2 trip detection logic)	

HINT:
When the 2 or more codes for a misfiring cylinder are recorded repeatedly but no random misfire code is recorded, it indicates that the misfires were detected and recorded at different times.

WIRING DIAGRAM



CONFIRMATION DRIVING PATTERN

(a) Connect the TOYOTA hand-held tester or OBD II scan tool.
(b) Record DTC and the freeze frame data.
(c) Use the TOYOTA hand-held tester to set to the check mode (See page DI-3).

(d) Drive the vehicle several times with the engine speed, load and its surrounding range shown with the ENGINE SPD, CALC LOAD in the freeze frame data or the MISFIRE RPM, MISFIRE LOAD in the data list.

If you have no TOYOTA hand-held tester, turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again.

HINT:

In order to memorize DTC of misfire, it is necessary to drive around the MISFIRE RPM, MISFIRE LOAD in the data list for the following period of time.

Engine Speed	Time
Ignition	3 minutes 30 seconds or more
1000 rpm	3 minutes or more
2000 rpm	1 minute 30 seconds or more
3000 rpm	1 minute or more

(e) Check whether there is misfire or not by monitoring DTC and the freeze frame data. After that, record them.

(f) Turn the ignition switch OFF and wait at least 5 seconds.

INSPECTION PROCEDURE

HINT:

- If is case that DTC besides misfire is memorized simultaneously, first perform the troubleshooting for them.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame data records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the vehicle is brought to the workshop and the misfire is not occurred, misfire can be confirmed by reproducing the condition or freeze frame data. Also, after finishing the repair, confirm that there is no misfire (See the confirmation driving pattern).
- When either of the SHORT FT #1, LONG FT #1, SHORT FT #2 or LONG FT #2 in the freeze frame data is besides the range of ±20%, there is a possibility that the air-fuel ratio is inclining either to RICH (-20 % or less) or LEAN (+20 % or more).
- When the COOLANT TEMP in the freeze frame data is less than 80˚C (176˚F), there is a possibility or misfire only during warming up.
- In the case that misfire cannot be reproduced, the reason may be because of the driving with lack or fuel, the use of improper fuel, a stain of ignition plug, and etc.

1	**Check connection of PCV valve and hose**

NG → **Repair or replace PCV valve and hose**

OK

2	**Check wire harness, connector and vacuum hose in engine room.**

CHECK:

(a) Check the connection conditions of wire harness and connector.

(b) Check the disconnection, piping and break of vacuum hose.

NG → **Repair or replace, then confirm that there is no misfire (See confirnation drive pattern).**

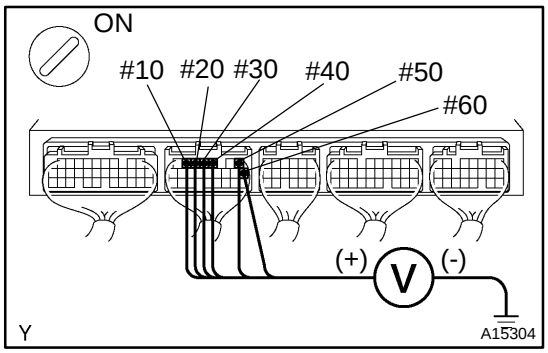
OK ↓

3	**Check spark plug and spark of misfiring cylinder (See page IG-1).**

NG → **Replace or check ignition system (See page IG-1).**

OK ↓

4	Check voltage of ECM terminal for injector of failed cylinder.



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between applicable terminals of the ECM connector and body ground.

OK:

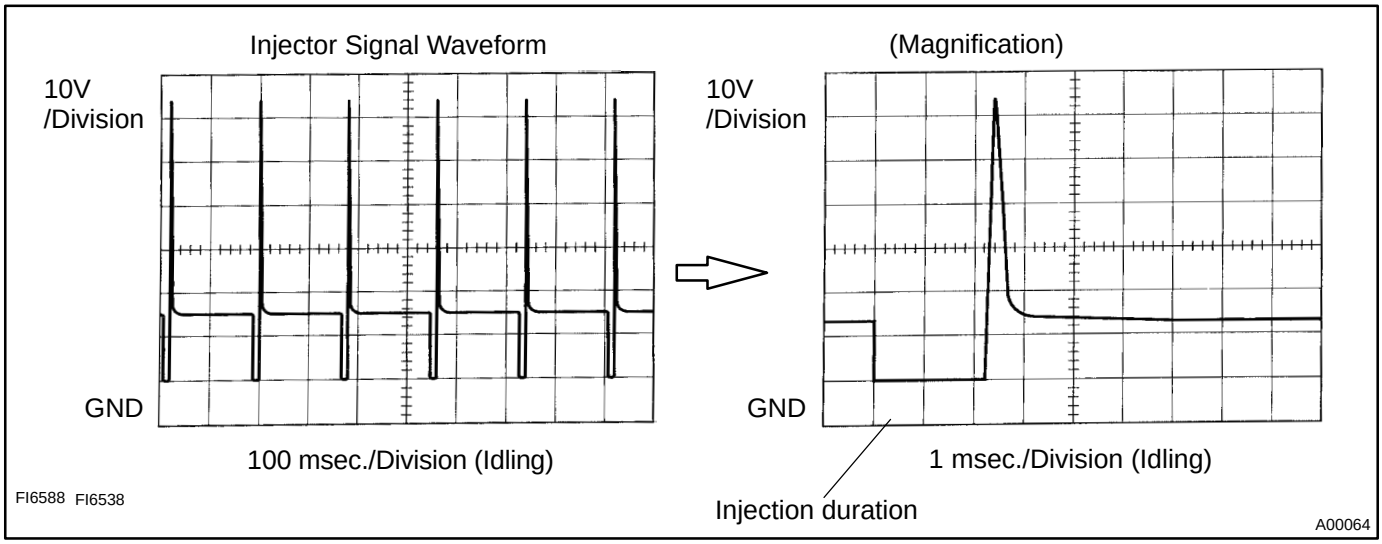
Voltage: 9 - 14 V

Reference: INSPECTION USING OSCILLOSCOPE

With the engine idling, check the waveform between terminals #10 - #60 and E01 of the ECM connector.

HINT:

The correct waveform is as shown.



OK	Go to step 4.

NG

5	Check resistance of injector of misfiring cylinder (See page SF-21).

NG → Replace injector.

OK →

Check for open and short in harness and connector between injector and ECM (See page IN-28).

6	Check fuel pressure (See page SF-7).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page SF-1).

OK →

7	Check injector injection (See page SF-21).

NG → Replace injector.

OK →

8	Check mass air flow meter (See page SF-28) and engine coolant temperature sensor (See page SF-44).

NG → Repair or replace.

OK →

Check compression pressure, valve clearance and valve timing.

DI0S4-11

DTC	P0325	Knock Sensor 1 Circuit Malfunction (Bank 1)

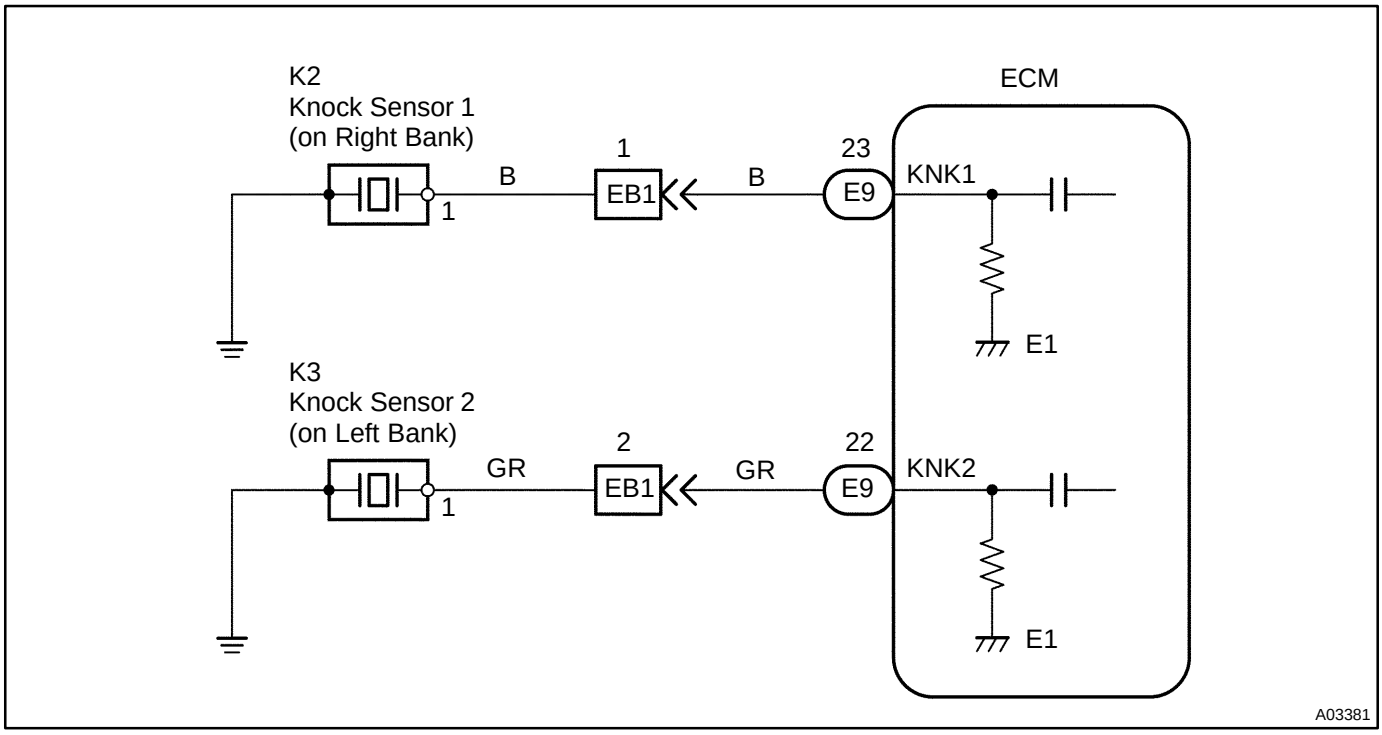
DTC	P0330	Knock Sensor 2 Circuit Malfunction (Bank 2)

CIRCUIT DESCRIPTION

Knock sensors are fitted one to the right bank and left bank of the cylinder block to detect engine knocking. This sensor contains a piezoelectric element which generates a voltage when it becomes deformed, which occurs when the cylinder block vibrates due to knocking. If engine knocking occurs, ignition timing is retarded to suppress it.

DTC No.	DTC Detecting Condition	Trouble Area
P0325	No knock sensor 1 signal to ECM with engine speed between 2000 rpm and 5,600 rpm	• Open or short in knock sensor 1 circuit • Knock sensor 1 (looseness) • ECM
P0330	No knock sensor 2 signal to ECM with engine speed between 2000 rpm and 5,600 rpm	• Open or short in knock sensor 2 circuit • Knock sensor 2 (looseness) • ECM

WIRING DIAGRAM



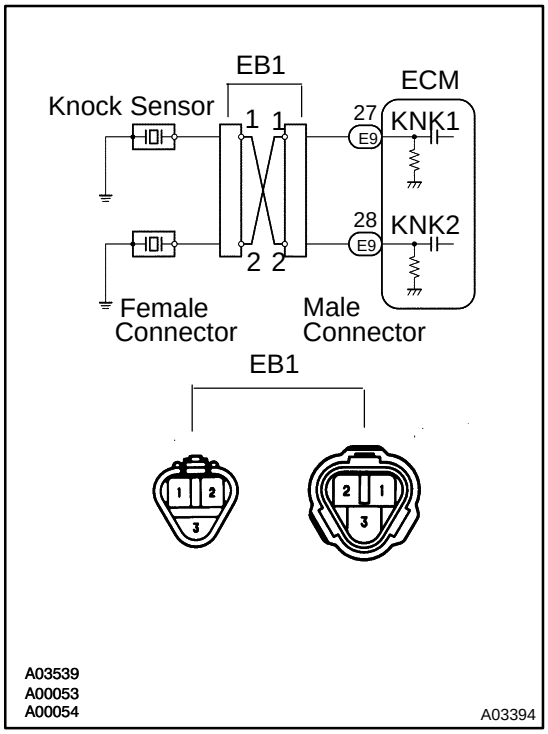
INSPECTION PROCEDURE

HINT:

- DTC P0325 is for the right bank knock sensor circuit.
- DTC P0330 is for the left bank knock sensor circuit.

- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Connect OBD II scan tool or TOYOTA hand-held tester, and check knock sensor circuit.**



PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(b) Disconnect the EB1 connector.
(c) Connect the terminals of the disconnected EB1 male connector and EB1 female as follows.

Male connector ↔ Female connector
Terminal 1 ↔ Terminal 2
Terminal 2 ↔ Terminal 1

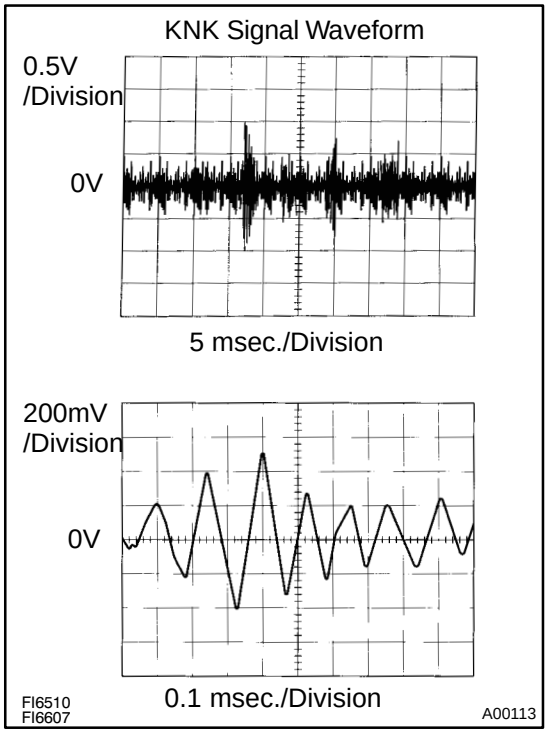
(d) Turn the ignition switch ON and push the OBDII scan tool or TOYOTA hand-held tester main switch ON.
(e) After the engine is warmed up, perform quick racing to 4,000 rpm 3 times.

CHECK:

Check the DTC.

RESULT:

Type I	DTC same as when vehicle brought in P0325 → P0325 or P0330 → P0330
Type II	DTC different to when vehicle brought in P0325 → P0330 or P0330 → P0325



Reference: INSPECTION USING OSCILLOSCOPE

- With the engine racing (4,000 rpm), check the waveform between terminals KNK1, KNK2 of the ECM connector and body ground.

HINT:

The correct waveform is as shown.

- Spread the time on the horizontal axis, and confirm that period of the wave is 0.141 msec. (Normal mode vibration frequency of knock sensor: 7.1 kHz)

HINT:

If normal mode vibration frequency is not 7.1 kHz, the sensor is malfunctioning.

Type II	**Go to step 3.**

Type I

2	**Check for open and short in harness and connector between EB1 connector and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

3	**Check for open and short in harness and connector between EB1 connector and knock sensor (See page IN-28).**

HINT:

- If DTC P0325 has changed to P0330, check the knock sensor circuit on the right bank side.
- If DTC P0330 has changed to P0325, check the knock sensor circuit on the left bank side.

NG → **Repair or replace harness or connector.**

OK

Replace knock sensor.

DI0S5-14

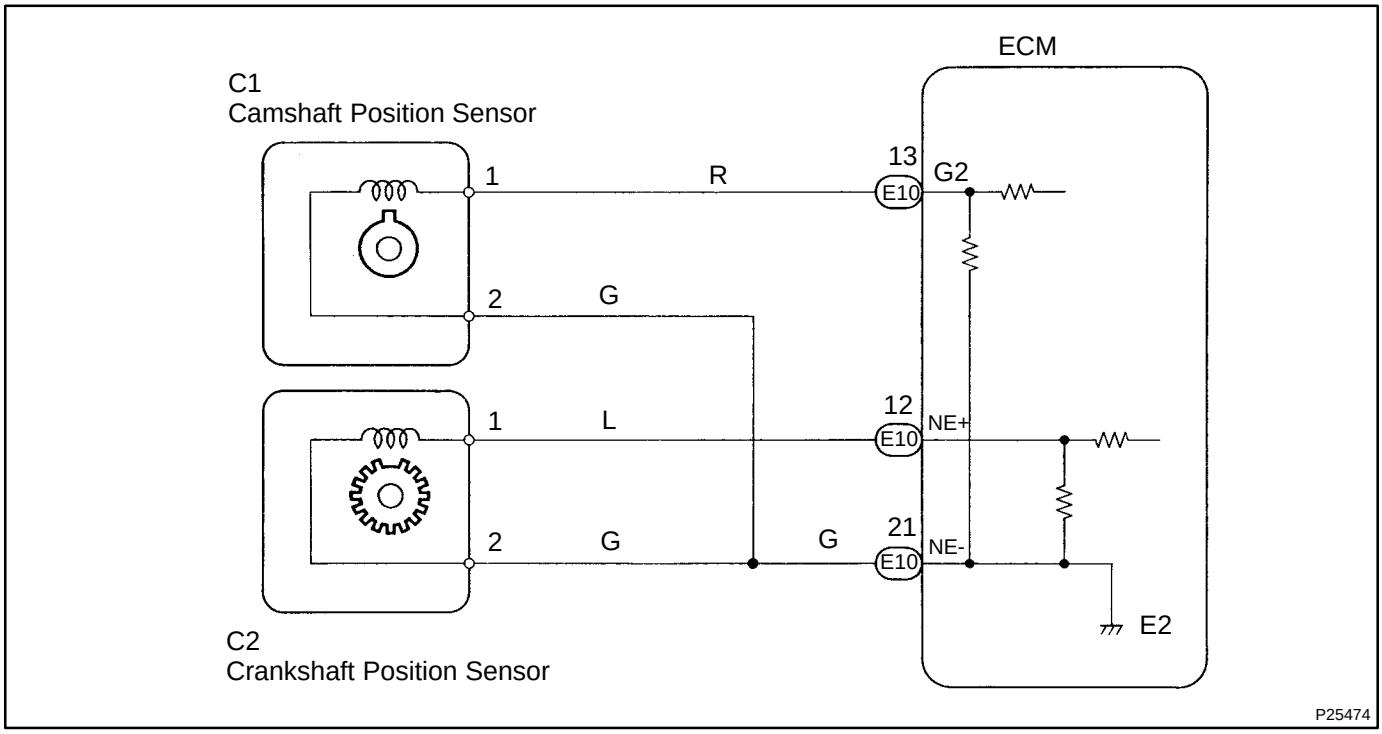
DTC	P0335	Crankshaft Position Sensor ”A” Circuit Malfunction

CIRCUIT DESCRIPTION

The crankshaft position sensor, which detects the engine speed and crankshaft angle signal (NE signal), has been installed on the oil pump body.
The NE signal plate has 34 teeth. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal, and the actual crankshaft angle and the engine speed by the NE signal.

DTC No.	DTC Detecting Condition	Trouble Area
P0335	No crankshaft position sensor signal to ECM during cranking (2 trip detection logic)	• Open or short in crankshaft position sensor circuit. • Crankshaft position sensor • Crankshaft timing pulley • ECM
	No crankshaft position sensor signal to ECM with engine speed 600 rpm or more (2 trip detection logic)	

WIRING DIAGRAM

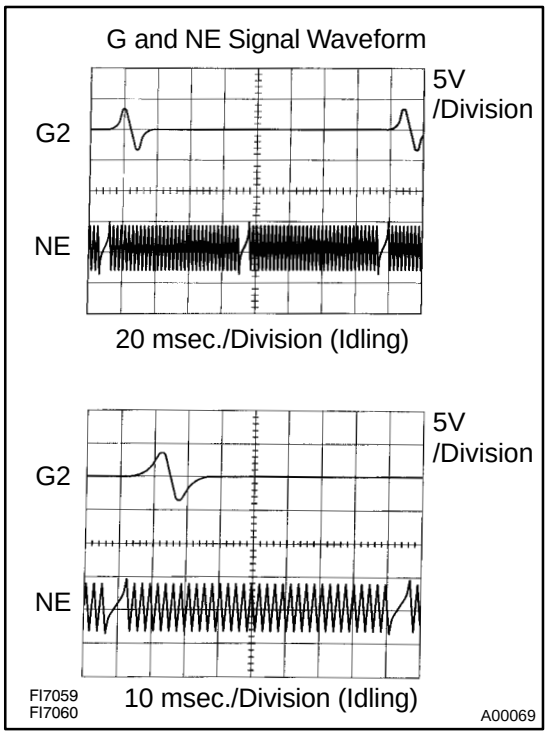


INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC P0335 first. If no trouble is found, troubleshoot the following mechanical systems.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check resistance of crankshaft position sensor (See page IG-13).**



Reference: INSPECTION USING OSCILLOSCOPE

During cranking or idling, check the waveforms between terminals G2 and NE-, and NE+ and NE- of the ECM connector.

HINT:

The correct waveforms are as shown.

NG → **Replace crankshaft position sensor.**

OK

2	**Check for open and short in harness and connector between ECM and crankshaft position sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

3	**Inspect sensor installation and teeth of crankshaft timing pulley.**

NG → **Tighten the sensor. Replace crankshaft timing pulley.**

OK

Check and replace ECM (See page IN-28).

DI0S6-08

DTC	P0340	Camshaft Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

Camshaft posision sensor (G signal) consists of a magnet, iron core and pickup coil.
The G signal plate has 1 tooth, on its outer circumference and is mounted on the left bank camshafts.
When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations, in the magnetic field and generating an electromotive force in the pickup coil.
The NE signal plate has 34 teeth and is mounted on the crankshaft. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal and the actual crankshaft angle and the engine speed by the NE signal.

DTC No.	DTC Detecting Condition	Trouble Area
P0340	No camshaft position sensor signal to ECM during cranking (2 trip detection logic)	• Open or short in camshaft position sensor circuit • Camshaft position sensor • ECM
	No camshaft position sensor signal to ECM with engine speed 600 rpm or more	

WIRING DIAGRAM

Refer to DTC P0335 on page DI-66 .

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBDII scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check resistance of camshaft position sensor (See page IG-1).**

Reference: INSPECTION USING OSCILLOSCOPE
Refer to DTC P0335 on page DI-66 .

NG → **Replace camshaft position sensor.**

OK

2	**Check for open and short in harness and connector between ECM and camshaft position sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

3	Inspect sensor installation and tooth of RH camshaft timing pulley.

NG → Tighten sensor. Replace RH camshaft timing pulley

OK

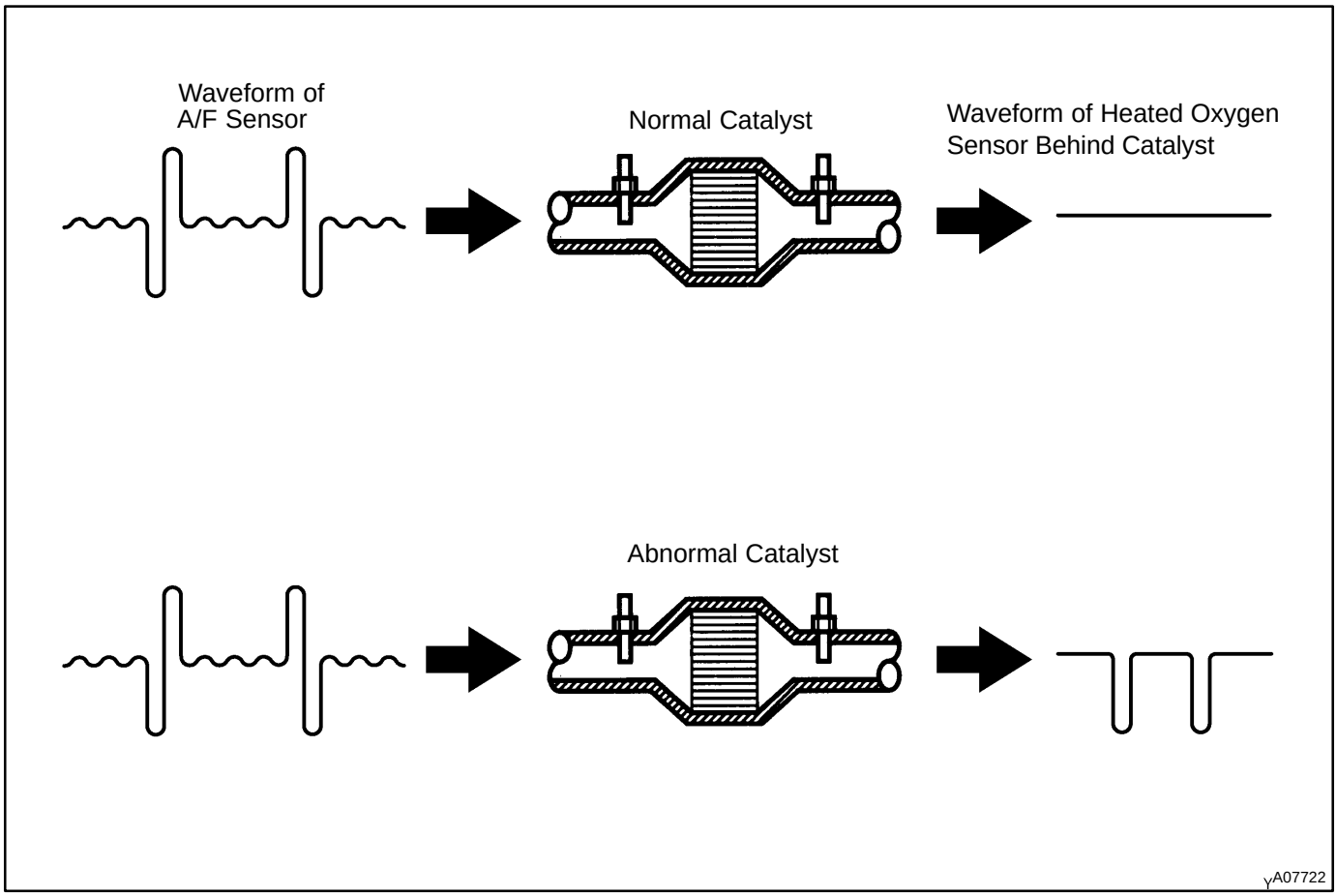
Check and replace ECM (See page IN-28).

DI5C9-06

DTC	P0420	Catalyst System Efficiency Below Threshold (Bank 1)

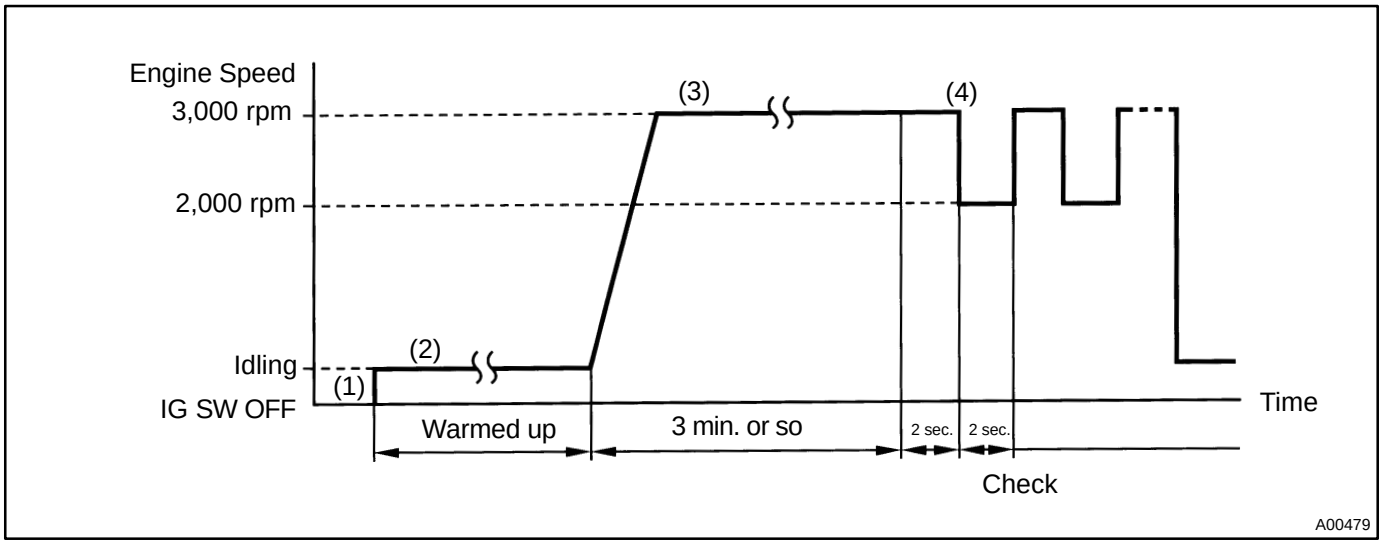
CIRCUIT DESCRIPTION

The ECM observes the waveform of the heated oxygen sensor located behind the catalyst to determine whether the catalyst is performance has deteriorated. If the catalyst is functioning normally, the waveform of the heated oxygen sensor located behind the catalyst switches back and forth between rich and lean much more slowly. When the waveform of the heated oxygen sensor located behind the catalyst alternates flatteringly between rich and lean, it indicates that catalyst performance has deteriorated.



DTC No.	DTC Detecting Condition	Trouble Area
P0420	After engine and catalyst are warmed up, and while vehicle is driven within set vehicle and engine speed range, waveform of heated oxygen sensor (bank 1 sensor 2) alternates flatteringly between rich and lean (2 trip detection logic)	• Gas leakage on exhaust system • A/F sensor (bank 1 sensor 1) • Heated oxygen sensor (bank 1 sensor 2) • Three-way catalytic converter

CONFIRMATION ENGINE RACING PATTERN



(1) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(2) Start the engine and warm it up with all the accessories switched OFF until the water temperature is stable.
(3) Race the engine at 2,500 - 3,000 rpm for about 3 min.
(4) When racing the engine at 3,000 rpm for 2 sec. and 2,000 rpm for 2 sec. alternately, check the waveform of the heated oxygen sensor (bank 1 sensor 2).

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P0420) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Check gas leakage on exhaust system.**

NG → **Repair or replace.**

OK

3	Check A/F sensor (bank 1 sensor 1) (See page SF-51).

NG → Repair or replace.

OK

4	Check heated oxygen sensor (bank 1 sensor 2) (See page SF-52).

NG → Repair or replace.

OK

Replace three-way catalytic converter.

DI9O0-01

DTC	P0440	Evaporative Emission Control System Malfunction

DTC	P0442	Evaporative Emission Control System Leak Detected (Small Leak)

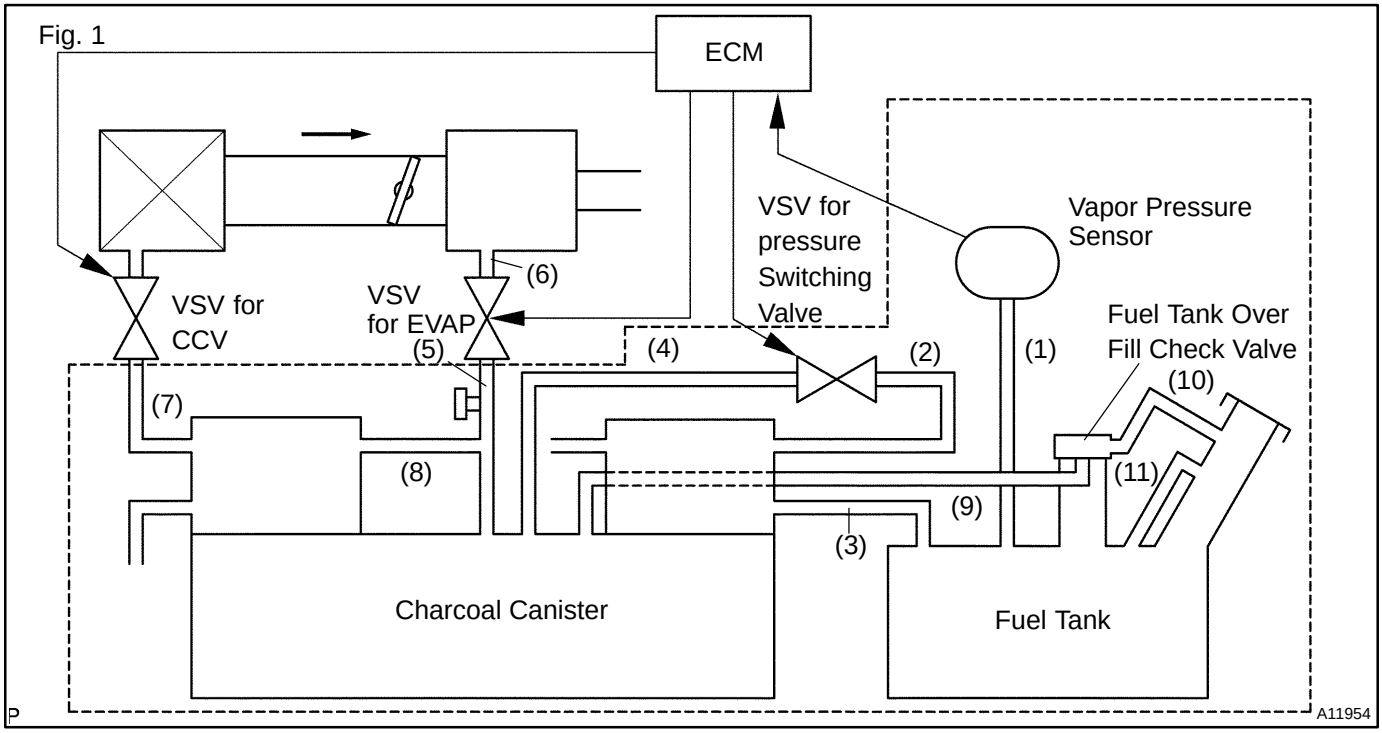
CIRCUIT DESCRIPTION

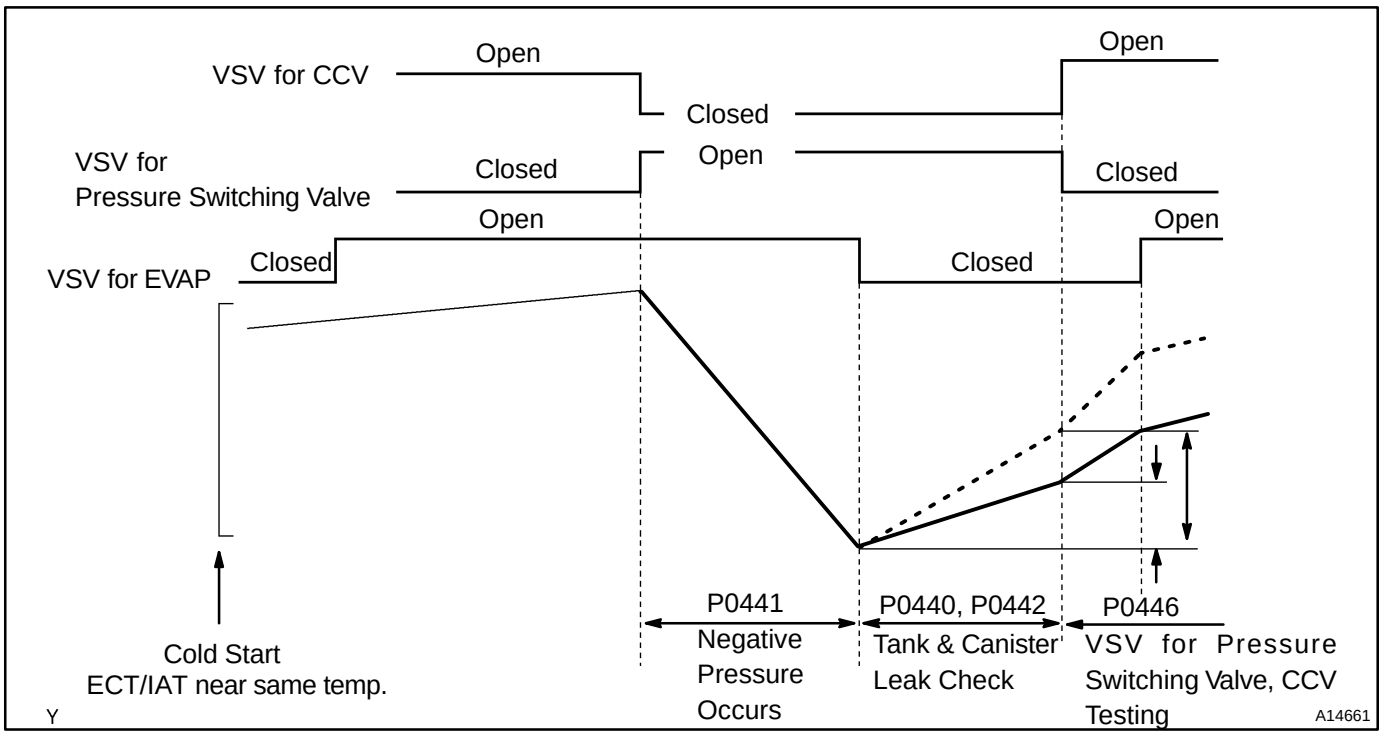
The vapor pressure sensor, VSV for canister closed valve (CCV) and VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTC P0440 is recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when the vapor pressure sensor malfunctions.

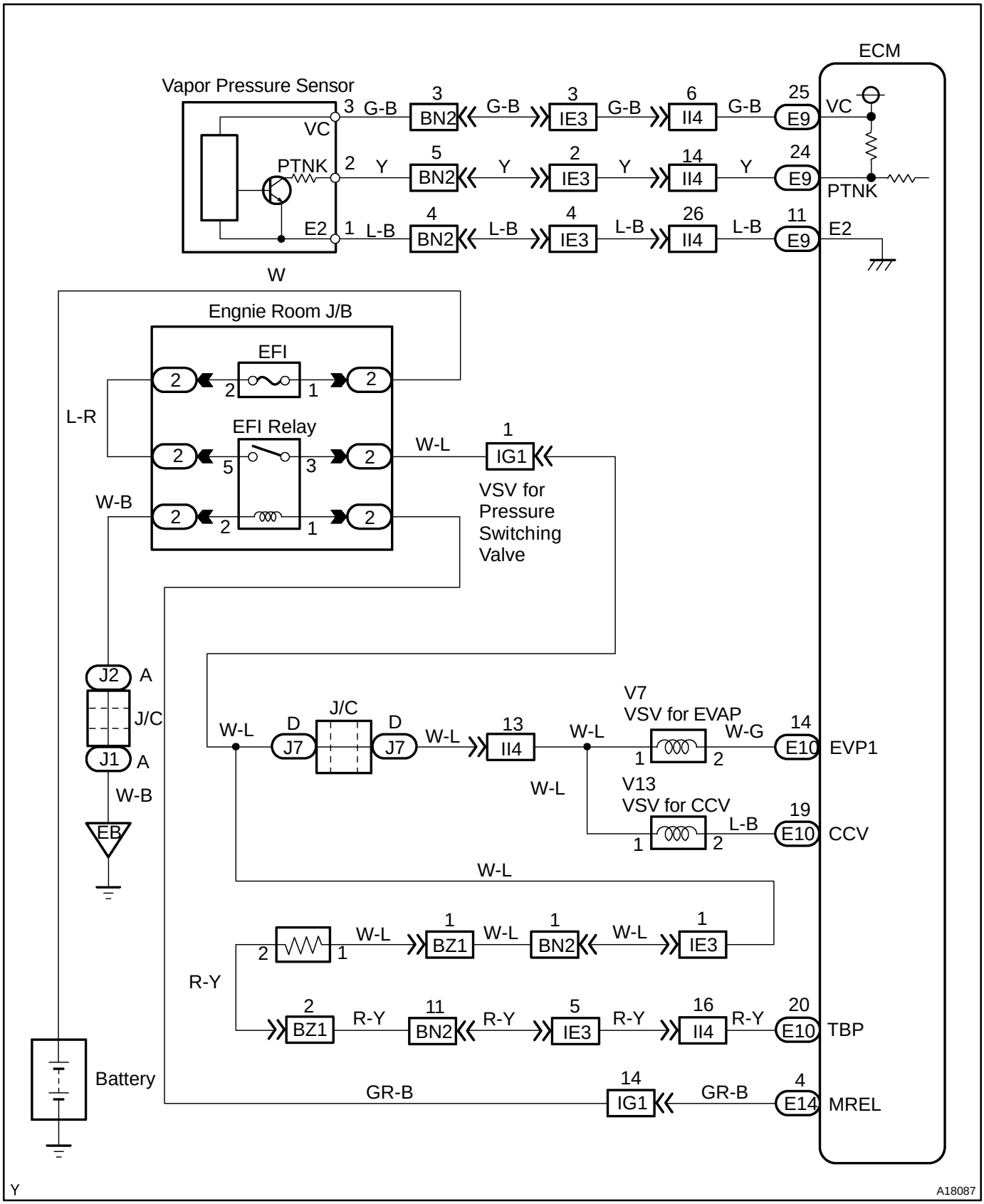
Fig. 1





DTC No.	DTC Detecting Condition	Trouble Area
P0440 P0442	After cold engine start. After VSV for EVAP operation, the VSV for EVAP is turned off sealing the vacuum in the system and the ECM begins to monitor the pressure increase. Some increase is normal. A very rapid, sharp increase in pressure indicates a leak in the EVAP system and sets the DTC P0440. This monitoring method is also able to distinguish what is called the small leak detection.(DTC P0442) A pressure rise just above normal indicates a very small hole.	• Hose or tube cracked, hole, damaged or loose seal ((3) or (9) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Vacuum hose cracked, holed, blocked, damaged or disconnected ((1), (2), (4), (5), (6), (7), (8), (10)and (11) in Fig. 1) • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Fuel tank over fill check valve cracked or damaged • ECM

WIRING DIAGRAM

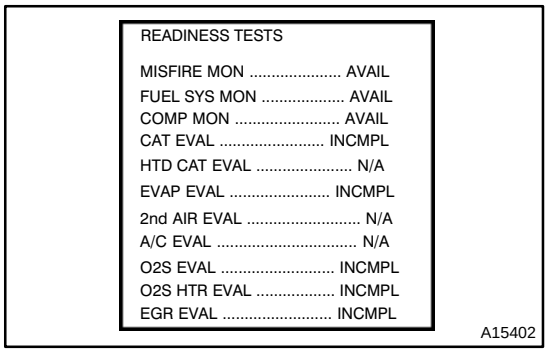


CONFIRMATION READINESS TEST

First Trip Procedure

(a) Vehicle must be cold, ambient temperature approximately between 50˚F - 95˚F.

(b) Intake Air Temp. (IAT) and Engine Coolant Temp. (ECT) sensor almost same value.



(c) Clear DTC's.

- Disconnecting the battery terminals or EFI fuse.
- Readiness tests will show INCMPL (incomplete).

(d) Drive the vehicle according to LA#4 drive cycle. Note the state of Readiness Tests. They will change to COMPL as the evaluation monitors operate and if the system passes. This procedure may take approximately 20 minutes or more.

NOTICE:

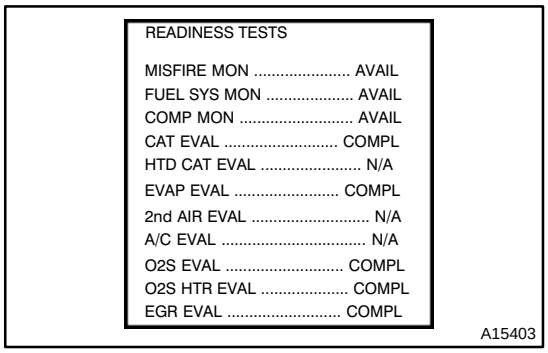
Do not shut off the engine - the results will be invalid.

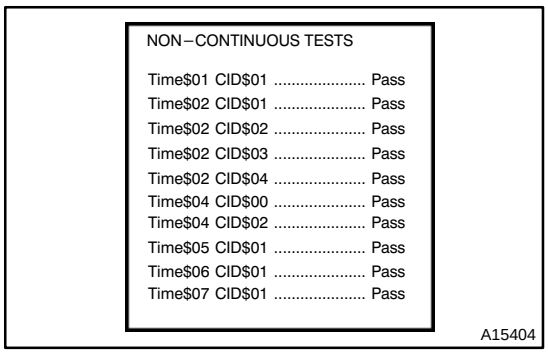
Pass Condition - No Problem Found by the ECM

If the EVAP evaluation monitor shows COMPL, go to the Non-Continuous Test screen.

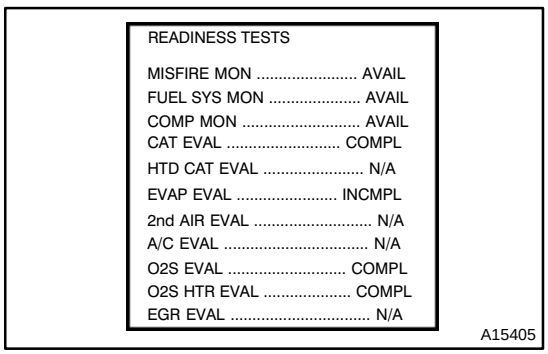
NOTICE:

Do not shut off the engine - the results will be invalid.



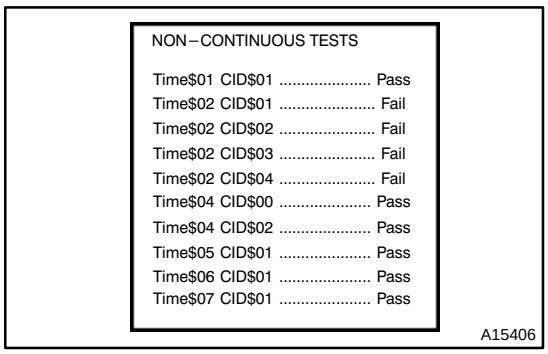


- To get there, go to Advanced OBD II, Onboard Tests, Non-continuous Tests.
- If all of the tests in the time $02 category Tests show Pass, the evaluation monitor has operated and no problem was detected.



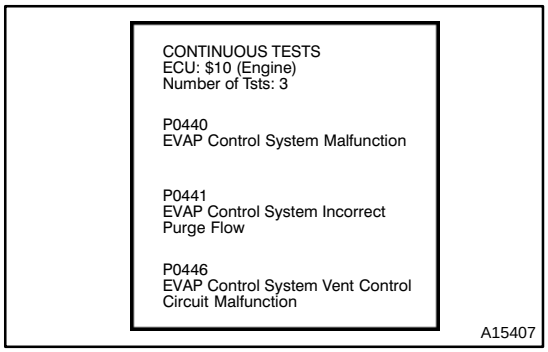
Fail Condition - Problem Detected by the ECM

If the EVAP evaluation monitor shows INCMPL, go to the Non-Continuous Test screen.



(1) If all Tests show Pass, the following may have occurred.
- The EVAP evaluation monitor did not operate.
- The EVAP evaluation monitor did not finish.
- The ECM withheld judgement.

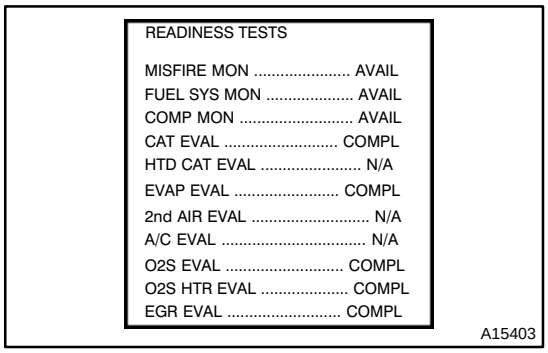
(2) If one or more of the tests in the time $02 category show Fail, the EVAP evaluation monitor did operate and the ECM detected a problem.



(3) Go to Continuous Tests screen. This is the only place DTC's are listed for the first trip.

NOTICE:

The DTC listed may not be valid. A second trip is needed to confirm the DTC.



Second Trip Procedure

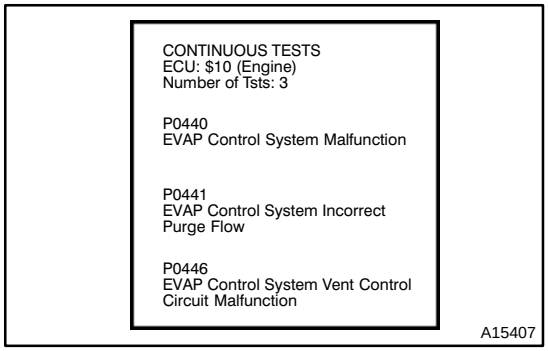
(a) Vehicle must be cold, ambient temperature approximately between 50°F - 95°F.

(b) Go to Readiness Tests screen.

(c) Drive the vehicle according to LA#4 drive cycle. Note the state of EVAP evaluation monitor. This procedure may take approximately 20 minutes or more.

NOTICE:

Do not shut off the engine - the results will be invalid.



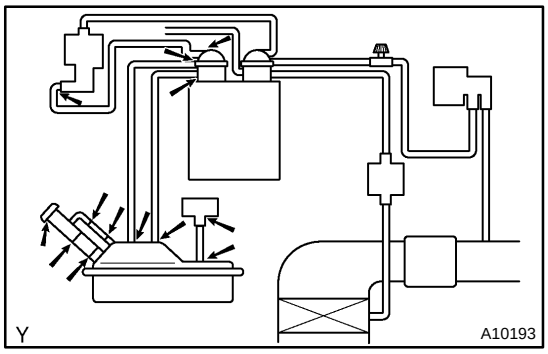
(d) If Readiness Tests changes to COMPL, the EVAP evaluation monitor has operated. Check for any stored DTC's.
- If a DTC has stored, the problem has been detected and confirmed by the ECM.
- If no DTC was found, the EVAP monitor operated but no problem was detected.

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 or P0442 first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 or P0442 next.
- Ask the customer whether, after the MIL came on, the customer found the fuel tank cap loose and tightened it. Also ask the customer whether the fuel tank cap was loose when refuelling. If the fuel tank cap was not loose, it was the cause of the DTC. If the fuel tank cap was not loose or if the customer was not sure if it was loose, troubleshoot according to the following procedure.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister.**



CHECK:

Check for cracks, deformation and loose connection of these parts:

- Fuel tank
- Charcoal canister
- Fuel tank filler pipe
- Hoses and tubes around the fuel tank and charcoal canister

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is TOYOTA genuine parts.**

NG → **Replace to TOYOTA genuine parts.**

OK

3	**Check that fuel tank cap is correctly installed.**

NG → **Correctly install fuel tank cap.**

OK

4	**Check fuel tank cap (See page EC-6).**

NG → **Replace fuel tank cap.**

OK

5	**Check filler neck for damage.**

PREPARATION:

Remove the fuel tank cap.

CHECK:

Visually inspect the filler neck for damage.

NG → **Replace filler pipe.**

OK

6	**Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister.**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole and damage.

NG → **Repair or replace.**

OK ↓

7	**Check hose and tube between fuel tank and charcoal canister.**

CHECK:

(a) Check for proper connection of the fuel tank and fuel evap pipe (See page EC-6), fuel evap pipe and fuel tube under the floor, fuel tube under the floor and charcoal canister.
(b) Check the hose and tube for cracks, hole and damage.

NG → **Repair or replace.**

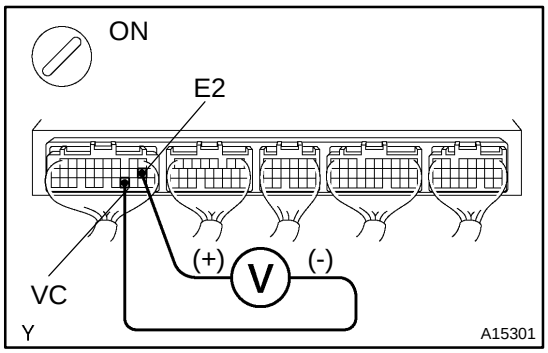
OK ↓

8	**Check charcoal canister for cracks, hole and damage (See page EC-6).**

NG → **Replace charcoal canister.**

OK ↓

9	Check voltage between terminals VC and E2 of ECM connector.



CHECK:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the ECM connector.

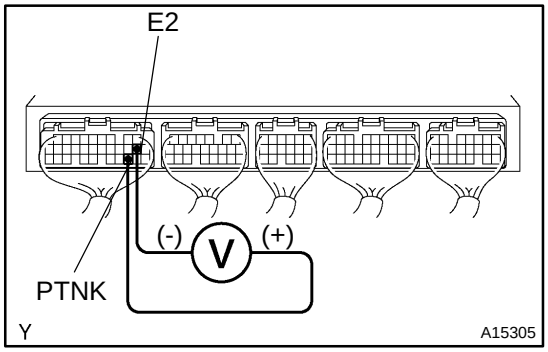
OK:

Voltage: 4.5 - 5.5 V

NG	Check and replace ECM (See page IN-28).

OK

10	Check voltage between terminals PTNK and E2 of ECM connectors.



PREPARATION:

(a) Remove the grove compartment.

(b) Remove the fuel tank cap.

(c) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors.

OK:

Voltage: 3.3 V

OK	Go to step 12.

NG

11	Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).

NG	Repair or replace harness or connector.

OK

Replace vapor pressure sensor.

12	Check fuel tank and fuel tank over fill check valve for cracks and damage.

NG → Replace fuel tank or fuel tank over fill check valve.

OK →

It is likely that vehicle user did not properly close fuel tank cap. Please explain to customer how to properly install fuel tank cap.

DI8XJ-01

DTC	P0441	Evaporative Emission Control System Incorrect Purge Flow

DTC	P0446	Evaporative Emission Control System Vent Control Malfunction

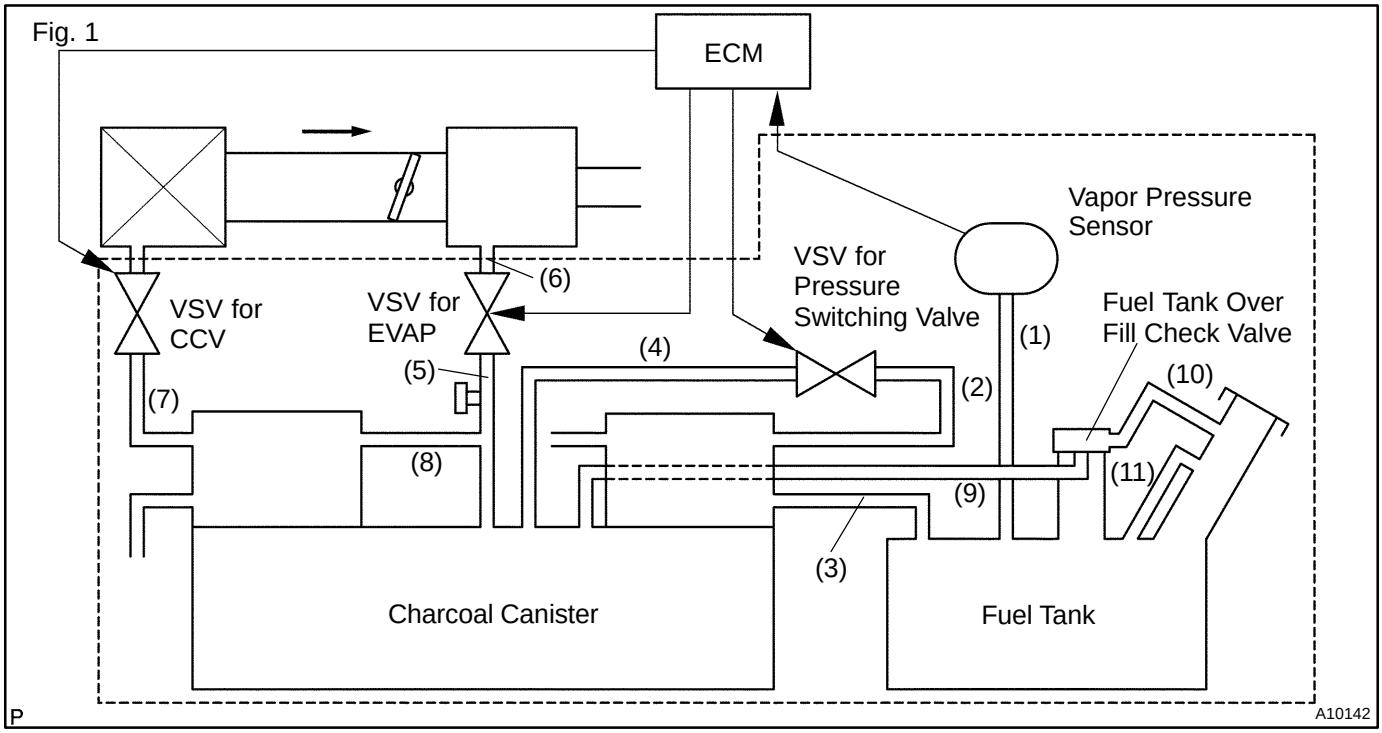
CIRCUIT DESCRIPTION

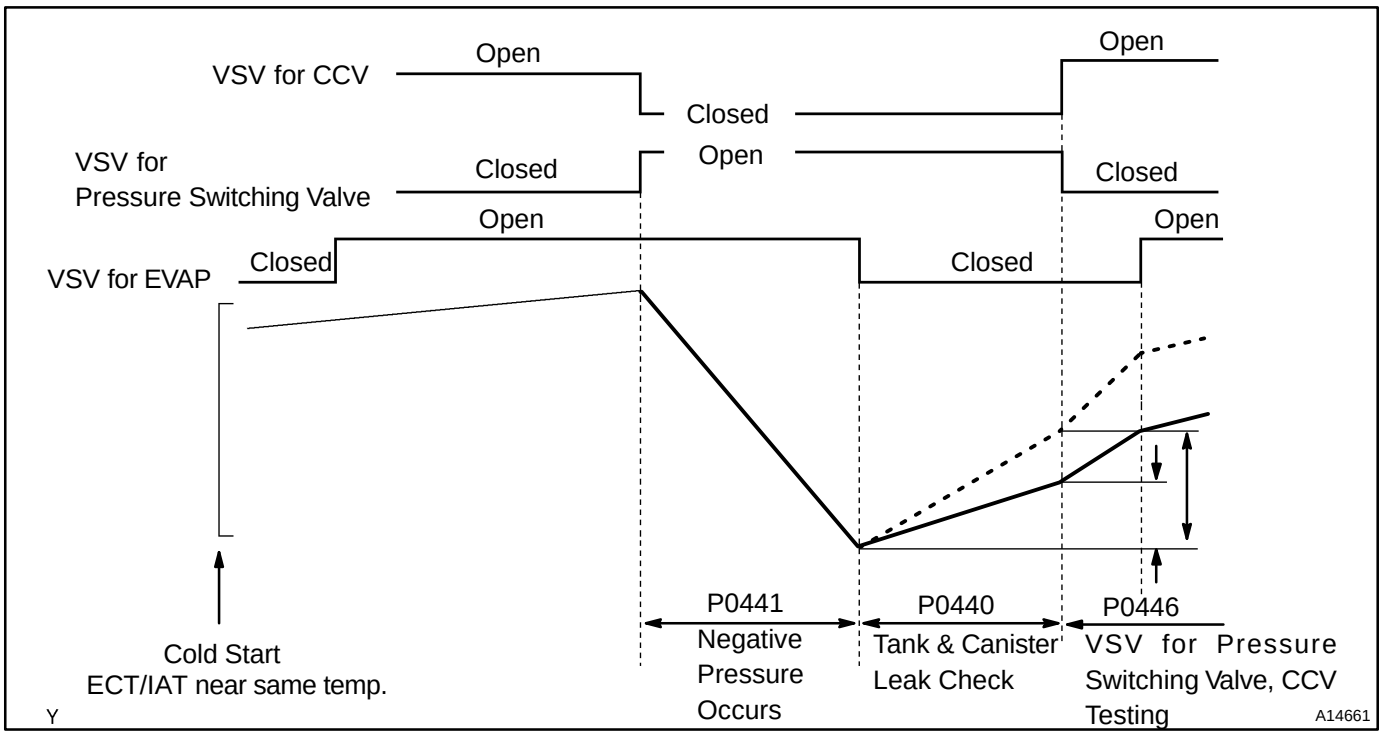
The vapor pressure sensor, VSV for canister closed valve (CCV), VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTCs P0441 and P0446 are recorded by the ECM when evaporative emissions leak from the components within the dotted line in Fig. 1 below, or when there is a malfunction in either the VSV for EVAP, the VSV for pressure switching valve, or in the vapor pressure sensor itself.

Fig. 1





DTC No.	DTC Detecting Condition	Trouble Area
P0441	Pressure in charcoal canister and fuel tank does not drop or drop in pressure increased beyond the specified limit during purge control (2 trip detection logic)	• Vacuum hose cracks, holed blocked, damaged or disconnected ((1), (2), (3), (4), (5), (6), (7), (8), (9), (10) and (11) in Fig. 1) • Fuel tank cap incorrectly installed • Fuel tank cap cracked or damaged • Open or short in vapor pressure sensor circuit • Vapor pressure sensor • Open or short in VSV circuit for EVAP • VSV for EVAP • Open or short in VSV circuit for CCV • VSV for CCV • Open or short in VSV circuit for pressure switching valve • VSV for pressure switching valve • Fuel tank cracked, holed or damaged • Charcoal canister cracked, holed or damaged • Fuel tank over fill check valve cracked damaged • ECM
P0446	When the vapor pressure rises to a specified point, the ECM opens the VSV for CCV. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side.	
	The ECM closes the VSV for pressure switching valve. The pressure rise is no longer as great. If there was no change in pressure, the ECM will conclude the VSV for pressure switching valve did not close.	

WIRING DIAGRAM

Refer to DTC P0440 on page DI-73 .

CONFIRMATION READINESS TEST

Refer to DTC P0440 on page DI-73 .

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 first troubleshoot DTC P0441, P0446, P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 next.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

TOYOTA hand-held tester:

1	**Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page DI-73 , step 1).**

NG → **Repair or replace.**

OK

2	**Check that fuel tank cap is TOYOTA genuine parts (See page DI-73 ,step 2).**

NG → **Replace to TOYOTA genuine parts.**

OK

3	**Check that fuel tank cap is correctly installed (See page DI-73 , step 3).**

NG → **Correctly install fuel tank cap.**

OK

4	**Check fuel tank cap (See page DI-73 , step 4).**

NG → **Replace fuel tank cap.**

OK

5	Check filler neck for damage (See page DI-73 , step 5).

NG → Replace filler pipe.

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page DI-73 , step 6).

NG → Repair or connect VSV or sensor connector.

OK

7	Check hose and tube between fuel tank and charcoal canister (See page DI-73 , step 7).

NG → Repair or replace.

OK

8	Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.

NG → Repair or connect VSV or sensor connector.

OK

9	**Check vacuum hoses ((8), (9), (10) and (11) in Fig. 1 in circuit description).**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK ↓

10	**Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).**

NG → **Check and replace ECM (See page IN-28).**

OK ↓

11	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).**

OK → **Go to step 13.**

NG ↓

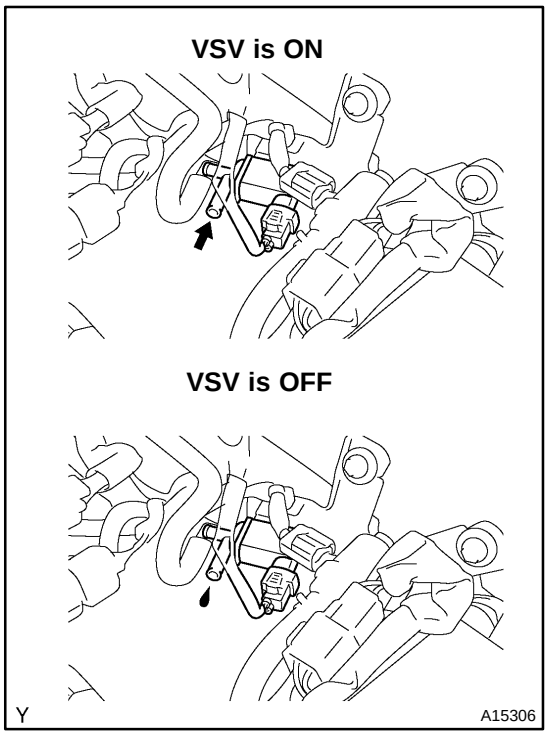
12	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK ↓

Replace vapor pressure sensor.

13	Check purge flow.



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(c) Disconnect the vacuum hose for the VSV for the EVAP from the charcoal canister.
(d) Start the engine.

CHECK:

When the VSV for the EVAP is operated by the TOYOTA hand-held tester, check whether the disconnected hose applies suction to your finger.

OK:

VSV is ON:
Disconnected hose applies suction to your finger.
VSV is OFF:
Disconnected hose applies no suction to your finger.

OK → **Go to step 17.**

NG

14	Check vacuum hose between intake manifold and VSV for EVAP, and VSV for EVAP and charcoal canister.

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole, damage and blockage.

NG → **Repair or replace.**

OK

15	Check operation of VSV for EVAP (See page SF-39).

OK → **Go to step 16.**

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister.

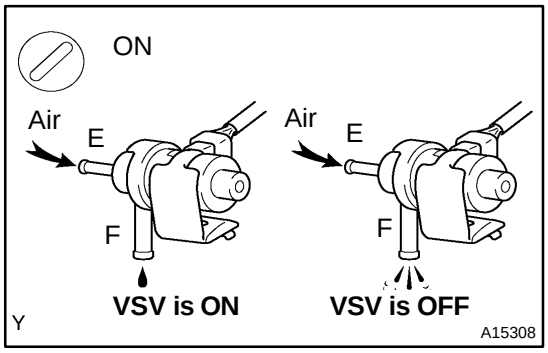
16	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

17	**Check VSV for CCV.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Disconnect the vacuum hose for the VSV for the CCV from the charcoal canister.
(c) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
(d) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check the VSV operation when it is operated by the TOYOTA hand-held tester.

OK:

VSV is ON:
Air does not flow from port E to port F.
VSV is OFF:
Air from port E flows out through port F.

OK → **Go to step 21.**

NG

18	**Check vacuum hose between VSV for CCV and charcoal canister.**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole damage and blockage.

NG → **Repair or replace.**

OK

19	**Check operation of VSV for CCV (See page SF-40).**

OK → **Go to step 20.**

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

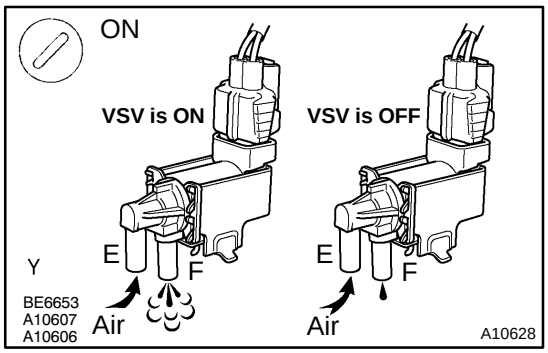
20	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

21	**Check VSV for pressure switching valve.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check the VSV operation when it is operated by the TOYOTA hand-held tester.

OK:

VSV is ON:
Air from port E flows out through port F.
VSV is OFF:
Air does not flow from port E to port F.

OK	**Go to step 24.**

NG

22	**Check operation of VSV for pressure switching valve (See page SF-42).**

OK	**Go to step 23.**

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

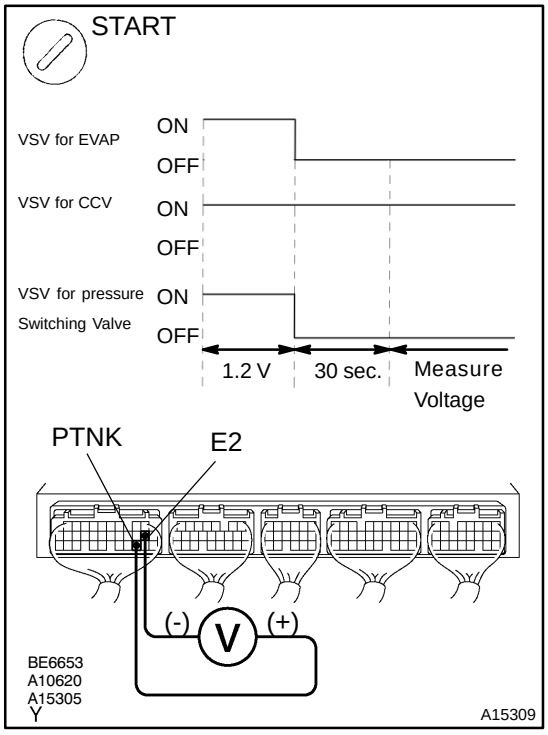
23	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-28).**

NG	**Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

24	**Check fuel tank.**



PREPARATION:

(a) Remove the grove compartment.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.
(e) The VSV for the CCV is ON by the TOYOTA hand-held tester.
(f) The VSV for the EVAP and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP and the VSV for the pressure switching valve from ON to OFF.

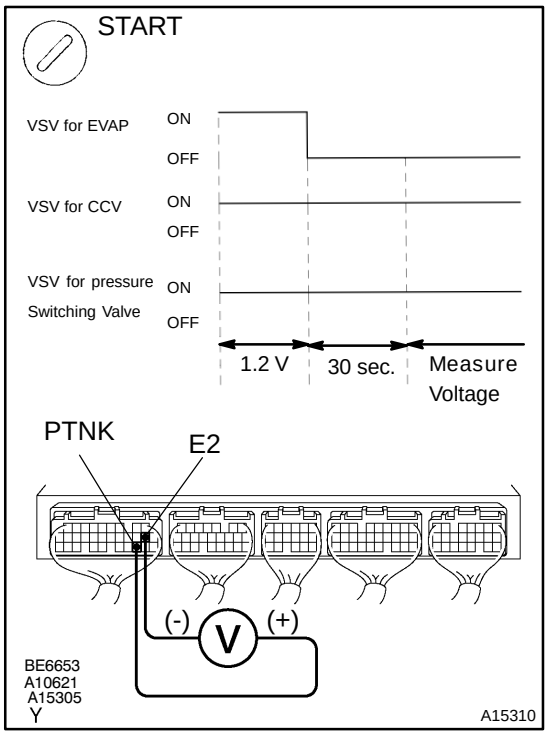
OK:

Voltage:
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG → **Replace fuel tank.**

OK

25	Check charcoal canister.



PREPARATION:

(a) Remove the grove compartment.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.
(d) Start the engine.
(e) The VSV for the CCV and the VSV for the pressure switching valve are ON by the TOYOTA hand-held tester.
(f) The VSV for the EVAP is ON by the TOYOTA hand-held tester and hold the VSV for the EVAP until voltage between terminals PTNK and E2 becomes 1.2 V.

CHECK:

Measure the voltage between terminals PTNK and E2 of the ECM connectors 30 sec. after switching the VSV for the EVAP from ON to OFF.

OK:

Voltage:
When there is no sharp change of the voltage with the voltage of more or less 1.2 V

NG → **Replace charcoal canister.**

OK

26	Remove charcoal canister and check it (See page EC-6).

NG → **Replace charcoal canister.**

OK

27	Check fuel tank over fill check valve (See page EC-6).

NG → **Replace fuel tank over fill check valve or fuel tank.**

OK

Check and replace charcoal canister (See page EC-6).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	Check whether hose close to fuel tank have been modified, and check whether there are signs of any accident near fuel tank or charcoal canister (See page DI-73 , step 1).

NG → Repair or replace.

OK

2	Check that fuel tank cap is TOYOTA genuine parts (See page DI-73 , step 2).

NG → Replace to TOYOTA genuine parts.

OK

3	Check that fuel tank cap is correctly installed (See page DI-73 , step 3).

NG → Correctly install fuel tank cap.

OK

4	Check fuel tank cap (See page DI-73 step, 4).

NG → Replace fuel tank cap.

OK

5	Check filler neck for damage (See page DI-73 , step 5).

NG → Replace filler pipe.

OK

6	Check vacuum hoses between vapor pressure sensor and fuel tank, charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and charcoal canister (See page DI-73 , step 6).

NG → Repair or connect VSV or sensor connector.

OK

7	Check hose and tube between fuel tank and charcoal canister (See page DI-73 , step 7).

NG → Repair or replace.

OK

8	Check VSV connector for EVAP, VSV connector for CCV, VSV connector for pressure switching valve and vapor pressure sensor connector for looseness and disconnection.

NG → Repair or connect VSV or sensor connector.

OK

9	**Check vacuum hoses ((8), (9) , (10) and (11) in Fig. 1 in circuit description).**

CHECK:

(a) Check that the vacuum hose is connected correctly.
(b) Check the vacuum hose for looseness and disconnection.
(c) Check the vacuum hose for cracks, hole damage and blockage.

NG → **Repair or replace.**

OK

10	**Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).**

NG → **Check and replace ECM (See page IN-28).**

OK

11	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).**

OK → **Go to step 13.**

NG

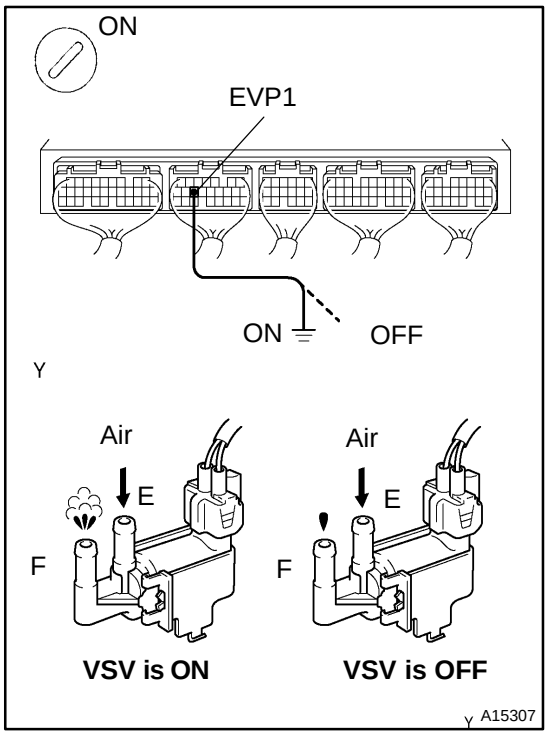
12	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Replace vapor pressure sensor.

13	Check VSV for EVAP.



PREPARATION:

(a) Remove the glove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal EVP1 of the ECM connector and body ground (ON).

(2) Disconnect between terminal EVP1 of the ECM connector and body ground (OFF).

OK:

(1) VSV is ON:
Air from port E frows out through port F.
(2) VSV is OFF:
Air does not flow from port E to port F.

OK → **Go to step 16.**

NG

14	Check operation of VSV for EVAP (See page SF-39).

OK → **Go to step 15.**

NG

Replace VSV and clean vacuum hoses between throttle body and VSV for EVAP, and VSV for EVAP and charcoal canister, and then check charcoal canister.

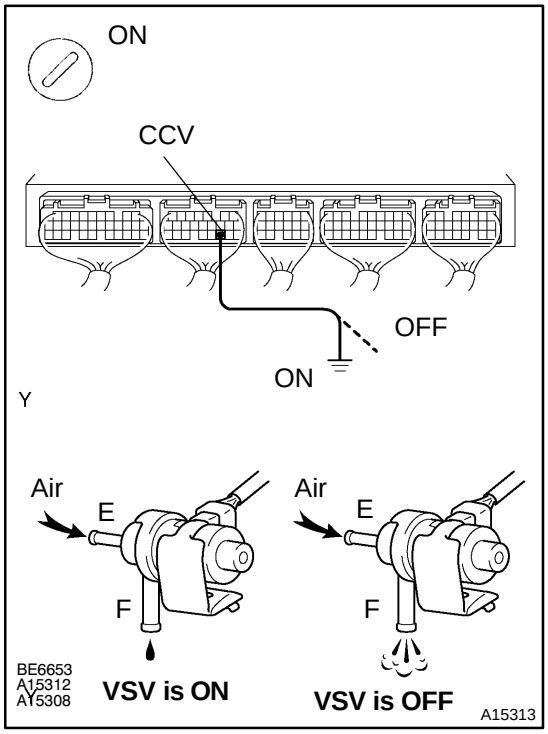
15	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for EVAP, and VSV for EVAP and ECM (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

16	Check VSV for CCV.



PREPARATION:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal CCV of the ECM connector and body ground (ON).

(2) Disconnect between terminal CCV of the ECM connector and body ground (OFF).

OK:

VSV is ON:
Air does not flow from port E to port F.
VSV is OFF:
Air from port E flows out through port F.

OK	Go to step 19.

NG

17	Check operation of VSV for CCV (See page SF-40).

OK	Go to step 18.

NG

Replace VSV and charcoal canister, and then clean vacuum hose between charcoal canister and VSV for CCV.

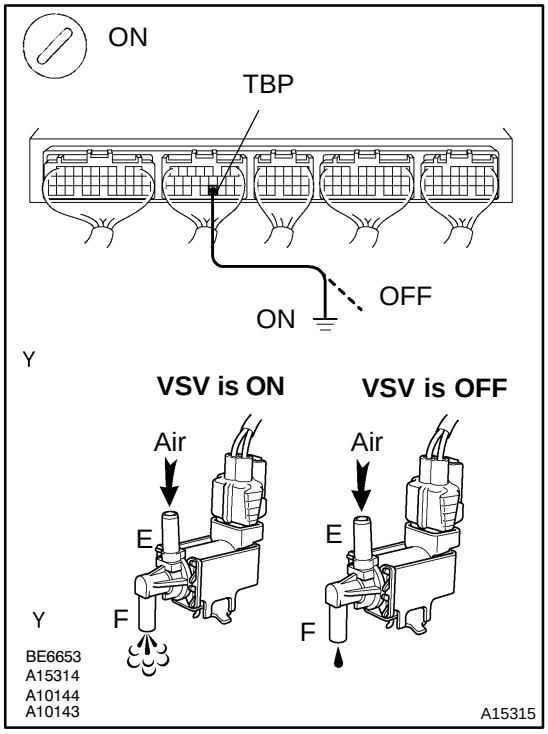
18	**Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for CCV, and VSV for CCV and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

19	**Check VSV for pressure switching valve.**



PREPARATION:

(a) Remove the grove compartment.

(b) Turn the ignition switch ON.

CHECK:

Check the VSV function.

(1) Connect between terminal TBP of the ECM connector and body ground (ON).

(2) Disconnect between terminal TBP of the ECM connector and body ground (OFF).

OK:

(1) VSV is ON:
Air from port E flows out through port F.
(2) VSV is OFF:
Air does not flow from port E to port F.

OK → **Go to step 22**

NG

20	**Check operation of VSV for pressure switching valve (See page SF-42).**

OK → **Go to step 21.**

NG

Replace VSV and charcoal canister, and then clean vacuum hoses between charcoal canister and VSV for pressure switching valve, and VSV for pressure switching valve and fuel tank.

21	Check for open and short in harness and connector between EFI main relay (Marking: EFI) and VSV for pressure switching valve, and VSV for pressure switching valve and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-28).

22	Check fuel tank over fill check valve (See page EC-6).

NG → Replace fuel tank over fill check valve or fuel tank.

OK

Check and replace charcoal canister (See page EC-6).

DI09X-09

DTC	P0450	Evaporative Emission Control System Pressure Sensor Malfunction

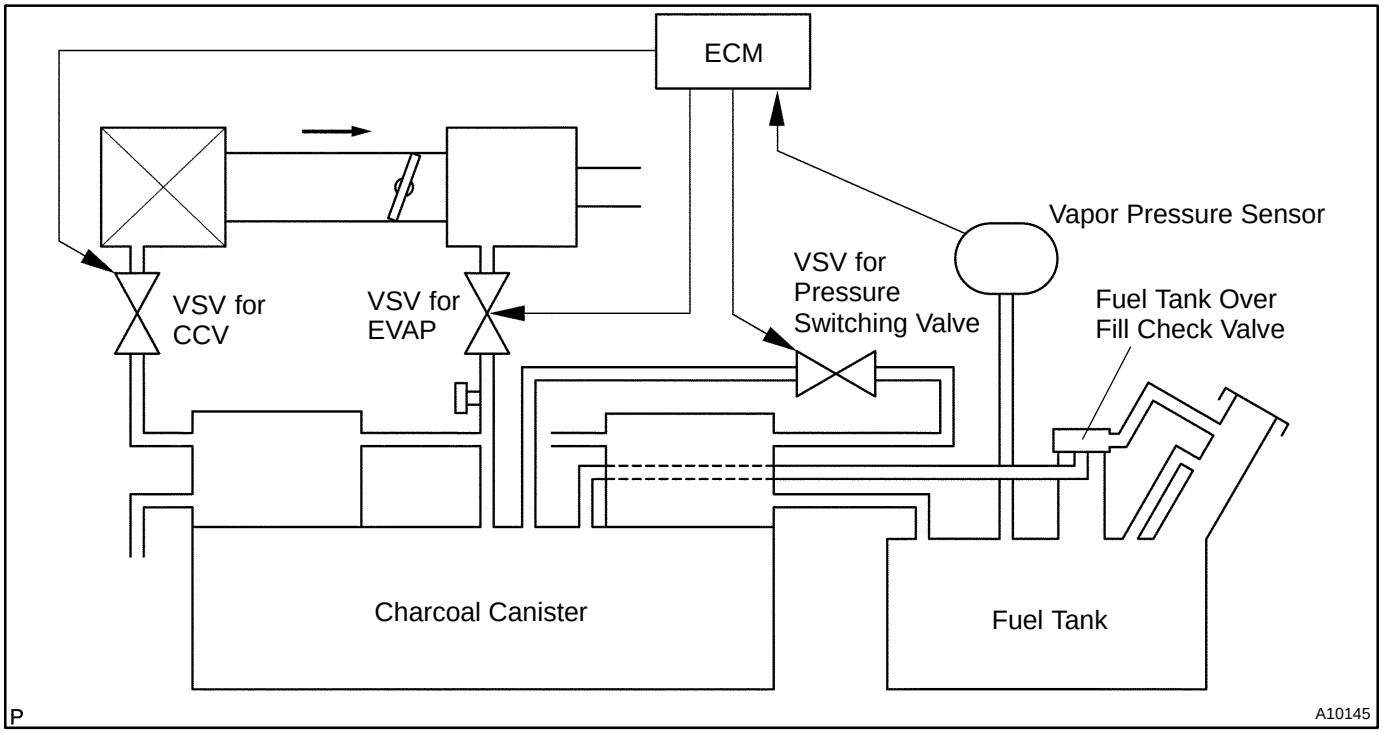
DTC	P0451	Evaporative Emission Control System Pressure Sensor Range/Performance

CIRCUIT DESCRIPTION

The vapor pressure sensor, VSV for canister closed valve (CCV) and VSV for pressure switching valve are used to detect abnormalities in the evaporative emission control system.

The ECM decides whether there is an abnormality in the evaporative emission control system based on the vapor pressure sensor signal.

DTC P0450 or P0451 is recorded by the ECM when the vapor pressure sensor malfunction.



DTC No.	DTC Detecting Condition	Trouble Area
P0450	10 seconds or less after engine starting condition vapor pressure sensor fixed value continues for fixed value or more: (2 trip detection logic)	• Open or short in vapor pressure sensor circuit • Vapor pressure sensor • ECM
P0451	Vapor pressure sensor output extremely changes under conditions of (a) and (b): (2 trip detection logic) (a) Vehicle speed: 0 km/h (0mph), Engine speed: Idling and VSV for pressure switching valve is OFF (b) vavor pressure sensor value ≧ opening pressure valve of charcoal canister	

WIRING DIAGRAM

Refer to DTC P0440 on page DI-73 .

INSPECTION PROCEDURE

HINT:

- If DTC P0441, P0446, P0450 or P0451 is output after DTC P0440 first trouble shoot DTC P0441, P0446 P0450 or P0451. If no malfunction is detected, troubleshoot DTC P0440 next.
- Read freeze frame data using LEXUS hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.
- When the ENGINE RUN TIME in the freeze frame data is less than 200 seconds, carefully check the vapor pressure sensor.

1	**Check voltage between terminals VC and E2 of ECM connector (See page DI-73 , step 9).**

NG → **Check and replace ECM (See page IN-28).**

OK

2	**Check voltage between terminals PTNK and E2 of ECM connectors (See page DI-73 , step 10).**

OK → **Check and replace ECM (See page IN-28).**

NG

3	**Check for open and short in harness and connector between vapor pressure sensor and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

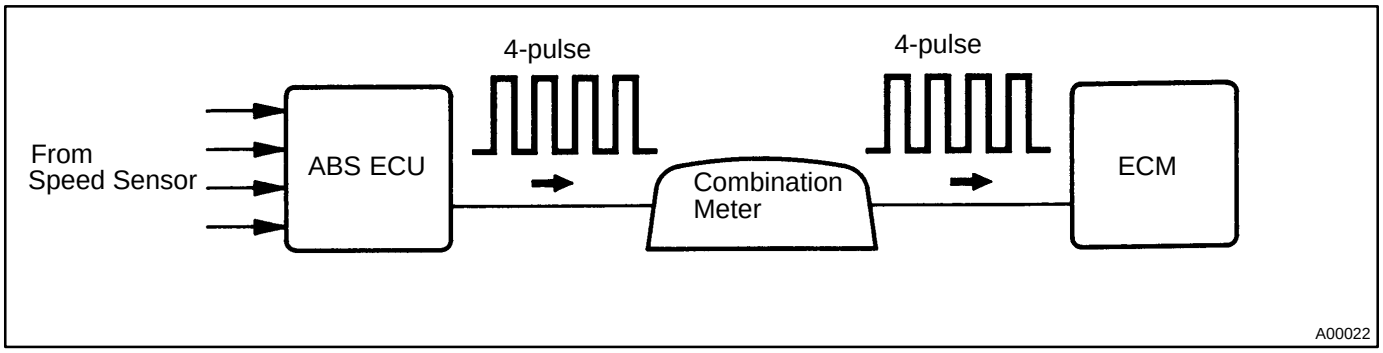
Replace vapor pressure sensor.

DI0SB-12

DTC	P0500	Vehicle Speed Sensor Malfunction

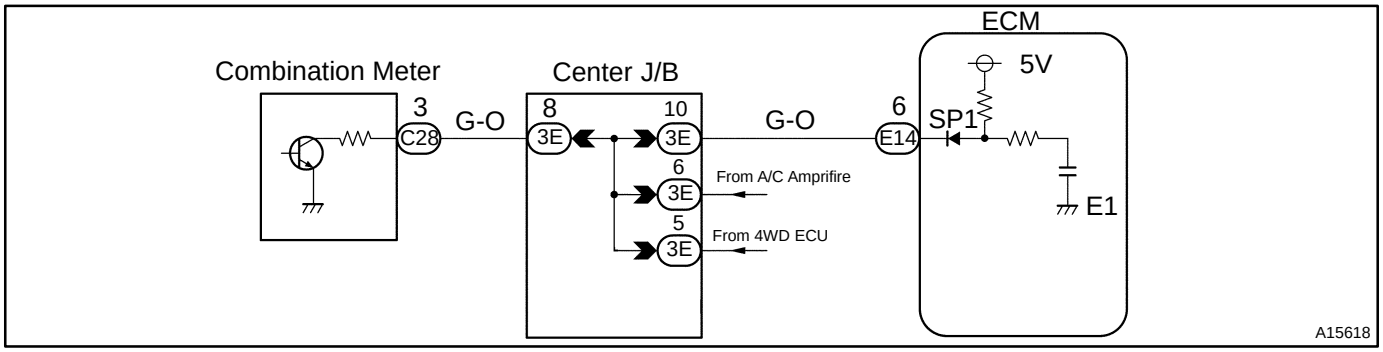
CIRCUIT DESCRIPTION

The speed sensor for ABS detects the wheel speed and sends the appropriate signals to the ABS ECU. The ECU converts these signals into a 4-pulse signal and outputs it to the combination meter. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	No vehicle speed sensor signal to ECM under following conditions: (2 trip detection logic) For A/T: (a) Park/neutral position switch is OFF (b) Vehicle is being driven For M/T: (a) Engine speed is between 1,800 rpm and 3,500 rpm	• Speedometer cable • Open or short in speed signal circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check operation of speedometer.**

CHECK:

Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

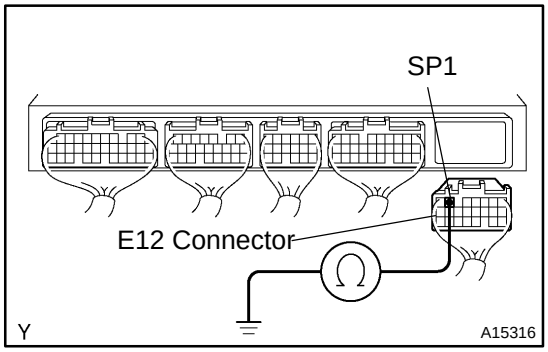
HINT:

The vehicle speed is operating normally if the speedometer display is normal.

NG → **Check speedometer circuit (See page BE-40).**

OK

2	**Check voltage between terminal SP1 of ECM connector and body ground.**



PREPARATION:

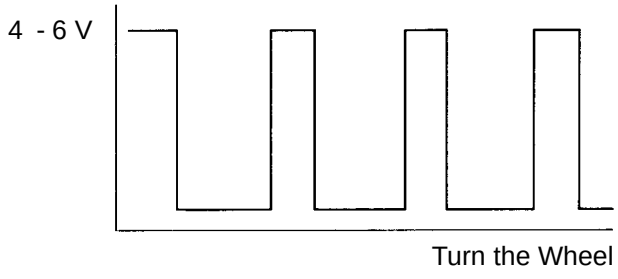
(a) Remove the glove compartment (See page SF-54).
(b) Disconnect the E12 connector from the ECM.
(c) Shift the shift lever to the neutral.
(d) Jack up a rear wheel on one side.
(e) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal SP1 of the ECM connector and body ground when the wheel is turned slowly.

OK:

Voltage is generated intermittently.



NG → **Check and repair harness and connector between combination meter and ECM.**

OK

Check and replace ECM (See page IN-28).

DI1LY-11

DTC	P0505	Idle Control System Malfunction

CIRCUIT DESCRIPTION

The idle speed is controlled by the Electric Throttle Control System (ETCS).
ETCS is composed of the throttle motor to operate the throttle valve, the magnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the ECM to control the ETCS and the one valve type throttle body.
The ECM controls the throttle motor to make the throttle valve opening angle properly for the target idle speed.

DTC No.	DTC Detecting Condition	Trouble Area
P0505	Idle speed continues to vary greatly from target speed (2 trip detection logic)	• Air induction system • Electric throttle control system • PCV valve and hose

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides P0505) being output?**

YES → **Go to relevant DTC chart (See page DI-13).**

NO

2	**Check connection of PCV valve and hose**

NG → **Repair or replace PCV valve and hose**

OK

3	Check air induction system (See page SF-1).

NG → Repair or replace.

OK

Check electric throttle control system (See page SF-30).

DI1LZ-14

DTC	P1120	Accelerator Pedal Position Sensor Circuit Malfunction

CIRCUIT DESCRIPTION

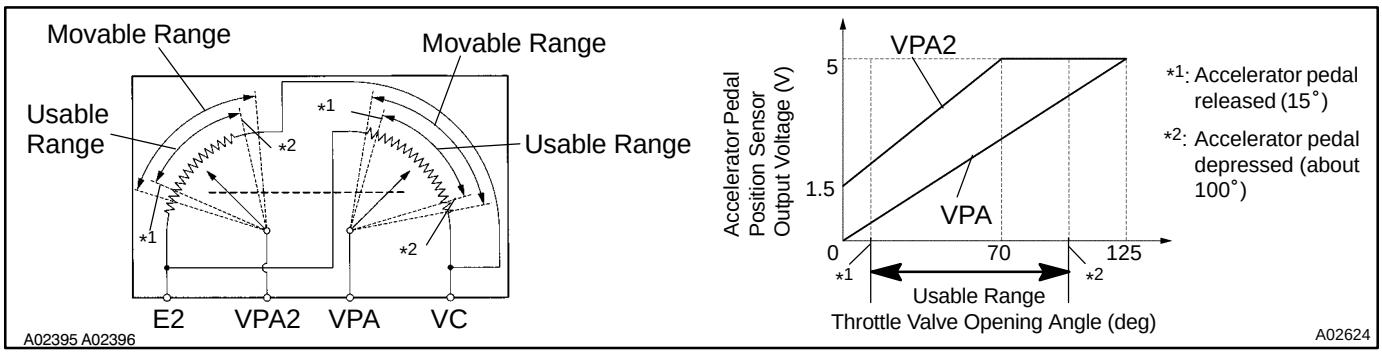
Accelerator pedal position sensor is mounted on the throttle body and it has the 2 sensors to detects the accelerator position and a malfunction of the accelerator position's own.

The accelerator pedal position sensor is connected with the accelerator pedal by the accelerator wire and the voltage applied to the terminals VPA and VPA2 of the ECM changes between 0 V and 5 V in proportion to the opening angle of the accelerator pedal.

The ECM judges the current opening angle of the accelerator pedal from these signals input from terminals VPA and VPA2 and the ECM controls the throttle motor based on these signals.

If this DTC is stored, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.

However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.



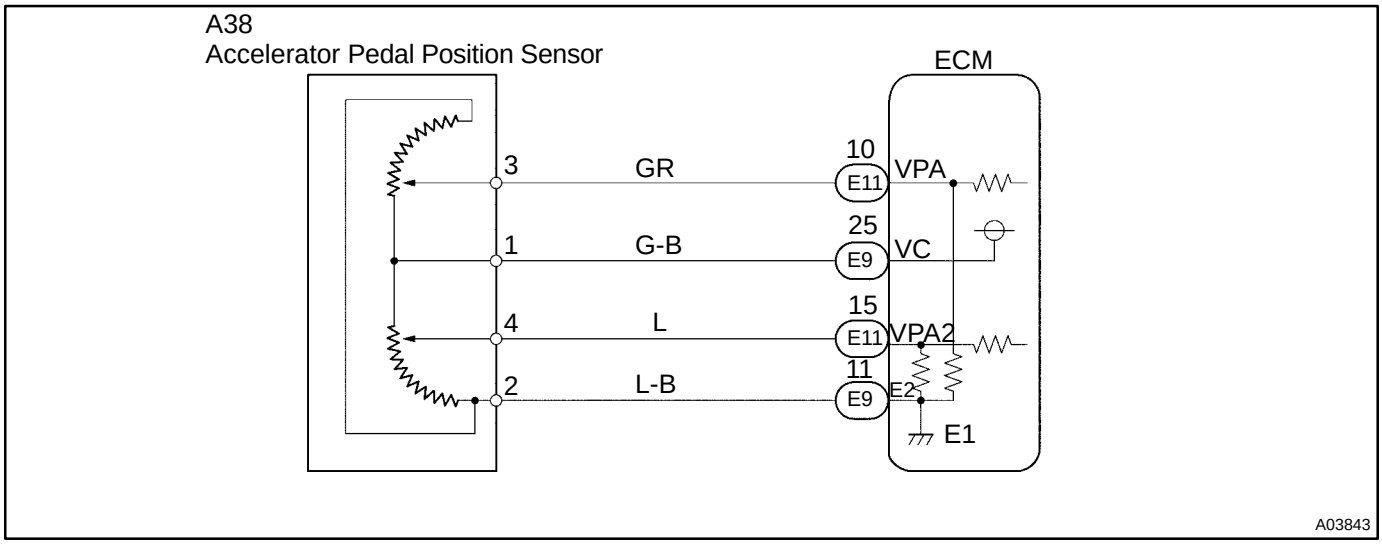
DTC No.	DTC Detecting Condition	Trouble Area
P1120	Condition (a), (b), (c), (d) or (e) continues for 2.0 seconds: (a) VPA ≦ 0.2 V (b) VPA2 ≦ 0.5 V (c) VPA ≧ 4.8 V (d) When VPA ≧ 0.2 V and ≦ 1.8 V, and VPA2 ≧ 4.97 V (e) VPA-VPA2 ≦ 0.02 V, or VPA2-VPA ≦ 0.02 V	• Open or short in accelerator pedal position sensor circuit • Accelerator pedal position sensor • ECM
	Condition (a) continues for 0.4 seconds: (a) VPA ≦ 0.2 V and VPA2 ≦ 0.5 V	

HINT:

After confirming DTC P1120, use the OBD II scan tool or TOYOTA hand-held tester to confirm the throttle valve opening percentage.

Accelerator pedal position expressed as voltage				Trouble area
Accelerator pedal released		Accelerator pedal depressed		
ACCEL POS #1	ACCEL POS #2	ACCEL POS #1	ACCEL POS #2	
0 V	0 V	0 V	0 V	VC circuit open
0 V	1.8 - 2.7 V	0 V	4.7 - 5.1 V	VPA circuit open or ground short
0.3 - 0.9 V	0 V	3.2 - 4.8 V	0 V	VPA2 circuit open or ground short
5 V	5 V	5 V	5 V	E2 circuit open

WIRING DIAGRAM



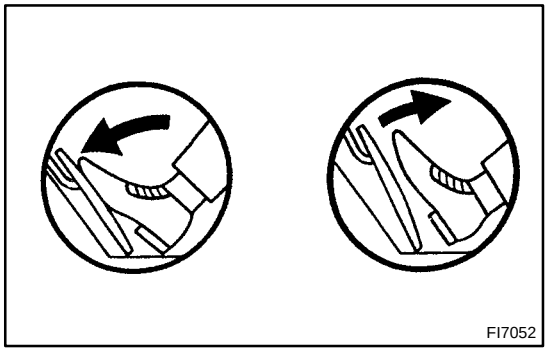
INSPECTION PROCEDURE

HINT:

- If DTCs P0110, P0115, P0120, P0450 and P1120 are output simultaneously, E2 (sensor ground) may be open.
- Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

TOYOTA hand-held tester:

1	**Connect TOYOTA hand-held tester, and read the voltage for accelerator pedal position sensor data.**



PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.

CHECK:

Read the voltage for the accelerator pedal position sensor data.

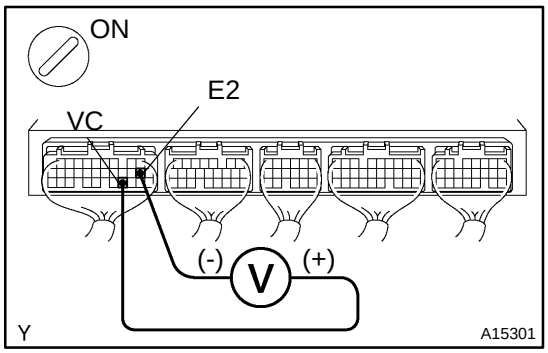
OK:

Accelerator Pedal	VPA	VPA2
Released	0.3 - 0.9 V	1.8 - 2.7 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK	**Check and replace ECM (See page IN-28).**

NG

2	Check voltage between terminals VC and E2 of ECM connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VC and E2 of the ECM connector.

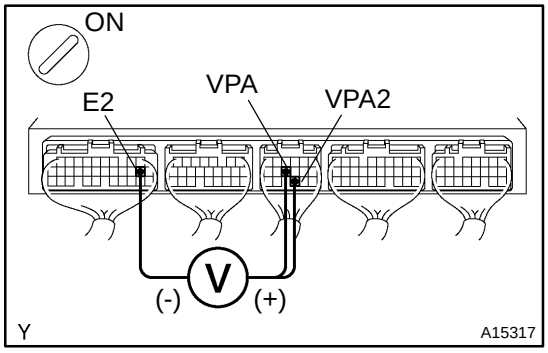
OK:

Voltage: 4.5 - 5.5 V

NG	Check and replace ECM (See page IN-28).

OK

3	Check voltage between terminals VPA and E2, and VPA2 and E2 of ECM connector.



PREPARATION:

(a) Remove the glove compartment door.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the ECM connector.

OK:

Accelerator pedal	Voltage	
	VPA - E2	VPA2 - E2
Released	0.3 - 0.9 V	1.8 - 2.7 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK	Check and replace ECM (See page IN-28).

NG

4	Check accelerator pedal position sensor (See page SF-30).

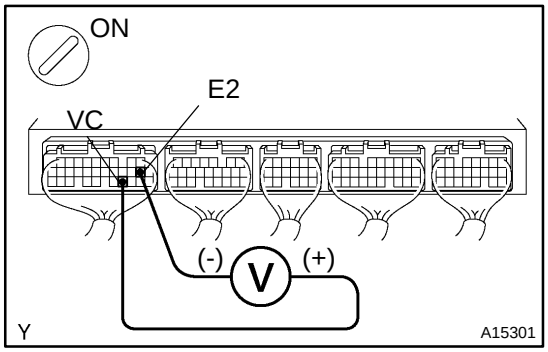
NG	Replace accelerator pedal position sensor (See page SF-32).

OK

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between ECM and accelerator pedal position sensor (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	**Check voltage between terminals VC and E2 of ECM connector.**



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

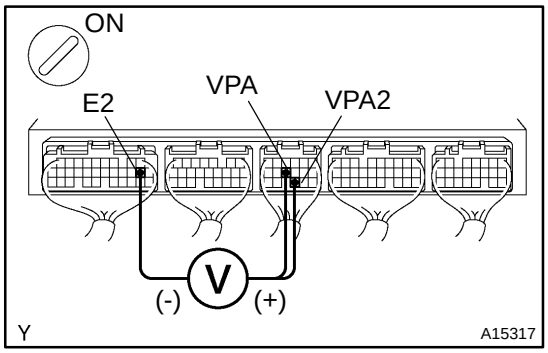
CHECK:
Measure the voltage between terminals VC and E2 of the ECM connector.

OK:
Voltage: 4.5 - 5.5 V

NG → **Check and replace ECM (See page IN-28).**

OK

2	**Check voltage between terminals VPA and E2, and VPA2 and E2 of ECM connector.**



PREPARATION:
(a) Remove the glove compartment door.
(b) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminals VPA and E2, and VPA2 and E2 of the ECM connector.

OK:

Accelerator pedal	Voltage	
	VPA - E2	VPA2 - E2
Released	0.3 - 0.9 V	1.8 - 2.7 V
Depressed	3.2 - 4.8 V	4.7 - 5.1 V

OK → **Check and replace ECM (See page IN-28).**

NG

3	Check accelerator pedal position sensor (See page SF-30).

NG → Replace accelerator pedal position sensor (See page SF-32).

OK →

Check for open and short in harness and connector in VC, VPA, VPA2 and E2 circuits between ECM and accelerator pedal position sensor (See page IN-28).

DTC	P1121	Accelerator Pedal Position Sensor Range/ Performance Problem

CIRCUIT DESCRIPTION

Refer to DTC P1120 on page DI-107 .

DTC No.	DTC Detecting Condition	Trouble Area
P1121	Condition (a) continues for 2.0 seconds: (a) Difference between VPA and VPA2 is out of threshold	• Accelerator pedal position sensor

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace accelerator pedal position sensor (See page SF-32).

DI8XK-01

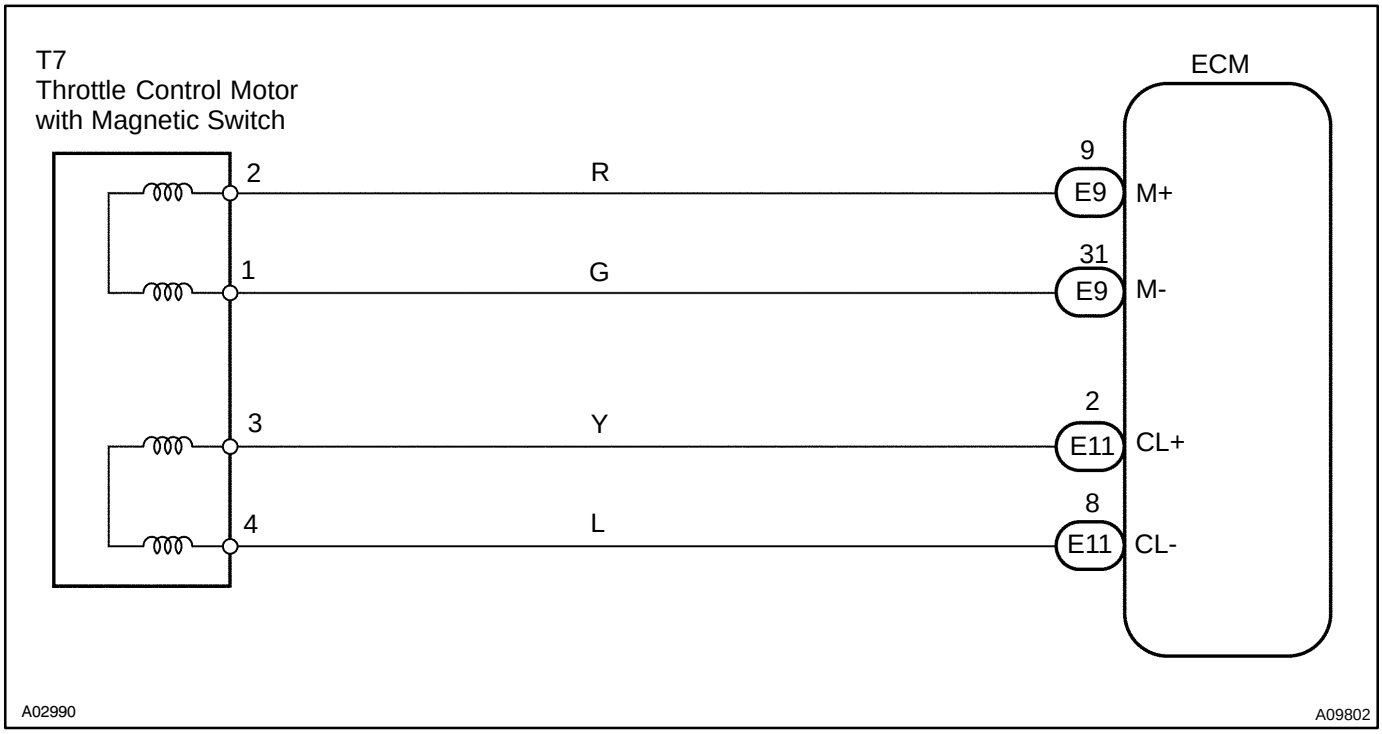
DTC	P1125	Throttle Control Motor Circuit Malfunction

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECM and it opens and closes the throttle valve.
The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the ECM to control the throttle motor in order to the throttle valve opening angle properly in response to driving condition.
If this DTC is stored, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1125	Conditions (a) and (b) continue for 0.5 seconds: (a) Throttle control motor output duty ≧ 80 % (b) Throttle control motor current < 0.5 A	• Open or short in throttle control motor circuit • Throttle control motor • ECM
	Throttle control motor current ≧ 16 A	
	Condition (a) continues for 0.6 seconds: (a) Throttle control motor current ≧ 7 A	

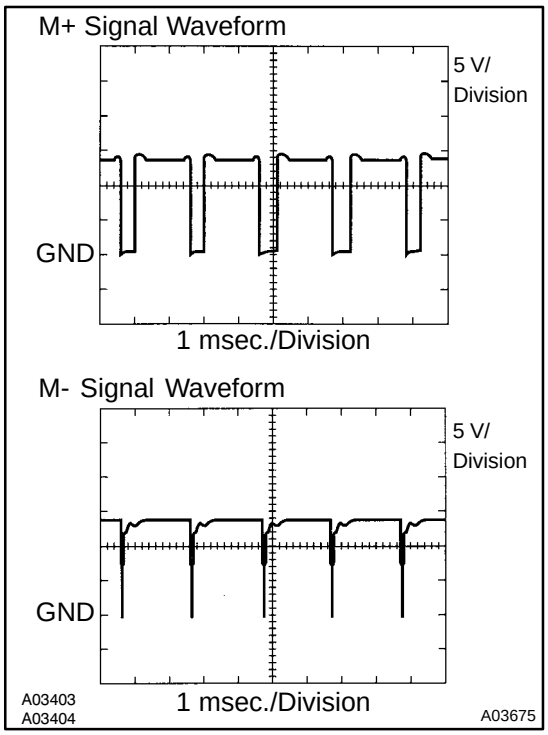
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check throttle control motor circuit.



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals M+ or M- and E1 of the ECM connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals M+ or M- and E1 of the ECM when the engine is idling.

OK:

The correct waveforms are as shown.

HINT:

The waveform frequency varies depending on the throttle opening.

OK → **Check and replace ECM (See page IN-28).**

NG

2	Check throttle control motor (See page SF-30).

NG → **Replace throttle control motor (See page SF-32).**

OK

3	Check for open and short in harness and connector between throttle control motor and ECM (See page IN-28).

NG → **Repair or replace.**

OK

Check and replace ECM (See page IN-28).

DI8XL-01

DTC	P1126	Magnetic Clutch Circuit Malfunction

CIRCUIT DESCRIPTION

Magnetic clutch is mounted between the throttle motor and the valve, and it connects the throttle motor with the throttle valve.
Therefore, the throttle motor opens and closes the throttle valve through the magnetic clutch.
If the electric throttle control system has a malfunction, the magnetic clutch separates the throttle motor from the throttle valve in order not to operate the throttle valve by the throttle motor.
If this DTC is stored, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1126	Condition (a) continues for 0.8 seconds: (a) Magnetic clutch current ≧ 1.4 A or ≦ 0.4 A	• Open or short in magnetic clutch circuit • Magnetic clutch • ECM
	Condition (a) continues for 1.5 seconds: (a) Magnetic clutch current ≧ 1.0 A or ≦ 0.8 A	

WIRING DIAGRAM

Refer to DTC P1125 on page DI-1 13.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check magnetic clutch circuit.

When using TOYOTA hand-held tester:

PREPARATION:

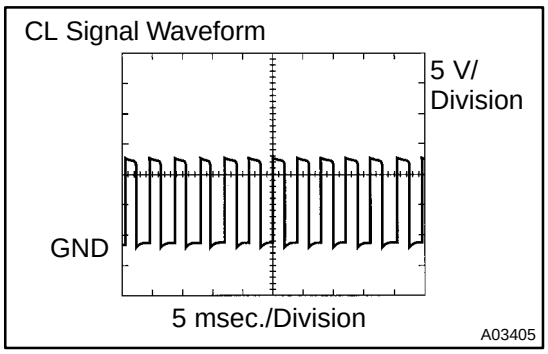
(a) Connect the TOYOTA hand-held tester to the DLC3.
(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.

CHECK:

Read the magnetic clutch current value on the TOYOTA hand-held tester.

OK:

Current: 0.8 - 1.0 A



When not using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the oscilloscope between terminals CL+ and CL- of the ECM connector.

(b) Start the engine.

CHECK:

Check the waveform between terminals CL+ and CL- of the ECM connector when the engine is idling.

OK:

The correct waveform is as shown.

NG	**Go to step 4.**

OK

2	**Check magnetic clutch (See page SF-30).**

NG	**Replace throttle control motor with magnetic clutch (See page SF-32).**

OK

3	**Check for open and short in harness and connector between magnetic clutch and ECM (See page IN-28).**

NG	**Repair or replace.**

OK

4	**Check operation of magnetic clutch.**

CHECK:

(a) Clear the DTC.

(b) Perform the following steps and check the DTC.

(1) Turn the ignition switch ON.

(2) Start the engine.

(3) Turn the ignition switch OFF and wait 3 seconds.

(4) Turn the ignition switch ON.

OK:

DTC P1126 is not stored.

NG → **Replace throttle control motor with magnetic clutch (See page SF-32).**

OK

Check and replace ECM (See page IN-28).

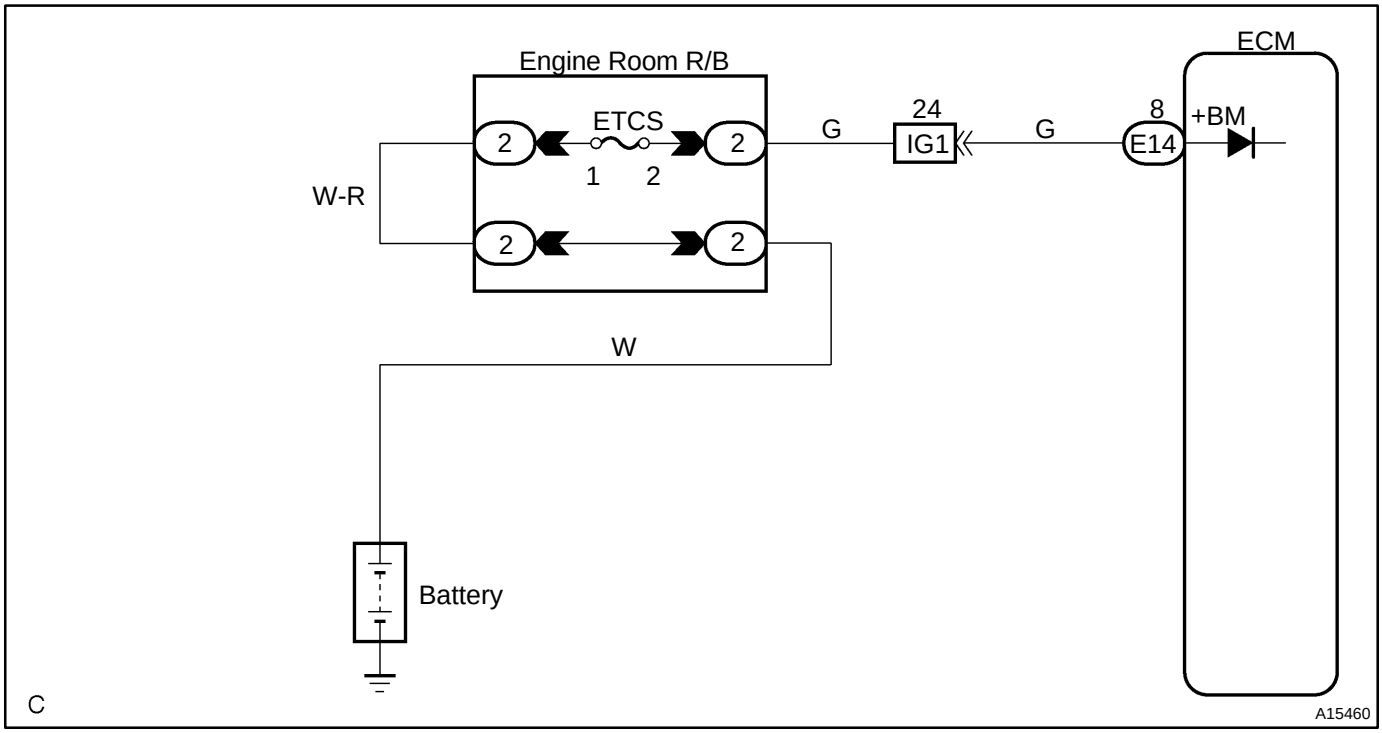
DTC	P1127	ETCS Actuator Power Source Circuit Malfunction

CIRCUIT DESCRIPTION

Battery positive voltage is supplied to terminal +BM of the ECM even once when the ignition switch is OFF for the electric ETCS control system.
If this DTC is stored, the ECM shuts down the power for the ETCS motor and the magnetic clutch, and the ETCS valve is fully closed by the return spring.
However, the opening angle of the ETCS valve can be controlled by the accelerator pedal through the ETCS cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1127	Open in ETCS power source circuit	• Open in ETCS power source circuit • ECM

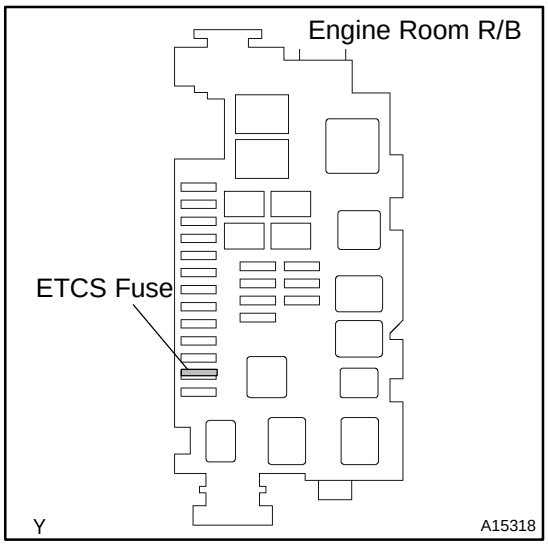
WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check ETCS fuse.



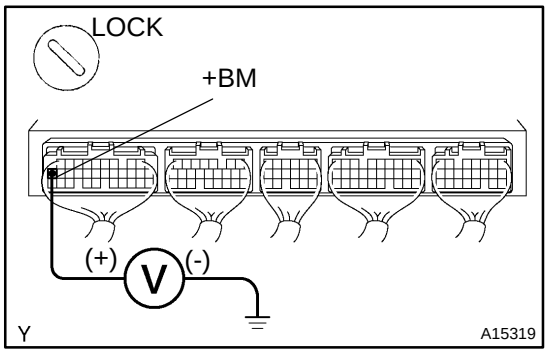
PREPARATION:
Remove the ETCS fuse from the engine room R/B.
CHECK:
Check the countinuity of the ETCS fuse.
OK:

Continuity

NG → **Check for short in all harness and components connected to ETCS fuse.**

OK

2	Check voltage between terminal +BM of ECM connector and body ground.



PREPARATION:
Remove the glove compartment door.
CHECK:
Measure the voltage between terminal +BM of the ECM connector and body ground.
OK:

Voltage: 9 - 14 V

OK → **Check and replace ECM (See page IN-28).**

NG

Check and repair harness or connector between battery and ETCS fuse, and ETCS fuse and ECM (See page IN-28).

DI8XM-01

DTC	P1128	Throttle Control Motor Lock Malfunction

CIRCUIT DESCRIPTION

Throttle motor is operated by the ECM and it opens and closes the throttle valve. The opening angle of the throttle valve is detected by the throttle position sensor which is mounted on the throttle body and it provides feedback to the ECM to control the throttle motor in order the throttle valve opening angle properly in response to driving condition. If this DTC is stored, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring. However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1128	Lock throttle control motor during control throttle control motor	• Throttle control motor • Throttle body

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check throttle control motor (See page DI-1 13).**

NG → **Replace throttle control motor (See page SF-32).**

OK ↓

2	**Visualy check throttle valve.**

PREPARATION:

Remove the intake air connector.

CHECK:

Check whether or not a foreign body is caught between the throttle valve and the housing.

NG → **Remove a foreign body and clean throttle body.**

OK ↓

Replace throttle body.

DI1M6-10

DTC	P1129	Electric Throttle Control System Malfunction

CIRCUIT DESCRIPTION

Electric Throttle Control System (ETCS) is composed of the throttle motor to operate the throttle valve, the electromagnetic clutch to connect the throttle motor with the throttle valve, the throttle position sensor to detect the opening angle of the throttle valve, the accelerator pedal position sensor to detect the accelerator pedal position, the ECM to control the ETCS and the one valve type throttle body.
The ECM controls the throttle motor to make the throttle valve opening angle properly in response driving condition.
The throttle position sensor which is mounted on the throttle body detects the opening angle of the throttle valve, and it provides feedback to the ECM to control the throttle motor.
If the ETCS has a malfunction, the ECM shuts down the power for the throttle motor and the magnetic clutch, and the throttle valve is fully closed by the return spring.
However, the opening angle of the throttle valve can be controlled by the accelerator pedal through the throttle cable.

DTC No.	DTC Detecting Condition	Trouble Area
P1129	Throttle opening angle continues to vary great from target throttle opening angle	• Electric throttle control system • ECM

WIRING DIAGRAM

Refer to DTC P1125 on page DI-1 13.

INSPECTION PROCEDURE

HINT:
Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace ECM, and clear DTC. If DTC P1129 is memorized again, and then replace throttle body.

DI5CA-07

DTC	P1130	A/F Sensor Circuit Range/Performance Malfunction (Bank 1 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P1130	Voltage output* of A/F sensor remains at 3.8 V or more, or 2.8 V or less, during engine running after engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM
	Voltage output* of A/F sensor does not change from 3.30 V, during engine running after engine is warmed up (2 trip detection logic) *: Output value changes at inside of ECM only	
	Open or short in A/F sensor circuit (2 trip detection logic)	

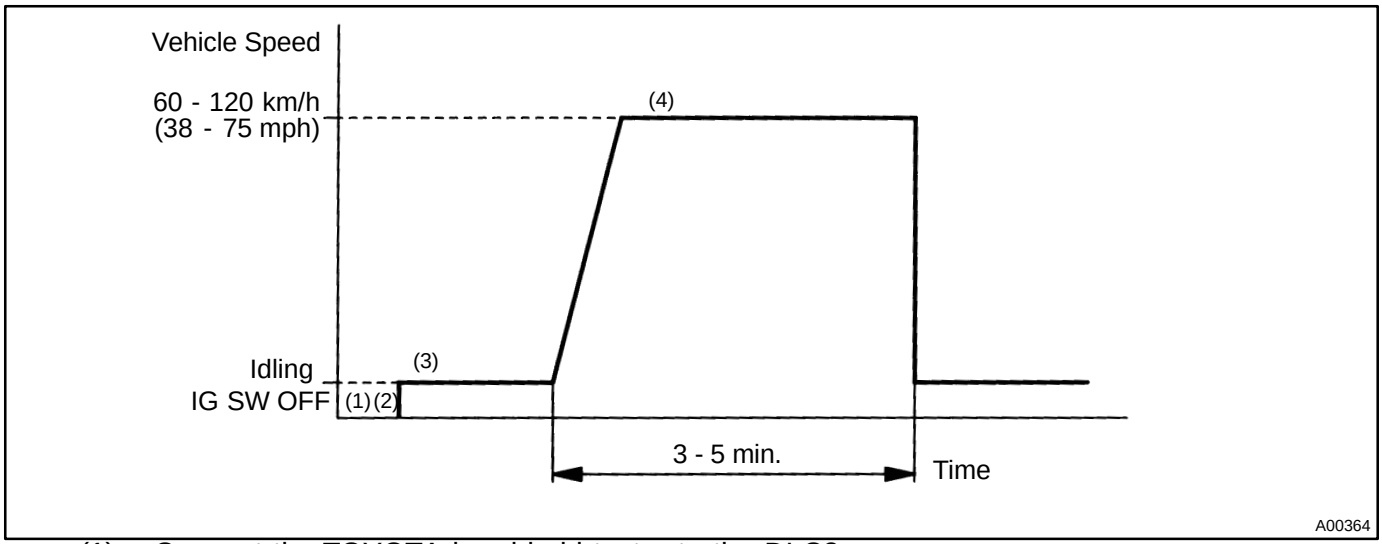
HINT:

- After confirming DTC P1130, use the OBD II scan tool or TOYOTA hand-held tester to confirm voltage output of the A/F sensor (AFS B1 S1/O2S B1 S1) from the CURRENT DATA.
- The A/F sensor's output voltage and the short-term fuel value can be read using the OBD II scan tool or TOYOTA hand-held tester.
- The ECM controls the voltage of AF1+ and AF1- terminals of the ECM to the fixed voltage. Therefore, it is impossible to confirm the A/F sensor output voltage without OBD II scan tool or TOYOTA hand-held tester.
- OBD II scan tool (excluding TOYOTA hand-held tester) displays the one fifth of the A/F sensor output voltage which is displayed on the TOYOTA hand-held tester.

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

CONFIRMATION DRIVING PATTERN



(1) Connect the TOYOTA hand-held tester to the DLC3.
(2) Switch the TOYOTA hand-held tester from the normal mode to the check mode (See page DI-3).

(3) Start the engine and warm it up with all the accessory switches OFF.
(4) Drive the vehicle at 60 - 120 km/h (38 - 75 mph) and the engine speed at 1,600 - 3,200 rpm for 3 - 5 min.

HINT:
If a malfunction exists, the MIL will light up during step (4).

NOTICE:

- **If the conditions in this test are not strictly followed, detection of the malfunction will not be possible.**
- **If you do not have a TOYOTA hand-held tester, turn the ignition switch OFF after performing steps (3) and (4), then perform steps (3) and (4) again.**

INSPECTION PROCEDURE

HINT:

- If DTC P1130 is displayed, check the bank 1 sensor 1 circuit.
- Read frame freeze data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P1130) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Connect OBDII scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor.**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage of the A/F sensor on the screen of OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:
The voltage of the AF1+ terminals of the ECM is fixed at 3.3 V and the voltage of the AF1- terminals is fixed at 3.0 V. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding TOYOTA hand-held tester).

OK	Go to step 8.

NG

3	Check for open and short in harness and connector between ECM and A/F sensor (See page IN-28).

NG	Repair or replace harness or connector.

OK

4	Check resistance of A/F sensor heater (See page SF-51).

NG	Replace A/F sensor.

OK

5	Check air induction system (See page SF-1).

NG	Repair or replace.

OK

6	Check fuel pressure (See page SF-7).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page SF-1).

OK

7	Check injector injection (See page SF-21).

NG → Replace injector.

OK

Replace A/F sensor.

8	Perform confirmation driving pattern.

Go

9	Is there DTC P1130 being output again?

YES → Check and replace ECM (See page IN-28).

NO

10	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI-3).

YES

DTC P1130 is caused by running out of fuel.

DI5CB-07

DTC	P1133	A/F Sensor Circuit Response Malfunction (Bank 1 Sensor 1)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P1133	After engine is warmed up and during vehicle driving at engine speed 1,400 rpm or more and vehicle speed 60 km/h (38 mph) or more, if response characteristic of A/F sensor becomes deteriorated (2 trip detection logic)	• Open or short in A/F sensor circuit • A/F sensor • Air induction system • Fuel pressure • Injector • ECM

WIRING DIAGRAM

Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Are there any other codes (besides DTC P1133) being output?**

YES → **Go to relevant DTC chart.**

NO

2	**Connect OBDII scan tool or TOYOTA hand-held tester, and read value for voltage output of A/F sensor.**

PREPARATION:

(a) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.

(b) Warm up the A/F sensor with the engine speed at 2,500 rpm for approx. 90 sec.

CHECK:

Read the voltage of the A/F sensor on the screen of the OBD II scan tool or TOYOTA hand-held tester when you perform all the following conditions.

HINT:

The voltage of the AF1+ terminal of the ECM is fixed at 3.3 V and the voltage of the AF1- terminal is fixed at 3.0 V. Therefore, it is impossible to check the A/F sensor output voltage at the terminals (AF1+/AF1-) of the ECM.

OK:

Condition	A/F Sensor Voltage value
Engine idling	• Not remains at 3.30 V (0.660 V*) • Not remains at 3.8 V (0.76 V*) or more • Not remains at 2.8 V (0.56 V*) or less *: When you use the OBD II scan tool (excluding TOYOTA hand-held tester)
Engine racing	
Driving at engine speed 1,500 rpm or more and vehicle speed 40 km/h (25 mph) or more, and operate throttle valve open and close	

HINT:

- During fuel enrichment, there is a case that the output voltage of the A/F sensor is below 2.8 V (0.56 V*), it is normal.
- During fuel cut, there is a case that the output voltage of the A/F sensor is above 3.8 V (0.76 V*), it is normal.
- If the output voltage of the A/F sensor remains at 3.30 V (0.660 V*) even after performing all the above conditions, the A/F sensor circuit may be open.
- If the output voltage of the A/F sensor remains at 3.8 V (0.76V*) or more, or 2.8 V (0.56 V*) or less even after performing all the above conditions, the A/F sensor circuit may be short.

*: When you use the OBD II scan tool (excluding TOYOTA hand-held tester).

OK → **Go to step 8.**

NG

3	**Check for open and short in harness and connector between ECM and A/F sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

4	**Check resistance of A/F sensor heater (See page SF-51).**

NG → **Replace A/F sensor.**

OK

5	**Check air induction system (See page SF-1).**

NG → **Repair or replace.**

OK

6	Check fuel pressure (See page SF-7).

NG → Check and repair fuel pump, pressure regulator, fuel pipe line and filter (See page SF-1).

OK

7	Check injector injection (See page SF-21).

NG → Replace injector.

OK

Replace A/F sensor.

8	Perform confirmation driving pattern (See page DI-122).

Go

9	Is there DTC P1133 being output again?

YES → Check and replace ECM (See page IN-28).

NO

10	Did vehicle runs out of fuel in past?

NO → Check for intermittent problems (See page DI-3).

YES

DTC P1133 is caused by running out of fuel.

DI5CC-07

DTC	P1135	A/F Sensor Heater Circuit Malfunction (Bank 1 Sensor 1) (California Spec.)

CIRCUIT DESCRIPTION

Refer to DTC P0125 on page DI-42 .

DTC No.	DTC Detecting Condition	Trouble Area
P1135	When heater operates, heater current exceeds 8 A (2 trip detection logic)	• Open or short in heater circuit of A/F sensor • A/F sensor heater • ECM
	Heater current of 0.25 A or less when heater operates (2 trip detection logic)	

WIRING DIAGRAM

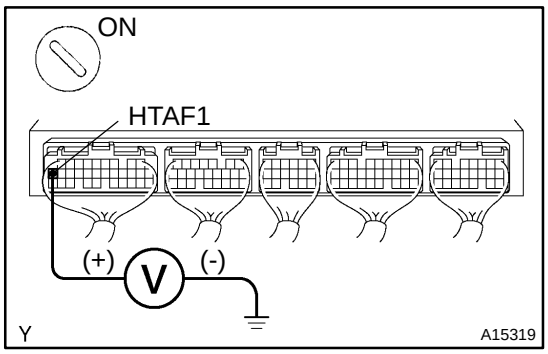
Refer to DTC P0125 on page DI-42 .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check voltage between terminal HTAF of ECM connector and body ground.



PREPARATION:

(a) Remove the glove compartment (See page SF-53).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals HTAF of the ECM connector and body ground.

OK:

Voltage: 9 - 14 V

OK	Check and replace ECM (See page IN-28).

NG

2	Check resistance of A/F sensor heater (See page SF-51).

NG	Replace A/F sensor.

OK

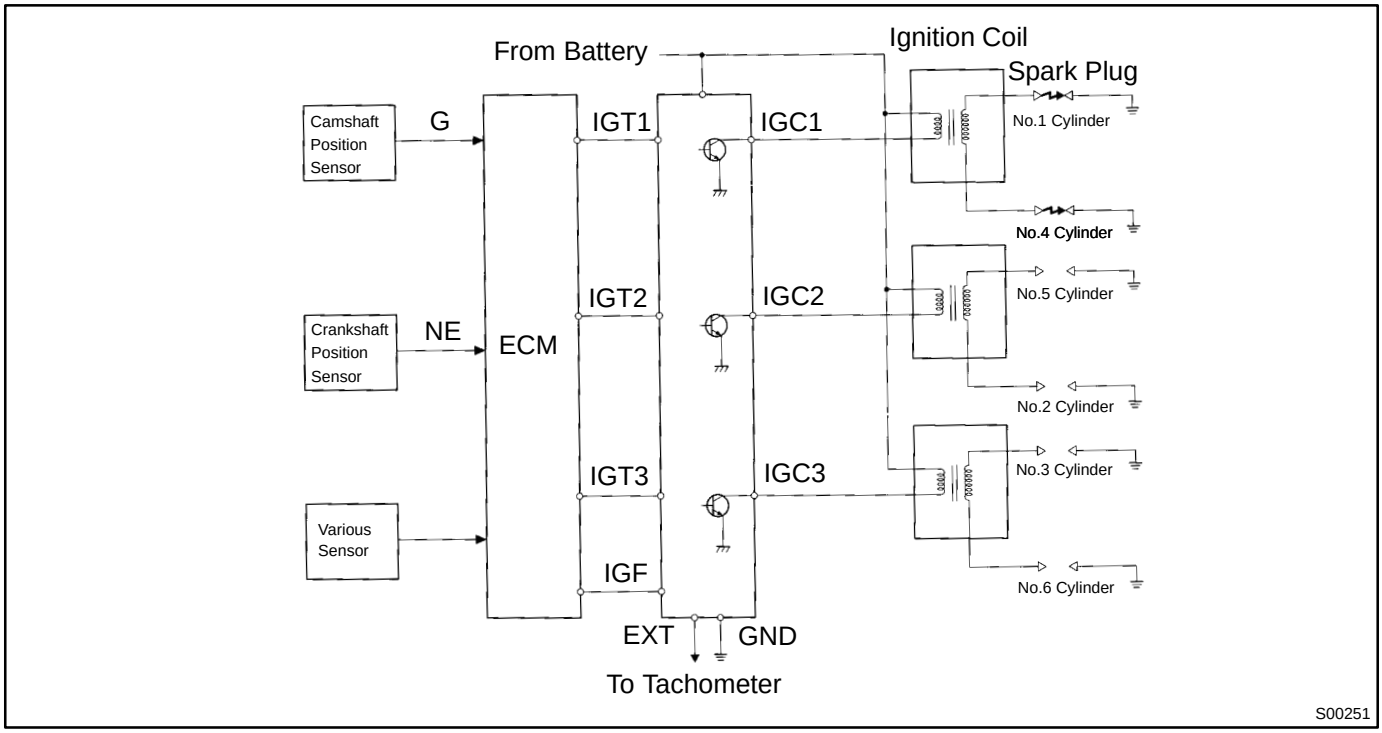
Check and repair harness or connector between EFI main relay (Marking: EFI) and A/F sensor, and A/F sensor and ECM (See page IN-28).

DI0SD-15

DTC	P1300	Igniter Circuit Malfunction

CIRCUIT DESCRIPTION

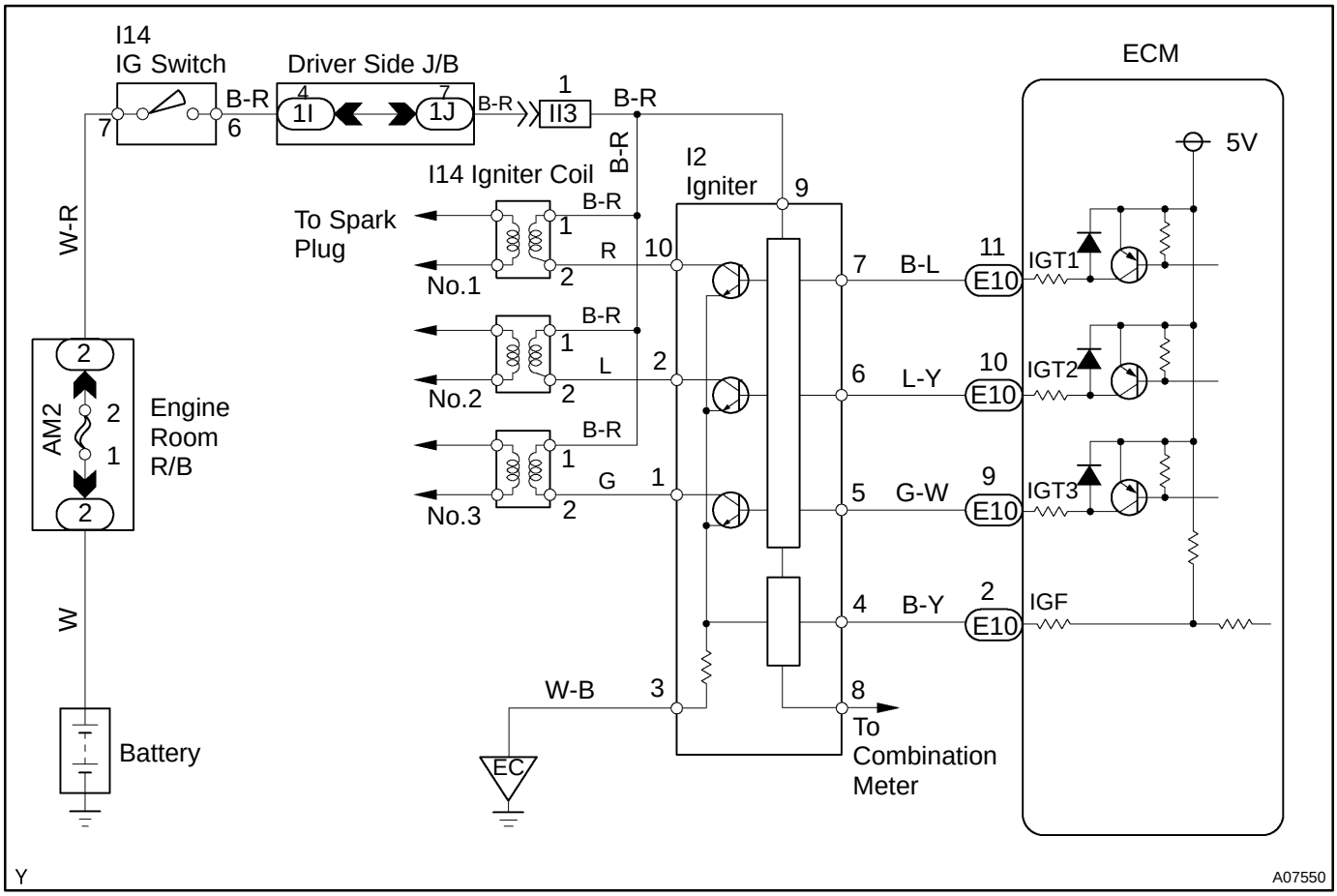
A Direct Ignition System (DIS) has been adopted. The DIS improves the ignition timing accuracy, reduces high-voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor. The DIS is a 2-cylinder simultaneous ignition system which ignites 2 cylinders simultaneously with one ignition coil. In the 2-cylinder simultaneous ignition system, each of the 2 spark plugs is connected to the end of the secondary winding. High voltage generated in the secondary winding is applied directly to the spark plugs. The sparks of the 2 spark plugs pass simultaneously from the center electrode to the ground electrode. The ECM determines ignition timing end outputs the ignition signals (IGT) for each cylinder. Based on IGT signals, the igniter controls the primary ignition signals (IGC) for all ignition coils. At the same time, the igniter also sends an ignition confirmation signal (IGF) as a fail-safe measure to the ECM.



S00251

DTC No.	DTC Detecting Condition	Trouble Area
P1300	Condition (a) is repeated 3 times consecutively during 6 consecutively IGT signals while engine is running (a) IGF signal is not input to ECM for 2 or more ignitions	• Ignition system • Open or short in IGF and IGT circuits from igniter to ECM • Igniter • Ignition coil • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	**Check spark plug and spark of misfiring cylinder (See page DI-57).**

NG → **Go to step 4.**

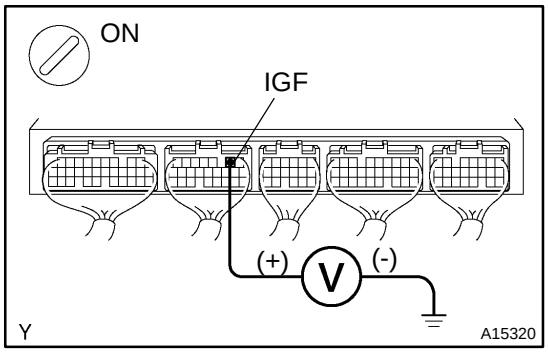
OK

2	**Check for open and short in harness and connector in IGF signal circuit between ECM and igniter (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

3	Disconnect igniter connector and check voltage between terminal IGF of ECM connector and body ground.



PREPARATION:
(a) Disconnect the igniter connector.
(b) Remove the glove compartment (See page SF-54).
(c) Turn the ignition switch ON.

CHECK:
Measure the voltage between terminal IGF of the ECM connector and body ground.

OK:
Voltage: 4.5 - 5.5 V

OK	Replace igniter.

NG

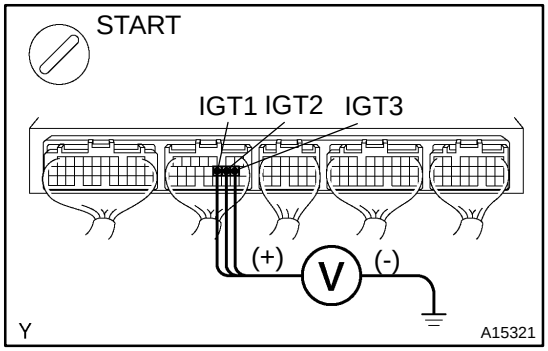
Check and replace ECM (See page IN-28).

4	Check for open and short in harness and connector in IGT signal circuit between ECM and igniter (See page IN-28).

NG	Repair or replace harness or connector.

OK

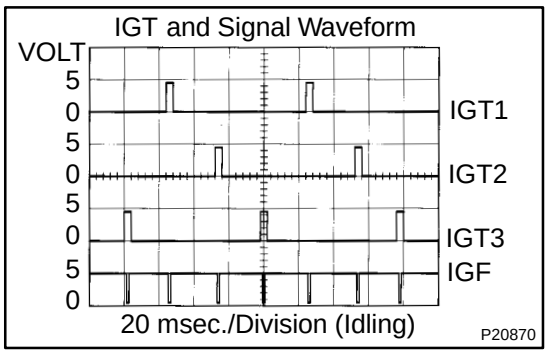
5	Check voltage between terminals IGT1 - IGT3 of ECM connector and body ground.



PREPARATION:
Remove the glove compartment (See page SF-54).

CHECK:
Measure the voltage between terminal IGT1 - IGT3 of the ECM connector and body ground when the engine is cranked.

OK:
Voltage: More than 0.1 V and less than 4.5 V



Reference: INSPECTION USING OSCILLOSCOPE

During idling, check waveform between terminals IGT1 - IGT3 and E1, and IGF and E1 of the ECM connector.

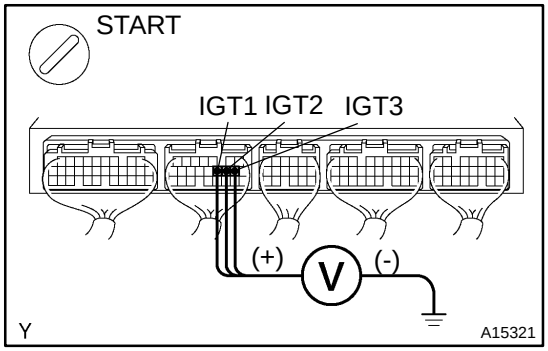
HINT:

The correct waveform is as shown.

NG	**Check and replace ECM (See page IN-28).**

OK

6	**Disconnect igniter connector, and check voltage between terminals IGT1 - IGT3 of ECM connector and body ground.**



PREPARATION:

(a) Disconnect the igniter connector.

(b) Remove the glove compartment (See page SF-54).

CHECK:

Measure the voltage between terminals IGT1 - IGT3 of the ECM connector and body ground when the engine is cranked.

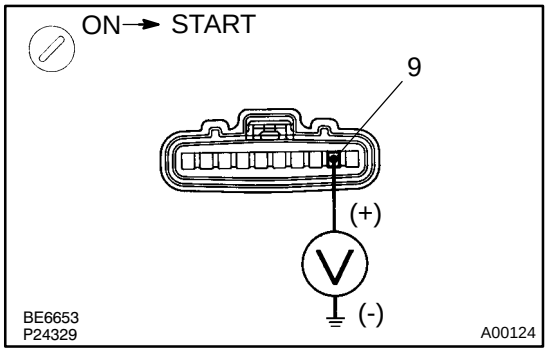
OK:

Voltage: More than 0.1 V and less than 5.0 V

NG	**Check and replace ECM (See page IN-28).**

OK

7	**Check voltage between terminal 9 of igniter connector and body ground.**



PREPARATION:

Disconnect the igniter connector.

CHECK:

Measure the voltage between terminal 9 of the igniter connector and body ground when the ignition switch is turned to ON and START position.

OK:

Voltage: 9 - 14 V

NG	**Check and repair igniter power source circuit.**

OK

8	**Check for open and short in harness and connector between ignition switch and ignition coil, and ignition coil and igniter (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

9	**Check ignition coil (See page IG-1).**

NG → **Replace ignition coil.**

OK

Replace igniter.

DI0SE-08

DTC	P1335	Crankshaft Position Sensor Circuit Malfunction (During engine running)

CIRCUIT DESCRIPTION

Refer to DTC P0335 on page DI-66 .

DTC No.	DTC Detecting Condition	Trouble Area
P1335	No crankshaft position sensor signal to ECM with engine speed 1,000 rpm or more	• Open or short in crankshaft position sensor circuit • Crankshaft position sensor • Crankshaft timing pulley • ECM

WIRING DIAGRAM

Refer to DTC P0335 on page DI-66 .

INSPECTION PROCEDURE

Refer to DTC P0335 on page DI-66 .

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

DI1D3-06

DTC	P1520	Stop Light Switch Signal Malfunction

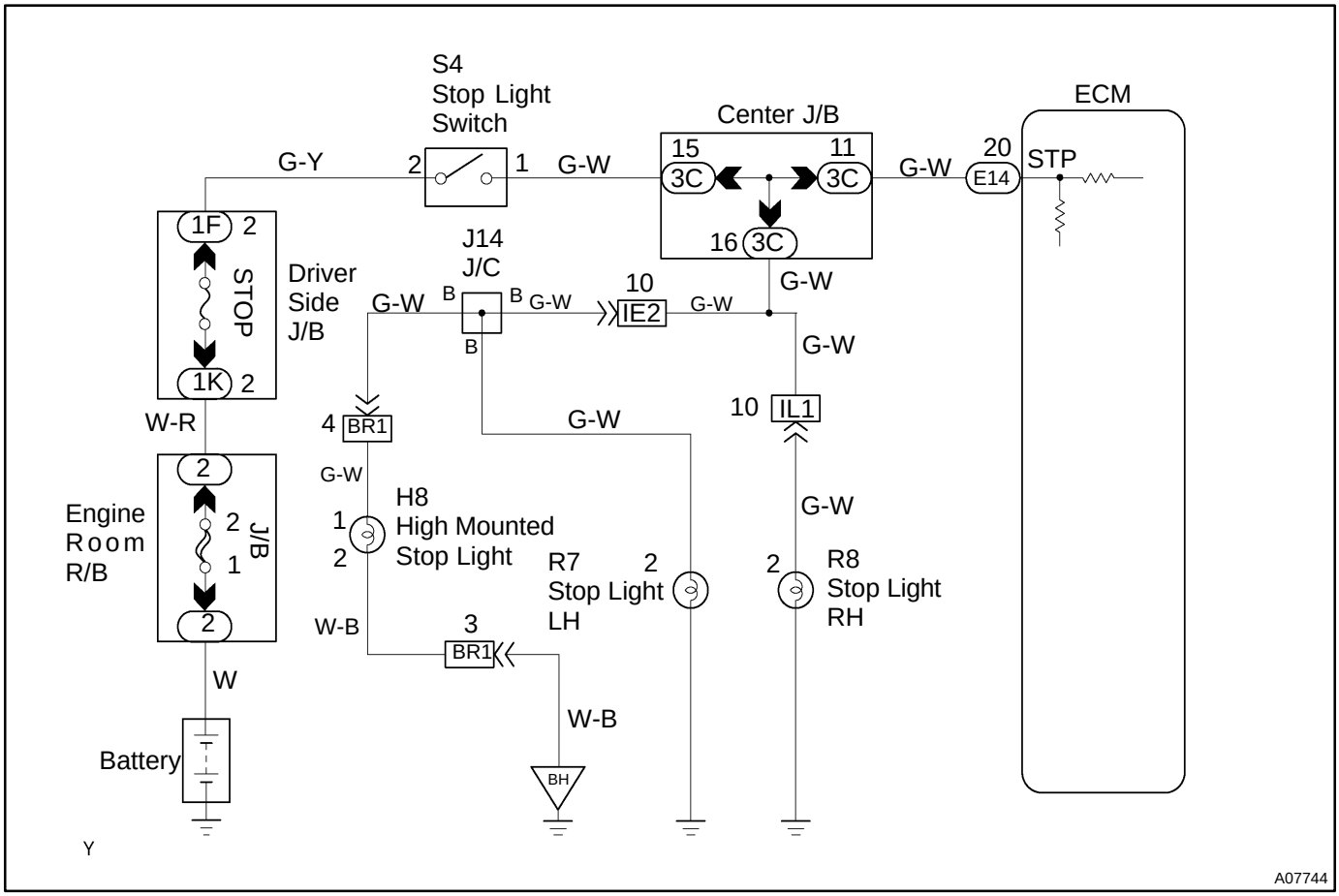
CIRCUIT DESCRIPTION

This signal is used to detect when the brakes have been applied. The STP signal voltage is the same as the voltage supplied to the stop lights. The STP signal is used mainly to control the fuel cut-off engine speed. (The fuel cut-off engine speed is reduced slightly when the vehicle is braking.)

DTC No.	DTC Detecting Condition	Trouble Area
P1520	Stop light switch does not turn off even once vehicle is driven (2 trip detection logic)	• Short in stop light switch signal circuit • Stop light switch • ECM

HINT:
In this circuit, diagnosis can only be made in the check mode.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check operation of stop light.

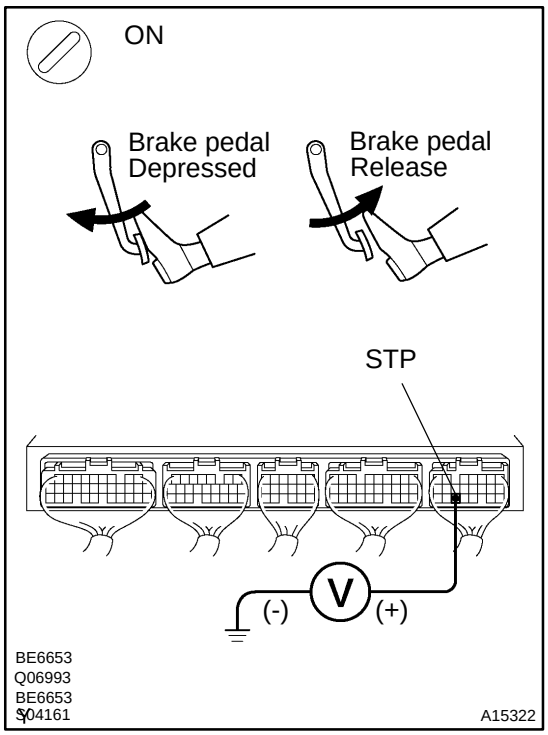
CHECK:

Check if the stop lights go on and off normally when the brake pedal is operated and released.

NG → **Check and repair stop light circuit (See page BE-32).**

OK ↓

2	Check STP signal.



When using TOYOTA hand-held tester:

PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.

CHECK:

Read the STP signal on the TOYOTA hand-held tester.

OK:

Brake Pedal	STP Signal
Depressed	ON
Release	OFF

When not using TOYOTA hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Check the voltage between terminal STP of the ECM connector and body ground.

OK:

Brake Pedal	Voltage
Depressed	7.5 - 14 V
Release	Below 1.5 V

OK → **Check for intermittent problems (See page DI-20).**

NG ↓

3	**Check harness and connector between stop light switch and ECM (See page DI-18).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

DI0SG-11

DTC	P1600	ECM BATT Malfunction

CIRCUIT DESCRIPTION

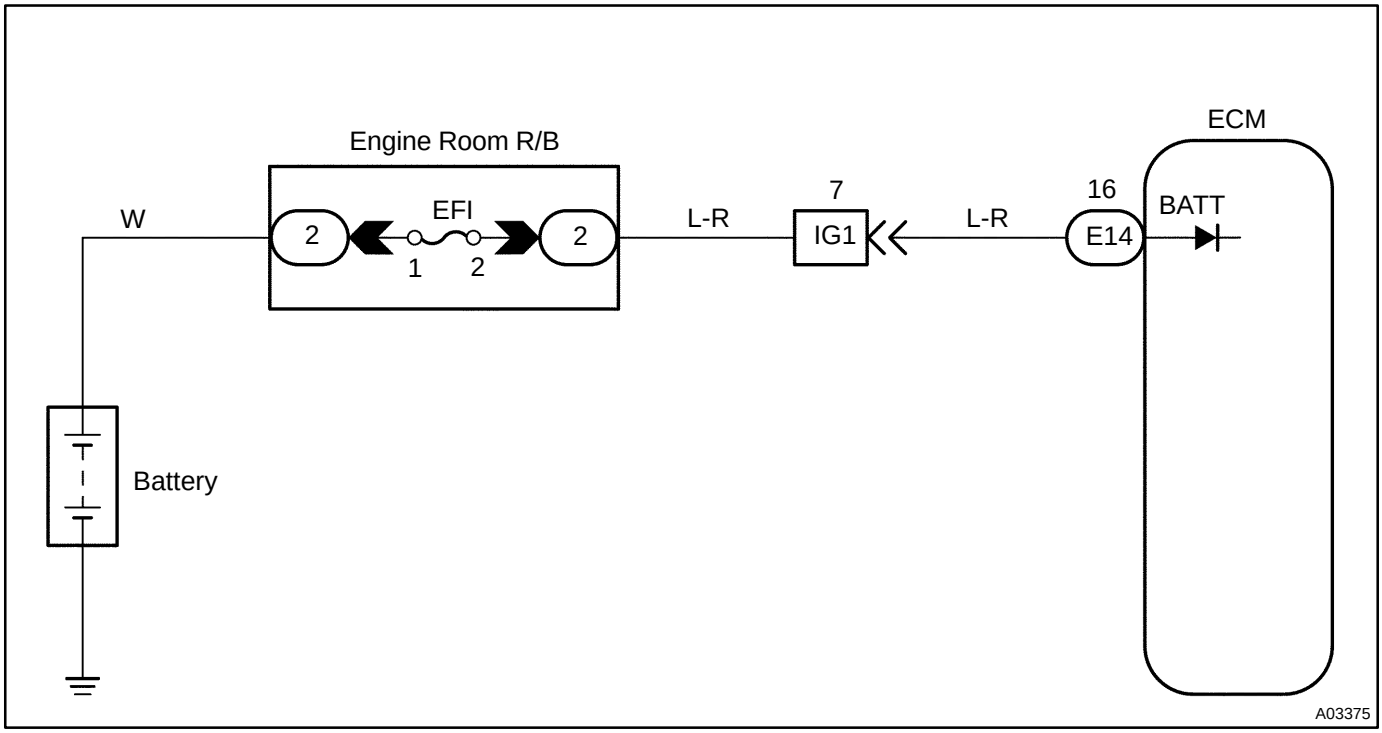
Battery positive voltage is supplied to terminal BATT of the ECM even when the ignition switch is OFF for use by the DTC memory and air-fuel ratio adaptive control value memory, etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1600	Open in back up power source circuit	• Open in back up power source circuit • ECM

HINT:

If DTC P1600 appear, the ECM does not store another DTC.

WIRING DIAGRAM

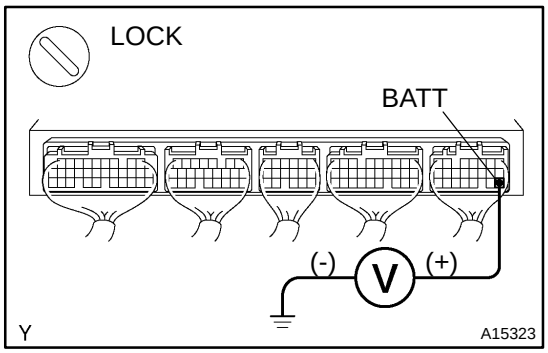


INSPECTION PROCEDURE

HINT:

Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

1	Check voltage between terminal BATT of ECM connector and body ground.

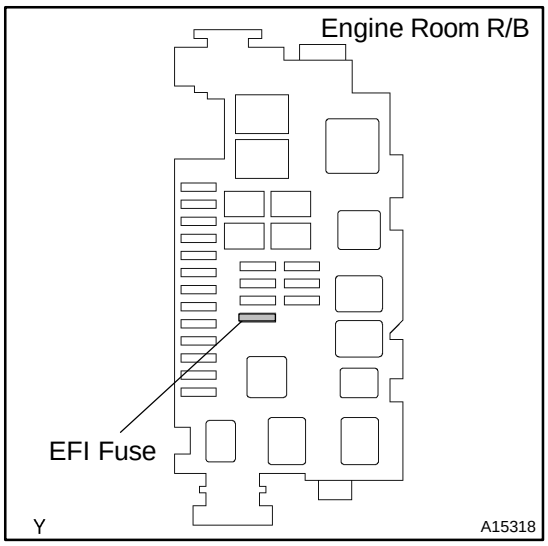


PREPARATION:
Remove the glove compartment (See page SF-54).
CHECK:
Measure the voltage between terminal BATT of the ECM connector and body ground.
OK:
Voltage: 9 - 14 V

OK	Check and replace ECM (See page IN-28).

NG

2	Check EFI fuse.



PREPARATION:
Remove the EFI fuse from the engine room R/B.
CHECK:
Check the continuity of the EFI fuse.
OK:
Continuity

NG	Check for short in all harness and components connected to EFI fuse.

OK

Check and repair harness or connector between battery and EFI fuse, and EFI fuse and ECM.

DI1MF-08

DTC	P1633	ECM Malfunction (ETCS Circuit)

CIRCUIT DESCRIPTION

Refer to DTC P1129 on page DI-121 .

DTC No.	DTC Detecting Condition	Trouble Area
P1633	ECM malfunction	• ECM

INSPECTION PROCEDURE

HINT:

Read freeze frame data using TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Replace ECM.

DI0SH-08

DTC	P1780	Park/Neutral Position Switch Malfunction (Only for A/T)

CIRCUIT DESCRIPTION

The park/neutral position switch go on when the shift lever is in the N or P shift position. When it goes on terminal NSW of the ECM is grounded to body ground via the starter relay, thus the terminal NSW voltage becomes 0V. When the shift lever is in the D, 2, L or R position, the park/neutral position switch goes off, so the voltage of ECM. Terminal NSW becomes battery voltage, the voltage of the ECM internal power source. If the shift lever is moved from the N position to the D position, this signal is used for air-fuel ratio correction and for idle speed control (estimated control), etc.

DTC No.	DTC Detecting Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for P, R, N, D, 2 and L position (2 trip detection logic)	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM
	When driving under conditions (a) and (b) for 30 sec. or more park/neutral position switch is ON (N position): (2 trip detection logic) (a) Vehicle speed: 70 km/h (44 mph) or more (b) Engine speed: 1,500 - 2,500 rpm	

HINT:
After confirming DTC P1780, use the TOYOTA hand-held tester to confirm the PNP switch signal from the CURRENT DATA.

WIRING DIAGRAM

Refer to DTC P1780 on page DI-203 .

INSPECTION PROCEDURE

Refer to DTC P1780 on page DI-203 .
HINT:
Read freeze frame data using the TOYOTA hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

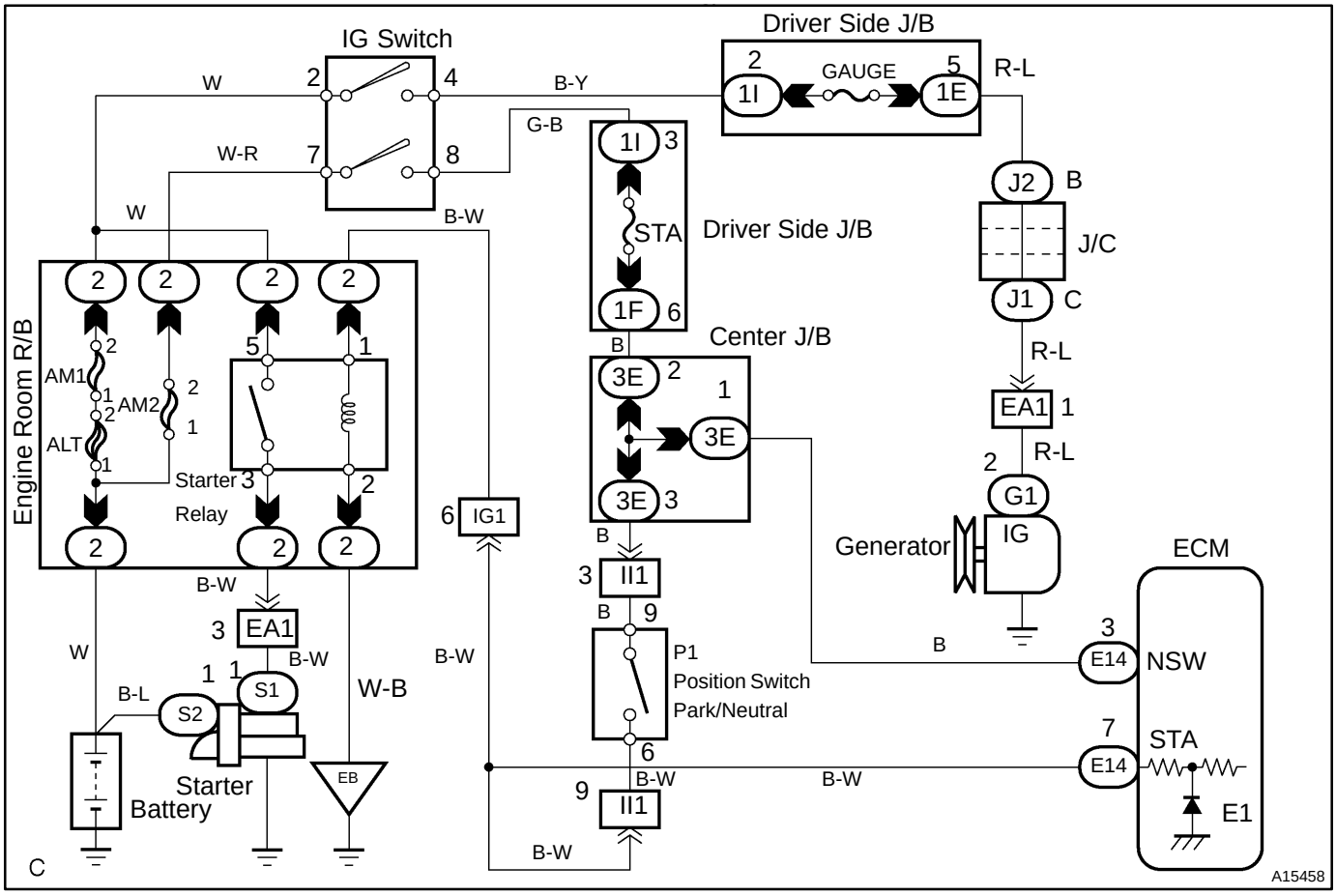
DI0SI-14

Starter Signal Circuit

CIRCUIT DESCRIPTION

When the engine is cranked, the intake air flow is slow, so fuel vaporization is poor. A rich mixture is therefore necessary in order to achieve good startability. While the engine is being cranked, the battery positive voltage is applied to terminal STA of the ECM. The starter signal is mainly used to increase the fuel injection volume for the starting injection control and after-starter injection control.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

This diagnostic chart is based on the premise that the engine is cranked normally. If the engine is not cranked, proceed to the problem symptoms table on page DI-20 .

TOYOTA hand-held tester:

1	**Connect TOYOTA hand-held tester, and check STA signal.**

PREPARATION:

(a) Connect the TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the TOYOTA hand-held tester main switch ON.

CHECK:

Read the STA signal on the TOYOTA hand-held tester while the starter operates.

OK:

Ignition Switch Position	ON	START
STA Signal	OFF	ON

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-20).**

NG

2	**Check for open in harness and connector between ECM and starter relay (See page DI-18).**

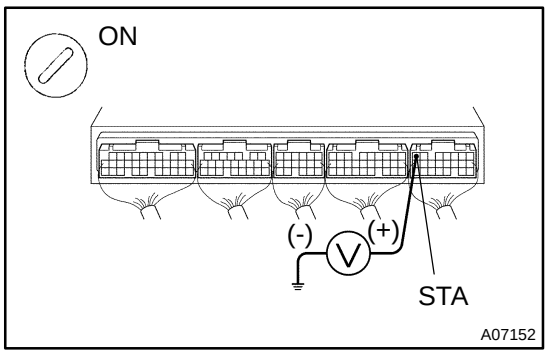
NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	**Check voltage between terminal STA of ECM connector and body ground.**



PREPARATION:

Remove the glove compartment (See page SF-54).

CHECK:

Measure the voltage between terminal STA of the ECM connector and body ground during the engine cranking.

OK:

Voltage: 6 V or more

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-20).**

NG

2	**Check for open in harness and connector between ECM and starter relay (See page DI-18).**

NG → Repair or replace harness or connector.

OK

Check and replace ECM (See page IN-28).

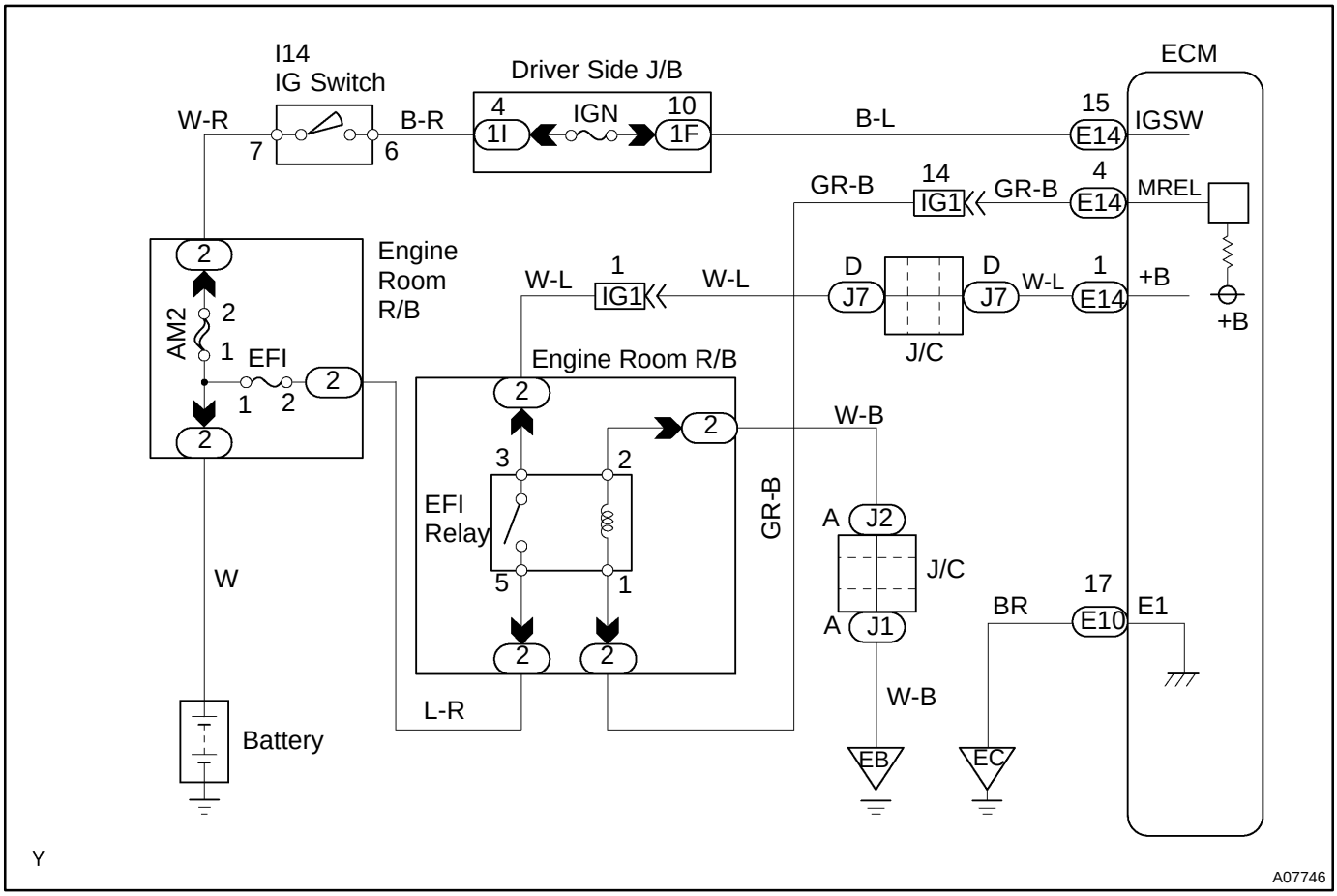
DI0SJ-08

ECM Power Source Circuit

CIRCUIT DESCRIPTION

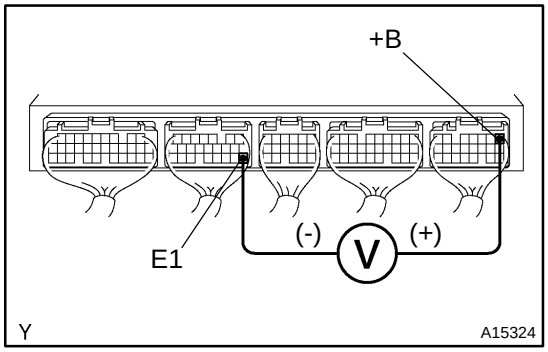
When the ignition switch is turned ON, battery positive voltage is applied to the coil, closing the contacts of the EFI main relay (Marking: EFI) and supplying power to terminal +B of the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals +B and E1 of ECM connectors.**



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals +B and E1 of the ECM connectors.

OK:

Voltage: 9 - 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI-20).**

NG

2	Check for open in harness and connector between terminal E1 of ECM and body ground (See page IN-28).

NG → Repair or replace harness or connector.

OK

3	Check EFI main relay (Marking: EFI) (See page SF-35).

NG → Replace EFI main relay.

OK

4	Check EFI fuse (See page DI-148 , step 2).

NG → Check for short in all harness and components connected to EFI fuse.

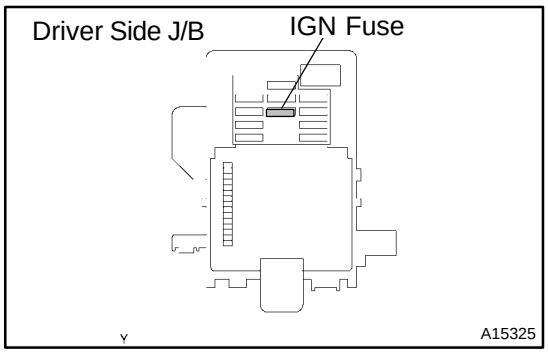
OK

5	Check for open harness and connector between EFI main relay (Marking: EFI) and battery, and EFI main relay and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

6	**Check IGN fuse.**



PREPARATION:
Remove the IGN fuse from the driver side J/B.
CHECK:
Check the continuity of the IGN fuse.
OK:

Continuity

NG → **Check for short in all harness and components connected to IGN fuse.**

OK

7	**Check ignition switch (See page BE-12).**

NG → **Replace ignition switch (See page SR-17).**

OK

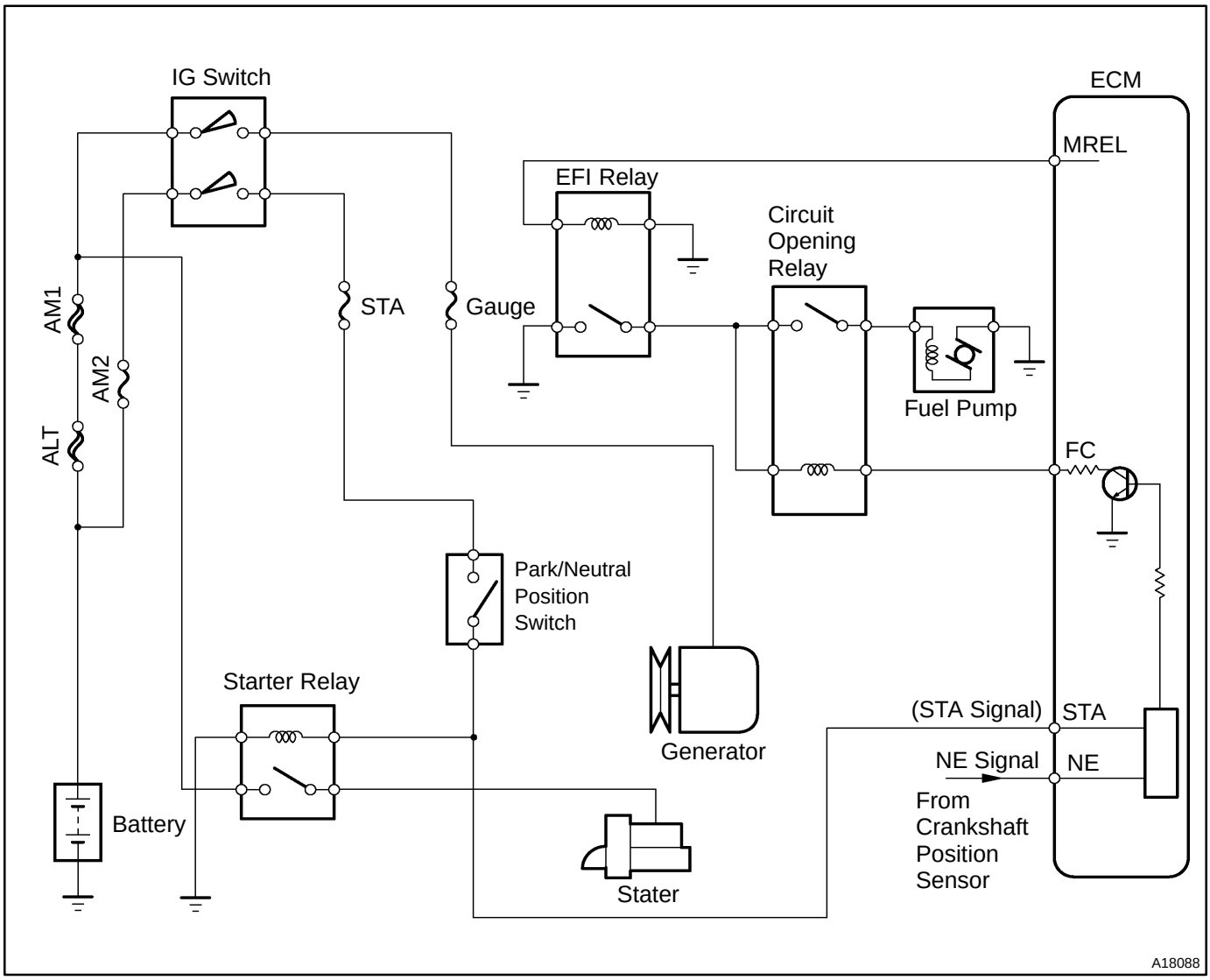
Check for open in harness and connector between ignition switch and EFI main relay (Marking: EFI), and EFI main relay and body ground (See page IN-28).

DI8XN-02

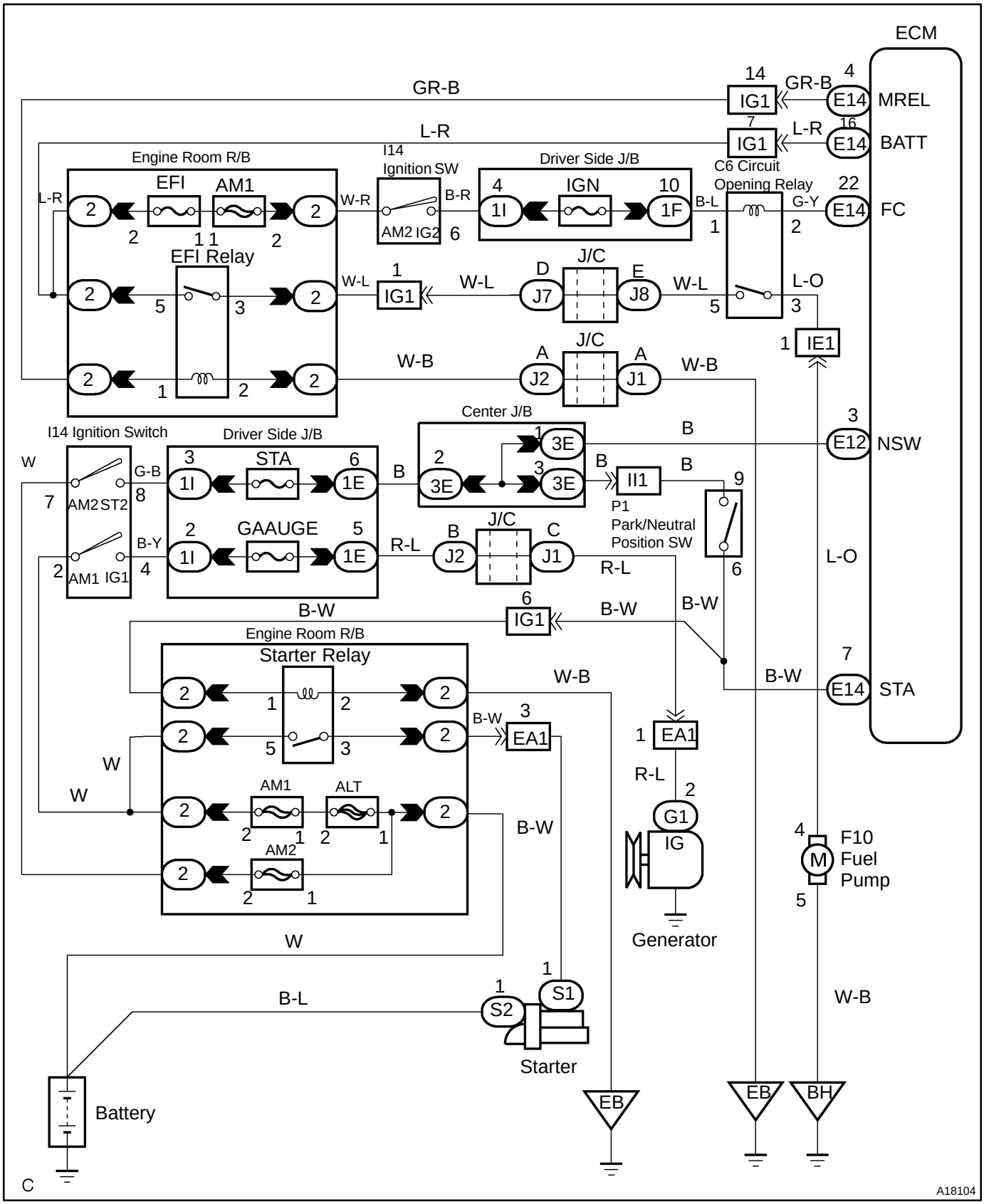
Fuel Pump Control Circuit

CIRCUIT DESCRIPTION

In the diagram below, when the engine is cranked, current flows from terminal ST of the ignition switch to the starter relay coil, the starter relay switches on and current flows to coil L1 of the circuit opening relay. Thus the circuit opening relay switches on, power is supplied to the fuel pump and the fuel pump oparates. When the STA signal and NE signal are input to the ECM, Tr is turned ON, current flows to coil L2 of the circuit opening relay, the relay switches on, and the fuel pump operates. While the NE signal is generated (engine running), the ECM keeps Tr ON (circuit opening relay ON) and the fuel pump also keeps operating.



WIRING DIAGRAM



INSPECTION PROCEDURE
TOYOTA hand-held tester:

1	Connect TOYOTA hand-held tester, and check operation of fuel pump (See page SF-7).

OK → Check for starter signal circuit (See page DI-145).

NG

2	Check for ECM power source circuit (See page DI-148).

NG → Repair or replace.

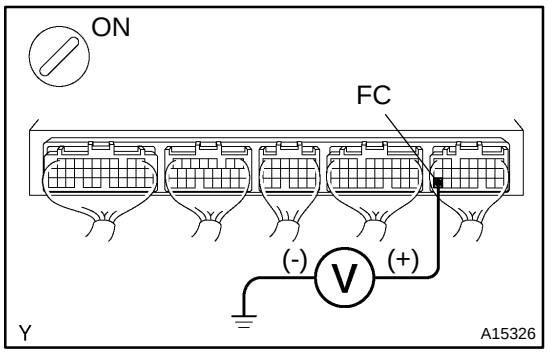
OK

3	Check circuit opening relay (See page SF-37).

NG → Replace circuit opening relay.

OK

4	**Check voltage between terminals FC of ECM and body ground.**



PREPARATION:

(a) Remove the glove compartment (See page SF-54).

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal FC of the ECM and body ground.

OK:

Voltage: 9 - 14 V

OK → **Go to step 5.**

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and circuit opening relay, and circuit opening relay and ECM.

5	**Check fuel pump (See page SF-7).**

NG → **Repair or replace fuel pump.**

OK

6	**Check for open in harness and connector between circuit opening relay and fuel pump, and fuel pump and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester):

1	Check operation of fuel pump (See page SF-7).

OK → Check for starter signal circuit (See page DI-145).

NG

2	Check for ECM power source circuit (See page DI-148).

NG → Repair or replace.

OK

3	Check circuit opening relay (See page SF-37).

NG → Replace circuit opening relay.

OK

4	Check voltage between terminals FC of ECM connector and body ground (See page DI-151 , step 4).

OK → Go to step 5.

NG

Check for open in harness and connector between EFI main relay (Marking: EFI) and circuit opening relay, and circuit opening relay and ECM.

5	Check fuel pump (See page SF-7).

NG → Repair or replace fuel pump.

OK

6	Check for open in harness and connector between circuit opening relay and fuel pump, and fuel pump and body ground (See page IN-28).

NG → Repair or replace harness or connector.

OK

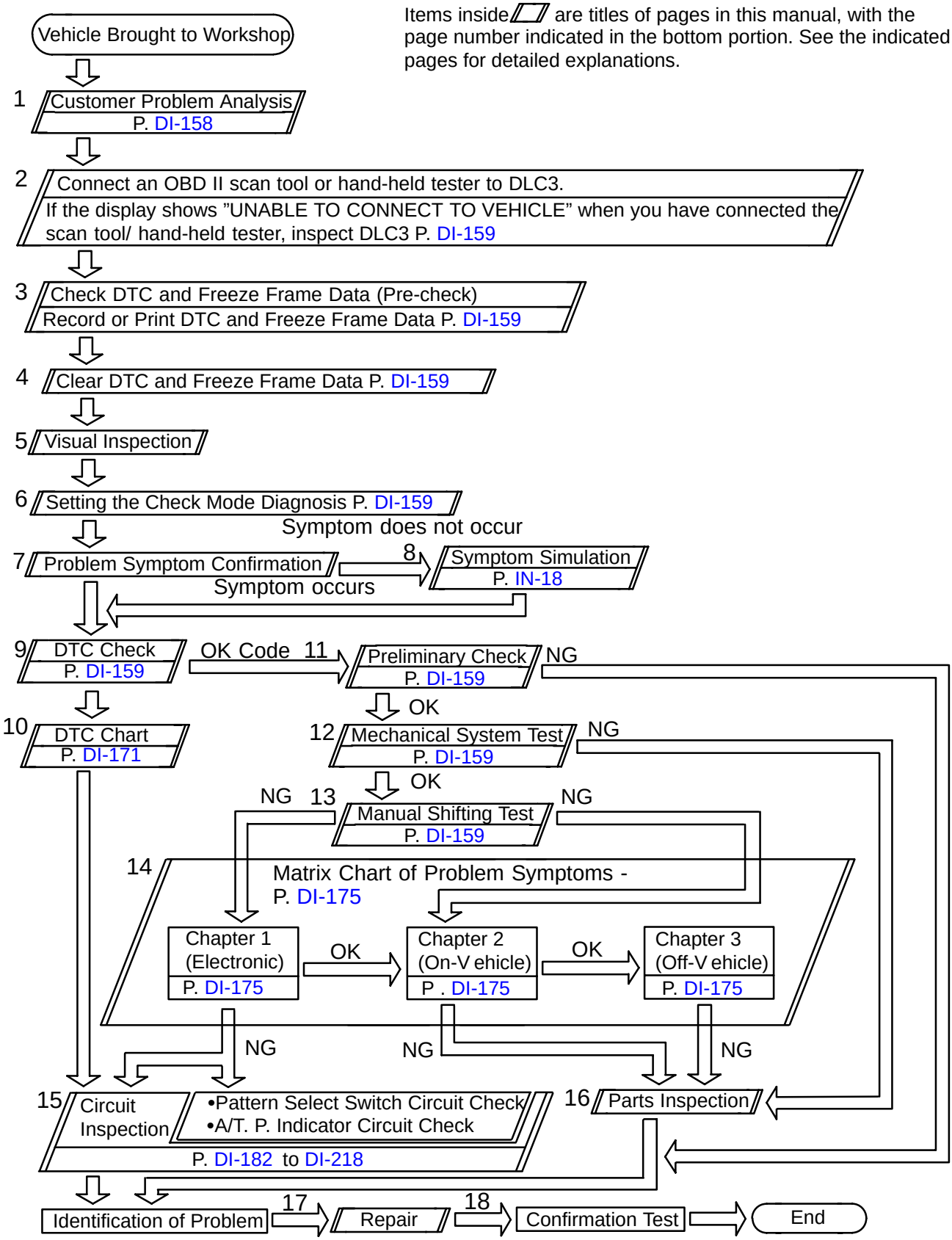
Check and replace ECM (See page IN-28).

AUTOMATIC TRANSMISSION

DI0SL-29

HOW TO PROCEED WITH TROUBLESHOOTING

Items inside ▱ are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



DI0SM-03

CUSTOMER PROBLEM ANALYSIS CHECK

Transmission Control System Check Sheet

Inspector's Name :

Customer's Name		Registration No.	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	Odometer Reading	km mile

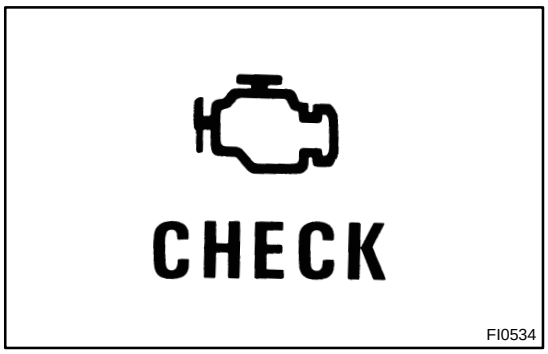
Date Problem Occurred	/ /
How Often Problem Occurs?	☐ Continuous ☐ Intermittent (times a day)

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)
	☐ Lock-up malfunction
	☐ Shift point too high or too low
	☐ Harsh engagement (☐ N → D ☐ Lock-up ☐ Any drive position)
	☐ Slip or shudder
	☐ No kick-down
	☐ Others ( )

Check Item	Malfunction Indicator Lamp	☐ Normal ☐ Remains ON

DTC Check	1st Time	☐ Normal code	☐ Malfunction code (Code)
	2nd Time	☐ Normal code	☐ Malfunction code (Code)

DI8WD-02



PRE-CHECK

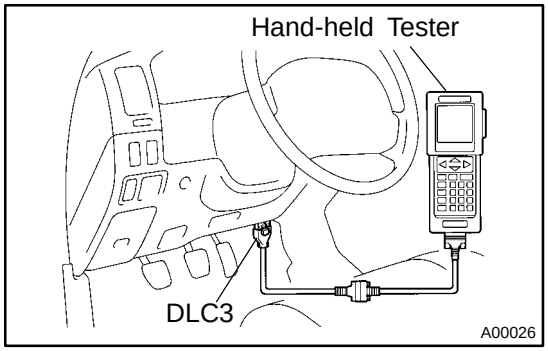
1. DIAGNOSIS SYSTEM

(a) Description

- When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle an OBD II scan tool complying with SAE J1987 or hand-held tester, and read off various data output from the vehicle's ECM.

  OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable DTCs prescribed by SAE J2012 are recorded in the ECM memory (See page DI-13).

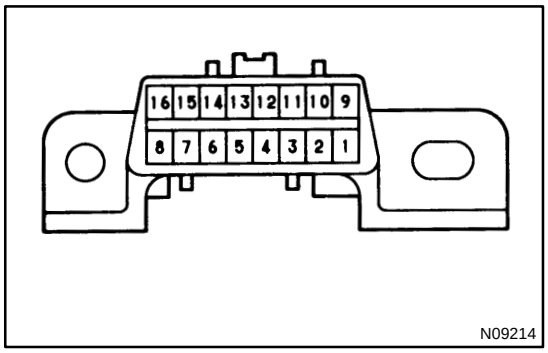
  If the malfunction only occurs in 3 trips, the MIL goes off but the DTCs remain recorded in the ECM memory.



- To check the DTCs, connect an OBD II scan tool or hand-held tester to DLC3 on the vehicle. The OBD II scan tool or hand-held tester also enables you to erase the DTCs and check freeze frame data and various forms of engine data (For instruction book). DTCs include SAE controlled codes and Manufacturer controlled codes.

  SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits (See DTC chart on page DI-171).

- The diagnosis system operates in normal mode during normal vehicle use, and also has a check mode for technicians to simulate malfunction symptoms and perform troubleshooting. Most DTCs use 2 trip detection logic(*) to prevent erroneous detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up and for a malfunction that is only detected once or momentarily.
  (hand-held tester) (See page DI-159)
- *2 trip detection logic:
  When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the 2nd test drive, this 2nd detection causes the MIL to light up.

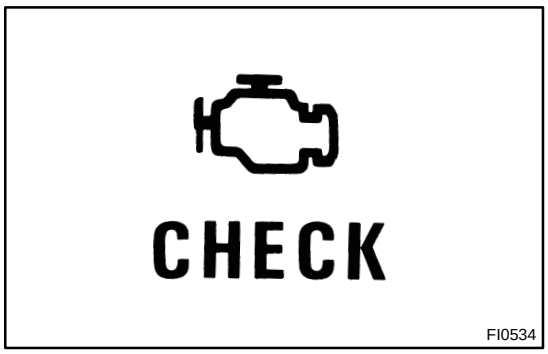


(b) Inspect the DLC3.
The vehicle's ECM uses the V.P.W. (Variable Pulse Width) for communication to comply with SAE J1850. The terminal arrangement of DLC3 complies with SAE J1962 and matches the V.P.W. format.

Terminal No.	Connection / Voltage or Resistance	Condition
2	Bus (+) Line / Pulse generation	During communication
4	Chassis Ground ↔ Body / 1 Ω or less	Always
5	Signal Ground ↔ Body / 1 Ω or less	Always
16	Battery Positive ↔ Body / 9 ~ 14 V	Always

HINT:
If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of OBD II scan tool or hand-held tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



2. INSPECT DIAGNOSIS (NORMAL MODE)

(a) Check the MIL.

(1) The MIL comes on when the ignition switch is turned ON and the engine is not running.

HINT:

If the MIL does not light up, troubleshoot the combination meter (See page BE-2).

(2) When the engine is started, the MIL should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

(b) Check the DTC.

NOTICE:

hand-held tester only: When the diagnostic system is switched from normal mode to check mode, it erases all DTCs and freeze frame data recorded in normal mode. So before switching modes, always check the DTCs and freeze frame data, and note them down.

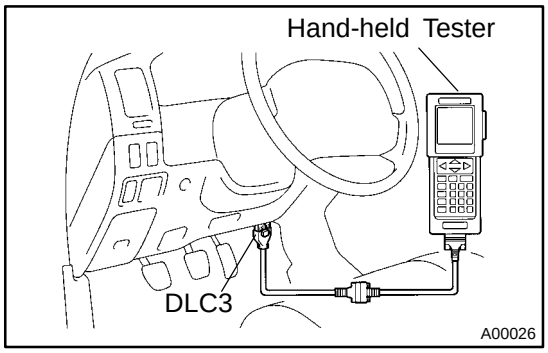
(1) Prepare an OBD II scan tool (complying with SAE J1978) or hand-held tester.

(2) Connect the OBD II scan tool or hand-held tester to DLC3 at the lower of the instrument panel.

(3) Turn the ignition switch ON and turn the OBD II scan tool or hand-held tester switch ON.

(4) Use the OBD II scan tool or hand-held tester to check the DTCs and freeze frame data and note them down (For operating instructions, see the OBD II scan tool's instruction book).

(5) See page DI-159 to confirm the details of the DTCs.



NOTICE:

When simulating symptoms with an OBD II scan tool (excluding hand-held tester) to check the DTCs, use normal mode. For codes on the DTCs chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptoms have been simulated the 1st time. Then repeat the simulation process again. When the program has DTCs, they are recorded in the ECM.

3. INSPECT DIAGNOSIS (CHECK MODE)

HINT:

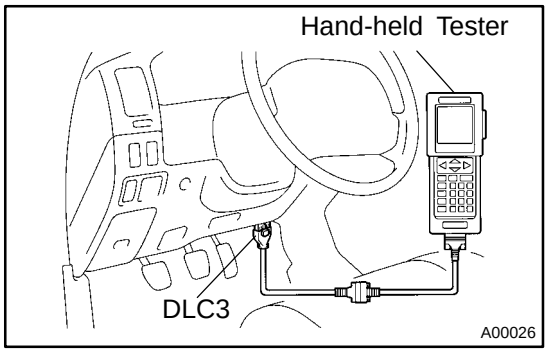
hand-held tester only: Compared to the normal mode, the check mode has high sensing ability to detect malfunctions. Furthermore, the same diagnostic items which are detected in Normal mode can also be detected in Check mode.

(a) Check the DTC.

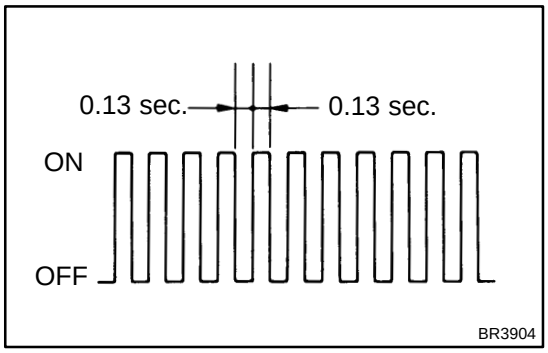
(1) Check the initial conditions.

- Battery positive voltage 11 V or more.
- Throttle valve fully closed.
- Transmission in P position.
- Air conditioning switched OFF.

(2) Turn the ignition switch OFF.
(3) Prepare a hand-held tester.



(4) Connect the hand-held tester to DLC3 at the lower portion of the instrument panel.
(5) Turn the ignition switch ON and switch the hand-held tester ON.



(6) Switch the hand-held tester from Normal mode to Check mode (Check that the MIL flashes).
(7) Start the engine (MIL goes out after the engine starts).
(8) Simulate the conditions of the malfunction described by the customer.

NOTICE:
Leave the ignition switch ON until you have checked the DTCs, etc.

(9) After simulating the malfunction conditions, use the hand-held tester diagnosis selector to check the DTCs and freeze frame data, etc.

HINT:
Take care not to turn the ignition switch OFF, as turning it off the diagnosis system switches Check mode to Normal mode, so all DTCs, etc. are erased.

(10) After checking the DTC, inspect the applicable circuit.

(b) Clear the DTC.
The following operation will erase the DTC and freeze frame data. Operating an OBD II scan tool (complying with SAE J1978) or hand-held tester to erase the codes (See the OBD II scan tool's instruction book for operating instructions.).

4. ROAD TEST

NOTICE:

Perform the test at normal operating ATF temperature 50 - 80 °C (122 - 176 °F).

(a) D position test (NORM and PWR pattern):

Shift into the D position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

1 → 2, 2 → 3 and 3 → O/D up-shift takes place, at the shift point shown in the automatic shift schedule (See page SS-23).

HINT:

- O/D Gear Up-shift Prohibition Control (1. Coolant temp. is 60 °C (140 °F) or less.)
- O/D Gear Lock-up Prohibition Control (1. Brake pedal is depressed. 2. Coolant temp. is 60 °C (140 °F) or less.)

(2) Check for shift shock and slip.

Check for shock and slip at the 1 → 2, 2 → 3 and 3 → O/D up-shifts.

(3) Check for abnormal noises and vibration.

Run at the D position lock-up or O/D gear and check for abnormal noises and vibration.

HINT:

The check for the cause of abnormal noises and vibration must be done very thoroughly as it could also be due to loss of balance in the differential torque converter clutch, etc.

(4) Check kick-down operation.

While running in the D position, 2nd, 3rd and O/D gears, check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 2 and O/D → 3 kick-downs conform to those indicated on the automatic shift schedule (See page SS-23).

(5) Check abnormal shock and slip at kick-down.

(6) Check the lock-up mechanism.

- Drive in D position, O/D gear, at a steady speed (lock-up ON) of about 70 km/h (43 mph).
- Lightly depress the accelerator pedal and check that the engine speed does not change abruptly.

If there is a big jump in engine speed, lock-up mechanism is not functioning.

(b) 2 position test:

Shift into the 2 position and fully depress the accelerator pedal and check the following points.

(1) Check up-shift operation.

Check to see that the 1 → 2 up-shift takes place and that the shift point conforms to the automatic shift schedule (See page SS-23).

HINT:

There is no O/D up-shift and lock-up in the 2 position.

(2) Check engine braking.

While running in the 2 position and 2nd gear, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration, and for shock at up-shift and down-shift.

(c) L position test:

Shift into the 2 position and fully depress the accelerator pedal and check the following points.

(1) Check no up-shift.

While running in the L position, check that no up-shift occurs to 2nd gear.

(2) Check engine braking.

While running in the L position, release the accelerator pedal and check the engine braking effect.

(3) Check for abnormal noises during acceleration and deceleration.

(d) R position test:

Shift into the R position and fully depress the accelerator pedal and check for slipping.

CAUTION:

Before conducting this test ensure that the test area is free from people and obstruction.

(e) P position test:

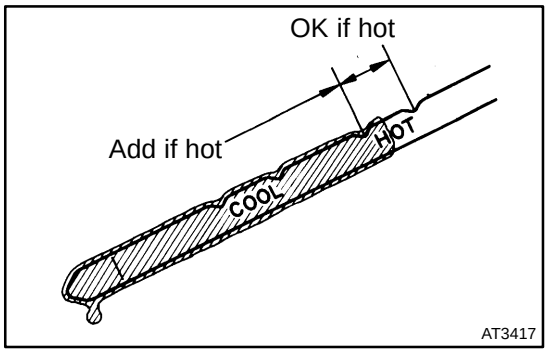
Stop the vehicle on a grade (more than 5˚) and after shifting into the P position, release the parking brake. Then, check to see that the parking lock pawl holds the vehicle in place.

5. BASIC INSPECTION

(a) Check the fluid level.

HINT:

- Drive the vehicle so that the engine and transmission are at normal operating temperature.
  Fluid temp.: 70 - 80 ˚C (158 - 176 ˚F)
- Only use the COOL range on the dipstick as a rough reference when the fluid is replaced or the engine does not run.



(1) Park the vehicle on a level surface and set the parking brake.
(2) With the engine idling and the brake pedal depressed, shift the shift lever into all positions from P to L position and return to P position.
(3) Pull out the dipstick and wipe it clean.
(4) Push it back fully into the pipe.
(5) Pull it out and check that the fluid level is in the HOT range.

If the level is not within the HOT range, add new fluid.

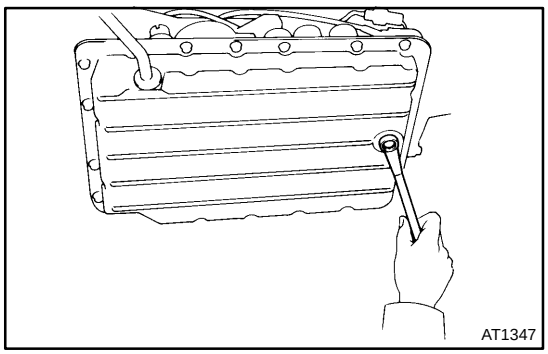
Fluid type: ATF D-II or DEXRON®III (DEXRON®II)

NOTICE:

Do not overfill.

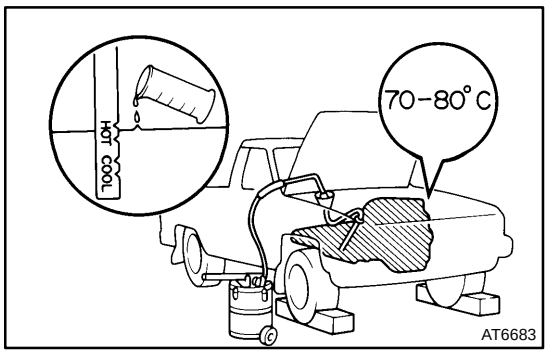
(b) Check the fluid condition.

If the fluid smells burnt or is black, replace it.



(c) Replace the ATF.

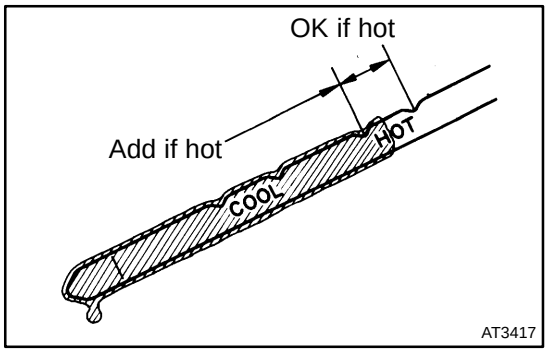
(1) Remove the drain plug and drain the fluid.
(2) Reinstall the drain plug securely.



(3) With the engine OFF add new fluid through the oil filler pipe.

Fluid type: ATF D-II or DEXRON®III (DEXRON®II)
Capacity:
A340E: 1.6 liters (1.7 US qts, 1.4 Imp. qts)
A340F: 2.0 liters (2.1 US qts, 1.8 Imp. qts)

(4) Start the engine and shift the shift lever into all positions from P to L position and then shift into P position.



(5) With the engine idling, check the fluid level. Add fluid up to the COOL level on the dipstick.

(6) Check the fluid level at the normal operating temperature, 70 - 80 °C (158 - 176 °F), and add as necessary.

NOTICE:
Do not overfill.

(d) Check the fluid leaks.

Check for leaks in the transmission.

If leaks occurs, it is necessary to repair or replace O-rings, FIPGs, oil seals, plugs or other parts.

(e) Inspect and adjust the shift lever position.

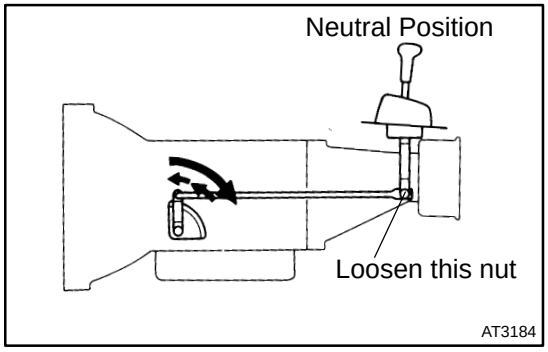
When shifting the shift lever from the N position to other positions, check that the lever can be shifted smoothly and accurately to each position and that the position indicator is not aligned with the correct position.

If the indicator is not aligned with the correct position, carry out the following adjustment procedures.

(1) Loosen the nut on the shift lever.

(2) Push the control shaft fully rearward.

(3) Return the control shaft lever 2 notches to N position.

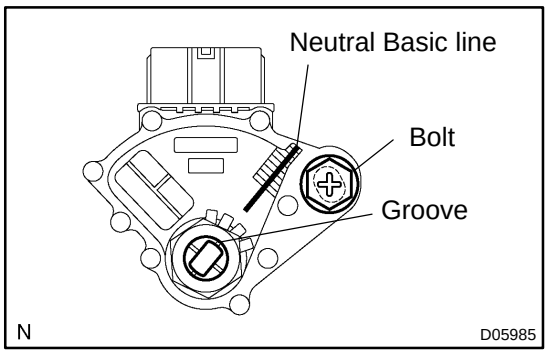


(4) Set the shift lever to N position.

(5) While holding the shift lever lightly toward the R position side, tighten the shift lever nut.

Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

(6) Start the engine and make sure that the vehicle moves forward when shifting the lever from the N to D position and reverses when shifting it to the R position.



(f) Inspect and adjust the park/neutral position.
Check that the engine can be started with the shift lever only in the N or P position, but not in other positions.

If it is not as stated above, carry out the following adjustment procedures.

(1) Loosen the park/neutral position switch bolt and set the shift lever to the N position.
(2) Align the groove with neutral basic line.
(3) Hold in position and tighten the bolt.
Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

HINT:
For continuity inspection of the park/neutral position switch, See page DI-203 .

(g) Check the idle speed.
Idle speed (In N position and air conditioner OFF): 700 ± 50 rpm

6. MECHANICAL SYSTEM TESTS

(a) Measure the stall speed.

The object of this test is to check the overall performance of the transmission and engine by measuring the stall speeds in the D and R positions.

NOTICE:

- **Do the test at normal operating fluid temperature 50 - 80 °C (122 - 176 °F).**
- **Do not continuously run this test longer than 5 seconds.**
- **To ensure safety, conduct this test in a wide, clear level area which provides good traction.**
- **The stall test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**

(1) Chock the 4 wheels.

(2) Connect an OBD II scan tool or hand-held tester to DLC3.

(3) Fully apply the parking brake.

(4) Keep your left foot pressing firmly on the brake pedal.

(5) Start the engine.

(6) Shift into the D position. Depress all the way down on the accelerator pedal with your right foot. Quickly read the stall speed at this time.

Stall speed:

2,250 ± 150 rpm

(7) Do the same test in R position.

Stall speed:

2,250 ± 150 rpm

Evaluation:

Problem	Possible cause
(c) Stall speed low in D and R positions	• Engine output may be insufficient • Stator one-way clutch not operating properly HINT: If more than 600 rpm below the specified value, the torque converter clutch could be faulty.
(d) Stall speed high in D position	• Line pressure too low • Forward clutch slipping • No. 2 one-way clutch not operating properly • O/D one-way clutch not operating properly
(e) Stall speed high in R position	• Line pressure too low • Direct clutch slipping • 1st & reverse brake slipping • O/D one-way clutch not operating properly
(f) Stall speed high in D and R positions	• Line pressure too low • Improper fluid level • O/D one-way clutch not operating properly

(b) Measure the time lag.

When the shift lever is shifted while the engine is idling, there will be a certain time lapse or lag before the shock can be felt. This is used for checking the condition of the O/D direct clutch, forward clutch, and 1st & reverse brake.

NOTICE:

- **Do the test at normal operating fluid temperature 50 - 80 ˚C (122 - 176 ˚F).**
- **Be sure to allow 1 minute interval between tests.**
- **Take 3 measurements and take the average value.**

(1) Fully apply the parking brake.

(2) Start the engine and check idle speed.

Idle speed (In N position and air conditioner OFF):

700 ± 50 rpm

(3) Shift the shift lever from N to D position. Using a stop watch, measure the time from when the lever is shifted until the shock is felt.

Time lag: N → D Less than 1.2 seconds

(4) In the same manner, measure the time lag for N → R.

Time lag: N → R Less than 1.5 seconds

Evaluation (If N → D time or N → R time lag is longer than specified):

Problem	Possible cause
N → D time lag is longer	• Line pressure too low • Forward clutch worn • O/D one-way clutch not operating properly
N → R time lag is longer	• Line pressure too low • Direct clutch worn • 1st & reverse brake worn • O/D one-way clutch not operating properly

7. HYDRAULIC TEST

Measure the line pressure.

NOTICE:

- **Do the test at normal operation fluid temperature 50 - 80 ˚C (122 - 176 ˚F).**
- **The line pressure test should always be carried out in pairs. One technician should observe the conditions of wheels or wheel stoppers outside the vehicle while the other is doing the test.**
- **Be careful to prevent SST's hose from interfering with the exhaust pipe.**

(1) Warm up the ATF.
(2) Remove the test plug on the transmission case front left side and connect SST (See page AT-18 for the location to connect SST).
SST 09992-00095, 09992-00151, 09992-00271
(3) Fully apply the parking brake and chock the 4 wheels.
(4) Start the engine and check idling speed.
(5) Keep your left foot pressing firmly on the brake pedal and shift into D position.
(6) Measure the line pressure when the engine is idling.
(7) Depress the accelerator pedal all the way down. Quickly read the highest line pressure when engine speed reaches stall speed.
(8) In the same manner, do the test in R position.

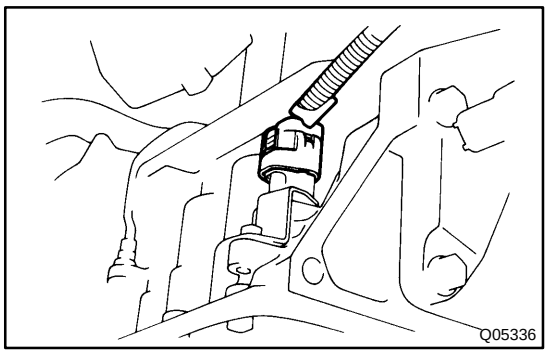
Specified line pressure:

Condition	D position kPa (kgf/cm^2, psi)	R position kPa (kgf/cm^2, psi)
Idling	382 - 441 (3.9 - 4.5, 55 - 64)	598 - 696 (6.1 - 7.1, 87 - 101)
Stall	1,196 - 1,334 (12.2 - 13.6, 174 - 193)	1,598 - 1,942 (16.3 - 19.8, 232 - 282)

If the measured pressures are not up to the specified values, recheck the throttle cable adjustment and re-test.

Evaluation

Problem	Possible cause
If the measured values at all positions are higher	• Shift solenoid valve SLT • Throttle valve defective • Regulator valve defective
If the measured values at all positions are lower	• Shift solenoid valve SLT • Throttle valve defective • Regulator valve defective • Oil pump defective • O/D direct clutch defective
If pressure is low in the D position only	• D position circuit fluid leaks • Forward clutch defective
If pressure is low in the R position only	• R position circuit fluid leakage • Direct clutch defective • 1st & reverse brake defective



8. MANUAL SHIFTING TEST

HINT:

With this test, it can be determined whether the trouble is within the electrical circuit or is a mechanical problem in the transmission.

(a) Disconnect the solenoid wire.

(b) Inspect the manual driving operation.

Check that the shift and gear positions correspond with the table below.

While driving, shift through the L, 2 and D positions. Check that the gear change corresponds to the shift position.

Shift Position	Gear Position
D	O/D
2	3rd
L	1st
R	Reverse
P	Pawl Lock

HINT:

If the L, 2 and D position gear positions are difficult to distinguish, do the above read test.

If any abnormality is found in the above test, the problem is in the transmission itself.

(c) Connect the solenoid wire.

(d) Cancel out the DTC (See page DI-159).

DI0SO-19

DIAGNOSTIC TROUBLE CODE CHART

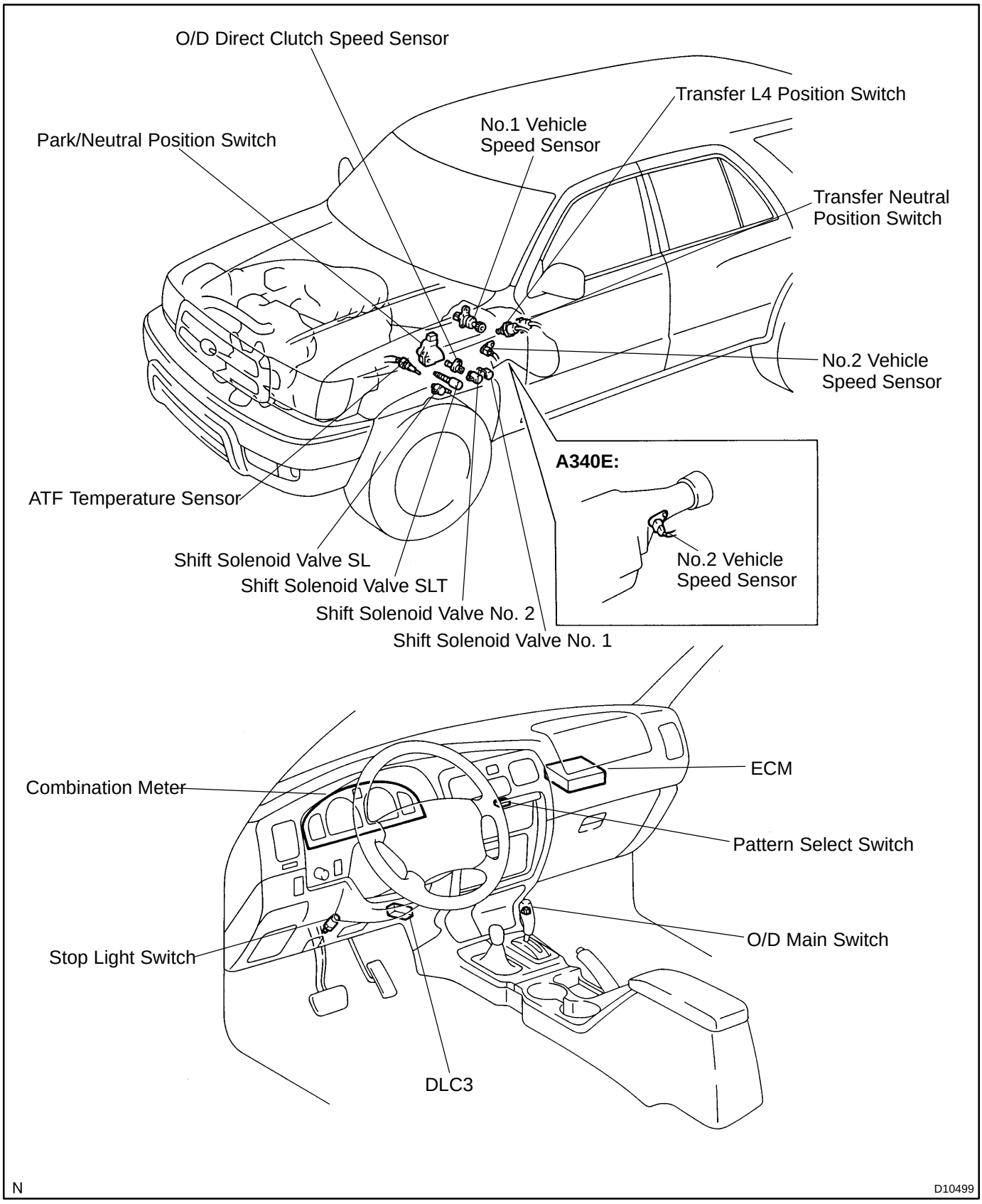
If a DTC is displayed during the DTC check, check the circuit listed for that code in the table below and proceed to the page given.

DTC No. (See Page)	Detection Item	Trouble Area	MIL *1	Memory
P0500 (DI-179)	Vehicle Speed Sensor Malfunction	• Open or short in No. 1 vehicle speed sensor circuit • No. 1 vehicle speed sensor • Combination meter • ECM • Automatic transmission (clutch, bracket or gear etc.)	●	○
P0710 (DI-182)	Transmission Fluid Temperature Sensor Malfunction	• Open or short in ATF temperature sensor circuit • ATF temperature sensor • ECM	●	○
P0750 (DI-184)	Shift Solenoid "A" Malfunction	• Shift solenoid valve No. 1 is stuck open or closed • Valve body is blocked up or stuck	●	○
P0753 (DI-186)	Shift Solenoid "A" Electrical	• Open or short in shift solenoid valve No. 1 circuit • Shift solenoid valve No. 1 • ECM	●	○
P0755 (DI-184)	Shift Solenoid "B" Malfunction	• Shift solenoid valve No. 2 is stuck open or closed • Valve body is blocked up or stuck	●	○
P0758 (DI-186)	Shift Solenoid "B" Electrical	• Open or short in shift solenoid valve No. 2 circuit • Shift solenoid valve No. 2 • ECM	●	○
P0770 (DI-190)	Shift Solenoid "E" Malfunction	• Shift solenoid valve SL is stuck open or closed • Valve body is blocked up or stuck • Lock-up clutch	●	○
P0773 (DI-192)	Shift Solenoid "E" Electrical	• Open or short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM	●	○
P1520 (DI-195)	Stop Light Switch Circuit Malfunction	• Short in stop light switch signal circuit • Stop light switch • ECM	●	○
P1700 (DI-196)	Speed Sensor No. 2 Malfunction	• Open or short in No. 2 vehicle speed sensor circuit • No. 2 vehicle speed sensor • ECM	●	○
P01760 (DI-200)	Linear Solenoid for Line Pressure Control Circuit Malfunction	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM	●	○
P1780 (DI-203)	Park/Neutral Position Switch Malfunction	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM	●	○
P1782 *2 (DI-208)	Transfer L4 SW Circuit Malfunction	• Transfer L4 position switch • Transfer L4 position switch circuit • ECM	●	○
P1783 *2 (DI-211)	Transfer N SW Circuit Malfunction	• Transfer neutral position switch • Transfer neutral position switch circuit • ECM	●	○

* 1: ●...MIL lights up.
* 2: 4WD only.

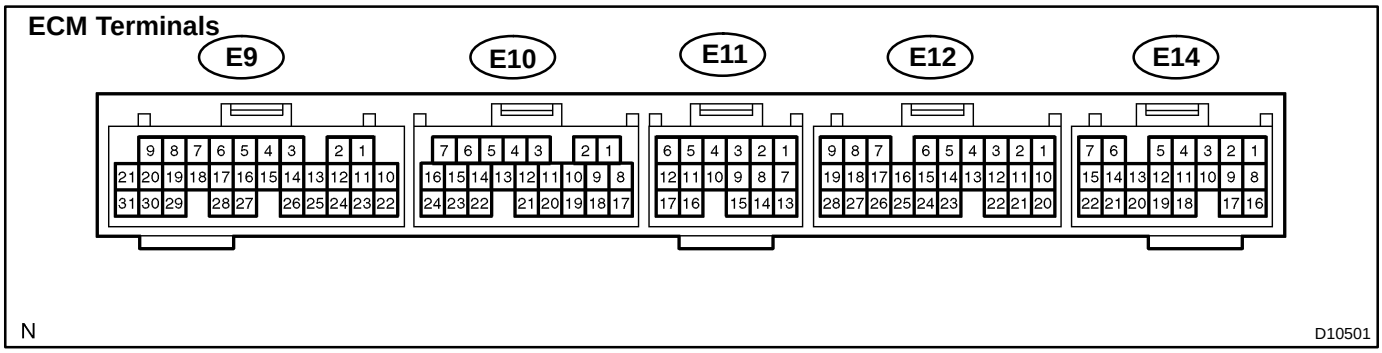
DI8WE-01

PARTS LOCATION



DI8WF-02

TERMINALS OF ECM



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
S1 - E1 (E9-3 - E10-17)	P-L ↔ BR	IG ON	9 - 14
		1st or 2nd gear	9 - 14
		3rd or O/D gear	Below 1.5
S2 - E1 (E9-2 - E10-17)	L-W ↔ BR	IG ON	Below 1.5
		2nd or 3rd gear	9 - 14
		1st or O/D gear	Below 1.5
SL - E1 (E9-1 - E10-17)	LG ↔ BR	IG ON	Below 1.5
		Vehicle driving under lock-up position	9 - 14
SLT + (E11-5) - SLT - (E11-11)	R-Y ↔ Y-B	IG ON	Below 3
		Engine is idling	Pulse signal is output Below 1.5 ↔ 10 - 12
SP1 (E14-6) - E1 (E10-17)	G-O ↔ BR	IG switch ON Rotate driving wheel slowly	Pulse generation
SP2 + - SP2 - (E10-23 - E10-22)	Y-R ↔ W-R	Vehicle driving	Pulse signal is output Below 1.5 ↔ 4 - 6
ODLP - E1 (E12-20 - E10-17)	G-Y ↔ BR	O/D main switch ON (O/D OFF)	Below 3
		O/D main switch OFF (O/D ON)	9 - 14
THOC - E2 (E9-19 - E9-11)	L-R ↔ L-B	ATF temperature: 115˚C (239˚F) or more	Below 1.5
D (E12 - 25) - E1 (E10 - 17)	*1 W-R ↔ BR *2 GR-B ↔ BR	IG ON and Shift lever D position	9 - 14
		IG ON and Shift lever other than D position	Below 1.5
L - E1 (E12-4 - E10-17)	LG ↔ BR	IG ON and Shift lever L position	9 - 14
		IG ON and Shift lever other than L position	Below 1.5
2 - E1 (E12-5 - E10-17)	V ↔ BR	IG ON and Shift lever 2 position	9 - 14
		IG ON and Shift lever other than 2 position	Below 1.5
R - E1 (E12-6 - E10-17)	W-L ↔ BR	IG ON and Shift lever R position	9 - 14
		IG ON and Shift lever other than R position	Below 1.5
NSW - E1 (E12-3 - E10-17)	B ↔ BR	IG ON and Shift lever P or N position	Below 1.5
		IG ON and Shift lever other than P or N position	9 - 14
TFN *2 - E1 (E12-11 - E10-17)	B-R ↔ BR	IG ON and Transfer shift position H2 or H4 or L4	9 - 14
		IG ON and Transfer shift position N	Below 1.5
PWR - E1 (E12-1 - E10-17)	G-R ↔ BR	IG ON and Pattern select switch ”NORM”	Below 1.5
		IG ON and Pattern select switch ”PWR”	9 - 14
L4 *2 - E1 (E12-2 - E10-17)	L-R ↔ BR	IG ON and Transfer shift position L4	Below 1.5
		IG ON and Transfer shift position H2 or H4	9 - 14

OILW*2 - E1 (E12-21 - E10-17)	Y ↔ BR	ATF temperature: 149˚C (300˚F) or more	Below 1.5
ODMS - E1 (E12-14 - E10-17)	L-R ↔ BR	IG ON	9 - 14
		IG ON and Press continuously O/D main switch	Below 1.5

*1: 2WD

*2: 4WD

DI0SR-12

PROBLEM SYMPTOMS TABLE

HINT:

If a normal code is displayed during the diagnostic trouble code check but the trouble still occurs, check the circuits for each symptom in the order given in the charts on the following pages and proceed to the page given for troubleshooting.

The Matrix Chart is divided into 3 chapters.

- If the instruction ”Proceed to next circuit inspection shown on matrix chart” is given in the flow chart for each circuit, proceed to the circuit with the next highest number in the table to continue the check.
- If the trouble still occurs even though there are no abnormalities in any of the other circuits, then check and replace the ECM.

CHAPTER 1: ELECTRONIC CIRCUIT MATRIX CHART

Symptom	Suspect Area	See page
No up-shift (A particular gear from 1st to 3rd gear is not up-shifted)	1. ECM	IN-28
No up-shift (3rd → O/D)	3. O/D main switch & O/D OFF indicator light circuit 4. ECM	DI-218 IN-28
No down-shift (O/D → 3rd)	1. ECM	IN-28
No down-shift (A particular gear from 1st to 3rd gear is not down-shifted)	1. ECM	IN-28
No lock-up	1. ECM	IN-28
No lock-up off	1. ECM	IN-28
Shift point too high or too low	1. Pattern select switch circuit 2. ECM	DI-214 IN-28
Up-shift to O/D from 3rd while main switch is off	1. O/D main switch & O/D OFF indicator light circuit 2. ECM	DI-218 IN-28
Up-shift to O/D from 3rd while engine is cold	1. ECM	IN-28
Poor acceleration	1. ECM	IN-28
No pattern select	1. Pattern select switch 2. ECM	DI-214 IN-28
Large shift shock or engine stalls when starting off or stopping	1. ECM	IN-28

CHAPTER 2: ON-VEHICLE REPAIR
(★: A340E, A340F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM391U)
(★: A340F, A343F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM479U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. Transmission control rod 2. Manual valve 3. Parking lock pawl 4. Off-vehicle repair matrix chart	DI-159 ★ ★ DI-175
Vehicle does not move in R position	1. Off-vehicle repair matrix chart	DI-175
Vehicle does not move in particular position or positions (except R position)	1. Off-vehicle repair matrix chart	DI-175
No up-shift (1st → 2nd)	1. 1-2 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No up-shift (2nd → 3rd)	1. 2-3 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No up-shift (3rd → O/D)	1. 3-4 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No down-shift (O/D → 3rd)	1. 3-4 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No down-shift (3rd → 2nd)	1. 2-3 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No down-shift (2nd → 1st)	1. 1-2 shift valve 2. Off-vehicle repair matrix chart	★ DI-175
No lock-up or No lock-up off	1. Lock-up control valve 2. Lock-up relay valve 3. Off-vehicle repair matrix chart	★ ★ DI-175
Harsh engagement (N → D)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_1 accumulator 4. Orifice control valve 5. Off-vehicle repair matrix chart	★ ★ ★ ★ DI-175
Harsh engagement (Lock-up)	1. Lock-up control valve 2. Lock-up relay valve 3. Solenoid relay valve 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Harsh engagement (N → R)	1. Accumulator control valve 2. C_2 accumulator 3. Solenoid modulator valve 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Harsh engagement (N → L)	1. Low coast modulator valve	★
Harsh engagement (1st → 2nd → 3rd → O/D)	1. Accumulator control valve 2. Solenoid modulator valve	★ ★
Harsh engagement (2nd → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_2 accumulator 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Harsh engagement (3rd → O/D)	1. Accumulator control valve 2. Solenoid modulator valve 3. B_0 accumulator 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175

Symptom	Suspect Area	See page
Harsh engagement (O/D → 3rd)	1. Accumulator control valve 2. Solenoid modulator valve 3. C_0 accumulator 4. Off-vehicle repair matrix chart	★ ★ ★ DI-175
Slip or shudder (Forward and reverse)	1. Transmission control rod 2. Oil strainer 3. Pressure relief valve 4. Off-vehicle repair matrix chart	DI-159 ★ ★ DI-175
Slip or shudder (Particular position)	1. Transmission control rod 2. Off-vehicle repair matrix chart	DI-159 DI-175
No engine braking (1st: L position)	1. Low coast modulator valve 2. Off-vehicle repair matrix chart	★ DI-175
No engine braking (2nd: 2 position)	1. 2nd coast modulator valve 2. Off-vehicle repair matrix chart	★ DI-175
No kick-down	1. 1-2 shift valve 2. 2-3 shift valve	★ ★

CHAPTER 3: OFF-VEHICLE REPAIR
(★: A340E, A340F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM391U)
(★: A340F, A343F AUTOMATIC TRANSMISSION Repair Manual Pub. No. RM479U)

Symptom	Suspect Area	See page
Vehicle does not move in any forward position and reverse position	1. O/D one-way clutch (F_0) 2. O/D direct clutch (C_0) 3. O/D planetary gear unit 4. Torque converter clutch	★ ★ ★ ★
Vehicle does not move in R position	1. Front and rear planetary gear unit 2. Direct clutch (C_2) 3. 1st and reverse brake (B_3) 4. O/D direct clutch (C_0)	★ ★ ★ ★
No up-shift (1st → 2nd)	1. 2nd brake (B_2) 2. No. 1 one-way clutch (F_1)	★ ★
No up-shift (2nd → 3rd)	1. Direct clutch (C_2)	★
No up-shift (3rd → O/D)	1. O/D brake (B_0)	★
No lock-up or No lock-up off	1. Torque converter clutch	★
Harsh engagement (N → D)	1. Forward clutch (C_1) 2. O/D one-way clutch (F_0) 3. No. 2 one-way clutch (F_2)	★ ★ ★
Harsh engagement (N → R)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3) 3. O/D one-way clutch (F_0)	★ ★ ★
Harsh engagement (N → 2)	1. Forward clutch (C_1) 2. O/D one-way clutch (F_0) 3. No. 2 one-way clutch (F_2)	★ ★ ★
Harsh engagement (N → L)	1. Forward clutch (C_1) 2. 1st and reverse brake (B_3) 3. O/D one-way clutch (F_0) 4. No. 2 one-way clutch (F_2)	★ ★ ★ ★
Harsh engagement (Lock-up)	1. Torque converter clutch	★
Slip or shudder (Forward and reverse: After warm-up)	1. Torque converter clutch 2. O/D one-way clutch (F_0) 3. O/D direct clutch (C_0)	★ ★ ★
Slip or shudder (Particular position: Just after engine starts)	1. Torque converter clutch	★
Slip or shudder (R position)	1. Direct clutch (C_2) 2. 1st and reverse brake (B_3)	★ ★
Slip or shudder (1st)	1. Forward clutch (C_1) 2. No. 2 one-way clutch (F_2)	★ ★
Slip or shudder (2nd)	1. 2nd brake (B_2) 2. 2nd coast brake (B_1) 3. No. 1 one-way clutch (F_1)	★ ★ ★
Slip or shudder (3rd)	1. Direct clutch (C_2)	★
Slip or shudder (O/D)	1. O/D brake (B_0)	★
No engine braking (1st - 3rd: D position)	1. 2nd brake (B_2)	★
No engine braking (1st: L position)	1. 1st and reverse brake (B_3)	★
No engine braking (2nd: 2 position)	1. 2nd coast brake (B_1)	★
Poor acceleration (All position)	1. Torque converter clutch	★
Poor acceleration (O/D)	1. O/D direct clutch (C_0) 2. O/D planetary gear unit	★ ★
Engine stalls when starting off or stopping	1. Torque converter clutch	★

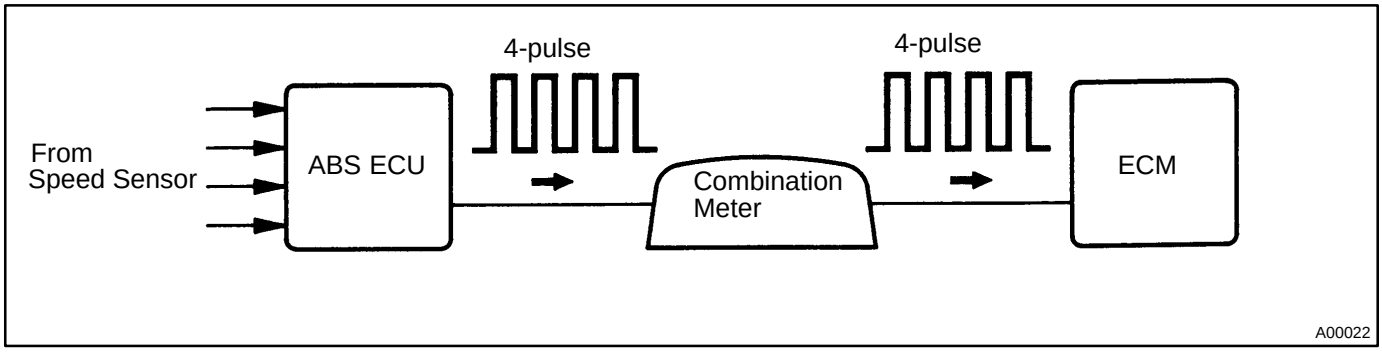
DI3BU-10

CIRCUIT INSPECTION

DTC	P0500	Vehicle Speed Sensor Malfunction

CIRCUIT DESCRIPTION

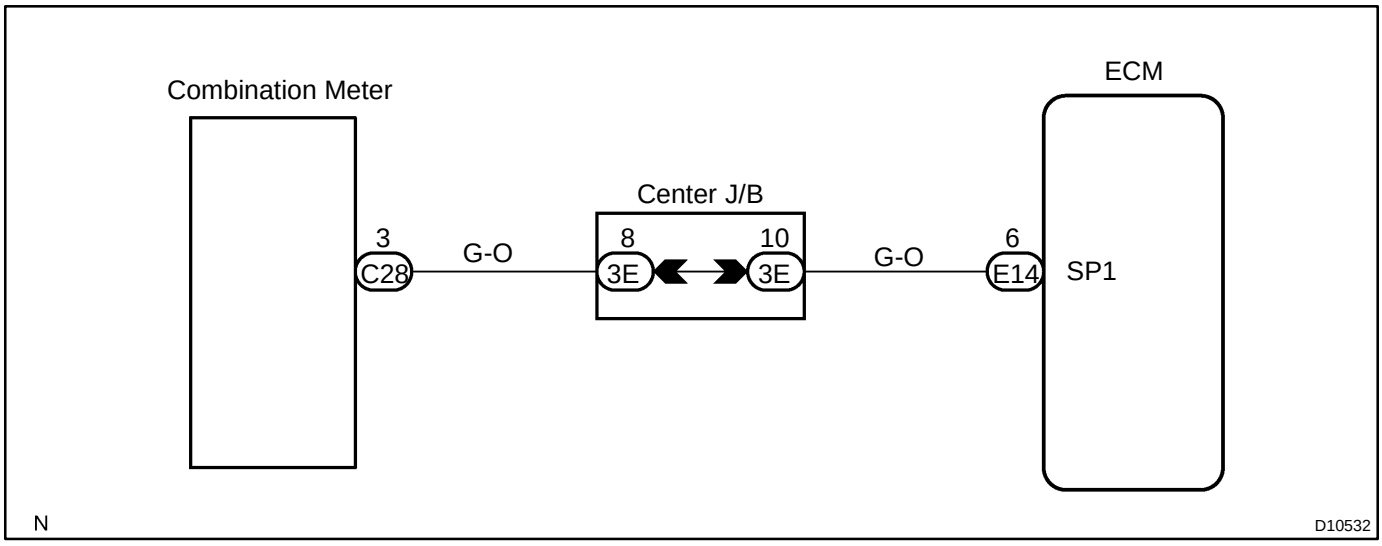
The speed sensor for ABS detects the wheel speed and sends the appropriate signals to the ABS ECU. The ECU converts these signals into a 4-pulse signal and outputs it to the combination meter. After this signal is converted into a more precise rectangular waveform by the waveform shaping circuit inside the combination meter, it is then transmitted to the ECM. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC No.	DTC Detecting Condition	Trouble Area
P0500	No vehicle speed sensor signal to ECM under conditions 1. and 2. (2-trip detection logic). 1. Park/neutral position switch is OFF. 2. Vehicle is being driven.	• Open or short in No. 1 vehicle speed sensor circuit • No. 1 vehicle speed sensor • Combination meter • ECM • Automatic transmission (clutch, brake or gear etc.)
	Clutch or brake slips or gear is broken	

HINT:
Check the No. 1 vehicle speed sensor when DTC P0500 (Vehicle Speed Sensor Malfunction) is output.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of speedometer.**

CHECK:

Drive the vehicle and check if the operation of the speedometer in the combination meter is normal.

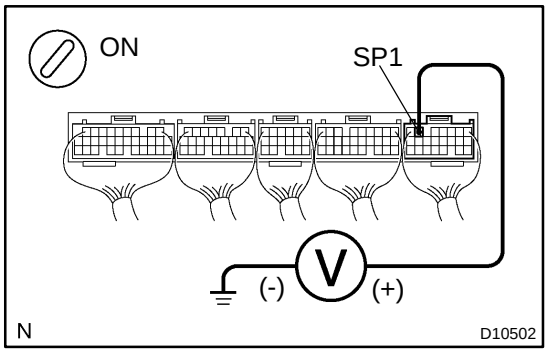
HINT:

The vehicle speed sensor is operating normally if the speedometer display is normal.

NG → **Check speedometer circuit (See page BE-40).**

OK

2	**Check voltage between terminal SP1 of ECM connector and body ground.**



PREPARATION:

(a) Shift the shift lever to neutral.

(b) Jack up a rear wheels on one side.

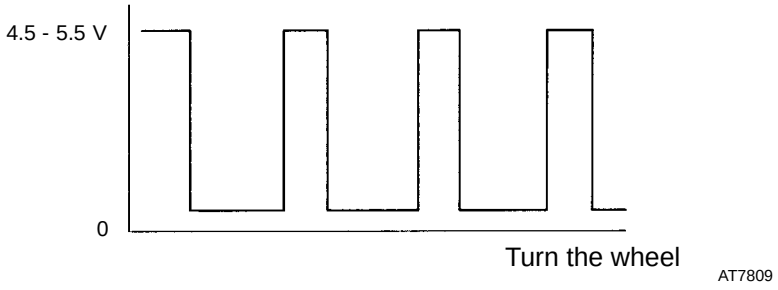
(c) Turn the ignition switch ON.

CHECK:

Measure voltage between terminal SP1 of ECM connector and body ground when the wheel is turned slowly.

OK:

Voltage is generated intermittently.



NG → **Check and repair harness and connector between combination meter and ECM (See page IN-28).**

OK

3	Check ECM (See page IN-28).

NG → Replace the ECM.

OK →

Check and repair the transmission (clutch, brake or gear etc.).

DI0ST-18

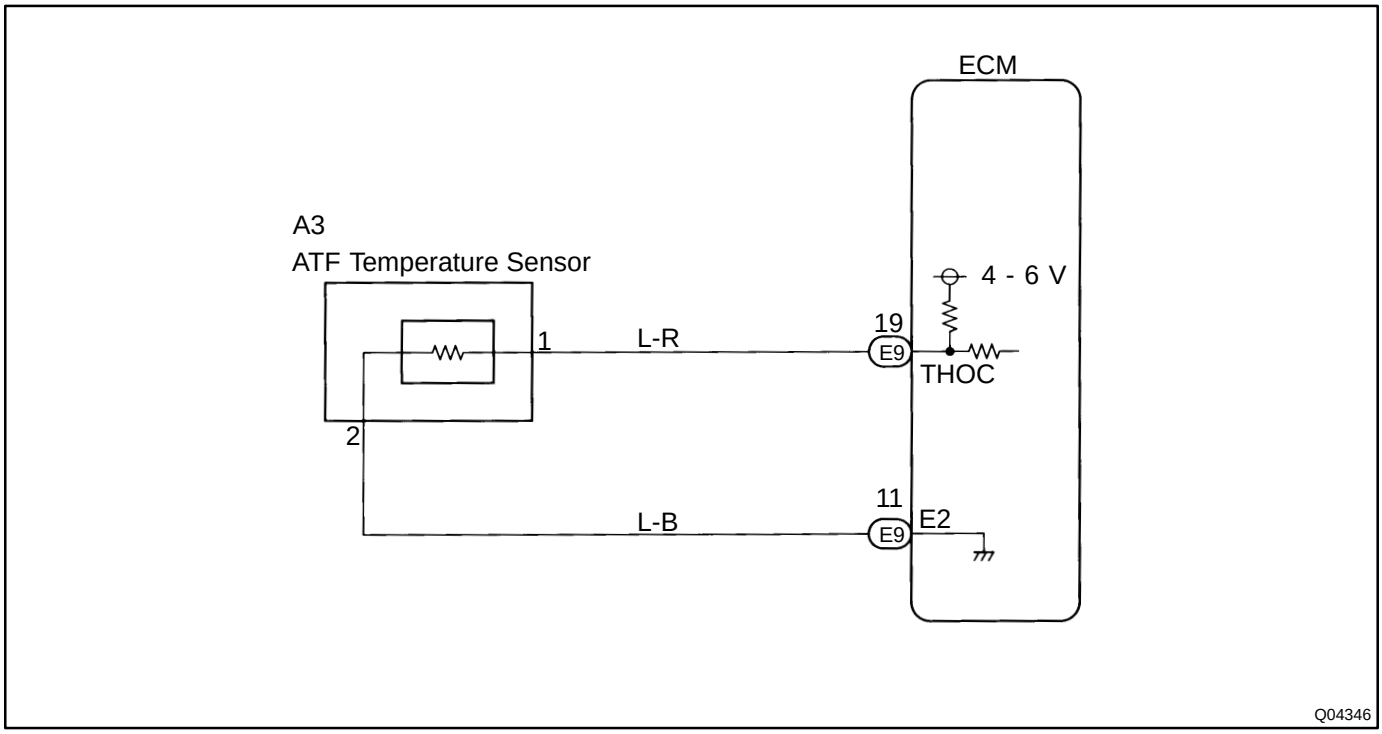
DTC	P0710	Transmission Fluid Temperature Sensor Malfunction

CIRCUIT DESCRIPTION

The ATF temperature sensor converts fluid temperature into a resistance value which is input into the ECM.

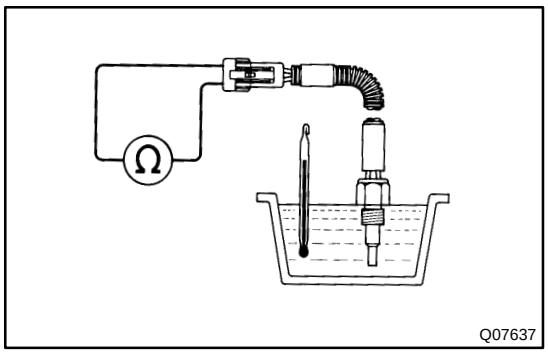
DTC No.	DTC Detecting Condition	Trouble Area
P0710	Either 1. or 2. is detected for 0.5 sec. or more (2 trip detection logic). 1. Temp. sensor resistance is less than 79 Ω 2. After the engine has been operating for 15 minutes or more, the resistance at the temp. sensor is more than 156 kΩ	• Open or short in ATF temp. sensor • ATF temp. sensor • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check ATF temperature sensor.**



PREPARATION:
Remove the ATF temperature sensor.
CHECK:
Measure resistance between terminals of ATF temperature sensor at 20 ˚C (68 ˚F) and 110 ˚C (230 ˚F).
OK:

Resistance (Approx.):
20 ˚C (68 ˚F): 4.29 kΩ
110 ˚C (230 ˚F): 690 Ω

NG → **Replace the ATF temperature sensor.**

OK

2	**Check harness and connector between ATF temperature sensor and ECM (See page IN-28).**

NG → **Repair or replace the harness or connector.**

OK

Check and replace the ECM.

DI0SU-14

DTC	P0750	Shift Solenoid ”A” Malfunction

DTC	P0755	Shift Solenoid ”B” Malfunction

SYSTEM DESCRIPTION

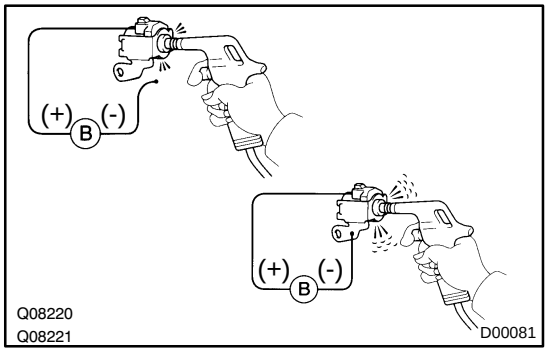
The ECM uses signals from the vehicle speed sensor to detect the actual gear position (1st, 2nd, 3rd or O/D gear).
Then the ECM compares the actual gear with the shift schedule in the ECM memory to detect mechanical trouble of the shift solenoid valves and valve body.

DTC No.	DTC Detecting Condition	Trouble Area
P0750 P0755	During normal driving, the gear required by the ECM does not match the actual gear (2 trip detection logic).	• Shift solenoid valve No. 1/No. 2 is stuck open or closed • Valve body is blocked up or stuck

HINT:
Check the shift solenoid valve No. 1 when DTC P0750 (Shift Solenoid ”A” Malfunction) is output and check shift solenoid valve No. 2 when DTC P0755 (Shift Solenoid ”B” Malfunction) is output.

INSPECTION PROCEDURE

1	Check shift solenoid valve No. 1 or No. 2 operation.



PREPARATION:
(a) Remove the oil pan.
(b) Remove the shift solenoid valve No. 1 or No. 2.

CHECK:
(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.
(b) When battery positive voltage is supplied to the shift solenoid valve, check that the solenoid valve opens.

OK:

(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

NG → **Replace the shift solenoid valve No. 1 or No. 2.**

OK

2	Check the valve body (See page DI-175).

NG → Repair or replace the valve body.

OK →

Repair or replace the transmission (See page AT-18 and AT-22).

DI0SV-22

DTC	P0753	Shift Solenoid ”A” Electrical

DTC	P0758	Shift Solenoid ”B” Electrical

CIRCUIT DESCRIPTION

Shifting from 1st to O/D is performed in combination with status (ON and OFF) of the shift solenoid valves No. 1 and No. 2 controlled by ECM. If an open or short circuit occurs in either of the shift solenoid valves, the ECM controls the remaining normal shift solenoid valve to allow the vehicle to be operated smoothly (Fail safe function).

Position	NORMAL			SHIFT SOLENOID No. 1 MALFUNCTIONING			SHIFT SOLENOID No. 2 MALFUNCTIONING			BOTH SOLENOIDS MALFUNCTIONING
	Solenoid valve		Gear	Solenoid valve		Gear	Solenoid valve		Gear	Gear when shift selector is manually operated
	No. 1	No. 2		No. 1	No. 2		No. 1	No. 2		
D	ON	OFF	1st	X	ON	3rd	ON	X	1st	O/D
	ON	ON	2nd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	ON	3rd	X	ON	3rd	OFF	X	O/D	O/D
	OFF	OFF	O/D	X	OFF	O/D	OFF	X	O/D	O/D
2	ON	OFF	1st	X	ON	3rd	ON	X	1st	3rd
	ON	ON	2nd	X	ON	3rd	OFF	X	3rd	3rd
	OFF	ON	3rd	X	ON	3rd	OFF	X	3rd	3rd
L	ON	OFF	1st	X	OFF	1st	ON	X	1st	1st
	ON	ON	2nd	X	ON	2nd	ON	X	1st	1st

X: Malfunctions

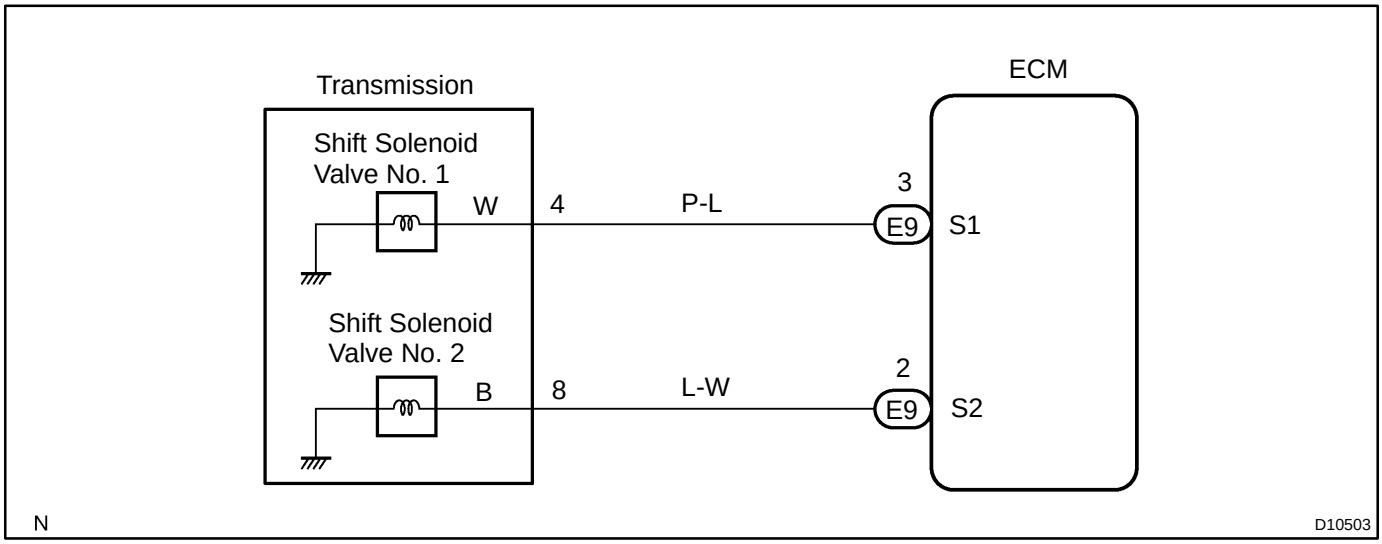
HINT:

Check the shift solenoid valve No. 1 when DTC P0753 (Shift Solenoid ”A” Electrical) is output and check the shift solenoid valve No. 2 when DTC P0758 (Shift Solenoid ”B” Electrial) is output.

DTC No.	DTC Detecting Condition	Trouble Area
P0753 P0758	The ECM checks for an open or short circuit in the shift solenoid valve No. 1 or No. 2 circuit when it changes. The ECM records DTC P0753 or P0758 if condition 1. or 2. is detected once, but it does not light up MIL. After ECM detects condition 1. or 2. continuously 8 times or more in one-trip, it causes the MIL light up until condition 1. or 2. disappears. After that, if the ECM detects condition 1. or 2. once, it starts lighting up MIL again. 1. Solenoid resistance is 8 Ω or less (short circuit) when the solenoid is energized. 2. Solenoid resistance is 100 kΩ or more (open circuit) when the solenoid is not energized.	• Open or short in shift solenoid valve No. 1/No. 2 circuit • Shift solenoid valve No. 1/No. 2 • ECM

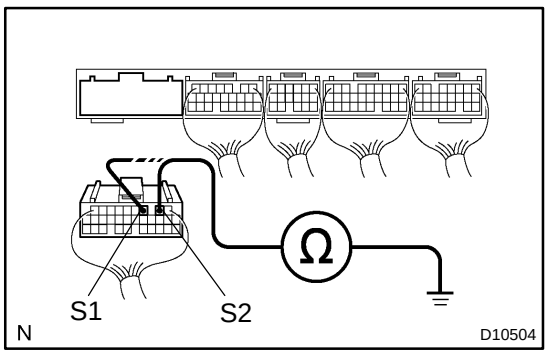
Fail safe function:
If either of the shift solenoid valve circuits develops an open or short, the ECM turns the other shift solenoid ON and OFF to shift to the gear positions shown in the table above. The ECM also turns the shift solenoid valve SL OFF at the same time. If both solenoids are malfunctioning, hydraulic control cannot be performed electronically and must be done manually.
Manual shifting as shown in the table above must be done (In the case of a short circuit, the ECM stops sending current to the short circuited solenoid).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal S1 or S2 of ECM and body ground.**

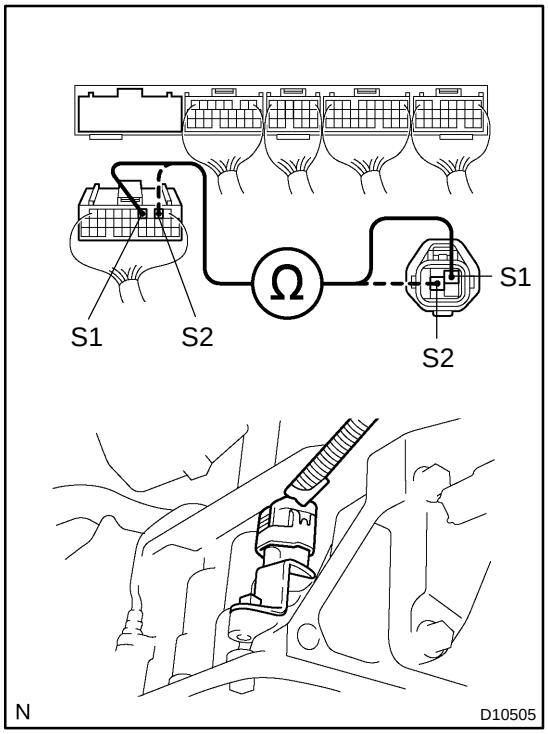


PREPARATION:
Disconnect the connector from ECM.
CHECK:
Measure resistance between terminal S1 or S2 of ECM and body ground.
OK:
Resistance: 11 - 15 Ω at 20˚C (68˚F)

OK	**Check and replace the ECM (See page IN-28).**

NG

2	Check harness and connector between ECM and automatic transmission solenoid connector.



PREPARATION:

Disconnect the solenoid connector from the automatic transmission.

CHECK:

Check the harness and connector between terminal S1 or S2 of ECM and terminal S1 or S2 of solenoid connector.

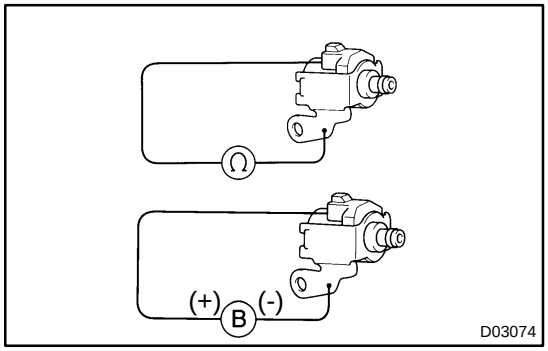
OK:

There is no open and no short circuit.

NG → **Repair or replace the harness or connector.**

OK

3	Check shift solenoid valve No. 1 or No. 2.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the shift solenoid valve No. 1 or No. 2.

CHECK:

(a) Measure resistance between solenoid connector and body ground.

(b) Connect positive (+) lead to terminal of solenoid connector, negative (-) lead to solenoid body.

OK:

(a) Resistance: 11 - 15 Ω at 20˚C (68˚F)

(b) The solenoid makes an operation noise.

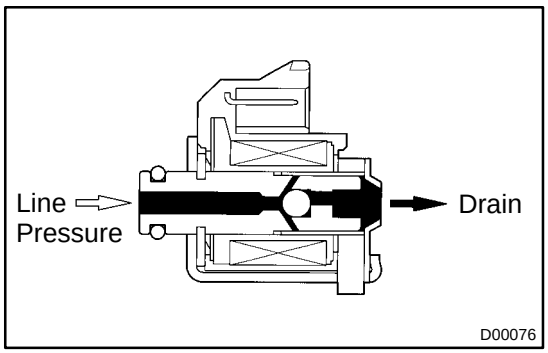
NG → **Replace the solenoid valve.**

OK

Repair or replace the solenoid wire.

DI0SW-15

DTC	P0770	Shift Solenoid ”E” Malfunction



SYSTEM DESCRIPTION

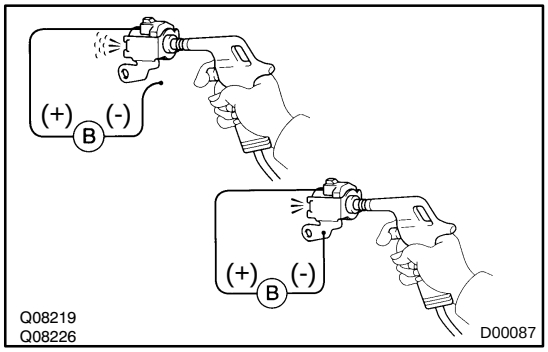
The ECM uses the signals from the throttle position sensor, air-flow meter and crankshaft position sensor to monitor the engagement condition of the lock-up clutch.
Then the ECM compares the engagement condition of the lock-up clutch with the lock-up schedule in the ECM memory to detect mechanical trouble of the shift solenoid valve SL, valve body and torque converter clutch.

DTC No.	DTC Detecting Condition	Trouble Area
P0770	Lock-up does not occur when driving in the lock-up range (normal driving at 80 km/h [50 mph]), or lock-up remains ON in the lock-up OFF range (2 trip detection logic).	• Shift solenoid valve SL is stuck open or closed • Valve body blocked up or stuck • Lock-up clutch

HINT:
Check the shift solenoid valve SL when DTC P0770 (Shift Solenoid ”E” Malfunction) is output.

INSPECTION PROCEDURE

1	Check solenoid valve SL operation.



PREPARATION:
(a) Remove the oil pan.
(b) Remove the shift solenoid valve SL.

CHECK:
(a) Applying 490 kPa (5 kgf/cm^2, 71 psi) of compressed air, check that the solenoid valve does not leak air.
(b) When battery voltage is supplied to the shift solenoid valve, check that the solenoid valve opens.

OK:

(a) Solenoid valve does not leak air.
(b) Solenoid valve opens.

NG	Replace the solenoid valve SL.

OK

2	Check valve body (See page DI-175).

NG → Repair or replace the valve body.

OK →

Replace the torque converter clutch (See page AT-18 and AT-22).

DI0SX-20

DTC	P0773	Shift Solenoid ”E” Electrical

CIRCUIT DESCRIPTION

The shift solenoid valve SL is turned ON and OFF by signals from the ECM to control the hydraulic pressure acting on the lock-up relay valve, which then controls operation of the lock-up clutch.

DTC No.	DTC Detecting Condition	Trouble Area
P0773	Either 1. or 2. is detected for 1 time (2 - trip detection logic). 1. Solenoid resistance is 8 Ω or less (short circuit) when the solenoid is energized. 2. Solenoid resistance is 100 kΩ or more (open circuit) when the solenoid is not energized.	• Open or short in shift solenoid valve SL circuit • Shift solenoid valve SL • ECM

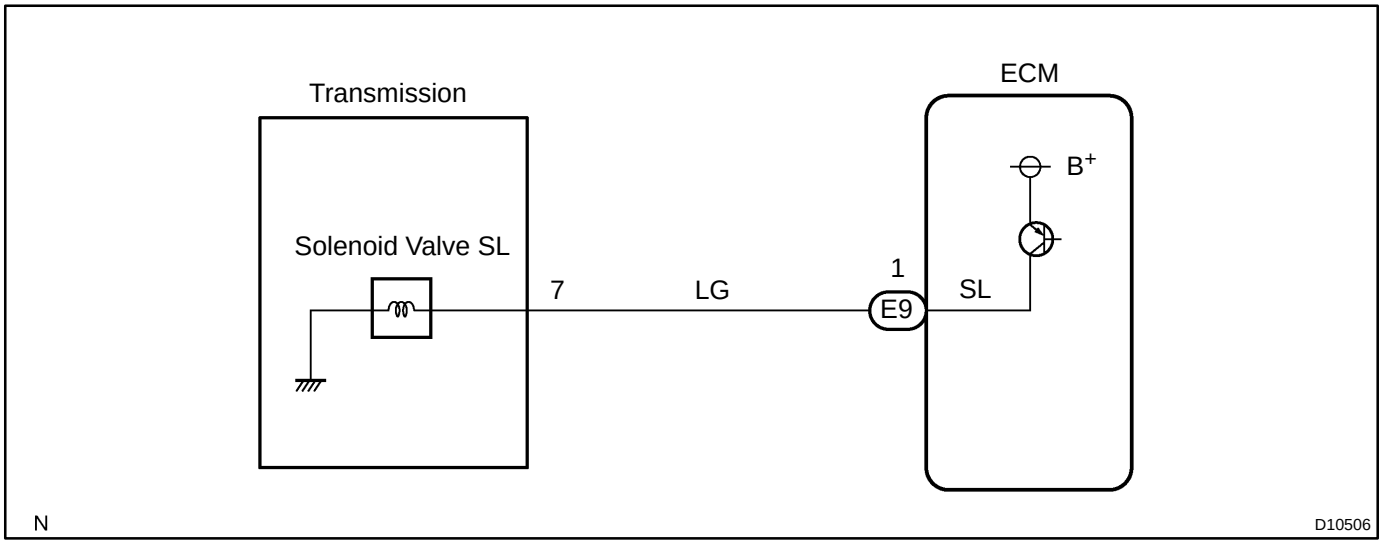
Fail safe function

If the ECM detects a malfunction, it turns the shift solenoid valve SL OFF.

HINT:

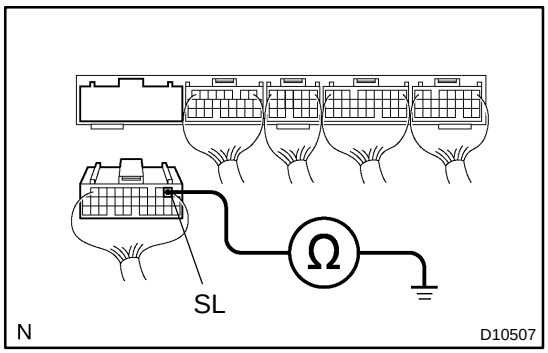
Check the shift solenoid valve SL when DTC P0773 (Shift Solenoid ”E” Electrical) is output.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Measure resistance between terminal SL of ECM and body ground.**

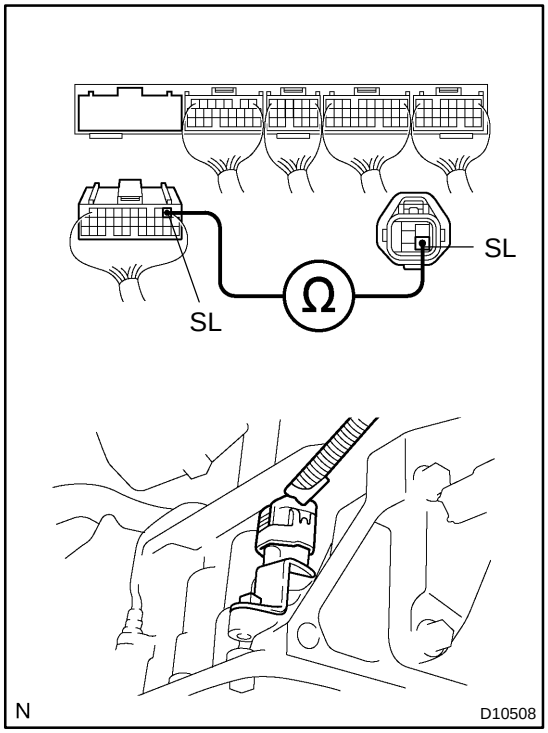


PREPARATION:
Disconnect the connector from the ECM.
CHECK:
Measure resistance between terminal SL of ECM and body ground.
OK:
Resistance: 11 - 15 Ω at 20˚C (68˚F)

OK → **Check and replace the ECM (See page IN-28).**

NG

2	**Check harness and connector between ECM and automatic transmission solenoid connector.**

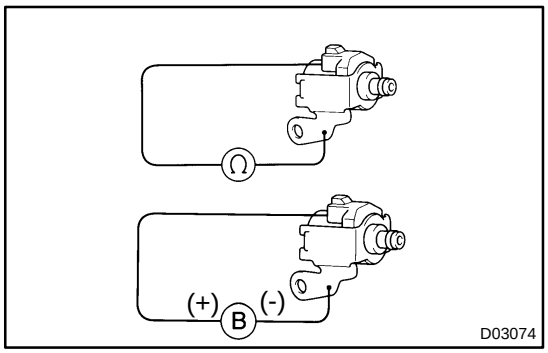


PREPARATION:
Disconnect the solenoid connector from the transmission.
CHECK:
Check the harness between terminal SL of ECM and terminal SL of transmission solenoid connector.
OK:
There is no open or short circuit.

NG → **Repair or replace the harness or connector.**

OK

3	Check shift solenoid valve SL.



PREPARATION:

(a) Remove the oil pan.

(b) Remove the shift solenoid valve SL.

CHECK:

(a) Measure resistance between terminal SL of shift solenoid valve and solenoid body.

(b) Connect positive (+) lead to terminal of solenoid connector, negative (-) lead to solenoid body.

OK:

(a) Resistance: 11 - 15 Ω at 20˚C (68˚F)

(b) The shift solenoid valve SL makes operation noise.

NG → **Replace the shift solenoid valve SL.**

OK

Repair or replace the solenoid wire.

DI0SY-07

DTC	P1520	Stop Light Switch Circuit Malfunction

CIRCUIT DESCRIPTION

The purpose of this circuit is to prevent the engine from stalling, while driving in lock-up condition, when brakes are suddenly applied.
When the brake pedal is operated, this switch sends a signals to ECM. Then the ECM cancels operation of the lock-up clutch while braking is in progress.

DTC No.	DTC Detecting Condition	Trouble Area
P1520	The stop light switch does not turn off even once the vehicle is driven (2 trip detection logic).	• Short in stop light switch signal circuit • Stop light switch • ECM

WIRING DIAGRAM

See page DI-144 .

INSPECTION PROCEDURE

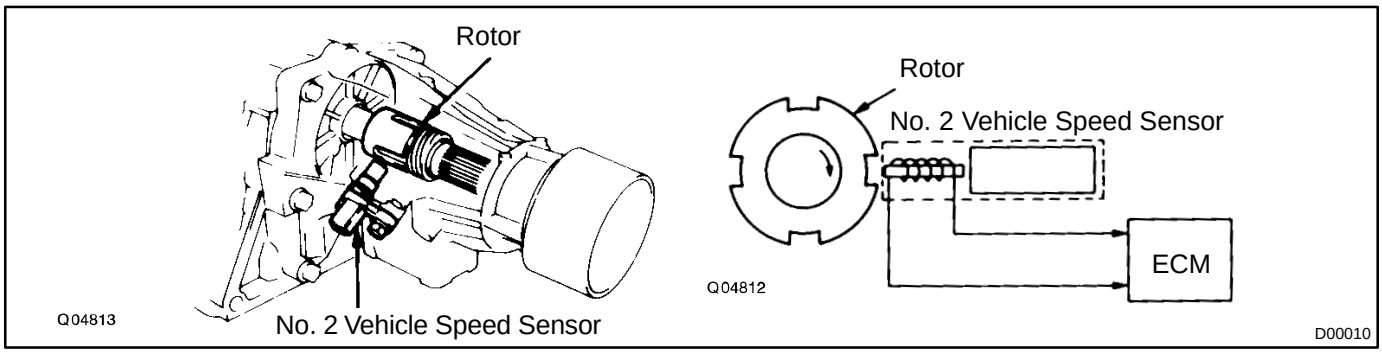
See page DI-144 .

DI0SZ-27

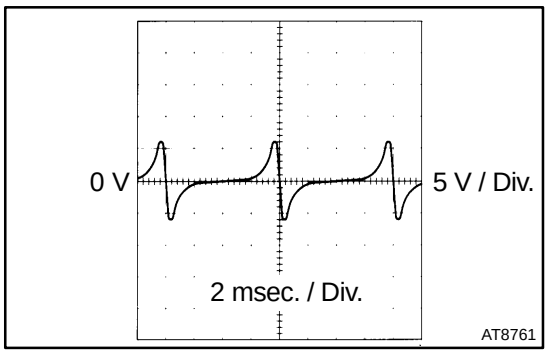
DTC	P1700	Speed Sensor No. 2 Malfunction

CIRCUIT DESCRIPTION

The No. 2 vehicle speed sensor detects the rotation speed of the transmission output shaft and sends signals to the ECM. The ECM determines the vehicle speed based on these signals.
An AC voltage is generated in the No. 2 vehicle speed sensor coil as the rotor mounted on the output shaft rotates, and this voltage is sent to the ECM.
The gear shift point and lock-up timing are controlled by the ECM based on the signals from this vehicle speed sensor and the throttle position sensor signal.
If the No. 2 vehicle speed sensor malfunctions, the ECM uses input signals from the No. 1 vehicle speed sensor as a back-up signal.

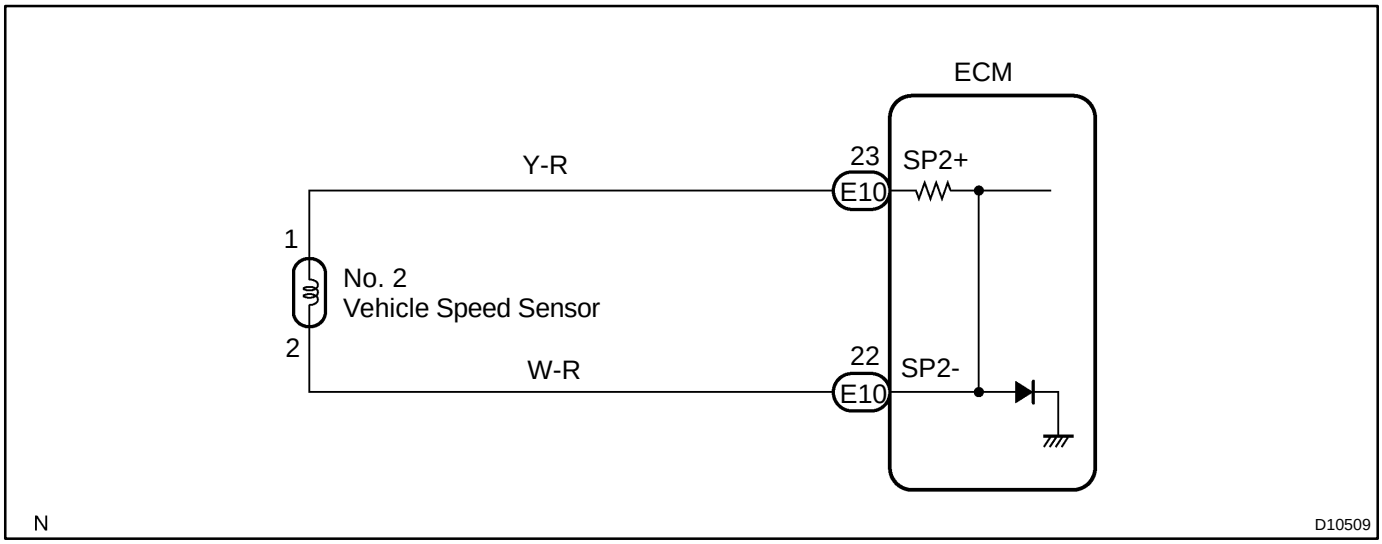


DTC No.	DTC Detecting Condition	Trouble Area
P1700	All conditions below are detected 500 times or more continuously (2 - trip detection logic). 1. No signal from No. 2 vehicle speed sensor is input to ECM while 4 pulses of No. 1 vehicle speed sensor signal are sent. 2. Vehicle speed: 9 km/h (5.6 mph) or more for at least 4 seconds. 3. Park/neutral position switch: OFF (Other than P or N) 4. Transfer position: Other than N position (A340F only)	• Open or short in No. 2 vehicle speed sensor circuit • No. 2 vehicle speed sensor • ECM



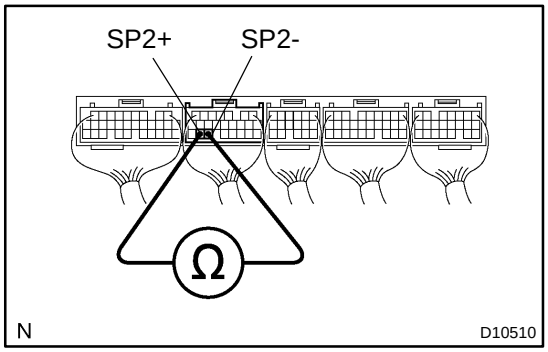
HINT:
Wave from between terminals $SP2^+$ and $SP2^-$ when vehicle speed is approx. 60 km/h (37 mph).

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check vehicle speed value or resistance between terminals $SP2^+$ and $SP2^-$ of ECM.**



When using OBD II scan tool or hand-held tester:

PREPARATION:

(a) Remove the DLC3 cover.

(b) Connect an OBD II scan tool or hand-held tester to the DLC3.

(c) Start the engine and turn OBD II scan tool or hand-held tester main switch ON.

CHECK:

Drive the vehicle and read vehicle speed value.

OK:

Vehicle speed matches tester speed value.

When not using OBD II scan tool or hand-held tester:

PREPARATION:

Disconnect the connector from the ECM.

CHECK:

Check resistance between terminals $SP2^+$ and $SP2^-$ of ECM.

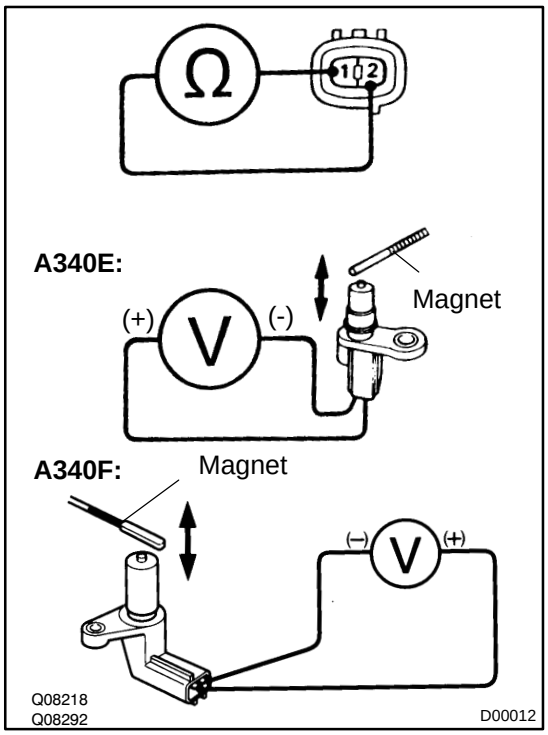
OK:

Resistance: 560 - 680 Ω at 20˚C (68˚F)

OK → **Check and replace the ECM (See page IN-28).**

NG

2	Check No. 2 vehicle speed sensor.



PREPARATION:

Remove the No. 2 vehicle speed sensor from the transmission.

CHECK:

(a) Measure resistance between terminals 1 and 2 of vehicle speed sensor.

(b) Check voltage between terminals 1 and 2 of vehicle speed sensor when a magnet is put close to the front end of the vehicle speed sensor then taken away quickly.

OK:

(a) Resistance: 560 - 680 Ω at 20˚C (68˚F)

(b) Voltage is generated intermittently.

HINT:

The voltage generated is extremely low.

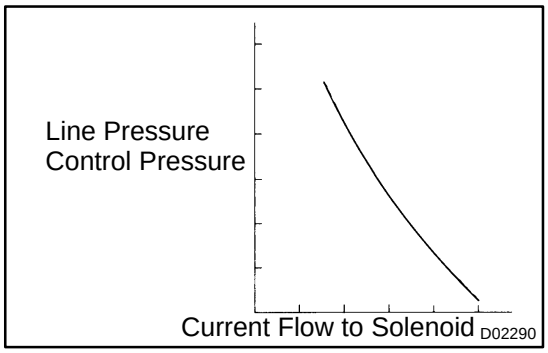
NG → **Replace the No. 2 vehicle speed sensor.**

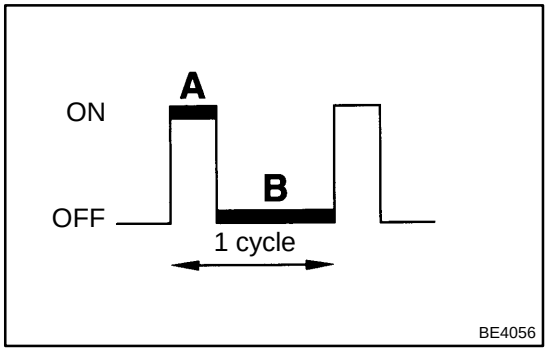
OK

Check and repair the harness and connector between ECM and No. 2 vehicle speed sensor (See page IN-28).

DI1O9-27

DTC	P1760	Linear Solenoid for Line Pressure Control Circuit Malfunction



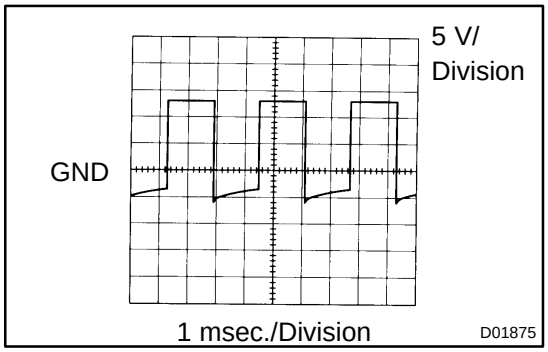


CIRCUIT DESCRIPTION

The throttle pressure that is applied to the primary regulator valve (which modulates line pressure) causes the solenoid valve SLT, under electronic control, to precisely and minutely modulate and generate line pressure according to the accelerator pedal effort, or the detected engine power output.
This reduces the function of line pressure and provides smooth shifting characteristics.
Upon receiving the throttle valve opening angle signal, ECM controls the line pressure by sending a predetermined (*) duty ratio to the solenoid valve, modulating the line pressure, and generating throttle pressure.
(*) Duty Ratio
The duty ratio is the ratio of the period of continuity in one cycle. For example, if A is the period of continuity in one cycle, and B is the period of non-continuity, then

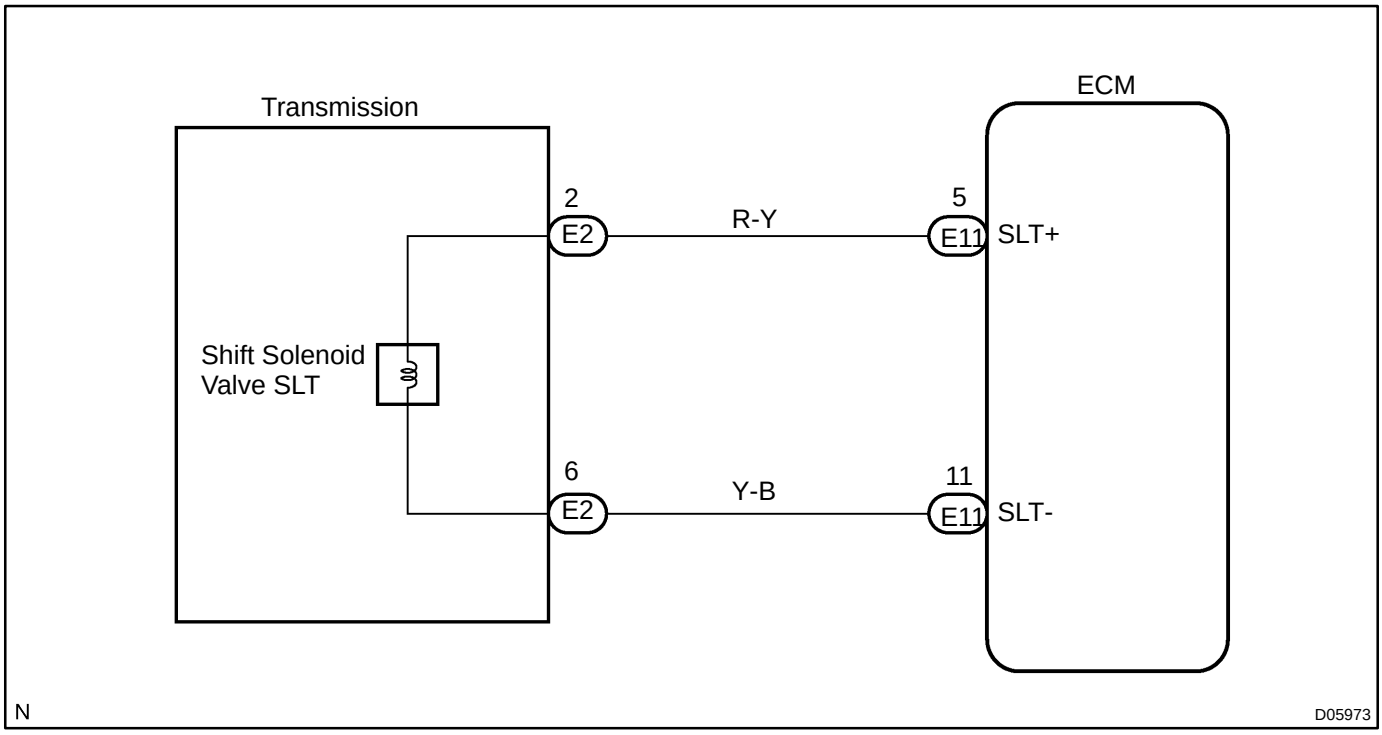
$$\text{Duty Ratio} = \frac{A}{A + B} \times 100\ (\%)$$

DTC No.	DTC Detecting Condition	Trouble Area
P1760	1. or 2. condition below is detected for 1 second or more. 1. SLT^- terminal: 0 V 2. SLT^- terminal: 12 V	• Open or short in shift solenoid valve SLT circuit • Shift solenoid valve SLT • ECM



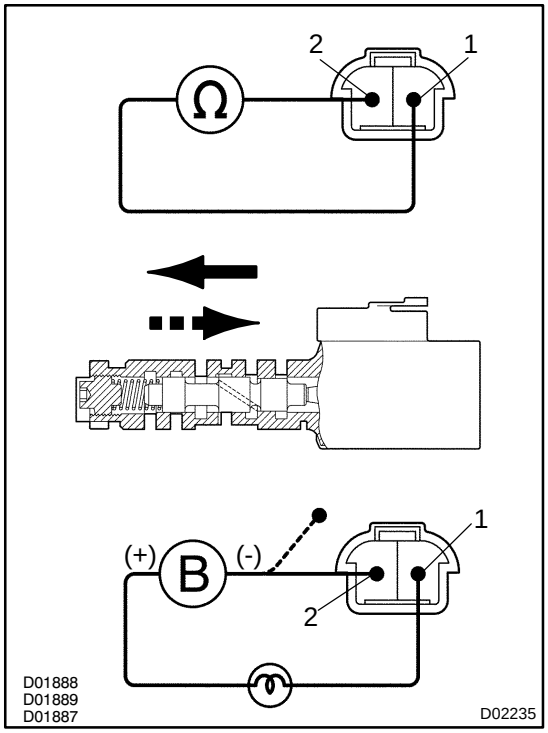
HINT:
Waveform between terminals SLT^+ and SLT^- during engine idling is shown at left.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check shift solenoid valve SLT.**



PREPARATION:

(a) Remove the oil pan.

(b) Disconnect the solenoid connector.

Check solenoid resistance:

CHECK:

Measure resistance between terminals 1 and 2 of solenoid connector.

OK:

Resistance: 5.0 - 5.6 Ω at 20 ˚C (68 ˚F)

Check solenoid operation:

CHECK:

Connect positive (+) lead with an 8 - 10W bulb to terminal 1 of solenoid connector and negative (-) lead to terminal 2, then check the movement of the valve.

OK:

When battery positive voltage is applied.	Valve moves in ◄ direction in illustration at left.
When battery positive voltage is cut off.	Valve moves in ■■► direction in illustration at left.

NG → **Replace shift solenoid valve SLT.**

OK ↓

2	**Check harness and connector between shift solenoid valve SLT and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace ECM (See page IN-28).

DI6AH-03

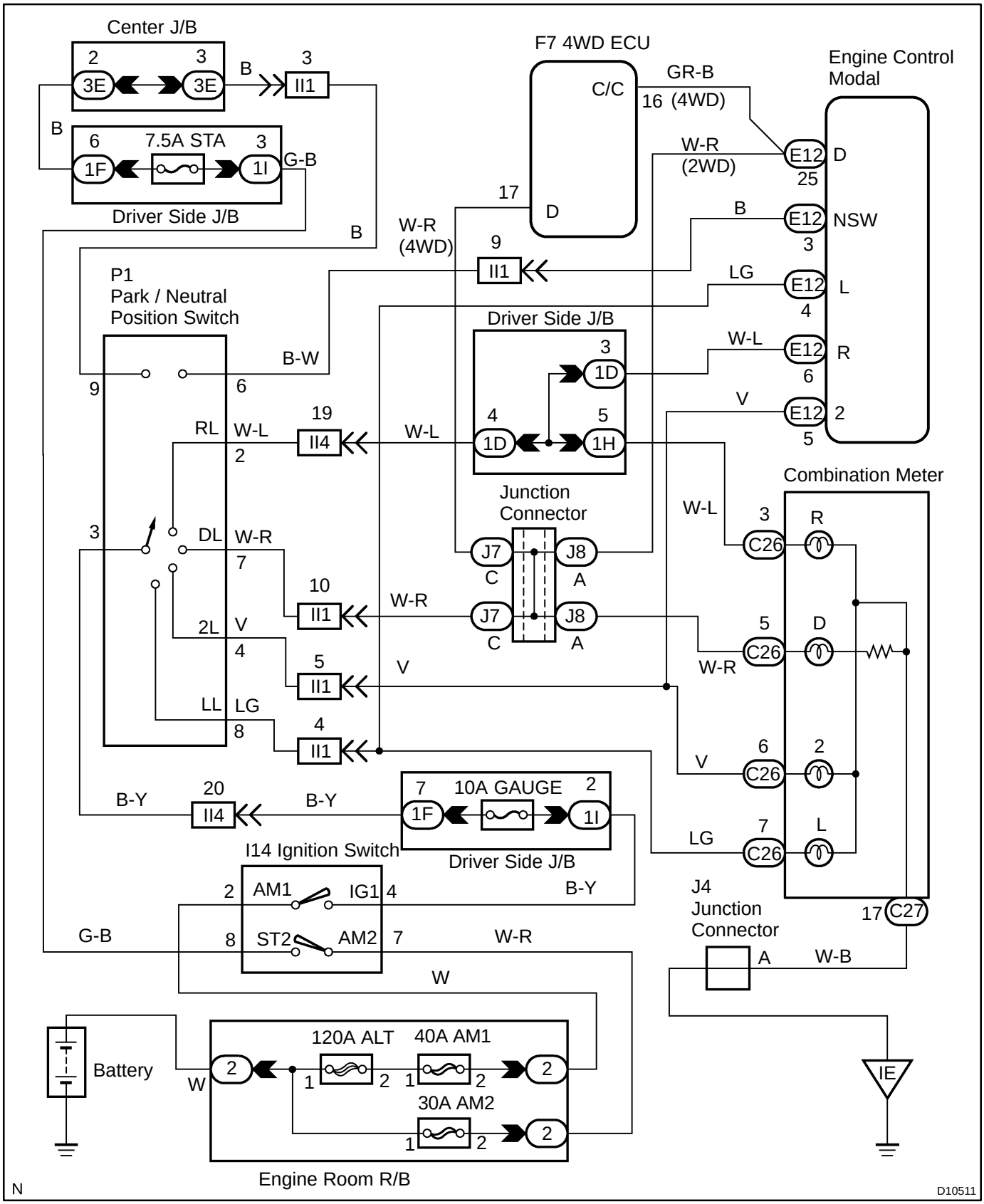
DTC	P1780	Park/Neutral Position Switch Malfunction

CIRCUIT DESCRIPTION

The park/neutral position switch detects the shift lever position and sends signals to the ECM.
The ECM receives signals (NSW, R, 2 and L) from the park/neutral position switch. When the signal is not sent to the ECM from the park/neutral position switch, the ECM judges that the shift lever is in D position.

DTC No.	DTC Detection Condition	Trouble Area
P1780	2 or more switches are ON simultaneously for R, N, 2 and L positions (2 - trip detection logic).	• Short in park/neutral position switch circuit • Park/neutral position switch • ECM
	When driving under conditions 1. and 2. for 30 seconds or more, the park/neutral position switch is ON (N position) (2 trip detection logic). 1. Vehicle speed: 70 km/h (44 mph) or more 2. Engine speed: 1,500 - 2,500 rpm	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Read PNP, REVERSE, 2ND and LOW signals.**

When using hand-held tester:

PREPARATION:

(a) Remove the DLC3 cover.

(b) Connect a hand-held tester to the DLC3.

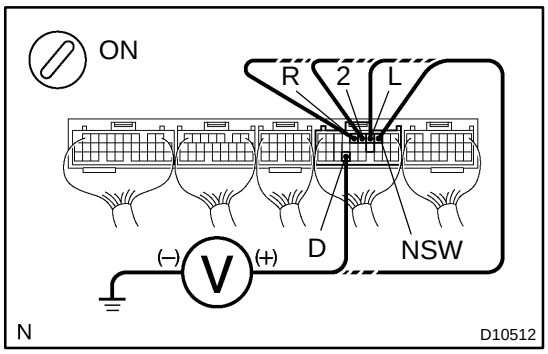
(c) Turn the ignition switch ON and hand-held tester main switch ON.

CHECK:

Shift lever into the P, R, D, N, 2 and L positions, and read the PNP, REVERSE, 4TH/DRIVE 2ND and LOW signals on the TOYOTA hand-held tester.

OK:

Shift position	Signal
2	2ND OFF → ON
L	LOW OFF → ON
D	4TH / DRIVE OFF → ON
R	REVERSE OFF → ON
P, N	PNP OFF → ON



When not using hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminals NSW, 2, L and R of ECM and body ground when the shift lever is shifted to the following positions.

OK:

Position	NSW-Body ground	R-Body ground	D-Body ground	2-Body ground	L-Body ground
P, N	0 V	0 V	0 V	0 V	0 V
R	9 - 14 V*	7.5 - 14 V*	0 V	0 V	0 V
D	9 - 14 V	0 V	7.5 - 14 V	0 V	0 V
2	9 - 14 V	0 V	0 V	7.5 - 14 V	0 V
L	9 - 14 V	0 V	0 V	0 V	7.5 - 14 V

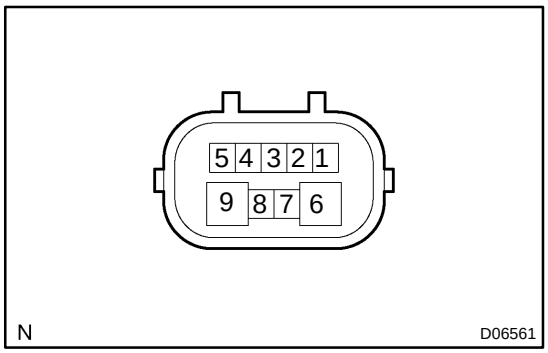
HINT:

*: The voltage will drop slightly due to lighting up of the back up light.

OK → **Check and replace the ECM (See page IN-28).**

NG

2	Check park/neutral position switch.



PREPARATION:

(a) Jack up the vehicle.

(b) Disconnect the park/neutral position switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each position.

OK:

Shift Position	Terminal No. to continuity	Terminal No. to continuity
P	6 - 9	1 - 3
R	2 - 3	-
N	6 - 9	3 - 5
D	3 - 7	-
2	3 - 4	-
L	3 - 8	-

NG → **Replace the park/neutral position switch.**

OK →

Repair or replace harness and connector between battery and park/neutral position switch, park/neutral position switch and ECM (See page IN-28).

DI9OB-01

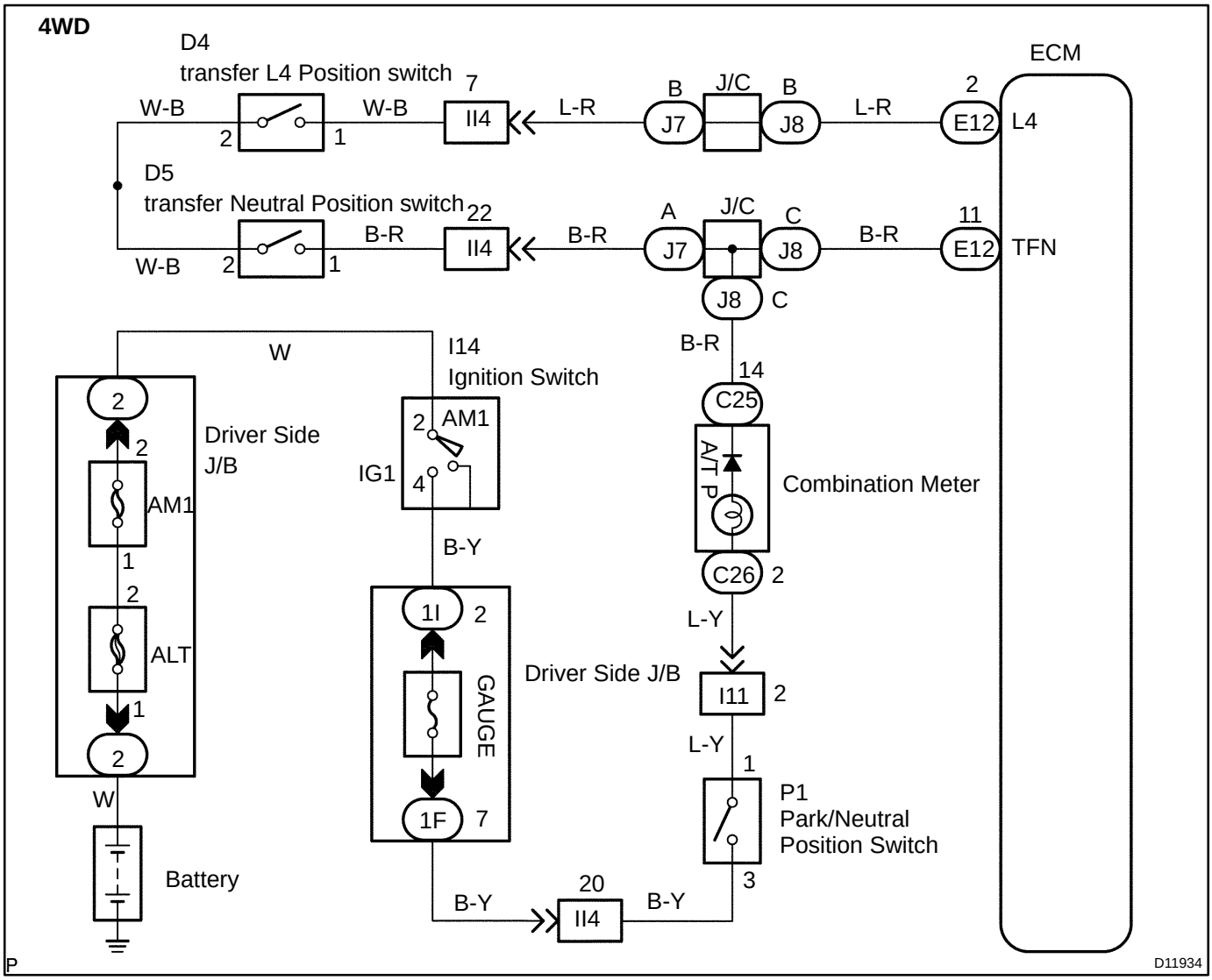
DTC	P1782	Transfer L4 SW Circuit Malfunction

CIRCUIT DESCRIPTION

The ECM receive signal L4 from the indicator switch (LOW switch).

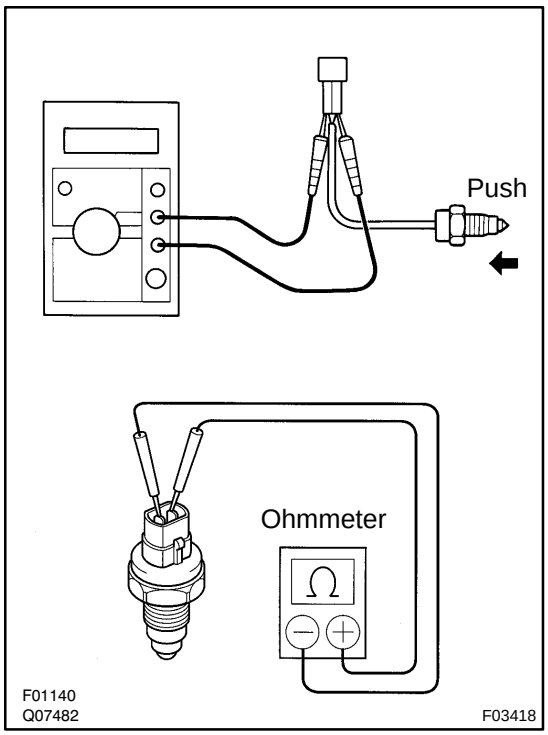
DTC No.	DTC Detecting Condition	Trouble Area
P1782	When driving under conditions (a) and (b) for 1.8 seconds or more, the indicator switch (LOW switch) is ON . (1-trip detection logic) (a) Output shaft speed 3000 rpm or less (b) Transfer shift position is H	• Short in transfer L4 position switch (LOW switch) signal circuit • transfer L4 position switch (LOW switch) • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check transfer L4 position switch (See page TR-1 1).**



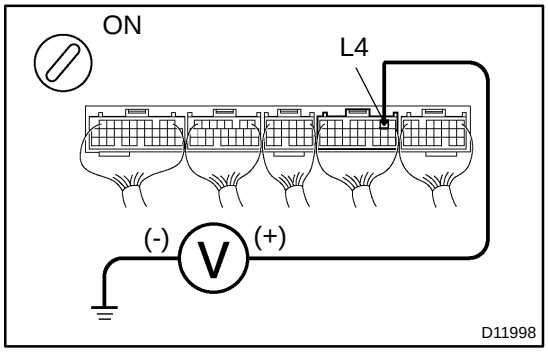
PREPARATION:
Remove the transfer L4 position switch (See page TR-9).
CHECK:
Check that there is continuity between terminals, as shown.
OK:

Switch position	Specified condition
Push	Continuity
Free	No continuity

NG → **Replace transfer L4 position switch.**

OK

2	**Check voltage between terminal L4 of ECM and body ground.**



PREPARATION:
Remove the ECM with connectors still connected.
CHECK:
(a) Turn the ignition switch ON.
(b) Measure voltage between terminal L4 of ECM and body ground when transfer in L4 position.
OK:

Transfer shift position	Voltage (V)
L	Below 1.5
Except L	9 - 14

OK	Proceed to next circuit inspection shown in problem symptoms chart (See page DI-175).

NG

3	Check for open or short circuit in harness and connector between transfer L4 position switch and ECM (See page IN-28).

NG	Repair or replace harness or connector.

OK

Check and replace ECM.

DI9OC-01

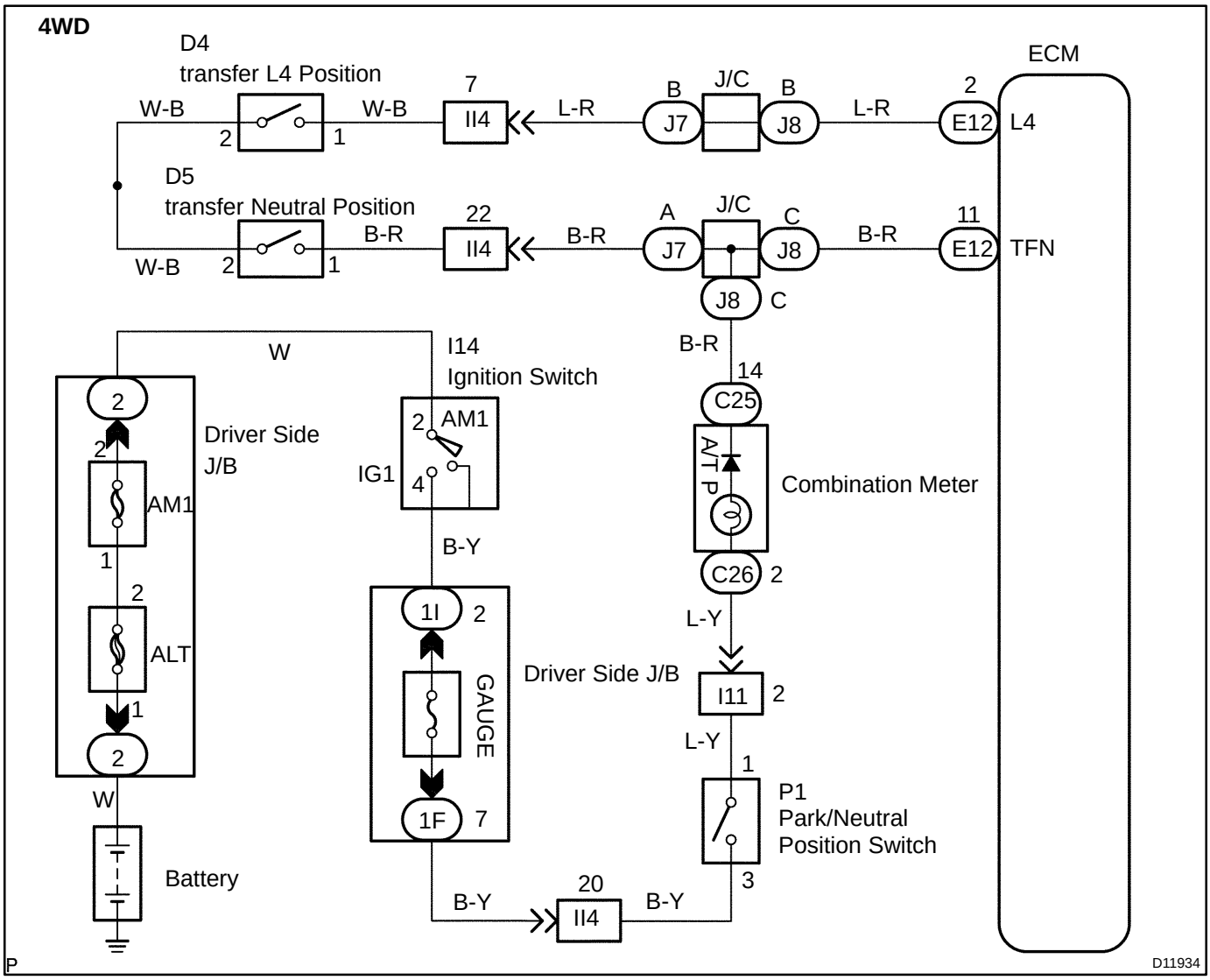
DTC	P1783	Transfer N SW Circuit Malfunction

CIRCUIT DESCRIPTION

The propeller shaft and wheels are free even when the transmission shift lever is set to P as long as the transfer shift lever is in Neutral position. The A/T.P. indicator light lights up to warn the drive that the propeller shaft and wheels are not locked.
If the A/T.P. indicator light goes on, the transfer shift lever should be shifted out of N position.
The ECM receive signal TFN from the indicator switch (neutral position switch).

DTC No.	DTC Detecting Condition	Trouble Area
P1783	While driving under conditions (a) and (b) for 30 seconds or more, the indicator switch(TFN switch) is ON . (2-trip detection logic) (a) Vehicle speed: 25 km/h (16 mph) or more (b) Transfer shift position is H	• Short in transfer neutral position switch signal circuit • Transfer neutral position switch • ECM

WIRING DIAGRAM



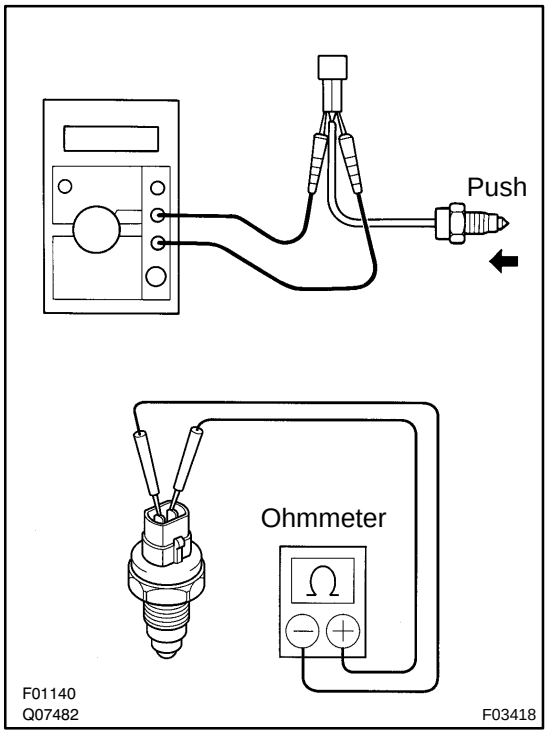
INSPECTION PROCEDURE

1	**Check park/neutral position switch (See page DI-203).**

NG → **Replace the park/neutral position switch.**

OK

2	**Check transfer neutral position switch.**



PREPARATION:

Remove the transfer park/neutral position switch (See page TR-9).

CHECK:

Check that there is continuity between terminals, as shown.

OK:

Switch position	Specified condition
Push	Continuity
Free	No continuity

OK → **Replace the transfer neutral position switch.**

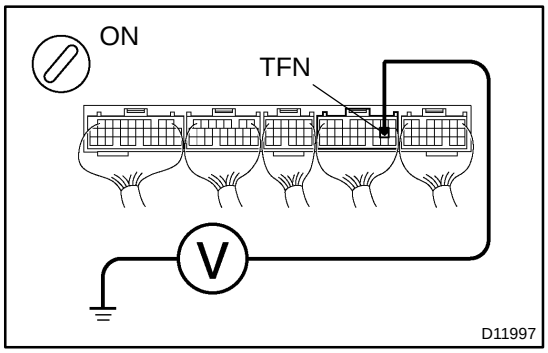
NG

3	**Check combination meter (See page BE-45).**

NG → **Repair or replace the combination meter.**

OK

4	**Check voltage between terminal TFN of ECM and body ground.**



PREPARATION:
Remove the ECM with connectors still connected.
CHECK:
Turn the ignition switch ON, measure voltage between terminal TFN of ECM and body ground when transfer shift lever is shifted to the following position.
OK:

Transfer shift position	Voltage (V)
N	Below 1.5
Except N	9 - 14

OK → **Proceed to next circuit inspection shown on problem symptom chart (See page DI-175).**

NG

5	**Check for open or short circuit in harness and connector between transfer neutral position switch and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM.

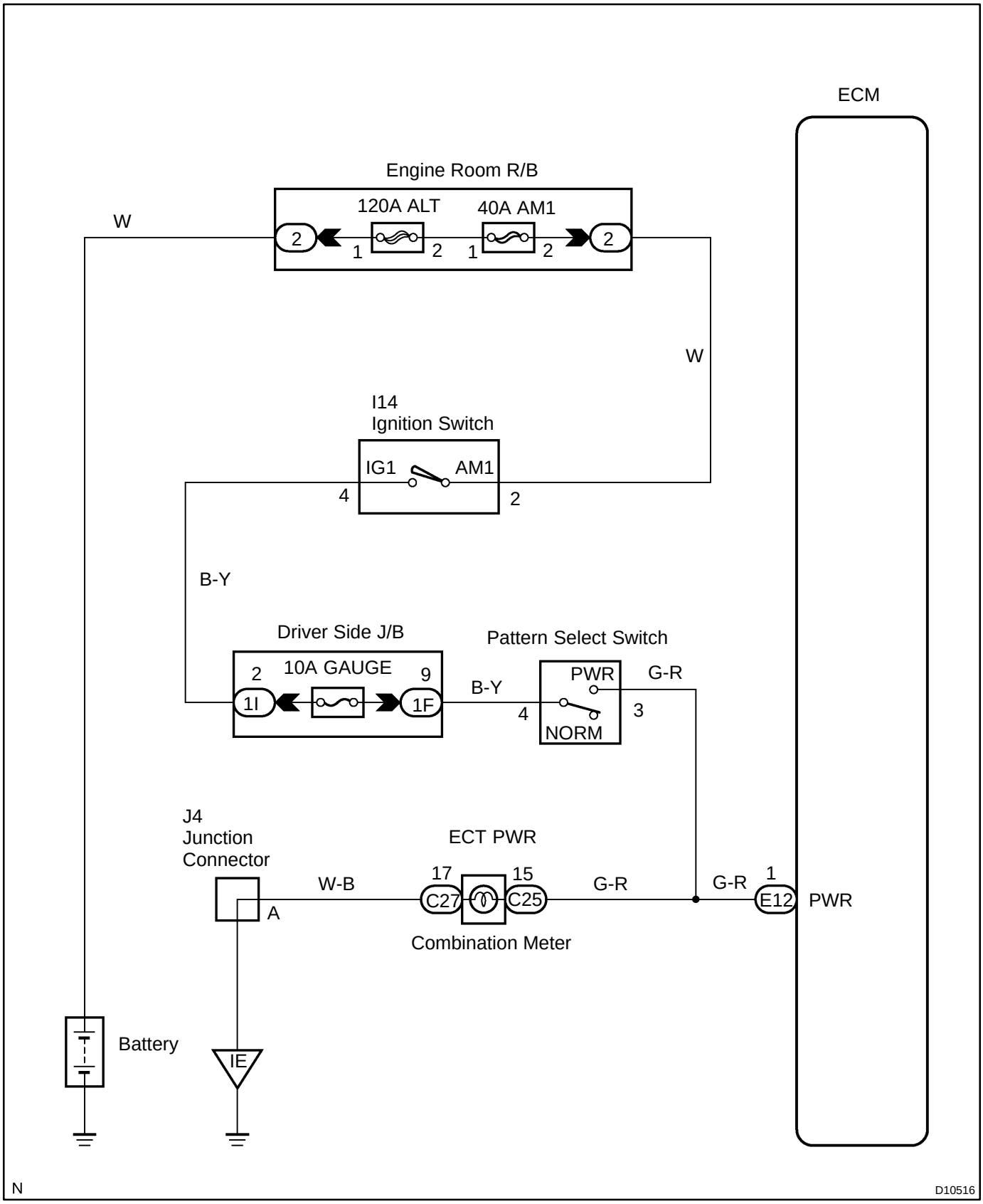
DI0T3-12

Pattern Select Switch Circuit

CIRCUIT DESCRIPTION

The ECM memory contains the shift programs for the NORMAL and POWER patterns, 2 position, L position and the lock-up patterns. Following the programs corresponding to the signals from the pattern select switch, the park/neutral position and other various sensors, the ECM switches the solenoid valves ON and OFF, and controls the transmission gear change and the lock-up clutch operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check PATTERN SEL SW signal.**

When using TOYOTA hand-held tester:

PREPARATION:

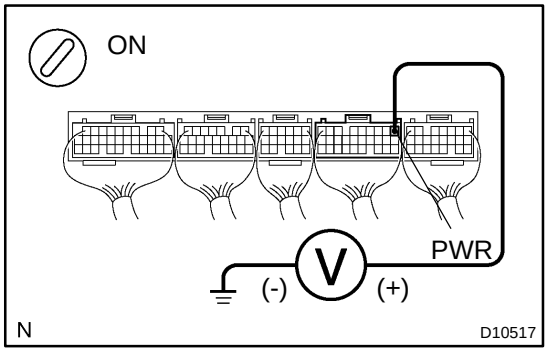
(a) Remove the DLC3 cover.
(b) Connect a TOYOTA hand-held tester to the DLC3.
(c) Turn the ignition switch ON and TOYOTA hand-held tester main switch ON.

CHECK:

Read the PATTERN SEL SW signal on the TOYOTA hand-held tester.

OK:

Pattern select switch	PATTERN SEL SW signal
Pushed in	ON
Pushed out	OFF



When not using TOYOTA hand-held tester:

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure voltage between terminal PWR of the ECM and body ground when the pattern select switch set to the PWR (POWER) position and NORM (NORMAL) position.

OK:

Pattern select switch	Voltage
PWR	9 - 14 V
NORM	Below 1.5 V

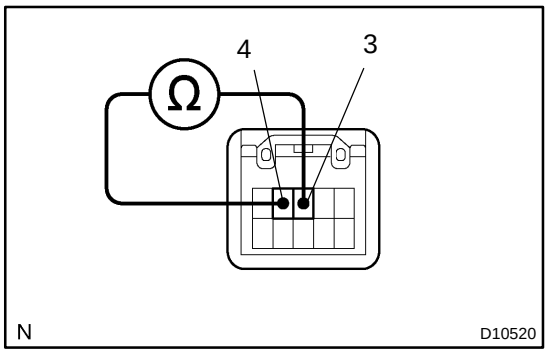
HINT:

The ECM uses the normal pattern signal if the PWR signal is not input.

OK → **Proceed to next circuit inspection shown on matrix chart (See page DI-175).**

NG

2	Check pattern select switch.



PREPARATION:

Disconnect the pattern select switch connector.

CHECK:

Check continuity between terminals 3 and 4 of pattern select switch connector when the select switch is set to PWR and NORM positions.

OK:

Pattern select switch	Specified condition
PWR	Continuity
NORM	No continuity

NG → **Replace the pattern select switch.**

OK

3	Check harness and connector between battery and pattern select switch, pattern select switch and ECM (See page IN-28).

NG → **Repair or replace the harness or connector.**

OK

Check and replace the ECM (See page IN-28).

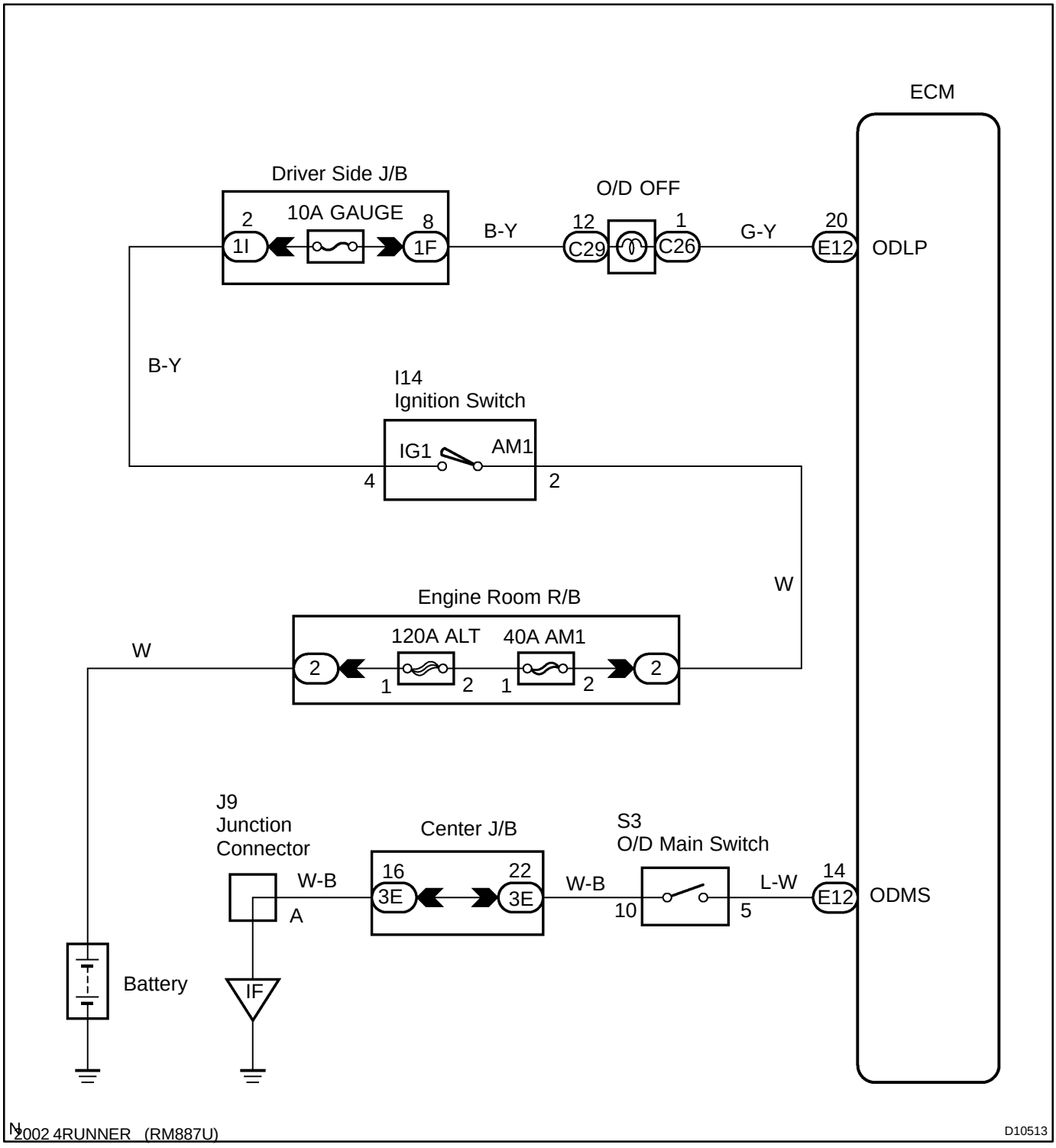
DI1CP-14

O/D Main Switch & O/D OFF Indicator Light Circuit

CIRCUIT DESCRIPTION

The O/D main switch is a momentary type switch. When pressing the O/D OFF main switch, the O/D OFF indicator light lights up and ECM prohibit shifting to O/D, and when pressing it again, the O/D OFF indicator light goes off and ECM allows shifting to O/D. Turning the IG switch OFF will reset the O/D OFF indicator light.

WIRING DIAGRAM



N

2002 4RUNNER (RM887U)

D10513

INSPECTION PROCEDURE

1	**Check operation of O/D main switch.**

PREPARATION:
Turn the ignition switch ON.
CHECK:
(a) Check O/D OFF indicator light when O/D main switch is pushed in to ON.
(b) Check O/D OFF Indicator light when O/D main switch is pushed again.
OK:
(a) O/D OFF indicator light lights up.
(b) O/D OFF indicator light goes off.

OK	**Proceed to next inspection shown on problem symptoms table (See page DI-175).**

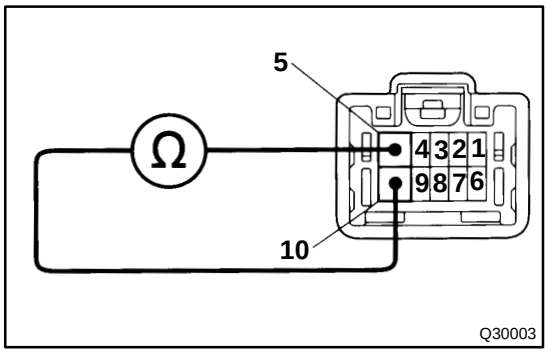
NG

2	**Check and replace combination meter (See page BE-45).**

NG	**Replace the combination meter.**

OK

3	**Check O/D main switch.**



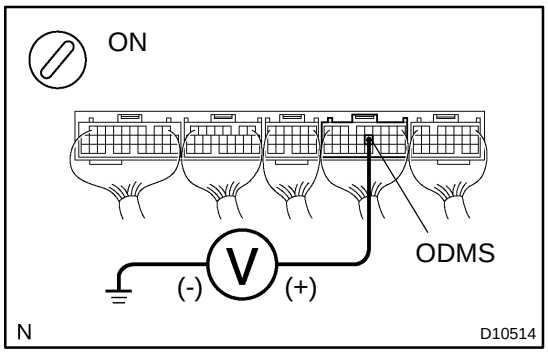
PREPARATION:
Disconnect the O/D main switch connector.
CHECK:
Check continuity between 5 and 10 of the O/D main switch connector.
OK:

O/D main switch condition	Specified condition
Press continuously O/D main switch	Continuity
Release O/D main switch	No continuity

NG	**Replace and repair O/D main switch.**

OK

4	Check voltage between terminal ODMS of ECM and body ground.



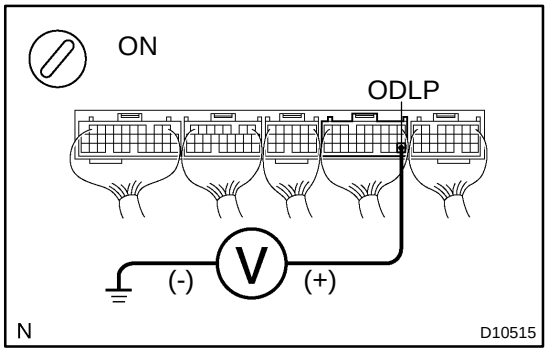
PREPARATION:
Turn the ignition switch ON.
CHECK:
Check voltage between terminal ODMS of the ECM and body ground when O/D main switch is ON and OFF.
OK:

O/D main switch	Specified voltage
Press continuously O/D main switch	Below 1.5 V
Release O/D main switch	9 - 14 V

OK → **Check and replace the ECM (See page IN-28).**

NG

5	Check voltage between terminal ODLP of ECM and body ground.



PREPARATION:
(a) Disconnect the connector of ECM.
(b) Turn the ignition switch ON.
CHECK:
Check voltage between terminal ODLP of the ECM and body ground.
OK:

O/D main switch	Specified voltage
Press continuously O/D main switch	Below 3 V
Release O/D main switch	9 - 14 V

OK → **Check and replace the ECM (See page IN-28).**

NG

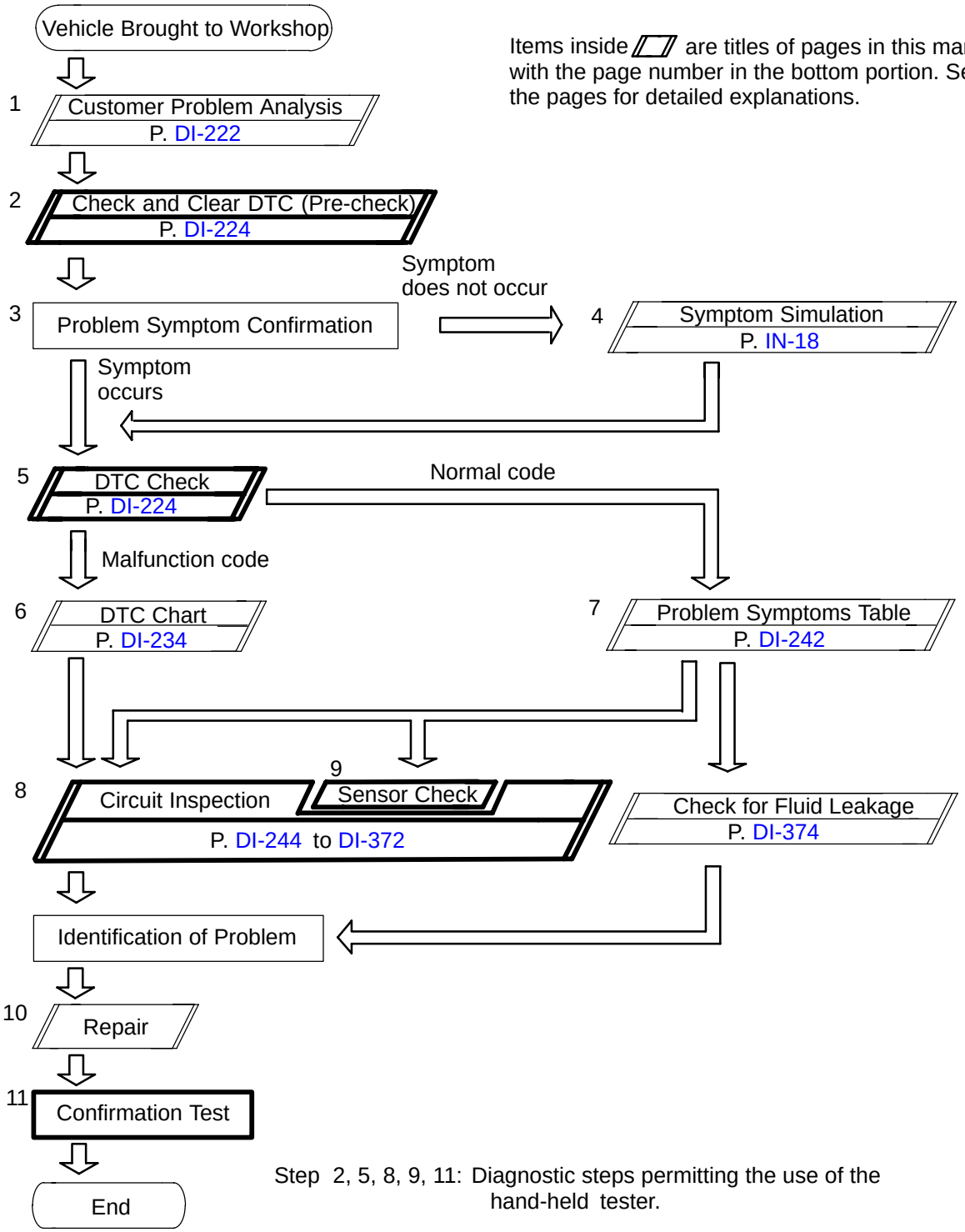
Check and replace harness and connector between combination meter and ECM, O/D main switch and ECM, O/D main switch and body ground (See page IN-28).

ABS WITH EBD & BA & TRAC & VSC SYSTEM

DI6BA-04

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshooting in accordance with the procedure on the following pages.



Step 2, 5, 8, 9, 11: Diagnostic steps permitting the use of the hand-held tester.

Fail safe function:
When a failure occurs in the ABS & BA & TRAC & VSC system, the ABS and VSC TRAC warning light is lit and the ABS & BA & TRAC & VSC operation is prohibited. In addition to this, when the failure that disables the EBD operation occurs, the brake warning light is lit as well and the EBD operation is prohibited.

DI6BB-03

CUSTOMER PROBLEM ANALYSIS CHECK

ABS Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Date	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ ABS does not operate.	
	☐ ABS does not operate efficiently.	
	☐ BA does not operate.	
	ABS Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	BRAKE Warning Light Abnormal (PKB released)	☐ Remains ON ☐ Does not Light Up
	Brake Warning Buzzer Abnormal	☐ Sounds ☐ Does not sound

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

BA & TRAC & VSC Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Date	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

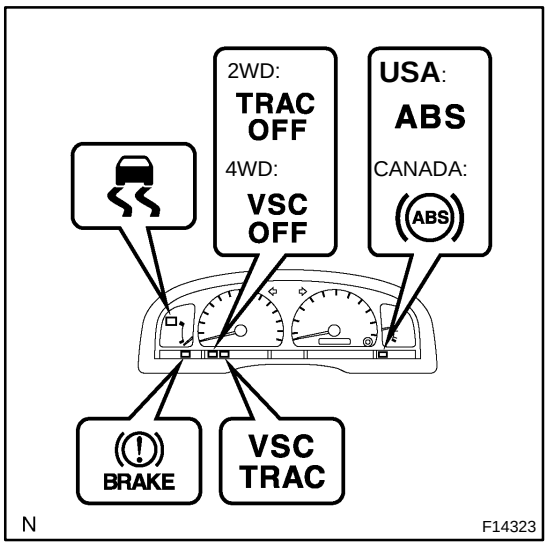
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ TRAC does not operate. (Wheels spin when starting rapidly.)	
	☐ VSC does not operate. (Wheels sideslip at the time of sharp turning.)	
	☐ BA does not operate.	
	VSC OFF TRAC OFF Indicator Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC TRAC Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up

Check Item	**ABS Warning Light**	☐ Normal ☐ Malfunction Code (Code)
	Malfunction Indicator Lamp	☐ Normal ☐ Malfunction Code (Code)
	BRAKE Warning Light Abnormal	☐ Remains ON ☐ Does not Light Up
	VSC Warning Buzzer Abnormal	☐ Sounds ☐ Does not Sound

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI8XO-02



PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Inspect the battery positive voltage.

Battery positive voltage: 10 - 14 V

(b) Check the warning lights and buzzer.

(1) Release the parking brake lever.

(2) When the ignition switch is ON, check that the ABS, BRAKE, VSC TRAC warning lights, VSC or TRAC OFF and SLIP indicator lights go on for 3 sec.

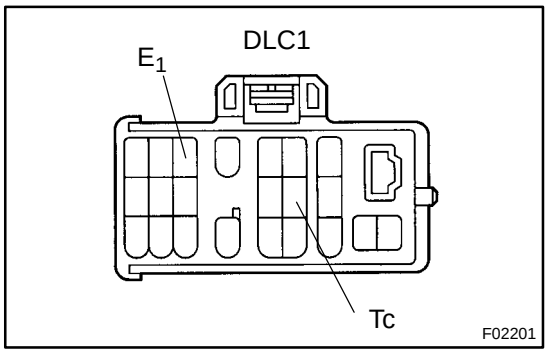
(3) 4WD:
Check that the center diff. lock indicator light and VSC OFF indicator light light up when the center diff. lock switch is pressed.

(4) Depressing the brake pedal repeatedly may light the warning light and sound the buzzer.

HINT:

- If the ECU stores DTC, ABS or VSC TRAC indicator light is ON.
- If the indicator check result is not normal, proceed to troubleshooting for the circuits of the ABS, BRAKE warning lights,VSC or TRAC OFF, SLIP, center diff. lock indicator lights.

Trouble Area	See page
ABS warning light circuit	DI-351
BRAKE warning light circuit	DI-365
VSC TRAC warning light circuit	DI-354
VSC OFF indicator light circuit (4WD)	DI-357
TRAC OFF indicator light circuit (2WD)	DI-360
SLIP indicator light circuit	DI-363
Center diff. lock indicator light circuit (4WD)	DI-357
VSC buzzer circuit	DI-367



(c) In case of not using the hand-held tester:
Check the DTC.

(1) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020

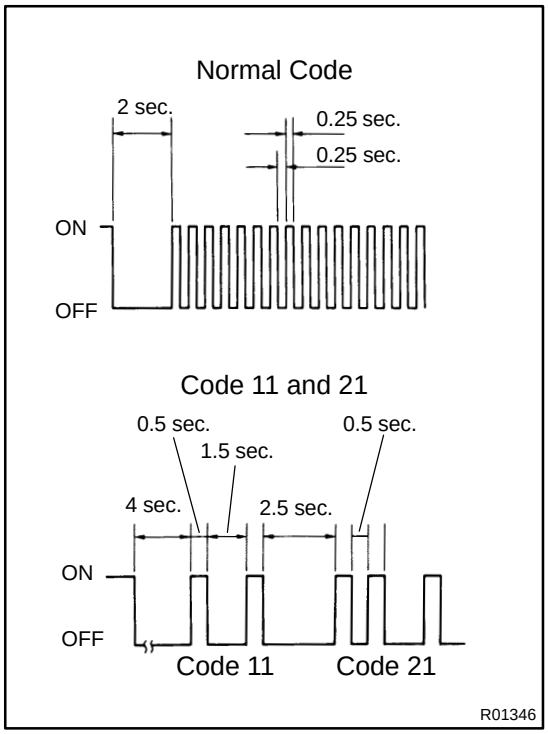
(2) Turn the ignition switch ON.

(3) Read the DTC from the ABS or VSC TRAC warning lights on the combination meter.

HINT:

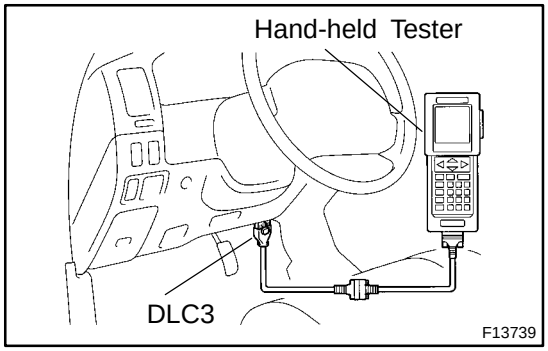
- If no code appears, inspect the diagnostic circuit, ABS or VSC TRAC warning light circuit.

Trouble Area	See page
Tc terminal circuit	DI-370
ABS warning light circuit	DI-351
VSC TRAC warning light circuit	DI-354



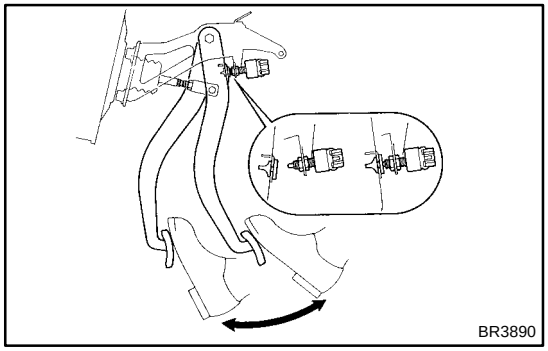
- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.
  (4) Codes are explained in the code table on page DI-234 .
  (5) After completing the check, disconnect terminals Tc and E_1 of DLC1, and turn off the display.

If 2 or more malfunctions are indicated at the same time, the lowest numbered DTC will be displayed 1st.



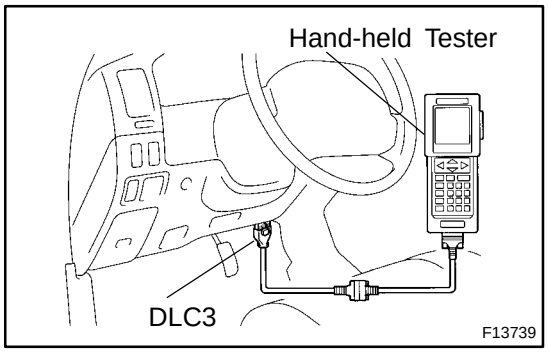
(d) In case of using the hand-held tester:
Check the DTC.
(1) Hook up the hand-held tester to DLC3.
(2) Turn the ignition switch ON.
(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand-held tester operator's manual for further details.



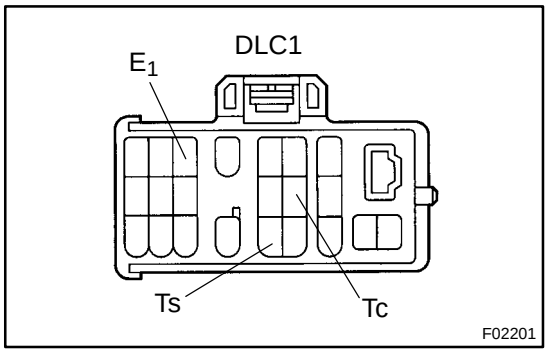
(e) In case of not using the hand-held tester:
Clear the DTC.
(1) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020
(2) Turn the ignition switch ON.
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 times or more within 5 sec.
(4) Check that the warning light shows the normal code blinking pattern.

(5) Remove the SST from terminals Tc and E_1 of DLC1.
SST 09843-18020



(f) In case of using the hand-held tester:
Clear the DTC.
(1) Hook up the hand-held tester to DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand-held tester to erase the codes.

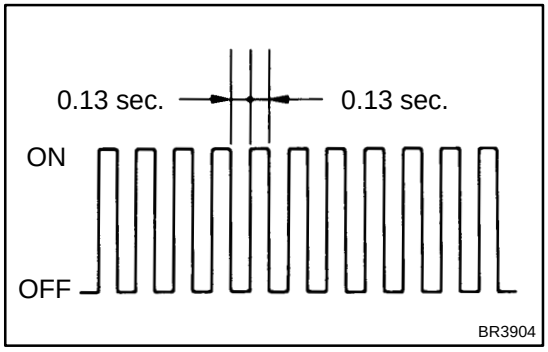
HINT:
Please refer to the hand-held tester operator's manual for further details.



2. In case of not using the hand-held tester:
ABS SENSOR SIGNAL CHECK (TEST MODE)

HINT:
If the ignition switch is turned from ON to ACC or LOCK during the test mode, DTC will be erased.

(a) Procedures for the test mode:
(1) Turn the ignition switch OFF.
(2) Shift the shift lever to P range.
(3) Using SST, connect terminals Ts and E_1 of DLC1.
SST 09843-18020
(4) Check that the steering wheel is in the straight-ahead position.
(5) Turn the ignition switch ON.



(6) Check that the ABS warning light blinks.

HINT:
If the ABS warning light does not blink, inspect the ABS warning light circuit or the Ts terminal circuit.

Trouble Area	See page
Ts terminal circuit	DI-372
ABS warning light circuit	DI-351

(b) Check the deceleration sensor.
Keep the vehicle in a stationary condition on a level place for 1 sec. or more.

(c) Check the master cylinder pressure sensor.
Leaving the vehicle in a stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with the force of 98 N (10 kgf, 22 lbf) or more for 1 sec. or more.

HINT:
At this time, the ABS warning light goes on for 3 sec.

(d) 4WD:
Check the center diff. lock switch.
Turn the center diff. lock switch from OFF to ON and OFF again.

(e) 4WD:
Check the L4 position switch.
(1) Shift the transfer lever to L4 position and turn the center diff. lock switch ON.
(2) Shift the transfer lever to H4 position.

(f) Check the speed sensor signal.
Drive the vehicle straight forward.
Drive the vehicle with a speed faster than 45 km/h (28 mph) for several seconds. Check that the ABS warning light comes off.

HINT:
The sensor check may not be completed if the wheels spin or the steering wheel is steered during this check.

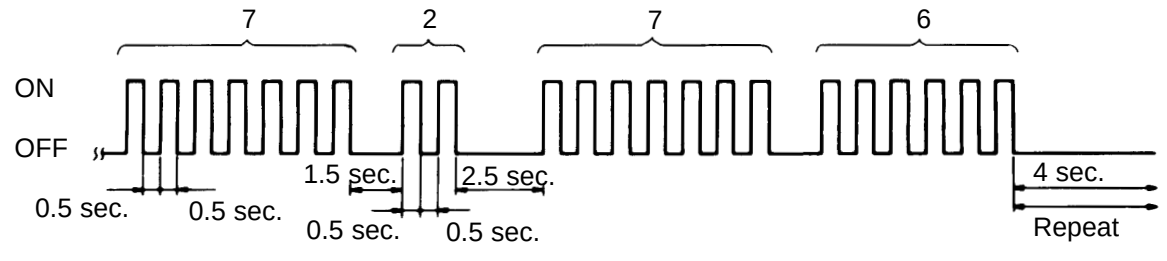
(g) Stop the vehicle.

(h) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020

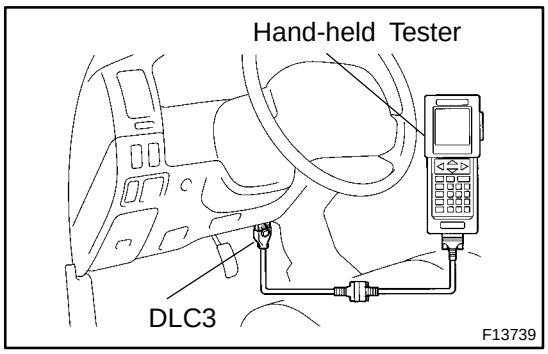
(i) Read the number of blinks of the ABS warning light.

HINT:
- See the list of DTC on the next page.
- If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest number code will be displayed 1st.

Malfunction Code (Example Code 72, 76)



(j) After doing the check, disconnect SST from the terminals of DLC1 and turn the ignition switch OFF.
SST 09843-18020



3. In case of using the hand-held tester:
ABS SENSOR SIGNAL CHECK (TEST MODE)

(a) Hook up the hand-held tester to DLC3.
(b) Do step (b) - (g) on the previous page.
(c) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand-held tester operator's manual for further details.

DTC of ABS sensor check function:

Code No.	Diagnosis	Trouble Area
C1271 / 71	Low output voltage of right front speed sensor	• Right front speed sensor • Sensor installation • Sensor rotor
C1272 / 72	Low output voltage of left front speed sensor	• Left front speed sensor • Sensor installation • Sensor rotor
C1273 / 73	Low output voltage of right rear speed sensor	• Right rear speed sensor • Sensor installation • Sensor rotor
C1274 / 74	Low output voltage of left rear speed sensor	• Left rear speed sensor • Sensor installation • Sensor rotor
C1275 / 75	Abnormal change in output voltage of right front speed sensor	Right front speed sensor rotor
C1276 / 76	Abnormal change in output voltage of left front speed sensor	Left front speed sensor rotor
C1277 / 77	Abnormal change in output voltage of right rear speed sensor	Right rear speed sensor rotor
C1278 / 78	Abnormal change in output voltage of left rear speed sensor	Left rear speed sensor rotor
C1279 / 79	Deceleration sensor is faulty	• Deceleration sensor • Sensor installation
C1281 / 81	Master cylinder pressure sensor output signal is faulty	Master cylinder pressure sensor
C1282 / 82*	Transfer indicator (center diff. lock) switch malfunction	Transfer indicator (center diff. lock) switch
C1283 / 83*	Transfer L4 position switch malfunction	Transfer L4 position switch

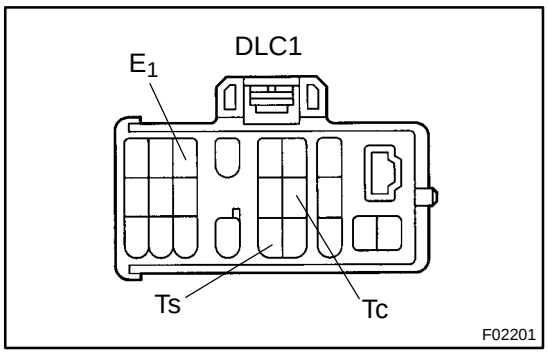
*: 4WD

4. In case of not using the hand-held tester:
VSC SENSOR SIGNAL CHECK (TEST MODE)

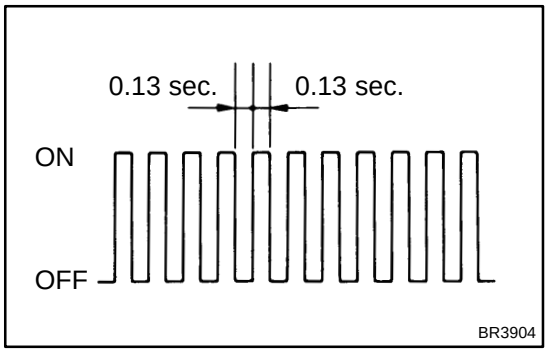
NOTICE:
When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.).

HINT:
If the ignition switch is turned from ON to ACC or LOCK during the test mode, DTC will be erased.

(a) Procedures for the test mode:
  (1) Turn the ignition switch OFF.
  (2) Check that the shift lever position is at P range. Turn the steering wheel to the neutral position.



(3) Using SST, connect terminals Ts and E_1 of DLC1.
SST 09843-18020
(4) Start the engine.

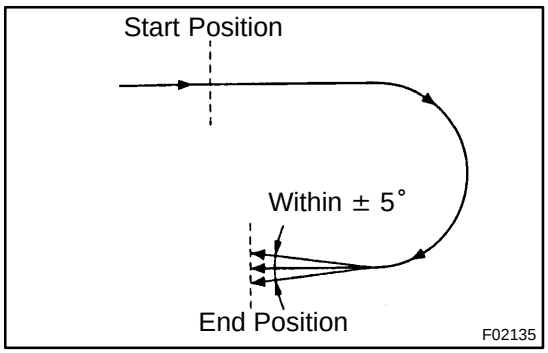


(5) Check that the VSC TRAC warning light blinks.

HINT:
If the VSC TRAC warning light does not blink, inspect the VSC TRAC warning light circuit or the Ts terminal circuit.

Trouble Area	See page
Ts terminal circuit	DI-372
VSC TRAC warning light circuit	DI-354

(b) Check the steering angle sensor.
Turn the steering wheel either to left or right for 450˚ or more from the vehicle stationary condition, and turn back the steering wheel to the straight ahead position.



(c) Check the yaw rate sensor.
Shift the shift lever to the D position and drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to left or right for 90˚ or more, and maintain wheel 180˚ circular drive for the vehicle.
Stop the vehicle and shift the shift lever to the P position, check that the VSC buzzer sounds for 3 sec.

HINT:
- If the VSC buzzer sounds, the sensor check is in normal completion.
- If the VSC buzzer does not sound, check the VSC buzzer circuit, then do the sensor check again.

Trouble Area	See page
VSC buzzer circuit	DI-367

- If the VSC buzzer still won't sound, there is malfunction in the VSC sensor, so check the DTC.

HINT:

- Drive the vehicle circularly by 180°. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- Do not spin the wheels.

(d) Read the DTC.

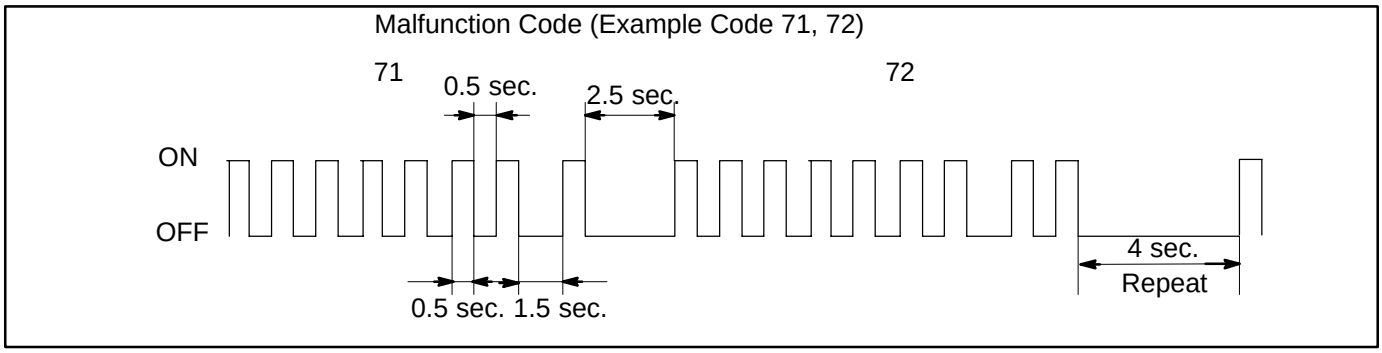
(1) Using SST, connect terminals Tc and E_1 of DLC1.

SST 09843-18020

(2) Read the number of blinks of the VSC OFF indicator light.

HINT:

- See the list of DTC shown on the next page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.



(3) After doing the check, disconnect SST from terminals Ts and E_1 of DLC1 and turn the ignition switch OFF.

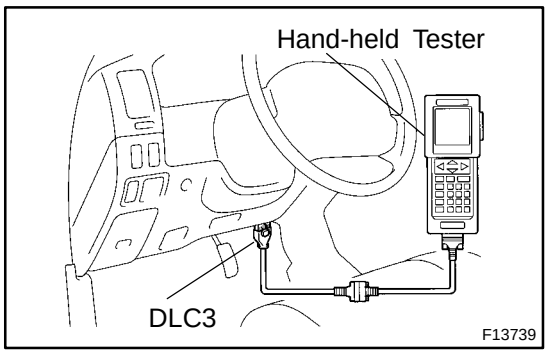
SST 09843-18020

5. In case of using the hand-held tester:

VSC SENSOR SIGNAL CHECK (TEST MODE)

NOTICE:

When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.). Make sure that this operation should be done before starting the following is started.



(a) Hook up the hand-held tester to DLC3.
(b) Do steps (a)-(2), (a)-(4), (b) and (c) on the previous pages.
(c) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand-held tester operator's manual for further details.

DTC of VSC sensor check function:

Code No.	Diagnosis	Trouble Area
C0371/71	Yaw rate sensor output signal malfunction	• Yaw rate sensor • Yaw rate sensor circuit
C1208/72	Steering position sensor output signal malfunction	• Steering position sensor • Steering position sensor circuit

6. DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM

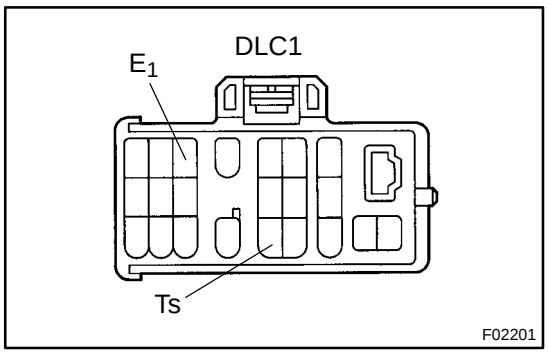
CAUTION:
While the deceleration sensor operating diagnosis system is checked, ABS does not work.

7. IF NECESSARY, YAW RATE SENSOR ZERO POINT CALIBRATION

HINT:
- When having replaced the yaw rate sensor, deceleration sensor or the ECU, make sure to perform yaw rate and deceleration sensors zero point calibration.
- This operation is also required when the deceleration sensor or yaw rate sensor has been replaced since the calibrated zero point of both sensors will be erased.

NOTICE:
- **While obtaining the zero point, do not give any vibration to the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- **Be sure to do this on a level surface (within an inclination of 1%).**

(a) Clear the zero point of the yaw rate and deceleration sensors.
  (1) Shift the shift lever to P range.
  (2) Turn the ignition switch ON in a stationary condition.



(3) With the ignition switch ON, using SST, repeat a cycle of connect and disconnect between terminals Ts and E_1 of DLC1 4 times or more within 8 sec. Check that the VSC TRAC warning light is lit indicating the recorded zero point is erased.

SST 09843-18020

(4) Turn the ignition switch OFF.

(b) Obtain zero point of the yaw rate sensor.

(1) Make terminals Ts and E_1 of DLC1 disconnected.

(2) Turn the ignition switch ON.

HINT:

The vehicle should be in a stationary condition with the shift lever in P range.

(3) Check that the lit VSC TRAC warning light goes off about 15 sec. after the ignition switch is turned ON.

HINT:

Even if the ignition switch is not turned OFF in step (a)-(4) and remains ON, the yaw rate sensor zero point calibration can be completed. In this case, the VSC TRAC warning light is lit for about 15 sec. and starts blinking. (Normal code)

(4) After ensuring that the VSC warning light remains OFF for 2 sec., turn the ignition switch OFF.

HINT:

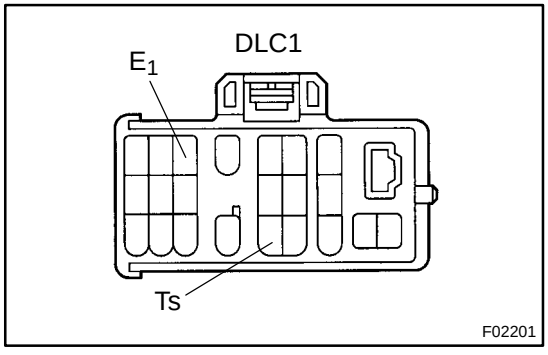
If the ignition switch is not turned OFF in step (a)-(4), make sure that the light blinks for 2 sec. and turn the ignition switch OFF.

(c) Perform deceleration sensor zero point calibration.

NOTICE:

After step (b) (the yaw rate sensor zero point calibration), the VSC TRAC warning light goes off. At this time, if the vehicle is driven without preforming step (c) (deceleration sensor zero point calibration), deceleration sensor zero point calibration malfunction will be detected and the VSC warning light will light up.

Therefore, perform step (c) right after step (b).



(1) Using SST, connect terminals Ts and E_1 of DLC1.

SST 09843-18020

(2) Turn the ignition switch ON.

HINT:

Make sure that the vehicle is in a stationary condition with the shift lever in P range.

(3) After turning the ignition switch ON, check that the VSC TRAC warning light is lit for about 4 sec. and then starts quick blinking at 0.13 sec. intervals.

(4) After making sure that the VSC TRAC warning light blinks for 2sec., turn the ignition switch OFF.

(5) Remove SST and make terminals Ts and E_1 of DLC1 disconnected.

DI6BD-04

DIAGNOSTIC TROUBLE CODE CHART

NOTICE:

When removing the part, turn the ignition switch OFF.

HINT:

- Using SST 09843-18020, connect terminals Tc and E_1 of DLC1.
- If any abnormality is not found when parts are inspected, inspect the ECU.
- If a malfunction code is displayed during the DTC check, check the circuit listed that code. For details of each code, turn to the page in the "See page" for respective "DTC No." in the DTC chart.
- EBD shall be checked according to the ABS trouble code chart.

DTC chart of ABS:

DTC No. (See Page)	Detection Item	Trouble Area
C0200 / 31*1 (DI-244)	Right front wheel speed sensor signal malfunction	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Sensor rotor
C0205 / 32*1 (DI-244)	Left front wheel speed sensor signal malfunction	
C0210 / 33*1 (DI-244)	Right rear wheel speed sensor signal malfunction	
C0215 / 34*1 (DI-244)	Left rear wheel speed sensor signal malfunction	
C0226 / 21 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SFR circuit)	• Hydraulic brake booster • SFRR or SFRH circuit
C0236 / 22 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SFL circuit)	• Hydraulic brake booster • SFLR or SFLH circuit
C0246 / 23 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SRR circuit)	• Hydraulic brake booster • SRRR or SRRH circuit
C0256 / 24 (DI-250)	Open or short circuit in hydraulic brake booster solenoid circuit (SRL circuit)	• Hydraulic brake booster • SRLR or SRLH circuit
C0278 / 11 (DI-253)	Open or short circuit in ABS SOL relay circuit	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12 (DI-253)	B+ short circuit in ABS SOL relay circuit	
C1225 / 25 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (SA1 circuit)	• Hydraulic brake booster • SA1 circuit
C1226 / 26 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (SA2 circuit)	• Hydraulic brake booster • SA2 circuit
C1227 / 27 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (SA3 circuit)	• Hydraulic brake booster • SA3 circuit
C1228 / 28 (DI-270)	Open or short circuit in hydraulic brake booster solenoid circuit (STR circuit)	• Hydraulic brake booster • STR circuit
C1237 / 37 (DI-284)	Some tire's different size is from the other tires'	Tire size
C1241 / 41 (DI-285)	Low battery positive voltage or abnormally high battery positive voltage	• Battery • Charging system • Power source circuit
C1242 / 42*2 (DI-288)	Open circuit in IG2 circuit	• Battery • Charging system • Power source circuit
C1243 / 43 (DI-291)	Malfunction in deceleration sensor (constant output)	• Deceleration sensor • Wire harness for deceleration sensor system

C1244 / 44 (DI-276)	Open or short circuit in deceleration sensor circuit	• Deceleration sensor • Deceleration sensor circuit
C1245 / 45 (DI-291)	Malfunction in deceleration sensor	• Deceleration sensor • Wire harness for deceleration sensor system
C1246 / 46 (DI-294)	Malfunction in master cylinder pressure sensor	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit
C1249 / 49 (DI-297)	Open circuit in stop light switch circuit	Stop light switch circuit
C1251 / 51*2 (DI-300)	Pump motor is locked Open circuit in pump motor ground	Hydraulic brake booster pump motor
C1252 / 52*2 (DI-303)	Hydraulic brake booster pump motor malfunction	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)
C1253 / 53*2 (DI-309)	Hydraulic brake booster pump motor relay malfunction	• ABS or TRC MTR relay • ABS or TRC MTR relay circuit • Hydraulic brake booster pump motor circuit
C1254 / 54*2 (DI-314)	Pressure switch malfunction	• Pressure switch (PH or PL) • Pressure switch circuit
C1256 / 56*2 (DI-317)	Accumulator low pressure malfunction	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor
C1257 / 57*2 (DI-317)	Power supply drive circuit malfunction	• Battery • Power source circuit • Skid control ECU
C1268 / 68*3 (DI-331)	Transfer L4 position signal transmission failure	• Transfer L4 position switch • Transfer L4 position switch circuit
C1269 / 69 (DI-334)	Malfunction in PNP switch circuit (R range)	• PNP switch • PNP switch circuit (R range)
Always ON (DI-343)	Malfunction in skid control ECU	• Battery • Charging system • Power source circuit • Skid control ECU

*1: As the DTC cannot be erased by replacing parts alone, do either one of the following operations.
(1) Clear DTC (See page DI-224).
(2) At the vehicle speed of 20 km/h (12 mph), drive the vehicle for 30 sec. or more.
*2: Using the following table, troubled parts can be specified.
*3: 4WD

Table of trouble Part and DTC:

DTC		C1242/42		C1251/51		C1252/52		C1253/53		C1254/54		C1256/56		C1257/57	
Brake warning light and buzzer		Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer	Light	Buzzer
Pressure switch	PH					○	○			○		○	○		
	PL					○	○			○		○	○		
Pump motor circuit	Pump motor			○	○	○	○					○	○		
	MTT wire harness					○	○	○							
	MT+ wire harness			○											
	MT- wire harness			○											
Accumulator malfunction												○	○		
Motor relay circuit	MR1 open circuit							○							
	MR2 open circuit							○							
	MR1 welded contact					○	○	○							
	MR2 welded contact					○	○	○							
Hydraulic brake booster	Pressure leaks					○	○					○	○		
Power source*	IG2 open circuit	○													
ECU	Power supply circuit													○	

*: When IG1 circuit is open, ABS warning light and brake warning light come on.

DTC chart of VSC:

DTC No. (See Page)	Detection Item	Trouble Area
C1201 / 51 (DI-259)	ECM system malfunction	Engine control system
C1203 / 53 (DI-260)	ECM communication circuit malfunction	• TRC+ or TRC- circuit • ENG+ or ENG- circuit • ECM
C1207 / 37 (DI-262)	Malfunction in neutral start switch (P/R range)	• PNP switch • PNP switch circuit (P/R range)
C1210 / 36 (DI-264)	Zero point calibration of yaw rate sensor undone	• Yaw rate sensor • Yaw rate sensor circuit • PNP switch circuit (P range)
C1223 / 43 (DI-267)	Malfunction in ABS control system	ABS control system
C1224 / 44 (DI-268)	Open or short circuit in NE signal circuit	• NEO circuit • ECM • Skid control ECU
C1231 / 31 (DI-272)	Malfunction in steering angle sensor	• Steering angle sensor • Steering angle sensor circuit
C1232 / 32 (DI-276)	Malfunction in deceleration sensor	• Deceleration sensor • Deceleration sensor circuit
C1233 / 33 (DI-280)	Open or short circuit in yaw rate sensor circuit	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34 (DI-280)	Malfunction in yaw rate sensor	• Yaw rate sensor • Yaw rate sensor circuit
C1258 / 58* (DI-328)	Transfer 4WD position signal transmission failure	• Transfer 4WD position switch • Transfer 4WD position switch circuit
C1336 / 39 (DI-337)	Zero point calibration of deceleration sensor undone	• Deceleration sensor • Deceleration sensor circuit • PNP switch (P range) circuit
C1340 / 47* (DI-341)	Open circuit in center differential lock signal	• Center differential lock system • Center differential lock circuit • Center differential lock indicator light circuit
Always ON (DI-347)	Malfunction in skid control ECU Open circuit in VSC TRAC warning indicator circuit	• Power source circuit • VSC TRAC warning light circuit

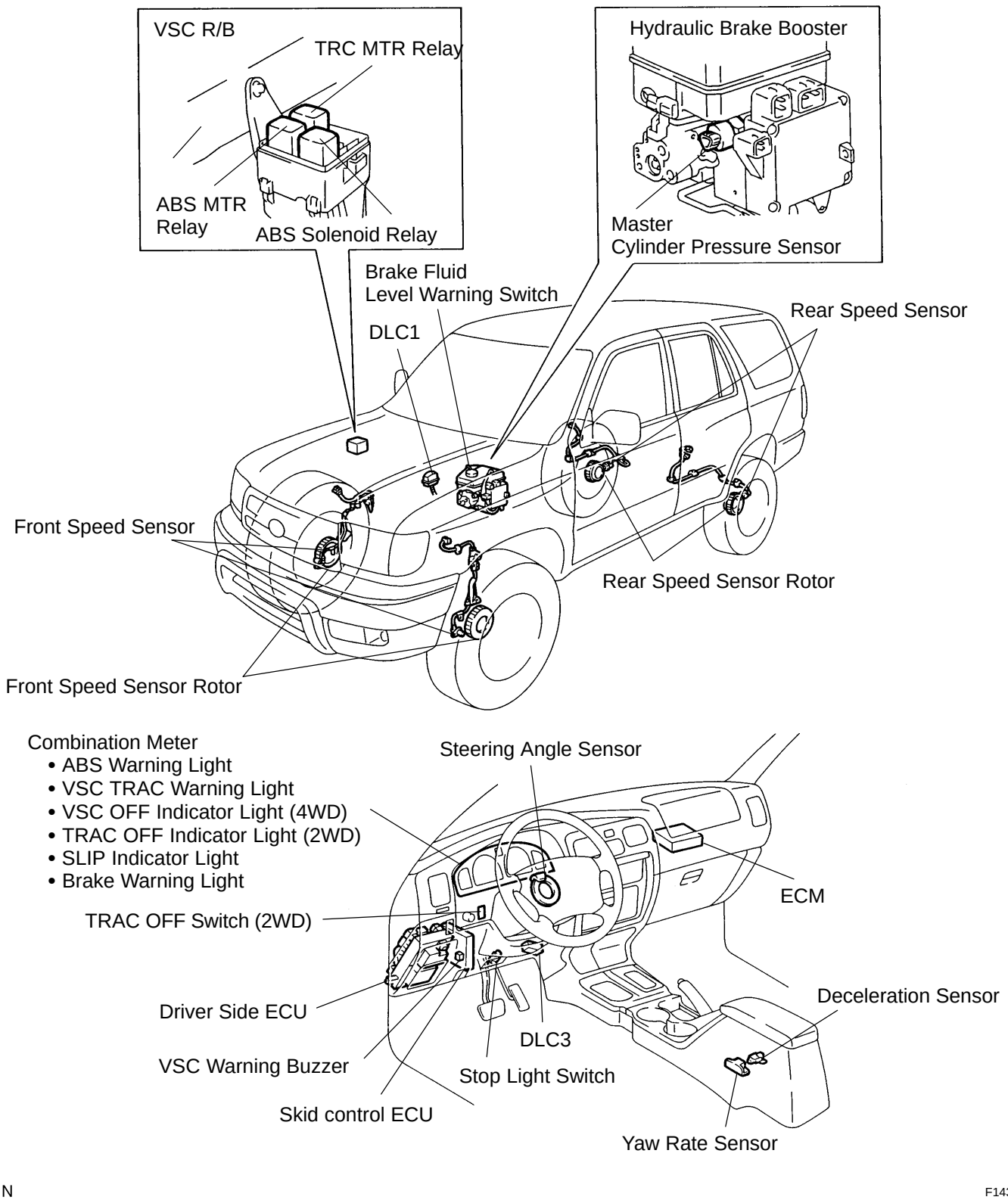
*: 4WD

HINT:

There is a case that the hand-held tester cannot be used when the VSC TRAC warning light is always on.

DI6BE-02

PARTS LOCATION



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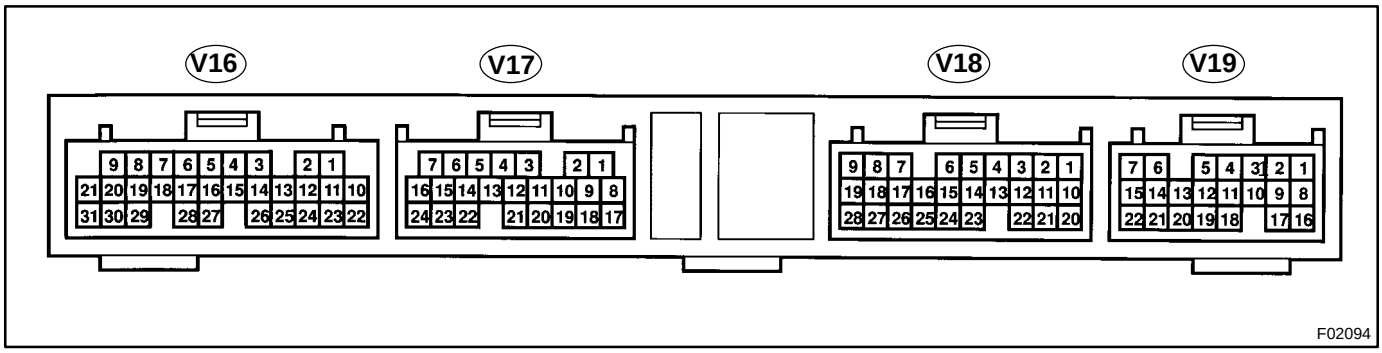
DI8XP-02

TERMINALS OF ECU



Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
SA1 (V16 - 2) - GND (V16 - 6, 31, V19 - 8, 16)	B-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SA2 (V16 - 3) - GND (V16 - 6, 31, V19 -8, 16)	W-L ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SA3 (V16 - 4) - GND (V16 - 6, 31, V19 - 8, 16)	W-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
STR (V16 - 5) - GND (V16 - 6, 31, V19 - 8, 16)	Y-G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFLR (V16 - 7) - GND (V16 - 6, 31, V19 - 8, 16)	Y-R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRH (V16 - 8) - GND (V16 - 6, 31, V19 - 8, 16)	G-Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRRR (V16 - 9) - GND (V16 - 6, 31, V19 - 8, 16)	LG ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
VCM (V16 - 10) - GND (V16 - 6, 31, V19 - 8, 16)	B ↔ W-B	IG switch ON	4.5 - 5.5
PH (V16 - 11) - GND (V16 - 6, 31, V19 - 8, 16)	LG-B ↔ W-B	IG switch ON, pressure switch (PH) ON	Below 0.9
		IG switch ON, pressure switch (PH) OFF	5 - 8
FR+ (V16 - 14) - FR- (V16 - 13)	LG ↔ L	IG switch ON, right front wheel is turned slowly	Pulse generation
FL+ (V16 - 16) - FL- (V16 - 15)	W ↔ R	IG switch ON, left front wheel is turned slowly	Pulse generation
SR (V16 - 19) - R1+ (V16 - 1)	G-B ↔ R-B	IG switch ON, ABS warning light OFF	10 - 14
SFLH (V16 - 21) - GND (V16 - 6, 31, V19 - 8, 16)	L-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
PMC (V16 - 22) - E2 (V16 - 23)	W ↔ R	IG switch ON, stop light switch released	0.3 - 0.7
MSS (V16 - 24) - GND (V16 - 6, 31, V19 - 8, 16)	BR ↔ W-B	IG switch OFF	Continuity
MMT (V16 - 27) - GND (V16 - 6, 31, V19 - 8, 16)	P-B ↔ W-B	IG switch ON, (Motor relay is OFF)	Below 1.5
MT+ (V16 - 28) - MT- (V16 - 18)	GR ↔ O	IG switch ON, (Motor relay is OFF)	Below 1.5
MR1 (V16 - 29) - R1+ (V16 - 1)	L-B ↔ R-B	IG switch ON, hydraulic brake booster pump motor running	10 - 14
MR2 (V17 - 1) - R2+ (V17 - 2)	P-B ↔ Y-B	IG switch ON, hydraulic brake booster pump motor running	10 - 14

SRLR (V17 - 3) - GND (V16 - 6, 31, V19 - 8, 16)	R ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SRLH (V17 - 4) - GND (V16 - 6, 31, V19 - 8, 16)	L ↔ W-B	IG switch ON, ABC warning light OFF	10 - 14
SFRR (V17 - 5) - GND (V16 - 6, 31, V19 - 8, 16)	Y ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
SFRH (V17 - 6) - GND (V16 - 6, 31, V19 - 8, 16)	G ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
PL (V17 - 8) - GND (V16 - 6, 31, V19 - 8, 16)	L-W ↔ W-B	IG switch ON, pressure switch ON	3 - 5
		IG switch ON, pressure switch OFF	7 - 11
AST (V17 - 10) - GND (V16 - 6, 31, V19 - 8, 16)	LG-B ↔ W-B	IG switch ON, ABS warning light OFF	10 - 14
IG2 (V17 - 18) - GND (V16 - 6, 31, V19 - 8, 16)	GR-B ↔ W-B	IG switch ON	10 - 14
VGS (V18 - 1) - GGND (V18 - 21)	G ↔ B	IG switch ON	4.5 - 5.5
EXI*1 (V18 - 3) - GND (V16 - 6, 31, V19 - 8, 16)	R-B ↔ W-B	IG switch ON, center diff. lock switch ON	Below 2.0
		IG switch ON, center diff. lock switch OFF	10 - 14
VSCW (V18 - 4) - GND (V16 - 6, 31, V19 - 8, 16)	V-W ↔ W-B	IG switch ON, VSC TRAC warning light ON	Below 2.0
		IG switch ON, VSC TRAC warning light OFF	10 - 14
BRL (V18 - 5) - GND (V16 - 6, 31, V19 - 8, 16)	O ↔ W-B	IG switch ON, brake warning light ON	10 - 14
		IG switch ON, brake warning light OFF	Below 2.0
IND (V18 - 6) - GND (V16 - 6, 31, V19 - 8, 16)	R-W ↔ W-B	IG switch ON, SLIP indicator light ON	Below 2.0
		IG switch ON, SLIP indicator light OFF	10 - 14
WT (V18 - 7) - GND (V16 - 6, 31, V19 - 8, 16)	L-W ↔ W-B	IG switch ON, VSC (TRAC) OFF indicator light ON	Below 2.0
		IG switch ON, VSC (TRAC) OFF indicator light OFF	10 - 14
EXI3*1 (V18 - 8) - GND (V16 - 6, 31, V19 - 8, 16)	B-L ↔ W-B	IG switch ON, ADD switch ON (4WD)	Below 2.0
		IG switch ON, ADD switch OFF (2WD)	10 - 14
VYS (V18 - 9) - GND (V16 - 6, 31, V19 - 8, 16)	R ↔ W-B	IG switch ON	4.5 - 5.5
GL2 (V18 - 10) - GGND (V18 - 21)	R ↔ LB	IG switch ON, vehicle is placed on the horizontal surface	2.0 - 3.0
GSS (V18 - 11) - GND (V16 - 6, 31, V19 - 8, 16)	BR ↔ W-B	IG switch OFF	Continuity
SS1+ (V18 - 14) - SS1- (V18 - 23)	P ↔ V	Engine idling, steering wheel is turned slowly.	Pulse generation
SP1 (V18 - 16) - GND (V16 - 6, 31, V19 - 8, 16)	GR-L ↔ W-B	Vehicle drive at about 20 km/h (12mph)	Pulse generation
EXI4*1 (V18 - 17) - GND (V16 - 6, 31, V19 - 8, 16)	L-R ↔ W-B	IG switch ON, transfer in L4 position	Below 2.0
		IG switch ON, transfer in except L4 position	10 - 14
YSS (V18 - 18) - GND (V16 - 6, 31, V19 - 8, 16)	BR-B ↔ W-B	IG switch OFF	Continuity
YD (V18 - 19) - GYAW (V18 - 27)	Y ↔ B	IG switch ON, ABS warning light OFF	4.5 - 5.3
GGND (V18 - 21) - GND (V16 - 6, 31, V19 - 8, 16)	B ↔ W-B	IG switch OFF	Continuity
GL1 (V18 - 22 - GGND (V18 - 21)	W ↔ LB	IG switch ON, ABS warning light OFF	2.0 - 3.0

CD*1 (V18 - 24) - GND (V16 - 6, 31, V19 - 8, 16)	P-G ↔ W-B	IG switch ON, center diff. lock indicator ON	Below 2.0
		IG switch ON, center diff. lock indicator OFF	10 - 14
TF*1 (V18 - 25) - GND (V16 - 6, 31, V19 - 8, 16)	B-R ↔ W-B	IG switch ON, transfer in N position	Below 2.0
		IG switch ON, transfer in except N position	10 - 14
CSW*2 (V18 - 26) - GND (V16 - 6, 31, V19 - 8, 16)	L ↔ W-B	IG switch ON, TRAC OFF switch OFF	10 - 14
		IG switch ON, TRAC OFF switch ON	Below 1.5
YAW (V18 - 28) - GYAW (V18 - 27)	W ↔ B	IG switch ON, ABS warning light OFF	2.42 - 2.58
WA (V19 - 1) - GND (V16 - 6, 31, V19 - 8, 16)	B-L ↔ W - B	IG switch ON, ABS warning light ON	10 - 14
		IG switch ON, ABS warning light OFF	Below 2.0
NEO (V19 - 2) - GND (V16 - 6, 31, V19 - 8, 16)	V-W ↔ W - B	Engine idling	Pulse generation
P (V19 - 3) - GND (V16 - 6, 31, V19 - 8, 16)	L-Y ↔ W-B	IG switch ON, PNP switch in P position	10 - 14
		IG switch ON, PNP switch in except P position	Below 1.5
TRC+ (V19 - 4) - TRC- (V19 - 17)	BR-Y ↔ Y-G	Engine idling	Pulse generation
ENG+ (V19 - 6) - ENG- (V19 - 5)	L ↔ P	Engine idling	Pulse generation
IG1 (V19 - 7) - GND (V16 - 6, 31, V19 - 8, 16)	Y ↔ W-B	IG switch ON	10 - 14
PKB (V19 - 9) - GND (V16 - 6, 31, V19 - 8,16)	R-W ↔ W-B	IG switch ON, parking brake switch ON	Below 1.5
		IG switch OFF, parking brake switch OFF	10 - 14
R (V19 - 10) - GND (V16 - 6, 31, V19 - 8, 16)	W-L ↔ W-B	IG switch ON, PNP switch in R position	10 - 14
		IG switch ON, PNP switch in except R position	Below 1.5
Ts (V19 - 11) - GND (V16 - 6, 31, V19 - 8, 16)	G-R ↔ W-B	IG switch ON and terminals Ts-E_1 of DLC1 connected	Below 1.5
		IG switch ON and terminals Ts-E_1 of DLC1 not connected	10 - 14
Tc (V19 - 12) - GND (V16 - 6, 31, V19 - 8, 16)	GR ↔ W-B	IG switch ON and terminals Tc-E_1 of DLC1 connected	Below 1.5
		IG switch ON and terminals Tc-E_1 of DLC1 not connected	10 - 14
STP (V19 - 13) - GND (V16 - 6, 31, V19 - 8, 16)	G-W ↔ W-B	Stop light switch OFF	Below 1.5
		Stop light switch ON	8 - 14
DG (V19 - 15) - GND (V16 - 6, 31, V19 - 8, 16)	W ↔ W-B	IG switch ON	10 - 14
RR+ (V19 - 19) - RR- (V19 - 18)	B ↔ W	IG switch ON, right rear wheel is turned slowly	Pulse generation
RL+ (V19 - 21) - RL- (V19 - 20)	R ↔ G	IG switch ON, left rear wheel is turned slowly	Pulse generation
BZ (V19 - 22) - GND (V16 - 6, 31, V19 - 8, 16)	L-B ↔ W-B	IG switch ON, VSC buzzer is sounded	Below 1.0 ↔ 10 - 14
		IG switch ON, VSC buzzer is not sounded	10 - 14

*1: 4WD

*2: 2WD

DI6BG-03

PROBLEM SYMPTOMS TABLE

If a normal code is displayed during the DTC check but the problem still occurs, check the circuits for each problem symptom in the order given in the table below and proceed to the relevant troubleshooting page.

NOTICE:

When replacing skid control ECU, sensor or etc., turn the ignition switch OFF.

Symptom	Suspect Area	See page
ABS does not operate BA does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output 2. IG power source circuit 3. Speed sensor circuit 4. Check the hydraulic brake booster with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI-374).	 DI-224 DI-285 DI-244 BR-26
ABS does not operate efficiently BA does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output 2. Speed sensor circuit 3. Stop light switch circuit 4. Check the hydraulic brake booster with a checker or hand-held tester. If abnormal, check the hydraulic circuit for leakage (See page DI-374).	 DI-224 DI-244 DI-297 BR-26
ABS warning light abnormal	1. ABS warning light circuit 2. Skid control ECU	DI-351 IN-28
DTC check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. ABS warning light circuit 2. Tc terminal circuit	 DI-351 DI-370
Speed sensor signal check cannot be done	1. Ts terminal circuit 2. Skid control ECU	DI-372 IN-28
TRAC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit	 DI-224 DI-285 DI-374 DI-244

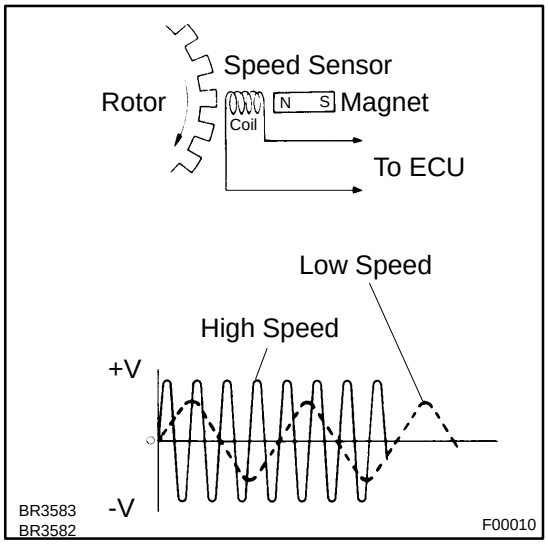
VSC does not operate	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. Check the DTC, reconfirming that the normal code is output. 2. IG power source circuit 3. Check the hydraulic circuit for leakage. 4. Speed sensor circuit 5. Deceleration sensor circuit 6. Yaw rate sensor circuit 7. Steering angle sensor circuit	 DI-224 DI-285 DI-374 DI-244 DI-276 DI-280 DI-272
VSC TRAC warning light abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. VSC TRAC warning light circuit 2. Skid control ECU	 DI-354 IN-28
SLIP indicator light abnormal	SLIP indicator light circuit	DI-363
VSC OFF or TRAC OFF indicator abnormal	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. VSC OFF or TRAC OFF indicator light circuit 2. Center diff. lock indicator switch circuit	 DI-357 DI-360 DI-341
Center diff. lock indicator light abnormal	Center diff. lock indicator light circuit	DI-357
DTC check cannot be done	If the symptoms still occur even after the following circuits in suspect areas are inspected and proved normal, replace the skid control ECU. 1. VSC TRAC warning light circuit 2. Tc terminal circuit	 DI-354 DI-370

DI6BH-03

CIRCUIT INSPECTION

DTC	C0200 / 31 - C0215 / 34	Speed Sensor Circuit

CIRCUIT DESCRIPTION



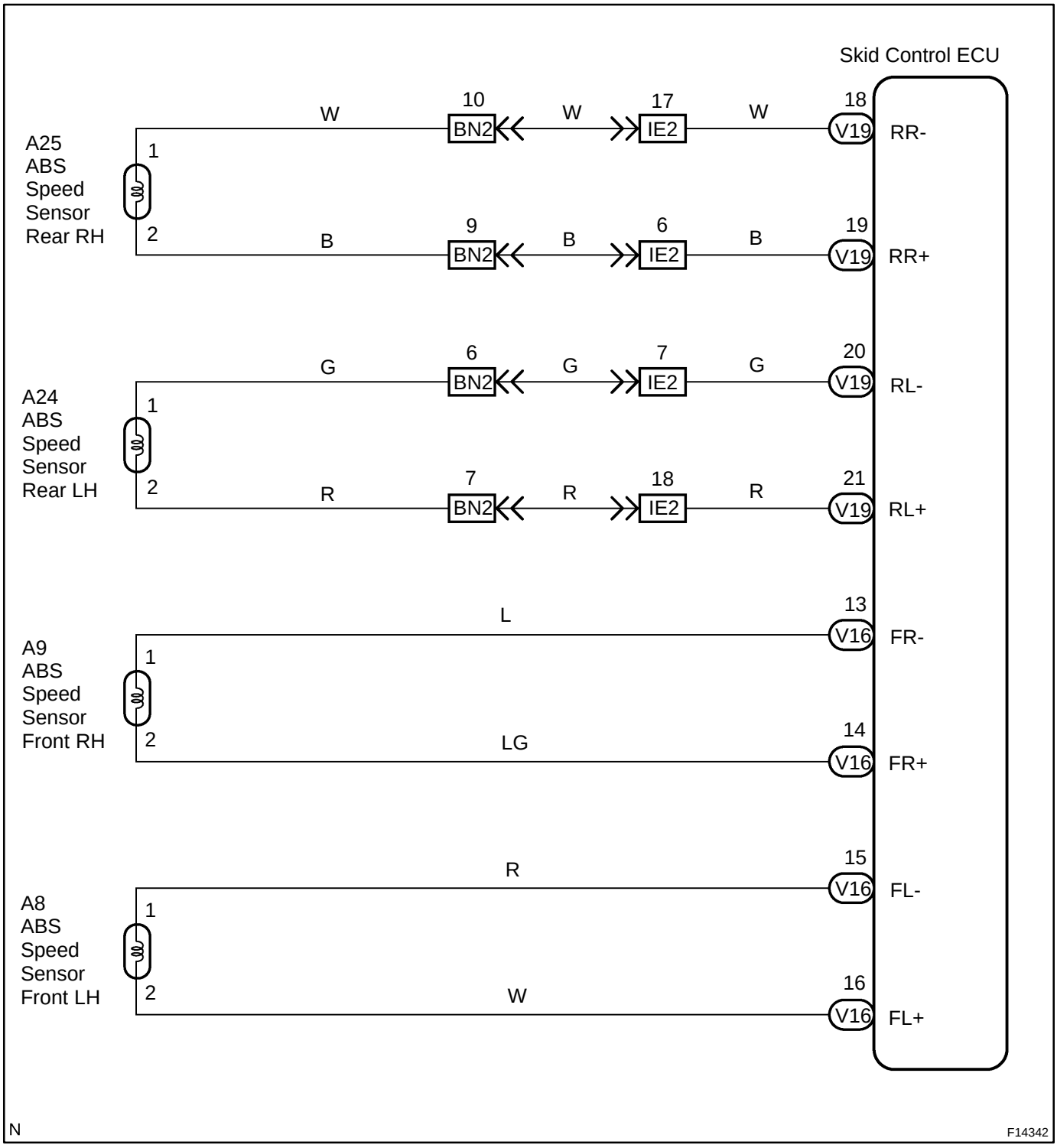
The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of both the ABS & BA & TRAC & VSC control system. The front and rear rotors each have 48 serrations.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200 / 31 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of conditions 1. through 4.: 1. At vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between turning the ignition switch ON and turning it OFF. 3. Continuous noise occurs in the speed sensor signals with the vehicle speed of 20 km/h (12 mph) or more. 4. The condition that the speed sensor signal circuit is open continues for 0.12 sec. or more.	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Sensor rotor

HINT:

- DTC No. C0200 / 31 is for the right front speed sensor.
- DTC No. C0205 / 32 is for the left front speed sensor.
- DTC No. C0210 / 33 is for the right rear speed sensor.
- DTC No. C0215 / 34 is for the left rear speed sensor.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check output value of speed sensor.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.

(b) Turn the ignition switch ON and push the hand-held tester main switch ON.

(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that there is no difference between the speed value output from the speed sensor displayed on the hand-held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is almost no difference in the displayed speed value.

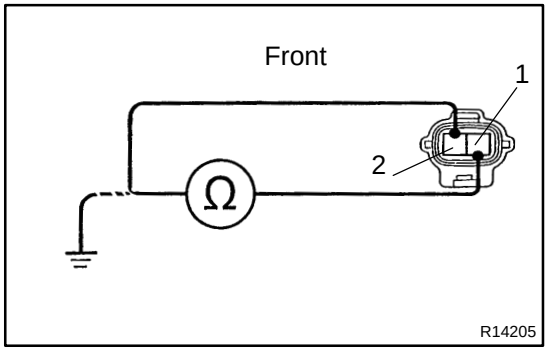
HINT:

There is tolerance of ± 10 % in the speedometer indication.

OK → **Go to step 4.**

NG

2	**Check speed sensor.**



Front:

PREPARATION:

(a) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(b) Disconnect the speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:

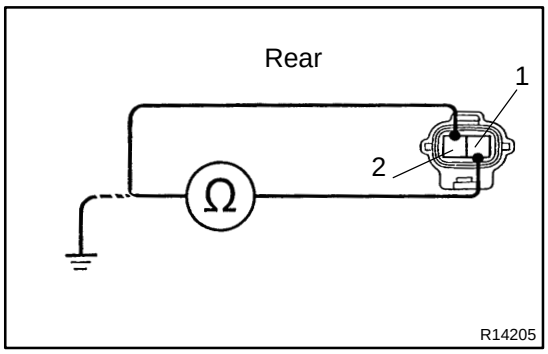
Resistance: 1.4 - 1.8 kΩ

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher



Rear:

PREPARATION:

(a) Make sure that there is no looseness at the connector lock part and connecting part of the connector.

(b) Disconnect the speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:

Resistance: 1.0 - 1.4 kΩ

CHECK:

Measure resistance between terminal 1 or 2 of the speed sensor connector and body ground.

OK:

Resistance: 1 MΩ or higher

NG	**Replace speed sensor.**

NOTICE:

Check the speed sensor signal last (See page DI-224).

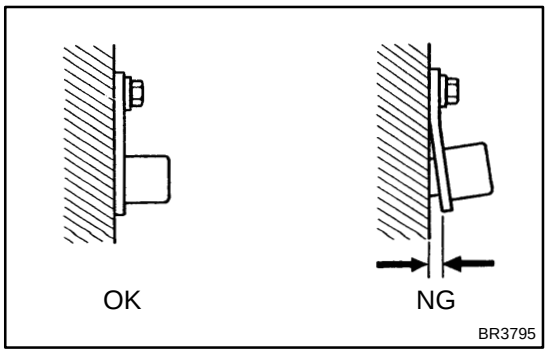
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and skid control ECU (See page IN-28).**

NG	**Repair or replace harness or connector.**

OK

4	Check sensor installation.



CHECK:
Check the speed sensor installation.
OK:

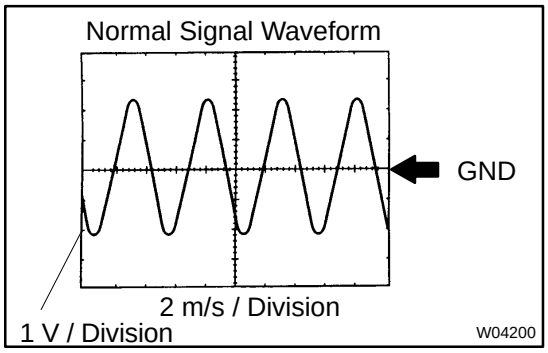
The installation bolt is tightened properly and there is no clearance between the sensor and the front steering knuckle or the rear axle carrier.
Torque: 8.0 N.m (82 kgf.cm, 71 in.·lbf)

NG	Replace speed sensor.

NOTICE:
Check the speed sensor signal last (See page DI-224).

OK

5	Check speed sensor and sensor rotor serrations.



(REFERENCE) INSPECTION USING OSCILLOSCOPE
PREPARATION:
(a) Remove the skid control ECU with the connector still connected.
(b) Connect the oscilloscope to terminals FR+ - FR-, FL+ - FL-, RR+ - RR- and RL+ - RL- of the skid control ECU.

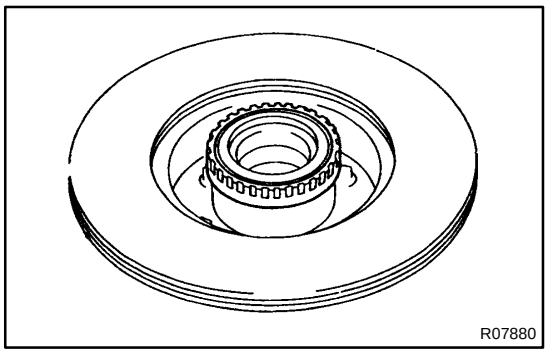
CHECK:
Drive the vehicle at about 20 km/h (12 mph), and check the signal waveform.
HINT:

- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform becomes shorter and the fluctuation in the output voltage becomes geater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter deposited on it.

OK	Check and replace skid control ECU.

NG

6	Check sensor rotor and sensor tip.



Front:

PREPARATION:

Remove the front axle hub (See page SA-9).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the front speed sensor (See page BR-46).

CHECK:

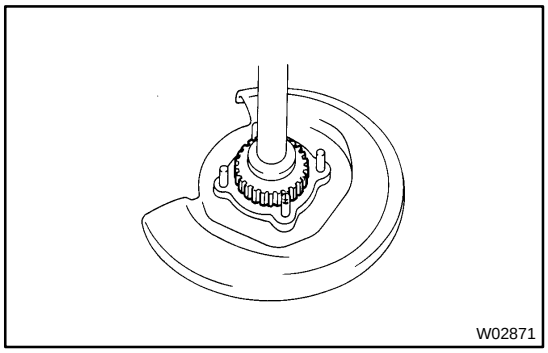
Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.



Rear:

PREPARATION:

Remove the rear axle shaft (See Page SA-80).

CHECK:

Check the sensor rotor serrations.

OK:

No scratches, missing teeth or foreign objects.

PREPARATION:

Remove the rear speed sensor (See Page BR-49).

CHECK:

Check the sensor tip.

OK:

No scratches or foreign objects on the sensor tip.

HINT:

If foreign matter (including that on the sensor rotor side) is identified, remove it and after reassembling, check the output waveform.

NG	Replace speed sensor or rotor.

NOTICE:

Check the speed sensor signal last (See page DI-224).

OK

Check and replace skid control ECU.

DI6BI-03

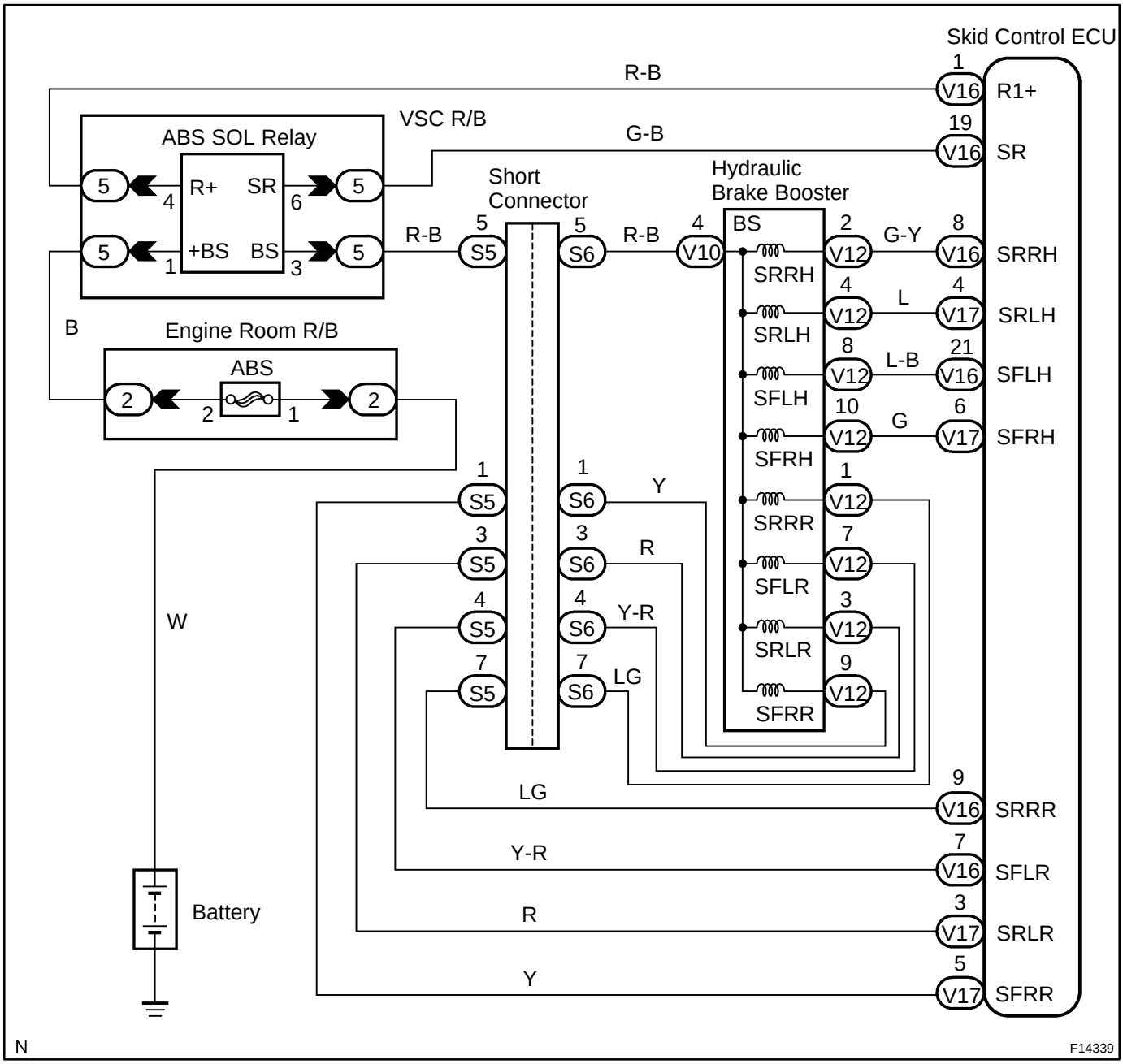
DTC	C0226 / 21 - C0256 / 24	ABS Solenoid Circuit

CIRCUIT DESCRIPTION

This solenoid goes on when signals are received from the ECU and controls the pressure acting on the wheel cylinders thus controlling the braking force.

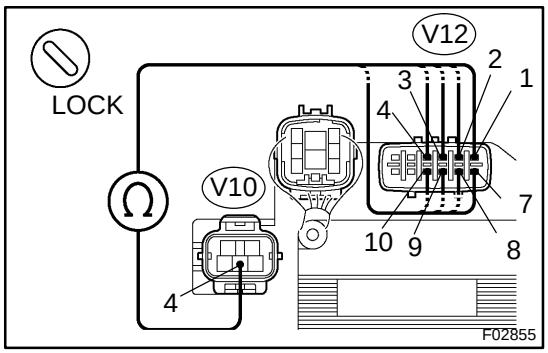
DTC No.	DTC Detecting Condition	Trouble Area
C0226 / 21	Open or short circuit in SFRH or SFRR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SFRH or SFRR circuit
C0236 / 22	Open or short circuit in SFLH or SFLR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SFLH or SFLR circuit
C0246 / 23	Open or short circuit in SRRH or SRRR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SRRH or SRRR circuit
C0256 / 24	Open or short circuit in SRLH or SRLR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SRLH or SRLR circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check hydraulic brake booster solenoid.



PREPARATION:

Disconnect the 2 connectors (V10, V12) from the hydraulic brake booster.

CHECK:

Check continuity between each of the terminals V10 - 4 and V12 - 1, 2, 3, 4, 7, 8, 9 and 10 of hydraulic brake booster connector.

OK:

Continuity

HINT:

Resistance of each solenoid at 20 ˚C (68 ˚F)

SFRH, SFLH, SRRH, SRLH: 4.75 - 5.25 Ω

SFRR, SFLR, SRRR, SRLR: 2.00 - 2.40 Ω

NG	Replace hydraulic brake booster.

OK

2	Check for open and short circuit in harness and connector between skid control ECU and hydraulic brake booster (See page DI-224).

NG	Repair or replace harness or connector.

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, ECU may be defective.

DI6BJ-03

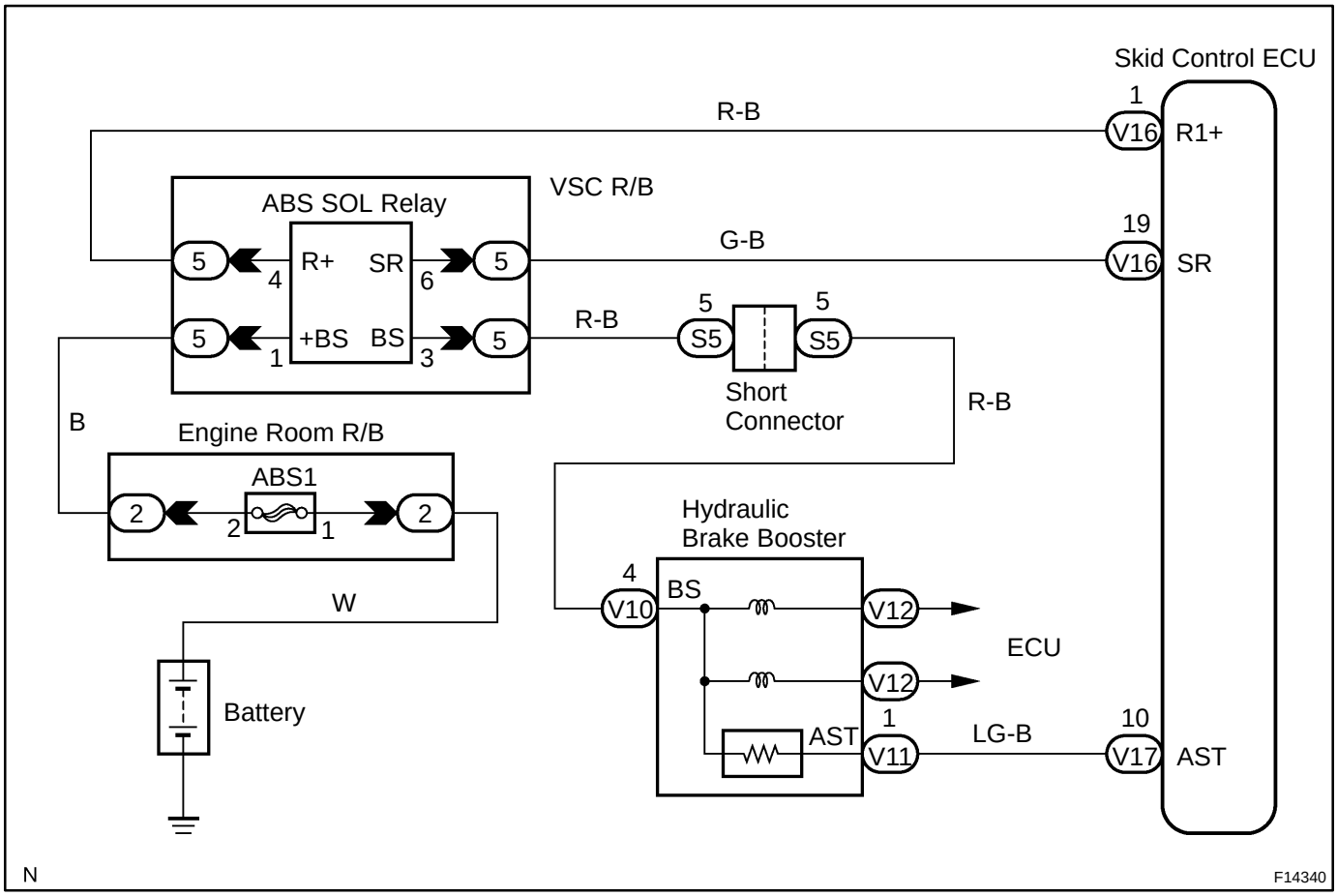
DTC	C0278 / 11, C0279 / 12	ABS SOL Relay Circuit

CIRCUIT DESCRIPTION

This relay supplies power to each ABS solenoid. After the ignition switch is turned ON, if the initial check is OK, the relay goes on.

DTC No.	DTC Detecting Condition	Trouble Area
C0278 / 11	Conditions 1. and 2. continue for 0.2 sec. or more: 1. ECU terminal IG1 voltage is 9.5 V to 17.0 V and the ABS SOL relay is ON, however, the contact point of the ABS SOL relay is OFF. 2. With ABS SOL relay ON, ECU terminal IG1 voltage becomes 9.5 V or less and the contact point of the ABS SOL relay does not become ON.	• ABS SOL relay • ABS SOL relay circuit
C0279 / 12	Immediately after ECU terminal IG1 becomes ON, ABS SOL relay is OFF. However, the condition that the ABS SOL relay remains ON due to the contact point continues for 0.2 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check ABS SOL relay operation.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check the operation sound of the ABS SOL relay when operating it with the hand-held tester.

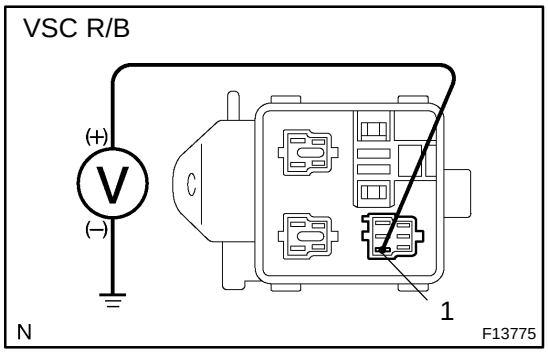
OK:

The operation sound of the ABS SOL relay should be heard.

OK → **Go to step 6.**

NG

2	**Check voltage between terminal 1 of VSC R/B (for ABS SOL relay) and body ground.**



PREPARATION:

Remove the ABS SOL relay from VSC R/B.

CHECK:

Measure the voltage between terminals 1 and 2 of VSC R/B (for ABS SOL relay).

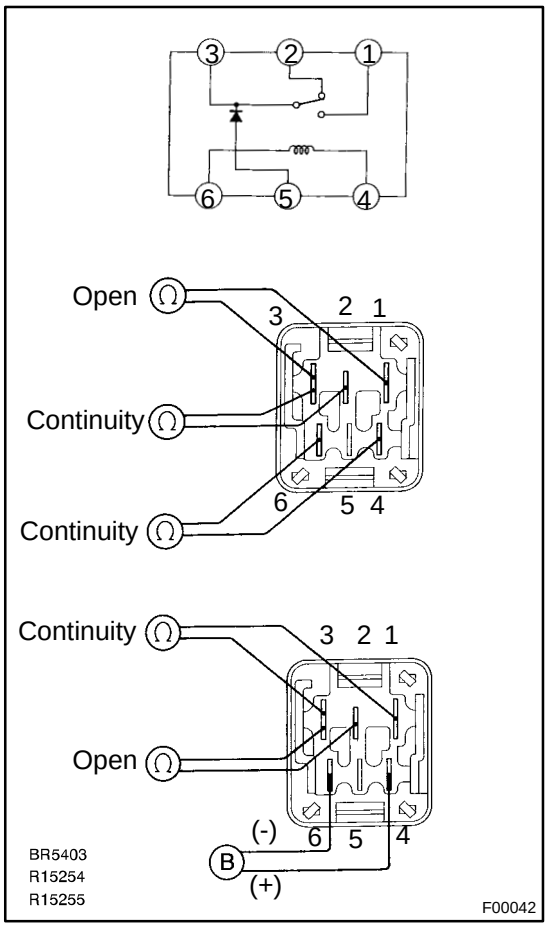
OK:

Voltage: 10 - 14 V

NG → **Check and repair harness or connector.**

OK

3	Check ABS SOL relay.



CHECK:

Check continuity between each terminal of ABS SOL relay.

OK:

Terminals 4 and 6	Continuity (Reference value 80 Ω)
Terminals 2 and 3	Continuity
Terminals 1 and 3	Open

CHECK:

(a) Apply battery positive voltage between terminals 4 and 6.

(b) Check continuity between each terminal of ABS SOL relay.

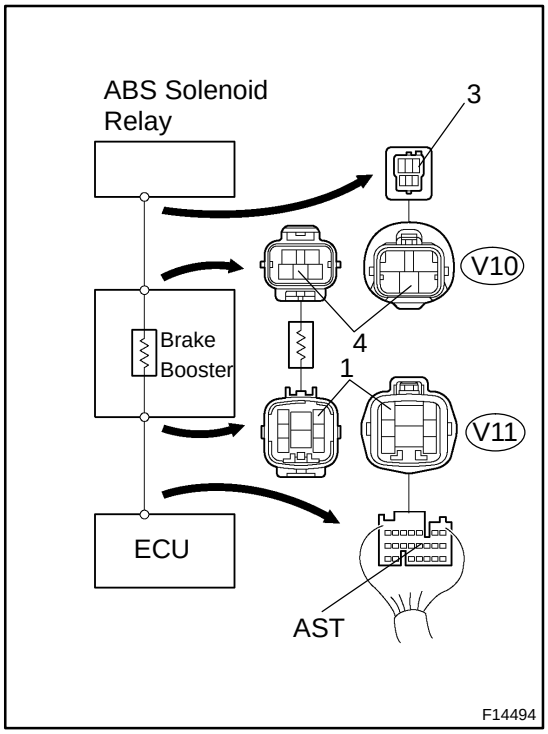
OK:

Terminals 2 and 3	Open
Terminals 1 and 3	Continuity

NG → **Replace ABS SOL relay.**

OK

4	Check continuity between terminal 3 of VSC R/B (for ABS SOL relay) and terminal AST of skid contorl ECU.



CHECK:

Check continuity between terminal 3 of VSC R/B (for ABS SOL relay) and terminal AST of the skid control ECU.

OK:

Continuity

HINT:

There is a resistance of 33 ± 3 Ω between terminal 4 of connector V10 and terminal 1 of connector V11.

NG → **Repair or replace harness or hydraulic brake booster.**

OK ↓

5	Check for open and short circuit in harness and connector between VSC R/B and skid control ECU (See page IN-28).

NG → **Repair or replace harness or connector.**

OK ↓

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, ECU may be defective.

6	**Check for open circuit in harness and connector between terminals AST of hydraulic brake booster and skid control ECU (See page IN-28).**

NG → **Repair or replace harness and connector.**

OK

Check and replace skid control ECU.

DI6CD-03

DTC	C1201 / 51	Engine Control System Malfunction

CIRCUIT DESCRIPTION

If trouble occurs in the engine control system, the ECU prohibits TRAC and VSC control.

DTC No.	DTC Detecting Condition	Trouble Area
C1201 / 51	Conditions 1. and 2. continue for 5 sec.: 1. Engine speed: 500 rpm or more. 2. A trouble signal in the engine control system is input.	Engine control system

INSPECTION PROCEDURE

1	**Check DTC for engine.**

*1 → **Repair engine control system according to the output code.**

*2 →

Check for ECM connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

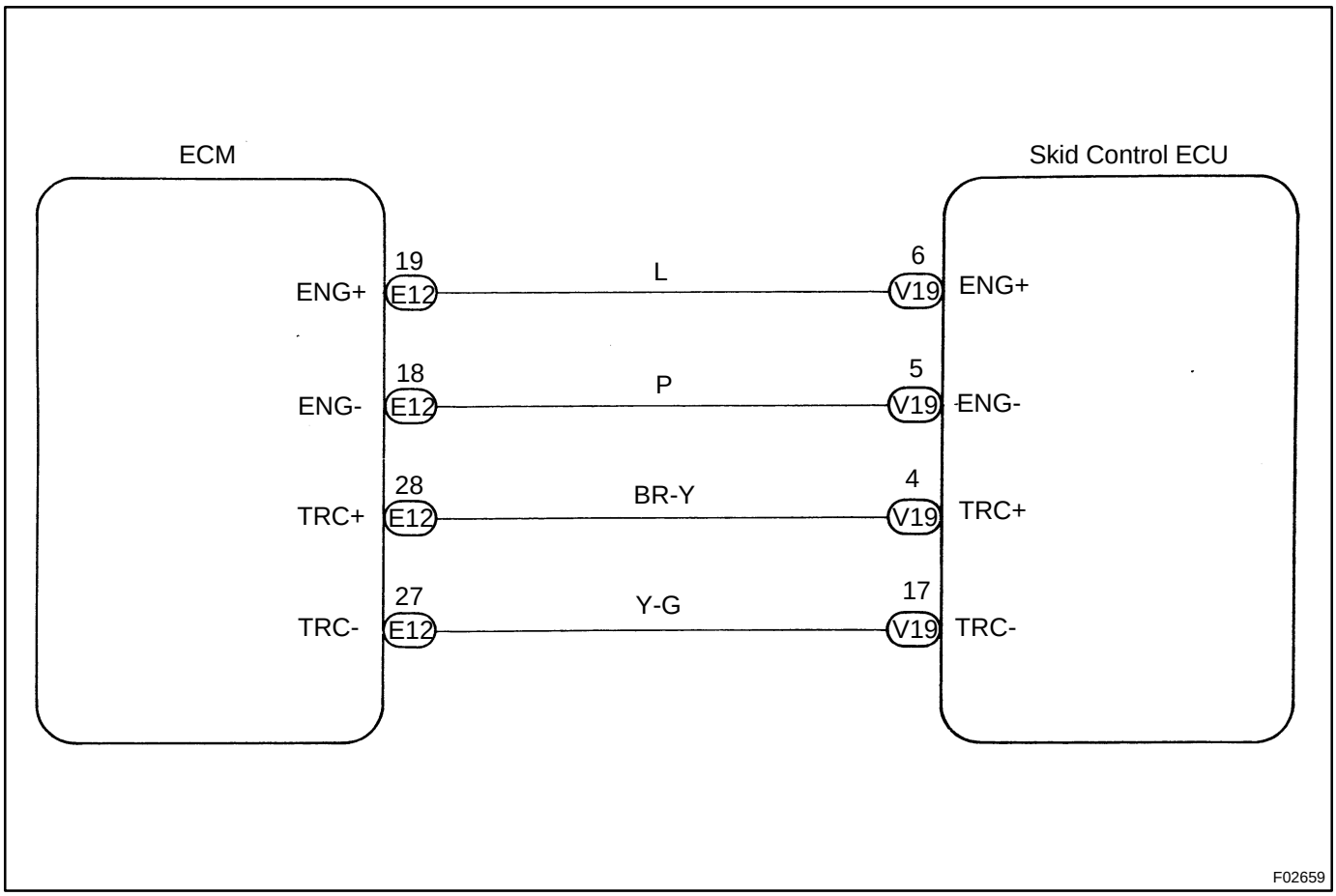
DTC	C1203 / 53	ECM Communication Circuit Malfunction

CIRCUIT DESCRIPTION

The circuit is used to send TRAC & VSC control information from the skid control ECU to the ECM (TRC+, TRC-), and engine control information from the ECM to the skid control ECU (ENG+, ENG-).

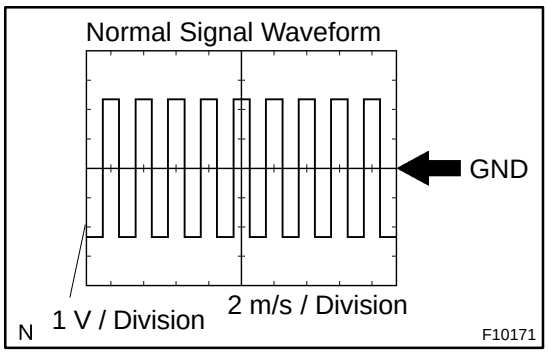
DTC No.	DTC Detecting Condition	Trouble Area
C1203 / 53	Either the condition 1. or 2. continues for 5 sec.: 1. ECU IG1 terminal voltage is 9.5 V to 17.0 V and data transmission to the ECM is impossible. 2. ECU IG1 terminal voltage is 9.5 V to 17.0 V, engine speed is 500 rpm or more or vehicle speed is 60 km/h (36 mph) or more and data receiving from the ECM is impossible.	• TRC+ or TRC- circuit • ENG+ or ENG- circuit • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check skid control ECU communication.**



(REFERENCE) INSPECTION USING OSCILLOSCOPE

PREPARATION:

(a) Remove the skid control ECU with the connector still connected.

(b) Connect the oscilloscope to each of terminals ENG+ - ENG- and TRC+ - TRC- of the skid control ECU.

CHECK:

Start the engine and check the signal waveform.

OK → **Check and replace skid control ECU.**

NG

2	**Check for open and short circuit in harness and connector between each of terminals ENG+, ENG-, TRC+, TRC- of skid control ECU and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM.

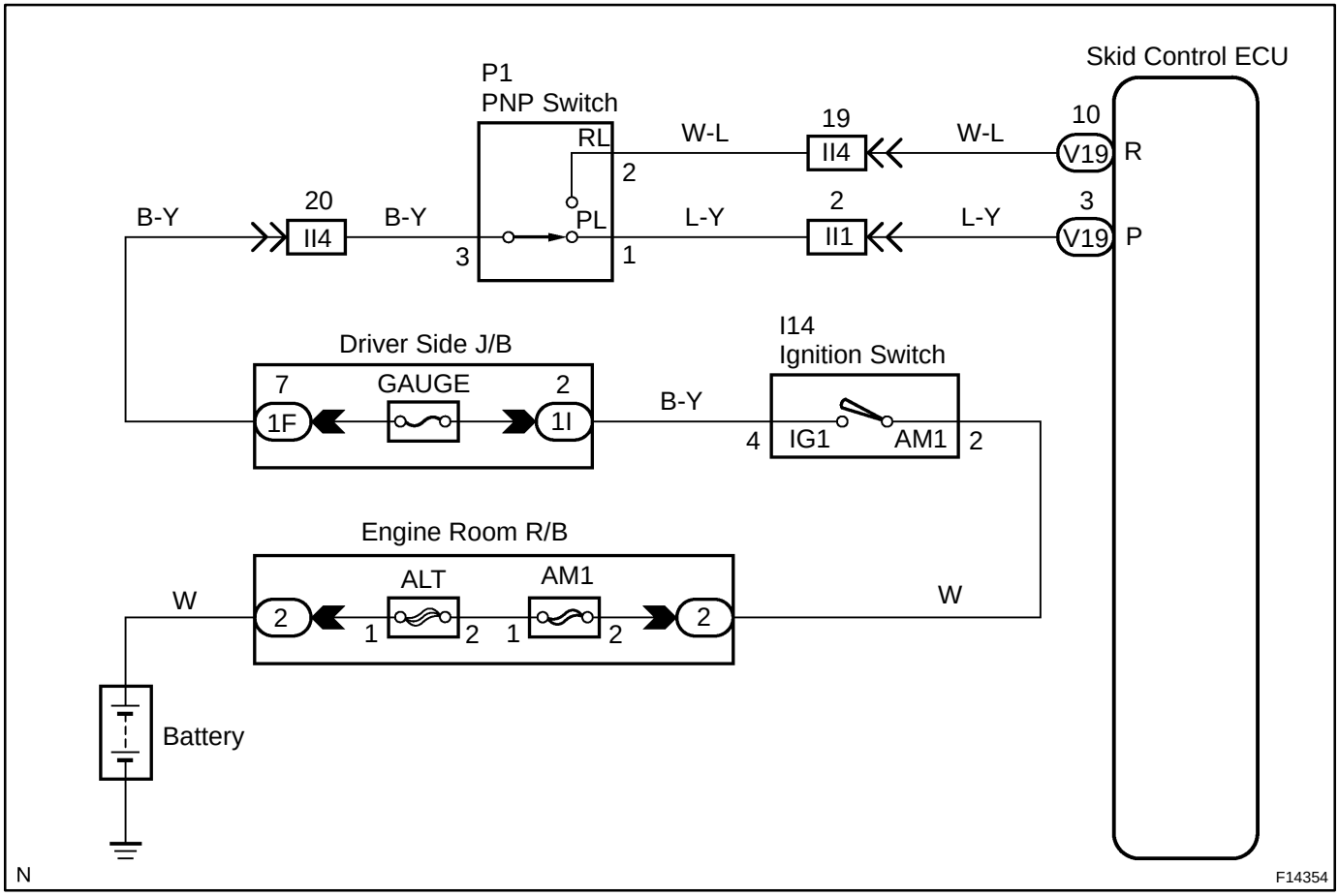
DI6CF-03

DTC	C1207 / 37	PNP Switch Circuit (P/R Range)

CIRCUIT DESCRIPTION

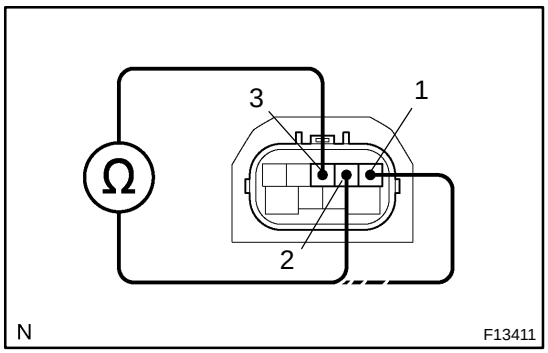
DTC No.	DTC Detection Condition	Trouble Area
C1207 / 37	When any of the condition 1. through 3. is detected: 1. At vehicle speed of 15 km/h (9 mph) or less, the conditions that P signal open circuit of park/neutral position switch is detected and the voltage of IG1 terminal is 9.5 V to 17 V continue for 5 sec. or more. 2. At vehicle speed of 15 km/h (9 mph) or more, the condition that P signal from park/neutral position switch is ON, and the the shift lever position information from the ECM is other than in P or N position continues for 60 sec. or more. 3. At vehicle speed of 15 km/h (9 mph) or less, the conditions that P signal open circuit of park/neutral position switch is ON and the voltage of IG1 terminal is 9.5 V to17 V continue for 5 sec. or more.	• PNP switch • PNP switch circuit (P/R range)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check PNP switch (P/R range).**



PREPARATION:

(a) Jack up the vehicle.

(b) Disconnect the PNP switch connector.

CHECK:

Check continuity between each terminal shown below when the shift lever is moved to each range.

OK:

P range	Terminals 3 - 1	Continuity
R range	Terminals 3 - 2	Continuity

NG → **Replace PNP switch.**

OK

2	**Check for open and short circuit in harness and connector between terminals P and R of skid control ECU and PNP switch (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

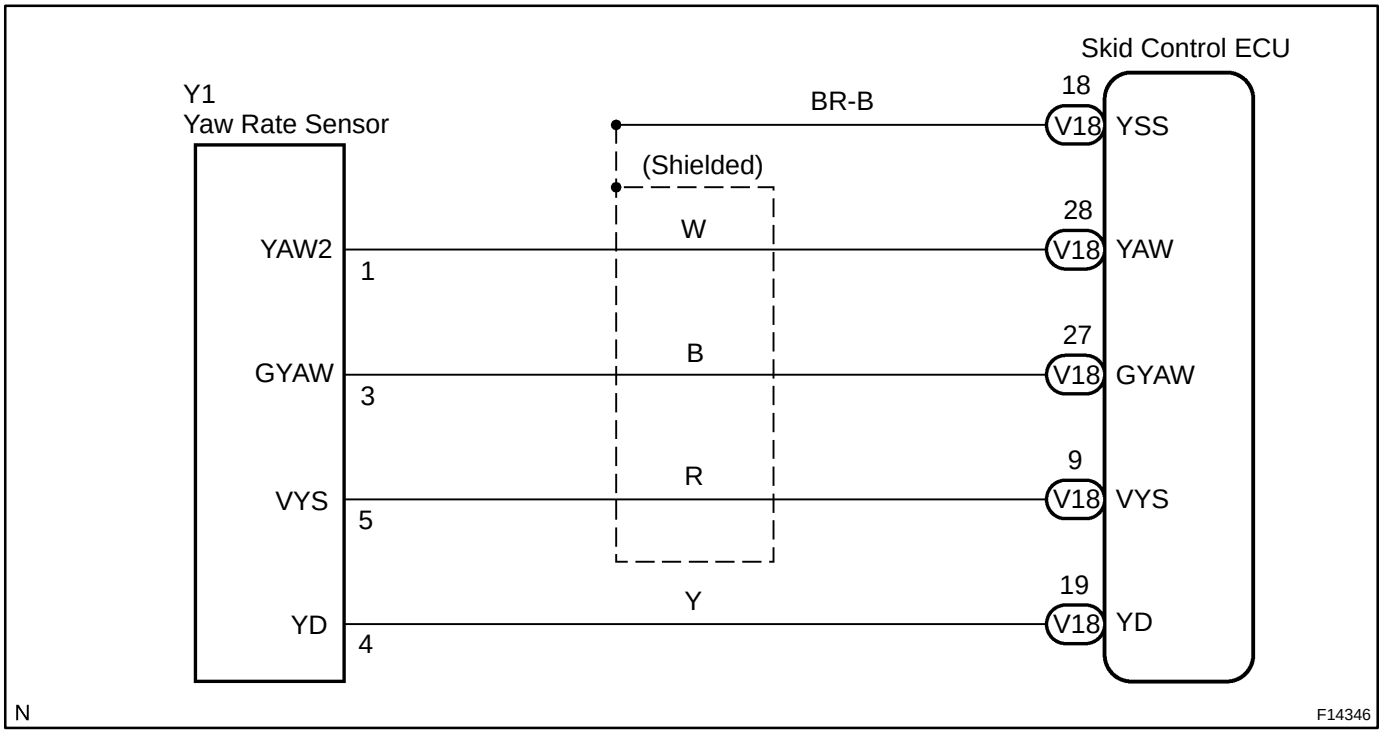
DI8XQ-02

DTC	C1210 / 36	Zero Point Calibration of Yaw Rate Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1210 / 36	When either the condition 1. or 2. is detected: 1. After battery terminal was connected, ECU terminal IG1 is turned ON for the first time. Within 15 sec. the shift lever is moved to any position except P range. 2. When the yaw rate sensor zero point recorded in ECU is deleted.	• Yaw rate sensor • Yaw rate sensor circuit • PNP switch circuit (P range)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Perform zero point calibration of yaw rate sensor (See page DI-224).**

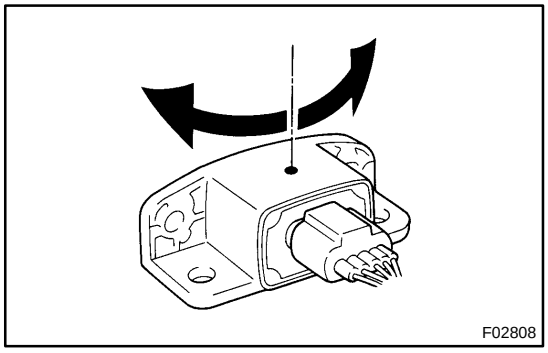
2	**Is DTC still output?**

Check DTC on page DI-224 .

NO → **No problem.**

YES

3	**Check output value of yaw rate sensor.**



In case of using the hand-held tester:

PREPARATION:

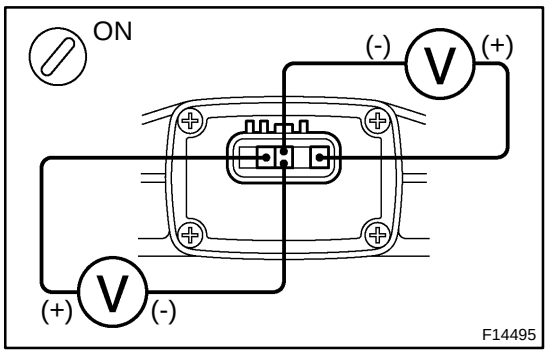
(a) Remove the 2 bolts and the yaw rate sensor with the connector still connected.
(b) Connect the hand-held tester to DLC3.
(c) Turn the ignition switch ON and push the hand-held tester main switch ON.
(d) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the yaw rate sensor value of the yaw rate sensor displayed on the hand-held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.
(Reference)
When the yaw rate sensor is stationary:
Output value: ± 4 deg/s



In case of not using the hand-held tester:

PREPARATION:

(a) Remove the consol box, then the yaw rate sensor with the connector still connected.

(b) Turn the ignition switch ON.

CHECK:

Measure voltage between terminals YAW2 (1) - GYAW (3), and terminals YD (4) - GYAW (3) of the yaw rate sensor.

OK:

Terminals 1 and 3 (YAW - GYAW)	About 2.42 - 2.58 V
Terminals 4and 3 (YD - GYAW)	About 4.5 - 5.3 V

NG → **Replace yaw rate sensor.**

OK

4	**Check for open and short circuit in harness and connector between yaw rate sensor and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

DI6CH-03

DTC	C1223 / 43	ABS Control System Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1223 / 43	ABS control system is abnormal.	ABS control system

INSPECTION PROCEDURE

1	**Check DTC for ABS (See page DI-224).**

***1** → **Repair ABS control system according to the code output.**

***2**

Check ECU connected to malfunction indicator light.

*1: Output NG code
*2: Malfunction indicator light remains ON

DI6CI-03

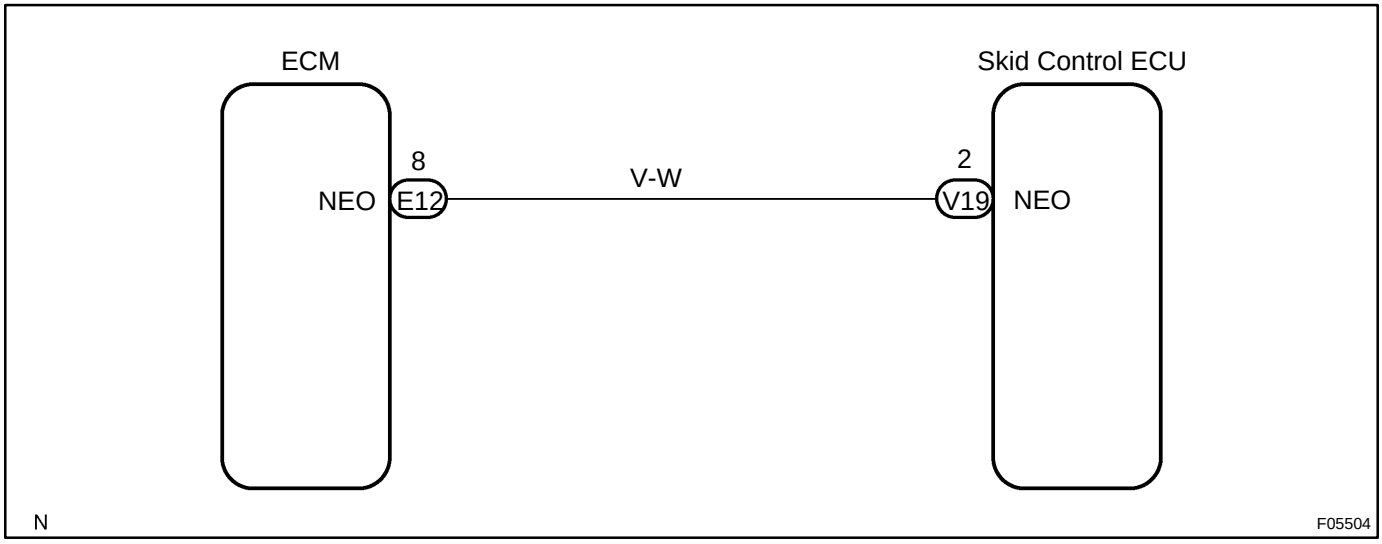
DTC	C1224 / 44	NE Signal Circuit

CIRCUIT DESCRIPTION

The ABS & BA & TRAC & VSC ECU receives engine revolution speed signals (NE signals) from the ECM.

DTC No.	DTC Detecting Condition	Trouble Area
C1224 / 44	When either the condition 1. or 2. is detected: 1. At vehicle speed of 30 km/h (19 mph) or more, and when data received from the ECM is in normal condition, and open or short circuit for engine revolution signal circuit continues for 10 sec. or more. 2. While TRAC is operating, the conditions that open or short circuit in engine revolution signal circuit is detected, main throttle opening degree is 0 and IDL switch is OFF continue for 0.24 sec. or more.	• NEO circuit • ECM • Skid control ECU

WIRING DIAGRAM



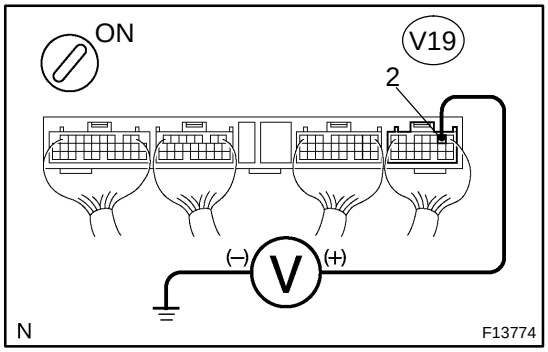
INSPECTION PROCEDURE

1	**Check for open and short circuit in harness and connector between terminal NEO of skid control ECU and terminal NEO of ECM (See page IN-28).**

NG → **Repair or replace harness and connector.**

OK

2	**Check voltage between terminal NEO of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

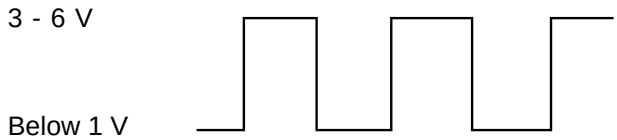
(a) Turn the ignition switch ON.

(b) Measure voltage between terminal NEO (V19 - 2) of the skid control ECU and body ground for the engine conditions below.

OK:

Engine condition	Voltage
OFF (IG ON)	3 - 6 V or below 1 V
ON (Idling)	3 - 6 V ↔ below 1 V (Pulse)

(Reference)



NG → **Check and replace skid control ECU or ECM.**

OK

If the same codes is still output after the DTC is deleted, check the contact condition of each connection.

DI6BK-03

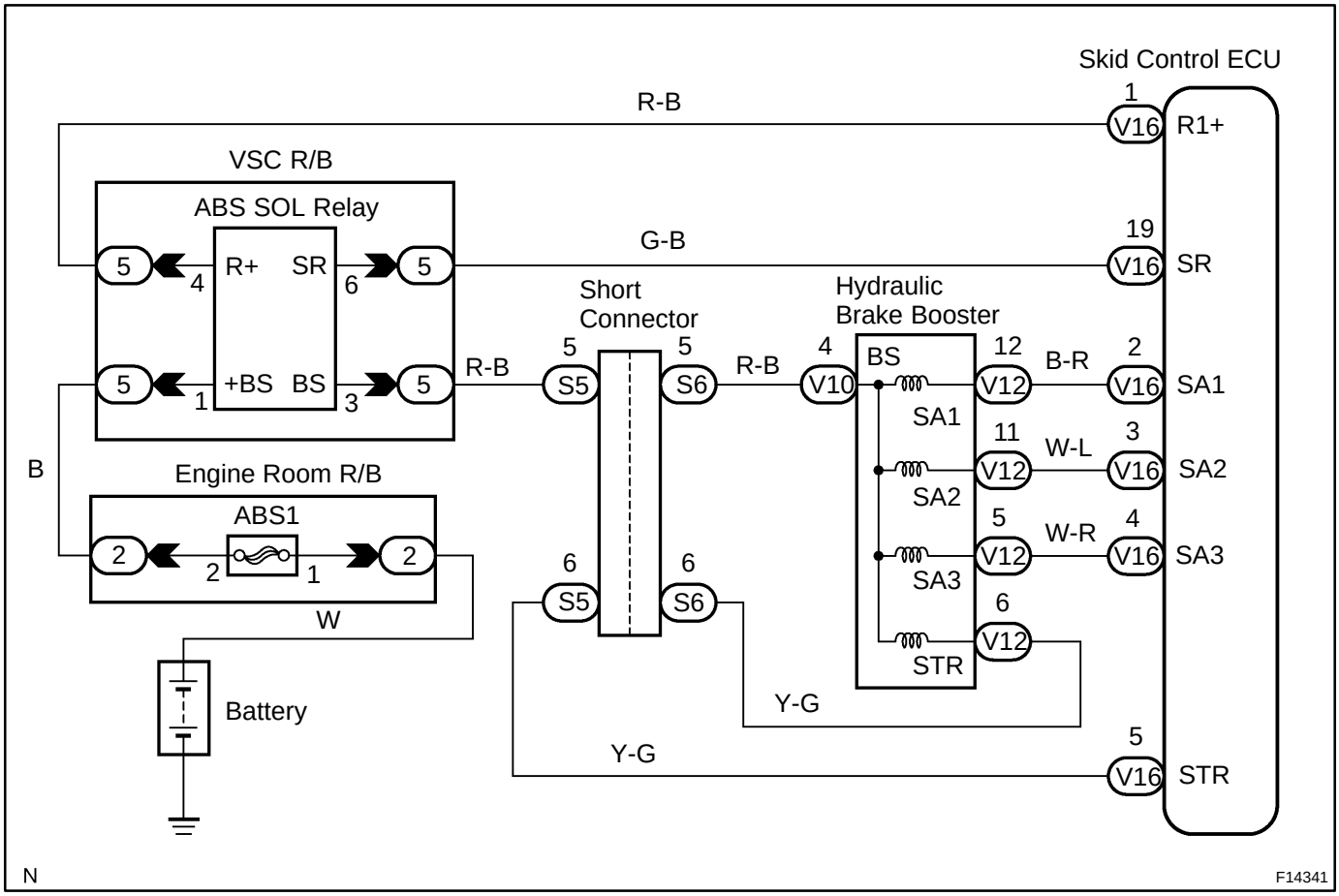
DTC	C1225 / 25 - C1228 / 28	TRAC & VSC Solenoid Circuit

CIRCUIT DESCRIPTION

The TRAC & VSC solenoid operates in accordance with signals from the ECU and raises and lowers the fluid pressure in the brake cylinders.

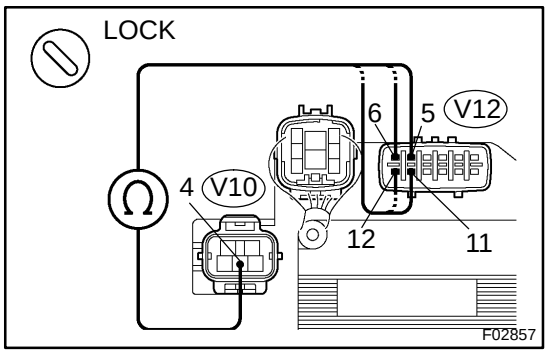
DTC No.	DTC Detecting Condition	Trouble Area
C1225 / 25	Open or short circuit for SA1 circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SA1 circuit
C1226 / 26	Open or short circuit for SA2 circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SA2 circuit
C1227 / 27	Open or short circuit for SA3 circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • SA3 circuit
C1228 / 28	Open or short circuit for STR circuit continues for 0.015 sec. or more.	• Hydraulic brake booster • STR circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check TRAC & VSC solenoid.**



PREPARATION:

Disconnect the 2 connectors (V10, V12) from the hydraulic brake booster.

CHECK:

Check continuity between terminals V10 - 4 and V12 - 5, 6, 11 and 12 of the hydraulic brake booster.

OK:

Continuity

HINT:

Resistance of each solenoid at 20 ˚C (68 ˚F)

SA1, SA2, STR: 3.5 - 3.9 Ω

SA3: 4.75 - 5.25 Ω

NG	**Replace hydraulic brake booster.**

OK

2	**Check for open and short circuit in harness and connector between skid control ECU and hydraulic brake booster (See page IN-28).**

NG	**Repair or replace harness or connector.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, ECU may be defective.

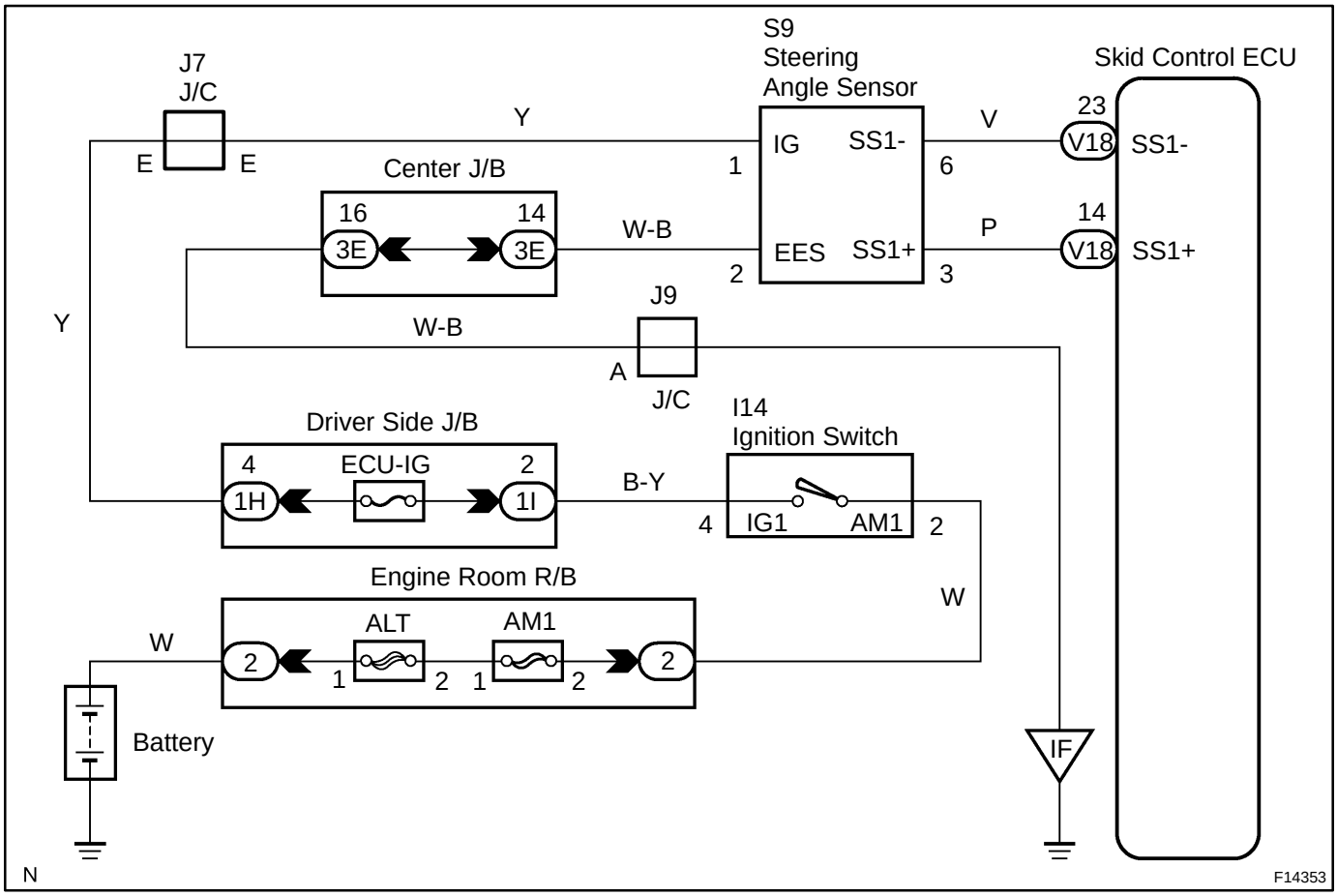
DI6CJ-03

DTC	C1231 / 31	Steering Angle Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1231 / 31	Detection of any of conditions 1. through 3.: 1. When the condition that ECU terminal IG1 voltage is 9.5 V or more, and ECU does not receive a data from steering angle sensor continues for 1 sec. or more. 2. When the steering angle sensor value changes by 360˚ or more with SSC signal from steering angle sensor remaining ON or OFF. 3. When the condition that difference between the steering angle valve output by SSC when the steering wheel is positioned straight-forward, and the one when the steering wheel is turned for 360˚ is out of the range from 355.5˚ - 364.5˚ occurs 10 times or more.	• Steering angle sensor • Steering angle sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 3 in case of not using the hand-held tester.

1	**Check output value of steering angle sensor.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the steering wheel turning angle value of the steering angle position sensor displayed on the hand-held tester is changing when the steering wheel is turned.

HINT:

It is necessary to drive the vehicle straight-forward at 35 km/h (22 mph) or more for 1 sec. or more so that the hand-held tester can measure and output the data.

OK:

Steering wheel turning angle value must be changing.

OK → **Go to step 3.**

NG

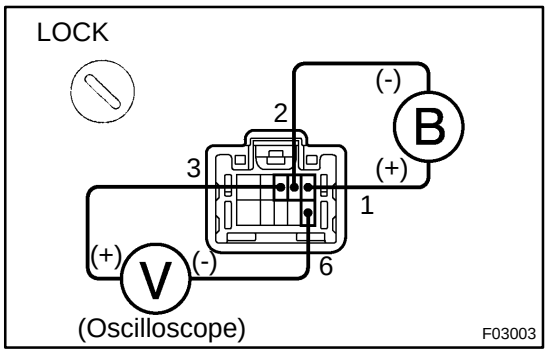
2	**Replace ECU and check whether or not the trouble occurs again.**

OK → **Replace steering angle sensor.**

NG

END

3	Check steering angle sensor.



PREPARATION:

(a) Remove the steering wheel lower covers, steering wheel pad, steering wheel column upper and lower covers (See page SR-22).

(b) Disconnect the combination switch connector (for the steering angle sensor).

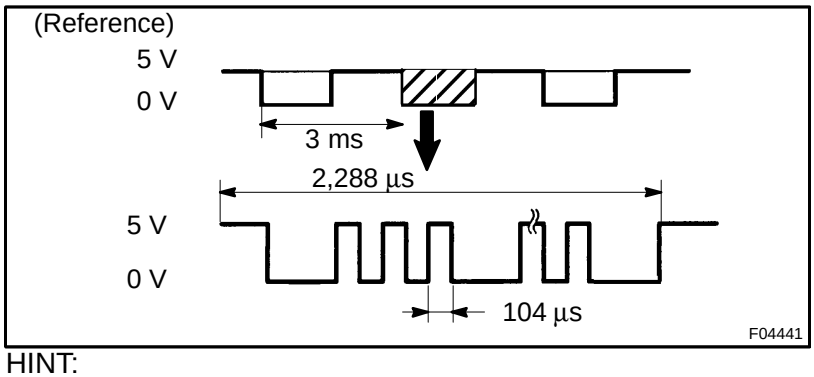
(c) Connect the oscilloscope to terminals 3 and 6 of the combination switch connector (for the steering angle sensor).

(d) Apply battery positive voltage between terminals 1 and 2.

CHECK:

Turns the steering wheel slowly and check the signal waveform.

OK:



HINT:

The above signal waveform does not repeat ON and OFF regularly and this combination changes case by case according to the data.

NG	Replace steering angle sensor.

OK

4	Check that slits of the steering sensor disc are clogged up.

NG	Repair or replace steering sensor disc.

OK

5	**Check for open and short circuit in harness and connector between steering angle sensor and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

DI8XR-02

DTC	C1232 / 32, C1244 / 44	Deceleration Sensor Circuit

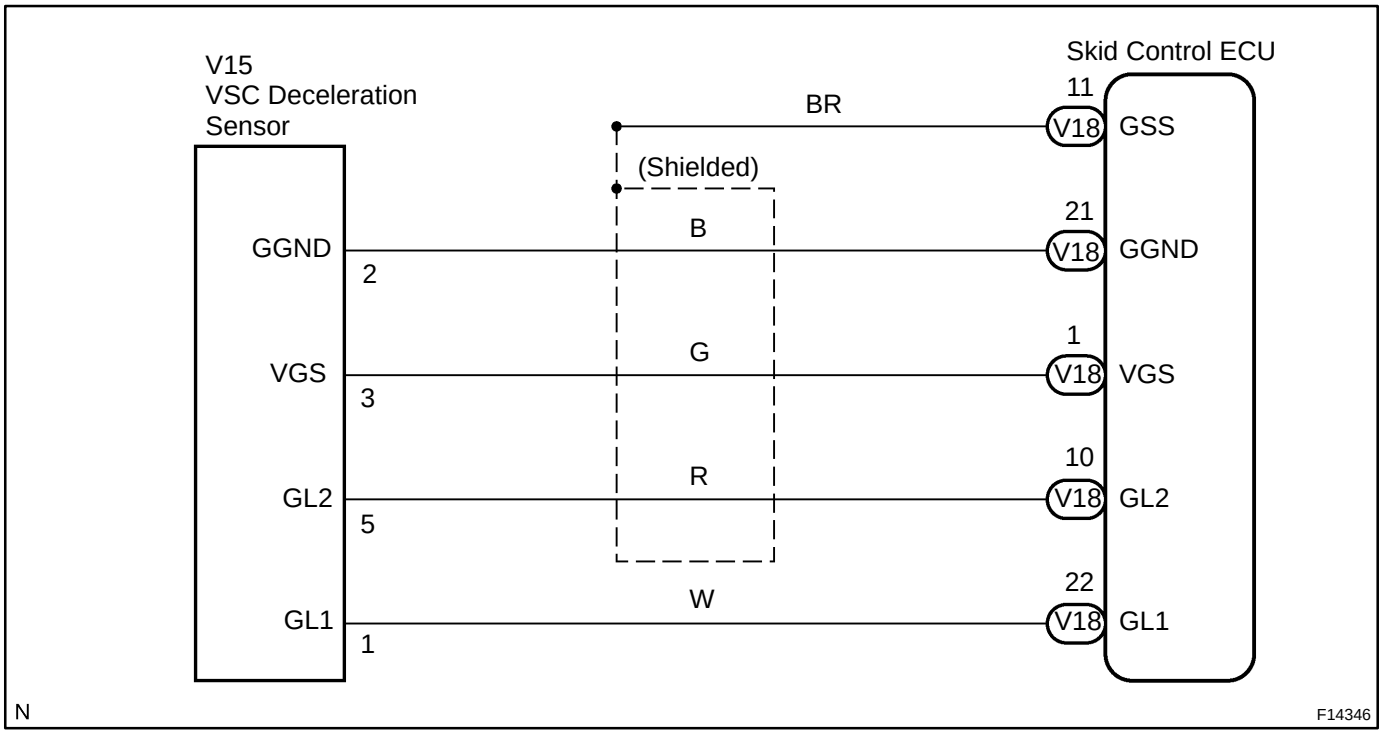
CIRCUIT DESCRIPTION

This sensor detects deceleration on the vehicle. The sensor signal is used in ABS & BA & TRAC & VSC. If the sensor functions abnormally, the ABS warning light comes on.

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1232 / 32	Detection of either the condition 1. or 2.: 1. At the vehicle speed of 10 km/h (6 mph) or more, when the condition that ECU terminal GL1 signal change range is less than 20 mV, and ECU terminal GL2 signal change range swings by 468 mV or more occurs for 30 sec. or more. 2. At the vehicle speed of 10 km/h (6 mph) or more, the condition that ECU terminal GL2 signal change range is less than 20 mV, and ECU terminal GL1 signal change range swings by 468 mV or more occurs for 30 sec. or more.	• Deceleration sensor • Deceleration sensor circuit
C1244 / 44	Any of the conditions 1. through 4. is detected: 1. The condition that ECU terminals GL1 and GL2 values are -1.5 G or less or 1.5 G or more continues for 1.2 sec. or more. 2. The condition that the deceleration sensor terminal VGS voltage is 4.4 V or less or 5.6 V or more continues for 1.2 sec. or more. 3. At the vehicle speed of 0 km/h (0 mph), after the difference of output value between deceleration sensor terminals GL1 and GL2 becomes 0.6 G or more, the condition that it does not become 0.4 G or less continues for 60 sec. or more. 4. Deceleration sensor signal momentary open occurs for 7 times or more.	• Deceleration sensor • Deceleration sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

2	**Check deceleration sensor.**

In case of using the hand-held tester:

PREPARATION:

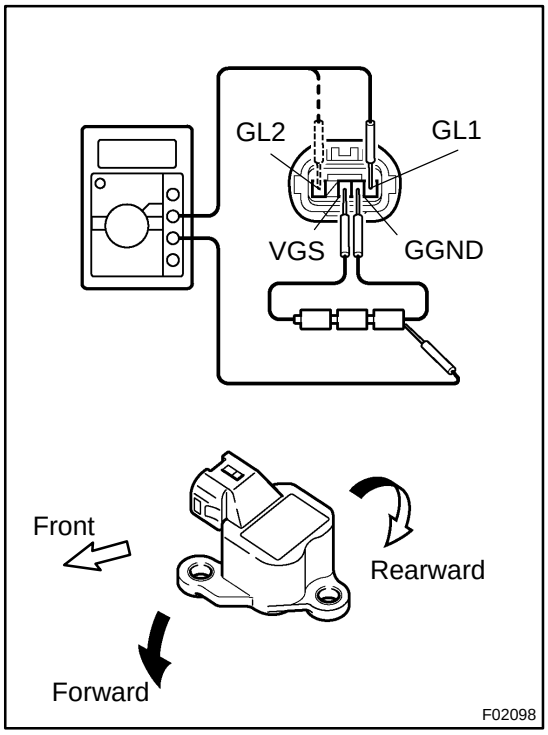
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and turn the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing as the vehicle is tilted.

OK:

Deceleration value must be changing.



In case of not using the hand-held tester:

PREPARATION:

(a) Remove the consol box.
(b) Connect 3 dry batteries of 1.5 V in series.
(c) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (-) terminal, apply about 4.5 V between VGS and GGND terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean forward	0.4 V - about 2.3 V
GL1	Lean rearward	About 2.3 V - 4.1 V
GL2	Horizontal	About 2.3 V
GL2	Lean forward	About 2.3 V - 4.1 V
GL2	Lean rearward	0.4 V - about 2.3 V

HINT:

- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.

NG → **Replace deceleration sensor.**

OK

Check and replace skid control ECU.

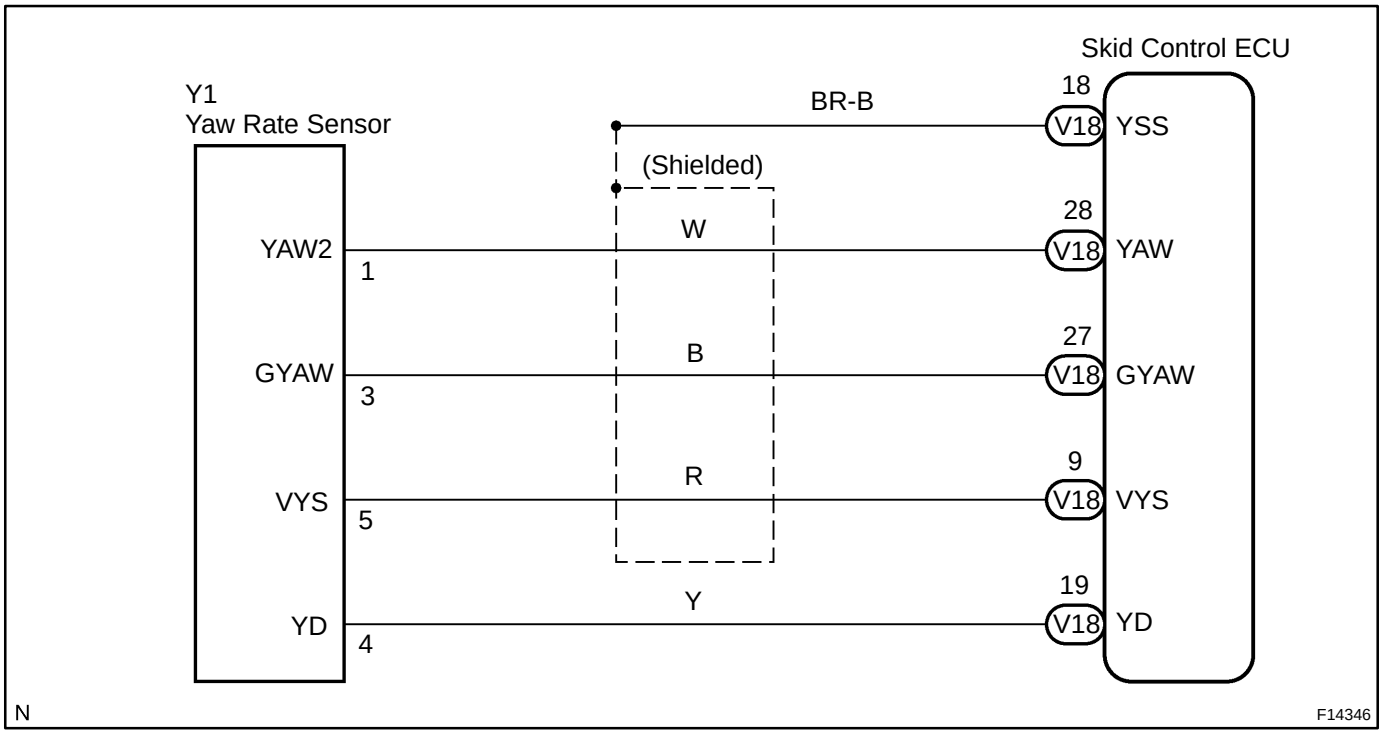
DI6CL-03

DTC	C1233 / 33, C1234 / 34	Yaw Rate Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1233 / 33	When any of the conditions 1. through 4. is detected: 1. ECU terminal IG1 voltage is 9.5 V to 17.0 V, and the condition that yaw rate sensor voltage is out of the range from 0.25 V to 4.75 V continues for 1 sec. or more. 2. The conditions that yaw rate sensor open detect circuit signal is ON and the voltage of ECU terminal IG1 is 9.5 V to 17 V continue for 1 sec. or more. 3. The conditions that yaw rate sensor power source voltage is out of the range from 4.4 V to 5.6 V and the voltage of ECU terminal IG1 is 9.5 V to 17 V continue for 1 sec. or more. 4. The condition that yaw rate sensor signal is momentarily open occurs 10 times or more and the voltage of ECU terminal IG1 is 9.5 V to 17 V.	• Yaw rate sensor • Yaw rate sensor circuit
C1234 / 34	Condition 1. or 2. is detected: 1. The conditions that yaw rate sensor VYS terminal voltage is 4.75 V to 5.25 V and YD malfunction signal of yaw rate sensor is ON continue for 5 sec. or more. 2. Shift lever position is in P range and output voltage of yaw rate sensor is out of the range from 2.4 V to 2.6 V or after the difference from zero point calibration voltage of yaw rate sensor has become 0.08 V or more and when the condition that the vehicle speed exceeds 15 km/h (9 mph) while output condition of yaw rate sensor has been repeated more than 3 times.	

WIRING DIAGRAM

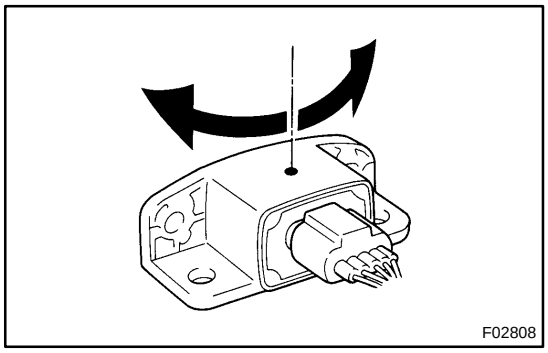


INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 3 in case of not using the hand-held tester.

1	**Check output value of yaw rate sensor.**



PREPARATION:

(a) Remove the 2 bolts and the yaw rate sensor with the connector still connected.

(b) Connect the hand-held tester to DLC3.

(c) Turn the ignition switch ON and push the hand-held tester main switch ON.

(d) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the yaw rate value of the yaw rate sensor displayed on the hand-held tester is changing: Place the yaw rate sensor vertically to the ground and turn the sensor pivoted on its center.

OK:

Yaw rate value must be changing.

OK	**Go to step 4.**

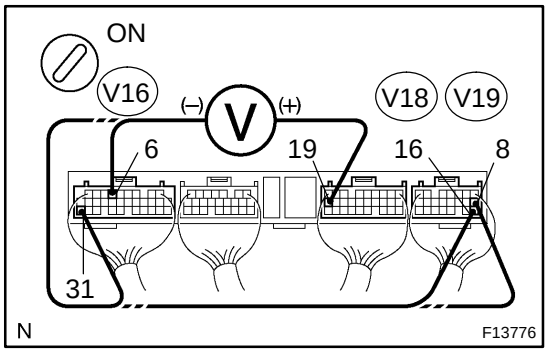
NG

2	**Check whether continuity exists between terminal YD of yaw rate sensor and terminal skid control ECU.**

NG → **Repair or replace harness or connector.**

OK

3	**Check voltage between terminals YD and GND of skid control ECU.**



PREPARATION:
Remove the skid control ECU with the connector still connected.

CHECK:
(a) Turn the ignition switch ON.
(b) Measure voltage between terminals YD (V18 - 19) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

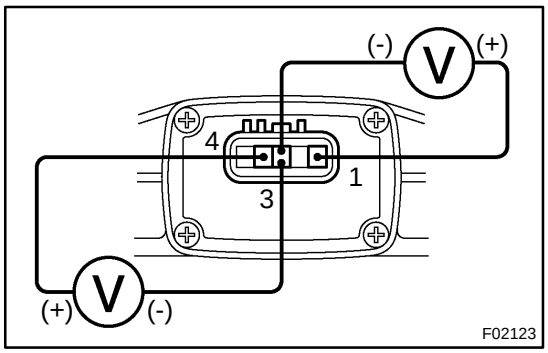
OK:
Voltage: 4.5 - 5.3 V

NG → **Replace yaw rate sensor.**

OK

Check and replace skid control ECU.

4	Check yaw rate sensor.



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals 1 and 3, 3 and 4 of the yaw rate sensor with the connector still connected.

OK:

Terminals 1 and 3 (YAW - GYAW)	Approx. 2.5 V
Terminals 3 and 4 (GYAW - YD)	Approx. 4.5 V - 5.3 V

NG → **Replace yaw rate sensor.**

OK

Check and replace skid control ECU.

DI6BL-03

DTC	C1237 / 37	Tires of Different Size

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1237 / 37	The condition of driving at more than 30 km/h (19 mph) for more than 20 seconds with 1 or 2 tires of different size is detected 3 times continuously.	Tire size

INSPECTION PROCEDURE

1	**Check tire size.**

NG → **Replace tires so that all 4 tires are of the same size.**

OK

Check and replace skid control ECU.

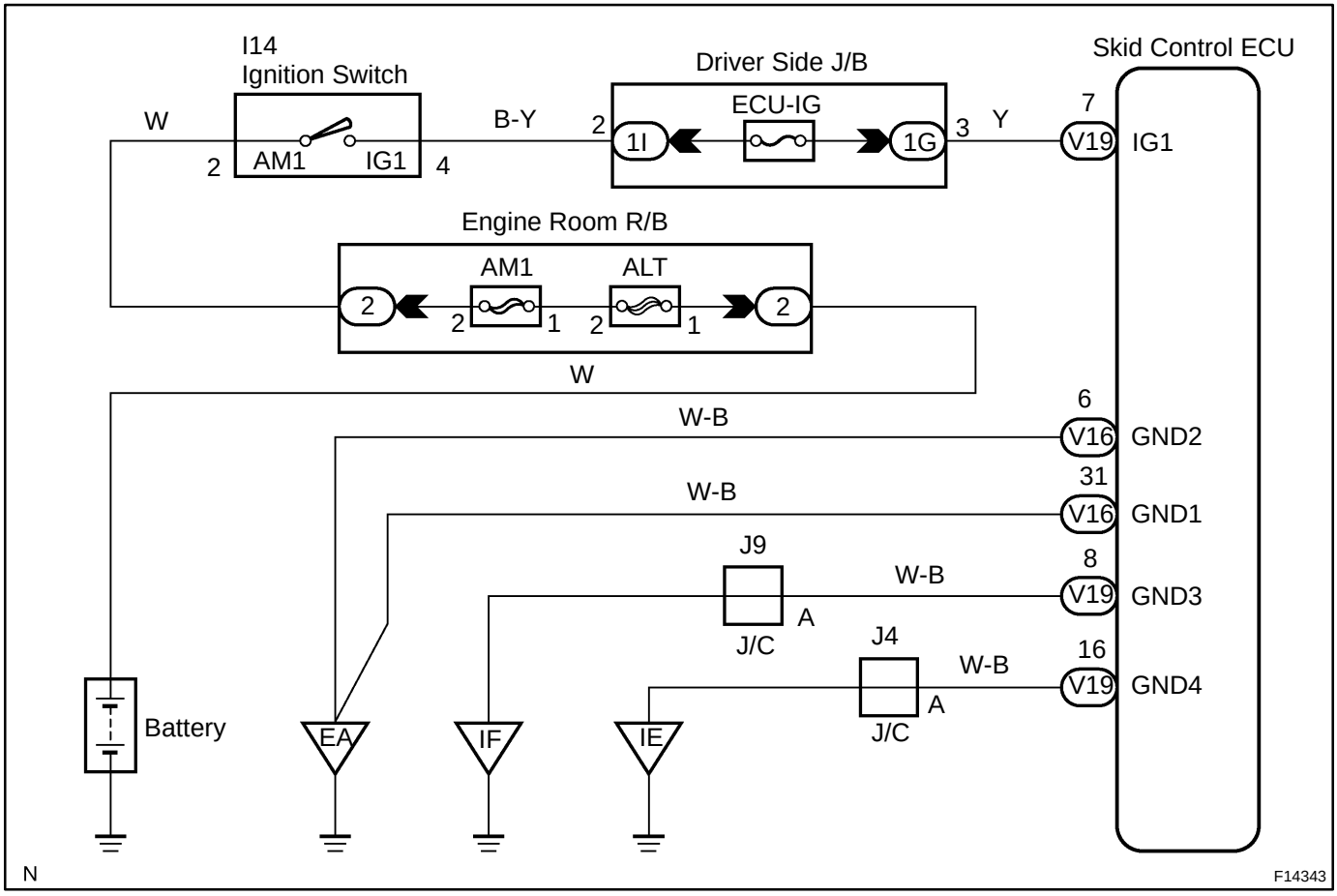
DI6BM-03

DTC	C1241 / 41	IG Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1241 / 41	Detection of any of conditions 1. through 4.: 1. Vehicle speed is 3 km/h (1.9 mph) or more and voltage of ECU terminal IG remains below 9.5 V for more than 10 sec. 2. While the condition that the ABS SOL relay is ON continues, ECU terminal IG1 voltage becomes 9.5 V or less, and the condition that the contact point of the ABS SOL relay is OFF continues for 0.2 sec. or more. 3. The condition that ECU terminal IG1 voltage is more than 17.0 V continues for 1.2 sec. or more. 4. While the ABS SOL relay outputs ON signal, ECU terminal IG1 voltage becomes more than 17.0 V, and the condition that the contact point of the ABS SOL relay is OFF continues for 0.2 sec. or more.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

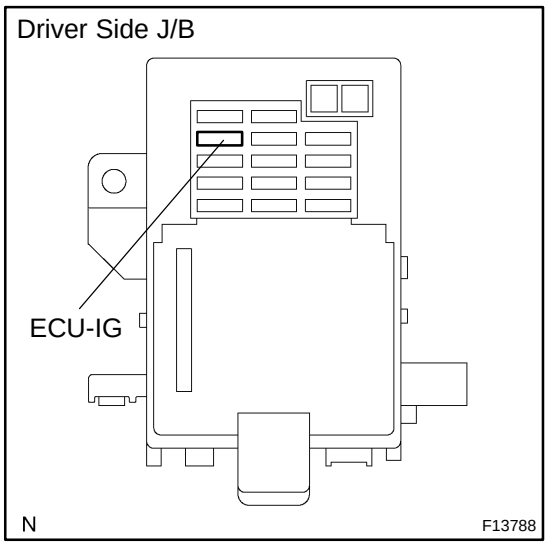
OK:

Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK

2	**Check ECU-IG fuse.**



PREPARATION:

Remove the ECU-IG fuse from the driver side J/B.

CHECK:

Check continuity of the ECU-IG fuse.

OK:

Continuity

NG → **Check for short circuit in all the harnessers and components connected to ECU-IG fuse (See attached wiring diagram).**

OK

3	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

(a) Connect the hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push the hand-held tester main switch ON.

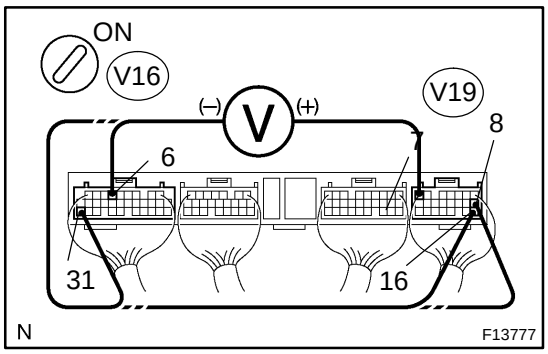
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check the voltage condition output from the ECU displayed on the hand-held tester.

OK:

"Normal" is displayed.



In case of not using the TOYOTA hand-held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals IG1 (V19 - 7) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

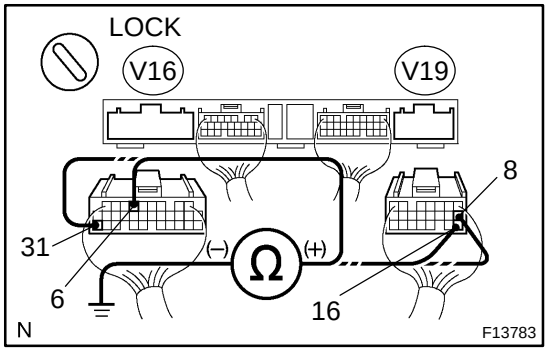
OK:

Voltage: 10 - 14 V

OK	**Check and replace skid control ECU.**

NG

4	**Check continuity between terminal GND of skid control ECU connector and body ground.**



PREPARATION:

Disconnect the connectors (V16, V19) from the skid control ECU.

CHECK:

Measure resistance between terminal GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU harness side connector and body ground.

OK:

Resistance: 1 Ω or less

NG	**Repair or replace harness or connector.**

OK

Check for open circuit in harness and connector between skid control ECU and battery (See page IN-28).

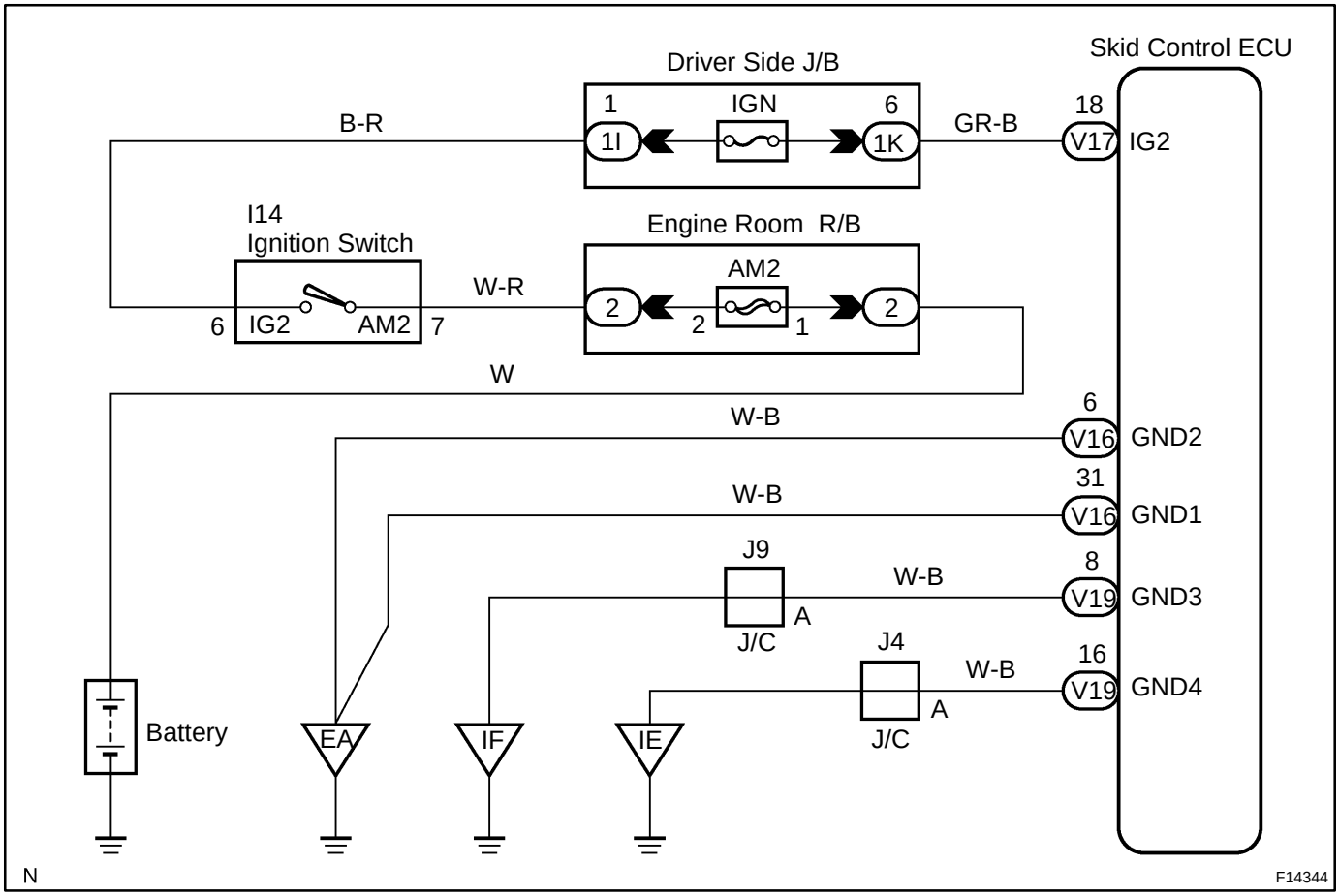
DI6BN-03

DTC	C1242 / 42	IG2 Power Source Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1242 / 42	With the vehicle running, open circuit in IG2 is detected for more than 7 sec.	• Battery • Charging system • Power source circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

OK:

Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK

2	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

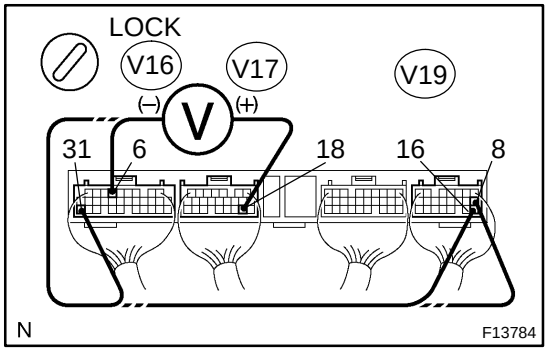
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check the voltage condition output from the ECU displayed on the hand-held tester.

OK:

"Normal" is displayed.



In case of not using the hand-held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG2 (V17 - 18) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

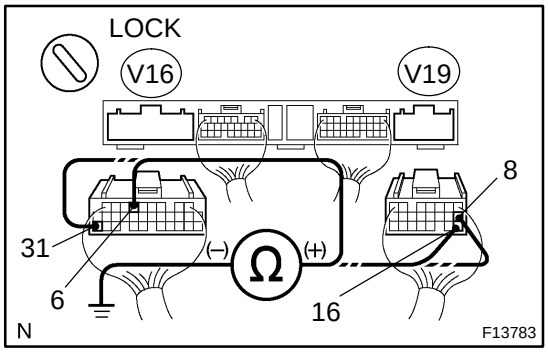
OK:

Voltage: 10 - 14 V

OK → **Check and replace skid control ECU.**

NG

3	**Check continuity between terminal GND of skid control ECU connector and body ground.**



PREPARATION:

Disconnect the connectors (V16, V19) from the skid control ECU.

CHECK:

Measure resistance between terminal GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU connector and body ground.

OK:

Resistance: 1 Ω or less

NG → **Repair or replace harness or connector.**

OK

Check for open circuit in harness and connector between skid control ECU and battery (See page IN-28).

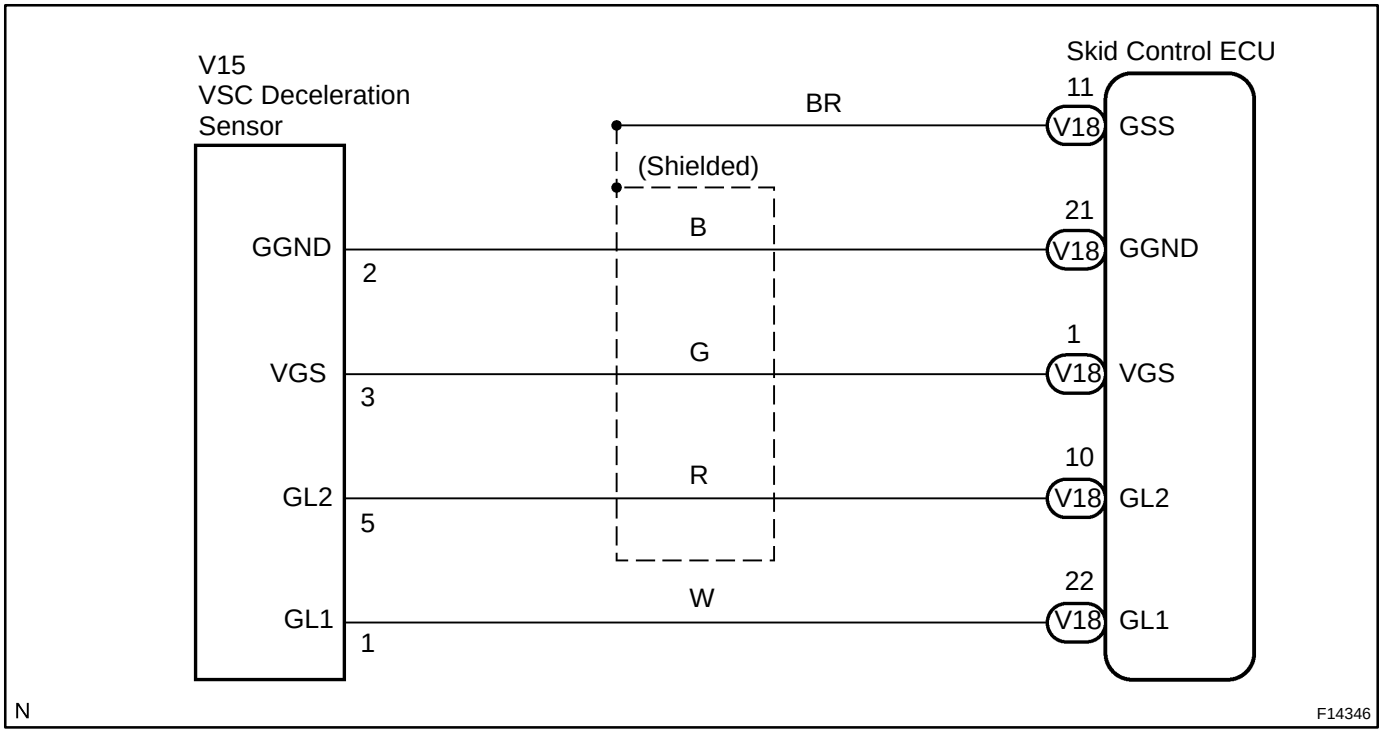
DI8XS-02

DTC	C1243 / 43, C1245 / 45	Malfunction in Deceleration Sensor

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1243 / 43	While vehicle speed becomes 0 km/h (0 mph) from 30 km/h (18 mph), the condition that GL1 and GL2 signals of ECU terminals do not change 40 mV or less continues 16 times in sequence.	• Deceleration sensor • Wire harness for deceleration sensor system
C1245 / 45	At the vehicle speed of 30 km/h (18 mph) or more, the condition that the difference between acceleration and deceleration values of computation from deceleration sensor and vehicle speed becomes more than 0.35 G continues for 60 sec. or more.	

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester, and go to step 3 in case of not using the hand-held tester.

1	**Check output value of deceleration sensor.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and turn the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing when the vehicle is tilted.

OK:

Deceleration value must be changing.

OK → **Go to step 3.**

NG

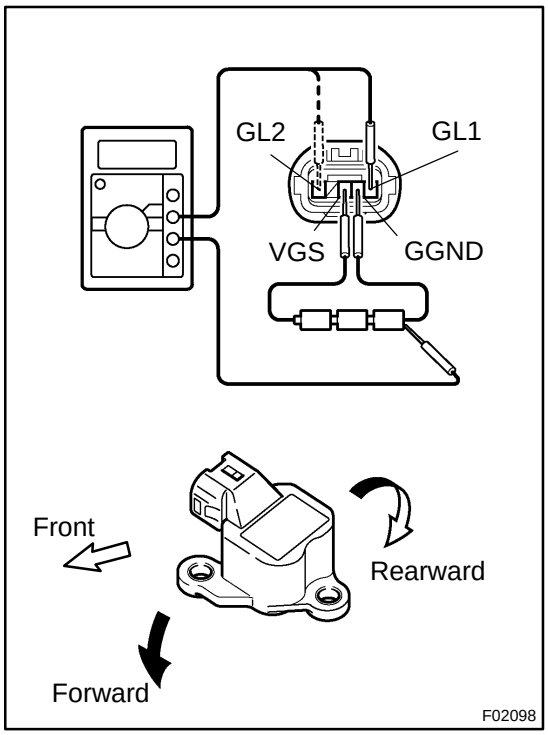
2	**Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Replace deceleration sensor.

3	Check deceleration sensor.



PREPARATION:

(a) Remove the consol box.
(b) Connect 3 dry batteries of 1.5 V in series.
(c) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (-) terminal, apply about 4.5 V between VGS and GGND terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean forward	0.4 V - about 2.3 V
GL1	Lean rearward	About 2.3 V - 4.1 V
GL2	Horizontal	About 2.3 V
GL2	Lean forward	About 2.3 V - 4.1 V
GL2	Lean rearward	0.4 V - about 2.3 V

HINT:

- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.

NG → **Replace deceleration sensor.**

OK

4	Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

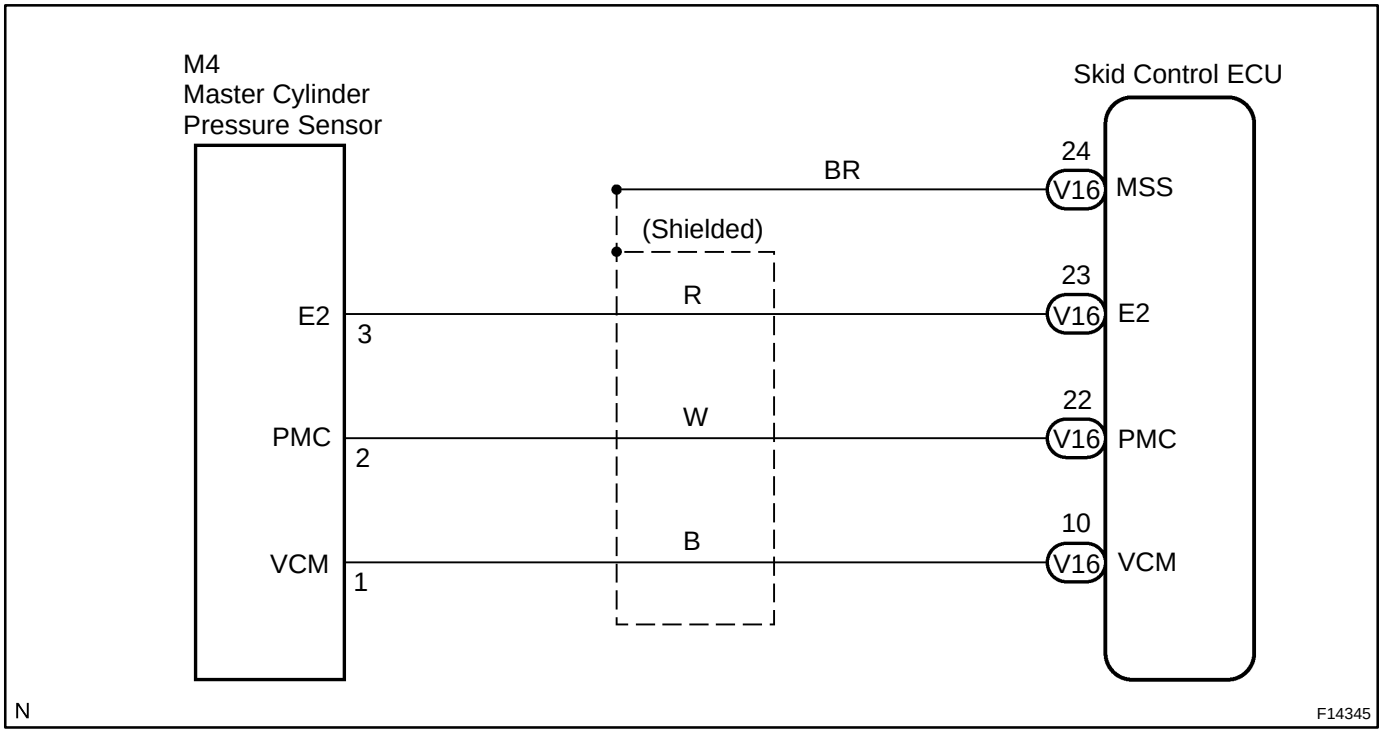
DI6BQ-04

DTC	C1246 / 46	Master Cylinder Pressure Sensor Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1246 / 46	Any of the conditions 1. through 5. is detected: 1. At the vehicle speed of 7 km/h (4 mph) or more, ECU terminal PMC voltage becomes more than 0.86 V and the condition that 0.01 V or less does not change continues for 30 sec. 2. Interference occurs to ECU terminal PMC 7 times or more in 5 sec. 3. ECU terminal STP is OFF, and the condition that terminal PMC voltage becomes more than 0.86 V or less than 0.3 V continues for 5 sec. or more. 4. The condition that ECU terminal IG1 voltage is 9.5 V to 17.0 V, and terminal VCM voltage is out of the range from 4.4 V to 5.6 V continues for 1.2 sec. or more. 5. The condition that ECU terminal VCM voltage is 4.4 V to 5.6 V, and terminal PMC voltage is out of the range from 0.14 V to 4.85 V continues for 1.2 sec. or more.	• Master cylinder pressure sensor • Master cylinder pressure sensor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check output value of master cylinder pressure sensor.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the brake fluid pressure value of the master cylinder pressure sensor displayed on the hand-held tester is changing when the brake pedal is depressed.

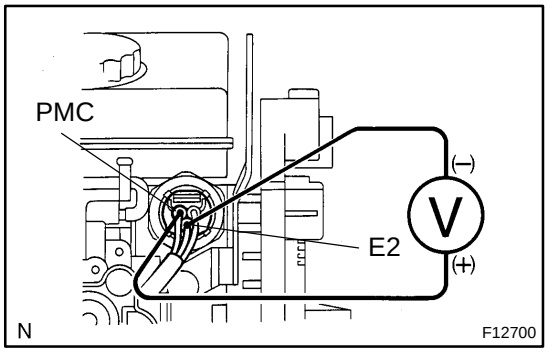
OK:

Brake fluid pressure value must be changing.

OK → **Go to step 4.**

NG

2	**Check master cylinder pressure sensor.**



PREPARATION:

Install LSPV gauge to the front caliper bleeder plug portion, and bleed LSPV gauge.

SST 09709-29018

CHECK:

Start the engine and depress the brake pedal, then check the relation between the fluid pressure and voltage of PMC and E2 terminals of the master cylinder pressure sensor with the connector still connected.

OK:

Front brake caliper fluid pressure	Voltage
0 kPa (0 Kgf/cm^2, 0 psi)	0.37 - 0.63 V
5,883 kPa (60 kgf/cm^2, 853 psi)	1.57 - 1.83 V
11,768 kPa (120 kgf/cm^2, 1,706 psi)	2.77 - 3.03 V

HINT:

Voltage of between terminals VCM and E2: 4.7 - 5.3 V

NG → **Replace master cylinder pressure sensor.**

OK

3	Check for open and short circuit in harness and connector between master cylinder pressure sensor and skid control ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

4	Check whether or not ECU terminal STP input voltage is changed when stop light switch is turned on and off.

NO → Check stop light switch circuit (See page BE-40).

YES

Check and replace skid control ECU.

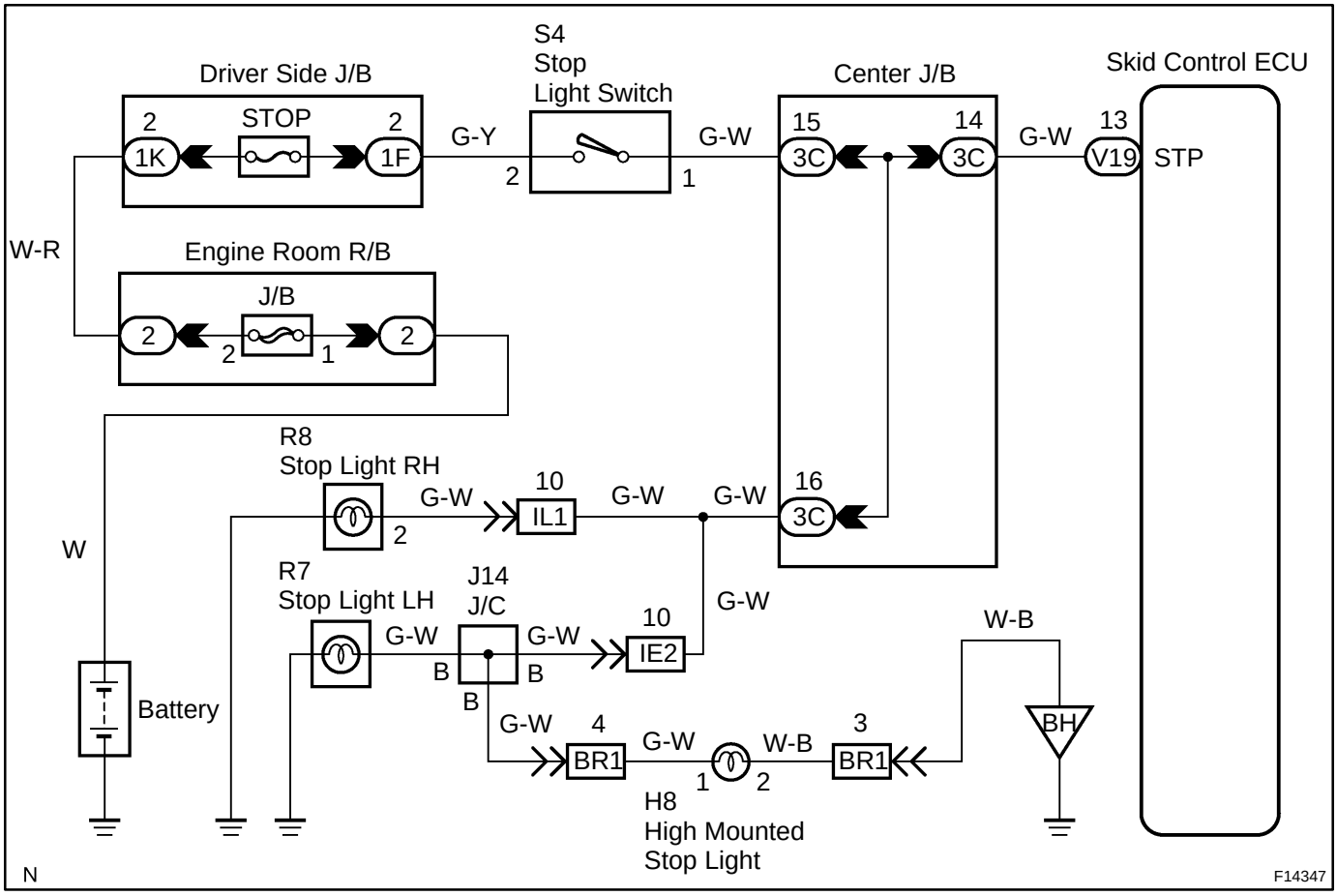
DI6BR-03

DTC	C1249 / 49	Stop Light Switch Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1249 / 49	ECU terminal IG1 voltage is 9.5 to 17.2 V and ABS is in non-operation, the open circuit in stop light switch circuit continues for 0.3 sec. or more.	Stop light switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of stop light switch.**

CHECK:

Check that the stop light lights up when the brake pedal is depressed and turns OFF when the brake pedal is released.

OK → **Go to step 3.**

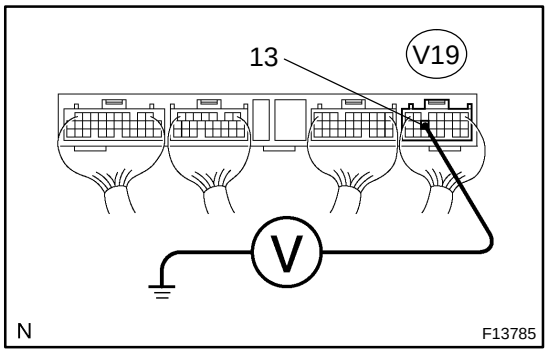
NG

2	**Check stop light circuit (See page BE-40).**

NG → **Repair or replace stop light circuit.**

OK

3	**Check voltage between terminal STP of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

Measure voltage between terminal STP (V19 - 13) of the skid control ECU and body ground when the brake pedal is depressed.

OK:

Voltage: 10 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-242).**

NG

4	**Check for open circuit in harness and connector between skid control ECU and stop light switch (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

5	**Check stop light bulb.**

NG → **Replace stop light bulb.**

OK

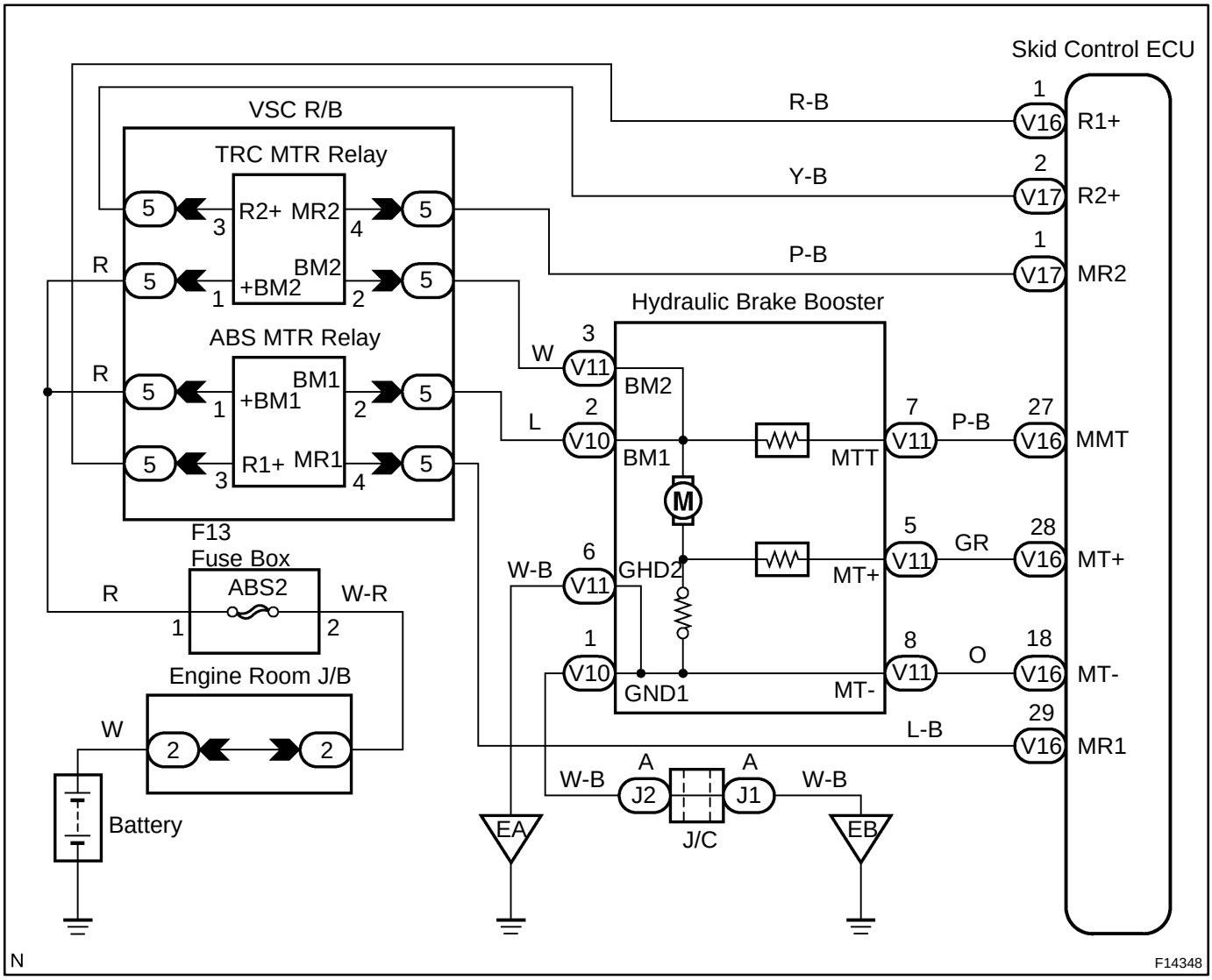
Check and replace skid control ECU.

DTC	C1251 / 51	Hydraulic Brake Booster Pump Motor Malfunction

CIRCUIT DESCRIPTION

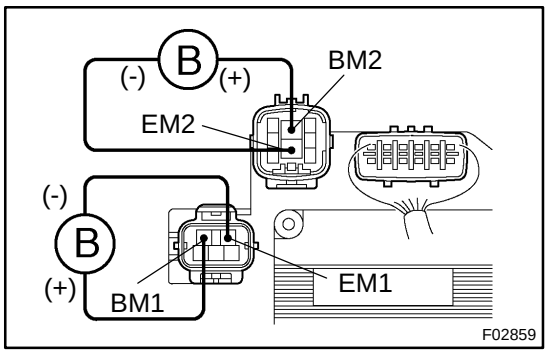
DTC No.	DTC Detecting Condition	Trouble Area
C1251 / 51	Either of the condition 1. or 2. is detected: 1. After the ignition switch is turned ON, the current of more than 30 A flows to the motor for more than 1 sec. 2. After the ignition switch is turned ON, less than 7 A change in current is detected more than 3 times continuously when the motor is ON.	Hydraulic brake booster pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of hydraulic brake booster pump motor.**



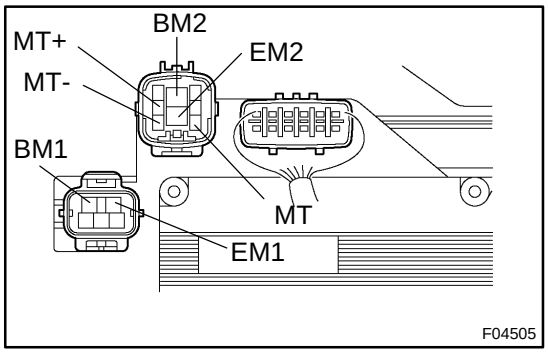
PREPARATION:
Disconnect the 2 connectors from the hydraulic brake booster.
CHECK:
Connect battery positive (+) lead to BM1 or BM2 terminal and battery negative (-) lead to EM1 or EM2 terminal of the hydraulic brake booster (pump motor) connector.
OK:

The operation sound of the pump motor should be heard.

NG	**Go to step 4.**

OK

2	**Check hydraulic brake booster resistance.**



PREPARATION:
Disconnect the 2 connectors from the hydraulic brake booster.
CHECK:
Check resistance between terminals MT+ and MT-, BM1 and MT, BM2 and MT, EM1 and MT+, EM2 and MT+ of the hydraulic brake booster connector.
OK:

30 - 36 Ω

NG	**Replace hydraulic brake booster assembly.**

OK

3	Check for open circuit in harness and connector between hydraulic brake booster (MT+, MT-) and skid control ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK →

Check and replace skid control ECU.

4	Check for open and short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN-28).

NG → Replace wire harness.

OK →

5	Check hydraulic brake booster pump motor (See page BR-42).

NG → Replace hydraulic brake booster pump motor.

OK →

Replace hydraulic brake booster.

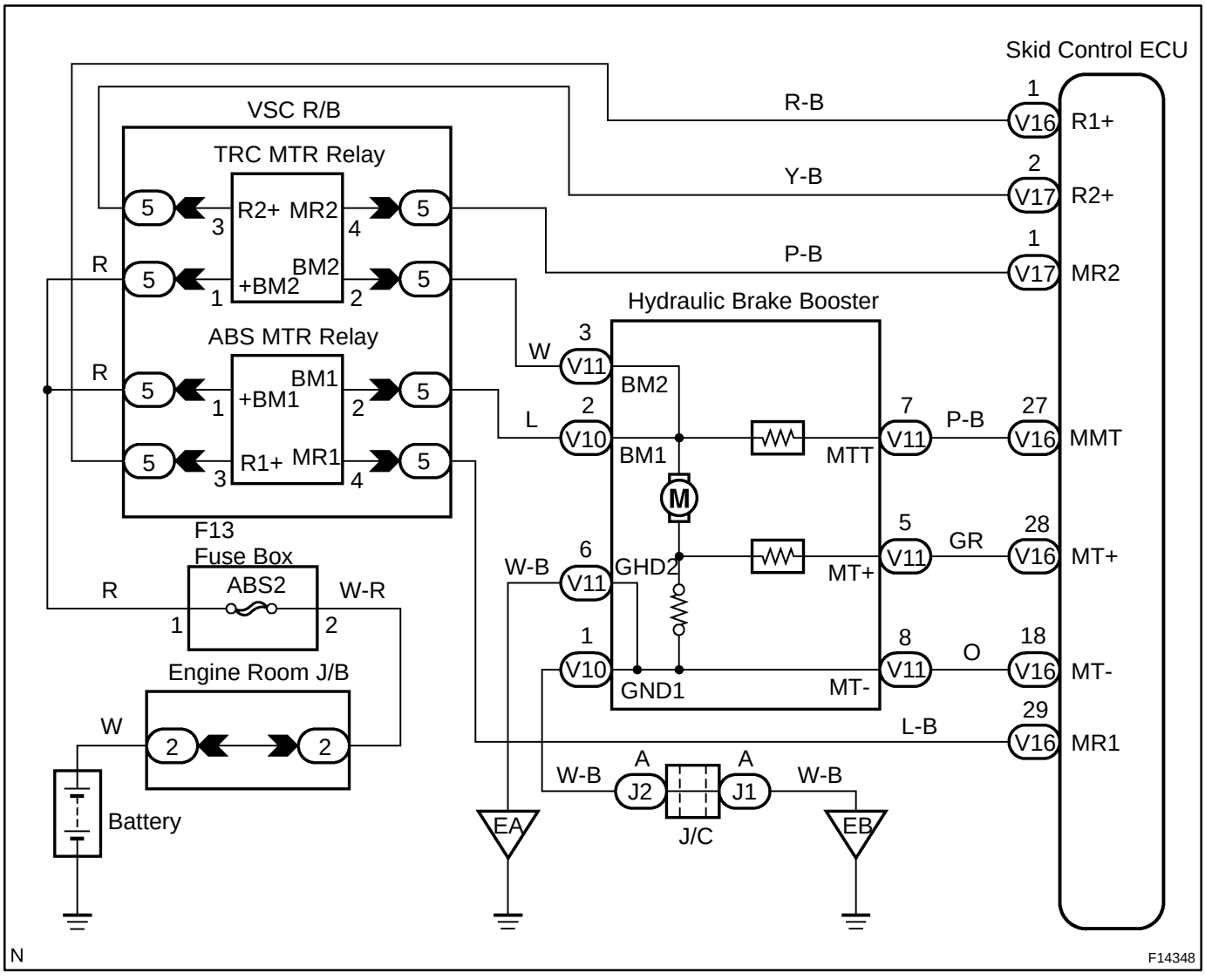
DI6BT-08

DTC	C1252 / 52	Hydraulic Brake Booster Pump Motor ON Time Abnormally Long

CIRCUIT DESCRIPTION

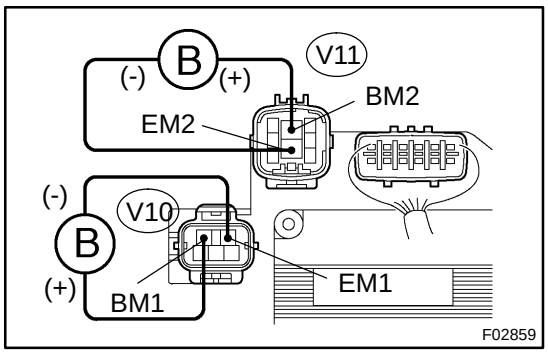
DTC No.	DTC Detecting Condition	Trouble Area
C1252 / 52	After the ignition switch has been turned ON, the power is supplied to the pump motor for more than 5 minutes.	• Hydraulic brake booster pump motor • Hydraulic brake booster pump motor circuit • Pressure switch (PH or PL)

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check operation of hydraulic brake booster pump motor.**



PREPARATION:

Disconnect the 2 connectors from (V10, V11) the hydraulic brake booster.

CHECK:

Connect battery positive (+) lead to BM1 or BM2 terminal and battery negative (-) lead to EM1 or EM2 terminal of the hydraulic brake booster (pump motor) connector.

OK:

The operation sound of the pump motor should be heard.

NG → **Go to step 9.**

OK

2	**Check for short circuit (to B+) in harness and connector between BM1 or BM2 of hydraulic brake booster and ABS MTR relay or TRC MTR relay (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

3	**Check for short circuit (to B+) in harness and connector between MT of hydraulic brake booster and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

4	**Check pressure switch (PH).**

In case of using the hand-held tester:

PREPARATION:

(a) Connect the hand-held tester to DLC3.

(b) Turn the ignition switch ON and push the hand-held tester main switch ON.

(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Depress the brake pedal more than 40 times with the ignition switch OFF then turn the ignition switch ON and check the pressure switch (PH) condition.

HINT:

When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

OK:

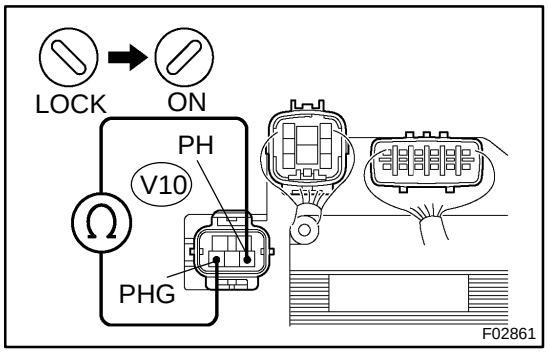
"OFF" turns to "ON".

HINT:

OFF: Low pressure

ON: High pressure

In case of not using the hand-held tester:



PREPARATION:

(a) Disconnect the connector (V10) from the hydraulic brake booster.

(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:

When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

PREPARATION:

(a) Connect the connector (V10) to the hydraulic brake booster.

(b) Disconnect the connector (V10) after the ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

OK:

Resistance: 0 Ω

HINT:

After inspection, connect the connector and clear the DTC (See page DI-224).

NG	**Replace hydraulic brake booster assembly.**

OK

5	Check pressure switch (PL).

In case of using the hand-held tester:

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Depress the brake pedal more than 40 times with the ignition switch OFF then turn the ignition switch ON and check the pressure switch (PL) condition.

HINT:

When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

OK:

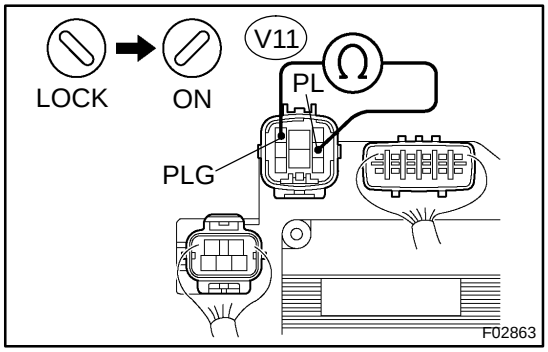
"OFF" turns to "ON".

HINT:

OFF: Low pressure

ON: High pressure

In case of not using the hand-held tester:



PREPARATION:

(a) Disconnect the connector (V11) from the hydraulic brake booster.
(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:

When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

OK:

Resistance: 5.7 kΩ

PREPARATION:

(a) Connect the connector (V11) to the hydraulic brake booster.
(b) Disconnect the connector (V11) after the ignition switch has been ON and the pump motor has stopped.

CHECK:

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

OK:

Resistance: 1.0 kΩ

HINT:
After inspection, connect the connector and clear the DTC (See page DI-224).

NG → **Replace hydraulic brake booster assembly.**

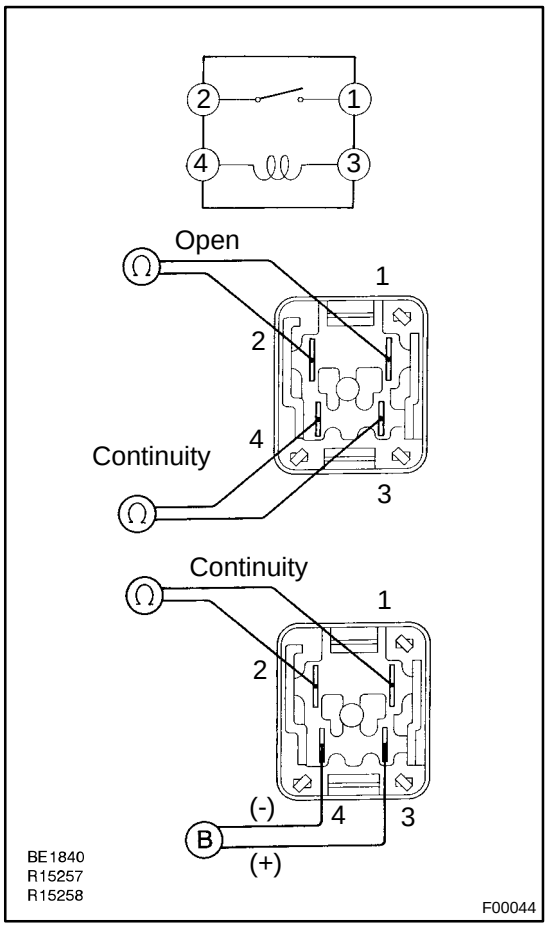
OK

6	**Check for short circuit (to B+) in harness and connector between pressure switch and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

7	**Check ABS MTR relay and TRC MTR relay.**



PREPARATION:
Remove the ABS MTR relay and TRC MTR relay from VSC R/B.

CHECK:
Check continuity between each pair of terminals of the motor relay.

OK:

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

*1: ABS MTR relay 62 Ω
TRC MTR relay 54 Ω

CHECK:
(a) Apply battery positive voltage between terminals 3 and 4.
(b) Check continuity between terminals.

OK:

Terminals 1 and 2	Continuity

NG → Replace ABS MTR relay or TRC MTR relay.

OK

8	Check for short circuit in harness and connector between ABS MTR relay or TRC MTR relay and skid control ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

9	Check for open and short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN-28).

NG → Replace wire harness.

OK

10	Check hydraulic brake booster pump motor (See page BR-42).

NG → Replace hydraulic brake booster pump motor.

OK

Replace hydraulic brake booster.

DI6BU-08

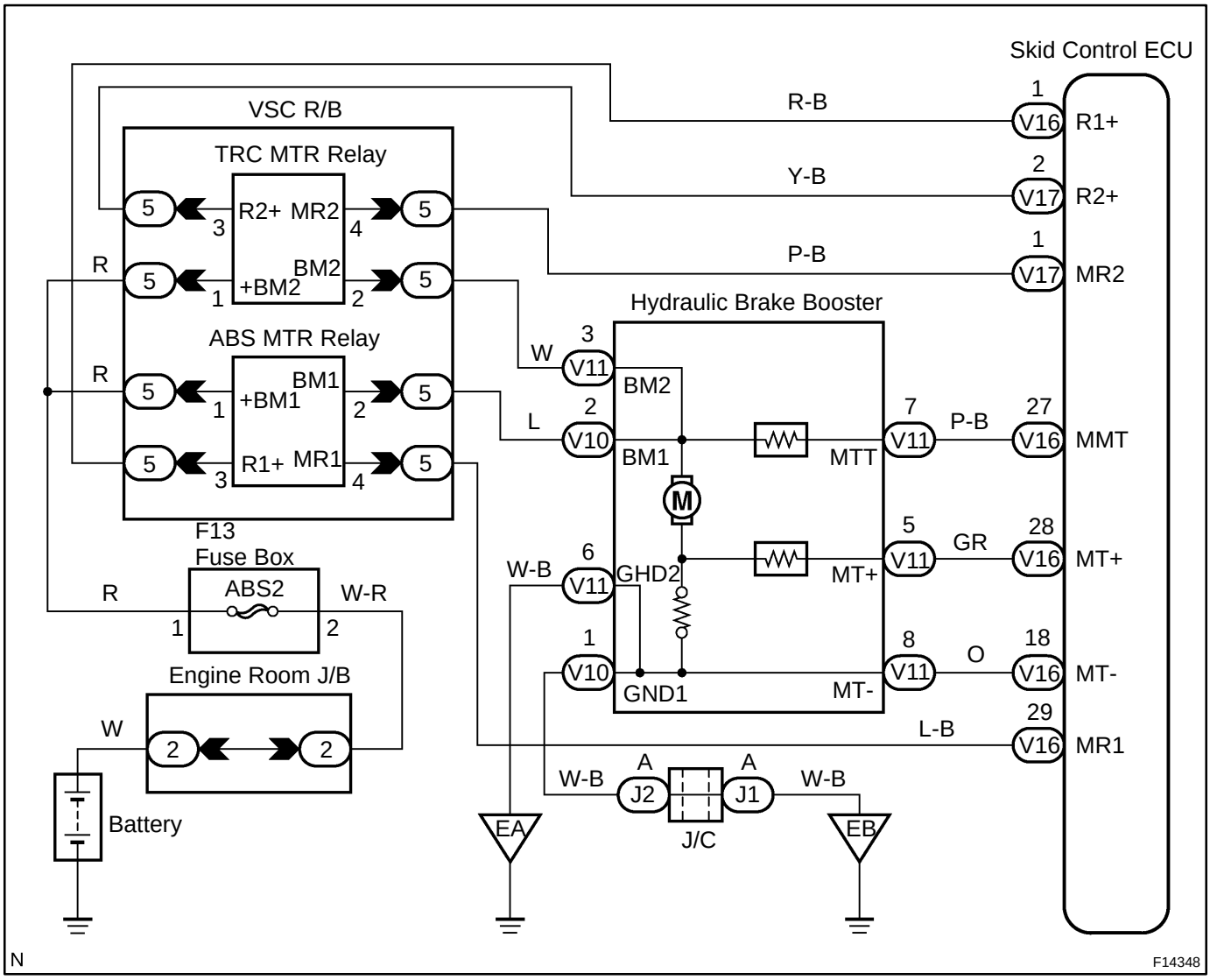
DTC	C1253 / 53	Motor Relay Circuit

CIRCUIT DESCRIPTION

The ABS MTR relay and TRC MTR relay supply power to the hydraulic brake booster pump motor. While the ABS & BA & TRAC & VSC are activated, the ECU switches the motor relay ON and operates the hydraulic brake booster pump motor.

DTC No.	DTC Detecting Condition	Trouble Area
C1253 / 53	When any of the condition 1. through 4. is detected: 1. After the ignition switch is turned ON, open in the relay coil is detected for more than 1 sec. 2. When the pressure switch does not control motor driving, the status that the motor relay is always ON continues for more than 1 sec. due to short circuit. 3. When the pressure switch (PH) detects the low pressure or while the pump motor operates to increase the pressure, the status that the motor relay does not turn ON continues for more than 0.2 sec. 4. When pressure switch does not control motor driving, the status that the motor relay is always ON due to the welded contact continues for more than 2 sec.	• ABS MTR relay or TRC MTR relay • ABS MTR relay or TRC MTR relay circuit • Hydraulic brake booster pump motor circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 3 in case of not using the hand-held tester.

1	**Check ABS MTR relay and TRC MTR relay operation.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check the operation sound of the ABS MTR relay and TRC MTR relay individually when operating them with the hand-held tester.

OK:

The operation sound of the ABS MTR relay and TRC MTR relay should be heard.

NG → **Go to step 3.**

OK

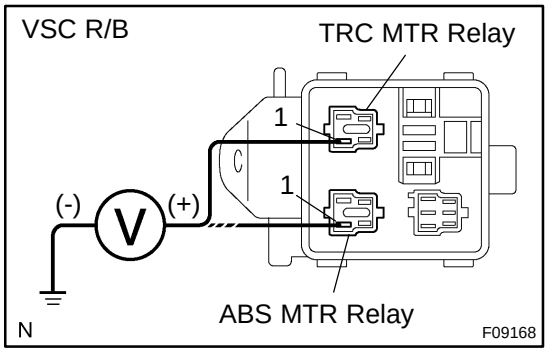
2	**Check for short circuit (to B+) in harness and connector between MT of hydraulic brake booster and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

3	Check voltage between terminal 1 of VSC R/B (for ABS MTR relay and TRC MTR relay) and body ground.

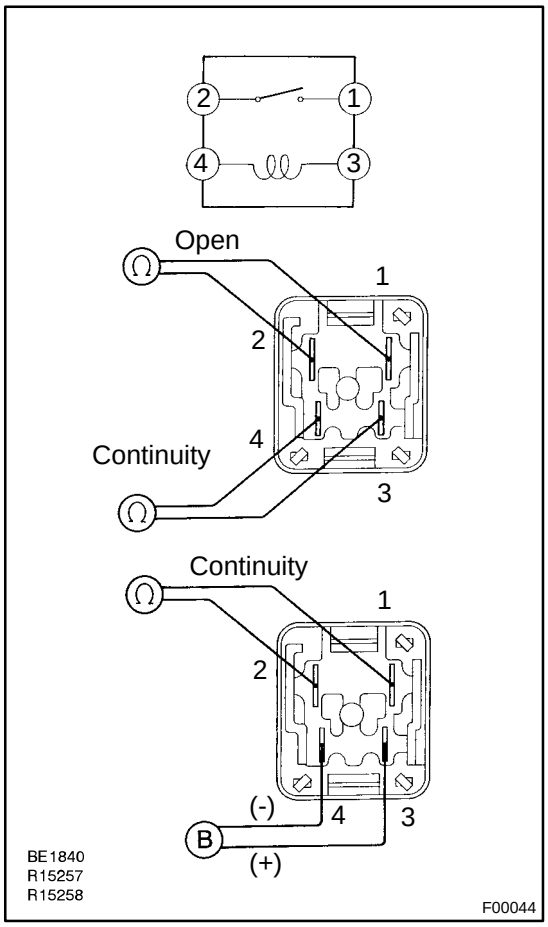


PREPARATION:
Remove the ABS MTR relay and TRC MTR relay from VSC R/B.
CHECK:
Measure voltage between terminal 1 of VSC R/B (for ABS MTR relay and TRC MTR relay) and body ground.
OK:
Voltage: 10 - 14 V

NG	Check and repair harness or connector.

OK

4	Check ABS MTR relay and TRC MTR relay.



CHECK:
Check continuity between each pair of terminals of the motor relay.
OK:

Terminals 3 and 4	Continuity (Reference value *1)
Terminals 1 and 2	Open

*1: ABS MTR relay 62 Ω
TRC MTR relay 54 Ω

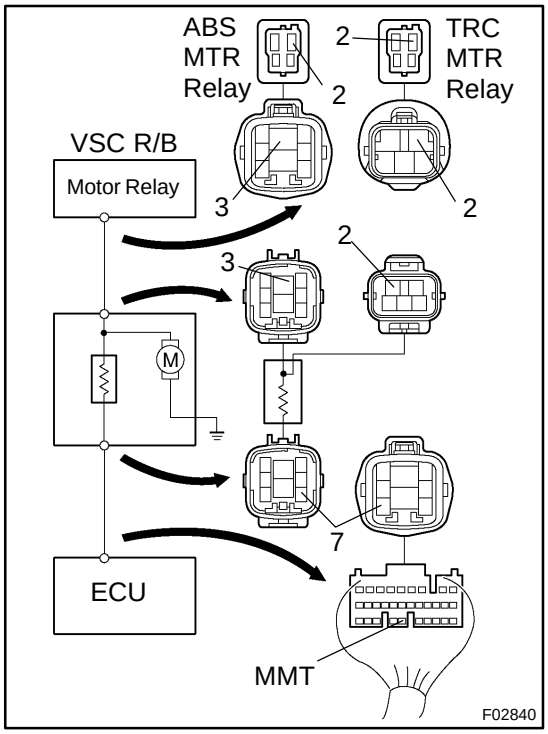
CHECK:
(a) Apply battery positive voltage between terminals 3 and 4.
(b) Check continuity between terminals.
OK:

Terminals 1 and 2	Continuity

NG	Replace ABS MTR relay or TRC MTR relay.

OK

5	Check continuity between each terminal BM1 and BM2 and terminal MMT of skid control ECU.



CHECK:

(a) Check continuity between terminal BM1 of the ABS MTR relay and terminal MMT of the skid control ECU.

(b) Check continuity between terminal BM2 of the TRC MTR relay and terminal MMT of the skid control ECU.

OK:

Continuity

HINT:

There is resistance of 33 ± 3 Ω between terminal BM1or BM2 and MT of the hydraulic brake booster.

NG → **Repair or replace harness, connector or hydraulic brake booster.**

OK ↓

6	Check for open and short circuit in harness and connector between ABS MTR and TRC MTR relay and skid control ECU (See page IN-28).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace skid control ECU.

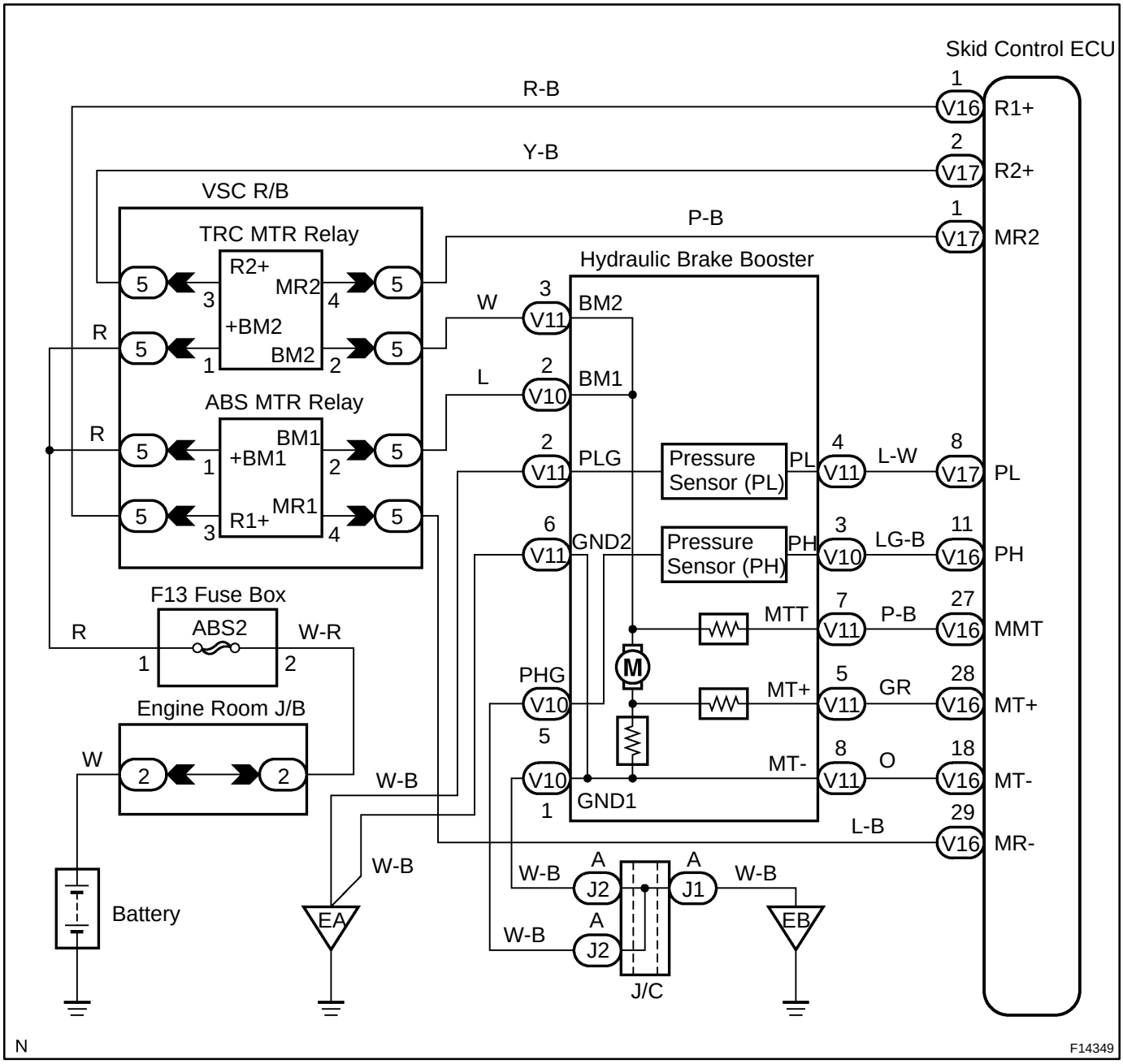
DI6BV-08

DTC	C1254 / 54	Pressure Switch Circuit

CIRCUIT DESCRIPTION

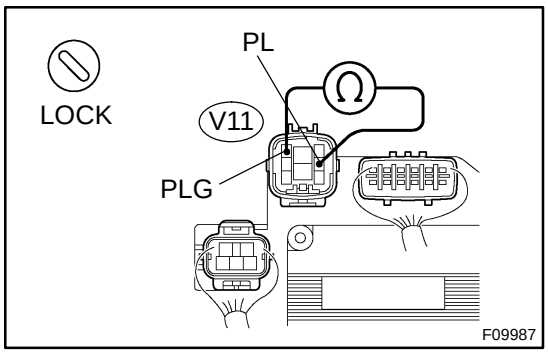
DTC No.	DTC Detecting Condition	Trouble Area
C1254 / 54	Either of the condition 1. or 2. is detected: 1. After the ignition switch is turned ON, short or open circuit in pressure switch (PL) continues for more than 1 sec. 2. After the ignition switch is turned ON, open circuit in pressure switch (PH) continues for more than 1 sec.	• Pressure switch (PH or PL) • Pressure switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check pressure switch (PL) resistance.



PREPARATION:

(a) Disconnect the connector (V11) from the hydraulic brake booster.

(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:

When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PL and PLG of the hydraulic brake booster connector.

OK:

Resistance: 5.1 - 6.3 kΩ

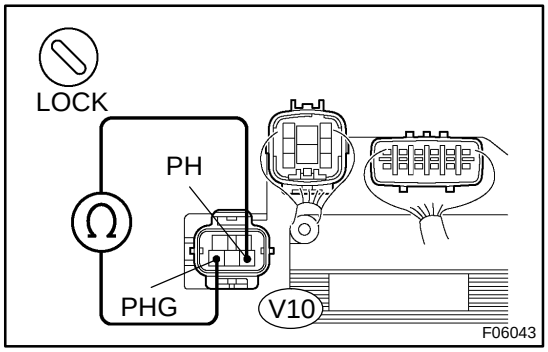
HINT:

After inspection, connect the connector and clear the DTC (See page DI-224).

NG → **Replace hydraulic brake booster assembly.**

OK

2	Check pressure switch (PH) resistance.



PREPARATION:

(a) Disconnect the connector (V10) from the hydraulic brake booster.

(b) With the ignition switch OFF, depress the brake pedal more than 40 times to decrease the accumulator pressure.

HINT:

When the pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

CHECK:

Measure resistance between terminals PH and PHG of the hydraulic brake booster connector.

OK:

Resistance: 0.9 - 1.1 kΩ

HINT:

After inspection, connect the connector and clear the DTC (See page DI-224).

NG → Replace hydraulic brake booster assembly.

OK

3	Check for open and short circuit in harness and connector between pressure switch and skid control ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

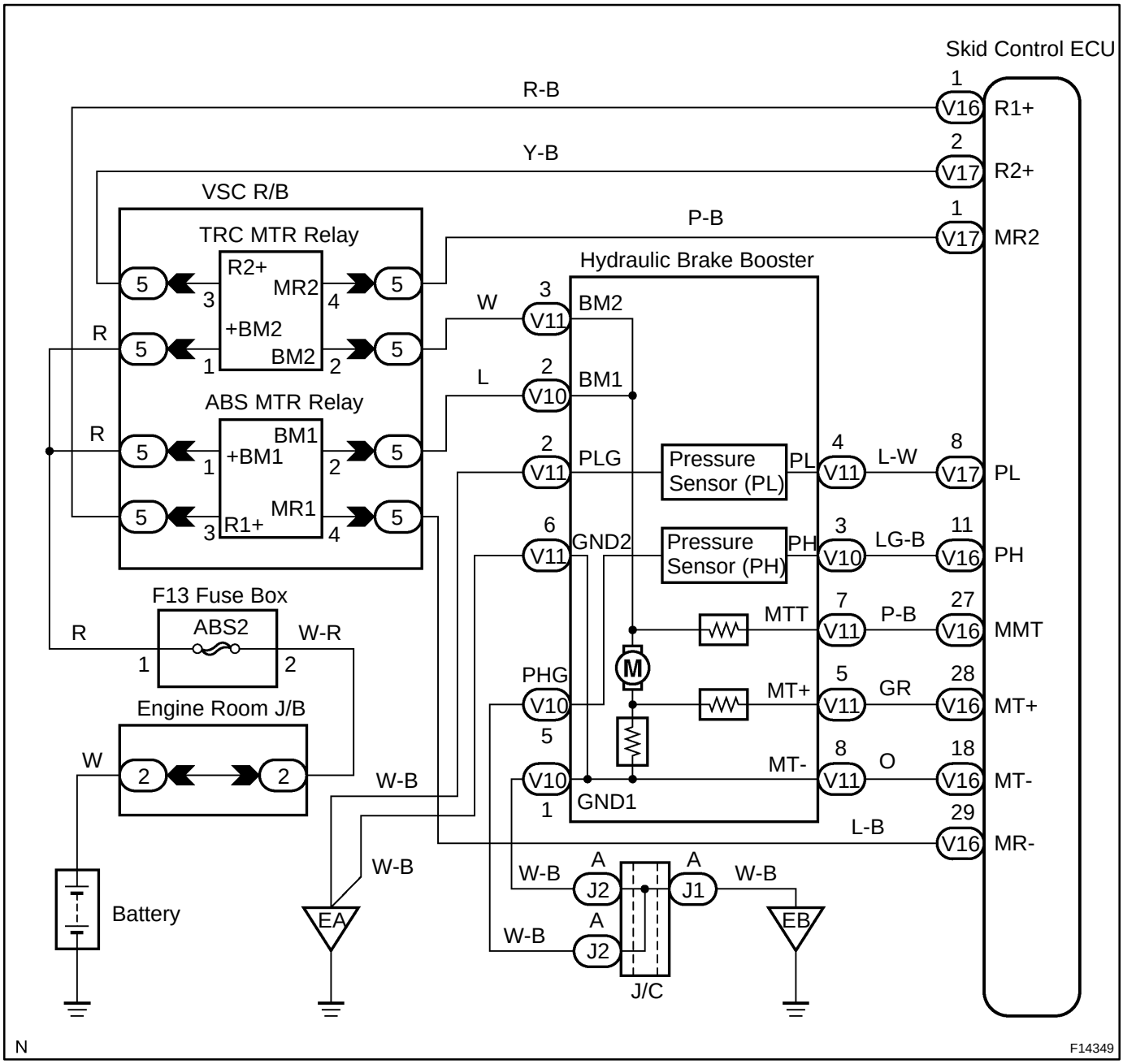
DI6BW-08

DTC	C1256 / 56	Accumulator Low Pressure Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1256 / 56	Any of the conditions 1. through 5. is detected: 1. With the vehicle running and ABS, TRAC or VSC not in operation, the pressure switch (PL) detects low pressure for 1.4 sec. or more while the pressure switch (PH) detects high pressure. 2. With the vehicle running and ABS, TRAC or VSC not in operation, the pressure switch (PL) detects low pressure for 0.2 sec. or more while the pressure switch (PH) detects high pressure. 3. After the ignition switch is turned ON, the pressure switch (PL) detects low pressure for 60 sec. or more. 4. With the vehicle running and after the ignition switch is turned ON, the pressure switch (PL) remains ON while ABS, TRAC or VSC does not operate for 1.4 sec. or more. 5. With the vehicle running and after the ignition switch is turned OFF, the pressure switch (PL) remains ON while ABS, TRAC or VSC operates for 0.2 sec. or more.	• Accumulator • Pressure switch (PH or PL) • Hydraulic brake booster pump motor

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check accumulator operation.**

PREPARATION:

(a) Turn the ignition switch OFF, and depress the brake pedal 40 times or more.

HINT:

When the pressure in the power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear wheel cylinder and bleed air.

SST 09709-29018

CHECK:

Depress the brake pedal with force of more than 343 N (35 kgf, 77 lbf) and turn the ignition switch ON, then check the rear wheel cylinder pressure when an increase of pressure changes from acutely to mildly.

OK:

5,099 - 8,924 kPa (52 - 91 kgf/cm^2, 740 - 1,294 psi) at 20˚C (68˚F)

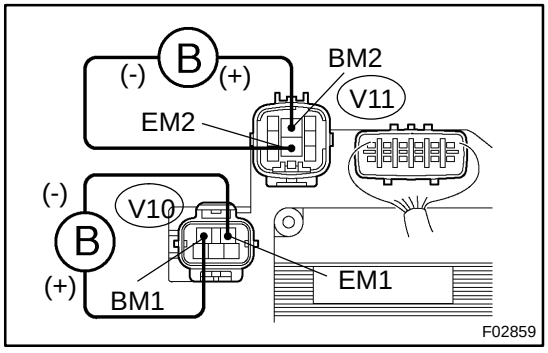
HINT:

If the value is not within the standard, cool the engine room and check it again.

NG → **Replace accumulator.**

OK

2	**Check operation of hydraulic brake booster pump motor.**



PREPARATION:

Disconnect the 2 connectors (V10, V11) from the hydraulic brake booster.

CHECK:

Connect battery positive (+) lead to BM1 or BM2 terminal and battery negative (-) lead to EM1 or EM2 terminal of the hydraulic brake booster (pump motor) connector.

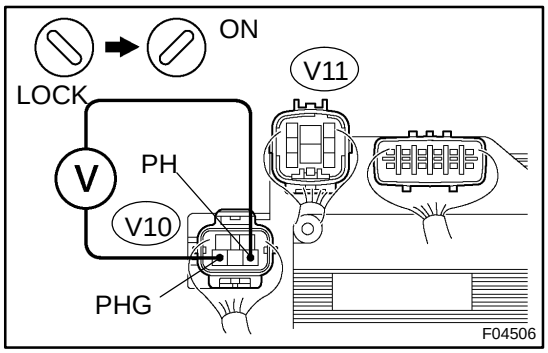
OK:

The operation sound of the pump motor should be heard.

NG → **Go to step 7.**

OK

3	Check pressure switch (PH) operation.



PREPARATION:

(a) Connect the 2 connectors (V10, V11), and depress the brake pedal 40 times or more.

HINT:

When a pressure in the power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear wheel cylinder and bleed air.

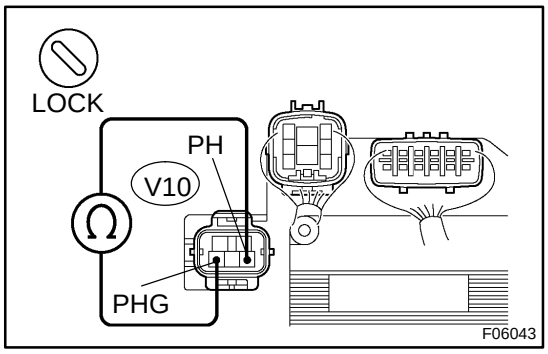
SST 09709-29018

CHECK:

While checking the voltage between terminals PH and PHG of the hydraulic brake booster, depress the brake pedal with force of more than 343 N (35 kgf, 77 lbf) and turn the ignition switch ON, then check the rear wheel cylinder pressure when voltage changes from 6 V to 0 V.

OK:

12,553 - 20,104 kpa (128 - 205 kgf·cm^2, 1,820 - 2,916 psi)



PREPARATION:

Turn the ignition switch OFF and disconnect the connector (V10) from the hydraulic brake booster.

CHECK:

While checking the resistance between terminals PH and PHG, depress the brake pedal changing the force in the range of 197 N (20 kgf, 44 lbf) to 343 N (35 kgf, 77 lbf) and check the rear wheel cylinder pressure when resistance changes from 0 kΩ to 1 kΩ between PH and PHG.

OK:

11,964 - 18,240 kpa (122 - 186 kgf·cm^2, 1,735 - 2,645 psi)

HINT:

After inspection, connect the connector, fill the brake reservoir with brake fluid and clear the DTC (See page DI-224).

OK	Go to step 5.

NG

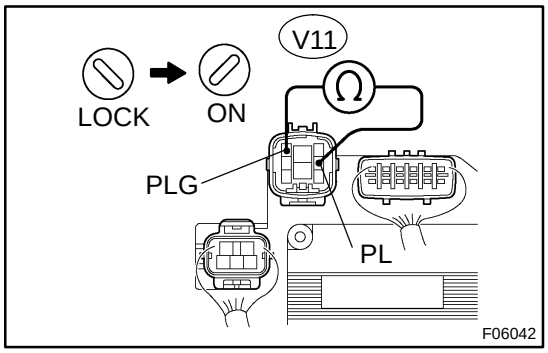
4	**Check for open circuit in harness and connector between pressure switch (PH) and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Replace hydraulic brake booster assembly.

5	**Check pressure switch (PL) operation.**



PREPARATION:

(a) Turn the motor switch OFF, and depress the brake pedal 40 times or more.

HINT:

When a pressure in the power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Install the LSPV gauge (SST) to the rear wheel cylinder and bleed air.

SST 09709 -29018

(c) Disconnect the connector (V11) from the hydraulic brake booster.

CHECK:

While checking the resistance between terminals PL and PLG of the hydraulic brake booster, depress the brake pedal with force of more than 343 N (35 kgf, 77 lbf) and turn the ignition switch ON, then check the rear wheel cylinder pressure when the resistance changes from 5.7 kΩ to 1.0 kΩ.

OK:

9,022 - 15,102 kpa (92 - 154 kgf·cm^2, 1,308 - 2,190 psi)

PREPARATION:

Turn the ignition switch OFF and disconnect the connector (V11) from the hydraulic brake booster.

CHECK:

While checking the resistance between terminals PL and PLG of the hydraulic brake booster, depress the brake pedal changing the force in the range of 197 N (20 kgf, 44 lbf) to 343 N (35 kgf, 77 lbf) and check the rear wheel cylinder pressure when resistance changes from 1.0 kΩ to 5.7 kΩ.

OK:

8,532 - 13,337 kpa (87 - 136 kgf·cm^2, 1,237 - 1,934 psi)

HINT:

After inspection, connect the connector, fill the brake reservoir with brake fluid and clear the DTC (See page DI-224).

NG → Replace hydraulic brake booster assembly.

OK

6	Check pressure switch (PH) and pressure switch (PL)

CHECK:

Compare the pressure value of the rear wheel cylinder measured in the check pressure switch (PL) operation with the one measured in the check pressure switch (PH) operation.

OK:

- **Pressure when the voltage between PH and PHG becomes 6 to 0 V > pressure when the resistance between PL and PLG becomes 5.7 kΩ to 1.0 kΩ.**
- **Pressure when the resistance between PH and PHG becomes 0 kΩ to 1 kΩ > pressure when the resistance between PL and PLG becomes 1.0 kΩ to 5.7 kΩ.**

NG → Replace hydraulic brake booster assembly.

OK

Check and replace skid control ECU.

7	Check for open and short circuit in harness and connector between hydraulic brake booster pump motor and hydraulic brake booster (See page IN-28).

NG → Replace wire harness.

OK

8	Check hydraulic brake booster pump motor (See page BR-42).

NG → Replace hydraulic brake booster pump motor.

OK

Replace hydraulic brake booster.

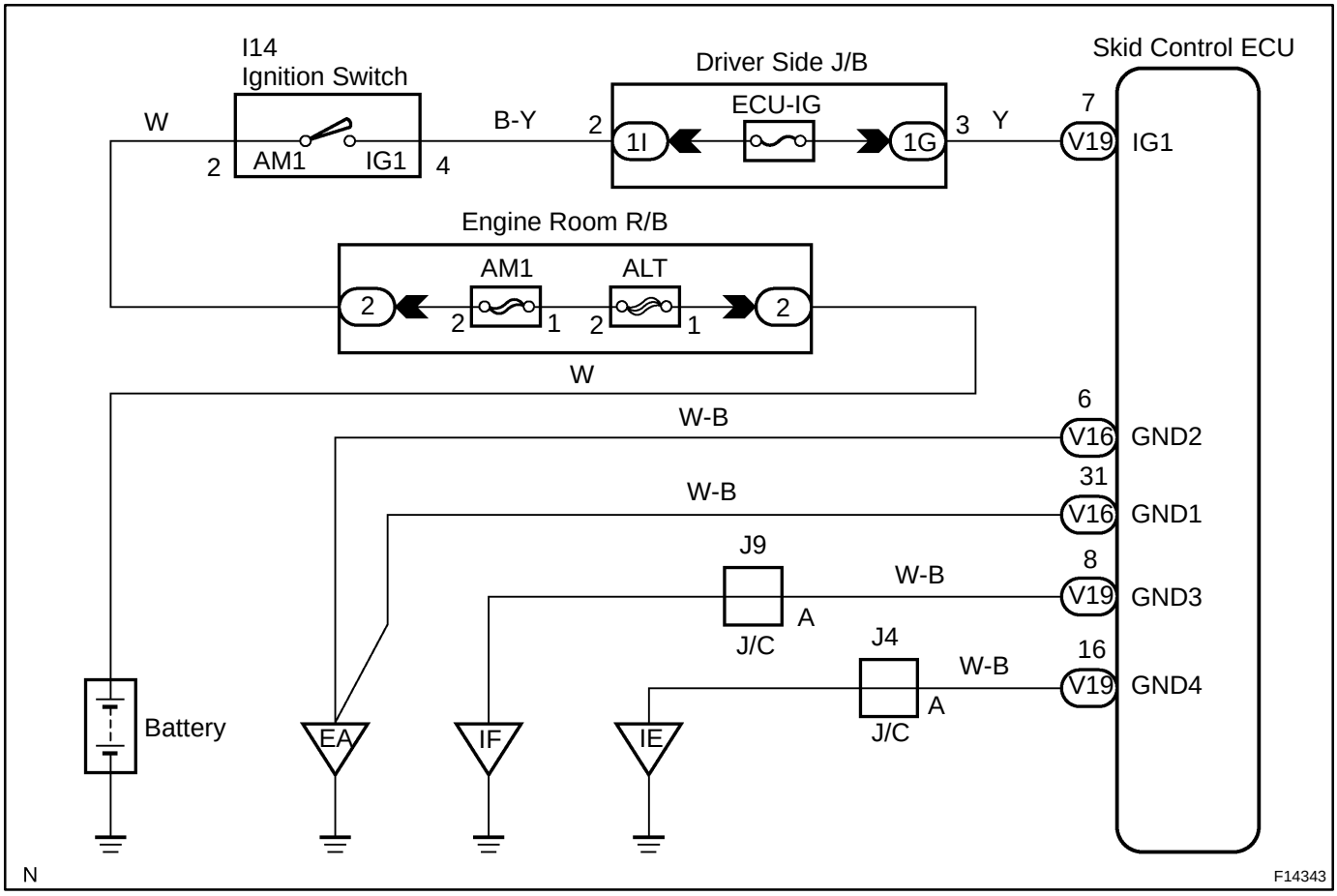
DI6BX-03

DTC	C1257 / 57	Power Supply Drive Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1257 / 57	When malfunction inside ECU is detected.	• Battery • Power source circuit • Skid control ECU

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check battery positive voltage.**

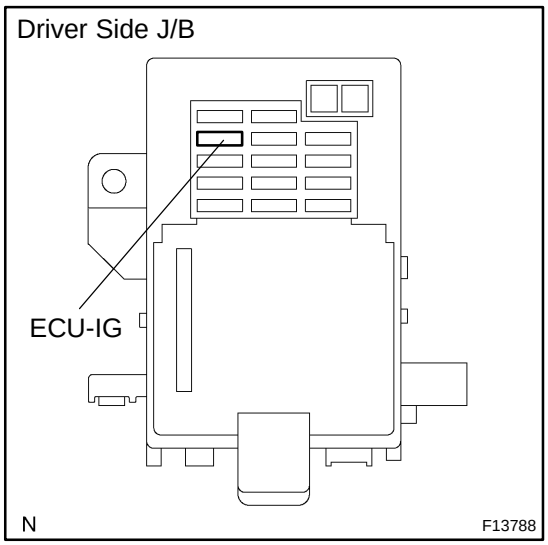
OK:

Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK

2	**Check ECU-IG fuse.**



PREPARATION:

Remove the ECU-IG fuse from the driver side J/B.

CHECK:

Check continuity of the ECU-IG fuse.

OK:

Continuity

NG → **Check for short circuit in all the harnesses and components connected to ECU-IG fuse (See attached wiring diagram).**

OK

3	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

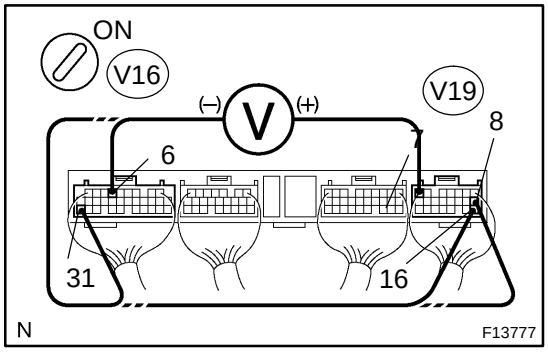
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check the voltage condition output from the ECU displayed on the hand-held tester.

OK:

"Normal" is displayed.



In case of not using the hand-held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 (V19 - 7) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU connector.

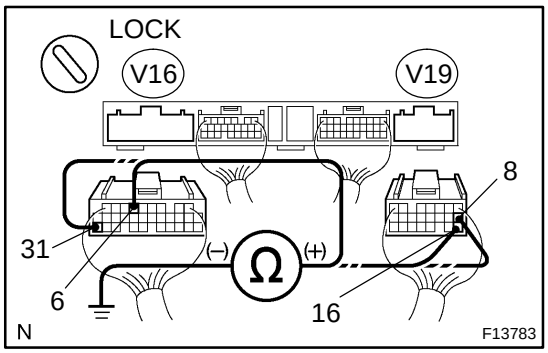
OK:

Voltage: 10 - 14 V

OK	**Check and replace skid control ECU.**

NG

4	Check continuity between terminal GND of skid control ECU and body ground.



PREPARATION:

Disconnect the 2 connectors (V16, V14) from the skid control ECU.

CHECK:

Measure resistance between terminal GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU and body ground.

OK:

Resistance: 1 Ω or less

NG → **Repair or replace harness or connector.**

OK

Check for open circuit in harness and connector between skid control ECU and battery (See page IN-28).

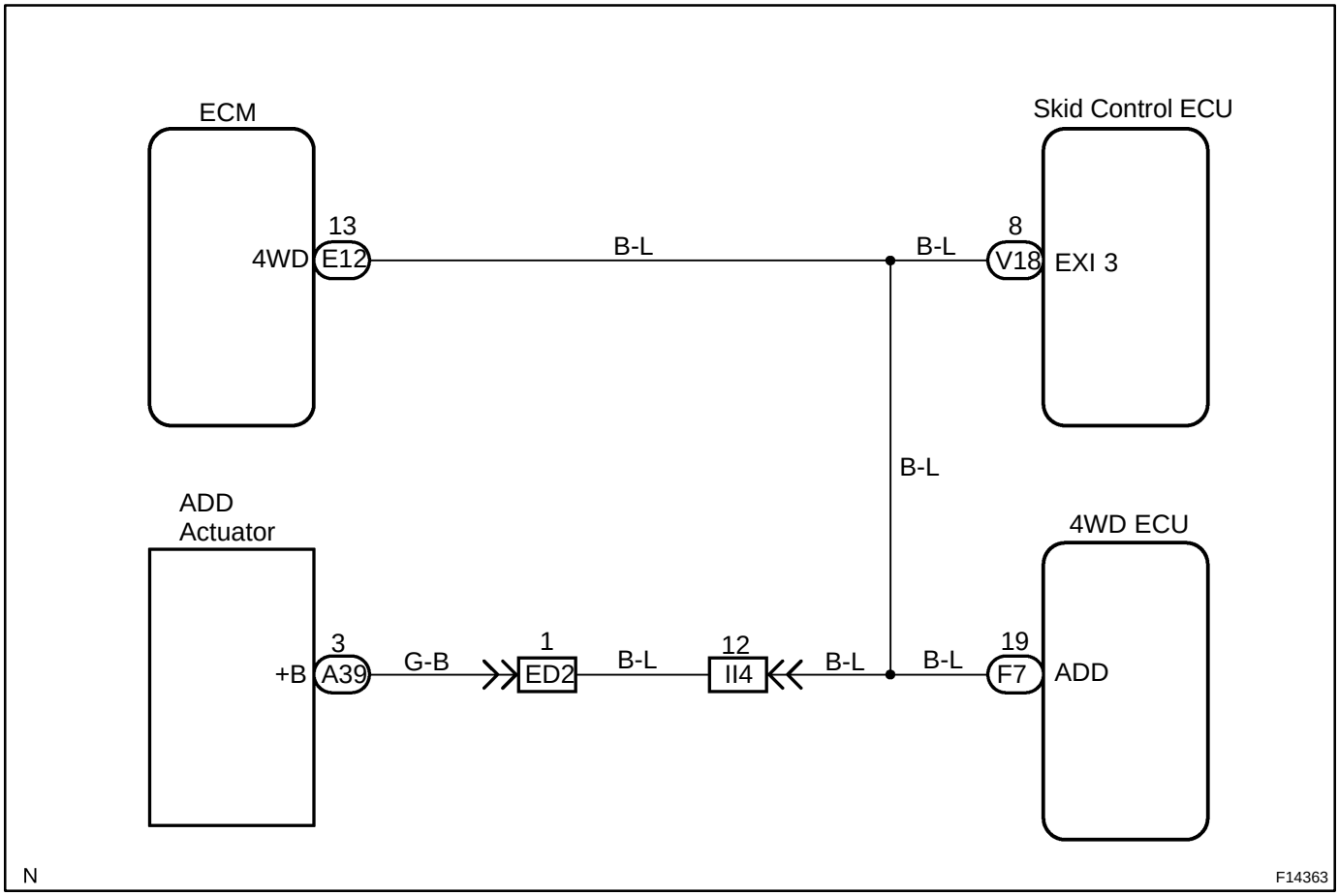
DI8XT-02

DTC	C1258 / 58	Transfer 4WD Position Switch Circuit

CIRCUIT DESCRIPTION

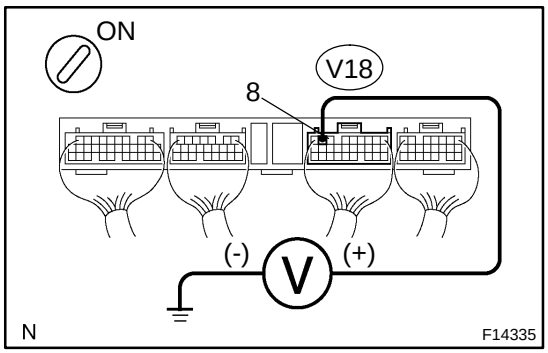
DTC No.	DTC Detecting Condition	Trouble Area
C1258 / 58	Open or short circuit in transfer 4WD position switch circuit.	• Transfer 4WD position switch • Transfer 4WD indicator switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal EXI3 of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal EXI3 (V18 - 8) of the skid control ECU and body ground with the transfer shift lever in 4WD position and in other than 4WD position.

OK:

Voltage:
4WD position: Below 2.0 V
Except 4WD position: 10 - 14 V

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI-242).**

NG

2	**Check transfer 4WD position switch (See page TR-11).**

NG	**Replace transfer 4WD position switch.**

OK

3	**Check for open and short circuit in harness and connector between transfer 4WD position switch and skid control ECU (See page IN-28).**

NG	**Repair or replace harness or connector.**

OK

4	**Check for open and short circuit in harness and connector between skid control ECU and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

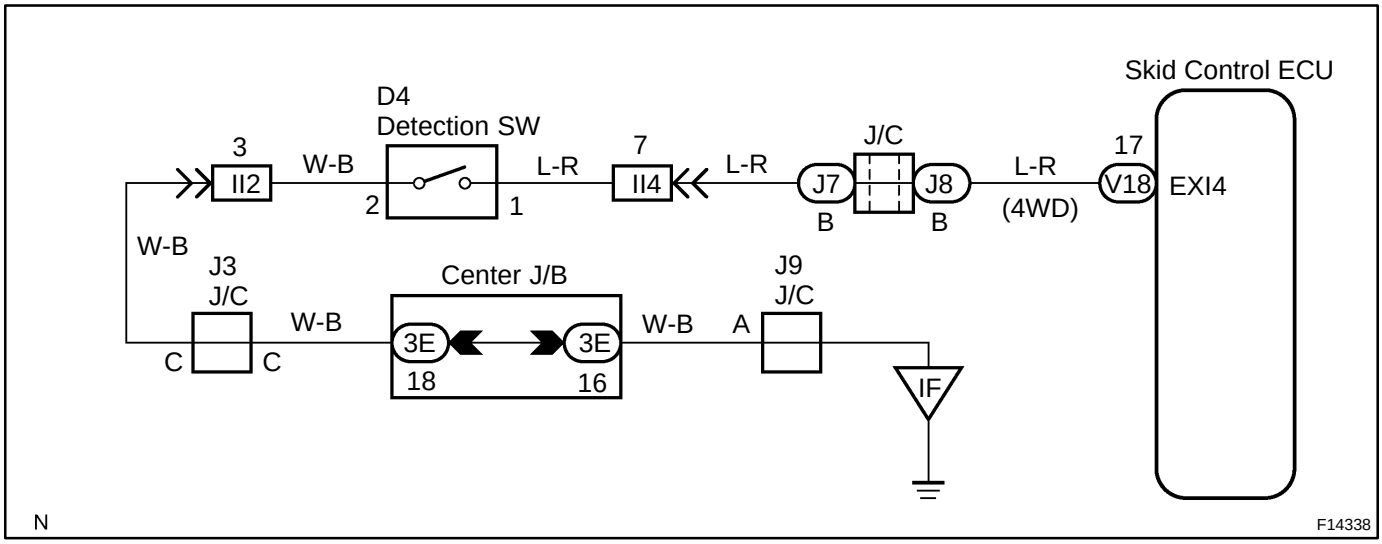
DI6BY-03

DTC	C1268 / 68	Transfer L4 Position Switch Circuit

CIRCUIT DESCRIPTION

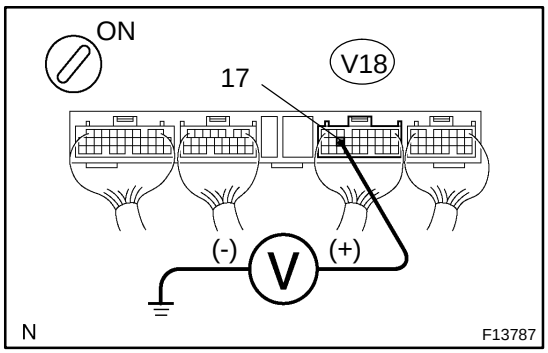
DTC No.	DTC Detecting Condition	Trouble Area
C1268 / 68	Open or short circuit in transfer L4 position switch circuit.	• Transfer L4 position switch • Transfer L4 indicator switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal EXI4 of skid control ECU and body ground.**



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal EXI4 (V18 - 17) of the skid control ECU and body ground with the transfer shift lever in L4 position and in other than L4 position.

OK:

Voltage:
L4 position: Below 2.0 V
Except L4 position: 10 - 14 V

OK	**Proceed to next circuit inspection shown in problem symptoms table (See page DI-242).**

NG

2	**Check transfer L4 position switch (See page TR-11).**

NG	**Replace transfer L4 position switch.**

OK

3	**Check for open and short circuit in harness and connector between transfer L4 position switch and skid control ECU (See page IN-28).**

NG	**Repair or replace harness or connector.**

OK

4	**Check for open and short circuit in harness and connector between skid control ECU and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

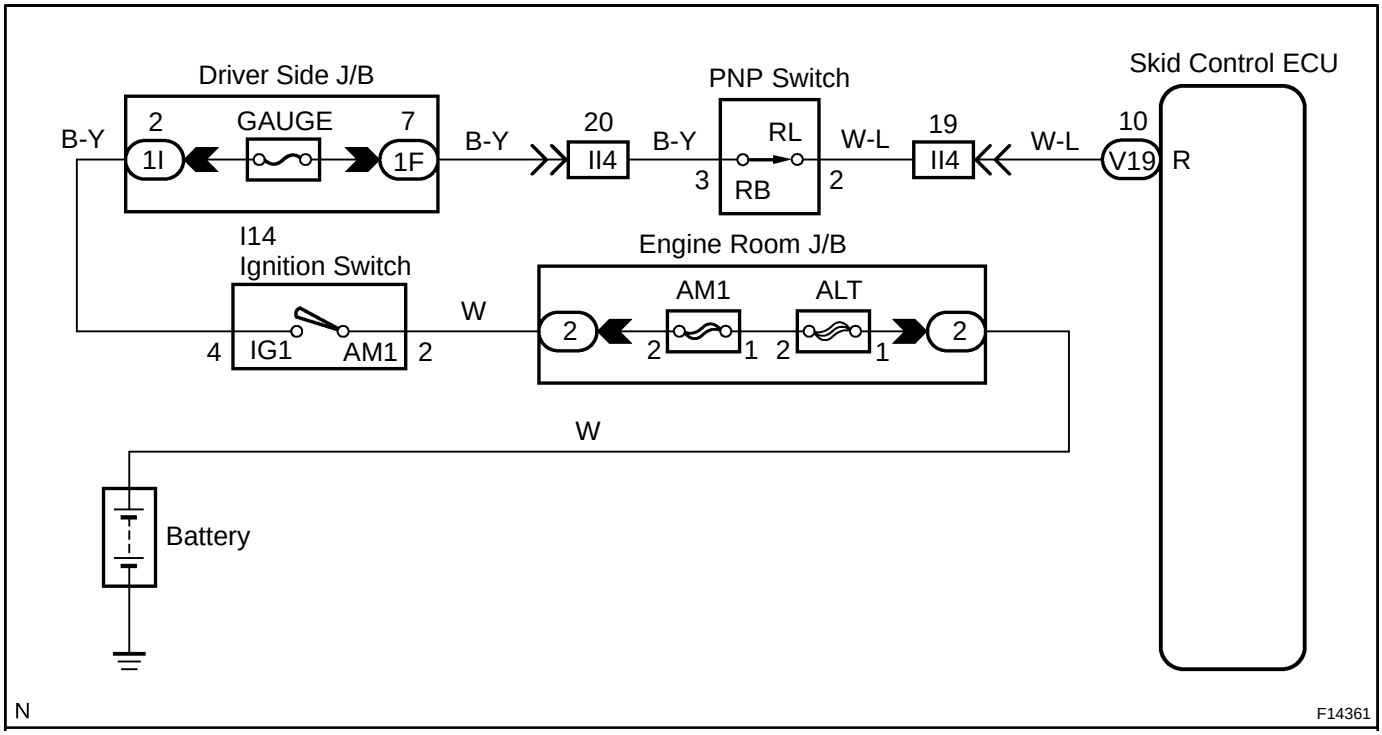
DI6BZ-03

DTC	C1269 / 69	PNP Switch Circuit (R range)

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1269 / 69	With the vehicle speed less than 15 km/h (9 mph), open circuit in R signal circuit is detected for more than 2 sec.	• PNP switch • PNP switch circuit (R range)

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check operation of PNP switch (R range) circuit.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Set the shift lever in the R range, and read the R signal on the hand-held tester.

OK:

"ON" is displayed.

OK	**Check and replace skid control ECU.**

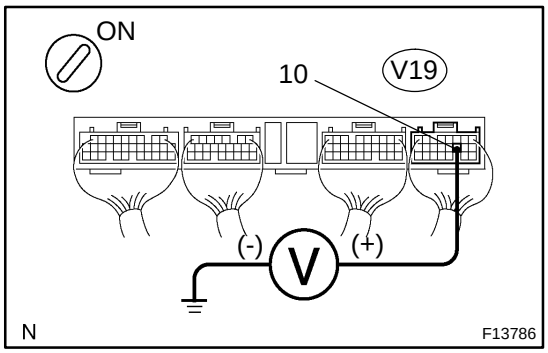
NG

2	**Check PNP switch (R range) (See page DI-159).**

NG	**Repair or replace PNP switch.**

OK

3	Check voltage between terminal R of skid control ECU and body ground.



PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminal R (V19 - 10) of the skid control ECU and body ground when the brake pedal is depressed and shift the shift lever to R position.

OK:

Voltage: 10 - 14 V

NG → **Go to step 4.**

OK

If the same code is still output after the DTC is deleted, check the contact condition of each connection. If the connections are normal, ECU may be defective.

4	Check for open circuit in harness and connector between PNP switch (R range) and skid control ECU (See page IN-28).

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

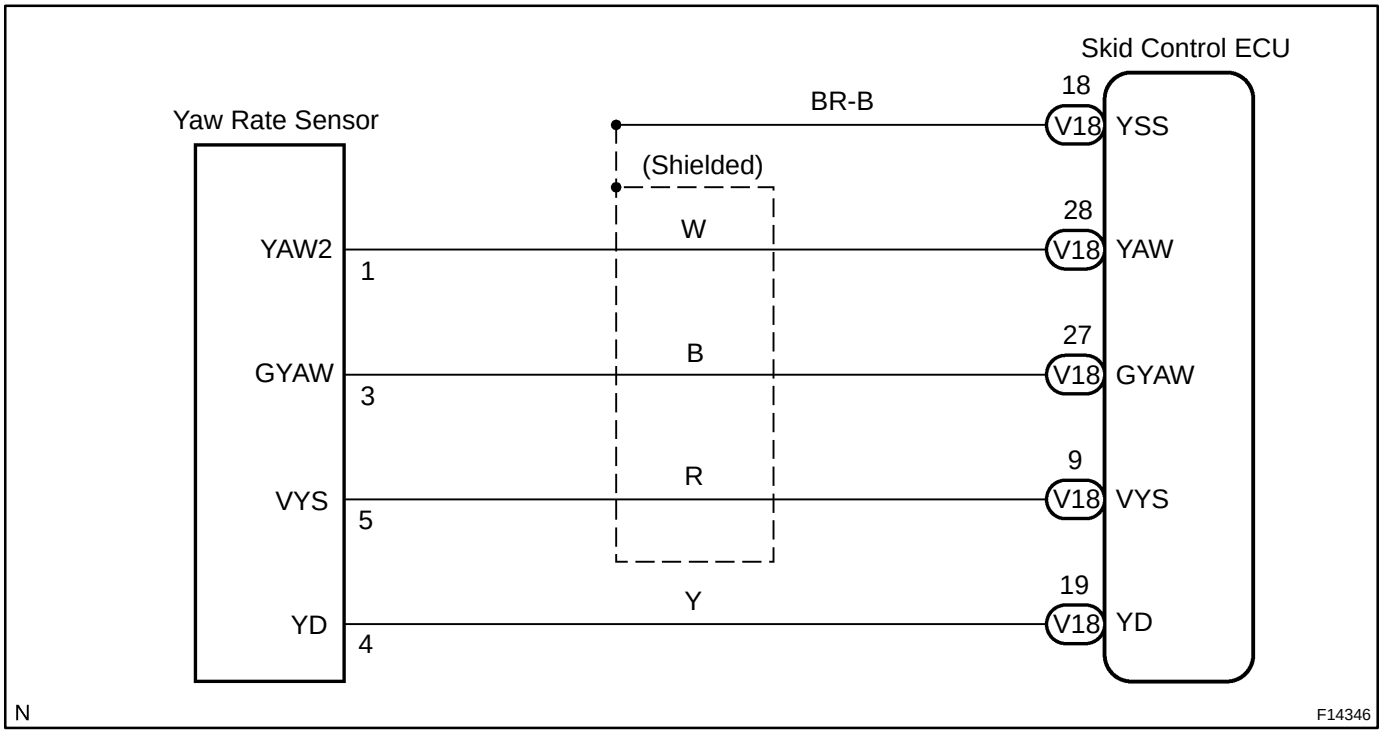
DI8XU-02

DTC	C1336 / 39	Zero Point Calibration of Deceleration Sensor Undone

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1336 / 39	Either the condition 1. or 2. is detected: 1. In TEST mode, the shift lever is shifted to any position except P range within 2 sec. after ECU terminal IG1 is turned ON for the first time. 2. The deceleration sensor zero point recorded in ECU is deleted.	• Deceleration sensor • Deceleration sensor circuit • PNP switch circuit (P range)

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

After step 1 and 2, go to step 3 in case of using the hand-held tester, and go to step 5 in case of not using the hand-held tester.

1	**Perform zero point calibration of Deceleration sensor (See page DI-224).**

2	**Is DTC still output?**

Check DTC on page DI-224 .

NO → **No problem.**

YES

3	**Check output value of deceleration sensor.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and turn the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check that the deceleration value of the deceleration sensor observed in the hand-held tester is changing when the vehicle is tilted.

OK:

Deceleration value must be changing.

OK → **Go to step 3.**

NG

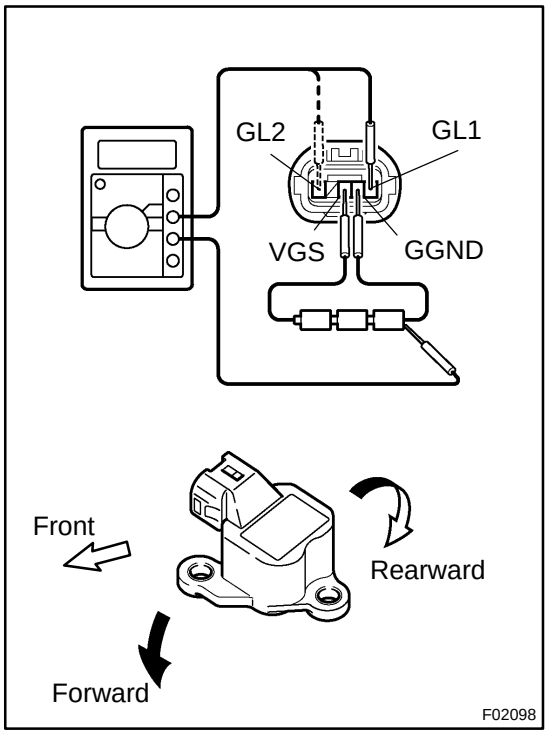
4	**Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Replace deceleration sensor.

5	**Check deceleration sensor.**



PREPARATION:

(a) Remove the consol box.
(b) Connect 3 dry batteries of 1.5 V in series.
(c) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (-) terminal, apply about 4.5 V between VGS and GGND terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VYS and GYAW.

CHECK:

Check the output voltage of GL1 and GL2 terminals when the sensor is tilted forward and rearward.

OK:

Symbols	Condition	Standard Value
GL1	Horizontal	About 2.3 V
GL1	Lean forward	0.4 V - about 2.3 V
GL1	Lean rearward	About 2.3 V - 4.1 V
GL2	Horizontal	About 2.3 V
GL2	Lean forward	About 2.3 V - 4.1 V
GL2	Lean rearward	0.4 V - about 2.3 V

HINT:

- If the sensor is tilted too much it may show the wrong value.
- If dropped, the sensor should be replaced with a new one.
- The sensor removed from the vehicle should not be placed upside down.

NG → **Replace deceleration sensor.**

OK

6	**Check for open and short circuit in harness and connector between deceleration sensor and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

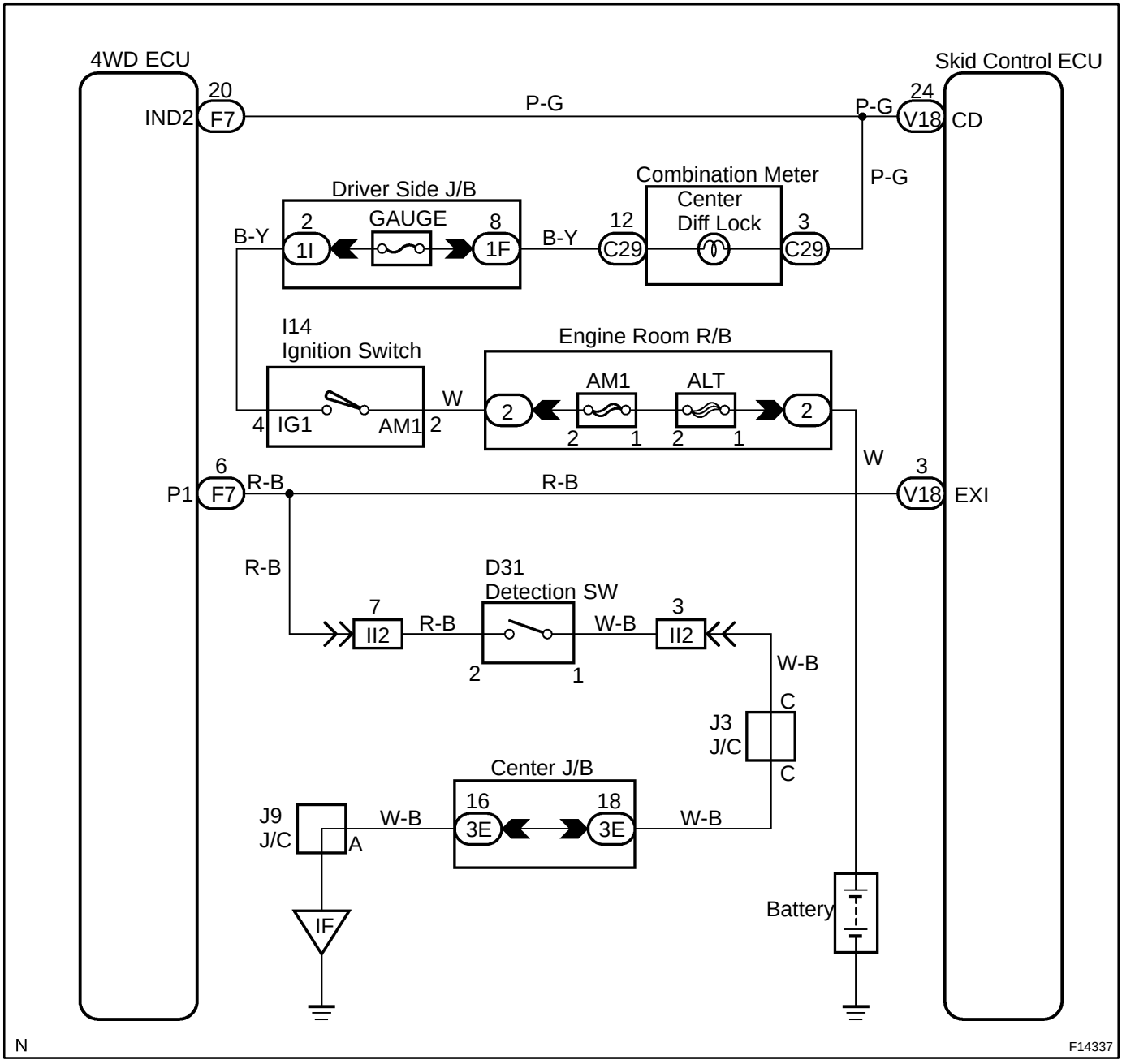
DI6CN-03

DTC	C1340 / 47	Center Differential Lock Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
C1340 / 47	Open or short circuit in center differential lock circuit.	• Center differential lock system • Center differential lock circuit • Center differential lock indicator light circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check that center differential is free and center diff. lock switch is OFF.**

NG → **Repair center differential lock system.**

OK

2	**Is DTC output?**

Check DTC on page DI-224 .

NO → **Normal.**

YES

3	**Check that bulb for center diff. lock indicator light is not burnt out.**

YES → **Replace indicator light.**

NO

4	**Check for open circuit in harness and connector between center diff. lock switch and skid control ECU, skid control ECU and center diff. lock indicator light (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

DI8XV-02

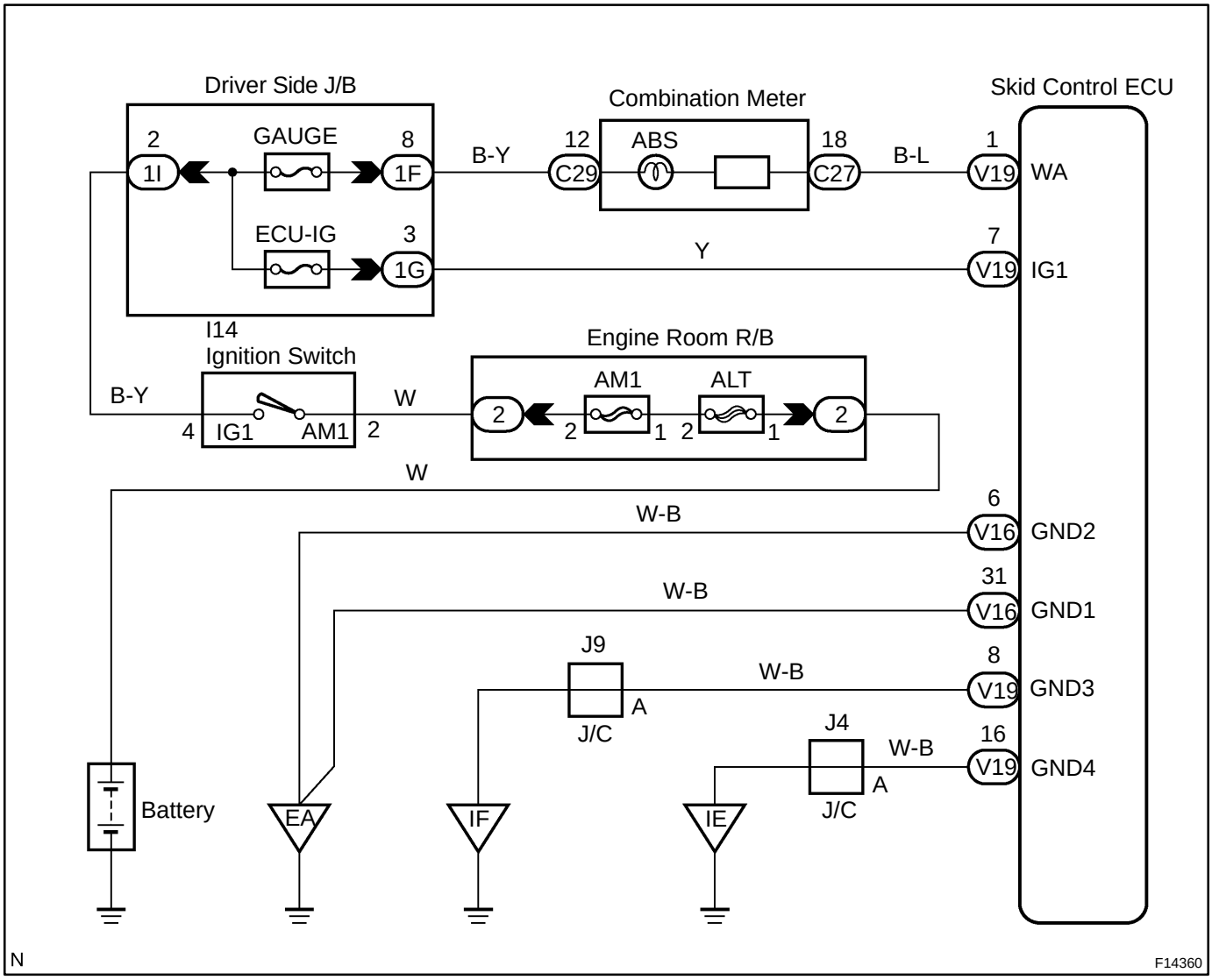
DTC	Always ON	Malfunction in ECU ABS Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	Either the condition 1. or 2. is detected: 1. The ECU connectors are disconnected from the ECU. 2. There is a malfunction in the ECU internal circuit.	• Battery • Charging system • Power source circuit • Skid control ECU

HINT:
There is a case that the hand-held tester cannot be used when ECU is abnormal.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Is DTC output?**

Check DTC on page DI-224 .

YES → **Repair circuit indicated by the output code.**

NO

2	**Check that ECU connectors are securely connected to ECU.**

NO → **Connect the connector to ECU.**

YES

3	**Check battery positive voltage.**

CHECK:

Check the battery positive voltage.

OK:

Voltage: 10 - 14 V

NG → **Check and repair charging system.**

OK

4	**Check voltage of ECU IG power source.**

In case of using the hand-held tester:

PREPARATION:

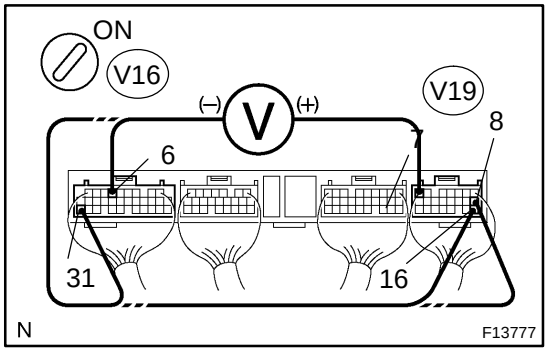
(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the DATALIST mode on the hand-held tester.

CHECK:

Check the voltage condition output from the ECU displayed on the hand-held tester.

OK:

"Normal" is displayed.



In case of not using the hand-held tester:

PREPARATION:

Remove the skid control ECU with the connectors still connected.

CHECK:

(a) Turn the ignition switch ON.
(b) Measure voltage between terminals IG1 (V19 - 7) and GND (V16 - 6, 31, V19 - 8, 16) of the skid control ECU.

OK:

Voltage: 10 - 14 V

OK → **Check and replace skid control ECU.**

NG

5	**Check operation of ABS warning light.**

In case of using the hand-held tester:

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check that ”ON” and ”OFF” of the ABS warning light can be shown on the combination meter by the hand-held tester.

In case of not using the hand-held tester:

PREPARATION:

(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the skid control ECU.
(c) Turn the ignition switch ON.

CHECK:

Check that the ABS warning light goes off.

OK → **Check and replace combination meter (See page BE-40).**

NG

6	**Check for short circuit in harness and connector between combination meter and skid control ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

DI6CO-03

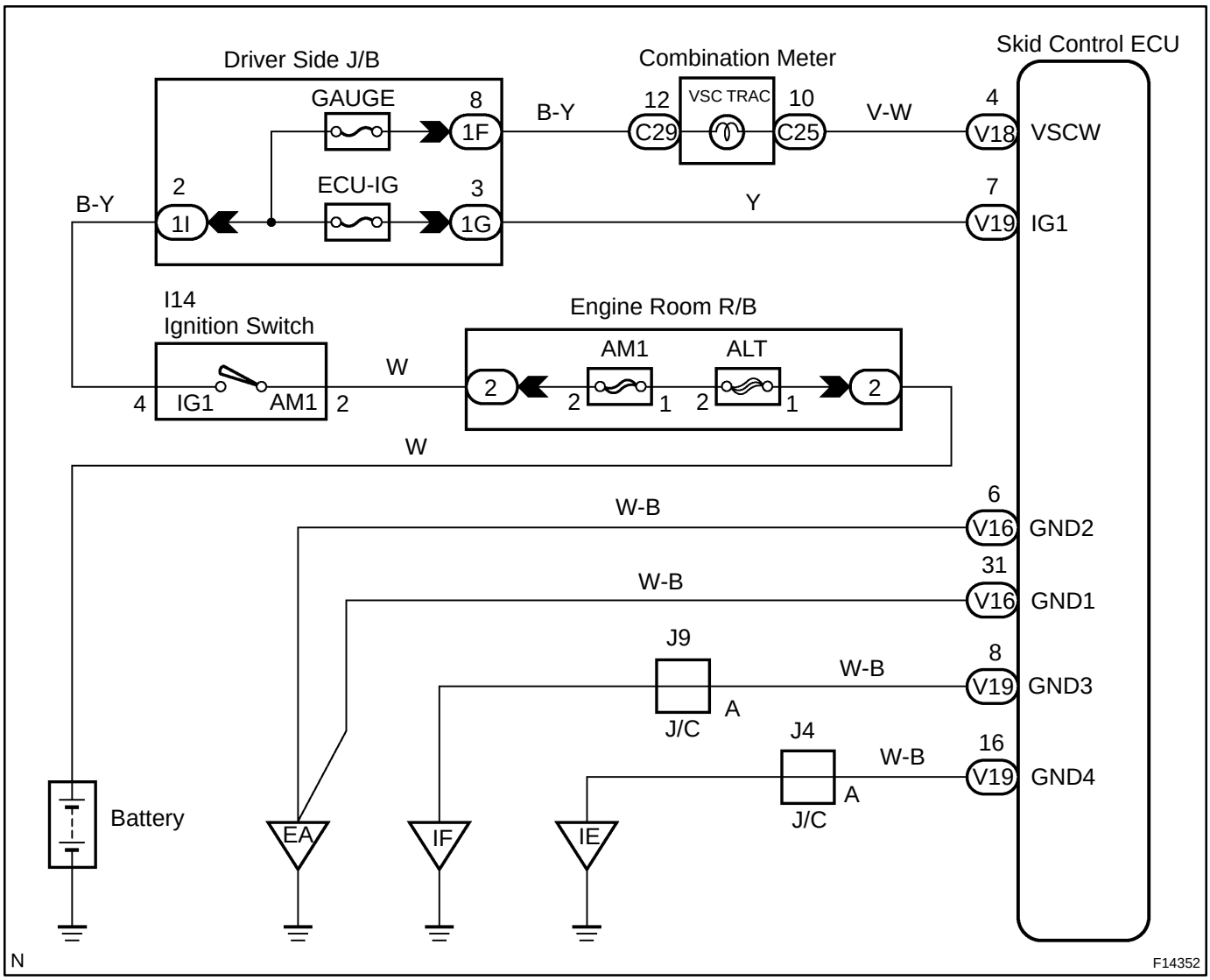
DTC	Always ON	Malfunction in ECU VSC TRAC Warning Light Circuit

CIRCUIT DESCRIPTION

DTC No.	DTC Detecting Condition	Trouble Area
Always ON	There is a malfunction in the ECU internal circuit.	• Power source circuit • VSC TRAC warning light circuit • Skid control ECU

HINT:
If fail safe function is activated in VSC system, the "VSC OFF" indicator light lights up.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check that ECU connectors are securely connected to ECU.**

NO → **Connect the connector to ECU.**

YES

2	**Is DTC output for VSC?**

Check DTC on page DI-224 .

YES → **Repair circuit indicated by the output code.**

NO

3	**Does VSC TRAC warning light go off?**

YES → **Check for open and short circuit in harness and connector between ECU-IG fuse and ECU (See page IN-28).**

NO

4	Check battery positive voltage.

CHECK:

Check the battery positive voltage.

OK:

Voltage: 10 - 14 V

NG → **Check and repair the charging system.**

OK ↓

5	Check operation of VSC TRAC warning light.

In case of using the hand-held tester:

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check that ”ON” and ”OFF” of the VSC TRAC warning light can be shown on the combination meter on the hand-held tester.

In case of not using the hand-held tester:

PREPARATION:

(a) Turn the ignition switch OFF.
(b) Disconnect the connector from the skid control ECU.
(c) Turn the ignition switch ON.

CHECK:

Check that the VSC TRC warning light goes off.

NG → **Check and replace combination meter (See page BE-40).**

OK ↓

6	**Check for short circuit in harness and connector between combination meter and skid control ECU, combination meter and DLC1 (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace skid control ECU

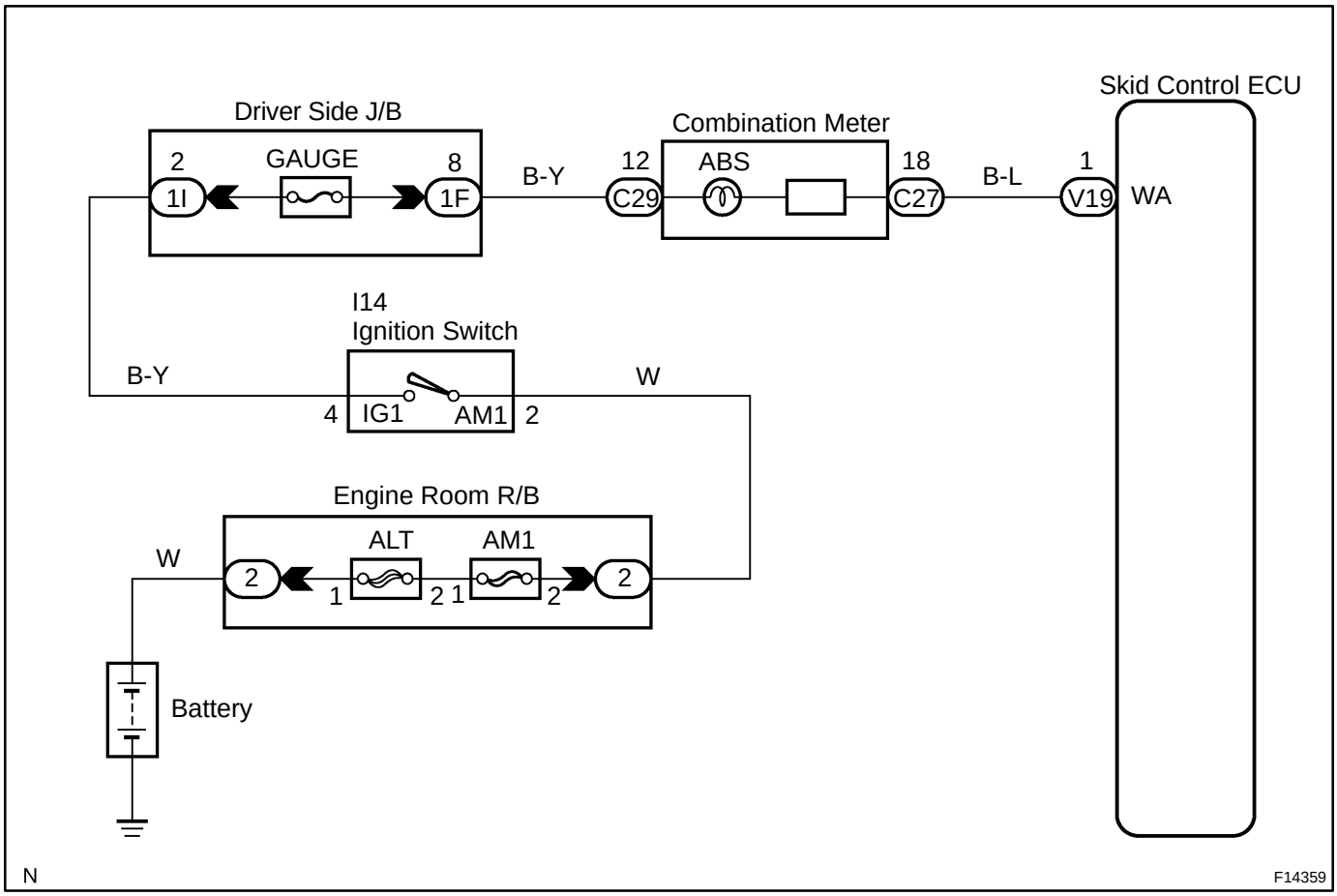
DI8XW-02

ABS Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU detects trouble, it lights the ABS warning light while prohibiting ABS control. At this time, the ECU records DTC in memory.
Connect terminals Tc and E_1 of DLC1 to make the ABS warning light blink and output the DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Troubleshoot in accordance with the chart below for each trouble symptom.

ABS warning light does not light up	*1
ABS warning light remains on	*2

*1: Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

*2: After inspection with step 4, start the inspection from step 5 in case of using the hand-held tester and start from step 6 in case of not using the hand-held tester.

1	**Check operation of ABS warning light.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.

(b) Turn the ignition switch ON and push the hand-held tester main switch ON.

(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check that ”ON” and ”OFF” of the ABS warning light can be shown on the combination meter by the hand-held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Check ABS warning light.**

See the combination meter troubleshooting on page BE-40 .

NG → **Repair bulb or combination meter assembly.**

OK

Check for short circuit in harness and connector between combination meter and skid control ECU (See page BE-40). Repair or replace harness or connector.

3	**Check that ECU connectors are securely connected to ECU.**

NO → **Connect the connector to ECU.**

YES

4	**Check operation of ABS warning light (See step 1).**

OK → **Check and replace skid control ECU.**

NG

5	**Is DTC output?**

Check DTC on page DI-224 .

YES → **Repair circuit indicated by the output code.**

NO

Check for open circuit in harness and connector between combination meter and skid control ECU (See page IN-28). Repair or replace harness or connector.

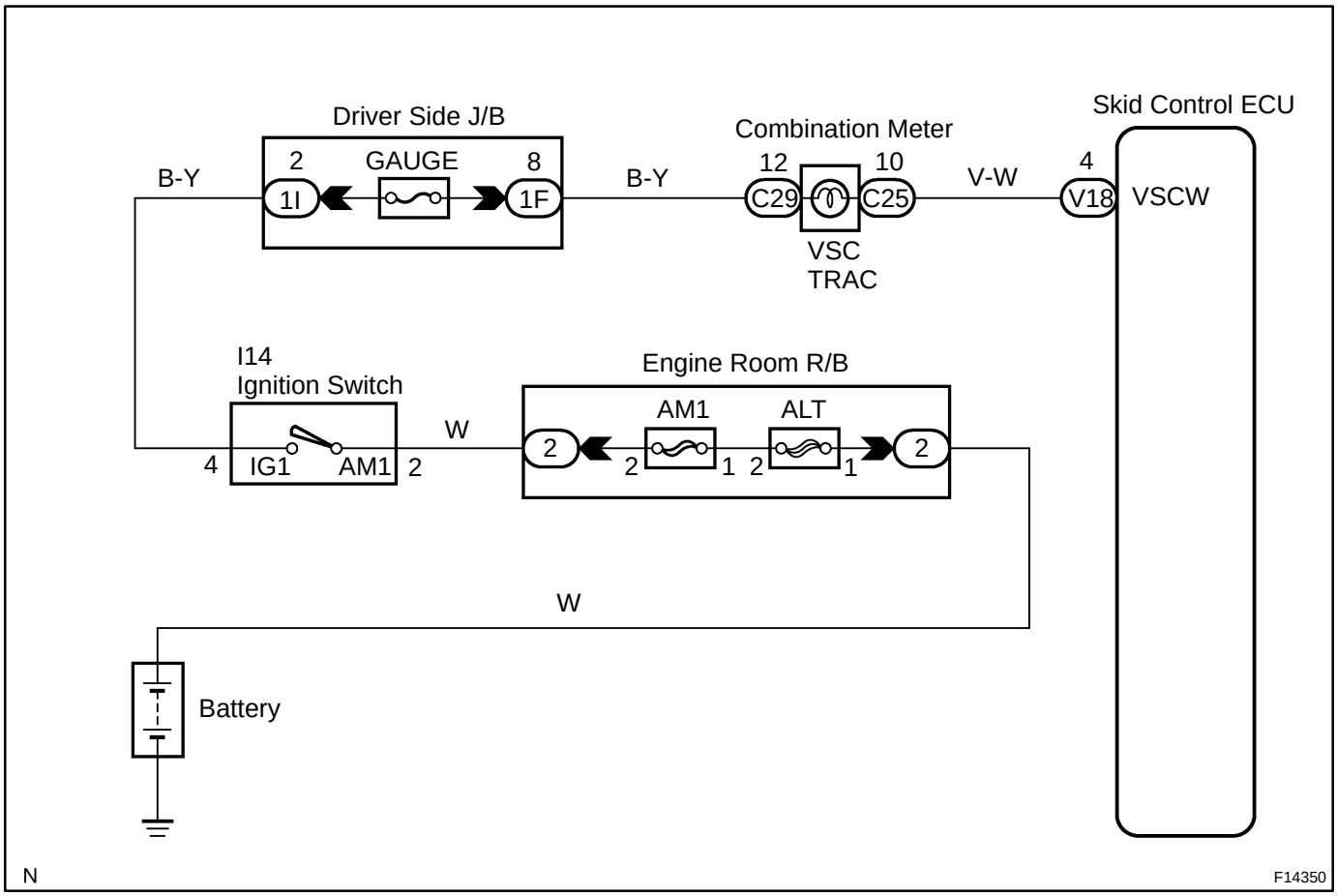
DI6CP-03

VSC TRAC Warning Light Circuit

CIRCUIT DESCRIPTION

If the ECU stores DTC, the VSC TRAC warning light lights on the combination meter.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check operation of VSC TRAC warning indicator.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check that ”ON” and ”OFF” of the VSC TRAC warning light can be shown on the combination meter by the hand-held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Is DTC output for VSC?**

YES → **Repair circuit indicated by the output code.**

NO

3	**Check for open and short circuit in harness and connector between skid control ECU and VSC TRAC warning light (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

4	**Check VSC TRAC warning light.**

NG → **Repair or replace combination meter.**

OK →

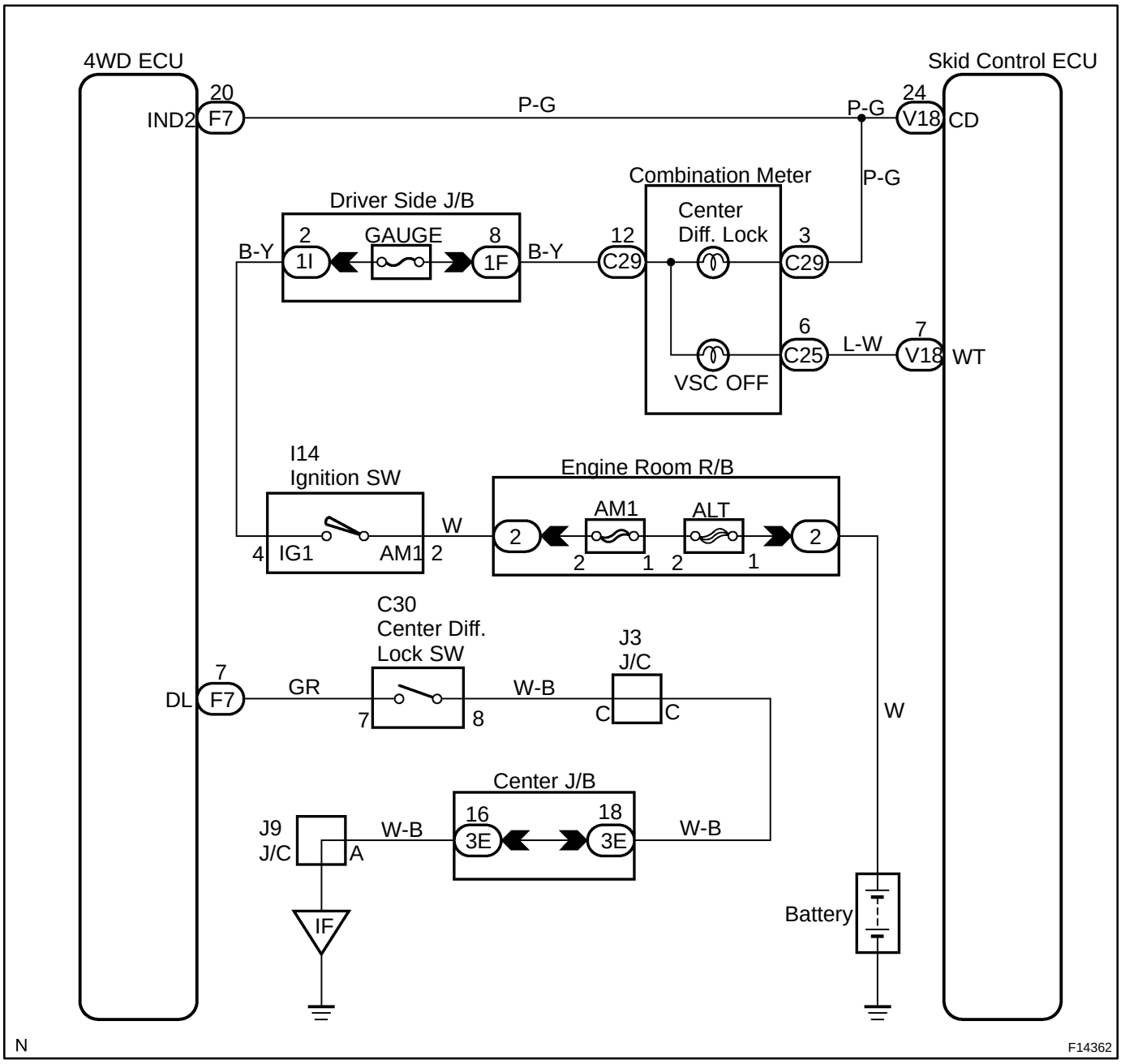
Check and replace skid control ECU.

4WD: VSC OFF Indicator Light, Center Diff. Lock Switch Circuit

CIRCUIT DESCRIPTION

When the center differential is locked, VSC control goes off and the VSC OFF indicator lights up. Also, the VSC OFF indicator light goes on when the VSC system is at the fail safe control.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check operation of VSC OFF indicator light.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

CHECK:

Check that ”ON” and ”OFF” of the VSC OFF indicator light can be shown on the combination meter by the hand-held tester.

NG → **Go to step 4.**

OK ↓

2	**Check center diff. lock switch (See page TR-11).**

NG → **Replace center diff. lock switch.**

OK ↓

3	**Check for open and short circuit in harness and connector between terminal EXI of skid control ECU and center diff. lock switch and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK ↓

4	**Check VSC OFF indicator light.**

NG → **Repair or replace combination meter.**

OK

5	**Check for open and short circuit in harness and connector between terminal WT of skid control ECU and VSC OFF indicator light (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

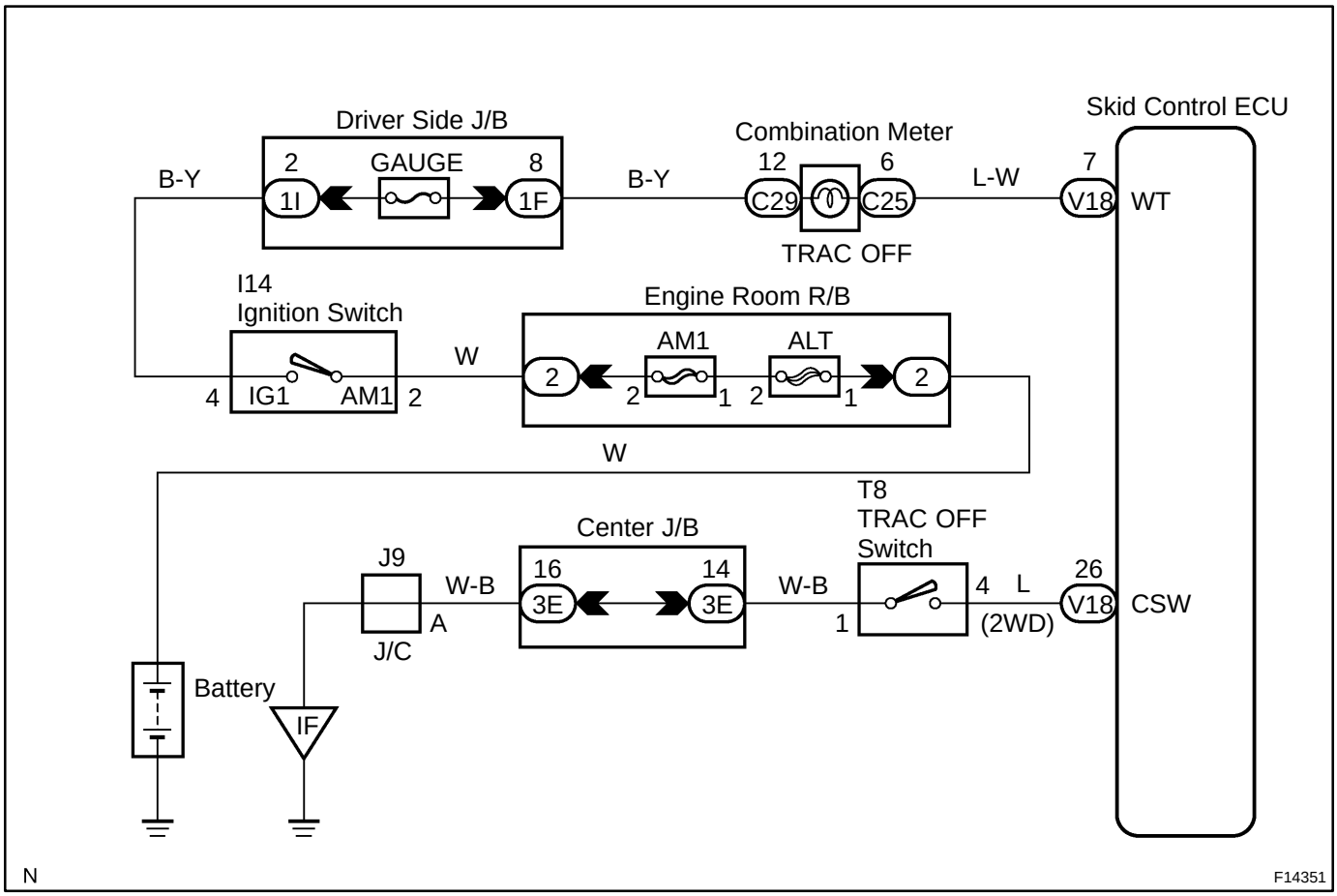
DI3JI-04

2WD: TRAC OFF Indicator, TRAC OFF Switch Circuit

CIRCUIT DESCRIPTION

This is the TRAC control main switch. When the TRAC OFF switch is pushed on, TRAC control goes off and the TRAC OFF indicator light lights up. This indicator blinks for warnings when the trouble occurs and for displaying DTC.

WIRING DIAGRAM



INSPECTION PROCEDURE

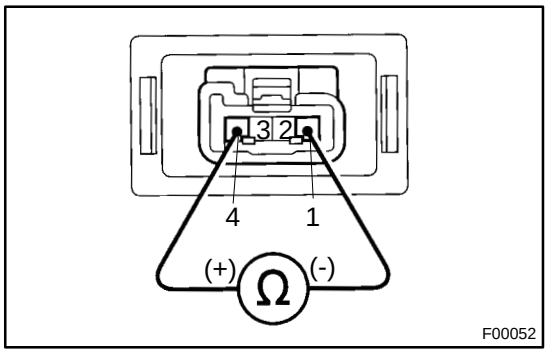
1	**Check DTC.**

Check DTC on page DI-224 .

YES → **Repair circuit indicated by the output code.**

NO

2	**Check TRAC OFF switch.**



PREPARATION:

(a) Remove the TRAC OFF switch.

(b) Disconnect the TRAC OFF switch connector.

CHECK:

Measure resistance between terminals 1 and 4 of the TRAC OFF switch when the TRAC OFF switch is ON and OFF.

OK:

TRAC OFF switch	Resistance
Pushed in	Continuity
Released	1 MΩ or higher

NG → **Replace TRAC OFF switch.**

OK

3	**Check for open and short circuit in harness and connector between terminal CSW of skid control ECU and TRAC OFF switch and body ground (See page IN-28).**

NG → **Repair or replace combination meter.**

OK

4	**Check TRAC OFF indicator light.**

See the combination meter troubleshooting on page BE-2 .

NG → **Repair or replace combination meter.**

OK

5	**Check for open and short circuit in harness and connector between terminal WT of skid control ECU and TRAC OFF indicator light (See page IN-28).**

NG → **Repair or replace harness connector.**

OK

Check and replace skid control ECU.

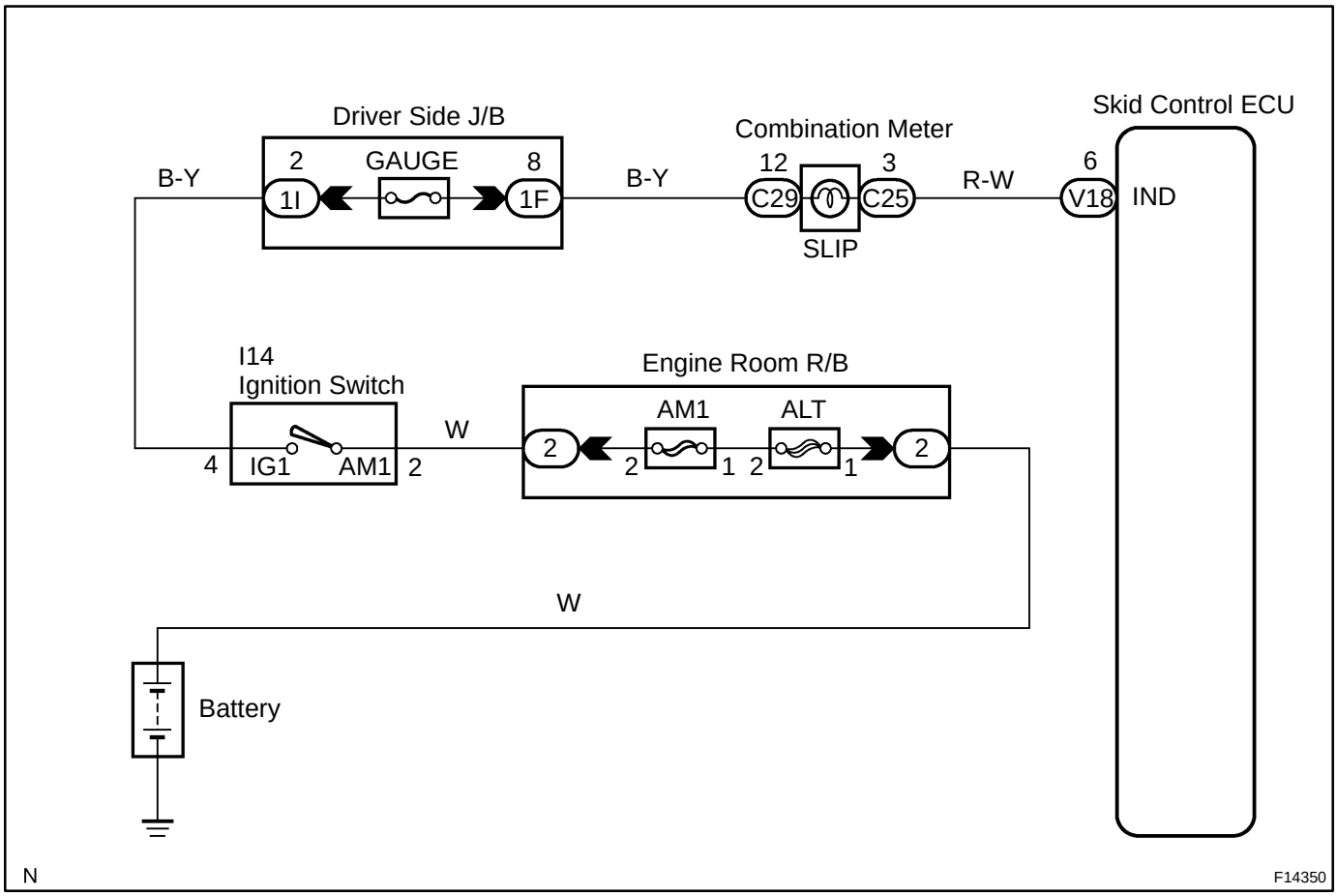
DI6CQ-03

SLIP Indicator Light Circuit

CIRCUIT DESCRIPTION

The SLIP indicator blinks during VSC operation.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check that SLIP indicator light is ON for 3 sec. soon after ignition switch is turned ON.

OK → Check and replace skid control ECU.

NG

2	Check SLIP indicator light.

NG → Repair or replace combination meter check.

OK

3	Check for open and short circuit in harness and connector between skid control ECU and SLIP indicator light (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace skid control ECU.

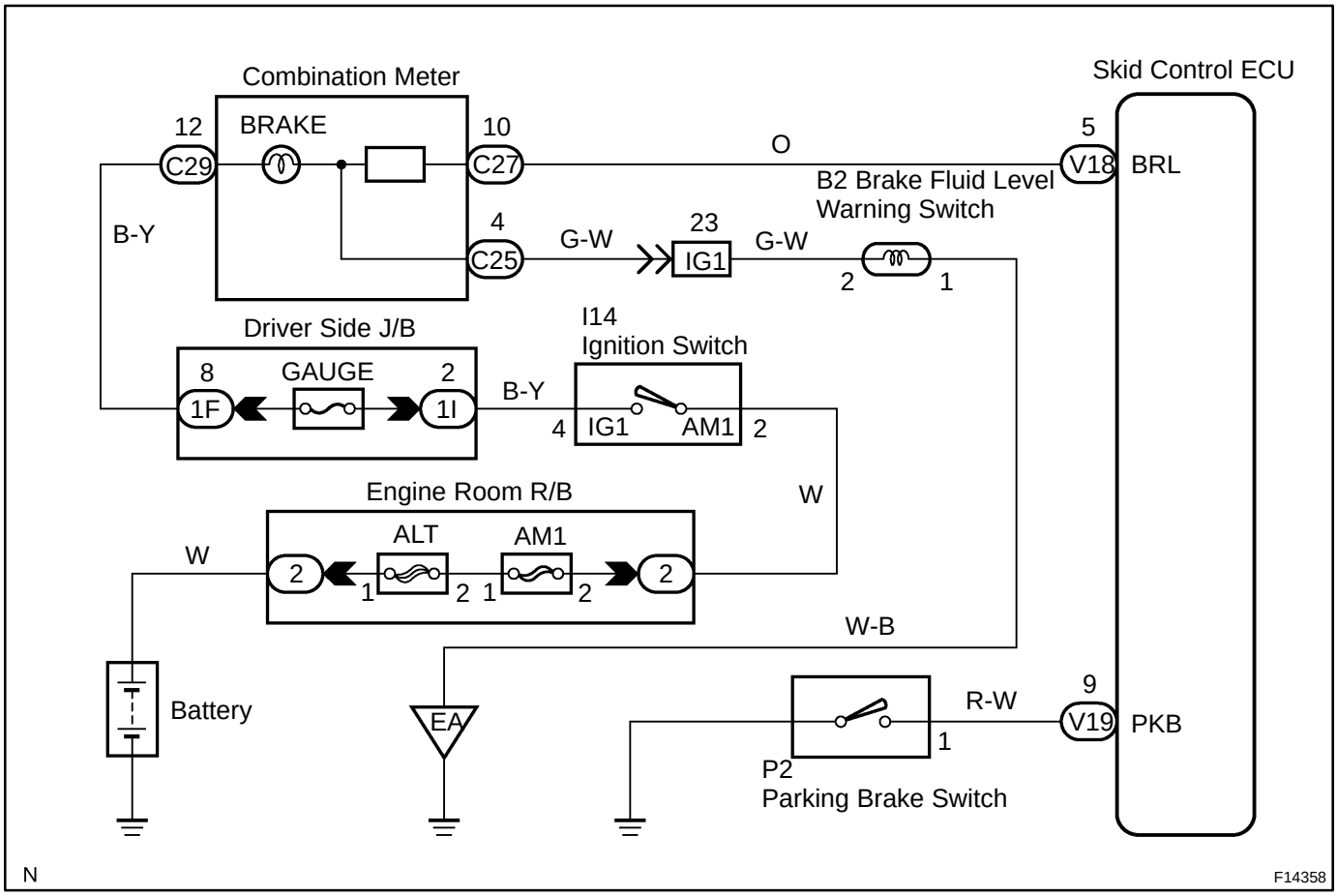
DI6C2-03

BRAKE Warning Light Circuit

CIRCUIT DESCRIPTION

The BRAKE warning light lights up when the brake fluid is insufficient, the parking brake is applied or the EBD is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check parking brake switch circuit (See page BE-45).**

NG → **Repair or replace parking brake switch circuit.**

OK

2	**Check brake fluid level warning switch circuit (See page BE-45).**

NG → **Repair or replace brake fluid level warning switch circuit.**

OK ↓

3	**Is DTC output for ABS ?**

Yes → **Repair circuit indicated by the output code.**

No ↓

4	**Check BRAKE warning light.**

See the combination meter troubleshooting on page BE-40 .

NG → **Repair or replace combination meter.**

OK ↓

Check and replace skid control ECU.

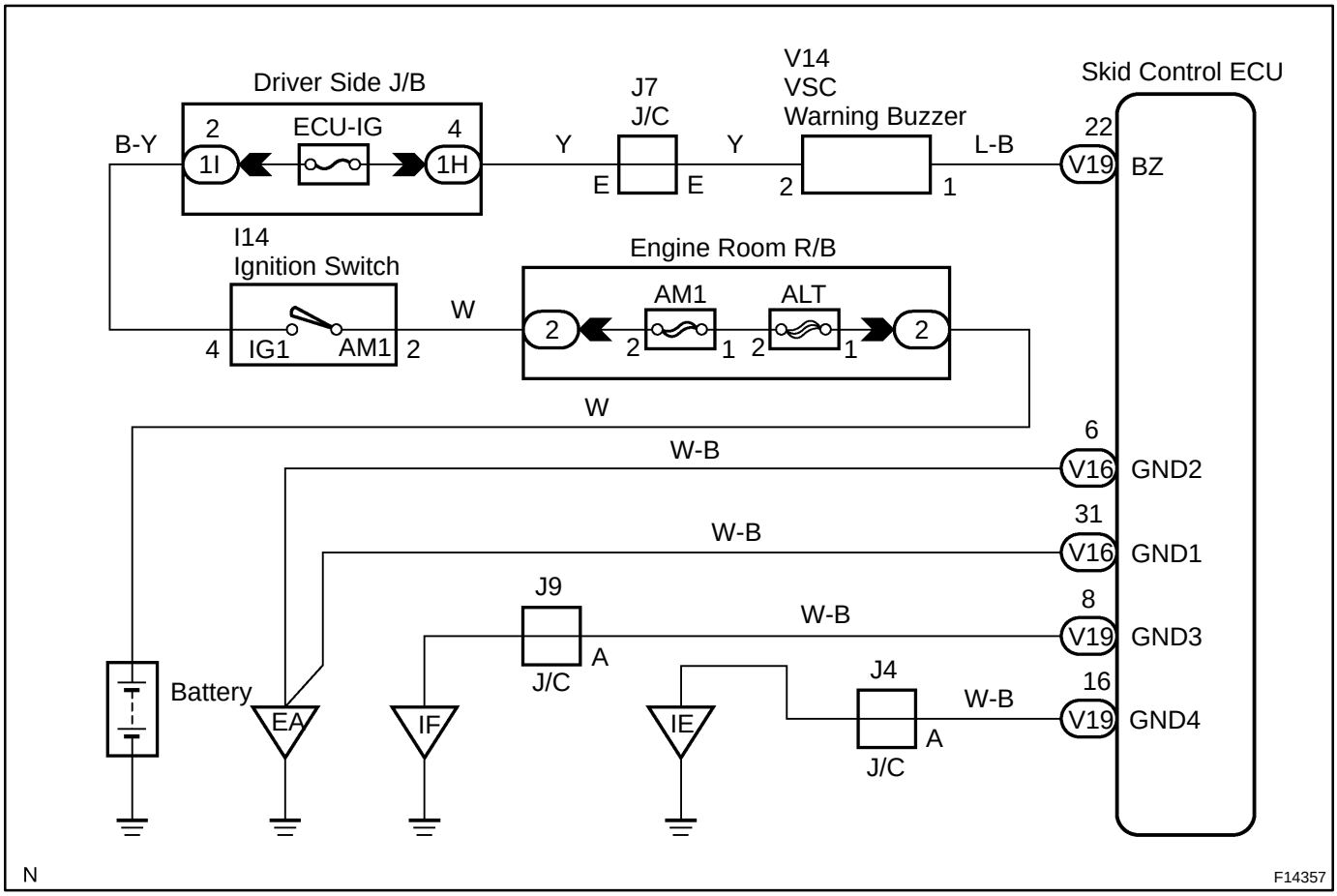
DI6C3-03

VSC Warning Buzzer Circuit

CIRCUIT DESCRIPTION

The VSC warning buzzer sounds while the accumulator pressure is abnormally low or an abnormality causing low fluid pressure occurs.

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Start the inspection from step 1 in case of using the hand-held tester and start from step 2 in case of not using the hand-held tester.

1	**Check operation of VSC buzzer.**

PREPARATION:

(a) Connect the hand-held tester to DLC3.
(b) Turn the ignition switch ON and push the hand-held tester main switch ON.
(c) Select the ACTIVE TEST mode on the hand-held tester.

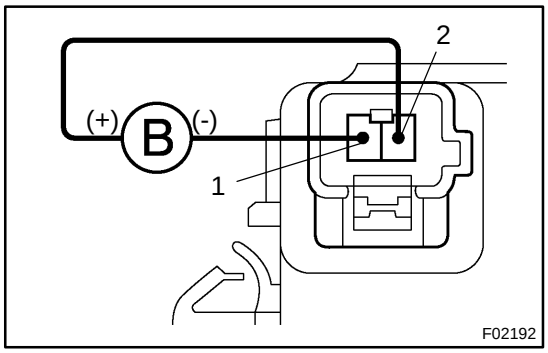
CHECK:

Check that the VSC warning buzzer sounds ”ON” and ”OFF” with the hand-held tester.

OK → **Check and replace skid control ECU.**

NG

2	**Check VSC warning buzzer.**



PREPARATION:

Disconnect the VSC warning buzzer connector.

CHECK:

Apply battery positive voltage to terminals 1 and 2 of the VSC buzzer connector, check that the VSC warning buzzer sounds.

NG → **Replace VSC warning buzzer.**

OK

3	**Check for open and short circuit in harness and connector between skid control ECU and VSC warning buzzer (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

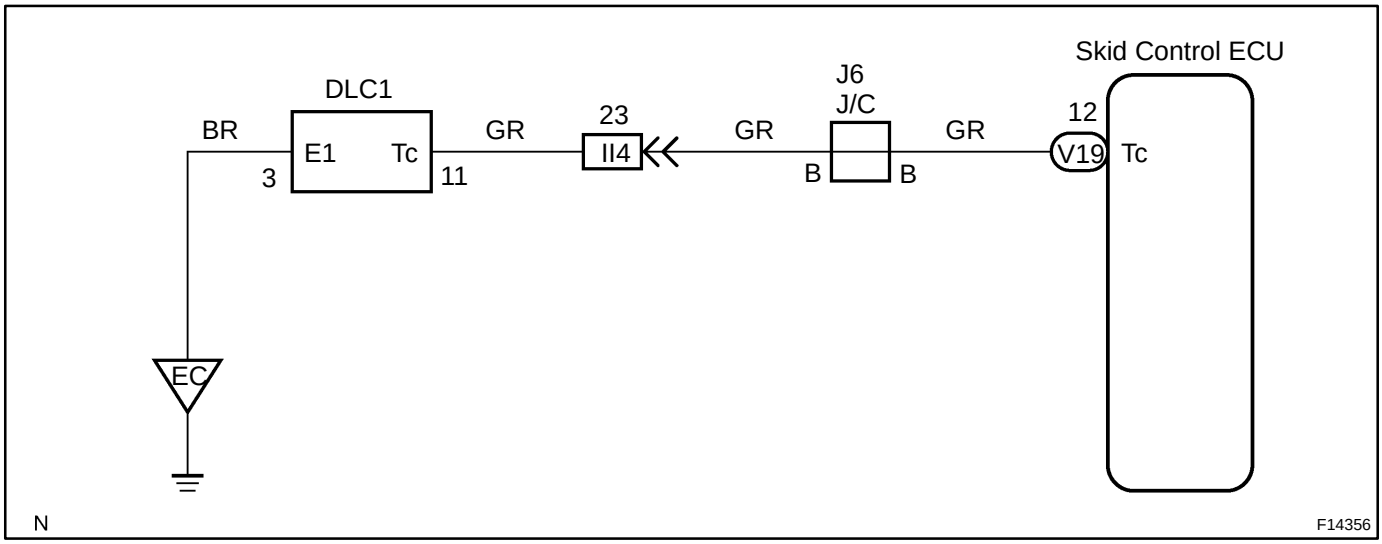
DI6C4-03

Tc Terminal Circuit

CIRCUIT DESCRIPTION

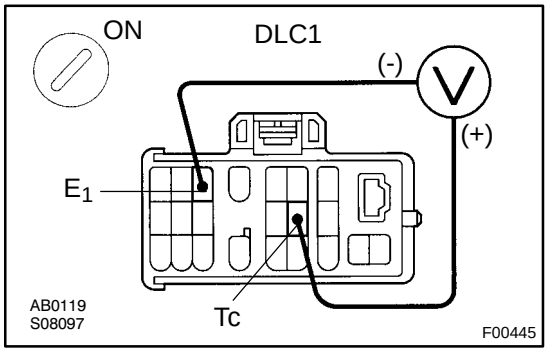
Connecting terminals Tc and E_1 of DLC1 causes the ECU to display the DTC by flashing the ABS warning light and VSC TRAC warning light.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Tc and E_1 of DLC1.**



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Tc and E_1 of DLC1.

OK:

Voltage: 10 - 14 V

OK → **If ABS warning light does not blink even after Tc and E_1 have been connected, ECU may be defective.**

NG

2	**IG switch OFF, and check for open and short circuit in harness and connector between skid control ECU and DLC1, DLC1 and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace skid control ECU.

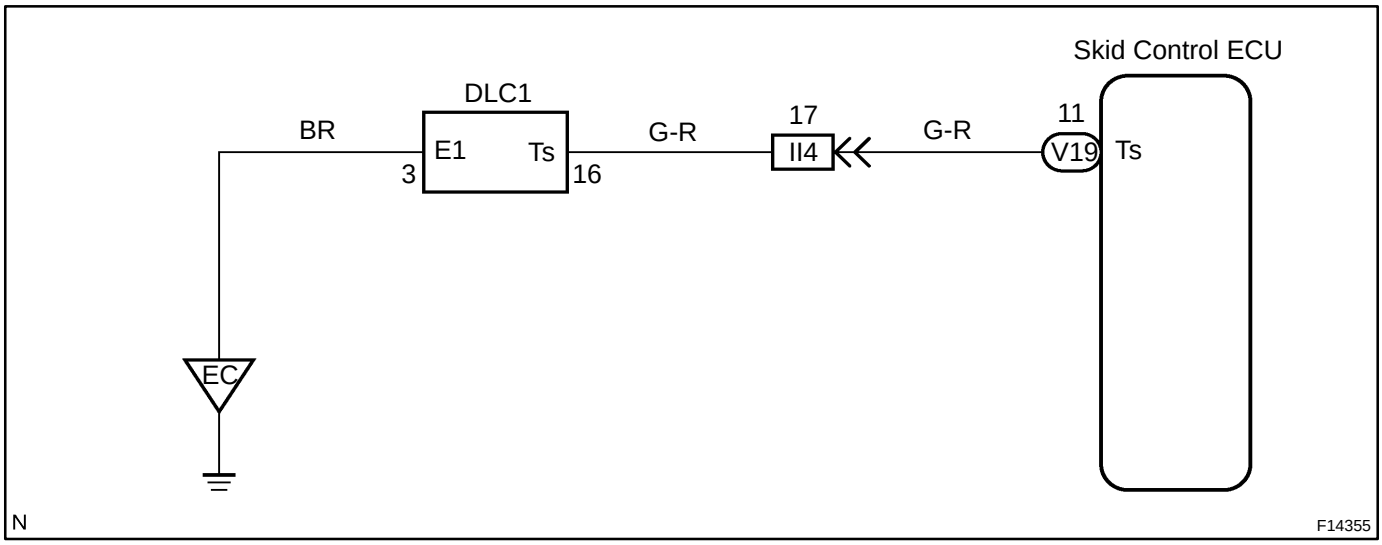
DI6C5-03

Ts Terminal Circuit

CIRCUIT DESCRIPTION

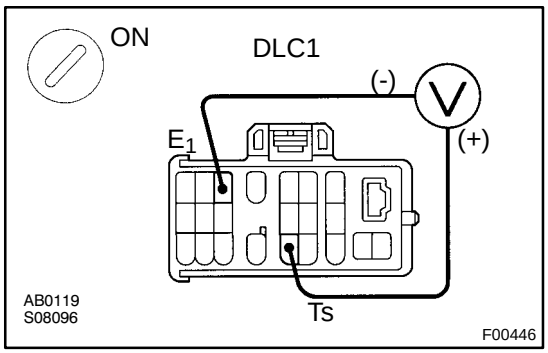
The sensor check circuit detects abnormalities in the speed sensor signal which cannot be detected by the DTC check.
Connecting terminals Ts and E_1 of DLC1 or Tc starts the check.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals Ts and E_1 of DLC1.**



CHECK:

(a) Turn the ignition switch ON.

(b) Measure voltage between terminals Ts and E_1 of DLC1.

OK:

Voltage: 10 - 14 V

OK	**If ABS warning light does not blink even after Ts and E_1 have been connected, ECU may be defective.**

NG

2	**IG switch OFF, and check for open and short circuit in harness and connector between skid control ECU and DLC1, DLC1 and body ground (See page IN-28).**

NG	**Repair or replace harness or connector.**

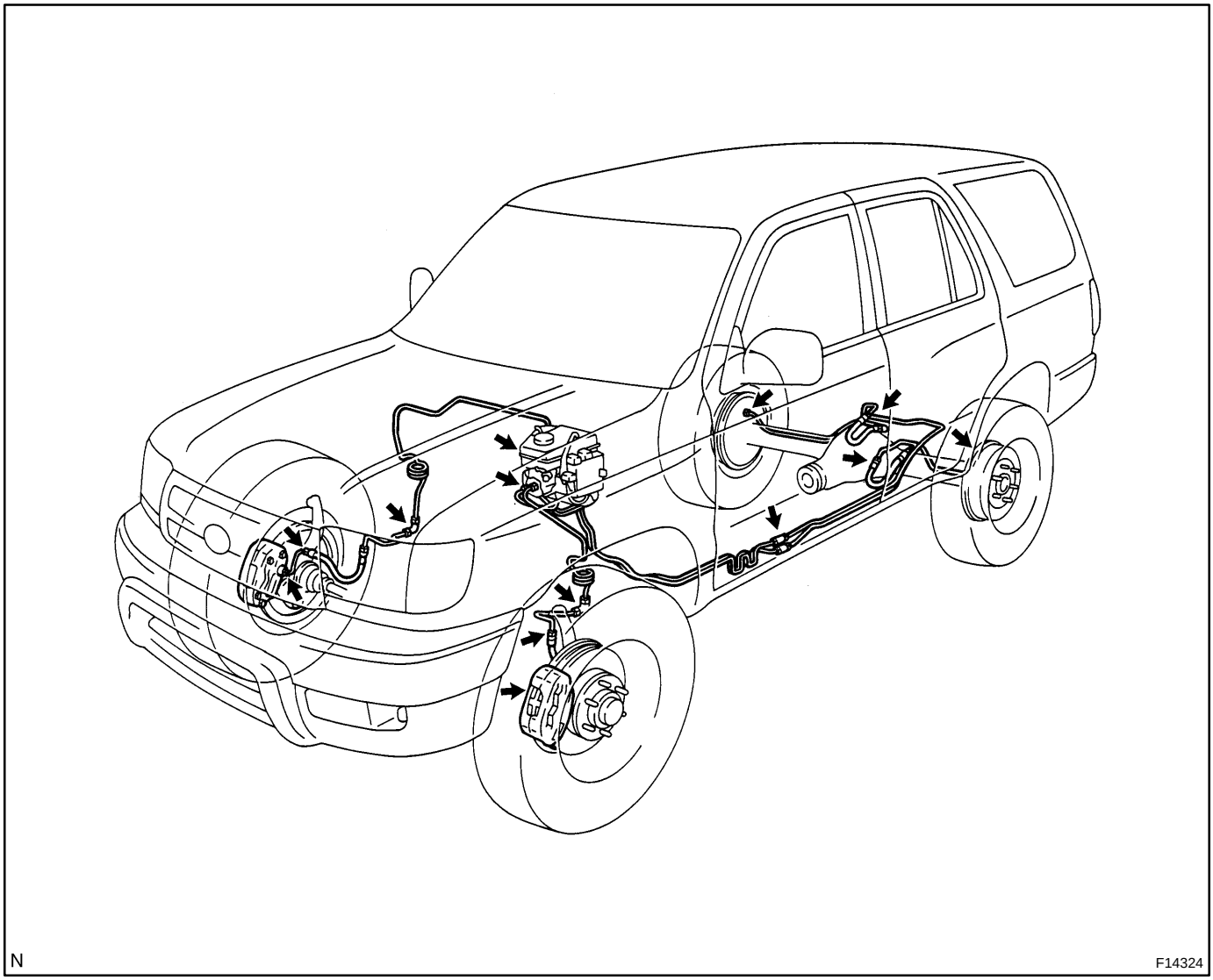
OK

Check and replace skid control ECU.

DI6CU-02

Check for Fluid Leakage

Check for fluid leakage from the actuator or the hydraulic lines.



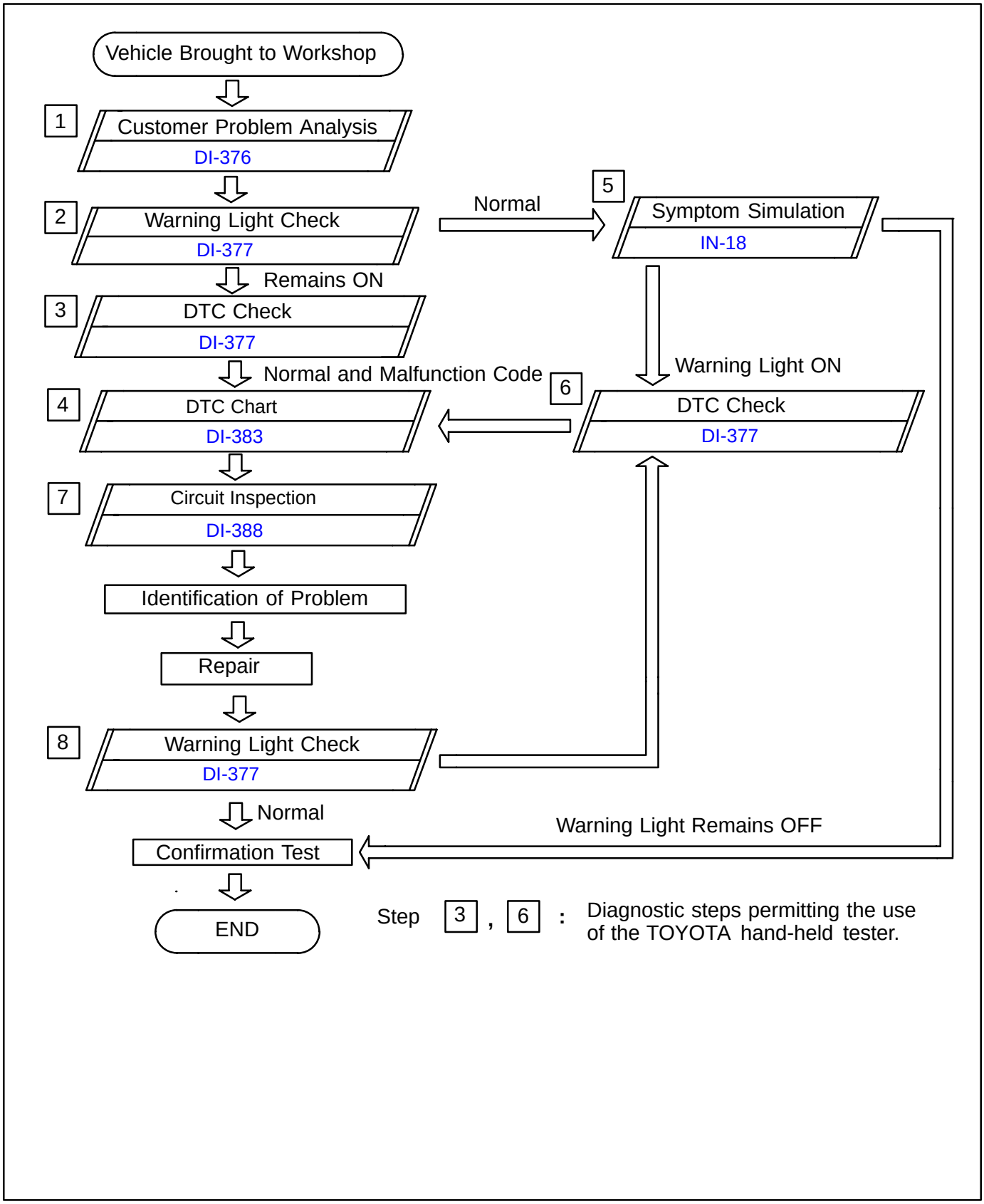
N

F14324

SUPPLEMENTAL RESTRAINT SYSTEM

DI18J-16

HOW TO PROCEED WITH TROUBLESHOOTING



DI18K-03

CUSTOMER PROBLEM ANALYSIS CHECK

Supplemental Restraint System Check Sheet

Inspector's Name _____

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

Date Problem Occurred	/ /
Weather	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Other
Temperature	**Approx.**

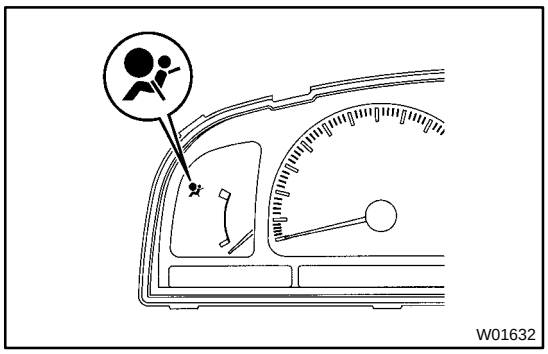
Vehicle Operation	☐ Starting ☐ Idling ☐ Driving [☐ Constant speed ☐ Acceleration ☐ Deceleration ☐ Other]
Road Conditions	
Details Of Problem	

Vehicle Inspection and Repair History Prior to Occurrence of Malfunction (Including Supplemental Restraint System)	

Diagnosis System Inspection

SRS Warning Light Inspection	**1st Time**	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
	2nd Time	☐ Remains ON ☐ Sometimes Lights Up ☐ Does Not Light Up
DTC Inspection	**1st Time**	☐ Normal Code ☐ Malfunction Code [Code.]
	2nd Time	☐ Normal Code ☐ Malfunction Code [Code.]

DI58G-01



PRE-CHECK

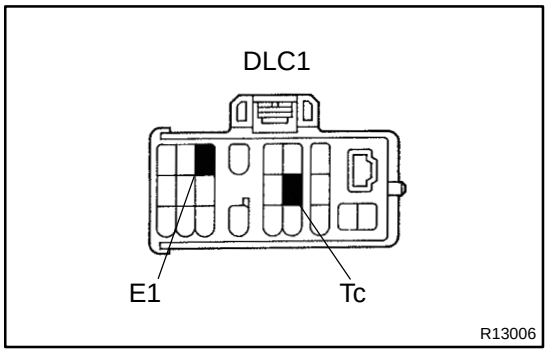
1. SRS WARNING LIGHT CHECK

(a) Turn the ignition switch to the ACC or ON position and check that the SRS warning light lights up.

(b) Check that the SRS warning light goes out after approx. 6 seconds.

HINT:

- When the ignition switch is at ACC or ON and the SRS warning light remains ON or flashes, the airbag sensor assembly has detected a malfunction code.
- If, after approx. 6 seconds have elapsed, the SRS warning light sometimes lights up or the SRS warning light lights up even when the ignition switch is OFF, a short in the SRS warning light circuit can be considered likely. Proceed to "SRS warning light circuit malfunction" on page DI-459 , DI-461 .



2. DTC CHECK (Using diagnosis check wire)

(a) Present trouble codes:

Output the DTC.

(1) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

(2) Using SST, connect terminals Tc and E1 of the DLC1.

SST 09843-18020

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

(b) Past trouble codes:

Output the DTC.

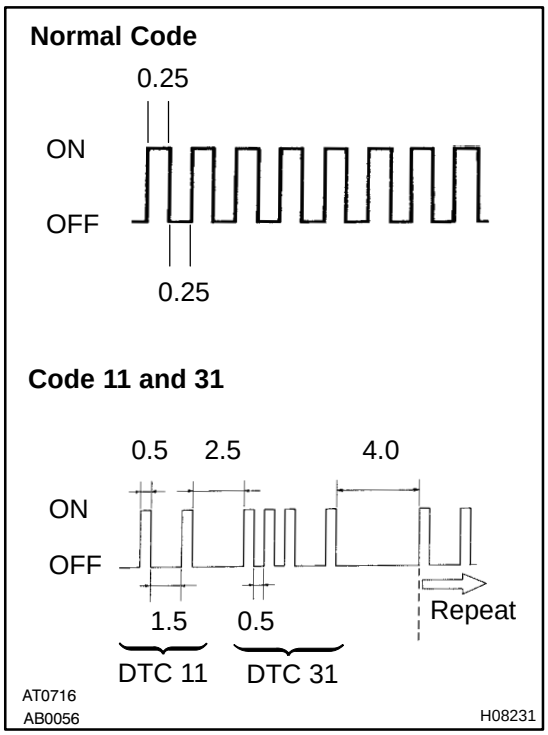
(1) Using SST, connect Terminals Tc and E1 of the DLC1.

SST 09843-18020

(2) Turn the ignition switch to the ACC or ON position and wait for approx. 20 seconds.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

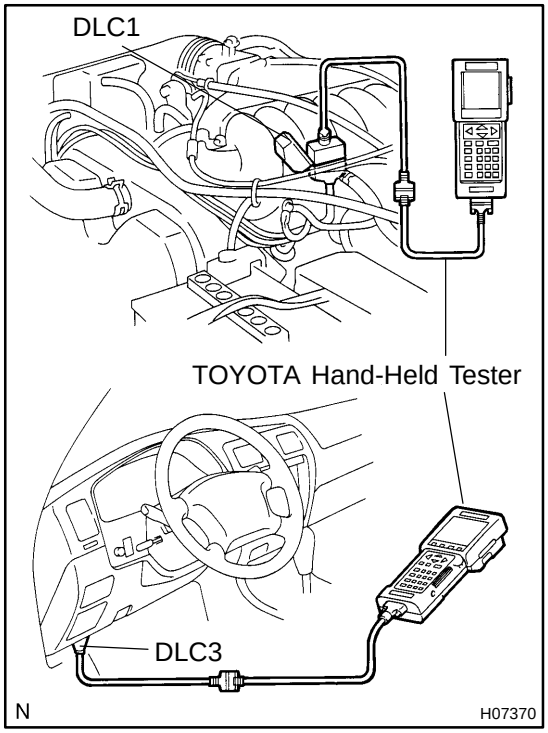


(c) Read the DTC.
Read the 2-digit DTC as indicated by the number of times the SRS warning light blinks. As an example, the blinking patterns, normal, 11 and 31 are shown in the illustration.

- Normal code indication
  The light will blink 2 times per second.
- Malfunction code indication
  The first blinking output indicates the first digit of a 2-digit DTC. After a 1.5-second pause, the second blinking output will indicate the second digit.

If there are 2 or more codes, there will be a 2.5-second pause between each code. After all the codes have been output, there will be a 4.0-second pause and they will all be repeated.
HINT:

- In the event of a number of trouble codes, indication will start from the smallest numbered code.
- If a DTC is not output or a DTC is output without terminal connection, proceed to the Tc terminal circuit inspection on page DI-465 .



3. DTC CHECK (Using TOYOTA hand-held tester)

(a) Hook up the TOYOTA hand-held tester to the DLC1 or DLC3.
(b) Read the DTCs by following the prompts on the tester screen.

HINT:
Please refer to the TOYOTA hand-held tester operator's manual for further details.

4. DTC CLEARANCE (Not using service wire)

When the ignition switch is turned OFF, the diagnostic trouble code is cleared.

5. DTC CLEARANCE (Using service wire)

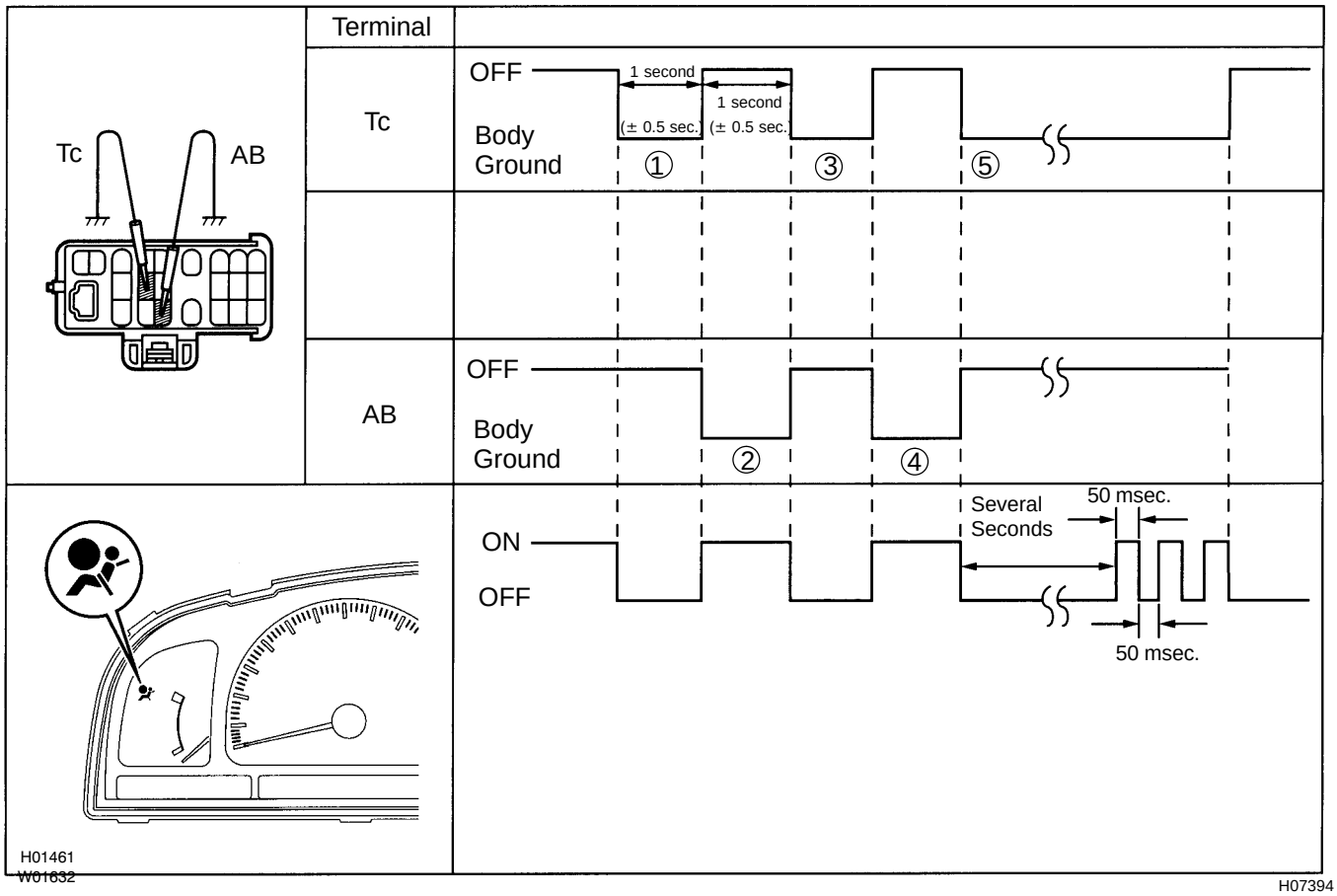
(a) Connect the 2 service wires to terminals Tc and AB of DLC1.
(b) Turn the ignition switch to ACC or ON and wait for approx. 6 seconds.

(c) Starting with the Tc terminal, ground alternately terminal Tc and terminal AB twice each in cycles of 1.0 second. Make sure that the terminals are grounded. Ensure the terminal Tc remains grounded.

HINT:

When alternately grounding terminals Tc and AB, release ground from one terminal and immediately ground the other terminal within an interval of 0.2 seconds.

If DTCs are not cleared, repeat the above procedure until the codes are cleared.



(d) Several seconds after doing the clearing procedure, the SRS warning light will blink in a 50 msec. cycle to indicate the codes which have been cleared.

6. Past trouble codes:
DTC CLEARANCE
(See step 5.)

7. RELEASE METHOD OF AIRBAG ACTIVATION PREVENTION MECHANISM

An airbag activation prevention mechanism is built into the connector for the squib circuit of the SRS.

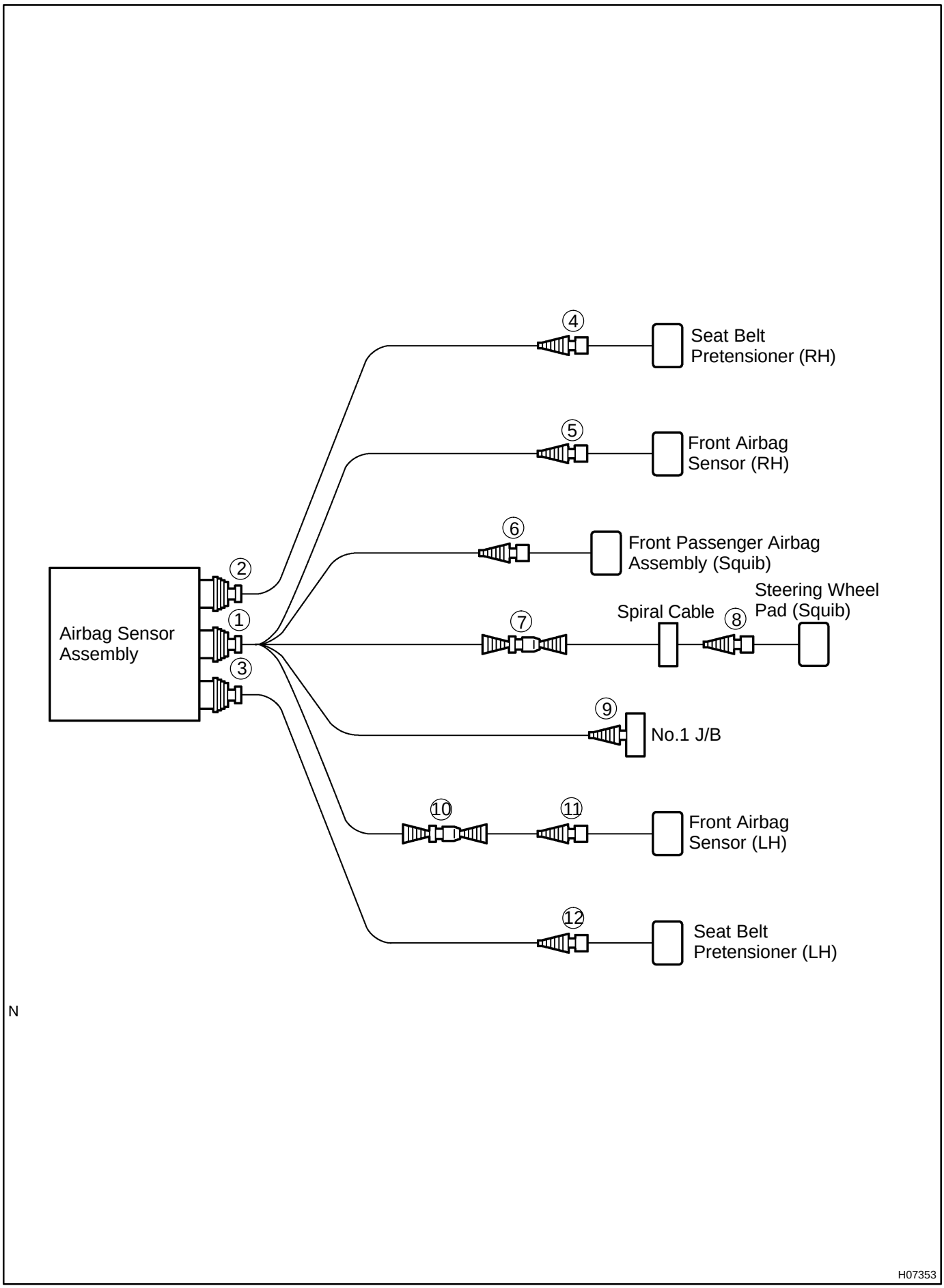
When release of the airbag activation prevention mechanism is directed in the troubleshooting procedure, as shown in the illustrations on the following pages, insert paper which has the same thickness as the male terminal between the terminal and the short spring.

CAUTION:

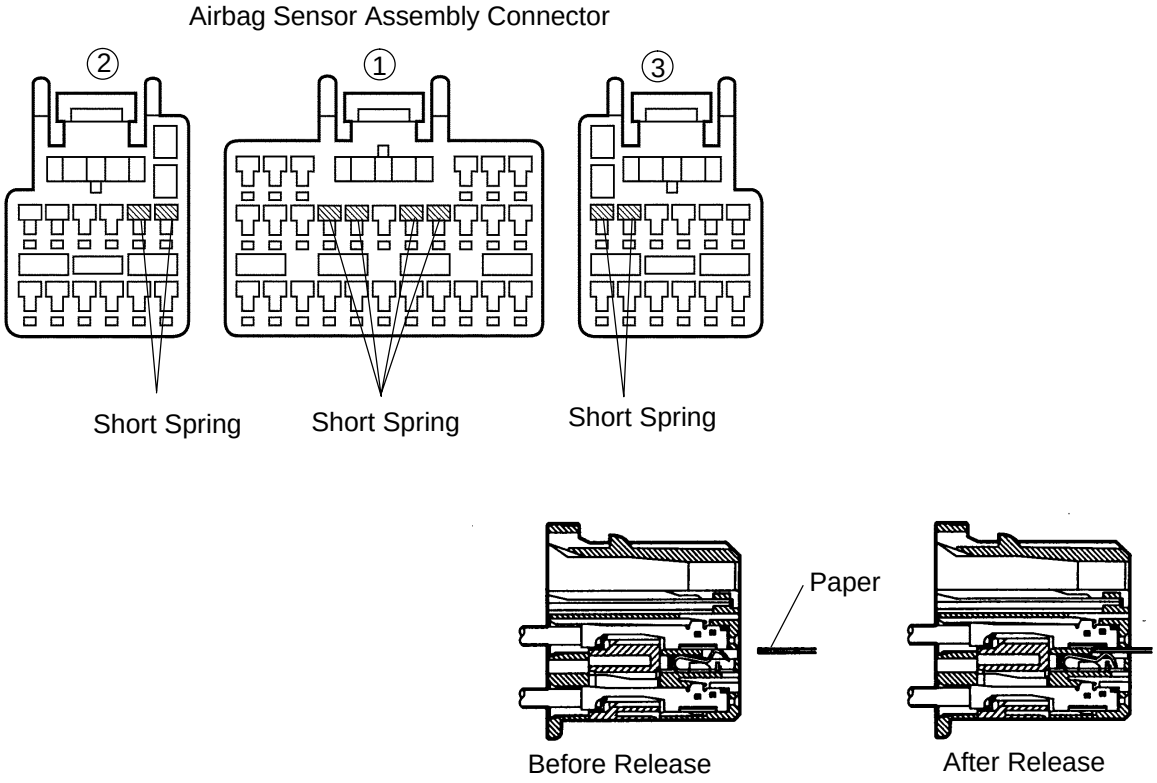
Never release the airbag activation prevention mechanism unless specifically directed by the troubleshooting procedure.

NOTICE:

If the inserted paper is too thick the terminal and short spring may be damaged, so always use paper with the same thickness as the male terminal.


Airbag Sensor Assembly
1
2
3
4
Seat Belt Pretensioner (RH)
5
Front Airbag Sensor (RH)
6
Front Passenger Airbag Assembly (Squib)
7
Spiral Cable
8
Steering Wheel Pad (Squib)
9
No.1 J/B
10
11
Front Airbag Sensor (LH)
12
Seat Belt Pretensioner (LH)
H07353

N



H09168
H01233
AB0130 H02248
AB0045 AB0046

H09169

DI161-37

DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the DTC check, check the circuit listed for that code in the table below (Proceed to the page given for that circuit.).

DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B0100/13 (DI-388)	Short in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0101/14 (DI-393)	Open in D squib circuit	• Steering wheel pad (squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0102/11 (DI-397)	Short in D and P squib circuit (to ground)	• Steering wheel pad (squib) • Front passenger airbag assembly (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0103/12 (DI-404)	Short in D and P squib circuit (to B+)	• Steering wheel pad (squib) • Front passenger airbag assembly (Squib) • Spiral cable • Airbag sensor assembly • Wire harness	ON
B0105/53 (DI-410)	Short in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0106/54 (DI-414)	Open in P squib circuit	• Front passenger airbag assembly (squib) • Airbag sensor assembly • Wire harness	ON
B0130/63 (DI-417)	Short in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	ON
B0131/64 (DI-421)	Open in P/T squib (RH) circuit	• Seat belt pretensioner RH (squib) • Airbag sensor assembly • Wire harness	ON
B0132/61 (DI-424)	Short in LH and RH P/T squib (RH) circuit (to ground)	• Seat belt pretensioners (squib) • Airbag sensor assembly • Wire harness	ON
B0133/62 (DI-429)	Short in LH and RH P/T squib (RH) circuit (to B+)	• Seat belt pretensioners (squib) • Airbag sensor assembly • Wire harness	ON
B0135/73 (DI-434)	Short in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	ON
B0136/74 (DI-438)	Open in P/T squib (LH) circuit	• Seat belt pretensioner LH (squib) • Airbag sensor assembly • Wire harness	ON
B1100/31 (DI-441)	Airbag sensor assembly malfunction	Airbag sensor assembly	ON

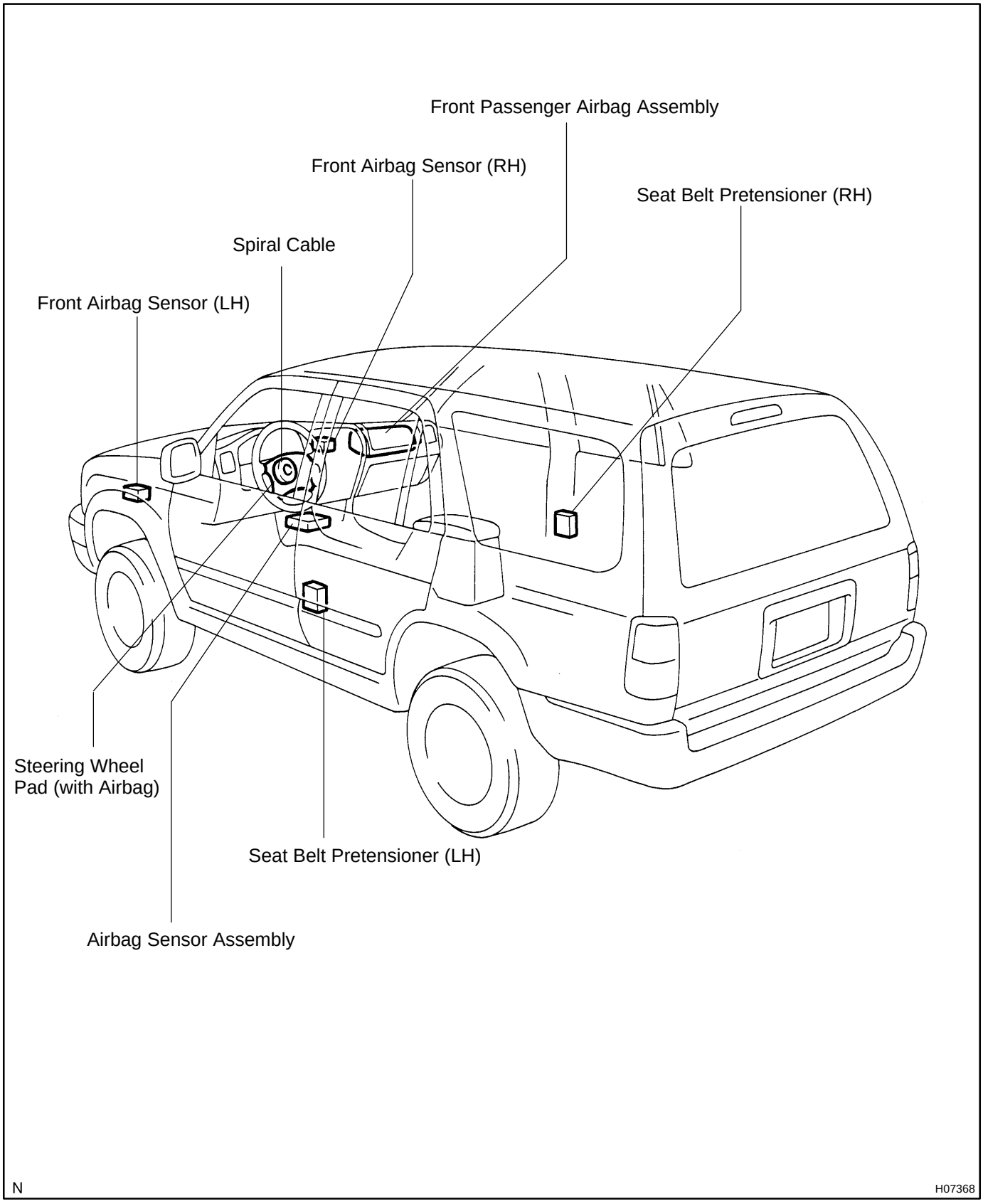
DTC No. (See Page)	Detection Item	Trouble Area	SRS Warning Light
B1156/B1157/15 (DI-443)	Front airbag sensor assembly (RH) malfunction	• Front airbag sensor assembly (RH) • Wire harness	ON
B1158/B1159/16 (DI-448)	Front airbag sensor assembly (LH) malfunction	• Front airbag sensor assembly (LH) • Wire harness	ON
Normal (DI-459)	System normal	-	OFF
	Voltage source drop	• Battery • Airbag sensor assembly	ON

HINT:

- When the SRS warning light remains lit up and the DTC is the normal code, this means a voltage source drops.
  This malfunction is not stored in memory by the airbag sensor assembly and if the power source voltage returns to normal, the SRS warning light will automatically go out.
- When 2 or more codes are indicated, the codes will be displayed in numeral order starting from the lowest numbered code.
- If a code not listed on the chart is displayed, the airbag sensor assembly is faulty.

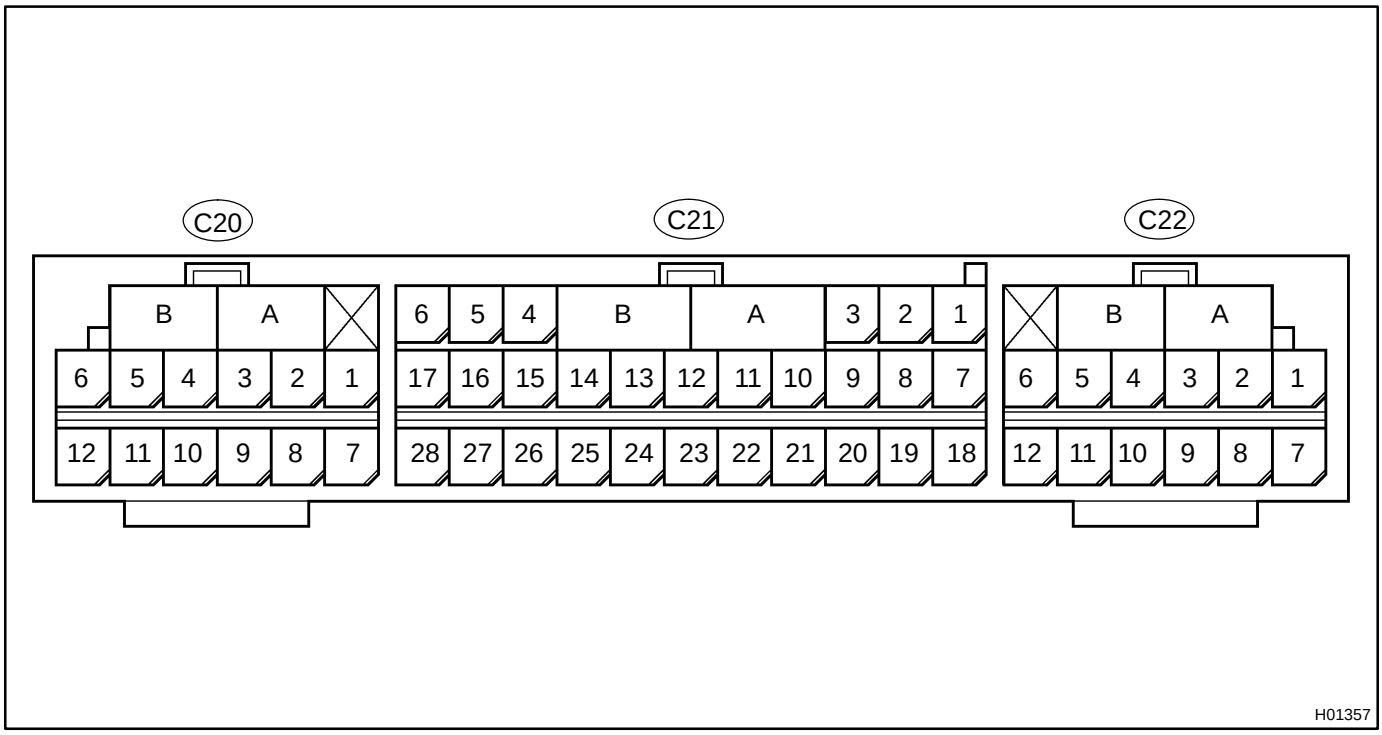
DI1HD-17

PARTS LOCATION



DI1B1-31

TERMINALS OF ECU



No.	Symbol	Terminal Name
A	-	Electrical Connector Check Mechanism
B	-	Electrical Connector Check Mechanism
C20 - 1	PL-	Squib (Seat Belt Pretensioner, LH)
C20 - 2	PL+	Squib (Seat Belt Pretensioner, LH)
C20-11	LBE+	Seat Belt Buckle Switch (LH)
C21 - 3	LA	SRS Warning Light
C21 - 5	IG2	Power Source (IGN Fuse)
C21 - 6	IG1	Power Source (ECU-IG Fuse)
C21 - 9	+SR	Front Airbag Sensor (RH)
C21 - 10	P+	Squib (Passenger)
C21 - 11	P-	Squib (Passenger)
C21 - 12	SIL	Diagnosis
C21 - 13	D-	Squib (Driver)
C21 - 14	D+	Squib (Driver)
C21 - 15	+SL	Front Airbag Sensor (LH)
C21 - 19	Tc	Diagnosis
C21 - 20	-SR	Front Airbag Sensor (RH)
C21 - 26	-SL	Front Airbag Sensor (LH)
C21 - 27	E1	Ground
C21 - 28	E2	Ground
C22 - 5	PR+	Squib (Seat Belt Pretensioner, RH)
C22 - 6	PR-	Squib (Seat Belt Pretensioner, RH)
C22 - 8	RBE+	Seat Belt Buckle Switch (LH)

DI18P-05

PROBLEM SYMPTOMS TABLE

Proceed with troubleshooting of each circuit in the table below.

Symptom	Suspect Area	See page
With the ignition switch at ACC or ON, the SRS warning light sometimes lights up after approx. 6 seconds have elapsed.	SRS warning light circuit (Always lights up when ignition switch is in LOCK position.)	DI-459
SRS warning light is always lit up even when ignition switch is in the LOCK position.		
With the ignition switch at ACC or ON, the SRS warning light does not light up.	SRS warning light circuit (Does not light up when ignition switch is turned to ACC or ON.)	DI-461
DTC is not displayed.	Tc terminal circuit	DI-465
SRS warning light is always lit up in a DTC check procedure.		
DTC is displayed without Tc and E1 terminal connection.		

DI18Q-35

CIRCUIT INSPECTION

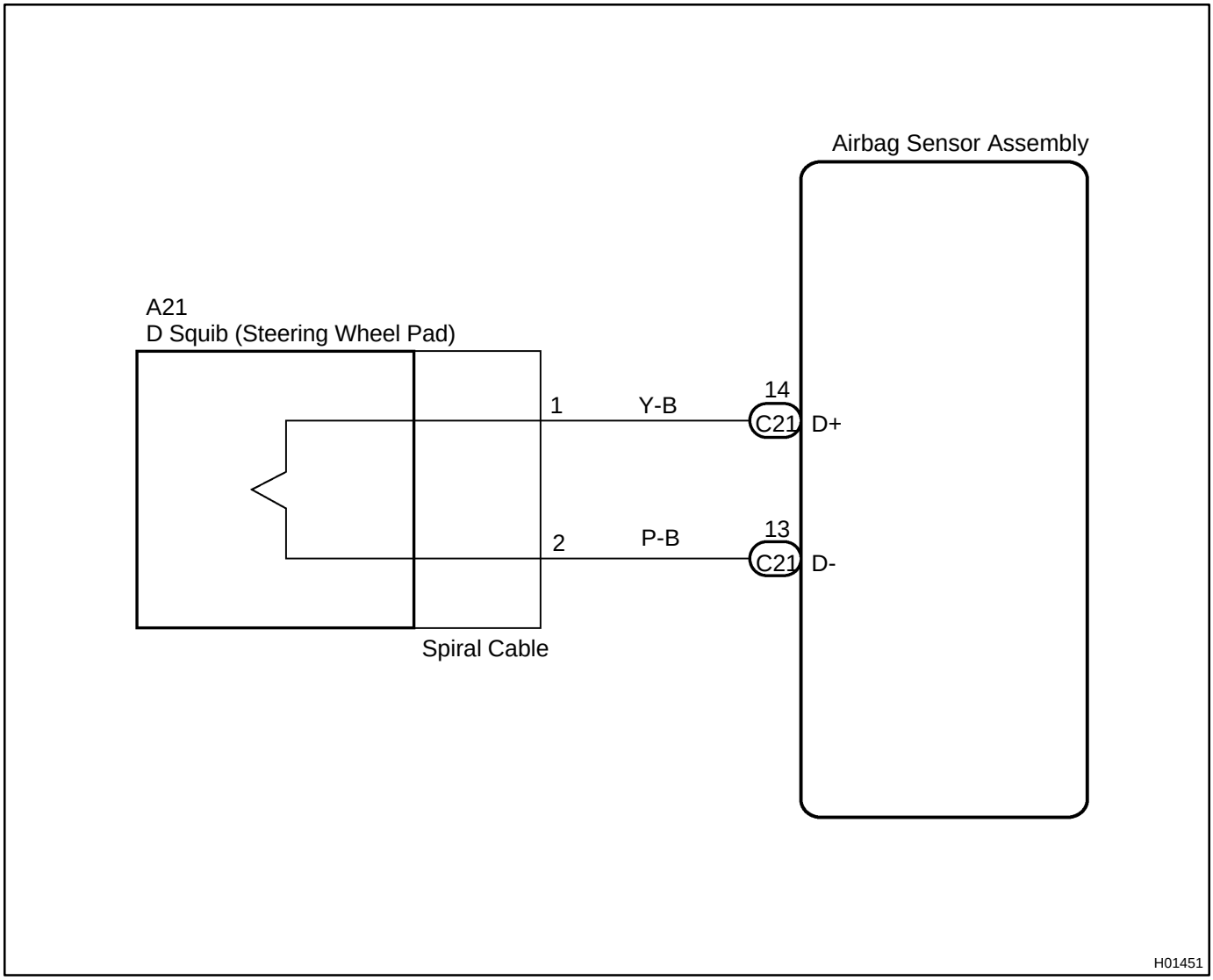
DTC	B0100/13	Short in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0100/13 is recorded when a short is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0100/13	• Short circuit between D+ wire harness and D- wire harness of squib • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

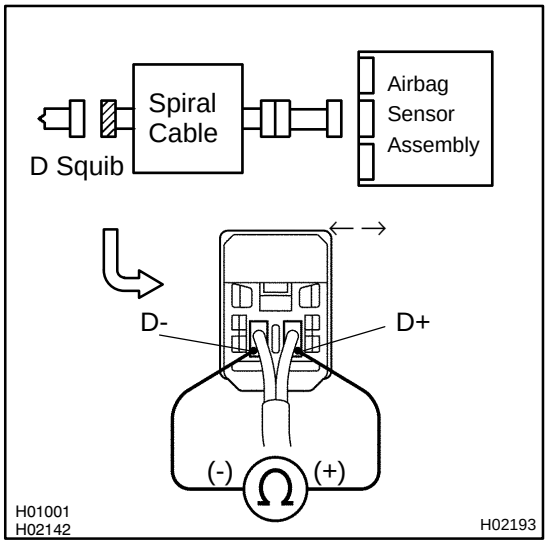
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check D squib circuit.**



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable.
(See page DI-377)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

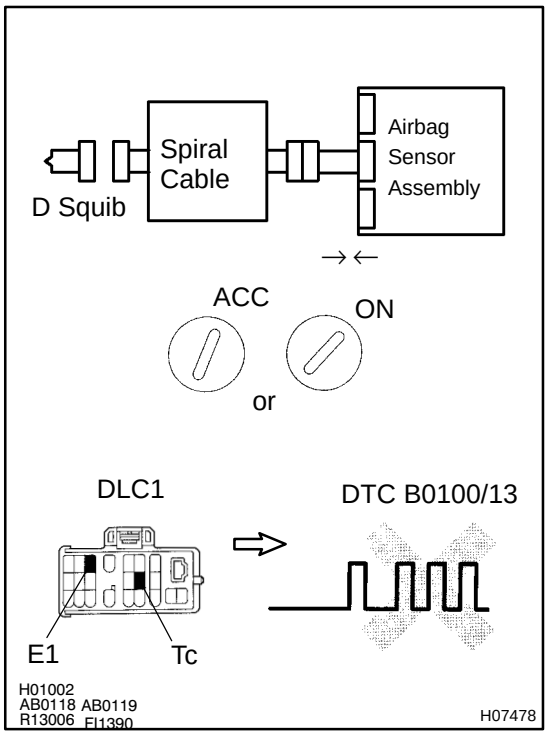
OK:

Resistance: 1 MΩ or Higher

NG	**Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

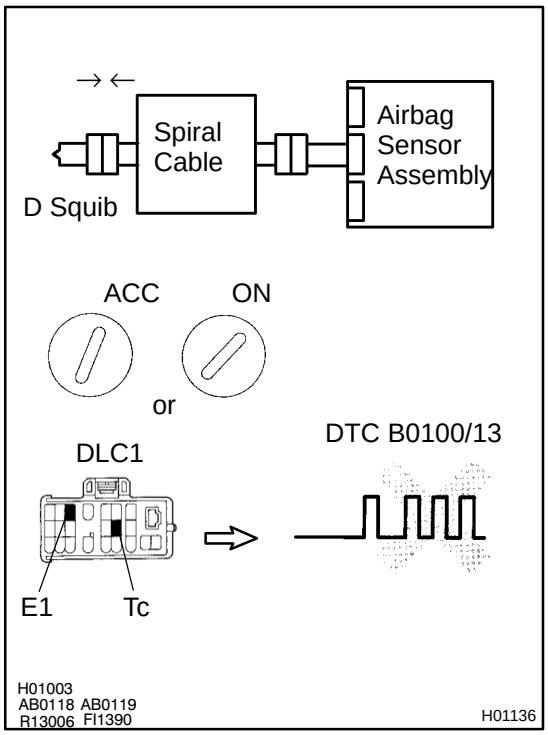
DTC B0100/13 is not output.

HINT:
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:

DTC B0100/13 is not output.

HINT:

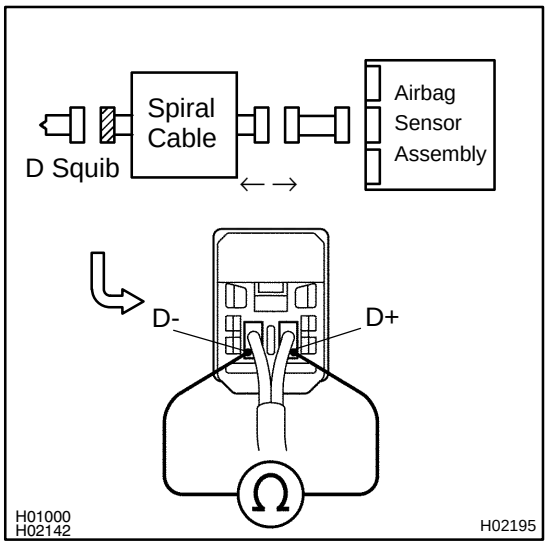
Codes other than code B0100/13 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	Check spiral cable.



PREPARATION:

(a) Disconnect the connector between the airbag sensor assembly and the spiral cable.

(b) Release the airbag activation prevention mechanism of the spiral cable connector on the airbag sensor assembly side. (See page DI-377)

CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

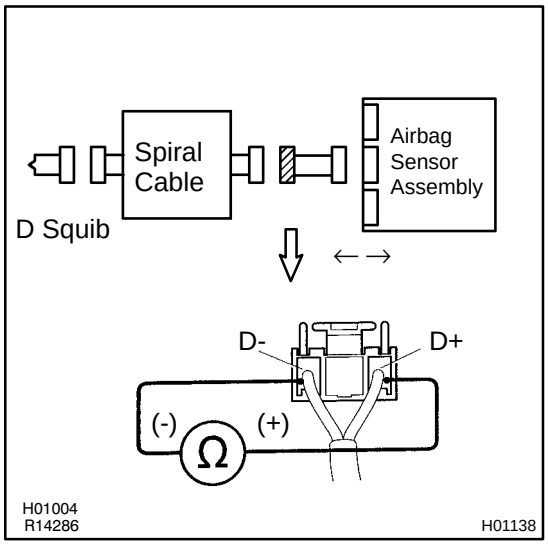
OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the spiral cable.
(See page DI-377)

CHECK:

For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D-.

OK:

Resistance: 1 MΩ or Higher

NG	Repair or replace harness or connector between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI18R-18

DTC	B0101/14	Open in D Squib Circuit

CIRCUIT DESCRIPTION

The D squib circuit consists of the airbag sensor assembly, spiral cable and steering wheel pad.
It causes the airbag to deploy when the airbag deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0101/14 is recorded when an open is detected in the D squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0101/14	• Open circuit in D+ wire harness or D- wire harness of squib • D squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Spiral cable • Airbag sensor assembly • Wire harness

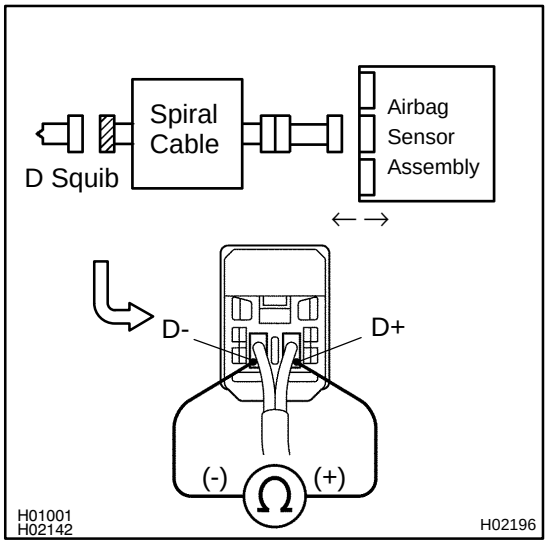
WIRING DIAGRAM

See page DI-388 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check D squib circuit.**



CHECK:

For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.

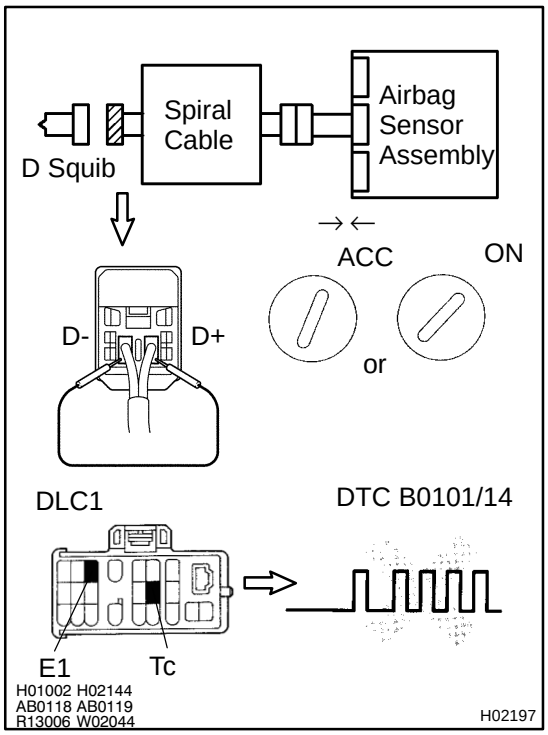
OK:

Resistance: Below 1 Ω

NG → **Go to step 5.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Using a service wire, connect D+ and D- of the connector (on the spiral cable side) between the spiral cable and the steering wheel pad.
(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

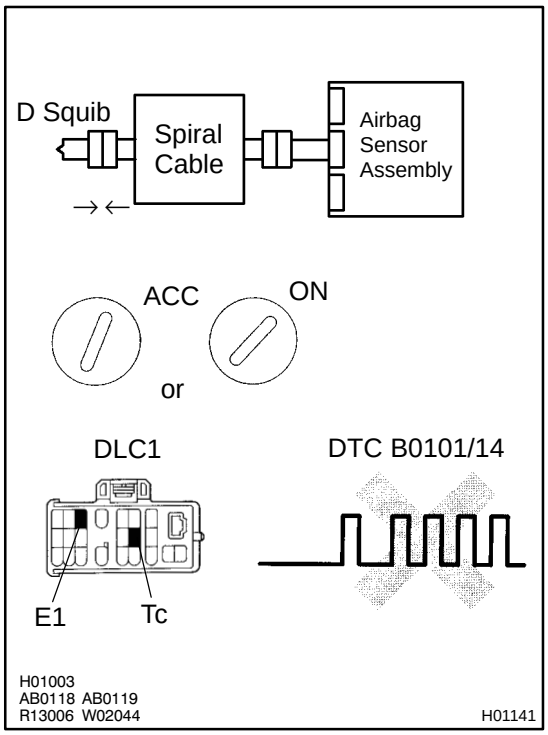
DTC B0101/14 is not output.

HINT:
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0101/14 is not output.

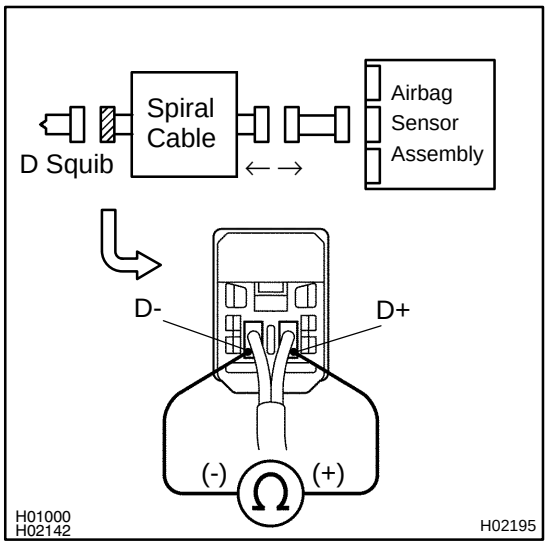
HINT:
Codes other than code B0101/14 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

5	Check spiral cable.

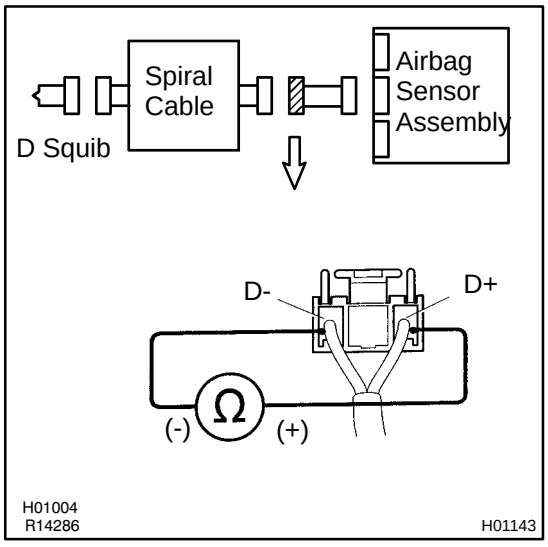


PREPARATION:
Disconnect the connector between the airbag sensor assembly and the spiral cable.
CHECK:
For the connector (on the spiral cable side) between the spiral cable and the steering wheel pad, measure the resistance between D+ and D-.
OK:
Resistance: Below 1 Ω

NG	Repair or replace spiral cable.

OK

6	Check harness between airbag sensor assembly and spiral cable.



CHECK:
For the connector (on the spiral cable side) between the airbag sensor assembly and the spiral cable, measure the resistance between D+ and D-.
OK:
Resistance: Below 1 Ω

NG	Repair or replace harness or connector between airbag sensor assembly and spiral cable.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI58K-02

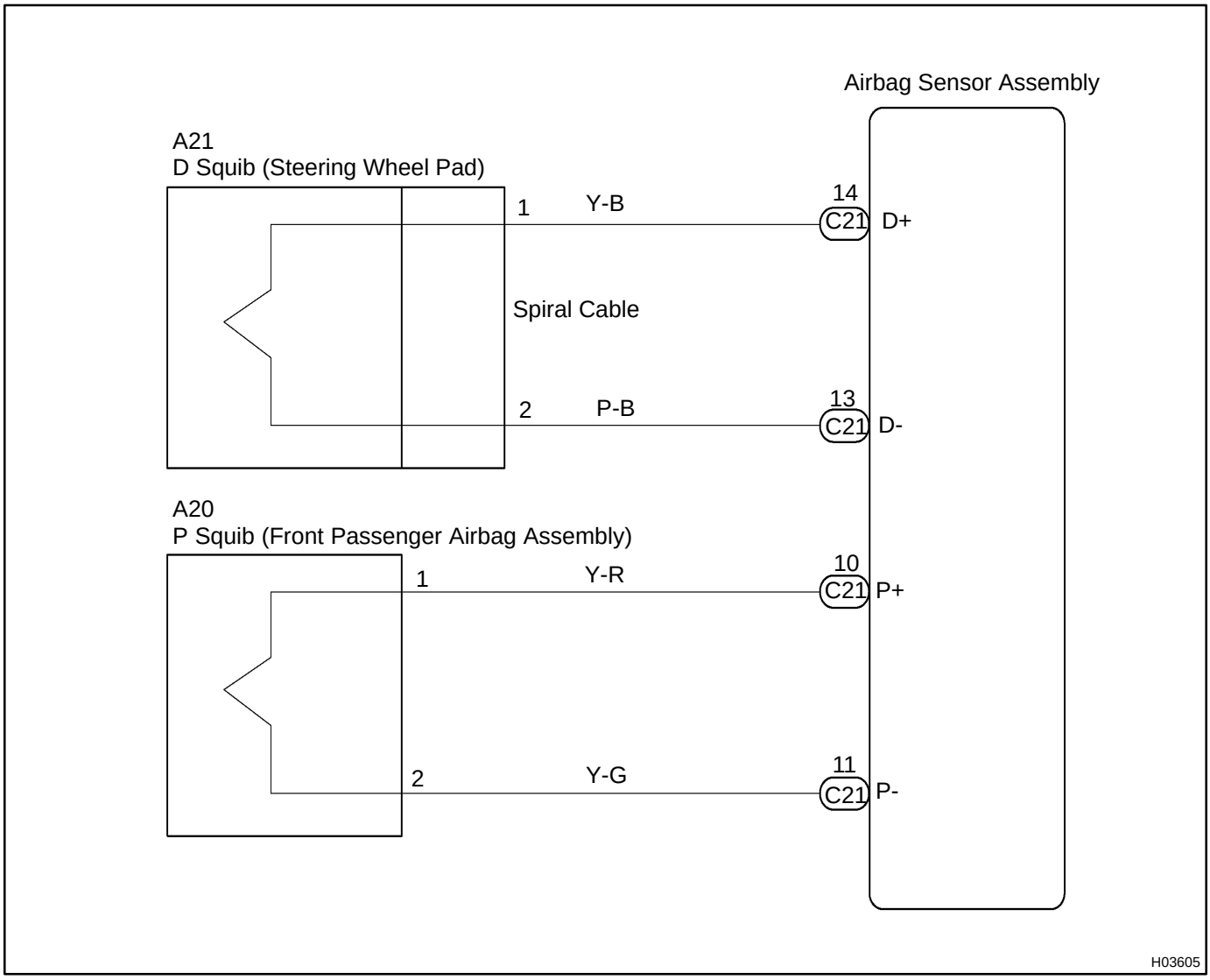
DTC	B0102/11	Short in D and P Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The D and P squib circuits consist of the airbag sensor assembly, spiral cable, steering wheel pad and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0102/11 is recorded when ground short is detected in the D and P squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0102/11	• Short circuit in D squib wire harness (to ground) • Short circuit in P squib wire harness (to ground) • D squib malfunction • P squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Front passenger airbag assembly (P squib) • Spiral cable • Airbag sensor assembly • Wire harness

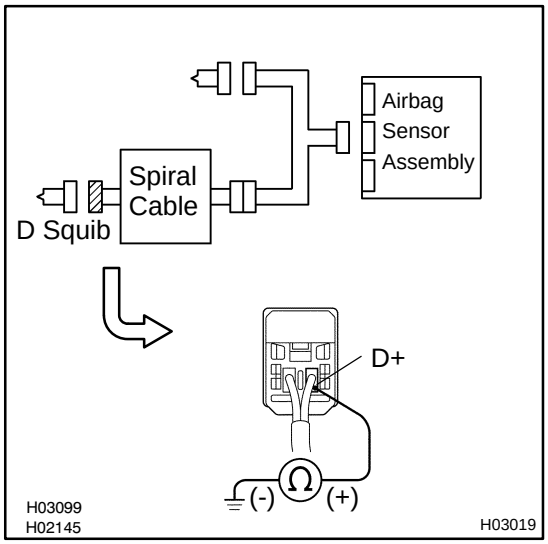
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check D squib circuit.**



CHECK:

For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the resistance between D+ and body ground.

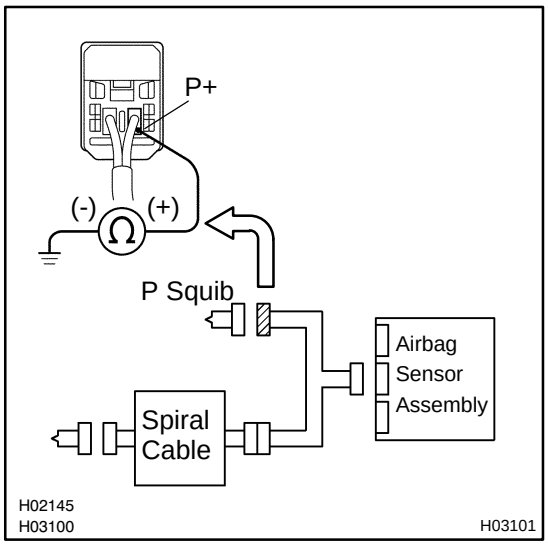
OK:

Resistance: 1 MΩ or Higher

NG → **Go to step 7.**

OK

3	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the resistance between P+ and body ground.

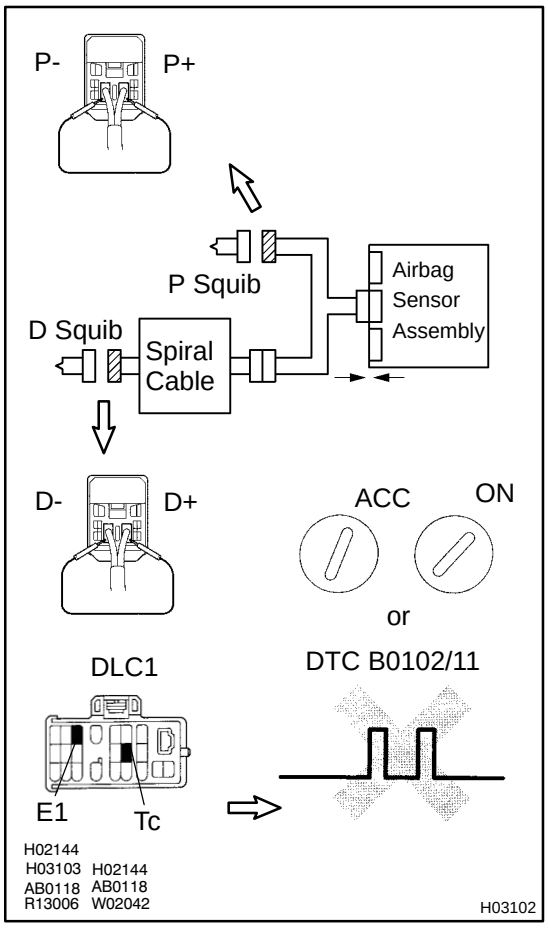
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

4	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D- of the connector (on the spiral cable side) between the spiral cable and steering wheel pad.

(c) Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0102/11 is not output.

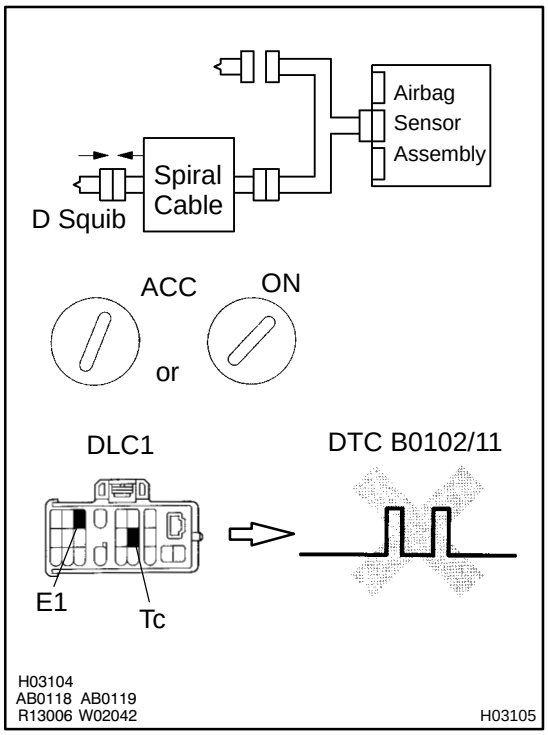
HINT:

Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

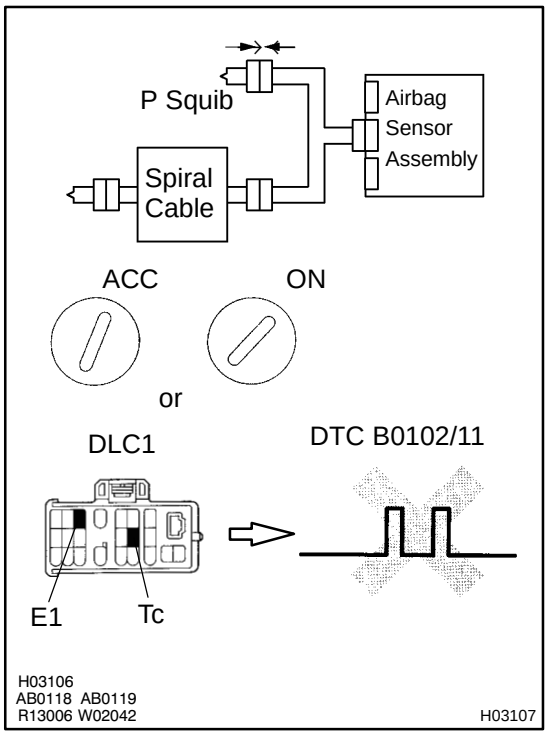
DTC B0102/11 is not output.

HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG → **Replace steering wheel pad.**

OK

6	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0102/11 is not output.

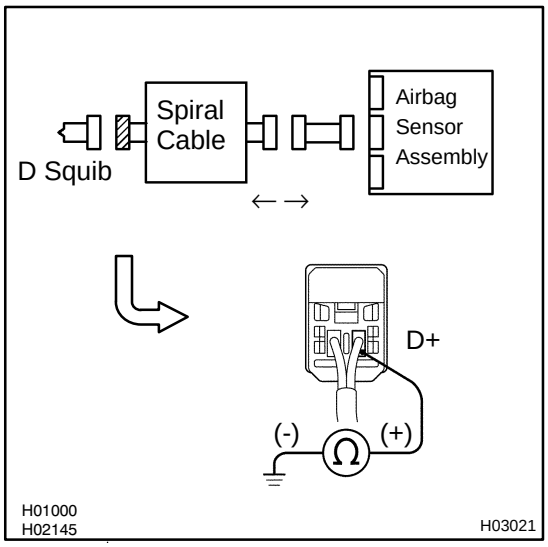
HINT:
Codes other than DTC B0102/11 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

7	Check spiral cable.



PREPARATION:
Disconnect the connector between the airbag sensor assembly and spiral cable.

CHECK:
For the connector (on the spiral cable side) between the steering wheel pad and spiral cable, measure the resistance between D+ and body ground.

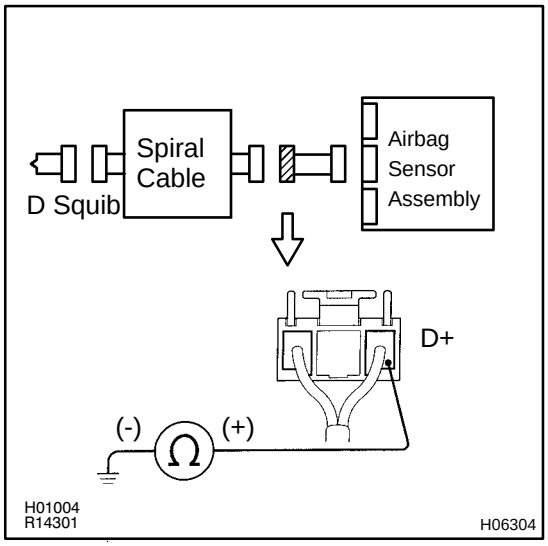
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace spiral cable.**

OK

8	Check harness between airbag sensor assembly and spiral cable.



CHECK:
For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the resistance between D+ and body ground.

OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI58L-02

DTC	B0103/12	Short in D and P Squib Circuit (to B+)

CIRCUIT DESCRIPTION

The D and P squib circuits consist of the airbag sensor assembly, spiral cable, steering wheel pad and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see page OPERATION on page RS-2 .
DTC B0103/12 is recorded when B+ short is detected in the D and P squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0103/12	• Short circuit in D squib wire harness (to B+) • Short circuit in P squib wire harness (to B+) • D squib malfunction • P squib malfunction • Spiral cable malfunction • Airbag sensor assembly malfunction	• Steering wheel pad (D squib) • Front passenger airbag assembly (P squib) • Spiral cable • Airbag sensor assembly • Wire harness

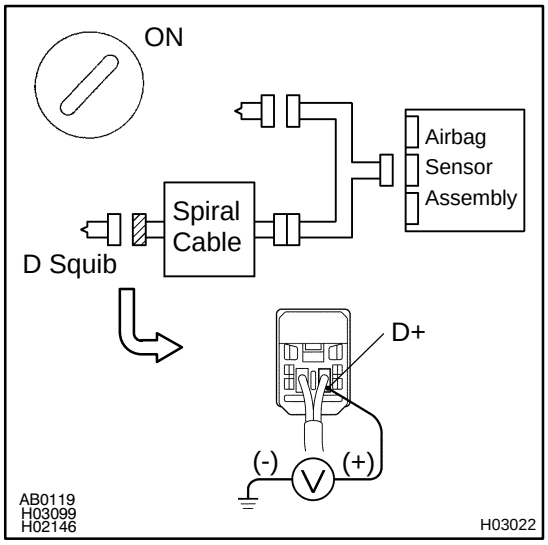
WIRING DIAGRAM

See page DI-397 .

INSPECTION PROCEDURE

1	Prepare for inspection. (See step 1 on page DI-456)

2	Check D squib circuit.

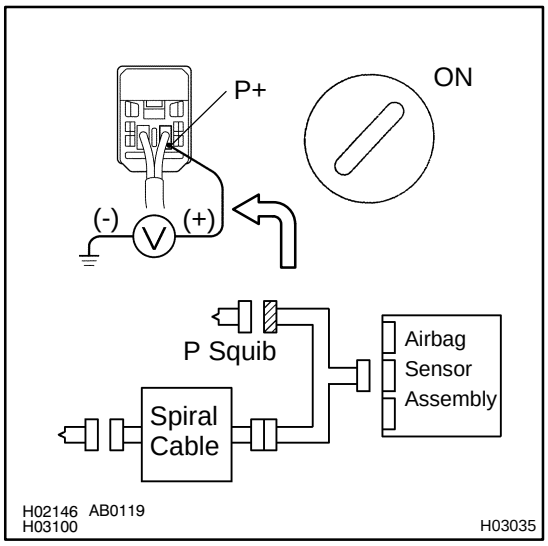


PREPARATION:
Turn ignition switch ON
CHECK:
For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.
OK:
Voltage: Below 1 V

NG → **Go to step 7.**

OK

3	Check P squib circuit.



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor assembly, measure the voltage between P+ and body ground.

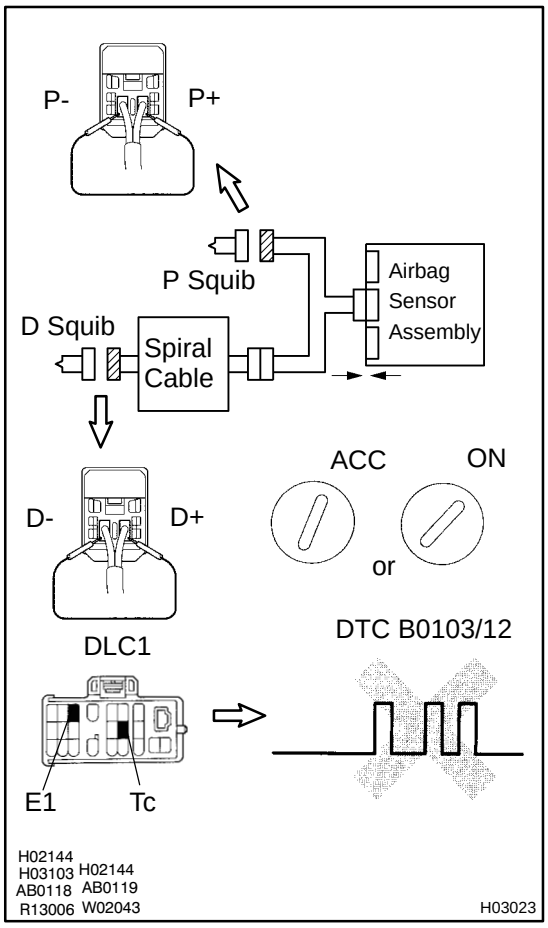
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

4	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect D+ and D- of the connector (on the spiral cable side) between the spiral cable and steering wheel pad.

(c) Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and airbag sensor.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0103/12 is not output.

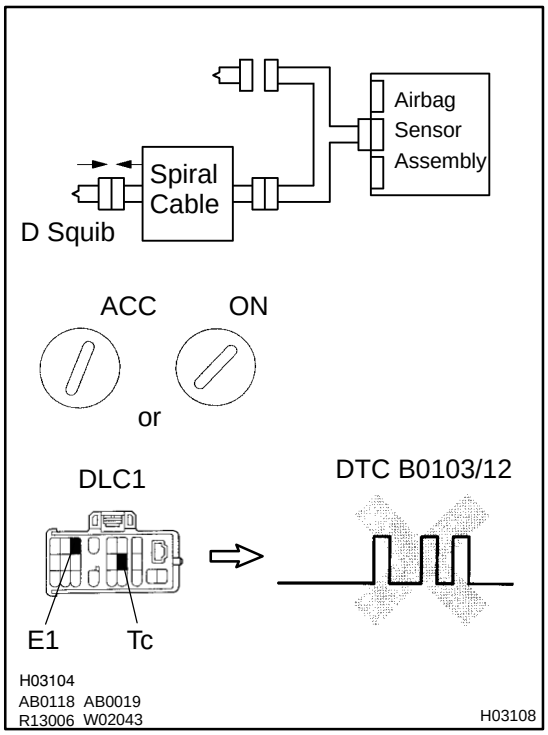
HINT:

Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	Check D squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the steering wheel pad connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

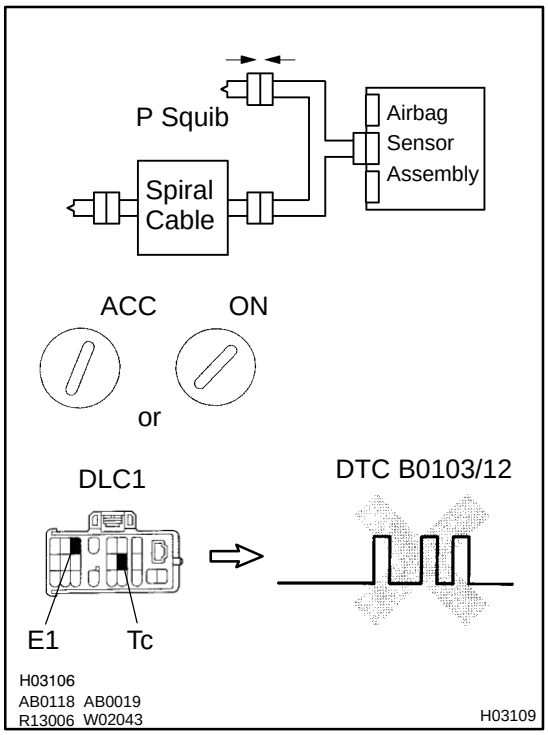
DTC B0103/12 is not output.

HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace steering wheel pad.

OK

6	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0103/12 is not output.

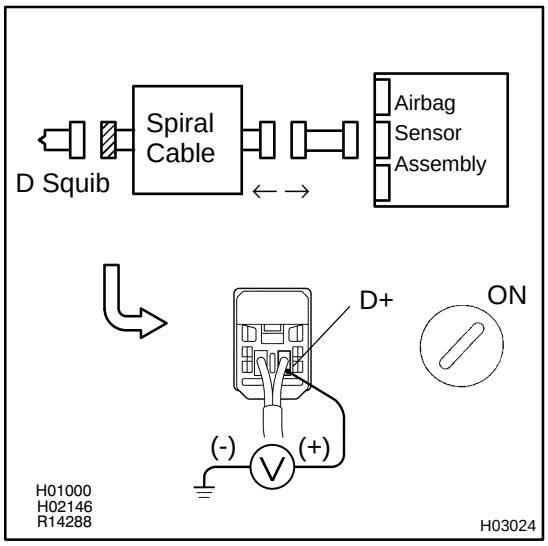
HINT:
Codes other than DTC B0103/12 may be output at this time, but they are not relevant to this check.

NG	Replace front passenger airbag assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

7	**Check spiral cable.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect the connector between the airbag sensor assembly and spiral cable.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and steering wheel pad, measure the voltage between D+ and body ground.

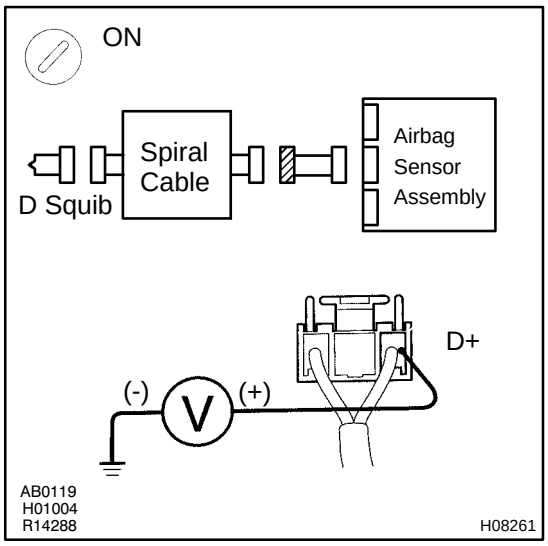
OK:

Voltage: Below 1 V

NG → **Repair or replace spiral cable.**

OK

8	**Check spiral cable.**



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the spiral cable side) between the spiral cable and airbag sensor assembly, measure the voltage between D+ and body ground.

OK:

Voltage: 0 V

NG → **Repair or replace harness between airbag sensor assembly and spiral cable.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI1B6-36

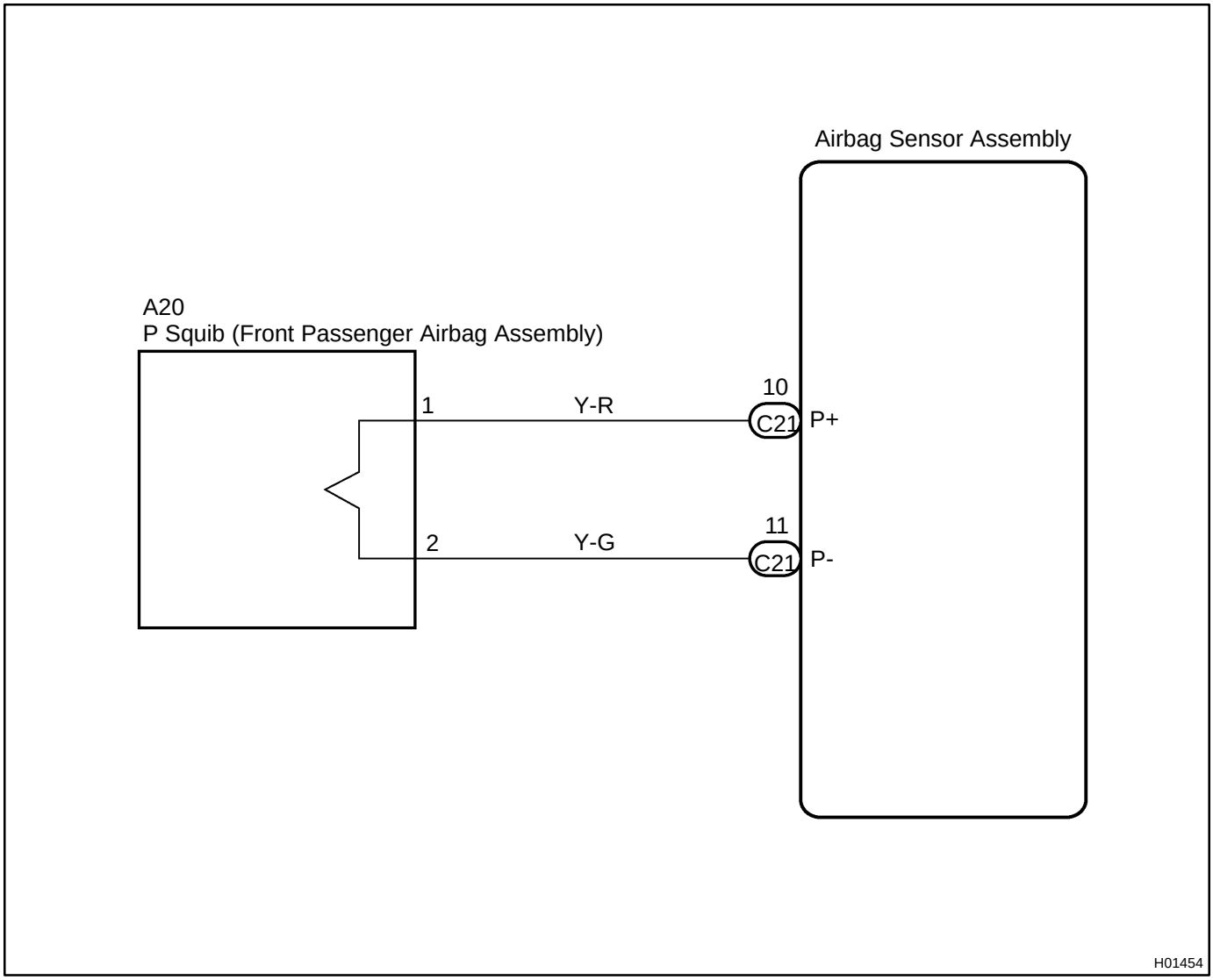
DTC	B0105/53	Short in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0105/53 is recorded when a short is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0105/53	• Short circuit in P squib wire harness • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

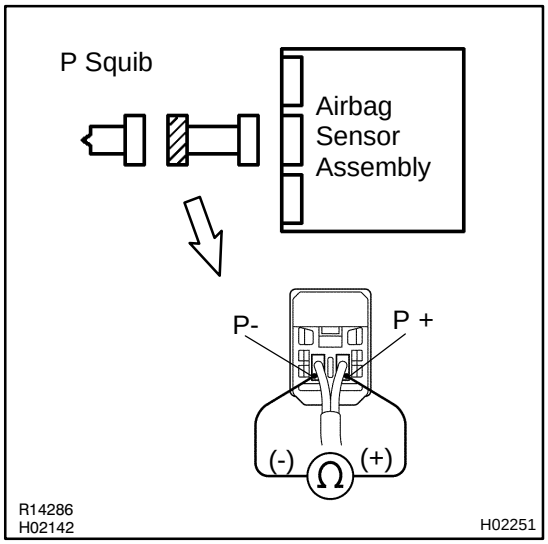
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P squib circuit.**



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P-.

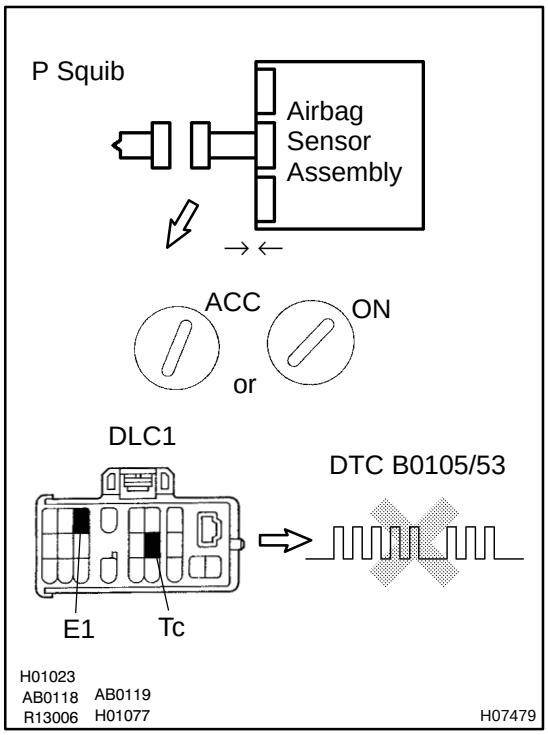
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

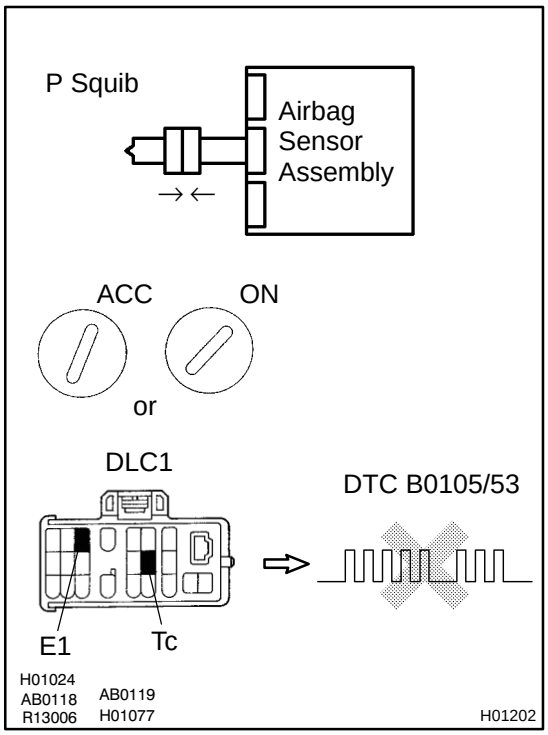
DTC B0105/53 is not output.

HINT:
Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 seconds.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:

DTC B0105/53 is not output.

HINT:

Codes other than code B0105/53 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1B7-36

DTC	B0106/54	Open in P Squib Circuit

CIRCUIT DESCRIPTION

The P squib circuit consists of the airbag sensor assembly and front passenger airbag assembly.
It causes the SRS to deploy when the SRS deployment conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0106/54 is recorded when an open is detected in the P squib circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0106/54	• Open circuit in P+ wire harness or P- wire harness • P squib malfunction • Airbag sensor assembly malfunction	• Front passenger airbag assembly (P squib) • Airbag sensor assembly • Wire harness

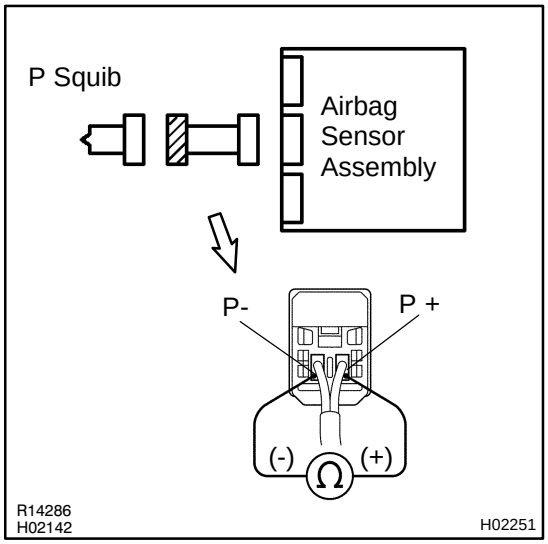
WIRING DIAGRAM

See page DI-410 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P squib circuit.**



CHECK:

For the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly, measure the resistance between P+ and P-.

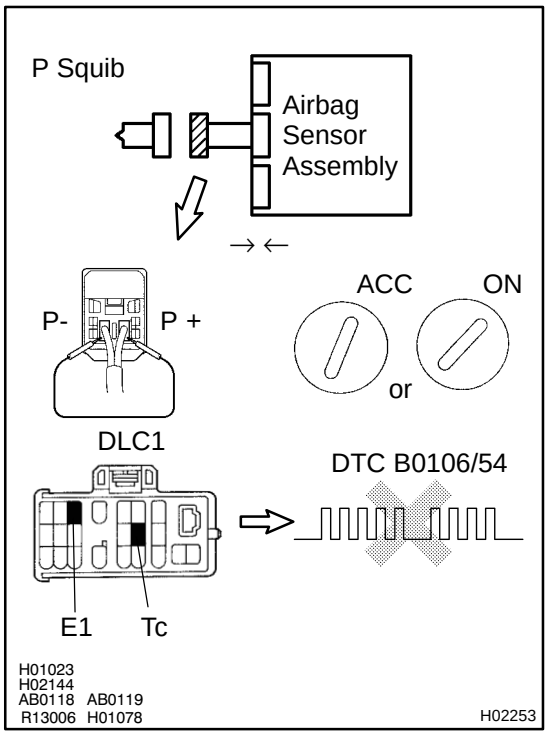
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between front passenger airbag assembly and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect P+ and P- of the connector (on the front passenger airbag assembly side) between the front passenger airbag assembly and the airbag sensor assembly.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0106/54 is not output.

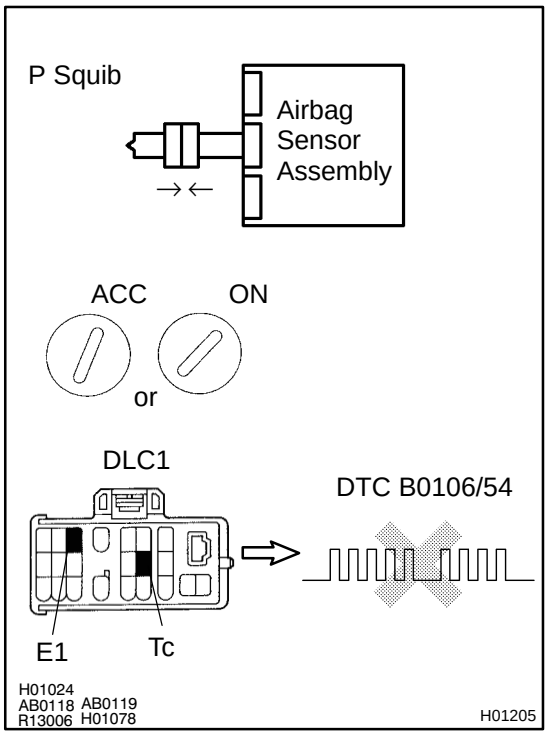
HINT:

Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P squib.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front passenger airbag assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0106/54 is not output.

HINT:
Codes other than code B0106/54 may be output at this time, but they are not relevant to this check.

NG → **Replace front passenger airbag assembly.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI16S-43

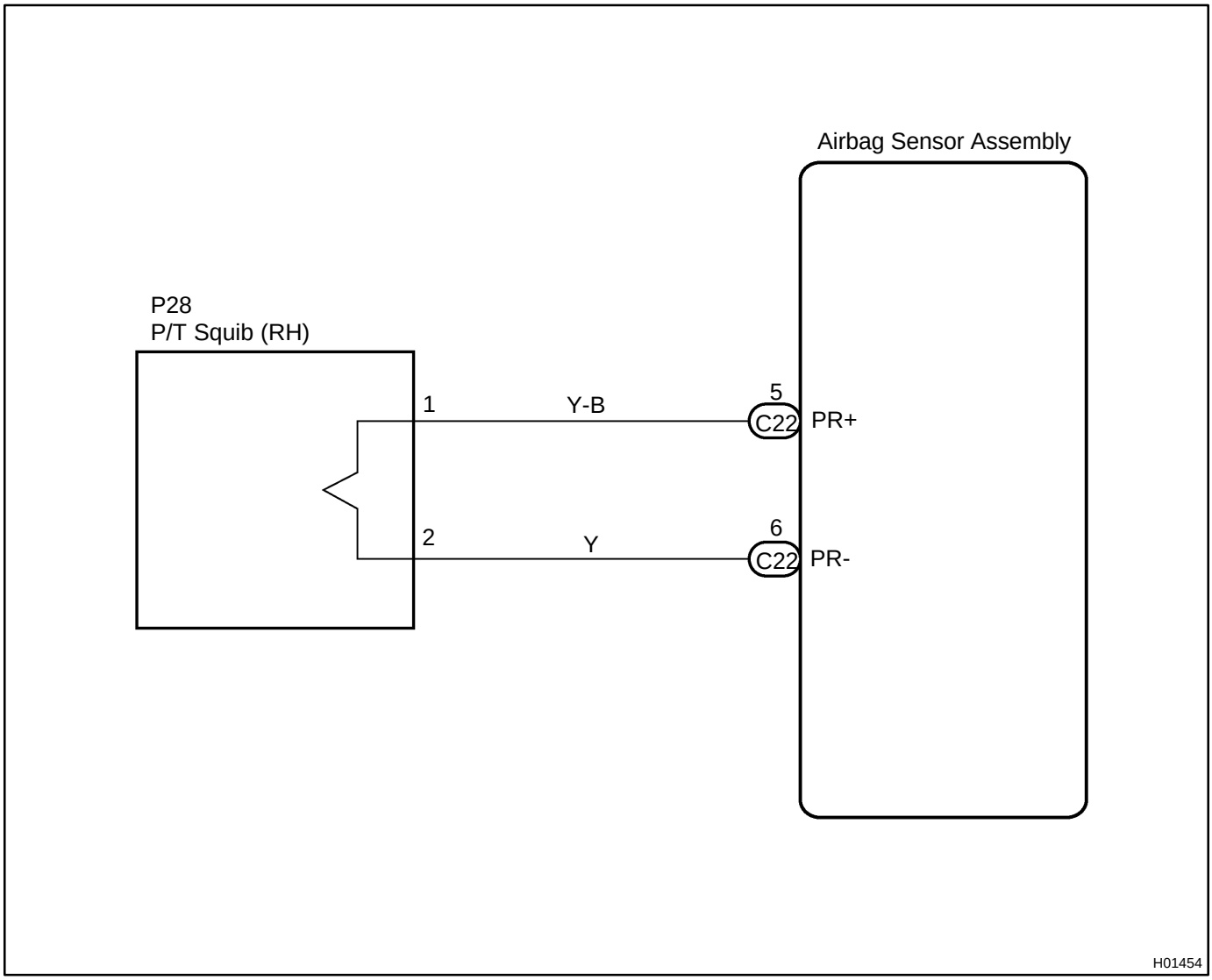
DTC	B0130/63	Short in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (RH) circuit consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the seat belt pretensioner (RH) to activate when the seat belt pretensioner (RH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0130/63 is recorded when a short is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0130/63	• Short circuit between PR+ wire harness and PR- wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

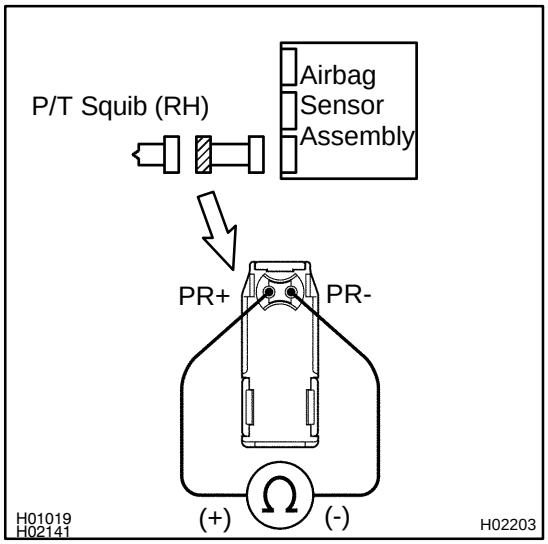
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (RH) circuit.**



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (RH). (See page DI-377)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR-.

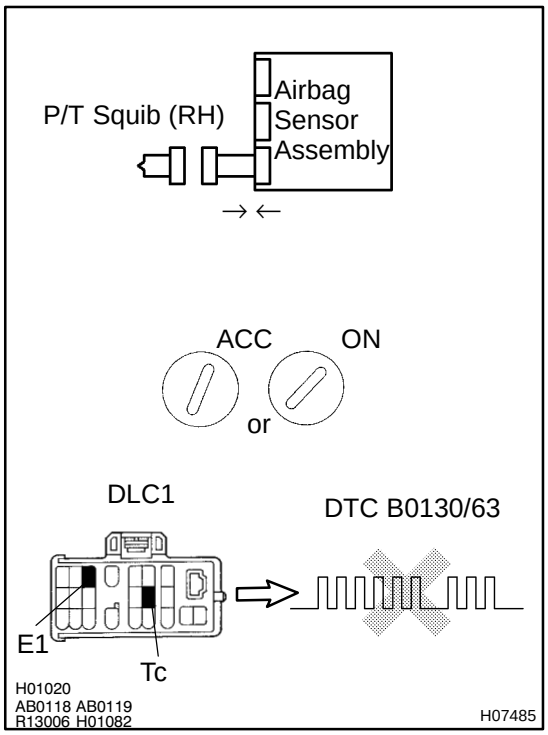
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

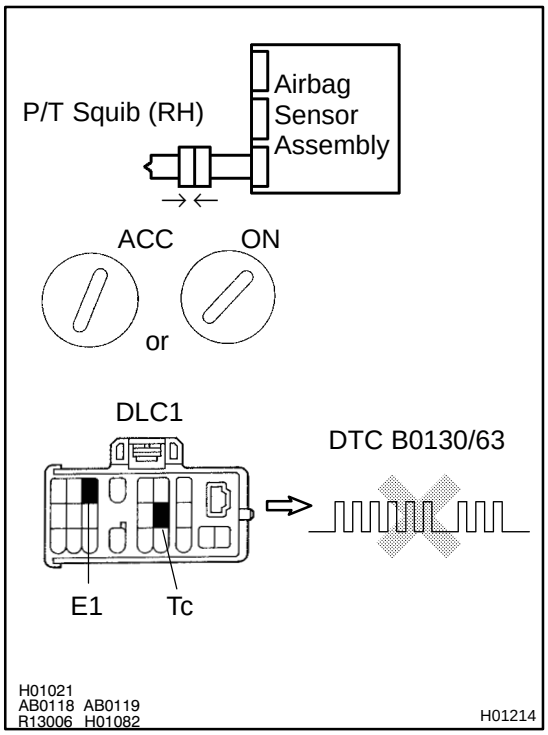
DTC B0130/63 is not output.

HINT:
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:

DTC B0130/63 is not output.

HINT:
Codes other than code B0130/63 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1BG-34

DTC	B0131/64	Open in P/T Squib (RH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (RH) consists of the airbag sensor assembly and seat belt pretensioner (RH).
It causes the seat belt pretensioner (RH) to activate when the seat belt pretensioner (RH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0131/64 is recorded when an open is detected in the P/T squib (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0131/64	• Open circuit in PR+ wire harness or PR- wire harness of squib • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

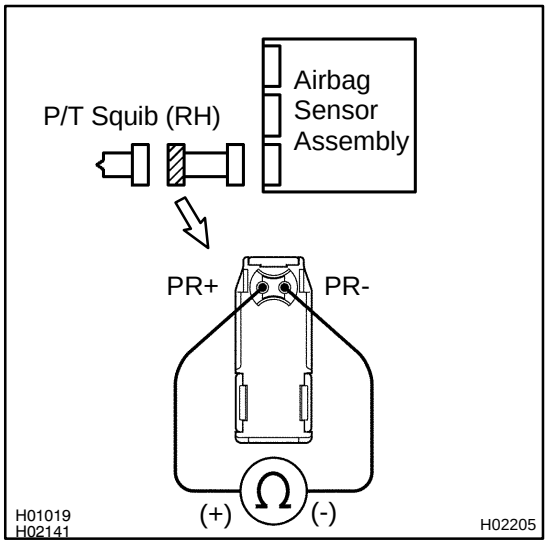
WIRING DIAGRAM

See page DI-417 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (RH) circuit.**



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly, measure the resistance between PR+ and PR-.

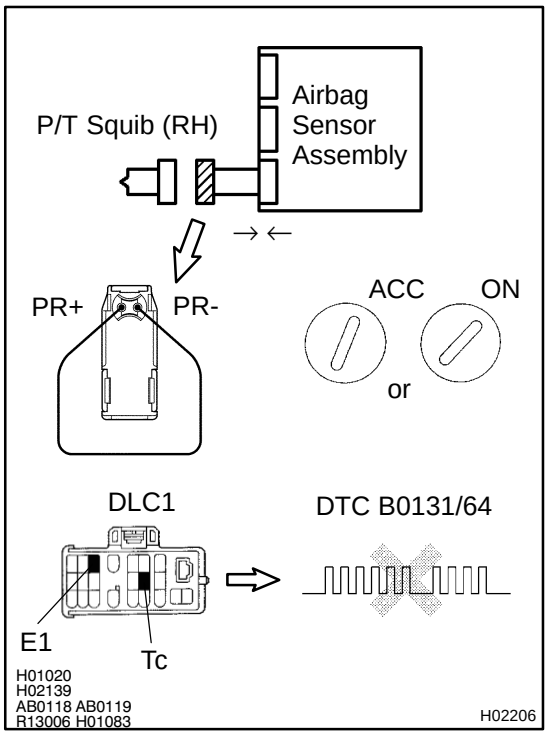
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PR+ and PR- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and the airbag sensor assembly.

(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0131/64 is not output.

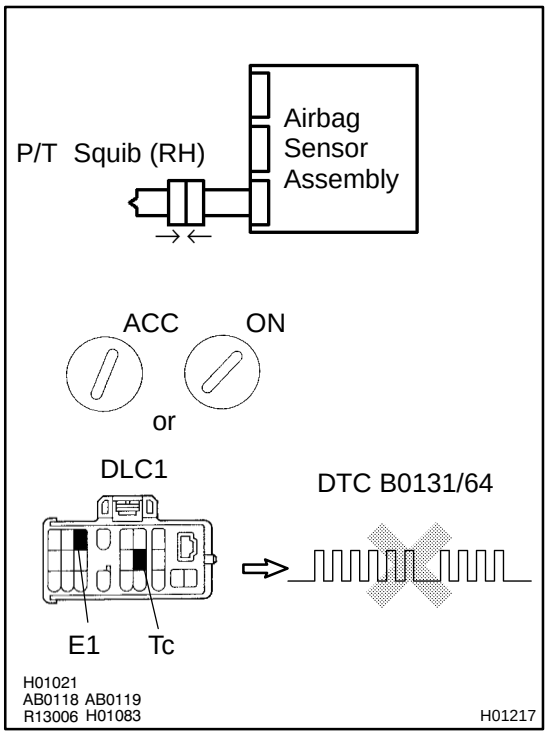
HINT:

Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

4	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0131/64 is not output.

HINT:
Codes other than code B0131/64 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI58N-02

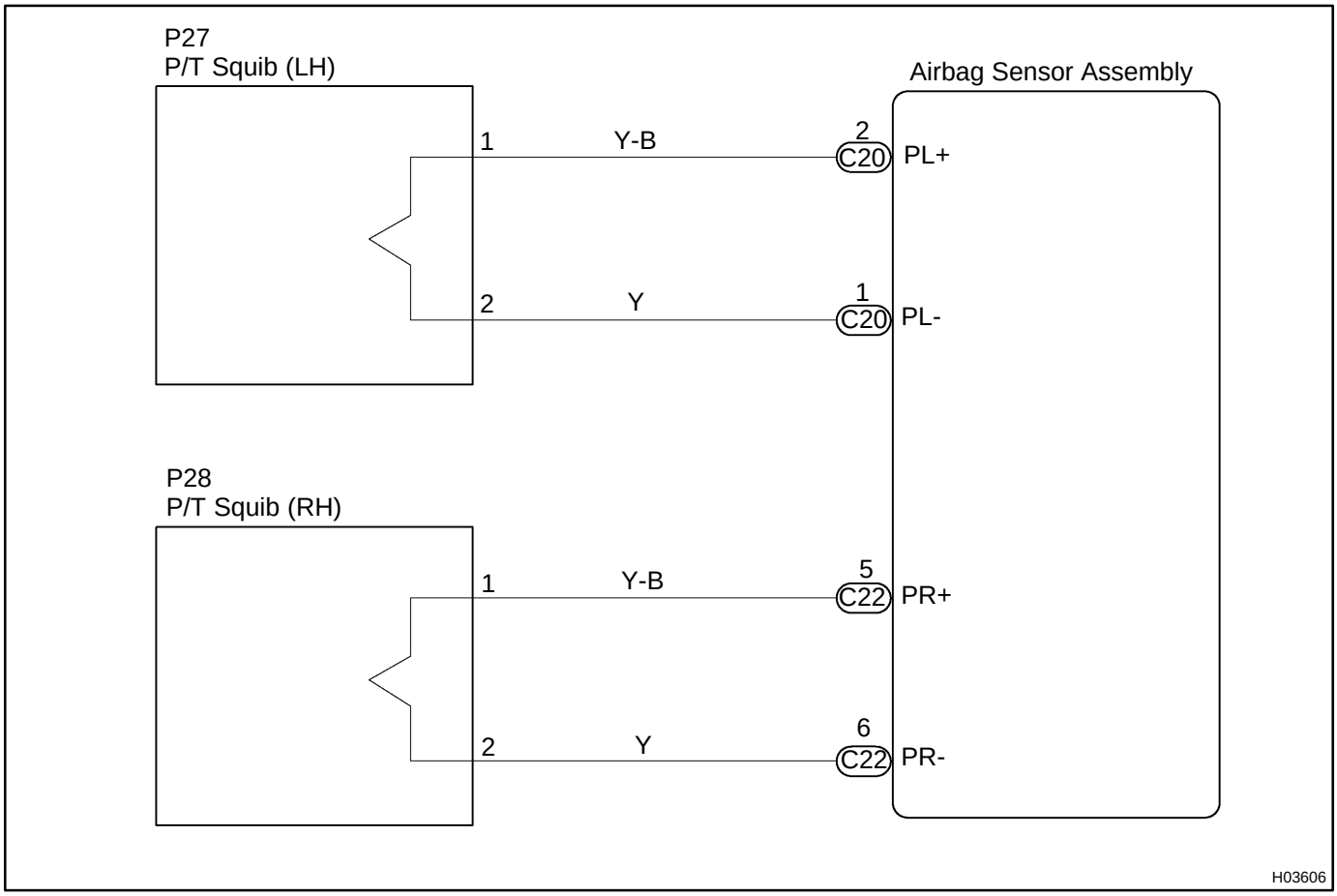
DTC	B0132/61	Short in LH and RH P/T Squib Circuit (to Ground)

CIRCUIT DESCRIPTION

The LH and RH P/T squib circuits consist of the airbag sensor assembly and LH and RH seat belt pretensioners.
It causes the pretensioner to activate when the pretensioner activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0132/61 is recorded when a ground short is detected in the LH and RH P/T squib circuits.

DTC No.	DTC Detecting Condition	Trouble Area
B0132/61	• Short circuit in P/T squib (LH) wire harness (to ground) • Short circuit in P/T squib (RH) wire harness (to ground) • P/T squib (RH) malfunction • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

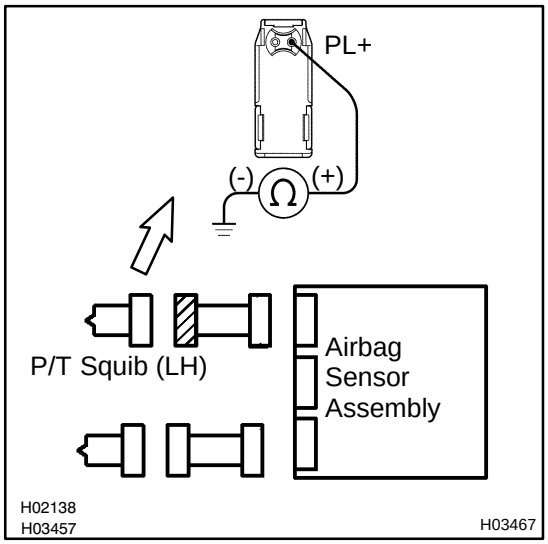
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (LH) circuit.**

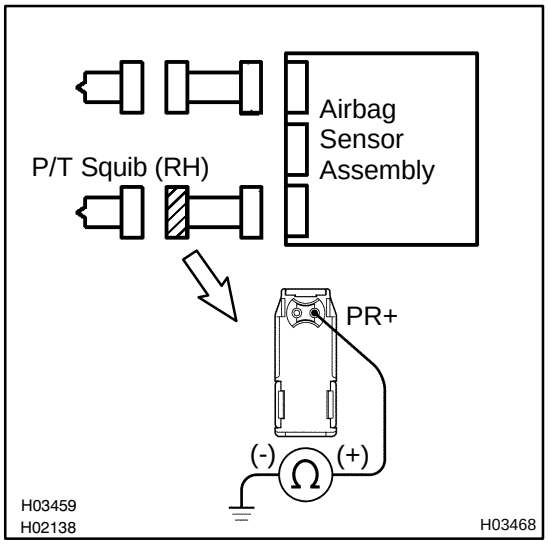


CHECK:
For the connector (on the airbag sensor assembly side) between the seat belt pretensioner and airbag sensor assembly, measure the resistance between PL+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	**Check P/T squib (RH) circuit.**

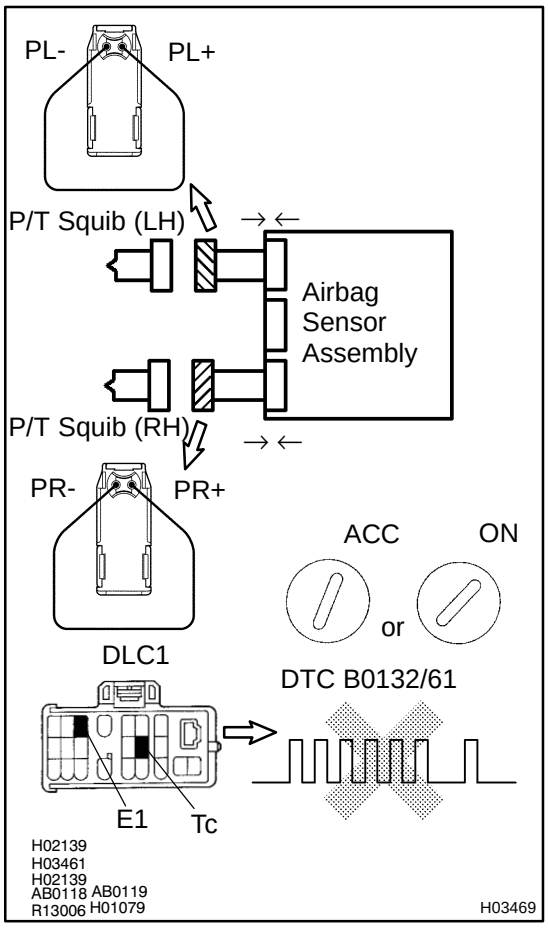


CHECK:
For the connector (on the airbag sensor assembly side) between the seat belt pretensioner and airbag sensor assembly, measure the resistance between PR+ and body ground.
OK:
Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

4	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connectors to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly.

(c) Using a service wire, connect PR+ and PR- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0132/61 is not output.

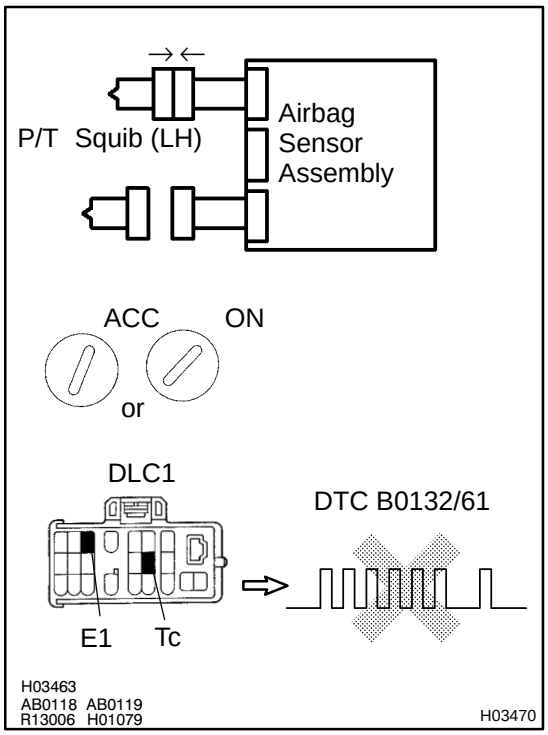
HINT:

Codes other than DTC B0132/61 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI-377)

OK:

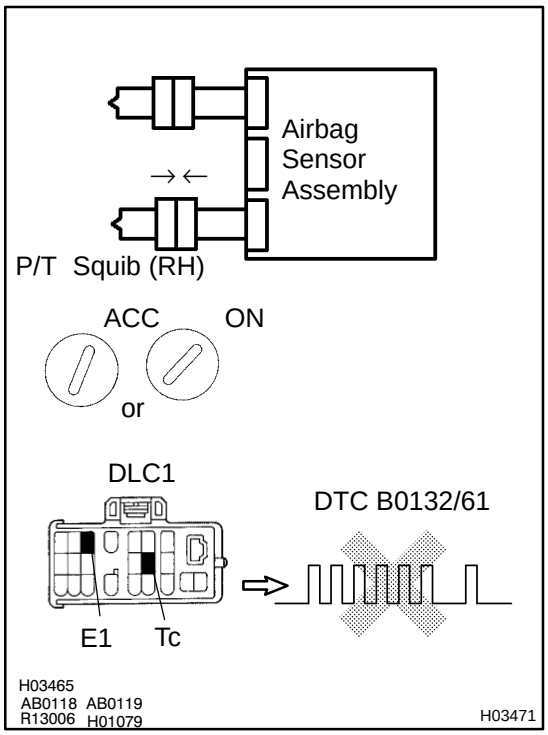
DTC B0132/61 is not output.

HINT:
Codes other than DTC B0132/61 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (LH).**

OK

6	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC. (See page DI-377)

OK:

DTC B0132/61 is not output.

HINT:
Codes other than DTC B0132/61 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (RH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI58O-01

DTC	B0133/62	Short in LH and RH P/T Squib Circuits (to B+)

CIRCUIT DESCRIPTION

The LH and RH P/T squib circuits consist of the airbag sensor assembly and LH and RH seat belt pretensioners.
It causes the pretensioner to activate when the pretensioner activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0133/62 is recorded when B+ is detected in the LH and RH P/T squib circuits.

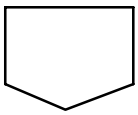
DTC No.	DTC Detecting Condition	Trouble Area
B0133/62	• Short circuit in seat belt pretensioner (LH) wire harness (to B+) • Short circuit in seat belt pretensioner (RH) wire harness (to B+) • P/T squib (LH) malfunction • P/T squib (RH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Seat belt pretensioner (RH) • Airbag sensor assembly • Wire harness

WIRING DIAGRAM

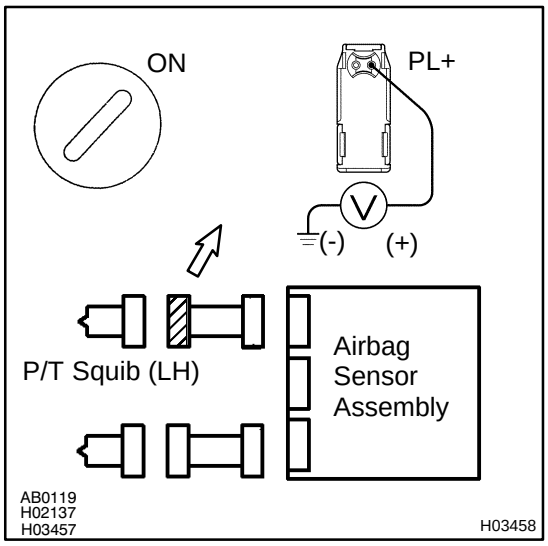
See page DI-424 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**



2	Check P/T squib (LH) circuit.



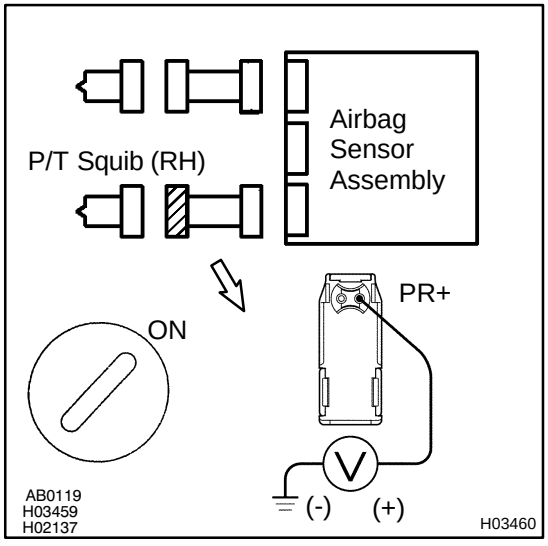
PREPARATION:
Turn ignition switch ON.
CHECK:
For the connector (on the airbag sensor assembly side) between the seat belt pretensioner (LH) and airbag sensor assembly, measure the voltage between PL+ and body ground.
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

3	Check P/T squib (RH) circuit.



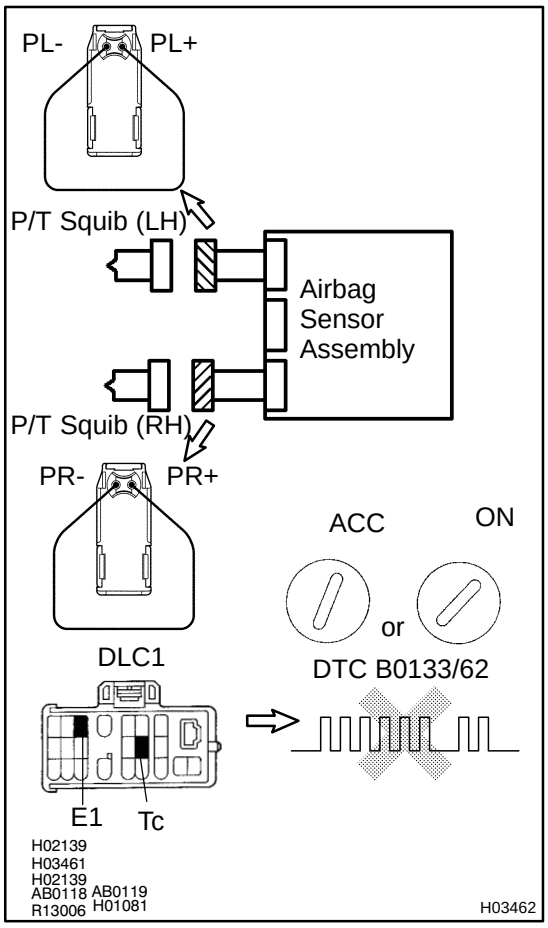
PREPARATION:
Turn ignition switch ON.
CHECK:
For the connector (on the airbag sensor assembly side) between the seat belt pretensioner (RH) and airbag sensor assembly, measure the voltage between PR+ and body ground.
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between the seat belt pretensioner (RH) and airbag sensor assembly.**

OK

4	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.

(b) Using a service wire, connect PL+ and PL- of the connector (on the pretensioner side) between the seat belt pretensioner (LH) and airbag sensor assembly.

(c) Using a service wire, connect PR+ and PR- of the connector (on the pretensioner side) between the seat belt pretensioner (RH) and airbag sensor assembly.

(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.

(b) Clear DTC stored in memory.
(See step 5 on page DI-377)

(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(e) Check DTC.
(See page DI-377)

OK:

DTC B0133/62 is not output.

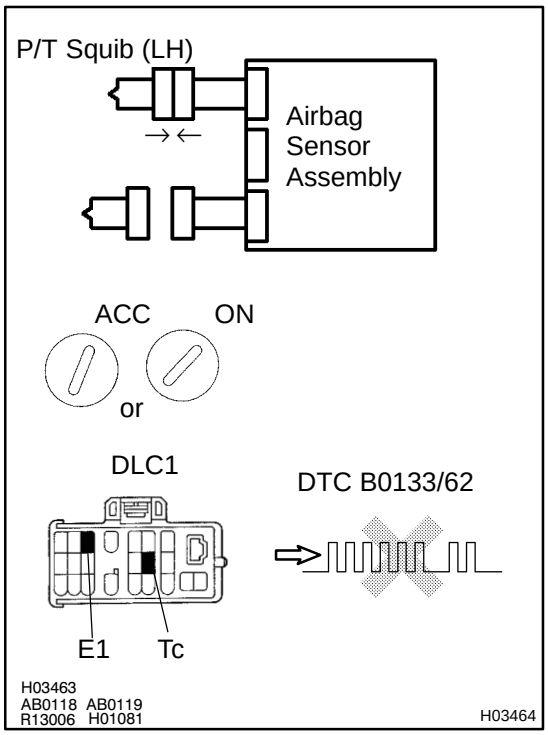
HINT:

Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

5	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

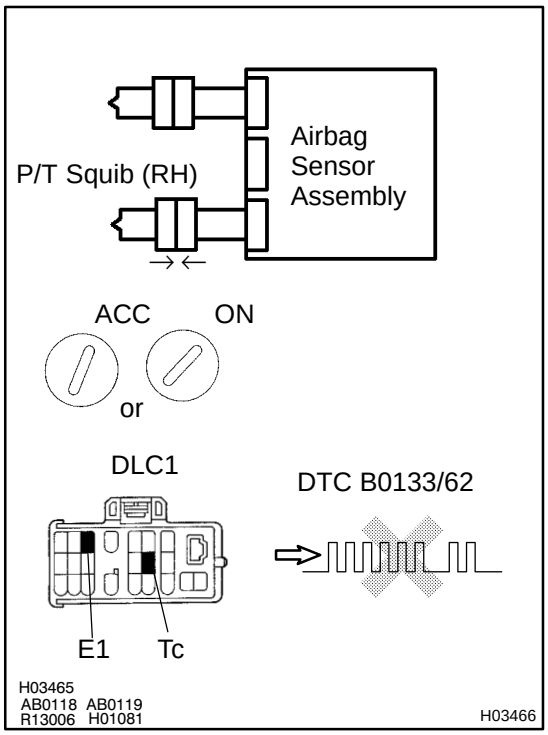
DTC B0133/62 is not output.

HINT:
Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG → **There is possibility that D, P and side airbags except for pretensioner are damaged, so check DTC B0103/12, B0113/42 and B0118/46.**

OK

6	Check P/T squib (RH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (RH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See step 5 on page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0133/62 is not output.

HINT:
Codes other than DTC B0133/62 may be output at this time, but they are not relevant to this check.

NG → **There is possibility that D, P and side airbags except for pretensioner are damaged, so check DTC B0103/12, B0113/42 and B0118/46.**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check. If the malfunctioning part can not be detected by the simulation method, replace all SRS components including the wire harness.

DI16W-44

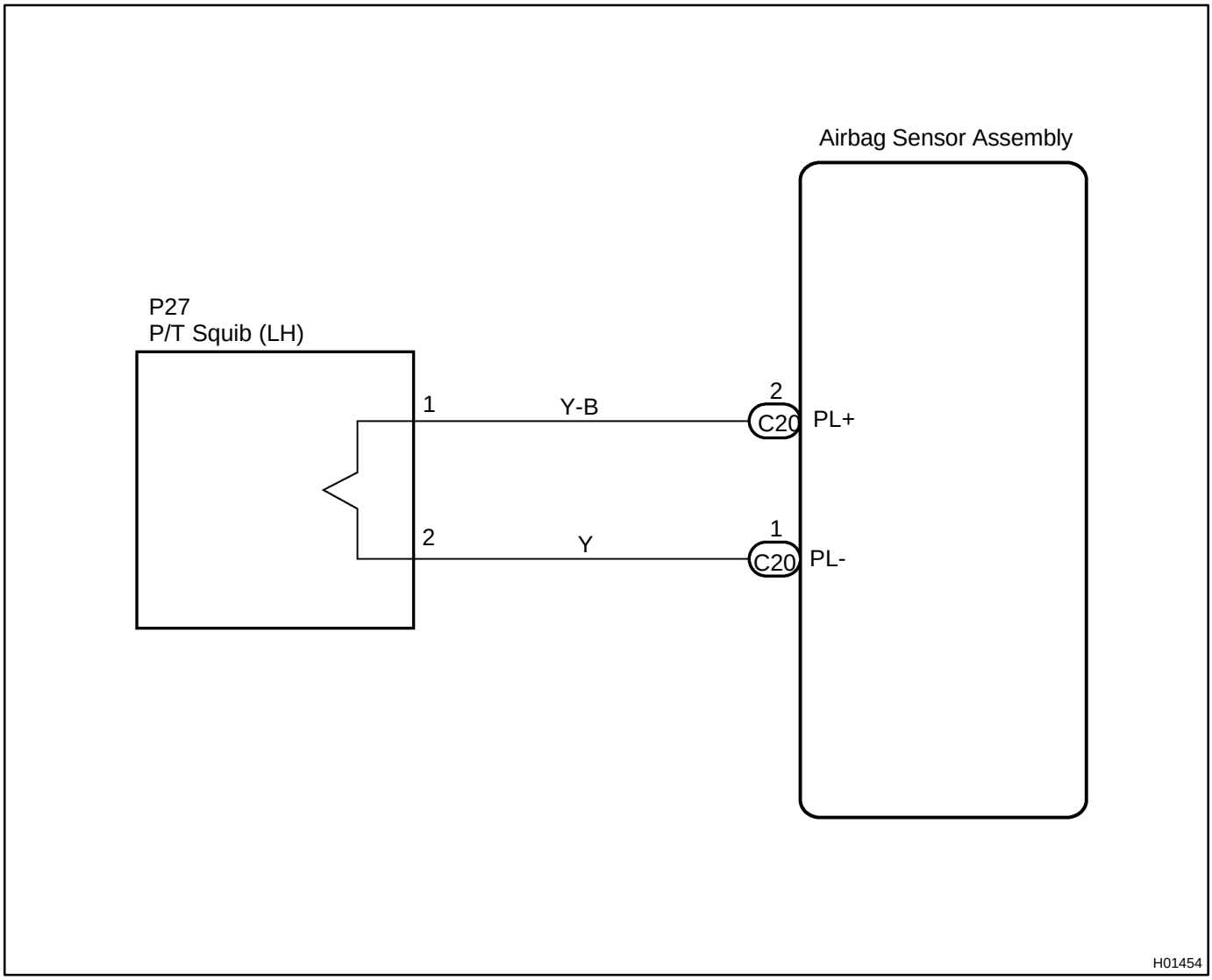
DTC	B0135/73	Short in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib (LH) circuit consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the seat belt pretensioner (LH) to activate when the seat belt pretensioner (LH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0135/73 is recorded when a short is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0135/73	• Short circuit between PL+ wire harness and PL- wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

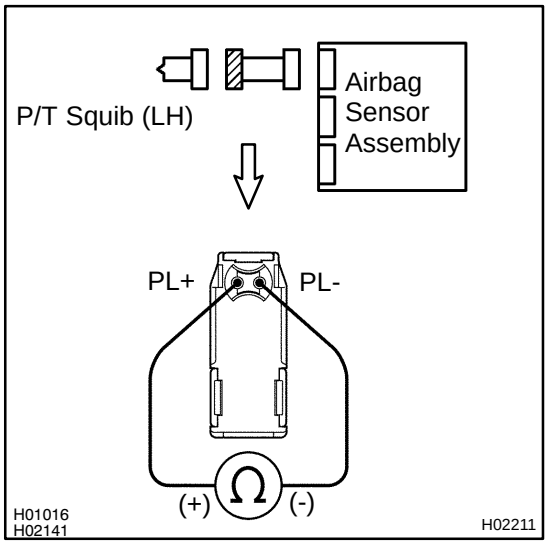
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (LH) circuit.**



PREPARATION:

Release the airbag activation prevention mechanism of the connector (on the airbag sensor assembly side) between the airbag sensor assembly and the seat belt pretensioner (LH). (See page DI-377)

CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL-.

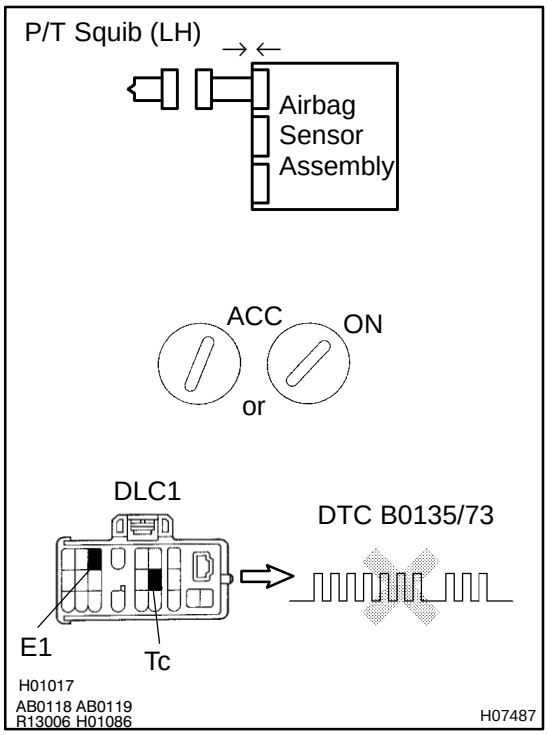
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0135/73 is not output.

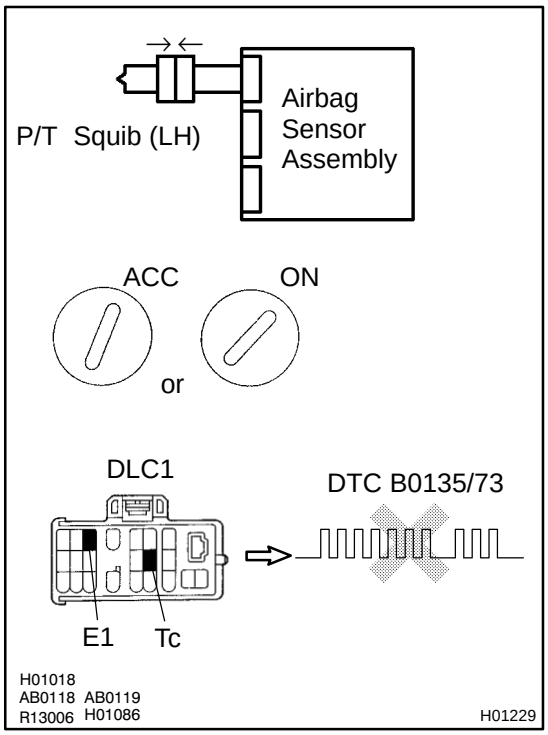
HINT:

Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to LOOK, and wait at least for 20 second.
(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(c) Clear DTC stored in memory.
(See page DI-377)
(d) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(e) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(f) Check DTC.
(See page DI-377)

OK:

DTC B0135/73 is not output.

HINT:
Codes other than code B0135/73 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1BJ-16

DTC	B0136/74	Open in P/T Squib (LH) Circuit

CIRCUIT DESCRIPTION

The P/T squib circuit (LH) consists of the airbag sensor assembly and seat belt pretensioner (LH).
It causes the seat belt pretensioner (LH) to activate when the seat belt pretensioner (LH) activation conditions are satisfied.
For details of the function of each component, see OPERATION on page RS-2 .
DTC B0136/74 is recorded when an open is detected in the P/T squib (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B0136/74	• Open circuit in PL+ wire harness or PL- wire harness of squib • P/T squib (LH) malfunction • Airbag sensor assembly malfunction	• Seat belt pretensioner (LH) • Airbag sensor assembly • Wire harness

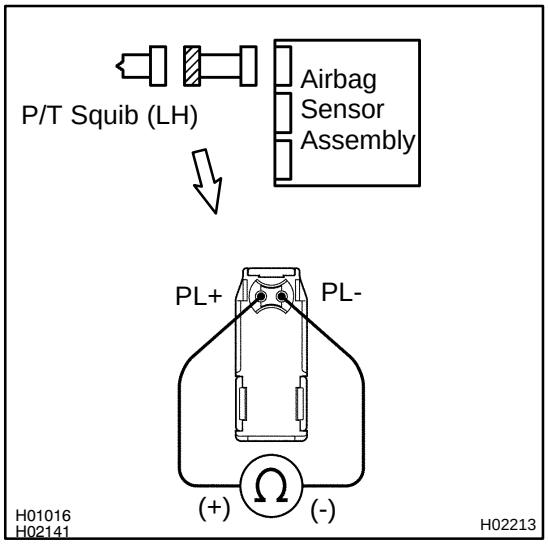
WIRING DIAGRAM

See page DI-434 .

INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check P/T squib (LH) circuit.**



CHECK:

For the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly, measure the resistance between PL+ and PL-.

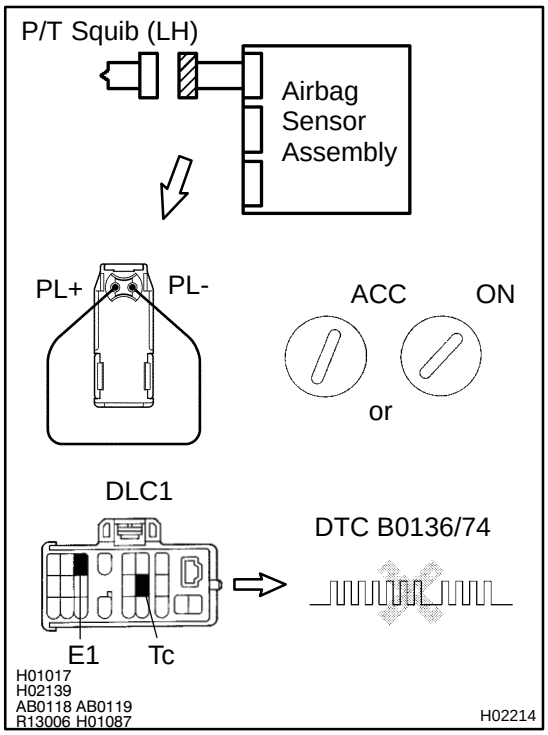
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between seat belt pretensioner (LH) and airbag sensor assembly.**

OK

3	Check airbag sensor assembly.



PREPARATION:

(a) Connect the connector to the airbag sensor assembly.
(b) Using a service wire, connect PL+ and PL- of the connector (on the seat belt pretensioner side) between the seat belt pretensioner (LH) and the airbag sensor assembly.
(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

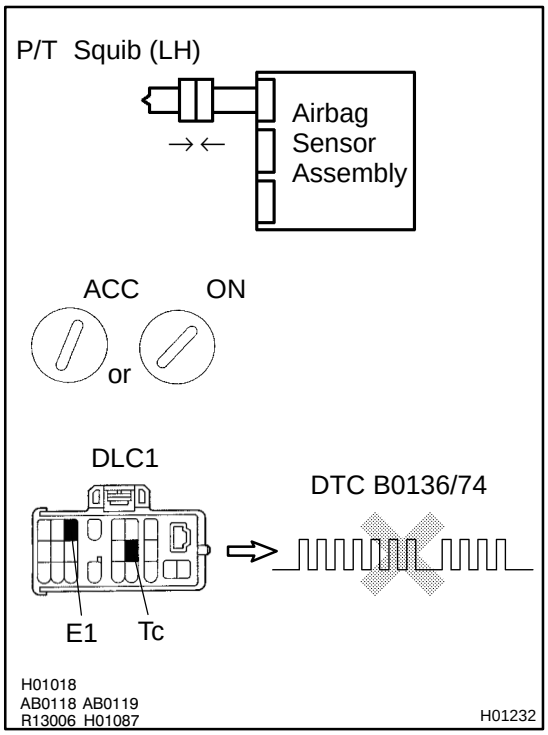
DTC B0136/74 is not output.

HINT:
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG → **Replace airbag sensor assembly.**

OK

4	Check P/T squib (LH).



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the seat belt pretensioner (LH) connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B0136/74 is not output.

HINT:
Codes other than code B0136/74 may be output at this time, but they are not relevant to this check.

NG → **Replace seat belt pretensioner (LH).**

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI1BM-21

DTC	B1100/31	Airbag Sensor Assembly Malfunction

CIRCUIT DESCRIPTION

The airbag sensor assembly consists of a airbag sensor, safing sensor, drive circuit, diagnosis circuit and ignition control, etc.
It receives signals from the airbag sensor, judges whether or not the SRS must be activated, and detects diagnosis system malfunction.
DTC B1100/31 is recorded when occurrence of a malfunction in the airbag sensor assembly is detected.

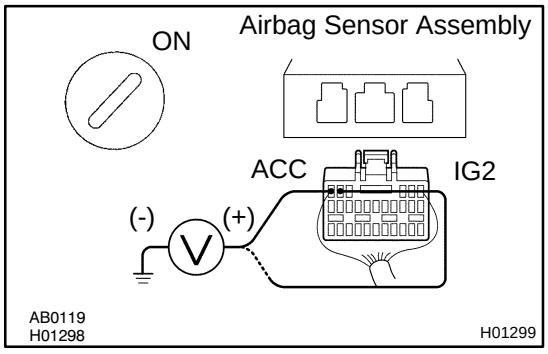
DTC No.	DTC Detecting Condition	Trouble Area
B1100/31	• Airbag sensor assembly malfunction	• Airbag sensor assembly

INSPECTION PROCEDURE

HINT:
When a malfunction code other than code B1100/31 is displayed at the same time, first repair the malfunction indicated by the malfunction code other than code B1100/31.

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check voltage at IG2 and ACC of airbag sensor assembly.**



CHECK:

(a) Turn ignition switch to ON.
(b) Measure the voltage between body ground and each of terminals IG2 and ACC of the airbag sensor assembly connector.

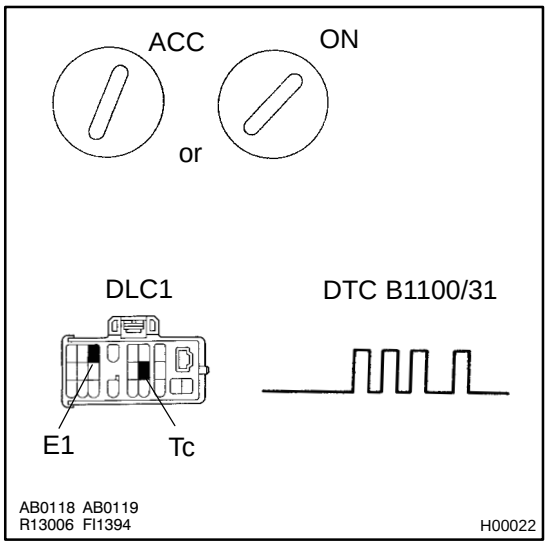
OK:

Voltage: Below 10 - 14 V

NG → **Check that an abnormality occurs on the battery and charging system.**

OK

3	Is DTC B1100/31 output again?



PREPARATION:

Clear DTC.

(See step 5 on page DI-377)

CHECK:

(a) Turn ignition switch to LOCK, and wait at least for 20 seconds.

(b) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.

(c) Repeat operation in step (a) and (b) at least 5 times.

(d) Check DTC.
(See page DI-377)

HINT:

Codes other than code B1100/31 may be output at this time, but they are not relevant to this check.

NO → **Using simulation method, reproduce malfunction symptoms. (See page IN-18)**

YES

Replace airbag sensor assembly.

DI58P-04

DTC	B1156/B1157/15	Front Airbag Sensor (RH) Malfunction

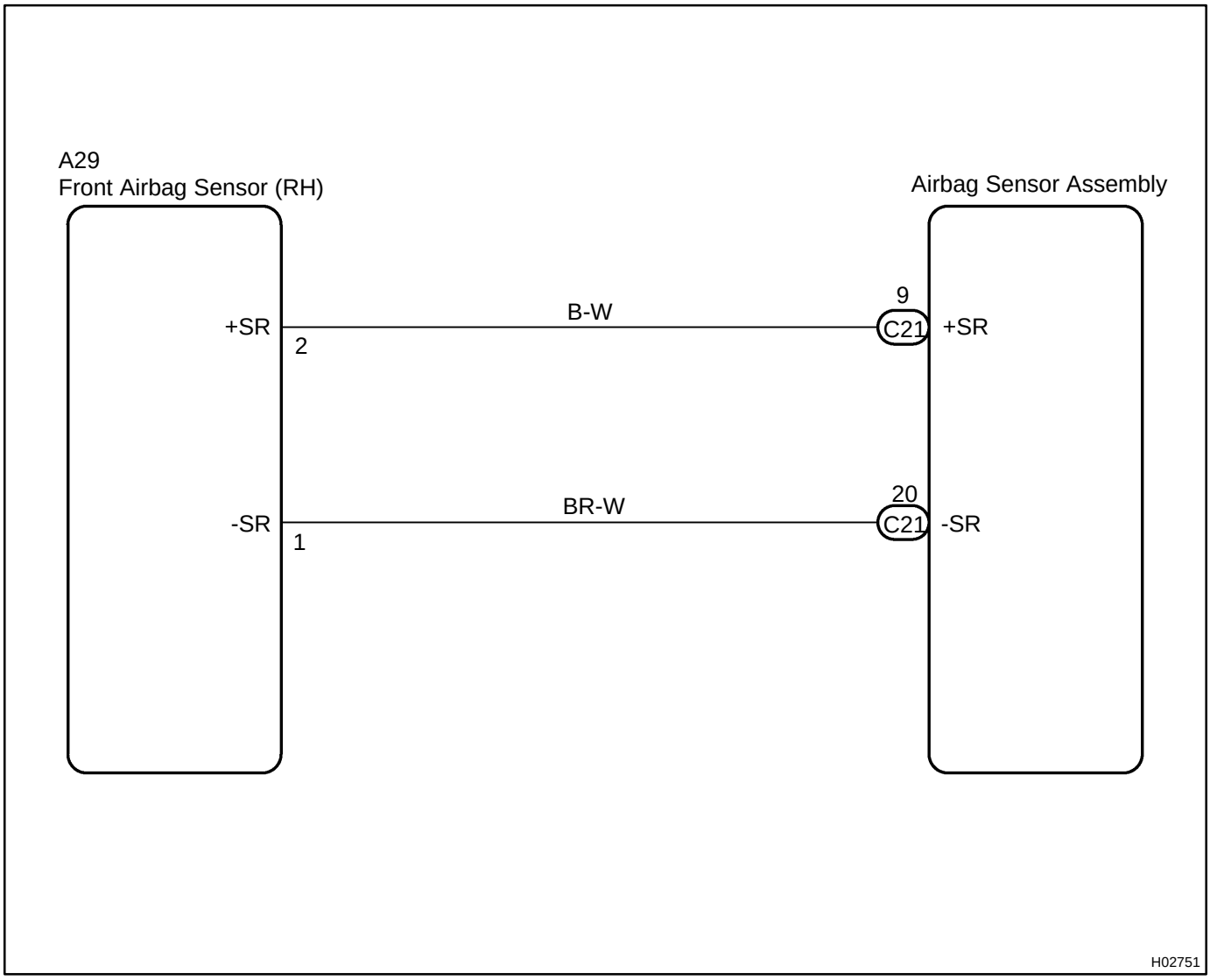
CIRCUIT DESCRIPTION

The front airbag sensor (RH) circuit consists of the airbag sensor assembly and front airbag sensor (RH). For details of the function of each component, see OPERATION on page RS-2 .

DTC B1156/B1157/15 is recorded when malfunction is detected in the front airbag sensor (RH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1156/B1157/15	• Front airbag sensor (RH) malfunction	• Front airbag sensor (RH) • Wire harness • Engine room main wire harness • Airbag sensor assembly

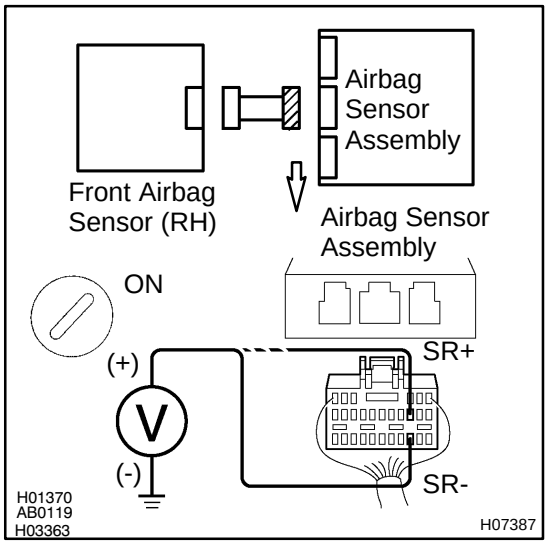
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the voltage between body ground and each of SR+ and SR-.

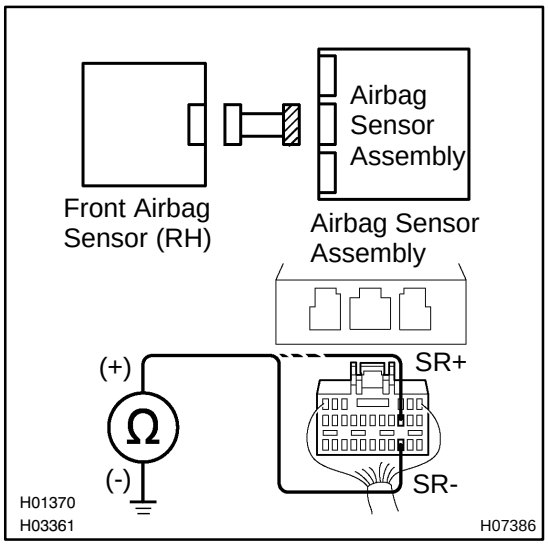
OK:

Voltage: Below 1 V

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

OK

3	**Check wire harness (to ground).**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between body ground and each of SR+ and SR-.

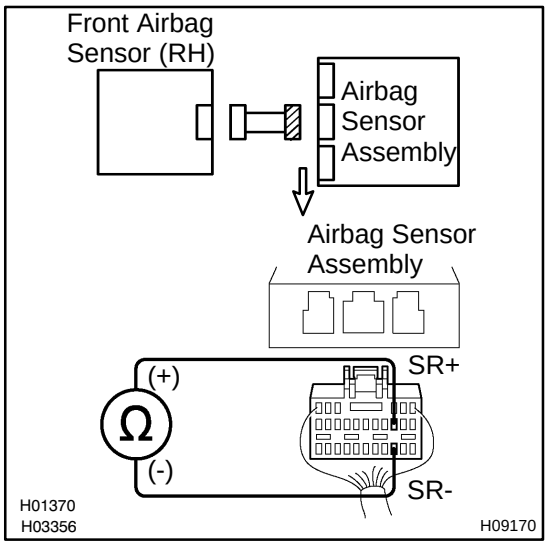
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

OK

4	Check wire harness.



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR-.

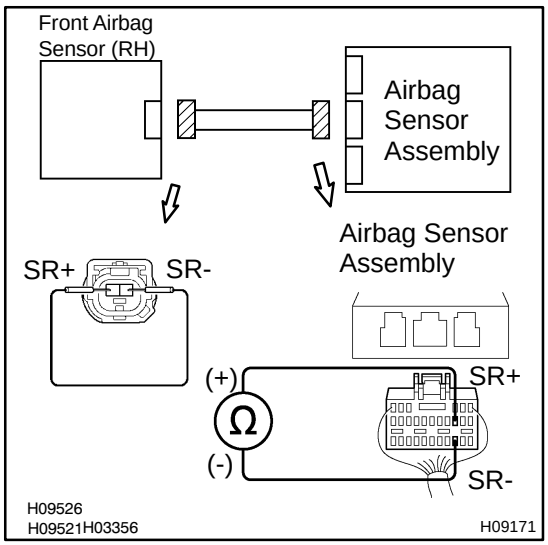
OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

OK

5	Check wire harness.



PREPARATION:

Using a service wire, connect SR+ and SR- of the connector (on the front airbag sensor (RH) side) between the airbag sensor assembly and the front airbag sensor (RH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (RH) and the airbag sensor assembly, measure the resistance between SR+ and SR-.

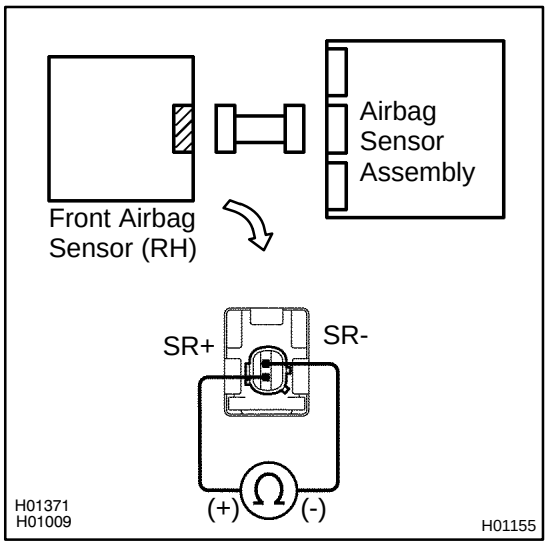
OK:

Resistance: Below 1 Ω

NG → **Repair or replace harness or connector between front airbag sensor (RH) and airbag sensor assembly.**

OK

6	Check front airbag sensor (RH).



CHECK:

For the connector (on the front airbag sensor (RH)), measure the resistance between SR+ and SR-.

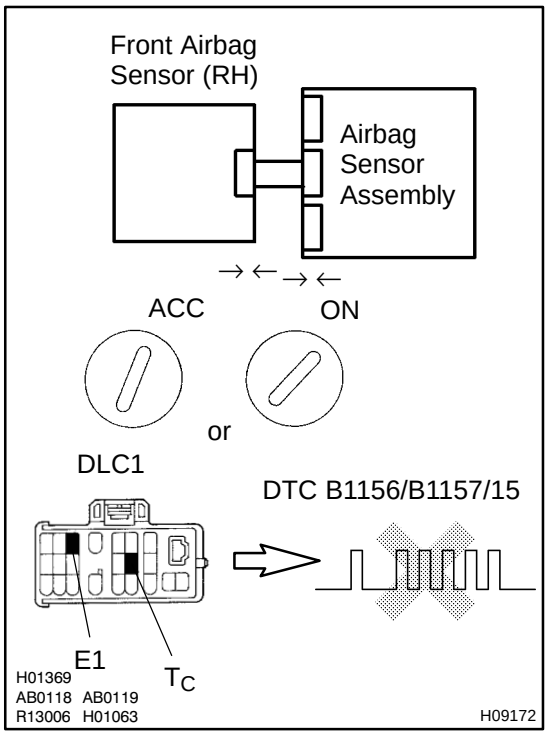
OK:

Resistance: 300 - 1500 Ω

NG → **Replace front airbag sensor (RH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front airbag sensor (RH) connector and airbag sensor assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B1156/B1157/15 is not output.

HINT:
Codes other than code B1156/B1157/15 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

DI58Q-07

DTC	B1158/B1159/16	Front Airbag Sensor (LH) Malfunction

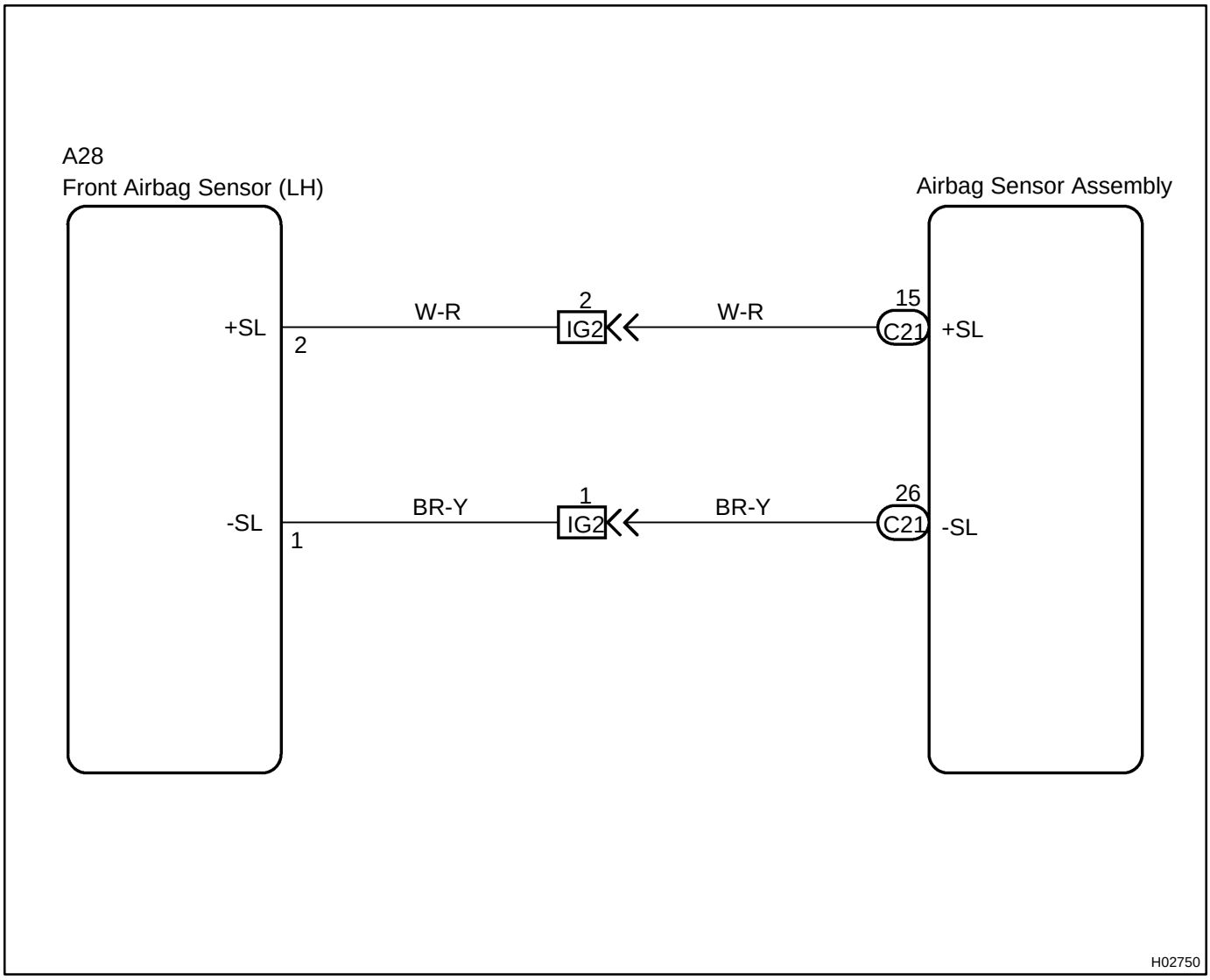
CIRCUIT DESCRIPTION

The front airbag sensor (LH) circuit consists of the airbag sensor assembly and front airbag sensor (LH). For details of the function of each component, see OPERATION on page RS-2 .

DTC B1158/B1159/16 is recorded when malfunction is detected in the front airbag sensor (LH) circuit.

DTC No.	DTC Detecting Condition	Trouble Area
B1158/B1159/16	• Front airbag sensor (LH) malfunction	• Front airbag sensor (LH) • Wire harness • Airbag sensor assembly

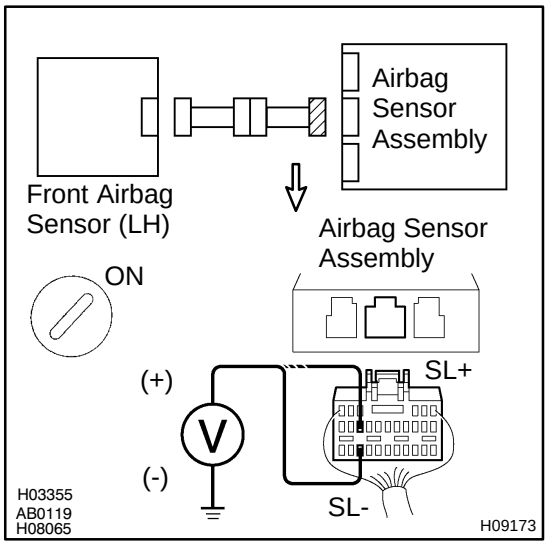
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Check wire harness (to B+).**



CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the voltage between body ground and each of SL+ and SL-.

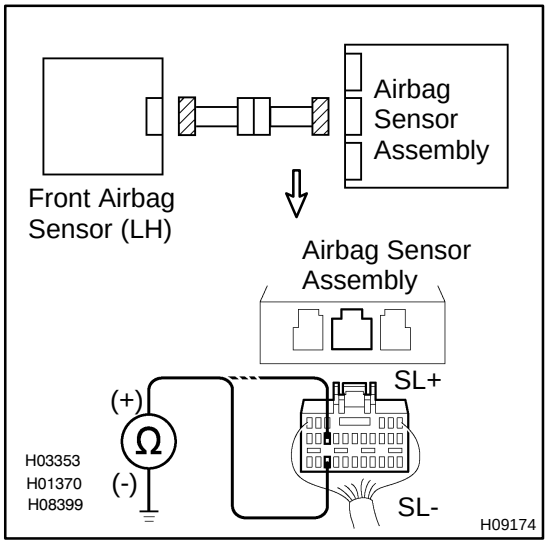
OK:

Voltage: Below 1 V

NG → **Go to step 8.**

OK

3	**Check wire harness (to ground).**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between body ground and each of SL+ and SL-.

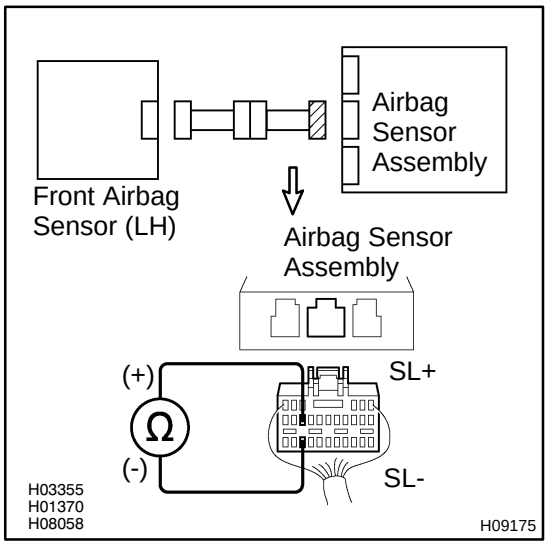
OK:

Resistance: 1 MΩ or Higher

NG	**Go to step 9.**

OK

4	**Check wire harness.**



CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL-.

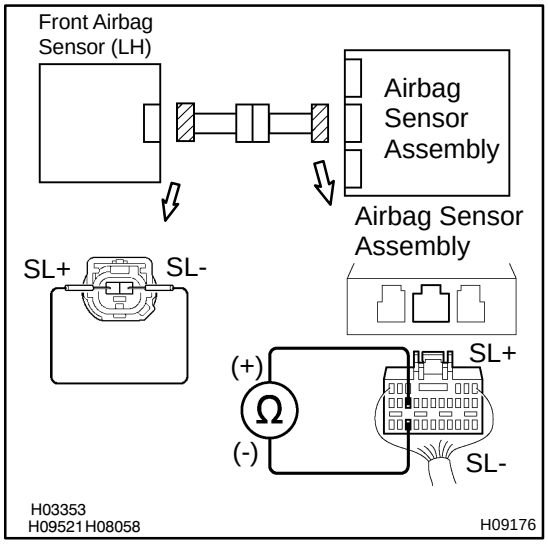
OK:

Resistance: 1 MΩ or Higher

NG	**Go to step 10.**

OK

5	**Check wire harness.**



PREPARATION:

Using a service wire, connect SL+ and SL- of the connector (on the front airbag sensor (LH) side) between the airbag sensor assembly and the front airbag sensor (LH).

CHECK:

For the connector (on the airbag sensor assembly side) between the front airbag sensor (LH) and the airbag sensor assembly, measure the resistance between SL+ and SL-.

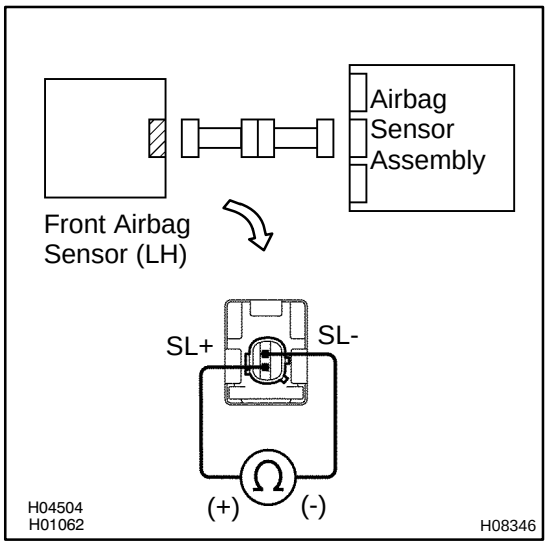
OK:

Resistance: Below 1 Ω

NG	**Go to step 11.**

OK

6	**Check front airbag sensor (LH).**



CHECK:

For the connector (on the front airbag sensor (LH)), measure the resistance between SL+ and SL-.

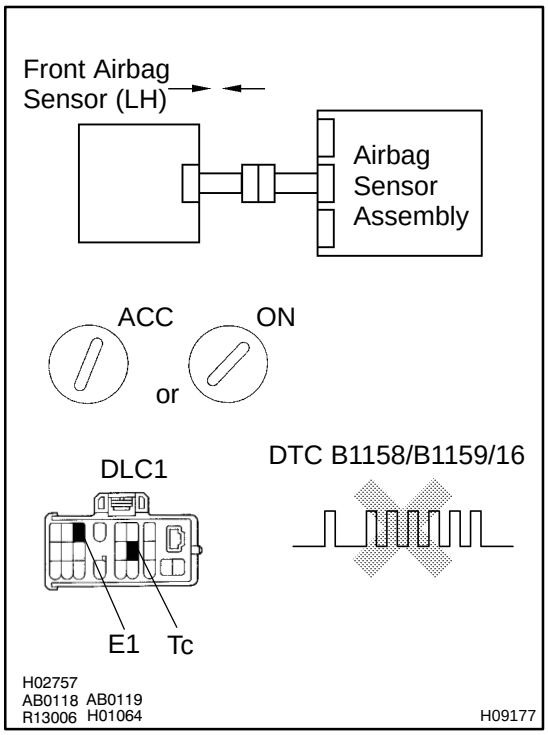
OK:

Resistance: 300 - 1500 Ω

NG → **Replace front airbag sensor (LH).**

OK

7	Check airbag sensor assembly.



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Connect the front airbag sensor (LH) connector and airbag sensor assembly connector.
(d) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.

CHECK:

(a) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(b) Clear DTC stored in memory.
(See page DI-377)
(c) Turn ignition switch to LOCK, and wait at least for 20 seconds.
(d) Turn ignition switch to ACC or ON, and wait at least for 20 seconds.
(e) Check DTC.
(See page DI-377)

OK:

DTC B1158/B1159/16 is not output.

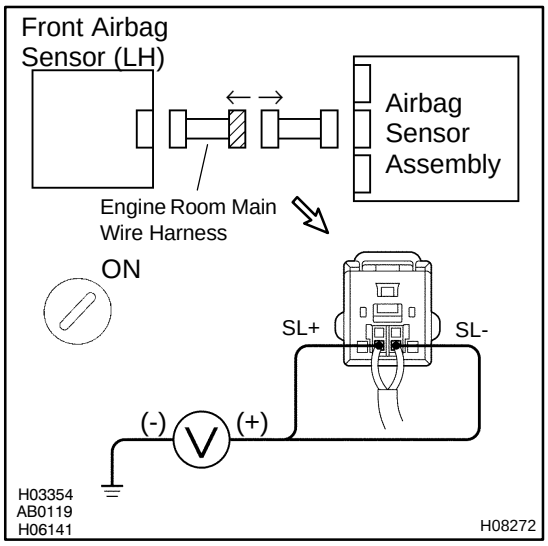
HINT:
Codes other than code B1158/B1159/16 may be output at this time, but they are not relevant to this check.

NG	Replace airbag sensor assembly.

OK

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

8	**Check engine room main wire harness (to B+).**



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

(a) Turn ignition switch to ON.

(b) For the connector (on the LH front door wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the voltage between body ground and each of SL+ and SL-.

OK:

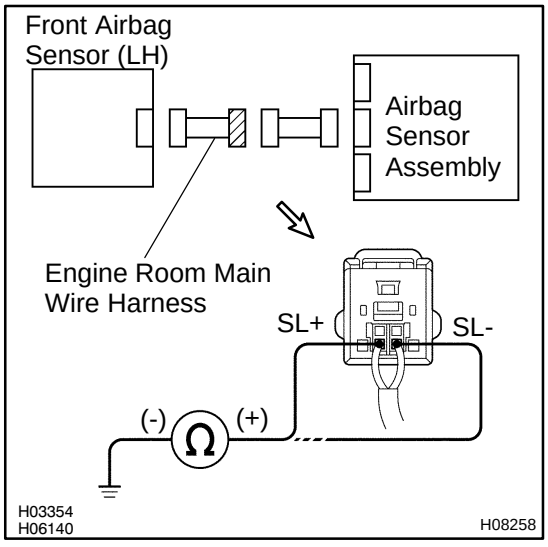
Voltage: Below 1 V

NG	**Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

9	**Check engine room main wire harness (to ground).**



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between body ground and each of SL+ and SL-.

OK:

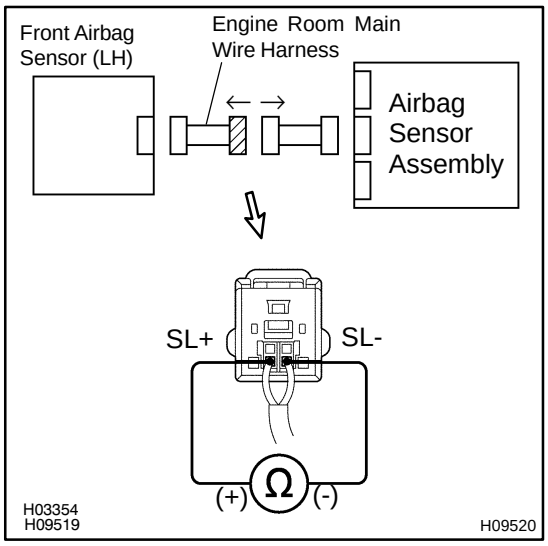
Resistance: 1 MΩ or Higher

NG	**Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

10	Check engine room main wire harness.



PREPARATION:

Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL-.

OK:

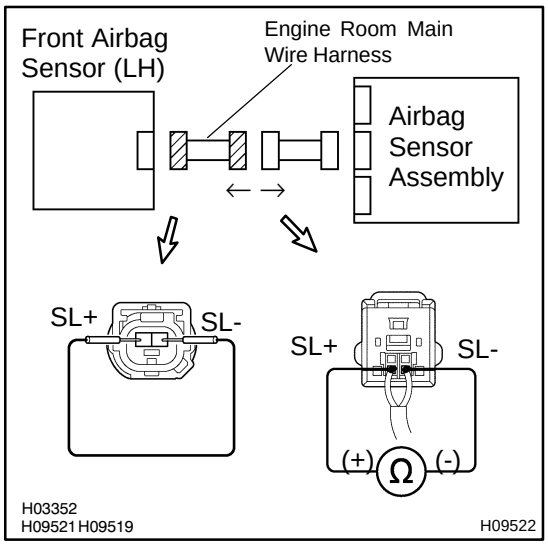
Resistance: 1 MΩ or Higher

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

11	Check engine room main wire harness.



PREPARATION:

(a) Disconnect the engine room main wire harness connector on the airbag sensor assembly side.

(b) Using a service wire, connect SL+ and SL- of the connector (on the engine room main wire harness side) between the engine room main wire harness and the front airbag sensor (LH).

CHECK:

For the connector (on the engine room main wire harness side) between the airbag sensor assembly and the engine room main wire harness, measure the resistance between SL+ and SL-.

OK:

Resistance: Below 1 Ω

NG → **Repair or replace engine room main wire harness.**

OK

Repair or replace harness or connector between airbag sensor assembly and engine room main wire harness.

DI18Z-33

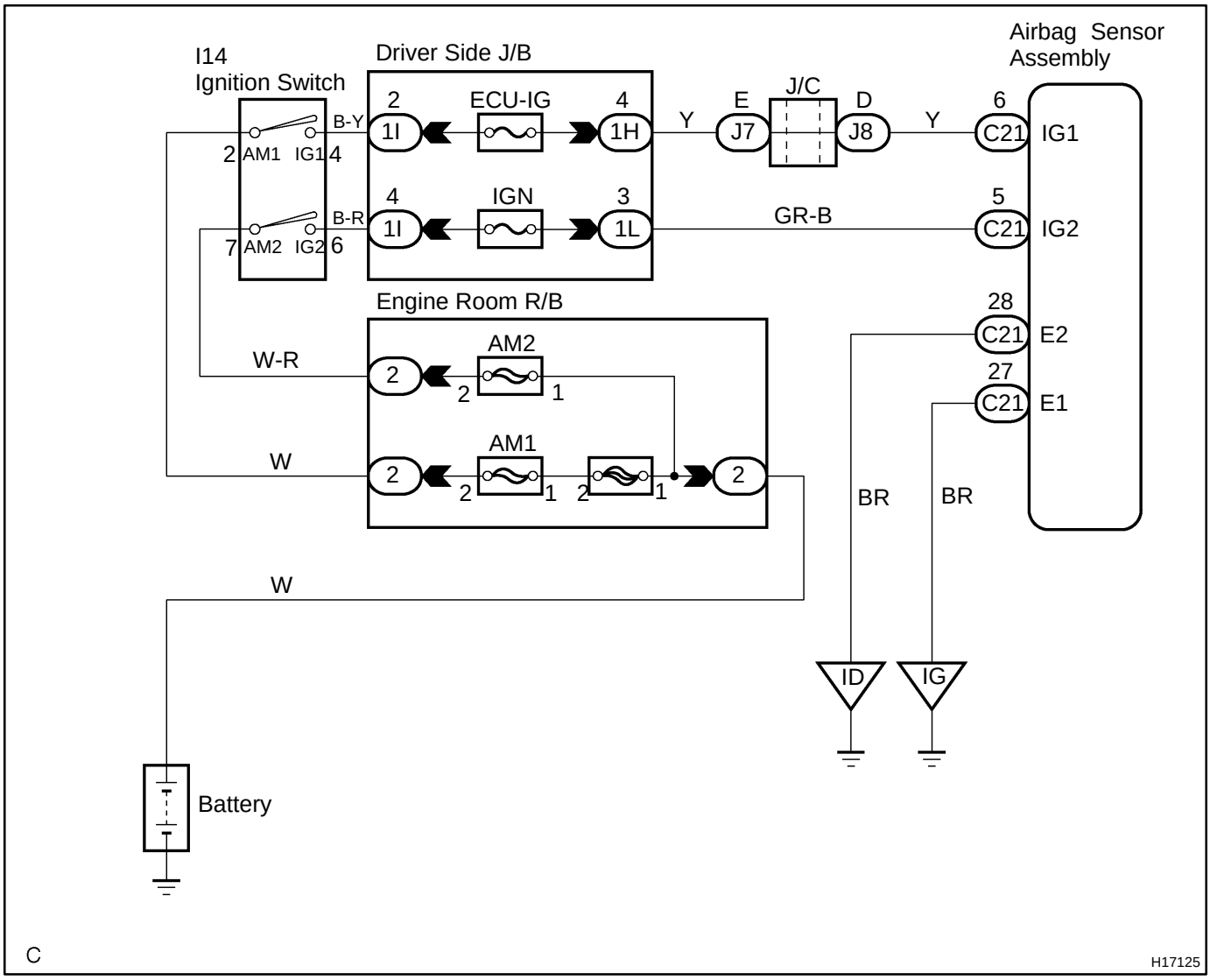
DTC	Normal	Source Voltage Drop

CIRCUIT DESCRIPTION

The SRS is equipped with a voltage-increase circuit (DC-DC converter) in the airbag sensor assembly in case the source voltage drops.
When the battery voltage drops, the voltage-increase circuit (DC-DC converter) functions to increase the voltage of the SRS to normal voltage.
The diagnosis system malfunction display for this circuit is different from other circuits that is when the SRS warning light remains lit up and the DTC is a normal code, source voltage drop is indicated.
Malfunction in this circuit is not recorded in the airbag sensor assembly, and the source voltage returns to normal, the SRS warning light automatically goes off.

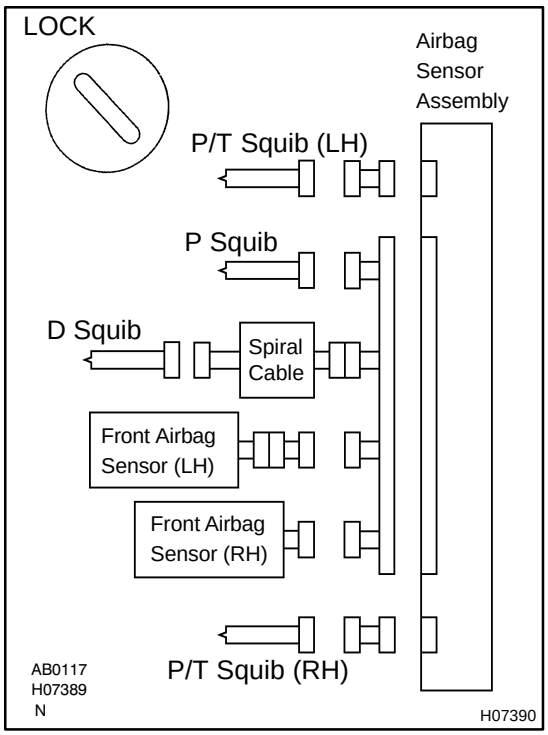
DTC No.	Diagnosis
(Normal)	Source voltage drop

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection.**



PREPARATION:

(a) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(b) Remove the steering wheel pad. (See page SR-13)

(c) Disconnect the connector of the front passenger airbag assembly. (See page RS-25)

(d) Disconnect the connectors of the seat belt pretensioner RH and LH. (See page BO-121)

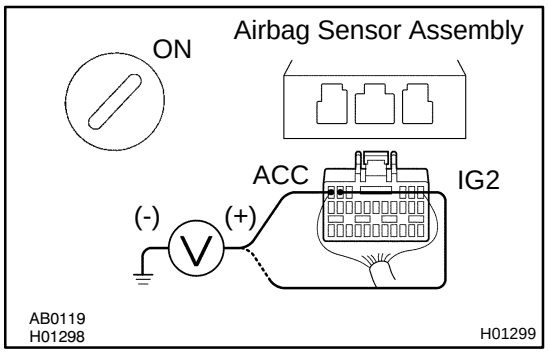
(e) Disconnect the connectors of the airbag sensor assembly. (See page RS-38)

(f) Disconnect the connectors of the front airbag sensor RH and LH. (See page RS-43)

CAUTION:

Store the steering wheel pad with the front surface facing upward.

2	Check source voltage.



PREPARATION:

(a) Connect negative (-) terminal cable to the battery.
(b) Turn ignition switch to ON.

CHECK:

Operating electric system (defogger, wiper, headlight, heater blower, etc.), measure the voltage between each of IG2 and ACC of sensor and body ground.

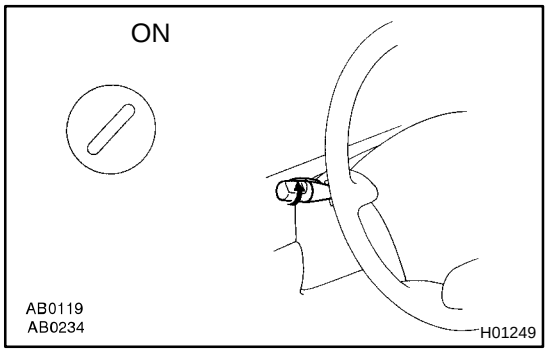
OK:

Voltage: 10 - 14 V

NG → **Check harness between battery and airbag sensor assembly, and check battery and charging system.**

OK

3	Does SRS warning light turn OFF?



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Connect the steering wheel pad connector.
(c) Connect the front passenger airbag assembly connector.
(d) Connect the seat belt pretensioner connector RH and LH.
(e) Connect the airbag sensor assembly connector.
(f) Turn ignition switch to ON.

CHECK:

Operate electric system (defogger, wiper, headlight, heater blower, etc.) and check that SRS warning light goes off.

NO → **Check for DTCs. If a DTC is output, perform troubleshooting for the DTC. If a normal code is output, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use the simulation method to check.

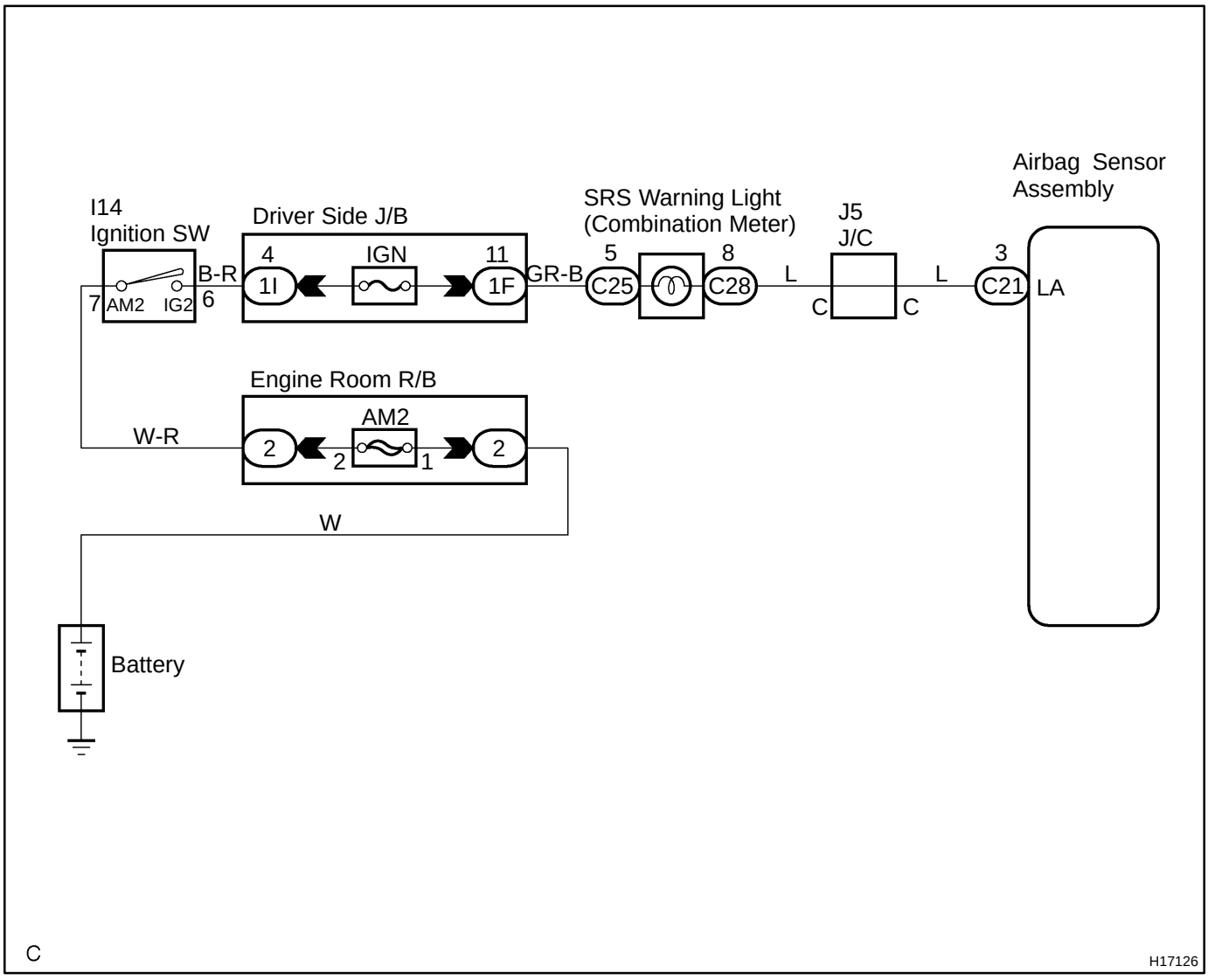
DI2I5-21

SRS Warning Light Circuit Malfunction (Always lights up, when ignition switch is in LOCK position.)

CIRCUIT DESCRIPTION

The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from the LOCK position to ACC or ON position, and then turns OFF automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality. When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by blinking the SRS warning light.

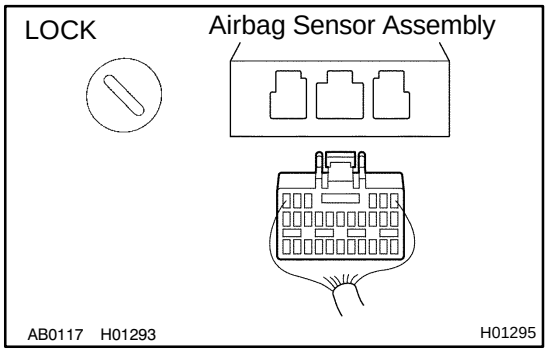
WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Prepare for inspection. (See step 1 on page DI-456)**

2	**Does SRS warning light turn OFF?**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the airbag sensor assembly connector.

(d) Connect negative (-) terminal cable to the battery.

CHECK:

Check operation of SRS warning light.

NO → **Check SRS warning light circuit or terminal AB circuit of DLC1.**

YES

Replace airbag sensor assembly.

SRS Warning Light Circuit Malfunction (Does not light up, when ignition switch is turned to ACC or ON.)

CIRCUIT DESCRIPTION

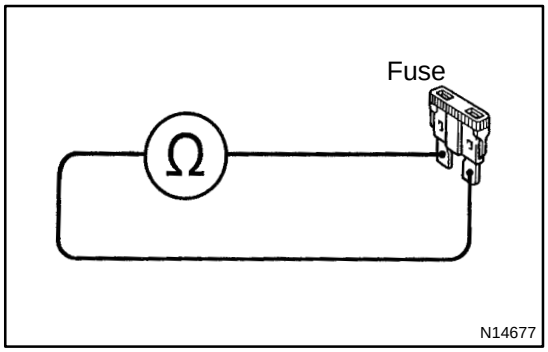
The SRS warning light is located on the combination meter.
When the SRS is normal, the SRS warning light lights up for approx. 6 seconds after the ignition switch is turned from LOCK position to ACC or ON position, and then turns OFF automatically.
If there is a malfunction in the SRS, the SRS warning light lights up to inform the driver of the abnormality When terminals Tc and E1 of the DLC1 are connected, the DTC is displayed by blinking the SRS warning light.

WIRING DIAGRAM

See page DI-459 .

INSPECTION PROCEDURE

1	**Check ECU-B Fuse.**



PREPARATION:
Remove ECU-B fuse.
CHECK:
Check continuity of ECU-B fuse.
OK:

Continuity

HINT:

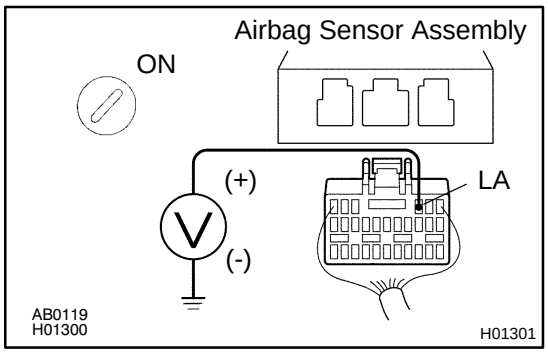
- Fuse may be burnt out even if it appears to be OK during visual inspection.
- If fuse is OK, install it.

NG → **Go to step 5.**

OK

2	**Prepare for inspection. (See step 1 on page DI-456)**

3	Check SRS warning light circuit.



PREPARATION:

(a) Connect negative (-) terminal cable to the battery.

(b) Turn ignition switch to ACC or ON.

CHECK:

Measure the voltage between LA terminal of the harness side connector and body ground.

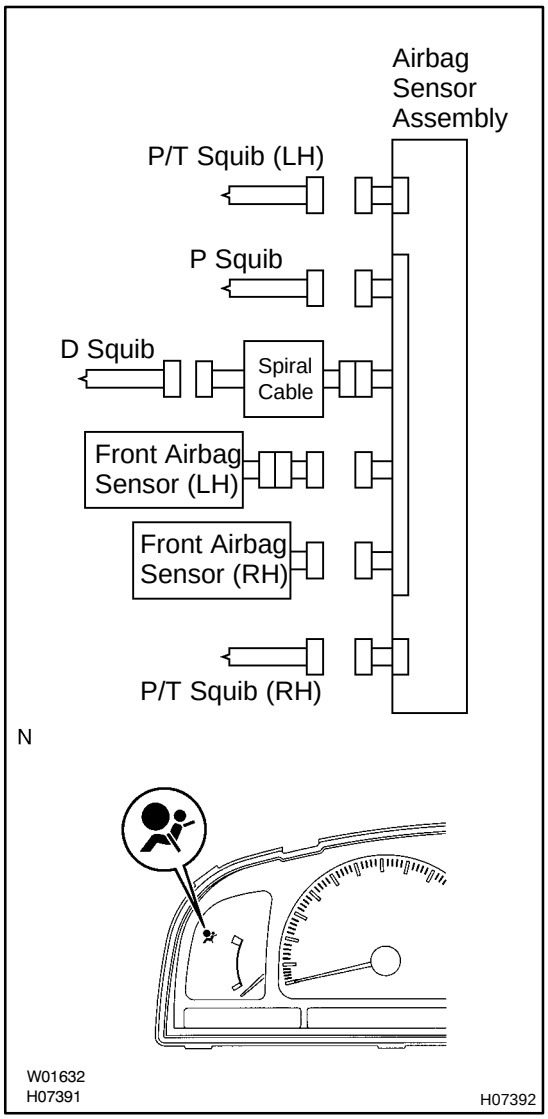
OK:

Voltage: 10 - 14 V

NG → **Check SRS warning light bulb or repair SRS warning light circuit.**

OK

4	Does SRS warning light come on?



PREPARATION:

(a) Disconnect negative (-) terminal cable from the battery.
(b) Connect the airbag sensor assembly connector.
(c) Connect negative (-) terminal cable to the battery, and wait at least for 2 seconds.
(d) Turn ignition switch to ACC or ON.

CHECK:

Check operation of SRS warning light.

NO → **Check terminal LA of airbag sensor assembly. If normal, replace airbag sensor assembly.**

YES

From the results of the above inspection, the malfunctioning part can now be considered normal. To make sure of this, use simulation method to check.

5	**Is new ECU-B fuse burnt out again?**

NO → **Using simulation method, reproduce malfunction symptoms. (See page IN-18)**

YES

Check harness between ECU- B fuse and SRS warning light.

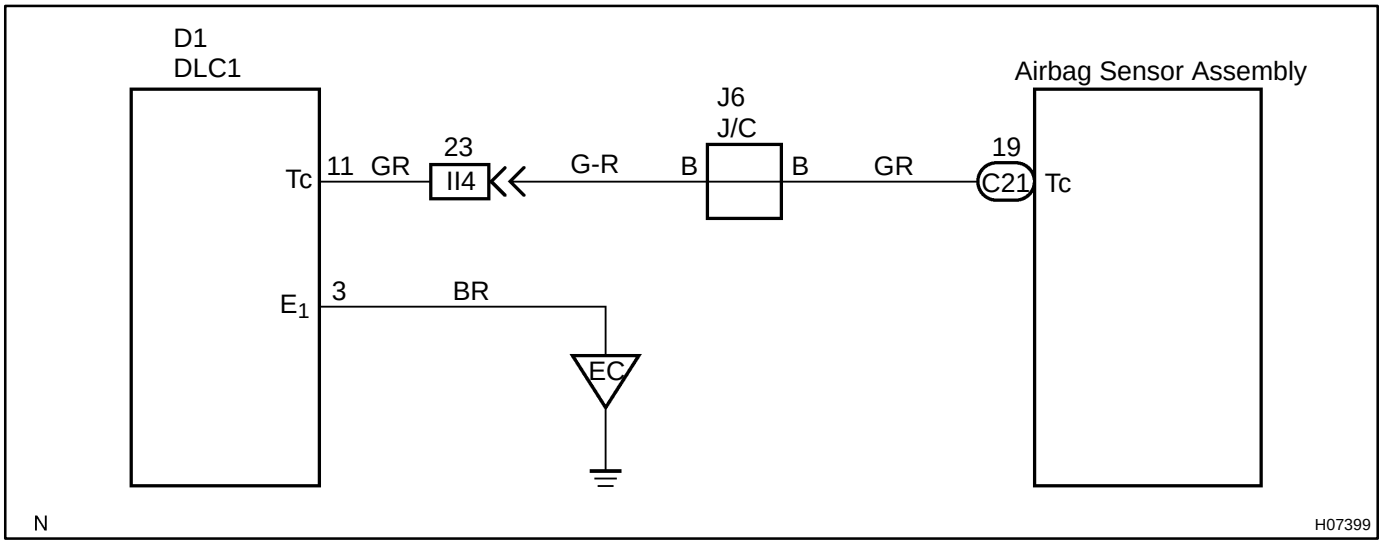
DI192-33

Tc Terminal Circuit

CIRCUIT DESCRIPTION

By connecting terminals Tc and E1 of the DLC1 the airbag sensor assembly is set in the DTC output mode. The DTCs are displayed by blinking the SRS warning light.

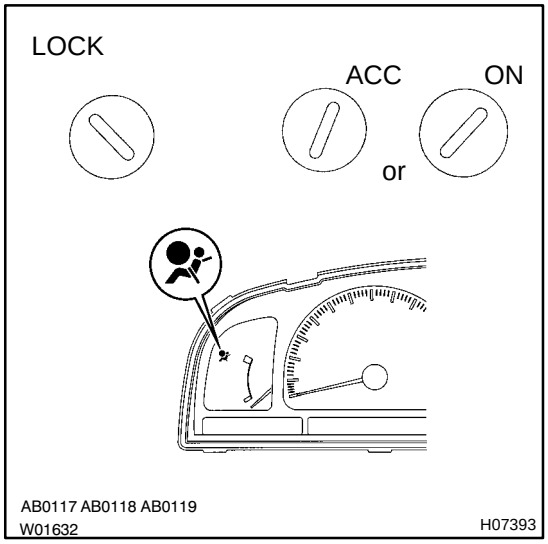
WIRING DIAGRAM



INSPECTION PROCEDURE

If the DTC is not displayed, do the following troubleshooting.

1	**Does SRS warning light light up for approx. 6 seconds?**



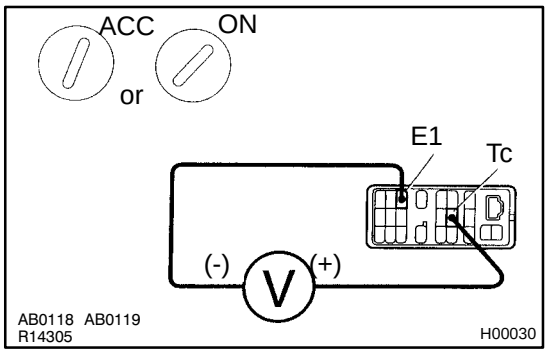
PREPARATION:

Check operation of the SRS warning light after ignition switch is turned from LOCK position to ACC or ON position.

NO → **Check SRS warning light system.**
(See page DI-377)

YES

2	Check voltage between terminals Tc and E1 of DLC1.

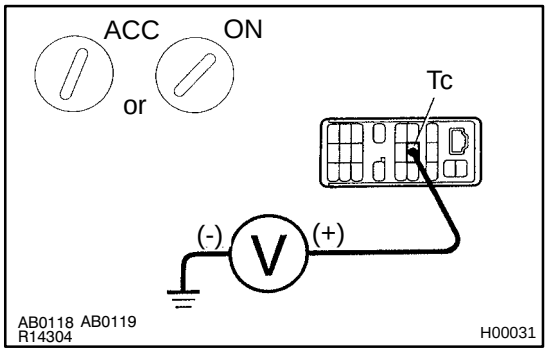


PREPARATION:
Turn ignition switch to ACC or ON.
CHECK:
Measure the voltage between terminals Tc and E1 of DLC1.
OK:
Voltage: 10 - 14 V

OK	Go to step 4.

NG

3	Check voltage between terminal Tc of DLC1 and body ground.

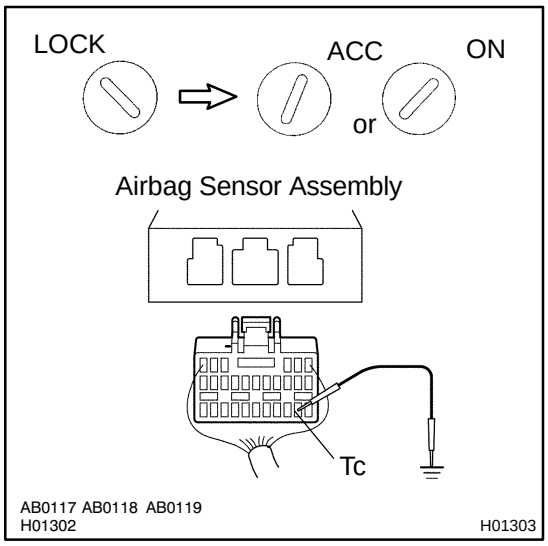


CHECK:
Measure the voltage between terminal Tc of DLC1 and body ground.
OK:
Voltage: 10 - 14 V

OK	Check harness between terminal E1 of DLC1 and body ground.

NG

4	**Check airbag sensor assembly.**



PREPARATION:

(a) Turn ignition switch to LOCK.
(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.
(c) Disconnect the airbag sensor assembly connector.
(d) Insert service wire into terminal Tc from back side as shown in the illustration.
(e) Connect the airbag sensor assembly connector with service wire.
(f) Connect negative (-) terminal cable to the battery.
(g) Turn ignition switch to ACC or ON and wait at least for 20 seconds.
(h) Connect service wire of terminal Tc to body ground.

CHECK:

Check operation of SRS warning light.

OK:

SRS waning light comes on.

NOTICE:

Pay due attention to the terminal connecting position to avoid a malfunction.

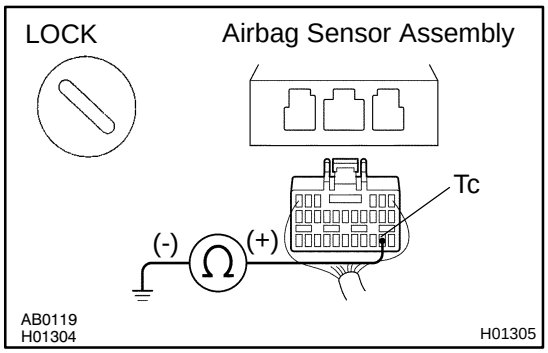
OK → **Check harness between the airbag sensor assembly and DLC1.**

NG

Replace airbag sensor assembly.

If the DTC is displayed without a DTC check procedure, perform the following troubleshooting.

1	**Check resistance between terminal Tc of airbag sensor assembly and body ground.**



PREPARATION:

(a) Turn ignition switch to LOCK.

(b) Disconnect negative (-) terminal cable from the battery, and wait at least for 90 seconds.

(c) Disconnect the airbag sensor assembly connector.

CHECK:

Check the resistance between terminal Tc of the airbag sensor assembly connector and body ground.

OK:

Resistance: 1 MΩ or Higher

NG → **Repair or replace harness or connector.**

OK

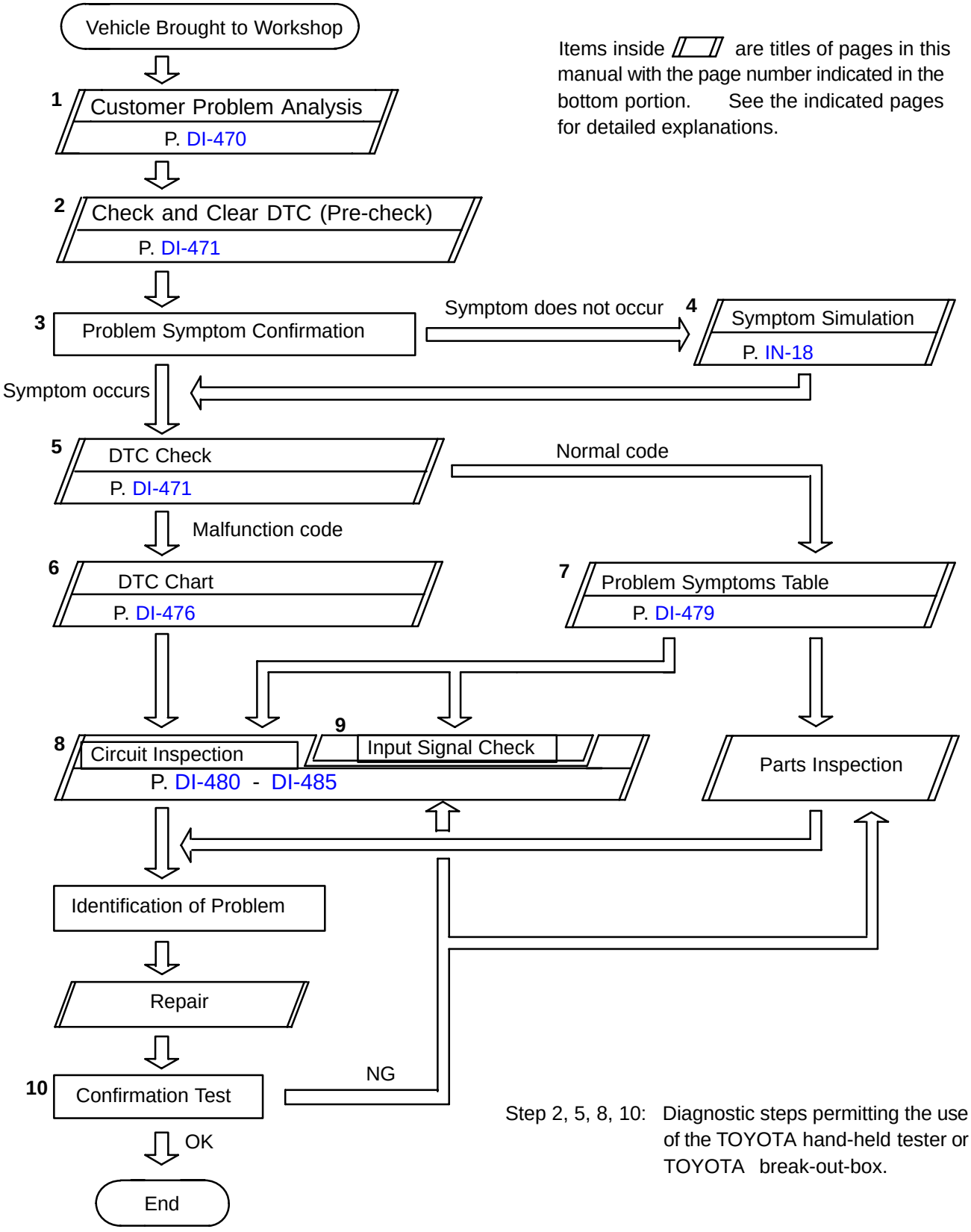
Replace airbag sensor assembly.

CRUISE CONTROL SYSTEM (DENSO Made)

DI0QT-04

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshoot in accordance with the procedure on the following page.



Items inside ▱ are titles of pages in this manual with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.

Step 2, 5, 8, 10: Diagnostic steps permitting the use of the TOYOTA hand-held tester or TOYOTA break-out-box.

DI0QU-03

CUSTOMER PROBLEM ANALYSIS CHECK

CRUISE CONTROL SYSTEM Check Sheet

Inspector's name: _____

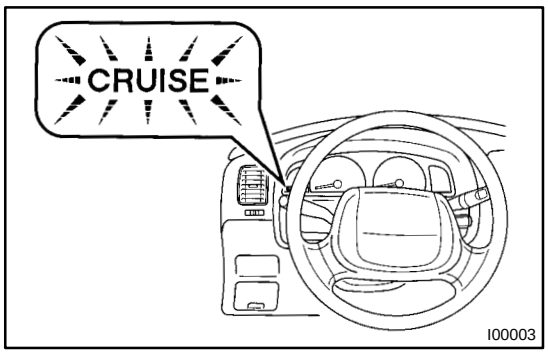
Customer's Name		Registration No.	
		Registration Year	
		Frame No.	
Date of Vehicle Brought in	/ /	Odometer Reading	km Mile

Condition of Problem Occurrence	Date of Problem Occurrence	/ /
	Frequency Problem Occurs?	☑ Continuous ☑ Intermittent (Times a day)
	Vehicle Speed when Problem Occurred	km Mile

Symptoms	☑ Auto cancel occurs	● Driving condition ☐ City driving ☐ Freeway ☐ Up hill ☐ Down hill ● After cancel occurred, did the driver activate cruise control again? ☐ Yes ☐ No
	☐ Cancel does not occur	☐ With brake ON ☐ Except D position shift ☐ When control SW turns to CANCEL position
	☐ Cruise control malfunction	☐ Slip to acceleration side ☐ Slip to deceleration side ☐ Hunting occurs ☐ O/D cut off does not occur ☐ O/D does not return
	☐ Switch malfunction	☐ SET ☐ ACC ☐ COAST ☐ RES ☐ CANCEL
	☐ Cruise main indicator light	☐ Remains ON ☐ Does not light up ☐ Blinks

DTC Check	1st Time	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI0QV-04



PRE-CHECK

1. DIAGNOSIS SYSTEM

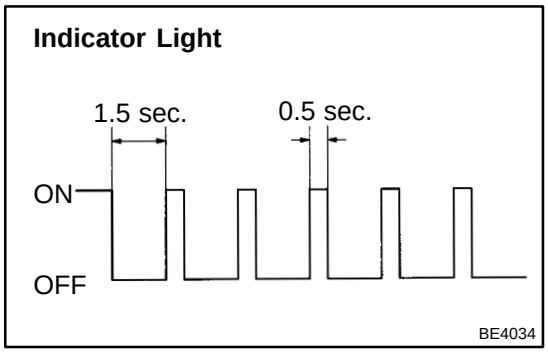
(a) Check the indicator.

(1) Turn the ignition switch ON.

(2) Check that the CRUISE MAIN indicator light comes on when the cruise control main switch is turned on, and that the indicator light goes off when the main switch is turned OFF.

HINT:

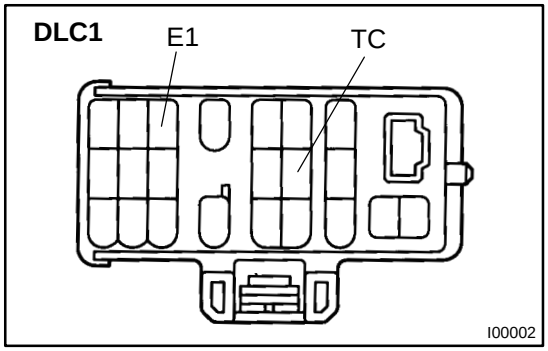
If the indicator check result is not normal, proceed to trouble-shooting (See page BE-2) for the combination meter section.



(b) Check the DTC.

HINT:

If a malfunction occurs in the No. 1 vehicle speed sensor or actuator, etc. during cruise control driving, the ECU actuates AUTO CANCEL of the cruise control and turns ON and OFF the CRUISE MAIN indicator light to inform the driver of a malfunction. At the same time, the malfunction is stored in memory as a diagnostic trouble code.



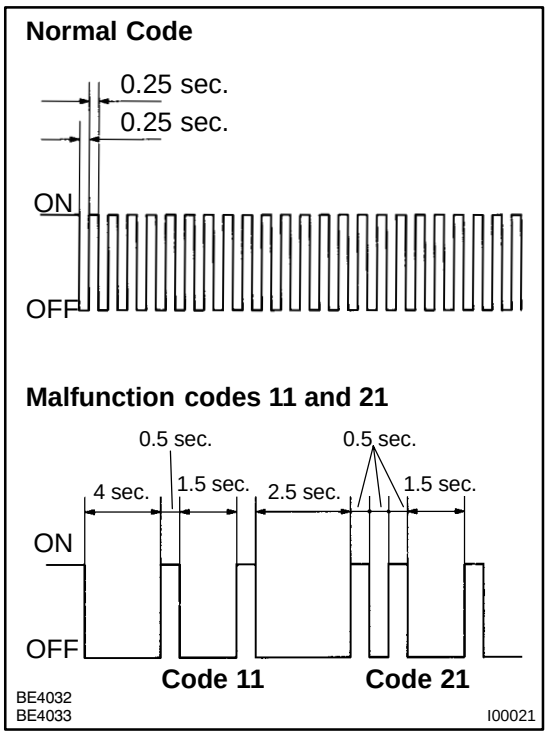
(c) Using diagnosis check wire, check the output of DTC.

(1) Turn the ignition switch ON.

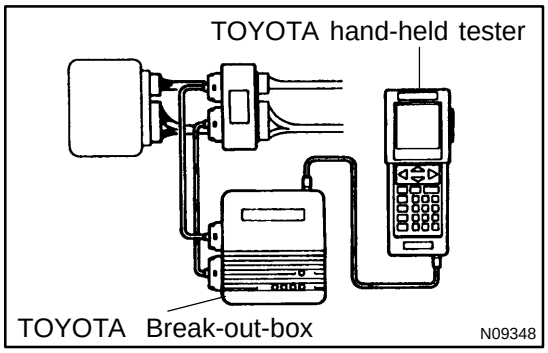
(2) Using SST, connect terminals Tc and E_1 of DLC1.

SST 09843-18020

(3) Read the DTC on the CRUISE MAIN indicator light.



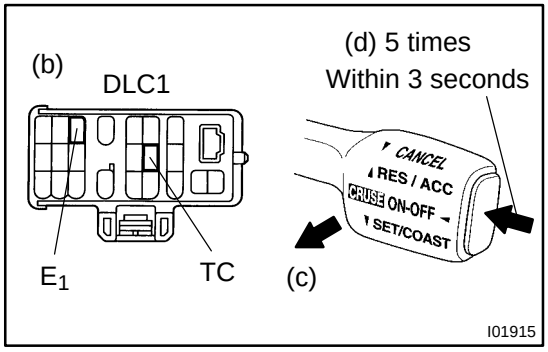
HINT:
If the DTC is not output, inspect the diagnosis circuit.
As an example, the blinking patterns for codes; normal 11 and 21 are shown in the illustration.



2. ECU TERMINAL VALUES MEASUREMENT BY USING TOYOTA BREAK-OUT-BOX AND TOYOTA HAND-HELD TESTER

(a) Hook up the TOYOTA break- out- box and TOYOTA hand-held tester to the vehicle.
(b) Read the ECU input/output values by following the prompts on the tester screen.

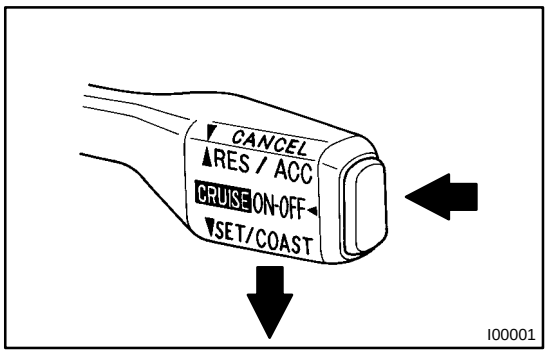
HINT:
TOYOTA hand-held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
Please refer to the TOYOTA hand-held tester/TOYOTA break-out-box operator's manual for further details.



3. DTC CLEARANCE (ERASE MODE)

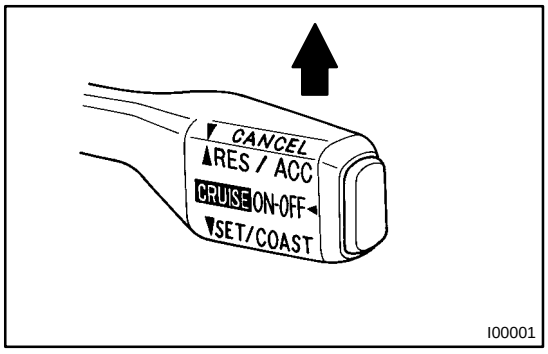
HINT:
Under the erase mode, diag detection does not work.

(a) Drive at about 15 km/h or below.
(b) Using SST, connect terminals Tc and E_1 of DLC1.
SST 09843-18020
(c) Pull the cruise control switch to CANCEL.
(d) On the above metioned condition, turn on the cruise control main switch 5 times within 3 seconds.

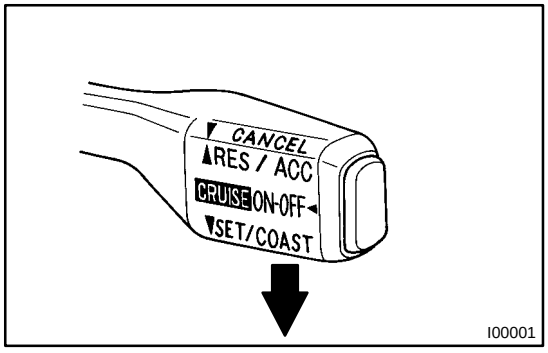


4. PROBLEM SYMPTOM CONFIRMATION (ROAD TEST)

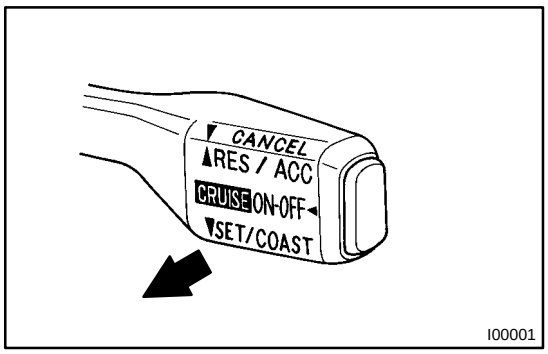
(a) Inspect the SET switch.
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Press the control switch to the SET/COAST.
- (4) After releasing the switch, check that the vehicle cruises at the desired speed.



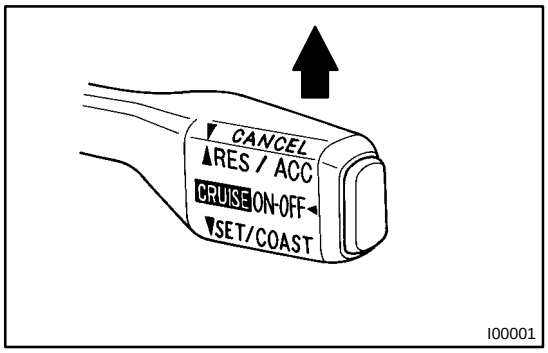
(b) Inspect the ACCEL switch.
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Press the control switch to the SET/COAST.
- (4) Check that the vehicle speed increases while the control switch is turned to RES/ACC, and that the vehicle cruises at the set speed when the switch is released.
- (5) Momentarily press the control switch upward to RES/ACC and then immediately release it. Check that the vehicle speed increases by about 1.6 km/h (1 mph) (Tap-up function).



(c) Inspect the COAST.
- (1) Push the main switch ON.
- (2) Drive at a desired speed (40 km/h (25 mph) or higher).
- (3) Press the control switch to the SET/COAST.
- (4) Check that the vehicle speed decreases while the control switch is turned to SET/COAST, and the vehicle cruises at the set speed when the switch is released.
- (5) Momentarily press the control switch downward to SET/COAST, and then immediately release it. Check that the vehicle speed decreases by about 1.6 km/h (1 mph) (Tap-down function).

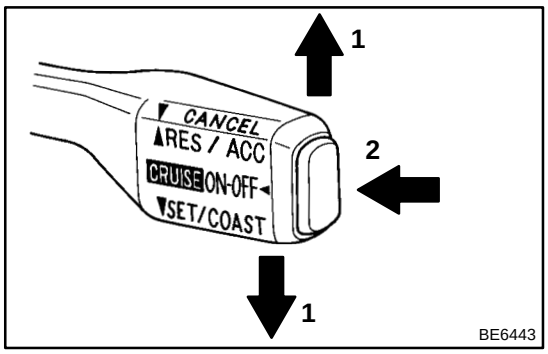


(d) Inspect the CANCEL switch.
(1) Push the main switch ON.
(2) Drive at a desired speed (40 km/h (25 mph) or higher).
(3) Press the control switch to the SET/COAST.
(4) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depress the brake pedal
- Depress the clutch pedal (M/T)
- Shift to except D position (A/T)
- Turn the main switch OFF
- Pull the cruise control switch to CANCEL



(e) Inspect the RESUME switch.
(1) Push the main switch ON.
(2) Drive at a desired speed (40 km/h (25 mph) or higher).
(3) Press the control switch to the SET/COAST.
(4) When operating one of the followings, check that the cruise control system is cancelled and that the normal driving mode is reset.
- Depress the brake pedal
- Depress the clutch pedal (M/T)
- Shift to except D position (A/T)
- Pull the cruise control switch to CANCEL

(5) After the control switch is turned to RES/ACC at the driving speed of more than 40 km/h (25 mph), check that the vehicle restores the speed prior to the cancellation.



5. INPUT SIGNAL CHECK

HINT:

(1) For check No.1 ~ No.2
- Turn the ignition switch ON.

(2) For check No.3
- Turn ignition switch ON.
- Shift to D position.

(3) For check No.4
- Jack up the vehicle.
- Start the engine.
- Shift to D position.

(a) Press the control switch to SET/COAST or RES/ACC position and hold it down or hold it up respecively (1)

(b) Push the main switch ON (2).

(c) Check that the CRUISE MAIN indicator light blinks twice or 3 times repeatedly after 3 seconds.

(d) Turn the SET/COAST or RES/ACC switch OFF.

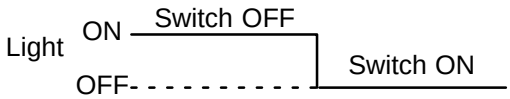
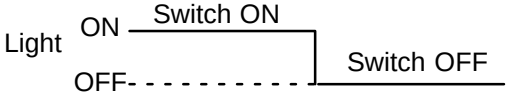
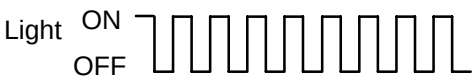
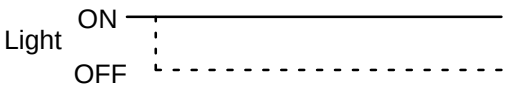
(e) Operate each switch as listed in the table below.

(f) Read the blinking pattern of the CRUISE MAIN indicator light.

(g) After performing the check, turn the main switch OFF.

HINT:

When 2 or more signals are input to the ECU, the lowest numbered code will be displayed first.

No.	Operation Method	CRUISE MAIN Indicator Light Blinking Pattern	Diagnosis
1	Turn SET/COAST switch ON		SET/COAST switch circuit is normal
2	Turn RES/ACC switch ON		RES/ACC switch circuit is normal
3	Turn CANCEL switch ON		CANCEL switch circuit is normal
	Turn stop light switch ON Depress brake pedal		Stop light switch circuit is normal
	Turn Park/Neutral Position switch OFF (Shift to except D position)		Park/Neutral Position switch circuit is normal
	Turn clutch switch OFF (Depress clutch pedal)		Clutch switch circuit is normal
4	Drive at about 40 km/h (25 mph)or higher		Vehicle Speed Sensor is normal
	Drive at about 40 km/h (25 mph) or below		

DI0QW-04

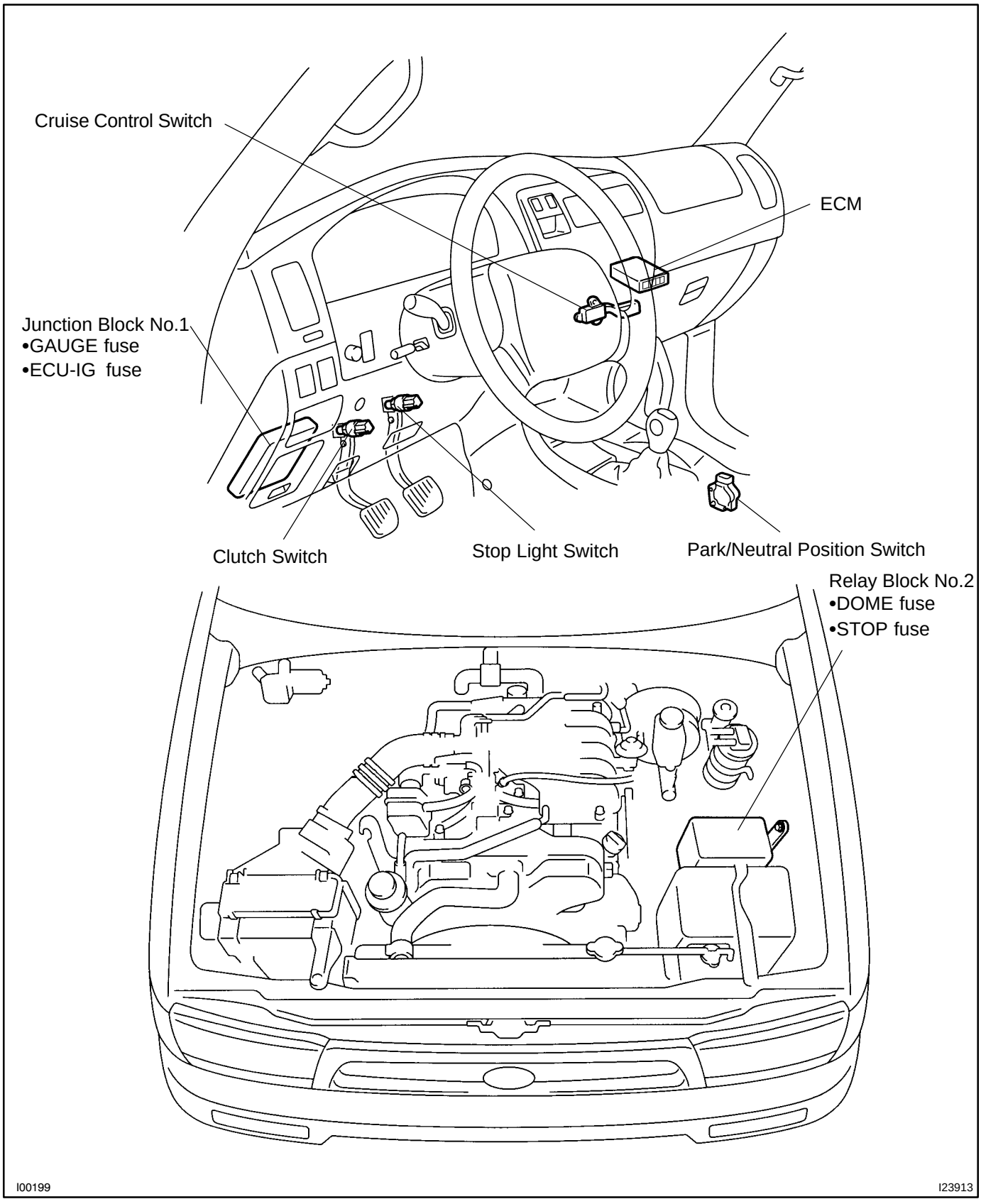
DIAGNOSTIC TROUBLE CODE CHART

If a malfunction code is displayed during the diagnostic trouble code check, check the circuit listed for that code in the table below and proceed to the appropriate page.

DTC No. (See page)	Detection Item	Trouble Area
P0500/21, 23 (DI-480)	Vehicle Speed Signal Abnormal	• Combination meter • Harness or connector between ECM and vehicle speed sensor • Vehicle speed sensor • ECM
P1520/52 (DI-481)	Short in Stop Light Switch Circuit	• Stop light switch • Harness or connector between ECM and stop light switch • ECM
P1566/54 (DI-485)	Input Signal Circuit	• ECM

DI0QX-05

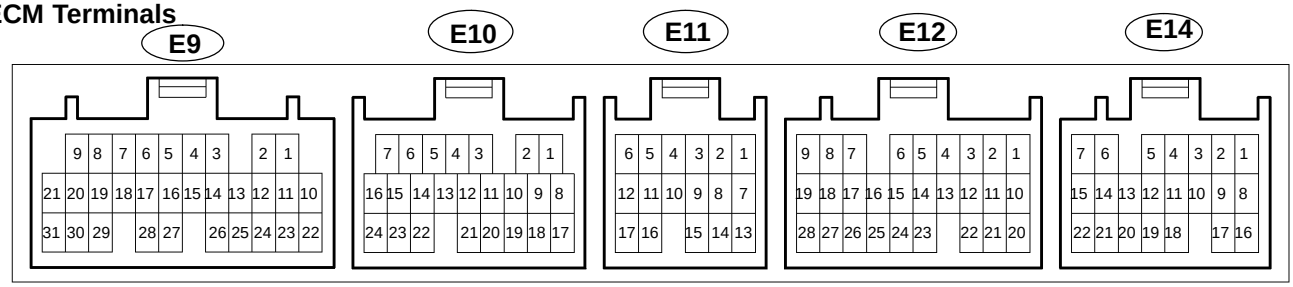
PARTS LOCATION



DI1CQ-04

TERMINALS OF ECU

ECM Terminals



YA02016

Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage
STP (E14-20) - E1 (E10-17)	G-W - BR	Depress brake pedal	7.5 - 14 V
		Release brake pedal	0 - 1.5 V
CCS (E12-22) - E1 (E10-17)	G - BR	Ignition switch ON	9 - 14 V
		Ignition switch ON MAIN switch hold ON	Below 1 V
		Ignition switch ON CANCEL switch hold ON	6.0 - 10.1 V
		Ignition switch ON SET/COAST switch hold ON	4.0 - 7.1 V
		Ignition switch ON RES/ACC switch hold ON	2.1 - 4.0 V
PI (E14-17) - E1 (E10-17)	GR - BR	Ignition switch ON Cruise control main switch ON	0 - 3 V
		Ignition switch ON Cruise control main switch OFF	9 - 14 V
ST1- (E12-9) - E1 (E10-17)	R-B - BR	Depress brake pedal	0 - 1.5 V
		Release brake pedal	7.5 - 14 V

DI0QZ-05

PROBLEM SYMPTOMS TABLE

Symptom	Suspected Area	See page
SET not occurring or CANCEL occurring (DTC is Normal)	1. Input signal circuit 2. Vehicle speed sensor circuit 3. Stop light switch circuit 4. Park/neutral position switch circuit 5. ECM	DI-485 DI-480 DI-481 DI-203 IN-28
SET not occurring or CANCEL occurring (DTC is not output)	1. ECM	IN-28
Actual vehicle speed deviates above or below the set speed	1. Input signal circuit 2. ECM	DI-485 IN-28
Gear shifting occurs frequently between 3rd and O/D when driving on uphill road (Hurting)	1. ECM	IN-28
Cruise control not cancelled, even when brake pedal is depressed	1. Stop light switch circuit 2. ECM	DI-481 IN-28
Cruise control not cancelled, even when transmission is shifted to N position	1. Park/neutral position switch circuit 2. ECM	DI-203 IN-28
Cruise control not cancelled, even when clutch pedal is depressed	1. ECM	IN-28
Control switch does not operate (SET/COAST, ACC/RES, CANCEL not possible)	1. Cruise control switch circuit 2. ECM	DI-486 IN-28
SET possible at 40 km/h (25 mph) or less, or CANCEL does not operate at 40 km/h (25 mph) or less	1. Input signal circuit 2. ECM	DI-485 IN-28
Poor response is ACC and RES modes	1. ECM	IN-28
O/D does not resume, even though the road is not uphill	1. ECM	IN-28
DTC memory is erased	1. ECM	IN-28
DTC is not output, or is output when should not be	1. Diagnosis circuit 2. ECM	- IN-28
Cruise main indicator light remains on or falls to lighting up	1. Input signal circuit 2. ECM	DI-485 IN-28

DI3CI-09

CIRCUIT INSPECTION

DTC	P0500/21, 23	Vehicle Speed Sensor Circuit

CIRCUIT DESCRIPTION

See page DI-179 .

DTC No.	DTC Detection Condition	Trouble Area
P0500/21, 23	Speed signal is not input to ECM while cruise control is set	• Combination meter • Harness or connector between ECM and vehicle speed sensor • Vehicle speed sensor • ECM

WIRING DIAGRAM

See page DI-179 .

INSPECTION PROCEDURE

See page DI-179 ..

DI3CJ-18

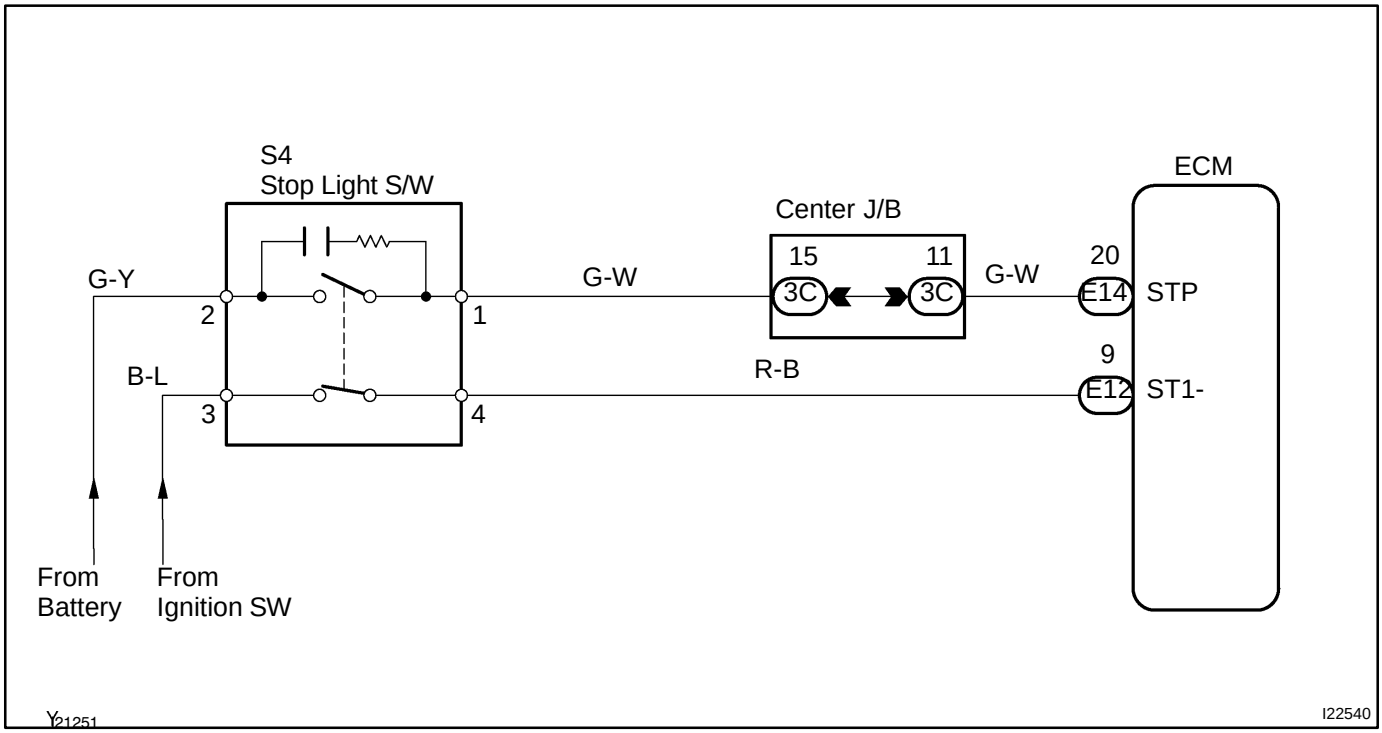
DTC	P1520/52	Stop light switch circuit

CIRCUIT DESCRIPTION

When the brake pedal is depressed, the stop light switch sends a signal to the ECM. When the ECM receives this signal, it cancels the cruise control.
A fail-safe function is provided so that the cancel functions normally, even if there is a malfunction in the stop light signal circuit.
The cancel condition is that battery positive voltage is supplied to terminal STP.
When the brake is on, battery positive voltage is normally applied through the STOP fuse and stop light switch to terminal STP of the ECM, and the ECM turns the cruise control OFF.
If the harness connected to terminal STP has an open circuit, terminal STP will have battery positive voltage and the cruise control will be turned OFF.

DTC No.	DTC Detection Condition	Trouble Area
P1520/52	Stop light switch circuit	• Stop light switch • Harness or connector between ECM and stop light switch • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

In case of using the TOYOTA hand-held tester, start the inspection from step 1 and in case of not using the TOYOTA hand-held tester, start it from step 2.

1	**Check stop light switch using TOYOTA hand-held tester.**

PREPARATION:

Connect the TOYOTA hand-held tester to the DLC3.

CHECK:

Check the stop light switch using DATA LIST.

OK:

Condition	STP LIGHT SW1-S (Sub CPU)	STP LIGHT SW2-S (Sub CPU)	STP LIGHT SW2-M (Main CPU)
Depressed	ON	ON	ON
Released	OFF	OFF	OFF

HINT:

- STP LIGHT SW1 has a function to disconnect the connection (OFF) when depressing the pedal, however, the ECM is control by the logic reverse, so with the TOYOTA hand-held tester, it displays ON.
- STP LIGHT SW1 indicates an input of the ST1- terminal and STP LIGHT SW2 indicates an input of the STP terminal.

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

NG

2	**Check operation of stop light.**

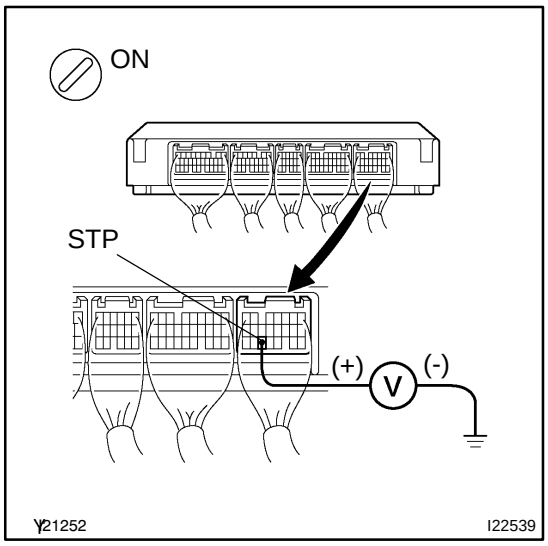
CHECK:

Check that the stop light comes on when the brake pedal is depressed, and goes off when the brake pedal is released.

NG → **Check stop light system (See page BE-32).**

OK

3	Check voltage between terminal STP of ECM connector and body ground.



PREPARATION:

(a) Remove the ECM with connectors being connected.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal STP of the ECM connector and the body ground when the brake pedal is depressed and released.

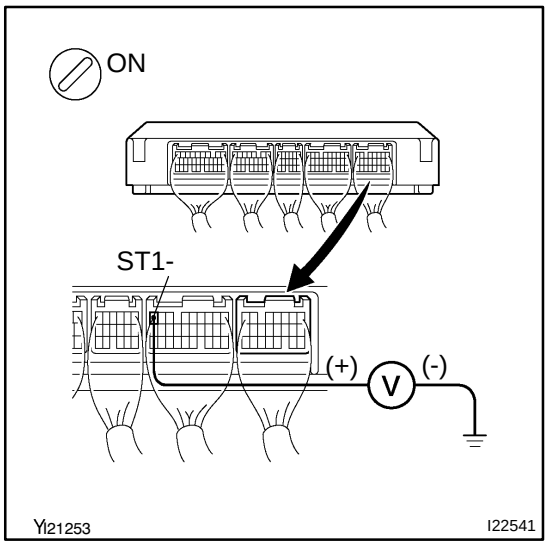
OK:

Brake Pedal	Voltage
Depressed	7.5 - 14 V
Released	0 - 1.5 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

NG

4	Check voltage between terminal ST1- of ECM connector and body ground.



PREPARATION:

(a) Remove the ECM with connectors being connected.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal ST1- of the ECM connector and the body ground when the brake pedal is depressed and released.

OK:

Brake Pedal	Voltage
Depressed	Below 1 V
Released	7.5 - 14 V

OK → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

NG

5	**Check harness and connector between terminal STP of ECM and stop light switch, and terminal ST1- of ECM and stop light switch (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace ECM (See page IN-28).

DI3CL-12

DTC	P1566/54	Input Signal Circuit

CIRCUIT DESCRIPTION

See page DI-481 .

DTC No.	DTC Detection Condition	Trouble Area
P1566/54	Input signal abnormal	ECM

INSPECTION PROCEDURE

Check and replace ECM (See page IN-28).

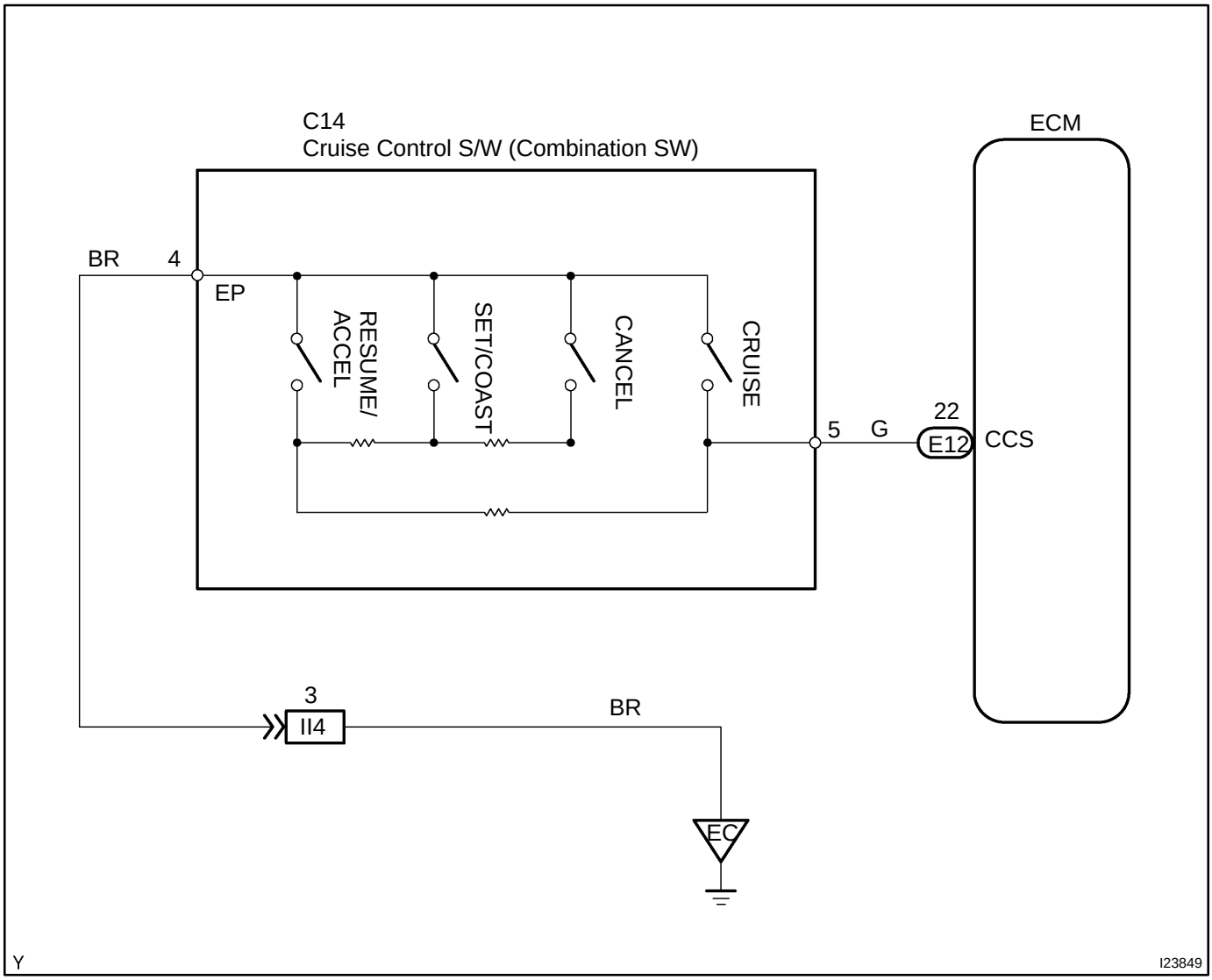
DI3CK-12

Control Switch Circuit (Cruise Control Switch)

CIRCUIT DESCRIPTION

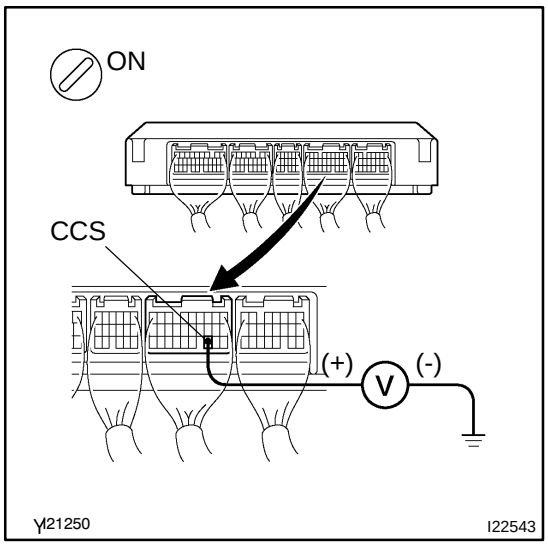
This circuit Sends the SET/COAST, RES/ACC and CANCEL signals (each voltage) to the ECM.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal CCS of ECM connector and body ground.**



PREPARATION:

(a) Remove the ECM with connector being connected.

(b) Turn the ignition switch ON.

CHECK:

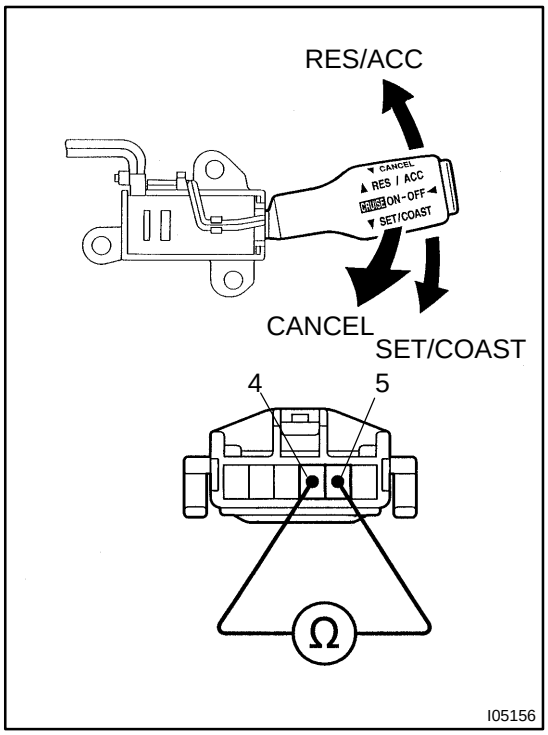
Measure the voltage between terminals CCS of the ECM connector and the body ground when each control switch is operated.

Switch position	Voltage
Neutral	9 - 14 V
MAIN	Below 1 V
RES/ACC	2.1 - 4.0 V
SET/COAST	4.0 - 7.1 V
CANCEL	6.0 - 10.1 V

NG → **Proceed to next circuit inspection shown in problem symptoms table (See page DI-479).**

OK

2	**Check control switch continuity.**



PREPARATION:

(a) Remove the steering wheel center pad.

(b) Disconnect the control switch connector.

CHECK:

Measure the resistance between terminals 4 and 5 of the control switch connector when the control switch is operated.

Switch Position	Resistance
Neutral	∞ (No continuity)
RES/ACC	210 - 270 Ω
SET/COAST	560 - 700 Ω
CANCEL	1380 - 1700 Ω

NG → **Replace control switch.**

OK

3	**Check harness and connector between ECM and cruise control switch, and cruise control switch and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

4	**Check cruise control indicator light (See combination meter).**

NG → **Replace combination meter.**

OK

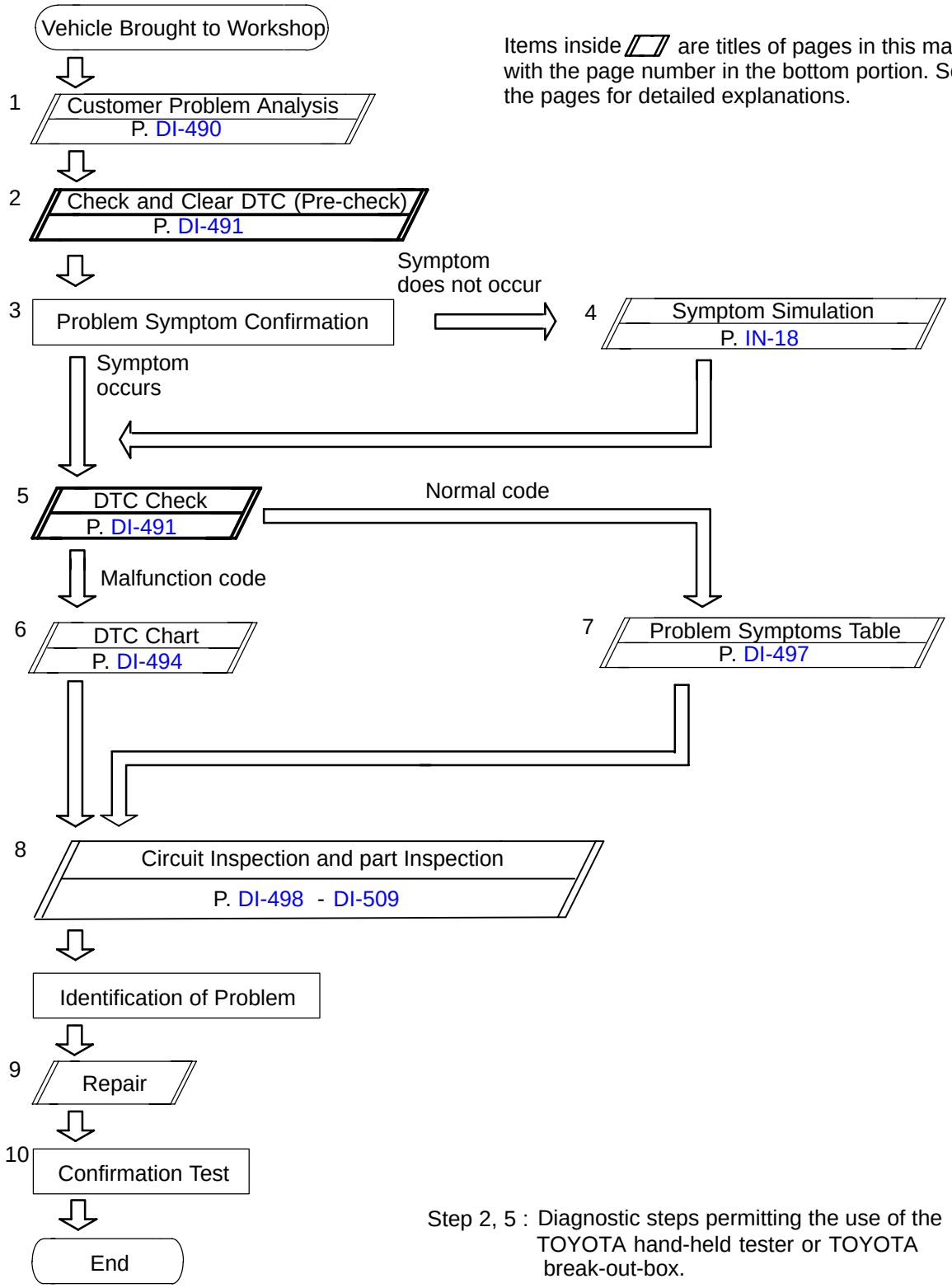
Check and replace ECM (See page IN-28).

ENGINE IMMOBILISER SYSTEM

DI1KE-05

HOW TO PROCEED WITH TROUBLESHOOTING

Troubleshooting in accordance with the procedure on the following pages.



Items inside ▱ are titles of pages in this manual, with the page number in the bottom portion. See the pages for detailed explanations.

Step 2, 5 : Diagnostic steps permitting the use of the TOYOTA hand-held tester or TOYOTA break-out-box.

DI1KF-05

CUSTOMER PROBLEM ANALYSIS CHECK

ENGINE IMMOBILISER Check Sheet

Inspector's Name :

Customer's Name		**Registration No.**	
		Registration Year	/ /
		Frame No.	
Date Vehicle Brought In	/ /	**Odometer Reading**	km miles

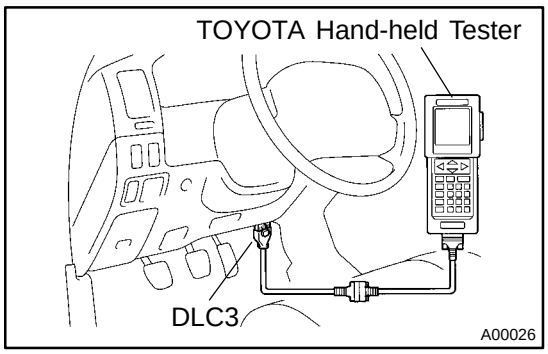
Date Problem First Occurred	/ /
Frequency Problem Occurs	☐ Continuous ☐ Intermittent (times a day)

Symptoms	☐ Immobiliser is not set. (Engine starts with key codes other than the registered key code.)
	☐ Engine does not start.

Check Item	**Malfunction Indicator Light**	☐ Normal ☐ Remains ON ☐ Does not Light Up

DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

DI1KG-10

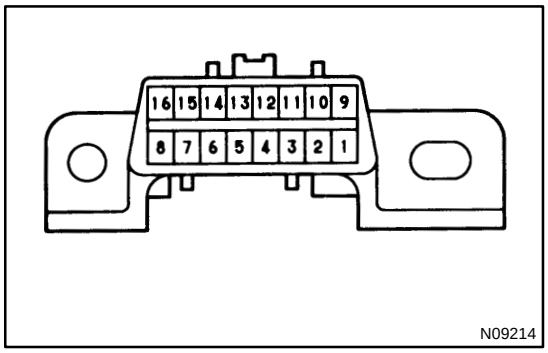


PRE-CHECK

1. DIAGNOSIS SYSTEM

(a) Description

ECM controls the function of immobiliser on this vehicle. Data of the immobiliser or DTC can be read form DLC3 of the vehicle. When a trouble occurs in immobiliser, MIL does not light ON but DTC inspection is performed. Therefore when there seems to be a trouble with immobiliser, use TOYOTA hand-held tester or SST to check and troubleshoot it.



(b) Inspect the DLC3.

The vehicle's ECM uses ISO 9141-2 for communication. The terminal arrangement of DLC3 complies with SAEJ1962 and matches the ISO 9141-2 format.

Tester connection	Condition	Specified condition
7 (Bus ⊕ line) - 5 (Signal ground)	During communication	Pulse generation
4 (Chassis ground) - Body	Always	1 Ω or less
5 (Signal ground) - Body	Always	1 Ω or less
16 (B+) - Body	Always	9 - 14 V

HINT:

If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of OBD ll scan tool or TOYOTA hand-held tester to DLC3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- If communication is normal when the tool is connected to another vehicle, inspect DLC3 on the original vehicle.
- If communication is still impossible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.

2. INSPECT DIAGNOSIS

(a) Check the DTC (Using TOYOTA hand-held tester).

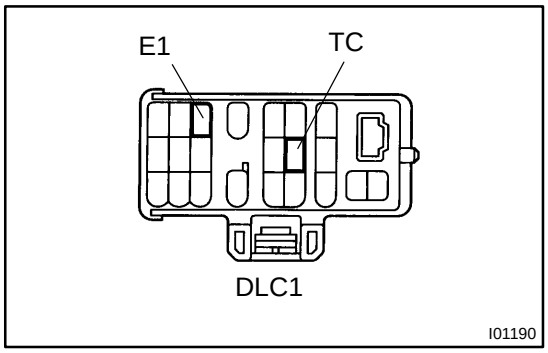
(1) Prepare the OBD ll scan tool (complying with SAEJ 1978) or TOYOTA hand-held tester.

(2) Connect the OBD ll scan tool or TOYOTA hand-held tester to DLC3 under the instrument panel lower pad.

(3) Turn the ignition switch ON and turn the OBD ll scan tool or TOYOTA hand-held tester switch ON.

(4) Use the OBD ll scan tool or TOYOTA hand-held tester to check the DTCs and freeze frame data; note them down (For operating instructions, see the OBD ll scan tool's instruction book.).

(5) See page DI-494 to confirm the details of the DTCs.



(b) Check the DTC (Using diagnosis check wire).

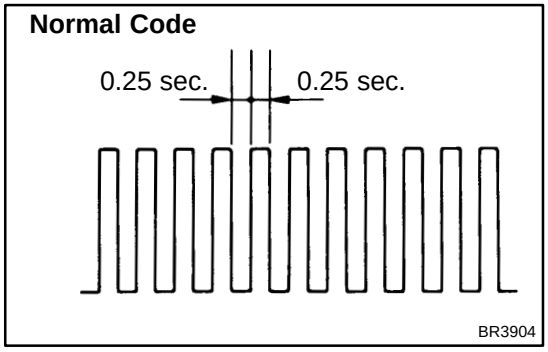
(1) Turn the ignition switch ON.

(2) Using SST, connect between terminals 11 (TC) and 3 (E1) of the DLC1.
SST 09843-18040

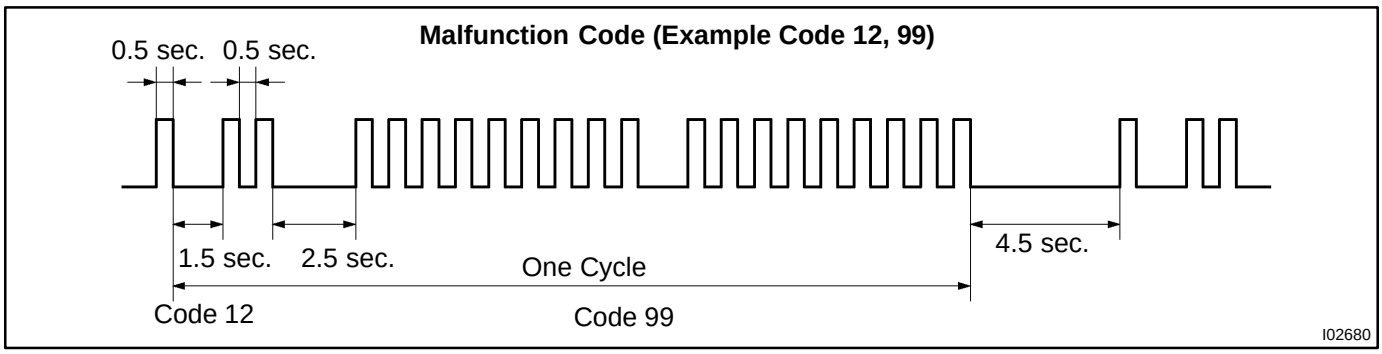
(3) Read the diagnostic trouble code from malfunction indicator lamp.

HINT:

- If a diagnostic trouble code is not output, check the TC terminal circuit .
- ECM controls the immobiliser function on this vehicle, DTC is out put with DTC of engine.



- As an example, the blinking patterns for codes; normal, 12 and 99 are as shown in the illustration.



(4) When DTC ”99” is output, there is a trouble with immobiliser. Start troubleshooting referring to PROBLEM SYMPTOM TABLE.

(5) After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn OFF the display.

HINT:

In the event of 2 or more malfunction codes. indication will begin from the smaller numbered code and continue in order to the larger.

(c) Clear the DTC.

The following procedures will erase the DTCs and freeze frame data.

(1) Operating the OBD ll scam tool (complying with SAEJ1978) or TOYOTA hand-held tester to erase the codes. (See the OBD ll scan tool’s instruction book for operating instructions.)

(2) Disconnecting the battery terminals or EFI fuse.

DI1KH-09

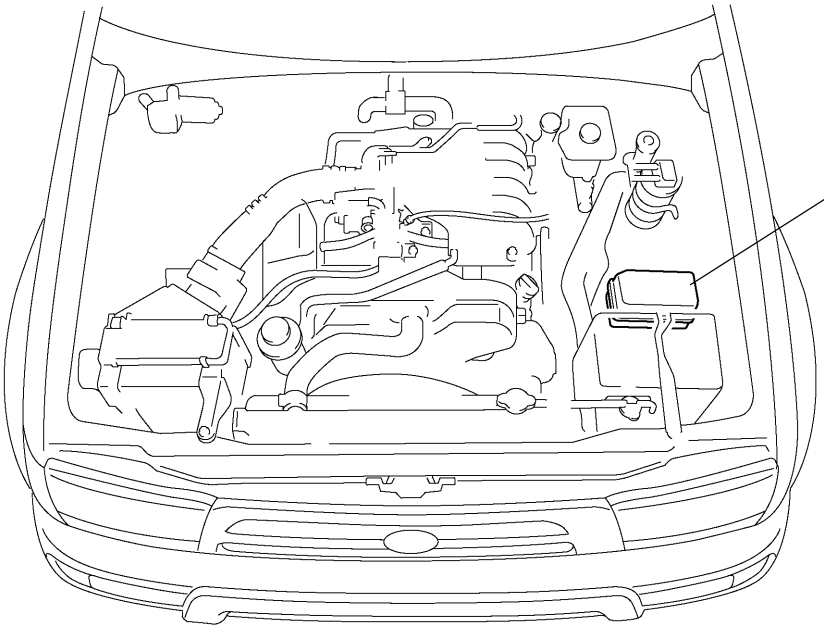
DIAGNOSTIC TROUBLE CODE CHART

DTC No. (See page)	Detection Item	Trouble Area
B2785 (DI-498)	Ignition Switch ON Malfunction	• Ignition switch • EFI main relay • Wire harness • ECM
B2786 (DI-498)	Ignition Switch OFF Malfunction	
B2791 (DI-502)	Key Unlock Warning Switch OFF Malfunction	• Key unlock warning switch • Wire harness • ECM
B2795 (DI-504)	Unmatched Key Code	• Key • Unregistered key inserted before
B2796 (DI-505)	No Communication in Immobiliser System	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM
B2797 (DI-507)	Communication Malfunction No. 1	• Communication contests • Unregistered key inserted before • ECM
B2798 (DI-509)	Communication Malfunction No. 2	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM

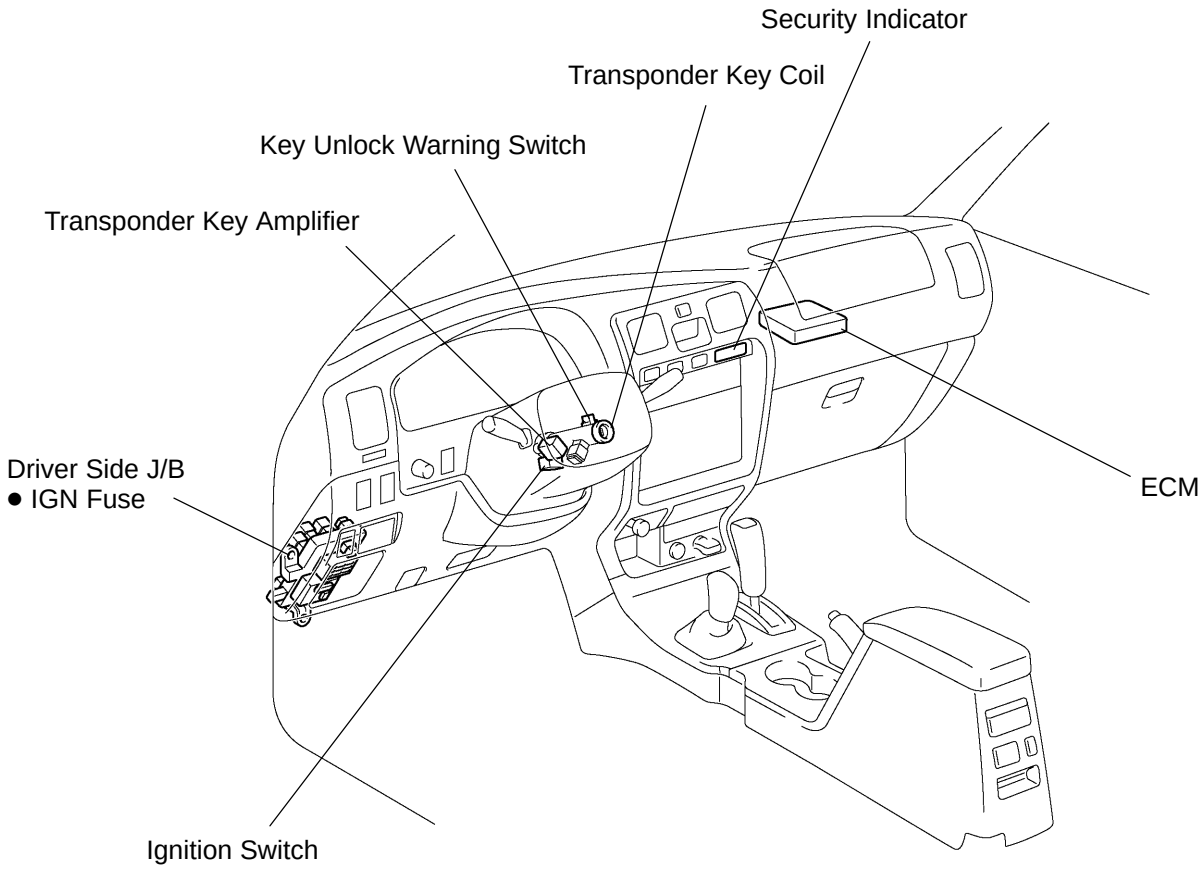
HINT:
To reduce the unnecessary exchange of ECM, check that a trouble occurs with the original ECM at the time of exchanging ECM and the trouble will disappear with a new ECM.

DI1KI-09

PARTS LOCATION



Y



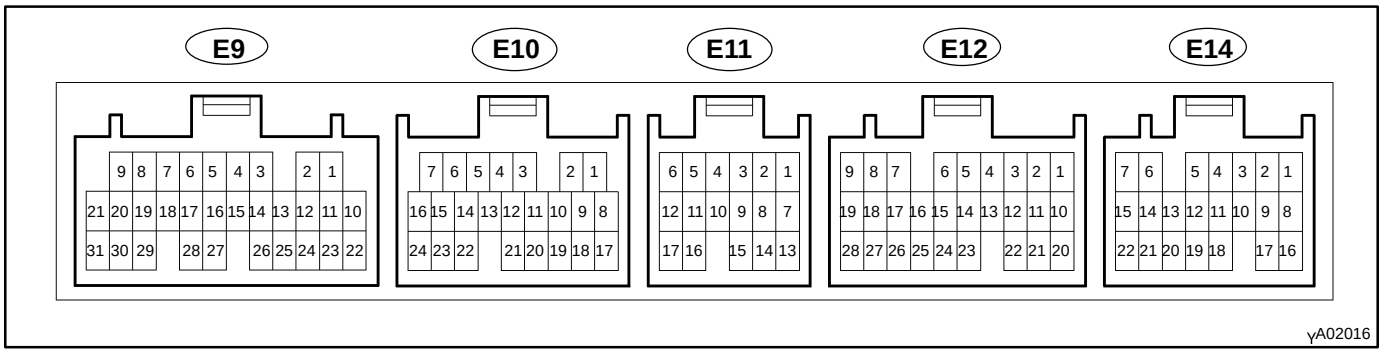
Y

I21708
I21844

I22132

DI1KJ-10

TERMINALS OF ECM



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
CODE (E14-5) - E1 (E10-17)	GR-R - BR	Ignition switch ON	10 - 14
TXCT (E14-19) - E1 (E10-17)	P-B - BR	Ignition switch ON	10 - 14
KSW (E14-11) - E1 (E10-17)	Y-R - BR	Ignition switch ON	10 - 14
EOM (E14-10) - E1 (E10-17)	W-B - BR	Ignition switch ON	4.5 - 5.5
RXCK (E14-18) - E1 (E10-17)	R-B - BR	Ignition switch ON	10 - 14

DI1KK-08

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Immobiliser is not set (Engine starts with key codes other than the registered key code)	3. ECM	IN-28
Engine does not start	1. Key 2. Wire harness 3. Transponder key coil 4. Transponder key amplifier 5. ECM	*1 IN-28 BE-172 - IN-28
Security indicator is always ON	1. Security indicator 2. Wire harness 3. ECM	*2 IN-28 IN-28
Security indicator is always ON (Although code has been registered in the automatic registration mode, indicator is not OFF)	1. Wire harness 2. Transponder key coil 3. Transponder key amplifier 4. ECM	IN-28 BE-172 - IN-28
Security indicator is OFF (When DTC of immobiliser is output)	1. Wire harness 2. Transponder key coil 3. Transponder key amplifier 4. ECM	IN-28 BE-172 - IN-28
Security indicator is OFF (When DTC of immobiliser is not output)	1. Wire harness 2. ECM	IN-28 IN-28
Security indicator is abnormally blinking	1. Wire harness 2. ECM	IN-28 IN-28

*1: Check that the key which did not start the engine has been registered and that it is possible to start with other already registered key codes.

*2: Finish the automatic registration mode because the mode might still remain.

DI1KL-08

CIRCUIT INSPECTION

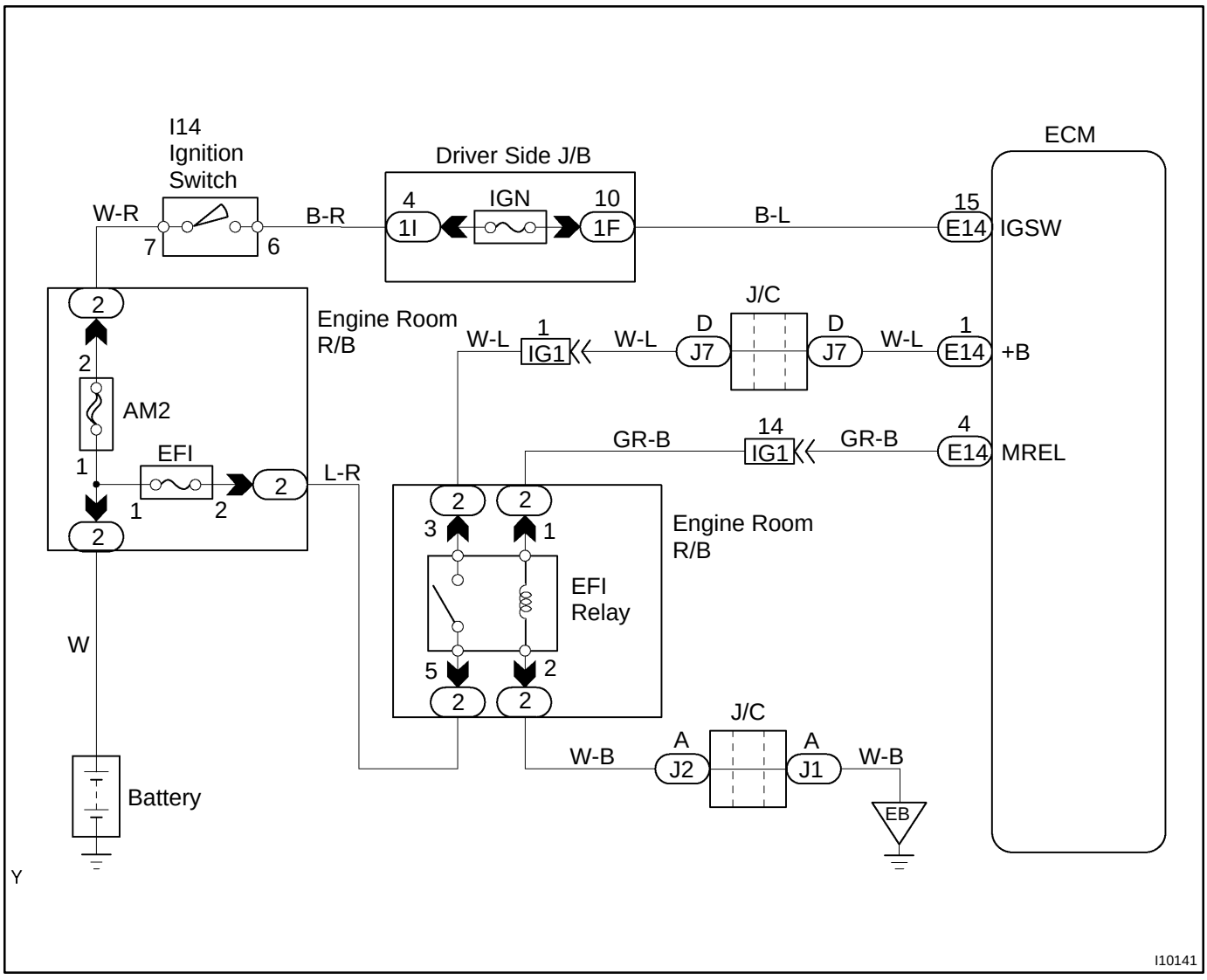
DTC	B2785/99	IG Switch ON Malfunction

DTC	B2786/99	IG Switch OFF Malfunction

CIRCUIT DESCRIPTION

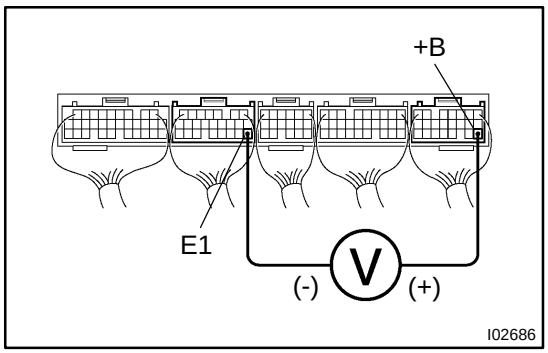
DTC No.	DTC Detection Condition	Trouble Area
B2785/99	• Short circuit in IG switch circuit • Ignition switch adheres to ON position	• Ignition switch • EFI main relay • Wire harness • ECM
B2786/99	• Open circuit in IG switch circuit • Ignition switch adheres to OFF position	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals +B and E1 of ECM connectors.**



PREPARATION:

(a) Remove the glove compartment.

(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals +B and E1 of the ECM connectors.

OK:

Voltage: 9 - 14 V

OK	**Proceed to next circuit inspection shown in problem symptoms (See page DI-497).**

NG

2	**Check for open in harness and connector between terminal E1 of ECM and body ground (See page IN-28).**

NG	**Repair or replace harness or connector.**

OK

3	**Check EFI main relay (Marking: EFI) (See page SF-35).**

NG	**Replace EFI main relay.**

OK

4	**Check EFI fuse.**

NG	**Check for short in all harness and components connected to EFI fuse.**

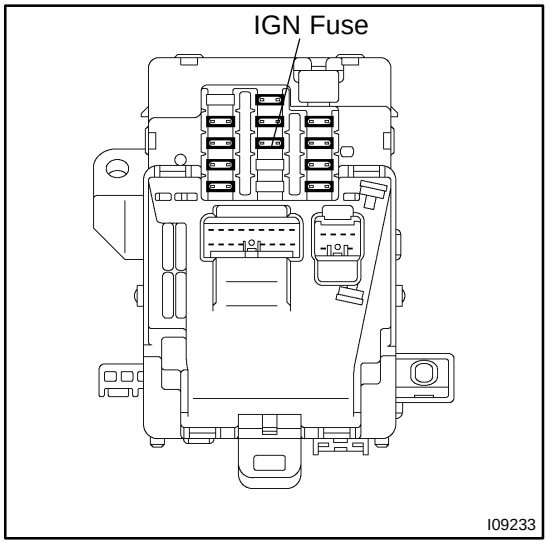
OK

5	**Check for open harness and connector between EFI main relay (Marking: EFI) and battery, and EFI main relay and ECM (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

6	**Check IGN fuse.**



PREPARATION:
Remove the IGN fuse from the driver side J/B.
CHECK:
Check the continuity of the IGN fuse.
OK:
Continuity

NG → **Check for short in all harness and components connected to IGN fuse.**

OK

7	**Check ignition switch (See page BE-12).**

NG → **Replace ignition switch.**

OK

8	**Check for open circuit in harness and connector between ignition switch and EFI main relay (Marking: EFI), and EFI main relay and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Replace ECM.

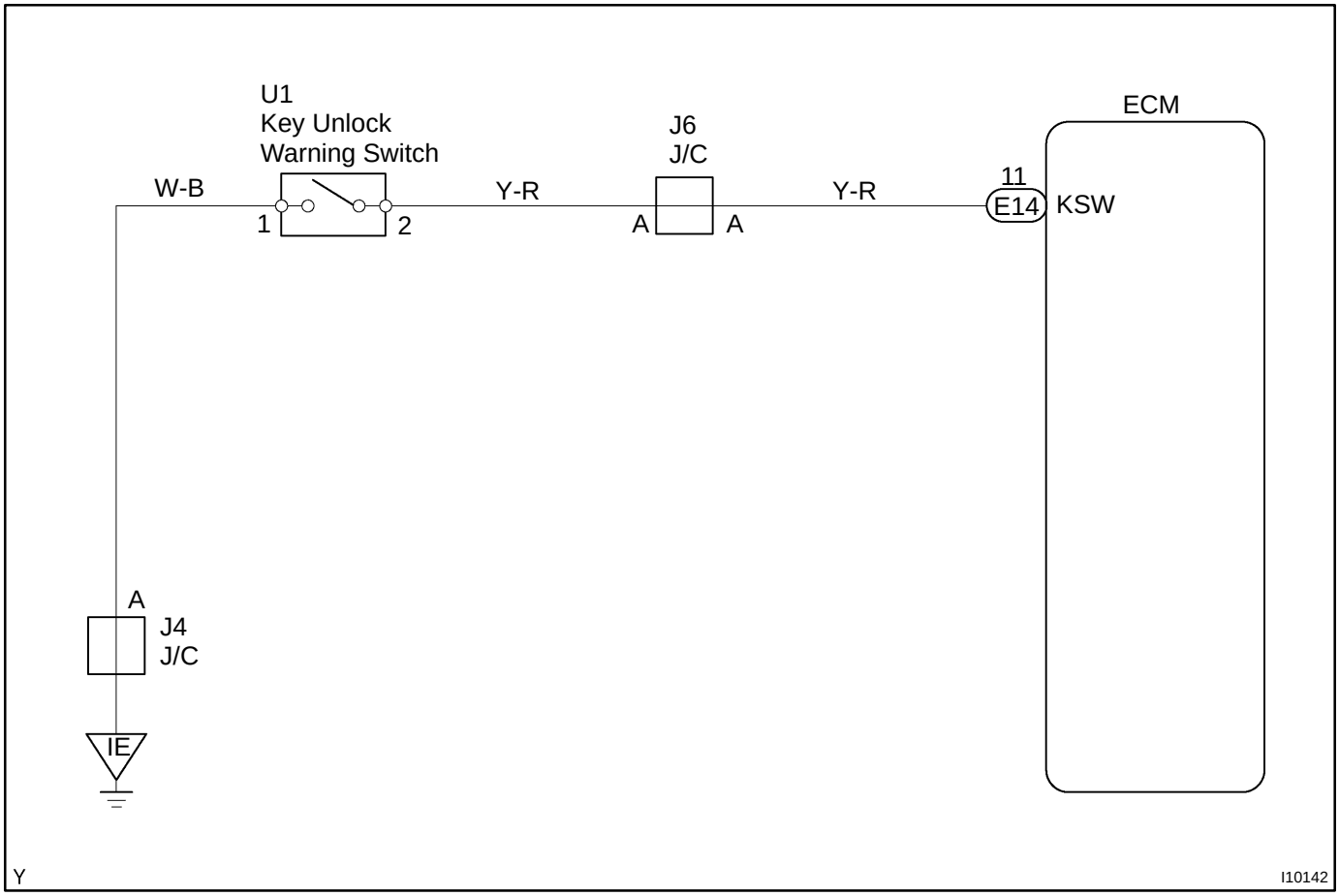
DI1KM-07

DTC	B2791/99	Key Unlock Warning SW OFF Malfunction

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
B2791/99	• Open circuit in key unlock warning switch circuit • Key unlock warning switch adheres to OFF position	• Key unlock warning switch • Wire harness • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check key unlock warning switch (See page BE-12).

NG → Replace key unlock warning switch.

OK

2	Check harness and connector between key unlock warning switch and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

Replace ECM

DI1KN-07

DTC	B2795/99	Unmatched Key Code

CIRCUIT DESCRIPTION

This DTC is output when an unregistered key is inserted. When this DTC is output, delete DTC and insert the key that a customer keeps to check that B2795 is output.
When a key that outputs B2795 is found, register this key. when B2795 is not output, there is a possibility that the unregistered key has been inserted before (ECM is normal.).
Inquire a customer the condition of using the system to find the cause of the trouble.
(Example: Another key has been inserted, etc.)

DTC No.	DTC Detection Condition	Trouble Area
B2795/99	No communication	• Key • Unregistered key inserted before

INSPECTION PROCEDURE

1	**Delete DTC and insert all the presently available keys to check whether the engine starts or not.**

HINT:
When inserting the key that does not start the engine, DTC (B2795) is stored in memory.

RESULT:

OK	All keys starts the engine
NG	A specific key does not start the engine

OK → **No problem.**

HINT:
If the result is ”OK”, please confirm whether or not customers have ever inserted the unregistered key or the immobiliser key (with transponder chip) of other vehicle in the ignition key cylinder, and find out the cause of detecting DTC.

NG

Register key that does not start engine.

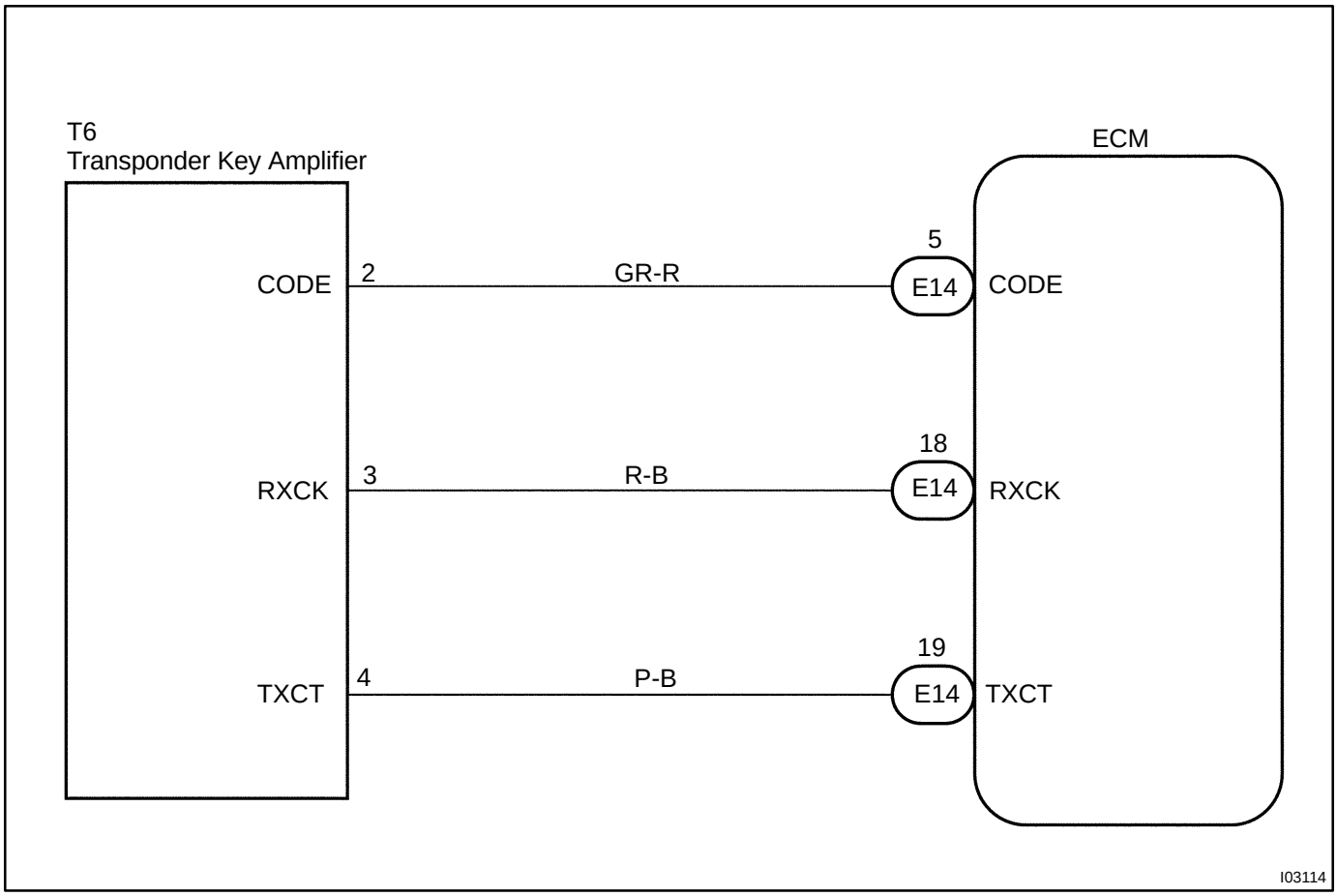
DI1KO-09

DTC	B2796/99	No Communication in Immobiliser System

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
B2796/99	No communication	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transponder key coil (See page BE-172).

NG → Replace transponder key coil.

OK

2	Check harness and connector between transponder key amplifier and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

3	Does it operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

Replace ECM.

DI1KP-10

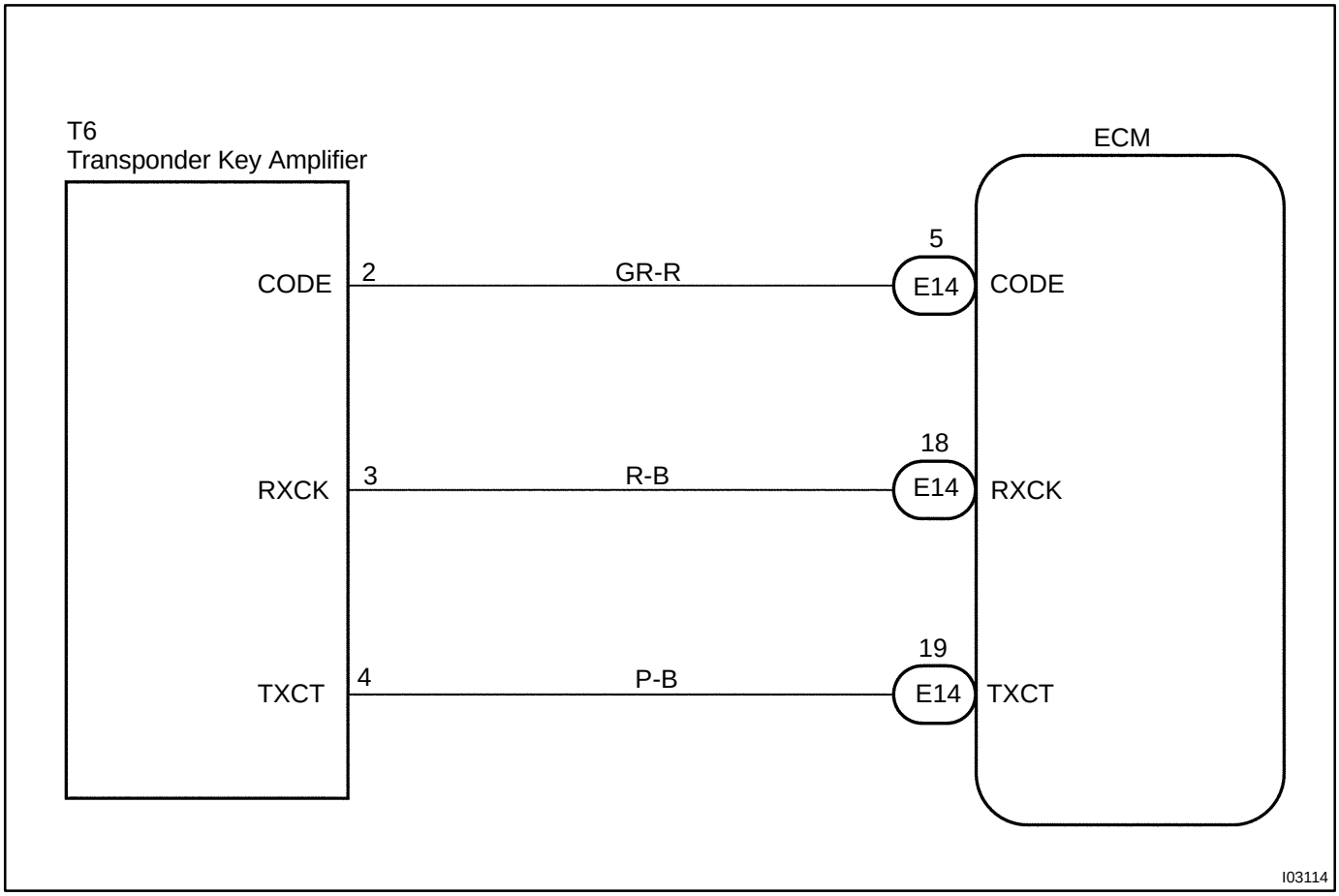
DTC	B2797/99	Communication Malfunction No. 1

CIRCUIT DESCRIPTION

This code is detected when although the communication has been performed normally, an error occurs. (Example: Some noise is included in communication line.)

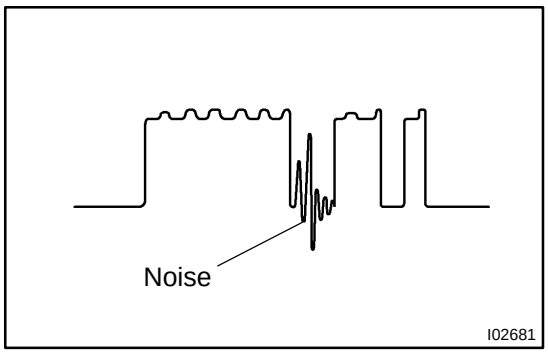
DTC No.	DTC Detection Condition	Trouble Area
B2797/99	Communication error	• Wire harness • Transponder key amplifier • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check noise.**



PREPARATION:
Insert already registered master key in the key cylinder.
CHECK:
Using an oscilloscope or TOYOTA hand-held tester, check that noise is included in terminal CODE of the ECM.
OK:
No noise is detected.

NG → **Try to find cause of noise and remove it.**

OK

2	**Does it operate normally after replacement of transponder key amplifier?**

Yes → **Replace transponder key amplifier.**

No

Replace ECM.

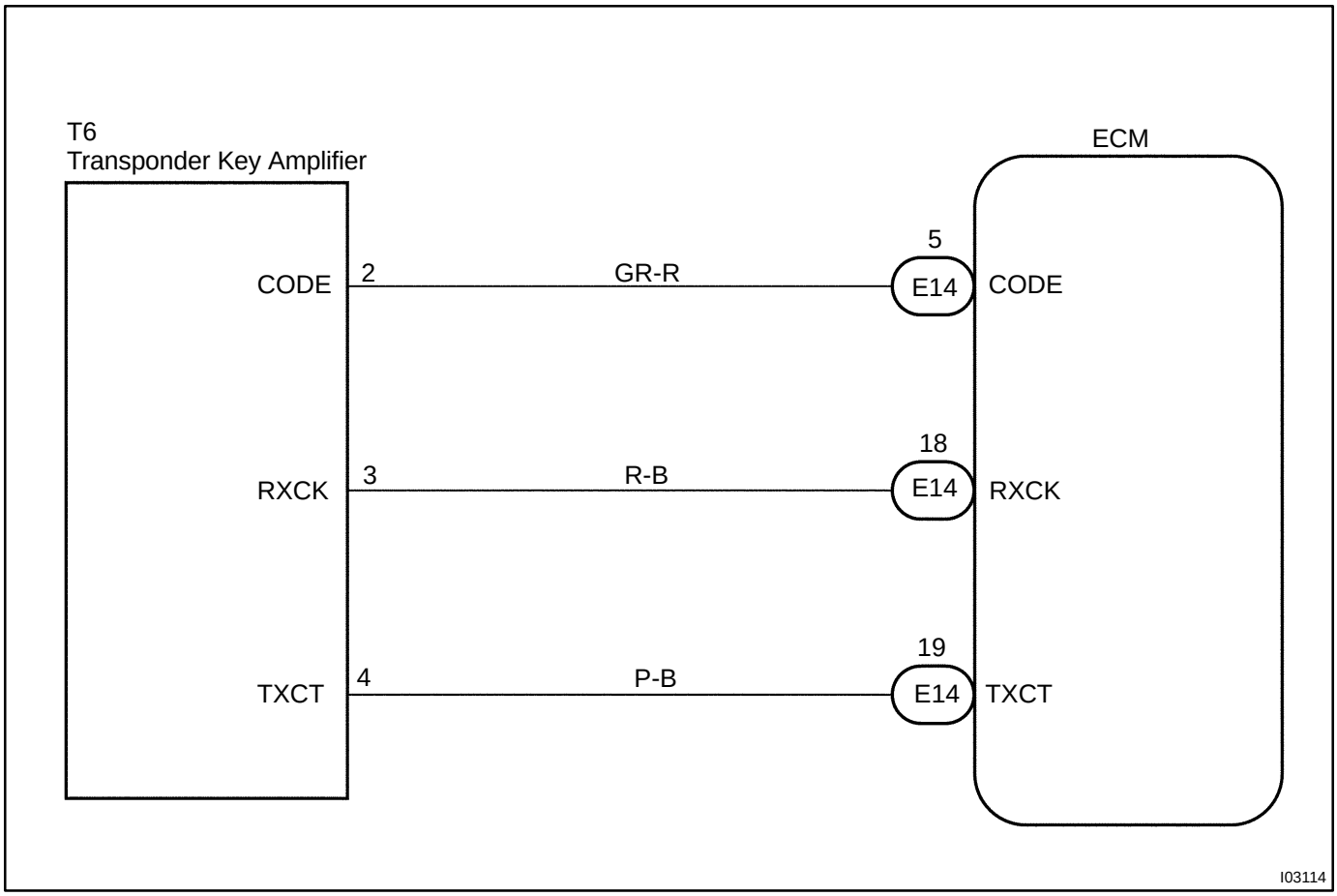
DI1KQ-08

DTC	B2798/99	Communication Malfunction No. 2

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
B2798/99	Communication error	• Key • Transponder key coil • Transponder key amplifier • Wire harness • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check transponder key coil (See page BE-172).

NG → Replace transponder key coil.

OK

2	Check harness and connector between transponder key amplifier and ECM (See page IN-28).

NG → Repair or replace harness or connector.

OK

3	Does it operate normally after replacement of transponder key amplifier?

Yes → Replace transponder key amplifier.

No

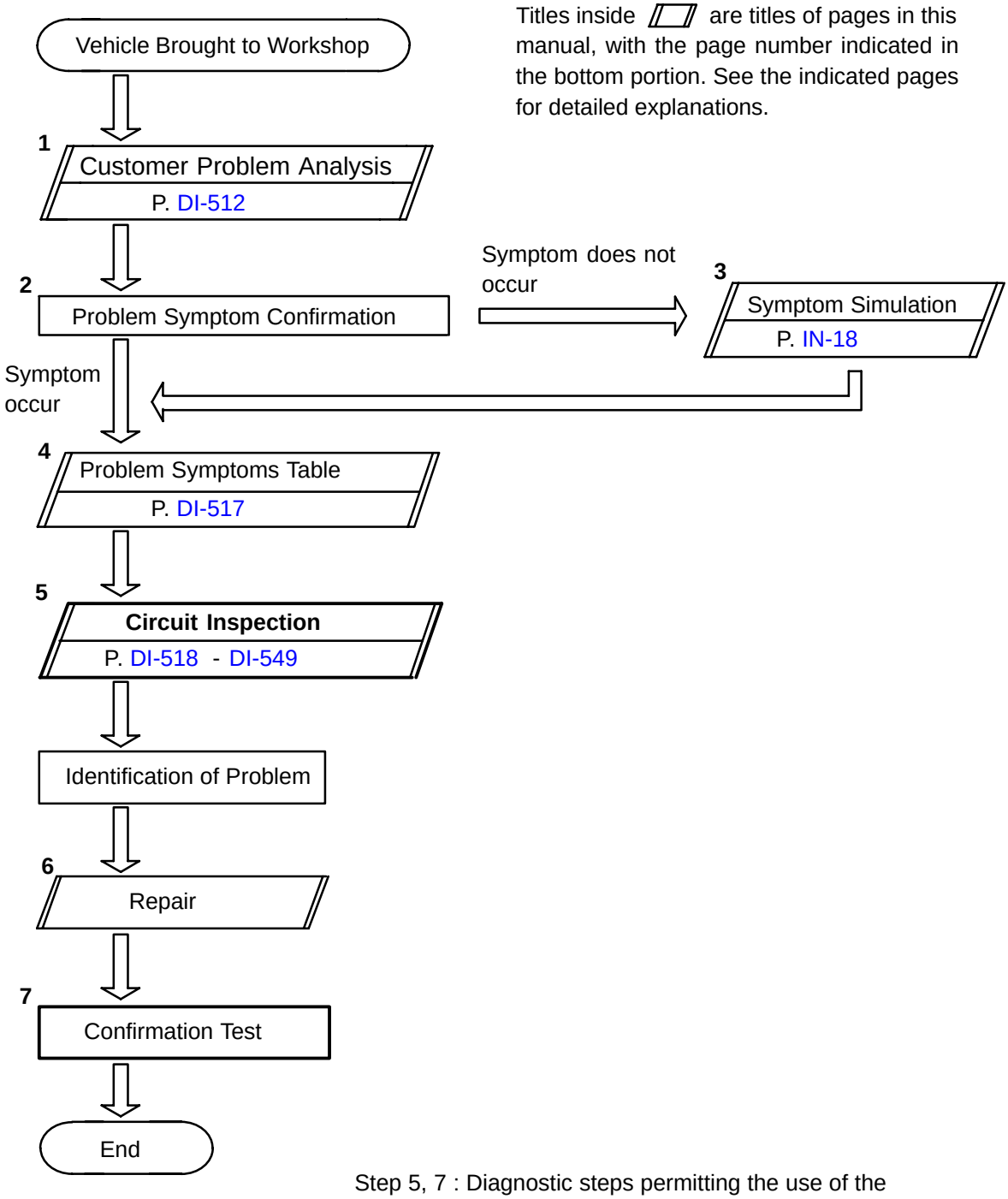
Replace ECM.

BODY CONTROL SYSTEM

HOW TO PROCEED WITH TROUBLESHOOTING

DI1OD-09

Titles inside ▱ are titles of pages in this manual, with the page number indicated in the bottom portion. See the indicated pages for detailed explanations.



Step 5, 7 : Diagnostic steps permitting the use of the TOYOTA hand-held tester .

DI1OE-09

CUSTOMER PROBLEM ANALYSIS CHECK

BODY CONTROL SYSTEM Check Sheet

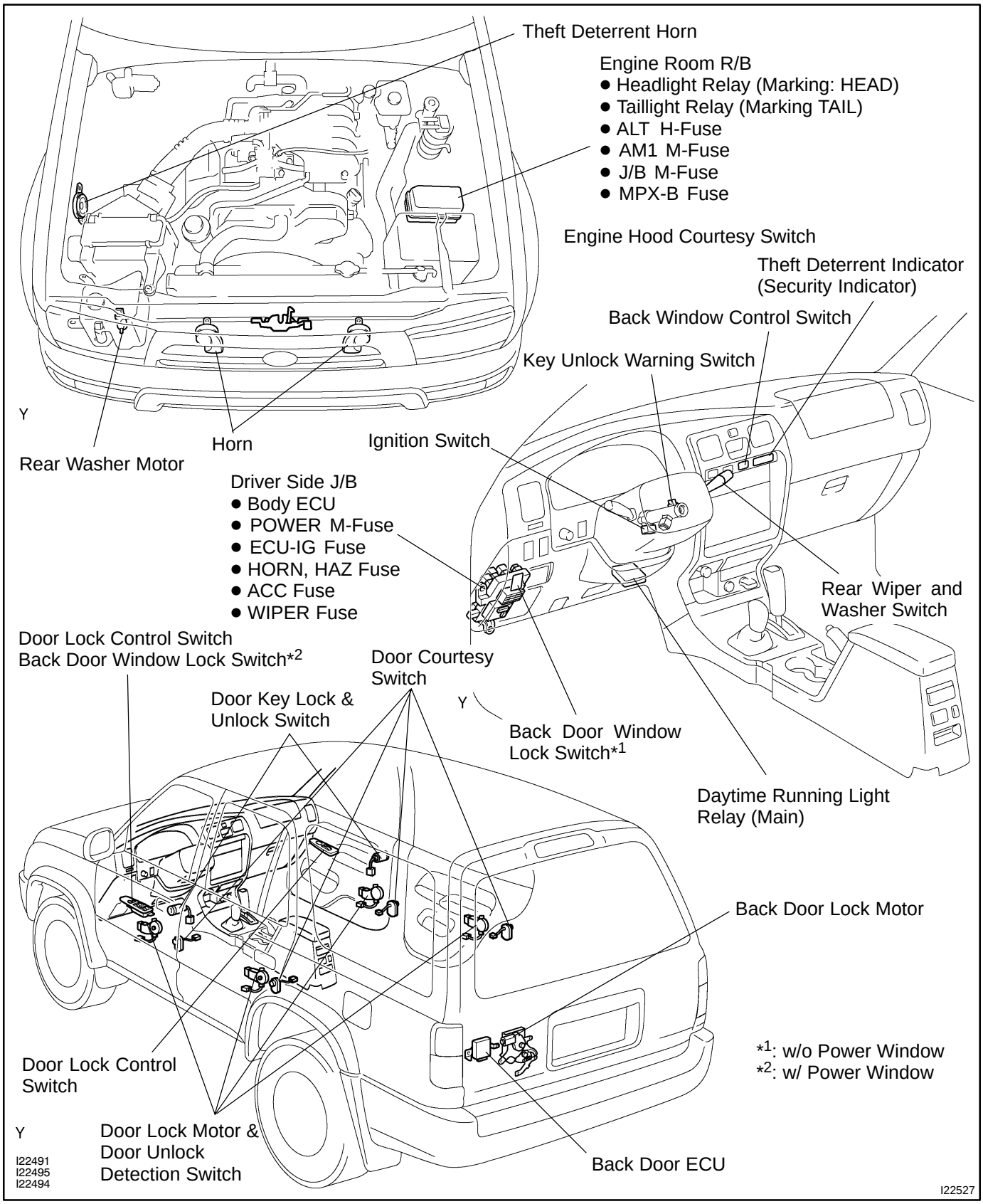
Inspector's name: _____

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		☐ Constant ☐ Sometimes (times per day, month) ☐ Once only
Weather Conditions When Problem Occurred	**Weather**	☐ Fine ☐ Cloudy ☐ Rainy ☐ Snowy ☐ Various/ Others
	Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F (°C))

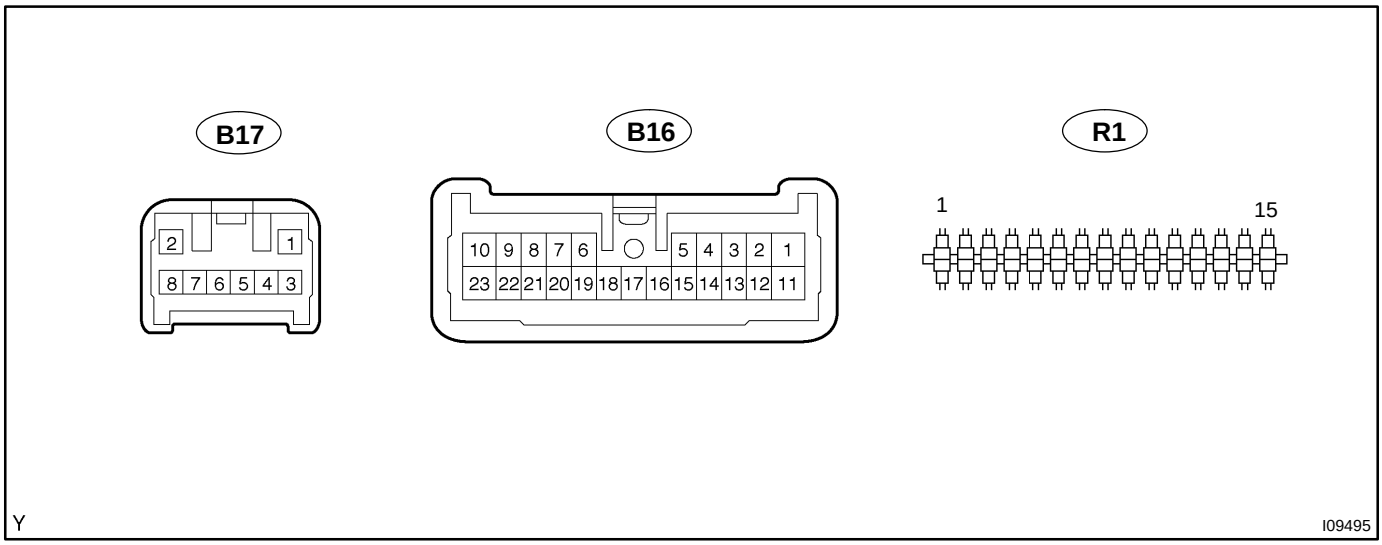
Malfunction System	☐ Rear Washer System
	☐ Defogger System
	☐ Power Door Lock Control System
	☐ Theft Deterrent System
	☐ Others

PARTS LOCATION



DI1OG-19

TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
HORN SW (B16-1) - Body ground	G-R	Horn switch OFF	10 - 14
		Horn switch ON	Below 1.0
KSW (B16-2) - Body ground	Y-R	Key unlock warning switch OFF (Key not inserted)	10 - 14
		Key unlock warning switch ON (Key inserted)	Below 1.0
DIND (B16-3) - Body ground	LG-R	Rear window defogger operating	Below 2.0
		Rear window defogger not operating	10 - 14
DOWN (B16-4) - Body ground	R-B	Back door power window switch OFF or UP position	10 - 14
		Back door power window switch DOWN position	Below 1.0
UP (B16-5) - Body ground	R	Back door power window switch OFF or DOWN position	10 - 14
		Back door power window switch UP position	Below 1.0
ACC (B16-9) - Body ground	GR	Ignition switch OFF	Below 1.0
		Ignition switch ACC or ON	10 - 14
ECU-B (B16-10) - Body ground	L-R	Constant	10 - 14
L2 (B16-11) - Body ground	BR-W	Driver and passenger door key lock & unlock switch OFF or UNLOCK position	10 - 14
		Driver or passenger door key lock & unlock switch LOCK position	Below 1.0
UL2 (B16-12) - Body ground	G-Y	Passenger door key lock & unlock switch OFF or LOCK position	10 - 14
		Passenger door key lock & unlock switch UNLOCK position	Below 1.0
UL3 (B16-13) - Body ground	L-B	Driver door key lock & unlock switch OFF or LOCK position	10 - 14
		Driver door key lock & unlock switch UNLOCK position	Below 1.0
LSWP (B16-14) - Body ground	L-Y	Driver door unlock detection switch OFF (Locked)	10 - 14
		Driver door unlock detection switch ON (Unlocked)	Below 1.0
RCTY (B16-15) - Body ground	B-R	Rear door courtesy switch OFF (Closed)	10 - 14
		Any rear door courtesy switch ON (Open)	Below 1.0
PCTY (B16-16) - Body ground	B-W	Passenger door courtesy switches OFF (Closed)	10 - 14
		Passenger door courtesy switch ON (Open)	Below 1.0
LSWD (B16-17) - Body ground	R-L	Driver door unlock detection switch OFF (Locked)	10 - 14
		Driver door unlock detection switch ON (Unlocked)	Below 1.0

DEF SW (B16-18) - Body ground	LG-B	Rear defogger switch OFF	10 - 14
		Rear defogger switch ON	Below 1.0
DCTY (B16-19) - Body ground	B	Driver door courtesy switch OFF (Closed)	10 - 14
		Driver door courtesy switch ON (Open)	Below 1.0
R/W ON (B16-20) - Body ground	GR-G	Rear wiper switch OFF or INT	10 - 14
		Rear wiper switch ON	Below 1.0
R/W INT (B16-21) - Body ground	GR-R	Rear wiper switch OFF or ON	10 - 14
		Rear wiper switch INT	Below 1.0
B/D CTY (B16-22) - Body ground	G-W	Back door courtesy switch OFF (Closed)	10 - 14
		Back door courtesy switch ON (Open)	Below 1.0
ACTD (B16-23) - Body ground	B-Y	Power door lock operating to LOCK	10 - 14
		Power door lock not operating or operating to UNLOCK	Below 1.0
SEC IND (B17-1) - Body ground	L	Security indicator light lights up	10 - 14
		Security indicator dies not light up	Below 1.0
SH (B17-2) - Body ground	R-W	Security horn sounding	10 - 14
		Security horn not sounding	Below 1.0
HRY (B17-3) - Body ground	R*2 G*3	Headlight relay OFF	10 - 14
		Headlight relay ON	Below 1.0
TRY (B17-4) - Body ground	R-G	Taillight relay OFF	10 - 14
		Taillight relay ON	Below 1.0
HOOD SW (B17-7) - Body ground	G-O	Hood courtesy switch OFF (Closed)	10 - 14
		Hood courtesy switch ON (Open)	Below 1.0
LSWR (B17-8) - Body ground	LG	Rear door unlock detection switch OFF (Locked)	10 - 14
		Rear door unlock detection switch ON (Unlocked)	Below 1.0
HORN (R1-1) - GND (R1-8)	-	Horn switch OFF	Below 1.0
		Horn switch ON	10 - 14
POWER (R1-3) - GND (R1-8)	-	Constant	10 - 14
P/W (R1-2) - GND (R1-8)	-	Ignition switch OFF or ACC*1	Below 1.0
		Ignition switch ON	10 - 14
DEF (R1-4) - GND (R1-8)	-	Rear defogger not operating	10 - 14
		Rear defogger operating	Below 1.0
HAZ (R1-7) - GND (R1-8)	-	Constant	10 - 14
GND (R1-8) - Body ground	-	Constant	Below 1.0
WIP (R1-9) GND (R1-8)	-	Ignition switch OFF or ACC	Below 1.0
		Ignition switch ON	10 - 14
ECU-IG (R1-10) - GND (R1-8)	-	Ignition switch OFF or ACC	Below 1.0
		Ignition switch ON	10 - 14
L1 (R1-11) - GND (R1-8)	-	Driver or passenger door lock control switch OFF or UNLOCK	10 - 14
		Driver or passenger door lock control switch LOCK	Below 1.0
UL1 (R1-12) - GND (R1-8)	-	Driver or passenger door lock control switch OFF or LOCK	10 - 14
		Driver or passenger door lock control switch UNLOCK	Below 1.0
WMTR (R1-13) - GND (R1-8)	-	Rear washer switch OFF	10 - 14
		Rear washer switch ON	Below 1.0
ACT+ (R1-14) - GND (R1-8)	-	Power door lock not operating or operating to UNLOCK	Below 1.0
		Power door lock operating to LOCK	10 - 14

ACT- (R1-15) - GND (R1-8)	-	Power door lock not operating or operating to LOCK	Below 1.0
		Power door lock operating to UNLOCK twice	10 - 14

*1 (Exceptions): During 60 seconds after the ignition switch is turned ON to OFF (ACC) or until driver or passenger door is opened after the ignition switch is turned ON to OFF (ACC).
*2: w/o Daytime running light
*3: w/ Daytime running light

DI56V-03

PROBLEM SYMPTOMS TABLE

DOOR LOCK CONTROL

Symptom	Suspect Area	See page
Lock or unlock cannot be operated with door lock control switch	3. Door lock control switch circuit (D or P) 4. Body ECU	DI-533 IN-28
Door key linked function does not operate	1. Door key lock and unlock switch circuit (D or P) 2. Body ECU	DI-535 IN-28
Key confinement prevention function does not operate	1. Key unlock warning switch circuit 2. Body ECU	DI-527 IN-28

THEFT DETERRENT SYSTEM

Symptom	Suspect Area	See page
No alerting condition is operated (System cannot be set)	1. Security indicator circuit 2. Key unlock warning switch circuit 3. Courtesy switch circuit 4. Door unlock detection switch circuit 5. Engine hood courtesy switch circuit 6. Back door courtesy switch circuit 7. Back door ECU 8. Body ECU	DI-543 DI-527 DI-539 DI-533 DI-541 DI-562 IN-28 IN-28
Cannot be canceled when ignition switch is ON with a key	1. Key unlock warning switch circuit 2. Ignition switch 3. Body ECU	DI-527 BE-12 IN-28
Cannot be canceled when unlocking the back door with a key	1. Back door courtesy switch circuit 2. Body ECU	DI-562 IN-28
Some of the system does not operate (Headlight does not light up)	1. Headlight relay circuit 2. Body ECU	DI-526 IN-28
Taillight does not light up	1. Taillight relay circuit 2. Body ECU	DI-525 IN-28
Theft deterrent horn or horn does not sound	1. Security horn circuit 2. Horn circuit 3. Body ECU	DI-547 DI-545 IN-28
During warning condition, cannot be canceled by unlocking the door with a key	1. Door key lock and unlock switch circuit 2. Body ECU	DI-535 IN-28
During warning condition, cannot be canceled by unlocking the door with a key (Transmitter)	1. Transmitter 2. Back door ECU 3. Body ECU	BE-93 IN-28 IN-28
During warning condition, cannot be cancelled by turning the ON with a key	1. Ignition switch 2. Key unlock warning switch circuit 3. Body ECU	BE-12 DI-527 IN-28
The system operated for more 60 records	1. Body ECU	IN-28

DI56W-03

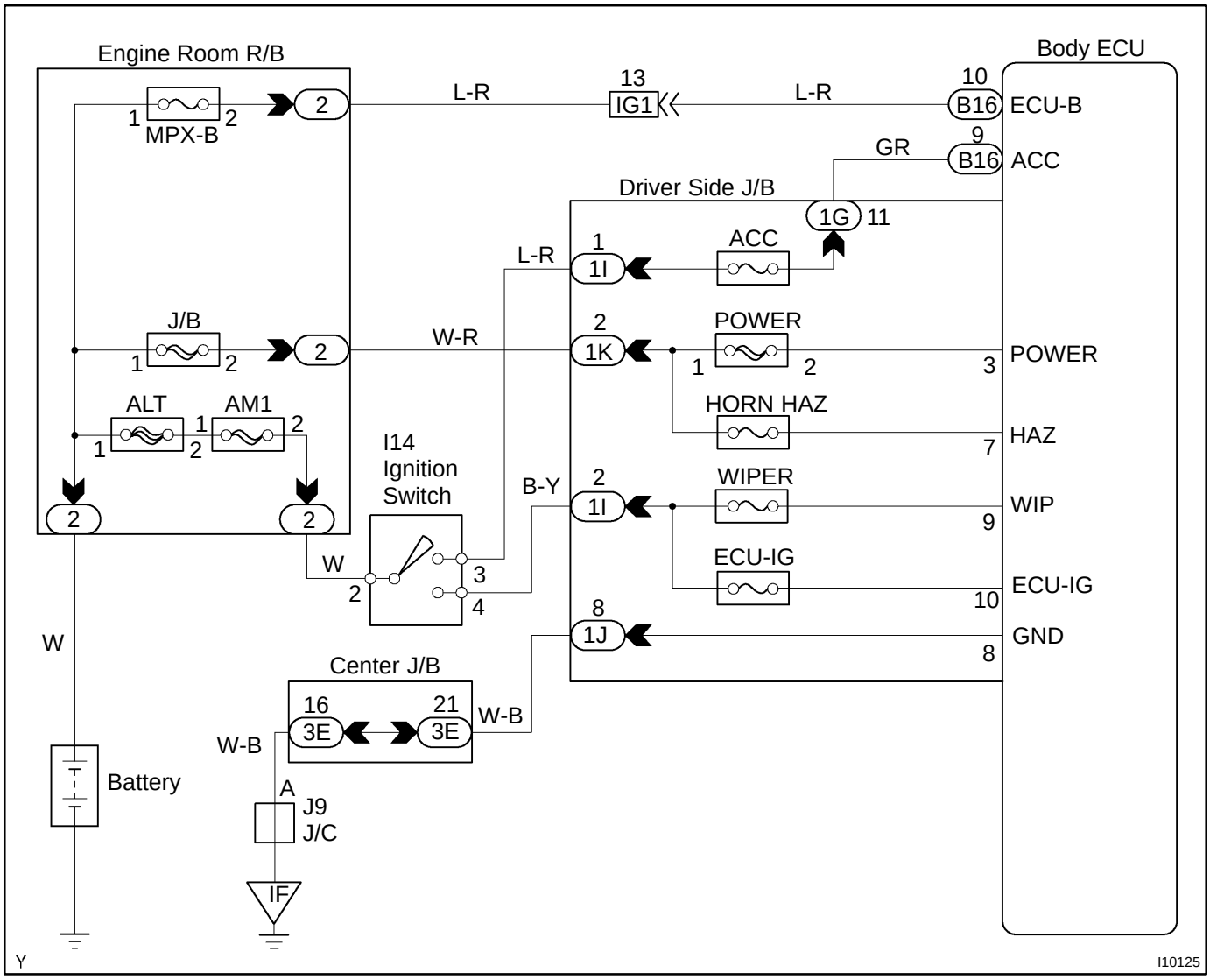
CIRCUIT INSPECTION

Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the body ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check POWER M-fuse, WIPER, ACC, HORN, HAZ, MPX-B and ECU-IG fuses.**

CHECK:

Check the continuity of the POWER M-fuse, the WIPER, ACC, HORN, HAZ, MPX-B and ECU-IG fuses.

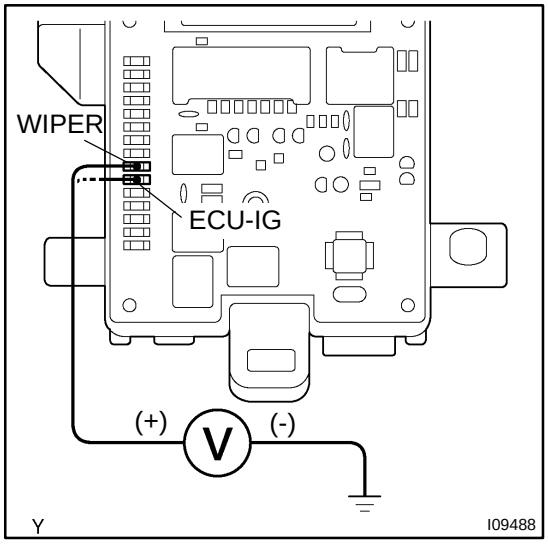
OK:

Continuity

NG → **Replace failure fuse.**

OK

2	**Check voltage between terminals WIPER, ACC, HORN, HAZ, POWER, ECU-B, ECU-IG and GND of body ECU connector and body ground.**



PREPARATION:

(a) Disconnect the 2 connectors and remove the cover.

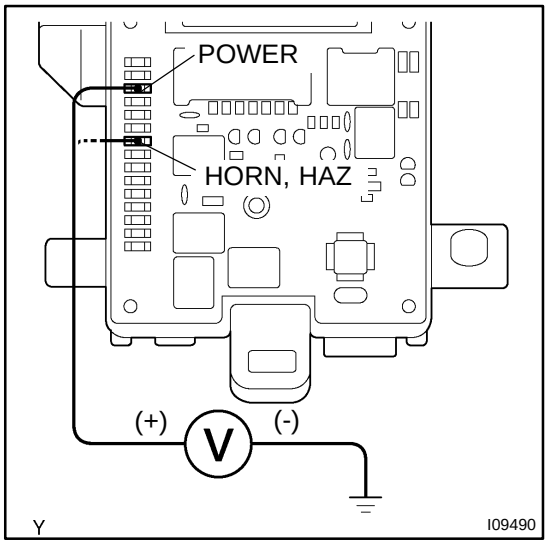
(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals WIPER, ECU-IG and body ground.

OK:

Voltage: 10 - 14 V



PREPARATION:

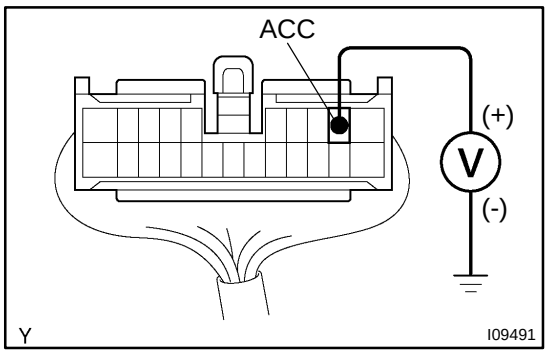
Turn the ignition switch OFF.

CHECK:

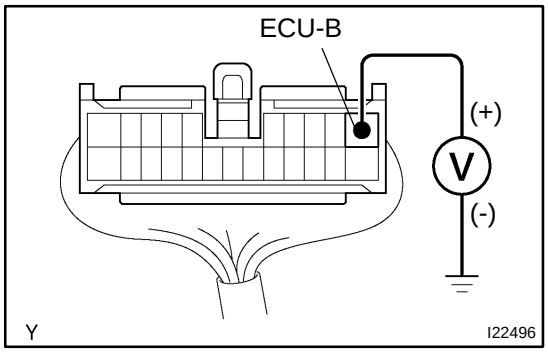
Measure the voltage between terminals HORN, HAZ, POWER and body ground.

OK:

Voltage: 10 - 14 V



PREPARATION:
Turn the ignition switch ON.
CHECK:
Measure the voltage between terminal ACC and body ground.
OK:
Voltage: 10 - 14 V

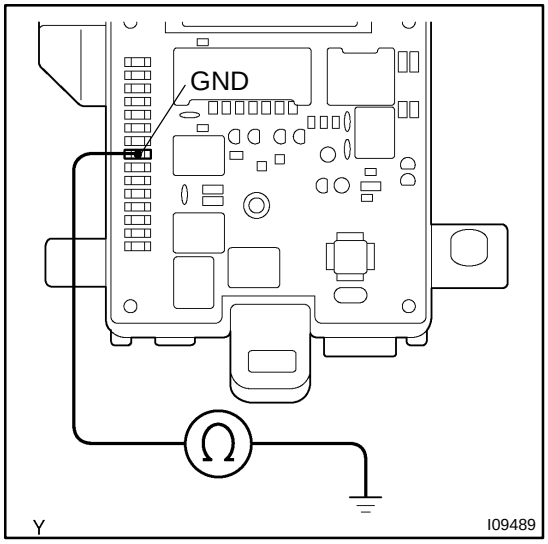


PREPARATION:
Turn the ignition switch OFF.
CHECK:
Measure the voltage between terminal ECU- B and body ground.
OK:
Voltage: 10 - 14 V

NG → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).**

OK

3	**Check continuity between terminal GND and body ground.**



PREPARATION:
Disconnect the 2 connectors and remove the cover.
CHECK:
Check the continuity between terminal GND and body ground.
OK:
Continuity

NG → **Repair or replace driver side J/B, harness or connector.**

OK

Replace driver side J/B.

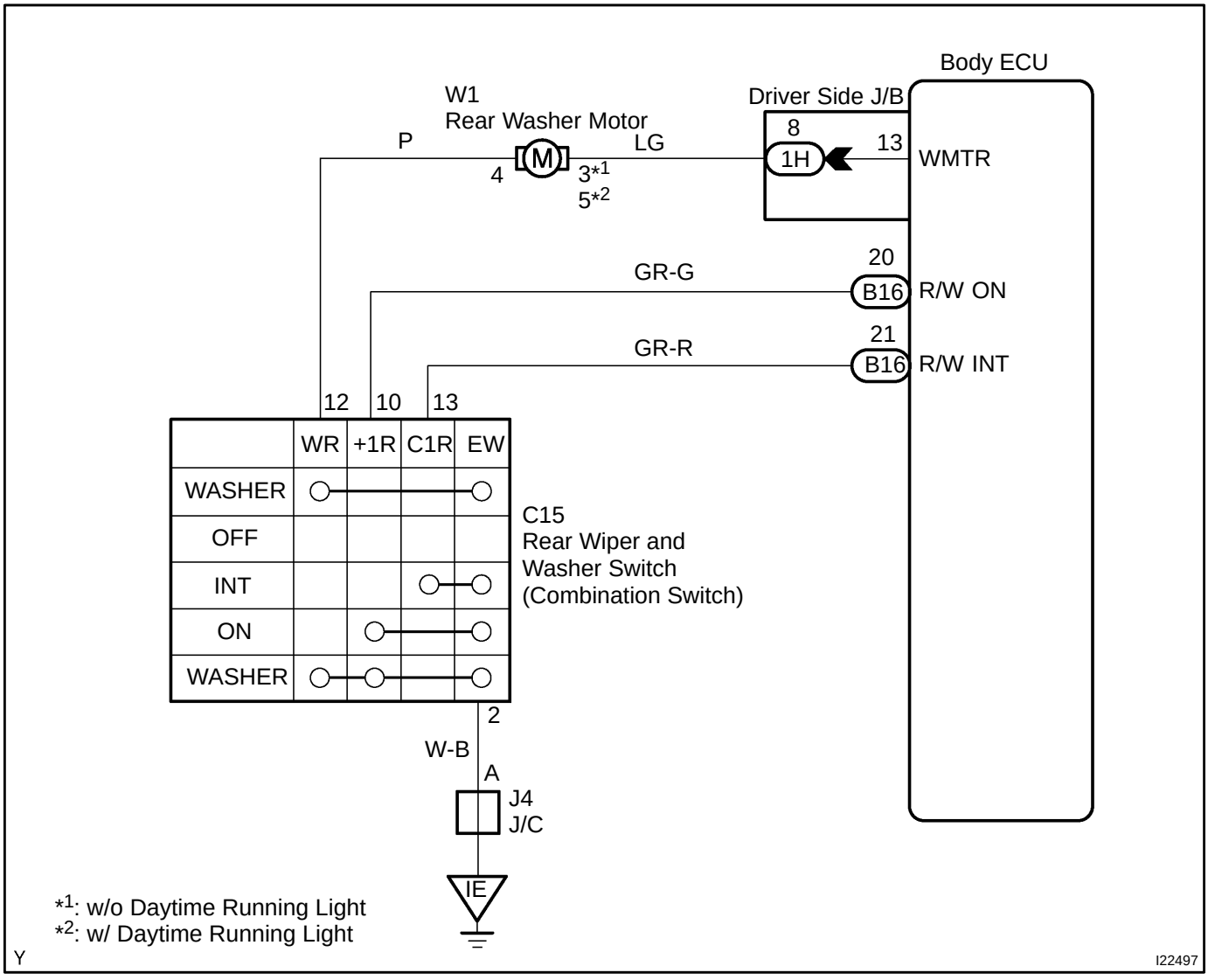
DI56X-05

Rear Wiper Switch Circuit

CIRCUIT DESCRIPTION

Body ECU judges the switch position with the terminal voltage of the rear wiper switch and runs the wiper motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper and washer switch (See page BE-34).

NG → Replace rear wiper and washer switch.

OK

2	Check harness and connector between rear wiper and washer switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

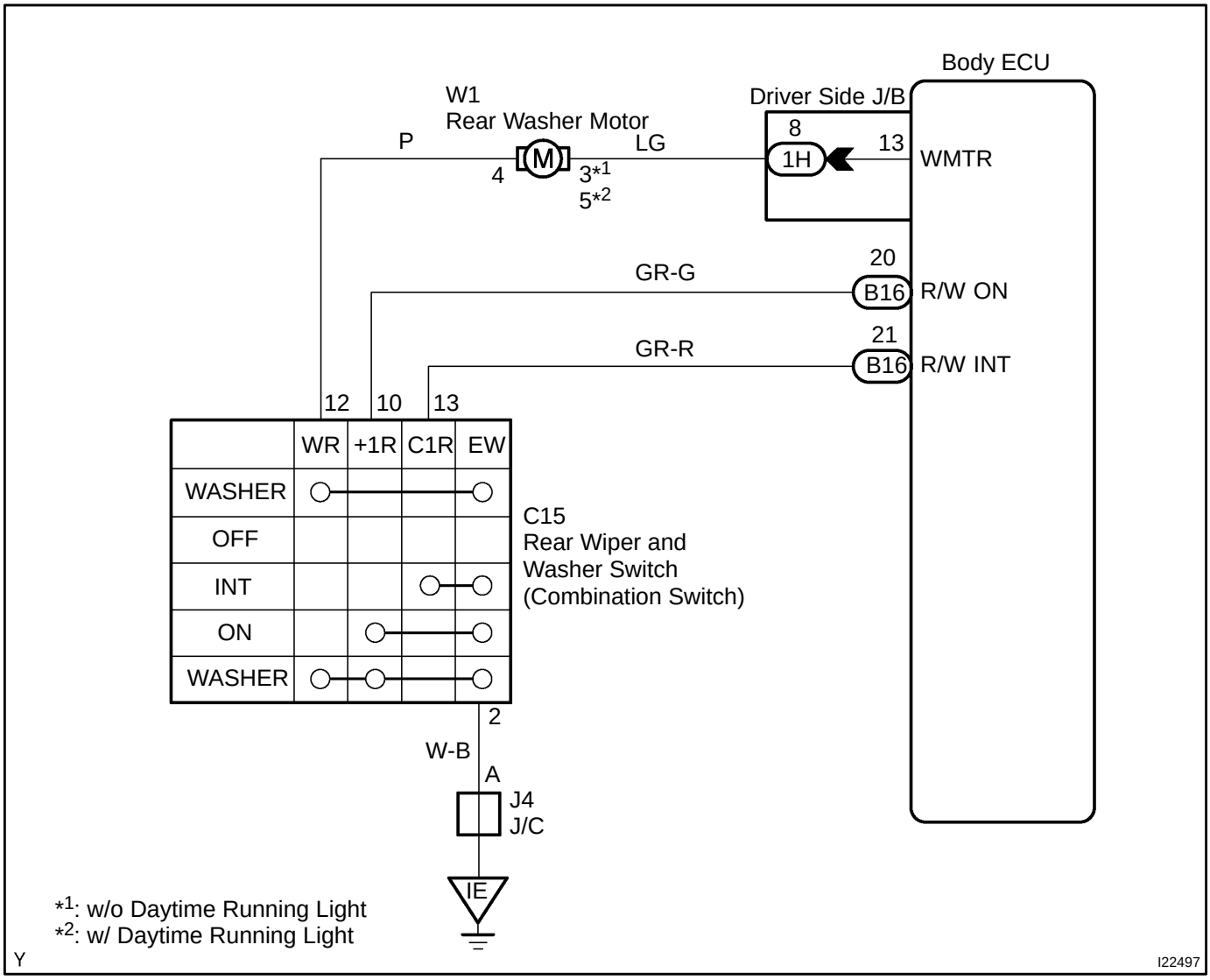
DI56Y-05

Rear Washer Motor Circuit

CIRCUIT DESCRIPTION

Body ECU judges the switch position with the terminal voltage of the wiper and washer switch and runs the wiper motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper and washer switch (See page BE-34).

NG → Replace rear wiper and washer switch.

OK

2	Check rear washer motor (See page BE-34).

NG → Replace wiper motor.

OK

3	Check harness and connector between rear wiper and washer switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

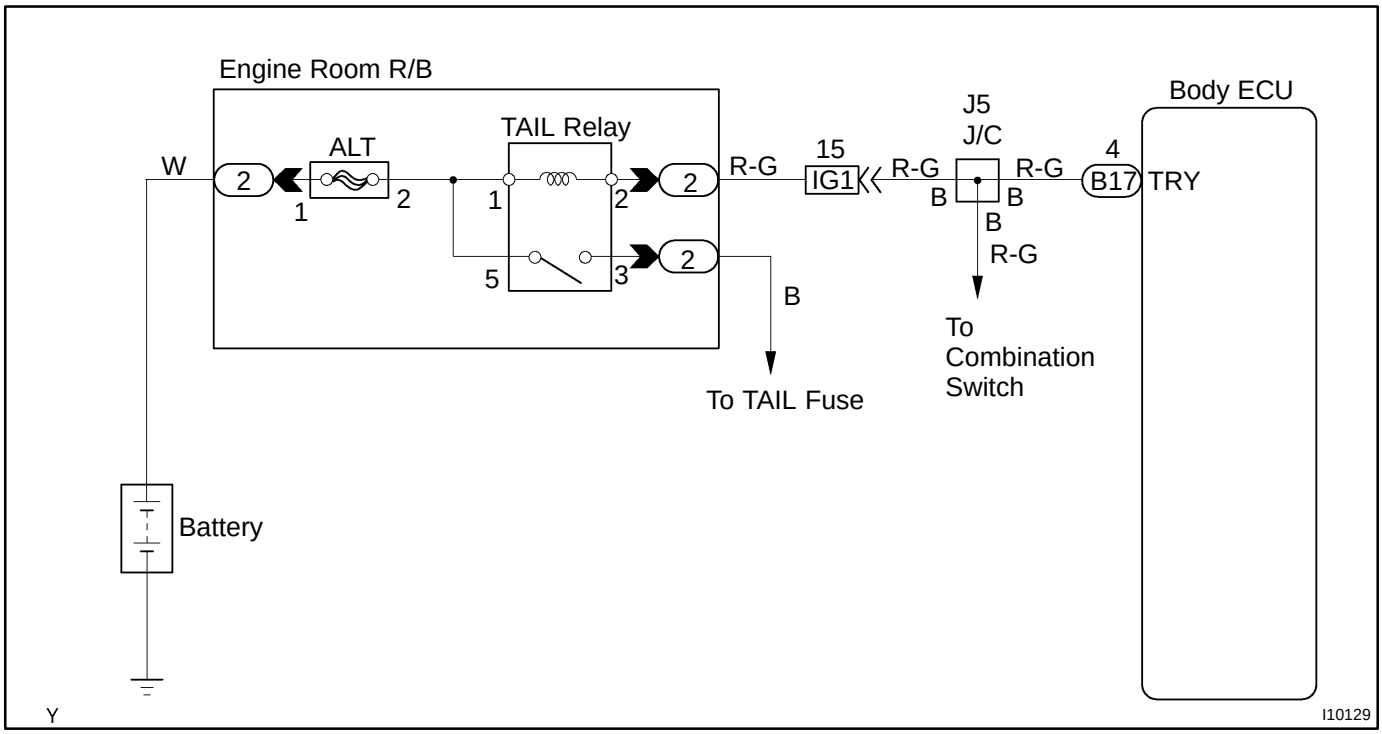
DI56Z-03

Taillight Relay Circuit

CIRCUIT DESCRIPTION

When the panic signal is received, the control of the taillight relay is performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check harness and connector between taillight relay (Marking: TAIL) and body ECU (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace body ECU.

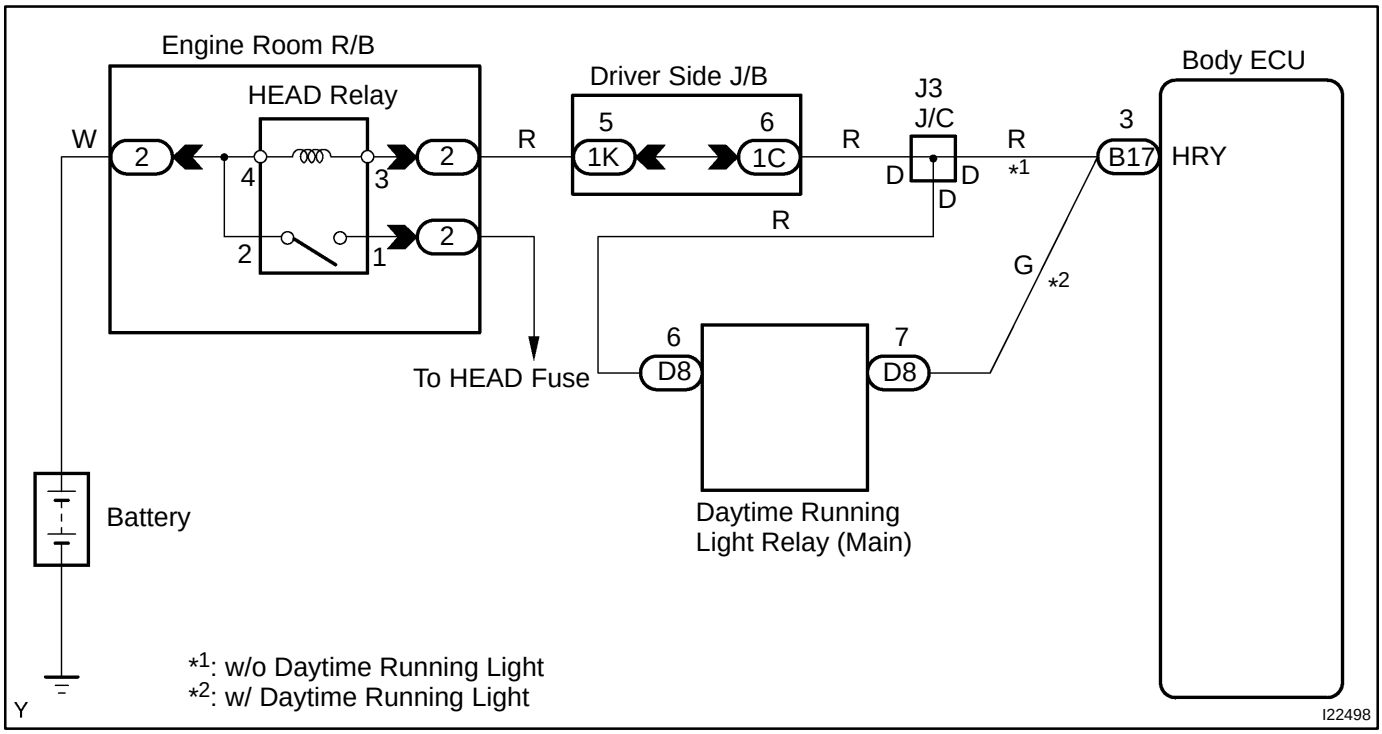
DI570-03

Headlight Relay Circuit

CIRCUIT DESCRIPTION

When the panic signal is received, the control of the headlight relay is performed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check harness and connector between headlight relay (Marking: HEAD) and body ECU, and battery and headlight relay (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace body ECU.

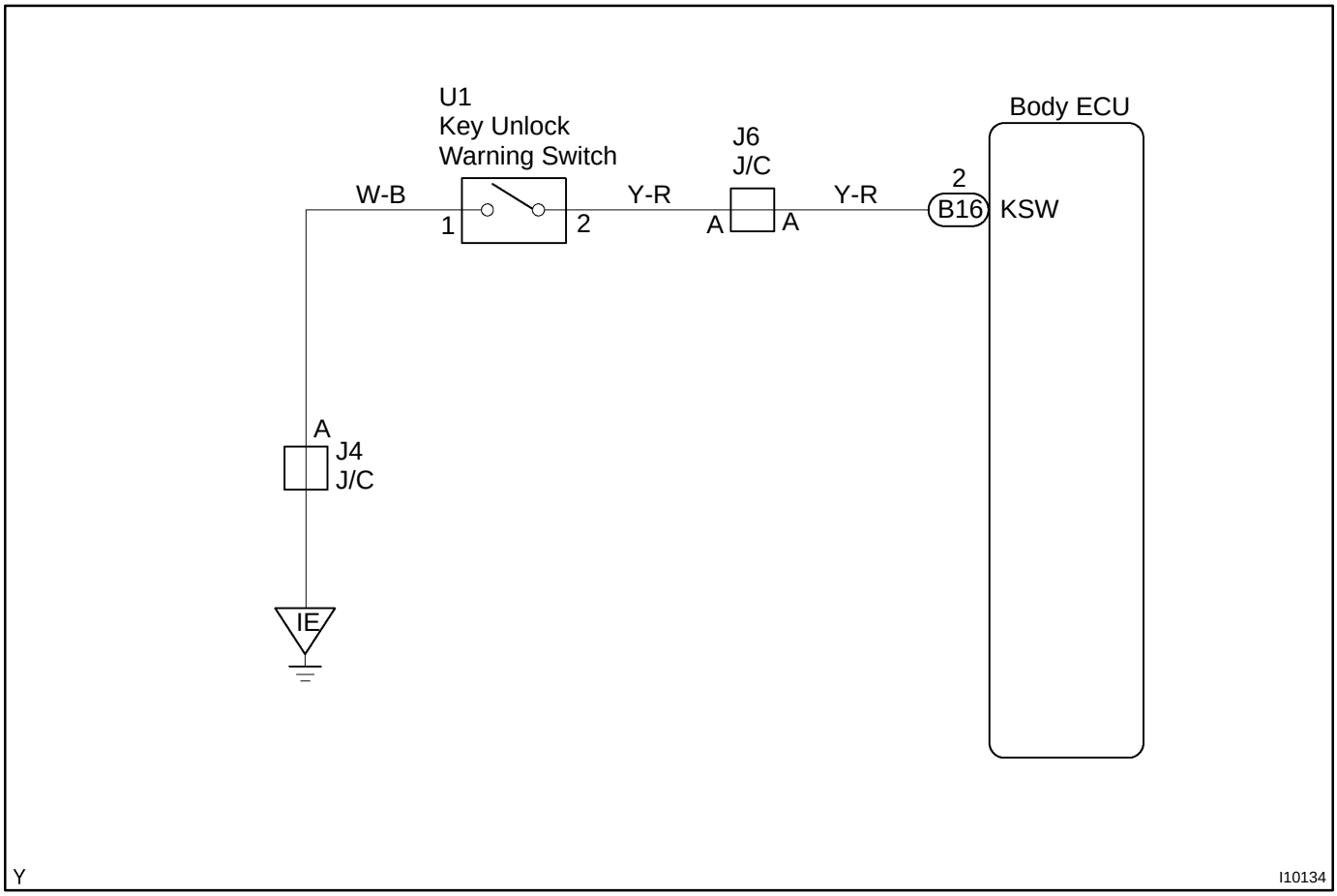
DI571-05

Key Unlock Warning Switch Circuit

CIRCUIT DESCRIPTION

The key unlock warning switch goes on when the ignition key is inserted in the key cylinder and goes off when the ignition key is removed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check key unlock warning switch (See page BE-12).

NG → Replace key unlock warning switch.

OK

2	Check harness and connector between key unlock warning switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

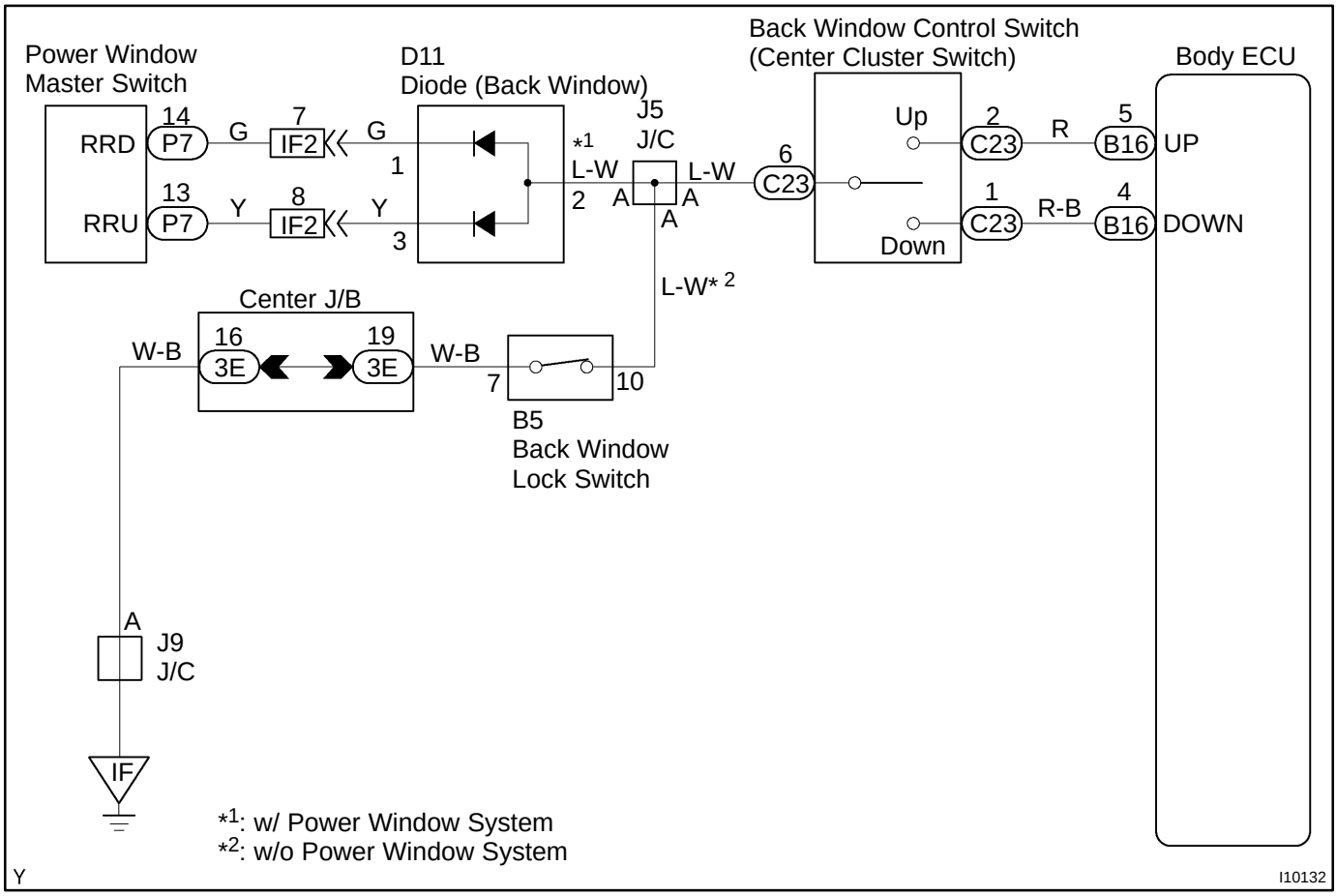
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI572-05

Back Door Power Window Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check back door power window switch (See page BE-65).

NG → Replace back door power window switch.

OK

2	Check harness and connector between power window switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

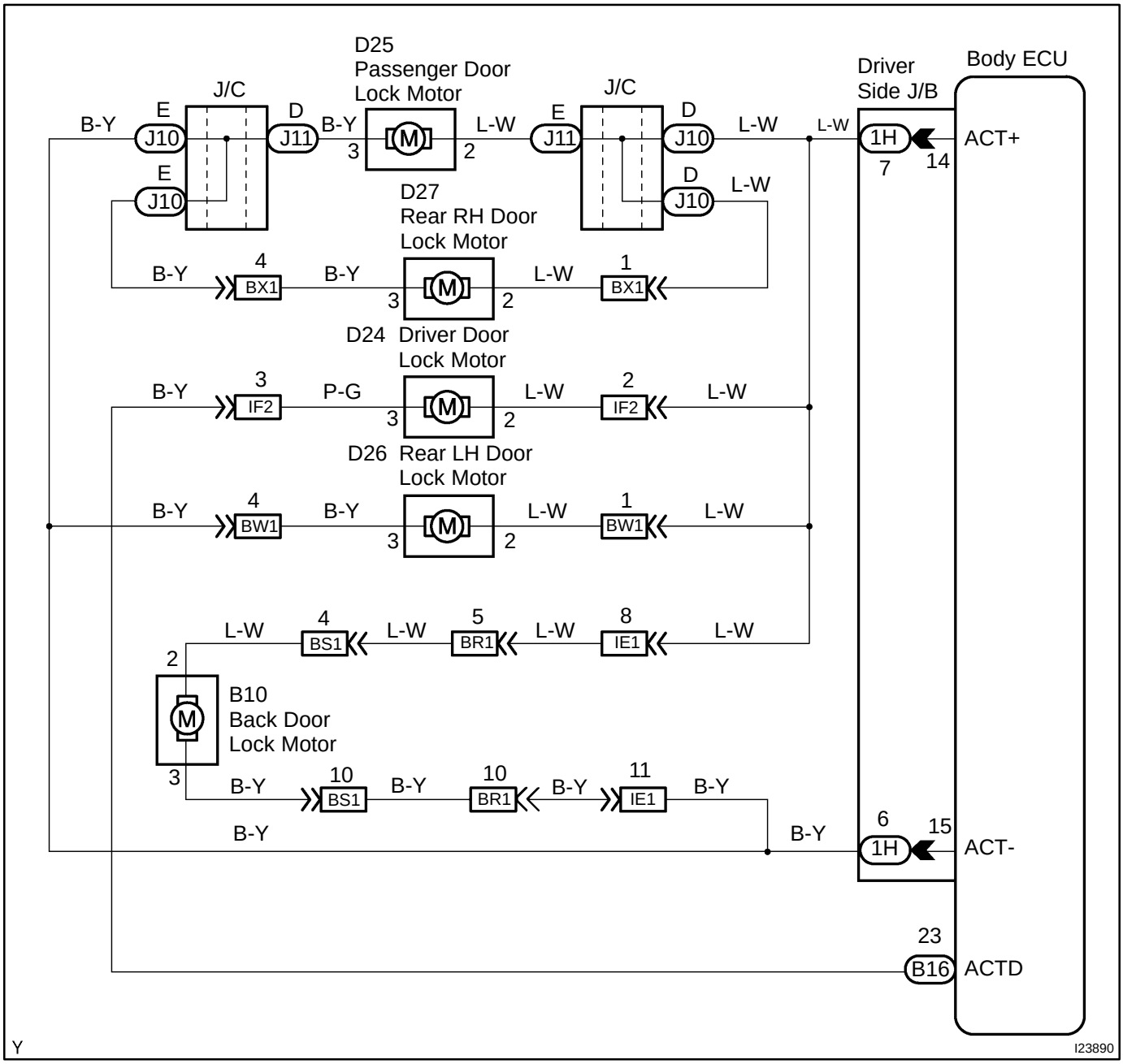
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI573-05

Door Lock Motor Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door lock motor (See page BE-76).

NG → Replace door lock motor.

OK ↓

2	Check harness and connector between door lock motor and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK ↓

Check and replace body ECU.

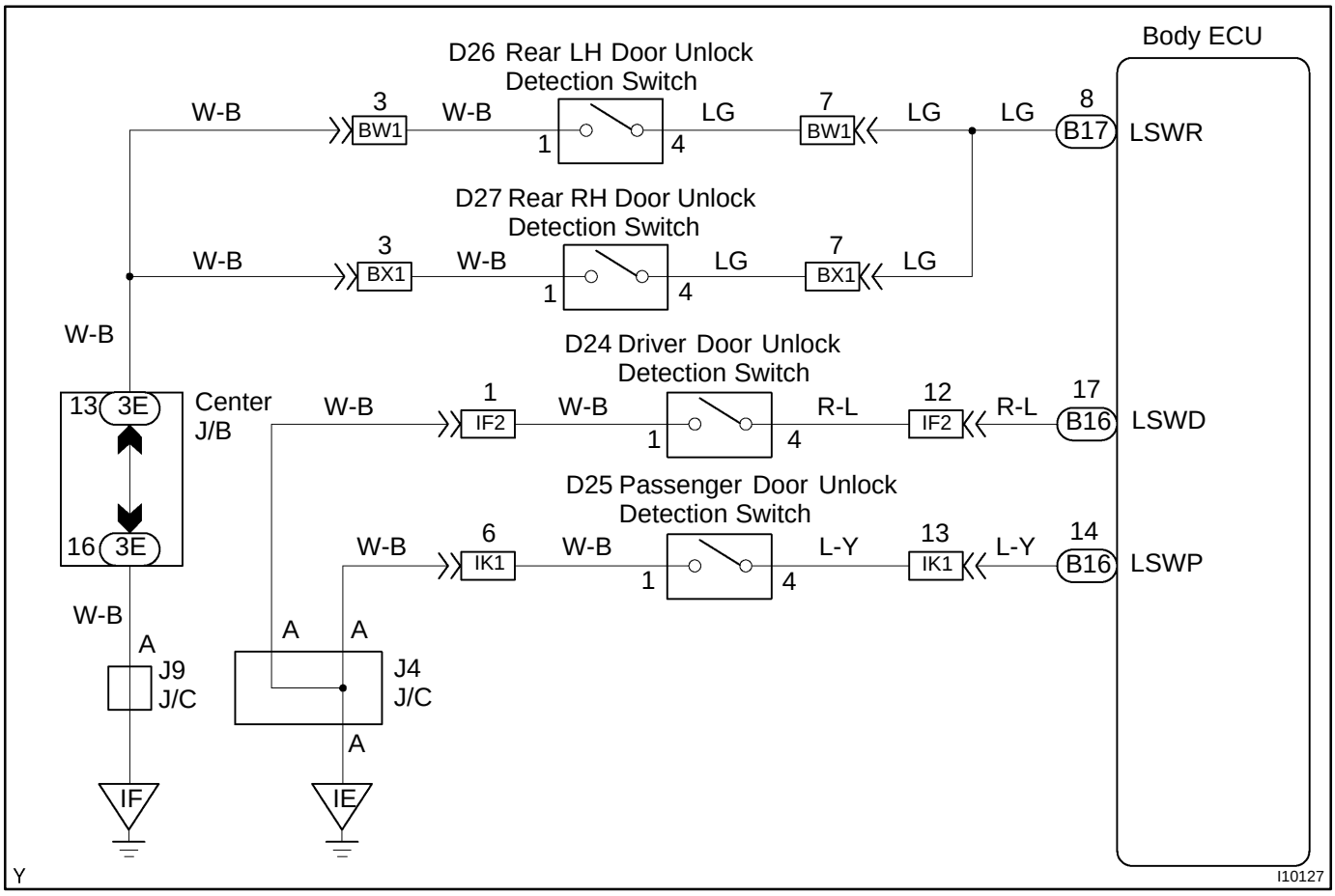
DI574-03

Door Unlock Detection Switch Circuit

CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the key confinement prevention function, wireless door lock control system and theft deterrent system.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door unlock detection switch (See page BE-76).

NG → Replace door lock motor.

OK

2	Check harness and connector between door unlock detection switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

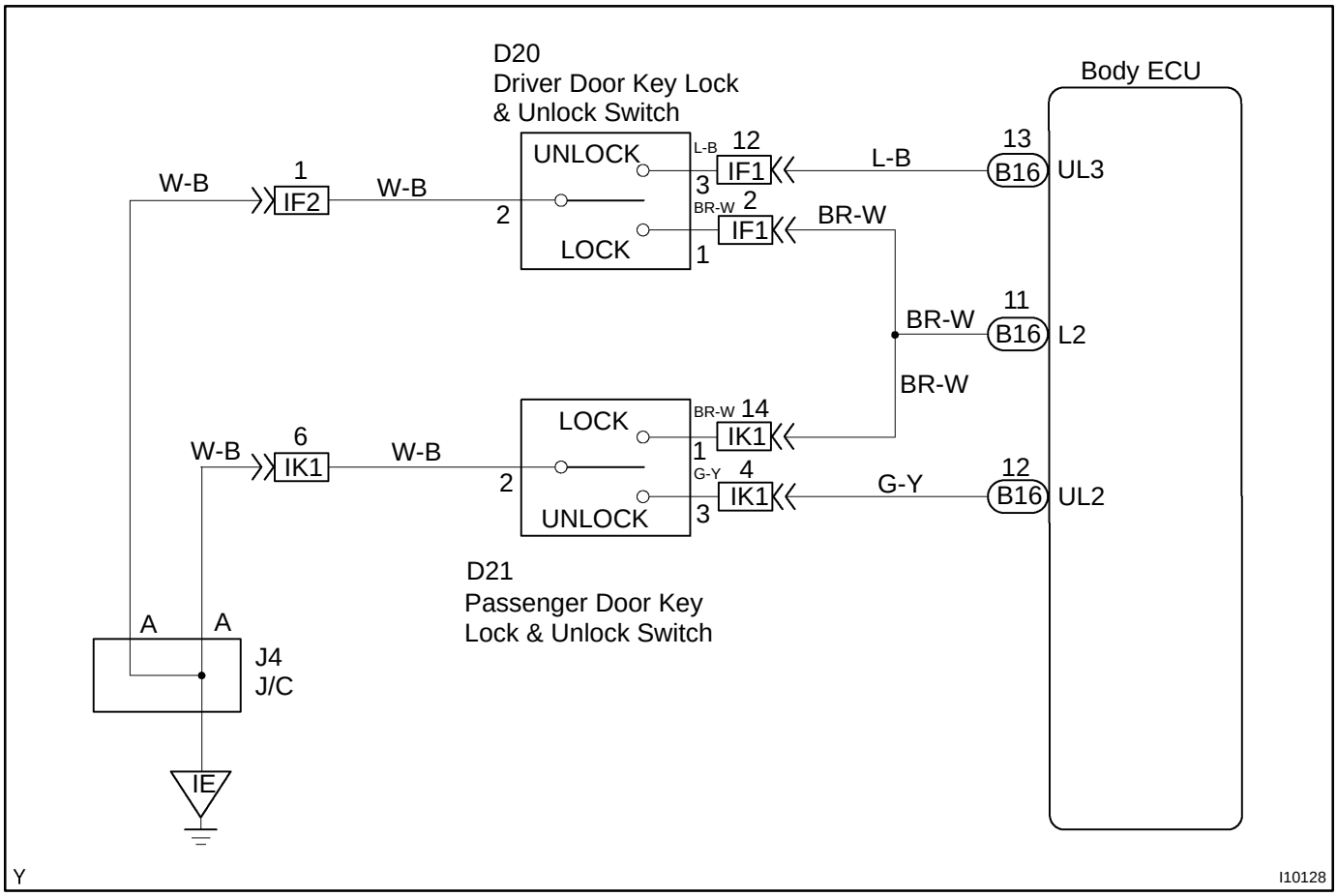
DI575-03

Door Key Lock and Unlock Switch Circuit

CIRCUIT DESCRIPTION

The door key lock and unlock switch is installed to the door key cylinder. When the key is turned to the lock side, terminal 1 of the switch is grounded and when the key is turned to the unlock side, terminal 3 of the switch is grounded.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door key lock and unlock switch (See page BE-76).

NG → Replace door key lock and unlock switch.

OK

2	Check harness and connector between door key lock and unlock switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

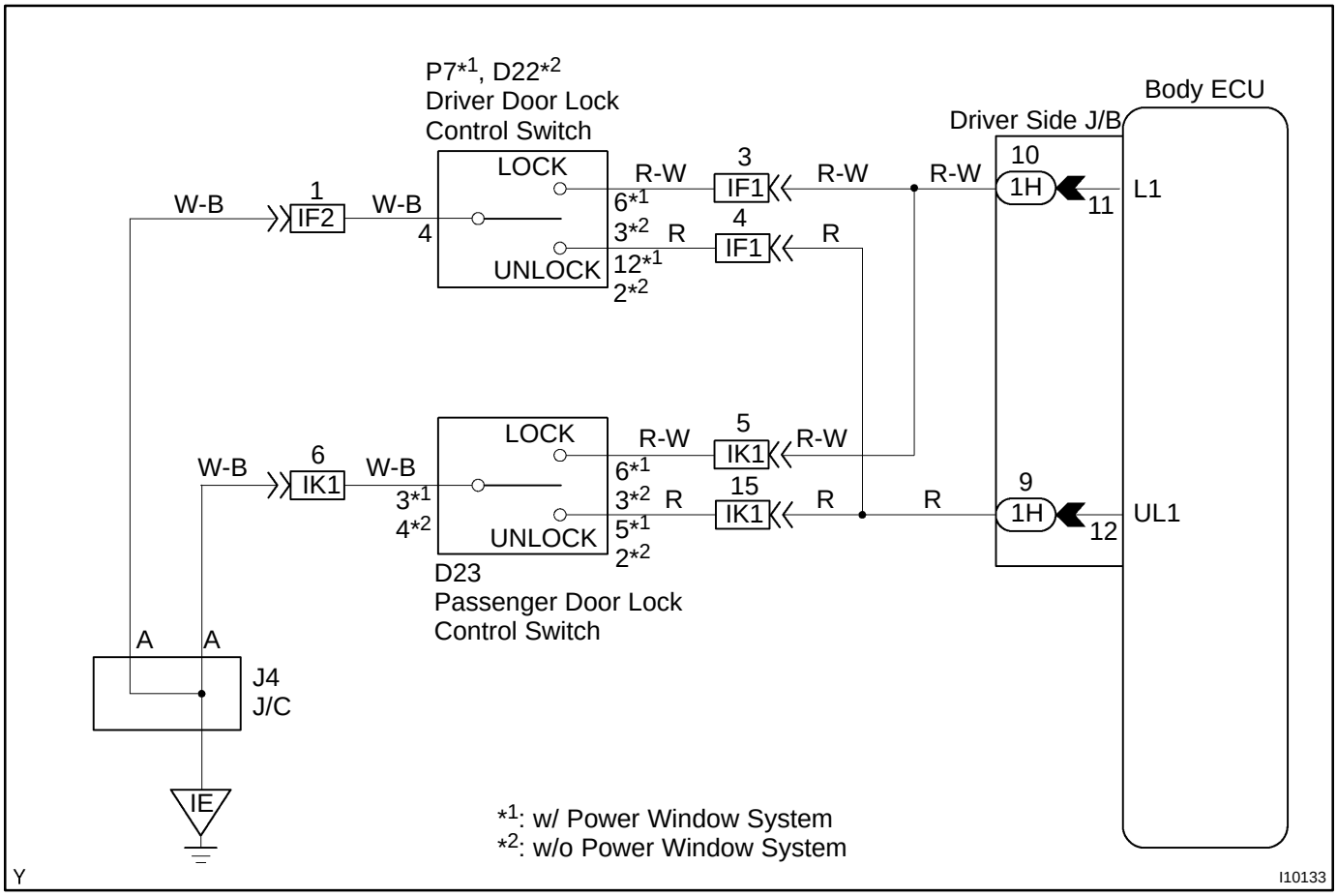
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI576-03

Door Lock Control Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door lock control switch (See page BE-76).

NG → Replace door lock control switch.

OK

2	Check harness and connector between door lock control switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

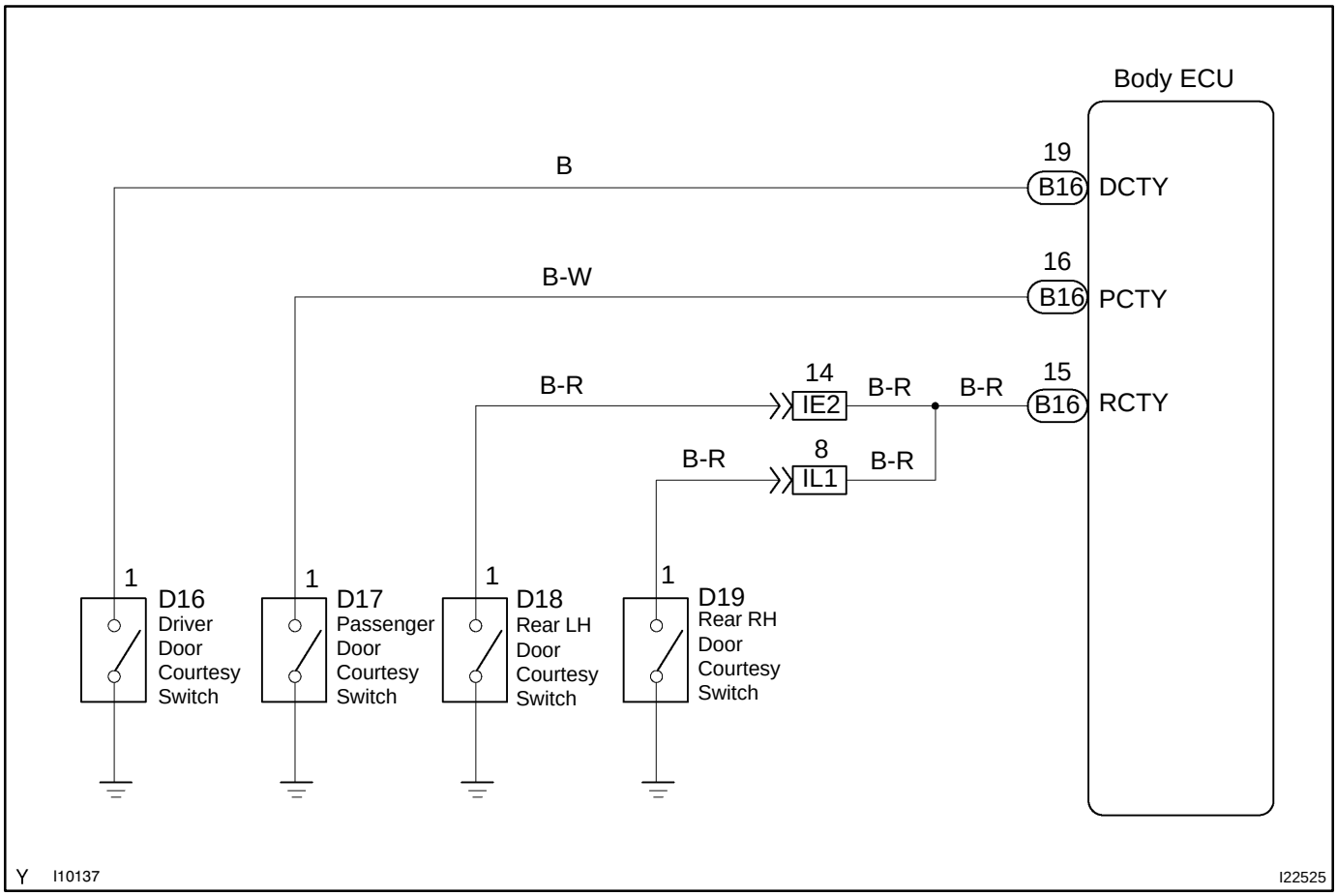
DI577-03

Front and Rear Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The door courtesy switch ON when the door is opened and OFF when door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check door courtesy switch (See page BE-26).

NG → Replace door courtesy switch.

OK

2	Check harness and connector between door courtesy switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

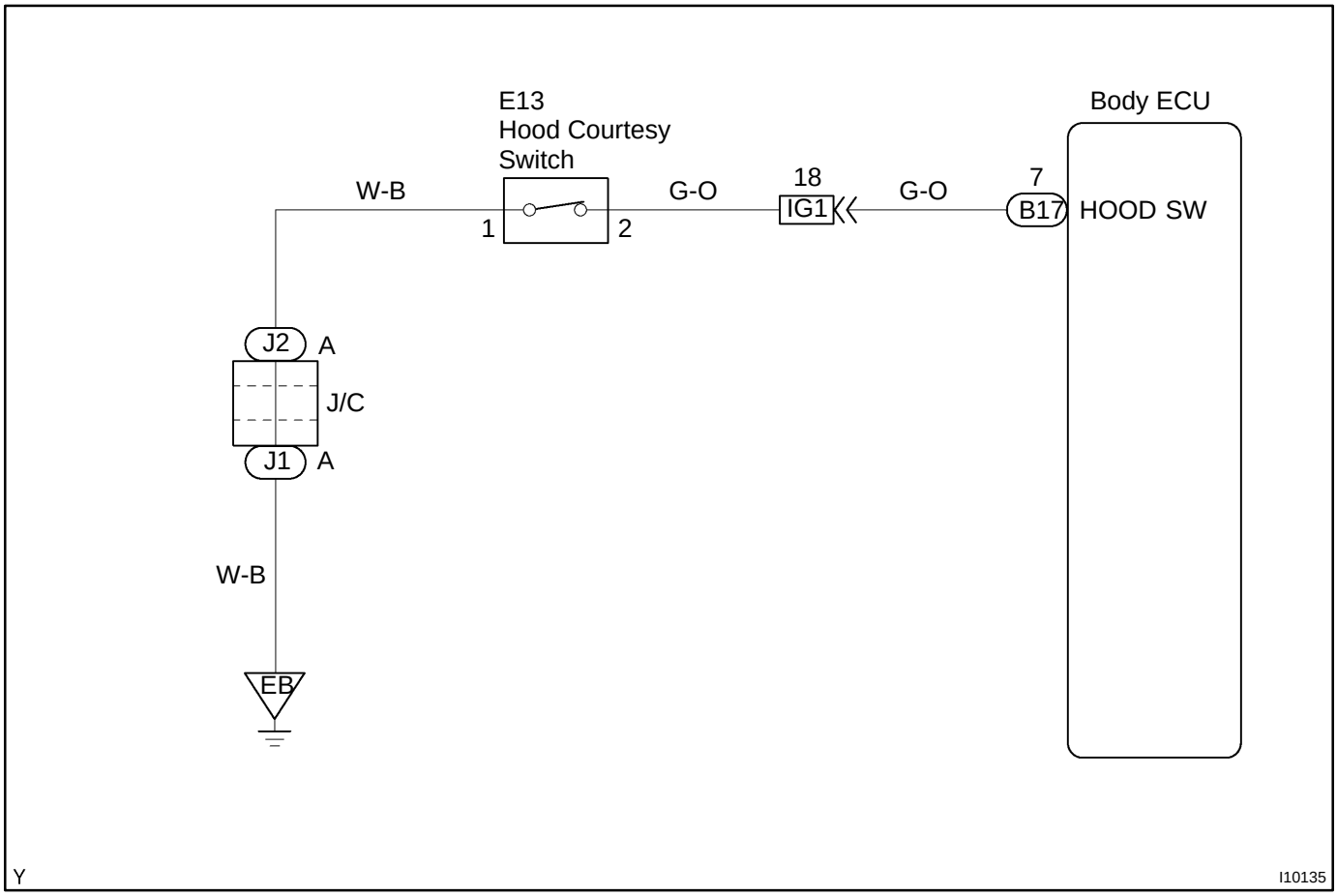
DI578-02

Hood Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The hood courtesy switch is built into the engine hood lock assembly and goes on when the engine hood is opened and goes off when the engine hood is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check hood courtesy switch (See page BE-85).

NG → Replace hood courtesy switch.

OK

2	Check harness and connector between hood courtesy switch and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

DI579-02

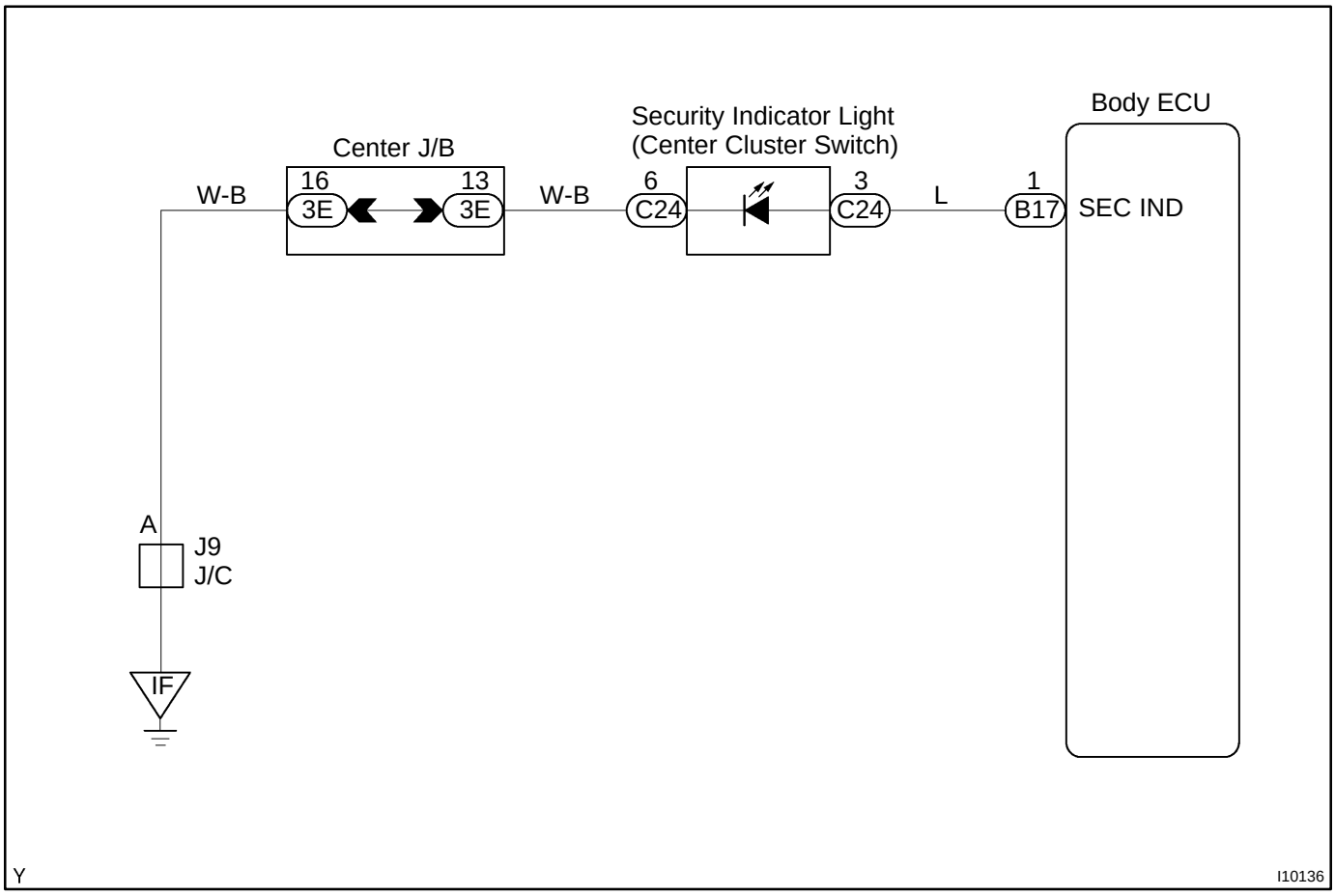
Theft Deterrent Indicator Circuit

CIRCUIT DESCRIPTION

When the theft deterrent system is preparing to set, this circuit lights up the indicator light. When the system has been set, it continually turns the indicator light on for 1 second and turns it off for 1 second, thus blinking the indicator light.

This theft deterrent indicator is connected to the ECM and outputs the key judgment of the immobilizer.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check theft deterrent indicator (See page BE-85).

NG → Replace theft deterrent indicator.

OK ↓

2	Check harness and connector between theft deterrent indicator and body ECU, and theft deterrent indicator and body ground (See page IN-28).

NG → Repair or replace harness or connector.

OK ↓

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

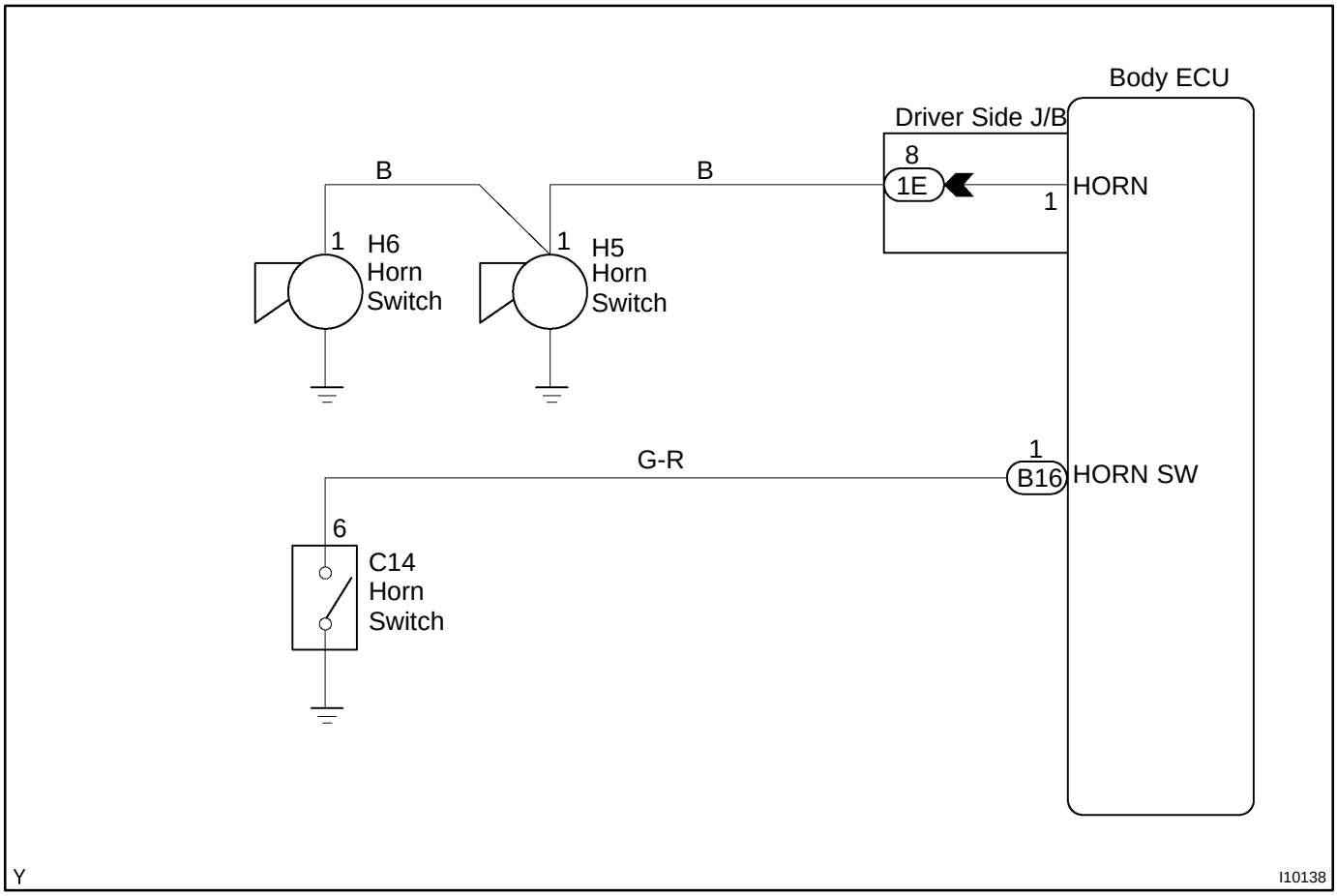
DI57A-03

Horn Circuit

CIRCUIT DESCRIPTION

The horn is connected to the body ECU and activated by the body ECU during warning of the theft deterrent system and horn switch ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check horn.

NG → Replace horn.

OK

2	Check horn switch.

NG → Replace horn switch.

OK

3	Check harness and connector between horn and body ECU, and body ECU and horn switch (See page IN-28).

NG → Repair or replace harness or connector.

OK

Check and replace driver side J/B.

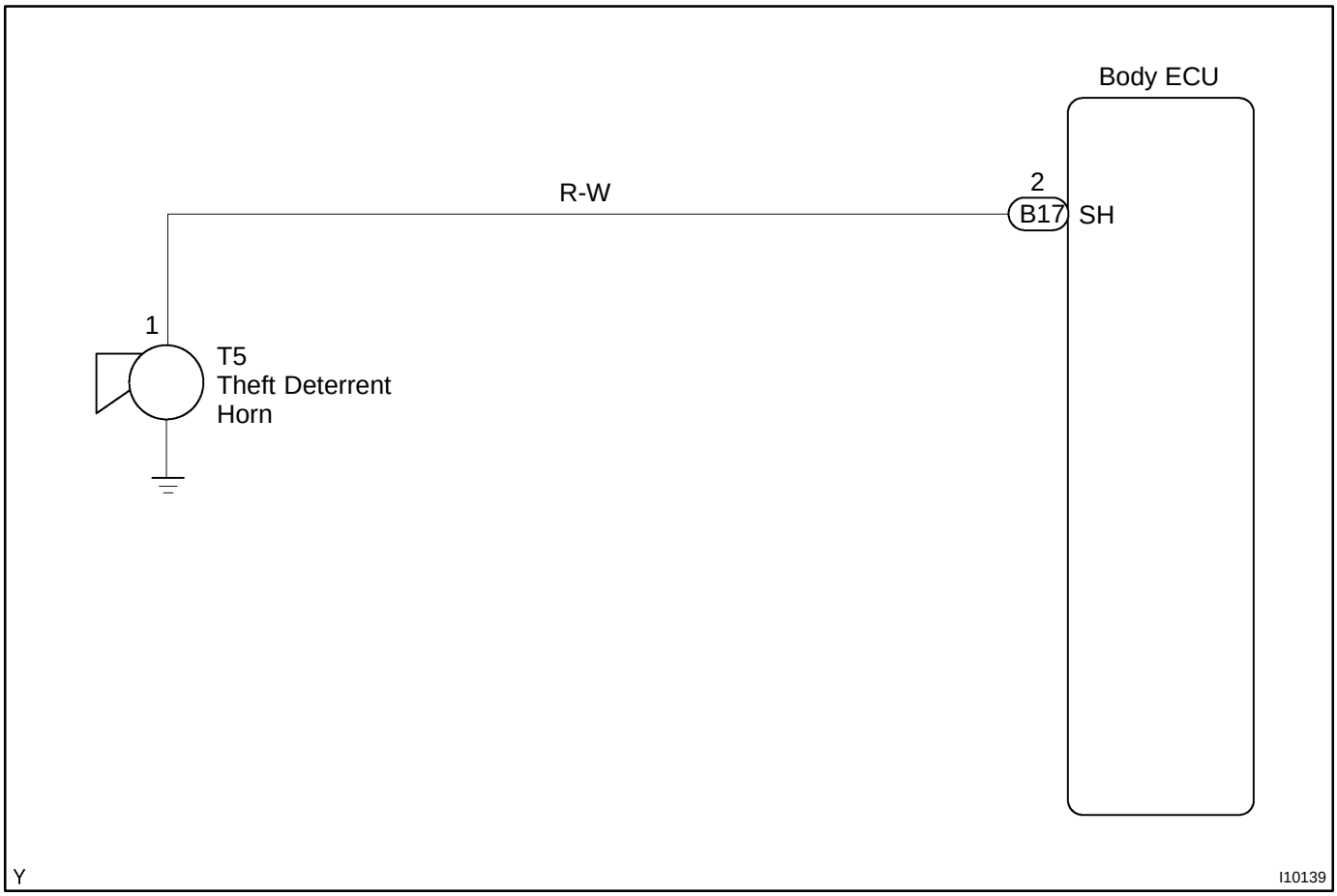
DI57B-02

Theft Deterrent Horn Circuit

CIRCUIT DESCRIPTION

During warning of the theft deterrent system, the body ECU activates the theft deterrent horn.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check theft deterrent horn (See page BE-85).

NG → Replace theft deterrent horn.

OK

2	Check harness and connector between theft deterrent horn and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

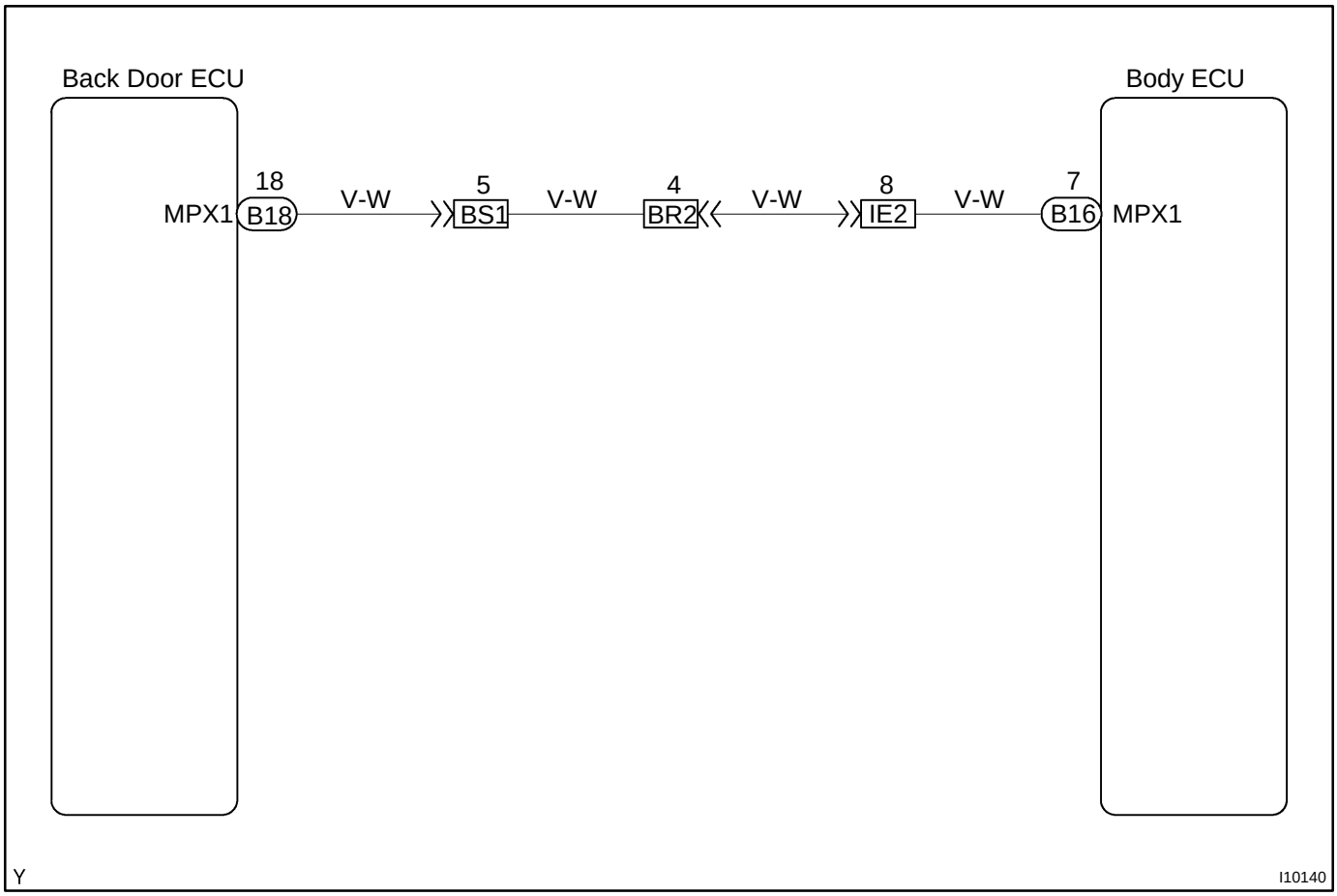
DI57C-04

MPX Circuit

CIRCUIT DESCRIPTION

This circuit communicates information of the wireless door lock control system, rear defogger system, open door warning, luggage light, theft deterrent system, rear wiper washer system and back door power window system between the body ECU and back door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check harness and connector between back door ECU and body ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table (See page DI-517).

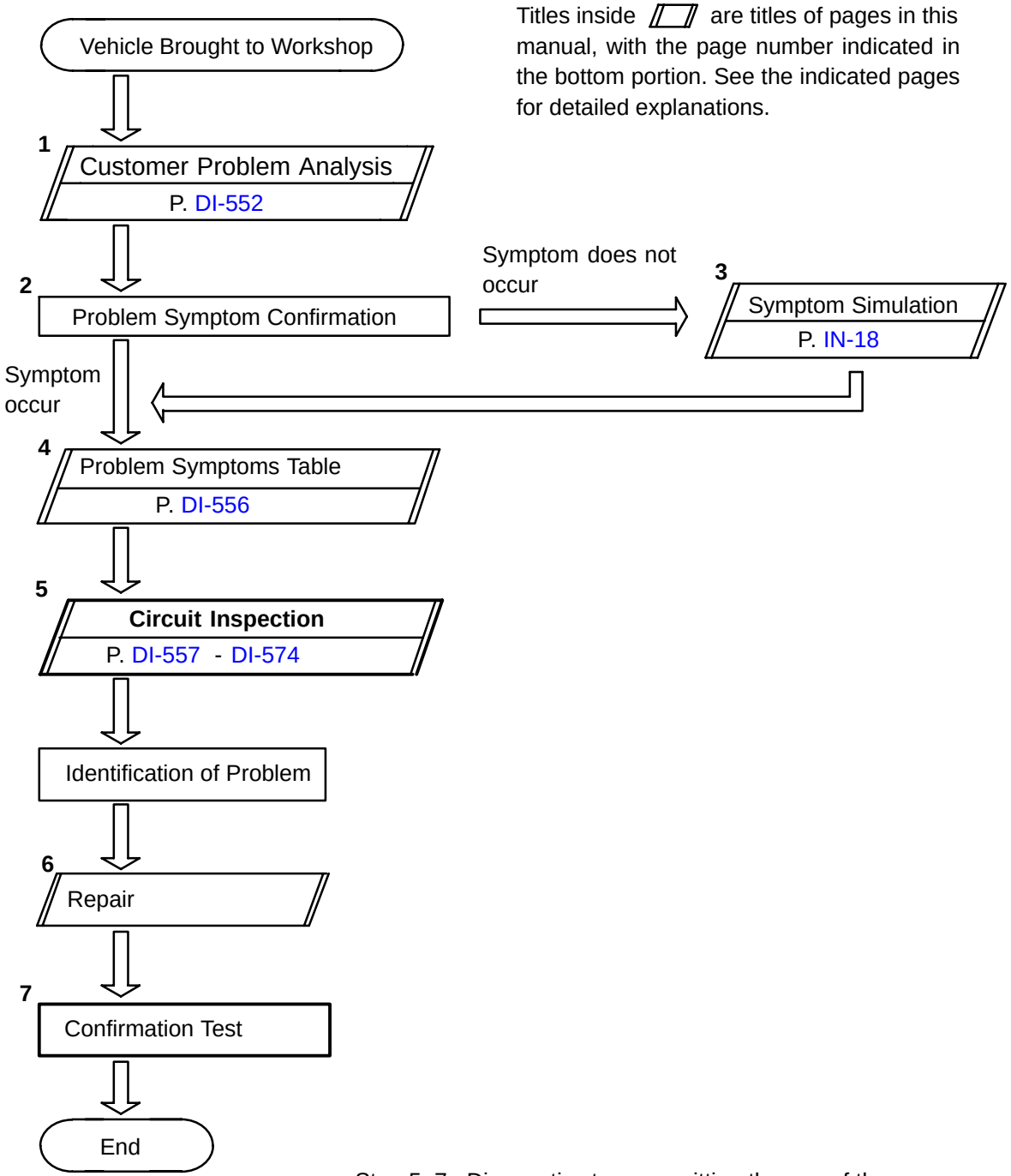
BACK DOOR CONTROL SYSTEM

DI57D-01

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

This ECU is connected to the multiplex communication system. Therefore, be sure to check that there is no troubles in the multiplex communication system before performing the troubleshooting.



Step 5, 7 : Diagnostic steps permitting the use of the TOYOTA hand-held tester.

DI57E-01

CUSTOMER PROBLEM ANALYSIS CHECK

BACK DOOR CONTROL SYSTEM Check Sheet

Inspector's name: _____

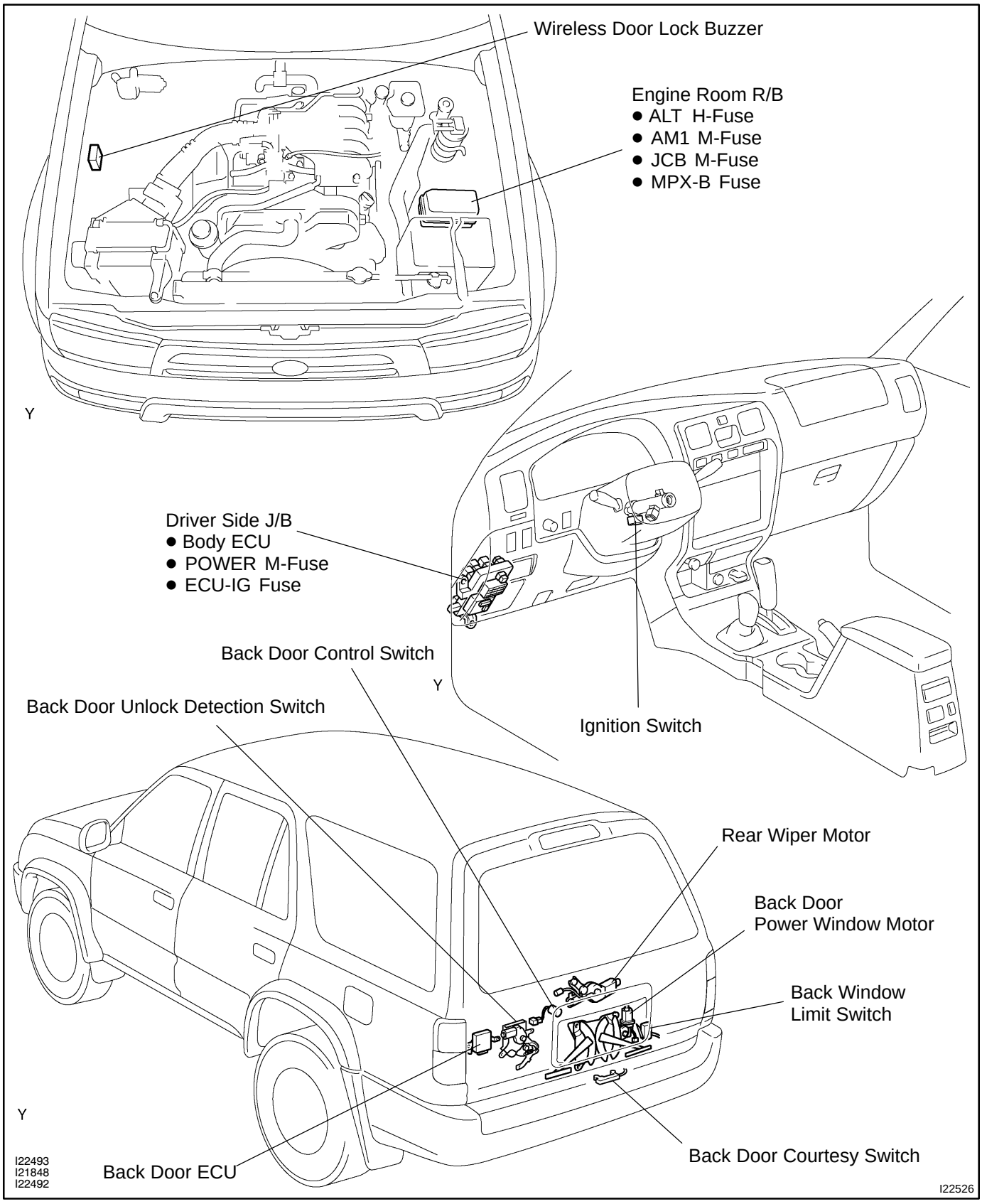
Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date Vehicle Brought in	/ /	**Odometer Reading**	**km Mile**

Date Problem First Occurred		/ /
Frequency Problem Occurs		¿ Constant ¿ Sometimes (times per day, month) ¿ Once only
Weather Conditions When Problem Occurred	**Weather**	¿ Fine ¿ Cloudy ¿ Rainy ¿ Snowy ¿ Various/ Others
	Outdoor Temperature	¿ Hot ¿ Warm ¿ Cool ¿ Cold (Approx. °F (°C))

Malfunction System	¿ Wireless Door Lock Control System
	¿ Power Door Lock Control System
	¿ Theft Deterrent System
	¿ Others

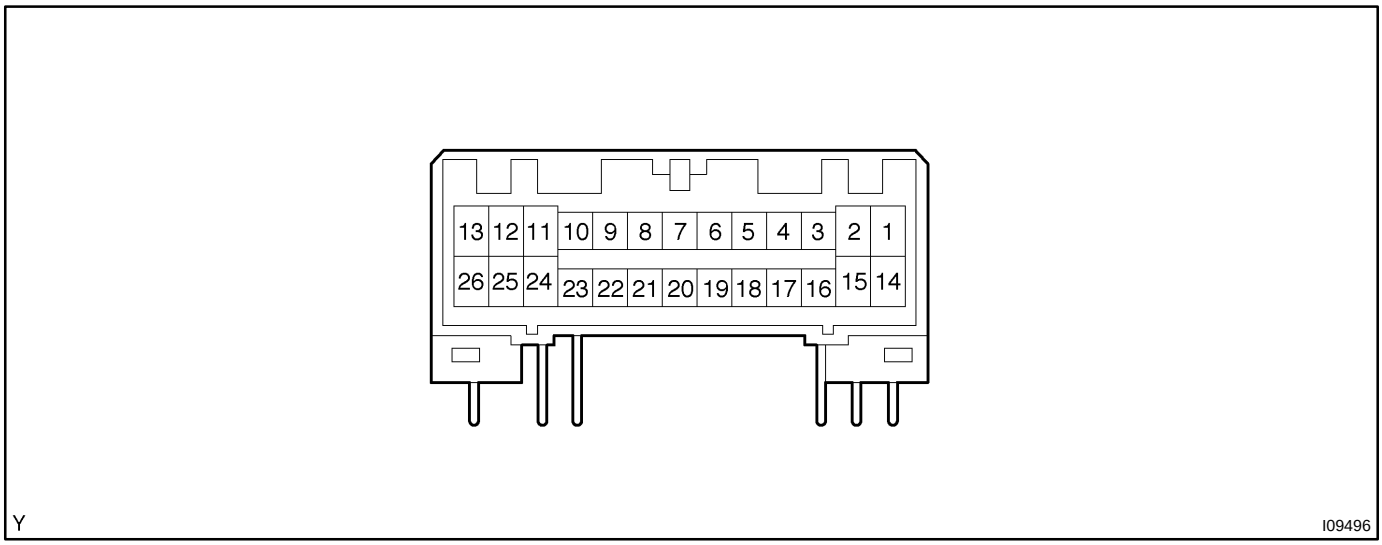
DI57F-03

PARTS LOCATION



DI57G-05

TERMINALS OF ECU



Symbols (Terminal No.)	Wiring Color	Condition	STD Voltage (V)
POWE (B18-1) - GND (B18-26)	L - W-B	Constant	10 - 14
ECU-B (B18-2) - GND (B18-26)	L-R - W-B		
IG (B18-3) - GND (B18-26)	Y - W-B	Ignition switch OFF or ACC	Below 1.0
		Ignition switch ON	10 - 14
BZR1 (B18-5) - BZR2 (B18-4)	P-B - P-G	Wireless door lock buzzer sounded	10 - 14
		Wireless door lock buzzer not sounded	Below 1.0
BCTY (B18-7) - GND (B18-26)	L-W - W-B	Back door courtesy switch OFF (Closed)	10 - 14
		Back door courtesy switch ON (Open)	Below 1.0
CLS (B18-9) - GND (B18-26)	G-R - W-B	Back door control switch OFF or DOWN	10 - 14
		Back door control switch UP	Below 1.0
OPN (B18-10) - GND (B18-26)	G-Y - W-B	Back door control switch OFF or UP	10 - 14
		Back door control switch DOWN	Below 1.0
CLSM (B18-11) - GND (B18-26)	R - W-B	Back door power window not operating	Below 1.0
		Back door power window operating upward	10 - 14
OPNM (B18-12) - GND (B18-26)	G - W-B	Back door power window not operating	Below 1.0
		Back door power window operating downward	10 - 14
LMTW (B18-13) - GND (B18-26)	R-L - W-B	Window limit switch OFF (Closed)	10 - 14
		Window limit switch ON (Open)	Below 1.0
LSWB (B18-20) - GND (B18-26)*	L-B - W-B	Back door unlock detection switch OFF (Locked)	10 - 14
		Back door unlock detection switch ON (Unlocked)	Below 1.0
LMT2 (B18-22) - GND (B18-26)	GR - W-B	Rear wiper arm storing position	10 - 14
		Rear wiper arm not storing position	Below 1.0
LMT1 (B18-23) - GND (B18-26)	GR-R - W-B	Rear wiper arm between stopping and reversing position	10 - 14
		Rear wiper arm except stopping and reversing position	Below 1.0
WIP- (B18-24) - GND (B18-26)	L-B - W-B	Rear wiper motor not operating	Below 1.0
		Rear wiper motor rotates reversely	10 - 14

WIP+ (B18-25) - GND (B18-26)	L-Y - W-B	Rear wiper motor not operating	Below 1.0
		Rear wiper motor rotates	10 - 14
GND (B18-26) - Body ground	W-B - Body ground	Constant	Below 1.0

*: w/ Theft deterrent system

DI57H-01

PROBLEM SYMPTOMS TABLE

WIRELESS DOOR LOCK CONTROL

Symptom	Suspect Area	See page
All function of wireless door lock control system do not operate	2. Transmitter 3. Key unlock warning switch circuit 4. Back door ECU 5. MPX circuit 6. Body ECU	BE-93 DI-527 IN-28 DI-549 IN-28
Lock (or unlock) function does not operate	1. Door key lock and unlock switch circuit 2. Door unlock detection switch circuit 3. Body ECU	DI-535 DI-533 IN-18
Automatic lock function operates even if any door is opened within 30 seconds after all doors are unlocked by wireless door lock control system	1. Door courtesy switch circuit 2. Back door ECU	DI-539 IN-18
Wireless door lock operates, but the buzzer does not sound	1. Wireless door lock buzzer circuit 2. MPX circuit 3. Back door ECU	DI-574 DI-549 IN-18
Buzzer sound, but wireless door lock function does not operate	1. Body ECU	IN-18
Back door window open control system does not operate	1. Back door power window motor circuit 2. Rear wiper limit switch circuit 3. Back door ECU	DI-570 DI-568 IN-18

REAR WIPER AND WASHER

Symptom	Suspect Area	See page
Rear wiper does not operate	1. Wiper switch circuit 2. Wiper motor circuit 3. Body ECU 4. Back door ECU	DI-521 DI-523 IN-18 IN-18
Rear washer does not operate	1. Washer switch circuit 2. Washer motor 3. Wire harness 4. Body ECU	DI-521 DI-521 - IN-18
Wiper does not operate when washer switch is ON	1. Wiper switch circuit 2. Body ECU	DI-521 IN-18

DI57I-05

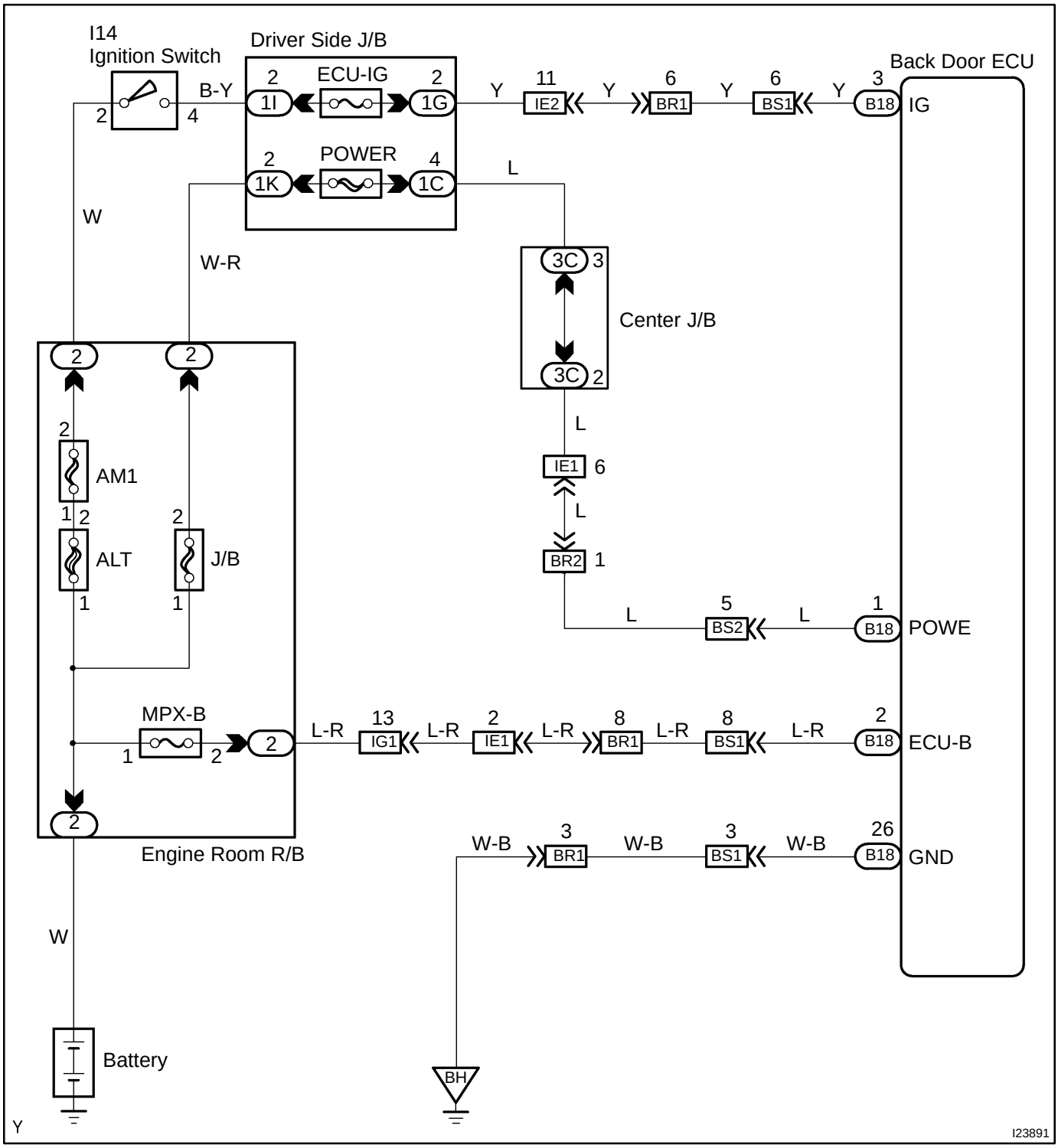
CIRCUIT INSPECTION

Power Source Circuit

CIRCUIT DESCRIPTION

This circuit provides power to operate the back door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check POWER and JCB M-fuses, and MPX-B and ECU-IG fuses.**

CHECK:

Check the continuity of the POWER and JCB M-fuses, and MPX-B and ECU-IG fuse.

OK:

Continuity

NG → **Replace failure fuse.**

OK

2	**Check voltage between terminals POWE/ECU-B/IG and GND of back door ECU connector.**

PREPARATION:

Turn the ignition switch ON.

CHECK:

Measure the voltage between terminals IG and GND.

OK:

Voltage: 10 - 14 V

PREPARATION:

(a) Turn the ignition switch OFF.

(b) Disconnect the back door ECU connector.

CHECK:

Measure the voltage between terminals POWE/ECU-B and GND.

OK:

Voltage: 10 - 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).**

NG

3	**Check harness and connector between back door ECU and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

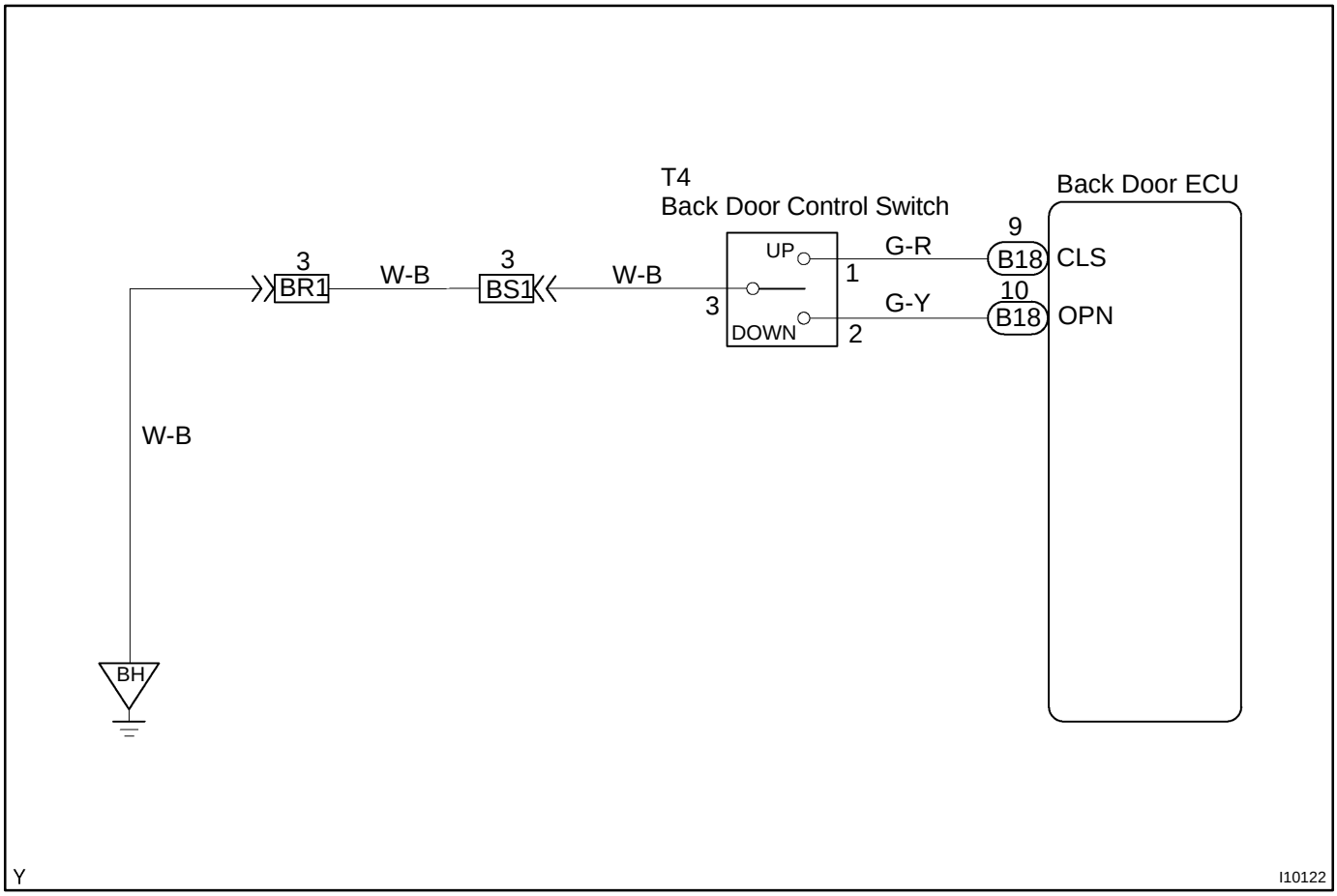
OK

Check and repair harness and connector between back door ECU and battery.

DI57J-03

Back Door Control Switch Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check back door control switch (See page BE-65).

NG → Replace back door control switch.

OK →

2	Check harness and connector between back door control switch and back door ECU.

NG → Repair or replace harness or connector.

OK →

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

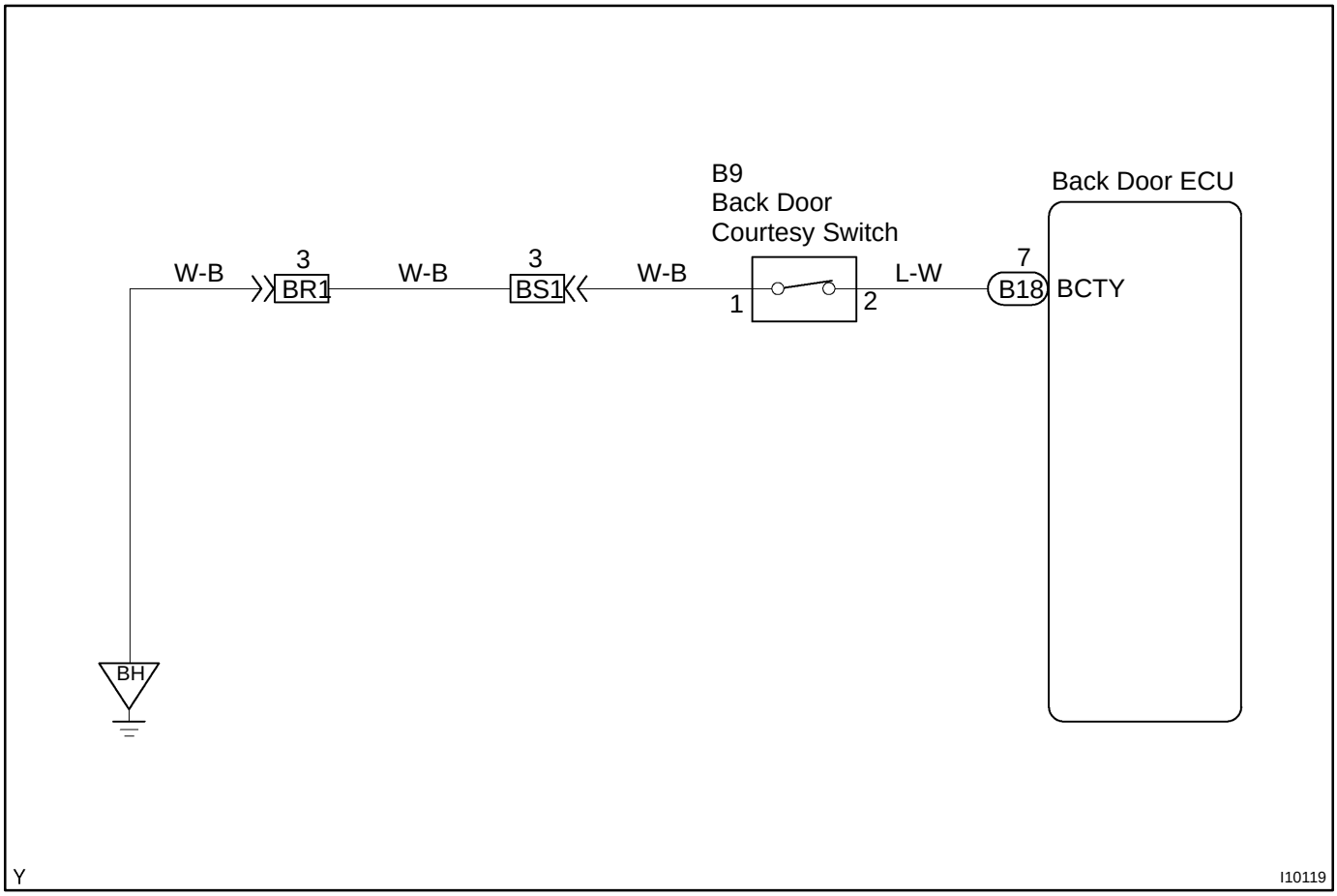
DI57K-03

Back Door Courtesy Switch Circuit

CIRCUIT DESCRIPTION

The back door courtesy switch is built in the back door lock.
This switch goes on when the back door is opened and goes off when back door is closed.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check back door courtesy switch (See page BE-26).

NG → Replace back door courtesy.

OK

2	Check harness and connector between back door courtesy switch and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

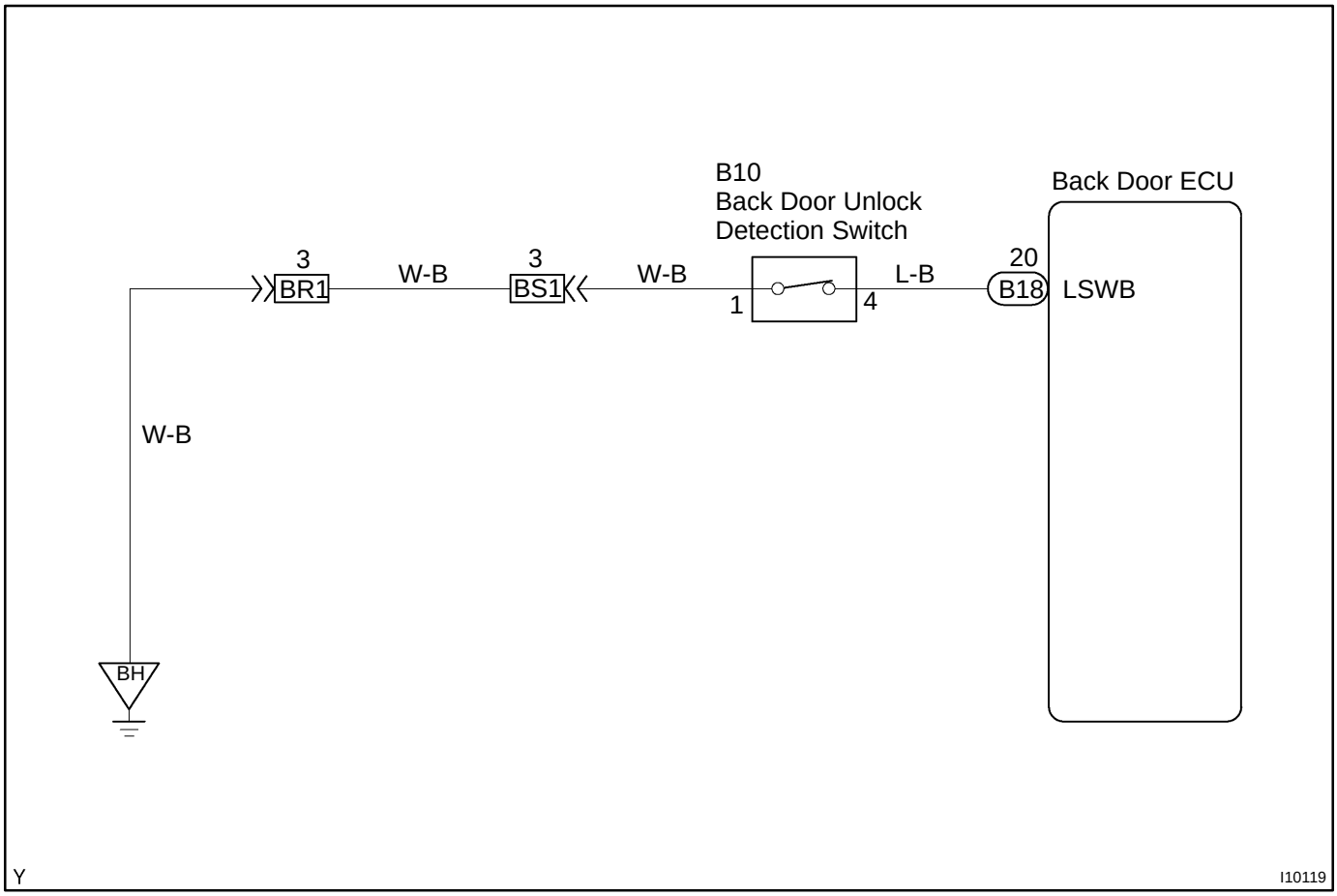
DI57L-05

Back Door Unlock Detection Switch Circuit (w/ Theft Deterrent System)

CIRCUIT DESCRIPTION

The door unlock detection switch is built in the door lock motor assembly. This switch is ON when the door lock knob is in the unlock position and OFF when the lock knob is in the lock position. The ECU detects the door lock knob conditions is this circuit. It is used as one of the operating conditions for the theft deterrent system.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check back door unlock detection switch (See page BE-76).

NG → Replace door lock motor.

OK

2	Check harness and connector between door unlock detection switch and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

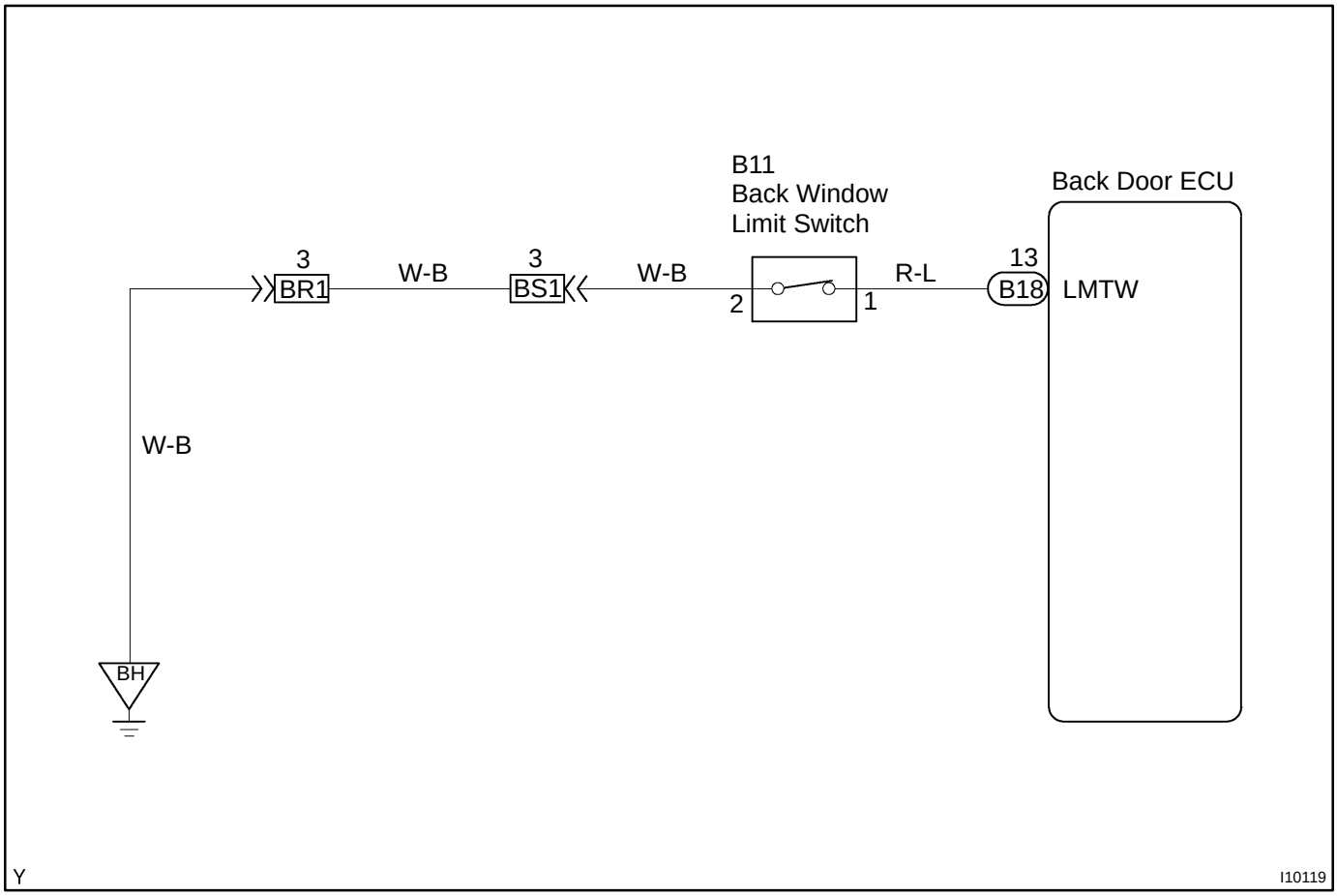
DI57M-04

Window Limit Switch Circuit

CIRCUIT DESCRIPTION

This switch functions to turn ”OFF” before the top dead center, and ECU reads this ”OFF signal resulting in closing the window fully.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check window limit switch (See page BE-65).

NG → Replace window limit switch.

OK

2	Check harness and connector between window limit switch and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

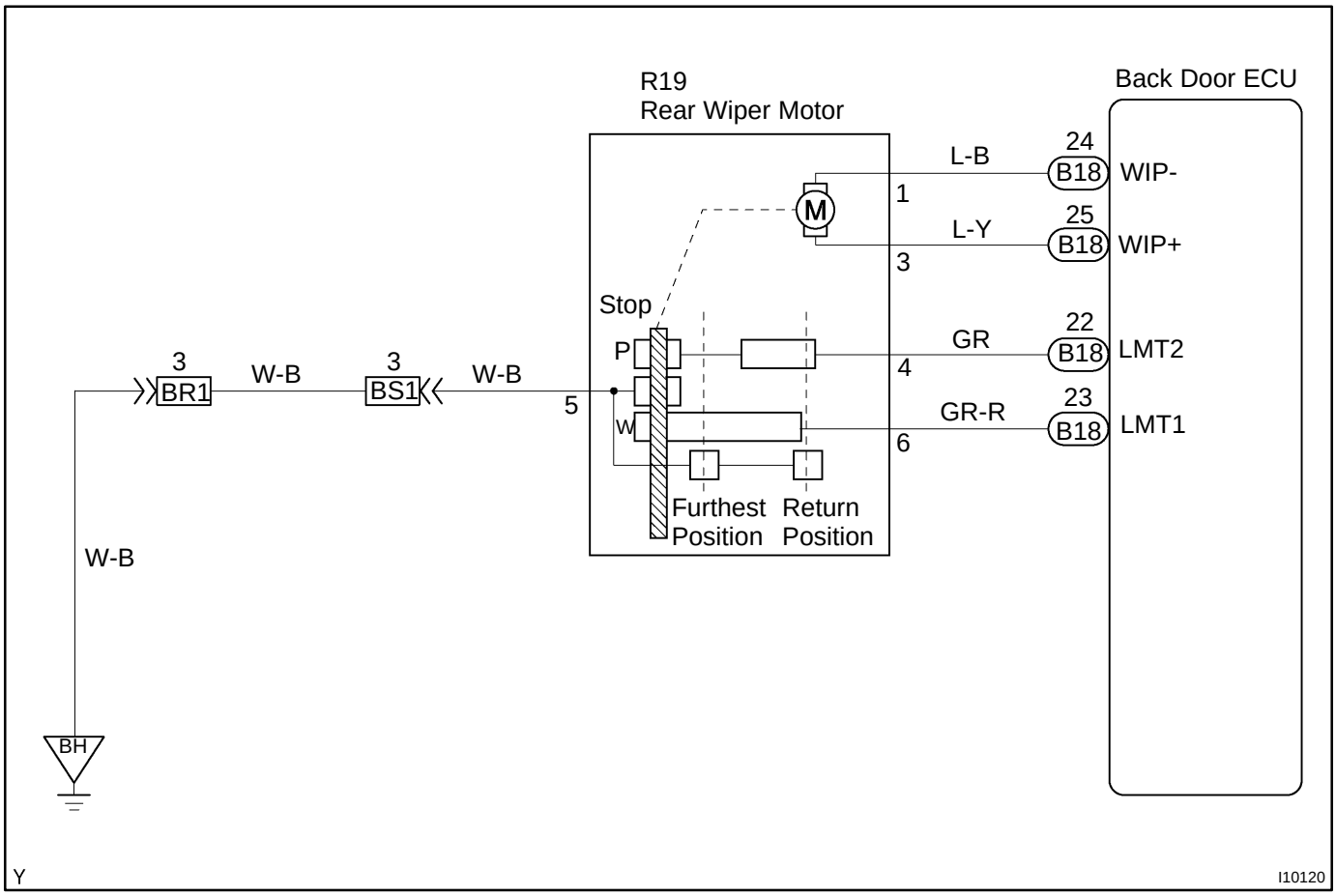
DI57N-03

Rear Wiper Limit Switch Circuit

CIRCUIT DESCRIPTION

Rear wiper limit switch is built-in the rear wiper motor. LMT1 switch is ON when the rear wiper arm is in the between stopping and reversing position and OFF when the rear wiper arm is in the except between stopping and reversing position. LMT2 switch is ON when the rear wiper arm is in the except storing position and OFF when the rear wiper arm is in the storing position.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper motor continuity (See page BE-65).

NG → Replace rear wiper motor.

OK

2	Check harness and connector between rear wiper motor and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

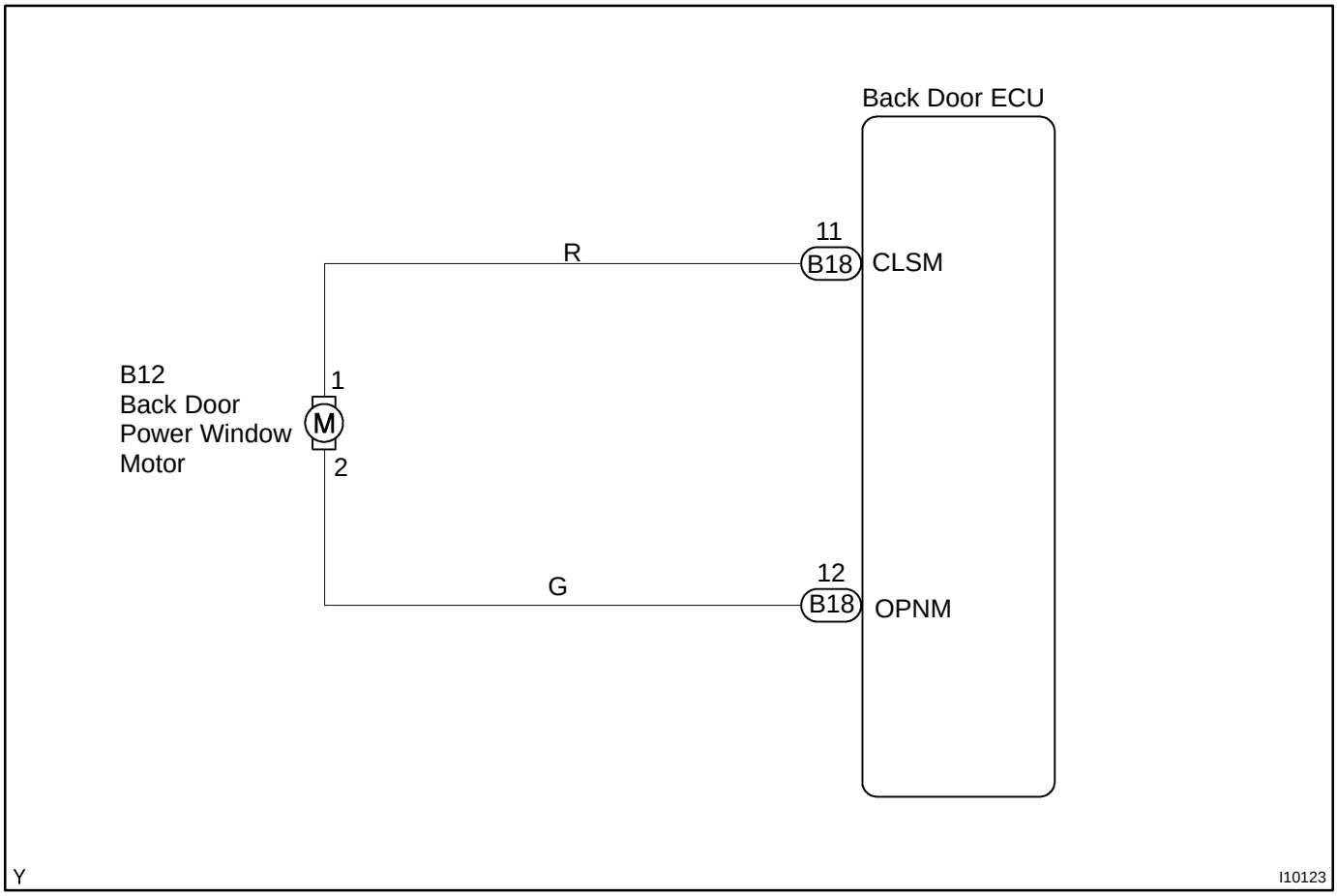
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

DI57O-03

Back Door Power Window Motor Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check back door power window motor (See page BE-65).

NG → Replace back door power window motor.

OK

2	Check harness and connector between back door power window motor and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

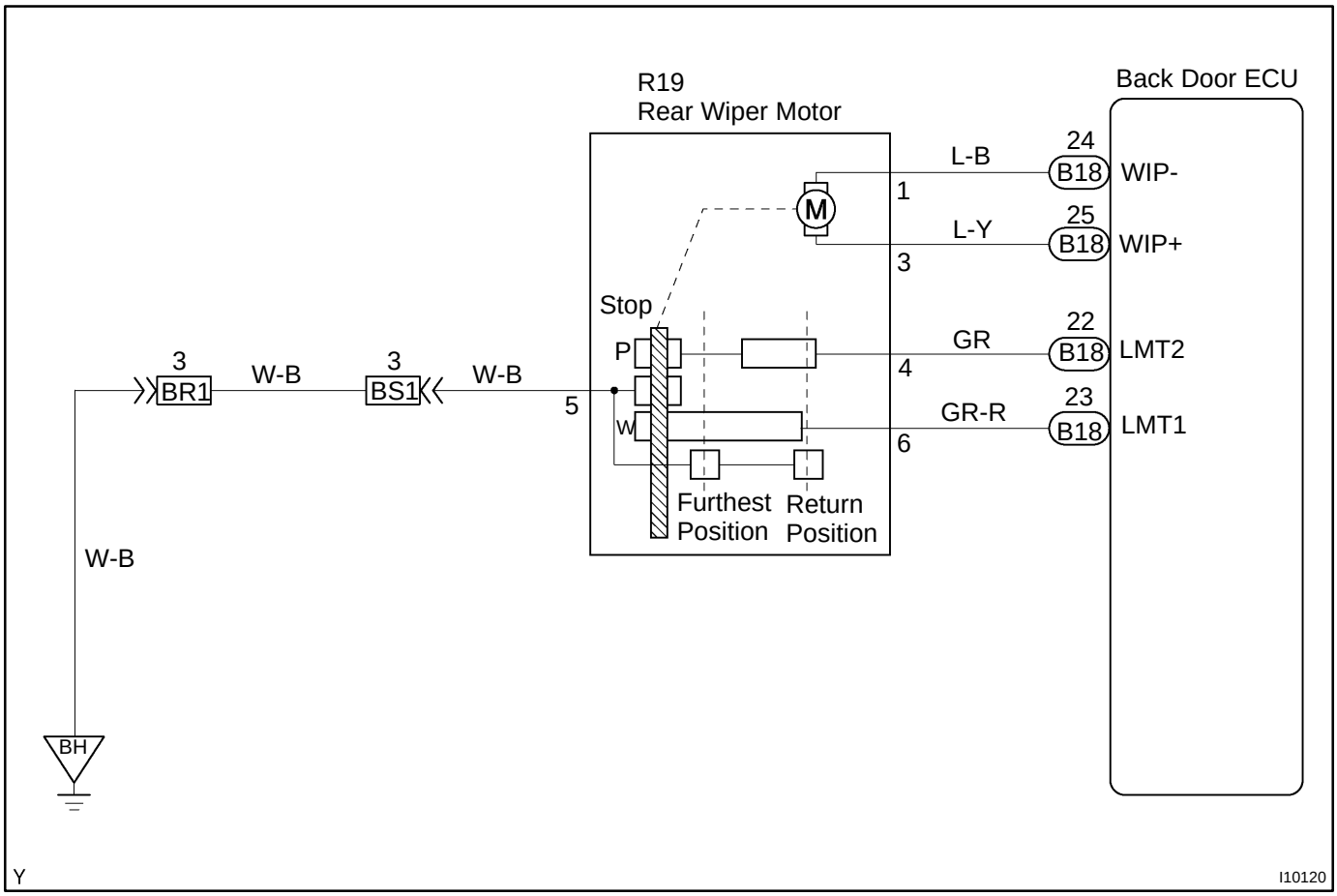
DI57P-05

Rear Wiper Motor Circuit

CIRCUIT DESCRIPTION

Wiper motor is controlled by the back door ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check rear wiper motor (See page BE-34).

NG → Replace rear wiper motor.

OK

2	Check harness and connector between wiper motor and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

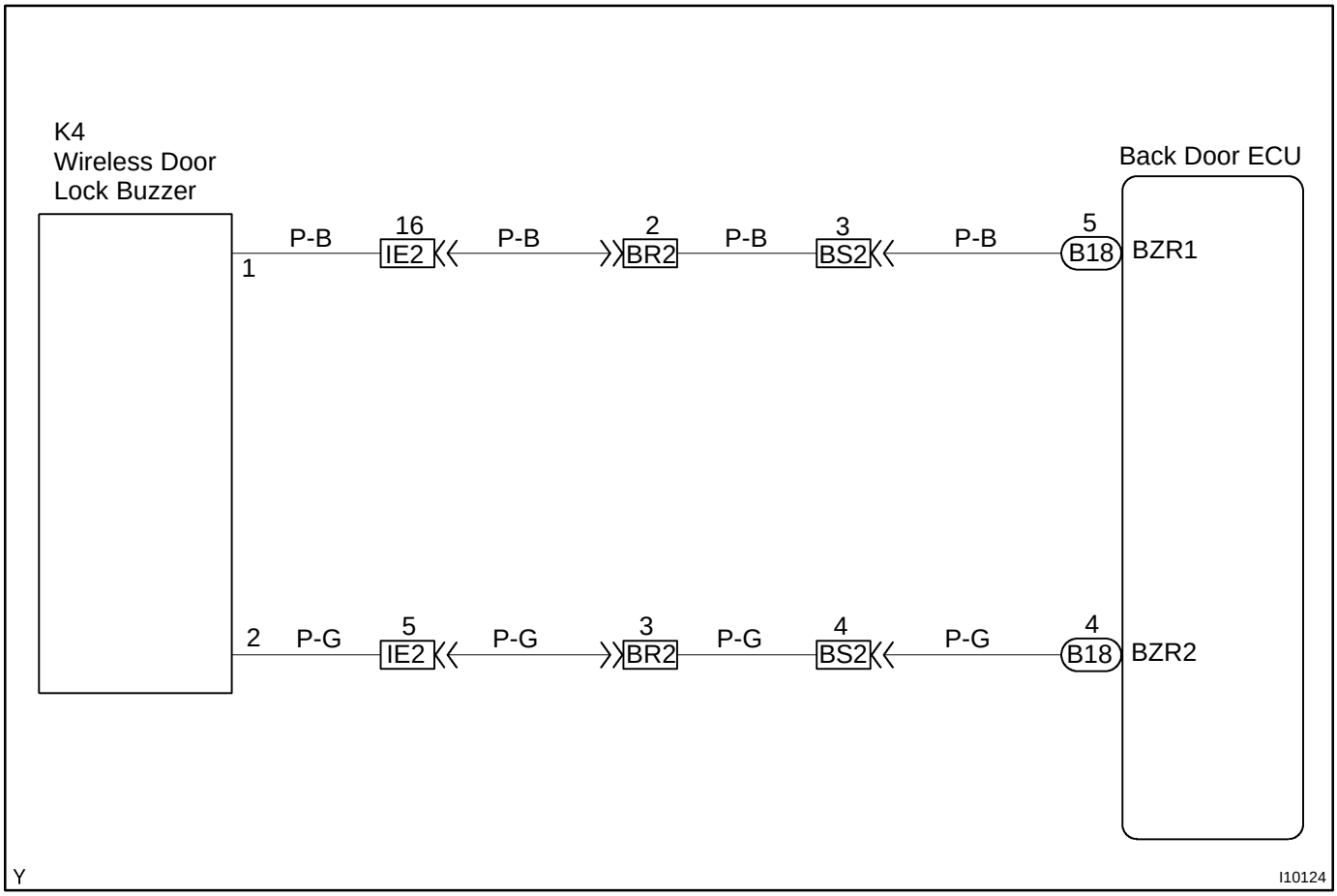
OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

DI57Q-02

Wireless Door Lock Buzzer Circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check wireless door lock buzzer (See page BE-93).

NG → Replace wireless door lock buzzer.

OK

2	Check harness and connector between wireless door lock buzzer and back door ECU (See page IN-28).

NG → Repair or replace harness or connector.

OK

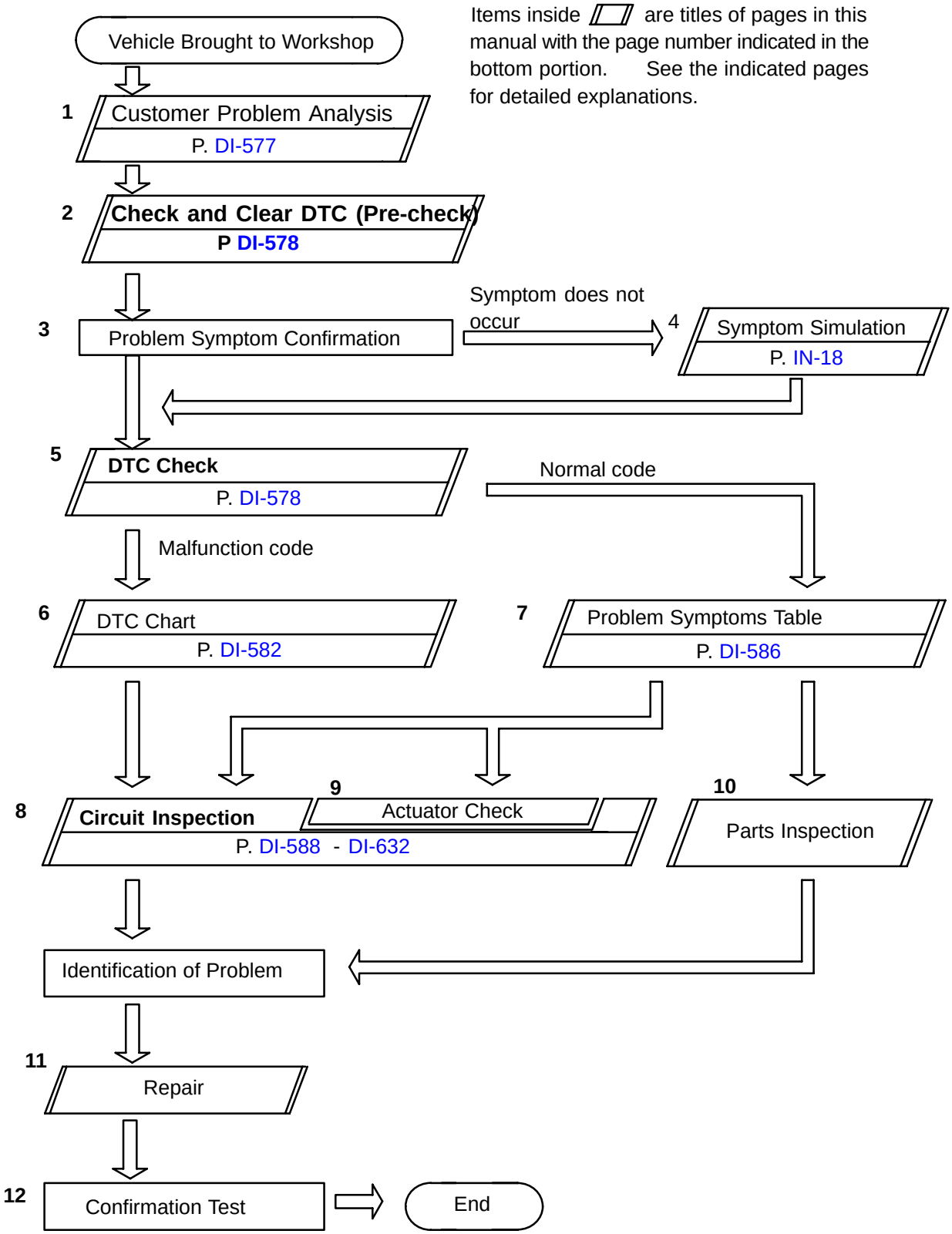
Proceed to next circuit inspection shown on problem symptoms table (See page DI-556).

AIR CONDITIONING SYSTEM

DI3VS-09

HOW TO PROCEED WITH TROUBLESHOOTING

Perform troubleshooting in accordance with the procedure on the following page.



DI3VT-02

CUSTOMER PROBLEM ANALYSIS CHECK

AIR CONDITIONING SYSTEM Check Sheet

Inspector's name:

Customer's Name		**Registration No.**	
		Registration Year	
		Frame No.	
Date vehicle Brought In	/ /	**Odometer Reading**	**km Miles**

Date of Problem Occurrence	/ /
How Often does Problem Occur?	☐ Continuous ☐ Intermittent (times a day)
Weather	☐ Fine ☐ Cloudy ☐ Snowy ☐ Various / Other
Outdoor Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold (Approx. °F °C)

Symptoms	**Air Flow Control is Faulty**	☐ Blower motor does not operation ☐ Blower motor speed does not change (Always Hi, Always Med, Always Lo)
	Temperature Control is Faulty	☐ Cabin temperature does not go down ☐ Cabin temperature does not rise ☐ Response is slow
	Air Inlet Control is Faulty	☐ Cannot change between FRS and REC (Always Fresh or always Recirculating)
	Vent Control is Faulty	☐ Mode will not change ☐ Will not enter the desired mode

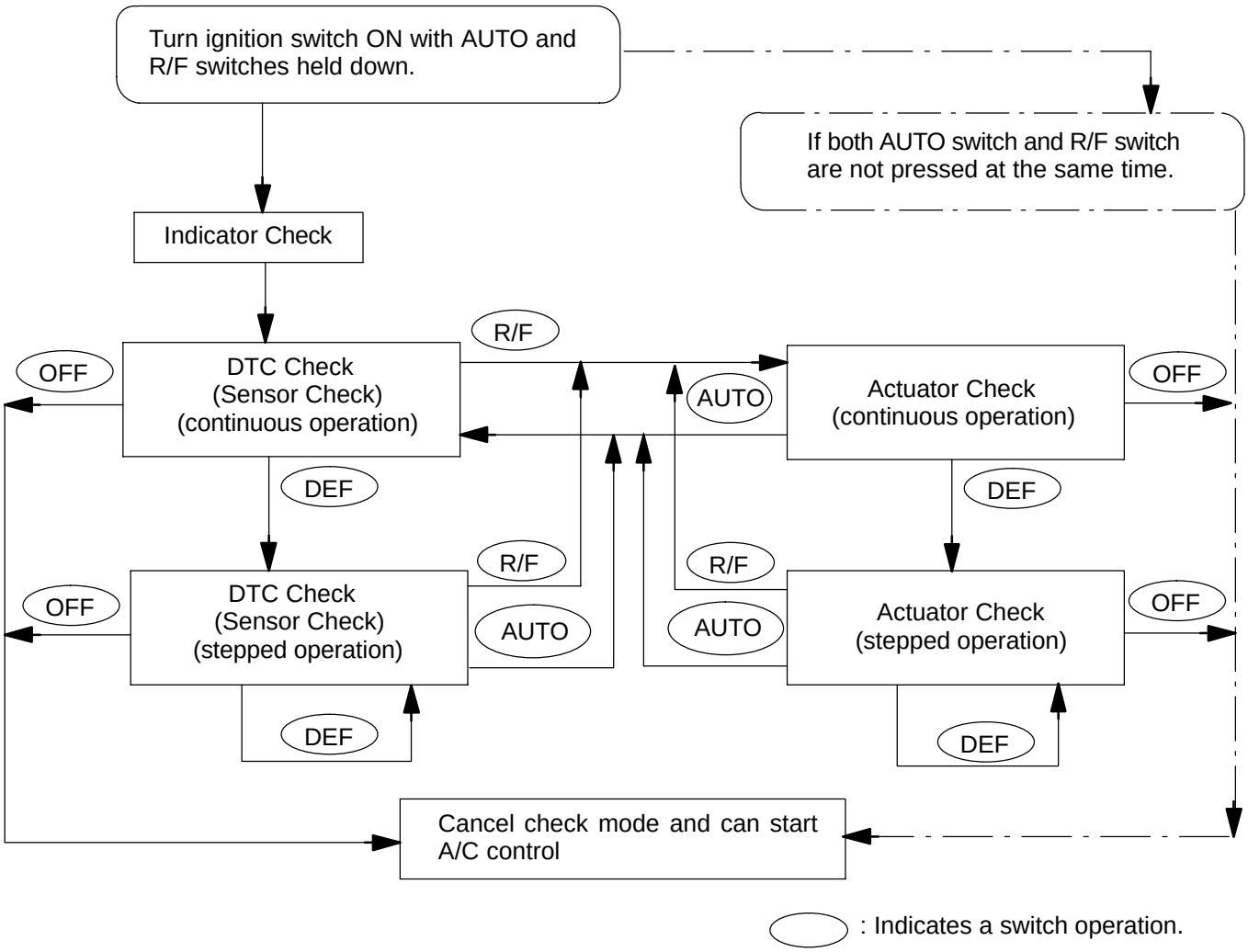
DTC Check	**1st Time**	☐ Normal Code ☐ Malfunction Code (Code)
	2nd Time	☐ Normal Code ☐ Malfunction Code (Code)

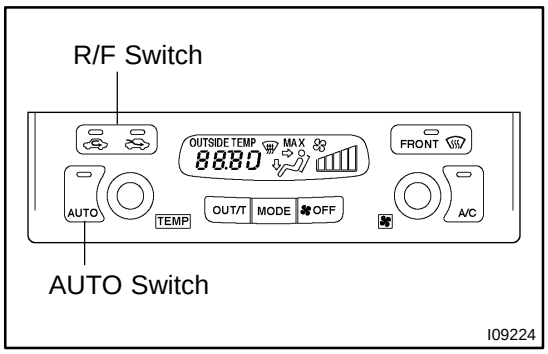
DI5CD-01

PRE-CHECK

1. LIST OF OPERATION METHODS

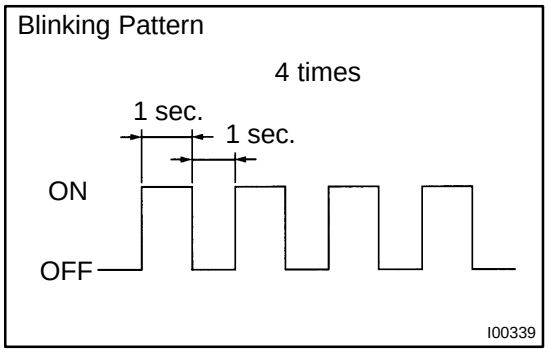
By operating each of the A/C control switches as shown in the diagram below, it is possible to enter the diagnosis check mode.





2. INDICATOR CHECK

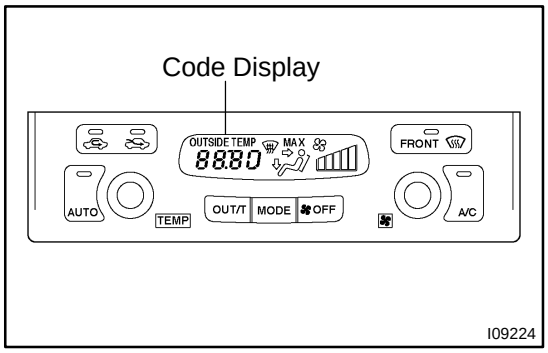
(a) Turn the ignition switch to ON while pressing the air conditioning control AUTO switch and R/F switch simultaneously.



(b) Check that all the indicators light up and go off at 1 second intervals 4 times in succession.

HINT:

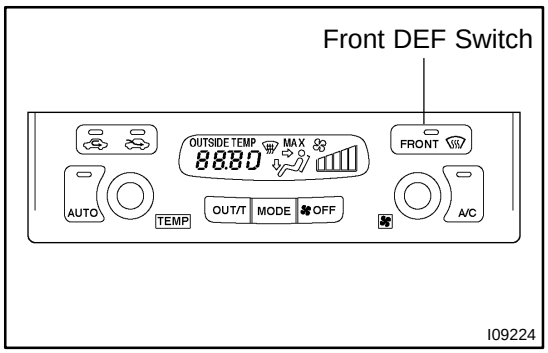
- After the indicator check is ended, the system enters the DTC begins automatically.
- Press the OFF switch when desiring to cancel the check mode.



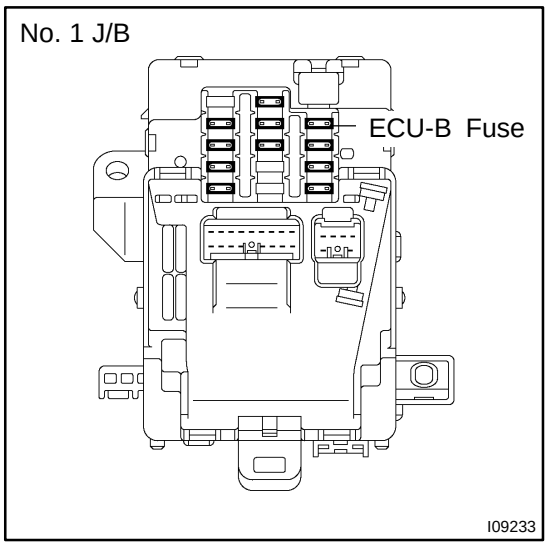
3. DTC CHECK (SENSOR CHECK)

(a) Perform an indicator check. After the indicator check is completed, the system enters the DTC check mode automatically.

(b) Read the code displayed on the panel. Refer to the list of DTCs on page DI-582 when reading the DTCs. (DTCs are output at the temperature display).



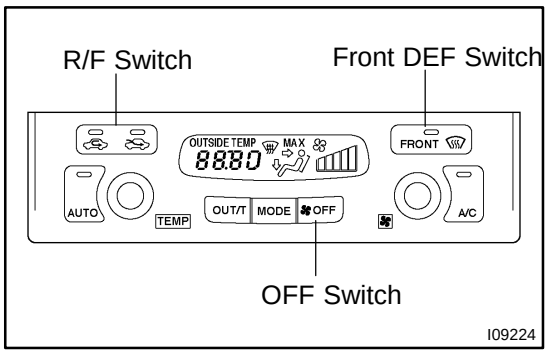
(c) If the slower display is desired, press the front DEF switch and change it to stepped operation. Each time the front DEF switch is pressed, the display changes by 1 step.



4. CLEARING DTC

(a) Pull out the ECU-B fuse in No. 1 J/B for 10 sec., or longer to clear the DTC memory.

(b) After reinserting the fuse, check that the normal code is output.



5. ACTUATOR CHECK

(a) After entering the DTC check mode (Sensor Check Mode) press the R/F switch.

(b) Since each damper, motor and relay automatically operates at 1 second intervals beginning in order from 10 in the temperature display, check the temperature and air flow visually and by hand.

If a slower display is desired, press the FRONT DEF switch and change it to a stepped operation. Each time the FRONT DEF switch is pressed, the display changes by 1 step.

HINT:

- Code are displayed in order from the smaller to the larger numbers.
- To cancel the check mode, press the Off switch.

Step No.	Display code	Conditions				
		Blower motor	Air flow vent	Air inlet damper	Magnetic clutch	Air mix damper
1	0	OFF	FACE	FRESH	OFF	Cool side (0 % open)
2	1	1	FACE	FRESH	OFF	Cool side (0 % open)
3	2	16	FACE	FRESH	ON	Cool side (0 % open)
4	3	16	FACE	FRS/REC	ON	Cool side (0 % open)
5	4	16	FACE	RECIRC	ON	Cool / Hot (50 % open)
6	5	16	BI-LEVEL	RECIRC	ON	Cool / Hot (50 % open)
7	6	16	FOOT	RECIRC	ON	Hot side (100 % open)
8	7	16	FOOT	RECIRC	ON	Hot side (100 % open)
9	8	16	FOOT/DEF	RECIRC	ON	Hot side (100 % open)
10	9	31	DEF	RECIRC	ON	Hot side (100 % open)

DI3VV-06

DIAGNOSTIC TROUBLE CODE CHART

If malfunction code is displayed during the DTC check (sensor check), check the circuit listed for that code in the table below (Proceed to the page given for that circuit).

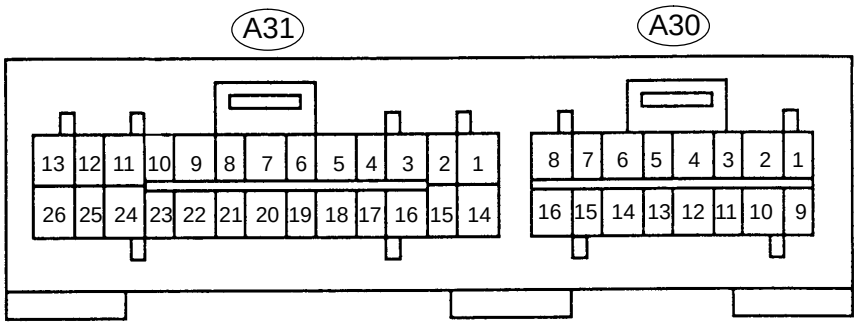
DTC No. (See Page)	Detection Item	Trouble Area	Memory
00	Normal	-	-
11*1 (DI-588)	Room temperature sensor circuit	• Room temp. Sensor • A/C control assembly • Harness or connector between room temp. sensor and A/C control assembly	○ (8.5 min. or more)
12*2 (DI-591)	Ambient temperature sensor circuit	• Ambient temp. Sensor • Harness or connector between ambient temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
13 (DI-594)	Evaporator temperature sensor circuit	• Evaporator temp. Sensor • Harness or connector between evaporator temp. sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
14 (DI-597)	Engine coolant temperature sensor circuit	• Engine coolant temp. sensor • Harness or connector between engine coolant temp. sensor and A/C control assembly • A/C control assembly	-
21*3 (DI-600)	Solar sensor circuit (short)	• Solar sensor • Harness or connector between solar sensor and A/C control assembly • A/C control assembly	○ (8.5 min. or more)
	Solar sensor circuit (open)		-
23 (DI-603)	Pressure switch circuit	• Pressure switch • Harness or connector between pressure switch and A/C control assembly • Refrigerant pipe line • A/C control assembly	-
31 (DI-606)	Air mix damper position sensor circuit	• Air mix damper position sensor • A/C control assembly • Harness or connector between air mix damper position sensor and A/C control assembly	○ (1 min. or more)
32 (DI-609)	Air inlet damper position sensor circuit	• Air inlet damper position sensor • A/C control assembly • Harness or connector between air inlet damper position sensor and A/C control assembly	○ (1 min. or more)
41 (DI-606, DI-612)	Air mix control servomotor	• Air mix control servomotor • Air mix damper position sensor • Harness or connector between air mix damper servomotor and A/C control assembly • A/C control assembly	○ (15 sec.)
42 (DI-609, DI-616)	Air inlet control servomotor	• Air inlet control servomotor • Air inlet damper position sensor • Harness or connector between air inlet damper servomotor and A/C control assembly • A/C control assembly	○ (15 sec.)

HINT:

- *1: If the room temp. is approx. -18.6˚C (-3.7˚F) or lower, trouble code 11 may be output even though the system is normal.
- *2: If the ambient temp. is approx. -52.9˚C (-61.4˚F) or lower, a malfunction code may be output even though the system is normal.
- *3: If the check is being performed in a dark place, DTC 21 (solar sensor circuit abnormal) could be displayed.
- The A/C control assembly memorizes the DTC of the respective malfunction it has occurred for the period of the time indicated in the brackets.

DI3VW-08

TERMINALS OF ECU



I00371

Symbols (Terminals No.)	Wiring Color	Condition	STD Voltage (V)
TAM (A30 - 3) - SG (A31 - 1)	B-L - GR	IG ON. Ambient temp.: 25 °C (77 °F)	1.35 - 1.75 V
		IG ON. Ambient temp.: 40 °C (104 °F)	0.85 - 1.25 V
TR (A30 - 4) - SG (A31 - 1)	B-Y - GR	IG ON. Room temp.: 25 °C (77 °F)	1.8 - 2.2 V
		IG ON. Room temp.: 40 °C (104 °F)	1.2 - 1.6 V
TS (A30 - 5) - SG (A31 - 1)	P - GR	IG ON. Sensor subjected to electrical light.	1.0 V or more
		IG ON. Sensor covered by cloth	Below 1.0 V
TE (A30 - 6) - SG (A31 - 1)	W-R - GR	IG ON. Evaporator temp.: 0 °C (32 °F)	2.0 - 2.4 V
		IG ON. Evaporator temp.: 15 °C (59 °F)	1.4 - 1.8 V
TPI (A30 - 7) - SG (A31 - 1)	V - GR	IG ON. Push REC switch	3.5 - 4.5 V
		IG ON. Push FRS switch	0.5 - 1.8 V
TP (A30 - 8) - SG (A31 - 1)	B - GR	Set temp.: Max. Cool	3.5 - 4.5 V
		Set temp.: Max. Hot	0.5 - 1.8 V
PSW(A30-9) - GND (A31-14)	O - W-B	IG ON.	Below 1.0 V
		IG ON. Disconnect the pressure switch connector.	10 - 14 V
ACT (A30-10) - GND (A31-14)	L-B - W-B	Start the Engine (Idling). Operate the compressor	10 - 14 V
		Start the Engine (Idling). Do not operate compressor	Below 1.5 V
VER1 (A30-11) - GND (A31-14)	W-B - W-B	IG ON.	Below 1.0 V
AC1 (A30-13) - GND (A31-14)	L-Y - W-B	Start the engine, AUTO switch ON and magnetic clutch ON.	Below 1.0 V
		Start the engine, AUTO switch ON and magnetic clutch OFF.	10 - 14 V
BLW (A30-16) - GND (A31-14)	R-W - W-B	IG ON. Operate the blower motor	Below 1.5 V
SG (A31-1) - Body Ground	GR - Body Ground	Always	1 Ω or less
FACE (A31-4) - GND (A31-14)	G-B - W-B	IG ON. Air Flow: FACE	Below 1.0 V
AIF (A31-6) - AIR - (A31-7)	Y-G - R-G	IG ON.	No voltage
AMC (A31-8) - AMH (A31-9)	W - R	IG ON.	13 - 19 Ω
HR (A31-10) - GND (A31-14)	Y-R - W-B	IG ON. Operate the blower motor	Below 1.0 V
		IG ON. Do not operate the blower motor	10 - 14 V
S5 (A31-11) - SG (A31-1)	Y - GR	IG ON.	4 - 6 V
S5 (A31-11) - TS (A30-5)	Y - P	IG ON. Solar sensor subjected to electrical light.	Below 4.0 V
		IG ON. Solar sensor covered by a cloth.	4.0 - 4.5 V
B (A31-13) - GND (A31-14)	L-R - W-B	IG OFF.	10 - 14 V
GND (A31-14) - Body Ground	W-B - Body Ground	Always	1 Ω or less
SPD (A31-15) - GND (A31-14)	G-O - W-B	Turn propeller shaft slowly	Pulse

B/L (A31-17) - GND (A31-14)	G-W - W-B	IG ON. Air Flow: BI-LEVEL.	Below 1.0 V
FOOT (A31-18) - GND (A31-14)	R-L - W-B	IG ON. Air Flow: FOOT.	Below 1.0 V
F/D (A31-19) - GND (A31-14)	P-B - W-B	IG ON. Air Flow: FOOT/DEF	Below 1.0 V
DEF (A31-20) - GND (A31-14)	Y-B - W-B	IG ON. Air Flow: DEF	Below 1.0 V
FR (A31-23) - GND (A31-14)	R-Y - W-B	IG ON. Operate blower motor	Below 1.0 V
		IG ON. Do not operate blower motor	10 - 14 V
IG+ (A31-26) - GND (A31-14)	B-Y - W-B	IG ON.	10 - 14 V

DI3VX-02

PROBLEM SYMPTOMS TABLE

Symptom	Suspect Area	See page
Whole functions of the A/C system does not operate.	3. IG power source circuit 4. A/C control assembly	DI-622 IN-28
Air Flow Control: No blower operation	1. Heater main relay circuit 2. Blower motor circuit 3. Engine coolant temperature sensor circuit 4. IG power source circuit 5. A/C control assembly	DI-627 DI-630 DI-597 DI-622 IN-28
Air Flow Control: No blower control	1. Blower motor circuit 2. IG power source circuit 3. Heater main relay circuit	DI-630 DI-622 DI-627
Air Flow Control: Insufficient air out	1. Blower motor circuit	DI-630
Temperature Control: No cool air comes out	1. Volume of refrigerant 2. Drive belt tension 3. Inspect refrigeration system with manifold gauge set 4. Compressor circuit 5. Pressure switch circuit 6. Air mix control servomotor circuit 7. Air mix damper position sensor circuit 8. Room temp. sensor circuit 9. Ambient temp. sensor circuit 10.A/C control assembly	AC-3 AC-16 AC-3 DI-632 DI-603 DI-612 DI-606 DI-588 DI-591 IN-28
Temperature Control: No warm air comes out	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. Ambient temp. sensor circuit 4. Room temp. sensor circuit 5. Evaporator temp. sensor circuit 6. A/C control assembly 7. Heater radiator (in heater unit)	DI-612 DI-606 DI-591 DI-588 DI-594 IN-28 AC-34
Temperature Control: Output air is warmer or cooler than the set temperature or response is slow.	1. Volume of refrigerant 2. Drive belt tension 3. Inspect refrigeration system with manifold gauge set 4. Ambient temp. sensor circuit 5. Evaporator temp. sensor circuit 6. Solar sensor circuit 7. Air mix damper position sensor circuit 8. Engine coolant temp. sensor circuit 9. Air mix control servomotor circuit 10.Compressor 11.Condenser 12.Receiver 13.Evaporator 14.Heater radiator (in heater unit) 15.Expansion valve 16.A/C control assembly	AC-3 AC-16 AC-3 DI-591 DI-594 DI-600 DI-606 DI-597 DI-612 AC-49 AC-60 AC-57 AC-29 AC-34 AC-24 IN-28
Temperature Control: No temperature control (only Max. cool or Max. warm)	1. Air mix control servomotor circuit 2. Air mix damper position sensor circuit 3. A/C control assembly	DI-612 DI-606 IN-28
No air outlet control	1. Air outlet control servomotor circuit 2. A/C control assembly	DI-619 IN-28
Engine idle up does not occur, or is continuous	1. Compressor circuit 2. A/C control assembly	DI-632 IN-28

Symptom	Suspect Area	See page
Set temperature value displayed does not match up with operation of temperature control switch.	1. A/C control assembly	IN-28
Brightness does not change when rheostat volume or light control switch is turned.	1. Illumination light system 2. A/C control assembly	BE-15 IN-28
Unable to access the diagnosis mode.	A/C control assembly	IN-28
DTC not recorded. Set mode is cleared when IG switch is turned off.	1. Back-up power source circuit 2. A/C control assembly	DI-625 IN-28

DI3VY-09

CIRCUIT INSPECTION

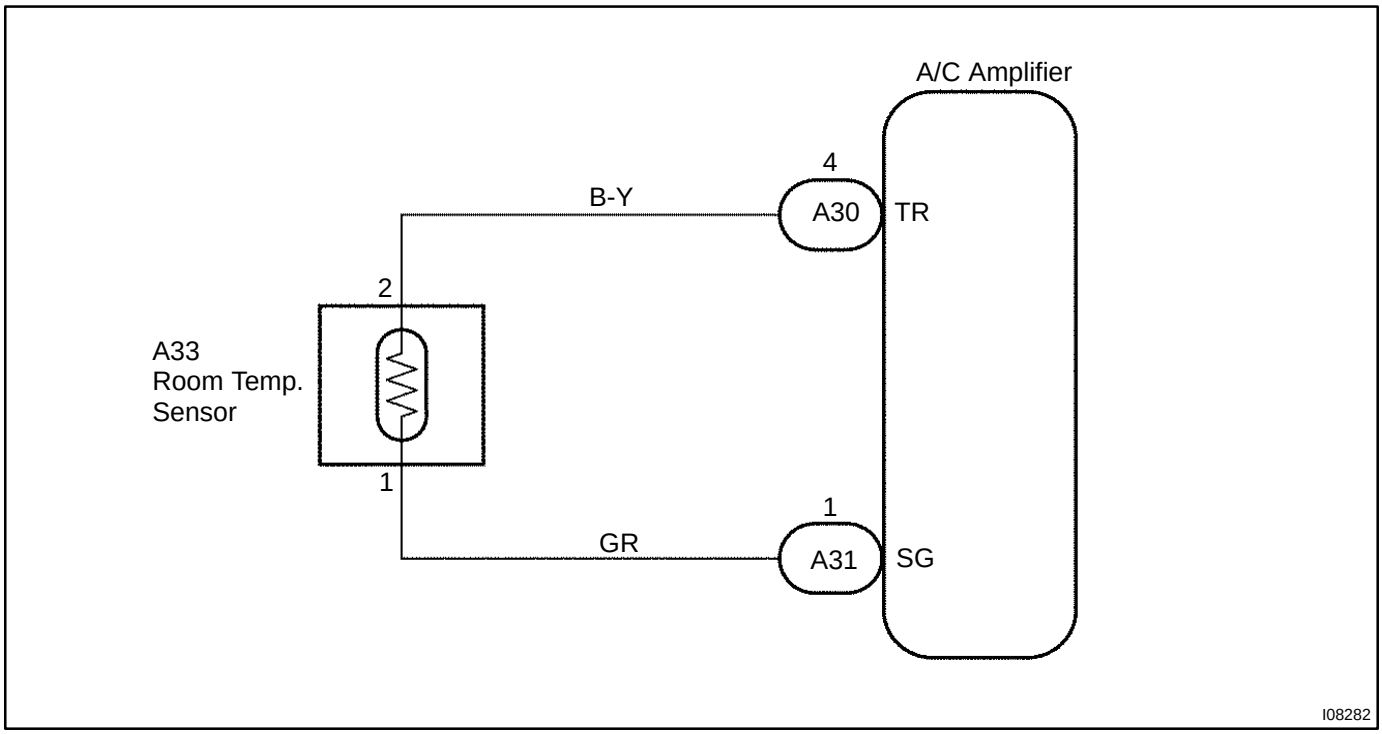
DTC	11	Room Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the cabin and sends the appropriate signals to the A/C control assembly.

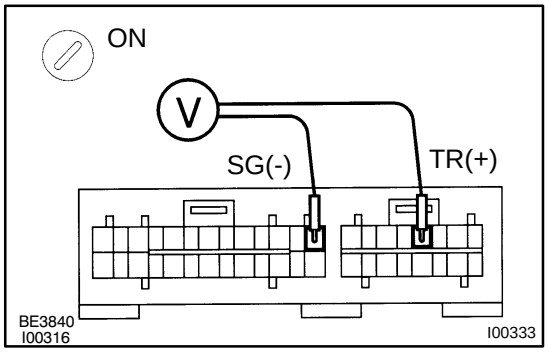
DTC No.	Detection Item	Trouble Area
11	Open or short in room temperature sensor circuit.	• Room temperature sensor • Harness or connector between room temp. sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TR and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Check voltage between terminals TR and SG of A/C control assembly connector at each temperature.

OK:

at 25 ˚C (77 ˚F) : 1.8 - 2.2 V

at 40 ˚C (104 ˚F) : 1.2 - 1.6 V

HINT:

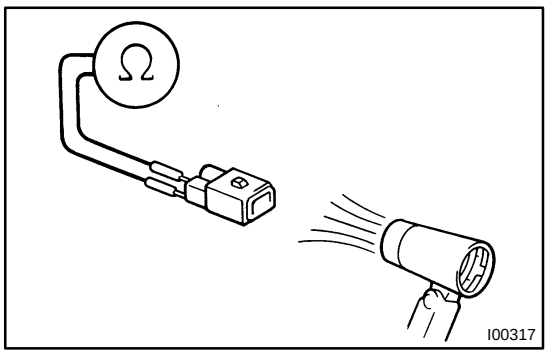
As the temperature increases, the voltage decreases.

NG	Go to step 2.

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 11 is displayed, check and replace A/C control assembly.

2	Check room temperature sensor.



PREPARATION:

(a) Remove room temperature sensor from lower No. 1 panel (See page AC-74).

(b) Disconnect room temperature sensor connector.

CHECK:

Check resistance between terminals 1 and 2 of room temperature sensor connector at each temperature.

OK:

at 25 ˚C (77 ˚F) : 1.6 - 1.8 kΩ

at 40 ˚C (104 ˚F) : 0.5 - 1.7 kΩ

HINT:

As the temperature increases, the resistance decreases.

NG	Replace room temperature sensor.

OK

3	**Check harness and connector between A/C control assembly and room temperature sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DI3VZ-10

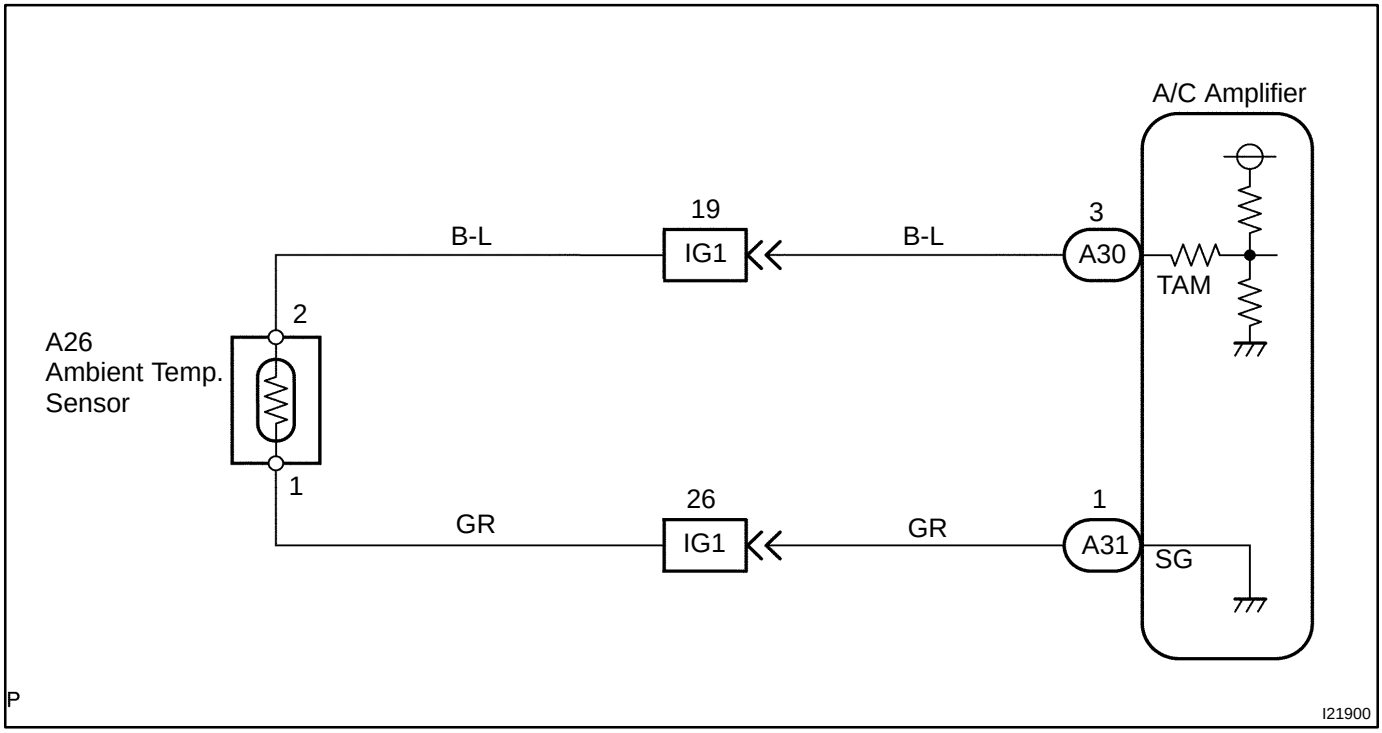
DTC	12	Ambient Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the ambient temperature and sends the appropriate signals to the A/C control assembly.

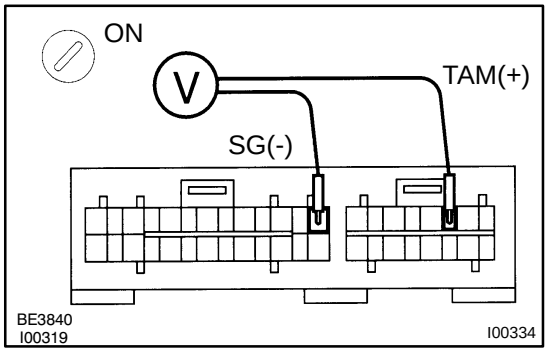
DTC No.	Detection Item	Trouble Area
12	Open or short in ambient temperature sensor circuit.	• Ambient temperature sensor • Harness or connector between ambient temperature sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TAM and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Check voltage between terminals TAM and SG of A/C control assembly connector at each temperature .

OK:

Voltage
at 25 ˚C (77 ˚F) : 1.35 - 1.75 V
at 40 ˚C (104 ˚F) : 0.85 - 1.25 V

HINT:

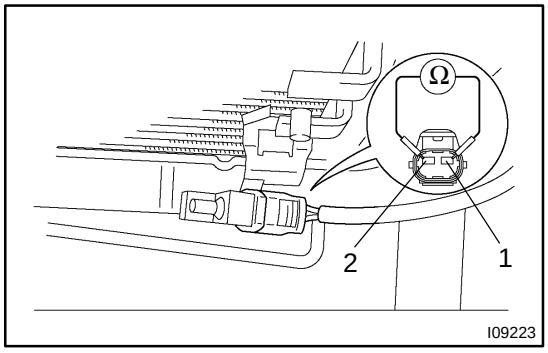
As the temperature increases, the voltage decreases.

NG → **Go to step 2.**

OK

Proceed to the next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 12 is displayed, check and replace A/C control assembly.

2	Check ambient temperature sensor.



PREPARATION:

Disconnect ambient temperature sensor connector.

CHECK:

Check resistance between terminals 1 and 2 of ambient temperature sensor connector at each temperature.

OK:

Resistance
at 25 ˚C (77 ˚F) : 1.6 - 1.8 kΩ
at 40 ˚C (104 ˚F) : 0.5 - 0.7 kΩ

HINT:

As the temperature increase, the resistance decrease.

NG → **Replace ambient temperature sensor.**

OK

3	**Check harness and connector between A/C control assembly and ambient temperature sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DI3W0-10

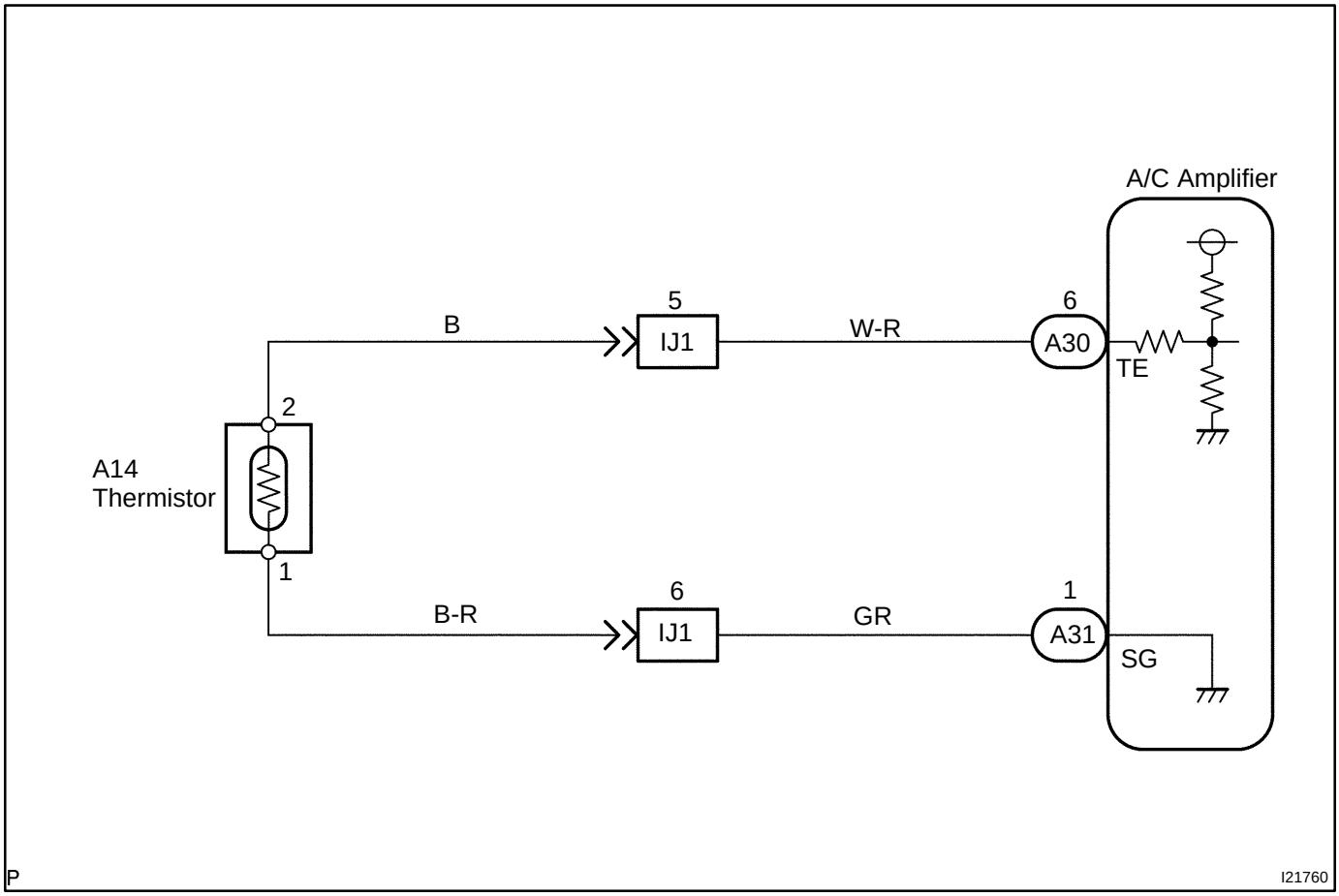
DTC	13	Evaporator Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the temperature inside the A/C unit and sends the appropriate signals to the A/C control assembly.

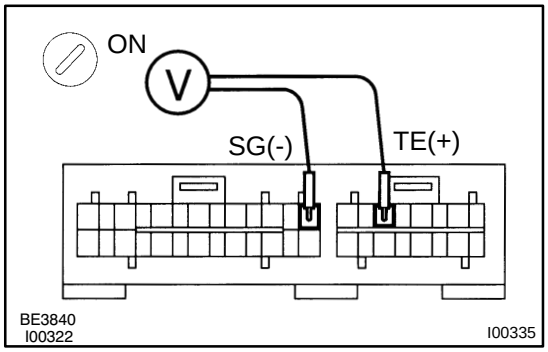
DTC No.	Detection Item	Trouble Area
13	Open or short in evaporator temperature sensor circuit.	• Evaporator temperature sensor • Harness or connector between evaporator temperature sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals TE and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals TE and SG of A/C control assembly connector at each temperature.

OK:

Voltage
at 0 ˚C (32 ˚F) : 2.0 - 2.4 V
at 15 ˚C (59 ˚F) : 1.4 - 1.8 V

HINT:

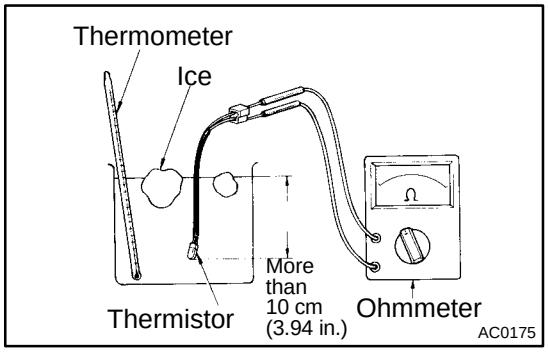
As the temperature increases, the voltage decreases.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 13 is displayed, check and replace A/C control assembly.

2	Check evaporator temperature sensor.



PREPARATION:

Remove evaporator temperature sensor (See page AC-28).

CHECK:

Check resistance between terminals 1 and 2 of evaporator temperature sensor connector at each temperature.

OK:

Resistance
at 0 ˚C (32 ˚F) : 4.6. - 5.1 kΩ
at 15 ˚C (59 ˚F) : 2.1 - 2.6 kΩ

HINT:

As the temperature increases, the resistance decreases.

NG → **Replace evaporator temperature sensor.**

OK

3	**Check harness and connector between A/C control assembly and evaporator temperature sensor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

DI5CE-02

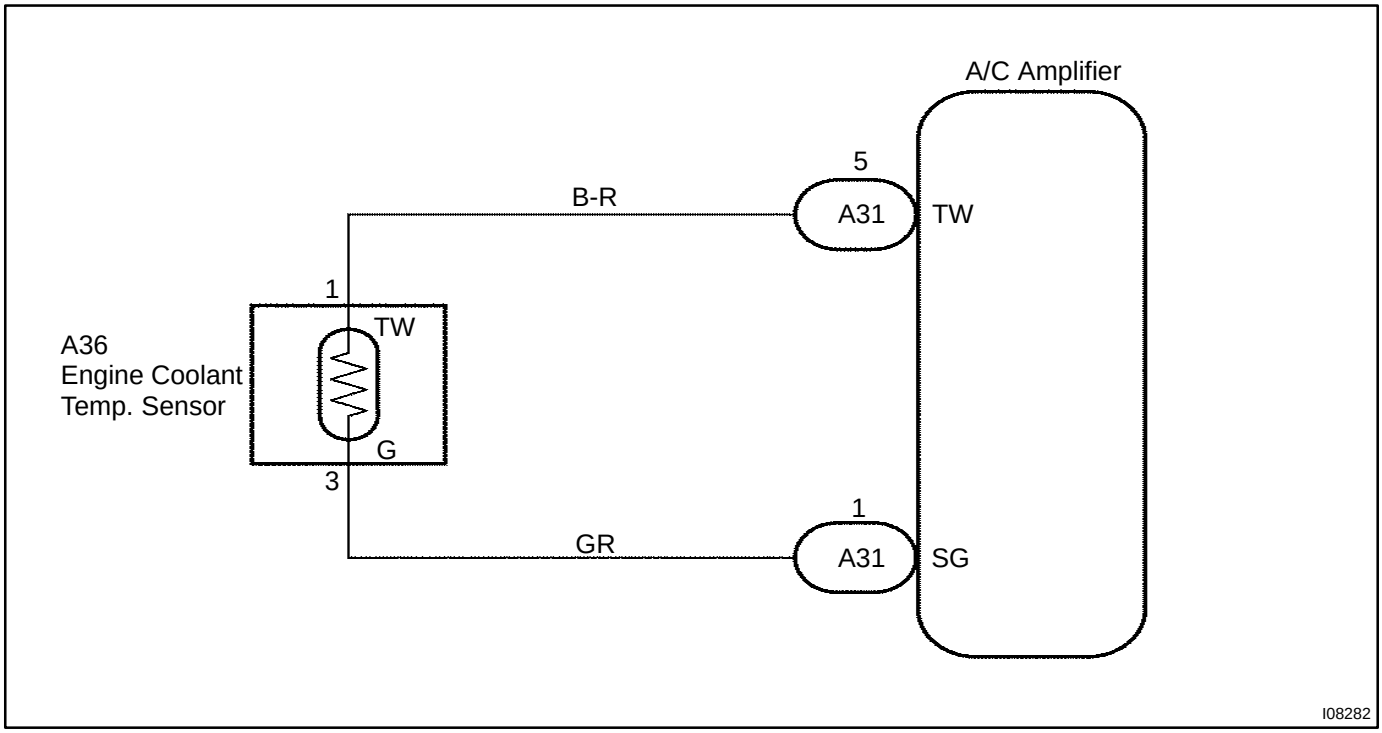
DTC	14	Engine Coolant Temperature Sensor Circuit

CIRCUIT DESCRIPTION

This sensor detects the engine coolant temperature and sends the appropriate signals to the A/C control assembly. These signals are used for warm up control when the engine is cold.

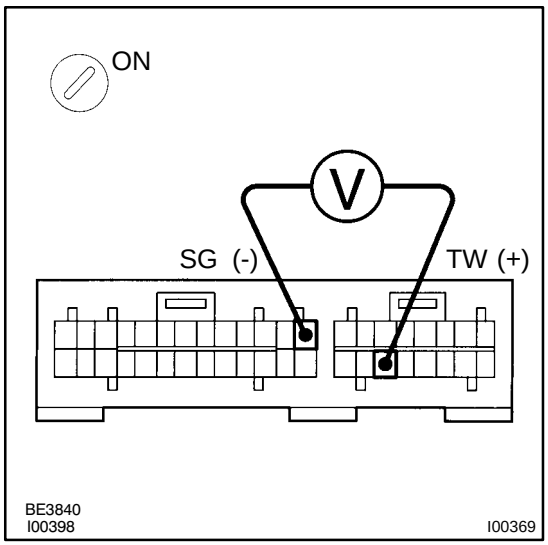
DTC No.	Detection Item	Trouble Area
14	Open or short in engine coolant temperature sensor circuit.	• Engine coolant temperature sensor • Harness or connector between engine coolant temp. sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TW and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals TW and SG of A/C control assembly connector at each engine coolant temperature.

OK:

Voltage
at 0 ˚C (32 ˚F): 2.8 - 3.2 V
at 40 ˚C (104 ˚F): 1.8 - 2.2 V
at 70 ˚C (158 ˚F): 0.9 - 1.3 V

HINT:

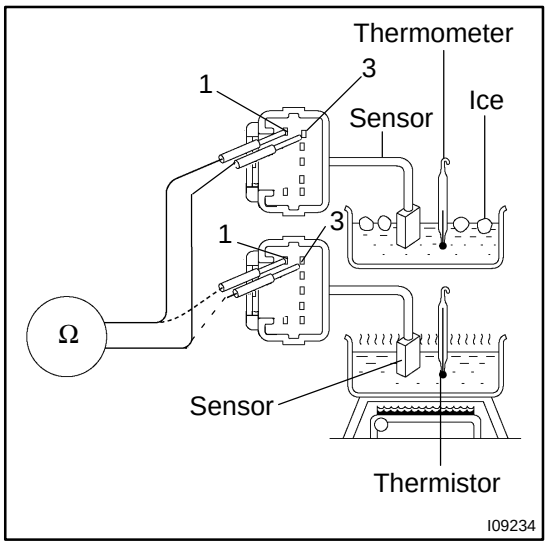
As the temperature increases, the voltage decreases.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 14 is displayed, check and replace A/C control assembly.

2	Check engine coolant temperature sensor.



PREPARATION:

Remove engine coolant temperature sensor (See page AC-28).

CHECK:

Measure resistance between terminals 1 and 3 of engine coolant temperature sensor connector at each temperature.

OK:

Resistance :
at 0˚C (32˚F) : Below 50 kΩ
at 40˚C (104˚F) : 2.5 - 2.7 kΩ
at 100 ˚C (212˚F): Over 0.3 kΩ

HINT:

As the temperature increases, the resistance decreases gradually.

NG → **Replace engine coolant temperature sensor.**

OK

3	Check harness and connector between A/C control assembly and engine coolant temperature sensor (See page IN-28).

NG → **Repair or replace harness or connector.**

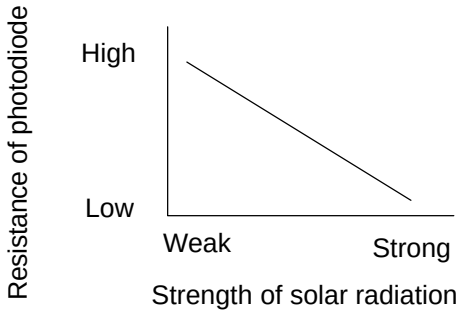
OK

Check and replace A/C control assembly.

DI3W2-11

DTC	21	Solar Sensor Circuit

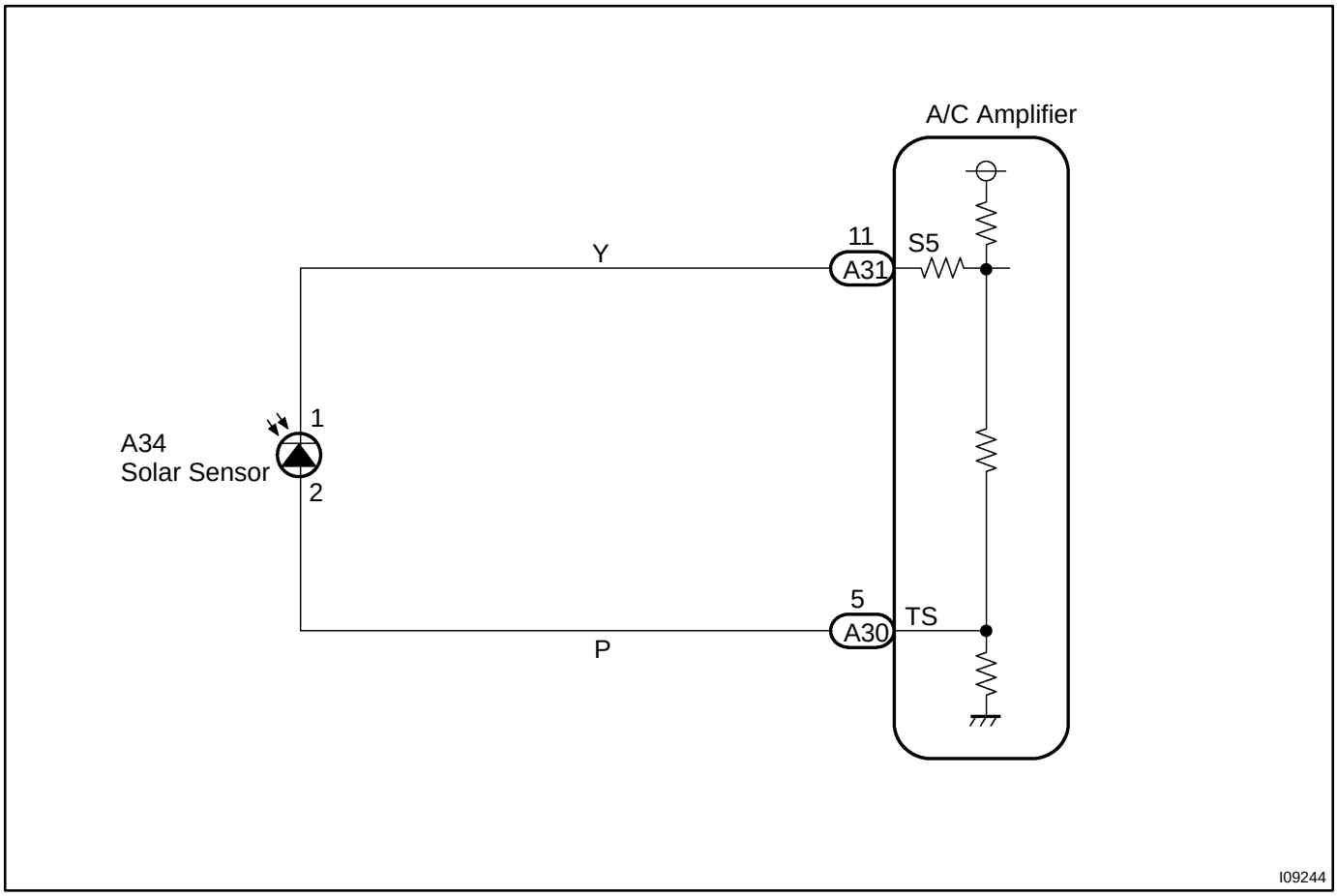
CIRCUIT DESCRIPTION



A photo diode in the solar sensor detects solar radiation and sends signals to the A/C control assembly.

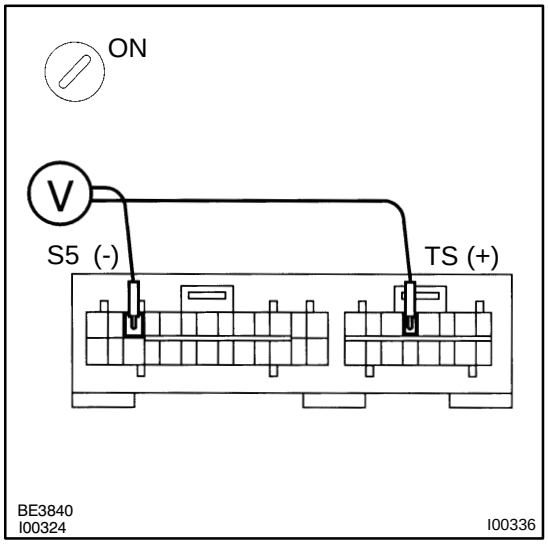
DTC No	Detection Item	Trouble Area
21	Open or short in solar sensor circuit. Please note that display of diagnostic trouble code 21 is not abnormal when the sensor is not receiving solar radiation.	• Solar sensor • Harness or connector between solar sensor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminals S5 and TS of A/C control assembly connector.



PREPARATION:

Remove A/C control assembly with connectors still connected.

CHECK:

(a) Turn ignition switch to ON.

(b) Measure voltage between terminals S5 and TS of A/C control assembly connector when the solar sensor is subjected to an electric light, and when the sensor is covered by a cloth.

OK:

Condition	Voltage
Sensor subjected to electric light	Below 4.0 V
Sensor covered by a cloth	4.0 - 4.5 V

HINT:

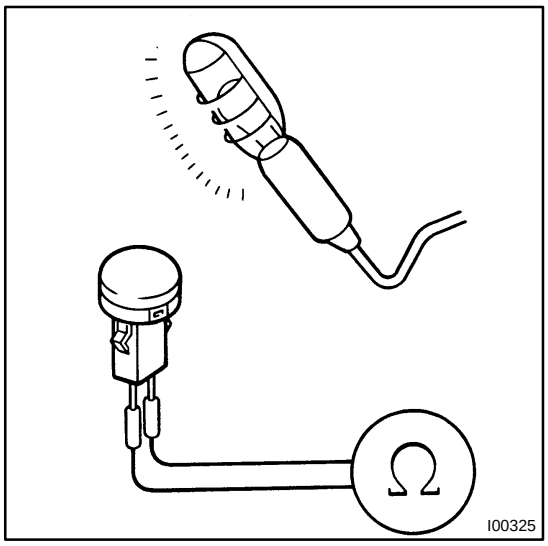
As the inspection light is moved away from the sensor, the voltage increases.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 21 is displayed, check and replace A/C control assembly.

2	Check solar sensor.



PREPARATION:

Remove solar sensor (See page AC-73).

CHECK:

(a) Cover the sensor with a cloth.

(b) Measure resistance between terminals 1 and 2 of solar sensor connector.

HINT:

Connect positive (+) lead of ohmmeter to terminal 1 and negative (-) lead to terminal 2 of the solar sensor.

OK:

Resistance : ∞ Ω (no continuity)

PREPARATION:

(a) Remove the cloth from the solar sensor and subject the sensor to electric light.

(b) Measure resistance between terminals.

OK:

Resistance : Approx. 10 kΩ (continuity)

HINT:

As the electric light is moved away from the sensor, the resistance increases.

NG → **Replace solar sensor.**

OK ↓

3	Check harness and connector between A/C control assembly and solar sensor (See page IN-28).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace A/C control assembly.

DI3W4-11

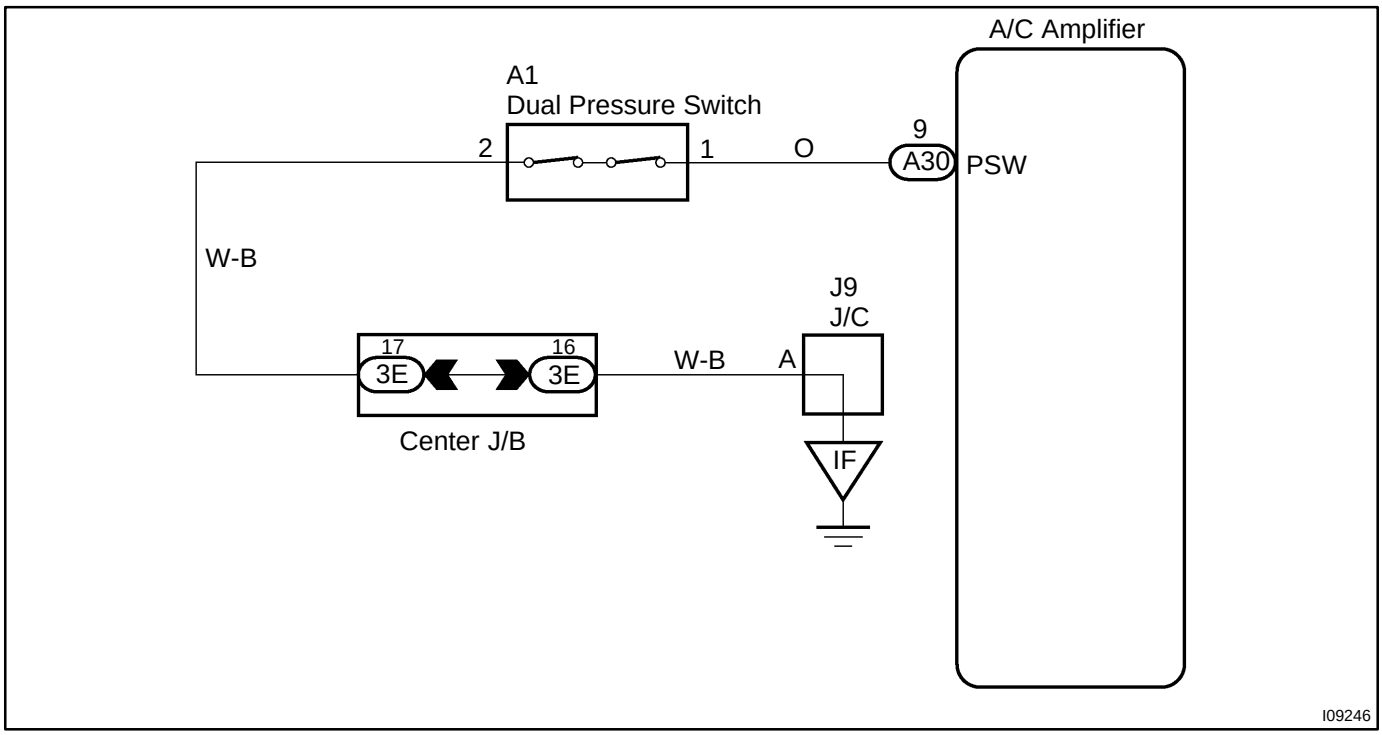
DTC	23	Pressure Switch Circuit

CIRCUIT DESCRIPTION

This pressure switch sends the appropriate signals to the A/C control assembly when the A/C refrigerant pressure drops too low or rises too high. When the A/C control assembly receives these signals, if outputs signals via the ECM to switch off the compressor relay and turns the magnetic clutch off.

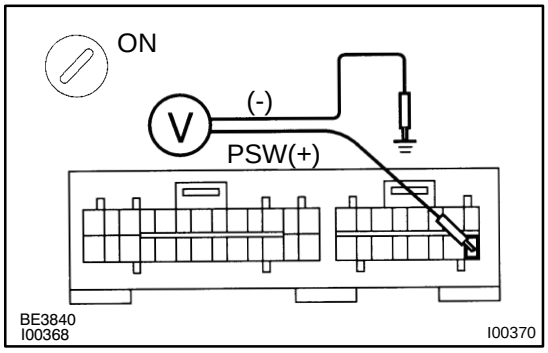
DTC No.	Detection Item	Trouble Area
23	• Open in pressure sensor circuit. • Abnormal refrigerant pressure. below 196 kPa (2.0 kgf/cm^2. 28 psi) over 3,140 kPa (32.0 kgf/cm^2. 455 psi)	• Pressure switch • Harness or connector between pressure switch and A/C control assembly • Refrigerant pipe line • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals PSW of A/C control assembly and body ground.**



PREPARATION:

(a) Install the manifold gauge set (See page AC-19).

(b) Remove the A/C control assembly with connectors still connected.

(c) Turn ignition switch to ON.

CHECK:

Check voltage between terminals PSW of A/C control assembly connector and body ground when refrigerant pressure is changed.

OK:

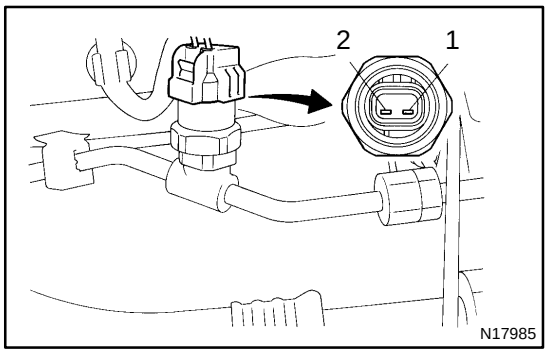
The voltage changes refrigerant pressure, as shown in the chart below.

Low Pressure Cut Side	Referaence : High Pressure Cut SIde
ON (0 V) 225 kPa 196 kPa OFF (12V)	ON (0 V) 2,550 kPa 3,140 kPa OFF (12V)

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	Check pressure switch.



PREPARATION:

Disconnect pressure switch connector.

CHECK:

Check continuity between terminals 1 and 2 of pressure switch when refrigerant is changed.

OK:

The continuity changes with refrigerant pressure as shown in the chart below.

Low Pressure Cut Side	Referaence : High Pressure Cut SIde
ON (continuity) 225 kPa 196 kPa OFF (no continuity)	ON (continuity) 2,550 kPa 3,140 kPa OFF (nocontinuity)

NG → **Replace pressure switch.**

OK

3	Check harness and connector between A/C control assembly and pressure switch, pressure switch and body ground (See page IN-28).

NG → **Repair or replace harness or connector.**

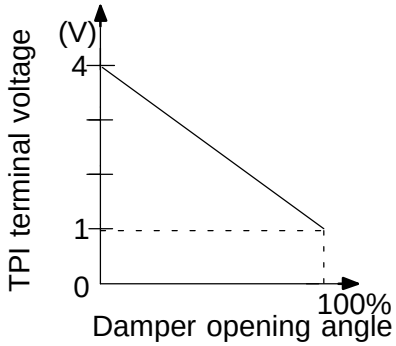
OK

Check and replace A/C control assembly.

DI3W5-09

DTC	31, 41	Air Mix Damper Position Sensor Circuit

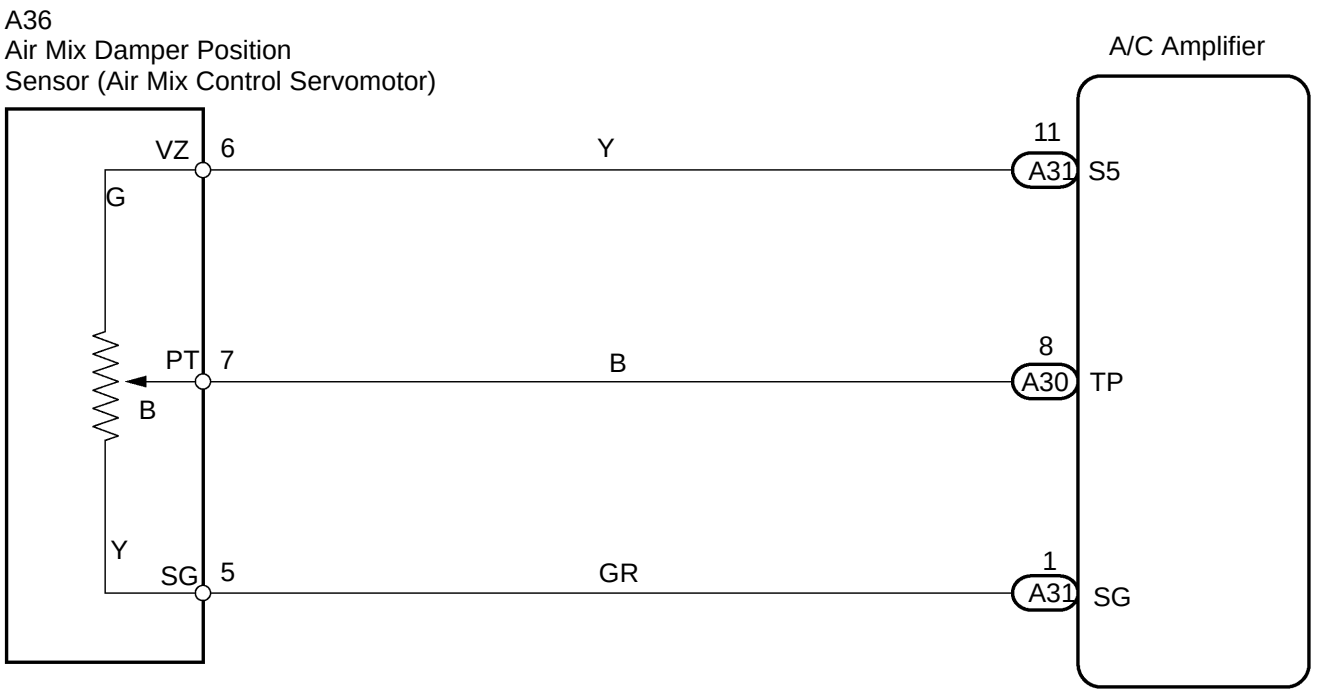
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air inlet control servomotor.

DTC No.	Detection Item	Trouble Area
31	Short to ground or power source circuit in air mix damper position sensor circuit.	• Air mix damper position sensor • Harness or connector between air inlet control servomotor and A/C control assembly • A/C assembly
41	Air mix damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	

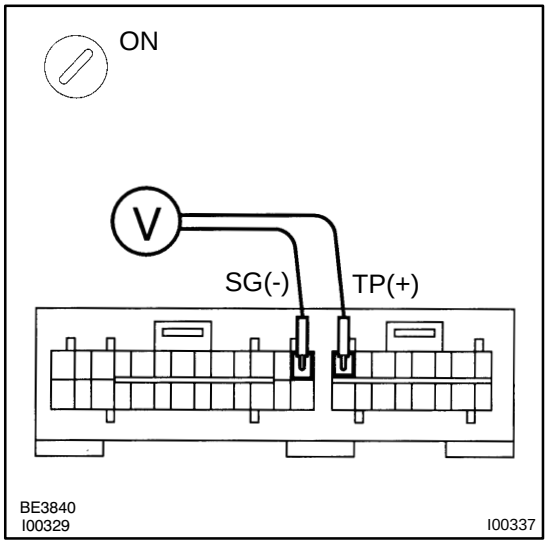
WIRING DIAGRAM



I10328

INSPECTION PROCEDURE

1	Check voltage between terminals TP and SG of A/C control assembly connector.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Change the set temperature to activate the air mix damper, and measure the voltage between terminals TP and SG of A/C control assembly connector each time when the set temperature is changed.

OK:

Set Temperature	Voltage
Max. cool	3.5 - 4.5 V
Max. hot	0.5 - 1.8 V

HINT:

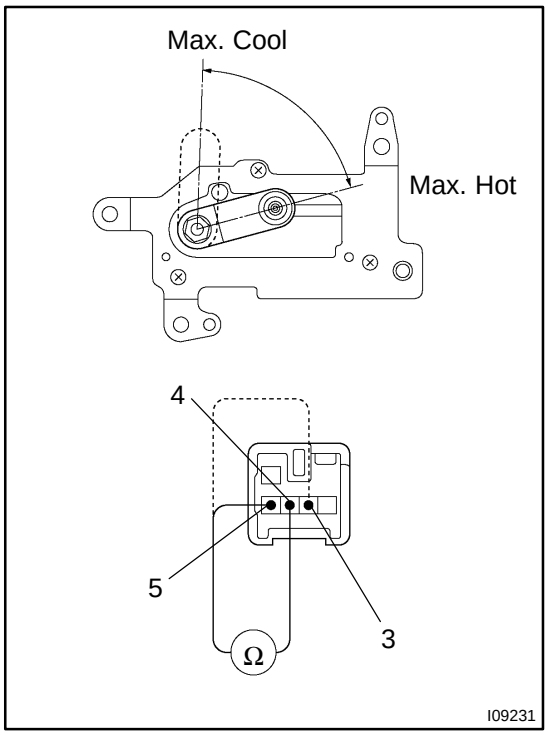
As the set temperature increases, the voltage decreases gradually without interruption.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 31 or 41 is displayed, check and replace A/C control assembly.

2	Check air mix damper position sensor.



PREPARATION:

Remove air mix control servomotor (See page AC-34).

CHECK:

Measure resistance between terminals 4 and 5 of air inlet control servomotor connector.

OK:

Resistance: 4.8 - 7.2 kΩ

CHECK:

While operating air mix control servomotor as shown in the procedure on page DI-612 , measure resistance between terminals 3 and 5 of air mix control servomotor connector.

OK:

Position	Resistance
Max. cool	3.8 - 5.8 kΩ
Max. hot	0.95 - 1.45 kΩ

HINT:

As the air inlet control servomotor moves from cool side to hot side, the resistance decreases gradually without interruption.

NG → **Replace air mix control servomotor.**

OK

3	Check harness and connector between A/C control assembly and air mix control servomotor. (See page IN-28).

NG → **Repair or replace harness or connector.**

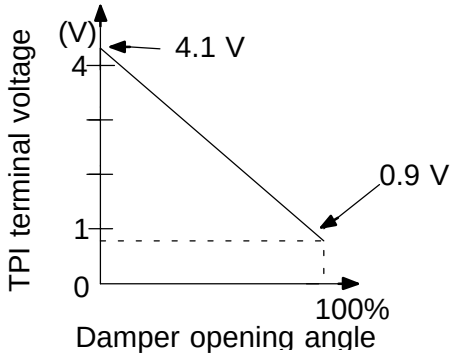
OK

Check and replace A/C control assembly.

DI3W6-09

DTC	32, 42	Air Inlet Damper Position Sensor Circuit

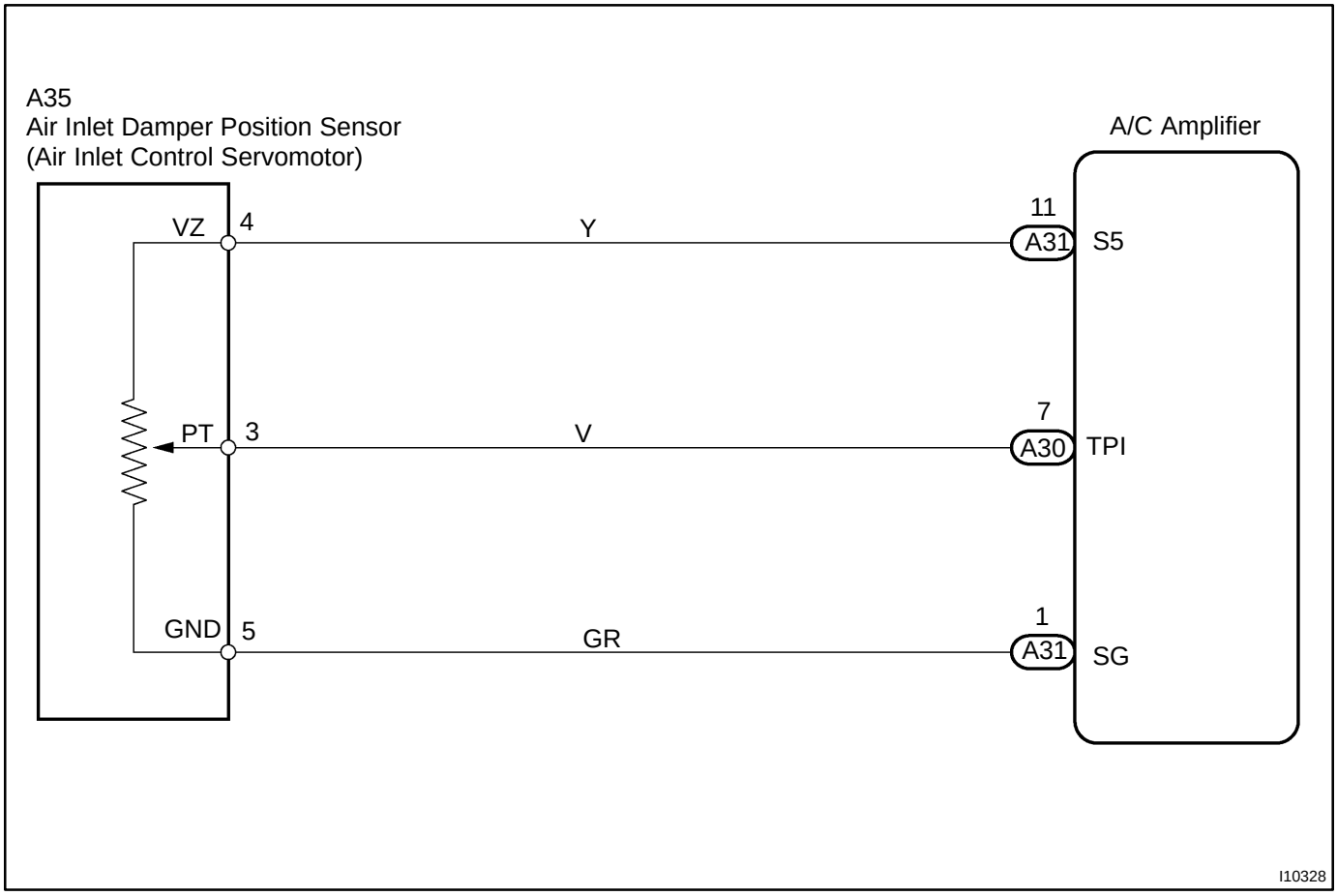
CIRCUIT DESCRIPTION



This sensor detects the position of the air inlet damper and sends the appropriate signals to the A/C control assembly. The position sensor is built into the air inlet control servomotor.

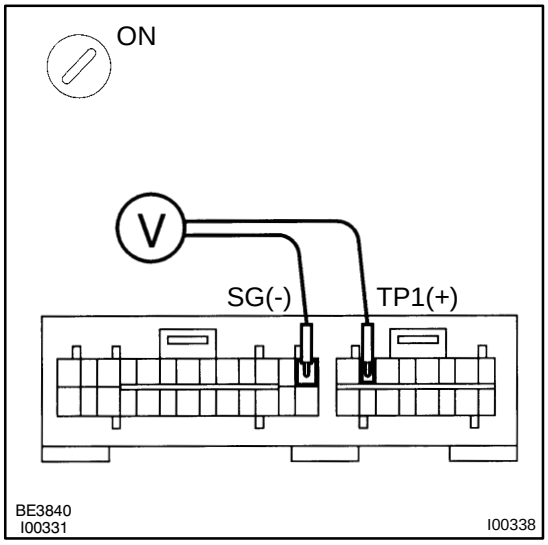
DTC No.	Detection Item	Trouble Area
32	Short to ground or power source circuit in air inlet damper position sensor circuit.	• Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C control assembly • A/C control assembly
42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals TPI and SG of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Press REC/FRS switch to change air inlet between fresh and recirculation air and measure voltage between terminals TP1 and SG of A/C control assembly when the air inlet servomotor operates.

OK:

REC/FRS Switch	Voltage
REC	3.5 - 4.5 V
FRS	0.5 - 1.8 V

HINT:

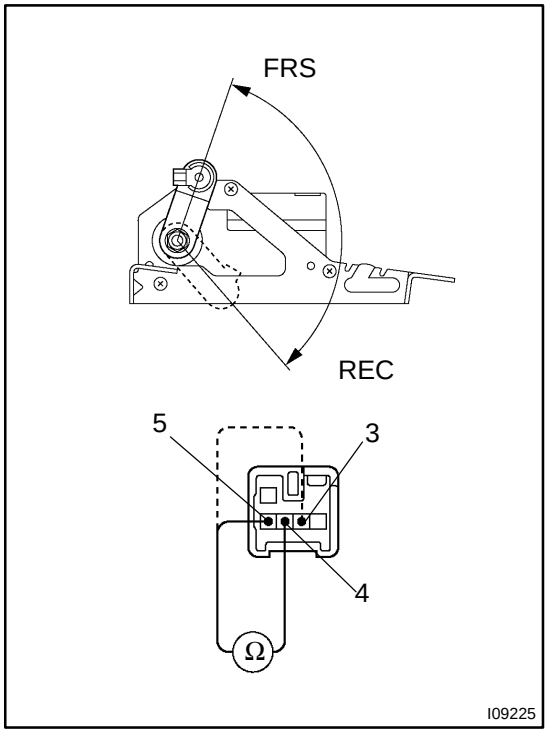
As the air inlet control servomotor is moved from REC side to FRS side, the voltage decreases gradually without interruption.

NG → **Go to step 2.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586). However, if DTC 32 or 42 is displayed, check and replace A/C control assembly.

2	Check air inlet damper position sensor.



PREPARATION:

(a) Remove air inlet control servomotor (See page AC-46).

(b) Disconnect air inlet control servomotor connector.

CHECK:

Measure resistance between terminals 4 and 5 of air inlet control servomotor connector.

OK:

Resistance : 4.2 - 7.8 kΩ

CHECK:

While operating air inlet control servomotor as in the procedure on page, measure resistance between terminals 3 and 4 of air inlet control servomotor connector.

OK:

Resistance :

Damper Position	Resistance
REC side	3.4 - 6.4 kΩ
FRS side	0.76 - 1.4 kΩ

HINT:

As the air inlet control servomotor is moved from REC side to FRS side, the resistance decreases gradually without interruption.

NG → **Replace air inlet control servomotor.**

OK ↓

3	Check harness and connector between A/C control assembly and air inlet control servomotor. (See page AC-84).

NG → **Repair or replace harness or connector.**

OK ↓

Check and replace A/C control assembly.

DI3W7-07

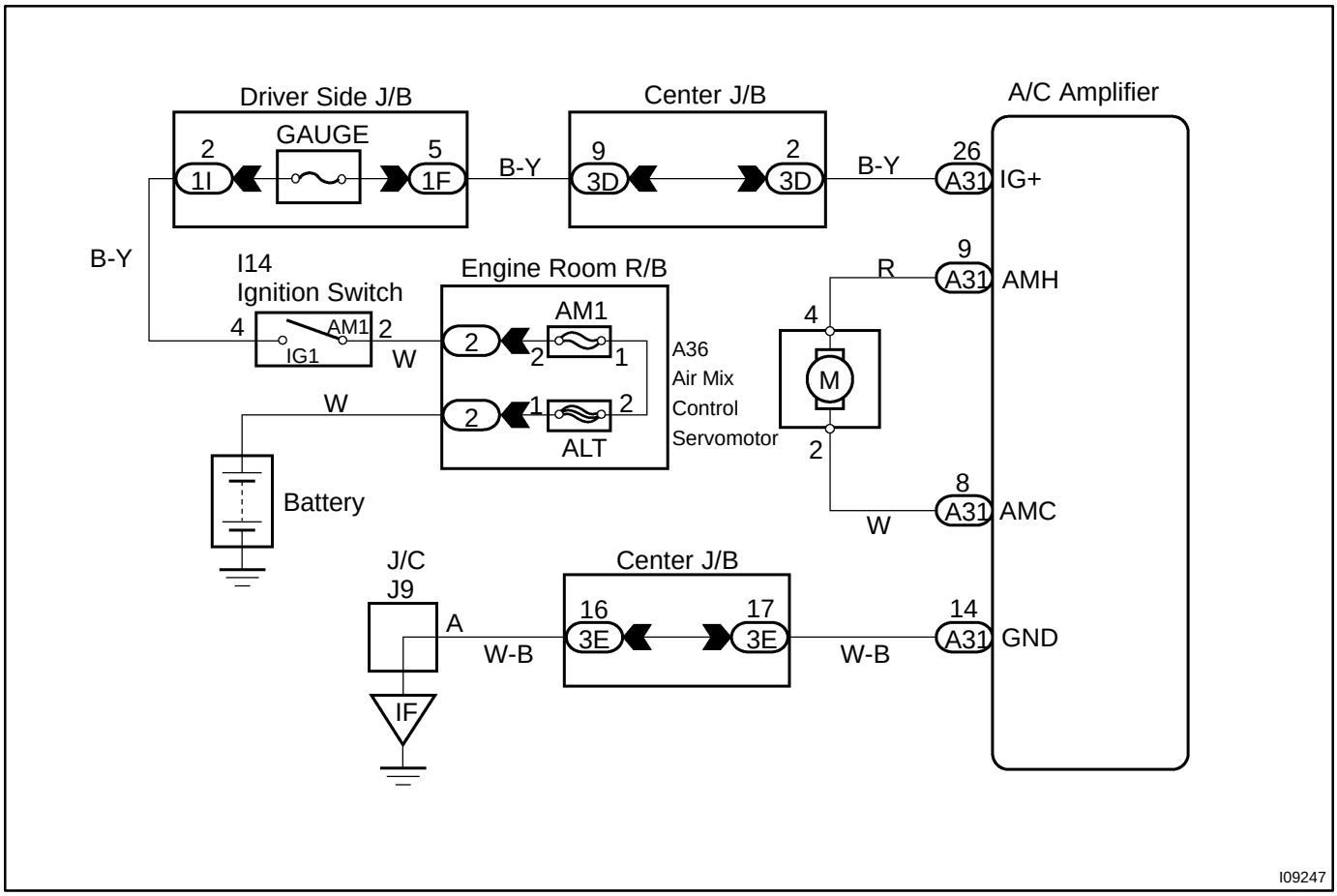
DTC	41	Air Mix Control Servomotor Circuit

CIRCUIT DESCRIPTION

This air mix control servomotor is controlled by the A/C control assembly and moves the air mix damper to the desired position.

DTC No.	Detection Item	Trouble Area
41	Air mix damper position sensor value does not change even if A/C control assembly operates air mix control servomotor.	• Air mix control servomotor • Air mix damper position sensor • Harness or connector between A/C control assembly and air mix control servomotor, air mix damper position sensor • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Actuator check**

PREPARATION:

(a) Warm up the engine.

(b) Set to the actuator check mode (See page DI-578).

(c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation of the air mix damper and the condition of the blower.

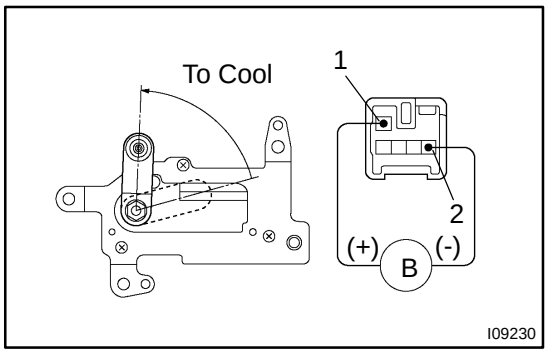
OK:

Display Code	Air Mix Damper	Condition
0 - 3	0 % (Fully closed)	Cool air comes out
4 - 5	50 %	
6 - 9	100 % (Fully opened)	Warm air comes out

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	Check air mix control servomotor.



PREPARATION:

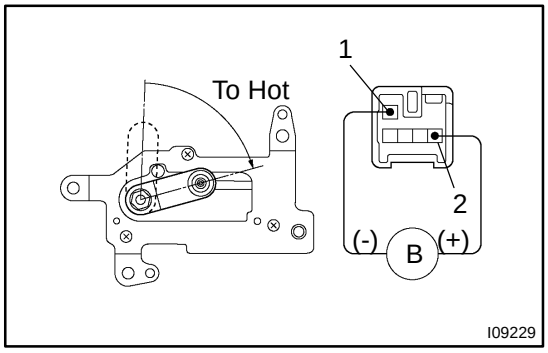
Remove air mix control servomotor (See page AC-34).

CHECK:

Connect positive (+) lead to terminal 1 and the negative (-) lead to terminal 2.

OK:

The lever turns smoothly to COOL side.



CHECK:

Connect negative (-) lead to terminal 1 and positive (+) lead to terminal 2.

OK:

The lever turns smoothly to HOT side.

NG → **Repair or replace harness or connector.**

OK

3	**Check harness and connector between A/C control assembly and air mix control servomotor (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly (See page IN-28).

DI3W8-04

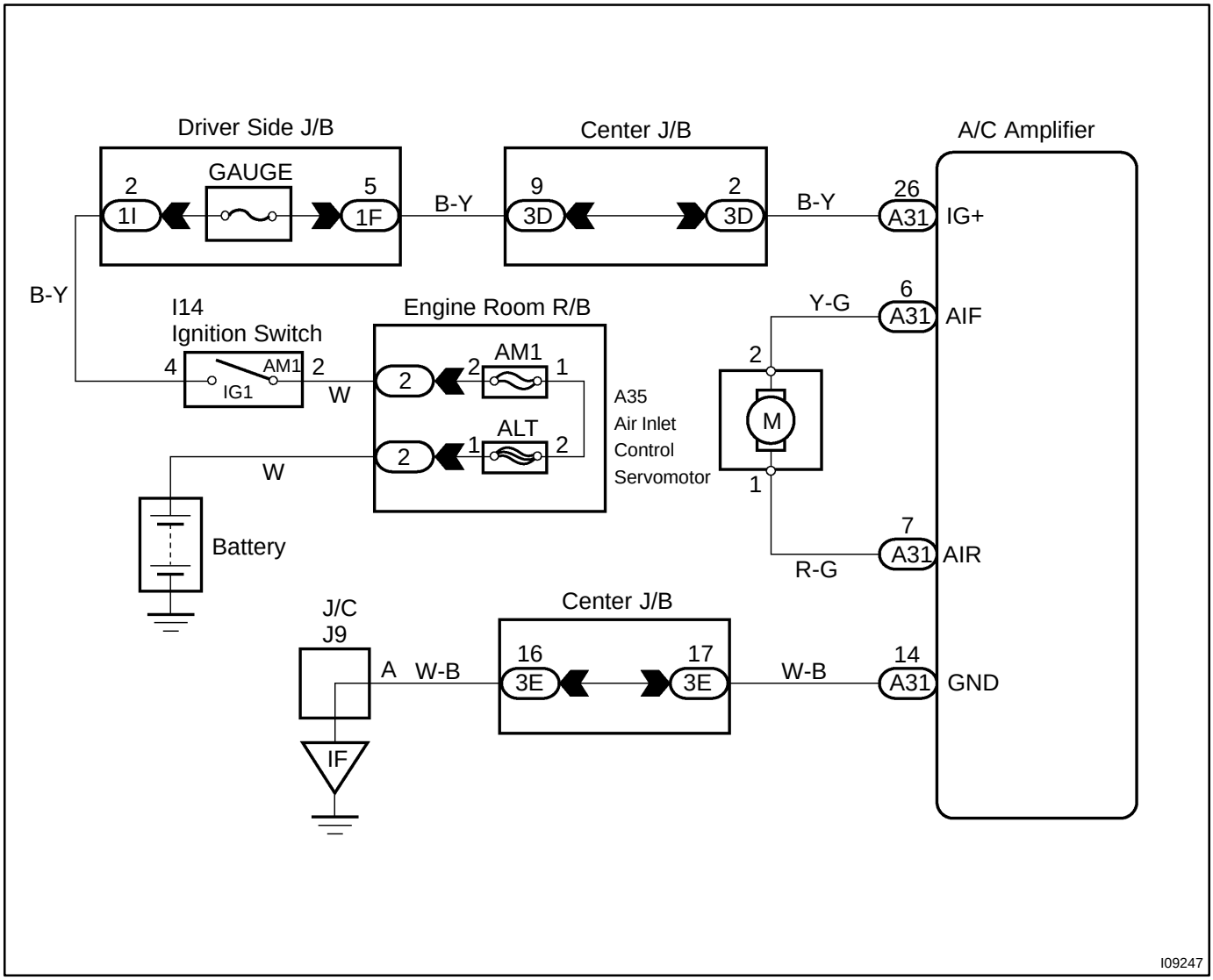
DTC	42	Air Inlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

The air inlet control servomotor is controlled by the A/C control assembly and moves the air inlet damper to the desired position.

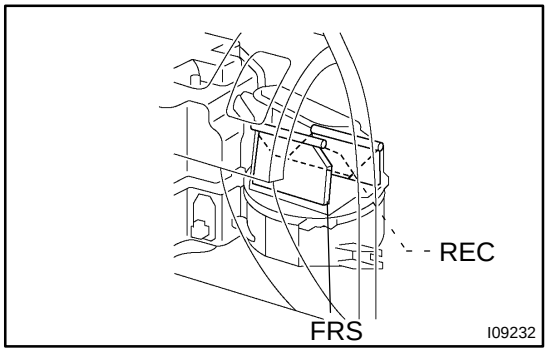
DTC No.	Detection Item	Trouble Area
42	Air inlet damper position sensor value does not change even if A/C control assembly operates air inlet control servomotor.	• Air inlet damper position sensor • Harness or connector between air inlet control servomotor and A/C control assembly • A/C control assembly

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.



PREPARATION:

(a) Remove glove compartment to see and check the air inlet damper operation.

(b) Set to the actuator check mode (See page DI-578).

(c) Press the DEF switch and change it to step operation.

CHECK:

Press the DEF switch and check the operation air inlet damper.

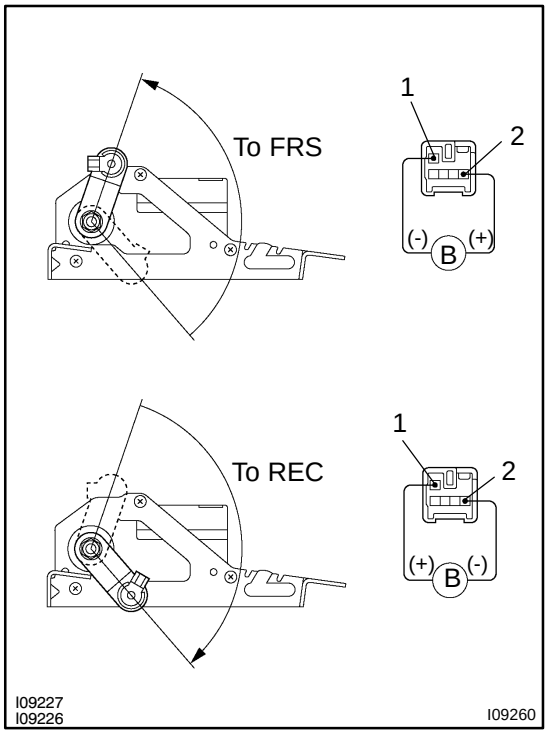
OK:

DIsplay Code	Air Inlet Damper
0 - 2	FRS
3	REC/FRS
4 - 9	REC

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	Check air inlet control servomotor.



PREPARATION:

Remove air inlet control servomotor (See page AC-46).

CHECK:

Connect positive (+) lead to terminal 2 and negative (-) lead to terminal 1.

OK:

The lever moves smoothly to FRS position.

CHECK:

Connect negative (-) lead to terminal 2 and positive (+) lead to terminal 1.

OK:

The lever moves smoothly to REC position.

NG → **Replace air inlet control servomotor assembly.**

OK

3	**Check harness and connector between A/C control assembly and air inlet control servomotor. (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Check and replace A/C control assembly.

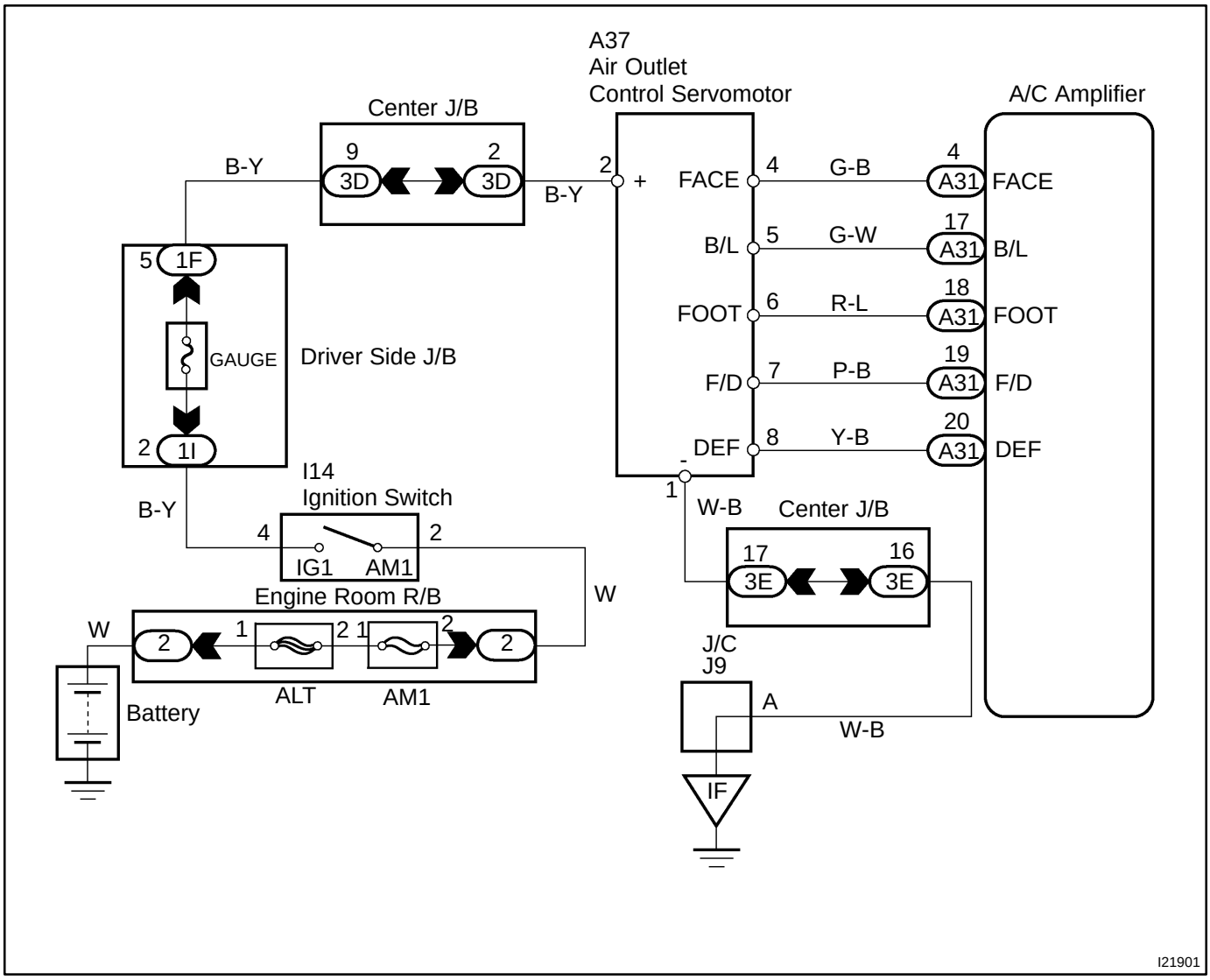
DI3W9-10

Air Outlet Control Servomotor Circuit

CIRCUIT DESCRIPTION

This circuit turns the servomotor and changes each mode damper position by signals from the A/C control assembly. When the AUTO switch is ON, the A/C control assembly changes the mode automatically between FACE, BI-LEVEL and FOOT according to the temperature setting.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Actuator check.

Display Code	Air Flow Mode
0 - 4	FACE
5	BI-LEVEL
6 - 7	FOOT
8	FOOT/DEF
9	DEF

PREPARATION:

(a) Set to the actuator check mode (See page DI-578).

(b) Press the DEF switch and change to step operation.

CHECK:

Press the DEF switch in order and check the condition of air flow mode by hand.

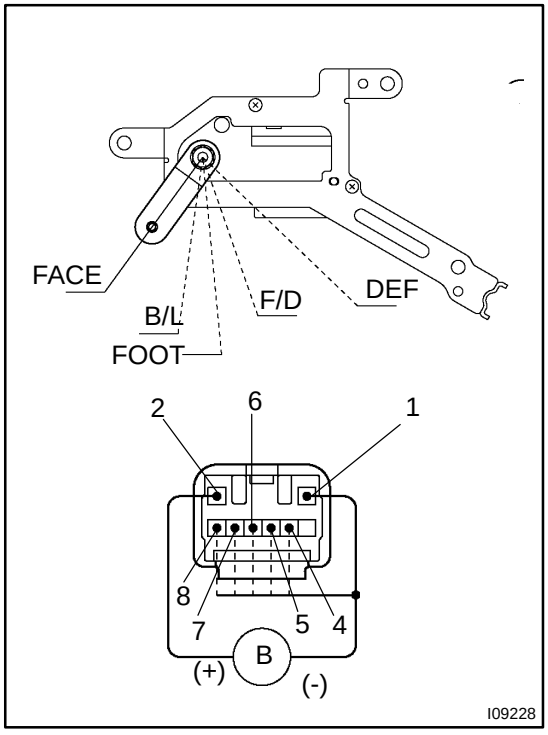
OK:

The mode changes with the change in the temperature display as shown in the table.

OK	Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

NG

2	Check air outlet control servomotor.



PREPARATION:

Remove air outlet control servomotor (See page AC-72).

CHECK:

(a) Connect positive (+) lead to terminal 2 and negative (-) lead to terminal 1.

(b) Check the lever operation when the negative (-) lead is connected to the terminals shown below.

OK:

The lever moves smoothly to the position for each mode.

Ground Terminals	Mode
8	DEF.
7	FOOT/DEF
6	FOOT
5	B/L
4	FACE

NG	Replace air outlet control servomotor.

OK

3	**Check harness and connector between A/C control assembly and air outlet control servomotor, air outlet control servomotor and battery, air outlet control servomotor and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Repair or replace A/C control assembly.

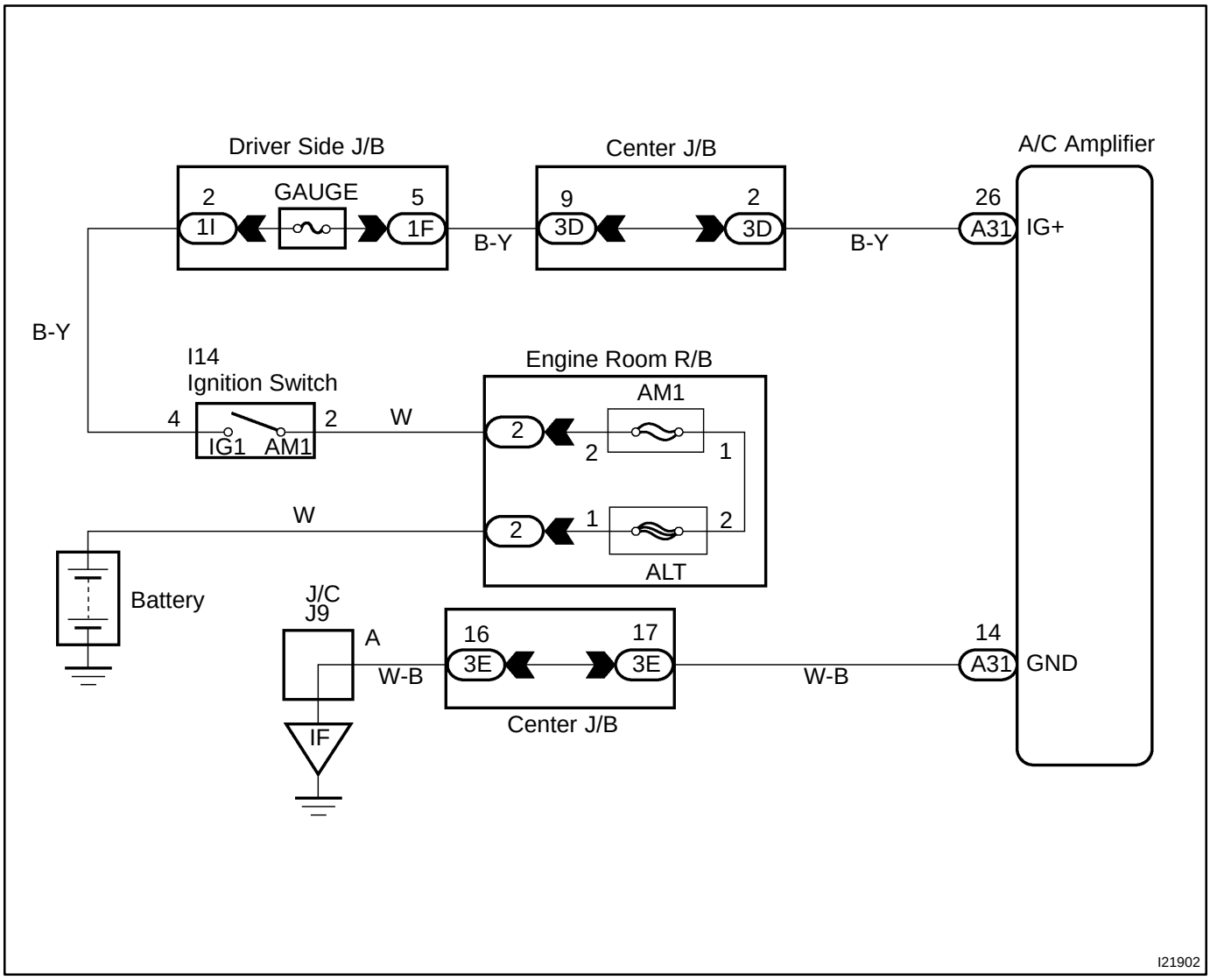
DI3WA-14

IG Power Source Circuit

CIRCUIT DESCRIPTION

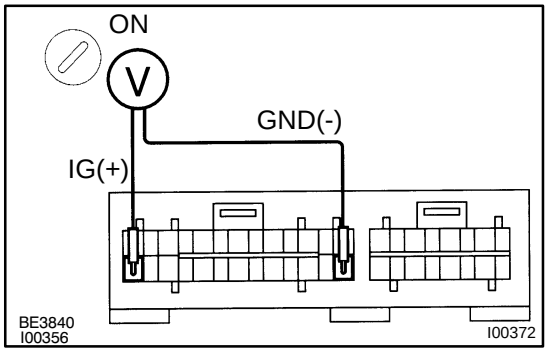
This is the power source for the A/C control assembly (contains the ECU) and servomotors, etc.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminals IG and GND of A/C control assembly connector.**



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Turn ignition switch to ON.

CHECK:

Measure voltage between terminals IG and GND of A/C control assembly.

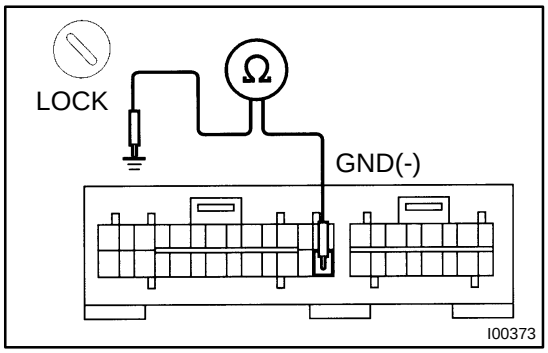
OK:

Voltage : 10 - 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	**Check continuity between terminal GND of A/C control assembly and body ground.**



PREPARATION:

Turn ignition switch to LOCK.

CHECK:

Measure resistance between terminal GND of A/C control assembly and body ground.

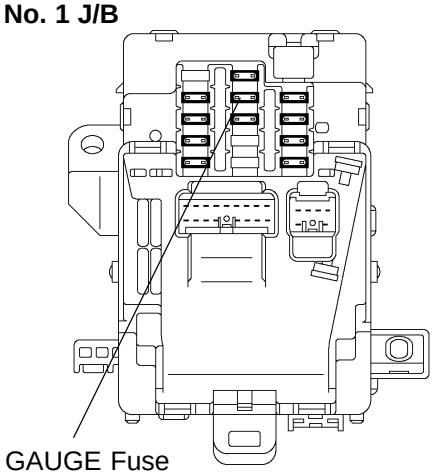
OK:

Resistance : Below 1 Ω

NG	**Repair or replace harness or connector.**

OK

3	Check GAUGE fuse.



PREPARATION:
Remove GAUGE fuse from No. 1 J/B.
CHECK:
Check continuity of GAUGE fuse.
OK:
Continuity exists.

NG → **Check for shot in all the harness and components connected to the GAUGE fuse (See page IN-28).**

OK

Check and repair harness and connector between A/C control assembly and battery.

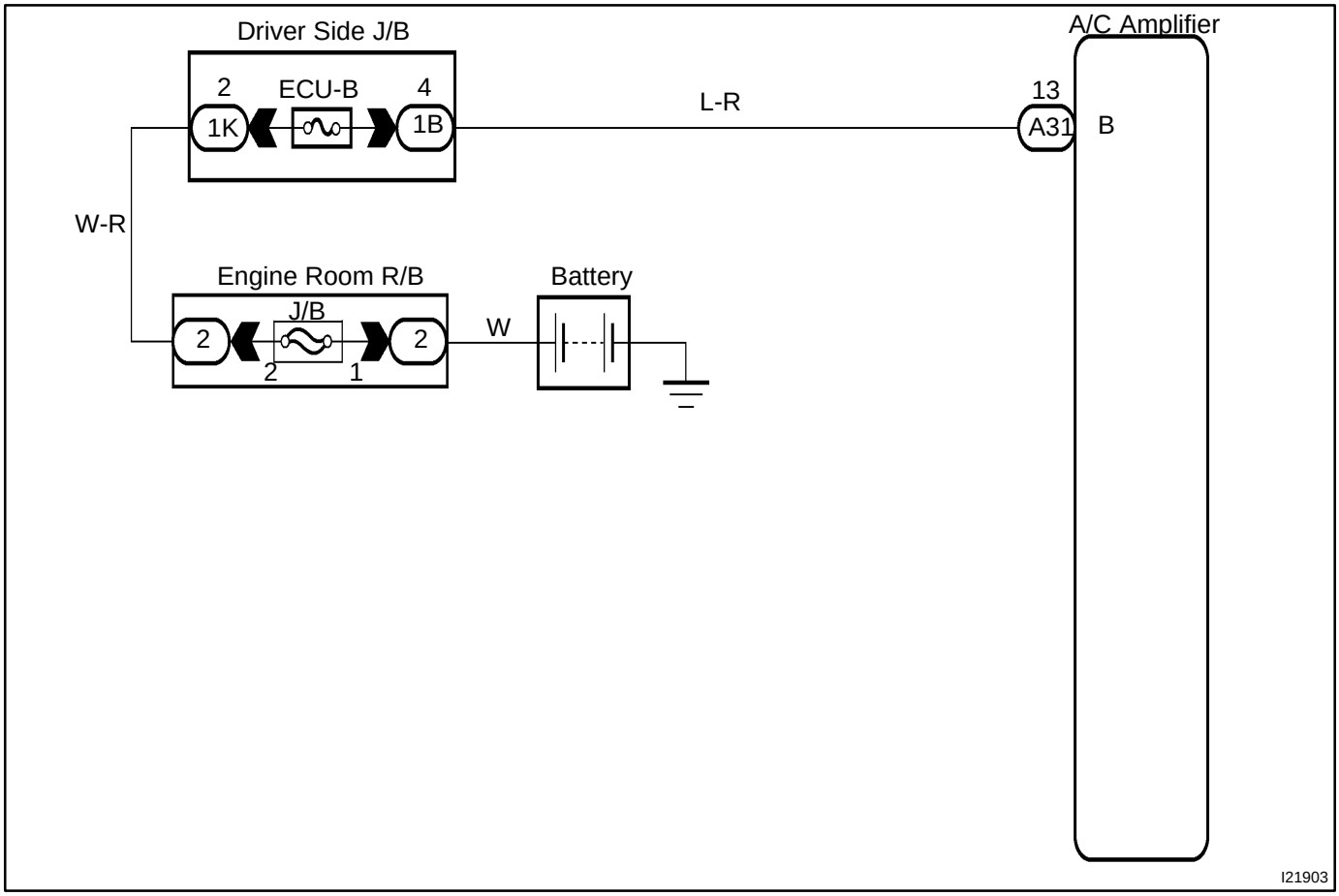
DI3WB-08

Back Up Power Source Circuit

CIRCUIT DESCRIPTION

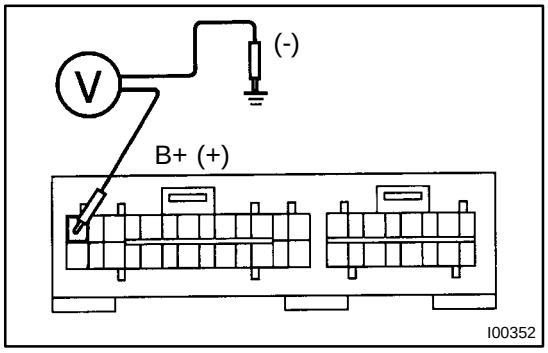
This is the back-up power source for the A/C control assembly. Power is supplied even when the ignition switch is off and is used for DTC memory, etc..

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal B+ of A/C control assembly connector and body ground.**



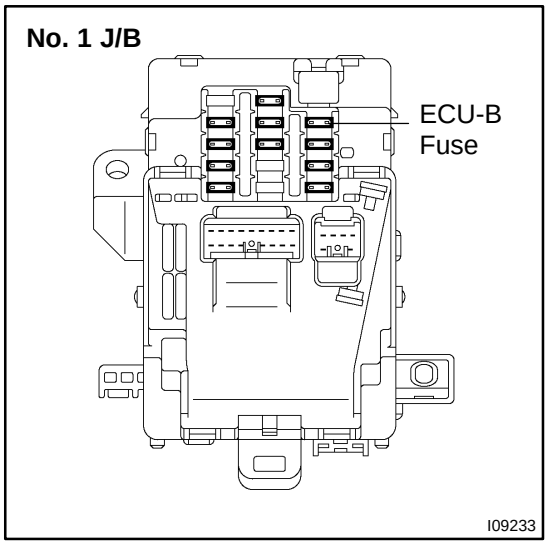
PREPARATION:
Remove A/C control assembly with connectors still connected (See page AC-84).
CHECK:
Measure voltage between terminal B+ of A/C control assembly connector and body ground.
OK:

Voltage : 10 - 14 V

OK	**Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	**Check ECU-B fuse.**



PREPARATION:
Remove ECU-B fuse from No. 1 J/B.
CHECK:
Check continuity of ECU-B fuse.
OK:

No continuity exists.

NG	**Check for short in all the harness and components connected to the ECU-B fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

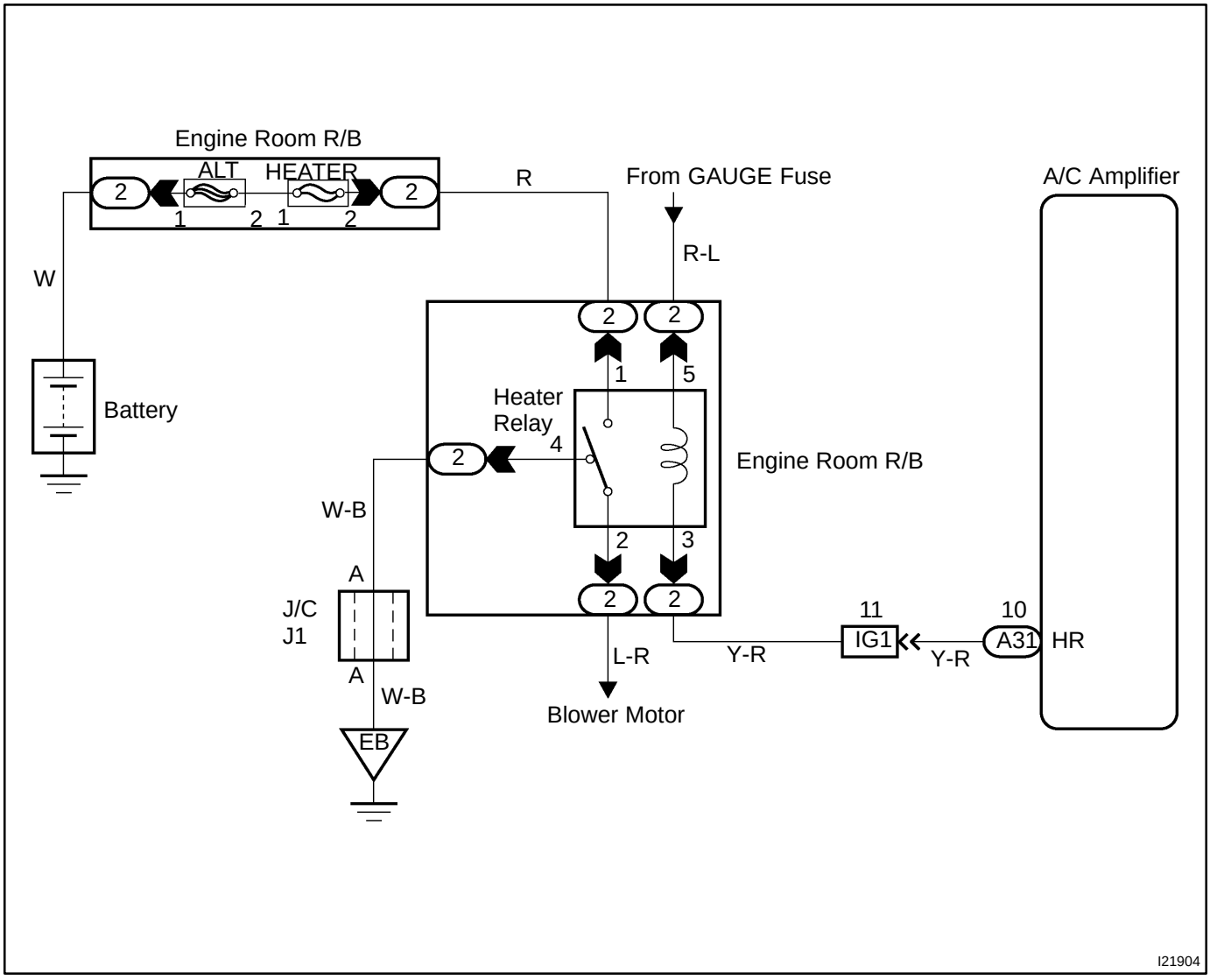
DI3WC-17

Heater Main Relay Circuit

CIRCUIT DESCRIPTION

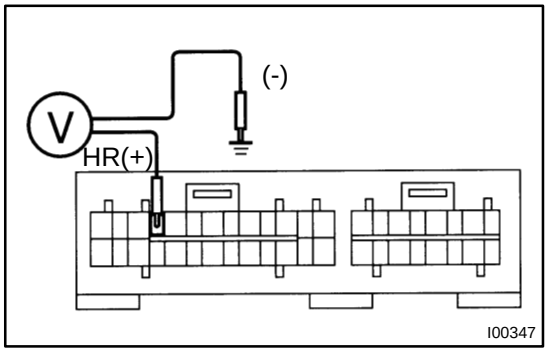
The heater main relay is switched on by signals from the A/C control assembly. It supplies power to the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check voltage between terminal HR of A/C control assembly connector and body ground.**



PREPARATION:

Remove A/C control assembly with connectors still connected (See page AC-84).

CHECK:

Measure voltage between terminal HR of A/C control assembly and body ground when ignition switch is ON and OFF.

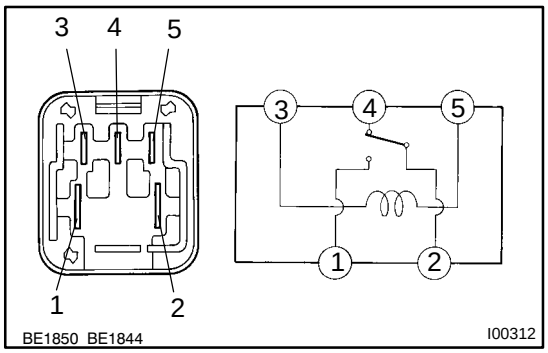
OK:

Ignition Switch	Voltage	
OFF	0 V	
ON	Blower ON	0 V
	Blower OFF	10 - 14 V

OK → **Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).**

NG

2	Check heater main relay.



PREPARATION:
Remove heater main relay from No. 2 R/B.
CHECK:
Check continuity between each pair of terminals of heater main relay shown below.
OK:

Tester connection	Specified condition
1 - 4	No continuity
2 - 4	Continuity
3 - 5	62.5 - 90.9 Ω

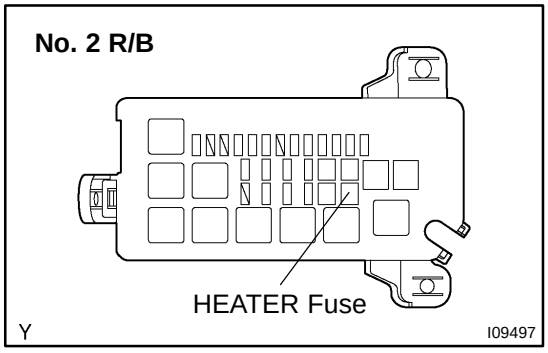
PREPARATION:
Apply battery positive voltage between terminals 3 and 5.
CHECK:
Check continuity between each pair of terminal shown below.
OK:

Tester connection	Specified condition
1 - 2	Continuity
2 - 4	No continuity

NG → **Replace hater main relay.**

OK

3	Check HEATER fuse



PREPARATION:
Remove HEATER fuse from No. 2 R/B.
CHECK:
Check continuity of HEATER fuse.
OK:

Continuity exists.

NG → **Check for short in all the harness and components connected to the HEATER fuse (See attached wiring diagram).**

OK

Check and repair harness and connector between A/C control assembly and battery.

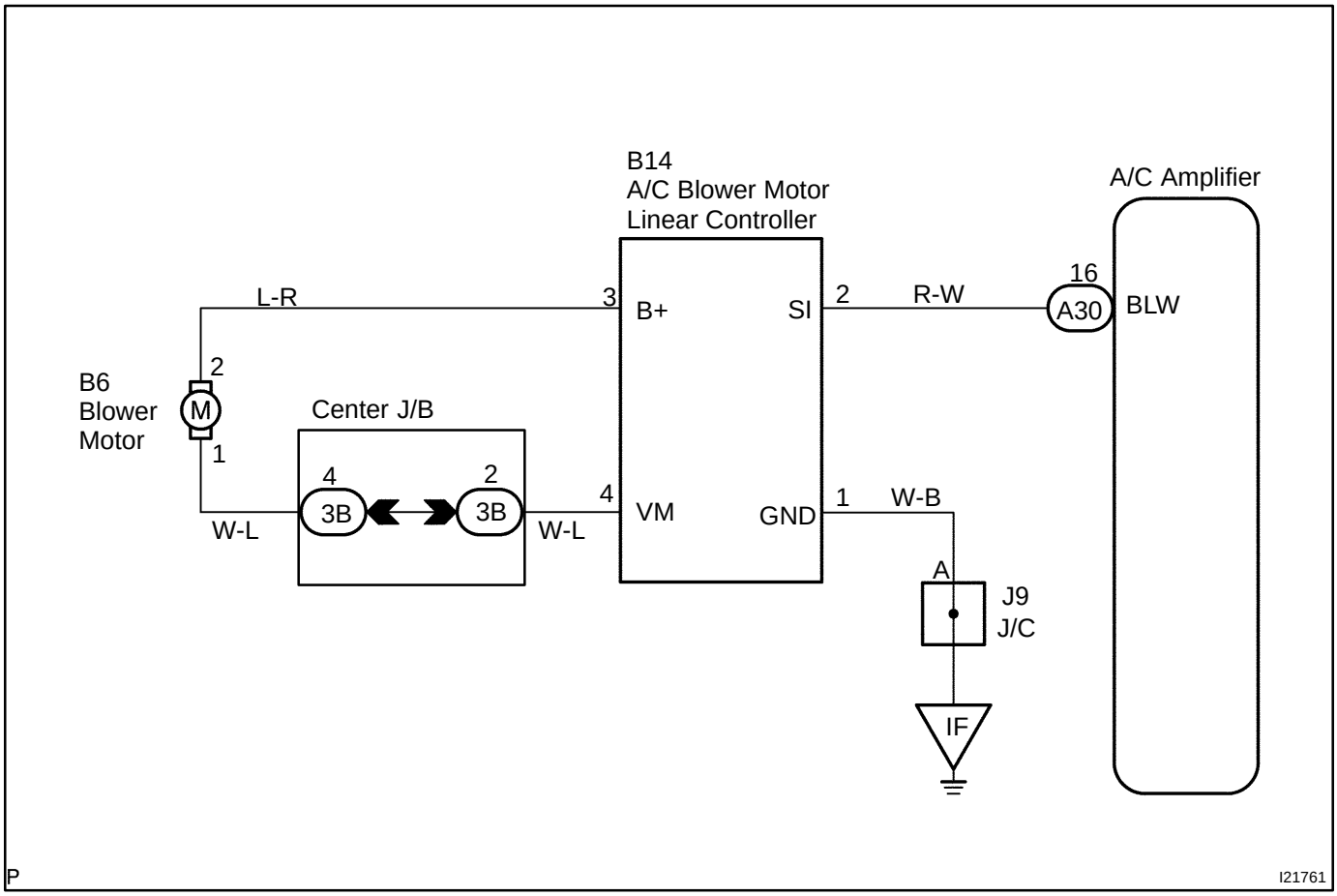
DI3WD-09

Blower Motor Circuit

CIRCUIT DESCRIPTION

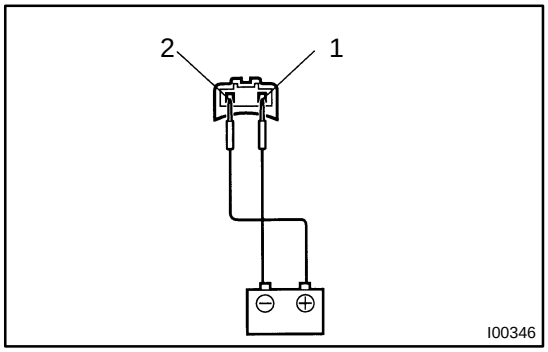
This is the power source for the blower motor.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	**Check blower motor.**



PREPARATION:
Remove blower motor (See page AC-66).
CHECK:
Connect positive (+) lead connected to terminal 2 of blower motor connector, negative (-) lead to terminal 1.
OK:
Blower motor operates smoothly.

NG → **Replace blower motor.**

OK

2	**Check harness and connector between battery and blower motor, blower motor and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

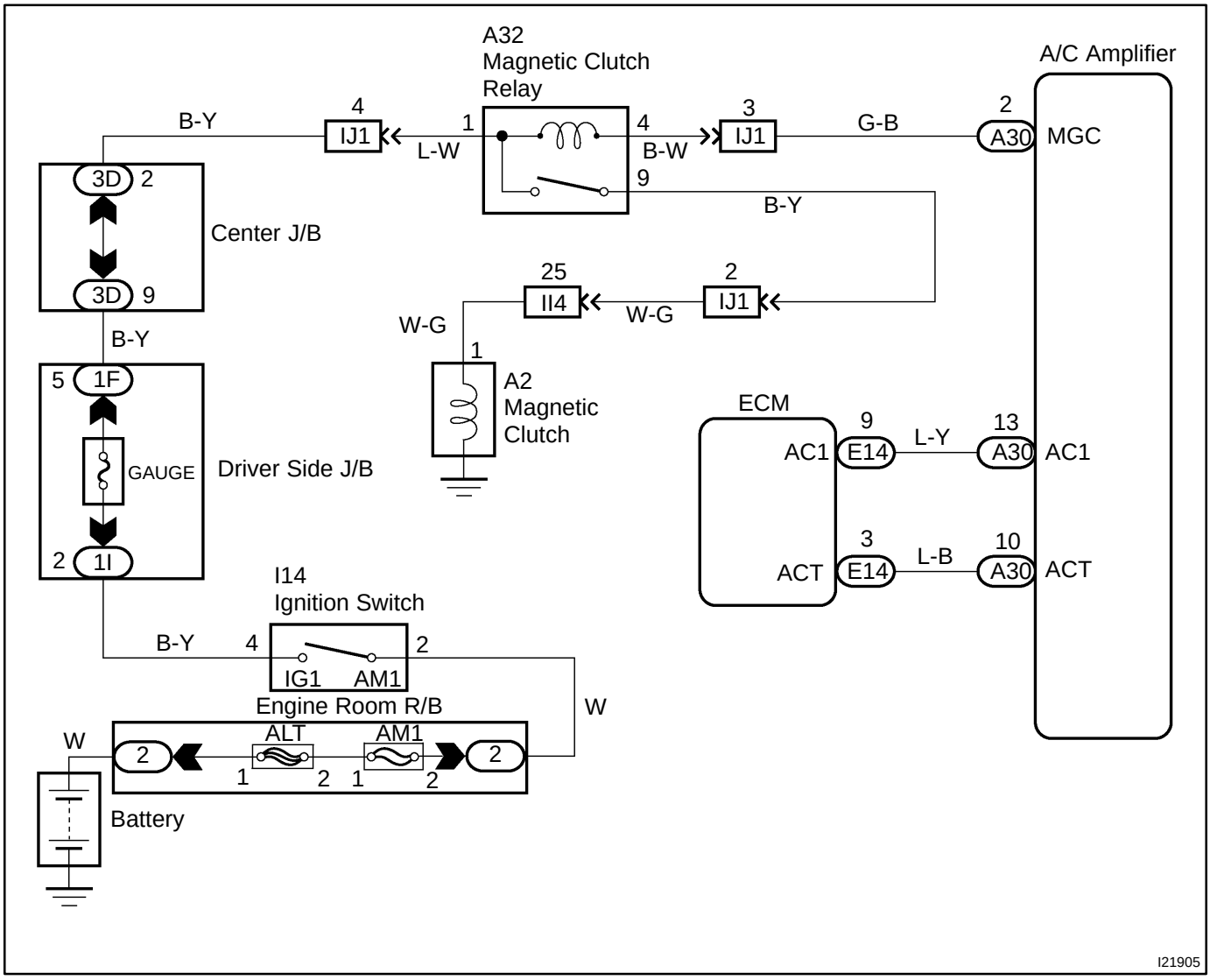
DI3WF-08

Compressor Circuit

CIRCUIT DESCRIPTION

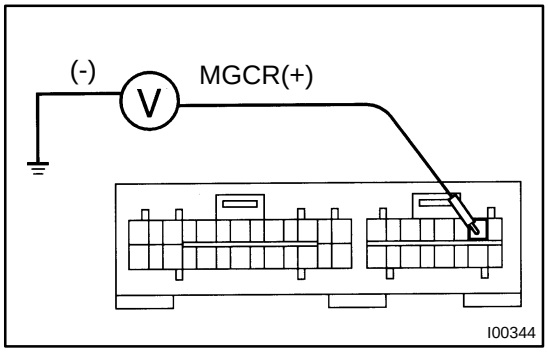
The A/C control assembly outputs the magnetic clutch ON signal from terminal AC1 to the ECM. When the ECM receives this signal, it sends a signal from terminal ACT and switches the A/C magnetic clutch relay ON, thus turning on the A/C magnetic clutch.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	Check voltage between terminal MGC of A/C control assembly connector and body ground.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Start the engine and push AUTO switch.

CHECK:

Check voltage between terminal MGC of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.

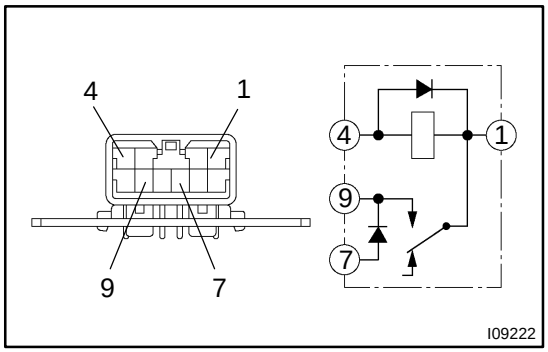
OK:

A/C switch	Voltage
ON	Below 1 V
OFF	10 - 14 V

NG → **Go to step 5.**

OK →

2	Check magnetic clutch relay.



PREPARATION:

Remove magnetic clutch relay from cooling unit (See page AC-28).

CHECK:

Check continuity between each pair of terminals shown below of magnetic clutch relay.

OK:

Tester connection	Specified condition
1 - 4	62.5 - 90.9 Ω
7 - 9	Continuity

PREPARATION:

Apply battery positive (+) voltage between terminals 1 and 4.

CHECK:

Check continuity between terminals 1 and 9.

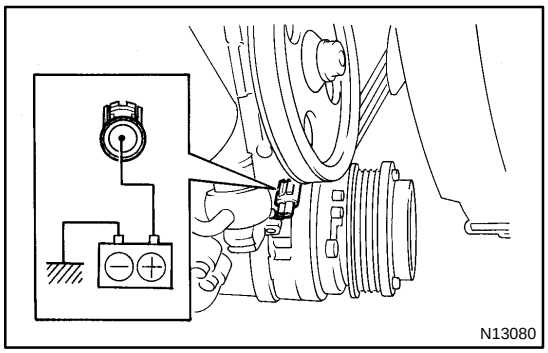
OK:

Continuity exists.

NG → **Replace magnetic clutch relay.**

OK →

3	**Check A/C magnetic clutch.**



PREPARATION:
Disconnect magnetic clutch connector.
CHECK:
Connect positive (+) lead connected to battery to magnetic clutch connector and negative (-) lead connected to battery to body ground.
OK:
Magnetic clutch is energized.

NG → **Repair A/C magnetic clutch.**

OK

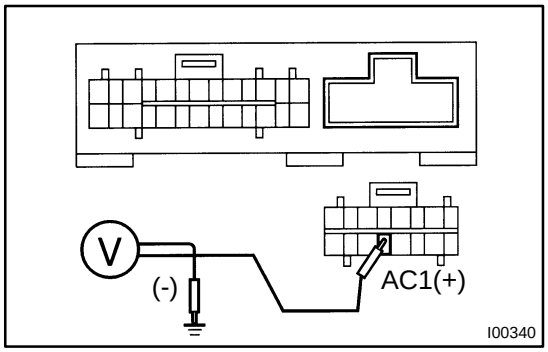
4	**Check harness and connector between magnetic clutch relay and A/C compressor, A/C compressor and body ground (See page IN-28).**

NG → **Repair or replace harness or connector.**

OK

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

5	Check voltage between terminal AC1 of A/C control assembly connector side and body ground.



PREPARATION:

(a) Disconnect A/C control connector.

(b) Ignition switch to ON.

CHECK:

Check voltage between terminal AC1 of A/C control assembly harness side connector.

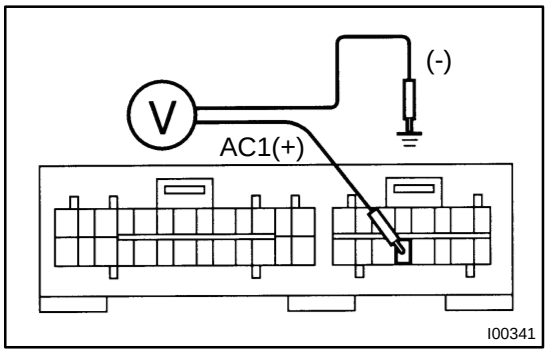
OK:

Voltage : 10 - 14 V

NG	Check and replace ECM.

OK

6	Check voltage between terminal AC1 of A/C control assembly connector and body ground.



PREPARATION:

(a) Remove A/C control assembly with connector still connected (See page AC-84).

(b) Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal AC1 of A/C control assembly connector and body ground when magnetic clutch is ON and OFF by A/C switch.

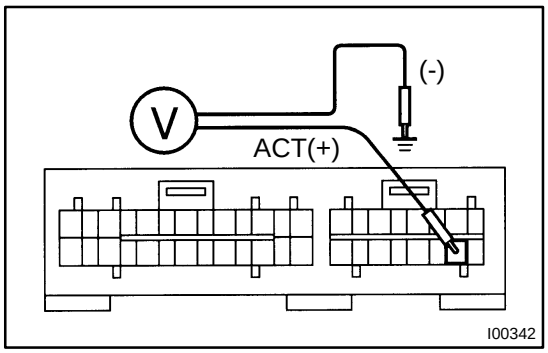
OK:

Magnetic clutch	Voltage
ON	Below 1 V
OFF	10 - 14 V

NG	Check and replace A/C control assembly.

OK

7	Check voltage between terminal ACT of A/C control assembly and body ground.



PREPARATION:

(a) Remove A/C control assembly with connectors still connected (See page AC-84).

(b) Start the engine and push AUTO switch.

CHECK:

Check the voltage between terminal ACT of A/C control assembly and body ground.

OK:

A/C switch	Voltage
ON	10 - 14 V
OFF	Below 1.5 V

NG → **Check and replace ECM.**

OK ↓

8	Check voltage between terminal ACT of ECM connector and body ground (See page DI-18).

NG → **Check and replace ECM.**

OK ↓

9	Check harness and connector between A/C control assembly and ECM (See page IN-28).

NG → **Repair or replace harness or connector.**

OK ↓

Proceed to next circuit inspection shown on problem symptoms table (See page DI-586).

CO/HC

INSPECTION

EM01C-05

HINT:

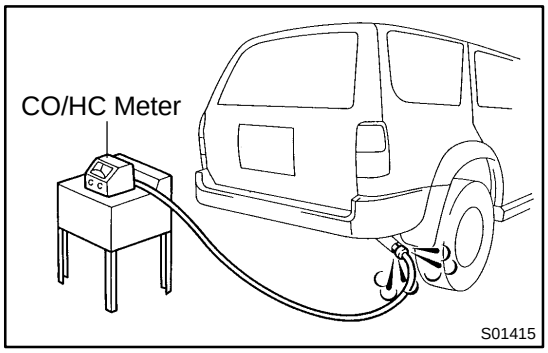
This check is used only to determine whether or not the idle CO/HC complies with regulations.

1. INITIAL CONDITIONS

(a) Engine at normal operating temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All accessories switched OFF
(e) All vacuum lines properly connected
(f) SFI system wiring connectors fully plugged
(g) Ignition timing checked correctly
(h) Transmission in neutral position
(i) Tachometer and CO/HC meter calibrated by hand

2. START ENGINE

3. RACE ENGINE AT 2,500 RPM FOR APPROX. 180 SECONDS



4. INSERT CO/HC METER TESTING PROBE AT LEAST 40 cm (1.3 ft) INTO TAILPIPE DURING IDLING

5. IMMEDIATELY CHECK CO/HC CONCENTRATION AT IDLE AND/OR 2,500 RPM

HINT:

When doing the 2 mode (2,500 rpm and idle) test, follow the measurement order prescribed by the applicable local regulations.

6. TROUBLESHOOTING

If the CO/HC concentration does not comply with regulations, troubleshoot in the order given below.

(1) Check oxygen sensor operation (See page DI-48).
(2) Check A/F sensor operation (See page DI-122).
(3) See the table below for possible causes, then inspect and correct the applicable causes if necessary.

CO	HC	Symptom	Causes
Normal	High	Rough idle	3. Faulty ignitions: • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed high-tension cords 4. Incorrect valve clearance 5. Leaky intake and exhaust valves 6. Leaky cylinder
Low	High	Rough idle (Fluctuating HC reading)	1. Vacuum leaks: • PCV hose • EGR valve • Intake manifold • Throttle body • IAC Valve • Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Clogged air filter 2. Plugged PCV valve 3. Faulty SFI system • Faulty fuel pressure regulator • Clogged fuel return line • Defective ECT sensor • Faulty ECM • Faulty injectors • Faulty throttle position sensor • Faulty MAF meter

COMPRESSION

EM01D-05

INSPECTION

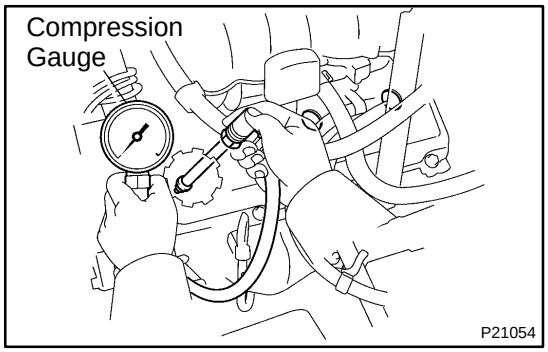
HINT:

If there is lack of power, excessive oil consumption or poor fuel economy, measure the compression pressure.

1. WARM UP AND STOP ENGINE

Allow the engine to warm up to normal operating temperature.

2. REMOVE SPARK PLUGS (See page IG-1)



3. CHECK CYLINDER COMPRESSION PRESSURE

(a) Insert a compression gauge into the spark plug hole.

(b) Fully open the throttle.

(c) While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain engine speed of 250 rpm or more.

(d) Repeat steps (a) through (c) for each cylinder.

NOTICE:

This measurement must be done in as short a time as possible.

Compression pressure:
1,200 kPa (12.2 kgf/cm^2, 174 psi) or more
Minimum pressure: 1,000 kPa (10.2 kgf/cm^2, 145 psi)
Difference between each cylinder:
100 kPa (1.0 kgf/cm^2, 15 psi) or less

(e) If the cylinder compression in 1 or more cylinders is low, pour a small amount of engine oil into the cylinder through the spark plug hole and repeat steps (a) through (c) for cylinders with low compression.

- If adding oil helps the compression, it is likely that the piston rings and/or cylinder bore are worn or damaged.
- If pressure stays low, a valve may be sticking or seating is improper, or there may be leakage past the gasket.

4. REINSTALL SPARK PLUGS (See page IG-1)

VALVE CLEARANCE

INSPECTION

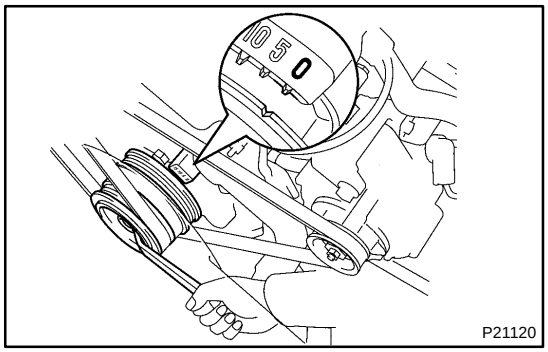
EM01E-08

HINT:

Inspect and adjust the valve clearance when the engine is cold.

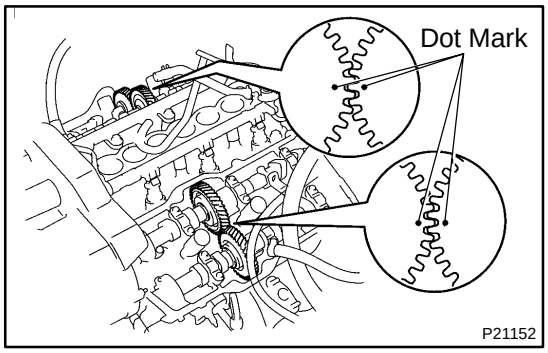
1. REMOVE INTAKE AIR CONNECTOR
(See page EM-29)

2. REMOVE CYLINDER HEAD COVERS
(See page EM-29)



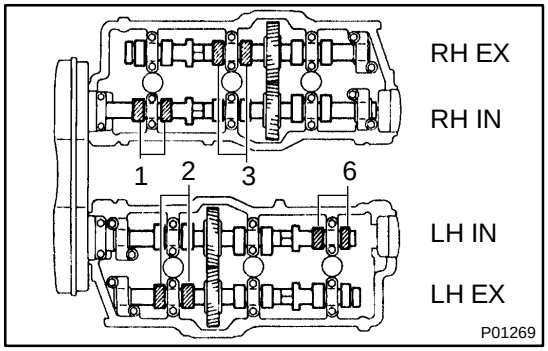
3. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Turn the crankshaft pulley, and align its groove with the timing mark ”0” of the No.1 timing belt cover.



(b) Check that the timing marks (1 dot) of the camshaft drive and driven gears are in straight line on the cylinder heads surface as shown in the illustration.

If not, turn the crankshaft 1 revolution (360˚) and align the marks.



4. INSPECT VALVE CLEARANCE

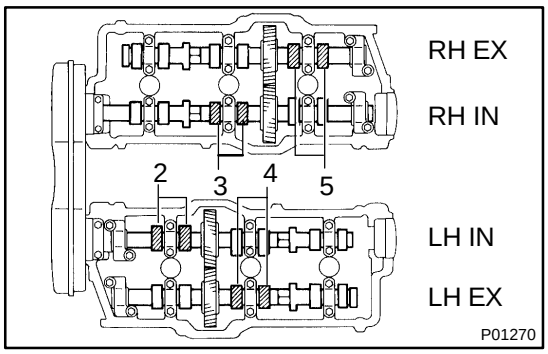
(a) Check only those valves indicated in the illustration.

(1) Using a thickness gauge, measure the clearance between the valve lifter and camshaft.

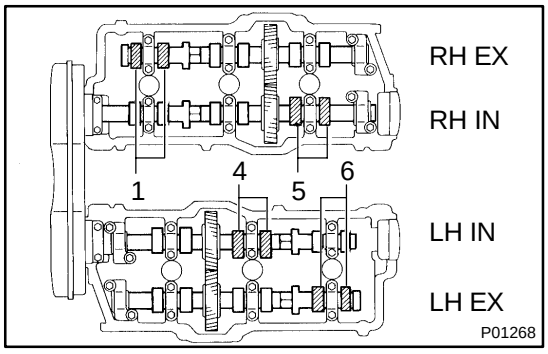
(2) Record out of specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

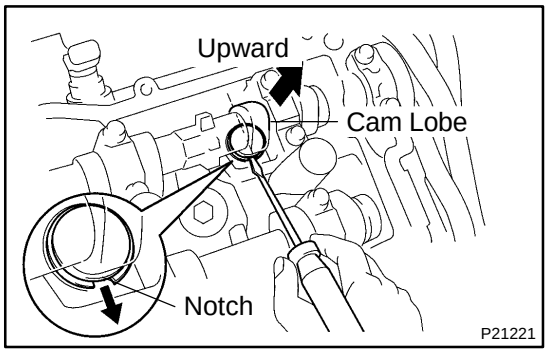
Intake	0.13 - 0.23 mm (0.006 - 0.009 in.)
Exhaust	0.27 - 0.37 mm (0.011 - 0.014 in.)



(b) Turn the crankshaft 2/3 of a revolution (240˚), and check only the valves indicated in the illustration. Measure the valve clearance. (See step (a))



(c) Turn the crankshaft a further 2/3 of a revolution (240˚), and check only the valves indicated in the illustration. Measure the valve clearance. (See step (a))

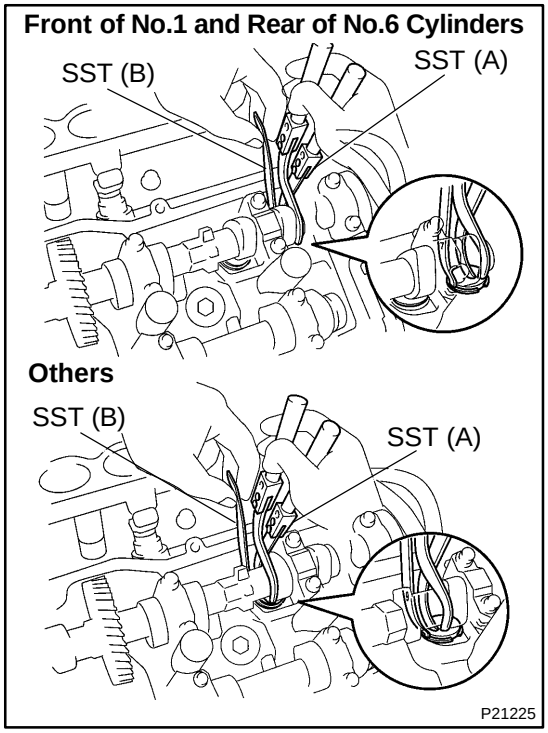


5. ADJUST VALVE CLEARANCE

(a) Remove the adjusting shim.

(1) Turn the camshaft so that the cam lobe for the valve to be adjusted faces up.

(2) Turn the valve lifter with a screwdriver so that the notches are perpendicular to the camshaft.

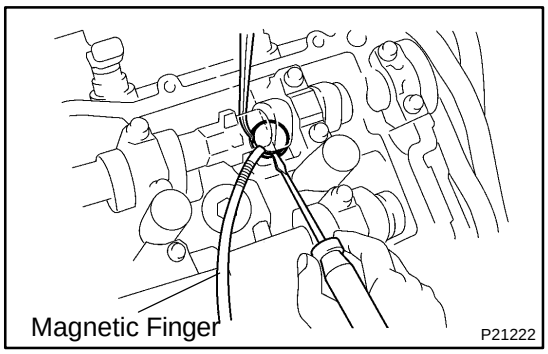


(3) Using SST (A), press down the valve lifter and place SST (B) between the camshaft and valve lifter. Remove SST (A).

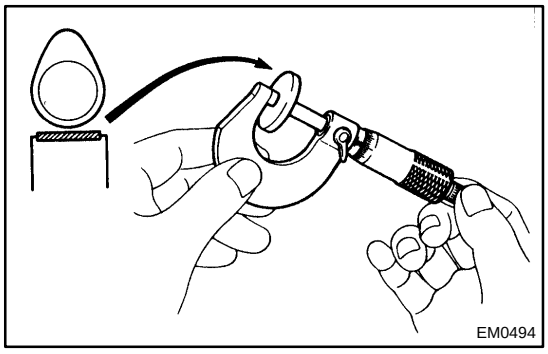
SST 09248-55040 (09248-05410, 09248-05420)

HINT:

- Apply SST (B) at a slight angle on the side marked with ”9” or ”7”, at the position shown in the illustration.
- When SST (B) is inserted too deeply, it will get pinched by the shim. To prevent it from being stuck, insert it gently from the intake side, at a slight angle.



(4) Using a small screwdriver and magnetic finger, remove the adjusting shim.



(b) Determine the replacement adjusting shim size according to these Formula or Charts:

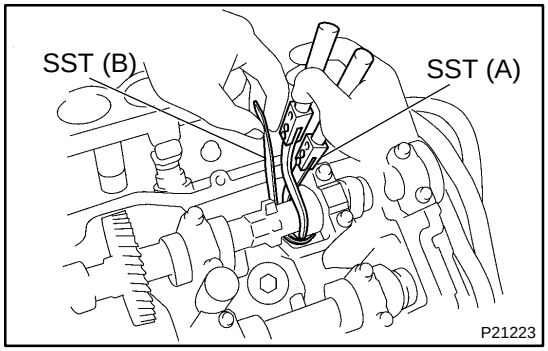
(1) Using a micrometer, measure the thickness of the removed shim.

(2) Calculate the thickness of a new shim so the valve clearance comes within the specified value.

T ..... Thickness of used shim
A ..... Measured valve clearance
N ..... Thickness of new shim
Intake: N = T + (A - 0.18 mm (0.007 in.))
Exhaust: N = T + (A - 0.32 mm (0.013 in.))

(3) Select a new shim with a thickness as close as possible to the calculated values.

HINT:
Shims are available in 17 sizes in increments of 0.050 mm (0.0020 in.), from 2.500 mm (0.0984 in.) to 3.300 mm (0.1299 in.).



(c) Install a new adjusting shim.

(1) Place a new adjusting shim on the valve lifter, with imprinted numbers facing down.

(2) Press down the valve lifter with SST (A), and remove SST (B).

SST 09248-55040 (09248-05410, 09248-05420)

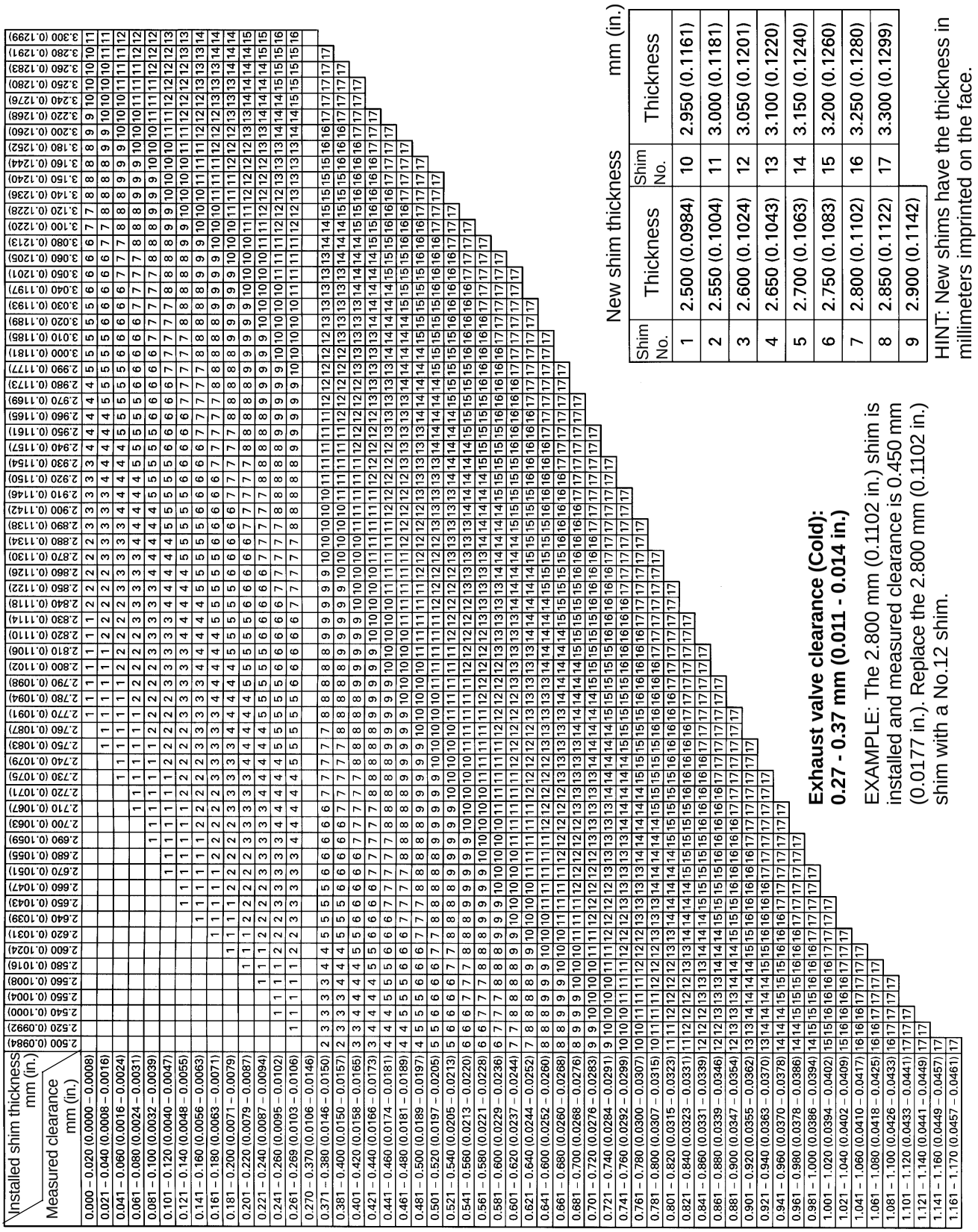
(d) Recheck the valve clearance.

6. INSTALL CYLINDER HEAD COVERS
(See page EM-52)

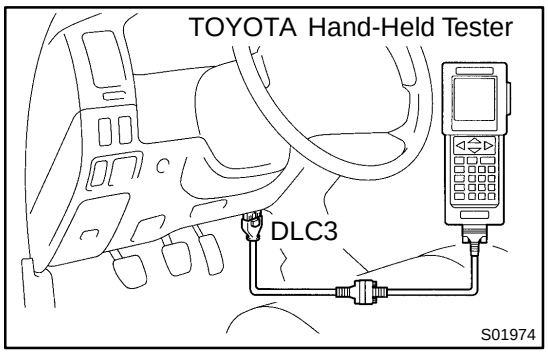
7. INSTALL INTAKE AIR CONNECTOR
(See page EM-52)

Adjusting Shim Selection Chart (Intake)

| Measured clearance mm (in.) \ Installed shim thickness mm (in.) | 2.500 (0.0984) | 2.520 (0.0992) | 2.540 (0.1000) | 2.550 (0.1004) | 2.560 (0.1008) | 2.580 (0.1016) | 2.600 (0.1024) | 2.620 (0.1031) | 2.640 (0.1039) | 2.650 (0.1043) | 2.660 (0.1047) | 2.670 (0.1051) | 2.680 (0.1055) | 2.690 (0.1059) | 2.700 (0.1063) | 2.710 (0.1067) | 2.720 (0.1071) | 2.730 (0.1075) | 2.740 (0.1079) | 2.750 (0.1083) | 2.760 (0.1087) | 2.770 (0.1091) | 2.780 (0.1094) | 2.790 (0.1098) | 2.800 (0.1102) | 2.810 (0.1106) | 2.820 (0.1110) | 2.830 (0.1114) | 2.840 (0.1118) | 2.850 (0.1122) | 2.860 (0.1126) | 2.870 (0.1130) | 2.880 (0.1134) | 2.890 (0.1138) | 2.900 (0.1142) | 2.910 (0.1146) | 2.920 (0.1150) | 2.930 (0.1154) | 2.940 (0.1157) | 2.950 (0.1161) | 2.960 (0.1165) | 2.970 (0.1169) | 2.980 (0.1173) | 2.990 (0.1177) | 3.000 (0.1181) | 3.010 (0.1185) | 3.020 (0.1189) | 3.030 (0.1193) | 3.040 (0.1197) | 3.050 (0.1201) | 3.060 (0.1205) | 3.080 (0.1213) | 3.100 (0.1220) | 3.120 (0.1228) | 3.140 (0.1236) | 3.150 (0.1240) | 3.160 (0.1244) | 3.180 (0.1252) | 3.200 (0.1260) | 3.220 (0.1268) | 3.240 (0.1276) | 3.250 (0.1280) | 3.260 (0.1283) | 3.280 (0.1291) | 3.300 (0.1299) |
|---|---|---


Adjusting Shim Selection Chart (Exhaust)
Installed shim thickness mm (in.)
Measured clearance mm (in.)
Exhaust valve clearance (Cold):
0.27 - 0.37 mm (0.011 - 0.014 in.)
EXAMPLE: The 2.800 mm (0.1102 in.) shim is installed and measured clearance is 0.450 mm (0.0177 in.). Replace the 2.800 mm (0.1102 in.) shim with a No.12 shim.
New shim thickness mm (in.)
Shim No. | Thickness | Shim No. | Thickness
1 | 2.500 (0.0984) | 10 | 2.950 (0.1161)
2 | 2.550 (0.1004) | 11 | 3.000 (0.1181)
3 | 2.600 (0.1024) | 12 | 3.050 (0.1201)
4 | 2.650 (0.1043) | 13 | 3.100 (0.1220)
5 | 2.700 (0.1063) | 14 | 3.150 (0.1240)
6 | 2.750 (0.1083) | 15 | 3.200 (0.1260)
7 | 2.800 (0.1102) | 16 | 3.250 (0.1280)
8 | 2.850 (0.1122) | 17 | 3.300 (0.1299)
9 | 2.900 (0.1142)
HINT: New shims have the thickness in millimeters imprinted on the face.

V06209



IGNITION TIMING

EM01F-05

INSPECTION

1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

2. CONNECT TOYOTA HAND-HELD TESTER OR OBDII SCAN TOOL

(a) Connect a TOYOTA hand-held tester or OBDII scan tool to the DLC3.

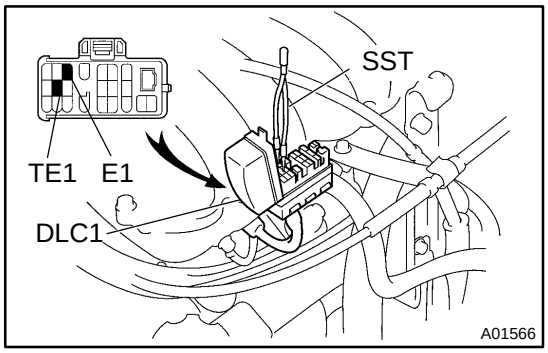
(b) Please refer to the TOYOTA hand-held tester or OBDII scan tool operator's manual for further details.

3. CONNECT TIMING LIGHT TO ENGINE

4. CHECK IDLE SPEED

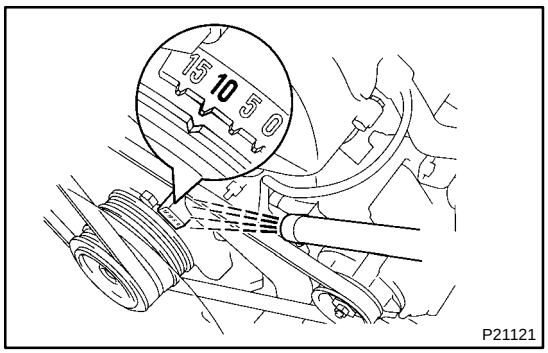
(a) Race the engine speed at 1,000 rpm for approx. 5 seconds.

(b) Check the idle speed.
Idle speed: 700 ± 50 rpm
(Transmission in neutral position and A/C OFF)



5. INSPECT IGNITION TIMING

(a) Using SST, connect terminals TE1 and E1 of the DLC1.
SST 09843-18020



(b) Using a timing light, check the ignition timing.
Ignition timing: 8 - 12˚ BTDC @ idle
(Transmission in neutral position)

(c) Remove the SST from the DLC1.
SST 09843-18020

6. FURTHER CHECK IGNITION TIMING
Ignition timing: 3 - 19˚ BTDC @ idle
(Transmission in neutral position)

HINT:
The timing mark moves in a range between 3˚ and 19˚.

7. DISCONNECT TIMING LIGHT FROM ENGINE

8. DISCONNECT TOYOTA HAND- HELD TESTER OR OBDII SCAN TOOL

IDLE SPEED

EM0YZ-01

INSPECTION

1. INITIAL CONDITIONS

(a) Engine at normal operation temperature
(b) Air cleaner installed
(c) All pipes and hoses of air induction system connected
(d) All accessories switched OFF
(e) All vacuum lines properly connected
(f) SFI system wiring connectors fully plugged
(g) Ignition timing checked correctly
(h) Transmission in neutral position
(i) A/C switch is OFF

2. CONNECT TOYOTA HAND-HELD TESTER OR OBDII SCAN TOOL (See page EM-9)

3. INSPECT IDLE SPEED

(a) Race the engine speed at 1,000 rpm for approx. 5 seconds.
(b) Check the idle speed.

Idle speed: 700 ± 50 rpm

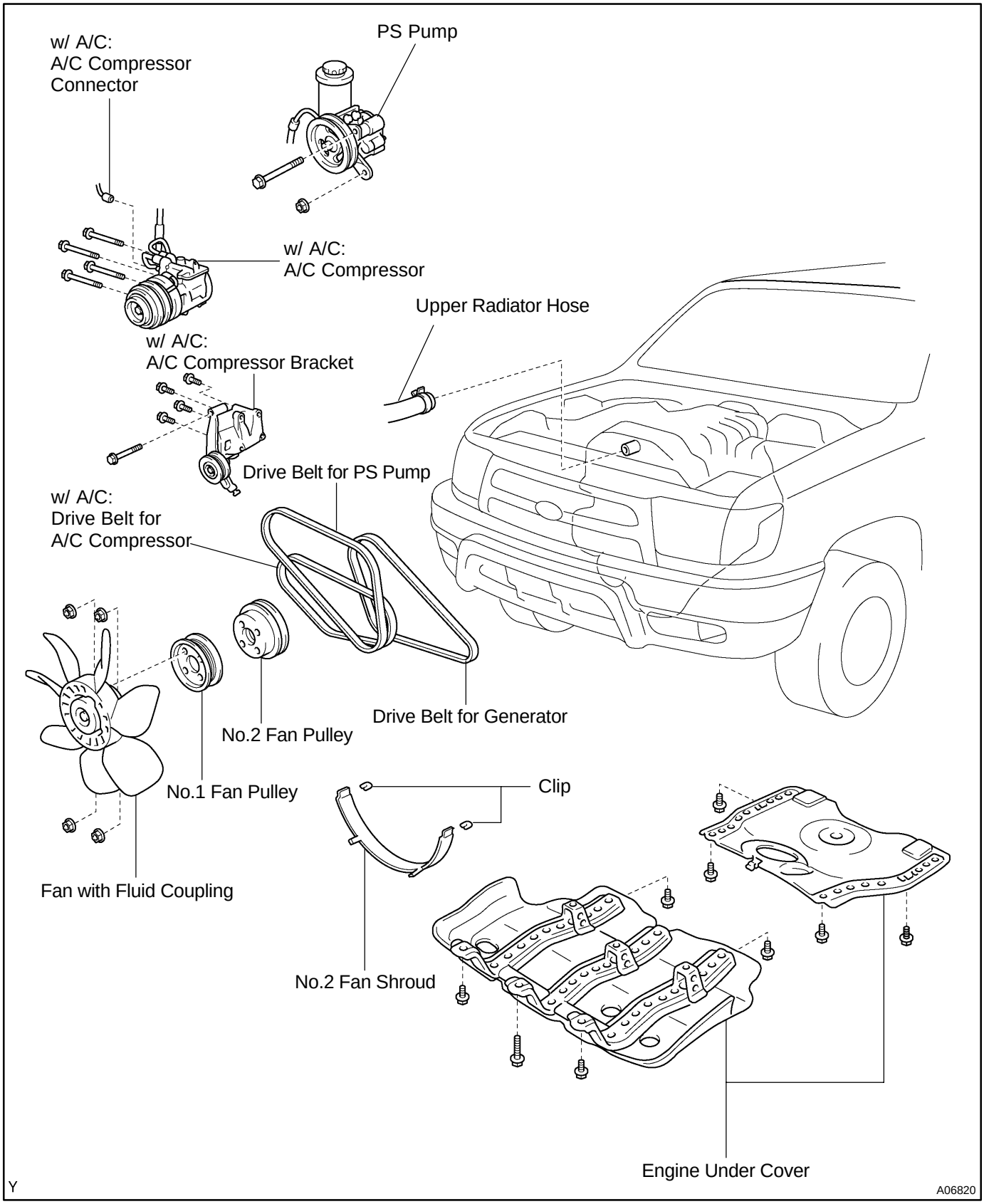
If the idle speed is not as specified, check the IAC valve and air intake system.

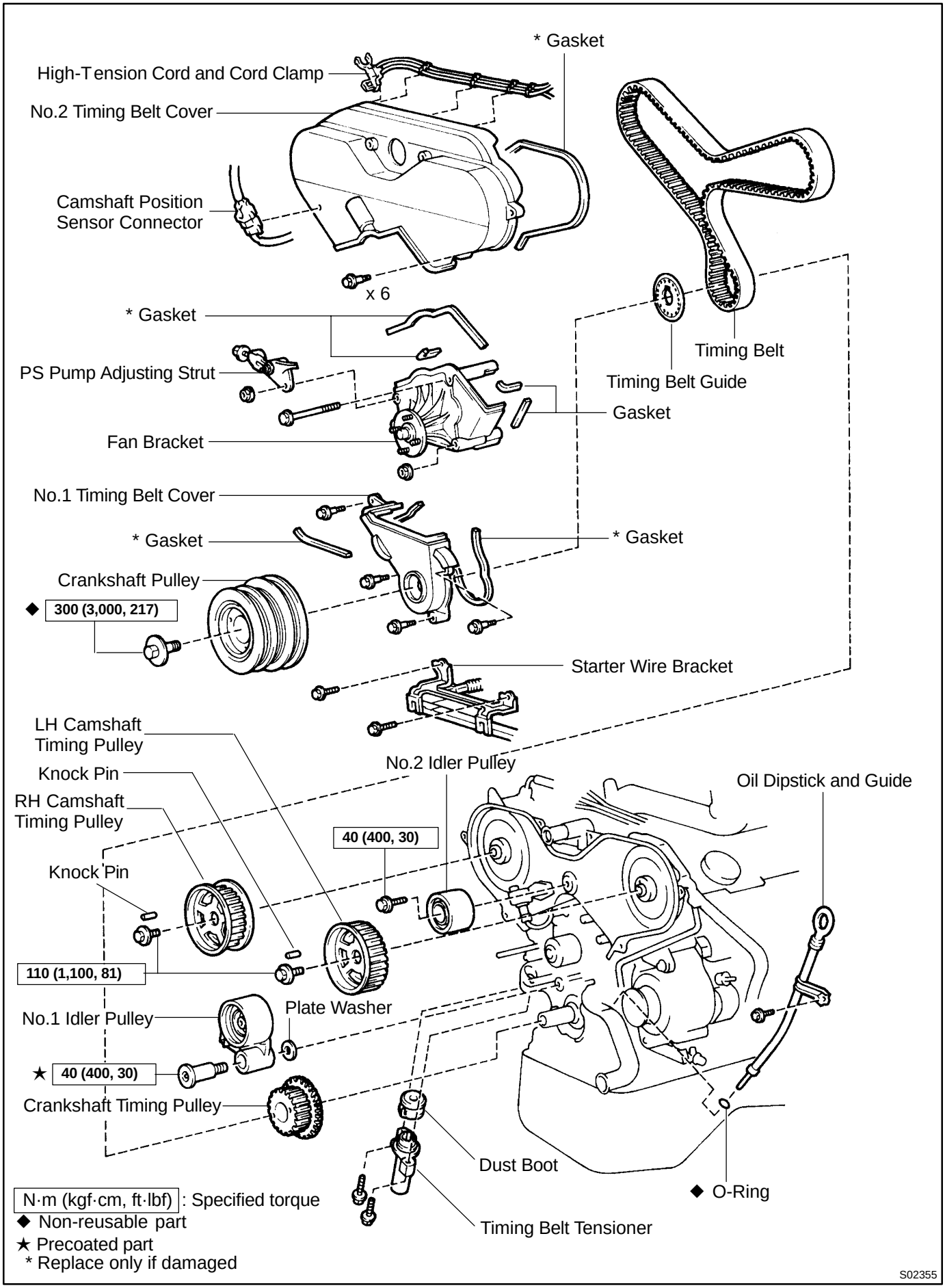
4. DISCONNECT TOYOTA HAND-HELD TESTER OR OBDII SCAN TOOL

TIMING BELT

COMPONENTS

EM01H-06

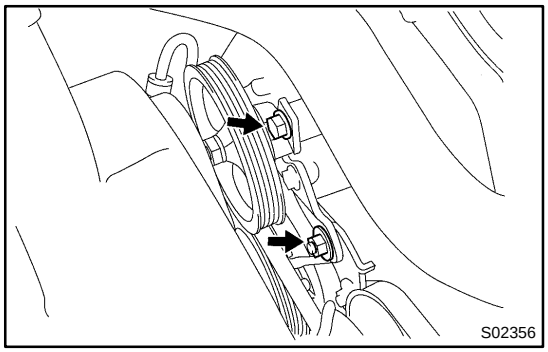



* Gasket
High-Tension Cord and Cord Clamp
No.2 Timing Belt Cover
Camshaft Position Sensor Connector
x 6
* Gasket
PS Pump Adjusting Strut
Fan Bracket
Timing Belt
Timing Belt Guide
Gasket
No.1 Timing Belt Cover
* Gasket
* Gasket
Crankshaft Pulley
◆ 300 (3,000, 217)
Starter Wire Bracket
LH Camshaft Timing Pulley
Knock Pin
RH Camshaft Timing Pulley
Knock Pin
No.2 Idler Pulley
Oil Dipstick and Guide
40 (400, 30)
110 (1,100, 81)
No.1 Idler Pulley
Plate Washer
★ 40 (400, 30)
Crankshaft Timing Pulley
Dust Boot
◆ O-Ring
Timing Belt Tensioner
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part
* Replace only if damaged
S02355

EM01I-14

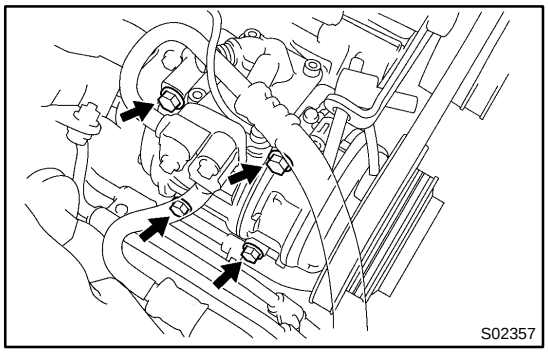
REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. DISCONNECT UPPER RADIATOR HOSE



4. DISCONNECT PS PUMP FROM ENGINE

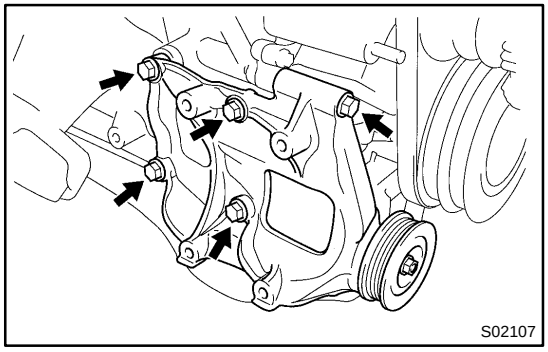
(a) Disconnect the 2 PS air hoses from the air intake chamber and resonator.
(b) Remove the bolt holding the PS pressure tube clamp to the frame.
(c) Remove the drive belt (See page SR-33).
(d) Remove the bolt and nut, and disconnect the PS pump from the engine.



5. w/ A/C:
DISCONNECT A/C COMPRESSOR FROM ENGINE

(a) Disconnect the A/C compressor connector.
(b) Remove the drive belt (See page AC-17).
(c) Remove the 4 bolts, and disconnect the A/C compressor from the engine.

6. LOOSEN FAN WITH FLUID COUPLING AND FAN PULLEYS
7. REMOVE DRIVE BELT FOR GENERATOR (See page CH-6)
8. REMOVE NO.2 FAN SHROUD
9. REMOVE FAN WITH FLUID COUPLING AND FAN PULLEYS

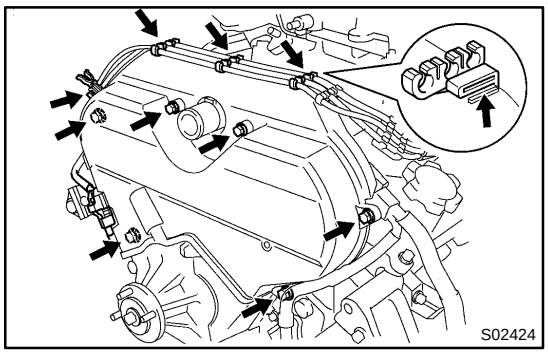


10. w/ A/C:
REMOVE A/C COMPRESSOR BRACKET

Remove the 5 bolts and A/C compressor bracket.

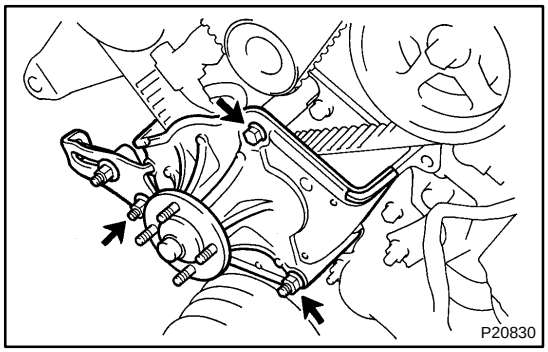
11. REMOVE OIL DIPSTICK AND GUIDE

Remove the bolt, oil dipstick, guide and O-ring.



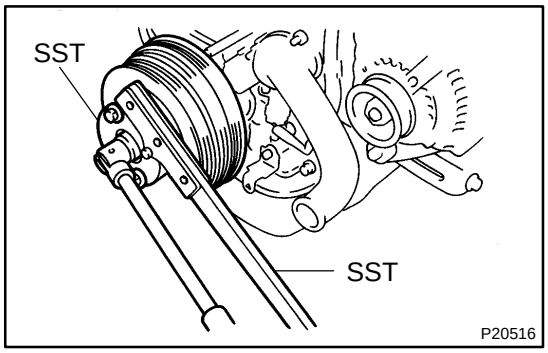
12. REMOVE NO.2 TIMING BELT COVER

(a) Disconnect the 4 high-tension cord clamps from the No.2 timing belt cover.
(b) Remove the 6 bolts and No.2 timing belt cover.
(c) Disconnect the camshaft position sensor connector.



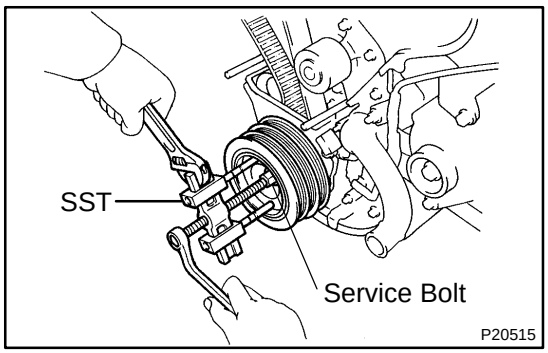
13. REMOVE FAN BRACKET

(a) Remove the nut and PS pump adjusting strut.
(b) Remove the bolt, nut and fan bracket.

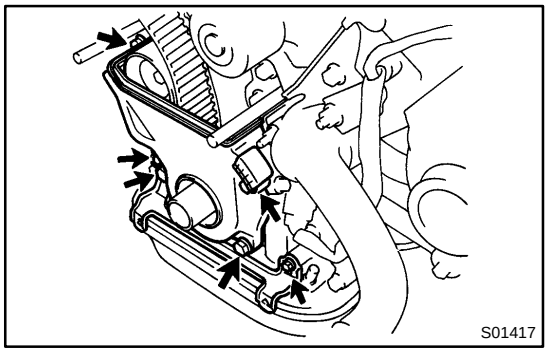


14. REMOVE CRANKSHAFT PULLEY

(a) Using SST, loosen the pulley bolt.
SST 09213-54015 (90119-08216), 09330-00021
(b) Remove the SST, pulley bolt and pulley.



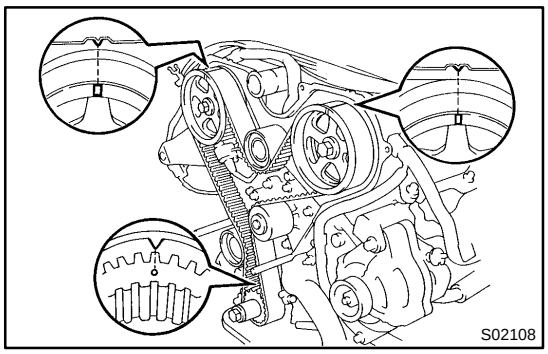
HINT:
If necessary, remove the pulley with SST and a service bolt.
SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05031)



15. REMOVE STARTER WIRE BRACKET AND NO.1 TIMING BELT COVER

(a) Remove the 2 bolts and starter wire bracket.
(b) Remove the 4 bolts and timing belt cover.

16. REMOVE TIMING BELT GUIDE



17. SET NO.1 CYLINDER AT TDC/COMPRESSION

(a) Temporarily install the crankshaft pulley bolt to the crankshaft.

(b) Turn the crankshaft, and align the timing marks of the crankshaft timing pulley and oil pump body.

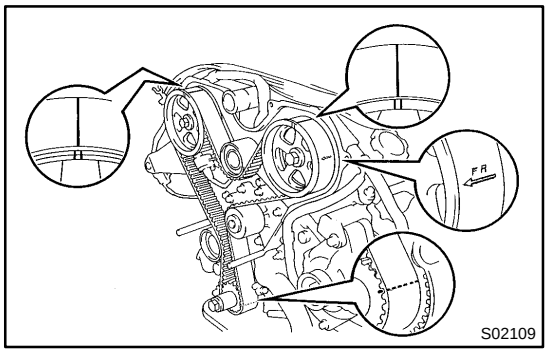
NOTICE:

Always turn the crankshaft clockwise.

(c) Check that the timing marks of the camshaft timing pulleys and No.3 timing belt cover are aligned.

If not, turn the crankshaft pulley 1 revolution (360˚).

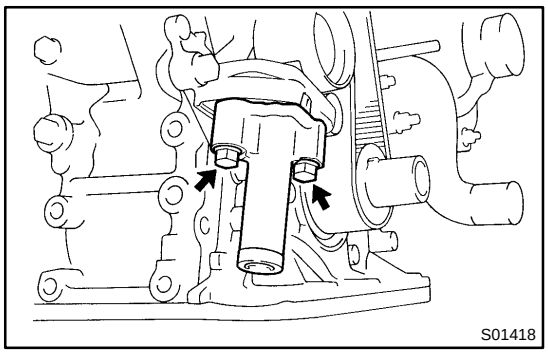
(d) Remove the crankshaft pulley bolt.



18. IF REUSING TIMING BELT, CHECK INSTALLATION MARKS ON TIMING BELT

Check that there are 3 installation marks and front mark on the timing belt.

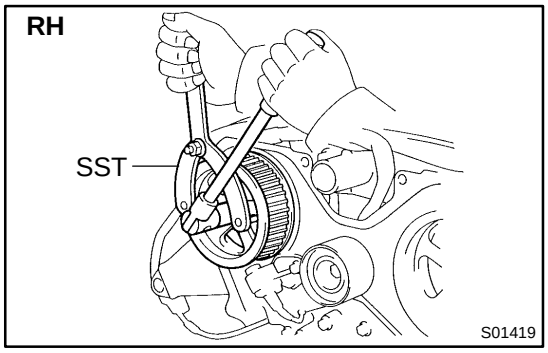
If the installation and front marks have disappeared, before removing the timing belt, place 3 new installation marks on the timing belt to match the timing marks of the timing pulleys, and place a new front mark on the timing belt.



19. REMOVE TIMING BELT TENSIONER

Alternately loosen the 2 bolts, and remove them, the belt tensioner and dust boot.

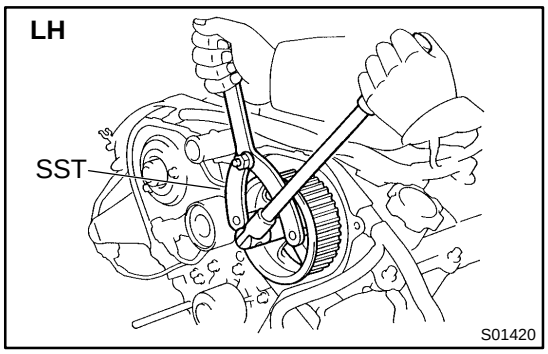
20. REMOVE TIMING BELT



21. REMOVE RH CAMSHAFT TIMING PULLEY

(a) Using SST, loosen the pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)

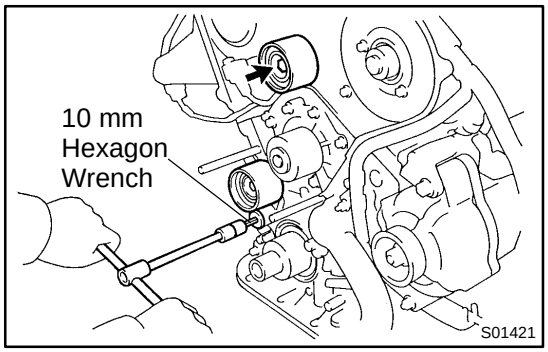
(b) Remove the bolt, knock pin and camshaft timing pulley.



22. REMOVE LH CAMSHAFT TIMING PULLEY

(a) Using SST, loosen the pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)

(b) Remove the bolt, knock pin and camshaft timing pulley.

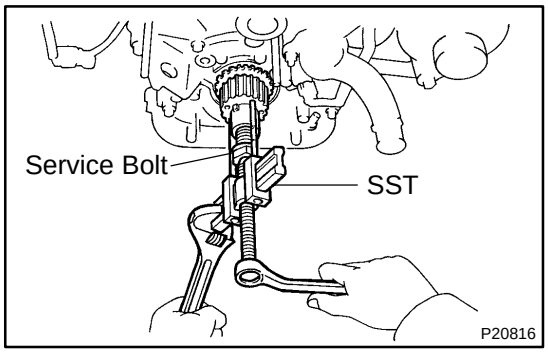


23. REMOVE NO.2 IDLER PULLEY

Remove the bolt and No.2 idler pulley.

24. REMOVE NO.1 IDLER PULLEY

Using a 10 mm hexagon wrench, remove the pivot bolt, No.1 idler pulley and plate washer.



25. REMOVE CRANKSHAFT TIMING PULLEY

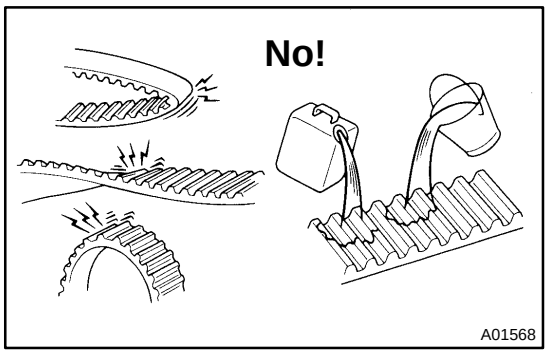
Remove the crankshaft timing pulley.

HINT:

If the pulley cannot be removed by hand, use SST and a service bolt to remove the crankshaft timing pulley.

SST 09950- 50013 (09951- 05010, 09952- 05010, 09953-05020, 09954-05011)

EM01J-05



INSPECTION

1. INSPECT TIMING BELT

NOTICE:

- **Do not bend, twist or turn the timing belt inside out.**
- **Do not allow the timing belt to come into contact with oil, water or steam.**
- **Do not utilize timing belt tension when installing or removing the mount bolt of the camshaft timing pulley.**

If there are any defects, as shown in the illustrations, check these points:

(1) Premature parting
Check for proper installation.
Check the timing cover gasket for damage and proper installation.

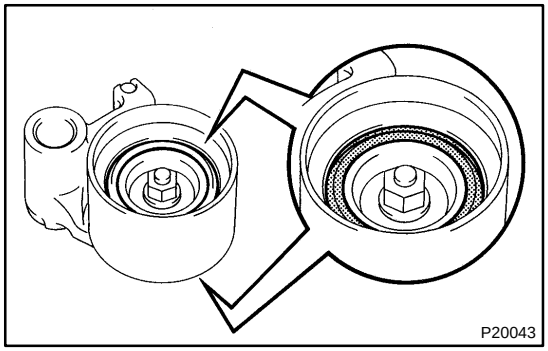
(2) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.

(3) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on the side of the idler pulley lock and water pump.

(4) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.

(5) If there is noticeable wear on the belt teeth, check the timing cover for damage, correct gasket installation, and for foreign material on the pulley teeth.

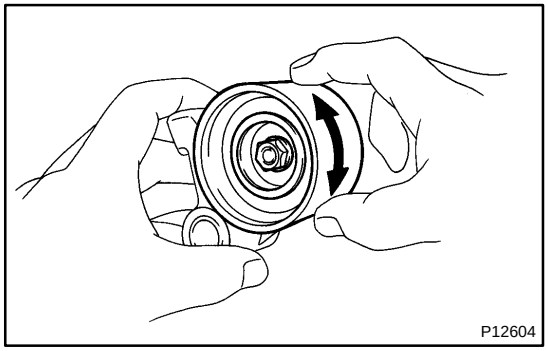
If necessary, replace the timing belt.



2. INSPECT IDLER PULLEYS

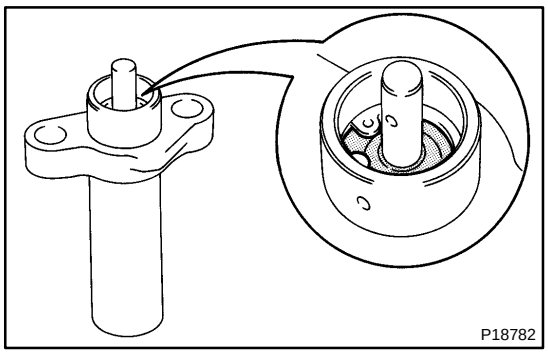
(a) Visually check the seal portion of the idler pulley for oil leakage.

If leakage is found, replace the idler pulley.



(b) Check that the idler pulley turns smoothly.

If necessary, replace the idler pulley.



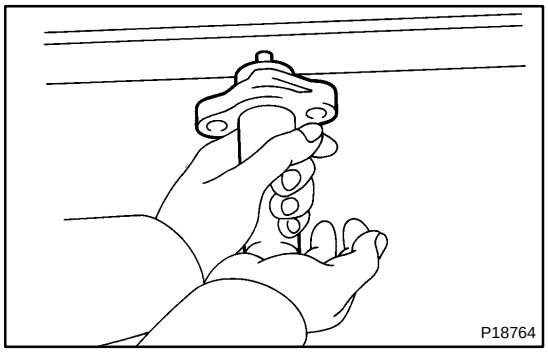
3. INSPECT TIMING BELT TENSIONER

(a) Visually check the seal portion of the tensioner for oil leakage.

HINT:

If there is only the faintest trace of oil on the seal on the push rod side, the tensioner is all right.

If leakage is found, replace the tensioner.

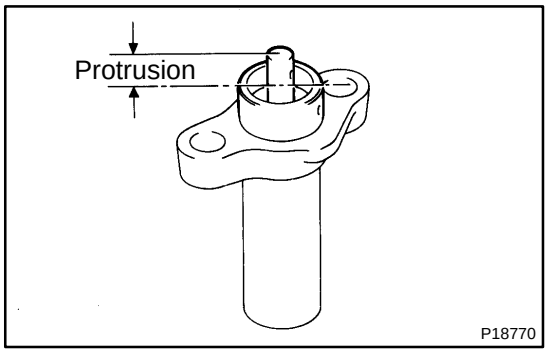


(b) Hold the tensioner with both hands and push the push rod strongly as shown to check that it doesn't move.

If the push rod moves, replace the tensioner.

NOTICE:

Never hold the tensioner push rod facing downward.



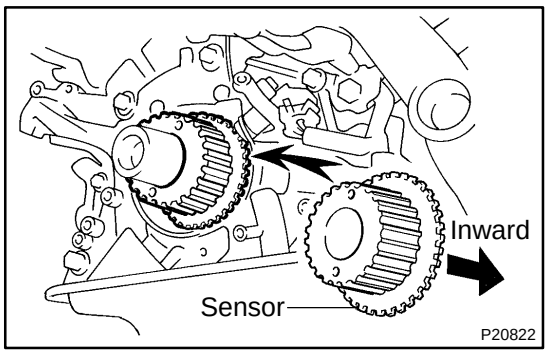
(c) Measure the protrusion of the push rod from the housing end.

Protrusion: 10.0 - 10.8 mm (0.394 - 0.425 in.)

If the protrusion is not as specified, replace the tensioner.

EM0ZO-03

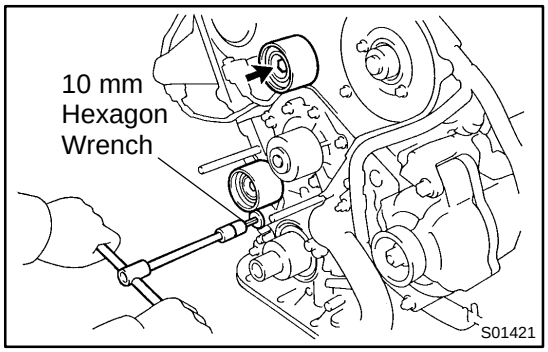
INSTALLATION



1. INSTALL CRANKSHAFT TIMING PULLEY

(a) Align the pulley set key with the key groove of the timing pulley and slide on the timing pulley.

(b) Slide on the timing pulley, facing the flange side inward.



2. INSTALL NO.1 IDLER PULLEY

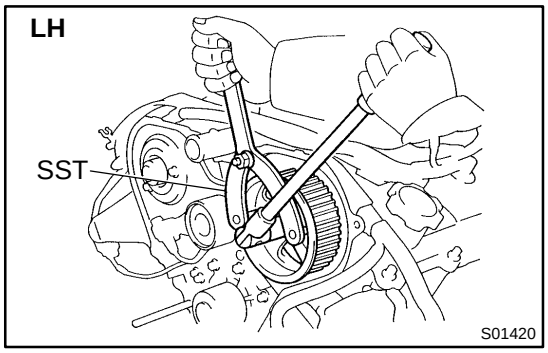
(a) Using a 10 mm hexagon wrench, install the plate washer and No.1 idler pulley with bolt.
Torque: 35 N·m (350 kgf·cm, 26 ft·lbf)

(b) Check that the pulley bracket moves smoothly.

3. INSTALL NO.2 IDLER PULLEY

(a) Install the No.2 idler pulley with the bolt.
Torque: 40 N·m (400 kgf·cm, 30 ft·lbf)

(b) Check that the No.2 idler pulley moves smoothly.

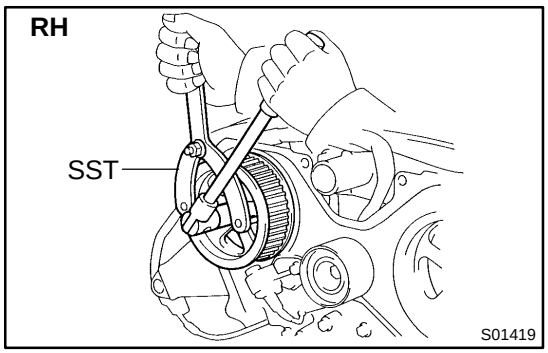


4. INSTALL LH CAMSHAFT TIMING PULLEY

(a) Face the flange side of the timing pulley outward.

(b) Align the knock pin on the camshaft with the knock pin groove of the timing pulley, and slide on the timing pulley.

(c) Using SST, install the pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 110 N·m (1,100 kgf·cm, 81 ft·lbf)

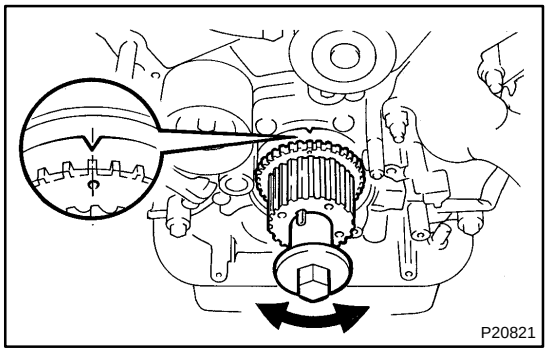


5. INSTALL RH CAMSHAFT TIMING PULLEY

(a) Face the flange side of the timing pulley outward.

(b) Align the knock pin on the camshaft with the knock pin groove of the timing pulley, and slide on the timing pulley.

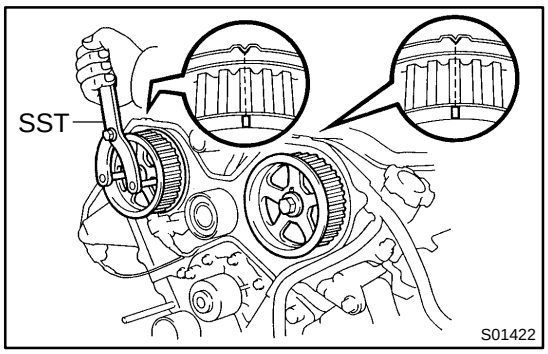
(c) Using SST, install the pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque: 110 N·m (1,100 kgf·cm, 81 ft·lbf)



6. SET NO.1 CYLINDER TO TDC/COMPRESSION

(a) Temporarily install the crankshaft pulley bolt to the crankshaft.

(b) Turn the crankshaft, and align the timing marks of the crankshaft timing pulley and oil pump body.



(c) Using SST, turn the camshaft pulley, align the timing marks of the timing pulley and No.3 timing belt cover.
SST 09960-10010 (09962-01000, 09963-01000)

7. INSTALL TIMING BELT

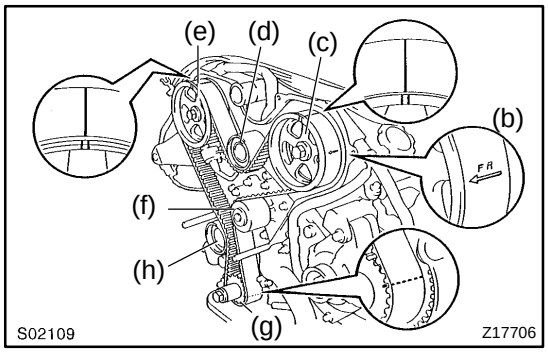
NOTICE:

The engine should be cold.

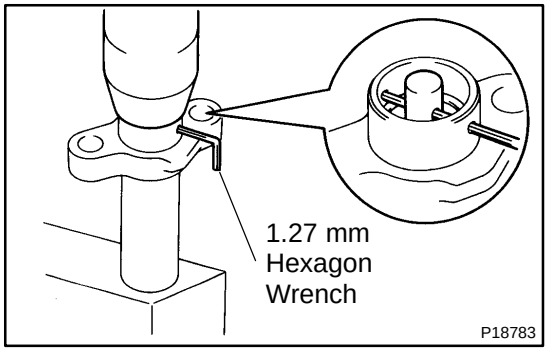
(a) Remove any oil or water on the pulleys, and keep them clean.

NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

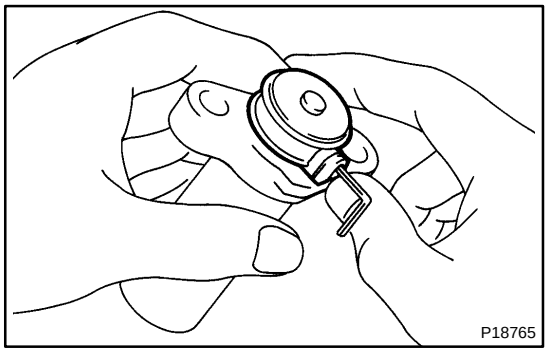


(b) Face the front mark on the timing belt forward.
(c) Install the timing belt to the LH camshaft timing pulley. Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley.
(d) Install the timing belt to the No.2 idler pulley.
(e) Install the timing belt to the RH camshaft timing pulley. Align the installation mark on the timing belt with the timing mark of the camshaft timing pulley.
(f) Install the timing belt to the water pump pulley.
(g) Install the timing belt to the crankshaft timing pulley. Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
(h) Install the timing belt to the No.1 idler pulley.

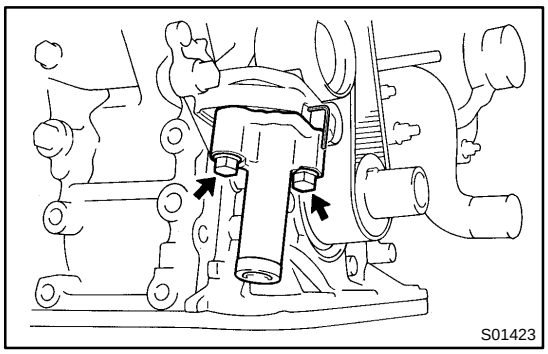


8. SET TIMING BELT TENSIONER

(a) Using a press, slowly press in the push rod using 981 - 9,807 N (100 - 1,000 kgf, 200 - 2,205 lbf) of pressure.
(b) Align the holes of the push rod and housing, pass a 1.27 mm hexagon wrench through the holes to keep the setting position of the push rod.
(c) Release the press.



(d) Install the dust boot to the tensioner.



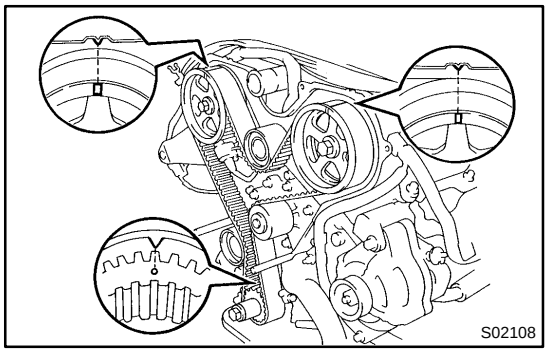
9. INSTALL TIMING BELT TENSIONER

(a) Temporarily install the tensioner with the 2 bolts.

(b) Alternately tighten the 2 bolts.

Torque: 27 N·m (280 kgf·cm, 20 ft·lbf)

(c) Remove the 1.27 mm hexagon wrench from the tensioner.



10. CHECK VALVE TIMING

(a) Turn the crankshaft, and align the timing marks of the crankshaft timing pulley and oil pump body.

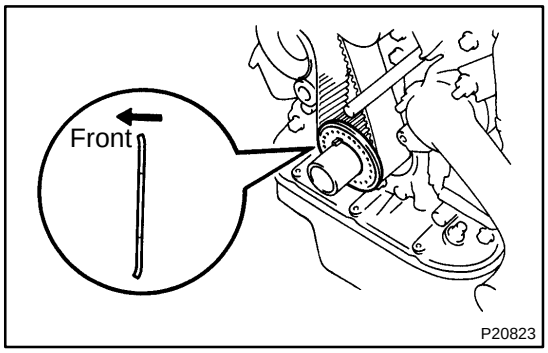
NOTICE:

Always turn the crankshaft clockwise.

(b) Check that the timing marks of the RH and LH timing pulleys with the timing marks of the No.3 timing belt cover as shown in the illustration.

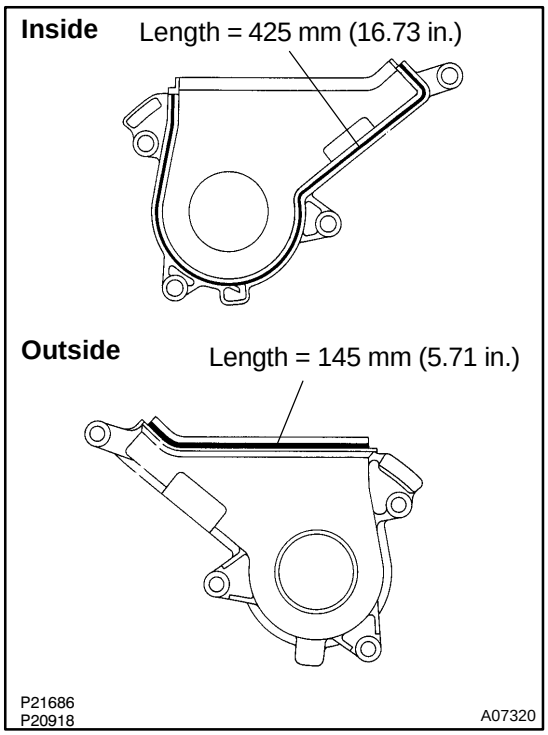
If the marks do not align, remove the timing belt and reinstall it.

(c) Remove the crankshaft pulley bolt.



11. INSTALL TIMING BELT GUIDE

Install the guide, facing the cup side outward.



12. INSTALL NO.1 TIMING BELT COVER AND STARTER WIRE BRACKET

(a) Check that the timing belt cover gaskets have cracks or peeling, etc.

If the gasket does have cracks or peeling, etc., replace it using these steps.

(1) Using a screwdriver and gasket scraper, remove all the old gasket material.

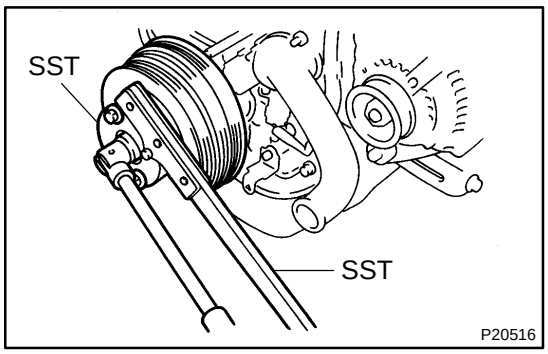
(2) Thoroughly clean all components to remove all the loose material.

(3) Remove the backing paper from a new gasket and install the gasket evenly to the part of the belt cover shaded back in the illustration.

(b) Install the timing belt cover with the 4 bolts.

Torque: 9 N·m (90 kgf·cm, 80 in.·lbf)

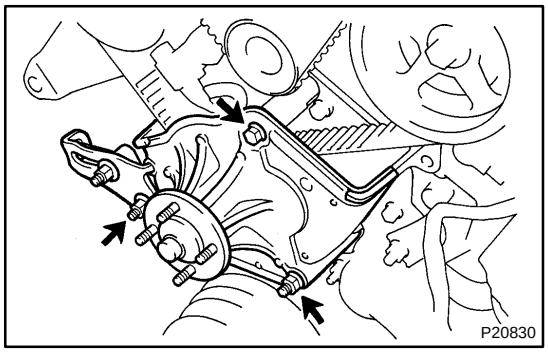
(c) Install the starter wire bracket with the 2 bolts.



13. INSTALL CRANKSHAFT PULLEY

(a) Align the pulley set key with the key groove of the pulley, and slide the pulley.

(b) Using SST, install a new bolt.
SST 09213-54015 (90119-08216), 09330-00021
Torque: 300 N·m (3,000 kgf·cm, 217 ft·lbf)



14. INSTALL FAN BRACKET

(a) Install the fan bracket with the bolt and nut.

(b) Install the PS pump adjusting strut with the nut.

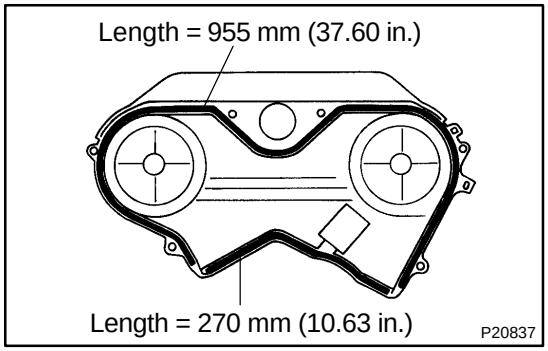
15. INSTALL NO.2 TIMING BELT COVER

(a) Check that the timing belt cover gasket has no cracks or peeling, etc.

If the gasket does have cracks or peeling, etc., replace it using these steps.

(1) Using a screwdriver and gasket scraper, remove all the old gasket material.

(2) Thoroughly clean all components to remove all the loose material.



(3) Remove the backing paper from a new gasket and install the gasket evenly to the part of the belt cover shaded black in the illustration.

(b) Install the belt cover with the 6 bolts.
Torque: 9 N·m (90 kgf·cm, 80 in.·lbf)

(c) Connect the 4 high-tension cord clamps and camshaft position sensor connector to the No.2 timing belt cover.

16. INSTALL OIL DIPSTICK AND GUIDE

(a) Install a new O-ring to the dipstick guide.

(b) Apply soapy water to the O-ring.

(c) Install the oil dipstick and guide to the cylinder block.

(d) Install the bolt to the generator bracket.
Torque: 8 N·m (80 kgf·cm, 71 in.·lbf)

17. w/ A/C:
INSTALL A/C COMPRESSOR BRACKET
Torque: 47 N·m (479 kgf·cm, 35 ft·lbf)

18. TEMPORARILY INSTALL FAN WITH FLUID COUPLING AND FAN PULLEYS

19. INSTALL NO.2 FAN SHROUD

20. INSTALL AND ADJUST DRIVE BELT FOR GENERATOR (See page CH-1)

21. TIGHTEN FAN WITH FLUID COUPLING AND FAN PULLEYS

Torque: 5.4 N·m (54 kgf·cm, 48 in.·lbf)

22. w/ A/C:

CONNECT A/C COMPRESSOR TO ENGINE

(a) Install the A/C compressor with the 4 bolts.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Install the drive belt (See page AC-18).

(c) Connect the A/C compressor connector.

23. CONNECT PS PUMP TO ENGINE

(a) Temporarily install the PS pump with the bolt and nut.

(b) Install the drive belt (See page SR-41).

(c) Tighten the bolt and nut.

Torque: 43 N·m (440 kgf·cm, 31 ft·lbf)

(d) Install the PS pressure tube clamp with the bolt.

(e) Connect the 2 PS air hoses to the air intake chamber and resonator.

24. CONNECT UPPER RADIATOR HOSE

25. FILL ENGINE WITH COOLANT

26. START ENGINE CHECK FOR LEAKS

27. INSTALL ENGINE UNDER COVER

28. PERFORM ROAD TEST

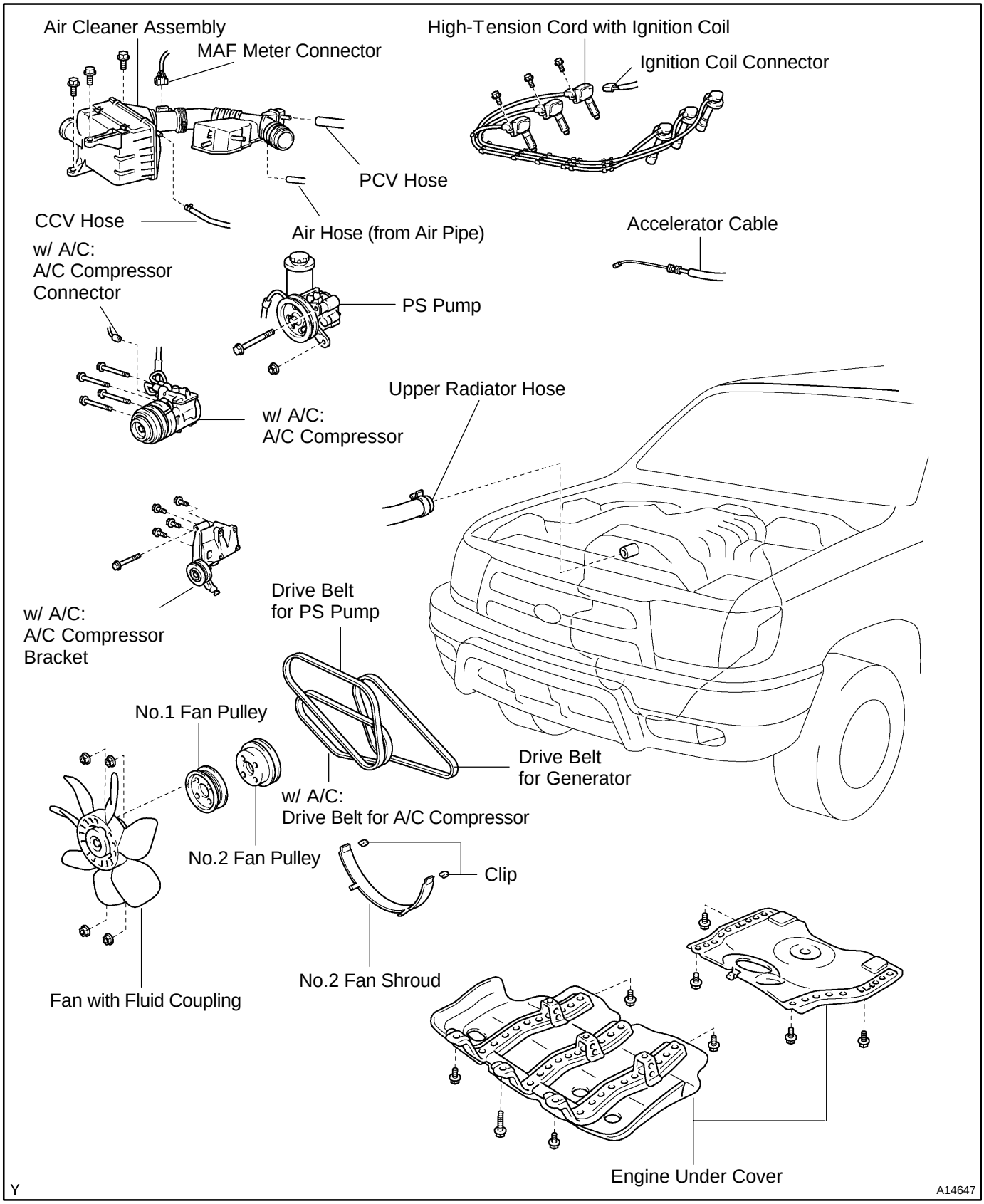
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

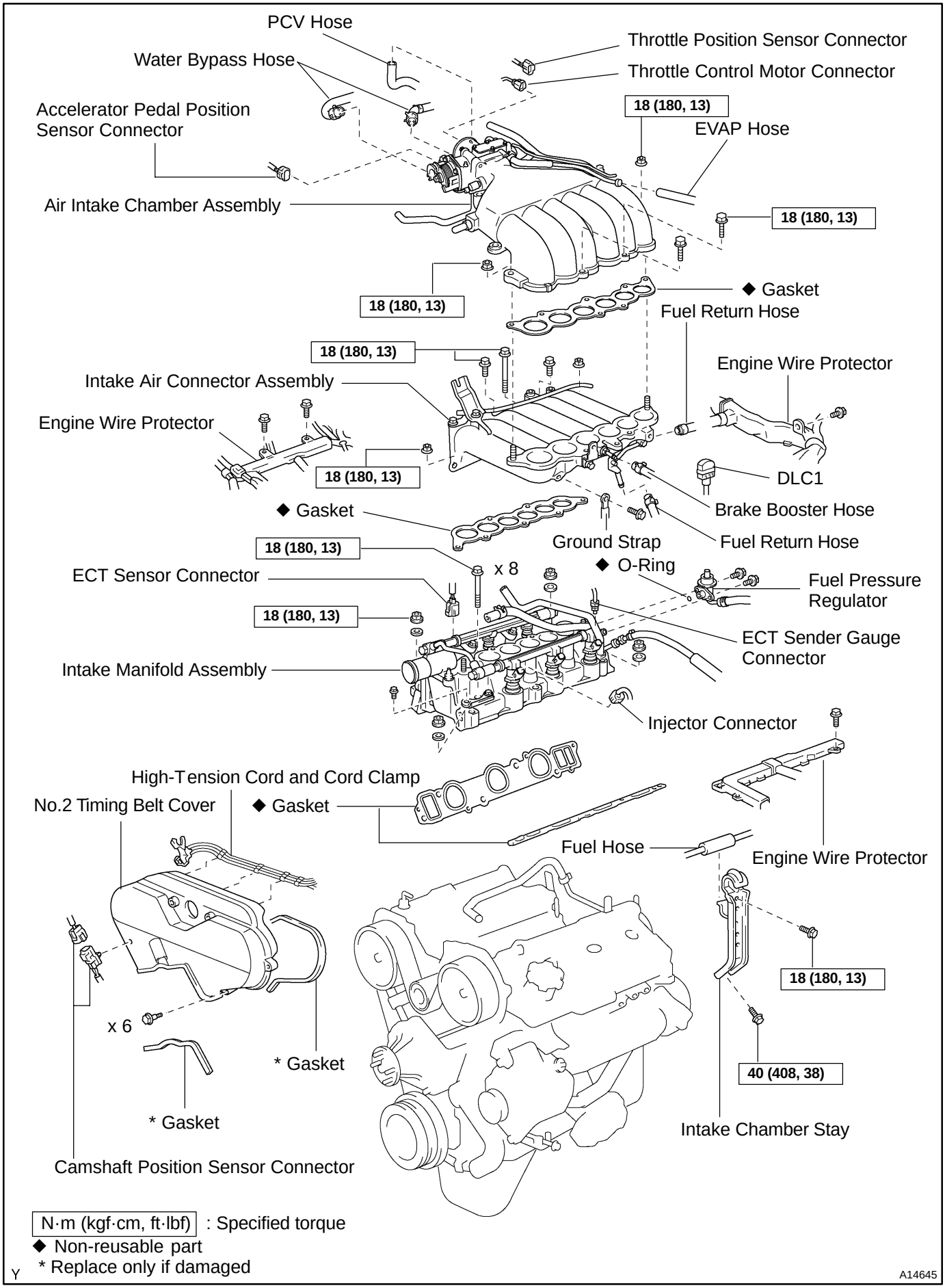
29. RECHECK ENGINE COOLANT LEVEL

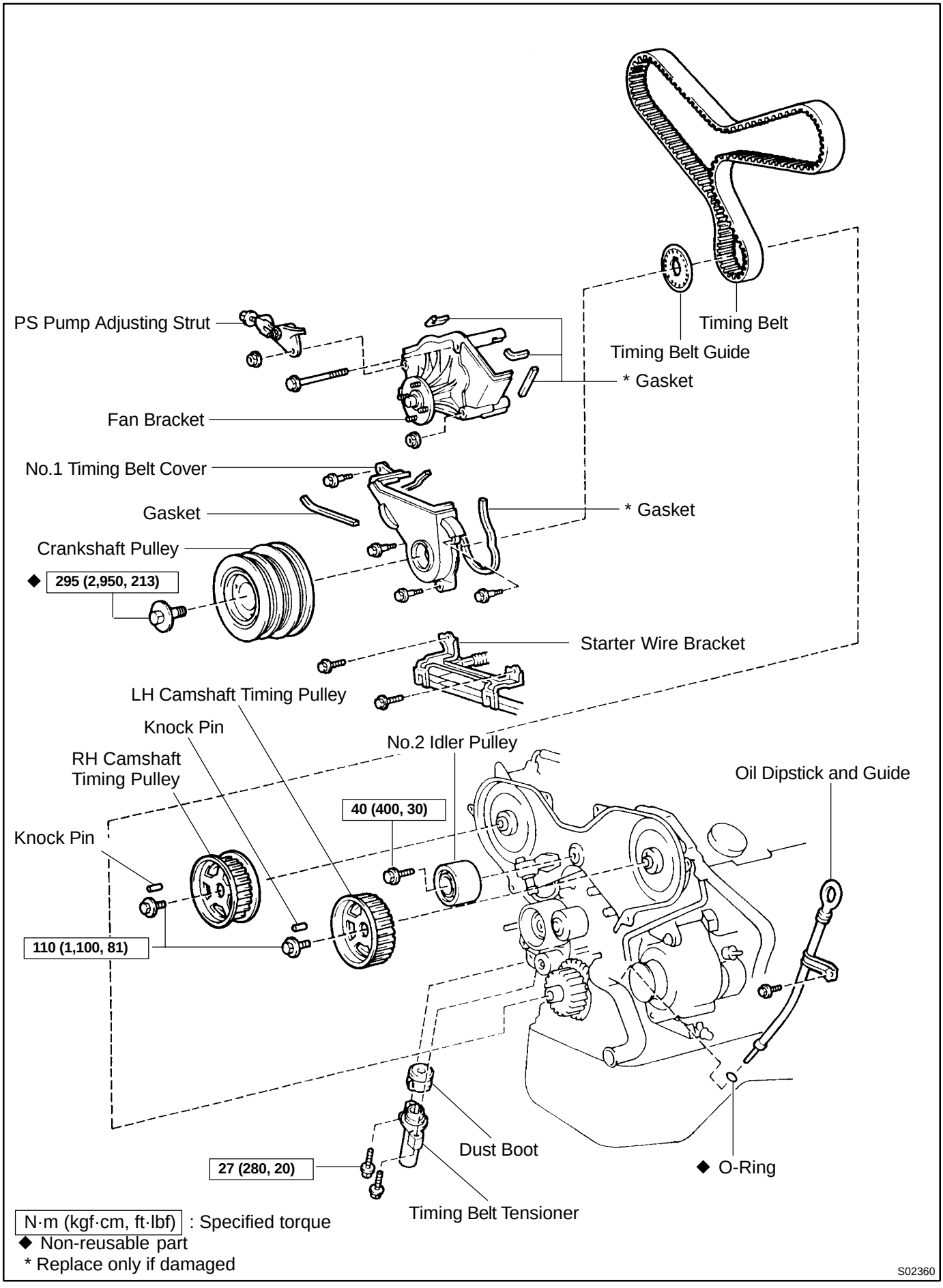
CYLINDER HEAD

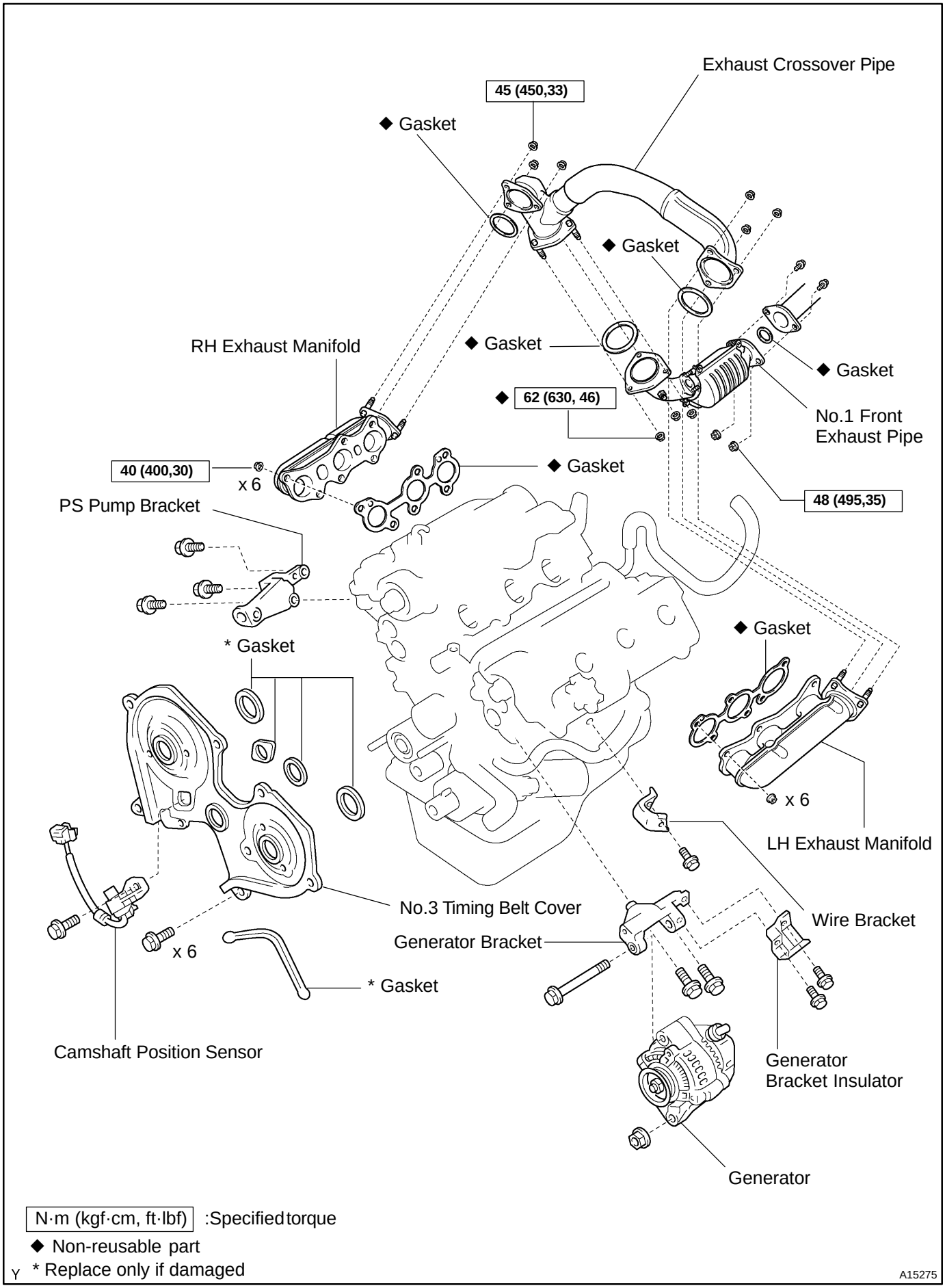
COMPONENTS

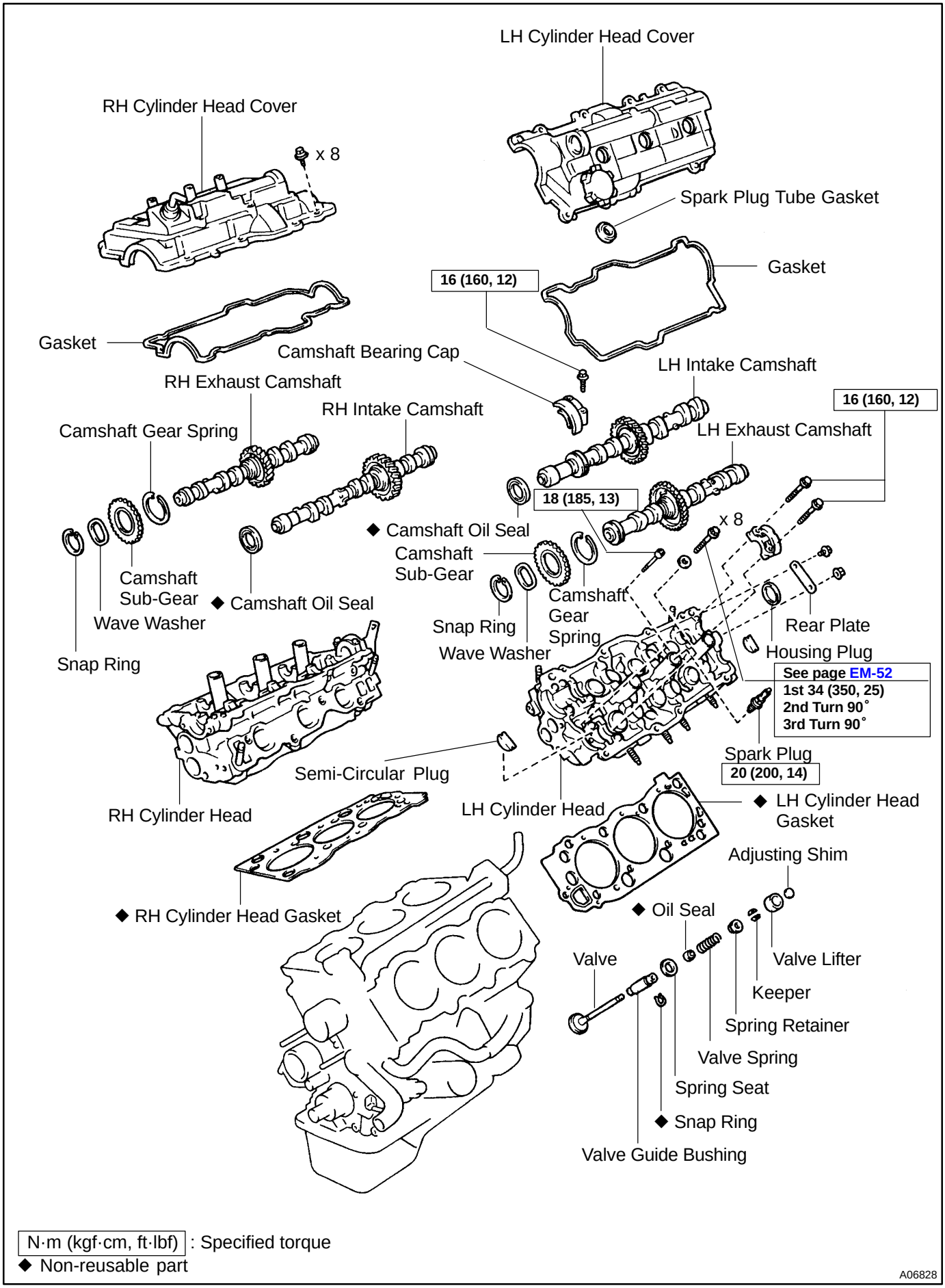
EM1MO-01




PCV Hose
Water Bypass Hose
Throttle Position Sensor Connector
Throttle Control Motor Connector
Accelerator Pedal Position Sensor Connector
18 (180, 13)
EVAP Hose
Air Intake Chamber Assembly
18 (180, 13)
18 (180, 13)
◆ Gasket
Fuel Return Hose
18 (180, 13)
Engine Wire Protector
Intake Air Connector Assembly
Engine Wire Protector
18 (180, 13)
DLC1
Brake Booster Hose
◆ Gasket
Ground Strap
Fuel Return Hose
18 (180, 13)
x 8
◆ O-Ring
ECT Sensor Connector
Fuel Pressure Regulator
18 (180, 13)
ECT Sender Gauge Connector
Intake Manifold Assembly
Injector Connector
High-Tension Cord and Cord Clamp
No.2 Timing Belt Cover
◆ Gasket
Fuel Hose
Engine Wire Protector
18 (180, 13)
x 6
* Gasket
40 (408, 38)
* Gasket
Intake Chamber Stay
Camshaft Position Sensor Connector
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
* Replace only if damaged
Y
A14645


Timing Belt
Timing Belt Guide
PS Pump Adjusting Strut
* Gasket
Fan Bracket
No.1 Timing Belt Cover
Gasket
* Gasket
Crankshaft Pulley
◆ 295 (2,950, 213)
Starter Wire Bracket
LH Camshaft Timing Pulley
Knock Pin
No.2 Idler Pulley
RH Camshaft Timing Pulley
Oil Dipstick and Guide
40 (400, 30)
Knock Pin
110 (1,100, 81)
Dust Boot
27 (280, 20)
◆ O-Ring
Timing Belt Tensioner
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
* Replace only if damaged
S02360

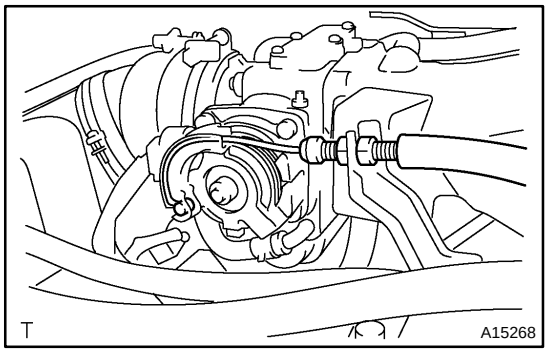

Exhaust Crossover Pipe
45 (450,33)
◆ Gasket
◆ Gasket
RH Exhaust Manifold
◆ Gasket
◆ Gasket
◆ 62 (630, 46)
No.1 Front Exhaust Pipe
40 (400,30)
x 6
◆ Gasket
48 (495,35)
PS Pump Bracket
* Gasket
◆ Gasket
x 6
LH Exhaust Manifold
No.3 Timing Belt Cover
Wire Bracket
Generator Bracket
x 6
* Gasket
Camshaft Position Sensor
Generator Bracket Insulator
Generator
N·m (kgf·cm, ft·lbf) :Specified torque
◆ Non-reusable part
* Replace only if damaged
A15275


LH Cylinder Head Cover
RH Cylinder Head Cover
x 8
Spark Plug Tube Gasket
Gasket
16 (160, 12)
Gasket
Camshaft Bearing Cap
LH Intake Camshaft
RH Exhaust Camshaft
RH Intake Camshaft
16 (160, 12)
Camshaft Gear Spring
LH Exhaust Camshaft
18 (185, 13)
◆ Camshaft Oil Seal
x 8
Camshaft Sub-Gear
Camshaft Sub-Gear
◆ Camshaft Oil Seal
Camshaft Gear Spring
Snap Ring
Wave Washer
Rear Plate
Housing Plug
Wave Washer
Snap Ring
See page EM-52
1st 34 (350, 25)
2nd Turn 90°
3rd Turn 90°
Spark Plug
20 (200, 14)
Semi-Circular Plug
RH Cylinder Head
LH Cylinder Head
◆ LH Cylinder Head Gasket
Adjusting Shim
◆ RH Cylinder Head Gasket
◆ Oil Seal
Valve
Valve Lifter
Keeper
Spring Retainer
Valve Spring
Spring Seat
◆ Snap Ring
Valve Guide Bushing
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
A06828

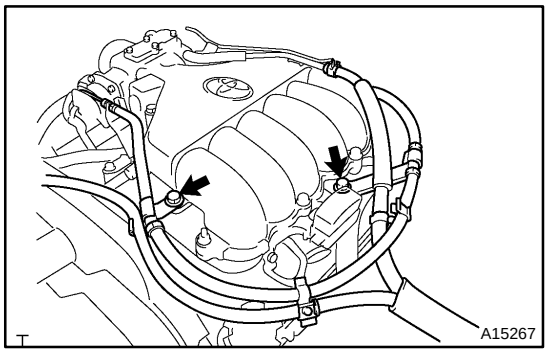
EM1MP-01

REMOVAL

1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT
3. REMOVE FRONT EXHAUST PIPE (See page EM-105)
4. DISCONNECT HEATER HOSE
5. REMOVE AIR CLEANER ASSEMBLY
6. REMOVE HIGH-TENSION CORDS WITH IGNITION COILS AND SPARK PLUGS (See page IG-7)

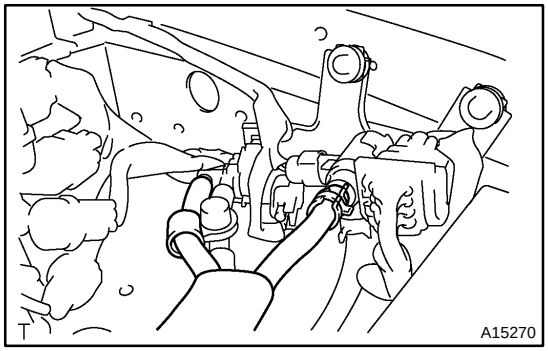


7. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY

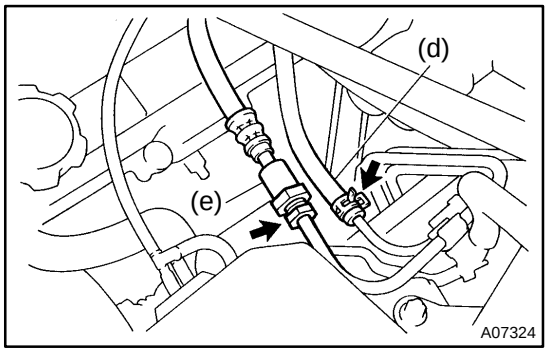


8. DISCONNECT HOSES

(a) Remove the 2 bolts from the air intake chamber assembly.

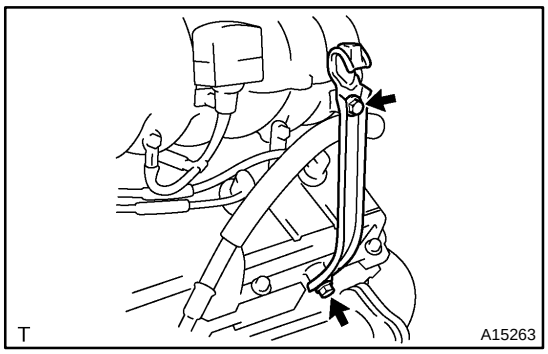


(b) Disconnect the EVAP hose.



(c) Disconnect the fuel return hose.

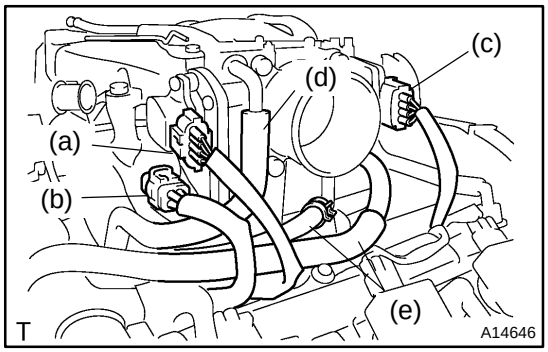
(d) Disconnect the fuel inlet hose.



9. REMOVE INTAKE CHAMBER STAY

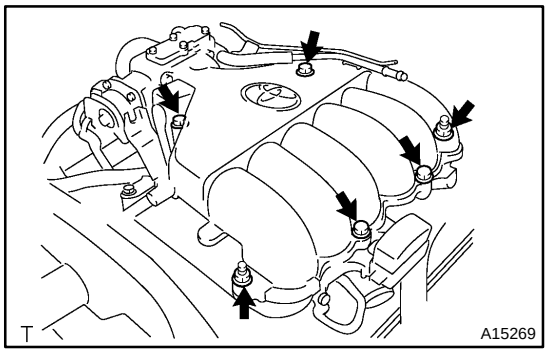
Remove the 2 bolts and intake chamber stay.

10. REMOVE NO.2 TIMING BELT COVER (See page EM-13)

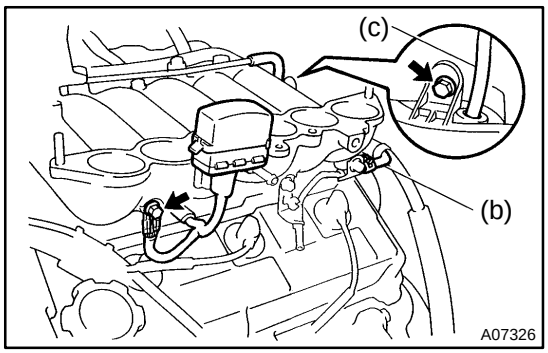


11. REMOVE AIR INTAKE CHAMBER ASSEMBLY

(a) Disconnect the throttle position sensor connector.
(b) Disconnect the throttle control motor connector.
(c) Disconnect the accelerator pedal position sensor connector.
(d) Disconnect the air hose.
(e) Disconnect the 2 water bypass hoses.

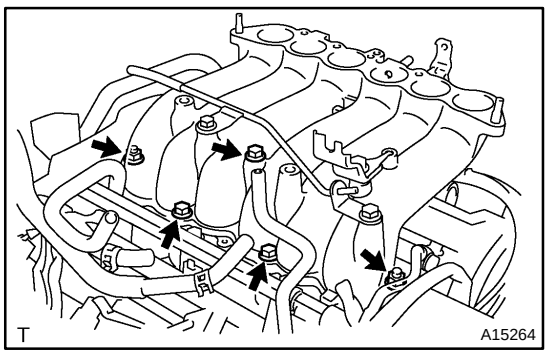


(f) Remove the 4 bolts, 2 nuts, the air intake chamber assembly and gasket.

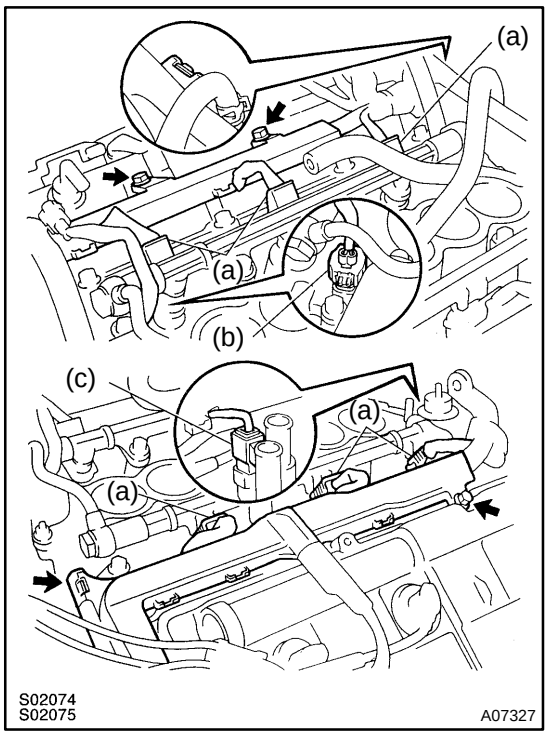


12. REMOVE INTAKE AIR CONNECTOR ASSEMBLY

(a) Remove the bolt and disconnect the engine wire.
(b) Disconnect the fuel return hose.
(c) Disconnect the vacuum sensing hose form the fuel pressure regulator.
(d) Remove the bolt and disconnect the ground strap from the intake air connector.
(e) Disconnect the DLC1 from the bracket.

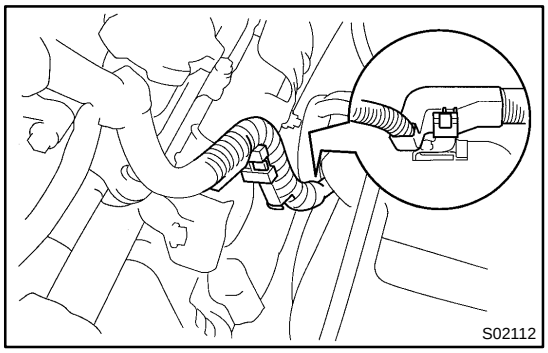


(f) Remove the 3 bolts, 2 nuts, the intake air connector assembly and gasket.



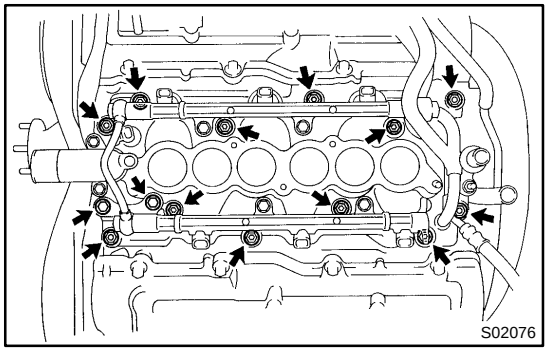
13. DISCONNECT ENGINE WIRE PROTECTOR

(a) Disconnect the 6 injector connectors.
(b) Disconnect the ECT sensor connector.
(c) Disconnect the ECT sender gauge connector.
(d) Disconnect the 2 engine wire clamps.
(e) Remove the 3 bolts, and disconnect the engine wire protector from the cylinder head.



(f) Disconnect the 2 engine wire clamps from the engine.

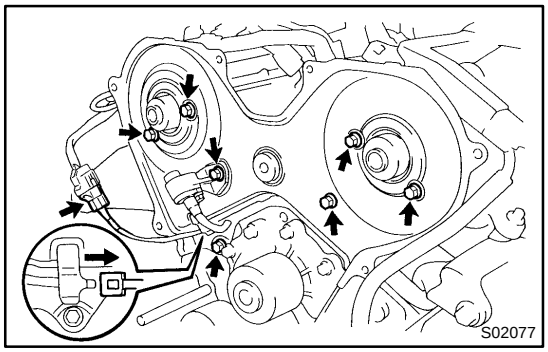
14. REMOVE FUEL PRESSURE REGULATOR (See page SF-16)



15. REMOVE INTAKE MANIFOLD ASSEMBLY

(a) Remove the 2 bolts and intake manifold stay.
(b) Remove the 8 bolts, 4 nuts, 4 plate washers, the intake manifold assembly and 2 gaskets.

16. REMOVE TIMING BELT (See page EM-13)



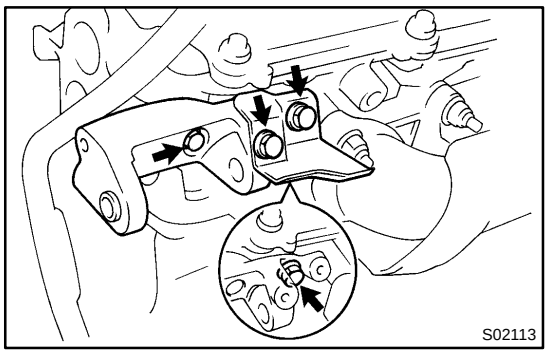
17. REMOVE CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.
(b) Disconnect the clamp from the No.3 timing belt cover.
(c) Remove the bolt and camshaft position sensor.

18. REMOVE NO.3 TIMING BELT COVER

Remove the 6 bolts and timing belt cover.

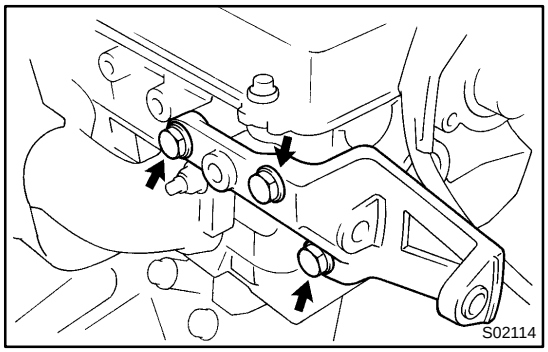
19. REMOVE GENERATOR (See page CH-6)



20. REMOVE GENERATOR BRACKET

(a) Remove the 2 bolts and generator bracket insulator.

(b) Remove the 2 bolts and generator bracket.



21. REMOVE PS PUMP BRACKET

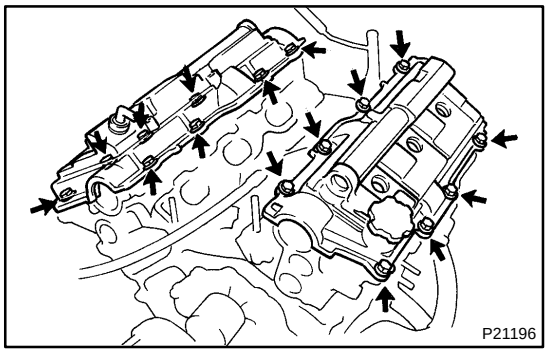
Remove the 3 bolts and PS pump bracket.

22. REMOVE EXHAUST CROSSOVER PIPE

Remove the 6 nuts, crossover pipe and 2 gaskets.

23. REMOVE EXHAUST MANIFOLDS

Remove the 12 nuts, 2 exhaust manifolds and 2 gaskets.



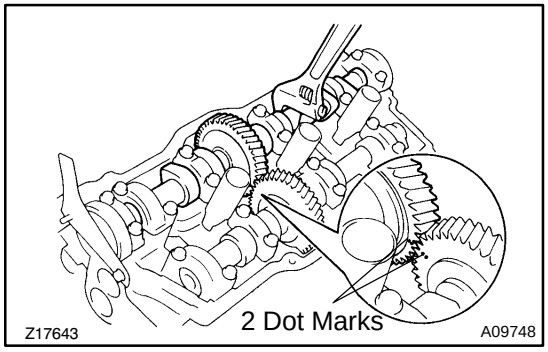
24. REMOVE CYLINDER HEAD COVERS

Remove the 8 bolts, seal washers, cylinder head cover and gasket. Remove the 2 cylinder head covers.

25. REMOVE CAMSHAFTS

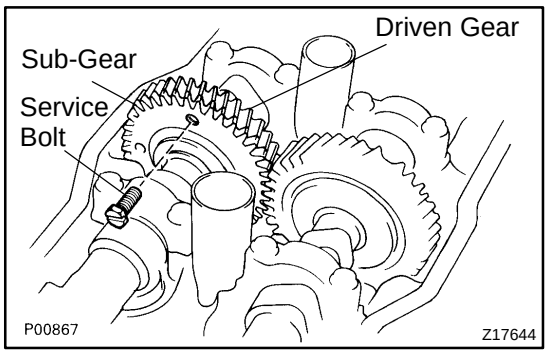
NOTICE:

Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being removed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, these steps should be carried out.



(a) Remove the exhaust camshaft of the RH cylinder head.

(1) Align the timing marks (2 dot marks) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(2) Secure the exhaust camshaft sub-gear to the main gear with a service bolt.

Torque: 5.5 N·m (55 kgf·cm, 49 in.·lbf)

Recommended service bolt:

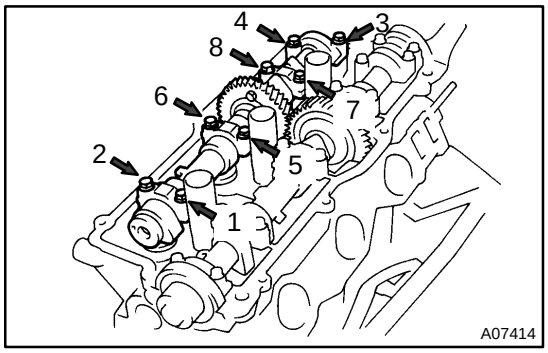
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 - 20 mm (0.63 - 0.79 in.)

NOTICE:

If the bolt is loose, the camshaft may tilt and cause damage in the camshaft and camshaft bearing cap.

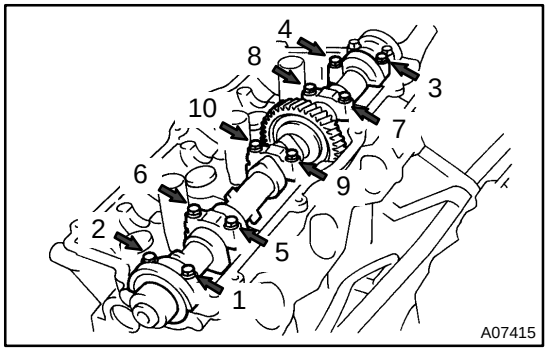
HINT:

When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



(3) Uniformly loosen and remove the 8 bearing cap bolts, in several passes, in the sequence shown.

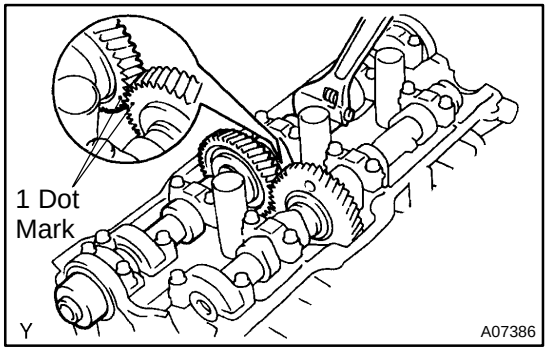
(4) Remove the 4 bearing caps and exhaust camshaft.



(b) Remove the intake camshaft of the RH cylinder head.

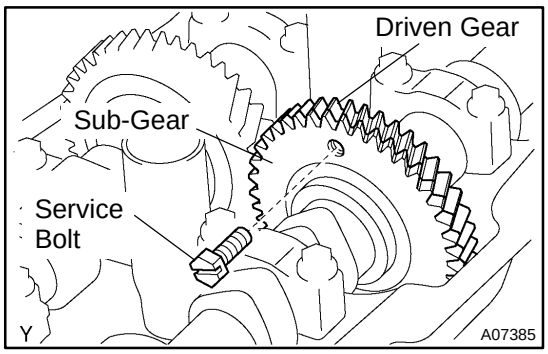
(1) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.

(2) Remove the 5 bearing caps, oil seal and intake camshaft.



(c) Remove the exhaust camshaft of the LH cylinder head.

(1) Align the timing marks (1 dot mark) of the camshaft drive and driven gears by turning the camshaft with a wrench.



(2) Secure the exhaust camshaft sub-gear to the main gear with a service bolt.

Torque: 5.5 N·m (55 kgf·cm, 49 in.·lbf)

Recommended service bolt:

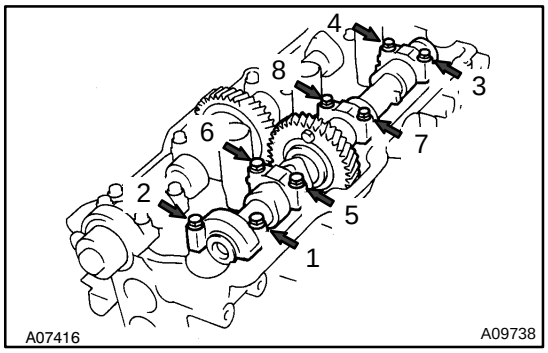
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 - 20 mm (0.63 - 0.79 in.)

NOTICE:

If the bolt is loose, the camshaft may tilt and cause damage in the camshaft and camshaft bearing cap.

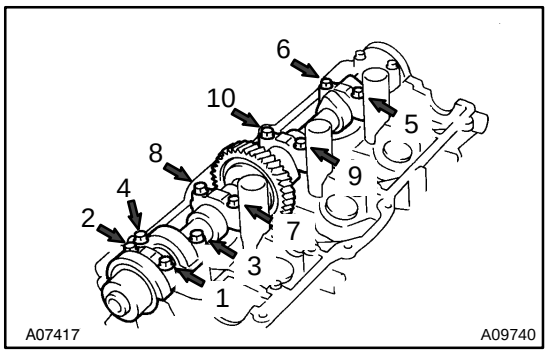
HINT:

When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



(3) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.

(4) Remove the 4 bearing caps and exhaust camshaft.



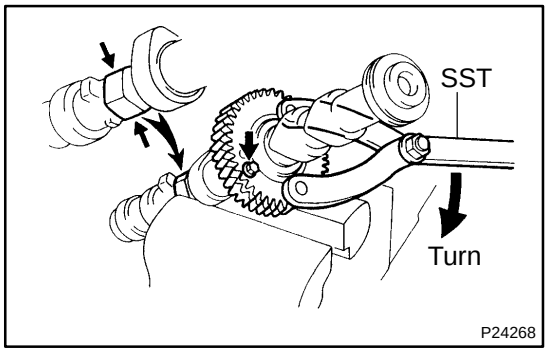
(d) Remove the intake camshaft of the LH cylinder head.

(1) Uniformly loosen and remove the 10 bearing cap bolts, in several passes, in the sequence shown.

(2) Remove the 5 bearing caps, oil seal and intake camshaft.

HINT:

- Arrange the camshafts in the correct order.
- Arrange the bearing caps in the correct order.



26. DISASSEMBLE EXHAUST CAMSHAFTS

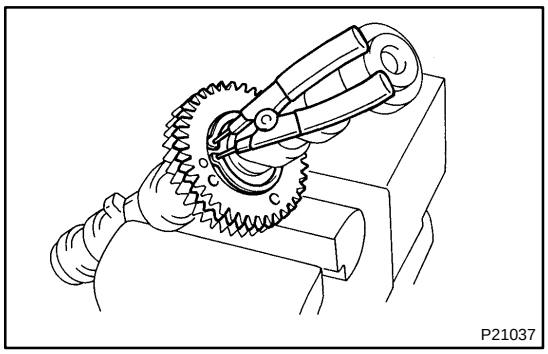
(a) Mount the hexagonal wrench head portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.

(b) Using SST, turn the sub-gear clockwise and remove the service bolt.

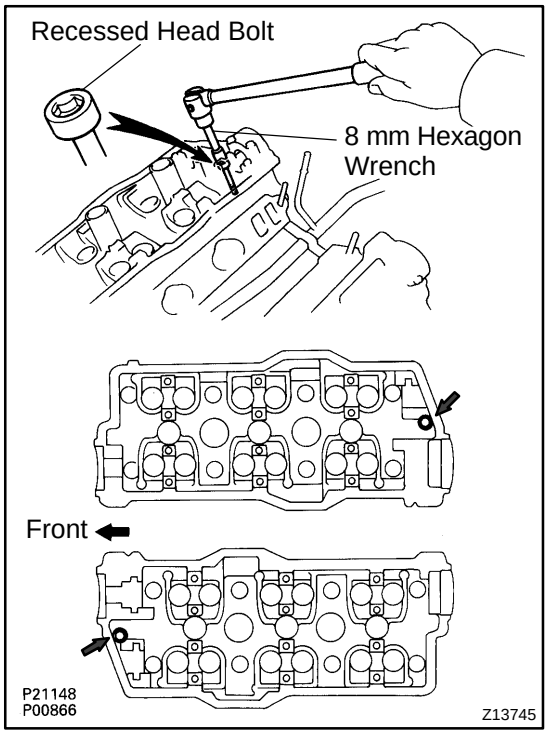
SST 09960-10010 (09962-01000, 09963-00600)



(c) Using snap ring pliers, remove the snap ring.
(d) Remove the wave washer, camshaft sub-gear and camshaft gear spring.

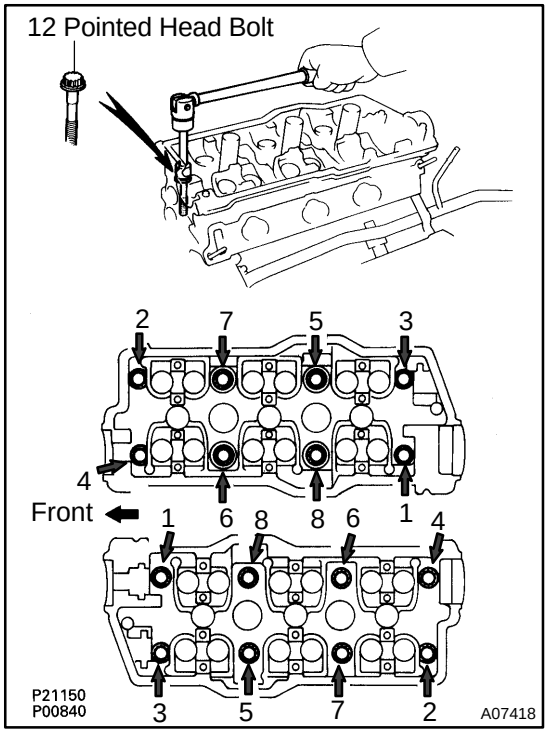
HINT:

Arrange the camshaft sub-gears and gear springs (RH and LH side).



27. REMOVE CYLINDER HEADS

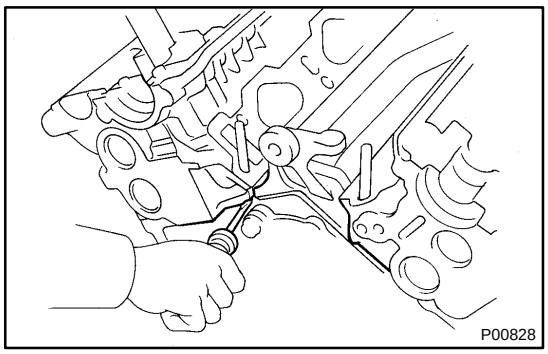
(a) Remove the bolt and disconnect the ground strap.
(b) Using an 8 mm hexagon wrench, remove the cylinder head (recessed head) bolt on each cylinder head, then repeat for the other side, as shown.



(c) Uniformly loosen nd remove the 8 cylinder head (12 pointed head) bolts on each cylinder head, in several passes, in the sequence shown, then repeat for the other side, as shown. Remove the 16 cylinder head bolts and plate washers.

NOTICE:

Head warpage or cracking could result from removing bolts in an incorrect order.



(d) Lift the cylinder head from the dowels on the cylinder block and place the 2 cylinder heads on wooden blocks on a bench.

HINT:

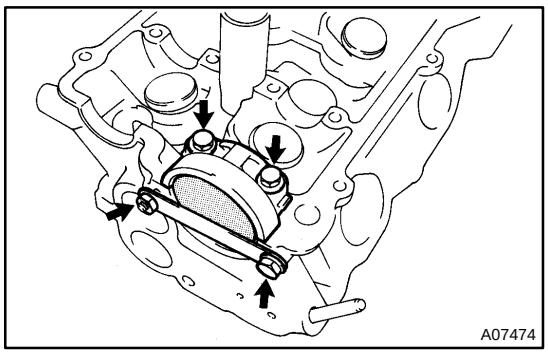
- If the cylinder head is difficult to lift off, pry between the cylinder head and cylinder block with a screwdriver.
- Arrange the cylinder heads in the correct order.

NOTICE:

Be careful not to damage the contact surfaces of the cylinder head and cylinder block.

EM01N-09

DISASSEMBLY



1. REMOVE CAMSHAFT HOUSING PLUGS

(a) Remove the bolt, nut, ground strap and cylinder head rear plate.

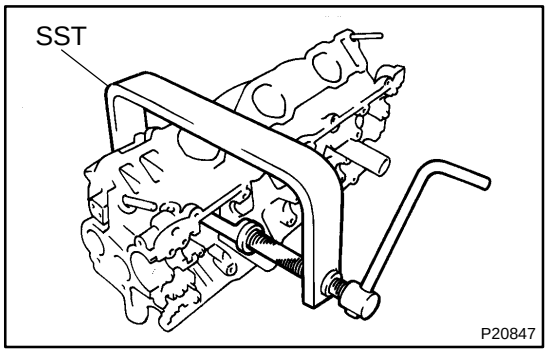
(b) Remove the 2 bolts, camshaft bearing cap and housing plug.

2. REMOVE VALVE LIFTERS AND SHIMS

Pull out the valve lifter and shim by hand.

HINT:

Arrange the valve lifters and shims in correct order.

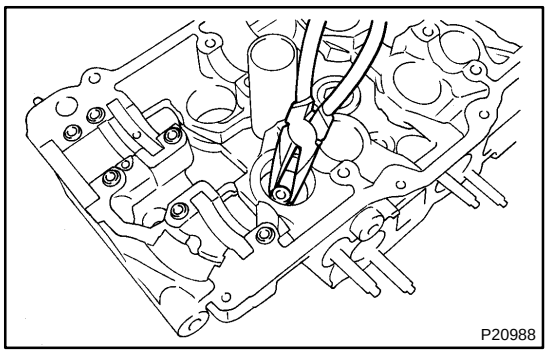


3. REMOVE VALVES

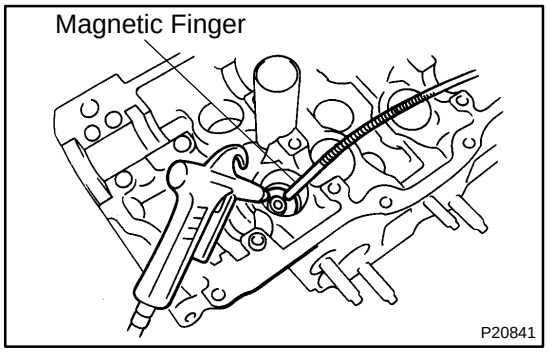
(a) Using SST, compress the valve spring and remove the 2 keepers.

SST 09202-70020

(b) Remove the spring retainer, valve spring and valve.



(c) Using needle-nose pliers, remove the oil seal.



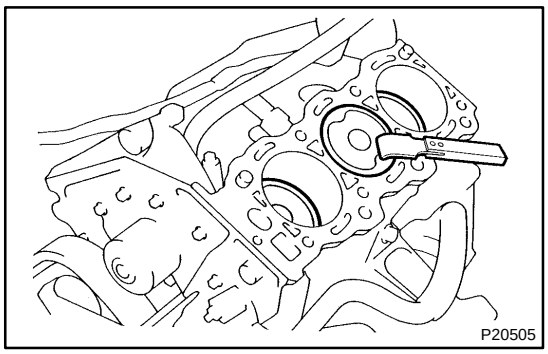
(d) Using compressed air and a magnetic finger, remove the spring seat by blowing air.

HINT:

Arrange the valves, valve springs, spring seats and spring retainers in the correct order.

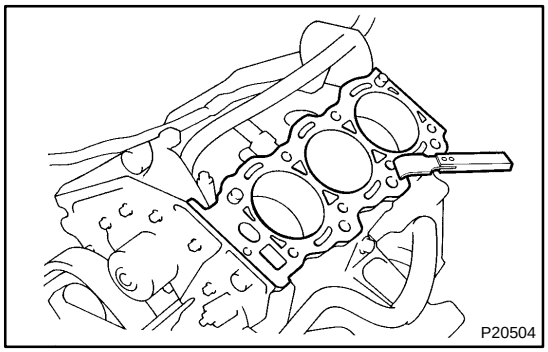
EM0Z2-03

INSPECTION



1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

(a) Turn the crankshaft and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surfaces.



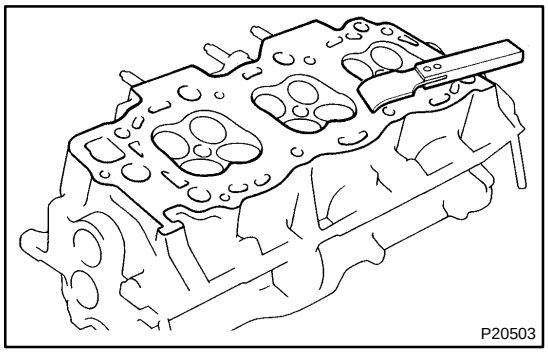
(b) Using a gasket scraper, remove all the gasket material from the cylinder block surfaces.

(c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high-compressed air.

2. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS (See page EM-88)

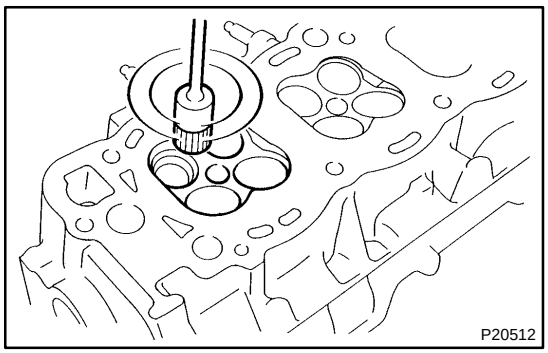


3. CLEAN CYLINDER HEAD

(a) Using a gasket scraper, remove all the gasket material from the cylinder block contact surface.

NOTICE:

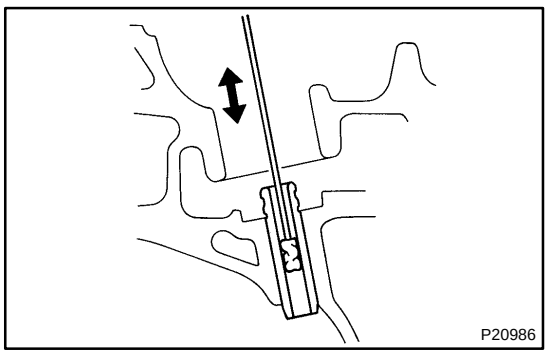
Be careful not to scratch the cylinder block contact surfaces.



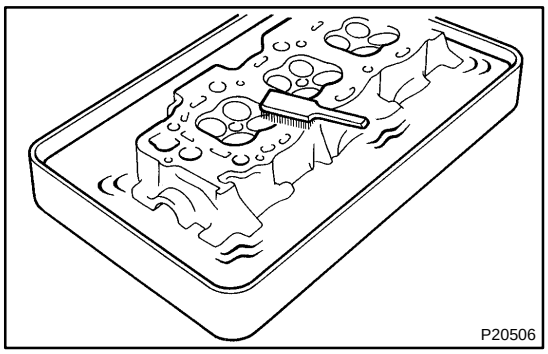
(b) Using a wire brush, remove all the carbon from the combustion chambers.

NOTICE:

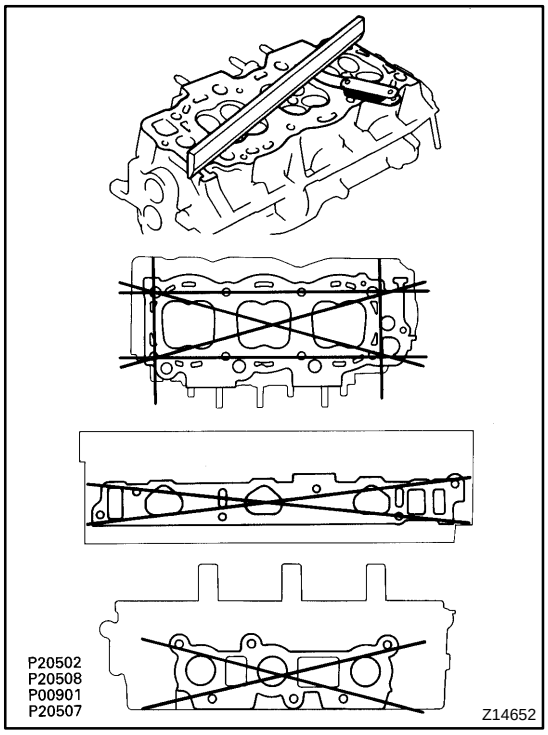
Be careful not to scratch the cylinder block contact surfaces.



(c) Using a valve guide bushing brush and solvent, clean all the guide bushings.



(d) Using a soft brush and solvent, thoroughly clean the cylinder heads.



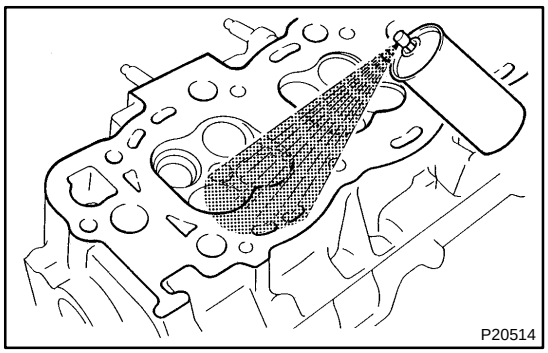
4. INSPECT CYLINDER HEAD

(a) Inspect for flatness.

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and manifolds for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

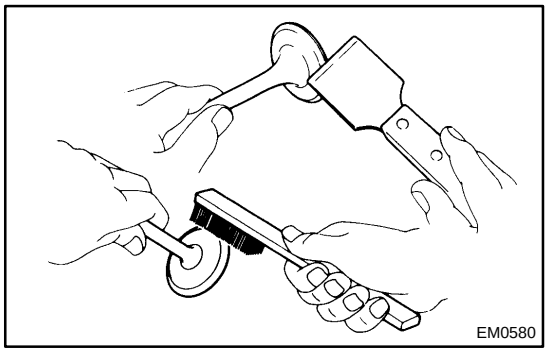
If warpage is greater than maximum, replace the cylinder head.



(b) Inspect for cracks.

Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

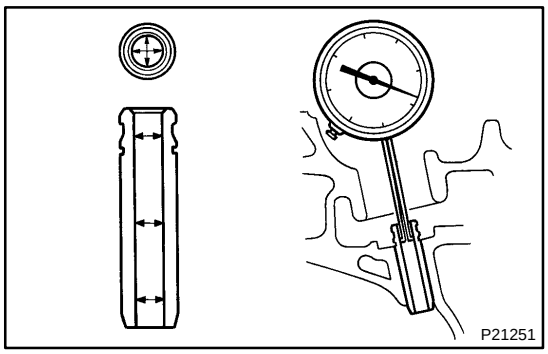
If cracked, replace the cylinder head.



5. CLEAN VALVES

(a) Using a gasket scraper, chip off any carbon from the valve head.

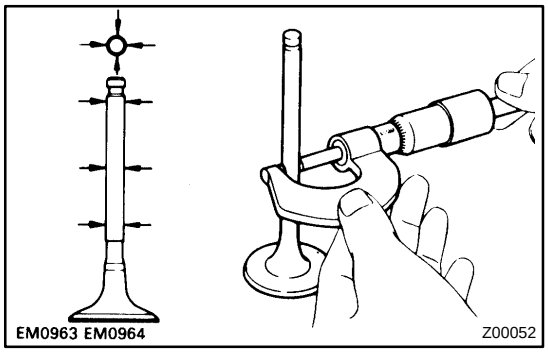
(b) Using a wire brush, thoroughly clean the valve.



6. INSPECT VALVE STEMS AND GUIDE BUSHINGS

(a) Using a caliper gauge, measure the inside diameter of the guide busing.

Bushing inside diameter:
6.010 - 6.030 mm (0.2366 - 0.2374 in.)



(b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:

Intake	5.970 - 5.985 mm (0.2350 - 0.2356 in.)
Exhaust	5.965 - 5.980 mm (0.2348 - 0.2354 in.)

(c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

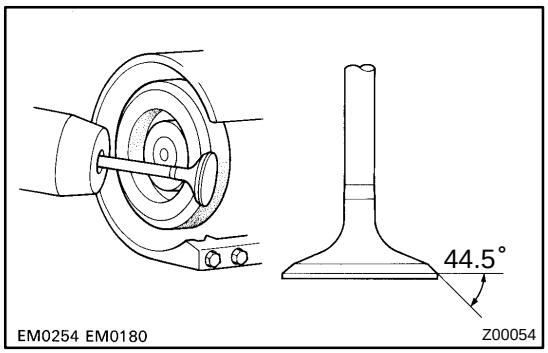
Standard oil clearance:

Intake	0.025 - 0.060 mm (0.0010 - 0.0024 in.)
Exhaust	0.030 - 0.065 mm (0.0012 - 0.0026 in.)

maximum oil clearance:

Intake	0.08 mm (0.0031 in.)
Exhaust	0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing. (See page EM-47)

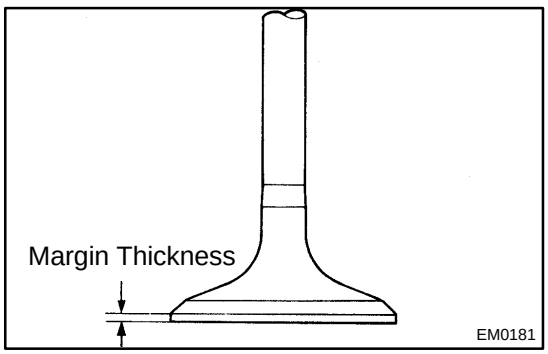


7. INSPECT AND GRIND VALVES

(a) Grind the valve enough to remove pits and carbon.

(b) Check that the valve is ground to the correct valve face angle.

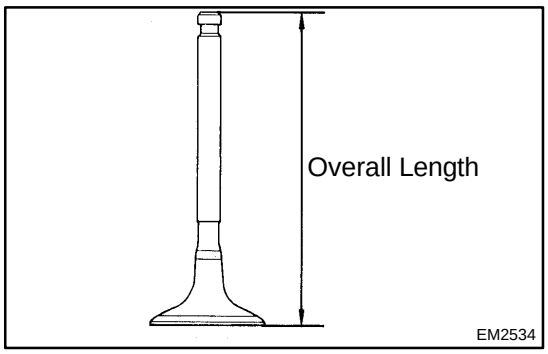
Valve face angle: 44.5˚



(c) Check the valve head margin thickness.

Standard margin thickness: 1.0 mm (0.039 in.)
Minimum margin thickness: 0.5 mm (0.020 in.)

If the margin thickness is less than the minimum, replace the valve.



(d) Check the valve overall length.

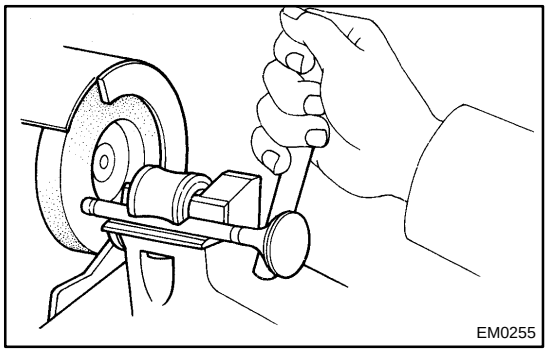
Standard overall length:

Intake	95.15 mm (3.7461 in.)
Exhaust	94.90 mm (3.7362 in.)

Minimum overall length:

Intake	94.60 mm (3.7244 in.)
Exhaust	94.40 mm (3.7165 in.)

If the overall length is less than minimum, replace the valve.

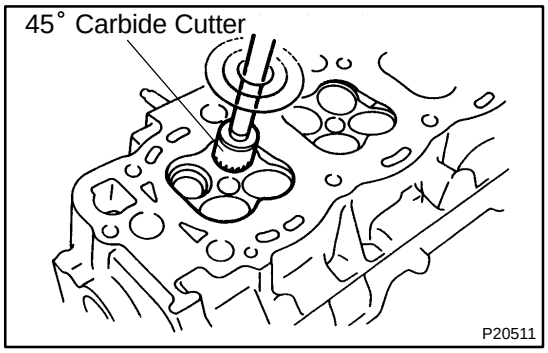


(e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

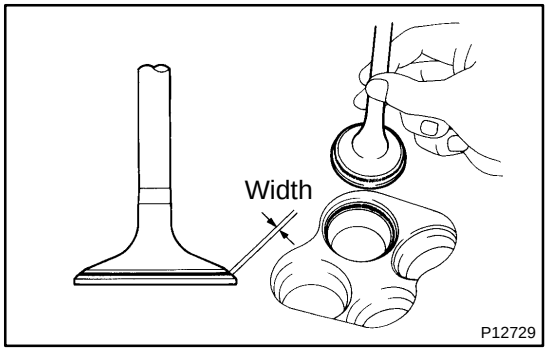
NOTICE:

Do not grind off more than the minimum length.



8. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45˚ carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.



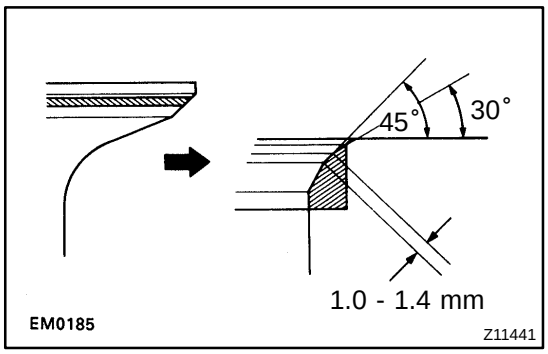
(b) Check the valve seating position.

Apply a thin coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate the valve.

(c) Check the valve face and seat for the following:

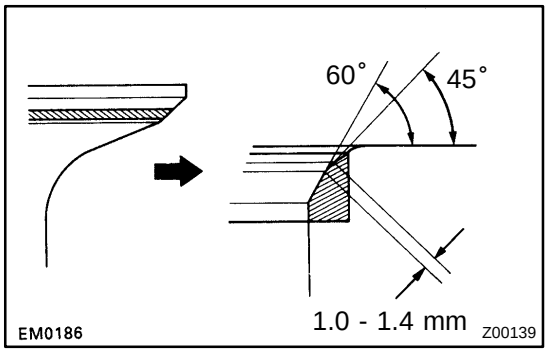
- If blue appears 360˚ around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360˚ around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with these width.

1.0 - 1.4 mm (0.039 - 0.055 in.)

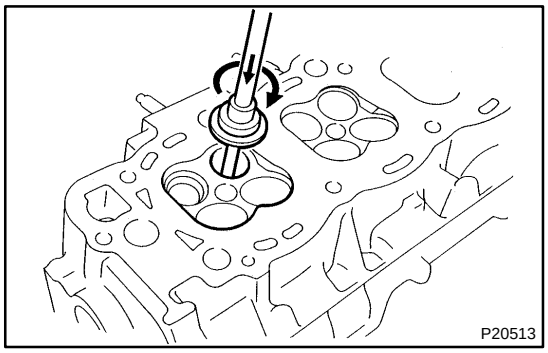


If not, correct the valve seats as follows:

(1) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

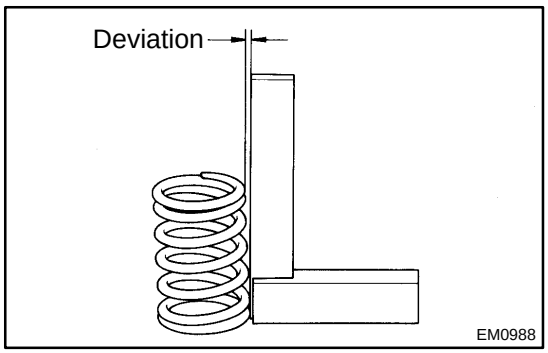


(2) If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.



(d) Hand-lap the valve and valve seat with an abrasive compound.

(e) After hand-lapping, clean the valve and valve seat.

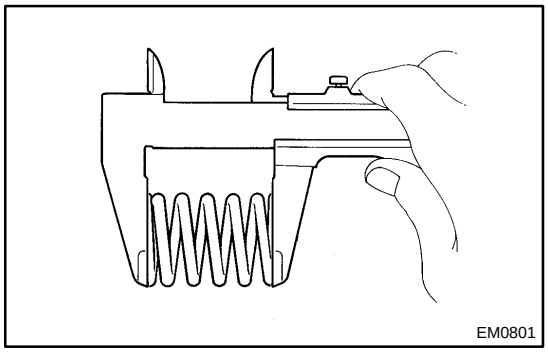


9. INSPECT VALVE SPRINGS

(a) Using a steel square, measure the squareness of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

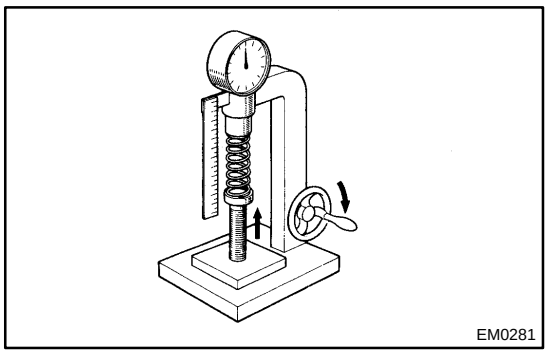
If the deviation is greater than maximum, replace the valve spring.



(b) Using vernier calipers, measure the free length of the valve spring.

Free length: 44.78 mm (1.7630 in.)

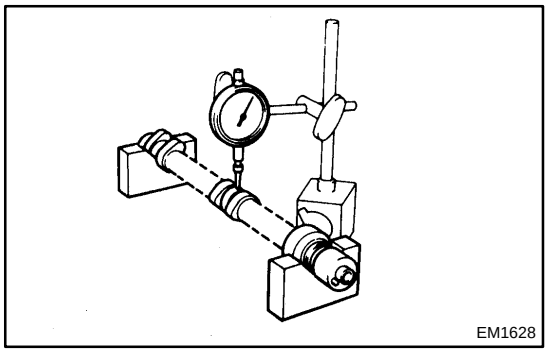
If the free length is not as specified, replace the valve spring.


EM0281

(c) Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:
186 - 206 N (19.0 - 21.0 kgf, 41.9 - 46.3 lbf)
at 33.3 mm (1.311 in.)

If the installed tension is not as specified, replace the valve spring.

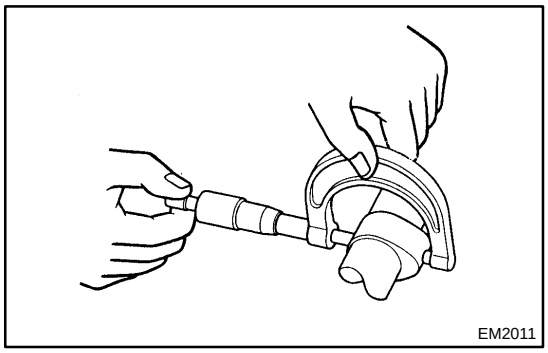

EM1628

10. INSPECT CAMSHAFTS

(a) Inspect the circle runout.
(1) Place the camshaft on V-blocks.
(2) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the camshaft.


EM2011

(b) Using a micrometer, measure the cam lobe height.

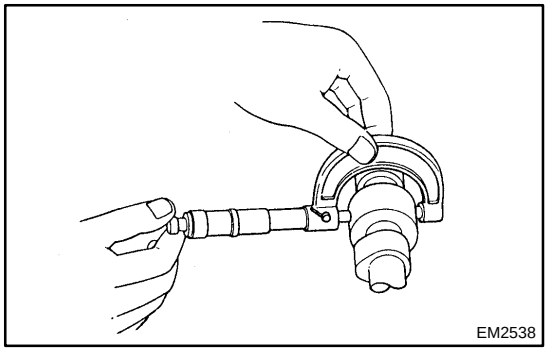
Standard cam lobe height:

Intake	42.31 - 42.41 mm (1.6657 - 1.6697 in.)
Exhaust	41.96 - 42.06 mm (1.6520 - 1.6559 in.)

Minimum cam lobe height:

Intake	42.16 mm (1.6598 in.)
Exhaust	41.81 mm (1.6461 in.)

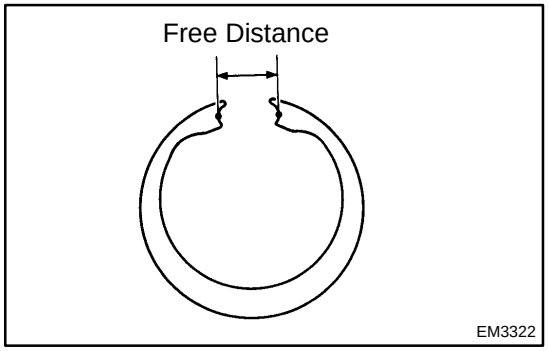
If the cam lobe height is less than minimum, replace the camshaft.


EM2538

(c) Using a micrometer, measure the journal diameter.

Journal diameter:
26.949 - 26.965 mm (1.0610 - 1.0616 in.)

If the journal diameter is not as specified, check the oil clearance.

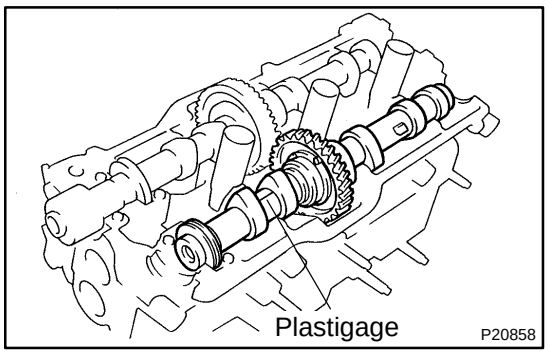


EM3322

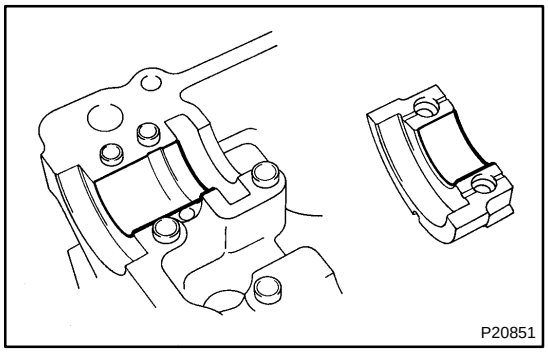
(d) Using a vernier caliper, measure the free distance between the spring end.

Free distance: 18.2 - 18.8 mm (0.712 - 0.740 in.)

If the free distance is not as specified, replace the gear spring.



(e) Inspect the journal oil clearance.
(1) Clean the bearing caps and camshaft journals.



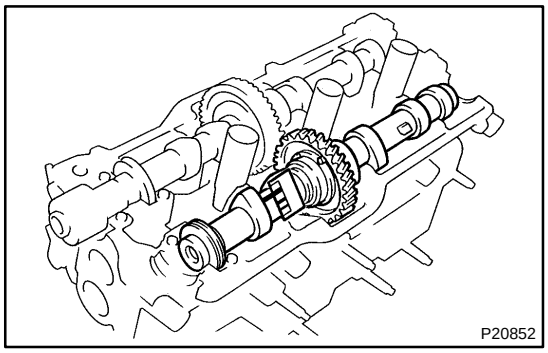
(2) Check the bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

(3) Place the camshafts on the cylinder head.
(4) Lay a strip of Plastigage across each of the camshaft journals.
(5) Install the bearing caps. (See page EM-52)

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

NOTICE:
Do not turn the camshaft.

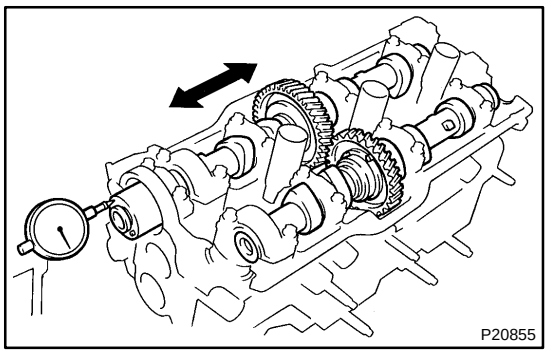


(6) Remove the bearing caps.
(7) Measure the Plastigage at its widest point.

Standard oil clearance:
0.035 - 0.072 mm (0.0014 - 0.0028 in.)
Maximum oil clearance: 0.10 mm (0.0039 in.)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

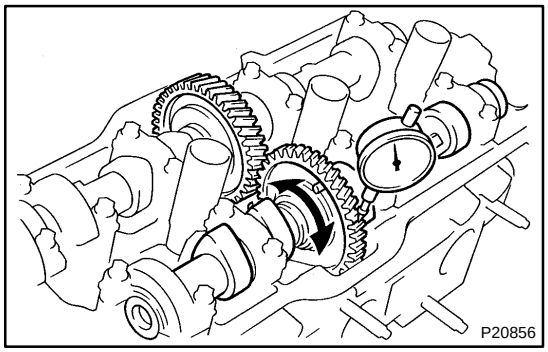
(8) Completely remove the Plastigage.



(f) Inspect the camshaft thrust clearance.
(1) Install the camshafts. (See page EM-52)
(2) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:
0.033 - 0.080 mm (0.0013 - 0.0031 in.)
Maximum thrust clearance: 0.12 mm (0.0047 in.)

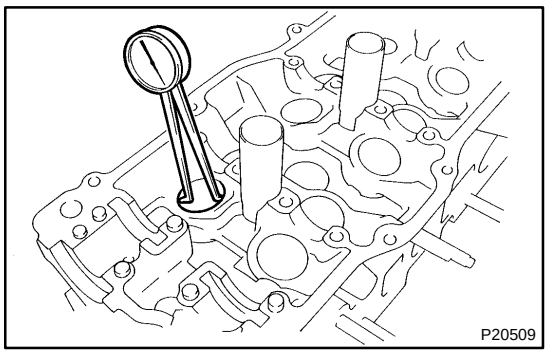
If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.



(g) Inspect the camshaft gear backlash.
(1) Install the camshafts without installing the exhaust camshaft sub-gear. (See page EM-52)
(2) Using a dial indicator, measure the backlash.

Standard backlash:
0.020 - 0.200 mm (0.0008 - 0.0079 in.)
Maximum backlash: 0.30 mm (0.0188 in.)

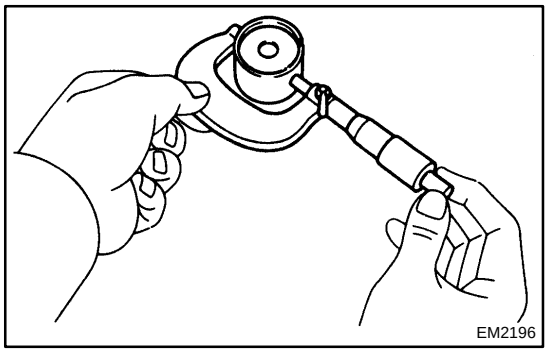
If the backlash is greater than maximum, replace the camshafts.



11. INSPECT VALVE LIFTERS AND LIFTER BORES

(a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:
31.000 - 31.018 mm (1.2205 - 1.2212 in.)



(b) Using a micrometer, measure the lifter diameter.

Lifter diameter:
30.966 - 30.976 mm (1.2191 - 1.2195 in.)

(c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

Standard oil clearance:
0.024 - 0.052 mm (0.0009 - 0.0020 in.)
Maximum oil clearance: 0.08 mm (0.0031 in.)

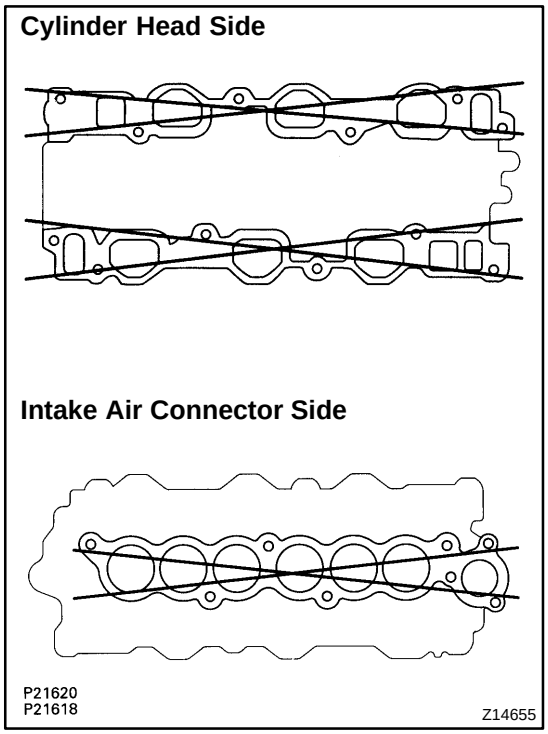
If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.

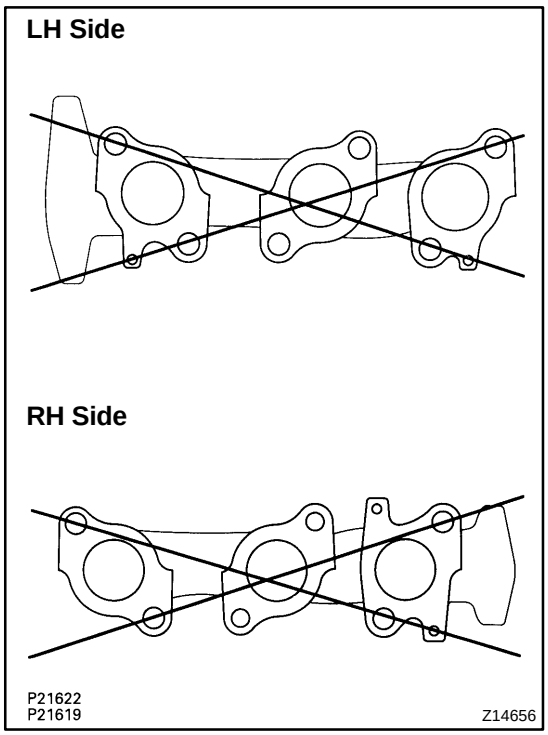
12. INSPECT INTAKE MANIFOLD

Using precision straight edge and thickness gauge, measure the surfaces contacting the cylinder head and intake air connector for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the intake manifold.



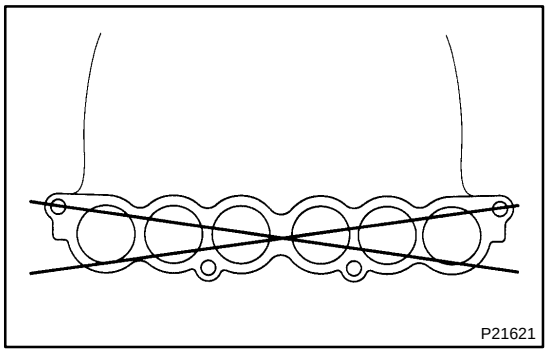


13. INSPECT EXHAUST MANIFOLDS

Measure the surfaces contacting the cylinder head for warpage.

Maximum warpage: 1.00 mm (0.0394 in.)

If warpage is greater than maximum, replace the exhaust manifold.



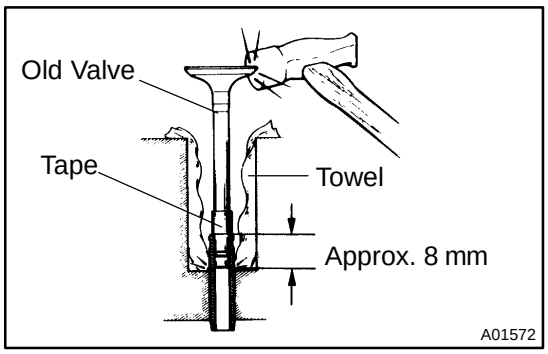
14. AIR INTAKE CHAMBER AND INTAKE AIR CONNECTOR

Measure the surfaces contacting the intake manifold and intake air connector for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

If warpage is greater than maximum, replace the air intake chamber or intake air connector.

EM0Z3-02



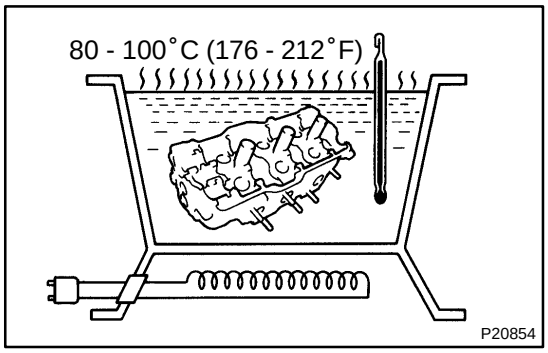
REPLACEMENT

1. REPLACE VALVE GUIDE BUSHINGS

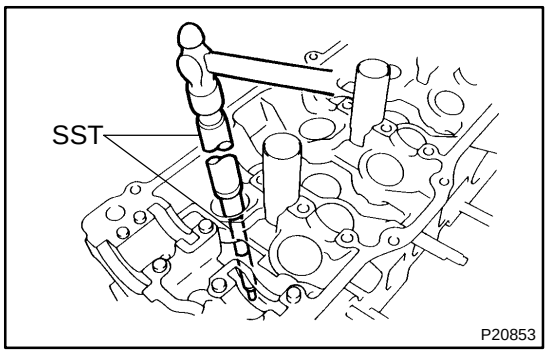
(a) w/ Snap ring:
Insert an old valve wrapped with tape into the valve guide bushing, and break off the valve guide bushing by hitting it with a hammer. Remove the snap ring.

HINT:
Wrap the tape approx. 8 mm (0.31 in.) from the valve stem end.

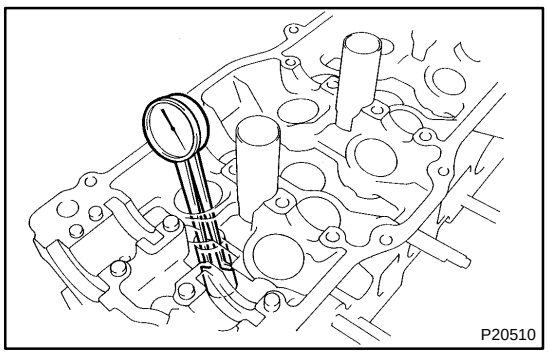
NOTICE:
Be careful not to damage the valve lifter hole.



(b) Gradually heat the cylinder head to 80 - 100˚C (176 - 212˚F).



(c) Using SST and a hammer, tap out the guide bushing.
SST 09201-10000 (09201-01060),
09950-70010 (09951-07150)



(d) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

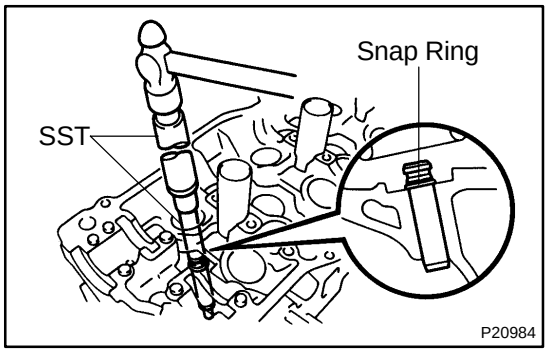
(e) Select a new guide bushing (STD size or O/S 0.05).
Both intake and exhaust

Bushing bore diameter mm (in.)	Bushing size
10.985 - 11.027 (0.4350 - 0.4341)	Use STD
11.050 - 11.077 (0.4350 - 0.4361)	Use O/S 0.05

If the bushing bore diameter of the cylinder head is greater than 11.027 mm (0.4341 in.), machine the bushing bore to these dimension:

11.050 - 11.077 mm (0.4350 - 0.4361 in.)

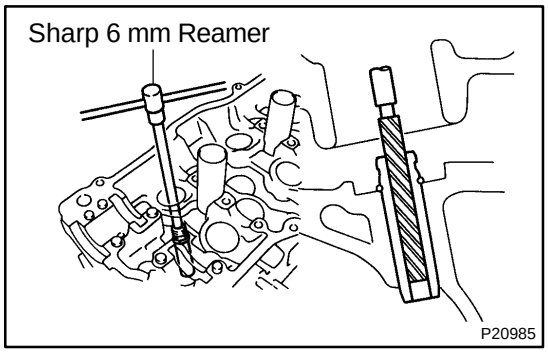
If the bushing bore diameter of the cylinder head is greater than 11.077 mm (0.4361 in.), replace the cylinder head.



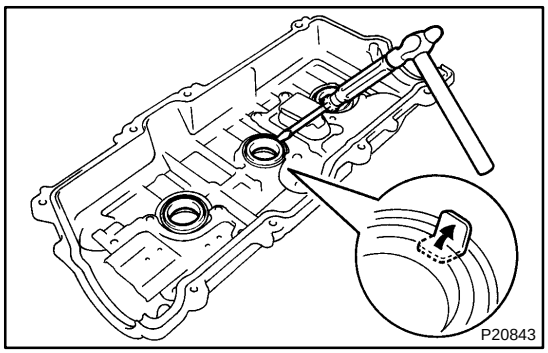
(f) Gradually heat the cylinder head to 80 - 100˚C (176 - 212˚F).

(g) Using SST and a hammer, tap in a new guide bushing until the snap ring makes contact with the cylinder head.

SST 09201-10000 (09201-01060), 09950-70010 (09951-07150)



(h) Using a sharp 6 mm reamer, ream the guide bushing to obtain the standard specified clearance (See page EM-38) between the guide bushing and valve stem.



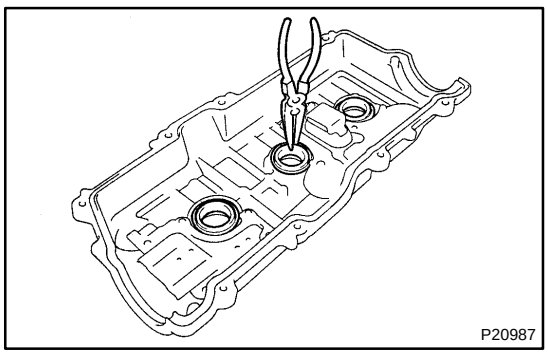
2. REPLACE SPARK PLUG TUBE GASKETS

(a) Bend up the tab on the ventilation baffle plate which prevents the gasket from the slipping out.

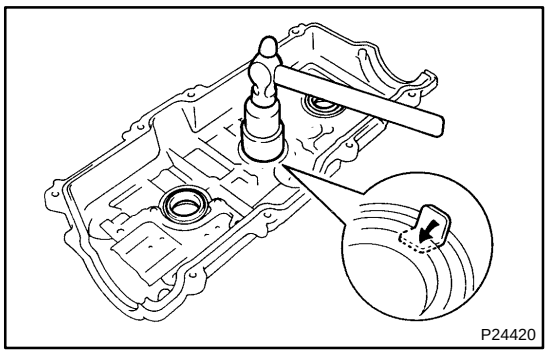
(b) Using a screwdriver and hammer, tap out the gasket.

NOTICE:

Do not scratch or damage the joint of the cylinder head cover.



(c) Using needle-nose pliers, pry out the gasket.



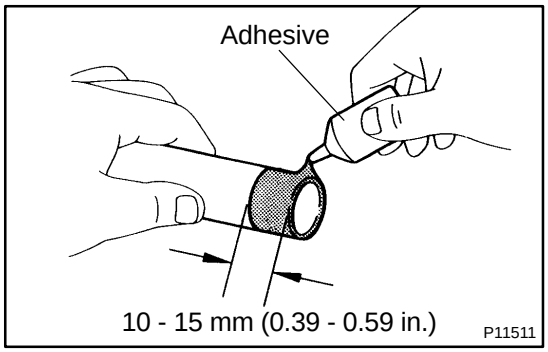
(d) Using a 32 mm socket wrench and hammer, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.
(e) Apply a light coat of MP grease to the gasket lip.
(f) Return the ventilation plate tab to its original position.

EM0Z4-02

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.



1. INSTALL SPARK PLUG TUBES

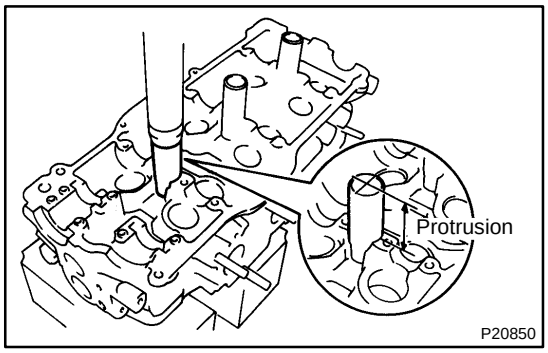
HINT:

When using a new cylinder head, spark plug tubes must be installed.

(a) Apply adhesive to the end of a spark plug tube.

Adhesive:

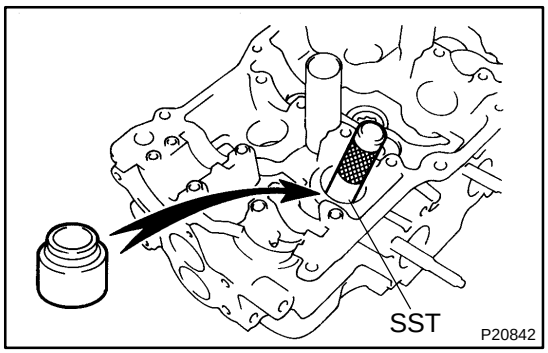
Part No. 08833-00070, THREE BOND 1324 or equivalent



(b) Using a press, press in the spark plug tube until there is 49.0 - 49.4 mm (1.929 - 1.945 in.) protruding from the camshaft bearing cap installation surface of the cylinder head.

NOTICE:

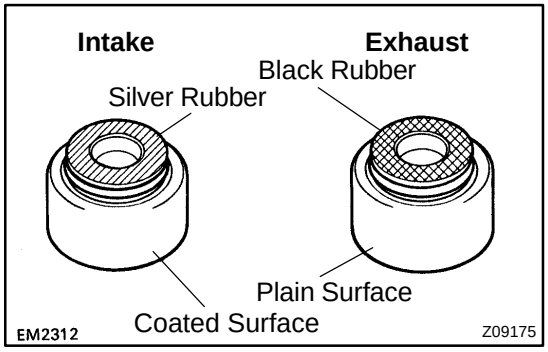
Avoid pressing the spark plug tube in too far by measuring the amount of the protrusion while pressing.



2. INSTALL VALVES

(a) Using SST, push in a new oil seal.

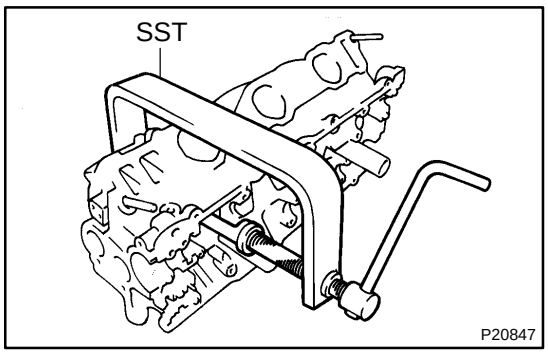
SST 09201-41020



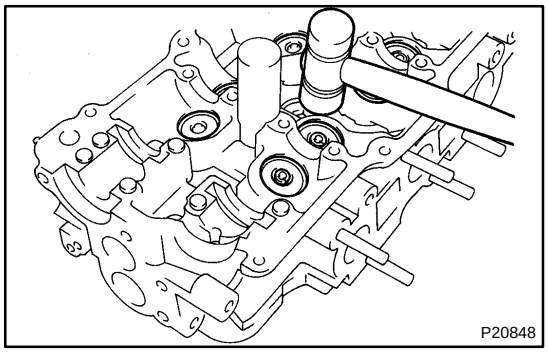
HINT:

The intake valve oil seal is silver and the exhaust valve oil seal is black.

(b) Install the valve, spring seat, valve spring and spring retainer.



(c) Using SST, compress the valve spring and place the 2 keepers around the valve stem.
SST 09202-70020

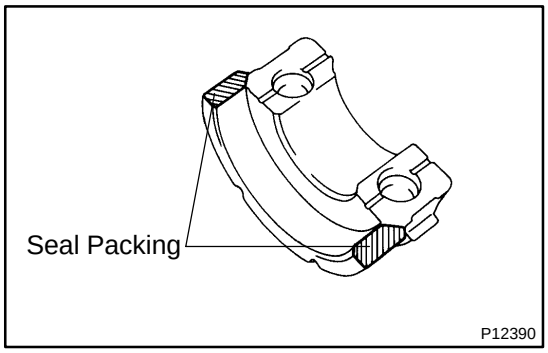


(d) Using a plastic-faced hammer, lightly tap the valve stem tip to ensure a proper fit.

3. INSTALL VALVE LIFTERS AND SHIMS

(a) Install the valve lifter and shim.

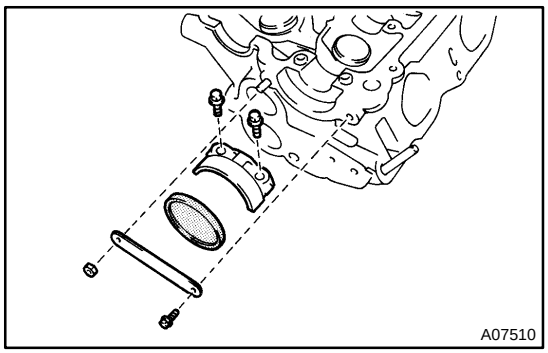
(b) Check that the valve lifter rotates smoothly by hand.



4. INSTALL CAMSHAFT HOUSING PLUGS

(a) Remove any old packing (FIPG) material.

(b) Apply seal packing to the bearing cap as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent



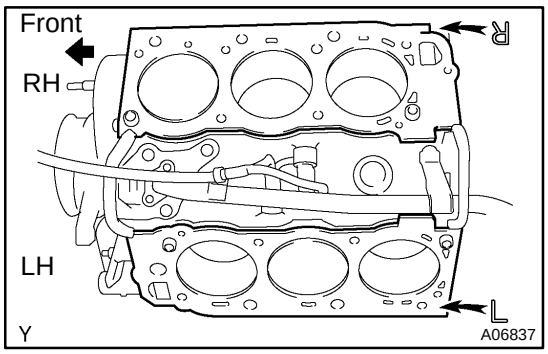
(c) Place a new housing plug in position on the cylinder head, facing the cup side inward.

(d) Install the camshaft bearing cap with the 2 bolts.
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

(e) Install the rear plate and ground strap with the bolt and nut.
Torque: 8 N·m (80 kgf·cm, 71 in.·lbf)

EM1MQ-01

INSTALLATION



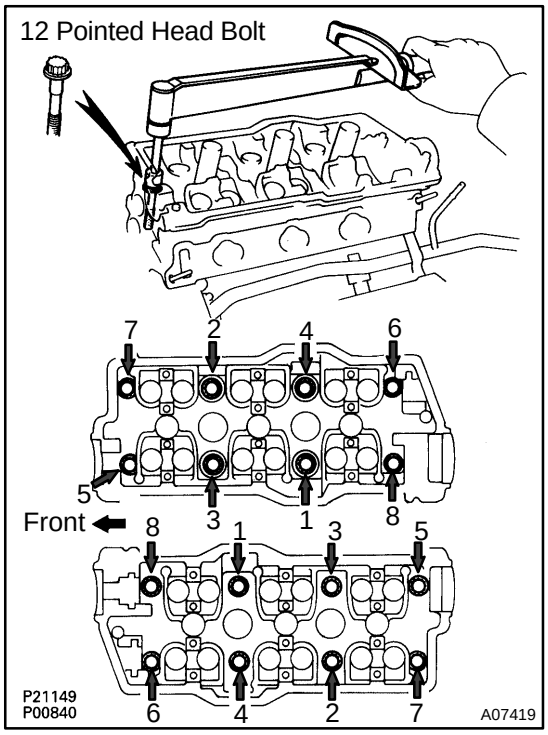
1. PLACE CYLINDER HEAD ON CYLINDER BLOCK

(a) Place 2 new cylinder head gaskets in position on the cylinder block.

NOTICE:

Be careful of the installation direction.

(b) Place the 2 cylinder heads in position on the cylinder head gaskets.



2. INSTALL 12 POINTED HEAD CYLINDER HEAD BOLTS

HINT:

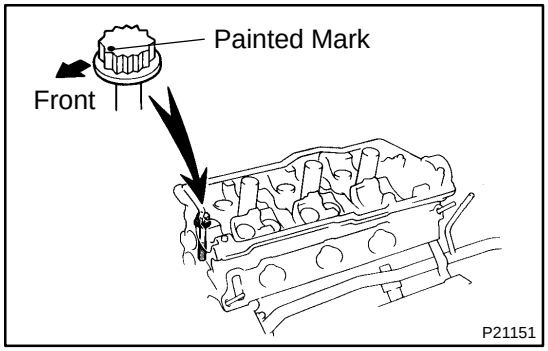
- The cylinder head bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any bolt is broken or deformed, replace it.

(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

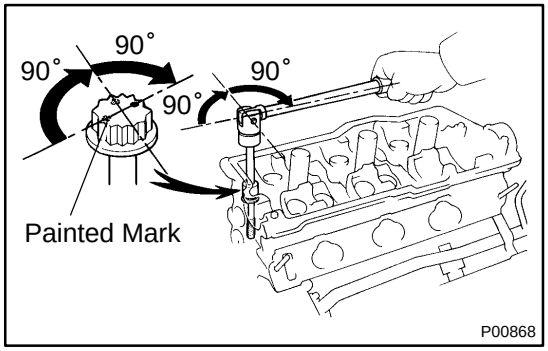
(b) Install and uniformly tighten the cylinder head bolts on each cylinder head, in several passes, in the sequence shown, then repeat for the other side, as shown.

Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

If any of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.



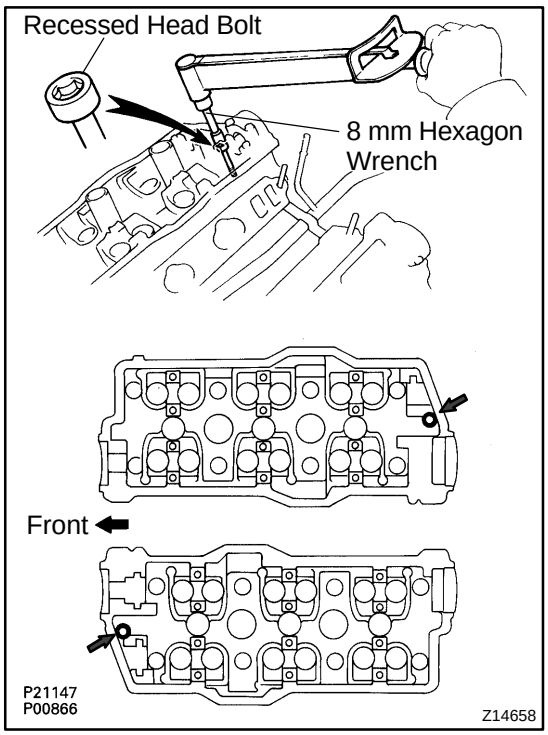
(c) Mark the front of the cylinder head bolt head with paint.



(d) Retighten the cylinder head bolts by 90° in the numerical order shown.

(e) Retighten the cylinder head bolts by an additional 90°.

(f) Check that the painted mark is now facing rearward.



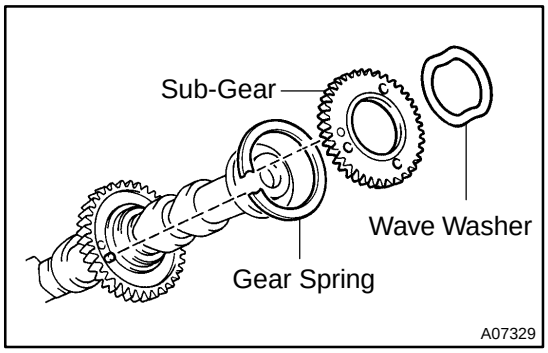
3. INSTALL RECESSED HEAD CYLINDER HEAD BOLTS

(a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.

(b) Using an 8 mm hexagon wrench, install the cylinder head bolt on each cylinder head, then repeat for the other side, as shown.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Connect the ground strap with the bolt.



4. ASSEMBLE EXHAUST CAMSHAFTS

(a) Mount the hexagonal wrench head portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.

(b) Install the camshaft gear spring, camshaft sub-gear and wave washer.

HINT:

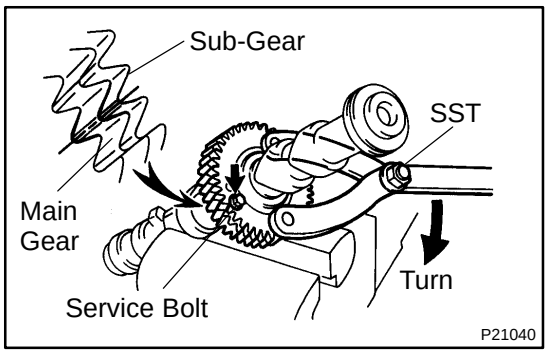
Attach the pins on the gears to the gear spring ends.

(c) Using snap ring pliers, install the snap ring.

(d) Using SST, align the holes of the camshaft main gear and sub-gear by turning camshaft sub-gear clockwise, and temporarily install a service bolt.

SST 09960-10010 (09962-01000, 09963-00600)

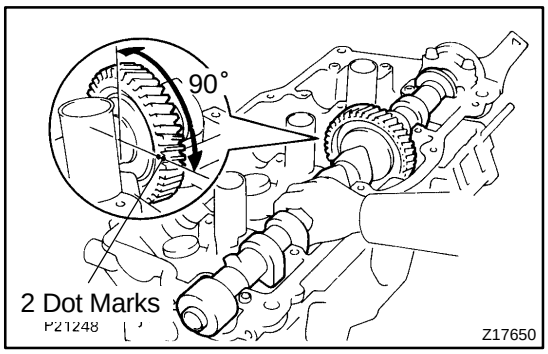
(e) Align the gear teeth of the main gear and sub-gear, and tighten the service bolt.



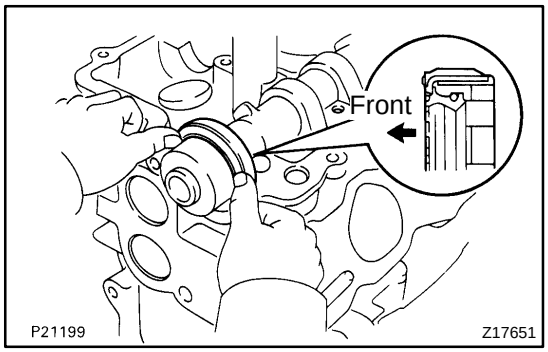
5. INSTALL CAMSHAFTS

NOTICE:

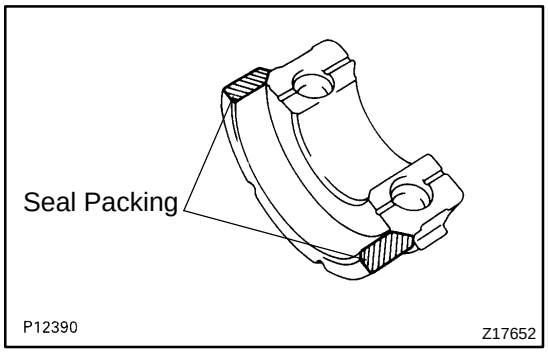
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, these steps should be carried out.



(a) Install the intake camshaft of the RH cylinder head.
(1) Apply new engine oil to the thrust portion and journal of the camshaft.
(2) Place the intake camshaft at 90° angle of timing mark (2 dot marks) on the cylinder head.

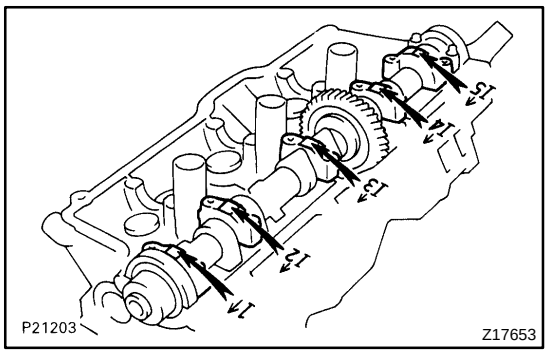


(3) Apply MP grease to a new oil seal lip.
(4) Install the oil seal to the camshaft.

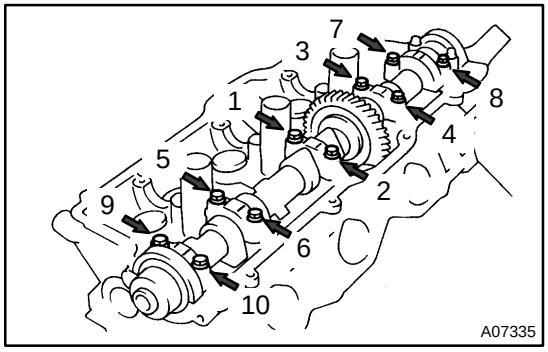


(5) Remove any old packing (FIPG) material.
(6) Apply seal packing to the No.1 bearing cap as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

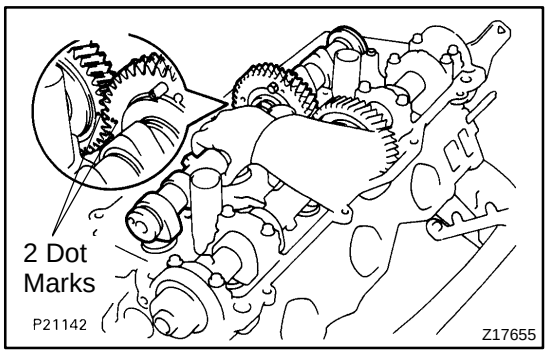


(7) Install the 5 bearing caps in their proper locations.

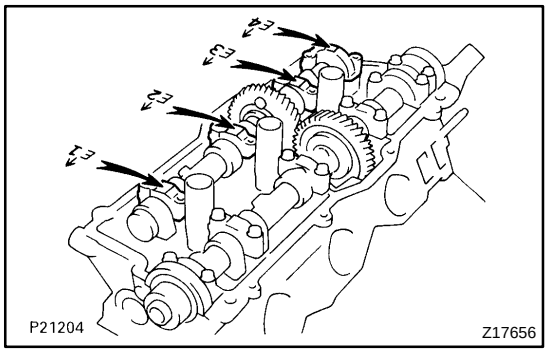


(8) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(9) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

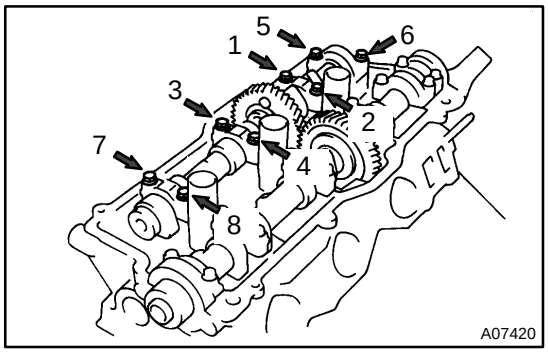
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



(b) Install the exhaust camshaft of the RH cylinder head.
(1) Apply new engine oil to the thrust portion and journal of the camshaft.
(2) Align the timing marks (2 dot marks) of the camshaft drive and driven gears.
(3) Place the exhaust camshaft on the cylinder head.



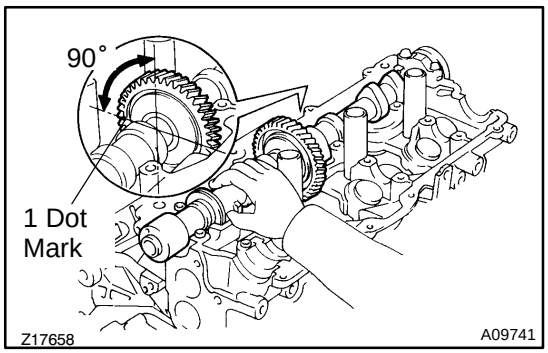
(4) Install the 4 bearing caps in their proper locations.



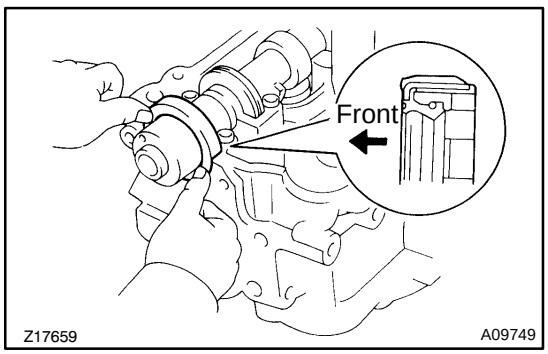
(5) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(6) Install and uniformly tighten the 8 bearing cap bolts, in several passes, in the sequence shown.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

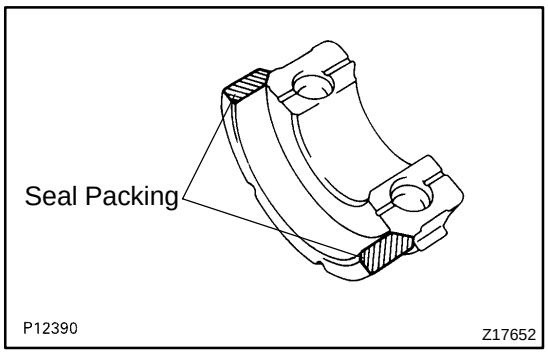
(7) Remove the service bolt.



(c) Install the intake camshaft of the LH cylinder head.
(1) Apply new engine oil to the thrust portion and journal of the camshaft.
(2) Place the intake camshaft at 90° angle of timing mark (1 dot mark) on the cylinder head.

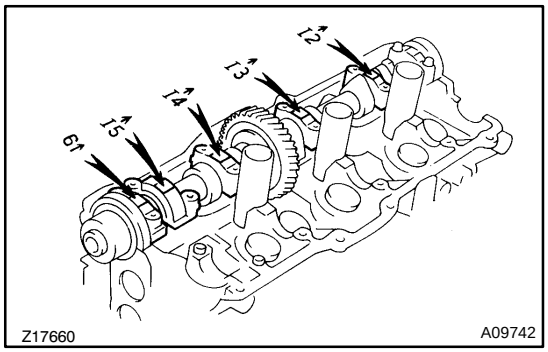


(3) Apply MP grease to a new oil seal lip.
(4) Install the oil seal to the camshaft.

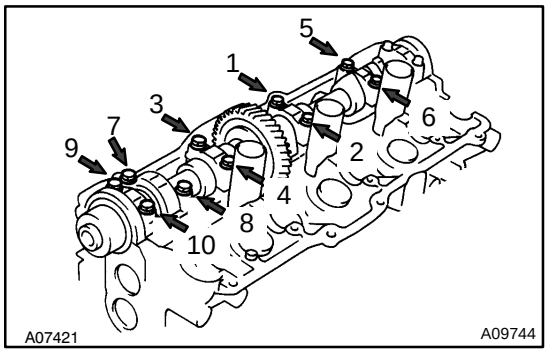


(5) Remove any old packing (FIPG) material.
(6) Apply seal packing to the No.1 bearing cap as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

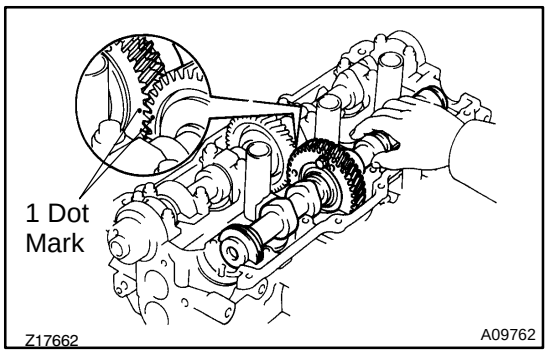


(7) Install the 5 bearing caps in their proper locations.

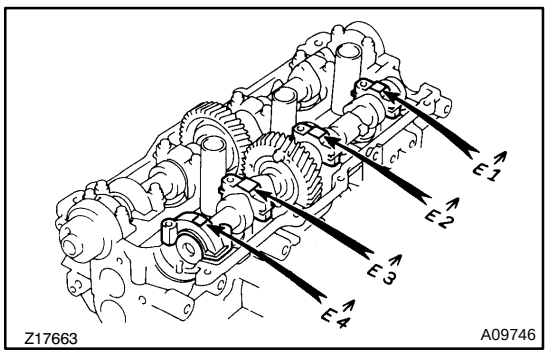


(8) Apply a light coat of engine oil on the threads and under the heads of the bearing cap bolts.
(9) Install and uniformly tighten the 10 bearing cap bolts, in several passes, in the sequence shown.

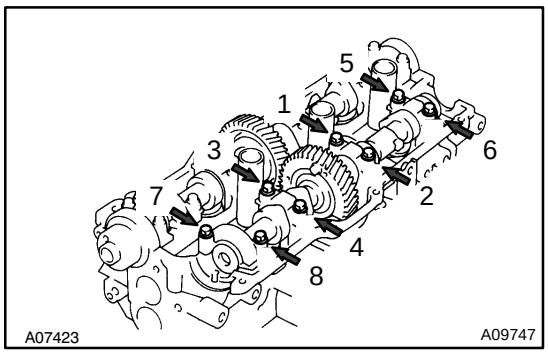
Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)



(d) Install the exhaust camshaft of the LH cylinder head.
(1) Apply new engine oil to the thrust portion and journal of the camshaft.
(2) Align the timing marks (1 dot mark) of the camshaft drive and driven gears.
(3) Place the exhaust camshaft on the cylinder head.



(4) Install the 4 bearing caps in their proper locations.

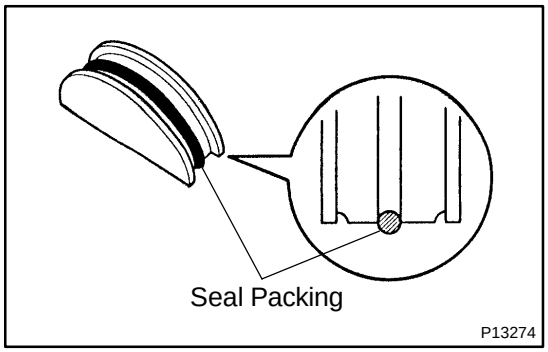


(5) Apply a light coat of engine oil on the threads and under the heads of bearing cap bolts.
(6) Install and uniformly tighten the 8 bearing cap bolts, in several passes, in the sequence shown.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

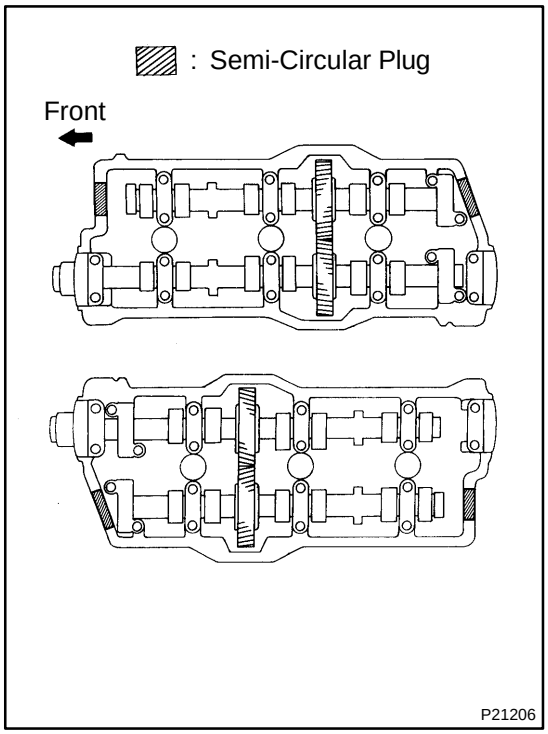
(7) Remove the service bolt.

6. CHECK AND ADJUST VALVE CLEARANCE
(See page EM-4)

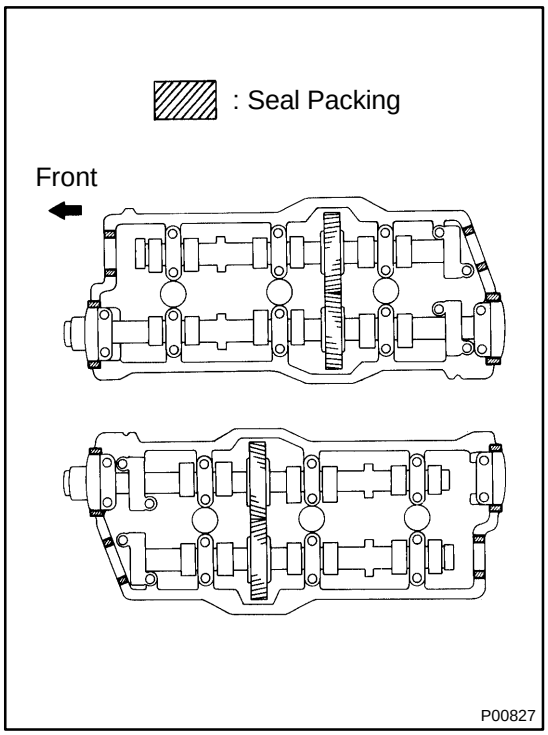


7. INSTALL SEMI-CIRCULAR PLUGS

(a) Remove any old packing (FIPG) material.
(b) Apply seal packing to the semi-circular plug groove.
Seal packing: Part No. 08826-00080 or equivalent



(c) Install the 4 semi-circular plugs to the cylinder heads.



8. INSTALL CYLINDER HEAD COVERS

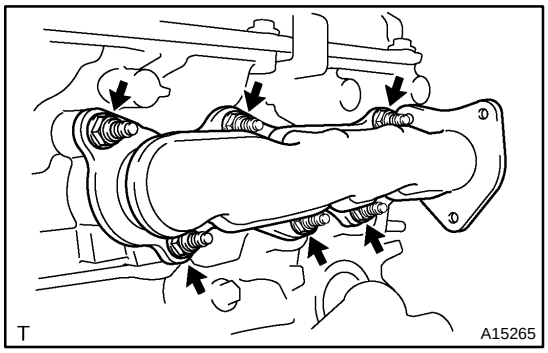
(a) Apply seal packing to the cylinder heads as shown in the illustration.

Seal packing: Part No. 08826-00080 or equivalent

(b) Install the gasket to the cylinder head cover.

(c) Install the cylinder head cover with the 8 bolts. Uniformly tighten the bolts in several passes. Install the 2 cylinder head covers.

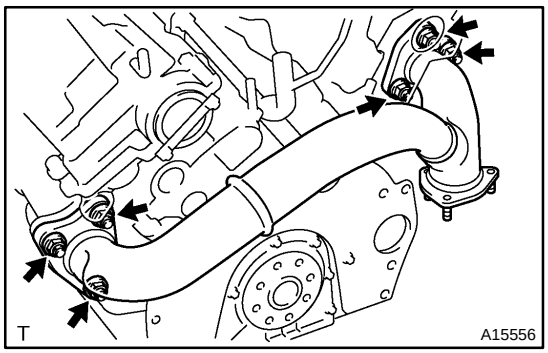
Torque: 6 N·m (60 kgf·cm, 53 in.·lbf)



9. INSTALL EXHAUST MANIFOLDS

Install 2 new gaskets and the 2 exhaust manifolds with the 12 nuts.

Torque: 40 N·m (400 kgf·cm, 30 ft·lbf)



10. INSTALL EXHAUST CROSSOVER PIPE

Install 2 new gaskets and the crossover pipe with the 6 nuts.

Torque: 45 N·m (450 kgf·cm, 33 ft·lbf)

11. INSTALL PS PUMP BRACKET

Torque: 18.5 N·m (185 kgf·cm, 14 ft·lbf)

12. INSTALL GENERATOR BRACKET

Torque: 18.5 N·m (185 kgf·cm, 14 ft·lbf)

13. INSTALL GENERATOR (See page CH-15)

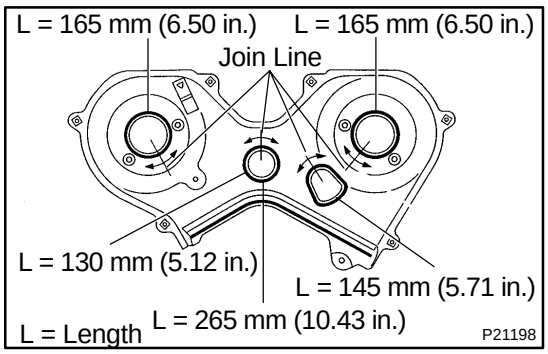
14. INSTALL NO.3 TIMING BELT COVER

(a) Check that the timing belt cover gaskets have no cracks or peeling, etc.

If the gaskets have cracks or peeling etc., replace them using these steps:

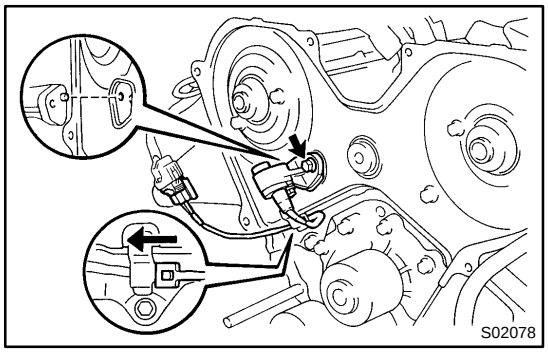
(1) Using a screwdriver and gasket scraper, remove all the old gasket material.

(2) Thoroughly clean all components to remove all the loose material.



(3) Remove the backing paper from a new gasket and install the gasket evenly to the part of the timing belt cover shaded black in the illustration.

(b) Install the timing belt cover with the 6 bolts.
Torque: 9 N·m (90 kgf·cm, 80 in.·lbf)



15. INSTALL CAMSHAFT POSITION SENSOR

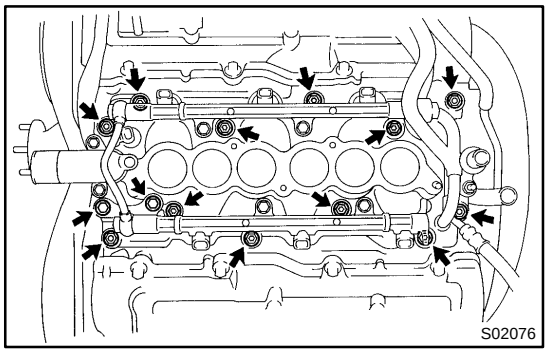
(a) Install the camshaft position sensor with the bolt.
Torque: 8 N·m (80 kgf·cm, 71 in.·lbf)

HINT:
Match the protrusion of the sensor with the indentation of the RH cylinder head.

(b) Connect the clamp to the No.3 timing belt cover.

(c) Connect the camshaft position sensor connector.

16. INSTALL TIMING BELT (See page EM-19)

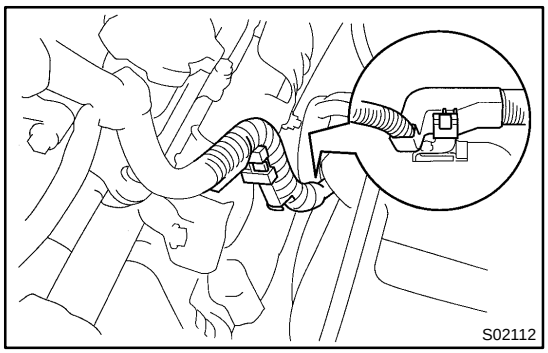


17. INSTALL INTAKE MANIFOLD ASSEMBLY

(a) Install 2 new gaskets and the intake manifold assembly with the 8 bolts, 4 plate washers and 4 nuts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

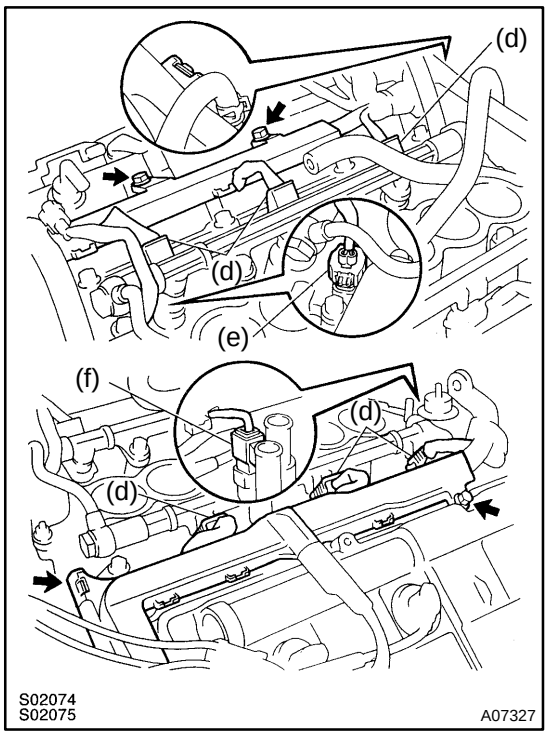
(b) Install the intake manifold stay with the 2 bolts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

18. INSTALL FUEL PRESSURE REGULATOR
(See page SF-17)

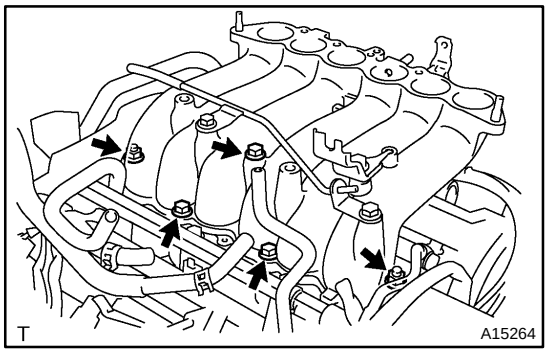


19. CONNECT ENGINE WIRE PROTECTOR

(a) Connect the 2 engine wire clamps.

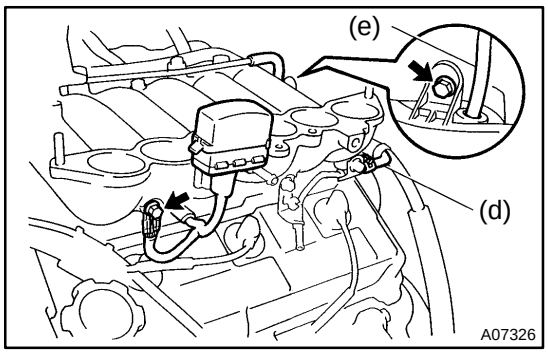


(b) Install the engine wire with the 3 bolts.
(c) Connect the 2 engine wire clamps.
(d) Connect the 6 injector connectors.
(e) Connect the ECT sensor connector.
(f) Connect the ECT sender gauge connector.

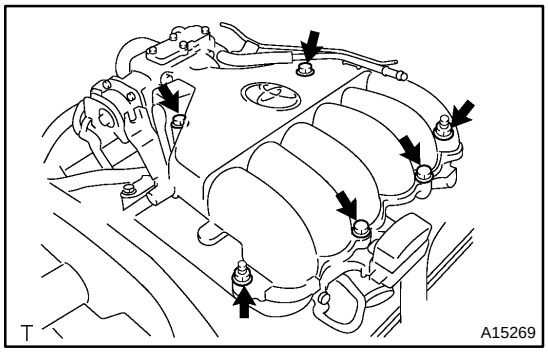


20. INSTALL INTAKE AIR CONNECTOR

(a) Install a new gasket and the intake air connector with the 3 bolts and 2 nuts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

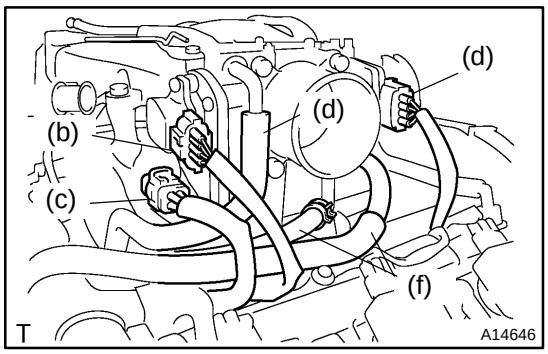


(b) Connect the DLC1 to the bracket.
(c) Install the ground strap to the intake air connector with the bolt.
(d) Connect the fuel return hose.
(e) Connect the vacuum sensing hose to the fuel pressure regulator.
(f) Install the engine wire with the bolt.



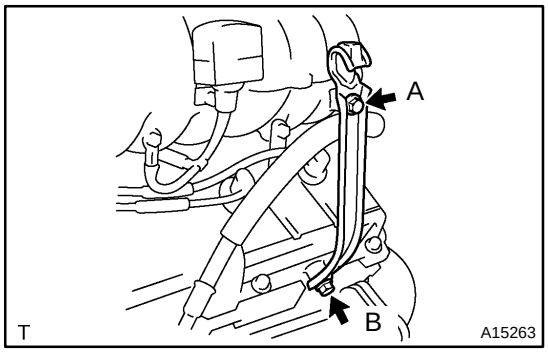
21. INSTALL AIR INTAKE CHAMBER ASSEMBLY

(a) Install a new gasket and the air intake chamber assembly with the 4 bolts and 2 nuts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)



(b) Connect the throttle position sensor connector.
(c) Connect the throttle control motor connector.
(d) Connect the accelerator pedal position sensor connector.
(e) Connect the air hose.
(f) Connect the 2 water bypass hoses.

22. INSTALL NO.2 TIMING BELT COVER (See page EM-19)



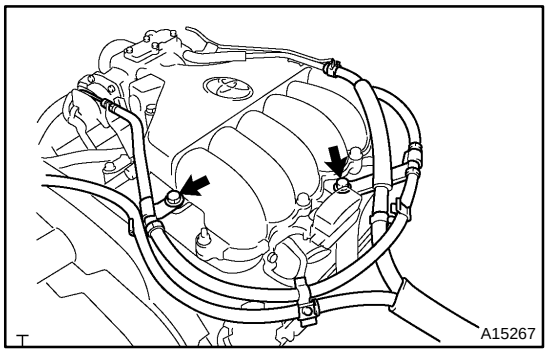
23. INSTALL AIR INTAKE CHAMBER STAY

Install the air intake chamber stay with the 2 bolts.

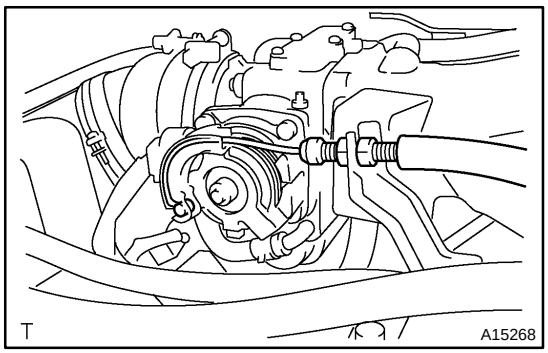
Torque:
18 N·m (184 kgf·cm, 13 ft·lbf) for Bolt A
40 N·m (408 kgf·cm, 30 ft·lbf) for Bolt B

24. CONNECT HOSES

(a) Connect the fuel return hose.
(b) Connect the fuel inlet hose.
(c) Connect the EVAP hose.



(d) Install the 2 bolts to the air intake chamber assembly.



25. CONNECT ACCELERATOR CABLE TO THROTTLE BODY
26. INSTALL SPARK PLUGS AND HIGH-TENSION CORDS WITH IGNITION COILS (See page IG-1)
27. CONNECT HEATER HOSE
28. INSTALL AIR CLEANER ASSEMBLY
29. INSTALL FRONT EXHAUST PIPE (See page EM-105)
30. FILL WITH ENGINE COOLANT
31. START ENGINE AND CHECK FOR LEAKS
32. CHECK IGNITION TIMING (See page EM-9)
33. INSTALL ENGINE UNDER COVER
34. PERFORM ROAD TEST

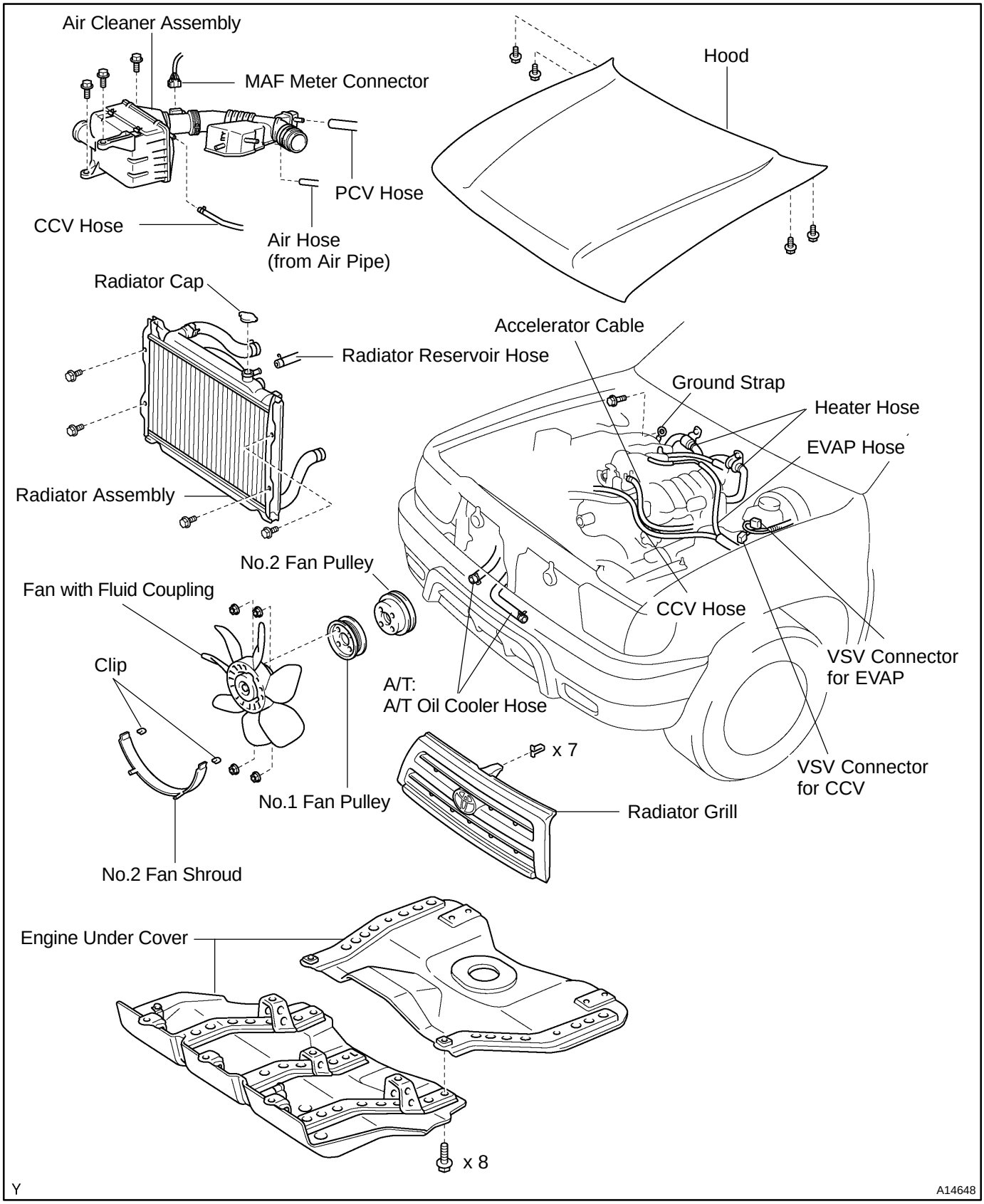
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

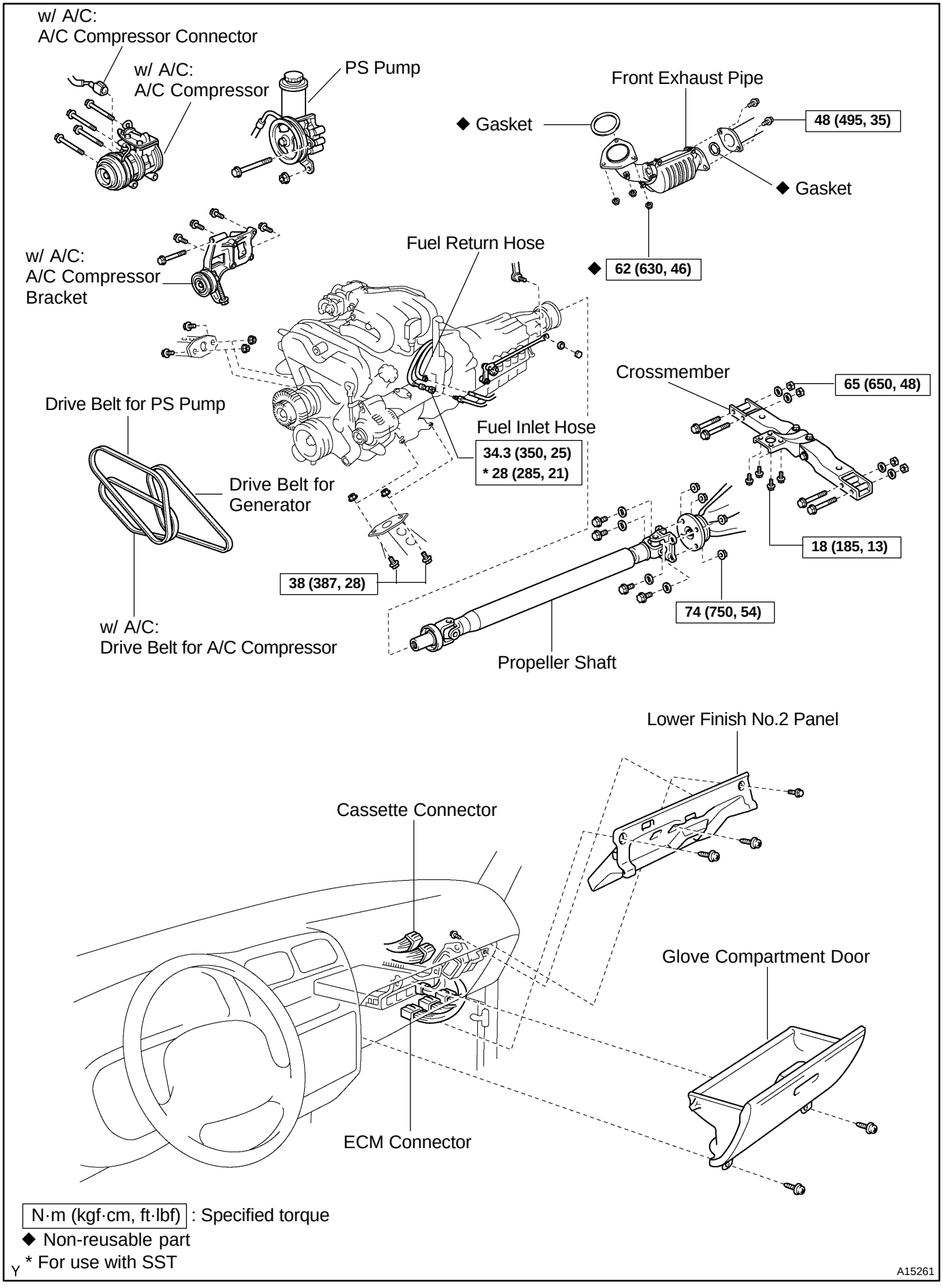
35. RECHECK ENGINE COOLANT LEVEL

ENGINE UNIT (2WD)

EM01R-08

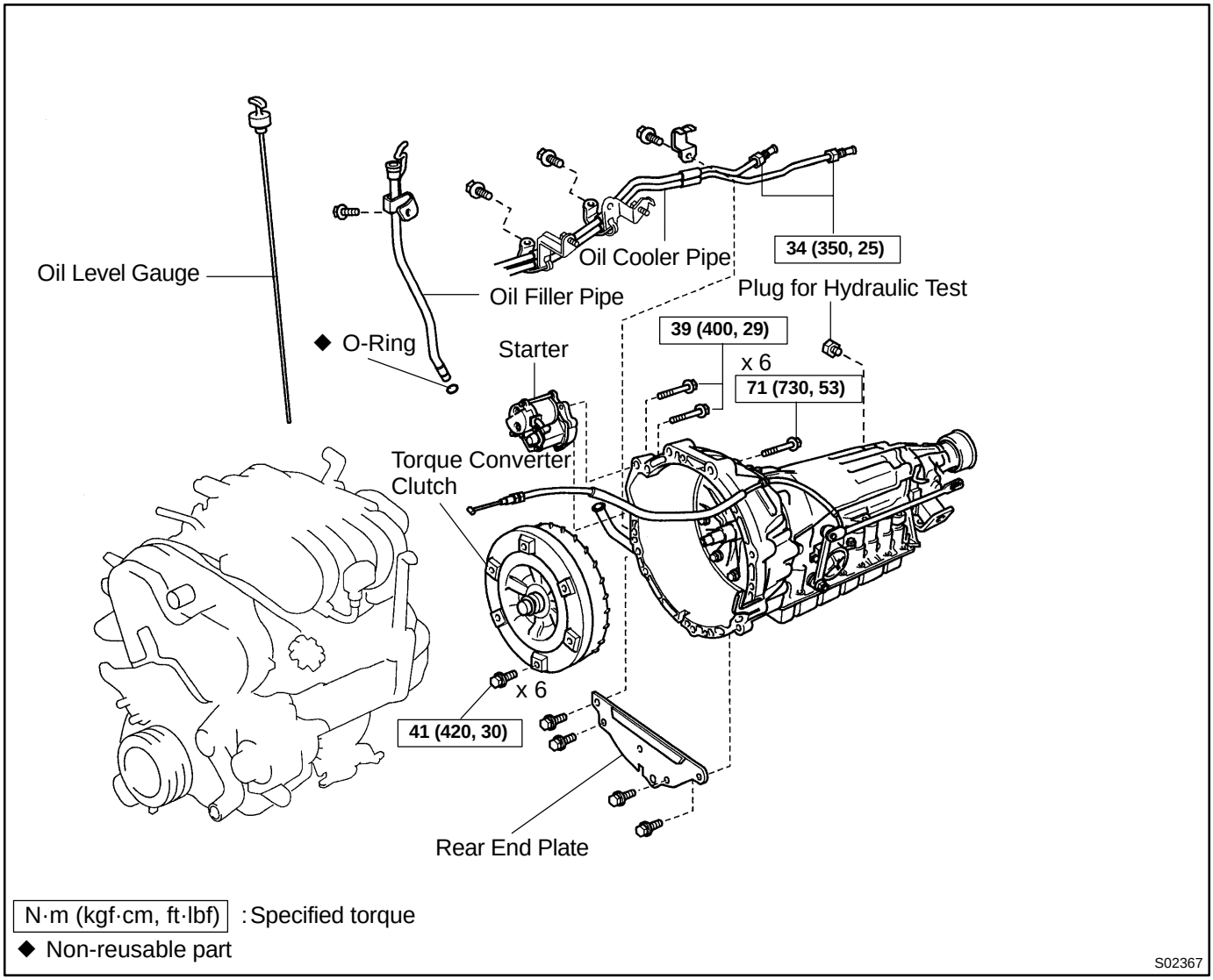
COMPONENTS





N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
* For use with SST

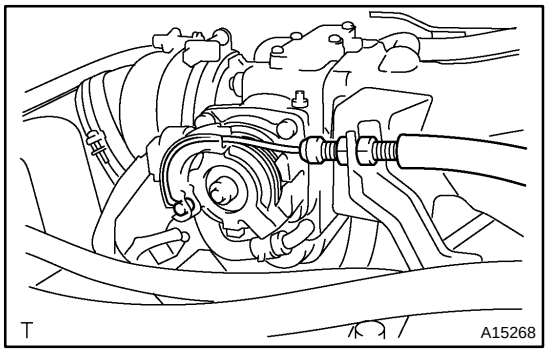
A15261


Oil Level Gauge
Oil Filler Pipe
◆ O-Ring
Oil Cooler Pipe
34 (350, 25)
Plug for Hydraulic Test
39 (400, 29)
x 6
71 (730, 53)
Starter
Torque Converter Clutch
x 6
41 (420, 30)
Rear End Plate
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
S02367

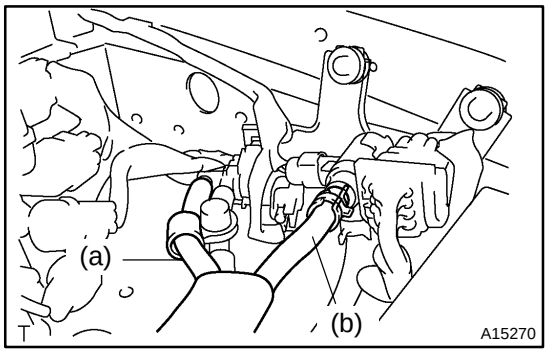
EM1MR-01

REMOVAL

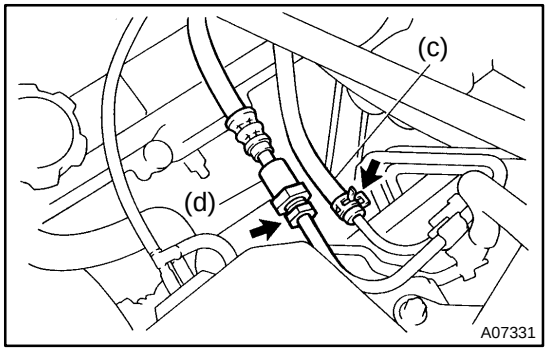
1. REMOVE ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT AND OIL
3. DRAIN TRANSMISSION OIL
4. REMOVE HOOD
5. REMOVE RADIATOR ASSEMBLY (See page CO-18)
6. REMOVE FAN WITH FLUID COUPLING AND FAN PULLEYS
7. REMOVE AIR CLEANER ASSEMBLY



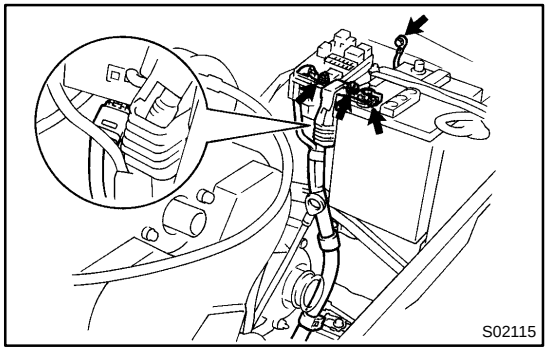
8. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY
9. DISCONNECT HEATER HOSES



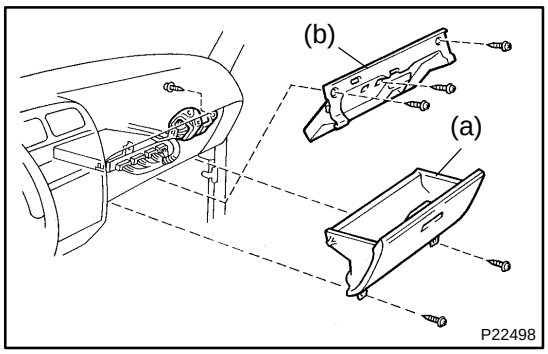
10. DISCONNECT HOSES
(a) Disconnect the EVAP hose.
(b) Disconnect the CCV hose.



(c) Disconnect the fuel return hose.
(d) Disconnect the fuel inlet hose.

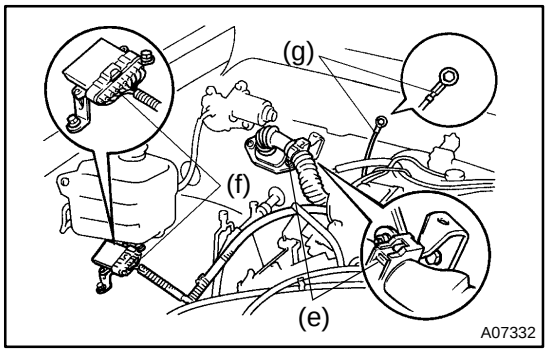


11. DISCONNECT STARTER WIRE AND CONNECTOR
(a) Remove the bolt, and disconnect the ground strap.
(b) Remove the 2 nuts, disconnect the positive (+) terminal cable from the battery.
(c) Disconnect the 2 starter wire clamps and connector.
(d) Remove the nut, and disconnect the wire from the relay block No.2.
12. DISCONNECT GENERATOR WIRE (See page CH-6)

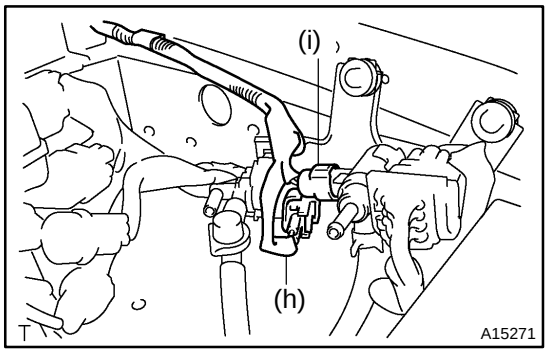


13. DISCONNECT ENGINE WIRE FROM CABIN

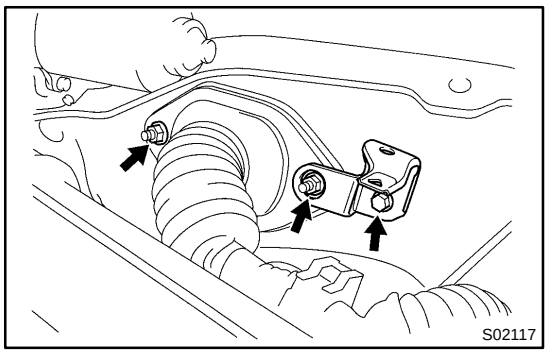
(a) Remove the glove compartment door.
(b) Remove the lower finish No.2 panel.
(c) Disconnect the 5 ECM connectors.
(d) Disconnect the 2 cassette connectors (cowl wire x engine wire) and 2 wire clamps from the lower finish panel.



(e) Disconnect the engine wire clamp.
(f) Disconnect the igniter connector.
(g) Disconnect the ground strap.



(h) Disconnect the VSV connector for the EVAP.
(i) Disconnect the VSV connector for the CCV and clamp.



(j) Remove the bolt and wire bracket.
(k) Remove the 2 nuts holding the engine wire retainer to the cowl panel, and pull out the engine wire from the cabin.

14. REMOVE PROPELLER SHAFT (See page PR-4)

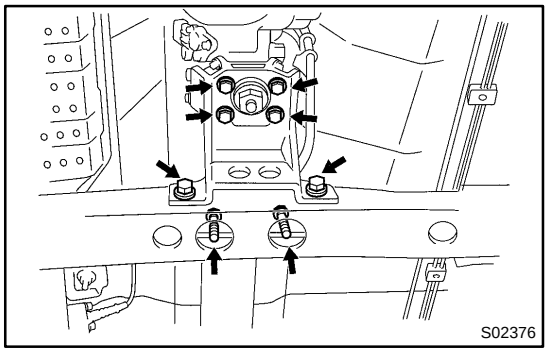
15. DISCONNECT SPEEDOMETER CABLE

NOTICE:

Do not lose the felt protector and washers.

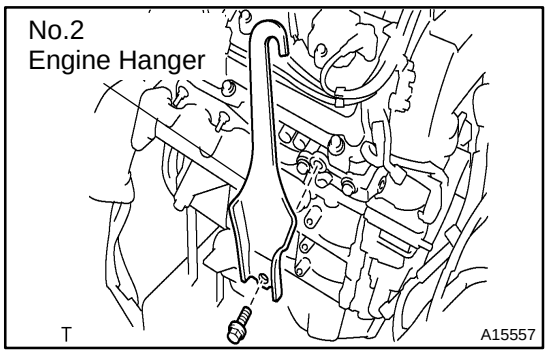
16. REMOVE FRONT EXHAUST PIPE (See page EM-105)

17. PLACE JACK UNDER TRANSMISSION



18. REMOVE ENGINE REAR MOUNTING BRACKET

Remove the 8 bolts holding the mounting bracket to the mounting insulator and crossmember.



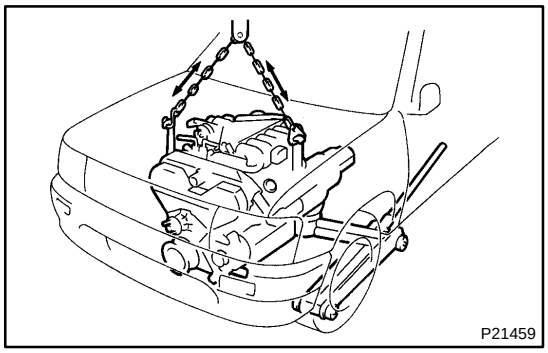
19. REMOVE ENGINE WITH TRANSMISSION

(a) w/ A/C:
Remove the bolt and disconnect the A/C compressor wire clamp.

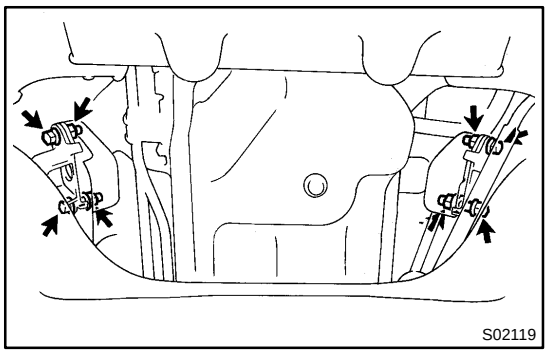
(b) Install the No. 2 engine hanger with the bolt in the correct direction.
Parts No.:

No. 2 engine hanger	12282-62050
Bolt	90119-10684

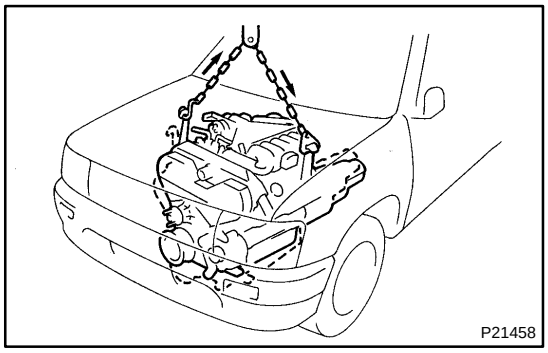
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)



(c) Attach the engine hoist chain to the 2 engine hangers.



(d) Remove the 4 bolts and nuts holding the engine front mounting insulators to the frame.



(e) Lift the engine with transmission out of the vehicle slowly and carefully.

NOTICE:

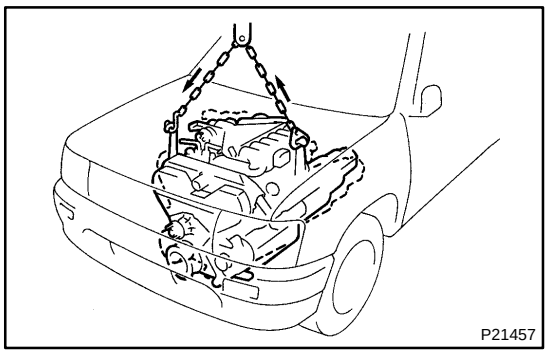
Make sure the engine is clear of all wiring and hoses.

(f) Place the engine and transmission assembly onto the stand.

20. SEPARATE ENGINE AND TRANSMISSION

EM1MS-01

INSTALLATION

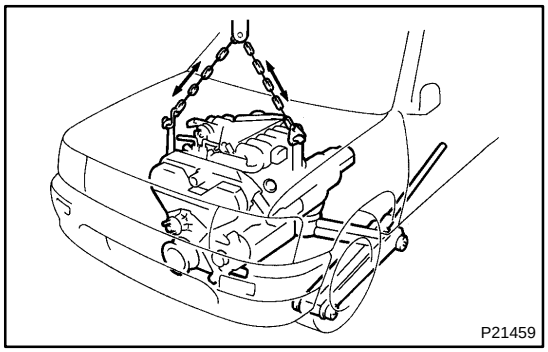


1. INSTALL TRANSMISSION TO ENGINE (See page AT-18)

2. INSTALL ENGINE AND TRANSMISSION ASSEMBLY IN VEHICLE

(a) Attach the engine hoist chain to the engine hangers.

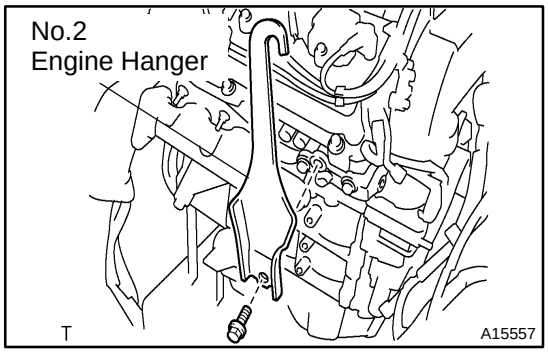
(b) Lower the engine and transmission assembly into the engine compartment.



(c) Keep the engine level, and align the RH and LH mountings and body mountings.

(d) Attach the RH and LH mounting insulators to the body mountings, and temporarily install the 4 bolts and nuts.

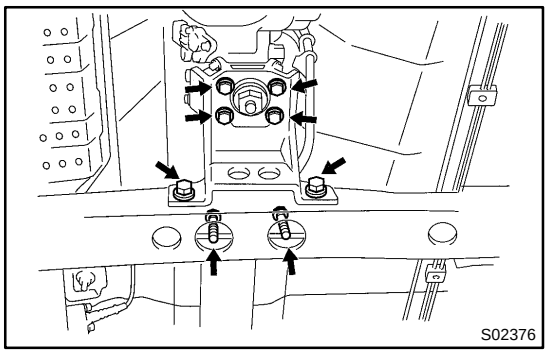
(e) Jack up and put the transmission onto the frame.



(f) Remove the engine chain hoist from the engine.

(g) Remove the bolt and No.2 engine hanger.

(h) w/ A/C:
Connect the A/C compressor wire with the bolt.



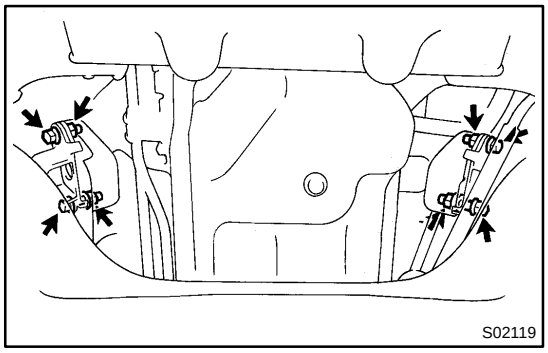
3. INSTALL ENGINE REAR MOUNTING BRACKET

(a) Raise the transmission slightly by raising the engine with a jack and a wooden block under the transmission.

(b) Install the engine rear mounting bracket to the frame.
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

(c) Lower the transmission and rest it on the extension housing.

(d) Install the mounting bracket to the mounting insulator.
Torque: 18 N·m (183 kgf·cm, 13 ft·lbf)



4. TIGHTEN RH AND LH ENGINE MOUNTING INSULATOR BOLTS AND NUTS

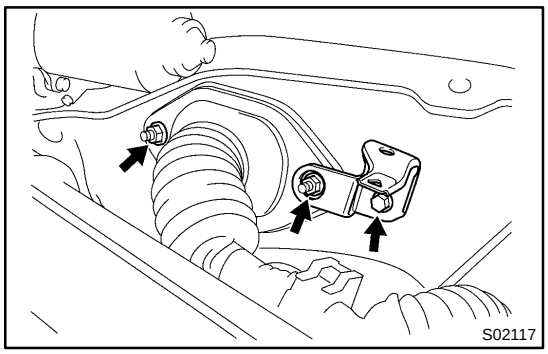
Tighten the 4 bolts and nuts holding the mounting insulators to the body mountings.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

5. INSTALL FRONT EXHAUST PIPE (See page EM-105)

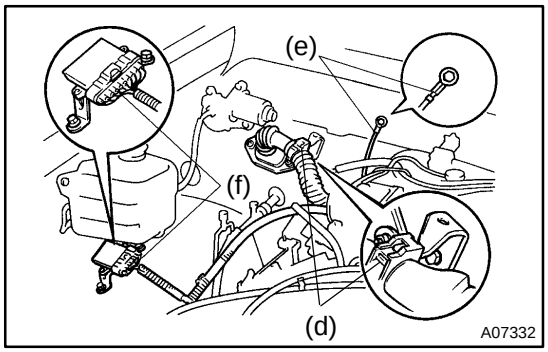
6. CONNECT SPEEDOMETER CABLE

7. INSTALL PROPELLER SHAFT (See page PR-6)

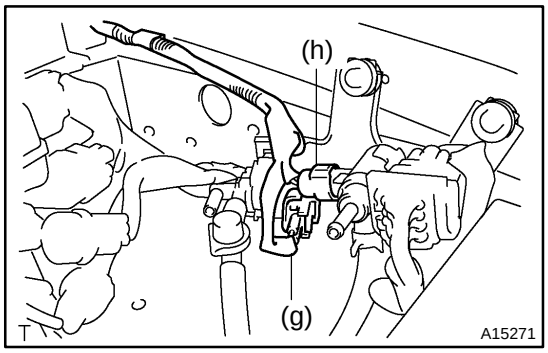


8. CONNECT ENGINE WIRE TO CABIN

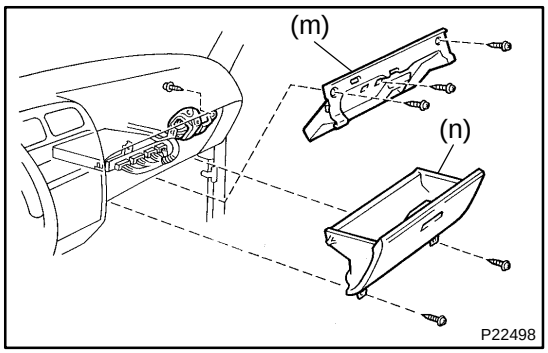
(a) Push in the engine wire through the cowl panel.
(b) Install the 2 nuts.
(c) Install the bolt and bracket.



(d) Connect the engine wire clamp.
(e) Connect the ground strap.
(f) Connect the igniter connector.

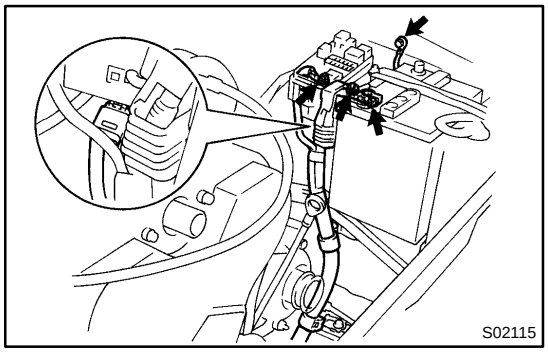


(g) Connect the VSV connector for the EVAP.
(h) Connect the VSV connector for the CCV and clamp.
(i) Connect the 5 connectors to the ECM.
(j) Connect the 2 cassette connectors.
(k) Install the ECM with the 2 bolts.



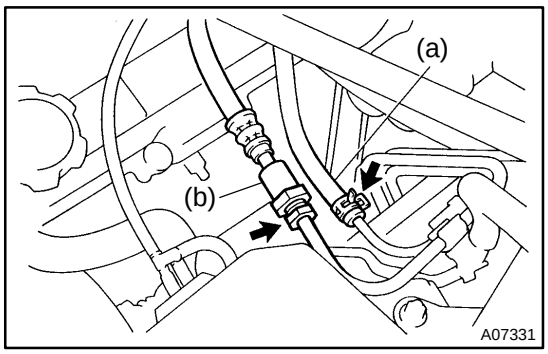
(l) Install the lower finish No.2 panel.
(m) Install the glove compartment door.

9. CONNECT GENERATOR WIRE (See page CH-15)



10. CONNECT STARTER WIRE AND CONNECTOR

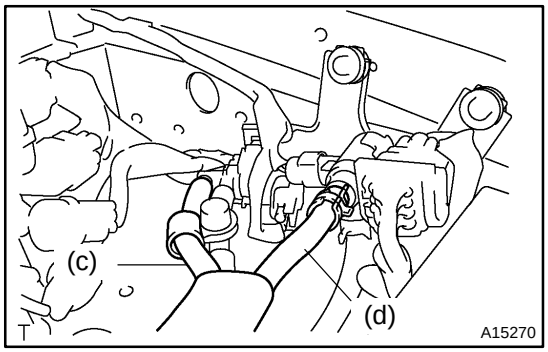
(a) Connect the 2 starter wire clamps and connector.
(b) Install the 2 nuts, and connect the positive (+) terminal cable to the battery.
(c) Connect the ground strap with the bolt.
(d) Connect the wire from relay block No.2 with the nut.



11. CONNECT HOSES

(a) Connect the fuel return hose.

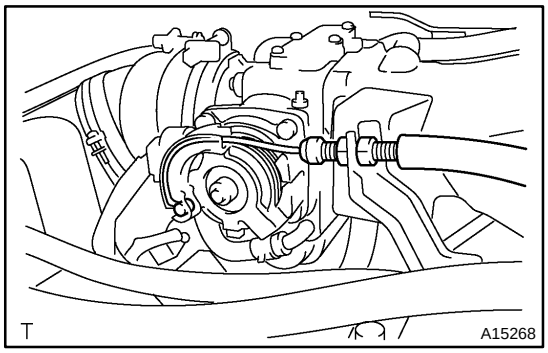
(b) Connect the fuel inlet hose. (See page SF-1)



(c) Connect the EVAP hose.

(d) Connect the CCV hose.

12. CONNECT HEATER HOSES



13. CONNECT ACCELERATOR CABLE TO THROTTLE BODY

14. INSTALL FAN WITH FLUID COUPLING AND FAN PULLEYS

15. INSTALL AIR CLEANER ASSEMBLY

16. INSTALL RADIATOR ASSEMBLY (See page CO-23)

17. FILL WITH ENGINE OIL AND COOLANT

18. FILL TRANSMISSION OIL

19. START ENGINE AND CHECK FOR LEAKS

20. CHECK IGNITION TIMING (See page EM-9)

21. INSTALL ENGINE UNDER COVER

22. INSTALL HOOD

23. PERFORM ROAD TEST

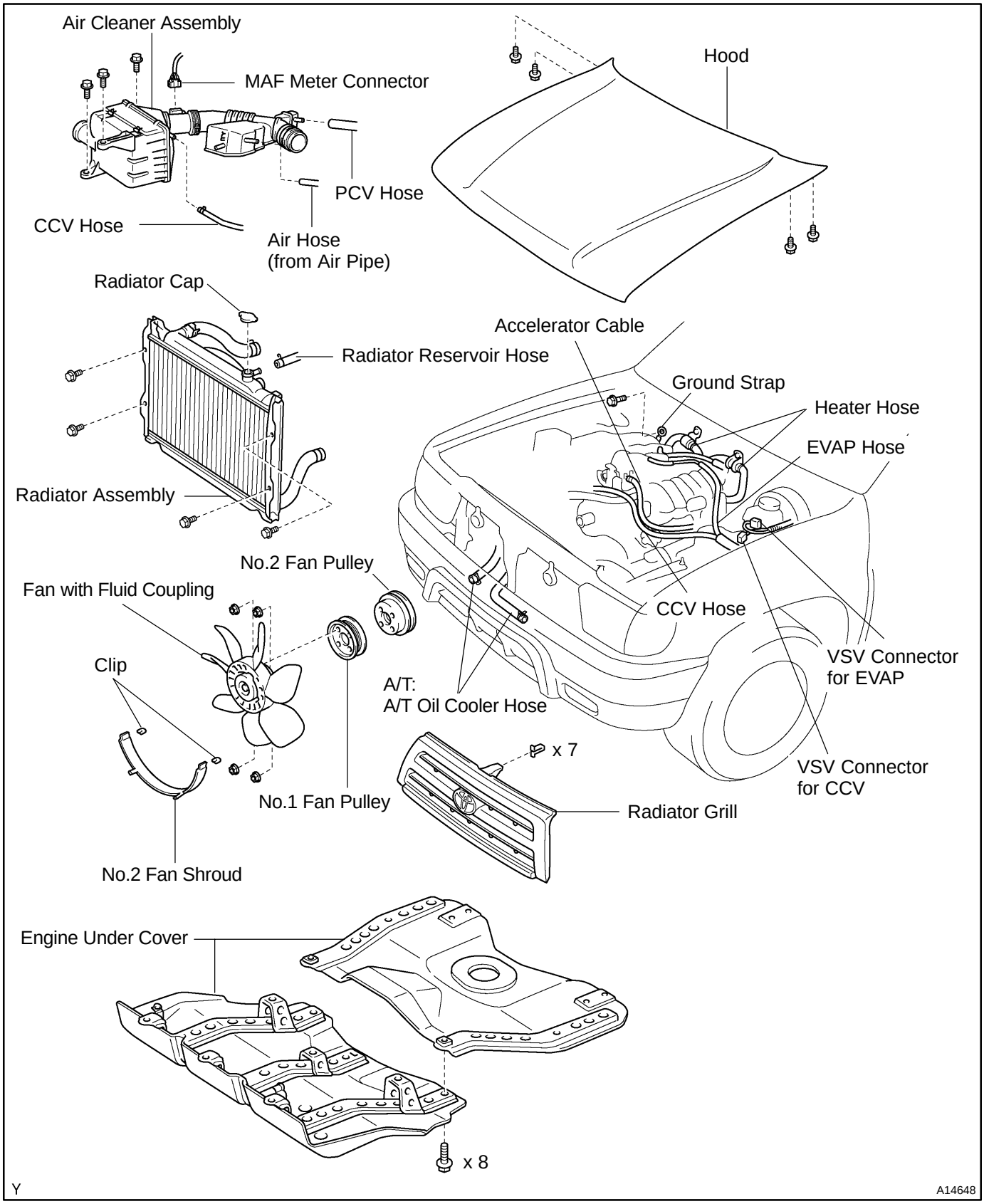
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

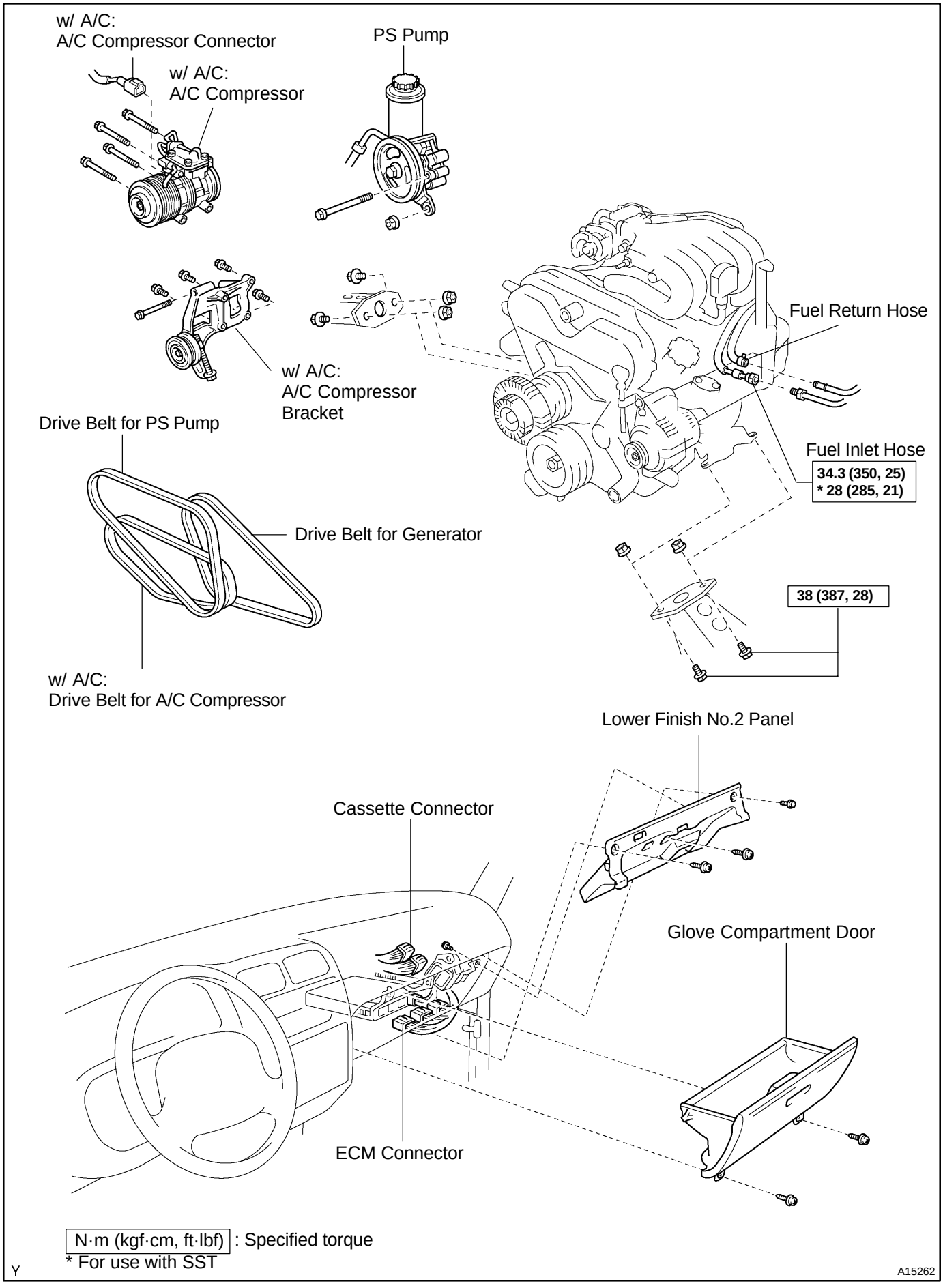
24. RECHECK ENGINE COOLANT AND ENGINE OIL LEVELS

ENGINE UNIT (4WD)

EM01U-09

COMPONENTS

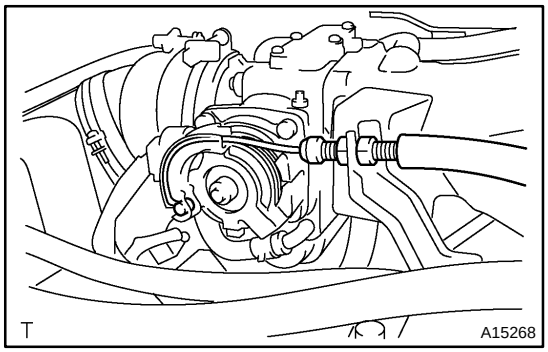



w/ A/C:
A/C Compressor Connector
w/ A/C:
A/C Compressor
PS Pump
w/ A/C:
A/C Compressor
Bracket
Fuel Return Hose
Drive Belt for PS Pump
Fuel Inlet Hose
34.3 (350, 25)
* 28 (285, 21)
Drive Belt for Generator
38 (387, 28)
w/ A/C:
Drive Belt for A/C Compressor
Lower Finish No.2 Panel
Cassette Connector
Glove Compartment Door
ECM Connector
N·m (kgf·cm, ft·lbf) : Specified torque
* For use with SST
Y
A15262

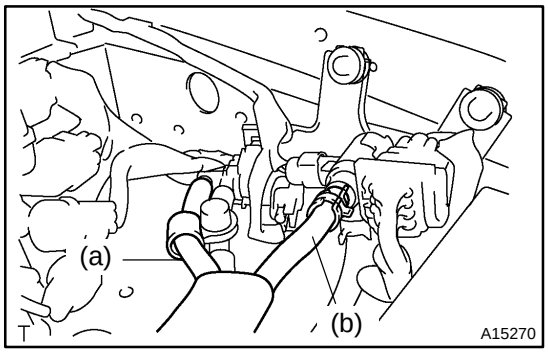
EM1MT-02

REMOVAL

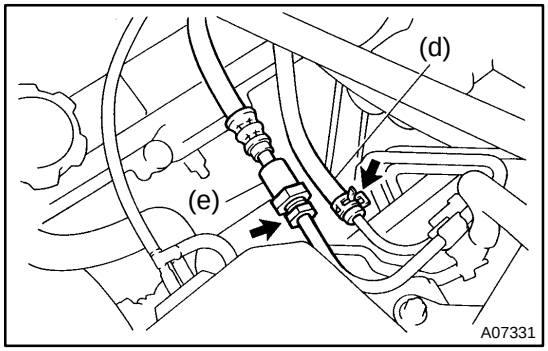
1. REMOVE TRANSMISSION (See page AT-19)
2. REMOVE ENGINE UNDER COVER
3. DRAIN ENGINE COOLANT AND OIL
4. REMOVE HOOD
5. REMOVE RADIATOR ASSEMBLY (See page CO-18)
6. REMOVE FAN WITH FLUID COUPLING AND FAN PULLEYS
7. REMOVE AIR CLEANER ASSEMBLY



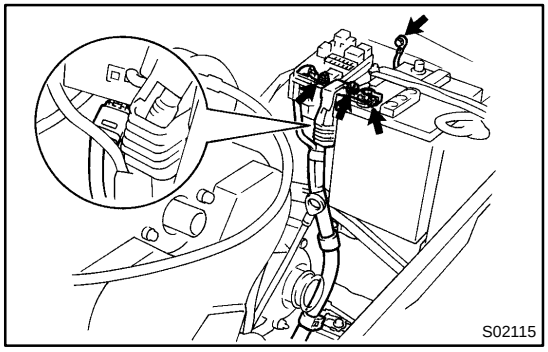
8. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY
9. DISCONNECT HEATER HOSES



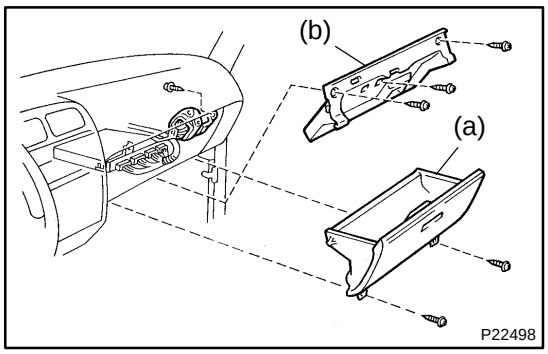
10. DISCONNECT HOSES
(a) Disconnect the EVAP hose.
(b) Disconnect the CCV hose.



(c) Disconnect the fuel return hose.
(d) Disconnect the fuel inlet hose.

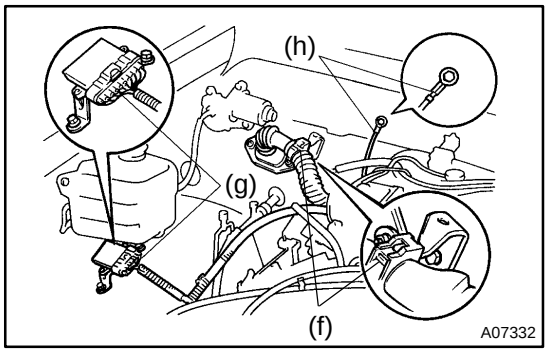


11. DISCONNECT STARTER WIRE AND CONNECTORS
(a) Remove the bolt, and disconnect the ground strap.
(b) Remove the 2 nut, and disconnect the positive (+) terminal cable from the battery.
(c) Disconnect the 2 starter wire clamps and connector.
(d) Remove the nut, and disconnect the wire from the relay block No.2.
12. DISCONNECT GENERATOR WIRE (See page CH-6)

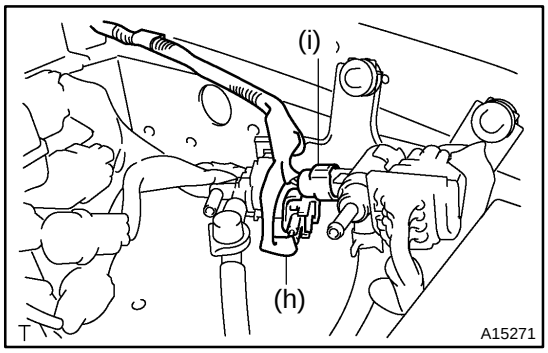


13. DISCONNECT ENGINE WIRE FROM CABIN

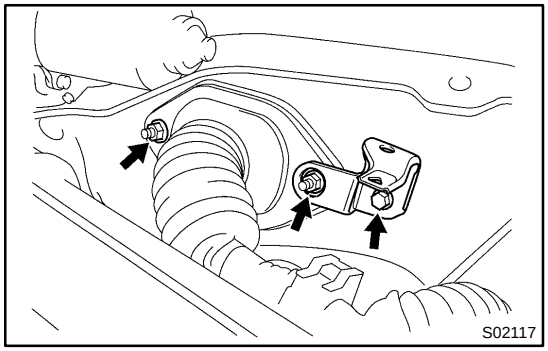
(a) Remove the glove compartment door.
(b) Remove the lower finish No.2 panel.
(c) Disconnect the 5 ECM connectors.
(d) Disconnect the 2 cassette connectors (cowl wire x engine wire) and 2 wire clamps from the lower finish panel.



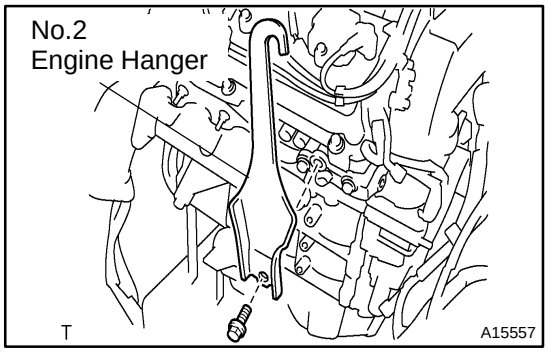
(e) Disconnect the engine wire clamp.
(f) Disconnect the igniter connector.
(g) Disconnect the ground strap.



(h) Disconnect the VSV connector for the EVAP.
(i) Disconnect the VSV connector for the CCV and clamp.



(j) Remove the bolt and wire bracket.
(k) Remove the 2 nuts holding the engine wire retainer to the cowl panel, and pull out the engine wire from the cabin.



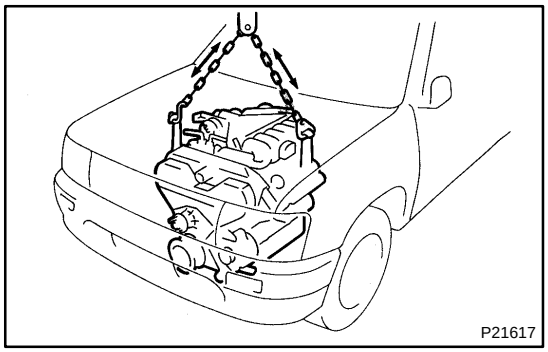
14. REMOVE ENGINE

(a) w/ A/C:
Remove the bolt and disconnect the A/C compressor wire clamp.

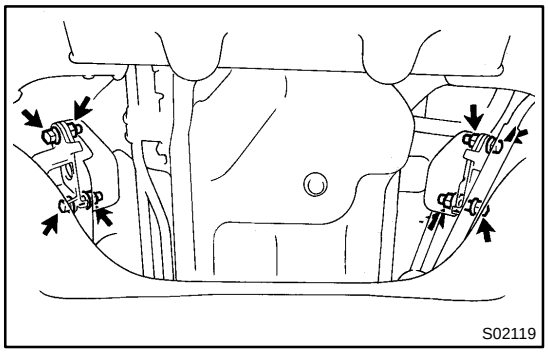
(b) Install the No. 2 engine hanger with the bolt in the correct direction.
Parts No.:

No. 2 engine hanger	12282-62050
Bolt	90119-10684

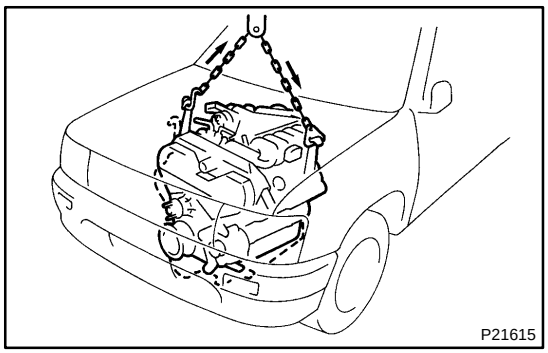
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)



(c) Attach the engine hoist chain to the 2 engine hangers.



(d) Remove the 4 bolts and nuts holding the engine front mounting insulators to the frame.



(e) Lift the engine out of the vehicle slowly and carefully.

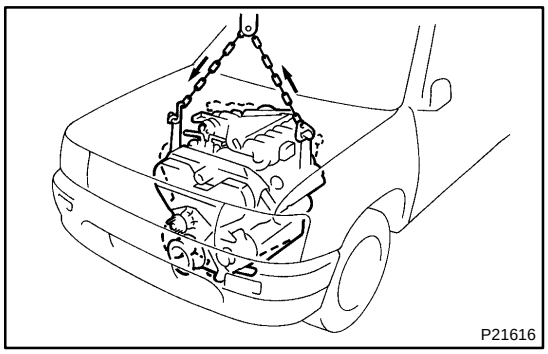
NOTICE:

Make sure the engine is clear of all wiring and hoses.

(f) Place the engine assembly onto the stand.

EM1MU-02

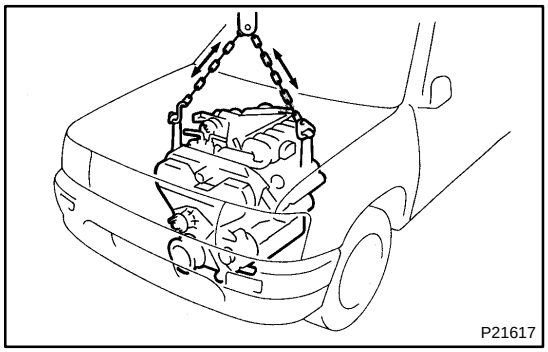
INSTALLATION



1. INSTALL ENGINE ASSEMBLY IN VEHICLE

(a) Attach the engine hoist chain to the engine hangers.

(b) Lower the engine assembly into the engine compartment.



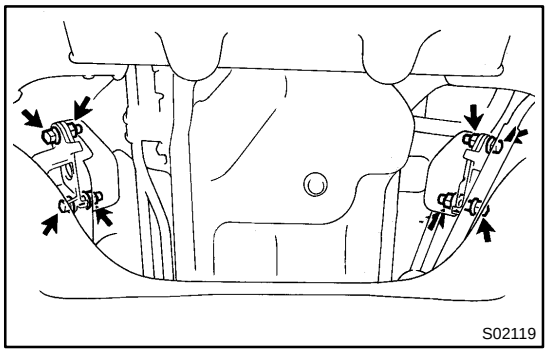
(c) Keep the engine level, and align the RH and LH mountings and body mountings.

(d) Attach the RH and LH mounting insulators to the body mountings, and temporarily install the 4 bolts and nuts.

(e) Remove the engine chain hoist from the engine.

(f) Remove the bolt and engine hanger No.2.

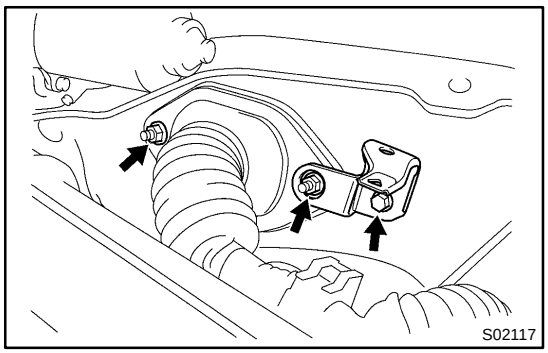
(g) w/ A/C:
Install the bolt, and connect the A/C compressor wire.



2. TIGHTEN RH AND LH ENGINE MOUNTING INSULATOR BOLTS AND NUTS

Tighten the 4 bolts and nuts holding the mounting insulators to the body mountings.

Torque: 38 N·m (387 kgf·cm, 28 ft·lbf)

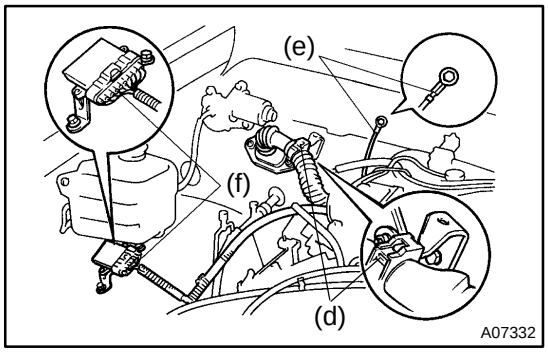


3. CONNECT ENGINE WIRE TO CABIN

(a) Push in the engine wire through the cowl panel.

(b) Install the 2 nuts.

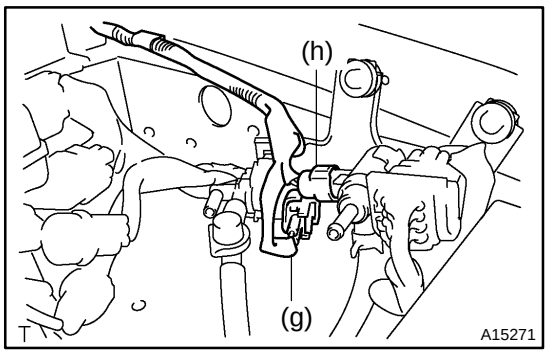
(c) Install the bolt and bracket.



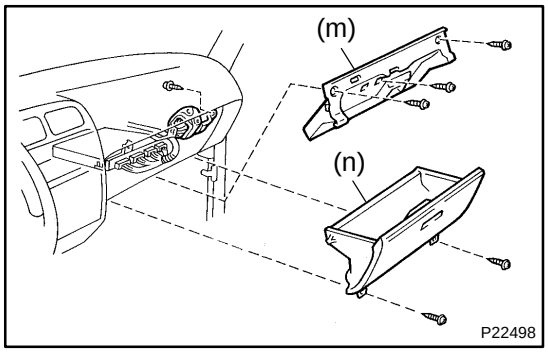
(d) Connect the engine wire clamp.

(e) Connect the round strap.

(f) Connect the igniter connector.

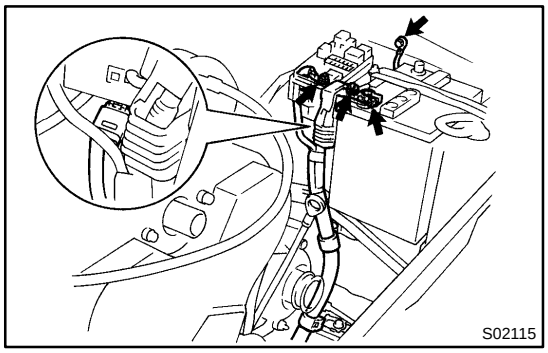


(g) Connect the VSV connector for the EVAP.
(h) Connect the VSV connector for the CCV and clamp.
(i) Connect the 5 connectors to the ECM.
(j) Connect the 2 cassette connectors.
(k) Install the ECM with the 2 bolts.



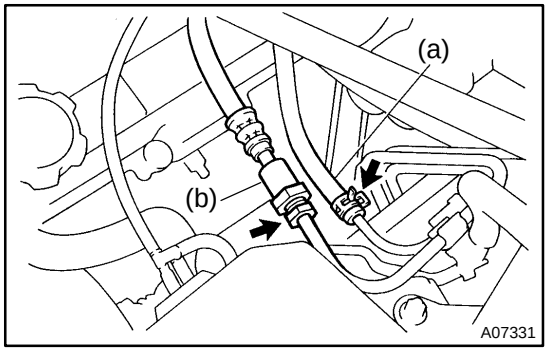
(l) Install the lower finish No.2 panel.
(m) Install the glove compartment door.

4. CONNECT GENERATOR WIRE (See page CH-15)



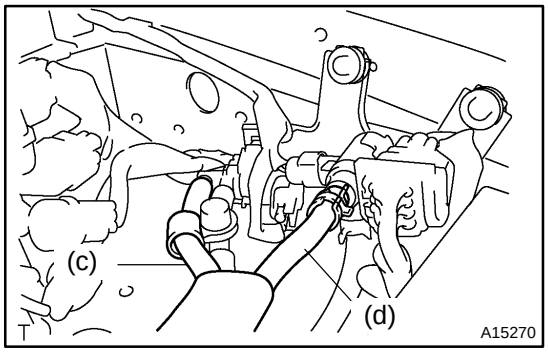
5. CONNECT STARTER WIRE AND CONNECTORS

(a) Connect the 3 starter wire clamps and connector.
(b) Install the 2 nuts, and connect the positive (+) terminal cable to battery.
(c) Connect the ground strap with the bolt.
(d) Connect wire to the relay block No.2 with the nut.



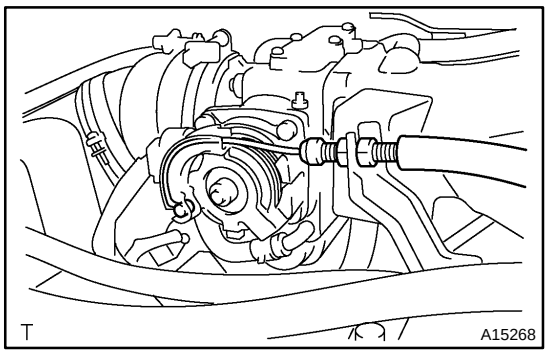
6. CONNECT HOSES

(a) Connect the fuel return hose.
(b) Connect the fuel inlet hose. (See page SF-1)



(c) Connect the EVAP hose.
(d) Connect the CCV hose.

7. CONNECT HEATER HOSES



8. **CONNECT ACCELERATOR CABLE TO THROTTLE BODY**
9. **INSTALL FAN WITH FLUID COUPLING AND FAN PULLEYS**
10. **INSTALL AIR CLEANER ASSEMBLY**
11. **INSTALL RADIATOR ASSEMBLY (See page CO-23)**
12. **FILL WITH ENGINE OIL**
13. **FILL WITH ENGINE COOLANT**
14. **INSTALL ENGINE UNDER COVER**
15. **INSTALL TRANSMISSION (See page AT-27)**
16. **INSTALL HOOD**
17. **PERFORM ROAD TEST**

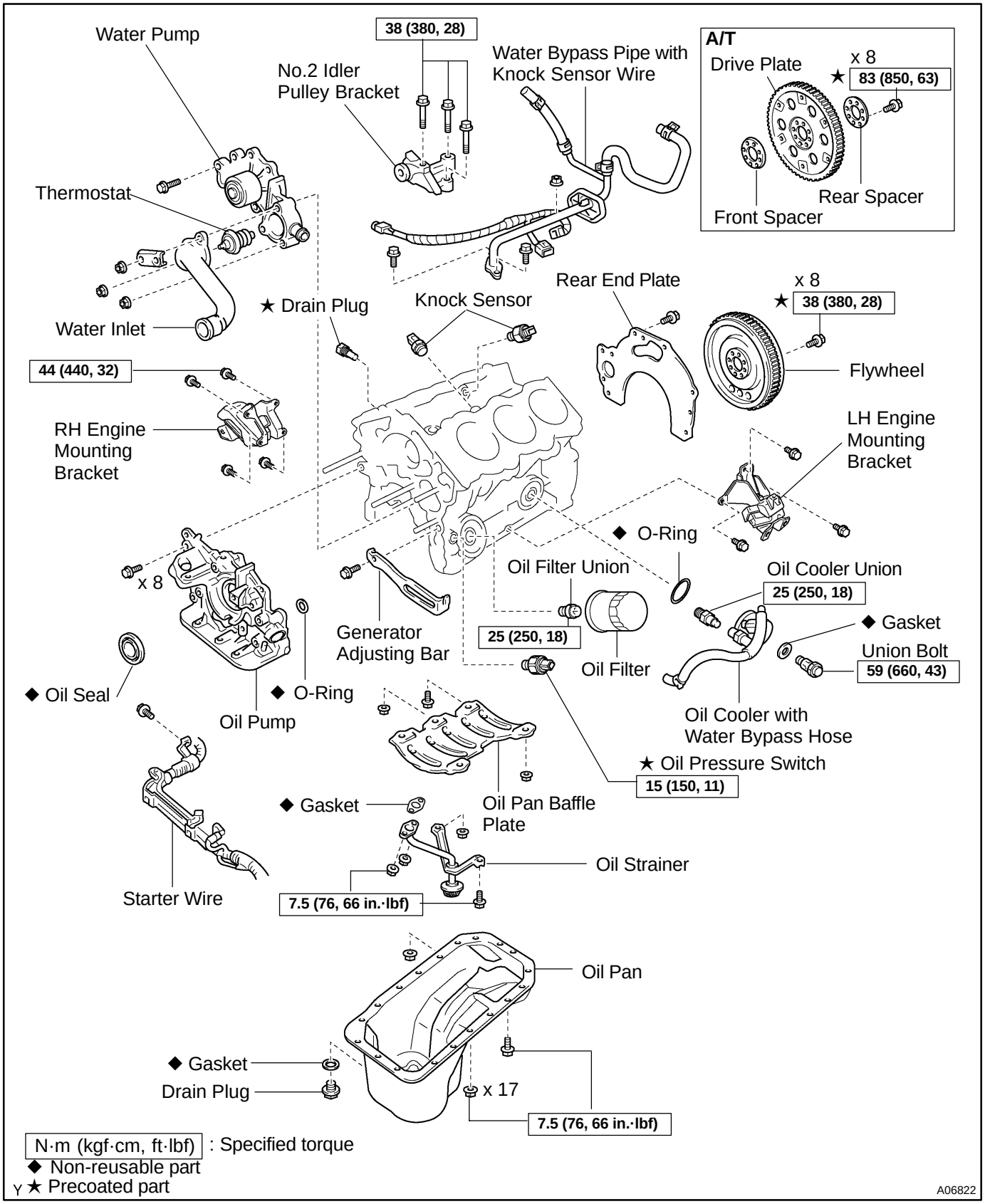
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.

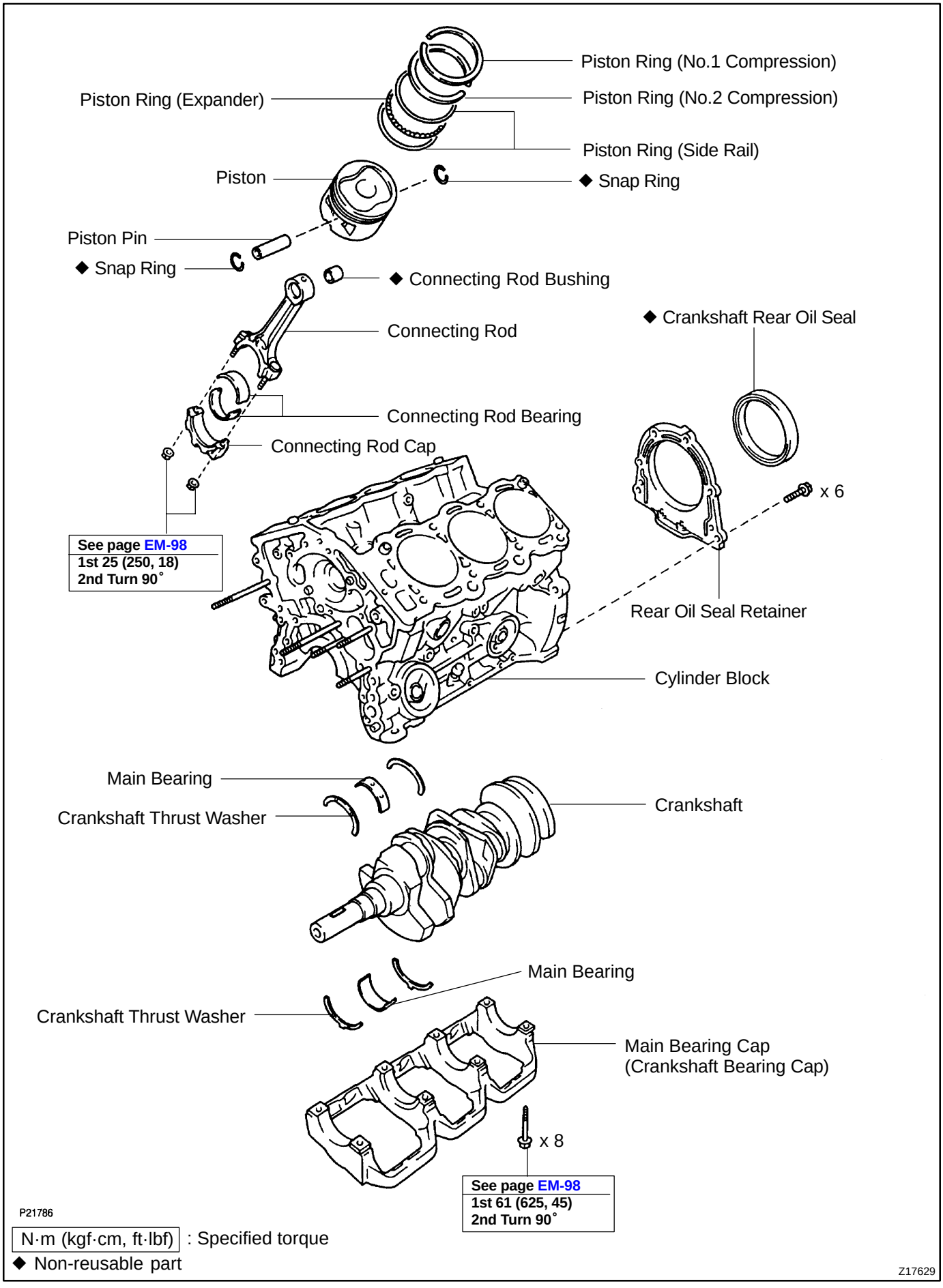
18. **RECHECK ENGINE COOLANT AND ENGINE OIL LEVELS**

CYLINDER BLOCK

COMPONENTS

EM01X-06

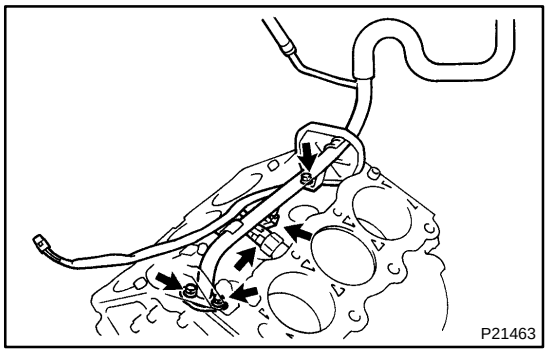



Piston Ring (No.1 Compression)
Piston Ring (Expander)
Piston Ring (No.2 Compression)
Piston Ring (Side Rail)
Piston
◆ Snap Ring
Piston Pin
◆ Snap Ring
◆ Connecting Rod Bushing
◆ Crankshaft Rear Oil Seal
Connecting Rod
Connecting Rod Bearing
Connecting Rod Cap
See page EM-98
1st 25 (250, 18)
2nd Turn 90°
x 6
Rear Oil Seal Retainer
Cylinder Block
Main Bearing
Crankshaft Thrust Washer
Crankshaft
Main Bearing
Crankshaft Thrust Washer
Main Bearing Cap
(Crankshaft Bearing Cap)
x 8
See page EM-98
1st 61 (625, 45)
2nd Turn 90°
P21786
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
Z17629

EM0Z7-01

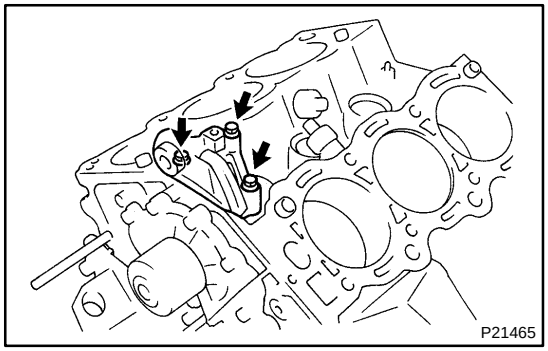
DISASSEMBLY

1. **M/T:**
   REMOVE FLYWHEEL
2. **A/T:**
   REMOVE DRIVE PLATE
3. **REMOVE REAR END PLATE**
4. **INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY**
5. **REMOVE TIMING BELT AND PULLEYS (See page EM-13)**
6. **REMOVE CYLINDER HEADS (See page EM-29)**



7. **REMOVE WATER BYPASS PIPE WITH KNOCK SENSOR WIRE**

(a) Disconnect the 2 knock sensor connectors.
(b) Remove the 2 bolts, nut and water bypass pipe.



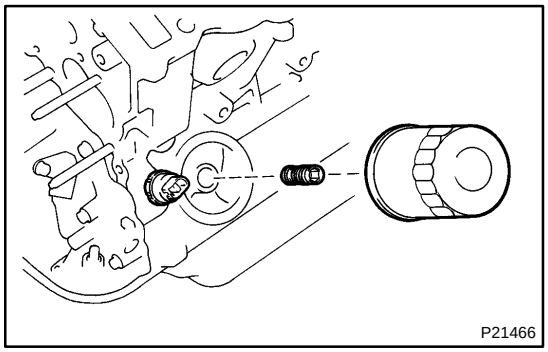
8. **REMOVE NO.2 IDLER PULLEY BRACKET**

Remove the 3 bolts and idler pulley bracket.

9. **REMOVE KNOCK SENSORS (See page SF-49)**
10. **REMOVE WATER PUMP (See page CO-6)**
11. **REMOVE GENERATOR ADJUSTING BAR**
12. **REMOVE OIL PRESSURE SWITCH**

Using SST, remove the oil pressure switch.

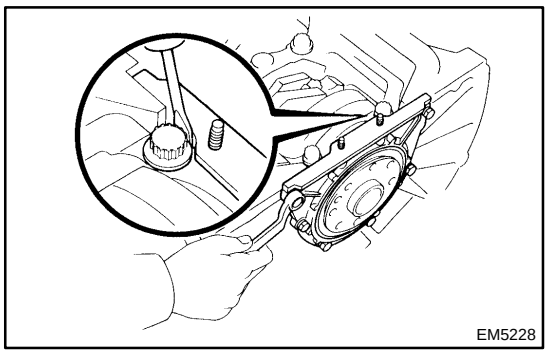
SST 09816-30010



13. **REMOVE OIL FILTER (See page LU-3)**
14. **REMOVE OIL FILTER UNION**

Using 12 mm hexagon wrench, remove the union.

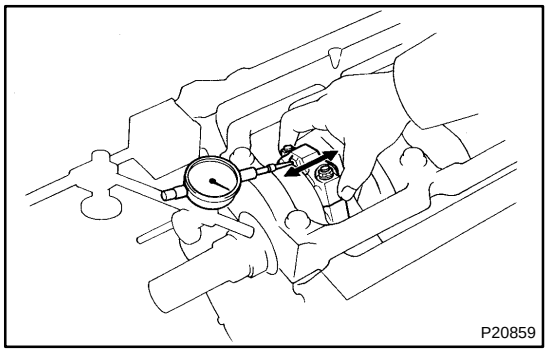
15. **REMOVE RH AND LH ENGINE MOUNTING BRACKET**
16. **REMOVE COOLANT DRAIN COCK**
17. **REMOVE OIL COOLER (See page LU-19)**
18. **REMOVE OIL PUMP (See page LU-9)**



19. REMOVE REAR OIL SEAL RETAINER

(a) Remove the 6 bolts and retainer.

(b) Using a screwdriver, remove the oil seal retainer by plying the portions between the oil seal retainer and main bearing cap.

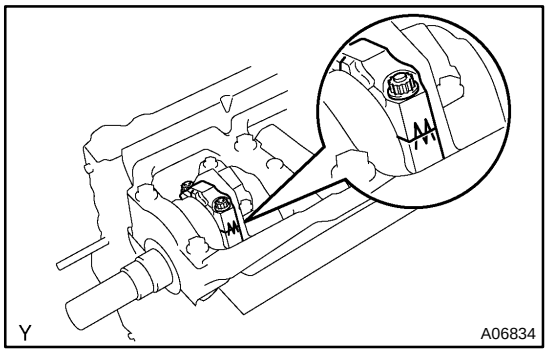


20. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

Standard thrust clearance:
0.150 - 0.330 mm (0.0059 - 0.0130 in.)
Maximum thrust clearance: 0.380 mm (0.0150 in.)

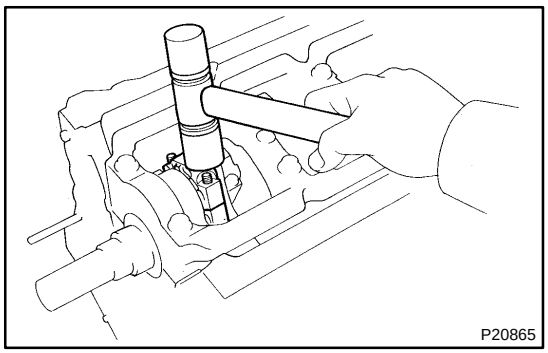
If the thrust clearance is greater than maximum, replace the connecting rod assembly. If necessary, replace the crankshaft.



21. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

(a) Check the matchmarks on the connecting rod and cap are aligned to ensure correct reassembly.

(b) Remove the 2 connecting rod cap nuts.



(c) Using a plastic-faced hammer, lightly tap the connecting rod bolts and lift off the connecting rod cap.

HINT:

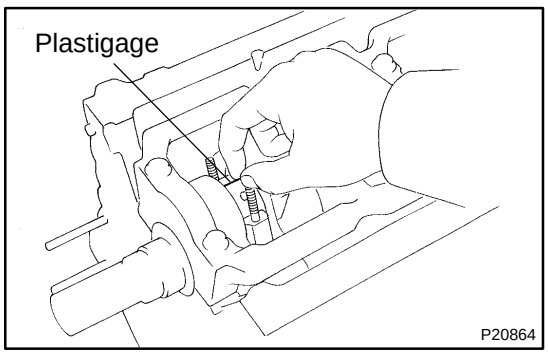
Keep the lower bearing inserted with the connecting rod cap.

(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

(e) Clean the crank pin and bearing.

(f) Check the crank pin and bearing for pitting and scratches.

If the crank pin or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

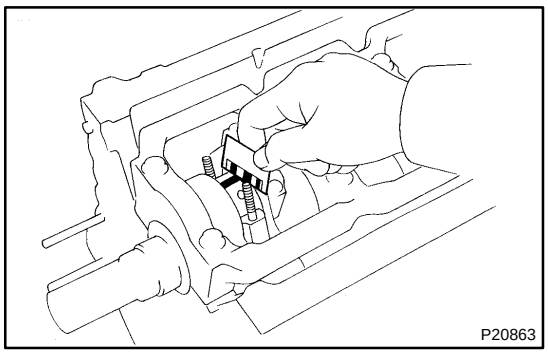


(g) Lay a strip of Plastigage across the crank pin.

(h) Install the connecting rod cap with the 2 nuts.
(See page EM-98)
Torque:
1st: 25 N·m (250 kgf·cm, 18 ft·lbf)
2nd: Turn 90°

NOTICE:
Do not turn the crankshaft.

(i) Remove the 2 nuts and connecting rod cap.
(See step (b) and (c) above)



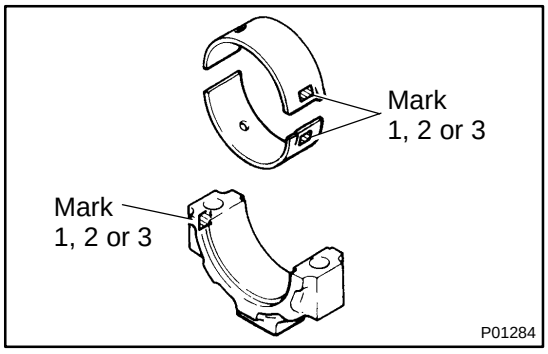
(j) Measure the Plastigage at its widest point.

Standard oil clearance:

STD	0.024 - 0.053 mm (0.0009 - 0.0021 in.)
U/S 0.25	0.023 - 0.069 mm (0.0009 - 0.0027 in.)

Maximum oil clearance: 0.08 mm (0.0031 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.



HINT:

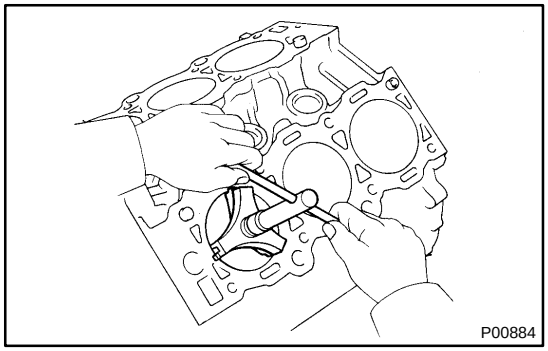
If using a standard bearing, replace with one having the same number marked on the connecting rod cap. There are 3 sizes of standard bearings, marked "1", "2" and "3" accordingly.

Reference:

Standard bearing center wall thickness:

Mark "1"	1.484 - 1.488 mm (0.0584 - 0.0586 in.)
Mark "2"	1.488 - 1.492 mm (0.0586 - 0.0587 in.)
Mark "3"	1.492 - 1.496 mm (0.0587 - 0.0589 in.)

(k) Completely remove the Plastigage.



22. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

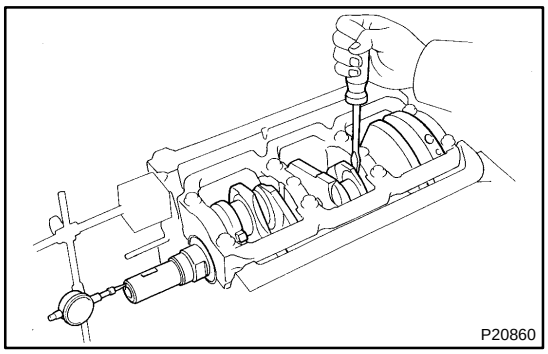
(a) Using a ridge reamer, remove the all carbon from the top of the cylinder.

(b) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.

(c) Push the piston, connecting rod assembly and upper bearing through the top of the cylinder block.

HINT:

- Keep the bearings, connecting rod and cap together.
- Arrange the piston and connecting rod assemblies in correct order.



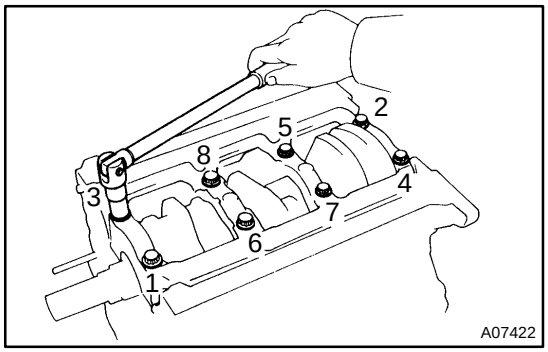
23. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance:
0.020 - 0.220 mm (0.0008 - 0.0087 in.)
Maximum thrust clearance: 0.300 mm (0.0118 in.)

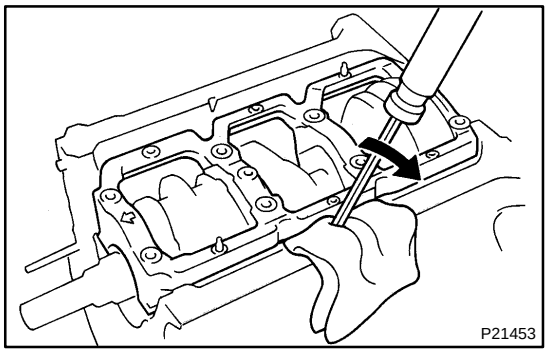
If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:
2.440 - 2.490 mm (0.0961 - 0.0980 in.)



24. REMOVE MAIN BEARING CAP AND CHECK OIL CLEARANCE

(a) Uniformly loosen and remove the main bearing cap bolts, in several passes, in the sequence shown.



(b) Using a screwdriver, pry out the main bearing cap and remove the main bearing cap, lower main bearings and lower thrust washers (No.2 journal position of main bearing cap only).

HINT:
Keep the lower main bearings and lower thrust washers together with the main bearing cap.

(c) Lift out the crankshaft.

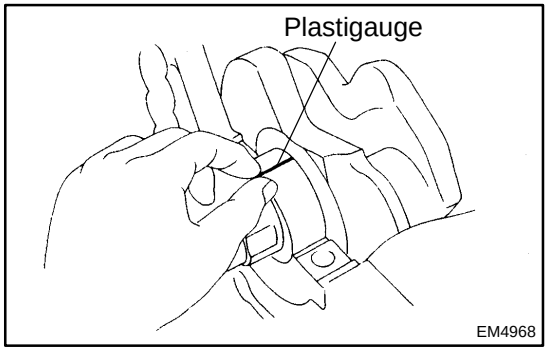
HINT:
Keep the upper main bearings and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

(e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, grind or replace the crankshaft.

(f) Place the crankshaft on the cylinder block.

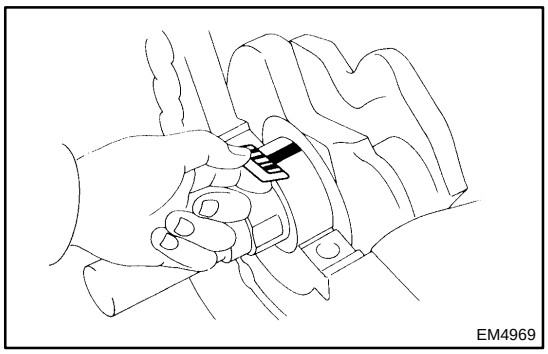


(g) Lay a strip of Plastigage across each journal.

(h) Install the main bearing cap with the 8 bolts.
(See page EM-98)
Torque:
1st: 61 N·m (625 kgf·cm, 45 ft·lbf)
2nd: Turn 90°

NOTICE:
Do not turn the crankshaft.

(i) Remove the 8 bolts and main bearing cap.
(See step (a) and (b) above)


EM4969

(j) Measure the Plastigage at its widest point.

Standard clearance:

Item	STD mm (in.)	U/S 0.25 mm (in.)
No.1	0.020 - 0.038 (0.0008 - 0.0015)	0.019 - 0.059 (0.0007 - 0.0023)
Others	0.024 - 0.042 (0.0009 - 0.0017)	0.023 - 0.063 (0.0009 - 0.0025)

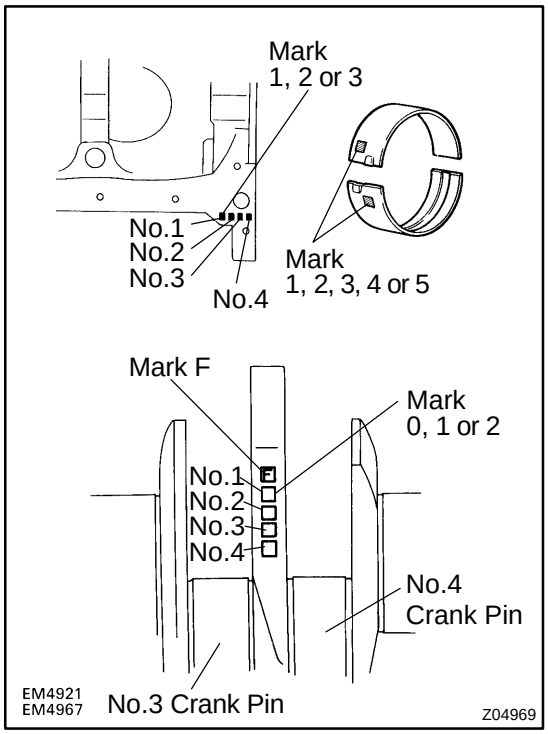
Maximum clearance: 0.08 mm (0.0031 in.)

HINT:

If replacing the cylinder block subassembly, the bearing standard clearance will be:

No.1	0.010 - 0.049 mm (0.0004 - 0.0020 in.)
Others	0.014 - 0.053 mm (0.0006 - 0.0021 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, grind or replace the crankshaft.



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HINT:

If using a standard bearing, replace with one having the same number. If the number of the bearing cannot be determined, select the correct bearing by adding together the numbers imprinted on the cylinder block and crankshaft, then selecting the bearing with the same number as the total. There are 5 sizes of standard bearings, marked "1", "2", "3", "4" and "5" accordingly.

	Number marked								
Cylinder block	1			2			3		
Crankshaft	0	1	2	0	1	2	0	1	2
Use bearing	1	2	3	2	3	4	3	4	5

EXAMPLE: Cylinder block "2" + Crankshaft "1"
= Total number 3 (Use bearing "3")

Reference:

Standard sized bearing center wall thickness:

No.1:

Mark "1"	1.991 - 1.994 mm (0.0784 - 0.0785 in.)
Mark "2"	1.994 - 1.997 mm (0.0785 - 0.0786 in.)
Mark "3"	1.997 - 2.000 mm (0.0786 - 0.0787 in.)
Mark "4"	2.000 - 2.003 mm (0.0787 - 0.0789 in.)
Mark "5"	2.003 - 2.006 mm (0.0789 - 0.0790 in.)

Others:

Mark "1"	1.989 - 1.992 mm (0.0783 - 0.0784 in.)
Mark "2"	1.992 - 1.995 mm (0.0784 - 0.0785 in.)
Mark "3"	1.995 - 1.998 mm (0.0785 - 0.0787 in.)
Mark "4"	1.998 - 2.001 mm (0.0787 - 0.0788 in.)
Mark "5"	2.001 - 2.004 mm (0.0788 - 0.0789 in.)

Cylinder block main journal bore diameter:

Mark "1"	68.010 - 68.016 mm (2.6776 - 2.6778 in.)
Mark "2"	68.016 - 68.022 mm (2.6778 - 2.6780 in.)
Mark "3"	68.022 - 68.028 mm (2.6780 - 2.6783 in.)

Crankshaft main journal diameter:

Mark "0"	63.996 - 64.000 mm (2.5195 - 2.5197 in.)
Mark "1"	63.990 - 63.996 mm (2.5193 - 2.5195 in.)
Mark "2"	63.985 - 63.990 mm (2.5191 - 2.5193 in.)

(k) Completely remove the Plastigage.

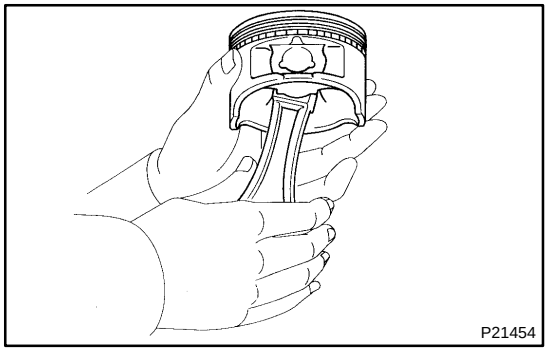
25. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the upper main bearings and upper thrust washers from the cylinder block.

HINT:

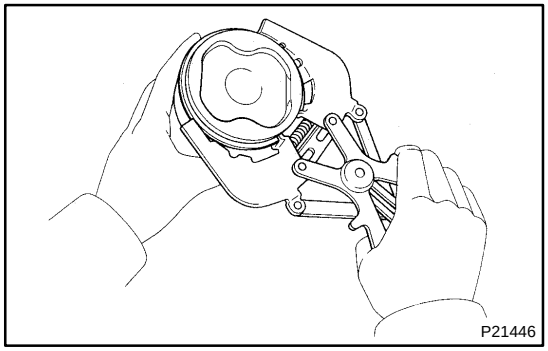
Arrange the main bearings and thrust washers in correct order.



26. CHECK FIT BETWEEN PISTON AND PISTON PIN

Try to move the piston back and forth on the piston pin.

If any movement is felt, replace the piston and pin as a set.



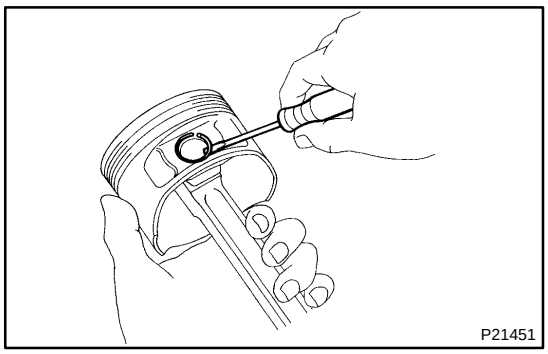
27. REMOVE PISTON RINGS

(a) Using a piston ring expander, remove the 2 compression rings.

(b) Remove the 2 side rails and oil ring by hand.

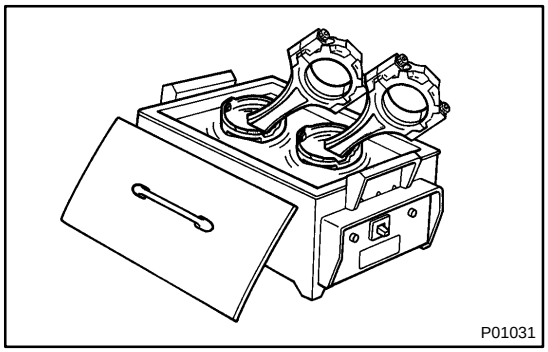
HINT:

Arrange the piston rings in the correct order only.

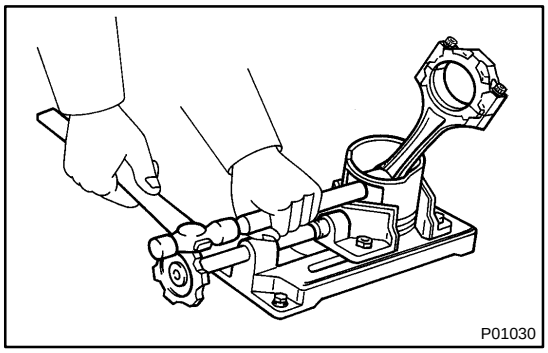


28. DISCONNECT CONNECTING ROD FROM PISTON

(a) Using a small screwdriver, pry out the 2 snap rings.



(b) Gradually heat the piston to about 60˚C (140˚F).



(c) Using a plastic-faced hammer and brass bar, lightly tap out the piston pin and remove the connecting rod.

HINT:

- The piston and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in the correct order.

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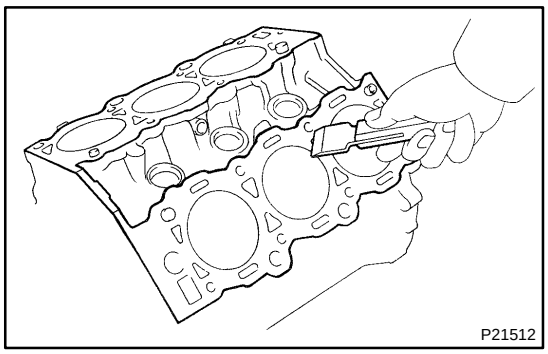
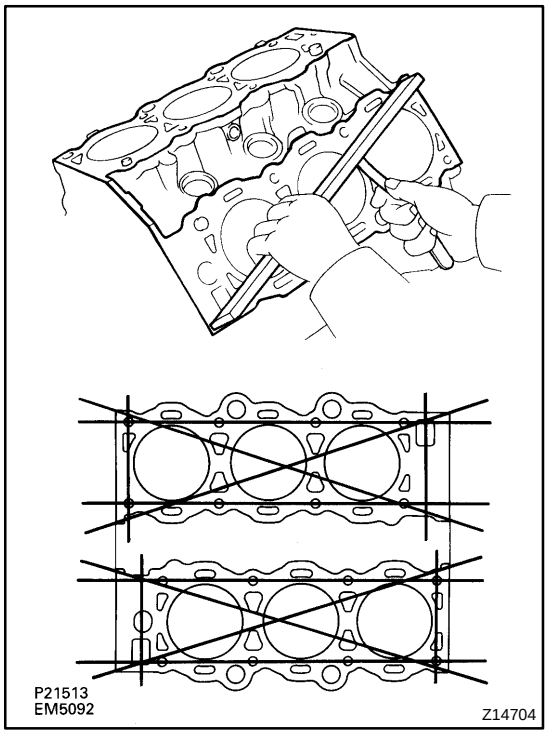
INSPECTION



1. CLEAN CYLINDER BLOCK

(a) Remove the gasket material.
Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

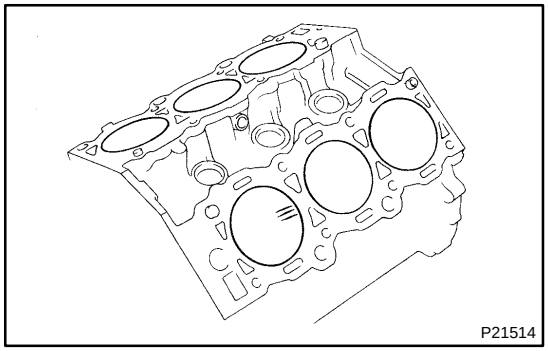
(b) Clean the cylinder block.
Using a soft brush and solvent, thoroughly clean the cylinder block.



2. INSPECT CYLINDER BLOCK

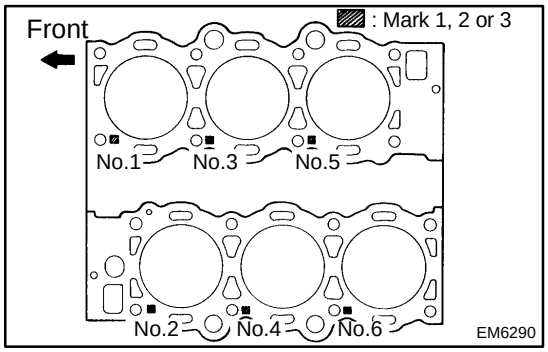
(a) Inspect for flatness.
Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder head gasket for warpage.
Maximum warpage: 0.05 mm (0.0020 in.)

If warpage is greater than maximum, replace the cylinder block.



(b) Visually check the cylinder for vertical scratches.

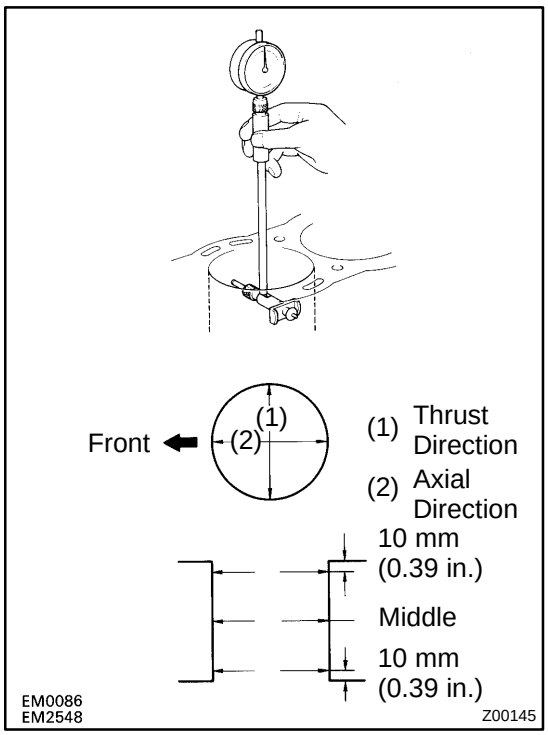
If deep scratches are present, rebore all the 6 cylinders. If necessary, replace the cylinder block.



(c) Inspect the cylinder bore diameter.

HINT:

There are 3 sizes of the standard cylinder bore diameter, marked ”1”, ”2” and ”3” accordingly. The mark is stamped on the top of the cylinder block.



(d) Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

Standard diameter:

Mark "1"	93.500 - 93.510 mm (3.6811 - 3.6815 in.)
Mark "2"	93.510 - 93.520 mm (3.6815 - 3.6819 in.)
Mark "3"	93.520 - 93.530 mm (3.6819 - 3.6823 in.)

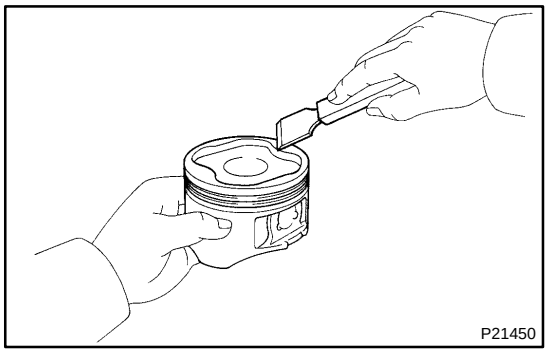
Maximum diameter:

STD	93.730 mm (3.6902 in.)
O/S 0.50	94.230 mm (3.7098 in.)

If the diameter is greater than maximum, rebore all the 6 cylinders, If necessary, replace the cylinder block.

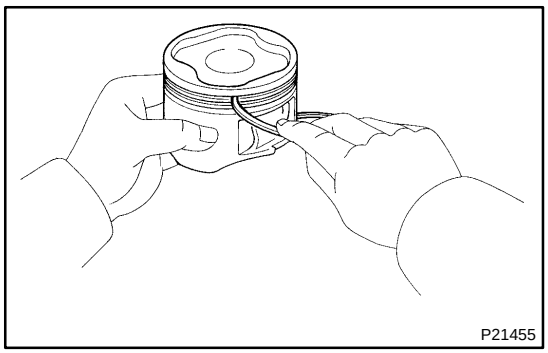
(e) Remove the cylinder ridge.

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.

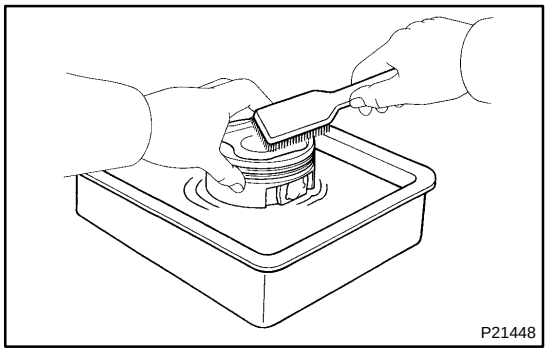


3. CLEAN PISTON

(a) Using a gasket scraper, remove the carbon from the piston top.



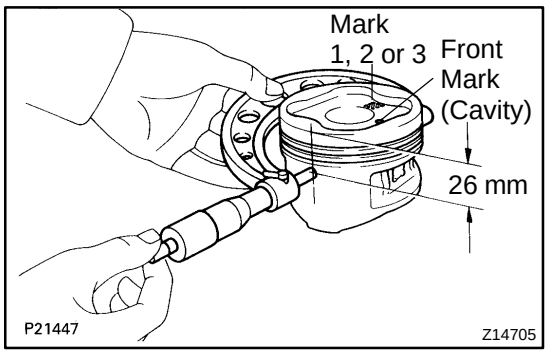
(b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



(c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



4. INSPECT PISTON AND CONNECTING ROD

(a) Inspect the piston oil clearance.

HINT:

There are 3 sizes of the standard piston diameter, marked "1", "2" and "3" accordingly. The mark is stamped on the piston top.

(1) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 26 mm (1.02 in.) from the piston head.

Piston diameter:

STD	Mark "1"	93.356 - 93.666 mm (3.6754 - 3.6758 in.)
	Mark "2"	93.367 - 93.376 mm (3.6759 - 3.6762 in.)
	Mark "3"	93.377 - 93.386 mm (3.6763 - 3.6766 in.)
O/S 0.50		93.856 - 93.886 mm (3.6951 - 3.6963 in.)

(2) Measure the cylinder bore diameter in the thrust directions (See step 5).

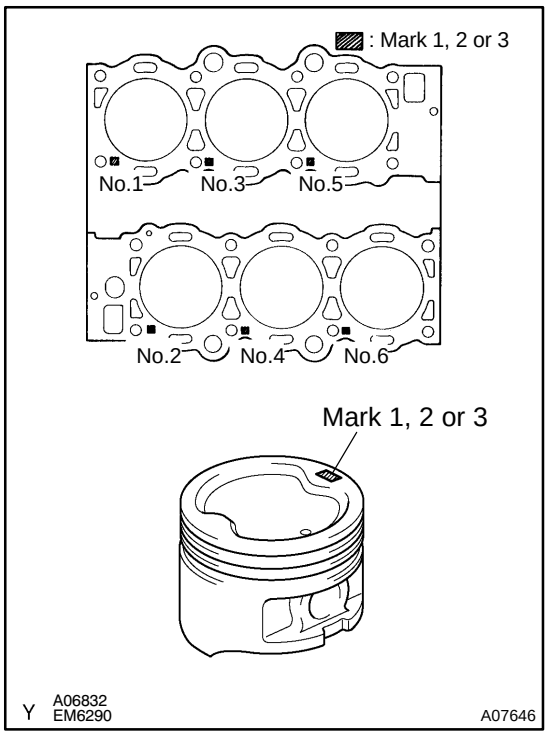
(3) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Standard oil clearance:

0.134 - 0.154 mm (0.0053 - 0.0060 in.)

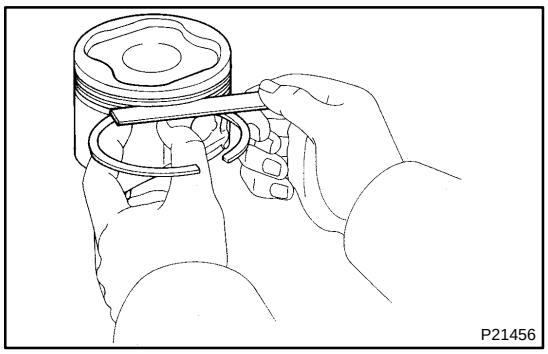
Maximum oil clearance: 0.174 mm (0.0069 in.)

If the oil clearance is greater than maximum, replace all the 6 pistons. If necessary, rebore all the 6 cylinders or replace the cylinder block.



HINT:

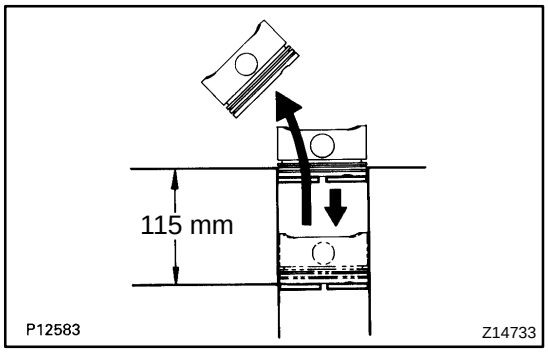
Use a new cylinder block: Use a piston with the same number mark as the standard bore diameter marked on the cylinder block.



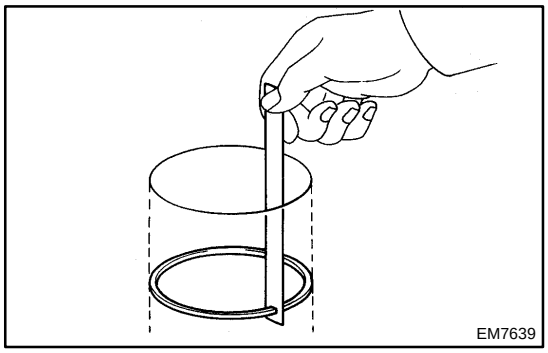
(b) Inspect the piston ring groove clearance.
Using a feeler gauge, measure the clearance between new piston ring and the wall of the piston ring groove.
Standard ring groove clearance:

No.1	0.040 - 0.080 mm (0.0016 - 0.0031 in.)
No.2	0.030 - 0.070 mm (0.0012 - 0.0028 in.)

If the clearance is not as specified, replace the piston.



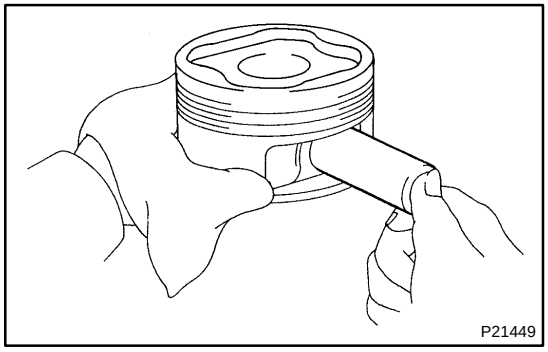
(c) Inspect the piston ring end gap.
(1) Insert the piston ring into the cylinder bore.
(2) Using a piston, push the piston ring a little beyond the bottom of the ring travel, 115 mm (4.53 in.) from the top of the cylinder block.



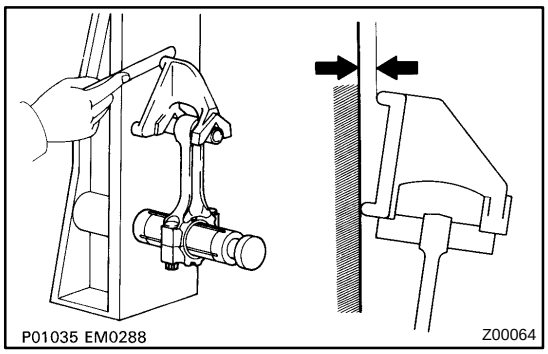
(3) Using a feeler gauge, measure the ring end gap.
Ring end gap:

Piston ring	STD mm (in.)	Maximum mm (in.)
No.1	0.300 - 0.500 (0.0118 - 0.0197)	1.100 (0.0433)
No.2	0.400 - 0.600 (0.0157 - 0.0236)	1.200 (0.0472)
Oil (Side rail)	0.150 - 0.550 (0.0059 - 0.0217)	1.150 (0.0453)

If the end gap is greater than maximum, replace the piston ring.
If the end gap is greater than maximum, even with a new piston ring, rebore all the 6 cylinders or replace the cylinder block.



(d) Inspect the piston pin fit.
At 60˚C (140˚F), you should be able to push the piston pin into the piston pin hole with your thumb.



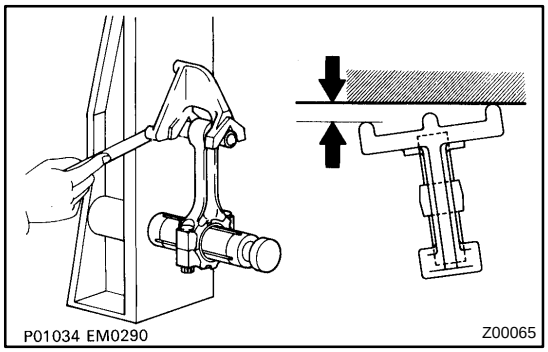
(e) Using a rod aligner and feeler gauge, check the connecting rod alignment.

(1) Check for bend.

Maximum bend:

0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If bend is greater than maximum, replace the connecting rod assembly.

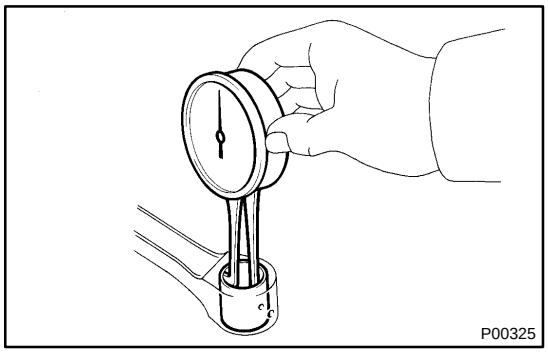


(2) Check for twist.

Maximum twist:

0.15 mm (0.0059 in.) per 100 mm (3.94 in.)

If twist is greater than maximum, replace the connecting rod assembly.

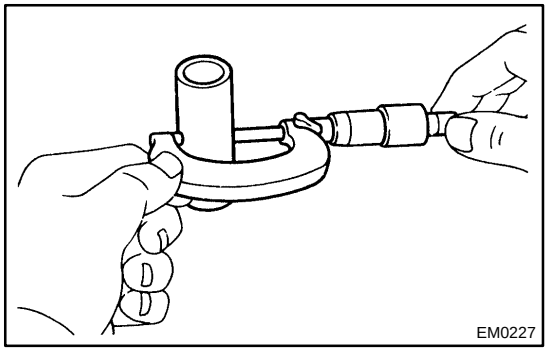


(f) Inspect the piston pin oil clearance.

(1) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:

22.005 - 22.017 mm (0.8663 - 0.8668 in.)



(2) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

21.997 - 22.009 mm (0.8660 - 0.8665 in.)

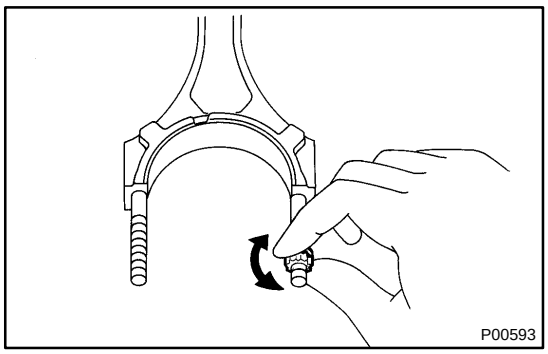
(3) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

Standard oil clearance:

0.005 - 0.011 mm (0.0002 - 0.0004 in.)

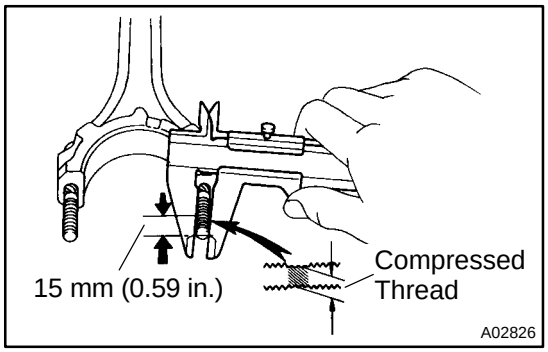
Maximum oil clearance: 0.05 mm (0.0020 in.)

If the oil clearance is greater than maximum, replace the bushing. If necessary, replace the piston and piston pin as a set.



(g) Inspect the connecting rod bolts.

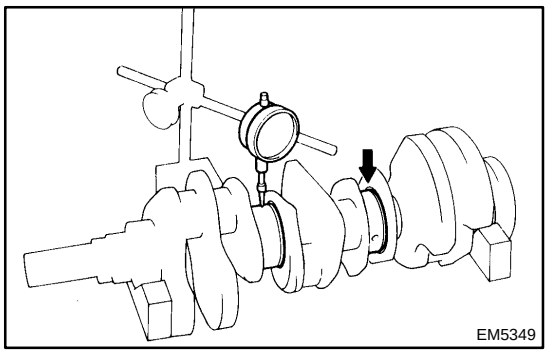
(1) Install the cap nut to the connecting rod bolt. Check that the rod cap nut can be turned easily by hand to the end of the thread.



(2) If the cap nut cannot be turned easily, measure the outer diameter of the compressed thread with a vernier caliper.

Standard outer diameter:
7.860 - 8.000 mm (0.3094 - 0.3150 in.)
Minimum outer diameter: 7.600 mm (0.2992 in.)

HINT:
If the location of this area cannot be judged by visual inspection, measure the outer diameter at the location shown in the illustration.
If the outer diameter is less than minimum, replace the connecting rod and rod cap nut as a set.



5. INSPECT CRANKSHAFT

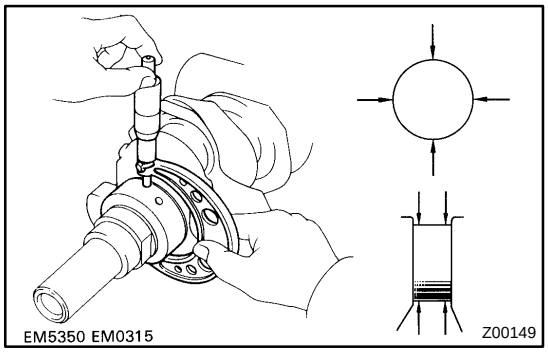
(a) Inspect for runout.

(1) Place the crankshaft on V-blocks.

(2) Using a dial indicator, measure the circle runout at the No.2 and No.3 journals.

Maximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is greater than maximum, replace the crankshaft.



(b) Inspect the main journals and crank pins.

(c) Using a micrometer, measure the diameter of each main journal and crank pin.

Diameter:

Item	STD mm (in.)	U/S 0.25 mm (in.)
Main journal	63.985 - 64.000 (2.5191 - 2.5197)	63.745 - 63.755 (2.5096 - 2.5100)
Crank pin	54.987 - 55.000 (2.1648 - 2.1654)	54.745 - 54.755 (2.1553 - 2.1557)

If the diameter is not as specified, check the oil clearance (See page EM-81).

(d) Check each main journal and crank pin for taper and out-of-round as shown.

Maximum taper and out-of-round:
0.02 mm (0.0008 in.)

If the taper or out-of-round is greater than maximum, grind or replace the crankshaft.

6. IF NECESSARY, GRIND AND HONE MAIN JOURNALS AND/OR CRANK PINS

(a) Grind and hone the main journals and/or crank pins to the finished undersized diameter.

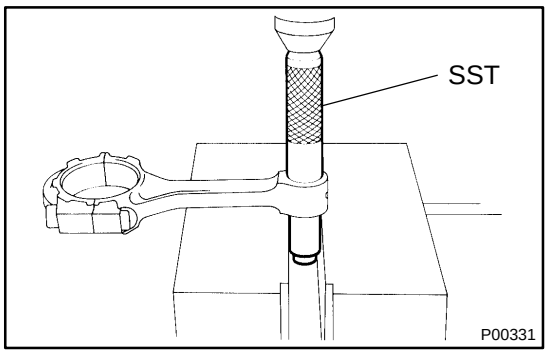
(b) Install new main journal and/or crank pin undersized bearings.

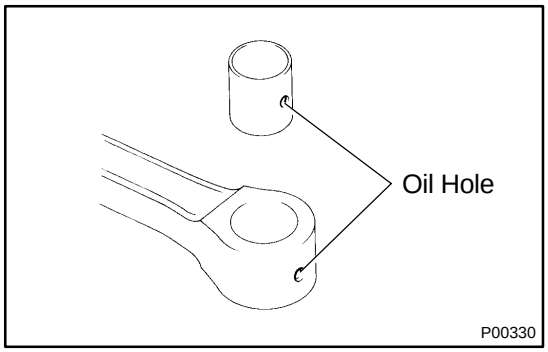
EM0Z9-01

REPLACEMENT

1. REPLACE CONNECTING ROD BUSHINGS

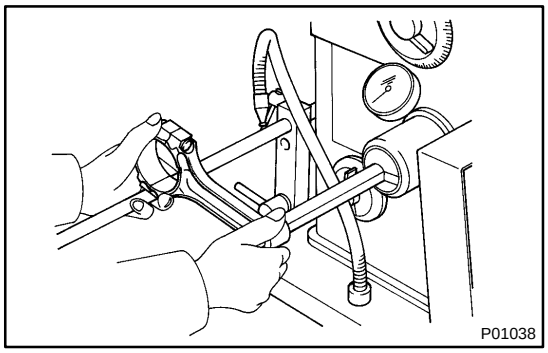
(a) Using SST and a press, press out the bushing.
SST 09222-30010



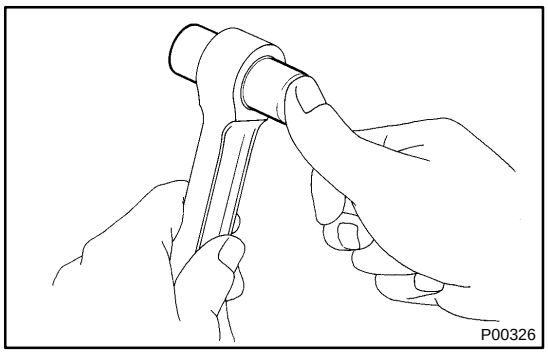


(b) Align the oil holes of a new bushing and the connecting rod.

(c) Using SST and a press, press in the bushing.
SST 09222-30010



(d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (See page EM-88) between the bushing and piston pin.



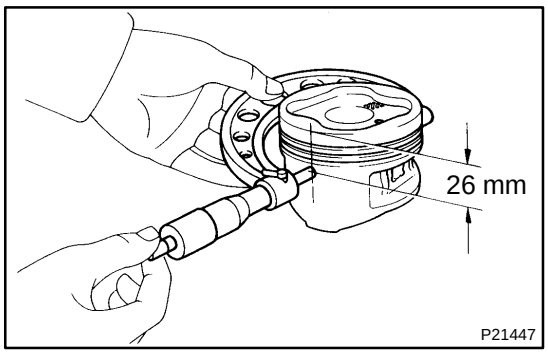
(e) Check the piston pin fit at normal room temperature. Coat the piston pin with engine oil, and push it into the connecting rod with your thumb.

2. REPLACE OVERSIZED (O/S) PISTONS FOR CYLINDER BORING

HINT:

- Bore all the 6 cylinders for the oversized piston outside diameter.
- Replace all the piston rings with ones to match the oversized pistons.

(a) Keep the oversized pistons.
O/S 0.50 piston diameter:
93.856 - 93.886 mm (3.6951 - 3.6963 in.)



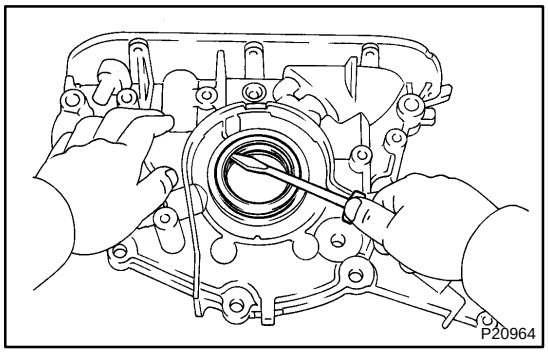
(b) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 26 mm (1.02 in.) from the piston head.

(c) Calculate the amount of each cylinder is to be rebored as follows:

Size to be rebored = P + C - H
P = Piston diameter
C = Piston oil clearance
0.134 - 0.154 mm (0.0053 - 0.0060 in.)
H = Allowance for honing
0.02 mm (0.0008 in.) or less

(d) Bore and hone cylinder to the calculated dimensions.
Maximum honing: 0.02 mm (0.0008 in.)

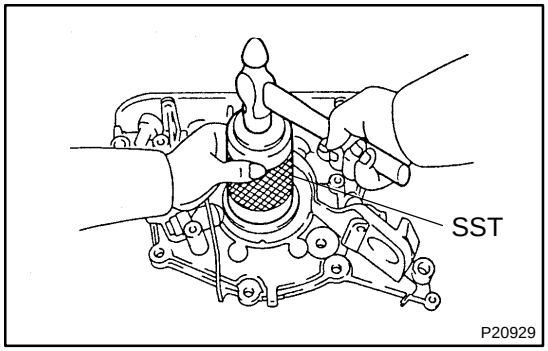
NOTICE:
Excess honing will destroy the finished roundness.



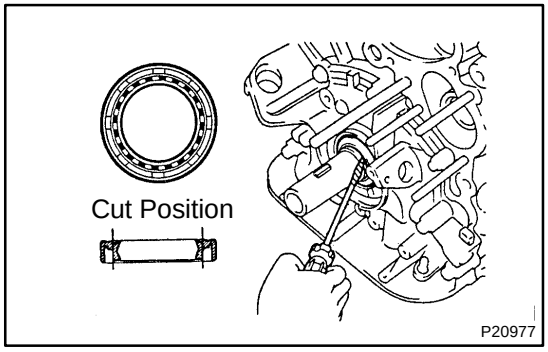
3. REPLACE CRANKSHAFT FRONT OIL SEAL

HINT:
There are 2 methods ((a) and (b)) to replace the oil seal.

(a) If oil pump is removed from the cylinder block:
(1) Using a screwdriver, pry out the oil seal.

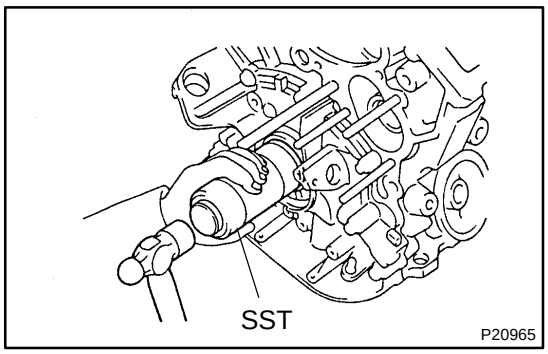


(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.
SST 09309-37010
(3) Apply MP grease to the oil seal lip.

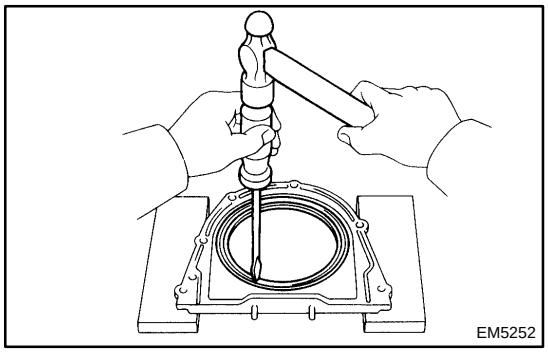


(b) If oil pump is installed to the cylinder block:
(1) Using a knife, cut off the oil seal lip.
(2) Using a screwdriver, pry out the oil seal.

NOTICE:
Be careful not damage the crankshaft. Tape the screwdriver tip.



(3) Apply MP grease to the to a new oil seal lip.
(4) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
SST 09306-37010

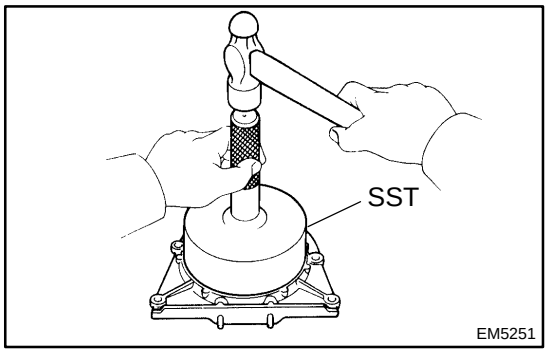


4. REPLACE CRANKSHAFT REAR OIL SEAL

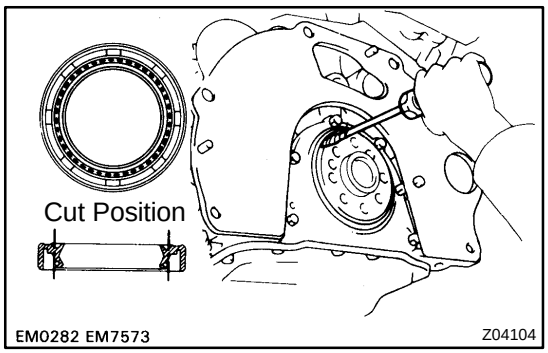
HINT:

There are 2 methods ((a) and (b)) to replace the oil seal.

(a) If rear oil seal retainer is removed from the cylinder block:
(1) Using a screwdriver and hammer, tap out the oil seal.



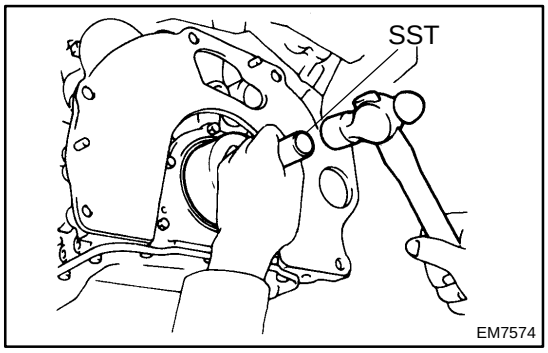
(2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223-15030, 09950-70010 (09951-07150)
(3) Apply MP grease to the oil seal lip.



(b) If rear oil seal retainer is installed to the cylinder block:
(1) Using a knife, cut off the oil seal lip.
(2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.



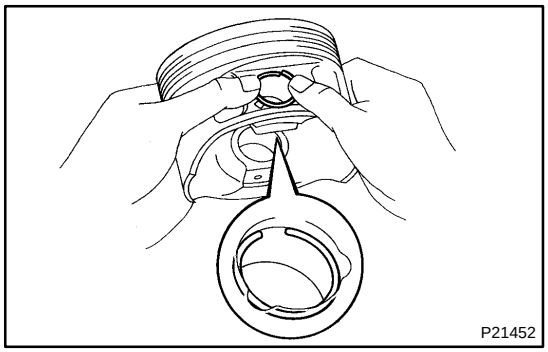
(3) Apply MP grease to a new oil seal lip.
(4) Using SST and a hammer, tap in the oil seal until its surface is flush with the rear oil seal retainer edge.
SST 09223-15030, 09950-70010 (09951-07150)

EM020-07

REASSEMBLY

HINT:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets, O-rings and oil seals with new parts.



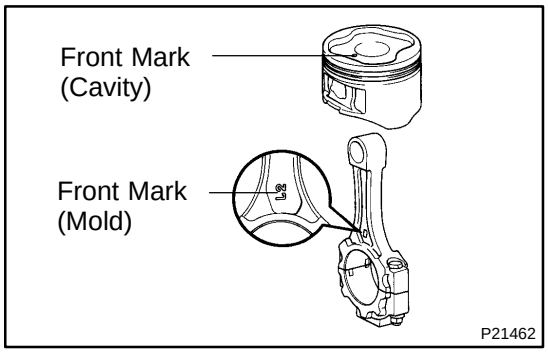
1. ASSEMBLE PISTON AND CONNECTING ROD

(a) Using a small screwdriver, install a new snap ring at one end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.

(b) Gradually heat the piston to about 60°C (140°F).



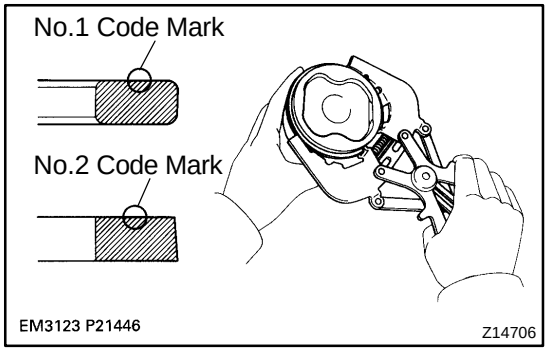
(c) Coat the piston pin with engine oil.

(d) Align the front marks of the piston and connecting rod, and push in the piston pin with your thumb.

(e) Using a small screwdriver, install a new snap ring on the other end of the piston pin hole.

HINT:

Be sure that end gap of the snap ring is not aligned with the pin hole cutout portion of the piston.



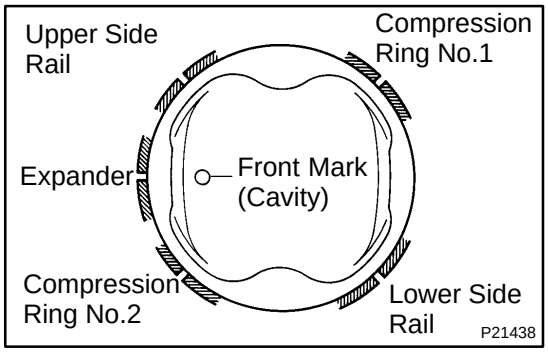
2. INSTALL PISTON RINGS

(a) Install the oil ring expander and 2 side rails by hand.

(b) Using a piston ring expander, install the 2 compression rings with the code mark facing upward.

Code mark:

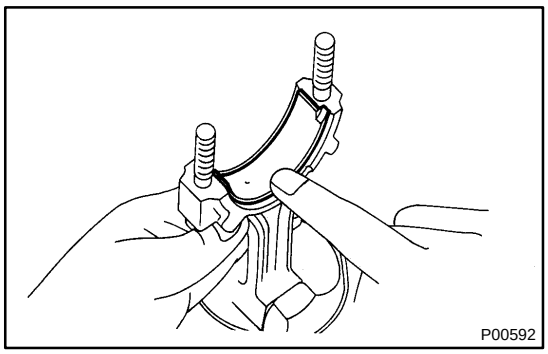
No.1	1R or T
No.2	2R or T



(c) Position the piston rings so that the ring ends are as shown.

NOTICE:

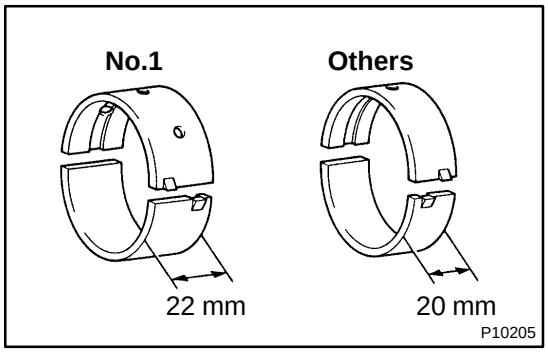
Do not align the ring ends.



3. INSTALL BEARINGS

(a) Align the bearing claw with the groove of the connecting rod or connecting cap.

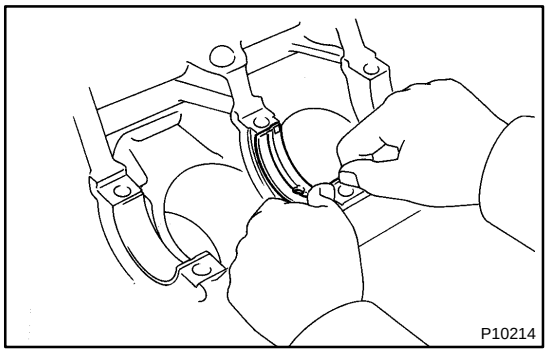
(b) Install the bearings in the connecting rod and connecting rod cap.



4. INSTALL MAIN BEARINGS

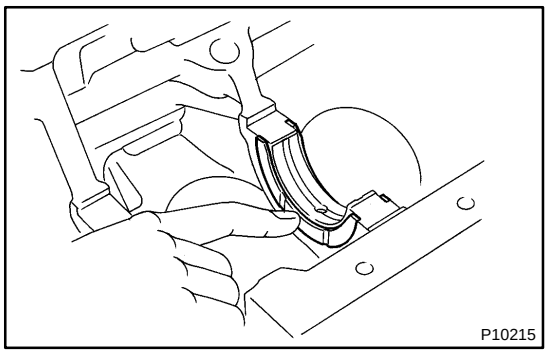
HINT:

- Main bearings come in widths of 20 mm (0.79 in.) and 22 mm (0.87 in.). Install the 22 mm (0.87 in.) bearings in the No.1 cylinder block journal position with the main bearing caps. Install the 20 mm (0.79 in.) bearings in the other positions.
- Upper bearings have an oil holes; lower bearings do not.



(a) Align the bearing claw with the claw groove of the main bearing cap or cylinder block.

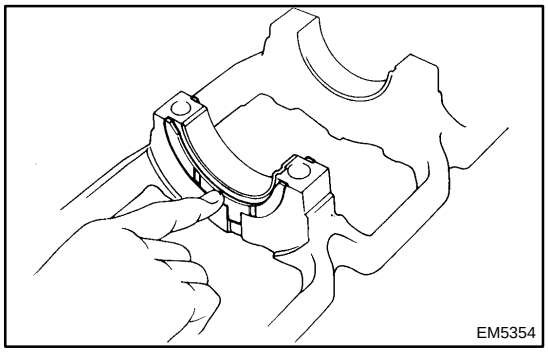
(b) Install the bearings in the cylinder block and main bearing cap.



5. INSTALL UPPER THRUST WASHERS

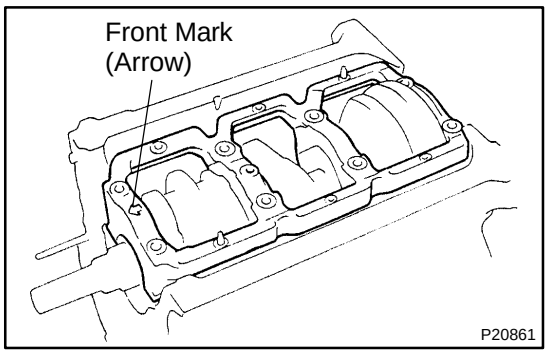
Install the thrust washers under the No.2 journal position of the cylinder block with the oil grooves facing outward.

6. PLACE CRANKSHAFT ON CYLINDER BLOCK



7. PLACE MAIN BEARING CAP AND LOWER THRUST WASHERS ON CYLINDER BLOCK

(a) Install the thrust washers on the No.2 journal position of the bearing cap with the grooves facing outward.

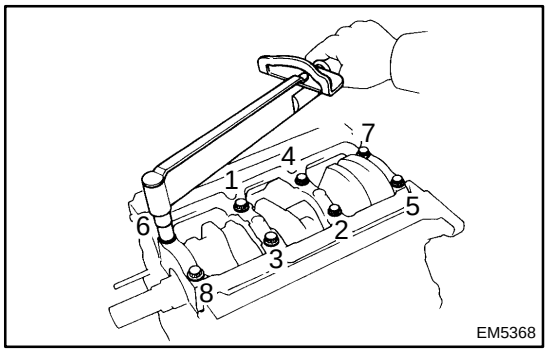


(b) Install the main bearing cap with the front mark facing forward.

8. INSTALL MAIN BEARING CAP BOLTS

HINT:

- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
- If any main bearing cap bolt is broken or deformed, replace it.

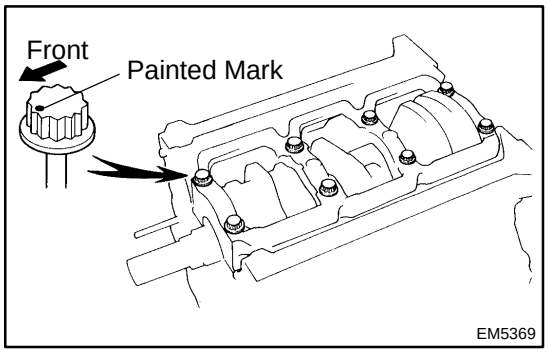


(a) Apply a light coat of engine oil on the threads and under the heads of the main bearing cap bolts.

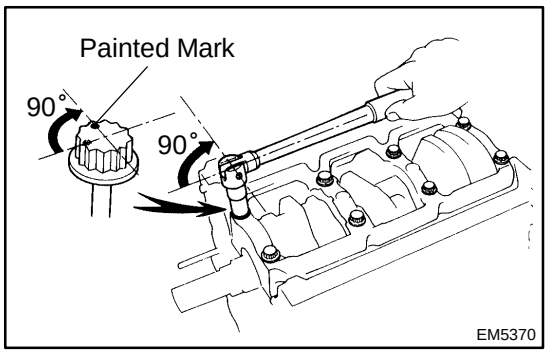
(b) Install and uniformly tighten the 8 main bearing cap bolts in several passes, in the sequence shown.

Torque: 61 N·m (625 kgf·cm, 45 ft·lbf)

If any one of the main bearing cap bolts does not meet the torque specification, replace the cap bolt.



(c) Mark the front of the main bearing cap bolt with paint.

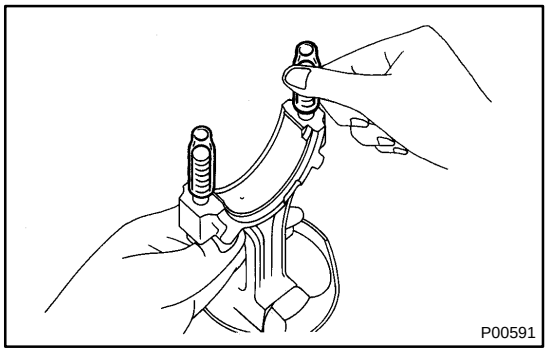


(d) Retighten the main bearing cap bolts by 90° in the numerical order shown.

(e) Check that the painted mark is now at a 90° angle to the front.

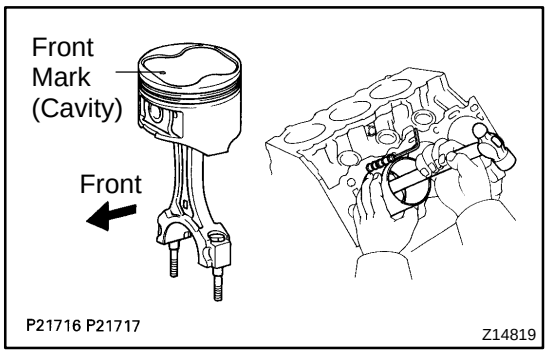
(f) Check that the crankshaft turns smoothly.

(g) Check the crankshaft thrust clearance.
(See page EM-88)

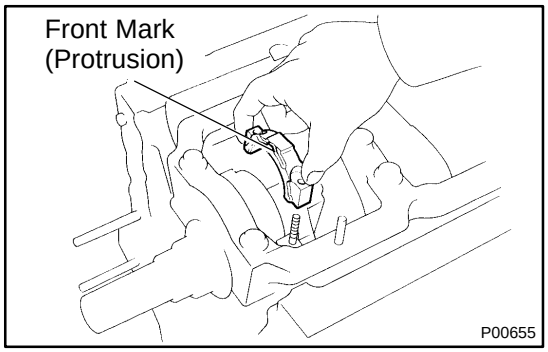


9. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

(a) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



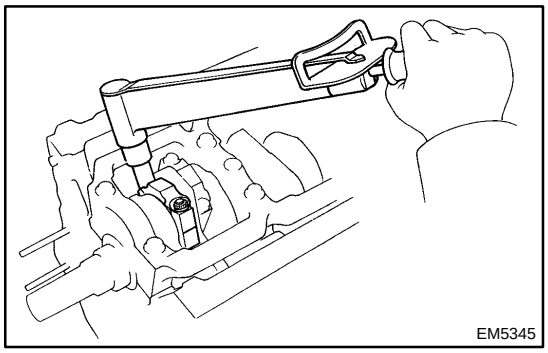
(b) Using a piston ring compressor, push the correctly numbered piston and connecting rod assemblies into each cylinder with the front mark of the piston facing forward.



10. PLACE CONNECTING ROD CAP ON CONNECTING ROD

(a) Match the numbered connecting rod cap with the connecting rod.

(b) Install the connecting rod cap with the front mark facing forward.



11. INSTALL CONNECTING ROD CAP NUTS

HINT:

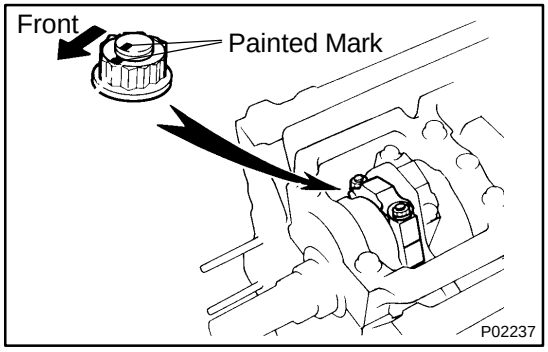
- The connecting rod cap nuts are tightened in 2 progressive steps (steps (b) and (d)).
- If any connecting rod bolt is broken or deformed, replace it.

(a) Apply a light of engine oil on the threads and under the nuts of the connecting rod cap.

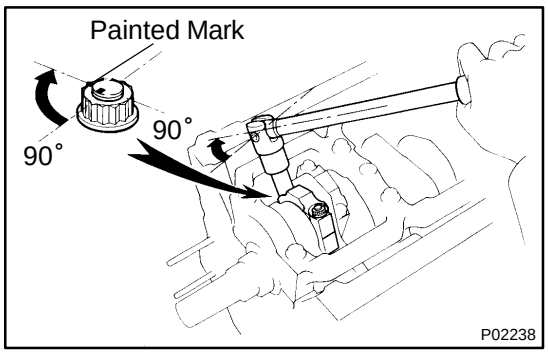
(b) Install and alternately tighten the nuts of the connecting rod cap in several passes.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

If any one of the connecting rod cap nuts does not meet the torque specification, replace the cap nut.



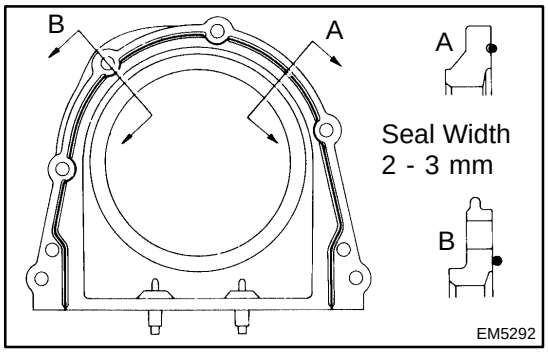
(c) Mark the front of the connecting rod cap nut and bolt with paint.



(d) Retighten the connecting rod cap nuts 90° as shown.
(e) Check that the painted mark is now at a 90° angle to the front.
(f) Check that the crankshaft turns smoothly.
(g) Check the connecting rod thrust clearance.
(See page EM-88)

12. INSTALL REAR OIL SEAL RETAINER

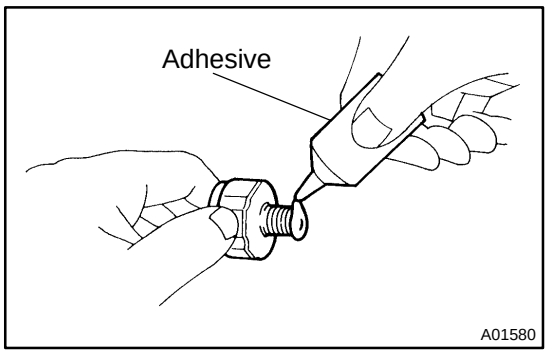
(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the retainer and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non-residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the oil seal retainer as shown in the illustration.
Seal packing: Part No.08826-00080 or equivalent
- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the oil seal retainer with the 6 bolts.
Torque: 8 N·m (80 kgf·cm, 71 in.·lbf)

13. INSTALL OIL PUMP (See page LU-15)
14. INSTALL OIL COOLER (See page LU-21)
15. INSTALL COOLANT DRAIN COCK
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
16. INSTALL RH AND LH ENGINE MOUNTING BRACKET
Torque: 44 N·m (440 kgf·cm, 32 ft·lbf)
17. INSTALL OIL FILTER UNION
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)
18. INSTALL OIL FILTER (See page LU-3)



19. INSTALL OIL PRESSURE SWITCH

(a) Apply adhesive to 2 or 3 threads of the oil pressure switch.
Adhesive:
Part No. 08833 - 00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install the oil pressure switch.
SST 09816-30010
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

20. INSTALL GENERATOR ADJUSTING BAR
Torque: 42 N·m (420 kgf·cm, 31 ft·lbf)

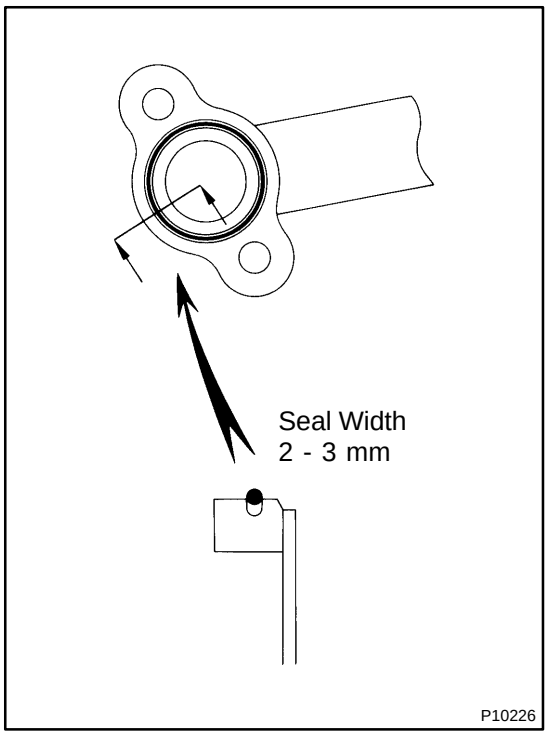
21. INSTALL WATER PUMP (See page CO-8)

22. INSTALL KNOCK SENSORS (See page SF-49)

23. INSTALL NO.2 IDLER PULLEY BRACKET
Torque: 38 N·m (380 kgf·cm, 28 ft·lbf)

24. INSTALL WATER BYPASS PIPE WITH KNOCK SENSOR WIRE

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the bypass and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non-residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the groove of the bypass pipe.
Seal packing: Part No. 08826 - 00100 or equivalent
- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.

HINT:
Avoid applying an excessive amount to the surface.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the bypass pipe with the 2 bolts and nut.
Torque: 8.5 N·m (85 kgf·cm, 75 in.·lbf)

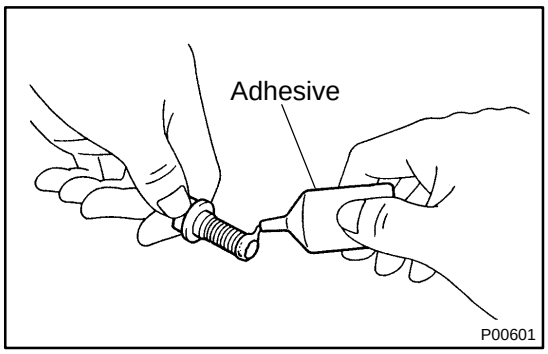
(d) Connect the 2 knock sensor connectors.

25. INSTALL CYLINDER HEADS (See page EM-52)

26. INSTALL PULLEYS AND TIMING BELT (See page EM-19)

27. REMOVE ENGINE STAND

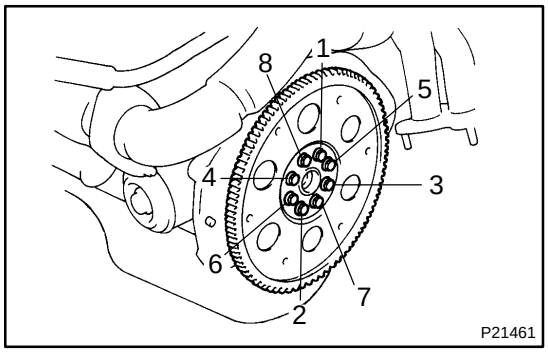
28. INSTALL REAR END PLATE
Torque: 7.5 N·m (75 kgf·cm, 66 in.·lbf)



29. A/T:
INSTALL DRIVE PLATE

(a) Apply adhesive to 2 or 3 threads of the mount bolt end.
Adhesive:
Part No. 08833 - 00070, THREE BOND 1324 or equivalent

(b) Install the front spacer, drive plate and rear spacer on the crankshaft.



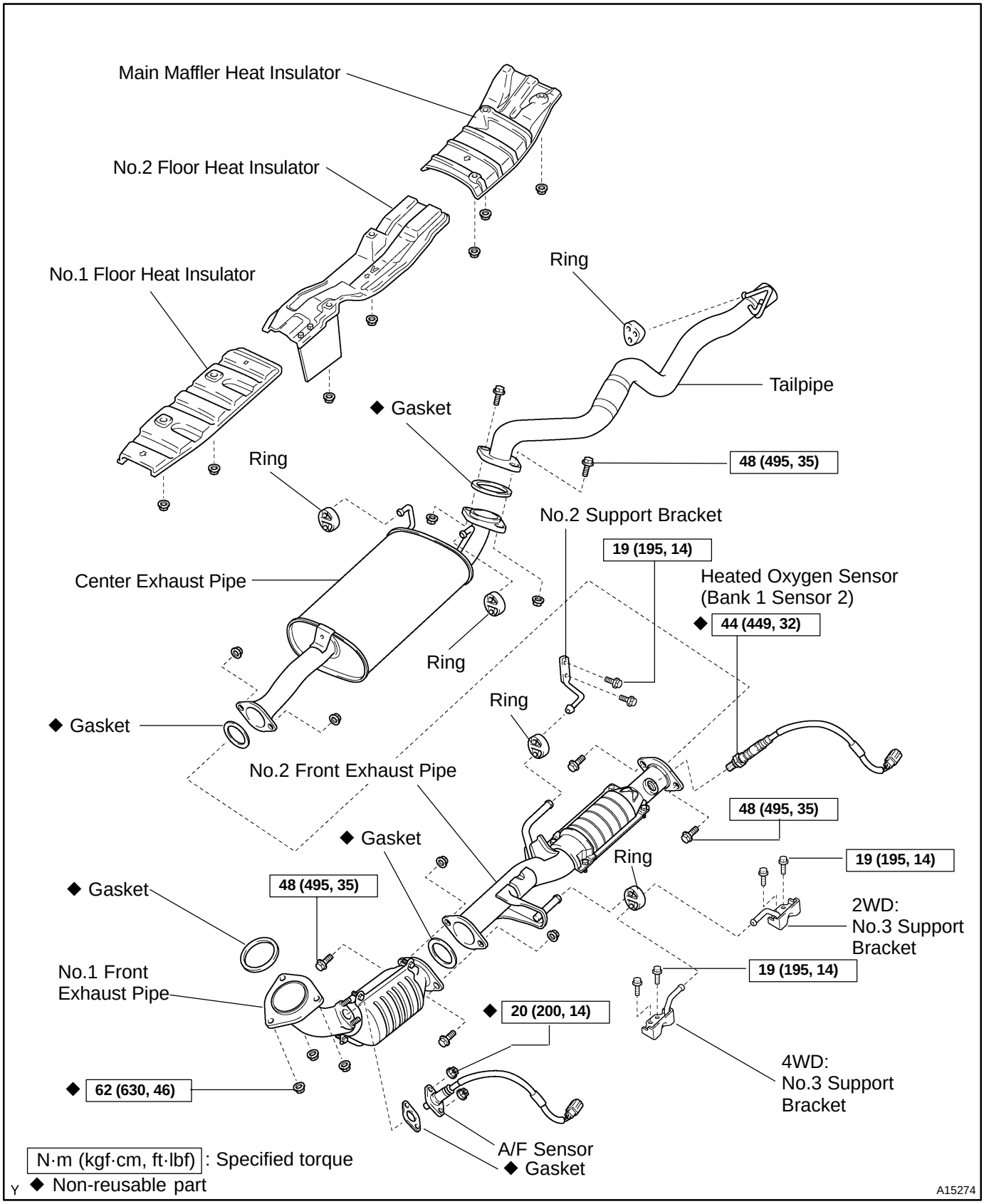
(c) Install and uniformly tighten the 8 mount bolts in several passes, in the sequence shown.
Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)

30. M/T:
INSTALL FLYWHEEL (See step 29)
Torque: 85 N·m (850 kgf·cm, 63 ft·lbf)

EXHAUST SYSTEM

COMPONENTS

EM1MV-01



EMISSION CONTROL SYSTEM

EC00J-02

PURPOSE

The emission control systems are installed to reduce the amount of CO, HC and NOx exhausted from the engine (3 and 4), to prevent the atmospheric release of blow-by gas-containing HC (1) and evaporated fuel containing HC being released from the fuel tank (2).
The function of each system is shown in these table.

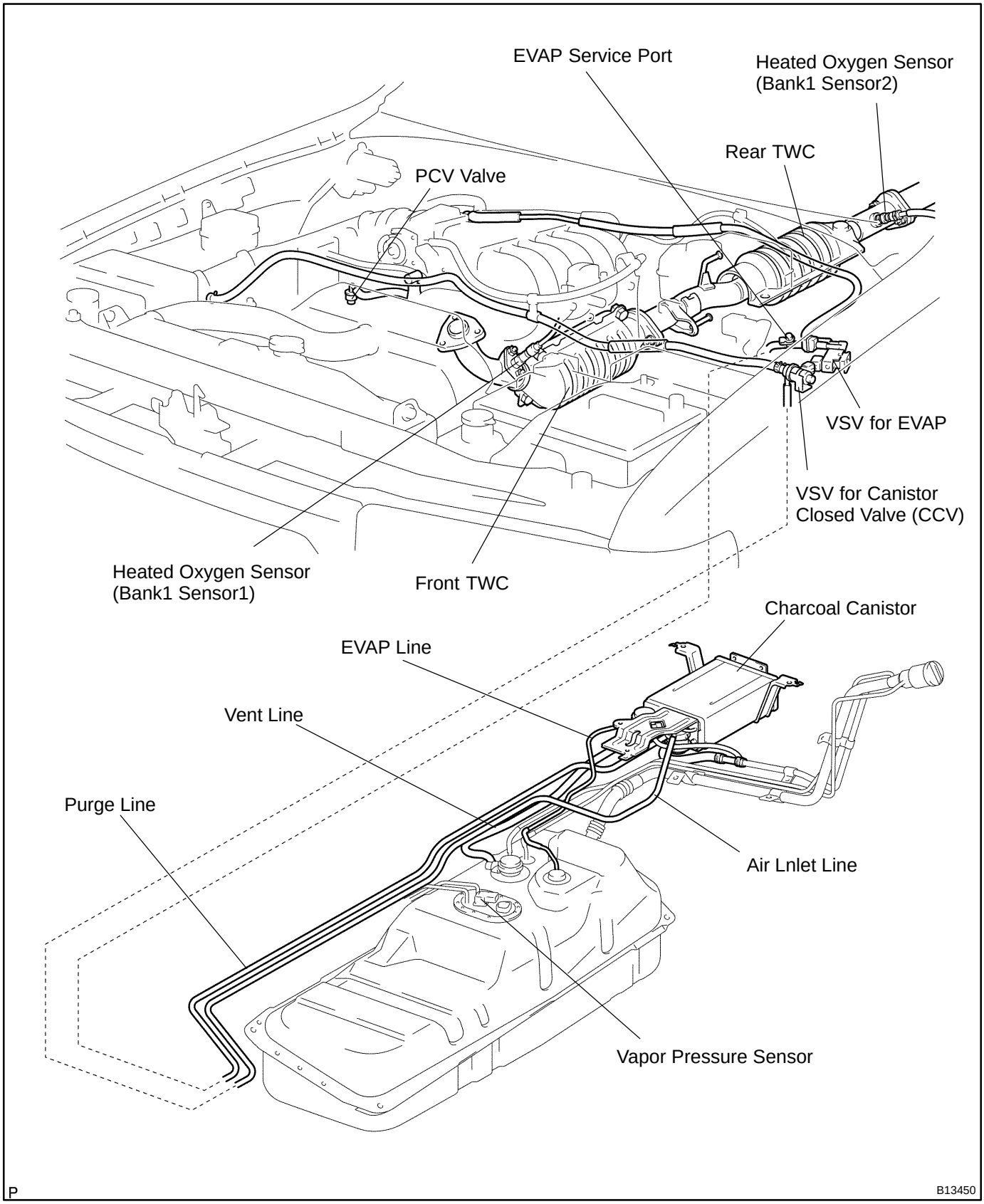
System	Abbreviation	Function
4. Positive Crankcase Ventilation	PCV	Reduces crankcase blow-by gas (HC)
5. Evaporative Emission Control	EVAP	Reduces evaporated HC
6. Three-Way Catalytic Converter	TWC	Reduces CO, HC and NOx
7. Sequential Multiport Fuel Injection *	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: * For inspection and repair of the SFI system, refer to the SF section of this manual.

PARTS LAYOUT AND SCHEMATIC DRAWING

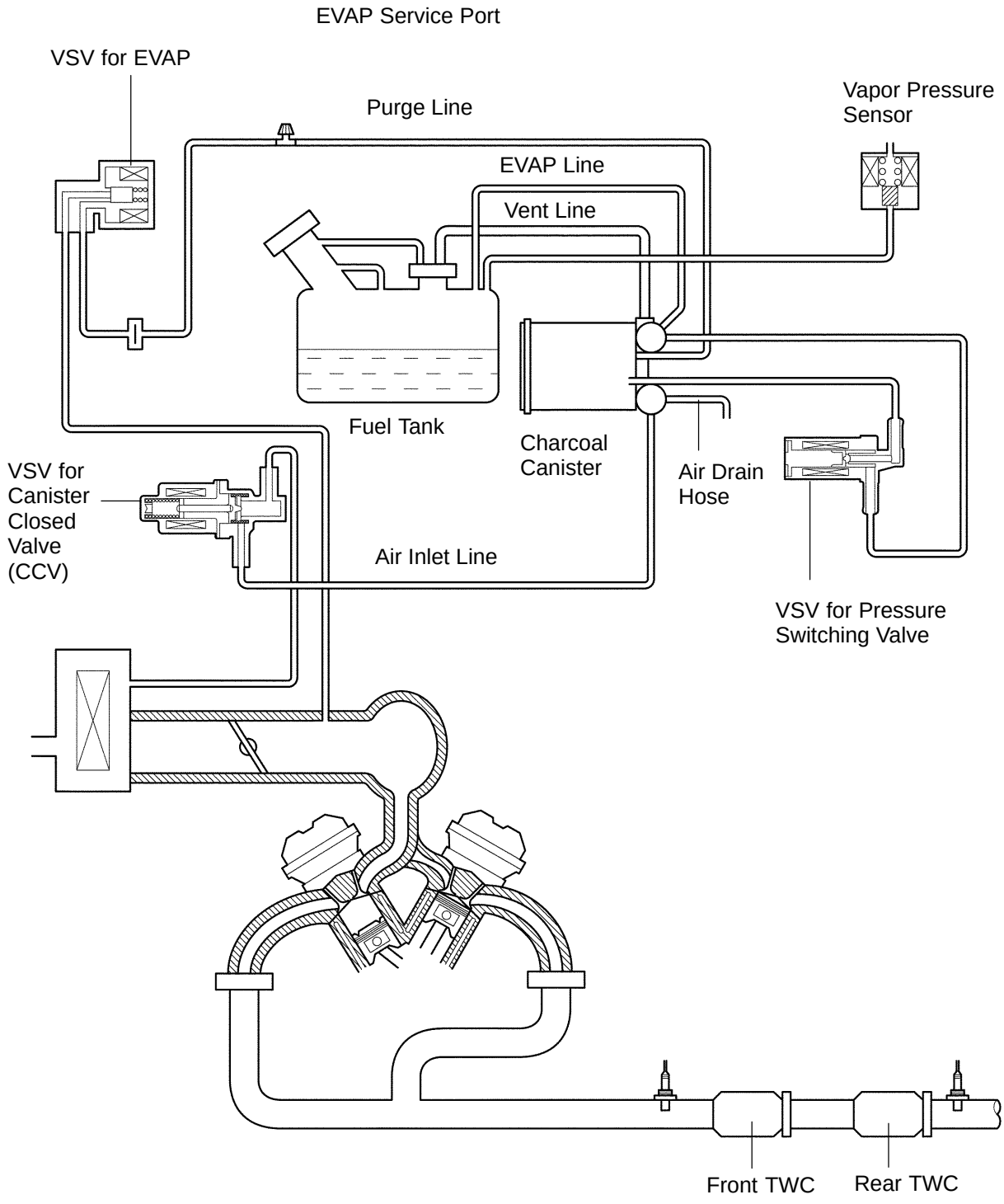
EC0J2-01

LOCATION



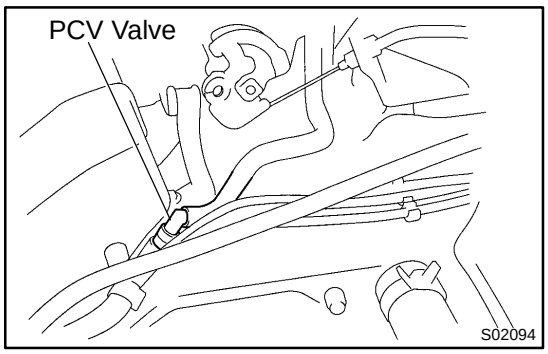
EC0J3-01

DRAWING



P

B13451



POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM

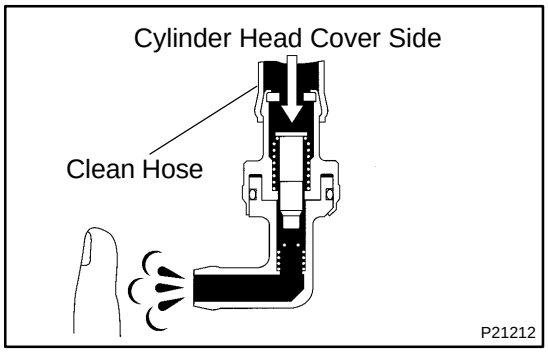
EC00M-03

INSPECTION

1. INSPECT PCV VALVE

(a) Remove the PCV valve.
  (1) Disconnect the PCV hose from the PCV valve.
  (2) Remove the PCV valve.

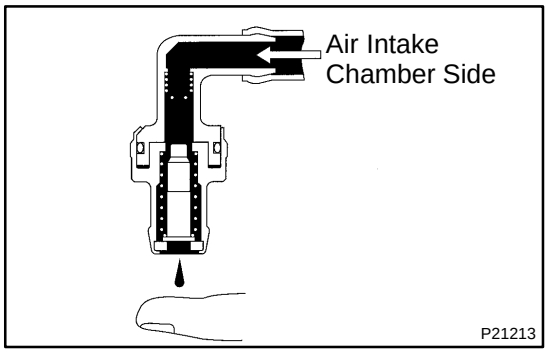
(b) Install a clean hose to the PCV valve.



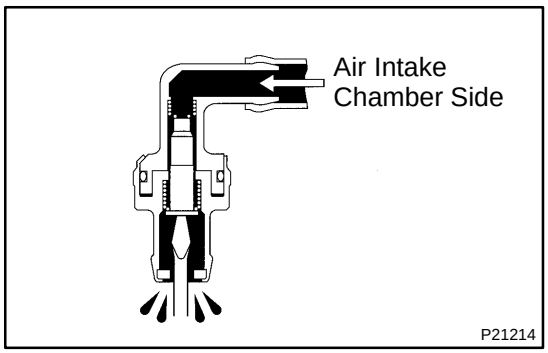
(c) Inspect the PCV valve operation.
  (1) Blow air into the cylinder head cover side, and check that air passes through easily.

CAUTION:

Do not suck air through the valve. Petroleum substances inside the valve are harmful.



  (2) Blow air into the air intake chamber side, and check that air passes through with difficulty.

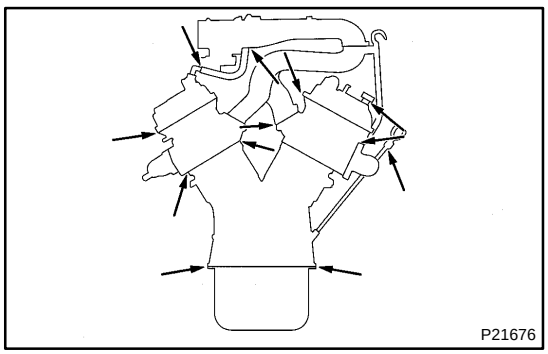


  (3) Blow air into the air intake chamber side when lift up the inside valve, and check that there is a strong resistance to air flow.

If operation is not as specified, replace the PCV valve.

(d) Remove the clean hose from the PCV valve.

(e) Reinstall the PCV valve.



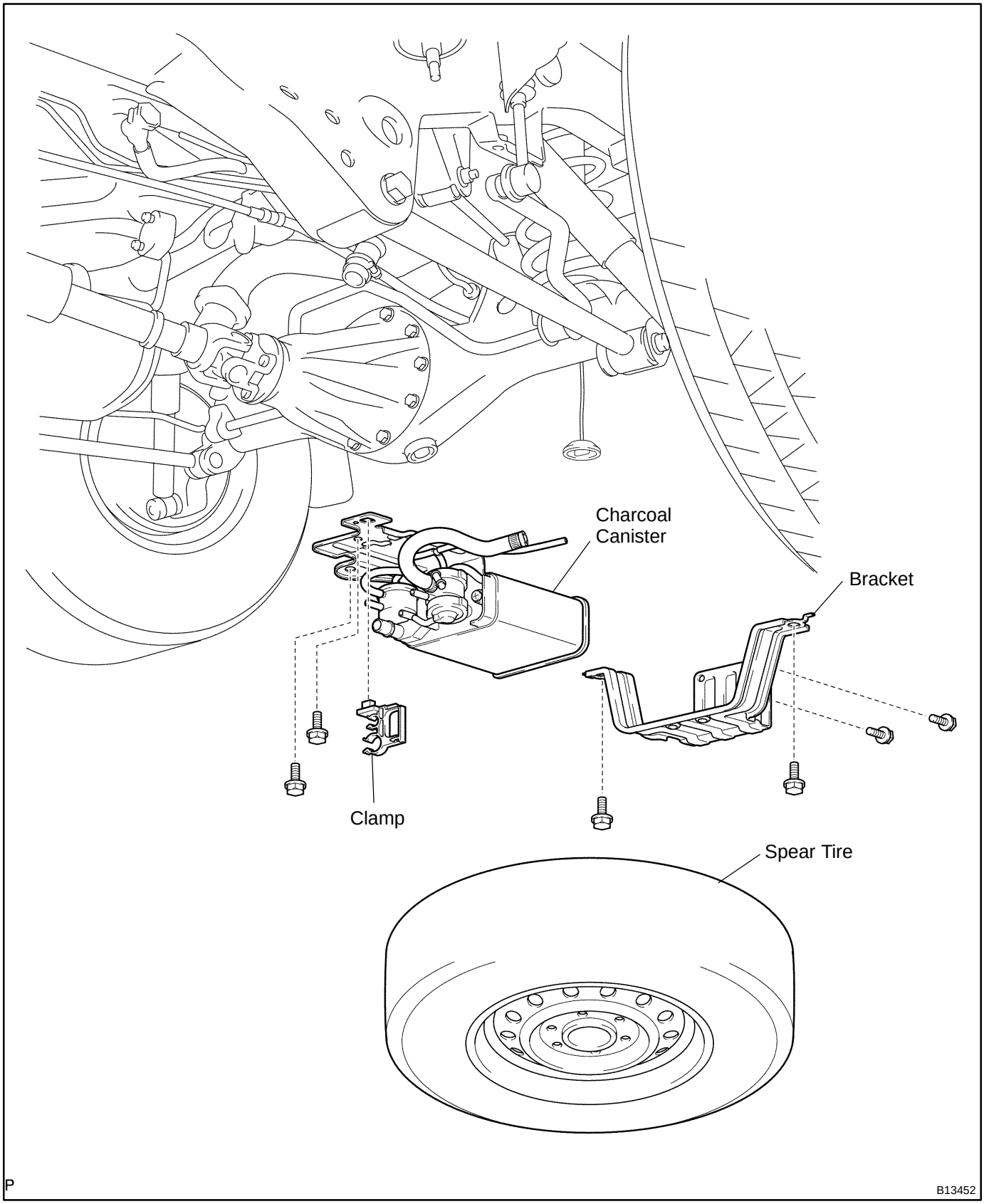
2. INSPECT HOSES, CONNECTIONS AND GASKETS

Visually check for cracks, leaks or damage.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM

EC0J4-01

COMPONENTS



EC0DE-02

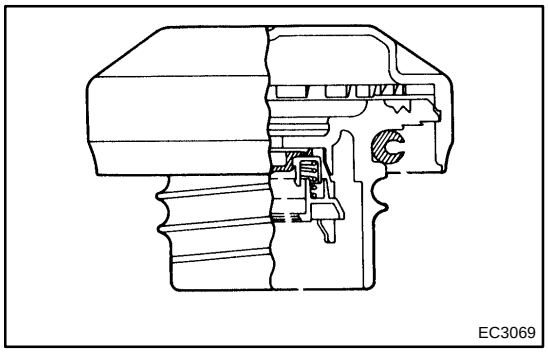
INSPECTION

1. VISUALLY INSPECT LINES AND CONNECTORS

Look for loose connections, sharp bends or damage.

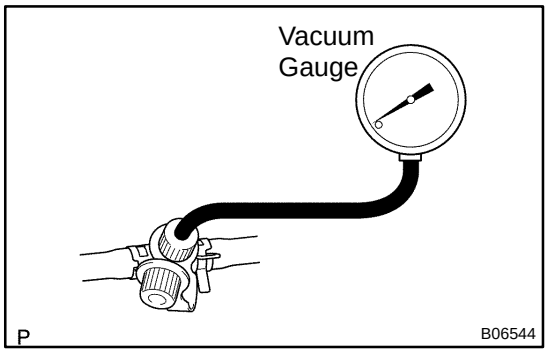
2. VISUALLY INSPECT FUEL TANK FILLER PIPE

Look for deformation, cracks or fuel leakage.



3. VISUALLY INSPECT FUEL TANK CAP

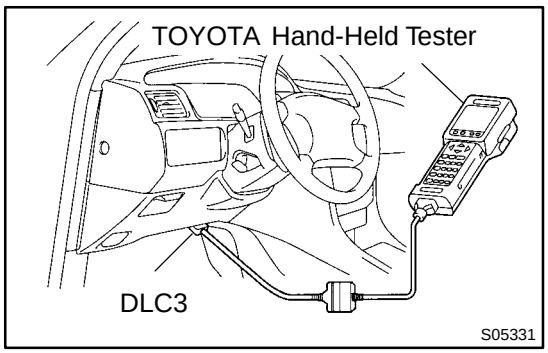
Check if the cap and/or gasket are deformed or damaged.
If necessary, repair or replace the cap.



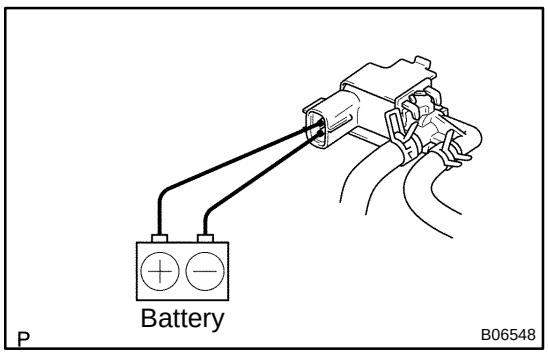
4. INSPECT EVAP SYSTEM LINE

(a) Warm up the engine and stop the engine.
Allow the engine to warm up to normal operating temperature.

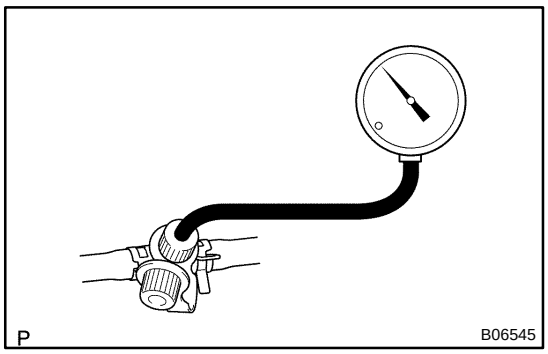
(b) Install a EVAP control system test equipment vacuum gauge to the EVAP service port on the purge line.



(c) TOYOTA Hand-Held Tester:
Forced driving of the VSV for EVAP.
(1) Connect a TOYOTA hand-held tester to the DLC3.
(2) Start the engine.
(3) Push the TOYOTA hand-held tester main switch ON.
(4) Use the ACTIVE TEST mode on the TOYOTA hand-held tester to operate the VSV for the EVAP.



(d) If you have no TOYOTA Hand-Held Tester:
Forced driving of the VSV for EVAP.
(1) Disconnect the VSV connector for the EVAP.
(2) Connect the positive (+) and negative (-) leads from the battery to the VSV terminals for the EVAP.
(3) Start the engine.



(e) Check the vacuum at idle.
Vacuum:
Maintain at 0.368 - 19.713 in.Hg (5 - 268 in.Aq) for over 5 seconds

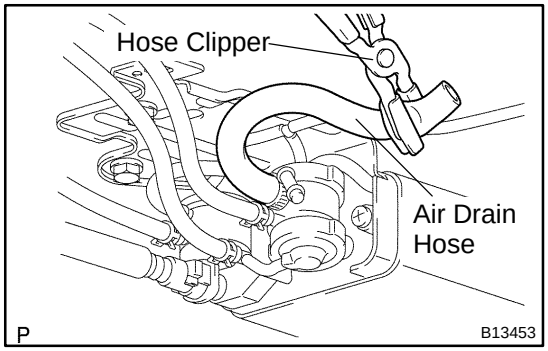
HINT:
If the vacuum does not change, you can conclude that the hose connecting the VSV to the service port has come loose or is blocked, or the VSV is malfunctioning.

(f) TOYOTA Hand-Held Tester:
Conclude forced driving of the VSV for EVAP.
(1) Stop the engine.
(2) Disconnect the TOYOTA hand-held tester from the DLC3.

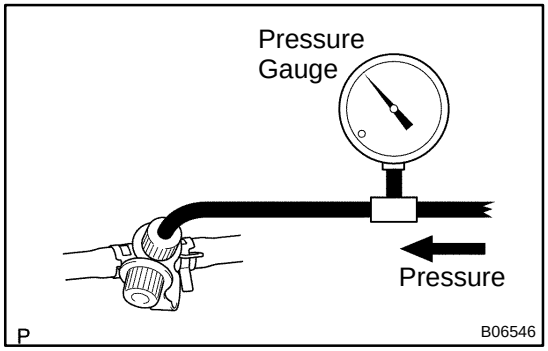
(g) If you have no TOYOTA Hand-Held Tester:
Conclude forced driving of the VSV for EVAP.
(1) Stop the engine.
(2) Disconnect the positive (+) and negative (-) leads from the battery from the VSV terminals the EVAP.
(3) Connect the VSV connector for the EVAP.

(h) Disconnect the vacuum gauge.

(i) Connect the pressure gauge.

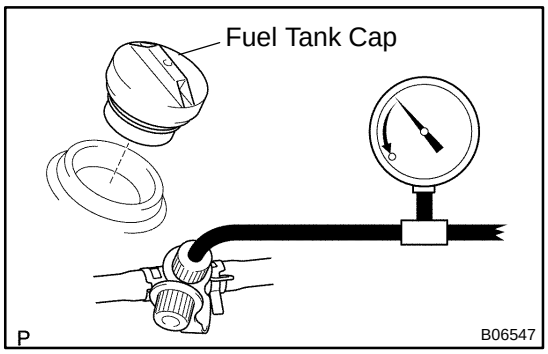


(j) Inspect for the pressure.
(1) Close off the air drain hose of the canister with a hose clipper or similar instrument.



(2) Add the pressure (13.5 -15.5 in.Aq) from the EVAP service port.
Pressure:
2 minutes after the pressure is added, the gauge should be over 7.7 - 8.8 in.Aq.

HINT:
If you can't add pressure, you can conclude that the hose connecting the VSV - canister - fuel tank has slipped off or the VSV is open.

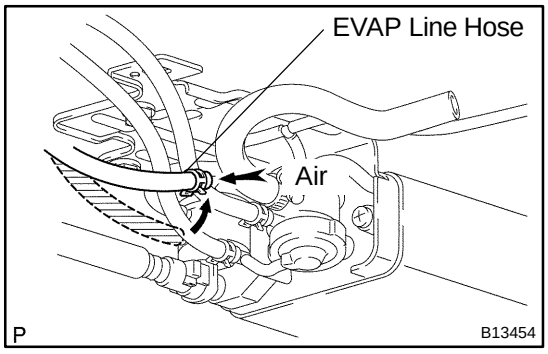


(3) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

HINT:

If the pressure does not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

(k) Disconnect the pressure gauge.



5. CHECK AIRTIGHTNESS IN FUEL TANK AND FILLER PIPE

(a) Disconnect the EVAP line hose from the charcoal canister side and then pressurize and make the internal pressure in the fuel tank 4 kPa (41 gf/cm^2, 0.58 psi).

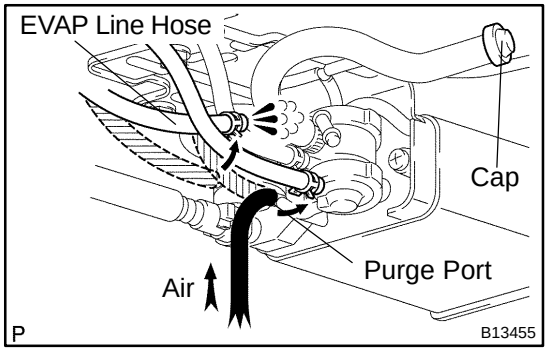
(b) Check that the internal pressure of the fuel tank can be hold for 1 minute.

(c) Check the connected portions of each hose and pipe.

(d) Check the installed parts on the fuel tank.

If there is no abnormality, replace the fuel tank and filler pipe.

(e) Reconnect the EVAP line hose to the charcoal canister.



6. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE

(a) Disconnect the purge line hose and EVAP line hose from the charcoal canister.

(b) Plug the cap to the air drain hose.

(c) Pressurize 4 kPa (41 gf/cm^2, 0.58 psi) to the purge port and check that there is ventilation through the EVAP line hose.

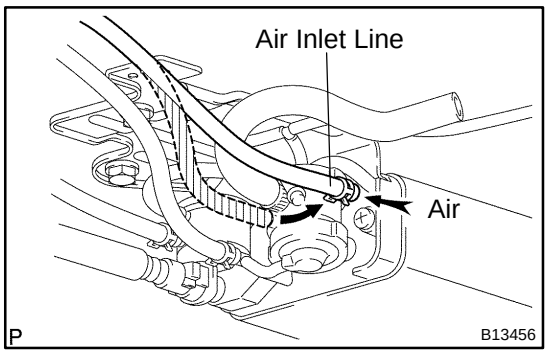
HINT:

In the condition that the fuel is full, as the float value of the fill check valve is closed and has no ventilation, it is necessary to check the fuel amount (volume).

(d) Check if there is any struck in the vent line hose and EVAP line hose.

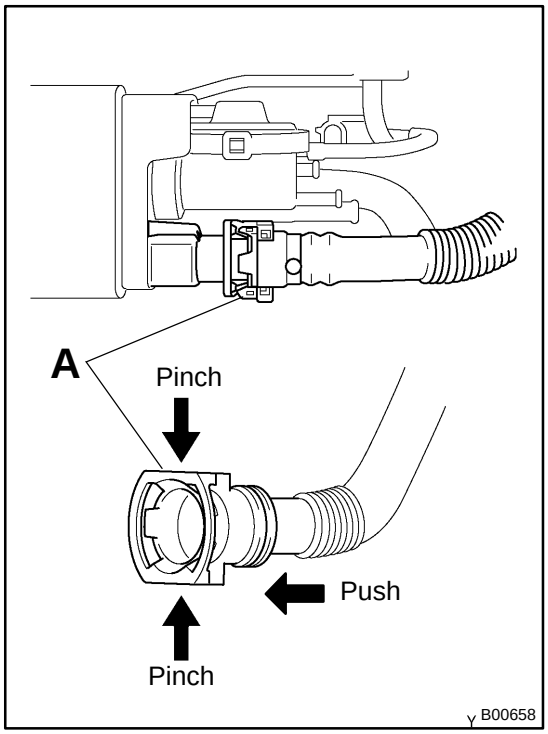
If there is no stuck in hoses, replace the fuel cutoff valve and fill check valve.

(e) Reconnect the purge line hose and EVAP line hose to the charcoal canister.



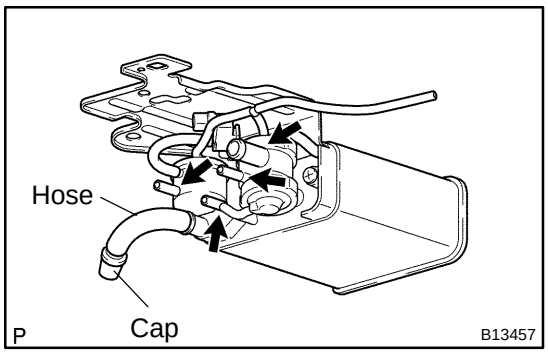
7. CHECK AIR INLET LINE

(a) Disconnect the air inlet line hose from the charcoal canister.
(b) Check that there is ventilation in the air inlet line.
(c) Reconnect the air inlet line hose to the charcoal canister.



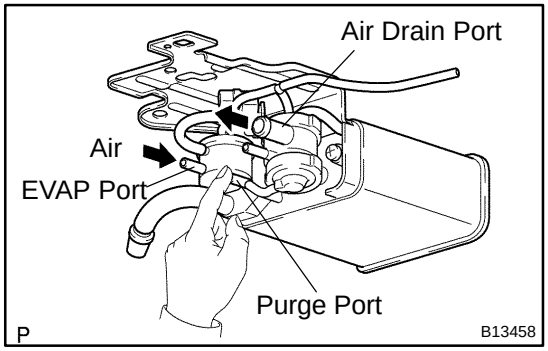
8. REMOVE CHARCOAL CANISTER ASSEMBLY

(a) Remove the spear tire.
(b) Disconnect the VSV connector.
(c) Disconnect the purge line hose, EVAP line hose and air inlet line hose from the charcoal canister.
(d) Disconnect the vent line hose from the charcoal canister.
  (1) Push the connector deep inside.
  (2) Pinch portion A.
  (3) Pull out the connector.
(e) Remove the 4 bolts and the charcoal canister assembly.
(f) Remove the 2 bolts and charcoal canister bracket.

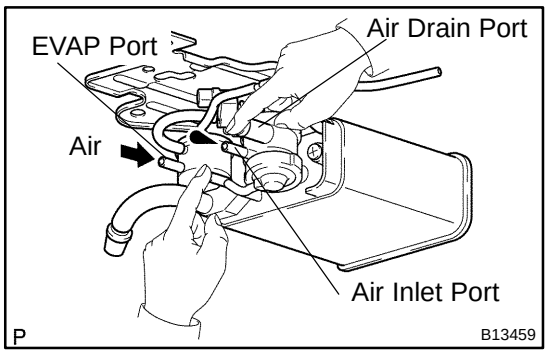


9. INSPECT CHARCOAL CANISTER

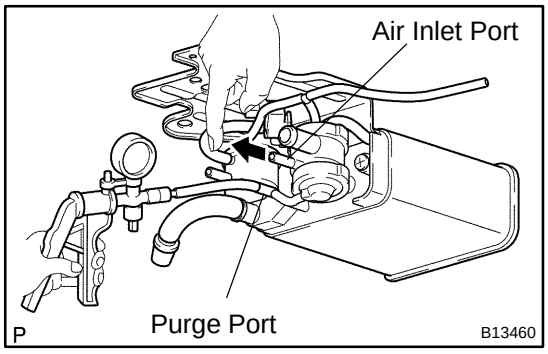
(a) Visually check the charcoal canister for cracks or damage.
(b) Inspect the charcoal canister operation.
  (1) Plug the vent port with a hose and cap.



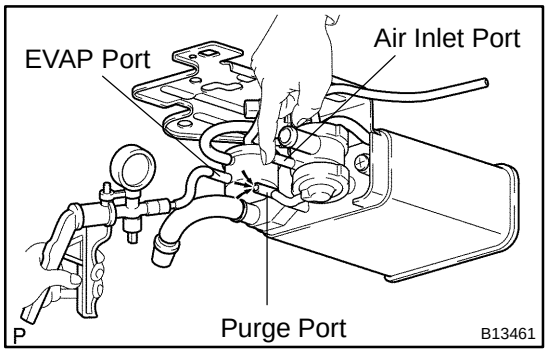
  (2) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm^2, 0.26 psi) into the EVAP port and check that air flows from the air drain port.



(3) While holding the purge port and the air drain port closed, blow air (1.76 kPa, 18 gf/cm^2, 0.26 psi) into the EVAP port and check that air does not flow from the air inlet port.



(4) Apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the purge port, check that the vacuum does not decrease when the air inlet port is closed, and check that the vacuum decreases when the air inlet port is released.



(5) While holding the air inlet port closed, apply vacuum (3.43 kPa, 25.7 mmHg, 1.01 in.Hg) to the EVAP port and check that air flows into the purge port.

If operation is not as specified, replace the charcoal canister.

(6) Remove the cap and hose from the vent port.

10. INSPECT VSV FOR EVAP (See page SF-39)

11. INSPECT VSV FOR PRESSURE SWITCHING VALVE (See page SF-42)

12. INSPECT VSV FOR CANISTER CLOSED VALVE (CCV) (See page SF-40)

13. INSPECT VAPOR PRESSURE SENSOR (See page SF-46)

14. REINSTALL CHARCOAL CANISTER ASSEMBLY

THREE-WAY CATALYTIC CONVERTER (TWC) SYSTEM

EC0BB-02

ON-VEHICLE INSPECTION

1. INSPECT EXHAUST PIPE ASSEMBLY

(a) Check the connections for looseness or damage.

(b) Check the clamps for weakness, cracks or damage.

2. INSPECT TWC

Check for dents or damage.

If any part of the protector is damaged or dented to the extent that it contacts the TWC, repair or replace it.

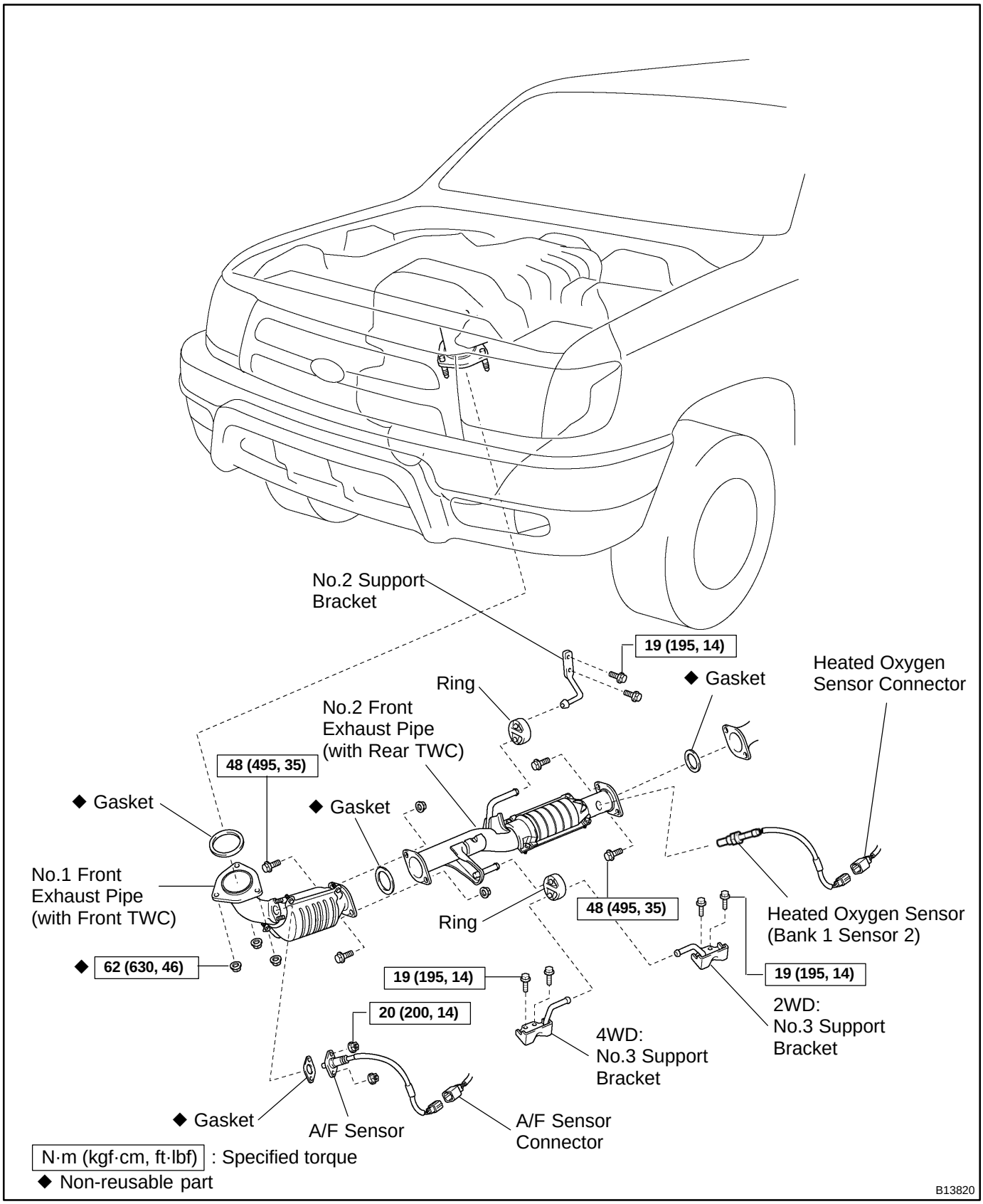
3. INSPECT TWC HEAT INSULATOR

(a) Check the heat insulator for damage.

(b) Check for adequate clearance between the TWC and heat insulator.

EC0J5-01

COMPONENTS



SFI SYSTEM

SF1NS-01

PRECAUTION

1. BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (-) TERMINAL CABLE FROM BATTERY

HINT:

Any diagnostic trouble code retained by the ECM will be erased when the battery negative (-) terminal cable is removed from the battery.

Therefore, if necessary, read the diagnostic trouble code(s) before removing the negative (-) terminal cable from the battery.

2. DO NOT SMOKE OR WORK NEAR AN OPEN FLAME WHEN WORKING ON FUEL SYSTEM

3. KEEP GASOLINE AWAY FROM RUBBER OR LEATHER PARTS

4. MAINTENANCE PRECAUTIONS

(a) Precaution when the connecting gauge.
Use battery as the power source for the timing light, etc.

(b) In the event of engine misfire, these precautions should be taken.
  (1) Check proper connection of battery terminals, etc.
  (2) Handle high-tension cords carefully.
  (3) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
  (4) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

(c) Precautions when the handling heated oxygen sensors.
  (1) Do not allow oxygen sensor to drop or hit against an object.
  (2) Do not allow the sensor to come into contact with water.

5. IF VEHICLE IS EQUIPPED WITH MOBILE RADIO SYSTEM (HAM, CB, ETC.)

If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

6. AIR INDUCTION SYSTEM

(a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.

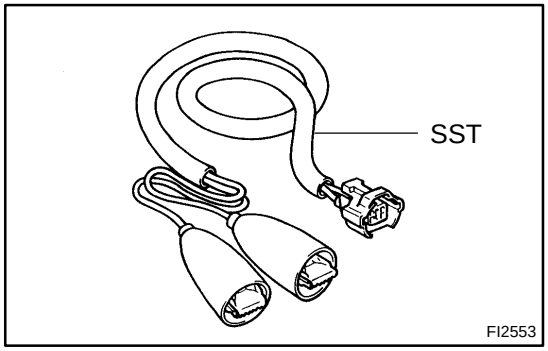
(b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will cause air suction and cause the engine to run out of tune.

7. ELECTRONIC CONTROL SYSTEM

(a) Before removing SFI wiring connectors, terminals, etc., first disconnect the power by either turning the ignition switch OFF or disconnecting the negative (-) terminal cable from the battery.

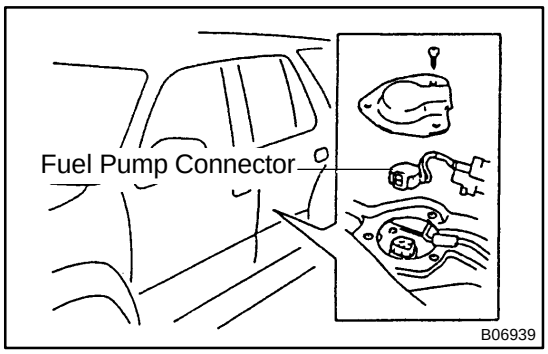
HINT:
Always check the diagnostic trouble code before disconnecting the battery terminal cable.

(b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (-) cable terminals.
(c) Do not permit parts to receive a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.
(d) Do not be careless during troubleshooting as there are numerous transistor circuits and even slight terminal contact can further troubles.
(e) Do not open the ECM cover.
(f) When inspecting during rainy weather, take care to prevent entry of water. Also, when washing the engine compartment, prevent water from getting on the SFI parts and wiring connectors.
(g) Parts should be replaced as an assembly.
(h) Care is required when pulling out and inserting wiring connectors.
    (1) Release the lock and pull out the connector, pulling on the connectors.
    (2) Fully insert the connector and check that it is locked.
(i) When inspecting a connector with a volt/ohmmeter.
    (1) Carefully take out the water-proofing rubber if it is a water-proof type connector.
    (2) Insert the test probe into the connector from wiring side when checking the continuity, amperage or voltage.
    (3) Do not apply unnecessary force to the terminal.
    (4) After checking, install the water-proofing rubber on the connector securely.



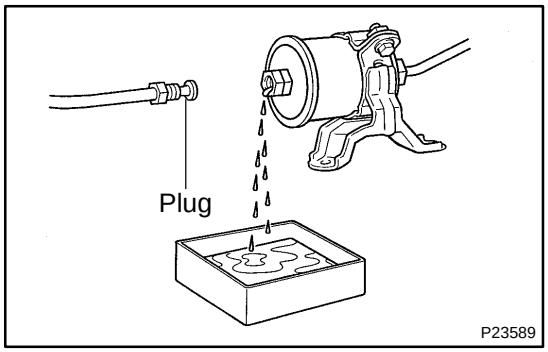
(5) Use SST for inspection or test of the injector or its wiring connector.

SST 09842-30070

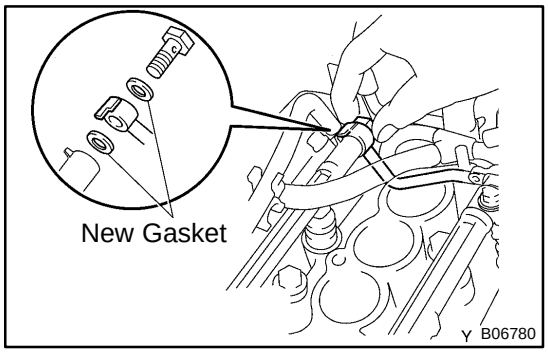


8. FUEL SYSTEM

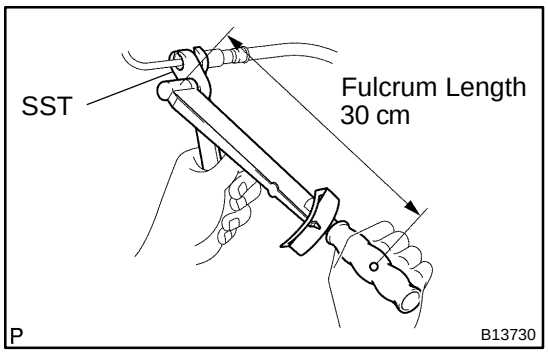
(a) When disconnecting the high pressure fuel line, a large amount of gasoline will spill out, so observe these procedures:
(1) Disconnect the fuel pump connector.
(2) Start the engine. After the engine has stopped on its own, turn the ignition switch OFF.



(3) Put a container under the connection.
(4) Slowly loosen the connection.
(5) Disconnect the connection.
(6) Plug the connection with a rubber plug.

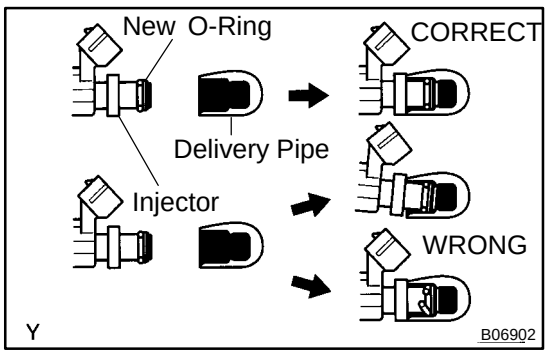


(b) When connecting the union bolt on the high pressure pipe union, observe these procedures:
(1) Always use a new gasket.
(2) Tighten the union bolt by hand.
(3) Tighten the union bolt to the specified torque.
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

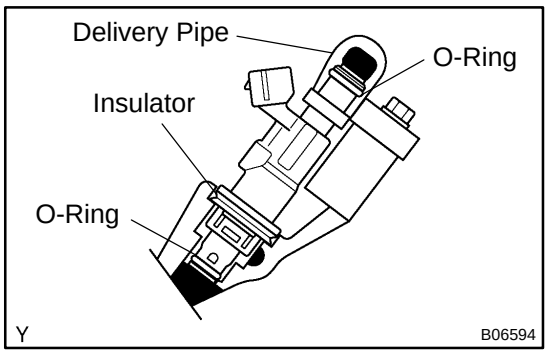


(c) When connecting the flare nut on the high pressure pipe union, observe these procedures:
(1) Apply a light coat of engine oil to the flare and tighten the flare nut by hand.
(2) Using SST, tighten the flare nut to the specified torque.
SST 09023-38400
Torque: 24 N·m (245 kgf·cm, 18 ft·lbf)

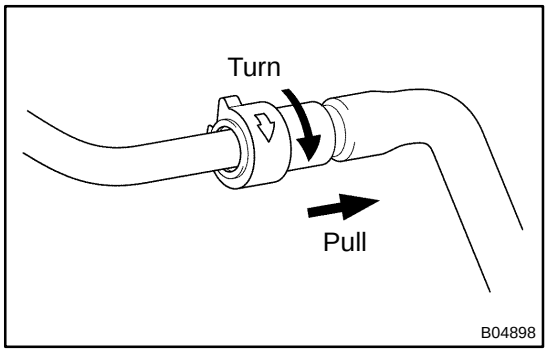
HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



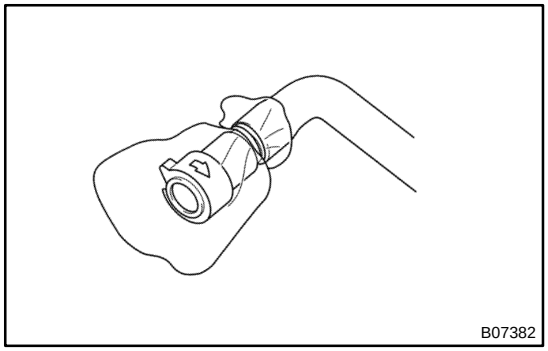
(d) Observe these precautions when removing and installing the injectors.
(1) Never reuse the O-ring.
(2) When placing a new O-ring on the injector, take care not to damage it in any way.
(3) Coat a new O-ring with spindle oil or gasoline before installing-never use engine, gear or brake oil.

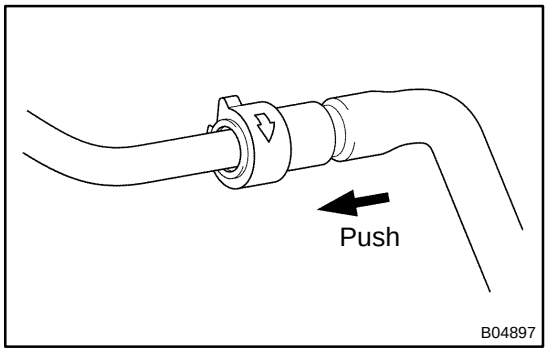


(e) Install the injector to the delivery pipe and intake manifold as shown in the illustration.



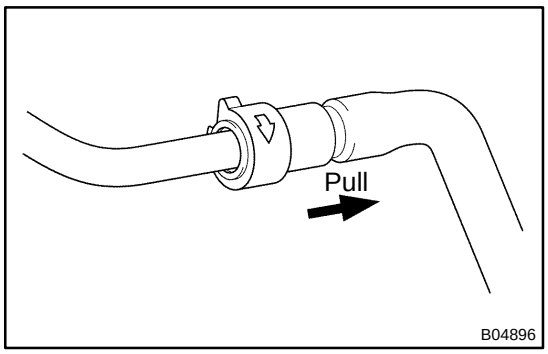
(f) Observe these precautions when disconnecting the fuel tube connector (quick type):
(1) Check that there is any dirt or the like on the pipe and around the connector before disconnecting them and clean the dirt away.
(2) Be sure to disconnect by hands.
(3) When the connector and the pipe are stuck, turn and pull the connector to free to disconnect and pull it out. Do not use any tools at this time.
(4) Inspect if there is any dirt or the like on the seal surface of the disconnected pipe and clean it away.





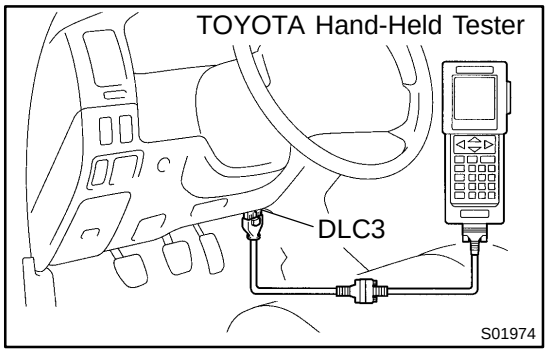
(5) Prevent the disconnected pipe and connector from being damaged or mixed with foreign objects by covering them with a vinyl bag.

(g) Observe these precautions when connecting the fuel tube connector (quick type):
(1) Do not reuse the retainer removed from the pipe.
(2) Must use hands to remove the retainer from the pipe.
(3) Check that there is any damage or foreign objects on the connected part of the pipe.
(4) Match the axis of the connector with axis of the pipe, and push in the connector until the connector makes a ”click” sound. In case that the connections is tight, apply small amount of fresh engine oil on the tip of the pipe.



(5) After having finished the connection, check if the pipe and the connector are securely connected by pulling them.
(6) Check that there is any fuel leakage.

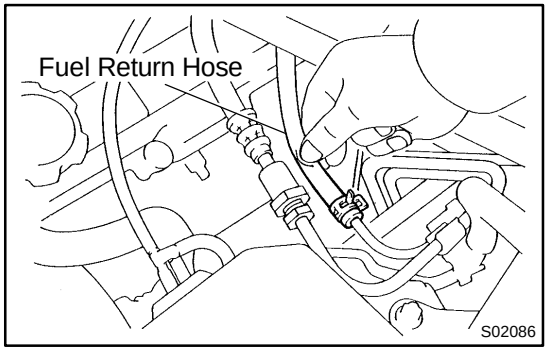
(h) Observe these precautions when handling nylon tube.
(1) Pay attention not to turn the connected part of the nylon tube and the quick connector by force when connecting them.
(2) Pay attention not to kink the nylon tube.
(3) Do not remove the EPDM protector from the outside of the nylon tube.
(4) Must not close the piping with the nylon tube by bending it.



(i) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
(1) Connect a TOYOTA hand-held tester to the DLC3.
(2) Turn ignition switch ON and TOYOTA hand-held tester main switch ON.

NOTICE:
Do not start the engine

(3) Select the active test mode on the TOYOTA hand-held tester.
(4) Please refer to the TOYOTA hand-held tester operator's manual for further details.
(5) If you have no TOYOTA hand-held tester, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector (See page SF-7).

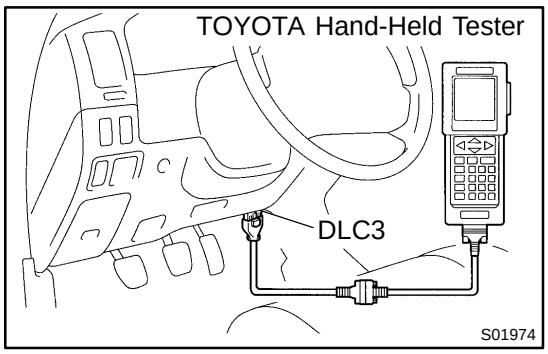


(6) Pinch the fuel return hose. The pressure in high pressure line will rise to approx. 400 kPa (4 kgf/cm^2, 57 psi). In this state, check to see that there are no leaks from any part of the fuel system.

NOTICE:
Always pinch the hose. Avoid bending as it may cause to hose to crack.

(7) Turn the ignition switch OFF.

(8) Disconnect the TOYOTA hand-held tester from the DLC3.



FUEL PUMP

SF0ZD-02

ON-VEHICLE INSPECTION

1. CHECK FUEL PUMP OPERATION

(a) Connect a TOYOTA hand-held tester to the DLC3.

(b) Turn the ignition switch ON and push TOYOTA hand-held tester main switch ON.

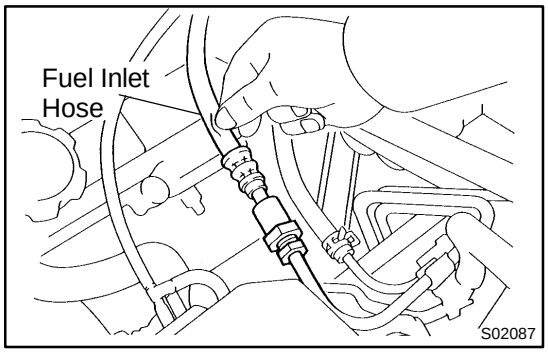
NOTICE:

Do not start the engine.

(c) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

(d) Please refer to the TOYOTA hand-held tester operator's manual for further details.

(e) If you have no TOYOTA hand-held tester, connect the positive (+) and negative (-) leads from the battery to the fuel pump connector.



(f) Check that there is pressure in the fuel inlet hose from the fuel filter.

HINT:

If there is fuel pressure, you will hear the sound of fuel flowing. If there is no pressure, check the H-fuse, M-fuses, fuses, EFI main relay, circuit opening relay, fuel pump, ECM and wiring connections.

(g) Turn the ignition switch OFF.

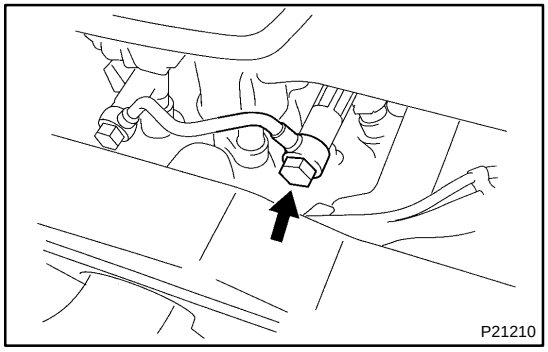
(h) Disconnect the TOYOTA hand-held tester from the DLC3.

2. CHECK FUEL PRESSURE

(a) Check the battery positive voltage is above 12 V.

(b) Disconnect the negative (-) terminal cable from the battery.

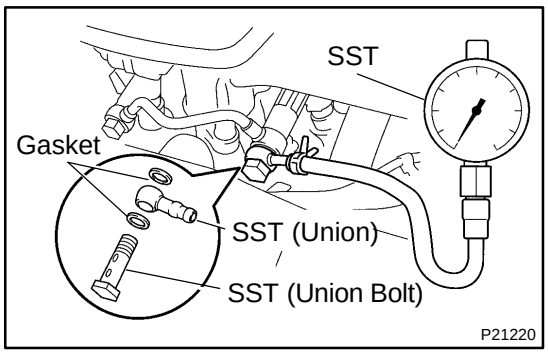
(c) Remove the 6 bolts, and disconnect the No.2 timing belt cover.



(d) Remove the union bolt holding the fuel pipe to the delivery pipe and gasket.

CAUTION:

- **Put a shop towel under the delivery pipe.**
- **Slowly loosen the union bolt.**



(e) Install SST (pressure gauge) to the delivery pipe with the 2 gaskets and SST (union and union bolt).
SST 09268-45014
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

(f) Wipe off any splattered gasoline.

(g) Connect a TOYOTA hand-held tester to the DLC3 (See step 1).

(h) Reconnect the negative (-) terminal cable to the battery.

(i) Turn the ignition switch ON.

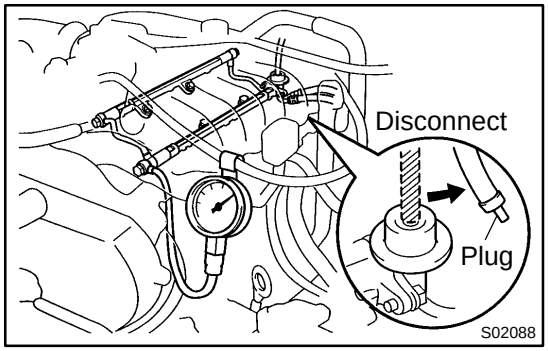
(j) Measure the fuel pressure.
Fuel pressure:
265 - 304 kPa (2.7 - 3.1 kgf/cm^2, 38 - 44 psi)

If pressure is high, replace the fuel pressure regulator.
If pressure is low, check the fuel hoses, fuel hose connections, fuel pump, fuel filter, fuel pressure regulator and VSV for the fuel pressure control.

(k) Disconnect the TOYOTA hand-held tester from the DLC3.

(l) Reinstall the No.2 timing belt cover with the 6 bolts.
Torque: 9 N·m (90 kgf·cm, 80 in.·lbf)

(m) Start the engine.



(n) Disconnect the vacuum sensing hose from the fuel pressure regulator, and plug the hose end.

(o) Measure the fuel pressure at idle.
Fuel pressure:
265 - 304 kPa (2.7 - 3.1 kgf/cm^2, 38 - 44 psi)

(p) Reconnect the vacuum sensing hose to the fuel pressure regulator.

(q) Measure the fuel pressure at idle.
Fuel pressure:
226 - 265 kPa (2.3 - 2.7 kgf/cm^2, 33 - 38 psi)

If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

(r) Stop the engine.

(s) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.
Fuel pressure: 147 kPa (1.5 kgf/cm^2, 21 psi) or more

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

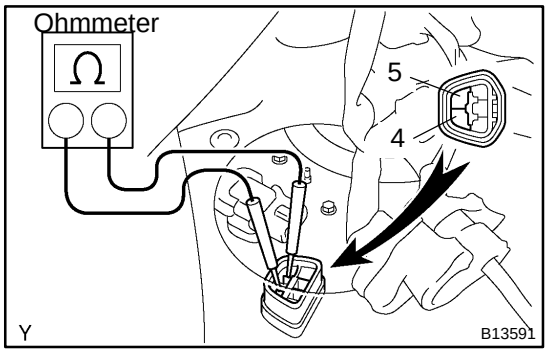
(t) After checking fuel pressure, disconnect the negative (-) terminal cable from the battery and carefully remove the SST to prevent gasoline from splashing.
SST 09268-45012

(u) Remove the other union bolt, 3 gaskets and fuel pipe from the delivery pipes.

(v) Reinstall the fuel pipe with 4 new gaskets and the 2 union bolts.
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

(w) Reconnect the negative (-) terminal cable to the battery.

(x) Check for fuel leaks (See page SF-1).



3. INSPECT FUEL PUMP RESISTANCE

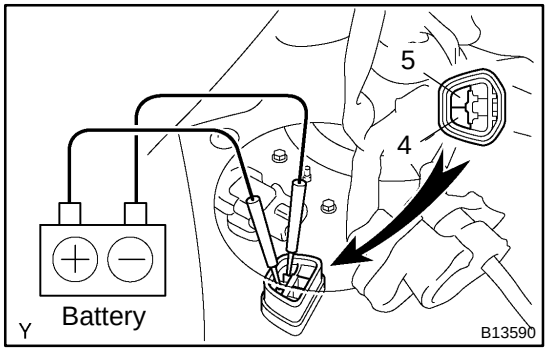
(a) Pull up the LH rear seat cushion.

(b) Remove the floor service hole cover with the 3 screws.

(c) Disconnect the fuel pump connector.

(d) Using an ohmmeter, measure the resistance between terminals 4 and 5.
Resistance: 0.2 - 0.3 Ω at 20˚C (68˚F)

If the resistance is not specified, replace the fuel pump and/or set plate.



4. INSPECT FUEL PUMP OPERATION

(a) Connect the positive (+) lead from the battery to terminal 4 of the connector, and the negative (-) lead to terminal 5. Check that the fuel pump operations.

NOTICE:

- **These tests must be done quickly (within 10 seconds) to prevent the coil from burning out.**
- **Keep the fuel pump as far away from the battery as possible.**
- **Always do switching at the battery side.**

If operation is as not specified, replace the fuel pump and/or set plate.

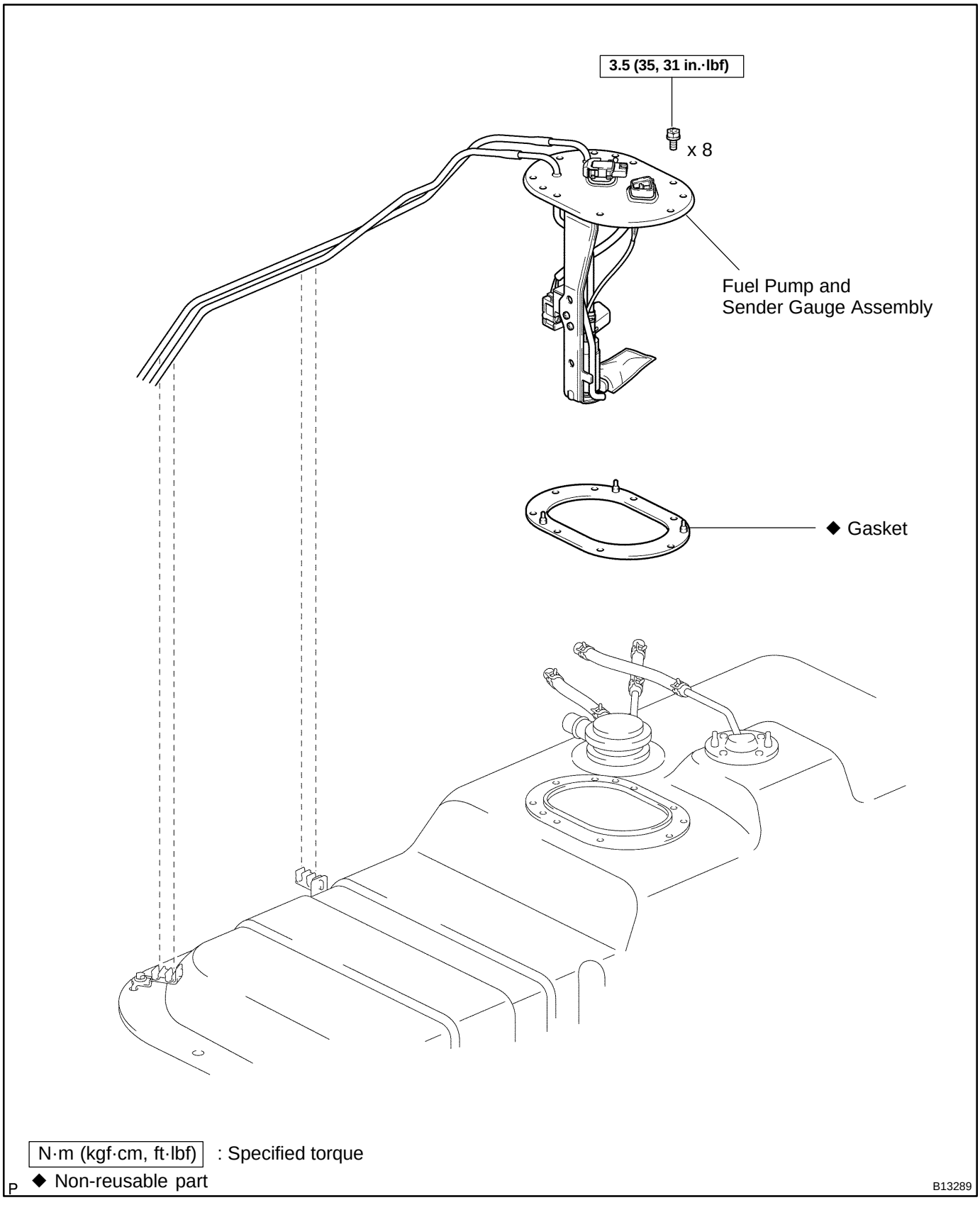
(b) Connect the fuel pump connector.

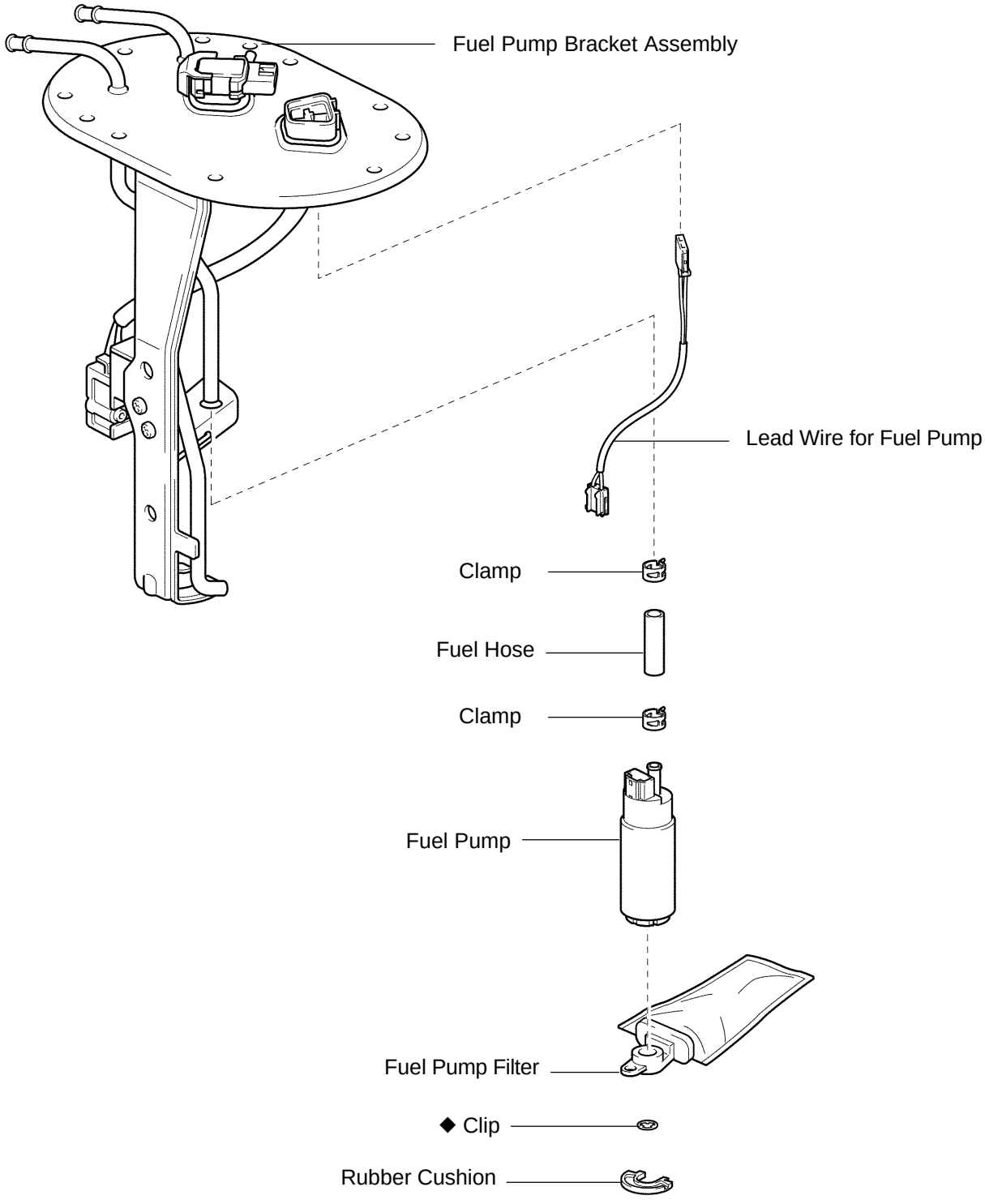
(c) Install the floor service hole cover with the 3 screws.

(d) Connect the LH rear seat cushion.

SF1NT-01

COMPONENTS





P ◆ Non-reusable part

B13290

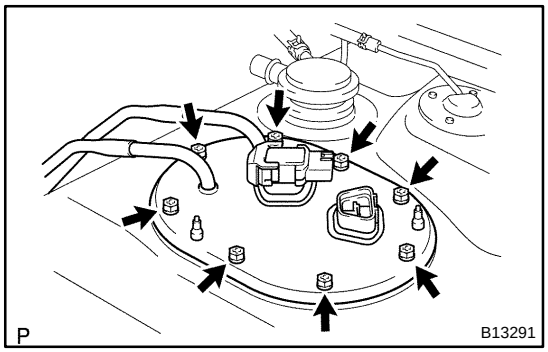
SF1NU-01

REMOVAL

CAUTION:

Do not smoke or work near an open frame when working the fuel pump.

1. **REMOVE FUEL TANK (See page SF-25)**
2. **DISCONNECT FUEL MAIN TUBE AND RETURN TUBE FROM FUEL TANK**



3. **REMOVE FUEL PUMP AND SENDER GAUGE ASSEMBLY FROM FUEL TANK**

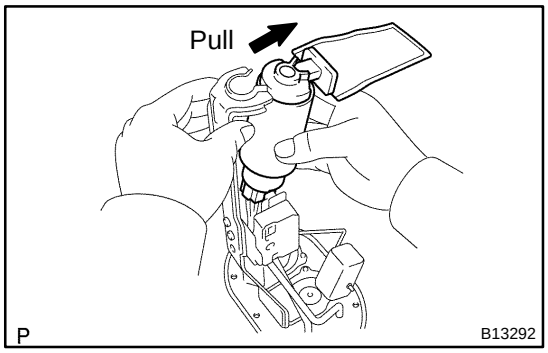
(a) Remove the 8 bolts.

(b) Pull out the fuel pump and sender gauge assembly.

NOTICE:

- **Do not damage the fuel pump filter.**
- **Be careful not to bend the arm of the sender gauge.**

(c) Remove the gasket from the fuel section plate.



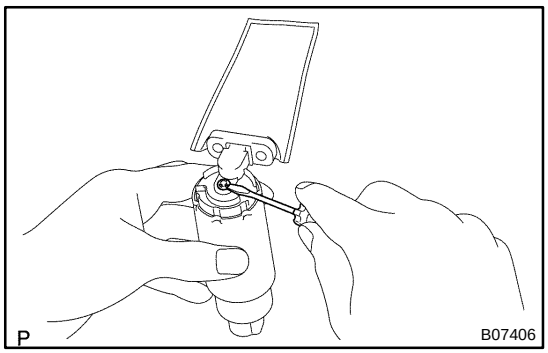
4. **REMOVE FUEL PUMP FROM FUEL PUMP BRACKET**

(a) Disconnect the lead wire from the connecor of the fuel sustion plate.

(b) Pull out the lower side of the fuel pump from the pump bracket.

(c) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.

(d) Remove the rubber cushion from the fuel pump.



5. **REMOVE FUEL PUMP FILTER FROM FUEL PUMP**

(a) Using a small screwdriver, remove the clip.

(b) Pull out the pump filter.

SF1NV-01

INSTALLATION

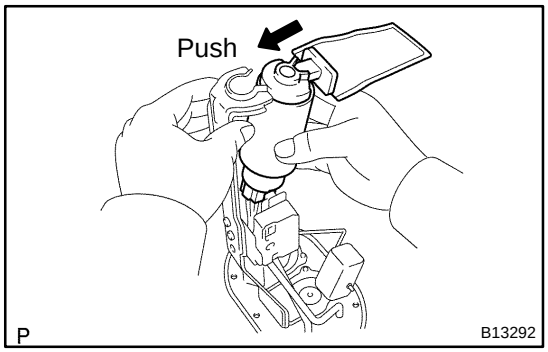
1. INSTALL FUEL PUMP FILTER TO FUEL PUMP

Install the pump filter with a new clip.

2. INSTALL FUEL PUMP TO FUEL PUMP BRACKET

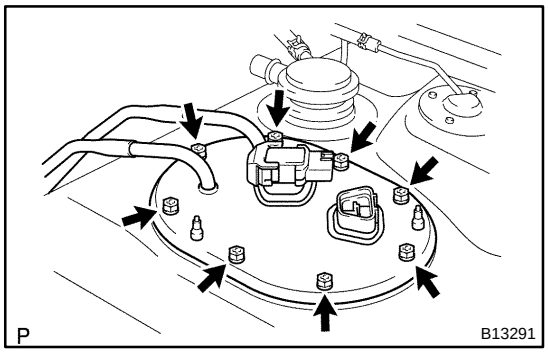
(a) Install the rubber cushion to the fuel pump.

(b) Connect the fuel hose to the outlet port of the fuel pump.



(c) Install the fuel pump by pushing the lower side of the fuel pump.

(d) Install the lead wire to the fuel pump and connector of the fuel suction plate.



3. INSTALL FUEL PUMP AND SENDER GAUGE ASSEMBLY TO FUEL TANK

(a) Install a new gasket to the fuel suction plate.

(b) Insert the fuel pump and sender gauge assembly into the fuel tank.

(c) Install the fuel pump and sender gauge to the fuel tank with the 8 bolts.

Torque: 3.5 N·m (35 kgf·cm, 31 in.·lbf)

4. CONNECT FUEL MAIN TUBE AND RETURN TUBE TO FUEL TANK

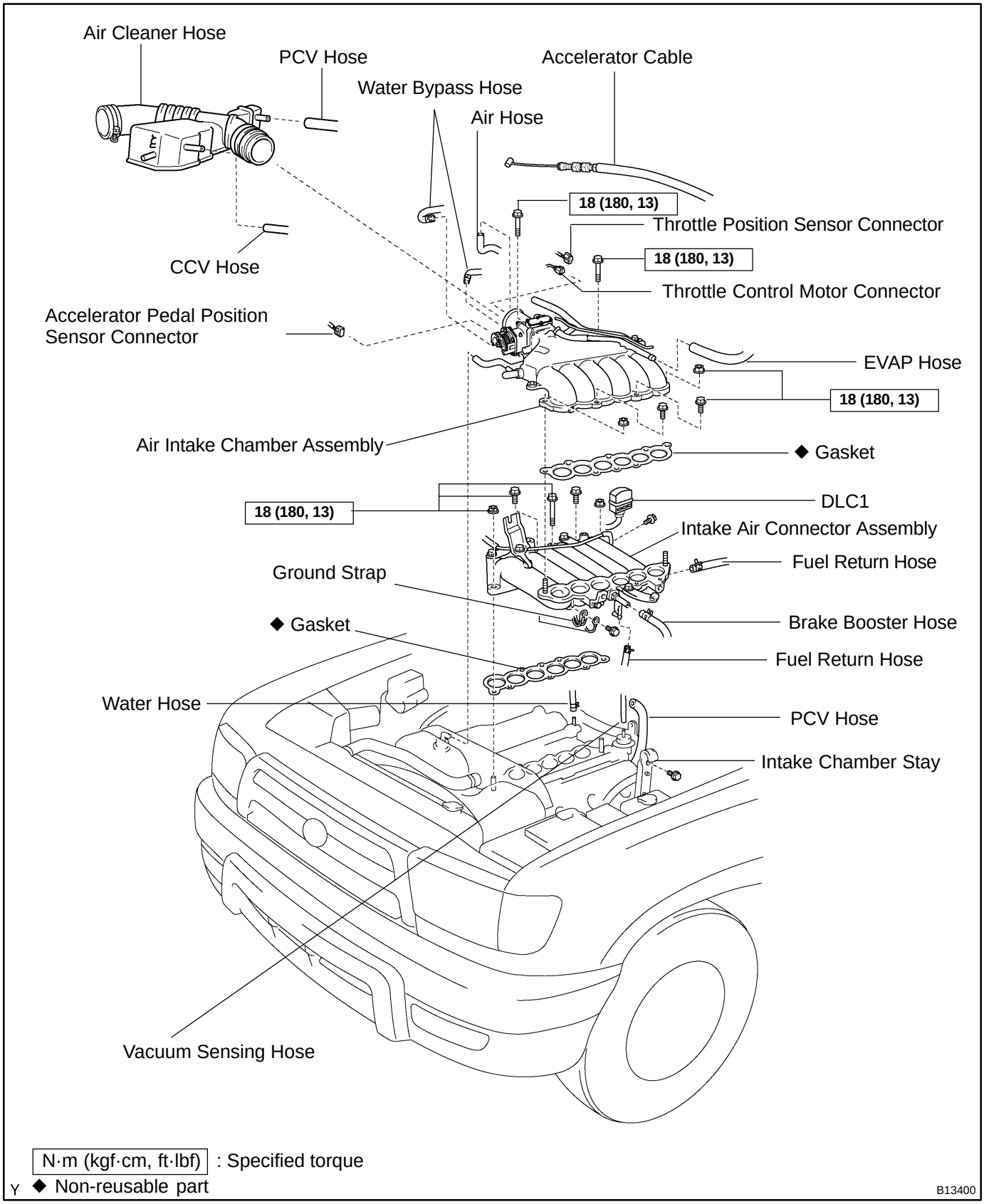
5. CHECK FOR FUEL LEAKS (See page SF-1)

6. INSTALL FUEL TANK (See page SF-25)

FUEL PRESSURE REGULATOR

SF01Z-04

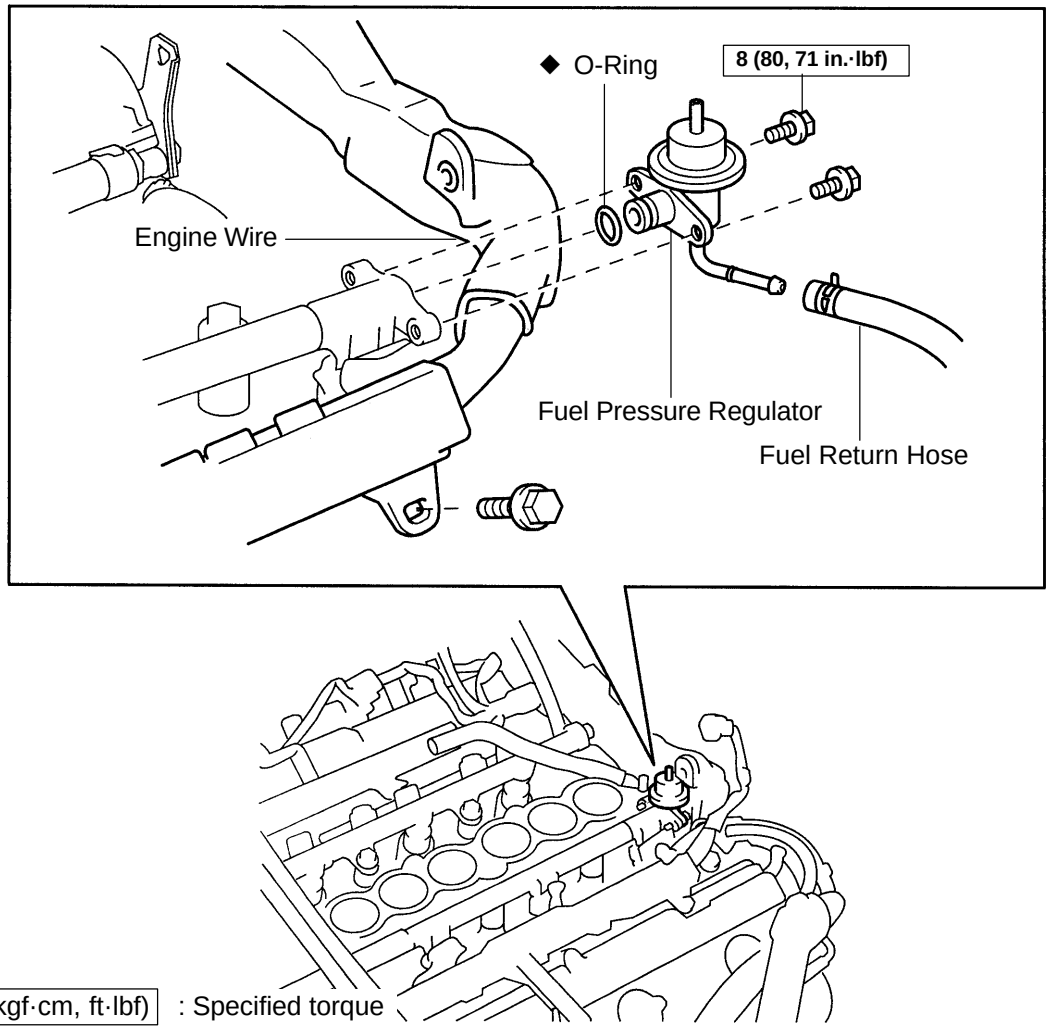
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

Y ◆ Non-reusable part

B13400



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

P21128

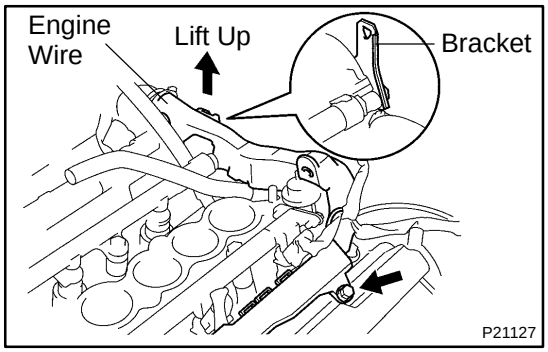
SF020-04

REMOVAL

1. **REMOVE AIR CLEANER HOSE**
2. **REMOVE INTAKE AIR CONNECTOR ASSEMBLY (See page EM-29)**
3. **DISCONNECT FUEL RETURN HOSE FROM FUEL PRESSURE REGULATOR**

CAUTION:

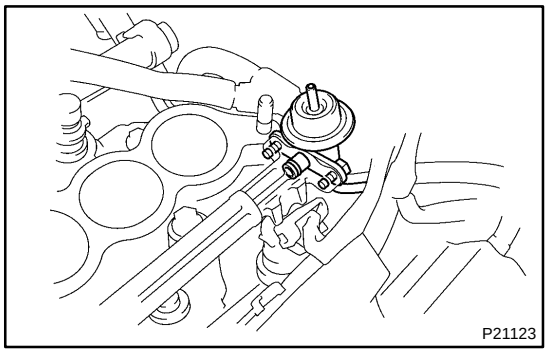
Put a shop rag under the pressure regulator.



4. **REMOVE FUEL PRESSURE REGULATOR**

(a) Remove holding bolt the engine wire to the LH cylinder head cover.

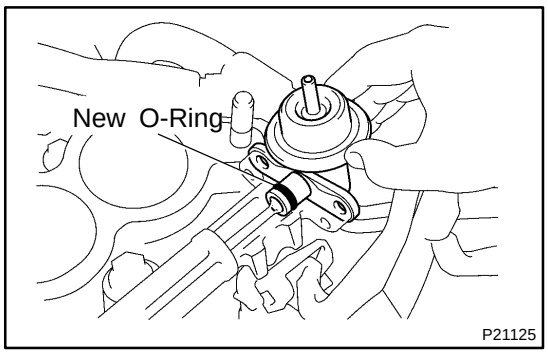
(b) Disconnect the protector from the bracket on the RH cylinder head cover, and lift up the engine wire.



(c) Remove the 2 bolts, and pull out the pressure regulator.

(d) Remove the O-ring from the pressure regulator.

SF021-04

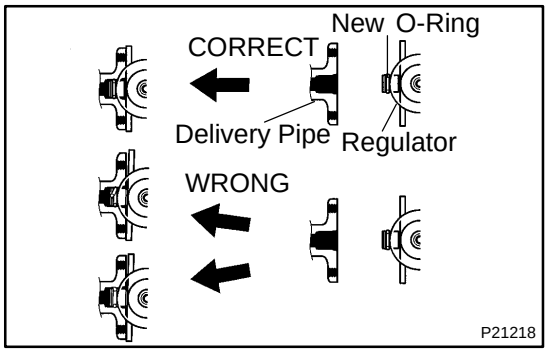


INSTALLATION

1. INSTALL FUEL PRESSURE REGULATOR

(a) Apply a light coat of gasoline to a new O-ring, and install it to the pressure regulator.

(b) Attach the pressure regulator to the LH delivery pipe.



(c) Check that the pressure regulator rotates smoothly.

NOTICE:

If it does not rotate smoothly, the O-ring may be pinched, so remove the pressure regulator and repeat steps (a) to (c) above.

(d) Install the pressure regulator with the 2 bolts.

Torque: 8 N·m (80 kgf·cm, 71 in.·lbf)

(e) Install the engine wire with the bolt.

2. CONNECT FUEL RETURN HOSE TO FUEL PRESSURE REGULATOR

NOTICE:

Be sure to insert the hose up to the stopper and clip it.

3. INSTALL INTAKE AIR CONNECTOR ASSEMBLY (See page EM-52)

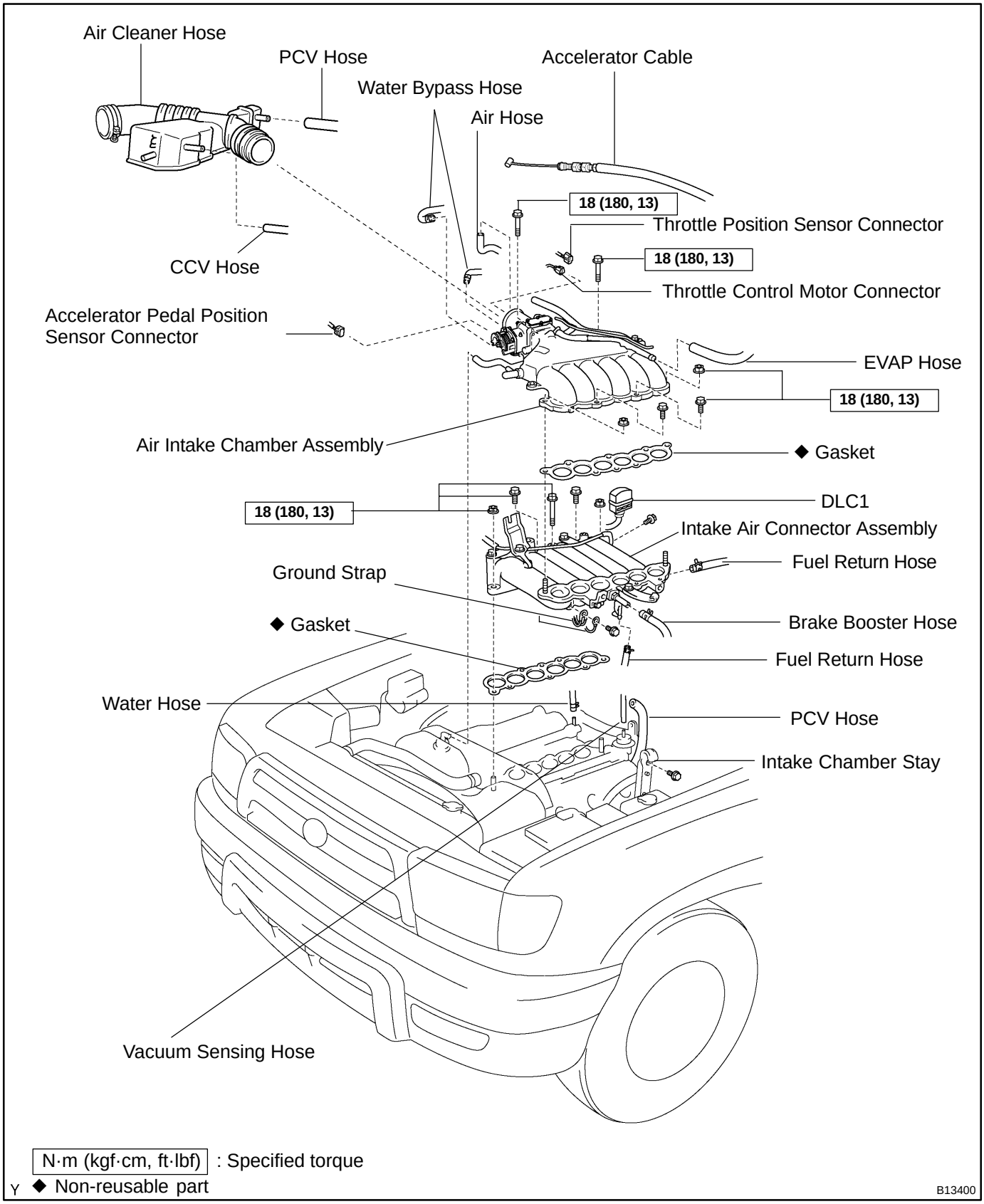
4. INSTALL AIR CLEANER HOSE

5. CHECK FOR FUEL LEAKS (See page SF-1)

INJECTOR

COMPONENTS

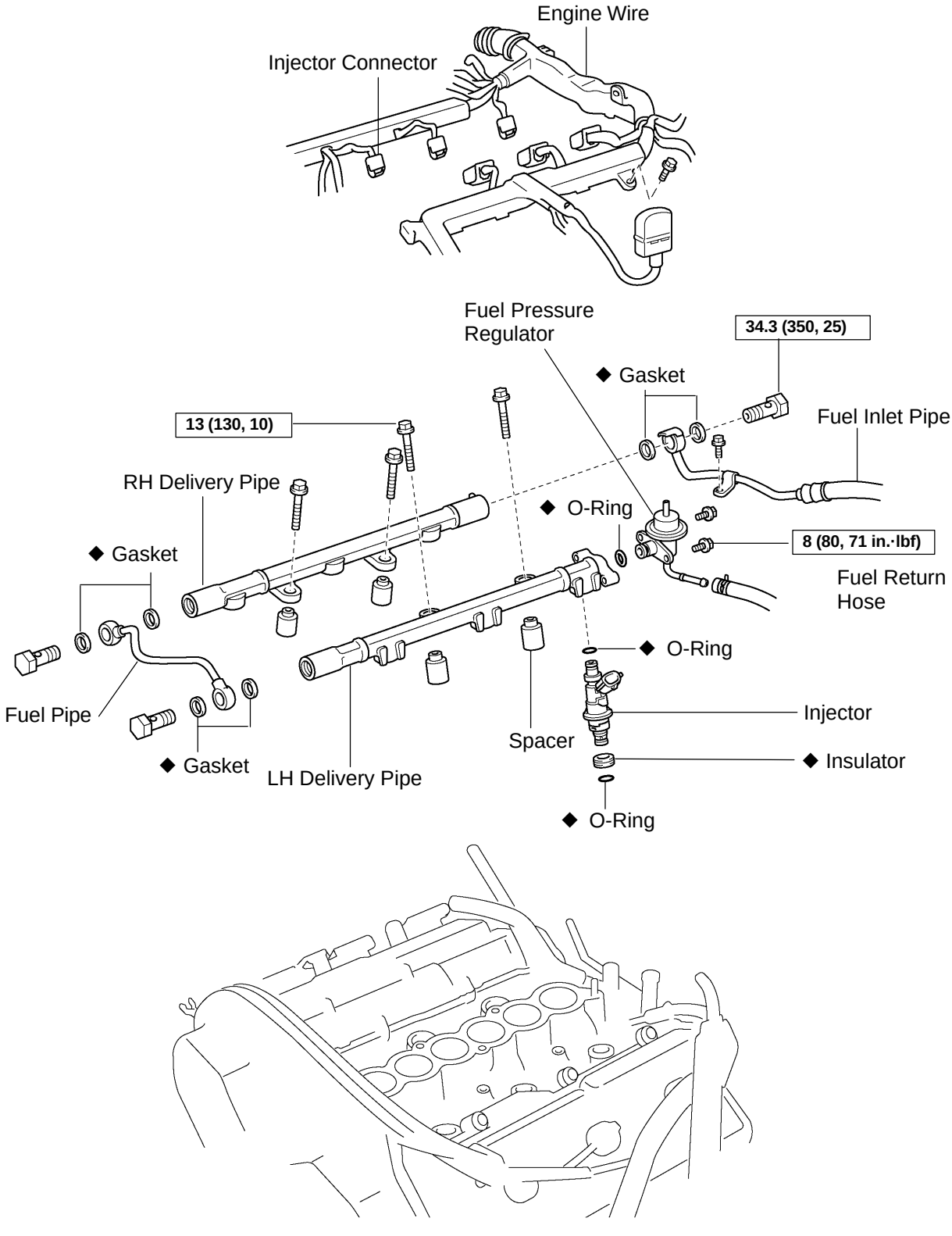
SF022-04



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

B13400



N·m (kgf·cm, ft·lbf) : Specified torque

Y ◆ Non-reusable part

B06047

SF023-04

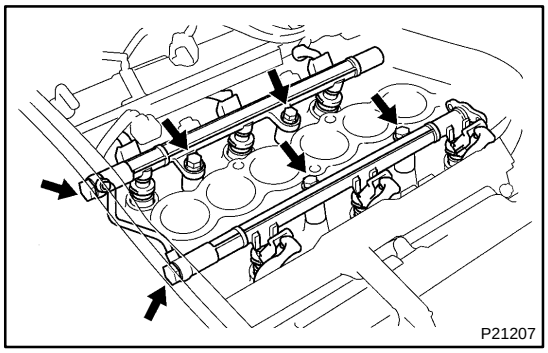
REMOVAL

1. REMOVE AIR CLEANER HOSE
2. REMOVE INTAKE AIR CONNECTOR ASSEMBLY (See page EM-29)
3. REMOVE FUEL PRESSURE REGULATOR (See page SF-16)
4. DISCONNECT FUEL INLET PIPE

CAUTION:

Catch leaking fuel in a container.

5. REMOVE FUEL PIPE
6. DISCONNECT INJECTOR CONNECTORS



7. REMOVE DELIVERY PIPES AND INJECTORS

NOTICE:

- **Be careful not to drop the injectors when removing the delivery pipes.**
- **Pay attention to put any hung load on the injector to and from the side direction.**

(a) Remove the 4 bolts and delivery pipes together with the 6 injectors.

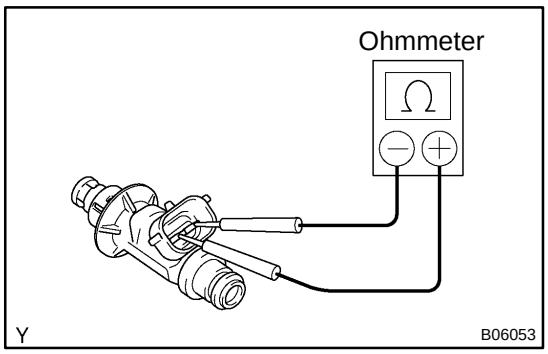
(b) Remove the 4 spacers from the intake manifold.

(c) Pull out the 6 injectors from the delivery pipes.

(d) Remove the 2 O-rings and insulator from each injector.

SF024-04

INSPECTION

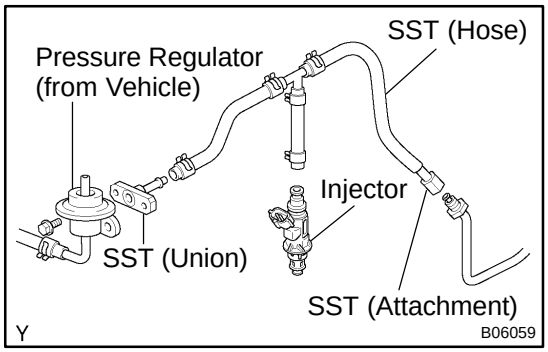


1. INSPECT INJECTOR RESISTANCE

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Approx. 13.8 Ω at 20˚C (68˚F)

If the resistance is not as specified, replace the injector.



2. INSPECT INJECTOR INJECTION

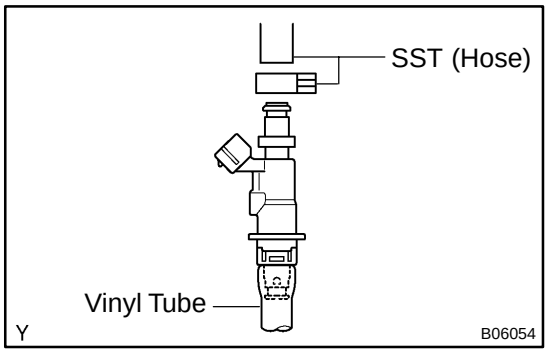
CAUTION:

Keep injector clear of sparks during the test.

(a) Disconnect the fuel inlet pipe from the fuel tube.

(b) Connect SST (attachment and hose) to the fuel tube.
SST 09268-41047 (09268-52011)

(c) Connect the fuel return hose, SST (union) and SST (hose) to the fuel pressure regulator.
SST 09268-41047 (09268-41091)



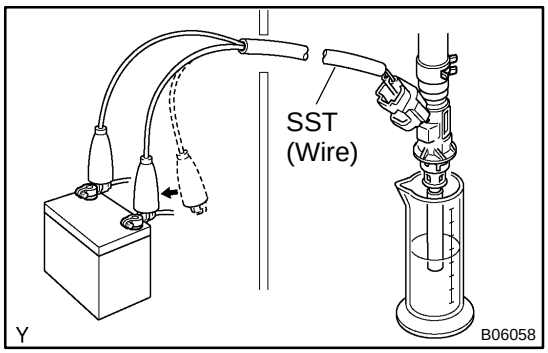
(d) Connect SST (hose) to the injector.
SST 09268-41047

(e) Put the injector into the graduated cylinder.

HINT:

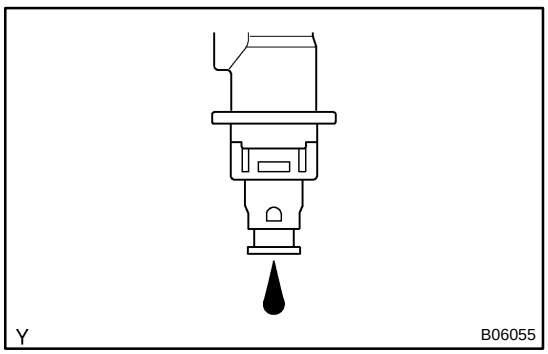
Install a suitable vinyl hose onto the injector to prevent gasoline from splashing out.

(f) Connect a TOYOTA hand-held tester to the DLC3.
(See page SF-7)



(g) Connect SST (wire) to the injector and battery for 15 seconds, and measure the injection volume with a graduated cylinder. Test each injector 2 or 3 times.
SST 09842-30070
Volume: 60 - 73 cm^3 (3.4 - 4.5 cu in.) per 15 sec.
Difference between each injector:
13 cm^3 (0.8 cu in.) or less

If the injection volume is not as specified, replace the injector.



3. INSPECT LEAKAGE

(a) In the condition above, disconnect the tester probes of SST (wire) from the battery and check the fuel leakage from the injector.
SST 09842-30070
Fuel drop: 1 drop or less per 12 minutes

(b) Turn the ignition switch OFF.

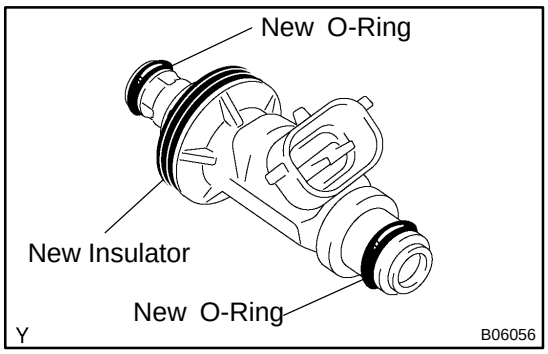
(c) Disconnect the negative (-) terminal cable from the battery.

(d) Remove the SST.
SST 09268-41047

(e) Disconnect the TOYOTA hand- held tester from the DLC3.

SF025-04

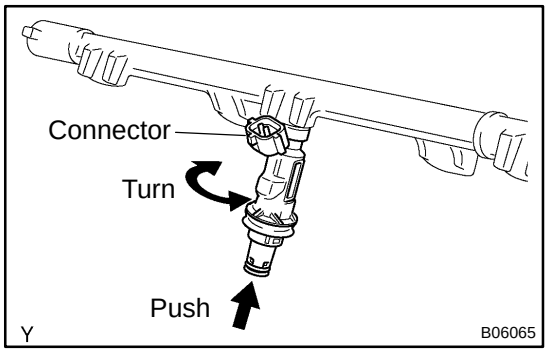
INSTALLATION



1. TEMPORARILY INSTALL INJECTORS AND DELIVERY PIPES

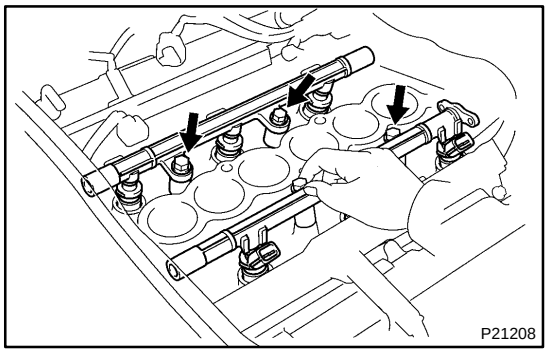
(a) Install a new insulator to each injector.

(b) Apply a light coat of spindle oil or gasoline to 2 new O-rings and install them to each injector.



(c) While turning the injector clockwise and counterclockwise, push it to the delivery pipes. Install the 6 injectors.

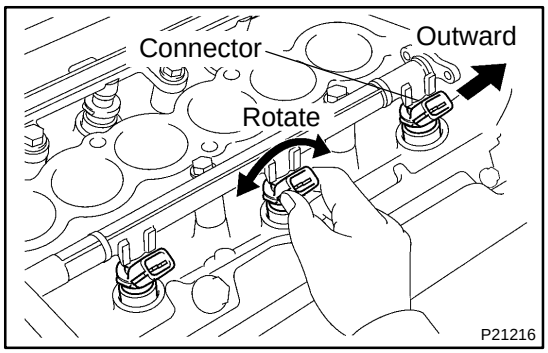
(d) Position the injector connector outward.



(e) Place the 4 spacers in position on the intake manifold.

(f) Place the delivery pipes with the 6 injectors in position on the intake manifold.

(g) Temporarily install the 4 bolts holding the delivery pipes to the intake manifold.

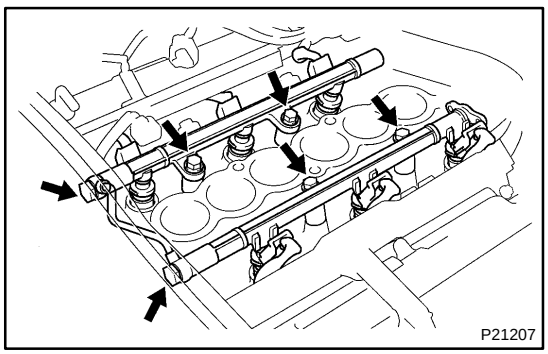


(h) Check that the injectors rotate smoothly.

HINT:

If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.

(i) Position the injector connector outward.



2. CONNECT INJECTOR CONNECTORS

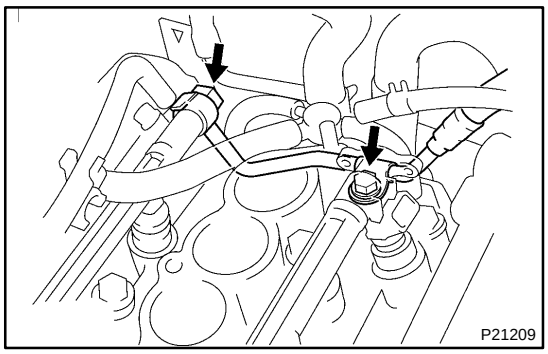
3. INSTALL FUEL PIPE AND TIGHTENING DELIVERY PIPE HOLDING BOLTS

(a) Install the fuel pipe with 4 new gaskets and the 2 union bolts.

Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

(b) Tighten the 4 bolts holding the delivery pipes to the intake manifold.

Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)



4. CONNECT FUEL INLET PIPE

(a) Temporarily install the inlet pipe with 2 new gaskets, union bolt and bolt.

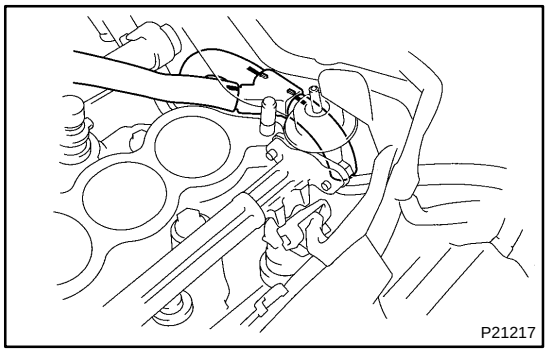
(b) Tighten the clamp bolt.

Torque: 8 N·m (80 kgf·cm, 71 in.·lbf)

(c) Tighten the union bolt.

Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

5. INSTALL FUEL PRESSURE REGULATOR (See page SF-17)



6. INSPECT AIR ASSIST LINES AND CONNECTIONS

Visually check for loose connections, sharp bends or damage.

7. INSTALL INTAKE AIR CONNECTOR ASSEMBLY (See page EM-52)

8. INSTALL AIR CLEANER HOSE

9. CHECK FOR FUEL LEAKS (See page SF-1)

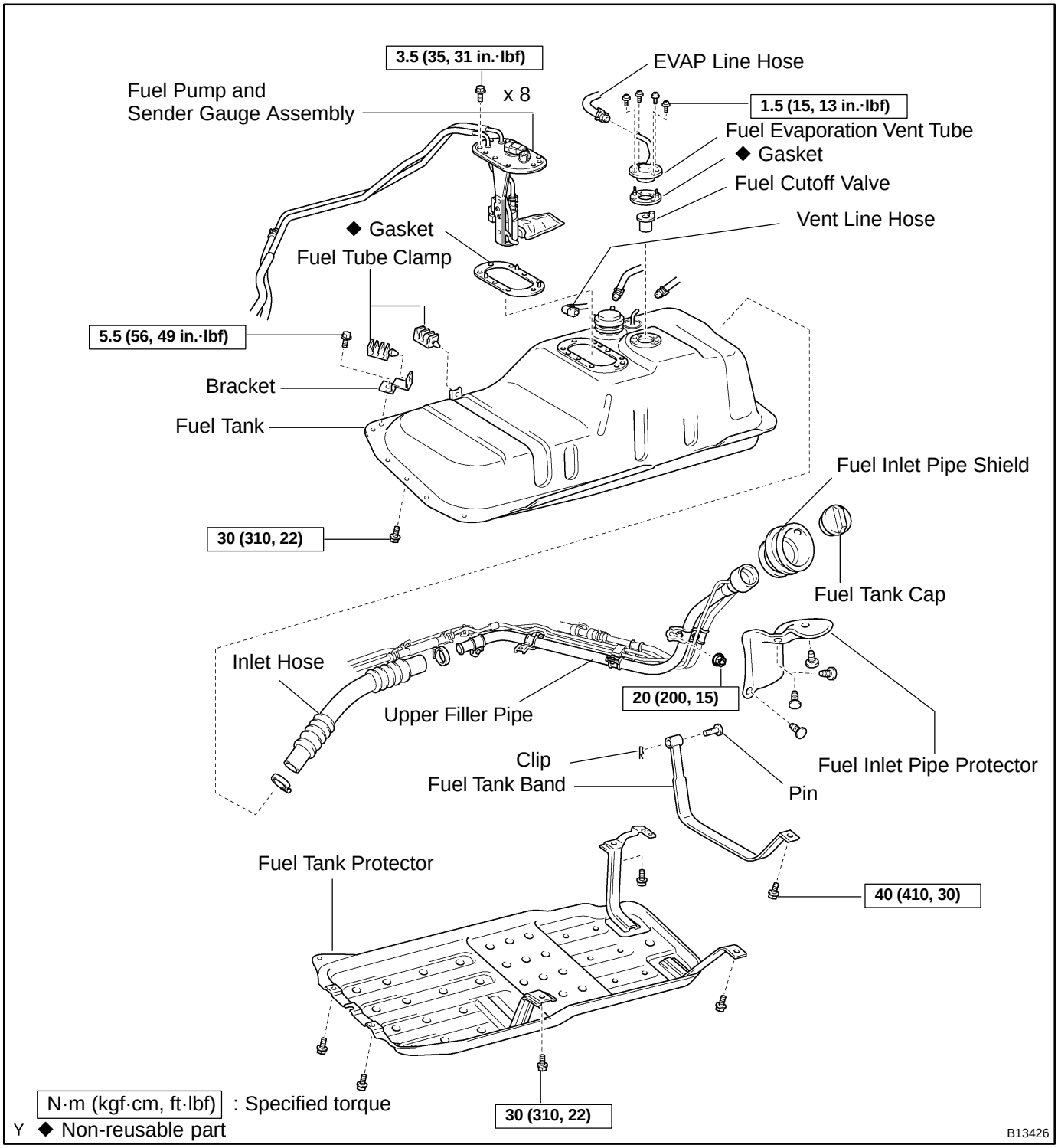
FUEL TANK AND LINE

SF00V-05

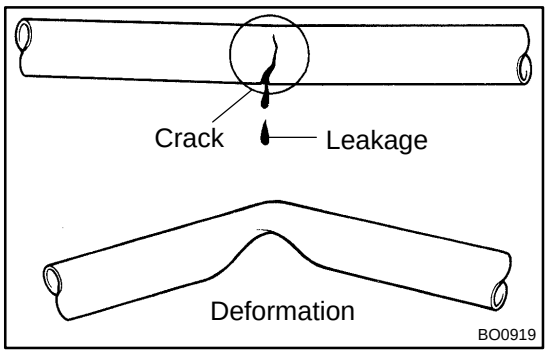
COMPONENTS

CAUTION:

- **Always use new gaskets when replacing the fuel tank or component parts.**
- **Apply the proper torque to all parts tightened.**



SF00W-05

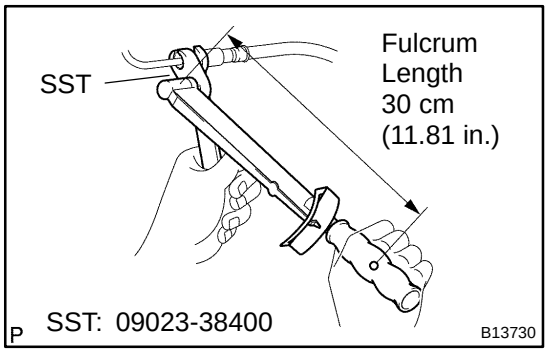


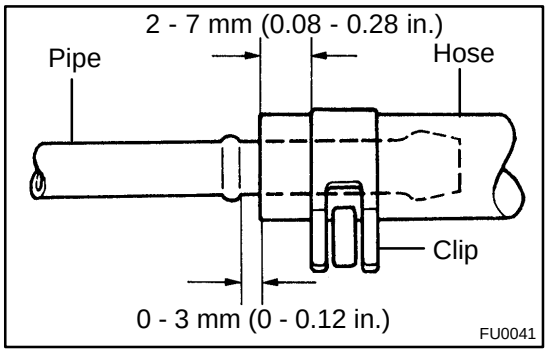
INSPECTION

INSPECT FUEL TANK AND LINE

(a) Check the fuel lines for cracks or leakage, and all connections for deformation.
(b) Check the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.
(c) Check the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
(d) Check the filler neck for damage or fuel leakage.
(e) Hose and tube connections are as shown in the illustration.

If a problem is found, repair or replace the part as necessary.





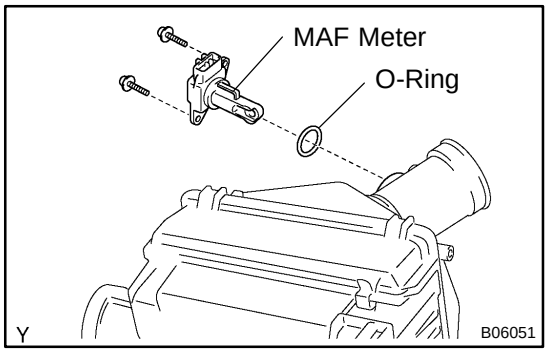
MASS AIR FLOW (MAF) METER

SF0ZG-02

REMOVAL

1. REMOVE AIR CLEANER CASE

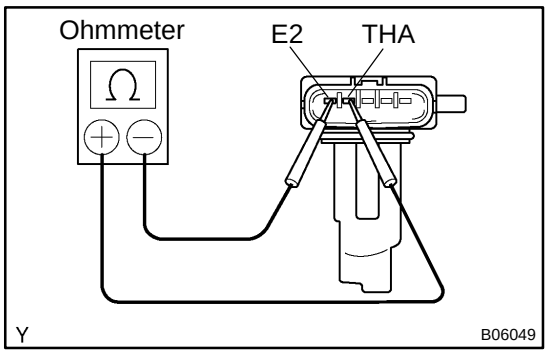
(a) Disconnect the air cleaner hose.
(b) Disconnect the MAF meter connector.
(c) Remove the 3 bolts and air cleaner case.

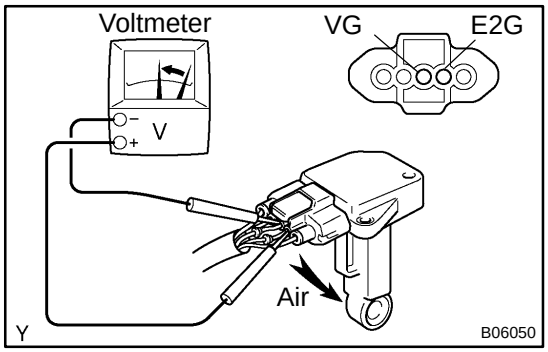


2. REMOVE MAF METER

(a) Remove the 2 screws and MAF meter.
(b) Remove the O-ring from the MAF meter.

SF027-04





INSPECTION

1. INSPECT MAF METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Resistance	Temperature
13.6 - 18.4 kΩ	-20˚C (-4˚F)
2.2 - 2.7 kΩ	20˚C (68˚F)
0.5 - 0.7 kΩ	60˚C (140˚F)

If the resistance is not as specified, replace the MAF meter.

2. INSPECT MAF METER OPERATION

(a) Connect the MAF meter connector.

(b) Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (-) tester probe to terminal E2G.

(c) Turn the ignition switch ON.

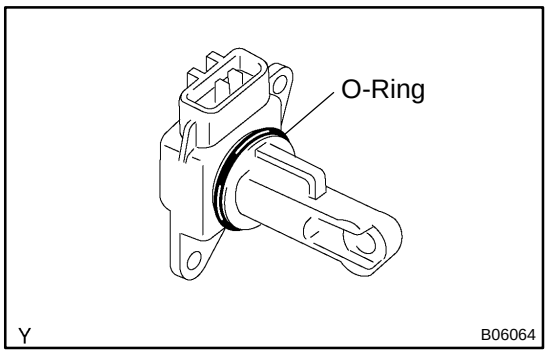
(d) Blow air into the MAF meter, and check that the voltage fluctuates.

If operation is not as specified, replace the MAF meter.

(e) Turn the ignition switch OFF.

(f) Disconnect the MAF meter connector.

SF0ZH-03



INSTALLATION

1. INSTALL MAF METER

(a) Install the O-ring to the MAF meter.

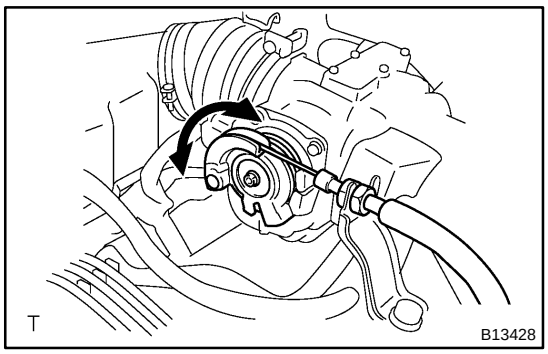
(b) Install the MAF meter with the 2 screws.

2. INSTALL AIR CLEANER CASE

(a) Install the air cleaner case with the 3 bolts.

(b) Connect the MAF meter connector.

(c) Connect the air cleaner hose.



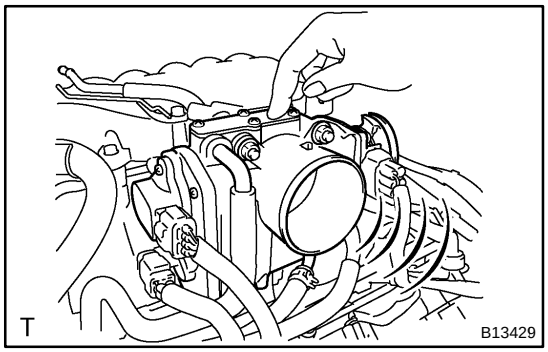
THROTTLE BODY

SF029-04

ON-VEHICLE INSPECTION

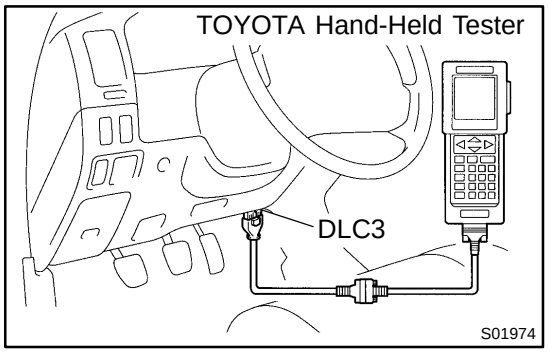
1. INSPECT SYSTEM OPERATION

(a) Check that the throttle linkage moves smoothly.



(b) Inspect the throttle control motor for operating sound.
   (1) Turn the ignition switch ON.
   (2) When turning the accelerator pedal position sensor lever, check the running sound of the motor. Also, check that there is no friction sound.

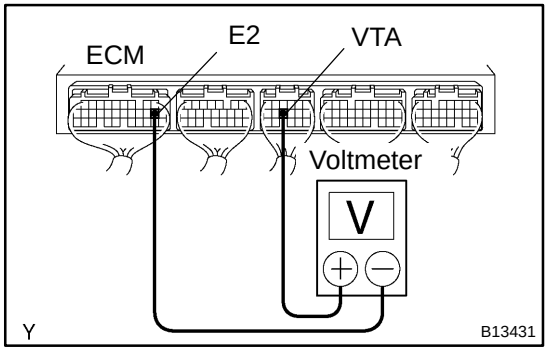
If operation is not as specified, check the throttle control motor (See step 2), wiring and ECM.



(c) Inspect the accelerator pedal position sensor.
   (1) Connect the TOYOTA hand- held tester to the DLC3.
   (2) Check that the MIL does not light up.
   (3) When turning the accelerator pedal position sensor lever to the full- open position, check that the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA showns the standard value.

   Standard throttle valve opening percentage:
   60 % or more

If operation is not as specified, check that the accelerator pedal position sensor (See step 5), wiring and ECM.



If you have no TOYOTA hand-held tester, measure voltage between terminals VTA and E2 of the ECM connector.

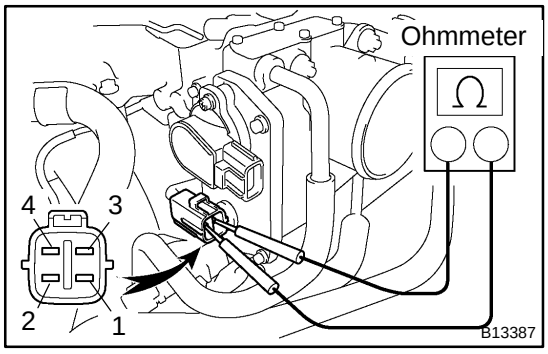
(d) Inspect the idle speed.
   (1) Start the engine and check that the MIL does not light up.
   (2) Allow the engine to warm up to normal operating temperature.
   (3) Turn the A/C compressor ON to OFF, and check the idle speed.

   Idle speed (Transmission in neutral): 700 ± 50 rpm

NOTICE:

Perform inspection under condition without electrical load.

(e) After checking the above (b) to (d), perform the driving test and check that there is no sense of incongruity.



2. INSPECT THROTTLE CONTROL MOTOR

(a) Disconnect the throttle control motor connector.

(b) Using an ohmmeter, measure the motor resistance between terminal 4 (M+) and 3 (M-).

Motor resistance: 0.3 - 100 Ω at 20˚C (68˚F)

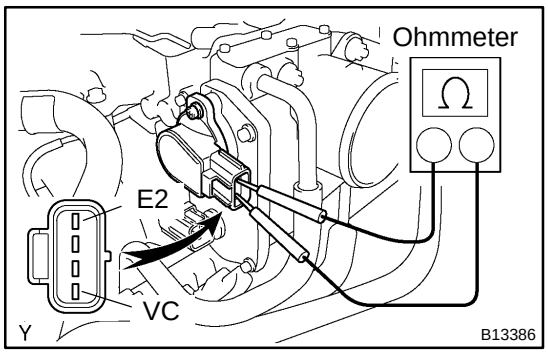
If the resistance is not as specified, replace the throttle body (See page SF-33 and SF-34).

(c) Using an ohmmeter, measure the clutch resistance between terminal 2 (CL-) and 1 (CL+).

Clutch resistance: 4.2 - 5.2 Ω at 20˚C (68˚F)

If the resistance is not as specified, replace the throttle body (See page SF-33 and SF-34).

(d) Reconnect the throttle control motor connector.



3. INSPECT THROTTLE POSITION SENSOR

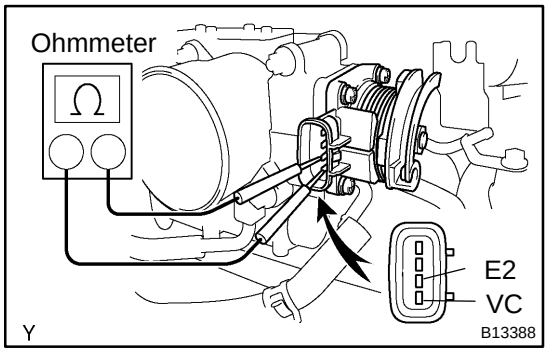
(a) Disconnect the throttle position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: 1.2 - 3.2 kΩ at 20˚C (68˚F)

If the resistance is not as specified, replace the throttle body (See page SF-33 and SF-34).

(c) Reconnect the throttle position sensor connector.



4. INSPECT ACCELERATOR PEDAL POSITION SENSOR

(a) Disconnect the pedal position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals VC and E2.

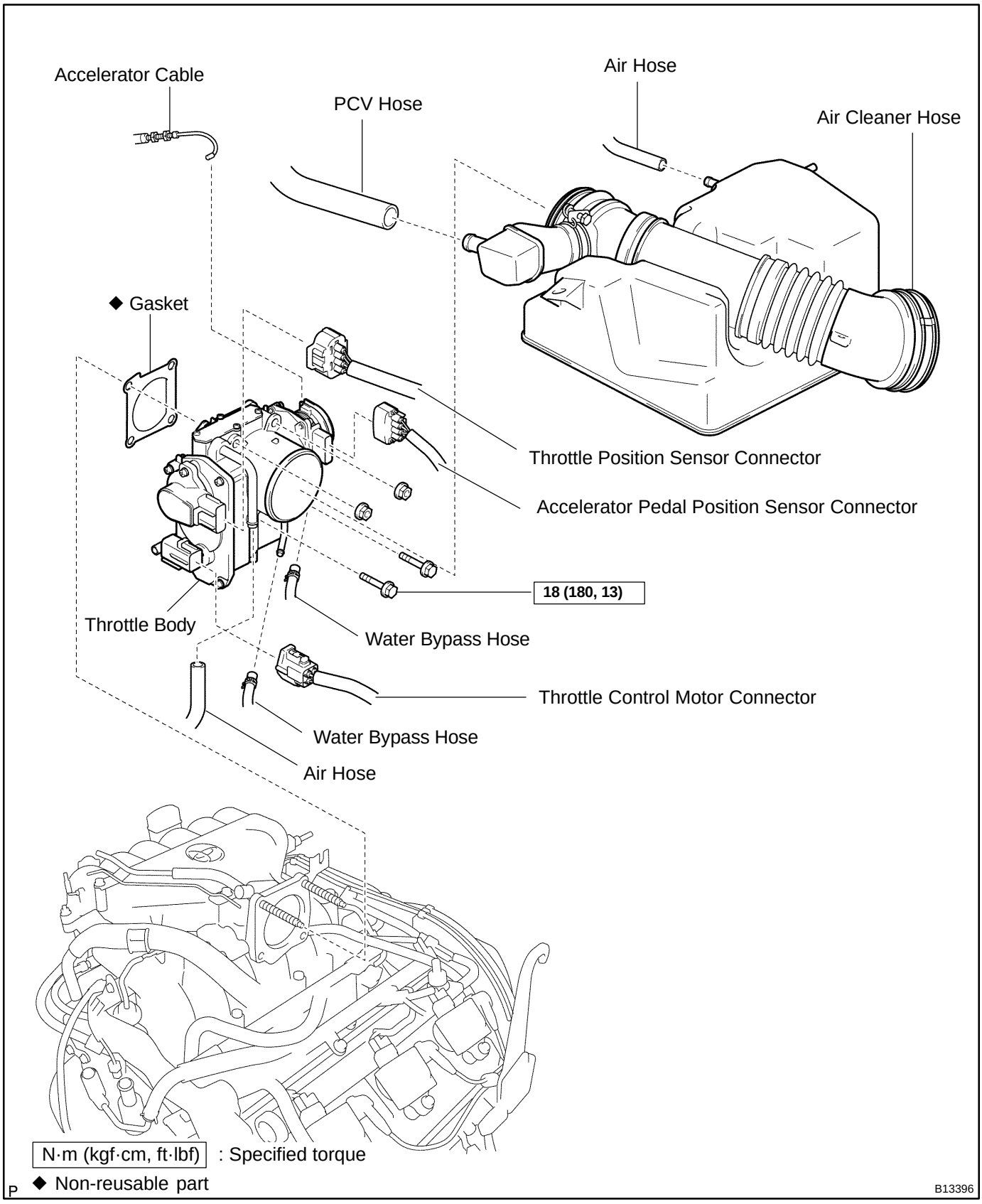
Resistance: 1.2 - 3.2 kΩ at 20˚C (68˚F)

If the resistance is not as specified, replace the throttle body (See page SF-33 and SF-34).

(c) Reconnect the pedal position sensor connector.

SF02A-04

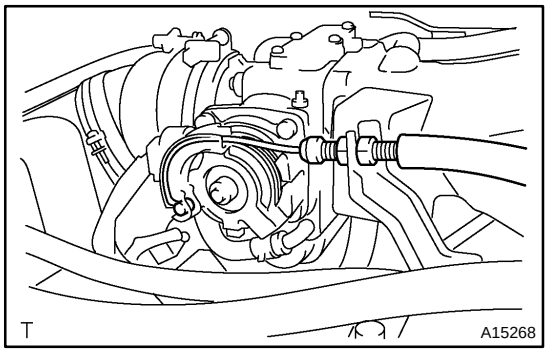
COMPONENTS



SF1NW-01

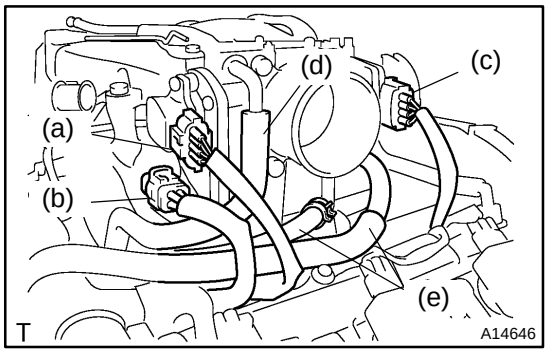
REMOVAL

1. DRAIN ENGINE COOLANT



2. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY

3. REMOVE AIR CLEANER HOSE



4. REMOVE THROTTLE BODY

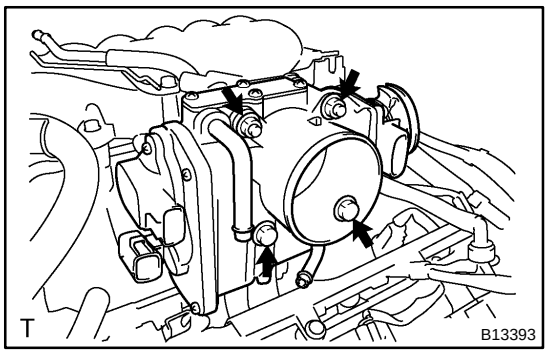
(a) Disconnect the throttle position sensor connector.

(b) Disconnect the throttle control motor connector.

(c) Disconnect the accelerator pedal position sensor connector.

(d) Disconnect the air hose.

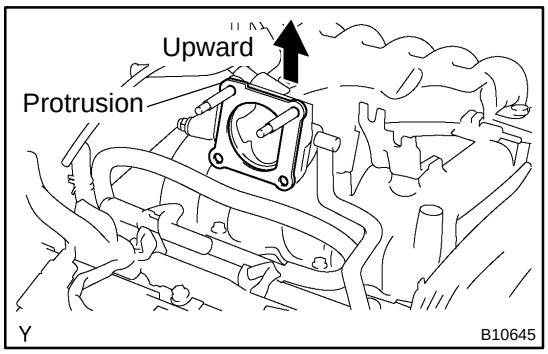
(e) Disconnect the 2 water bypass hoses.



(f) Remove the 2 bolts, 2 nuts, throttle body and gasket.

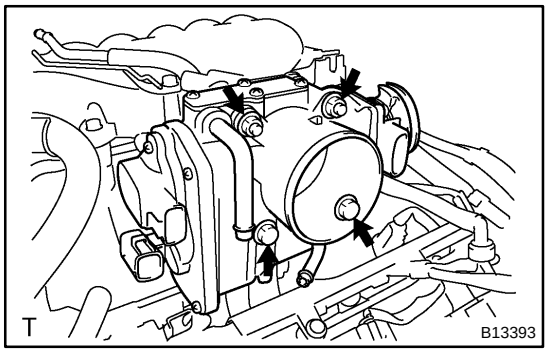
SF1NX-01

INSTALLATION

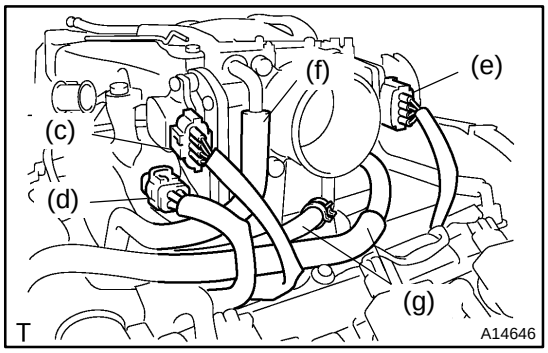


1. INSTALL THROTTLE BODY

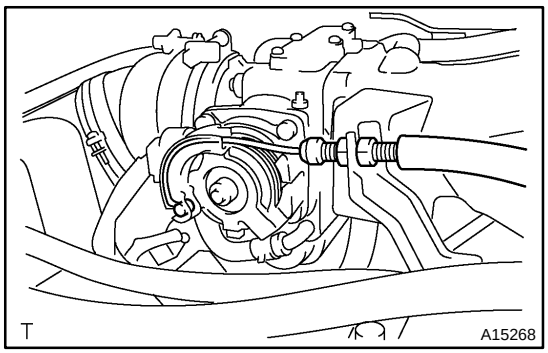
(a) Place a new gasket on the air intake chamber facing the protrusion upward.



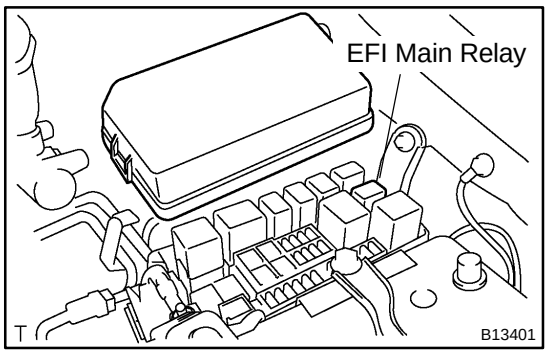
(b) Install the throttle body with the 2 bolts and 2 nuts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)



(c) Connect the throttle position sensor connector.
(d) Connect the throttle control motor connector.
(e) Connect the accelerator pedal position sensor connector.
(f) Connect the air hose.
(g) Connect the 2 water bypass hoses.



2. CONNECT ACCELERATOR CABLE TO THROTTLE BODY
3. INSTALL AIR CLEANER HOSE
4. FILL WITH ENGINE COOLANT
5. START ENGINE AND CHECK FOR COOLANT LEAKS

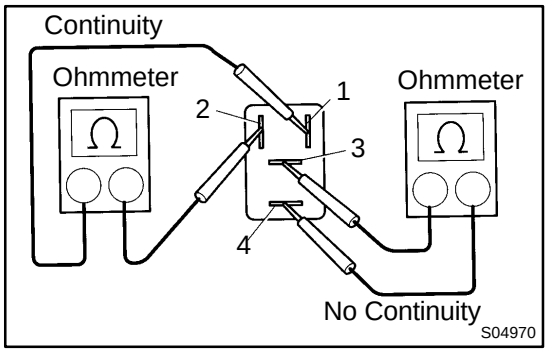


EFI MAIN RELAY

SF01B-05

INSPECTION

1. REMOVE EFI MAIN RELAY (Marking: EFI)



2. INSPECT EFI MAIN RELAY

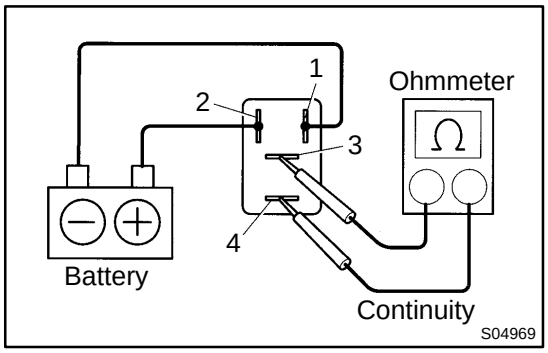
(a) Inspect the relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.



(b) Inspect the relay operation.

(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 4.

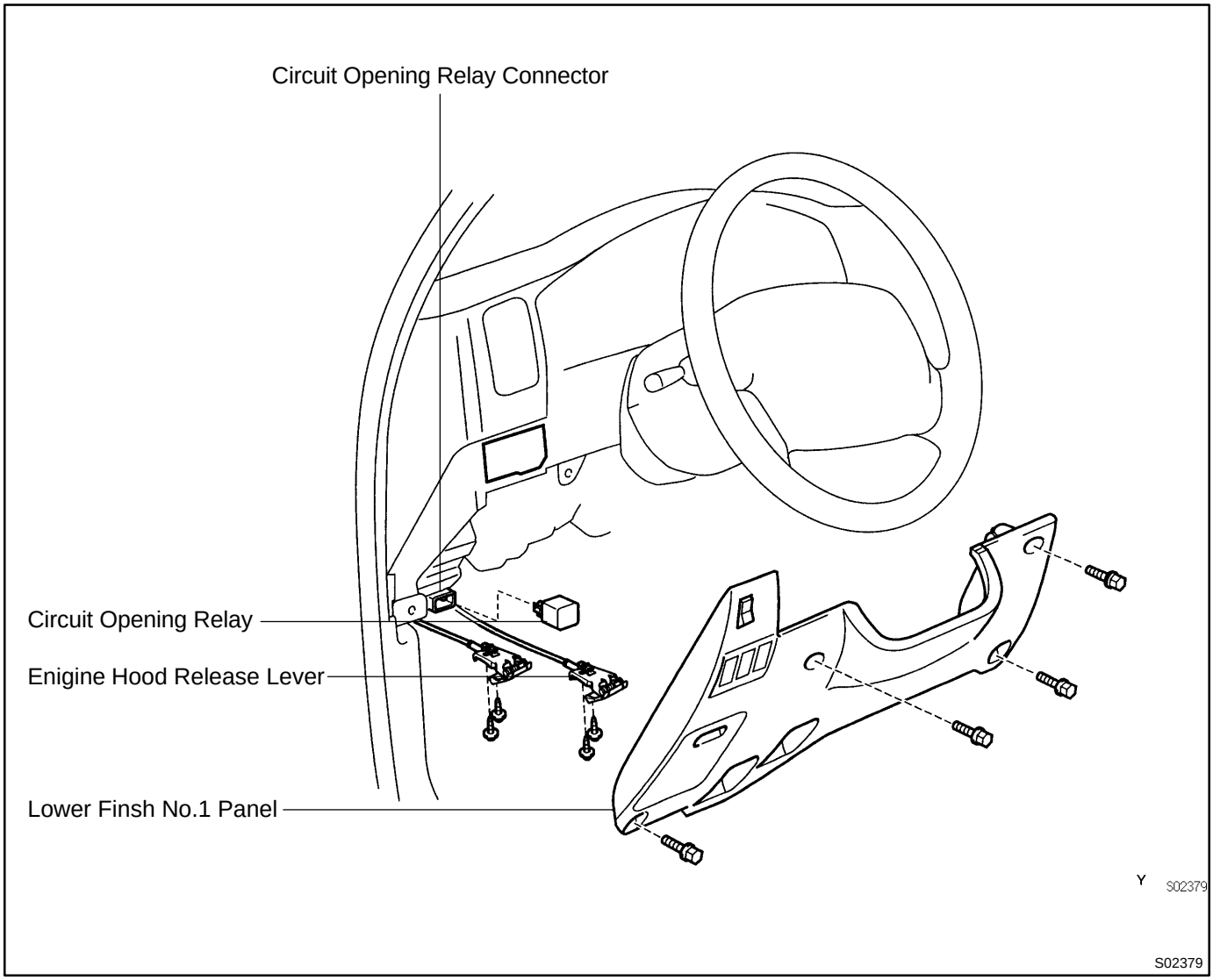
If operation is not as specified, replace the relay.

3. REINSTALL EFI MAIN RELAY

CIRCUIT OPENING RELAY

COMPONENTS

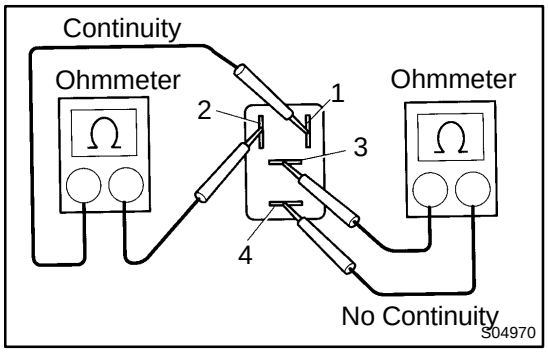
SF01C-04



SF01D-05

INSPECTION

1. REMOVE CIRCUIT OPENING RELAY



2. INSPECT CIRCUIT OPENING RELAY

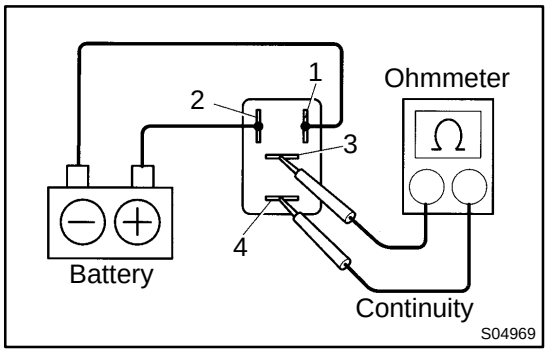
(a) Inspect the relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 4.

If there continuity, replace the relay.



(b) Inspect the relay operation.

(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is continuity between terminals 3 and 4.

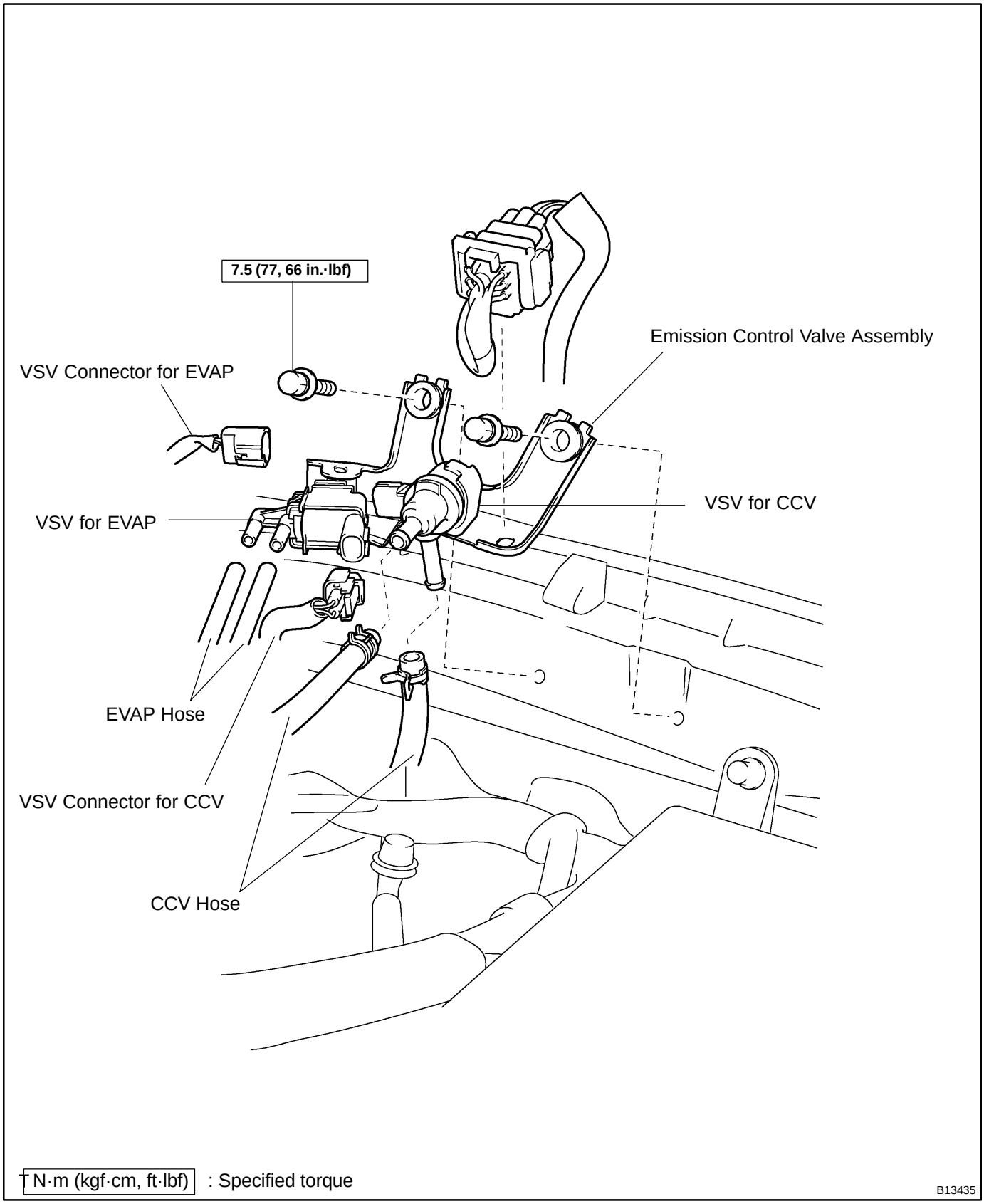
If operation is not as specified, replace the relay.

3. REINSTALL CIRCUIT OPENING RELAY

VSV FOR EVAPORATIVE EMISSION (EVAP)

SF1NY-01

COMPONENTS



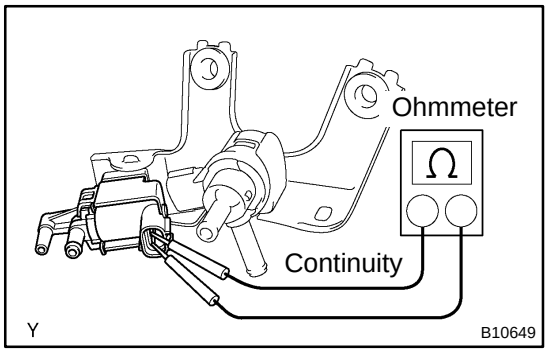
T N·m (kgf·cm, ft·lbf) : Specified torque

B13435

SF1NZ-01

INSPECTION

1. REMOVE VSV



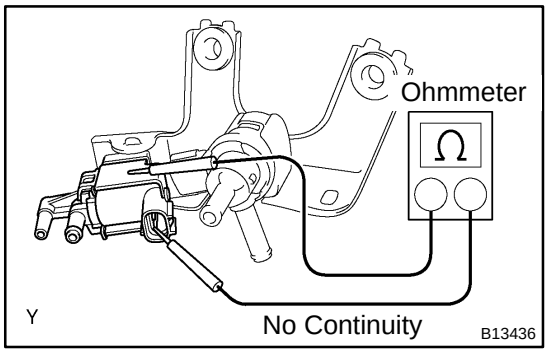
2. INSPECT VSV

(a) Inspect the VSV for open circuit.

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 30 - 34 Ω at 20˚C (68˚F)

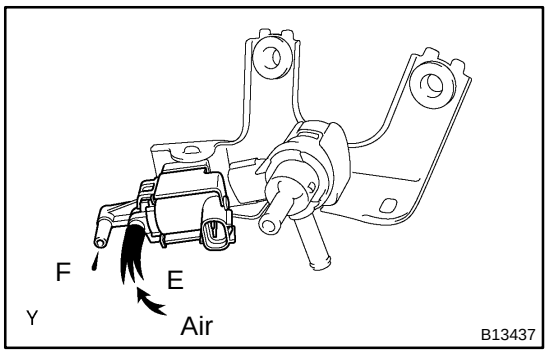
If there is no continuity, replace the VSV.



(b) Inspect VSV for ground.

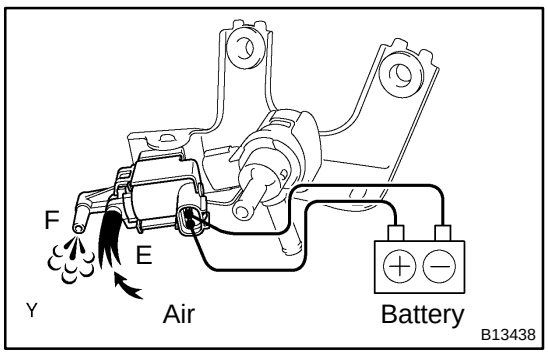
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



(c) Inspect the VSV opration.

(1) Check that air does not flow from port E to port F.



(2) Apply battery positive voltage across the terminals.

(3) Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

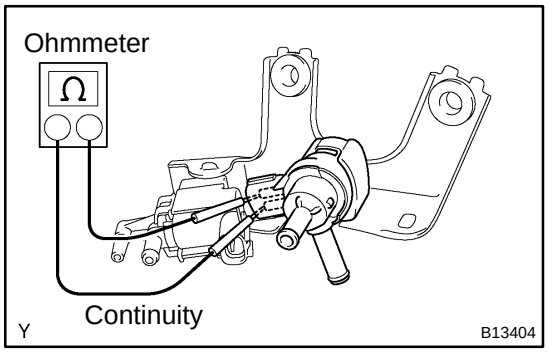
3. REINSTALL VSV

VSV FOR CANISTER CLOSED VALVE (CCV)

SF14A-03

INSPECTION

1. REMOVE VSV (See page SF-38)



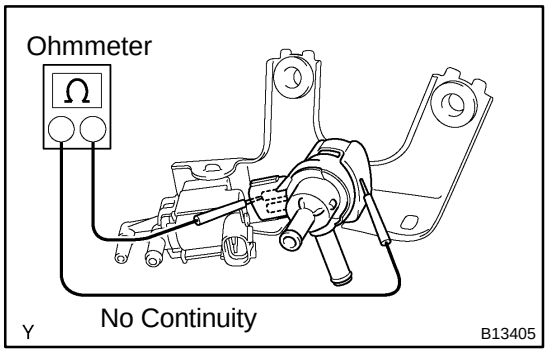
2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance:

At 20˚C (68˚F)	25 - 30 Ω
At 120˚C (248˚F)	33 - 42 Ω

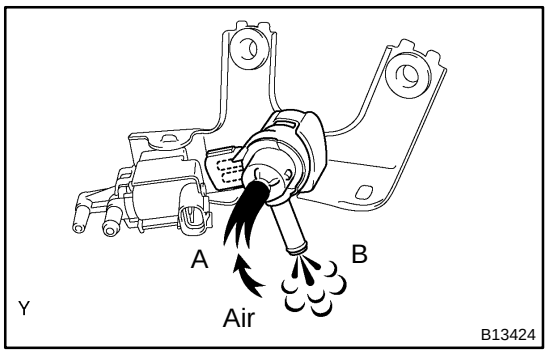
If there is no continuity, replace the VSV.



3. INSPECT VSV FOR GROUND

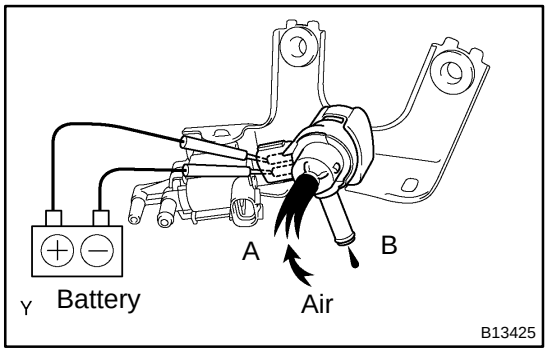
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



4. INSPECT VSV OPERATION

(a) Check that air flows from ports A to B.



(b) Apply battery positive voltage across the terminals.

(c) Check that air does not flow from ports A to B.

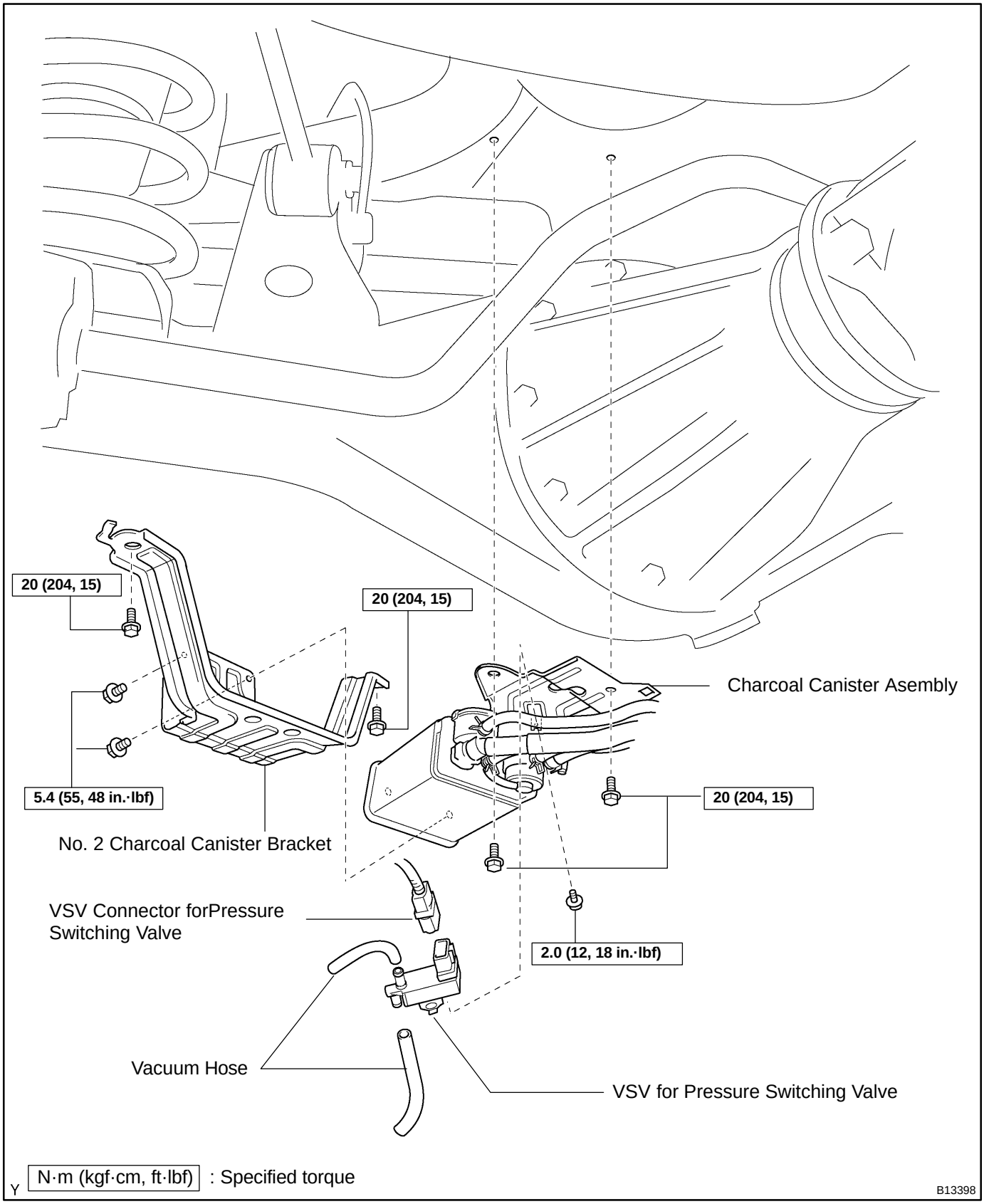
If operation is not as specified, replace the VSV.

5. REINSTALL VSV

VSV FOR PRESSURE SWITCHING VALVE

SF147-03

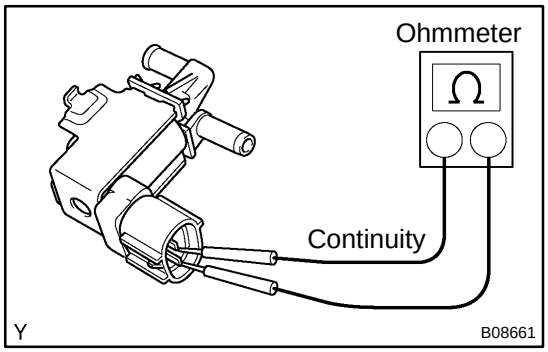
COMPONENTS



SF148-03

INSPECTION

1. REMOVE VSV



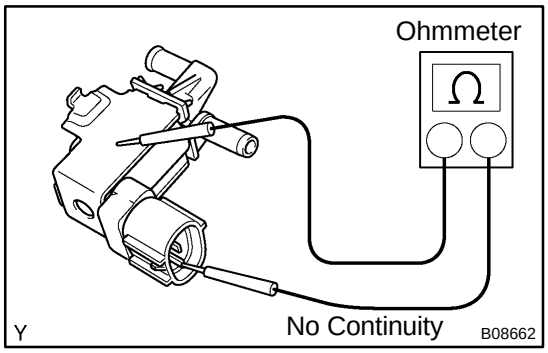
2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance:

At 20˚C (68˚F)	37 - 44 Ω
At 120˚C (248˚F)	51 - 62 Ω

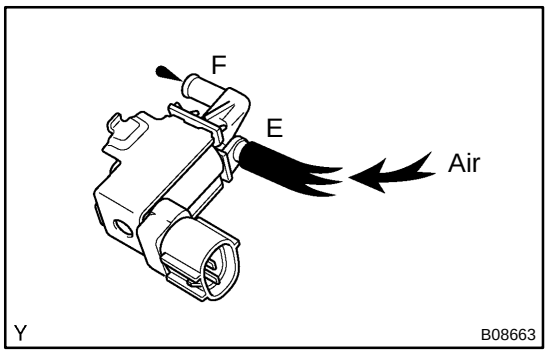
If there is no continuity, replace the VSV.



3. INSPECT VSV FOR GROUND

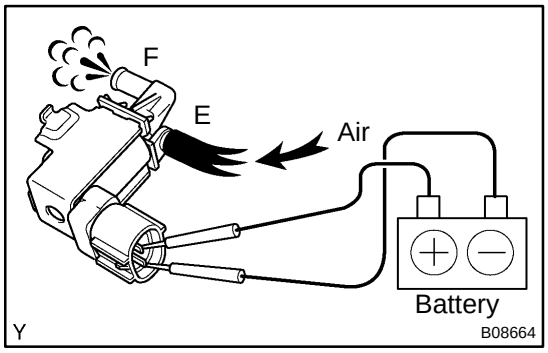
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



4. INSPECT VSV OPERATION

(a) Check that air does not flow from ports E to F.



(b) Apply battery positive voltage across the terminals.

(c) Check that air flows from ports E to F.

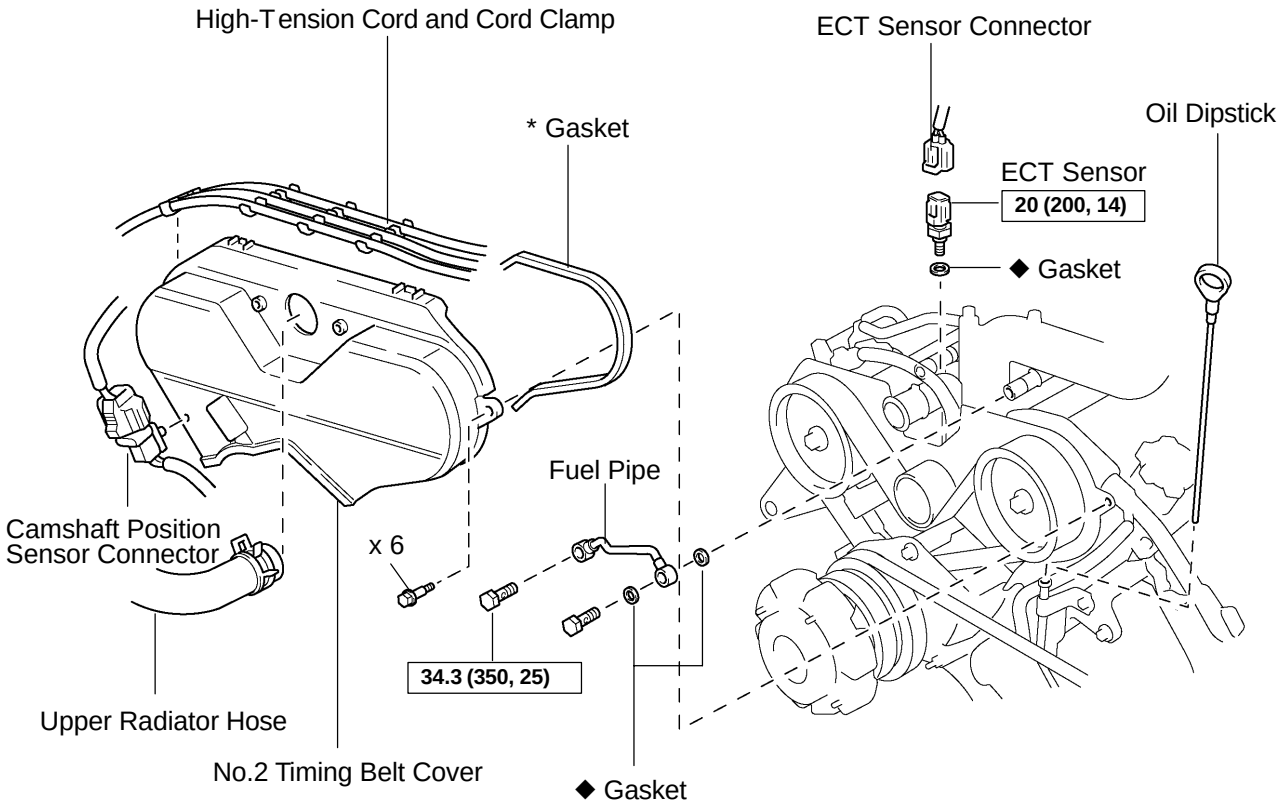
If operation is not as specified, replace the VSV.

5. REINSTALL VSV

ENGINE COOLANT TEMPERATURE (ECT) SENSOR

SF02M-05

COMPONENTS



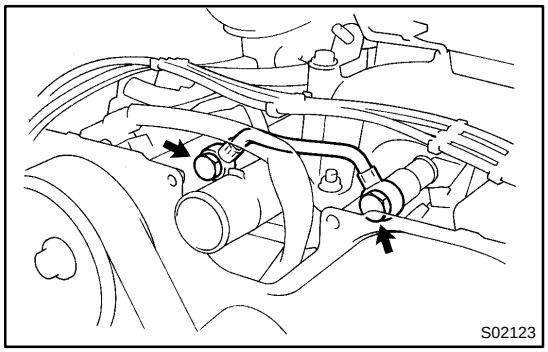
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
Y * Replace only if damaged

B13427

SF02N-04

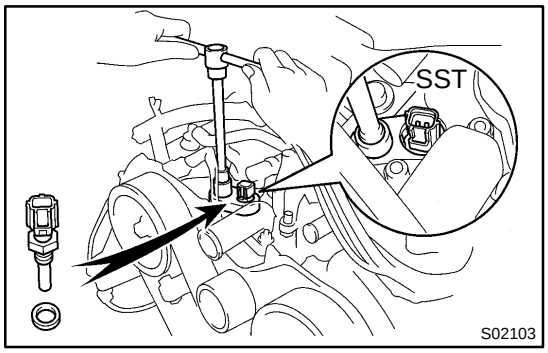
INSPECTION

1. DRAIN ENGINE COOLANT
2. DISCONNECT UPPER RADIATOR HOSE FROM WATER OUTLET
3. REMOVE NO.2 TIMING BELT COVER (See page EM-13)



4. REMOVE FUEL PIPE

Remove the 2 union bolts, 4 gaskets and fuel pipe.

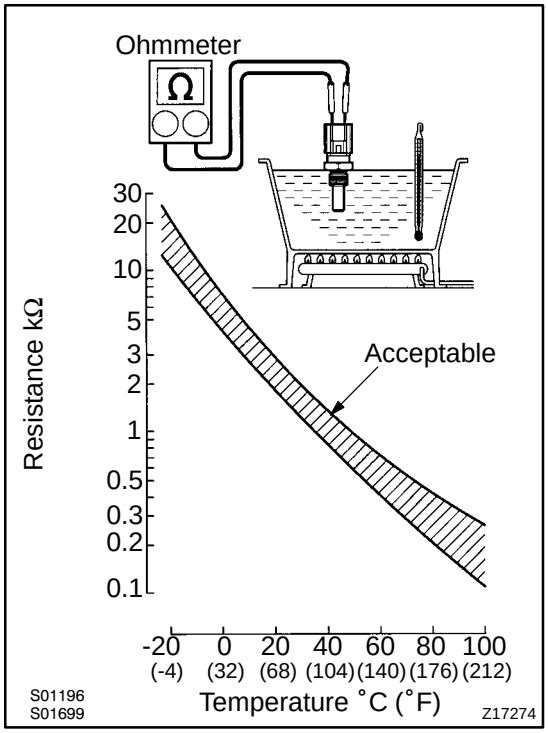


5. REMOVE ECT SENSOR

(a) Disconnect the ECT sensor connector.

(b) Using SST, remove the ECT sensor and gasket.

SST 09205-76030



6. INSPECT ECT SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the graph

If the resistance is not as specified, replace the ECT sensor.

7. REINSTALL ECT SENSOR

(a) Install a new gasket to the ECT sensor.

(b) Using SST, install the ECT sensor.

SST 09205-76030

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Connect the ECT sensor connector.

8. REINSTALL FUEL PIPE

Install the fuel pipe with 4 new gaskets and the 2 union bolts.

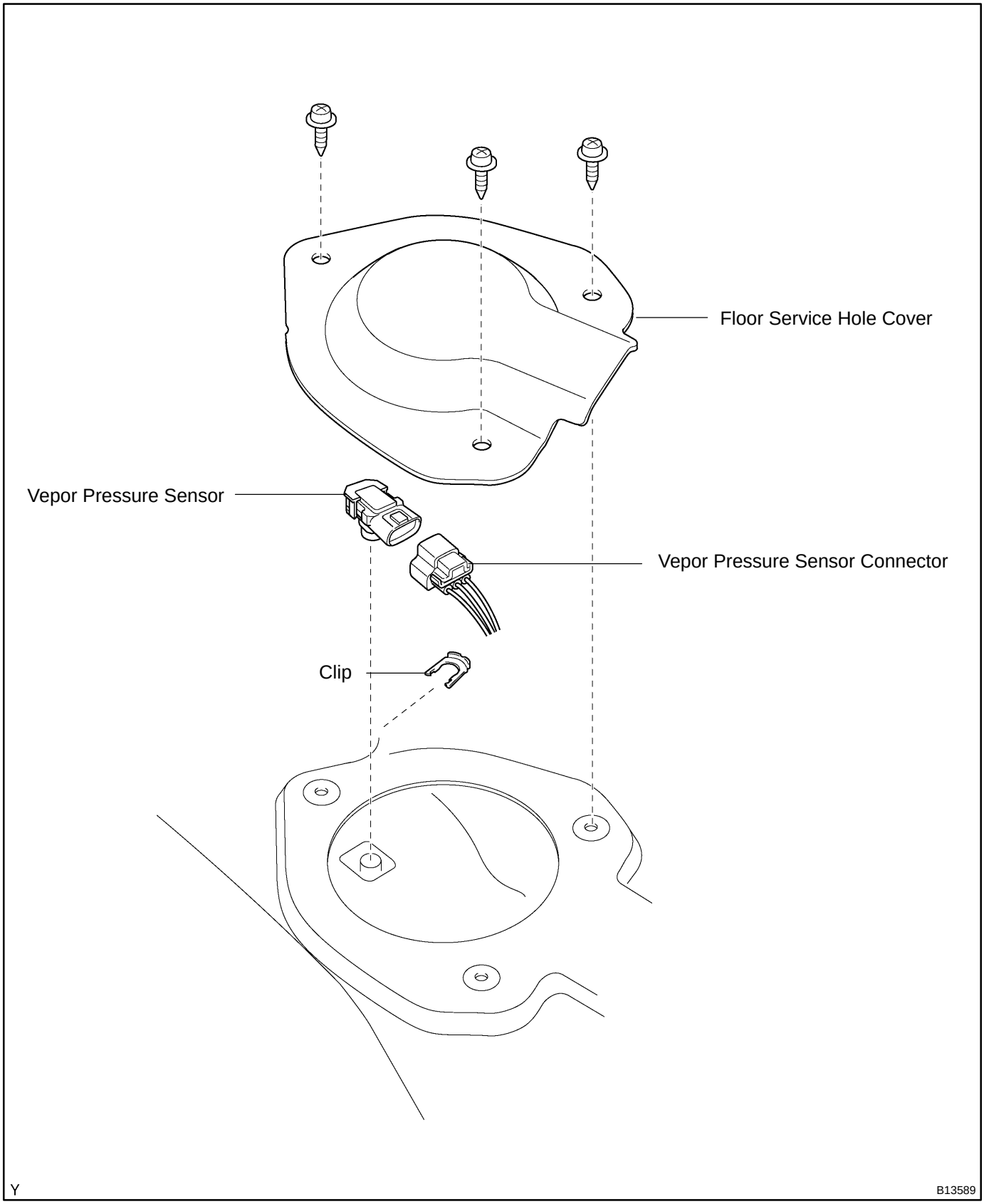
Torque: 34.3 N·m (350 kgf·cm, 25 ft·lbf)

9. REINSTALL NO.2 TIMING BELT COVER (See page EM-19)
10. RECONNECT UPPER RADIATOR HOSE TO WATER OUTLET
11. REFILL WITH ENGINE COOLANT

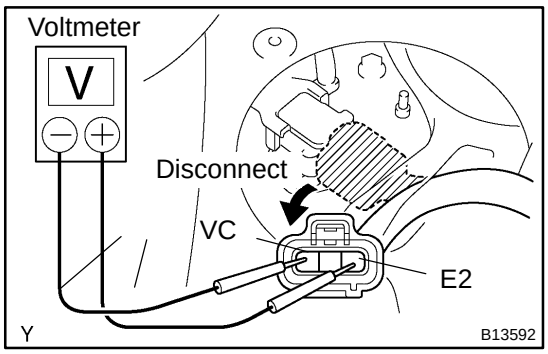
VAPOR PRESSURE SENSOR

COMPONENTS

SF1O0-01



SF02O-05



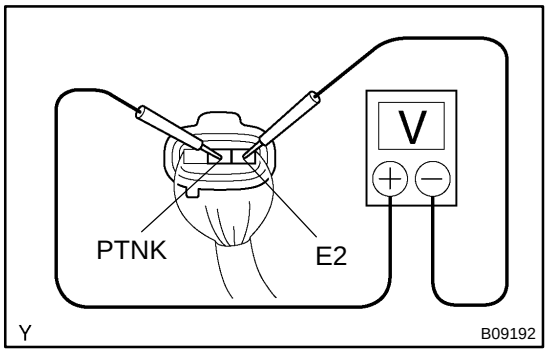
INSPECTION

1. INSPECT POWER SOURCE VOLTAGE OF VAPOR PRESSURE SENSOR

(a) Disconnect the vapor pressure sensor connector.
(b) Turn the ignition switch ON.
(c) Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.
Voltage: 4.5 - 5.5 V
(d) Turn the ignition switch OFF.
(e) Reconnect the vapor pressure sensor connector.

2. INSPECT POWER OUTPUT OF VAPOR PRESSURE SENSOR

(a) Turn the ignition switch ON.
(b) Remove the fuel tank cap.

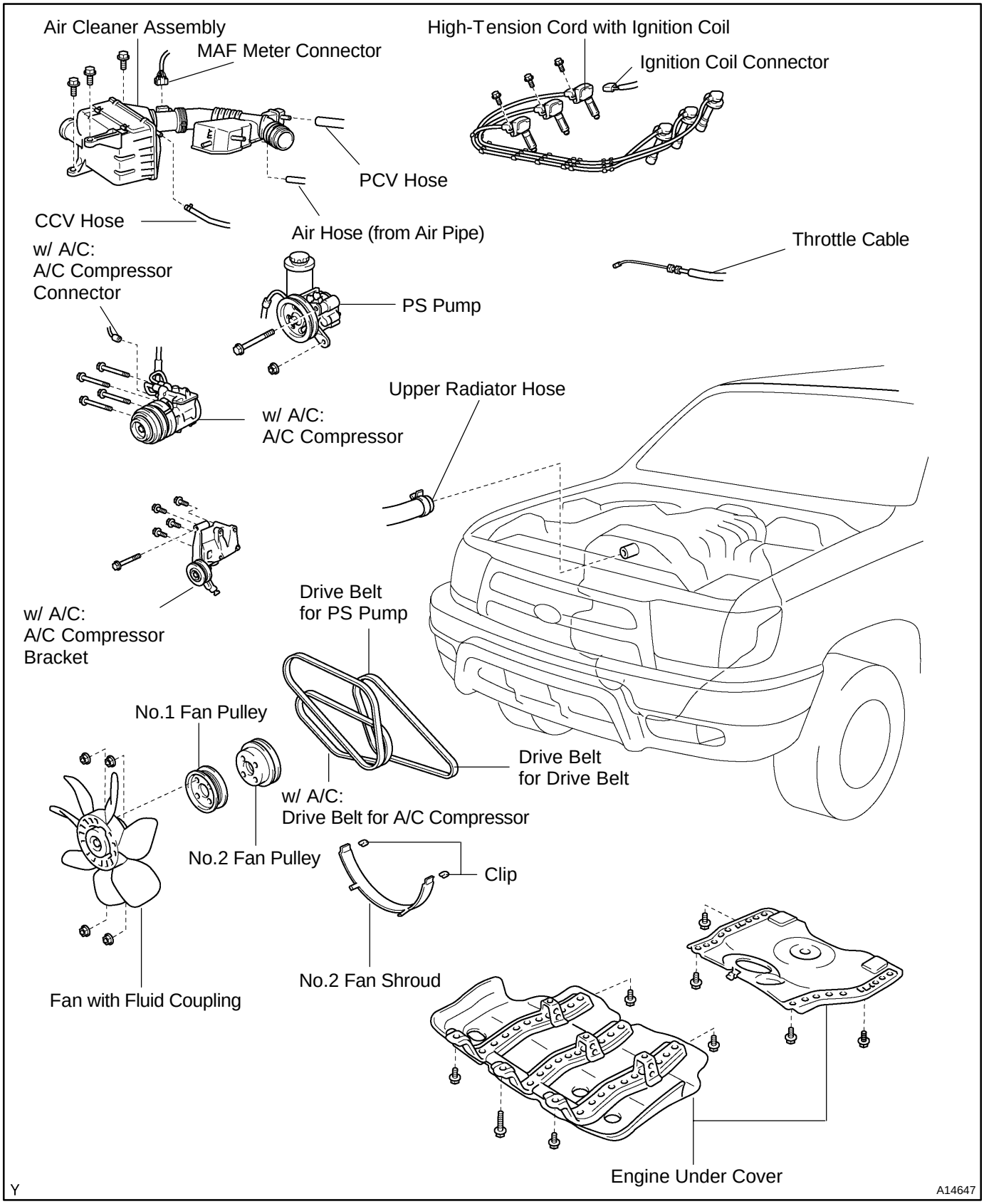


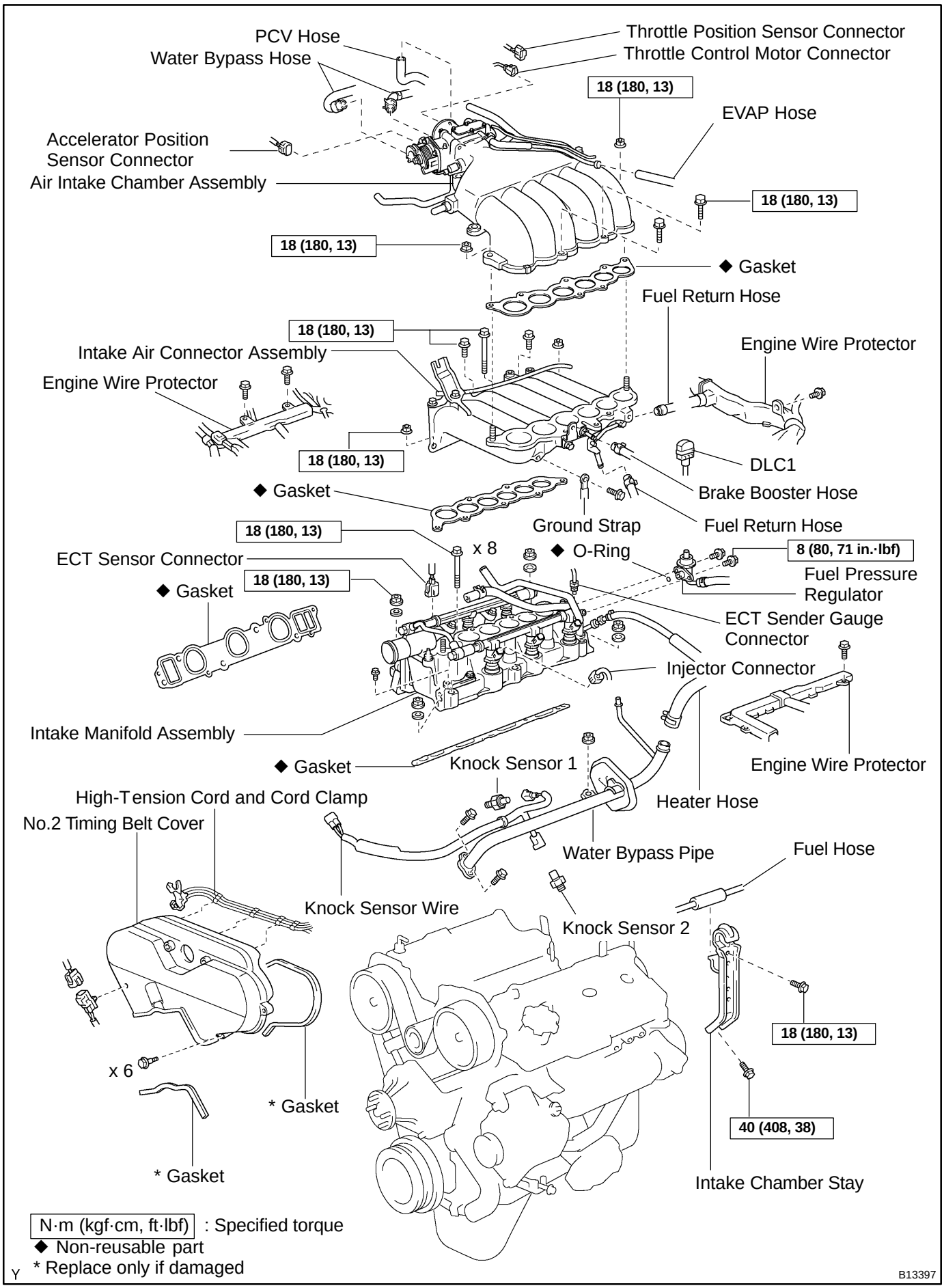
(c) Connect a voltmeter to terminals PTNK and E2, and measure the output voltage.
Voltage: 3.0 - 3.6 V
(d) Reinstall the fuel tank cap.

KNOCK SENSOR

COMPONENTS

SF02P-04

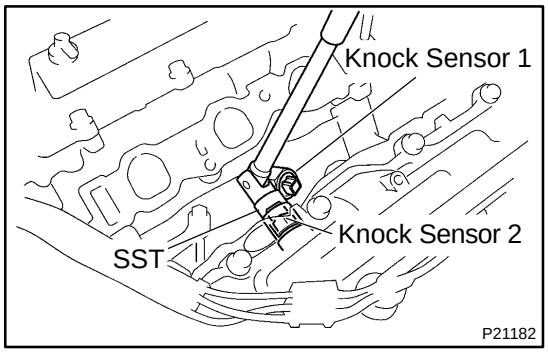



PCV Hose
Water Bypass Hose
Throttle Position Sensor Connector
Throttle Control Motor Connector
18 (180, 13)
EVAP Hose
Accelerator Position Sensor Connector
Air Intake Chamber Assembly
18 (180, 13)
18 (180, 13)
◆ Gasket
Fuel Return Hose
18 (180, 13)
Intake Air Connector Assembly
Engine Wire Protector
Engine Wire Protector
18 (180, 13)
DLC1
◆ Gasket
Brake Booster Hose
Ground Strap
Fuel Return Hose
18 (180, 13)
x 8
◆ O-Ring
8 (80, 71 in.·lbf)
ECT Sensor Connector
18 (180, 13)
Fuel Pressure Regulator
◆ Gasket
ECT Sender Gauge Connector
Injector Connector
Intake Manifold Assembly
◆ Gasket
Knock Sensor 1
Engine Wire Protector
High-Tension Cord and Cord Clamp
No.2 Timing Belt Cover
Heater Hose
Water Bypass Pipe
Fuel Hose
Knock Sensor Wire
Knock Sensor 2
18 (180, 13)
x 6
* Gasket
40 (408, 38)
* Gasket
Intake Chamber Stay
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
* Replace only if damaged
B13397

SF02Q-04

INSPECTION

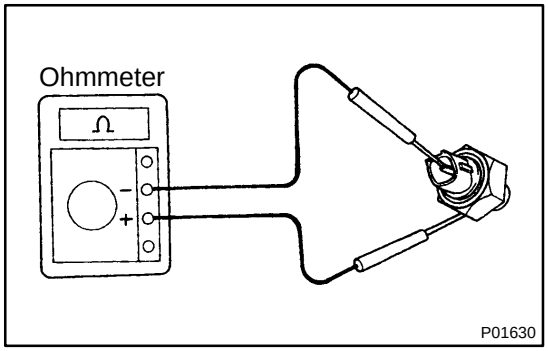
1. **DRAIN ENGINE COOLANT**
2. **REMOVE AIR CLEANER HOSE**
3. **REMOVE NO.2 TIMING BELT COVER (See page EM-13)**
4. **REMOVE INTAKE AIR CONNECTOR ASSEMBLY (See page EM-65)**
5. **REMOVE FUEL PRESSURE REGULATOR (See page SF-16)**
6. **REMOVE INTAKE MANIFOLD ASSEMBLY (See page EM-29)**
7. **REMOVE WATER BYPASS PIPE AND KNOCK SENSOR WIRE (See page EM-29)**



8. **REMOVE KNOCK SENSORS**

Using SST, remove the knock sensor.

SST 09817-1601 1



9. **INSPECT KNOCK SENSORS**

Using an ohmmeter, check that there is no continuity between the terminal and body.

If there is continuity, replace the sensor.

10. **INSTALL KNOCK SENSORS**

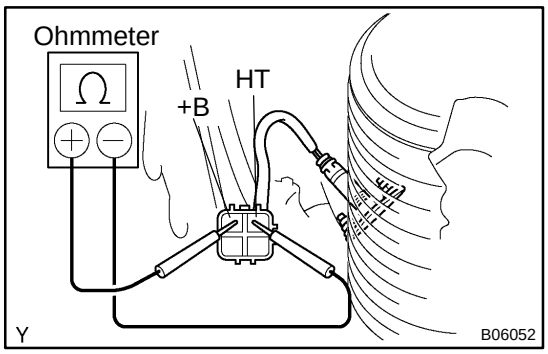
Using SST, install the knock sensor.

SST 09817-1601 1

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

11. **REINSTALL WATER BYPASS PIPE AND KNOCK SENSOR WIRE (See page EM-29)**
12. **REINSTALL INTAKE MANIFOLD ASSEMBLY (See page EM-29)**
13. **REINSTALL FUEL PRESSURE REGULATOR (See page SF-17)**
14. **REINSTALL INTAKE AIR CONNECTOR ASSEMBLY (See page SF-17)**
15. **REINSTALL NO.2 TIMING BELT COVER (See page EM-19)**

16. **REINSTALL AIR CLEANER HOSE**
17. **FILL WITH ENGINE COOLANT**
18. **CHECK ENGINE COOLANT LEVEL**



AIR-FUEL RATIO (A/F) SENSOR

SF15E-03

INSPECTION

1. INSPECT HEATER RESISTANCE OF A/F SENSOR

(a) Disconnect the A/F sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals +B and HT

Resistance:

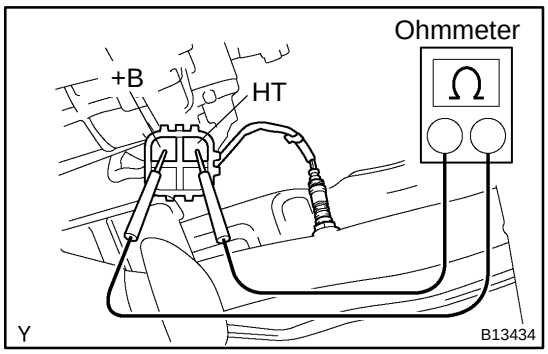
At 20˚C (68˚F)	0.8 - 1.4 Ω
At 800˚C (1,472˚F)	1.8 - 3.2 Ω

If the resistance is not as specified, replace the sensor.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Reconnect the A/F sensor connector.

2. INSPECT OPERATION OF A/F SENSOR (See page DI-122)



HEATED OXYGEN SENSOR (Bank 1 Sensor 2)

SF15G-03

INSPECTION

1. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSOR

(a) Disconnect the oxygen sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals +B and HT.

Resistance:

At 20˚C (68˚F)	11 - 16 Ω
At 800˚C (1,472˚F)	23 - 32 Ω

If the resistance is not as specified, replace the sensor.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

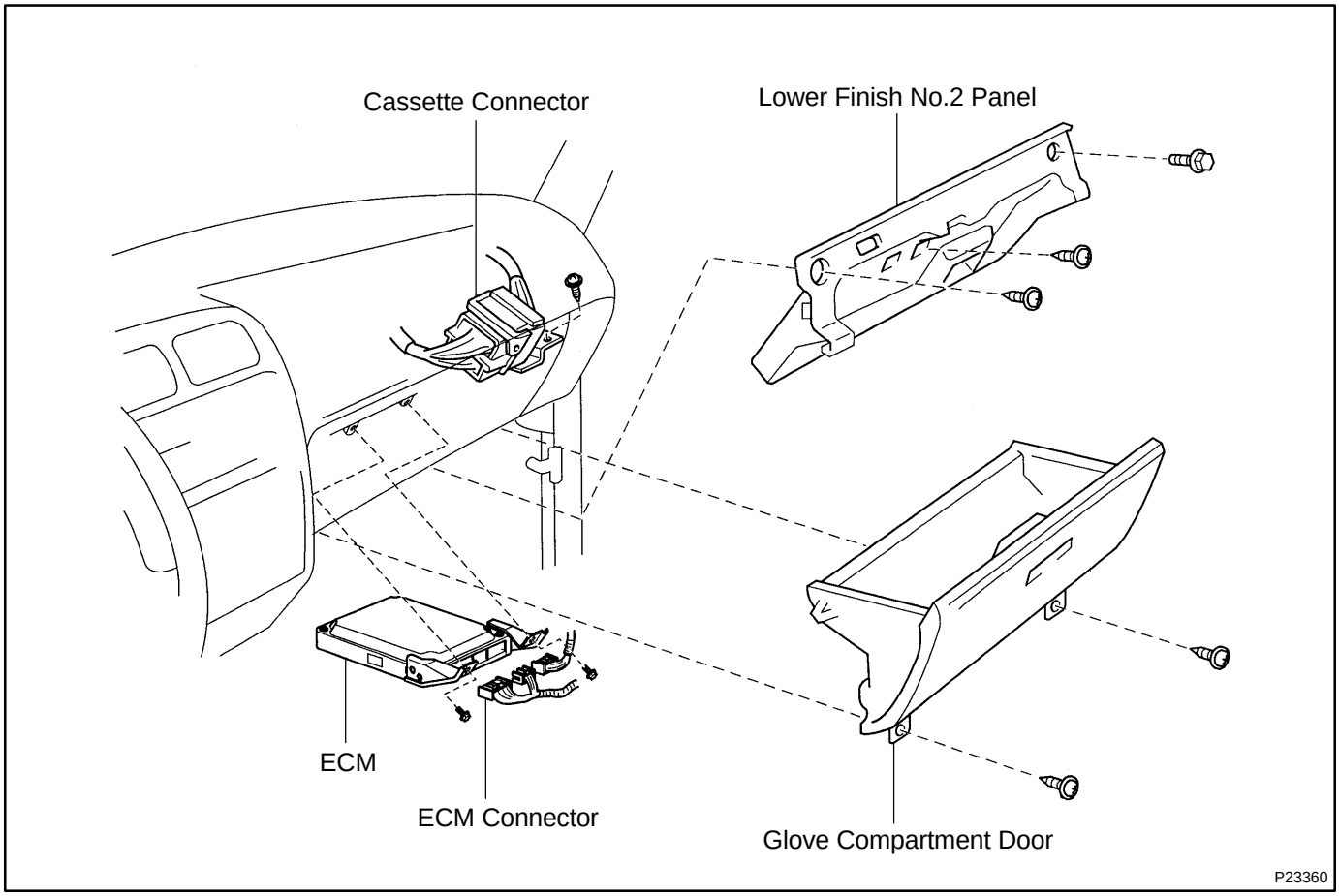
(c) Reconnect the oxygen sensor connector.

2. INSPECT OPERATION OF HEATED OXYGEN SENSOR (See page DI-48)

ENGINE CONTROL MODULE (ECM)

COMPONENTS

SF02S-03



SF0ZO-01

INSPECTION

1. REMOVE ECM
2. INSPECT ECM (See page DI-18)
3. REINSTALL ECM

FUEL CUT RPM

SF08X-03

INSPECTION

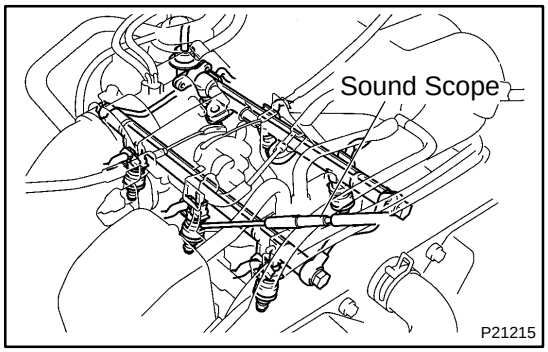
1. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

2. CONNECT TOYOTA HAND-HELD TESTER OR OBDII SCAN TOOL (See page SF-7)

3. INSPECT FUEL CUT OFF RPM

(a) Increase the engine speed to at least 3,500 rpm.



(b) Use a sound scope to check for injector operating noise.

(c) Check that when the throttle lever is released, injector operation noise stops momentarily and then resumes.

HINT:

Measure with the A/C OFF.

Fuel return rpm: 1,500 rpm

(Vehicle speed less than 25 km/h (16 mph), with brake OFF)

4. DISCONNECT TOYOTA HAND- HELD TESTER OR OBDII SCAN TOOL

COOLANT

CO0SR-01

INSPECTION

1. CHECK ENGINE COOLANT LEVEL AT RESERVOIR TANK

The engine coolant level should be between the ”LOW” and ”FULL” lines, when the engine is cold.

If low, check for leaks and add ”TOYOTA Long Life Coolant” or equivalent up to the ”FULL” line.

2. CHECK ENGINE COOLANT QUALITY

(a) Remove the radiator cap from the water outlet.

CAUTION:

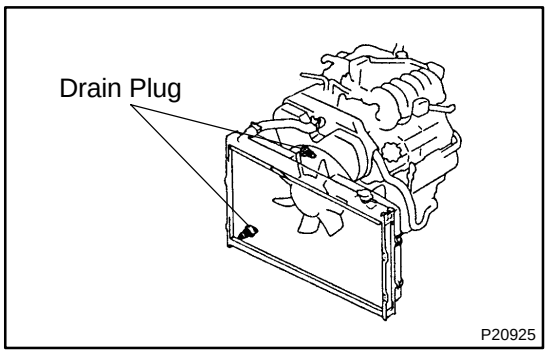
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

(b) There should not be any excessive deposits of rust or scale around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If they are excessively dirty, clean the coolant passages and replace the coolant.

(c) Reinstall the radiator cap.

CO00P-03



REPLACEMENT

1. DRAIN ENGINE COOLANT

(a) Remove the radiator cap.

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

(b) Loosen the drain plugs, and drain the engine coolant.

(c) Close the drain plugs.

2. FILL ENGINE COOLANT

(a) Slowly fill the system with engine coolant.

- Use of improper coolants may damage engine cooling system.
- Use ”TOYOTA Long Life Coolant” or equivalent and mix it with plain water according to the manufacturer’s directions.
- Use of the coolant which includes more than 50% (freezing protection down to -35˚C (-31 ˚F)) or 60% (freezing protection down to -50˚C (-58 ˚F)) of ethylene-glycol is recommended, but not more than 70%

NOTICE:

- **Do not use an alcohol type engine coolant.**
- **The engine coolant should be mixed with demineralized water or distilled water.**

  Capacity:

  w/ Rear heater: 9.0 liters (9.5 US qts, 7.9 Imp. qts)

  w/o Rear heater: 8.0 liters (8.5 US qts, 7.0 Imp. qts)

(b) Reinstall the radiator cap.

(c) Start the engine, and bleed the cooling system.

(d) If necessary, refill engine coolant into the reservoir tank until it is ”FULL” line.

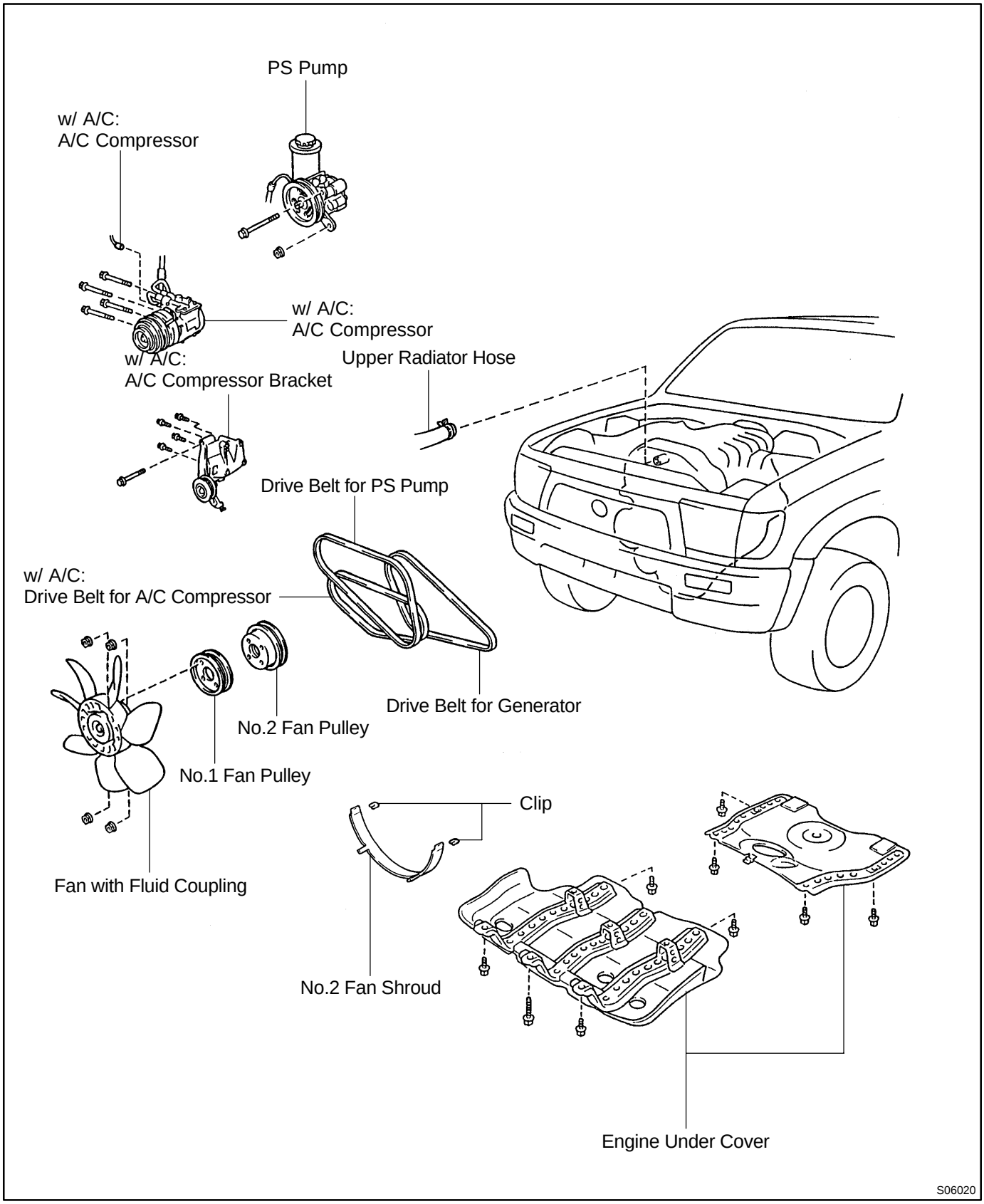
3. CHECK ENGINE COOLANT FOR LEAKS

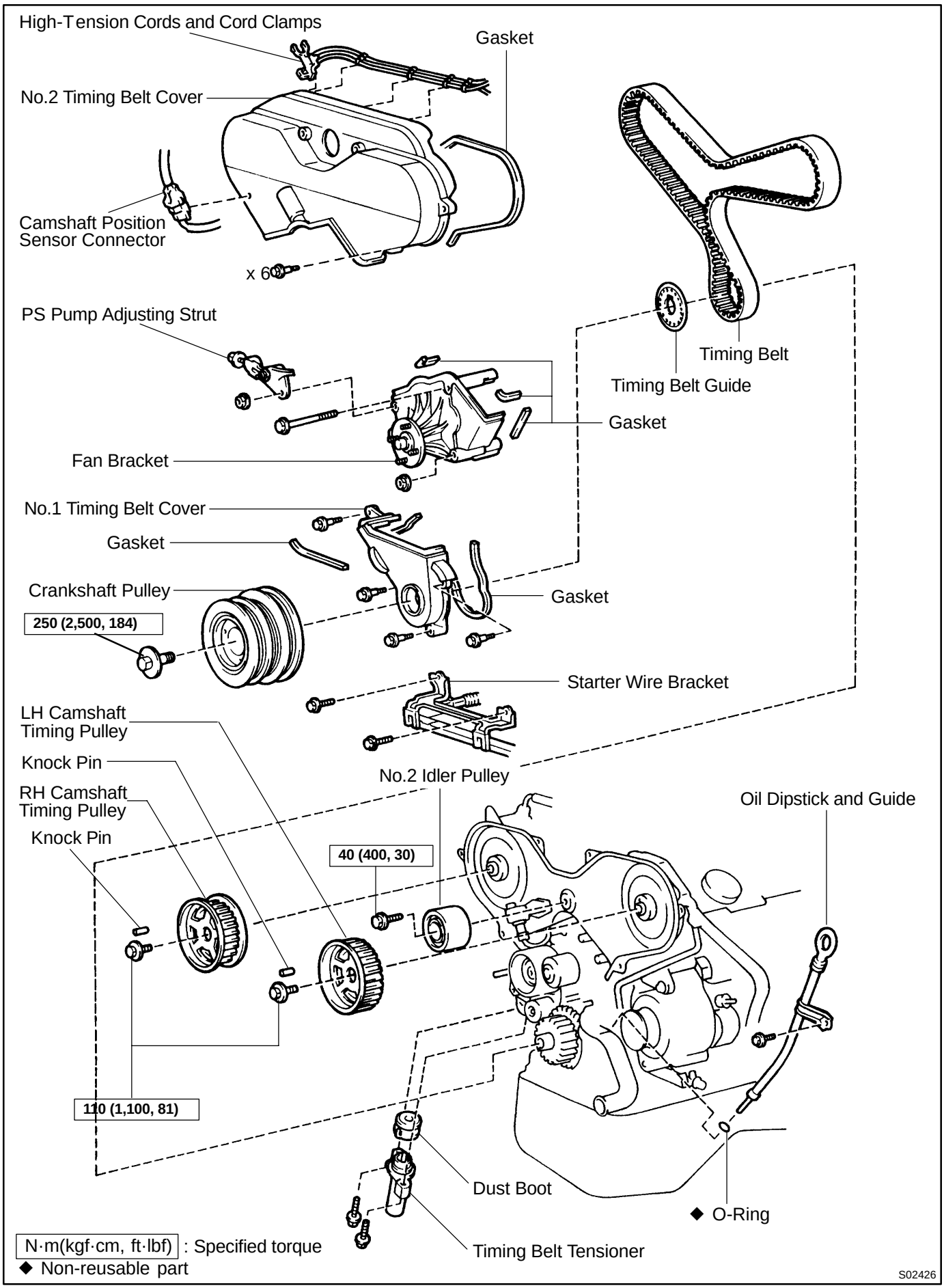
4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY

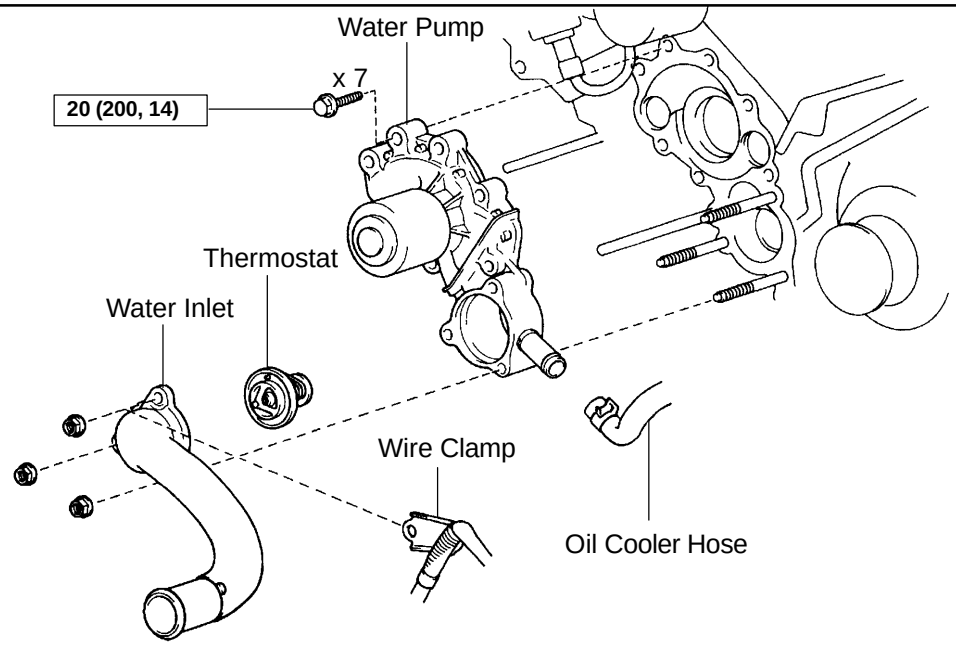
WATER PUMP

COMPONENTS

CO00Q-03



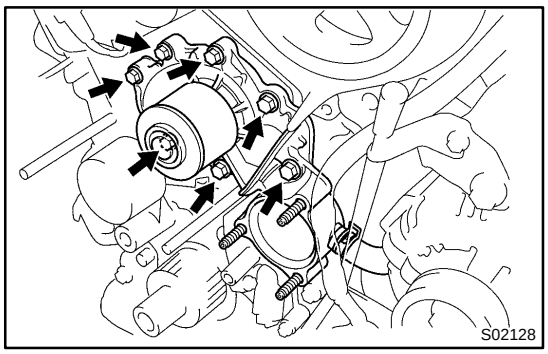

High-Tension Cords and Cord Clamps
Gasket
No.2 Timing Belt Cover
Camshaft Position Sensor Connector
x 6
PS Pump Adjusting Strut
Timing Belt
Timing Belt Guide
Gasket
Fan Bracket
No.1 Timing Belt Cover
Gasket
Crankshaft Pulley
Gasket
250 (2,500, 184)
Starter Wire Bracket
LH Camshaft Timing Pulley
Knock Pin
No.2 Idler Pulley
RH Camshaft Timing Pulley
Oil Dipstick and Guide
Knock Pin
40 (400, 30)
110 (1,100, 81)
Dust Boot
◆ O-Ring
N·m(kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
Timing Belt Tensioner
S02426



N·m(kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

S02351

CO00R-03

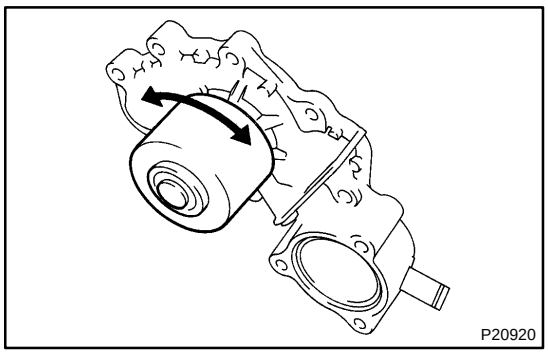


REMOVAL

1. REMOVE TIMING BELT (See page EM-13)
2. REMOVE WATER INLET AND THERMOSTAT
3. DISCONNECT NO.2 OIL COOLER HOSE FROM WATER PUMP
4. REMOVE WATER PUMP

CO00S-03

INSPECTION


P20920

1. INSPECT WATER PUMP

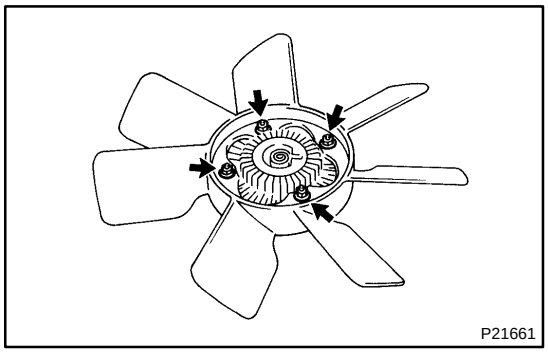
(a) Visually check the water hole and air hole for coolant leakage.

If leakage is found, replace the water pump.

If engine coolant has leaked onto the timing belt, replace the timing belt.

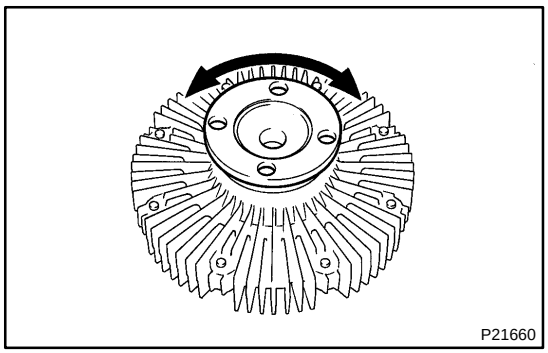
(b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.


P21661

2. INSPECT FLUID COUPLING

(a) Remove the 4 nuts and fan from the fluid coupling.

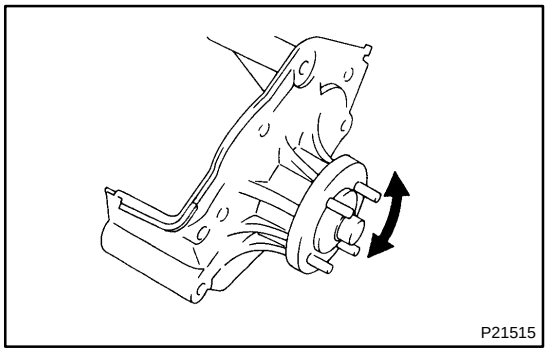

P21660

(b) Check that the fluid coupling is not damaged and that no silicon oil leaks.

If necessary, replace the fluid coupling.

(c) Reinstall the fan to the fluid coupling with the 4 nuts.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)


P21515

3. INSPECT FAN PULLEY BRACKET

Check the turning smoothness of the fan pulley.

If necessary, replace the fan pulley bracket.

4. INSPECT TIMING BELT (See page EM-17)

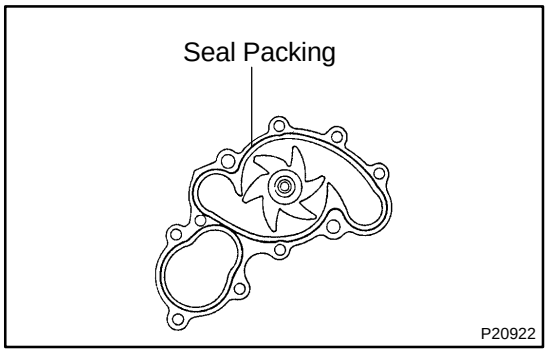
CO00T-03

INSTALLATION

1. INSTALL WATER PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water pump and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
- Thoroughly clean all components to remove all the loose material.
- Using a non-residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the water pump groove as shown in the illustration.

Seal packing: Part No. 08826-00100 or equivalent

- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

(c) Install the water pump with the 7 bolts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

2. CONNECT NO.2 OIL COOLER HOSE

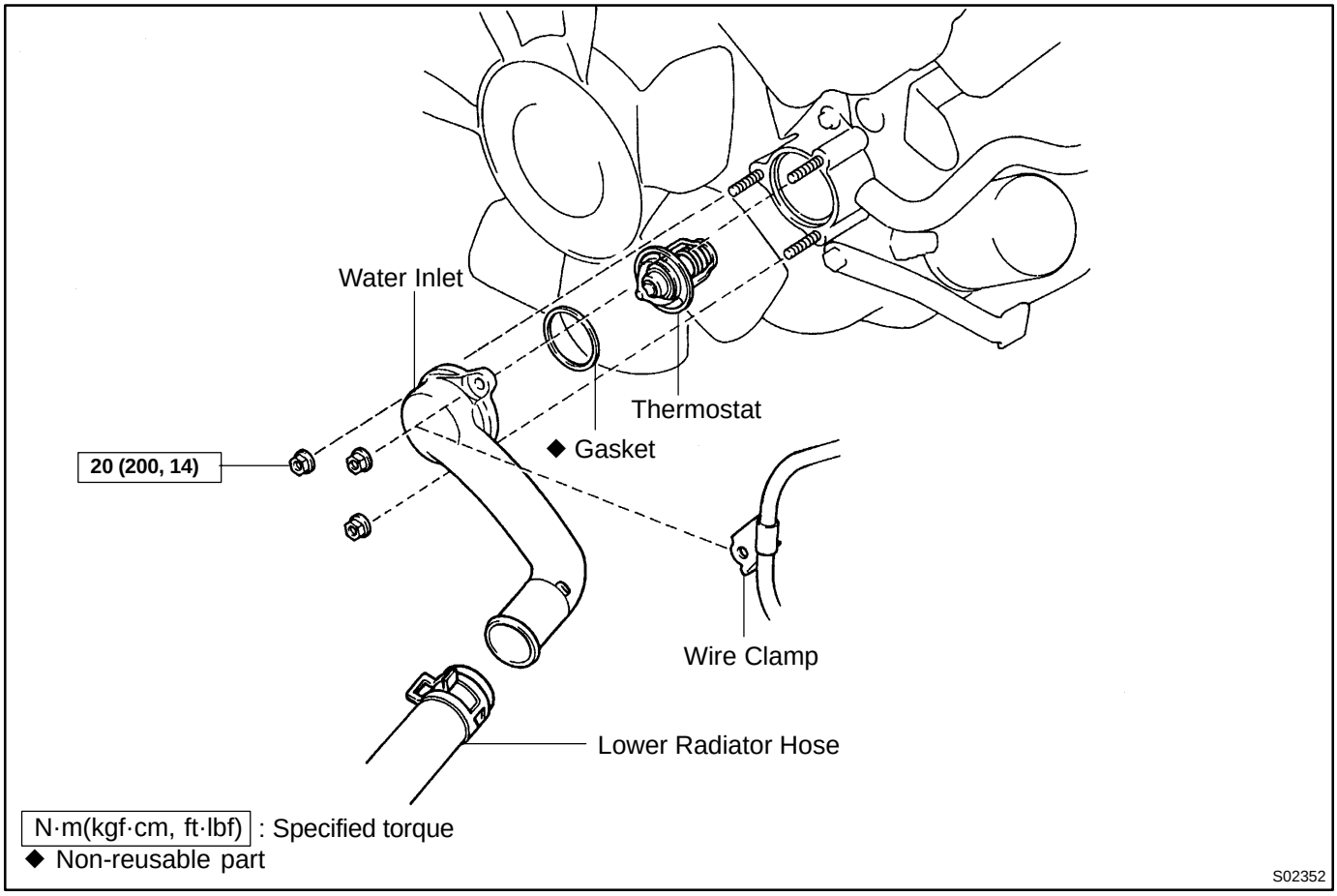
3. INSTALL THERMOSTAT AND WATER INLET (See page CO-12)

4. INSTALL TIMING BELT (See page EM-19)

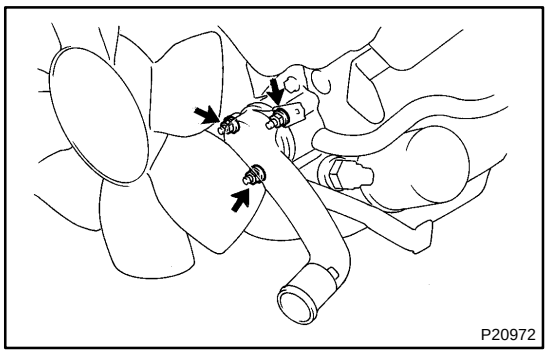
THERMOSTAT

COMPONENTS

CO00U-03



CO00V-02



REMOVAL

1. DRAIN ENGINE COOLANT

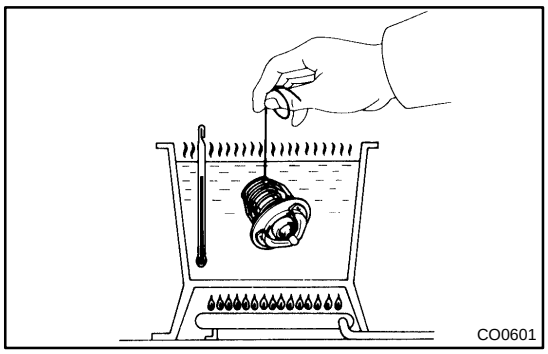
2. DISCONNECT LOWER RADIATOR HOSE

3. REMOVE THERMOSTAT

(a) Remove the 3 nuts, wire clamp, water inlet and thermostat with gasket from the water pump.

(b) Remove the gasket from the thermostat.

CO00W-03



INSPECTION

INSPECT THERMOSTAT

HINT:

Thermostat is numbered according to the valve opening temperature.

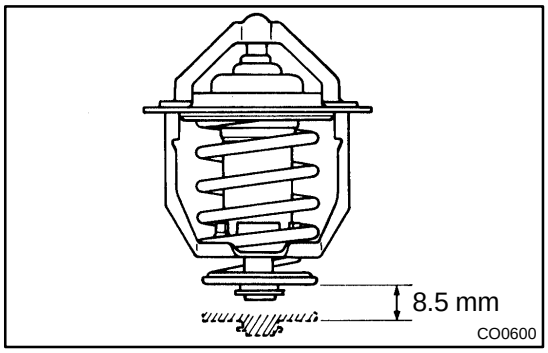
(a) Immerse the thermostat in water and heat the water gradually.

(b) Check the valve opening temperature and valve lift.

Valve opening temperature: 80 - 84˚C (176 - 183˚F)

Valve lift: 8.5 mm (0.335 in.) or more at 95˚C (203˚F)

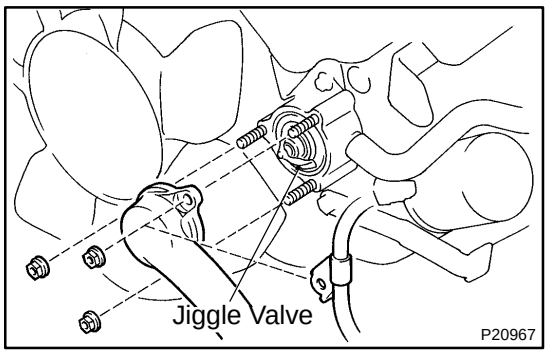
If the valve opening temperature and valve lift are not within specifications, replace the thermostat.



(c) Check that the valve is fully closed when the thermostat is at low temperatures (below 40˚C (104˚F)).

If it is not tight, replace the thermostat.

CO00X-02



INSTALLATION

1. INSTALL THERMOSTAT

(a) Place a new gasket to the thermostat.

(b) Install the thermostat with the jiggle valve downward.

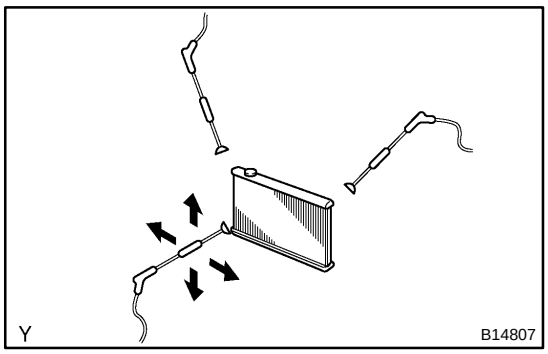
(c) Install the water inlet with the 3 bolts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

2. CONNECT LOWER RADIATOR HOSE

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR LEAKS



RADIATOR

CO1B0-01

ON-VEHICLE CLEANING

INSPECT FINS FOR BLOCKAGE

If fins are clogged, wash them with water or a steam cleaner and dry with compressed air.

NOTICE:

- **If the distance between the steam cleaner and the core is too close, there is a possibility of damaging the fin, so keep the following injection distance.**

Injection Pressure	Injection Distance
2,942 - 4,903 kpa (30 - 50 kg/cm^{2,} 427 -711 psi)	300 mm (11.811 in)
4,903 - 7,845 kpa (50 - 80 kg/cm^{2,} 711 - 1,138 psi)	500 mm (19.685 in)

- **If the fins are bent, straighten them with a screwdriver or pliers.**
- **Never apply water directly onto the electronic components.**

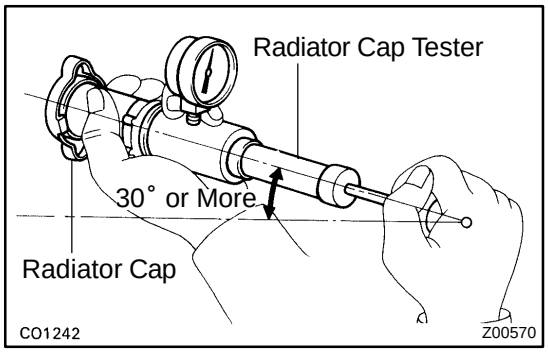
CO00Z-02

ON-VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



2. INSPECT RADIATOR CAP

NOTICE:

- **If the radiator cap has contaminations, always rinse it with water.**
- **When performing steps (a) and (b) below, keep the radiator cap tester at an angle of over 30° above the horizontal.**
- **Before using a radiator cap tester, wet the relief valve with engine coolant or water.**

(a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push/(3 seconds or more)

NOTICE:

Push the pump at a constant speed.

If air is not coming from the vacuum valve, replace the radiator cap.

(b) Pump the tester and measure the relief valve opening pressure.

Pump speed: within 1 second/1 push

NOTICE:

This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:

74-103 kPa (0.75-1.05 kgf/cm^2, 10.7 - 14.9 psi)

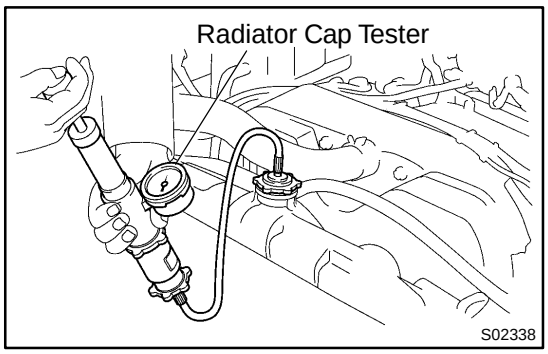
Minimum opening pressure:

59 kPa (0.6 kgf/cm^2, 8.5 psi)

HINT:

Use the tester's maximum reading as the opening pressure.

If the opening pressure is less than minimum, replace the radiator cap.



3. INSPECT COOLING SYSTEM FOR LEAKS

(a) Fill the radiator with coolant and attach a radiator cap tester.

(b) Warm up the engine.

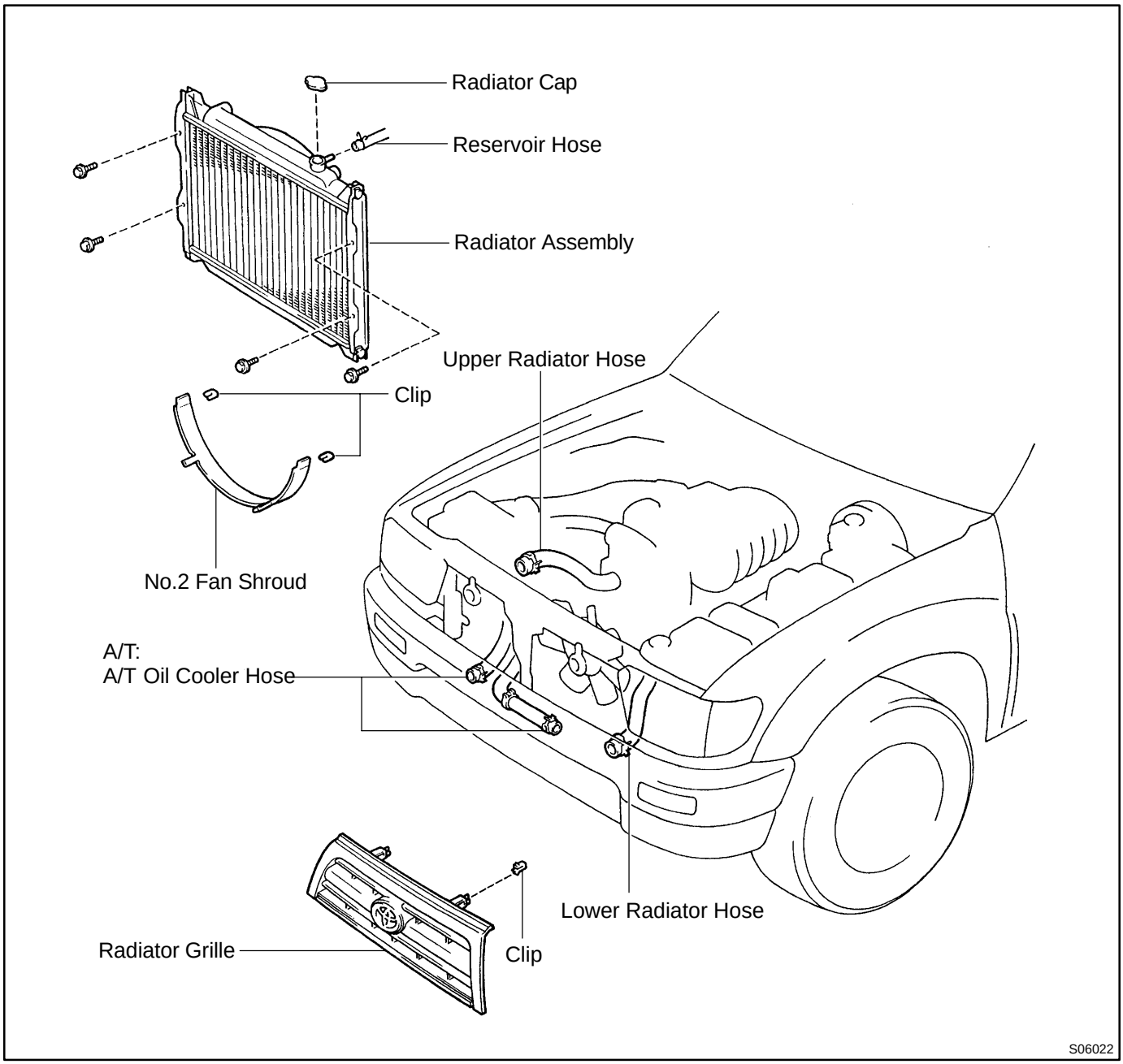
(c) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), and check that the pressure does not drop.

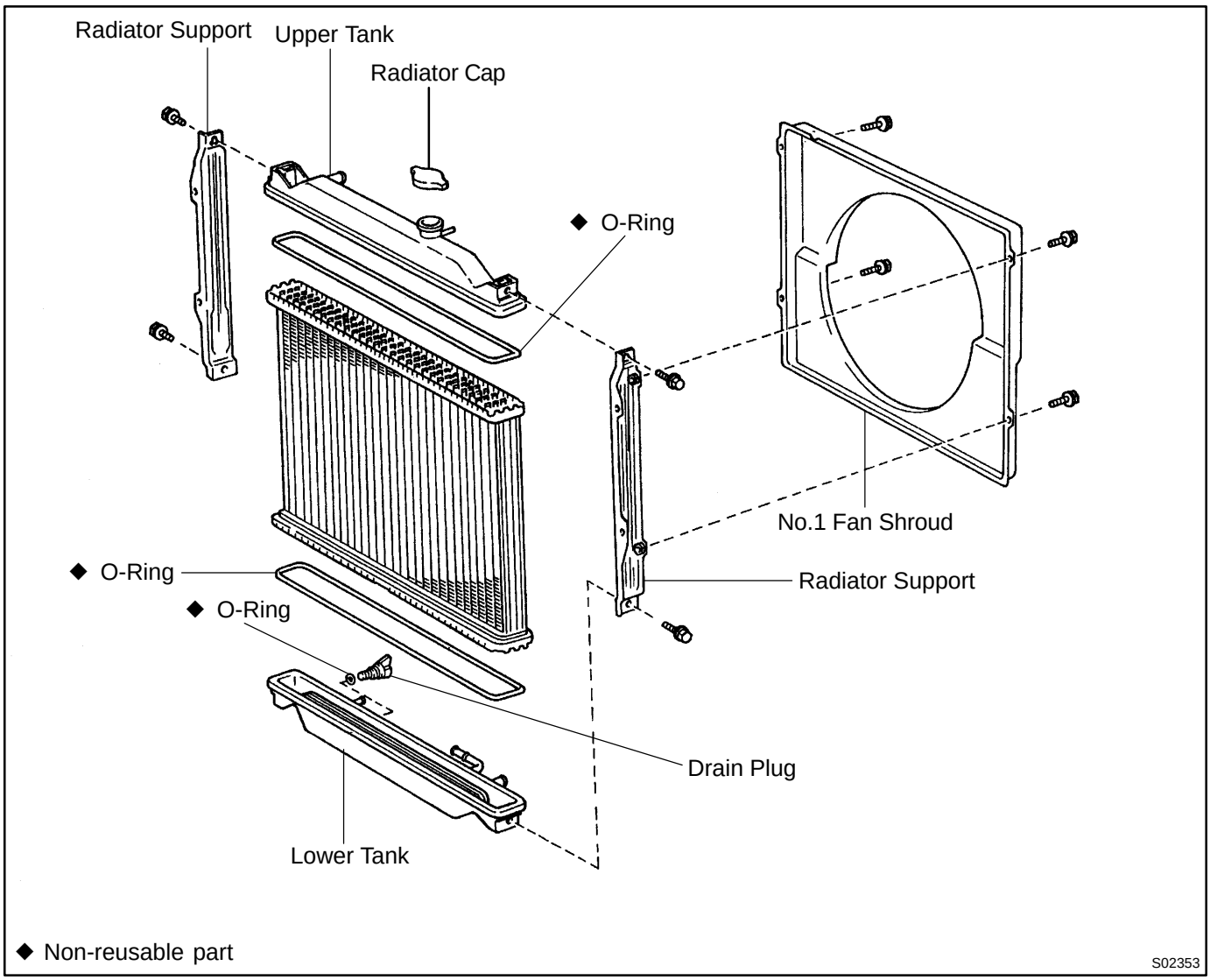
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

4. REINSTALL RADIATOR CAP

CO010-03

COMPONENTS

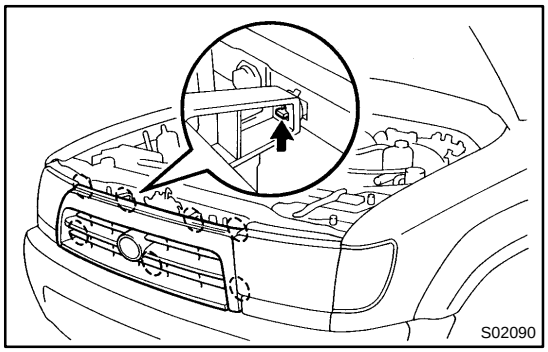



Radiator Support
Upper Tank
Radiator Cap
◆ O-Ring
No.1 Fan Shroud
◆ O-Ring
Radiator Support
◆ O-Ring
Drain Plug
Lower Tank
◆ Non-reusable part
S02353

CO0ST-01

REMOVAL

1. DRAIN ENGINE COOLANT



2. REMOVE RADIATOR GRILLE

Remove the 7 clips and radiator grille.

3. DISCONNECT UPPER RADIATOR HOSE

4. DISCONNECT RADIATOR RESERVOIR HOSE

5. DISCONNECT LOWER RADIATOR HOSE

6. REMOVE RADIATOR NO.2 FAN SHROUD

7. A/T:

DISCONNECT OIL COOLER HOSES

8. REMOVE RADIATOR

Remove the 4 bolts and the radiator.

CO012-02

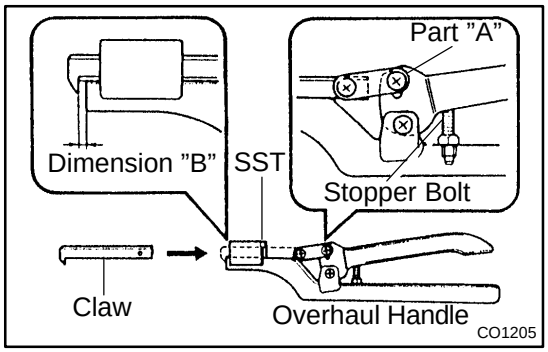
DISASSEMBLY

1. REMOVE NO.1 FAN SHROUD

Remove the 4 bolts and No.1 fan shroud.

2. REMOVE RADIATOR SUPPORTS

3. REMOVE DRAIN PLUG



4. ASSEMBLE SST

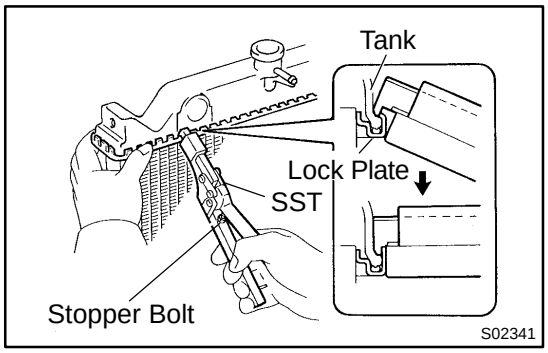
SST 09230-01010

(a) Install the claw to the overhaul handle, inserting it in the hole in part "A" as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension "B" shown in the diagram is 0.2 - 0.3 mm (0.008 - 0.012 in.).

NOTICE:

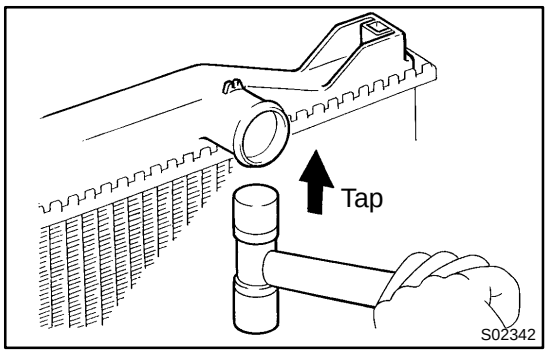
If this adjustment is not done, the claw may be damaged.



5. UNCAULK LOCK PLATES

Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230-01010



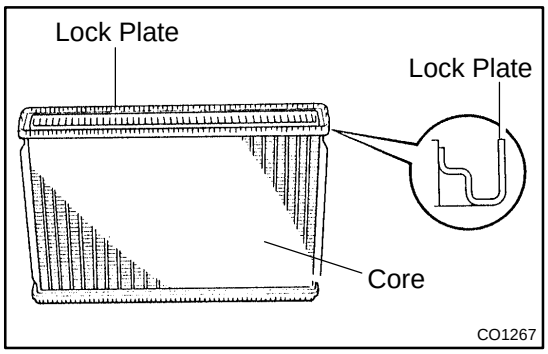
6. REMOVE TANKS AND O-RINGS

(a) Lightly tap the radiator port (inlet or outlet) with a soft-faced hammer, and remove the tank.

(b) Remove the O-ring.

CO013-02

REASSEMBLY



1. INSPECT LOCK PLATE

Inspect the lock plate for damage.

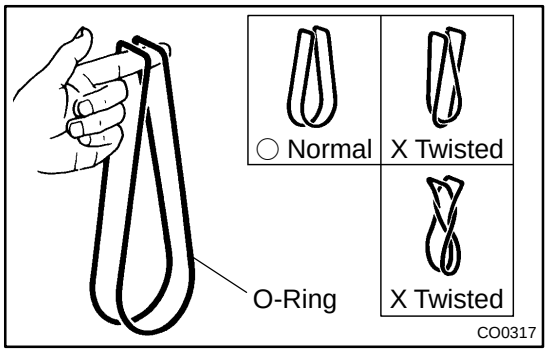
HINT:

If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.

NOTICE:

The radiator can only be recaulked 2 times.

After the 2nd time, the radiator core must be replaced.

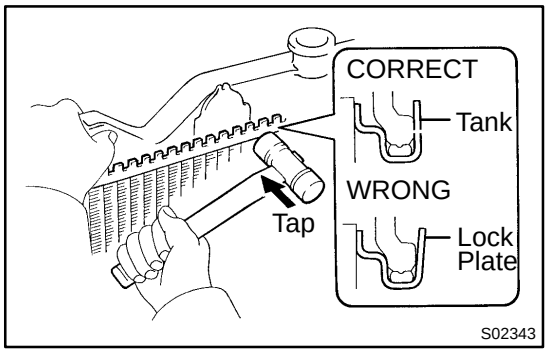


2. INSTALL NEW O-RINGS AND TANKS

(a) After checking that there are no foreign objects in the lock plate groove, install the new O-ring without twisting it.

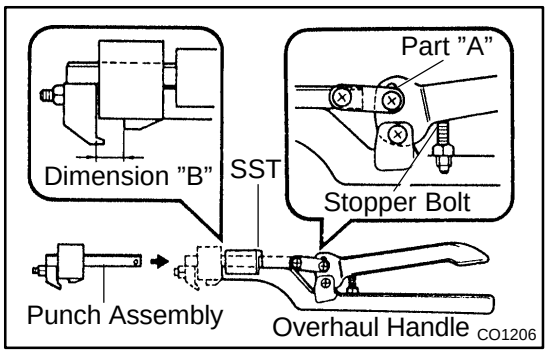
HINT:

When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.



(b) Install the tank without damaging the O-ring.

(c) Tap the lock plate with a soft-faced hammer so that there is no gap between it and the tank.



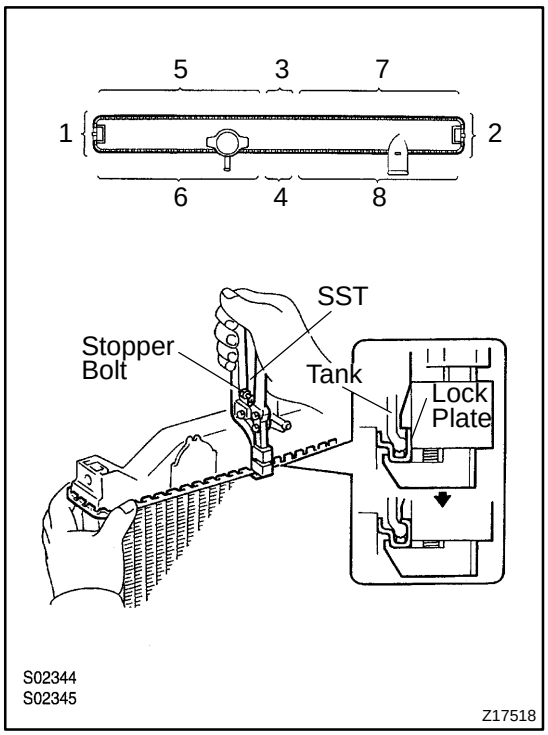
3. ASSEMBLE SST

SST 09230-01010

(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part "A" as shown in the illustration.

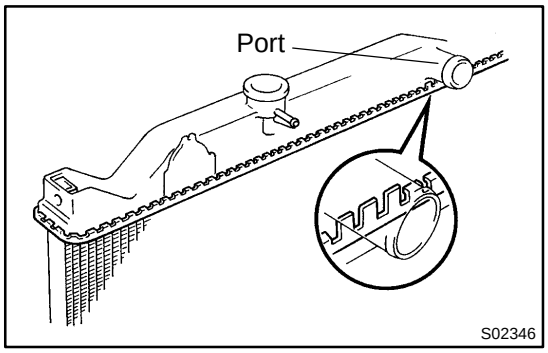
(b) While gripping the handle, adjust the stopper bolt so that dimension "B" shown in the diagram.

Dimension "B": 8.4 mm (0.34 in.)



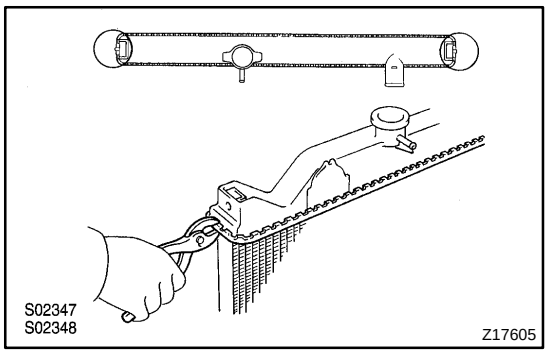
4. CAULK LOCK PLATE

(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper bolt.
SST 09230-01010

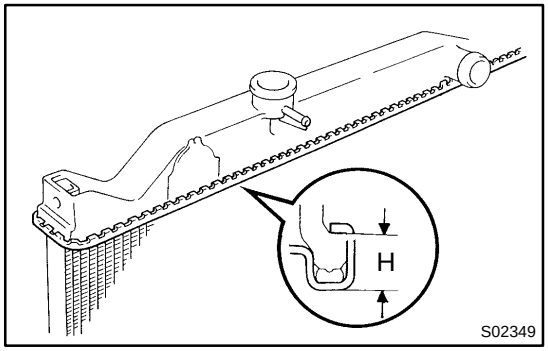


HINT:

- Do not stake the areas protruding around the ports.



- The points shown in the rib sides near here cannot be staked with SST. Use pliers or similar object and be careful not to damage the core plates.



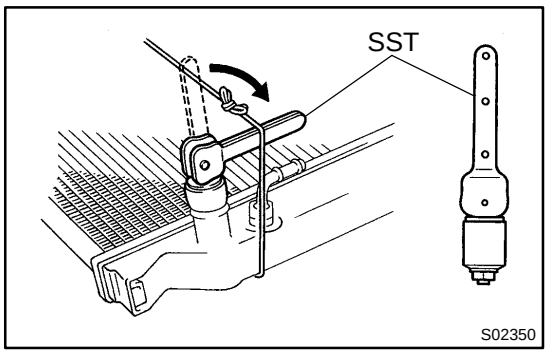
(b) Check the lock plate height (H) after completing the caulking.
Plate height (H): 7.4 - 7.8 mm (0.2959 - 0.3119 in.)

If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

5. PAINT LOCK PLATES

6. INSTALL DRAIN PLUG TO RADIATOR

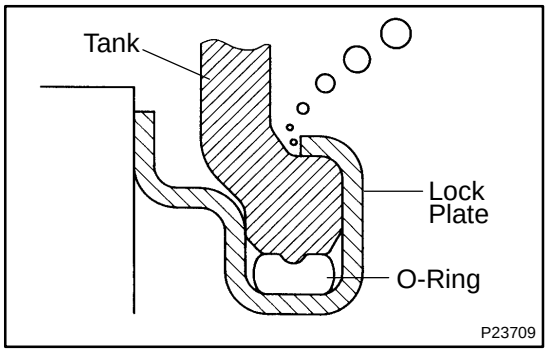
(a) Install a new O-ring to the drain plug.
(b) Apply soapy water to the O-ring.
(c) Install the drain plug.



7. CHECK FOR WATER LEAKS

(a) Using SST, plug the inlet and outlet pipes of the radiator.
SST 09230-01010

(b) Using a radiator cap tester, apply pressure to the radiator.
Test pressure: 177 kPa (1.8 kgf/cm^2, 26 psi)



(c) Check for water leaks.

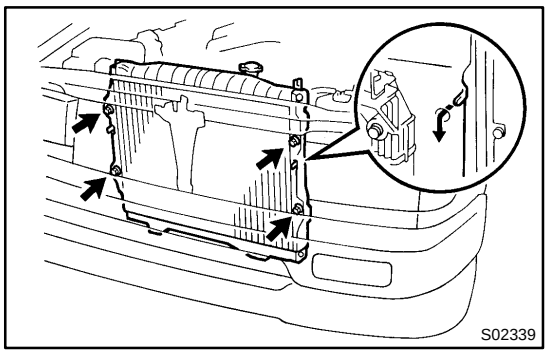
HINT:

On radiators with resin tanks, there is a clearance between the core plate and tank where a minute amount of air will remain, giving the appearance of an air leak when the radiator is submerged in water. Therefore, before performing the water leak test, first swirl the radiator around in the water until all air bubbles disappear.

8. INSTALL SUPPORTS
Torque: 12.7 N·m (130 kgf·cm, 9 ft·lbf)

9. INSTALL NO.1 FAN SHROUD

CO0SU-01



INSTALLATION

1. INSTALL RADIATOR

Install the radiator with 4 bolts.

Torque: 12 N·m (120 kgf·cm, 8.7 ft·lbf)

HINT:

Insert the tabs of the radiator support through the radiator service holes.

2. A/T:
CONNECT OIL COOLER HOSES

3. INSTALL RADIATOR NO.2 FAN SHROUD

4. CONNECT LOWER RADIATOR HOSE

5. CONNECT RADIATOR RESERVOIR HOSE

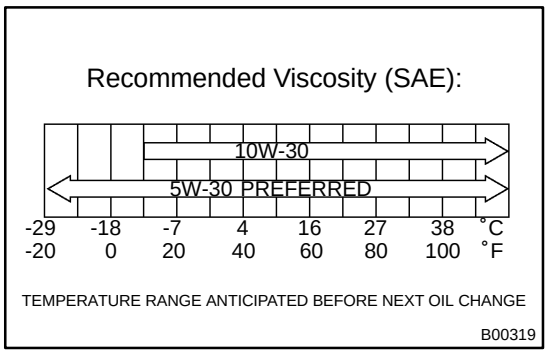
6. CONNECT UPPER RADIATOR HOSE

7. INSTALL RADIATOR GRILLE

Install the radiator grille with 7 clips.

8. FILL WITH ENGINE COOLANT

9. START ENGINE AND CHECK FOR COOLANT LEAKS



OIL AND FILTER

LU00H-04

INSPECTION

1. CHECK ENGINE OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If the quality is visibly poor, replace the oil.

Oil grade:

API grade SJ, Energy-Conserving or ILSAC multi-grade engine oil. SAE 5W-30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.

2. CHECK ENGINE OIL LEVEL

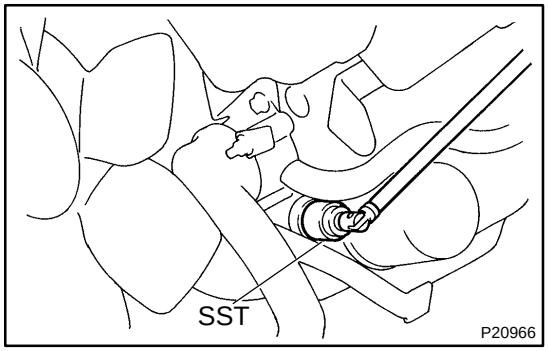
The oil level should be between the low level and full level marks on the dipstick.

3. CHECK OIL LEVEL

The oil level should be between the ”L” and ”F” marks on the level gauge. If low, check for leakage and add oil up to the ”F” mark. If low, check for leakage and add oil up to the full level marks.

NOTICE:

- **When inserting the oil dipstick, insert the curved tip of the dipstick facing the same direction as the curve of the guide.**
- **If the dipstick gets caught while inserting it, do not force it in. Reconfirm the direction of the dipstick.**



4. REMOVE OIL PRESSURE SWITCH

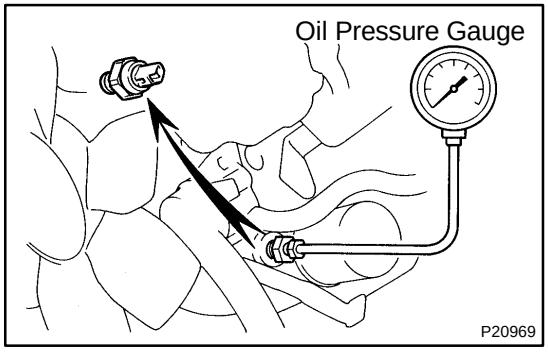
Using SST, remove the oil pressure switch.

SST 09816-30010

5. INSTALL OIL PRESSURE GAUGE

6. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

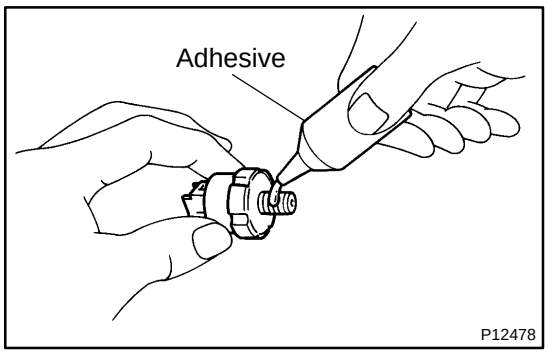


7. MEASURE OIL PRESSURE

Oil pressure:

At idle	29 kPa (0.3 kgf/cm^2, 4.3 psi) or more
At 3,000 rpm	245 - 520, kPa (2.5 - 5.3 kgf/cm^2, 36 - 75 psi)

8. REMOVE OIL PRESSURE GAUGE



9. INSTALL OIL PRESSURE SWITCH

(a) Apply adhesive to 2 or 3 threads.
Adhesive:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Using SST, install the oil pressure switch.
SST 09816-30010
Torque:15 N·m (150 kgf·cm, 11 ft·lbf)

10. START ENGINE AND CHECK FOR LEAKS

LU00I-03

REPLACEMENT

CAUTION:

- **Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.**
- **Care should be taken, therefore, when changing engine oil to minimize the frequency and length of time your skin is exposed to used engine oil. Protective clothing and gloves that cannot be penetrated by oil should be worn. The skin should be thoroughly washed with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.**
- **In order to preserve the environment, used oil and used oil filters must be disposed of only at designated disposal sites.**

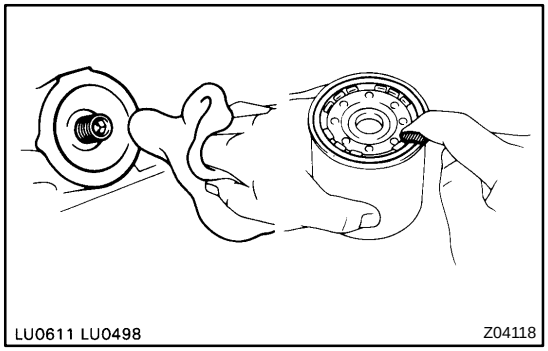
1. DRAIN ENGINE OIL

(a) Remove the oil filler cap.

(b) Remove the oil drain plug, and drain the oil into a container.

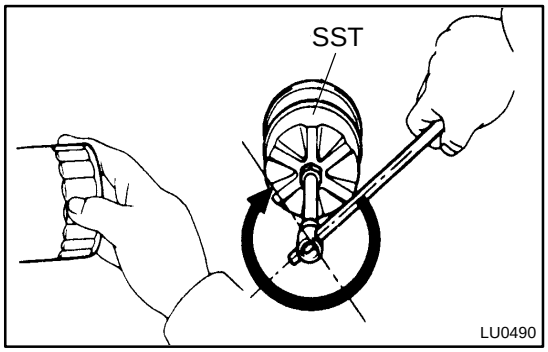
2. REPLACE OIL FILTER

(a) Using SST, remove the oil filter.
SST 09228-07501



(b) Clean the oil filter contact surface on the oil filter mounting.

(c) Lubricate the filter rubber gasket with clean engine oil.



(d) Tighten the oil filter by hand until the rubber gasket contacts the seat of the filter mounting.

(e) Using SST, give it an additional 3/4 turn to seat the filter.
SST 09228-07501

3. FILL WITH ENGINE OIL

(a) Clean and install the oil drain plug with a new gasket.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Fill with new engine oil.

Capacity:

Drain and refill

w/ Oil filter change	5.2 liters (5.5 US qts, 4.5 Imp. qts)
w/o Oil filter change	4.9 liters (5.2 US qts, 4.3 Imp. qts)

Dry fill: 5.9 liters (6.2 US qts, 5.2 Imp. qts)

(c) Reinstall the oil filler cap.

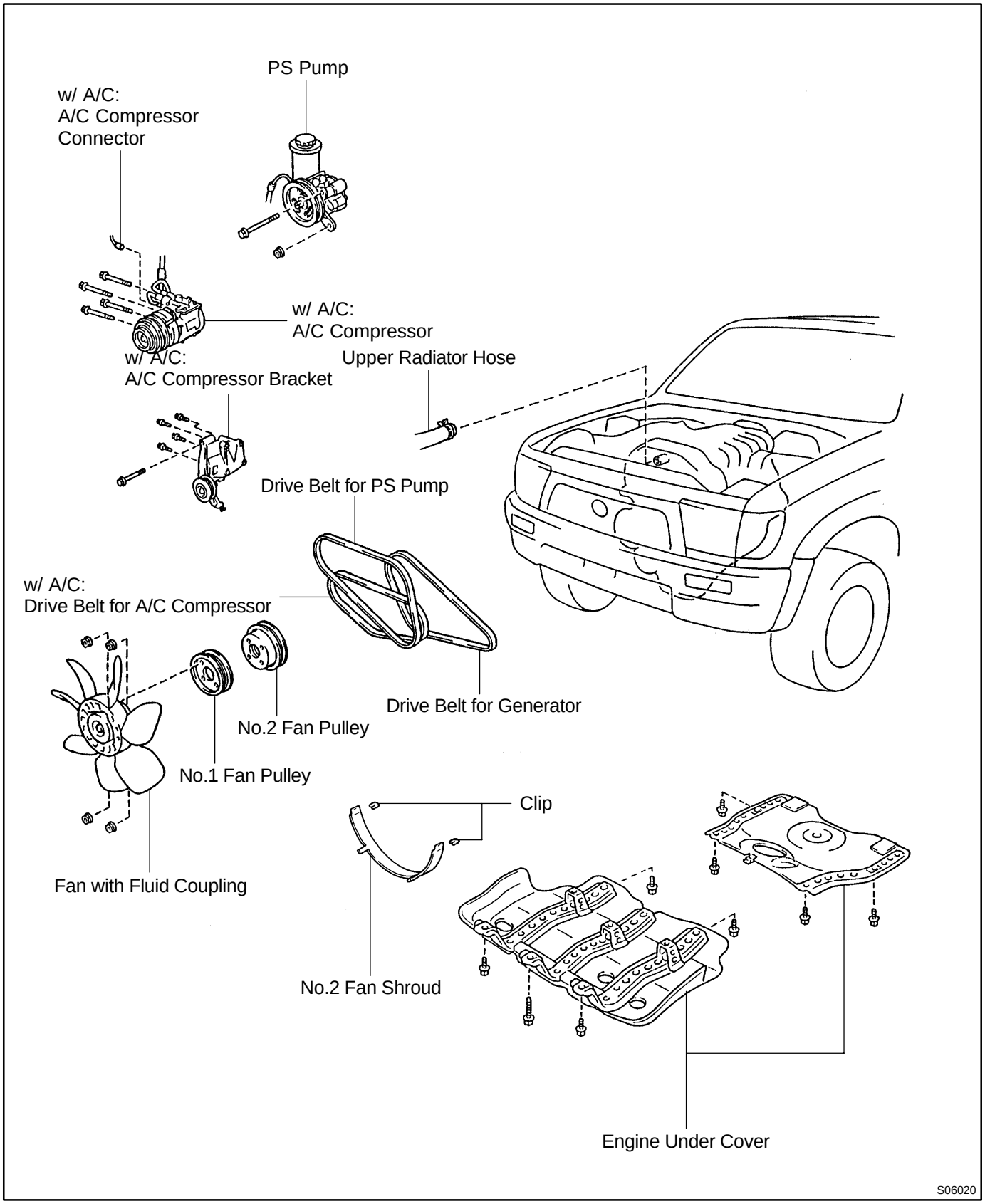
4. START ENGINE AND CHECK FOR OIL LEAKS

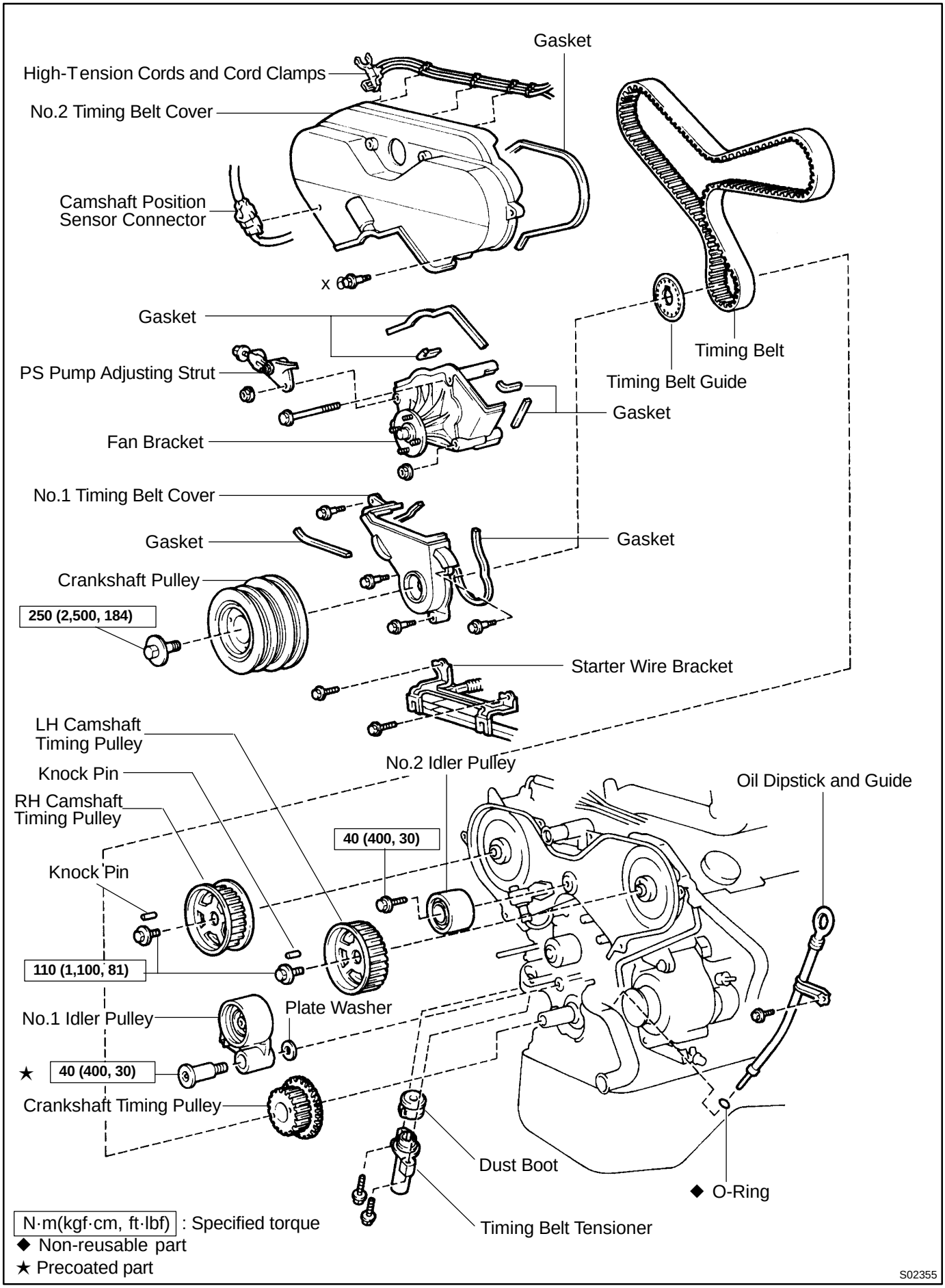
5. RECHECK ENGINE OIL LEVEL

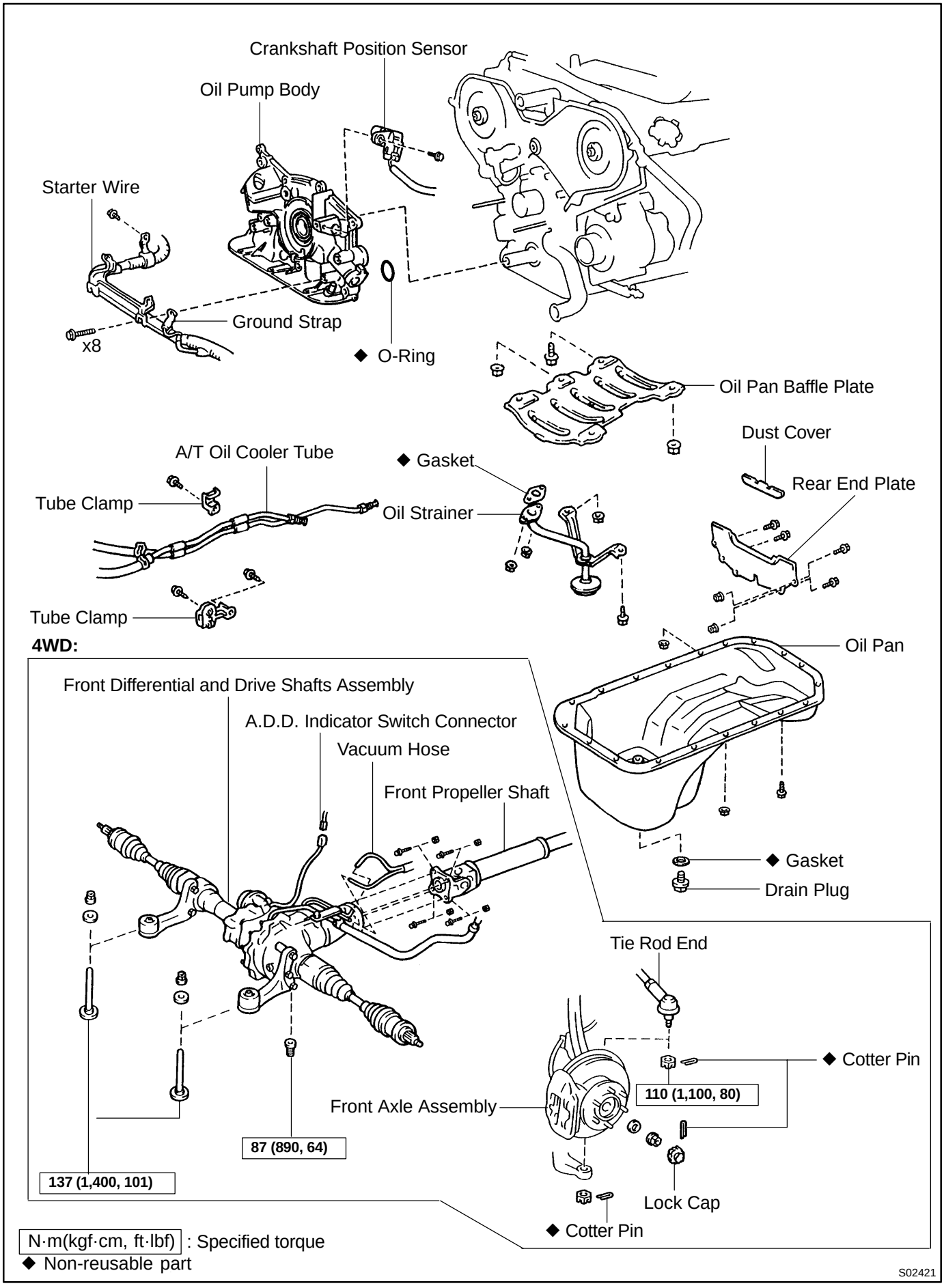
OIL PUMP

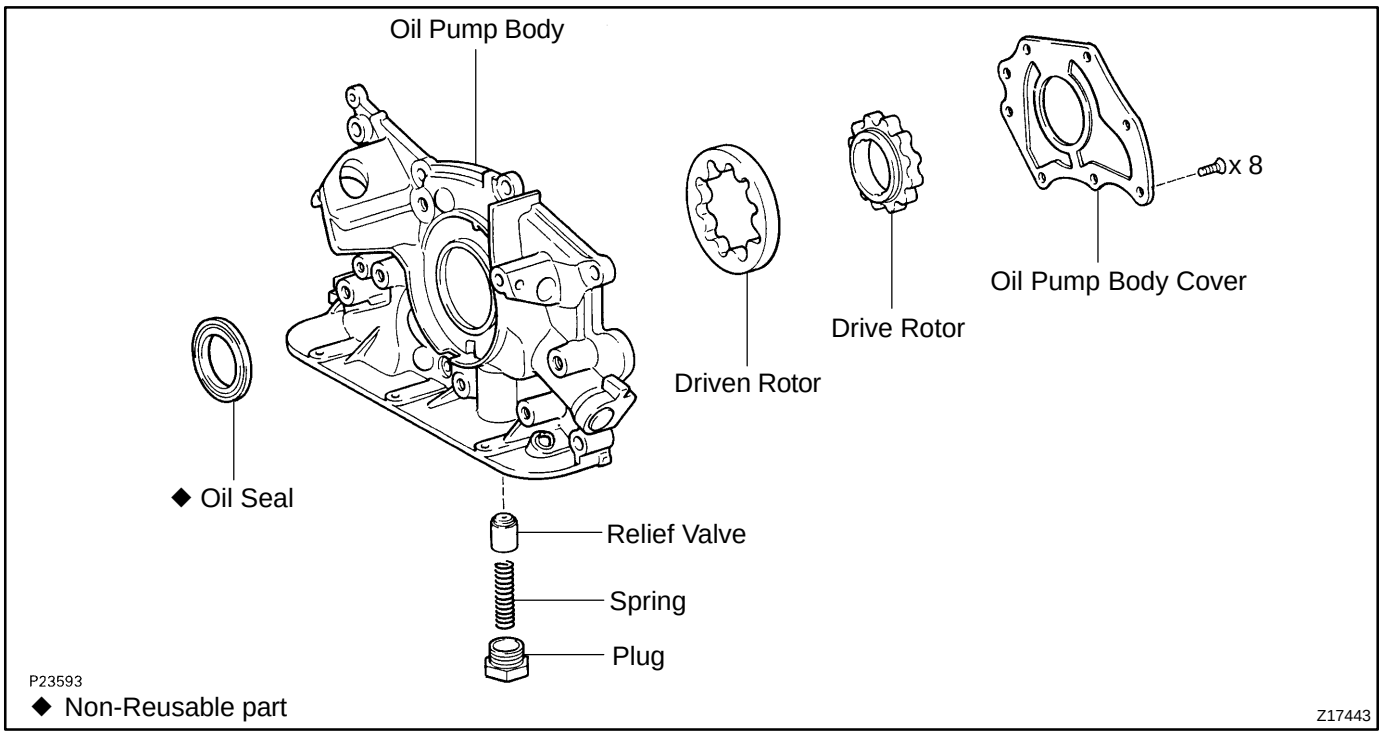
LU00J-03

COMPONENTS




Gasket
High-Tension Cords and Cord Clamps
No.2 Timing Belt Cover
Camshaft Position Sensor Connector
x 6
Gasket
PS Pump Adjusting Strut
Fan Bracket
Timing Belt
Timing Belt Guide
Gasket
No.1 Timing Belt Cover
Gasket
Gasket
Crankshaft Pulley
250 (2,500, 184)
Starter Wire Bracket
LH Camshaft Timing Pulley
Knock Pin
RH Camshaft Timing Pulley
Knock Pin
No.2 Idler Pulley
Oil Dipstick and Guide
40 (400, 30)
110 (1,100, 81)
No.1 Idler Pulley
Plate Washer
★ 40 (400, 30)
Crankshaft Timing Pulley
Dust Boot
◆ O-Ring
Timing Belt Tensioner
N·m(kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part
S02355


Crankshaft Position Sensor
Oil Pump Body
Starter Wire
Ground Strap
x8
◆ O-Ring
Oil Pan Baffle Plate
Dust Cover
A/T Oil Cooler Tube
◆ Gasket
Rear End Plate
Tube Clamp
Oil Strainer
Tube Clamp
Oil Pan
4WD:
Front Differential and Drive Shafts Assembly
A.D.D. Indicator Switch Connector
Vacuum Hose
Front Propeller Shaft
◆ Gasket
Drain Plug
Tie Rod End
◆ Cotter Pin
110 (1,100, 80)
Front Axle Assembly
87 (890, 64)
137 (1,400, 101)
Lock Cap
◆ Cotter Pin
N·m(kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
S02421


Oil Pump Body
x 8
Oil Pump Body Cover
Drive Rotor
Driven Rotor
◆ Oil Seal
Relief Valve
Spring
Plug
P23593
◆ Non-Reusable part
Z17443

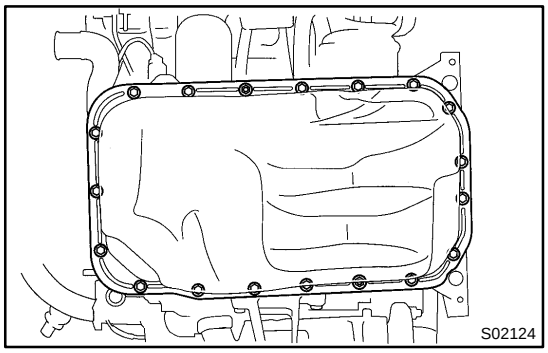
LU00K-03

REMOVAL

HINT:

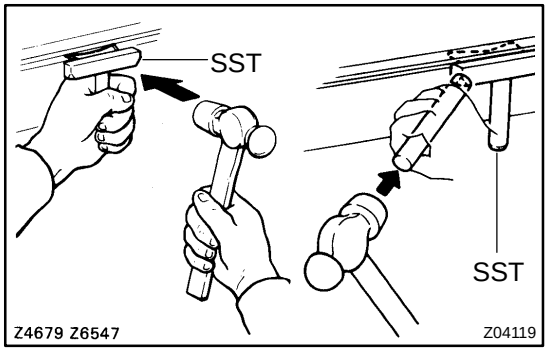
When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

1. **REMOVE CRANKSHAFT TIMING PULLEY**
   (See page EM-13)
2. **4WD:**
   REMOVE FRONT DIFFERENTIAL (See page SA-29)
3. **DRAIN ENGINE OIL**
4. **A/T:**
   REMOVE OIL COOLER TUBE AND CLAMP
   (A340E:See page AT-19)
   (A340F:See page AT-22)
5. **REMOVE REAR END COVER AND DUST COVER**
6. **DISCONNECT STARTER WIRE CLAMP**
7. **REMOVE CRANKSHAFT POSITION SENSOR**
   (See page IG-12)



8. **REMOVE OIL PAN**

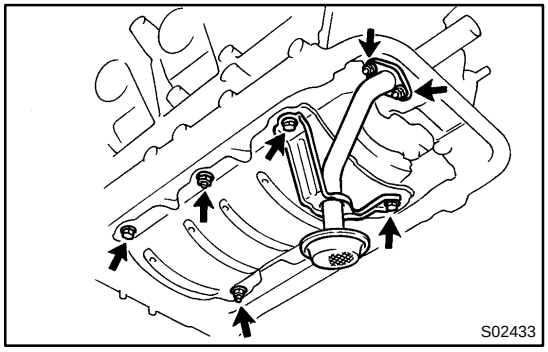
(a) Remove the 17 bolts and 2 nuts.



(b) Using SST and a brass bar, separate the oil pan from the cylinder block.
SST 09032-00100

HINT:

When removing the oil pan, be careful not to damage the oil pan flange.

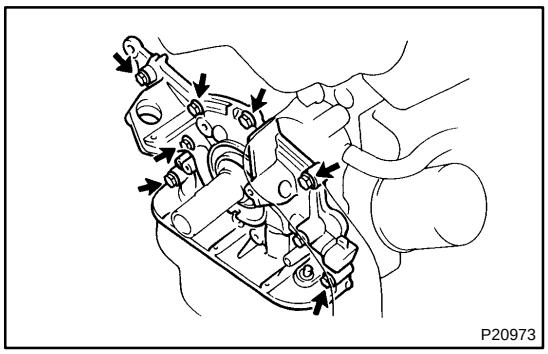


9. **REMOVE OIL STRAINER**

Remove the bolt, 3 nuts and oil strainer and gasket.

10. **REMOVE OIL PAN BAFFLE PLATE**

Remove the bolt, 2 nuts and oil pan baffle plate.



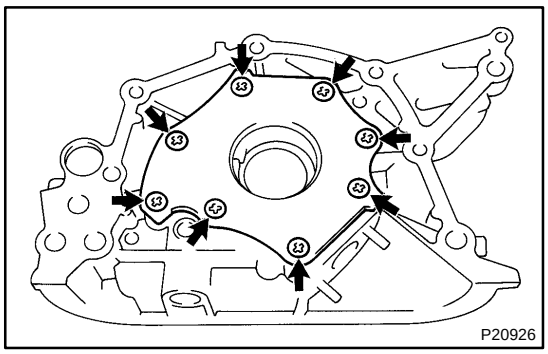
11. REMOVE OIL PUMP

(a) Remove the 8 bolts, ground strap and oil pump.

(b) Using a plastic-faced hammer, carefully tap the oil pump body.

(c) Remove the O-ring from the cylinder block.

LU0FW-01

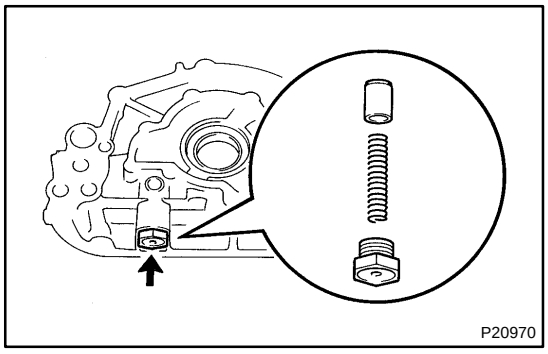


DISASSEMBLY

1. REMOVE DRIVEN AND DRIVE ROTORS

(a) Remove the 8 screws and pump body cover.

(b) Remove the drive and driven rotors.



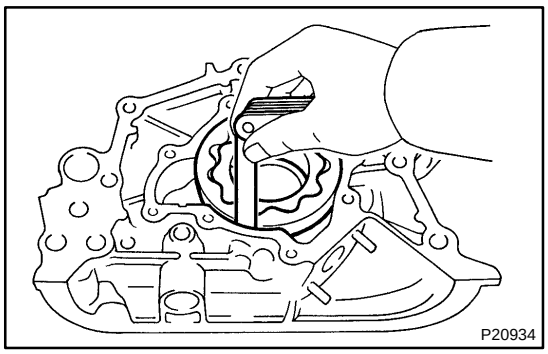
2. REMOVE RELIEF VALVE

(a) Unscrew the relief valve plug and gasket.

(b) Remove the spring and relief valve.

LU00M-02

INSPECTION

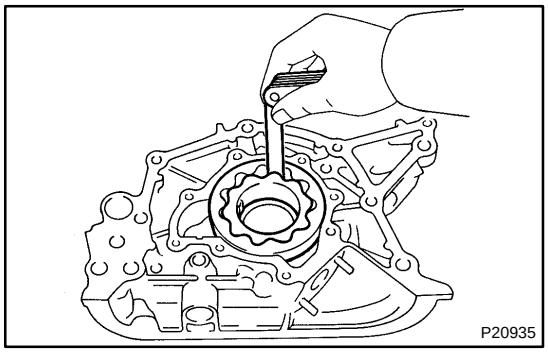


1. INSPECT BODY CLEARANCE

Using a thickness gauge, measure the clearance between the driven rotor and pump body.

Standard clearance:
0.10 -0.18 mm (0.0039 - 0.0069 in.)
Maximum clearance: 0.30 mm (0.0118 in.)

If the clearance is greater than the maximum, replace the oil pump rotor set and/or pump body.

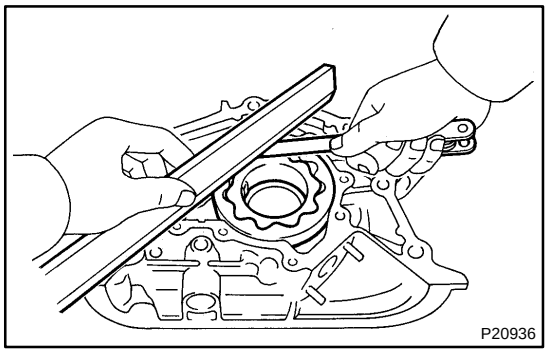


2. INSPECT TIP CLEARANCE

Using a thickness gauge, measure the clearance between the drive and driven rotors.

Standard clearance:
0.11 - 0.24 mm (0.0043 - 0.0094 in.)
Maximum clearance: 0.35 mm (0.0138 in.)

If the clearance is greater than the maximum, replace the oil pump rotor set.

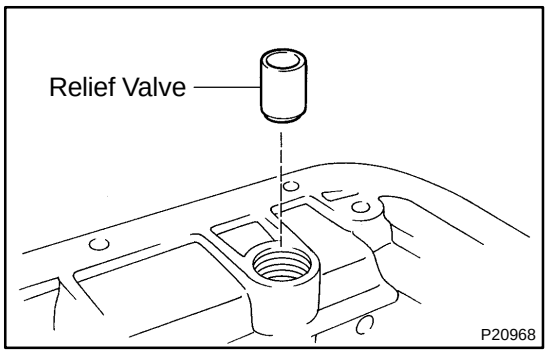


3. INSPECT SIDE CLEARANCE

Using a thickness gauge and precision straight edge, measure the side clearance, as shown.

Standard clearance:
0.03 - 0.09 mm (0.0012 - 0.0035 in.)
Maximum clearance: 0.15 mm (0.0059 in.)

If the clearance is greater than the maximum, replace the oil pump rotor set and/or pump body.



4. INSPECT RELIEF VALVE

Coat the relief valve with engine oil and check that it falls smoothly into the valve hole by its own weight.

If the valve does not fall smoothly, replace the valve and/or oil pump assembly.

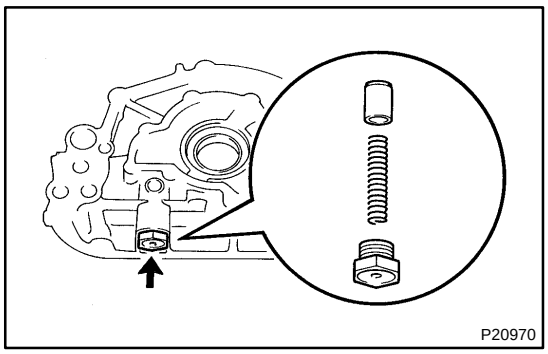
LU0FX-01

REPLACEMENT

REPLACE CRANKSHAFT FRONT OIL SEAL (See page EM-88)

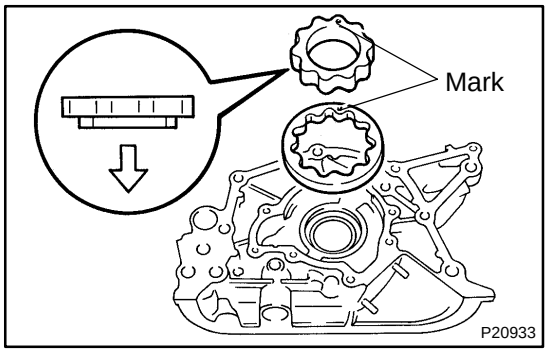
LU0FY-01

REASSEMBLY



1. INSTALL RELIEF VALVE

Install the relief valve, compression spring, new gasket and plug.

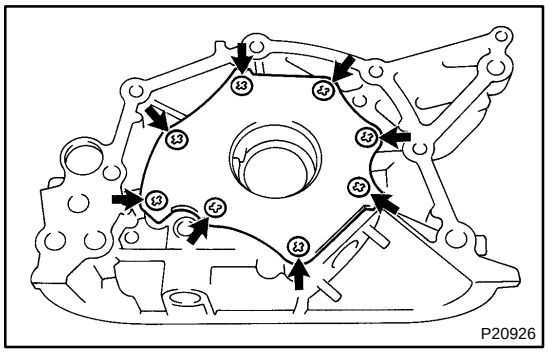


2. INSTALL DRIVEN AND DRIVE ROTORS

(a) Install the drive and driven rotor.

HINT:

Place the drive and driven rotor into pump body with the marks facing the pump body cover side.



(b) Install the pump body cover with 8 screws
Torque: 10 N·m (105 kgf·cm, 8 ft·lbf)

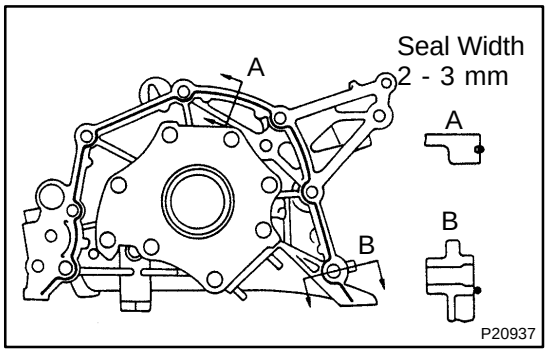
LU00P-03

INSTALLATION

1. INSTALL OIL PUMP

(a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the oil pump and cylinder block.

- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing grooves.
- Thoroughly clean all components to remove all the loose material.
- Using a non-residue solvent, clean both sealing surfaces.



(b) Apply seal packing to the oil pump, as shown in the illustration.

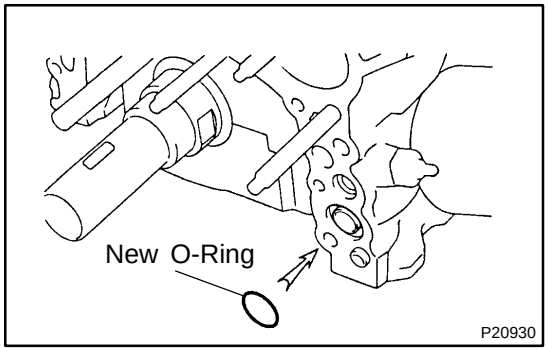
Seal packing: Part No. 08826-00080 or equivalent

- Install nozzle that has been cut out to a 2-3 mm (0.08-0.12 in.) opening.

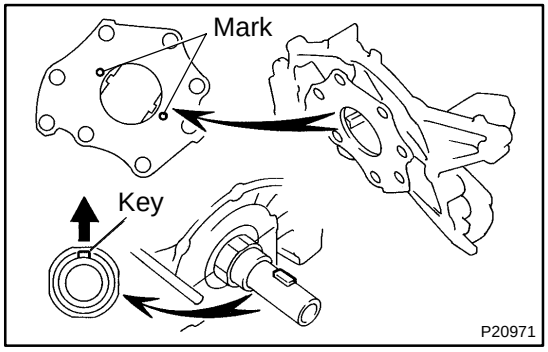
HINT:

Avoid applying an excessive amount to the surface.

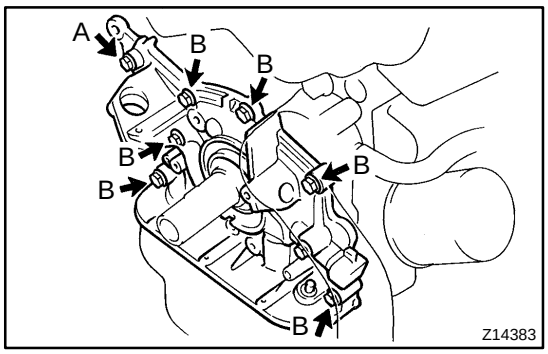
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.



(c) Place a new O-ring into the groove of cylinder block.



(d) Install the oil pump to the crankshaft with the spline teeth of the drive rotor engaged with the large teeth of the crankshaft.



(e) Install the oil pump with the 8 bolts, and ground strap.
Torque:
Bolt A: 20 N·m (200 kgf·cm, 15 ft·lbf)
Bolt B: 42 N·m (420 kgf·cm, 31 ft·lbf)

2. INSTALL CRANK SHAFT POSITION SENSOR
(See page IG-14)

3. INSTALL OIL PAN BAFFLE PLATE

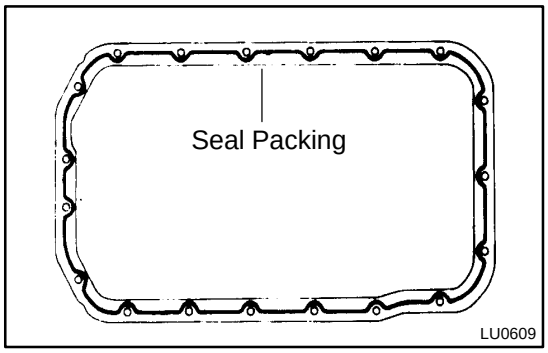
4. INSTALL OIL STRAINER

Place a new gasket and install the oil strainer.
Torque: 7.5 N·m (76 kgf·cm, 66 in.·lbf)

5. CLEAN OIL PAN.

Remove any old packing (FIPG) material and be careful not to drop any oil on the contacting surfaces of the, oil pan, cylinder block and sealing grooves.

- Using a razor blade and gasket scraper, remove all the remaining seal packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loose material.



- Clean both sealing surfaces with a non-residue solvent.

NOTICE:
Do not use a solvent which will affect the painted surfaces.

6. INSTALL OIL PAN

(a) Apply seal packing to the oil pan, as shown in the illustration.
Seal packing: Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 3 - 4 mm (0.12 - 0.16 in.) opening.

HINT:
Avoid applying an excess amount to the surface.

- If parts are not assembled within 5 minutes of applying the seal packing, the effectiveness of the seal packing is lost and the seal packing must be removed and reapplied.
- Immediately remove the nozzle from the tube and reinstall the cap after using the seal packing.

(b) Install the oil pan with the 2 nuts and 17 bolts.
Torque: 7.6 N·m (78 kgf·cm, 67 in.·lbf)

7. INSTALL REAR END COVER AND DUST COVER

8. CONNECT STARTER WIRE CLAMP

9. A/T:
INSTALL OIL COOLER TUBE AND CLAMP
(A340E: See page AT-21)
(A340F: See page AT-27)

10. INSTALL CRANKSHAFT TIMING PULLEY
(See page EM-19)

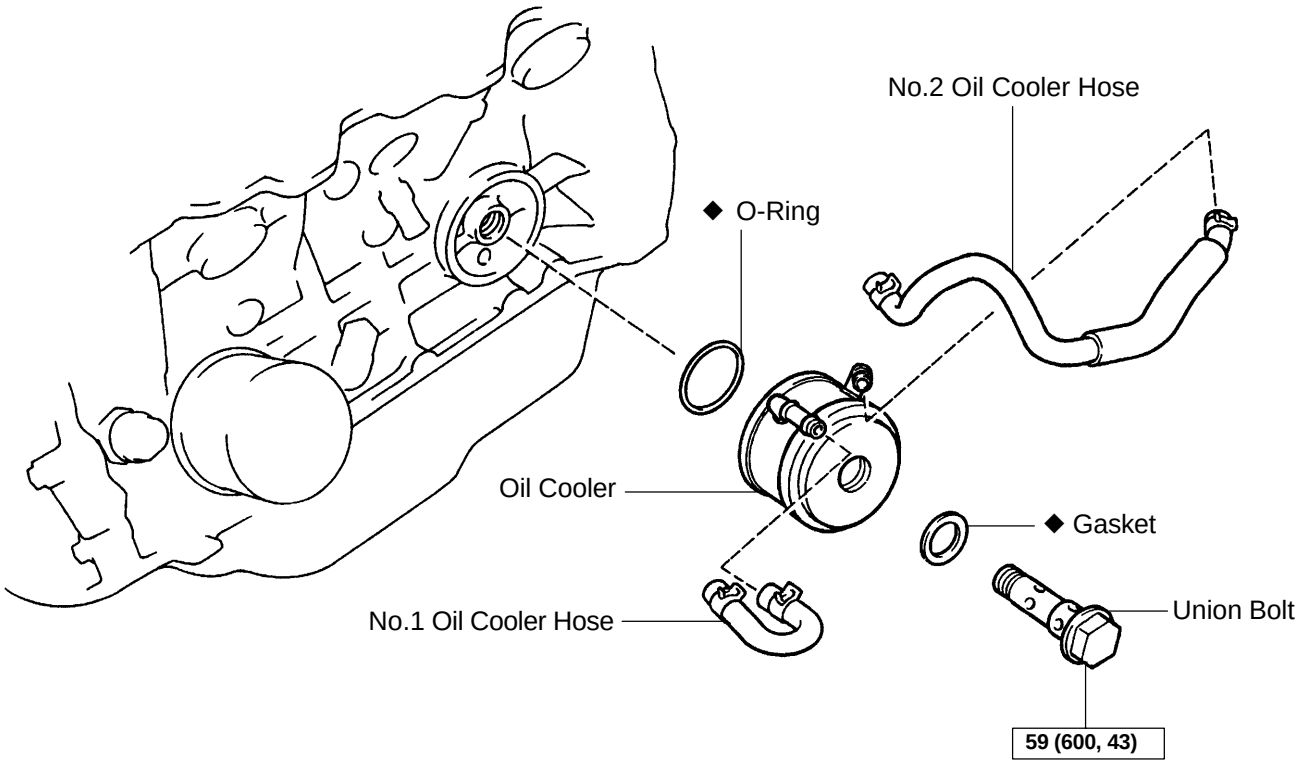
11. 4WD:
INSTALL FRONT DIFFERENTIAL (See page SA-47)

12. FILL WITH ENGINE OIL
13. START ENGINE AND CHECK FOR LEAKS
14. INSTALL ENGINE UNDER COVER
15. RECHECK ENGINE OIL LEVEL

OIL COOLER

COMPONENTS

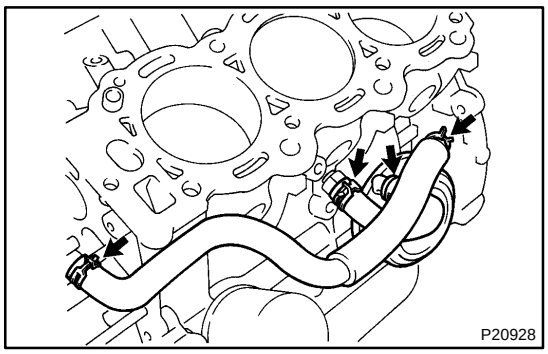
LU00Q-03



N·m(kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

S02431

LU00R-03

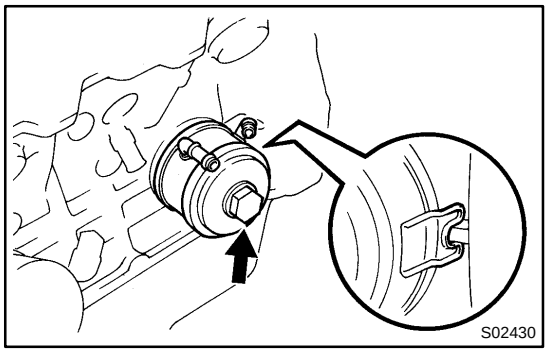


REMOVAL

1. DRAIN ENGINE COOLANT

2. DISCONNECT OIL COOLER HOSES

Disconnect the No.1 and No.2 oil cooler hoses.



3. REMOVE OIL COOLER

Remove the union bolt, gaskets, oil cooler and O-ring.

LU00S-02

INSPECTION

INSPECT OIL COOLER

Check the oil cooler for damage or clogging.
If necessary, replace the oil cooler.

LU0FZ-01

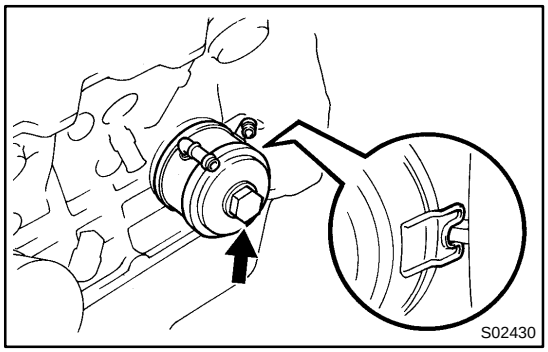
INSTALLATION

1. INSTALL OIL COOLER

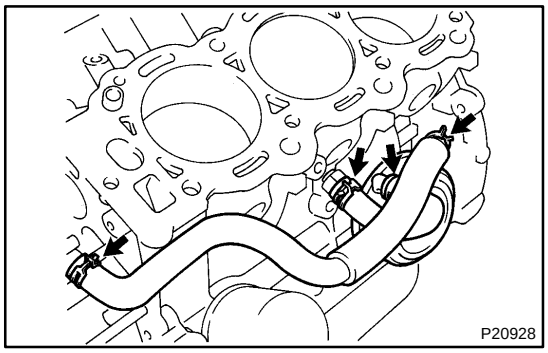
(a) Clean the oil cooler contact surface on the oil cooler mounting.

(b) Place a new O-ring to the oil cooler.

(c) Apply a light coat of engine oil on the threads and under the head of the union bolt.



(d) Install the oil cooler, New gasket and union bolt.
Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



2. CONNECT OIL COOLER HOSES

Connect the No.1 and No.2 oil cooler hoses.

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR COOLANT AND ENGINE OIL LEAKS

IGNITION SYSTEM

IG00U-07

ON-VEHICLE INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the coils themselves. "Cold" is from -10˚C (14˚F) to 50˚C (122˚F) and "Hot" is from 50˚C (122˚F) to 100˚C (212˚F).

1. INSPECT IGNITOR AND SPARK TEST

Check that the spark occurs.

(1) Disconnect high-tension cords from spark plug.
(2) Remove the spark plug.
(3) Install the spark plug to each high-tension cord.
(4) Ground the spark plug.
(5) Check if spark occurs while engine is being cranked.

NOTICE:

To prevent excess fuel being injected from the injectors during this test, do not crank the engine for more 5 - 10 seconds at a time.

If the spark does not occur, do the test as follows:

SPARK TEST
↓ NO
CHECK CONNECTION OF IGNITION COIL AND IGNITER → BAD → Connect securely.
↓ OK
CHECK RESISTANCE OF HIGH-TENSION CORD (See step 2.)
Maximum resistance; 25 kΩ per cord → BAD → Replace the cord(s).
↓ OK
CHECK POWER SUPPLY TO IGNITION COIL AND IGNITER
1. Turn ignition switch to ON.
2. Check that there is battery voltage at ignition coil positive (+) terminal.
→ BAD → Check wiring between ignition switch to ignition coil and igniter.
↓ OK
CHECK RESISTANCE OF IGNITION COIL (See step 4.)

Resistance:	Cold	Hot
Primary	0.67 - 1.05 kΩ	0.85 - 1.23 kΩ
Secondary	9.3 - 16.0 kΩ	11.7 - 18.8 kΩ

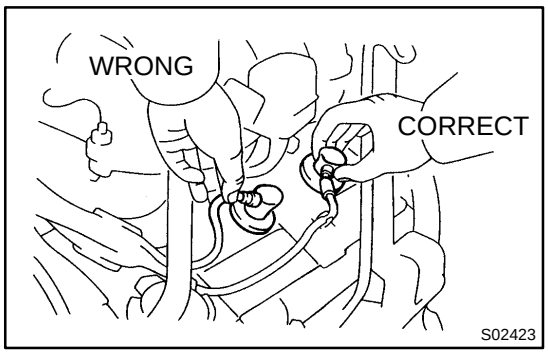
→ BAD → Replace the ignition coil.
↓ OK
CHECK RESISTANCE OF CAMSHAFT POSITION SENSOR (See step 5.)

Resistance:	Cold	Hot
G⊕ and G⊖	835 - 1,400 kΩ	1,060 - 1,645 kΩ

→ BAD → Replace the camshaft position sensor.
↓ OK
CHECK RESISTANCE OF CRANKSHAFT POSITION SENSOR (See page IG-13)

Resistance:	Cold	Hot
NE⊕ and NE⊖	1,630 - 2,740 kΩ	2,065 - 3,225 kΩ

→ BAD → Replace the crankshaft position sensor.
↓ OK
CHECK IGT SIGNAL FROM ECM (See page DI-18) → BAD → Check wiring between ECM, distributor and igniter, and then try another ECM.
↓
TRY ANOTHER IGNITER



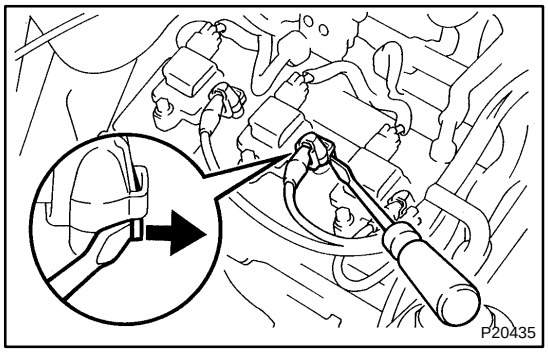
2. INSPECT HIGH-TENSION CORDS

(a) Remove the air cleaner cap and MAF meter assembly.

(b) Disconnect the high-tension cords from the spark plugs. Disconnect the high-tension cords at the rubber boot. DO NOT pull on the cords.

NOTICE:

Pulling on or bending the cords may damage the conductor inside.



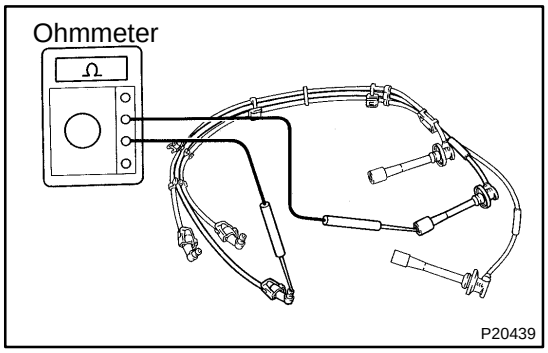
(c) Disconnect the high-tension cords from the ignition coils.

(1) Using a screwdriver, lift up the lock claw and disconnect the holder from the ignition coils.

(2) Disconnect the high-tension cord at the grommet. DO NOT pull on the cord.

NOTICE:

- **Pulling on or bending the cords may damage the conductor inside.**
- **Do not wipe any of the oil from the grommet after the high-tension cord is disconnected.**

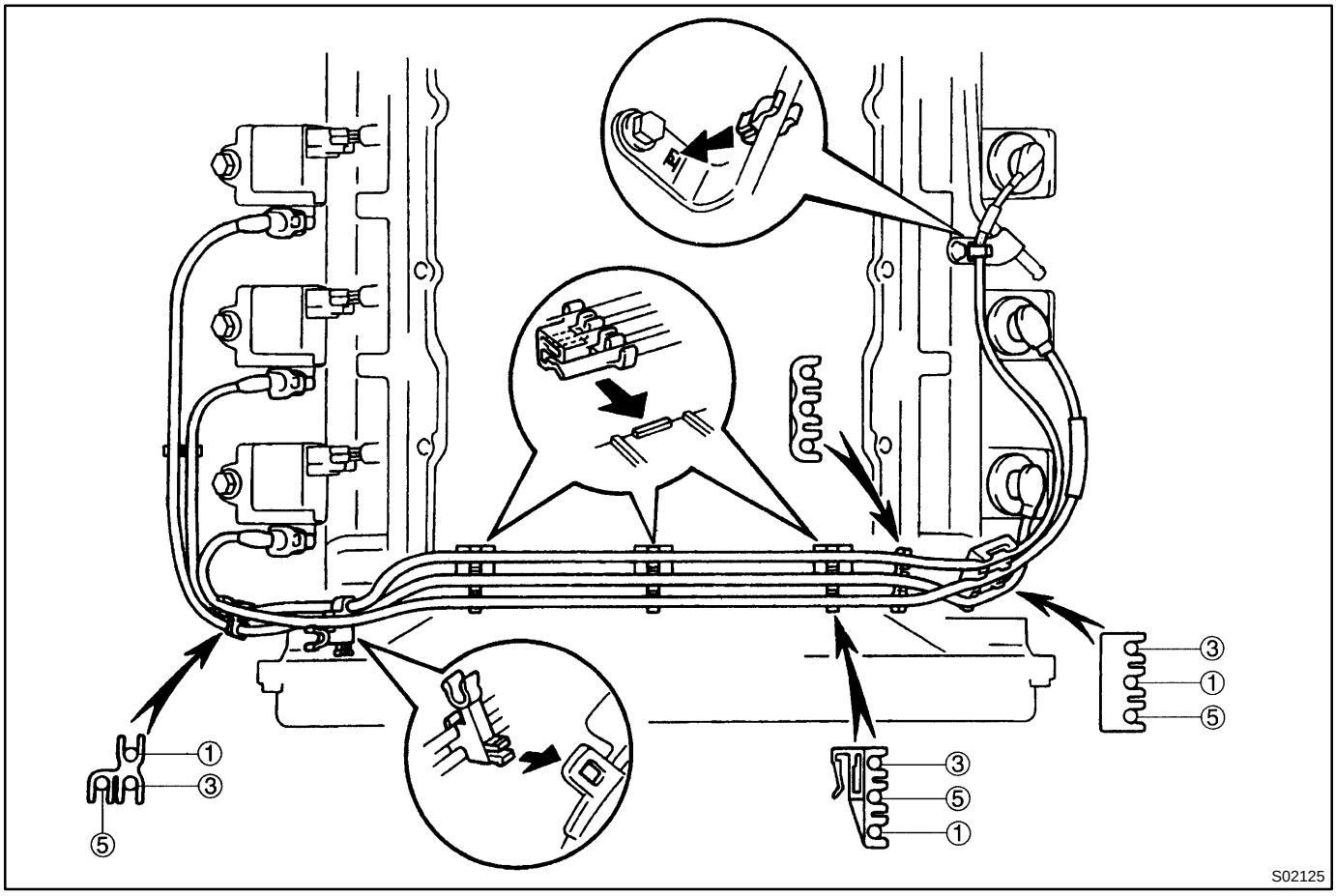


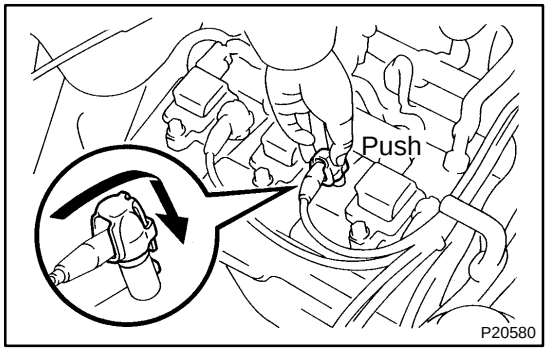
(d) Using an ohmmeter, measure the resistance.

Maximum resistance: 25 kΩ per cord

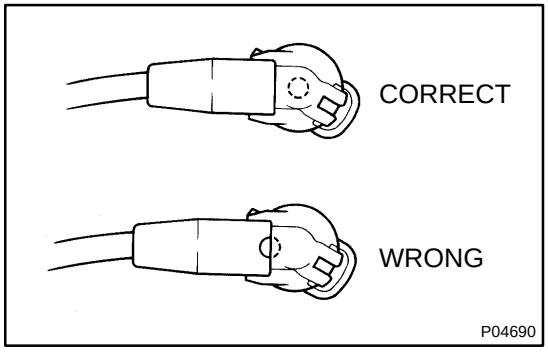
If the resistance is greater than the maximum, check the terminals. If necessary, replace the high-tension cord.

(e) Connect the high-tension cords to the ignition coils.





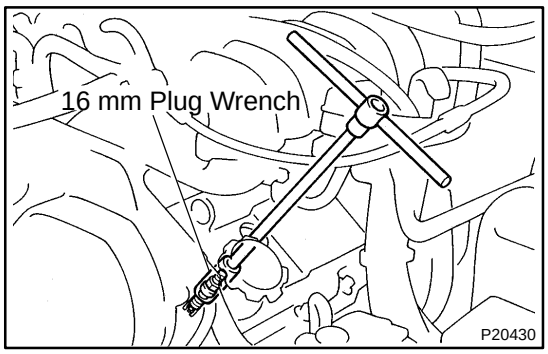
(1) Assemble the holder and grommet.
(2) Align the spline of the ignition coil with the spline of the holder, and push in the cord.



NOTICE:
Check that the holder is correctly installed to the grommet and distributor cap as shown in the illustration.

(3) Check that the lock claw of the holder is engaged by lightly pulling the holder.

(f) Connect the high-tension cords to the spark plugs.
(g) Install the air cleaner cap and MAF meter assembly.

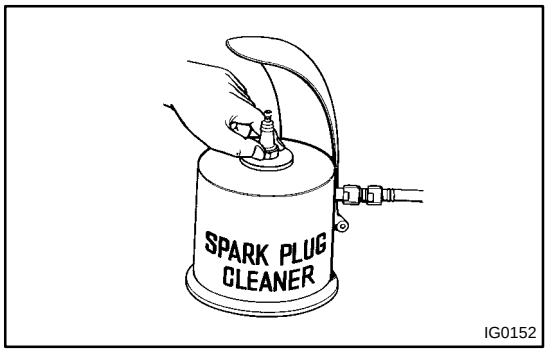


3. INSPECT SPARK PLUGS

(a) Disconnect the high-tension cords from the spark plugs. (See step 2)

(b) Remove the ignition coils. (See page IG-7)

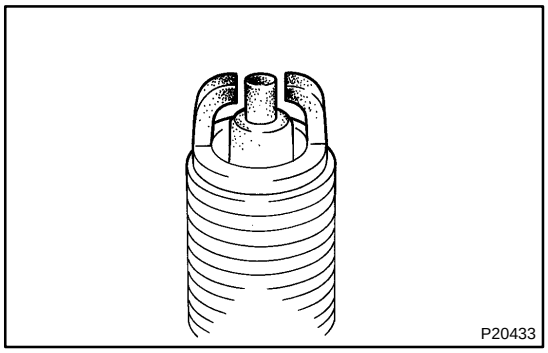
(c) Using a 16 mm plug wrench, remove the 6 spark plugs from the RH and LH cylinder heads.



(d) If the electrode has traces of wet carbon, allow it to dry and then clean with a spark plug cleaner.

Air pressure: Below 588 kPa (6 kgf/cm^2, 85 psi)
Duration: 20 seconds or less

HINT:
If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

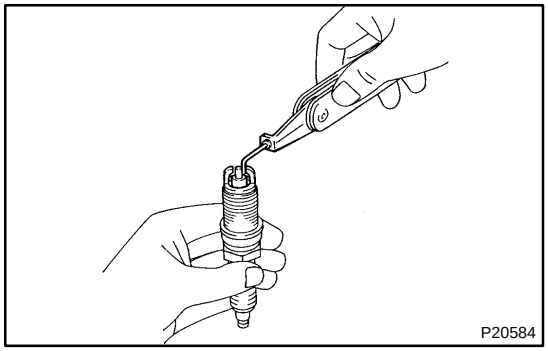


(e) Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

DENSO made	K16TR11
NGK made	BKR5EKB-11



(f) Carefully bend the outer electrode to obtain the correct electrode gap.

Correct electrode gap: 1.1 mm (0.043 in.)

(g) Using a 16 mm plug wrench, install the spark plug.

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

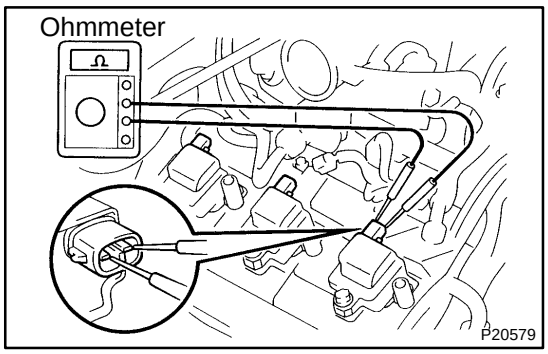
(h) Install the ignition coils. (See page IG-7)

(i) Connect the high-tension cords. (See step 2)

4. INSPECT IGNITION COIL

(a) Remove the air cleaner hose.

(b) Disconnect the high-tension cords and ignition coil connectors from the ignition coils.



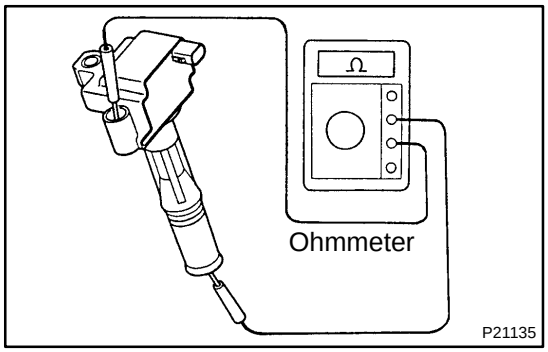
(c) Using an ohmmeter, measure the resistance between the positive (+) and negative (-) terminals.

Primary coil resistance :

Cold	0.67 - 1.05 Ω
Hot	0.85 - 1.23 Ω

If the resistance is not as specified, replace the ignition coil.

(d) Remove the ignition coils.



(e) Using an ohmmeter, measure the resistance between the positive (+) and high-tension terminals.

Secondary coil resistance:

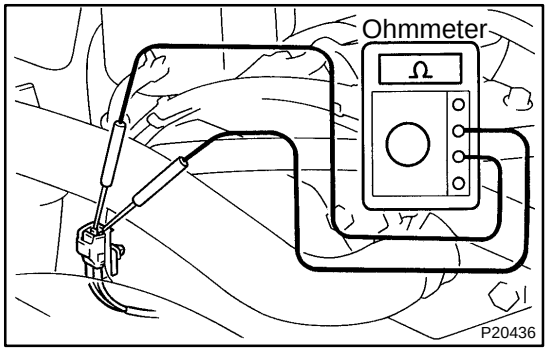
Cold	9.3 - 16.0 Ω
Hot	11.7 - 18.8 Ω

If the resistance is not as specified, replace the ignition coil.

(f) Install the ignition coils.

(g) Connect the ignition coil connectors and high-tension cords.

(h) Install the air cleaner hose.



5. INSPECTION CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.

(b) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	835 - 1,400 Ω
Hot	1,060 - 1,645 Ω

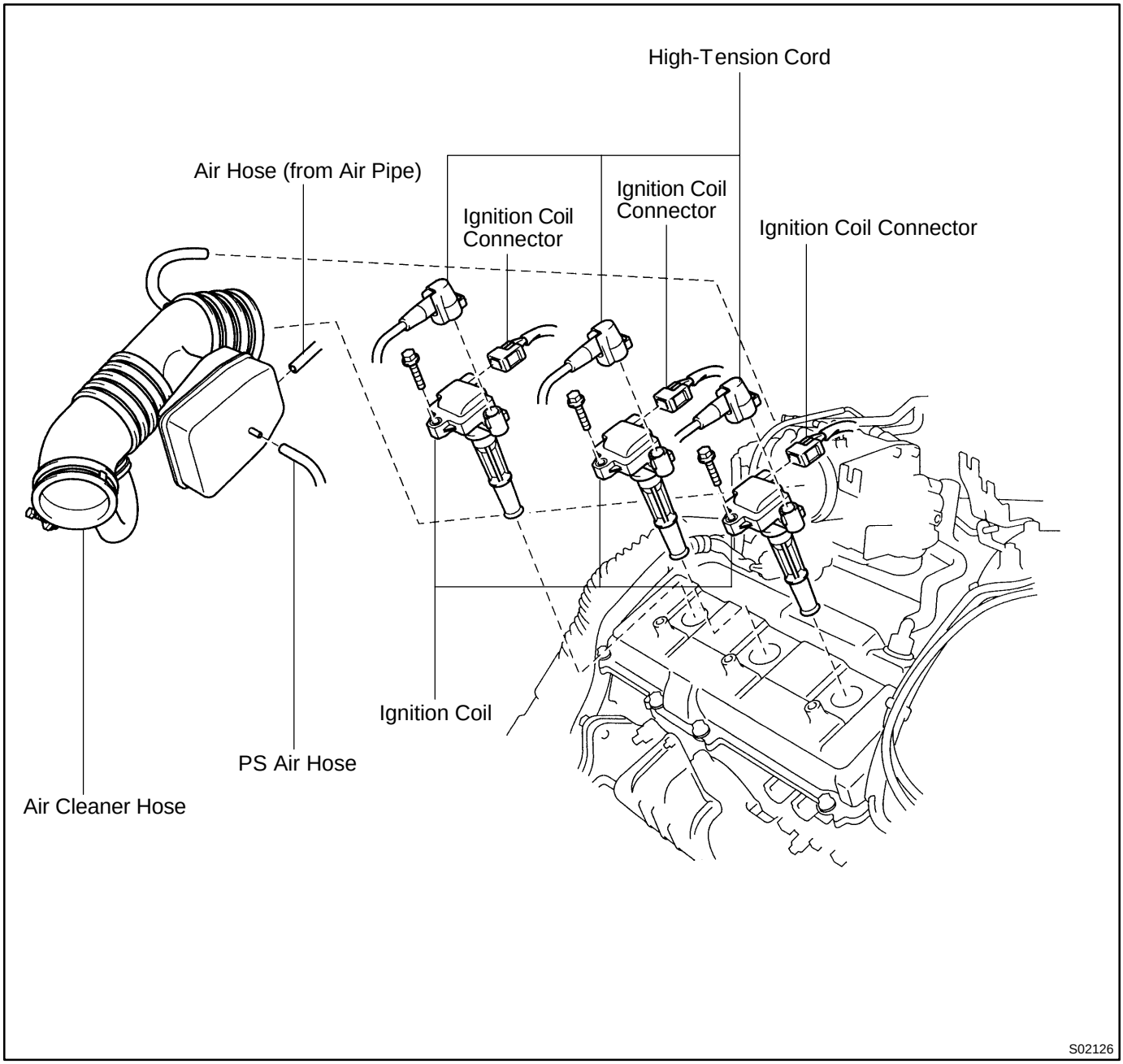
If the resistance is not as specified, replace the camshaft position sensor.

(c) Connect the camshaft position sensor connector.

IGNITION COIL

COMPONENTS

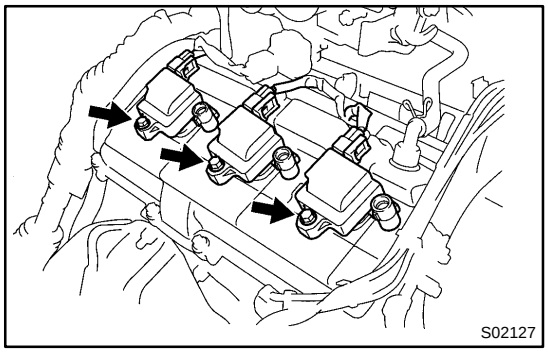
IG00V-02



IG00W-03

REMOVAL

1. REMOVE AIR CLEANER HOSE
2. DISCONNECT HIGH-TENSION CORDS FROM IGNITION COILS (See page IG-1)



3. REMOVE IGNITION COILS

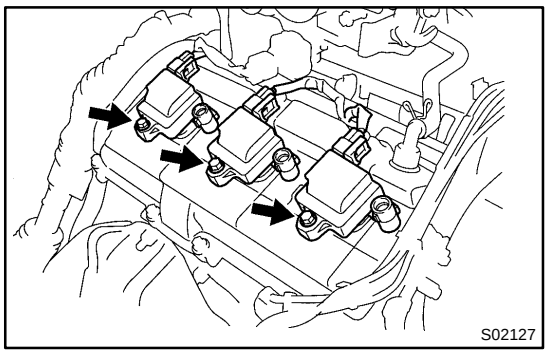
(a) Disconnect the 3 connectors from the ignition coils.

(b) Remove the 3 bolts and 3 ignition coils from the LH cylinder head.

HINT:

Arrange the ignition coils in correct order.

IG0DI-01



INSTALLATION

1. INSTALL IGNITION COILS

(a) Install the 3 ignition coil to LH cylinder head with 3 bolts.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(b) Connect the 3 connector to the ignition coil.

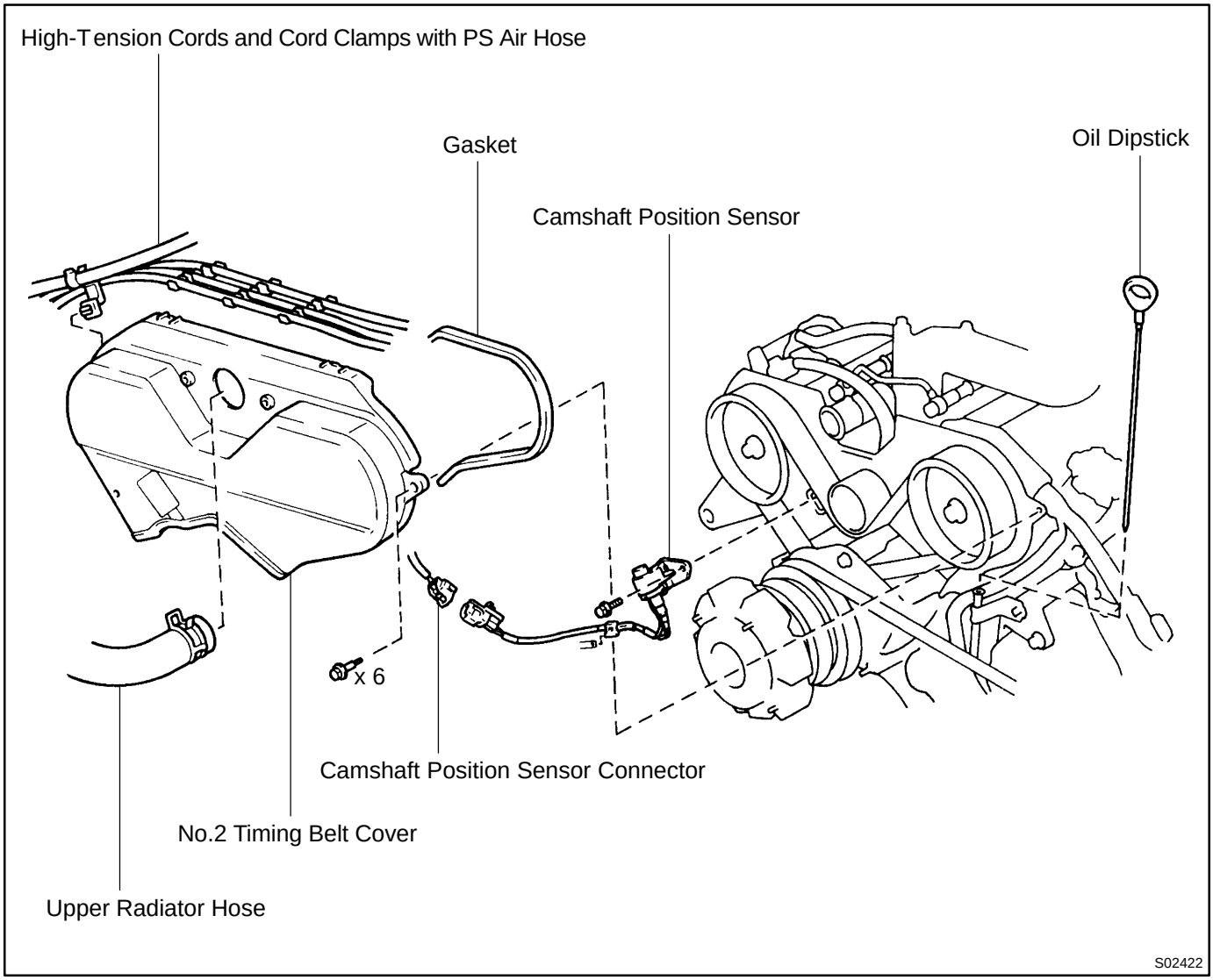
2. CONNECT HIGH-TENSION CORDS TO IGNITER
(See page IG-1)

3. INSTALL AIR CLEANER HOSE

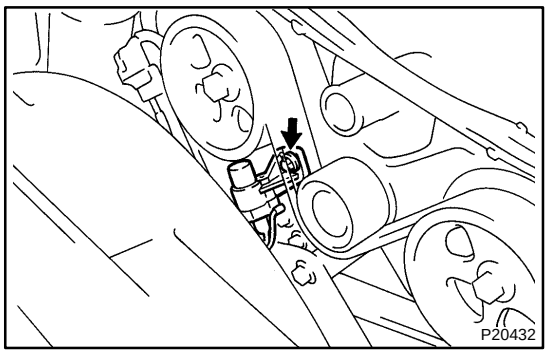
CAMSHAFT POSITION SENSOR

IG00Y-03

COMPONENTS



IG00Z-03



REMOVAL

1. REMOVE NO.2 TIMING BELT COVER
(See page EM-13)

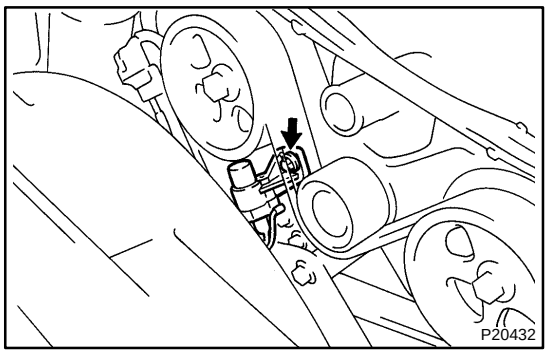
2. REMOVE CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.

(b) Remove the bolts and camshaft position sensor.

(c) Disconnect the cord clamp from the No.3 timing belt cover.

IG0DJ-01



INSTALLATION

1. INSTALL CAMSHAFT POSITION SENSOR

(a) Connect the cord clamp to the timing belt cover.

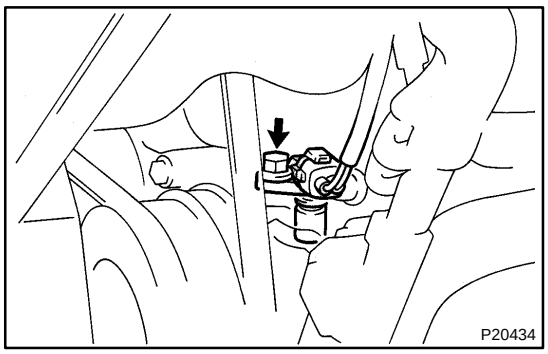
(b) Install the camshaft position sensor with bolt.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

(c) Connect the camshaft position sensor connector.

2. INSTALL NO.2 TIMING BELT COVER

(See page EM-19)



CRANKSHAFT POSITION SENSOR

IG011-03

REMOVAL

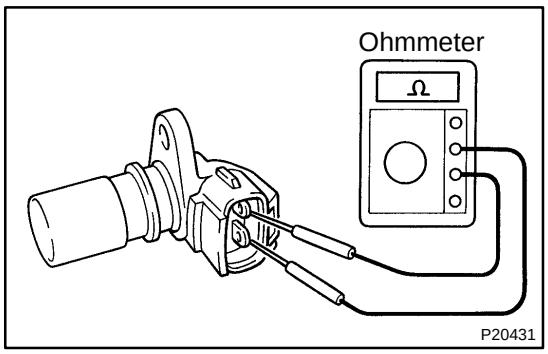
1. REMOVE ENGINE UNDER COVER

2. REMOVE CRANKSHAFT POSITION SENSOR

(a) Disconnect the crankshaft position sensor connector.

(b) Remove the bolt crankshaft position sensor.

IG012-03



INSPECTION

NOTICE:

"Cold" and "Hot" in these sentences express the temperature of the sensors themselves. "Cold" is from -10˚C (14˚F) to 50˚C (122˚F) and "Hot is from 50˚C (122˚F) to 100˚C (212˚F).

INSPECT CRANKSHAFT POSITION SENSOR RESISTANCE

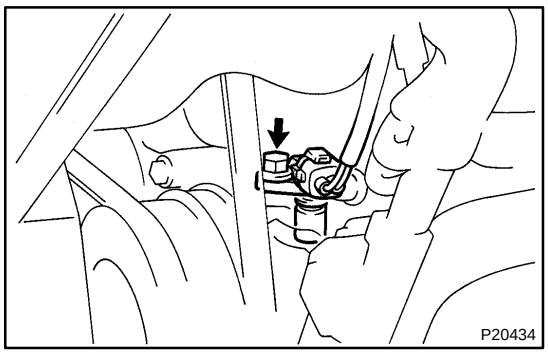
Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	1,630 - 2,740 Ω
Hot	2,065 - 3,225 Ω

If the resistance is not as specified, replace the crankshaft position sensor.

IG0DK-01



INSTALLATION

1. INSTALL CRANKSHAFT POSITION SENSOR

(a) Install the crankshaft position sensor with bolt.
Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

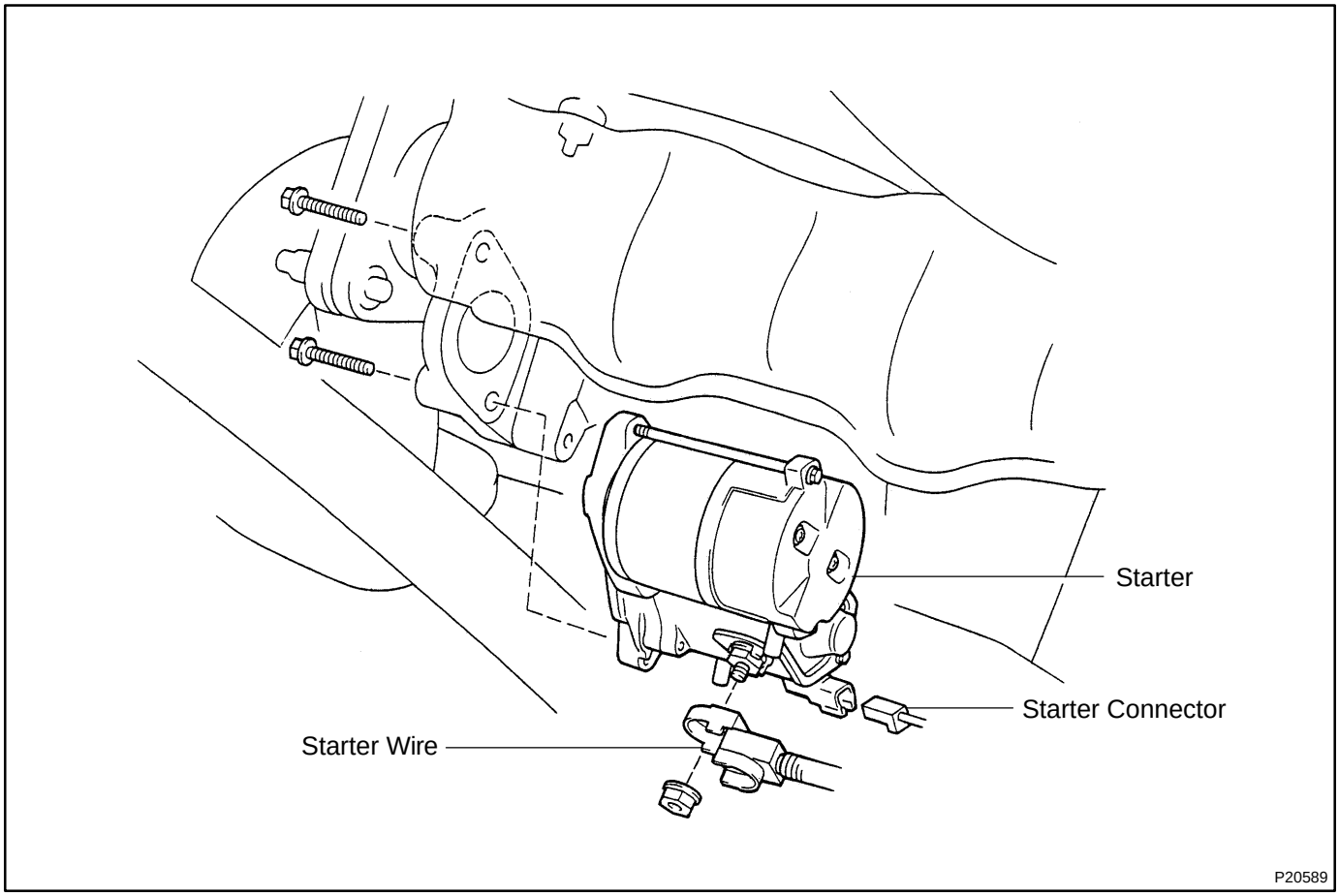
(b) Connect the crankshaft position sensor connector.

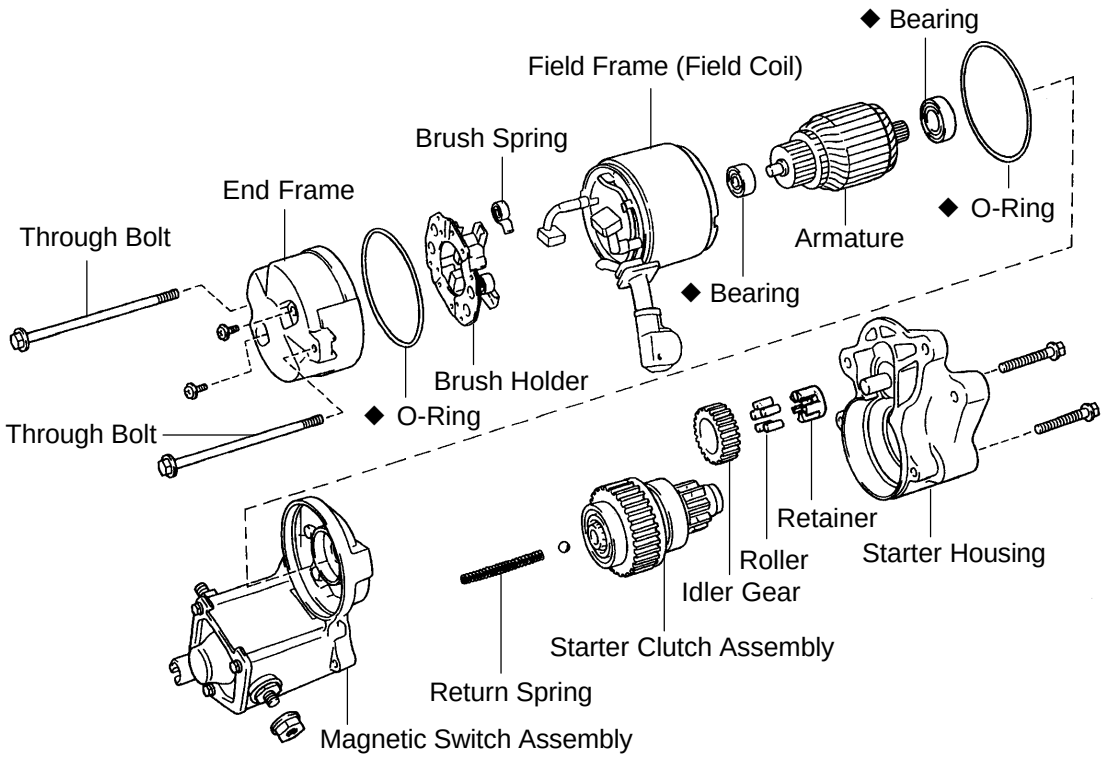
2. INSTALL ENGINE UNDER COVER

STARTER

COMPONENTS

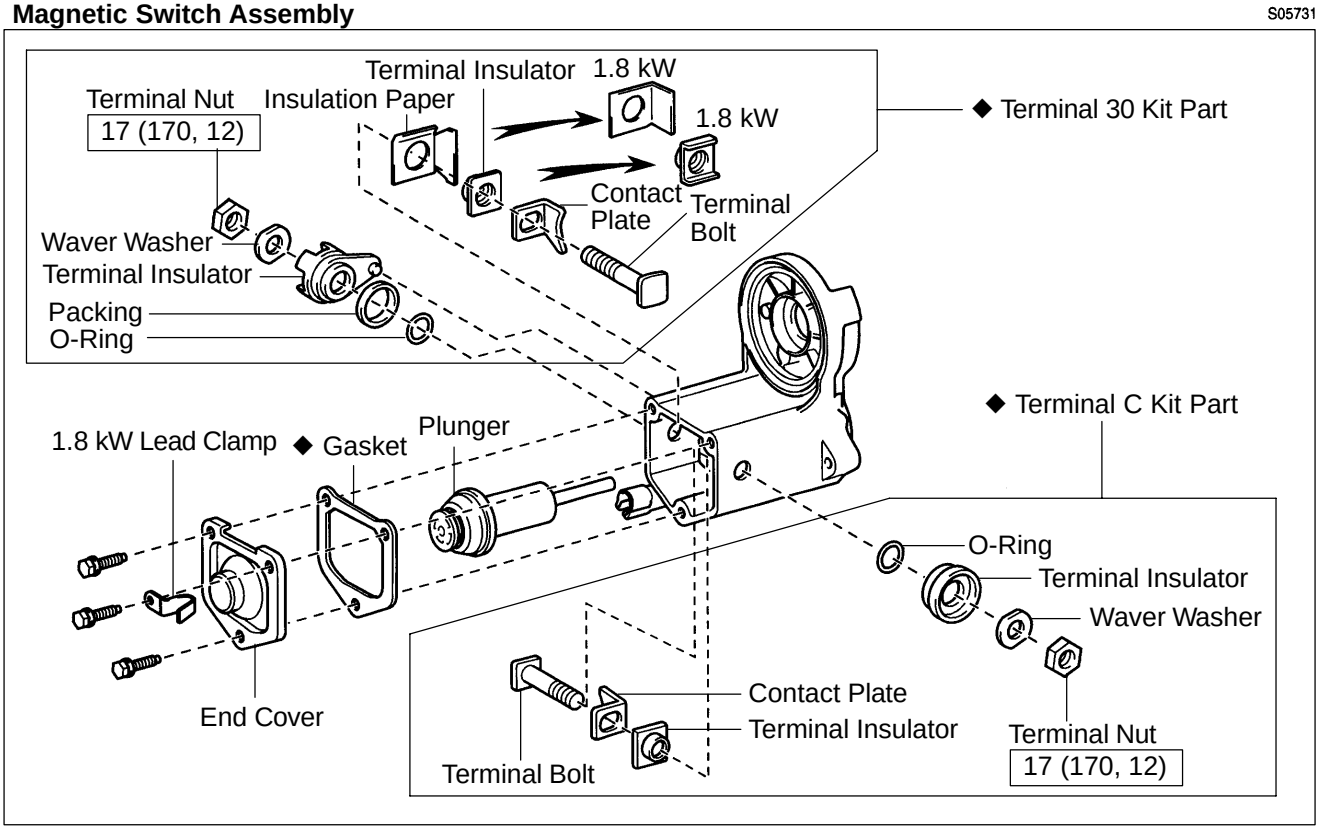
ST00F-02





Magnetic Switch Assembly

S05731



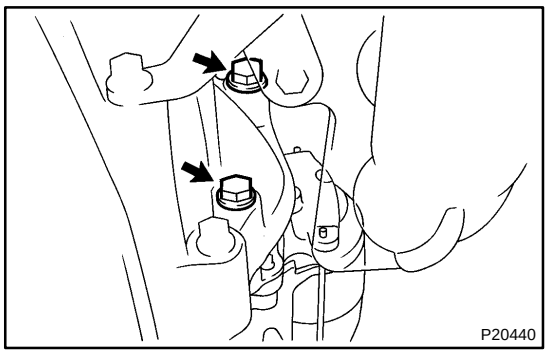
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

S02425

Z19063

ST00G-02



REMOVAL

NOTICE:

Before changing the starter, check the follwing items again:

- **Connector connection**
- **Accessory installation, e.g.: theft deterent system**

REMOVE STARTER

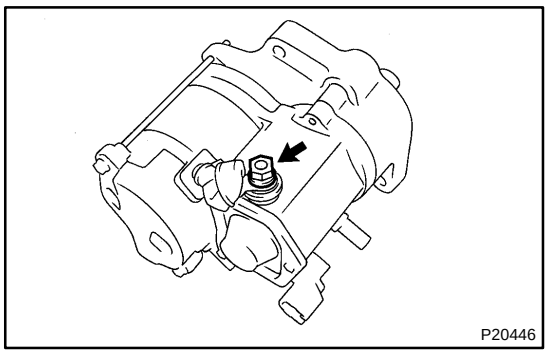
(a) Disconnect the starter connector.

(b) Remove the nut, and disconnect the starter wire.
Torque: 8.8 N·m (90 kgf·cm, 70 in.·lbf)

(c) Remove the 2 bolts and starter.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

ST00H-02

DISASSEMBLY


P20446

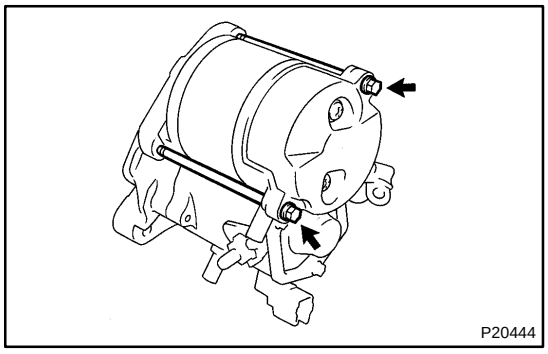
HINT:

Use high-temperature grease to lubricate the bearings, gears, return spring and steel ball when assembling the starter.

1. REMOVE FIELD FRAME AND ARMATURE

(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.

Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

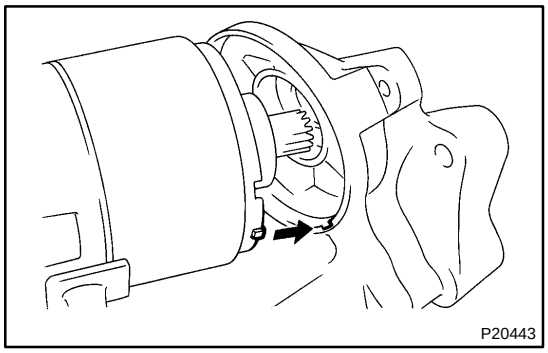

P20444

(b) Remove the 2 through bolts.

Torque:

1.4 kW type: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

1.8 kW type: 9.3 N·m (95 kgf·cm, 82 in.·lbf)


P20443

(c) Pull out the field frame with the armature from the magnetic switch assembly.

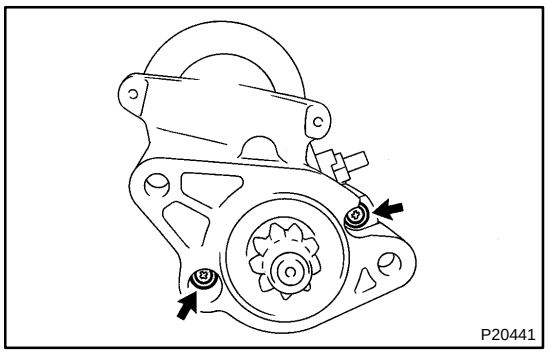
NOTICE:

Align the protrusion of the field frame with cutout of the magnetic switch.

(d) Remove the O-ring.

HINT:

Use a new O-ring.


P20441

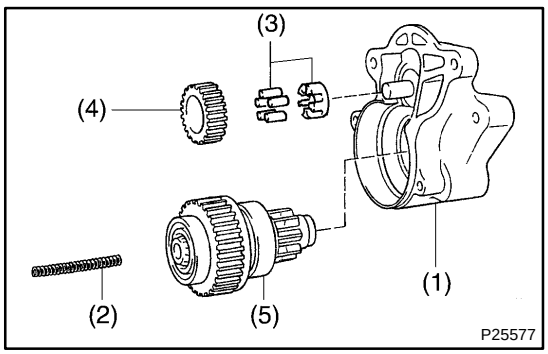
2. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

(a) Remove the 2 screws.

Torque:

1.4 kW type: 5.9 N·m (60 kgf·cm, 52 in.·lbf)

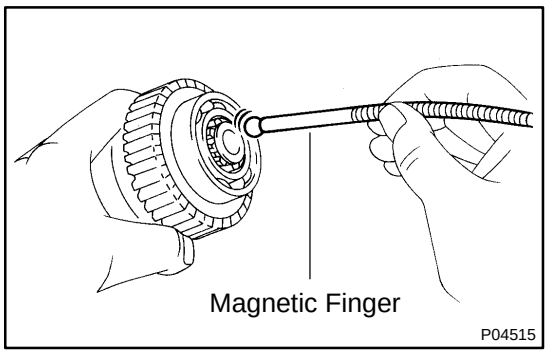
1.8 kW type: 9.3 N·m (95 kgf·cm, 82 in.·lbf)



P25577

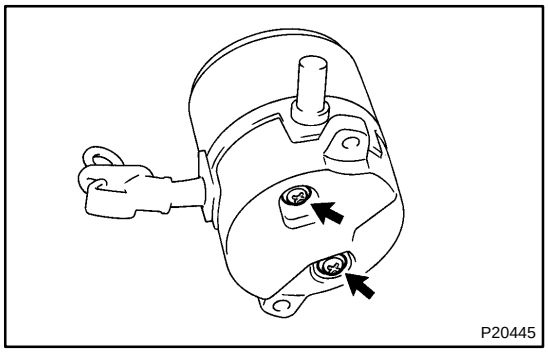
(b) Remove these parts from the magnetic switch assembly:

(1) Starter housing
(2) Return spring
(3) Bearing
(4) Idler Gear
(5) Clutch assembly



3. REMOVE STEEL BALL

Using a magnetic finger, remove the steel ball from the clutch shaft hole.



4. REMOVE BRUSH HOLDER

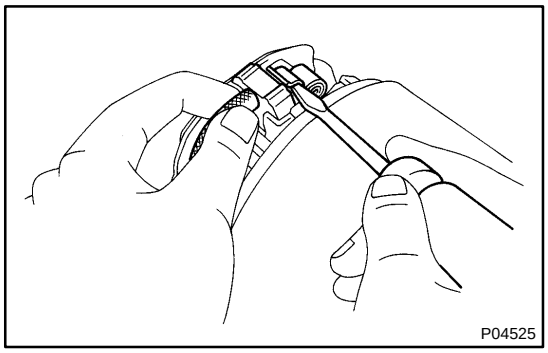
(a) Remove the 2 screws and 2 O-rings, and pull the end frame from the field frame.

Torque:
1.4 kW type: 1.5 N·m (15 kgf·cm, 13 in.·lbf)
1.8 kW type: 3.8 N·m (39 kgf·cm, 34 in.·lbf)

(b) Remove the O-ring from the field frame.

HINT:

Use a new O-ring.



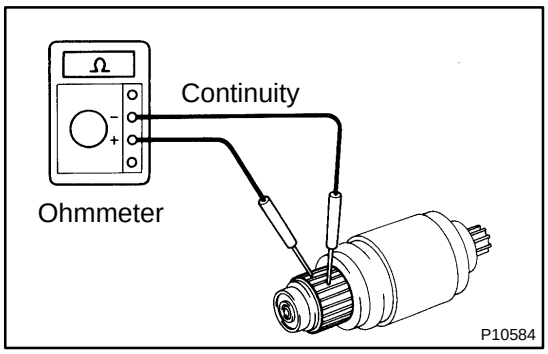
(c) Using a screwdriver hold the spring back and disconnect the brush from the brush holder.

Disconnect the 4 brushes, and remove the brush holder.

5. REMOVE ARMATURE FROM FIELD FRAME

ST00I-02

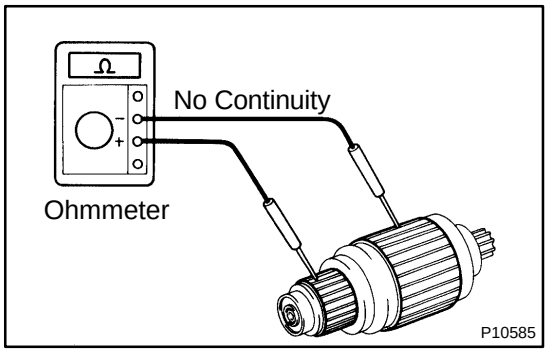
INSPECTION



1. INSPECT ARMATURE COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

If there is no continuity between any segment, replace the armature.



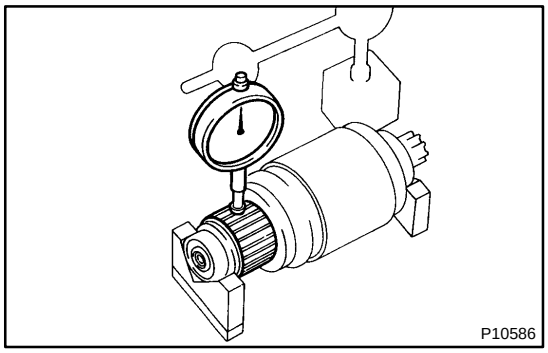
2. INSPECT ARMATURE COIL FOR GROUNDED

Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.

3. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If the surface is dirty or burnt, clean it with sandpaper (No.400) or on a lathe.



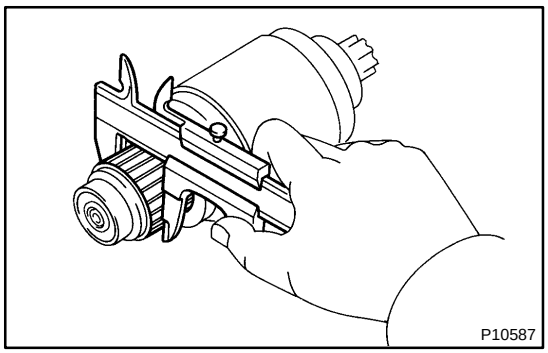
4. INSPECT COMMUTATOR CIRCLE RUNOUT

(a) Place the commutator on V-blocks.

(b) Using a dial indicator, measure the circle runout.

Maximum circle runout: 0.05 mm (0.0020 in.)

If the circle runout is greater than maximum, correct it on a lathe.

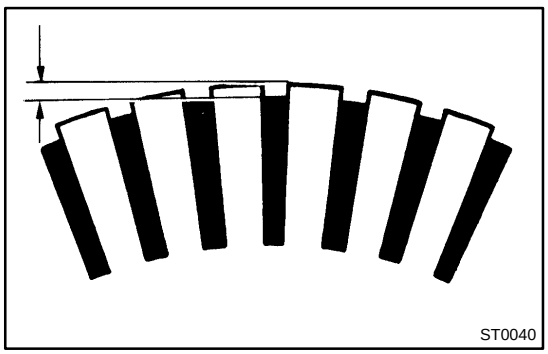


5. INSPECT COMMUTATOR DIAMETER

Using vernier calipers, measure the commutator diameter.

Standard diameter:
1.4 kW type: 30 mm (1.180 in.)
1.8 kW type: 35 mm (1.378 in.)
Minimum diameter:
1.4 kW type: 29 mm (1.140 in.)
1.8 KW type: 34 mm (1.339 in.)

If the diameter is less than minimum, replace the armature.

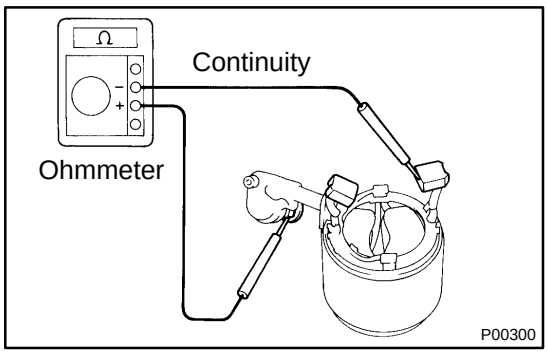


6. INSPECT UNDERCUT DEPTH OF SEGMENT

Check that the undercut depth is clean and free of foreign material. Smooth out the edge.

Standard undercut depth:
1.4 kW type: 0.6 mm (0.024 in.)
1.8 kW type: 0.7 mm (0.028 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)

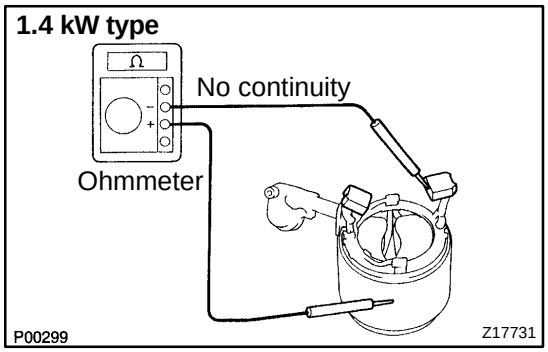
If the undercut depth is less than minimum, correct it with a hacksaw blade.



7. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

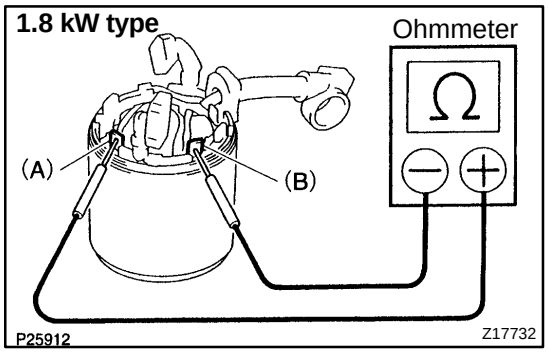
If there is no continuity, replace the field frame.



8. (1.4 kW type)
INSPECT THAT FIELD COIL IS NOT GROUNDED

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, repair or replace the field frame.

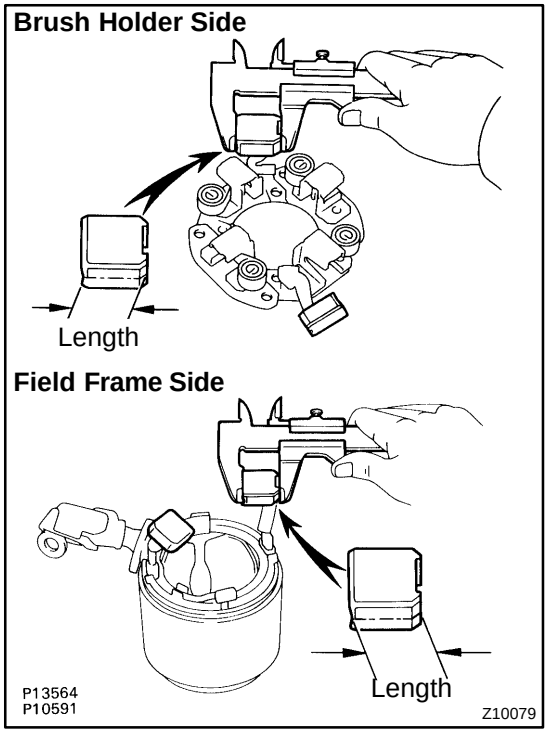


9. (1.8 kW type)
INSPECT SHUNT COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between terminal (A) and (B).

Standard resistance: At 20˚C (68˚F): 1.4 - 1.9 Ω

If the resistance is not as specified, repair or replace the field frame.

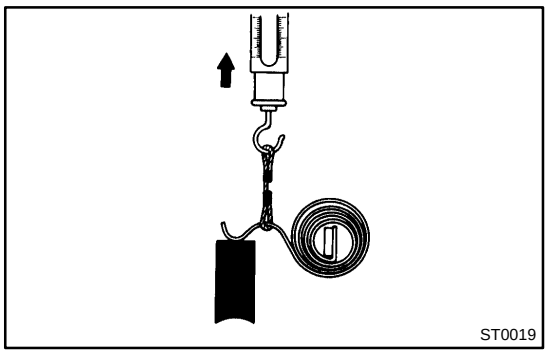


10. INSPECT BRUSH LENGTH

Using vernier calipers, measure the brush length.

Standard length:
1.4 kW type: 15.5 mm (0.610 in.)
1.8 kW type: 15.0 mm (0.591 in.)
Minimum length:
1.4 kW type: 10.0 mm (0.394 in.)
1.8 kW type: 9.0 mm (0.354 in.)

If the length is less than minimum, replace the brush holder and field frame.



11. INSPECT BRUSH SPRING LOAD

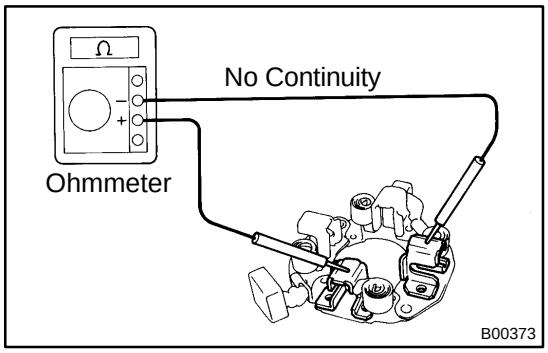
Take the pull scale reading the instant the brush spring separates from the brush.

Standard installed load:
1.4 kW type: 17.6 - 23.5 N (1.80 - 2.40 kgf, 4.0 - 5.3 lbf)
1.8 kW type: 21.5 - 27.5 N (2.20 - 2.80 kgf, 4.9 - 6.2 lbf)
Minimum installed load:
1.4 kw type: 11.8 N (1.20 kgf, 2.6 lbf)
1.8 kw type: 12.7 N (1.30 kgf, 2.7 lbf)

If the installed load is less than minimum, replace the brush springs.

HINT:

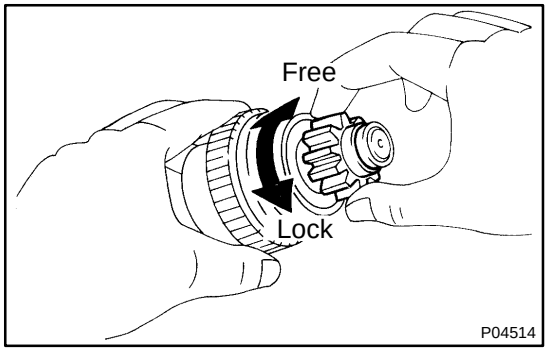
Take the pull scale reading the instant the brush spring separates from the brush.



12. INSPECT INSULATION OF BRUSH HOLDER

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brush holders.

If there is continuity, repair or replace the brush holder.



13. INSPECT GEAR TEETH

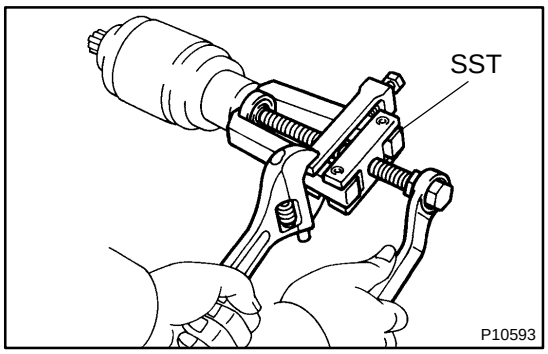
Check the gear teeth on the pinion gear, idler gear and clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

If damaged, also check the flywheel or drive plate ring gear for wear or damage.

14. INSPECT CLUTCH

Hold the starter clutch and rotate the clutch pinion gear clockwise and check that it turns freely. Try to rotate the clutch pinion counterclockwise and check that it locks. If necessary, replace the clutch assembly.



15. INSPECT FRONT BEARING

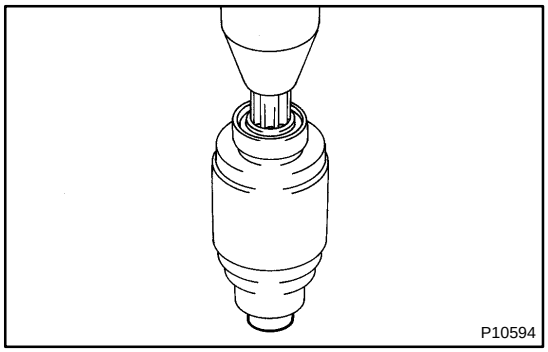
Turn the bearing by hand while applying inward force.

If resistance is felt or the bearing sticks, replace the bearing.

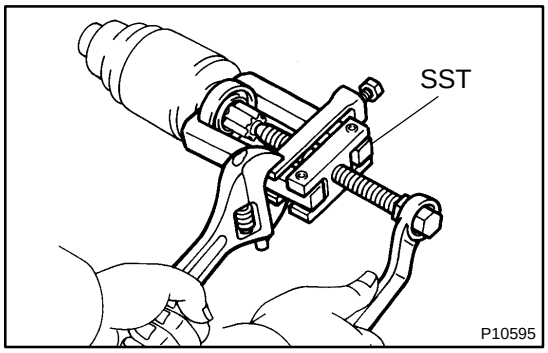
16. IF NECESSARY, REPLACE FRONT BEARING

(a) Using SST, remove the bearing.

SST 09286-4601 1



(b) Using a press, press in a new front bearing.



17. INSPECT REAR BEARING

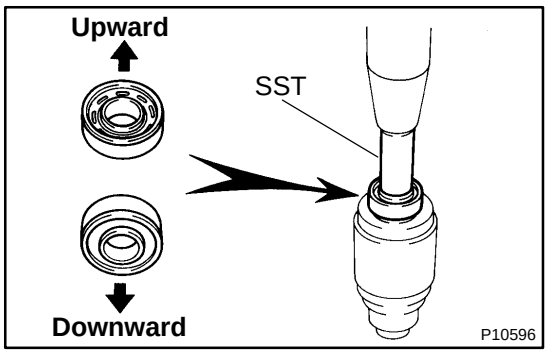
Turn the bearing by hand while applying inward force.

If resistance is felt or the bearing sticks, replace the bearing.

18. IF NECESSARY, REPLACE REAR BEARING

(a) Using SST, remove the bearing.

SST 09286-4601 1

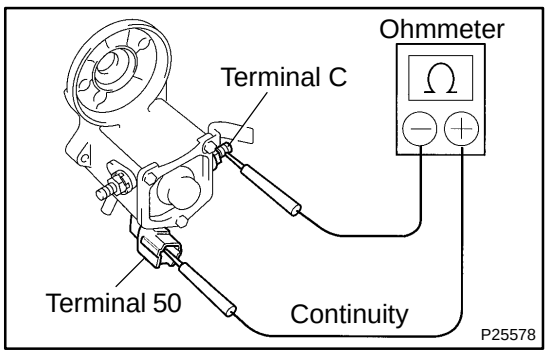


(b) Using SST and a press, press in a new rear bearing.

NOTICE:

Be careful of the bearing installation direction.

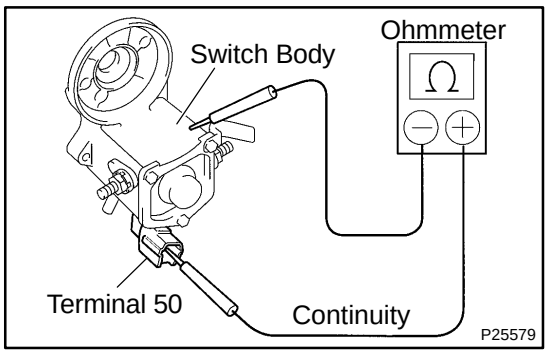
SST 09201-41020



19. DO PULL-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.



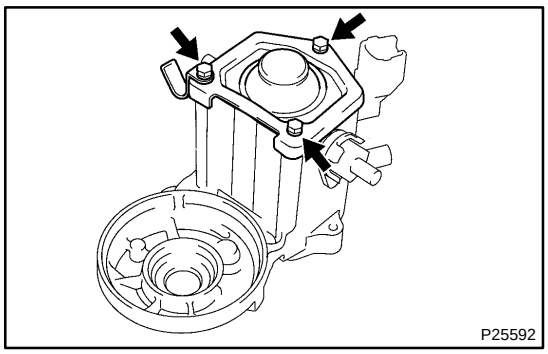
20. DO HOLD-IN COIL CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

If there is no continuity, check and replace the magnetic switch.

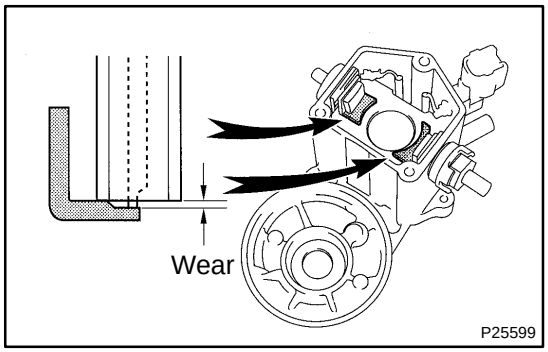
ST00J-02

REPLACEMENT



1. REMOVE MAGNETIC SWITCH END COVER

Remove the 3 bolts, lead clamp, end cover, gasket and plunger.

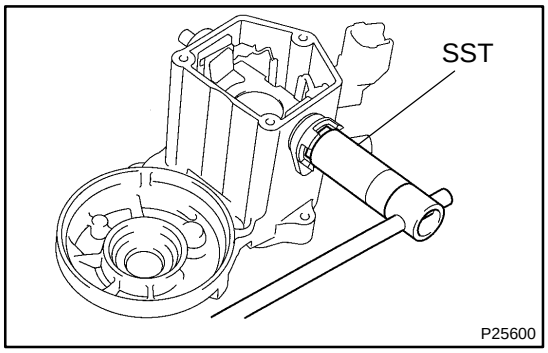


2. INSPECT CONTACT PLATE FOR WEAR

Using vernier calipers, measure the contact plate for depth of wear.

Maximum wear: 0.9 mm (0.035 in.)

If the depth of wear is greater than the maximum, replace the contact plate.

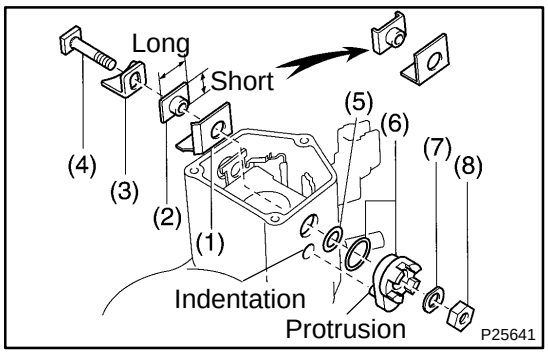


3. REMOVE TERMINAL KIT PARTS

(a) Using SST, loosen the terminal nuts.
SST 09810-38140

(b) Terminal C:
Remove the terminal nut, wave washer, terminal insulator (outside), O-ring, terminal bolt, contact plate and terminal insulator (inside).

(c) Terminal 30:
Remove the terminal nut, wave washer, terminal insulator (outside), packing, O-ring, terminal bolt, contact plate, terminal insulator (inside) and insulation paper.



4. REINSTALL TERMINAL KIT PARTS

(a) Terminal 30:
Install these new parts:
(1) Insulation paper
(2) Terminal insulator (inside)

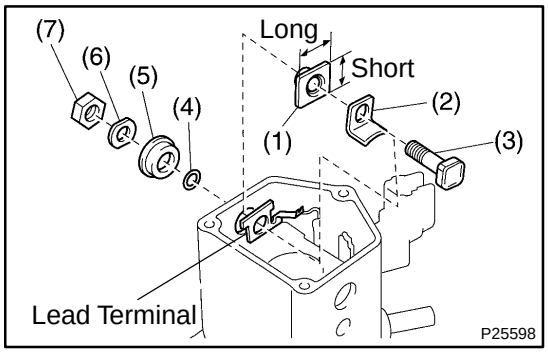
NOTICE:

Be careful to install the terminal insulator in the correct direction.

(3) Contact plate
(4) Terminal bolt
(5) O-ring
(6) Packing and terminal insulator (outside):
Install the packing to the terminal insulator, and install them.

HINT:
Match the protrusion of the insulator with the indentation of the housing.

(7) Wave washer
(8) Terminal nut

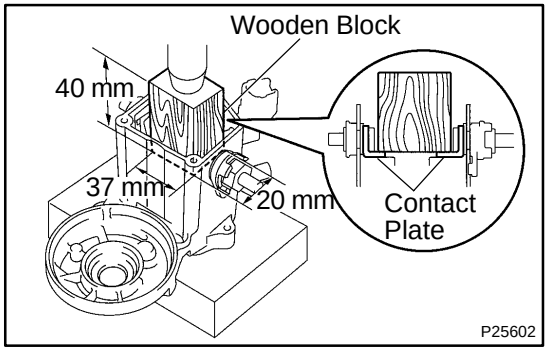


(b) Terminal C:
Install these new parts:
(1) Terminal insulator (inside)
(2) Contact plate
(3) Terminal bolt
(4) O-ring
(5) Terminal insulator (outside)
(6) Wave washer
(7) Terminal nut

NOTICE:

Be careful to install the terminal insulator (inside) in the correct direction.

(c) Temporarily tighten the terminal nuts.



5. TIGHTEN TERMINAL NUT

(a) Put a wooden block on the contact plate and press it down with a hand press.
Dimensions of wooden block:
20 x 37 x 40 mm (0.79 x 1.46 x 1.57 in.)
Press force: 981 N (100 kgf, 221 lbf)

NOTICE:
Check the diameter of the hand press ram. Then calculate the gauge pressure of the press when 981 N (100 kgf, 221 lbf) of force is applied.

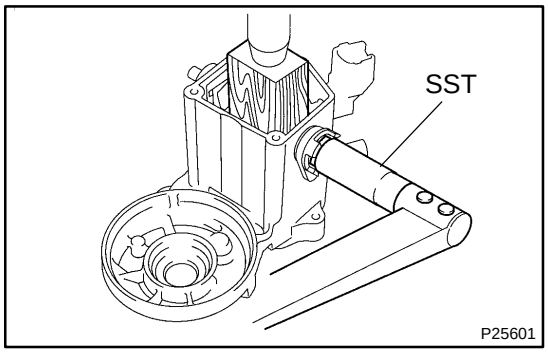
Gauge pressure:

$$(kgf/cm^2) = \frac{100\ kgf}{\left(\frac{\text{Ram diameter (cm)}}{2}\right)^2 \times 3.14\ (\pi)}$$

$$(psi) = \frac{221\ lbf}{\left(\frac{\text{Ram diameter (in.)}}{2}\right)^2 \times 3.14\ (\pi)}$$

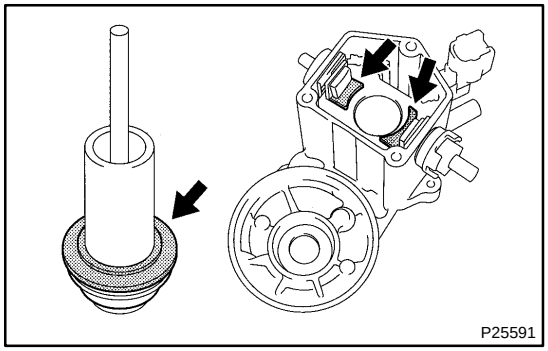
(kPa) = (kgf/cm^2) x 98.1

(kPa) = (psi) x 6.9



(b) Using SST, tighten the nuts to the specified torque.
SST 09810-38140
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)

NOTICE:
If the nut is over tightened, it may cause cracks on the inside of the insulator.



6. CLEAN CONTACT SURFACES OF CONTACT PLATE AND PLUNGER

Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.

7. REINSTALL MAGNETIC SWITCH END COVER

Install the plunger, new gasket, end cover and lead clamp with the 3 bolts.

Torque:
1.4 kW type: 2.5 N·m (25 kgf·cm, 22 in.·lbf)
1.8 kW type: 3.6 N·m (37 kgf·cm, 32 in.·lbf)

ST00K-02

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page ST-4).

ST00L-02

TEST

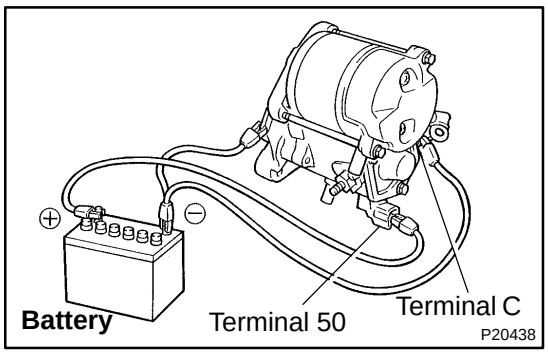
NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

1. DO PULL-IN TEST

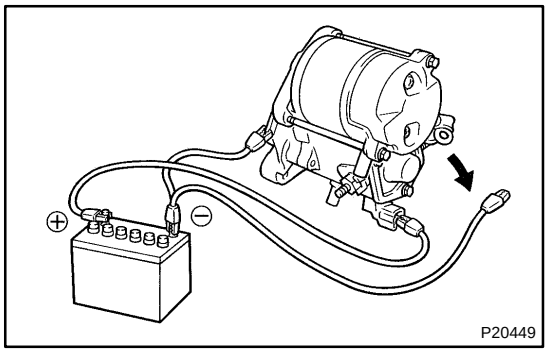
(a) Disconnect the field coil lead wire from terminal C.

(b) Connect the battery to the magnetic switch as shown. Check that the clutch pinion gear moves outward.



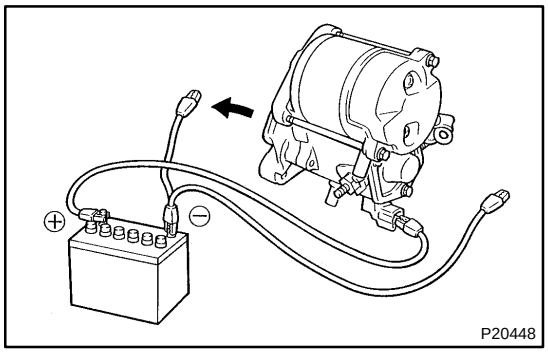
2. DO HOLD-IN TEST

With battery connected as above with the clutch pinion gear out, disconnect the negative (-) lead from terminal C. Check that the pinion gear remains out.



3. INSPECT CLUTCH PINION GEAR RETURN

Disconnect the negative (-) lead from the switch body. Check that the clutch pinion gear returns inward.



4. DO NO-LOAD PERFORMANCE TEST

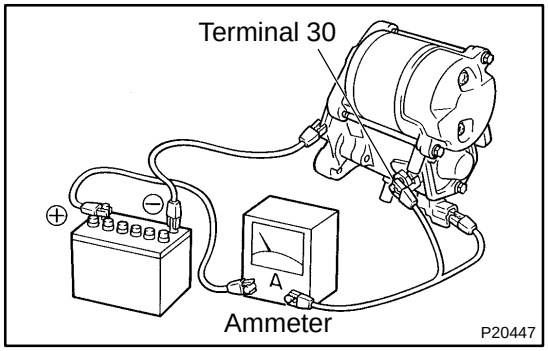
(a) Connect the battery and ammeter to the starter as shown.

(b) Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter reads the specified current.

Specified current:

1.4 kW type: At 11.5 V: 90 A or less

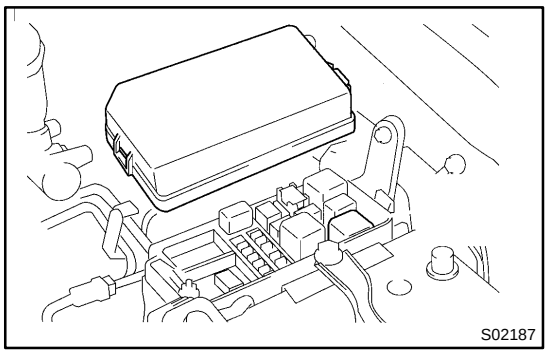
1.8 kw type: At 11.5 V: 100 A or less



ST00M-02

INSTALLATION

Installation is in the reverse order of removal (See page ST-3).

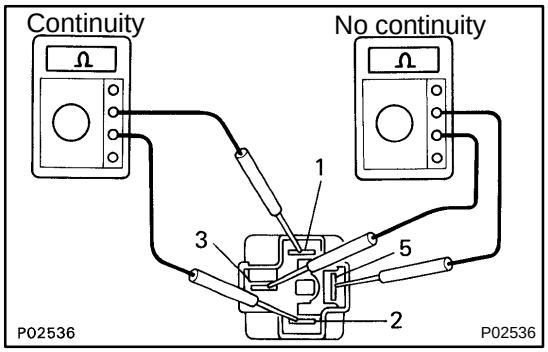


STARTER RELAY

ST00N-02

INSPECTION

1. REMOVE STARTER RELAY



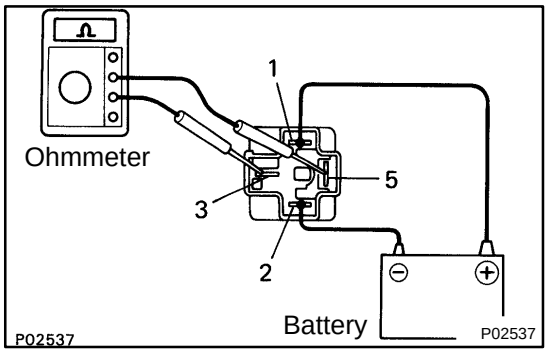
2. INSPECT STARTER RELAY CONTINUITY

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there no continuity, replace the relay.

(b) Check that there is no continuity between terminals 3 and 5.

If there continuity, replace the relay.



3. INSPECT STARTER RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 5.

If operation is not as described, replace the relay.

4. REINSTALL STARTER RELAY

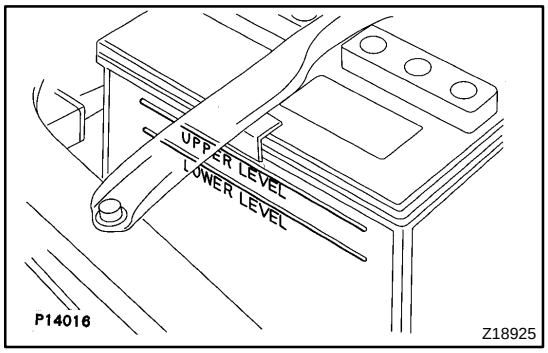
CHARGING SYSTEM

CH0IW-01

ON-VEHICLE INSPECTION

CAUTION:

- **Check that the battery cables are connected to the correct terminals.**
- **Disconnect the battery cables when the battery is given a quick charge.**
- **Do not perform tests with a high voltage insulation resistance tester.**
- **Never disconnect the battery while the engine is running.**



1. CHECK BATTERY ELECTROLYTE LEVEL

Check the electrolyte quantity of each cell.

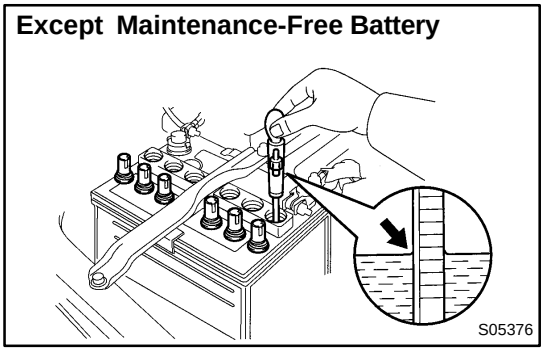
(Maintenance-Free Battery)

If under the lower level, replace the battery (or add distilled water if possible) and check the charging system.

(Except Maintenance-Free Battery)

If under the lower level, add distilled water.

Except Maintenance-Free Battery

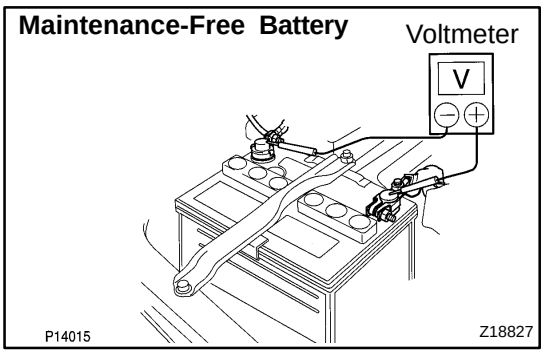


2. (Except Maintenance-Battery) CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

Standard specific gravity: At 20˚C (68˚F): 1.25 - 1.29

If the specific gravity is less than specification, charge the battery.



3. (Maintenance-Free Battery) CHECK BATTERY VOLTAGE

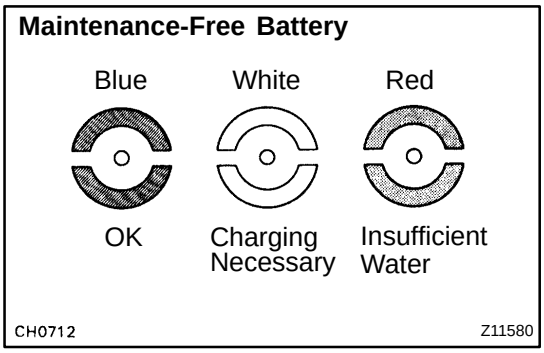
Measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

Standard voltage: At 20˚C (68˚F): 12.7 - 12.9 V

HINT:

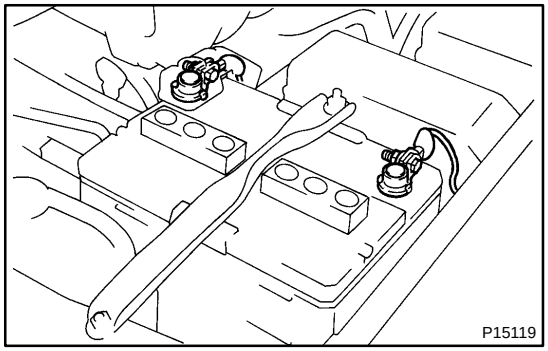
- Before measuring the voltage, turn the ignition switch OFF and turn off the electrical systems (headlight, blower motor, rear defogger etc.) for 60 secondsto remove the surface charge.
- When measuring the voltage, however, turn the ignition switch OFF and turn off the electrical systems.

If the voltage is less than the specification, charge the battery.



HINT:

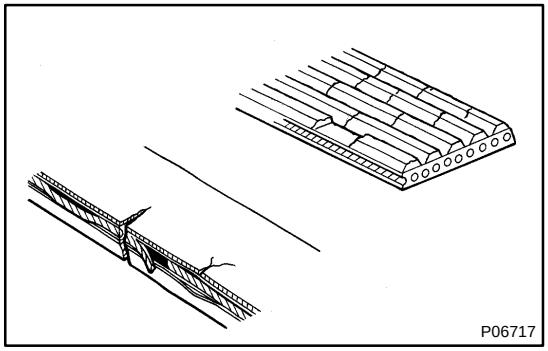
Check the indicator as shown in the illustration.



4. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

(a) Check that the battery terminals are not loose or corroded.

(b) Check the fusible link and fuses for continuity.

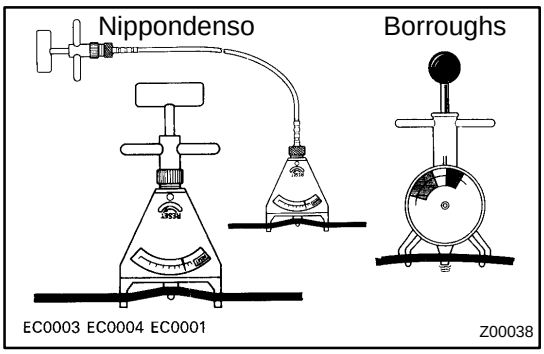


5. INSPECT DRIVE BELT

(a) Visually check the belt for excessive wear, frayed cords etc.

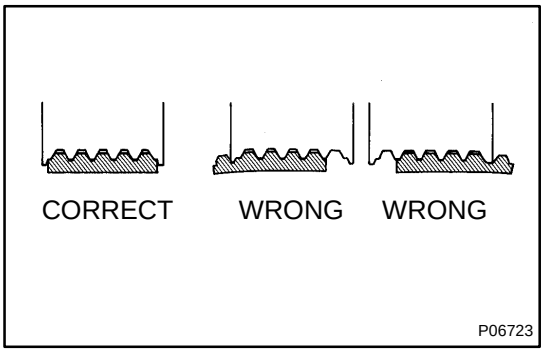
HINT:

Cracks on the ribbed side of the belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.



(b) Using a belt tension gauge, check the drive belt tension.
Belt tension gauge:
Nippondenso BTG 20 (95506-00020) or
Borroughs No. BT-33-73F
Drive belt tension:
New belt: 160 ± 20 lbf
Used belt: 100 ± 20 lbf

If necessary, adjust the drive belt tension.



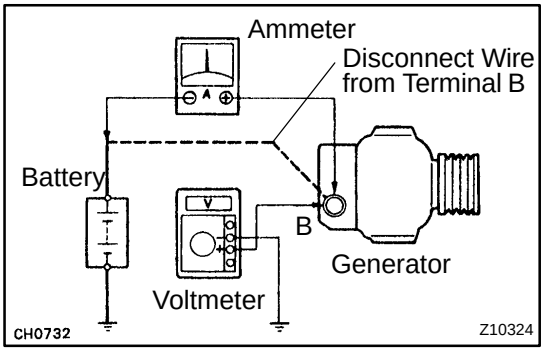
HINT:
- ”New belt” refers to a belt which has been used less than 5 minutes on a running engine.
- ”Used belt” refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves. Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the crank pulley.
- After installing a new belt, run the engine for approx. 5 minutes and then recheck the tension.

6. INSPECT FUSES FOR CONTINUITY
- ENGINE 10A
- CHARGE 7.5A
- IGN 7.5A

7. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES

(a) Check that the wiring is in good condition.

(b) Check that there is no abnormal noise from the generator while the engine is running.



8. CHECK CHARGING CIRCUIT WITHOUT LOAD

HINT:

If a battery/generator tester is available, connect the tester to the charging circuit according to the manufactuer’s instructions.

(a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:
- Disconnect the wire from terminal B of the generator and connect the wire to the negative (-) terminal of the ammeter.
- Connect the test lead from the positive (+) terminal of the ammeter to terminal B of the generator.
- Connect the positive (+) lead of the voltmeter to terminal B of the generator.
- Ground the negative (-) lead of the voltmeter.

(b) Check the charging circuit as follows:
With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.
Standard amperage: 10 A or less
Standard voltage:
At 25 ˚C (77 ˚F): 13.7 - 14.7 V
At 115 ˚C (239 ˚F): 13.2 - 14.0 V

If the voltage reading is greater than the standard voltage, check the voltage regulator (See page CH-9).

9. INSPECT CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater fan control switch to HI.

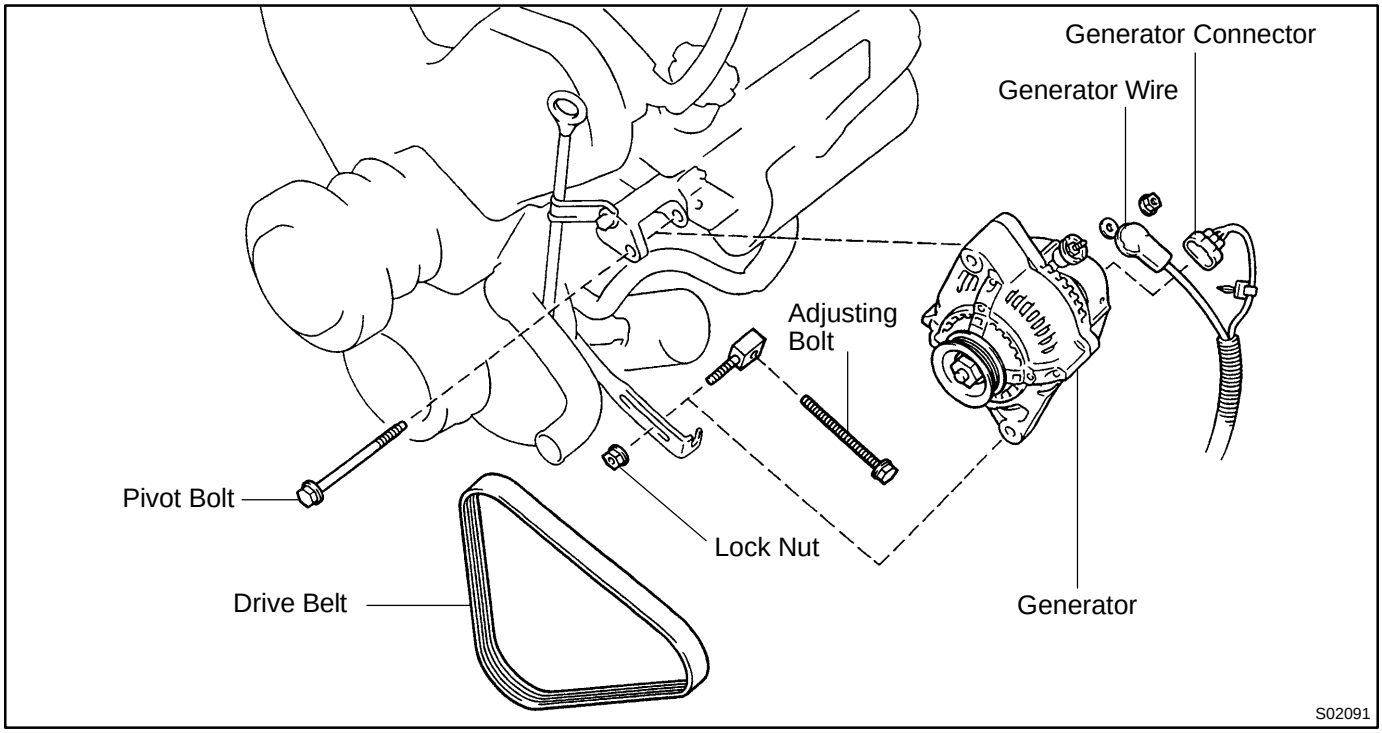
(b) Check the reading on the ammeter.
Standard amperage: 30 A or more

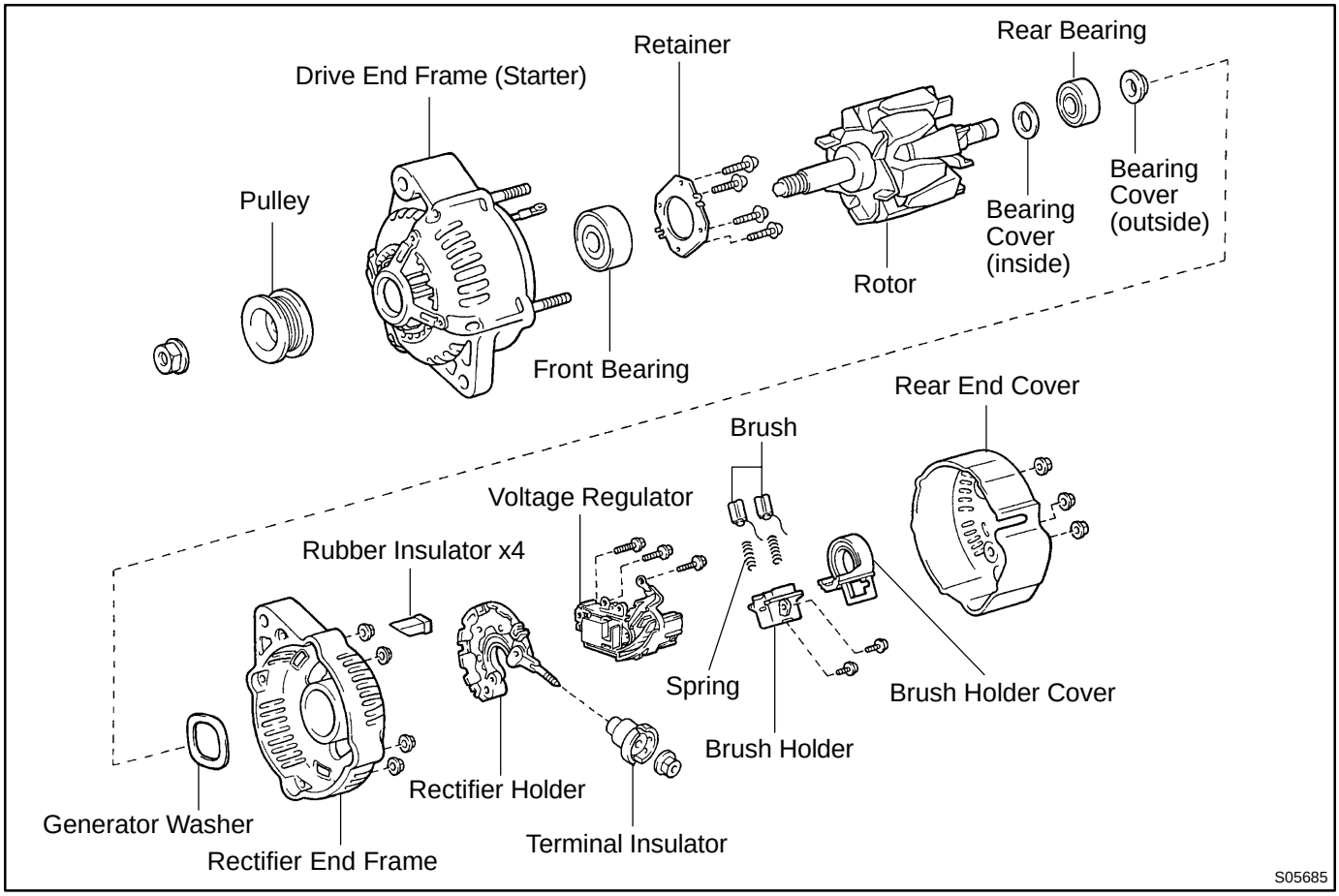
If the ammeter reading is less than 30 A, repair the generator.
HINT:
If the battery is fully charged, the indication will sometimes be less than 30 A.

GENERATOR

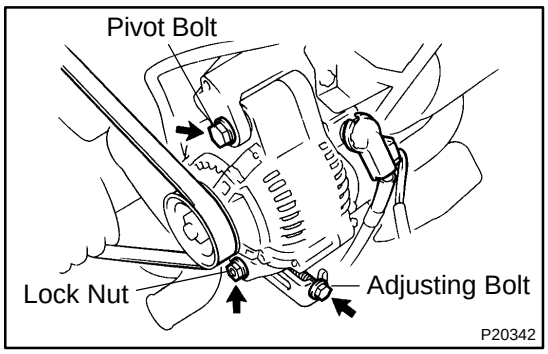
COMPONENTS

CH00F-03





CH00G-03



REMOVAL

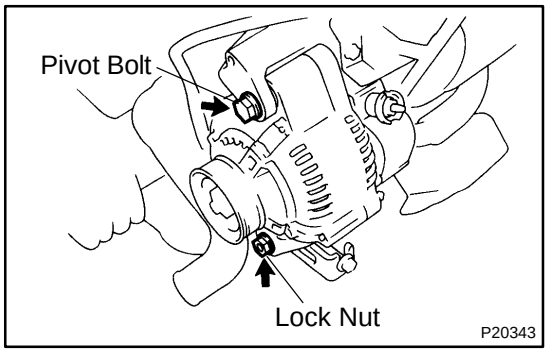
1. DISCONNECT WIRING FROM GENERATOR

(a) Disconnect the connector from the generator.

(b) Remove the nut and disconnect the wire from the generator.

2. REMOVE GENERATOR DRIVE BELT

Loosen the adjust lock nut, adjusting bolt and pivot bolt, and remove the drive belt.



3. REMOVE GENERATOR

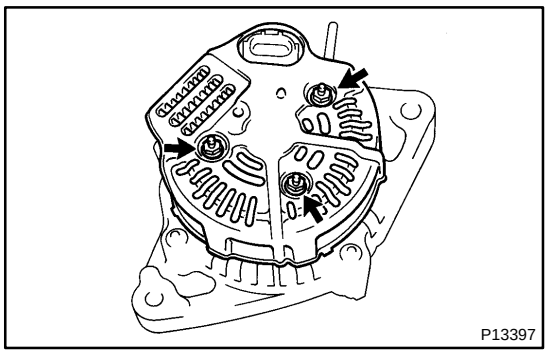
(a) Remove the pivot bolt and adjusting lock nut.

(b) Remove the generator.

Torque:
Pivot bolt: 51 N·m (520kgf·cm, 38 ft·lbf)
Lock Nut: 18.5 N·m (189kgf·cm, 25 ft·lbf)

CH00H-03

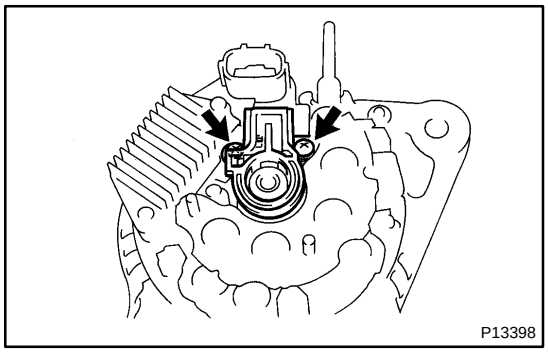
DISASSEMBLY



1. REMOVE REAR END COVER

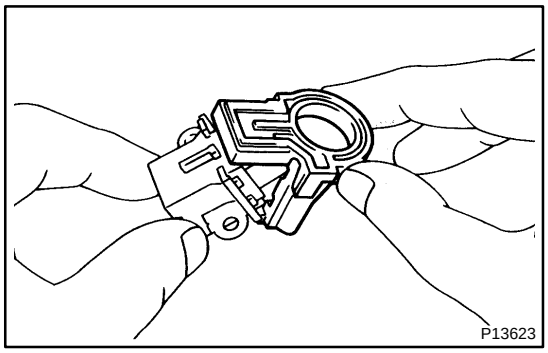
(a) Remove the nut and terminal insulator.

(b) Remove the 3 nuts and end cover.

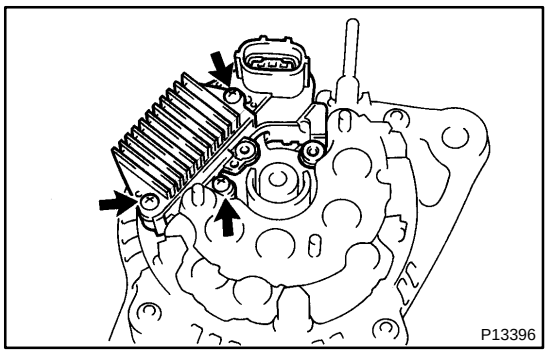


2. REMOVE BRUSH HOLDER

(a) Remove the 2 screws, brush holder and cover.

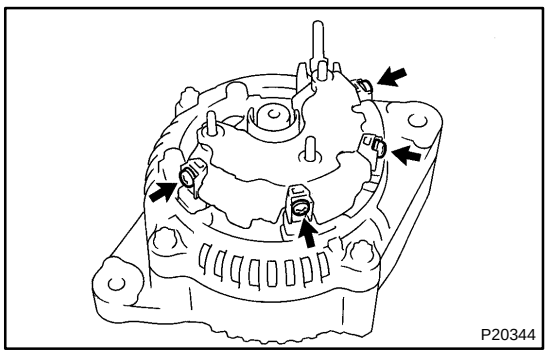


(b) Remove the brush holder cover from the brush holder.



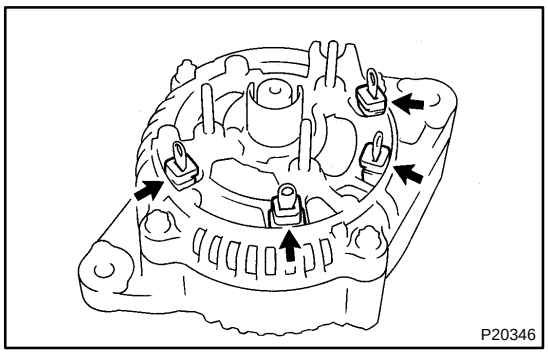
3. REMOVE VOLTAGE REGULATOR

Remove the 3 screws and voltage regulator.

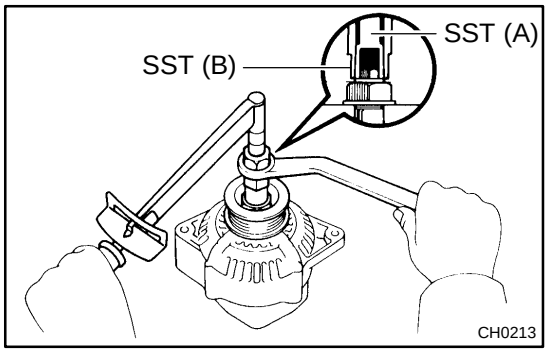


4. REMOVE RECTIFIER HOLDER

(a) Remove the 4 screws and rectifier holder.



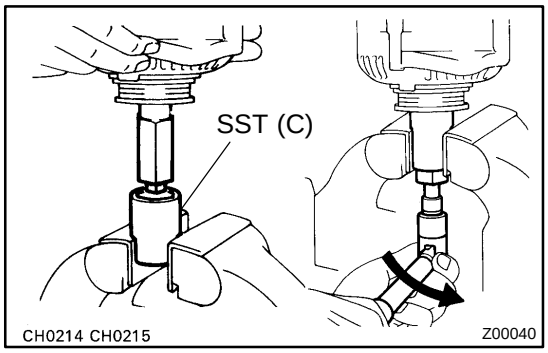
(b) Remove the 4 rubber insulators.



5. REMOVE PULLEY

(a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.
SST 09820-6301 1
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(b) Check that SST (A) is secured to the rotor shaft.



(c) As shown in the illustration, mount SST (C) in a vise, and install the generator with SST (A) and (B) to SST (C).

(d) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

NOTICE:

To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.

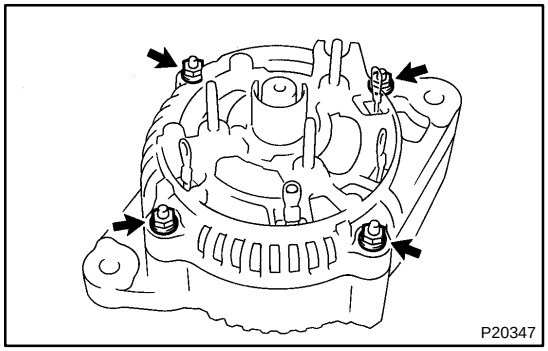
(e) Remove the generator with SST (A) and (B) from SST (C).

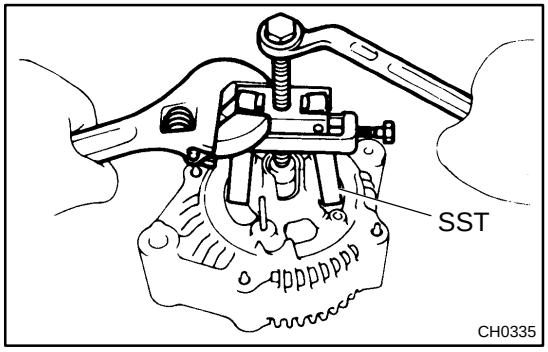
(f) Turn SST (B) and remove SST (A) and (B).

(g) Remove the pulley nut and pulley.

6. REMOVE RECTIFIER END FRAME

(a) Remove the 4 nuts.

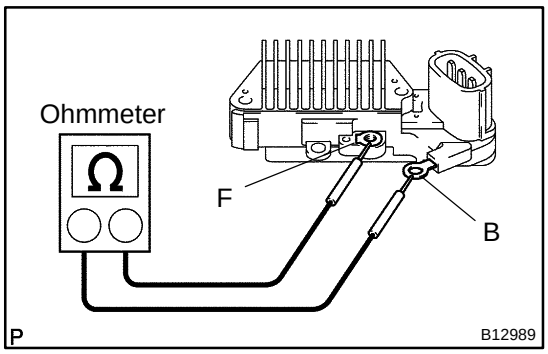




(b) Using SST, remove the rectifier end frame.
SST 09286-4601 1

(c) Using snap ring pliers, remove the generator washer from the rectifier end frame.

7. REMOVE ROTOR FROM DRIVE END FRAME



INSPECTION

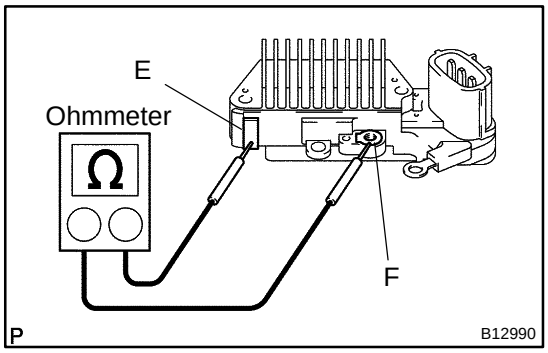
1. INSPECT VOLTAGE REGULATOR

(a) Using an ohmmeter, check the continuity between terminals F and B.

Standard:

When the positive and negative poles between terminals F and B are exchanged, there is continuity in one way but no continuity in another way.

If the continuity is not as specified, replace the voltage regulator.



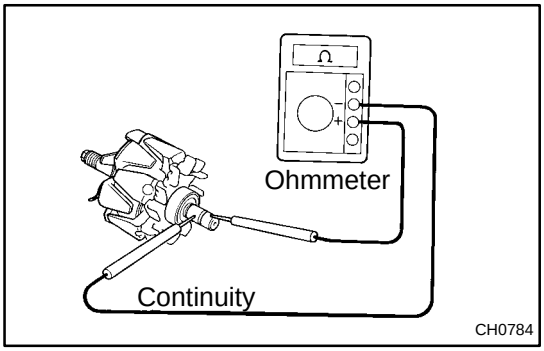
CH0IX-02

(b) Using an ohmmeter, check the continuity between terminals F and E.

Standard:

When the positive and negative poles between terminals F and E are exchanged, there is continuity in one way but no continuity in another way.

If the continuity is not as specified, replace the voltage regulator.

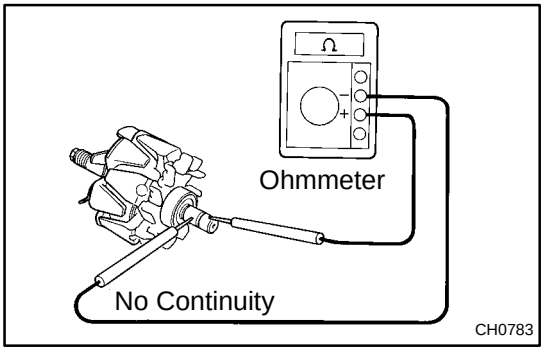


2. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: At 20°C (68°F): 2.1 - 2.5 Ω

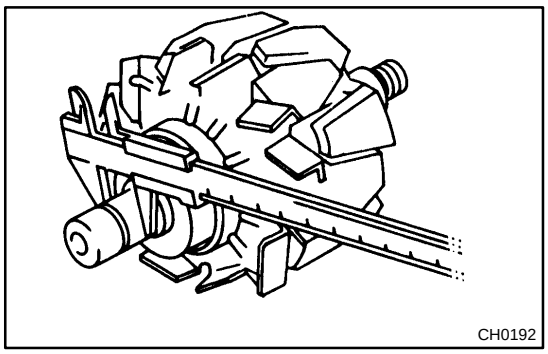
If there is no continuity, replace the rotor.



3. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.



4. INSPECT SLIP RINGS

(a) Check that the slip rings are not rough or scored.

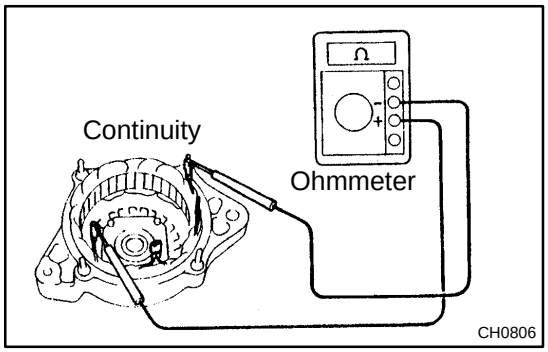
If rough or scored, replace the rotor.

(b) Using vernier calipers, measure the slip ring diameters.

Standard diameter: 14.2 - 14.4 mm (0.559 - 0.567 in.)

Minimum diameter: 12.8 mm (0.504 in.)

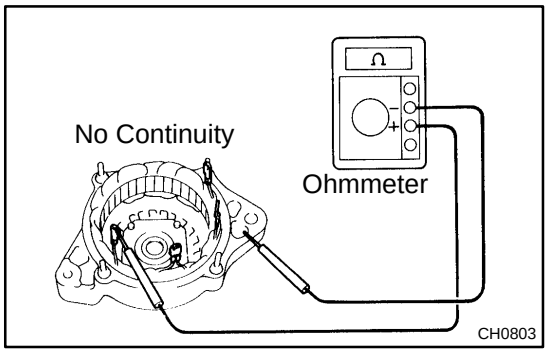
If the diameter is less than the minimum, replace the rotor.



5. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

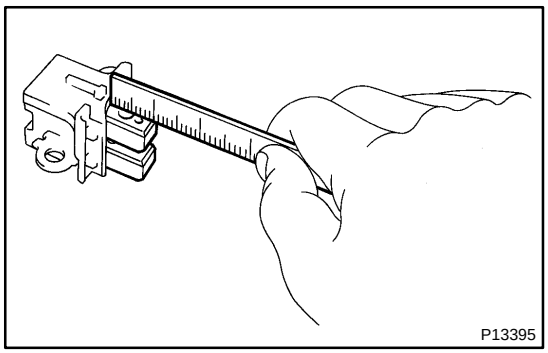
If there is no continuity, replace the drive end frame assembly.



6. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil leads and drive end frame.

If there is continuity, replace the drive end frame assembly.



7. INSPECT EXPOSED BRUSH LENGTH

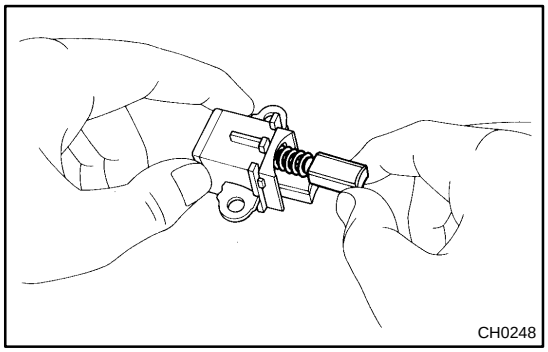
Using a scale, measure the exposed brush length.

Standard exposed length:

9.5 - 11.5 mm (0.374 - 0.452 in.)

Minimum exposed length: 1.5 mm (0.059 in.)

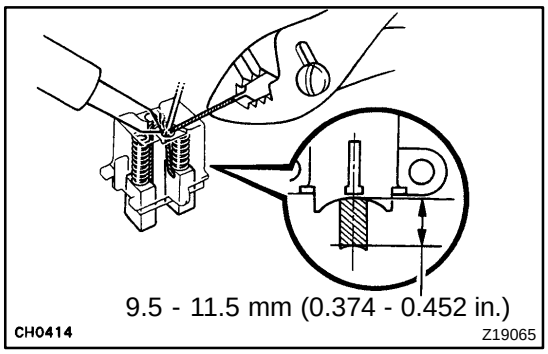
If the exposed length is less than the minimum, replace the brushes.



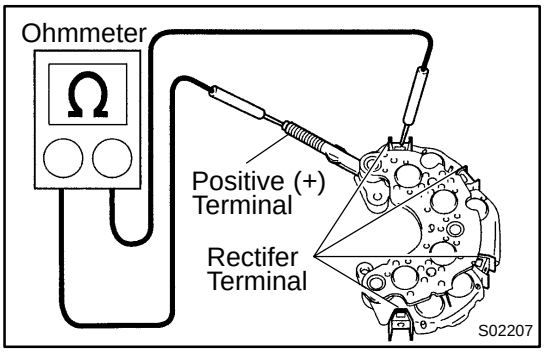
8. IF NECESSARY, REPLACE BRUSHES

(a) Unsolder and remove the brush and spring.

(b) Run the wire of the brush through the hole in the brush holder, and insert the spring and brush into the brush holder.

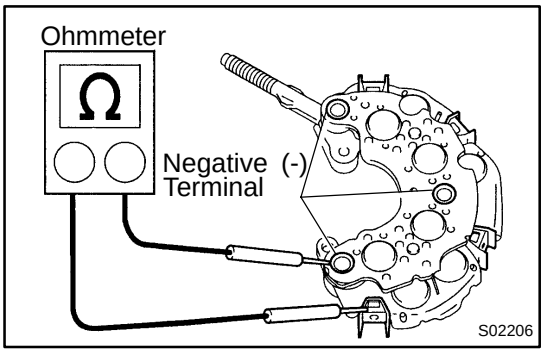


(c) Solder the brush wire to the brush holder at the exposed length.
Exposed length: 9.5 - 11.5 mm (0.374 - 0.452 in.)
(d) Check that the brush moves smoothly in the brush holder.
(e) Cut off the excess wire.
(f) Apply insulation paint to the soldered point.



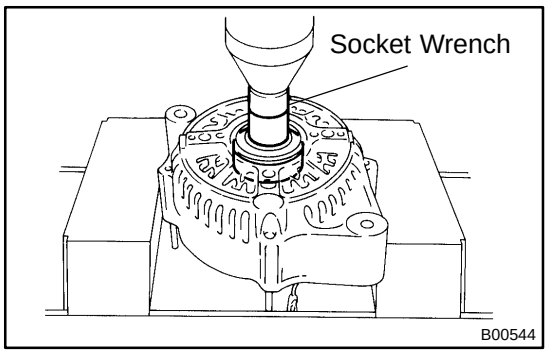
9. INSPECT POSITIVE RECTIFIER
(a) Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.
(b) Reverse the polarity of the tester probes and repeat step (a).
(c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



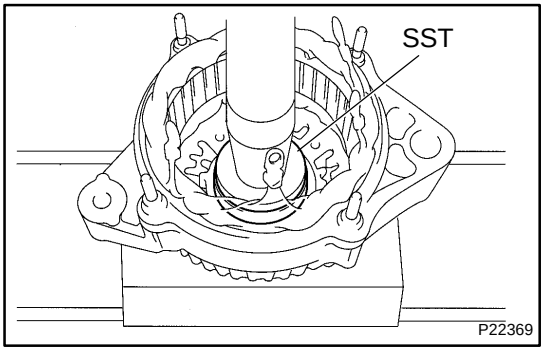
10. INSPECT NEGATIVE RECTIFIER
(a) Using an ohmmeter, connect one tester probe to each negative (-) terminal and the other to each rectifier terminal.
(b) Reverse the polarity of the tester probes and repeat step (a).
(c) Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

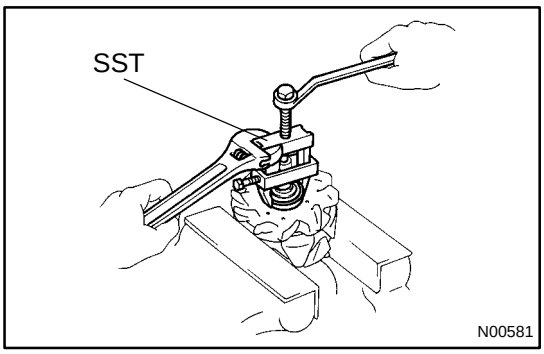


11. INSPECT FRONT BEARING
Check that the bearing is not rough or worn.

12. IF NECESSARY, REPLACE FRONT BEARING
(a) Remove the 4 screws and bearing retainer.
(b) Using a press and socket wrench, press out the front bearing.



(c) Using SST and a press, press the front bearing into the drive end frame.
SST 09950-60010 (09951-00500)
(d) Install the bearing retainer with the 4 screws.



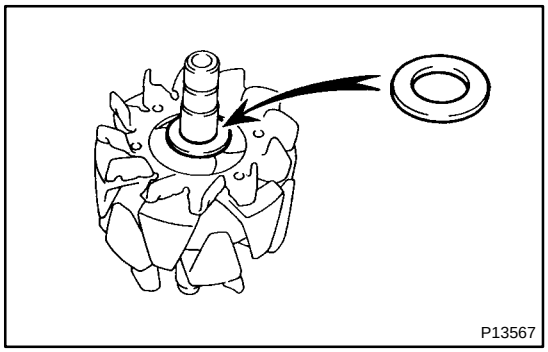
13. INSPECT REAR BEARING

Check that the bearing is not rough or worn.

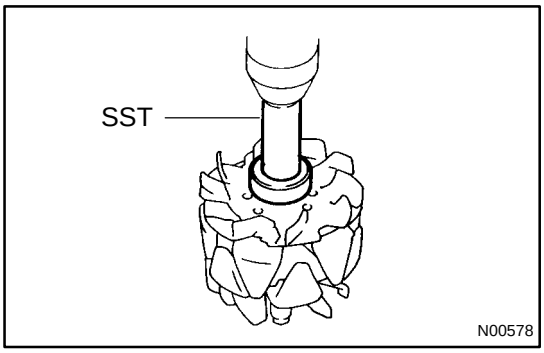
14. IF NECESSARY, REPLACE REAR BEARING

(a) Using SST, remove the bearing cover and bearing.
SST 09820-00021

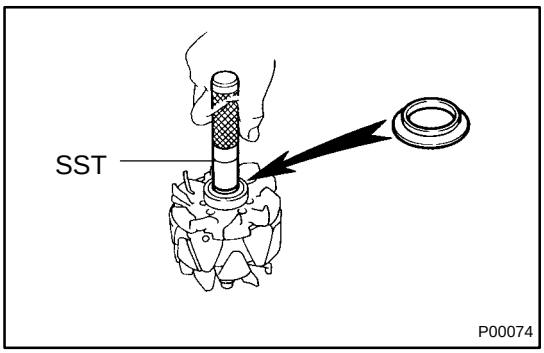
(b) Remove the bearing cover (inside).



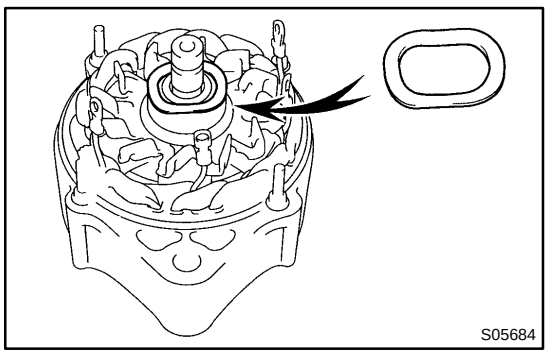
(c) Place the bearing cover (inside) on the rotor.



(d) Using SST and a press, press in a new bearing and the bearing cover.
SST 09820-00031



(e) Using SST, push in the bearing cover (outside).
SST 09285-76010



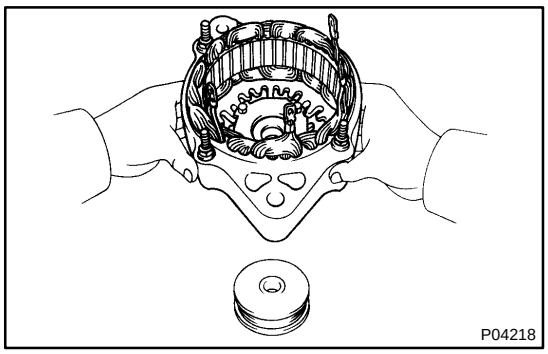
(f) Place the generator washer on the rotor.

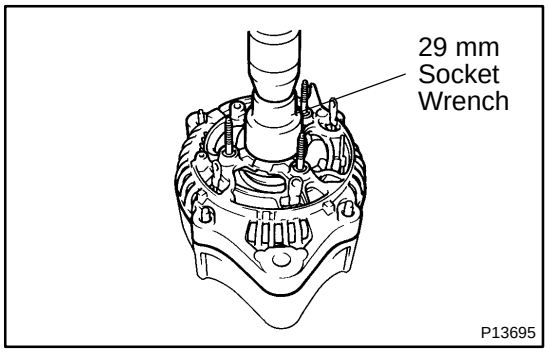
CH00J-03

REASSEMBLY

1. PLACE RECTIFIER END FRAME ON PULLEY

2. INSTALL ROTOR TO DRIVE END FRAME





3. INSTALL RECTIFIER END FRAME

(a) Install the generator washer to the rectifier end frame.

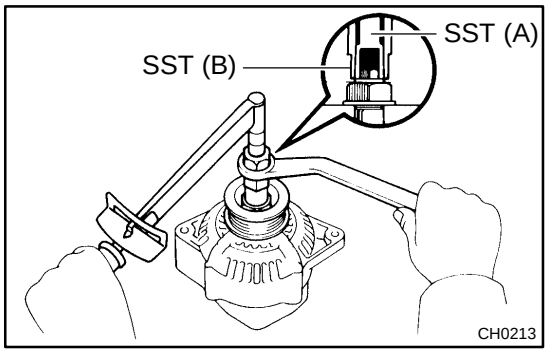
NOTICE:

Be careful of the generator washer installation direction.

(b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.

(c) Install the 4 nuts.

Torque: 4.5 N·m (45 kgf·cm, 39 in.·lbf)



4. INSTALL PULLEY

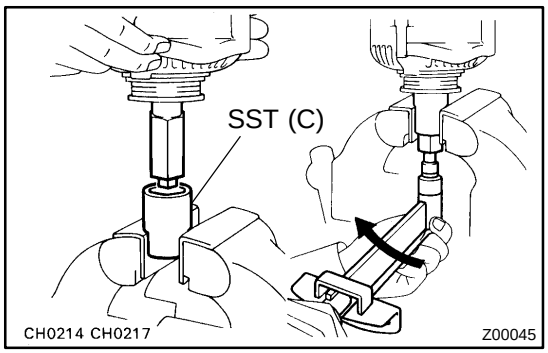
(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(b) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-6301 1

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

(c) Check that SST (A) is secured to the pulley shaft.



(d) As shown in the illustration, mount SST (C) in a vise, and install the generator with SST (A) and (B) to SST (C).

(e) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.

Torque: 110 N·m (1,125 kgf·cm, 81 ft·lbf)

(f) Remove the generator with SST (A) and (B) from SST (C).

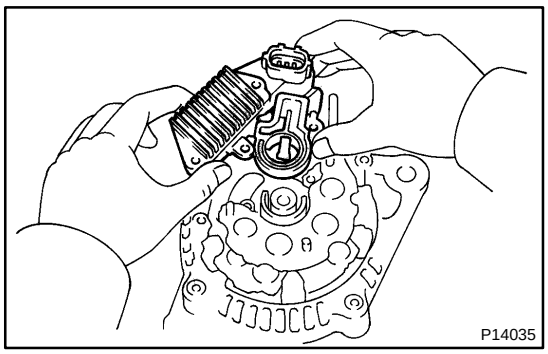
(g) Turn SST (B) and remove SST (A) and (B).

5. INSTALL RECTIFIER HOLDER

(a) Install the 4 rubber insulators on the lead wires.

(b) Install the rectifier with the 4 screws.

Torque: 2.0 N·m (20 kgf·cm, 18 in.·lbf)



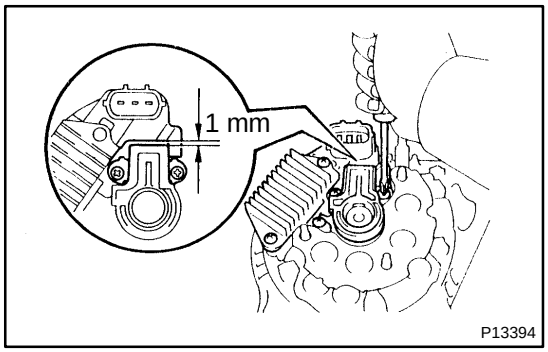
6. INSTALL BRUSH HOLDER AND VOLTAGE REGULATOR

(a) Place the brush holder cover to the brush holder.

(b) Install the voltage regulator and brush holder to the rear end frame horizontally as shown in the illustration.

HINT:

Check that the brush holder's cover doesn't slip to one side during installation.



(c) Tighten the 5 screws until there is a clearance of at least 1 mm (0.04 in.) between the brush holder cover and connector.

7. INSTALL REAR END COVER

(a) Install the end cover with the 3 nuts.
Torque: 4.5 N·m (45 kgf·cm, 39 in.·lbf)

(b) Install the terminal insulator with the nut.
Torque: 4.1 N·m (42 kgf·cm, 36 in.·lbf)

8. MAKE SURE ROTOR ROTATES SMOOTHLY

CH00K-02

INSTALLATION

Installation is in the reverse order of removal (See page CH-6).

AUTOMATIC TRANSMISSION SYSTEM

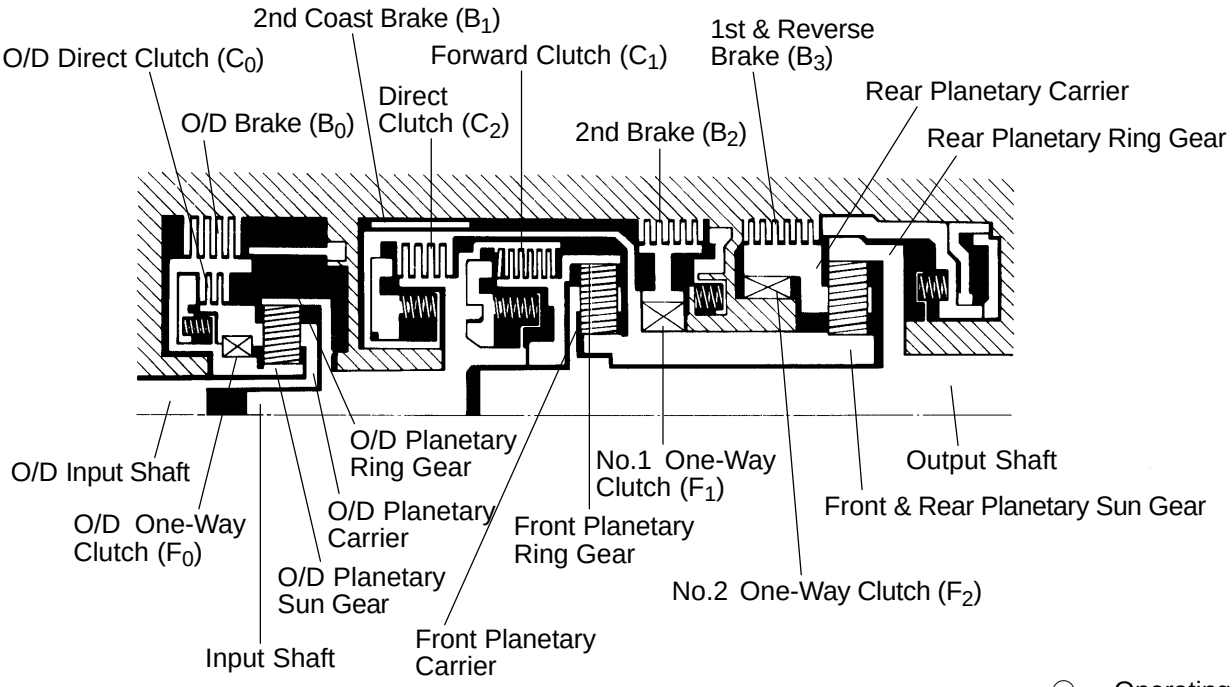
AT01P-01

PRECAUTION

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

AT007-09

OPERATION



AT2157

○ ... Operating

Shift lever position	Gear position	C_0	C_1	C_2	B_0	B_1	B_2	B_3	F_0	F_1	F_2
P	Parking	○									
R	Reverse	○		○				○	○		
N	Neutral	○									
D	1st	○	○						○		○
	2nd	○	○				○		○	○	
	3rd	○	○	○			○		○		
	O/D		○	○	○		○				
2	1st	○	○						○		○
	2nd	○	○			○	○		○	○	
	*1 3rd	○	○	○			○		○		
L	1st	○	○					○	○		○
	*2 2nd	○	○			○	○		○	○	

*1: Down-shift only in the 2 position and 3rd gear — no up-shift.

*2: Down-shift only in the L position and 2nd gear — no up-shift.

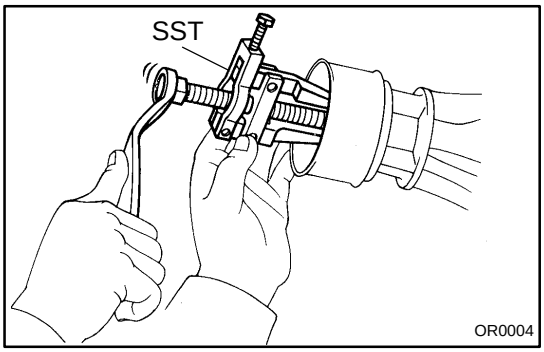
V07130

EXTENSION HOUSING OIL SEAL (A340E)

AT008-06

ON-VEHICLE REPAIR

1. REMOVE PROPELLER SHAFT (See page PR-4)



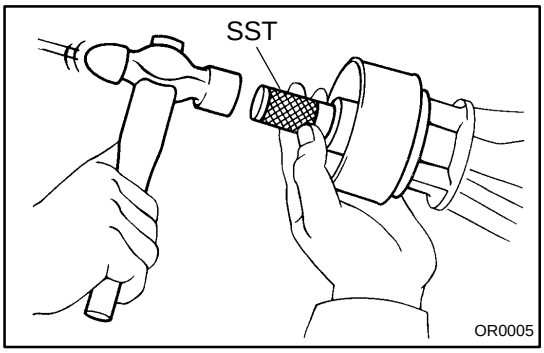
2. REMOVE REAR OIL SEAL

NOTICE:

Clean the extension housing before removing the oil seal.

Using SST, remove the oil seal.

SST 09308-10010



3. INSTALL NEW OIL SEAL

(a) Using SST and a hammer, carefully drive in the oil seal as far as it will go.

(b) Coat the lip of a new oil seal with MP grease.

SST 09325-40010

4. INSTALL PROPELLER SHAFT (See page PR-6)

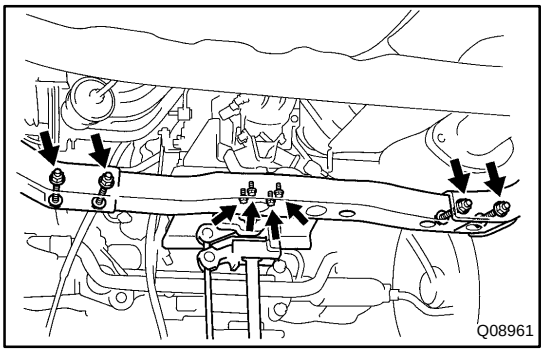
5. CHECK FLUID LEVEL (See page DI-159)

SENSOR ROTOR (A340E)

AT0YM-01

ON-VEHICLE REPAIR

1. **REMOVE PROPELLER SHAFT (See page PR-4)**
2. **REMOVE NO.2 VEHICLE SPEED SENSOR (See page AT-7)**



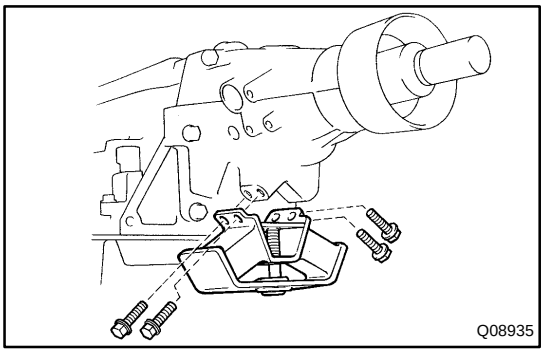
3. **JACK UP TRANSMISSION SLIGHTLY**

Securely support the transmission on a transmission jack. Lift the transmission slightly from the crossmember.

4. **REMOVE CROSSMEMBER**

(a) Remove the 4 bolts on the rear mounting side from the rear mounting bracket.

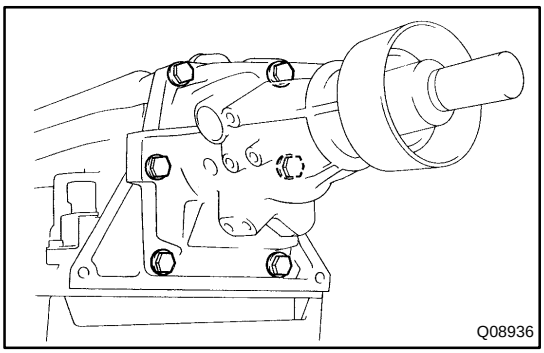
(b) Remove the 4 nuts, bolts and crossmember.



5. **REMOVE ENGINE REAR MOUNTING**

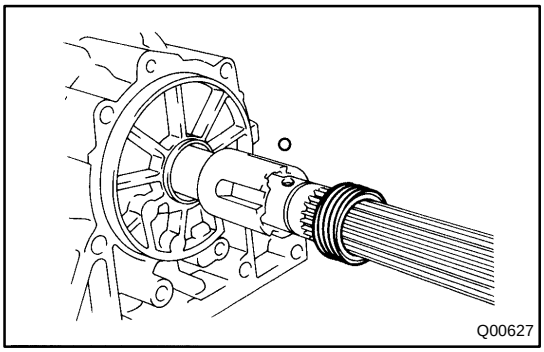
Remove the 4 bolts and engine rear mounting from the transmission.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



6. **REMOVE EXTENSION HOUSING AND GASKET**

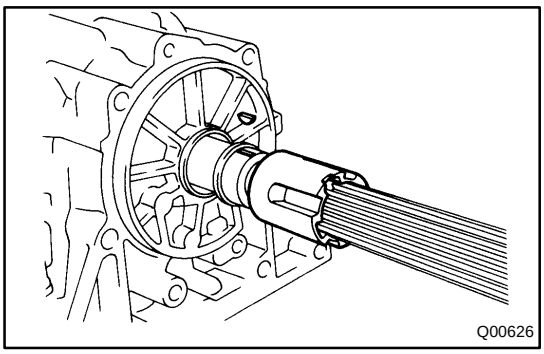
Remove the 6 bolts and extension housing. If necessary, tap the extension housing with a plastic hammer or a block of wood to loosen it.



7. **REMOVE SPEEDOMETER DRIVE GEAR AND BALL**

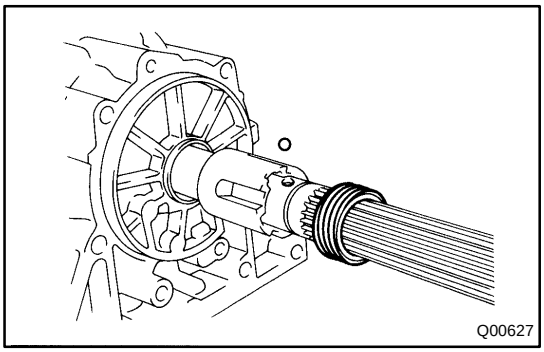
(a) Using a snap ring expander, remove the snap ring.

(b) Remove the speedometer drive gear and ball.


Q00626

8. REMOVE SENSOR ROTOR AND KEY

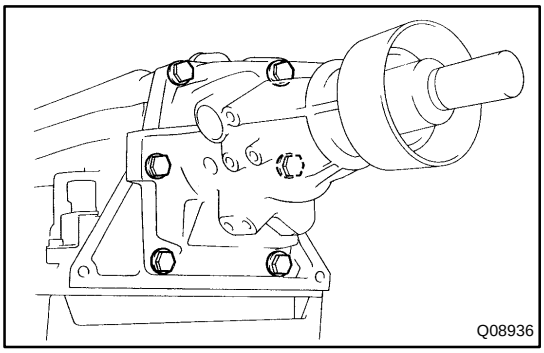
9. INSTALL SENSOR ROTOR AND KEY


Q00627

10. INSTALL SPEEDOMETER DRIVE GEAR AND BALL

(a) Install the speedometer drive gear and ball.

(b) Using a snap ring expander, install the snap ring.


Q08936

11. INSTALL EXTENSION HOUSING AND GASKET

(a) Apply sealant or equivalent to the 6 bolts.

Sealant:

Part No. 08833 - 00080, THREE BOND 1344, LOCTITE 242 or equivalent

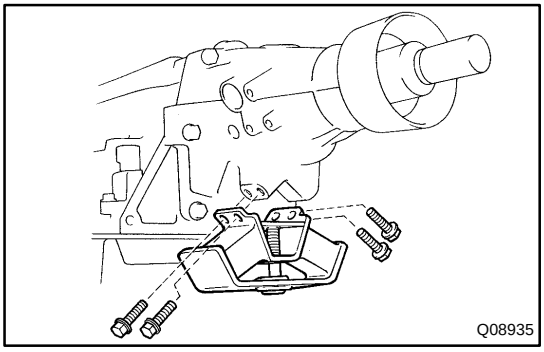
(b) Install the extension housing with a new gasket to the case.

(c) Install the 6 bolts.

Torque: 36 N·m (370 kgf·cm, 27 ft·lbf)

HINT:

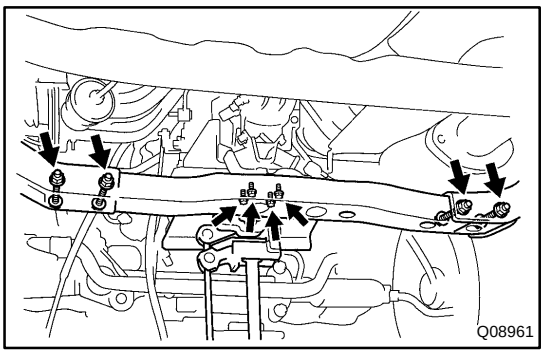
The 2 lower bolts are shorter.


Q08935

12. INSTALL ENGINE REAR MOUNTING

Install the 4 bolts of the engine rear mounting to the transmission.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



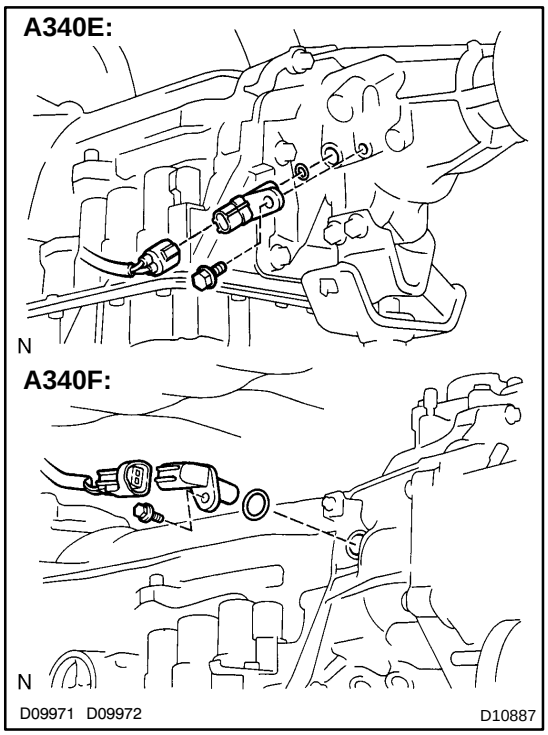
13. INSTALL CROSSMEMBER

(a) Install the 4 nuts, bolts and crossmember.
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

(b) Install the 4 bolts on the rear mounting side to the rear mounting bracket.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

14. INSTALL NO.1 AND NO.2 VEHICLE SPEED SENSORS (See page AT-7)

15. INSTALL PROPELLER SHAFT (See page PR-4)



VEHICLE SPEED SENSOR

AT0YN-01

ON-VEHICLE REPAIR

1. DISCONNECT NO.2 VEHICLE SPEED SENSOR CONNECTOR

2. REMOVE NO.2 VEHICLE SPEED SENSOR

(a) Remove the bolt and No.2 vehicle speed sensor.

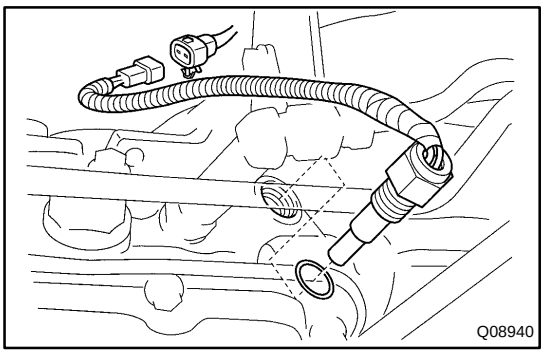
(b) Remove the O-ring from the No.2 vehicle speed sensor.

3. INSTALL NO.2 VEHICLE SPEED SENSOR

(a) Coat a new O-ring with ATF and install it to the No.2 vehicle speed sensor.

(b) Install the No.2 vehicle speed sensor and torque the bolt.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

4. CONNECT NO.2 VEHICLE SPEED SENSOR CONNECTOR



ATF TEMPERATURE SENSOR

AT00B-05

ON-VEHICLE REPAIR

1. DISCONNECT ATF TEMPERATURE SENSOR CONNECTOR

2. REMOVE ATF TEMPERATURE SENSOR

(a) Remove the ATF temperature sensor.

(b) Remove the O-ring from the ATF temperature sensor.

3. INSTALL ATF TEMPERATURE SENSOR

(a) Coat a new O-ring with ATF and install it to the ATF temperature sensor.

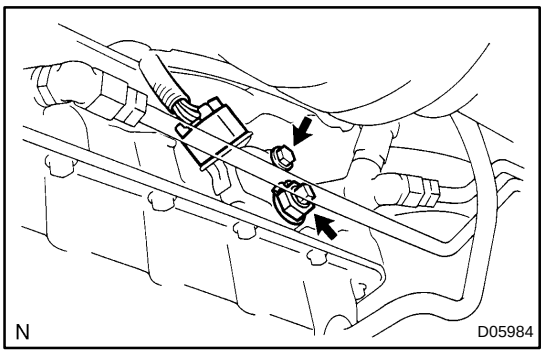
(b) Install the ATF temperature sensor.

Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)

4. CONNECT ATF TEMPERATURE SENSOR CONNECTOR

NOTICE:

Be careful not to twist the wire harness.



PARK/NEUTRAL POSITION (PNP) SWITCH

AT00C-04

ON-VEHICLE REPAIR

1. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

2. REMOVE PARK/NEUTRAL POSITION SWITCH

(a) Pry off the lock washer and remove the nut.

(b) Remove the bolt and park/neutral position switch.

3. INSTALL PARK/NEUTRAL POSITION SWITCH

(a) Install the park/neutral position switch with bolt.
Torque: 13 N·m (130 kgf·cm, 10 ft·lbf)

(b) Install a new lock plate and the nut.
Torque: 3.9 N·m (40 kgf·cm, 35 in.·lbf)

(c) Bend the claws on the lock plate to fix the nut.

(d) Adjust the park/neutral position switch.
(See page DI-159)

4. CONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR

VALVE BODY ASSEMBLY

AT0YO-01

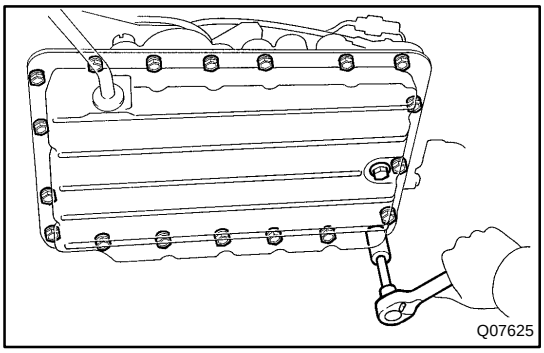
ON-VEHICLE REPAIR

CAUTION:

When working with FIPG material, you must observe the following items.

- **Using a razor blade and a gasket scraper, remove all old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all loose material.**
- **Clean both sealing surfaces with a non-residue solvent.**
- **Apply FIPG in an approx. 1 mm (0.04 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

1. REMOVE DRAIN PLUG AND DRAIN ATF

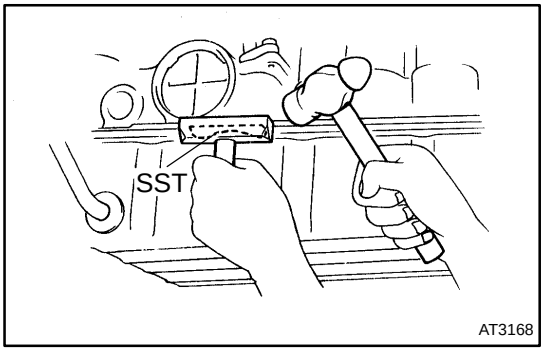


2. REMOVE OIL PAN

NOTICE:

Some fluid will remain in the oil pan.

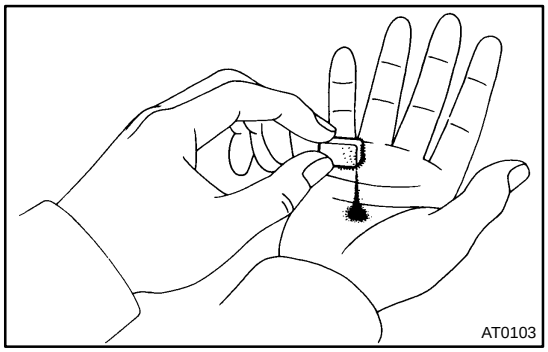
(a) Remove the 19 bolts.



(b) Install the blade of SST between the transmission case and oil pan, cut off applied sealer, and remove the oil pan.
SST 09032-00100

NOTICE:

When removing the oil pan, be careful not to damage the oil pan flange.

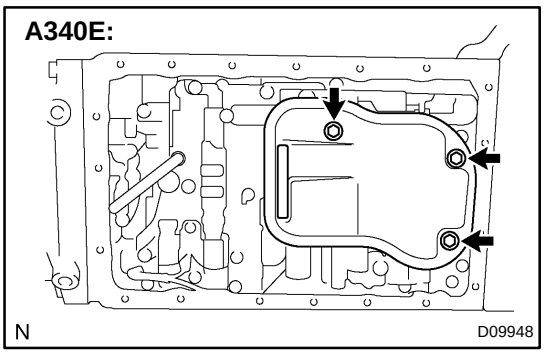


3. EXAMINE PARTICLES IN PAN

Remove the magnets and use them to collect steel particles. Carefully look at the foreign matter and particles in the pan and on the magnets to anticipate the type of wear you will find in the transmission.

Steel (magnetic) ... bearing, gear and clutch plate wear

Brass (non-magnetic) ... bushing wear

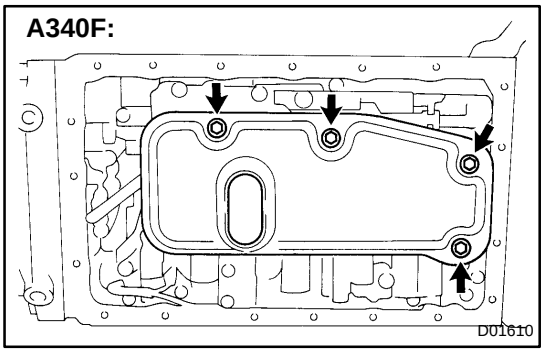


4. A340E:
REMOVE OIL STRAINER

NOTICE:

Be careful as some fluid will come out of the oil strainer.

Remove the 3 bolts, oil strainer and gaskets.



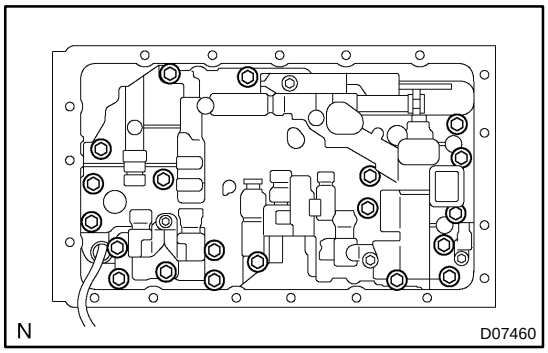
5. A340F:
REMOVE OIL STRAINER

NOTICE:

Be careful as some fluid will come out of the oil strainer.

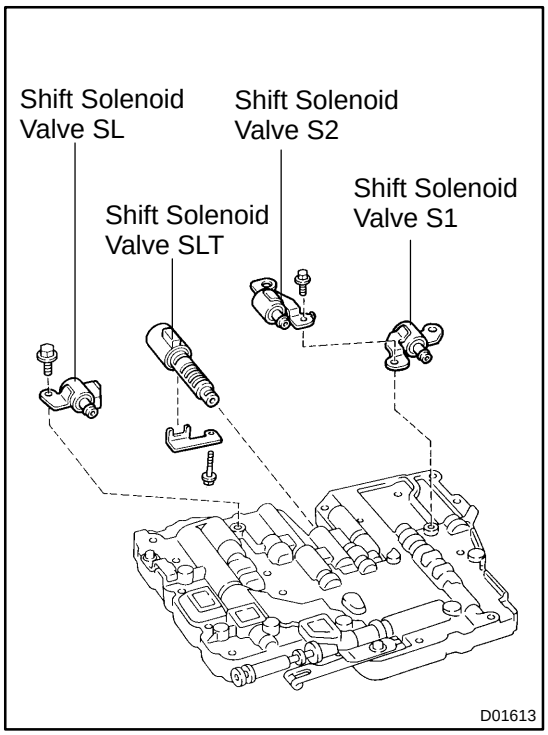
Remove the 4 bolts, oil strainer and gaskets.

6. DISCONNECT 4 CONNECTORS FROM EACH SHIFT SOLENOID VALVE



7. REMOVE VALVE BODY

Remove the 20 bolts and valve body.



8. REMOVE SHIFT SOLENOID VALVE

(a) Remove the 2 bolts and 3 shift solenoid valves.

(b) Turn the valve body, remove the bolt, lock plate and shift solenoid valve.

(c) Remove the 3 O-rings from the 3 solenoid valves.

9. REMOVE DETENT SPRING

10. REMOVE MANUAL VALVE

11. INSTALL MANUAL VALVE

12. INSTALL DETENT SPRING

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

13. INSTALL SOLENOID VALVE

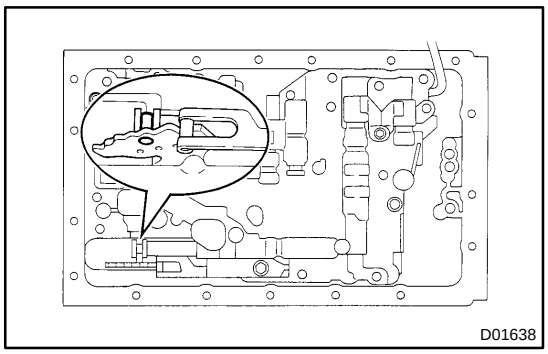
(a) Install 3 new O-rings to 3 shift solenoid valves.

(b) Install the shift solenoid valve and lock plate with the bolt.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

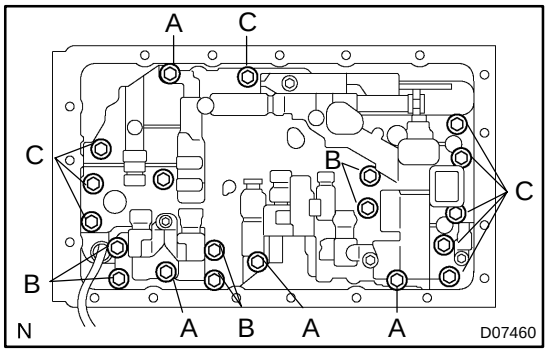
(c) Install the 3 shift solenoid valves with the 2 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



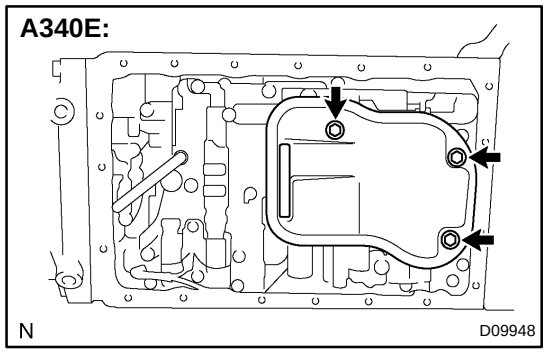
14. INSTALL VALVE BODY

(a) Align the groove of the manual valve with the pin of the lever.



(b) Install the valve body with the 20 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)
Bolt length:
Bolt A: 23 mm (0.91 in.)
Bolt B: 28 mm (1.10 in.)
Bolt C: 36 mm (1.42 in.)

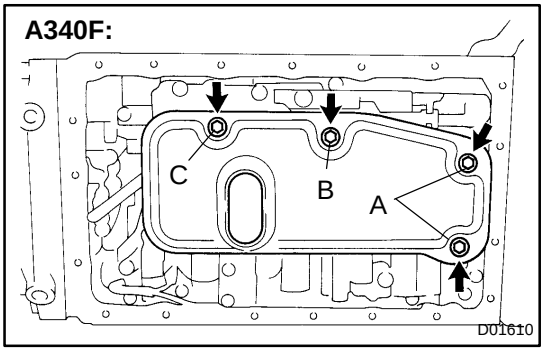
15. CONNECT 4 CONNECTORS TO SHIFT SOLENOID VALVES



16. A340E:
INSTALL OIL STRAINER

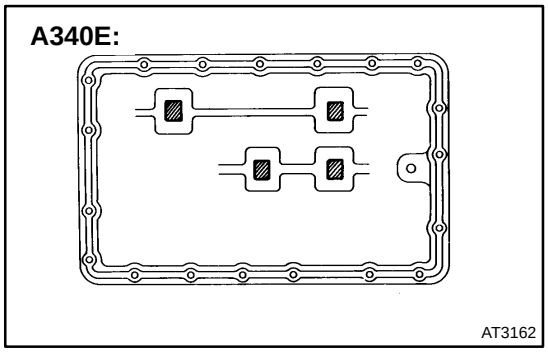
(a) Install the oil strainer with the 3 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

(b) Clamp the solenoid wire.



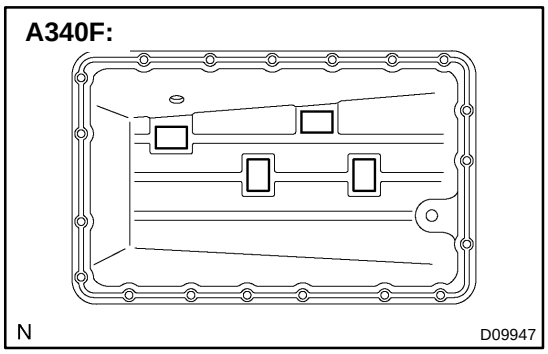
17. A340F:
INSTALL OIL STRAINER

Install the oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)
BOLT length:
Bolt A: 14 mm (0.55 in.)
Bolt B: 20 mm (0.79 in.)
Bolt C: 23 mm (0.91 in.)

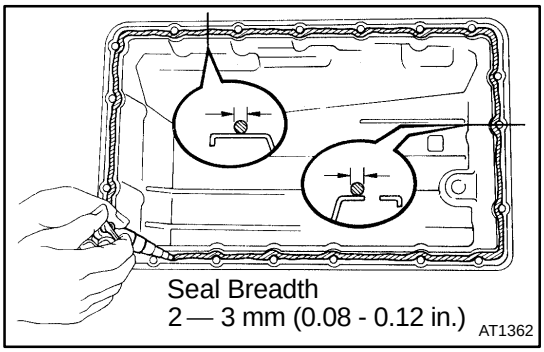


18. INSTALL OIL PAN

(a) A340E:
Install the 4 magnets in the indications of the oil pan.

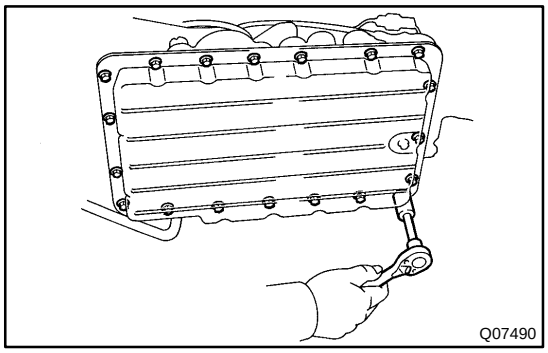


(b) A340F:
Install the 4 magnets in the indications of the oil pan.



(c) Remove any FIPG material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.

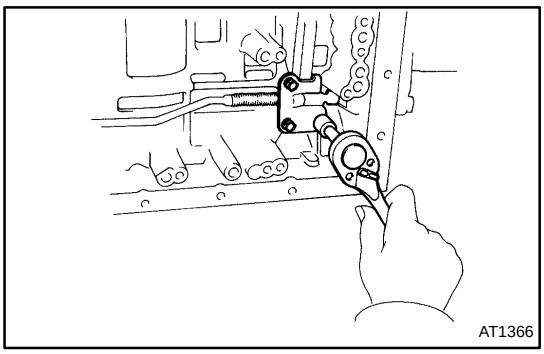
(d) Apply FIPG to the oil pan.
FIPG:
Part No. 08826 - 00090, THREE BOND 1281 or equivalent



(e) Install the oil pan with the 19 bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 ft·lbf)

19. INSTALL DRAIN PLUG
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

20. FILL AND CHECK ATF (See page DI-159)

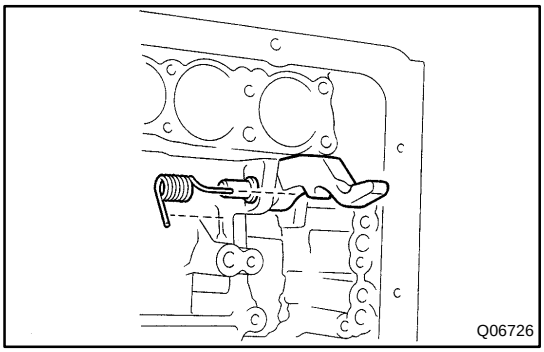


PARKING LOCK PAWL

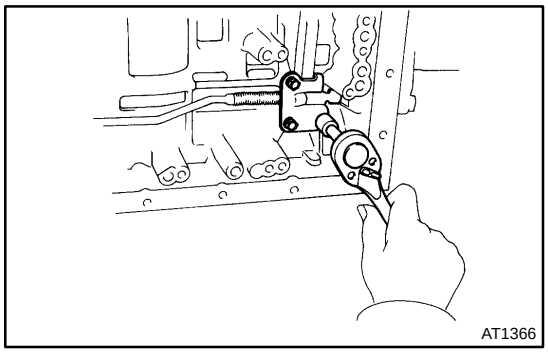
AT01S-03

ON-VEHICLE REPAIR

1. **REMOVE VALVE BODY (See page AT-10)**
2. **REMOVE PARKING LOCK PAWL BRACKET**



3. **REMOVE SPRING FROM PARKING LOCK PAWL SHAFT**
4. **REMOVE PARKING LOCK PAWL AND SHAFT**
5. **INSTALL PARKING LOCK PAWL AND SHAFT**
6. **INSTALL SPRING TO PARKING LOCK PAWL SHAFT**



7. **INSTALL PARKING LOCK PAWL BRACKET**

HINT:

- Pushing the lock rod fully forward.
- Check that the parking lock pawl operates smoothly.

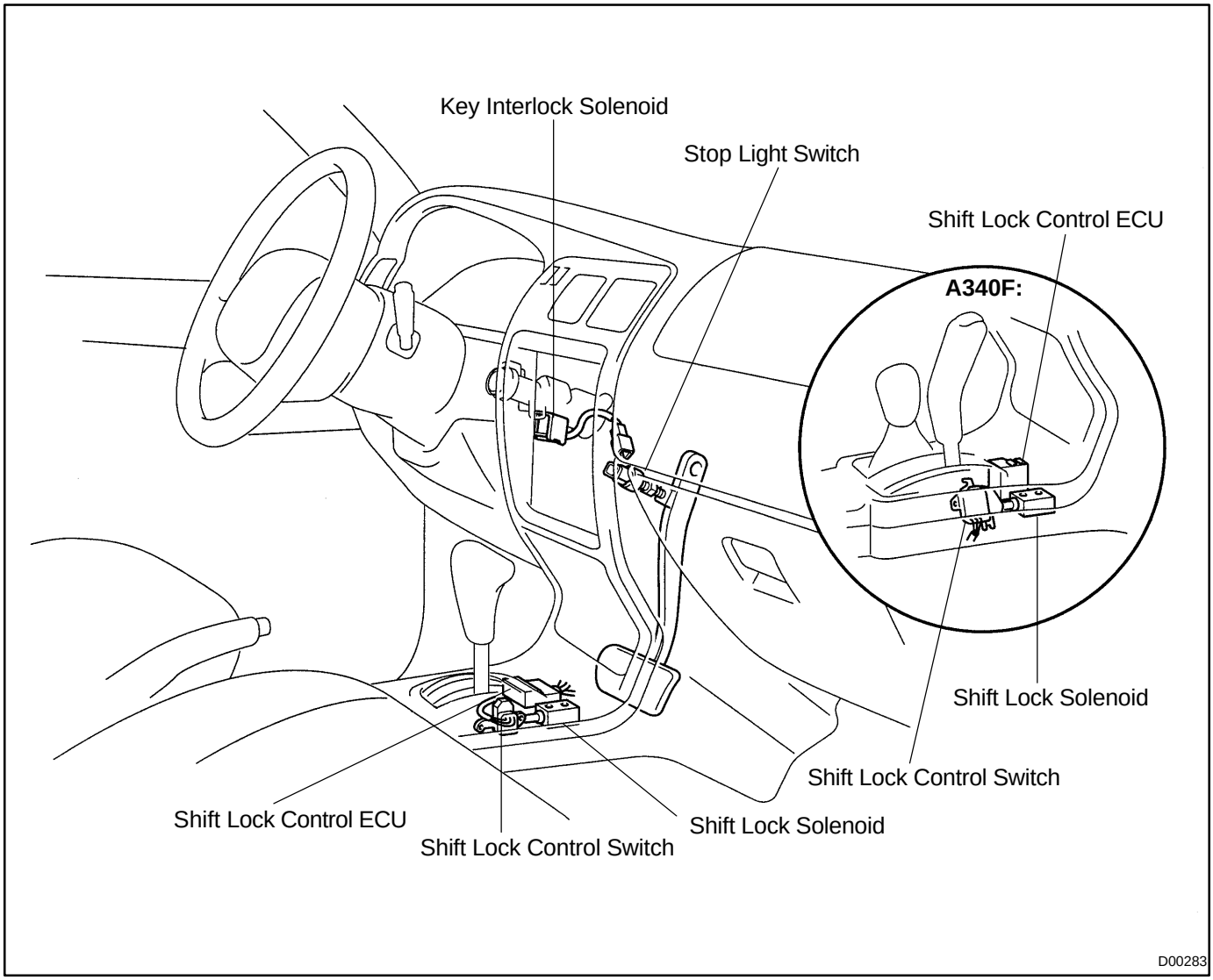
Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

8. **INSTALL VALVE BODY**
(See page AT-10)

SHIFT LOCK SYSTEM

AT00G-07

LOCATION



AT00I-04

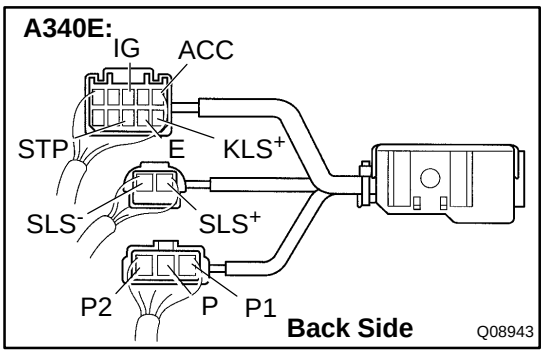
INSPECTION

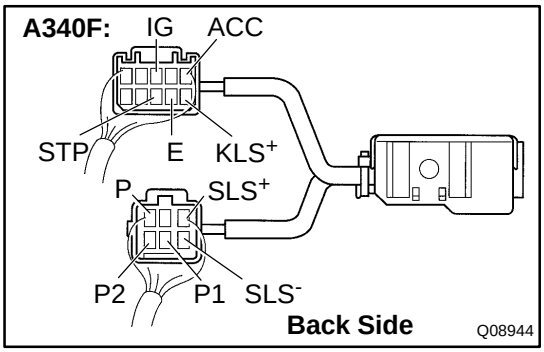
1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure voltage at each terminal.

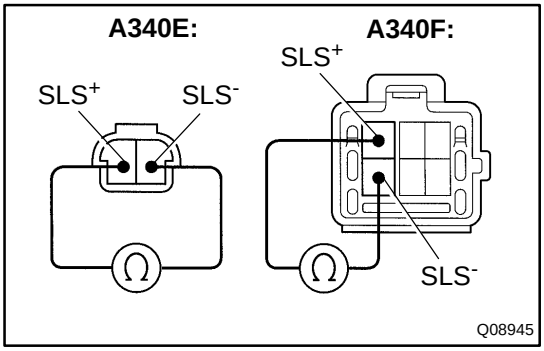
HINT:

Do not disconnect the ECU connector.





Terminal	Measuring Condition	Voltage (V)
ACC - E	Ignition switch ACC	10 - 14
IG - E	Ignition switch ON	10 - 14
STP - E	Depressing brake pedal	10 - 14
KLS^+ - E	(1) Ignition switch ACC and P position (2) Ignition switch ACC and except P position (3) (After approx. 1 second)	0 7.5 - 11 6 - 9.5
SLS^+ - SLS^-	(1) Ignition switch ON and P position (2) Depress brake pedal (3) (After approx. 20 seconds) (4) Shift except P position	0 8 - 13.5 6 - 8.5 0
P1 - P	(1) Ignition switch ON, P position and depress brake pedal (2) Shift except P position under conditions above	0 9 - 13.5
P2 - P	(1) Ignition switch ACC and P position (2) Shift except P position under conditions above	9 - 13.5 0



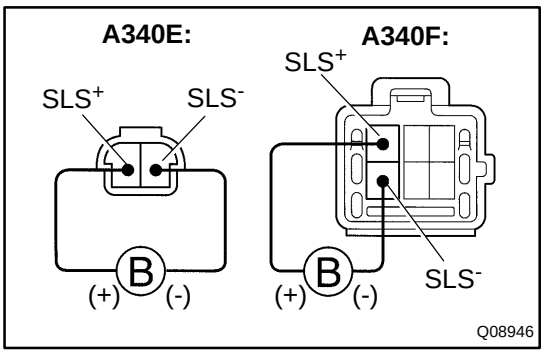
2. INSPECT SHIFT LOCK SOLENOID

(a) Disconnect the solenoid connector.

(b) Using an ohmmeter, measure resistance between terminals.

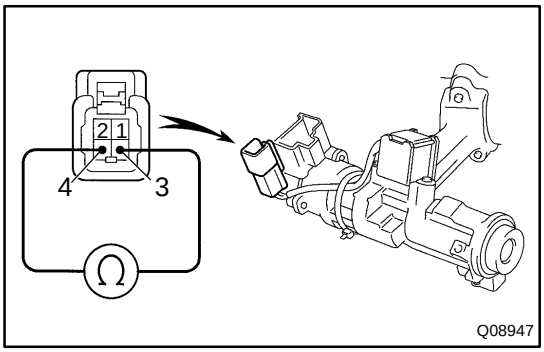
Standard resistance: 21 - 27 Ω

If resistance value is not as specified, replace the solenoid.



(c) Apply battery positive voltage between terminals. Check that operation noise can be heard from the solenoid.

If the solenoid dose not operate, replace the solenoid.



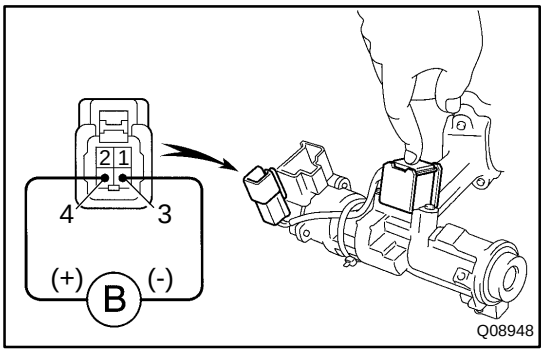
3. INSPECT KEY INTERLOCK SOLENOID

(a) Disconnect the solenoid connector.

(b) Using an ohmmeter, measure resistance between terminals.

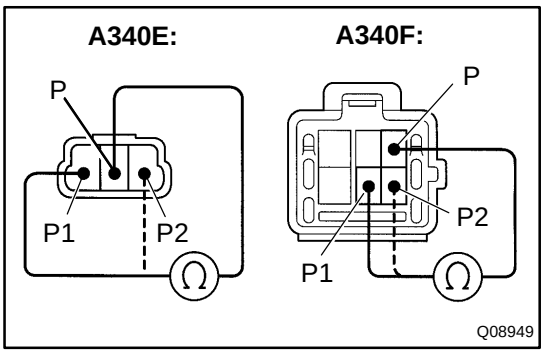
Standard resistance: 12.5 - 16.5 Ω

If resistance valve is not as specified, replace the solenoid.



(c) Apply battery positive voltage between terminals. Check that an operation noise can be heard from the solenoid.

If the solenoid dose not operate, replace the solenoid.



4. INSPECT SHIFT LOCK CONTROL SWITCH

Inspect that continuity exists between at each terminal.

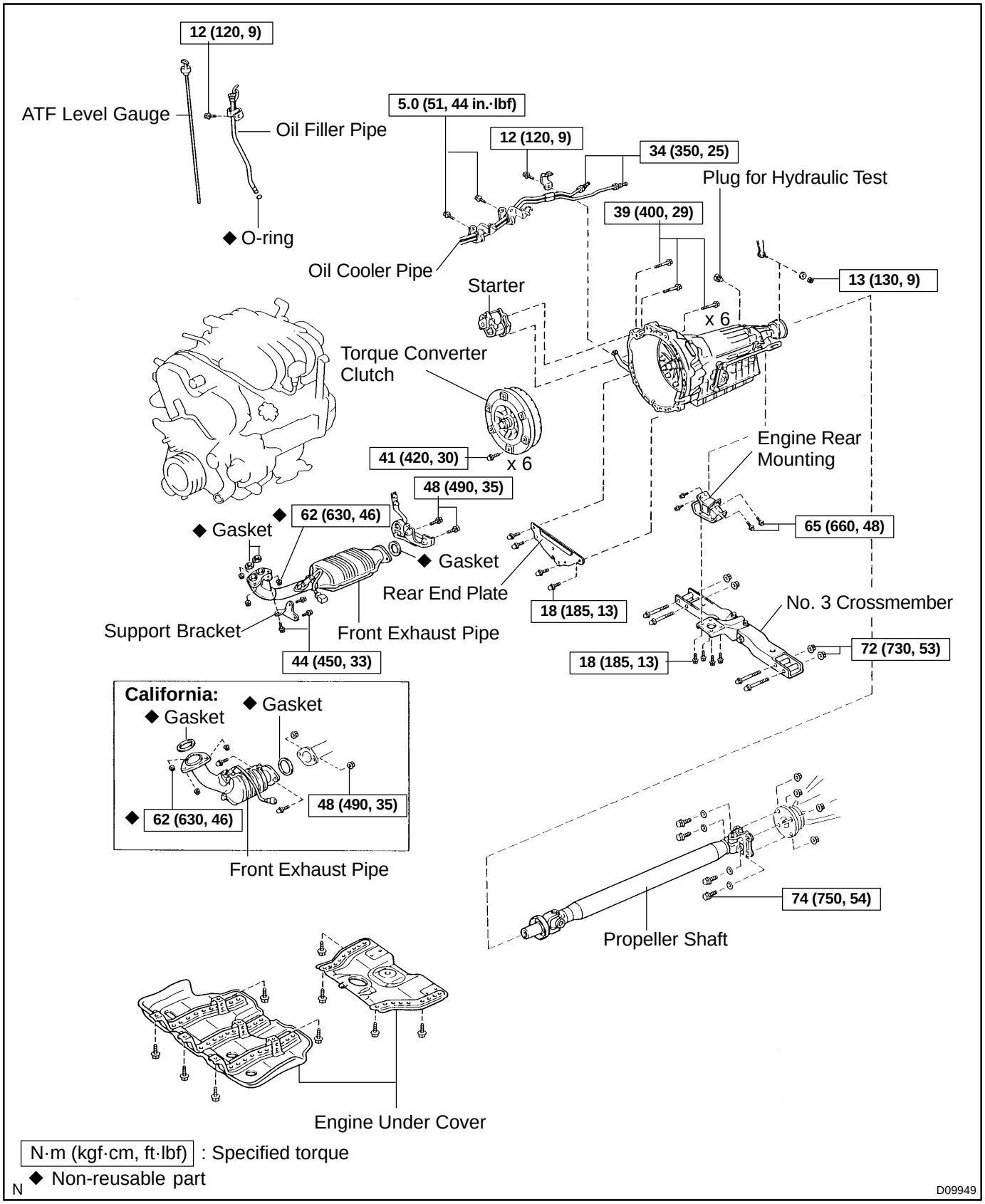
Shift position	Tester condition to terminal number	Specified value
P position (Release button is not pushed)	P - P1	Continuity
P position (Release button is pushed)	P - P1 P - P2	Continuity
R, N, D, 2, L position	P - P2	Continuity

If continuity is not as specified, replace the switch.

AUTOMATIC TRANSMISSION UNIT (A340E)

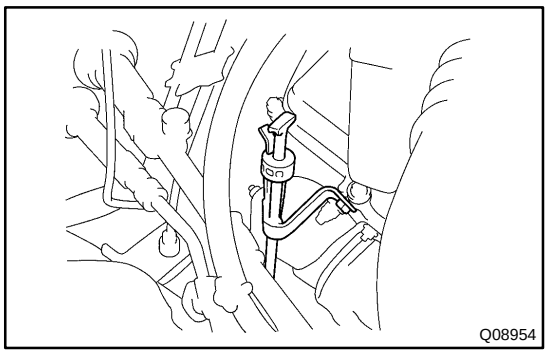
COMPONENTS

AT0YP-01



AT0YQ-01

REMOVAL



1. REMOVE ATF LEVEL GAUGE

2. REMOVE OIL FILLER PIPE

Remove the bolt and oil filler pipe with O-ring.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

HINT:

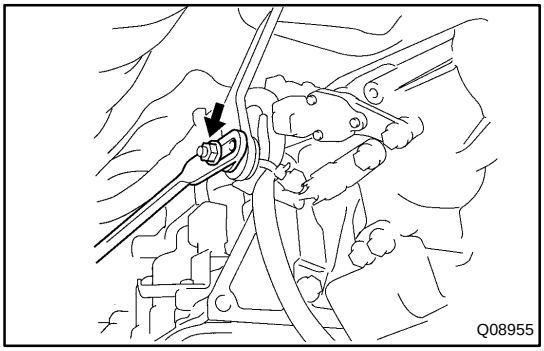
At the time of installation, please refer to the following item.

Replace the used O-ring with a new one.

3. REMOVE 2 ENGINE UNDER COVERS

4. REMOVE PROPELLER SHAFT (See page PR-4)

5. REMOVE FRONT EXHAUST PIPE (See page EM-105)



6. DISCONNECT TRANSMISSION CONTROL ROD FROM SHIFT LEVER

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

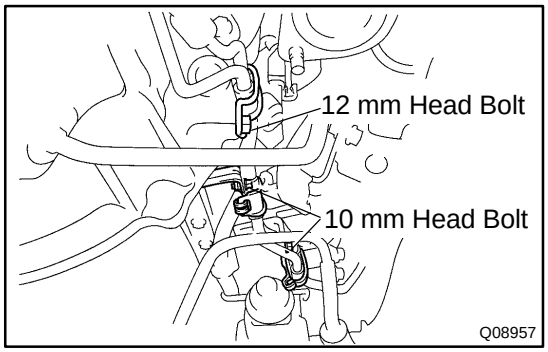
7. DISCONNECT NO. 2 VEHICLE SPEED SENSOR CONNECTOR FROM TRANSMISSION

8. DISCONNECT SOLENOID WIRE CONNECTOR FROM TRANSMISSION

9. DISCONNECT ATF TEMPERATURE SENSOR CONNECTOR FROM TRANSMISSION

10. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR FROM TRANSMISSION

11. SEPARATE WIRE HARNESS FROM TRANSMISSION



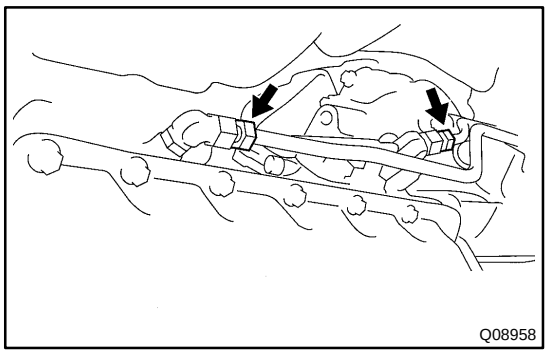
12. DISCONNECT OIL COOLER PIPE

(a) Remove the 3 bolts and oil cooler pipe clamps.

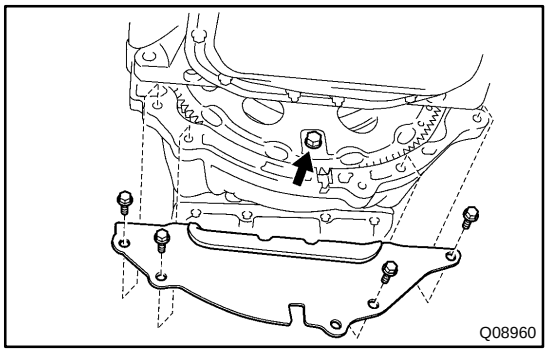
Torque:

10 mm head bolt: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

12 mm head bolt: 12 N·m (120 kgf·cm, 9 ft·lbf)



(b) Disconnect the 2 oil cooler pipes.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)



13. REMOVE REAR END PLATE AND TORQUE CONVERTER CLUTCH MOUNTING BOLT

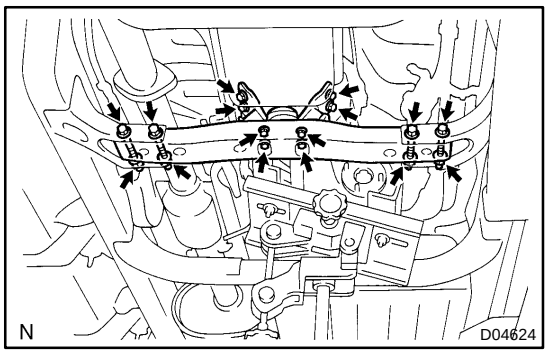
(a) Remove the 4 bolts and rear end plate.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Turn the crankshaft to gain access and remove the 6 bolts with holding the crankshaft pully set bolt by a wrench.
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

HINT:
At the time of installation, first install green colored bolt and then 5 other bolts.

14. JACK UP TRANSMISSION SLIGHTLY

Using a transmission jack, support the transmission.



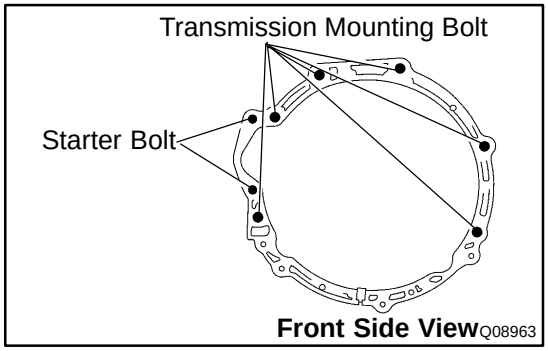
15. REMOVE NO. 3 CROSSMEMBER

(a) Remove the 4 set bolts of the engine rear mounting.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Remove the 4 bolts, nuts and No. 3 crossmember.
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

16. REMOVE ENGINE REAR MOUNTING

Remove the 4 bolts and engine rear mounting from the transmission.
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



17. REMOVE STARTER

(a) Remove the nut and disconnect the starter wire and connector.

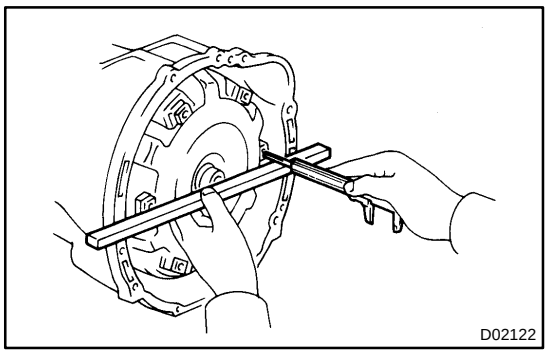
(b) Remove the 2 bolts and starter.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

18. REMOVE TRANSMISSION

Remove the 6 bolts and transmission.
Torque: 71 N·m (730 kgf·cm, 53 ft·lbf)

AT00L-04

INSTALLATION



1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure the distance from the installed surface of the transmission housing to the installed surface of the torque converter clutch.

Correct distance: More than 17.95 mm (0.7067 in.)

2. INSTALL TRANSMISSION

Installation is in the reverse order of removal (See page AT-19).

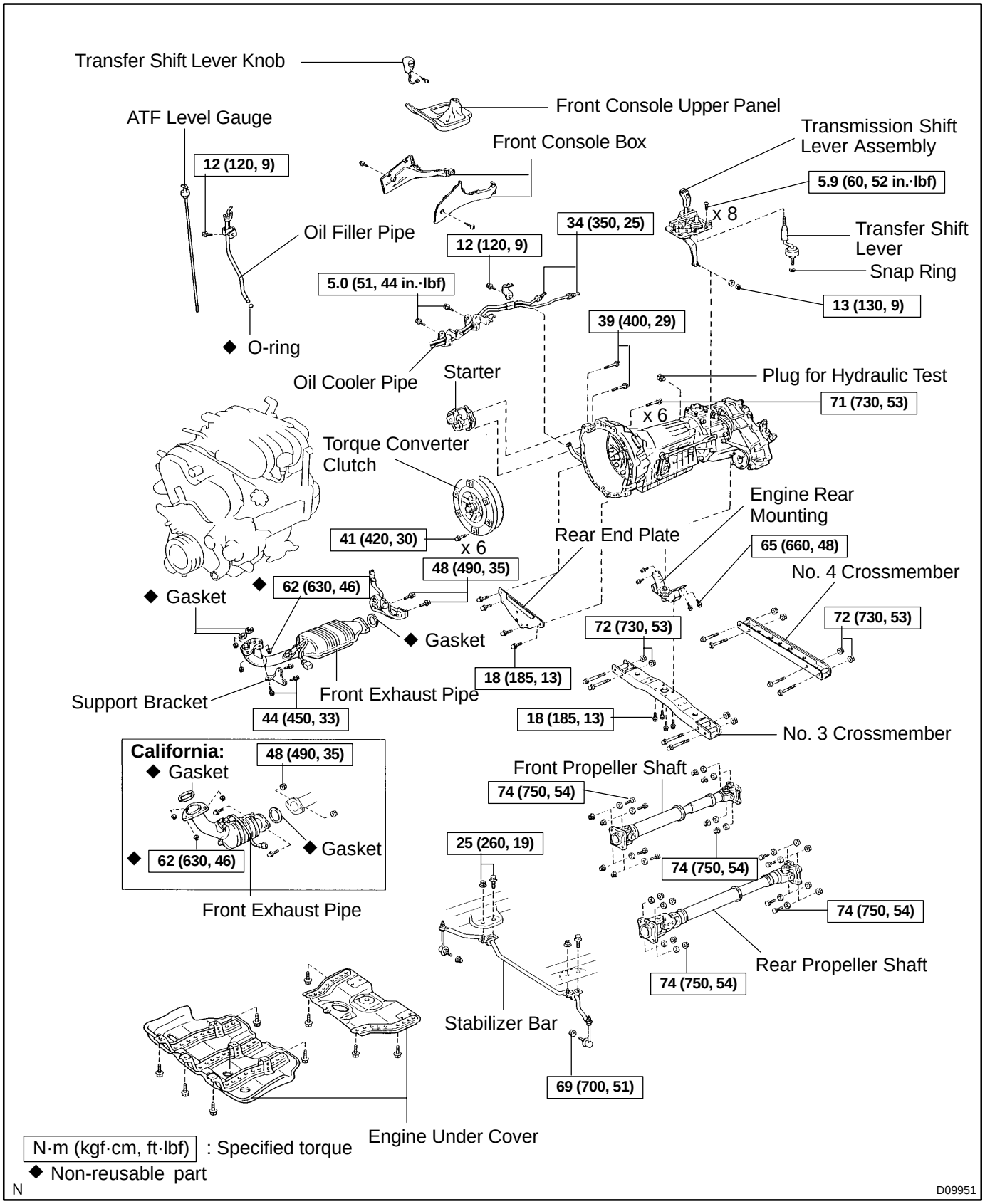
HINT:

- After installation, adjust the shift lever position (See page DI-159).
- Fill and check fluid level (See page DI-159).

AUTOMATIC TRANSMISSION UNIT (A340F)

COMPONENTS

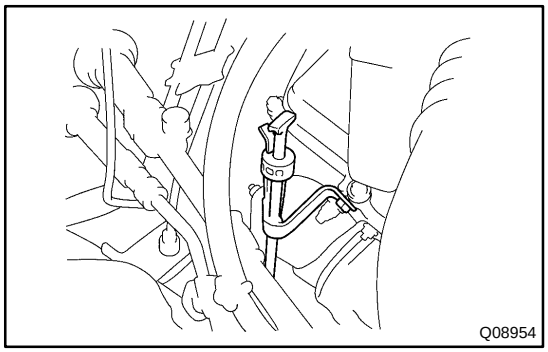
AT0YR-01



AT0YS-01

REMOVAL

1. REMOVE ATF LEVEL GAUGE



2. REMOVE OIL FILLER PIPE

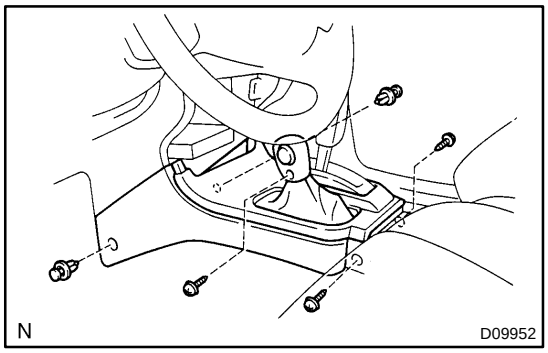
Remove the bolt and oil filler pipe with O-ring.

Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)

HINT:

At the time of installation, please refer to the following item.

Replace the used O-ring with a new one.



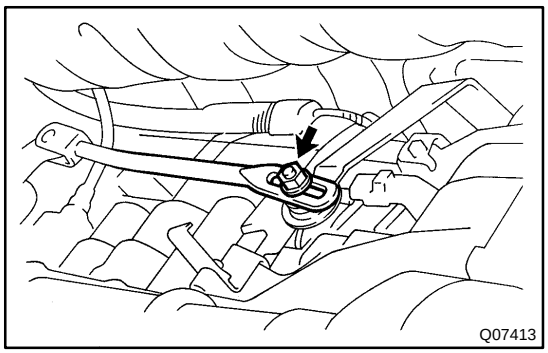
3. REMOVE TRANSMISSION SHIFT LEVER ASSEMBLY AND TRANSFER SHIFT LEVER

(a) Remove the screw and disconnect the transfer shift lever knob.

(b) Remove the front console upper panel.

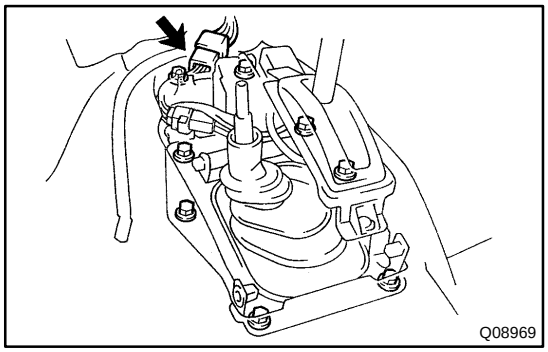
(c) Disconnect the 2-4 selector connector and remove the transfer shift lever knob.

(d) Remove the 2 clips, screws and front console box.



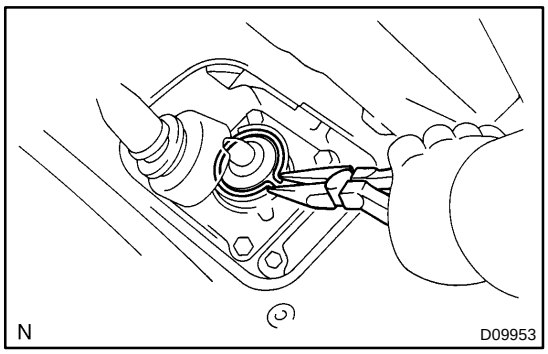
(e) Remove the nut and washer and disconnect the shift control rod.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



(f) Disconnect the connector and remove the 8 bolts and transmission shift lever assembly.

Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)



(g) Using pliers, remove the snap ring and pull out the transfer shift lever from the transfer.

HINT:

At the time of installation, please refer to the following item.

Apply MP grease to the transfer shift lever.

4. REMOVE 2 ENGINE UNDER COVERS

5. REMOVE FRONT AND REAR PROPELLER SHAFT (See page PR-8)

6. REMOVE FRONT EXHAUST PIPE (See page EM-105)

7. DISCONNECT NO. 2 VEHICLE SPEED SENSOR CONNECTOR FROM TRANSMISSION

8. DISCONNECT SOLENOID CONNECTOR FROM TRANSMISSION

9. DISCONNECT ATF TEMPERATURE SENSOR CONNECTOR FROM TRANSMISSION

10. DISCONNECT PARK/NEUTRAL POSITION SWITCH CONNECTOR FROM TRANSMISSION

11. DISCONNECT NO. 1 VEHICLE SPEED SENSOR CONNECTOR FROM TRANSFER

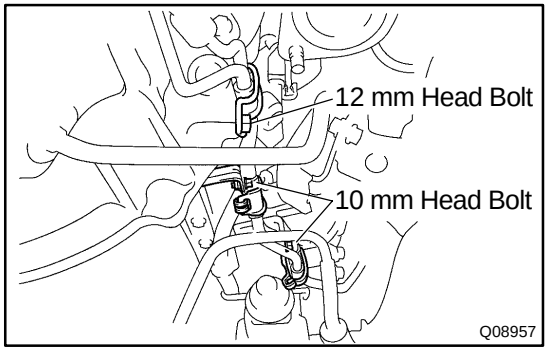
12. DISCONNECT TRANSFER NEUTRAL POSITION SWITCH CONNECTOR FROM TRANSFER

13. DISCONNECT TRANSFER L4 POSITION SWITCH CONNECTOR FROM TRANSFER

14. DISCONNECT TRANSFER 4WD POSITION SWITCH CONNECTOR FROM TRANSFER

15. DISCONNECT ACTUATOR CONNECTOR FROM TRANSFER

16. SEPARATE WIRE HARNESS FROM TRANSMISSION AND TRANSFER



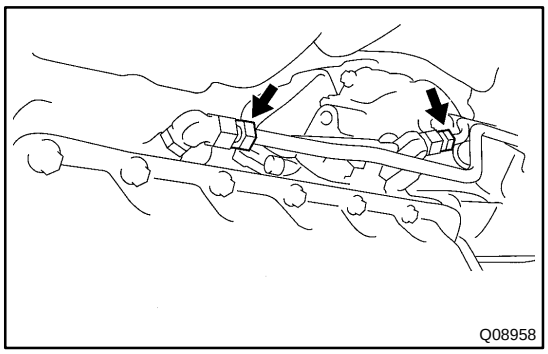
17. DISCONNECT OIL COOLER PIPE

(a) Remove the 3 bolts and oil cooler pipe clamps.

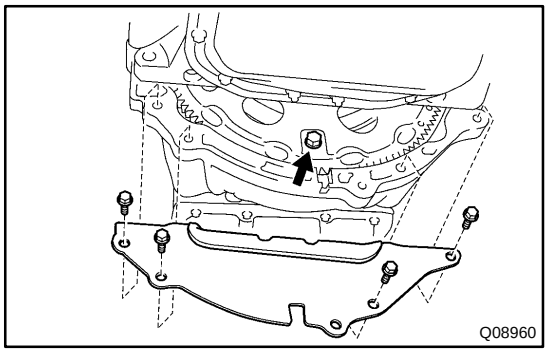
Torque:

10 mm head bolt: 5.0 N·m (51 kgf·cm, 44 in.·lbf)

12 mm head bolt: 12 N·m (120 kgf·cm, 9 ft·lbf)



(b) Disconnect the 2 oil cooler pipes.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

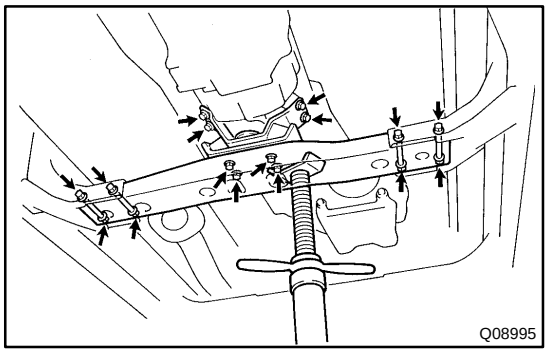


18. REMOVE REAR END PLATE AND TORQUE CONVERTER CLUTCH MOUNTING BOLT

(a) Remove the 4 bolts and rear end plate.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Turn the crankshaft to gain access and remove the 6 bolts with holding the crankshaft pulley set bolt by a wrench.
Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

HINT:
At the time of installation, please refer to the following item.
First install green colored bolt and then 5 other bolts.



19. REMOVE NO. 3 CROSSMEMBER

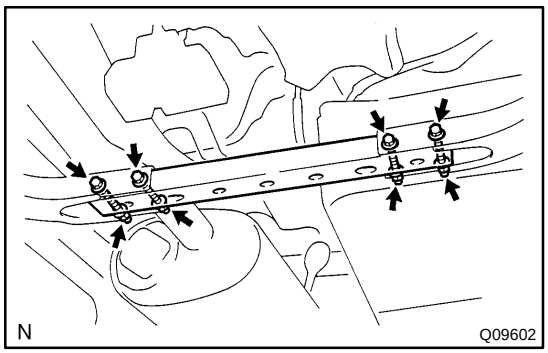
(a) Support the transmission rear side with a support stand.

(b) Remove the 4 set bolts of the engine rear mounting.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Remove the 4 bolts, nuts and No. 3 crossmember.
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

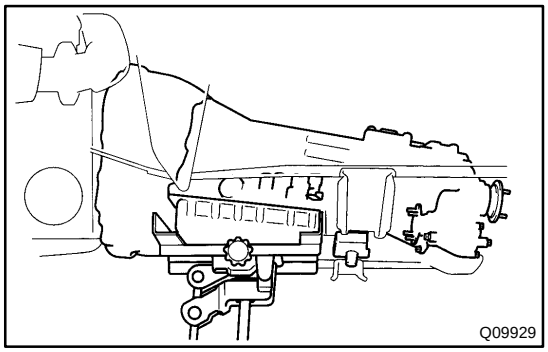
20. REMOVE ENGINE REAR MOUNTING

Remove the 4 bolts and engine rear mounting from the transmission.



21. REMOVE NO. 4 CROSSMEMBER

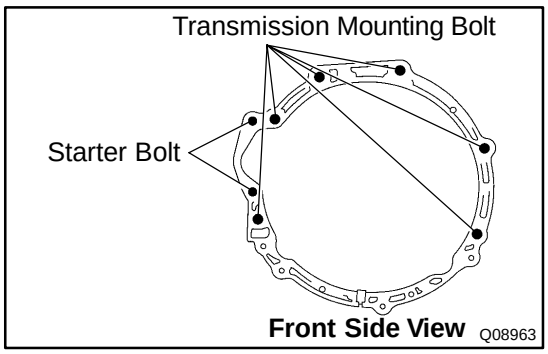
Remove the 4 bolts, nuts and No. 4 crossmember.
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



22. JACK UP TRANSMISSION

(a) Support the transmission with a transmission jack.

(b) Remove a support stand from the transmission rear side.



23. REMOVE STARTER

(a) Remove the nut and disconnect the starter wire and connector.

(b) Remove the 2 bolts and starter.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

24. REMOVE TRANSMISSION

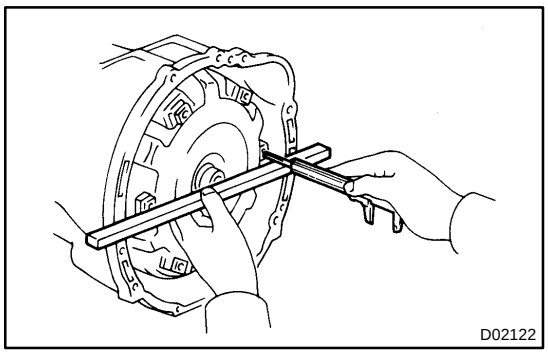
(a) Disconnect the stabilizer bar (See page SA-77).

(b) Remove the 6 bolts and transmission.

Torque: 71 N·m (730 kgf·cm, 53 ft·lbf)

AT00N-05

INSTALLATION



1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure the distance from the installed surface of the transmission housing to the installed surface of the torque converter clutch.

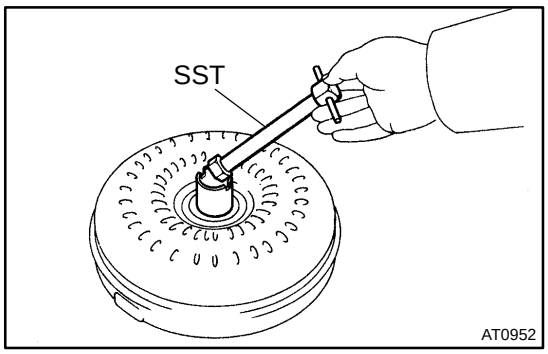
Correct distance: More than 17.95 mm (0.7067 in.)

2. INSTALL TRANSMISSION

Installation is in the reverse order of removal (See page AT-23).

HINT:

- After installation, adjust the shift lever position (See page DI-159).
- Fill and check fluid level (See page DI-159).



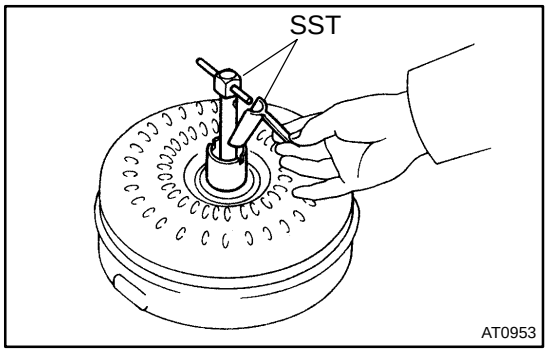
TORQUE CONVERTER CLUTCH AND DRIVE PLATE

AT00O-08

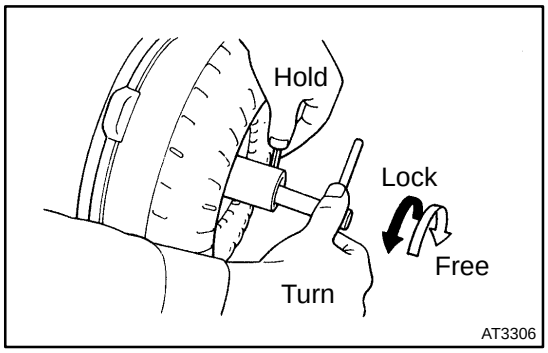
INSPECTION

1. INSPECT ONE-WAY CLUTCH

(a) Install SST in the inner race of one-way clutch.
SST 09350-30020 (09351-32010)

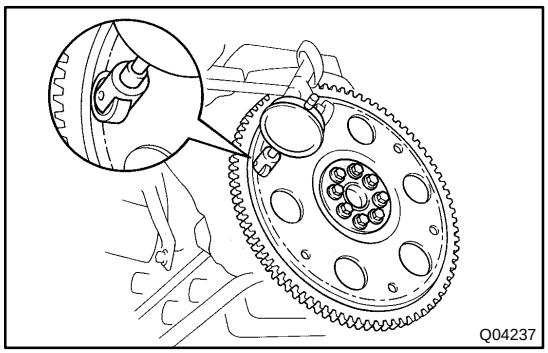


(b) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.
SST 09350-30020 (09351-32010)



(c) With the torque converter clutch standing on its side, the clutch locks when turned counterclockwise, and rotates freely and smoothly clockwise.

If necessary, clean the converter clutch and retest it. Replace the converter clutch if it still fails the test.



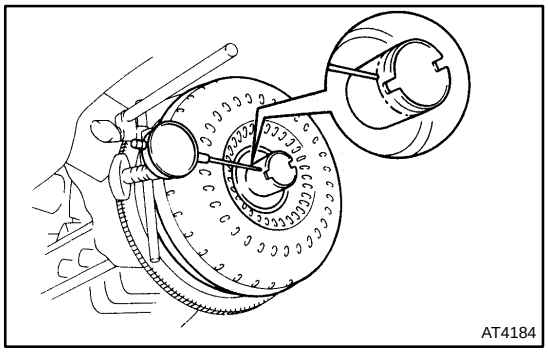
2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator, measure drive plate runout.

Maximum runout: 0.20 mm (0.0079 in.)

If runout is not within the specification, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tight the bolts.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

Temporarily mount the torque converter clutch to the drive plate. Set up a dial indicator.

Maximum runout: 0.30 mm (0.0118 in.)

If runout is not within the specification, try to correct by reorienting the installation of the torque converter clutch.

HINT:

Mark the position of the torque converter clutch to ensure correct installation.

TRANSFER SYSTEM

TR064-02

PRECAUTION

When working with FIPG material, you must observe the following.

- **Using a razor blade and gasket scraper, remove all the old FIPG material from the gasket surfaces.**
- **Thoroughly clean all components to remove all the loose material.**
- **Clean both sealing surfaces with a non-residue solvent.**
- **Apply FIPG in an approx. 1.2 mm (0.047 in.) wide bead along the sealing surface.**
- **Parts must be assembled within 10 minutes of application. Otherwise, the FIPG material must be removed and reapplied.**

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

TR00T-07

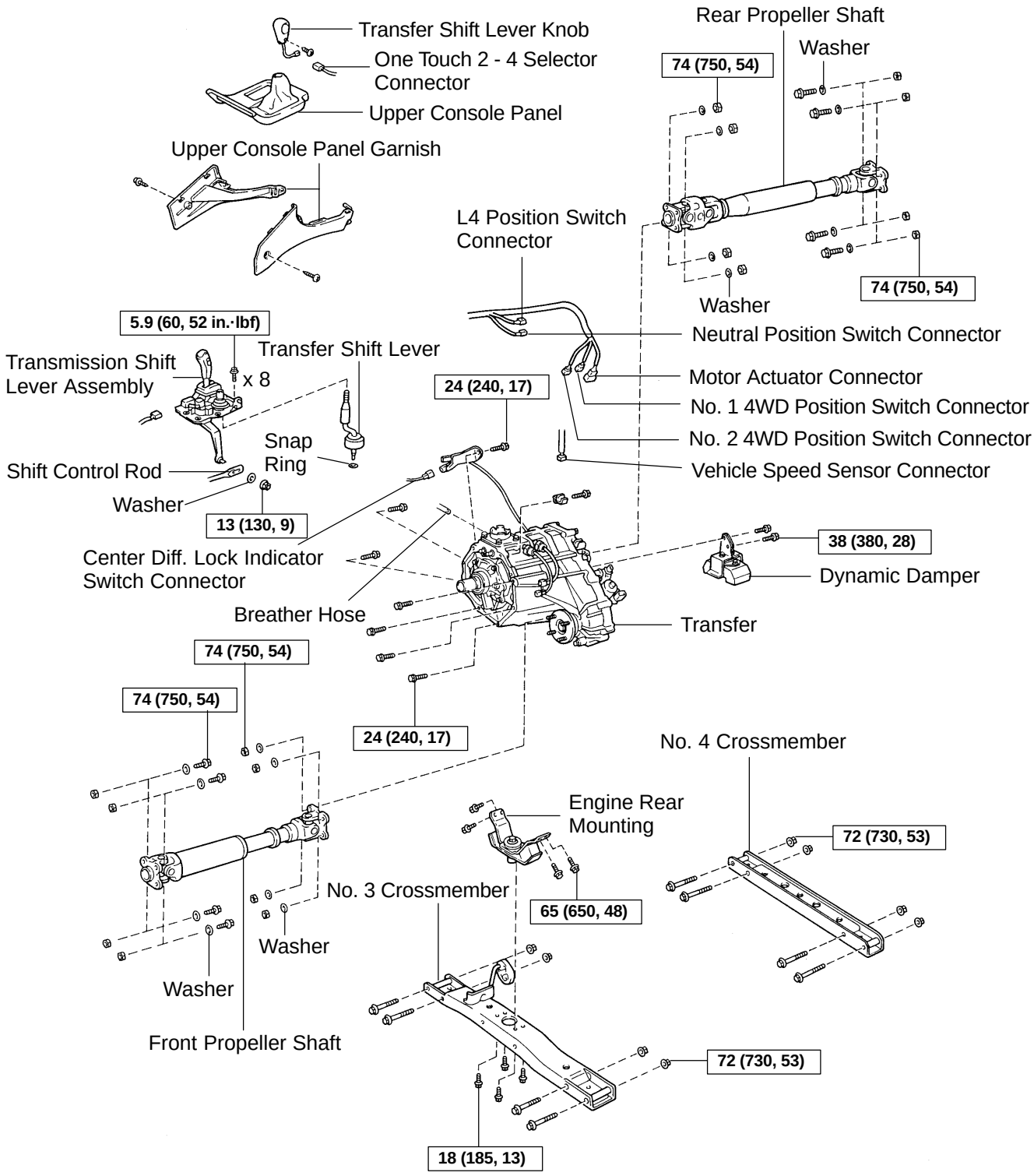
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	1. Oil (Level low) 2. Oil (Wrong) 3. Transfer faulty	TR-7 TR-7 TR-9
Oil leakage	1. Oil (Level too high) 2. Gasket (Damaged) 3. Oil seal (Worn or damaged) 4. O-ring (Worn or damaged)	TR-7 TR-9 TR-46 TR-9
Tight corner braking	Center differential or transfer faulty	TR-9
Shift from 2WD (H) to 4WD (H) impossible	1. 4WD fuse 2. Wire harness 3. Vehicle speed sensor 4. 4WD position switch 5. 4WD indicator light 6. Actuator assembly 7. A.D.D. control system 8. 4WD control ECU 9. Transfer assembly	- - BE-45 TR-9 TR-9 TR-49 SA-49 TR-49 TR-3
Shift from 2WD (H) to 4WD (L4) impossible	1. 2-4 selector switch 2. Wire harness 3. 4WD control ECU	TR-49 - TR-49
Shift from 4WD (H) to 4WD (L4) impossible	1. L4 position switch 2. Wire harness 3. 4WD control ECU	TR-11 - TR-49
Shift from 4WD (H) to 2WD (H) impossible	1. 4WD fuse 2. Wire harness 3. 4WD indicator light 4. Actuator assembly 5. A.D.D. control system 6. 4WD control ECU 7. Transfer assembly	- - TR-9 TR-49 SA-49 TR-49 TR-3
Shift from 4WD (L4) to 2WD (H) impossible	1. 2-4 selector switch 2. Wire harness 3. 4WD control ECU	TR-49 - TR-49
Shift from 4WD (L4) to 4WD (H) impossible	1. L4 position switch 2. Wire harness 3. 4WD control ECU	TR-11 - TR-49

TRANSFER UNIT

COMPONENTS

TR07Y-03



N·m (kgf·cm, ft·lbf) : Specified torque

N

D04621

TR01K-06

REMOVAL

1. REMOVE TRANSFER SHIFT LEVER

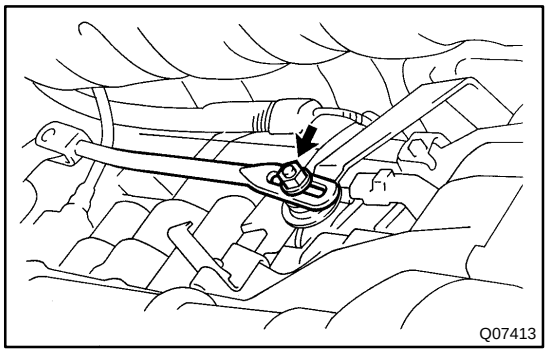
(a) Remove the screw and disconnect the transfer shift lever knob.

(b) Remove the upper console panel (See page BO-66).

(c) Disconnect the one touch 2 - 4 selector connector and remove the transfer shift lever knob.

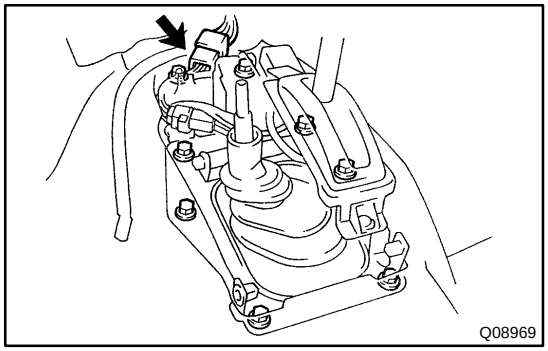
(d) Remove the upper console panel garnish (See page BO-66).

(e) Raise the vehicle.

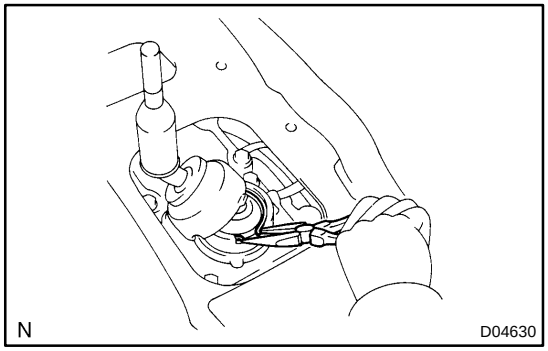


(f) Remove the nut and washer, and disconnect the shift control rod.

(g) Lower the vehicle.



(h) Disconnect the connector and remove the 8 bolts and transmission shift lever assembly.



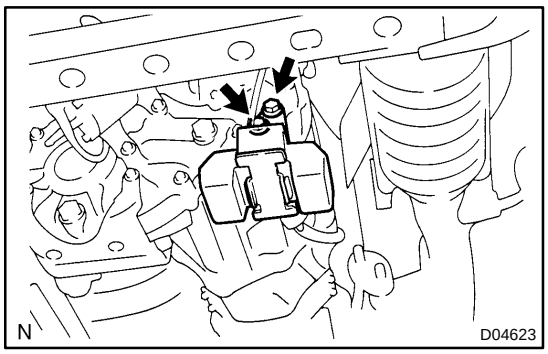
(i) Using pliers, remove the snap ring and pull out the transfer shift lever.

HINT:

Shift the transfer shift lever to the ”H” position and one touch 2 - 4 selector switch ”OFF”.

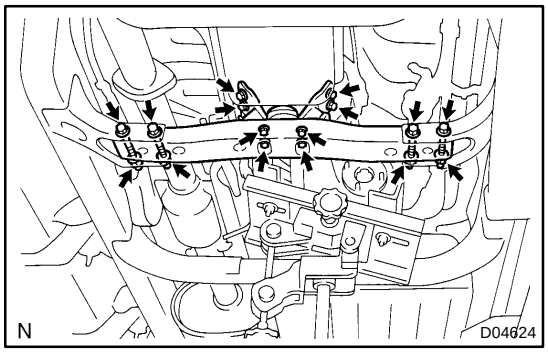
2. RAISE VEHICLE AND DRAIN TRANSFER OIL

3. REMOVE FRONT AND REAR PROPELLER SHAFTS (See page PR-7)



4. REMOVE DYNAMIC DAMPER

Remove the 2 bolts and dynamic damper from the transfer.



5. JACK UP TRANSFER SLIGHTLY

Using a transmission jack, support the transfer.

6. REMOVE NO. 3 CROSSMEMBER

(a) Remove the 4 set bolts of the engine rear mounting.

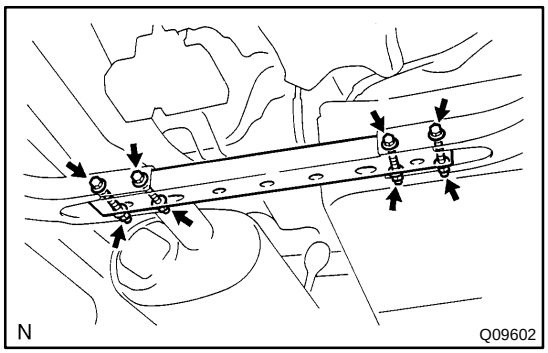
(b) Remove the 4 bolts, nuts and No. 3 crossmember.

7. REMOVE ENGINE REAR MOUNTING

Remove the 4 bolts and engine rear mounting from the transmission.

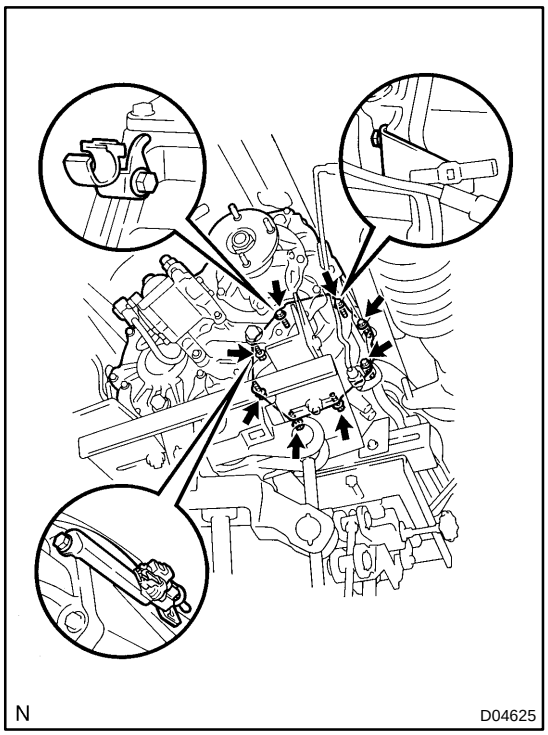
8. DISCONNECT VEHICLE SPEED SENSOR, NEUTRAL POSITION SWITCH, L4 POSITION SWITCH, MOTOR ACTUATOR, NO. 1 AND NO. 2 4WD POSITION SWITCH CONNECTORS

9. DISCONNECT BREATHER HOSE FROM TRANSFER



10. REMOVE NO. 4 CROSSMEMBER

Remove the 4 bolts, nuts and No. 4 crossmember.

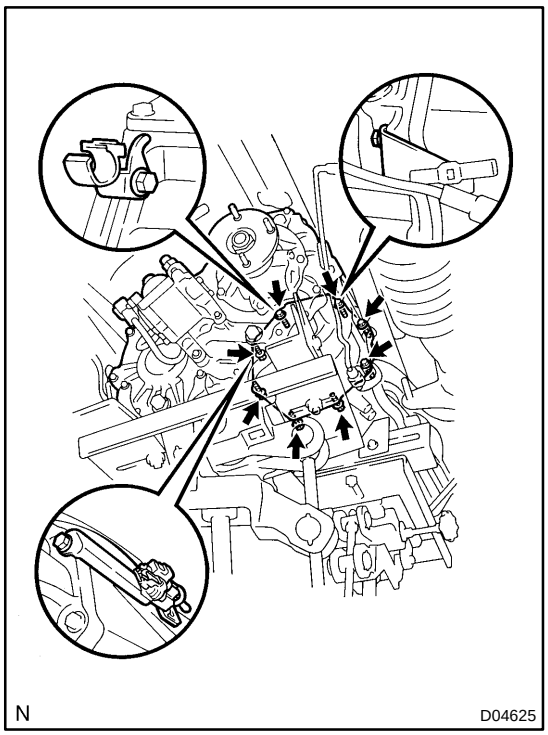


11. REMOVE TRANSFER FROM TRANSMISSION

(a) Support the transmission with another transmission jack.
(b) Remove the 8 transfer mounting bolts.
(c) Pull out the transfer down and toward the rear.

TR07Z-03

INSTALLATION



1. RAISE VEHICLE

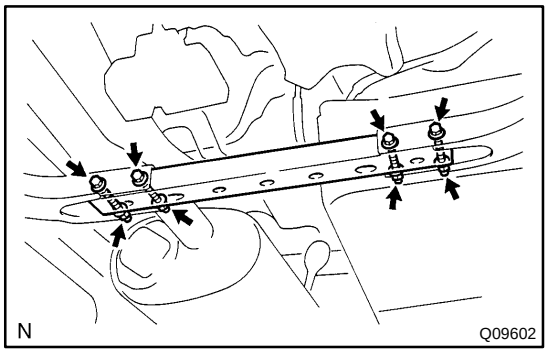
2. INSTALL TRANSFER TO TRANSMISSION

Raise the transfer and install it to the transmission with the 8 bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

NOTICE:

Take care not to damage the lip of the transfer adaptor rear oil seal with the transfer input shaft.



3. INSTALL NO. 4 CROSSMEMBER

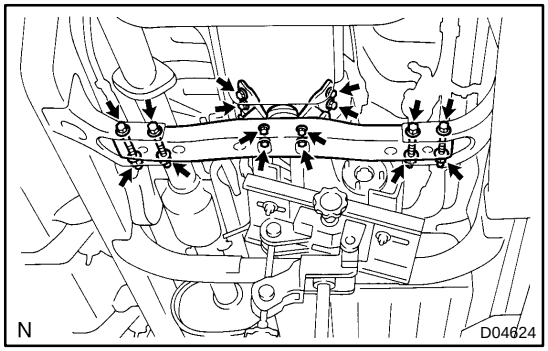
Install the No. 4 crossmember with the 4 bolts and nuts.

Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)

4. CONNECT BREATHER HOSE TO TRANSFER

Hose insertion depth: 13 mm (0.51 in.) or more

5. CONNECT VEHICLE SPEED SENSOR, NEUTRAL POSITION SWITCH, L4 POSITION SWITCH, MOTOR ACTUATOR, NO. 1 AND NO. 2 4WD POSITION SWITCH CONNECTORS



6. INSTALL ENGINE REAR MOUNTING

Install the engine rear mounting to the transmission with the 4 bolts.

Torque: 65 N·m (650 kgf·cm, 48 ft·lbf)

7. INSTALL NO. 3 CROSSMEMBER

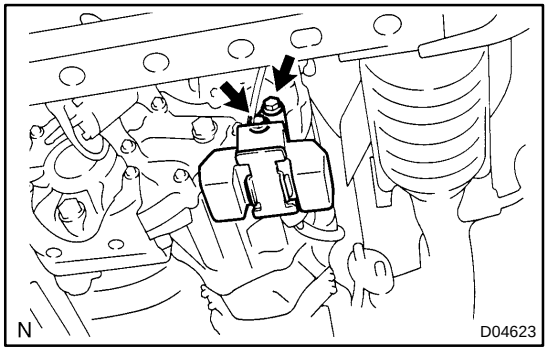
(a) Install the No. 3 crossmember with the 4 bolts and nuts.

Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)

(b) Install the 4 set bolts of the engine rear mounting.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(c) Remove the transmission jacks.



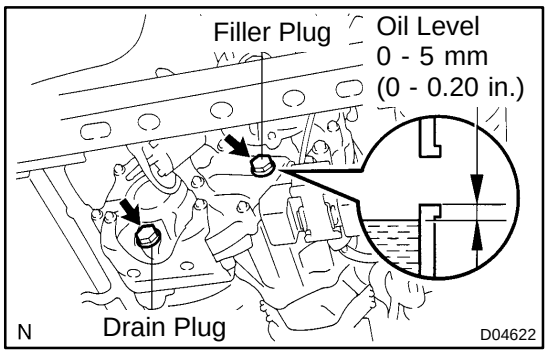
8. INSTALL DYNAMIC DAMPER

Install the dynamic damper to the transfer with the 2 bolts.

Torque: 38 N·m (380 kgf·cm, 28 ft·lbf)

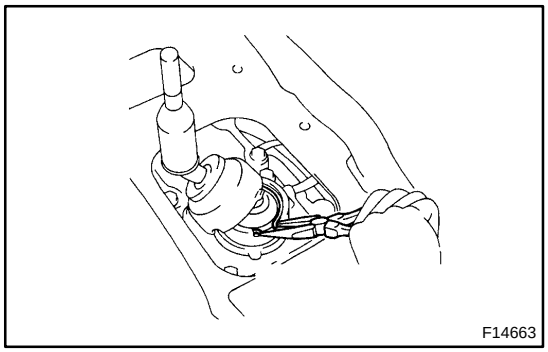
9. INSTALL FRONT AND REAR PROPELLER SHAFTS

(See page PR-7)



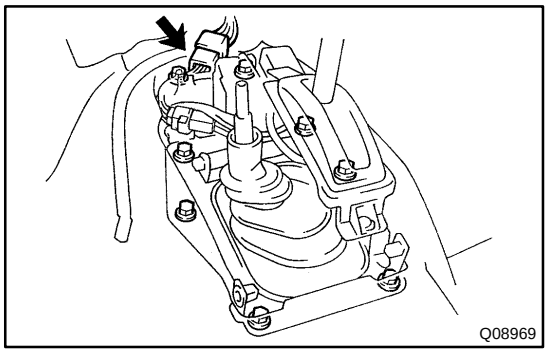
10. FILL TRANSFER OIL

Oil grade: API GL-4 or GL-5
Viscosity: SAE 75W-90
Capacity: 1.2 liters (1.3 US qts, 1.1 Imp. qts)
Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

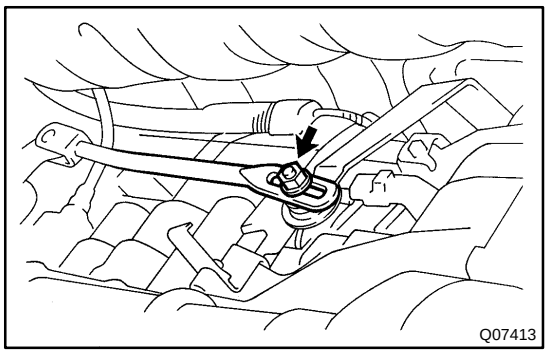


11. INSTALL TRANSFER SHIFT LEVER

(a) Lower the vehicle.
(b) Pressing down on the transfer shift lever cap, and using pliers, install the snap ring.



(c) Connect the connector and install the transmission shift lever assembly with the 8 bolts.
Torque: 5.9 N·m (60 kgf·cm, 52 in.·lbf)
(d) Raise the vehicle.



(e) Connect the shift control rod to the transmission shift lever assembly with the nut and washer. Adjust the shift lever position (See page DI-159).
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
(f) Lower the vehicle.
(g) Install the upper console panel garnish (See page BO-66).
(h) Connect the one touch 2 - 4 selector connector and install the transfer shift lever knob.
(i) Install the upper console panel (See page BO-66).
(j) Connect the transfer shift lever knob with the screw.

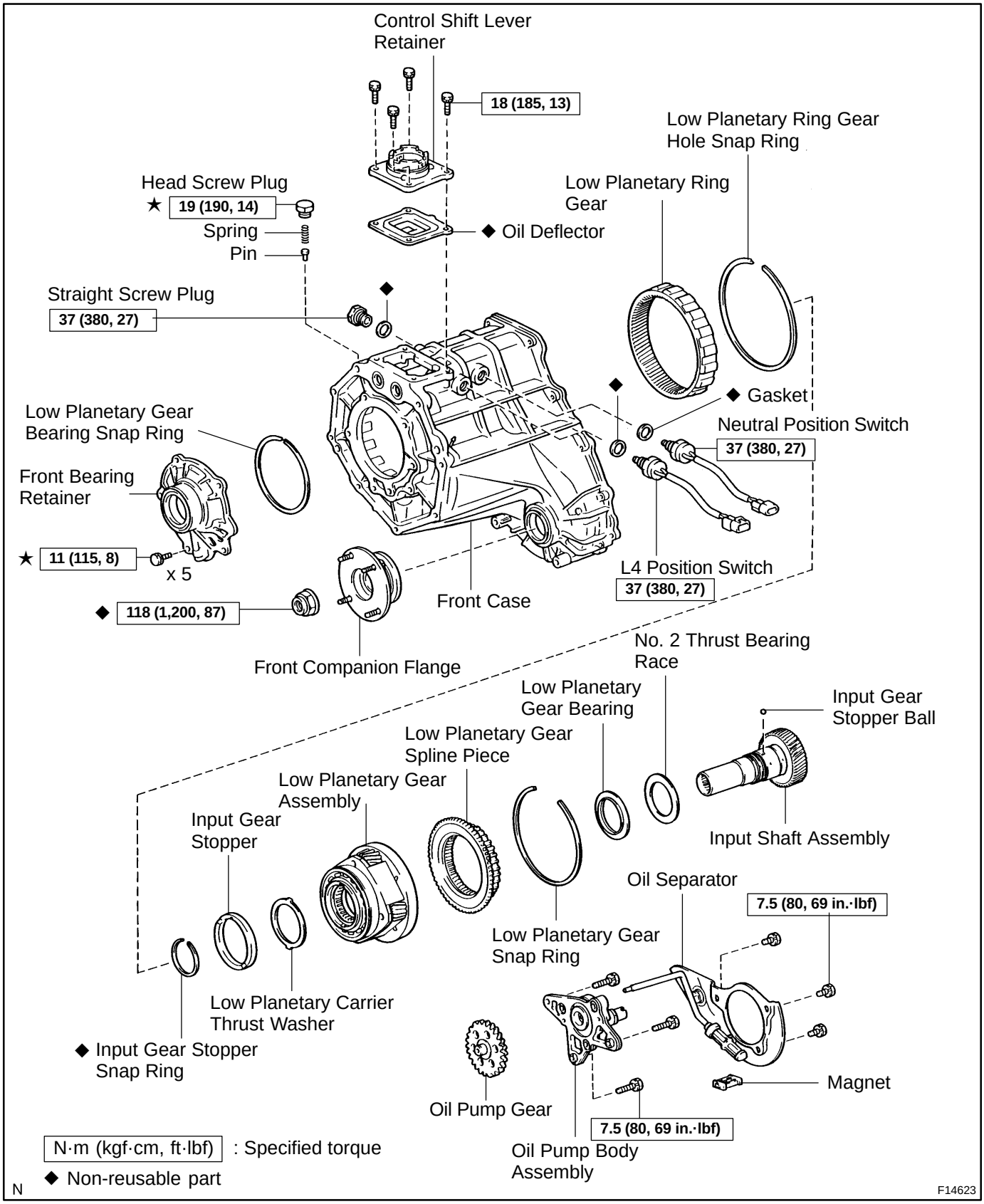
12. DO ROAD TEST

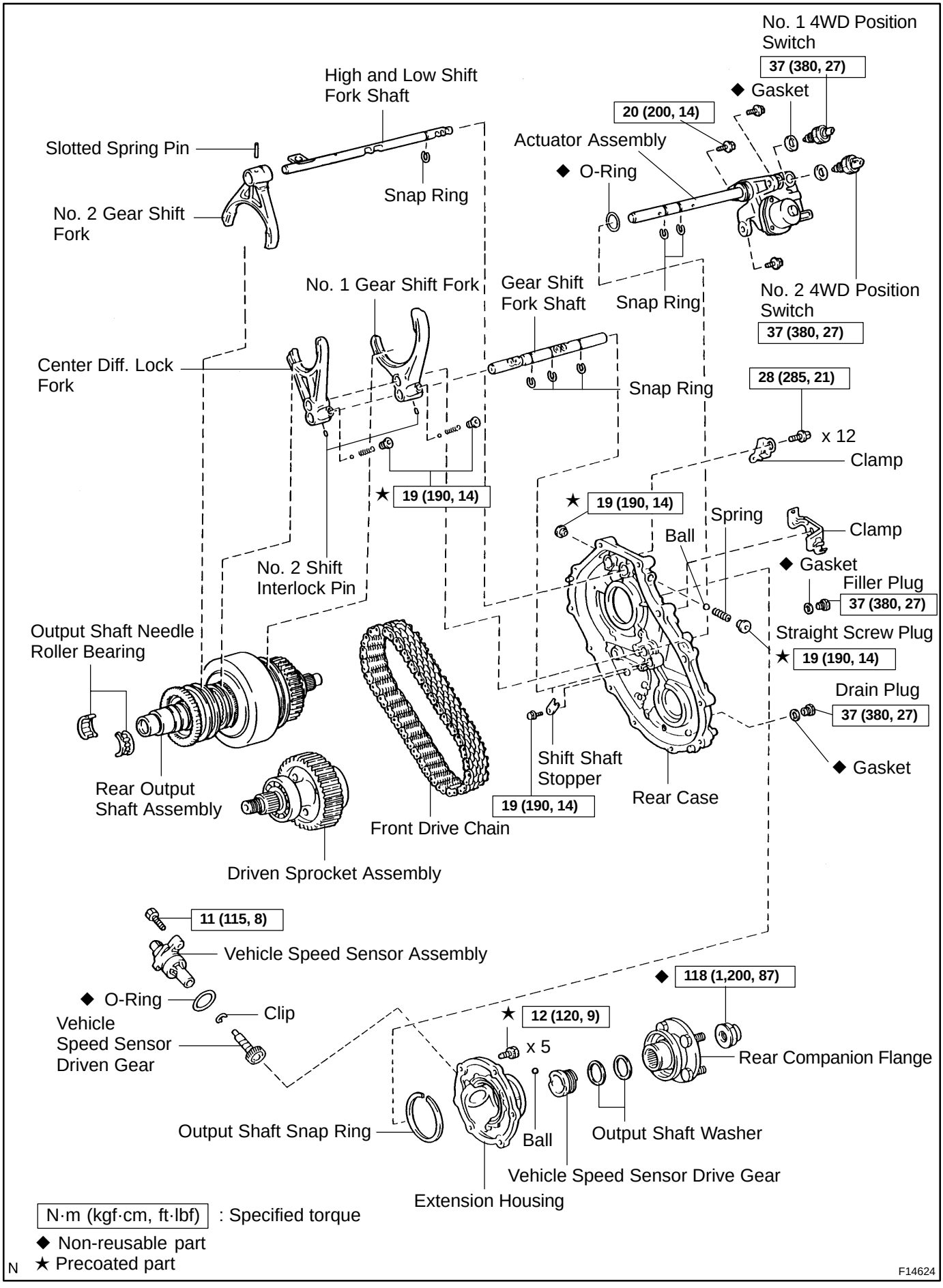
Check for abnormal noises and smooth shifting.

TRANSFER ASSEMBLY

TR080-04

COMPONENTS




No. 1 4WD Position Switch
37 (380, 27)
◆ Gasket
High and Low Shift Fork Shaft
20 (200, 14)
Actuator Assembly
Slotted Spring Pin
◆ O-Ring
Snap Ring
No. 2 Gear Shift Fork
No. 1 Gear Shift Fork
Gear Shift Fork Shaft
Snap Ring
No. 2 4WD Position Switch
37 (380, 27)
Center Diff. Lock Fork
Snap Ring
28 (285, 21)
x 12
Clamp
★ 19 (190, 14)
★ 19 (190, 14)
Spring
Ball
Clamp
◆ Gasket
Filler Plug
37 (380, 27)
No. 2 Shift Interlock Pin
Straight Screw Plug
★ 19 (190, 14)
Output Shaft Needle Roller Bearing
Drain Plug
37 (380, 27)
◆ Gasket
Shift Shaft Stopper
Rear Case
Rear Output Shaft Assembly
19 (190, 14)
Front Drive Chain
Driven Sprocket Assembly
11 (115, 8)
Vehicle Speed Sensor Assembly
◆ 118 (1,200, 87)
◆ O-Ring
Clip
★ 12 (120, 9)
x 5
Vehicle Speed Sensor Driven Gear
Rear Companion Flange
Output Shaft Snap Ring
Ball
Output Shaft Washer
Vehicle Speed Sensor Drive Gear
Extension Housing
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part
N
F14624

TR081-03

DISASSEMBLY

1. REMOVE VEHICLE SPEED SENSOR ASSEMBLY

(a) Remove the bolt and vehicle speed sensor assembly.

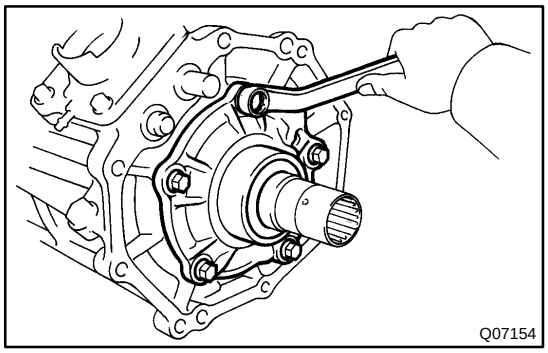
(b) Using a small screwdriver, remove the clip and vehicle speed sensor driven gear.

(c) Using a small screwdriver, remove the O-ring.

HINT:

Tape the small screwdriver tip before use.

2. REMOVE L4 POSITION SWITCH, NEUTRAL POSITION SWITCH AND STRAIGHT SCREW PLUG WITH 3 GASKETS



3. REMOVE FRONT BEARING RETAINER

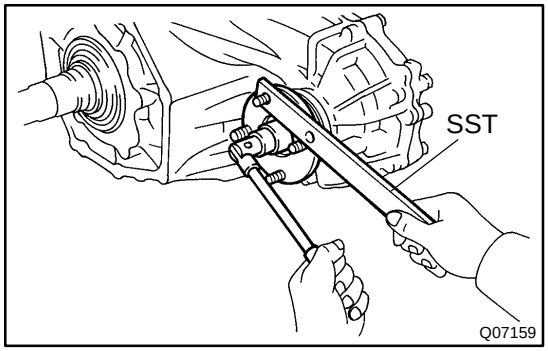
Remove the 5 bolts and front bearing retainer.

HINT:

If necessary, tap the front bearing retainer with a plastic hammer to remove it.

4. REMOVE CONTROL SHIFT LEVER RETAINER

Remove the 4 bolts, control shift lever retainer and oil deflector.

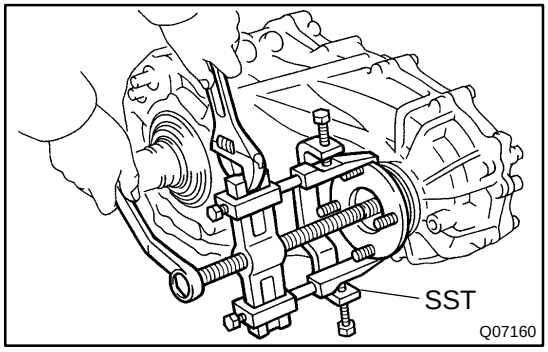


5. REMOVE FRONT COMPANION FLANGE

(a) Using a chisel and hammer, loosen the staked part of the front companion flange lock nut.

(b) Using SST to hold the front companion flange, remove the front companion flange lock nut.

SST 09330-00021

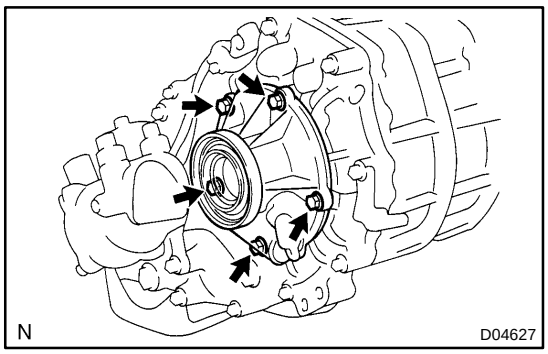


(c) Using SST, remove the front companion flange.

SST 09950-40011 (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04051, 09957-04010, 09958-04011)

6. REMOVE REAR COMPANION FLANGE

Remove the rear companion flange in the same way as the front companion flange.



7. REMOVE EXTENSION HOUSING

Remove the 5 bolts and extension housing.

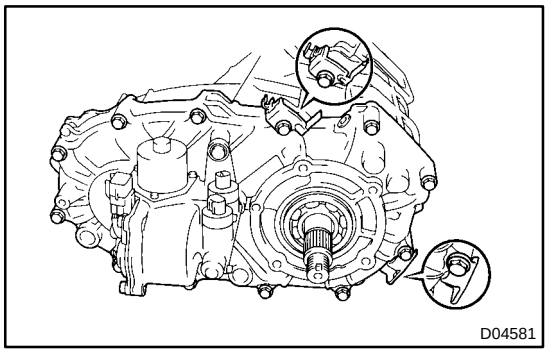
HINT:

If necessary, tap the extension housing with a plastic hammer to remove it.

8. REMOVE VEHICLE SPEED SENSOR DRIVE GEAR AND OUTPUT SHAFT WASHER

(a) Remove the vehicle speed sensor drive gear and 2 output shaft washers.

(b) Using a magnetic finger, remove the ball from the rear output shaft.

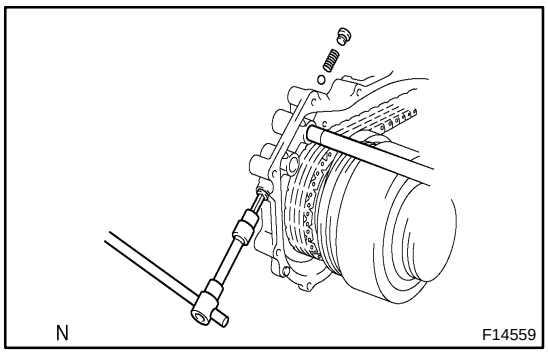


9. REMOVE REAR CASE

Remove the 12 bolts, 2 clamps and rear case.

HINT:

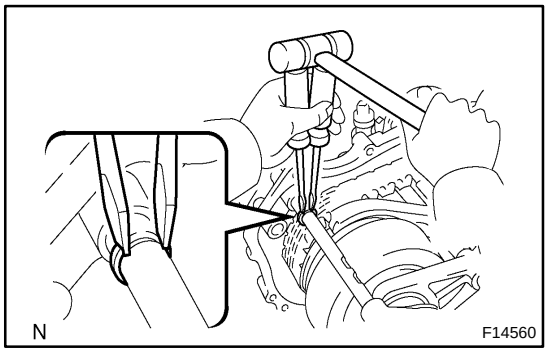
If necessary, tap the rear case with a plastic hammer to remove it.



10. REMOVE STRAIGHT SCREW PLUG, SPRING AND BALL

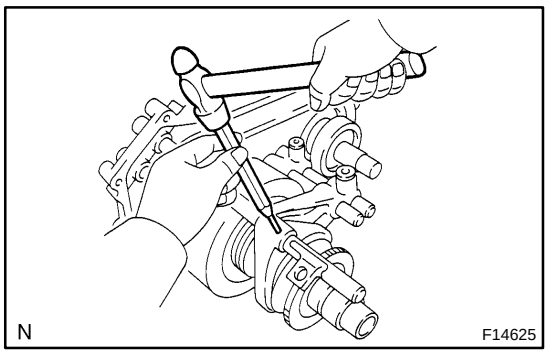
(a) Using a hexagon wrench, remove the 2 straight screw plugs.

(b) Using a magnetic finger, remove the spring and ball.

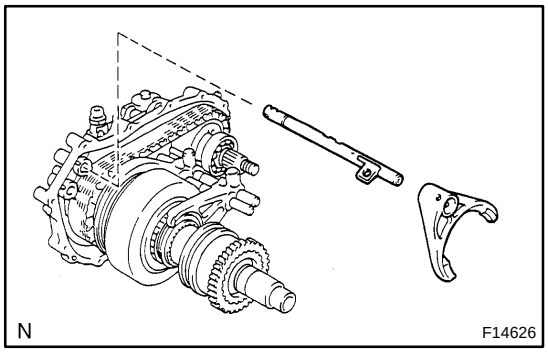


11. REMOVE NO. 2 GEAR SHIFT FORK AND HIGH AND LOW SHIFT FORK SHAFT

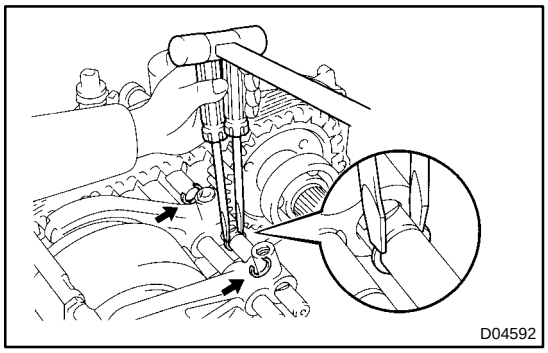
(a) Using 2 screwdrivers and a hammer, tap out the snap ring.



(b) Using a pin punch and hammer, tap out the slotted spring pin from the No. 2 gear shift fork.

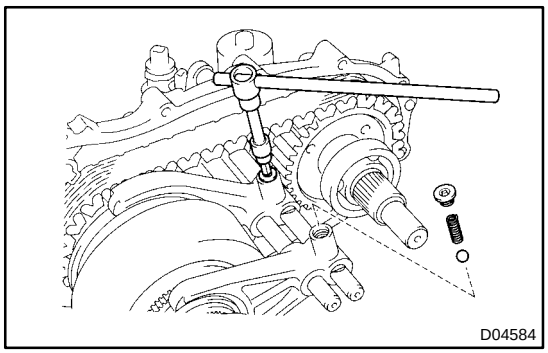


(c) Remove the No. 2 gear shift fork and high and low shift fork shaft.

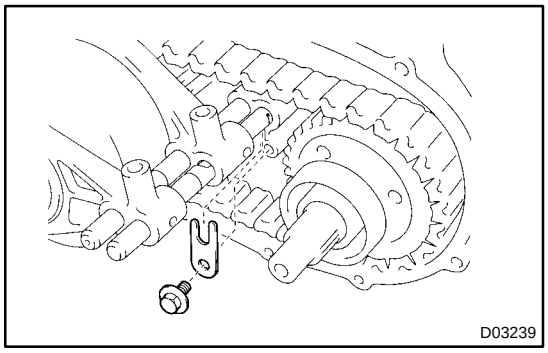


12. REMOVE GEAR SHIFT FORK SHAFT

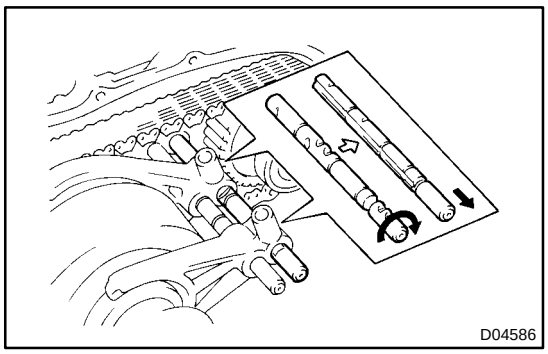
(a) Using 2 screwdrivers and a hammer, remove the 3 snap rings from the gear shift fork shaft.



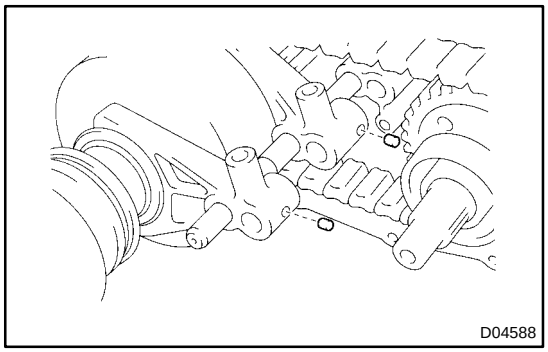
(b) Using a hexagon wrench, remove the 2 straight screw plugs, springs and balls from the No. 1 gear shift fork and center diff. lock fork.



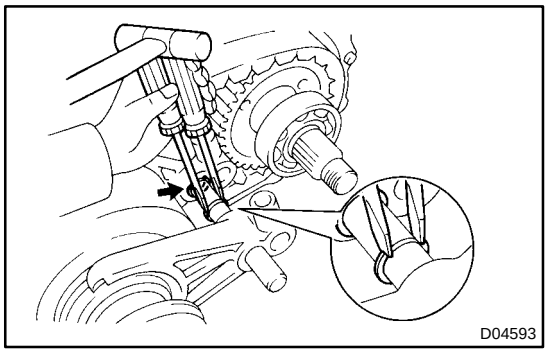
(c) Remove the bolt and shift shaft stopper.



(d) Rotate the slit portion of the gear shift fork shaft to the No. 2 shift interlock pin and remove it.



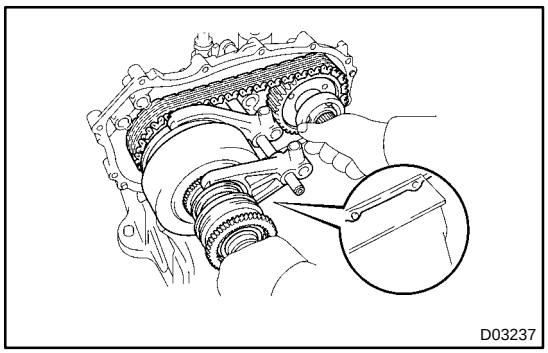
(e) Using a magnetic finger, remove the 2 No. 2 shift interlock pins from the No. 1 gear shift fork and center diff. lock fork.



13. REMOVE REAR OUTPUT SHAFT ASSEMBLY, NO. 1 GEAR SHIFT FORK, CENTER DIFF. LOCK FORK, DRIVEN SPROCKET ASSEMBLY AND FRONT DRIVE CHAIN

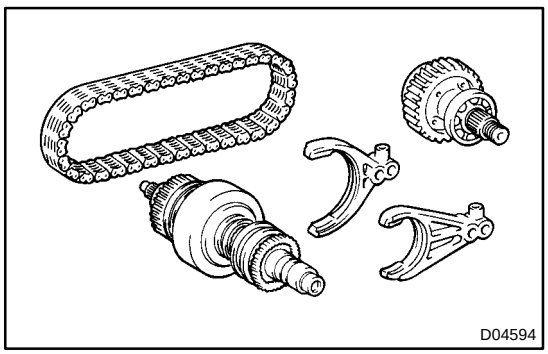
(a) Using 2 screwdrivers and a hammer, tap out the 2 snap rings from the gear shift fork shaft of the actuator assembly.

(b) Using a snap ring expander, remove the output shaft snap ring.



(c) Mount the rear case in a vise, as shown.

(d) Using a plastic hammer, carefully tap the rear case, and remove the rear output shaft assembly together with No. 1 gear shift fork, center diff. lock fork, driven sprocket assembly and front drive chain.

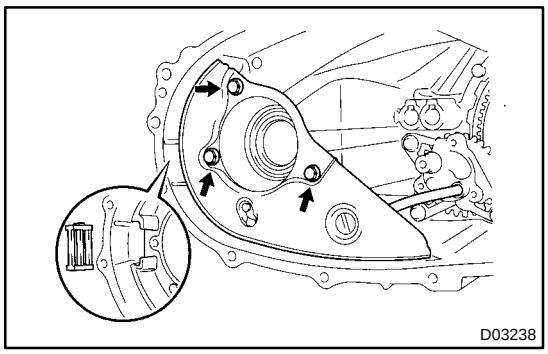


(e) Remove the front driven chain, driven sprocket assembly, center diff. lock fork and No. 1 gear shift fork from the rear output shaft assembly.

14. REMOVE ACTUATOR ASSEMBLY

(a) Remove the 3 bolts and actuator assembly.

(b) Remove the O- ring, No. 1 and No. 2 4WD position switches with the 2 gaskets from the actuator assembly.



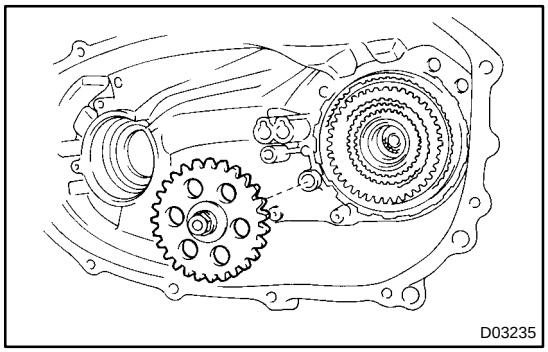
15. REMOVE OIL SEPARATOR AND MAGNET

(a) Remove the 3 bolts and oil separator.

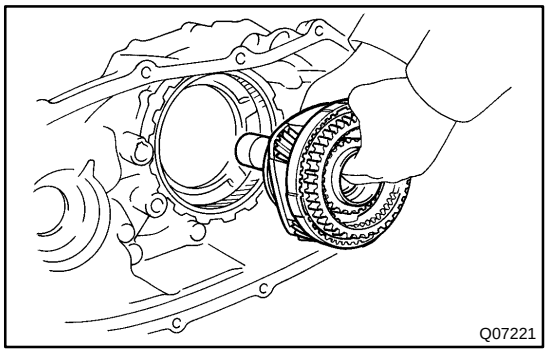
(b) Remove the magnet from the front case.

16. REMOVE OIL PUMP BODY ASSEMBLY

Remove the 3 bolts and oil pump body assembly.



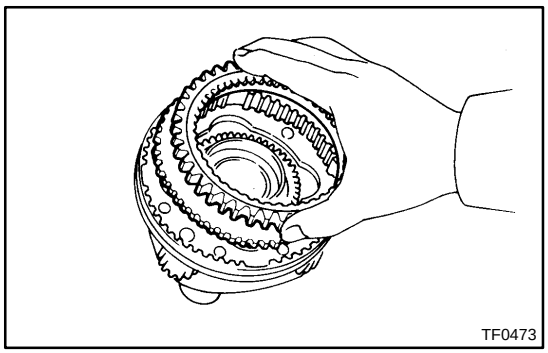
17. REMOVE OIL PUMP GEAR FROM FRONT CASE



18. REMOVE LOW PLANETARY GEAR ASSEMBLY WITH INPUT SHAFT ASSEMBLY

(a) Using a snap ring expander, remove the low planetary gear bearing snap ring.

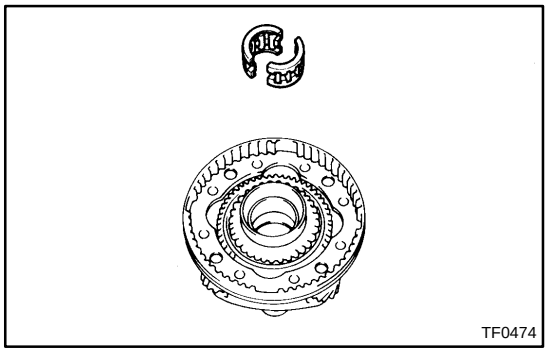
(b) Pull out the planetary gear assembly with the input shaft assembly.



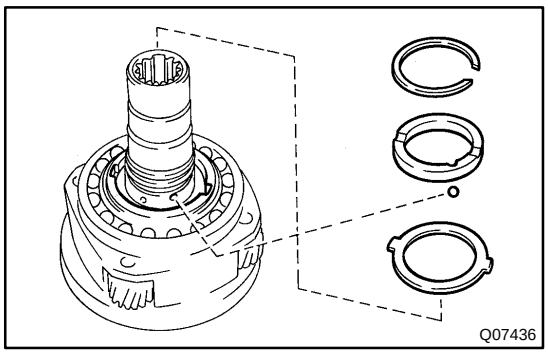
19. REMOVE LOW PLANETARY GEAR SPLINE PIECE

(a) Using a screwdriver, remove the low planetary gear snap ring.

(b) Remove the low planetary gear spline piece.



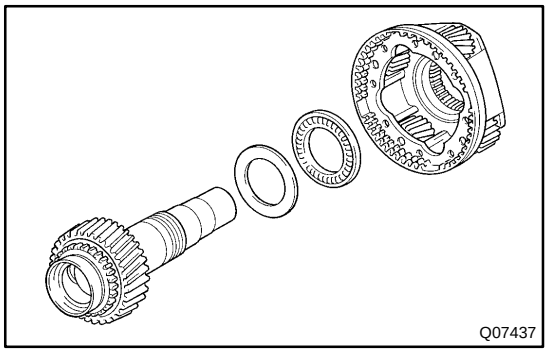
20. REMOVE OUTPUT SHAFT NEEDLE ROLLER BEARING FROM INPUT SHAFT



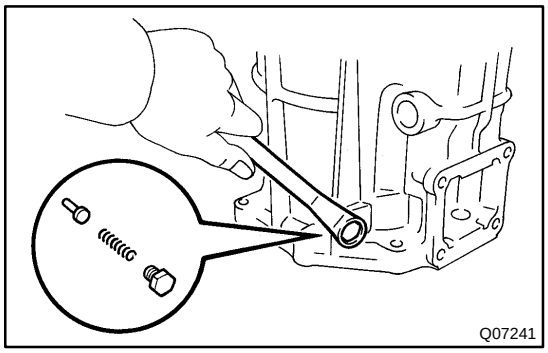
21. REMOVE INPUT GEAR STOPPER, LOW PLANETARY CARRIER THRUST WASHER AND INPUT GEAR STOPPER BALL

(a) Using a snap ring expander, remove the input gear stopper snap ring.

(b) Remove the input gear stopper, low planetary carrier thrust washer and input gear stopper ball.



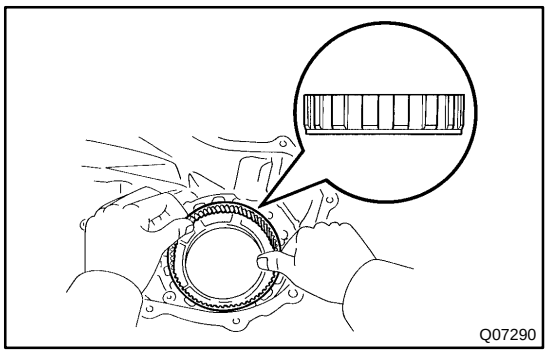
22. REMOVE INPUT SHAFT ASSEMBLY, LOW PLANETARY GEAR BEARING AND NO. 2 THRUST BEARING RACE



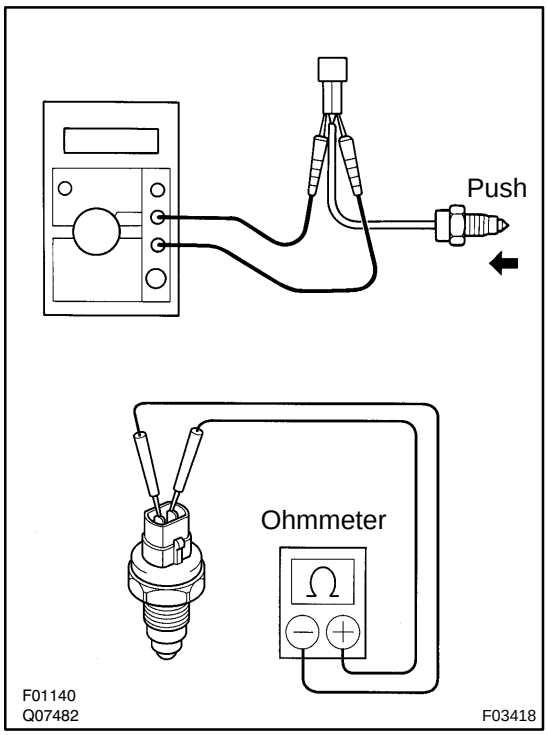
23. REMOVE LOW PLANETARY RING GEAR

(a) Using a screwdriver, remove the low planetary ring gear hole snap ring.

(b) Remove the head screw plug, spring and pin.



(c) Remove the low planetary ring gear.



24. INSPECT SWITCH

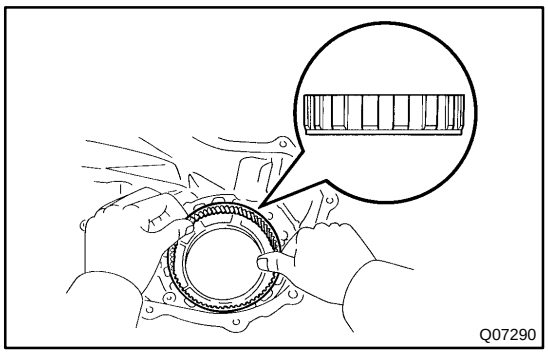
Check that there is continuity between terminals, as shown.

Switch position	Specified condition
Push	Continuity
Free	No continuity

If operation is not as specified, replace the switch.

TR082-02

REASSEMBLY


Q07290

HINT:

Coat all of the sliding and rotating surface with gear oil before reassembly.

1. INSTALL LOW PLANETARY RING GEAR

(a) Install the low planetary ring gear.

NOTICE:

Make sure to install the low planetary ring gear in the correct direction.

(b) Install the spring and pin.

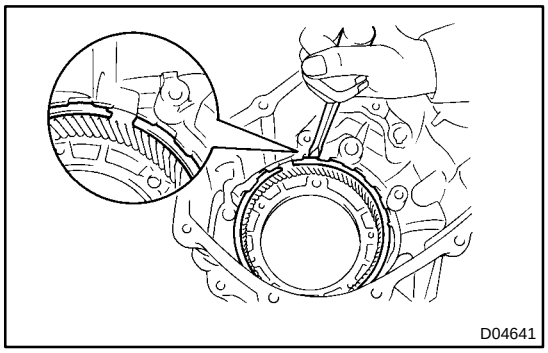
(c) Apply sealant to the head screw plug threads.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Install the head screw plug.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)

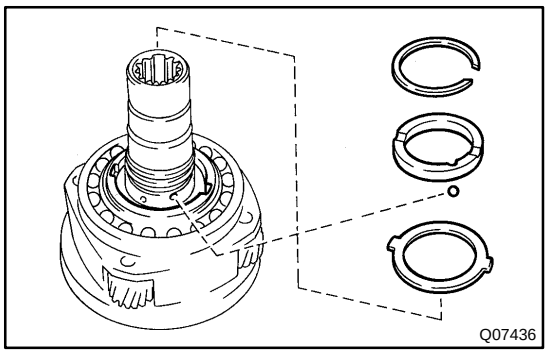

D04641

(e) Using a screwdriver, install the low planetary ring gear hole snap ring.

NOTICE:

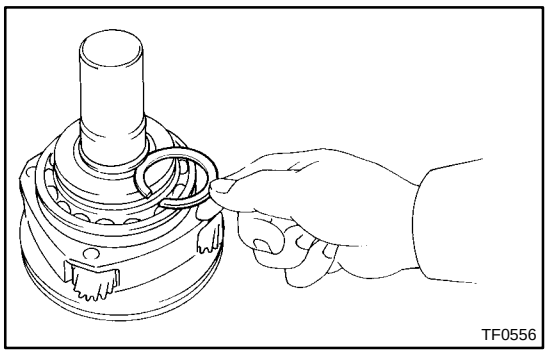
Be sure the end gap of the snap ring is not aligned with the upper side of the case.

2. INSTALL NO. 2 THRUST BEARING RACE, LOW PLANETARY GEAR BEARING AND INPUT SHAFT ASSEMBLY


Q07436

3. INSTALL INPUT GEAR STOPPER BALL, LOW PLANETARY CARRIER THRUST WASHER AND INPUT GEAR STOPPER

(a) Install the input gear stopper ball, low planetary carrier thrust washer and input gear stopper.


TF0556

(b) Select a input gear stopper snap ring that allows 0.05 - 0.15 mm (0.0020 - 0.0059 in.) axial play.

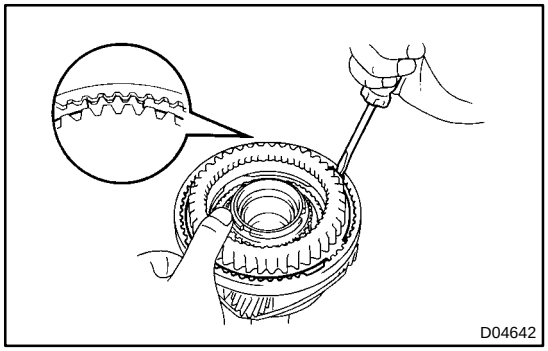
Mark	Thickness mm (in.)
A	2.10 - 2.15 (0.0827 - 0.0846)
B	2.15 - 2.20 (0.0846 - 0.0866)
C	2.20 - 2.25 (0.0866 - 0.0886)
D	2.25 - 2.30 (0.0886 - 0.0906)
E	2.30 - 2.35 (0.0906 - 0.0925)
F	2.35 - 2.40 (0.0925 - 0.0945)
G	2.40 - 2.45 (0.0945 - 0.0965)
H	2.45 - 2.50 (0.0965 - 0.0984)
J	2.50 - 2.55 (0.0984 - 0.1004)
K	2.55 - 2.60 (0.1004 - 0.1024)
L	2.60 - 2.65 (0.1024 - 0.1043)
M	2.65 - 2.70 (0.1043 - 0.1063)
N	2.70 - 2.75 (0.1063 - 0.1083)
P	2.75 - 2.80 (0.1083 - 0.1102)
Q	2.80 - 2.85 (0.1102 - 0.1122)
R	2.85 - 2.90 (0.1122 - 0.1142)
S	2.90 - 2.95 (0.1142 - 0.1161)
T	2.95 - 3.00 (0.1161 - 0.1181)
U	3.00 - 3.05 (0.1181 - 0.1201)

(c) Using a snap ring expander, install a new input gear stopper snap ring.

4. INSTALL OUTPUT SHAFT NEEDLE ROLLER BEARING TO INPUT SHAFT

5. INSTALL LOW PLANETARY GEAR SPLINE PIECE

(a) Install the low planetary gear spline piece.


D04642

(b) Using a screwdriver, install the low planetary gear snap ring.

NOTICE:

Be sure the end gap of the snap ring is not aligned with cut-out portion of the low planetary gear.

6. INSTALL LOW PLANETARY GEAR ASSEMBLY WITH INPUT SHAFT ASSEMBLY

(a) Install the low planetary gear assembly with the input shaft assembly.

HINT:

If necessary, heat the front case to about 50 - 80˚C (122 - 176˚F).

(b) Using a snap ring expander, install the low planetary gear bearing snap ring.

HINT:

Check that the low planetary gear assembly and input shaft assembly turn lightly.

7. INSTALL OIL PUMP GEAR TO FRONT CASE

8. INSTALL OIL PUMP BODY ASSEMBLY

Install the oil pump body assembly with the 3 bolts.

Torque: 7.5 N·m (80 kgf·cm, 69 in.·lbf)

9. INSTALL MAGNET AND OIL SEPARATOR

(a) Install the magnet to the front case.

(b) Install the oil separator with the 3 bolts.

Torque: 7.5 N·m (80 kgf·cm, 69 in.·lbf)

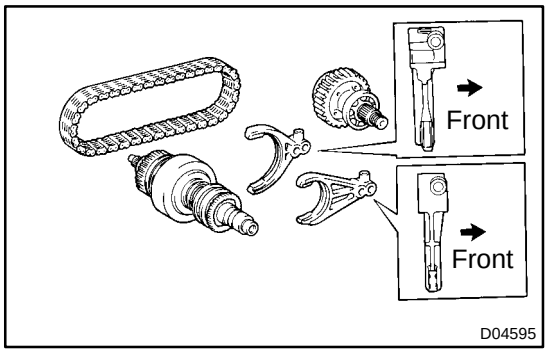
10. INSTALL ACTUATOR ASSEMBLY

(a) Install a new O-ring, No. 1 and No. 2 4WD position switches with 2 new gaskets.

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

(b) Install the actuator assembly with the 3 bolts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)



11. INSTALL REAR OUTPUT SHAFT ASSEMBLY, NO. 1 GEAR SHIFT FORK, CENTER DIFF. LOCK FORK, DRIVEN SPROCKET ASSEMBLY AND FRONT DRIVE CHAIN

(a) Install the No. 1 gear shift fork, center diff. lock fork, driven sprocket assembly and front drive chain to the rear output shaft assembly.

NOTICE:

Make sure to install the forks in the correct direction.

(b) Install the rear output shaft assembly with the driven sprocket assembly to the rear case.

NOTICE:

Do not let the clutch sleeve and shifting key drop.

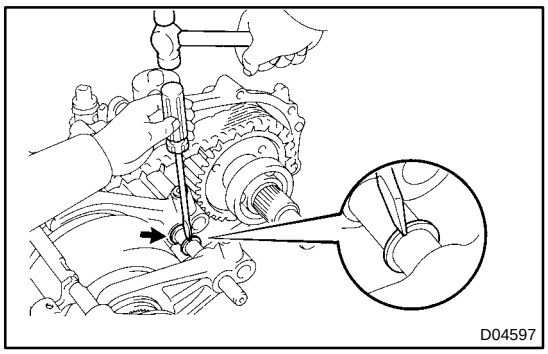
HINT:

If necessary, heat the rear case to about 50 - 80°C (122 - 176°F).

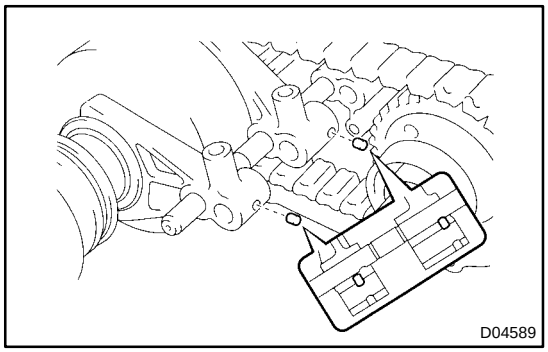
(c) Using a snap ring expander, install the output shaft snap ring.

HINT:

Check that the rear output shaft assembly and driven sprocket turn lightly.

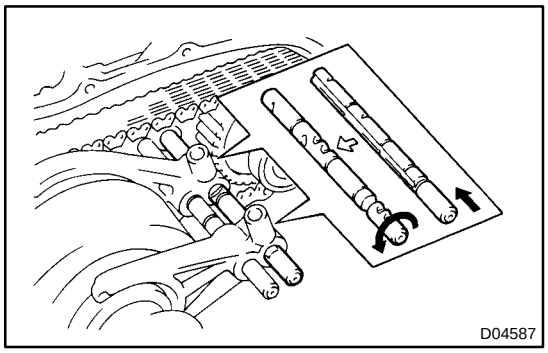


(d) Using a screwdriver and hammer, drive in the 2 snap rings to the gear shift fork shaft of the actuator assembly.

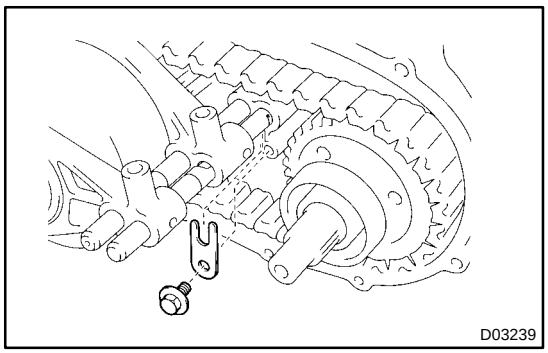


12. INSTALL GEAR SHIFT FORK SHAFT

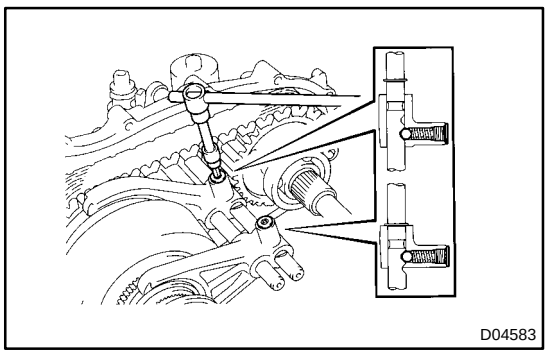
(a) Using a magnetic finger, install the 2 No. 2 shift interlock pins to the No. 1 gear shift fork and center diff. lock fork.



(b) Install the slit portion of the gear shift fork shaft with it facing No. 2 interlock pin and rotate the gear shift fork shaft, as shown in the illustration.



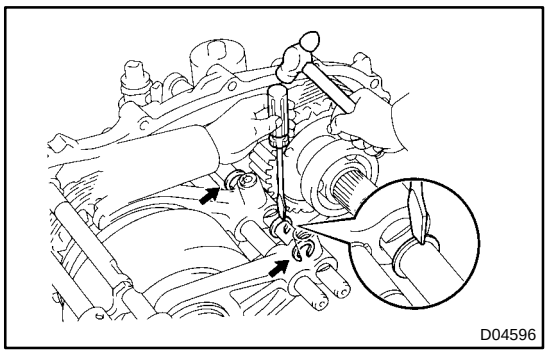
(c) Install the shift shaft stopper with the bolt.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



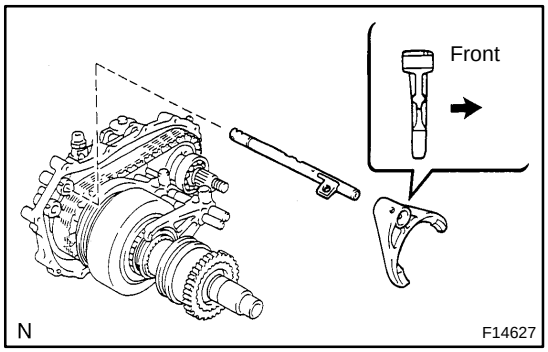
(d) Install the 2 springs and balls to the No. 1 gear shift fork and center diff. lock fork.

(e) Apply sealant to the straight screw plug threads.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(f) Using a hexagon wrench, install the 2 straight screw plugs to the No. 1 gear shift fork and center diff. lock fork.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



(g) Using a screwdriver and hammer, drive in the 3 snap rings to the gear shift fork shaft of the actuator assembly.

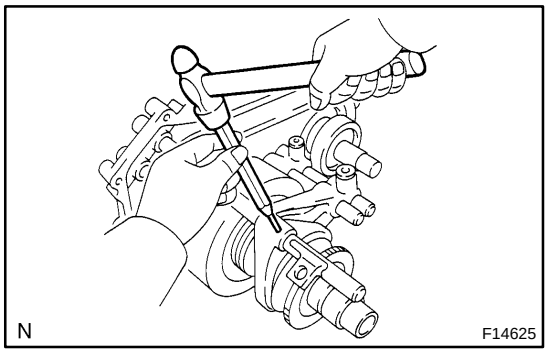


13. INSTALL HIGH AND LOW SHIFT FORK SHAFT AND NO. 2 GEAR SHIFT FORK

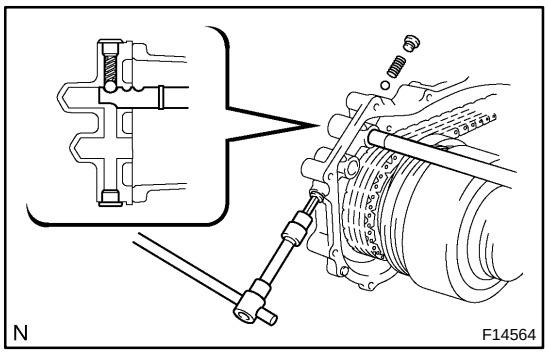
(a) Install the high and low shift fork shaft and No. 2 gear shift fork.

NOTICE:

Make sure to install the No. 2 gear shift fork in the correct direction.



(b) Using a pin punch and hammer, drive in the slotted spring pin to the No. 2 gear shift fork.



14. INSTALL STRAIGHT SCREW PLUG, SPRING AND BALL

(a) Install the ball and spring.

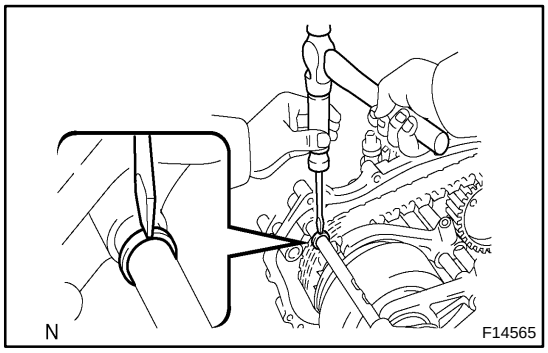
(b) Apply sealant to the straight screw plug threads.

Sealant:

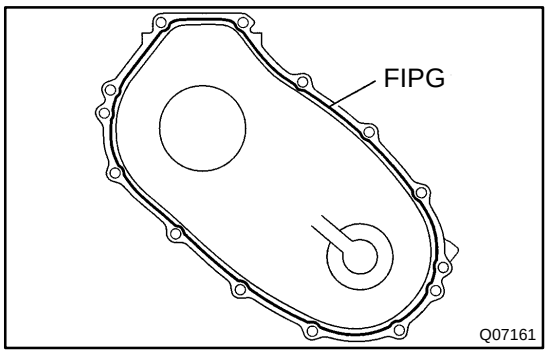
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Using a hexagon wrench, install the 2 straight screw plugs.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)



(d) Using a screwdriver and hammer, drive in the snap ring.



15. INSTALL REAR CASE

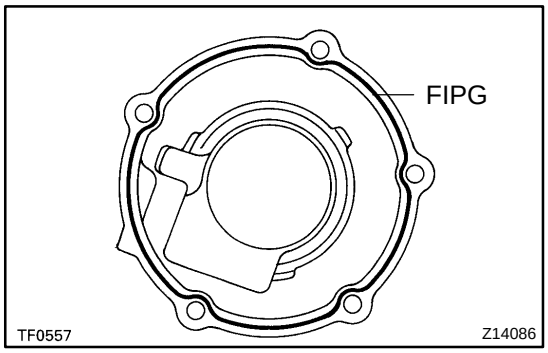
(a) Apply FIPG to the rear case, as shown.
FIPG:
Part No. 08826-00090, THREE BOND 1281 or equivalent

(b) Install the rear case and 2 clamps with the 12 bolts.
Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)

16. INSTALL VEHICLE SPEED SENSOR DRIVE GEAR AND OUTPUT SHAFT WASHER

(a) Install the ball on the rear output shaft.

(b) Install the vehicle speed sensor drive gear and 2 output shaft washers.

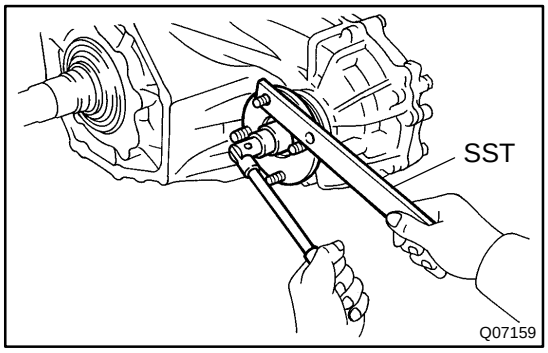


17. INSTALL EXTENSION HOUSING

(a) Apply FIPG to the extension housing, as shown.
FIPG:
Part No. 08826-00090, THREE BOND 1281 or equivalent

(b) Apply sealant to the bolt threads.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Install the extension housing with the 5 bolts.
Torque: 12 N·m (120 kgf·cm, 9 ft·lbf)



18. INSTALL FRONT COMPANION FLANGE

(a) Install the front companion flange to the input shaft assembly.

(b) Using SST to hold the front companion flange, install a new front companion flange lock nut.
SST 09330-00021
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

(c) Stake the front companion flange lock nut.

19. INSTALL REAR COMPANION FLANGE

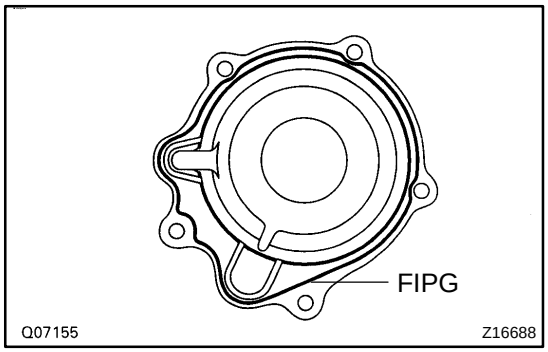
Install the rear companion flange in the same way as the front companion flange.

20. INSTALL CONTROL SHIFT LEVER RETAINER

(a) Install the select return spring to the control shift lever retainer.

(b) Install the control shift lever retainer and a new oil deflector with the 4 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



21. INSTALL FRONT BEARING RETAINER

(a) Apply FIPG to the front bearing retainer, as shown.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent

(b) Apply sealant to the bolt threads.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Install the front bearing retainer with the 5 bolts.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

22. INSTALL L4 POSITION SWITCH, NEUTRAL POSITION SWITCH AND STRAIGHT SCREW PLUG WITH 3 NEW GASKETS

Torque: 37 N·m (380 kgf·cm, 27 ft·lbf)

23. INSTALL VEHICLE SPEED SENSOR ASSEMBLY

(a) Install the vehicle speed sensor driven gear to the vehicle speed sensor assembly with the clip.

(b) Install a new O-ring to the vehicle speed sensor assembly.

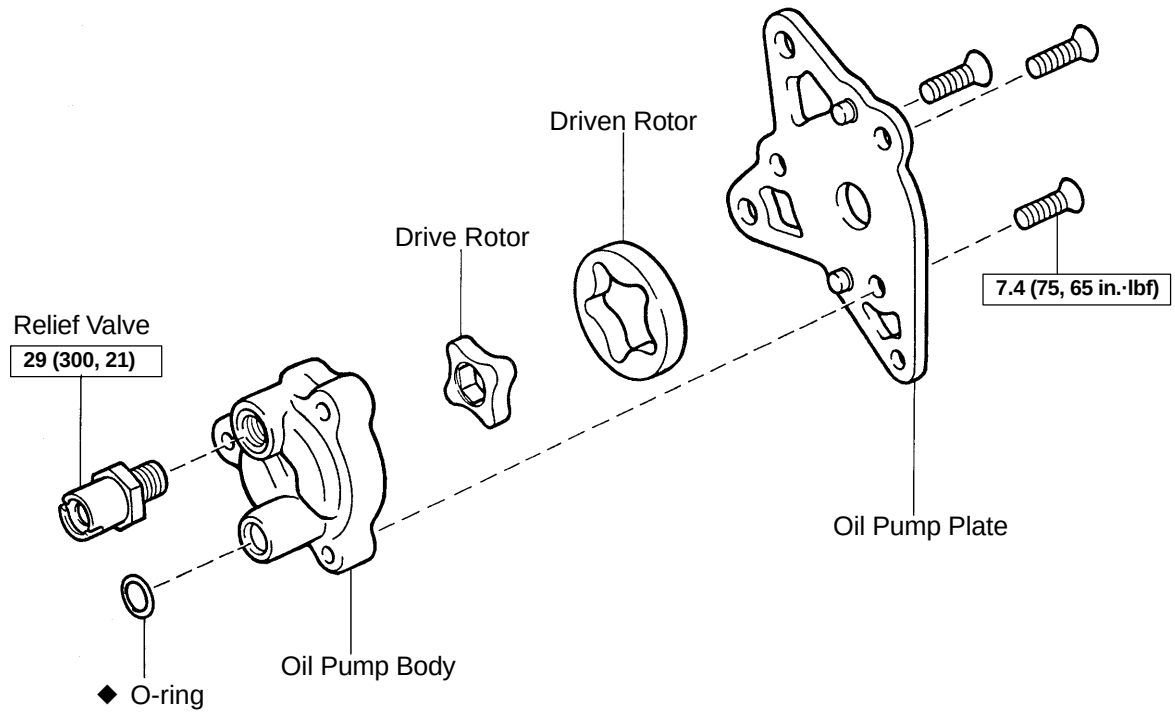
(c) Install the vehicle speed sensor assembly with the bolt.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

OIL PUMP BODY

COMPONENTS

TR00D-04

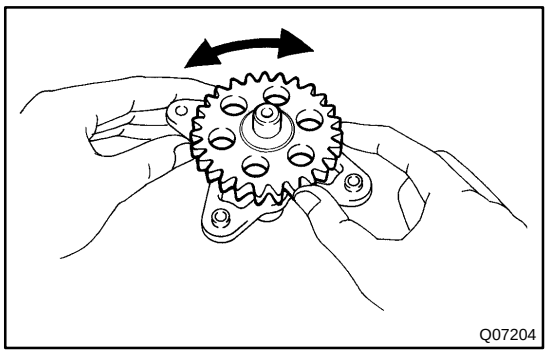


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Q07245

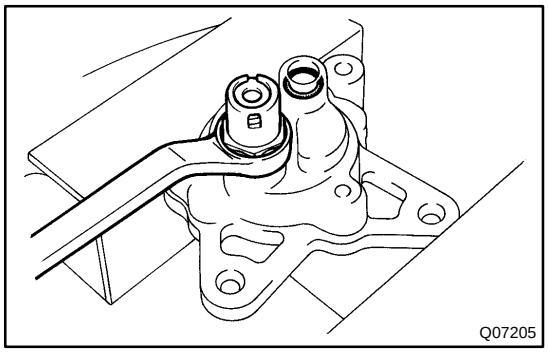
TR01M-03

INSPECTION



1. CHECK OIL PUMP OPERATION

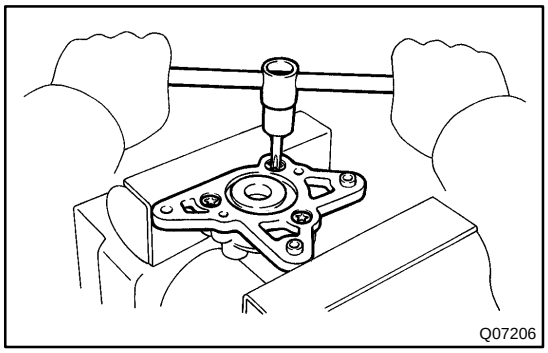
Install the oil pump drive gear to the drive rotor, check that the drive rotor turns smoothly.



2. INSPECT ROTOR CLEARANCE

(a) Remove the relief valve and O-ring.
   (1) Mount the oil pump plate in a vise.
   (2) Remove the relief valve and O-ring from the oil pump body.
   Torque: 29 N·m (300 kgf·cm, 21 ft·lbf)

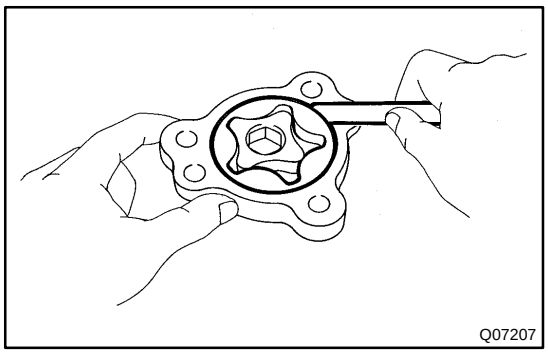
HINT:
At the time of reassembly, coat a new O-ring with gear oil and install it to the oil pump body.



(b) Remove the oil pump plate.
   (1) Using a torx socket wrench, unscrew the 3 torx screws. (Torx socket wrench T30 09042-00010)
   Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)
   (2) Remove the oil pump plate.

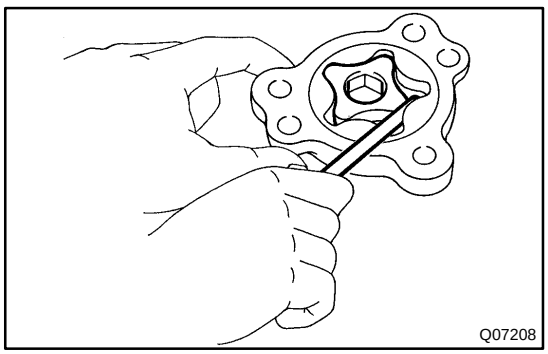
(c) Remove the drive rotor and driven rotor.

HINT:
At the time of reassembly, apply gear oil to the both rotors.



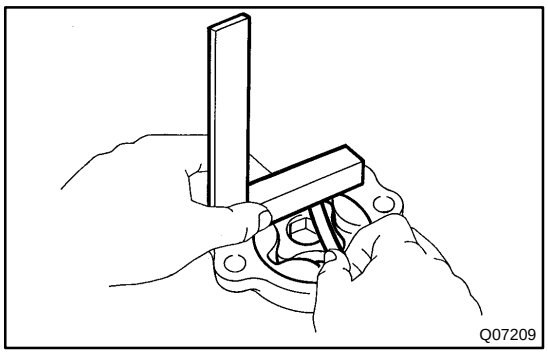
(d) Inspect the driven rotor body clearance.
   (1) Push the driven rotor to one side of the body.
   (2) Using a feeler gauge, measure the clearance.
   Standard clearance:
   0.09 - 0.16 mm (0.0035 - 0.0063 in.)
   Maximum clearance:
   0.16 mm (0.0063 in.)

If the clearance exceeds the maximum, replace the drive rotor, driven rotor or oil pump body.



(e) Inspect the both rotor tips clearance.
   Using a feeler gauge, measure the clearance between both rotor tips.
   Standard clearance:
   0.05 - 0.15 mm (0.0020 - 0.0059 in.)
   Maximum clearance:
   0.15 mm (0.0059 in.)

If the clearance exceeds the maximum, replace the drive rotor, driven rotor or oil pump body.



(f) Inspect the both rotors side clearance.
Using a steel square and feeler gauge, measure the clearance between the rotors and straight edge.
Standard clearance:
0.03 - 0.10 mm (0.0012 - 0.0039 in.)
Maximum clearance:
0.10 mm (0.0039 in.)

If the clearance exceeds the maximum, replace the drive rotor, driven rotor or oil pump body.

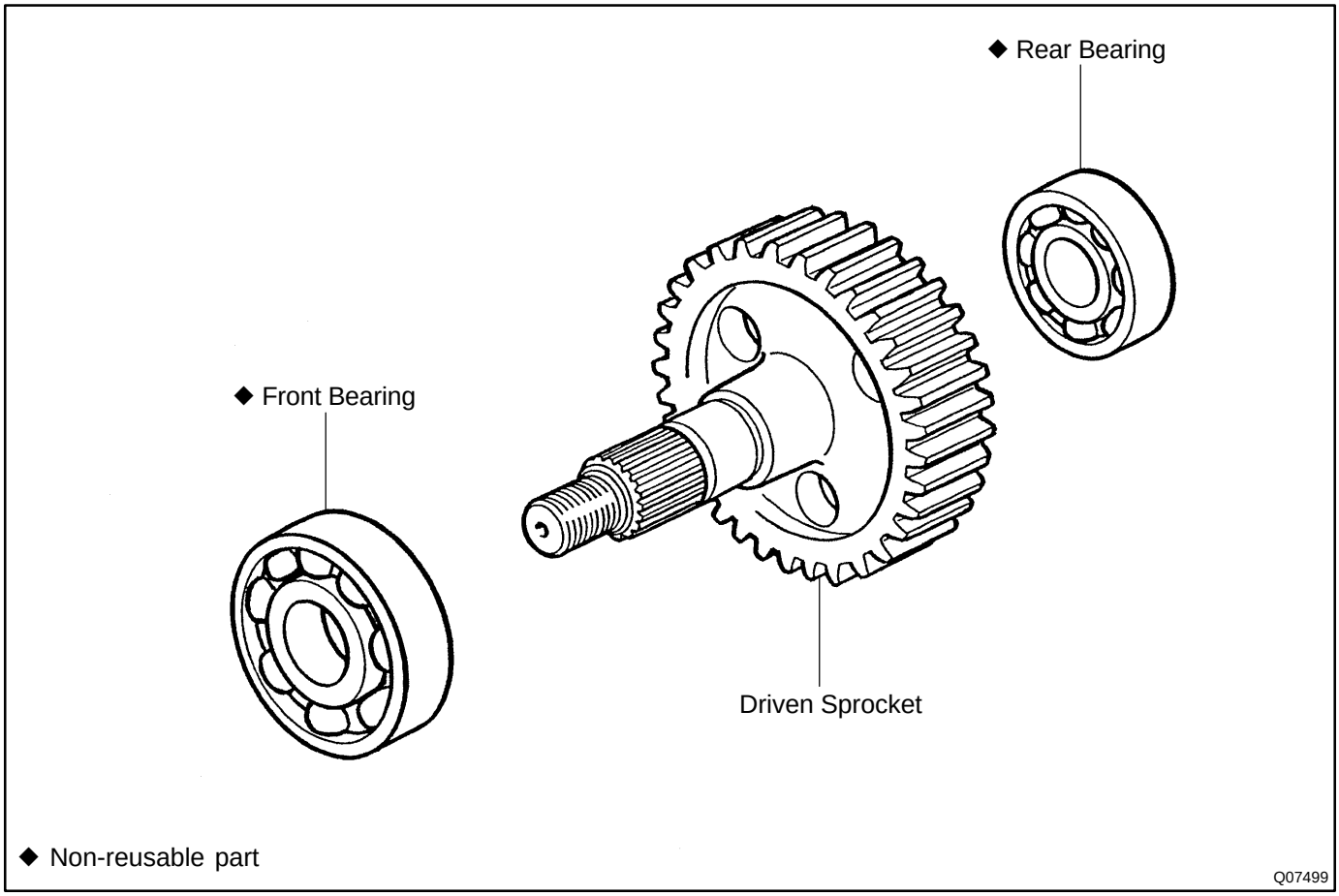
3. ASSEMBLE REMOVAL PARTS

HINT:
Reassembly is in the reverse order of disassembly.

DRIVEN SPROCKET

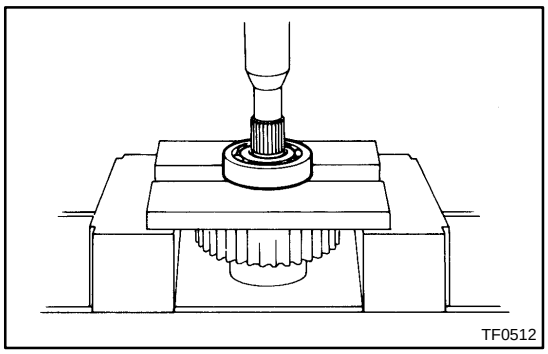
COMPONENTS

TR00F-04



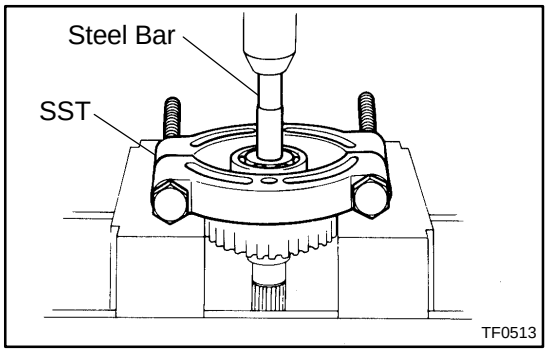
TR00G-04

REPLACEMENT



1. REMOVE FRONT BEARING

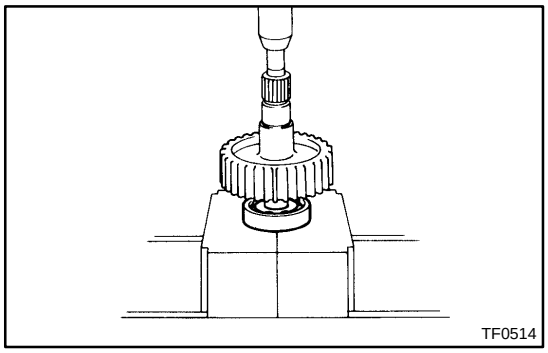
Using a press, remove the front bearing.



2. REMOVE REAR BEARING

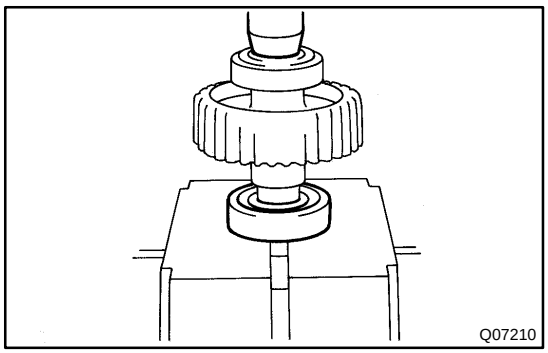
Using SST, a press and steel bar, remove the rear bearing.

SST 09555-55010



3. INSTALL REAR BEARING

Using a press, install a new rear bearing.



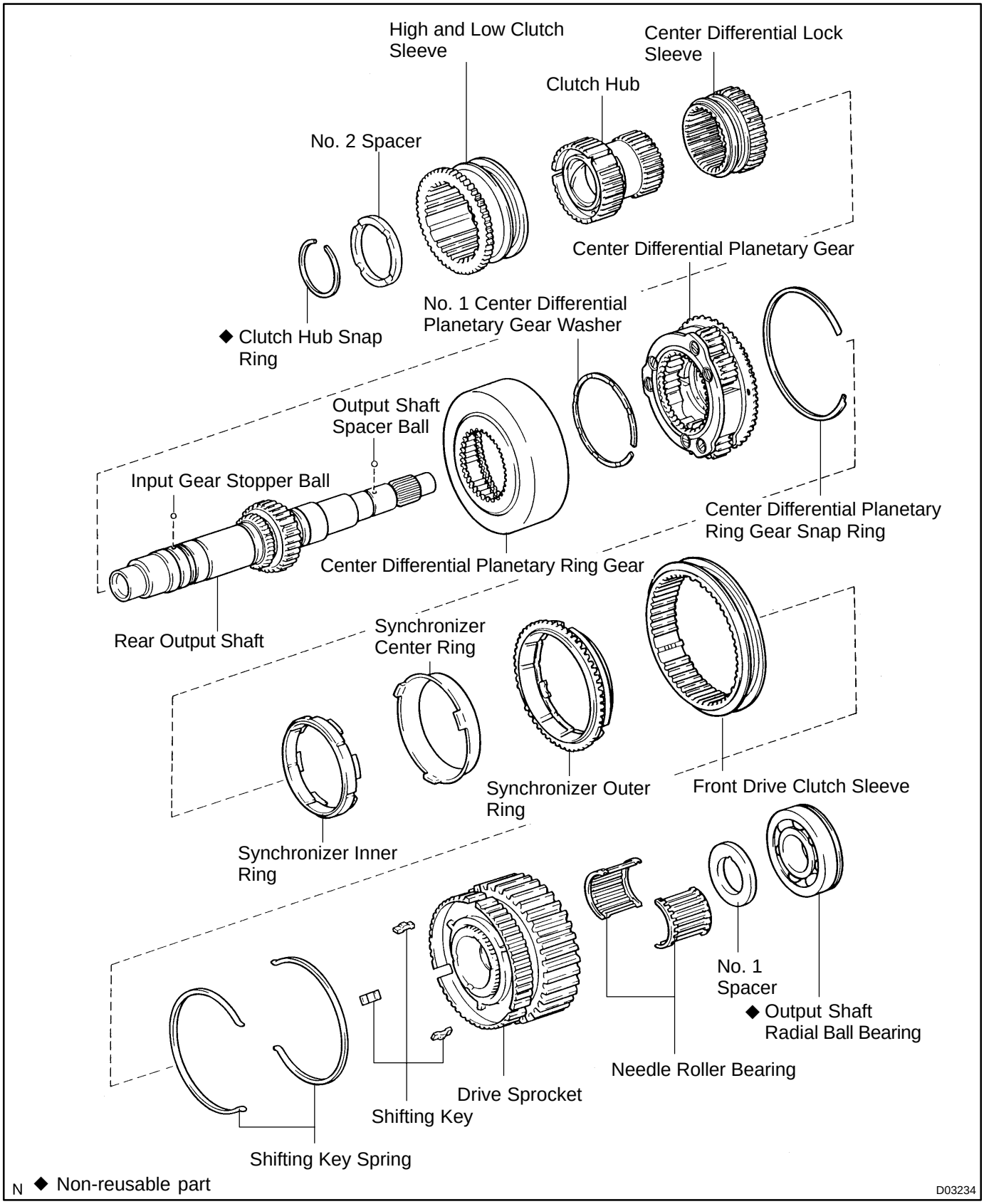
4. INSTALL FRONT BEARING

Using a press, install a new front bearing.

REAR OUTPUT SHAFT

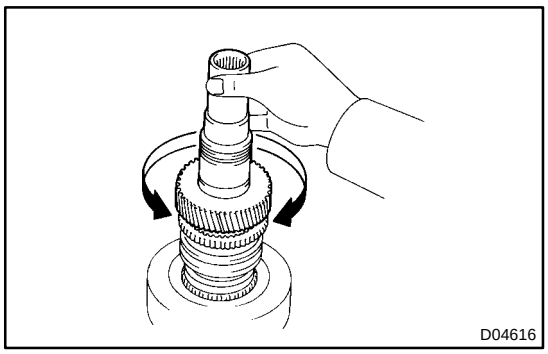
COMPONENTS

TR083-02



TR084-01

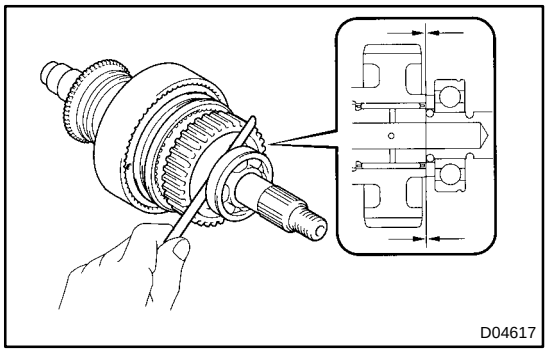
DISASSEMBLY



1. INSPECT OUTPUT SHAFT FRONT NEEDLE ROLLER BEARING

(a) Install the input shaft assembly via the needle roller bearing to the rear output shaft assembly.

(b) Rotate the input shaft assembly and inspect the needle roller bearing. Check that there should be no abnormal resistance, catching, abnormal noise or rattling.

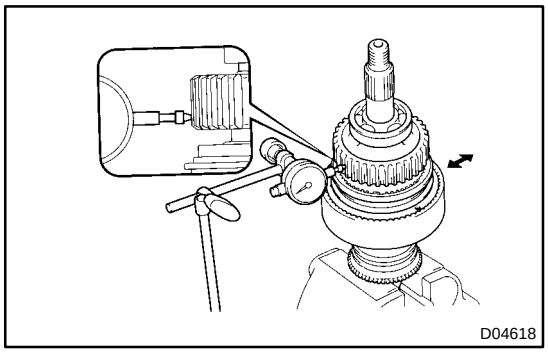


2. INSPECT DRIVE SPROCKET THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance of the drive sprocket.

Standard clearance:
0.10 - 0.25 mm (0.0039 - 0.0098 in.)
Maximum clearance:
0.25 mm (0.0098 in.)

If the clearance exceeds the maximum, replace the drive sprocket.

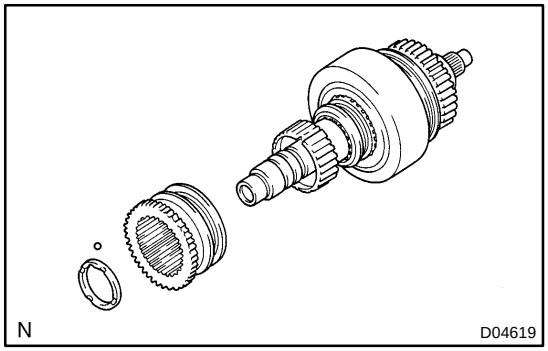


3. INSPECT DRIVE SPROCKET RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance of the drive sprocket.

Standard clearance:
0.01 - 0.06 mm (0.0004 - 0.0024 in.)
Maximum clearance:
0.06 mm (0.0024 in.)

If the clearance exceeds the maximum, replace the drive sprocket, rear output shaft or needle roller bearing.

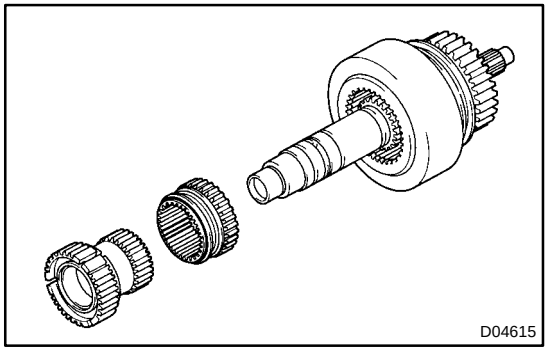


4. REMOVE HIGH AND LOW CLUTCH SLEEVE

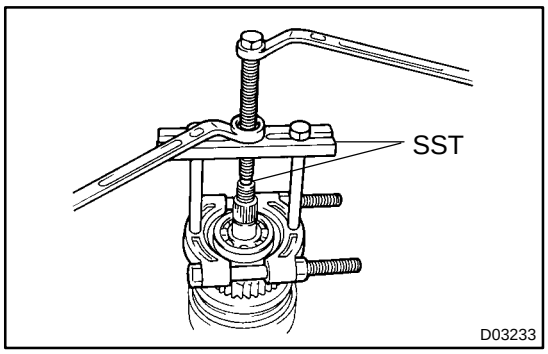
(a) Using a snap ring expander, remove the clutch hub snap ring.

(b) Remove the No. 2 spacer and input gear stopper ball.

(c) Remove the high and low clutch sleeve.



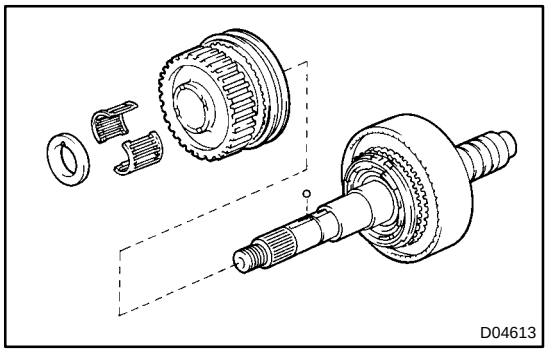
5. REMOVE CLUTCH HUB AND CENTER DIFFERENTIAL LOCK SLEEVE



6. REMOVE OUTPUT SHAFT RADIAL BALL BEARING

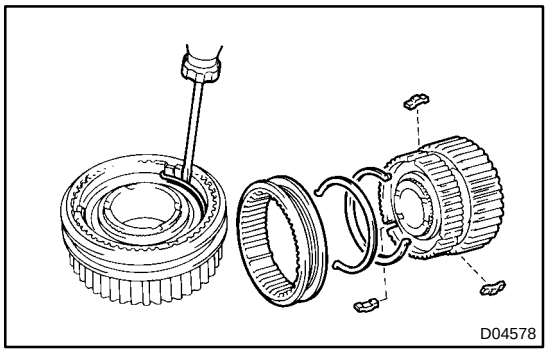
Using SST, remove the output shaft radial ball bearing.

SST 09950- 00020, 09950- 00030, 09950- 40011 (09957-04010)



7. REMOVE DRIVE SPROCKET AND FRONT DRIVE CLUTCH SLEEVE ASSEMBLY

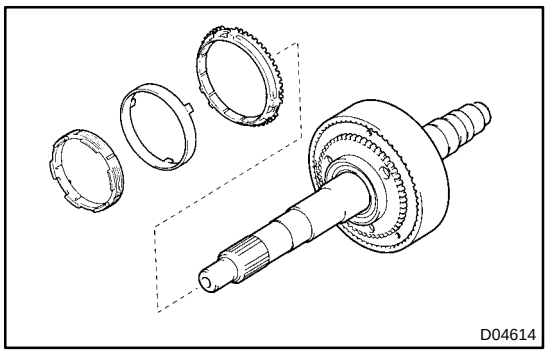
(a) Remove the No. 1 spacer, output shaft spacer ball, needle roller bearing, drive sprocket and front drive clutch sleeve assembly.



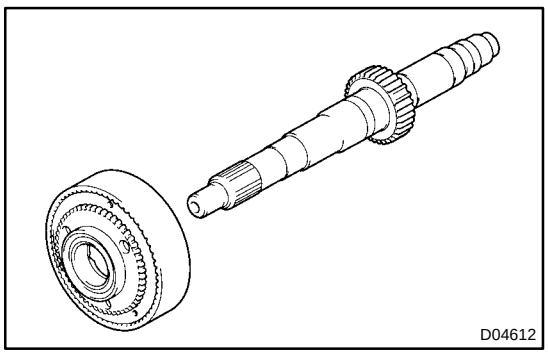
(b) Remove the front drive clutch sleeve from the drive sprocket.

(c) Using a screwdriver, remove the 2 shifting key springs.

(d) Remove the 3 shifting keys.

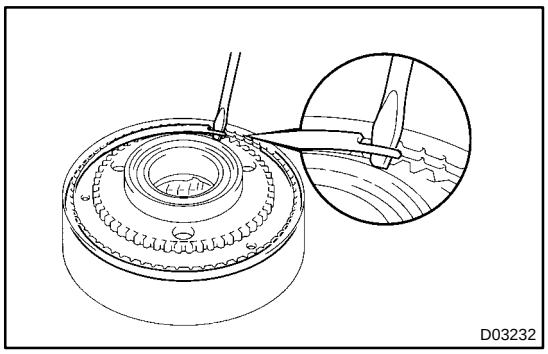


8. REMOVE SYNCHRONIZER INNER RING, SYNCHRONIZER CENTER RING AND SYNCHRONIZER OUTER RING FROM CENTER DIFFERENTIAL PLANETARY GEAR ASSEMBLY

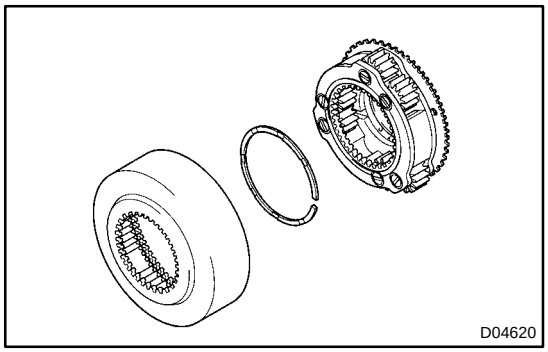


9. REMOVE CENTER DIFFERENTIAL PLANETARY GEAR ASSEMBLY

(a) Remove the center differential planetary gear assembly from the rear output shaft.



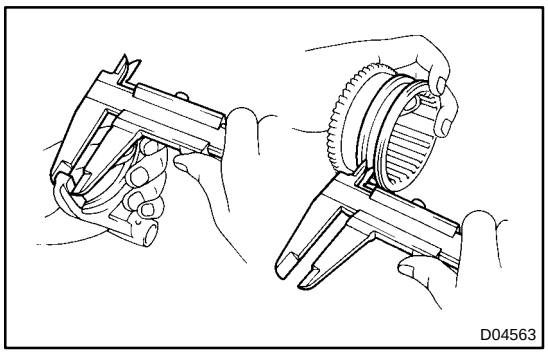
(b) Using a screwdriver, remove the center differential planetary ring gear snap ring.



(c) Remove the center differential planetary ring gear and No. 1 center differential planetary gear washer from the center differential planetary gear.

TR085-01

INSPECTION



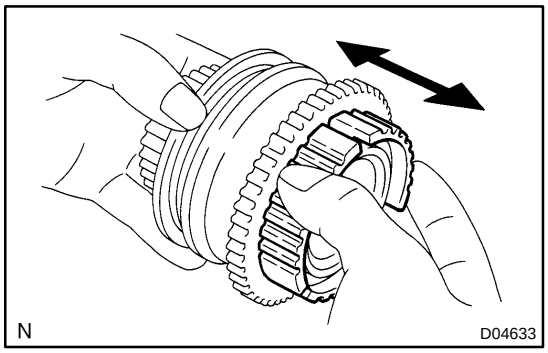
1. INSPECT HIGH AND LOW CLUTCH SLEEVE AND NO. 2 GEAR SHIFT FORK CLEARANCE

(a) Using vernier calipers, measure the thickness of the No. 2 gear shift fork claw.
Thickness: 11.85 mm (0.4665 in.)

(b) Using vernier calipers, measure the groove of the high and low clutch sleeve.
Distance: 12.00 mm (0.4724 in.)

(c) Calculate a clearance between the high and low clutch sleeve and No. 2 gear shift fork clearance.
Standard clearance:
0.15 - 0.35 mm (0.0059 - 0.0138 in.)
Maximum clearance:
0.35 mm (0.138 in.)

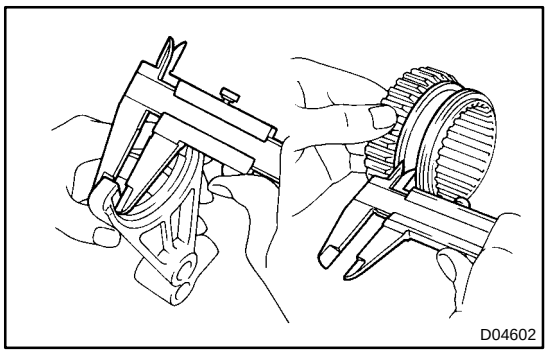
If the clearance exceeds the maximum, replace the high and low clutch sleeve or No. 2 gear shift fork.



2. INSPECT CLUTCH HUB AND HIGH AND LOW CLUTCH SLEEVE

(a) Check that the tip of the spline gear of the high and low clutch sleeve is not worn.

(b) Install the high and low clutch sleeve to the clutch hub and check that the high and low clutch sleeve moves smoothly.



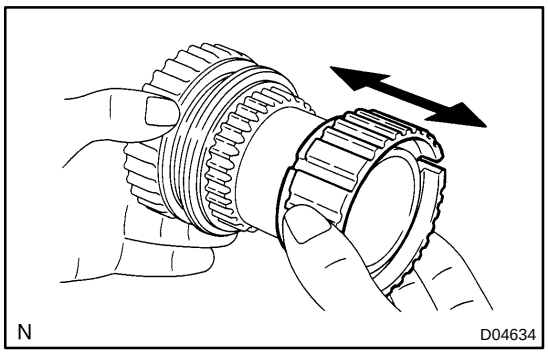
3. INSPECT CENTER DIFFERENTIAL LOCK SLEEVE AND CENTER DIFFERENTIAL LOCK FORK

(a) Using vernier calipers, measure the thickness of the center differential lock fork claw.
Thickness: 10.2 mm (0.4016 in.)

(b) Using vernier calipers, measure the groove of the center differential lock sleeve.
Distance: 10.5 mm (0.4134 in.)

(c) Calculate a clearance between the center differential lock sleeve and center differential lock fork.
Standard clearance:
0.26 - 0.84 mm (0.0102 - 0.0331 in.)
Maximum clearance:
0.84 mm (0.0331 in.)

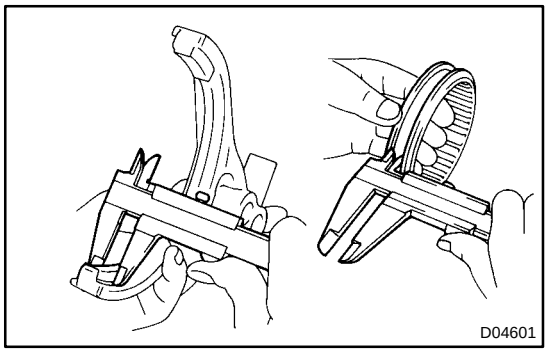
If the clearance exceeds the maximum, replace the center differential lock sleeve or center differential lock fork.



4. INSPECT CENTER DIFFERENTIAL LOCK SLEEVE AND CLUTCH HUB

(a) Check that the tip of the spline gear of the center differential lock sleeve is not worn.

(b) Install the center differential lock sleeve to the clutch hub and check that the center differential lock sleeve moves smoothly.



5. INSPECT FRONT DRIVE CLUTCH SLEEVE AND NO. 1 GEAR SHIFT FORK

(a) Using vernier calipers, measure the thickness of the No. 1 gear shift fork claw.

Thickness: 11.85 mm (0.4665 in.)

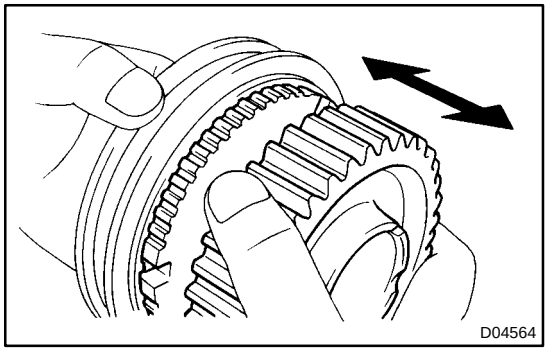
(b) Using vernier calipers, measure the groove of the front drive clutch sleeve.

Distance: 12.00 mm (0.4724 in.)

(c) Calculate a clearance between the front drive clutch sleeve and No. 1 gear shift fork.

Standard clearance:
0.15 - 0.35 mm (0.0059 - 0.0138 in.)
Maximum clearance:
0.35 mm (0.0138 in.)

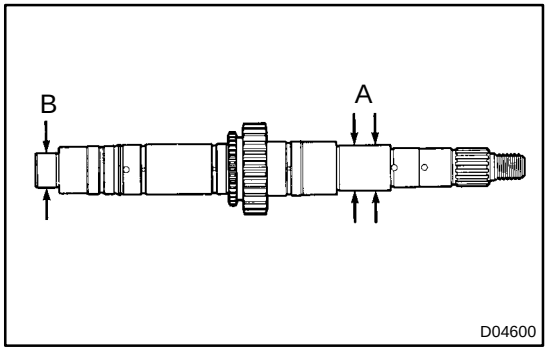
If the clearance exceeds the maximum, replace the front drive clutch sleeve or No. 1 gear shift fork.



6. INSPECT DRIVE SPROCKET AND FRONT DRIVE CLUTCH SLEEVE

(a) Check that the tip of the spline gear of the front drive clutch sleeve is not worn.

(b) Install the front drive clutch sleeve to the drive sprocket and check that the front drive clutch sleeve moves smoothly.

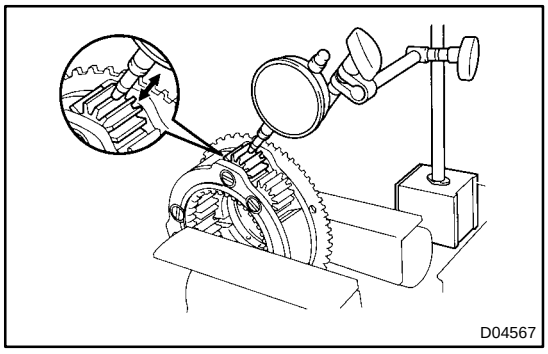


7. INSPECT REAR OUTPUT SHAFT

Using a micrometer, measure the outer diameter of the rear output shaft journal surface.

Standard diameter:
Part A: 36.98 - 37.00 mm (1.4559 - 1.4567 in.)
Part B: 27.98 - 27.99 mm (1.1016 - 1.1020 in.)
Minimum diameter:
Part A: 36.98 mm (1.4559 in.)
Part B: 27.98 mm (1.1016 in.)

If the outer diameter is less than the minimum, replace the rear output shaft.

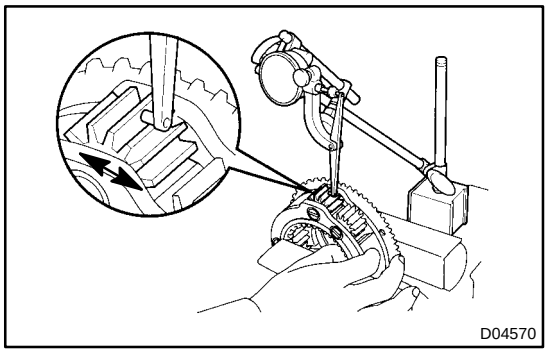


8. INSPECT CENTER DIFFERENTIAL PLANETARY GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance of the pinion gear (outside and inside).

Standard clearance:
0.01 - 0.04 mm (0.0004 - 0.0016 in.)
Maximum clearance:
0.04 mm (0.0016 in.)

If the clearance exceeds the maximum, replace the center differential planetary gear.



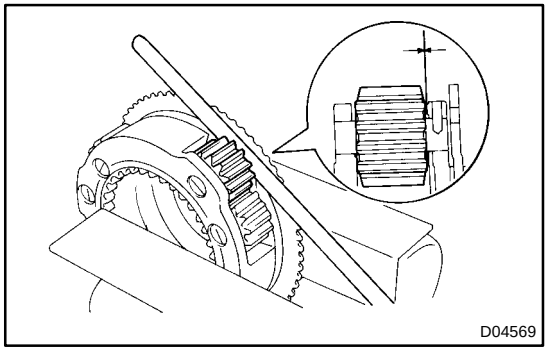
9. INSPECT CENTER DIFFERENTIAL PLANETARY GEAR BACKLASH

Using a dial indicator, set up the indicator to the tooth edge of the pinion gear (outside) perpendicularly then fix the pinion gear (inside), and inspect while moving the pinon gear (outside).

Standard backlash:
0.01 - 0.04 mm (0.0004 - 0.0016 in.)

HINT:

- Check at more than 3 points on the pinion gear.
- Do the same for the pinion gear.

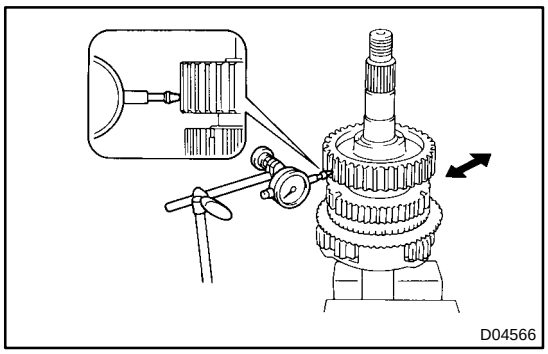


10. INSPECT CENTER DIFFERENTIAL PLANETARY GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance of the pinion gear.

Standard clearance:
0.15 - 0.70 mm (0.0059 - 0.0276 in.)
Maximum clearance:
0.70 mm (0.0276 in.)

If the clearance exceeds the maximum, replace the center differential planetary gear.



11. INSPECT DRIVE SPROCKET RADIAL CLEARANCE

(a) Install the center differential planetary gear to the rear output shaft and insert the drive sprocket via the needle roller bearing.

(b) Using a dial indicator, measure the radial clearance of the drive sprocket.

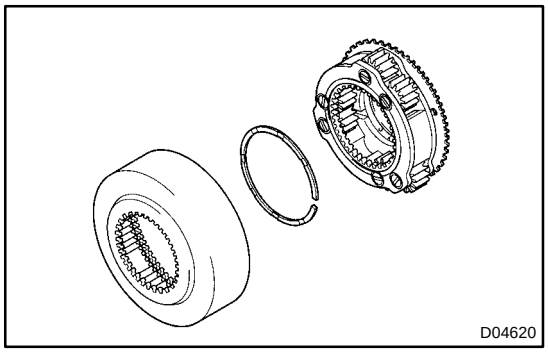
Standard clearance:
0.01 - 0.06 mm (0.0004 - 0.0024 in.)
Maximum clearance:
0.06 mm (0.0024 in.)

If the clearance exceeds the maximum, replace the drive sprocket, rear output shaft or needle roller bearing.

TR086-01

REASSEMBLY

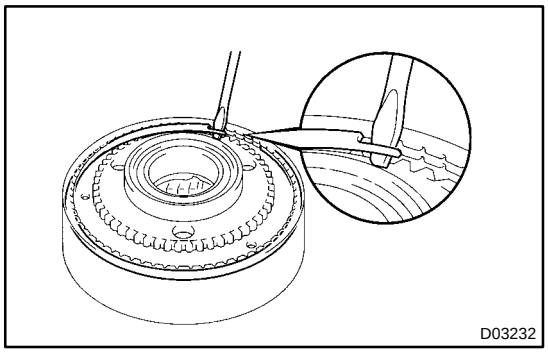
HINT:
Coat all of the sliding and rotating surfaces with gear oil before reassembly.


D04620

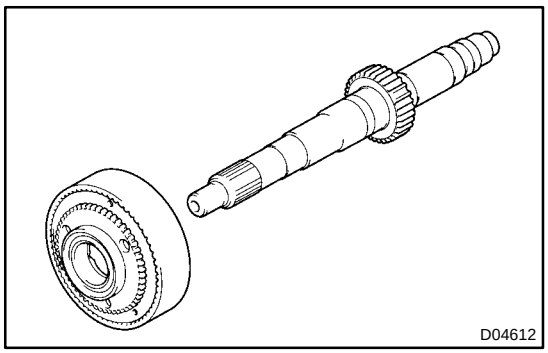
1. INSTALL CENTER DIFFERENTIAL PLANETARY GEAR ASSEMBLY

(a) Install the center differential planetary ring gear and No. 1 center differential planetary gear washer to the center differential planetary gear.

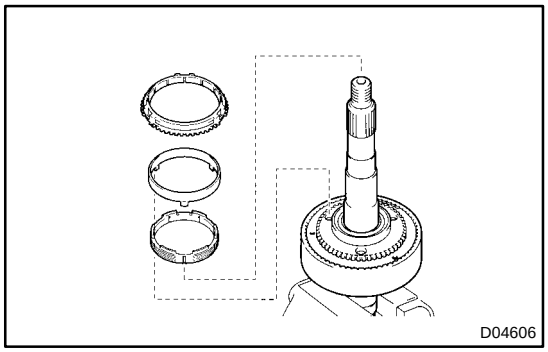
HINT:
There is no specific direction for the No. 1 center differential planetary gear washer.


D03232

(b) Using a screwdriver, install the center differential planetary ring gear snap ring.

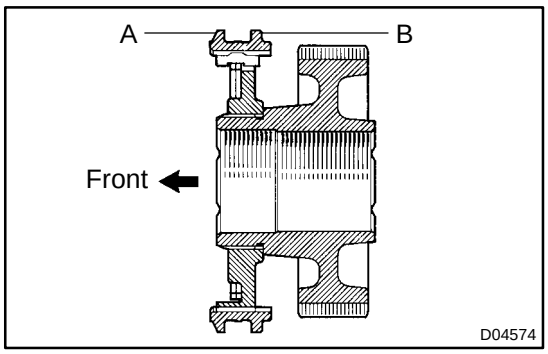

D04612

(c) Install the center differential planetary gear assembly to the rear output shaft.


D04606

2. INSTALL SYNCHRONIZER INNER RING, SYNCHRONIZER CENTER RING AND SYNCHRONIZER OUTER RING TO CENTER DIFFERENTIAL PLANETARY GEAR ASSEMBLY

NOTICE:
Be sure that the synchronizer center ring claw matches the cut-out portion of the planetary gear.

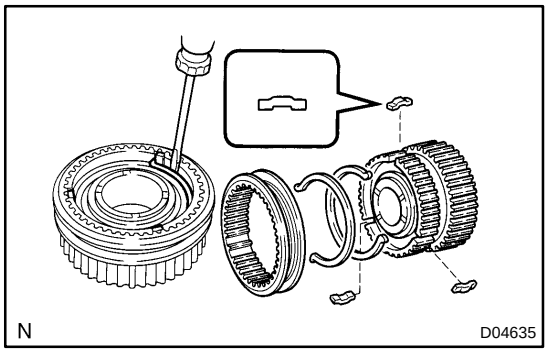


3. ASSEMBLE FRONT DRIVE CLUTCH SLEEVE

(a) Install the front drive clutch sleeve to the drive sprocket.

NOTICE:

The direction of the front drive clutch sleeve can be distinguished by the difference in the shape of the external surface areas "A" and "B".



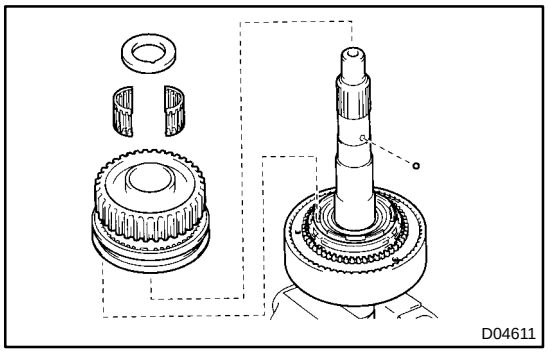
(b) Install the 3 shifting keys and fix them with the 2 shifting key springs.

NOTICE:

Position the key springs so that their end gaps are not aligned.

HINT:

There is no specific direction for the shifting key.

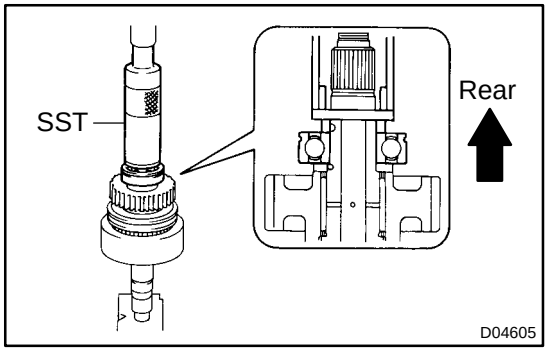


4. INSTALL DRIVE SPROCKET AND FRONT DRIVE CLUTCH SLEEVE ASSEMBLY

Install the needle roller bearing, drive sprocket and front drive clutch sleeve assembly, output shaft spacer ball and No. 1 spacer.

NOTICE:

- **Be sure that the slot of the synchronizer inner ring matches the protrusion of the drive sprocket.**
- **Align the synchronizer ring slots with the shifting keys.**



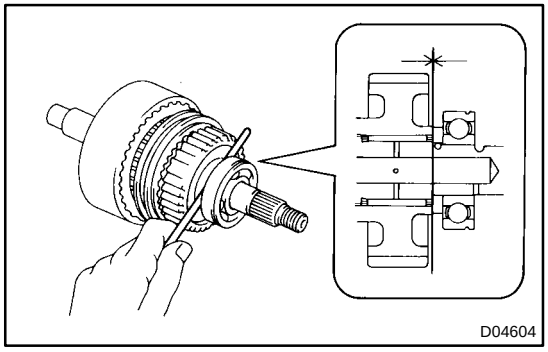
5. INSTALL OUTPUT SHAFT RADIAL BALL BEARING

Using SST and a press, install a new output shaft radial ball bearing.

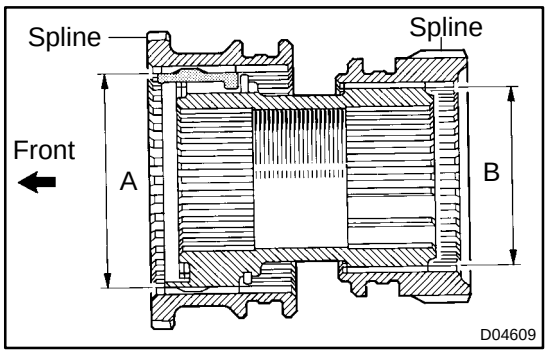
SST 09316-6001 1 (09316-00011, 09316-00071)

NOTICE:

Install the output shaft radial ball bearing so that the bearing snap ring groove faces to the rear.



6. INSPECT DRIVE SPROCKET THRUST CLEARANCE (See page TR-31)

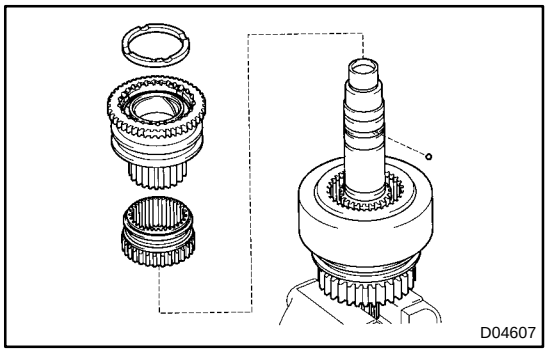


7. ASSEMBLE CLUTCH HUB

Install the high and low clutch sleeve and center differential lock sleeve to the clutch hub.

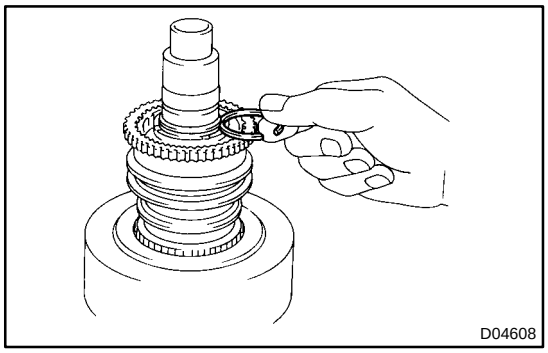
NOTICE:

- **The direction of the clutch hub can be distinguished by size of outer diameters "A" and "B" of the boss.**
- **The direction of the high and low clutch sleeve can be distinguished by width of the spline.**



8. INSTALL CLUTCH HUB ASSEMBLY

(a) Install the clutch hub assembly, input gear stopper ball and No. 2 spacer to the rear output shaft.



(b) Select a snap ring so that the clearance between the clutch hub and snap ring will be less than 0.15 mm (0.0059 in.).

Mark	Thickness mm (in.)
K	2.00 - 2.05 (0.0787 - 0.0807)
L	2.05 - 2.10 (0.0807 - 0.0827)
A	2.10 - 2.15 (0.0827 - 0.0846)
B	2.15 - 2.20 (0.0846 - 0.0866)
C	2.20 - 2.25 (0.0866 - 0.0886)
D	2.25 - 2.30 (0.0886 - 0.0906)
E	2.30 - 2.35 (0.0906 - 0.0925)
F	2.35 - 2.40 (0.0925 - 0.0945)
G	2.40 - 2.45 (0.0945 - 0.0965)
H	2.45 - 2.50 (0.0965 - 0.0984)
J	2.50 - 2.55 (0.0984 - 0.1004)

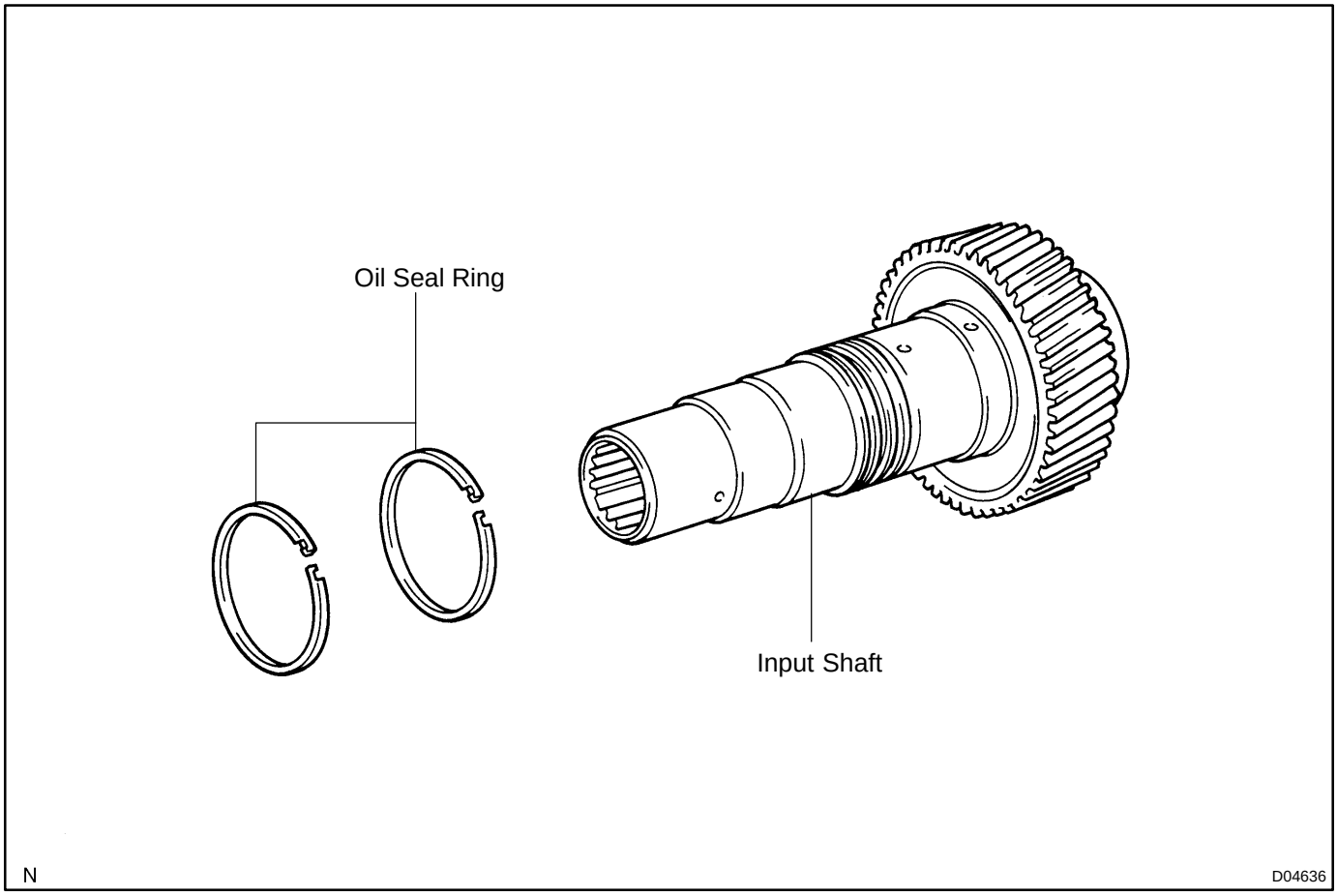
(c) Using a snap ring expander, install a new clutch hub snap ring.

9. INSPECT DRIVE SPROCKET RADIAL CLEARANCE
(See page TR-31)

INPUT SHAFT

COMPONENTS

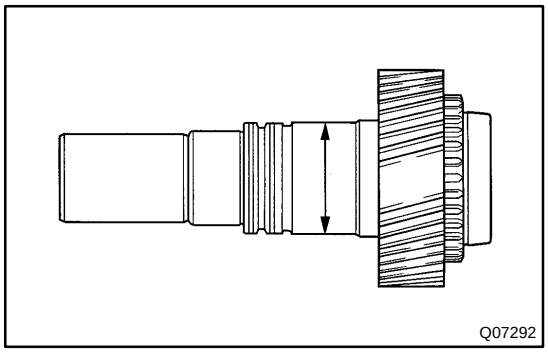
TR00L-04



TR087-01

INSPECTION

1. REMOVE 2 OIL SEAL RINGS

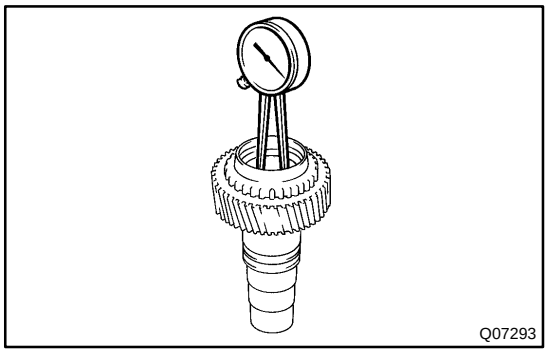


2. INSPECT INPUT SHAFT

(a) Using a micrometer, measure the outer diameter of the input shaft journal surface.

Minimum diameter: 47.59 mm (1.8736 in.)

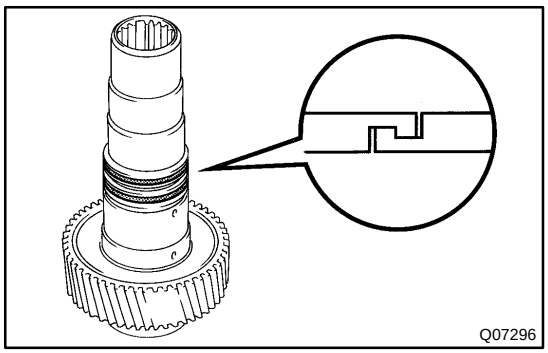
If the outer diameter is less than the minimum, replace the input shaft.



(b) Using a dial indicator, measure the inside diameter of the input shaft bushing.

Maximum diameter: 39.14 mm (1.5409 in.)

If the inside diameter exceeds the maximum, replace the input shaft.



3. INSTALL 2 OIL SEAL RINGS

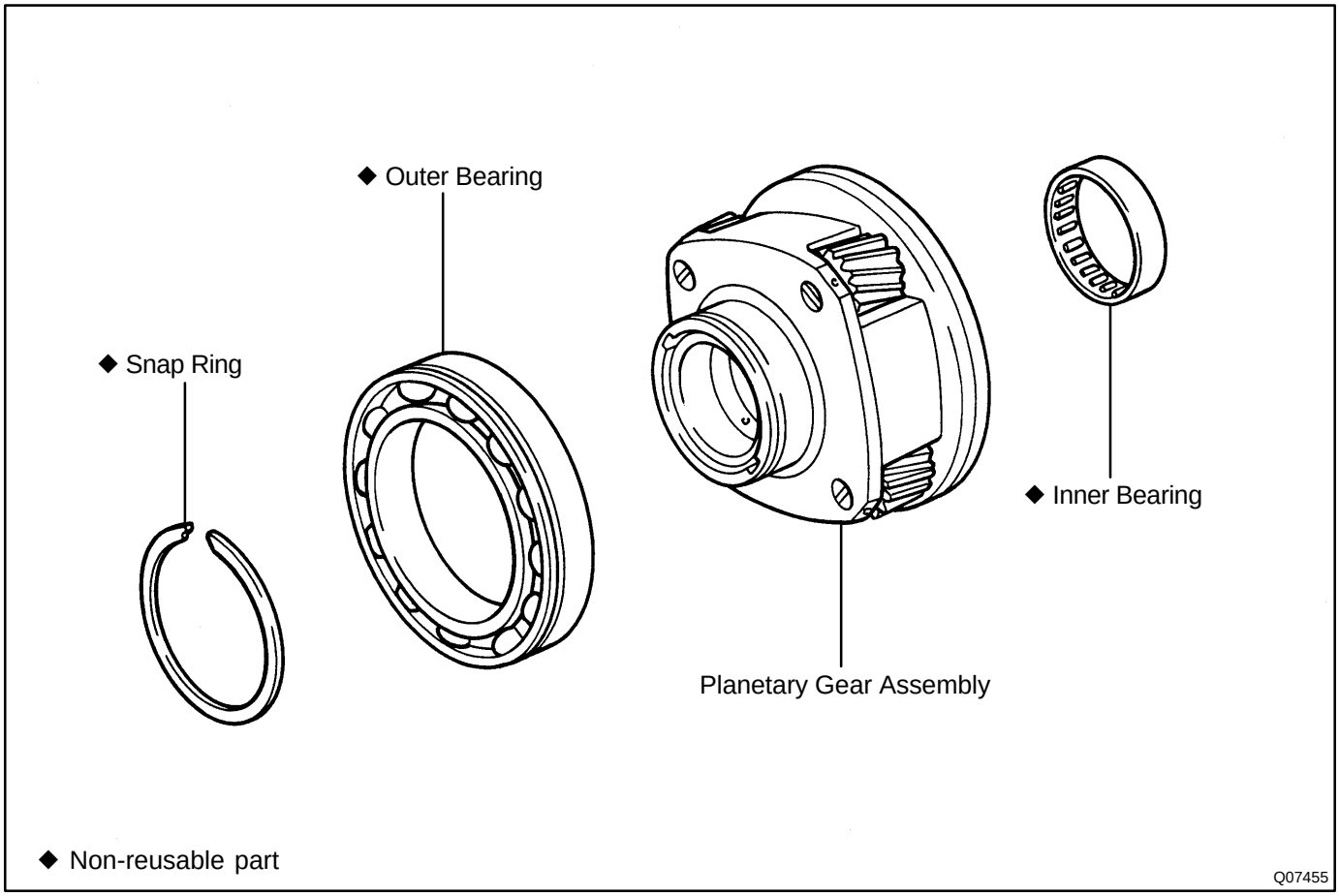
HINT:

- Apply gear oil to the oil seal ring.
- Hang securely to eliminate clearance.

PLANETARY GEAR

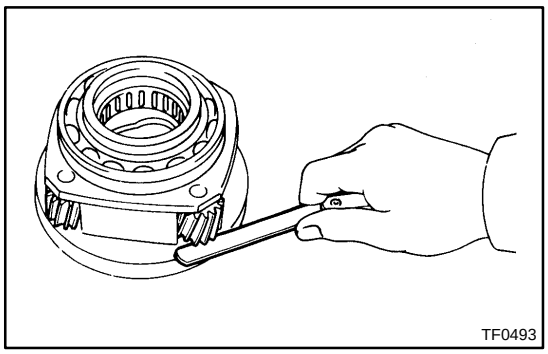
COMPONENTS

TR00N-04



TR00O-04

INSPECTION

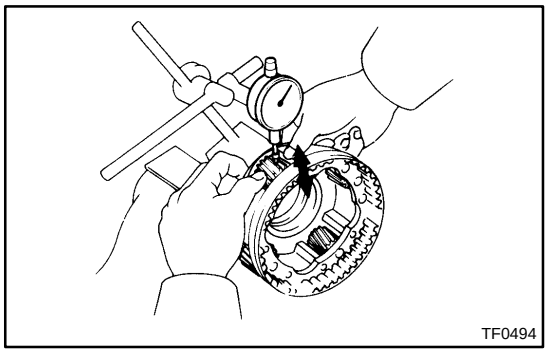

TF0493

1. INSPECT PINION GEAR THRUST CLEARANCE

Using a feeler gauge, measure the thrust clearance of the planetary pinion gear.

Standard clearance:
0.11 - 0.84 mm (0.0043 - 0.0331 in.)
Maximum clearance:
0.84 mm (0.0331 in.)

If the clearance exceeds the maximum, replace the planetary gear assembly.

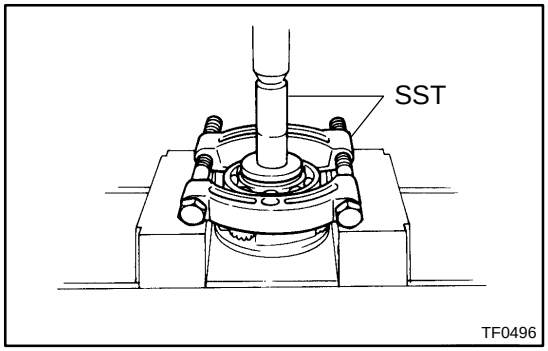

TF0494

2. INSPECT PLANETARY PINION GEAR RADIAL CLEARANCE

Using a dial indicator, measure the radial clearance of the planetary pinion gear.

Standard clearance:
0.009 - 0.038 mm (0.0004 - 0.0015 in.)
Maximum clearance:
0.038 mm (0.0015 in.)

If the clearance exceeds the maximum, replace the planetary gear assembly.

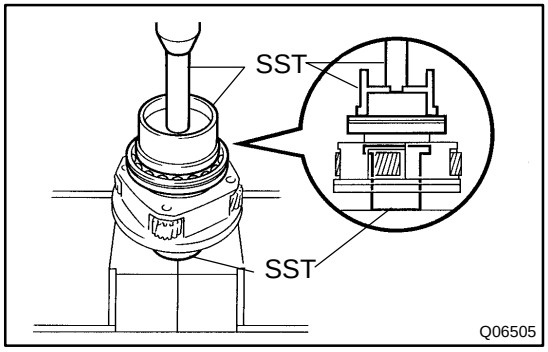


TF0496

3. IF NECESSARY, REPLACE PLANETARY GEAR OUTER BEARING

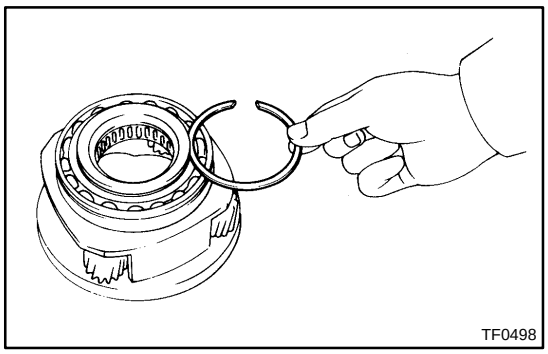
(a) Using a snap ring expander, remove the snap ring.

(b) Using SST and a press, remove the bearing.
SST 09554-3001 1, 09555-55010



Q06505

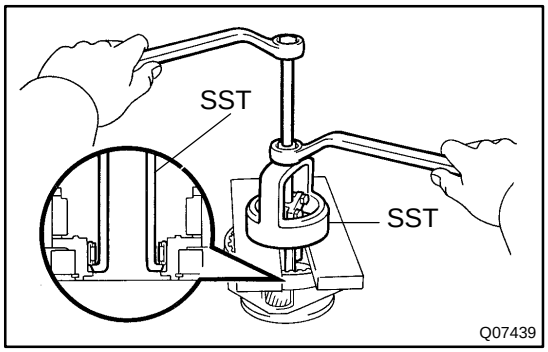
(c) Using SST and a press, install a new bearing with the groove facing forward.
SST 09223- 15020, 09515- 30010, 09950- 70010 (09951-07100)



(d) Select a snap ring that allows the minimum axial play.

Mark	Thickness mm (in.)
1	1.45 - 1.50 (0.0571 - 0.0591)
2	1.50 - 1.55 (0.0591 - 0.0610)
3	1.55 - 1.60 (0.0610 - 0.0630)
4	1.60 - 1.65 (0.0630 - 0.0650)
5	1.65 - 1.70 (0.0650 - 0.0669)

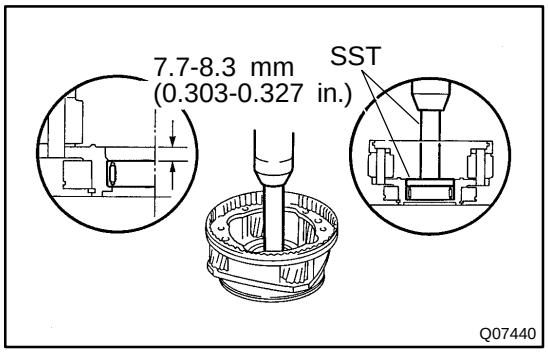
(e) Using a snap ring expander, install a new snap ring.



4. IF NECESSARY, REPLACE PLANETARY GEAR INNER BEARING

(a) Using SST, remove the bearing.
SST 09612-65014 (09612-01030, 09612-01050)

NOTICE:
Hang SST securely to the clearance between the inner bearing and planetary gear.

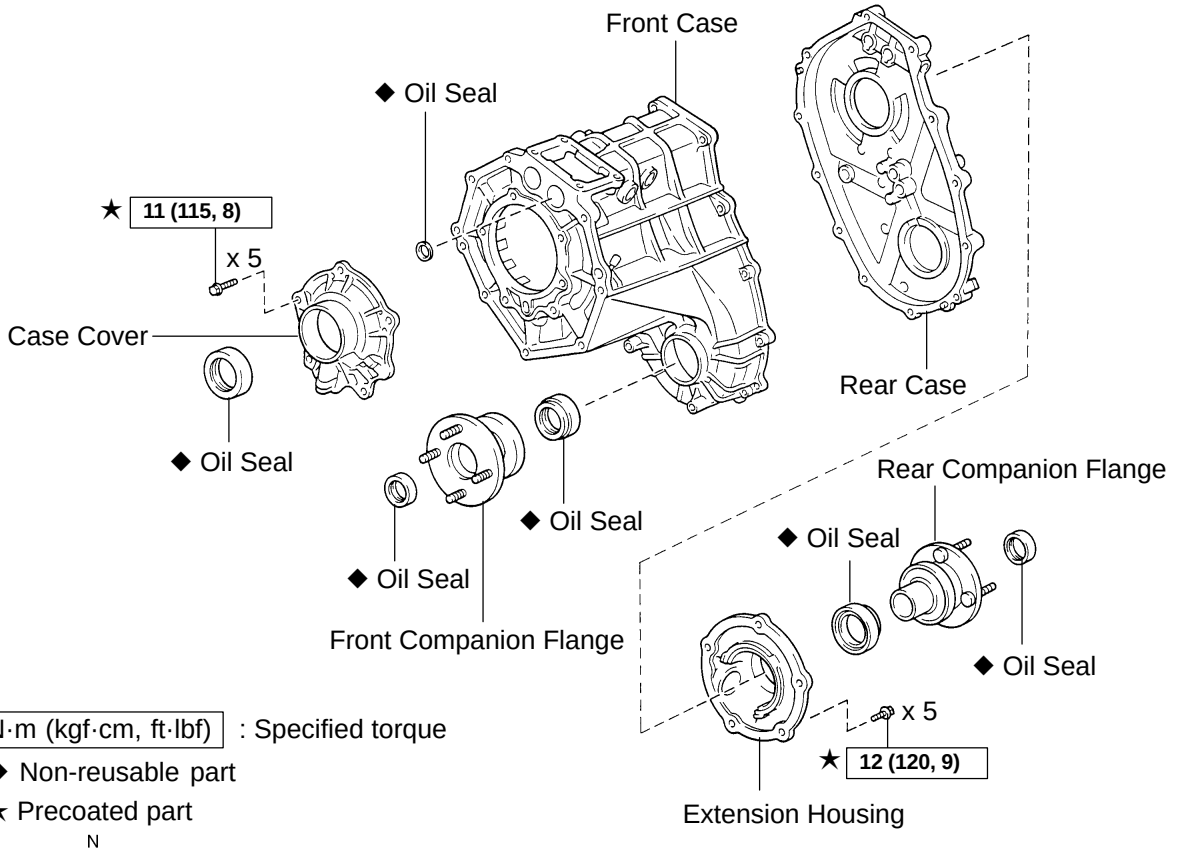


(b) Using SST and a press, install a new bearing.
SST 09950- 60010 (09951- 00570), 09950- 70010 (09951-07100)
Bearing press in depth: 7.7 - 8.3 mm (0.303 - 0.327 in.)

OIL SEAL

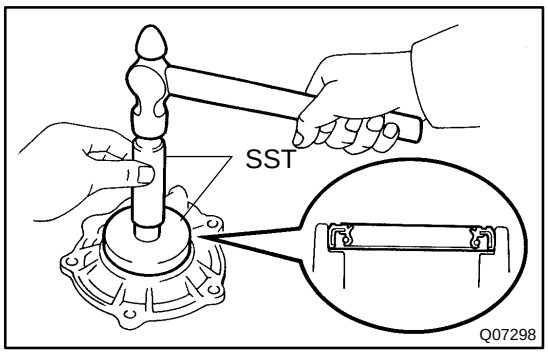
COMPONENTS

TR00P-07



TR088-02

REPLACEMENT

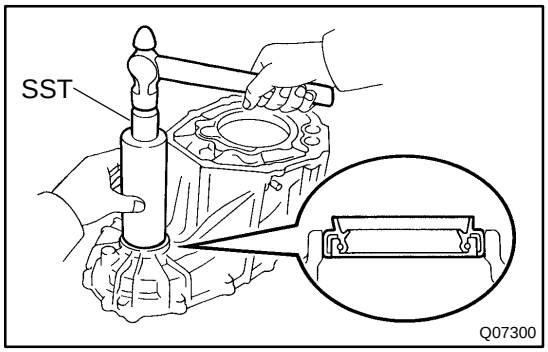


1. IF NECESSARY, REPLACE CASE COVER OIL SEAL

(a) Using a screwdriver and hammer, remove the oil seal from the case cover.

(b) Using SST and a hammer, drive in a new oil seal until its surface is flush with the case upper surface.
SST 09950- 60010 (09951- 00590), 09950- 70010 (09951-07100)

(c) Coat the lip of the oil seal with MP grease.

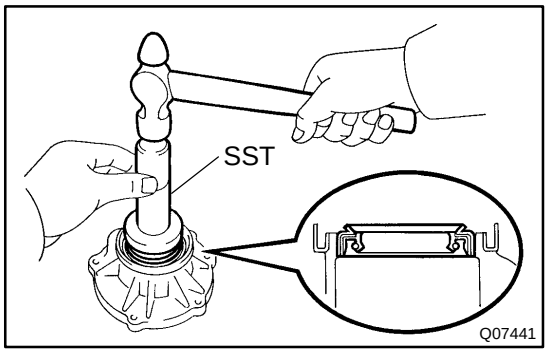


2. IF NECESSARY, REPLACE FRONT CASE OIL SEAL

(a) Using a screwdriver and hammer, remove the oil seal from the front case.

(b) Using SST and a hammer, drive in a new oil seal until its surface is flush with the case upper surface.
SST 09316-6001 1 (09316-00011)

(c) Coat the lip of the oil seal with MP grease.

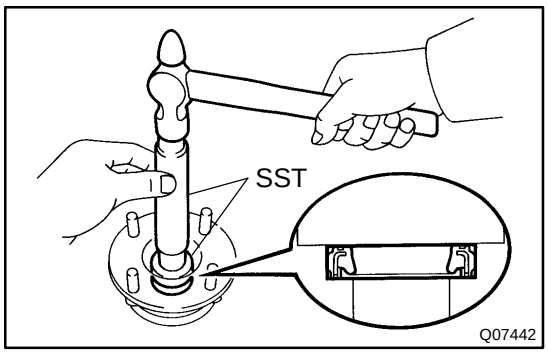


3. IF NECESSARY, REPLACE EXTENSION HOUSING OIL SEAL

(a) Using a screwdriver and hammer, remove the oil seal from the extension housing.

(b) Using SST and a hammer, drive in a new oil seal until its surface is flush with the housing upper surface.
SST 09554-22010

(c) Coat the lip of the oil seal with MP grease.

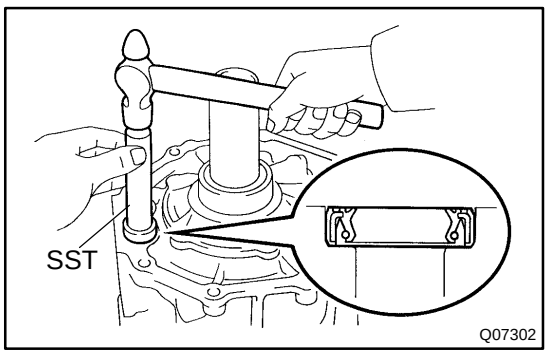


4. IF NECESSARY, REPLACE FRONT AND REAR COMPANION FLANGE OIL SEALS

(a) Using a screwdriver and hammer, remove the 2 oil seals from the front and rear companion flanges.

(b) Using SST and a hammer, drive in 2 new oil seals.
SST 09950-60010 (09951-00220, 09951-00350, 09952-06010), 09950-70010 (09951-07100)

(c) Coat the lip of the oil seal with MP grease.



5. IF NECESSARY, REPLACE SHIFT FORK SHAFT OIL SEAL

(a) Using a screwdriver, remove the oil seal from the front case.

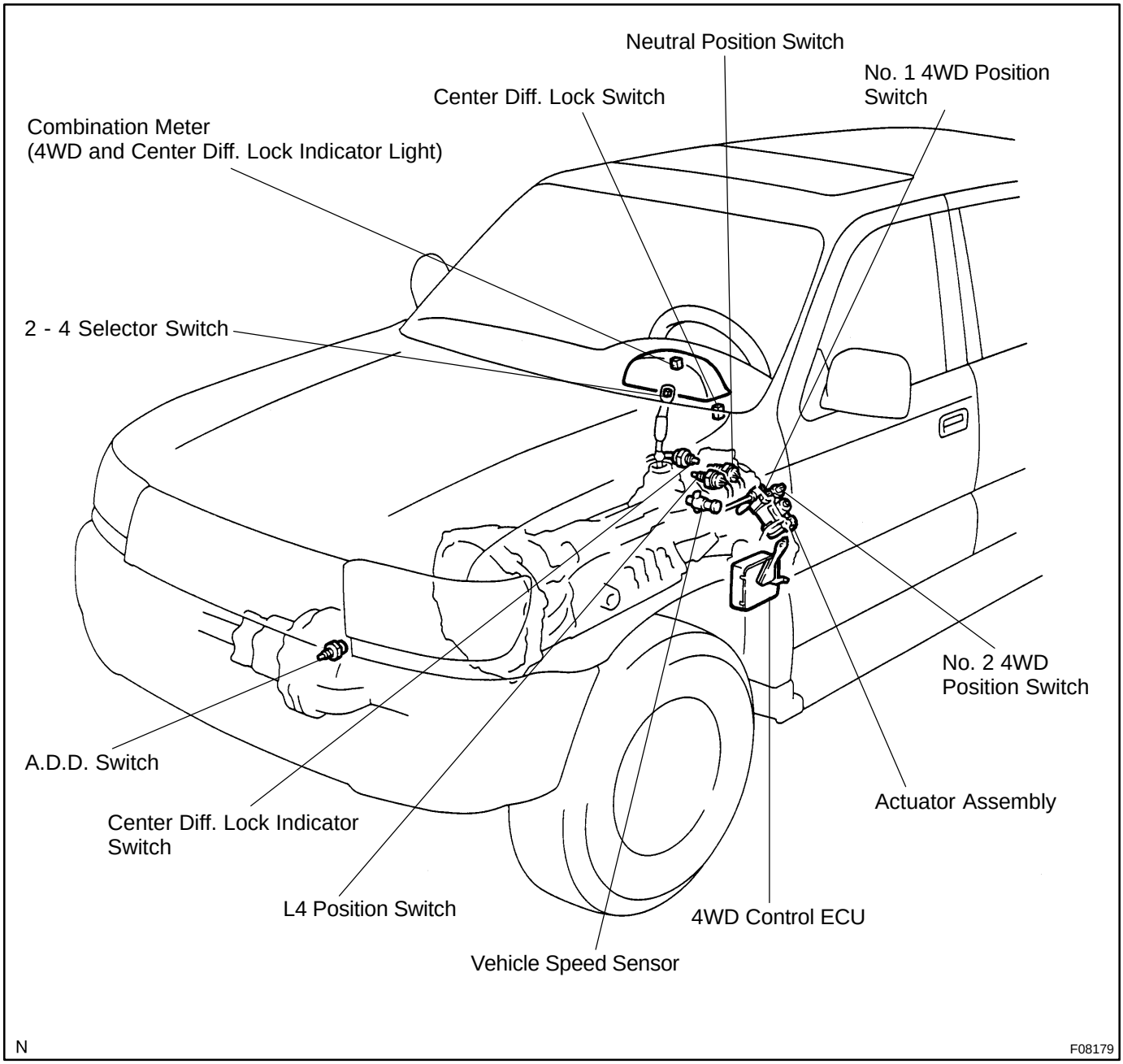
(b) Using SST and a hammer, drive in a new oil seal.
SST 09304-12012
Oil seal drive in depth:
-0.5 - 0.5 mm (-0.020 - 0.020 in.)

(c) Coat the lip of the oil seal with MP grease.

ONE TOUCH 2-4 SELECTOR SYSTEM

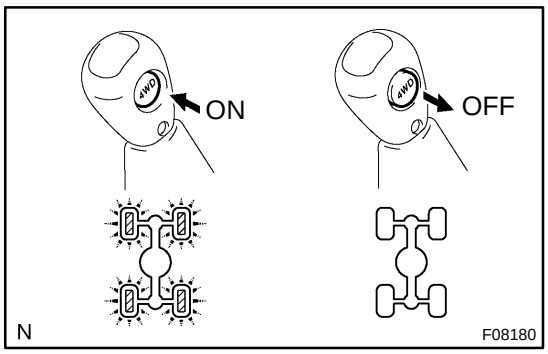
TR00R-05

LOCATION



TR0CF-01

INSPECTION



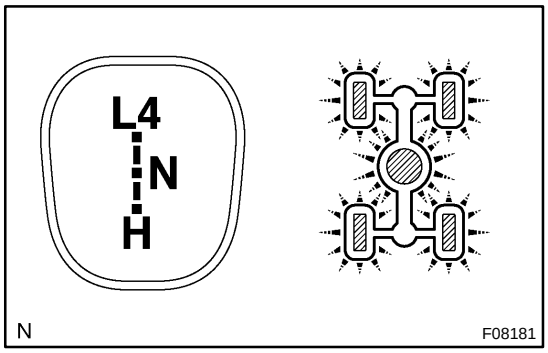
1. INSPECT H (2WD) ↔ H (4WD and Center diff. lock "FREE") SHIFT

(a) Start the engine, and shift the transfer shift lever to the "H" position.

(b) Check that the 4WD indicator light comes on when the 2-4 selector switch is in "ON" position. Check that the light goes off when the switch is in "OFF" position.

HINT:

- If the light does not light up, even though the switch has been turned ON, the vehicle should be moved back and forth.
- If switching is not completed after 3 seconds of shift operation, the 4WD indicator light and center diff. lock indicator light flash.



2. INSPECT H (2WD) • (4WD and Center diff. lock "FREE") ↔ L4 (Center diff. lock "LOCK") SHIFT

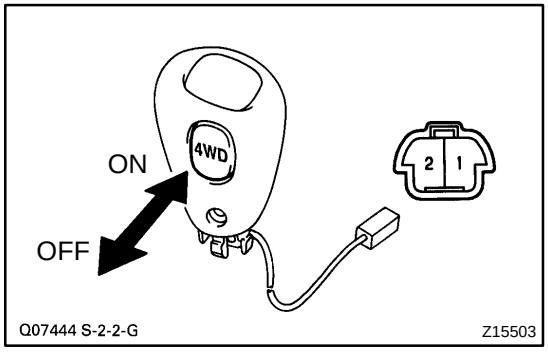
(a) Start the engine, and the 2-4 selector switch turns to "OFF".

(b) Check that the 4WD indicator light or center diff. lock indicator light comes on when the transfer shift lever is shifted to the "L4" position, and the center diff. lock switch is in "ON" position.

(c) Check that the light goes off when the transfer shift lever is shifted to the "H" position.

HINT:

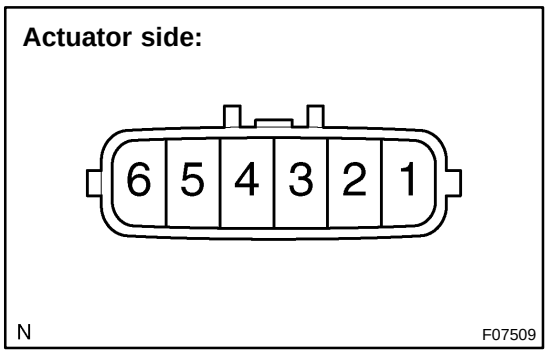
- Inspection should be performed with the vehicle stopped, and transmission shift lever in "N" position.
- If switching is not completed after 3 seconds of shift operation, the 4WD indicator light and center diff. lock indicator light flash.



3. INSPECT 2-4 SELECTOR SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	1 - 2	No continuity
ON	1 - 2	Continuity

If continuity is not as specified, replace the shift lever knob.

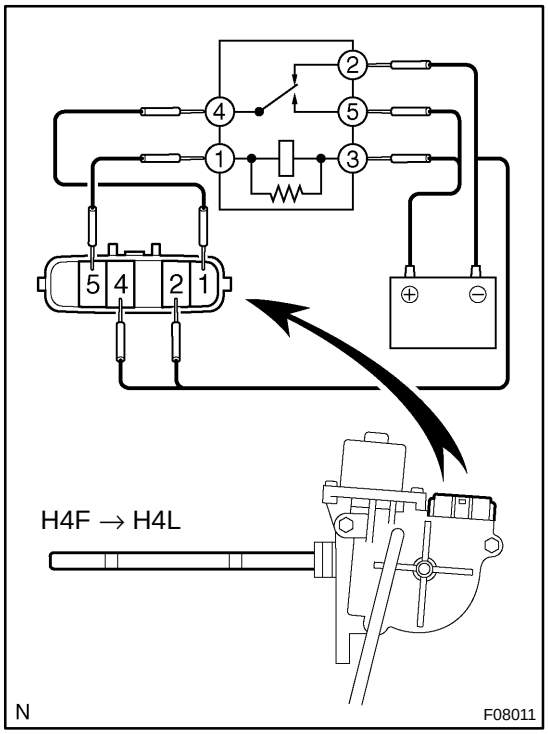


4. INSPECT ACTUATOR RESISTANCE

(a) Using an ohmmeter, measure the resistance between terminals 1 and 2.
Standard resistance: 0.3 - 100 Ω

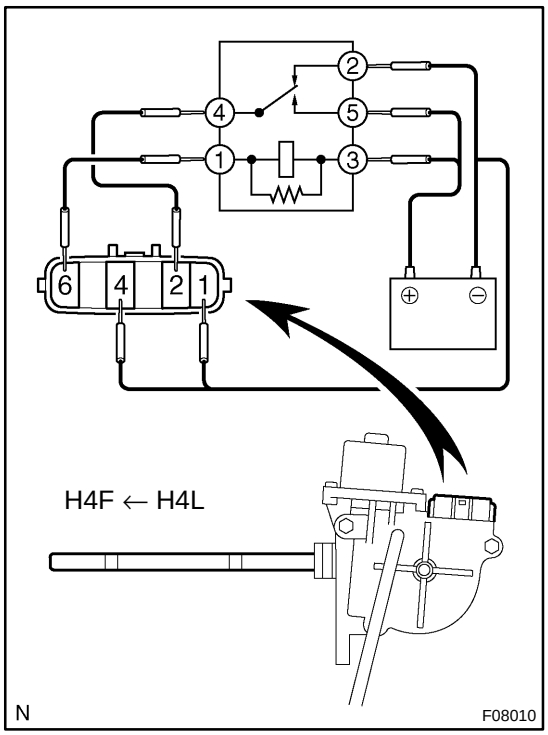
(b) Using an ohmmeter, measure the resistance between terminals 1 or 2 and body ground.
Standard resistance: More than 0.5 MΩ

If resistance value is not as specified, replace the actuator assembly.

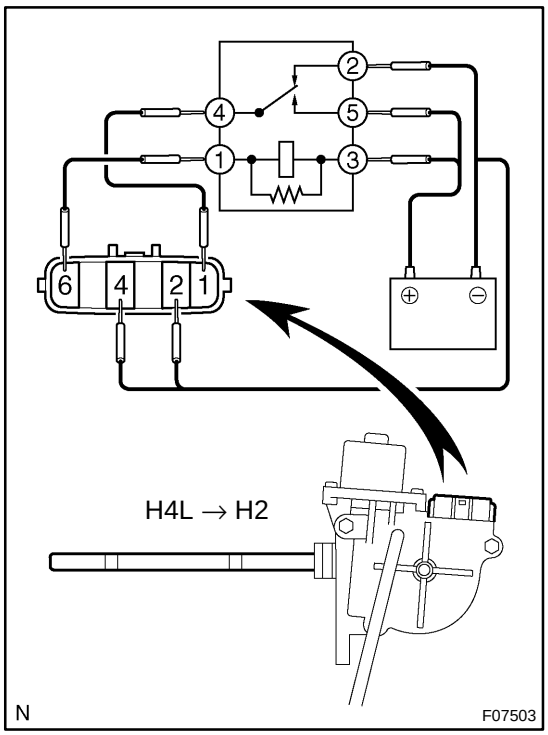


5. INSPECT ACTUATOR OPERATION

(a) H4F (4WD and Center diff. lock "FREE") → H4L (4WD and Center diff. lock "LOCK") shift:
Connect lines via a relay as shown in the illustration, then check that the actuator fork shaft moves to H4F (4WD and Center diff. lock "FREE") → H4L (4WD and Center diff. lock "LOCK") position.

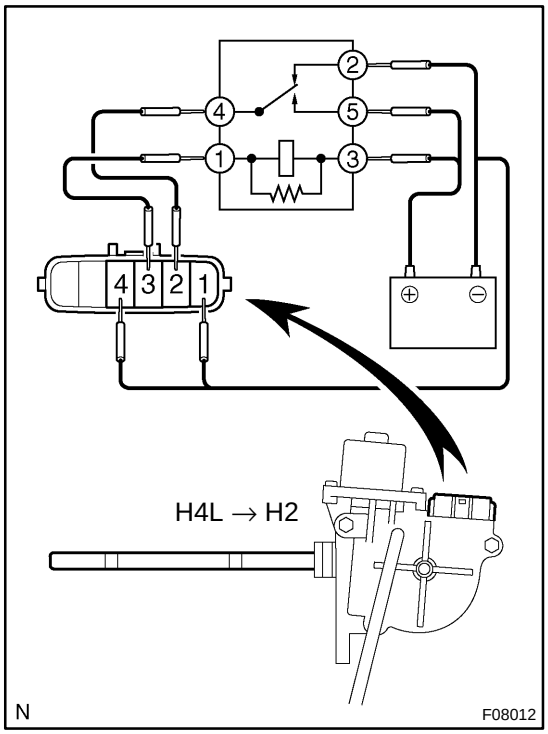


(b) H4L (4WD and Center diff. lock "LOCK") → H4F (4WD and Center diff. lock "FREE") shift:
Connect lines via a relay as shown in the illustration, then check that the actuator fork shaft moves to H4L (4WD and Center diff. lock "LOCK") → H4F (4WD and Center diff. lock "FREE") position.



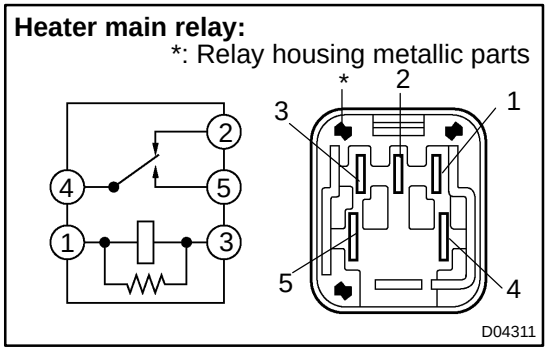
(c) H4L (4WD and Center diff. lock "LOCK") → H2 (2WD) shift:

Connect lines via a relay as shown in the illustration, then check that the actuator fork shaft moves to H4L (4WD and Center diff. lock "LOCK") → H2 (2WD) position.



(d) H2 (2WD) → H4L (4WD and Center diff. lock "LOCK") shift:

Connect lines via a relay as shown in the illustration, then check that the actuator fork shaft moves to H2 (2WD) → H4L (4WD and Center diff. lock "LOCK") position.

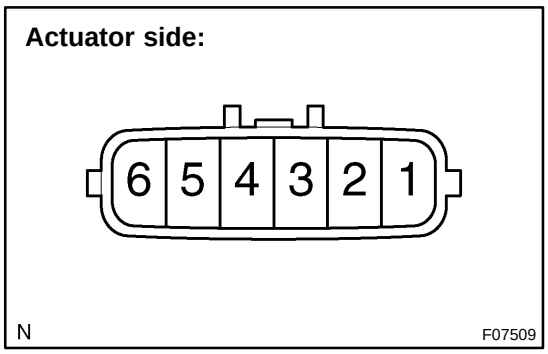


HINT:

When inspecting the operation described above, use a heater main relay.

NOTICE:

Connect the terminals being careful not to touch the neighboring terminals or metallic parts of relay housing.



6. INSPECT LIMIT SWITCH CONTINUITY

(a) Start the engine and raise the vehicle.

(b) With the actuator connector connected, shift the transfer shift lever and after checking the operating sound, disconnect the connector and inspect the continuity between each terminal.

HINT:

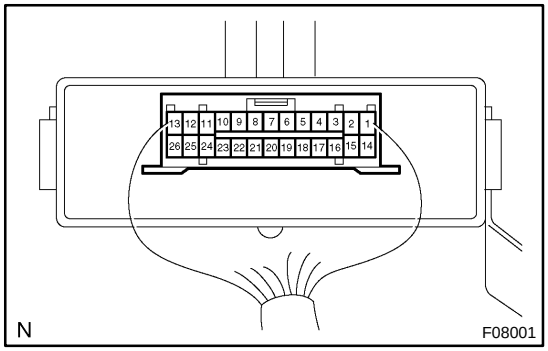
When shifting the actuator fork shaft, connect the connectors.

Shift position	Tester connection	Specified condition
H (2WD)	3-4	No continuity
	3-5	No continuity
	3-6	No continuity
	4-5	Continuity
	4-6	No continuity
	5-6	No continuity
H (4WD)	3-4	No continuity
	3-5	No continuity
	3-6	No continuity
	4-5	No continuity
	4-6	Continuity
	5-6	No continuity
L4	3-4	Continuity
	3-5	No continuity
	3-6	No continuity
	4-5	No continuity
	4-6	No continuity
	5-6	No continuity

7. INSPECT VEHICLE SPEED SENSOR (See page BE-45)

8. INSPECT 4WD INDICATOR LIGHT

Check the combination meter (See page BE-45).



9. INSPECT 4WD CONTROL ECU

Connect the wire harness side connector to the 4WD control ECU and inspect wire harness side connector from the back side, as shown.

STANDARD VALUE OF ECU TERMINAL

Terminals (Symbols)	Condition	STD Voltage (V)
3 (SPD) - 25 (GND)	During driving	Pulse generation
4 (2-4) - 25 (GND)	• Ignition switch ON • Touch select 2-4 switch OFF → ON	10 - 14 → 2 or less
2 (N) - 25 (GND)	• Ignition switch ON • Transfer shift lever other positions → Transfer shift lever N position	10 - 14 → 2 or less
6 (4WD) - 25 (GND)	• Ignition switch ON • Touch select 2-4 switch OFF → ON	10 - 14 → 2 or less
7 (DL) - 25 (GND)	• Ignition switch ON • Touch select center diff. lock switch is in "OFF" position → "ON" position	10 - 14 → 2 or less
8 (TL3) - 25 (GND)	• Ignition switch ON, touch select 2-4 switch OFF • H (2WD (Transfer shift lever "H" position)) → L4 (4WD (Transfer shift lever "L4" position)) and center diff. lock switch is in "OFF" position → "ON" position	2 or less → 10 - 14
9 (TL1) - 25 (GND)	• Ignition switch ON, touch select 2-4 switch ON • Center diff. lock switch is in "OFF" position → "ON" position	2 or less → 10 - 14
10 (DL1) - 25 (GND)	• Ignition switch ON • A.D.D. FREE → LOCK	2 or less → 10 - 14
11 (DM1) - 24 (DM2)	• Ignition switch ON • A.D.D. LOCK	10 - 14 (for about 5 seconds) then less than 0.5
	• Ignition switch ON • A.D.D. FREE	
12 (IG) - 25 (GND)	Ignition switch ON	10 - 14
13 (TM1) - 26 (TM2)	• Ignition switch ON • Touch select 2-4 switch OFF	10 - 14 (for about 5 seconds) then less than 0.5
	• Ignition switch ON • Touch select 2-4 switch ON	
5 (L4) - 25 (GND)	• Ignition switch ON, touch select 2-4 switch ON • Transfer shift lever "H" position → Transfer shift lever "L4" position	10 - 14 → 2 or less
19 (ADD) - 25 (GND)	• Ignition switch ON • A.D.D. LOCK	10 - 14 → 2 or less
20 (IND2) - 25 (GND)	• Ignition switch ON • Transfer shift lever "L4" position and center diff. lock switch is in "ON" position	1.5 - 3.5
21 (IND1) - 25 (GND)	• Ignition switch ON • Touch select 2-4 switch ON	1.5 - 3.5
22 (TL2) - 25 (GND)	• Ignition switch ON, touch select 2-4 switch ON and center diff. lock switch is in "ON" position • H (4WD (touch select 2-4 switch ON)) → H (2WD (touch select 2-4 switch OFF))	2 or less → 10 - 14
23 (DL2) - 25 (GND)	• Ignition switch ON • A.D.D. LOCK → FREE	2 or less → 10 - 14
25 (GND) - Body ground	Ignition switch OFF	Continuity

TROUBLESHOOTING (2WD)

PR013-03

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	8. Sleeve yoke spline (Worn)	PR-5
	9. Spider bearing (Worn or stuck)	PR-12
Vibration	1. Sleeve yoke spline (Stuck)	PR-5
	2. Propeller shaft (Runout)	PR-5
	3. Propeller shaft (Imbalance)	PR-5

TROUBLESHOOTING (4WD)

PR014-03

PROBLEM SYMPTOMS TABLE

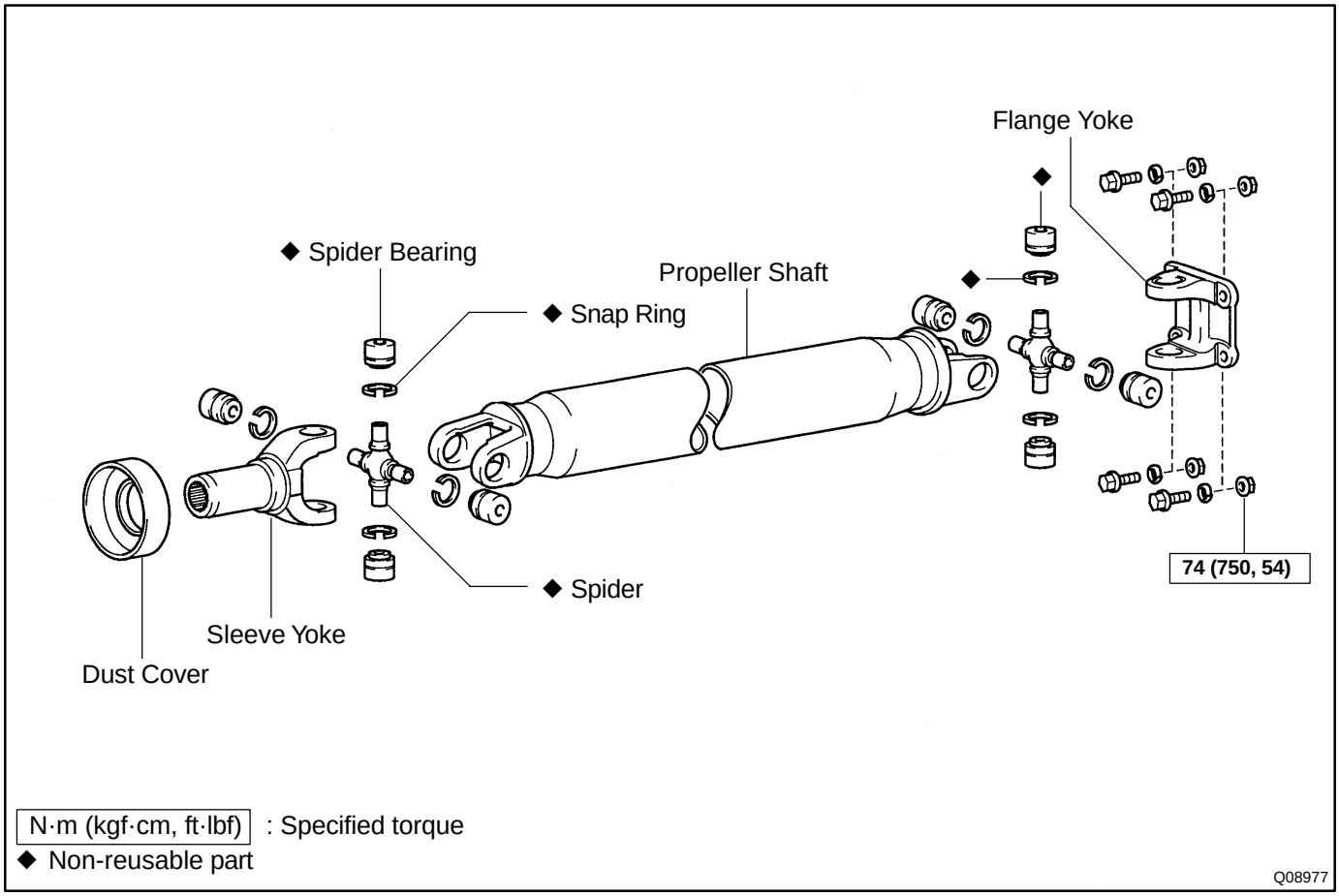
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Noise	1. Sleeve yoke spline (Worn) 2. Spider bearing (Worn or stuck)	PR-9 PR-12
Vibration	1. Sleeve yoke spline (Stuck) 2. Propeller shaft (Runout) 3. Propeller shaft (Imbalance)	PR-9 PR-9 PR-9

PROPELLER SHAFT ASSEMBLY(2WD)

PR015-01

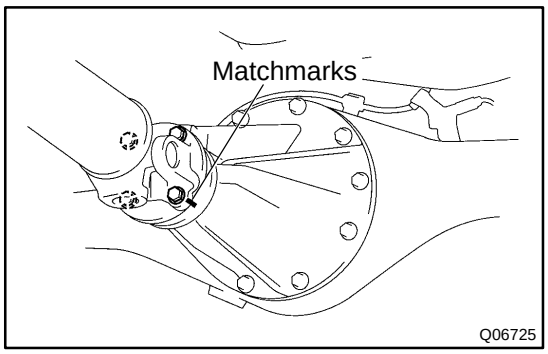
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Q08977

PR016-01



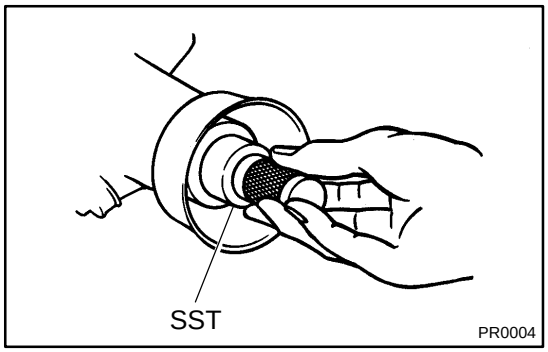
REMOVAL

REMOVE PROPELLER SHAFT

(a) Place matchmarks on the propeller shaft and differential flange.

(b) Remove the 4 nuts, bolts and washers.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

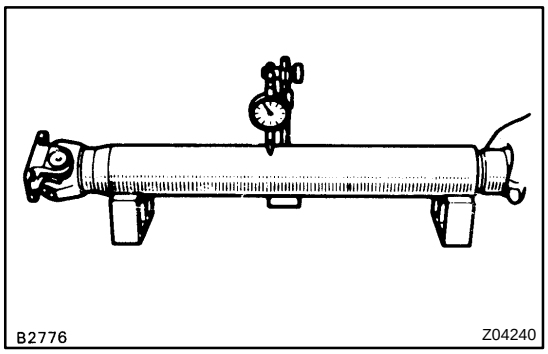
(c) Pull the yoke from the transmission.



(d) Insert SST in the transmission to prevent oil leakage.
SST 09325-20010

PR017-02

INSPECTION

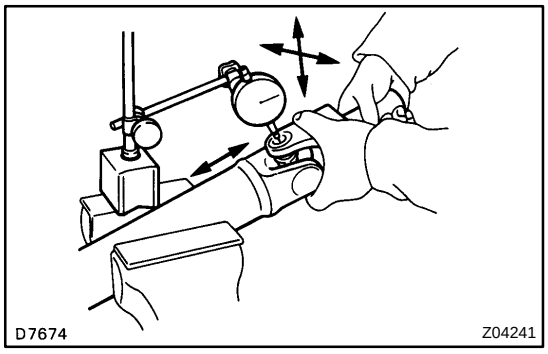


1. INSPECT PROPELLER SHAFT AND INTERMEDIATE SHAFTS FOR DAMAGE OR RUNOUT

Using a dial indicator, check the runout of shafts.

Maximum runout: 0.8 mm (0.031 in.)

If the shaft runout exceeds the maximum, replace the shaft.



2. INSPECT SPIDER BEARINGS

NOTICE:

Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

(a) Inspect the spider bearings for wear or damage.

(b) Using a dial indicator, check the spider bearing axial play by turning the yoke with holding the shaft tightly.

Bearing axial play: Maximum 0.05 mm (0.0020 in.)

If the bearing axial play exceeds the maximum, replace the spider bearing.

PR018-01

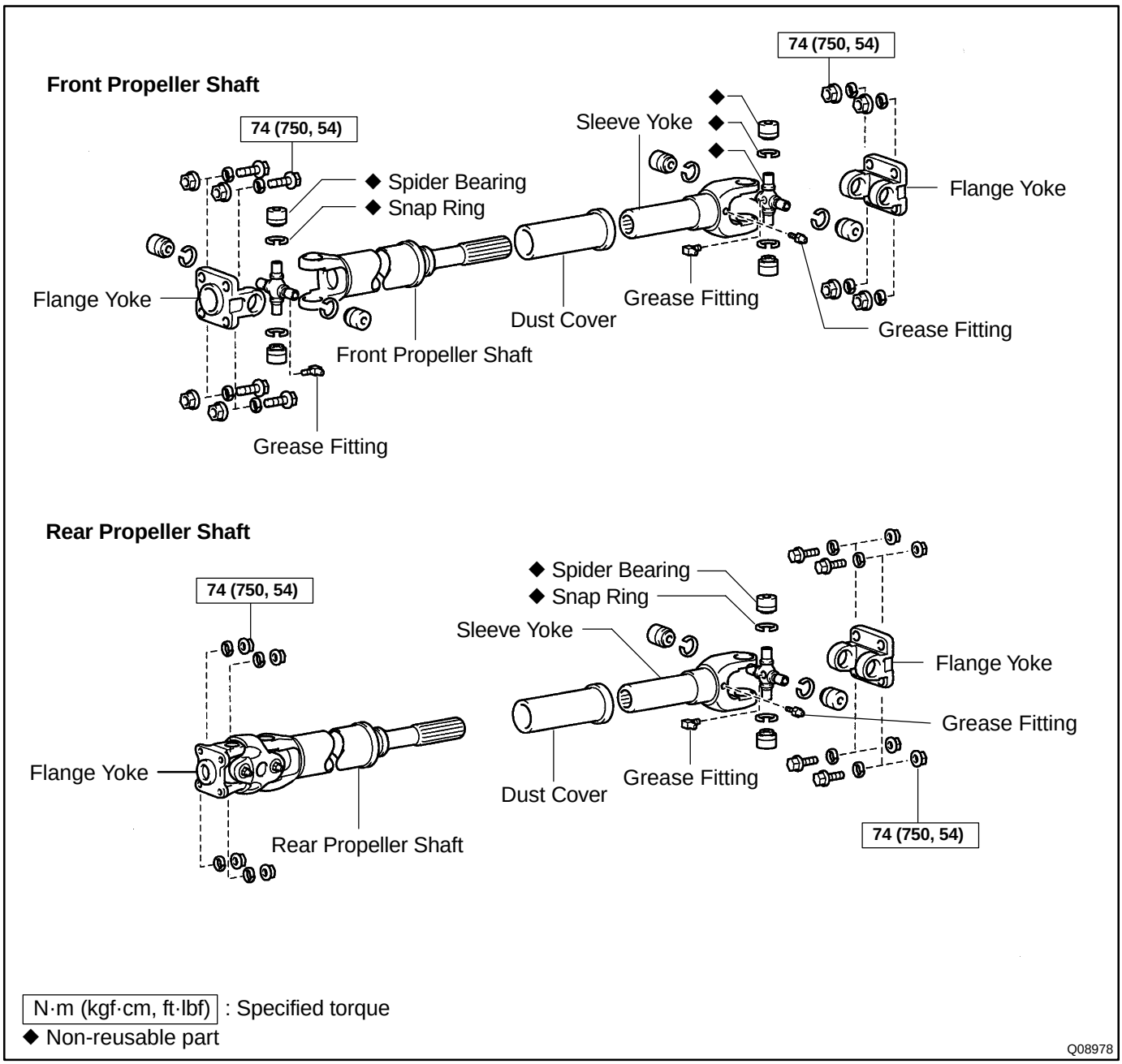
INSTALLATION

Installation is in the reverse order of removal (See page PR-4).

PROPELLER SHAFT ASSEMBLY(4WD)

COMPONENTS

PR019-01

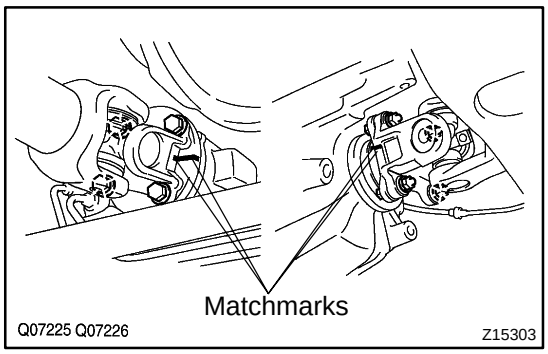


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Q08978

PR01A-02

REMOVAL



1. REMOVE FRONT PROPELLER SHAFT

(a) Place matchmarks on the propeller shaft and front differential flanges.

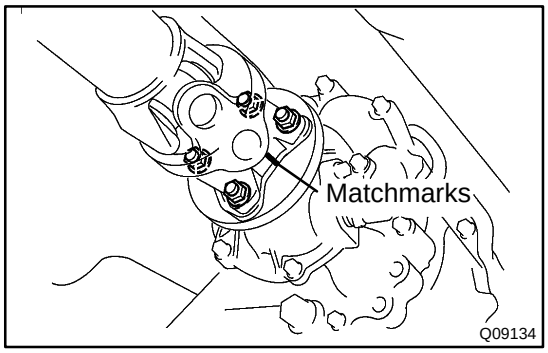
(b) Remove the 4 nuts, bolts and washers.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

(c) Suspend the front side of the propeller shaft.

(d) Place matchmarks on the propeller shaft and transfer flanges.

(e) Remove the 4 nuts and washers.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

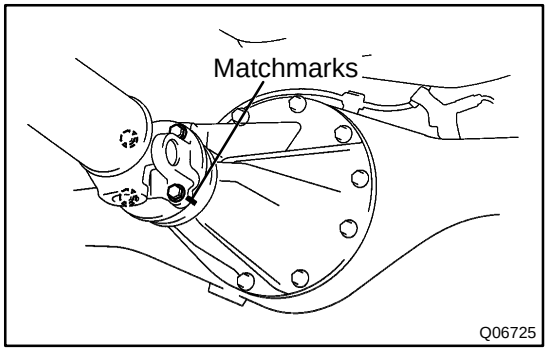
(f) Remove the front propeller shaft.



2. REMOVE REAR PROPELLER SHAFT

(a) Place matchmarks on the propeller shaft and transfer flanges.

(b) Remove the 4 nuts and washers.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)



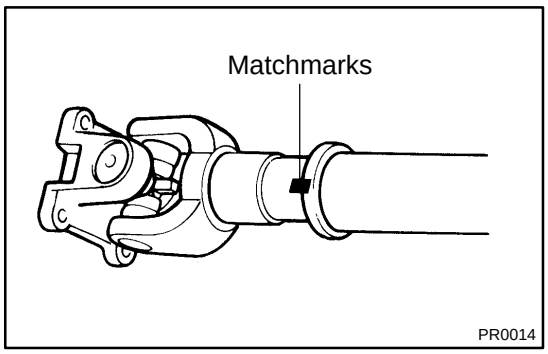
(c) Place matchmarks on the propeller shaft and rear differential flanges.

(d) Remove the 4 nuts, bolts and washers.
Torque: 74 N·m (750 kgf·cm, 54 ft·lbf)

(e) Remove the rear propeller shaft.

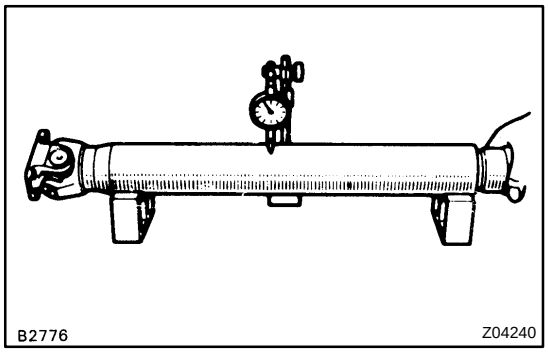
PR01B-02

INSPECTION



1. REMOVE SLEEVE YOKE FROM PROPELLER SHAFT

(a) Place matchmarks on the sleeve yoke and shaft.
(b) Pull out the sleeve yoke from the shaft.
(c) Remove the dust cover from the shaft.

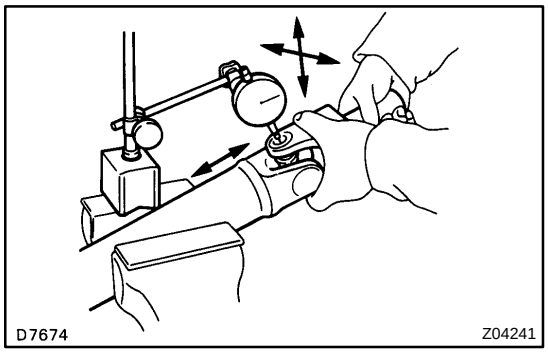


2. INSPECT PROPELLER SHAFT AND INTERMEDIATE SHAFTS FOR DAMAGE OR RUNOUT

Using a dial indicator, check the runout of shafts.

Maximum runout: 0.8 mm (0.031 in.)

If the shaft runout exceeds the maximum, replace the shaft.



3. INSPECT SPIDER BEARINGS

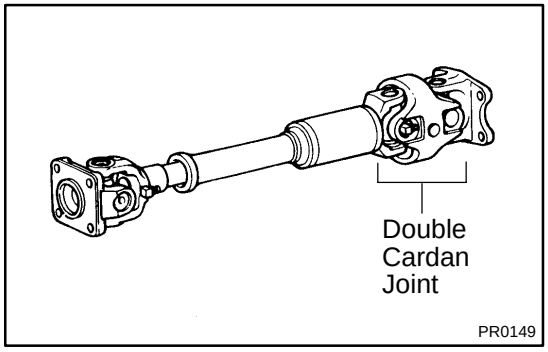
NOTICE:

Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

(a) Inspect the spider bearings for wear or damage.
(b) Using a dial indicator, check the spider bearing axial play by turning the yoke with holding the shaft tightly.

Bearing axial play: Maximum 0.05 mm (0.0020 in.)

If the bearing axial play exceeds the maximum, replace the spider bearing (w/o double cardan joint) / propeller shaft (w/ double cardan joint).



4. INSPECT WITH DOUBLE CARDAN JOINT PROPELLER SHAFT

HINT:

Double cardan joint is used on 4WD rear propeller shafts.

(a) Inspect the shaft for wear or damage.
(b) Inspect the double cardan joint for wear or damage.

If any problem is found, replace the propeller shaft assembly.

5. INSERT SLEEVE YOKE INTO PROPELLER SHAFT

(a) Apply grease to the propeller shaft spline and sleeve yoke sliding surface.

Grease:

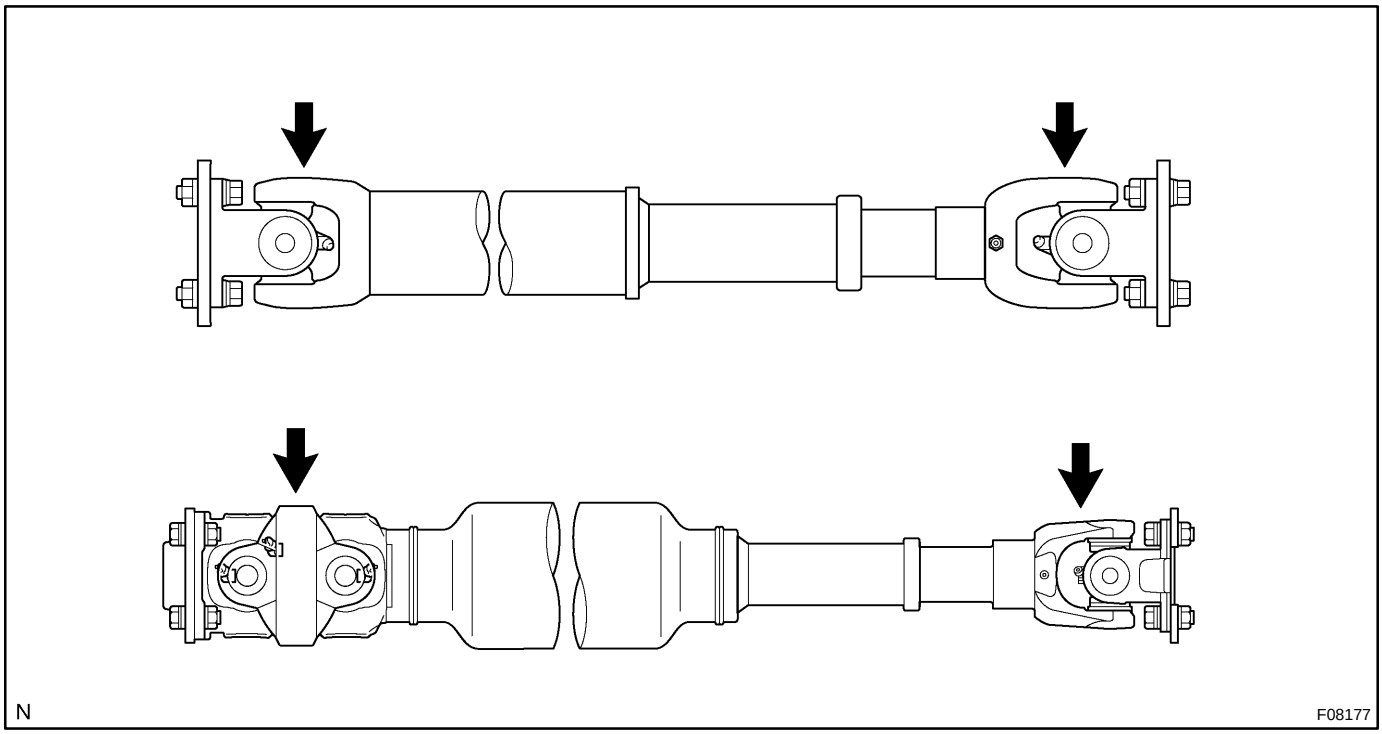
Molybdenum disulfide lithium base chassis grease, NLGI No.2

(b) Install the dust cover to the shaft.

(c) Align the matchmarks on the yoke and propeller shaft.

HINT:

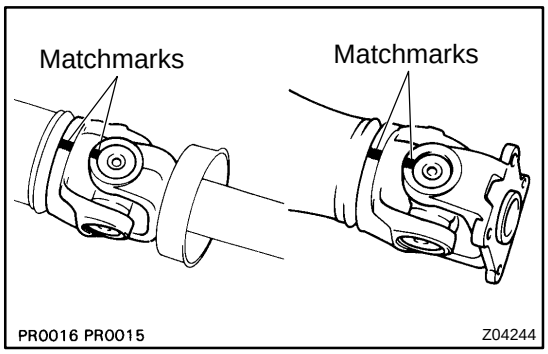
When replacing the propeller shaft, install the new parts facing, as shown in the following illustration.



PR01C-01

INSTALLATION

Installation is in the reverse order of removal (See page PR-8).



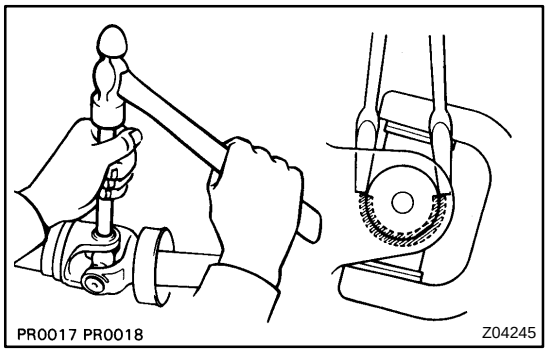
SPIDER BEARING

PR01D-02

REPLACEMENT

1. REMOVE PROPELLER SHAFT
2WD: (See page PR-4)
4WD: (See page PR-8)

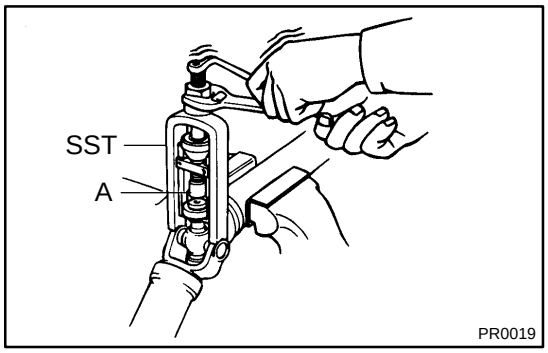
2. PLACE MATCHMARKS ON SHAFT AND YOKE



3. REMOVE SNAP RINGS

(a) Using a brass bar and hammer, slightly tap in the bearing outer races.

(b) Using 2 screwdrivers, remove the 4 snap rings from the grooves.



4. REMOVE SPIDER BEARINGS

NOTICE:

Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

(a) Using SST, push out the bearing from the propeller shaft.
SST 09332-25010

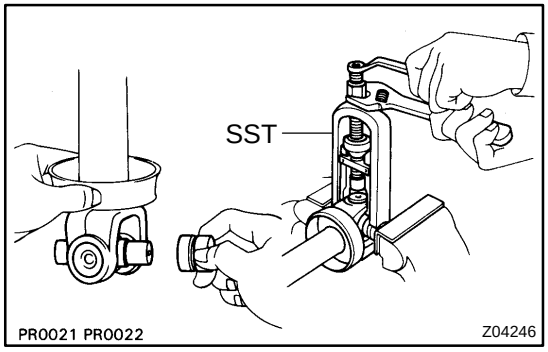
HINT:

Sufficiently raise the part indicated by ”A” so that it does not come into contact with the bearing.

(b) Clamp the bearing outer race in a vise and tap off the propeller shaft with a hammer.

HINT:

Remove the bearing on opposite side in the same procedure.



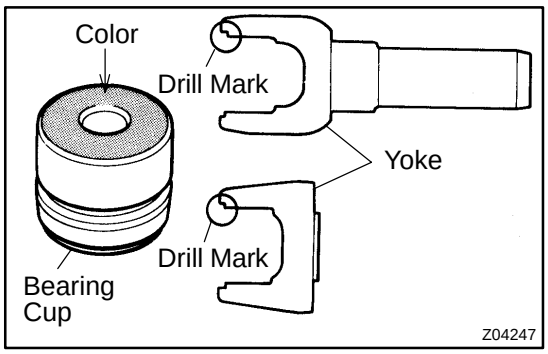
(c) Install the 2 removed bearing outer races to the spider.

(d) Using SST, push out the bearing from the yoke.
SST 09332-25010

(e) Clamp the outer bearing race in a vise and tap off the yoke with a hammer.

HINT:

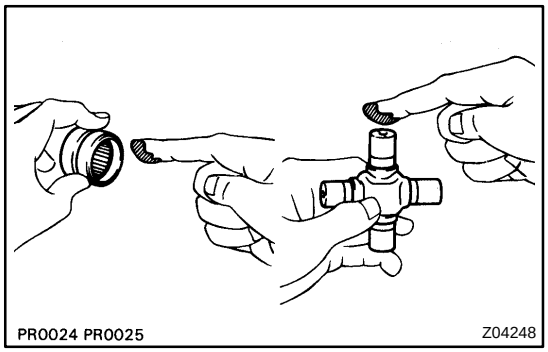
Remove the bearing on the opposite side in the same procedure.



5. SELECT SPIDER BEARING

Select the bearing according to whether or not there is a drill mark on the yoke section.

Yoke	Bearing
With drill mark	With color mark (Red)
No drill mark	No color mark



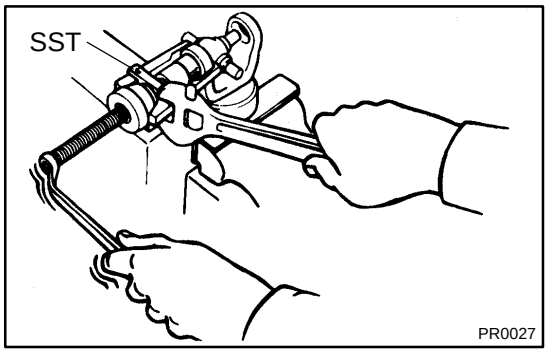
6. INSTALL SPIDER BEARINGS

(a) Apply MP grease to a new spider and bearings.

NOTICE:

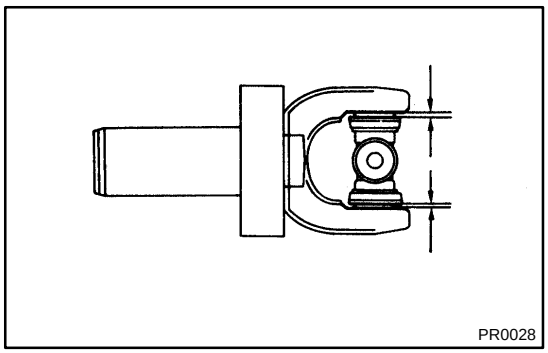
Be careful not to apply too much grease.

(b) Align the matchmarks on the yoke and shaft.

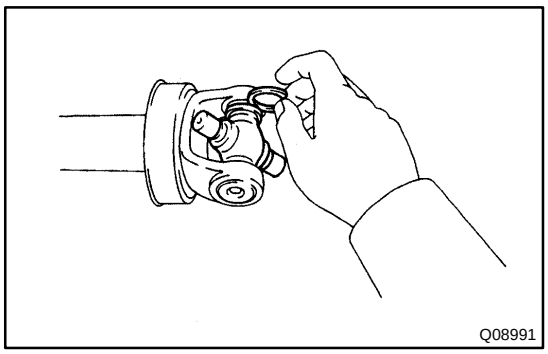


(c) Fit the spider into the yoke.

(d) Using SST, install new bearings on the spider.
SST 09332-25010



(e) Using SST, adjust both bearings so that the snap ring grooves are at maximum and equal widths.


Q08991

7. INSTALL SNAP RINGS

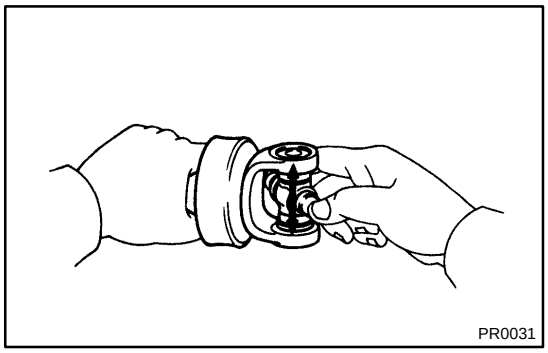
(a) Install 2 new snap rings of equal thickness which will allow 0 - 0.05 mm (0 - 0.0020 in.) axial play.

HINT:

Do not reuse the snap rings.

Color or Mark	Thickness mm (in.)
1	2.100 - 2.150 (0.0827 - 0.0846)
2	2.150 - 2.200 (0.0846 - 0.0866)
3	2.200 - 2.250 (0.0866 - 0.0886)
Brown	2.250 - 2.300 (0.0886 - 0.0906)
Blue	2.300 - 2.350 (0.0906 - 0.0925)
6	2.350 - 2.400 (0.0925 - 0.0945)
7	2.400 - 2.450 (0.0945 - 0.0965)
8	2.450 - 2.500 (0.0965 - 0.0984)

(b) Using a hammer, tap the yoke until there is no clearance between the bearing outer race and snap ring.


PR0031

8. CHECK SPIDER BEARING

(a) Check that the spider bearing moves smoothly.

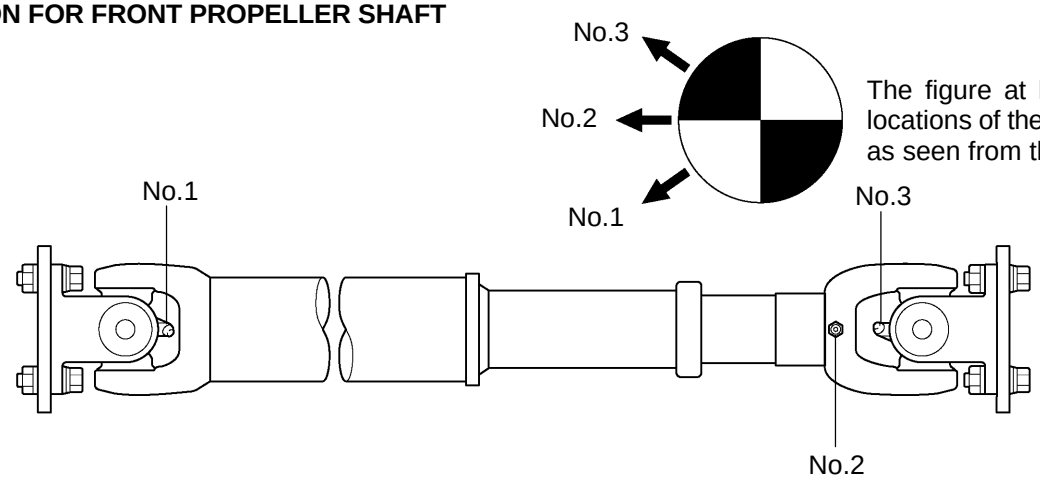
(b) Check the spider bearing axial play.

Bearing axial play: Maximum 0.05 mm (0.0020 in.)

HINT:

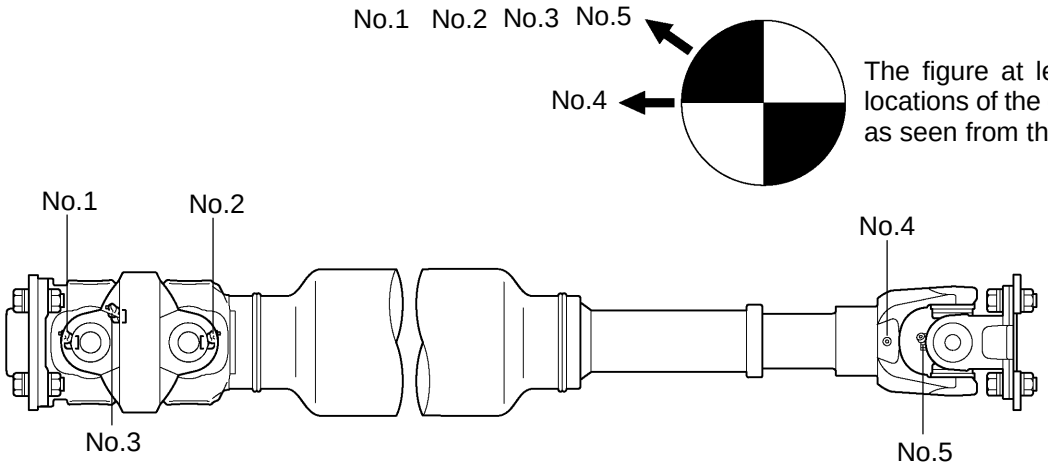
- Install new spider bearings on the shaft side in the procedure described above.
- When replacing the propeller shaft spider on 4WD vehicles, be sure that the grease fitting assembly hole is facing in the direction shown in the illustrations.

SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR FRONT PROPELLER SHAFT



The figure at left shows the locations of the grease fittings as seen from the rear.

SPIDER GREASE FITTING ASSEMBLY DIRECTION FOR REAR PROPELLER SHAFT



The figure at left shows the locations of the grease fittings as seen from the rear.

N

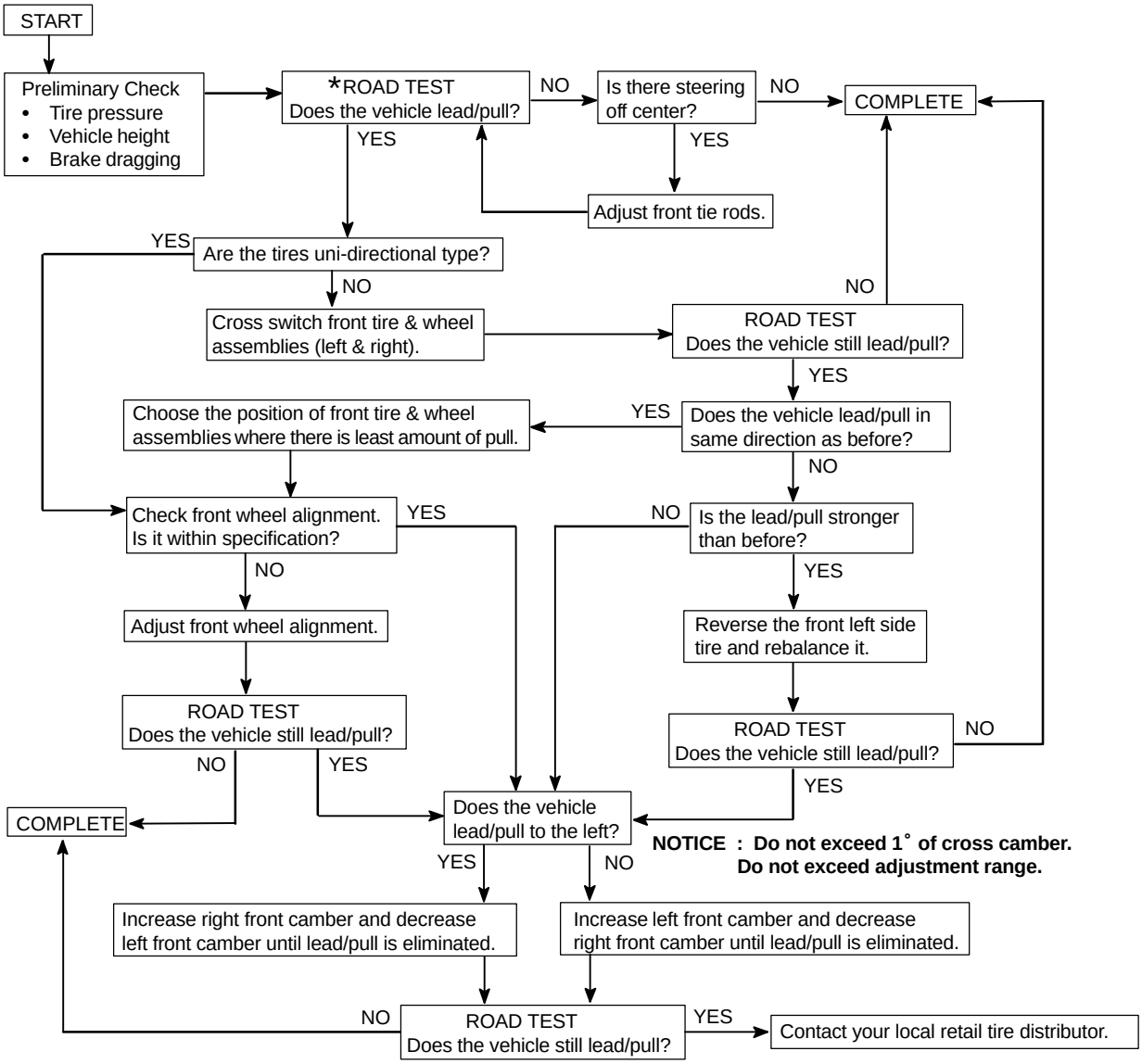
F08178

SA28L-01

REPAIR PROCEDURES

HINT:

This is a flow chart for vehicle pull.



* Select a flat road where the vehicle can be driven in a straight line for 100 meters at a constant speed of 35mph. Please confirm safety and set the steering wheel to its straight position. Drive the vehicle in a straight line for 100 meters at a constant speed of 35mph without holding the steering wheel.

(1) The vehicle can keep straight but the steering wheel has some angle.
→ STEERING OFF CENTER (See page SR-9)

(2) The vehicle cannot keep straight.
→ STEERING PULL

TROUBLESHOOTING

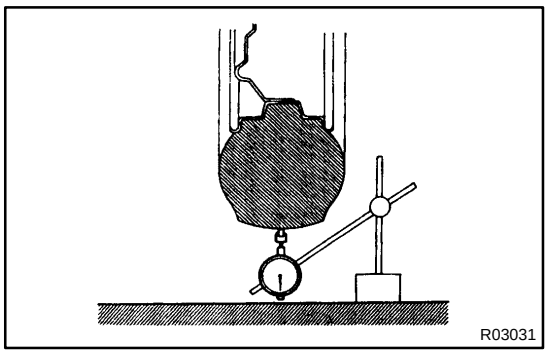
SA04S-03

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Bottoming	1. Vehicle (Overloaded)	-
	2. Spring (Weak)	SA-51 SA-123
	3. Shock absorber (Worn out)	SA-51 SA-123
Sways/pitches	1. Tires (Worn or improperly inflated)	SA-4
	2. Stabilizer bar (Bent or broken)	SA-76 SA-134
	3. Shock absorber (Worn out)	SA-51 SA-123
Front wheel shimmy	1. Tires (Worn or improperly inflated)	SA-4
	2. Wheels (Out of balance)	SA-4
	3. Shock absorber (Worn out)	SA-51 SA-123
	4. Wheel alignment (Incorrect)	SA-5
	5. Ball joints (Worn)	SA-69 SA-71
	6. Hub bearings (Loosen or worn)	SA-9
	7. Steering linkage (Loosen or worn)	-
	8. Steering gear (Out of adjustment or broken)	-
Abnormal tire wear	1. Tires (Improperly inflated)	SA-4
	2. Wheels alignment (Incorrect)	SA-5
	3. Shock absorber (Worn out)	SA-51 SA-123
	4. Suspension parts (Worn out)	-
Noise in front axle	1. Oil level (Low or wrong grade)	SA-24
	2. Excessive backlash between pinion and ring gear	SA-30
	3. Ring, pinion or side gears (Worn or chipped)	SA-27
	4. Pinion shaft bearing (Worn)	SA-27
	5. Side bearing (Worn)	SA-27
	6. Differential bearing (Loosen or worn)	SA-27
Oil leak from front differential	1. Oil level (Too high or wrong grade)	SA-24
	2. Drive pinion oil seal (Worn or damaged)	SA-24
	3. Side gear oil seal (Worn or damaged)	SA-27
	4. Companion flange (Loose or damaged)	SA-30
	5. Side gear shaft (Damaged)	SA-27
Oil leak from pinion shaft	1. Oil level (Too high or wrong grade)	SA-24
	2. Oil seal (Worn or damaged)	SA-24
	3. Companion flange (Loose or damaged)	SA-30
Noise in rear axle	1. Oil level (Low or wrong grade)	SA-88
	2. Excessive backlash between pinion and ring gear	SA-96
	3. Ring, pinion or side gears (Worn or chipped)	SA-91
	4. Pinion shaft bearing (Worn)	SA-91
	5. Axle shaft bearing (Worn)	SA-81
	6. Differential bearing (Loosen or worn)	SA-96

Oil leak from rear axle	1. Oil seal (Worn or damaged) 2. Rear axle housing (Cracked)	SA-88 SA-96
Oil leak from pinion shaft	1. Oil level (Too high or wrong grade) 2. Oil seal (Worn or damaged) 3. Companion flange (Loose or damaged)	SA-88 SA-88 SA-96



TIRE AND WHEEL

SA04T-02

INSPECTION

1. INSPECT TIRE

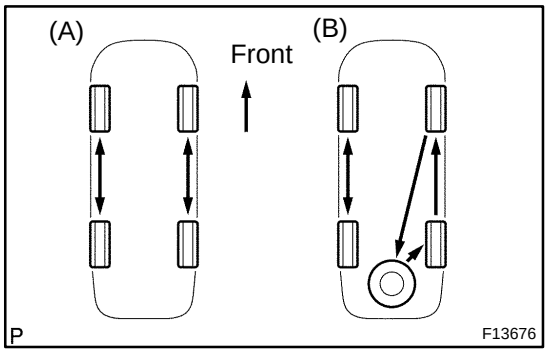
(a) Check the tires for wear and for the proper inflation pressure.

Cold tire inflation pressure:

Tire size	Front kPa (kgf/cm^2, psi)	Rear kPa (kgf/cm^2, psi)
P225/75R15	200 (2.0, 29)	200 (2.0, 29)
P265/70R16	220 (2.2, 32)	220 (2.2, 32)

(b) Check the tire runout.

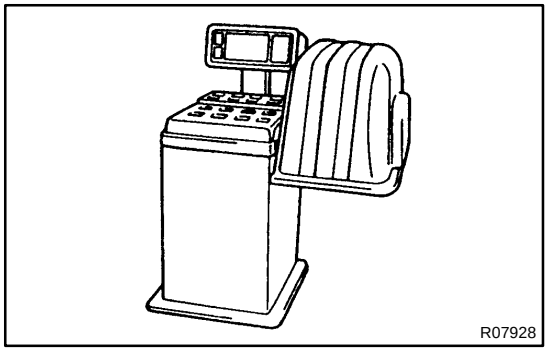
Tire runout: 3.0 mm (0.118 in.) or less



2. ROTATE TIRE

HINT:

- Rotate tires as shown in the illustration.
- Rotate as shown in (B) if the spare tire is included in the rotation.



3. INSPECT WHEEL BALANCE

Using the Off-the-car balance, check and adjust the wheel balance.

Unbalance after adjustment: 14.0 g (0.031 lb) or less

4. CHECK FRONT SUSPENSION FOR LOOSENESS

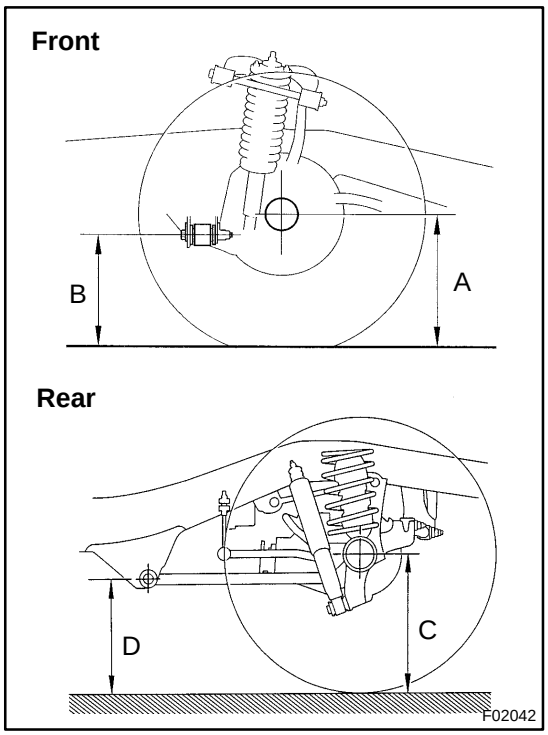
5. CHECK STEERING LINKAGE FOR LOOSENESS

6. CHECK BALL JOINT FOR LOOSENESS

(See page SA-71)

7. CHECK SHOCK ABSORBER WORKS PROPERLY

- Check for oil leak.
- Check the mounting bushings for wear.
- Bounce front and rear of the vehicle.



FRONT WHEEL ALIGNMENT

SA04U-03

INSPECTION

1. MEASURE VEHICLE HEIGHT

Vehicle height:

2WD:

Front	A - B: 72.2 mm (2.843 in.)
Rear	C - D: 52.0 mm (2.047 in.)

4WD:

Front	A - B: 69.9 mm (2.752 in.)
Rear	C - D: 50.7 mm (1.996 in.)

Measuring points:

A: Ground clearance of spindle center

B: Ground clearance of front adjusting cam bolt center

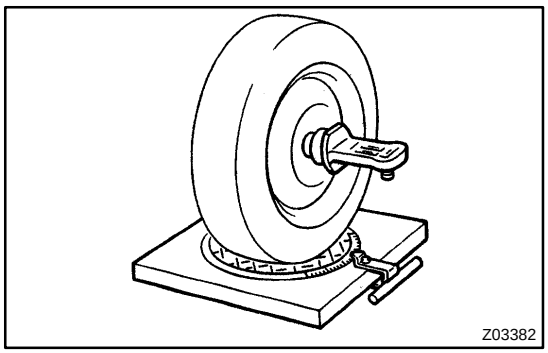
C: Ground clearance of rear axle shaft center

D: Ground clearance of lower control arm front bushing center

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to the specification.

If the vehicle height is not within the specification, try to adjust it by pushing down on or lifting the body.



2. INSTALL CAMBER-CASTER-KINGPIN GAUGE OR ONTO WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

3. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

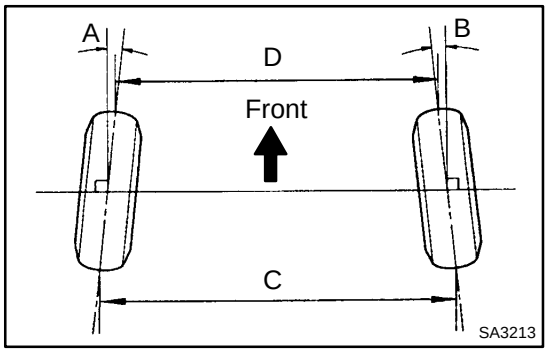
2WD:

Camber Left-right error	-0 °15' ± 45' (-0.25° ± 0.75°) 30' (0.5°) or less
Caster Left-right error	3°15' ± 45' (3.25° ± 0.75°) 30' (0.5°) or less
Steering axis inclination Left-right error	11°00' ± 45' (11° ± 0.75°) 30' (0.5°) or less

4WD:

Camber Left-right error	-0 °15' ± 45' (-0.25° ± 0.75°) 30' (0.5°) or less
Caster Left-right error	3°05' ± 45' (3.06° ± 0.75°) 30' (0.5°) or less
Steering axis inclination Left-right error	11°00' ± 45' (11.00° ± 0.75°) 30' (0.5°) or less

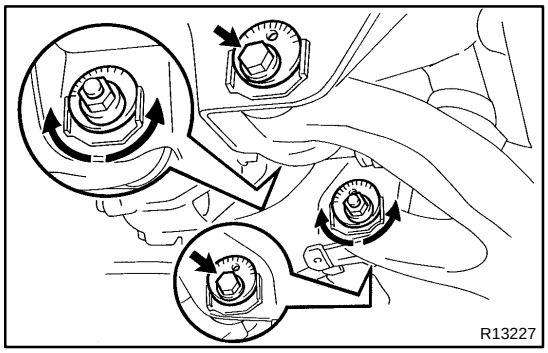
If the steering axis inclination is not within the specification, after the camber and caster have correctly adjusted, recheck the steering knuckle front wheel for bearing or looseness.



4. INSPECT TOE-IN

Toe-in (total)	A + B: 0°12' ± 12' (0.2° ± 0.2°) C - D: 2 ± 2 mm (0.08 ± 0.08 in.)

If the toe-in is not within the specification, adjust the rack ends.



5. ADJUST CAMBER AND CASTER

NOTICE:

After the camber has been adjusted, inspect the toe-in.

(a) Loosen the front and/or rear adjusting cam nuts.

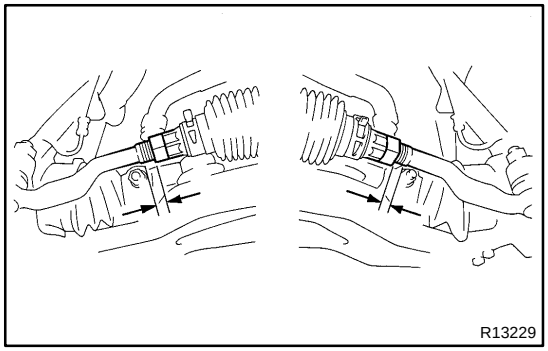
(b) Adjust the camber and caster by front and/or rear adjusting cams (See adjustment chart).

HINT:

Try to adjust the camber and caster to the center value.

(c) Torque the front and/or rear adjusting cam nuts.

Torque: 130 N·m (1,325 kgf·cm, 96 ft·lbf)



6. ADJUST TOE-IN AND WHEEL ANGLE

HINT:

First, check or adjust the lengths of the tie rod ends, then adjust the toe-in.

Tie rod end length left-right error:
1.5 mm (0.059 in.) or less

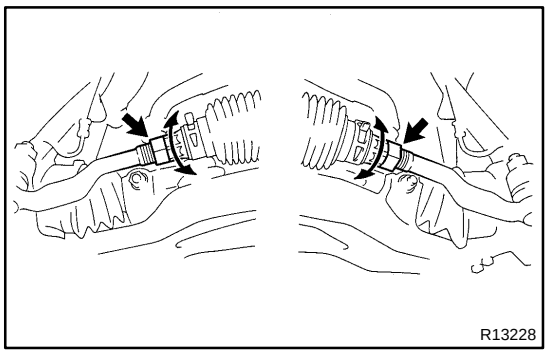
(a) Remove the boot clamps.

(b) Loosen the rack end lock nuts.

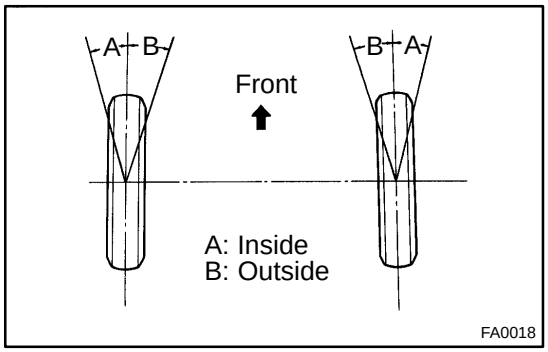
(c) Turn the left and right rack ends an equal amount to adjust the toe-in.

HINT:

Try to adjust the toe-in the center value.



(d) Tighten the rack end lock nuts.
Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)
(e) Place the boot on the seat and clip it.
HINT:
Make sure that the boots are not twisted.

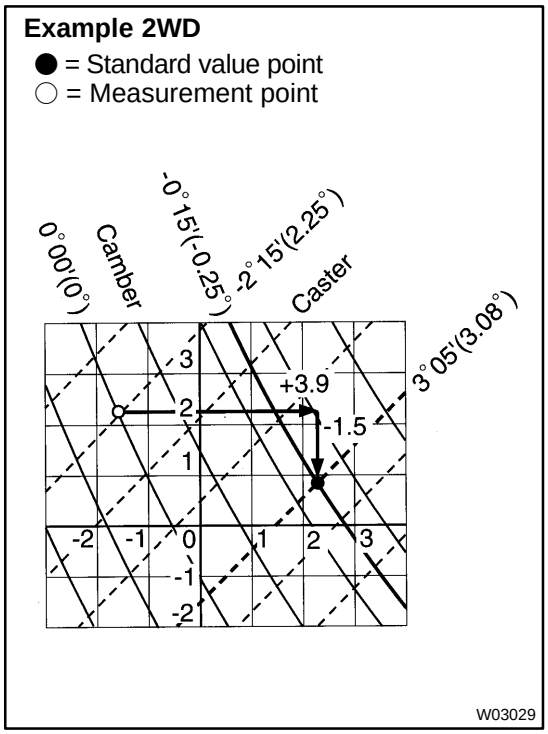


7. INSPECT WHEEL ANGLE

Turn the steering wheel fully, and measure the turning angle.

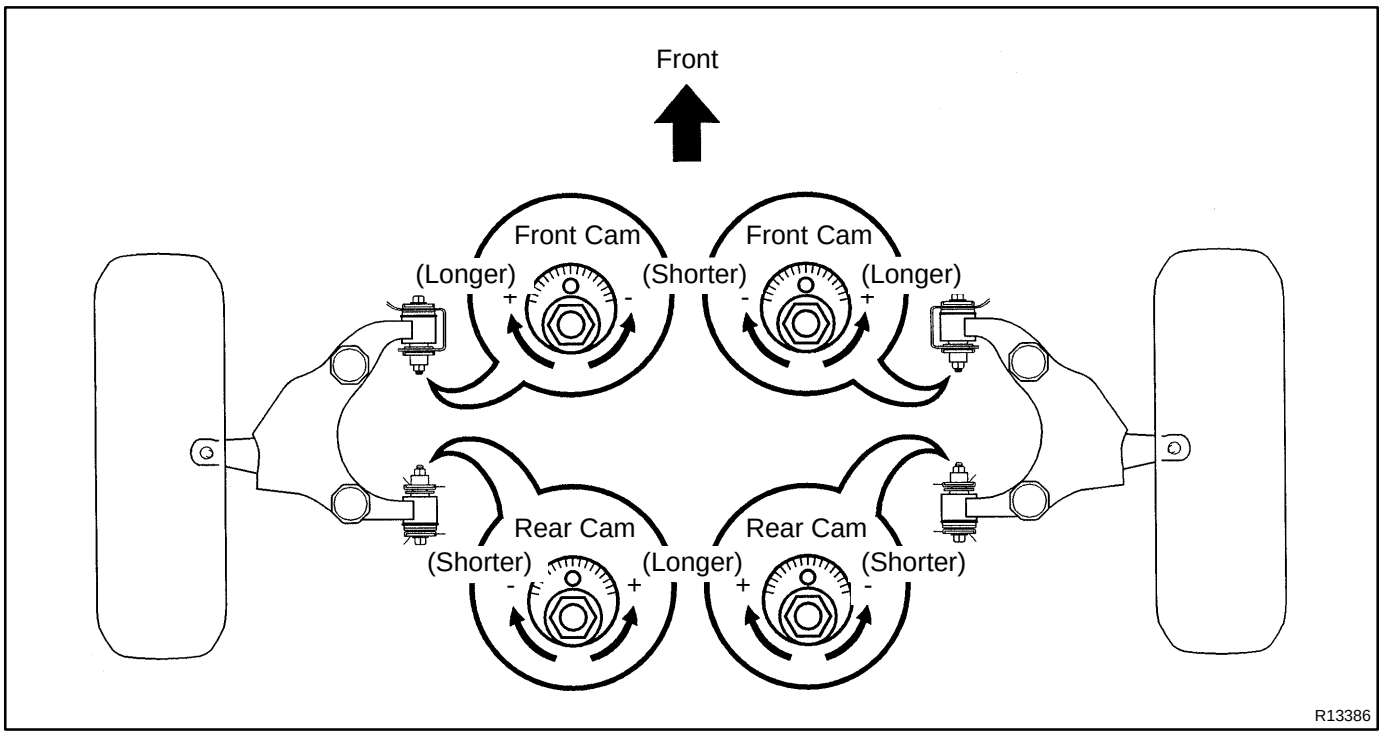
Inside wheel	Outside wheel (Reference)
35° (33° - 36°)	31°

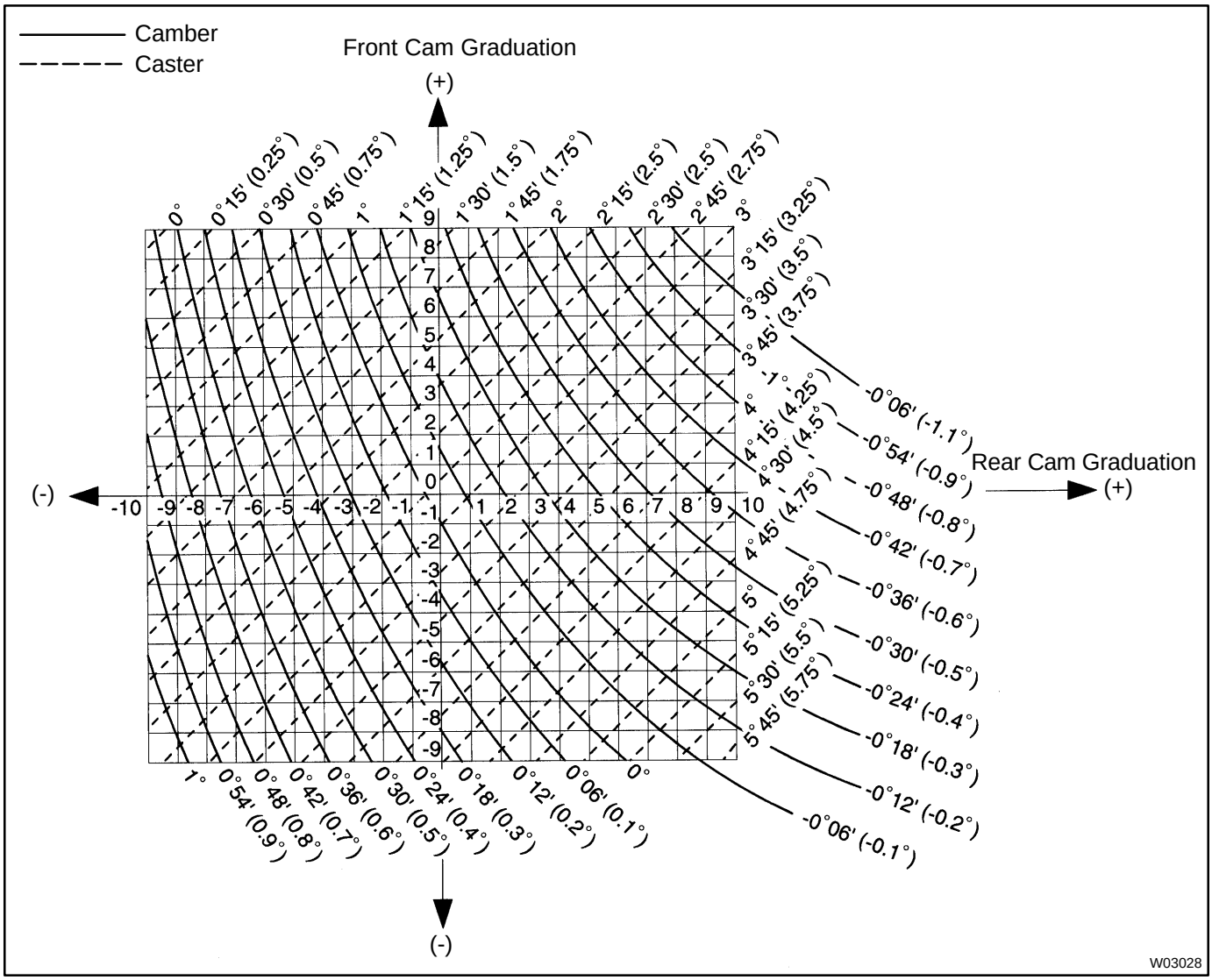
If wheel angle deviates from the specifications, readjust the toe-in and wheel angle within the specifications. At this time, the lengths of the tie rod end may be within less than 1.5 mm (0.059 in.).



8. HOW TO READ ADJUSTMENT CHART

(a) Find the wheel alignment standard value applicable for the tire size.
(b) Mark the selected standard value on the adjustment chart.
Example 2WD:
Camber -0°15' (-0.25°)
Caster 3°05' (3.08°)
(c) Mark on the adjustment chart the alignment values measured at the vehicle height.
Example:
Camber 0°00' (0°)
Caster 2°15' (2.25°)
(d) As shown in the illustration, read the distance from the standard value to the measured value, and adjust the front and/or rear adjusting cams accordingly.
Example:
Front cam -(shorter) 1.5
Rear cam +(Longer) 3.9

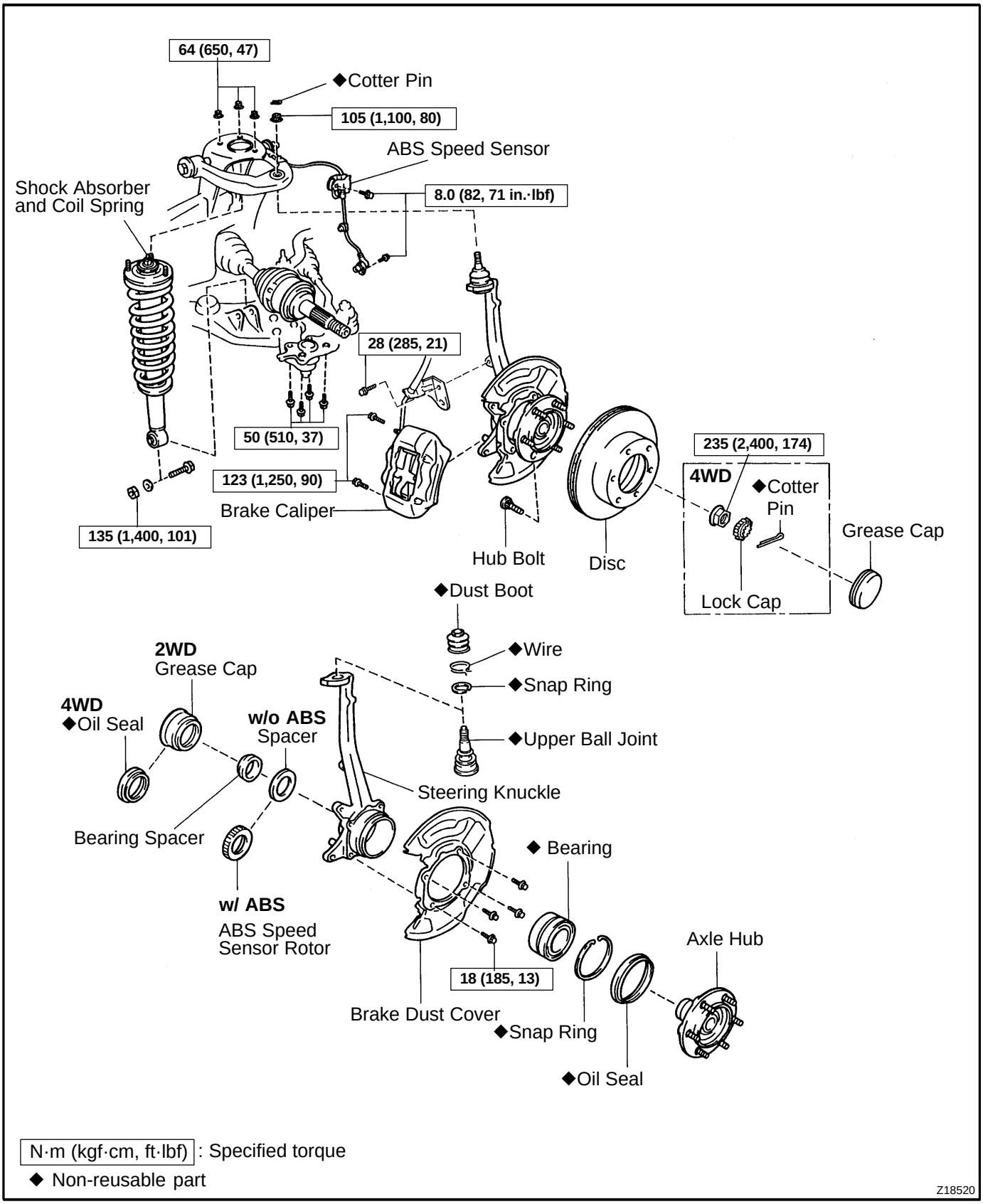

Front
Front Cam
(Longer)
(Shorter)
Front Cam
(Shorter)
(Longer)
Rear Cam
(Shorter)
(Longer)
Rear Cam
(Longer)
(Shorter)
R13386


Camber
Caster
Front Cam Graduation
(+)
(-)
Rear Cam Graduation
(+)
(-)
W03028

FRONT AXLE HUB

COMPONENTS

SA04V-02



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

Z18520

SA04W-05

REMOVAL

1. REMOVE FRONT WHEEL
Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

2. REMOVE SHOCK ABSORBER (See page SA-52)

3. REMOVE GREASE CAP

Using a screwdriver, remove the grease cap.

4. 4WD:
DISCONNECT DRIVE SHAFT (See page SA-17)

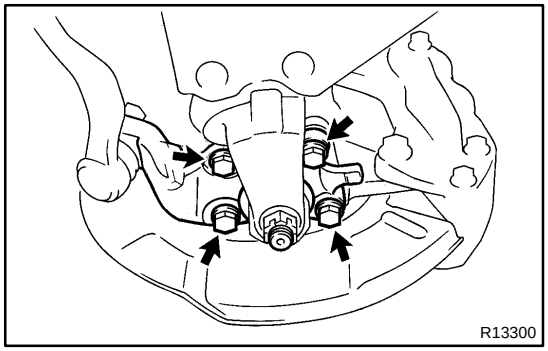
(a) Remove the cotter pin and lock cap.

(b) With applying the brakes, remove the lock nut.
Torque: 235 N·m (2,400 kgf·cm, 174 ft·lbf)

5. w/ ABS:
REMOVE ABS SPEED SENSOR AND WIRE HARNESS CLAMP FORM STEERING KNUCKLE
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

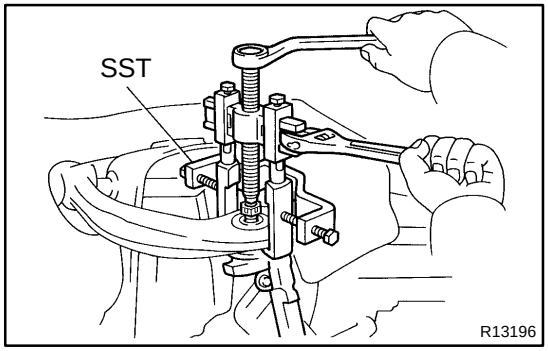
6. REMOVE BRAKE LINE BRACKET FROM STEERING KNUCKLE
Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)

7. REMOVE FRONT BRAKE CALIPER AND DISC (See page BR-16)



8. DISCONNECT LOWER BALL JOINT

Remove the 4 bolts and disconnect the lower ball joint.
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)



9. REMOVE STEERING KNUCKLE WITH AXLE HUB

(a) Remove the cotter pin and loosen the nut from the upper ball joint.
Torque: 105 N·m (1,100 kgf·cm, 80 ft·lbf)

(b) Using SST, disconnect the steering knuckle.
SST 09950- 40011 (09951- 04010, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04031, 09958-0401 1)

(c) Remove the nut and steering knuckle.

NOTICE:

Be careful not to damage the oil seal and drive shaft boot.

HINT:

4WD:

When it is difficult to disconnect the drive shaft, tap the drive shaft with a plastic hammer.

SA04X-03

DISASSEMBLY

1. REMOVE GREASE CAP OR OIL SEAL (INSIDE)

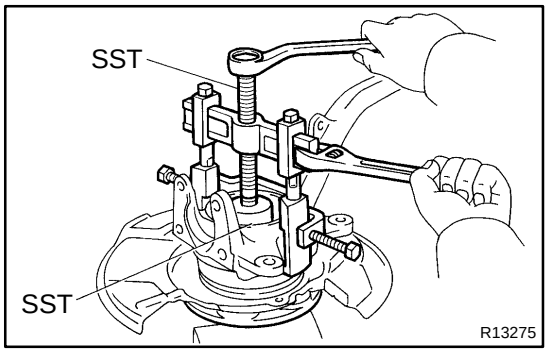
(a) Clamp the axle hub in a soft jaw vise.

HINT:

Close vise unit it holds hub bolts. Do not tighten it further.

(b) 2WD:
Using a screwdriver, remove the grease cap.

(c) 4WD:
Using a screwdriver, remove the oil seal (inside).



2. REMOVE AXLE HUB FROM STEERING KNUCKLE

(a) Remove the 4 bolts and shift the brake dust cover towards the hub side (outside).

(b) Using SST, remove the axle hub from the steering knuckle.
SST 09710-30021 (09710-03051),
09950- 40011 (09951- 04020, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04031, 09957-04010, 09958-04011)

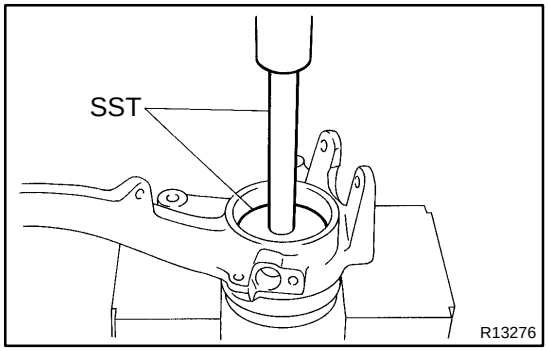
(c) Remove the bearing spacer and ABS speed sensor rotor/ spacer.

3. REMOVE OIL SEAL (OUTSIDE)

Using a screwdriver, remove the oil seal (outside) from the steering knuckle.

4. REMOVE BEARING FROM STEERING KNUCKLE

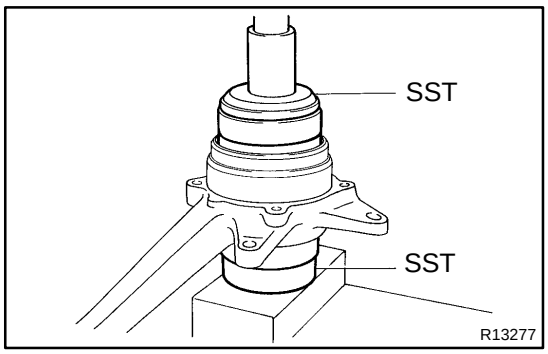
(a) Using snap ring pliers, remove the snap ring.



(b) Using SST and a press, remove the bearing from the steering knuckle.
SST 09950-60020 (09951-00810),
09950-70010 (09951-07150)

SA04Y-01

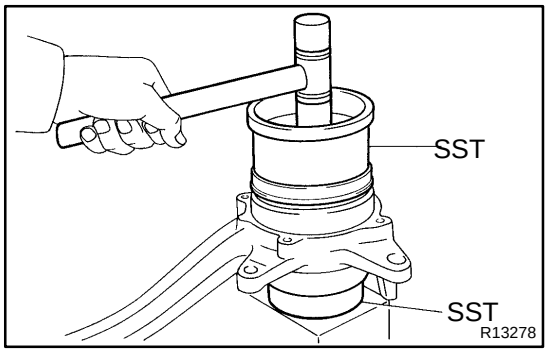
REASSEMBLY



1. INSTALL NEW BEARING

(a) Using SST and a press, install a new bearing to the steering knuckle.
SST 09527-1701 1, 09950-60020 (09951-00910)

(b) Using snap ring pliers, install a new snap ring.



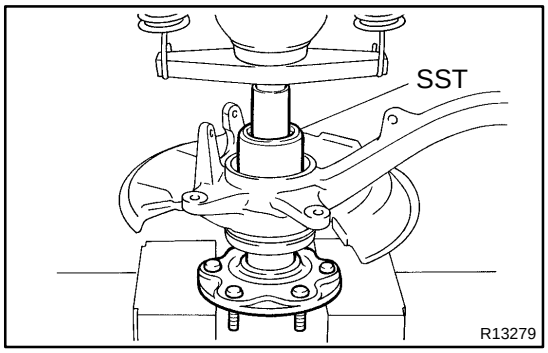
2. INSTALL NEW OIL SEAL (OUTSIDE)

(a) Using SST and a plastic hammer, install a new oil seal (outside).
SST 09223-15030, 09527-17011

(b) Coat MP grease to the oil seal lip.

3. INSTALL AXLE HUB TO STEERING KNUCKLE

(a) Install the brake dust cover to the steering knuckle with the 4 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

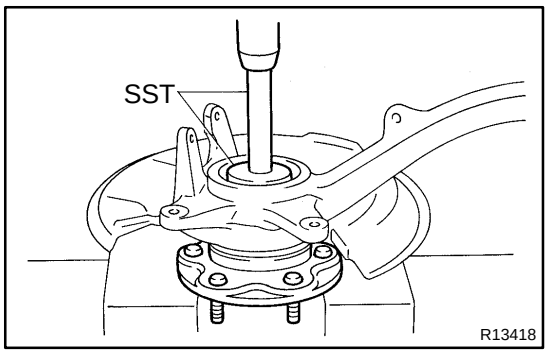


(b) Using SST and a press, install the axle hub to the steering knuckle.
SST 09649-17010

4. INSTALL ABS SPEED SENSOR ROTOR/SPACER

NOTICE:

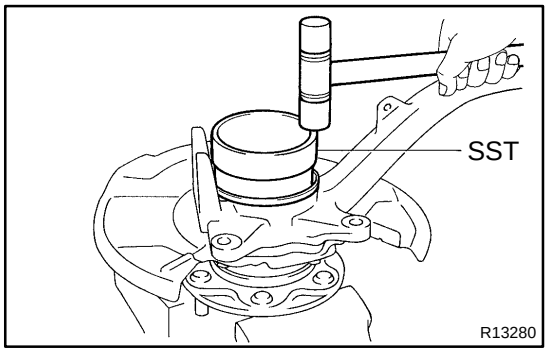
Do not scratch the serration of the speed sensor rotor.



5. INSTALL BEARING SPACER

Using SST and a press, install the bearing spacer.
SST 09950-60010 (09951-00650),
09950-70010 (09951-07150)

6. 2WD:
INSTALL GREASE CAP



7. 4WD:
INSTALL NEW OIL SEAL (INSIDE)

(a) Using SST and a plastic hammer, install a new oil seal (inside).
SST 09527-1701 1

HINT:
Strike the SST on its circumference evenly.

(b) Coat MP grease to the oil seal lip.

SA04Z-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-10).

HINT:

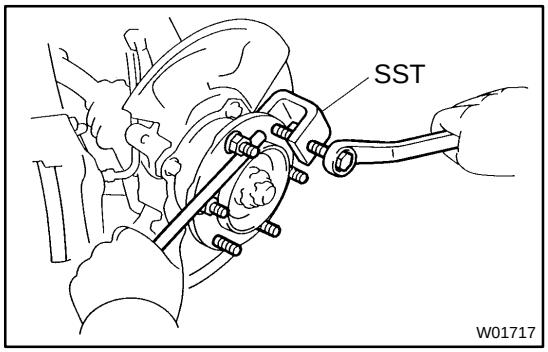
After installation, check the ABS speed sensor signal (See page DI-224) and front wheel alighnment (See page SA-5).

FRONT WHEEL HUB BOLT

SA050-01

REPLACEMENT

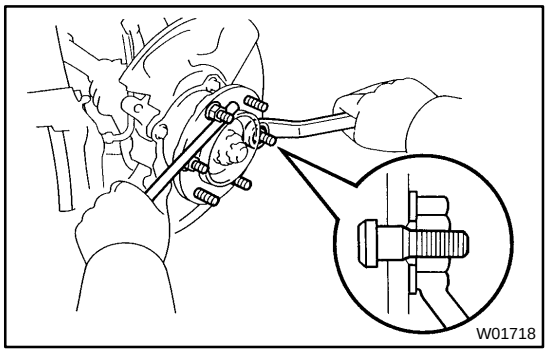
1. **REMOVE FRONT WHEEL**
2. **REMOVE BRAKE LINE BRACKET FROM STEERING KNUCKLE**
3. **REMOVE BRAKE CALIPER AND DISC (See page BR-16)**



4. **REMOVE HUB BOLT**

Using SST, remove hub bolt.

SST 09650-1701 1



5. **INSTALL HUB BOLT**

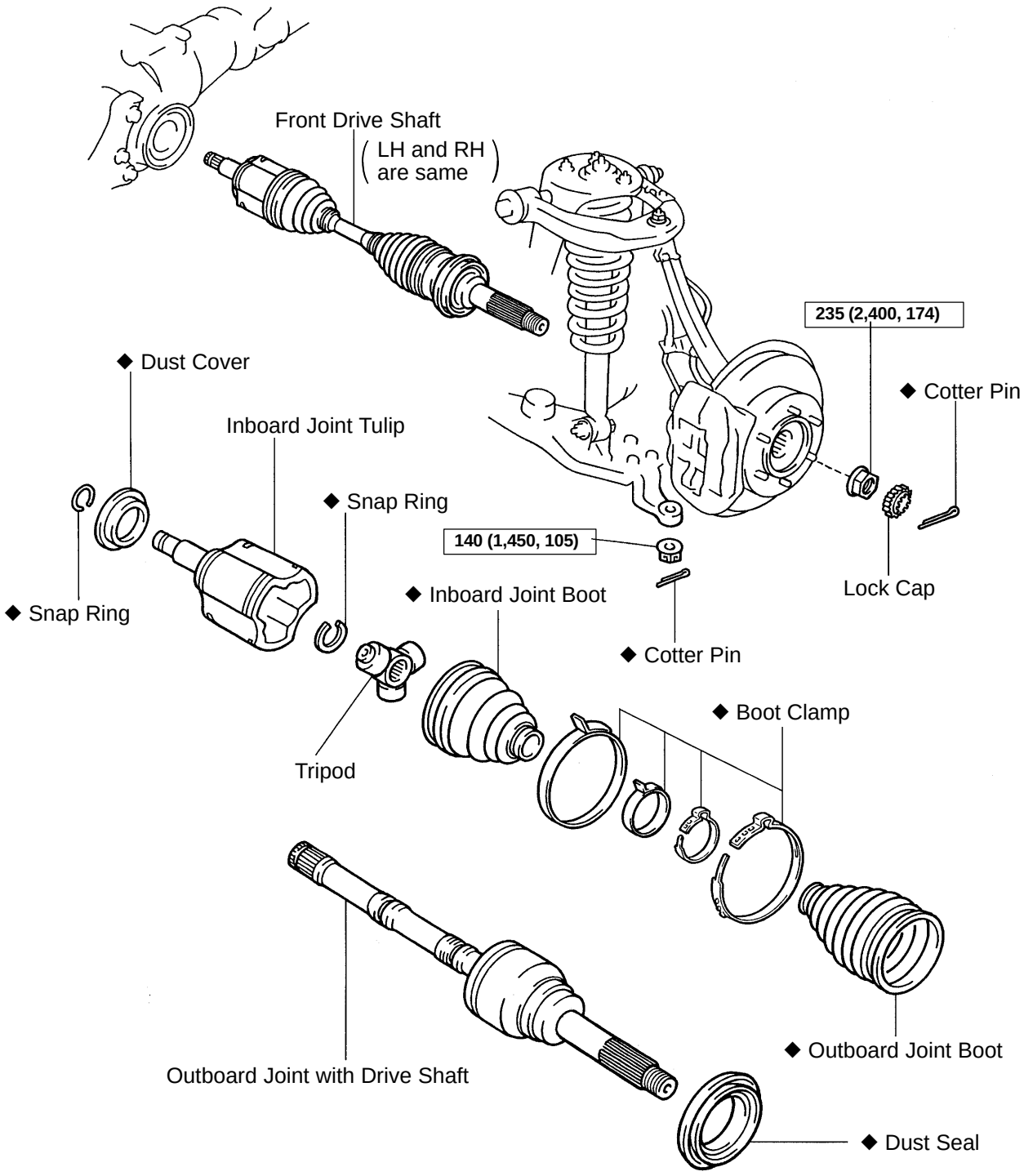
Install a washer and nut to the hub bolt, as shown in the illustration, and install the hub bolt with torquing the nut.

6. **INSTALL DISC AND BRAKE CALIPER (See page BR-20)**
7. **INSTALL BRAKE LINE BRACKET FROM STEERING KNUCKLE**
   Torque: 28 N·m (285 kgf·cm, 21 ft·lbf)
8. **INSTALL FRONT WHEEL**
   Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

FRONT DRIVE SHAFT

SA051-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specifled torque
◆ Non-reusable part

Z18521

SA052-01

REMOVAL

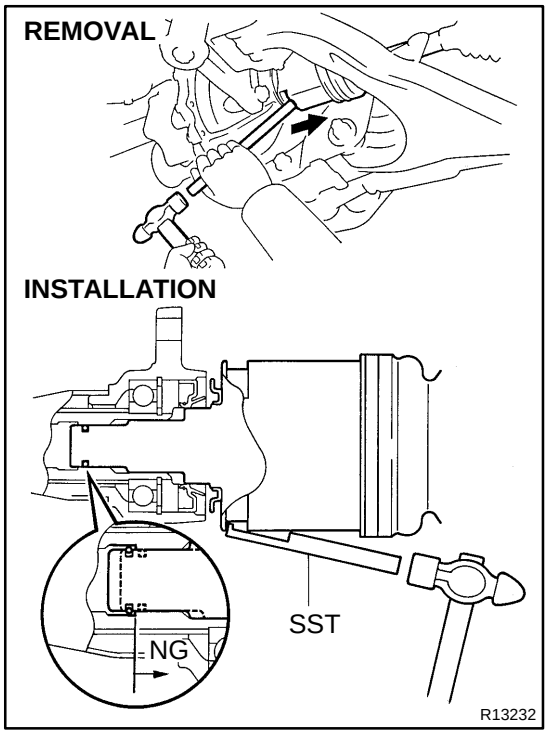
1. REMOVE FRONT WHEEL
Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

2. DRAIN DIFFERENTIAL OIL

3. REMOVE DRIVE SHAFT LOCK NUT

(a) Remove the cotter pin and lock cap.

(b) With applying the brakes, remove the lock nut.
Torque: 235 N·m (2,400 kgf·cm, 174 ft·lbf)



4. DISCONNECT DRIVE SHAFT

Using a brass bar and hammer, disconnect the drive shaft.

HINT:

When it is difficult to disconnect the drive shaft, tap in a screwdriver between differential side tube flange/differential carrier and drive shaft.

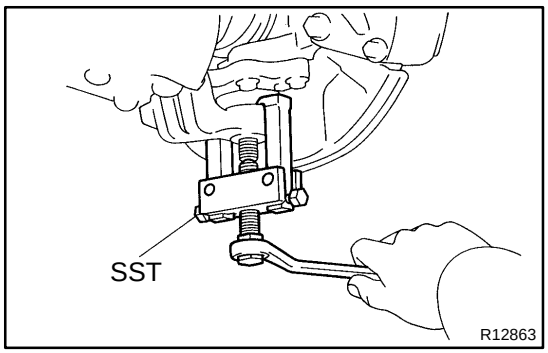
HINT:

At the time of installation, please refer to the following items.

- Before installation, set the snap ring opening side facing downward.
- Using SST and a hammer, strike the inboard joint into the differential. At that time, strike the snags evenly to avoid snags deformation.
  SST 09631-10030
- After installation, check that the drive shaft cannot be pull out by hand.

NOTICE:

Be careful not to damage the dust cover of the drive shaft.



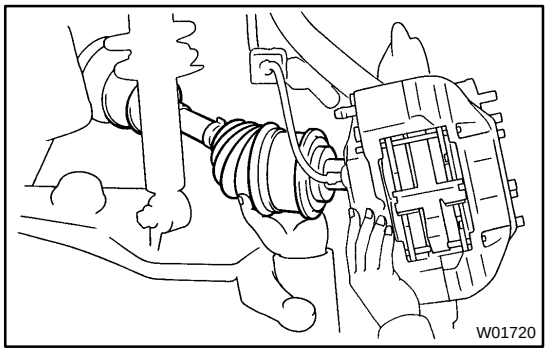
5. DISCONNECT LOWER SUSPENSION ARM

(a) Remove the cotter pin and nut.
Torque: 140 N·m (1,450 kgf·cm, 105 ft·lbf)

(b) Using SST, disconnect the lower suspension arm.
SST 09628-6201 1

HINT:

At the time of installation, face the cotter pin hole of the lower ball joint forward.



6. REMOVE DRIVE SHAFT

Push the steering knuckle outward and remove the drive shaft.

HINT:

When it is difficult to disconnect the drive shaft, tap the drive shaft with a plastic hammer.

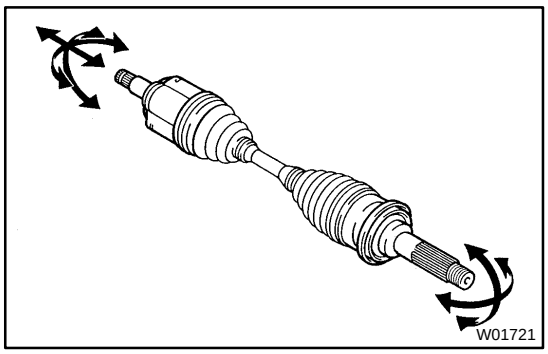
NOTICE:

Be careful not to damage the oil seal, boots and dust seal.

7. REMOVE SNAP RING FROM INBOARD SHAFT

SA053-02

DISASSEMBLY



1. CHECK DRIVE SHAFT

(a) Check to see that there is no play in the inboard and outboard joints.

(b) Check to see that the inboard joint slides smoothly in the thrust direction.

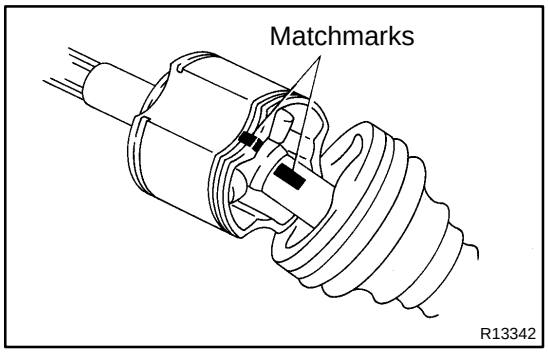
(c) Check to see that there is no significant play in the radial direction of the inboard joint.

(d) Check the boot for damage.

2. REMOVE INBOARD JOINT BOOT CLAMPS

(a) Using a screwdriver, remove the 2 inboard joint boot clamps.

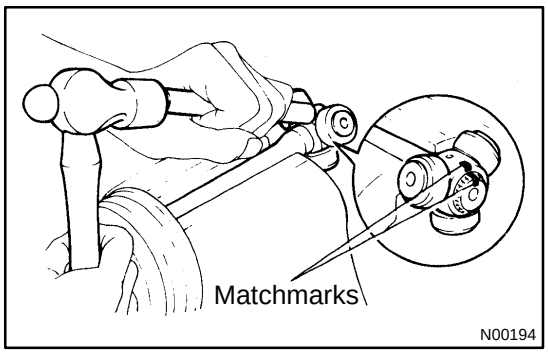
(b) Slide the inboard joint boot toward the outboard joint.



3. REMOVE INBOARD JOINT TULIP

(a) Place matchmarks on the inboard joint tulip and drive shaft.

(b) Remove the inboard joint tulip from the drive shaft.



4. REMOVE TRIPOD FROM DRIVE SHAFT

(a) Using snap ring expander, remove the snap ring.

(b) Place matchmarks on the shaft and tripod.

(c) Using a brass bar and hammer, remove the tripod.

NOTICE:

Do not tap the roller.

5. REMOVE INBOARD AND OUTBOARD JOINT BOOTS

(a) Remove the inboard joint boot and 2 clamps from the drive shaft.

(b) Using a side cutter, cut the 2 outboard boot clamps.

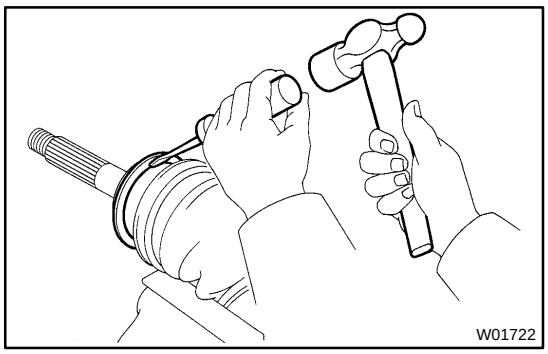
(c) Remove the outboard joint boot from the drive shaft.

NOTICE:

Do not disassemble the outboard joint.

6. REMOVE DUST COVER

Using a screwdriver, remove the dust cover from the inboard joint tulip.

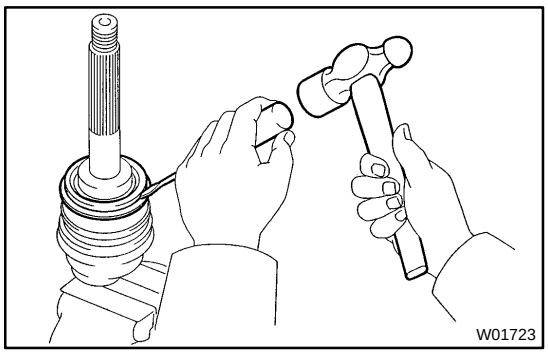


7. REMOVE DUST SEAL

Using a screwdriver and hammer remove the dust seal from the drive shaft.

SA054-02

REASSEMBLY

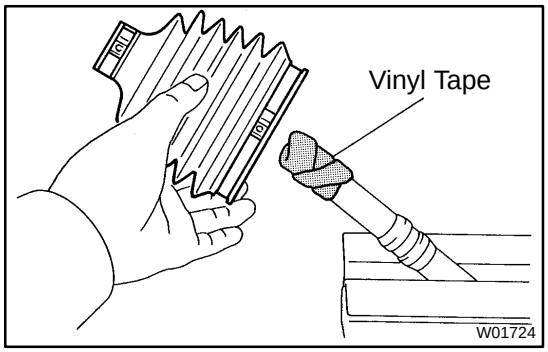


1. INSTALL DUST COVER

Using a screwdriver and hammer, install a new dust cover.

2. INSTALL DUST SEAL

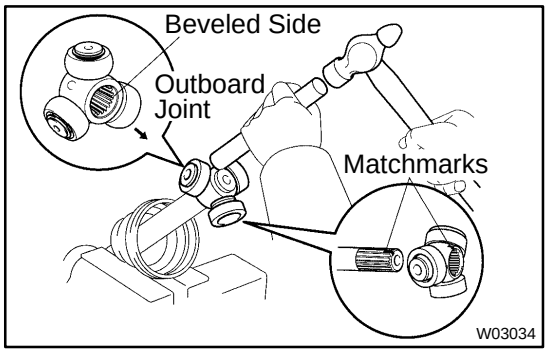
Using a screwdriver and hammer, install a new dust seal.



3. TEMPORARILY INSTALL NEW BOOTS TO DRIVE SHAFT

HINT:

- Before installing the 2 boots, wrap vinyl tape around the spline of the shaft to prevent the boots from damaging.
- Place 2 new clamps to the outboard joint boot and install them to the drive shaft.



4. INSTALL TRIPOD

(a) Place the beveled side of the tripod axial spline toward the outboard joint.

(b) Align the matchmarks placed before installation.

(c) Using a brass bar and a hammer, install the tripod onto the drive shaft.

NOTICE:

Do not tap the roller.

(d) Using a snap ring expander, install a new snap ring.

5. ASSEMBLE BOOT TO OUTBOARD JOINT

Grease capacity: 176 - 186 g (6.20 - 6.56 oz.)

Before assembling the boot, pack in grease in the boot kit.

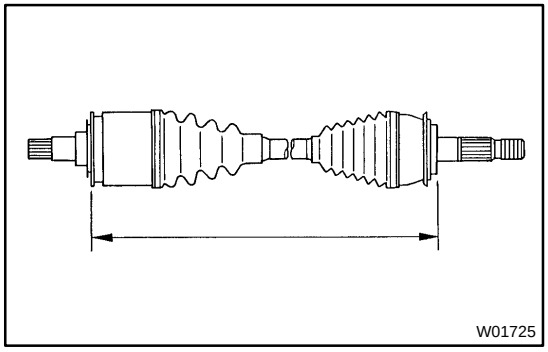
6. ASSEMBLE BOOT AND INBOARD JOINT TULIP

(a) Pack the inboard joint and boot with grease in the boot kit.
Grease capacity: 255 - 265 g (8.99 - 9.34 oz.)

(b) Align the matchmarks placed before installation.

(c) Install the inboard joint tulip to the drive shaft.

(d) Temporarily install the boot to the inboard joint tulip.



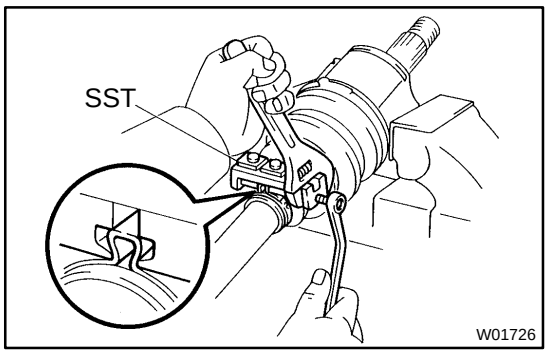
7. ASSEMBLE NEW INBOARD JOINT BOOT CLAMPS TO BOOT

(a) Make sure that the 2 boots are in the shaft groove.

(b) Make sure that the 2 boots are not stretched or contracted when the drive shaft is at the standard length.
Drive shaft standard length:
530.8 ± 5.0 mm (20.898 ± 0.197 in.)

(c) Place 2 new inboard joint boot clamps.

(d) Bend the band and lock it with a screwdriver.

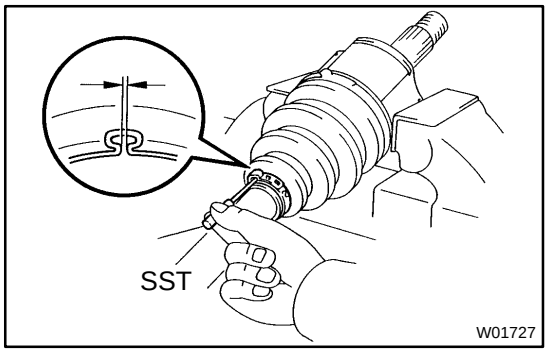


(e) To assemble the 2 outboard joint boot clamps, pinch the clamps and adjust clearance with SST.

NOTICE:

Do not overtighten the SST.

SST 09521-24010



(f) Measure the clearance of the 2 outboard joint boot clamps with SST.

SST 09240-00020

Clearance: 0.8 mm (0.0031 in.) or less

8. CHECK DRIVE SHAFT (See page SA-18)

SA055-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-17).

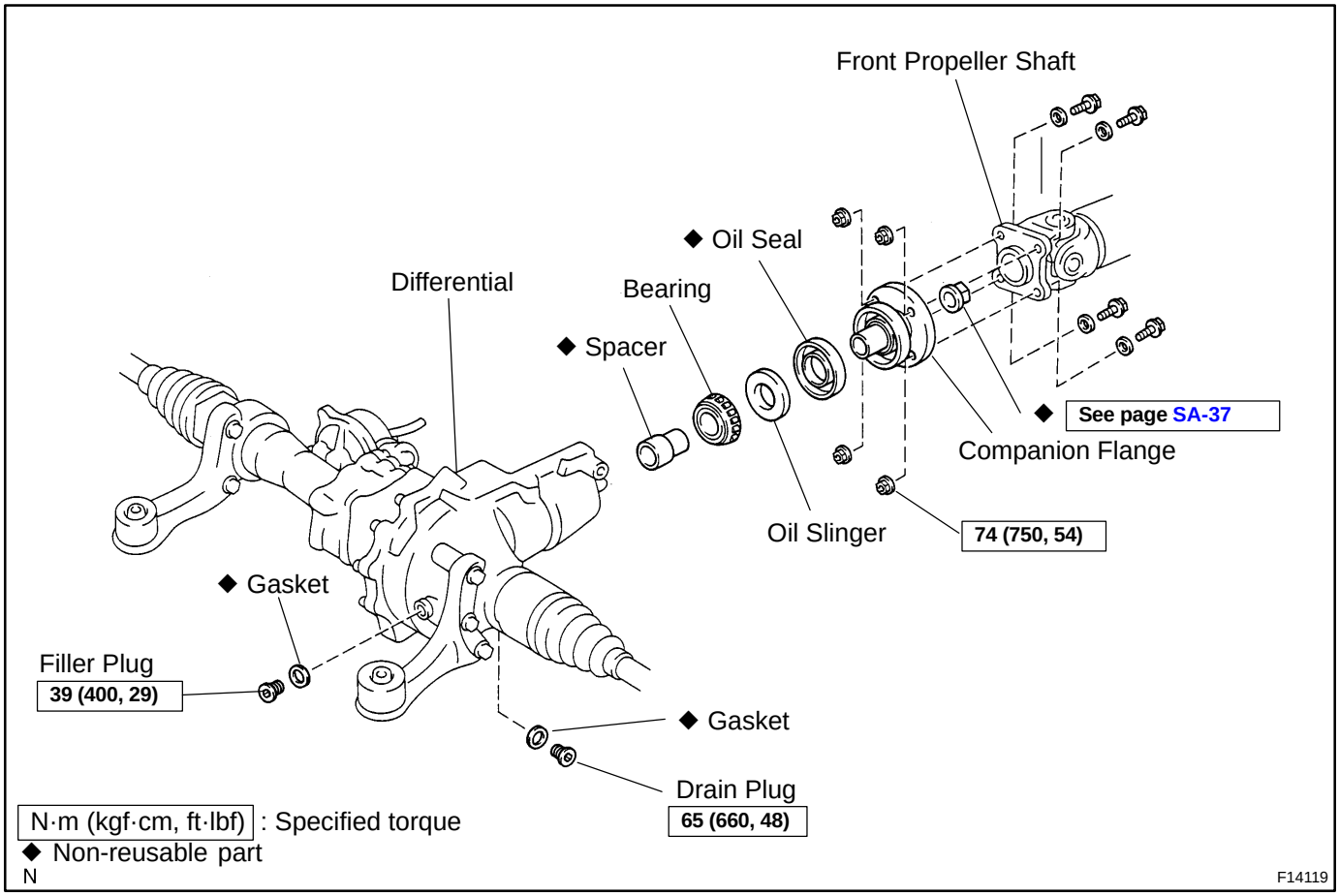
HINT:

After installation, fill the differential with differential oil (See page SA-24).

FRONT DIFFERENTIAL REAR OIL SEAL

COMPONENTS

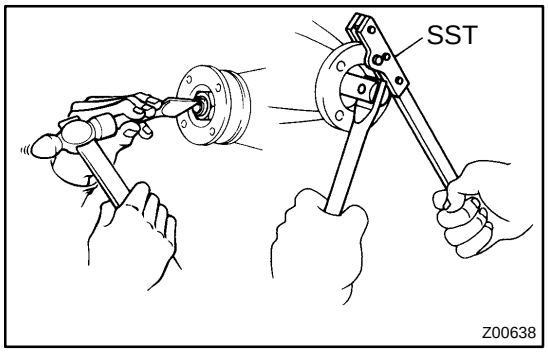
SA056-02



SA057-03

REPLACEMENT

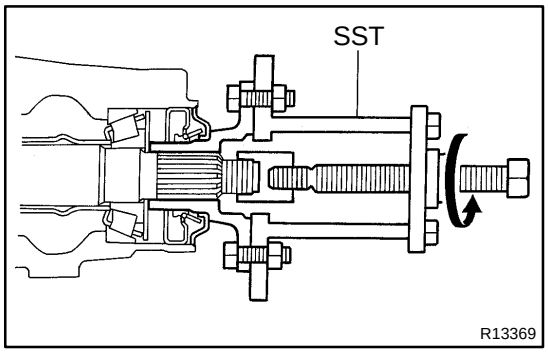
1. **REMOVE UNDER COVER**
2. **REMOVE FRONT PROPELLER SHAFT**
   (See page PR-8)



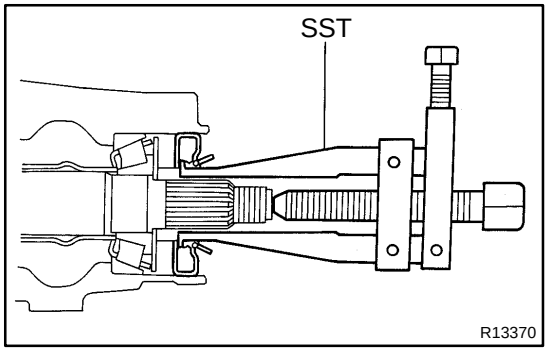
3. **REMOVE COMPANION FLANGE**

(a) Using a chisel and hammer, unstake the nut.

(b) Using SST to hold the flange, remove the nut.
SST 09330-00021



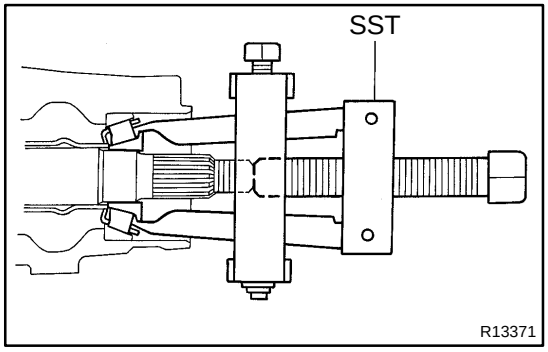
(c) Using SST, remove the companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



4. **REMOVE OIL SEAL AND OIL SLINGER**

(a) Using SST, remove the oil seal.
SST 09308-10010

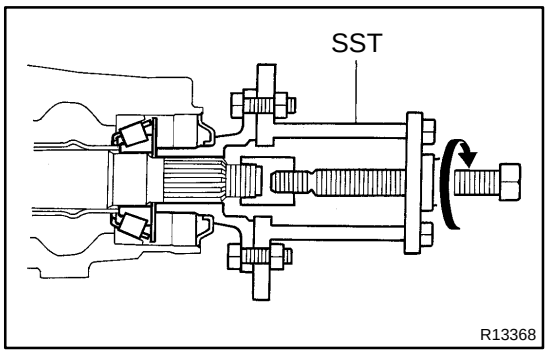
(b) Remove the oil slinger.



5. **REMOVE REAR BEARING AND BEARING SPACER**

(a) Using SST, remove the rear bearing from the drive pinion.
SST 09556-22010

(b) Remove the bearing spacer.

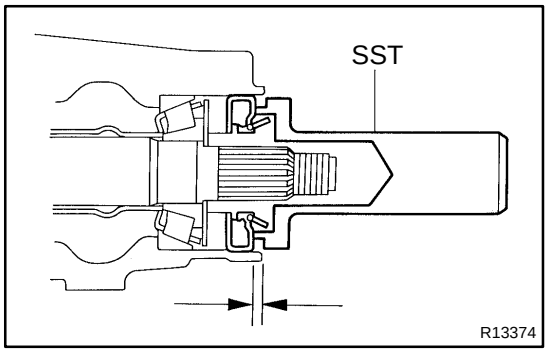


6. INSTALL BEARING SPACER, REAR BEARING AND OIL SLINGER

(a) Install a new bearing spacer and place the rear bearing and oil slinger.

(b) Using SST and the companion flange, install the rear bearing, then remove the companion flange.

SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)



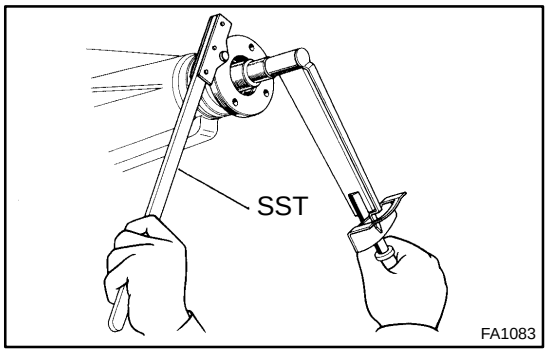
7. INSTALL NEW OIL SEAL

(a) Coat a new oil seal lip with MP grease.

(b) Using SST and a hammer, install the oil seal.

SST 09554-22010

Oil seal drive in depth: 4.5 mm (0.177 in.)



8. INSTALL COMPANION FLANGE

(a) Place the companion flange on the drive pinion.

(b) Coat the threads of a new nut with hypoid gear oil.

(c) Using SST to hold the flange, torque the nut.

SST 09330-00021

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)

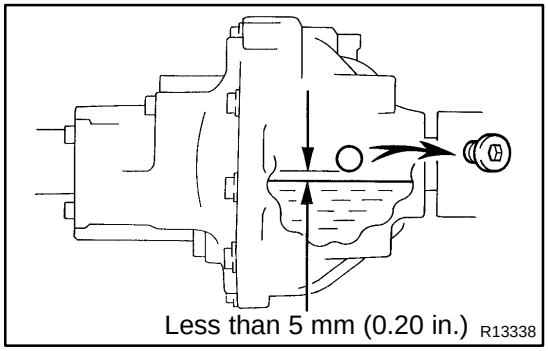
9. ADJUST DRIVE PINION PRELOAD

(See page SA-37)

10. STAKE DRIVE PINION NUT

11. INSTALL FRONT PROPELLER SHAFT

(See page PR-1 1)



12. FILL DIFFERENTIAL WITH DIFFERENTIAL OIL

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

w/o A.D.D.:

Oil type: Hypoid gear oil API GL-5

Recommended oil viscosity:

Above -18˚C (0˚F) SAE 90

Below -18˚C (0˚F) SAE 80W-90 or 80W

Capacity: 1.10 liters (1.16 US qts, 0.97 lmp.qts)

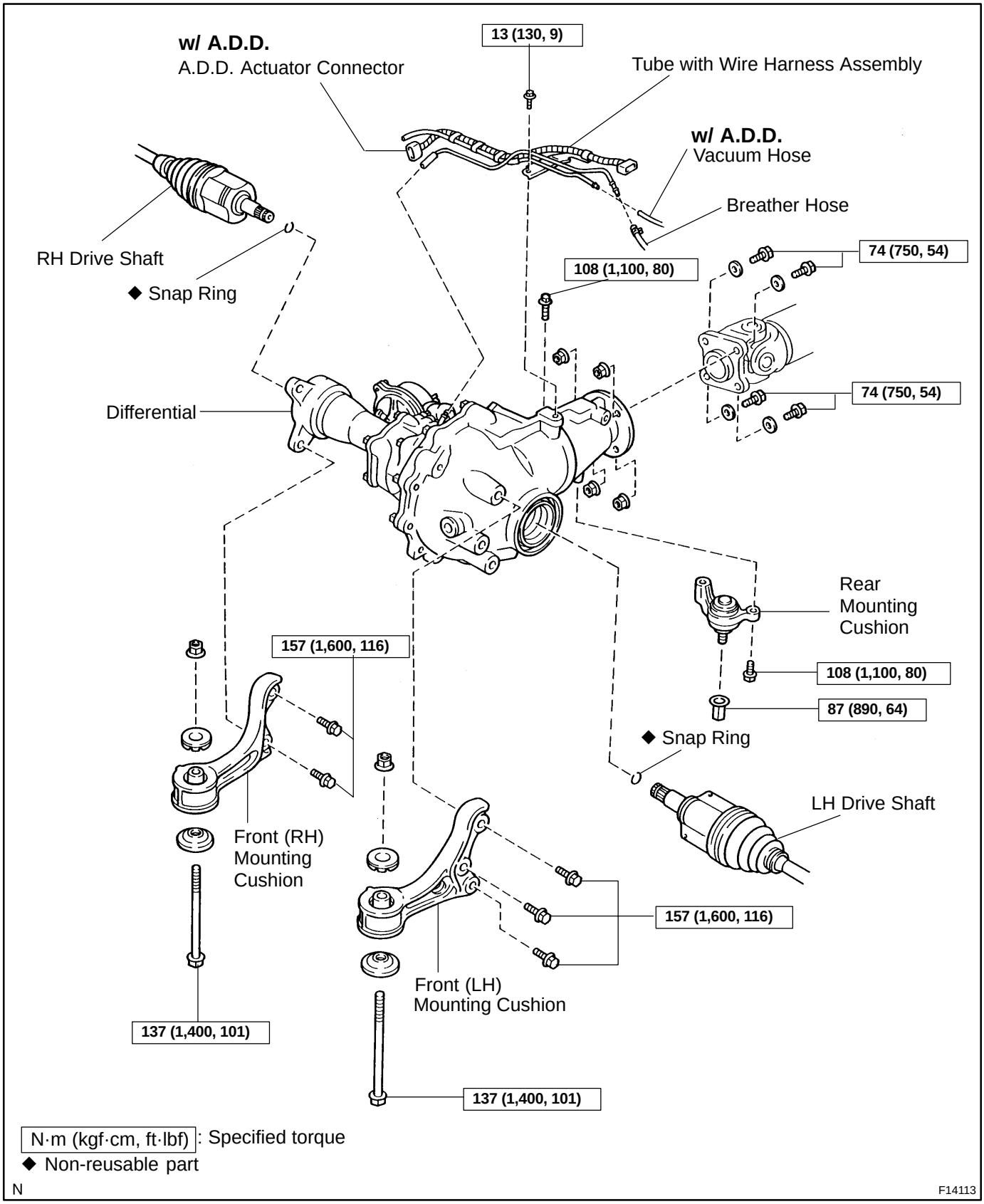
w/ A.D.D.:
Oil type: Hypoid gear oil API GL-5
Recommended oil viscosity: SAE 75W-90
Capacity: 1.15 liters (1.22 US qts, 1.01 lmp.qts)

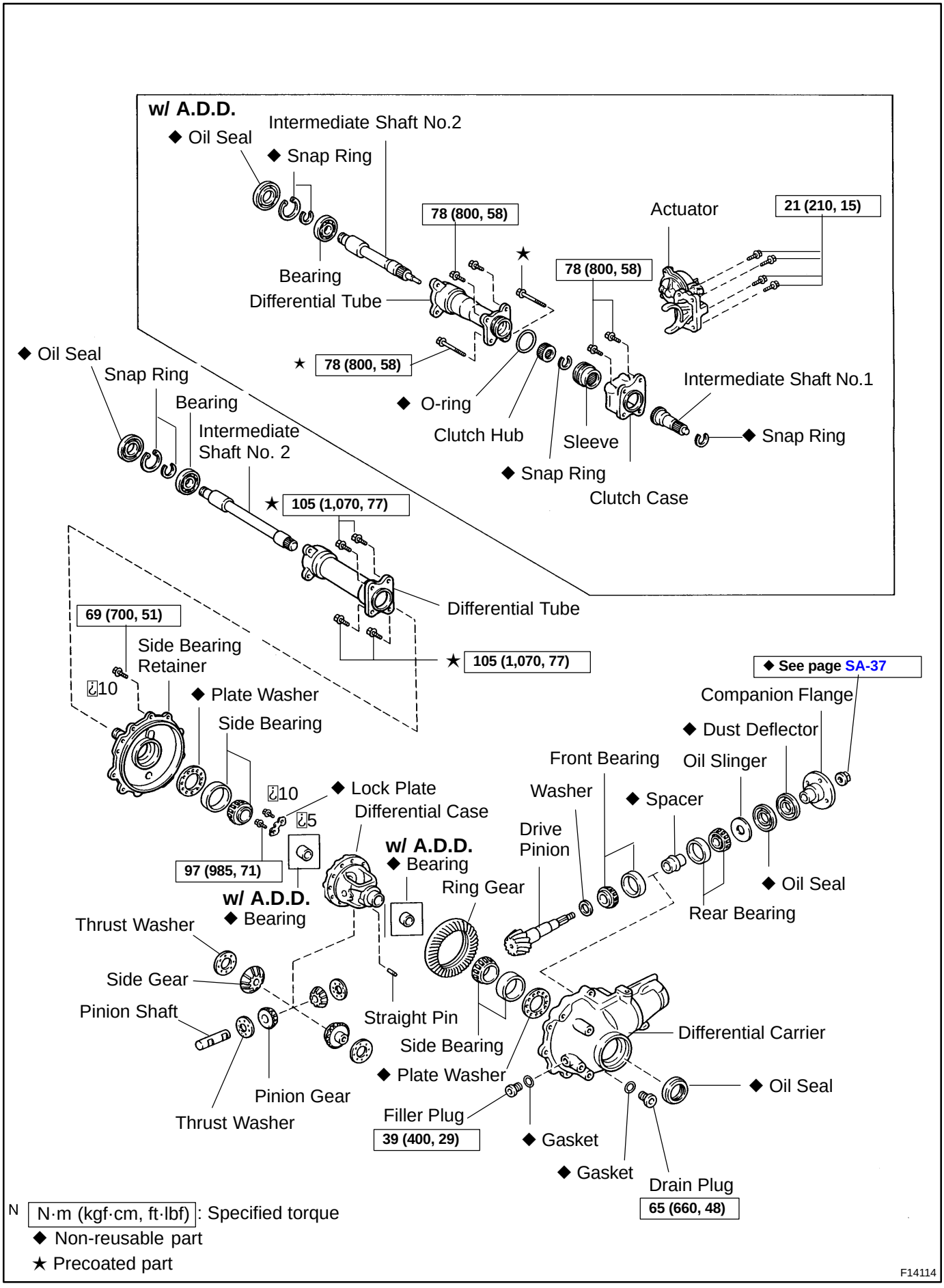
13. INSTALL UNDER COVER

FRONT DIFFERENTIAL CARRIER

COMPONENTS

SA058-02




w/ A.D.D.
◆ Oil Seal
Intermediate Shaft No.2
◆ Snap Ring
78 (800, 58)
Actuator
21 (210, 15)
Bearing
Differential Tube
★
78 (800, 58)
★ 78 (800, 58)
◆ Oil Seal
Snap Ring
Bearing
Intermediate Shaft No. 2
◆ O-ring
Clutch Hub
Sleeve
Intermediate Shaft No.1
◆ Snap Ring
◆ Snap Ring
Clutch Case
★ 105 (1,070, 77)
Differential Tube
★ 105 (1,070, 77)
69 (700, 51)
Side Bearing Retainer
10
◆ Plate Washer
Side Bearing
◆ See page SA-37
Companion Flange
◆ Dust Deflector
Front Bearing
Oil Slinger
Washer
◆ Spacer
10
◆ Lock Plate
5
Differential Case
Drive Pinion
w/ A.D.D.
◆ Bearing
97 (985, 71)
Ring Gear
◆ Oil Seal
w/ A.D.D.
◆ Bearing
Rear Bearing
Thrust Washer
Side Gear
Pinion Shaft
Straight Pin
Differential Carrier
Side Bearing
◆ Plate Washer
◆ Oil Seal
Pinion Gear
Thrust Washer
Filler Plug
39 (400, 29)
◆ Gasket
◆ Gasket
Drain Plug
65 (660, 48)
N N·m (kgf·cm, ft·lbf): Specified torque
◆ Non-reusable part
★ Precoated part
F14114

SA059-02

REMOVAL

1. REMOVE UNDER COVER AND DRAIN DIFFERENTIAL OIL
Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

2. REMOVE DRIVE SHAFTS (See page SA-17)

3. REMOVE FRONT PROPELLER SHAFT
(See page PR-8)

4. REMOVE TUBE FROM DIFFERENTIAL

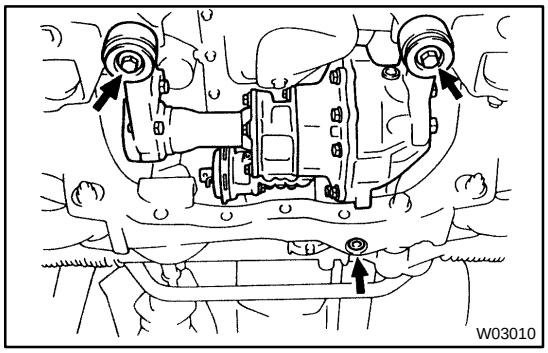
(a) w/o A.D.D.:
Disconnect the breather hose.

(b) w/ A.D.D.:
Disconnect the breather hose, A.D.D. switch connector.

(c) Remove the 1 (w/o A.D.D.) or 2 (w/ A.D.D.) bolts and tube from the differential.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

5. REMOVE FRONT DIFFERENTIAL ASSEMBLY

(a) Support the front differential with a jack.



(b) Remove the rear mounting nut.
Torque: 87 N·m (890 kgf·cm, 64 ft·lbf)

(c) Remove the 2 front mounting bolts and nuts.
Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)

(d) Lower the jack and remove the front differential assembly.

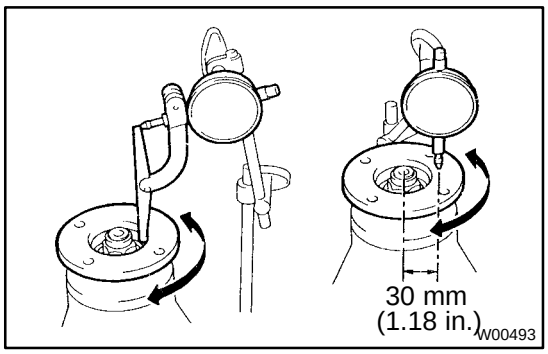
6. REMOVE DIFFERENTIAL MOUNTING CUSHIONS

(a) Remove the 2 bolts and rear mounting cushion.
Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)

(b) Remove the 5 bolts and 2 front mounting cushions.
Torque: 157 N·m (1,600 kgf·cm, 116 ft·lbf)

SA05A-05

DISASSEMBLY

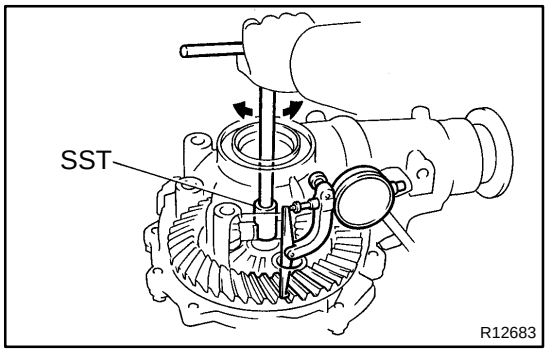


1. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum runout: 0.10 mm (0.0039 in.)

If the runout is greater than the maximum, replace the companion flange.



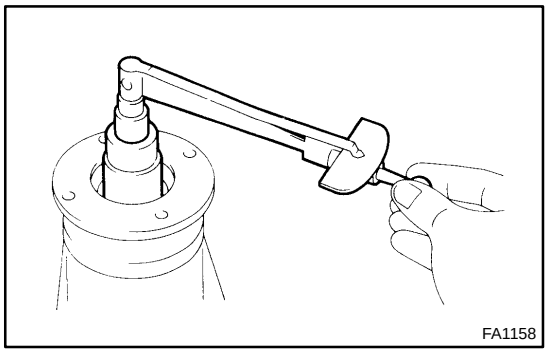
2. CHECK RING GEAR BACKLASH

Using SST and a dial indicator, measure the ring gear backlash.

SST 09564-3201 1

Backlash: 0.10 - 0.18 mm (0.0039 - 0.0071 in.)

If the backlash is not within the specification, adjust the side bearing preload or repair as necessary.



3. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the preload of backlash between the drive pinion and ring gear.

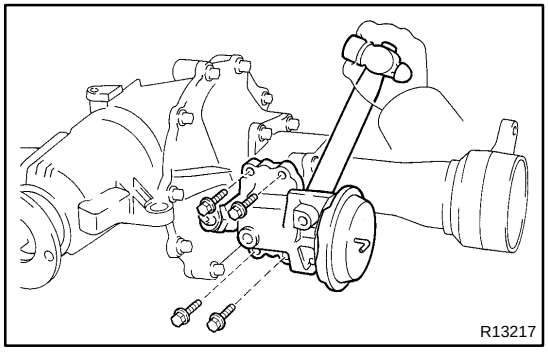
Preload (at starting):
0.6 - 1.0 N·m (6 - 10 kgf·cm, 5.2 - 8.7 in.·lbf)

4. CHECK TOTAL PRELOAD

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):
Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)

If necessary, disassemble and inspect the differential.

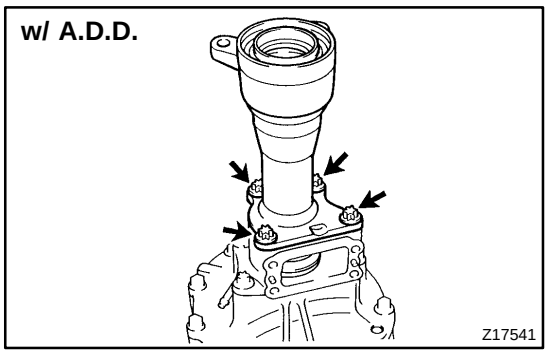


5. w/ A.D.D.:

REMOVE A.D.D. ACTUATOR

(a) Remove the 4 bolts.

(b) Using a hammer handle, remove the actuator.



6. w/ A.D.D.:
REMOVE DIFFERENTIAL TUBE

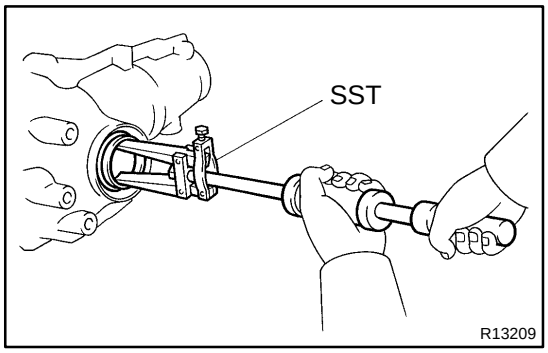
(a) Using a torx socket E14, remove the 4 torx bolts.
(b) Using a plastic hammer, remove the differential tube.
(c) Remove the sleeve.
(d) Remove the O-ring from the differential tube.

7. w/o A.D.D.:
REMOVE DIFFERENTIAL TUBE

(a) Remove the 4 bolts.
(b) Using a plastic hammer, remove the differential tube.

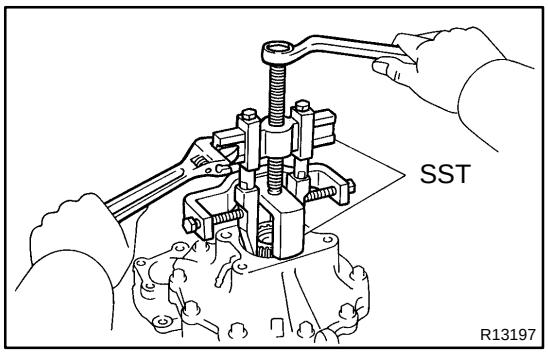
8. w/ A.D.D.:
REMOVE CLUTCH CASE

(a) Using a torx socket E14, remove the 2 torx bolts.
(b) Using a plastic hammer, remove the clutch case.



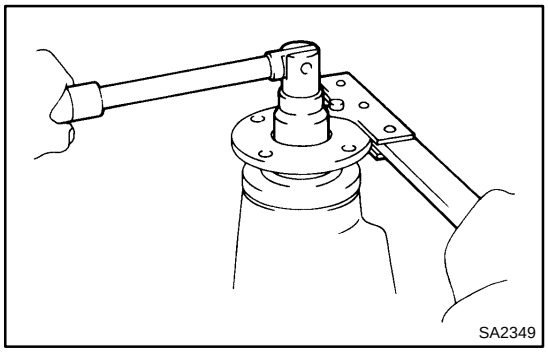
9. REMOVE SIDE OIL SEAL

Using SST, remove the side oil seal.
SST 09308-00010



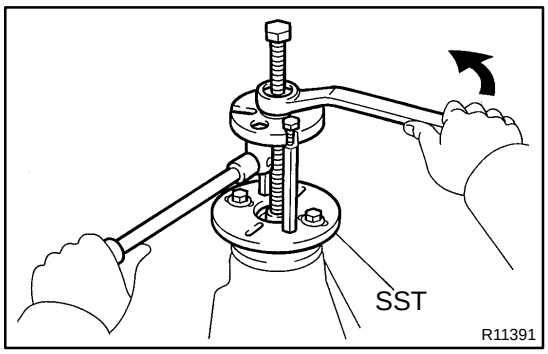
10. w/ A.D.D.:
REMOVE INTERMEDIATE SHAFT NO. 1

Using SST, remove the intermediate shaft No. 1.
SST 09350-20015 (09369-20040),
09950- 40011 (09951- 04010, 09952- 04010,
09953- 04020, 09954- 04010, 09955- 04011,
09957-04010, 09958-04011)

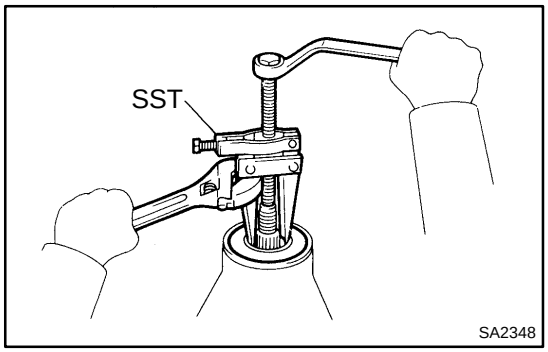


11. REMOVE COMPANION FLANGE

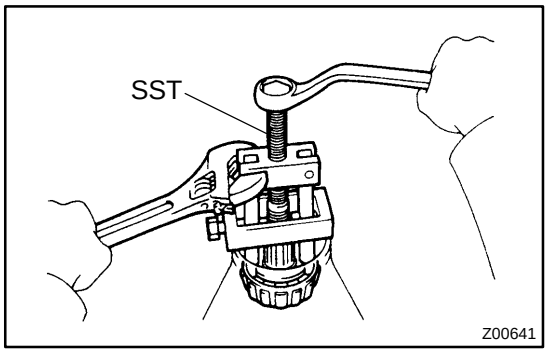
(a) Using a chisel and hammer, unstake the nut.
(b) Using SST to hold the flange, remove the nut.
SST 09330-00021



(c) Using SST, remove the companion flange.
SST 09950- 30012 (09951- 03010, 09953- 03010, 09954-03010, 09955-03030, 09956-03020)



12. REMOVE OIL SEAL AND OIL SLINGER
(a) Using SST, remove the oil seal.
SST 09308-10010
(b) Remove the oil slinger.

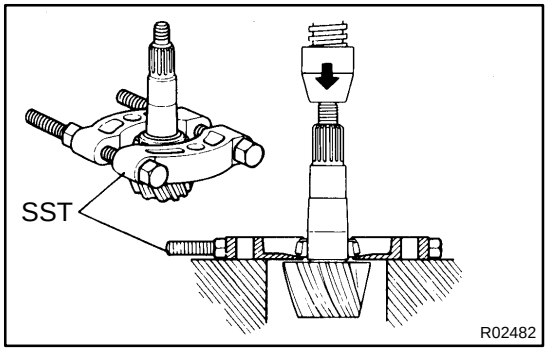


13. REMOVE REAR BEARING AND BEARING SPACER
(a) Using SST, remove the rear bearing from the drive pinion.
SST 09556-22010
(b) Remove the bearing spacer.

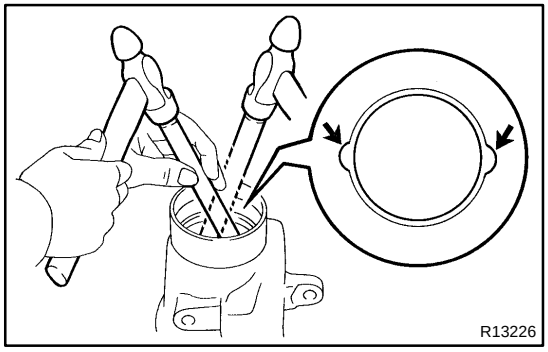
14. REMOVE SIDE BEARING RETAINER
Remove the 10 bolts and tap out the retainer with a plastic hammer.

15. REMOVE DIFFERENTIAL CASE ASSEMBLY

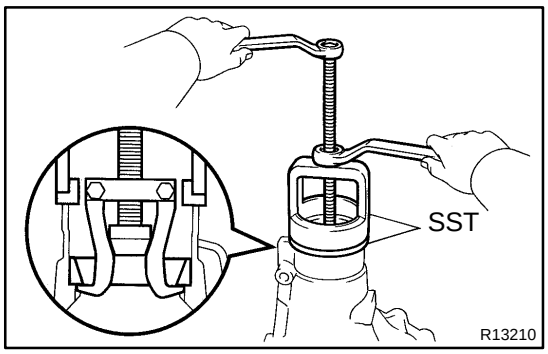
16. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER



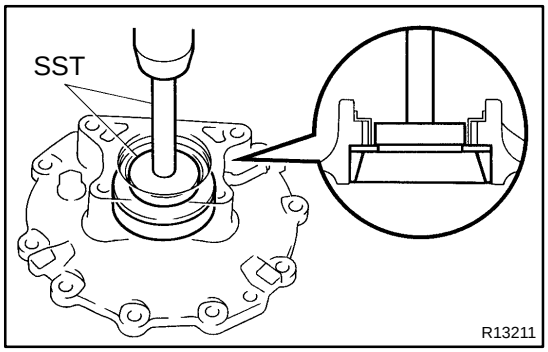
17. REMOVE DRIVE PINION FRONT BEARING
Using SST and a press, remove the bearing and washer from the drive pinion.
SST 09950-00020
HINT:
If the drive pinion or ring gear are damaged, replace them as a set.



18. REMOVE DRIVE PINION BEARING OUTER RACES
(a) Using a brass bar and hammer, remove the front bearing outer race.



(b) Using SST, remove the rear bearing outer race.
SST 09502- 12010, 09612- 65014 (09612- 01020, 09612-01050)

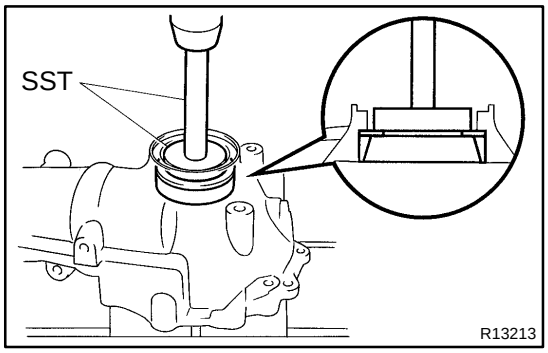


19. REMOVE SIDE BEARING OUTER RACES

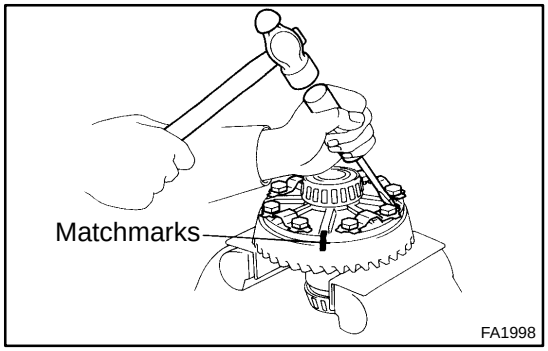
HINT:

- Measure the plate washer and note the thickness.
- Tag the bearing outer races to show the location for reassembly.

(a) Using SST and a press, remove the outer race and plate washer from the bearing retainer.
SST 09950-60010 (09951-00540), 09550-70010 (09951-07150)

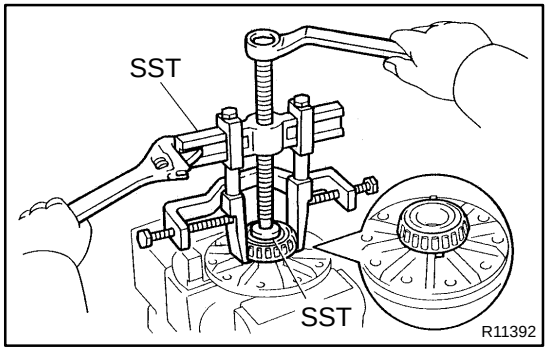


(b) Using SST and a press, remove the outer race and plate washer from the differential carrier.
SST 09950-60010 (09951-00650), 09950-70010 (09951-07150)



20. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.
(b) Using a screwdriver, unstake the 5 lock plates.
(c) Remove the 10 bolts and 5 lock plates.
(d) Using a plastic hammer, tap on the ring gear to separate it from the differential case.

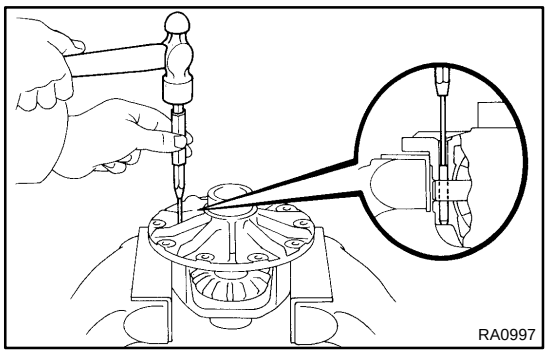


21. REMOVE SIDE BEARINGS

Using SST, remove the 2 side bearings from the differential case.
SST 09950- 40011 (09951- 04010, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04061, 09957-04010, 09958-04011), 09950-60010 (09951-00480)

HINT:

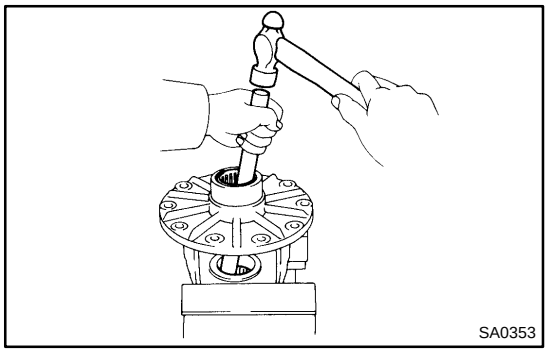
Fix the claws of SST to the notch in the differential case.



22. DISASSEMBLE DIFFERENTIAL CASE ASSEMBLY

(a) Using a pin punch and hammer, remove the straight pin.

(b) Remove the pinion shaft, 2 pinion gears, 2 pinion gears thrust washers, 2 side gears and 2 side gear thrust washers.



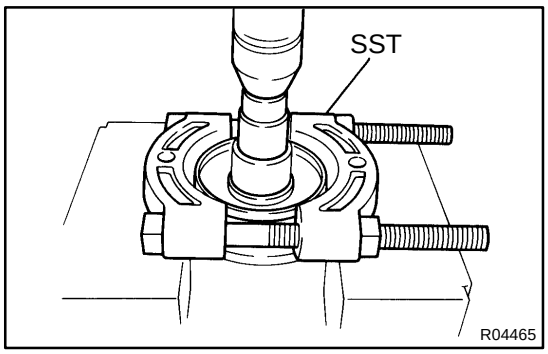
23. w/ A.D.D.:
REMOVE BEARINGS

Using a brass bar and hammer, remove the 2 bearings.

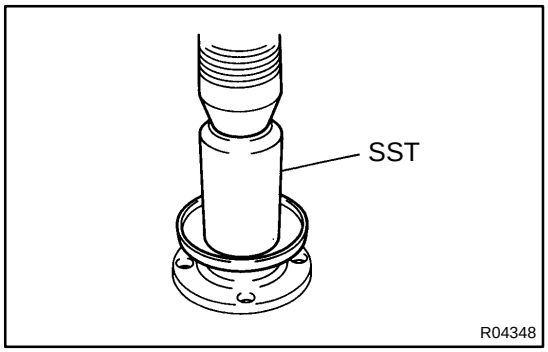
SA22E-01

REPLACEMENT

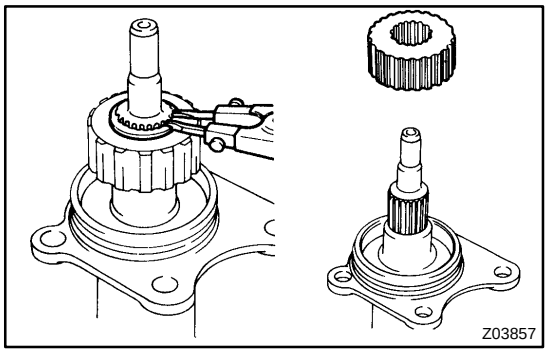
1. REPLACE COMPANION FLANGE DUST DEFLECTOR, IF NECESSARY



(a) Using SST and a press, remove the dust deflector.
SST 09950-00020

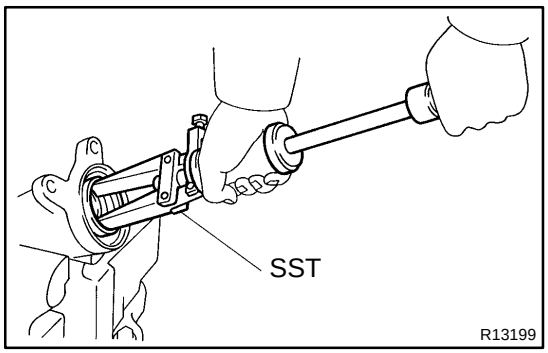


(b) Using SST and a press, install a new dust deflector.
SST 09636-20010



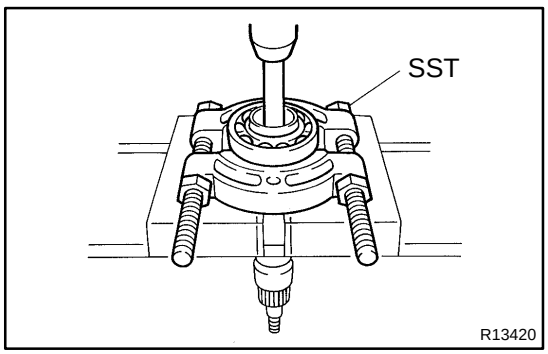
2. REPLACE INTERMEDIATE SHAFT NO. 2, IF NECESSARY

(a) w/ A.D.D.:
Remove the clutch hub.
(1) Using a snap ring expander, remove the snap ring.
(2) Remove the clutch hub from the intermediate shaft No. 2.

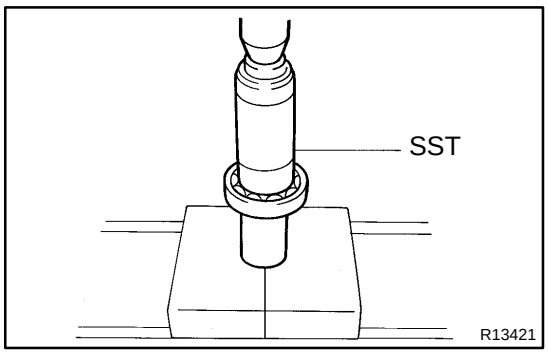


(b) Remove the oil seal.
Using SST, remove the oil seal from the differential tube.
SST 09308-00010

(c) Remove the intermediate shaft No. 2
(1) Using needle nose pliers, remove the snap ring.
(2) Remove the shaft from the differential tube.

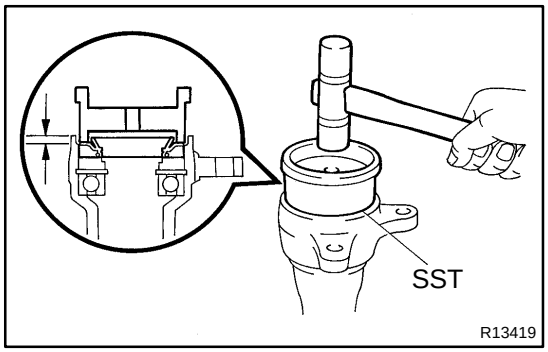


(d) Remove the intermediate shaft No. 2 bearing.
(1) Using a snap ring expander, remove the snap ring.
(2) Using SST, a brass bar and press, remove the bearing.
SST 09950-00020

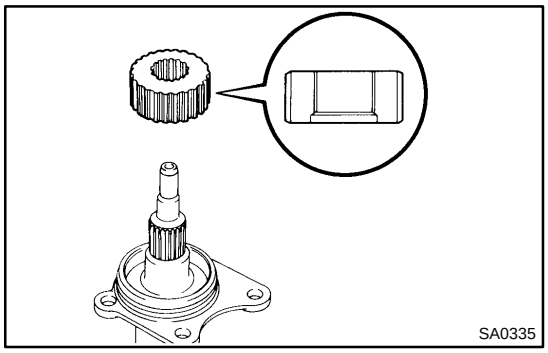


(e) Install a new intermediate shaft No.2 bearing.
(1) Using SST and a press, install a new bearing.
SST 09309-37010
(2) Using a snap ring expander, install the snap ring.

(f) Install the intermediate shaft No.2
(1) Install the shaft into the differential tube.
(2) Using needle nose pliers, install the snap ring.



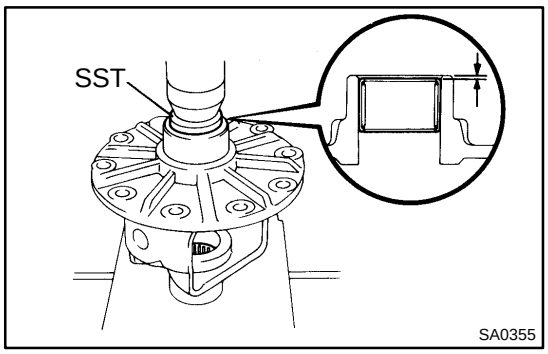
(g) Install a new oil seal.
(1) Using SST, install a new oil seal.
SST 09223-15020
Oil seal drive in depth: 5.5 mm (0.217 in.)
(2) Coat the oil seal lip with MP grease.



(h) w/ A.D.D.:
Install the clutch hub.
(1) Install the clutch hub to the intermediate shaft No.2.
(2) Using snap ring pliers, install the snap ring.

SA05C-04

REASSEMBLY



1. w/ A.D.D.:

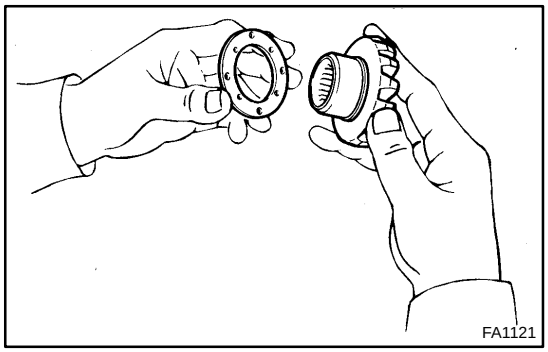
INSTALL NEW BEARINGS

Using SST and a press, install 2 new bearings.

SST 09950-60010 (09951-00380)

Bearing press in depth:

0.3 ± 0.3 mm (0.012 ± 0.012 in.)



2. ASSEMBLE DIFFERENTIAL CASE

(a) Install the 2 proper thrust washers on the 2 side gears.

HINT:

Using the table below, select 2 thrust washers which will ensure that the backlash is within the specifications.

Washer thickness

Thickness mm (in.)	Thickness mm (in.)
0.96 - 1.04 (0.0378 - 0.0409)	1.16 - 1.24 (0.0457 - 0.0488)
1.06 - 1.14 (0.0417 - 0.0449)	1.26 - 1.34 (0.0496 - 0.0528)

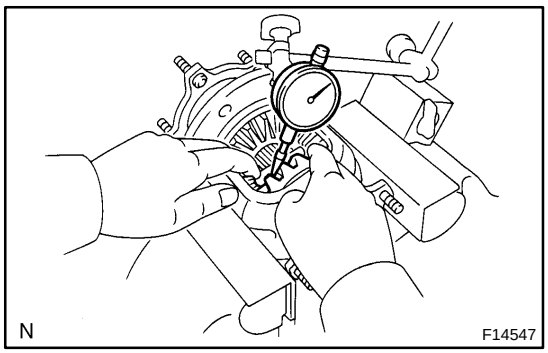
(b) Install the 2 side gears, 2 pinion gears, 2 pinion gear thrust washers and pinion shaft in the differential case.

HINT:

Align the holes of the differential case and pinion shaft.

(c) Measure the side gear backlash.

(1) Install the intermediate shaft to the differential case.

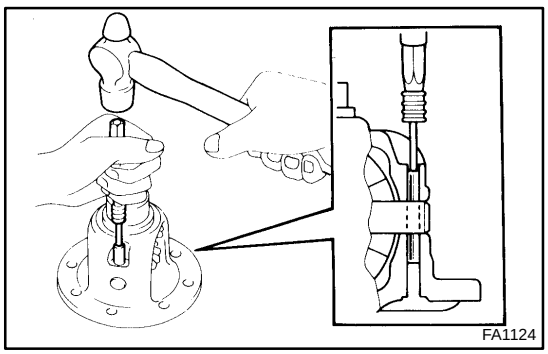


(2) Using a dial indicator, measure the side gear backlash with holding one pinion gear toward the differential case.

Backlash: 0 - 0.20 mm (0 - 0.0079 in.)

If the backlash is not within the specification, install 2 side gear thrust washers with different thicknesses.

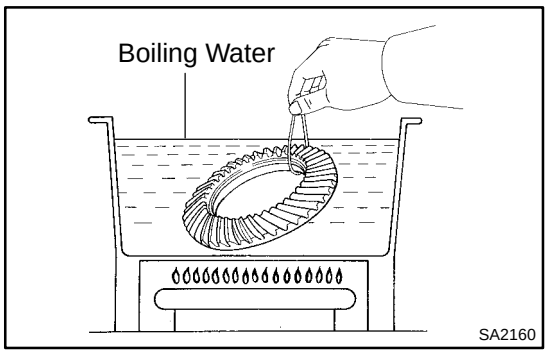
(3) Remove the intermediate shaft.



3. INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

(a) Using a pin punch and hammer, install the straight pin through the differential case and hole of the pinion shaft.

(b) Stake the differential case.



4. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surfaces of the differential case and ring gear.

(b) Heat the ring gear to about 100˚C (212˚F) in boiling water.

(c) Carefully remove the ring gear from the boiling water.

(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

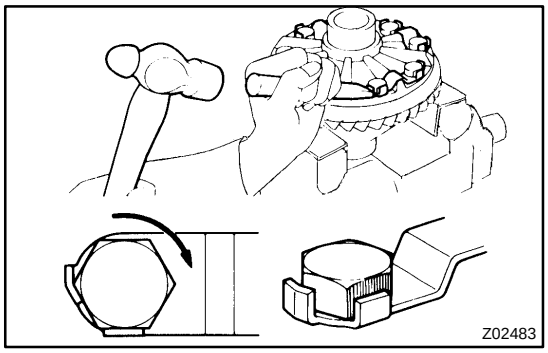
HINT:

Align the matchmarks on the ring gear and differential case.

(e) Temporarily install 5 new lock plates and 10 bolts so that the bolt holes in the ring gear and differential case are not misaligned.

(f) After the ring gear has cooled sufficiently, torque the ring gear set bolts.

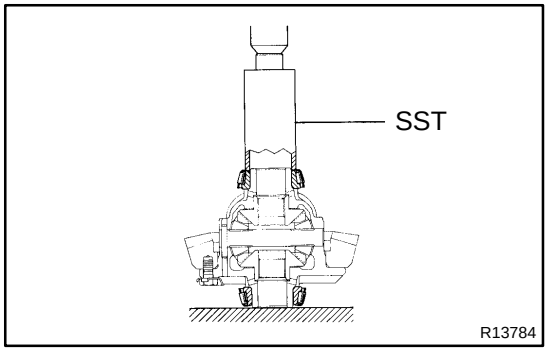
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)



(g) Using a drift punch and hammer, stake the 5 lock plates.

HINT:

Stake one claw flush with the flat surface of the bolt. For the claw contacting the protruding portion of the bolt, stake only the half on the tightening side.



5. INSTALL SIDE BEARINGS

Using SST and a press, install the 2 bearings into the differential case.

SST 09226-10010

6. INSTALL SIDE BEARING OUTER RACES

HINT:

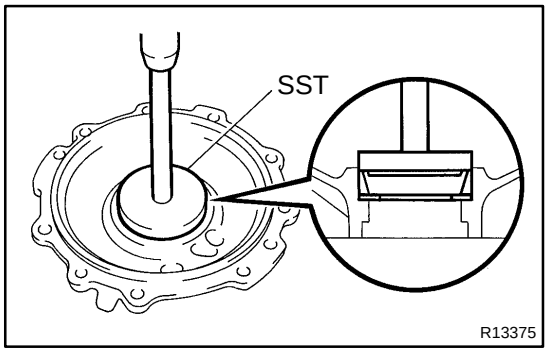
When replacing the 2 side bearings, fit the 2 thinnest washers to each bearing and when reusing the bearings, fit the washers with the same thickness as removed.

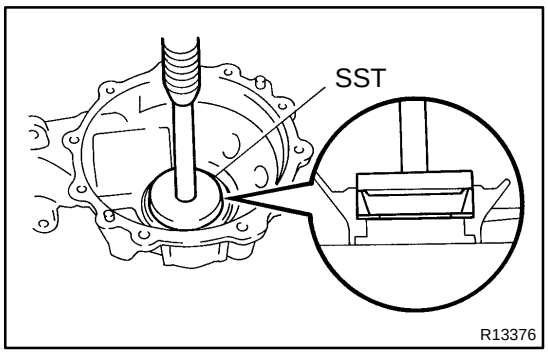
(a) Install a new plate washer to the side bearing retainer.

(b) Using SST and a press, install the bearing outer race to the side bearing retainer.

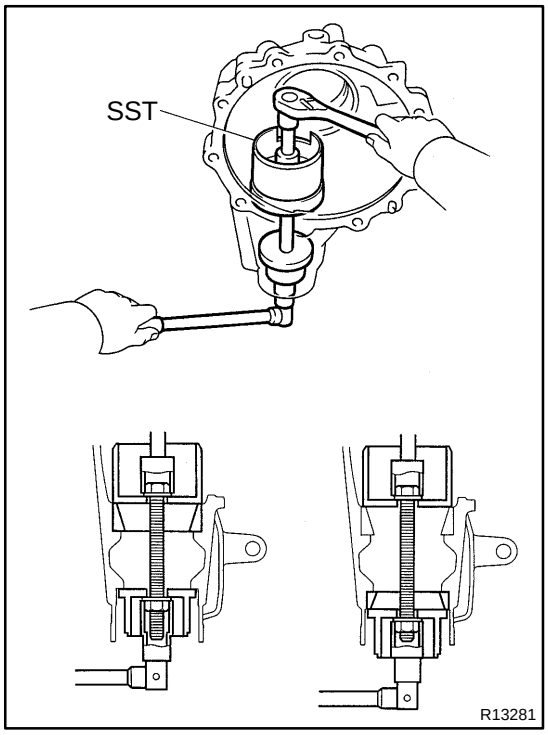
SST 09950-60020 (09951-00790),
09950-70010 (09951-07150)

(c) Install a new plate washer to the differential carrier.





(d) Using SST and a press, install the bearing outer race to the differential carrier.
SST 09950-60020 (09951-00790),
09950-70010 (09951-07150)



7. INSTALL DRIVE PINION FRONT AND REAR BEARING OUTER RACES

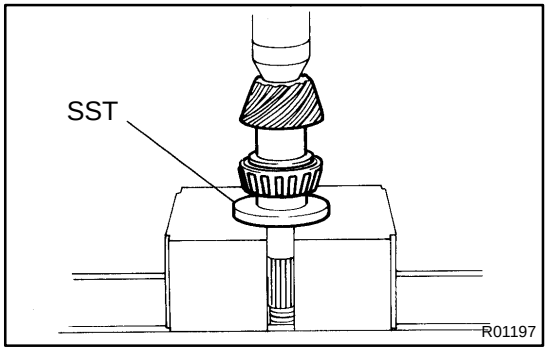
Using SST, install the 2 outer races.
SST 09570-2201 1

8. INSTALL DRIVE PINION FRONT BEARING

(a) Install the washer on the drive pinion.

HINT:

First fit a washer with the same thickness with the removed washer, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.



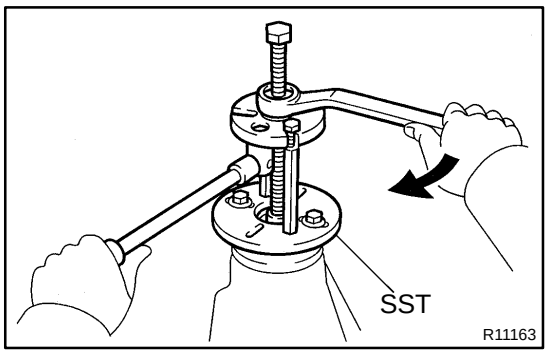
(b) Using SST and a press, install the front bearing onto the drive pinion.
SST 09506-30012

9. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the drive pinion and oil slinger.

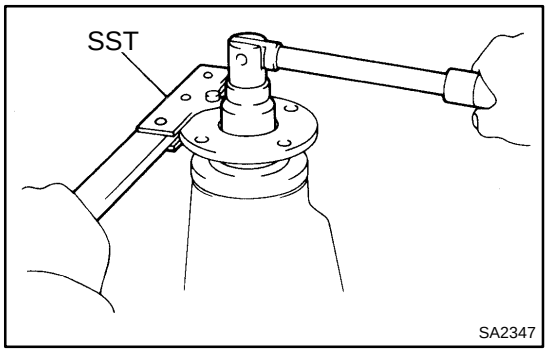
HINT:

Assemble the spacer and oil seal after adjusting the ring gear tooth contact pattern.



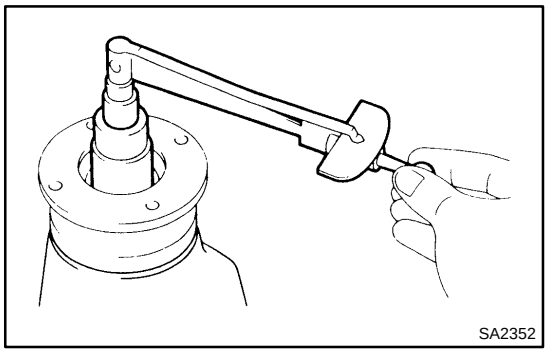
(b) Using SST, install the rear bearing, oil slinger and companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)

(c) Coat the threads of the nut with hypoid gear oil.



(d) Adjust the drive pinion preload by tightening the companion flange nut.
Using SST to hold the flange, tighten the nut.
SST 09330-00021

NOTICE:
As there is no spacer, tighten the nut a little at a time, being careful not to overtighten it.

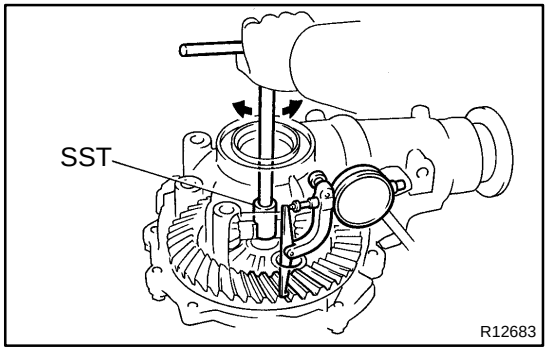


(e) Using a torque wrench, measure the preload.
Preroad (at starting)
New bearing:
1.2 - 1.9 N·m (12 - 19 kgf·cm, 10.4 - 16.5 in.·lbf)
Reused bearing:
0.6 - 1.0 N·m (6 - 10 kgf·cm, 5.2 - 8.7 in.·lbf)

10. INSTALL DIFFERENTIAL CASE IN DIFFERENTIAL CARRIER

11. ADJUST RING GEAR BACKLASH

(a) Install the side bearing retainer with the 10 bolts.
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)



(b) Using SST and a dial indicator, measure the ring gear backlash.
SST 09564-3201 1
Backlash: 0.10 - 0.18 mm (0.0039 - 0.0070 in.)

(c) If it is not within the specification, adjust it by either in creasing or decreasing the washers on both sides by an equal amount.

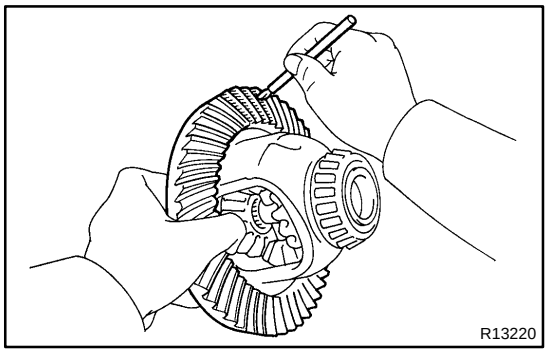
HINT:

There should be no clearance between the plate washer and case.

Make sure that there is ring gear backlash.

Washer thickness

Thickness mm (in.)	Thickness mm (in.)	Thickness mm (in.)
2.00 - 2.02 (0.0787 - 0.0795)	2.27 - 2.29 (0.0894 - 0.0902)	2.54 - 2.56 (0.1000 - 0.1008)
2.03 - 2.05 (0.0799 - 0.0807)	2.30 - 2.32 (0.0906 - 0.0913)	2.57 - 2.59 (0.1012 - 0.1020)
2.06 - 2.08 (0.0811 - 0.0819)	2.33 - 2.35 (0.0917 - 0.0925)	2.60 - 2.62 (0.1024 - 0.1031)
2.09 - 2.11 (0.0823 - 0.0831)	2.36 - 2.38 (0.0929 - 0.0937)	2.63 - 2.65 (0.1035 - 0.1043)
2.12 - 2.14 (0.0835 - 0.0843)	2.39 - 2.41 (0.0941 - 0.0949)	2.66 - 2.68 (0.1047 - 0.1055)
2.15 - 2.17 (0.0846 - 0.0854)	2.42 - 2.44 (0.0953 - 0.0961)	2.69 - 2.71 (0.1059 - 0.1067)
2.18 - 2.20 (0.0858 - 0.0866)	2.45 - 2.47 (0.0965 - 0.0972)	2.72 - 2.74 (0.1071 - 0.1079)
2.21 - 2.23 (0.0870 - 0.0878)	2.48 - 2.50 (0.0976 - 0.0984)	2.75 - 2.77 (0.1083 - 0.1091)
2.24 - 2.26 (0.0882 - 0.0890)	2.51 - 2.53 (0.0988 - 0.0996)	2.78 - 2.80 (0.1094 - 0.1102)



12. MEASURE TOTAL PRELOAD

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):

Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)

13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Remove the side bearing retainer and differential case.

(b) Coat 3 or 4 teeth at the 3 different positions on the ring gear with red lead.

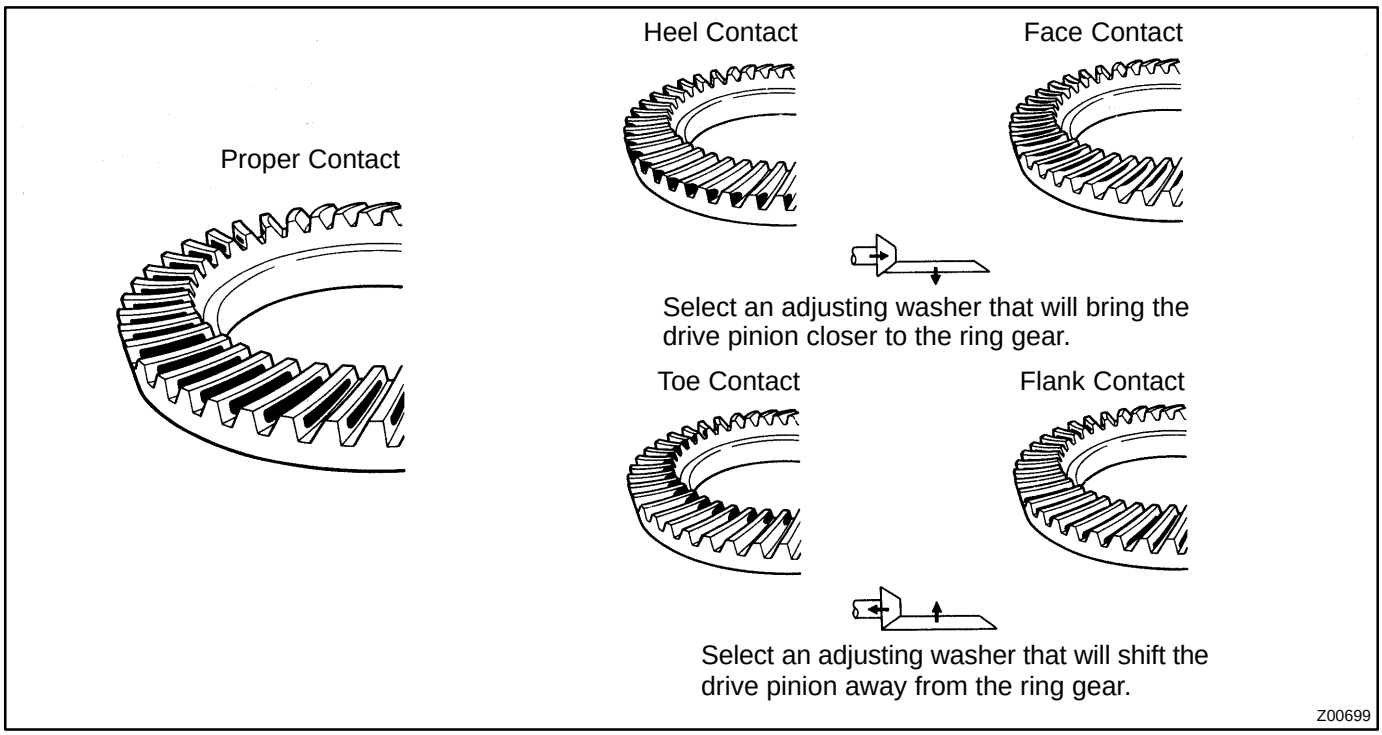
(c) Install the differential case and side bearing retainer.

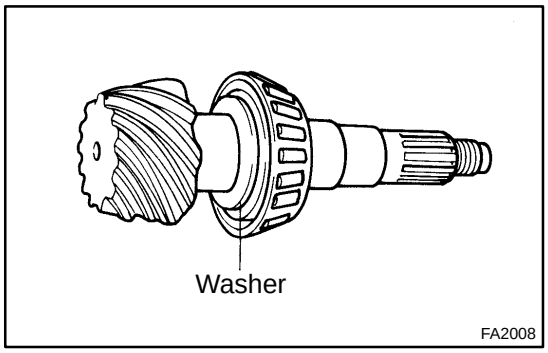
Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

(d) Hold the companion flange firmly and rotate the ring gear in both directions.

(e) Remove the side bearing retainer and differential case.

(f) Inspect the tooth contact pattern.





If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Washer thickness

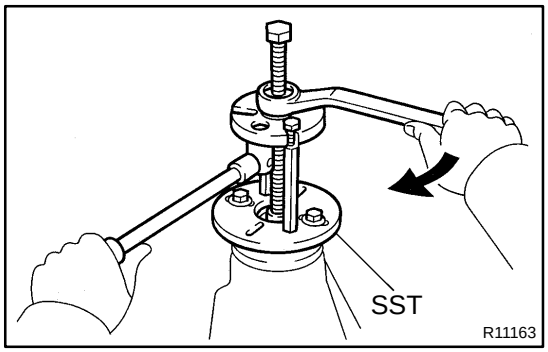
Thickness mm (in.)	Thickness mm (in.)	Thickness mm (in.)
1.69 - 1.71 (0.0665 - 0.0673)	1.93 - 1.95 (0.0760 - 0.0768)	2.17 - 2.19 (0.0854 - 0.0862)
1.72 - 1.74 (0.0677 - 0.0685)	1.96 - 1.98 (0.0772 - 0.0780)	2.20 - 2.22 (0.0866 - 0.0874)
1.75 - 1.77 (0.0689 - 0.0697)	1.99 - 2.01 (0.0783 - 0.0791)	2.23 - 2.25 (0.0878 - 0.0886)
1.78 - 1.80 (0.0701 - 0.0709)	2.02 - 2.04 (0.0795 - 0.0803)	2.26 - 2.28 (0.0890 - 0.0898)
1.81 - 1.83 (0.0713 - 0.0720)	2.05 - 2.07 (0.0807 - 0.0815)	2.29 - 2.31 (0.0902 - 0.0909)
1.84 - 1.86 (0.0724 - 0.0732)	2.08 - 2.10 (0.0819 - 0.0827)	2.32 - 2.34 (0.0913 - 0.0921)
1.87 - 1.89 (0.0736 - 0.0744)	2.11 - 2.13 (0.0831 - 0.0839)	-
1.90 - 1.92 (0.0748 - 0.0756)	2.14 - 2.16 (0.0843 - 0.0850)	-

14. REMOVE COMPANION FLANGE AND OIL SLINGER (See page SA-30)

15. REMOVE REAR BEARING (See page SA-30)

16. INSTALL NEW BEARING SPACER, REAR BEARING AND OIL SLINGER

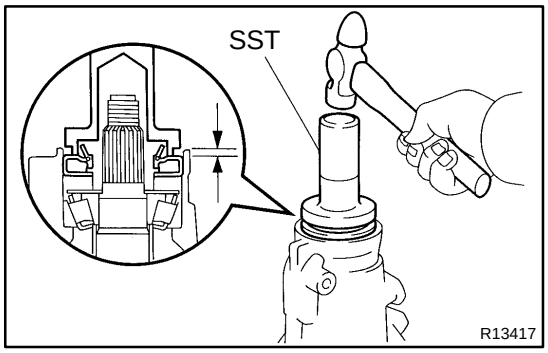
(a) Install a new bearing spacer and place the rear bearing and oil slinger.



(b) Using SST and the companion flange, install the rear bearing, then remove the companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03020)

17. INSTALL OIL SEAL

(a) Coat a new oil seal lip with MP grease.

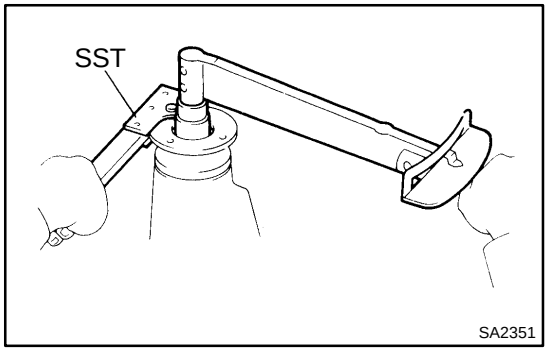


(b) Using SST and a hammer, install the oil seal.
SST 09554-22010
Oil seal drive in depth: 4.5 mm (0.177 in.)

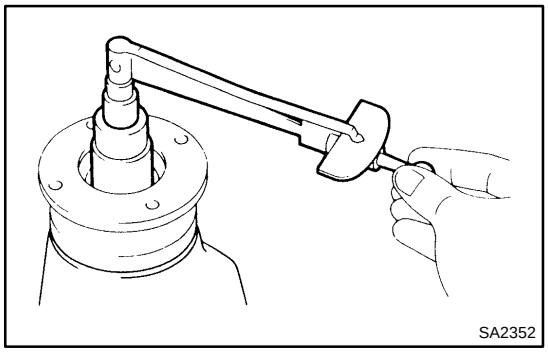
18. INSTALL COMPANION FLANGE

(a) Place the companion flange on the drive pinion.

(b) Coat the threads of a new nut with hypoid gear oil.



(c) Using SST to hold the flange, torque the nut.
SST 09330-00021
Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)



19. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

Preroad (at starting):
New bearing:
1.2 - 1.9 N·m (12 - 19 kgf·cm, 10.4 - 16.5 in.·lbf)
Reused bearing:
0.6 - 1.0 N·m (6 - 10 kgf·cm, 5.2 - 8.7 in.·lbf)

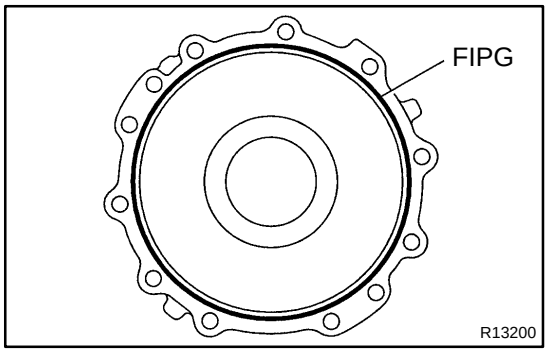
If the preload is greater than the specification, replace the bearing spacer.

If the preload is less than the specification, retighten the nut 13 N·m (130 kgf·cm, 9 ft·lbf) a little at a time until the specified preload is reached.

Torque: 223 N·m (2,275 kgf·cm, 165 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the nut to reduce the preload.

20. INSTALL DIFFERENTIAL CASE



21. INSTALL SIDE BEARING RETAINER

(a) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential carrier and side bearing retainer.

(b) Clean contacting surfaces of any residual FIPG material using gasoline or alcohol.

(c) Apply FIPG to the side bearing retainer, as shown.

FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT:

Install the side bearing retainer within 10 minutes after applying FIPG.

(d) Install the side bearing retainer with the 10 bolts.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

22. CHECK TOTAL PRELOAD

23. RECHECK RING GEAR BACKLASH

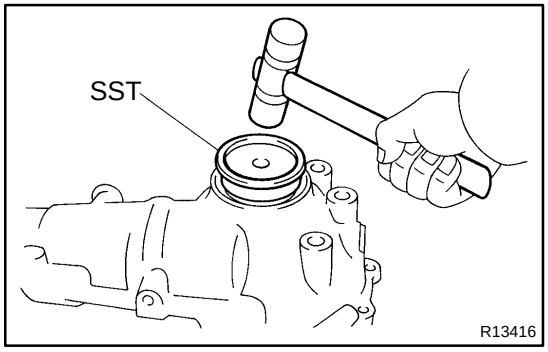
(See page SA-30)

24. RECHECK TEETH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 13)

25. CHECK RUNOUT OF COMPANION FLANGE

(See page SA-30)

26. STAKE DRIVE PINION NUT

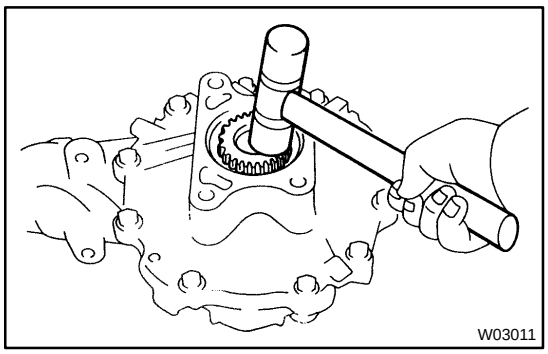


27. INSTALL SIDE OIL SEAL

(a) Using SST and a plastic hammer, install a new oil seal until its surface is flush with the differential carrier end.

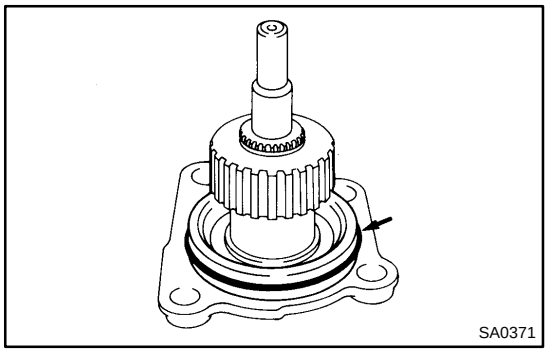
SST 09608-32010

(b) Coat the oil seal lip with MP grease.



28. w/ A.D.D.:
INSTALL INTERMEDIATE SHAFT NO. 1

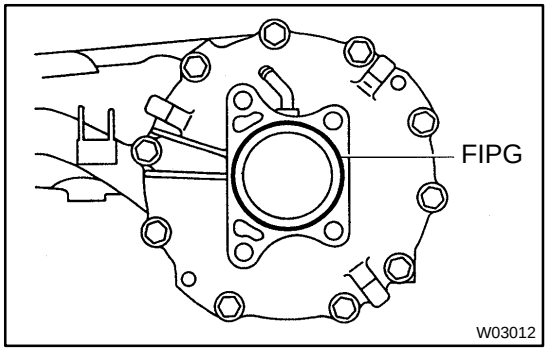
(a) Install a new snap ring to the intermediate shaft No. 1.
(b) Using a plastic hammer, install the intermediate shaft No. 1 to the differential case.
(c) Check that there is 2 - 3 mm (0.08 - 0.12 in.) of play in axial direction.
(d) Check that the intermediate shaft No. 1 will not come out by trying to pull it completely out by hand.



29. w/ A.D.D.:
INSTALL CLUTCH CASE TO DIFFERENTIAL TUBE

(a) Coat the O-ring with MP grease.
(b) Install a new O-ring to the tube.
(c) Install the clutch case to the tube.
(d) Using a torx socket E14, install the 2 torx bolts.
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)

30. w/ A.D.D.:
INSTALL CLUTCH SLEEVE

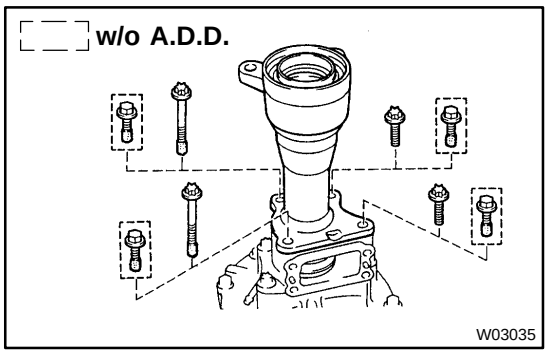


31. INSTALL DIFFERENTIAL TUBE TO DIFFERENTIAL

(a) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the differential and clutch case.
(b) Clean contacting surfaces of any residual FIPG material using gasoline or alcohol.
(c) Apply FIPG to the differential, as shown.
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT:
Install the differential tube within 10 minutes after applying FIPG.

(d) Install the differential tube to the differential.

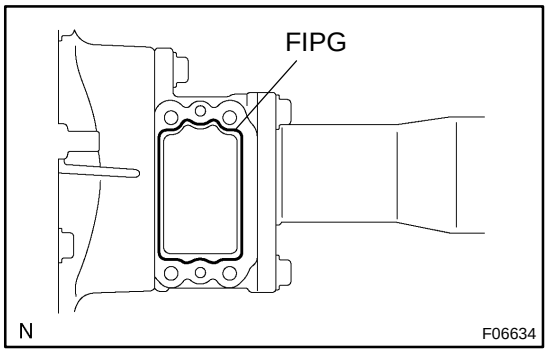


(e) Clean the threads of the 4 bolts (w/o A.D.D.) or 2 torx bolts (w/ A.D.D.) and retainer bolt holes with toluene or trichloroethylene.

(f) Apply adhesive to 2 or 3 threads of the bolts end.
Adhesive: Part No. 08833-00070, THREE BOND 1324 or equivalent

(g) w/o A.D.D.:
Install the 4 bolts.
Torque: 105 N·m (1,070 kgf·cm, 77 ft·lbf)

(h) w/ A.D.D.:
Using a torx socket E14, install the 4 torx bolts.
Torque: 78 N·m (800 kgf·cm, 58 ft·lbf)



32. w/ A.D.D.:
INSTALL A.D.D. ACTUATOR

(a) Remove any old FIPG material and be careful not to drop oil on the contact surfaces of the actuator and clutch case.

(b) Clean contacting surfaces of any residual FIPG material using gasoline or alcohol.

(c) Apply FIPG to the clutch case, as shown.
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

HINT:
Install the actuator within 10 minutes after applying FIPG.

(d) Install the 4 bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

SA05D-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-29).

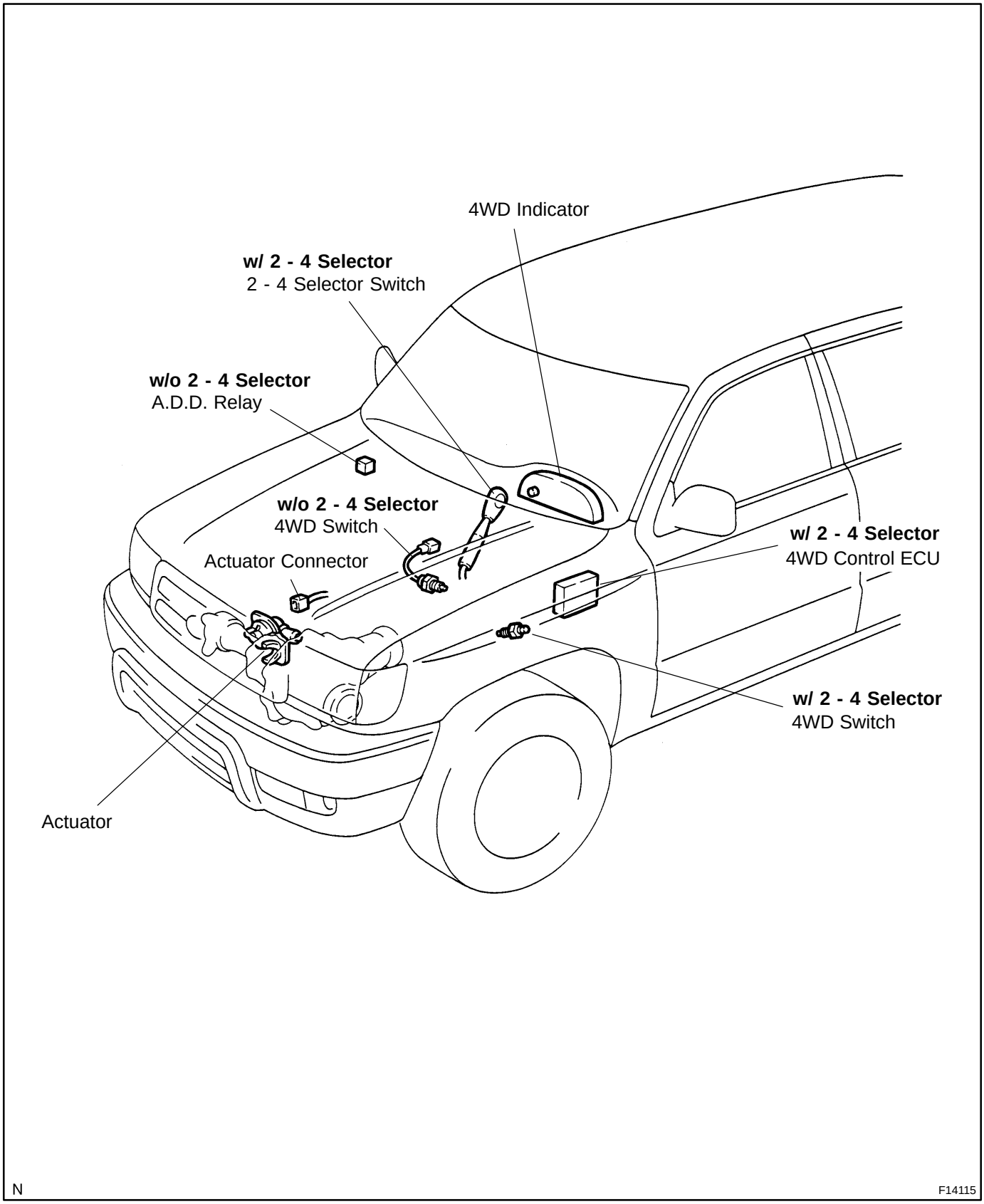
HINT:

After installation, fill the differential with gear oil (See page SA-24).

A.D.D. CONTROL SYSTEM

LOCATION

SA05E-02

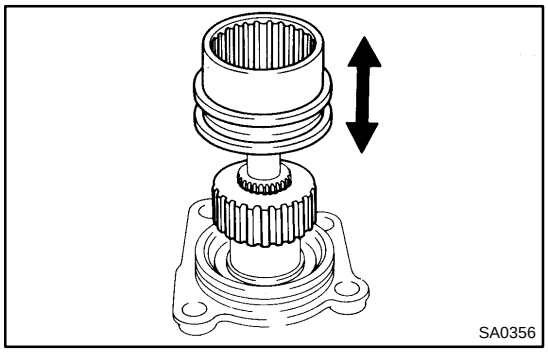


SA22N-01

INSPECTION

HINT:

First judge that the malfunction is found in A.D.D. control system or in 2 - 4 selector system (See page TR-49).

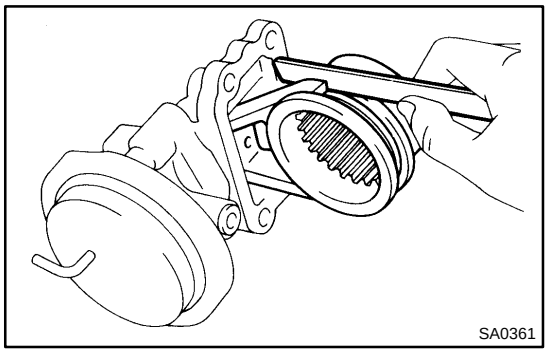


1. INSPECT CLUTCH HUB AND CLUTCH SLEEVE

(a) Check the wear and damage of the clutch hub and clutch sleeve.

If necessary, replace them.

(b) Check that clutch sleeve slides smoothly on the clutch hub.



2. MEASURE CLEARANCE OF SLEEVE FORK AND CLUTCH SLEEVE

Using a feeler gauge, measure the clearance between the sleeve fork and clutch sleeve.

Maximum clearance: 0.35 mm (0.0138 in.)

If the clearance exceeds the maximum, replace the fork or sleeve

3. INSPECT A.D.D. ACTUATOR

(a) Disconnect the actuator connector.

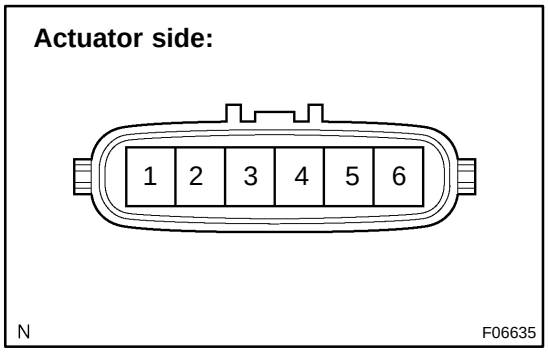
(b) Measure the resistance between the terminals 2 and 6.

Standard resistance: 0.3 - 100 Ω

(c) Measure the resistance between the terminals 2 or 6 and body ground.

Standard resistance: More than 0.5 MΩ

If the resistance value is not as specified, replace the actuator assembly.



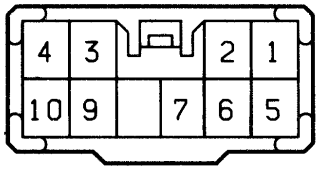
4. INSPECT A.D.D. ACTUATOR OPERATION

Apply battery positive voltage between the terminal 2 or 6, and check the actuator operation by sound, A.D.D. status and continuity between the terminal 3 and 4.

Battery voltage applied terminal	3-4 terminals continuity	A.D.D. status
2 (+) - 6 (-)	Continuity	Connected
2 (-) - 6 (+)	No continuity	Disconnected

If the operation is not as specified, replace the actuator assembly.

Relay side:



Z15367

5. INSPECT A.D.D. RELAY

(a) Check the continuity between each terminal, as shown in the chart.

Tester connected terminal number	Specified condition
1 - 2	Continuity
2 - 4	Continuity
6 - 7	*

*: There is a diode between the terminals 6 and 7. If no continuity exists, check that continuity exists when changing the position of ⊕ probe for the position of negative ⊖ probe of tester.

(b) Apply battery positive voltage between each terminal and check the continuity between each terminal, as shown in the chart.

Battery voltage applied terminal	Tester connected terminal number	Specified condition
6 (+) - 5 (-)	1 - 3 1 - 2	Continuity No continuity
7 (+) - 2 (-)	9 - 10	No continuity
9 (+) - 10 (-)	3 - 4 2 - 4	Continuity No continuity

If continuity is not as specified, replace the relay.

6. INSPECT TRANSFER 4WD POSITION SWITCH (See page TR-11 or TR-18)

7. REMOVE A.D.D. ACTUATOR (See page SA-30)

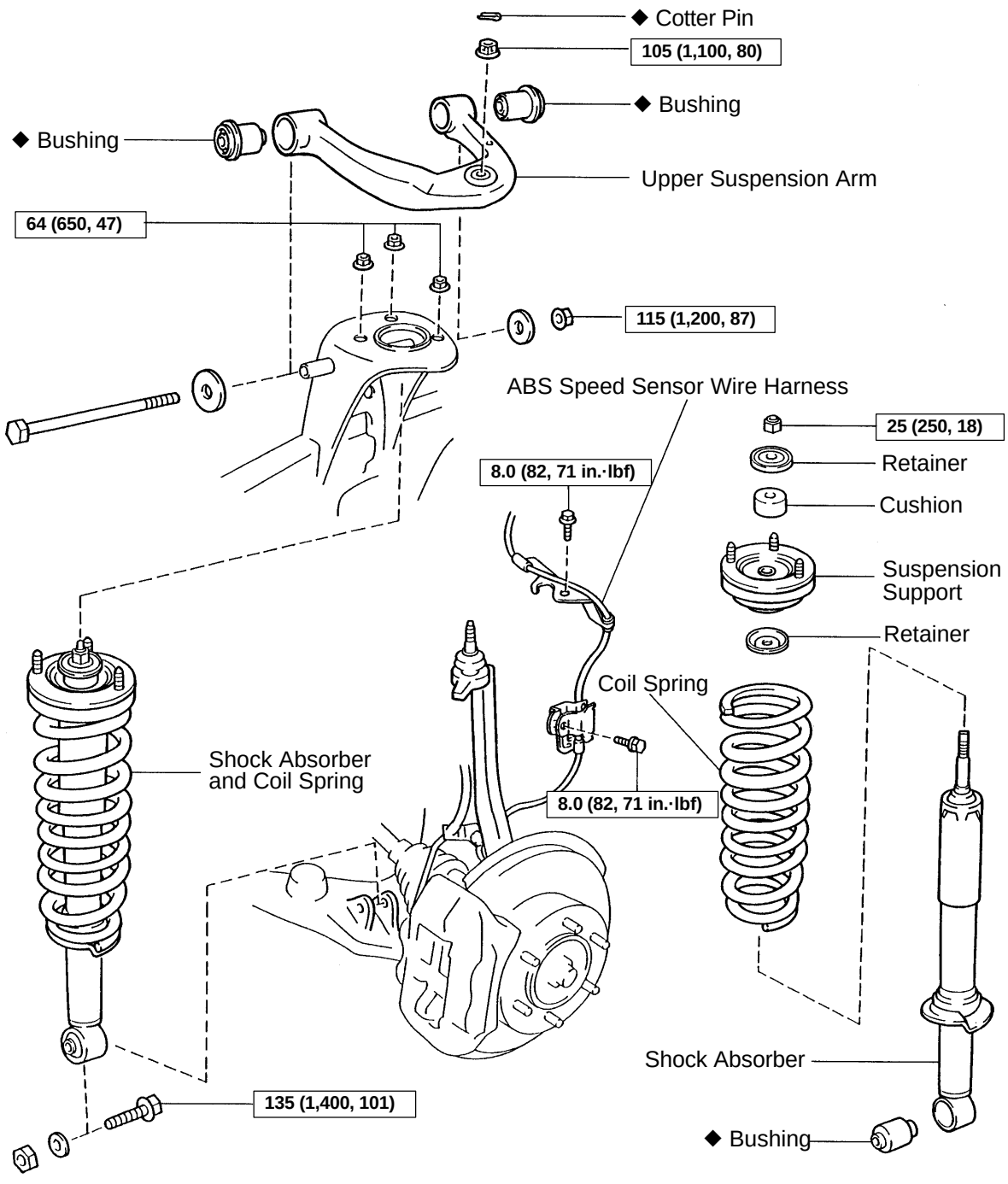
8. INSPECT CLUTCH HUB AND CLUTCH SLEEVE

Check the clutch hub and clutch sleeve for wear and damage. If necessary, replace them.

FRONT SHOCK ABSORBER

SA05G-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

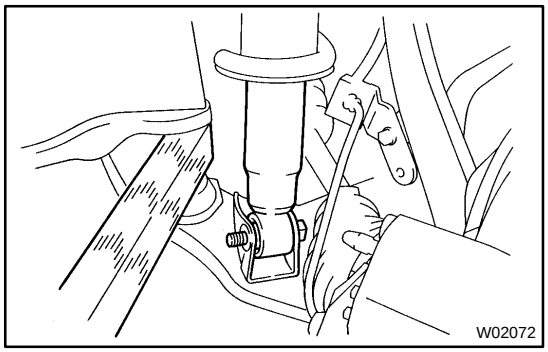
Z18522

SA05H-02

REMOVAL

1. REMOVE FRONT WHEEL

Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)



2. DISCONNECT SHOCK ABSORBER FROM LOWER SUSPENSION ARM

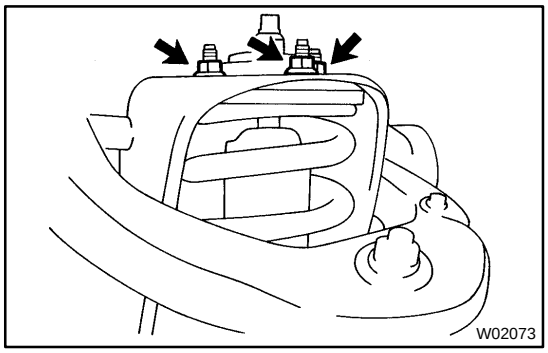
(a) Loosen the bolt and remove the shock absorber lower nut and washer.

Torque: 135 N·m (1,400 kgf·cm, 101 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the bolt.

(b) With lowering the lower suspension arm, remove the bolt and disconnect the shock absorber.

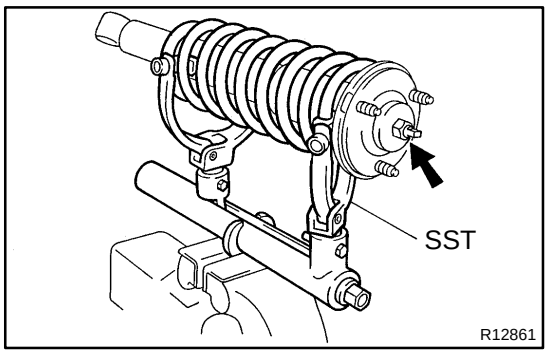


3. REMOVE SHOCK ABSORBER WITH COIL SPRING

Remove the 3 nuts, shock absorber with coil spring.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

SA05I-03



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

(a) Using SST, compress the coil spring until there is a clearance on both ends.
SST 09727-00060, 09727-30021

NOTICE:

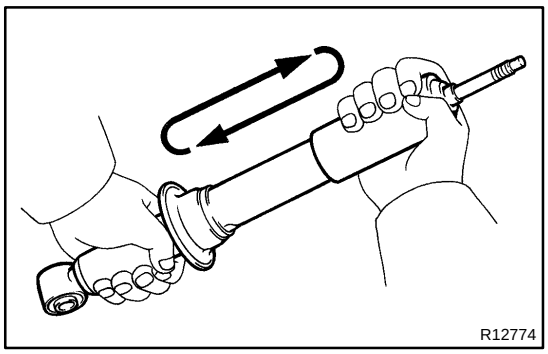
To avoid damage to SST:

- **Set SST arms to allow clearance to hold a 8-roll coil between them.**
- **Do not compress the coil spring more than necessary.**
- **Do not use an impact wrench.**

(b) Remove suspension support center nut.

(c) Remove the 2 retainers, cushion, suspension support and coil spring.

SA05J-01



INSPECTION

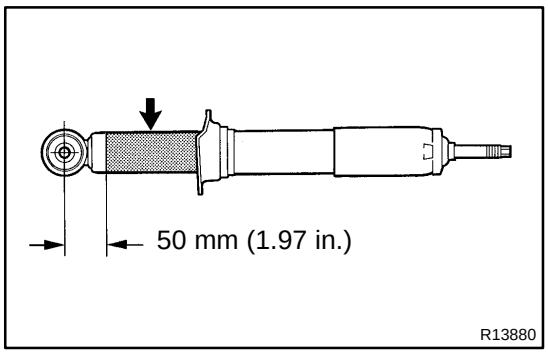
INSPECT SHOCK ABSORBER

Compress and extend the shock absorber rod and check that there is no abnormal resistance or unusual operation sounds. If there is any abnormality, replace the shock absorber with a new one.

NOTICE:

When discarding the shock absorber, see DISPOSAL on page SA-55 .

SA05N-01



DISPOSAL

1. FULLY EXTEND SHOCK ABSORBER ROD

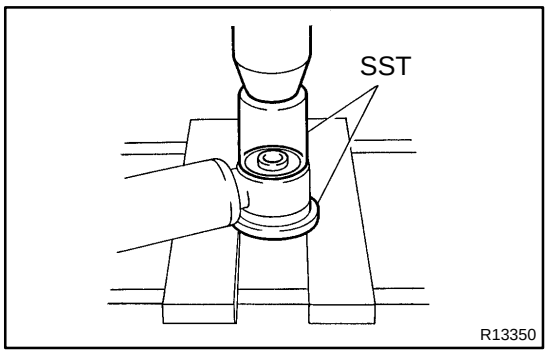
2. DRILL HOLE TO REMOVE GAS FROM CYLINDER

Using a drill, make a hole in the cylinder as shown to remove the gas inside.

CAUTION:

The gas coming out is harmless, but be careful of chips which may fly up when drilling.

SA05K-01

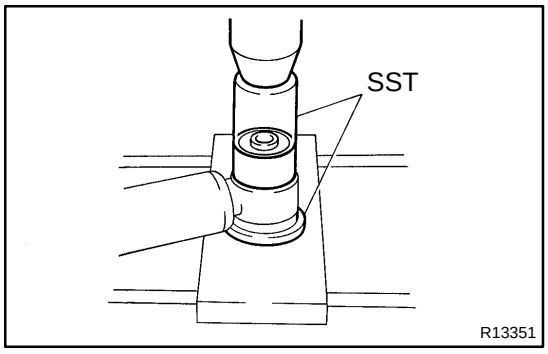


REPLACEMENT

1. REMOVE BUSHING

Using SST and a press, remove the bushing.

SST 09506-35010, 09632-36010



2. INSTALL NEW BUSHING

Using SST and a press, install a new bushing.

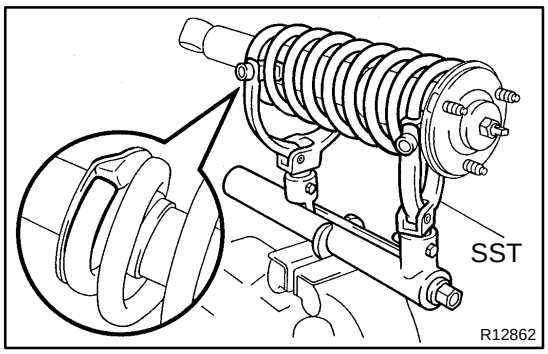
SST 09506-35010, 09632-36010

HINT:

Do not apply grease or oil to the bushing.

SA05L-02

REASSEMBLY



1. INSTALL COIL SPRING TO SHOCK ABSORBER

(a) Using SST, compress the coil spring.
SST 09727-00060, 09727-30021

NOTICE:

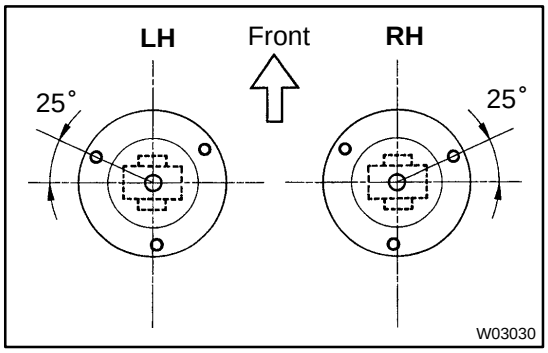
To avoid damage to SST:

- **Set SST arms to allow clearance to hold a 8-roll coil between them.**
- **Do not compress the coil spring more than necessary.**
- **Do not use an impact wrench.**

(b) Install the coil spring to the shock absorber.

HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.



2. INSTALL SUSPENSION SUPPORT

(a) Install the 2 retainers, suspension support and cushion to the rod.

(b) Temporarily tighten a new suspension support center nut.

(c) Align the suspension support with the shock absorber lower bushing, as shown.

HINT:

Face the lower end of the coil spring to the outside of the vehicle.

(d) Remove the SST.
SST 09727-00060, 09727-30021

HINT:

After removing the SST, recheck the direction of the suspension support.

(e) Torque the suspension center nut.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

SA05M-01

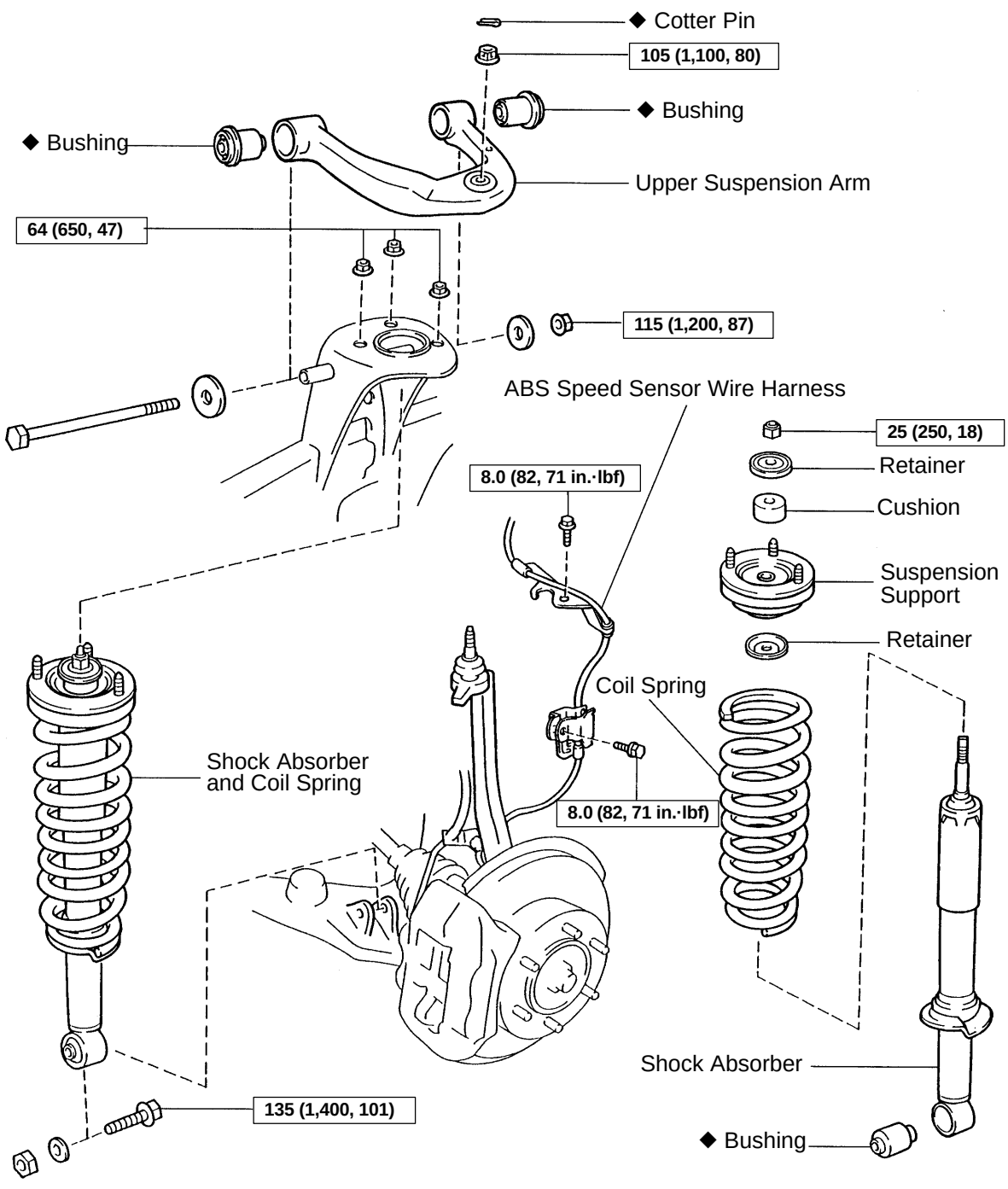
INSTALLATION

Installation is in the reverse order of removal (See page SA-52).

FRONT UPPER SUSPENSION ARM

SA05O-02

COMPONENTS



N·m (kgf·cm, ft·lbf): Specified torque

◆ Non-reusable part

Z18522

SA05P-03

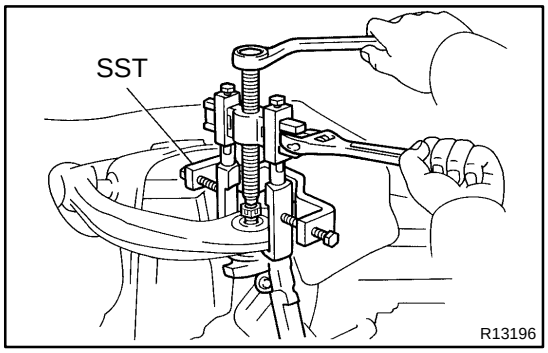
REMOVAL

1. REMOVE SHOCK ABSORBER AND COIL SPRING (See page SA-52)

2. w/ ABS:
DISCONNECT ABS SPEED SENSOR WIRE HARNESS CLAMP
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

3. DISCONNECT UPPER BALL JOINT

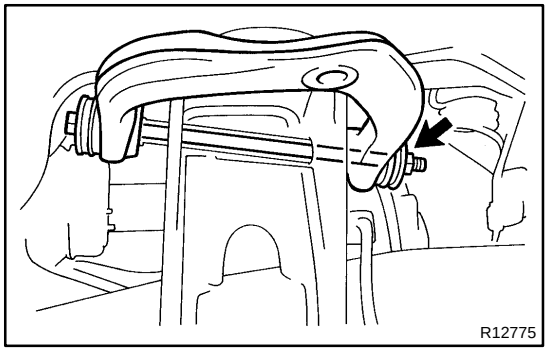
(a) Remove the cotter pin and loosen the nut.
Torque: 105 N·m (1,100 kgf·cm, 80 ft·lbf)



(b) Using SST, disconnect the upper ball joint.
SST 09950- 40011 (09951- 04010, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04031, 09958-0401 1)

(c) Support the steering knuckle securely.

(d) Remove the nut.



4. REMOVE UPPER SUSPENSION ARM

Remove the nut, bolt, washers and upper suspension arm.
Torque: 115 N·m (1,200 kgf·cm, 87 ft·lbf)

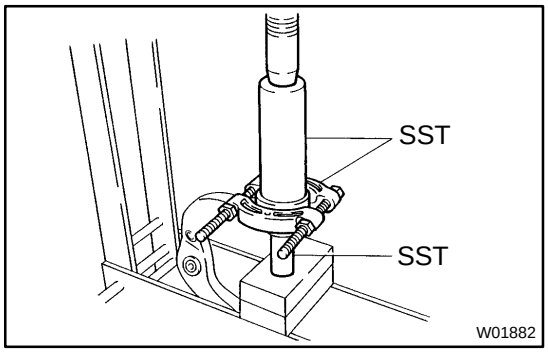
HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

SA05Q-01

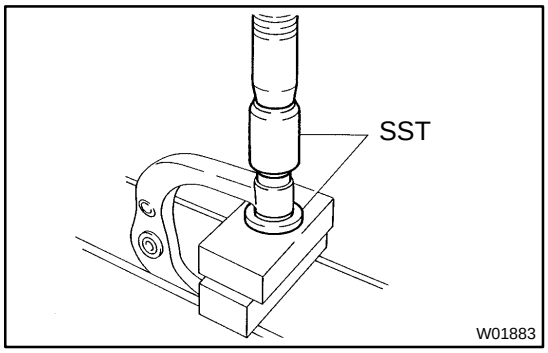
REPLACEMENT

1. REMOVE BUSHING

(a) Using a chisel and hammer, pry up the flange of the bushing.



(b) Using SST and a press, remove the bushing.
SST 09613-26010, 09631-20060, 09950-00020



2. INSTALL NEW BUSHING

Using SST and a press, install a new bushing.
SST 09223-00010, 09506-35010

SA05R-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-60).

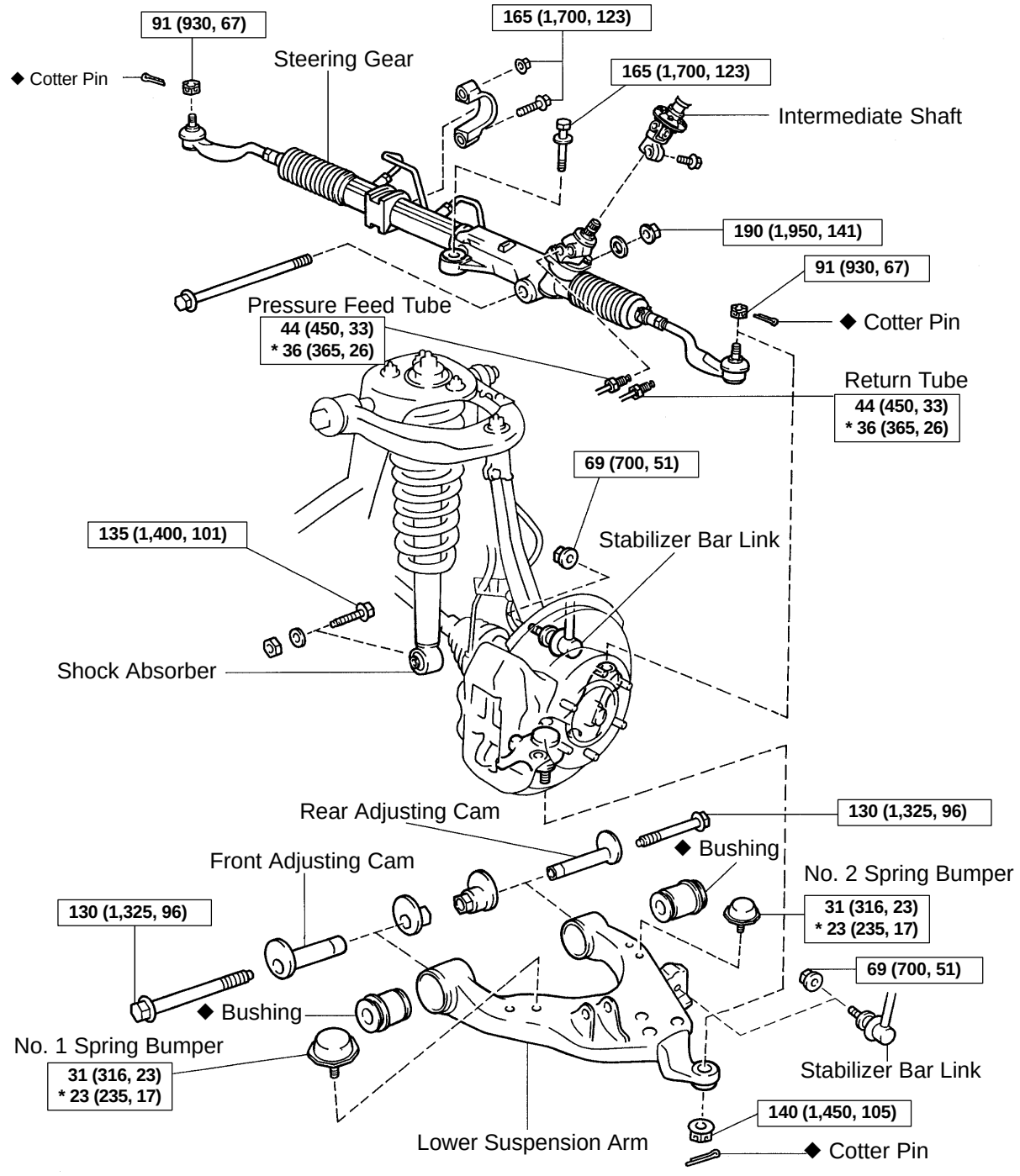
HINT:

After installation, check the front wheel alighnment (See page SA-5).

FRONT LOWER SUSPENSION ARM

SA05S-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
* For use with SST

W03081

SA05T-02

REMOVAL

1. REMOVE FRONT WHEEL
Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

2. REMOVE STEERING GEAR ASSEMBLY
(See page SR-45)

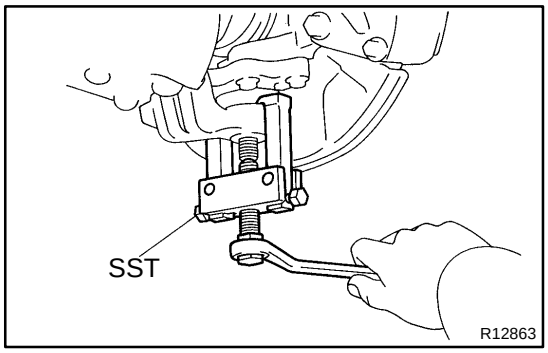
3. DISCONNECT STABILIZER BAR LINK
(See page SA-77)

4. DISCONNECT SHOCK ABSORBER FROM LOWER SUSPENSION ARM (See page SA-52)

5. DISCONNECT LOWER BALL JOINT

(a) Support the upper suspension arm and steering knuckle securely.

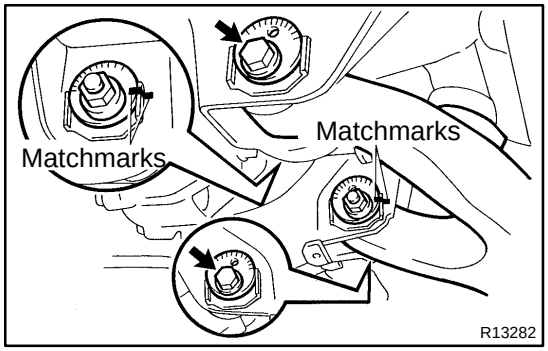
(b) Remove the cotter pin and nut from the lower ball joint.
Torque: 140 N·m (1,450 kgf·cm, 105 ft·lbf)



(c) Using SST, disconnect the lower ball joint from the lower suspension arm.
SST 09628-6201 1

NOTICE:
Be careful not to damage the lower ball joint.

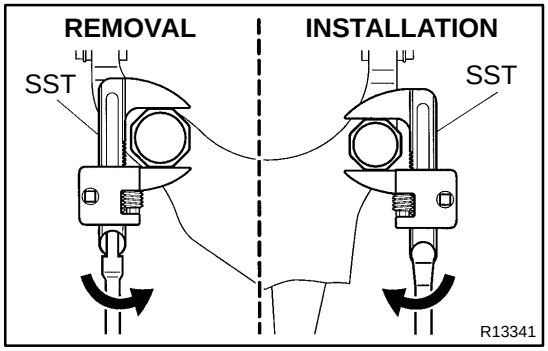
HINT:
At the time of installation, face the cotter pin hole of the lower ball joint forward.



6. REMOVE LOWER SUSPENSION ARM

(a) Place matchmarks on the front and rear adjusting cams.

(b) Remove the 2 bolts, nuts, adjusting cams and lower suspension arm.
Torque: 130 N·m (1,325 kgf·cm, 96 ft·lbf)



7. REMOVE NO. 1 AND NO. 2 SPRING BUMPERS

Using SST, remove the No. 1 and No. 2 spring bumpers.
SST 09922-10010
Torque: 23 N·m (235 kgf·cm, 17 ft·lbf)

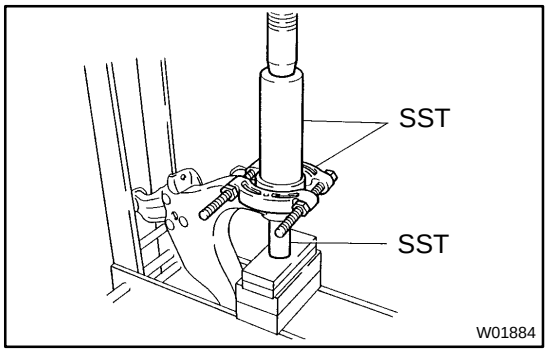
HINT:
At the time of installation, use a torque wrench with a fulcrum length of 34.5 cm (13.6 in.).

SA05U-01

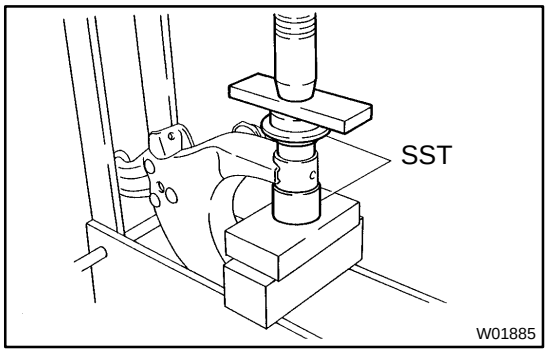
REPLACEMENT

1. REMOVE BUSHING

(a) Using a chisel and hammer, pry up the flange of the bushing.



(b) Using SST and a press, remove the bushing.
SST 09613-26010, 09632-36010, 09950-00020



2. INSTALL NEW BUSHING

Using SST and a press, install a new bushing.
SST 09316-2001 1, 09710-30021 (09710-03121)

SA05V-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-64).

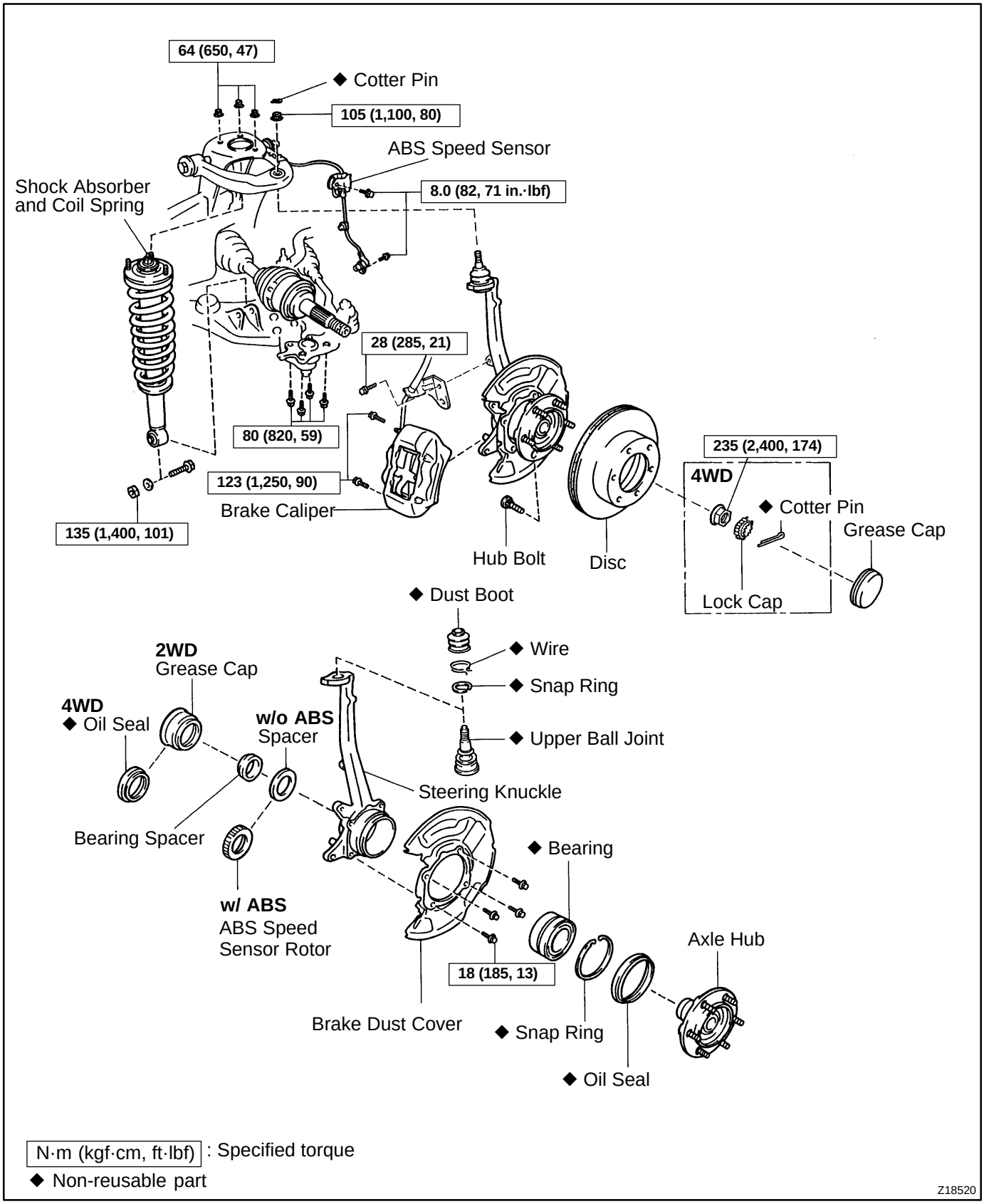
HINT:

After installation, check the front wheel alighnment (See page SA-5).

FRONT UPPER BALL JOINT

COMPONENTS

SA05W-02



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

Z18520

SA05X-03

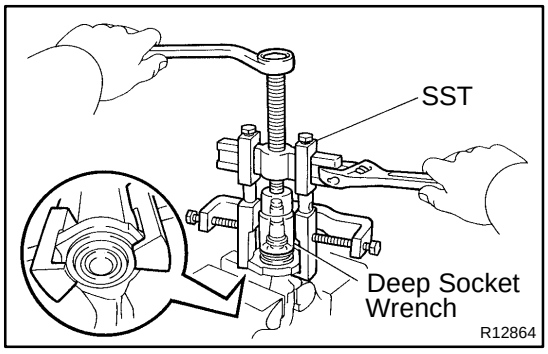
REMOVAL

1. REMOVE STEERING KNUCKLE WITH AXLE HUB (See page SA-10)

2. REMOVE UPPER BALL JOINT

(a) Remove the wire and boot.

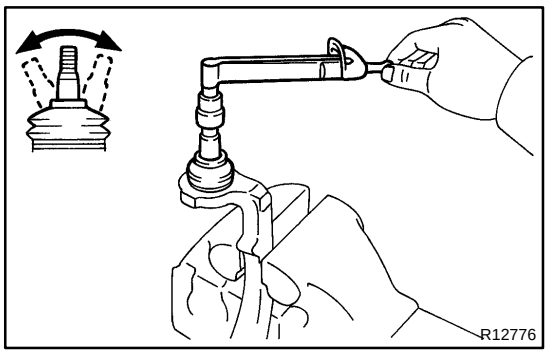
(b) Using a snap ring expander, remove the snap ring.



(c) Using SST and a deep socket wrench, remove the upper ball joint.

SST 09950- 40011 (09951- 04010, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04031, 09957-04010, 09958-04011)

SA05Y-01



INSPECTION

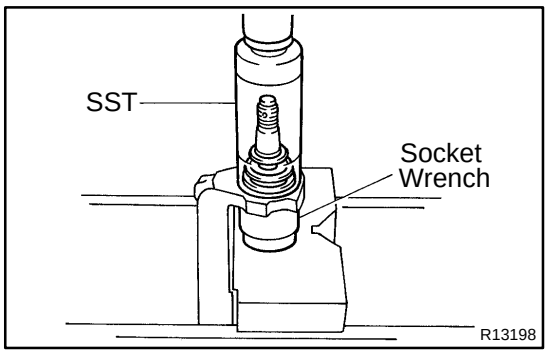
INSPECT BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously one turn each 2 - 4 seconds and take the torque reading on the 5th turn.

Turning torque:
0.7 - 4.4 N·m (7 - 45 kgf·cm, 6 - 39 in.·lbf)

SA05Z-02



INSTALLATION

1. INSTALL UPPER BALL JOINT

(a) Using SST, socket wrench and a press, install a new ball joint.

SST 09309-37010

(b) Using a snap ring expander, install a new snap ring.

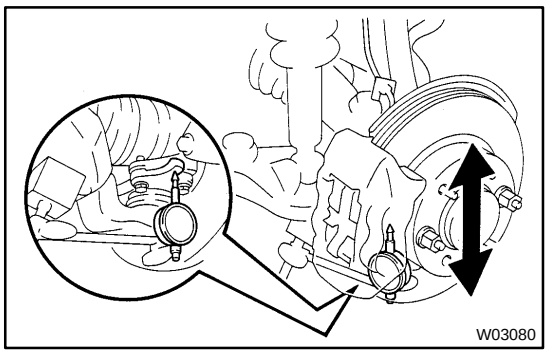
(c) Install a new boot and fix it with a new wire.

HINT:

Use the grease supplied in the kit.

2. INSTALL STEERING KNUCKLE WITH AXLE HUB

(See page SA-14)



FRONT LOWER BALL JOINT

SA060-01

ON-VEHICLE INSPECTION

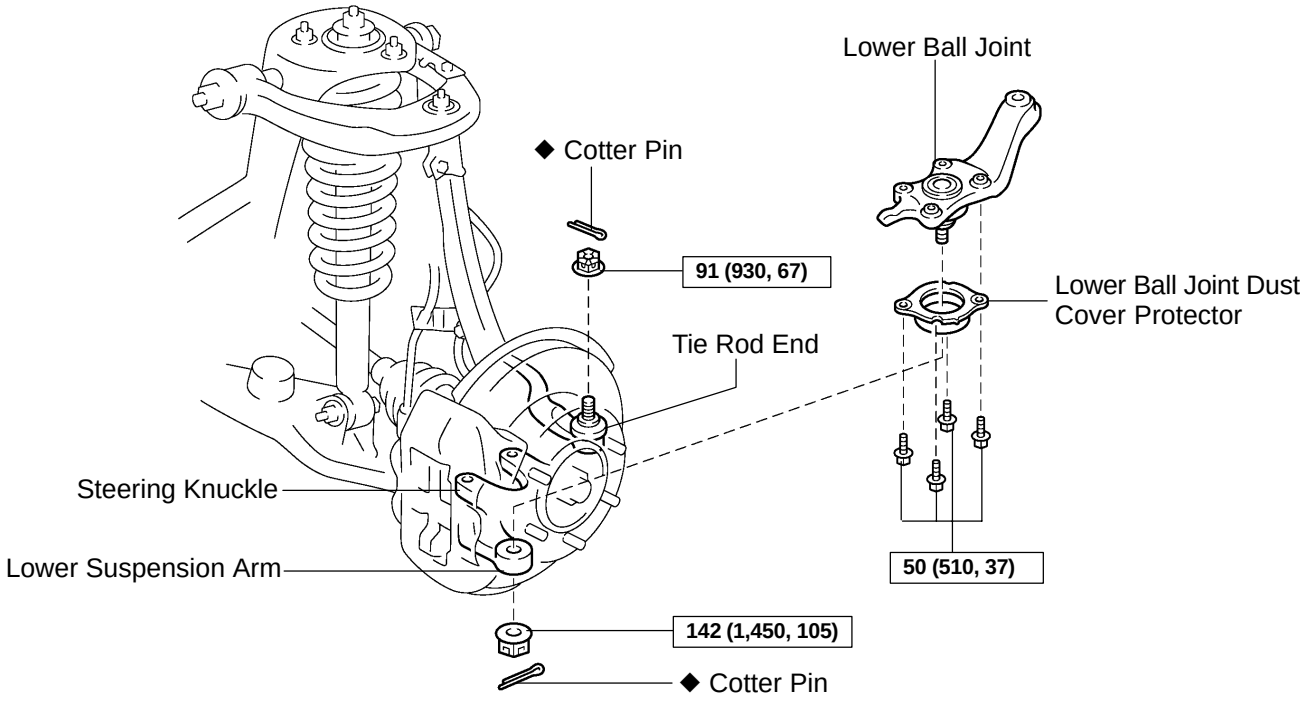
INSPECT LOWER BALL JOINT EXCESSIVE PLAY ON-VEHICLE

(a) Remove the tire and install the hub nuts to the disc.

(b) Using a dial indicator, check the lower ball joint for excessive play when you push the hub nuts up and down with a force of 294 N (30 kgf, 66 lbf).
Maximum: 0.5 mm (0.020 in.)

SA061-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

N

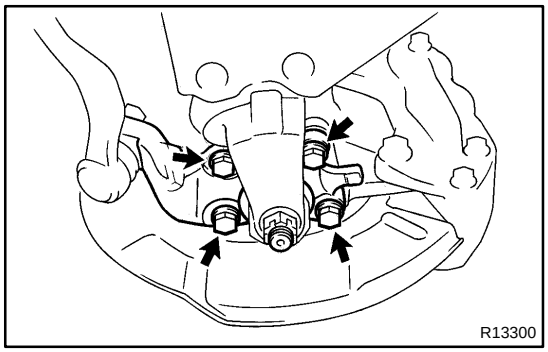
Q30021

SA062-03

REMOVAL

1. REMOVE FRONT WHEEL

Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)



2. LOOSEN 4 LOWER BALL JOINT SET BOLTS

HINT:

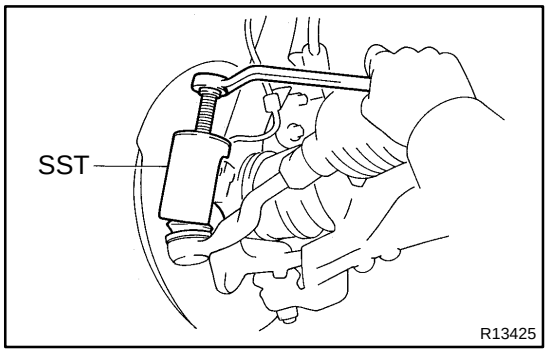
Do not remove the bolts.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

3. DISCONNECT TIE ROD END

(a) Remove the cotter pin and nut from the tie rod end.

Torque: 91 N·m (930 kgf·cm, 67 ft·lbf)



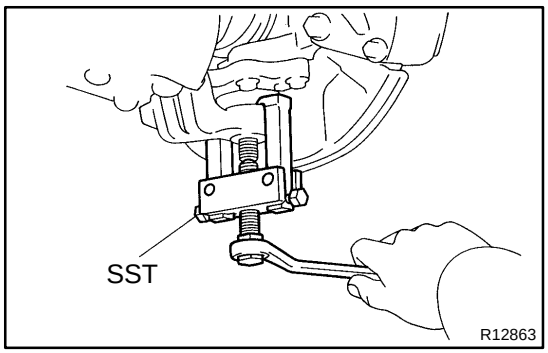
(b) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09610-20012

4. REMOVE LOWER BALL JOINT

(a) Remove the cotter pin and nut from the lower ball joint.

Torque: 142 N·m (1,450 kgf·cm, 105 ft·lbf)



(b) Using SST, disconnect the lower ball joint from the lower suspension arm.

SST 09628-6201 1

HINT:

At the time of installation, face the cotter pin hole of the lower ball joint forward.

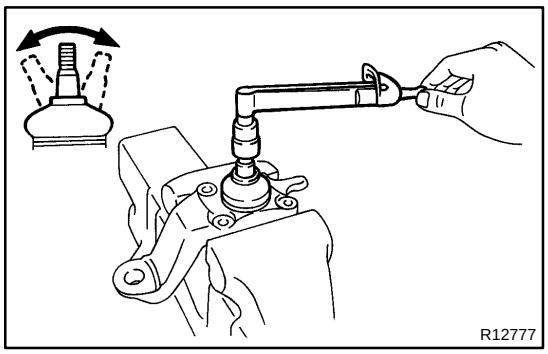
(c) Remove the 4 bolts.

(d) With lifting the upper suspension arm and steering knuckle, remove the lower ball joint and lower ball joint dust cover protector.

HINT:

After removing the lower ball joint, support the upper suspension arm and steering knuckle securely.

SA063-01



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the nut continuously one turn each 2 - 4 seconds and take the torque reading on the 5th turn.

Turning torque:

0.1 - 2.5 N·m (1 - 25 kgf·cm, 0.8 - 21.7 in.·lbf)

SA064-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-73).

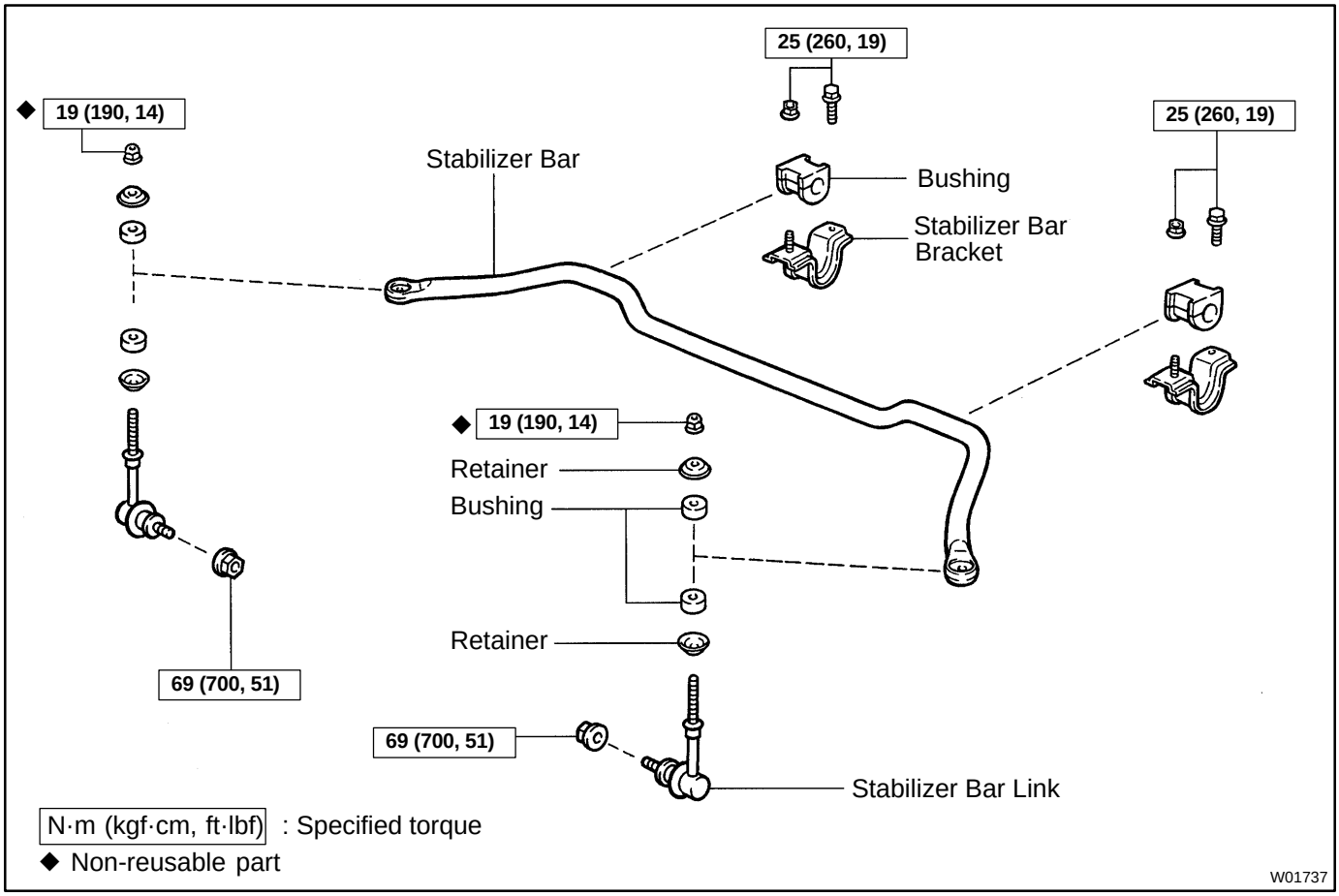
HINT:

After installation, check the front wheel alighnment (See page SA-5).

FRONT STABILIZER BAR

COMPONENTS

SA065-02

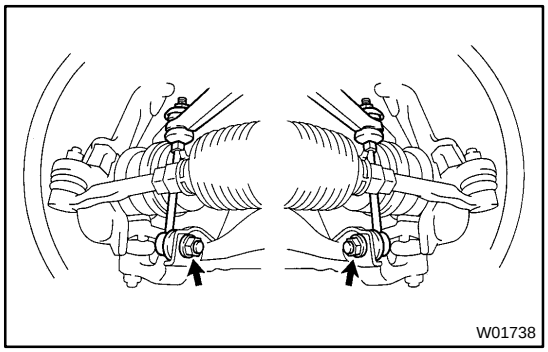


SA066-01

REMOVAL

1. REMOVE FRONT WHEELS

Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)



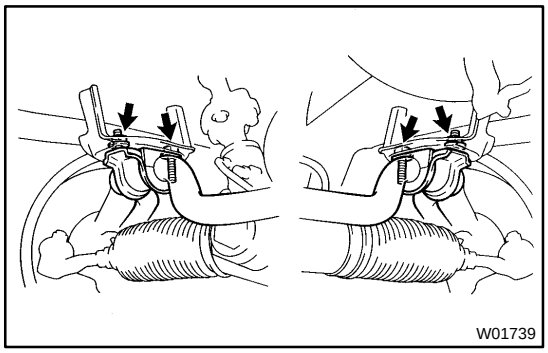
2. DISCONNECT STABILIZER BAR LINKS

Remove the 2 nuts and disconnect the stabilizer bar links from the lower suspension arm.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

HINT:

If the ball joint stud turns together with the nut, use a hexagon wrench to hold the stud.



3. REMOVE STABILIZER BAR

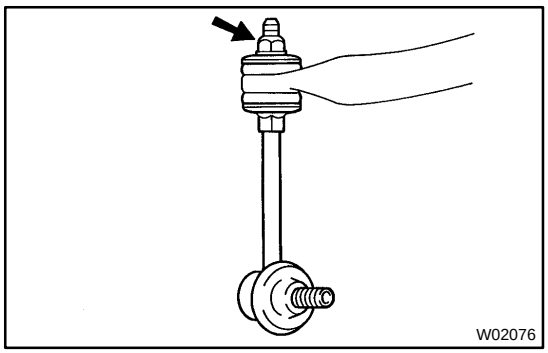
(a) Remove the 2 bolts, nuts and stabilizer bar with the bushings and brackets.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

(b) Remove the 2 brackets and bushings from the stabilizer bar.

HINT:

At the time of installation, install the bushings to the stabilizer bar so that the cutout of the bushings faces the front of the vehicle.

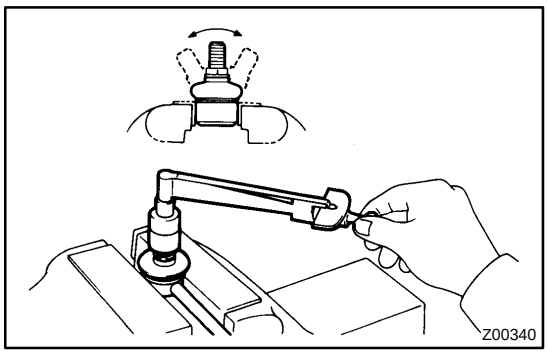


4. REMOVE STABILIZER BAR LINKS

Hold the stabilizer bar link, remove the nuts, retainers and bushings.

Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)

SA067-01



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

(a) As shown, flip the ball joint stud back and forth 5 times, before installing the nut.

(b) Using a torque wrench, turn the stud continuously one turn each 2 - 4 seconds and take the torque reading on the 5th turn.

Turning torque:

0.05 - 2.0 N·m (0.5 - 20 kgf·cm, 0.4 - 17 in.·lbf)

SA068-01

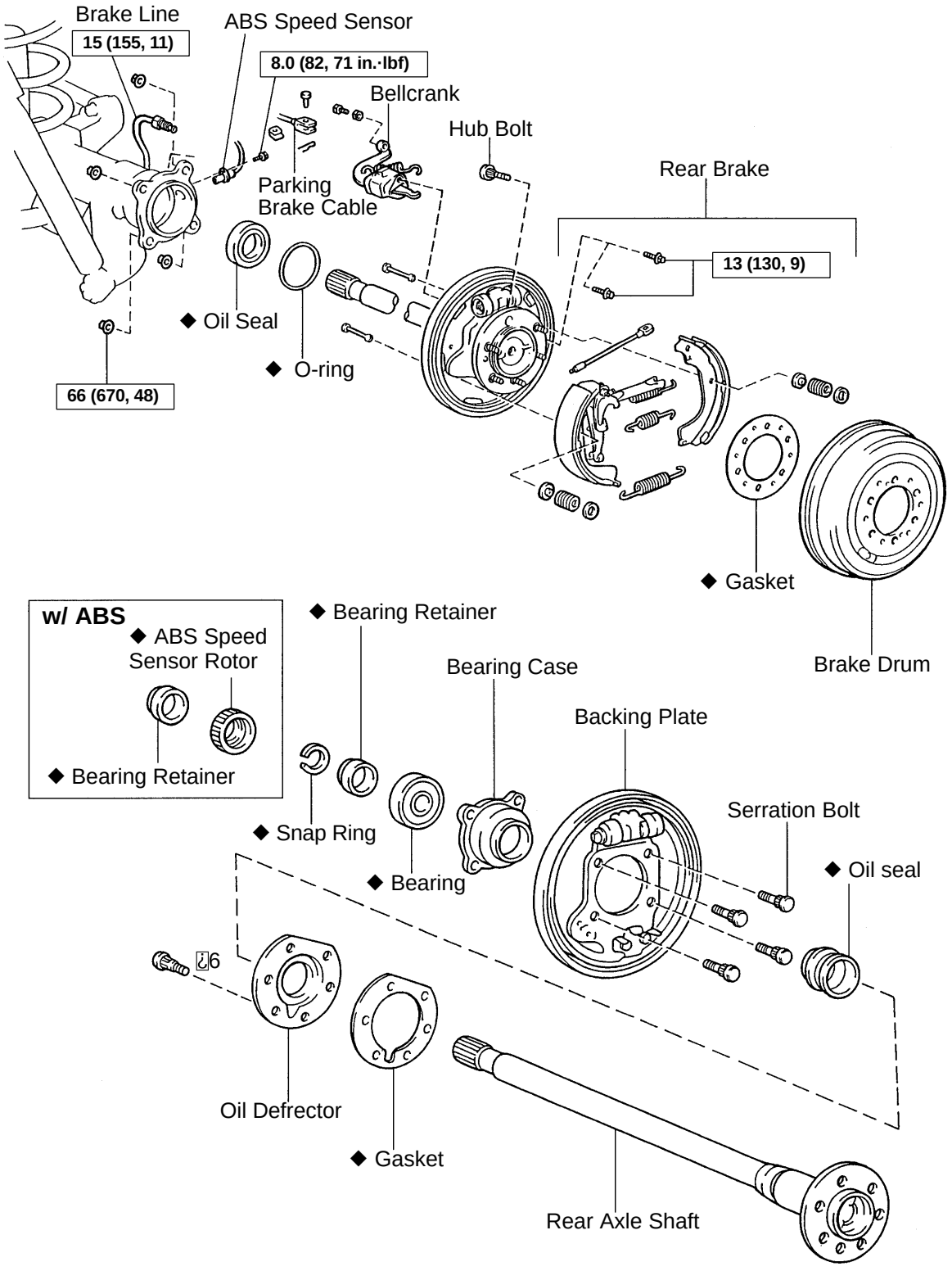
INSTALLATION

Installation is in the reverse order of removal (See page SA-77).

REAR AXLE SHAFT

COMPONENTS

SA069-02



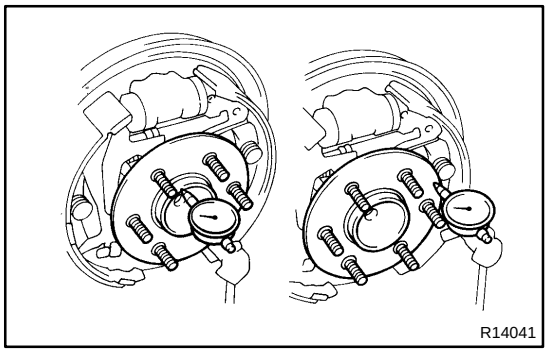
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

Z18523

SA06A-01

REMOVAL

1. REMOVE REAR WHEEL AND BRAKE DRUM
Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)



2. CHECK BEARING BACKLASH AND AXLE SHAFT DEVIATION

(a) Using a dial indicator, check the backlash in the bearing shaft direction.
Maximum: 0.7 mm (0.027 in.)

If the backlash exceeds the maximum, replace the bearing.

(b) Using a dial indicator, check the deviation at the surface of the axle shaft outside the hub bolt.
Maximum: 0.1 mm (0.0039 in.)

If the deviation exceeds the maximum, replace the axle shaft.

3. w/ ABS:
REMOVE ABS SPEED SENSOR FROM REAR AXLE HOUSING
Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

4. REMOVE REAR BRAKE ASSEMBLY
(See page BR-22)

5. REMOVE REAR AXLE SHAFT ASSEMBLY

(a) Remove the 4 backing plate mounting nuts.
Torque: 66 N·m (670 kgf·cm, 48 ft·lbf)

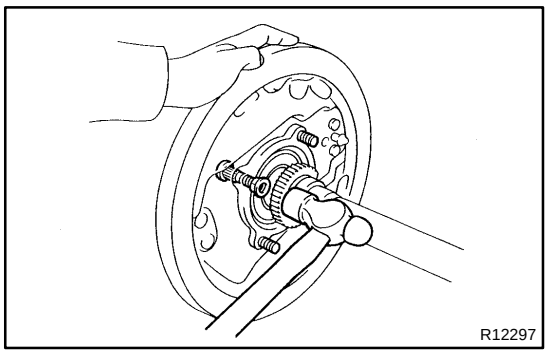
(b) Pull out the rear axle shaft assembly from the rear axle housing.

NOTICE:
Be careful not to damage the oil seal.

6. REMOVE O-RING FROM REAR AXLE HOUSING

SA06B-02

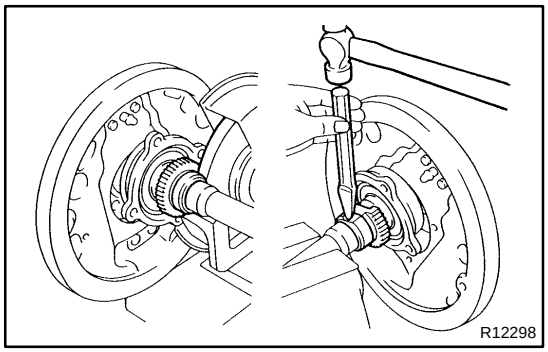
INSPECTION


R12297

1. w/ ABS:
REMOVE BEARING RETAINER (DIFFERENTIAL SIDE) AND ABS SPEED SENSOR ROTOR

(a) Attach 4 nuts to the serration bolts and remove the serration bolts from the backing plate using a hammer.

NOTICE:
Do not reuse the nuts previously removed from the vehicle.


R12298

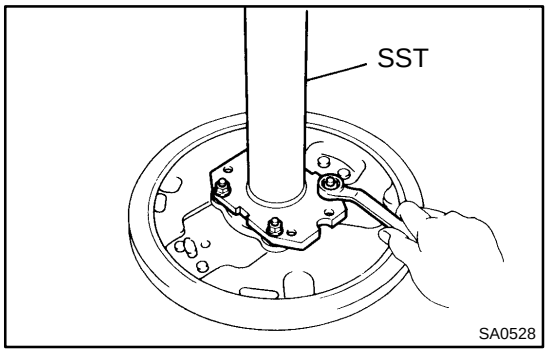
(b) Grind the retainer and sensor rotor surfaces using a grinder, then chisel them out with a chisel.

(c) Attach washers and nuts to the 4 serration bolts, then torque the nuts to install the serration bolts to the backing plate.

(d) Remove the 4 nuts from the serration bolts.

2. REMOVE SNAP RING FROM AXLE SHAFT

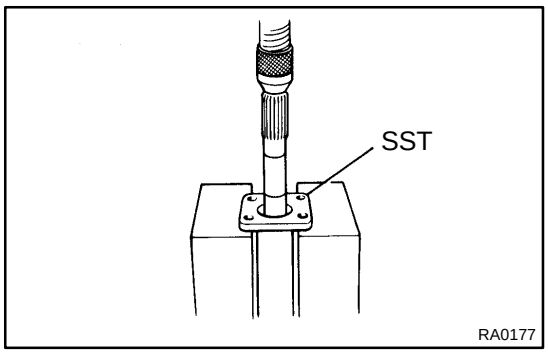
Using a snap ring expander, remove the snap ring.



SA0528

3. REMOVE REAR AXLE SHAFT FROM BACKING PLATE

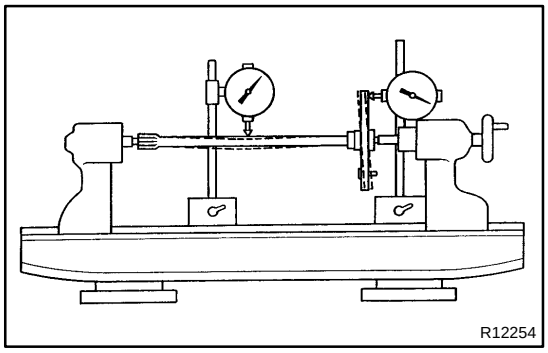
(a) Position SST on the backing plate with the 4 nuts.
SST 09521-2501 1



RA0177

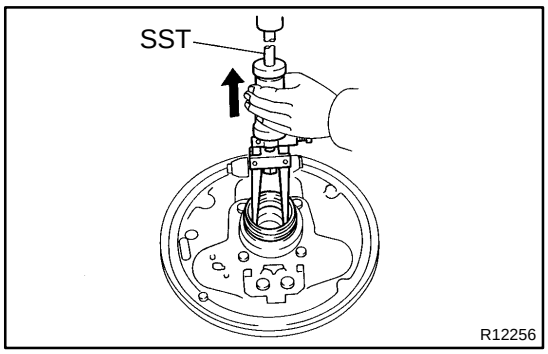
(b) Using a press, remove the rear axle shaft with the bearing retainer from the backing plate.

(c) Remove the SST.
SST 09521-2501 1


R12254

4. INSPECT AXLE SHAFT
Maximum runout:
Shaft runout: 2.0 mm (0.079 in.)
Flange runout: 0.1 mm (0.004 in.)

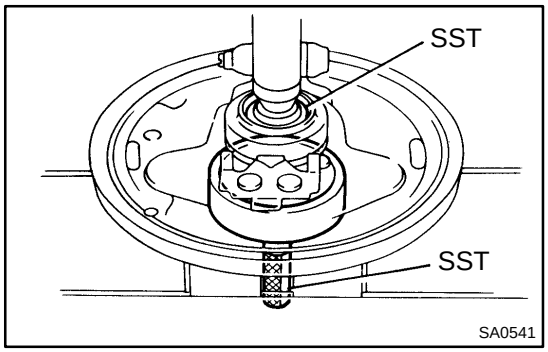
If the rear axle shaft or flange are damaged or worn, or if runout is greater than the maximum, replace the rear axle shaft.



5. REMOVE OUTER OIL SEAL

Using SST, remove the oil seal.

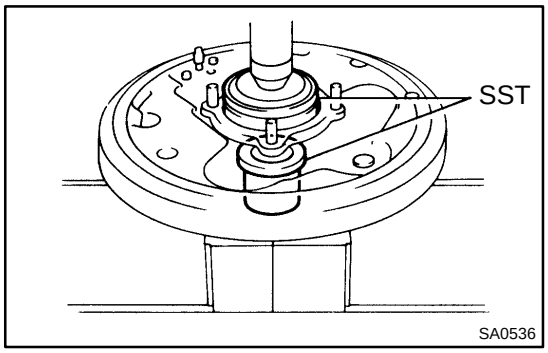
SST 09308-00010



6. REPLACE REAR AXLE BEARING

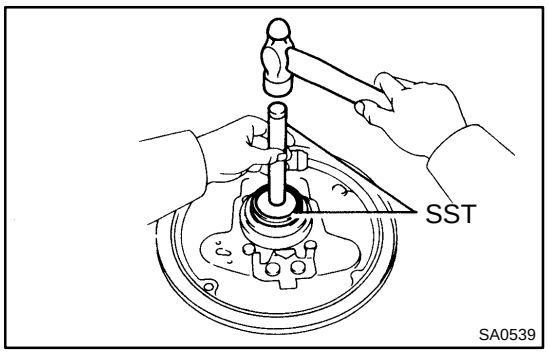
(a) Using SST, remove the bearing.

SST 09223-56010, 09950-60010 (09951-00560)



(b) Using SST, install a new bearing.

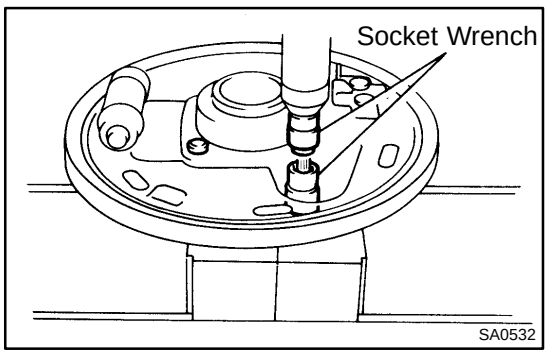
SST 09515-30010, 09950-60020 (09951-00890)



7. INSTALL NEW OUTER OIL SEAL

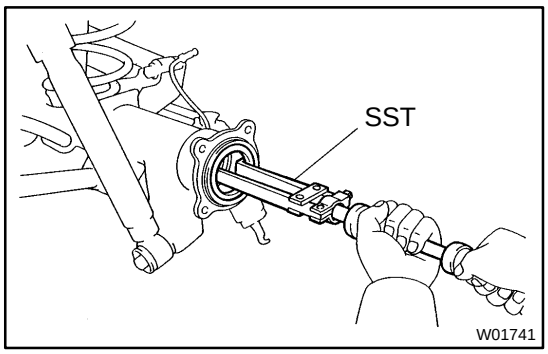
Using SST and a hammer, install a new oil seal.

SST 09950-60010 (09951-00610),
09950-70010 (09951-07150)



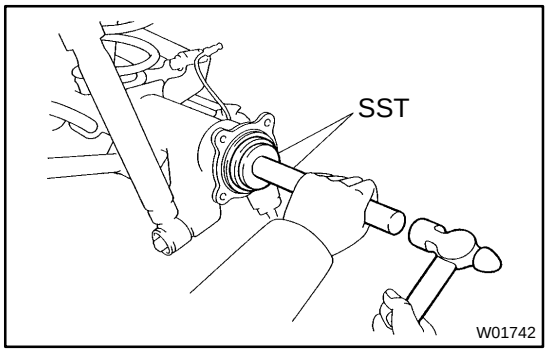
8. REPLACE BEARING CASE

(a) Remove the oil seal (outer side) and bearing.
(b) Install 4 nuts to the serration bolts.
(c) Using a hammer, remove the 4 serration bolts and remove the bearing case.
(d) Position the backing plate on a new bearing case and, using 2 socket wrenches, install the 4 serration bolts.
(e) Install a new bearing and oil seal (outer side).



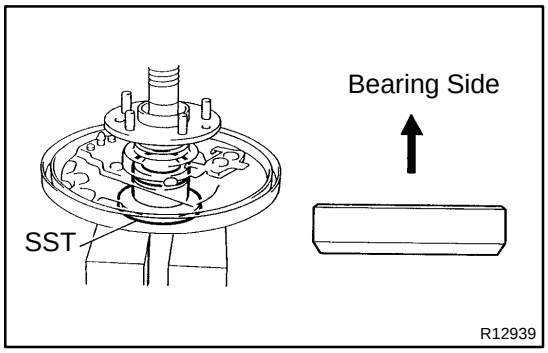
9. REPLACE OIL SEAL (INNER SIDE)

(a) Using SST, remove the oil seal.
SST 09308-00010



(b) Using SST and a hammer, install a new oil seal.
SST 09950-60020 (09951-00710),
09950-70010 (09951-07150)

(c) Apply MP grease to the oil seal lip.



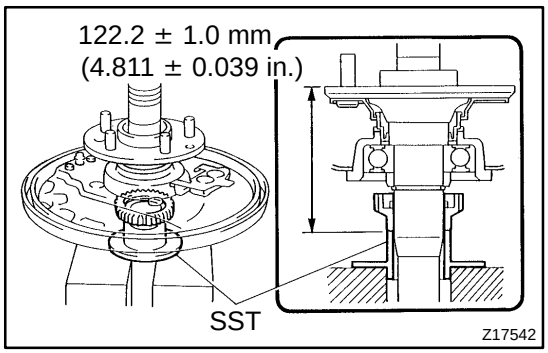
10. INSTALL REAR AXLE SHAFT IN BACKING PLATE

(a) Apply MP grease to the oil seal lip.

(b) Install the backing plate and bearing retainer on the rear axle shaft.

(c) Using SST and a press, install the rear axle shaft into the backing plate.
SST 09316-60010 (09316-00051)

(d) Using snap ring pliers, install a new snap ring.



11. w/ ABS:
INSTALL ABS SPEED SENSOR ROTOR AND BEARING RETAINER (DIFFERENTIAL SIDE)

Using SST and a press, install a new sensor rotor and new bearing retainer to the axle shaft.
SST 09316-60010 (09316-00051)
Standard length:
122.2 ± 1.0 mm (4.811 ± 0.039 in.)

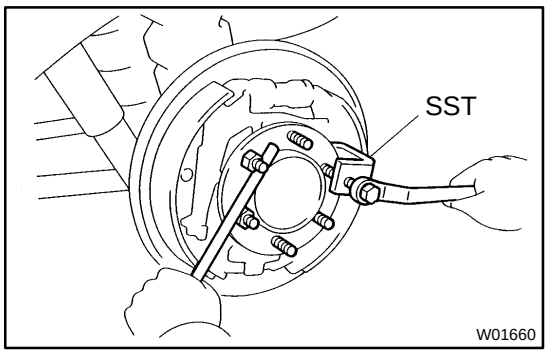
SA06C-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-81).

HINT:

After installation, bleed the brake system (See page BR-4), check the ABS sensor sensor signal (See page DI-224) and check for leaks.



REAR WHEEL HUB BOLT

SA06D-01

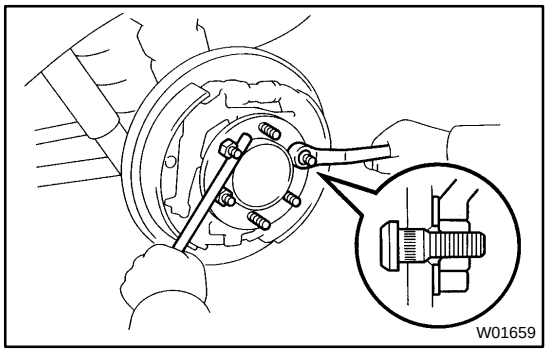
REPLACEMENT

1. REMOVE WHEEL AND BRAKE DRUM

2. REMOVE HUB BOLT

Using SST, remove the hub bolt.

SST 09650-1701 1



3. INSTALL HUB BOLT

Install a washer and nut to a new hub bolt, as shown in the illustration, and install the hub bolt with torquing the nut.

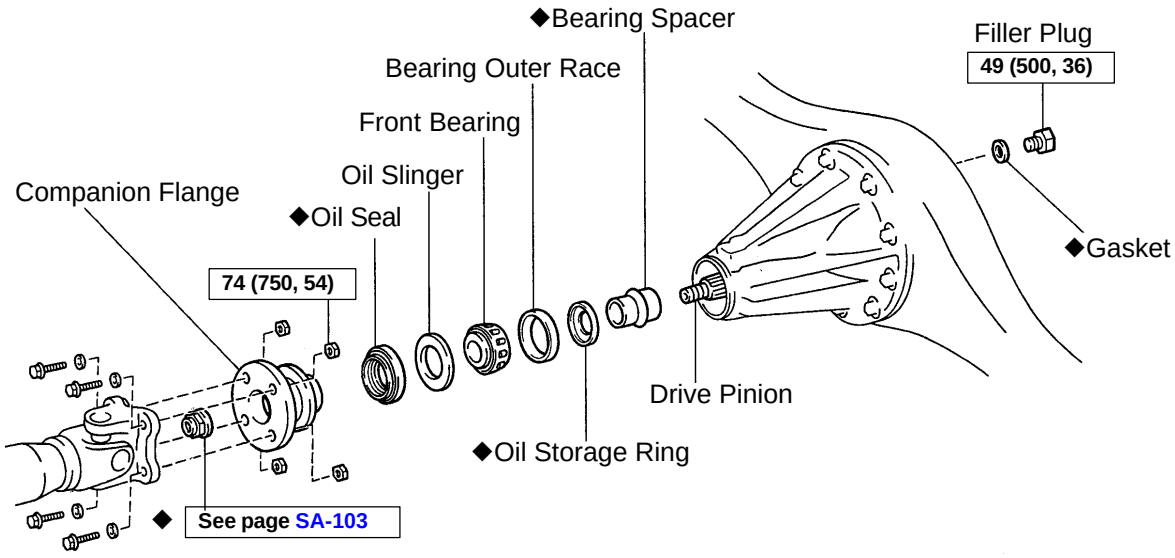
4. INSTALL BRAKE DRUM AND WHEEL

Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

REAR DIFFERENTIAL FRONT OIL SEAL

COMPONENTS

SA06E-02



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

W01732

SA06F-03

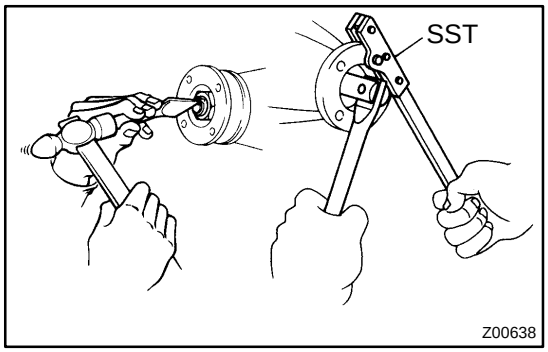
REPLACEMENT

1. DRAIN DIFFERENTIAL OIL

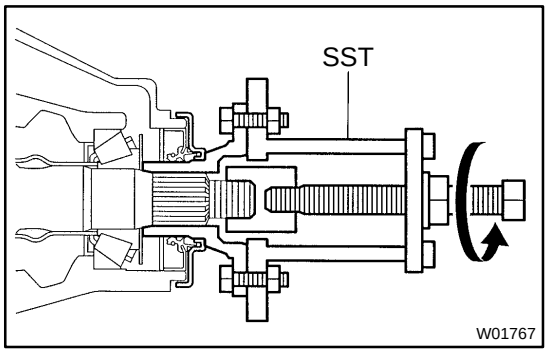
2. REMOVE REAR PROPELLER SHAFT
(See page PR-4 or PR-8)

3. REMOVE COMPANION FLANGE

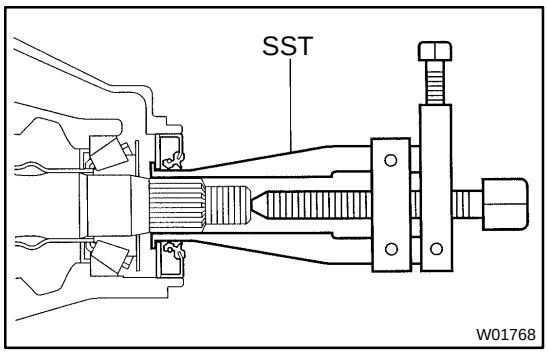
(a) Using a chisel and hammer, loosen the staked part of the nut.



(b) Using SST to hold the flange, remove the nut.
SST 09330-00021



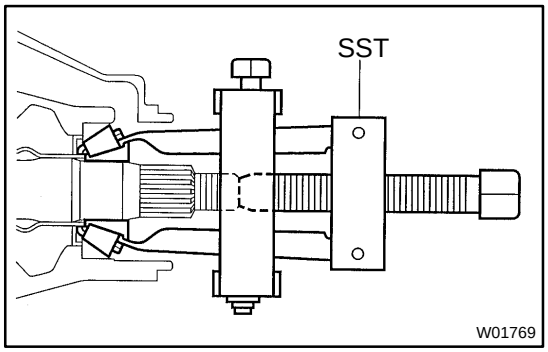
(c) Using SST, remove the companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)



4. REMOVE OIL SEAL

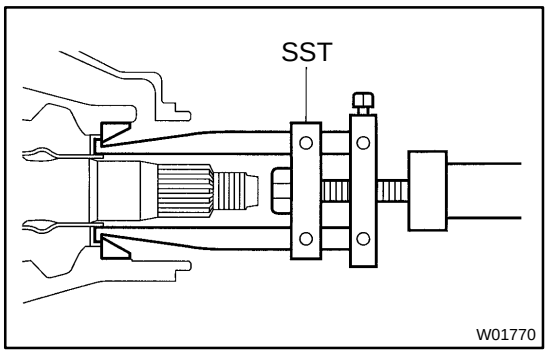
Using SST, remove the oil seal.
SST 09308-10010

5. REMOVE OIL SLINGER



6. REMOVE FRONT BEARING

Using SST, remove the front bearing from the drive pinion.
SST 09556-22010



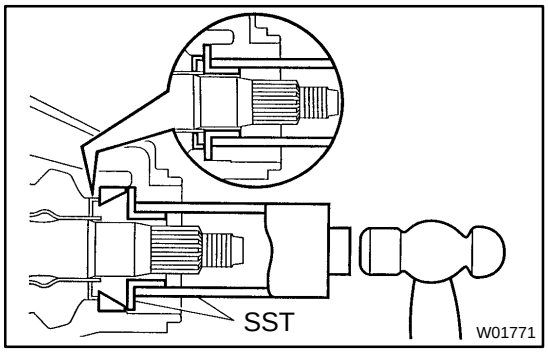
7. REMOVE FRONT BEARING OUTER RACE AND OIL STORAGE RING

(a) Using SST, remove the front bearing outer race.
SST 09308-00010

(b) Using a screwdriver, bend the oil storage ring and remove it.

8. REMOVE BEARING SPACER

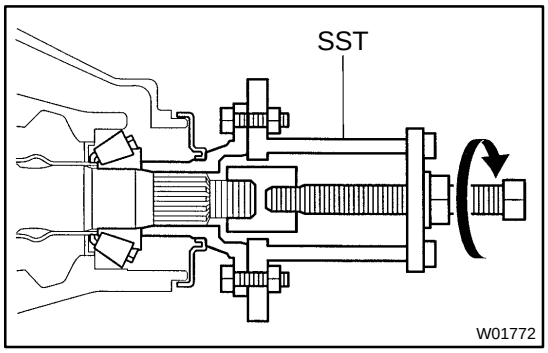
9. INSTALL NEW BEARING SPACER



10. INSTALL OIL STORAGE RING AND FRONT BEARING OUTER RACE

(a) Using SST and a hammer, install a new oil storage ring.
SST 09316-6001 1 (09316-00011, 09316-00021)

(b) Using SST and a hammer, install the front bearing outer race.
SST 09316-6001 1 (09316-00011, 09316-00021)

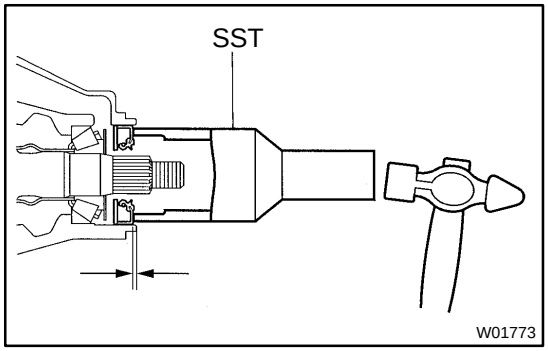


11. INSTALL FRONT BEARING

(a) Place the front bearing.

(b) Place the oil slinger.

(c) Using SST and the companion flange, install the front bearing, then remove the companion flange.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)



12. INSTALL NEW OIL SEAL

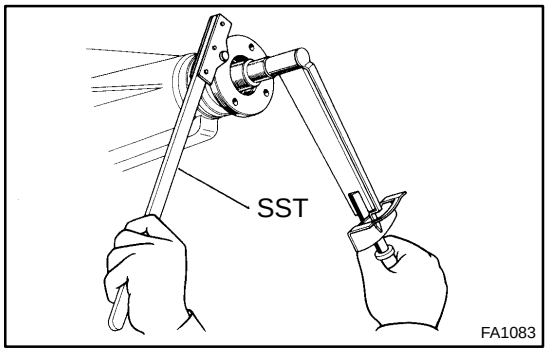
(a) Apply MP grease to a new oil seal.

(b) Using SST and a hammer, install the oil seal.
SST 09214-7601 1
Oil seal drive in depth: 1.0 mm (0.039 in.)

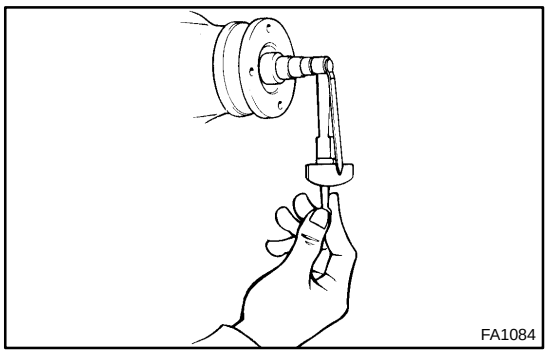
13. INSTALL COMPANION FLANGE

(a) Place the companion flange on the drive pinion.

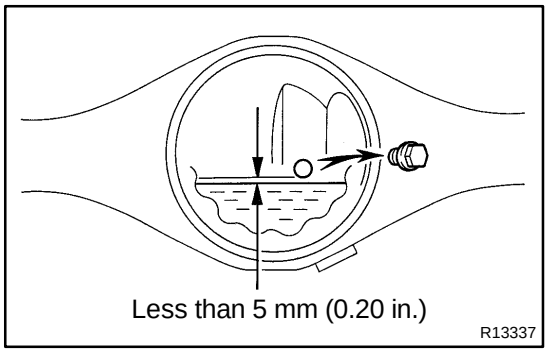
(b) Apply light coat of hypoid gear oil on threads of a new companion flange nut.



(c) Using SST to hold the flange, torque the nut.
SST 09330-00021
Torque: 196 N·m (2,000 kgf·cm, 145 ft·lbf)



14. ADJUST DRIVE PINION PRELOAD
(See page SA-103)
15. STAKE DRIVE PINION NUT
16. INSTALL REAR PROPELLER SHAFT
(See page PR-6 or PR-1 1)

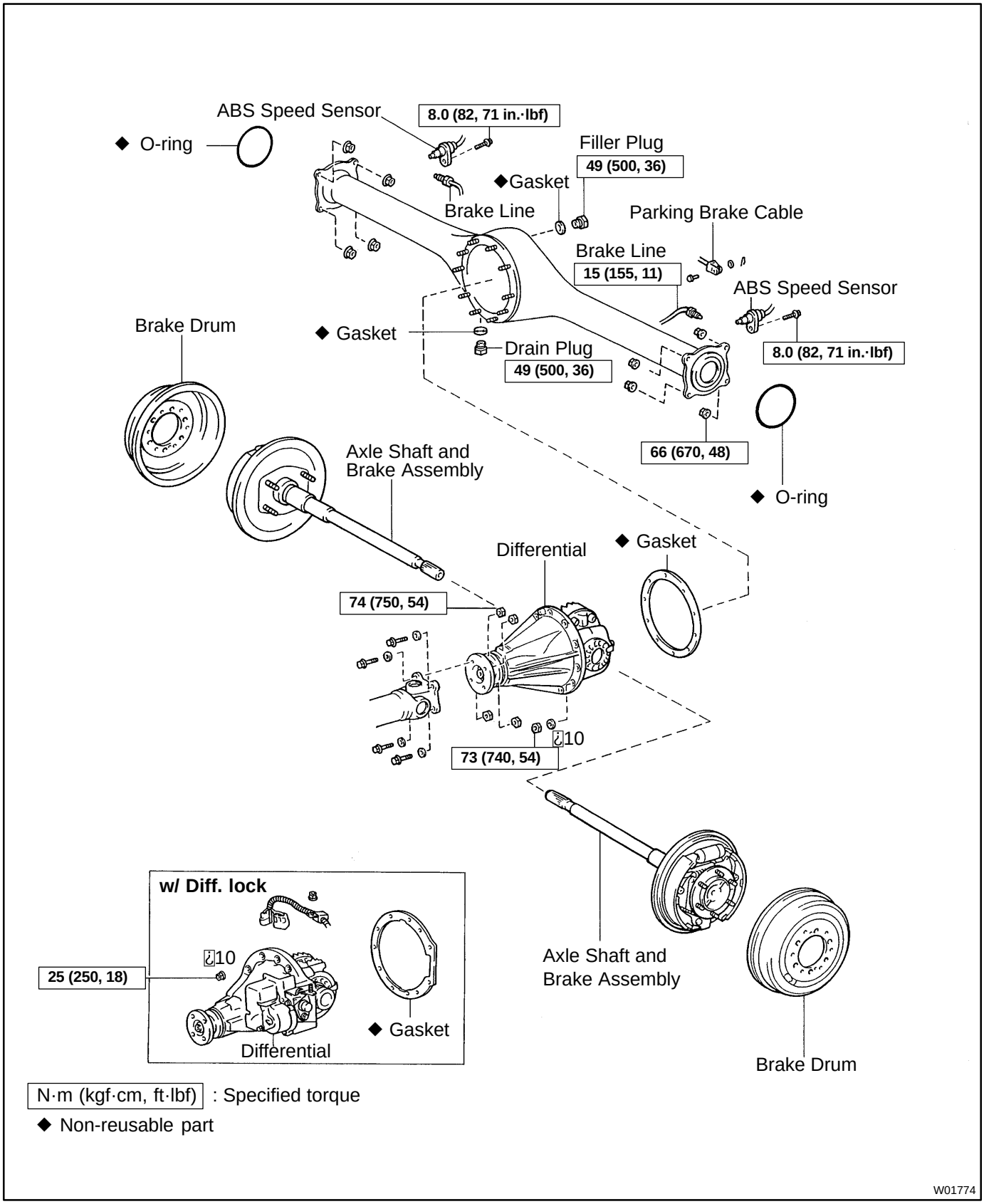


17. FILL DIFFERENTIAL WITH HYPOID GEAR OIL
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)
Oil type: Hypoid gear oil API GL-5
Recommended oil viscosity:
Above - 18˚C (0˚F) SAE 90
Below - 18˚C (0˚F) SAE 80 W or 80 W - 90
Capacity:
2WD: 2.75 liters (2.91 US qts., 2.42 lmp.qts)
4WD:
w/o Diff. lock: 2.45 liters (2.59 US qts., 2.16 lmp.qts)
w/ Diff. lock: 2.75 liters (2.91 US qts., 2.42 lmp.qts)

REAR DIFFERENTIAL CARRIER

COMPONENTS

SA06G-02

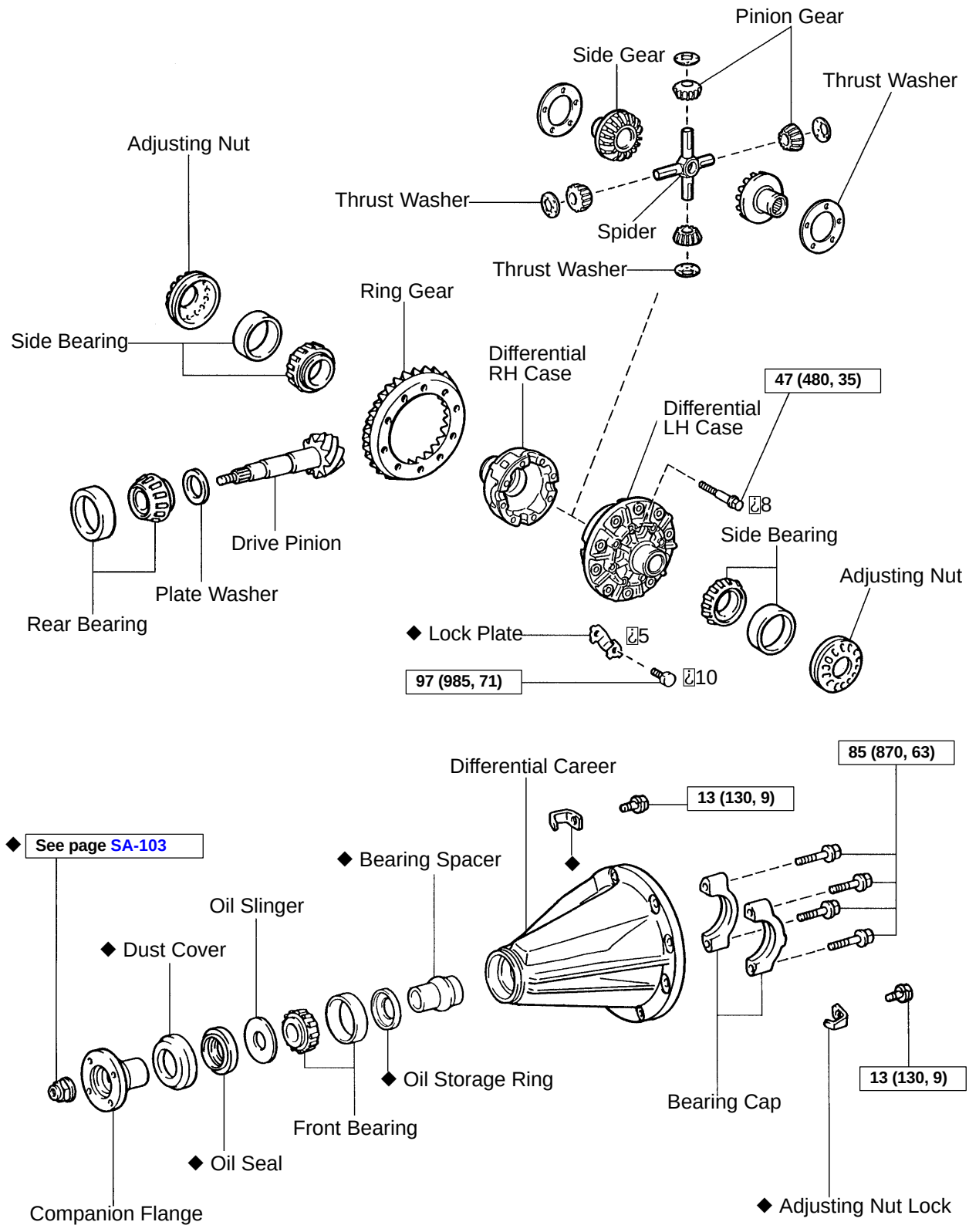


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

W01774

w/o Diff. lock

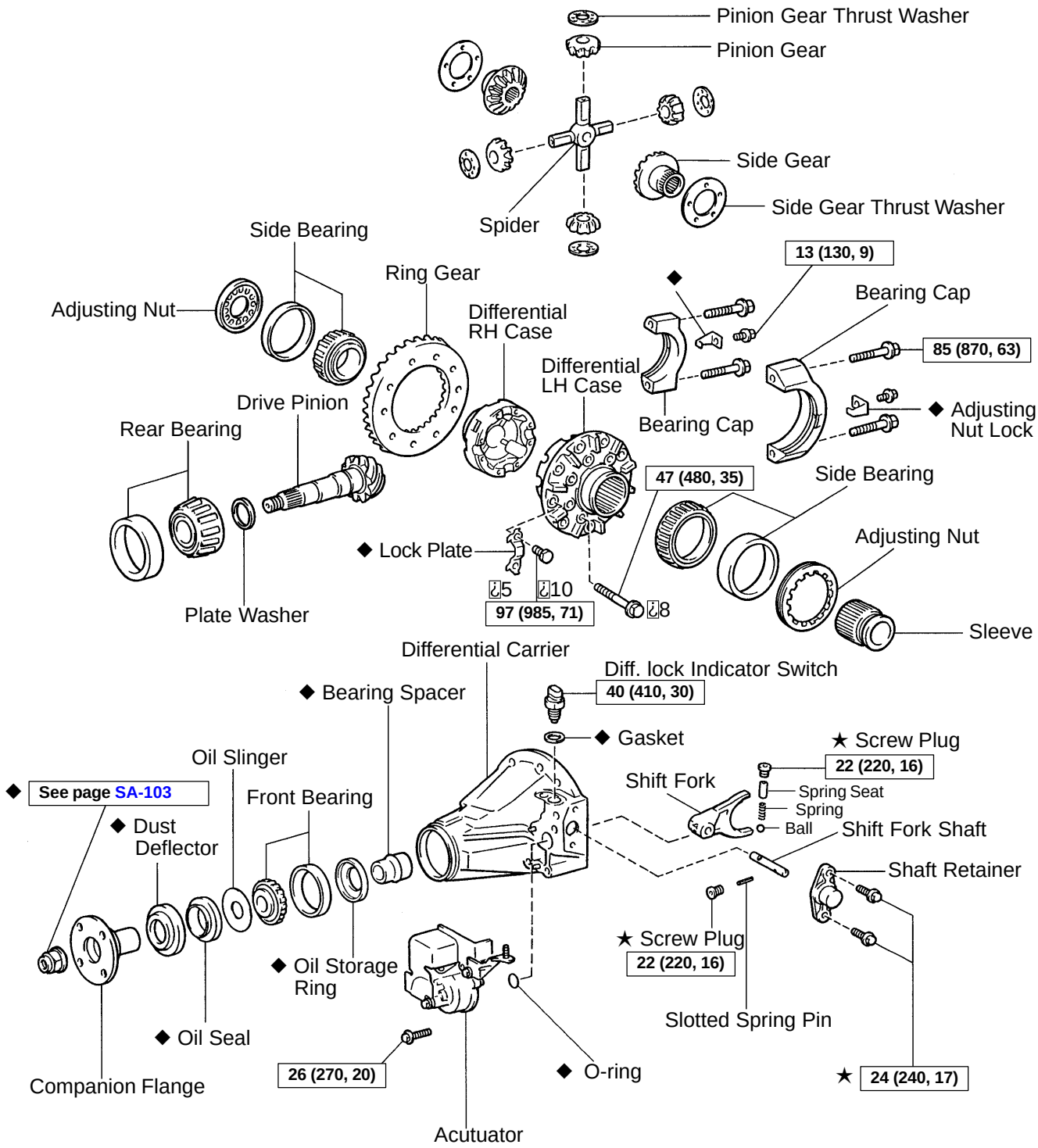


N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

W01775

w/ Diff. lock



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
★ Precoated part

Z18524

SA06H-02

REMOVAL

1. w/ DIFF. LOCK:
SHIFTING DIFF. LOCK POSITION

(a) Turn the ignition switch to the ON position.

(b) Push the differential lock control switch to the ON position and lock the rear differential.

HINT:

Rotating the tires, check they are in the differential lock condition.

(c) Disconnect the cable from the negative terminal of the battery.

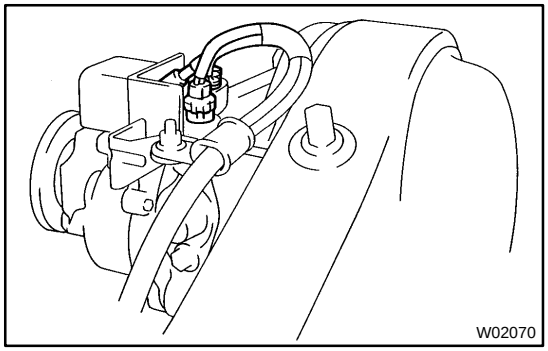
HINT:

At the time of installation, after installation, check that the breather plug at the end of the breather tube (inside of the LH frame) is not damaged or worn.

2. DRAIN DIFFERENTIAL OIL
Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

3. REMOVE REAR AXLE SHAFTS (See page SA-81)

4. REMOVE REAR PROPELLER SHAFT
(See page PR-4 or PR-8)

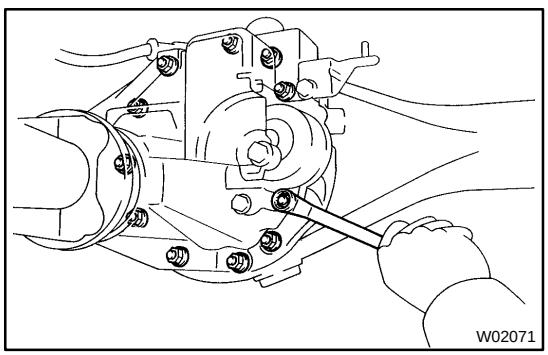

W02070

5. w/ DIFF. LOCK:
DISCONNECT CONNECTORS AND TUBE

HINT:

At the time of installation, please refer to the following items.

- When connecting the tube of the harness side to the hose of the actuator side, its depth of insertion is 15 mm (0.59 in.).
- Take care that water or equivalent dose not adhere to the connector and hose.


W02071

6. REMOVE DIFFERENTIAL CARRIER ASSEMBLY

(a) Remove the 10 nuts, washers and differential carrier assembly.

NOTICE:

Be careful not to damage the installation surface.

Torque:
w/o Diff. lock: 73 N·m (740 kgf·cm, 54 ft·lbf)
w/ Diff. lock: 25 N·m (250 kgf·cm, 18 ft·lbf)

(b) Remove the gasket.

HINT:

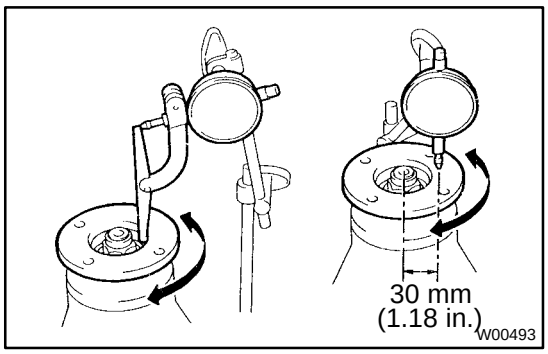
At the time of installation, please refer to the following items.

w/ Diff. lock:

- Before installation, check differential lock operation connect the connecter of the actuator to the connecter of the vehicle side.
- Before installation, check that the sleeves on work with switching over the differential lock control switch.
  After checking, lock the rear differential.

SA06I-05

DISASSEMBLY

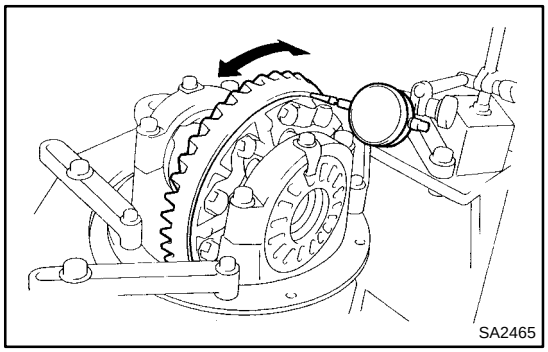


1. CHECK RUNOUT OF COMPANION FLANGE

Using a dial indicator, measure the vertical and lateral runout of the companion flange.

Maximum runout:
Vertical runout: 0.10 mm (0.0039 in.)
Lateral runout: 0.10 mm (0.0039 in.)

If the runout are not within the specification, replace the companion flange.

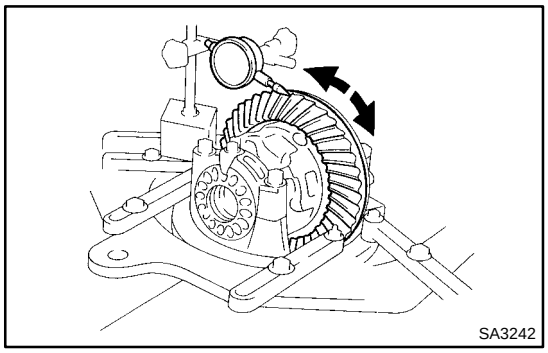


2. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

If the runout is not within the specification, replace the ring gear.



3. CHECK RING GEAR BACKLASH

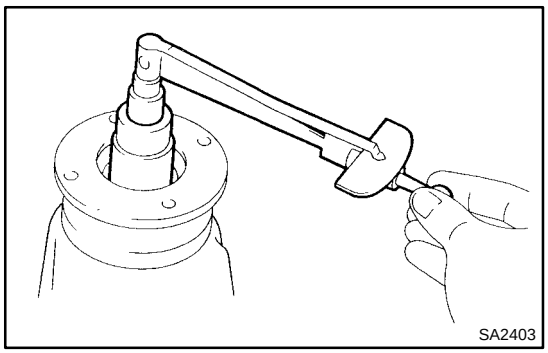
Using a dial indicator, measure the ring gear backlash.

Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

If the backlash is not within the specification, adjust the side bearing preload or repair as necessary.

HINT:

Before measurement, rotate the ring gear 5 times or more.



4. MEASURE DRIVE PINION PRELOAD

Using a torque wrench, measure the preload of backlash between the drive pinion and ring gear.

Preload (at starting):
0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in.·lbf)

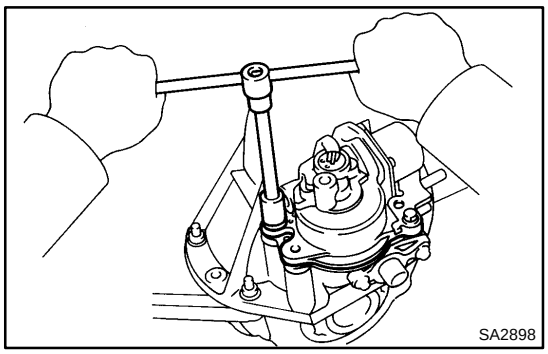
5. CHECK TOTAL PRELOAD

Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

Total preload (at starting):
Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)

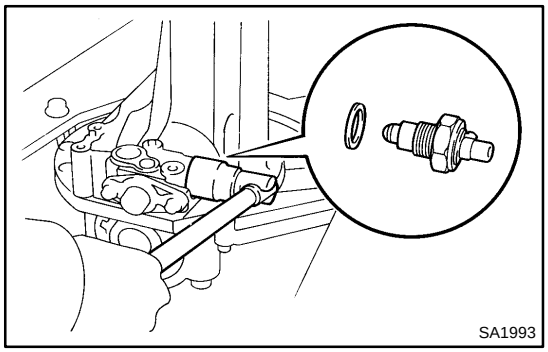
If necessary, disassemble and inspect the differential.

6. CHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See page SA-103)



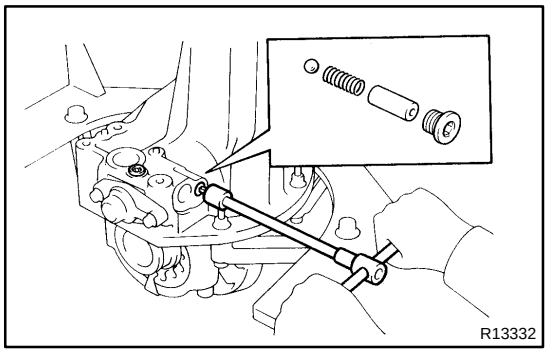
7. w/ DIFF. LOCK:
REMOVE ACTUATOR

(a) Remove the bolt and actuator from the differential carrier.
(b) Remove the O-ring.



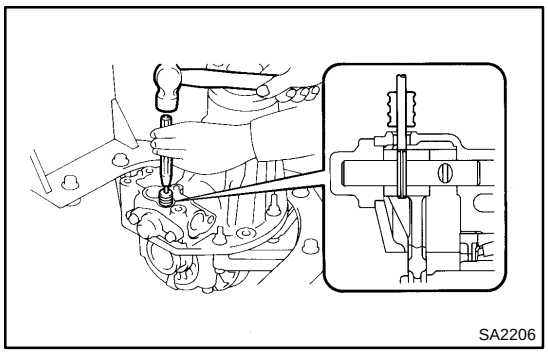
8. w/ DIFF. LOCK:
REMOVE INDICATOR SWITCH

Remove the indicator switch and gasket.

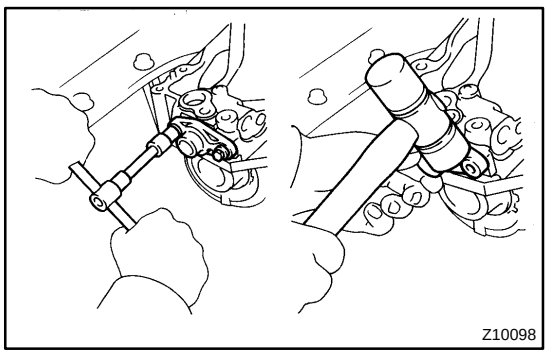


9. w/ DIFF. LOCK:
REMOVE SHIFT FORK SHAFT

(a) Using a hexagon wrench, remove the 2 straight screw plugs.
(b) Remove the spring seat, compression spring and ball.



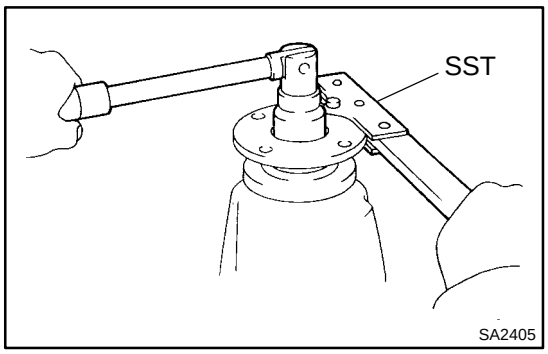
(c) Using a pin punch and hammer, remove the slotted spring pin.



(d) Remove the 2 bolts from the shaft retainer.
(e) Using a plastic hammer, remove the shaft retainer.
(f) Remove the shift fork shaft.

HINT:

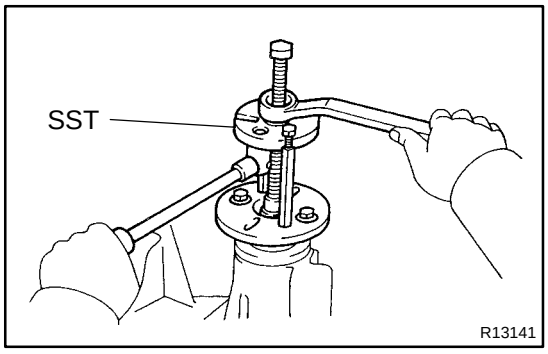
Pull out the shift fork shaft with a screwdriver turned round.



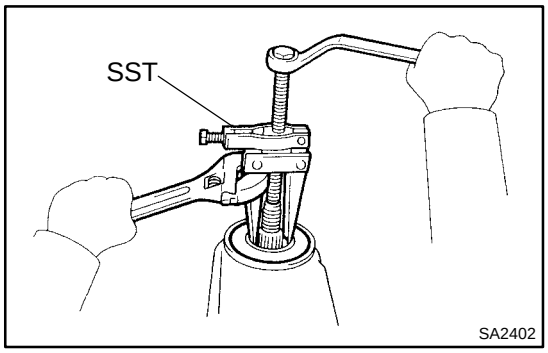
10. REMOVE COMPANION FLANGE

(a) Using a chisel and hammer, unstake the nut.

(b) Using SST to hold the flange, remove the nut.
SST 09330-00021



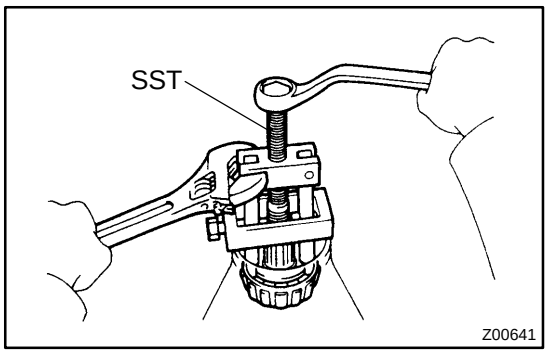
(c) Using SST, remove the companion flange.
SST 09950- 30012 (09951- 03010, 09953- 03010, 09954-03010, 09955-03030, 09956-03030)



11. REMOVE OIL SEAL AND OIL SLINGER

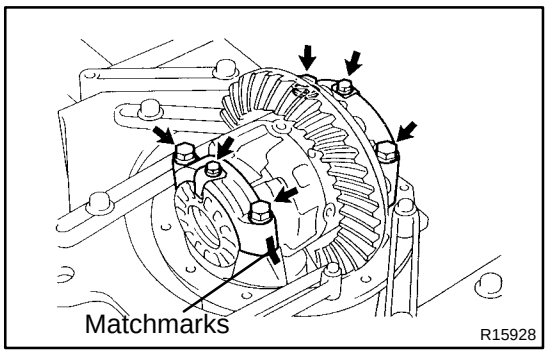
(a) Using SST, remove the oil seal from the differential carrier.
SST 09308-10010

(b) Remove the oil slinger.



12. REMOVE FRONT BEARING

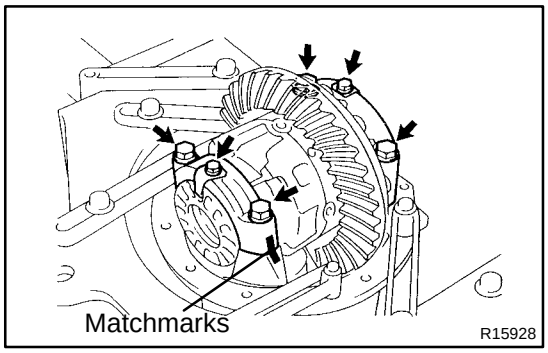
Using SST, remove the front bearing from the drive pinion.
SST 09556-22010



13. w/o Diff. lock:
REMOVE DIFFERENTIAL CASE

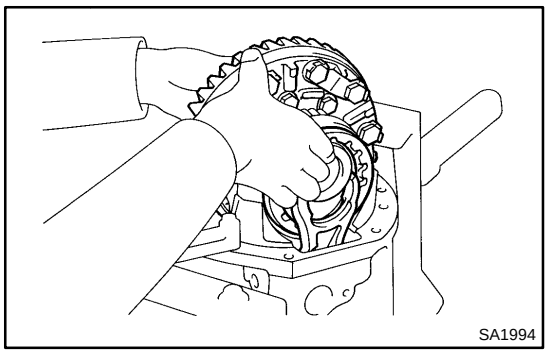
(a) Place matchmarks on the bearing cap and differential carrier.
(b) Remove the 2 adjusting nut locks.
(c) Remove the 4 bolts and 2 bearing caps.
(d) Remove the 2 adjusting nuts.
(e) Remove the differential case with the side bearing outer races from the differential carrier.

HINT:
Tag the disassembled parts to show the location for reassembly.



14. w/ Diff. lock:
REMOVE DIFFERENTIAL CASE

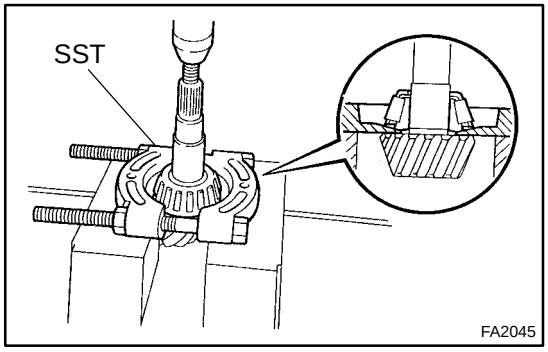
(a) Place matchmarks on the bearing cap and differential carrier.
(b) Remove the 2 adjusting nut locks.
(c) Remove the 4 bolts and 2 bearing caps.



(d) Remove the differential case with side bearing outer races, adjusting nut and sleeve from the differential carrier.
(e) Remove the shift fork.

15. REMOVE DRIVE PINION AND BEARING SPACER

(a) Remove the drive pinion with the rear bearing.
(b) Remove the bearing spacer.

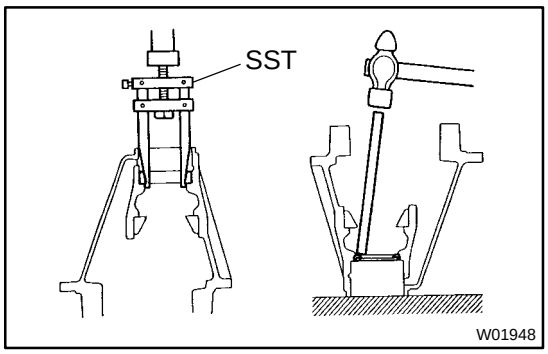


16. REMOVE DRIVE PINION REAR BEARING

(a) Using SST and a press, remove the bearing from the drive pinion.
SST 09950-00020

HINT:
If the drive pinion or ring gear are damaged, replace them as a set.

(b) Remove the plate washer from the drive pinion.

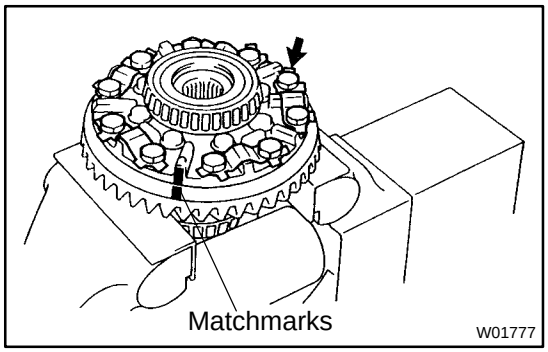


17. REMOVE FRONT AND REAR BEARING OUTER RACES AND OIL STORAGE RING

(a) Using SST, remove the front bearing outer race.
SST 09308-00010

(b) Using a brass bar and hammer, remove the oil storage ring.

(c) Using a brass bar and hammer, remove the rear bearing outer race.



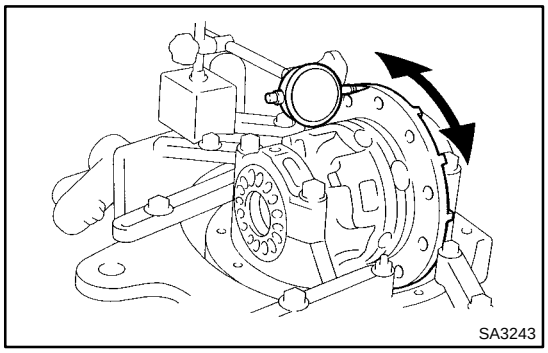
18. REMOVE RING GEAR

(a) Place matchmarks on the ring gear and differential case.

(b) Using a screwdriver and hammer, unstake the 5 lock plates.

(c) Remove the 10 ring gear set bolts and 5 lock plates.

(d) Using a plastic hammer, tap on the ring gear to separate it from the differential case.



19. w/o Diff. lock:
CHECK DIFFERENTIAL CASE RUNOUT

(a) Place the bearing outer races on their respective bearings. Check that the left and right outer races are not interchanged.

(b) Install the differential case in the differential carrier.

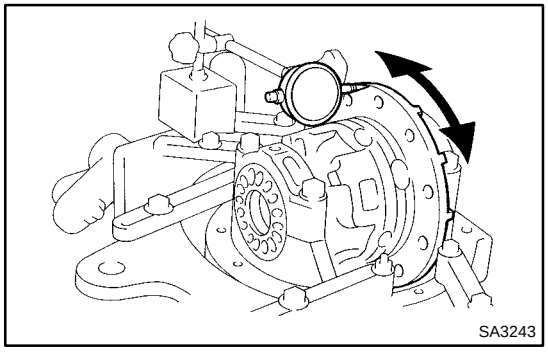
(c) When there is no play left in the side bearings, install the plate washers.

(d) Align the matchmarks on the bearing cap and differential carrier.

(e) Install and uniformly tighten the 4 bearing cap bolts in several passes.

(f) Using a dial indicator, measure the differential case runout.
Maximum runout: 0.07 mm (0.0028 in.)

(g) Remove the differential case.

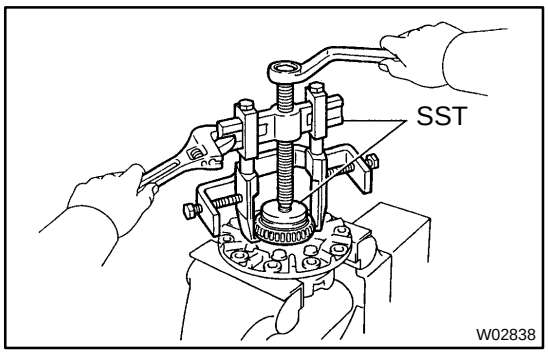


20. w/ Diff. lock:
CHECK DIFFERENTIAL CASE RUNOUT

(a) Install the differential case in the differential carrier and tighten the adjusting nut just to where there is no play in the bearing.

(b) Using a dial indicator, measure the differential case runout.
Maximum runout: 0.07 mm (0.0028 in.)

(c) Remove the differential case.



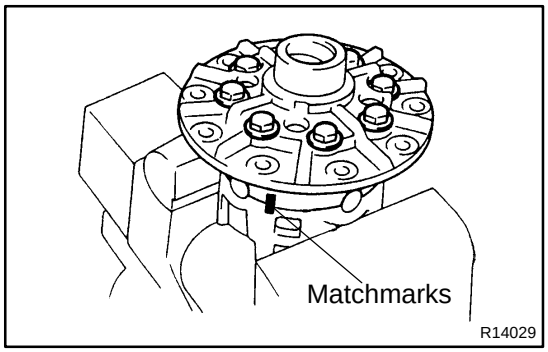
21. REMOVE SIDE BEARINGS FROM DIFFERENTIAL CASE

Using SST, remove the side bearings from the differential case.

SST 09950- 40011 (09951- 04010, 09952- 04010, 09953- 04020, 09954- 04010, 09955- 04061, 09957-04010, 09958-04011), 09950-60010 (09951-00480), 09950-60020 (09951-00730)

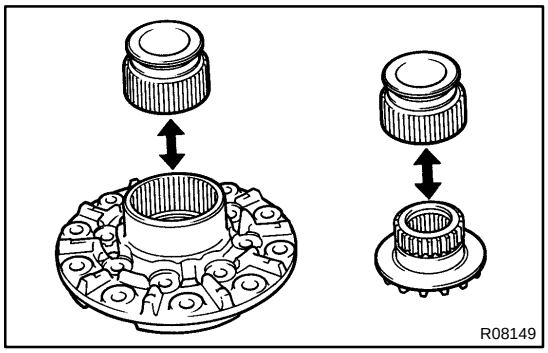
HINT:

Fix the claws of SST to the notches in the differential case.



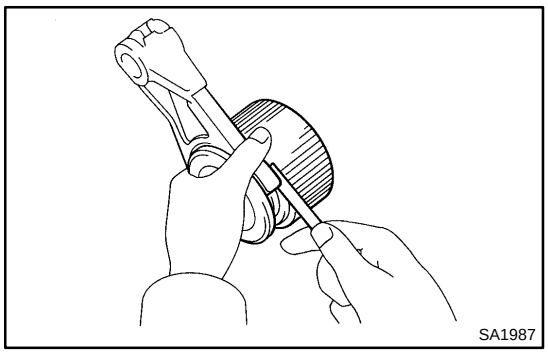
22. DISASSEMBLE DIFFERENTIAL CASE

(a) Place matchmarks on the LH and RH cases.
(b) Remove the 8 bolts uniformly, a little at a time.
(c) Using a plastic hammer, separate the LH and RH cases.
(d) Remove the 2 side gears, 2 side gear thrust washers, spider, 4 pinion gears and 4 pinion gear thrust washers.



23. w/ DIFF. LOCK: INSPECT SLEEVE

(a) Install the sleeve to the differential case (LH) and check that it moves smoothly.
(b) Install the sleeve to the side gear and check it moves smoothly.



24. w/ DIFF. LOCK: MEASURE CLEARANCE OF SHIFT FORK AND SLEEVE

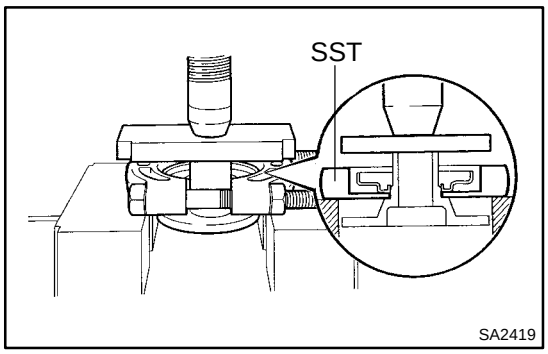
Using a feeler gauge, measure the clearance between the shift fork and sleeve.

Clearance (Reference):
0.15 - 0.35 mm (0.006 - 0.014 in.)

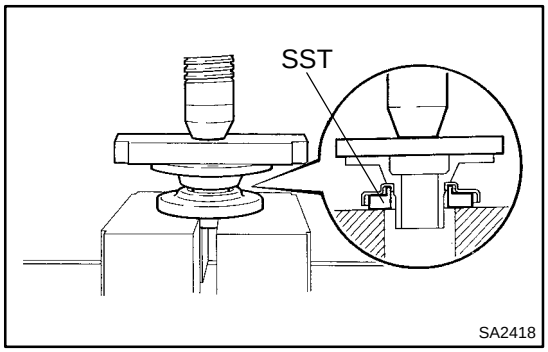
SA06J-01

REPLACEMENT

REPLACE COMPANION FLANGE DUST DEFLECTOR



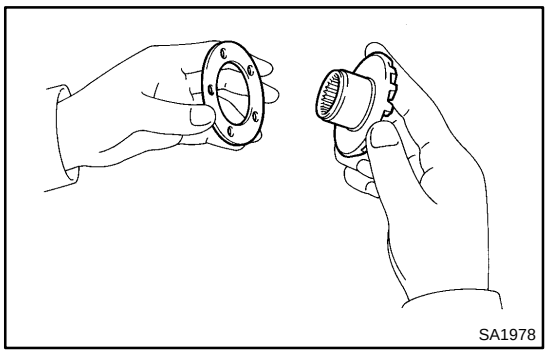
(a) Using SST and a press, remove the dust deflector.
SST 09950-00020



(b) Using SST and a press, install a new dust deflector.
SST 09726-40010

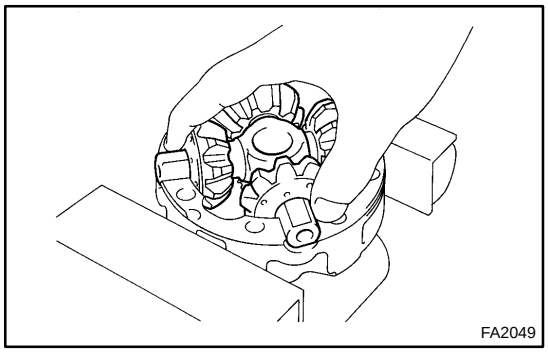
SA22O-02

REASSEMBLY

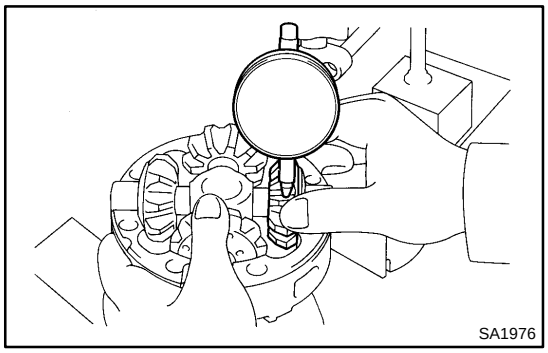

SA1978

1. ASSEMBLE DIFFERENTIAL CASE

(a) Apply all of the sliding and rotating surfaces with gear oil.
(b) Install the side gear thrust washer to the side gear.
(c) Install the side gear to the RH case.


FA2049

(d) Install the 4 pinion gears and pinion gear thrust washers to the spider.
(e) Install the 4 pinion gears with spider to the RH case.


SA1976

(f) Using a dial indicator, measure the side gear backlash with holding the side gear and spider.

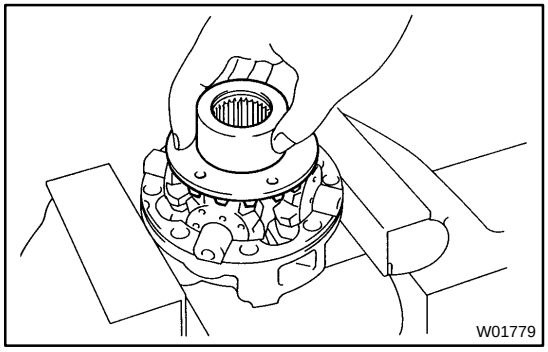
Standard backlash:
0.05 - 0.20 mm (0.0020 - 0.0079 in.)

HINT:
- Measure at all 4 locations.
- Measure the backlash at the RH case at the LH case.

If the backlash is not within the specification, install a thrust washer of a different thickness.

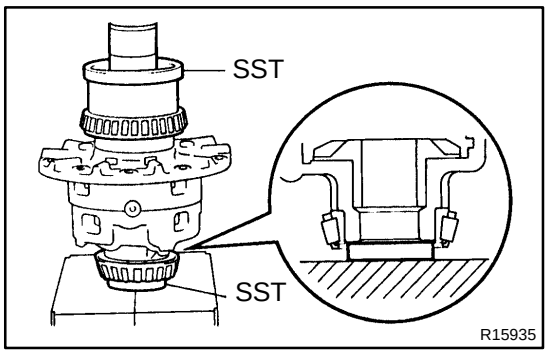
Thrust washer thickness

Thickness mm (in.)	Thickness mm (in.)
0.9 (0.035)	1.2 (0.047)
1.0 (0.039)	1.3 (0.051)
1.1 (0.043)	-


W01779

(g) Install the side gear and side gear thrust washer to the RH case.
(h) Install the pinion gears and spider to the RH case.
(i) Install the side gear and side gear thrust washer to the RH case.
(j) Align the matchmarks on the LH and RH cases.
(k) Torque the 8 bolts uniformly, a little at a time.

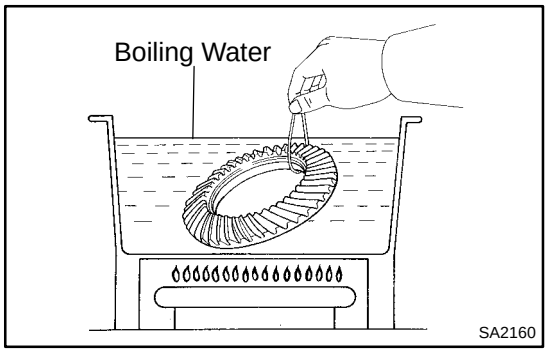
Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)



2. INSTALL SIDE BEARINGS

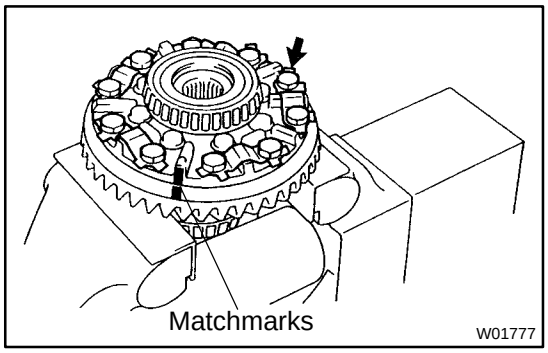
Using SST and a press, install the side bearings on the differential case.

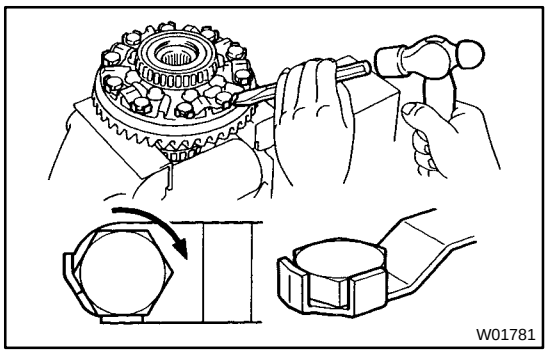
SST 09223-15020 09950-60010 (09951-00480, 09951-00550), 09950-60020 (09951-00730)



3. INSTALL RING GEAR ON DIFFERENTIAL CASE

(a) Clean the contact surfaces of the differential case and ring gear.
(b) Heat the ring gear to about 100 °C (212 °F) in boiling water.
(c) Carefully remove the ring gear from the boiling water.
(d) After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.
(e) Align the matchmarks on the ring gear and differential case.
(f) Temporarily install 5 new lock plates and 10 set bolts.
(g) After the ring gear cools down enough, tighten the set bolts uniformly and a little at a time.
Torque: 97 N·m (985 kgf·cm, 71 ft·lbf)

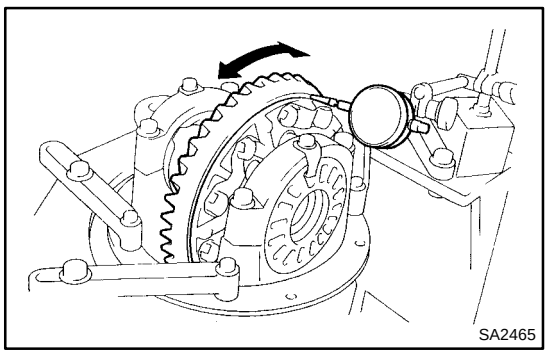




(h) Using a drift punch and hammer, stake the 10 lock plates.

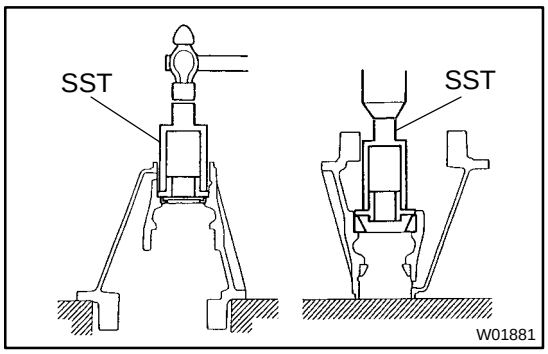
HINT:

Stake 1 claw flush with the flat surface of the bolt. For the claw contacting the protruding portion of the bolt, stake the half on the tightening side.



4. CHECK RING GEAR RUNOUT

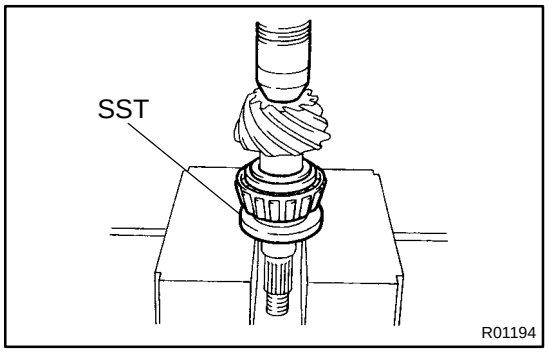
(a) Install the differential case onto the carrier and tighten the adjusting nut just to where there is no play in the bearings.
(b) Using a dial indicator, check the ring gear runout.
Maximum runout: 0.07 mm (0.0028 in.)
(c) Remove the differential case from the carrier.



5. INSTALL NEW OIL STORAGE RING AND DRIVE PINION FRONT AND REAR BEARING OUTER RACES

(a) Using SST and a hammer, install a new oil storage ring.
SST 09316-6001 1 (09316-00011, 09316-00021)

(b) Using SST and a press, install the outer races.
SST 09316-6001 1 (09316-00011, 09316-00021, 09316-00051)



6. INSTALL DRIVE PINION FRONT BEARING

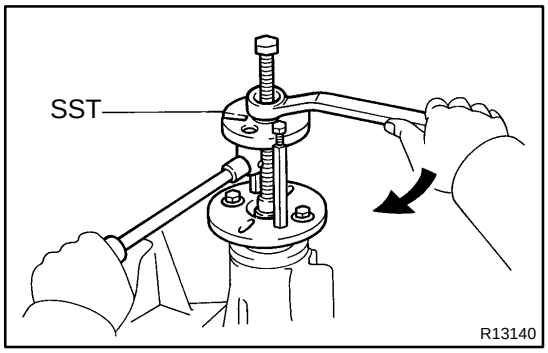
(a) Install the plate washer on the drive pinion.

(b) Using SST and a press, install the rear bearing onto the drive pinion.
SST 09506-30012

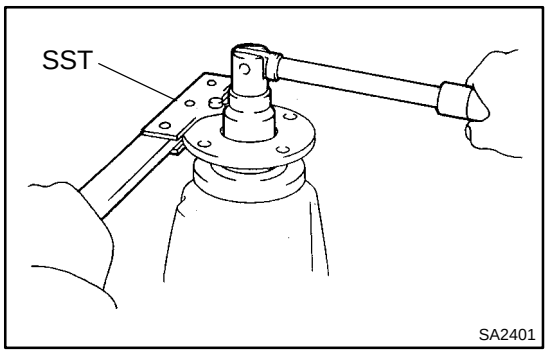
7. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the drive pinion, front bearing and oil slinger.

HINT:
Assemble the spacer and oil seal after adjusting the gear contact pattern.

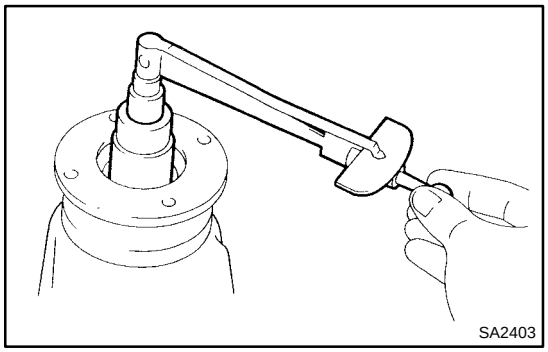


(b) Install the companion flange with SST.
SST 09950-30012 (09951-03010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)



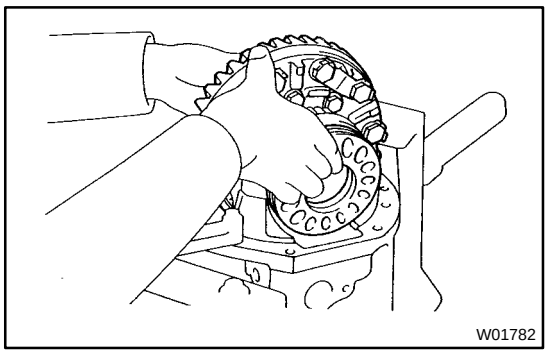
(c) Adjust the drive pinion preload by tightening the companion flange nut.
Using SST to hold the flange, tighten the nut.
SST 09330-00021

NOTICE:
As there is no spacer, tighten a little at a time, being careful not to overtighten.



(d) Using a torque wrench, measure the preload.
Preload (at starting):
New bearing:
0.9 - 1.6 N·m (10 - 16 kgf·cm, 8.7 - 13.9 in.·lbf)
Reused bearing:
0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in.·lbf)

HINT:
Measure the total preload after first turning the bearing clockwise and counterclockwise several times to make the bearing smooth.


W01782

8. w/o Diff. lock:
INSTALL DIFFERENTIAL CASE IN CARRIER

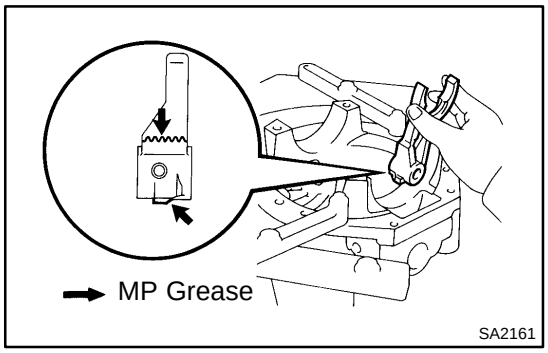
(a) Place the bearing outer races on their respective bearings. Make sure that the left and right outer races are not interchanged.

(b) Install the case in the carrier.

HINT:

Make sure that there is a backlash between the ring gear and drive pinion.

(c) Install the adjusting nuts on the carrier, making sure the nuts are threaded properly.

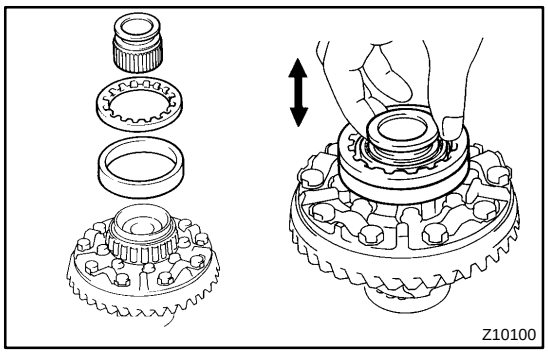


SA2161

9. w/ Diff. lock:
INSTALL DIFFERENTIAL CASE IN CARRIER

(a) Apply MP grease on the rack of the shift fork and connecting part of the indicator switch.

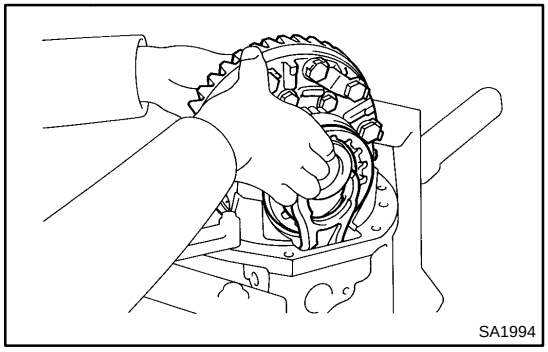
(b) Insert the shift fork into the differential carrier, as shown.


Z10100

(c) Place the outer races, adjusting nut and left side to sleeve.

HINT:

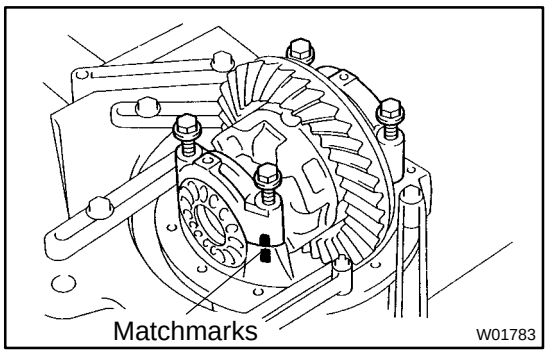
Check that the sleeve moves smoothly.


SA1994

(d) Install the shift fork in the groove of the sleeve holding it by hand and install the case in the carrier.

HINT:

Make sure that there is backlash between the ring gear and drive pinion.



10. INSTALL BEARING CAPS

Align the matchmarks on the cap and carrier. Screw in the 2 bearing cap bolts 2 or 3 turns and press down the bearing cap by hand.

HINT:

If the bearing cap does not fit tightly on the carrier, the adjusting nuts are not threaded properly.

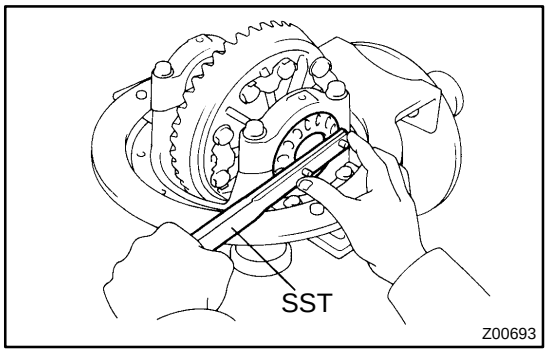
Reinstall the adjusting nuts if necessary.

11. w/o Diff. lock:
ADJUST SIDE BEARING PRELOAD

(a) Tighten the 4 bearing cap bolts to the specified torque, and loosen them to the point where they can be turned by hand.

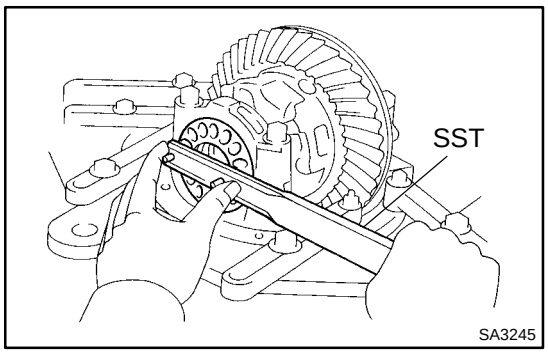
Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)

(b) Fully tighten the 4 bearing cap bolts by hand.



(c) Using SST, tighten the adjusting nut on the ring gear back side until the ring gear has a backlash of about 0.2 mm (0.008 in.).

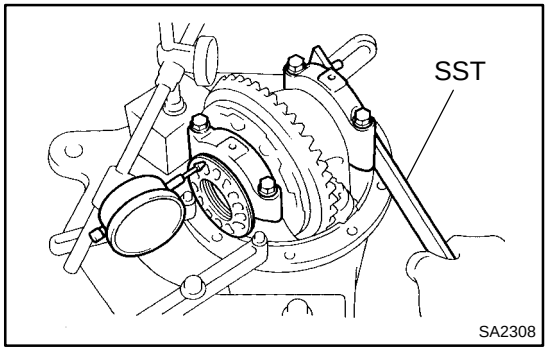
SST 09504-0001 1



(d) With turning the ring gear, use SST to fully tighten the adjusting nut on the ring gear teeth side.

After the bearings are settled, loosen the adjusting nut on the drive pinion side.

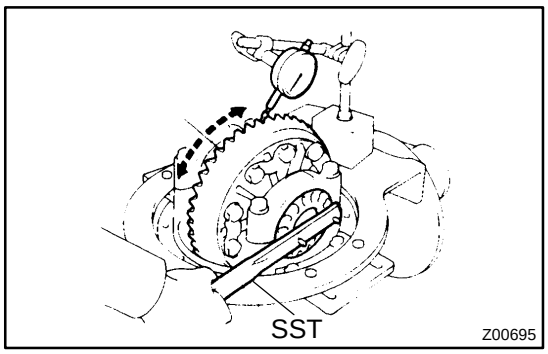
SST 09504-0001 1



(e) Place a dial indicator on the top of the adjusting nut on the ring gear back side.

(f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.

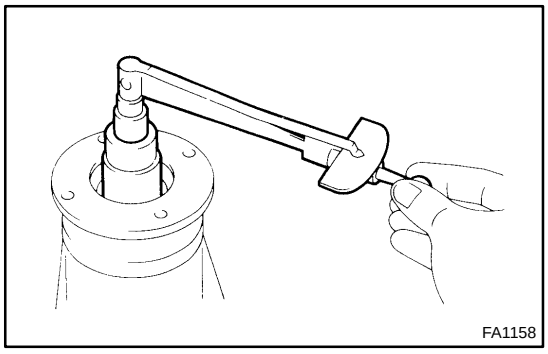
(g) Tighten the adjusting nut 1 - 1.5 notches from the zero preload position.



(h) Using a dial indicator, adjust the ring gear backlash until it is within the specification.
Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

HINT:
The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut of the left side one notch and tighten the nut on the right side one notch.

(i) Torque the bearing cap bolts.
Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)



(j) Recheck the ring gear backlash.

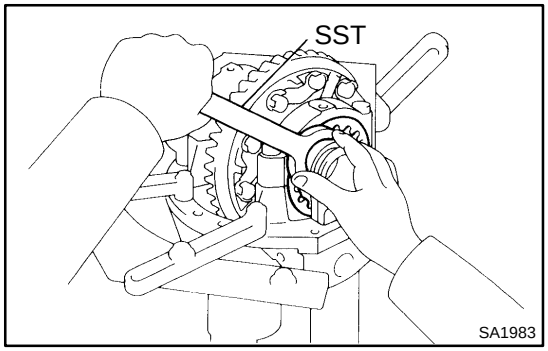
HINT:
Before measurement, rotate the ring gear 5 times or more.
Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

(k) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.
Total preload (at starting):
Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)

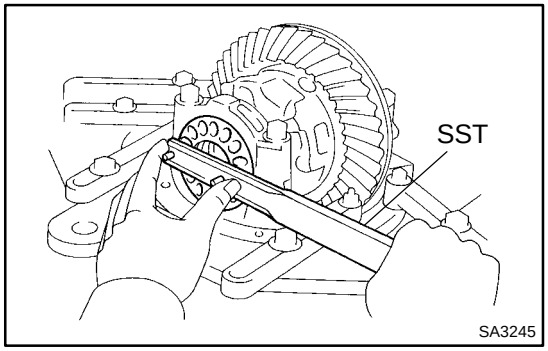
12. w/ Diff. lock:
ADJUST SIDE BEARING PRELOAD

(a) Torque the 4 bearing cap bolts to the specified torque, then loosen them to the point where the adjusting nut can be turned by hand.
Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)

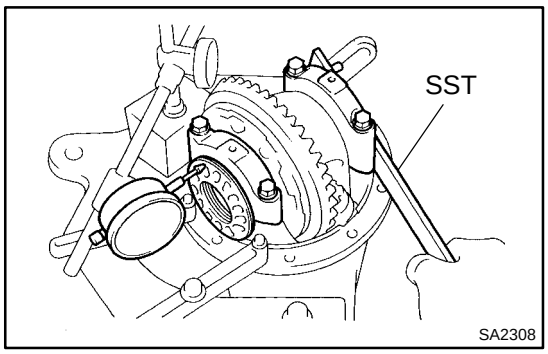
(b) Fully tighten the 4 bearing cap bolts by hand.



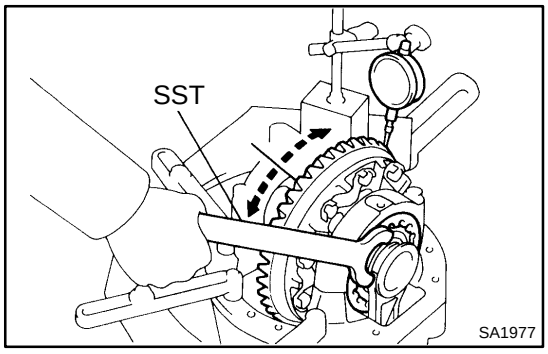
(c) Using the SST, torque the adjusting nut on the ring gear side until the ring has a backlash of about 0.2 mm (0.008 in.).
SST 09960-10010



(d) With turning the ring gear, use the SST to fully tighten the adjusting nut on the drive pinion side. After the bearings are settled, loosen the adjusting nut on the drive pinion side.
SST 09504-0001 1



(e) Place a dial indicator on the top of the adjusting nut on the ring gear side.
(f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.
(g) Torque the adjusting nut 1 - 1.5 notches from the zero preload position.

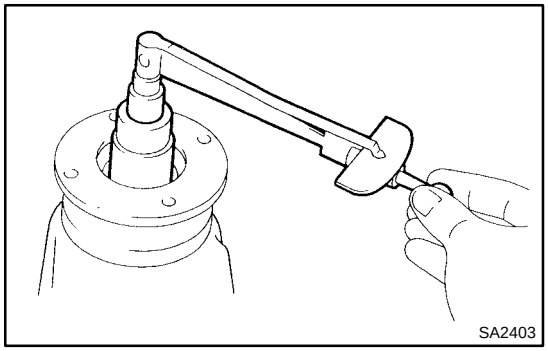


(h) Using a dial indicator, adjust the ring gear backlash until it is within specification.
Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

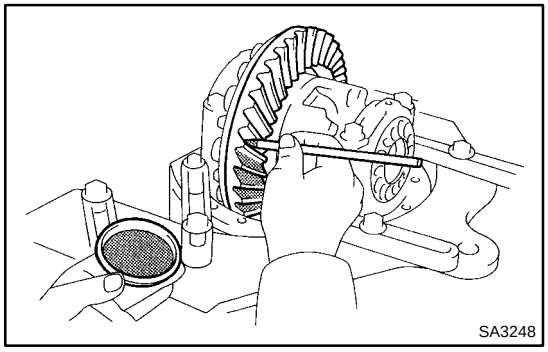
HINT:
The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut on the left side one notch and torque the nut on the right side one notch.

(i) Torque the bearing cap bolts.
Torque: 85 N·m (870 kgf·cm, 63 ft·lbf)
(j) Recheck the ring gear backlash.

HINT:
Before measurement, rotate the ring gear 5 times or more.
Backlash: 0.13 - 0.18 mm (0.0051 - 0.0071 in.)

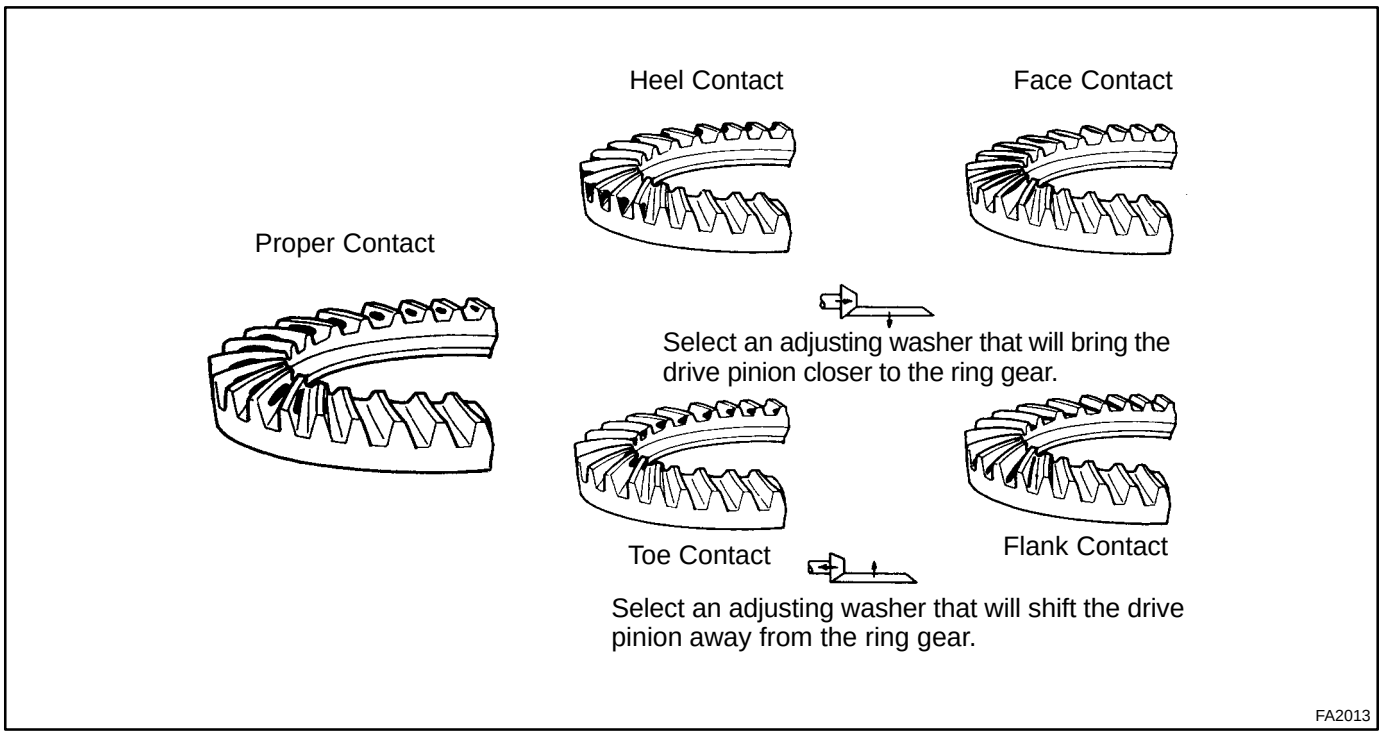


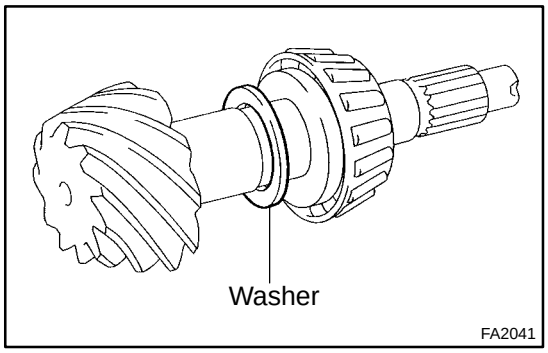
(k) Using a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.
Total preload (starting):
Drive pinion preload plus 0.4 - 0.6 N·m (4 - 6 kgf·cm, 3.5 - 5.2 in.·lbf)



13. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Coat 3 or 4 teeth at the 3 different positions on the ring gear with red lead.
(b) Hold the companion flange firmly and rotate the ring gear in both directions.
(c) Inspect the tooth pattern.





If the teeth are not contacting properly, use the following chart to select a proper washer for correction.

Thickness mm (in.)	Thickness mm (in.)
1.70 (0.0669)	2.03 (0.0799)
1.73 (0.0681)	2.06 (0.0811)
1.76 (0.0693)	2.09 (0.0823)
1.79 (0.0705)	2.12 (0.0835)
1.82 (0.0717)	2.15 (0.0846)
1.85 (0.0728)	2.18 (0.0858)
1.88 (0.0740)	2.21 (0.0870)
1.91 (0.0752)	2.24 (0.0882)
1.94 (0.0764)	2.27 (0.0894)
1.97 (0.0776)	2.30 (0.0906)
2.00 (0.0787)	2.33 (0.0917)

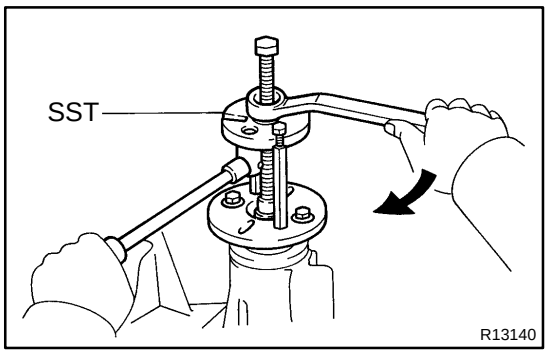
14. REMOVE COMPANION FLANGE (See page SA-96)

15. REMOVE OIL SLINGER AND FRONT BEARING (See page SA-96)

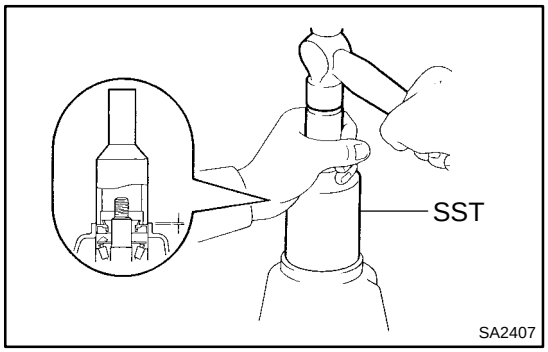
16. INSTALL BEARING SPACER AND FRONT BEARING

(a) Place a new bearing spacer on the shaft.

(b) Place the front bearing and oil slinger.



(c) Using SST and the companion flange, install the front bearing then remove the companion flange.
SST 09950-30012 (09951-06010, 09953-03010, 09954-03010, 09955-03030, 09956-03030)



17. INSTALL OIL SEAL

(a) Apply MP grease to the oil seal lip.

(b) Using SST and a hammer, install a new oil seal.
SST 09214-7601 1
Oil seal drive in depth: 1.0 mm (0.039 in.)

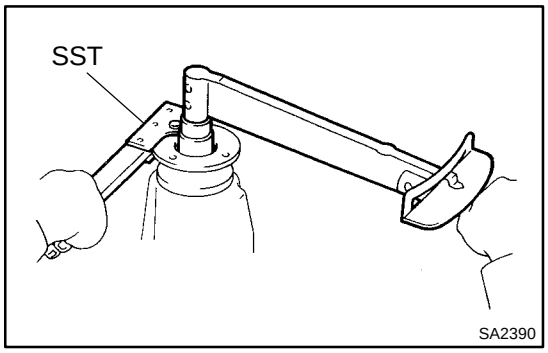
18. INSTALL COMPANION FLANGE

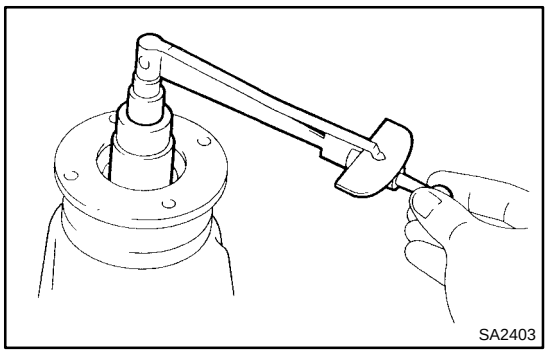
(a) Place the companion flange on the drive pinion.

(b) Install a new nut.

HINT:
Coat the threads of a new nut with hypoid gear oil.

(c) Using SST to hold the flange, tighten the nut.
SST 09330-00021
Torque: 196 N·m (2,000 kgf·cm, 145 ft·lbf)





19. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

Preload (at starting):
New bearing:
0.9 - 1.6 N·m (10 - 16 kgf·cm, 8.7 - 13.9 in.·lbf)
Reused bearing:
0.5 - 0.8 N·m (5 - 8 kgf·cm, 4.3 - 6.9 in.·lbf)

If preload is greater than the specification, replace the bearing spacer.

If preload is less than the specification, retighten the nut a little at a time with a torque of 13 N·m (130 kgf·cm, 9 ft·lbf) until the specified preload is reached.

Torque: 343 N·m (3,500 kgf·cm, 253 ft·lbf) or less

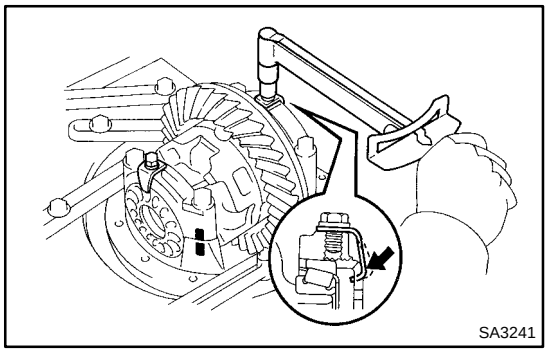
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure.
Do not back off the pinion nut to reduce the preload.

20. RECHECK RING GEAR BACKLASH
(See page SA-96)

21. RECHECK TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 14)

22. CHECK RUNOUT OF COMPANION FLANGE (See page SA-96)

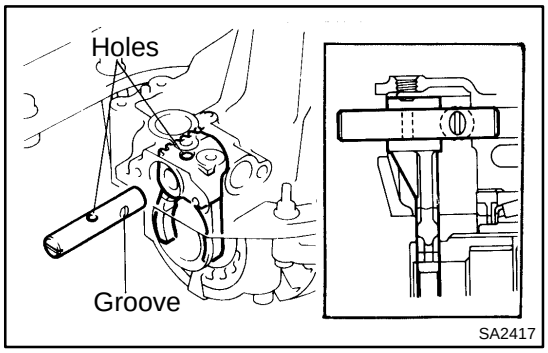
23. STAKE DRIVE PINION NUT



24. INSTALL ADJUSTING NUT LOCKS

(a) Install 2 new nut locks on the bearing caps.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

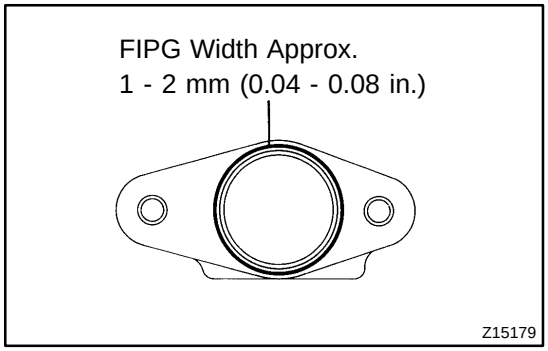
(b) After tightening bolts, bend the nut locks.



25. w/ DIFF. LOCK:
INSTALL SHIFT FORK SHAFT

(a) Apply MP grease onto the outer circuit of the fork shaft.

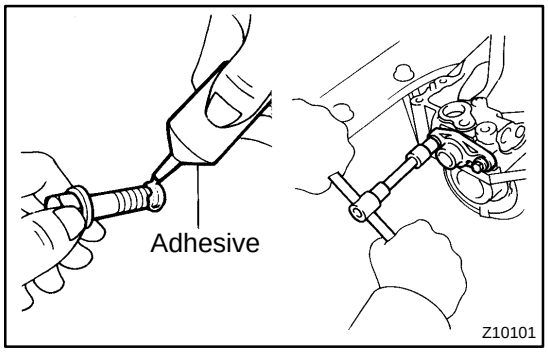
(b) Install the fork shaft to match the hole of the shift fork and that of the shift fork shaft.



(c) Remove any FIPG material and be careful not to drop oil on the contacting surface of the differential carrier and shaft retainer.

(d) Apply FIPG to the carrier, as shown.
FIPG: Part No. 08826-00090, THREE BOND 1281 or equivalent

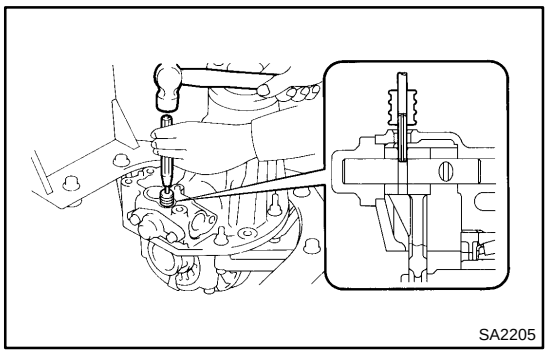
HINT:
Install the shaft retainer within 10 minutes after applying FIPG.



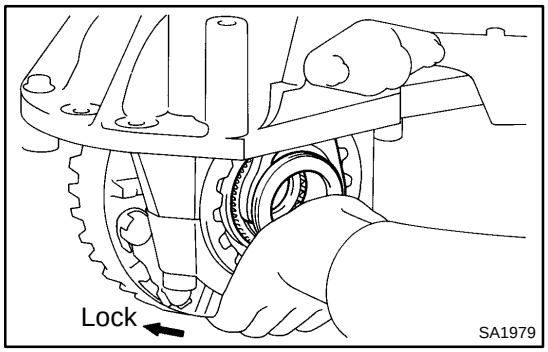
(e) Clean the threads of the bolts and retainer bolts holes with toluene or trichloroethylene.

(f) Apply adhesive to 2 or 3 threads of the mount bolt end.
Adhesive: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(g) Tighten the shaft retainer with the 2 bolts.
Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

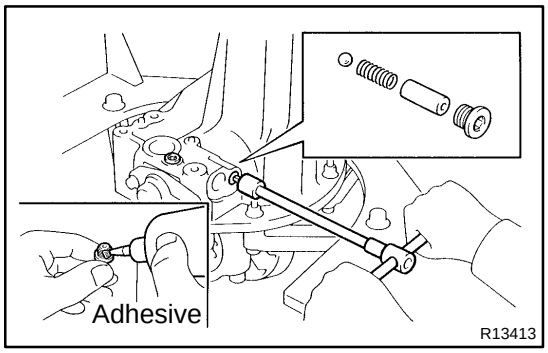

SA2205

(h) Using a pin punch and hammer, install the slotted spring pin to the shift fork.



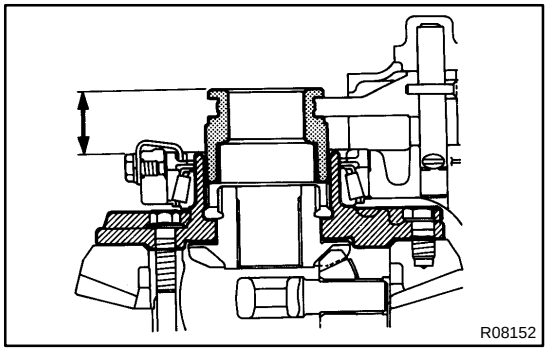
SA1979

(i) Shift the fork deeply and keep the differential lock condition.



R13413

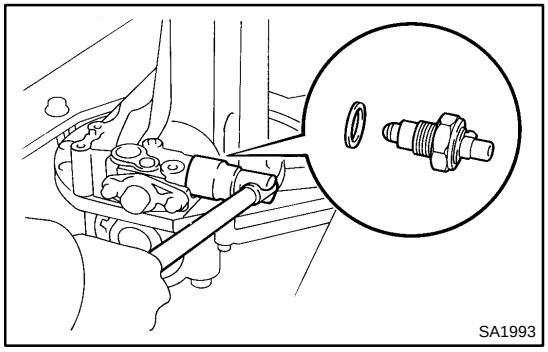
(j) Install the ball, compression spring and spring seat.
(k) Clean the threads of 2 plugs and plug holes with toluene or trichloroethylene.
(l) Apply adhesive to the plug threads.
Adhesive: Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent
(m) Using a hexagon wrench, install and tighten the screw plugs.
Torque: 22 N·m (220 kgf·cm, 16 ft·lbf)


R08152

26. w/ DIFF. LOCK:
MEASURE DISTANCE BETWEEN SLEEVE AND DIFFERENTIAL CASE END SIDE

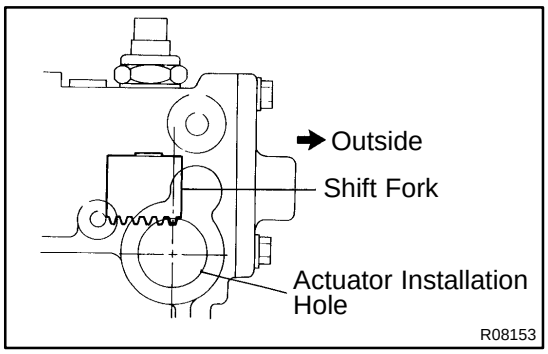
Measure distance between the sleeve and tip of the differential case when differential is free and locked.

Standard distance:
LOCK: 17.44 - 18.86 mm (0.6866 - 0.7425 in.)
FREE: 32.40 - 33.90 mm (1.2756 - 1.3346 in.)


SA1993

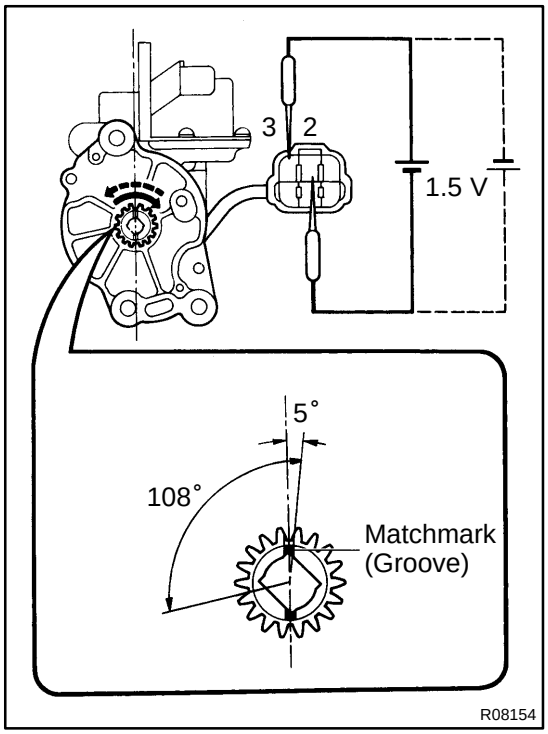
27. INSTALL INDICATOR SWITCH

Install the indicator switch with a new gasket.
Torque: 40 N·m (410 kgf·cm, 30 ft·lbf)



28. INSTALL ACTUATOR

(a) Check that the outermost rack tooth of the shift fork is virtually above the center line of the actuator installation hole.



(b) Ensure that the matchmarks of the pinion of the actuator is in the extent between zero and 5 degrees clockwise above the center line of the actuator.

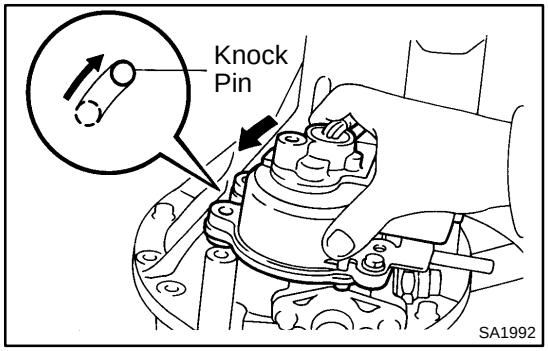
NOTICE:

- **If the matchmarks is not in this extent, rotate the pinion to be matched.**
- **Don't supply the battery positive voltage directly between terminals.**
- **If the matchmarks come to the extension limit of the rotation, don't electrify moreover.**

(c) Install a new O-ring to the actuator.

(d) Apply a light coat of gear oil on the O-ring.

(e) Apply MP grease to the gear part.



(f) Insert the actuator so that the long hole on the actuator side fits with the knock pin on the carrier side.

HINT:

Don't damage the O-ring of the actuator.

(g) Align the actuator with the long hole and rotate the actuator counterclockwise when the knock pin reaches the right-hand side.

(h) Install the actuator to the differential carrier with the bolt so that the outermost rack tooth of the shift fork will fit the matchmarks of the pinion of the actuator.

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)

SA06L-02

INSTALLATION

Installation is in the reverse order of removal (See page SA-94).

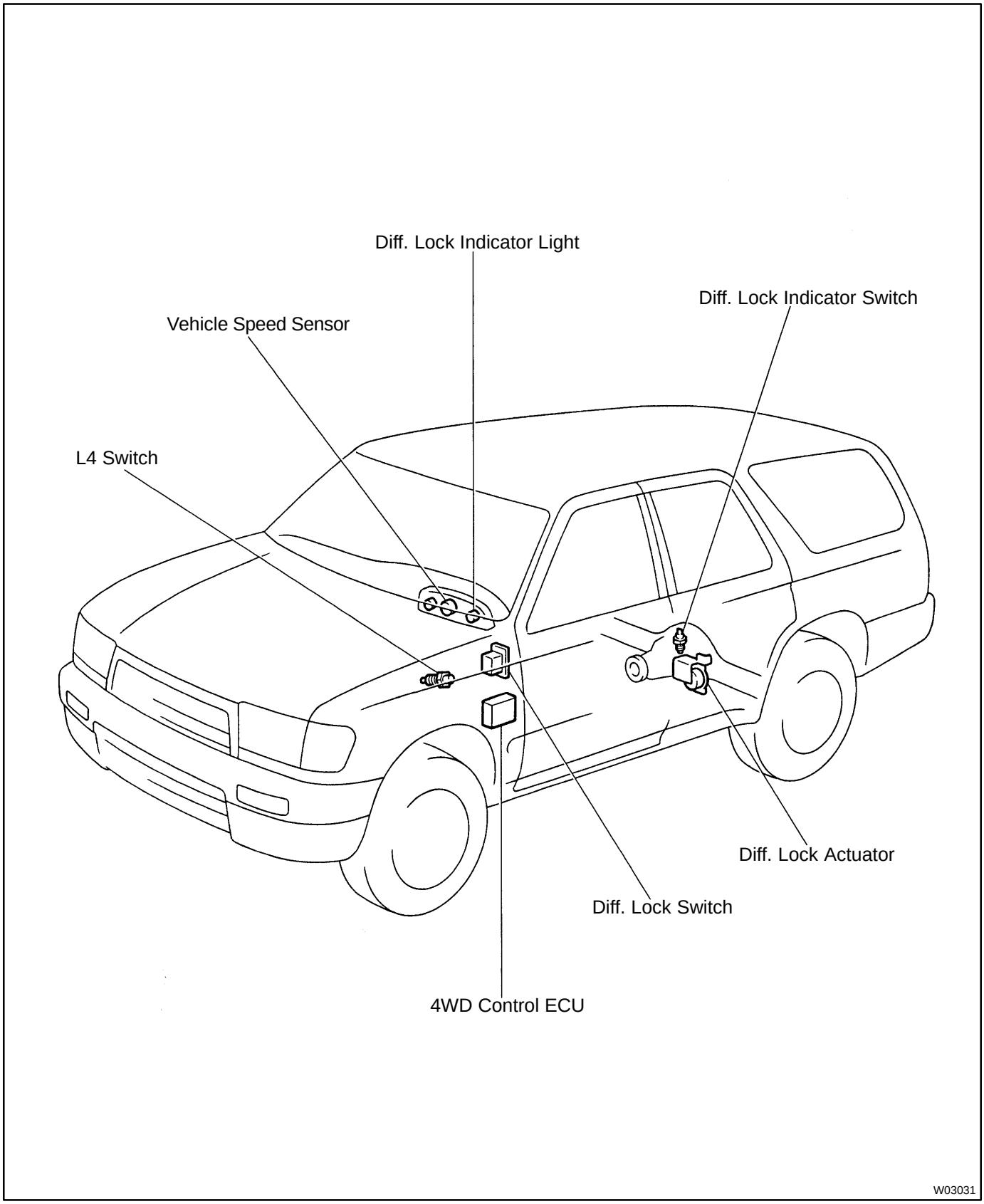
HINT:

After installation, fill the differential with differential oil (See page SA-88) and check the diff. lock operation (See page SA-1 18).

DIFFERENTIAL LOCKING SYSTEM

SA06N-02

LOCATION

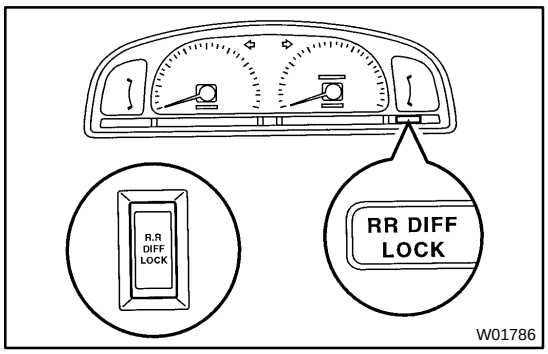


SA06O-01

REMOVAL

REMOVE DIFF. LOCK ACTUATOR (See page SA-96)

SA06P-03



INSPECTION

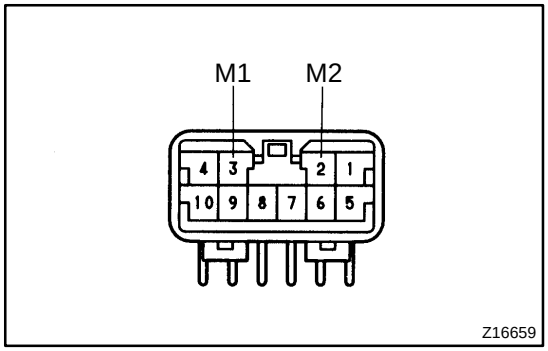
1. INSPECT DIFFERENTIAL LOCK SYSTEM

(a) Inspect the indicator light.
Check that the indicator light lights up for approx. 1 second when the ignition switch is turned ON.

(b) Inspect the differential lock operation.
(1) Jack up the vehicle then start the engine.
(2) Shift the transfer shift lever to the 4WD position.
(3) When the Diff. lock control switch is set to the ON position, the indicator light is turned on.
Differential lock is applied to the rear wheel at this time.

HINT:
If the gears of the differential lock system are not meshed, the indicator light remains blinking, so rotate the tires to mesh the gear.

(4) When the Diff. lock control switch is at the OFF position, the indicator light goes off.
Differential lock is released for the rear wheel at this time.



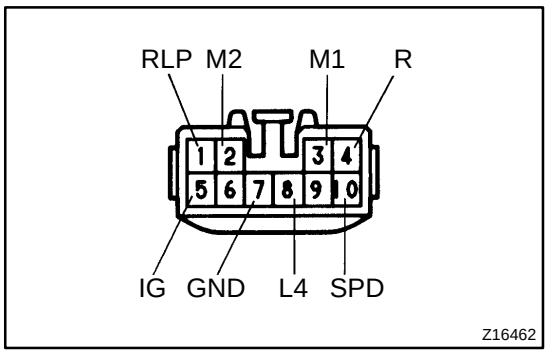
(5) Check the voltage between the terminals of the 4WD control ECU when switching the Diff. lock control switch with the speedometer, registering approx. 8 km/h (5 mph) or more.

Swith position	Terminal	Specified value
ON	M1 - M2	0.5 V or less (No change)

(6) Check that the indicator lights blink when 2WD mode is set.
Diff. lock is released for both the rear wheels at this time.
(7) Return the Diff. lock control switch to OFF.
(8) Stop the engine and lower the vehicle.

2. INSPECT DIFF. LOCK SYSTEM CIRCUIT

(a) Inspect the battery positive voltage.
Battery positive voltage: 10 - 14 V

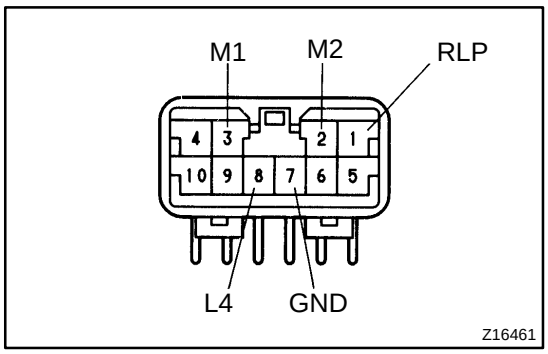


(b) Inspect the system circuit with the connector disconnected.
Disconnect the connector from the 4WD control ECU and inspect the connector on the wire harness side, as shown in the chart.

Symbols (Terminals No.)	Trouble part	Condition	Specified value
M_1 - M_2	RR Differntial Lock Actuator	-	Less than 100 Ω
GND - Body ground	Body ground	-	Continuity
SPD - Body ground	Speed sensor	Vehicle moves slowly	1 pulse each 40 cm (15.75 in.)
IG - Body ground	DIFF Fuse	Ignition switch ON	10 - 14 V
RLP - Body ground	Rear Differential Lock Indicator Switch	Ignition switch ON with indicator light ON	About 0 V
		Ignition switch ON with indicator light OFF	10 - 14 V
L4 - Body ground	L4 Indicator Switch	Ignition switch ON with indicator light OFF	About 0 V
		Ignition switch ON with indicator light OFF	10 - 14 V
R - Body ground	Differential Lock Control Switch	Ignition switch ON with differential lock control switch ON	10 - 14 V
		Ignition switch ON with differential lock control switch OFF	About 0 V

HINT:
If the circuit is not as specified, check and repair or replace the trouble part shown in the table above.

(c) Inspect the system circuit with the connector connected.
(1) Turn the ignition switch to the ON position.
(2) Keep the center Diff. lock condition.
(3) Remove the Diff. lock ECU.

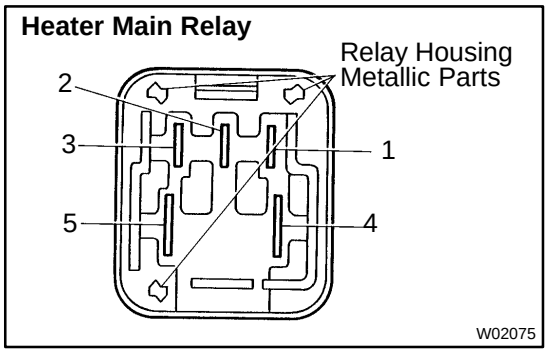


(4) Using a voltmeter, measure the voltage when the differential lock control switch is in the position, as shown below.

Tester Connection ⊕ - ⊖	Switch position	Specified valve
L4 - GND	-	0.5 V or less
RLP - GND	ON	0.5 V or less → 10 - 14 V (Approx. 1 sec.) → 0.5 V or less
M1 - M2	OFF - ON	
M2 - M1	ON - OFF	

If the circuit is not as specified, replace the ECU.

(5) Install the ECU in place.



3. INSPECT DIFF. LOCK COMPONENTS

(a) Inspect the relay operation.

(1) Jack up the vehicle.

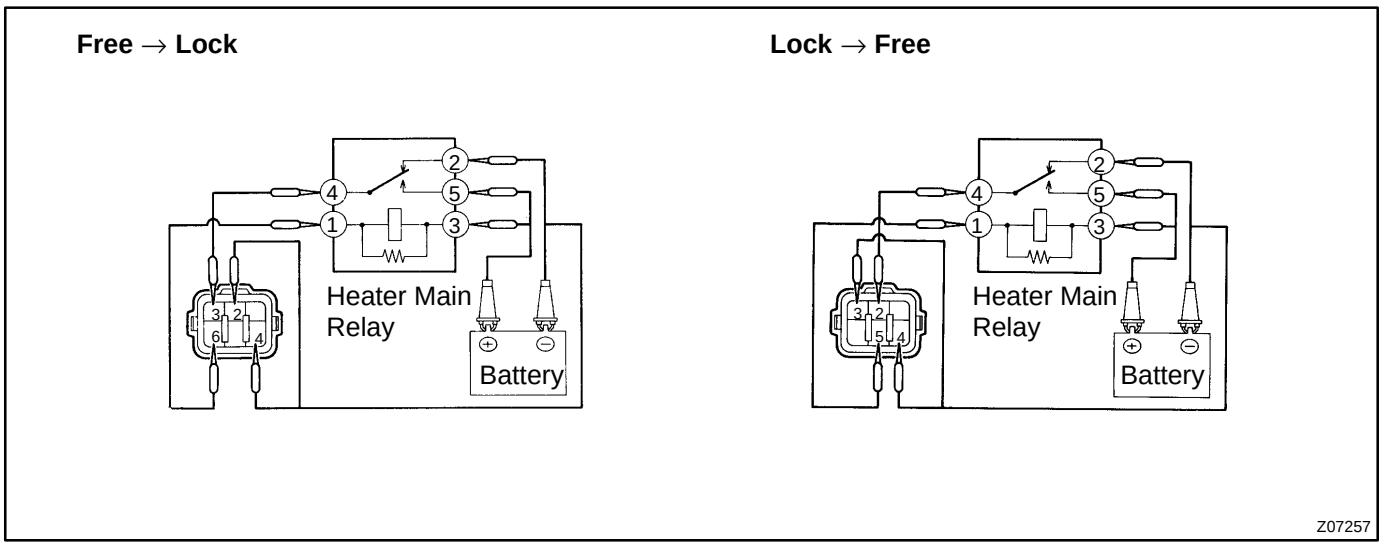
(2) Use a heater main relay and connect it, as shown below.

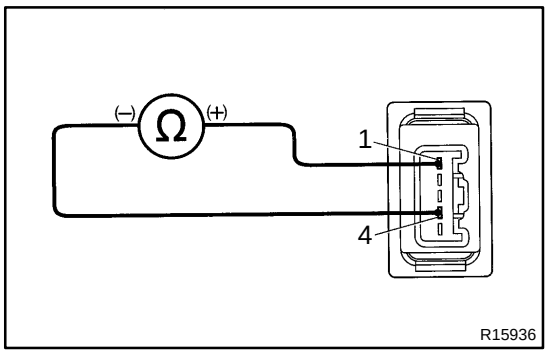
NOTICE:

Connect the terminals being careful not to touch the neighboring terminals or metallic parts of the relay housing.

(3) Rotate the tire and check that differential lock has occurred.

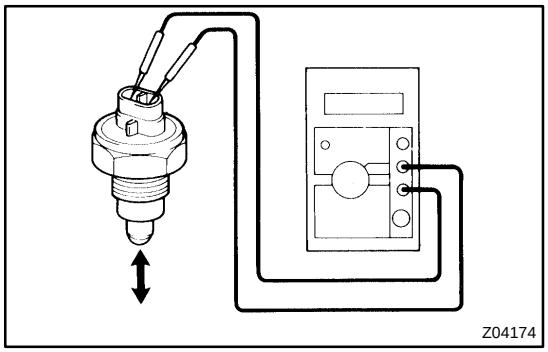
If operation is not as specified, replace the actuator.





(b) Inspect the Diff. lock control switch continuity.
Inspect the switch continuity between terminal 1 to terminal 4.

HINT:
If it is not continuity, replace the switch.



(c) Inspect the Diff. lock indicator switch.
(1) Check that there is continuity between terminals when the switch is pushed (differential connected position).
(2) Check that there is no continuity when the switch is free (differential disconnected position).

HINT:
If operation is not as specified, replace the switch.

(d) Inspect the transfer 4WD switch (See page TR-1 1).

(e) Inspect the vehicle speed sensor (See page BE-45).

SA06Q-01

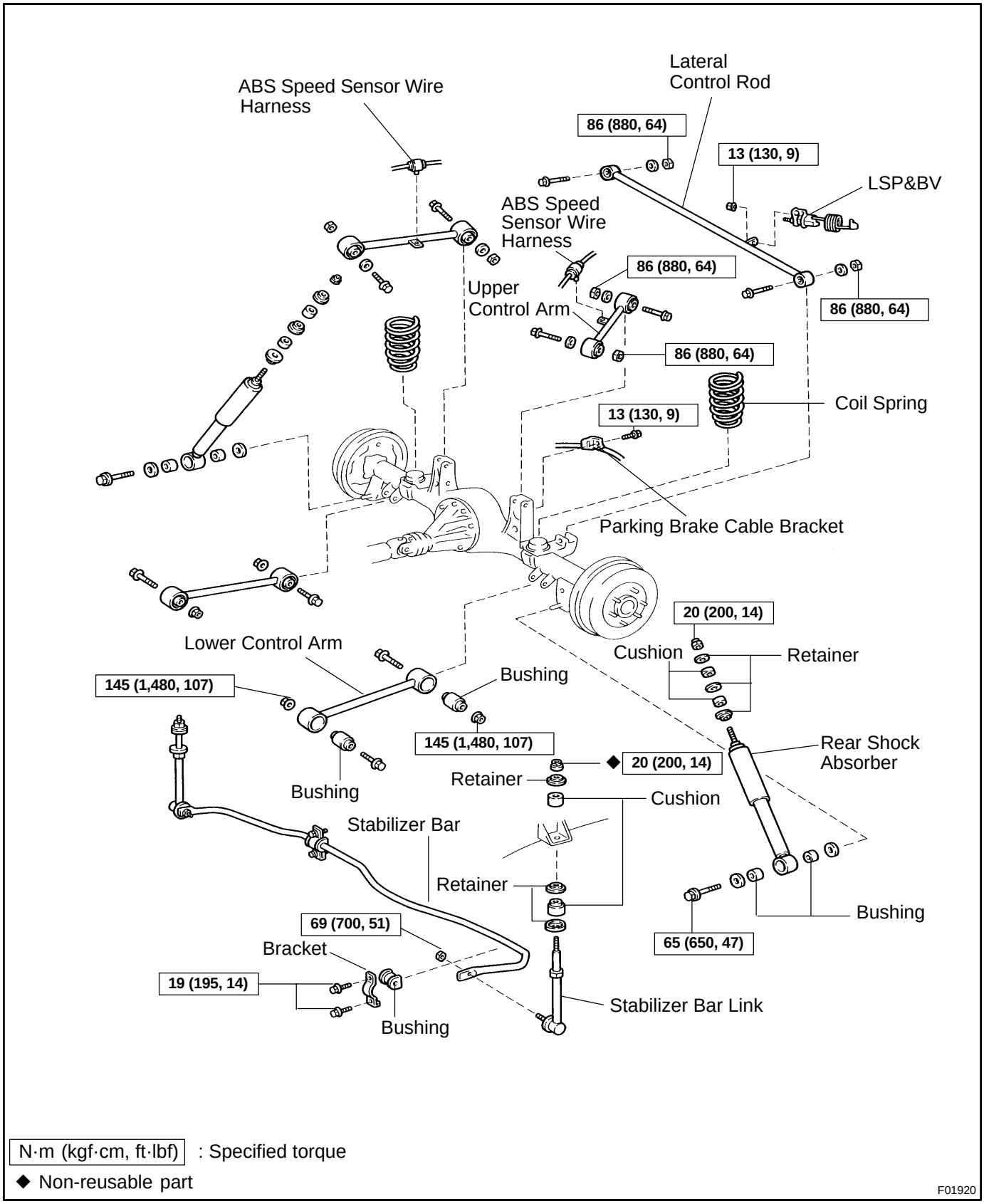
INSTALLATION

INSTALL DIFF. LOCK ACTUATOR (See page SA-103)

COIL SPRING AND REAR SHOCK ABSORBER

COMPONENTS

SA06R-02



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

F01920

SA06S-02

REMOVAL

1. JACK UP AND SUPPORT VEHICLE

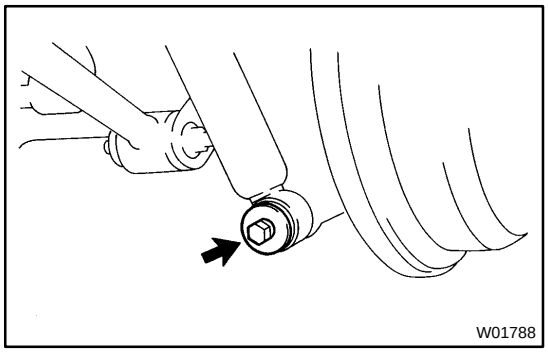
Jack up the rear axle housing and support the frame with stands. Hold the rear axle housing with a jack.

2. REMOVE WHEEL

Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

3. REMOVE PARKING BRAKE CABLE BRACKET FROM REAR AXLE HOUSING

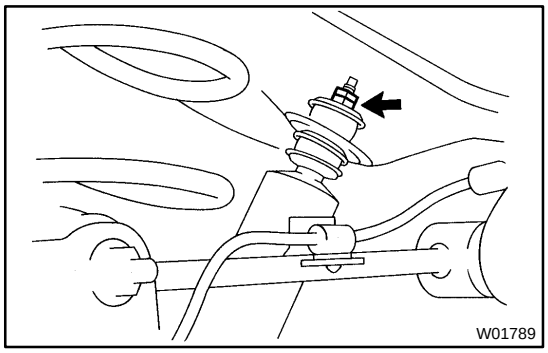
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



4. DISCONNECT REAR SHOCK ABSORBER

(a) Remove the bolt, 2 washers and 2 bushings, holding the shock absorber to the rear axle housing and disconnect the shock absorber.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

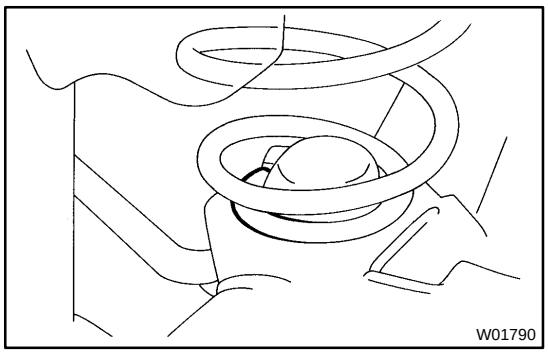


(b) Turn the shock absorber with holding the nut, and remove the 3 retainers, 2 cushions and shock absorber.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

5. DISCONNECT STABILIZER BAR BRACKETS (See page SA-135)

6. DISCONNECT LATERAL CONTROL ROD FROM FRAME (See page SA-128)



7. REMOVE COIL SPRING

(a) Lower the rear axle housing.

NOTICE:

Be careful not to snag the brake line.

(b) With lowering the rear axle housing, remove the coil spring.

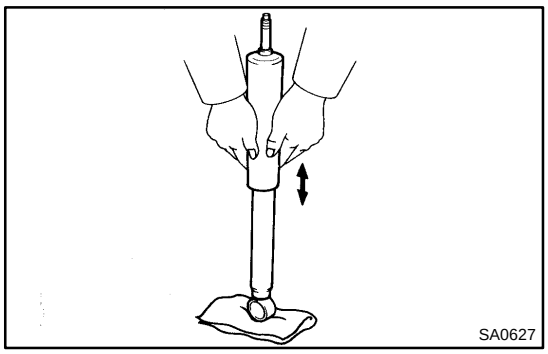
HINT:

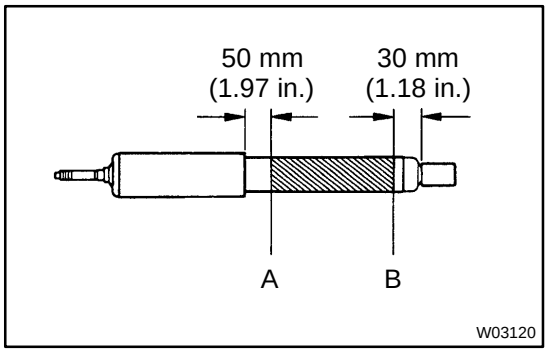
At the time of installation, check that the coil spring end is installed correctly.

If the coil spring end is not the correct position, reinstall the coil spring.

SA06T-01

INSPECTION


SA0627



W03120

1. INSPECT OPERATION OF SHOCK ABSORBER

(a) With pushing the shock absorber, check that the pull throughout the stroke is even, and there is no abnormal resistance or noise.

(b) Gas Filled Type:
Fully push the shock absorber in fully and release it. Check that it returns at a constant speed throughout.

HINT:

If the shock absorber is the gas filled type, this information will be engraved on the exterior of the outer shell.

2. GAS FILLED TYPE:
DISCARD SHOCK ABSORBER

Before discarding the shock absorber, drill a hole 2 - 3 mm (0.079 - 0.118 in.) in diameter at the location shown in the illustration (A - B) to release the gas inside.

NOTICE:

- **When drilling, chips may fly out, work carefully.**
- **The gas is colorless, odorless, and non-poisonous.**

SA06U-01

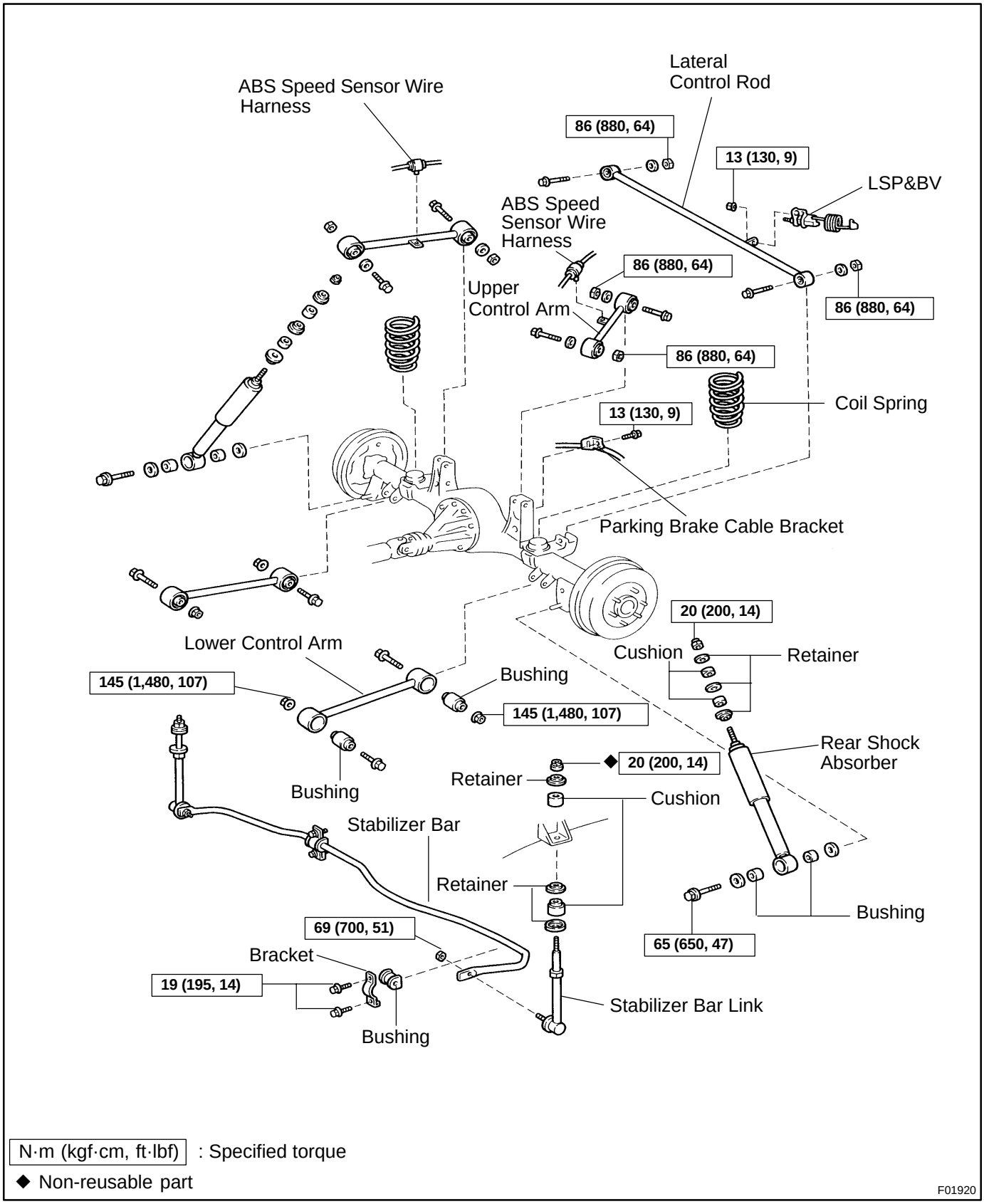
INSTALLATION

Installation is in the reverse order of removal (See page SA-124).

REAR LATERAL CONTROL ROD

SA06V-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

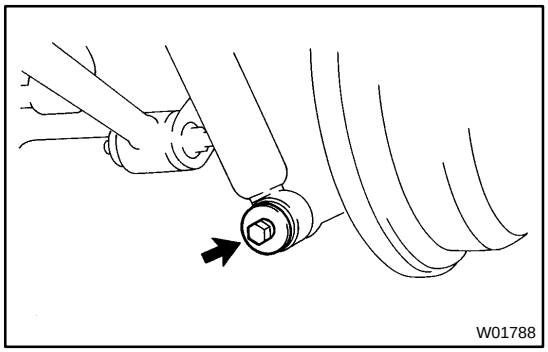
F01920

SA06W-02

REMOVAL

1. JACK UP AND SUPPORT VEHICLE

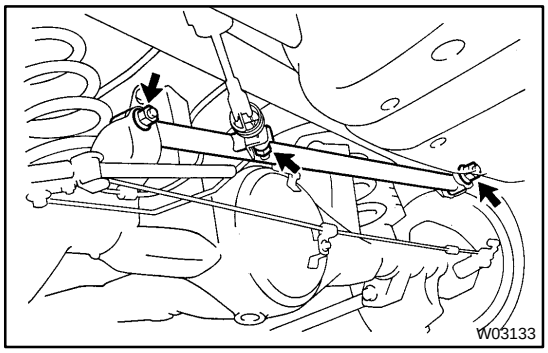
Jack up the rear axle housing and support the frame with stands. Hold the rear axle housing with a jack.



2. DISCONNECT RH SHOCK ABSORBER

Remove the bolt, washers and bushings, holding the RH shock absorber to the rear axle housing and disconnect the shock absorber.

Torque: 65 N·m (650 kgf·cm, 47 ft·lbf)



3. REMOVE LATERAL CONTROL ROD

(a) w/ LSP & BV:

Remove the nut and disconnect the LSP & BV.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(b) Remove the nut, washer and bolt from the frame and disconnect the lateral control rod.

Torque: 86 N·m (880 kgf·cm, 64 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

(c) Remove the nut and washers from the rear axle housing, and remove the lateral control rod.

Torque: 86 N·m (880 kgf·cm, 64 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the nut.

SA06X-01

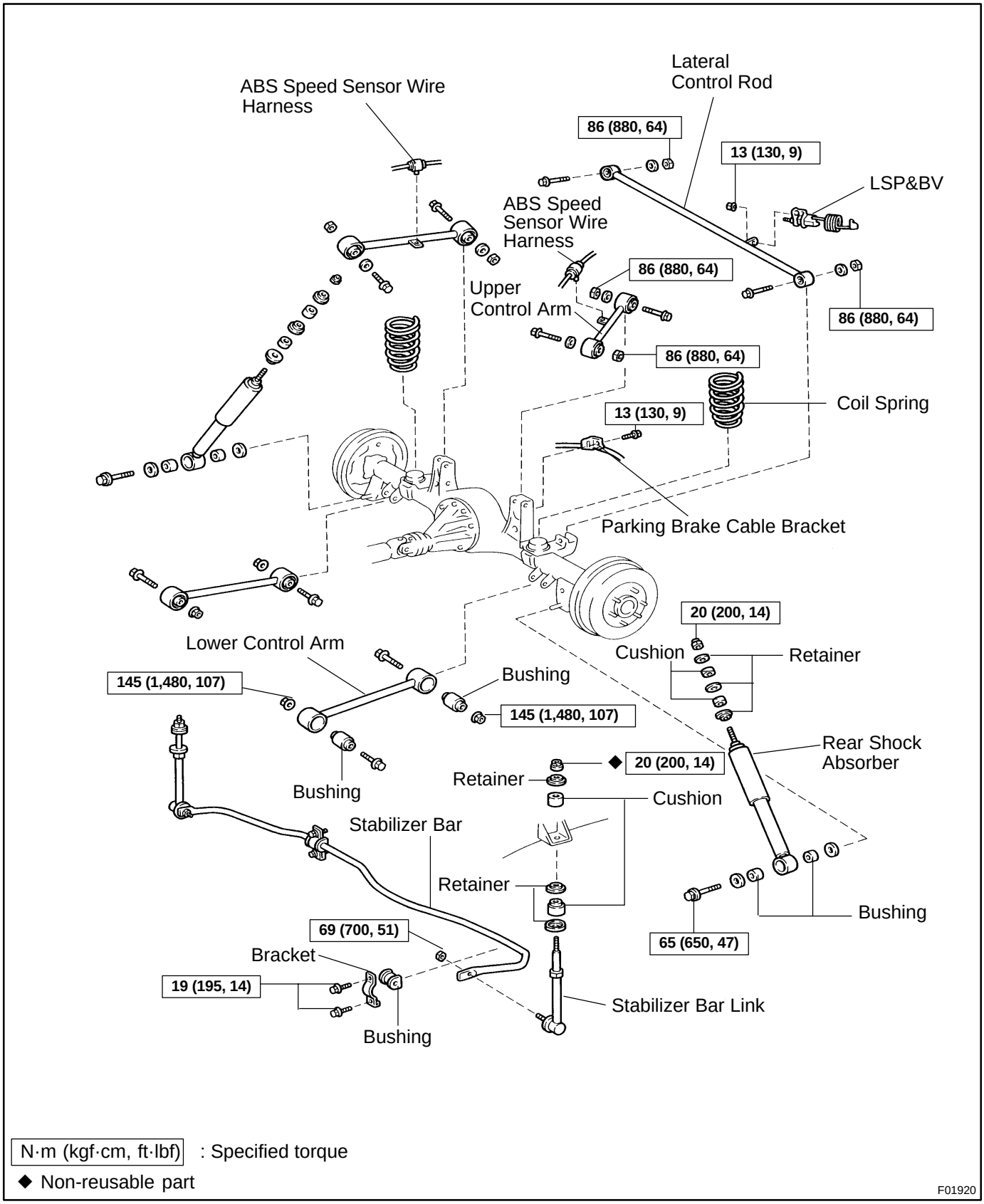
INSTALLATION

Installation is in the reverse order of removal (See page SA-128).

REAR UPPER AND LOWER CONTROL ARM

SA06Y-02

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

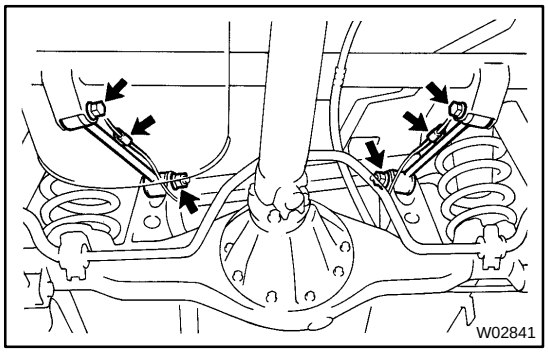
F01920

SA06Z-02

REMOVAL

1. JACK UP AND SUPPORT VEHICLE

Jack up the rear axle housing and support the frame with stands. Hold the rear axle housing with a jack.



2. w/ ABS:
DISCONNECT ABS SPEED SENSOR WIRE HARNESS FROM UPPER SUSPENSION ARM

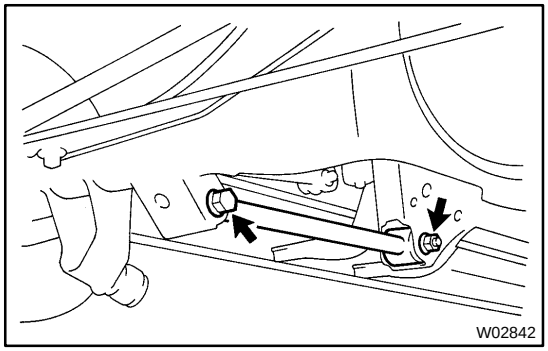
3. REMOVE UPPER CONTROL ARM

(a) Remove the nut, washer and bolt holding the upper control arm to the frame.
Torque: 86 N·m (880 kgf·cm, 64 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

(b) Remove the nut, washer and bolt holding the upper control arm to the rear axle housing and remove the upper control arm.
Torque: 86 N·m (880 kgf·cm, 64 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.



4. REMOVE LOWER CONTROL ARM

(a) Remove the nut and bolt holding the lower control arm to the frame.
Torque: 145 N·m (1,480 kgf·cm,107 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

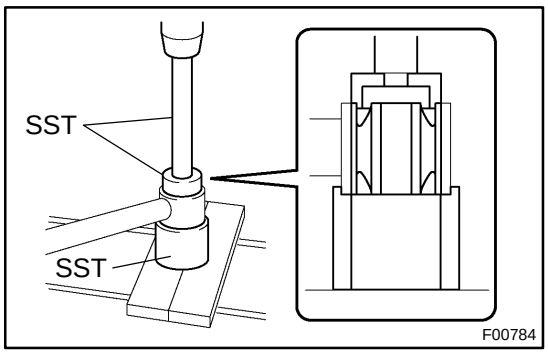
(b) Remove the nut, washer and bolt holding the lower control arm to the rear axle housing and remove the lower control arm.
Torque: 145 N·m (1,480 kgf·cm,107 ft·lbf)

HINT:
At the time of installation, after stabilizing the suspension, torque the nut.

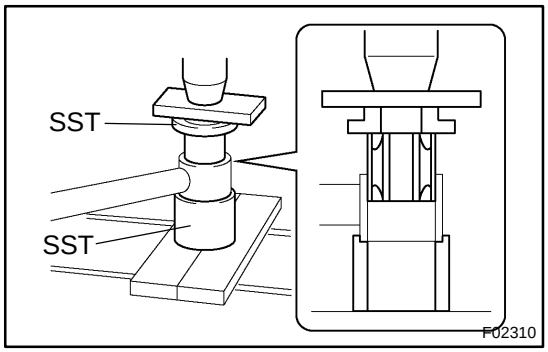
SA070-01

REPLACEMENT

REPLACE LOWER CONTROL ARM BUSHING



(a) Using SST and a press, remove the bushing.
SST 09710-14013 (09710-00021, 09710-00061), 09950-70010 (09951-07150)



(b) Using SST and a press, install the bushing.
SST 09506-35010, 09710-14013 (09710-00021)

SA071-01

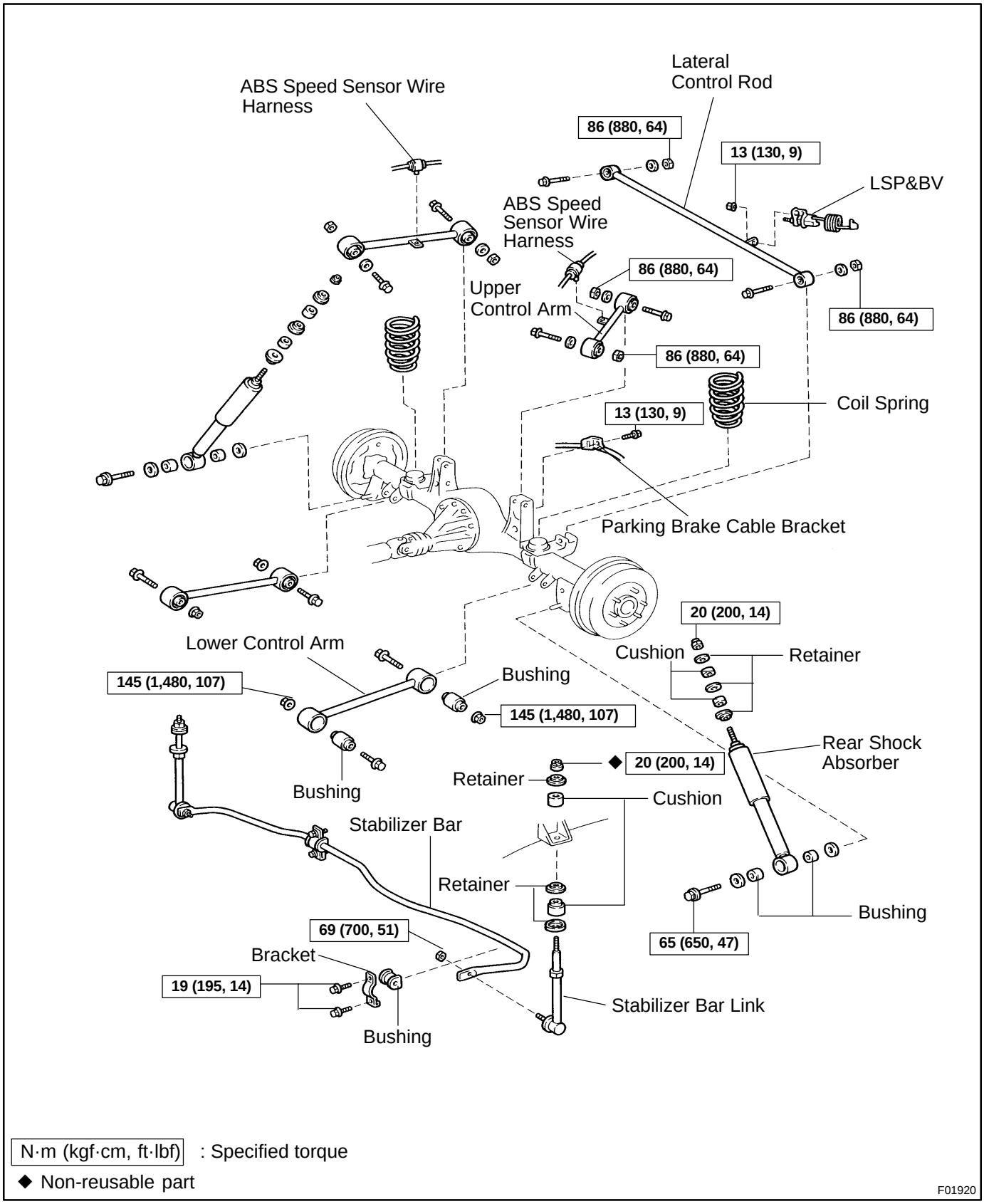
INSTALLATION

Installation is in the reverse order of removal (See page SA-131).

REAR STABILIZER BAR

COMPONENTS

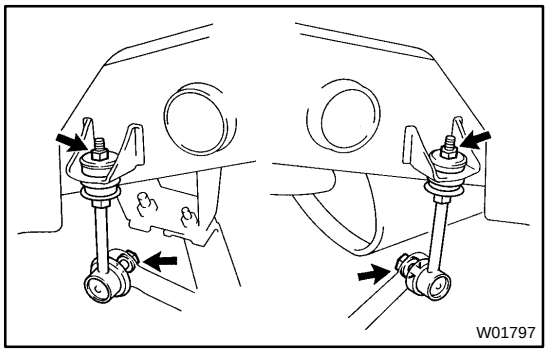
SA072-02



SA073-02

REMOVAL

1. JACK UP AND SUPPORT VEHICLE



2. REMOVE BOTH STABILIZER BAR LINKS

(a) Remove the nuts and disconnect the stabilizer bar from the stabilizer bar links.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

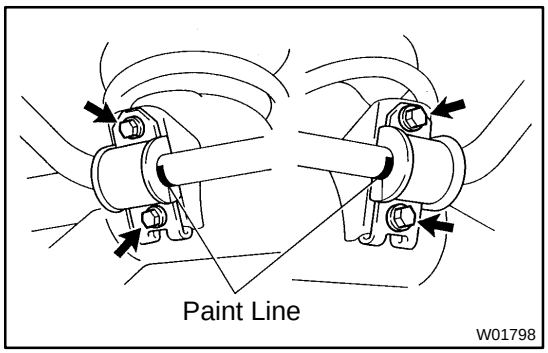
HINT:

If the ball joint stud turns together with the nut, use a hexagon wrench to hold the stud.

(b) Hold the stabilizer bar link with a wrench and remove the 2 nuts, 2 retainers, 2 cushions and 2 links.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Remove the 4 retainers and 2 cushions from the stabilizer bar links.



3. REMOVE STABILIZER BAR FROM REAR AXLE HOUSING

Remove the 4 bolts and stabilizer bar with bushings and brackets.

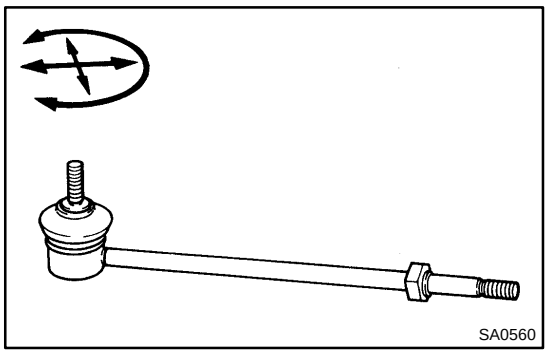
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

HINT:

At the time of installation, please refer to the following items.

- Install the bushing to outside of the paint line on the stabilizer bar.
- Install the bushings to the stabilizer bar so that the cutout of the bushing face the under of the vehicle, as shown.

SA074-01



INSPECTION

INSPECT STABILIZER BAR LINK

Rotate the ball joint stud in all directions.

If the movement is not smooth and free, replace the stabilizer link.

SA075-01

INSTALLATION

Installation is in the reverse order of removal (See page SA-135).

BRAKE SYSTEM

BR02F-02

PRECAUTION

- **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts having the same part number or equivalent.**
- **It is very important to keep parts and the area clean when repairing the brake system.**
- **If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.**

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BR07J-08

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	4. Brake system (Fluid leaks)	DI-374
	5. Brake system (Air in)	BR-4
	6. Piston seals (Worn or damaged)	BR-15
	7. Rear brake shoe clearance (Out of adjustment)	BR-25
	8. Hydraulic brake booster (Fauly)	BR-26
Brake drag	1. Brake pedal freeplay (Minimal)	BR-9
	2. Parking brake lever travel (Out of adjustment)	BR-11
	3. Parking brake wire (Sticking)	-
	4. Rear brake shoe clearance (Out of adjustment)	BR-25
	5. Pad or lining (Cracked or distorted)	BR-12 BR-21
	6. Piston (Stuck)	BR-15
	7. Piston (Frozen)	BR-15
	8. Anchor or return spring (Faulty)	BR-21
	9. Hydraulic brake booster (Faulty)	BR-26
Brake pull	1. Piston (Stuck)	BR-15
	2. Pad or lining (Oily)	BR-12 BR-21
	3. Piston (Frozen)	BR-15
	4. Disc (Scored)	BR-15
	5. Pad or lining (Cracked or distorted)	BR-12 BR-21
	6. Hydraulic brake booster (Faulty)	BR-26
Hard pedal but brake inefficient	1. Brake system (Fluid leaks)	DI-374
	2. Brake system (Air in)	BR-4
	3. Pad or lining (Worn)	BR-12 BR-21
	4. Pad or lining (Cracked or distorted)	BR-12 BR-21
	5. Rear brake shoe clearance (Out of adjustment)	BR-25
	6. Pad or lining (Oily)	BR-12 BR-21
	7. Pad or lining (Glazed)	BR-12 BR-21
	8. Disc (Scored)	BR-15
	9. Hydraulic brake booster (Faulty)	BR-26
Noise from brakes	1. Pad or lining (Cracked or distorted)	BR-12
	2. Installation bolt (Loose)	BR-21
	3. Disc (Scored)	BR-15
	4. Pad support plate (Loose)	BR-12
	5. Sliding pin (Worn)	BR-15
	6. Pad or lining (Dirty)	BR-12 BR-21
	7. Pad or lining (Glazed)	BR-12 BR-21
	8. Anchor or return spring (Faulty)	BR-21
	9. Anti-squeal shim (Damaged)	BR-12
	10.Shoe hold-down spring (Damaged)	BR-21
Noise from hydraulic brake booster (Abnormal pump motor operation noise)	Accumulator bracket clearance (Out of adjustment)	BR-44

Brake warning light lights up*1 (Parking brake lever released)	1. Brake fluid level 2. Hydraulic brake booster power supply system (Faulty)	- BR-26
Brake warning light lights up and brake warning buzzer sounds*2	Hydraulic brake booster power supply system (Faulty)	BR-26
ABS warning light lights up*3	1. Anti - lock brake system (Faulty) 2. Hydraulic brake booster power supply system (Faulty)	- BR-26

*1, *3: The light may stay on for about 60 seconds after the engine is started. It is normal if it goes out after a while.

*2, *3: Depressing the brake pedal repeatedly may turn on the warning light and buzzer. It is normal if the light goes off and the buzzer stops sounding after a few seconds.

*3: While ABS warning light is ON.

BRAKE FLUID

BR1ME-01

BLEEDING

HINT:

- If any work is done on the brake system or if air in the brake lines is suspected, bleed the air from the system.
- When bleeding, keep the amount of the fluid within the line of reservoir between Min. and Max.

NOTICE:

- **Do not let brake fluid remain on painted surfaces. Wash it off immediately.**
- **With the reservoir cap removed, when depressing the brake pedal, the fluid will spray.**

1. FILL RESERVOIR WITH BRAKE FLUID
Fluid: SAE J1703 or FMVSS NO. 116 DOT3

2. In case of using TOYOTA hand-held tester:
BLEED HYDRAULIC BRAKE BOOSTER

HINT:

If the hydraulic brake booster has been disassembled, disconnect the brake line from the hydraulic brake booster or if the reservoir becomes empty, bleed the hydraulic brake booster.

(a) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Turn the ignition switch ON, check that the pump stops after approx. 30 to 40 sec.

NOTICE:

When the pump does not stop, repeat step (a) and (b) again.

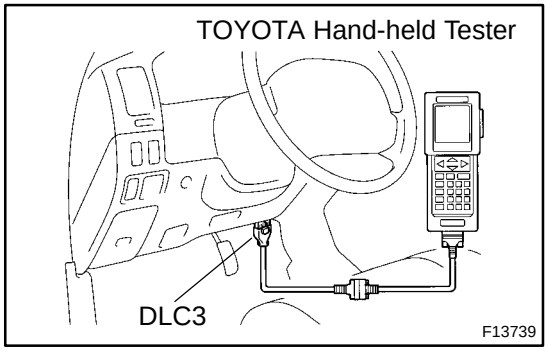
(c) With the ignition switch remained ON, depress the brake pedal more than 20 times.

(d) Observe the procedure in step 4 and bleed the right and left front brake caliper.

(e) Holding the brake pedal depressed, bleed the right and left rear brake caliper.

HINT:

It is not necessary to depress the pedal continuously, as brake fluid flows out by first depressing.



(f) Connect the TOYOTA hand-held tester.

(1) Turn the ignition switch OFF, connect the TOYOTA hand-held tester to DLC3.

(2) Turn the ignition switch ON and select ”AIR BLEEDING” on the TOYOTA hand-held tester.

HINT:

Please refer to the TOYOTA hand-held tester operator’s manual for further details.

(g) Bleed right front brake line.
  (1) Select ”FR LINE” on the TOYOTA hand-held tester.
  (2) With ”FR LINE” turned ON with the TOYOTA hand-held tester, depress the brake pedal and hold it to bleed the right front brake caliper.
  (3) Repeat step (2) until there are no more air bubbles in the fluid.

(h) Bleed left front brake line.
  (1) Select ”FL LINE” on the TOYOTA hand-held tester.
  (2) With ”FL LINE” turned ON with the TOYOTA hand-held tester, depress the brake pedal and hold it to bleed the left front brake caliper.
  (3) Repeat step (2) until there are no more air bubbles in the fluid.

(i) Bleed rear brake line.
  (1) Select ”RR LINE” on the TOYOTA hand-held tester.
  (2) With ”RR LINE” turned ON with the TOYOTA hand-held tester, bleed the left and right rear brake caliper.

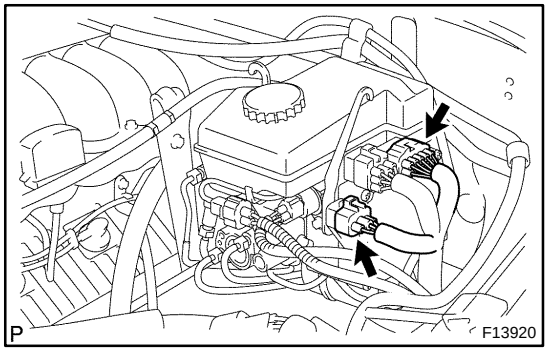
(j) Disconnect the TOYOTA hand-held tester from DLC3.

(k) Clear the DTC (See page DI-224).

3. In case of using ABS actuator checker (SST): BLEED HYDRAULIC BRAKE BOOSTER

HINT:

If the hydraulic brake booster has been disassembled, disconnect the brake line from the hydraulic brake booster or if the reservoir becomes empty, bleed the hydraulic brake booster.

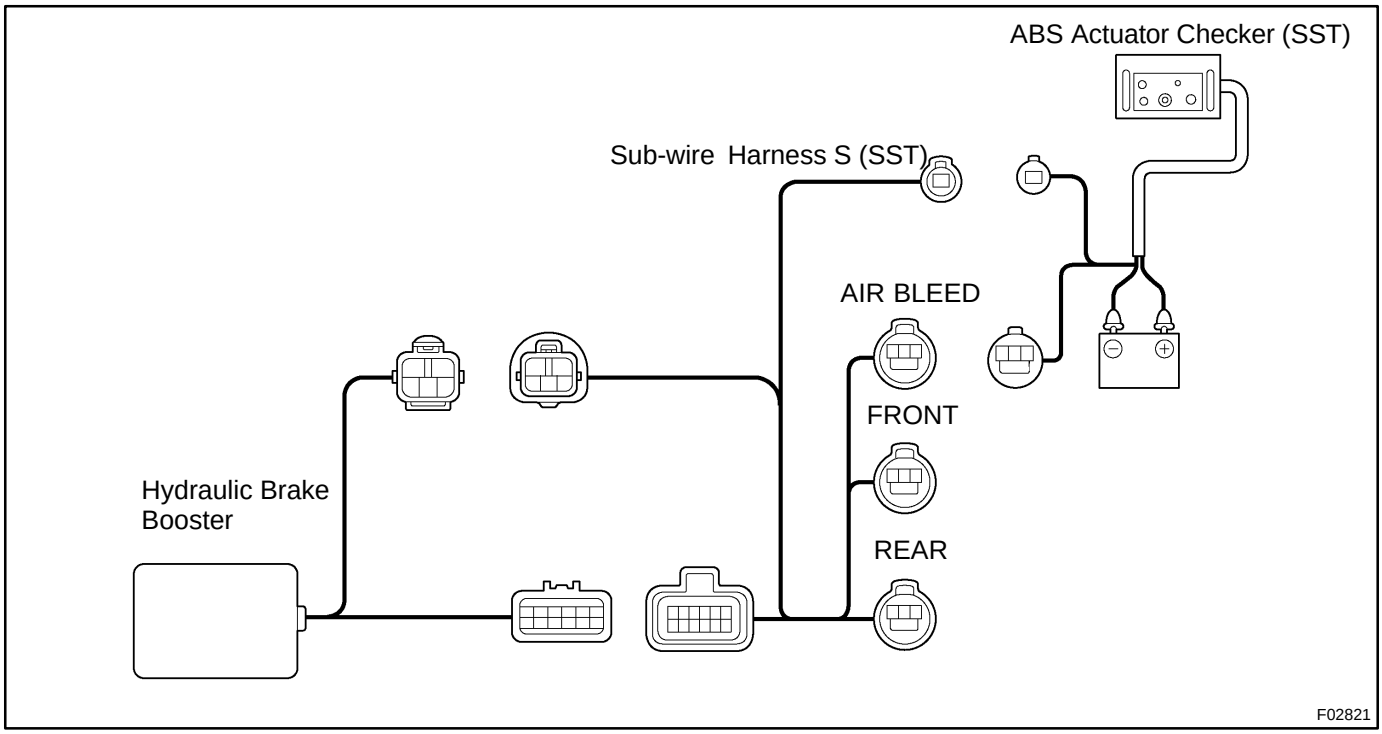


(a) Disconnect the 2 connectors from the hydraulic brake booster.

(b) Connect the ABS actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness (SST), as shown in the chart below.
SST 09990-00150, 09990-00480

HINT:
Connect the connector with the label of "AIR BLEED" attached to the connector of ABS actuator checker.

(c) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



(d) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(e) Turn the ignition switch ON, check that the pump stops after 30 to 40 sec.

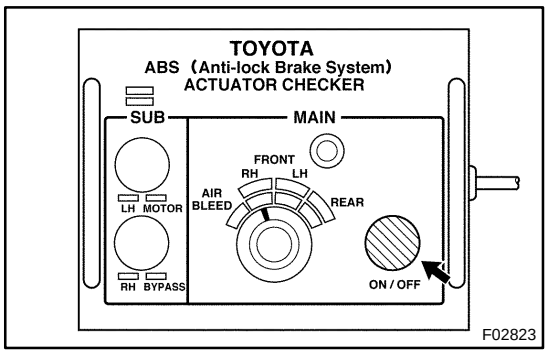
NOTICE:
When the pump does not stop, repeat step (d) and (e) again.

(f) With the ignition switch remained ON, depress the brake pedal more than 20 times.

(g) Observe the procedure in step 4 and bleed the right and left front brake caliper.

(h) Holding the brake pedal depressed, bleed the right and left rear brake caliper.

HINT:
It is not necessary to depress the pedal continuously, as brake fluid flows out by first depressing.



(i) Bleed right front brake line.

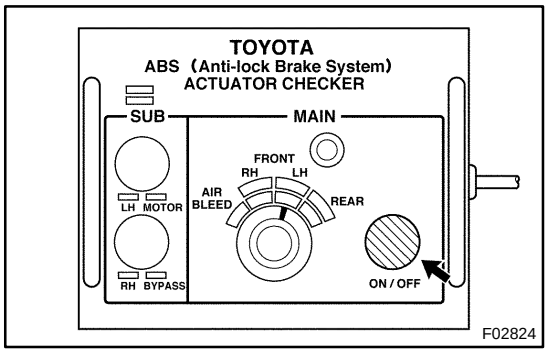
(1) Turn the selector switch of the ABS actuator checker to the ”FRONT RH” position.

(2) Push and hold in MAIN push switch, depress the brake pedal and hold it to bleed the right front brake caliper.

NOTICE:

Do not keep the MAIN switch pushed in for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

(3) Repeat step (2) until there are no more air bubbles in the fluid.



(j) Bleed left front brake line.

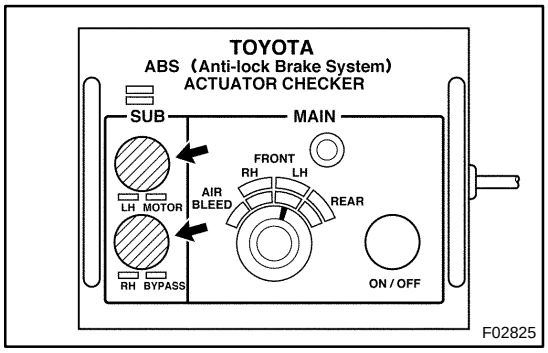
(1) Turn the selector switch of the ABS actuator checker to the ”FRONT LH” position.

(2) Push and hold in the MAIN push switch, depress the brake pedal and hold it to bleed the left front brake caliper.

NOTICE:

Do not keep the MAIN switch pushed in for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

(3) Repeat step (2) until there are no more air bubbles in the fluid.



(k) Bleed right rear brake line.

(1) Push and hold in the ”SUB LH” and ”SUB RH” switches, bleed the right rear brake caliper.

NOTICE:

Do not keep the MAIN switch pushed in for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

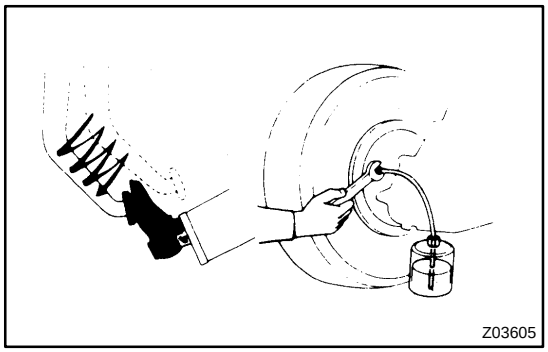
(2) Repeat step (1) until there are no more air bubbles in the fluid.

(l) Observe the procedure in step (k) and bleed left rear brake line.

(m) Disconnect the ABS actuator checker (SST) and sub-wire harness (SST) from the actuator.
SST 09990-00150, 09990-00480

(n) Connect the 2 connectors to the hydraulic brake booster.

(o) Clear the DTC (See page DI-224).



4. BLEED BRAKE LINE

(a) Connect the vinyl tube to the brake caliper.

(b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.

(c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

(d) Repeat (b) and (c) until all the air in the fluid has been bled out.

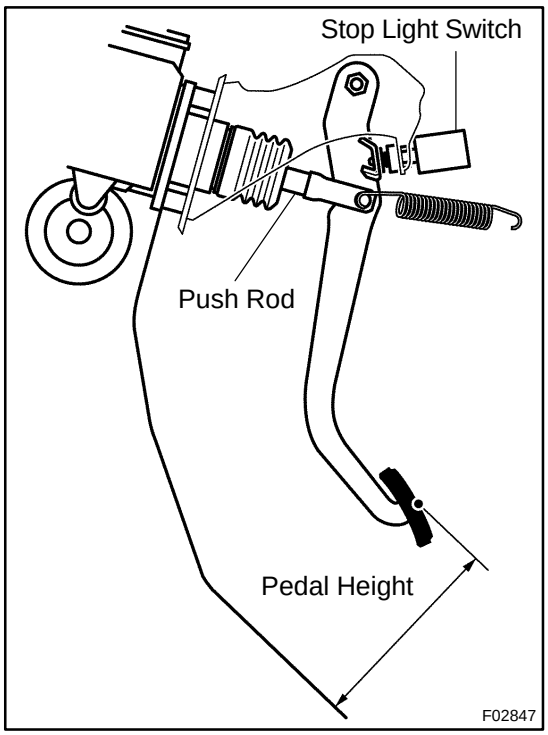
(e) Repeat the above procedure to bleed the brake line for each wheel.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)

5. CHECK FLUID LEVEL IN RESERVOIR

(a) With the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(b) Remove the reservoir cap. Add brake fluid up to the ”MAX” line.
Fluid: SAE J1703 or FMVSS NO. 116 DOT3



BRAKE PEDAL

BR1MF-01

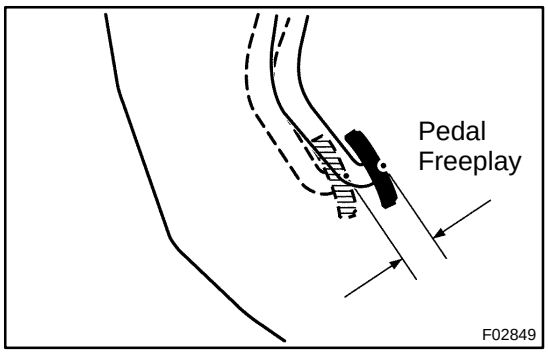
ON-VEHICLE INSPECTION

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:
158.1 - 168.1 mm (6.224 - 6.618 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Remove the lower finish panel (See page BO-69).
(b) Disconnect the connector from the stop light switch.
(c) Loosen the stop light switch lock nut and remove the stop light switch.
(d) Loosen the clevis lock nut.
(e) Adjust the pedal height by turning the pedal push rod.
(f) Tighten the clevis lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
(g) Install the stop light switch.
(h) Connect the connector to the stop light switch.
(i) Push the brake pedal in 5 - 15 mm (0.20 - 0.59 in.), turn the stop light switch to lock the nut in the position where the stop light goes off.
(j) Push the brake pedal in 5 - 15 mm (0.20 - 0.59 in.), check that stop light lights up.
(k) After adjusting the pedal height, check the pedal freeplay.
(l) Install the lower finish panel (See page BO-76).

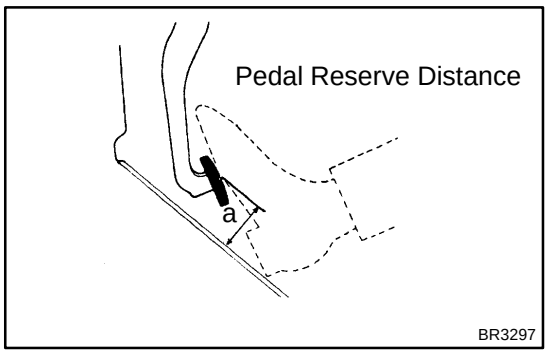


3. CHECK PEDAL FREEPLAY

(a) Stop the engine and depress the brake pedal several times until there is no more pressure left in the booster.
(b) Push in the pedal by hand until the beginning of the second resistance is felt. Measure the distance.
Pedal freeplay: 1 - 6 mm (0.12 - 0.24 in.)

HINT:
The freeplay to the 1st resistance is due to the play between the clevis and pin. This is magnified up to 1 - 3 mm (0.04 - 0.12 in.) at the pedal.
If incorrect, check the stop light switch clearance.
If the clearance is OK, then troubleshoot the brake system.

Stop light switch clearance:
0.5 - 2.4 mm (0.020 - 0.094 in.)

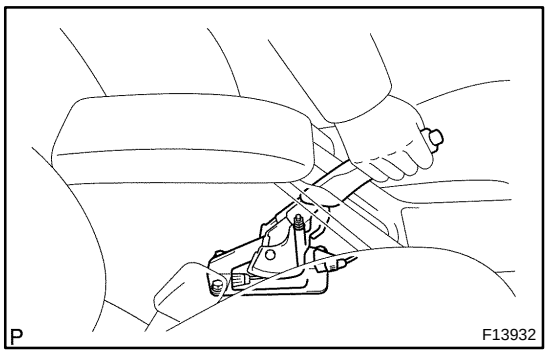


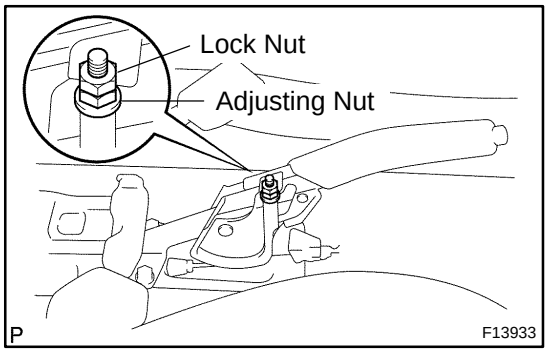
4. CHECK PEDAL RESERVE DISTANCE

Release the parking brake. With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance, 'a', at 490 N (50 kgf, 110.2 lbf): More than 75 mm (2.83 in.)

If incorrect, troubleshoot the brake system.





PARKING BRAKE LEVER

BR07M-02

ON-VEHICLE INSPECTION

1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 196 N (20 kgf, 44.1 lbf): 7 - 9 clicks

If incorrect, adjust the parking brake.

2. IF NECESSARY, ADJUST PARKING BRAKE LEVER TRAVEL

HINT:

Before adjusting the parking brake lever travel, make sure that the rear brake shoe clearance has been adjusted. For shoe clearance adjustment, see page BR-25 .

(a) Remove the console box.

(b) Loosen the lock nut and turn the adjusting nut until the lever travel is correct.

(c) Tighten the lock nut.

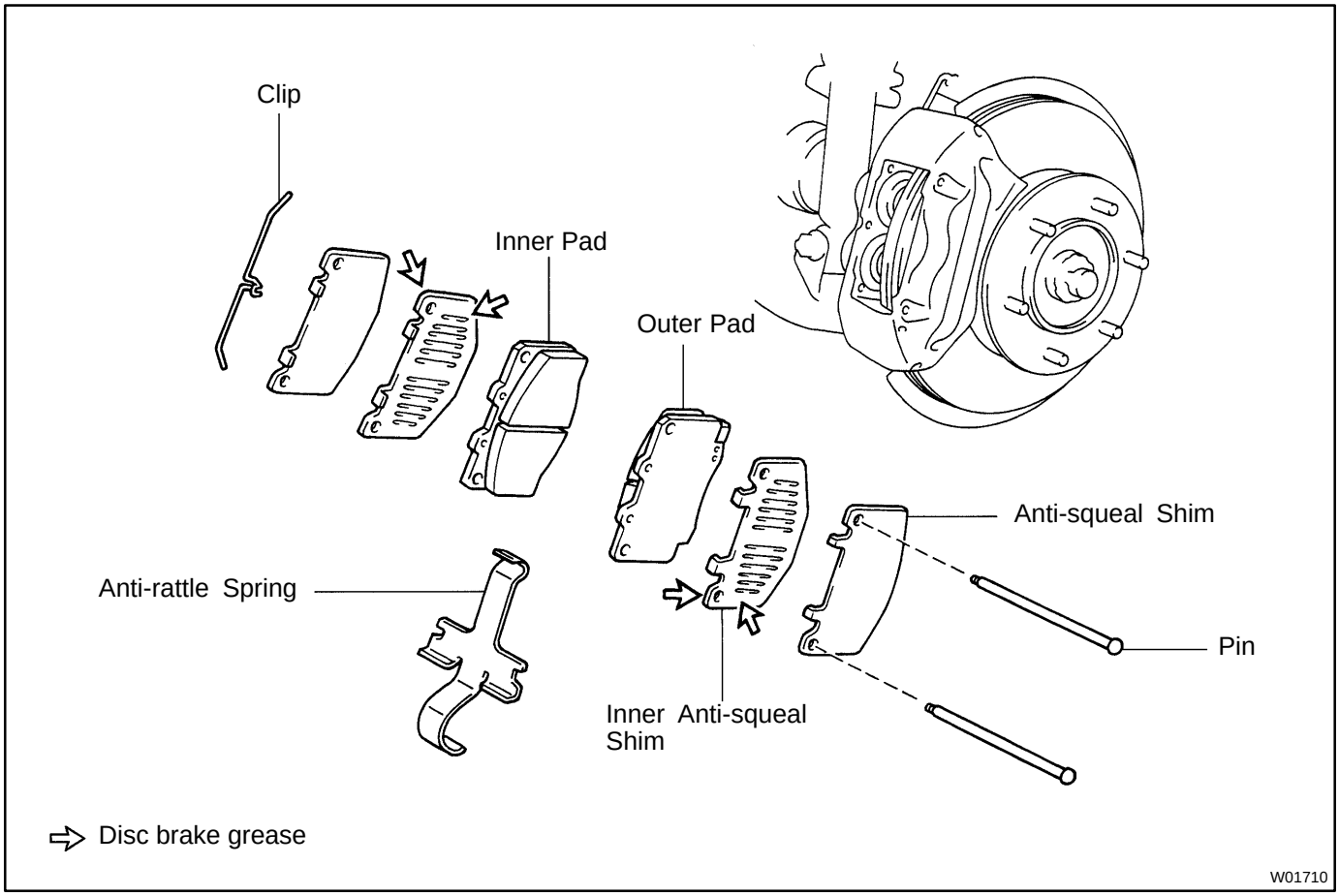
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(d) Install the console box.

FRONT BRAKE PAD

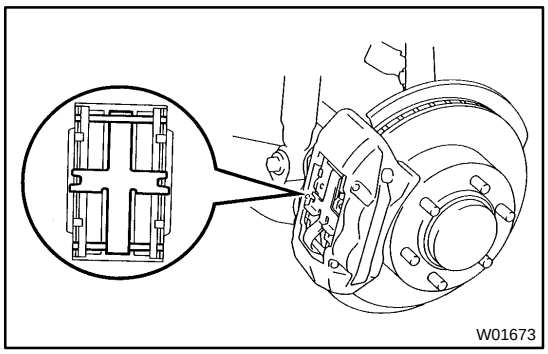
COMPONENTS

BR07X-02



BR07Y-02

REPLACEMENT

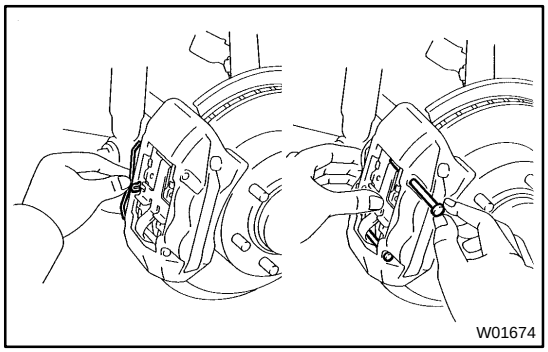


1. REMOVE FRONT WHEEL

2. INSPECT PAD LINING THICKNESS

Check the pad thickness and replace pads if not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. REMOVE CLIP, 2 PINS, ANTI- RATTLE SPRING, 2 PADS AND 4 ANTI-SQUEAL SHIMS

NOTICE:

The anti-rattle spring can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

4. CHECK DISC THICKNESS AND RUNOUT

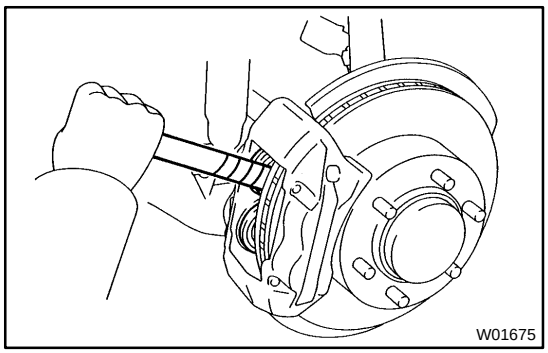
(See page BR-18)

5. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

(a) Draw out a small amount of brake fluid from the reservoir.



(b) Press in the pistons with a monkey wrench handle or an equivalent.

HINT:

- Tape the monkey wrench handle before use.
- Always change the pad on one wheel at a time as there is a possibility of the opposite piston flying out.
- If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

(c) Install the anti-squeal shims to new pads.

HINT:

Apply disc brake grease to both sides of the inner anti-squeal shims (See page BR-12).

(d) Install the 2 pads.

NOTICE:

Do not allow oil or grease to get on the rubbing face.

6. INSTALL ANTI-RATTLE SPRING AND 2 PINS

7. INSTALL CLIP

8. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

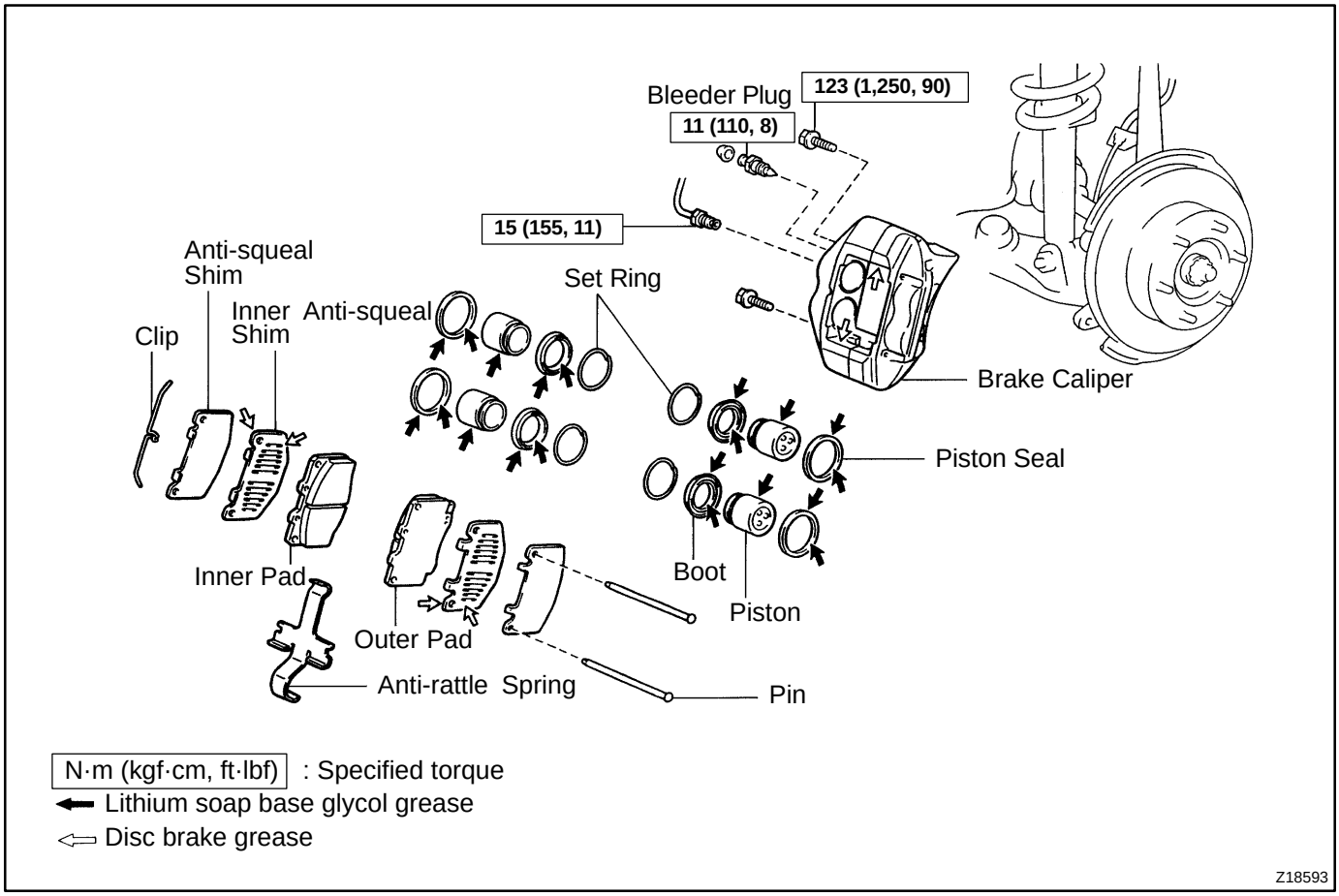
9. DEPRESS BRAKE PEDAL SEVERAL TIMES

10. CHECK THAT FLUID LEVEL IS AT MAX LINE

FRONT BRAKE CALIPER

BR07Z-02

COMPONENTS



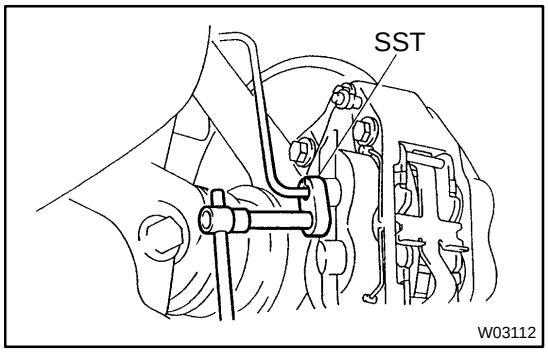
BR080-02

REMOVAL

1. REMOVE FRONT WHEEL

Remove the front wheel and temporarily fasten the disc with hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

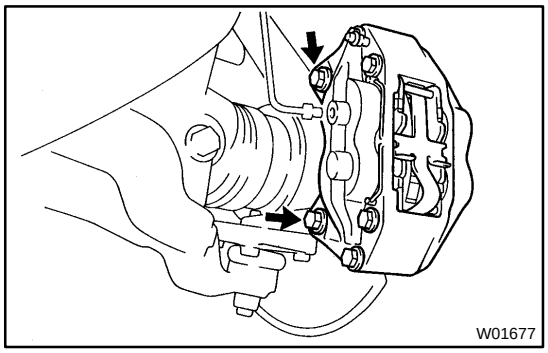


2. DISCONNECT BRAKE LINE

Using SST, disconnect the brake line. Use a container to catch the brake fluid.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)



3. REMOVE CALIPER

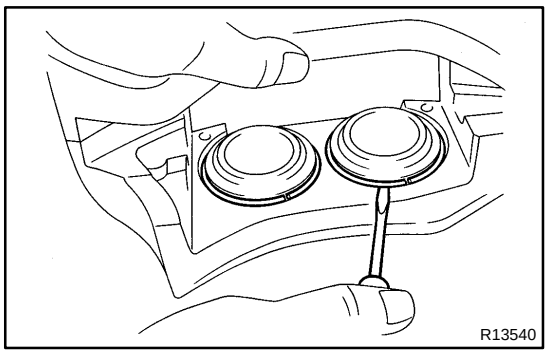
Remove the 2 mounting bolts and caliper.

Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

4. REMOVE CLIP, 2 PINS, ANTI-RATTLE SPRING AND 2 PADS WITH 4 ANTI-SQUEAL SHIMS

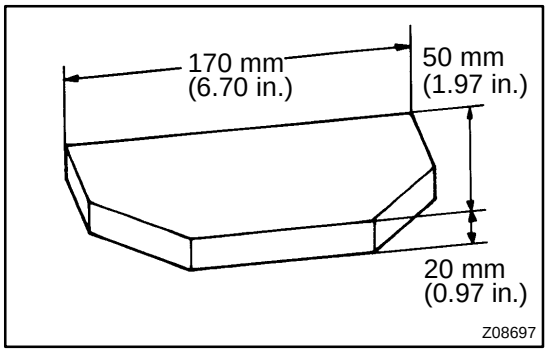
BR081-02

DISASSEMBLY



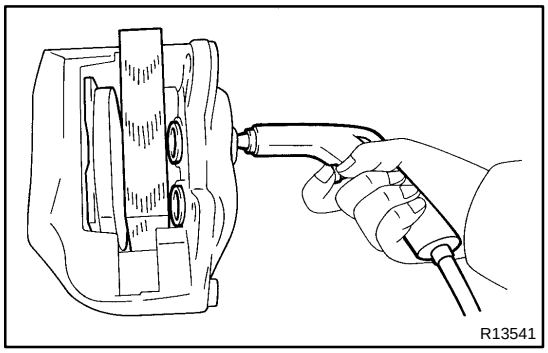
1. REMOVE CYLINDER BOOT SET RINGS AND BOOTS

Using a screwdriver, remove the 4 cylinder boot set rings and boots.



2. REMOVE PISTONS FROM CYLINDER

(a) Prepare the wooden plate to hold the pistons.

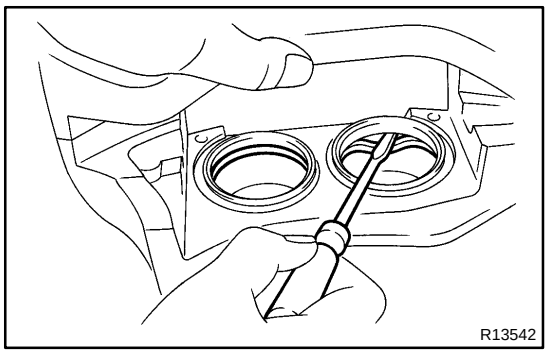


(b) Place the plate between the pistons and insert a pad at one side.

(c) Use compressed air to remove the pistons alternately from the cylinder.

CAUTION:

Do not place your fingers in front of the pistons when using compressed air.

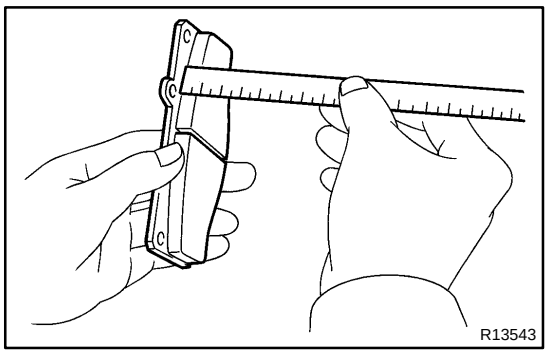


3. REMOVE PISTON SEALS

Using a screwdriver, remove the 4 piston seals from the cylinder.

BR082-02

INSPECTION



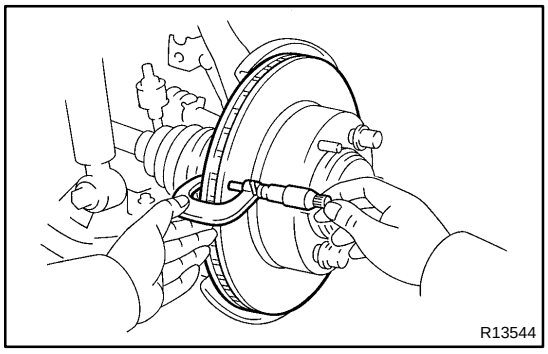
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 11.5 mm (0.453 in.)

Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the thickness is less than the minimum (the 1.0 mm slit is no longer visible), or if it shows signs of uneven wear.



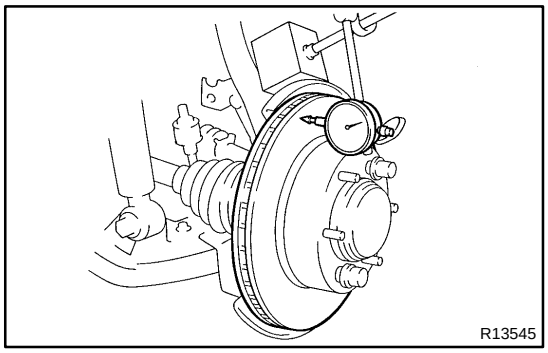
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 22.0 mm (0.866 in.)

Minimum thickness: 20.0 mm (0.787 in.)

Replace the disc if the thickness of the disc is at the minimum or less. Replace the disc or grind it on a lathe if it is scored or worn unevenly.



3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the outside edge.

Maximum disc runout: 0.07 mm (0.0028 in.)

If the runout is greater than the maximum, replace the disc or grind it on a ”On-Car” brake lathe.

HINT:

Before measuring the runout, confirm that the front hub bearing play is within the specification.

4. IF NECESSARY, ADJUST DISC RUNOUT

(a) Remove the hub nuts and disc. Reinstall the disc 1/6 of a turn round from its original position on the hub. Install and torque the hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

(b) Remeasure the disc runout. Make a note of the runout and the disc’s position on the hub.

(c) Repeat (a) and (b) until the disc has been installed on the 4 remaining hub position.

- If the minimum runout recorded in (a) to (c) is less than the maximum disc runout, install the disc in that position.
- If the minimum runout recorded in (a) to (c) is greater than the maximum disc runout, replace the disc and repeat step 3.

BR083-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR-17).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page BR-15).

BR084-02

INSTALLATION

Installation is in the reverse order of removal (See page BR-16).

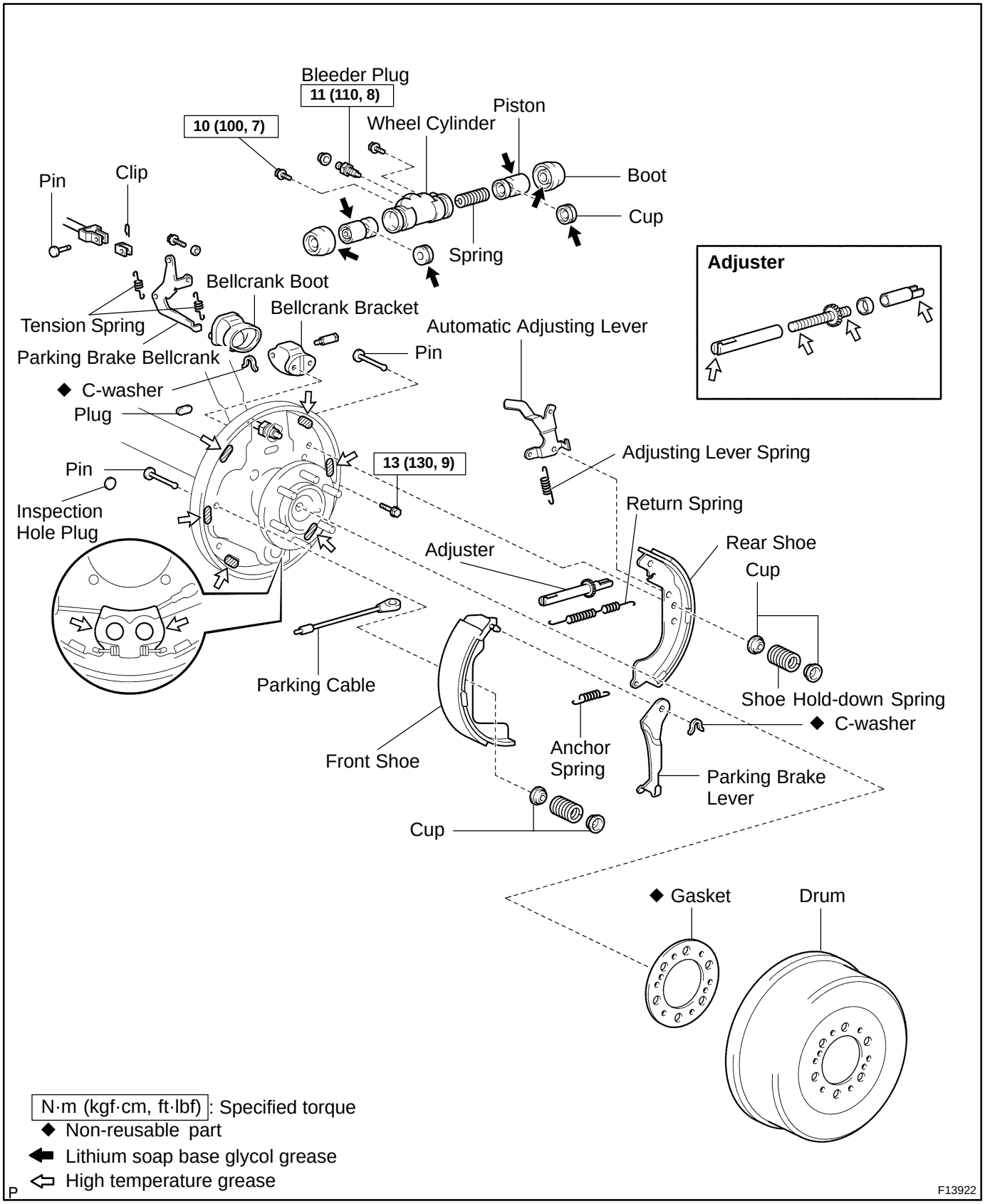
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR-4).
- Check for leaks.

REAR DRUM BRAKE

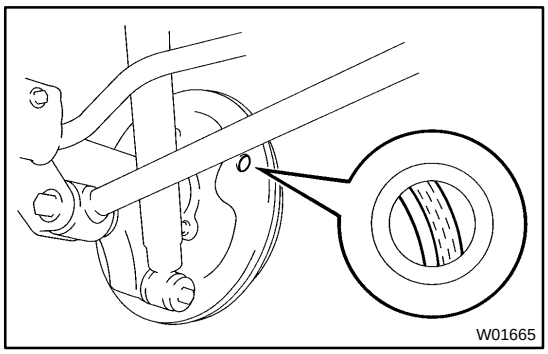
COMPONENTS

BR085-04



BR086-04

REMOVAL



1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining thickness through the hole.

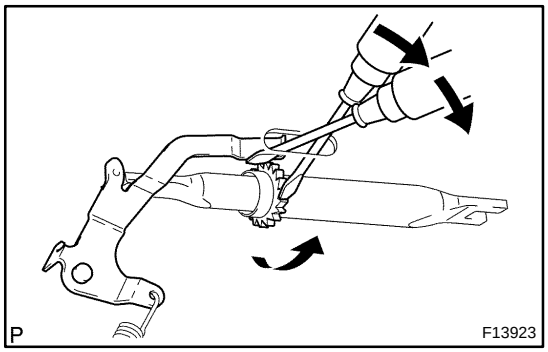
If less than the minimum, replace the shoes.

Minimum thickness: 1.0 mm (0.039 in.)

2. REMOVE REAR WHEEL

Torque: 110 N·m (1,150 kgf·cm, 83 ft·lbf)

3. RELEASE PARKING BRAKE LEVER



4. REMOVE BRAKE DRUM

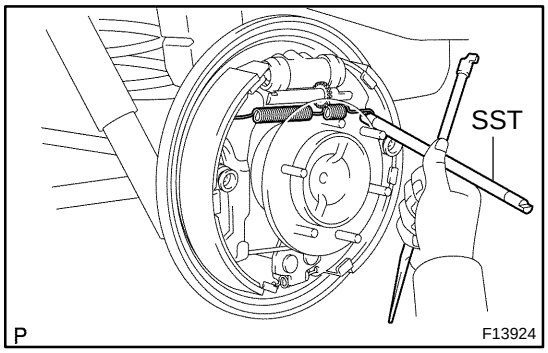
HINT:

If the brake drum cannot be removed easily, do the following steps.

(a) Remove the adjusting hole plug in the backing plate.

(b) Insert a screwdriver through the hole in the backing plate, and hold the automatic adjusting lever away from the adjusting bolt.

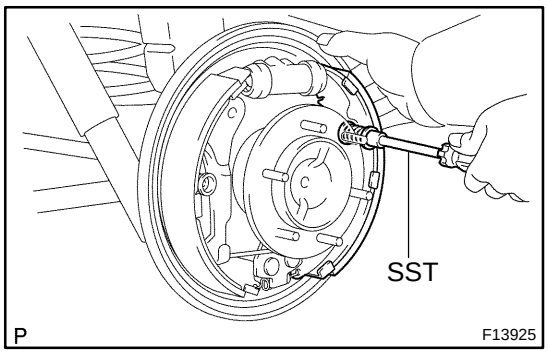
(c) Using the other screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt.



5. REMOVE REAR SHOE

(a) Using SST, disconnect the return spring from the shoe.
SST 09703-30010

(b) Remove the return spring from the front shoe.



(c) Using SST, remove the shoe hold-down spring, cups and pin.
SST 09718-00010

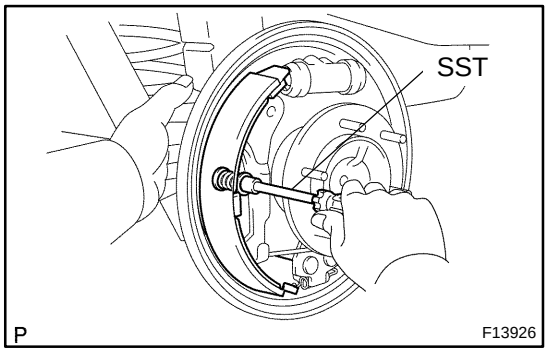
(d) Remove the adjuster.

(e) Using needle-nose pliers, remove the adjusting lever spring.

(f) Remove the automatic adjusting lever.

(g) Disconnect the anchor spring from the rear shoe and remove the rear shoe.

(h) Remove the anchor spring from the front shoe.

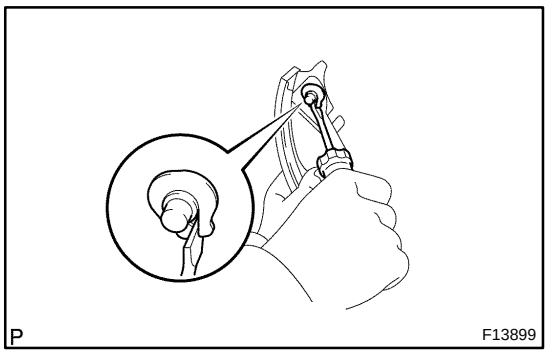


6. REMOVE FRONT SHOE

(a) Using SST, remove the shoe hold-down spring, cups and pin.
SST 09718-00010

(b) Disconnect the parking brake cable from the front shoe.

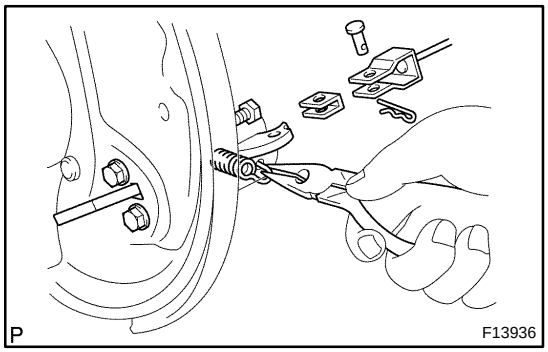
(c) Remove the front shoe and parking brake cable.



7. REMOVE PARKING BRAKE LEVER

(a) Using a screwdriver, remove the C-washer.

(b) Remove the parking brake lever.



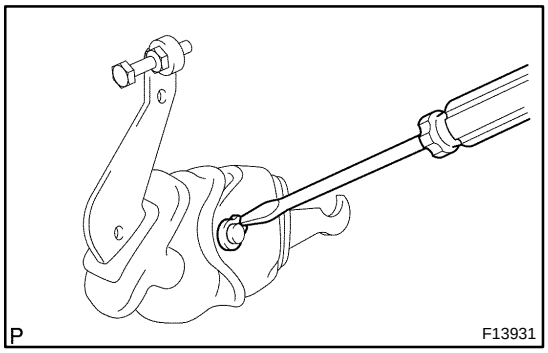
8. REMOVE AND DISASSEMBLE PARKING BRAKE BELLCRANK

(a) Remove the clip and disconnect the parking brake cable.

(b) Remove the 2 tension springs.

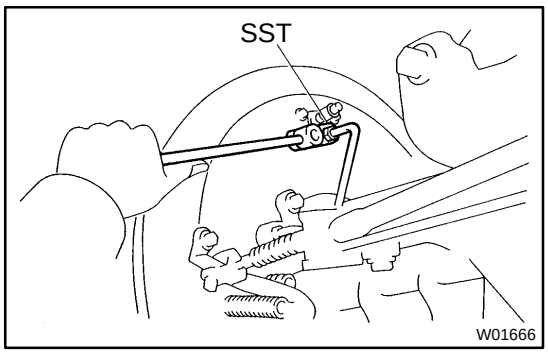
(c) Remove the 2 bolts and bellcrank.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(d) Remove the bellcrank boot from the bellcrank bracket.



(e) Using a screwdriver, remove the C-washer and pin.

(f) Remove the parking brake bellcrank from the bellcrank bracket.



9. REMOVE WHEEL CYLINDER

(a) Using SST, disconnect the brake line. Use a container to catch the brake fluid.
Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)
SST 09023-00100

(b) Remove the 2 bolts and the wheel cylinder.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

10. DISASSEMBLE WHEEL CYLINDER

(a) Remove the 2 boots from the wheel cylinder.

(b) Remove the 2 pistons and spring.

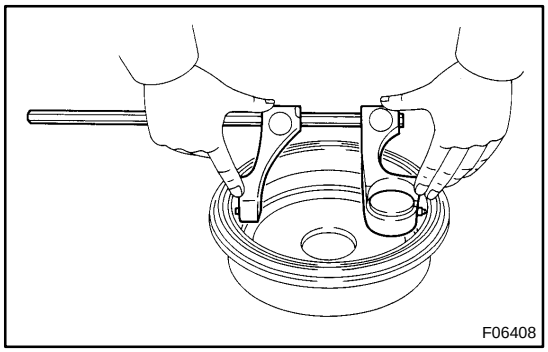
(c) Remove the 2 cups from the each piston.

BR087-04

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



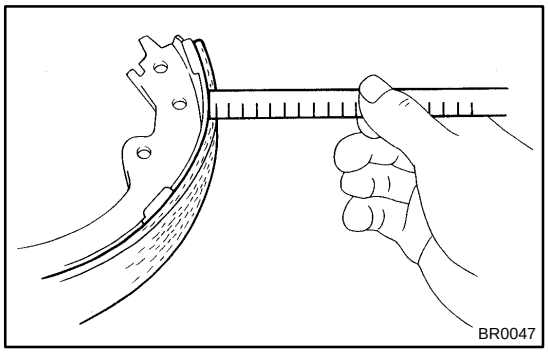
2. MEASURE BRAKE DRUM INSIDE DIAMETER

Using a brake drum gauge or equivalent, measure the inside diameter of the drum.

Standard inside diameter: 295.0 mm (11.614 in.)

Maximum inside diameter: 297.0 mm (11.693 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.



3. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the shoe lining thickness.

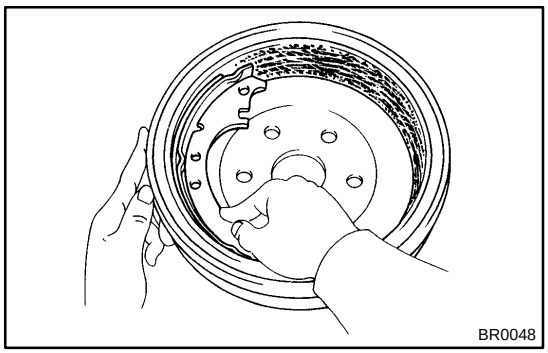
Standard thickness: 6.0 mm (0.236 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the shoe lining is less than the minimum, or shows signs of uneven wear, replace the brake shoes.

HINT:

If any of the brake shoes have to be replaced, replace all of the rear brake shoes in order to maintain even braking.



4. INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT

If the contact between the brake lining and drum is improper, repair the lining with a brake shoe grinder, or replace the brake shoe assembly.

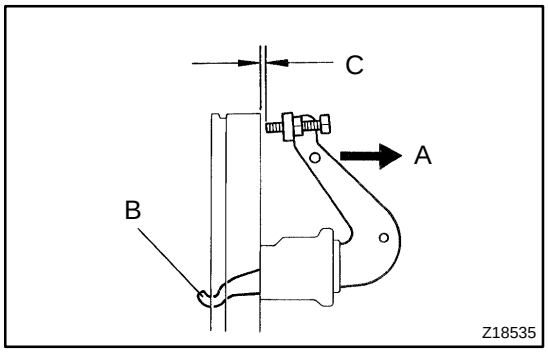
BR1MG-01

INSTALLATION

Installation is in the reverse order of removal (See page BR-22).

NOTICE:

Apply lithium soap base glycol grease and high temperature grease to the parts indicated by the arrows (See page BR-21).



1. ADJUST BELLCRANK

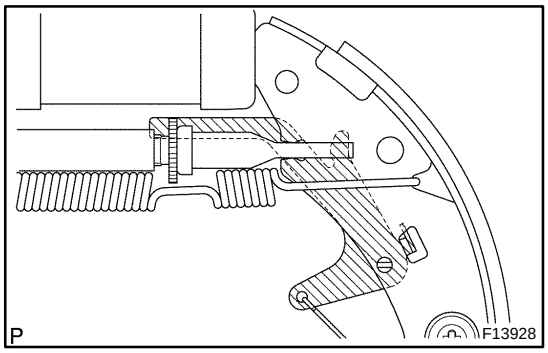
(a) Lightly pull the bellcrank in direction ”A” until there is no slack at part ”B”.

(b) In this condition, turn the adjusting bolt so that dimension ”C” will be 0.4 - 0.8 mm (0.016 - 0.031 in.).

(c) Lock the adjusting bolt with the lock nut.

(d) Connect the parking brake cable to the parking brake bellcrank and install the clip.

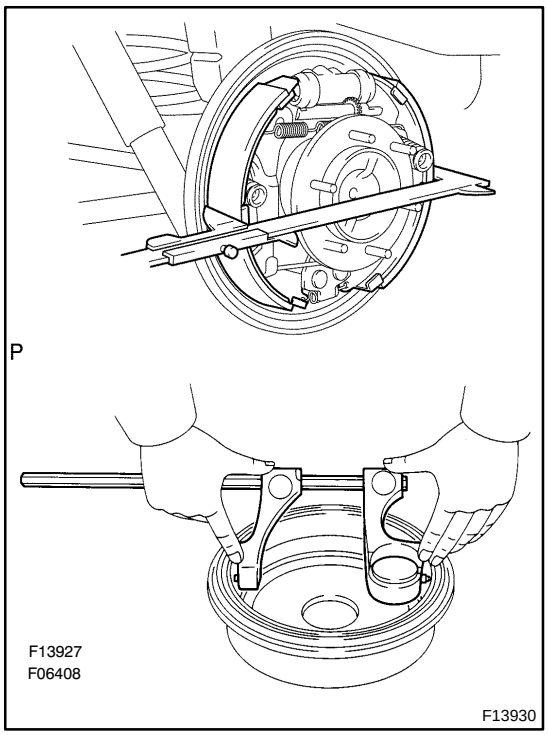
(e) Install the 2 tension springs.



2. CHECK AUTOMATIC ADJUSTING LEVER

Check that the automatic adjusting lever is properly installed.

If it is not incorrect, check for incorrect installation of the rear brakes.



3. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

(a) Remove the drum.

(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

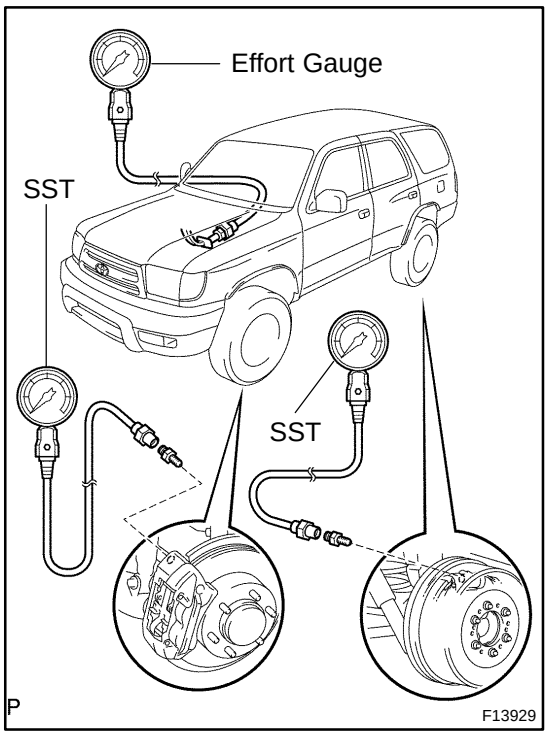
Shoe clearance: 0.5 mm (0.020 in.)

If it is incorrect, check the parking brake system.

4. FILL BRAKE RESERVOIR WITH BRAKE FLUID

5. BLEED BRAKE SYSTEM (See page BR-4)

6. CHECK FOR LEAKS



HYDRAULIC BRAKE BOOSTER

BR123-03

ON-VEHICLE INSPECTION

1. CHECK HYDRAULIC BRAKE BOOSTER FLUID PRESSURE CHANGE

(a) Inspect the battery positive voltage.

Battery positive voltage: 10 - 14 V

(b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(c) Install LSPV gauge (SST) and brake pedal effort gauge, bleed air.

SST 09709-29018

(d) When booster does not operate:

Depress the brake pedal and check fluid pressure.

At 245 N (25 kgf, 55 lbf):

Front brake pressure	Rear brake pressure
2,100 kPa (21 kgf/cm^2, 305 psi) or more	0 kPa (0 kgf/cm^2, 0 psi)

At 343 N (35 kgf, 77 lbf):

Front brake pressure	Rear brake pressure
3,100 kPa (32 kgf/cm^2, 450 psi) or more	0 kPa (0 kgf/cm^2, 0 psi)

(e) When booster operate:

(1) Turn the ignition switch ON and wait until the pump motor has stopped.

(2) Depress the brake pedal and check fluid pressure.

At 49 N (5 kgf, 11 lbf):

Front brake pressure	Rear brake pressure
1,000 - 2,200 kPa (10.2 - 22.4 kgf/cm^2, 145 - 319 psi)	1,200 - 2,400 kPa (12.2 - 24.4 kgf/cm^2, 174 - 348 psi)

At 98 N (10 kgf, 22 lbf):

Front brake pressure	Rear brake pressure
3,400 - 4,600 kPa (34.7 - 46.9 kgf/cm^2, 493 - 667 psi)	3,800 - 5,000 kPa (38.7 - 51.0 kgf/cm^2, 551 - 725 psi)

At 147 N (15 kgf, 33 lbf):

Front brake pressure	Rear brake pressure
5,600 - 6,800 kPa (57.1 - 69.3 kgf/cm^2, 812 - 986 psi)	6,000 - 7,200 kPa (61.2 - 73.4 kgf/cm^2, 870 - 1,044 psi)

At 196 N (20 kgf, 44 lbf):

Front brake pressure	Rear brake pressure
7,800 - 9,000 kPa (79.5 - 91.8 kgf/cm^2, 1,131 - 1,305 psi)	8,200 - 9,400 kPa (83.6 - 95.9 kgf/cm^2, 1,189 - 1,363 psi)

2. In case of using TOYOTA hand-held tester: INSPECT HYDRAULIC BRAKE BOOSTER OPERATION

(a) Inspect the battery positive voltage.
Battery positive voltage: 10 - 14 V

(b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

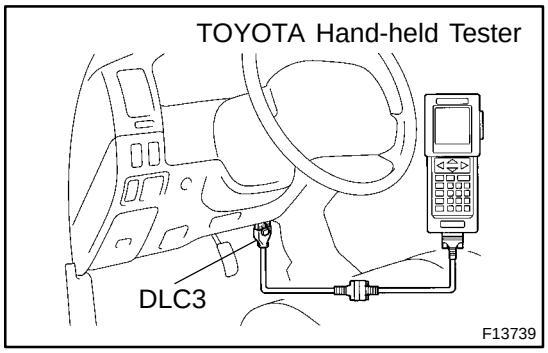
HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(c) Check that the brake pedal becomes heavy to depress.

If the pedal does not become to be heavy to depress, check and replace the brake line and hydraulic brake booster.

(d) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page BR-42).



(e) Connect the TOYOTA hand-held tester.
(1) Connect the TOYOTA hand- held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Select the ”ACTIVE TEST” mode on the TOYOTA hand-held tester.

HINT:
- Please refer to the TOYOTA hand-held tester operator’s manual for further details.
- To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

(f) Inspect the front TRAC & VSC solenoid operation.
(1) Select ”SA1” and ”SA2” on the TOYOTA hand-held tester.
(2) With ”SA1” and ”SA2” turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

HINT:
To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
If the pedal can be depressed, replace the hydraulic brake booster.

NOTICE:
When operating it continuously, set the interval of more than 20 sec.

(3) Once, release the brake pedal.

(4) When the solenoids are OFF, after depressing the brake pedal again and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(g) Inspect the front ABS solenoid operation.

(1) Select ”SFRH” and ”SFLH” on the TOYOTA hand-held tester.

(2) With ”SFRH” and ”SFLH” turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the brake pedal cannot be depressed.

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

If the pedal can be depressed, replace the hydraulic brake booster.

(3) Once, release the brake pedal when the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(4) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFRH and SFRR solenoids ON simultaneously.

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

(5) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(6) Once, release the brake pedal. After depressing and holding the brake pedal with stable force, turn the SFLH and SFLR solenoids ON simultaneously.

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

(7) When the solenoids are OFF, check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(h) Jack up and support the vehicle.

(i) Release the parking brake lever.

(j) Shift the transfer shift lever to ”N” position and check that the rear wheels by rotating them by hand.

(k) Inspect the rear TRAC & VSC solenoid operation.

(1) Select the ”SA3” and ”STR” on the TOYOTA hand-held tester.

(2) Turn the ”SA3” and ”STR” ON simultaneously with the TOYOTA hand-held tester, and check that the rear wheels does not rotate by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels rotate, replace the hydraulic brake booster.

(3) Turn the ”SA3” and ”STR” OFF simultaneously, and check that the rear wheels by rotating them by hand.

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

NOTICE:

When operating it continuously, set the interval of more than 20 sec.

If the rear wheels stop, replace the hydraulic brake booster.

(l) Inspect the right rear ABS solenoid.

(1) Select the ”SA3”, ”STR” and ”SRRH”, on the TOYOTA hand-held tester.

(2) Turn the ”SA3”, ”STR” and ”SRRH” ON simultaneously with the TOYOTA hand-held tester, and check that the right rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the rear wheels stop, replace the hydraulic brake booster.

(3) Turn the ”SA3”, ”STR” and ”SRRH” OFF, and check that the right rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the right rear wheel stop, replace the hydraulic brake booster.

(4) Depress the pedal with stable force, then turn the "SRRH" and "SRRR" ON simultaneously.

(5) When the solenoids are ON, check that the right rear wheel by rotating it by hand.

(m) Inspect the left rear ABS solenoid operation.

(1) Select the "SA3", "STR" and "SRLH" on the TOYOTA hand-held tester.

(2) Turn the "SA3", "STR" and "SRLH" ON with the TOYOTA hand-held tester, and check that the left rear wheel by rotating it by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels stop, replace the hydraulic brake booster.

(3) Turn the "SA3", "STR" and "SRLH" OFF and check that the left rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the left rear wheel stop, replace the hydraulic brake booster.

(4) Depress the pedal with stable force, then turn the "SRLH" and "SRLR" ON simultaneously.

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

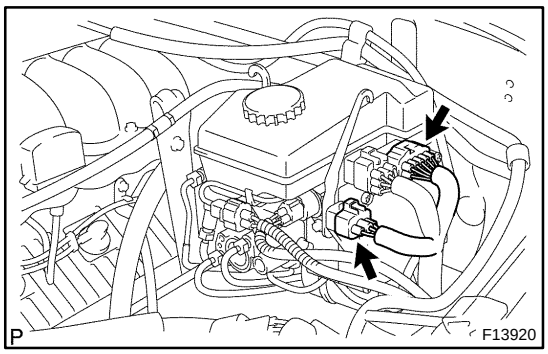
(5) When the solenoids are ON, check that the left rear wheel by rotating it by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

(n) Lower the vehicle.

(o) Disconnect the TOYOTA hand-held tester.



3. In case of using ABS actuator checker (SST): INSPECT HYDRAULIC BRAKE BOOSTER OPERATION

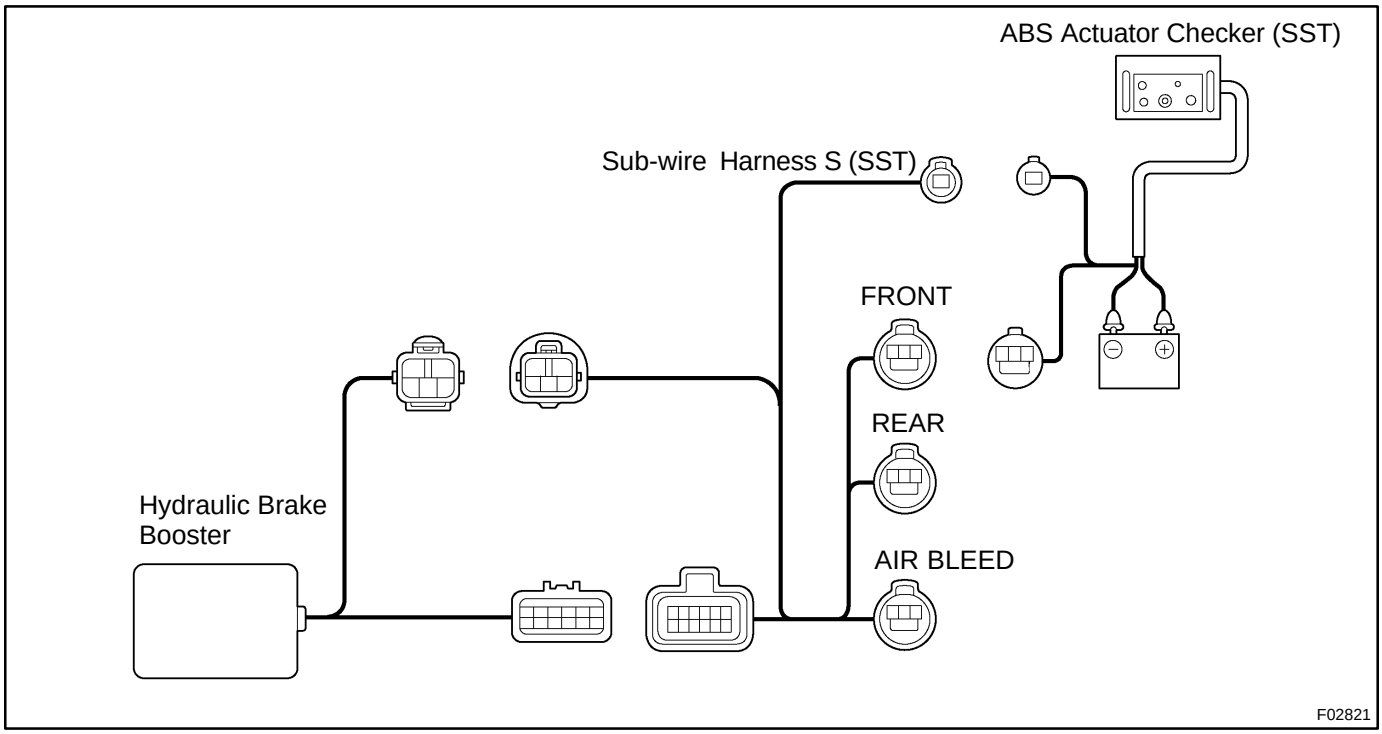
(a) Inspect the battery positive voltage.
Battery positive voltage: 10 - 14 V

(b) Disconnect the 2 connectors from hydraulic brake booster.

(c) Connect the ABS actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness S (SST), as shown in the following chart.
SST 09990-00150, 09990-00480

HINT:
Connect the connector with the label of "FRONT" attached to the connector of ABS actuator checker.

(d) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



(e) Place "SHEET G" (SST) of "FRONT" on ABS actuator checker.
SST 09990-00240

(f) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

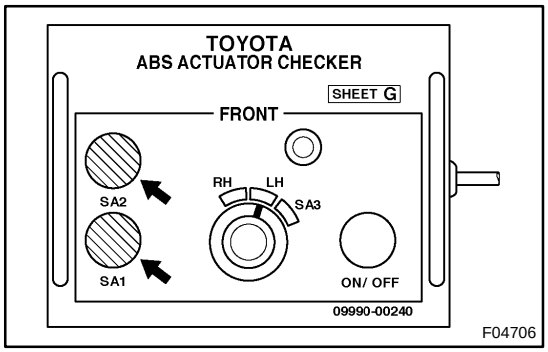
HINT:
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

(g) Check that the brake pedal becomes heavy to depress.

If the pedal does not become to be heavy to depress, check and replace the brake line and hydraulic brake booster.

(h) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor (See page BR-42).



(i) Inspect the front TRAC & VSC solenoid operation.

(1) Push in and hold the "SA1" and "SA2" switches simultaneously, depress strongly and hold the brake pedal with stable force.

NOTICE:

Do not keep the "SA1" and "SA2" pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

(2) Check that the brake pedal cannot be depressed.

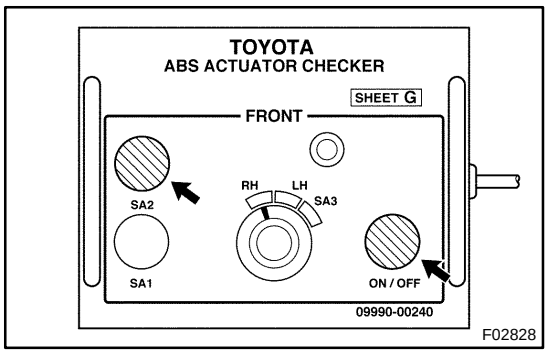
If the pedal can be depressed, replace the hydraulic brake booster.

(3) Release the "SA1" switch and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(4) Release the "SA2" switch and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.



(j) Inspect the right front ABS solenoid operation.

(1) Turn the selector switch to "RH" position.

(2) Push and hold in the MAIN push switch and "SA2" switch simultaneously, depress and hold the brake pedal with stable force.

NOTICE:

Do not keep the MAIN push switch and "SA2" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

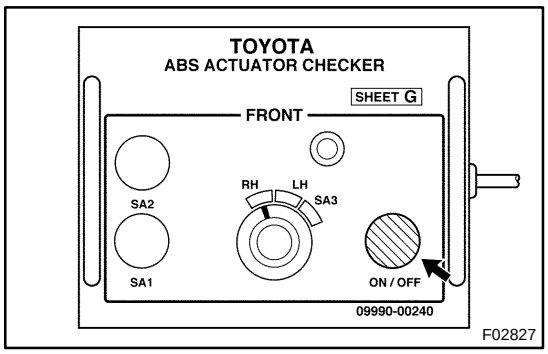
(3) Check that the brake pedal cannot be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

(4) Release the MAIN push switch and "SA2" switch simultaneously and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(5) Release the brake pedal.



(6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

NOTICE:

Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

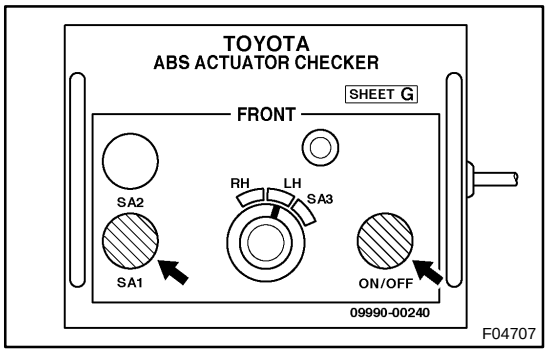
(7) Check that the brake pedal cannot be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

(8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(9) Release the brake pedal.



(k) Inspect the left front ABS solenoid operation.

(1) Turn the selector switch to ”LH” position.

(2) Push and hold in the MAIN push switch and ”SA1” switch simultaneously, depress and hold the brake pedal with stable force.

NOTICE:

Do not keep the MAIN push switch and ”SA1” switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

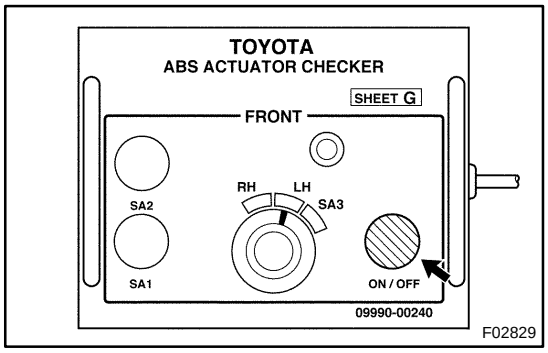
(3) Check that the brake pedal cannot be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

(4) Release the MAIN push switch and ”SA1” switch simultaneously, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

(5) Release the brake pedal.



(6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

NOTICE:

Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

(7) Check that the brake pedal cannot be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

(8) Release the MAIN push switch, and check that the brake pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

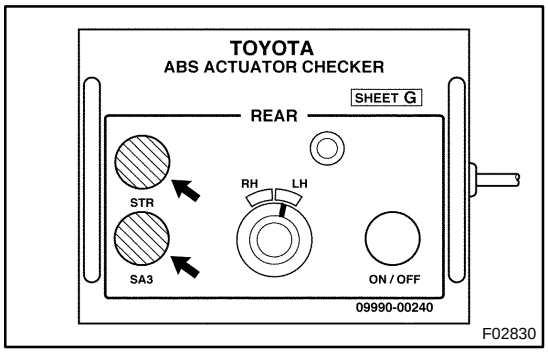
(9) Release the brake pedal.

(l) Turn the ignition switch OFF, then reconnect the connector of sub- wire harness from the one with label of ”FRONT” to ”REAR”.

(m) Place ”SHEET G” of ”REAR” on the actuator checker.

(n) Jack up and support the vehicle.

(o) Start the engine and run it at idle.



(p) Inspect the rear TRAC & VSC solenoid.

(1) Release the parking brake lever and shift the shift lever to ”L” position.

(2) Push and hold the ”SA3” switch and ”STR” switch simultaneously.

NOTICE:

- **Do not keep the ”STR” switch pushed down for more than 10 sec.**
- **Do not keep the ”SA3” switch pushed down for more than 5 sec.**
- **When operating it continuously, set the interval of more than 20 sec.**

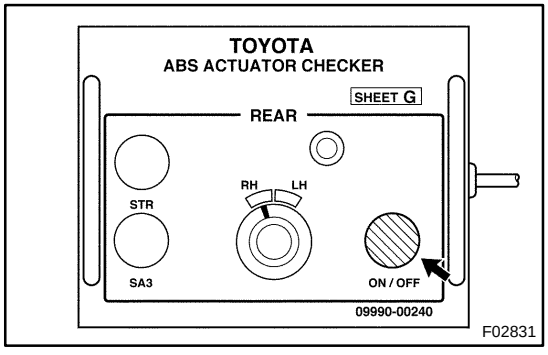
(3) Check that the rear wheels stop.

If the rear wheels rotate, replace the hydraulic brake booster.

(4) Release the ”SA3” switch and ”STR” switch simultaneously.

(5) Check that the rear wheels rotate.

If the rear wheels stop, replace the hydraulic brake booster.



(q) Inspect the right rear ABS solenoid.

(1) Turn the selector switch to ”RH” position.

(2) Depress the brake pedal several times and release the brake pedal when the pump begins rotating. Wait until the pump stops.

(3) Turn the ignition switch OFF.

(4) Depress the brake pedal with a force of 490 N (50 kgf, 110 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.

(5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

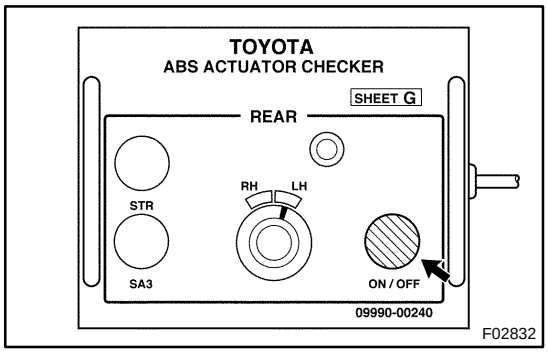
If the fluid surface level rises up, replace the hydraulic brake booster.

NOTICE:

Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.

(6) Start the engine and run it at idle.
(7) Depress the brake pedal.
(8) Release the parking brake lever and shift the shift lever to ”L” position.
(9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
(10) Check that the right rear wheel rotates.

If the right rear wheel stops, replace the hydraulic brake booster.



(r) Inspect the left rear ABS solenoid.
(1) Turn the selector switch to ”LH” position.
(2) Depress the brake pedal several times and release the brake pedal when the pump begins rotating. Wait until the pump stops.
(3) Turn the ignition switch OFF.
(4) Depress the brake pedal with a force of 490 N (50 kgf, 110 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.
(5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

If the fluid surface level rises up, replace the hydraulic brake booster.

NOTICE:

Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.

(6) Start the engine and run it at idle.
(7) Depress the brake pedal.
(8) Release the parking brake lever and shift the shift lever to ”L” position.
(9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
(10) Check that the left rear wheel rotates.

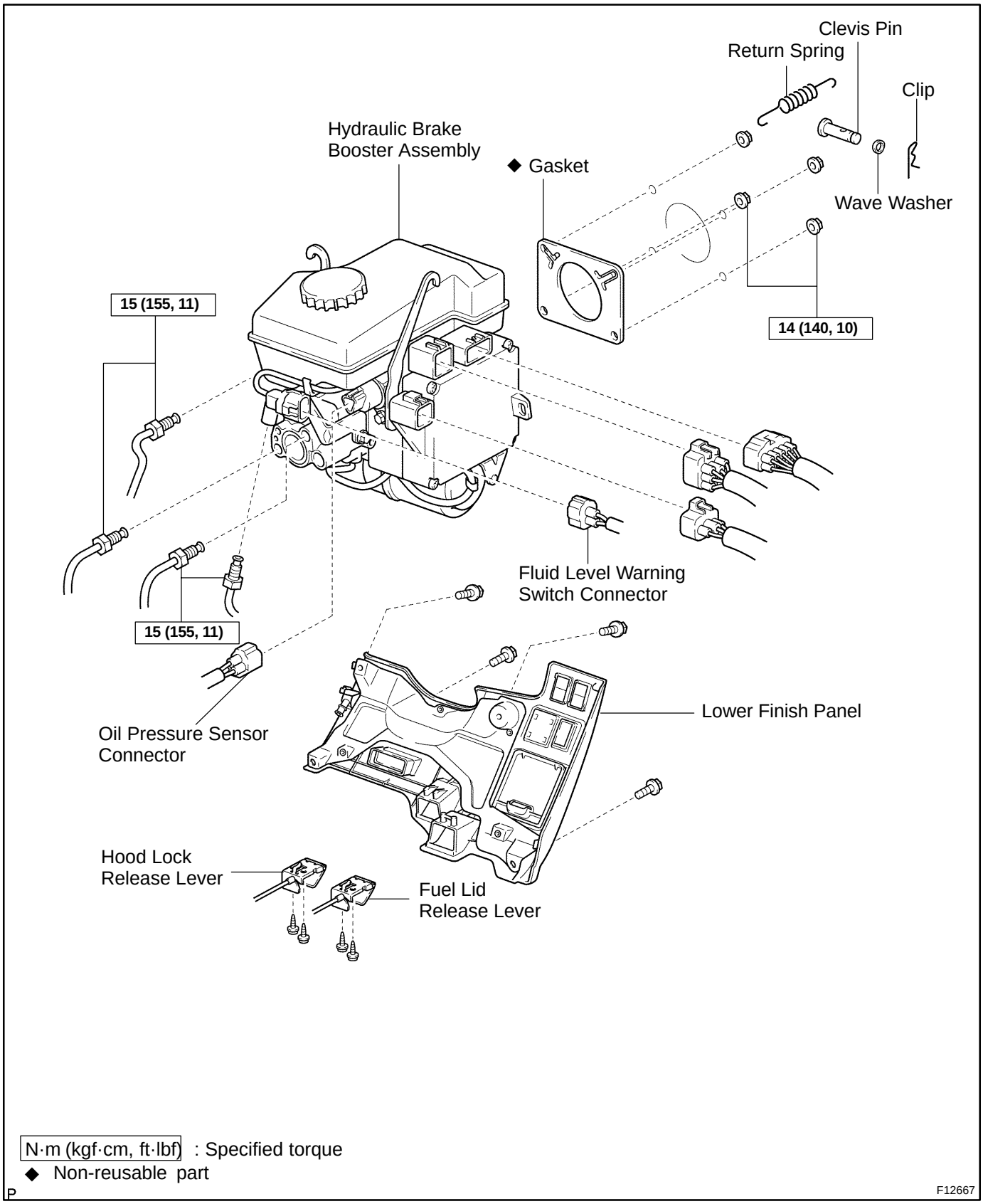
If the left rear wheel stops, replace the hydraulic brake booster.

(s) Stop the engine and lower the vehicle.

(t) Remove the ”SHEET G” (SST) and disconnect the actuator checker (SST) and sub-wire harness S (SST) from the hydraulic brake booster.
(u) Connect the 2 connectors to the actuator.
(v) Clear the DTC (See page DI-224).

BR124-03

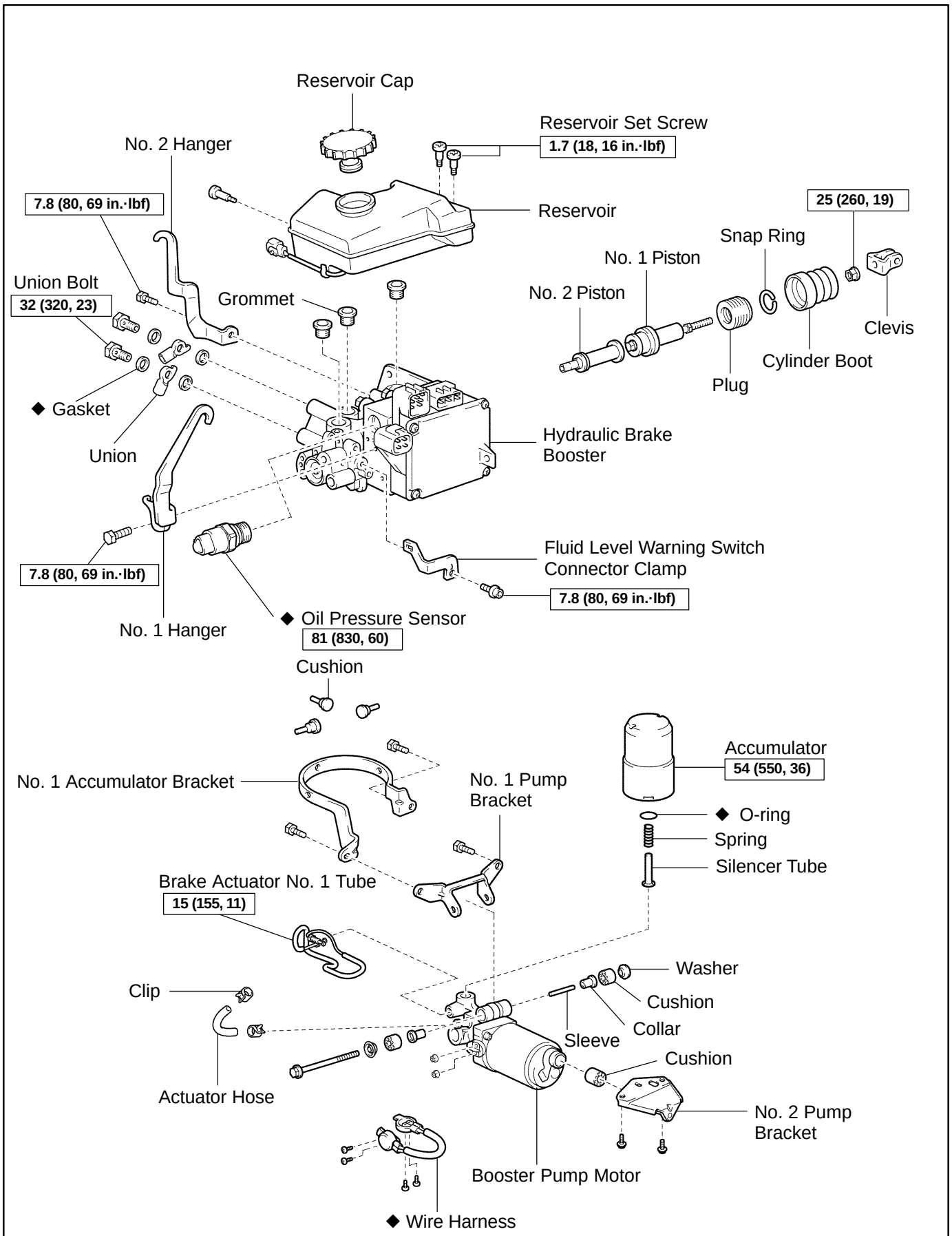
COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part

P

F12667


Reservoir Cap
Reservoir Set Screw
1.7 (18, 16 in.·lbf)
No. 2 Hanger
7.8 (80, 69 in.·lbf)
Reservoir
25 (260, 19)
Snap Ring
No. 1 Piston
Union Bolt
32 (320, 23)
Grommet
No. 2 Piston
Clevis
Cylinder Boot
Plug
◆ Gasket
Union
Hydraulic Brake Booster
Fluid Level Warning Switch Connector Clamp
7.8 (80, 69 in.·lbf)
7.8 (80, 69 in.·lbf)
No. 1 Hanger
◆ Oil Pressure Sensor
81 (830, 60)
Cushion
Accumulator
54 (550, 36)
No. 1 Accumulator Bracket
No. 1 Pump Bracket
◆ O-ring
Spring
Silencer Tube
Brake Actuator No. 1 Tube
15 (155, 11)
Washer
Clip
Cushion
Collar
Sleeve
Cushion
Actuator Hose
No. 2 Pump Bracket
Booster Pump Motor
◆ Wire Harness
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
F13921

BR125-03

REMOVAL

NOTICE:

Before starting the work, make sure that the ignition switch is OFF and depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

NOTICE:

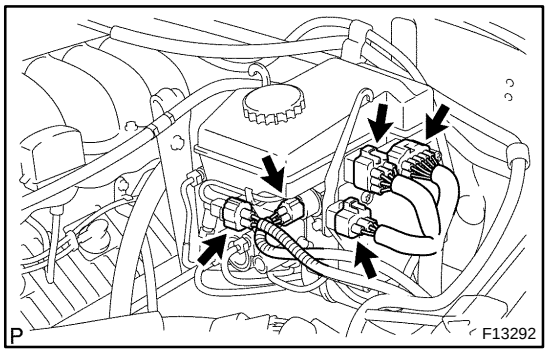
- **As high pressure is applied to the brake actuator No. 1 tube, never deform it.**
- **Until the work is over, do not turn the ignition switch ON.**

1. DRAW OUT FLUID WITH SYRINGE

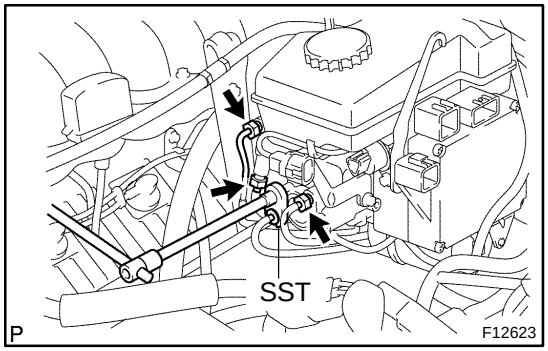
NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.

2. REMOVE LOWER FINISH PANEL, HOOD LOCK RELEASE LEVER, FUEL LID RELEASE LEVER
(See page BO-66)



3. DISCONNECT 5 CONNECTORS



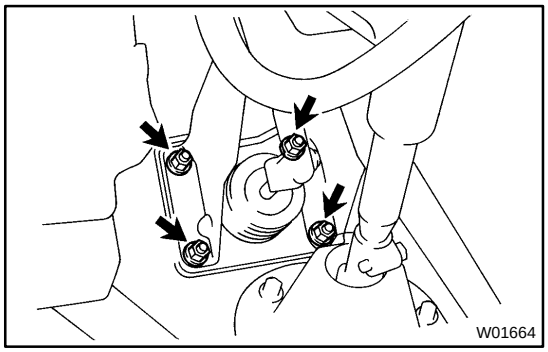
4. DISCONNECT BRAKE LINES

Using SST, disconnect the 4 brake lines.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

5. REMOVE RETURN SPRING, CLIP, WAVE WASHER AND CLEVIS PIN



6. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY

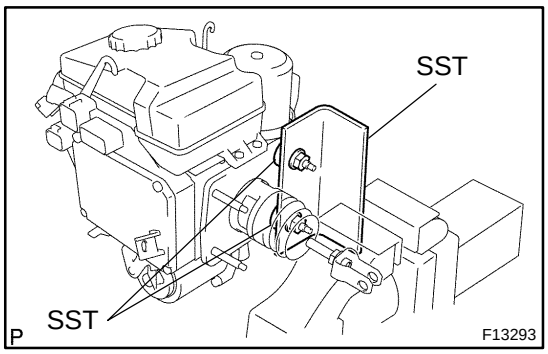
(a) Remove the 4 booster installation nuts.

Torque: 14 N·m (140 kgf·cm, 10 ft·lbf)

(b) Remove the booster assembly and gasket.

BR126-03

DISASSEMBLY



1. PLACE HYDRAULIC BRAKE BOOSTER IN VISE

Using SST, set the hydraulic brake booster in vise.

SST 09630-00014 (09631-00142), 09950-60010 (09951-00180, 09951-00190)

2. REMOVE FLUID LEVEL WARNING SWITCH CONNECTOR CLAMP

(a) Disconnect the connector from the clamp.

(b) Using 5 mm socket hexagon wrench, remove the bolt and fluid level warning switch connector clamp.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

3. REMOVE RESERVOIR

(a) Remove reservoir cap.

(b) Remove the 3 set screws and pull out the reservoir.

Torque: 1.7 N·m (18 kgf·cm, 16 in.·lbf)

(c) Remove the 3 grommets.

4. REMOVE CYLINDER BOOT

(a) Loosen the lock nut, then remove the clevis and lock nut.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)

(b) Remove the cylinder boot.

5. REMOVE NO. 1 AND NO. 2 HANGERS

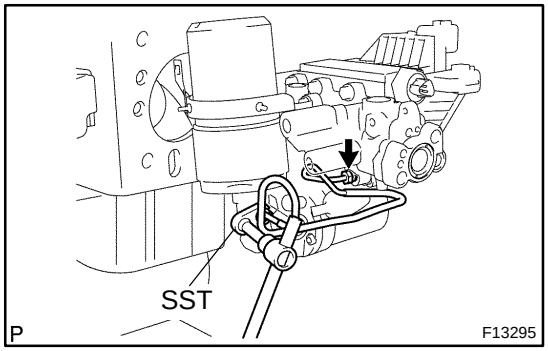
Remove the 2 bolts, No. 1 and No. 2 hangers.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

6. REMOVE 2 UNIONS

Remove the 2 union bolts, 4 gaskets and 2 unions.

Torque: 32 N·m (320 kgf·cm, 23 ft·lbf)



7. REMOVE BRAKE ACTUATOR NO. 1 TUBE

Using SST, remove the brake actuator No. 1 tube.

SST 09023-00100

Torque: 15 N·m (155 kgf·cm, 11 ft·lbf)

8. REMOVE BOOSTER PUMP WITH ACCUMULATOR

(a) Remove the 2 clips and actuator hose.

(b) Remove the 4 screws and wire harness from the booster and pump.

(c) Remove the 2 bolts and No. 1 accumulator bracket.

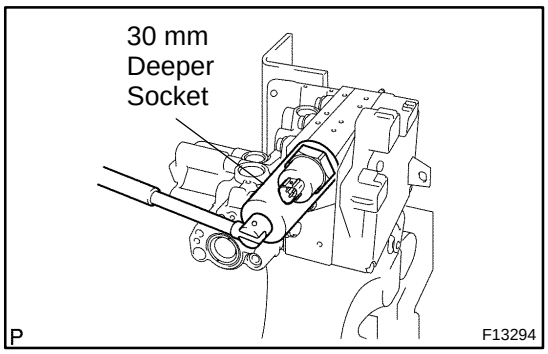
(d) Remove the 3 cushions from the No. 1 actuator bracket.

(e) Remove the 2 bolts and No. 1 pump bracket.

(f) Remove the 2 washers, 3 cushions, 2 collars and sleeve.

(g) Remove the 2 bolts and No. 2 pump bracket.

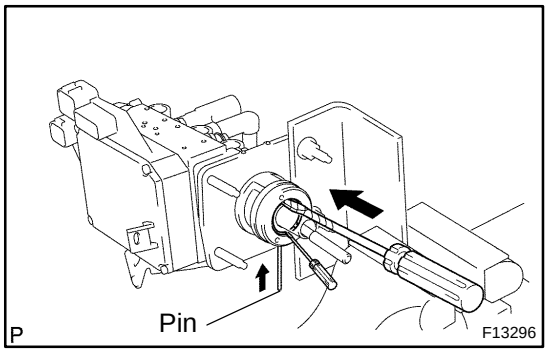
(h) Remove the cushion from No. 2 pump bracket.



9. REMOVE OIL PRESSURE SENSOR

Using 30 mm deeper socket wrench and remove the oil pressure sensor.

Torque: 81 N·m (830 kgf·cm, 60 ft·lbf)



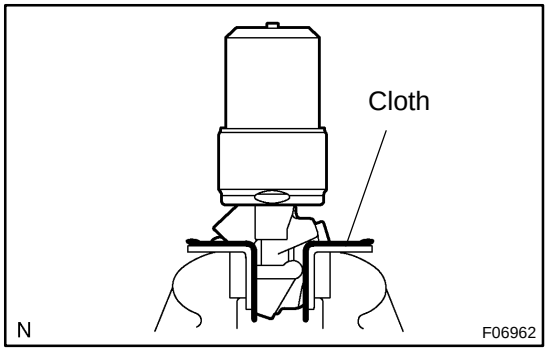
10. REMOVE PISTONS

(a) Pressing the piston in with a screwdriver, use a pin or an equivalent to push the snap ring from the hole in the body then remove it with another screwdriver.

(b) Remove the plug and No. 1, No. 2 pistons, pulling straight out, not at an angle.

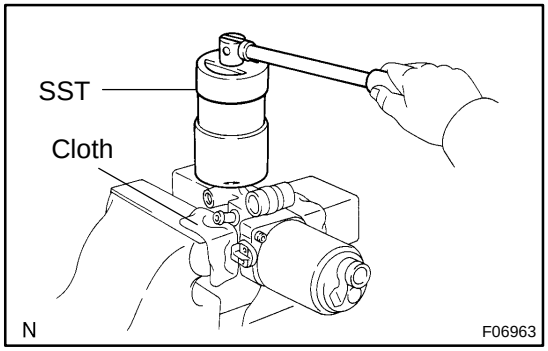
NOTICE:

- **If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.**
- **At the time of reassembly, be careful not to damage the rubber lips on the pistons.**



11. PLACE BOOSTER PUMP IN VISE

Place the booster pump with a cloth shown in the illustration on the left.

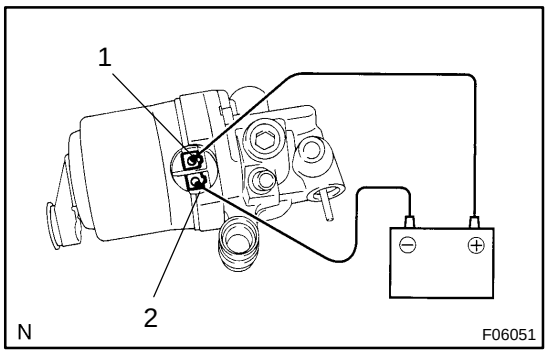


12. REMOVE ACCUMULATOR FROM BOOSTER PUMP

(a) Using SST, remove the accumulator.
SST 09318-12010
Torque: 54 N·m (550 kgf·cm, 36 ft·lbf)

(b) Remove the silencer tube, spring and O-ring.

BR120-13



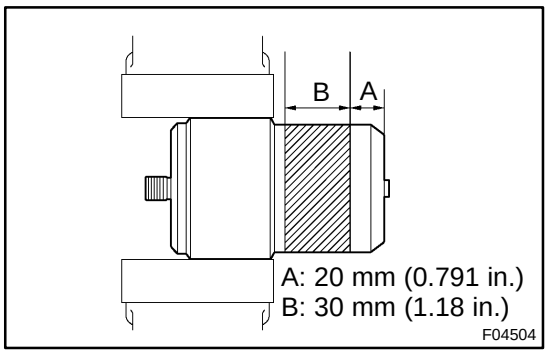
INSPECTION

INSPECT HYDRAULIC BRAKE BOOSTER PUMP MOTOR OPERATION

(a) Connct the positive (+) lead from the battery to terminal 1 of pump motor, and the negative (-) lead to terminal 2.

(b) Check that the pump motor operation.

BR127-03



DISPOSAL

DISPOSAL METHOD OF ACCUMULATOR

(a) Follow the procedures described below and drain the high pressure gas from the accumulator.

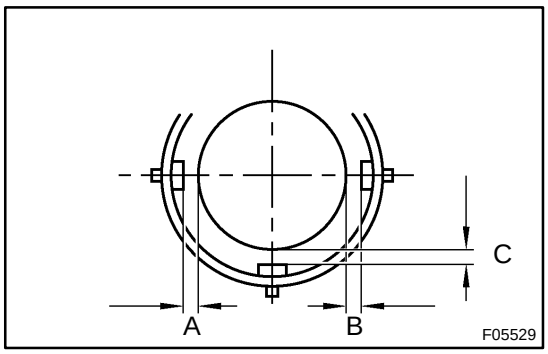
(b) Place the accumulator in a vise, cover it with a cloth over a saw then cut the accumulator body slowly.

CAUTION:

Never cut at a stretch.

(c) When the outer body of the accumulator is cut, gas discharges.

BR1MH-01



REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR-40).

INSTALL ACCUMULATOR BRACKET

When installing the accumulator bracket, adjust to secure the clearance (A, B and C) shown in the illustration on the left.

Standard clearance:

A + B: 4.1 mm (0.161 in.) or less

C: 0.3 - 3.8 mm (0.012 - 0.150 in.)

HINT:

Secure more than 0.3 mm (0.012 in.) clearance for A and B each.

BR129-01

INSTALLATION

Installation is in the reverse order of removal (See page BR-39).

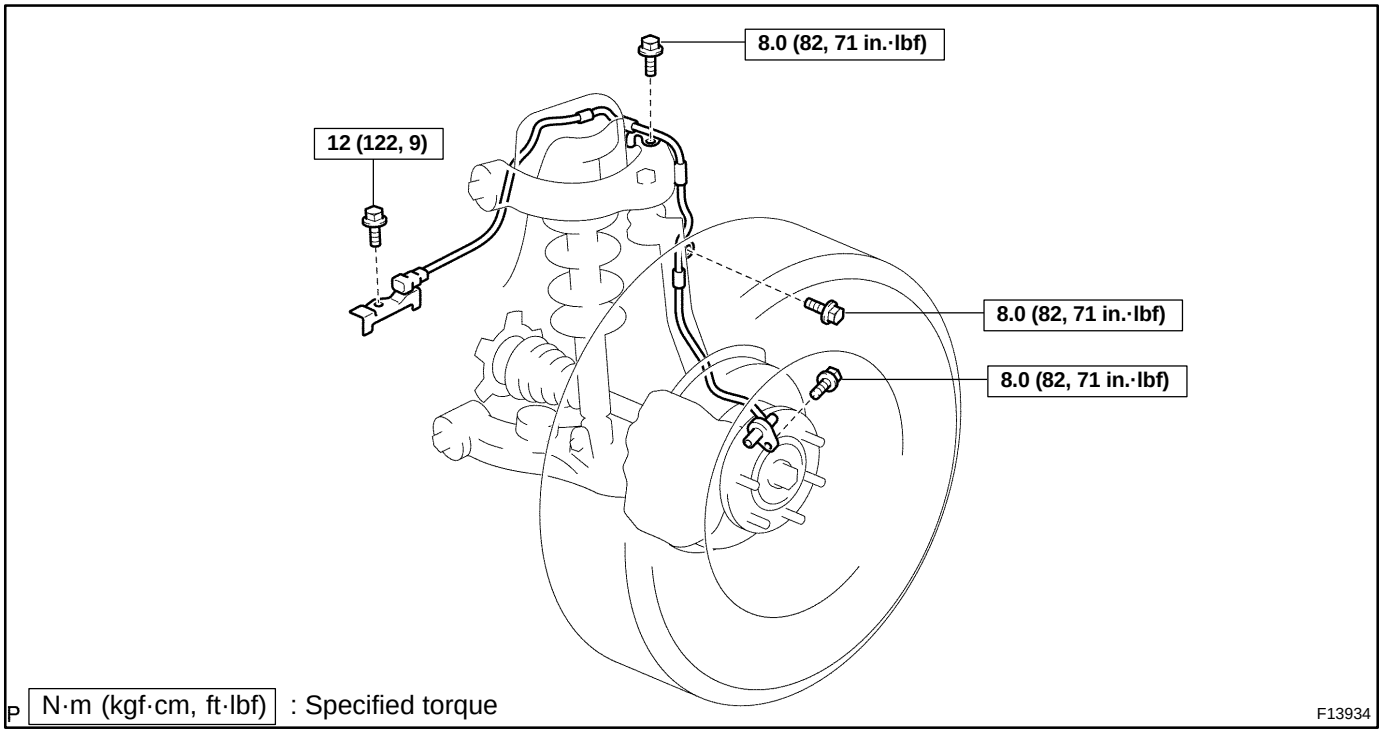
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR-4).
- Check for leaks.

FRONT SPEED SENSOR

COMPONENTS

BR08H-02



BR08I-02

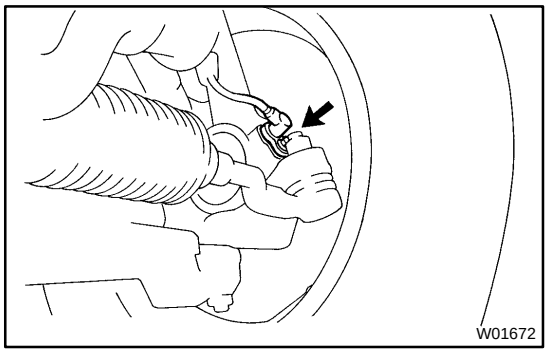
REMOVAL

REMOVE SPEED SENSOR

(a) Disconnect the speed sensor connector.

(b) Remove the 4 resin clips and 3 clamp bolts holding the sensor harness from the steering knuckle, upper arm and side rail.

Torque:
Steering knuckle and upper arm:
8.0 N·m (82 kgf·cm, 71 in.·lbf)
Side rail:
12 N·m (122 kgf·cm, 9 ft·lbf)



(c) Remove the speed sensor installation bolt from the steering knuckle.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

BR08J-02

INSTALLATION

Installation is in the reverse order of removal (See page BR-47).

CAUTION:

- **There are no foreign objects on the sensor or the part of the knuckle to which the sensor is to be installed.**
- **The sensor is installed flat against the knuckle when you tighten the bolt.**

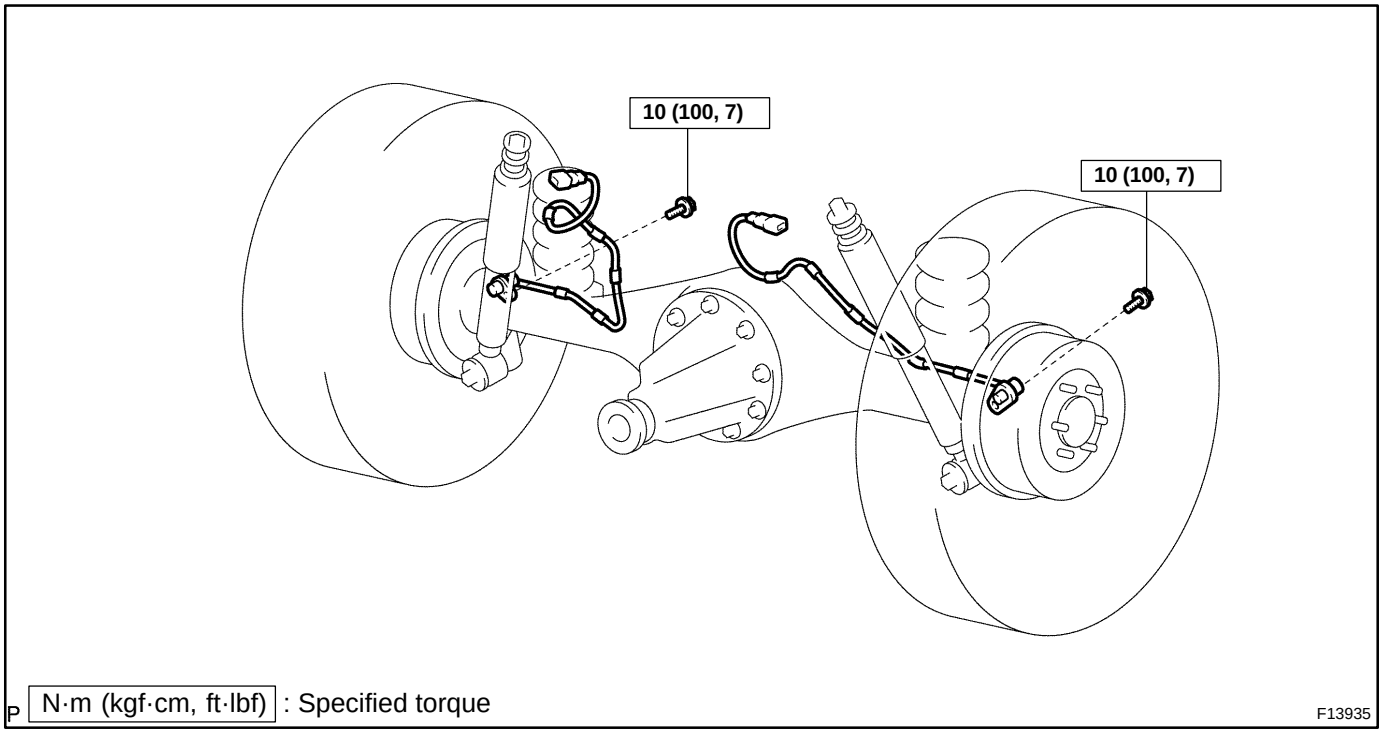
HINT:

After installation, check the speed sensor signal (See page DI-224).

REAR SPEED SENSOR

BR08K-02

COMPONENTS



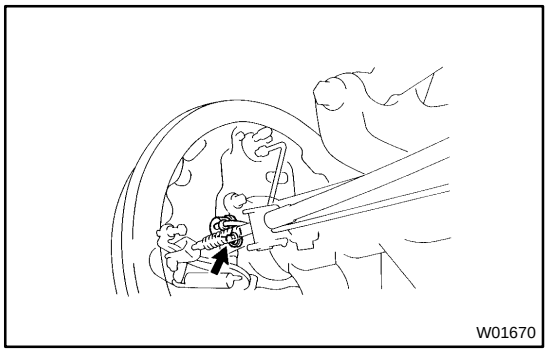
BR08L-02

REMOVAL

REMOVE SPEED SENSOR

(a) Disconnect the speed sensor connector, and pull out the sensor wire harness with grommet.

(b) Remove the 5 resin clips, holding the sensor wire harness from the frame, upper control arm and axle housing.



(c) Remove the mounting bolt and speed sensor.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

BR08M-02

INSTALLATION

Installation is in the reverse order of removal (See page BR-50).

NOTICE:

Make sure that

- **There are no foreign objects on the sensor or the part of the knuckle to which the sensor is to be installed.**
- **The sensor is installed flat against the knuckle when you tighten the bolt.**

HINT:

After installation, check the speed sensor signal (See page DI-224).

STEERING SYSTEM

SR01S-01

PRECAUTION

- **Care must be taken to replace parts properly because they could affect the performance of the steering system and result in a driving hazard.**
- **The 4 RUNNER is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.**

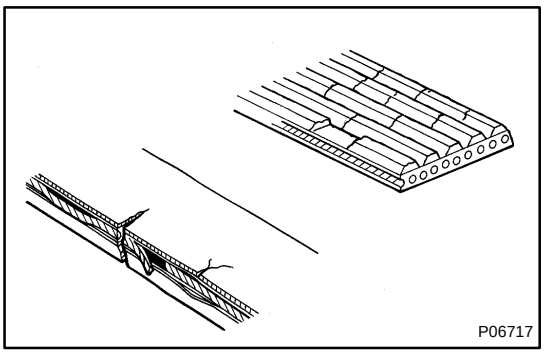
TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SR01T-06

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in the order shown. If necessary, repair or replace these parts.

Symptom	Suspect Area	See page
Hard steering	1. Tires (Improperly inflated)	SA-4
	2. Power steering fluid level (Low)	SR-5
	3. Drive belt (Loose)	SR-3
	4. Front wheel alignment (Incorrect)	SA-5
	5. Steering system joints (Worn)	-
	6. Suspension arm ball joints (Worn)	SA-72
	7. Steering column (Binding)	-
	8. Power steering vane pump	SR-31
	9. Power steering gear	SR-42
Poor return	1. Tires (Improperly inflated)	SA-4
	2. Front wheel alignment (Incorrect)	SA-5
	3. Steering column (Binding)	-
	4. Power steering gear	SR-42
Excessive play	1. Steering system joints (Worn)	-
	2. Suspension arm ball joints (Worn)	SA-72
	3. Intermediate shaft, Sliding yoke (Worn)	-
	4. Front wheel bearing (Worn)	SA-9
	5. Power steering gear	SR-42
Abnormal noise	1. Power steering fluid level (Low)	SR-5
	2. Steering system joints (Worn)	-
	3. Power steering vane pump	SR-31
	4. Power steering gear	SR-42



DRIVE BELT

SR01U-06

INSPECTION

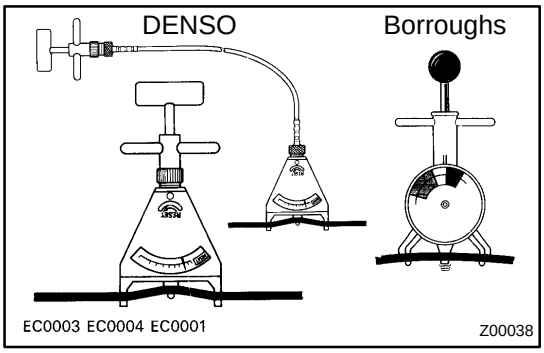
INSPECT DRIVE BELT

(a) Visually check the belt for excessive wear, frayed cords, etc.

If any defect has been found, replace the drive belt.

HINT:

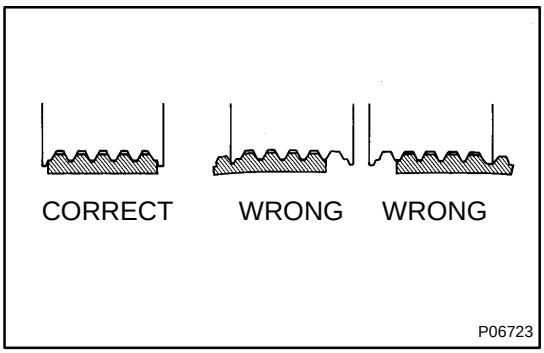
Cracks on the rib side of a belt are considered acceptable. If the missing chunks from the ribs are found on the belt, it should be replaced.



(b) Using a belt tension gauge, measure the belt tension.

Belt tension gauge:
DENSO BTG-20 (95506-00020)
Borroughs No. BT-33-73F
Drive belt tension:
New belt: 135 - 180 lbf
Used belt: 85 - 120 lbf

If the belt tension is not as specified, adjust it.



HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.

POWER STEERING FLUID

SR01V-06

BLEEDING

1. **CHECK FLUID LEVEL (See page SR-5)**
2. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**
3. **TURN STEERING WHEEL**

With the engine stopped, turn the wheel slowly from lock to lock several times.

4. **LOWER VEHICLE**
5. **START ENGINE**

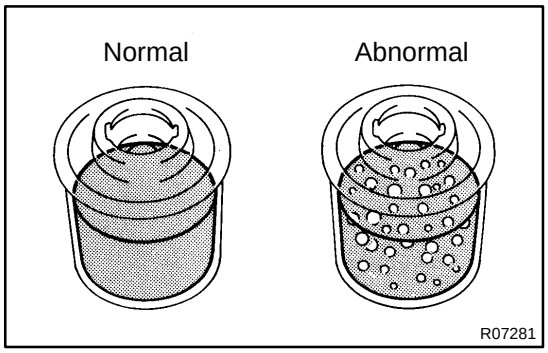
Run the engine at idle for a few minutes.

6. **TURN STEERING WHEEL**

(a) With the engine idling, turn the wheel to left or right full lock position and keep it there for 2 - 3 seconds, then turn the wheel to the opposite full lock position and keep it there for 2 - 3 seconds.

(b) Repeat (a) several times.

7. **STOP ENGINE**

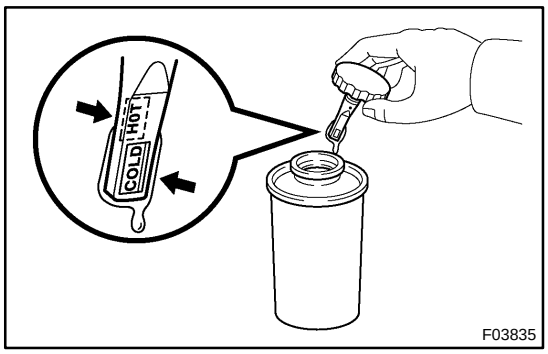


8. **CHECK FOR FOAMING OR EMULSIFICATION**

If the system has to be bled twice specifically because of foaming or emulsification, check for fluid leaks in the system.

9. **CHECK FLUID LEVEL (See page SR-5)**

SR01W-06



INSPECTION

1. CHECK FLUID LEVEL

(a) Keep the vehicle level.

(b) With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

Fluid: ATF DEXRON® II or III

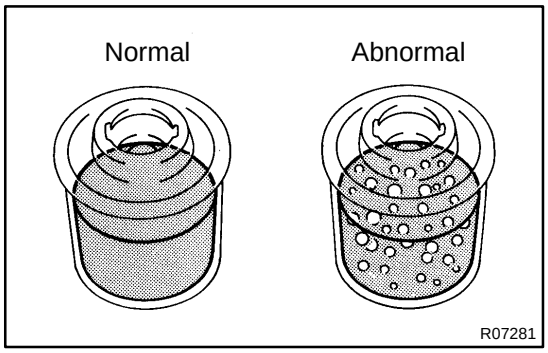
HINT:

Check that the fluid level is within the HOT LEVEL range on the reservoir cap dipstick. If the fluid is cold, check that it is within the COLD LEVEL range.

(c) Start the engine and run it at idle.

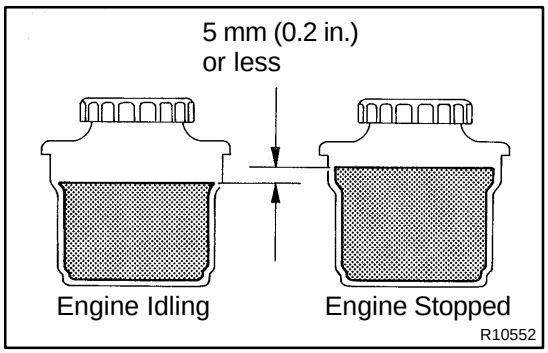
(d) Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80˚C (176˚F)



(e) Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system (See page SR-4).



(f) With the engine idling, measure the fluid level in the oil reservoir.

(g) Stop the engine.

(h) Wait a few minutes and remeasure the fluid level in the oil reservoir.

Maximum fluid level rise: 5 mm (0.20 in.)

If a problem is found, bleed power steering system (See page SR-4).

(i) Check the fluid level.

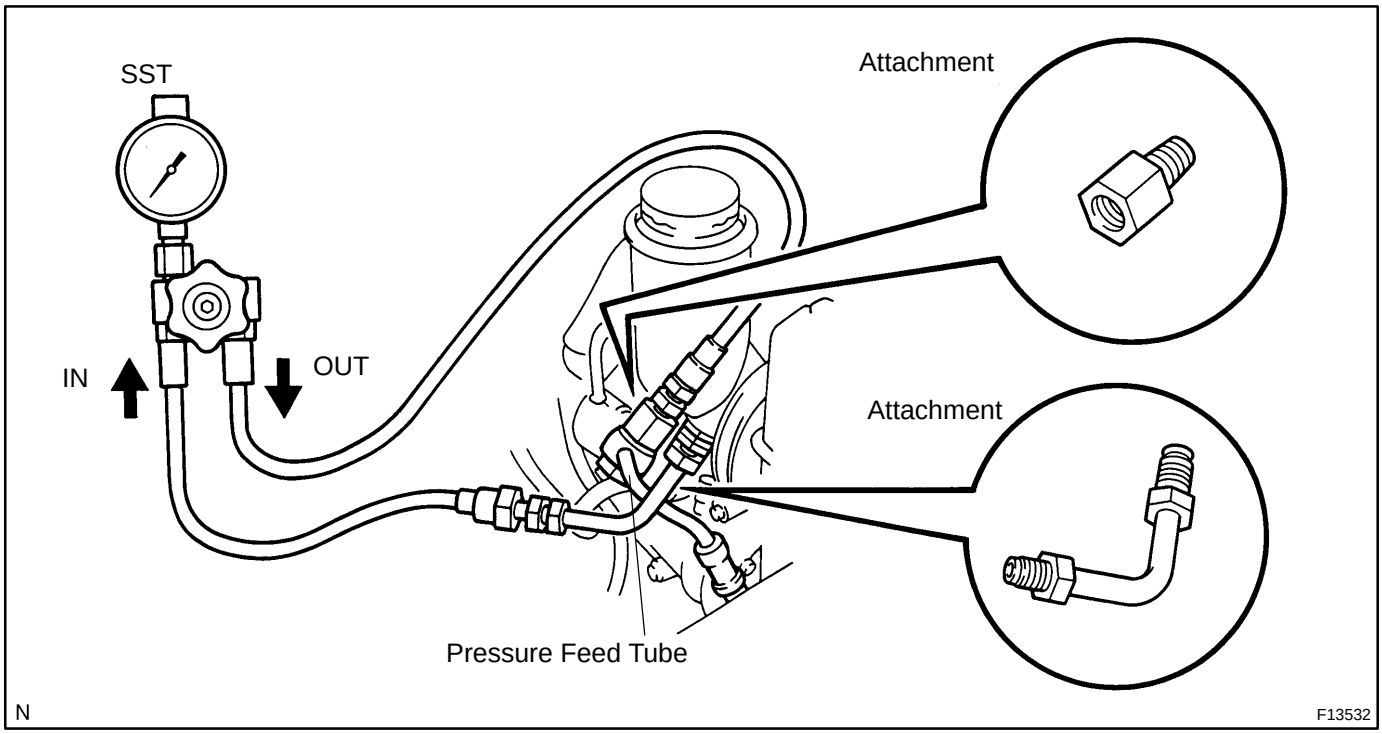
2. CHECK STEERING FLUID PRESSURE

(a) Remove the 3 bolts and air cleaner assembly (See page SR-31).

(b) Disconnect the pressure feed tube from the PS vane pump (See page SR-33).

(c) Connect SST, as shown in the illustration below.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)

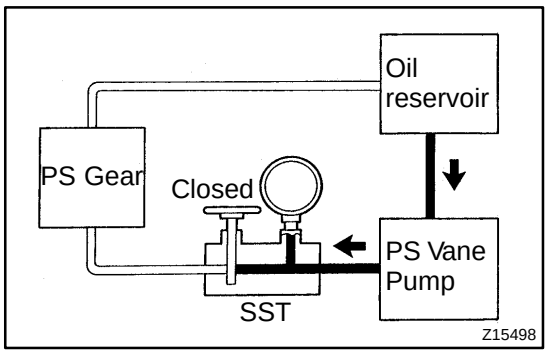
NOTICE:
Check that the valve of the SST is in the open position.



(d) Bleed the power steering system (See page SR-4).

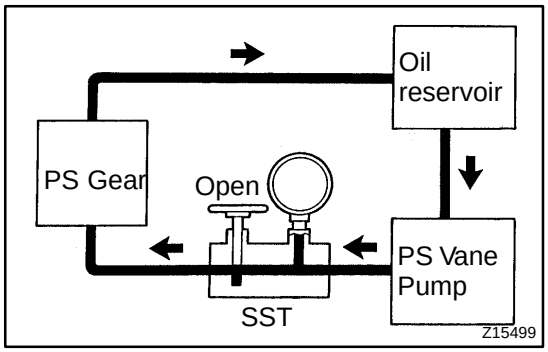
(e) Start the engine and run it at idle.

(f) Turn the steering wheel from lock to lock several times to boost fluid temperature.
Fluid temperature: 80 ˚C (176 ˚F)



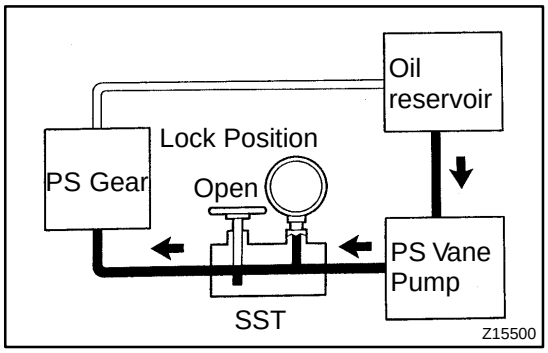
(g) With the engine idling, close the valve of the SST and observe the reading on the SST.
Minimum fluid pressure:
8,336 kPa (85 kgf/cm^2, 1,209 psi)

NOTICE:
- **Do not keep the valve closed for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**



(h) With the engine idling, open the valve fully.
(i) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.
Difference fluid pressure:
490 kPa (5 kgf/cm^2, 71 psi) or less

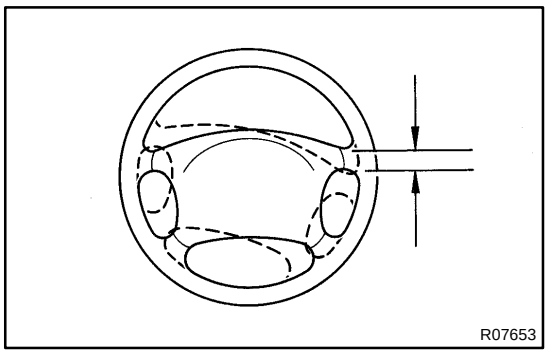
NOTICE:
Do not turn the steering wheel.



(j) With the engine idling and valve fully opened, turn the steering wheel to full lock.
Minimum fluid pressure:
8,336 kPa (85 kgf/cm^2, 1,209 psi)

NOTICE:
- **Do not maintain lock position for more than 10 seconds.**
- **Do not let the fluid temperature become too high.**

(k) Disconnect the SST.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01060)
(l) Connect the pressure feed tube (See page SR-41).
(m) Install the air cleaner and 3 bolts (See page SR-31).
(n) Bleed the power steering system (See page SR-4).



STEERING WHEEL

SR01Y-07

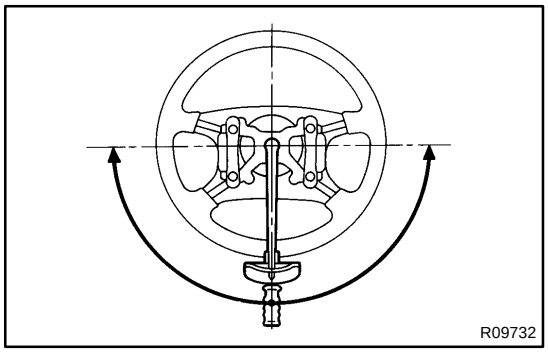
INSPECTION

1. CHECK STEERING WHEEL FREEPLAY

(a) Stop the vehicle and face the tires straight ahead.

(b) Rock the steering wheel gently up and down with a finger lightly, check the steering wheel freeplay.

Maximum freeplay: 30 mm (1.18 in.)



2. CHECK STEERING EFFORT

(a) Center the steering wheel.

(b) Remove the steering wheel pad (See page SR-13).

(c) Start the engine and run it at idle.

(d) Measure the steering effort in both directions.

Steering effort (Reference):

4.9 N·m (50 kgf·cm, 43 in.·lbf)

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

(e) Torque the steering wheel set nut.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

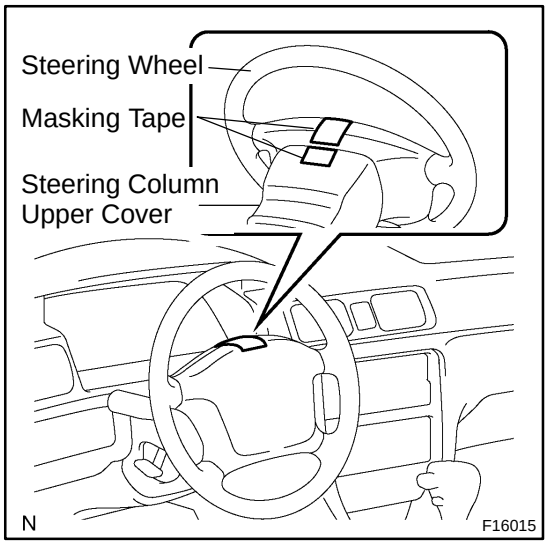
(f) Install the steering wheel pad (See page SR-20).

SR1HN-01

REPAIR PROCEDURES

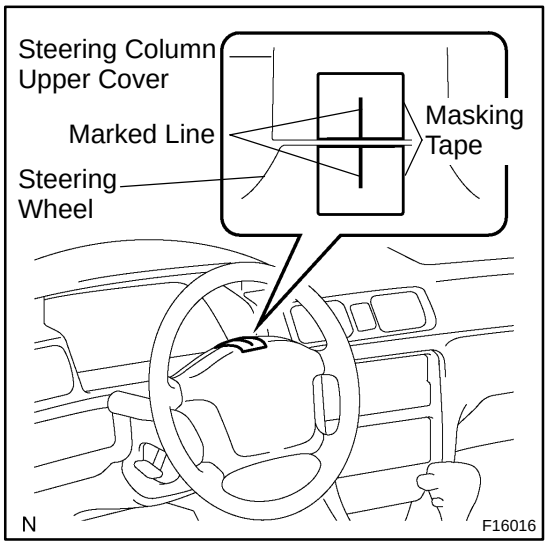
HINT:

This is the repair procedure for steering off center.



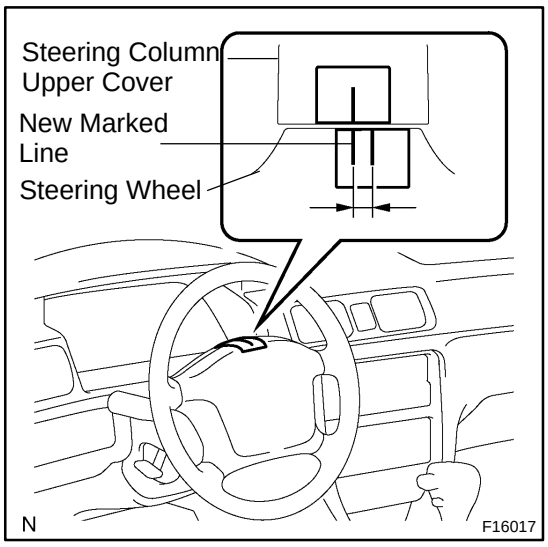
1. INSPECT STEERING WHEEL OFF CENTER

(a) Apply masking tape on the top center of the steering wheel and steering column upper cover.



(b) Drive the vehicle in a straight line for 100 meters at a constant speed of 35 mph (56 km/h), and hold the steering wheel to maintain the course.

(c) Draw a line on the masking tape as shown in the illustration.



(d) Turn the steering wheel to its straight position.

HINT:

Refer to the upper surface of the steering wheel, steering spoke and SRS airbag line for the straight position.

(e) Draw a new line on the masking tape of the steering wheel as shown in the illustration.

(f) Measure the distance between the 2 lines on the masking tape of the steering wheel.

(g) Convert the measured distance to steering angle.
Measured distance 1 mm (0.04 in.) = Steering angle approximately 1 deg.

HINT:

Make a note of the steering angle.

2. ADJUST STEERING ANGLE

(a) Lift up the vehicle.

NOTICE:

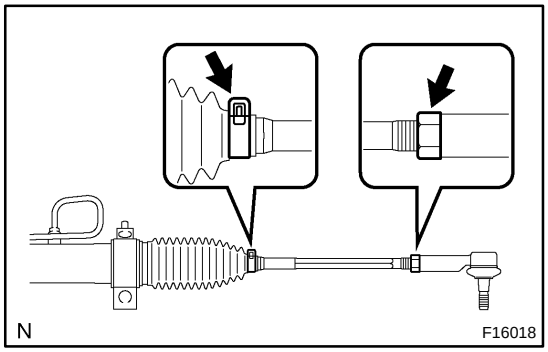
The adjustment method for steering angle is different depending on the models. Check whether it is type A or B.

(b) Draw a line on the RH and LH tie rod and rack ends where it can easily be seen.

(c) Using a paper gauge, measure the distance from RH and LH tie rod ends to the rack end screws.

HINT:

- Measure the RH side and LH side.
- Make a note of the measured values.



(d) Remove the RH and LH boot clips from the rack boots.

(e) Loosen the RH and LH lock nuts.

(f) Turn the RH and LH rack end by the same amount (but in different directions) according to the steering angle.
1 turn 360 deg. of rack end (1.5 mm (0.059 in.) horizontal movement) = 12 deg. of steering angle

(g) Tighten the RH and LH lock nuts by the specified torque.

NOTICE:

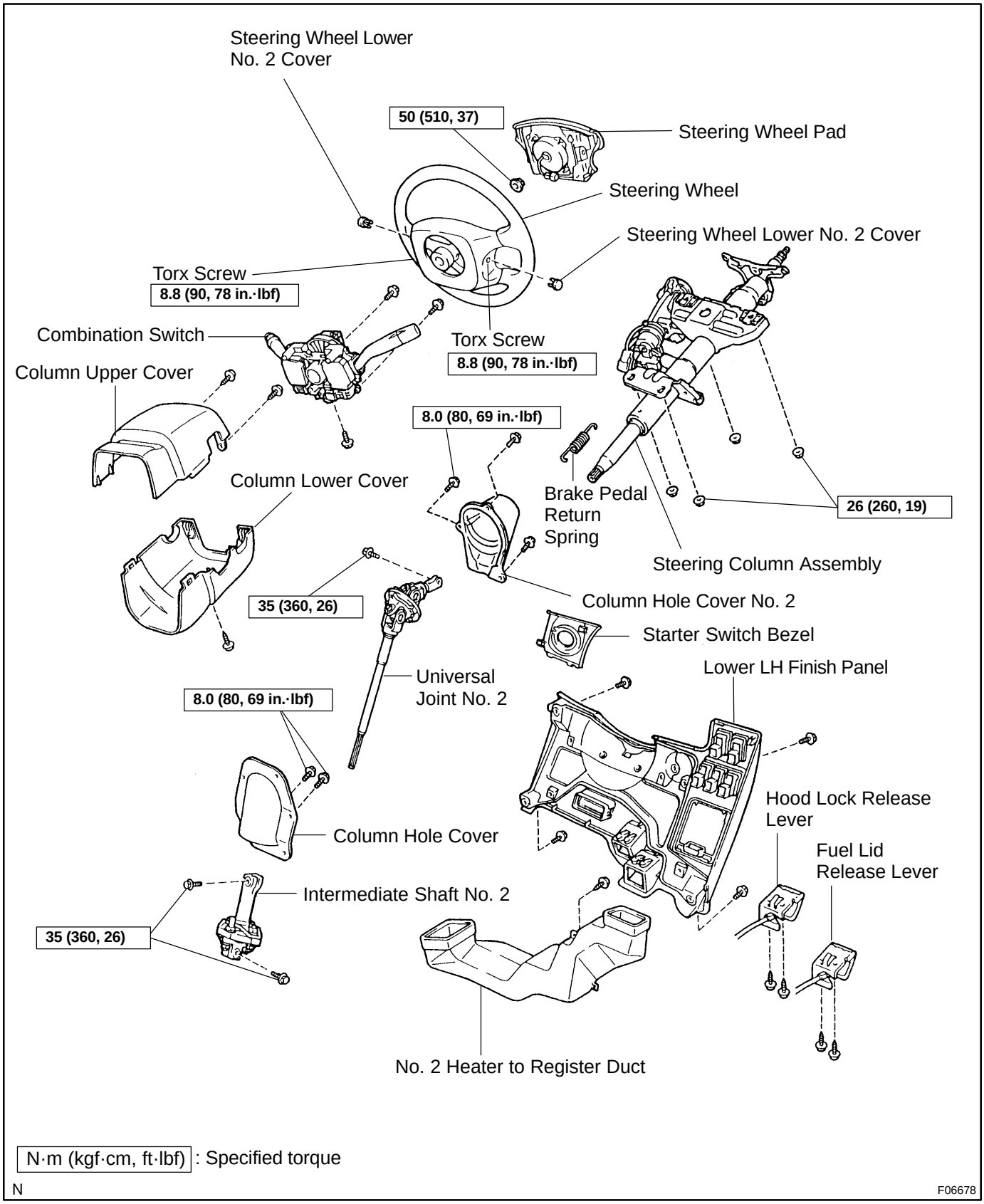
Make sure that the difference in length between RH and LH tie rod ends and rack end screws are within 1.5 mm (0.059 in.).

(h) Install the RH and LH boot clips.

NON-TILT STEERING COLUMN

COMPONENTS

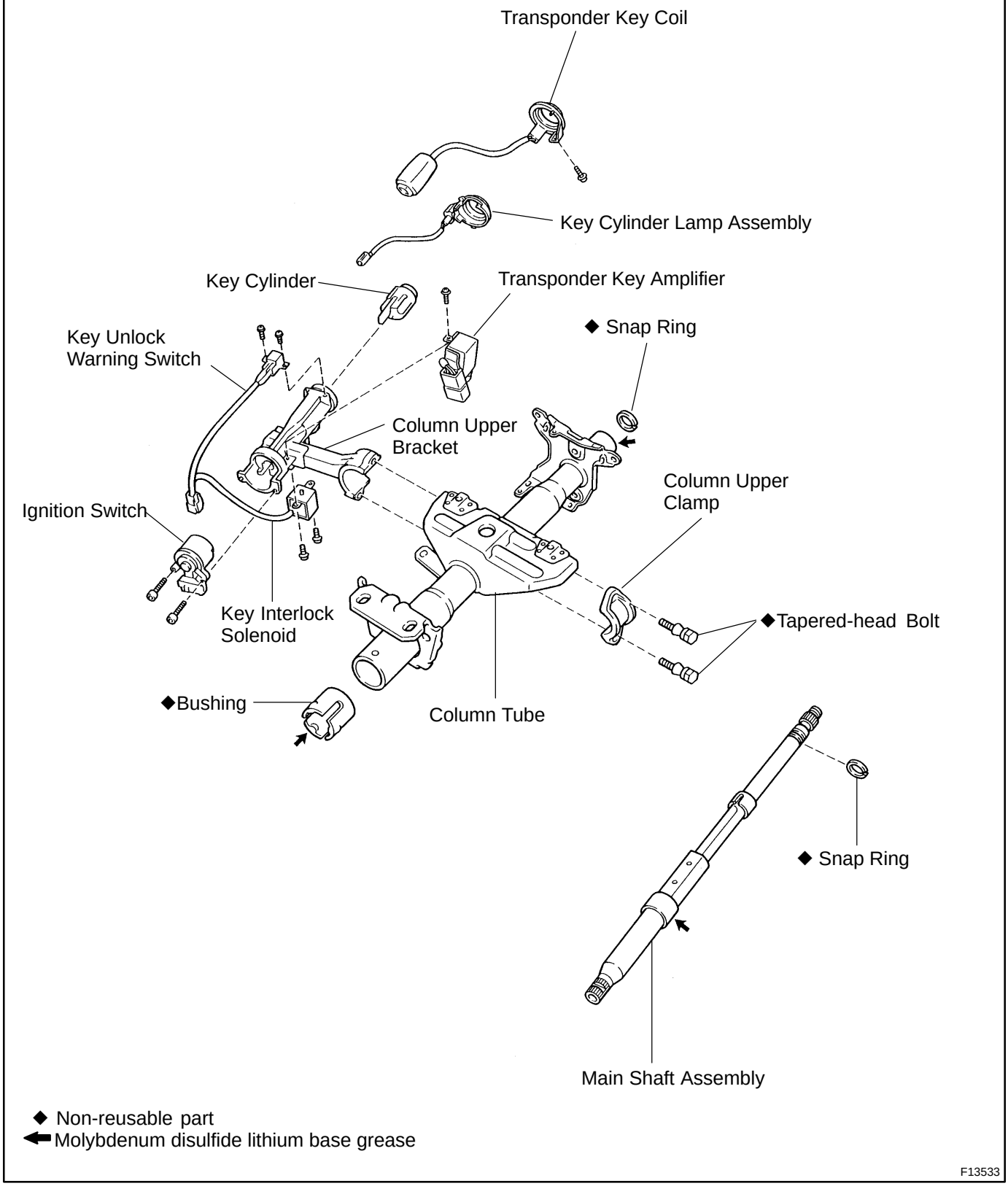
SR01Z-03



N·m (kgf·cm, ft·lbf) : Specified torque

N

F06678


Transponder Key Coil
Key Cylinder Lamp Assembly
Key Cylinder
Transponder Key Amplifier
◆ Snap Ring
Key Unlock
Warning Switch
Column Upper
Bracket
Column Upper
Clamp
Ignition Switch
Key Interlock
Solenoid
◆Tapered-head Bolt
◆Bushing
Column Tube
◆ Snap Ring
Main Shaft Assembly
◆ Non-reusable part
Molybdenum disulfide lithium base grease
F13533

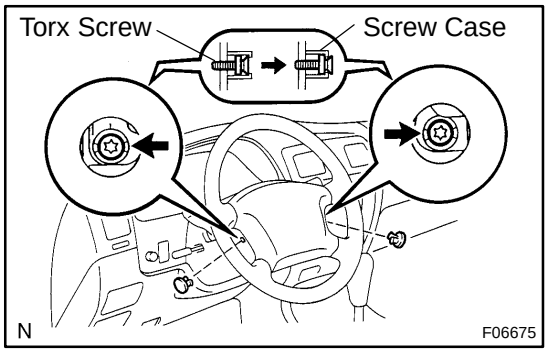
SR020-04

REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTICE:

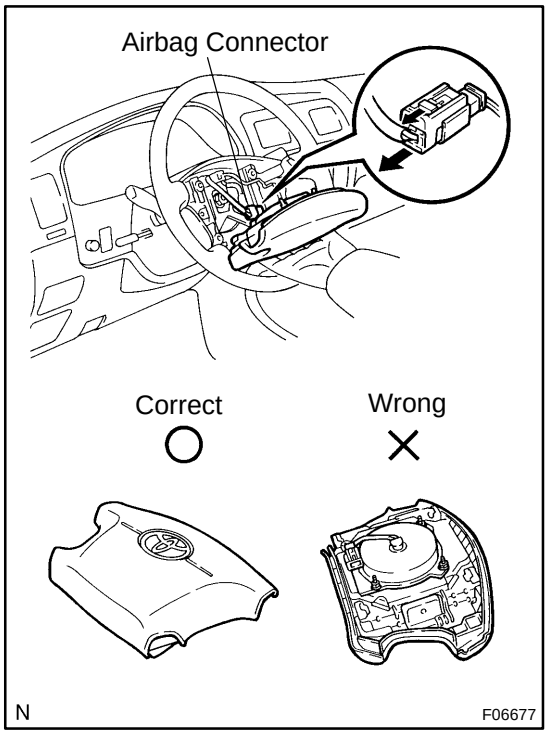
If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.



(a) Place the front wheels facing straight ahead.
(b) Remove the 2 steering wheel lower No. 2 covers.
(c) Using a torx socket wrench, loosen the 2 torx screws.

HINT:

Loosen the screw until the groove along the screw circumference catches on the screw case.



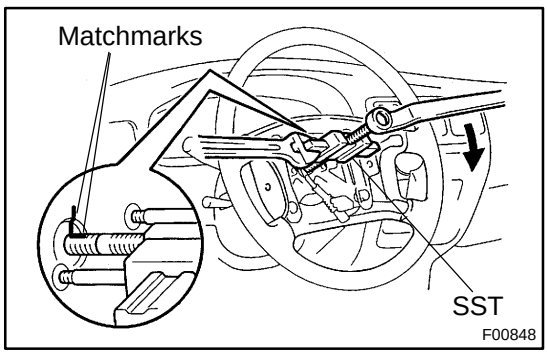
(d) Pull out the wheel pad from the steering wheel and disconnect the airbag connector.

CAUTION:

- **When storing the wheel pad, keep the upper surface of the pad facing upward.**
- **Never disassemble the wheel pad.**

NOTICE:

When removing the wheel pad, take care not to pull the airbag wire harness.



2. REMOVE STEERING WHEEL

(a) Remove the steering wheel set nut.
(b) Place matchmarks on the steering wheel and main shaft assembly.
(c) Using SST, remove the wheel.
SST 09950-50013 (09951-05010, 09952-05010, 09953-05021, 09954-05020)
(d) Disconnect the connector.

3. REMOVE UPPER AND LOWER COLUMN COVERS

Remove the 3 screws, upper and lower column covers.

4. REMOVE LOWER LH FINISH PANEL

(a) Remove the 2 screws and disconnect the hood lock release lever from the lower LH finish panel.

(b) Remove the 2 screws and disconnect the fuel lid release lever from the lower LH finish panel.

(c) Remove the 4 panel set bolts and lower LH finish panel.

5. REMOVE STARTER SWITCH BEZEL

6. REMOVE NO. 2 HEATER TO REGISTER DUCT

Remove the screw and No. 2 heater to register duct.

7. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

(a) Disconnect the 3 connectors.

(b) Disconnect the airbag connector.

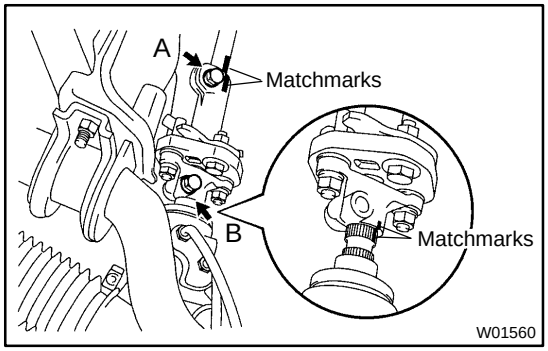
(c) Remove the 3 screws and combination switch with spiral cable.

8. REMOVE SPIRAL CABLE (See page BE-14)

NOTICE:

Do not disassemble the cable or apply oil to it.

9. REMOVE BRAKE PEDAL RETURN SPRING



10. REMOVE INTERMEDIATE SHAFT NO. 2

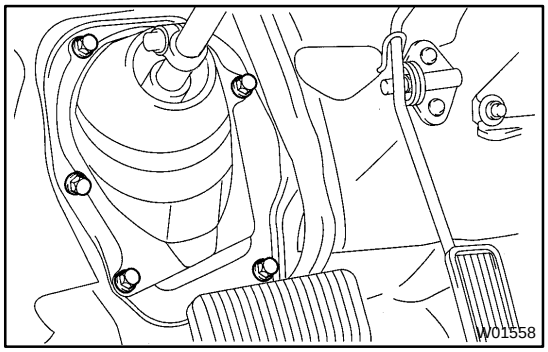
(a) Place matchmarks on the universal joint No. 2 and intermediate shaft No. 2.

(b) Remove the bolt "A".

(c) Place matchmarks on the intermediate shaft No. 2 and control valve shaft.

(d) Remove the bolt "B".

(e) Slide the intermediate shaft No. 2 and remove the intermediate shaft No. 2.



11. REMOVE COLUMN HOLE COVER AND COLUMN HOLE COVER NO. 2

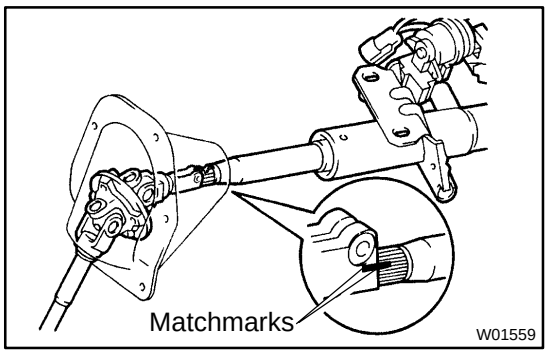
Remove the 5 bolts, column hole cover and column hole cover No. 2.

12. REMOVE STEERING COLUMN ASSEMBLY WITH UNIVERSAL JOINT NO. 2

(a) Disconnect the connectors.

(b) Remove the 4 steering column set nuts.

(c) Pull out the steering column assembly with universal joint No. 2.



13. DISCONNECT UNIVERSAL JOINT NO. 2

(a) Place matchmarks on the steering column assembly and universal joint No. 2.

(b) Remove the bolt, universal joint No. 2, column hole cover and column hole cover No. 2.

SR021-03

DISASSEMBLY

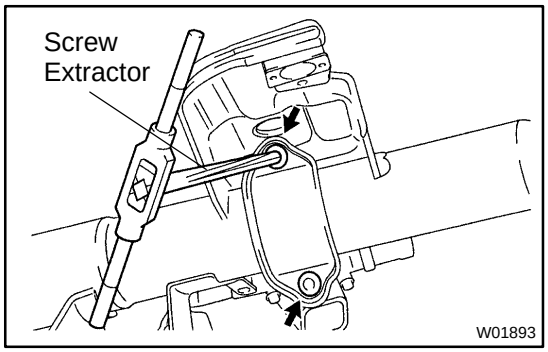
NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY COIL WITH KEY CYLINDER LAMP ASSEMBLY

(a) Remove the screw and transponder key coil with key cylinder lamp assembly.

(b) Remove the key cylinder lamp assembly from the transponder key coil.

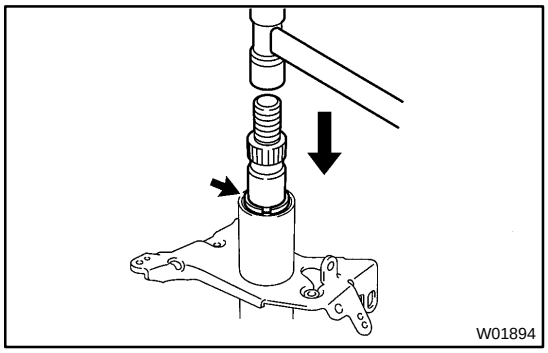


2. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Using a centering punch, mark the center of the 2 tapered-head bolts.

(b) Using a 3 - 4 mm (0.12 - 0.16 in.) drill, drill into the 2 bolts.

(c) Using a screw extractor, remove the 2 bolts, column upper bracket and column upper clamp.



3. REMOVE MAIN SHAFT ASSEMBLY

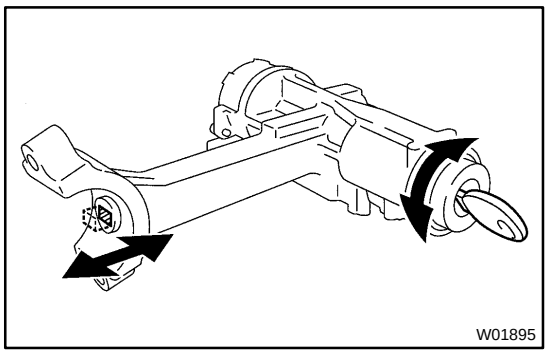
(a) Using a snap ring expander, remove the snap ring from the shaft assembly.

(b) Using a plastic hammer, tap out the shaft assembly from the column tube.

(c) Using a snap ring expander, remove the snap ring from the shaft assembly.

SR022-03

INSPECTION

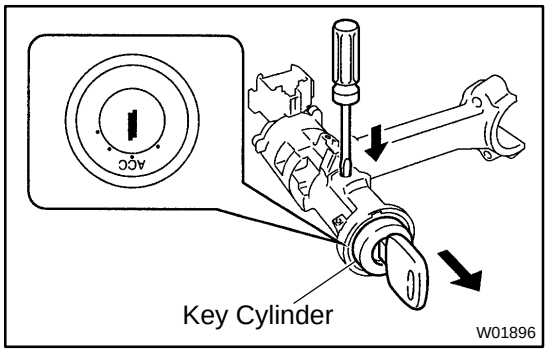

W01895

NOTICE:

When using a vise, do not overtighten it.

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.



W01896

2. IF NECESSARY, REPLACE KEY CYLINDER

(a) Place the ignition key at the ACC position.

(b) Using a screwdriver, push down the stop pin of the key cylinder, and pull out the key cylinder.

(c) Install a new key cylinder.

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH (See page BE-12)

4. IF NECESSARY, REPLACE IGNITION SWITCH

(a) Remove the 2 screws and ignition switch.

(b) Install a new ignition switch with the 2 screws.

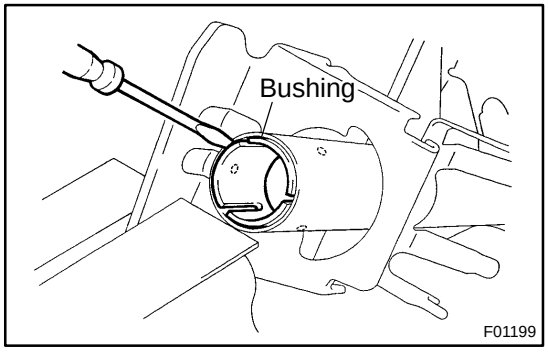
5. INSPECT KEY UNLOCK WARNING SWITCH (See page BE-12)

6. INSPECT KEY INTERLOCK SOLENOID (See page AT-16)

7. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH WITH KEY INTERLOCK SOLENOID

(a) Remove the 4 screws and key unlock warning switch with key interlock solenoid.

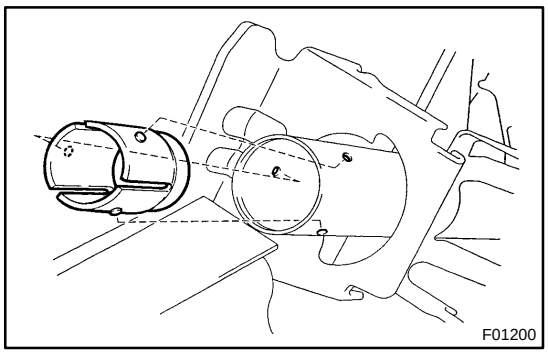
(b) Install a new key unlock warning switch and key interlock solenoid with the 4 screws.



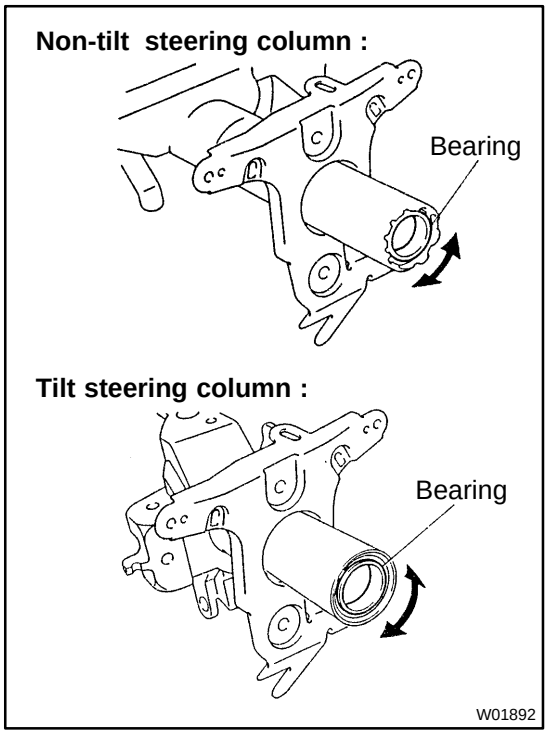
F01199

8. IF NECESSARY, REPLACE BUSHING

(a) Using a screwdriver, loosen the 3 projections of the bushing, and remove the bushing from the column tube.



(b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.
(c) Align the projections on the bushing with the holes in the column tube, then install the bushing until the projections are firmly engaged in the holes.

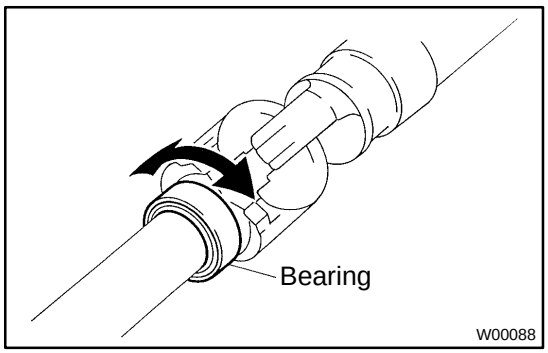


9. INSPECT BEARING

(a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the column tube/column upper tube.

(b) Coat the bearing with molybdenum disulfide lithium base grease.



10. Tilt steering column: INSPECT BEARING

(a) Check the bearing rotation condition of the main shaft assembly and check for abnormal noise.

If necessary, replace bearing.

(b) Coat the bearing with molybdenum disulfide lithium base grease.

11. INSPECT TRANSPONDER KEY COIL
(See page BE-172)

12. IF NECESSARY, REPLACE TRANSPONDER KEY COIL

13. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

(a) Remove the screw and transponder key amplifier.
(b) Install a new transponder key amplifier with the screw.

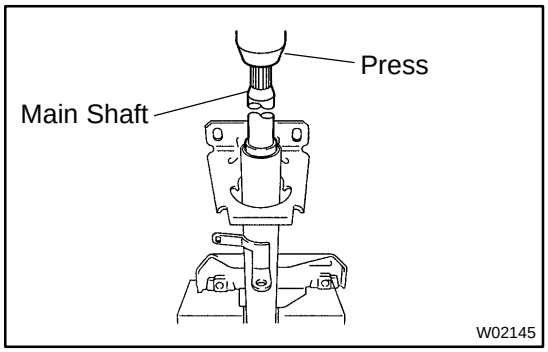
SR023-03

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE
(See page SR-11)



2. INSTALL MAIN SHAFT ASSEMBLY

(a) Using a snap ring expander, install a new snap ring to the shaft assembly.

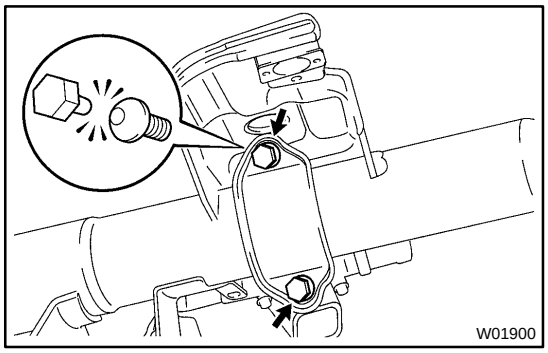
(b) Install the main shaft assembly to the column tube.

If the shaft can not be installed by hand, use a press.

NOTICE:

Do not apply too much pressure.

(c) Using a snap ring expander, install a new snap ring to the shaft assembly.



3. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

(a) Install the column upper bracket and column upper clamp with 2 new tapered-head bolts.

(b) Tighten the 2 tapered-head bolts until the bolt heads break off.

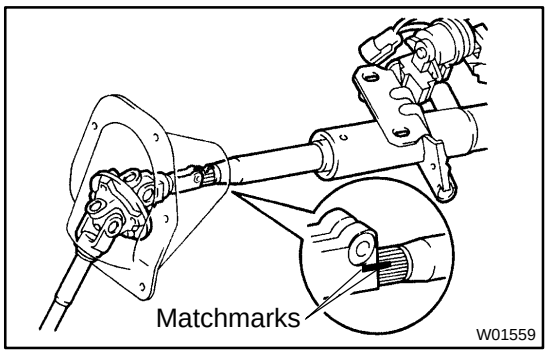
4. INSTALL KEY CYLINDER LAMP ASSEMBLY AND TRANSPONDER KEY COIL

(a) Install the key cylinder lamp assembly to the transponder key coil.

(b) Install the transponder key coil and key cylinder lamp assembly with the screw.

SR024-03

INSTALLATION



1. CONNECT UNIVERSAL JOINT NO. 2

(a) Insert the column hole cover and column hole cover No. 2.

(b) Align the matchmarks on the column assembly and universal joint No. 2.

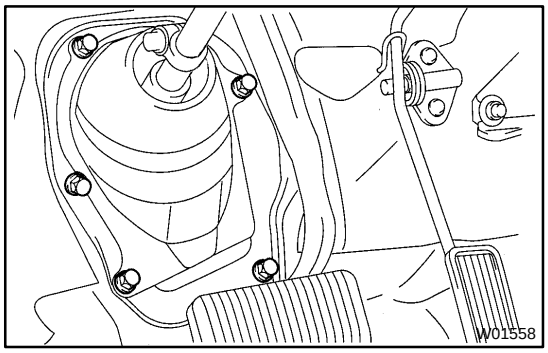
(c) Install the bolt.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

2. INSTALL STEERING COLUMN ASSEMBLY WITH UNIVERSAL JOINT NO. 2

(a) Install the steering column assembly with universal joint No. 2.

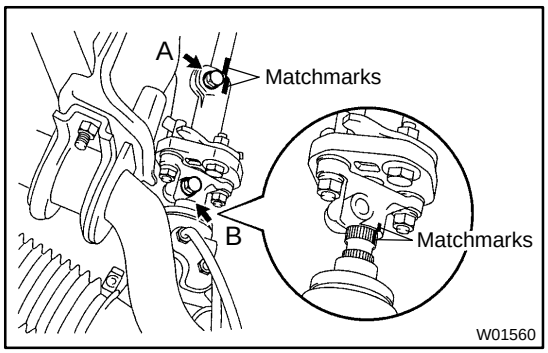
(b) Install the 4 steering column set nuts.
Torque: 26 N·m (260 kgf·cm, 19 ft·lbf)

(c) Connect the connectors.



3. INSTALL COLUMN HOLE COVER AND COLUMN HOLE COVER NO. 2

Install the column hole cover and column hole cover No. 2 to body with the 5 bolts.
Torque: 8.0 N·m (80 kgf·cm, 69 ft·lbf)



4. INSTALL INTERMEDIATE SHAFT NO. 2

(a) Align the matchmarks on the universal joint No. 2 and intermediate shaft No. 2.

(b) Align the matchmarks on the control valve shaft and intermediate shaft No. 2.

(c) Install the bolt ”A” and ”B”.
Torque: 35 N·m (360 kgf·cm, 26 ft·lbf)

5. INSTALL BRAKE PEDAL RETURN SPRING

6. INSTALL SPIRAL CABLE (See page BE-14)

7. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

(a) Install the combination switch with spiral cable with the 3 screws.

(b) Connect the airbag connector.

(c) Connect the 3 connectors.

8. INSTALL NO. 2 HEATER TO REGISTER DUCT

Install the No. 2 heater to register duct with the screw.

9. INSTALL STARTER SWITCH BEZEL

10. INSTALL LOWER LH FINISH PANEL

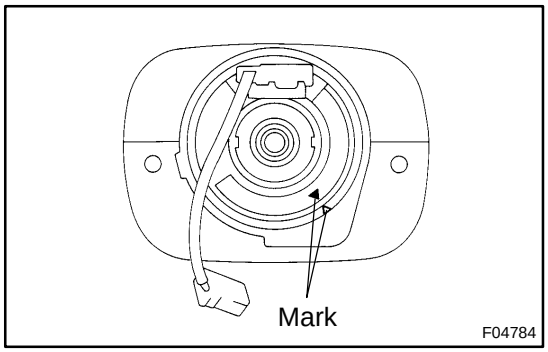
(a) Install the lower LH finish panel with the 4 bolts.

(b) Connect the fuel lid release lever with the 2 screws

(c) Connect the hood lock release lever with the 2 screws.

11. INSTALL UPPER AND LOWER COLUMN COVERS

Install the upper and lower column covers with the 3 screws.



12. CENTER SPIRAL CABLE

(a) Check that the front wheels are facing straight ahead.

(b) Turn the spiral cable counterclockwise by hand until it becomes harder to turn.

(c) Then rotate the spiral cable clockwise about 2.5 turns to align the mark.

HINT:

The spiral cable will rotate about 2.5 turns to either left or right of the center.

13. INSTALL STEERING WHEEL

(a) Align the matchmarks on the steering wheel and main shaft.

(b) Install the steering wheel set nut.

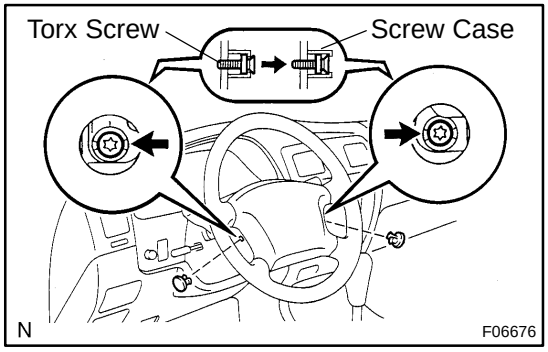
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

(c) Connect the connector.

14. INSTALL STEERING WHEEL PAD

NOTICE:

- **Never use airbag parts from another vehicle. When replacing parts, replace with new ones.**
- **Make sure the wheel pad is installed to the specified torque.**
- **If the wheel pad has been dropped, or there are cracks, dents or other defects in the case or connector, replace the wheel pad with a new one.**
- **When installing the wheel pad, take care that the wirings do not interfere with other parts and are not pinched between other parts.**



(a) Connect the airbag connector.

(b) Install the wheel pad after confirming that the circumference groove of the torx screw is caught on the screw case.

(c) Using a torx socket wrench, torque the 2 screws.

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

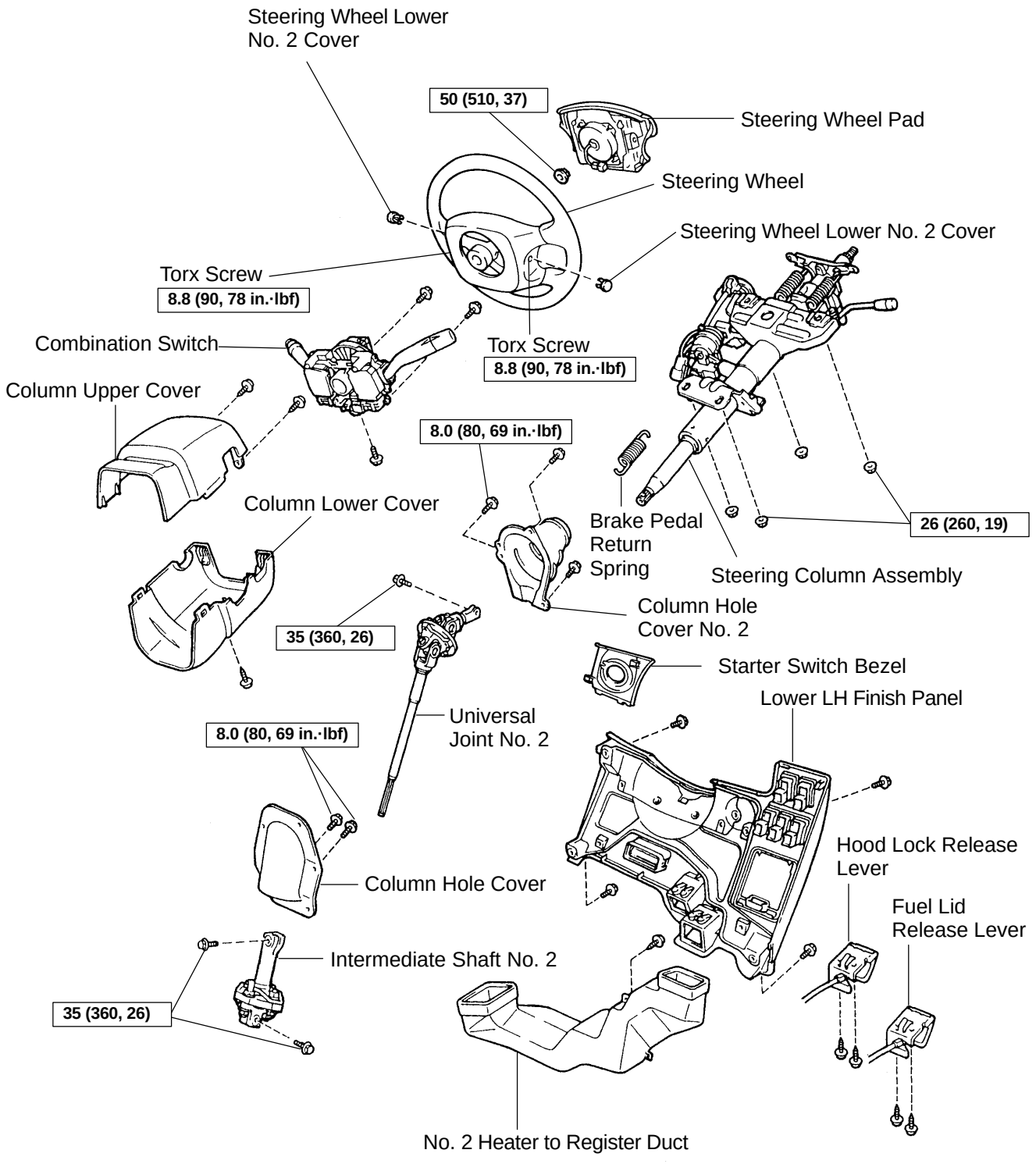
(d) Install the 2 steering wheel lower No. 2 covers.

15. CHECK STEERING WHEEL CENTER POINT

TILT STEERING COLUMN

COMPONENTS

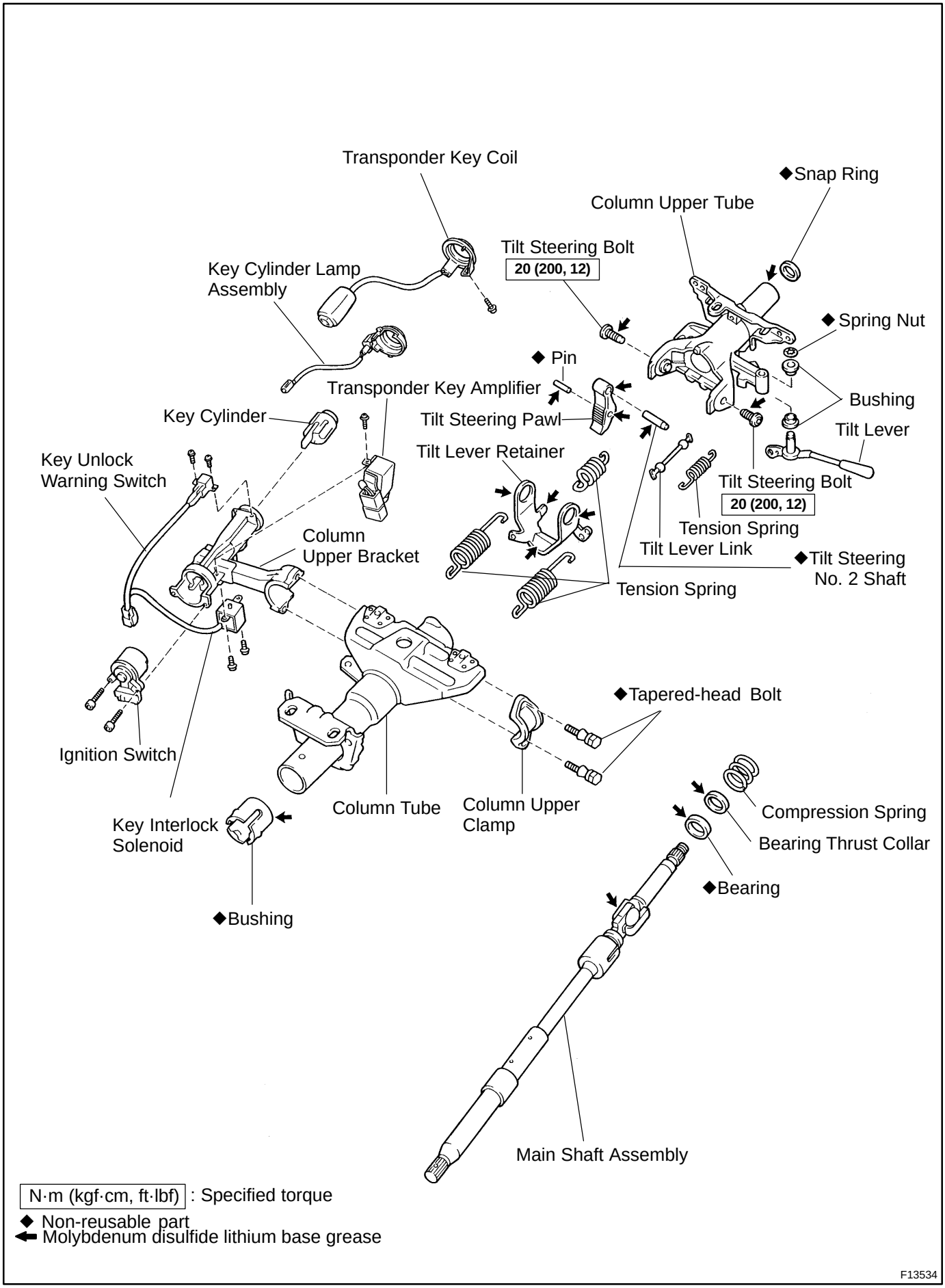
SR025-03



N·m (kgf·cm, ft·lbf) : Specified torque

N

F06679


Transponder Key Coil
◆Snap Ring
Column Upper Tube
Tilt Steering Bolt
20 (200, 12)
Key Cylinder Lamp Assembly
◆Spring Nut
◆ Pin
Transponder Key Amplifier
Bushing
Key Cylinder
Tilt Steering Pawl
Tilt Lever
Tilt Lever Retainer
Key Unlock Warning Switch
Tilt Steering Bolt
20 (200, 12)
Tension Spring
Column Upper Bracket
Tilt Lever Link
◆Tilt Steering No. 2 Shaft
Tension Spring
◆Tapered-head Bolt
Ignition Switch
Column Tube
Column Upper Clamp
Compression Spring
Key Interlock Solenoid
Bearing Thrust Collar
◆Bearing
◆Bushing
Main Shaft Assembly
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part
Molybdenum disulfide lithium base grease
F13534

SR026-01

REMOVAL

(See page SR-13)

SR027-04

DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY COIL WITH KEY CYLINDER LAMP ASSEMBLY

(a) Remove the screw and transponder key coil with key cylinder lamp assembly.

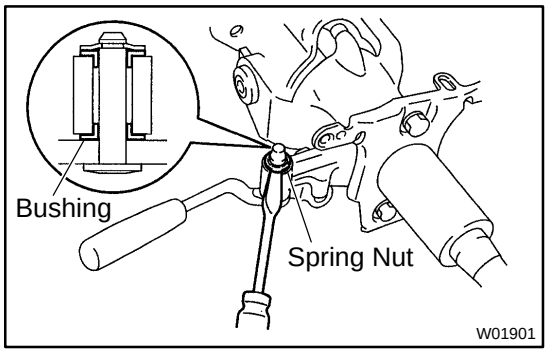
(b) Remove the key cylinder lamp assembly from the transponder key coil.

2. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP (See page SR-16)

3. REMOVE 3 TENSION SPRINGS

HINT:

Remove the tension springs with the tilt function at maximum tilt up.



4. REMOVE TILT LEVER

(a) Using a screwdriver, remove the spring nut.

(b) Remove the tilt lever.

(c) Remove the 2 bushings from the column upper tube.

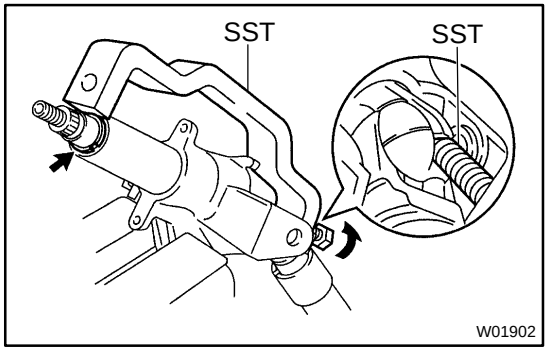
5. REMOVE TILT LEVER LINK

6. REMOVE COLUMN UPPER TUBE WITH MAIN SHAFT ASSEMBLY

(a) Using a hexagon wrench, remove the 2 tilt steering bolts.

(b) Remove the column upper tube with the main shaft assembly from the column tube.

7. REMOVE TILT LEVER RETAINER



8. REMOVE MAIN SHAFT ASSEMBLY

(a) Using SST, compress the compression spring.

SST 09950-4001 1 (09958-04011)

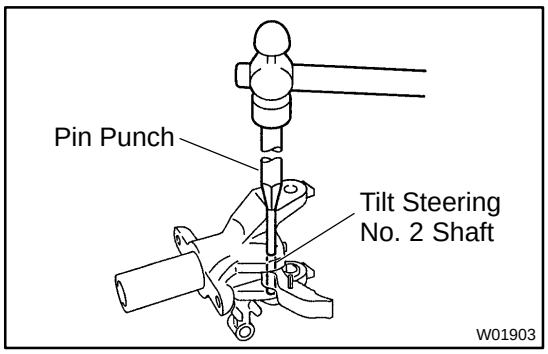
NOTICE:

Do not bend the universal joint of the shaft more than 20˚.

(b) Using a snap ring expander, remove the snap ring from the shaft.

(c) Remove the shaft assembly from the column upper tube.

(d) Remove the compression spring and bearing thrust collar from the main shaft.



9. REMOVE TILT STEERING PAWL

(a) Using a pin punch and hammer, tap out the tilt steering No. 2 shaft.

(b) Remove the steering pawl from the column upper tube.

(c) Remove the pin from the steering pawl.

SR028-01

INSPECTION

(See page SR-17)

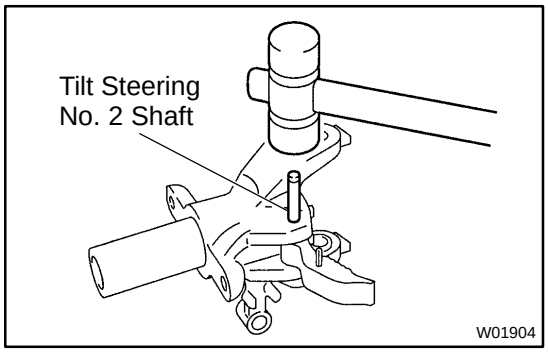
SR029-04

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR-22)



2. INSTALL TILT STEERING PAWL

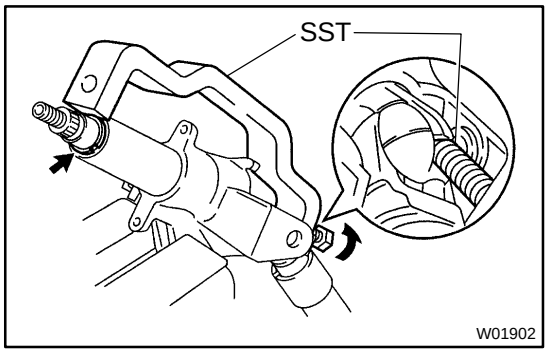
(a) Install a new pin to the steering pawl.

(b) Install the steering pawl to the column upper tube.

(c) Using a plastic hammer, tap in a new tilt steering No. 2 shaft.

NOTICE:

Tap the shaft completely into the steering column upper tube.



3. INSTALL MAIN SHAFT ASSEMBLY

(a) Install the bearing thrust collar and compression spring to the main shaft.

(b) Install the main shaft assembly to the column upper tube.

(c) Using SST, compress the compression spring.
SST 09950-4001 1 (09958-04011)

NOTICE:

Do not bend the universal joint of the shaft more than 20˚.

(d) Using a snap ring expander, install a new snap ring to the main shaft.

4. INSTALL TILT LEVER RETAINER

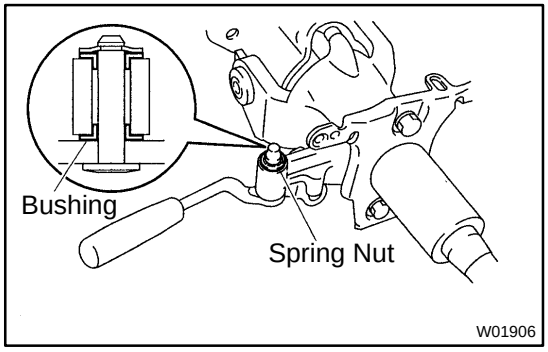
5. INSTALL COLUMN UPPER TUBE WITH MAIN SHAFT ASSEMBLY

(a) Install the column upper tube with main shaft to the column tube.

(b) Using a hexagon wrench, torque the 2 tilt steering bolts.
Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

(c) Check that the upper tube turns smoothly.

6. INSTALL TILT LEVER LINK



7. INSTALL TILT LEVER

(a) Install the 2 bushings and tilt lever to the column upper tube, as shown in the illustration.

(b) Install a new spring nut to the tilt lever.

8. INSTALL 3 TENSION SPRINGS

HINT:

Install the tension springs with the tilt function at maximum tilt up.

9. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP (See page SR-19)

10. INSTALL KEY CYLINDER LAMP ASSEMBLY AND TRANSPONDER KEY COIL

(a) Install the key cylinder lamp assembly to the transponder key coil.

(b) Install the transponder key coil and key cylinder lamp assembly with the screw.

11. CHECK TILT STEERING OPERATION

SR02A-01

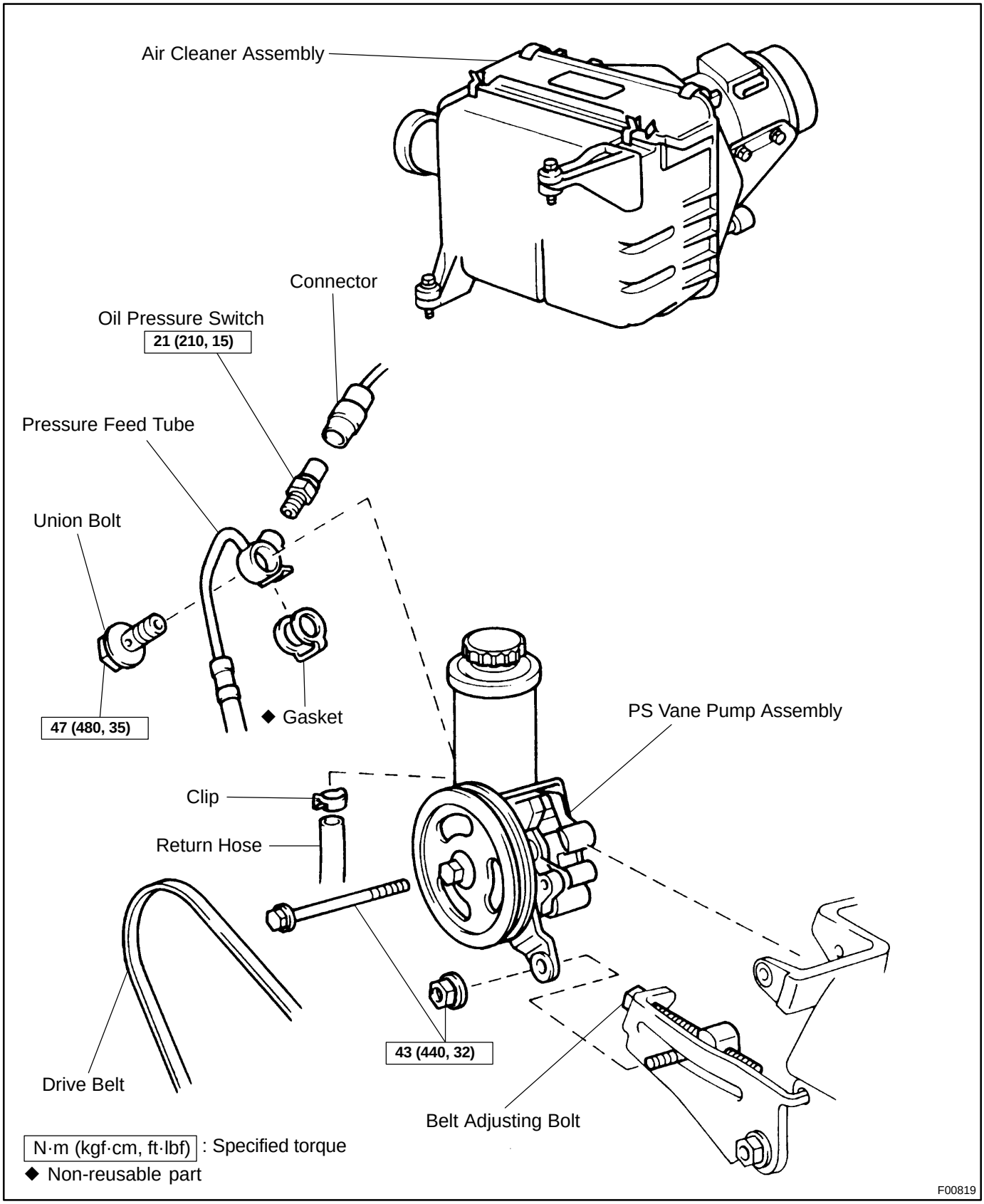
INSTALLATION

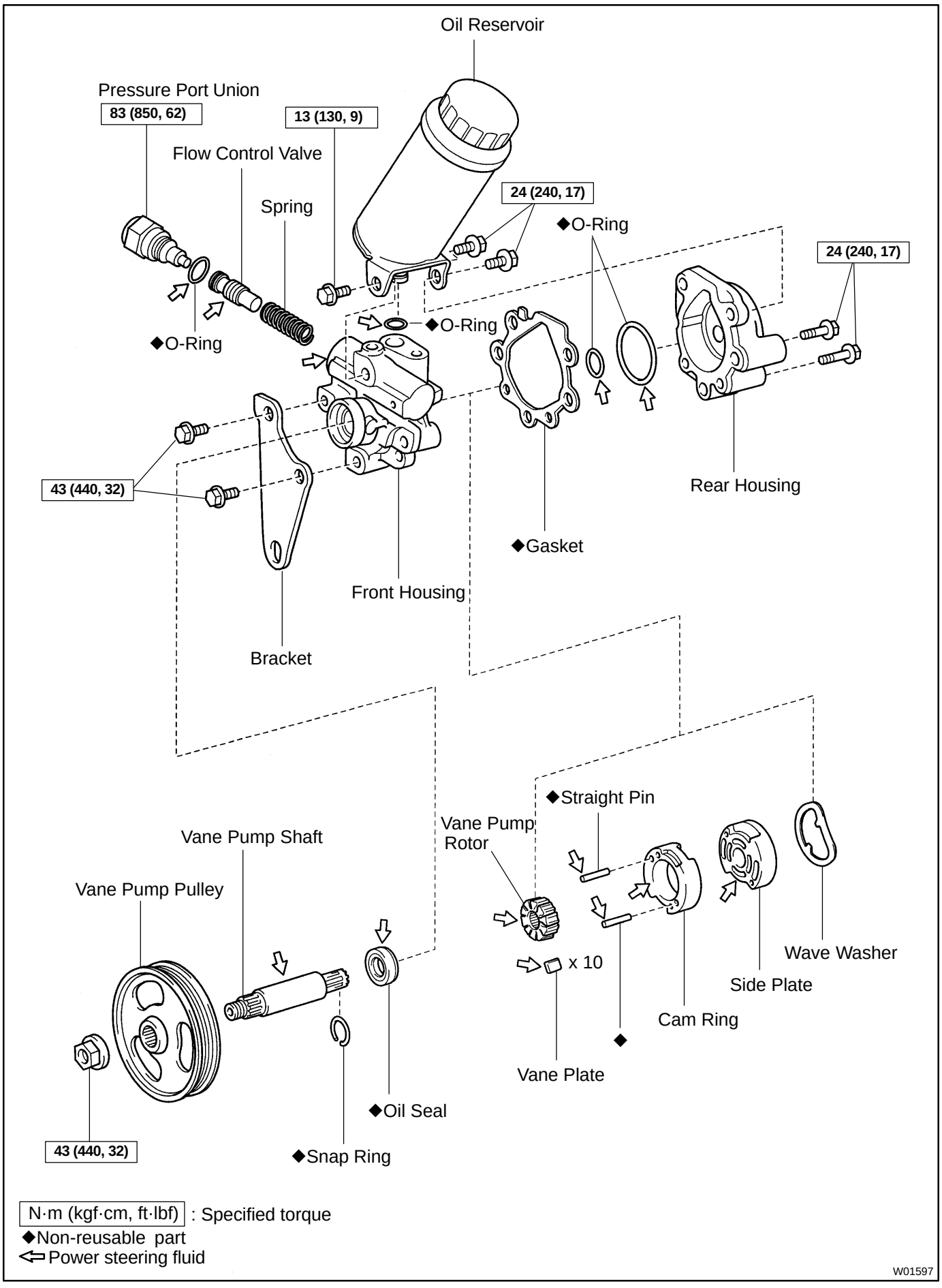
(See page SR-20)

POWER STEERING VANE PUMP

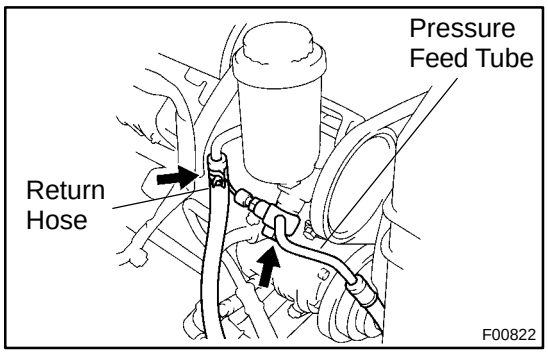
COMPONENTS

SR02H-04




Oil Reservoir
Pressure Port Union
83 (850, 62)
13 (130, 9)
Flow Control Valve
Spring
24 (240, 17)
◆O-Ring
24 (240, 17)
◆O-Ring
◆O-Ring
43 (440, 32)
Rear Housing
◆Gasket
Front Housing
Bracket
◆Straight Pin
Vane Pump Rotor
Vane Pump Shaft
Vane Pump Pulley
x 10
Wave Washer
Side Plate
Cam Ring
◆
Vane Plate
◆Oil Seal
43 (440, 32)
◆Snap Ring
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non-reusable part
⇦ Power steering fluid
W01597

SR02I-04



REMOVAL

1. REMOVE AIR CLEANER ASSEMBLY

Remove the 3 bolts and air cleaner assembly.

2. DISCONNECT RETURN HOSE

Remove the clip and disconnect the return hose.

NOTICE:

Take care not to spill fluid on the drive belt.

3. REMOVE OIL PRESSURE SWITCH

(a) Disconnect the connector.

(b) Remove the oil pressure switch from the pressure feed tube.

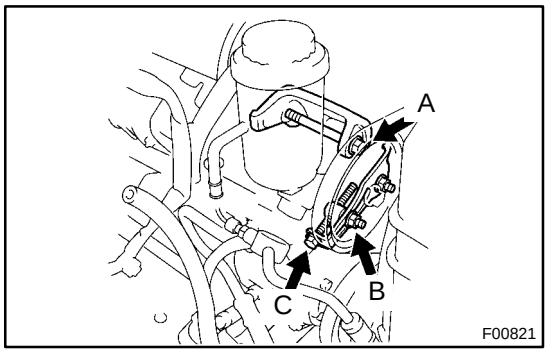
NOTICE:

Be careful not to drop the switch.

If the oil pressure switch is dropped or strongly damaged, replace it with a new one.

4. DISCONNECT PRESSURE FEED TUBE

Remove the union bolt and gasket, and disconnect the pressure feed tube from the PS vane pump assembly.



5. REMOVE DRIVE BELT

(a) Loosen the bolt ”A” and nut ”B”.

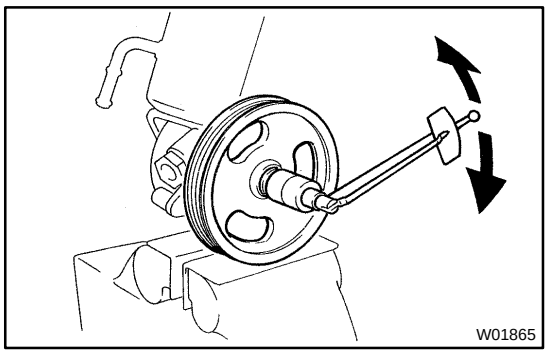
(b) Loosen the bolt ”C”.

6. REMOVE PS VANE PUMP ASSEMBLY

Remove the bolt ”A”, nut ”B” and PS vane pump assembly.

SR02J-03

DISASSEMBLY



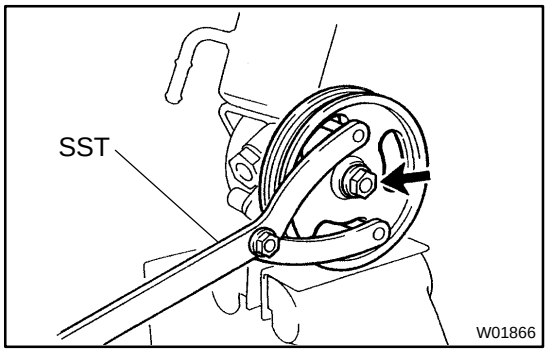
NOTICE:

When using a vise, do not overtighten it.

1. MEASURE PS VANE PUMP ROTATING TORQUE

(a) Check that the pump rotates smoothly without abnormal noise.

(b) Using a torque wrench, check the pump rotating torque.
Rotating torque:
0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less



2. REMOVE VANE PUMP PULLEY

(a) Using SST to stop the pulley rotating, loosen the nut.
SST 09960-10010 (09962-01000, 09963-01000)

(b) Remove the nut and vane pump pulley from the vane pump shaft.

3. REMOVE OIL RESERVOIR

(a) Remove the 3 bolts and oil reservoir.

(b) Remove the O-ring from the oil reservoir.

4. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

(a) Remove the pressure port union, flow control valve and spring.

(b) Remove the O-ring from the pressure port union.

5. REMOVE BRACKET

Remove the 2 bolts and bracket.

6. REMOVE REAR HOUSING

(a) Remove the 2 bolts and rear housing.

(b) Remove the 2 O-rings from the rear housing.

7. REMOVE WAVE WASHER

8. REMOVE SIDE PLATE

9. REMOVE GASKET

10. REMOVE CAM RING, VANE PLATES AND VANE PUMP ROTOR

(a) Using a screwdriver, remove the snap ring from the vane pump shaft.

(b) Remove the cam ring, 10 vane plates and vane pump rotor.

NOTICE:

Take care not to drop the vane plate.

11. REMOVE VANE PUMP SHAFT

12. REMOVE STRAIGHT PINS

Remove the 2 straight pins from the front housing.

SR0S7-03

INSPECTION

NOTICE:

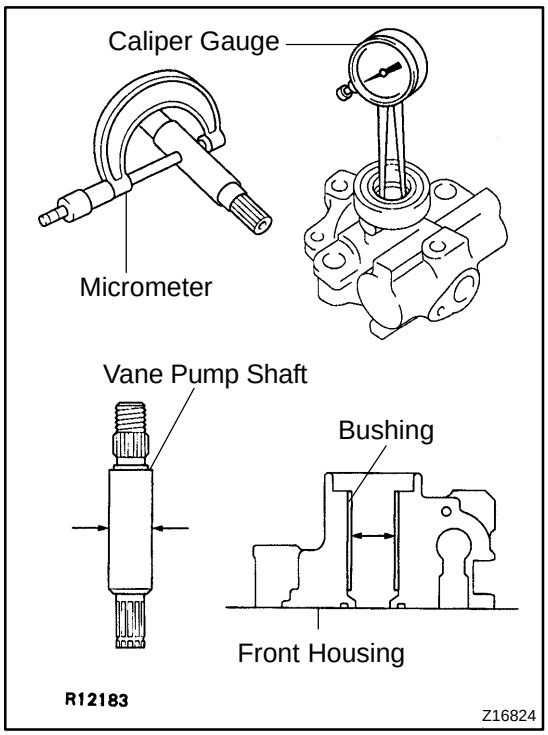
When using a vise, do not overtighten it.

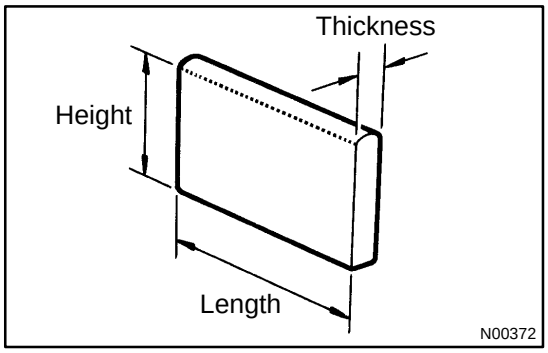
1. CHECK OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

Using a micrometer and caliper gauge, measure the oil clearance.

Standard clearance:
0.03 - 0.05 mm (0.0012 - 0.0020 in.)
Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the vane pump shaft and front housing.

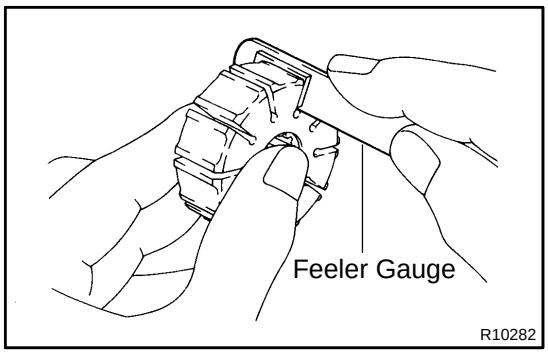




2. INSPECT VANE PUMP ROTOR AND VANE PLATES

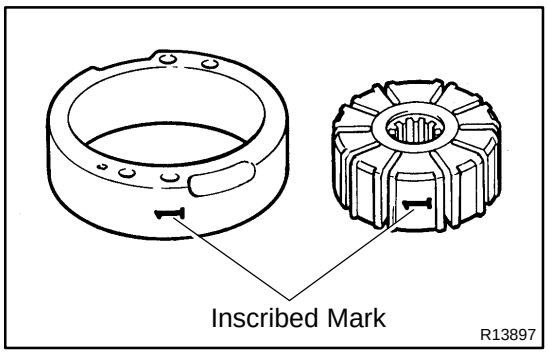
(a) Using a micrometer, measure the height, thickness and length of the vane plates.

Minimum height: 8.6 mm (0.339 in.)
Minimum thickness: 1.397 mm (0.0550 in.)
Minimum length: 14.991 mm (0.5902 in.)



(b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.

Maximum clearance: 0.035 mm (0.0014 in.)



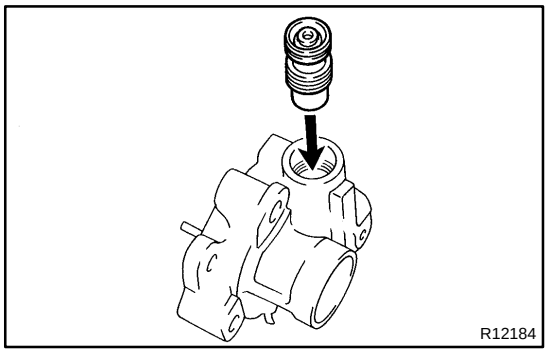
If it is more than the maximum, replace the vane plate and/or vane pump rotor with one having the same mark stamped on the cam ring.

Inscribed mark: 1, 2, 3, 4 or None

HINT:

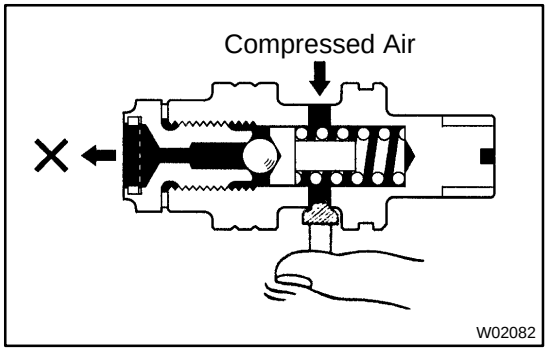
There are 5 vane plate lengths with the following vane pump rotor and cam ring marks:

Rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345-26010	14.999-15.001 (0.59051-0.59059)
1	44345-26020	14.997-14.999 (0.59043-0.59051)
2	44345-26030	14.995-14.997 (0.59035-0.59043)
3	44345-26040	14.993-14.995 (0.59027-0.59035)
4	44345-26050	14.991-14.993 (0.59020-0.59027)

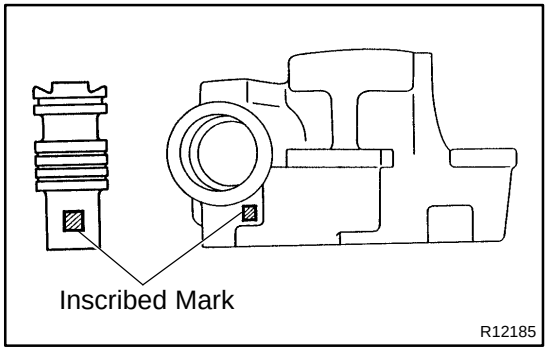


3. INSPECT FLOW CONTROL VALVE

(a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the flow control valve hole by its own weight.

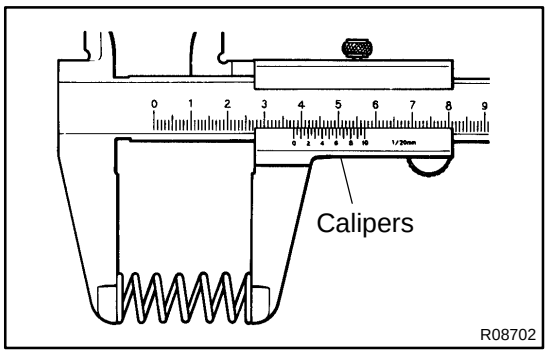


(b) Check the flow control valve for leakage. Close one of the holes and apply 392 - 490 kPa (4 - 5 kgf/cm^2, 57 - 71 psi) of compressed air into the opposite side hole, and confirm that air does not come out from the end hole.



If necessary, replace the flow control valve with one having the same letter as inscribed on the front housing.

Inscribed mark: A, B, C, D, E or F



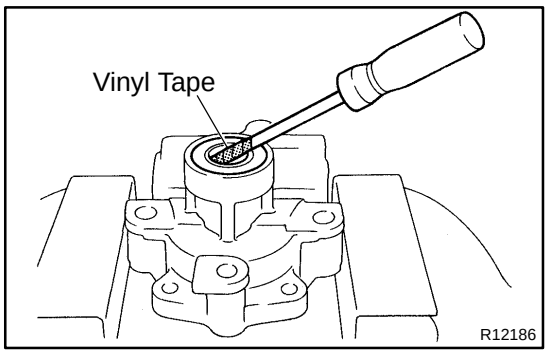
4. INSPECT SPRING

Using vernier calipers, measure the free length of the spring.

Minimum free length: 33.2 mm (1.307 in.)

If it is not within specification, replace the spring.

SR0S8-03



REPLACEMENT

NOTICE:

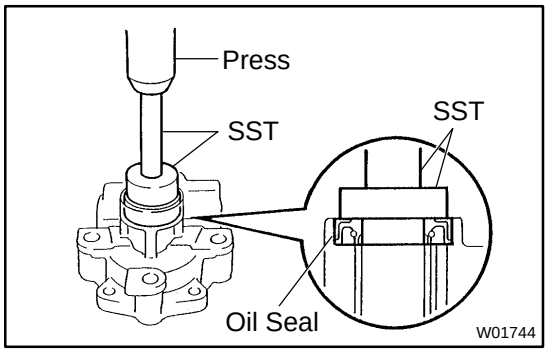
When using a vise, do not overtighten it.

IF NECESSARY, REPLACE OIL SEAL

(a) Using a screwdriver with vinyl tape wound around its tip, remove the oil seal.

NOTICE:

Be careful not to damage the bushing of the front housing.



(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00330),
09950-70010 (09951-07100)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

SR02L-03

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR-31)

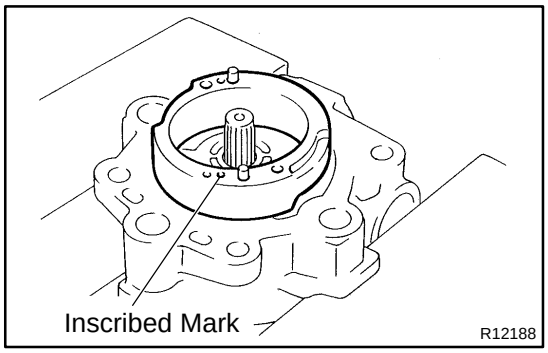
2. INSTALL STRAIGHT PINS

Using a plastic hammer, tap in 2 new straight pins to the front housing.

NOTICE:

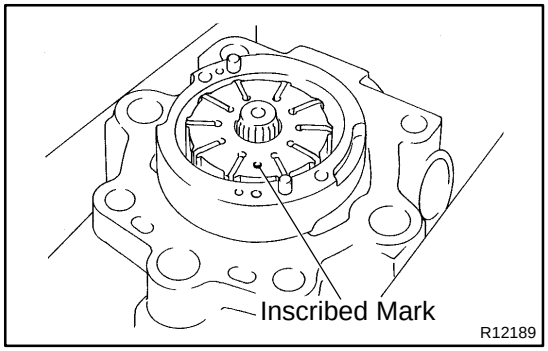
Be careful not to damage the straight pins.

3. INSTALL VANE PUMP SHAFT



4. INSTALL CAM RING

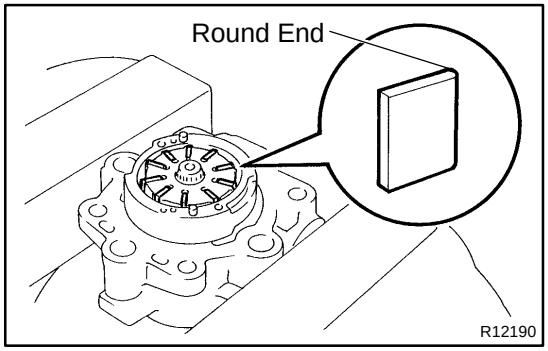
Align the holes of the cam ring and 2 straight pins, and install the cam ring with the inscribed mark facing outward.



5. INSTALL VANE PUMP ROTOR

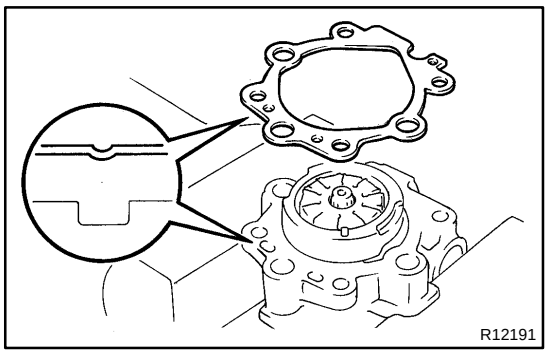
(a) Install the vane pump rotor with the inscribed mark facing outward.

(b) Install a new snap ring to the vane pump shaft.



6. INSTALL VANE PLATES

Install the 10 vane plates with the round end facing outward.



7. INSTALL GASKET

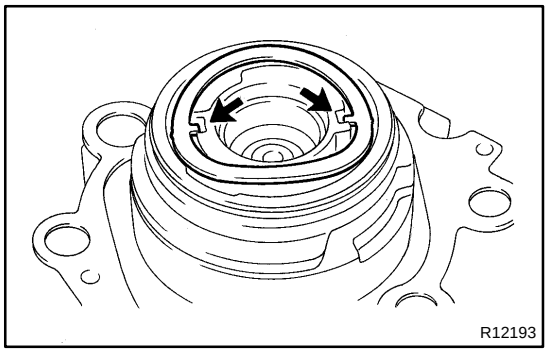
Install a new gasket on the front housing.

NOTICE:

Make sure that the gasket is installed facing in the correct direction.

8. INSTALL SIDE PLATE

Align the holes of the side plate and 2 straight pins, and install the side plate.



9. INSTALL WAVE WASHER

Install the wave washer so that its protrusions fit into the slots in the side plate.

10. INSTALL REAR HOUSING

(a) Coat 2 new O-rings with power steering fluid and install them to the housing.

(b) Install the rear housing with the 2 bolts.

Torque: 24 N·m (240 kgf·cm, 17 ft·lbf)

11. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

(a) Install the spring.

(b) Install the flow control valve facing in the correct direction (See page SR-31).

(c) Coat a new O-ring with power steering fluid and install it to the pressure port union.

(d) Install the pressure port union.

Torque: 83 N·m (850 kgf·cm, 62 ft·lbf)

12. INSTALL BRACKET

Install the bracket with the 2 bolts.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

13. INSTALL OIL RESERVOIR

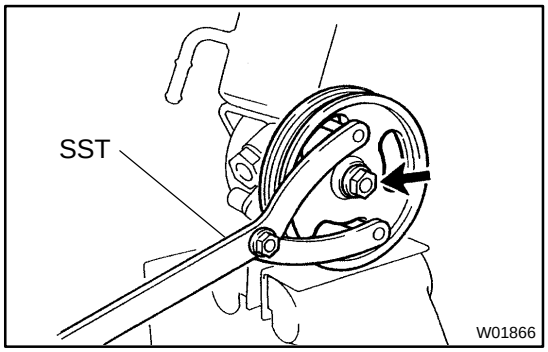
(a) Coat a new O-ring with power steering fluid and install it to the oil reservoir.

(b) Install the oil reservoir with the 3 bolts.

Torque:

Front side bolt: 13 N·m (130 kgf·cm, 9 ft·lbf)

Rear side bolts: 24 N·m (240 kgf·cm, 17 ft·lbf)



14. INSTALL VANE PUMP PULLEY

(a) Install the vane pump pulley and nut to the vane pump shaft.

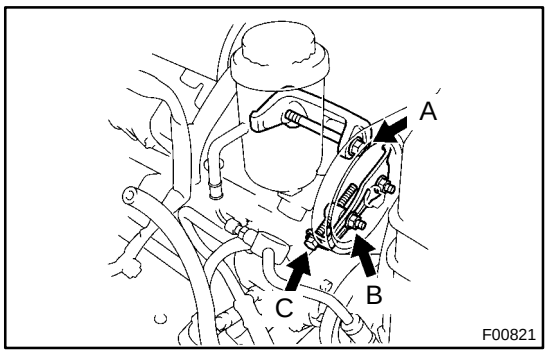
(b) Using SST to stop the pulley rotating, torque the nut.

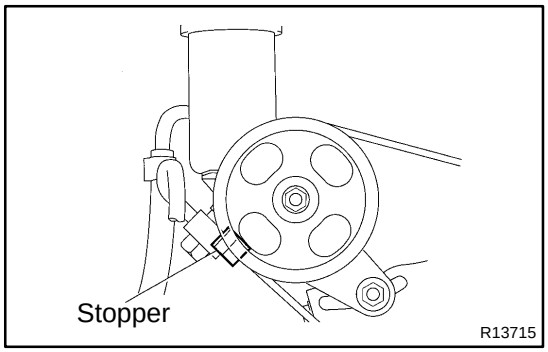
SST 09960-10010 (09962-01000, 09963-01000)

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

15. MEASURE PS VANE PUMP ROTATING TORQUE (See page SR-34)

SR02M-05





INSTALLATION

1. INSTALL PS VANE PUMP ASSEMBLY

Install the PS vane pump assembly, temporarily tighten the bolt "A" and nut "B".

2. INSTALL DRIVE BELT

(a) Tightening the bolt "C", adjust drive belt tension (See page SR-3).

(b) Torque the bolt "A" and nut "B".

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

3. CONNECT PRESSURE FEED TUBE

(a) Install a new gasket and the union bolt to the pressure feed tube.

(b) Connect the pressure feed tube.

HINT:

Make sure the stopper of the pressure feed tube touches the PS vane pump body as shown in the illustration, then install the union bolt.

Torque: 47 N·m (480 kgf·cm, 35 ft·lbf)

4. INSTALL OIL PRESSURE SWITCH

(a) Install the oil pressure switch to the pressure feed tube.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(b) Connect the connector.

NOTICE:

Be careful to prevent oil from being attached to the connector.

5. CONNECT RETURN HOSE

(a) Connect the return hose.

(b) Install the clip.

6. INSTALL AIR CLEANER ASSEMBLY

Install the air cleaner assembly with the 3 bolts.

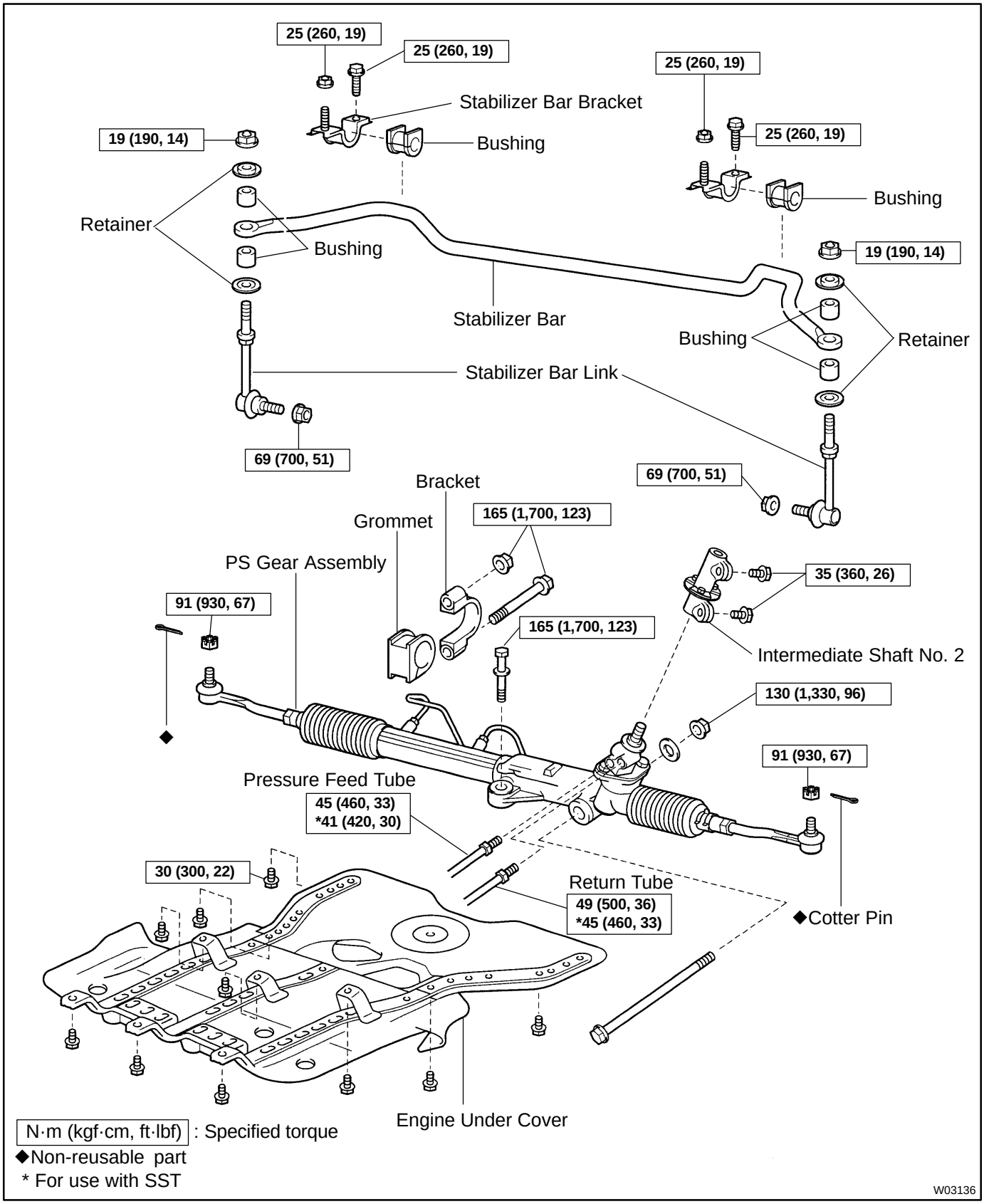
7. BLEED POWER STEERING SYSTEM

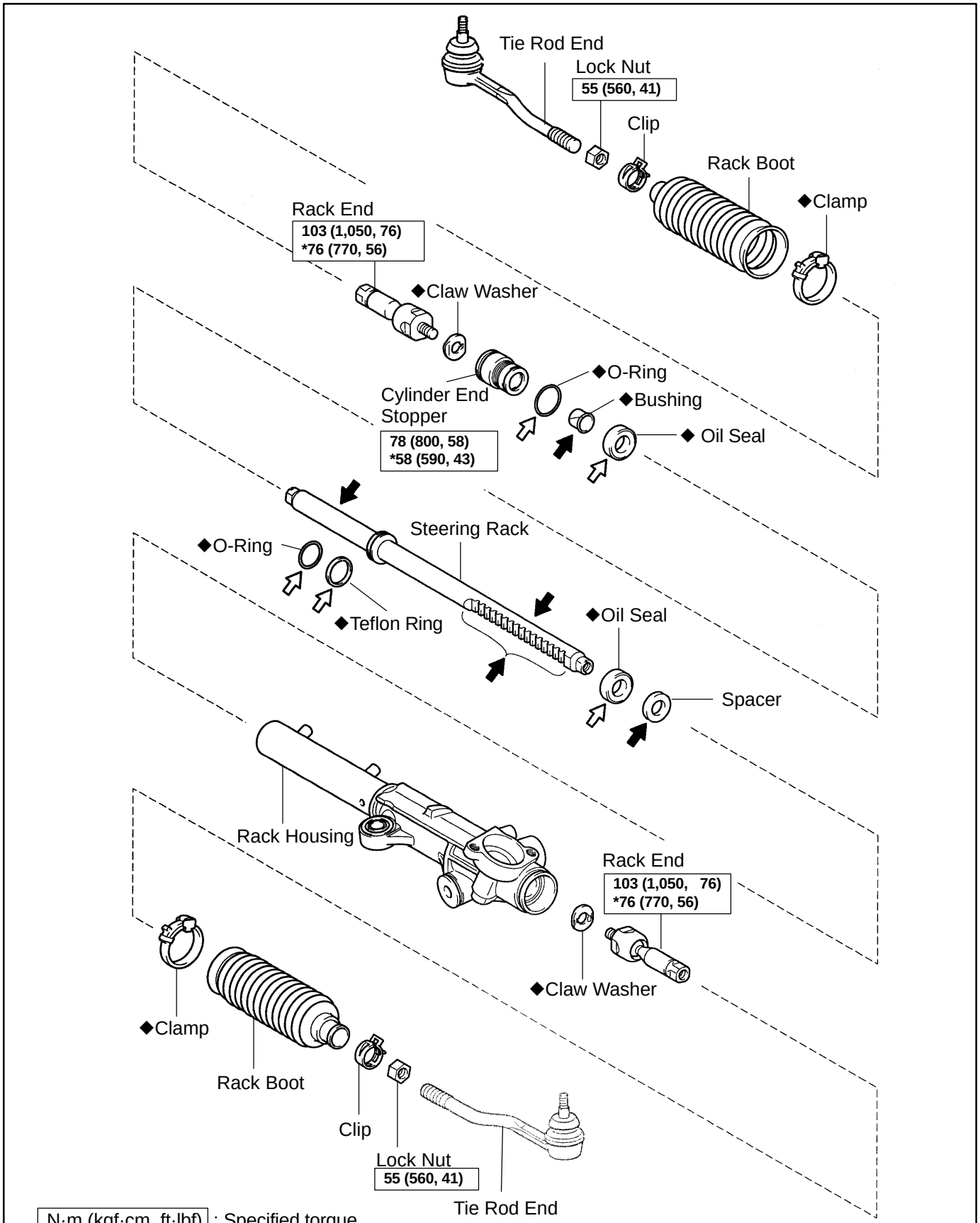
(See page SR-4)

POWER STEERING GEAR

COMPONENTS

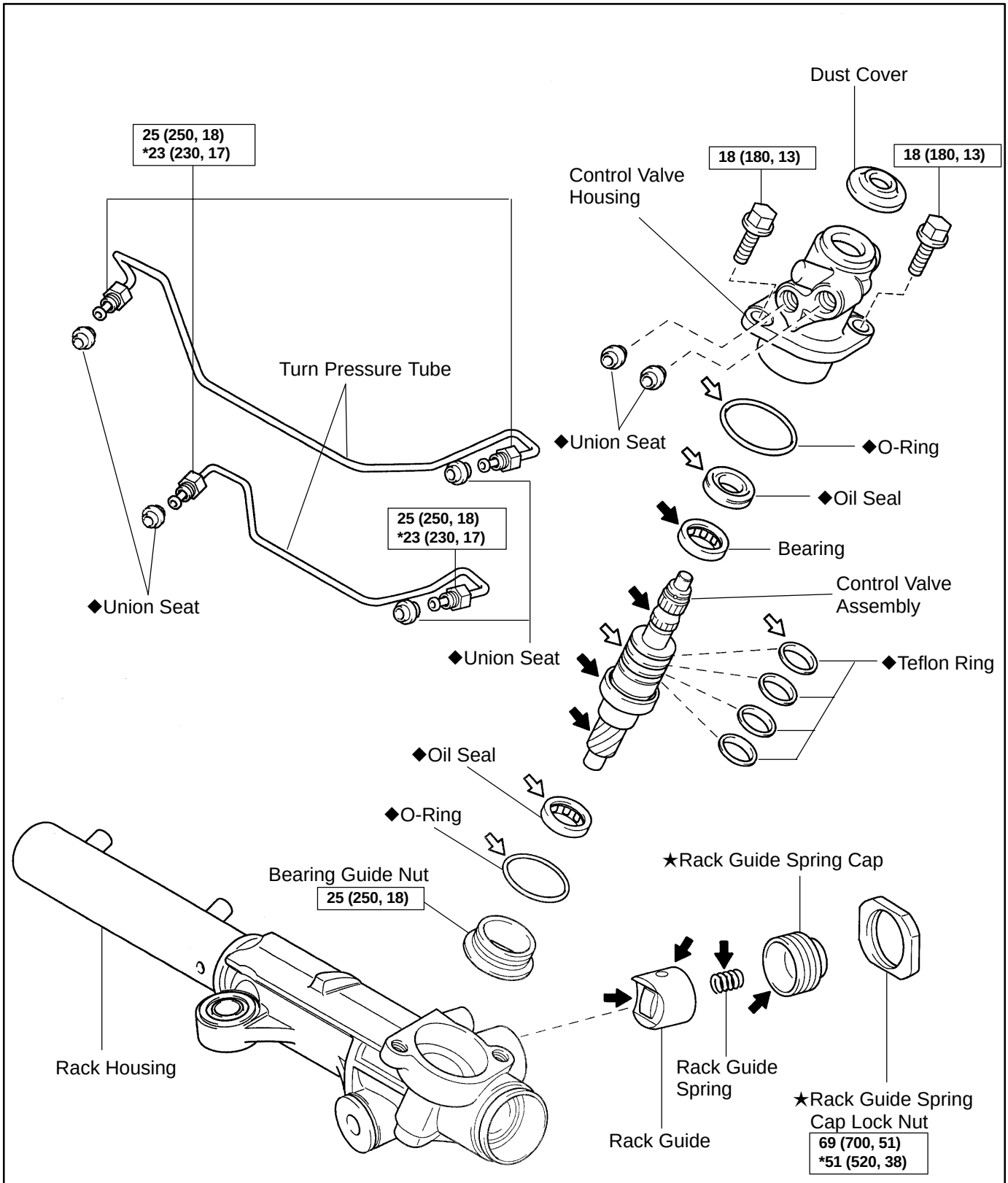
SR02N-05





N·m (kgf·cm, ft·lbf) : Specified torque
◆Non-reusable part
⬅ Molybdenum disulfide lithium base grease
⇦ Power steering fluid
*For use with SST

W02081


Dust Cover
25 (250, 18)
*23 (230, 17)
18 (180, 13)
18 (180, 13)
Control Valve Housing
Turn Pressure Tube
◆Union Seat
◆O-Ring
◆Oil Seal
Bearing
25 (250, 18)
*23 (230, 17)
◆Union Seat
Control Valve Assembly
◆Union Seat
◆Teflon Ring
◆Oil Seal
◆O-Ring
★Rack Guide Spring Cap
Bearing Guide Nut
25 (250, 18)
Rack Housing
Rack Guide Spring
★Rack Guide Spring Cap Lock Nut
69 (700, 51)
*51 (520, 38)
Rack Guide
N·m (kgf·cm, ft·lbf) : Specified torque
◆Non-reusable part
★Precoated part
Molybdenum disulfide lithium base grease
Power steering fluid
*For use with SST
W01599

SR02O-06

REMOVAL

NOTICE:

Remove the steering wheel assembly before the steering gear removal, because there is possibility of breaking of the spiral cable.

1. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

2. REMOVE STEERING WHEEL PAD
(See page SR-13)

3. REMOVE STEERING WHEEL
(See page SR-13)

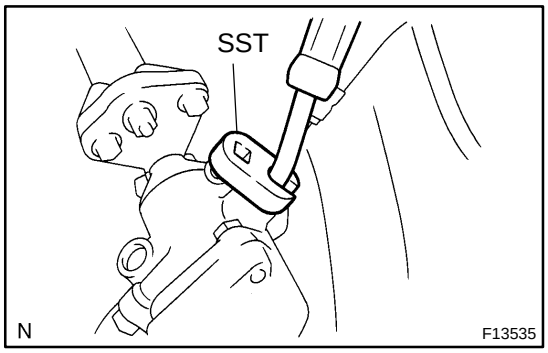
4. REMOVE ENGINE UNDER COVER

Remove the 10 bolts and engine under cover.

5. REMOVE STABILIZER BAR
(See page SA-76)

6. DISCONNECT RH AND LH TIE ROD ENDS
(See page SA-72)

7. DISCONNECT INTERMEDIATE SHAFT NO. 2
(See page SR-13)



8. DISCONNECT PRESSURE FEED AND RETURN TUBES

Using SST, disconnect the tube.

SST 09023-38400

9. REMOVE PS GEAR ASSEMBLY

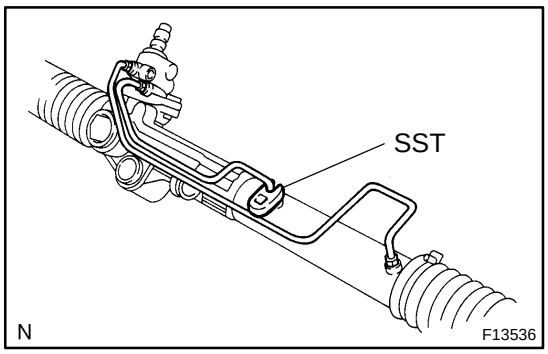
(a) Remove the bolt and nut from the bracket.

(b) Remove the 2 set bolts, nut, washer and PS gear assembly.

10. REMOVE BRACKET AND GROMMET

SR02P-03

DISASSEMBLY



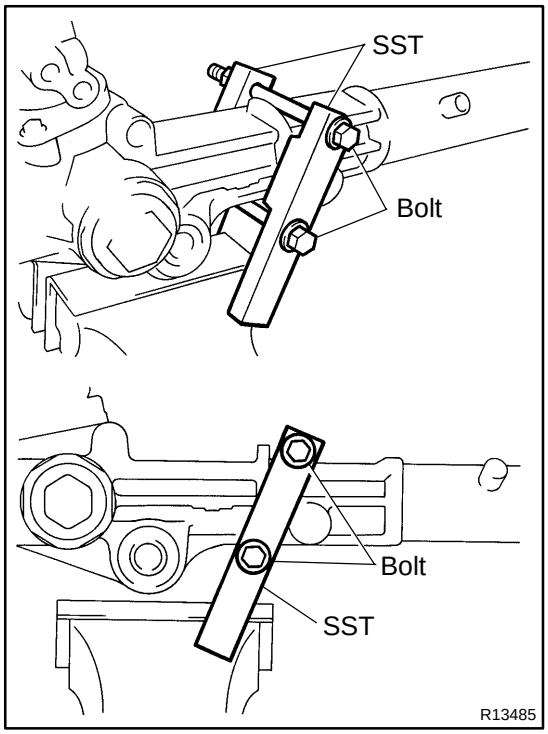
NOTICE:

When using a vise, do not overtighten it.

1. REMOVE 2 TURN PRESSURE TUBES

(a) Using SST, remove the 2 turn pressure tubes.
SST 09023-38200

(b) Remove the 4 union seats from the rack housing and control valve housing.



2. SECURE PS GEAR ASSEMBLY IN VISE

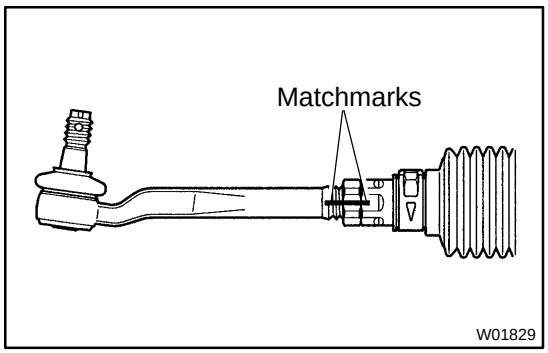
Using SST and 2 bolts, secure the gear assembly in a vise, as shown in the illustration.

SST 09612-00012

Reference:
Bolt: 90105-10346
Nut: 90170-10198

HINT:

Use 2 of the same type of SST.



3. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Place matchmarks on the tie rod end, lock nut and rack end.

(b) Loosen the lock nut, remove the tie rod end and lock nut.

(c) Employ the same manner described above to the other side.

4. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

(a) Remove the clamp, clip and rack boot.

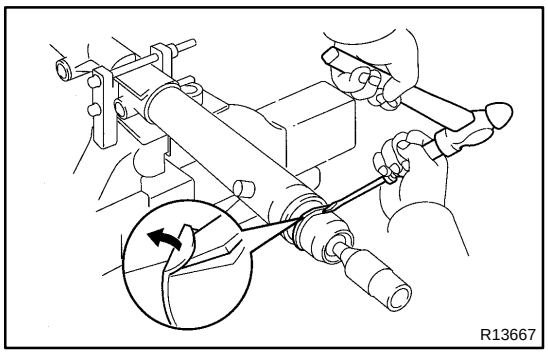
NOTICE:

Be careful not to damage the boot.

HINT:

Mark the RH and LH boots.

(b) Employ the same manner described above to the other side.

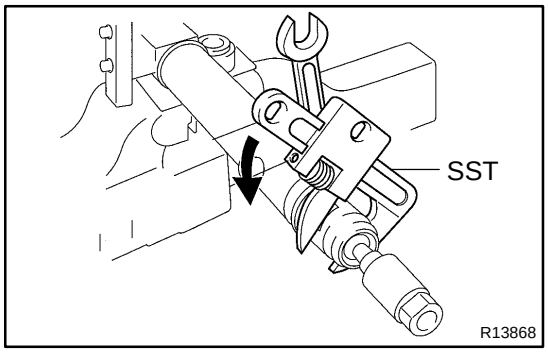


5. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

(a) Using a screwdriver and hammer, unstake the washer.

NOTICE:

Avoid any impact on the steering rack.



(b) Using a spanner to hold the steering rack steadily, and using SST, remove the rack end.

SST 09922-10010

HINT:

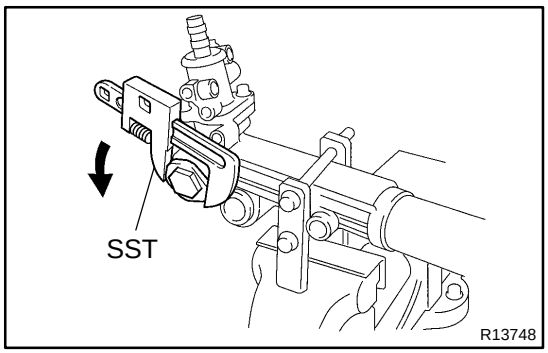
Mark the RH and LH rack ends.

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

(c) Remove the claw washer from the rack end.

(d) Employ the same manner described above to the other side.



6. REMOVE RACK GUIDE SPRING CAP LOCK NUT

Using SST, remove the lock nut.

SST 09922-10010

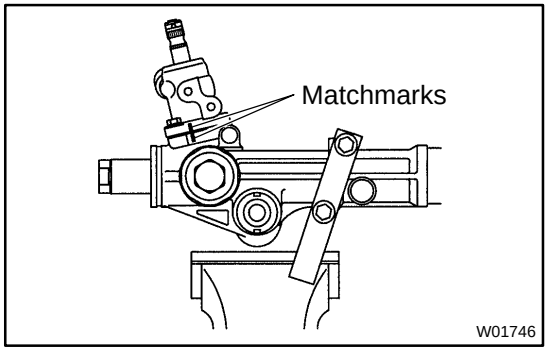
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

7. REMOVE RACK GUIDE SPRING CAP

8. REMOVE RACK GUIDE SPRING AND RACK GUIDE

9. REMOVE DUST COVER



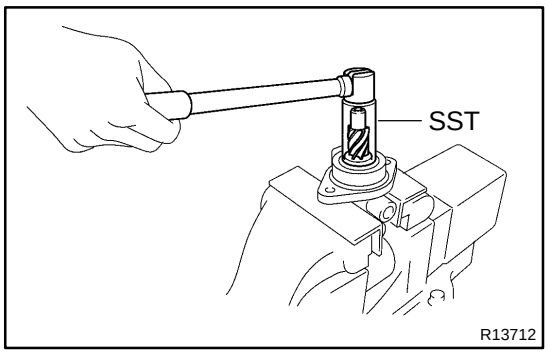
10. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Place matchmarks on the control valve housing and rack housing.

(b) Remove the 2 bolts.

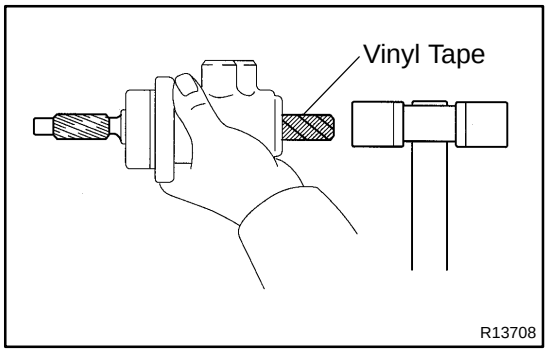
(c) Pull out the control valve assembly with the control valve housing.

(d) Remove the O-ring from the rack housing.



11. REMOVE CONTROL VALVE ASSEMBLY

(a) Using SST, loosen the bearing guide nut.
SST 09631-20060



(b) Wind vinyl tape to the control valve shaft.

(c) Using a plastic hammer, tap out the control valve assembly with the bearing guide nut from the control valve housing.

NOTICE:

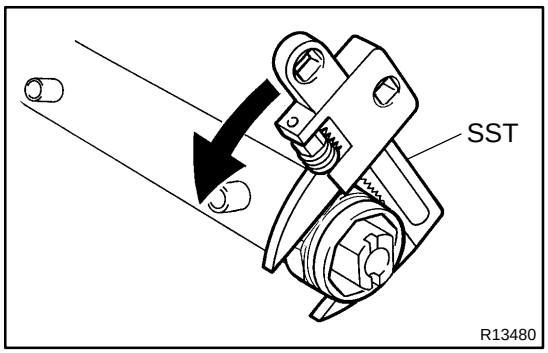
Be careful not to damage the oil seal lip.

(d) Remove the bearing guide nut from the control valve assembly.

NOTICE:

Be careful not to damage the oil seal lip.

(e) Remove the O-ring from the bearing guide nut.



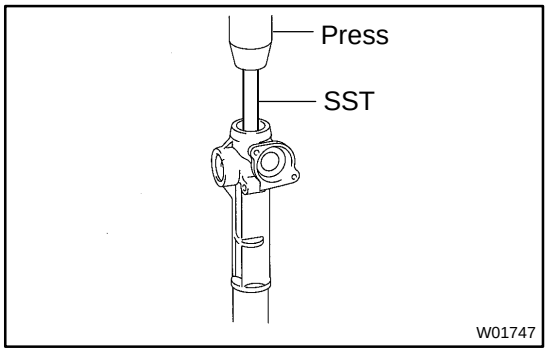
12. REMOVE CYLINDER END STOPPER

(a) Using SST, remove the cylinder end stopper.
SST 09922-10010

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

(b) Remove the O-ring from the cylinder end stopper.



13. REMOVE STEERING RACK AND OIL SEAL

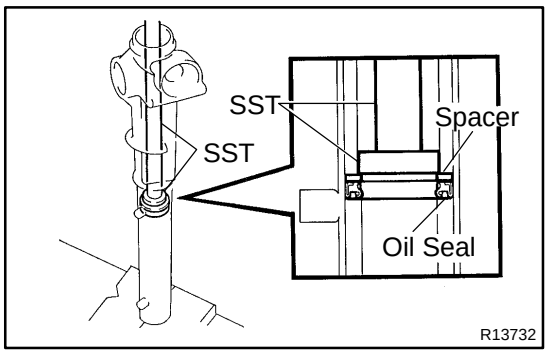
(a) Using SST, press out the steering rack and oil seal.

NOTICE:

Take care not to drop the rack.

SST 09950-70010 (09951-07360)

(b) Remove the oil seal from the steering rack.



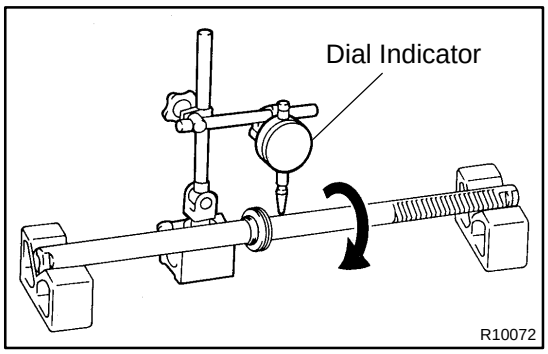
14. REMOVE OIL SEAL AND SPACER

Using SST, press out the oil seal and spacer.

SST 09950-60010 (09951-00360),
09950-70010 (09951-07360)

SR1ED-01

INSPECTION

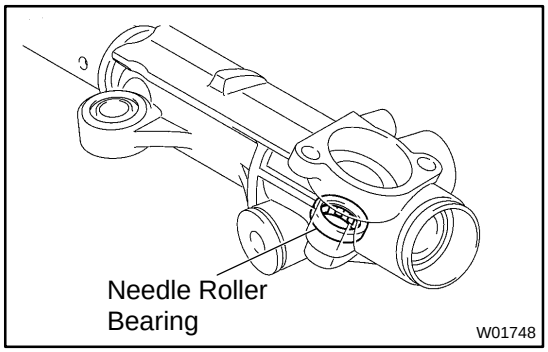


1. INSPECT STEERING RACK

(a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

Maximum runout: 0.3 mm (0.012 in.)

(b) Check the back surface for wear and damage.

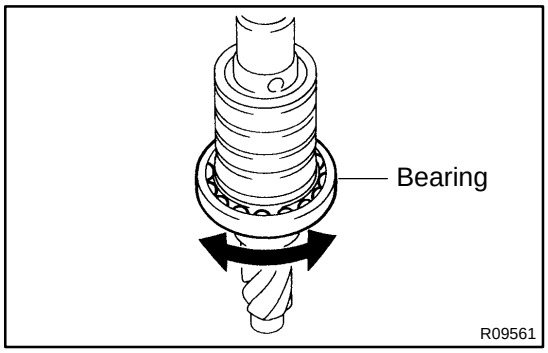


2. INSPECT BEARING

(a) Check the needle roller bearing of the rack housing for pitmarks or damage.

If faulty, replace the rack housing.

(b) Coat the inside of the bearing with molybdenum disulfide lithium base grease.



3. INSPECT BEARING

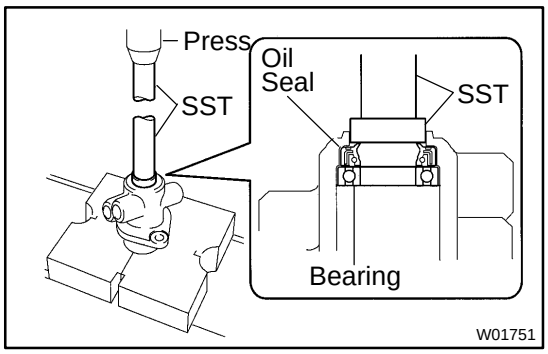
(a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the control valve assembly.

(b) Coat the bearing with molybdenum disulfide lithium base grease.

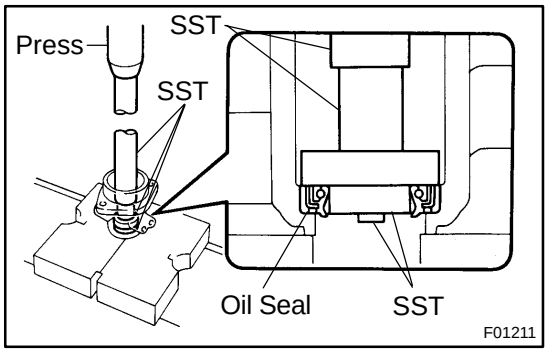
SR1EE-01

REPLACEMENT



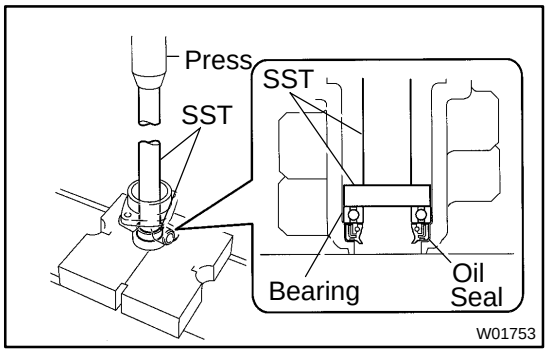
1. IF NECESSARY, REPLACE OIL SEAL AND BEARING

(a) Using SST, press out the oil seal and bearing from the control valve housing.
SST 09950-60010 (09951-00260), 09950-70010 (09951-07150)

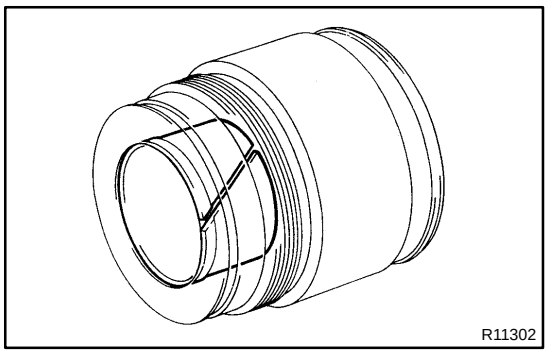


(b) Coat a new oil seal lip with power steering fluid.
(c) Using SST, press in the oil seal.
SST 09950-60010 (09951-00180, 09951-00330, 09952-06010), 09950-70010 (09951-07150)

NOTICE:
Make sure that the oil seal is installed facing in the correct direction.



(d) Coat a new bearing with molybdenum disulfide lithium base grease.
(e) Using SST, press in the bearing.
SST 09950-60010 (09951-00330), 09950-70010 (09951-07150)

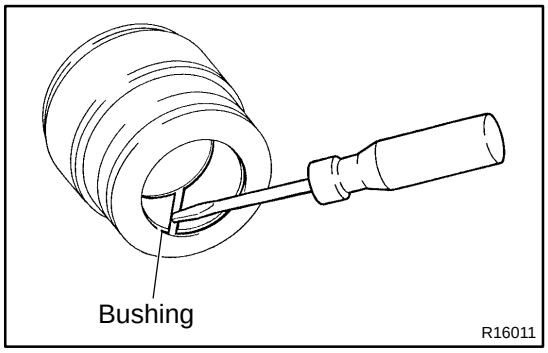


2. INSPECT BUSHING

(a) Check the inside of the bushing of the cylinder end stopper for cracks.

If faulty, replace the bushing.

(b) Apply molybdenum disulfide lithium base grease to the inside of the bushing.

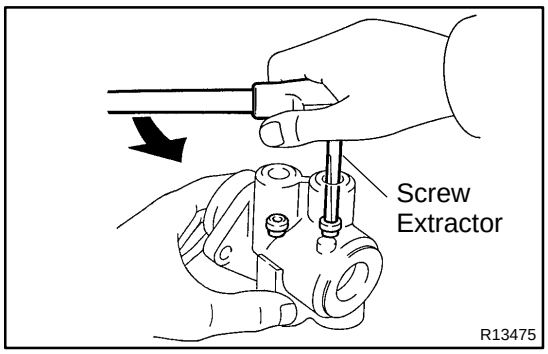


3. IF NECESSARY, REPLACE BUSHING

(a) Using a screwdriver, remove the bushing from the cylinder end stopper.

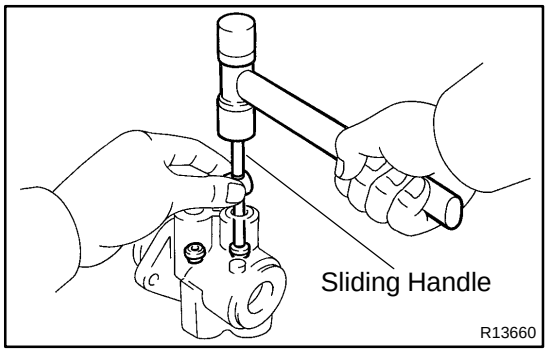
NOTICE:
Be careful not to damage the cylinder end stopper.

(b) Coat the inside of a new bushing with molybdenum disulfide lithium base grease.
(c) Install the bushing.



4. IF NECESSARY, REPLACE UNION SEATS

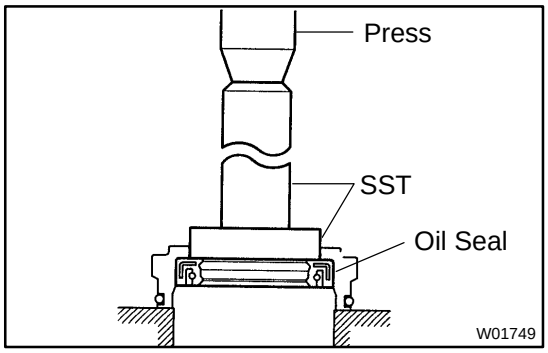
(a) Using a screw extractor, remove the 2 union seats from the control valve housing.



(b) Using a plastic hammer and sliding handle, lightly tap in 2 new seats.

NOTICE:

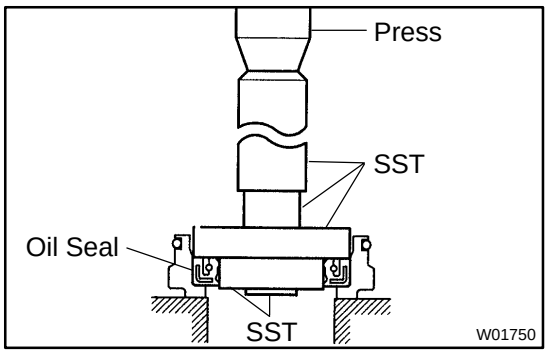
Before installing the union seat, remove dust sticking to the control valve housing.



5. IF NECESSARY, REPLACE OIL SEAL

(a) Using SST, press out the oil seal from the bearing guide nut.

SST 09950-60010 (09951-00320), 09950-70010 (09951-07100)



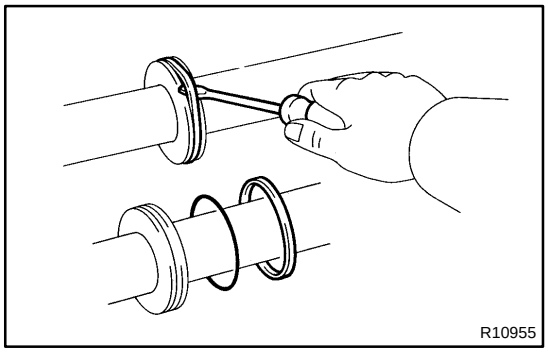
(b) Coat a new oil seal lip with power steering fluid.

(c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00280, 09951-00360, 09952-06010), 09950-70010 (09951-07100)

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.



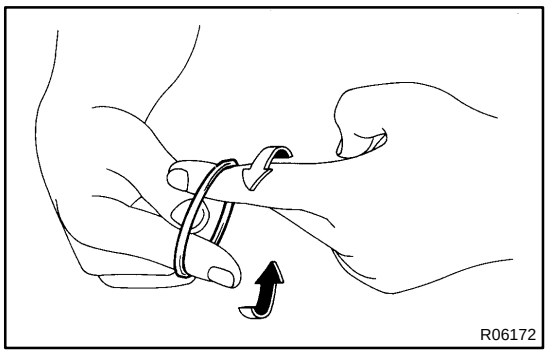
6. IF NECESSARY, REPLACE TEFLON RING AND O-RING

(a) Using a screwdriver, remove the teflon ring and O-ring from the steering rack.

NOTICE:

Be careful not to damage the groove for the ring.

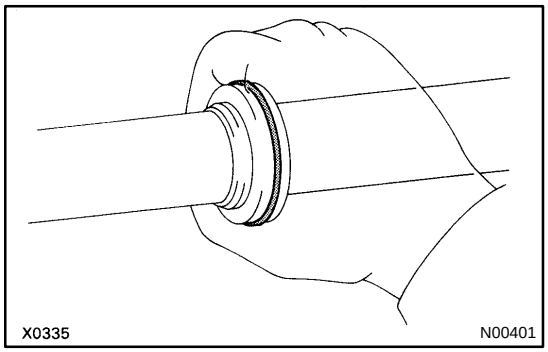
(b) Coat a new O-ring with power steering fluid and install it.



(c) Expand a new teflon ring with your fingers.

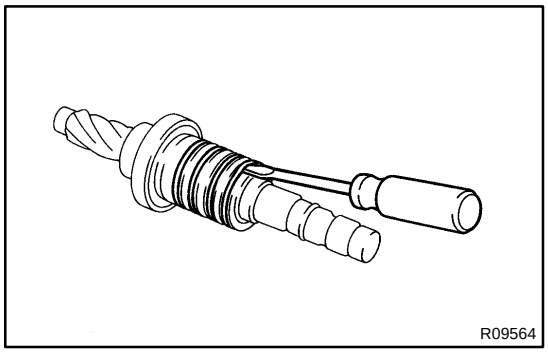
NOTICE:

Be careful not to overexpand the ring.



(d) Coat the ring with power steering fluid.

(e) Install the ring to the rack, and settle it down with your fingers.



7. IF NECESSARY, REPLACE TEFLON RINGS

(a) Using a screwdriver, remove the 4 teflon rings from the control valve assembly.

NOTICE:

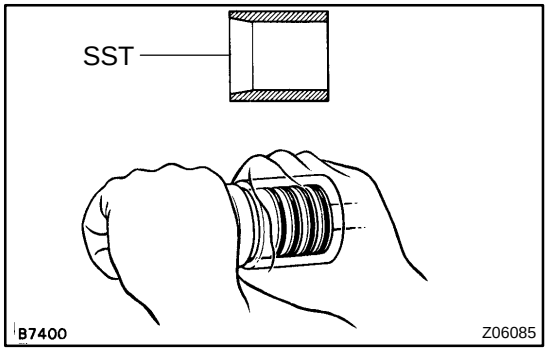
Be careful not to damage the grooves for the teflon ring.

(b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon ring.

(c) Coat the teflon rings with power steering fluid.



(d) Install the teflon rings to the control valve assembly, and settle them down with your fingers.

(e) Carefully slide the tapered end of SST over the teflon rings until then fits to the control valve assembly.

SST 09631-20081

NOTICE:

Be careful not to damage the teflon rings.

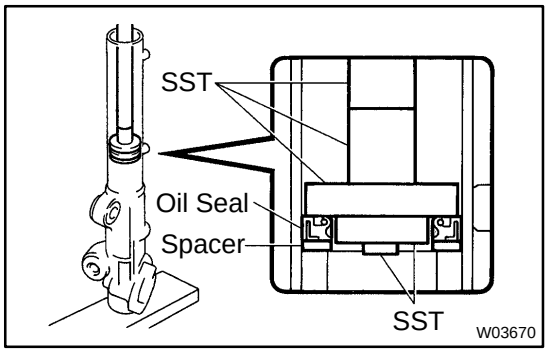
SR02R-05

REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID OR MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page SR-42)



2. INSTALL SPACER AND OIL SEAL

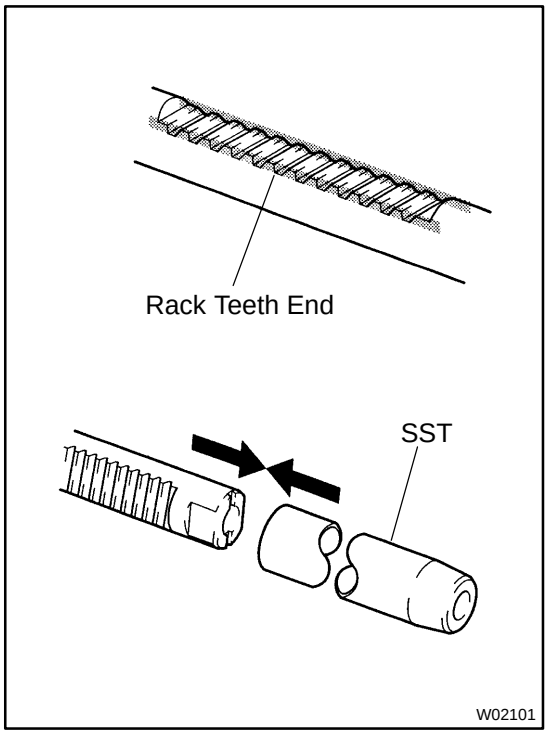
(a) Coat a new oil seal lip with power steering fluid.

(b) Using SST, press in the oil seal and spacer.

SST 09951- 60010 (09951- 00330, 09951- 00490, 09952-06010), 09950-70010 (09951-07360)

NOTICE:

- **Make sure that the oil seal is installed facing in the correct direction.**
- **Take care that the oil seal does not get reversed as you install it.**



3. INSTALL STEERING RACK

(a) Install SST to the rack.

SST 09631-00350

HINT:

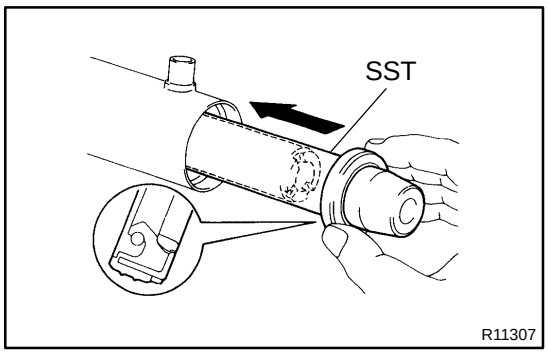
If necessary, scrape the burrs off the rack teeth end and burnish.

(b) Coat SST with power steering fluid.

(c) Install the rack into the rack housing.

(d) Remove the SST.

SST 09631-00350



4. INSTALL OIL SEAL

(a) Install SST to the steering rack opposite end.
SST 09631-00350

(b) Coat SST with power steering fluid.

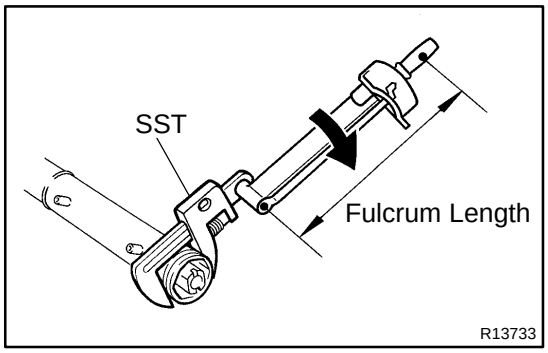
(c) Coat a new oil seal lip with power steering fluid.

(d) Install the oil seal by pushing it onto the SST without tilting.

NOTICE:

Make sure that the oil seal is installed facing in the correct direction.

(e) Remove the SST.
SST 09631-00350



5. INSTALL CYLINDER END STOPPER

(a) Coat a new O-ring with power steering fluid, and install it to the cylinder end stopper.

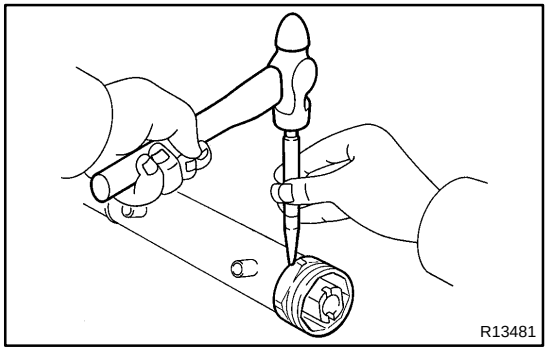
(b) Using SST, install the cylinder end stopper.
SST 09922-10010
Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)

NOTICE:

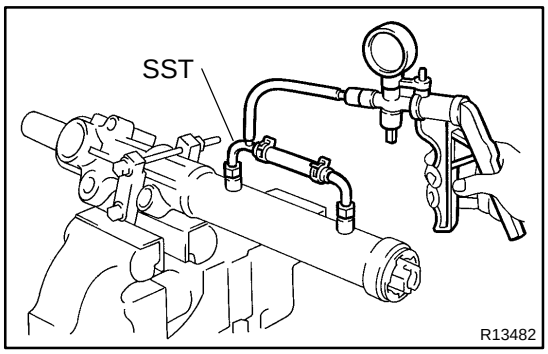
Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).



(c) Using a punch and a hammer, stake the rack housing.



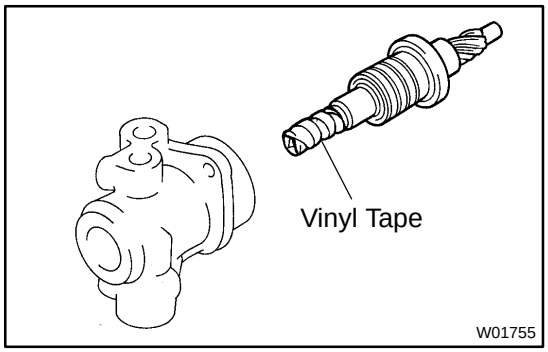
6. AIR TIGHTNESS TEST

(a) Install SST to the unions of the rack housing.
SST 09631-12071

(b) Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.

(c) Check that there is no change in the vacuum.

If there is change in the vacuum, check the installation of the oil seals.



7. INSTALL CONTROL VALVE ASSEMBLY

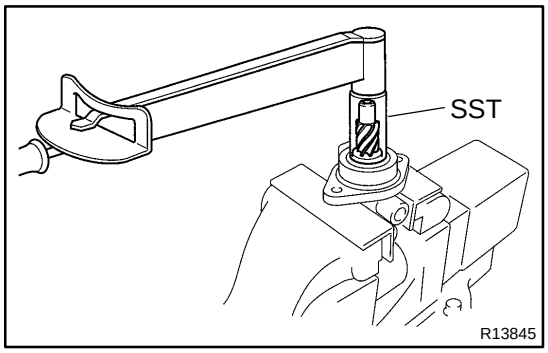
(a) Coat the teflon rings with power steering fluid.

(b) To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.

(c) Push the valve assembly into the control valve housing.

NOTICE:

Be careful not to damage the teflon rings and oil seal lip.

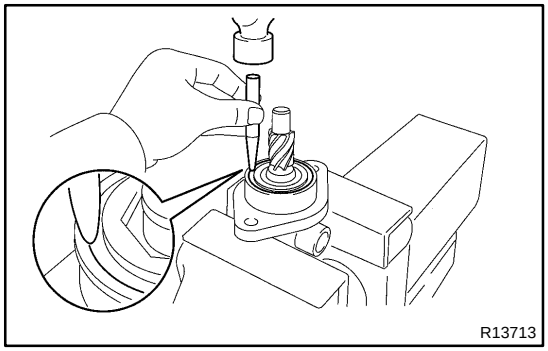


(d) Coat a new O-ring with power steering fluid, and install it to the bearing guide nut.

(e) Using SST, install the bearing guide nut.
SST 09631-20060
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

NOTICE:

Be careful not to damage the oil seal lip.



(f) Using a punch, stake the bearing guide nut.

8. INSTALL CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY

(a) Coat a new O-ring with power steering fluid, and install it to the valve housing.

(b) Align the matchmarks on the control valve housing and rack housing, and install the control valve housing with the control valve assembly to the rack housing.

(c) Install the 2 bolts.
Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

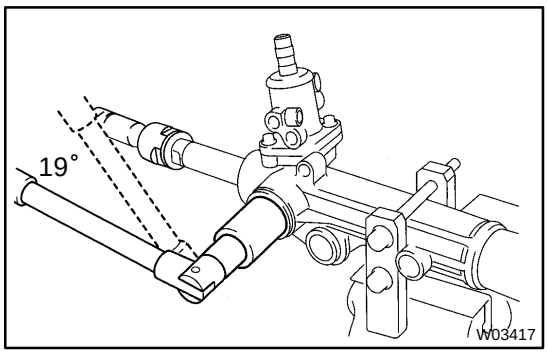
9. INSTALL DUST COVER

10. INSTALL RACK GUIDE, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP

(a) Install the rack guide and rack guide spring.

(b) Apply sealant to 2 or 3 threads of the rack guide spring cap.
Sealant:
Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

(c) Temporarily install the rack guide spring cap.

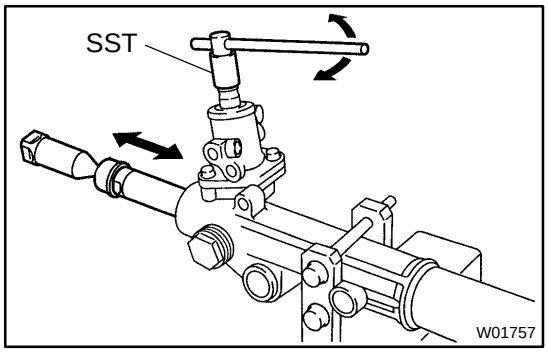


11. ADJUST TOTAL PRELOAD

(a) To prevent the steering rack teeth from damaging the oil seal lip, temporarily install the RH and LH rack ends.

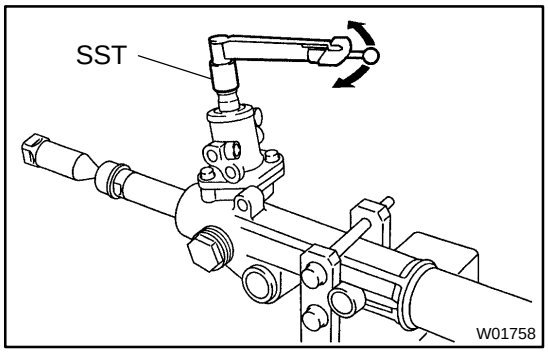
(b) Torque the rack guide spring cap.
Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

(c) Return the cap 19°.

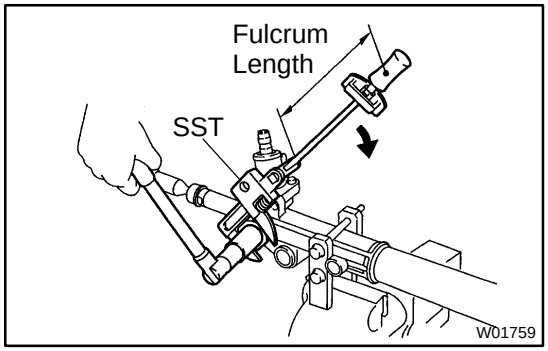


(d) Using SST, turn the control valve shaft right and left 1 or 2 times.
SST 09616-0001 1

(e) Loosen the cap until the rack guide spring is not functioning.



(f) Using SST and a torque wrench, tighten the cap until the preload is within specification.
SST 09616-0001 1
Preload (turning):
0.5 - 1.7 N·m (4.7 - 17.2 kgf·cm, 4.1 - 14.9 in.·lbf)



12. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply sealant to 2 or 3 threads of the lock nut.
Sealant:
Part No.08833-00080, THREE BOND 1344,
LOCTITE 242 or equivalent

(b) Temporarily install the lock nut.

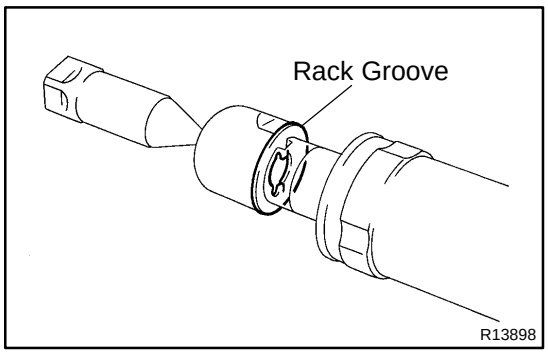
(c) Holding the rack guide spring cap rotating, and using SST, torque the lock nut.
SST 09922-10010
Torque: 51 N·m (520 kgf·cm, 38 ft·lbf)

NOTICE:
Use SST 09922-10010 in the direction shown in the illustration.

HINT:
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

(d) Recheck the total preload.
Preload (turning):
0.5 - 1.7 N·m (4.7 - 17.2 kgf·cm, 4.1 - 14.9 in.·lbf)

(e) Remove the RH and LH rack ends.

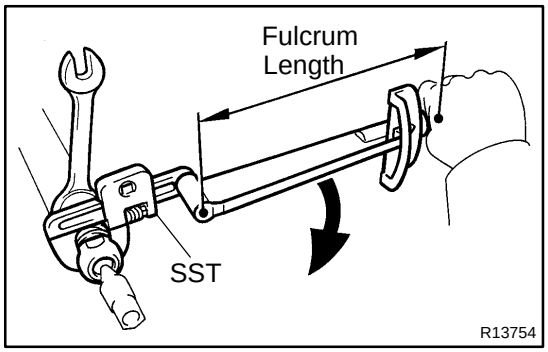


13. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

(a) Install a new claw washer, and temporarily tighten the rack end.

HINT:

Align the claws of the washer with the steering rack grooves.



(b) Using a spanner to hold the steering rack steady, and using SST, torque the rack end.

SST 09922-10010

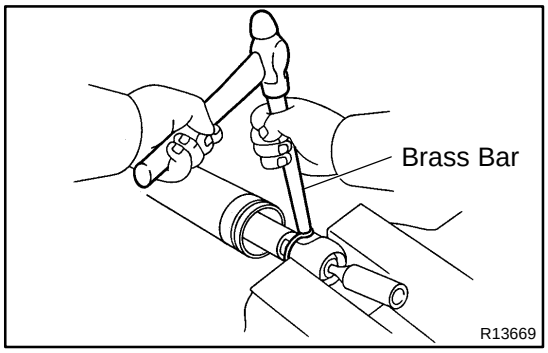
Torque: 76 N·m (770 kgf·cm, 56 ft·lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

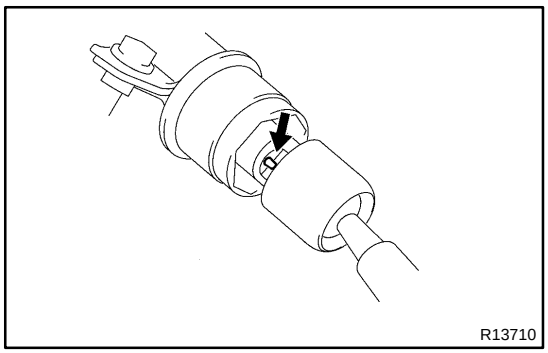


(c) Using a brass bar and a hammer, stake the washer.

NOTICE:

Avoid any impact on the rack.

(d) Employ the same manner described above to the other side.



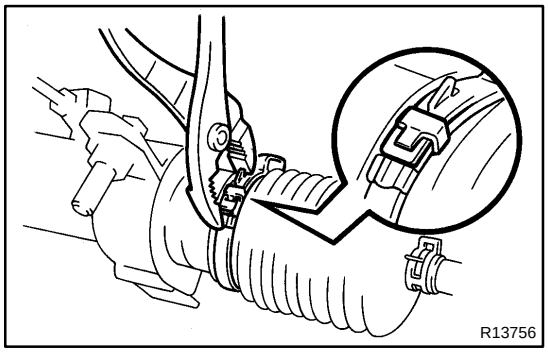
14. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

(a) Ensure that the tube hole is not clogged with grease.

HINT:

If the tube hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.

(b) Set a new clamp to the groove of the rack boot.

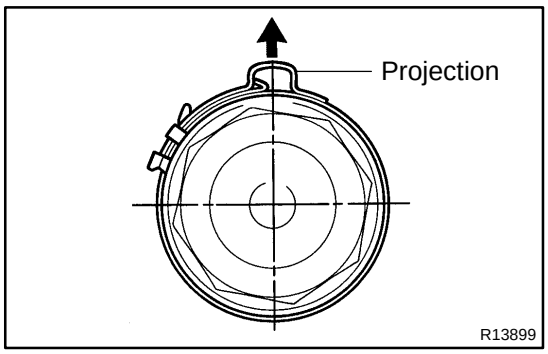


(c) Install the boot, clip and a new clamp.

NOTICE:

Be careful not to damage or twist the boot.

(d) Tighten a new clamp, as shown in the illustration.



HINT:

Face the projection to upper side of the vehicle.

(e) Install the clip to the rack boot.

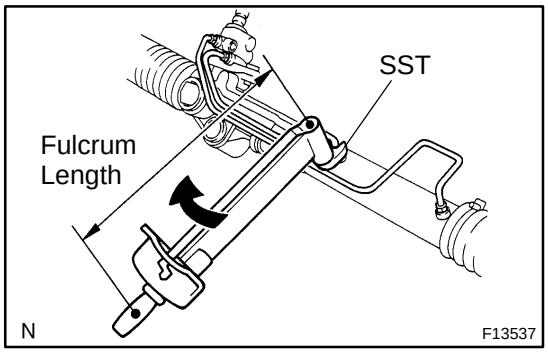
(f) Employ the same manner described above to the other side.

15. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

(a) Screw the lock nut and tie rod end onto the rack end until the matchmarks are aligned.

(b) After adjusting toe-in, torque the nut (See page SA-5).

Torque: 55 N·m (560 kgf·cm, 41 ft·lbf)



16. INSTALL 2 TURN PRESSURE TUBES

(a) Install 4 new union seats to the rack housing and control valve housing.

(b) Using SST, install the 2 turn pressure tubes.

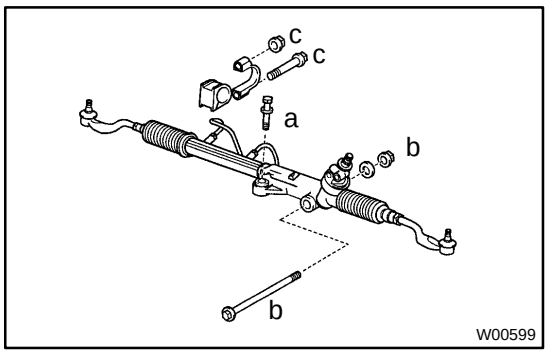
SST 09023-38200

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)

HINT:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

SR02S-05



INSTALLATION

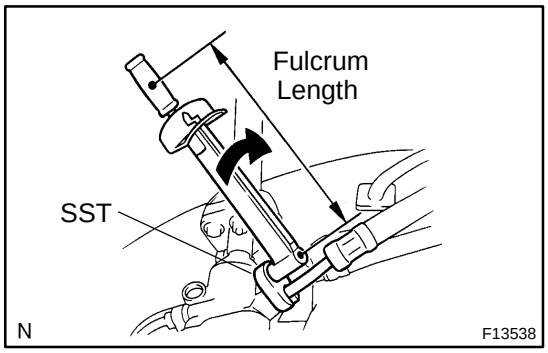
1. INSTALL GROMMET AND BRACKET

2. INSTALL PS GEAR ASSEMBLY

(a) Install the PS gear assembly with the gear assembly set bolt.
Torque: 165 N·m (1,700 kgf·cm, 123 ft·lbf)

(b) Install the gear assembly set bolt, nut and washer.
Torque: 130 N·m (1,330 kgf·cm, 96 ft·lbf)

(c) Install the bolt and nut to the bracket.
Torque: 165 N·m (1,700 kgf·cm, 123 ft·lbf)



3. CONNECT PRESSURE FEED AND RETURN TUBES

Using SST, connect the tube.
SST 09023-38400
Torque:
Pressure feed tube: 41 N·m (420 kgf·cm, 30 ft·lbf)
Return tube: 45 N·m (460 kgf·cm, 33 ft·lbf)

HINT:

- Use a torque wrench with a fulcrum length of 300 mm (11.81 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

4. CONNECT INTERMEDIATE SHAFT NO. 2 (See page SR-20)

5. CONNECT RH AND LH TIE ROD ENDS (See page SA-72)

6. INSTALL STABILIZER BAR (See page SA-76)

7. POSITION FRONT WHEEL FACING STRAIGHT AHEAD

HINT:
Do it with the front of the vehicle jacked up.

8. CENTER SPIRAL CABLE (See page SR-20)

9. INSTALL STEERING WHEEL

(a) Align the matchmarks on the wheel and steering column main shaft.

(b) Temporarily tighten the wheel set nut.

(c) Connect the connector.

10. BLEED POWER STEERING SYSTEM (See page SR-4)

11. CHECK STEERING WHEEL CENTER POINT

12. TORQUE STEERING WHEEL SET NUT
Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)

13. INSTALL STEERING WHEEL PAD (See page SR-20)

14. CHECK FRONT WHEEL ALIGNMENT (See page SA-5)

15. INSTALL ENGINE UNDER COVER

Install the engine under cover with the 10 bolts.

Torque: 30 N·m (300 kgf·cm, 22 ft·lbf)

SRS AIRBAG

RS0B6-03

PRECAUTION

NOTICE:

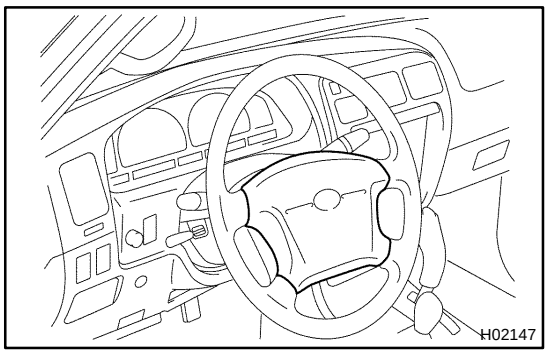
- **The 4 RUNNER is equipped with an SRS, which comprises a driver airbag and front passenger airbag. Failure to carry out service operations in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Further, if a mistake is made in servicing the SRS, it is possible the SRS may fail to operate when required. Before performing servicing (including removal or installation of parts, inspection or replacement), be sure to read the following items carefully, then follow the correct procedure described in the repair manual.**
- **Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.**
- **Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, airbag sensor assembly and front airbag sensor should be inspected. (See page RS-12 , RS-26 , RS-39 and RS-44)**
- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never disassemble and repair the steering wheel pad, front passenger airbag assembly, airbag sensor assembly or front airbag sensor in order to reuse it.**
- **If the steering wheel pad, front passenger airbag assembly, airbag sensor assembly or front airbag sensor has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace it with new one.**
- **Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.**
- **Information labels are attached to the periphery of the SRS components. Follow the instruction on the notices.**
- **After work on the SRS is completed, check the SRS warning light. (See page DI-377)**
- **If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.**

CAUTION:

- **Work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery. (The SRS is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (-) terminal cable of the battery, the SRS may be deployed.)**
- **When the negative (-) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as before and adjust the clock. To avoid erasing the memory of each memory system, never use a back-up power supply from outside the vehicle.**
- **Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.**
- **Do not expose the steering wheel pad, front passenger airbag assembly, airbag sensor assembly or front airbag sensor directly to hot air or flames.**

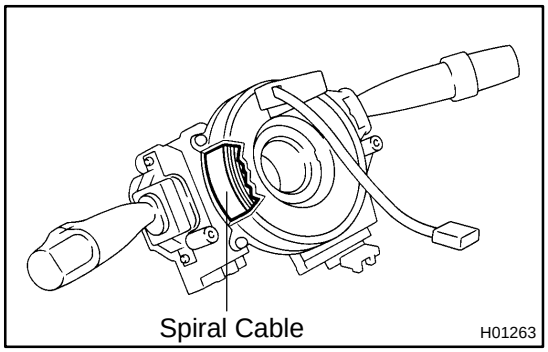
RS0B7-05

OPERATION



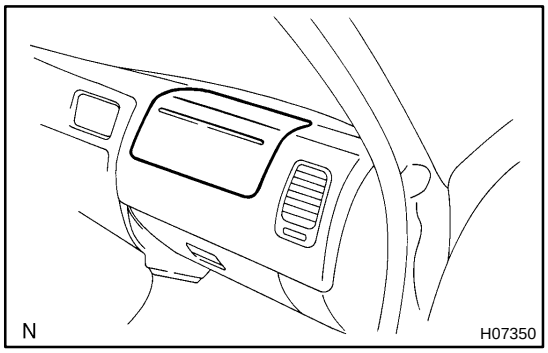
1. STEERING WHEEL PAD (with AIRBAG)

The inflater and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflater contains a squib, igniter charge, gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



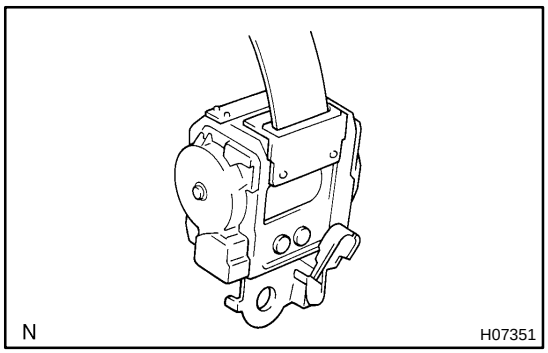
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



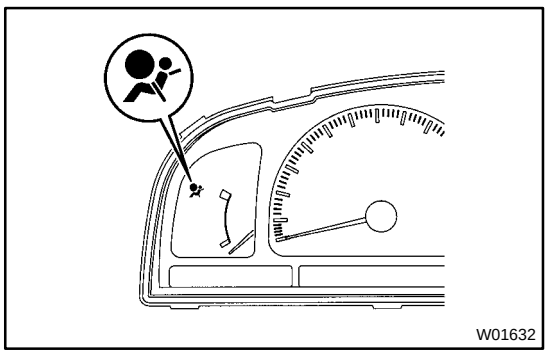
3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflater and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflater contains a squib, igniter charge and gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



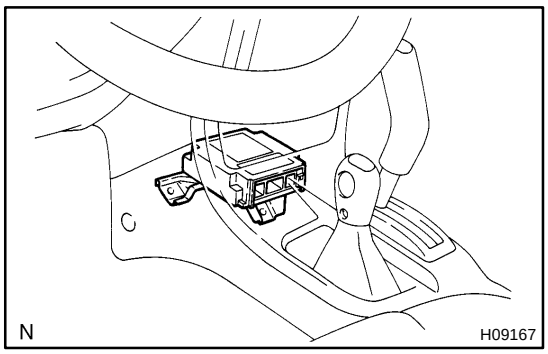
4. SEAT BELT PRETENSIONER

The seat belt pretensioner system is a component of the front seat outer belt. The pretensioner contains a squib, gas generant, strip, etc., and operates in the event of a frontal collision.



5. SRS WARNING LIGHT

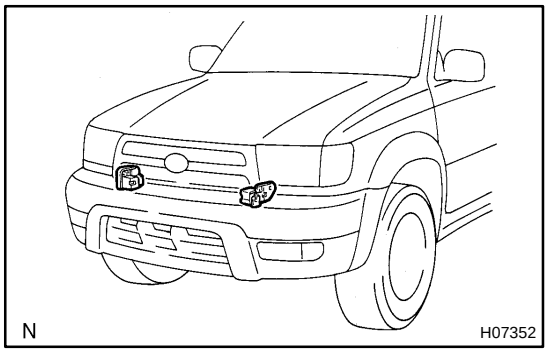
The SRS warning light is located on the combination meter. It goes on to alert the driver of trouble in the system when a malfunction is detected in the airbag sensor assembly self-diagnosis. In normal operating conditions when the ignition switch is turned to the ACC or ON position, the light goes on for about 6 seconds and then goes off.



6. AIRBAG SENSOR ASSEMBLY

The airbag sensor assembly is mounted on the floor inside the center cluster. The airbag sensor assembly consists of airbag sensor, safing sensor, diagnosis circuit, ignition control and drive circuit, etc.

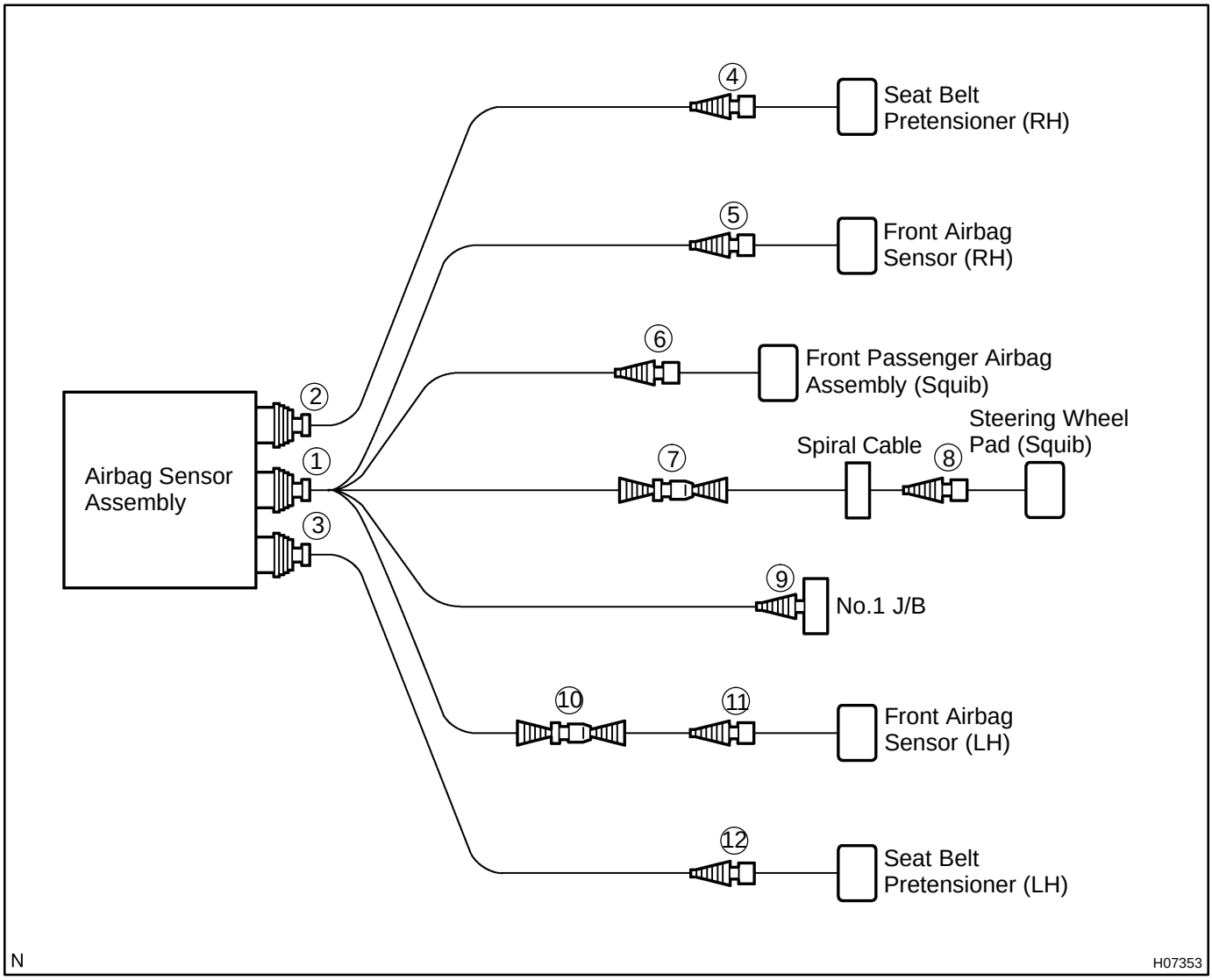
It receives signals from the airbag sensor assembly and judges whether the SRS must be activated or not.



7. FRONT AIRBAG SENSOR

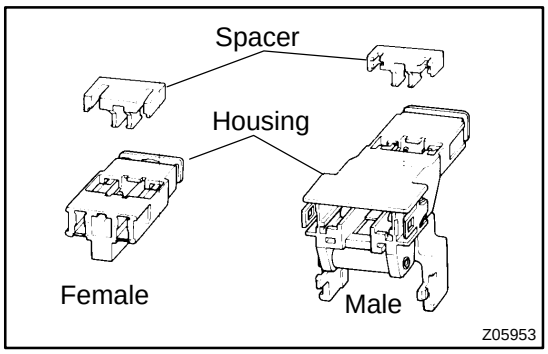
The front airbag sensor is mounted inside each of the side members. The sensor unit is a mechanical type. When the sensor detects deceleration force above a predetermined limit, contact is made in the sensor, sending a signal to the airbag sensor assembly. The sensor cannot be disassembled.

8. SRS CONNECTORS



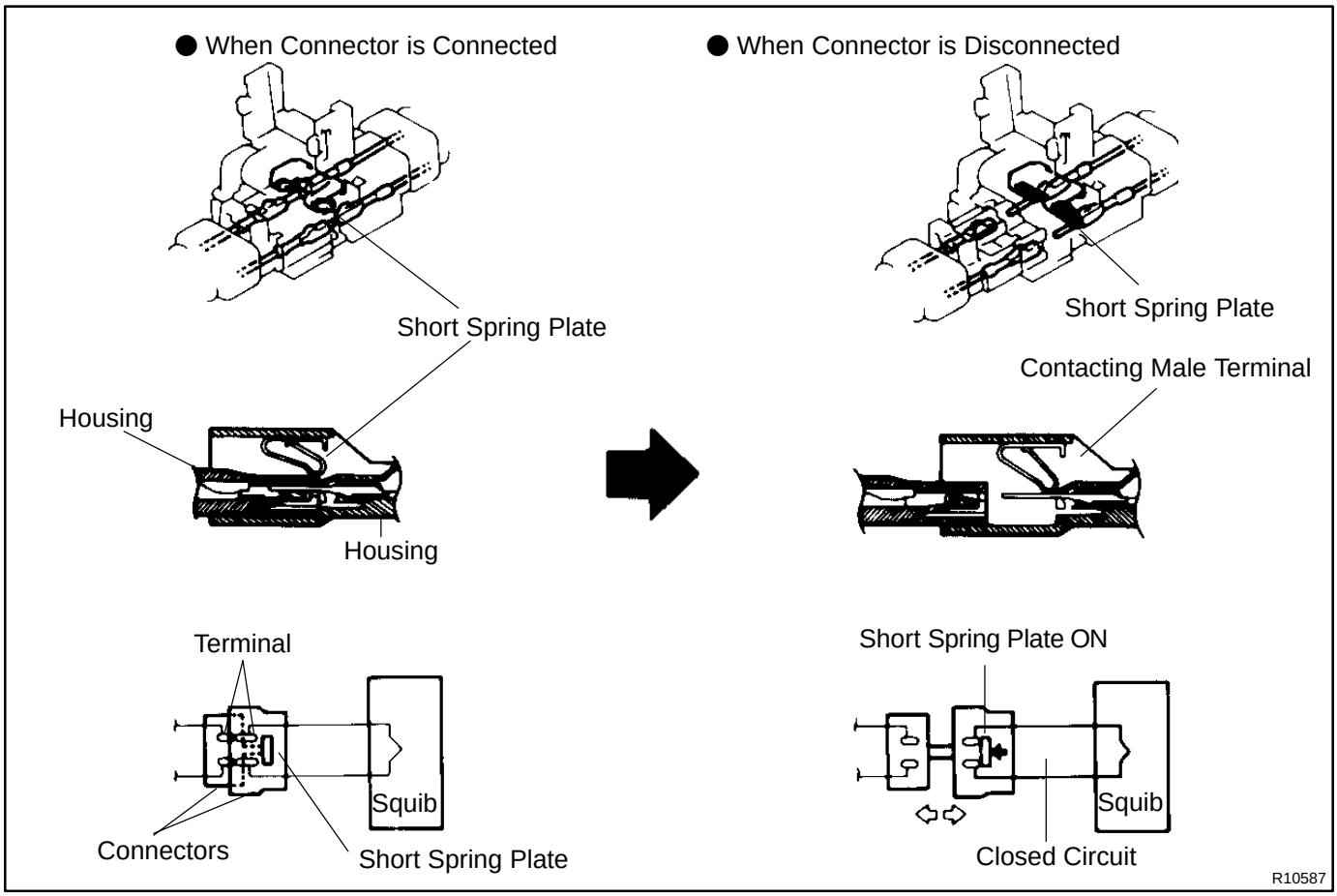
No.	Item	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
(2)	Airbag Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 6, 7, 8, 12
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3
(4)	Connector Twin-Lock Mechanism	Connectors 7, 9

(a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for SRS are used in the locations shown above to ensure high reliability. These connectors use durable gold-plated terminals.

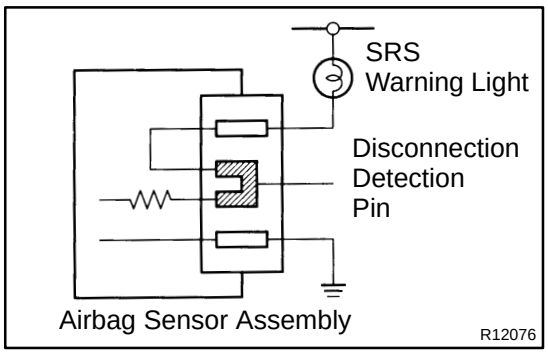


(1) Terminal Twin-Lock Mechanism
Each connector has a two-piece construction consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the spacer and the lance) to prevent terminals from coming out.

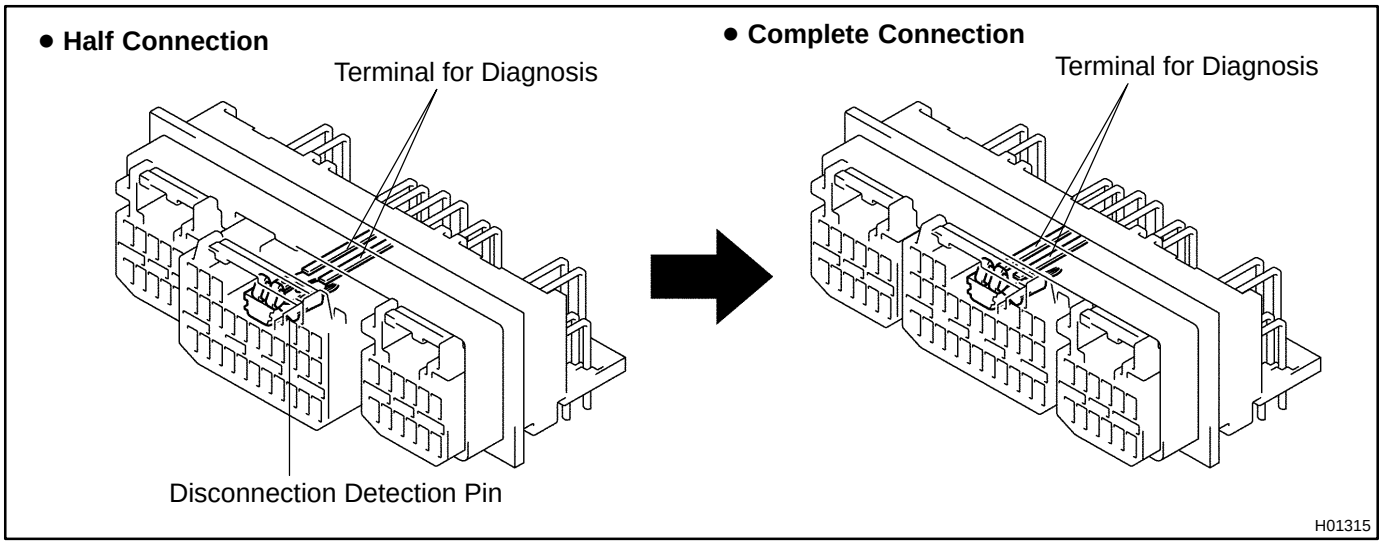
(2) Airbag Activation Prevention Mechanism
Each connector contains a short spring plate. When the connector is disconnected, positive (+) terminal and negative (-) terminal of the squib are attached.



HINT:
The type of connector shown above is used for the connectors "1", "2", "3", "4", "6", "7", "8" and "12" in the diagram on the previous page, but the operating principle is the same.

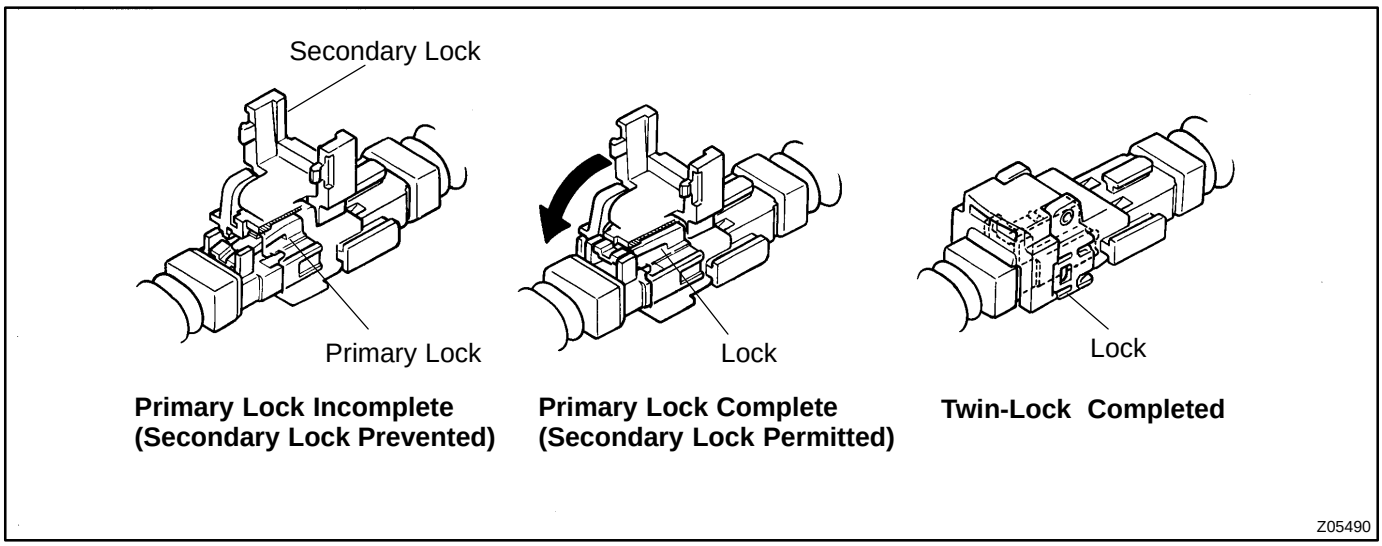


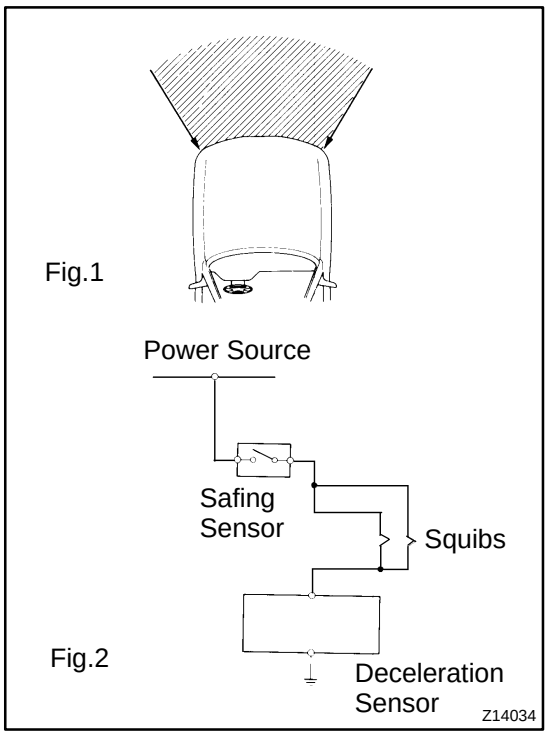
(3) Electrical Connection Check Mechanism
This mechanism is designed to electrically check if connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the connection detection pin connects with the diagnosis terminals when the connector housing lock is in the locked condition.



(4) Connector Twin-Lock Mechanism
With this mechanism connectors (male and female connectors) are locked by two locking devices to increase connection reliability.

If the primary lock is incomplete, ribs interfere and prevent the secondary lock.

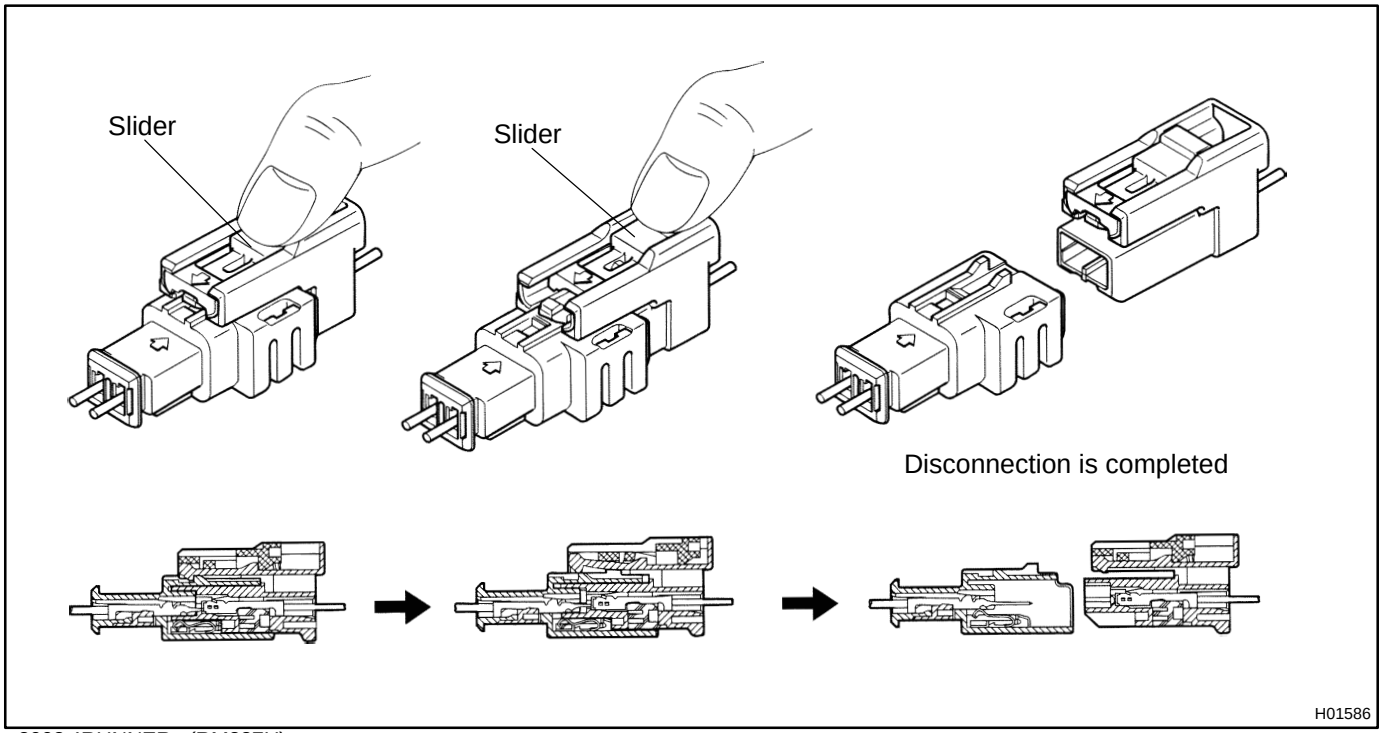




(b) When the vehicle is involved in a frontal collision in the hatched area (Fig. 1) and the shock is larger than a predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensors. As illustrated in Fig. 2, ignition is caused when a safing sensor and the deceleration sensor go on simultaneously. When a deceleration force acts on the sensors, two squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver and front passenger airbags rapidly increases the pressure inside the bags breaking open the steering wheel pad and instrument panel door. Bag inflation then ends, and the bags deflate as the gas is discharged through discharge holes at the bag's rear or side.

9. DISCONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY

(a) Place a finger on the slider.
(b) Slide the slider to release lock.
(c) Disconnect the connector.



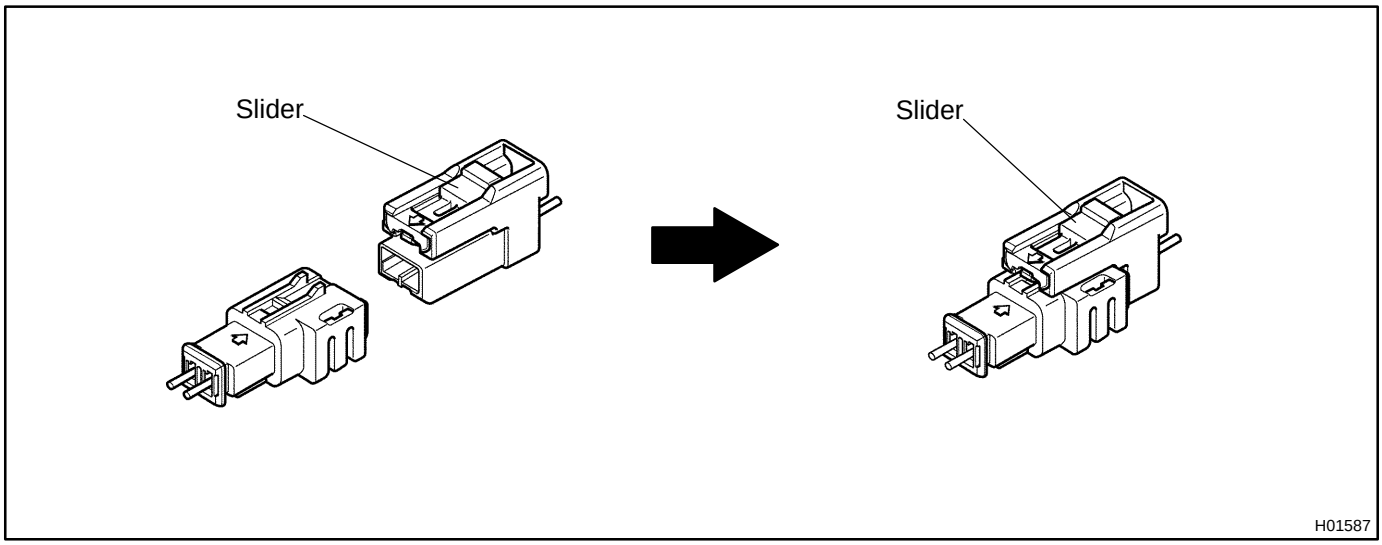
10. CONNECTION OF CONNECTORS FOR STEERING WHEEL PAD (with AIRBAG) AND FRONT PASSENGER AIRBAG ASSEMBLY

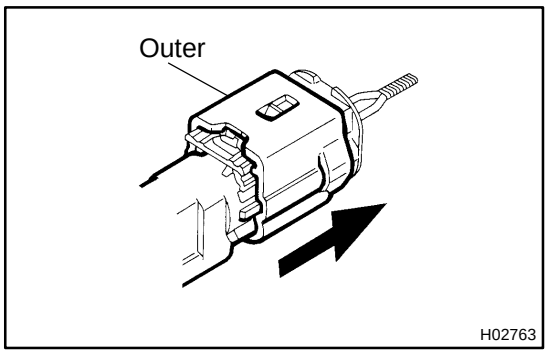
(a) Align a lock part of male connector and a slider of female connector in the same direction as shown in the illustration, fit in them without rubbing.

(b) Make sure to insert until they are locked. After fitting in pull them lightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.





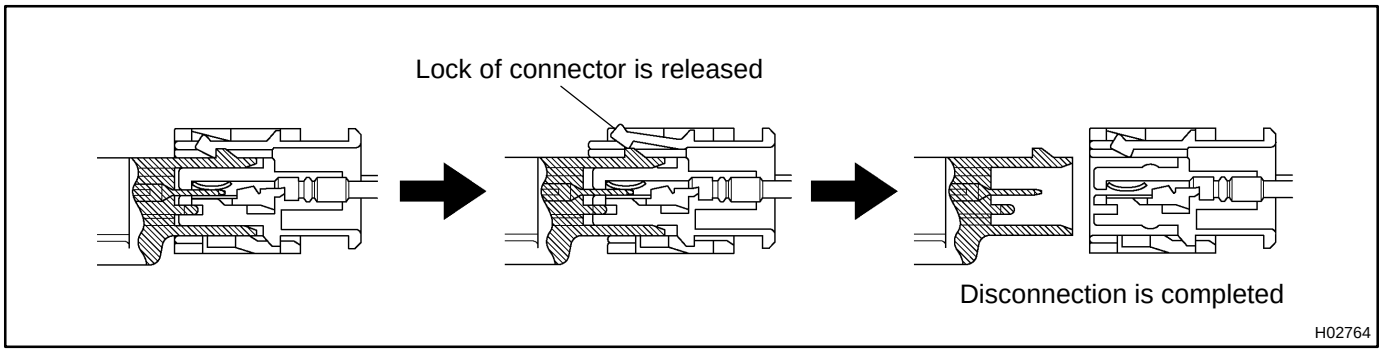
11. DISCONNECTION OF FRONT AIRBAG SENSOR CONNECTOR

(a) While holding both flank sides of the outer, slide the outer to the direction shown by an arrow.

(b) When lock of the connectors is released, disconnect the connectors.

HINT:

Make sure to hold both flank sides of the outer. If holding the top and bottom sides, it will obstruct disconnection.



12. CONNECTION OF FRONT AIRBAG SENSOR CONNECTOR

(a) Align the male connector (on the side of sensor) and female connector in the same direction as shown in the illustration and fit in them without rubbing.

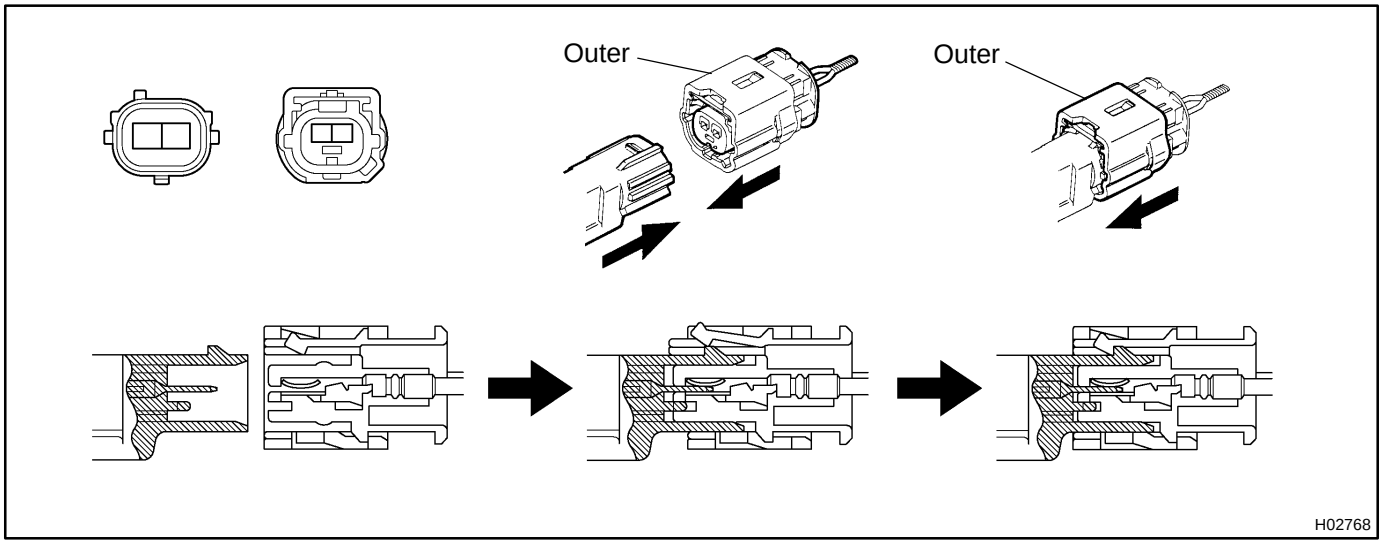
(b) As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops half way, connectors will separate.

(c) Make sure to insert until they are locked. After fitting in, pull them slightly to check that they are locked. (When locked, make sure that the outer returns to its original position and sound at the time of fitting in can be heard.)

HINT:

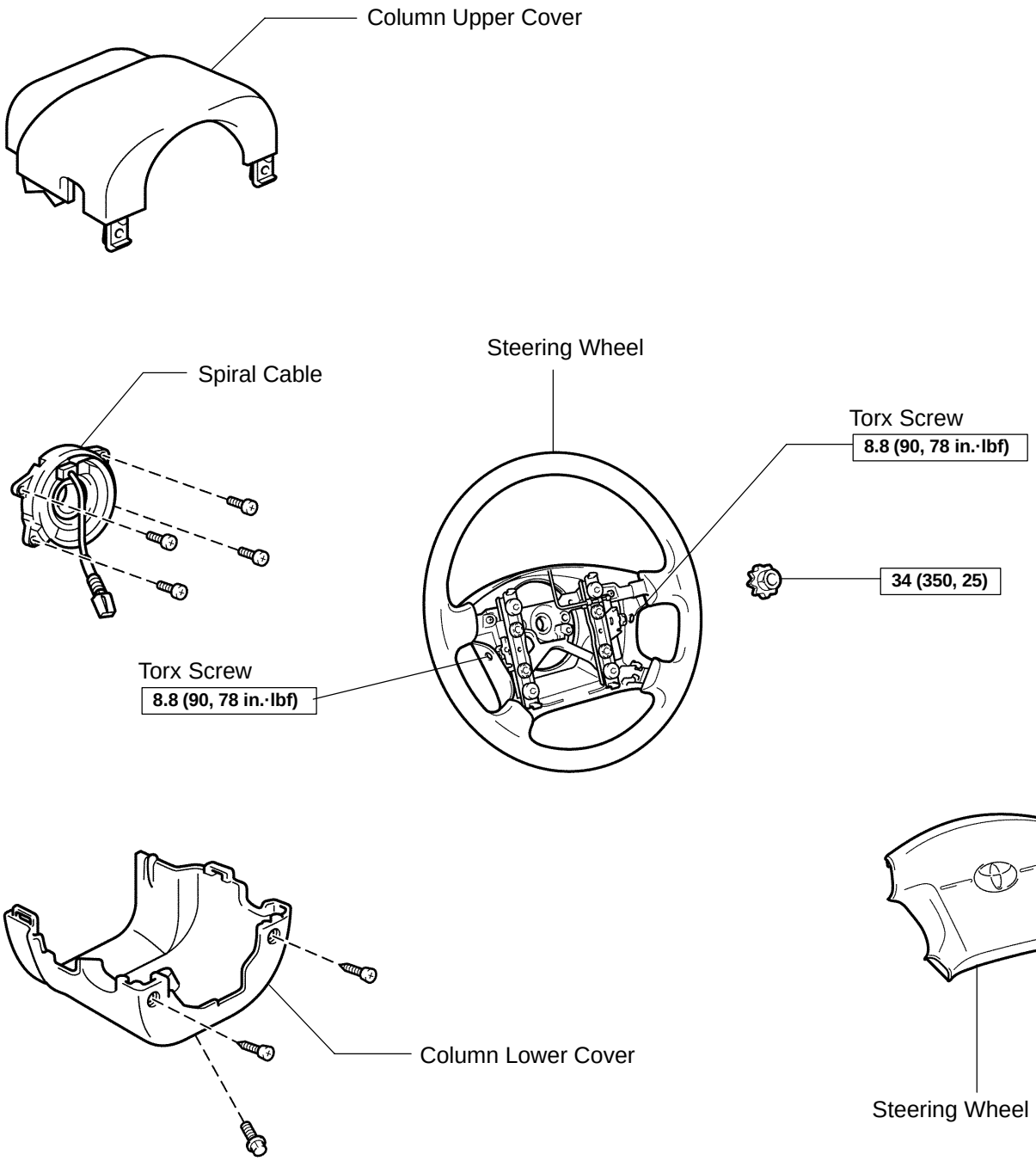
- Do not fit in while holding the outer.
- When fitting in, the outer slides. Do not touch it.



STEERING WHEEL PAD AND SPIRAL CABLE

RS0B8-05

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

H02242

RS0B9-06

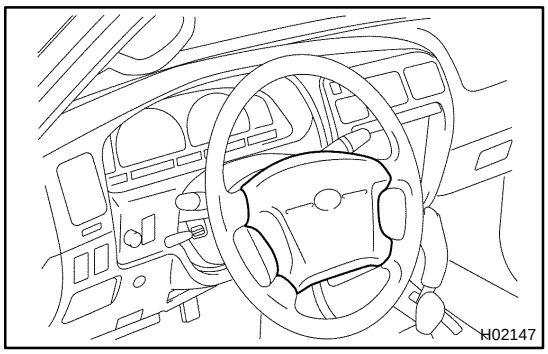
REMOVAL

HINT:

For step 1 to 4, refer to page SR-13 .

1. **REMOVE STEERING WHEEL PAD**
2. **REMOVE STEERING WHEEL**
3. **REMOVE UPPER AND LOWER COLUMN COVERS**
4. **REMOVE SPIRAL CABLE**

RS0BA-05

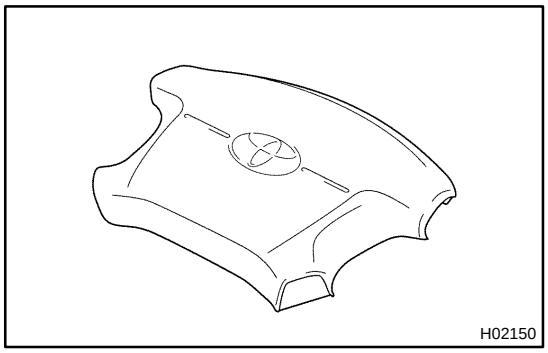


INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

(a) Do a diagnostic system check.
(See page DI-377)

(b) Do a visual check which includes the following item with the steering wheel pad (with airbag) installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.

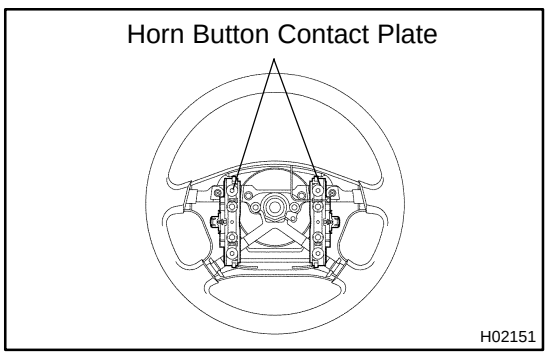


2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check.
(See page DI-377)

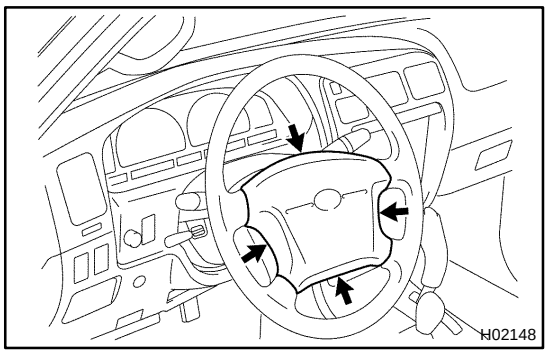
(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.

- Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.
- Check cuts and cracks in wire harnesses, and chipping in connectors.
- Check the deformation on the horn button contact plate of the steering wheel.
- Check the deformation on the steering wheel.



HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel with a new one.



- There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

CAUTION:
For removal and installation of the steering wheel pad, see page SR-13 and SR-20 , and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check.
(See page DI-377)

(b) Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
Check the damage on the spiral cable connector and wire harness.

HINT:
There should be no interference between the steering wheel pad and steering wheel, and the clearance should be uniform all the way around when the new steering wheel pad is installed on the steering wheel.

RS0FZ-01

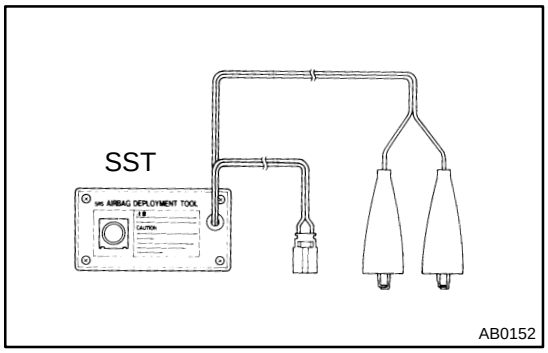
DISPOSAL

HINT:

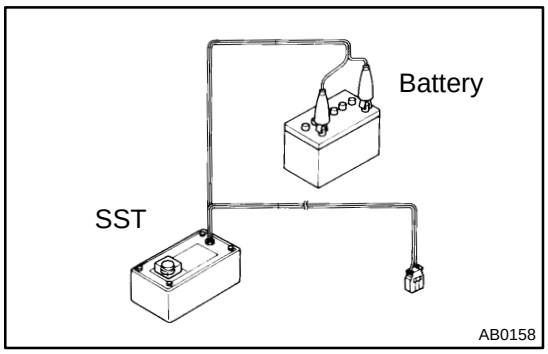
When scrapping vehicle equipped with an SRS or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC. When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given in step 1-(d) in "DISPOSAL".

CAUTION:

- **Never dispose of a steering wheel pad which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.**



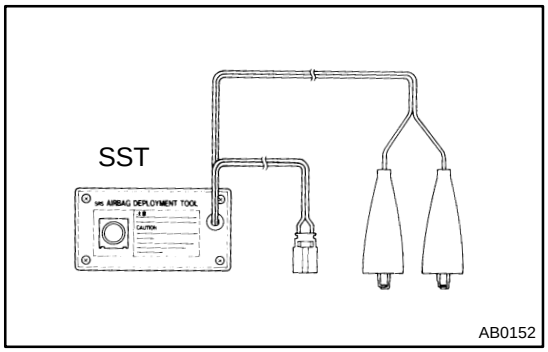
- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082-00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.**
- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

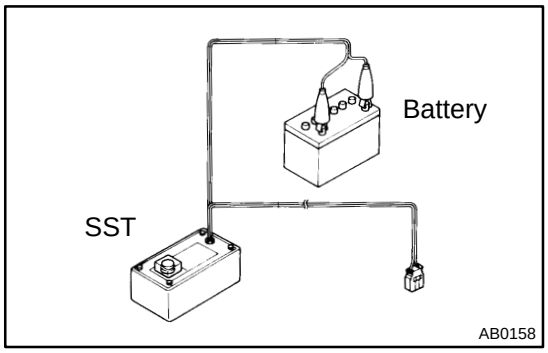


(a) Check functioning of the SST.

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082-00700

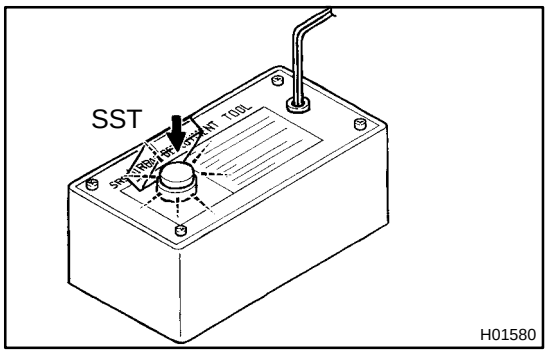


(1) Connect the SST to the battery.

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

HINT:

Do not connect the yellow connector which will be connected with the supplemental restraint system.

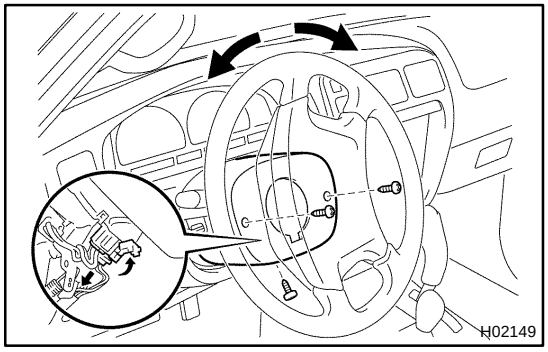


(2) Check functioning of the SST.

Press the SST activation switch, and check that the LED of the SST activation switch lights up.

CAUTION:

If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.



(b) Install the SST.

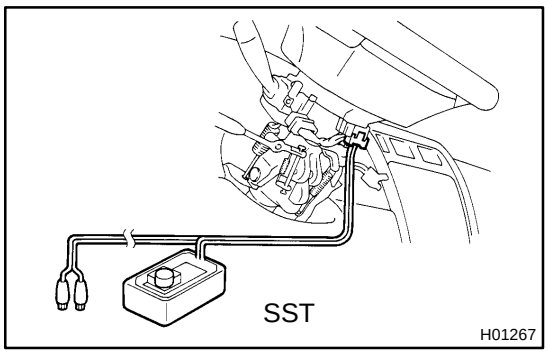
CAUTION:

Check that there is no looseness in the steering wheel and steering wheel pad.

(1) Remove the steering column lower cover.

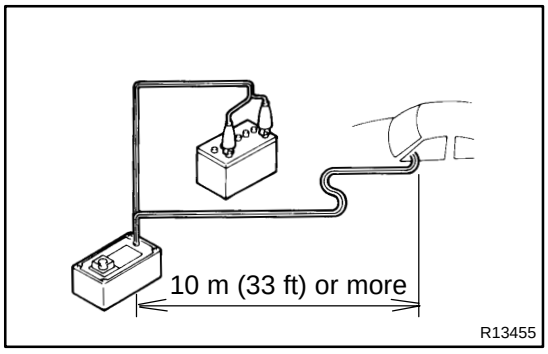
Remove the 3 screws and steering column lower cover as shown in the illustration.

(2) Disconnect the airbag connector of the spiral cable.



(3) Connect the SST connector to the airbag connector of the spiral cable.

SST 09082-00700



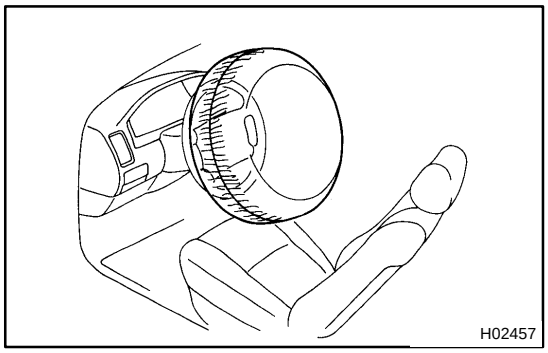
(4) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

(5) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(6) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (-) terminal.



(c) Deploy the airbag.

(1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.

(d) Dispose of steering wheel pad (with airbag).

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with the deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with the deployed airbag.**

(1) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the steering wheel pad still installed.

(2) When moving a vehicle for scrapping which has a steering wheel pad with deployed airbag, use gloves and safety glasses.

2. DEPLOYMENT WHEN DISPOSING OF STEERING WHEEL PAD ONLY

NOTICE:

- **When disposing of the steering wheel pad (with airbag) only, never use the customers vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

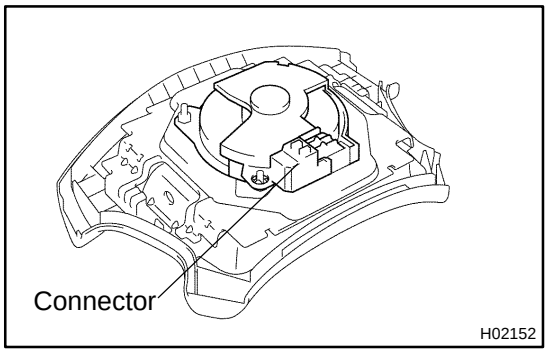
HINT:

Have a battery ready as the power source to deploy the airbag.

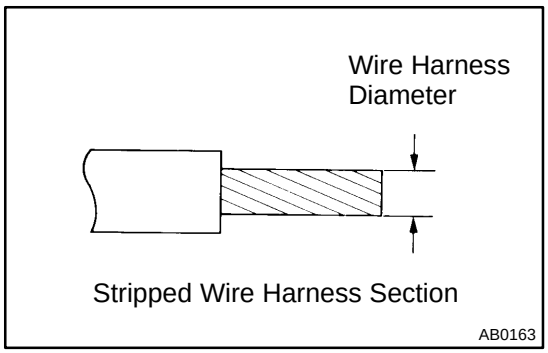
(a) Remove the steering wheel pad.
(See page SR-13)

CAUTION:

When storing the steering wheel pad, keep the upper surface of the pad facing upward.



(b) Remove the connector on the rear surface of the steering wheel pad from the bracket.



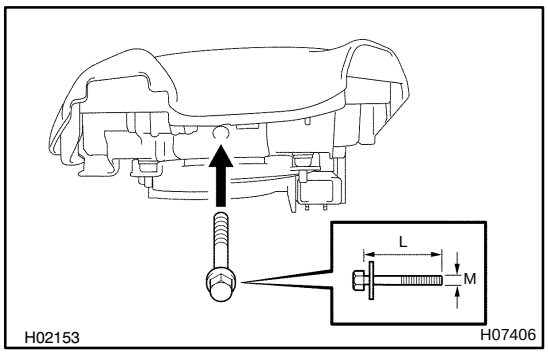
(c) Using a service-purpose wire harness, tie down the steering wheel pad to the disc wheel.
Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 $in.^2$ or more).

HINT:

To calculate the square of the stripped wire harness section:
Square = 3.14 x $(Diameter)^2$ divided by 4

CAUTION:

If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm^2 (0.0019 $in.^2$).



(1) Install the 2 bolts with washers in the 2 bolt holes in the steering wheel pad.

Bolt:
L: 35.0 mm (1.378 in.)
M: 6.0 mm (0.236 in.)
Pitch: 1.0 mm (0.039 in.)

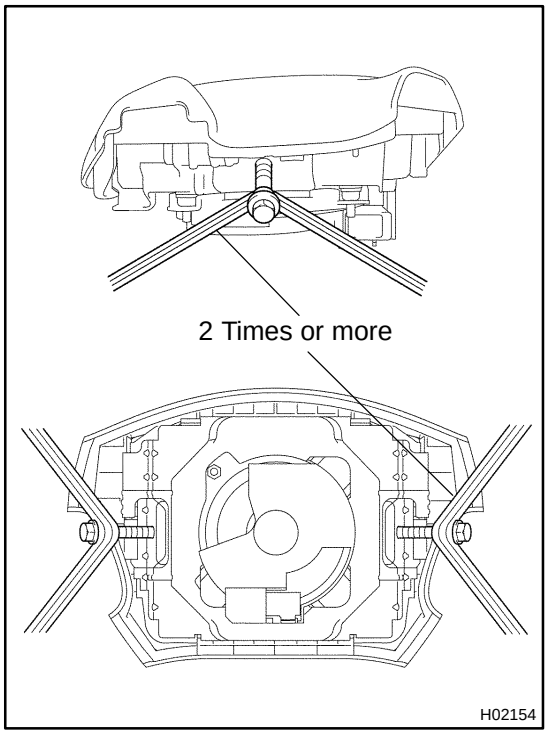
NOTICE:

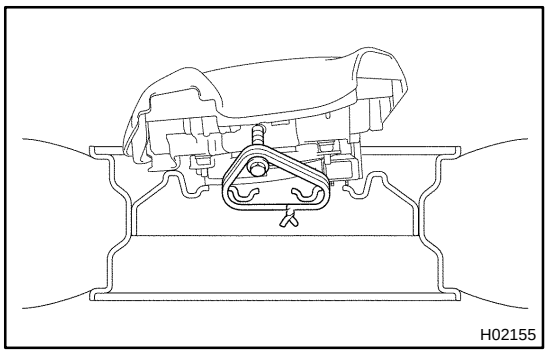
- **Tighten the bolts by hand until the bolts become difficult to turn.**
- **Do not tighten the bolts too much.**

(2) Using 3 wire harnesses, wind the wire harness at least 2 times each around the bolts installed on the left and right sides of the steering wheel pad.

CAUTION:

- **Tightly wind the wire harness around the bolts so that there is no slack.**
- **If there is slack in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed. This is highly dangerous.**





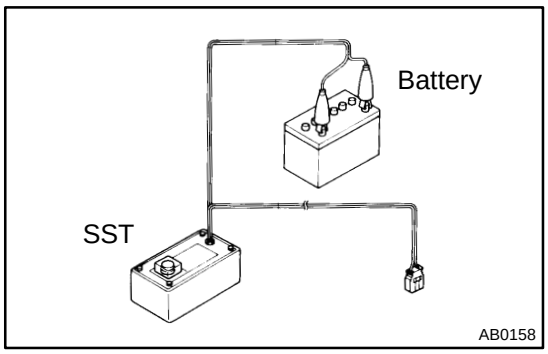
(3) Face the upper surface of the steering wheel pad upward. Separately tie the left and right sides of the steering wheel pad to the disc wheel through the hub nut holes. Position the steering wheel pad connector so that it hangs downward through a hub hole in the disc wheel.

CAUTION:

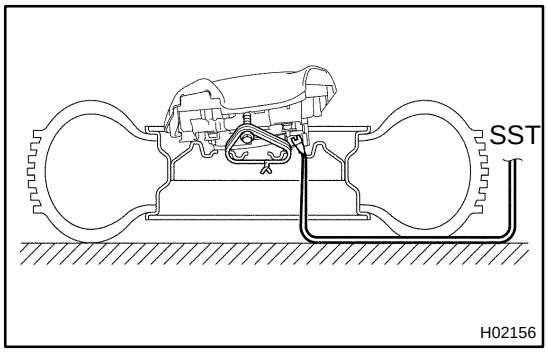
- **Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free through the shock from the airbag deploying.**
- **Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock from the airbag deploying and the steering wheel pad will be thrown into the air.**

NOTICE:

The disc wheel will be marked by airbag deployment, so when disposing of the airbag use a redundant disc wheel.



(d) Check functioning of the SST.
SST 09082-00700



(e) Install the SST.

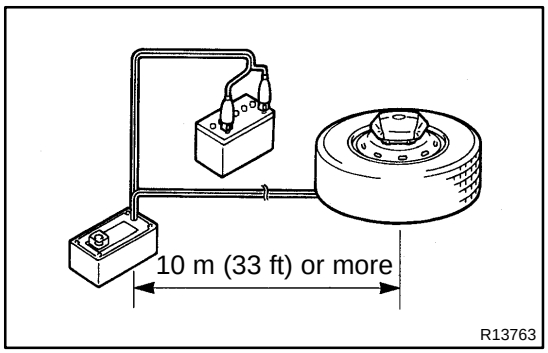
CAUTION:

Place the disc wheel on the level ground.

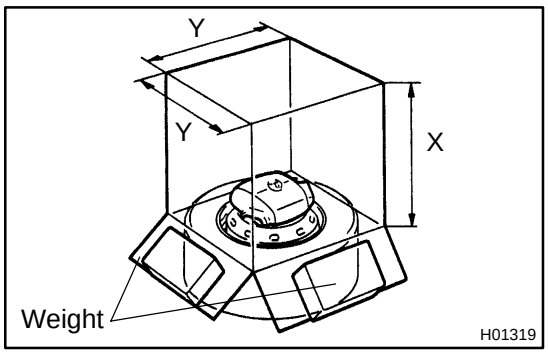
(1) Connect the connector of 2 SST to the steering wheel pad connector.
SST 09082-00700, 09082-00760

NOTICE:

Also, secure some slack for the SST wire harness inside the disc wheel.



(2) Move the SST to at least 10 m (33 ft) away from the steering wheel pad tied down on the disc wheel.



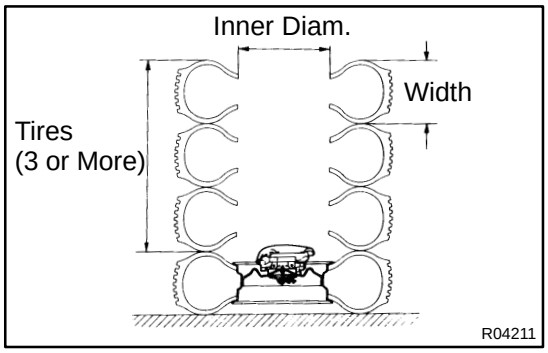
(f) Cover the steering wheel pad with a cardboard box or tires.

- Covering method using a cardboard box:
  Cover the steering wheel pad with the cardboard box and weight the cardboard box down in 4 places with at least 190 N (20 kg, 44 lb).

Size of cardboard box:
Must exceed the following dimensions:
X = 460 mm (18.11 in.)
Y = 650 mm (25.59 in.)

NOTICE:

- **When dimension Y of the cardboard box exceeds the diameter of the disc wheel with tire to which the steering wheel pad is tied, X should be the following size.**
  X = 460 mm (18.11 in.) + width of tire
- **If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the airbag deployment.**



- Covering method using tires:
  Place at least 3 tires without disc wheel on top of the disc wheel with tire to which the steering wheel pad is tied.

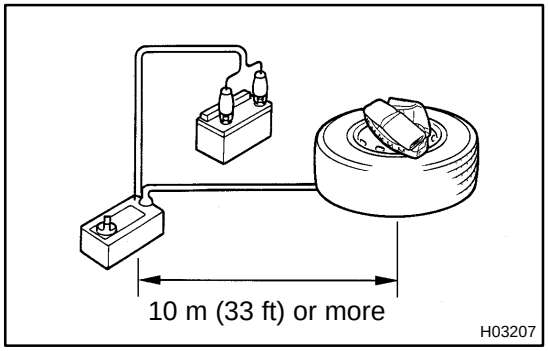
Tire size: Must exceed the following dimensions-
Width: 185 mm (7.87 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:
Do not use tires with disc wheels.

NOTICE:
The tires may be marked by the airbag deployment, so use the redundant tires.

(g) Deploy the airbag.

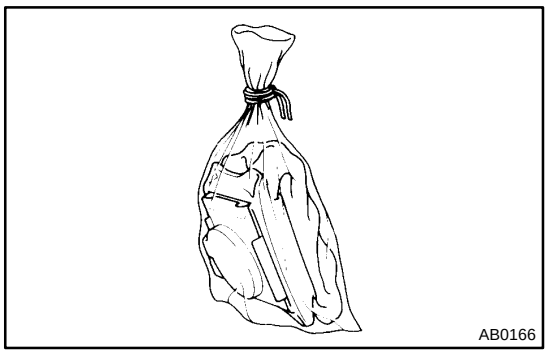
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.



(2) Check that no one is within 10 m (33 ft) area around the disc wheel which the steering wheel pad is tied to.

(3) Press the SST activation switch and deploy the airbag.

HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.


AB0166

(h) Dispose of the steering wheel pad (with airbag).

CAUTION:

- **The steering wheel pad is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a steering wheel pad with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a steering wheel pad with deployed airbag.**

(1) Remove the steering wheel pad from the disc wheel.

(2) Place the steering wheel pad in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS0BC-04

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

Case	Replacing part
If the airbag has been deployed.	Steering wheel pad
If the steering wheel pad has been found to be faulty in troubleshooting.	Steering wheel pad
If the spiral cable has been found to be faulty in troubleshooting.	Spiral cable
If the steering wheel pad has been found to be faulty during checking items. (See page RS-12)	Steering wheel pad
If the steering wheel has been found to be faulty during checking items. (See page RS-12)	Steering wheel
If the spiral cable has been found to be faulty during checking items. (See page RS-12)	Spiral cable
If the steering wheel pad has been dropped.	Steering wheel pad

CAUTION:

For removal and installation of the steering wheel pad, see page SR-13 and SR-20 , and be sure to follow the correct procedure.

RS0BD-05

INSTALLATION

HINT:

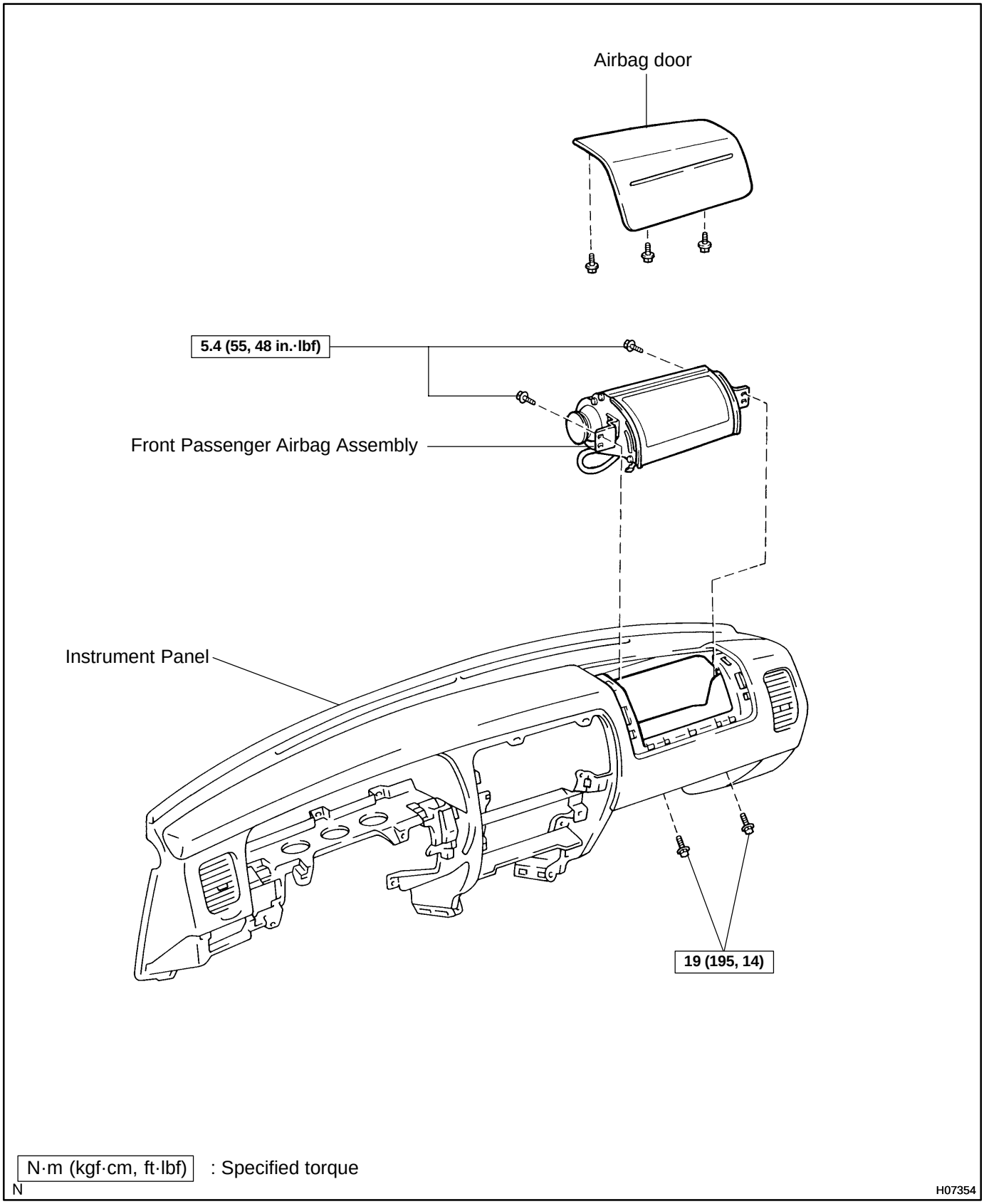
For step 1 to 4, refer to page SR-20 .

1. **INSTALL SPIRAL CABLE**
2. **INSTALL UPPER AND LOWER COLUMN COVERS**
3. **INSTALL STEERING WHEEL**
4. **INSTALL STEERING WHEEL PAD**

FRONT PASSENGER AIRBAG ASSEMBLY

RS0BE-05

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque

N

H07354

RS0BF-05

REMOVAL

NOTICE:

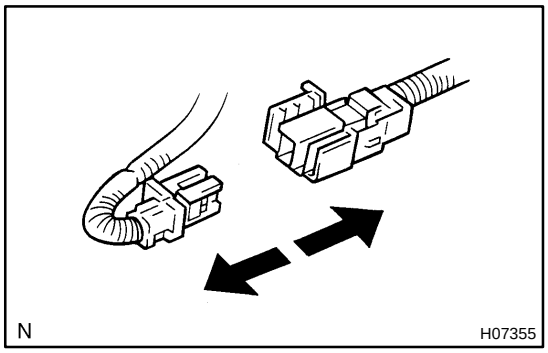
- **If the wiring connector of the SRS is disconnected and the ignition switch is in ON or ACC position, DTCs will be recorded.**
- **Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.**

1. DISCONNECT AIRBAG CONNECTOR

(a) Remove the glove compartment door.

NOTICE:

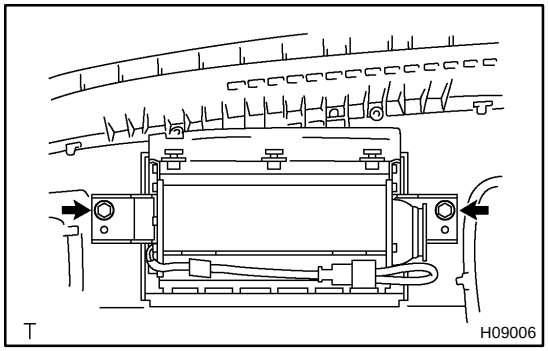
When handling the airbag connector, take care not to damage the airbag wire harness.



(b) Disconnect the front passenger airbag connector.

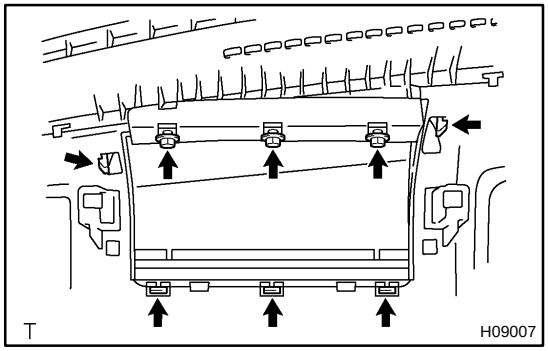
2. REMOVE INSTRUMENT PANEL

(See page BO-69)



3. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

(a) Remove the 2 bolts and front passenger airbag assembly.



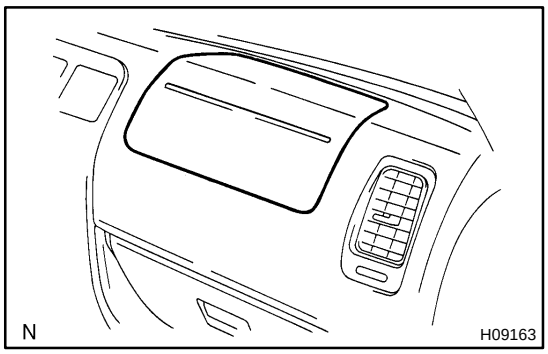
(b) Remove the 3 bolts and instrument panel stay, and pry up the 5 clips shown in the illustration.

CAUTION:

- **Do not store the front passenger airbag assembly with the airbag deployment side facing downward.**
- **Never disassemble the front passenger airbag assembly.**

RS0BG-05

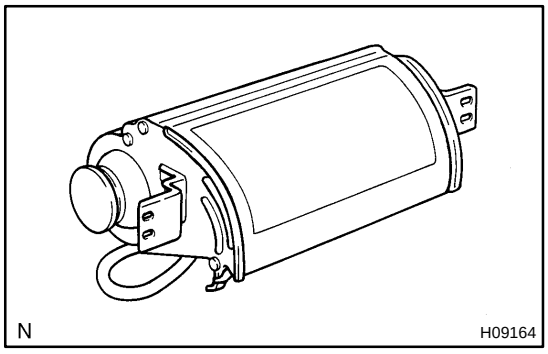
INSPECTION



1. VEHICLES NOT INVOLVED IN COLLISION

(a) Do a diagnostic system check.
(See page DI-377)

(b) Do a visual check which includes the following items with the front passenger airbag assembly installed in the vehicle.
Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly and instrument panel.

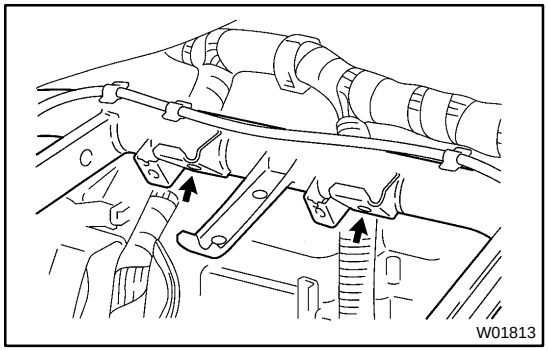


2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

(a) Do a diagnostic system check.
(See page DI-377)

(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.

- Check cuts, minute cracks or marked discoloration on the front passenger airbag assembly.
- Check cuts and cracks in wire harnesses, and for chipping in connectors.
- Check the deformation or cracks on the instrument panel and instrument panel reinforcement.



HINT:
If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

CAUTION:
For removal and installation of the front passenger airbag assembly, see page RS-25 and RS-35 and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

(a) Do a diagnostic system check.
(See page DI-377)

(b) Do a visual check which includes the following items with the front passenger airbag assembly removed from the vehicle.
- Check the deformation or cracks on the instrument panel and instrument panel reinforcement.
- Check the damage on the connector and wire harness.

HINT:
If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

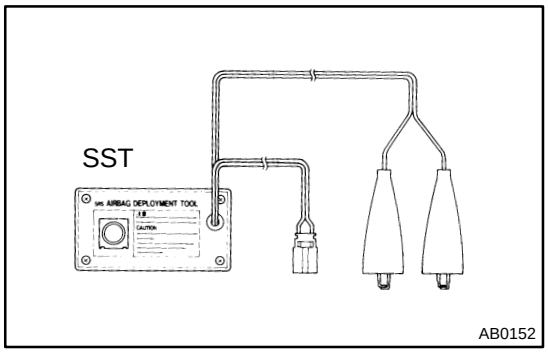
RS0G0-02

DISPOSAL

HINT:

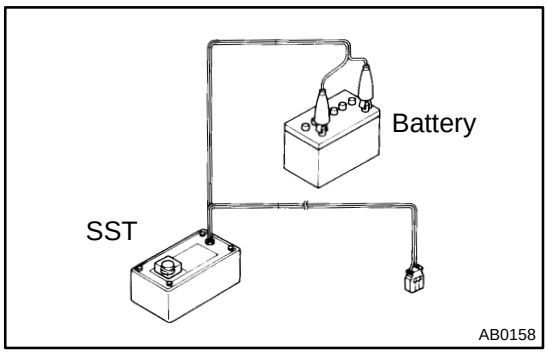
When scrapping vehicle equipped with an SRS or disposing of a front passenger airbag assembly, always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC.

When disposing of a front passenger airbag assembly with an airbag deployed in a collision, follow the same procedure given in step 1-(e) in "DISPOSAL".



CAUTION:

- **Never dispose of a front passenger airbag assembly which has an undeployed airbag.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.**
  SST 09082-00700
- **When deploying an airbag, perform the operation at least 10 m (33 ft) away from the front passenger airbag assembly.**
- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.**



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Check functioning of the SST.
(See page RS-14)

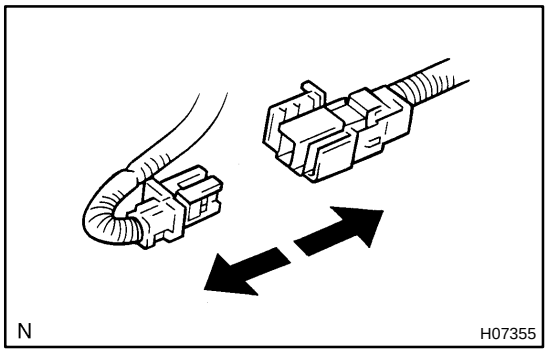
(b) Disconnect the airbag connector.

(1) Remove the glove compartment door.

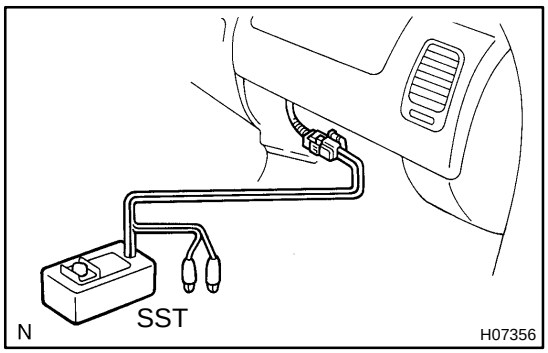
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

(2) Pull up the connector.



(3) Disconnect the airbag connector.



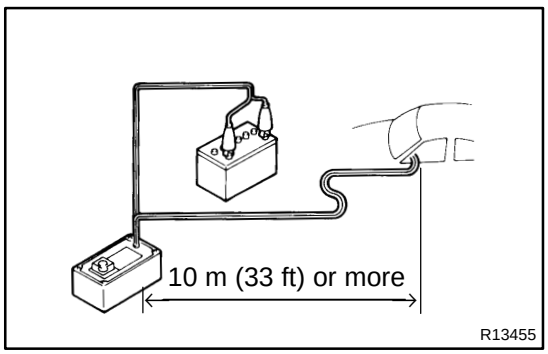
(c) Install the SST.

(1) Connect the SST connector to the front passenger airbag assembly connector.

SST 09082-00700

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



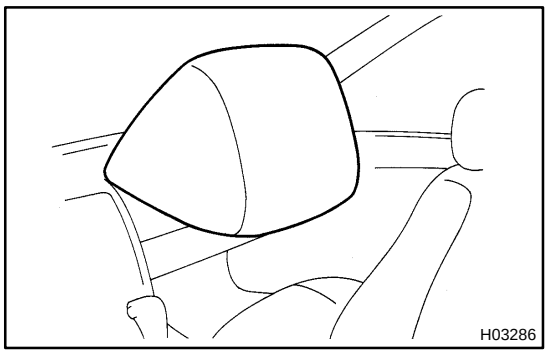
(2) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.

(3) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(4) Connect the SST red clip to the battery positive (+) terminal and the black clip to the negative (-) terminal.


H03286

(d) Deploy the airbag.
(1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.
(2) Press the SST activation switch and deploy the airbag.

HINT:
The airbag deploys simultaneously as the LED of the SST activation switch lights up.

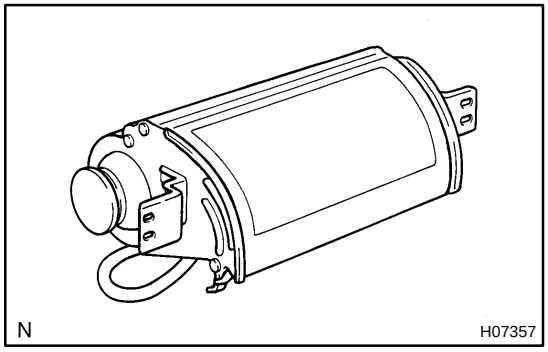
(e) Dispose of the front passenger airbag assembly.

CAUTION:
- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.**
  (1) When scrapping a vehicle, deploy the airbag and scrap the vehicle with the front passenger airbag assembly still installed.
  (2) When moving a vehicle for scrapping which has a front passenger airbag assembly with deployed airbag, use gloves and safety glasses.

2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY ONLY

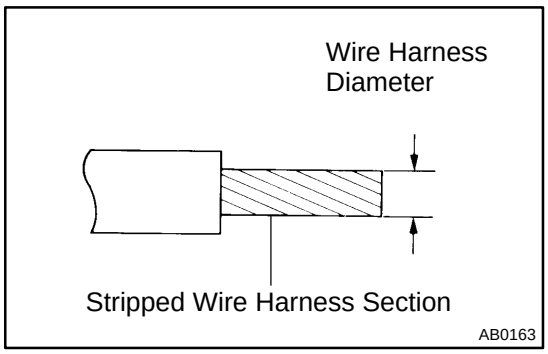
NOTICE:
- **When disposing of the front passenger airbag assembly only, never use the customer's vehicle to deploy the airbag.**
- **Be sure to follow the procedure given below when deploying the airbag.**

HINT:
Have a battery ready as the power source to deploy the airbag.


N H07357

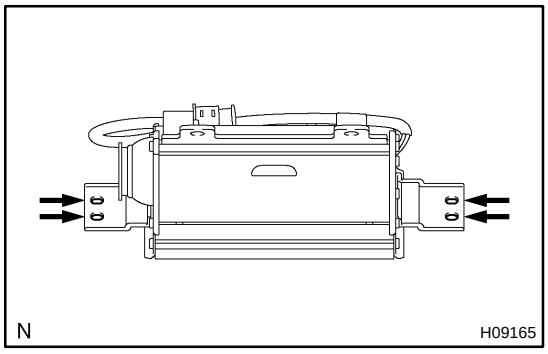
(a) Remove the front passenger airbag assembly.
(See page RS-25)

CAUTION:
- **When removing the front passenger airbag assembly, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.**
- **Store the front passenger airbag assembly with the airbag deployment side facing upward.**



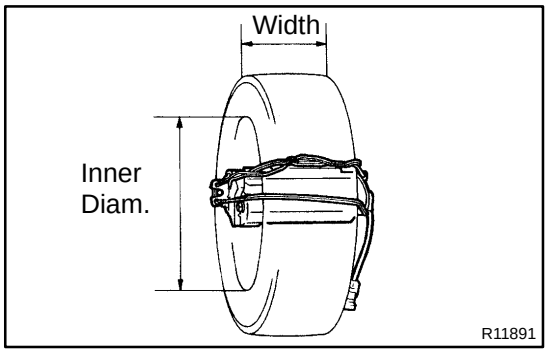
(b) Using a service-purpose wire harness for the vehicle, tie down the front passenger airbag assembly to the tire.
Wire harness: Stripped wire harness section 1.25 mm^2 or more (0.0019 in.^{2} or more)

HINT:
To calculate the square of the stripped wire harness section:
Square = 3.14 X (Diameter)^2 divided by 4



CAUTION:
If the front passenger airbag assembly is tied down with too thin wire harness, it may snap. This is highly dangerous. Always use a wire harness which is at least 1.25 mm^2 (0.0019 in.^{2}).

(1) Wind the wire harness around the tire, passing the wire harness through the installation holes indicated by arrows in the illustration.

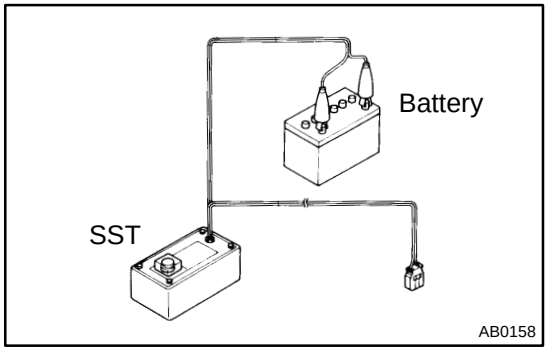


(2) Position the front passenger airbag assembly inside the tire with the airbag deployment side facing inside.

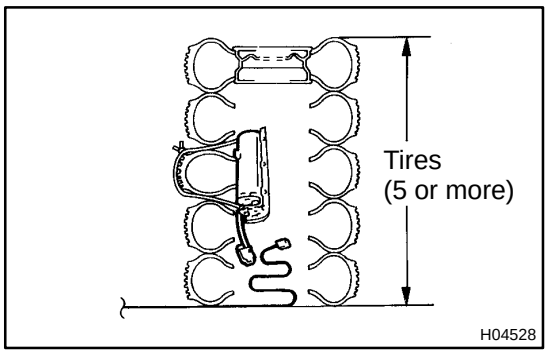
Tire size: Must exceed the following dimensions-
Width: 185 mm (7.28 in.)
Inner diameter: 360 mm (14.17 in.)

CAUTION:
- **Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the front passenger airbag assembly coming free due to the shock from the airbag deploying.**
- **Always tie down the front passenger airbag assembly with the airbag deployment side facing inside.**

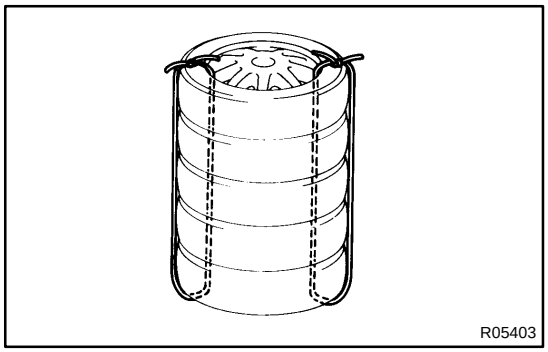
NOTICE:
The tire will be marked by the airbag deployment, so use a redundant tire.



(c) Check functioning of the SST.
SST 09082-00700



(d) Place tires.
(1) Place at least 2 tires under the tire to which the front passenger airbag assembly is tied.
(2) Place at least 2 tires over the tire to which the front passenger airbag assembly is tied. The top tire should have the wheel installed.



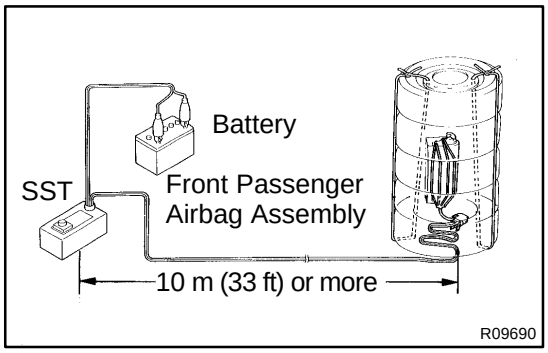
(3) Tie the tires together with 2 wire harnesses.

CAUTION:

Make sure that the wire harnesses are tight. It is very dangerous if loose wire harnesses result in the tires coming free due to the shock from the airbag deploying.

HINT:

Place the SST connector and wire harness inside tires. Provide at least 1 m (3 ft) of slack for the wire harness.



(e) Install the SST.
Connect the SST connector to the front passenger airbag assembly connector.
SST 09082-00700

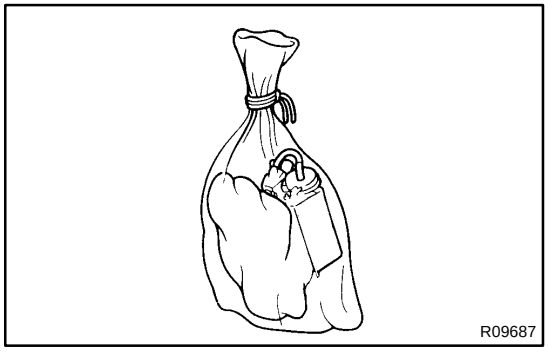
NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

(f) Deploy the airbag
(1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.
(2) Confirm that no one is within 10 m (33 ft) area around the tire which the front passenger airbag assembly is tied to.
(3) Press the SST activation switch and deploy the airbag.

HINT:

The airbag deploys simultaneously as the LED of the SST activation switch lights up.



(g) Dispose of the front passenger airbag assembly.

CAUTION:

- **The front passenger airbag assembly is very hot when the airbag is deployed, so leave it alone for at least 30 minutes after deployment.**
- **Use gloves and safety glasses when handling a front passenger airbag assembly with deployed airbag.**
- **Always wash your hands with water after completing the operation.**

- **Do not apply water, etc. to a front passenger airbag assembly with deployed airbag.**
  (1) Remove the front passenger airbag assembly from the tire.
  (2) Place the front passenger airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

RS0BI-01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

Case	Replacing part
If the airbag has been deployed.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty in trouble-shooting.	Front passenger airbag assembly
If the front passenger airbag assembly has been found to be faulty during checking items. (See page RS-26)	Front passenger airbag assembly
If the instrument panel has been found to be faulty during checking items. (See page RS-26)	Instrument panel
If the instrument panel reinforcement has been found to be faulty during checking items. (See page RS-26)	Instrument panel reinforcement
If the front passenger airbag assembly has been dropped.	Front passenger airbag assembly

CAUTION:

For replacement of the front passenger airbag assembly, see page RS-25 and RS-35 .

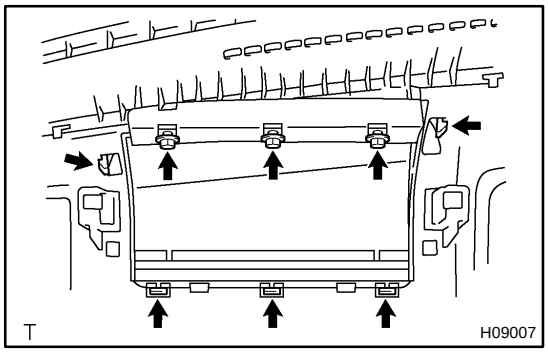
Be sure to follow the correct procedure.

RS0G1-03

INSTALLATION

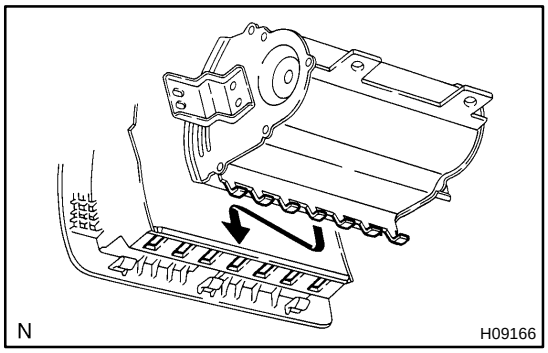
NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.



1. INSTALL FRONT PASSENGER AIRBAG ASSEMBLY

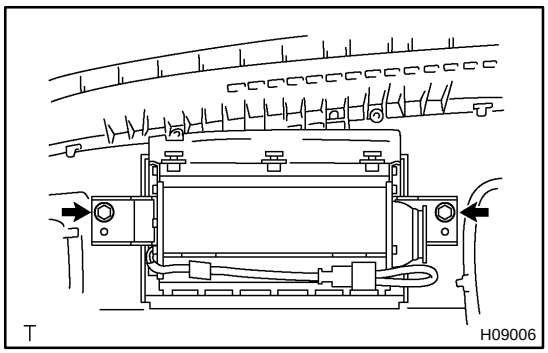
(a) Install the airbag door to the instrument panel and instrumet panel stay with the 3 bolts.



(b) Install the front passenger airbag assembly to the airbag door.

CAUTION:

- **Insert the 7 claws of the passenger airbag assembly into the holes in the airbag door securely.**
- **Make sure that no foreign objects are trapped between the airbag door and bag, and within the module.**

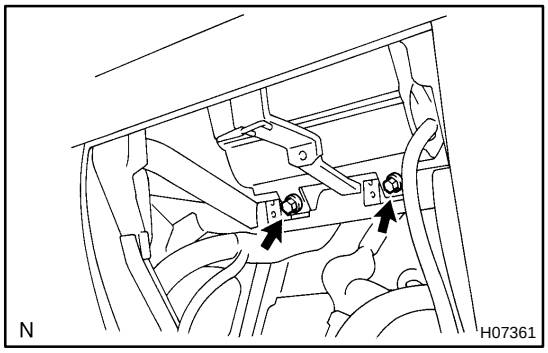


(c) Install the front passenger airbag assembly to the instrument panel with 2 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

If the front passenger airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front passenger airbag assembly with a new one.



2. INSTALL INSTRUMENT PANEL

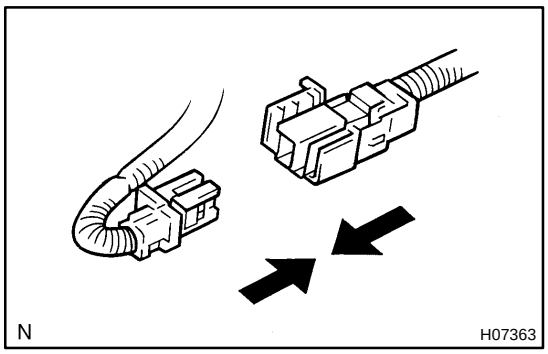
(See page BO-76)

Install the 2 bolts to instrument panel reinforcement.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

NOTICE:

- **Make sure the front passenger airbag assembly is installed with the specified torque.**
- **When installing the instrument panel, take care that the airbag wire harness does not interfere with other parts and is not pinched between other parts.**



3. CONNECT AIRBAG CONNECTOR

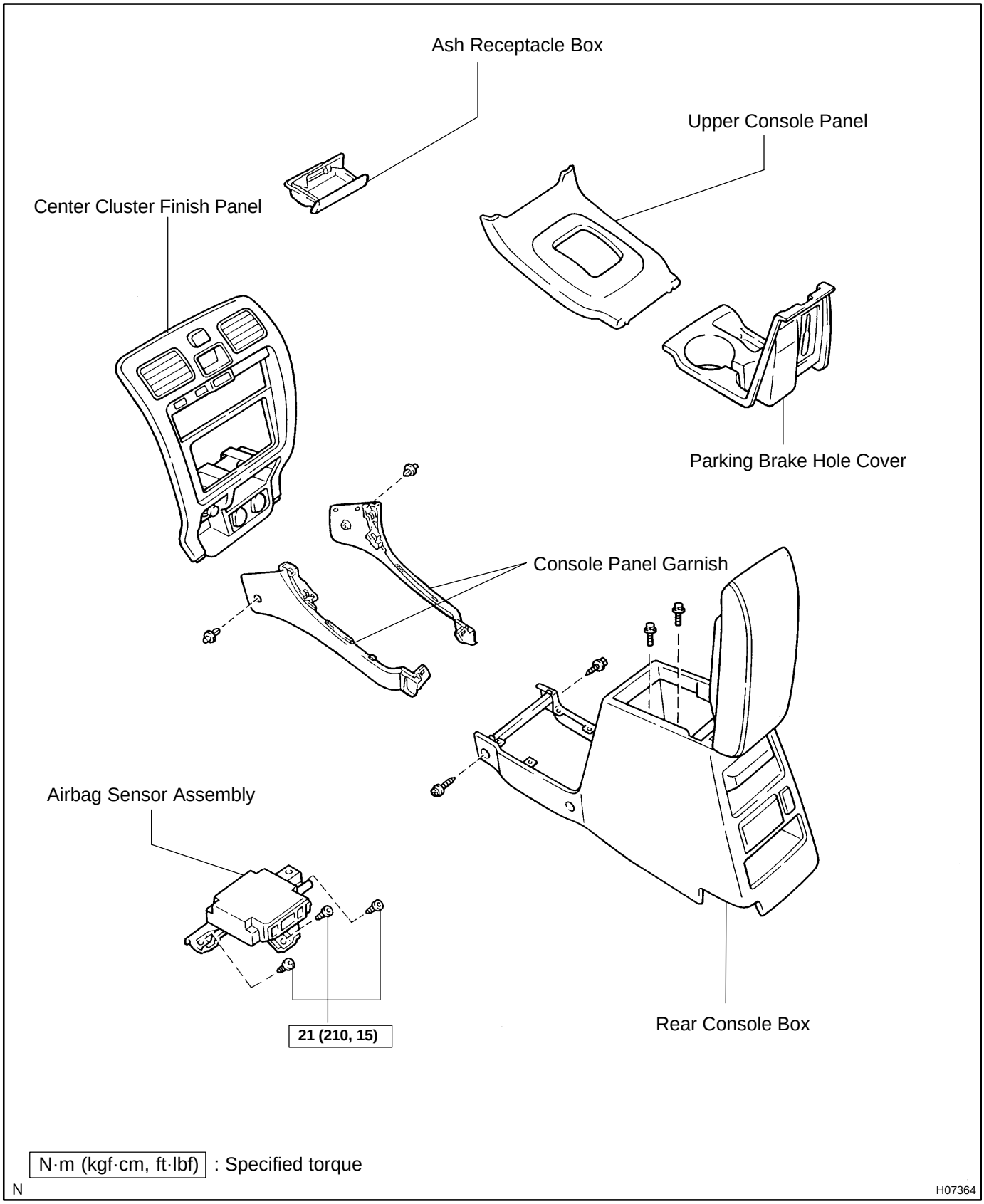
(a) Connect the airbag connector.

(b) Install the glove compartment door.

AIRBAG SENSOR ASSEMBLY

COMPONENTS

RS0BK-05



RS0BL-05

REMOVAL

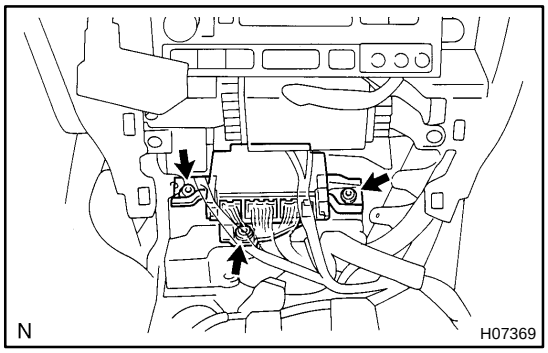
NOTICE:

Do not open the cover or the case of the ECU and various electrical devices unless absolutely necessary (If the IC terminals are touched, the IC may be destroyed by static electricity.).

HINT:

For step 1 to 6, refer to page BO-66 .

1. **REMOVE UPPER CONSOLE PANEL**
2. **REMOVE PARKING BRAKE HOLE COVER**
3. **REMOVE REAR CONSOLE BOX**
4. **REMOVE CONSOLE PANEL GARNISH**
5. **REMOVE ASH RECEPTACLE BOX**
6. **REMOVE CENTER CLUSTER FINISH PANEL**



7. **REMOVE AIRBAG SENSOR ASSEMBLY**

(a) Disconnect the airbag sensor connector.

NOTICE:

Remove the connector with the airbag sensor assembly installed.

(b) Using a torx wrench, remove the 3 screws and airbag sensor assembly.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)

RS0BM-01

INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page DI-377)

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check. (See page DI-377)

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly. (See page RS-37)

RS0BN-02

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the airbag sensor assembly.

- If the SRS has been deployed in a collision.
- If the airbag sensor assembly has been found to be faulty in troubleshooting.
- If the airbag sensor assembly has been dropped.

CAUTION:

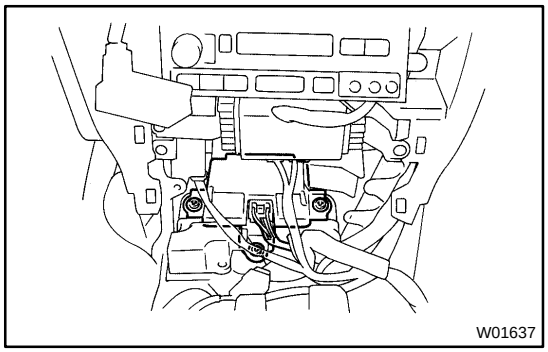
For removal and installation of the airbag sensor assembly, see page RS-38 and RS-41 . Be sure to follow the correct procedure.

RS0BO-05

INSTALLATION

NOTICE:

- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the airbag sensor assembly involved in a collision when the airbag has deployed.**
- **Never repair a sensor in order to reuse it.**



1. INSTALL AIRBAG SENSOR ASSEMBLY

(a) Using a torx wrench, install the airbag sensor assembly with 3 screws.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

(b) Connect the airbag sensor connector.

NOTICE:

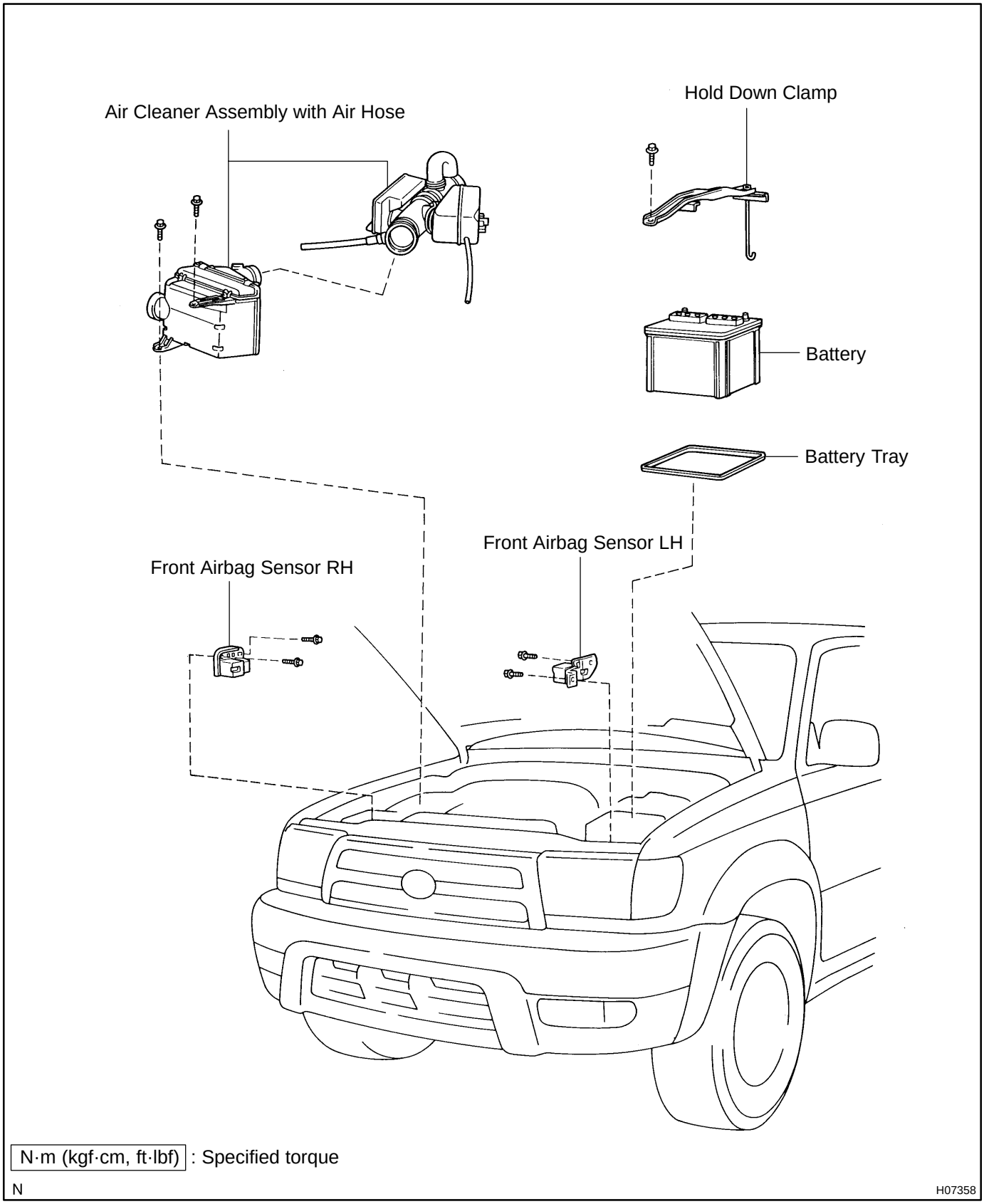
- **Installation of the connector is done after the sensor assembly has been installed.**
- **Make sure the sensor assembly is installed with the specified torque.**
- **If the sensor assembly has been dropped, or there are cracks, dents or other defects in the case, bracket or connector, replace the sensor assembly with a new one.**
- **When installing the senor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.**
- **After installing , shake the sensor assembly to check that there is no looseness.**

2. INSTALL REMOVED PARTS

FRONT AIRBAG SENSOR

COMPONENTS

RS0BP-05



N·m (kgf·cm, ft·lbf) : Specified torque

N

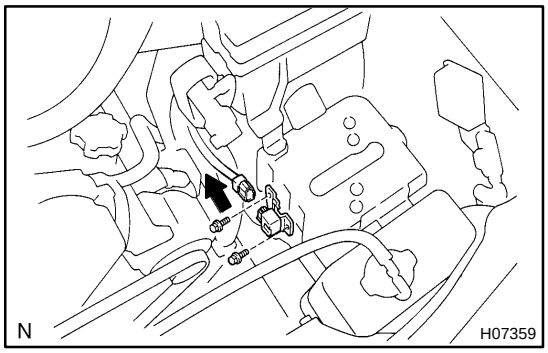
H07358

RS0BQ-06

REMOVAL

NOTICE:

- **If the wiring connector of the SRS is disconnected with the ignition switch at ON or ACC position, DTCs will be recorded.**
- **Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.**
- **Never reuse the sensor involved in a collision when the SRS has deployed.**
- **Never repair a sensor in order to reuse it.**



1. LH:

REMOVE FRONT AIRBAG SENSOR

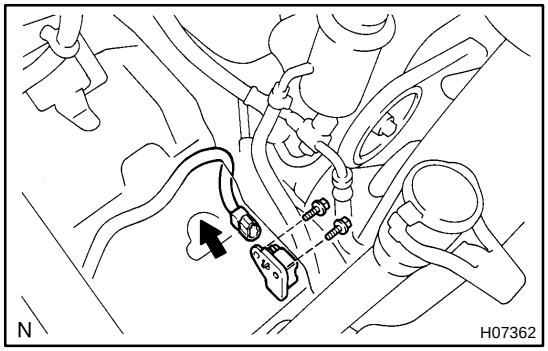
(a) Remove the hold down clamp, battery and battery tray.

(b) Disconnect the front airbag sensor connector.

NOTICE:

Disconnect the connector with sensor assembly installed.

(c) Remove the 2 bolts and front airbag sensor.



2. RH:

REMOVE FRONT AIRBAG SENSOR

(a) Remove the air cleaner assembly with air hose.

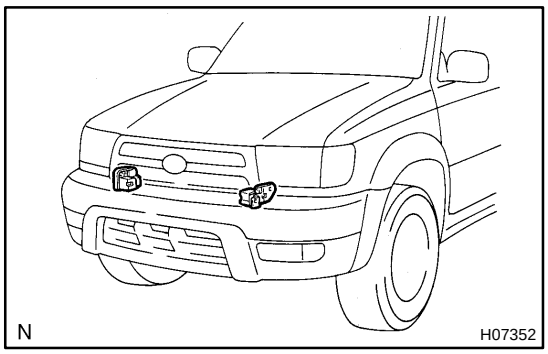
(b) Disconnect the front airbag sensor connector.

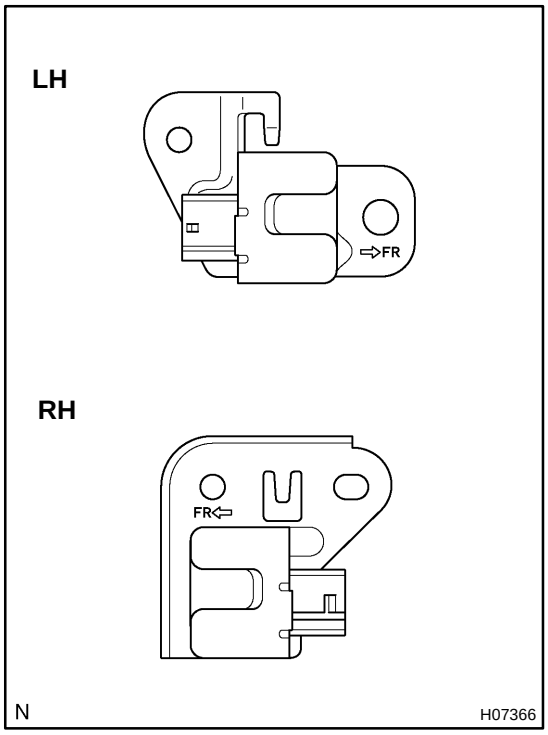
NOTICE:

Disconnect the connector with sensor assembly installed.

(c) Remove the 2 bolts and front airbag sensor.

RS0BR-05





INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check.
(See page DI-377)

2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check.
(See page DI-377)

(b) If the front fender of the car or its periphery is damaged, do a visual check for damage to the front airbag sensor, which includes the following items even if the airbag was not deployed:

- Bracket deformation
- Paint peeling off the bracket
- Cracks, dents or chips in the case
- Cracks, dents, chipping and scratches in the connector
- Peeling off of the label or damage to the serial number

RS0BS-01

REPLACEMENT

REPLACEMENT REQUIREMENTS

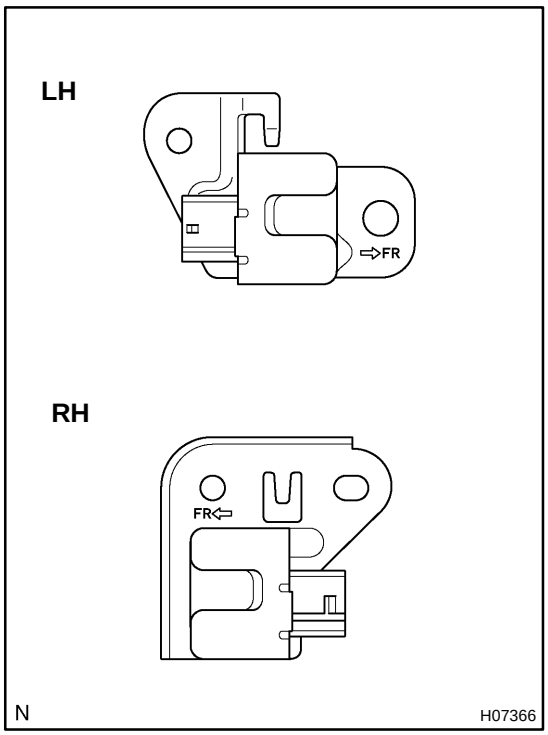
In the following cases, replace the front airbag sensor.

- If the SRS has been deployed in a collision. (Replace both the left and right airbag sensors.)
- If the front airbag sensor has been found to be faulty in troubleshooting.
- If the front airbag sensor has been found to be faulty during checking items.
  (See page RS-44)
- If the front airbag sensor has been dropped.

CAUTION:

For removal and installation of the front airbag sensor, see page RS-43 and RS-46 .
Be sure to follow the correct procedure.

RS0BT-05



INSTALLATION

1. INSTALL FRONT AIRBAG SENSOR

(a) Install the front airbag sensor with the arrow on the sensor facing toward the front of the vehicle.

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

NOTICE:

- **Connection of the connector is done after the sensor has been installed.**
- **Make sure the sensor is installed with the specified torque.**
- **If the sensor has been dropped, or there are cracks, dents or other defects in the case, brackets or connector, replace the removed sensor with a new one.**
- **The front sensor is equipped with an electrical connection check mechanism. Be sure to lock this mechanism securely when connecting the connector. If the connector is not securely locked, a malfunction code will be detected by the diagnostic system.**

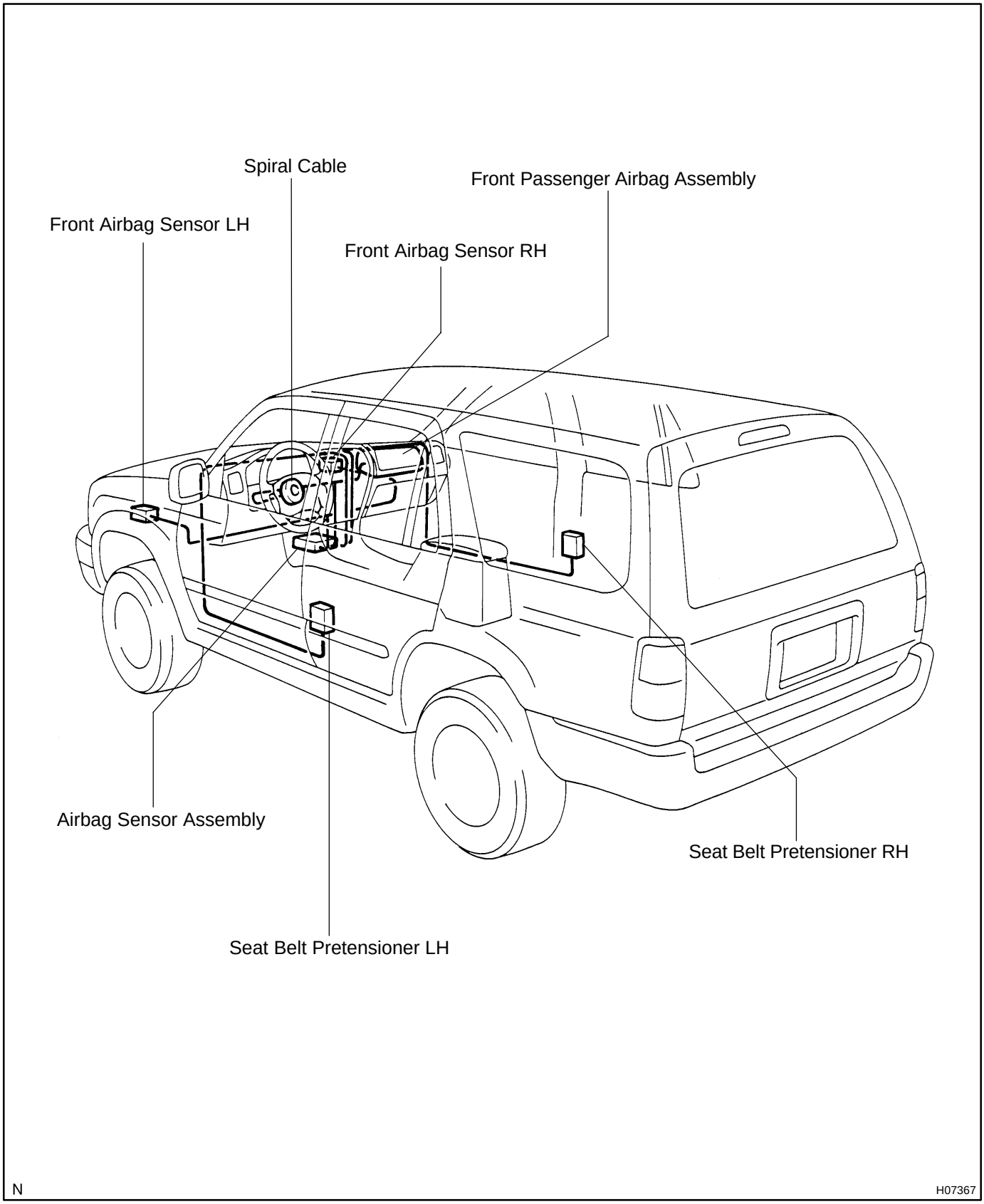
(b) Connect the front airbag sensor connector.

2. INSTALL REMOVED PARTS

WIRE HARNESS AND CONNECTOR

RS0BU-04

LOCATION



RS0BV-02

INSPECTION

HINT:

The SRS wire harness is integrated with the cowl wire harness assembly. All the connectors in the system are a standard yellow color.

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page DI-377)

2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check. (See page DI-377)

(b) Check for breaks in all wires of the SRS wire harness, and for exposed conductors.

(c) Check to see if the SRS wire harness connectors are cracked or chipped.

RS0BW-01

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the wire harness or connector.

- If any part of the SRS wire harness or any connector has been found to be faulty in troubleshooting.
- If any part of the SRS wire harness or any connector has been found to be faulty during checking items 2-(b) or (c). (See page RS-48)

NOTICE:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

BODY ELECTRICAL SYSTEM

BE06D-01

PRECAUTION

HINT:

Be sure to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. HEADLIGHT SYSTEM

Halogen bulbs have pressurized gas inside and require special handling. They can burst if scratched or dropped. Hold a bulb only by its plastic or metal case. Do not touch the glass part of a bulb with bare hands.

2. SRS (SUPPLEMENTAL RESTRAINT SYSTEM)

The 4 RUNNER is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

3. AUDIO SYSTEM

If the negative (-) terminal cable is disconnected from the battery, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to note the stations and reset them after the negative (-) terminal cable is reconnected to the battery.

4. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

TROUBLESHOOTING

BE11G-04

PROBLEM SYMPTOMS TABLE

HEADLIGHT AND TAILLIGHT SYSTEM (w/o Daytime Running Light):

Symptom	Suspect Area	See page
Only one side headlight does not light	5. HEAD RH or LH Fuse (Engine Room R/B) 6. Headlight Bulb 7. Wire Harness	BE-13 - -
”Lo-Beam” or ”Hi-Beam” does not light	1. Headlight Dimmer Switch 2. Wire Harness	BE-15 -
”Flash” does not light	1. Headlight Dimmer Switch 2. Wire Harness	BE-15 -
Headlight does not light (Taillight is normal)	1. Headlight Control Relay (Engine Room R/B) 2. Light Control Switch 3. Headlight Dimmer Switch 4. HEAD RH and LH Fuse (Engine Room R/B) 5. Wire Harness	BE-15 BE-15 BE-13 BE-15 -
Headlight and taillight do not light	1. Light Control Switch 2. Wire Harness	BE-15 -
Only one side taillight does not light	1. Taillight Bulb 2. Wire Harness	- -
Taillight does not light (Headlight is normal)	1. TAIL Fuse (Engine Room R/B) 2. Taillight Control Relay (Engine Room R/B) 3. Light Control Switch) 4. Wire Harness 5. Taillight Bulb	BE-15 BE-15 BE-13 - -

HEADLIGHT AND TAILLIGHT SYSTEM (w/ Daytime Running Light):

Symptom	Suspect Area	See page
”Lo-Beam” does not light (All) (Daytime running light system is normal)	1. DRL Fuse (Engine Room R/B) 2. No. 4 Daytime Running Light Relay 3. Wire Harness	BE-15 BE-13 -
”Lo-Beam” does not light (All) (Daytime running light system is not normal)	1. Headlight Control Relay (Engine Room R/B) 2. Light Control Switch 3. Daytime Running Light Relay 4. HEAD (LO LH) and (LO RH) Fuse (Engine Room R/B) 5. Headlight Bulb 6. Wire Harness	BE-13 BE-13 BE-13 BE-13 - -
”Lo-Beam” does not light (One side)	1. HEAD (LO LH) or (LO RH) Fuse (Engine Room R/B) 2. Headlight Bulb 3. Wire Harness	BE-13 - -
”Hi-Beam” does not light (All)	1. Headlight Dimmer Relay (Engine Room R/B) 2. Headlight Dimmer Switch 3. Daytime Running Light Relay 4. HEAD LH and RH Fuse (Engine Room R/B) 5. Headlight Bulb 6. Wire Harness	BE-13 BE-13 BE-13 BE-13 - -
”Hi-Beam” does not light (One side)	1. HEAD LH or RH Fuse (Engine Room R/B) 2. Headlight Bulb 3. Wire Harness	BE-13 - -
”Flash” does not light	1. Headlight Dimmer Relay (Engine Room R/B) 2. Headlight Dimmer Switch 3. Daytime Running Light Relay 4. Wire Harness	BE-13 BE-13 BE-13 -

Headlight does not light (Taillight is normal)	1. Headlight Control Relay (Engine Room R/B) 2. Headlight Dimmer Relay (Engine Room R/B) 3. DRL Fuse (Engine Room R/B) 4. Light Control Switch 5. Daytime Running Light Relay 6. Daytime Running Light No.4 Relay 7. Wire Harness	BE-13 BE-13 BE-13 BE-13 BE-13 BE-13 -
Headlight and taillight do not light	1. Light Control Switch 2. Wire Harness	BE-13 -
Only one side taillight does not light	1. Taillight Bulb 2. Wire Harness	- -
Taillight does not light (Headlight is normal)	1. TAIL Fuse (Engine Room R/B) 2. Taillight Control Relay (Engine Room R/B) 3. Light Control Switch 4. Wire Harness 5. Taillight Bulb	BE-13 BE-13 BE-13 - -
Daytime running light system does not operate	1. DOME Fuse (Engine Room R/B) 2. GAUGE Fuse (Driver Side J/B) 3. IGN Fuse (Driver Side J/B) 4. Daytime Running Light Relay 5. Daytime Running Light Resistor 6. Parking Brake Switch 7. Wire Harness	BE-13 BE-13 BE-13 BE-13 BE-45 BE-13 -

TURN SIGNAL AND HAZARD WARNING SYSTEM:

Symptom	Suspect Area	See page
”Hazard” and ”Turn” do not light	1. Hazard Warning Switch 2. Turn Signal Flasher (Driver Side J/B) 3. Wire Harness	BE-24 BE-24 -
The flashing frequency is abnormal	1. Bulb 2. Turn Signal Flasher (Driver Side J/B) 3. Wire Harness	- BE-24 -
Hazard warning light does not light (Turn signal is normal)	1. HORN Fuse (Engine Room R/B) 2. Wire Harness	BE-23 -
Turn signal does not light (Combination meter, wiper and washer do not operate)	1. Ignition Switch 2. TURN Fuse (Driver Side J/B) 3. Turn Signal Switch 4. Wire Harness	BE-23 BE-24 BE-12 -
Turn signal does not light (Combination meter, wiper and washer are normal)	1. Turn Fuse (Driver Side J/B) 2. Turn Signal Switch 3. Wire Harness	BE-24 BE-23 -
Turn signal does not light in one direction	1. Turn Signal Switch 2. Wire Harness	BE-24 -
Only one bulb does not light	1. Bulb 2. Wire Harness	- -

INTERIOR LIGHT SYSTEM:

Symptom	Suspect Area	See page
Interior light does not light	1. DOME Fuse (Engine Room R/B) 2. Wire Harness	BE-25 -
Front interior light does not light	1. Bulb 2. Door Courtesy Switch 3. Front Interior Light Switch 4. Wire Harness	- BE-26 BE-26 -

Rear interior light does not light	1. Bulb 2. Back Door Courtesy Switch 3. Rear Interior Light Switch 4. Wire Harness	- BE-26 BE-26 -
Front interior light remains on	1. Front Interior Light Switch 2. Door Courtesy Switch 3. Wire Harness	BE-26 BE-26 -
Rear interior light remains on	1. Rear Interior Light Switch 2. Back Door Courtesy Switch 3. Wire Harness	BE-26 BE-26 -
Personal light does not light	1. Bulb 2. Personal Light Switch 3. Wire Harness	- BE-26 -
Vanity light does not light	1. Bulb 2. Vanity Light 3. Wire Harness	- BE-26 -

BACK-UP LIGHT SYSTEM:

Symptom	Suspect Area	See page
Back-up light does not light	1. GAUGE Fuse (Driver Side J/B) 2. Park/Neutral Position Switch (A/T) 3. Back-up Light Switch (M/T) 4. Bulb 5. Wire Harness	- DI-203 BE-30 - -
Back-up light remains on	1. Park/Neutral Position Switch (A/T) 2. Back-up Light Switch (M/T) 3. Wire Harness	DI-203 BE-30 -
Only one light does not light	1. Bulb 2. Wire Harness	- -

STOP LIGHT SYSTEM:

Symptom	Suspect Area	See page
Stop light does not light	1. STOP Fuse (Engine Room R/B) 2. Stop Light Switch 3. Bulb 4. Wire Harness	BE-32 BE-31 - -
Stop light remains on	1. Stop Light Switch 2. Wire Harness	BE-32 -
Only one light does not light	1. Wire Harness 2. Bulb	- -

WIPER AND WASHER SYSTEM:

Symptom	Suspect Area	See page
Front wipers do not operate	1. WIPER Fuse (Driver Side J/B) 2. Wiper and Washer Switch 3. Front Wiper Motor 4. Wire Harness	BE-34 BE-34 BE-33 -
Front wipers do not operate in MIST, INT, LO or HI position	1. Wiper and Washer Switch 2. Front Wiper Motor 3. Wire Harness	BE-34 BE-34 -
Front washer motor does not operate	1. Wiper and Washer Switch 2. Front Wiper Motor 3. Wire Harness	BE-34 BE-34 -
Front wipers do not operate when washer switch on	1. Wiper and Washer Switch	BE-34

Rear wiper does not operate	1. WIPER Fuse (Driver Side J/B) 2. Rear Wiper Motor 3. Rear Wiper and Washer Switch 4. Window Limit Switch 5. Back Door Control Relay 6. Wire Harness	BE-34 BE-34 BE-73 BE-73 BE-33 -
Rear wiper does not operate in INT or ON position	1. Rear Wiper and Washer Switch 2. Back Door Control Relay 3. Wire Harness	BE-34 BE-73 -
Rear wiper does not return to off position	1. Rear Wiper Motor 2. Back Door Control Relay 3. Wire Harness	BE-34 BE-73 -
Rear washer motor does not operate	1. Rear Washer Motor 2. Rear Wiper and Washer Switch 3. Window Limit Switch 4. Back Door Control Relay 5. Wire Harness	BE-34 BE-73 BE-34 BE-73 -

COMBINATION METER:

Symptom	Suspect Area	See page
Tachometer, speedometer, engine coolant temperature gauge and fuel gauge do not operate	1. GAUGE Fuse (Driver Side J/B) 2. Meter Circuit 3. Wire Harness	BE-39 BE-40 -
Speedometer does not operate	1. Skid Control ECU 2. Meter Circuit 3. Wire Harness	DI-244 BE-40 -
Tachometer does not operate	1. ECM 2. Meter Circuit 3. Wire Harness	- BE-40 -
Fuel gauge does not operate or operates abnormally	1. Fuel Receiver Gauge 2. Fuel Sender Gauge 3. Meter Circuit 4. Wire Harness	BE-45 BE-45 BE-40 -
Engine coolant temperature gauge does not operate or operates abnormally	1. Engine Coolant Temperature Receiver Gauge 2. Engine Coolant Temperature Sender Gauge 3. Meter Circuit 4. Wire Harness	BE-45 BE-45 BE-40 -
All illumination lights do not light	1. TAIL Fuse (Engine Room R/B) 2. Taillight Control Relay 3. Light Control Rheostat 4. Wire Harness	BE-39 BE-15 BE-45 -
Only one illumination light does not light	1. Bulb 2. Meter Circuit	- BE-40
Warning lights do not light up (Except discharge, SRS and door open)	1. GAUGE Fuse (Driver Side J/B) 2. Meter Circuit 3. Wire Harness	BE-39 BE-40 -
Brake warning light does not light	1. Bulb 2. Brake Fluid Level Switch 3. Parking Brake Switch 4. Bulb Check Relay 5. Meter Circuit 6. Wire Harness	- BE-45 BE-45 BE-45 BE-40 -

ATF temperature warning light does not light	1. Bulb 2. ATF Temperature Sensor 3. ECM 4. Meter Circuit 5. Wire Harness	- DI-182 - BE-40 -
Door open warning light does not light	1. Bulb 2. Door Courtesy Switch 3. Back Door Courtesy Switch 4. DOME Fuse (Engine Room R/B) 5. Meter Circuit 6. Wire Harness	- BE-45 BE-26 BE-40 BE-26 -
SRS warning light does not light	1. Bulb 2. Airbag Sensor Assembly 3. ECU-B Fuse (Driver Side J/B) 4. Meter Circuit 5. Wire Harness	- - BE-45 BE-40 -
Discharge warning light does not light	1. Bulb 2. IGN Fuse (Driver Side J/B) 3. Generator 4. Meter Circuit 5. Wire Harness	- BE-45 - BE-40 -
Seat belt warning light does not light	1. Bulb 2. Buckle Switch 3. Meter Circuit 4. Wire Harness	- BE-45 BE-40 -
ABS warning light does not light	1. Bulb 2. Skid Control ECU 3. Meter Circuit 4. Wire Harness	- DI-244 BE-40 -
Low oil pressure warning light does not light	1. Bulb 2. Low Oil Pressure Warning Switch 3. Meter Circuit 4. Wire Harness	- BE-45 BE-40 -
Fuel level warning light does not light	1. Bulb 2. Meter Circuit 3. Wire Harness	- BE-40 -
Unengaged ”Park” warning light does not light	1. Bulb 2. Park/Neutral Position Switch 3. Transfer Neutral Position Switch 4. Meter Circuit 5. Wire Harness	- DI-203 TR-11 BE-40 -
Turn indicator light does not light	1. Bulb 2. Turn Signal and Hazard Warning System 3. Meter Circuit 4. Wire Harness	- BE-24 BE-40 -
High beam indicator light does not light	1. Bulb 2. Headlight and Taillight System 3. Meter Circuit 4. Wire Harness	- BE-15 BE-40 -
A/T PWR indicator light does not light	1. Bulb 2. A/T Pattern Select Switch 3. Meter Circuit 4. Wire Harness	- DI-214 BE-40 -

4WD indicator light does not light	1. Bulb 2. A.D.D. Switch 3. Meter Circuit 4. Wire Harness	- SA-49 BE-40 -
Washer level indicator light does not light	1. Bulb 2. Window Washer Level Warning Switch 3. Meter Circuit 4. Wire Harness	- BE-45 BE-40 -
O/D OFF indicator light does not light	1. Bulb 2. O/D Main Switch 3. Meter Circuit 4. Wire Harness	- DI-218 BE-40 -
Malfunction indicator light does not light	1. Bulb 2. ECM 3. Wire Harness	- DI-3 -
Cruise control indicator light does not light	1. Bulb 2. ECM 3. Meter Circuit 4. Wire Harness	- DI-471 BE-40 -
Rear DIFF. lock indicator light does not light	1. Bulb 2. DIFF. Lock Indicator Switch 3. Meter Circuit 4. Wire Harness	- SA-118 BE-40 -

DEFOGGER SYSTEM:

Symptom	Suspect Area	See page
Defogger system does not operate	1. GAUGE Fuse (Driver Side J/B) 2. DEFOG Fuse (Engine Room R/B) 3. Defogger Switch 4. Defogger Relay 5. Wire Harness	BE-57 BE-57 BE-58 BE-58 -

POWER WINDOW CONTROL SYSTEM:

Symptom	Suspect Area	See page
Power window does not operate (All) (Power door lock does not operate)	1. POWER Fuse (Driver Side J/B) 2. Combination meter 3. Wire Harness	BE-64 BE-45 -
Power window does not operate (All) (Power door lock is normal)	1. Ignition Switch 2. Power Main Relay (Driver Side J/B) 3. Power Window Master Switch 4. Wire Harness	BE-12 BE-65 BE-65 -
”One Touch Power Window System” does not operate	1. Power Window Master Switch	BE-65
Only one window glass does not operate	1. Power Window Master Switch 2. Power Window Switch 3. Power Window Motor 4. Wire Harness	BE-65 BE-65 BE-65 -
”Window Lock System” does not operate	1. Power Window Master Switch	BE-65
”Window Lock Illumination” does not light	1. Power Window Master Switch	BE-65
”Key-Off Power Window” does not operate	1. Combination meter 2. Ignition Switch 3. Door Courtesy Switch 4. Wire Harness	BE-45 BE-12 BE-26 -

BACK DOOR POWER WINDOW SYSTEM:

Symptom	Suspect Area	See page
Back door power window does not operate	1. POWER Fuse (Driver Side J/B)	BE-72
	2. Window Limit Switch	BE-34
	3. Rear Wiper Motor	BE-73
	4. Back Door Power Window Switch	BE-72
	5. Back Door Control Switch	BE-72
	6. w/o Power Window:	
	Back Door Window Lock Switch	BE-72
	7. w/ Power Window:	
	Power Window Master Switch	BE-72
	8. Back Door Power Window Motor	BE-72
	9. Back Door Control Relay	BE-72
	10.Wire Harness	-

POWER DOOR LOCK CONTROL SYSTEM:

Symptom	Suspect Area	See page
Power door lock control system does not operate (All)	1. POWER Fuse (Driver Side J/B)	BE-75
	2. Power source circuit (Terminal PWR)	BE-75
	3. Body ECU	-
Power door lock control system can not be operated by door lock control switch or back door lock switch	1. w/ Power Window:	BE-76
	Door Lock Control Switch	
	2. w/o Power Window:	BE-76
	Back Door Lock Switch	
	3. Integration Relay (Driver Side J/B)	BE-76
	4. Wire Harness	-
Power door lock control system can not be operated by door key	1. Door Key Lock and Unlock Switch	BE-76
	2. Back Door Control Switch	BE-76
	3. Wire Harness	-
	4. Body ECU	BE-76
Only one door does not operate	1. Door Lock Motor	BE-76
	2. Door Lock Link Disconnected	-
	3. Wire Harness	-
Fault in key confine prevention operation	1. Key Unlock Warning Switch	BE-12
	2. Door Courtesy Switch	BE-26
	3. Wire Harness	-
	4. Body ECU	BE-75

SLIDING ROOF SYSTEM:

Symptom	Suspect Area	See page
Sliding roof system does not operate	1. POWER Fuse (Driver Side J/B)	BE-76
	2. Power MAIN Relay (Driver Side J/B)	BE-65
	3. Sliding Roof Control Switch with Relay	BE-104
	4. Sliding Roof Motor	BE-104
	5. Wire Harness	-
Sliding roof system operates abnormally	1. Limit Switch	BE-104
	2. Sliding Roof Control Switch with Relay	BE-104
Sliding roof system stops operation half way	1. Sliding Roof Control switch with Relay	BE-104
	2. Limit Switch	BE-104
	3. Sliding Roof Motor	BE-104
	(Stones or foreign material trapped in motor assembly)	

POWER SEAT CONTROL SYSTEM:

Symptom	Suspect Area	See page
Power seat does not operate	1. POWER Fuse (Driver Side J/B) 2. Power Seat Switch 3. Wire Harness	BE-106 BE-107 -
”Sliding operation” does not operate	1. Slide Motor 2. Power Seat Switch 3. Wire Harness	BE-107 BE-107 -
”Reclining operation” does not operate	1. Reclining Motor 2. Power Seat Switch 3. Wire Harness	BE-107 BE-107 -
”Rear vertical operation” does not operate	1. Rear Vertical Motor 2. Power Seat Switch 3. Wire Harness	BE-107 BE-107 -
”Lumber support operation” does not operate	1. Lumber Support Motor 2. Lumber Support Switch 3. Wire Harness	BE-107 BE-107 -

POWER MIRROR SYSTEM:

Symptom	Suspect Area	See page
Power mirror system does not operate	1. ACC Fuse (Driver Side J/B) 2. Mirror Control Switch 3. Mirror Motor 4. Wire Harness	BE-113 BE-114 BE-114 -
Power mirror operates abnormally	1. Mirror Control Switch 2. Mirror Mortor 3. Wire Harness	BE-114 BE-114 -

SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Driver’s seat heater does not operate	1. SEAT HTR Fuse 2. Seat Heater Switch (D, P) 3. Seat Heater 4. Wire Harness	BE-10 BE-117 BE-117 -
Passenger’s seat heater does not operate	1. SEAT HTR Fuse 2. Seat Heater Switch (D, P) 3. Seat Heater 4. Wire Harness	BE-10 BE-117 BE-117 -
Seat heater temperature is too hot	1. Seat Heater	BE-117

GARAGE DOOR OPENER SYSTEM

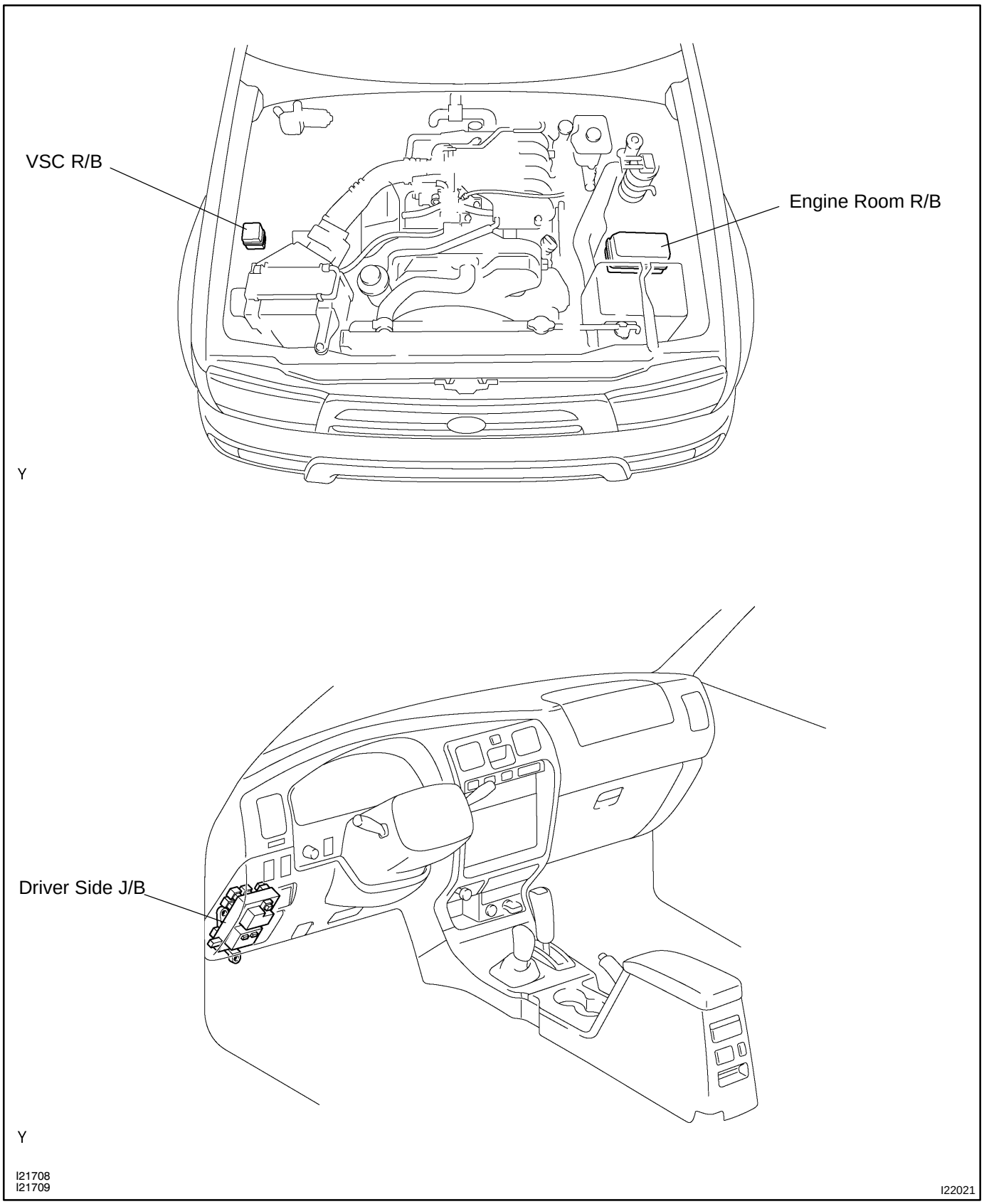
Symptom	Suspect Area	See page
Equipment of which code has been registered does not operate	1. Garage Door Opener 2. Wire Harness 3. *	BE-162 - -
LED does not light (Even though one switch is pressed)	1. Garage Door Opener 2. Wire Harness	BE-162 -
LED does not light (Only one switch is pressed)	1. Garage Door Opener	BE-162

* As the GARAGE DOOR OPENER on the vehicle side seems to be normal, check the OPENER, of which code has been registered on the equipment side.

POWER SOURCE

LOCATION

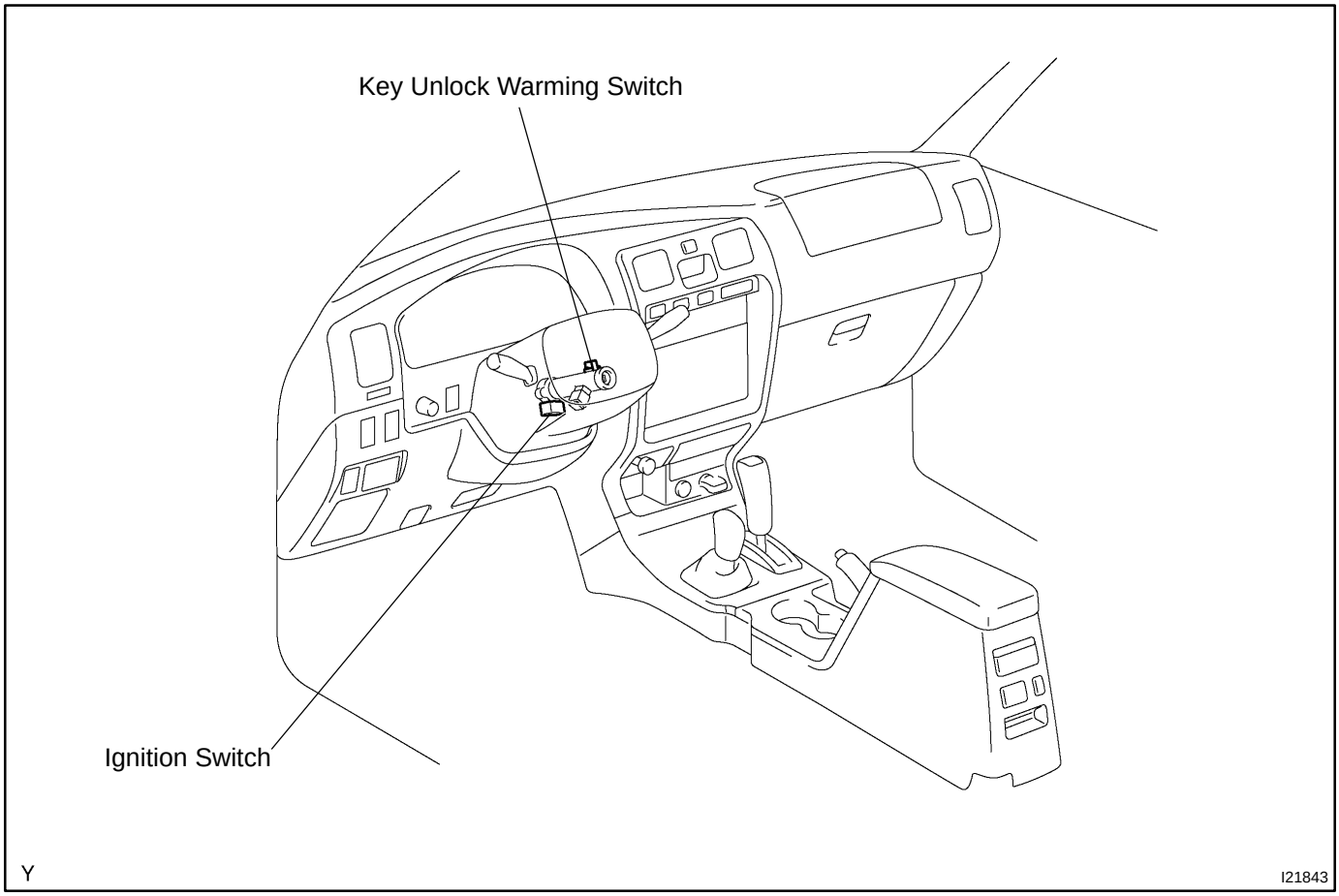
BE06F-03



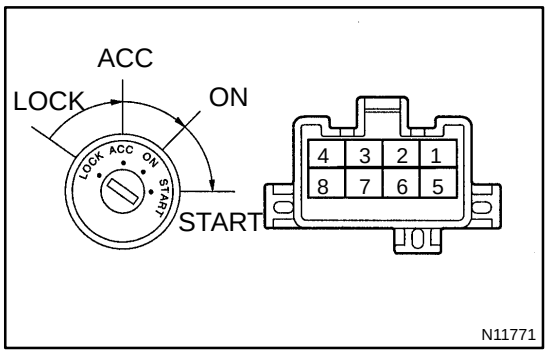
IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH

BE06G-03

LOCATION



BE11H-02

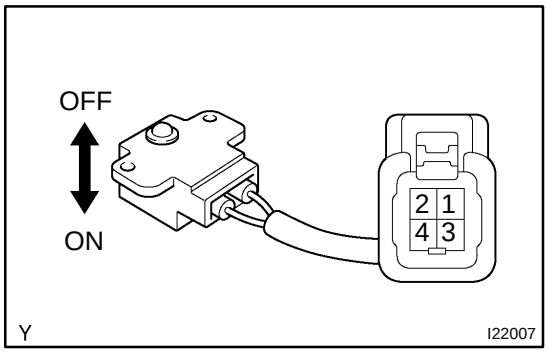


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
-	LOCK	-
2 - 3	ACC	Continuity
2 - 3 - 4	ON	Continuity
6 - 7		
1 - 2 - 4	START	Continuity
6 - 7 - 8		

If the continuity is not as specified, replace the switch.



2. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

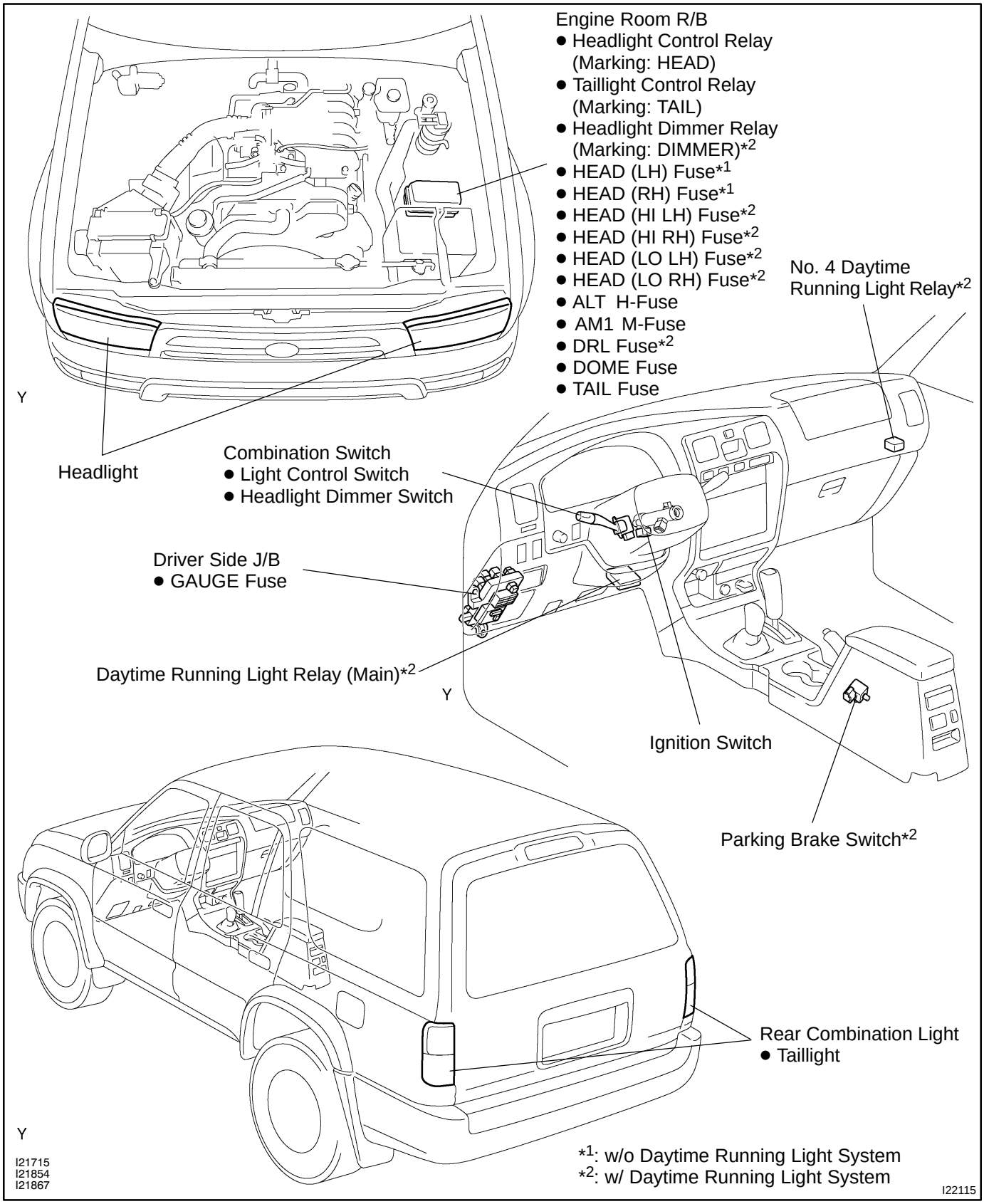
Tester connection	Switch position	Specified condition
1 - 2	OFF (Key removed)	No continuity
	ON (Key set)	Continuity

If the continuity is not as specified, replace the switch.

HEADLIGHT AND TAILLIGHT SYSTEM

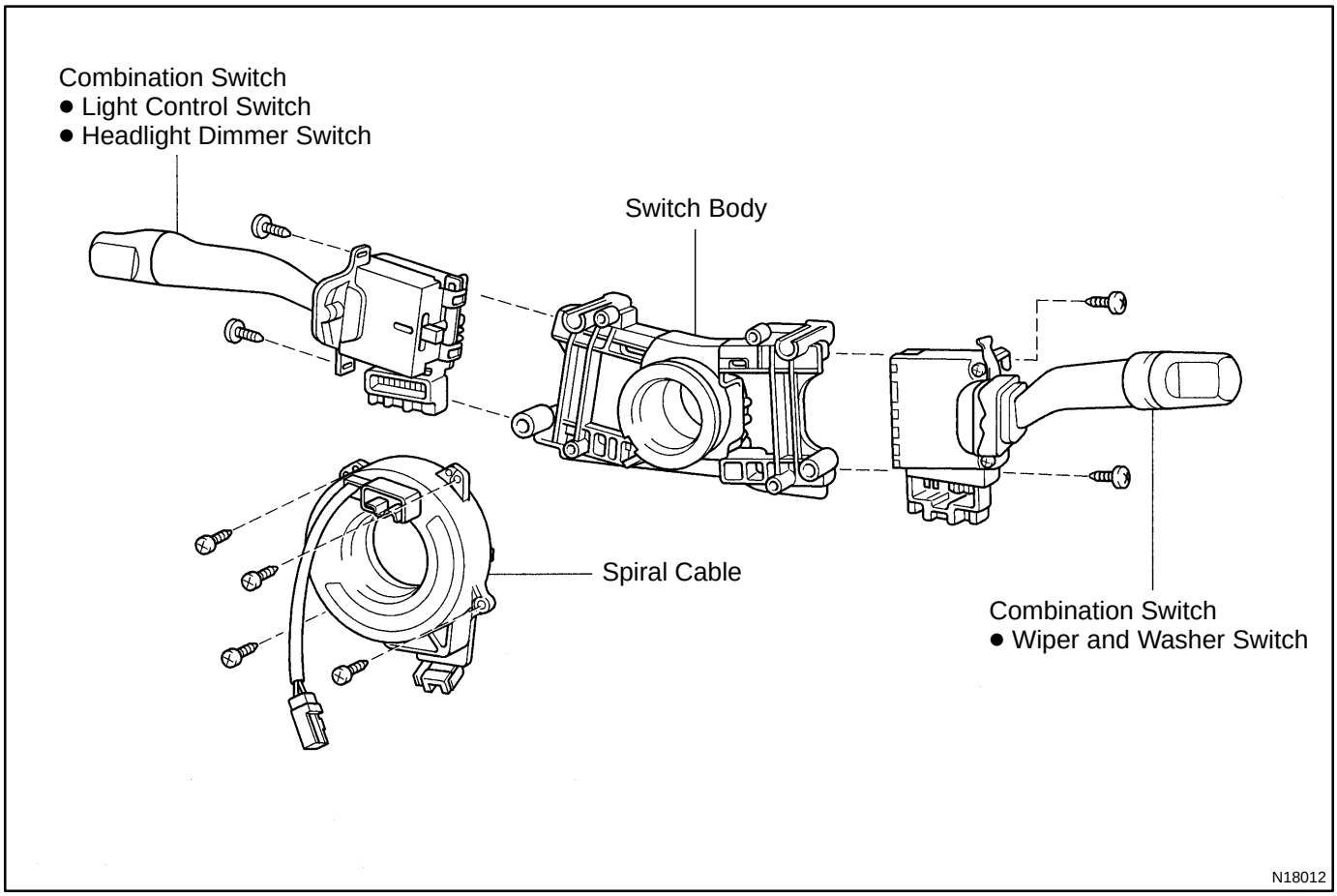
BE06I-03

LOCATION



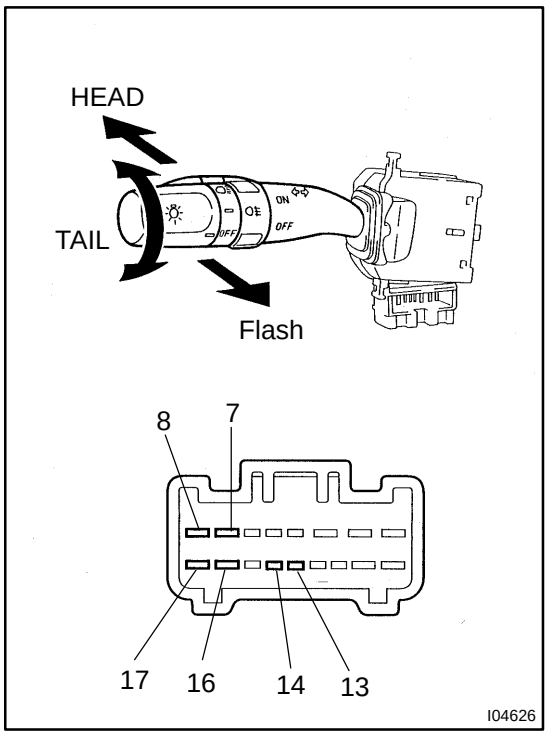
BE06J-02

COMPONENTS



BE23V-01

INSPECTION



1. INSPECT LIGHT CONTROL SWITCH CONTINUITY

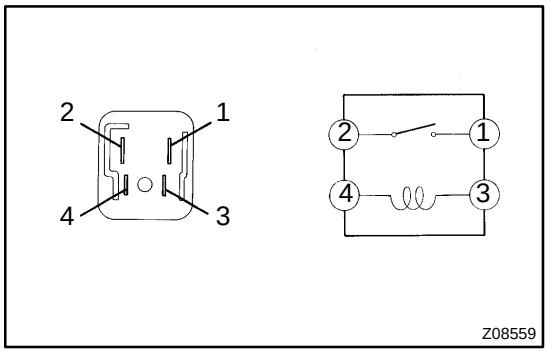
Tester connection	Switch position	Specified condition
-	OFF	No continuity
14 - 16	TAIL	Continuity
13 - 14 - 16	HEAD	Continuity

If the continuity is not as specified, replace the switch.

2. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
16 - 17	Low beam	Continuity
7 - 16	High beam	Continuity
7 - 8 - 16	Flash	Continuity

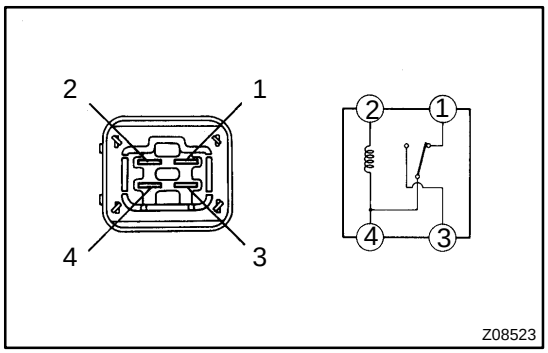
If the continuity is not as specified, replace the switch.



3. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY

Tester connection	Condition	Specified condition
3 - 4	Constant	Continuity
1 - 2	Apply B+ between terminals 3 and 4	Continuity

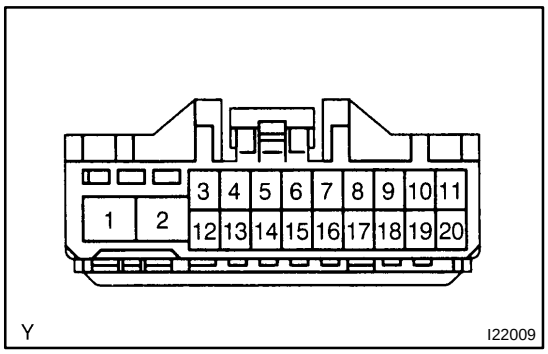
If the continuity is not as specified, replace the relay.



4. INSPECT HEADLIGHT DIMMER RELAY CONTINUITY

Tester connection	Condition	Specified condition
1 - 4	Constant	Continuity
2 - 4		
3 - 4	Apply B+ between terminals 2 and 4	Continuity

If the continuity is not as specified, replace the relay.

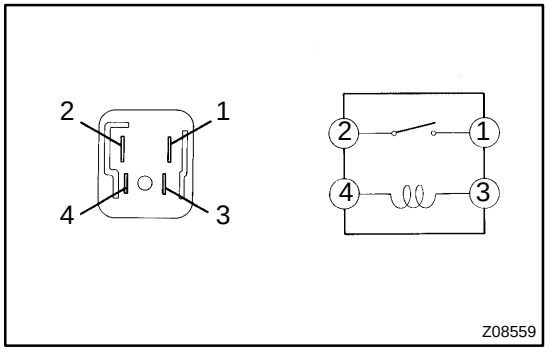


5. INSPECT DAYTIME RUNNING LIGHT RELAY (MAIN) CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 - 4	Constant	Continuity
2 - Ground	Constant	Continuity
3 - Ground	Constant	Battery positive voltage
5 - Ground	Constant	Continuity
6 - Ground	Constant	Battery positive voltage
7 - Ground	Light control switch position OFF or TAIL	No continuity
	Light control switch position HEAD	Continuity
8 - Ground	Headlight dimmer switch position Low beam	No continuity
	Headlight dimmer switch position High beam or Flash	Continuity
9 - Ground	Engine stop	No voltage
	Engine running	Battery positive voltage
11 - Ground	Parking brake switch position OFF Parking brake lever released	No continuity
	Parking brake switch position ON Parking brake lever pulled up	Continuity
12 - Ground	Ignition switch position LOCK or ACC	No voltage
	Ignition switch position ON or START	Battery positive voltage

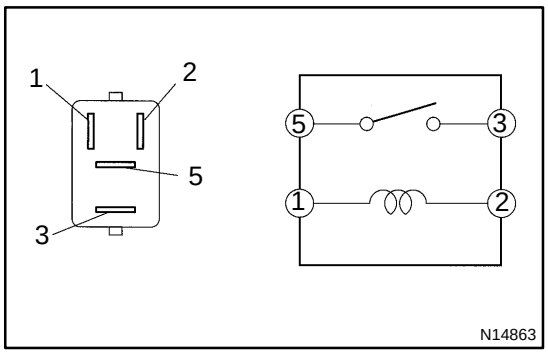
If the circuit is as specified, perform the following inspections.



6. INSPECT NO. 4 DAYTIME RUNNING LIGHT RELAY CONTINUITY

Tester connection	Condition	Specified condition
3 - 4	Constant	Continuity
1 - 2	Apply B+ between terminals 3 and 4	Continuity

If the continuity is not as specified, replace the relay.



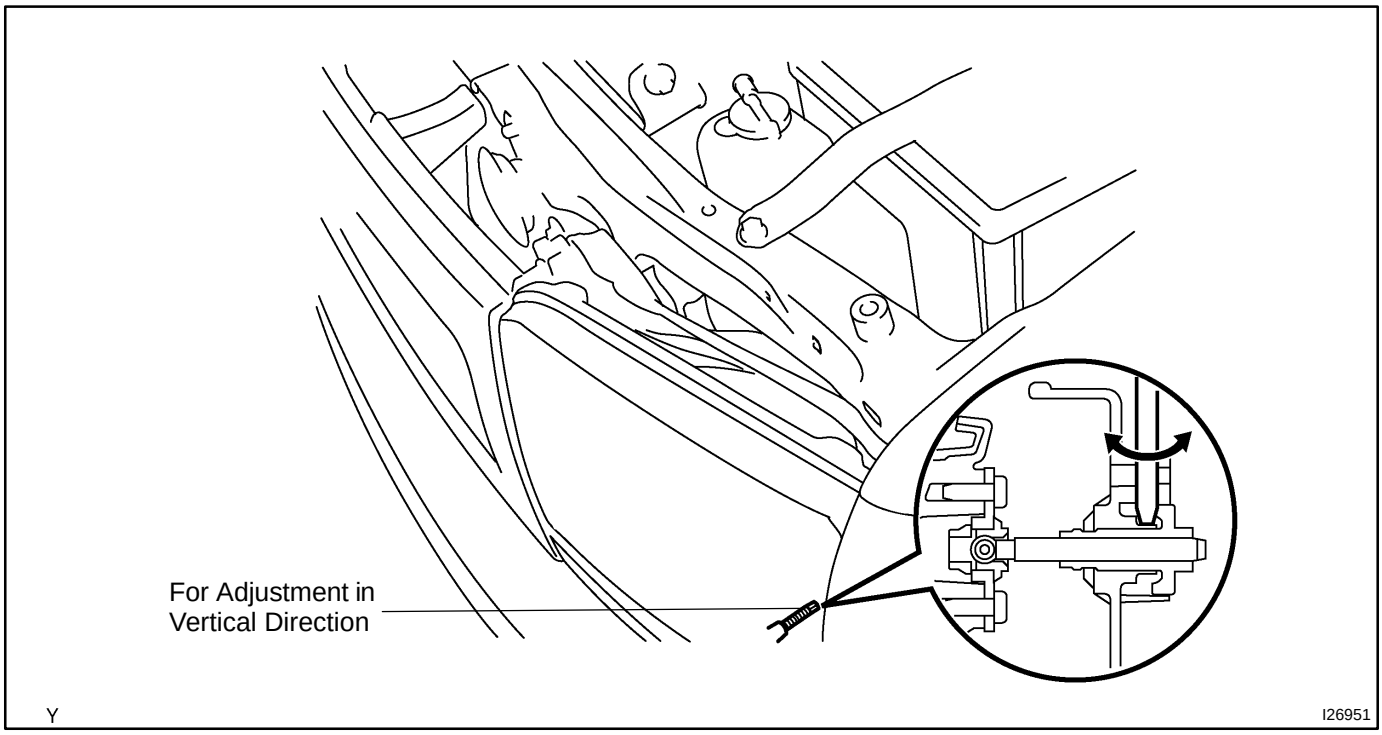
7. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY

Tester connection	Condition	Specified condition
1 - 2	Constant	Continuity
3 - 5	Apply B+ between terminals 1 and 2	Continuity

If the continuity is not as specified, replace the relay.

BE23W-01

ADJUSTMENT



ADJUST HEADLIGHT AIM ONLY

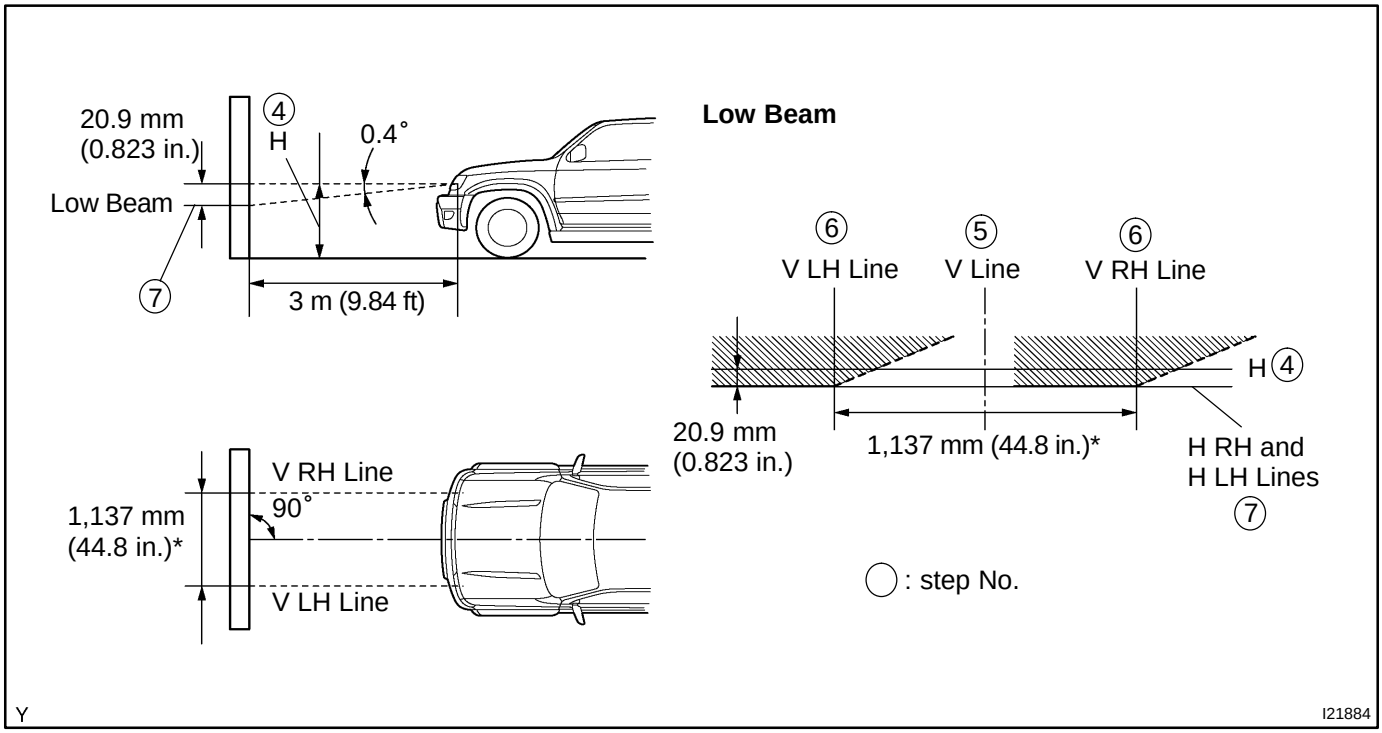
(a) Place the vehicle in the following conditions.
- The area around the headlight is not deformed.
- The vehicle is parked on a level surface.
- Tire inflation pressure is the specified value.
- A driver is in the driver's seat and the vehicle is in a state ready for driving (with a tank full).
- The vehicle has been bounced several times.

(b) Check the headlight aiming.
(1) Prepare a thick white paper.
(2) Stand the paper perpendicular to the ground at the position 9.84 ft away from the headlights.
(3) Ensure that the center line of the vehicle and the paper face forms a 90-degree angle as shown in the illustration.
(4) Draw a horizontal line (H line) on the paper, showing where the headlights should strike.
(5) Draw a vertical line (V line) to where the center line of the vehicle is to be.
(6) Draw 2 vertical lines to where the the headlights should strike (V RH and V LH lines).
(7) Draw a horizontal line (by connecting the both low beam center marks) to where the headlights should strike (H RH and H LH lines).

HINT:

The H RH and H LH line is 0.4° below the horizontal line (H line) of the light axis.

(8) Start the engine.
(9) Turn the headlights ON.
(10) Check that the headlights properly strike the position shown in the illustration.
(11) If not, adjust the lights in the vertical direction.



HINT:

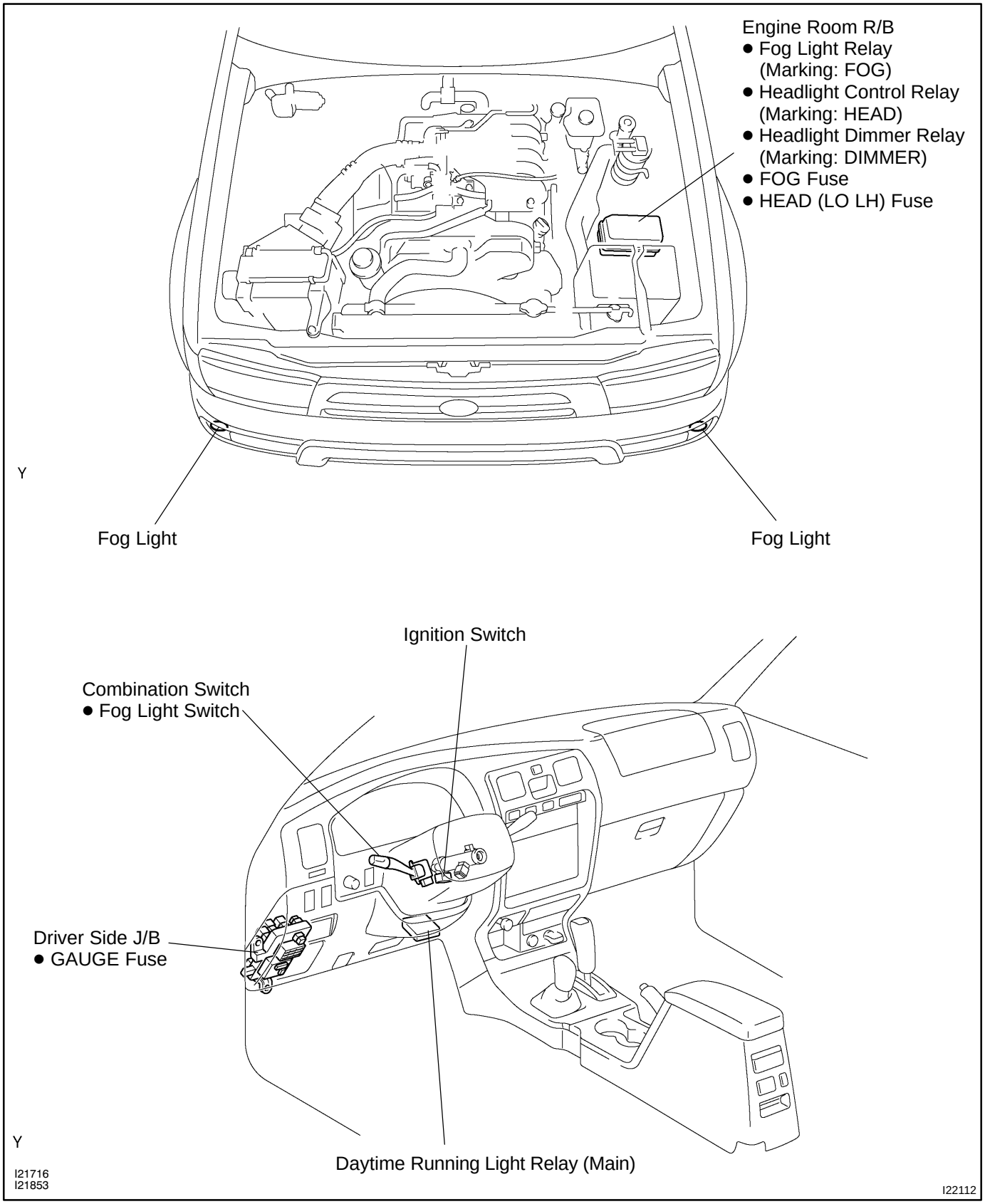
- As shown in the illustration, adjust each aim of the RH and LH lights.
- The "*" marked values in the illustration are reference values.

(c) When adjusting it in the vertical direction:
Using adjusting bolt, adjust the headlight aim to within the specified range.

FOG LIGHT SYSTEM

LOCATION

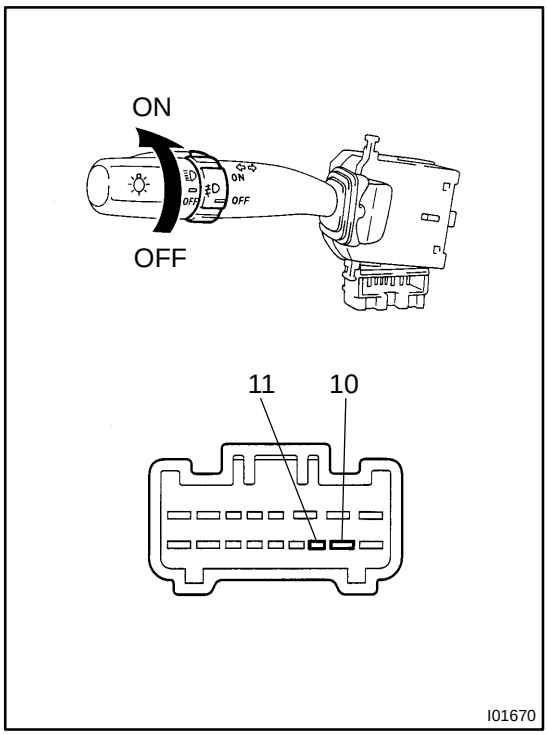
BE0DU-04



BE0DV-04

INSPECTION

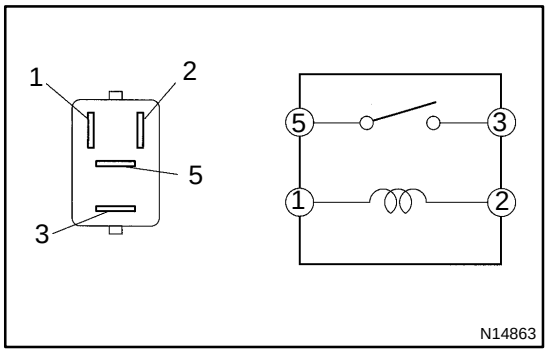
1. INSPECT FOG LIGHT SWITCH CONTINUITY



Tester connection	Condition	Specified condition
-	OFF	No continuity
10 - 11	ON	Continuity

If the continuity is not as specified, replace the switch.

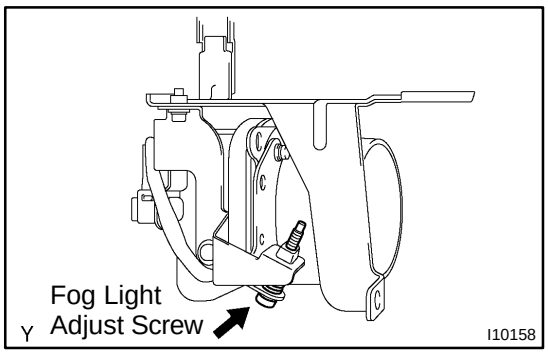
2. INSPECT FOG LIGHT RELAY CONTINUITY



Tester connection	Condition	Specified condition
1 - 2	Constant	Continuity
3 - 5	Apply B+ between terminals 1 and 2	Continuity

If the continuity is not as specified, replace the relay.

BE0DW-02



ADJUSTMENT

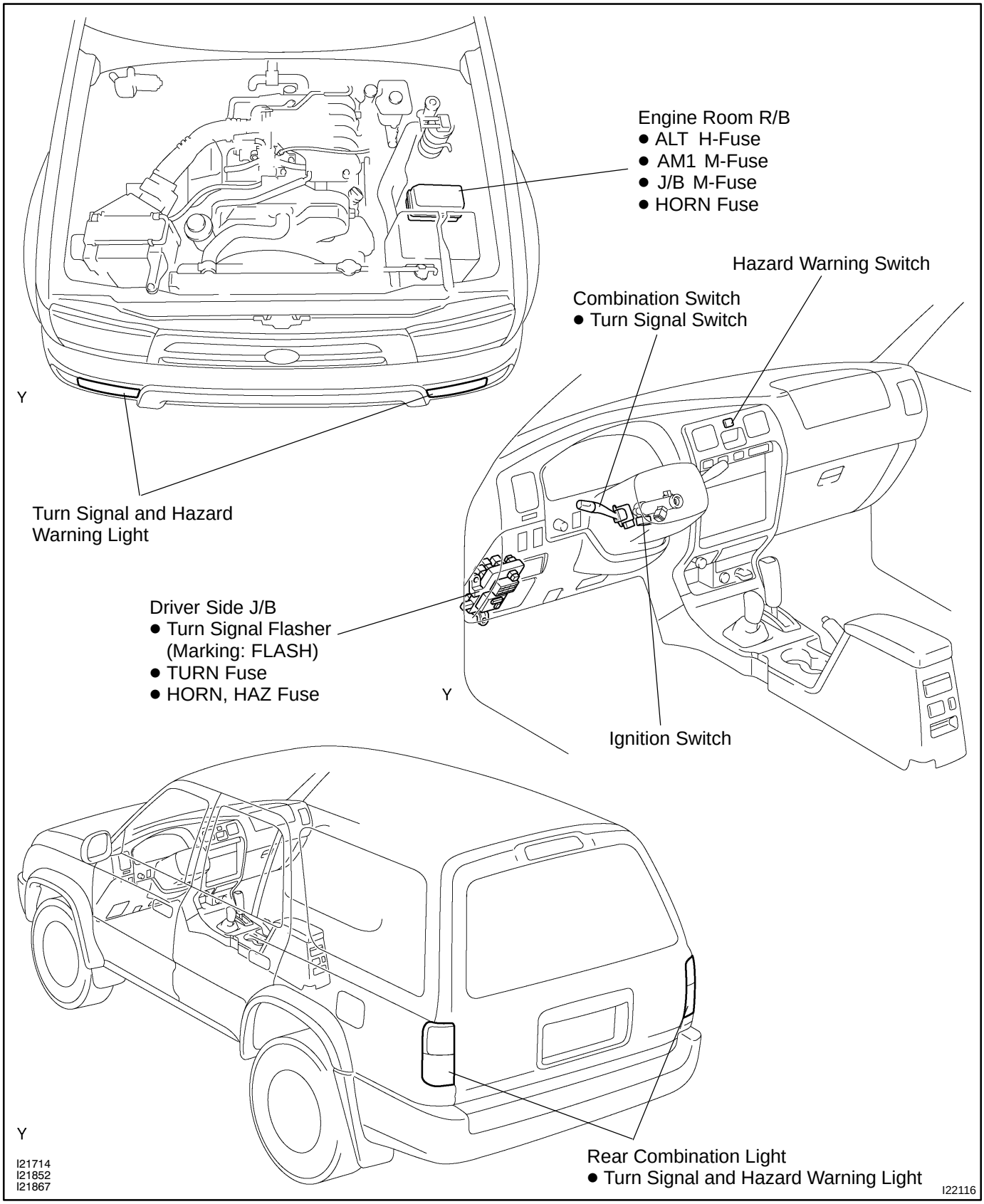
ADJUST FOG LIGHT AIM

Adjust screw: Vertical direction

TURN SIGNAL AND HAZARD WARNING SYSTEM

BE06M-03

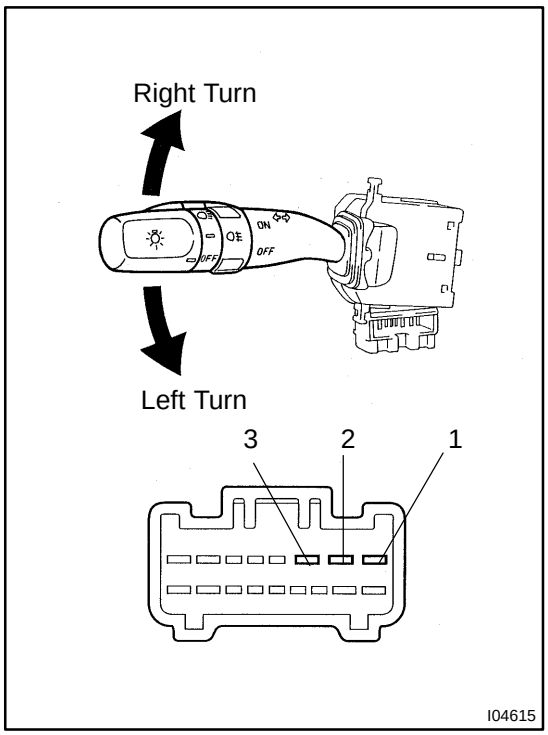
LOCATION



BE06N-03

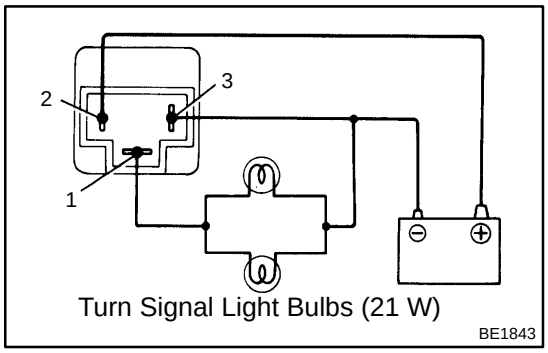
INSPECTION

1. INSPECT TURN SIGNAL SWITCH CONTINUITY



Tester connection	Switch position	Specified condition
1 - 2	Left turn	Continuity
-	Neutral	No continuity
2 - 3	Right turn	Continuity

If the continuity is not as specified, replace the switch.



2. INSPECT TURN SIGNAL FLASHER OPERATION

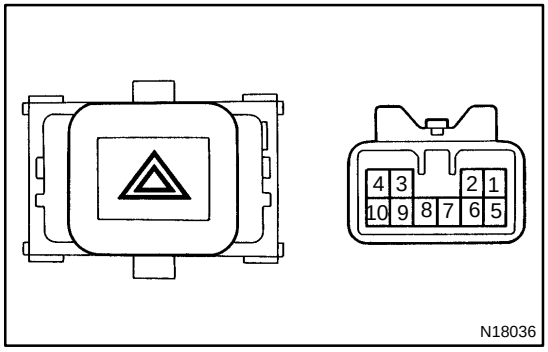
(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 3.

(b) Connect the 2 turn signal light bulbs connected in parallel each other to terminals 1 and 3, then check that the bulbs flash.

HINT:

The turn signal lights should flash 60 to 120 times per minute. If either one of the front or rear turn signal lights has an open circuit, the number of flashes is more than 140 per minute.

If the operation is not as specified, replace the flasher.



3. INSPECT HAZARD WARNING SWITCH CONTINUITY

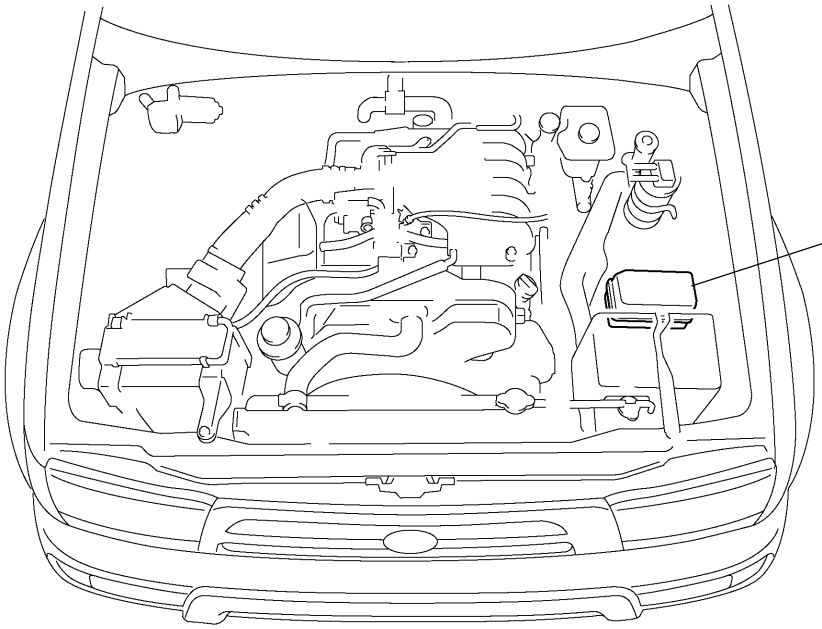
Tester connection	Switch position	Specified condition
5 - 7	Switch OFF	Continuity
1 - 2 - 4	Switch ON	Continuity
5 - 6		
8 - 9	Illumination circuit	Continuity

If continuity is not as specified, replace the switch.

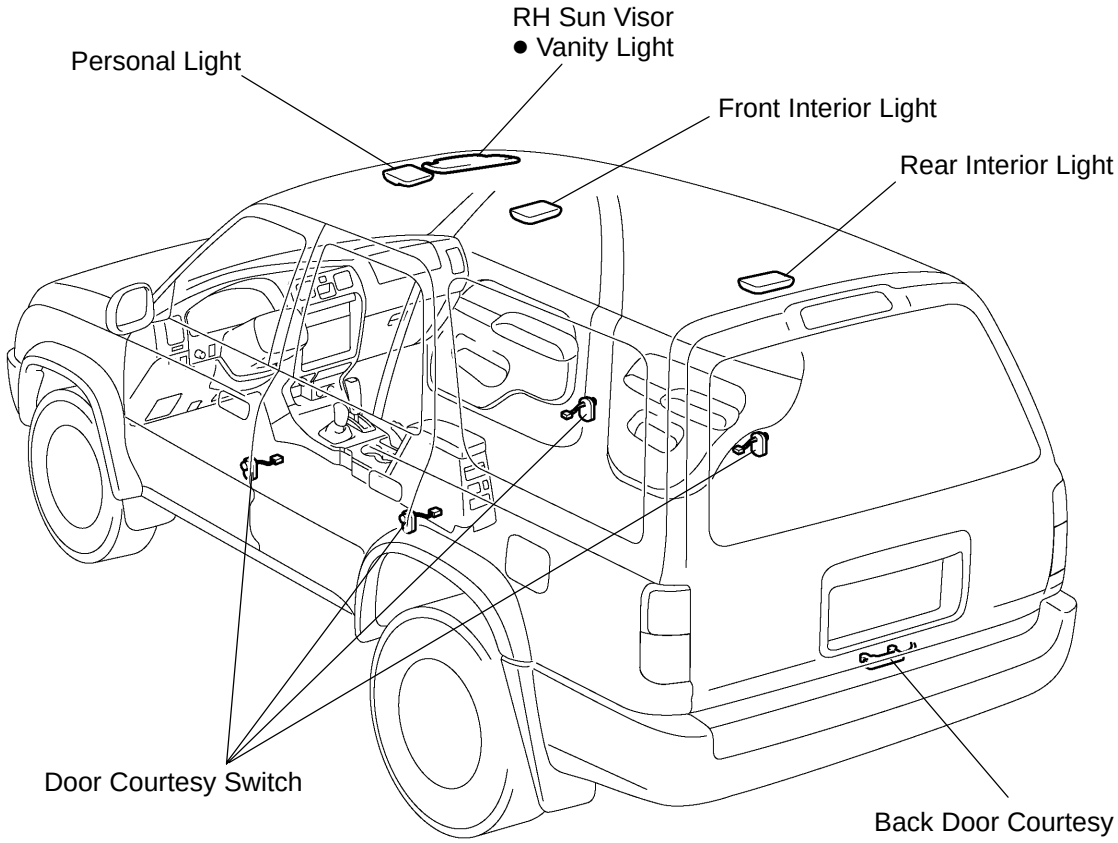
INTERIOR LIGHT SYSTEM

LOCATION

BE06O-03



Y



Y

I21708
I21868

I22017

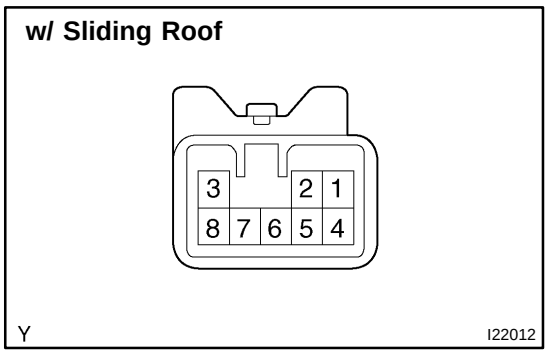
BE23X-01

INSPECTION

1. w/ Sliding Roof:
INSPECT PERSONAL LIGHT SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
1 - 3	OFF	No continuity
	ON	Continuity

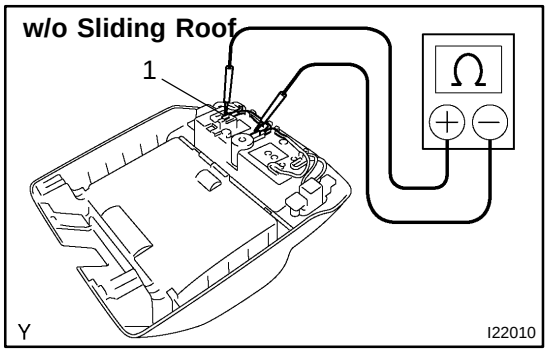
If the continuity is not as specified, replace the light assembly or bulb.



2. w/o Sliding Roof:
INSPECT PERSONAL LIGHT SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
1 - Ground	OFF	No continuity
	ON	Continuity

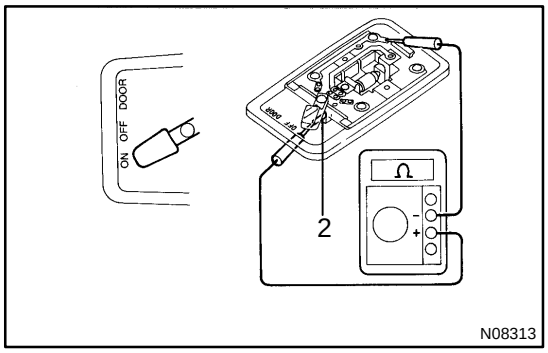
If the continuity is not as specified, replace the light assembly or bulb.



3. INSPECT FRONT INTERIOR LIGHT SWITCH

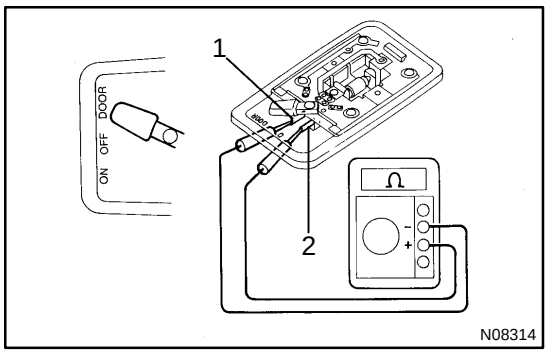
(a) Disconnect the connector from the interior light assembly.

(b) Turn the interior light to switch ON, then check that continuity exists between terminal 2 and the body ground.



(c) Turn the interior light switch to DOOR, then check that continuity exists between terminal 1 and 2.

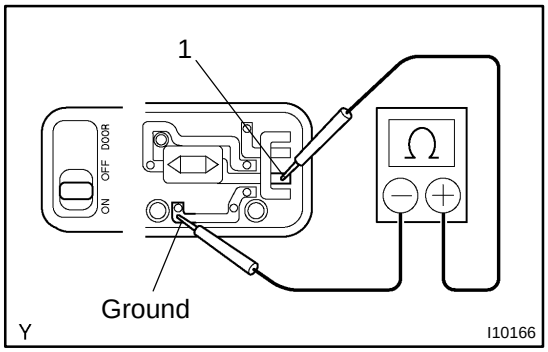
If the operation is not as specified, replace the switch.

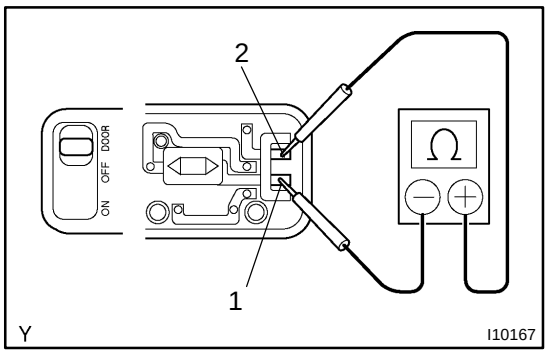


4. INSPECT REAR INTERIOR LIGHT SWITCH

(a) Disconnect the connector from the interior light assembly.

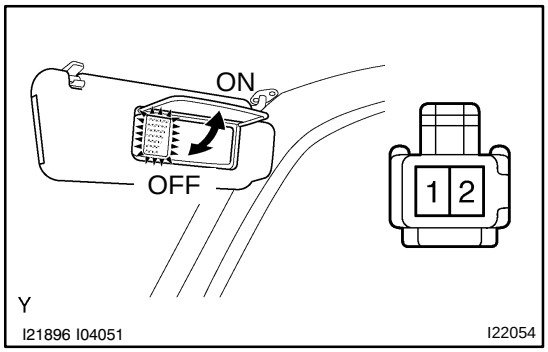
(b) Turn the interior light switch to ON, then check that continuity exists between terminal 1 and the body ground.





(c) Turn the interior light switch to DOOR, then check that continuity exists between terminals 1 and 2.

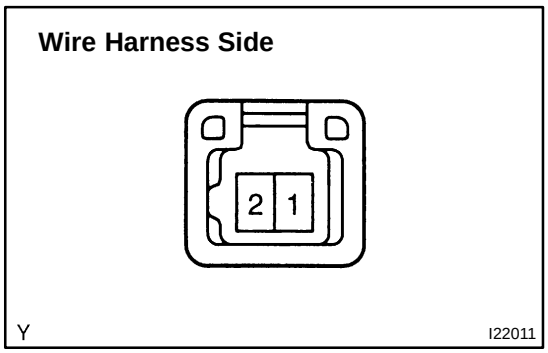
If the operation is not as specified, replace the switch.



5. INSPECT VANITY LIGHT CONTINUITY

Tester connection	Switch position	Specified condition
1 - 2	OFF (Closed)	No continuity
	ON (Opened)	Continuity

If the continuity is not as specified, replace the vanity light assembly or bulb.

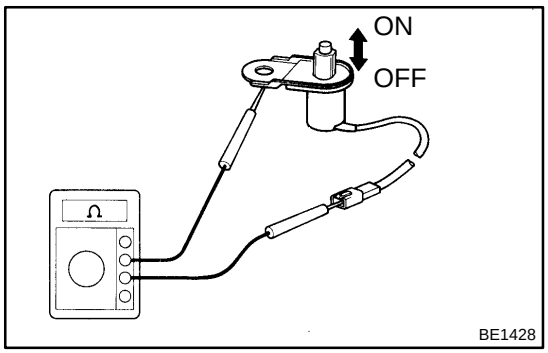


6. INSPECT VANITY LIGHT CIRCUIT

Disconnect the connector from the light and inspect the connector on the wire harness side, as shown.

Tester connection	Switch position	Specified condition
1 - Ground	Constant	Continuity
2 - Ground	Constant	Battery Positive Voltage

If the circuit is not as specified, inspect the power source or wire harness.

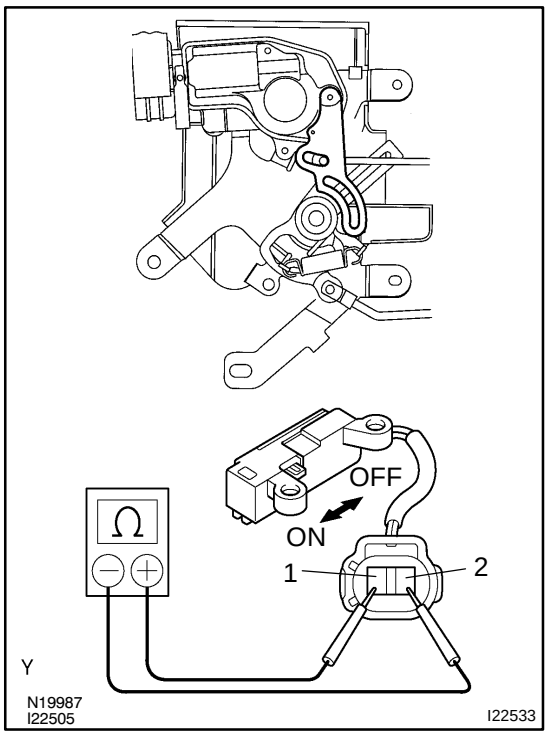


7. INSPECT DOOR COURTESY SWITCH CONTINUITY

(a) Check that continuity exists between terminals and the switch body with the switch ON (switch pin released: opened door).

(b) Check that no continuity exists between terminals and the switch body with the switch OFF (switch pin pushed in: closed door).

If the operation is not as specified, replace the switch.



8. INSPECT BACK DOOR COURTESY SWITCH CONTINUITY

(a) Check that continuity exists between terminal 1 and 2 with the switch ON (switch pin pushed in).

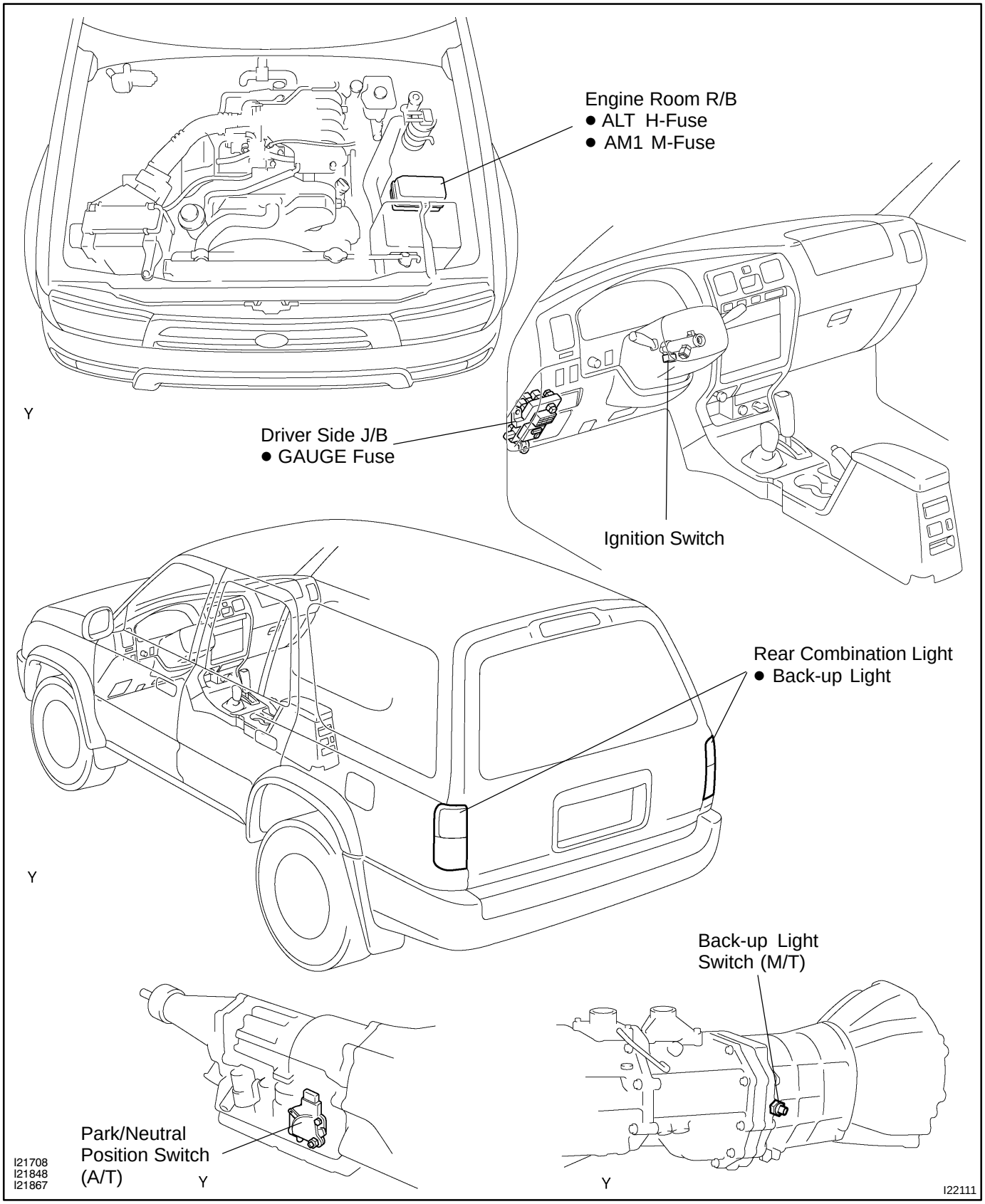
(b) Check that no continuity exists between terminal 1 and 2 with the switch OFF (switch pin pushed in).

If the continuity is not as specified, replace the switch.

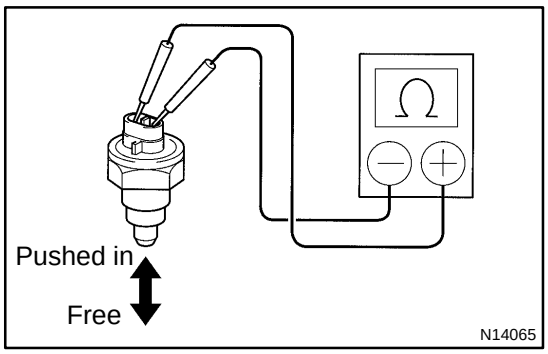
BACK-UP LIGHT SYSTEM

LOCATION

BE06Q-03



BE06R-03



INSPECTION

1. M/T:

INSPECT BACK-UP LIGHT SWITCH CONTINUITY

Tester connection	Condition	Specified condition
1 - 2	Free	No continuity
	Pushed in	Continuity

If the continuity is not as specified, replace the switch.

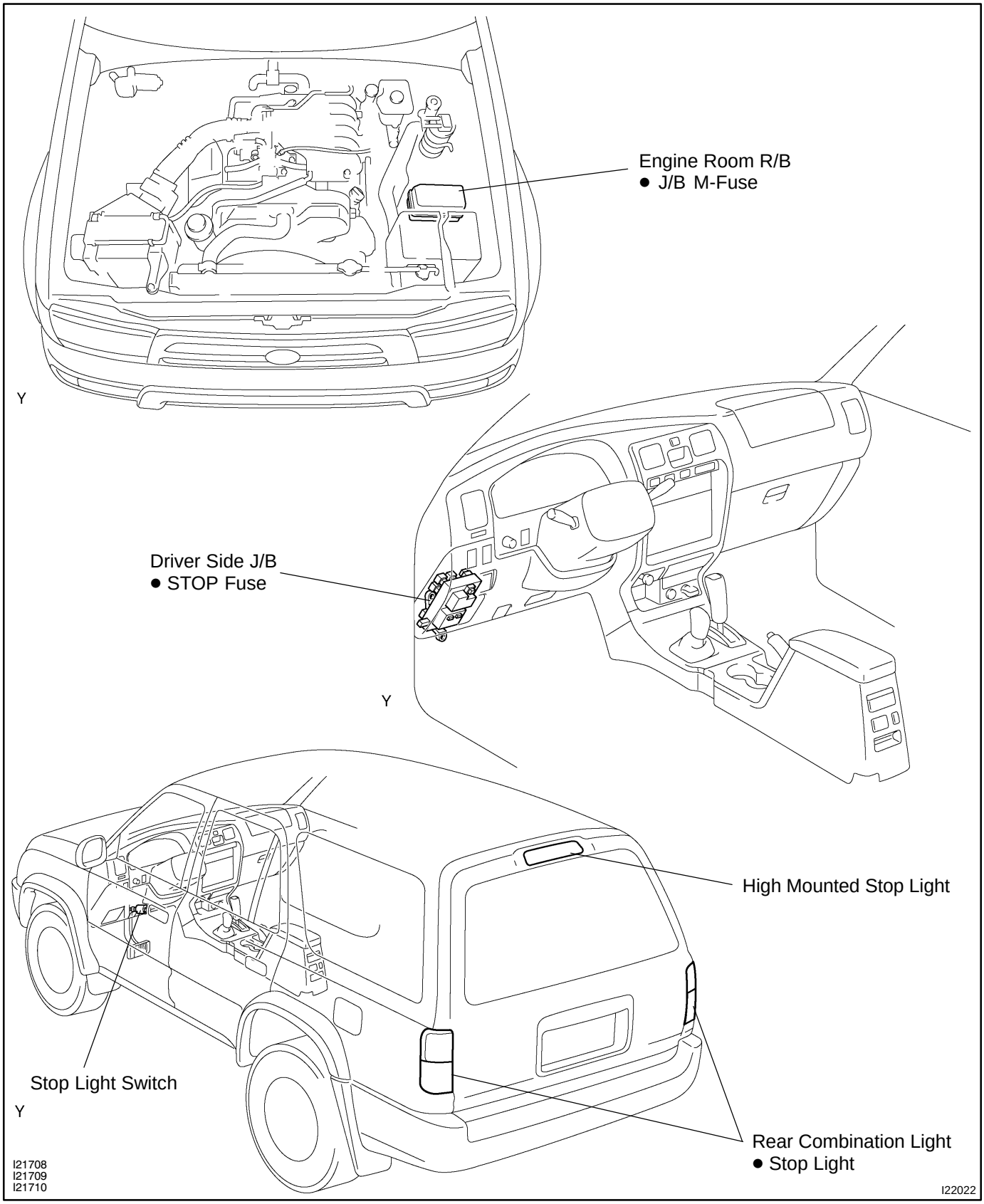
2. A/T:

INSPECT PARK/NEUTRAL POSITION SWITCH (See page DI-203)

STOP LIGHT SYSTEM

LOCATION

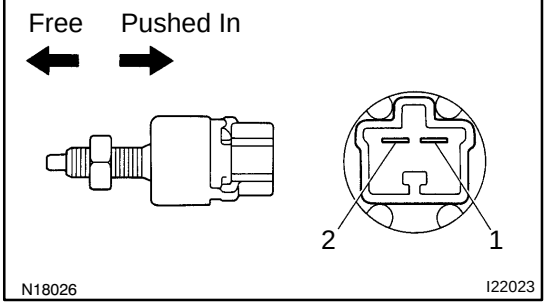
BE06S-03



BE23Y-01

INSPECTION

w/o Cruise Control

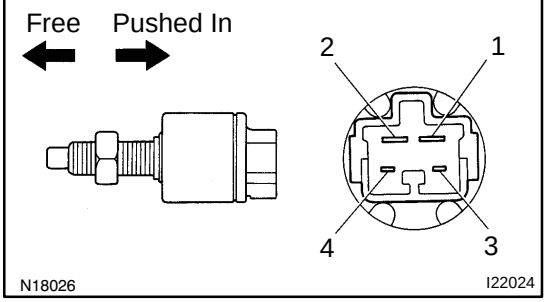


1. w/o Cruise Control:
INSPECT STOP LIGHT SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
1 - 2	Switch pin free	Continuity
	Switch pin pushed in	No continuity

If the continuity is not as specified, replace the switch.

w/ Cruise Control



2. w/ Cruise Control:
INSPECT STOP LIGHT SWITCH CONTINUITY

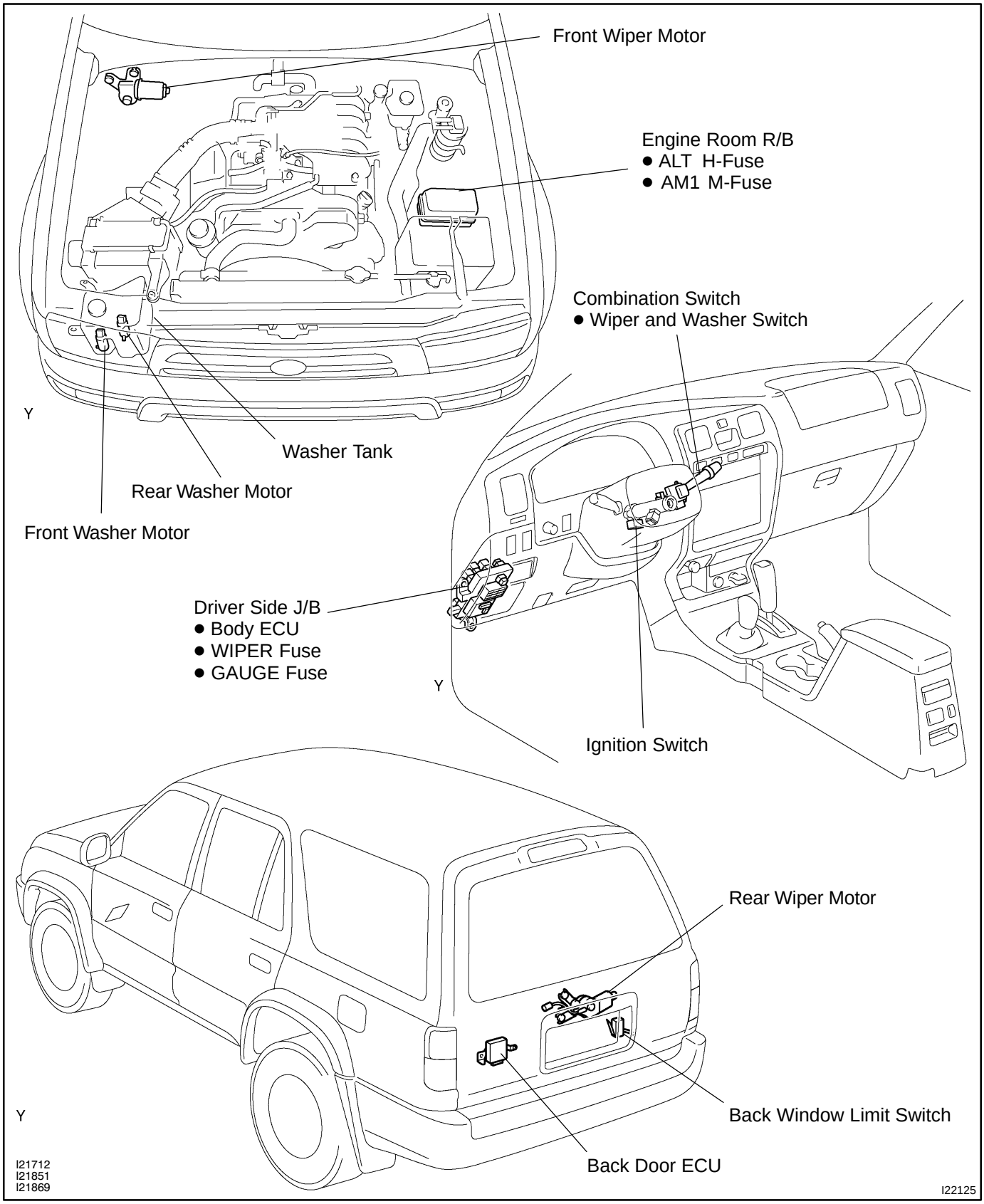
Tester connection	Switch position	Specified condition
1 - 2	Switch pin free	Continuity
	Switch pin pushed in	No continuity
3 - 4	Switch pin free	No continuity
	Switch pin pushed in	Continuity

If the continuity is not as specified, replace the switch.

WIPER AND WASHER SYSTEM

LOCATION

BE06U-03



BE23Z-01

INSPECTION

1. INSPECT FRONT WIPER AND WASHER SWITCH CONTINUITY

w/ Mist:

Tester connection	Switch position	Specified condition
7 - 16	OFF	Continuity
7 - 17	MIST	Continuity
	LO	Continuity
8 - 17	HI	Continuity
2 - 11	Washer ON	Continuity

w/ Intermittent:

Tester connection	Switch position	Specified condition
7 - 16	OFF	Continuity
	INT	Continuity
7 - 17	LO	Continuity
8 - 17	HI	Continuity
2 - 11	Washer ON	Continuity

If the continuity is not as specified, replace the switch.

2. INSPECT INTERMITTENT OPERATION

(a) Turn the wiper switch to INT position.

(b) Turn the intermittent time control switch to FAST position.

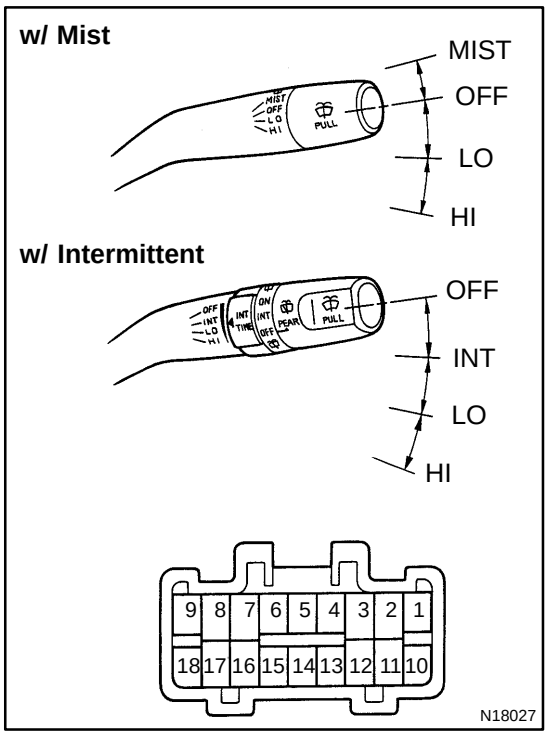
(c) Connect the positive (+) lead from the battery to terminal 16 and the negative (-) lead to terminal 2.

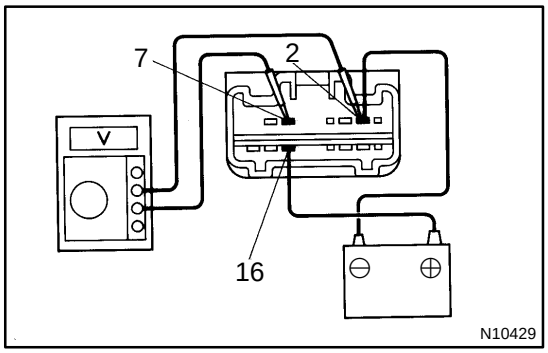
(d) Connect the positive (+) lead from the voltmeter to terminal 7 and the negative (-) lead to terminal 2, then check that the meter needle indicates battery positive voltage.

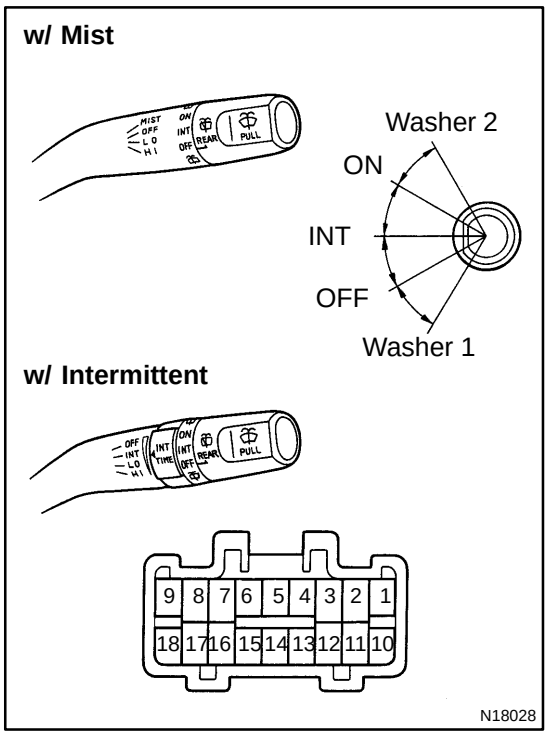
INT time control switch position	Voltage
FAST	Approx. 1 - 3 sec. Battery positive voltage 0 volt
SLOW	Approx. 10 - 15 sec. Battery positive voltage 0 volt

V03883

If the operation is not as specified, replace the wiper and washer switch.



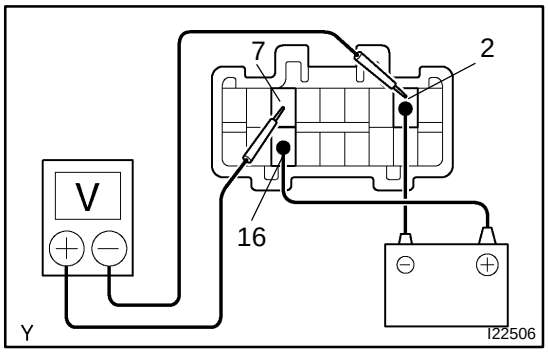




3. INSPECT REAR WIPER AND WASHER SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
2 - 12	Washer 1	Continuity
-	Wiper OFF	No continuity
2 - 13	Wiper INT	Continuity
2 - 10	Wiper ON	Continuity
2 - 10 - 12	Washer 2	Continuity

If the continuity is not as specified, replace the switch.

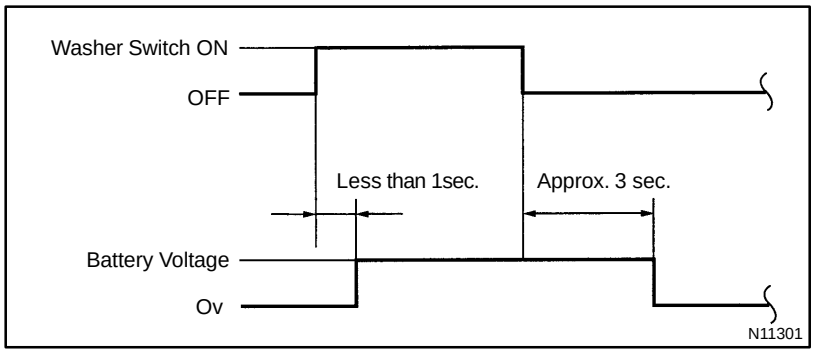


4. INSPECT WASHER LINKED OPERATION

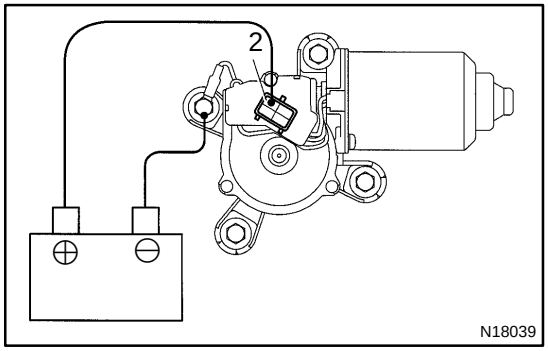
(a) Connect the positive (+) lead from the battery to terminal 16, and the negative (-) lead to terminal 2.

(b) Connect the positive (+) lead from the voltmeter to terminal 7, and the negative (-) lead to terminal 2.

(c) Push the washer switch, and check that the voltage changes as shown in the chart.



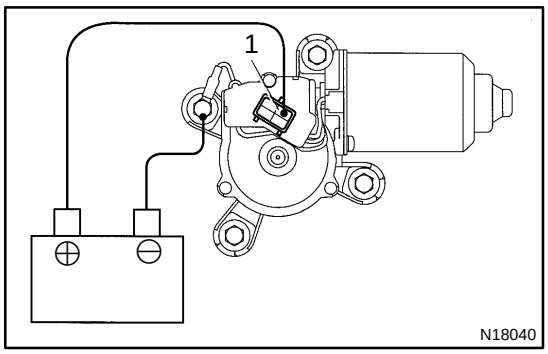
If the operation is not as specified, replace the wiper and washer switch.



5. Low Speed: INSPECT FRONT WIPER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead from the battery to the motor body, and check that the motor operates at low speed.

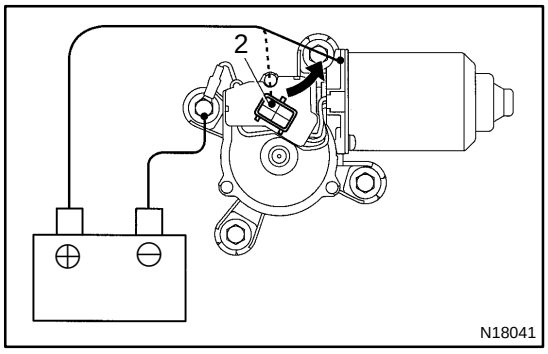
If the operation is not as specified, replace the motor.



6. High Speed:
INSPECT FRONT WIPER MOTOR OPERATION

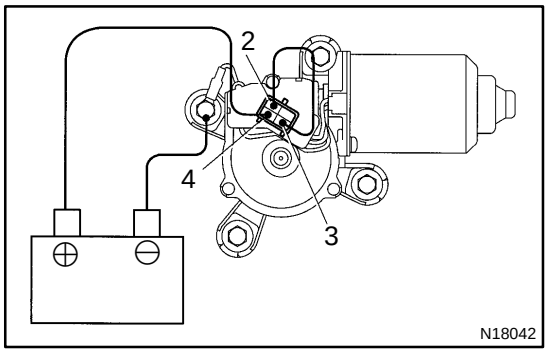
Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead from the battery to the motor body, and check that the motor operates at high speed.

If the operation is not as specified, replace the motor.



7. Stopping at Stop Position:
INSPECT FRONT WIPER MOTOR OPERATION

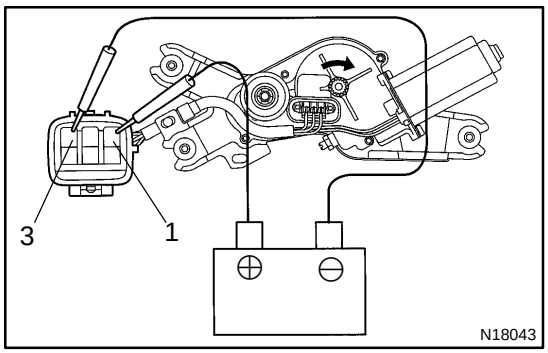
(a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting the positive (+) lead from terminal 2.



(b) Connect terminals 2 and 3.

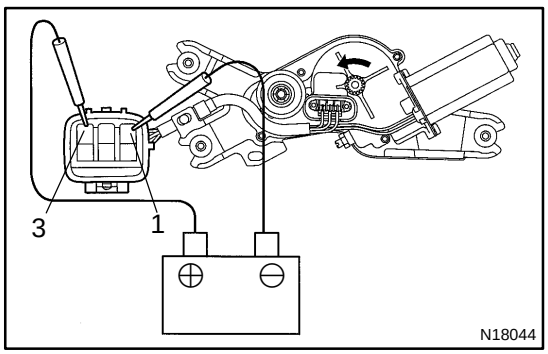
(c) Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead from the battery to the motor body, and check that the motor stops running at the stop position after the motor has operated again.

If the operation is not as specified, replace the motor.



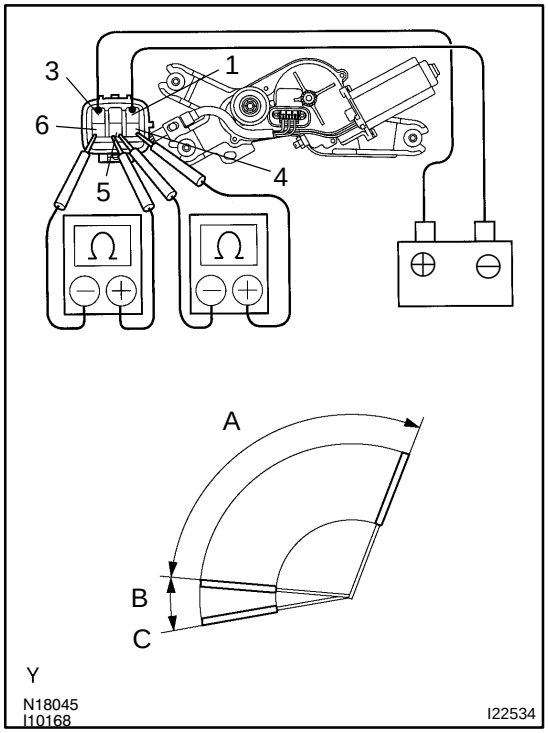
8. INSPECT REAR WIPER MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, and the negative (-) lead to terminal 3, then check that the motor turns clockwise.



(b) Reverse the polarity, and check that the motor turns counterclockwise.

If the operation is not as specified, replace the motor.

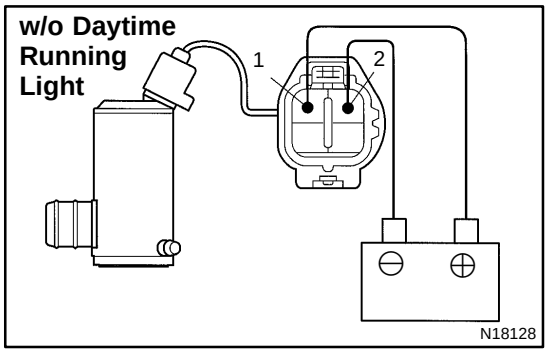


9. INSPECT REAR WIPER MOTOR CONTINUITY

Connect the positive (+) lead from the battery to terminal 3, and the negative (-) lead to terminal 1, then inspect the continuity between terminals.

Tester connection	Motor link position	Specified condition
4 - 5 - 6	A	Continuity
5 - 6	B	Continuity
-	C	No continuity

If the continuity is not as specified, replace the motor.

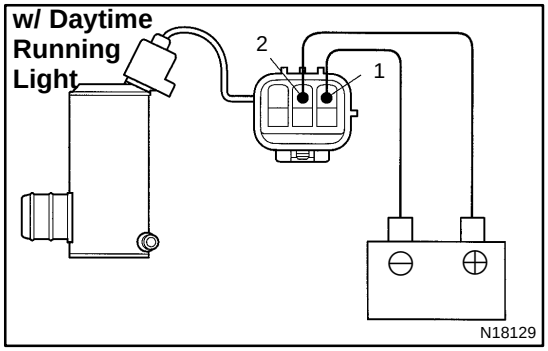


10. w/o Daytime Running Light: INSPECT FRONT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1, and the negative (-) lead to terminal 2, then check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

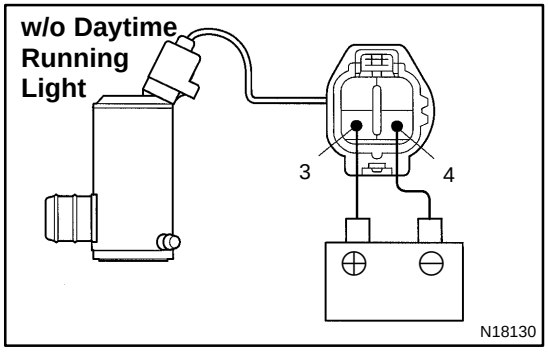


11. w/ Daytime Running Light: INSPECT FRONT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2, and the negative (-) lead to terminal 1, then check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

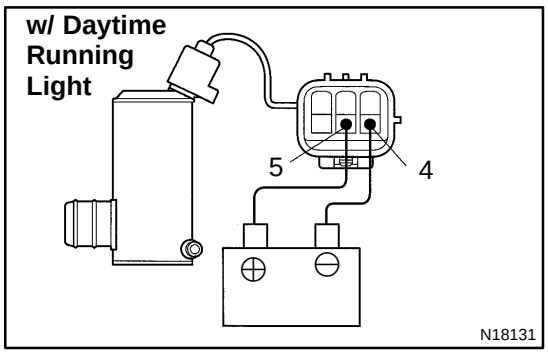


12. w/o Daytime Running Light: INSPECT REAR WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 3, and the negative (-) lead to terminal 4, then check that the motor operates.

NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.



13. w/ Daytime Running Light:
INSPECT REAR WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 5, and the negative (-) lead to terminal 4, then check that the motor operates.

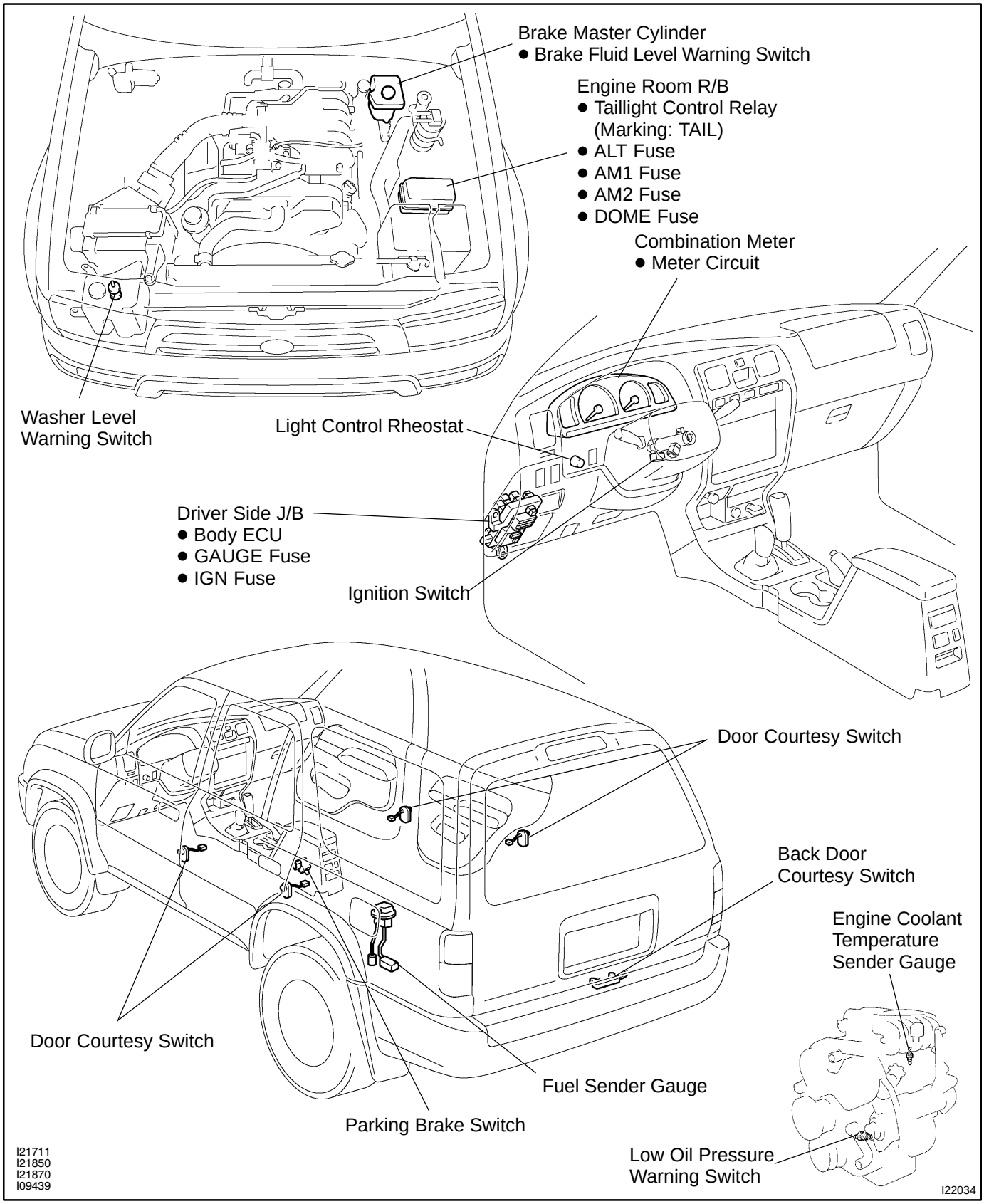
NOTICE:

These tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

COMBINATION METER

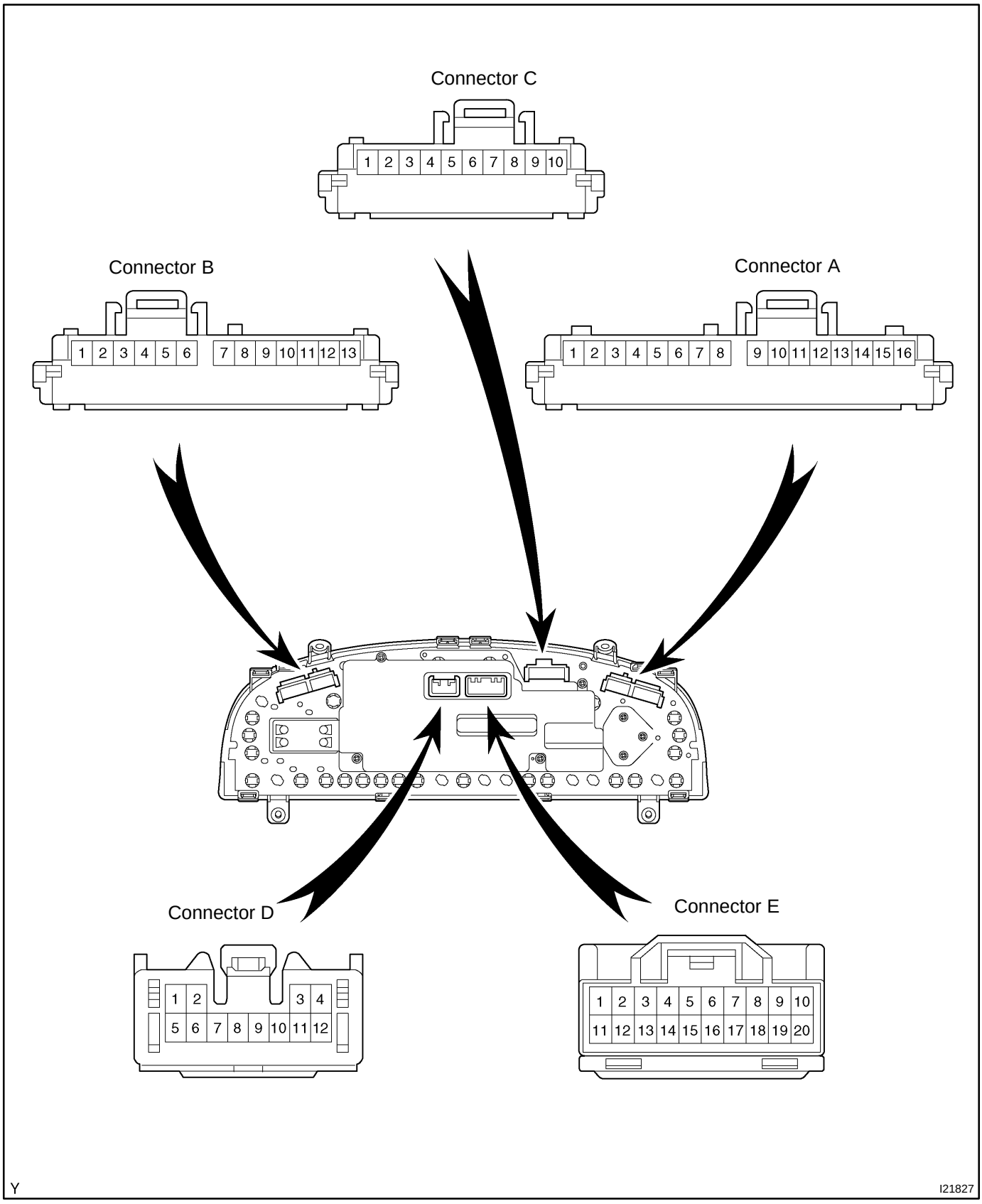
LOCATION

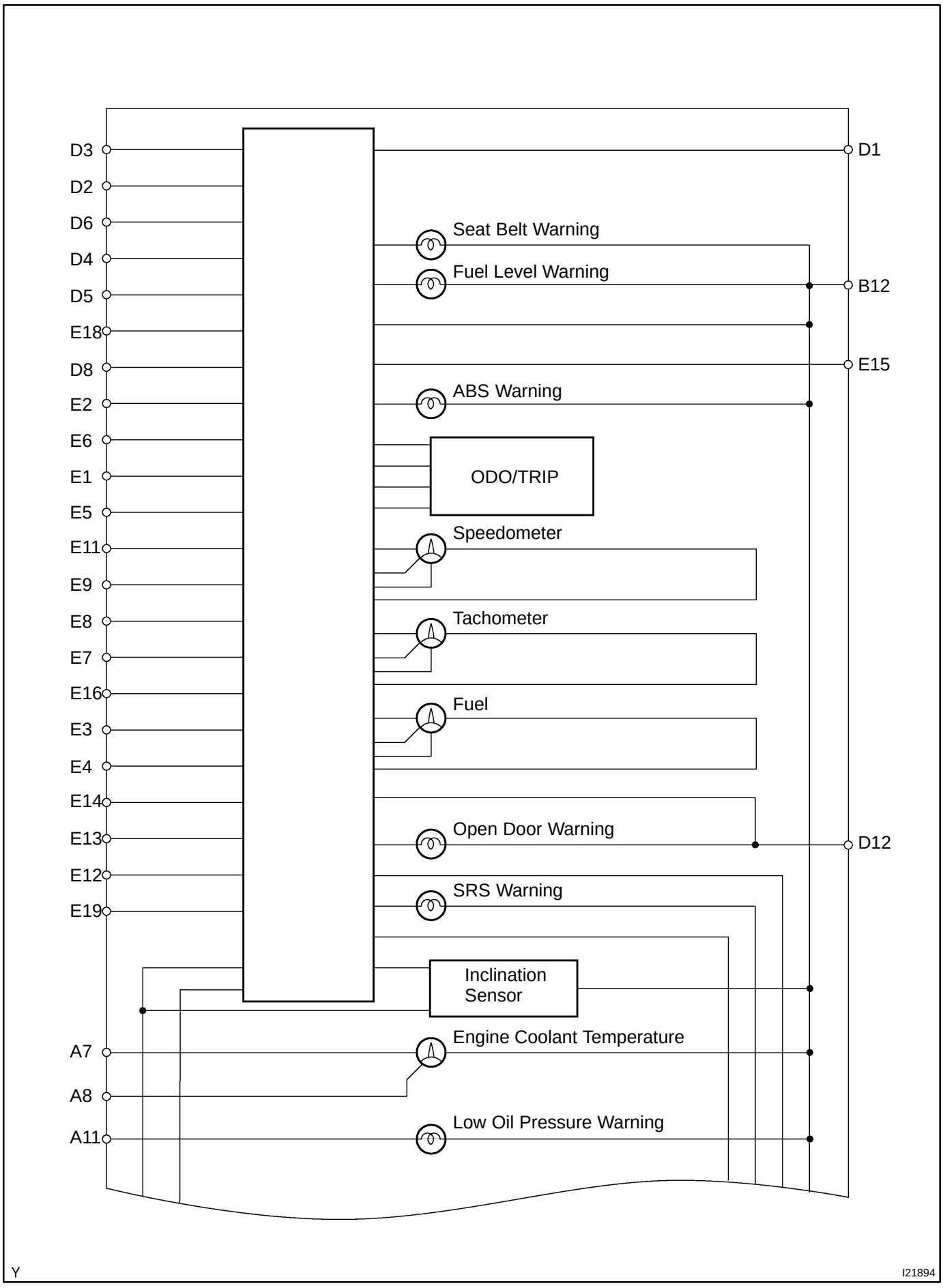
BE06W-03

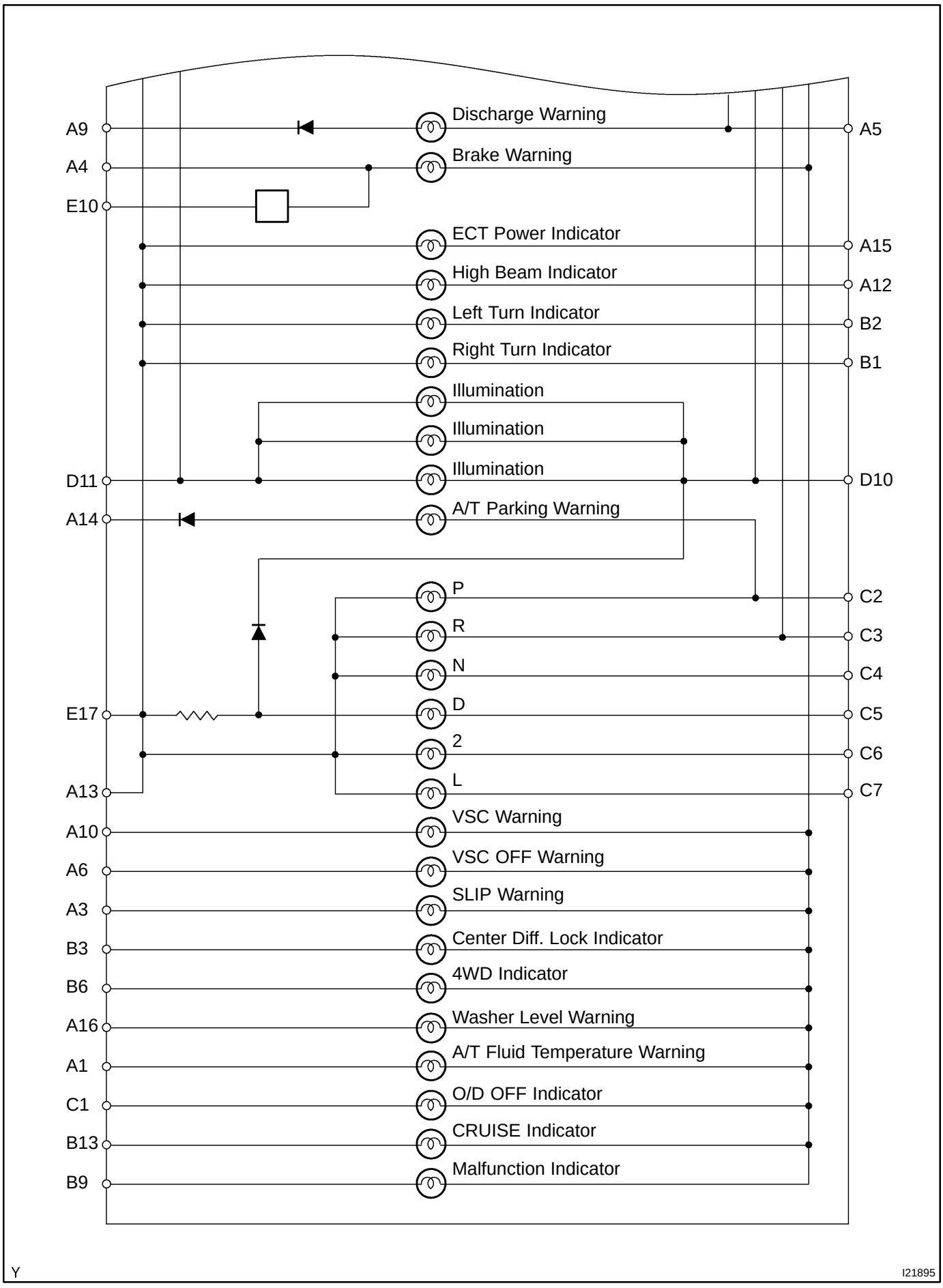


BE11J-02

CIRCUIT




D3
D2
D6
D4
D5
E18
D8
E2
E6
E1
E5
E11
E9
E8
E7
E16
E3
E4
E14
E13
E12
E19
A7
A8
A11
D1
B12
E15
D12
Seat Belt Warning
Fuel Level Warning
ABS Warning
ODO/TRIP
Speedometer
Tachometer
Fuel
Open Door Warning
SRS Warning
Inclination Sensor
Engine Coolant Temperature
Low Oil Pressure Warning
Y
I21894


A9
A4
E10
D11
A14
E17
A13
A10
A6
A3
B3
B6
A16
A1
C1
B13
B9
Discharge Warning
Brake Warning
ECT Power Indicator
High Beam Indicator
Left Turn Indicator
Right Turn Indicator
Illumination
Illumination
Illumination
A/T Parking Warning
P
R
N
D
2
L
VSC Warning
VSC OFF Warning
SLIP Warning
Center Diff. Lock Indicator
4WD Indicator
Washer Level Warning
A/T Fluid Temperature Warning
O/D OFF Indicator
CRUISE Indicator
Malfunction Indicator
A5
A15
A12
B2
B1
D10
C2
C3
C4
C5
C6
C7
Y
I21895

No.		Wire Hareness Side
A	1	ECM
	2	-
	3	VSC ECU
	4	Brake Fluid Level Warning Switch
	5	IGN Fuse
	6	VSC ECU
	7	Ground
	8	Engine Coolant Temperature Sender Gauge
	9	Generator
	10	VSC ECU
	11	Low Oil Pressure Switch
	12	Headlight Daytime Running Light Relay (Main)
	13	A/C Amplifier
	14	Park/Neutral Position Switch
	15	ECT Pattern Select Switch
	16	Washer Level Warning Switch
B	1	Turn Signal Switch Hazard Switch
	2	Turn Signal Switch Hazard Switch
	3	4WD ECU
	4	-
	5	-
	6	4WD ECU
	7	-
	8	-
	9	ECM
	10	-
	11	-
	12	GAUGE Fuse
	13	ECM
C	1	ECM
	2	Park/Neutral Position Switch
	3	Park/Neutral Position Switch
	4	Park/Neutral Position Switch
	5	Park/Neutral Position Switch
	6	Park/Neutral Position Switch
	7	Park/Neutral Position Switch
	8	-
	9	-
	10	-

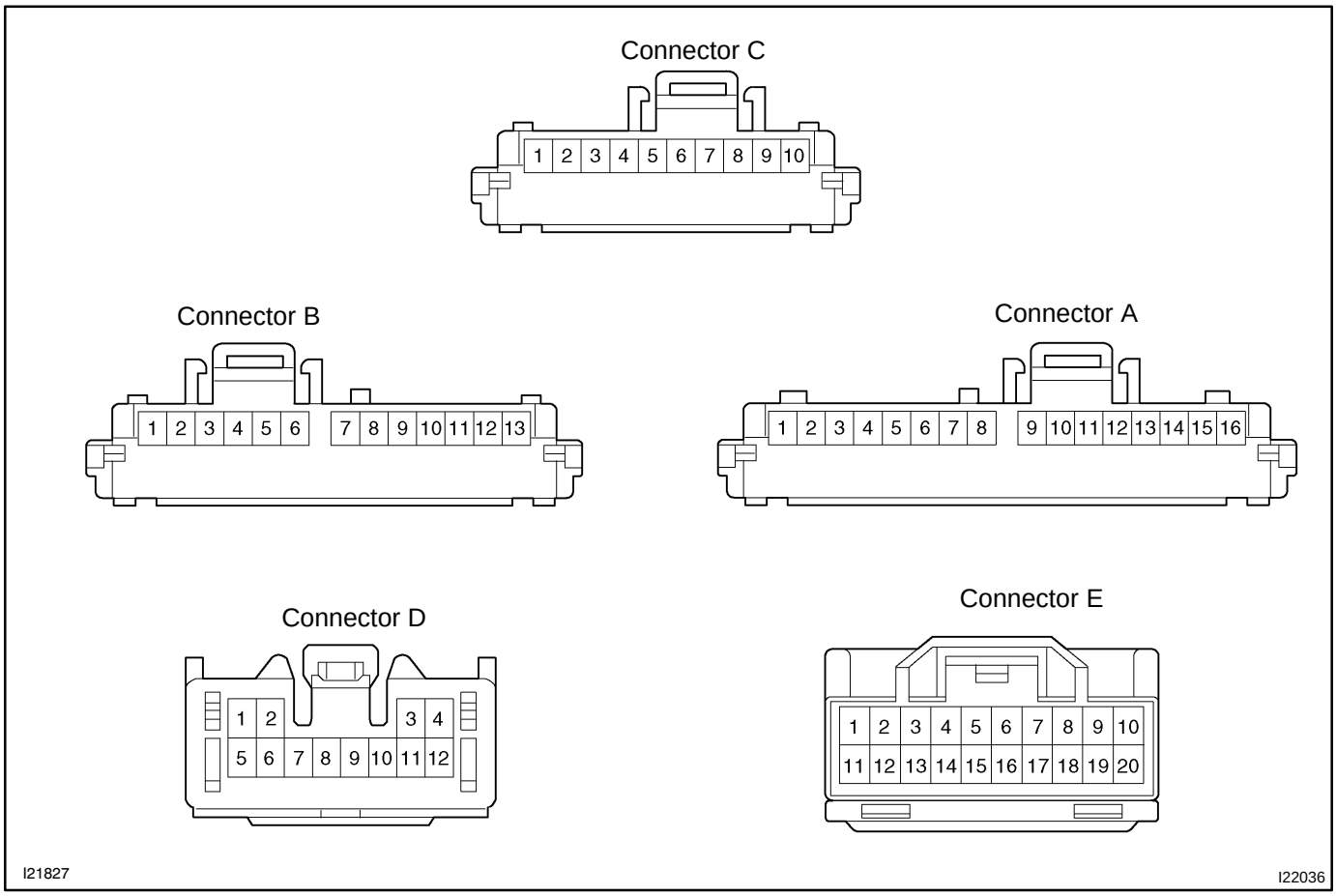
D	1	VSC ECU
	2	Igniter
	3	ECM A/C Amplifier 4WD ECU
	4	Fuel Sender Gauge
	5	Fuel Sender Gauge
	6	Fuel Sender Gauge
	7	-
	8	Airbag Sensor Assembly
	9	-
	10	TAIL Fuse
	11	Light Control Rheostat
	12	DOME Fuse
E	1	Light Control Switch
	2	Light Control Switch
	3	Driver's Seat Belt Buckle Switch
	4	Passenger's Seat Belt Buckle Switch
	5	HEAD Relay Diode (Daytime Running Light No. 1)
	6	TAIL Relay
	7	Rear Door Courtesy Switch
	8	Passenger's Door Courtesy Switch
	9	Driver's Door Courtesy Switch
	10	VSC ECU
	11	Body ECU
	12	Rear Interior light
	13	Front Interior light
	14	Passenger's Seat Belt Warning Light
	15	Ignition Key Illumination Light
	16	Key Unlock Warning Switch
	17	Ground
	18	VSC ECU
	19	Ground
	20	-

BE240-01

INSPECTION

1. INSPECT COMBINATION METER CIRCUIT

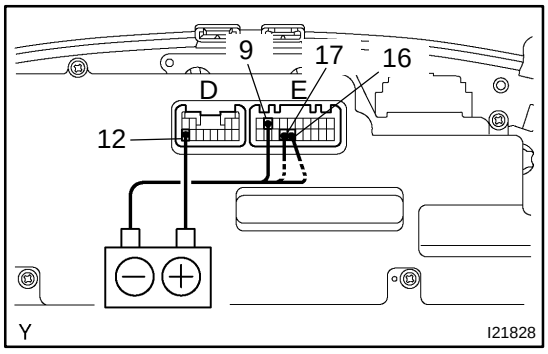
Disconnect the 5 connectors from the combination meter.



Tester connection	Condition	Specified
A4 - Body ground	Brake fluid level warning switch ON	Continuity
	Brake fluid level warning switch OFF	No continuity
A5 - Body ground	Ignition switch OFF or ACC	No voltage
	Ignition switch ON	Battery positive voltage
A7 - Body ground	Constant	Continuity
A8 - Body ground	When ignition switch ON and engine coolant temperature is 50˚C (122˚F)	234 - 314 Ω
A9 - Body ground	Ignition switch ON Engine is operation	No continuity
	Ignition switch ON Engine is stopped	Continuity
A10 - Body ground	For 3 sec., after ignition switch has been turned ON	Continuity
A11 - Body ground	Ignition switch ON Engine in operation	No continuity
	Ignition switch ON Engine stopped	Continuity
A12 - Body ground	Ignition switch ON Headlight dimmer switch low beam	No voltage
	Ignition switch ON Headlight dimmer switch High beam or flash	Battery positive voltage
A14 - Body ground	Transfer shift lever except N position	No continuity
	Transfer shift lever N position	Continuity

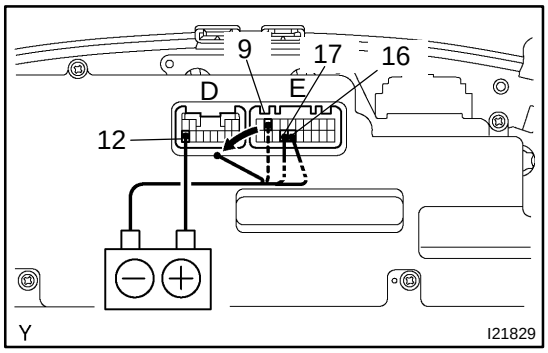
A15 - Body ground	Pattern select switch OFF	No voltage
	Pattern select switch ON	Battery positive voltage
A16 - Body ground	Washer fluid level warning switch OFF	No continuity
	Washer fluid level warning switch ON	Continuity
B1 - Body ground	Ignition switch ON Turn signal switch OFF or right	No voltage ↔ Battery positive voltage
	Ignition switch ON Turn signal switch left	No voltage
B2 - Body ground	Ignition switch ON Turn signal switch OFF or left	No voltage ↔ Battery positive voltage
	Ignition switch ON Turn signal switch right	No voltage
B3 - Body ground	Ignition switch ON Transfer shift position except L4L or H4L	No continuity
	Ignition switch ON Transfer shift position L4L or H4L	Continuity
B12 - Body ground	Ignition switch OFF or ACC	No voltage
	Ignition switch ON	Battery positive voltage
C1 - Body ground	O/D Main switch ON	No continuity
	O/D Main switch OFF	Continuity
C2 - Body ground	A/T shift lever except P position	No voltage
	A/T shift lever P position	Battery positive voltage
C3 - Body ground	A/T shift lever except R position	No voltage
	A/T shift lever R position	Battery positive voltage
C4 - Body ground	A/T shift lever except N position	No voltage
	A/T shift lever N position	Battery positive voltage
C5 - Body ground	A/T shift lever except D position	No voltage
	A/T shift lever D position	Battery positive voltage
C6 - Body ground	A/T shift lever except 2 position	No voltage
	A/T shift lever 2 position	Battery positive voltage
C7 - Body ground	A/T shift lever except L position	No voltage
	A/T shift lever L position	Battery positive voltage
D10 - Body ground	Headlight control switch OFF	No voltage
	Headlight control switch TAIL or HEAD	Battery positive voltage
D11 - Body ground	Constant	Continuity
D12 - Body ground	Constant	Battery positive voltage
E1 - Body ground	Headlight control switch OFF or TAIL	No continuity
	Headlight control switch HEAD	Continuity
E2 - Body ground	Headlight control switch OFF	No continuity
	Headlight control switch TAIL or HEAD	Continuity
E3 - Body ground	Driver's seat belt buckle switch OFF	No continuity
	Driver's seat belt buckle switch ON	Continuity
E4 - Body ground	Passenger's seat belt buckle switch OFF	No continuity
	Passenger's seat belt buckle switch ON Belt warning occupant detection sensor ON	Continuity
E7 - Body ground	Rear door courtesy switch OFF	No continuity
	Rear door courtesy switch ON	Continuity
E8 - Body ground	Passenger's door courtesy switch OFF	No continuity
	Passenger's door courtesy switch ON	Continuity

E9 - Body ground	Driver's door courtesy switch OFF	No continuity
	Driver's door courtesy switch ON	Continuity
E11 - Body ground	Back door courtesy switch OFF	No continuity
	Back door courtesy switch ON	Continuity
E16 - Body ground	Key unlock warning switch OFF	No continuity
	Key unlock warning switch ON	Continuity
E17 - Body ground	Constant	Continuity
E19 - Body ground	Constant	Continuity

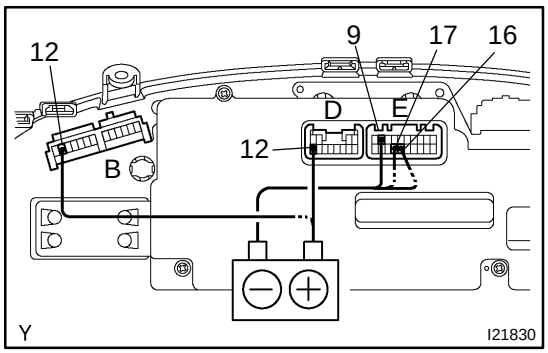


2. Key Unlock Warning System:
INSPECT COMBINATION METER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 12 of connector D.
(b) Connect the negative (-) lead from the battery to terminals 9, 16 and 17 of connector E.
(c) Check the chime sounds.

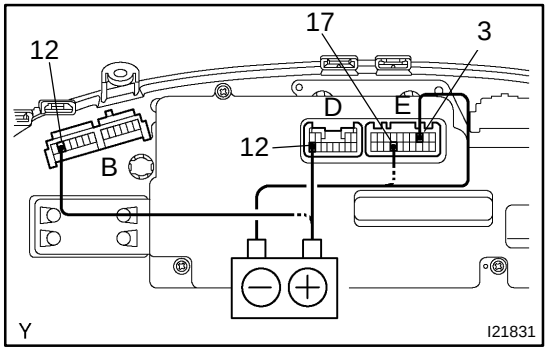


(d) Disconnect the negative (-) lead from the battery to terminal 9 of connector E.
(e) Check that the chime stops sounding.



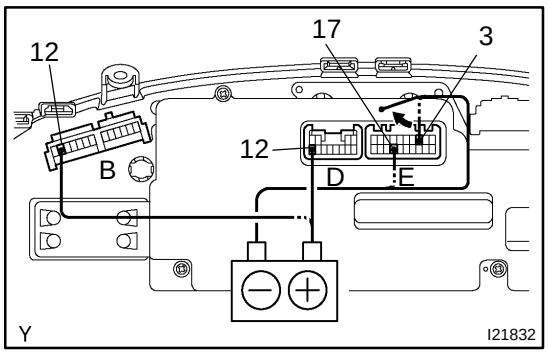
(f) Connect the negative (-) lead from the battery to terminal 9 of connector E.
(g) Connect the positive (+) lead from the battery to terminal 12 of connector B.
(h) Check that the chime stops sounding.

If the operation is not as specified, replace the combination meter.



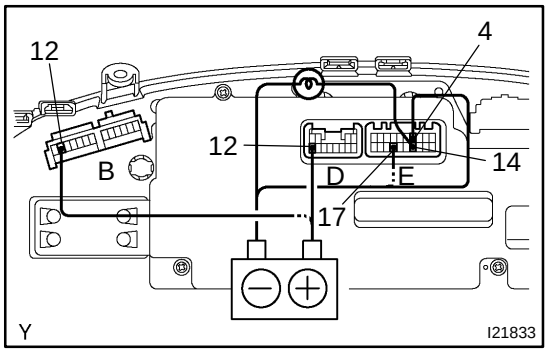
3. Driver's Seat Belt Waring System:
INSPECT COMBINATION METER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 12 of connector D and terminal 12 of connector B, and negative (-) lead from the battery to terminals 17 and 3 of connector E.
(b) Check that the driver's seat belt warning light flushes and buzzer sounds for approx. 6 seconds.



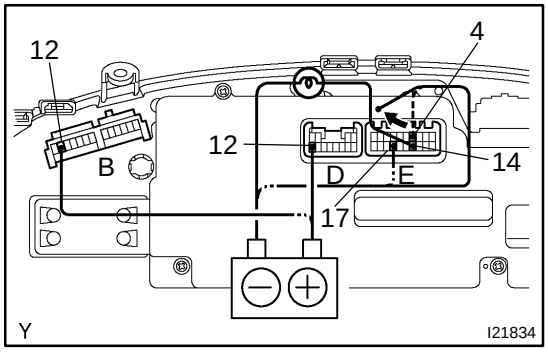
(c) Disconnect the negative (-) lead from the battery to terminal 3 of connector E and reconnect it again.
(d) Check that the buzzer sounds again.
(e) Check that the buzzer stops sounding when disconnecting the negative (-) lead from terminal 3 of connector E.

HINT:
Check the buzzer 6 seconds.
If the operation is not as specified, replace the combination meter.



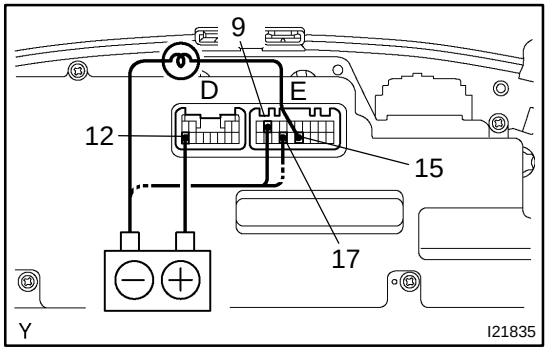
4. Passenger's Seat Belt Warning System: INSPECT COMBINATION METER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 12 of connector D and terminal 12 of connector B, and negative (-) lead from the battery to terminal 17 of connector E.
(b) Connect terminal 14 of connector E to battery negative (-) terminal through a 3.4 W test bulb.
(c) Connect the negative (-) lead from battery to terminal 4 of connector E.
(d) Check that the bulb flashes.
(e) Disconnect the negative (-) lead from the battery to terminal 4 of connector E, and reconnect it again.
(f) Check that the bulb flashes again.



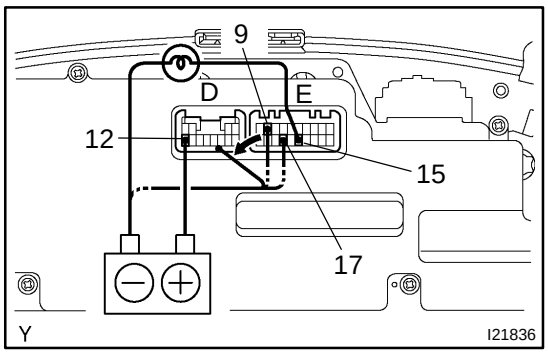
(g) Check that the bulb flashing when disconnecting terminal 4 of connector E from the negative (-) lead.

If operation is not as specified, replace the combination meter.



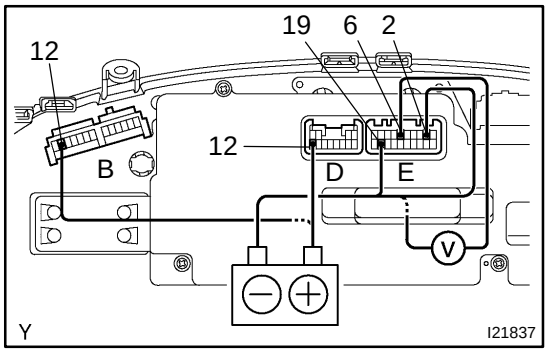
5. Key Illuminated Entry System: INSPECT COMBINATION METER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 12 of connector D, and negative (-) lead from the battery to terminals 9 and 17 of connector E.
(b) Connect terminal 15 of connector E to battery negative (-) terminal through a 3.4 W test bulb.
(c) Check that the bulb lights up.



(d) Disconnect the negative (-) lead from the battery to terminal 9 of connector E.

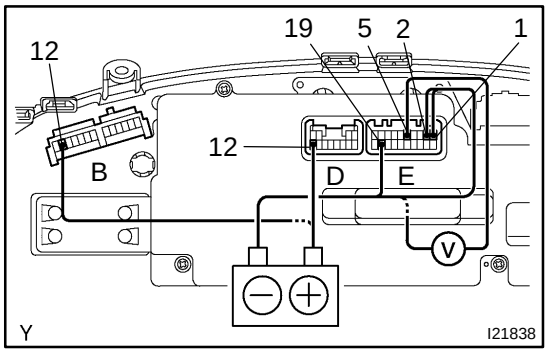
(e) After approx. 5 seconds, check that the bulb turns off.



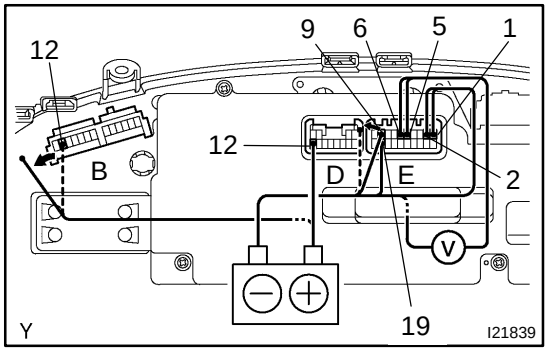
6. Light Auto Turn OFF System:
INSPECT COMBINATION METER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 12 of connector B and terminal 12 of connector D, and negative (-) lead from the battery to terminal 19 of connector E.

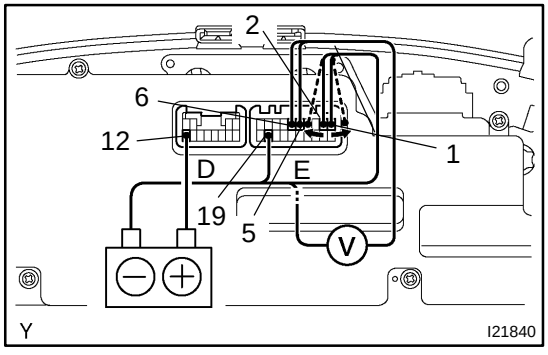
(b) Check that the voltage of terminal 6 of connector E is the battery positive voltage after the positive (+) lead from the battery has been connected to terminal 2 of connector E.



(c) Check that the voltage of terminal 5 of connector E is the battery positive voltage after the positive (+) lead from the battery has been connected to terminal 1 of connector E.



(d) Check that the voltage of terminals 5 and 6 of the connector E is 0 V after terminal 12 of connector B has been disconnected, and the positive (+) lead from the battery has been connected to terminal 9 of connector E.



(e) Check that the voltage of terminals 5 and 6 of the connector E is battery positive voltage after terminals 1 and 2 of connector E have been disconnected and reconnected.

7. INSPECT SPEEDOMETER ON-VEHICLE

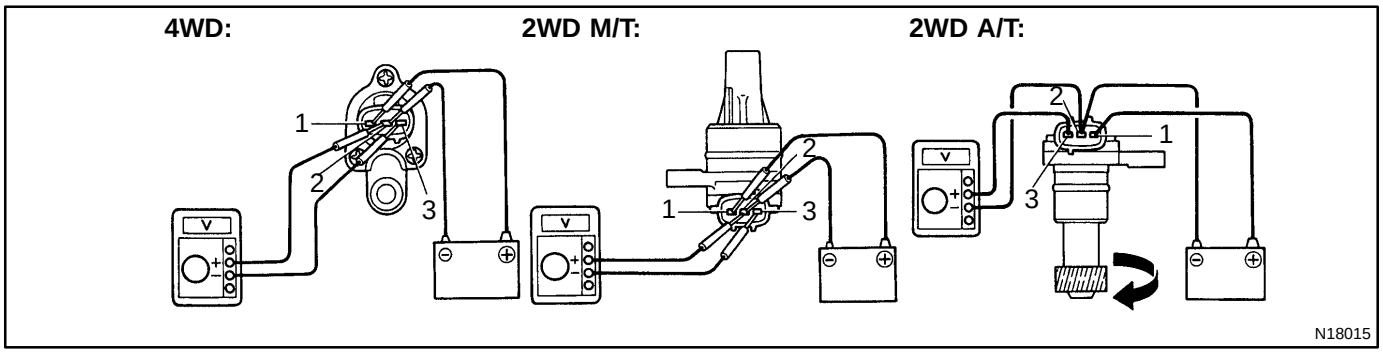
Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.
HINT:
Tire wear and tire over or under inflation will increase the indication error.
If error is excessive, replace the speedometer.

USA (mph)		CANADA (km/h)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18 - 24	20	17 - 24
40	38 - 44	40	38 - 46
60	56 - 66	60	57.5 - 67
80	78 - 88	80	77 - 88
100	98 - 110	100	96 - 109
120	118 - 132	120	115 - 130
		140	134 - 151.5
		160	153 - 173

8. INSPECT VEHICLE SPEED SENSOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, and negative (-) lead to terminal 2.
(b) Connect the positive (+) lead from tester to terminal 3 and the negative (-) lead to terminal 2.
(c) Rotate the shaft.
(d) Check that there is some voltage change from approx. 0 V to 11 V or more between terminals 2 and 3.

HINT:
The voltage change should be 4 times in every revolution of the speed sensor shaft.
If the operation is not as specified, replace the sensor.



9. INSPECT TACHOMETER ON-VEHICLE

(a) Connect a tune-up test tachometer, and start the engine.

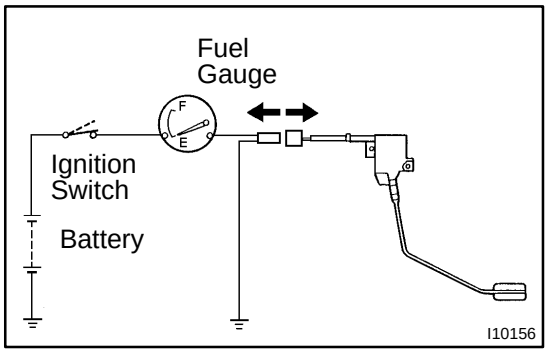
NOTICE:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop or subject it to heavy shocks.**

(b) Compare the tester with tachometer indications.

DC 13.5 V 20˚C at (68˚F)

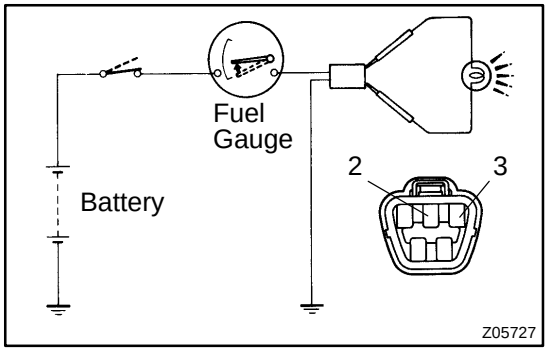
Standard indication	Allowable range
700	630 - 770
1,000	900 - 1,100
2,000	1,850 - 2,150
3,000	2,800 - 3,200
4,000	3,800 - 4,200
5,000	4,800 - 5,200
6,000	5,750 - 6,250



10. INSPECT FUEL RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON, check that the receiver gauge needle indicates EMPTY.



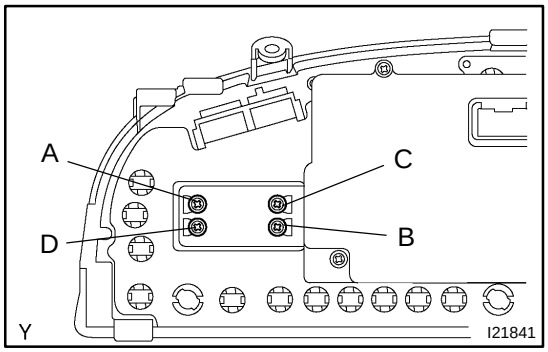
(c) Connect terminals 2 and 3 on the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, check that the bulb lights up and the receiver gauge needle moves towards the full side.

HINT:

Because of silicon oil in the gauge, it takes a little time for the needle to stabilize.

If the operation is not as specified, inspect the receiver gauge resistance.

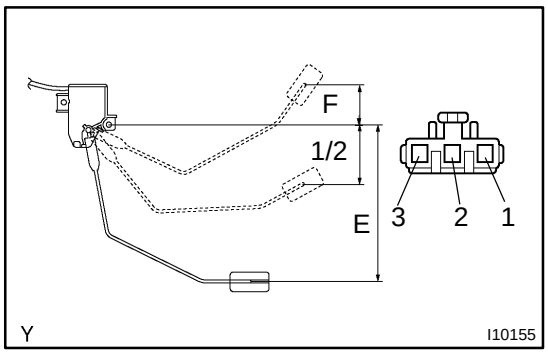


11. INSPECT FUEL RECEIVER GAUGE RESISTANCE

Measure the resistance between the terminals.

Tester connection	Resistance (Ω)
A - B	Approx. 160
C - D	Approx. 160

If the resistance value is not as specified, replace the receiver gauge.

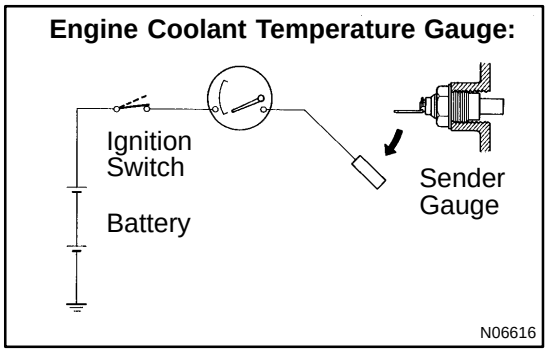


12. INSPECT FUEL SENDER GAUGE

Measure the resistance between terminals 1 and 3 in each float position.

Float position: mm (in.)	Resistance (Ω)
F: Approx. 39.4 (1.551)	Approx. 184
1/2: Approx. 56.0 (2.205)	Approx. 97
E: Approx. 148.9 (5.862)	Approx. 12

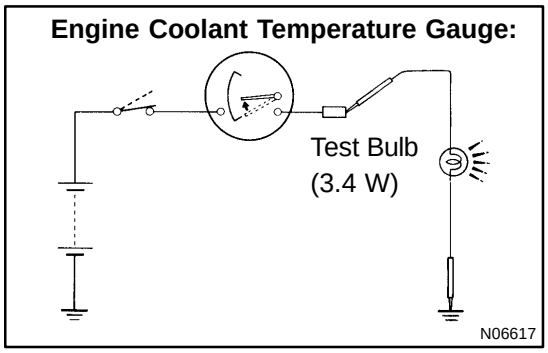
If the resistance value is not as specified, replace the sender gauge.



13. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge.

(b) Turn the ignition switch ON and check that the receiver gauge needle indicates COOL.

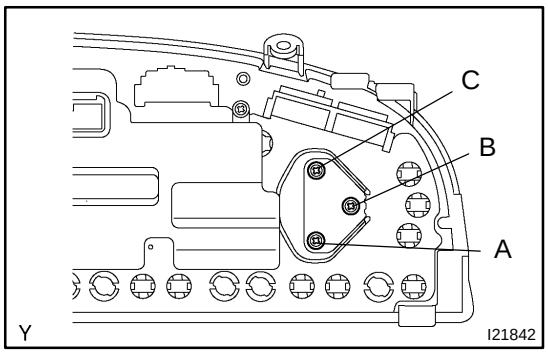


(c) Ground terminal on the wire harness side connector through a 3.4 W test bulb.

(d) Turn the ignition switch ON, and check that the bulb lights up and the receiver gauge needle moves to the hot side.

If the operation is as specified, replace the sender gauge. Then recheck the system.

If the operation is not as specified, measure the receiver gauge resistance.



14. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE RESISTANCE

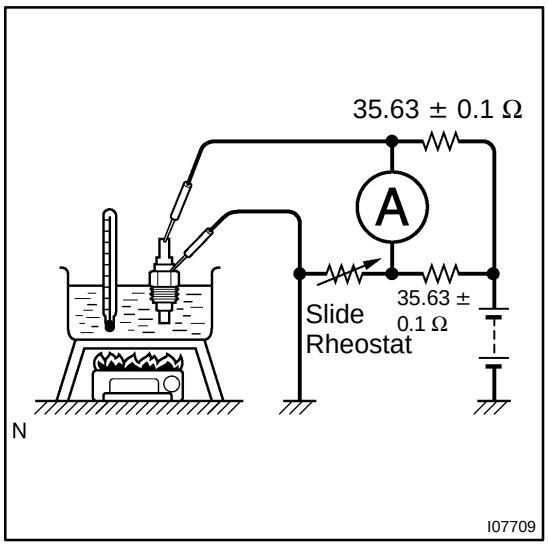
Measure the resistance between the terminals.

Tester connection	Resistance (Ω)
A - B	Approx. 90
A - C	Approx. 170
B - C	Approx. 230

HINT:

Connect test leads so that the current from the ohmmeter can flow according to the above order. This circuit includes the diode.

If the resistance value is not as specified, replace the receiver gauge.

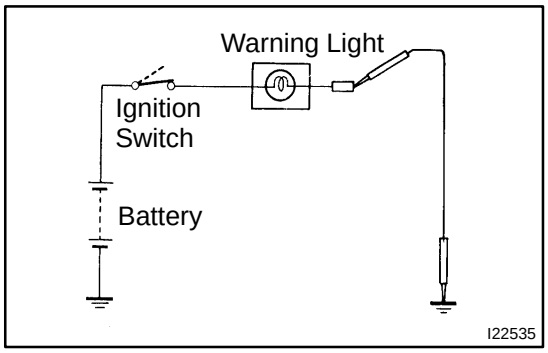


15. INSPECT ENGINE COOLANT TEMPERATURE SENDER GAUGE RESISTANCE

Connect the wire harness as shown in the illustration, and adjust the ammeter pointer so as to indicate ”0” using the slide rheostat, then read the rheostat indication.

Temperature ˚C (˚F)	Resistance (Ω)
50 (122.0)	234 - 314
120 (248.0)	24.0 - 30.5

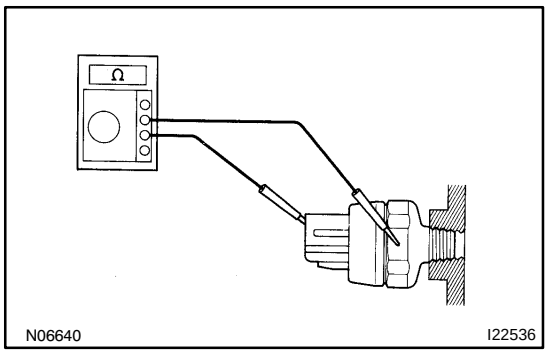
If the resistance value is not as specified, replace the engine coolant temperature sender gauge.



16. INSPECT LOW OIL PRESSURE WARNING LIGHT

(a) Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
(b) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, test the bulb.



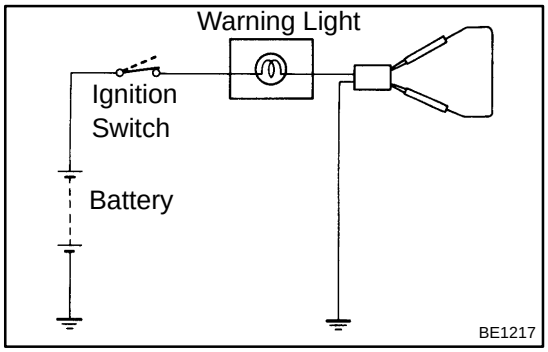
17. INSPECT LOW OIL PRESSURE SWITCH

(a) Disconnect the connector from the switch.
(b) Check that there is continuity between the terminal and ground with the engine stopped.
(c) Check that there is no continuity between the terminal and ground with the engine running.

HINT:

Oil pressure should be over 24.5 kPa (0.25 kgf/cm^2, 3.55 psi).

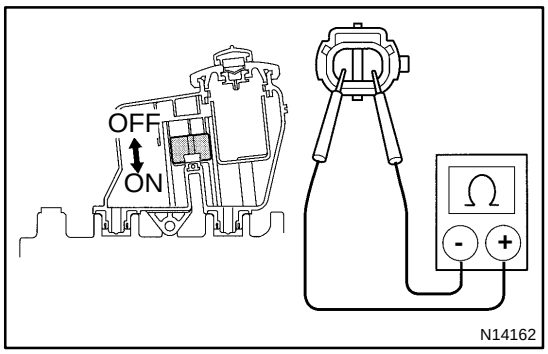
If the operation is not as specified, replace the switch.



18. INSPECT BRAKE WARNING LIGHT

(a) Disconnect the connectors from the level warning switch and parking brake switch.
(b) Connect terminals on the wire harness side connector of the level warning switch connector.
(c) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, test the bulb.

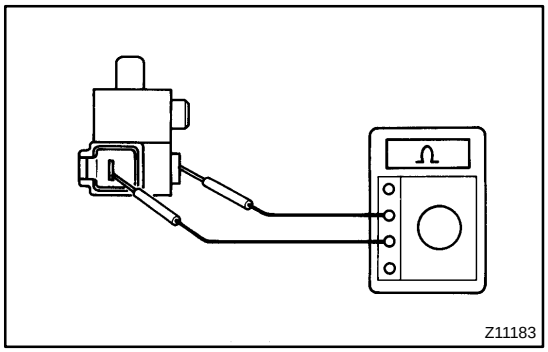


19. INSPECT BRAKE FLUID LEVEL WARNING SWITCH CONTINUITY

(a) Check that no continuity exists between the terminals with the switch OFF (float up).

(b) Check that continuity exists between the terminals with the switch ON (float down).

If the operation is not as specified, replace the switch.

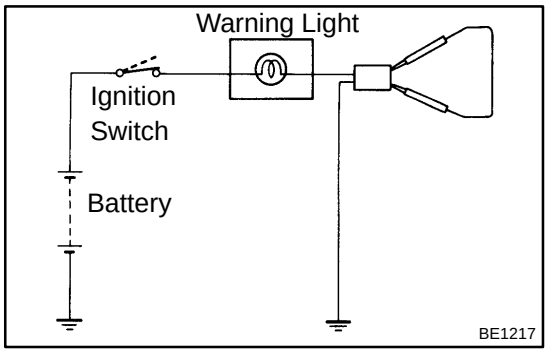


20. INSPECT PARKING BRAKE SWITCH CONTINUITY

(a) Check that continuity exists between the terminals with the switch ON (switch pin released).

(b) Check that no continuity exists between the terminals with the switch OFF (switch pin pushed in).

If the operation is not as specified, replace the switch.



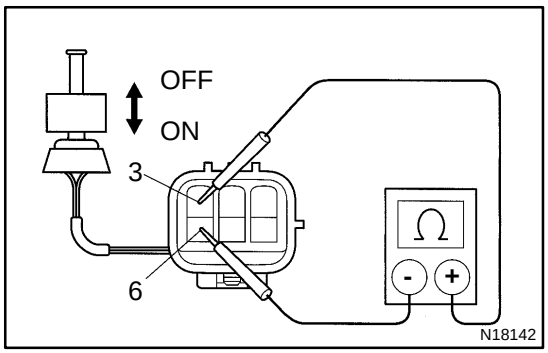
21. INSPECT WASHER LEVEL WARNING LIGHT

(a) Disconnect the connectors from the level warning switch and parking brake switch.

(b) Connect the terminals on the wire harness side connector of the level warning switch connector.

(c) Remove the CHARGE fuse and turn the ignition switch ON, and check that the warning light comes on.

If the warning light does not light up, test the bulb.

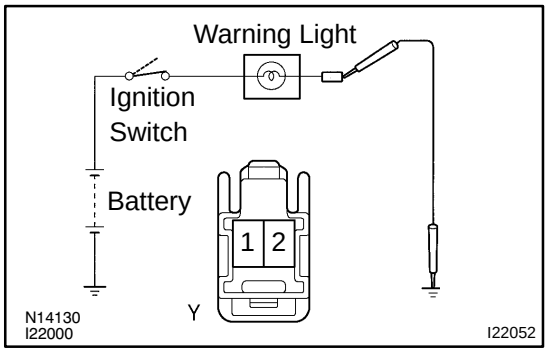


22. INSPECT WASHER LEVEL WARNING SWITCH

(a) Check that no continuity exists between the terminals with the switch OFF (float up).

(b) Check that continuity exists between the terminals with the switch ON (float down).

If the operation is not as specified, replace the switch.

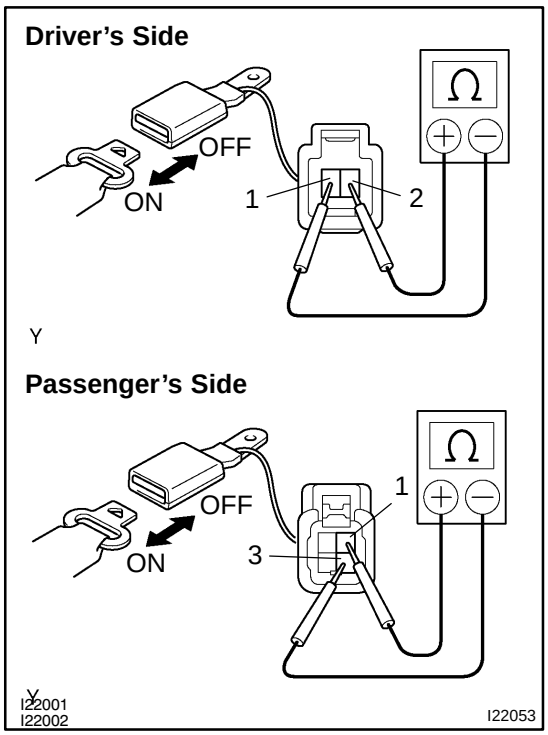


23. INSPECT DRIVER'S SEAT BELT WARNING LIGHT

(a) Disconnect the connector from the driver's buckle switch, and connect terminal 1 and the body ground.

(b) Turn the ignition switch ON and check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.



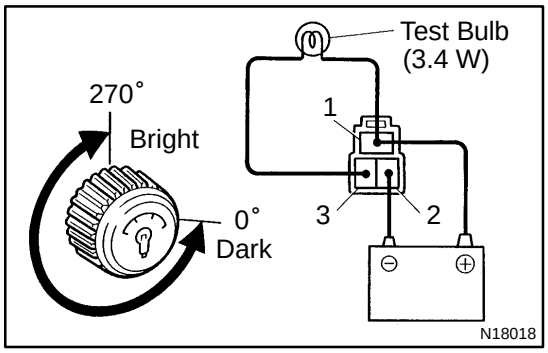
24. INSPECT BUCKLE SWITCH CONTINUITY

(a) Passenger's Seat only:
Press the sensing part of the belt warning occupant detection sensor (See step 29).

(b) Check that continuity exists between the terminals on the switch side connector with the switch ON (belt unfastened).

(c) Check that no continuity exists between the terminals on the switch side connector with the switch OFF (belt fastened).

If the operation is not as specified, replace the seat belt inner.



25. INSPECT LIGHT CONTROL RHEOSTAT

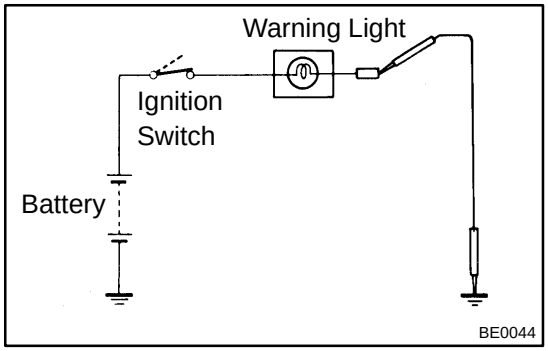
(a) Connect terminals 1 and 3 through a 3.4 W test bulb.

(b) Connect the positive (+) lead from the battery to terminal 1, and the negative (-) lead to terminal 2.

(c) Turn the rheostat knob fully counterclockwise, check that the test bulb goes off.

(d) Gradually turn the rheostat knob clockwise, check that the test bulb brightness changes from dark to bright.

If the operation is not as specified, replace the rheostat.

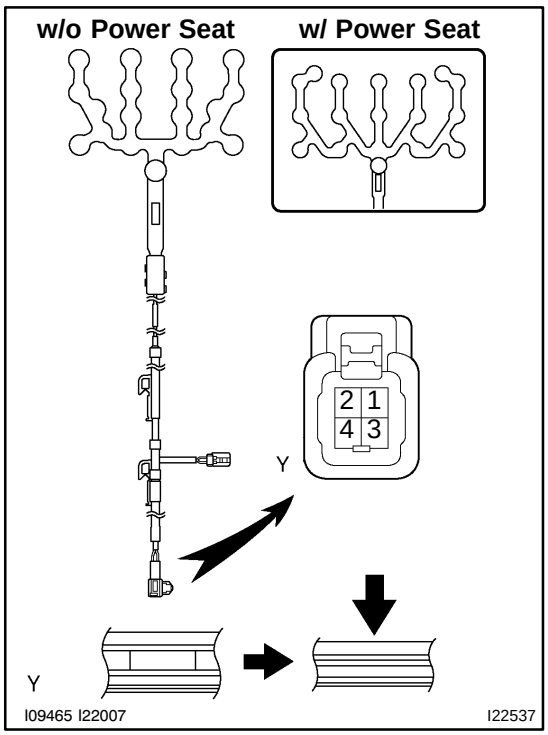


26. INSPECT OPEN DOOR WARNING LIGHT

(a) Disconnect the connector from the door courtesy switch and ground terminal on the wire harness side connector.

(b) Turn the ignition switch ON, check that the warning light lights up.

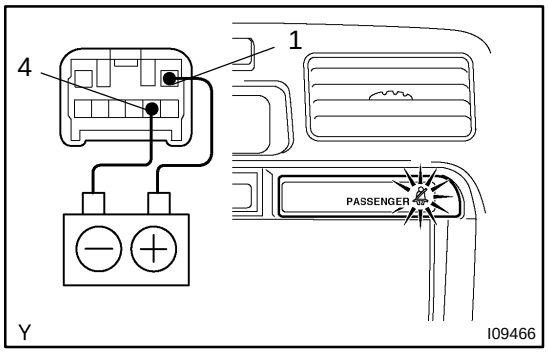
If the warning light does not light up, test the bulb.



27. Passenger's Seat only:
INSPECT SEAT BELT WARNING OCCUPANT DETECTION SENSOR CONTINUITY

Check that continuity exists between terminals 1 and 3 when pressing the sensing part.

If the operation is not as specified, replace the sensor.



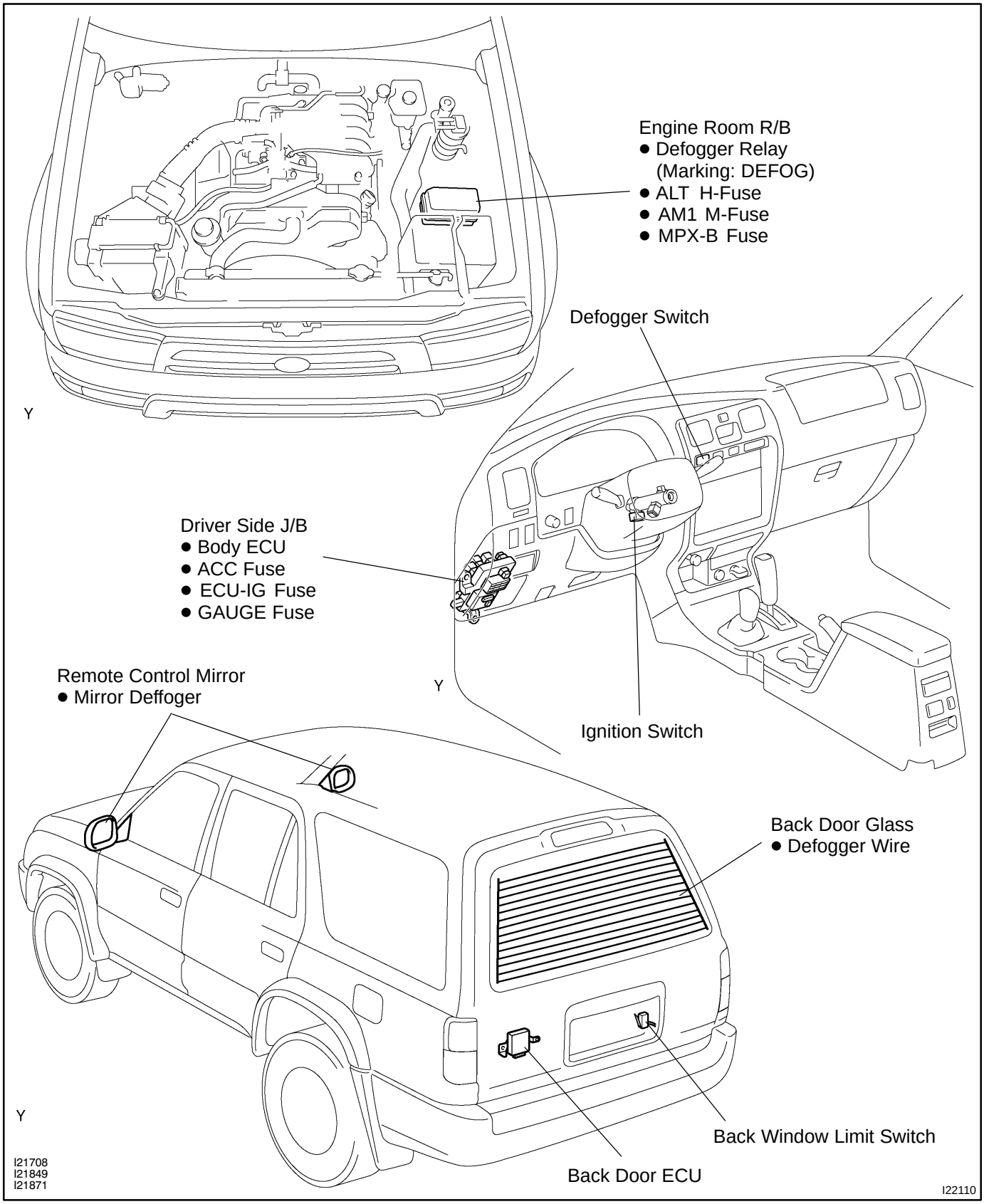
28. INSPECT PASSENGER SEAT BELT WARNING LIGHT

Connect the positive (+) lead from the battery to terminal 1, and negative (-) lead to terminal 4, then check that the warning light lights up.

DEFOGGER SYSTEM

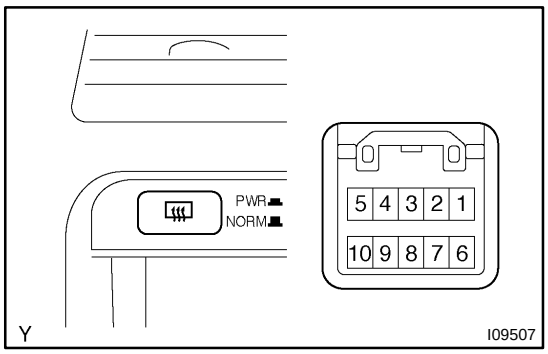
LOCATION

BE06Z-03



BE11L-02

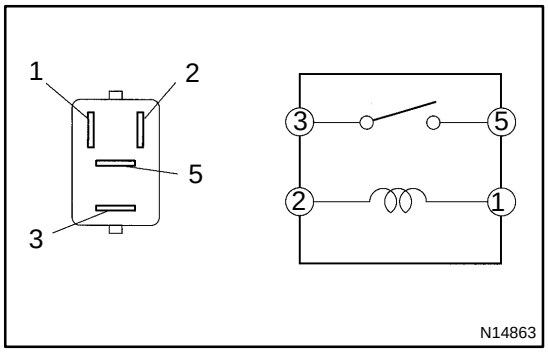
INSPECTION



1. INSPECT DEFOGGER SWITCH CONTINUITY

Push the defogger switch and check that continuity exists between terminals 7 and 10.

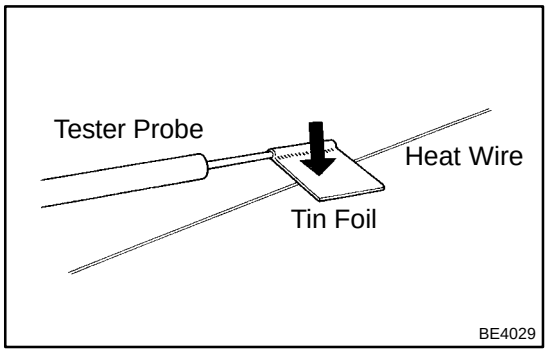
If the continuity is not as specified, replace the integration control panel.



2. INSPECT DEFOGGER RELAY CONTINUITY

Tester connection	Condition	Specified condition
1 - 2	Constant	Continuity
3 - 5	Apply B+ between terminals 1 and 2	Continuity

If the continuity is not as specified, replace the relay.



3. INSPECT DEFOGGER WIRE

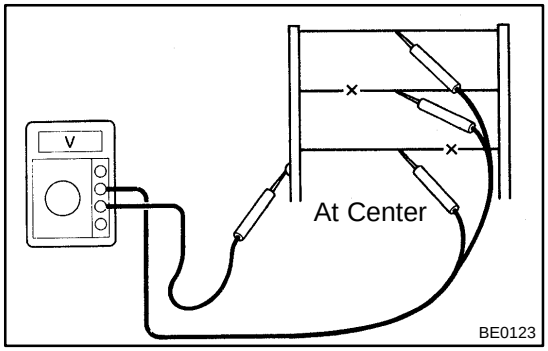
NOTICE:

- **When cleaning the glass, use a soft and dry cloth, and wipe the glass in the moving direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wind a piece of tin foil around the top of the negative probe and press the foil against the wire with your finger, as shown.**

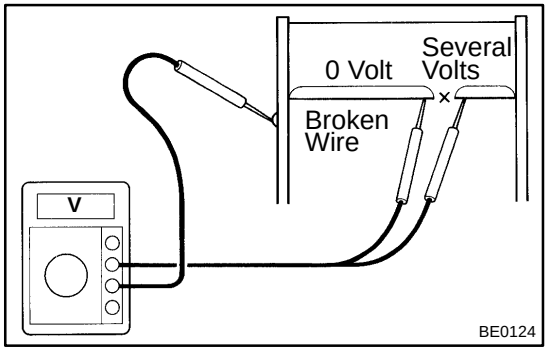
(a) Turn the ignition switch ON.

(b) Turn the defogger switch ON.

(c) Inspect the voltage at the center of each heat wire, as shown.



Voltage	Criteria
Approx. 5 V	OK (No break in wire)
Approx.10 V or 0 V	Broken wire



HINT:

If the voltage is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.

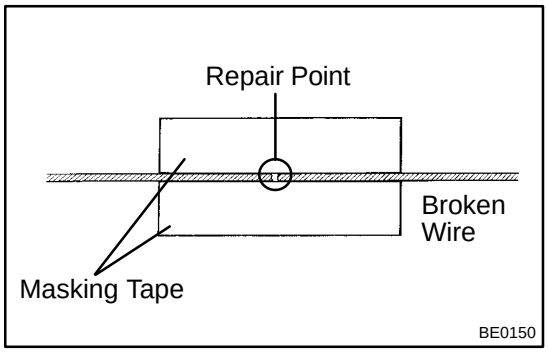
(d) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.

(e) Place the voltmeter negative (-) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (-) terminal end.

(f) The point where the voltmeter deflects between zero and several V is the place where the heat wire is broken.

HINT:

If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually increases to about 12 V as the meter probe is moved to the other end.

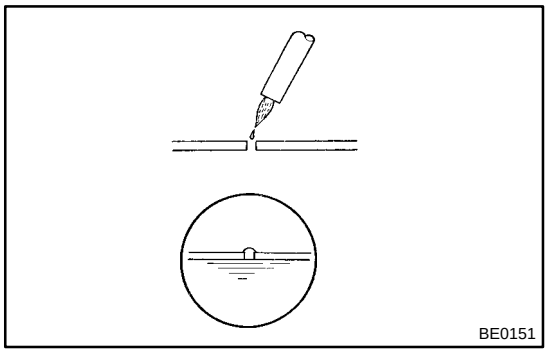


4. IF NECESSARY, REPAIR DEFOGGER WIRE

(a) Clean the broken wire tips with grease, wax and silicone remover.

(b) Place the masking tape along both sides of the wire to be repaired.

(c) Thoroughly mix the repair agent (Dupont paste No. 4817).

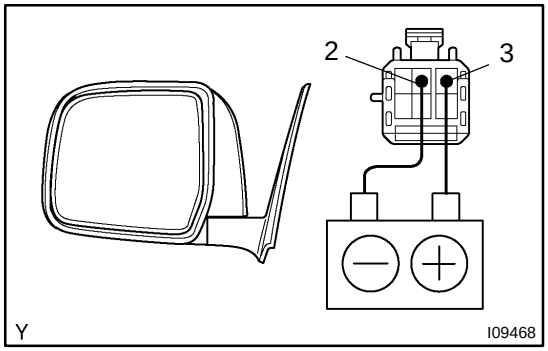


(d) Thoroughly mix the repair agent (Dupont paste No. 4817 or equivalent).

(e) Using a fine tip brush, apply a small amount of the agent to the wire.

(f) After a few minutes, remove the masking tape.

(g) Do not repair the defogger wire for at lease 24 hours.



5. INSPECT MIRROR DEFOGGER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2.

(b) Check that the mirror becomes warm.

HINT:

It takes a little time for the mirror to become warm.

POWER WINDOW CONTROL SYSTEM

BE19H-02

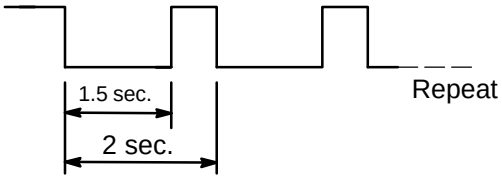
TROUBLESHOOTING

1	**One touch power window does not move up and down. (Prepare normal master and regulator switch.)**

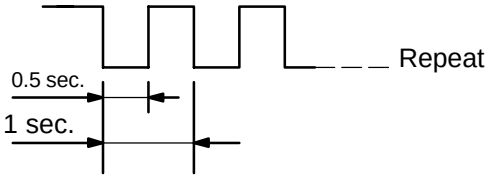
After turning the ignition switch ON and power window master switch on the driver side UP or DOWN and power window regulator switch on the passenger side UP or DOWN, check that the master and regulator switch AUTO light blinks.

• Error is classified into the following 3 types according to the way of blinking.

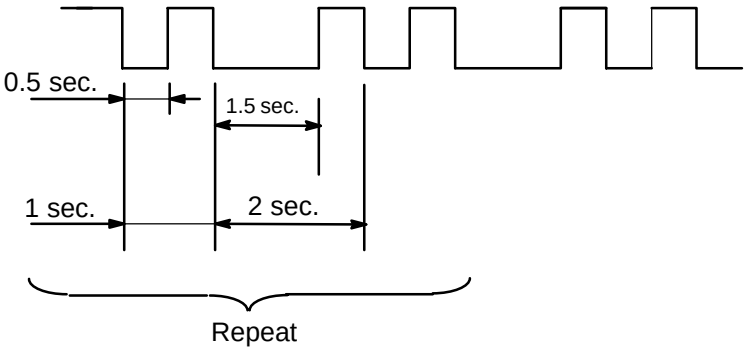
① Limit switch error



② Pulse sensor error



③ Limit switch/Pulse sensor synchronize error



<Reference> • When 30 seconds have elapsed since blinking begins, blinking stops. (AUTO light remains ON)
• When turning the ignition key OFF, blinking stops.

blinks in the ① way

Remove the master(regulator) switch. (Connector connection condition)

When the fully closed driver's door is opened, does the voltage between terminal 19 (2) and terminal 20 (3) of master(regulator) switch change from 0 V to 10 - 14 V?

Yes

CONTINUED ON NEXT PAGE

No

blinks in the ② or ③ way

No

Master (regulator) switch defective

Disconnect the connecters of master (regulator) switch and driver's (passenger's) power window motor.

CONTINUED ON NEXT PAGE

CONTINUED FROM PREVIOUS PAGE

CONTINUED FROM PREVIOUS PAGE

Master(regulator) switch defective

Does continuity exist between connector terminals on the vehicle side?

Master(regulator) switch side ↔ Motor side
20 (3) terminal ↔ 4 terminal
21 (4) terminal ↔ 3 terminal
19 (2) terminal ↔ 5 terminal

No

Yes

Wire harness defective (open)

Does continuity exist between 20, 21, terminals and 19 on the master (regulator) switch side or terminals 4, 3, and 5 on the motor side and the body ground?

Yes

No

Wire harness defective (short)

Connect the connector of power window motor.

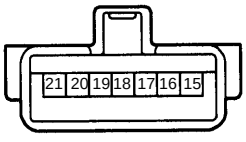
Yes

Connect the normal master (regulator) switch, do AUTO UP and AUTO DOWN operations work?

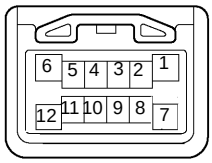
No

Power window motor defective.

Master Switch

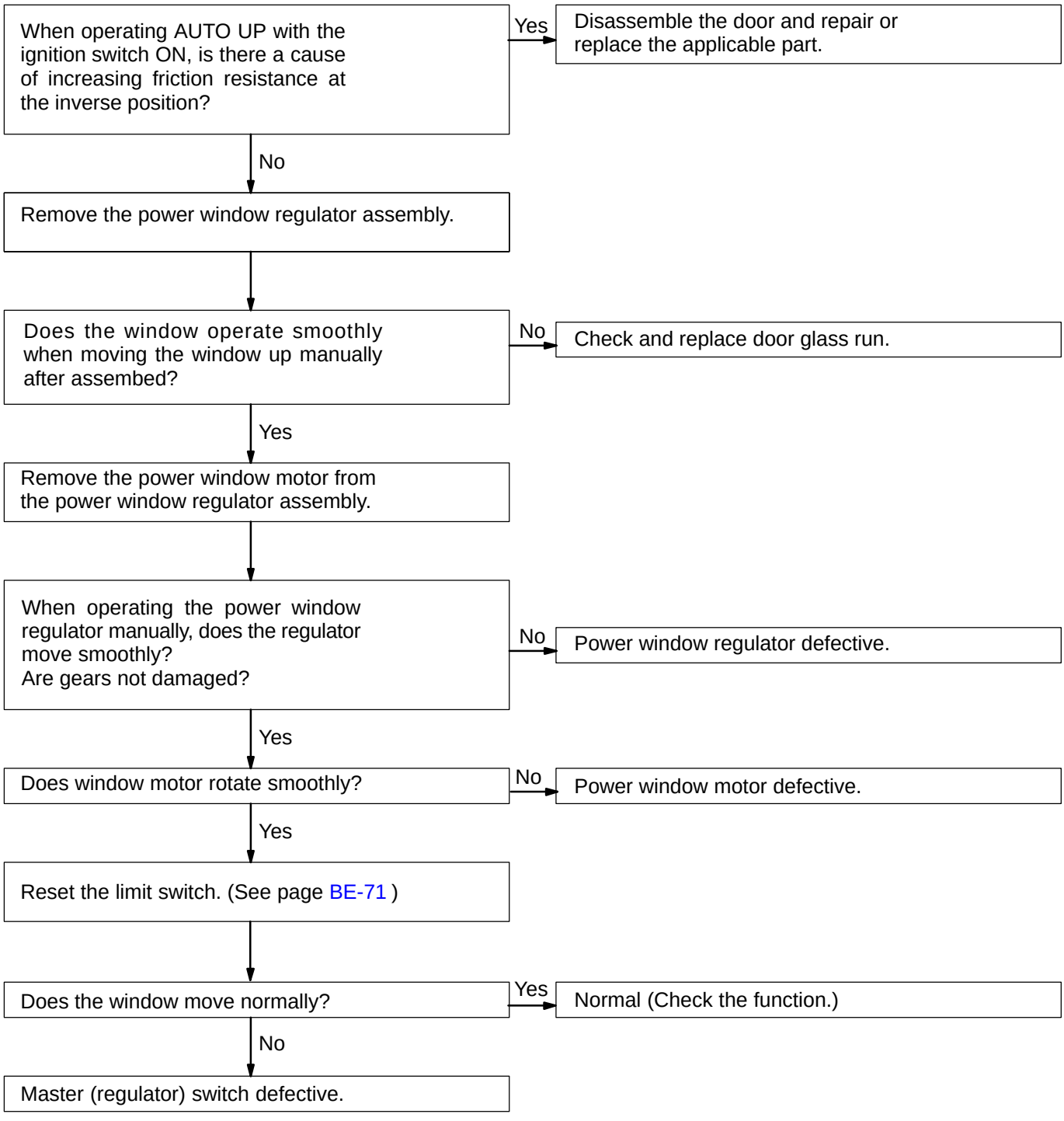


Regulator Switch

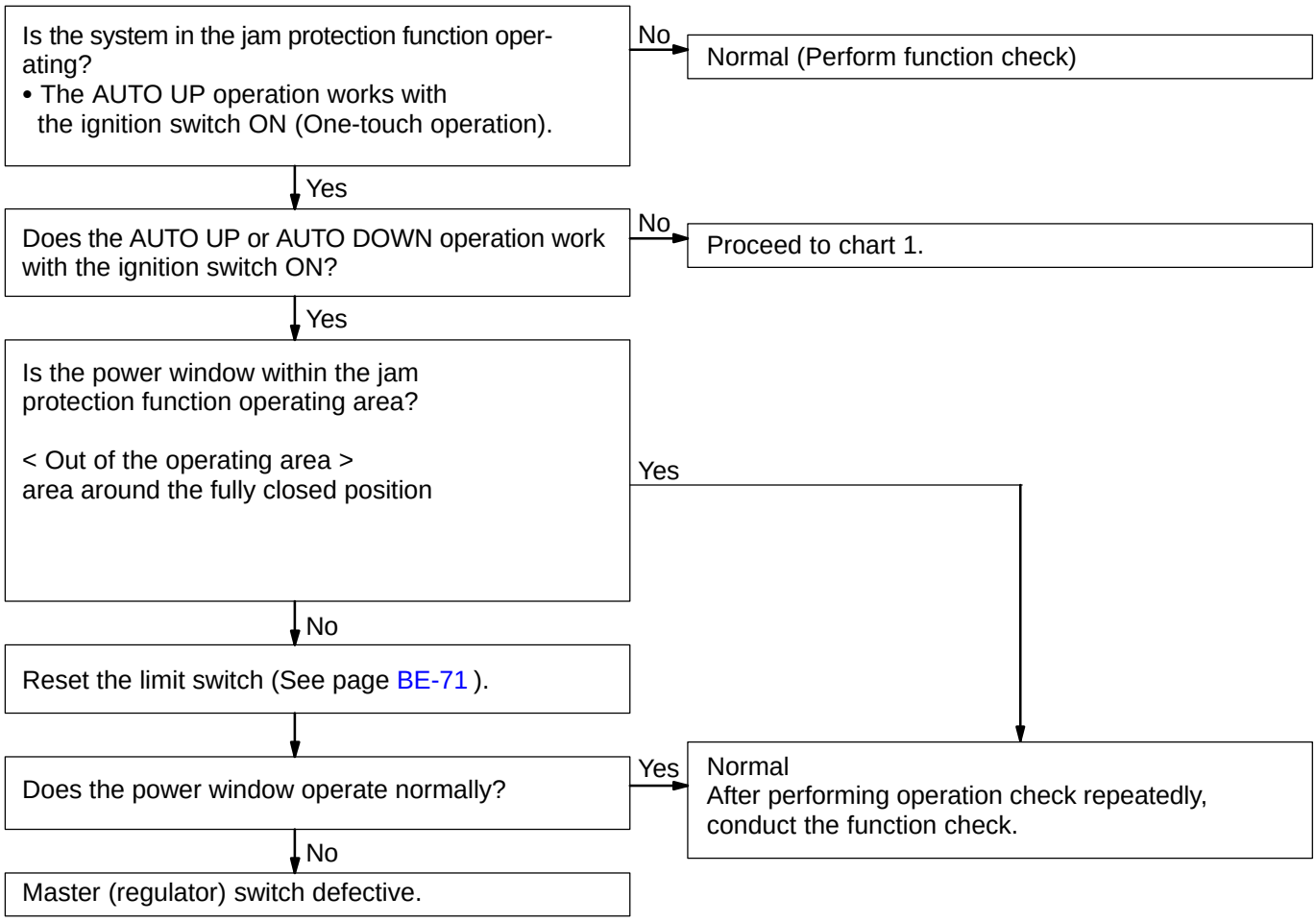


I10181

2	During AUTO UP operation, the power window moves down.

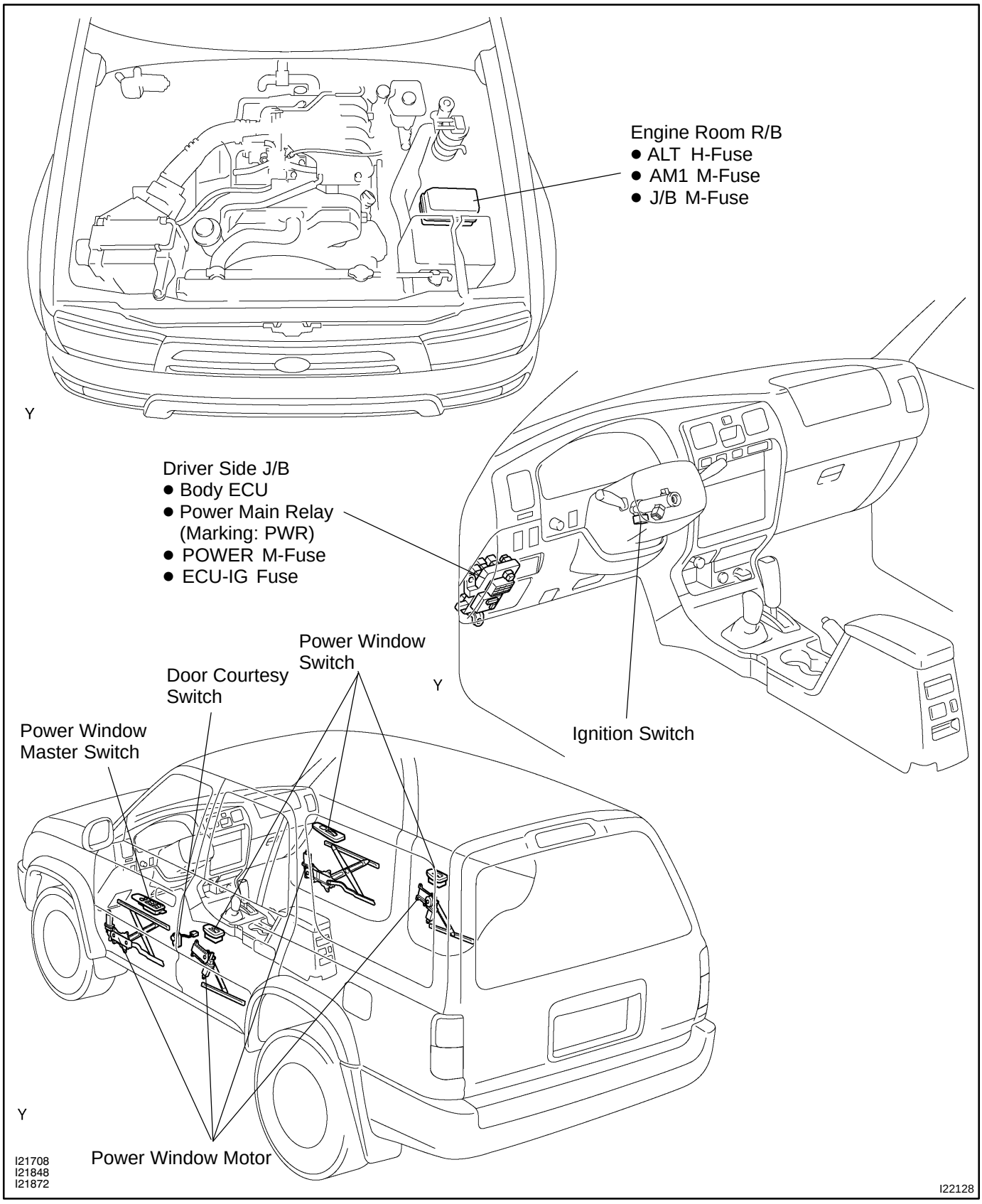


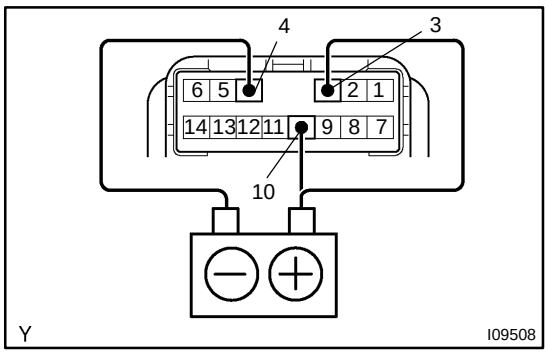
3	**The DOWN function does not work though foreign objects are caught in the power window glass.**



BE071-04

LOCATION





BE11M-03

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

Connect the positive (+) lead from the battery to terminals 3 and 10, and the negative (-) lead to terminal 4.

Front driver's switch (Window lock and unlock):

Switch position	Tester connection	Specified condition
UP	1 - 3	Battery positive voltage
	2 - 4	Continuity
DOWN	2 - 3	Battery positive voltage
	1 - 4	Continuity

Front passenger's switch (Window lock and unlock):

Switch position	Tester connection	Specified condition
UP	7 - 10	Battery positive voltage
DOWN	8 - 10	Battery positive voltage

Rear left switch (Window unlock):

Switch position	Tester connection	Specified condition
UP	9 - 10	Battery positive voltage
	11 - 4	Continuity
DOWN	11 - 10	Battery positive voltage
	9 - 4	Continuity

Rear left switch (Window lock):

Switch position	Tester connection	Specified condition
UP	9 - 10	Battery positive voltage
	11 - 4	No continuity
DOWN	11 - 10	Battery positive voltage
	9 - 4	No continuity

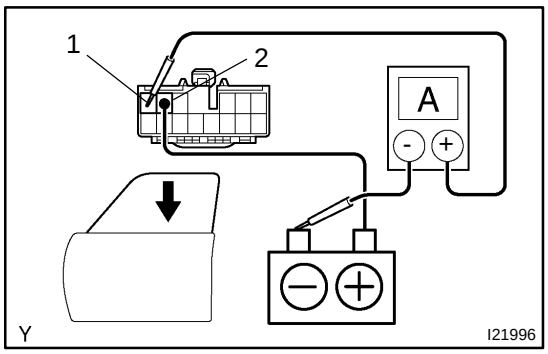
Rear right switch (Window unlock):

Switch position	Tester connection	Specified condition
UP	13 - 10	Battery positive voltage
	14 - 4	Continuity
DOWN	14 - 10	Battery positive voltage
	13 - 4	Continuity

Rear right switch (Window lock):

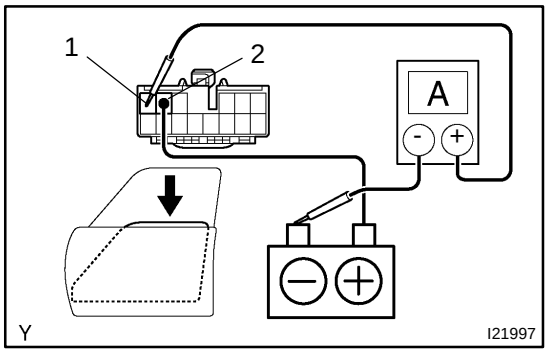
Switch position	Tester connection	Specified condition
UP	13 - 10	Battery positive voltage
	14 - 4	No continuity
DOWN	14 - 10	Battery positive voltage
	13 - 4	No continuity

If the continuity is not as specified, replace the master switch.



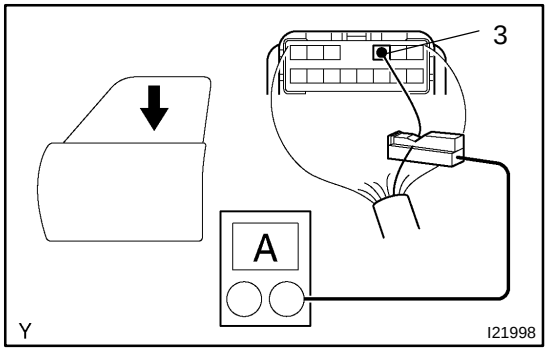
2. Using an ammeter:
INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT

(a) Disconnect the connector from the master switch.
(b) Connect the positive (+) lead from the ammeter to terminal 1 on the wire harness side connector, and the negative (-) lead to negative terminal of the battery.
(c) Connect the positive (+) lead from the battery to terminal 2 on the wire harness side connector.
(d) As the window goes down, check that the current flow is approximately 7 A.



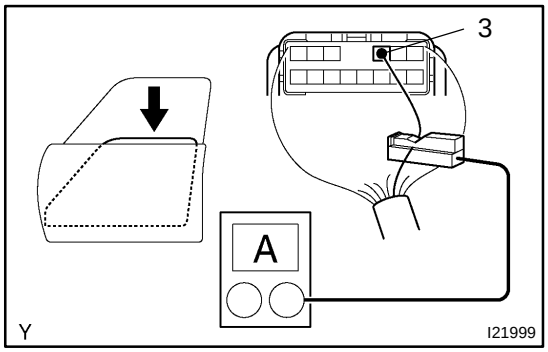
(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:
The circuit breaker opens for 4 - 40 seconds after the window stops going down, so that check must be made before the circuit breaker operates.
If the operation is as specified, replace the master switch.



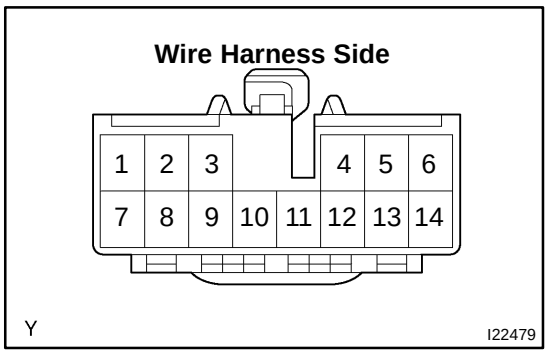
3. Using an ammeter with a current - measuring probe:
INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT

(a) Remove the master switch with the connector connected.
(b) Attach a current-measuring probe to terminal 3 of the wire harness.
(c) Turn the ignition switch ON and set the power window switch in the down position.
(d) As the window goes down, check that the current flow is approximately 7 A.



(e) Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:
The circuit breaker opens for 4 - 40 seconds after the window stops going down, so the check must be made before the circuit breaker operates.
If the operation is not as specified, replace the master switch.



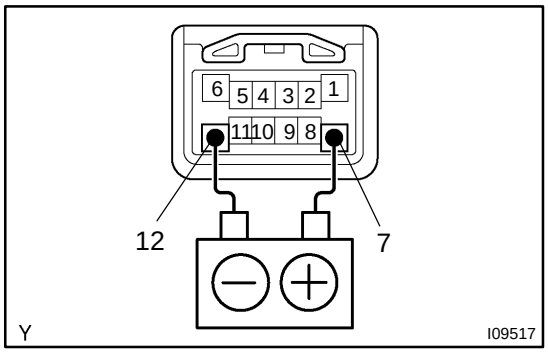
4. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT

Disconnect the connector from the master switch and inspect the connector on the wire harness side.

Tester connection	Switch position	Specified condition
3 - Ground	Constant	Battery positive voltage
4 - Ground	Constant	Continuity
10 - Ground	Ignition switch position LOCK or ACC	No voltage*
	Ignition switch position ON	Battery positive voltage

*Exceptions: During 43 seconds after the ignition switch ON → OFF (ACC) or until the driver or a passenger's door is opened after the ignition switch ON → OFF (ACC).

If the circuit is not as specified, inspect the circuits connected to other parts.

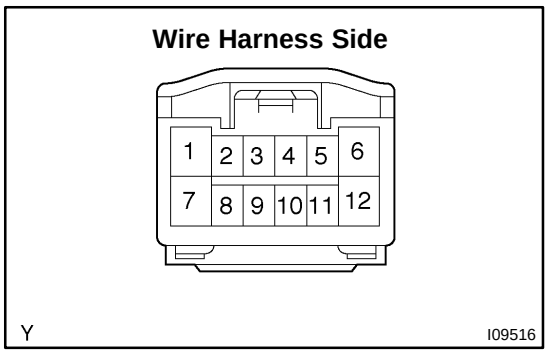


5. INSPECT POWER WINDOW SWITCH CONTINUITY

Connect the positive (+) lead from the battery to terminal 7 and negative (-) lead to terminal 12.

Switch position	Tester connection	Specified condition
UP	1 - 12	Battery positive voltage
	6 - 12	Continuity
DOWN	6 - 12	Battery positive voltage
	1 - 12	Continuity

If the continuity is not as specified, replace the switch.



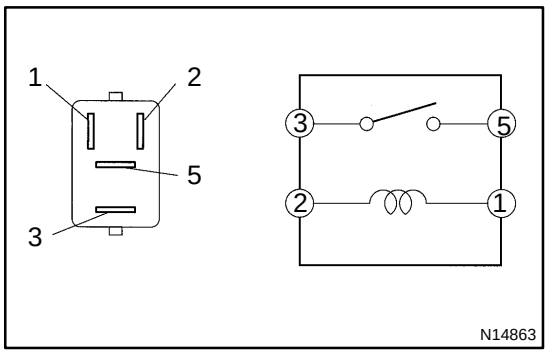
6. INSPECT POWER WINDOW SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Switch position	Specified condition
7 - Ground	Ignition switch position LOCK or ACC	No voltage*
	Ignition switch position ON	Battery positive voltage
12 - Ground	Constant	Continuity

*Exceptions: During 60 seconds after the ignition switch ON → OFF (ACC) or until the driver or a passenger's door is opened after the ignition switch ON → OFF (ACC).

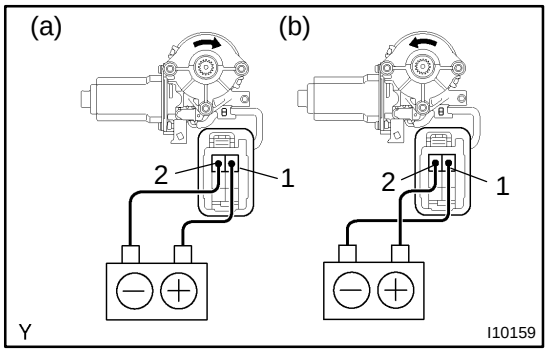
If the circuit is not as specified, inspect the circuits connected to other parts.



7. INSPECT POWER MAIN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 - 2	Continuity
Apply B+ between terminals 1 and 2	3 - 5	Continuity

If the continuity is not as specified, replace the relay.

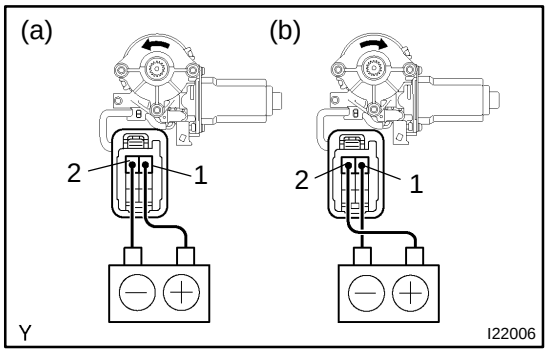


8. INSPECT DRIVER'S DOOR POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counter-clockwise.

If the operation is not as specified, replace the motor.

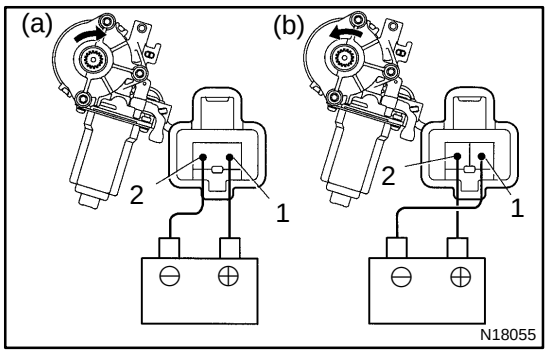


9. INSPECT FRONT PASSENGER'S DOOR POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counter-clockwise.

If the operation is not as specified, replace the motor.

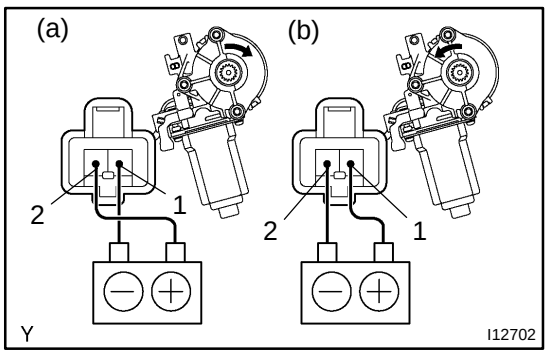


10. INSPECT REAR LEFT SIDE DOOR POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counter-clockwise.

If the operation is not as specified, replace the motor.

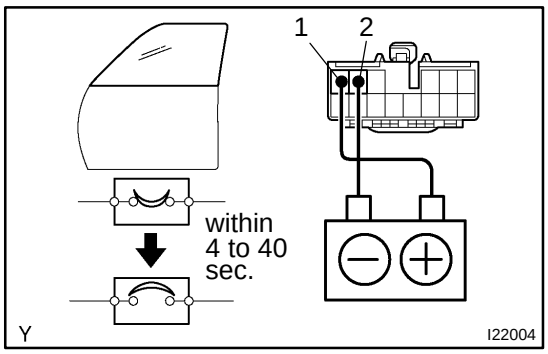


11. INSPECT REAR RIGHT SIDE DOOR POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the motor turns clockwise.

(b) Reverse the polarity, check that the motor turns counter-clockwise.

If the operation is not as specified, replace the motor.



12. INSPECT DRIVER'S DOOR POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

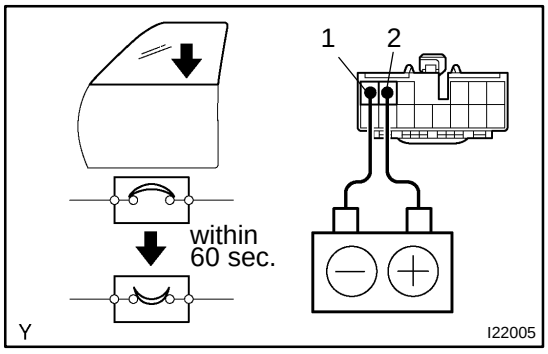
(a) Disconnect the connector from the master switch.

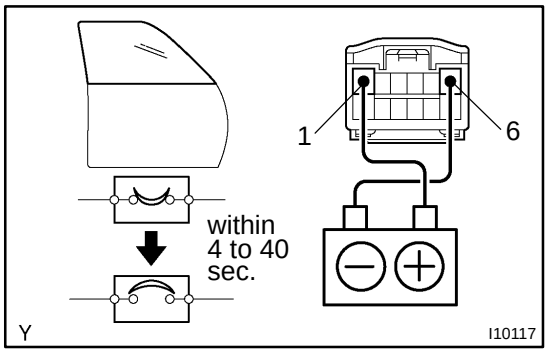
(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2 on the wire harness side connecter, and raise the window to the fully closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.

(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

If the operation is not as specified, replace the motor.





13. INSPECT FRONT PASSENGER'S DOOR POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION

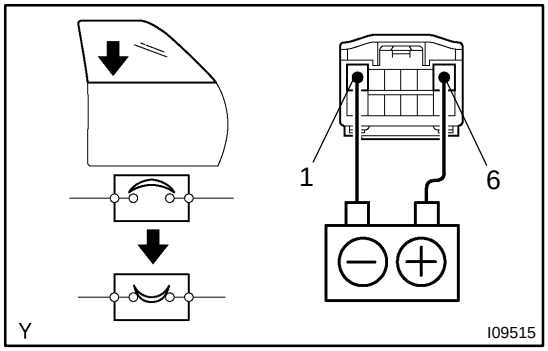
(a) Disconnect the connector from the power window switch.

(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 6 on the wire harness side connecter, and raise the window to the fully closed position.

(c) Continue to apply voltage, check that there is a circuit breaker operation noise within approximately 4 to 40 seconds.

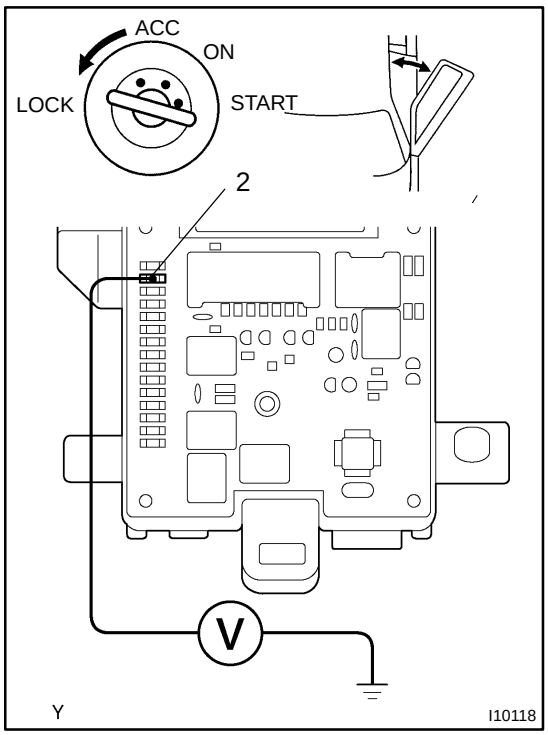
(d) Reverse the polarity, check that the window begins to descend within approximately 60 seconds.

If the operation is not as specified, replace the motor.



14. INSPECT REAR LEFT SIDE DOOR POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION (See step 13)

15. INSPECT REAR RIGHT SIDE POWER WINDOW MOTOR CIRCUIT BREAKER OPERATION (See step 13)



16. INSPECT KEY-OFF POWER WINDOW SIGNAL OPERATION OF INTEGRATION RELAY

HINT:

When the ECU circuit is as specified, inspect the key-off power window signal.

(a) Connect the positive (+) lead from the voltmeter to terminal 2 and the negative (-) lead to the body ground.

(b) Close the door with the ignition switch turned to LOCK or ACC, and check that the meter needle indicates battery positive voltage.

(c) Open the door and check that the meter needle indicates 0 V.

(d) Turn the ignition switch ON and check that the meter needle indicates battery positive voltage again.

If the operation is not as specified, replace the driver side J/B.

BE241-02

ADJUSTMENT

HOW TO RESET POWER WINDOW MOTOR (LIMIT SWITCH)

NOTICE:

If the jam protection function is not functioning properly, perform the following procedures.

HINT:

It is necessary to reset the power window motor (in initial position for the limit switch) when separating the window regulator from the power window motor or operating the window regulator with the door glass not installed.

(a) Remove the power window motor.

HINT:

Place matchmarks on the power window motor and window regulator gear.

(b) Connect the power window motor and power window switch to the wire harness of the vehicle.

(c) Turn the ignition switch ON.

(d) Press the power window UP switch until the motor completes 6 to 10 rotations (4 seconds of rotation or more).

(e) Assemble the power window motor and regulator.

HINT:

- Install the motor when the regulator arm is below the middle point.
- Align the matchmarks on the power window motor and window regulator gear when installing the power window motor.

(f) Assemble the power window regulator and door glass.

HINT:

Never rotate the motor downward until the completion of the window glass installation.

(g) Connect the power window switch to the wire harness and turn the ignition switch ON.

(h) Repeat UP and DOWN operation several times manually.

(i) Check AUTO UP → AUTO DOWN automatic operation is normal.

NOTICE:

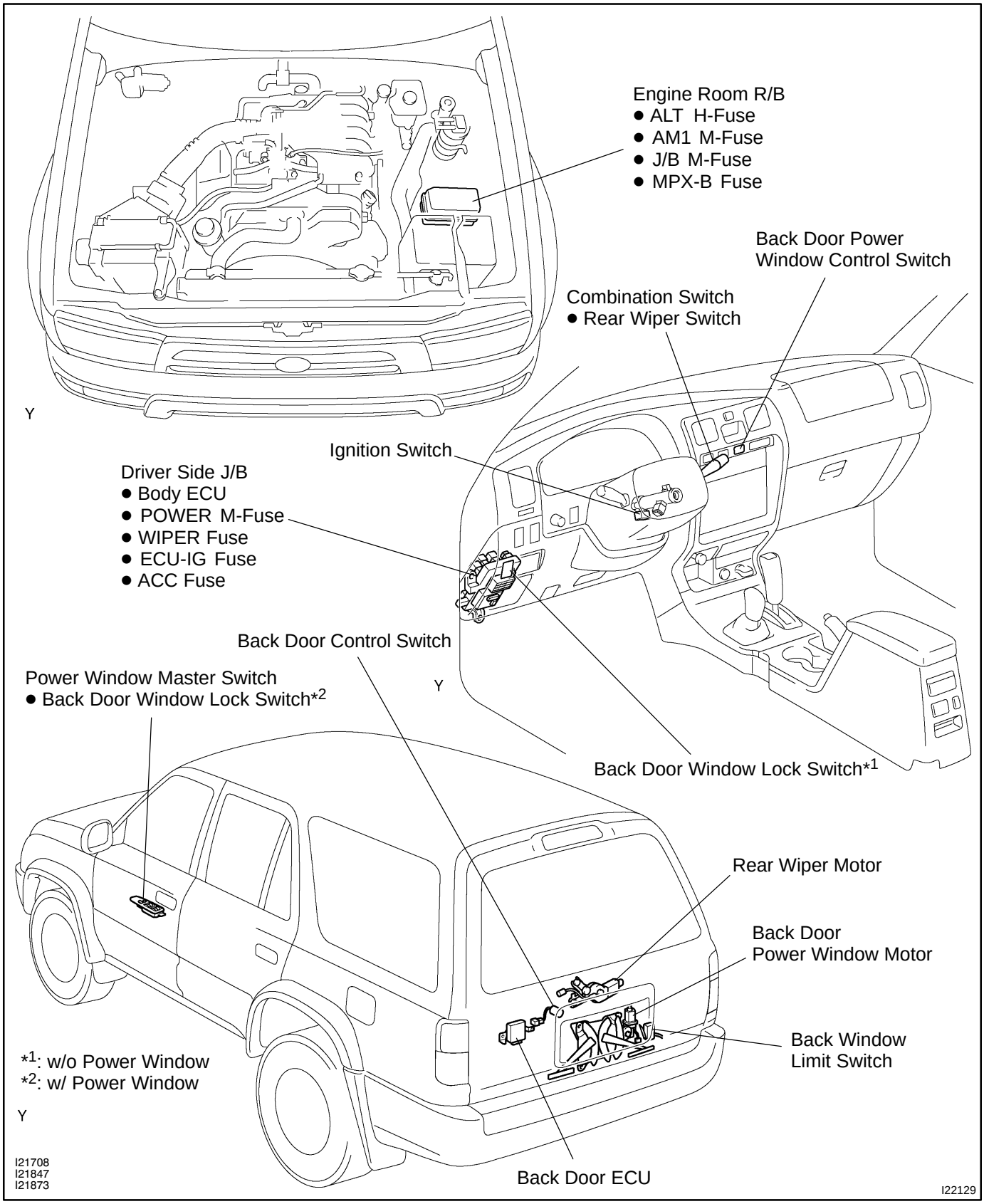
- **The jam protection function does not operate immediately after performing reset.**
- **If the jam protection function is triggered and the window lowers after the window has been fully closed by AUTO UP operation (step i), reset the power window motor again.**

(j) Check the power window function.

BACK DOOR POWER WINDOW CONTROL SYSTEM

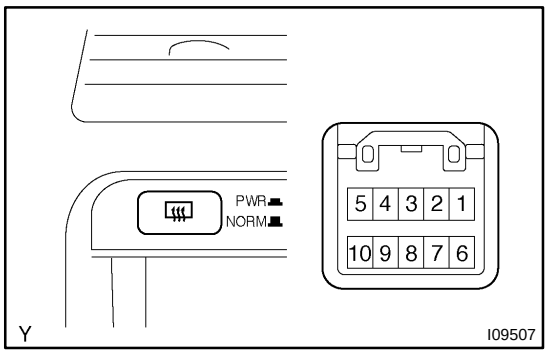
BE073-03

LOCATION



BE11N-02

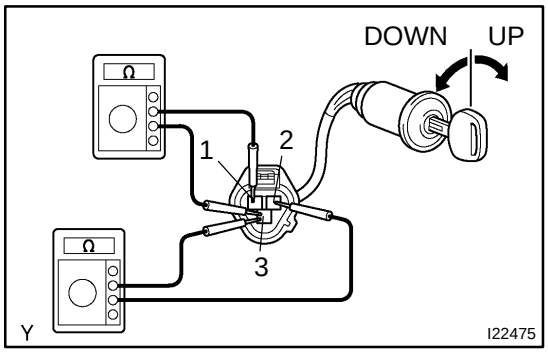
INSPECTION



1. INSPECT BACK DOOR POWER WINDOW SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
2 - 6	UP	Continuity
-	OFF	-
1 - 6	DOWN	Continuity
5 - 8	Illumination circuit (UP, OFF, DOWN)	Continuity

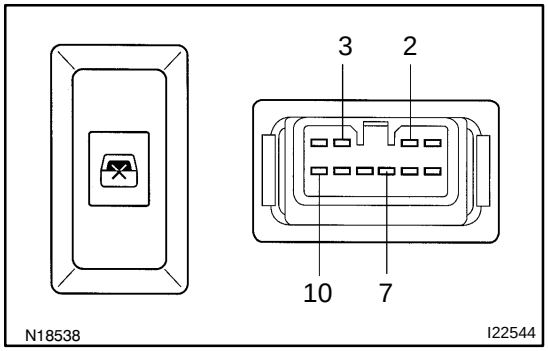
If the continuity is not as specified, replace the switch.



2. INSPECT BACK DOOR CONTROL SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
2 - 3	UP	Continuity
-	OFF	No continuity
1 - 3	DOWN	Continuity

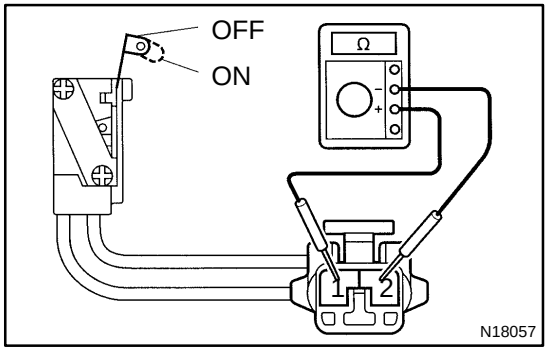
If the continuity is not as specified, replace the switch.



3. w/o Power Window: INSPECT BACK DOOR WINDOW LOCK SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
7 - 10	FREE	Continuity
-	LOCK	No continuity
2 - 3	Illumination circuit (FREE, LOCK)	Continuity

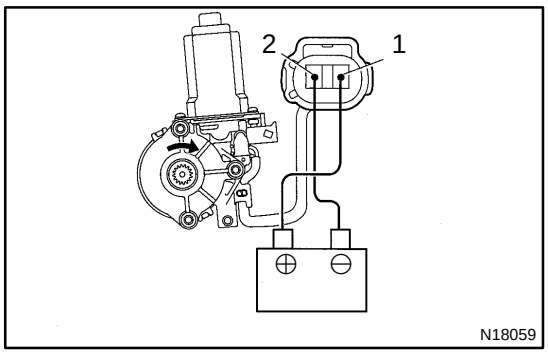
If the continuity is not as specified, replace the switch.



4. INSPECT WINDOW LIMIT SWITCH CONTINUITY

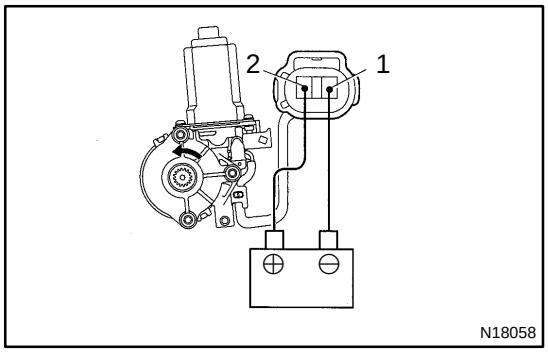
Tester connection	Switch position	Specified condition
1 - 2	Switch lever pushed (OFF position)	No continuity
	Switch lever released (ON position)	Continuity

If the continuity is not as specified, replace the switch.



5. INSPECT BACK DOOR POWER WINDOW MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.



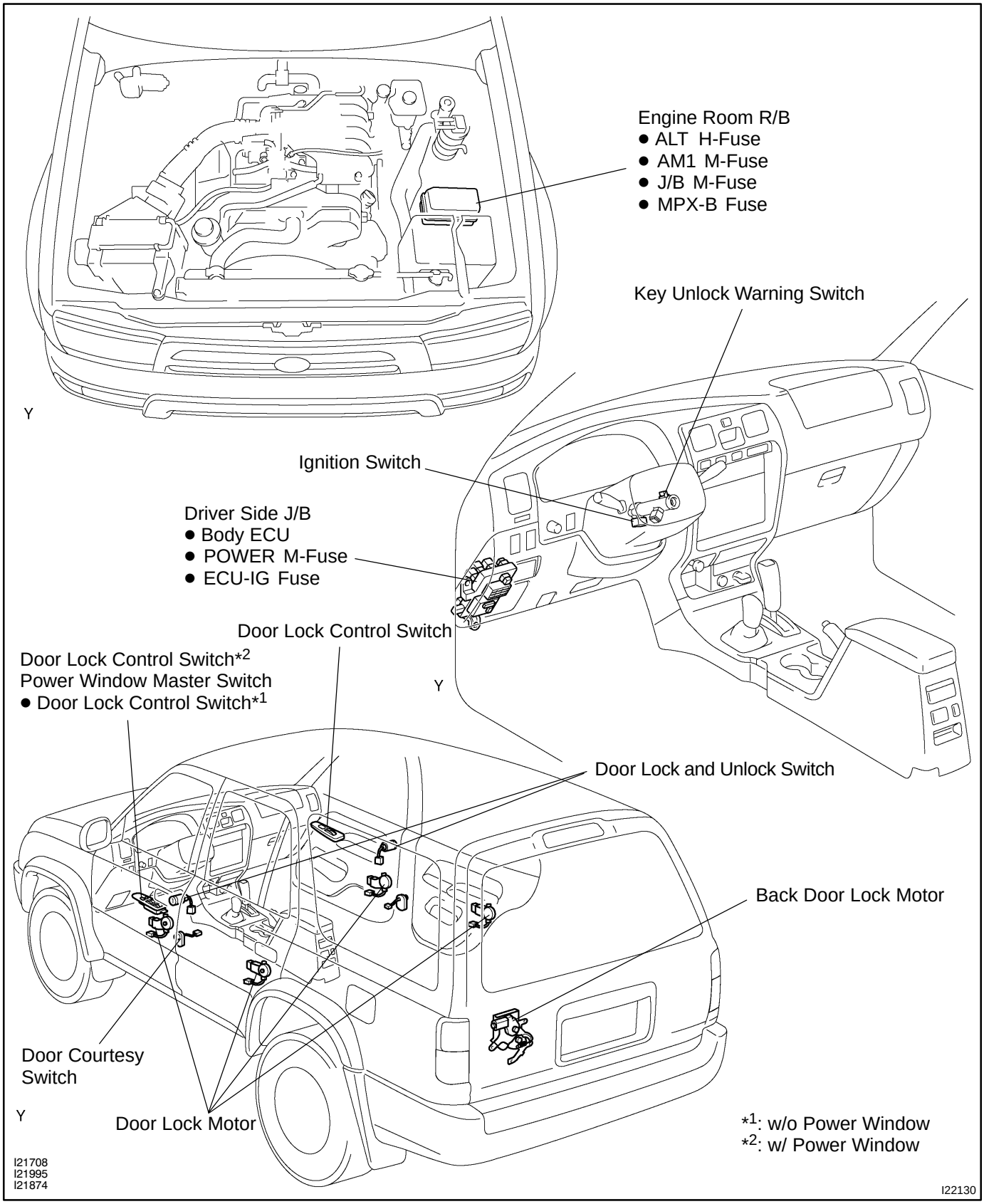
(b) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the motor turns counterclockwise.

If the operation is not as specified, replace the motor.

POWER DOOR LOCK CONTROL SYSTEM

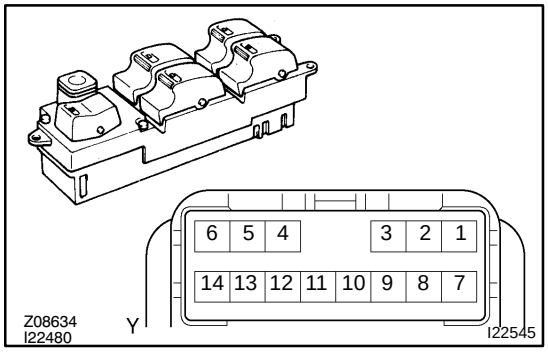
LOCATION

BE075-03



BE076-03

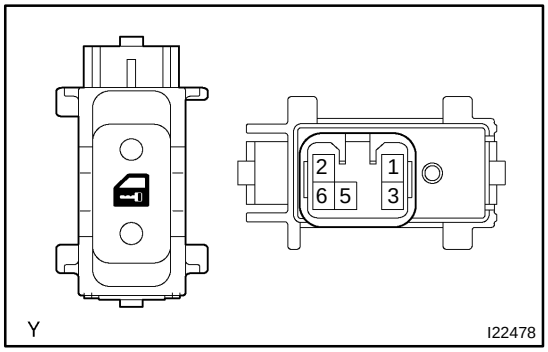
INSPECTION



1. w/ Power Window:
INSPECT DRIVER'S DOOR LOCK CONTROL SWITCH (MASTER SWITCH) CONTINUITY

Tester connection	Switch position	Specified condition
4 - 6	LOCK	Continuity
-	OFF	No continuity
4 - 12	UNLOCK	Continuity

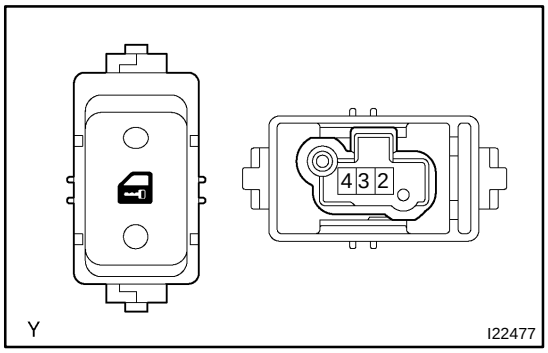
If the continuity is not as specified, replace the switch.



2. w/ Power Window:
INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
3 - 6	LOCK	Continuity
-	OFF	No continuity
3 - 5	UNLOCK	Continuity

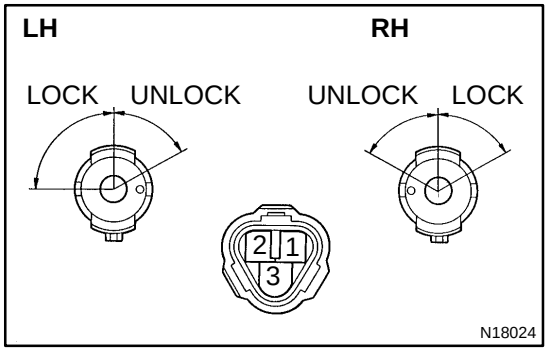
If the continuity is not as specified, replace the switch.



3. w/o Power Window:
INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
3 - 4	LOCK	Continuity
-	OFF	No continuity
2 - 4	UNLOCK	Continuity

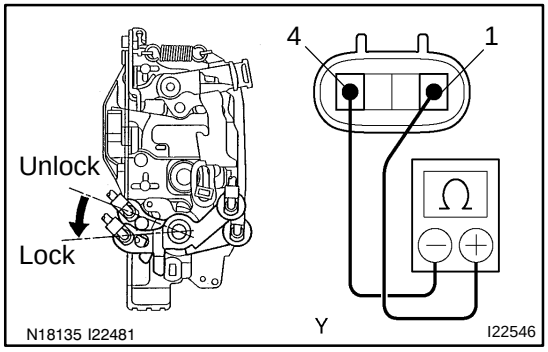
If the continuity is not as specified, replace the switch.



4. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
2 - 1	LOCK	Continuity
-	OFF	No continuity
3 - 2	UNLOCK	Continuity

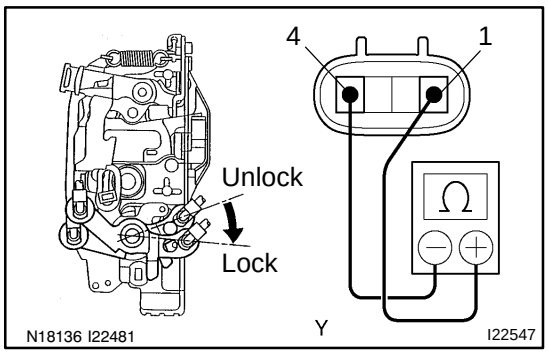
If the continuity is not as specified, replace the switch.



5. INSPECT DRIVER'S DOOR UNLOCK DETECTION SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
1 - 4	OFF (Door Lock set to LOCK)	No continuity
	ON (Door Lock set to UNLOCK)	Continuity

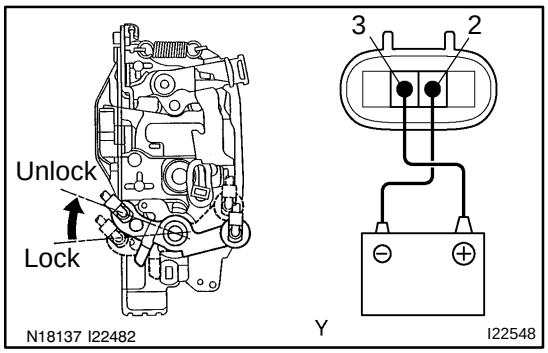
If the continuity is not as specified, replace the switch.



6. INSPECT PASSENGER'S DOOR UNLOCK DETECTION SWITCH CONTINUITY

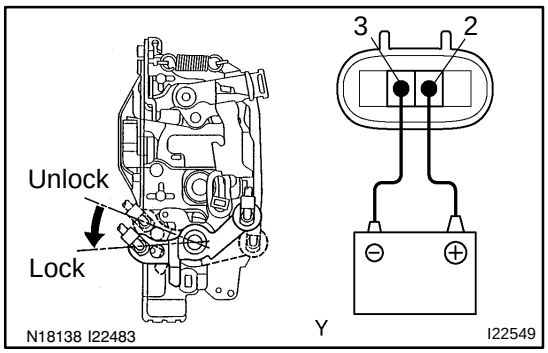
Tester connection	Switch position	Specified condition
1 - 4	OFF (Door Lock set to LOCK)	No continuity
	ON (Door Lock set to UNLOCK)	Continuity

If the continuity is not as specified, replace the switch.



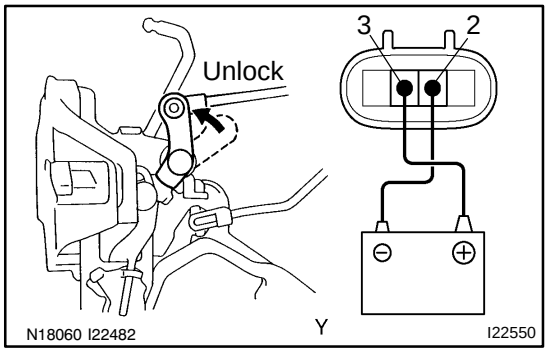
7. INSPECT FRONT DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the door lock link moves to UNLOCK position.



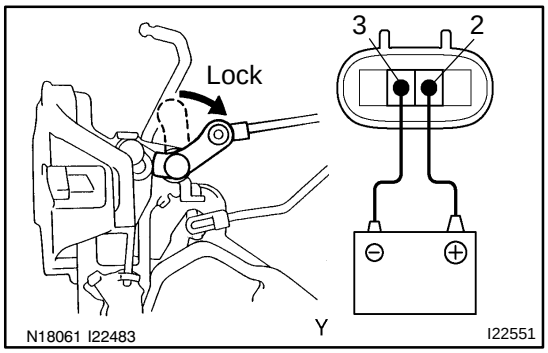
(b) Remove the polarity and check that the door lock link moves to LOCK position.

If the operation is not as specified, replace the door lock assembly.



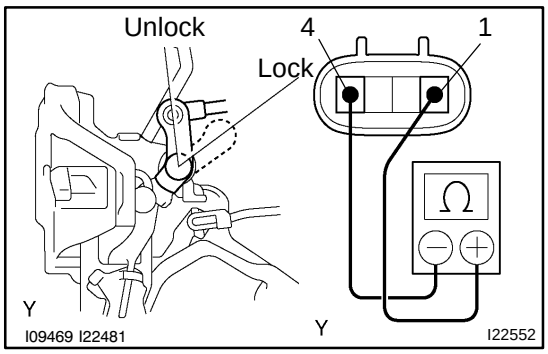
8. INSPECT REAR DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the door lock moves to UNLOCK position.



(b) Remove the polarity and check that the door lock link moves to LOCK position.

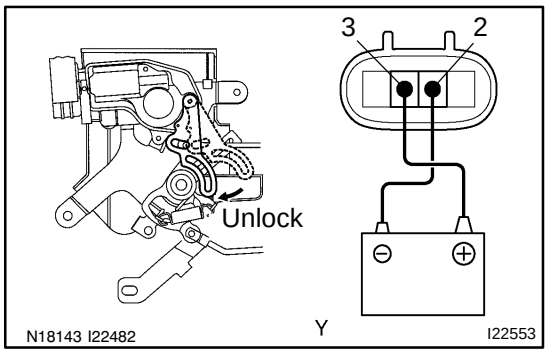
If the operation is not as specified, replace the door lock assembly.



9. INSPECT REAR DOOR UNLOCK DETECTION SWITCH CONTINUITY

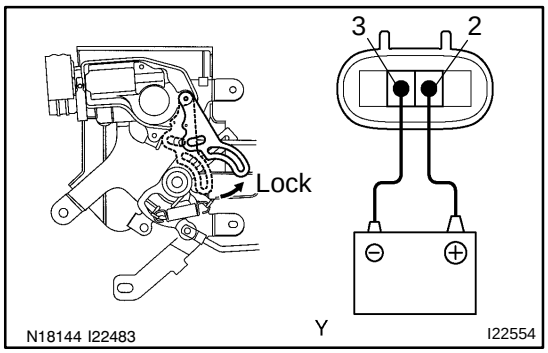
Tester connection	Switch position	Specified condition
1 - 4	OFF (Door Lock set to LOCK)	No continuity
	ON (Door Lock set to UNLOCK)	Continuity

If the continuity is not as specified, replace the switch.



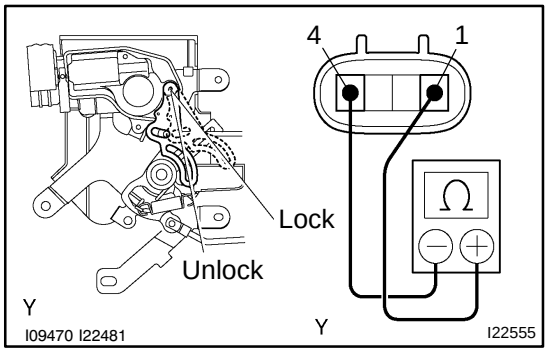
10. INSPECT BACK DOOR LOCK MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2, and check that the door lock link moves to UNLOCK position.



(b) Remove the polarity and check that the door lock link moves to LOCK position.

If the operation is not as specified, replace the door lock assembly.



11. INSPECT BACK DOOR UNLOCK DETECTION SWITCH CONTINUITY

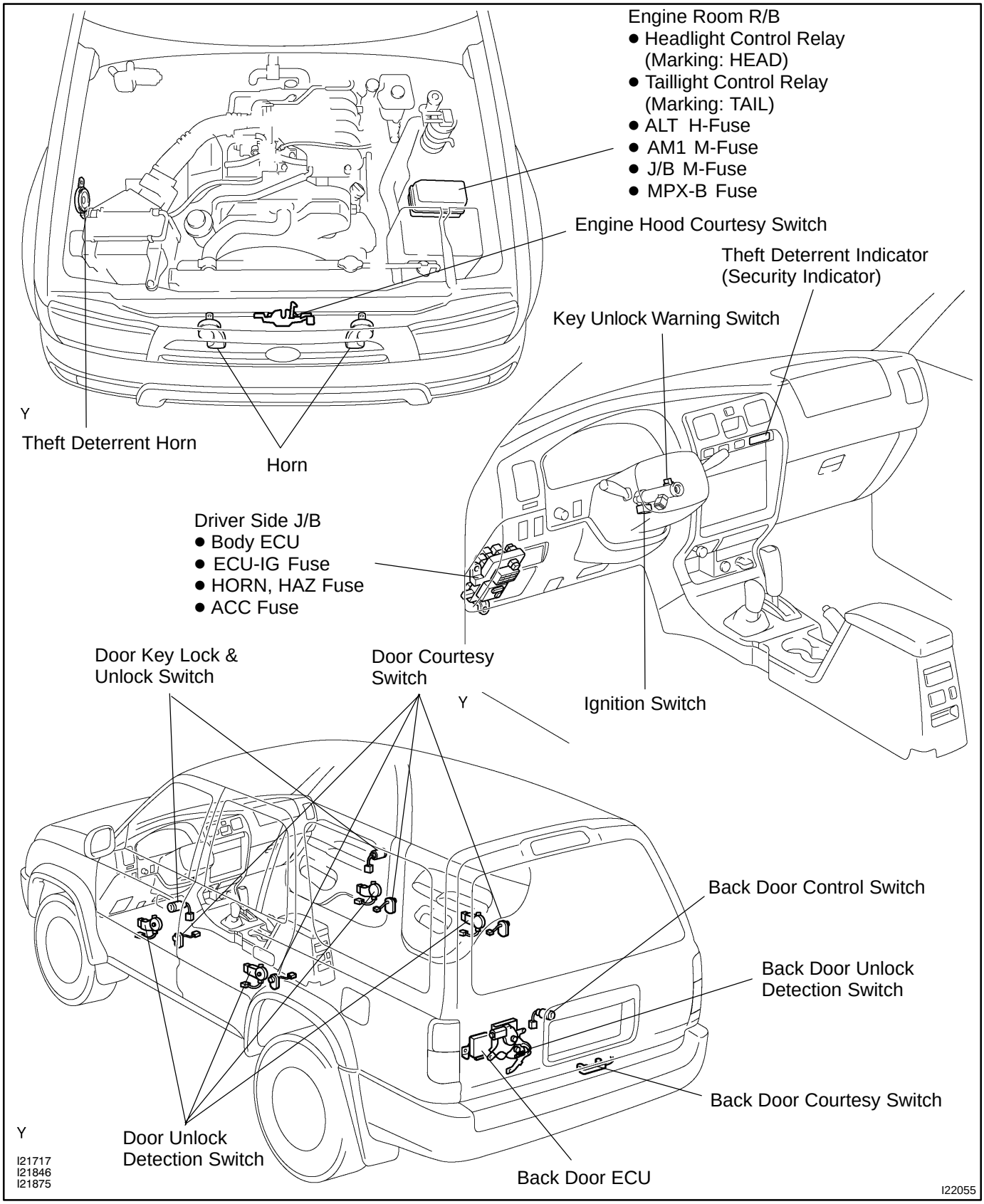
Tester connection	Switch position	Specified condition
1 - 4	OFF (Door Lock set to LOCK)	No continuity
	ON (Door Lock set to UNLOCK)	Continuity

If the continuity is not as specified, replace the switch.

THEFT DETERRENT SYSTEM

LOCATION

BE0CE-05



BE0CF-04

PRE-CHECK

1. ACTIVE ARMING MODE:

SETTING THE THEFT DETERRENT MODE

The system will be automatically set to the theft deterrent mode about 30 seconds after the setting process listed below are performed.

Setting Processes: (do processes (1)～(4) in the order)

(1) Remove the ignition key from the key cylinder.

(2) Close all entry points (door, hood and back door).

(3) Use any one of the following methods to lock all the doors depending on a given condition.

- Use the key to lock the driver or passenger side door or back door. (as a result, all the doors(including the engine hood and luggage compartment door) will be closed and locked), or
- Use the remote control to lock any door (as a result, all the doors(including the engine hood and luggage compartment door) will be closed and locked), or
- If the front right or left door is unlocked when both the rear doors are already locked, lock and close the remaining unlocked door by hand (as a result, all the doors(including the engine hood and luggage compartment door) will be closed and locked).
- Close all doors and locked with the engine hood or luggage compartment door opened, and close the engine hood or all the doors(including the engine hood and back door) will be closed and locked).

(4) About 30 seconds after the above process (3), the theft deterrent mode will automatically start.

HINT:

The closing/locking of all the entry points (doors, hood and back door) must remain unchanged for about 30 seconds, the system will start the theft deterrent mode.

2. PASSIVE ARMING MODE:

SETTING THE THEFT DETERRENT MODE

The system will be automatically set to the theft deterrent mode about 30 seconds after the setting process listed below are performed.

Setting Processes:

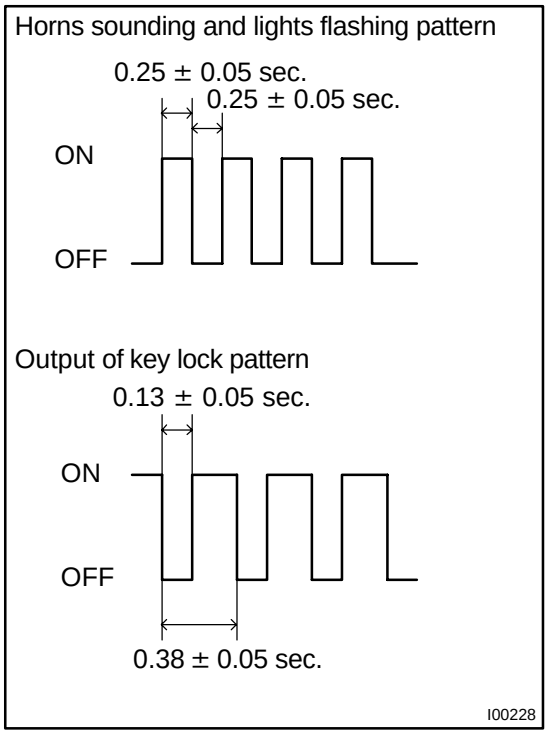
(1) Remove the ignition key from the key cylinder.

(2) Open and close driver door.

(3) Close any entry points (door, hood and back door).

(4) About 30 seconds after the above process-(3), the theft deterrent mode will automatically start.

HINT:
If, while following above steps, you use the key or the remote control to lock the door, the system will be set to ACTIVE ARMING MODE.



3. THEFT DETERRENT OPERATION

When the system is set to the theft deterrent mode and any of the following conditions are met, the system sounds the horns and flashes the headlights and the taillights for approx. 1 minute. At the same time the system locks all doors (If all door are not locked at once, the system repeats door locking operation every 0.38 seconds during the one minute alarm time).

Condition

(1) Any of the doors (Including the engine hood and luggage compartment door) is unlocked or opened without the key.*1

(2) The battery terminal is disconnected and reconnected.*2

*1: Only active arming mode.

*2: When the ignition key is not inserted in the key cylinder.

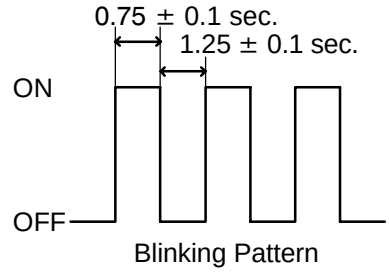
4. CANCELLATION OF THEFT DETERRENT OPERATION OR MODE

The theft deterrent operation or mode can be cancelled when any of the following conditions is met.

No.	Condition	Cancel of Operation	Cancel of Mode
1	Unlock front door with the key	Effective	Effective
2	Unlock doors with remote keyless entry	Effective	Effective
3	Insert key into ignition key cylinder and turn it to ON position	Effective	Effective
4	About 1 minute passes after theft deterrent operation begins	Automatic stop*1	-
5	Unlock the luggage compartment door with the key.	Effective	Effective
6	Unlock the back door.	Effective	Effective
7	If the system receives panic signal again when the system is activated by panic signal	Effective*2	Uneffective
6	If the system receives unlock signal when the system is activated by panic signal	Effective	Effective

*1: The system is set to the theft deterrent mode again in approx. 2 seconds after the operation stops.
*2: The alarm by the panic signal becomes the previous condition.

Security Only:



5. INDICATOR LIGHT (LED)

The indicator light functions as shown below according to the system condition in the theft deterrent mode. It remains off in the initial state.

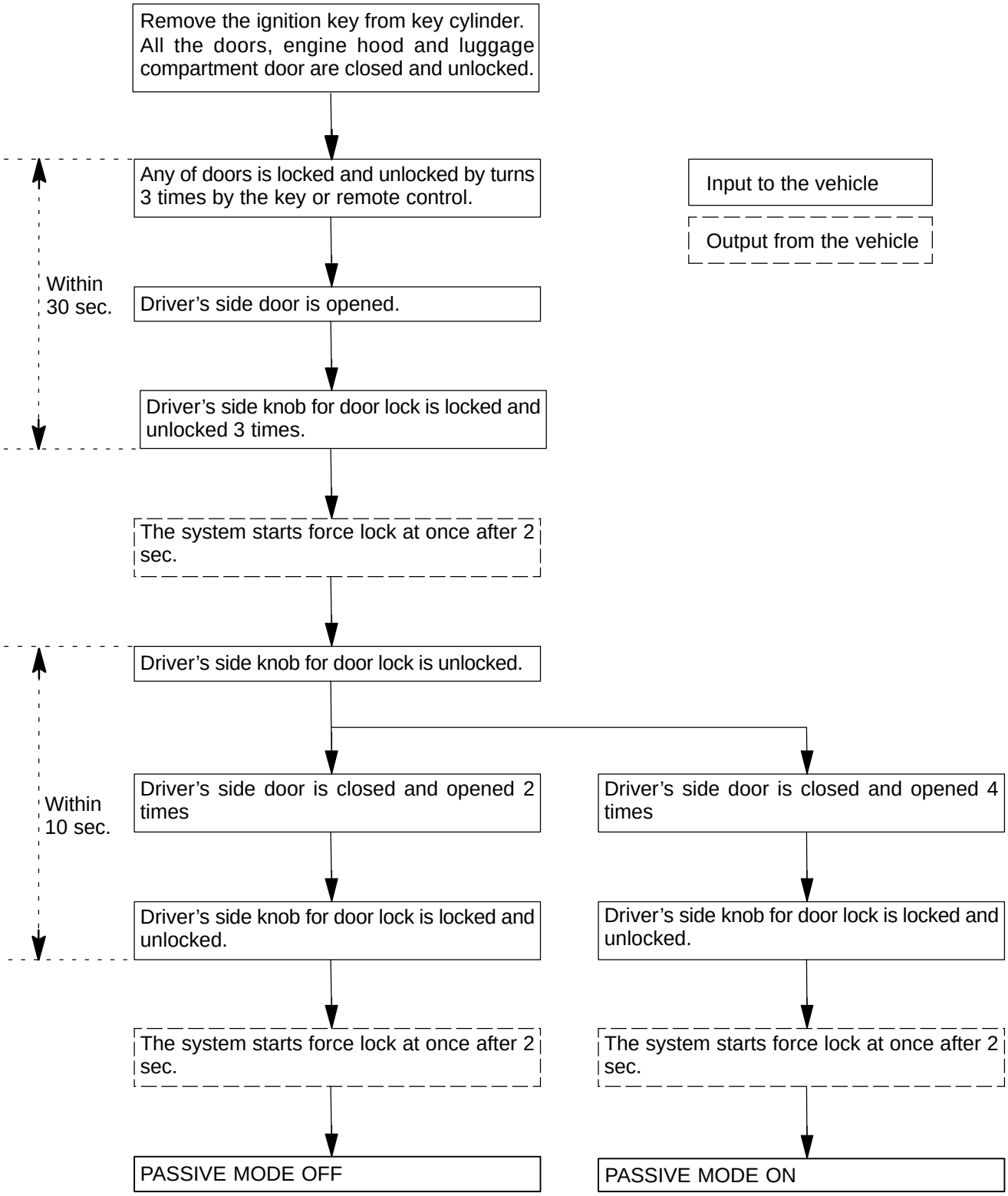
System Condition	Indicator Light
During set preparation time	ON
When the mode is set*	OFF
When alarm is activated	ON
When is the system temporally cancelled*	OFF

*: By the following 2 cases, the indicator flashes with the output from the immobiliser.

6. KEEPING POWER SUPPLY FUNCTION IN CASE OF DOME FUSE OPEN

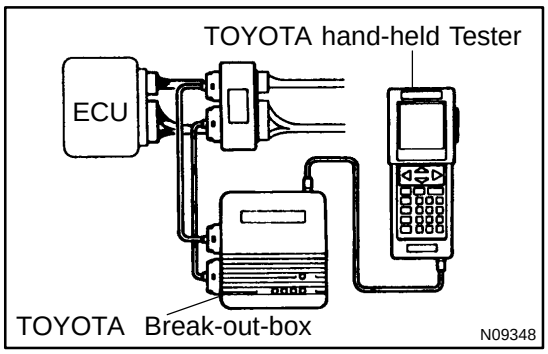
Even if the dome fuse blows open on the theft deterrent mode, the system will keep working on the theft deterrent mode.

7. CHANGING METHOD OF PASSIVE MODE (ON or OFF)



HINT:

- Initial mode is PASSIVE MODE OFF.
- If there is a different signal in the middle of changing. It is invalied.



8. ECU TERMINAL VALUES MEASUREMENT BY USING TOYOTA BREAK-OUT-BOX AND TOYOTA HAND-HELD TESTER

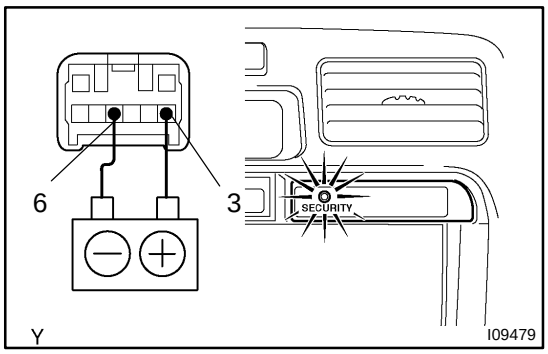
(a) Hook up the TOYOTA break- out- box and TOYOTA hand-held tester to the vehicle.

(b) Read the ECU input/ output values by following the prompts on the tester screen.

(c) Please refer to the TOYOTA hand-held tester has a ”Snapshot” function. This records the measured data and is effective in the diagnosis of intermittent problems.

BE11O-02

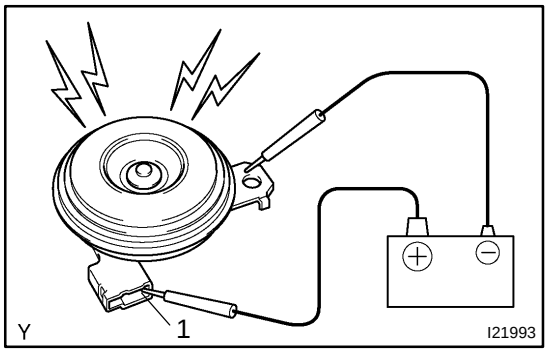
INSPECTION



1. INSPECT THEFT DETERRENT INDICATOR OPERATION

Connect the positive (+) lead from the battery to terminal 3 and negative (-) lead to terminal 6, and check that the indicator light lights up.

If the operation is not as specified, replace the integration control panel assembly.

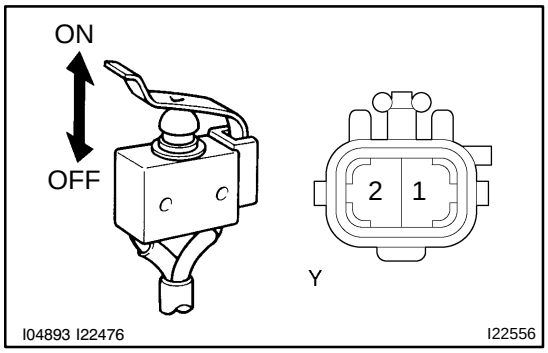


2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to the horn body, and check that the horn blows.

If the operation is not as specified, replace the horn.

3. INSPECT HORN CIRCUIT (See page DI-545)



4. INSPECT ENGINE HOOD COURTESY SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
1 - 2	LOCK	No continuity
	UNLOCK	Continuity

If continuity is not as specified, replace the switch.

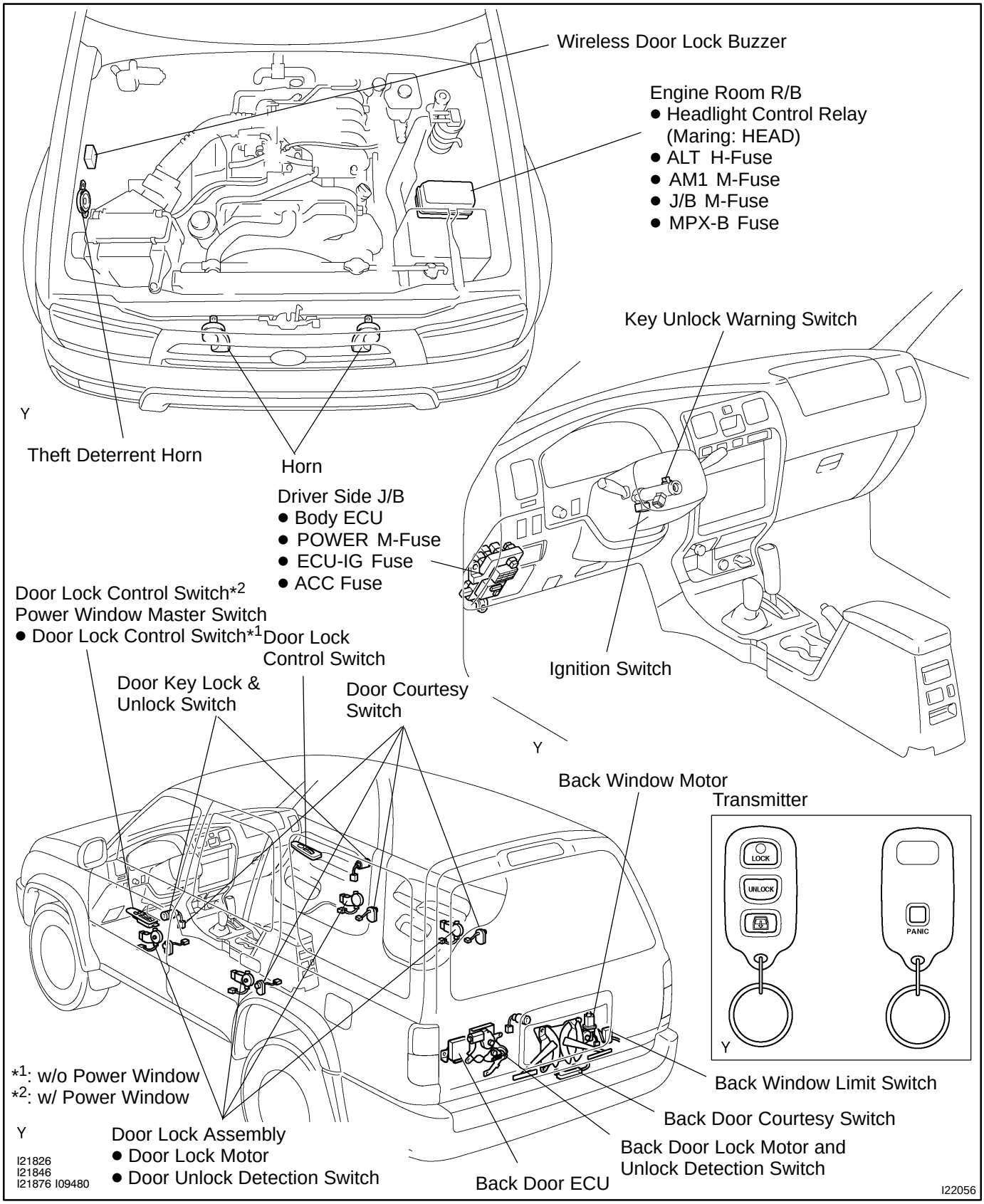
If continuity is as specified, inspect the switch circuit.

5. INSPECT ENGINE HOOD COURTESY SWITCH CIRCUIT (See page DI-541)

WIRELESS DOOR LOCK CONTROL SYSTEM

BE0CH-08

LOCATION



BE0CI-08

PRE-CHECK

1	**Only wireless function (Remote control) will not operate.** **(If a new transmitter or a transmitter of the same type that works properly with the vehicle is not available.)**

Put the vehicle in the following conditions (Pre requisite).
(1) Key plate has not been inserted in the ignition key cylinder.
(2) All the doors are closed. (Door warning light is off.)
(3) All the doors are locked.

Basic function check:

Under the standard operation, when repeating the operation of UNLOCK and LOCK switch 3 times or more alternately, check the UNLOCK-LOCK operation from 3rd time onward.
● Following procedures are standard operation.
(1) Keep about 1 M away in the right direction from the outside handle of a driver's seat.
(2) Face the transmitter to the vehicle and press one of transmitter switches for about 1 second

No

Yes

Normal
<Reference>
● Operative distance may differ according to an operator, the way of holding the transmitter or position.
● As weak electric wave is used, when there is strong wave or noise in the used frequency, operation distance might be shortened.

Transmitter battery check:

Replace the transmitter battery with a new or normal one and check UNLOCK-LOCK function works under the standard operation.
<Reference>
● The battery should be replaced by only the shops with sufficient skill.
● Battery quality can be judged by checking the remaining battery capacity.

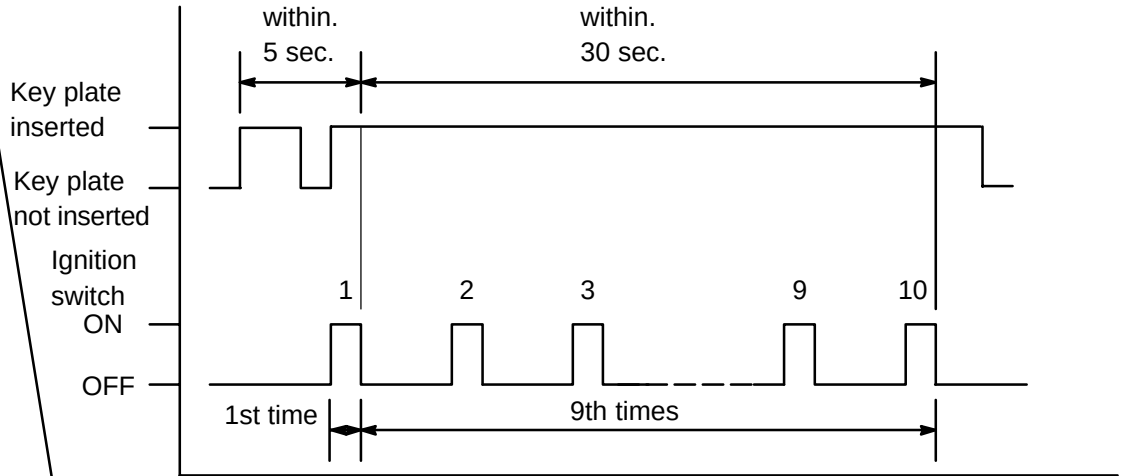
Yes → Battery faulty.

No

Put the vehicle in the same conditions as shown in the previous page. (Pre requisite)

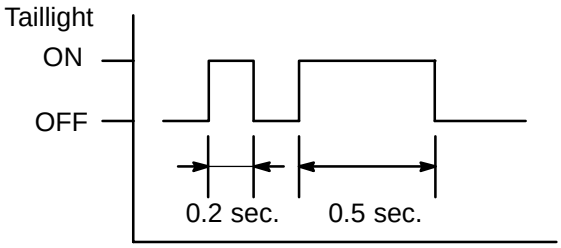
Inspection starts by using self diagnostic mode:

Enter into the self diagnostic mode.
When operating door control receiver in the order of 1 through 2, the mode turns to diagnostic mode.
(1) Insert the key plate in the ignition key cylinder and pull it out, then insert it again and turn the ignition switch
OFF → ON → OFF once within 5 seconds after pulling it out.
(2) After completing the above step within 30 seconds, turn the ignition switch OFF → ON → OFF 9 times.
HINT:
In case that either of (1) and (2) conditions is not satisfied, change to normal mode.
<Reference>
When completing self diagnostic mode, turn the ignition switch ON.
LOCK and UNLOCK operation is not performed under the self diagnostic mode.



Self diagnostic mode operation check:

After the self diagnostic mode input operation has been performed, check the taillight.



No
(Not enter into self diagnostic mode)

Is the method to enter into the diagnostic mode correct?

No

Yes

Is the lighting function of the operation confirmation of the taillight blinking?

No

Check control taillight.

Yes

Yes
(Enter into self diagnostic mode)

Key unlock warning switch inspection:

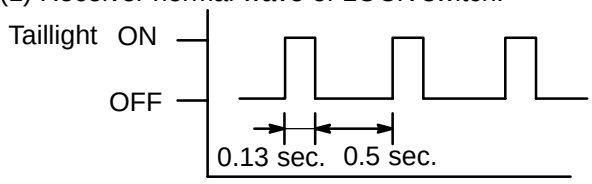
Check that continuity exists between connector terminal 5 of the integration relay on the vehicle side and the ground by inserting the key plate into the ignition key cylinder.

Check key unlock warning switch (See page BE-12).

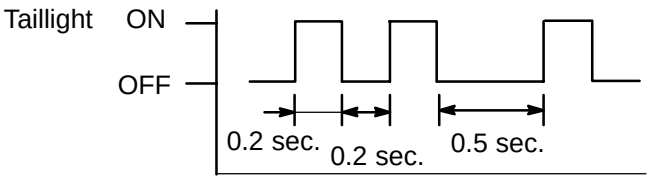
Self diagnostic mode check:

Check that how the taillight when pressing each transmitter switch.

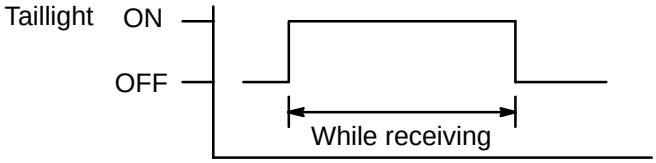
(1) Receiver normal wave of LOCK switch.



(2) Receiver normal wave of UNLOCK switch.



(3) Incompatibility of the recognition code or out from synchronization of rolling code.



<Reference>:
While turning the ignition switch ON in the self diagnostic mode, the mode returns to the normal mode.

(3) is output.
(All taillight's response are same.)

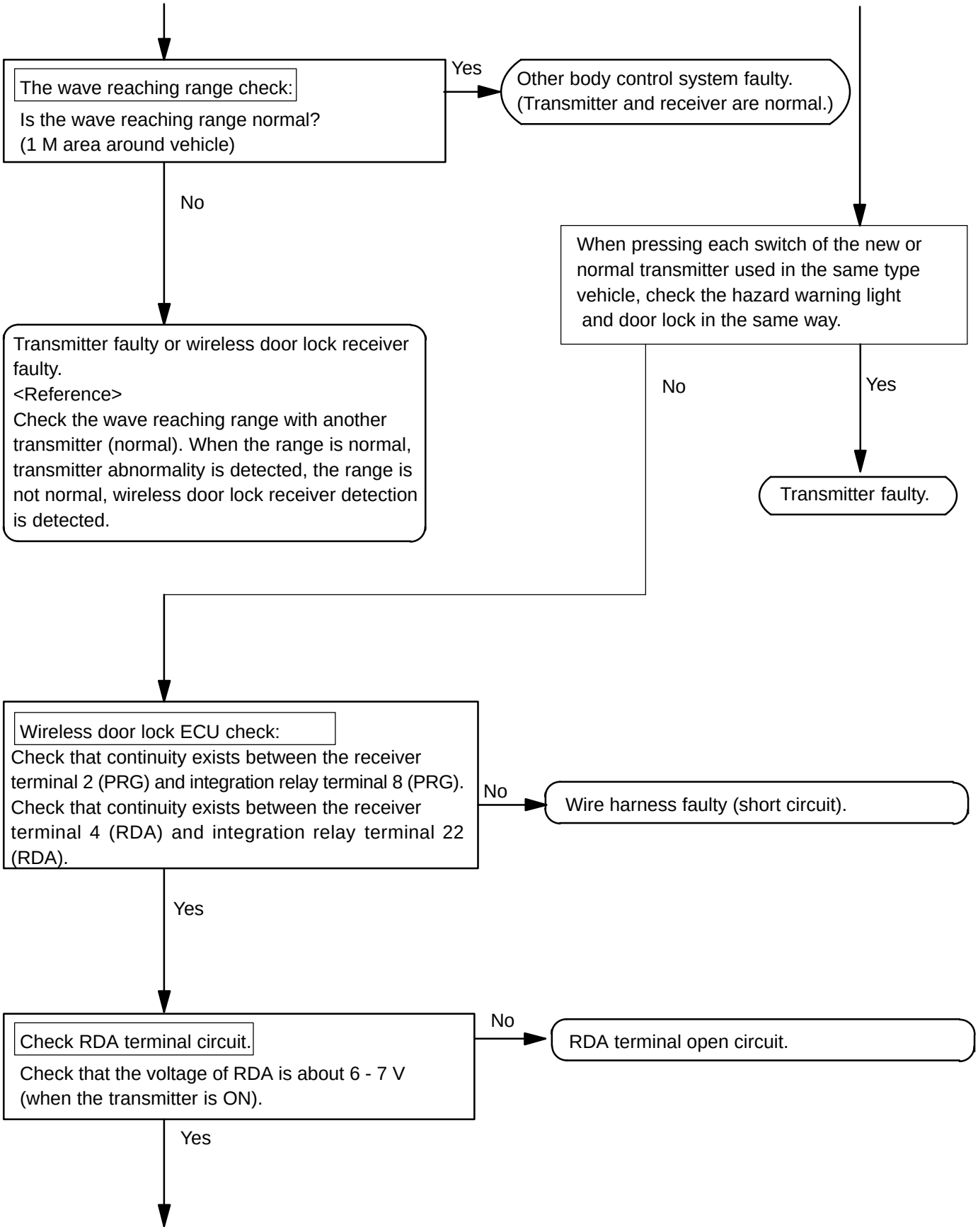
Recognition code registration function check:

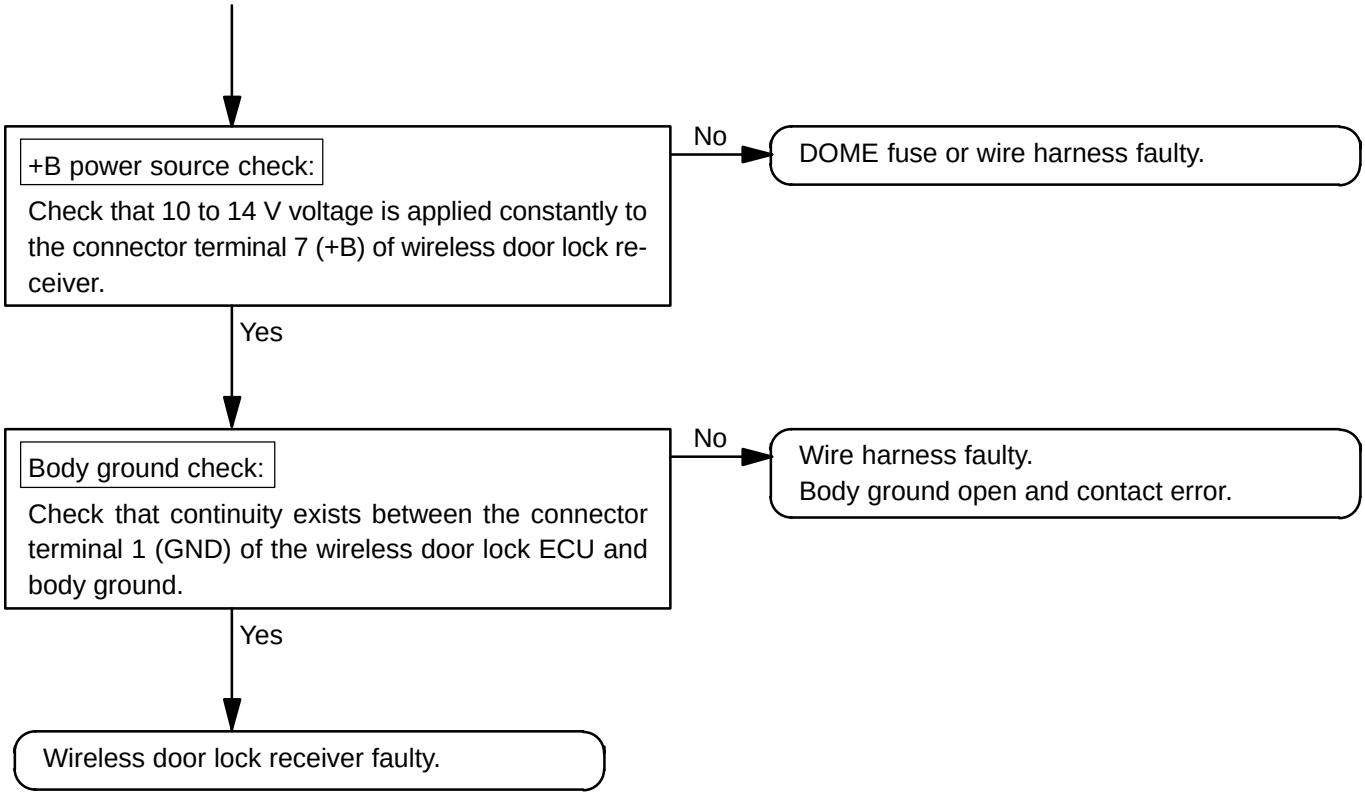
Check that it is possible to enter into rewrite mode or add mode.
(Refer to "Wireless door lock receiver and transmitter" - "Recognition code registration".)

Wireless door lock operate normally when recognition code is registered.

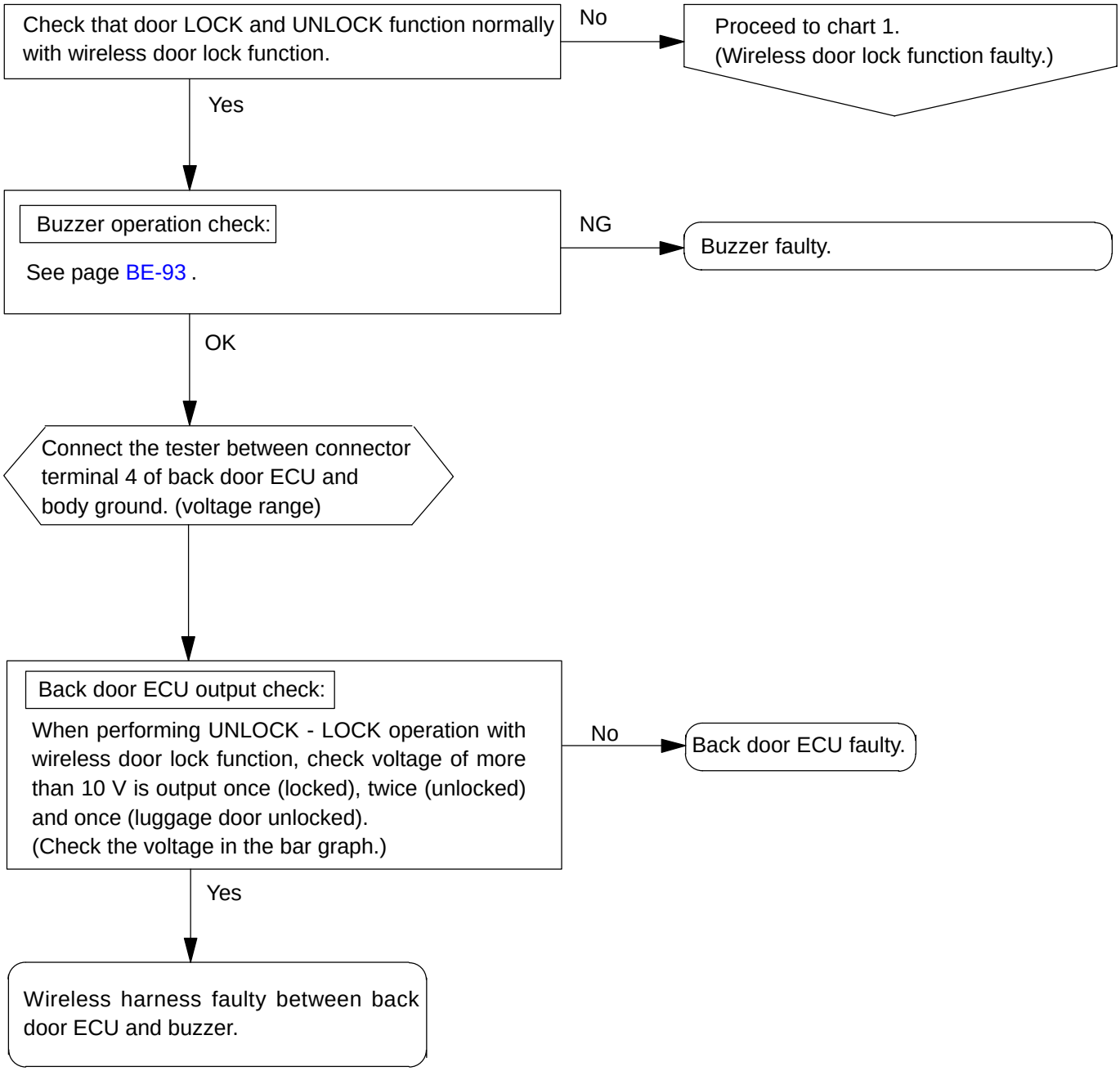
No response from taillight.

(1), (2) are output.


The wave reaching range check:
Is the wave reaching range normal?
(1 M area around vehicle)
Yes
Other body control system faulty.
(Transmitter and receiver are normal.)
No
When pressing each switch of the new or normal transmitter used in the same type vehicle, check the hazard warning light and door lock in the same way.
Transmitter faulty or wireless door lock receiver faulty.
<Reference>
Check the wave reaching range with another transmitter (normal). When the range is normal, transmitter abnormality is detected, the range is not normal, wireless door lock receiver detection is detected.
No
Yes
Transmitter faulty.
Wireless door lock ECU check:
Check that continuity exists between the receiver terminal 2 (PRG) and integration relay terminal 8 (PRG).
Check that continuity exists between the receiver terminal 4 (RDA) and integration relay terminal 22 (RDA).
No
Wire harness faulty (short circuit).
Yes
Check RDA terminal circuit.
Check that the voltage of RDA is about 6 - 7 V (when the transmitter is ON).
No
RDA terminal open circuit.
Yes


+B power source check:
Check that 10 to 14 V voltage is applied constantly to the connector terminal 7 (+B) of wireless door lock receiver.
No
DOME fuse or wire harness faulty.
Yes
Body ground check:
Check that continuity exists between the connector terminal 1 (GND) of the wireless door lock ECU and body ground.
No
Wire harness faulty.
Body ground open and contact error.
Yes
Wireless door lock receiver faulty.

2	**Wireless door lock buzzer does not chirp.**



BE11P-01

INSPECTION

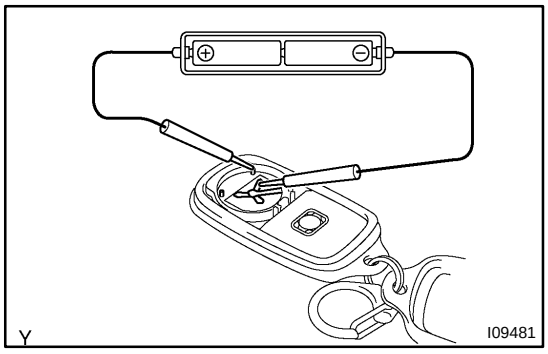
1. INSPECT WIRELESS DOOR LOCK TRANSMITTER OPERATION

HINT:

Refer to ”Wireless door lock control receiver and transmitter replacement”.

(a) Using a screwdriver, remove the screw and cover.

(b) Remove the battery (lithium battery).



(c) Install a new or normal battery (lithium battery).

HINT:

When a new or normal battery can not be obtained, connect 2 new 1.5 V batteries in series, connect the battery (+) to the battery receptacle side terminal and battery (-) to the bottom terminal, then apply 3 V voltage to the transmitter.

(d) In the location where is approx. 1 m away from driver’s outside handle in the right direction, face the key plate of the transmitter to the vehicle, and check the transmitter operation when pressing transmission switch on the side of the transmitter body.

Standard:

Remote control of vehicle door lock can be operated.

HINT:

- The minimum operation distance differs according to operator, the way of holding, and location.
- As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.

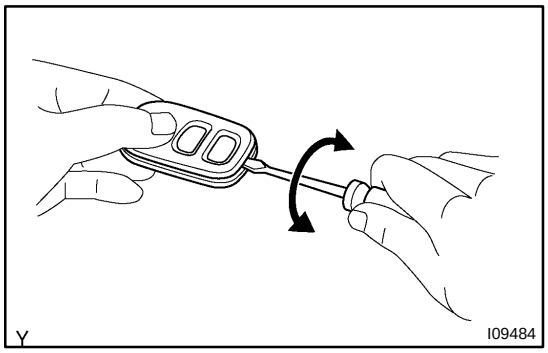
(e) Install the battery (lithium battery).

(f) Install a cover.

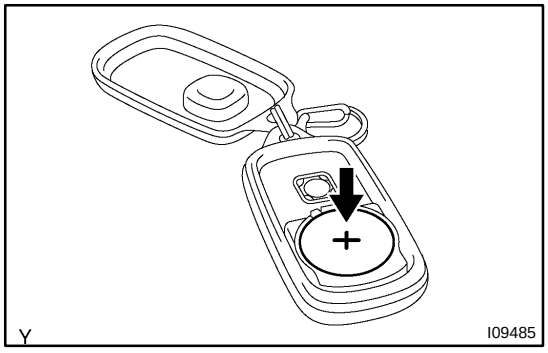
2. CHECK BATTERY CAPACITY

HINT:

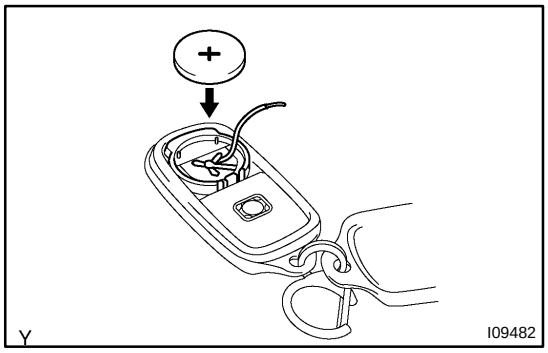
- Make sure to use the TOYOTA electrical tester.
- With the battery unloaded, judge can not be made whether the battery is available or not on the test.
- When the transmitter is faulty, the energy amount left in the battery might not be checked correctly.
- On the lithium battery used for the transmitter, the voltage more than 2.5 V with the battery unloaded is shown on the tester until the energy is completely consumed.
  Accordingly when inspecting the energy amount left in the battery, it is necessary to measure the voltage when the battery is loaded. (1.2 kΩ).



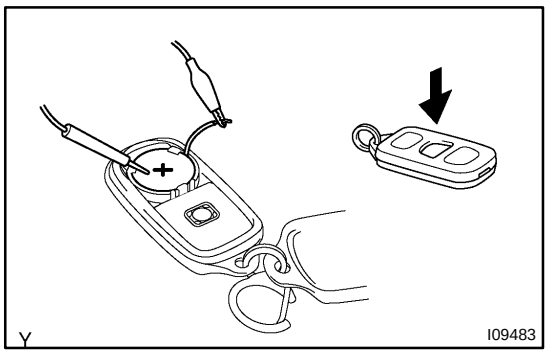
(a) Remove the cover using a (-) driver.



(b) Remove the battery (lithium battery) from the transmitter.



(c) Connect the lead to the (-) terminal of the transmitter and install the battery.

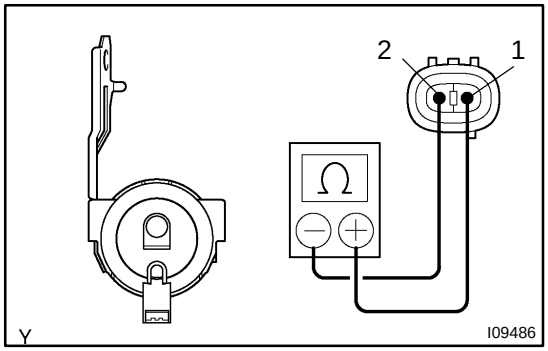


(d) Connect the (+) tester to the (+) battery (lithium battery), and (-) tester to the lead respectively.
(e) Press one of the transmitting switches on the transmitter for approx. 1 second.
(f) Press the transmitting switch on the transmitter again to check the voltage.
Standard: 2.1 V or more

HINT:

- When the temperature of the battery is low, the judge can not be made correctly.
  When the outcome of the test is less than 2.1 V, conduct the test again after leaving the battery in the place at 18 ˚C for more than 30 minutes.
- By auto power off function, the voltage becomes no load voltage (more than 2.5 V) condition after 20 seconds from the switch was pressed.
  Make sure to read the voltage before of it.
- High voltage might be shown 1 to 2 times after leaving the battery, judge should be made with the voltage shown at the 3rd time or later.

(g) Disconnect the lead.
(h) Set the battery (lithium battery) in the transmitter.
(i) Install the cover.



3. INSPECT WIRELESS DOOR LOCK BUZZER OPERATION

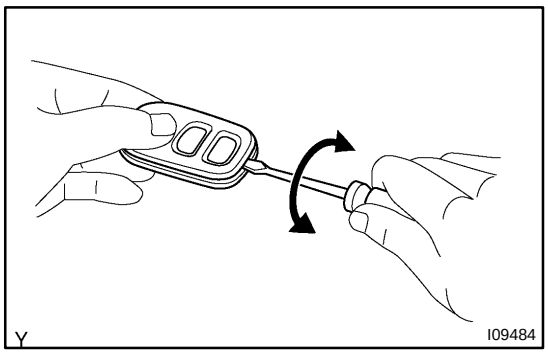
Connect the positive (+) lead from the ohmmeter to terminal 1 and the negative (-) lead to terminal 2, and measure resistance approx. 1 kΩ.

If resistance is not as specified, replace the buzzer.

4. INSPECT WIRELESS DOOR LOCK BUZZER CIRCUIT (See page DI-574)

BE11Q-01

REPLACEMENT

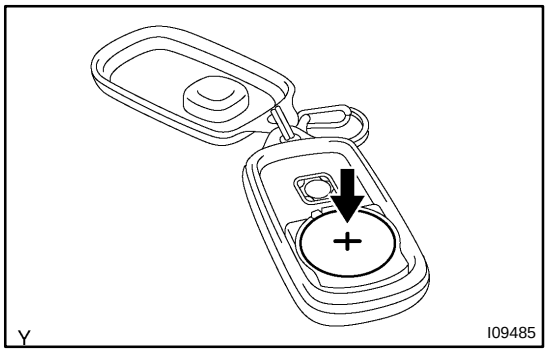


1. REPLACE TRANSMITTER (LITHIUM) BATTERY

(a) Using a screwdriver, remove the cover.

NOTICE:

Do not pry out the cover forcibly.



(b) Remove the battery (lithium battery) as shown in the illustration.

NOTICE:

- **Do not push the terminals with a finger.**
- **If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.**

(c) Install a battery (lithium battery).

NOTICE:

Face the battery upward. Take care not to deform the terminals.

(d) Install the cover.

NOTICE:

It might cause faulty contact of battery (lithium battery) and terminals.

2. REPLACE BACK DOOR ECU AND TRANSMITTER

NOTICE:

When replacing the back door ECU and transmitter, registration of recognition code is necessary because they are provided as a single components.

(a) Select the operation mode to perform from the following operation modes.
   - Add mode
   - Rewrite mode
   - Prohibition mode
   - Confirmation mode

HINT:

- The add mode is used to retain codes already registered while you register new recognition codes. This mode is used when adding a transmitter. However, if the number of registered codes exceeds 4 codes, previously registered codes are correspondingly erased in order, starting from the first registered code.
- The rewrite mode is used to erase all previously registered codes and register only new recognition codes.
- The prohibition mode is used to erase all registered codes and cancels the wireless door lock function. Use this mode when the transmitter is lost.
- The confirmation mode is for confirming few many recognition codes ar already registered before you register additional recognition codes.

(b) Follow the chart on the following page to register the transmitter recognition code at the back door ECU.

HINT:

- When procedure is out of the specified, the operation returns to normal operation.
- Maximum 4 recognition codes can be registered.

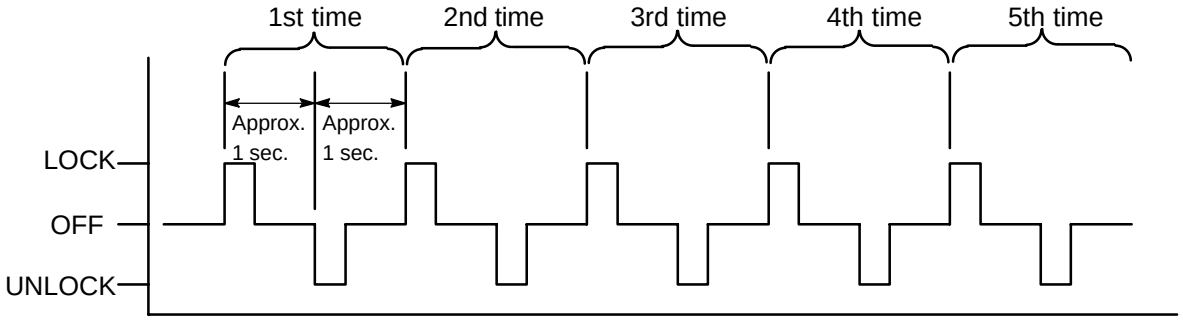
Start registration of recognition code

The vehicle should be in the following conditions.
- The key is not inserted in the ignition key cylinder.
- Driver's door is OPEN. (Other doors are CLOSED)
- Driver's door is UNLOCKED.

Insert the key into the ignition key cylinder, then pull it out.

Within 40 sec.

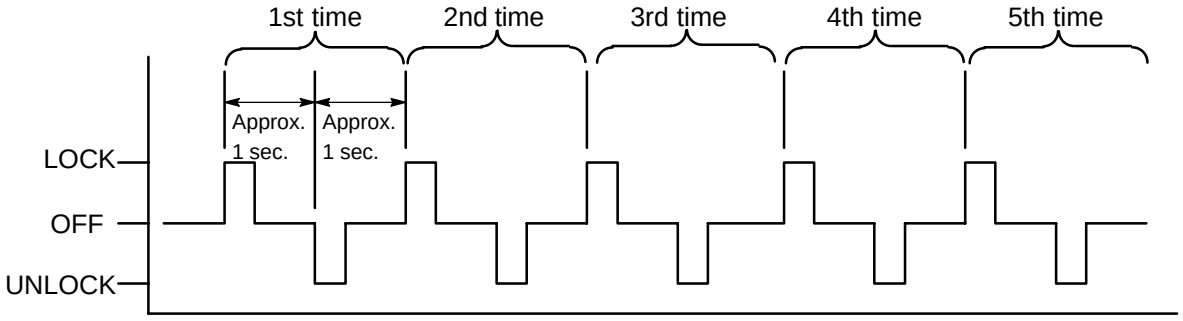
Press the door lock control switch (for manual operation) 5 times to LOCK/UNLOCK at approx. 1 sec. interval.



Close the driver's door, then open it.

Within 40 sec.

Again press the door lock control switch (for manual operation) 5 times to LOCK/UNLOCK at approx. 1 sec. interval.

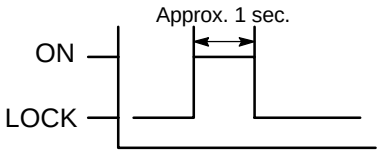


Insert the key into the ignition key cylinder.

Turn the ignition switch from ON to LOCK at approx. 1 sec. interval 1 to 5 times to select the mode.

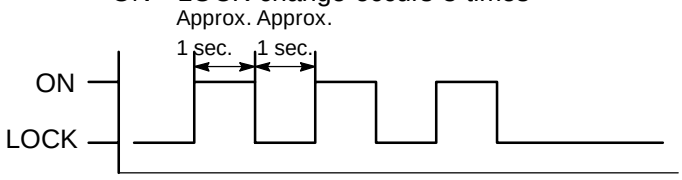
Add mode

ON - LOCK change occurs 1 time



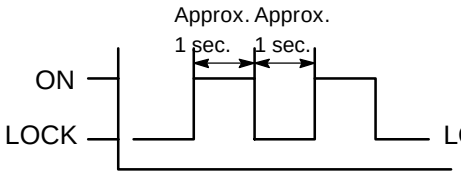
Confirmation mode

ON - LOCK change occurs 3 times



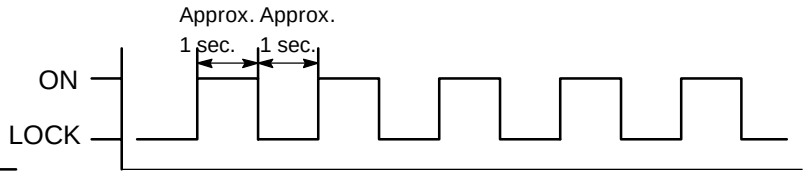
Rewrite mode

ON - LOCK change occurs 2 times



Prohibition mode

ON - LOCK change occurs 5 times



Pull out the key plate from the ignition key cylinder.

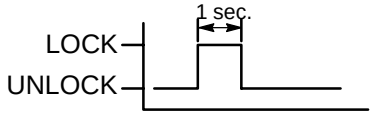
Within 3 sec.

When add mode or rewrite mode is selected.

Body ECU automatically performs the LOCK-UNLOCK operation once or twice at 1 sec, interval to inform the operator that either the add mode or rewrite mode has been selected.

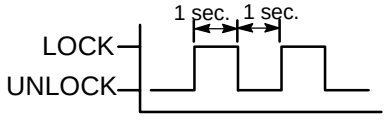
LOCK-UNLOCK occurs once

Indicates that add mode has been selected.



LOCK-UNLOCK occurs twice

Indicates that rewrite mode has been selected.

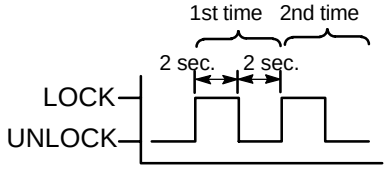


When prohibition mode is selected.

When confirmation mode is selected.

Body ECU automatically performs the LOCK-UNLOCK operation 1 to 4 times at 2 sec. interval to inform the operator of the number of the registered codes.
HINT:
When the number of the registered code is 0, the operation is automatically performed 5 times.

Example:
When the operation is performed twice, it directs that 2 type of recognition code have been registered.

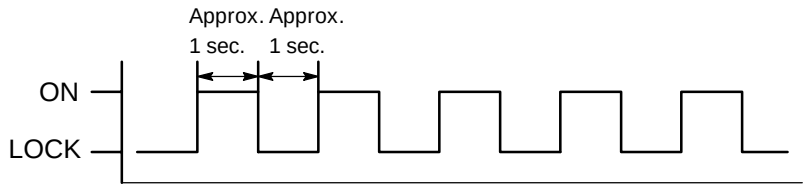


Registration of recognition code (Confirmation mode and probation mode) is completed.

When prohibition mode is selected.

Within 40 sec.

Body ECU performs operates LOCK-UNLOCK operation 5 times at a 1 sec. interval to inform the operator that prohibition mode has been selected.



Press the lock and unlock switches on the transmitter simultaneously within 1.5 sec.

Within 3 secs.

Press again either of switches on the transmitter for more than 1 sec.

Within 3 sec.

Body ECU automatically performs LOCK-UNLOCK operation once or twice at a 1 sec. interval to inform the operator that it has received the signal from the transmitter.

LOCK-UNLOCK occurs once

Registration of recognition code is completed

LOCK-UNLOCK occurs twice

Registration of recognition code has not been completed.
- Recognition code received first time and second time did not match.

If they are not performed, the mode returns to the normal mode, then start with "Start registration of recognition code".

Proceed to finish registration

Proceed to continue registration

Within 40 secs.

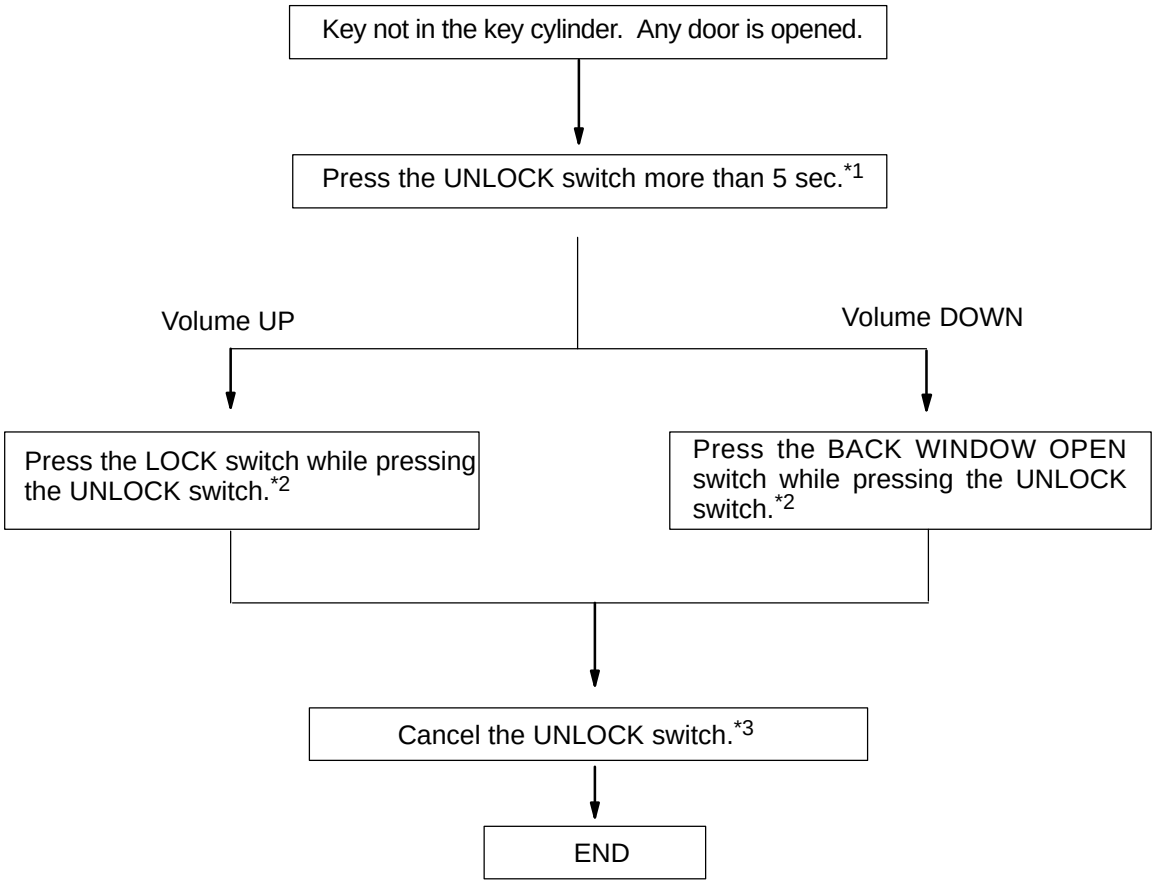
If even one of the following conditions is satisfied, registration of recognition codes in completed.
- 40 secs. elapses since the body ECU response.
- The driver's door is closed.
- The key plate is inserted in the ignition key cylinder.
- 4 types recognition codes are registration at one time.

Registration of recognition codes (add mode or rewrite mode) is completed.

BE19J-01

ADJUSTMENT

ADJUST WIRELESS DOOR LOCK BUZZER VOLUME

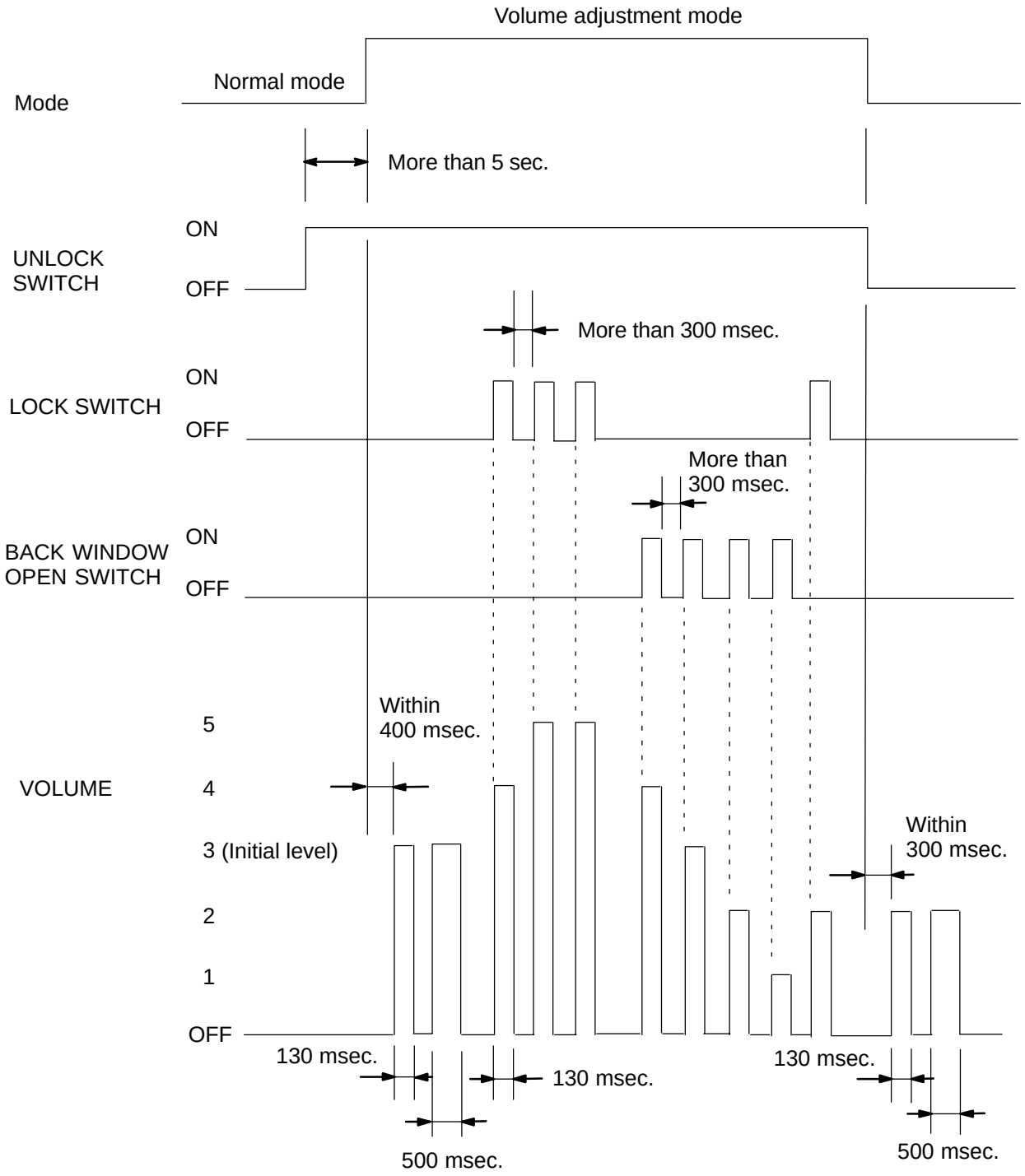


*1: When the mode is changed to the "Volume adjustment mode", the buzzer sounds 2 times.

*2: 5 volume level can be set. Initial volume is set to the intermediate level.

*3: When the mode is changed to the "Normal mode", the buzzer sounds 2 times.

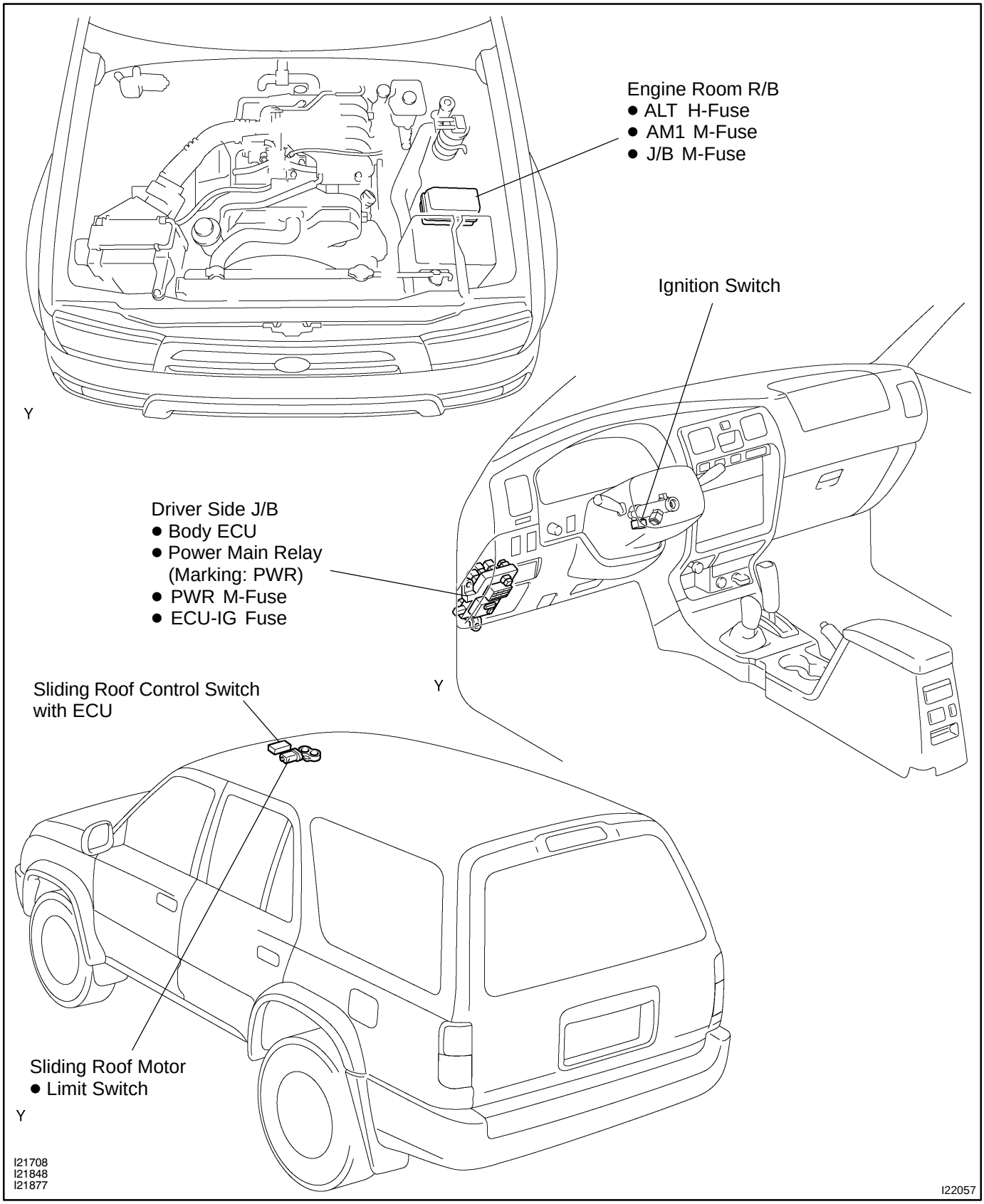
<REFERENCE>


Volume adjustment mode
Mode
Normal mode
More than 5 sec.
ON
UNLOCK SWITCH
OFF
More than 300 msec.
ON
LOCK SWITCH
OFF
More than 300 msec.
ON
BACK WINDOW OPEN SWITCH
OFF
Within 400 msec.
5
VOLUME
4
3 (Initial level)
2
1
OFF
Within 300 msec.
130 msec.
130 msec.
130 msec.
500 msec.
500 msec.

SLIDING ROOF SYSTEM

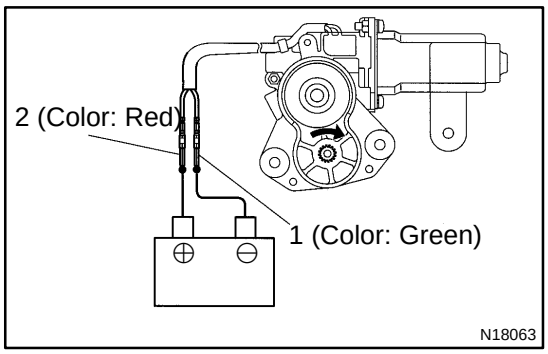
LOCATION

BE077-03



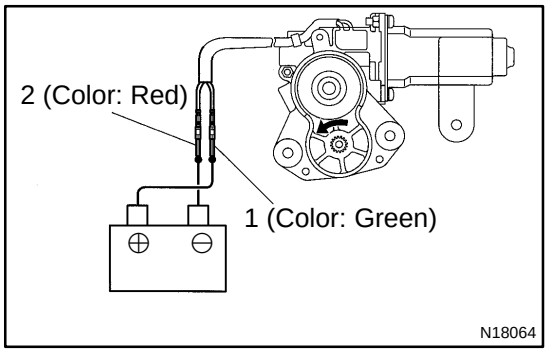
BE11R-02

INSPECTION



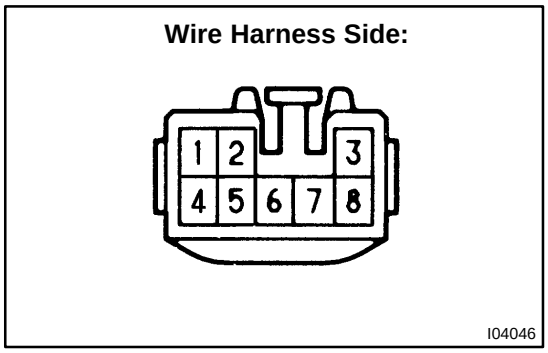
1. INSPECT SLIDING ROOF MOTOR CONTINUITY

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the motor turns clockwise.



(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns counterclockwise.

If the operation is not as specified, replace the motor.



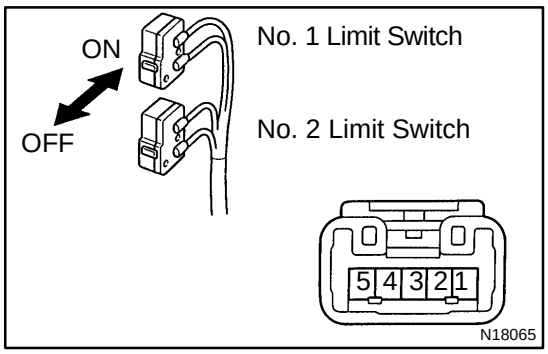
2. INSPECT SLIDING ROOF CONTROL RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
4 - 5	Constant	Continuity
6 - Ground	No. 1 limit switch OFF (Sliding roof tilted up or open approx. 200 mm (7.87 in.))	No continuity
6 - Ground	No. 1 limit switch ON (Except for conditions mentioned above)	Continuity
7 - Ground	No. 2 limit switch OFF (Sliding roof closed)	No continuity
7 - Ground	No. 2 limit switch ON (Sliding roof opened)	Continuity
2 - Ground	Constant	Continuity
2 - Ground	Ignition switch LOCK or ACC	No voltage*
2 - Ground	Ignition switch ON	Battery positive voltage

HINT:

*Exceptions: During 43 seconds after the ignition switch is turned to ON → OFF.



3. INSPECT LIMIT SWITCH CONTINUITY

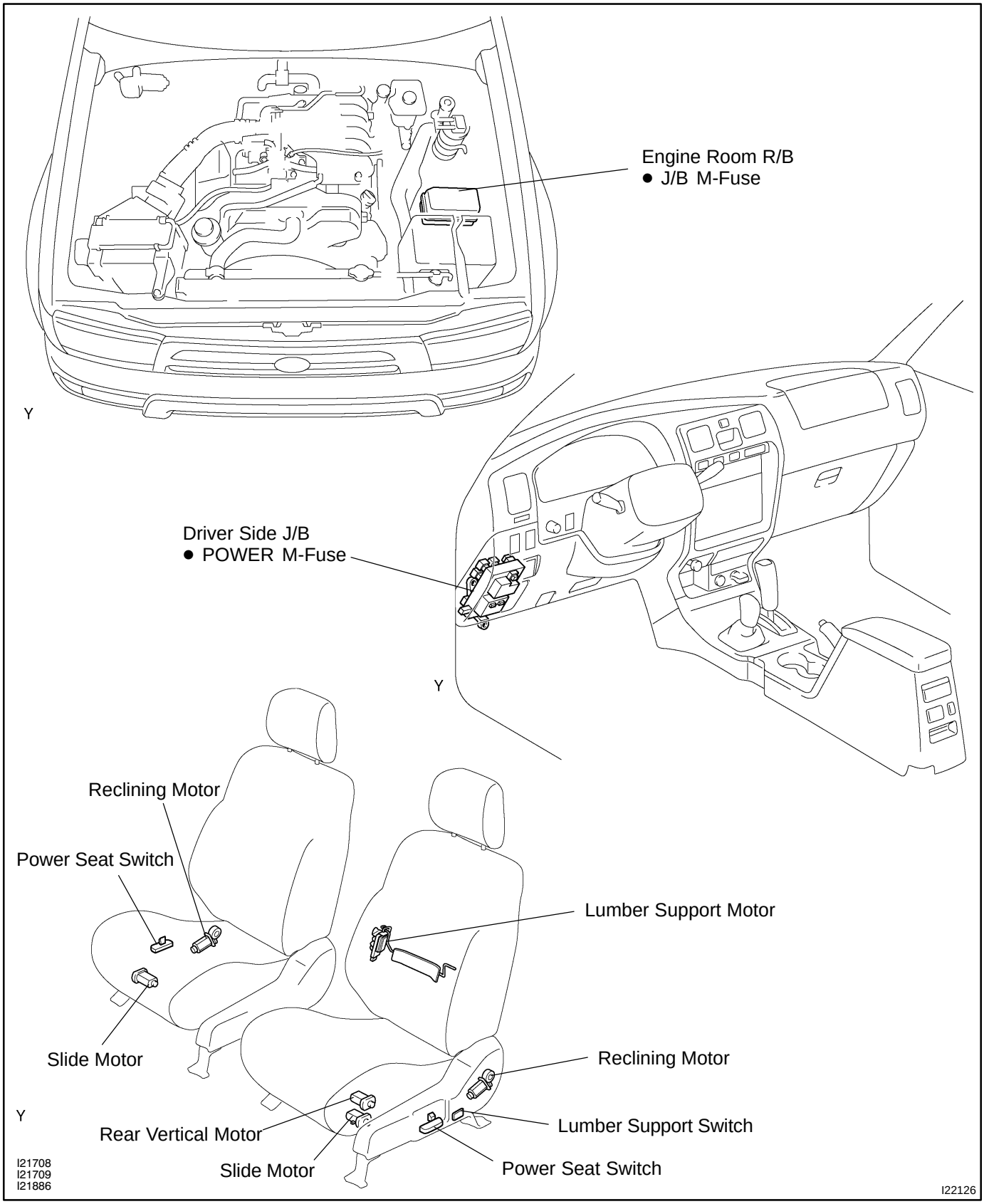
Tester connection	Switch position	Specified condition
3 - 5	No. 1 limit switch ON (Switch pin pushed in)	Continuity
3 - 4	No. 2 limit switch ON (Switch pin pushed in)	Continuity

If the continuity is not as specified, replace the switch.

POWER SEAT CONTROL SYSTEM

LOCATION

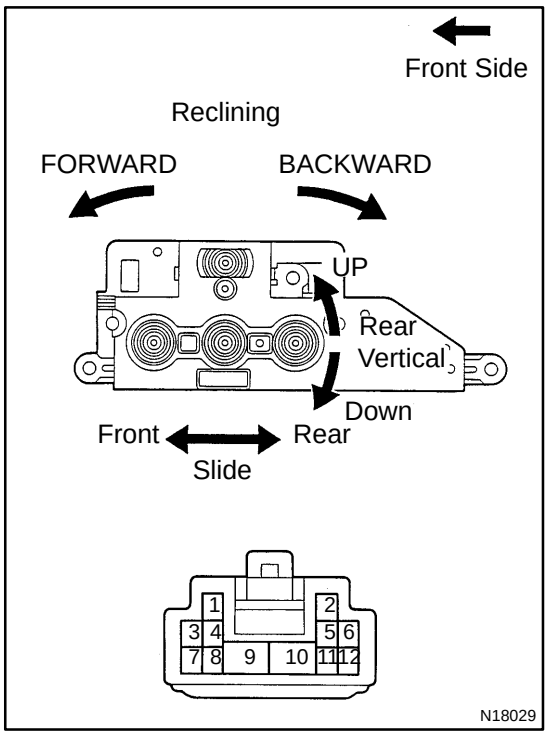
BE079-03



BE242-01

INSPECTION

1. INSPECT DRIVER'S SEAT SWITCH CONTINUITY



Slide switch:

Tester connection	Switch position	Specified condition
5 - 10	FRONT	Continuity
8 - 9		
5 - 9	OFF	Continuity
8 - 9		
5 - 9	BACK	Continuity
8 - 10		

Rear vertical switch:

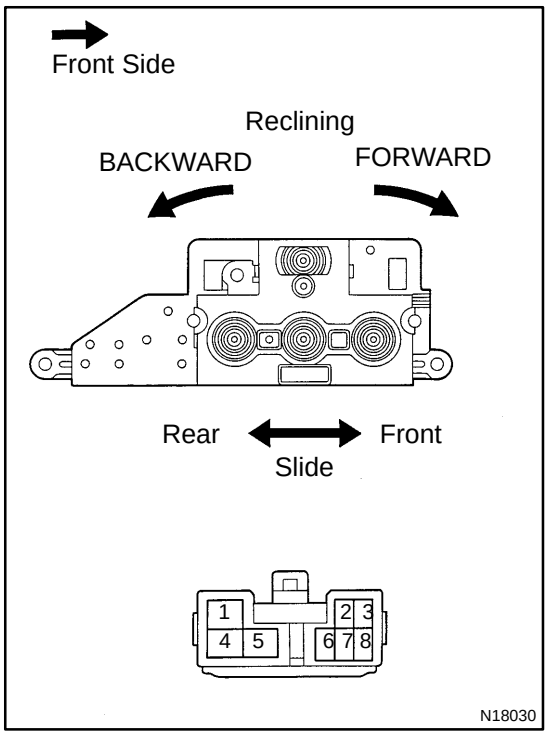
Tester connection	Switch position	Specified condition
2 - 10	UP	Continuity
6 - 7		
2 - 7	OFF	Continuity
6 - 7		
2 - 7	DOWN	Continuity
6 - 10		

Reclining switch:

Tester connection	Switch position	Specified condition
4 - 10	FORWARD	Continuity
7 - 9		
4 - 9	OFF	Continuity
7 - 9		
4 - 9	BACKWARD	Continuity
7 - 10		

If the continuity is not as specified, replace the switch.

2. INSPECT PASSENGER'S SEAT SWITCH CONTINUITY



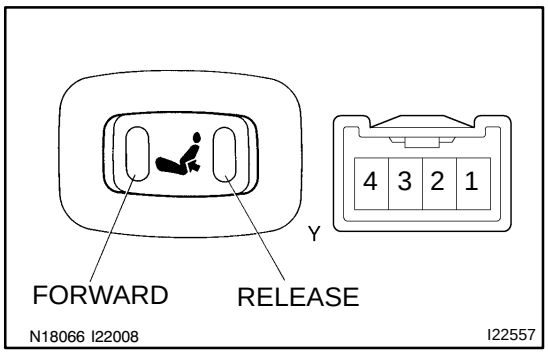
Slide switch:

Tester connection	Switch position	Specified condition
4 - 8	FRONT	Continuity
5 - 7		
4 - 7	OFF	Continuity
4 - 8		
4 - 7	REAR	Continuity
8 - 8		

Reclining switch:

Tester connection	Switch position	Specified condition
2 - 5	FORWARD	Continuity
3 - 4		
2 - 4	OFF	Continuity
3 - 4		
2 - 4	BACKWARD	Continuity
3 - 5		

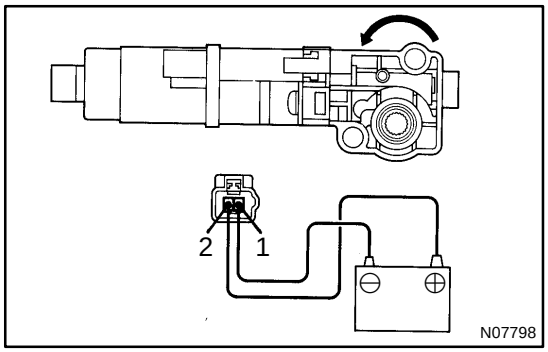
If the continuity is not as specified, replace the switch.



3. INSPECT LUMBAR SUPPORT SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
1 - 4	FORWARD	Continuity
2 - 3		
1 - 2 - 3	OFF	Continuity
1 - 3	RELEASE	Continuity
2 - 4		

If the continuity is not as specified, replace the switch.

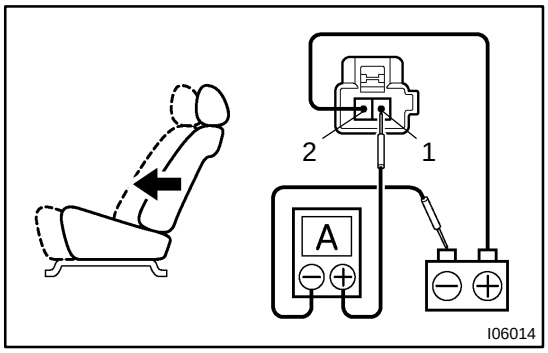


4. INSPECT SEAT SLIDE MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, check that the motor turns counterclockwise.

(b) Reverse the polarity, check that the motor turns clockwise.

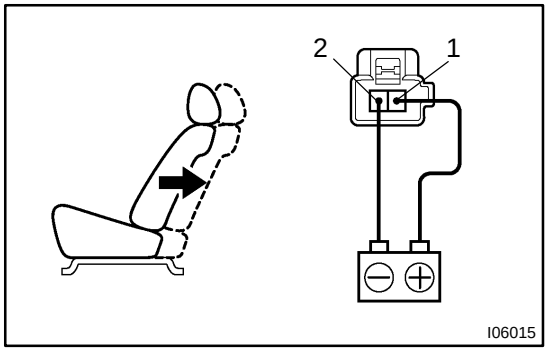
If the operation is not as specified, replace the motor.



5. INSPECT DRIVER'S SEAT SLIDE MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 , the positive (+) lead from the ammeter to terminal 1 , and the negative (-) lead to battery negative (-) terminal, and move the seat front end position.

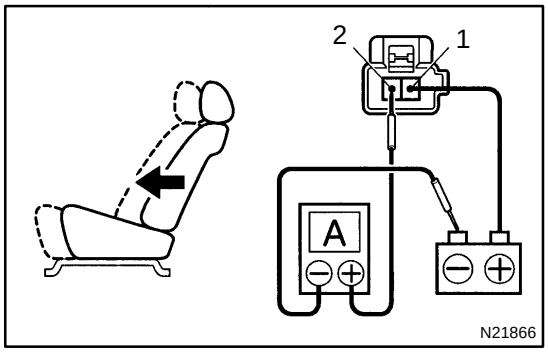
(b) Continue to apply voltage, check the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the lead from the terminals.

(d) Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 1 and the negative (-) lead to terminal 2, then check that the seat begins to move backwards.

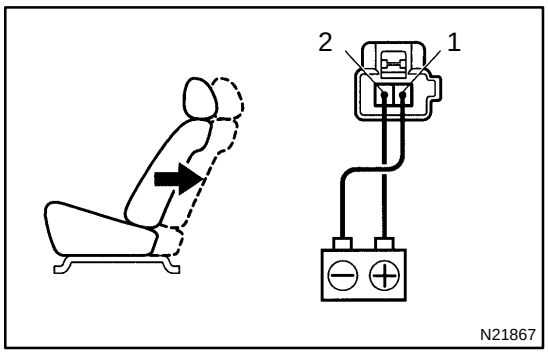
If operation is not as specified, replace the motor.



6. INSPECT PASSENGER'S SEAT SLIDE MOTOR PTC THERMISTOR OPERATION

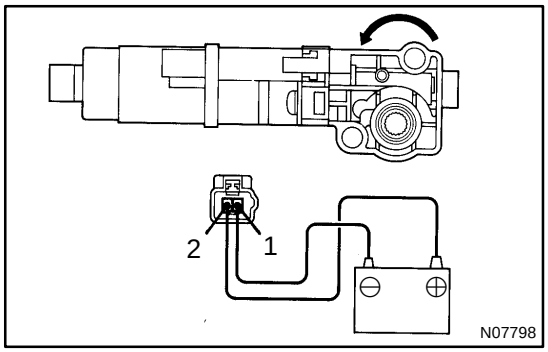
(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2, and the negative (-) lead to battery negative (-) terminal, and move the seat to the front end position.

(b) Continue to apply voltage, check the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the lead from terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, then check that the seat begins to move backwards.

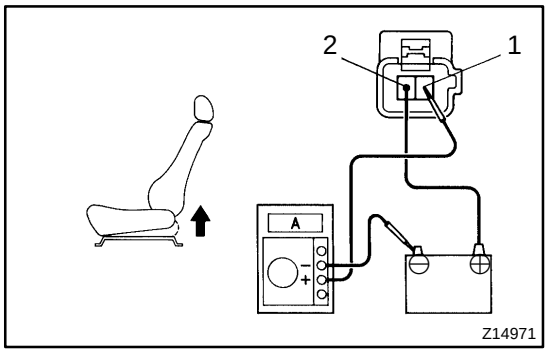
If the operation is not as specified, replace the motor.



7. INSPECT REAR VERTICAL MOTOR OPERATION

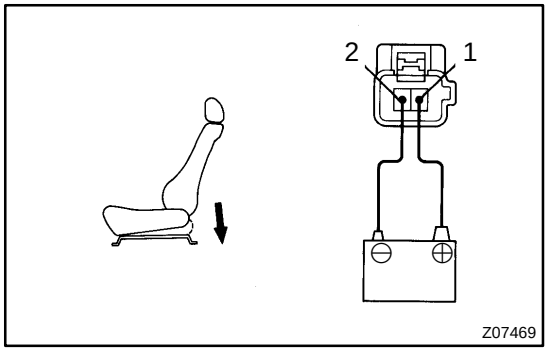
(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, then check that the motor turns clockwise.
(b) Reverse the polarity, then check that the motor turns counterclockwise.

If the operation is not as specified, replace the motor.



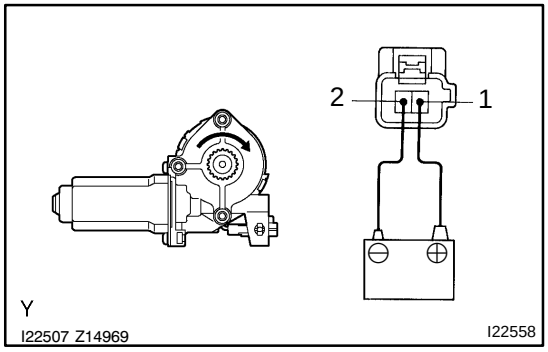
8. INSPECT REAR VERTICAL MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1 and the negative (-) lead to battery negative (-) terminal, and move the rear edge of the seat cushion to the highest position.
(b) Continue to apply voltage, check the current changes to less than 1 ampere within 4 to 90 seconds.



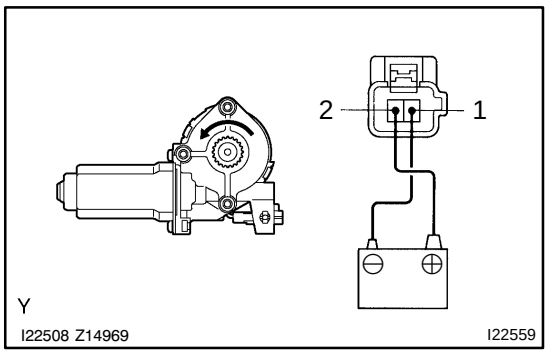
(c) Disconnect the leads from the terminals.
(d) Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 1 and the negative (-) lead to terminal 2, then check that the seat cushion begins to descend.

If the operation is not as specified, replace the motor.



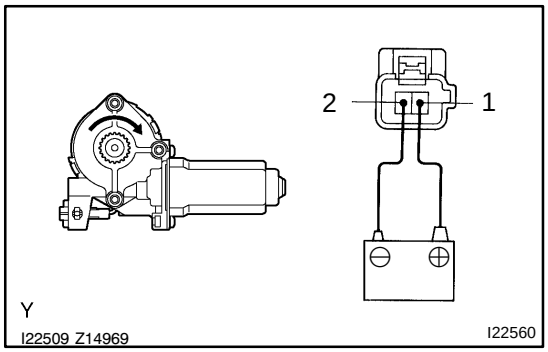
9. INSPECT DRIVER'S SEAT RECLINING MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.



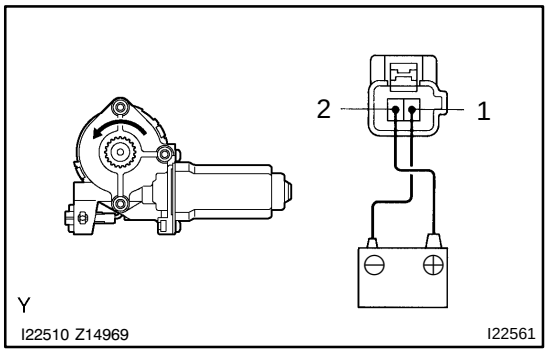
(b) Reverse the polarity, check that the motor turns counter-clockwise.

If the operation is not as specified, replace the motor.



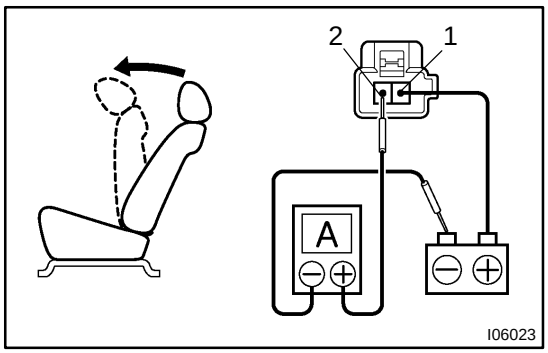
10. INSPECT PASSENGER'S RECLINING MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the motor turns clockwise.



(b) Reverse the polarity, check that the motor turns counter-clockwise.

If the operation is not as specified, replace the motor.

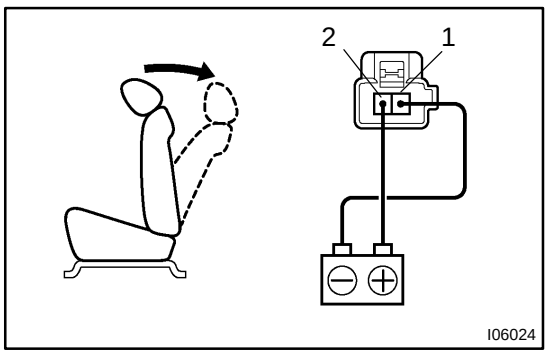


11. INSPECT DRIVER'S SEAT RECLINING MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 2, and the negative (-) lead to battery negative (-) terminal, and recline the seat back to the most forward position.

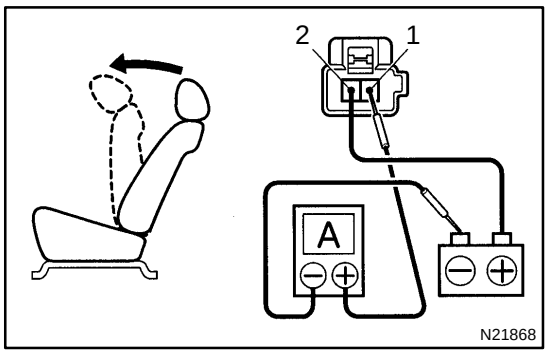
(b) Continue to apply voltage, check the current changes to less than 1 ampere within 4 to 90 seconds.

(c) Disconnect the lead from the terminals.



(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, check that the seat back starts to fall backwards.

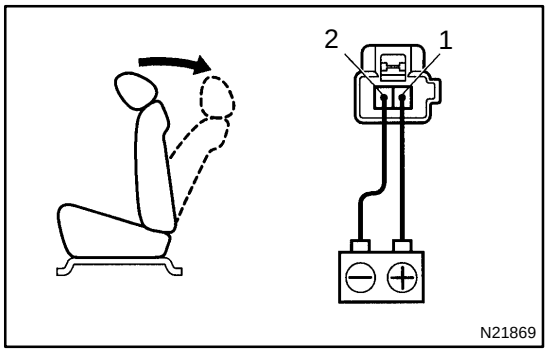
If the operation is not as specified, replace the motor.



12. INSPECT PASSENGER'S SEAT RECLINING MOTOR PTC THERMISTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1, and the negative (-) lead to battery negative (-) terminal, and recline the seat back to the most forward position.

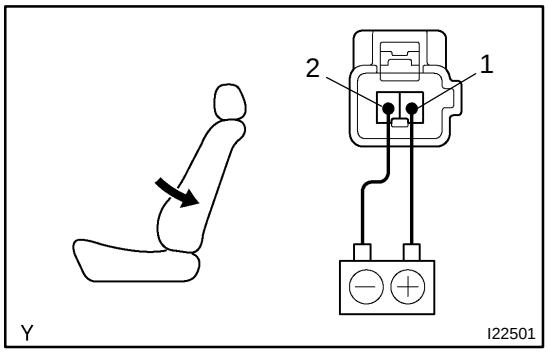
(b) Continue to apply voltage, check the current changes to less than 1 ampere within 4 to 90 seconds.



(c) Disconnect the lead from terminals.

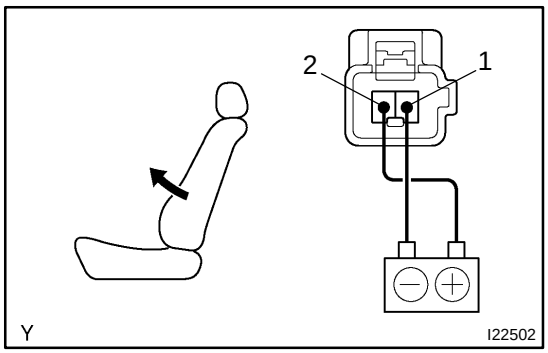
(d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the seat back starts to fall backwards.

If the operation is not as specified, replace the motor.



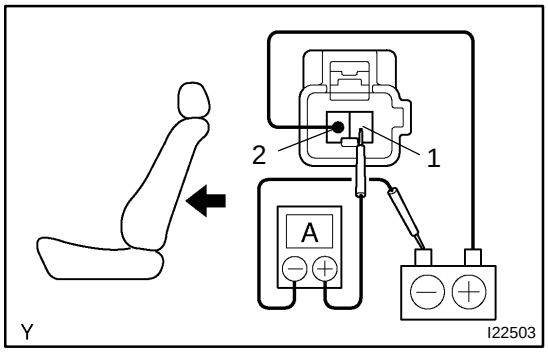
13. INSPECT LUMBAR SUPPORT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, check that the lumbar support moves to release side.



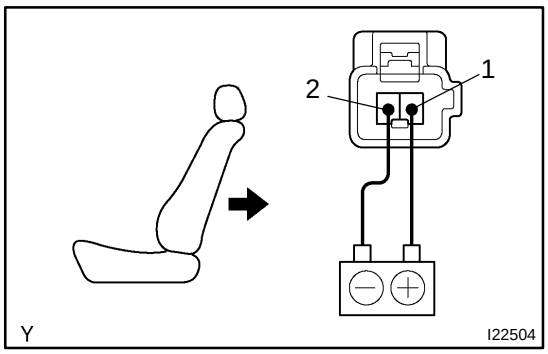
(b) Reverse the polarity, check that the lumbar support moves forward.

If the operation is not as specified, replace the motor.



14. INSPECT LUMBER SUPPORT MOTOR CIRCUIT BREAKER OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1, and the negative (-) lead to terminal 1 on the lumbar support motor connector and move the lumbar support to front end position.



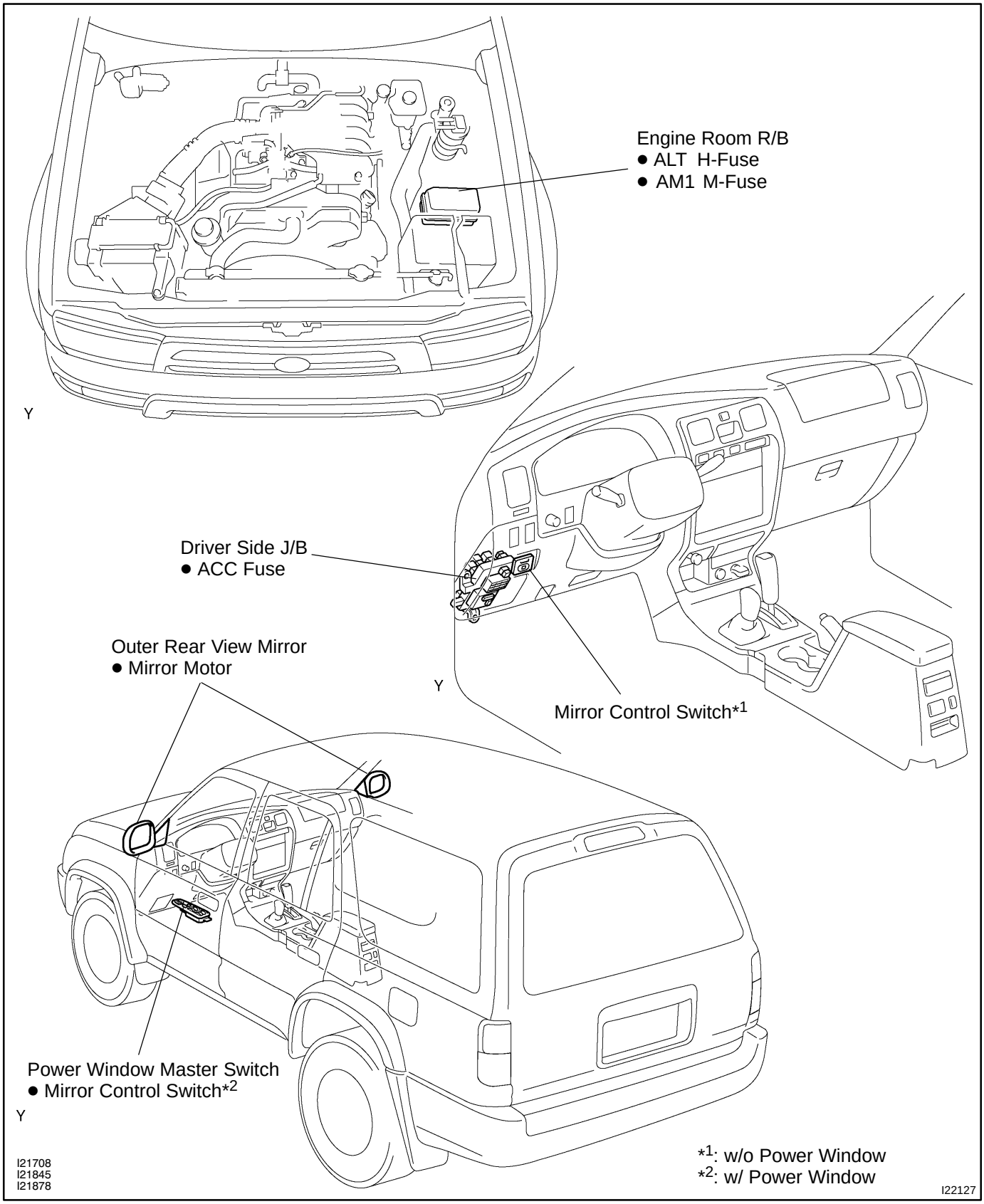
(b) Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.
(c) Reverse the polarity, check that the lumbar support begins to move to the release side within approximately 60 seconds.

If the operation is not as specified, replace the motor.

POWER MIRROR CONTROL SYSTEM

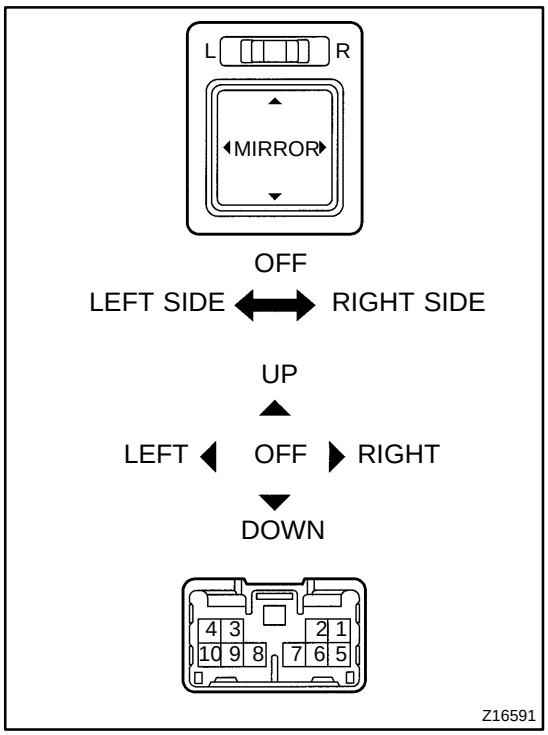
LOCATION

BE07B-03



BE07C-03

INSPECTION



1. Left Side:

INSPECT MIRROR CONTROL SWITCH CONTINUITY

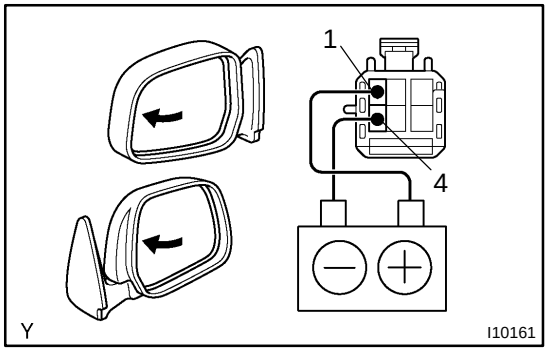
Tester connection	Switch position	Specified condition
-	OFF	No continuity
1 - 9	UP	Continuity
6 - 10		
1 - 10	DOWN	Continuity
6 - 9		
5 - 9	LEFT	Continuity
6 - 10		
5 - 10	RIGHT	Continuity
6 - 9		

2. Right Side:

INSPECT MIRROR CONTROL SWITCH CONTINUITY

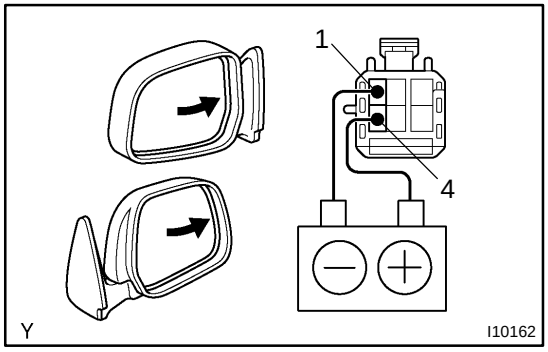
Tester connection	Switch position	Specified condition
-	OFF	No continuity
6 - 10	UP	Continuity
7 - 9		
6 - 9	DOWN	Continuity
7 - 10		
6 - 10	LEFT	Continuity
8 - 9		
6 - 9	RIGHT	Continuity
8 - 10		

If the continuity is not as specified, replace the switch.

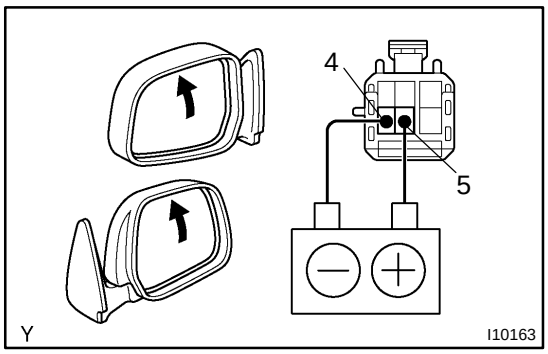


3. INSPECT MIRROR MOTOR

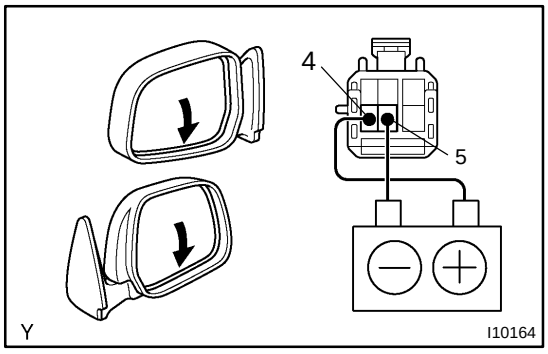
(a) Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 4, then check that the mirror turns left.



(b) Reverse the polarity, check that the mirror turns right.



(c) Connect the positive (+) lead from the battery to terminal 5 and the negative (-) lead to terminal 4, check that the mirror turns upward.



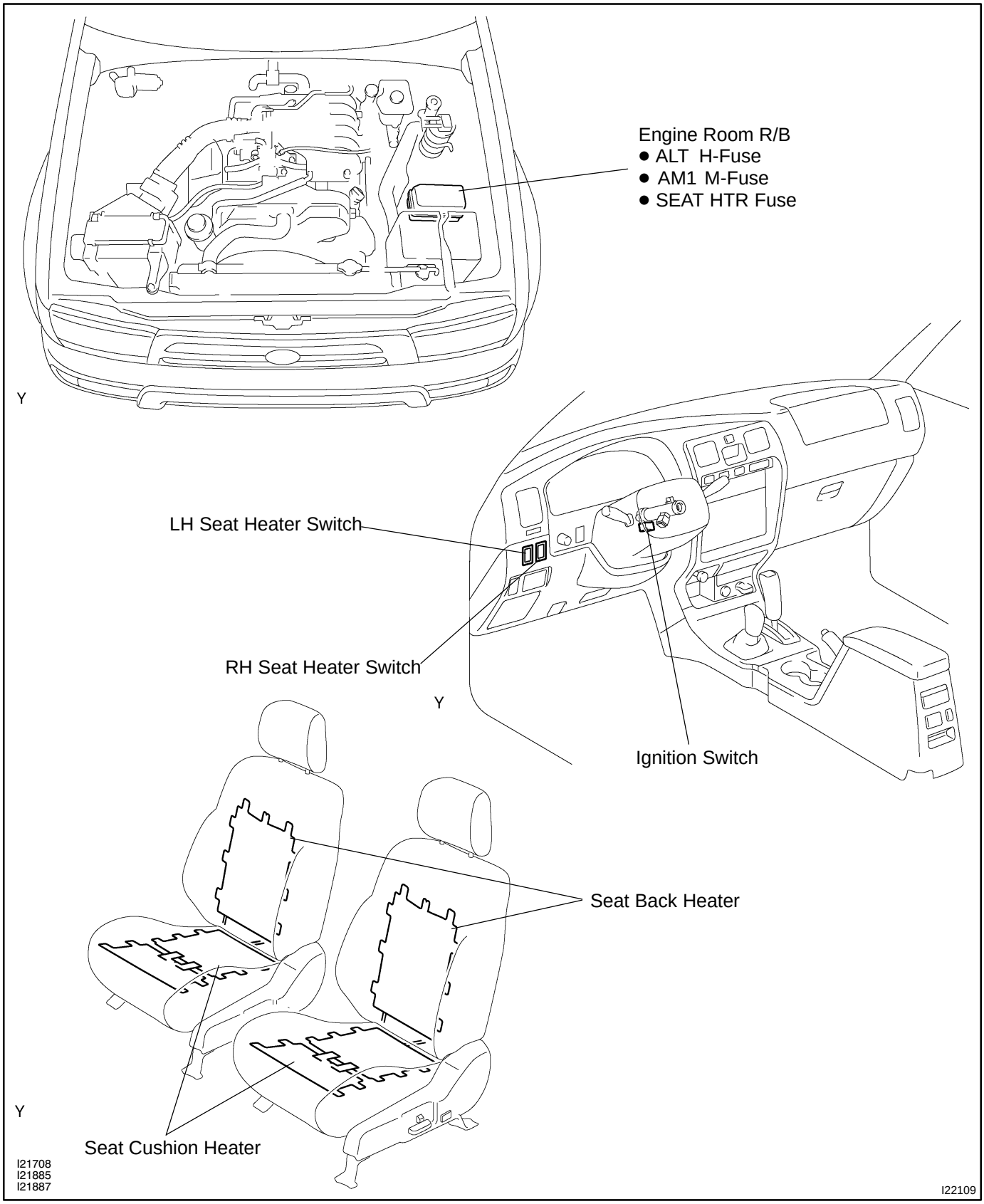
(d) Reverse the polarity, check that the mirror turns downward.

If the operation is not as specified, replace the mirror assembly.

SEAT HEATER SYSTEM

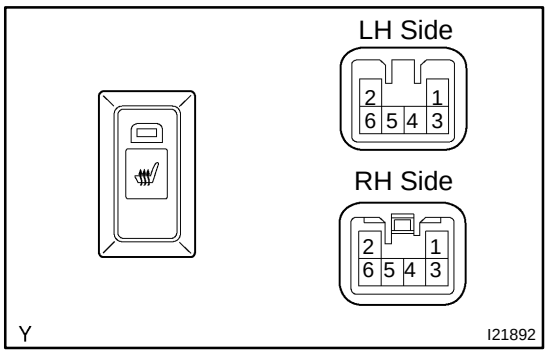
LOCATION

BE0TQ-04



BE0TR-02

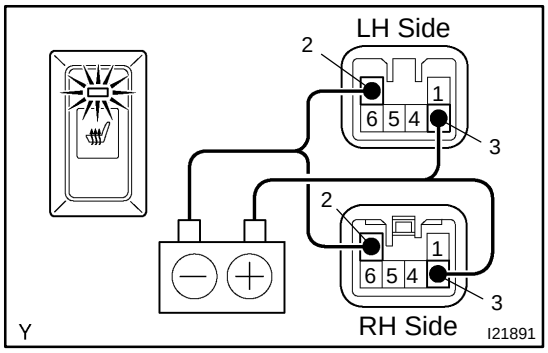
INSPECTION



1. INSPECT SEAT HEATER SWITCH CONTINUITY

Tester connection	Switch position	Specified condition
2 -3	ON	Continuity
3 - 6		Continuity
-	OFF	No continuity

If the continuity is not as specified, replace the switch.

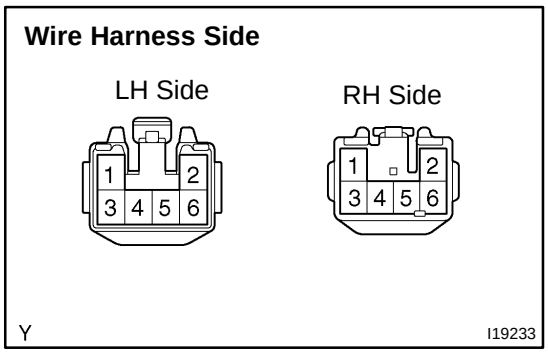


2. INSPECT SEAT HEATER INDICATOR LIGHT OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 2.

(b) Push the seat heater switch right or left side and check that the indicator light lights up.

If the operation is not as specified, replace the switch.

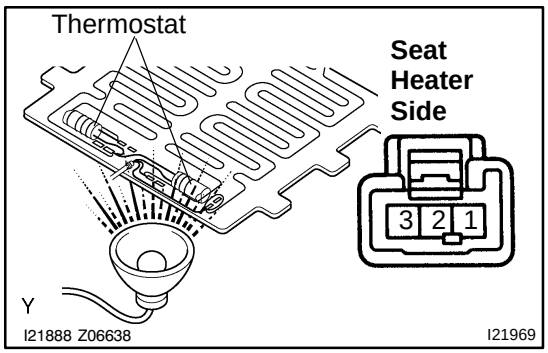


3. INSPECT SEAT HEATER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 - Ground	Constant	Continuity
3 - Ground	Ignition switch ON	Battery positive voltage
6 - Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT SEAT CUSHION HEATER CONTINUITY

(a) Heat the thermostats with a light.

(b) Inspect the seat cushion heater continuity between the terminals.

Tester connection	Thermostat temp.	Specified condition
1 - 2	Below 30˚C (86˚F)	Continuity
1 - 3		
1 - 2	Below 40˚C (104˚F)	No continuity
1 - 3	Above 50˚C (122˚F)	No continuity

If the continuity is not as specified, replace the seat cushion heater.

Seat Heater Side

e-3-2 Z06638

5. INSPECT SEAT BACK HEATER CONTINUITY

Inspect the seat back heater continuity between the terminals.

Tester connection	Condition	Specified condition
1 - 2	Constant	Continuity
1 - 3	Constant	Continuity

If the continuity is not as specified, replace the seat back heater.

AUDIO SYSTEM

BE243-01

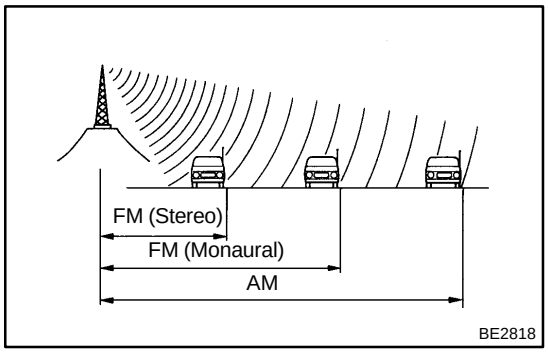
DESCRIPTION

1. RADIO WAVE BAND

The radio wave bands used in radio broadcasting are as follows:

Frequency	30 kHz	300 kHz	3 MHz	30 MHz	300 MHz
Designation	LF	MF	HF	VHF	
Radio wave		AM ⟷		FM ⟷	
Modulation	Amplitude modulation			Frequency modulation	

LF: Low Frequency
MF: Medium Frequency
HF: High Frequency
VHF: Very High Frequency

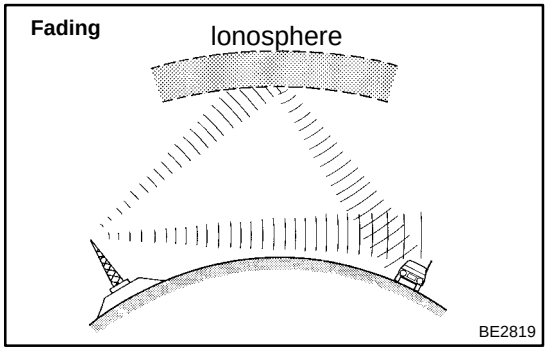


2. SERVICE AREA

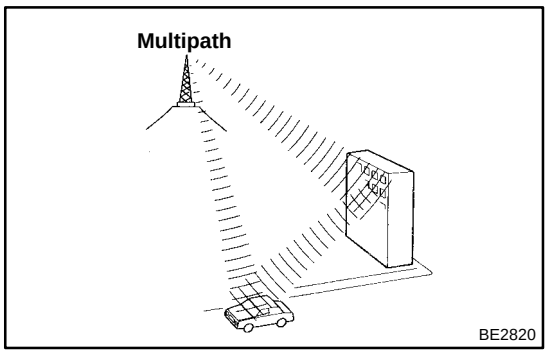
There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even through AM can be received in very clearly.
Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference (”noise”) easily.

3. RECEPTION PROBLEMS

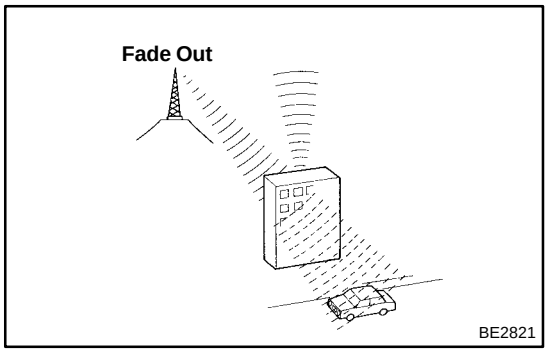
Besides the problem of static, there are also the problems called ”fading”, ”multipath” and ”fade out”. These problems are caused not by electrical noise but by the nature of the radio waves themselves.



(1) Fading:
Besides electrical interference, AM broadcasts are also susceptible to other types of interference, especially at night. This is because AM radio waves bounce off the ionosphere at night. These radio waves then interfere with the signals from the same transmitter that reach the vehicle’s antenna directly. This type of interference is called ”fading”.



(2) Multipath:
One type of interference caused by the bounce of radio waves off of obstructions is called ”multipath”. Multipath occurs when a signal from the broadcast transmitter antenna bounces off buildings and mountains and interferes with the signal that is received directly.



(3) Fade Out:
Because FM radio waves are of higher frequencies than AM radio waves, they bounce off buildings, mountains, and other obstructions. For this reason, FM signals often seem to gradually disappear or fade away as the vehicle goes behind a building or other obstruction. This is called ”fade out”.

4. COMPACT DISC PLAYER

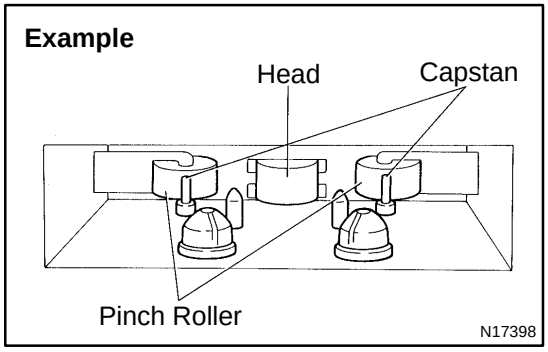
Compact Disc Players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc.

HINT:

Never attempt to disassemble or oil any part of the player unit. Do not insert any object other than a disc into the magazine.

NOTICE:

CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.

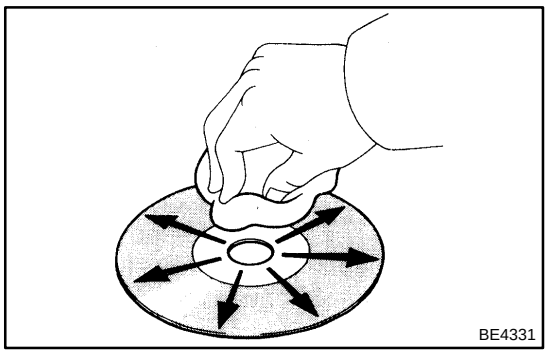


5. Tape player/head cleaning:

MAINTENANCE

(a) Raise the cassette door with your finger.
Next, using a pencil or similar object, push in the guide.

(b) Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



6. CD player/disc cleaning:
MAINTENANCE

If the disc gets dirty, clean the disc by wiping the surface from the center to outside in the radial directions with a soft cloth.

NOTICE:

Do not use a conventional record cleaner or anti-static preservative.

7. OUTLINE OF AVC-LAN

(a) What is AVC-LAN?

AVC-LAN is the abbreviation, which stands for Audio Visual Communication-Local Area Network. This is a unified standard co-developed by 6 audio manufactures associated with Toyota Motor Corporation.

The Unified standard covers signals, such as audio signal, visual signal, signal for switch indication and communication signal.

(b) Objectives

Recently the car audio system has been rapidly developed and functions have been changed drastically. The conventional system has been switched to the multi-media type such as a navigation system. At the same time the level of customers needs to audio system has been upgraded. This lies behind this standardization.

The concrete objectives are explained below.

(1) When products by different manufactures were combined together, there used to be a case that malfunction occurred such as sound did not come out. This problem has been resolved by standardization of signals.

(2) Various types of after market products have been able to add or replace freely.

(3) Because of the above (2), each manufacture has become able to concentrate on developing products in their strongest field. This has enabled many types of products provided inexpensively.

(4) Conventionally, a new product developed by a manufacture could not be used due to a lack of compatibility with other manufactures products. Because of this new standard, users can enjoy compatible products provided for them timely.

(c) The above descriptions are the objectives to introduce AVC-LAN. By this standardization, development of new products will no longer cause systematic errors. Thus, this is very effective standard for a product in the future.

HINT:

- When +B short or GND short is detected in AVC-LAN circuit, communication stops. Accordingly the audio system does not function normally.
- When audio system is not equipped with a navigation system, audio head unit is the master unit. (When audio system is equipped with a navigation system, radio receiver is the master unit.)
- The car audio system using AVC-LAN circuit has a diagnosis function.
- Each product has its own specified numbers called physical address. Numbers are also allotted to each function in one product, which are called logical address.

BE244-01

TROUBLESHOOTING

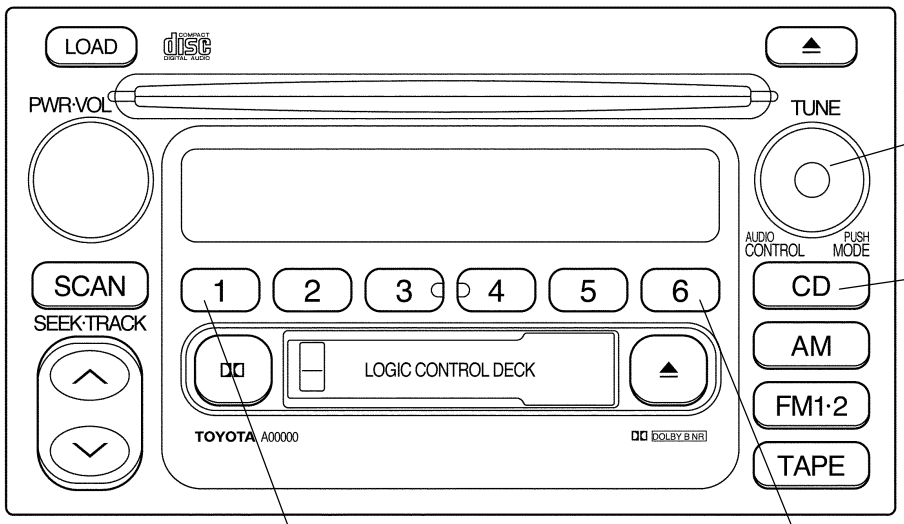
1. DIAGNOSIS FUNCTION

(a) Diagnosis start-up

For shifting to diagnosis mode, push ”CD” button 3 times with pressing ”1” and ”6” of TRUCK TUNE APS button at the same time while the audio power is OFF and ACC is ON.

In diagnosis mode, by pressing ”CD” button for 2 seconds or turning the ignition key OFF, the diagnosis mode is released.

<Example>



TUNE ”UP” and ”DOWN” buttons

”CD” button

”1” button

”6” button

P

I21741

(b) Service check mode

(1) After the diagnosis start-up, the system enters service check mode when ”TUNE UP” switch is pressed.

(2) Error codes over tuner and connected equipment are displayed on the screen of tuner.
Results for each check are displayed as follows:

- good:
  No DTC is detected for both ”System Check Confirmation” and ”Diagnosis Memory Response”.
- nCon:
  The Component does not respond to the ”Diagnosis On Instruction” command.
  Applicable to only the system where connected components are limited to be used.
- ECHn:
  Application of new version has been confirmed by the ”Diagnosis On Check”, and there is one or more DTC which indicates ”Replacement” in the ”System Check Result Response” or ”Diagnosis Memory Response”.
- CHEC:
  Application of new version has been confirmed by the ”Diagnosis On Check”, and there is no DTC which indicates ”Replacement” in the ”System Check Result Response” or ”Diagnosis Memory Response”, but one or more DTC which indicated ”Check” is identified.
- Old:
  Application of old version is confirmed by the ”Diagnosis On Check”, and DTC is identified in the ”System Check Result Response” or ”Diagnosis Memory Response”.

- nrES:
  No response is identified to the ”System Check Start Instruction” and ”Request for System Check Result” commands.

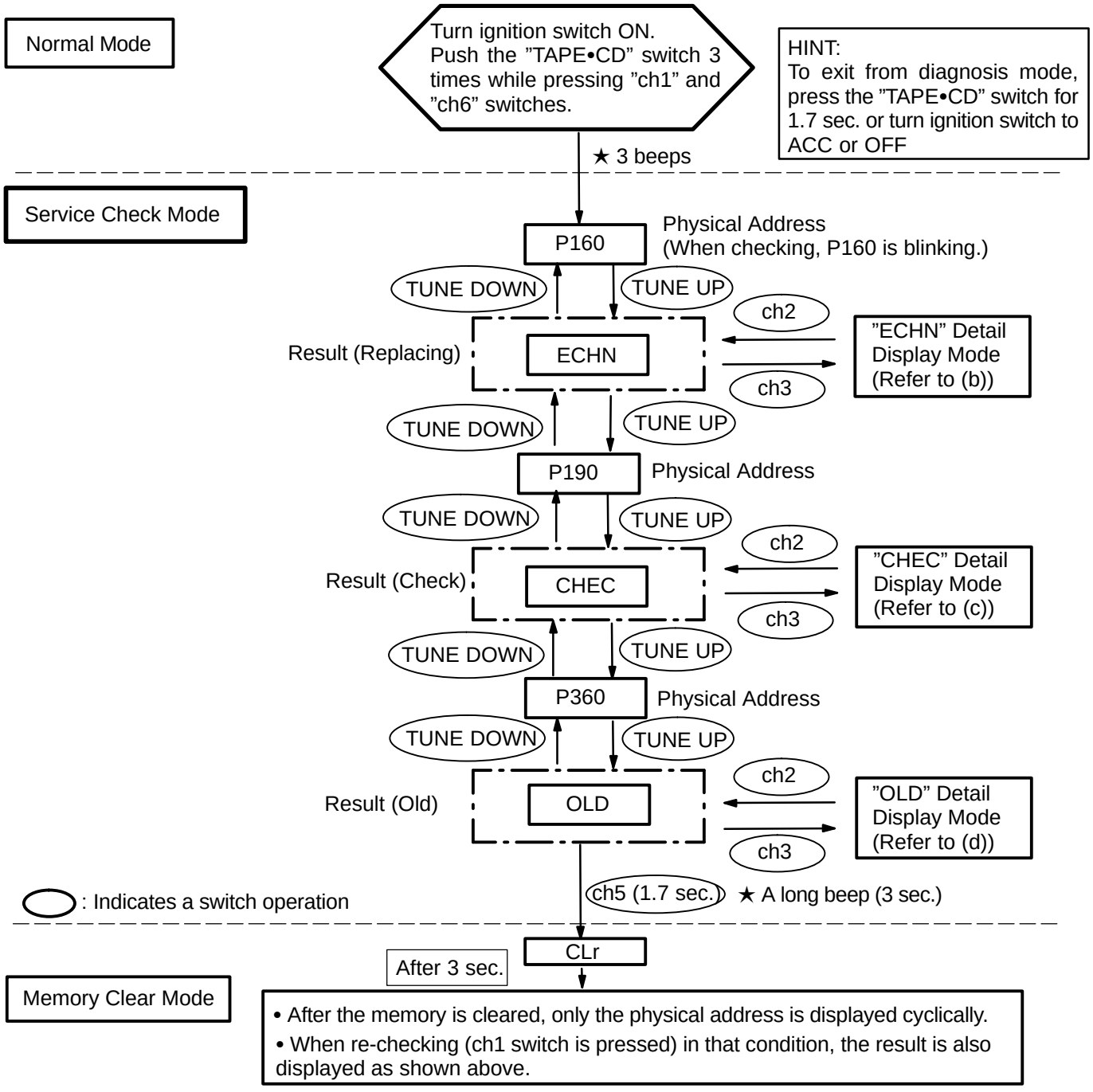
HINT:

- Check the present and past condition of components by performing the System Check and collecting stored DTC memories.
- Check results shall be displayed as one of six following indications: ”good”, ”ECHn”, ”CHEC”,”nCon”, ”Old” or ”nrES”.

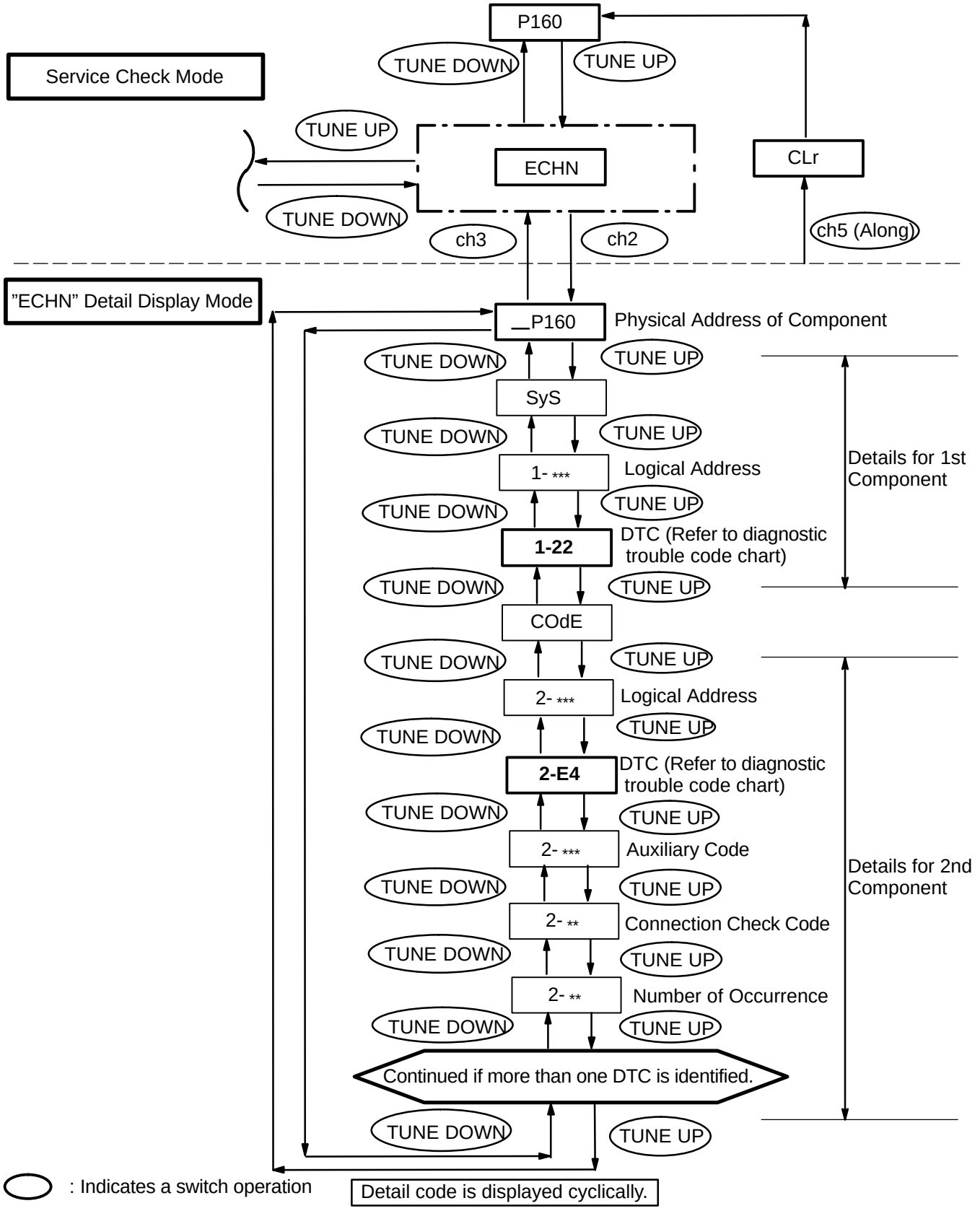
(c) Display Screen for Service Check.

Example:

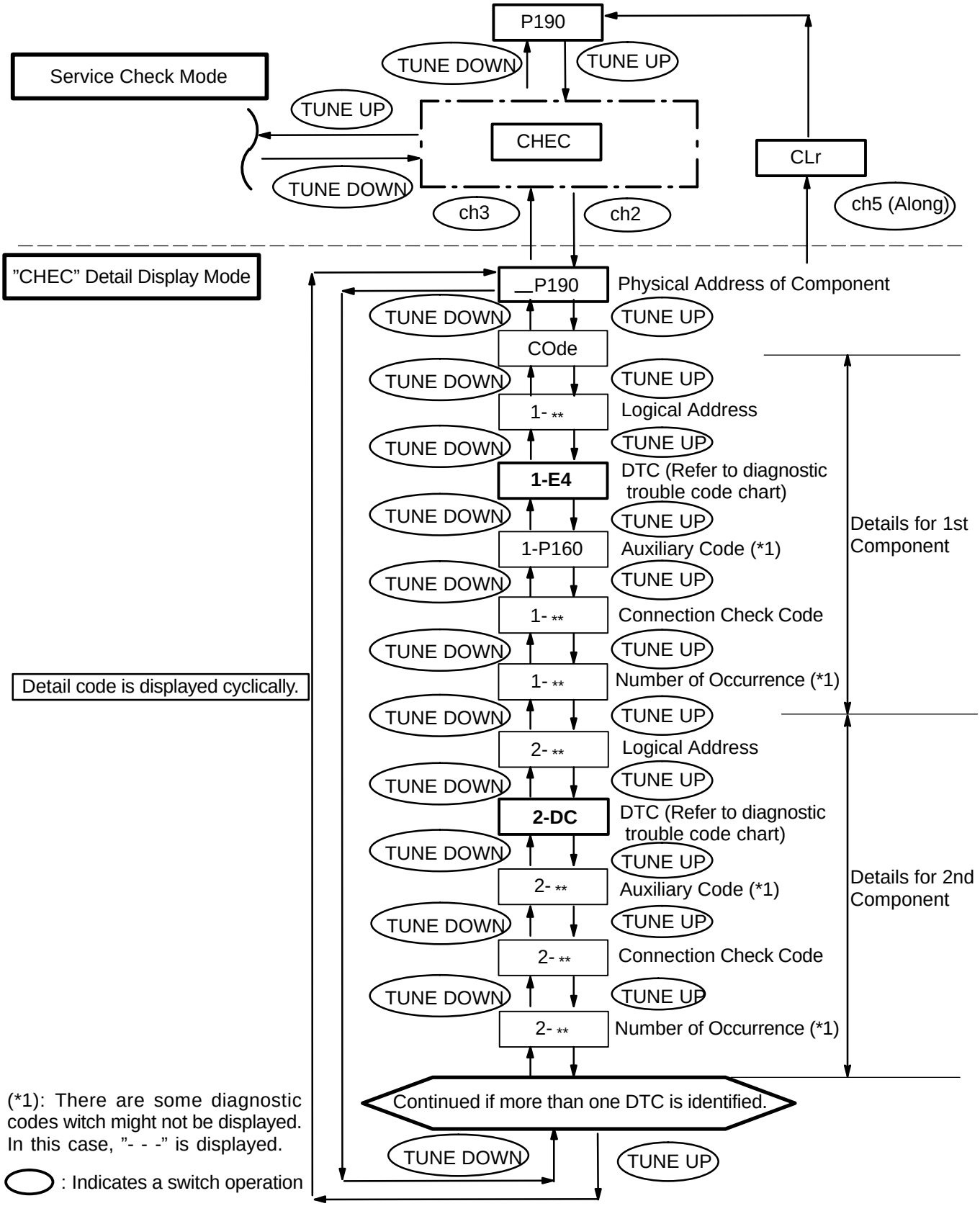
Connection parts (physical address): Multi Display (P160), Radio Receiver (P190), CD changer (P360)



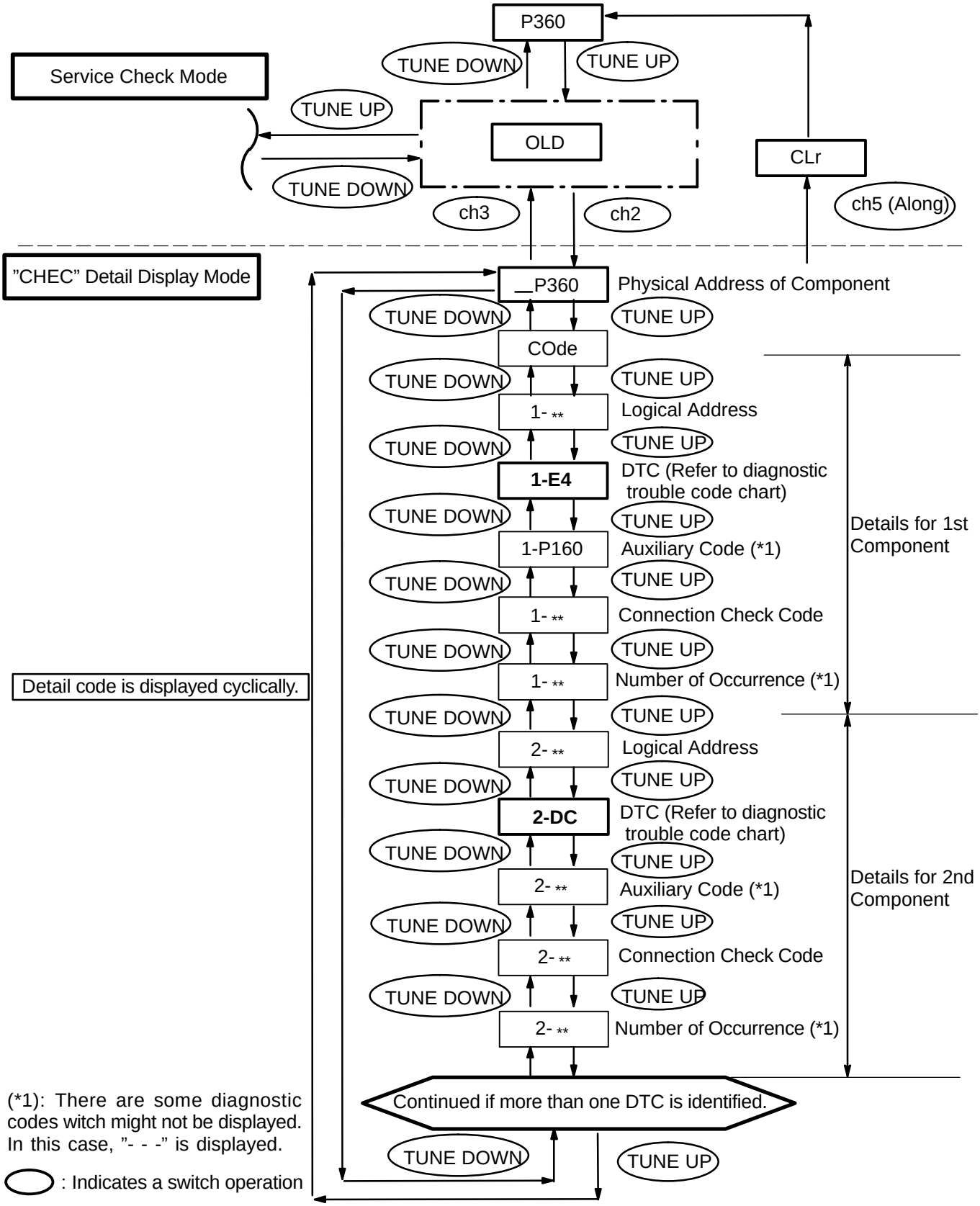
(d) ”ECHN” Detail Display Mode Screen



(e) ”CHEC” Detail Display Mode Screen



(f) ”OLD” Detail Display Mode Screen



(g) Recheck

(1) Pressing the [ch1] key in Service Check Mode executes recheck.

(2) To display the recheck process, follow the sequence indicated Display Screen for Service Check.

2. DIAGNOSIS CODE LIST

Terms	Meaning
Physical address	Three-digit code (shown in hexadecimal) which is given to each component comprising the AVC-LAN. Corresponding to the function, individual symbols are specified.
Logical address	Two-digit code (shown in hexadecimal) which is given to each function comprising the inner system of the AVC-LAN.

(a) Physical address: 190 Radio receiver assembly

HINT:

- *1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.
- *2: It is stored when 180 sec. has passed after the power supply connector is pulled out after engine start.
- *3: It may be stored when the engine key is turned 1 min. again after engine start.
- *4: It may be stored when the engine key is turned again after engine start.
- *5: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

(1) Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, multi-display assembly was disconnected.	• Check harness for power supply system of multi-display. • Check harness for communication system of multi-display. • Check harness for power supply system of radio and player. • Check harness for communication system of radio and player.
D8 *2	No Response to Connection Check	Component shown by auxiliary code is or had been disconnected from system after engine is start. D9	• Check harness for power supply system of component shown by auxiliary code. • Check harness for communication system of component shown by auxiliary code.
D9 *1	Last Mode Error	Component operated (sounds and/or images were provided) before engine stop is or has been disconnected with ignition switch in ACC or ON.	• Check harness for power supply system of component shown by auxiliary code. • Check harness for communication system of component shown by auxiliary code.
DA	No Response to ON/OFF Instruction	No response is identified when changing mode (audio and visual mode change). Detected when sound and picture does not change by button operation.	• Check harness for power supply system of component shown by auxiliary code. • Check harness for communication system of component shown by auxiliary code. • If error occurs again, replace component shown by auxiliary code.
DB *1	Mode Status Error	Dual alarm is detected.	• Check harness for power supply of component shown by auxiliary code. • Check harness for communication system of component shown by auxiliary code.
DC *3	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same auxiliary code is recorded in order component, check harness for power supply and communication system of all components shown by code.

DD *4	Master Reset (Momentary Interruption)	After engine is started, multi-display assembly was disconnected from system.	• Check harness for power supply system of multi-display. • Check harness for communication system of multi-display. • Check harness for power supply system of radio and player. • Check harness for communication system of radio and player. • If this error occurs frequently, replace multi-display assembly.
DE *4	Slave Reset (Momentary Interruption)	After engine is started, slave component was disconnected from system.	• Check harness for power supply of component shown by auxiliary code. • Check harness for communication system of component shown by auxiliary code.
DF *5	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	• Check harness for power supply of multi-display assembly. • Check harness for communication system of multi-display assembly. • Check harness for communication system between multi-display assembly and sub-master component.
E0 *1	Registration Completion Instruction Error	”Registration Completion Instruction” command from master cannot be received.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
E1 *1	Audio processor ON error	While source equipment is operating, AMP output is stopped.	• Check harness for power supply of multi-display assembly. • Check harness for communication system of multi-display assembly.
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from multi-display assembly.	Replace multi-display assembly.
E3 *1	Registration Request Transmission	Registration Request command is output from slave component. Receiving Connection Check Instruction, Registration Request command is output from sub-master component.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

(2) Logical address: 61 (Cassette switch)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
40	Mechanical of Media Error	Malfunction due to mechanical failure is identified. Or cassette tape is cut or entangled.	• Inspect cassette tape. • Replace radio and player.

(3) Logical address: 62 (CD player)/63 (CD Auto chager)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
42	No Disc Readout	Disc cannot be read	Inspect CD.
44	CD Error	Error is detected in CD player.	Replace radio receiver assembly.
51	Eject Error	CD cannot be ejected.	Replace radio receiver assembly.
46	Scratched/Reversed Disc	Scratches or dirt is found on CD surface or CD is set upside down.	Inspect CD.

(b) Physical address: 440 Stereo component amplifier

HINT:

- *1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.
- *2: It may be stored when the engine key is turned 1 min. again after engine start.
- *3: It may be stored when the engine key is turned again after engine start.
- *4: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.
  Logical address: 01 (Communication control)

DTC	Diagnosis item	Diagnosis content	Countermeasure and inspected parts
D6 *1	Absence of Master	Component in which this code is recorded has been disconnected from system with ignition in ACC or ON. Or, when this code was recorded, multi-display assembly was disconnected.	• Check harness for power supply of radio and player. • Check harness for communication system of radio and player. • Check harness for power supply of stereo component amplifier. • Check harness for communication system of stereo component amplifier.
D7	Communication Check Error	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, multi-display assembly was disconnected.	• Check harness for power supply of radio and player. • Check harness for communication system of radio and player. • Check harness for power supply of stereo component amplifier. • Check harness for communication system of stereo component amplifier.
DC *2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same auxiliary code is recorded in order component, check harness for power supply and communication system of all components shown by code.
DD *3	Master Reset (Momentary Interruption)	After engine is started, multi-display assembly was disconnected from system.	• Check harness for power supply of radio and player. • Check harness for communication system of radio and player. • Check harness for power supply of stereo component amplifier. • Check harness for communication system of stereo component amplifier. • If this error occurs frequently, replace multi-display assembly.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	• Check harness for power supply of multi-display assembly. • Check harness for communication system of multi-display assembly. • Check harness for communication system between multi-display assembly and sub-master component.
E0 *1	Registration Completion Instruction Error	”Registration Completion Instruction” command from master cannot be received.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
E1 *1	Audio processor ON error	While source equipment is operating, AMP output is stopped.	• Check harness for power supply of multi-display assembly. • Check harness for communication system of multi-display assembly.

E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from multi-display assembly.	Replace multi-display assembly.
E3 *1	Registration Request Transmission	• Registration Request command is output from slave component. • Registration Connection Check Instruction, Registration Request command is output from sub-master component.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

(c) Physical address: 360 CD Auto Changer

HINT:

- *1: Even if no failure is detected, it may be stored depending on the battery condition or voltage for starting an engine.
- *2: It may be stored when the engine key is turned 1 min. again after engine start.
- *3: It may be stored when the engine key is turned again after engine start.
- *4: It may be stored when the engine key is turned again after engine start.
- *5: When 210 sec. has passed after pulling out the power supply connector of the master component with the ignition switch in ACC or ON, this code is stored.

Logical address: 01 (Communication control)

DTC	Diagnosis item	diagnosis content	Countermeasure and inspected parts
21	ROM Error	Abnormal condition of ROM is detected.	Replace CD auto changer.
22	RAM Error	Abnormal condition of ROM is detected.	Replace CD auto changer.
D6 *2	Absence of Master	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, multi-display assembly was disconnected.	• Check harness for power supply system of multi-display. • Check harness for communication system of multi-display. • Check harness for power supply system of CD auto changer • Check harness for communication system CD auto changer
D7 *5	Connection check Error	Component in which this code is recorded is or was disconnected from system after engine start. Or, when recording this code, multi-display assembly was disconnected.	• Check harness for power supply of multi-displaly. • Check harness for communication system of multi-display. • Check harness for power supply of CD auto changer. • Check harness for communication system of CD auto changer.
DC *2	Transmission Error	Transmission to component shown by auxiliary code has been failed. (Detecting this DTC does not necessarily mean actual failure.)	If same auxiliary code is recorded in order component, check harness for power supply and communication system of all components shown by code.

DD *3	Master Reset (Momentary Interruption)	After engine is started, multi-display assembly was disconnected from system.	• Check harness for power supply system of multi-display. • Check harness for communication system multi-display. • Check harness for power supply system of CD auto changer. • Check harness for communication system CD auto changer. • If this error occurs frequently, replace multi-display assembly.
DF *4	Master Error	Due to defective condition of component with a display, master function is switched to audio equipment. Error occurs in communication between sub-master (audio) and master component.	• Check harness for power supply of multi-display assembly. • Check harness for communication system of multi-display assembly. • Check harness for communication system between multi-display assembly and sub-master component.
E0 *1	Registration Completion Instruction Error	”Registration Completion Instruction” command from master cannot be received.	Since this DTC is provided for engineering, it may be detected when no actual failure exists.
E2	ON/OFF Instruction Parameter Error	Error occurs in ON/OFF controlling command from multi-display assembly.	Replace multi-display assembly.
E3 *1	Registration Request Transmission	• Registration Request command is output from slave component. • Receiving Connection Check Instruction, Registration Request command is output from sub-master component.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.
E4 *1	Multiple Frame Abort	Multiple frame transmission is aborted.	Since this DTC is provided for engineering purpose, it may be detected when no actual failure exists.

3. PROBLEM SYMPTOMS TABLE

NOTICE:

When replacing the internal mechanism (computer part) of the audio system, be careful that no part of your body or clothing comes in contact with the terminals of the leads from the IC, etc. of the replacement part (spare part).

HINT:

This inspection procedure is a simple troubleshooting which should be carried out on the vehicle during system operation and was prepared on the assumption of system component troubles (except for the wires and connectors, etc.).

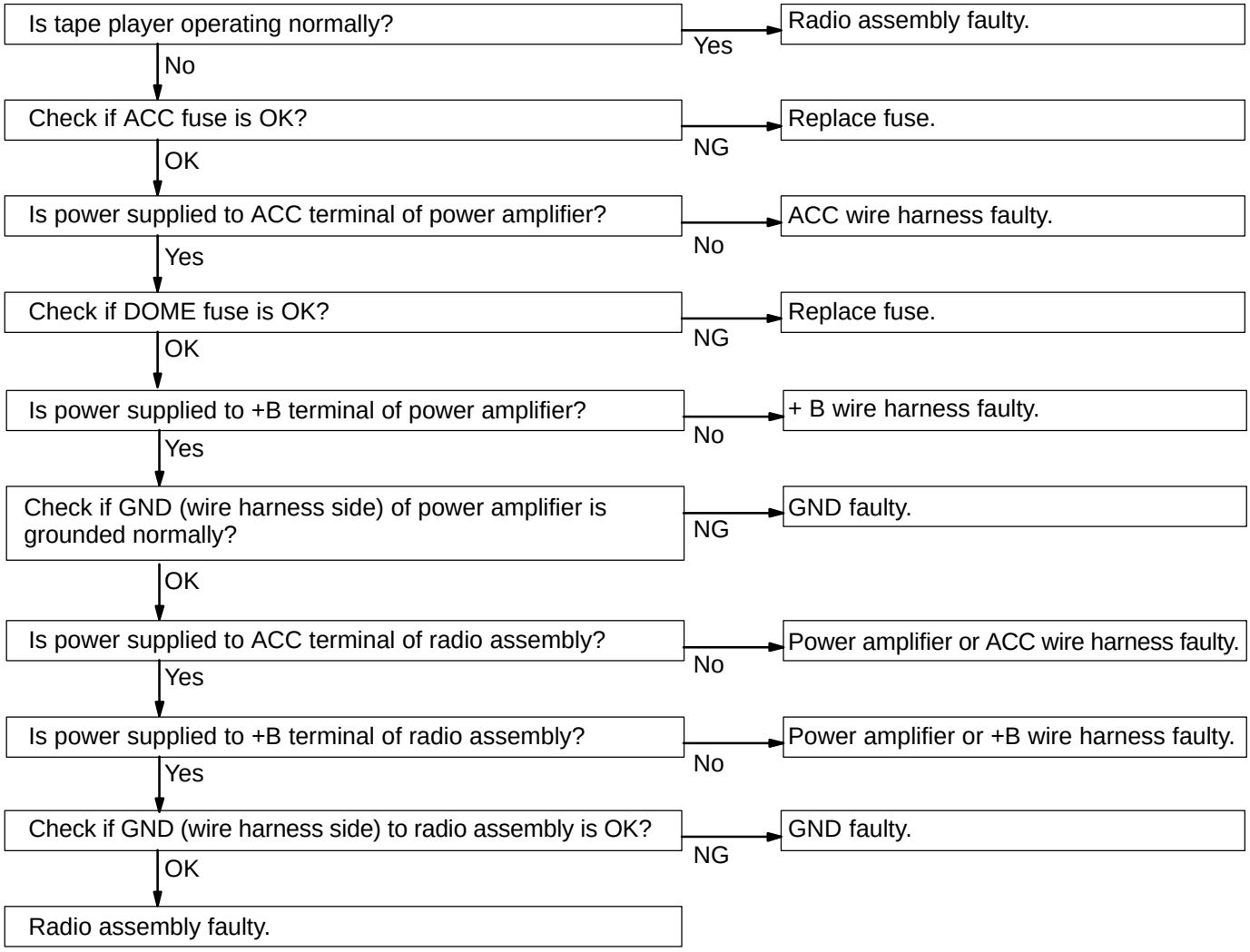
Always inspect the trouble taking the following items into consideration.

- Open or short circuit of the wire harness
- Connector or terminal connection fault

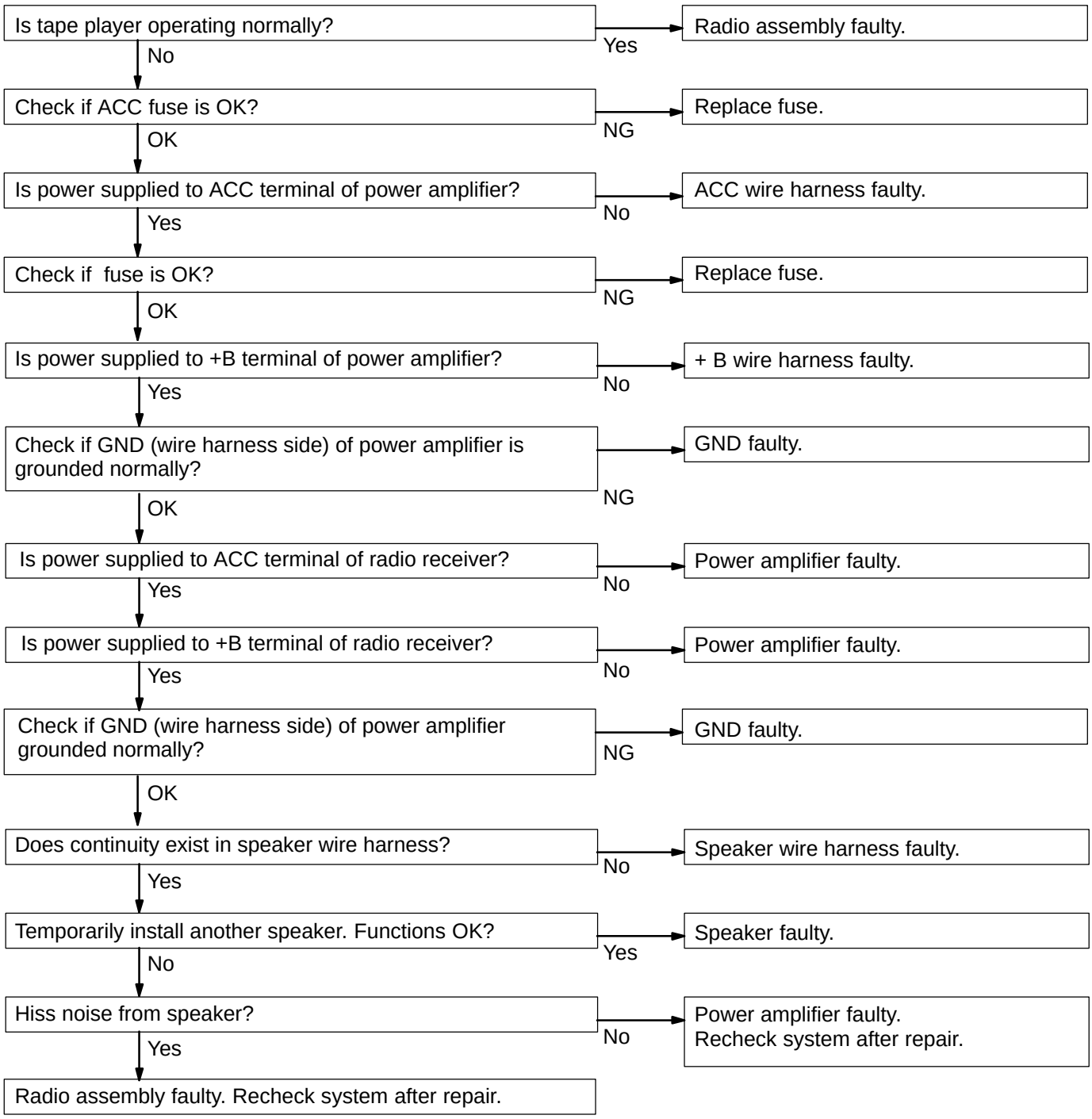
	Problem	No.
Radio	Radio not operating when power switch turned to 'ON'.	1
	Display indicates when power switch turned to 'ON', but no sound (including 'noise') is produced.	2
	Noise present, but AM - FM not operating.	3
	Any speaker does not work.	4
	Any AM or FM does not work.	5
	Few preset turning bands.	5
	Reception poor.	6
	Sound quality poor.	7
	Preset memory disappears.	8
Tape Player	Cassette tape cannot be inserted.	9
	Cassette tape inserted, but no power.	10
	Power coming in, but tape player not operating.	11
	Any speaker does not work.	12
	Sound quality poor.	13
	Tape jammed, malfunction with tape speed or auto-reverse.	14
	Cassette tape will not be ejected.	15
CD Player	CD cannot be inserted.	16
	CD inserted, but no power.	17
	Power coming in, but CD player not operating.	18
	Sound jumps.	19
	Sound quality poor (Volume faint).	20
	Any speaker does not work.	21
	CD will not be ejected.	22
Power Amplifier	No power coming in.	23
	Power coming in, but power amplifier not operating.	24
	Any speaker does not work.	25
Noise	Noise occurs	26
	Noise produced by vibration or shock while driving.	27
	Noise produced when engine starts.	28

The term "AM" includes LW, MW and SW, and the term "FW" includes UKW.

1	Radio	RADIO NOT OPERATING WHEN POWER SWITCH TURNED TO ”ON”



2	Radio	**DISPLAY INDICATES WHEN POWER SWITCH TURNED TO ”ON”, BUT NO SOUND (INCLUDING ”NOISE”) IS PRODUCED**

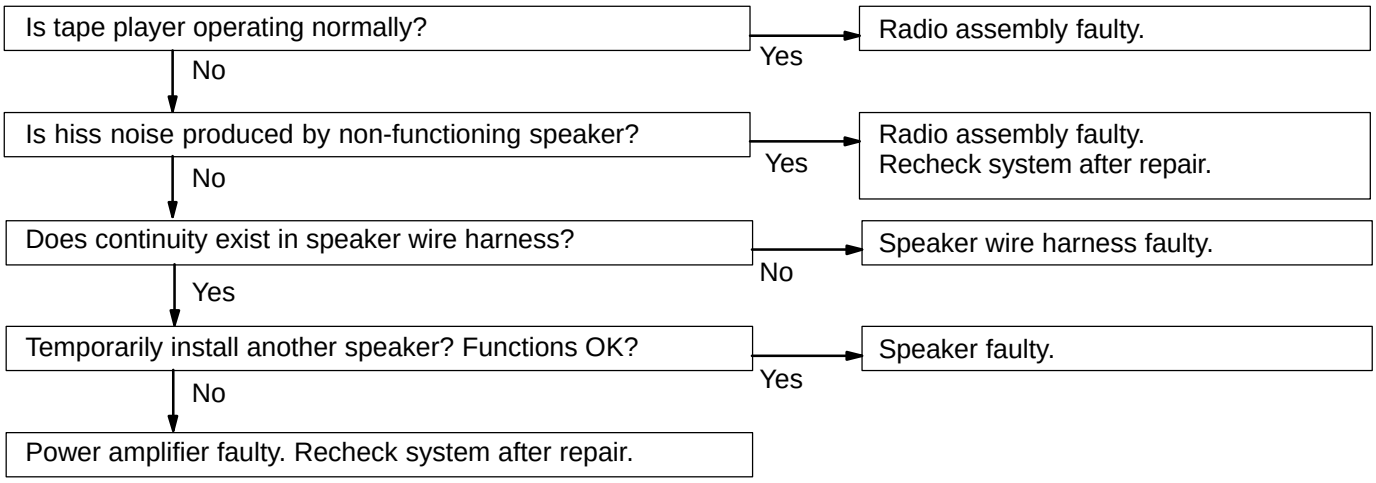


3	Radio	NOISE PRESENT, BUT AM-FM NOT OPERATING

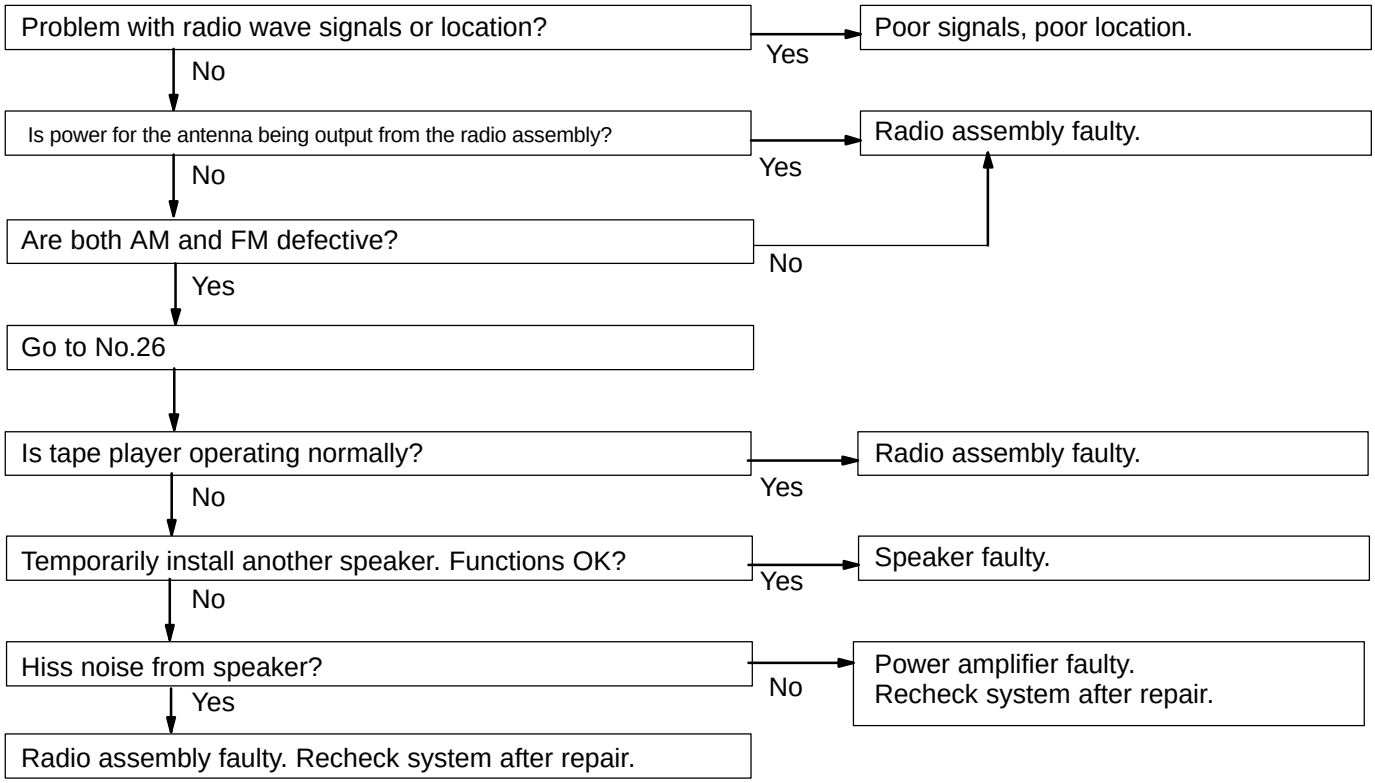
Go to No.25

If radio side faulty. → Radio faulty.

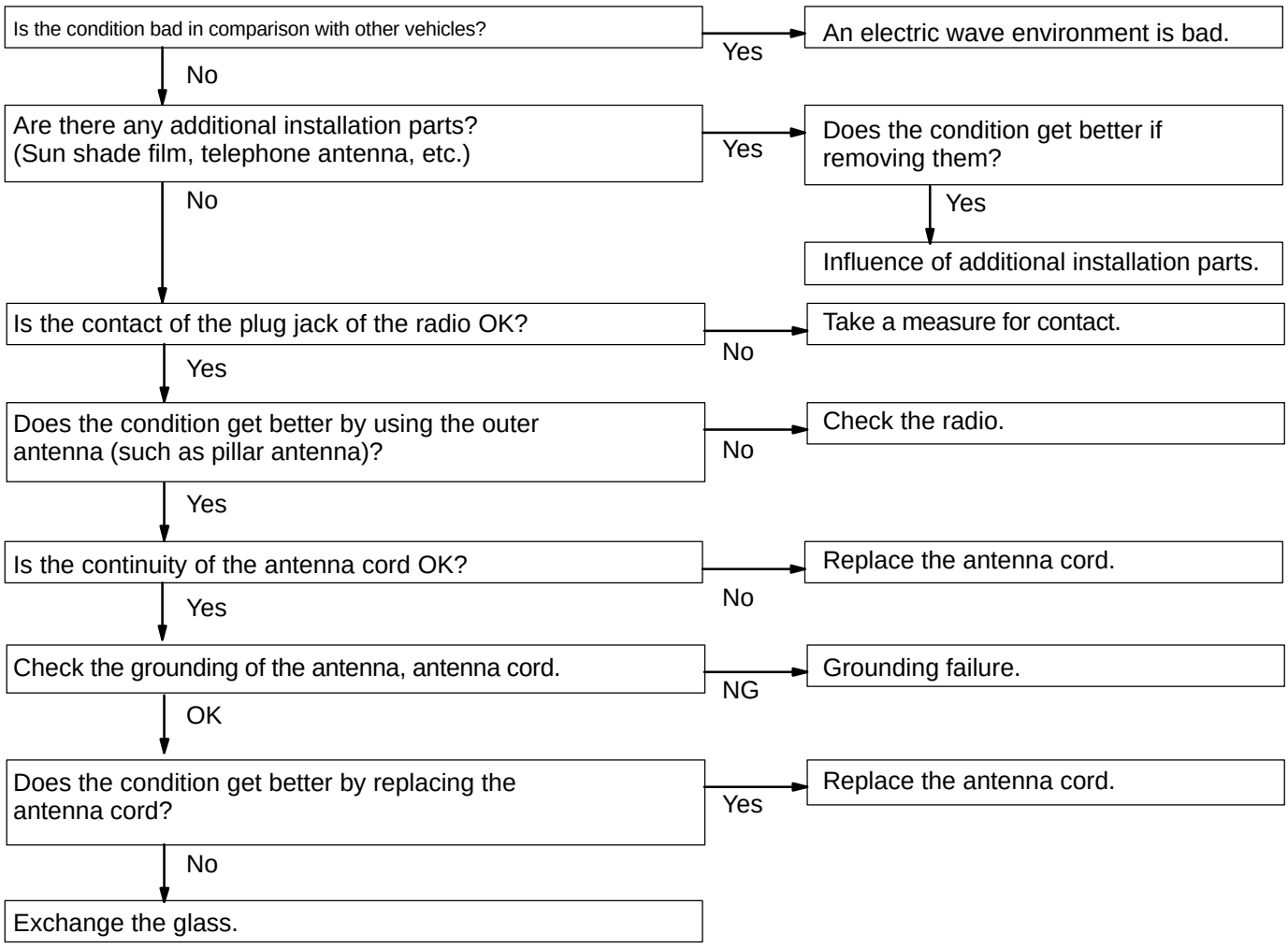
4	Radio	ANY SPEAKER DOSE NOT WORK



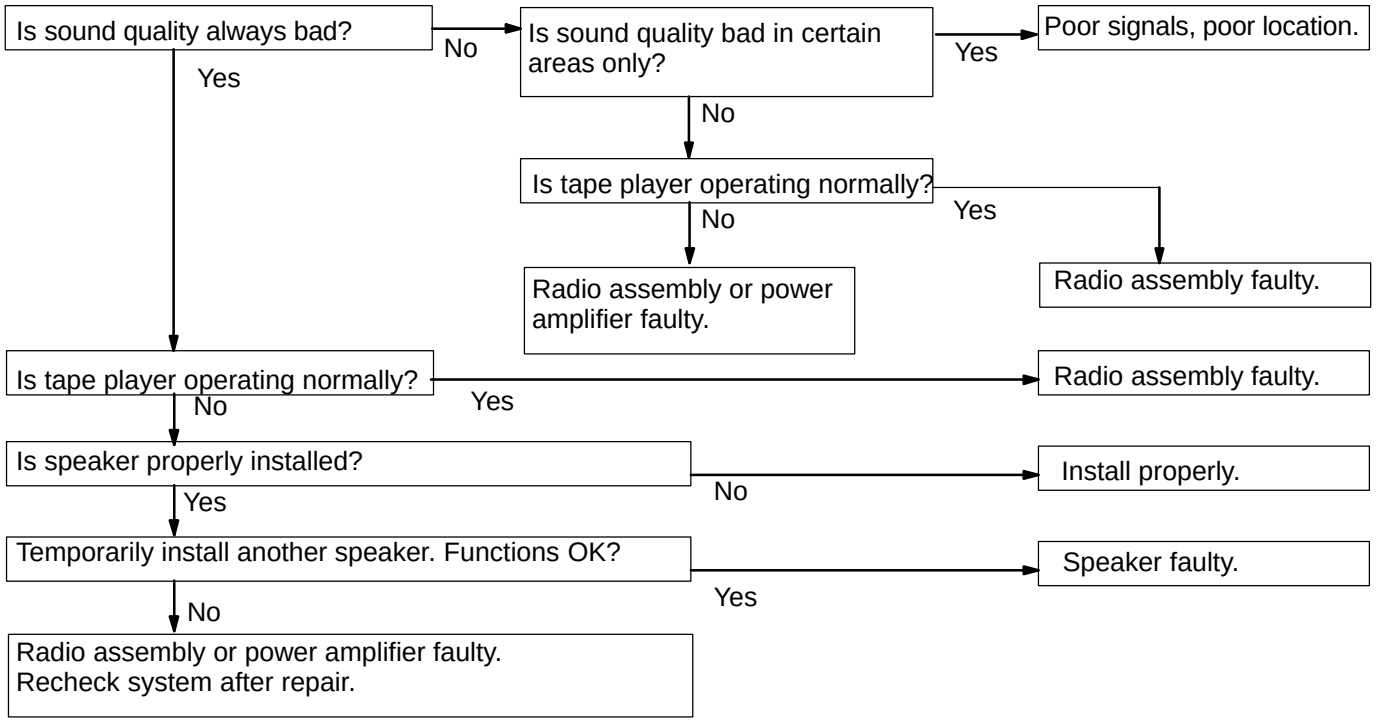
5	Radio	**ANY AM OR FM DOES NOR WORK FEW PRESET TUNING BANDS**



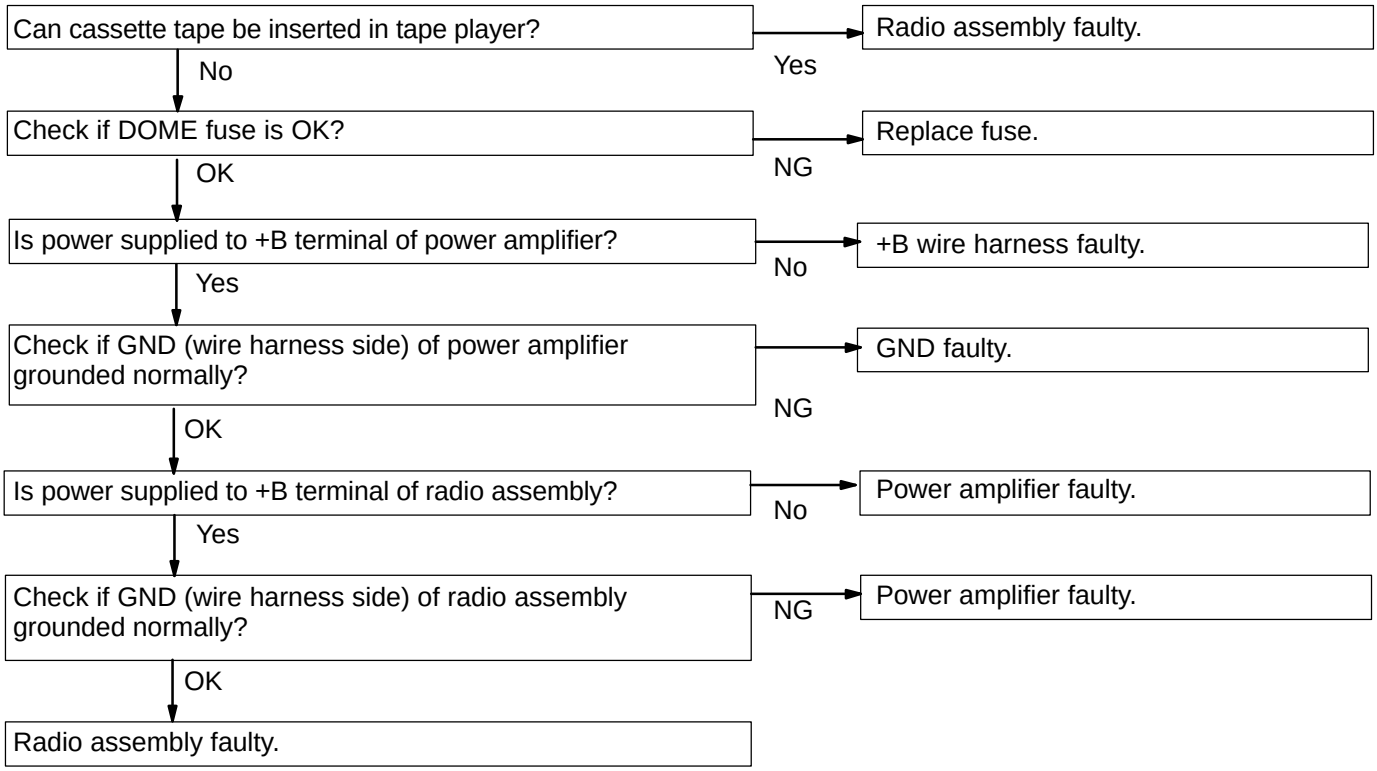
6	Radio	POOR RECEPTION



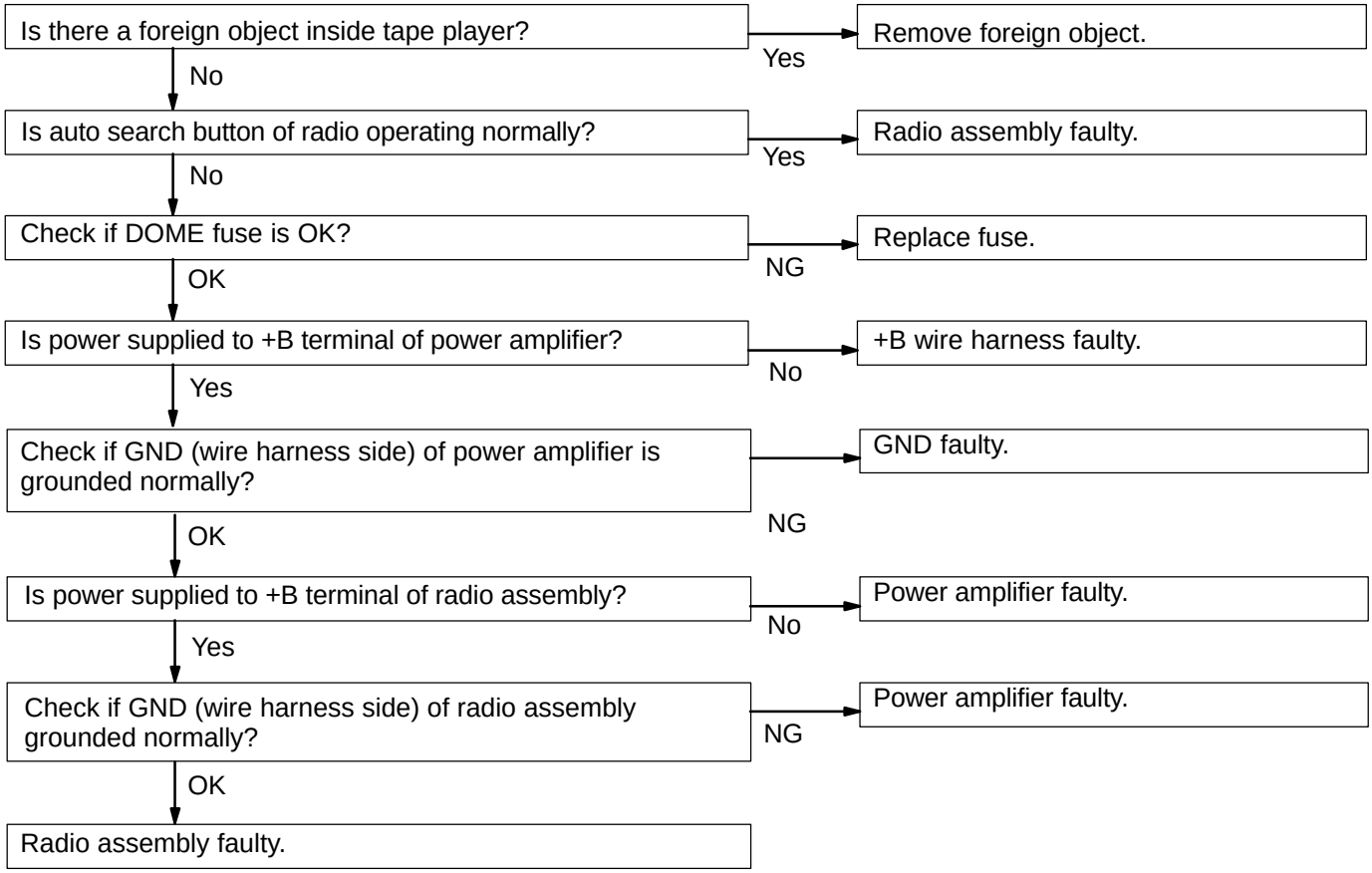
7	Radio	SOUND QUALITY POOR



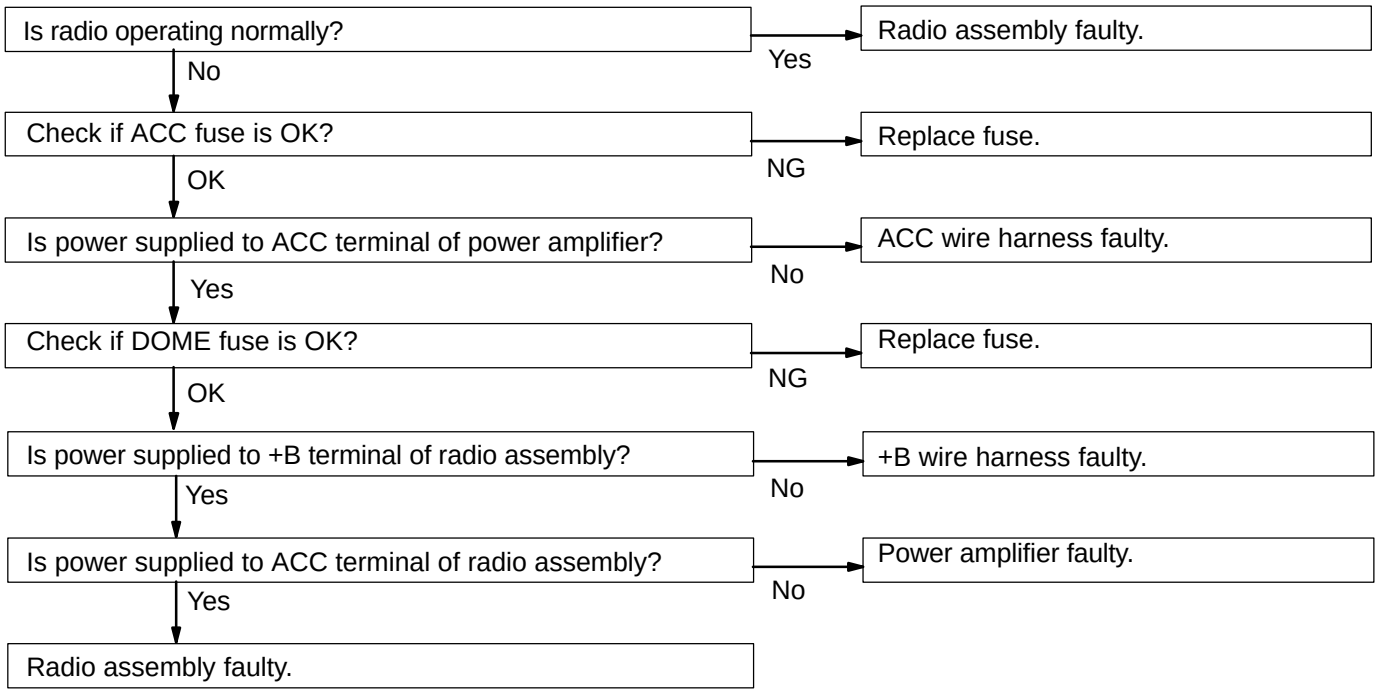
8	Radio	PRESET MEMORY DISAPPEARS



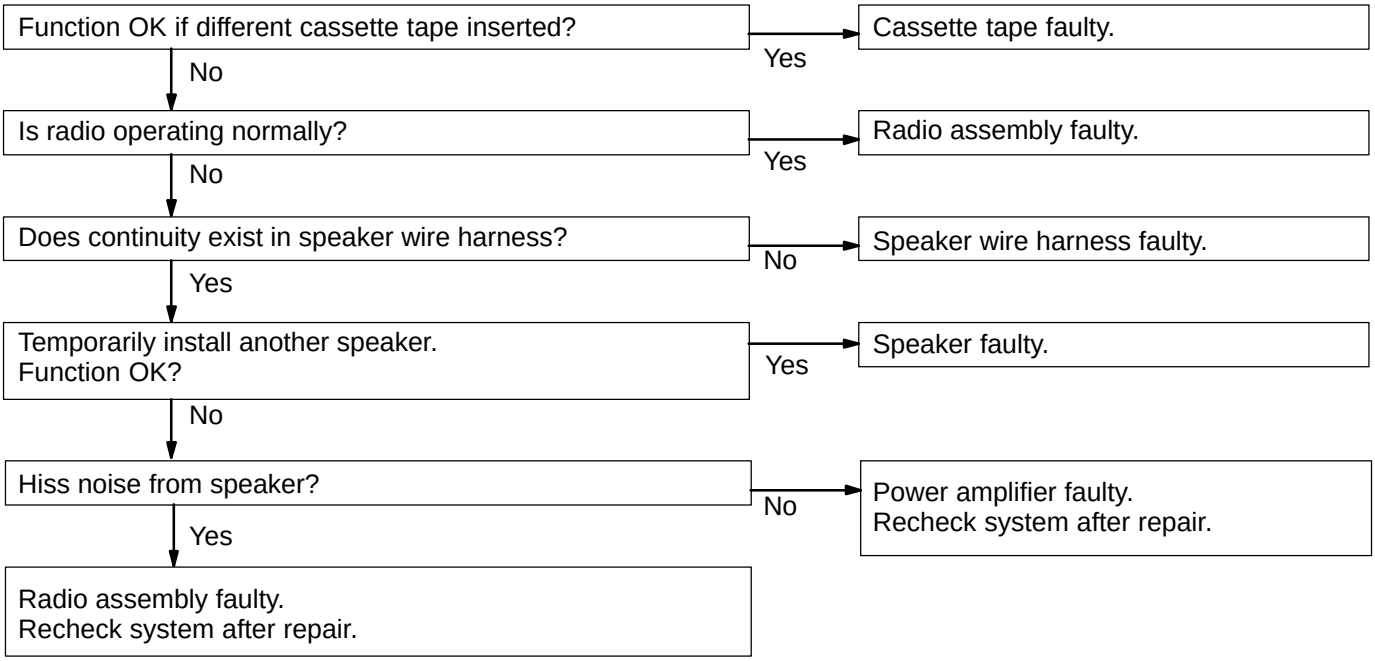
9	Tape Player	CASSETTE TAPE CANNOT BE INSERTED



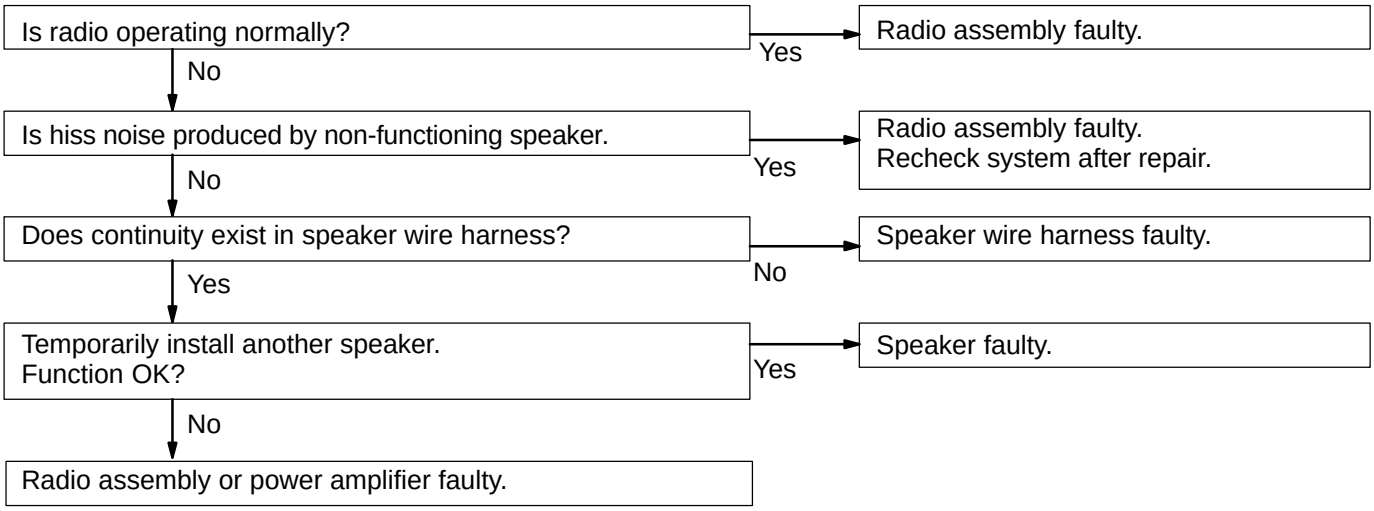
10	Tape Player	CASSETTE TAPE INSERTED, BUT NO POWER



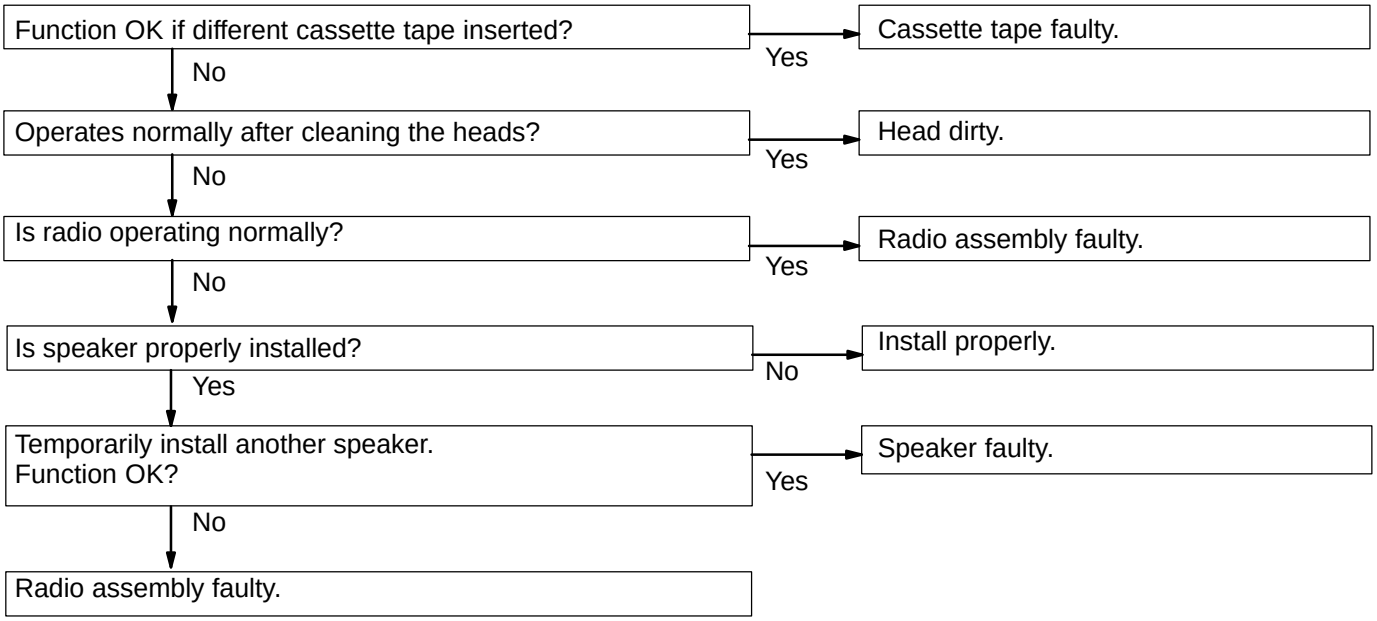
11	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING



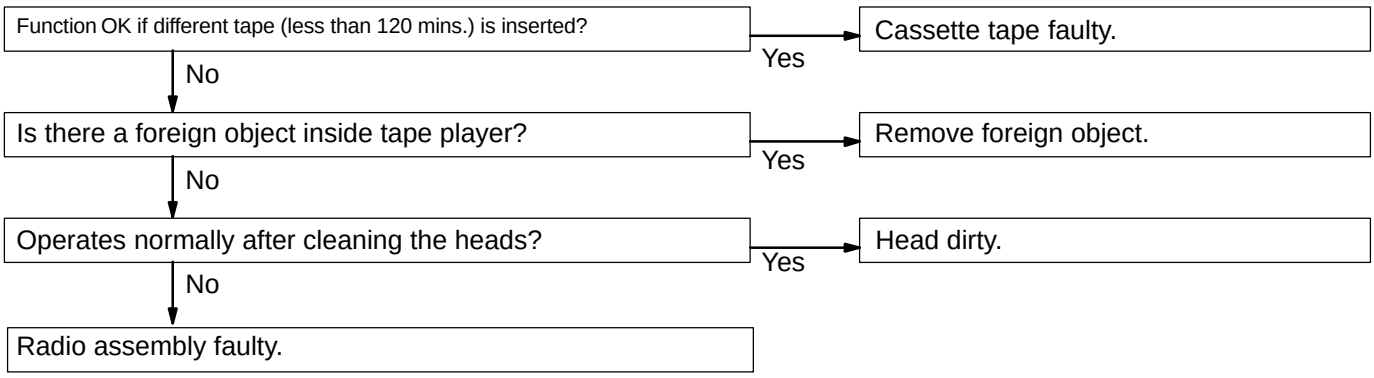
12	Tape Player	ANY SPEAKER DOES NOT WORK



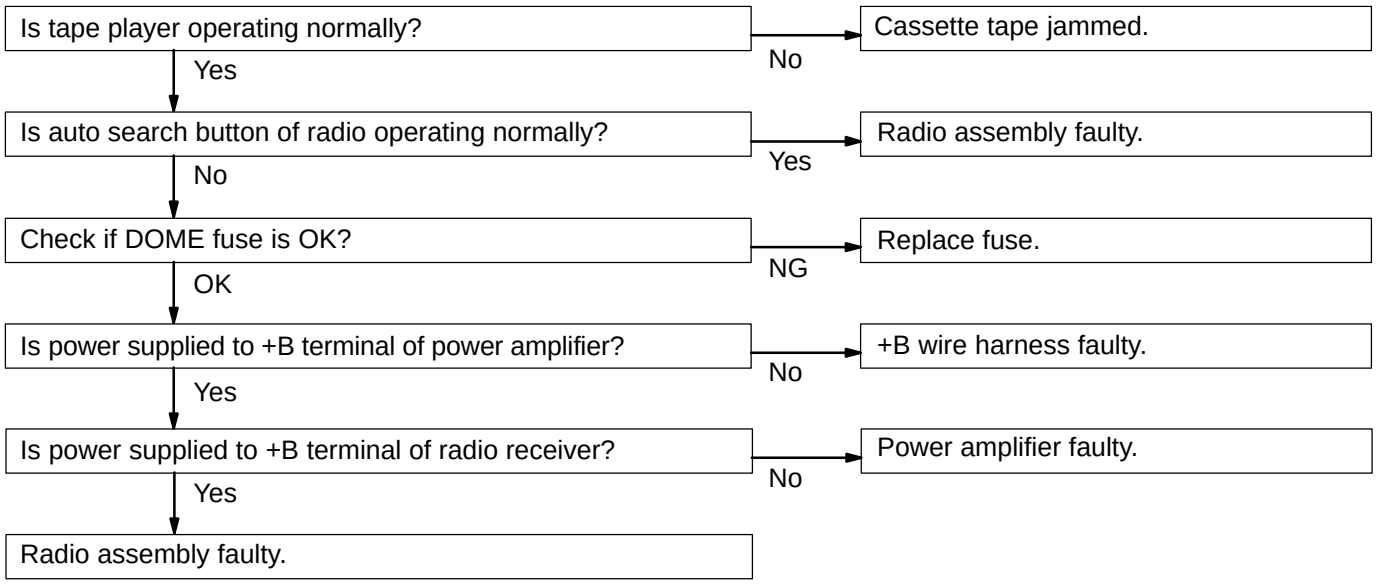
13	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)



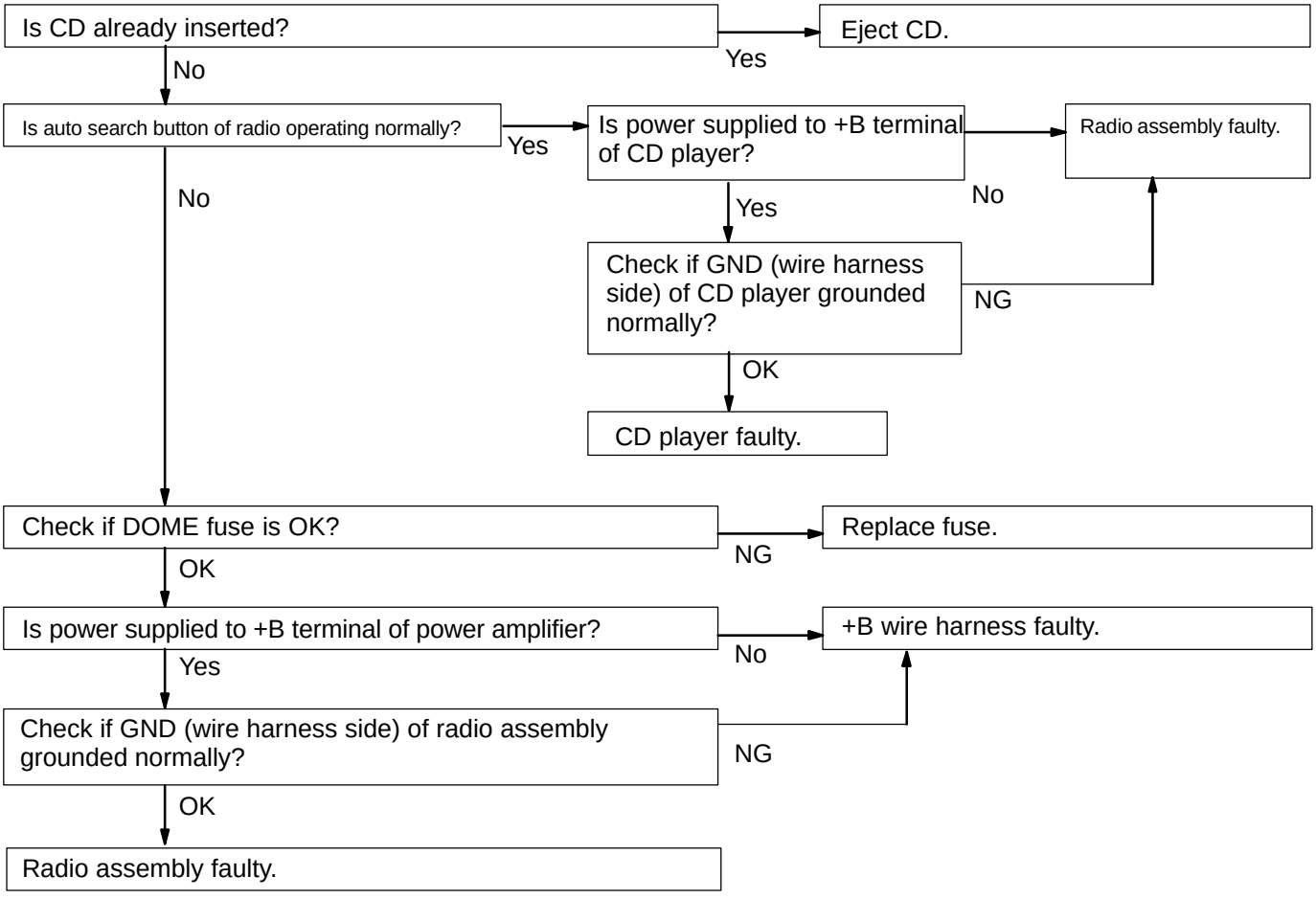
14	Tape Player	TAPE JAMMED,MALFUNCTION WITH TAPE SPEED OR AUTO-REVERSE



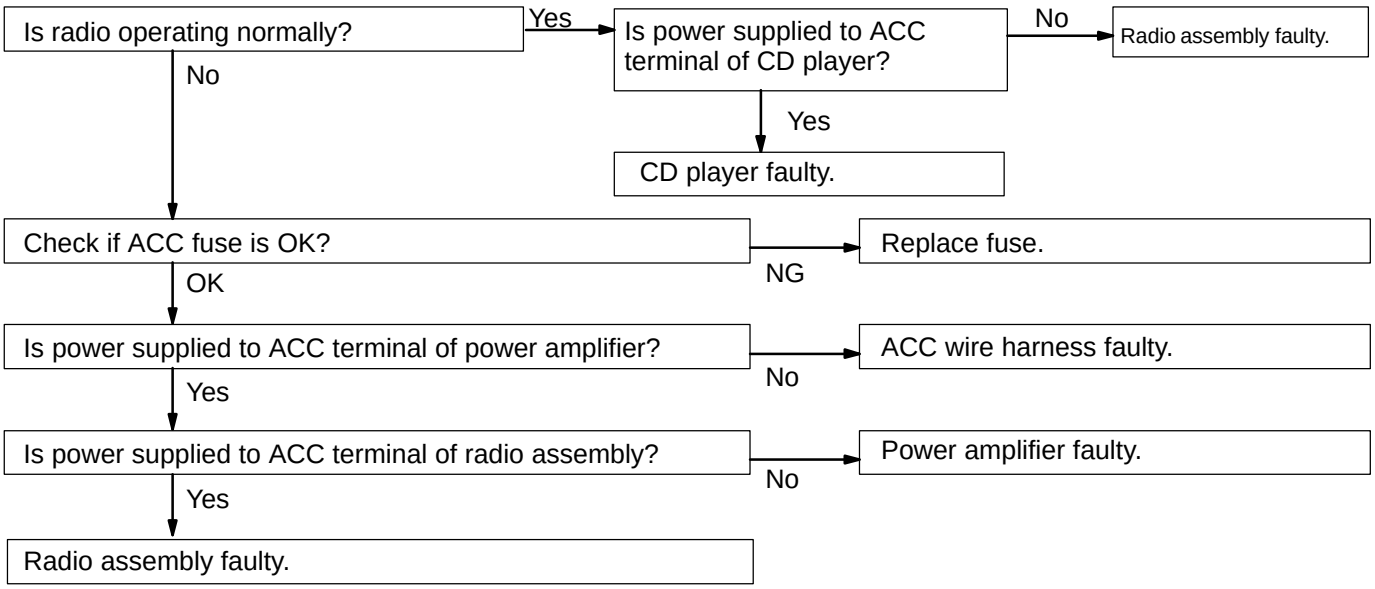
15	Tape Player	CASSETTE TAPE WILL NOT BE EJECTED



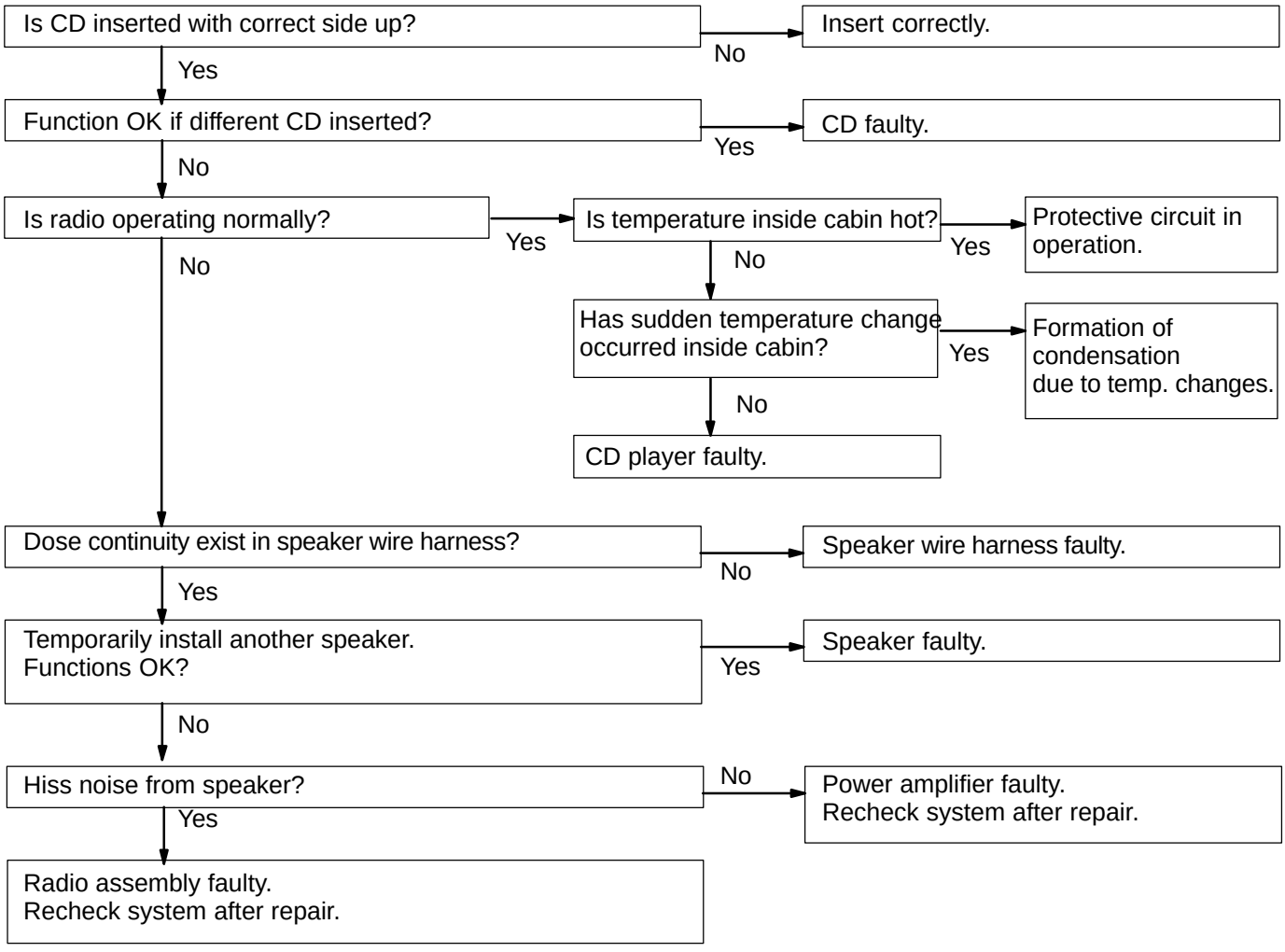
16	CD Player	CD CANNOT BE INSERTED



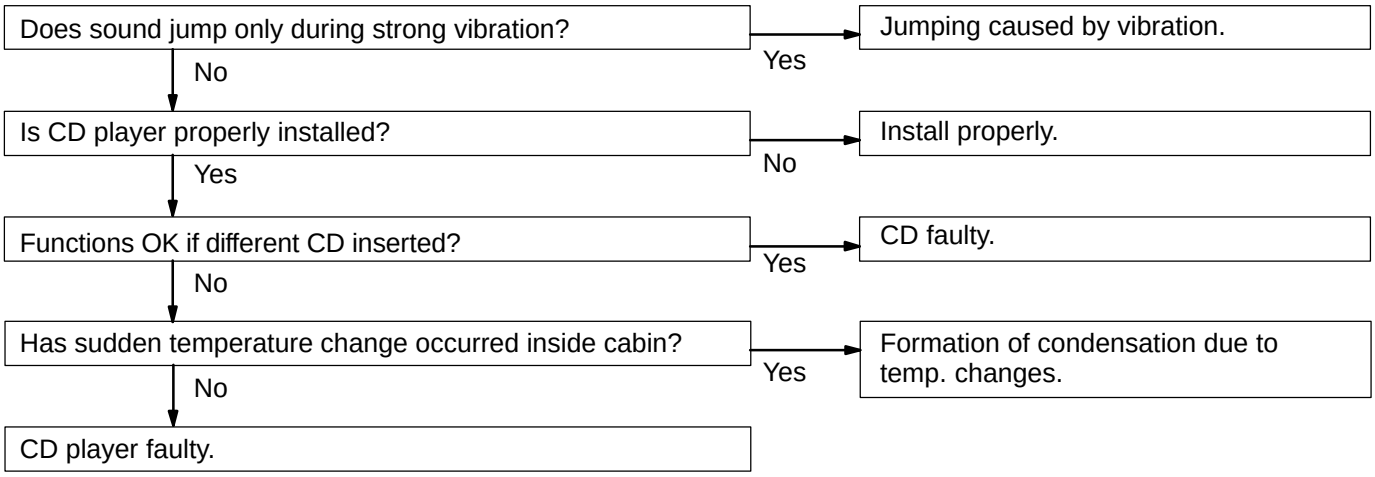
17	CD Player	CD INSERTED, BUT NO POWER



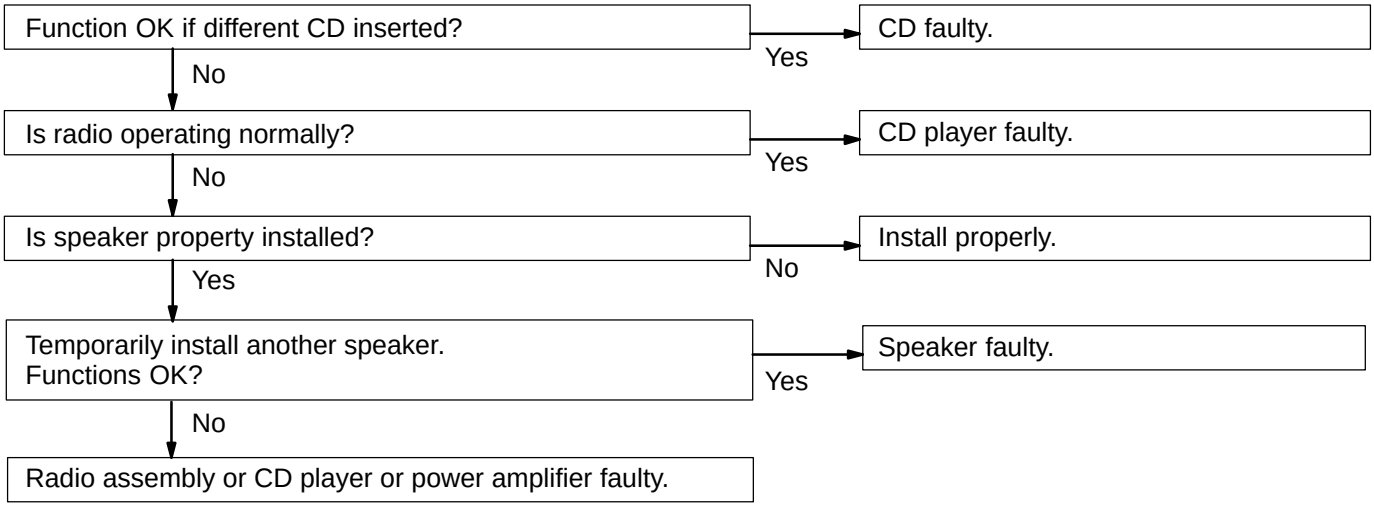
18	CD Player	POWER COMING IN, BUT CD PLAYER NOT OPERATING



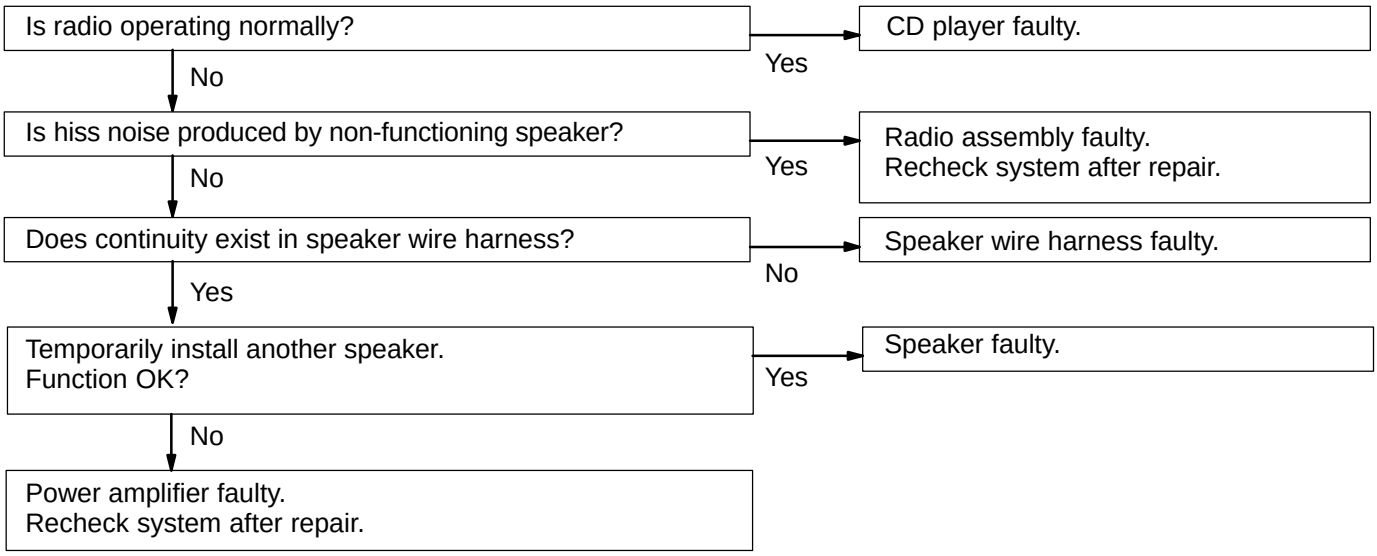
19	CD Player	SOUND JUMPS



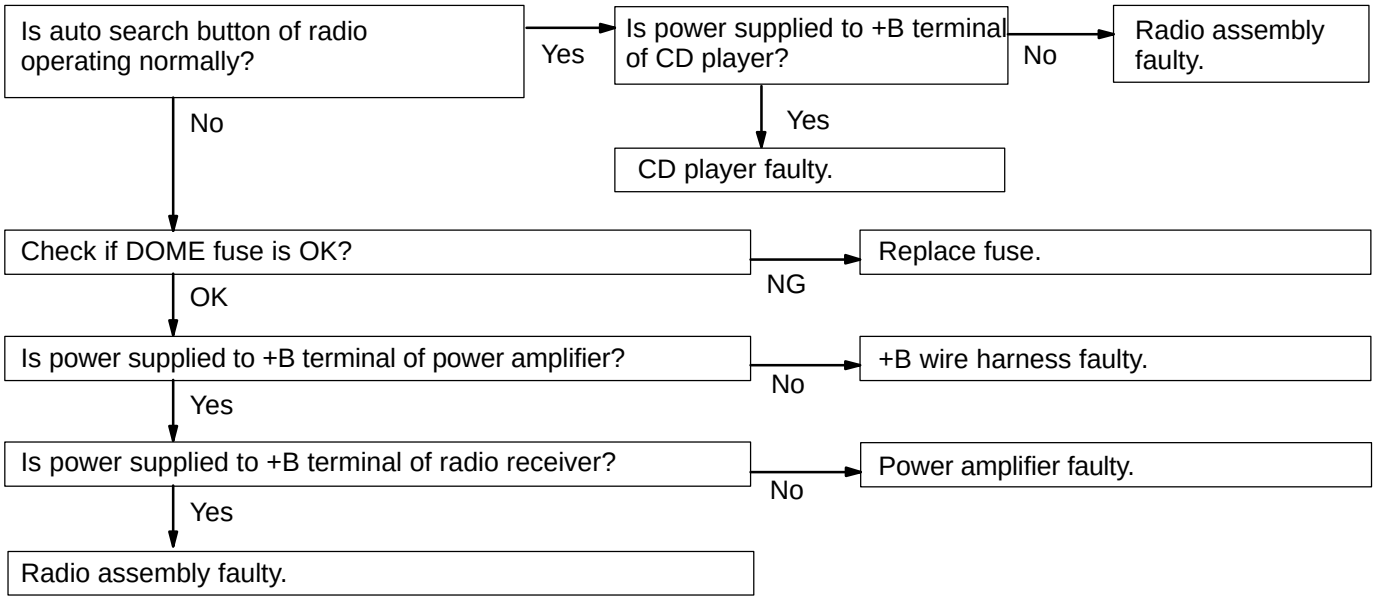
20	CD Player	SOUND QUALITY POOR (VOLUME FAINT)



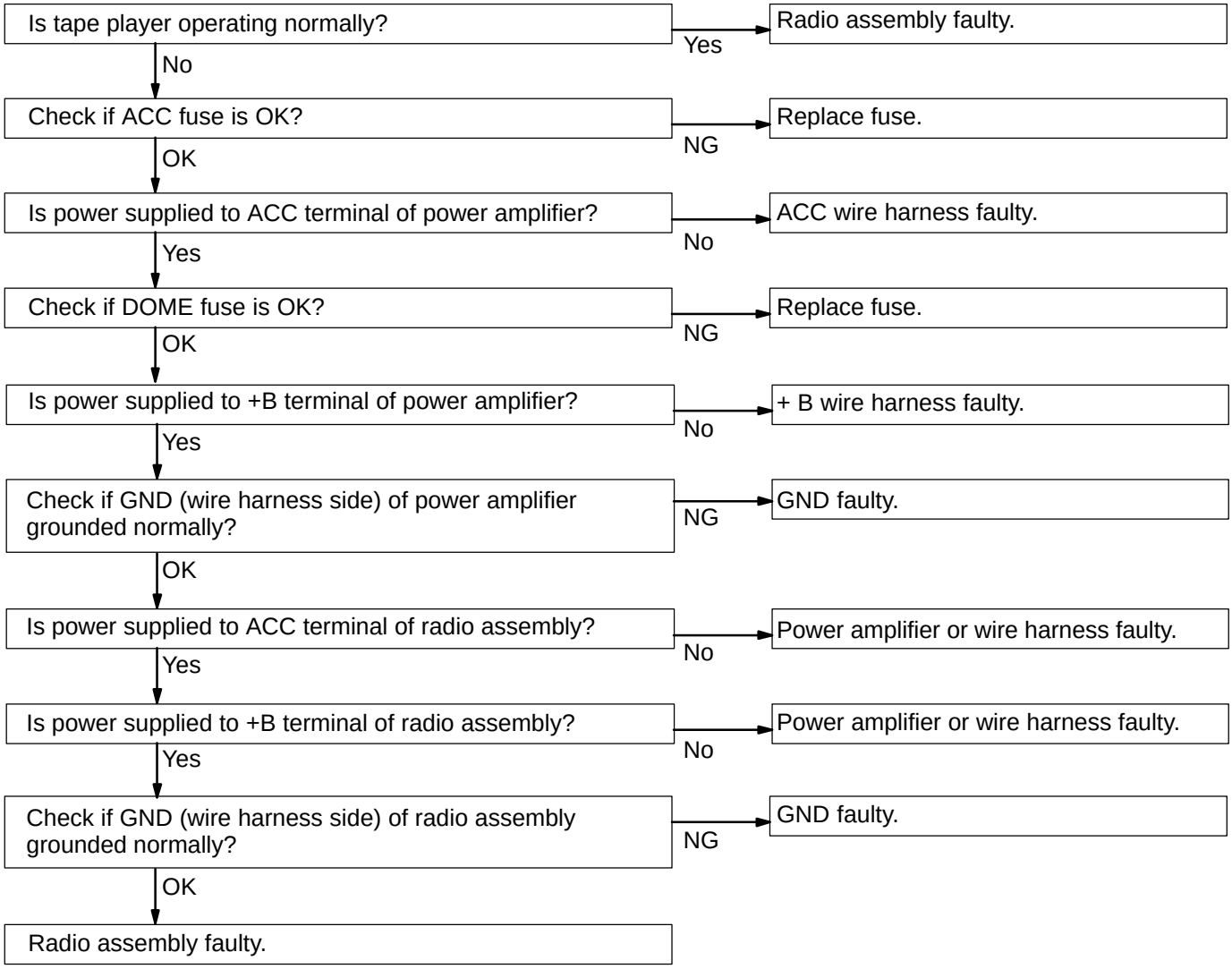
21	CD Player	ANY SPEAKER DOES NOT WORK



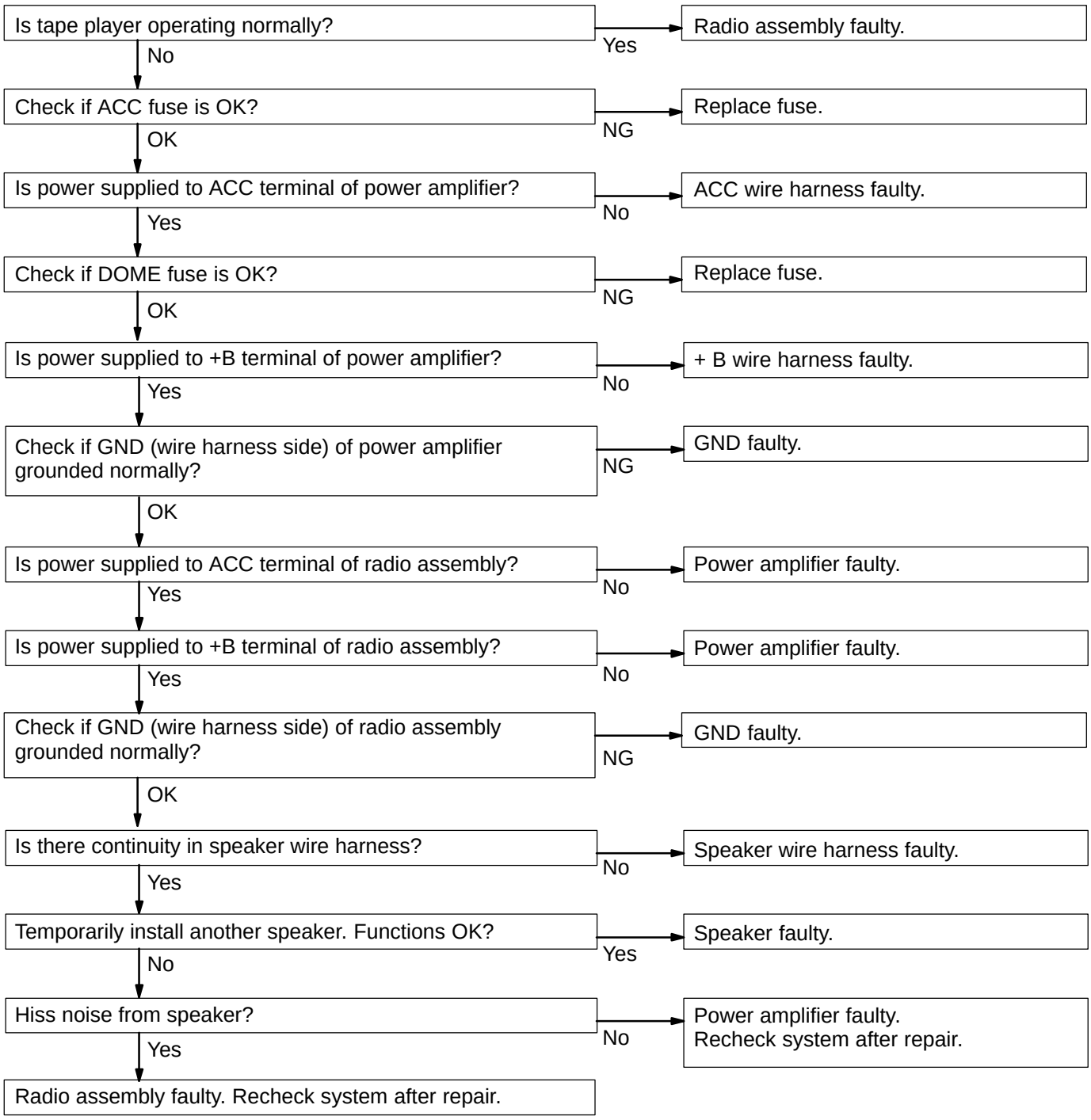
22	CD Player	CD WILL NOT BE EJECTED



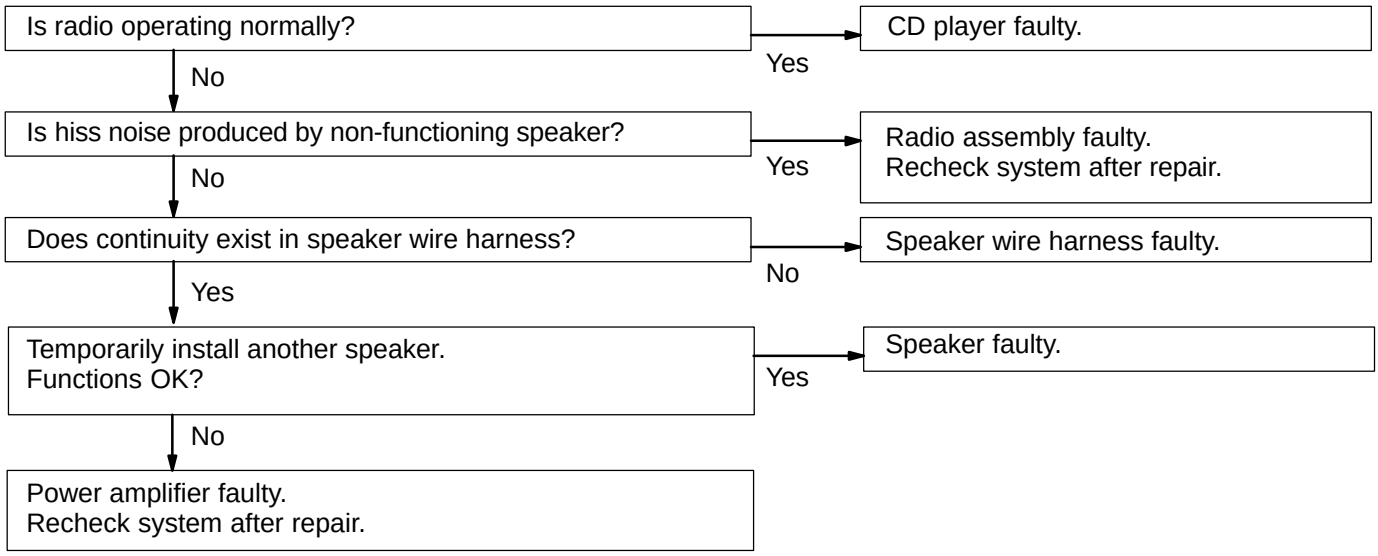
23	**Power Amplifier**	**NO POWER COMING IN**



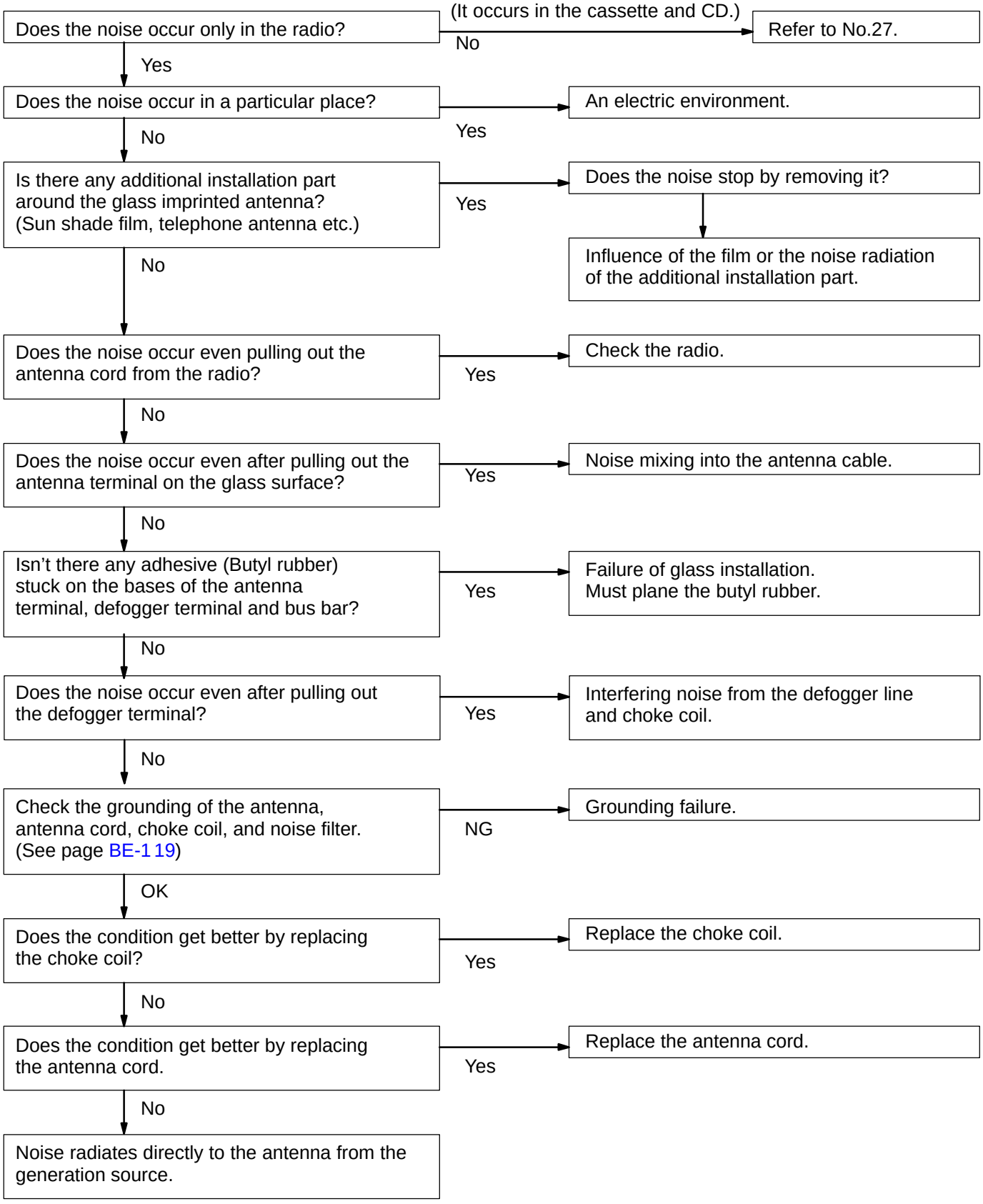
24	Power Amplifier	POWER COMING IN, BUT WOOFER (POWER) AMPLIFIER NOT OPERATING



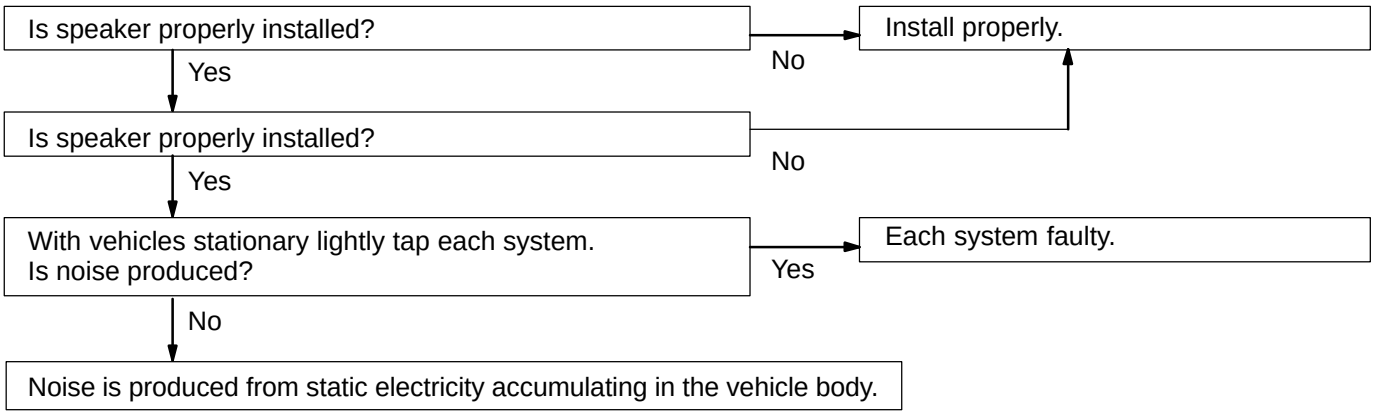
25	Power Amplifier	ANY SPEAKER DOES NOT WORK



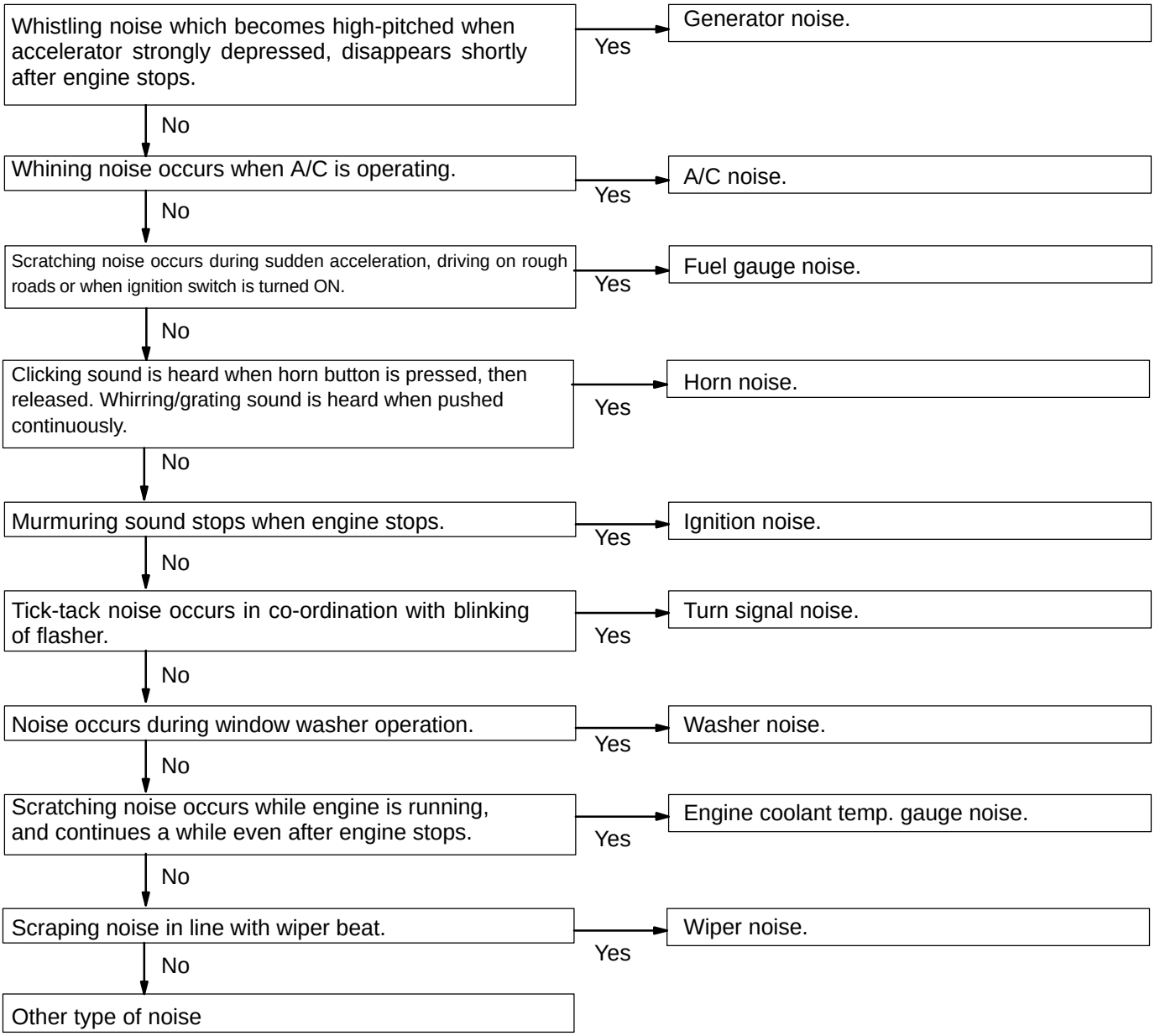
26	Noise	NOISE OCCURS



27	Noise	NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING

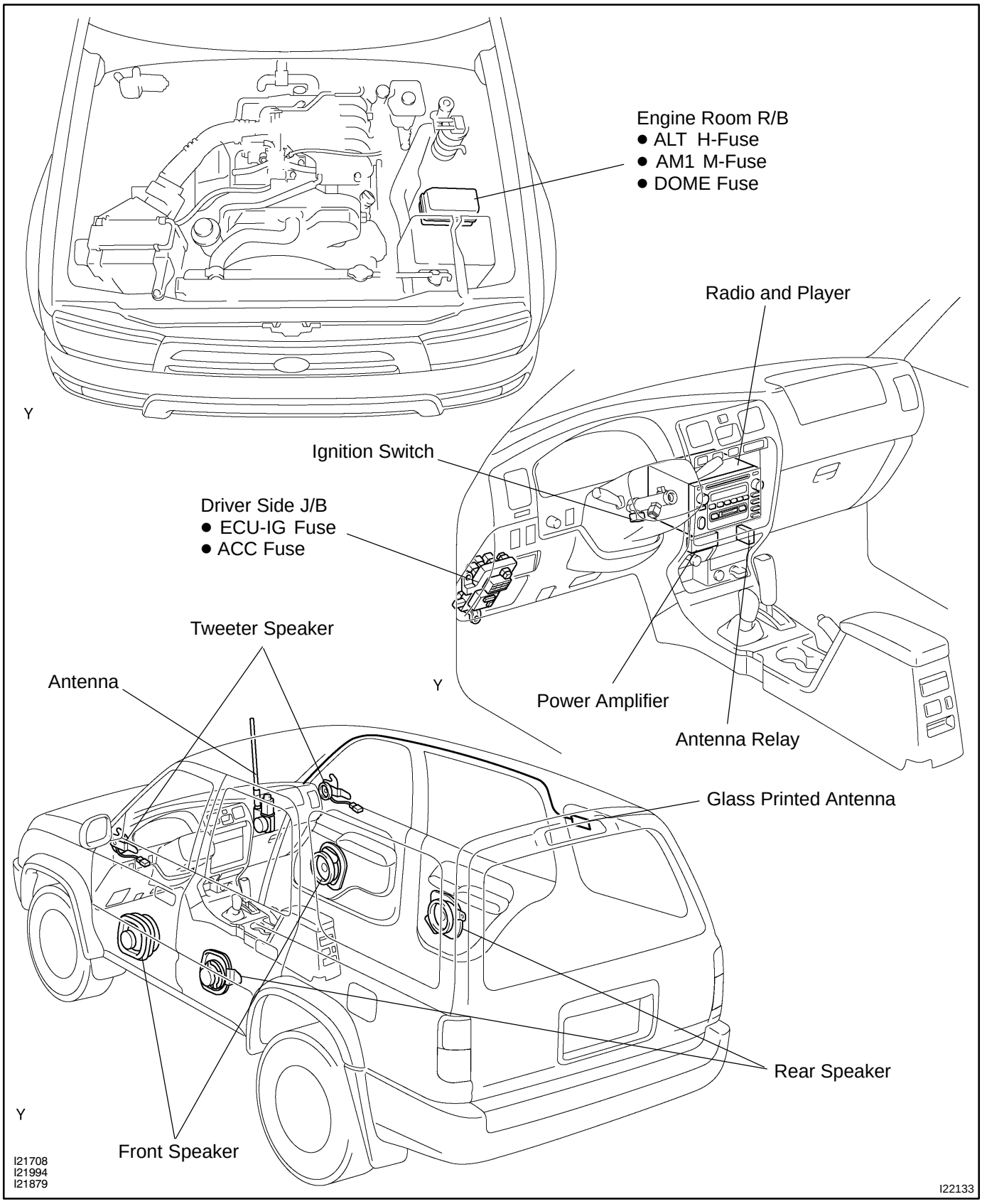


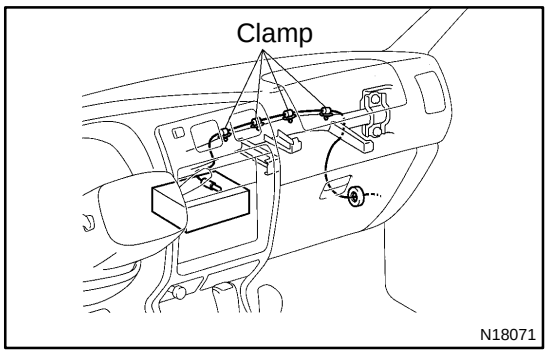
28	Noise	NOISE PRODUCED WHEN ENGINE STARTS



BE07E-03

LOCATION





ANTENNA

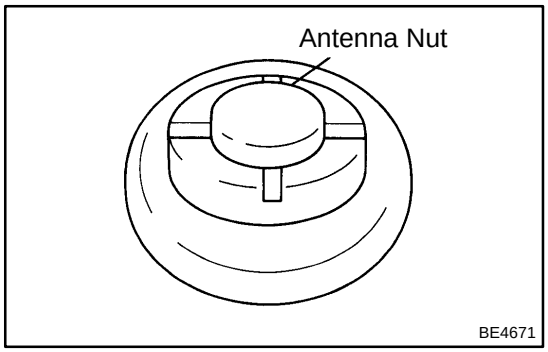
BE07F-02

REMOVAL

1. DISCONNECT ANTENNA CABLE

(a) Remove the radio and disconnect the antenna cable.

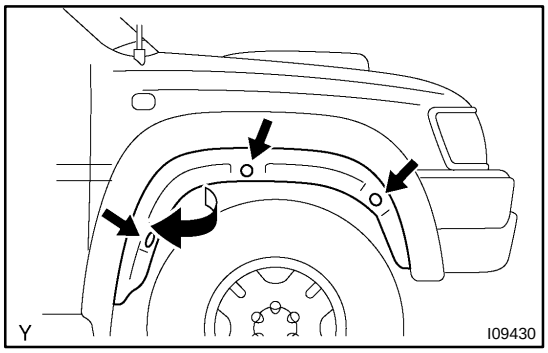
(b) Disconnect the antenna cable from the 4 clamps.



2. REMOVE ANTENNA NUT AND ORNAMENT

3. w/o Wheel Opening Extension:
REMOVE FENDER LINER

Remove the clips and fender liner.



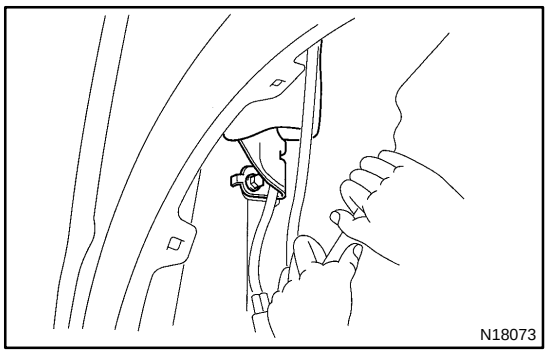
4. w/ Wheel Opening Extension:
REMOVE FENDER LINER

(a) Remove the 3 clips.

(b) Pull the fender liner.

HINT:

The following operations should be done by 2 persons.



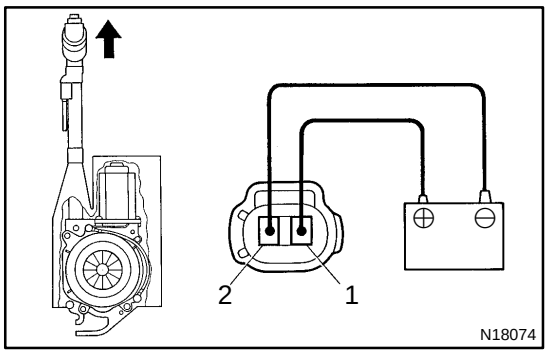
5. REMOVE ANTENNA ASSEMBLY

(a) Auto Antenna models:
Disconnect the connector.

(b) Remove the bolt and antenna assembly.

BE07G-03

INSPECTION



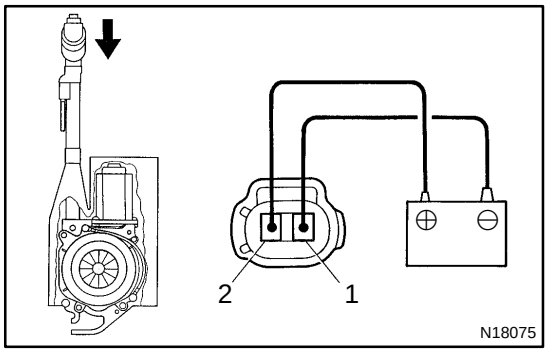
1. Auto Antenna Models:
INSPECT ANTENNA MOTOR

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.

(b) Check that the motor turns (moves upward).

NOTICE:

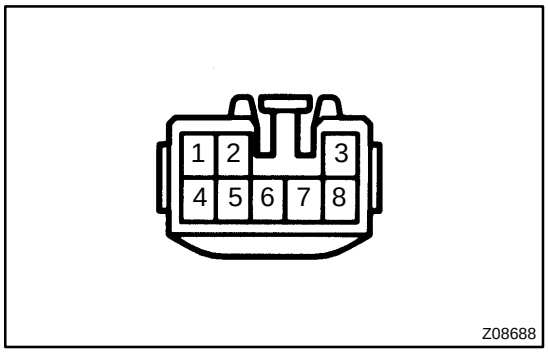
These tests must be done quickly (within 3 - 5 seconds) to prevent the coil from burning out.



(c) Reverse the polarity, then check that the motor turns the opposite way (moves downward).

NOTICE:

These tests must be done quickly (within 3 - 5 seconds) to prevent the coil from burning out.



2. Auto Antenna Models:
INSPECT ANTENNA MOTOR CONTROL RELAY CIRCUIT

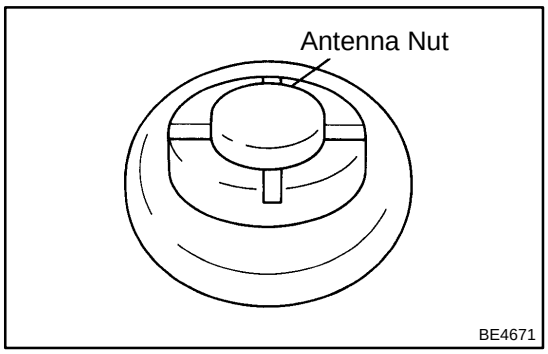
Disconnect the connector from the relay and inspect the connector on wire harness side, as shown in the chart below.

Tester connection	Condition	Specified condition
1 - Ground	Constant	Battery positive voltage
2 - 3	Constant	Continuity
4 - Ground	Ignition switch position LOCK or ACC	No voltage
	Ignition switch position ON	Battery positive voltage
5 - Ground	Ignition switch position LOCK	No voltage
	Ignition switch position ACC or ON	Battery positive voltage
6 - Ground	Constant	Continuity
7 - Ground	Radio switch and cassette OFF	No voltage
	Radio switch or cassette ON	Battery positive voltage
8 - Ground	Ignition switch position LOCK	No voltage
	Radio switch OFF or cassette ON	No voltage
	Radio switch ON and cassette OFF	Battery positive voltage

If the circuit is as specified, replace the relay.

BE07H-01

REPLACEMENT



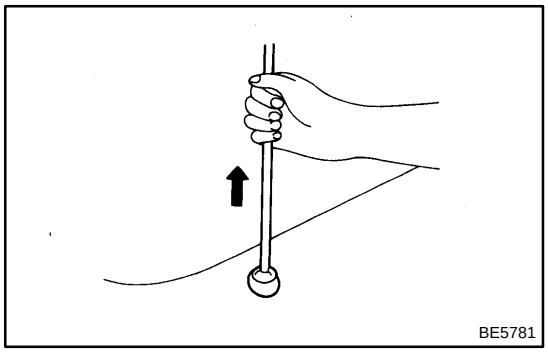
1. Auto Antenna Models:
REMOVE ANTENNA ROD

HINT:

Do this operation with the battery negative (-) cable connected to the battery terminal.

(a) Turn the ignition switch to ”LOCK” position.

(b) Remove the antenna nut.



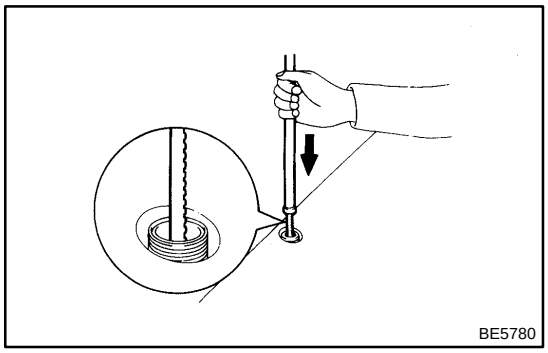
(c) Press the ”AM, FM” buttons on the radio receiver, and simultaneously turn the ignition switch to ”ACC” position.

HINT:

- The rod will be extended fully and be released form the motor antenna.
- After removing the antenna rod, leave the ignition switch ”ACC”.

NOTICE:

To prevent body damage when the antenna rod is released, hold the rod while it comes out.



2. Auto Antenna Models:
INSTALL ANTENNA ROD

(a) Insert the cable of the rod until it reaches the bottom.

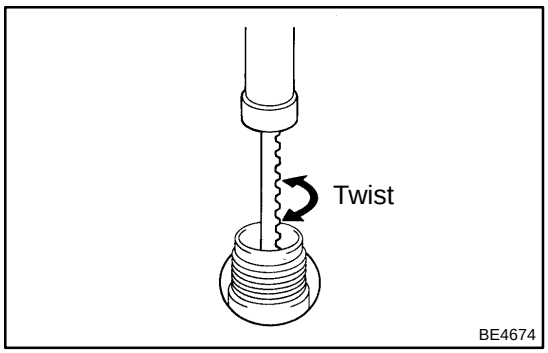
HINT:

- When inserting the cable, the teeth on the cable must face toward the rear of the vehicle.
- Insert the antenna by approx. 300 mm (11.8 in.).

(b) Wind the cable to retract the rod by turning the ignition switch to ”LOCK” position.

HINT:

- If the ignition switch is already in ”LOCK” position, do step 1 (c) first, then turn the ignition switch to ”ACC” position.
- In case the cable is not wound, twist it, as shown in the illustration.
- Even if the rod has not retracted fully, install the antenna nut and inspect the antenna rod operation. It will finally retract fully.



(c) Inspect the antenna rod operation by pushing the radio wave band select buttons.

BE07I-01

INSTALLATION

Installation is in the reverse order of removal (See page BE-153).

CLOCK

TROUBLESHOOTING

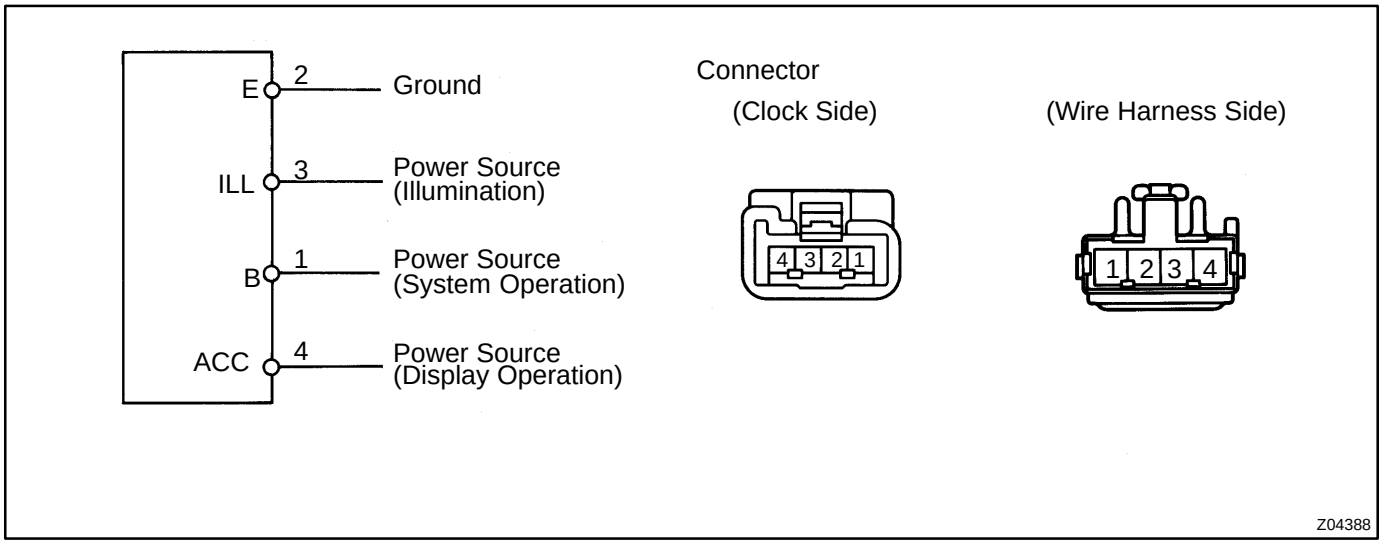
BE07J-01

HINT:

Troubleshoot the clock according to the table below.

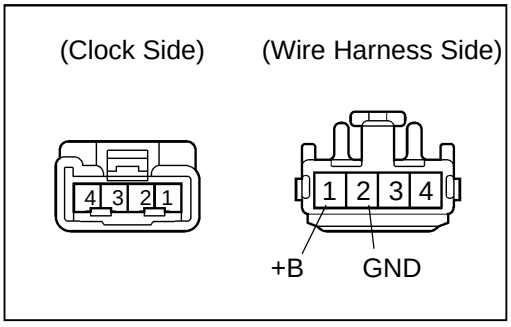
Clock will not operate	1
Clock loses or gains time	2

± 1.5 seconds/day



1. PROBLEM NO.1

1	**CLOCK WILL NOT OPERATE**



(a) Check that the battery positive voltage is 10 -14 V.
If the voltage is not as specified, replace the battery.

(b) Check that the DOME fuse is not blown.
If the fuse is blown, replace the fuse and check for short.

(c) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there battery voltage between terminal +B and body ground?
- No → Open or short circuit in wire harness between terminal +B and DOME fuse.
- Yes ↓

Is there continuity between terminal GND and body ground?
- No → Open circuit in wire harness between terminal GND and body ground.
- Yes ↓

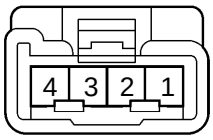
Replace clock.

I01417

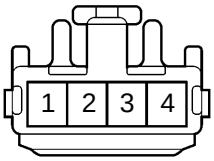
2. PROBLEM NO.2

2	**CLOCK LOSES OR GAINS TIME**

(Clock Side)



(Wire Harness Side)



(a) Check that the battery positive voltage is 10-16 V.
If the voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.
Allowable error (per day): ± 1.5 sec.
If the error exceeds the allowable error, replace the clock.

(c) Check that the clock adjusting button is sticking in position and has failed to return.
If the button is not returned, repair or replace the clock.

(d) Troubleshoot the clock as follows.
HINT:
Inspect the connector on the wire harness side.

Is there 10 - 16 V between terminal +B and body ground?

Below 10V → Locate cause and repair, or recharge battery.

Yes ↓

Adjust or replace clock.

I01418

GARAGE DOOR OPENER SYSTEM

BE0TY-03

REGISTRATION PROCEDURE

1. NEW CODE REGISTRATION

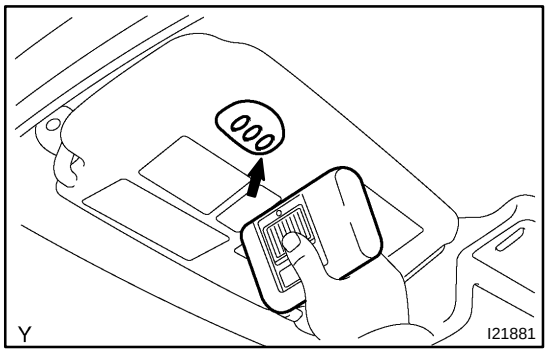
NOTICE:

- **If pressing the switch of the original transmitter to register the code, the system might operate.**
- **When registering the transmitter codes such as for garage or gate, check that there is nobody around those places then register.**

(a) Press the switch for the item to be registered for 20 seconds

HINT:

When transferring to registration mode, LED (red) blinks in 1 Hz cycle.

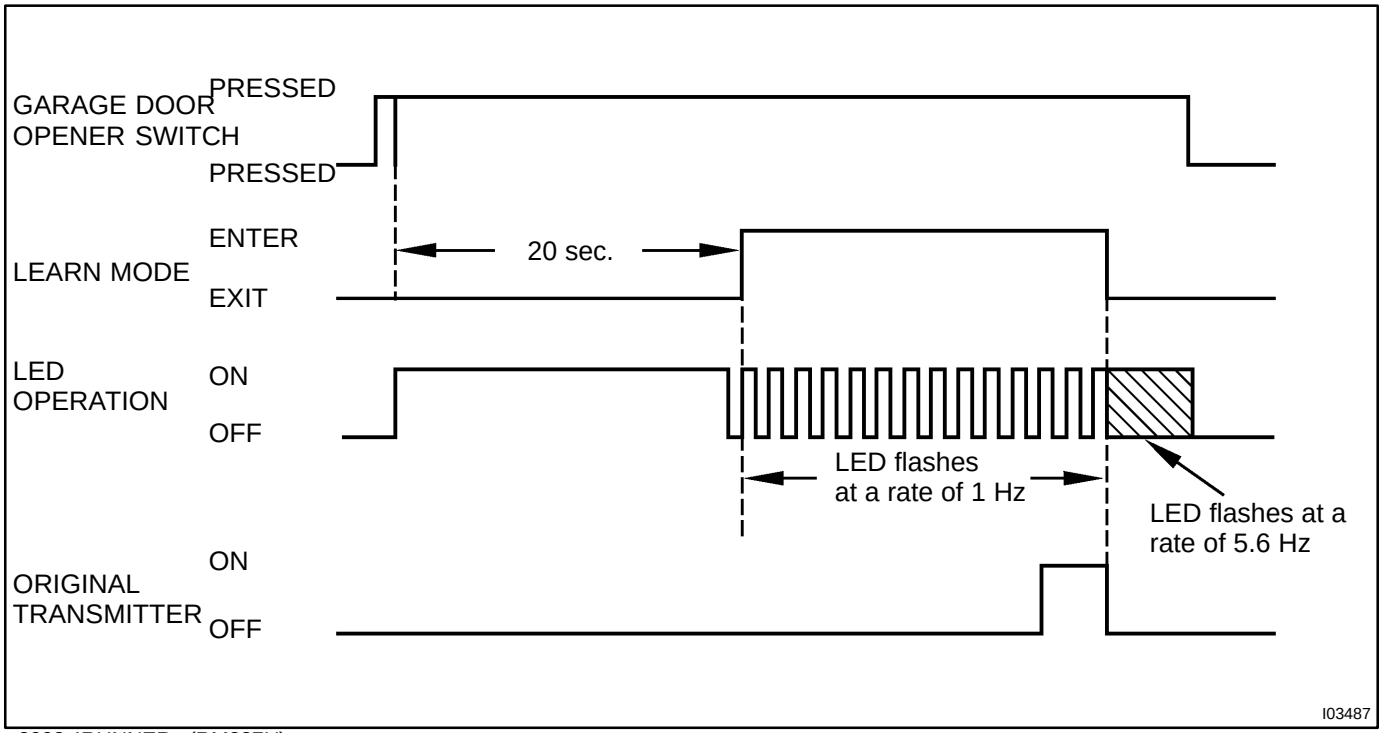


(b) In the condition of (a), bring the original transmitter to within 1-inch area around the garage door opener and press the switch (code transmitting).

HINT:

When code registration completes correctly, LED (red) blinks in 5.6 Hz cycle.

New code registration timing chart



2002 4RUNNER (RM887U)

If a code can not be registered, observe the following conditions.

HINT:

- If the battery of original transmitter is consumed.
- Press the switch of the transmitter repeatedly in registration mode, as some transmitters stop transmitting for 1 to 2 seconds.
- This system is not applicable to the garage door opener which had been made before 1982.

2. CODE DELETION

(a) Press the switches at both ends of garage door opener simultaneously for 20 seconds.

HINT:

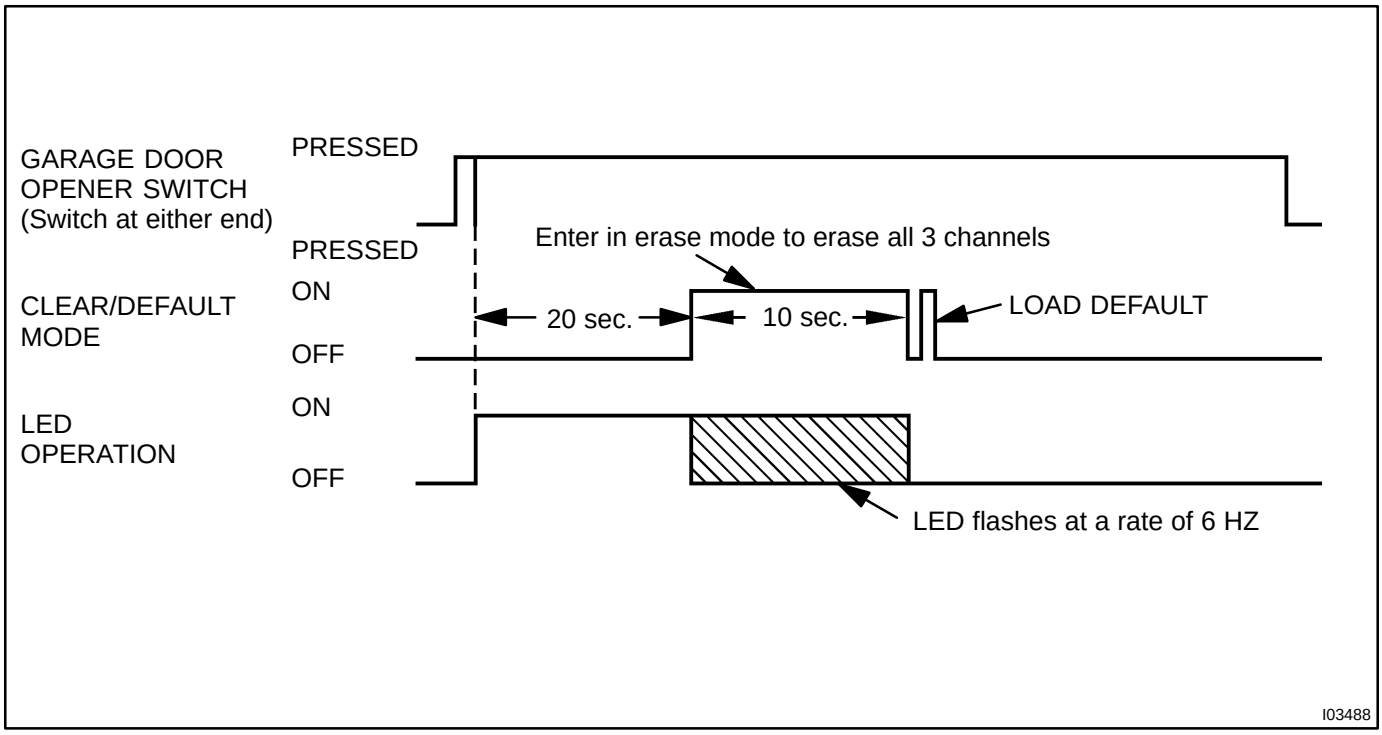
When transferring to deletion mode, LED (red) blinks in 6 Hz cycle.

(b) When releasing the switch within 10 seconds after transferring to deletion mode, all the registered codes will be erased.

HINT:

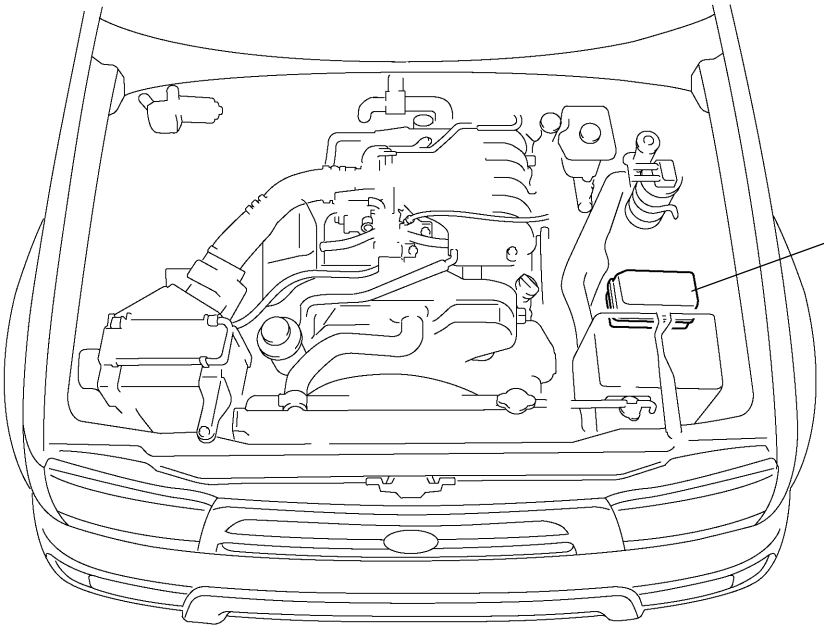
Press the switch until blinking in 6 Hz cycle stops, so that the default code for check is set.

Code deletion timing chart



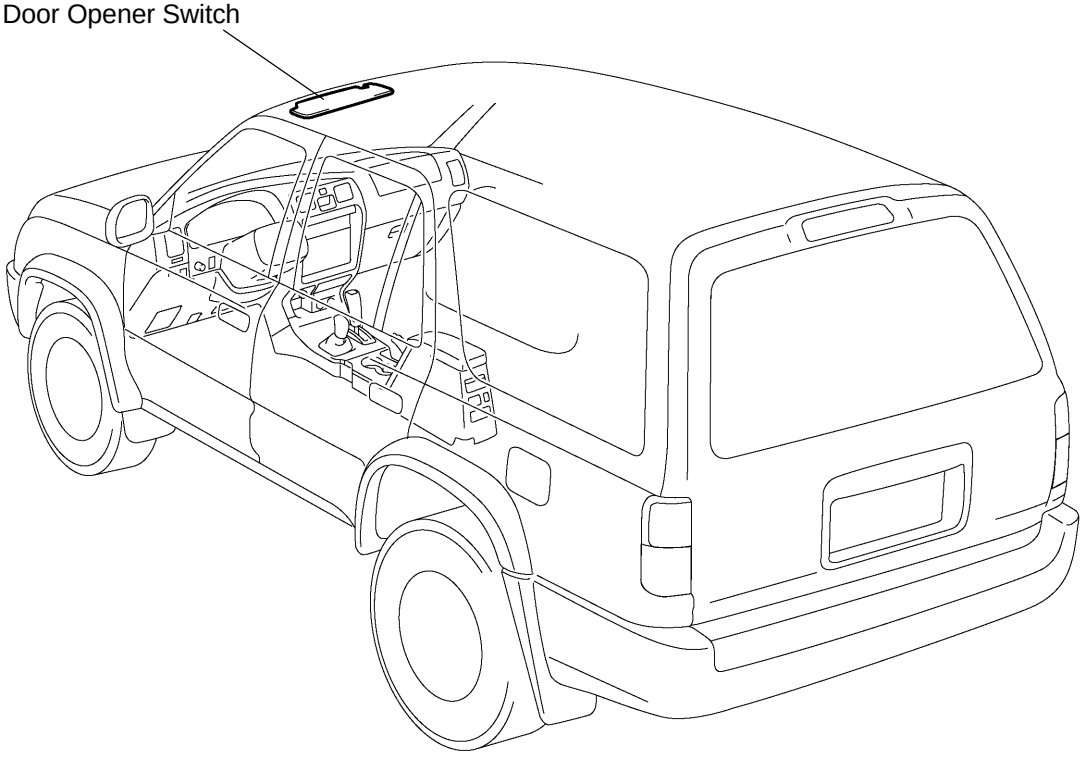
BE0TZ-05

LOCATION



Y

LH Sun Visor
● Garage Door Opener Switch



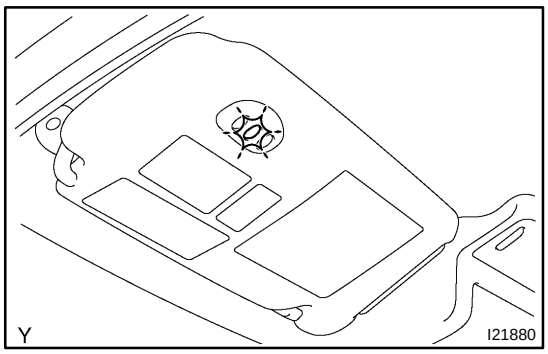
Y

I21708
I21855

I22015

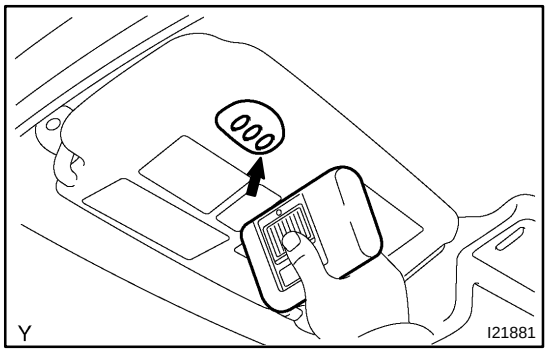
BE0U0-03

INSPECTION



1. INSPECT GARAGE DOOR OPENER SWITCH

Press the switch and check that each LED (red) lights up.
Even if only one switch is found not to light up, replace it.



2. INSPECT GARAGE DOOR OPENER REGISTRATION AND TRANSMITTING

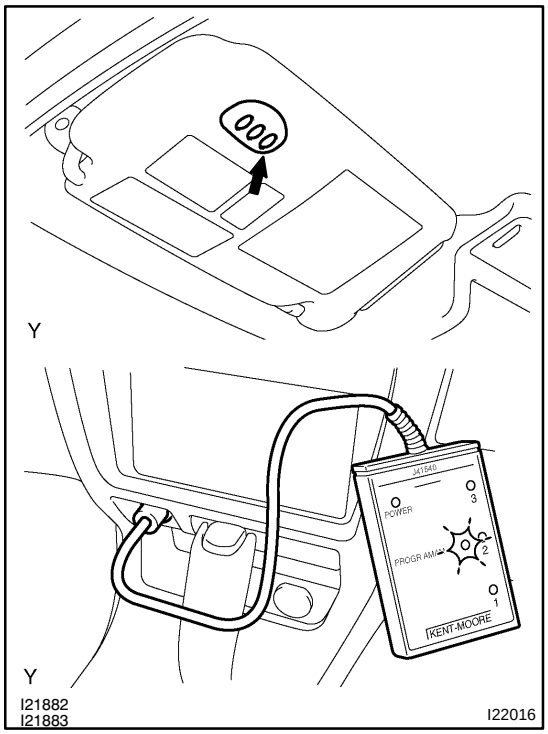
HINT:
Use the home link tester made by KENT MOORE for this test. As it is necessary to record the code of the hand held transmitter, customer's code will be erased. When the inspection completes, please register the customer's again.

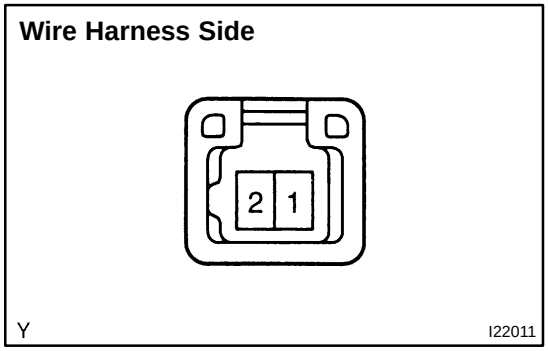
(a) Check that the code of hand held transmitter for inspection can be recorded (See page BE-159).

If the code can not be registered, replace garage door opener.

(b) Press the switch which an inspection code has been registered for and check that LED (green) of the home link tester lights up.

If the LED (green) does not light up, replace the garage door opener.





3. INSPECT GARAGE DOOR OPENER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
1 - Ground	Constant	Continuity
2 - Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the power source or wire harness.

ENGINE IMMOBILISER SYSTEM

BE11U-04

REGISTRATION PROCEDURE

HINT:

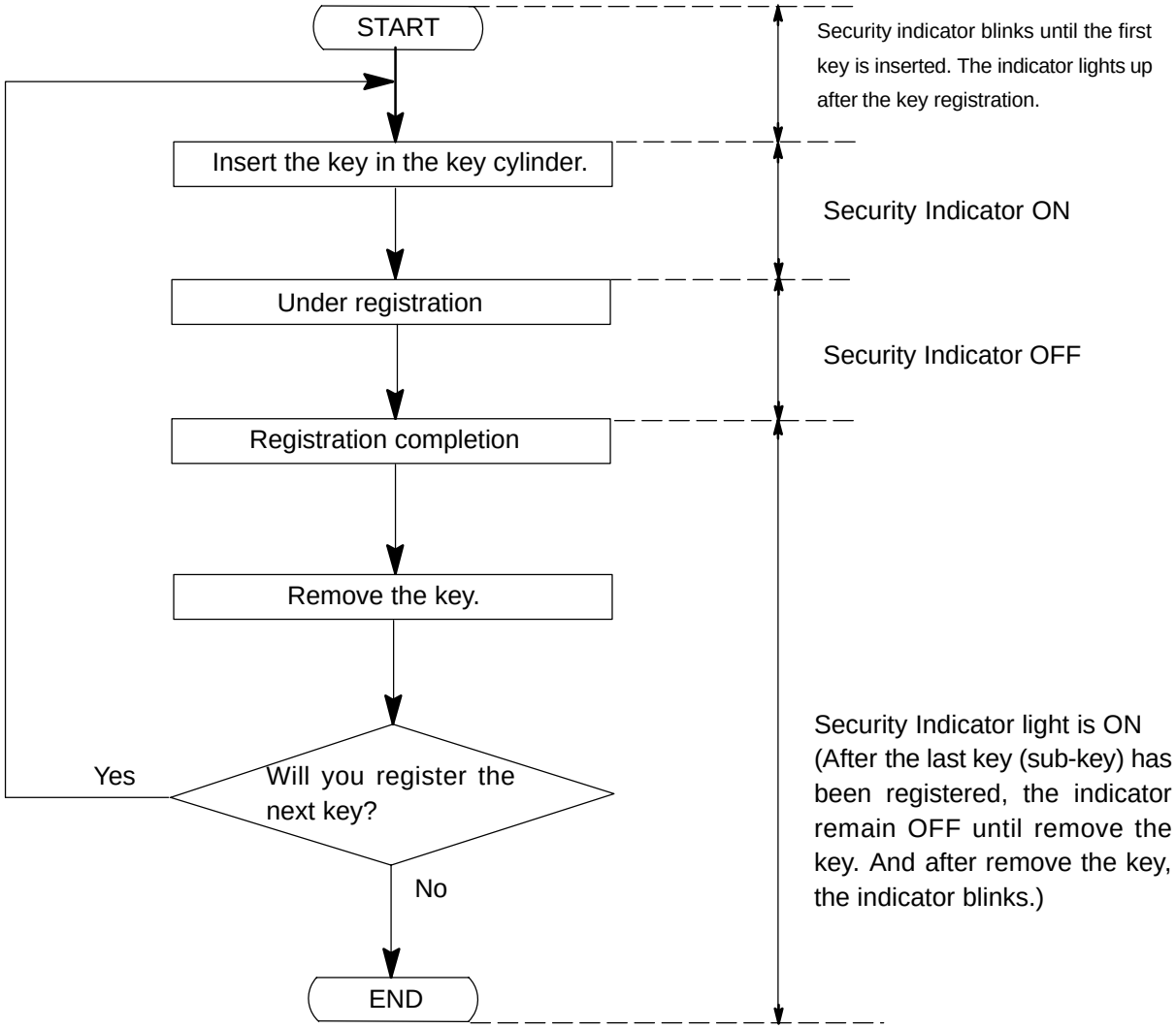
In case of having lost all the already registered master keys, you are not able to do additional registration or deletion. Change the ECM and then must register the new key codes according to the following registration procedure of the automatic registration mode.

1. KEY REGISTRATION IN AUTOMATIC REGISTRATION MODE

(a) Registration of a new transponder key.

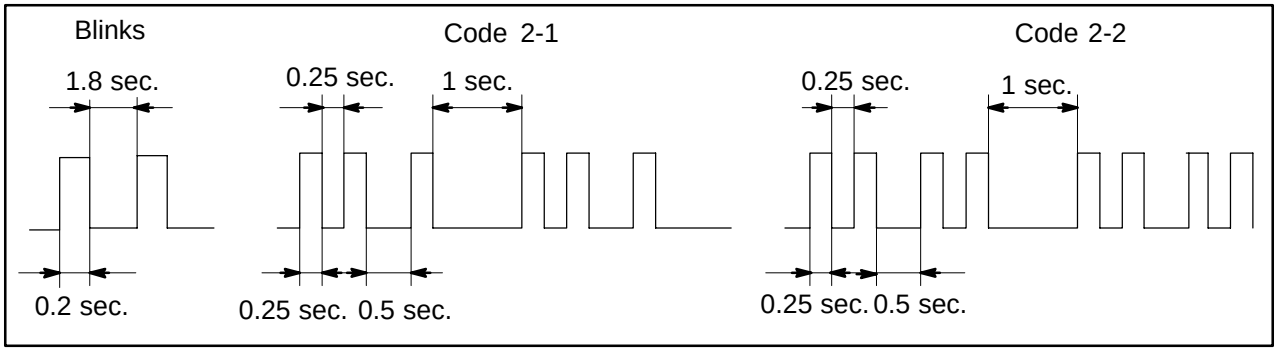
HINT:

- This must be done when you install a new ECM.
- The new ECM is on the automatic key code registration mode. The already fixed number of key codes for this ECM can be registered.
  On this type of vehicle, up to 3 key codes can be registered.
- In the automatic registration mode, the last key registered becomes sub-key.



HINT:

- When a key is not inserted in the key cylinder on the automatic registration mode, the security indicator always lights on.
- When the immobiliser system operates normally and the key is pull out, the security indicator blinks.
- When key code registration could not be performed on the automatic registration mode, code 2-1 is output from the security indicator and when inserting the already registered key, code 2-2 is output.



(b) Automatic registration mode completion

If completing the mode forcibly when more than 1 key code have been registered on the automatic registration mode, perform the following procedures.

After 1 more key code have been registered with master key, perform step (1) or (2) without pulling the key out or inserting the already registered key.

(1) Depress and release brake pedal 5 times or more within 15 sec.

(2) With the hand-held tester, require automatic registration mode completion.

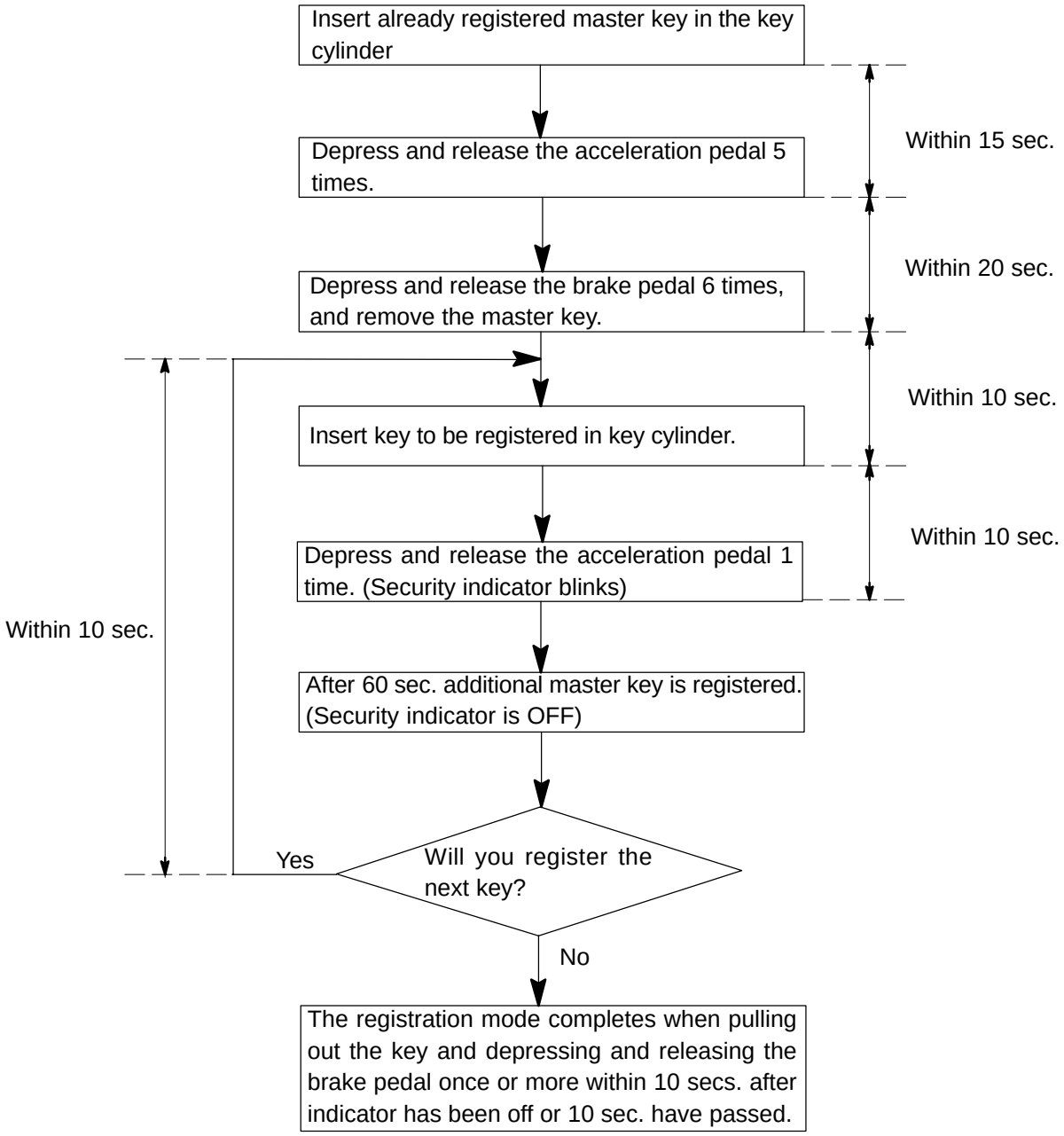
2. REGISTRATION OF ADDITIONAL MASTER KEY

There are 2 ways for registration of additional master key, one way is depressing brake pedal and acceleration pedal and the other way is using hand-held tester.

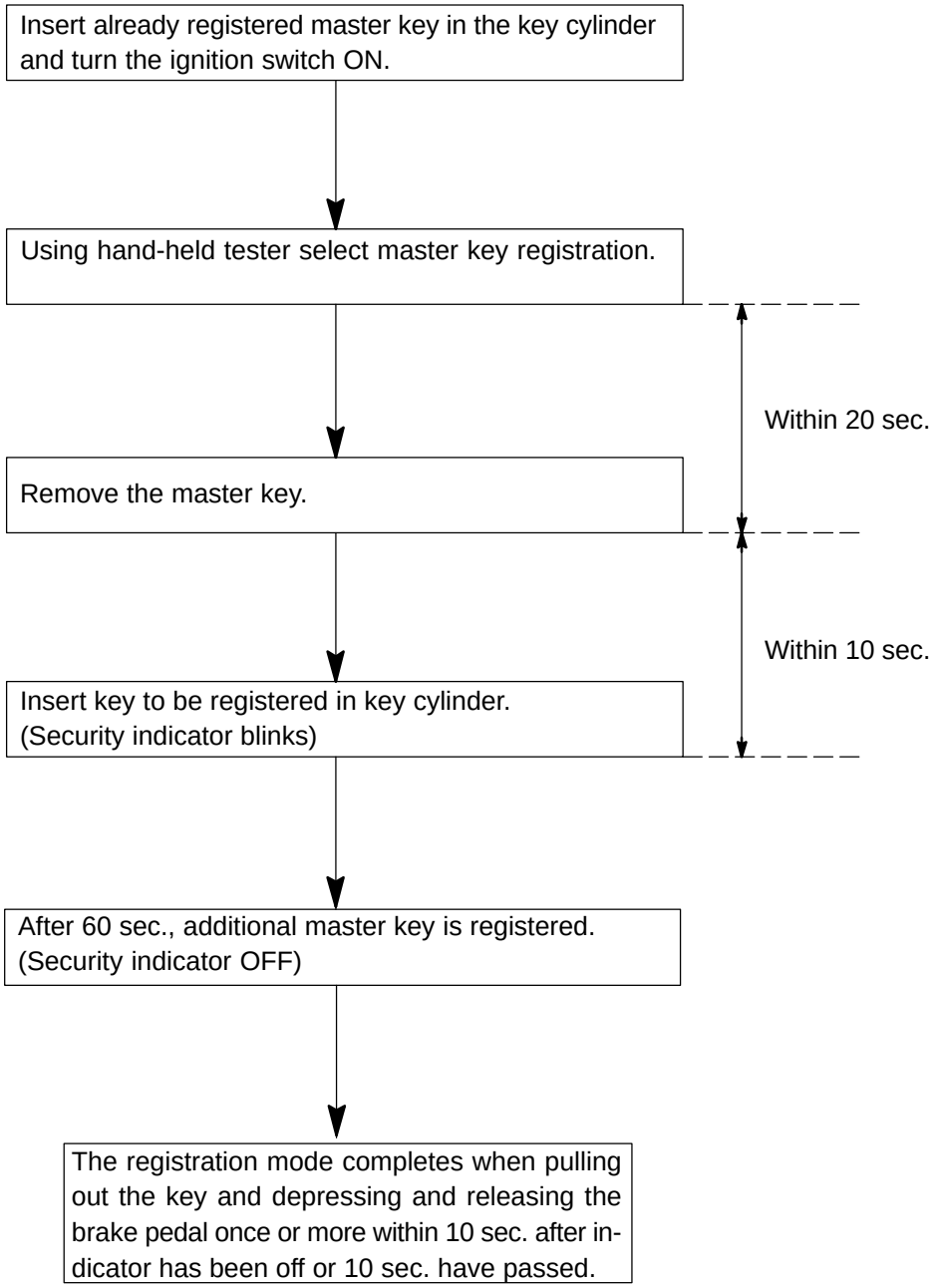
HINT:

- It is possible to register up to 7 master key codes including the already registered key code.
- When any operation time described below is over, registration mode completes.
- When the next procedure is performed while the timer is working, the timer completes counting time, then next timer starts.
- When replacing ”Ignition Cylinder Key Set” or ”Lock Cylinder Set” and register according to the following procedure using the original master key. However, after the registration of the additional master key, as the original master key and the original sub-key is not necessary any more, so erase registration of those key codes.

(1) Depressing brake pedal and acceleration pedal:



(2) Using hand-held tester:



HINT:
Please follow the screen of the hand-held tester for more detailed procedure.

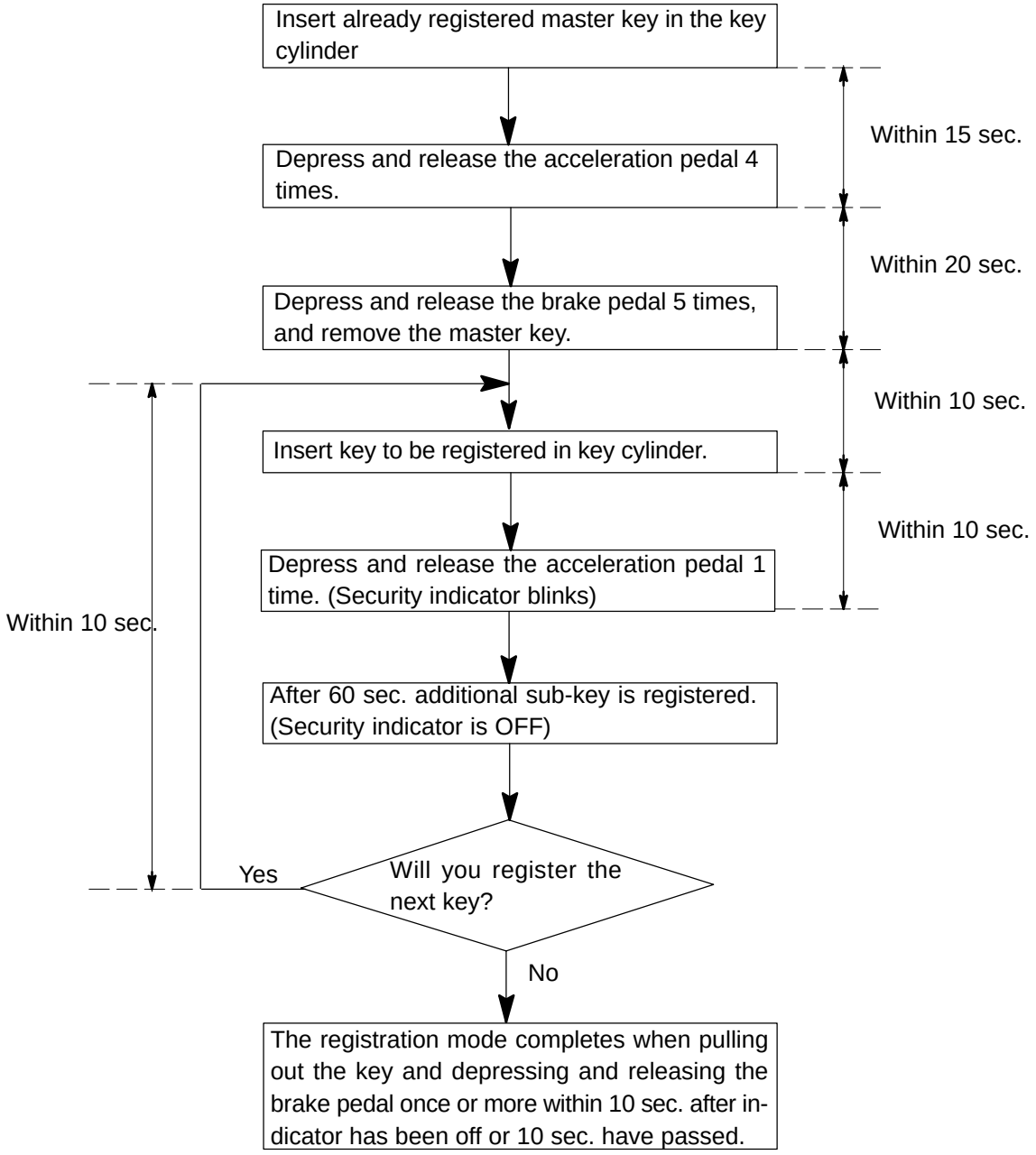
3. REGISTRATION OF ADDITIONAL SUB-KEY

There are 2 ways for registration of additional sub-key, one way is depressing brake pedal and acceleration pedal and the other way is using hand-held tester.

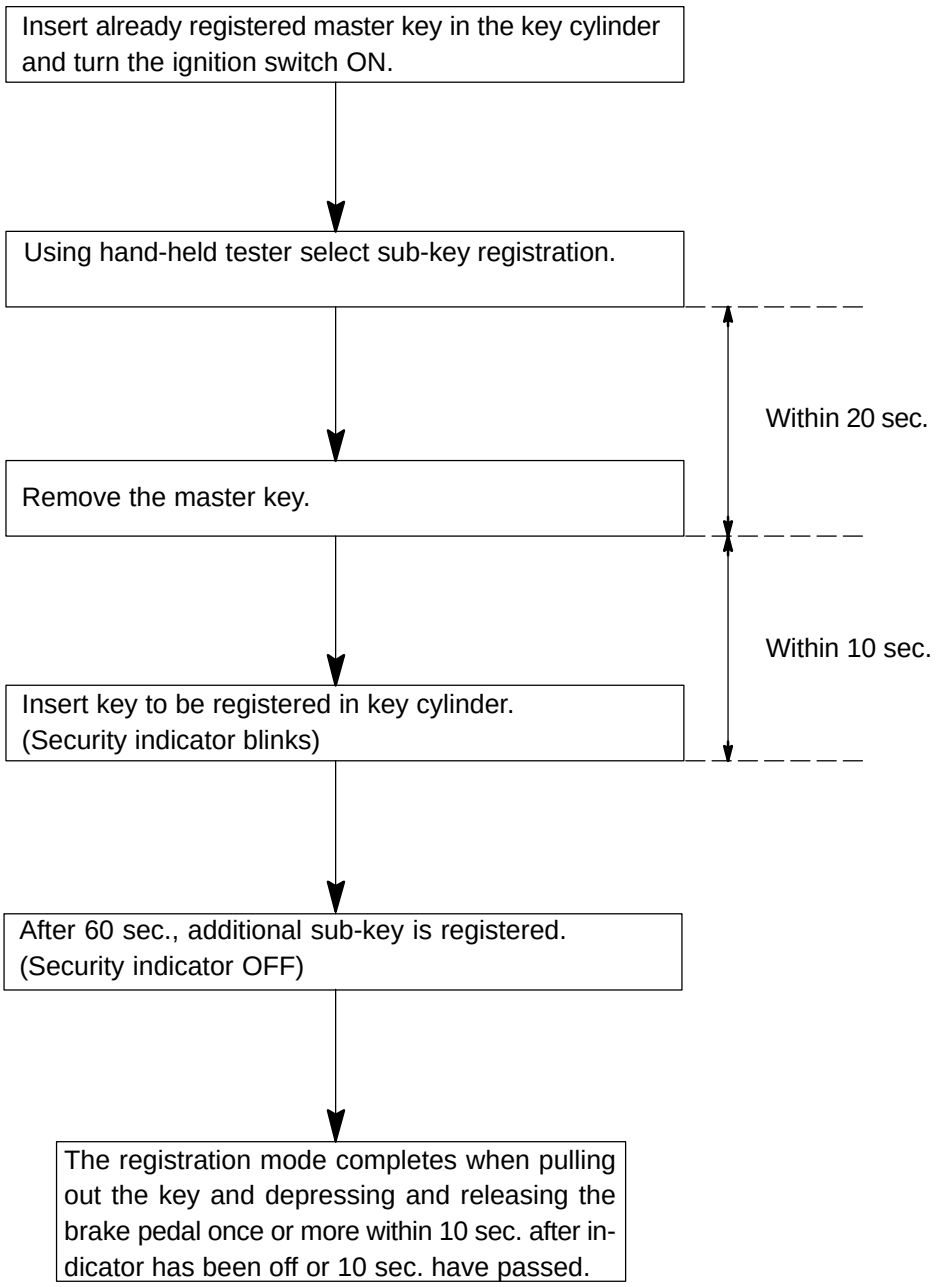
HINT:

- It is possible to register up to 3 sub-key codes including the already registered key code.
- When any operation time described below is over, registration mode completes.
- When the next procedure is performed while the timer is working, the timer completes counting time, then next timer starts.

(1) Depressing brake pedal and acceleration pedal:



(2) Using hand-held tester:



HINT:
Please follow the screen of the hand-held tester for more detailed procedure.

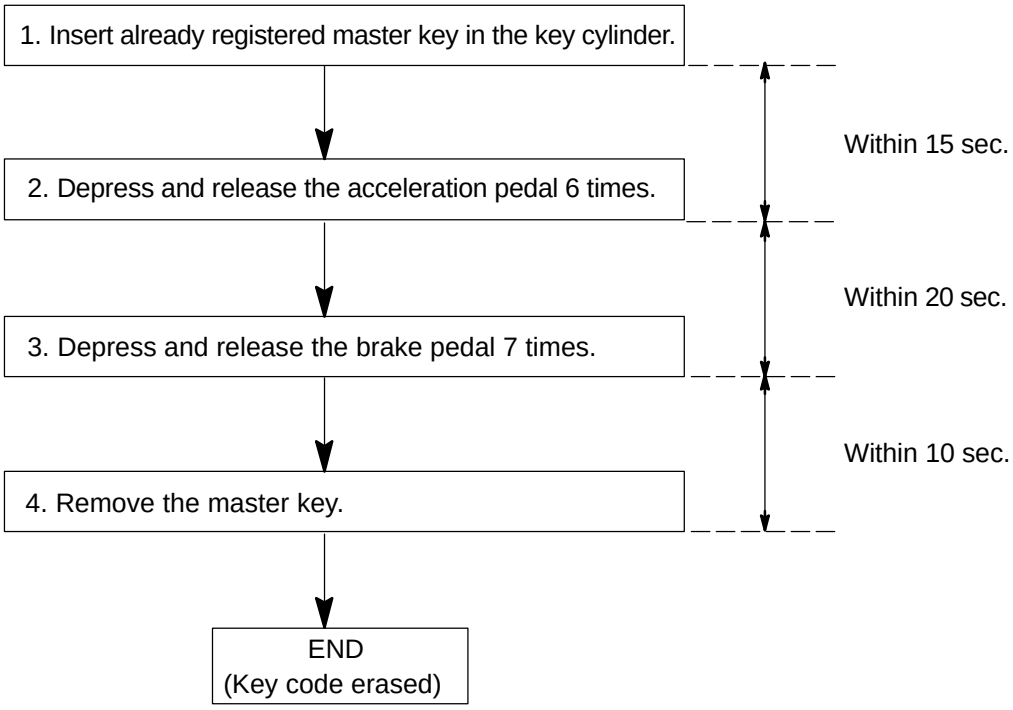
4. ERASURE OF TRANSPONDER KEY CODE

There are 2 ways for erasure of transponder key code, one way is depressing brake pedal and acceleration pedal and the other way is using hand-held tester.

HINT:

- Delete all other master and sub-key codes leaving the master key code to use the operation. When using the key which was used before deletion, it is necessary to register the code again.
- When any operation time described below is over, registration mode completes.
- When the next procedure is performed while the timer is working, the timer completes counting time, then next timer starts.

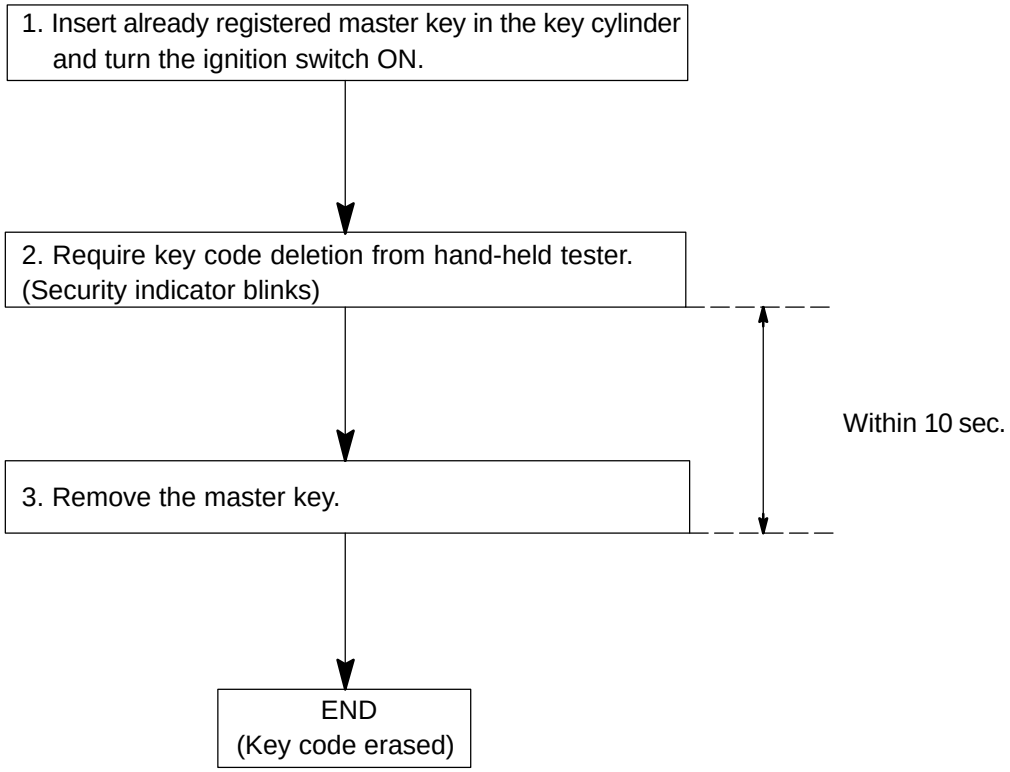
(1) Depressing brake pedal and acceleration pedal:



HINT:

When the key cannot be pulled out in the step 4, key code deletion is canceled.

(2) Using hand-held tester:

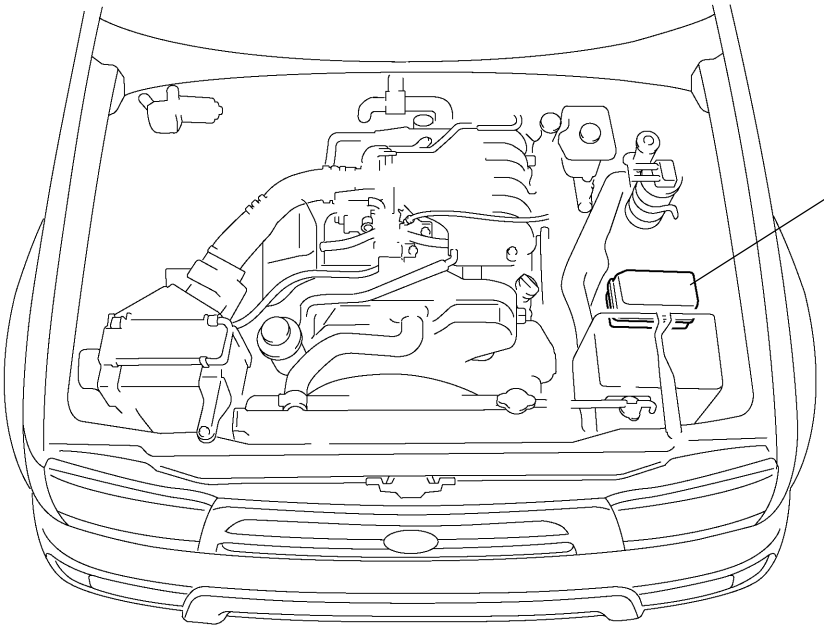


HINT:

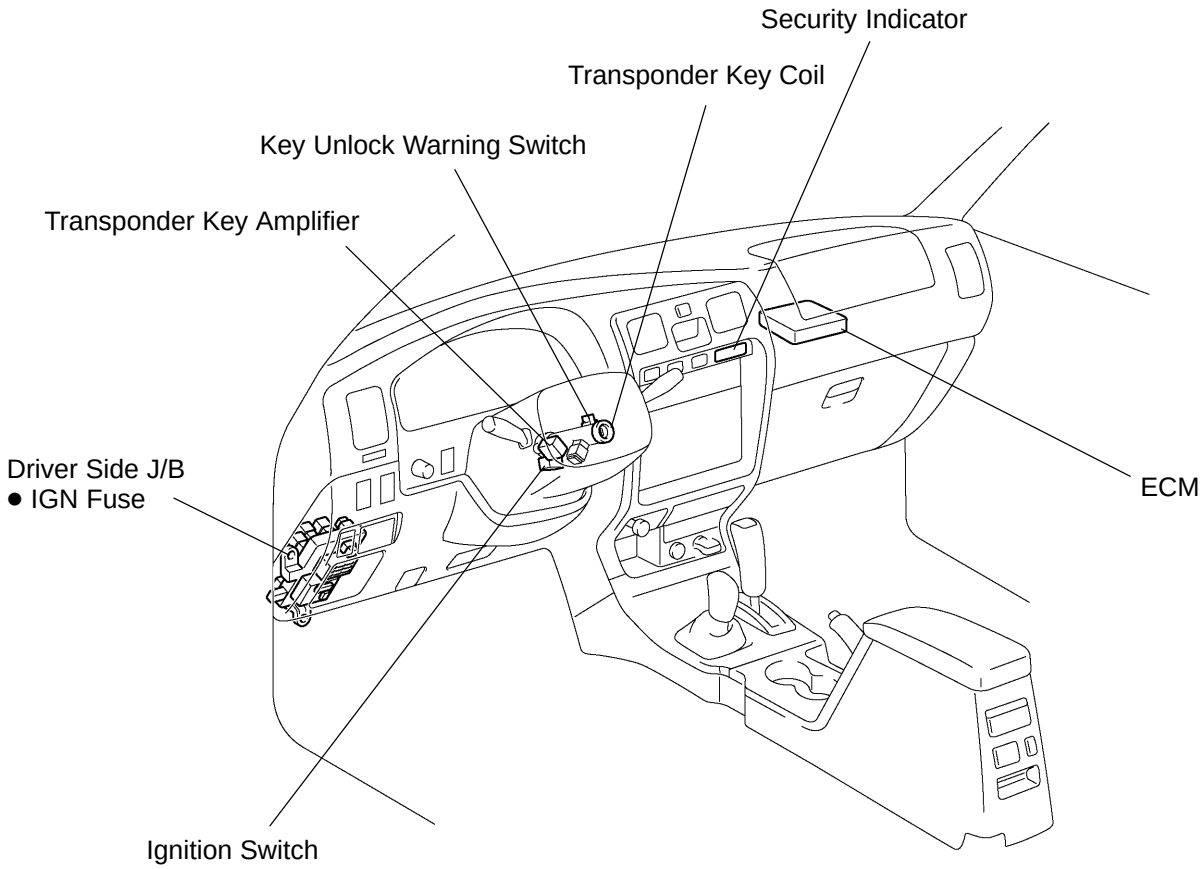
- When the key cannot be pulled out in step 3, key code deletion is canceled. (Security indicator is OFF.)
- Please follow the screen of the hand-held tester for more detailed procedure.

BE0D8-06

LOCATION



Y

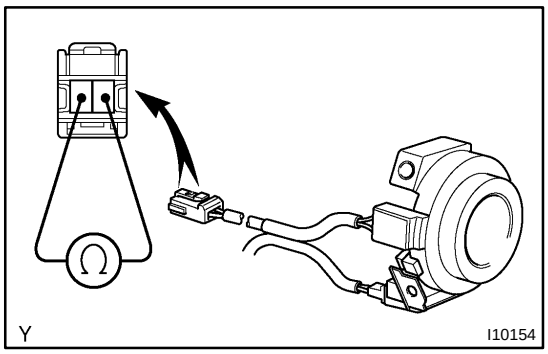


Y

I21708
I21844

I22132

BE0D9-03



INSPECTION

INSPECTION TRANSPONDER KEY COIL CONTINUITY

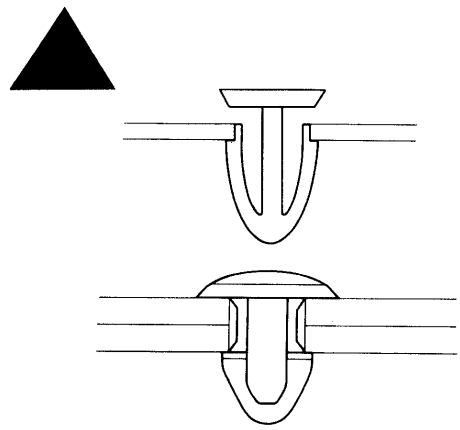
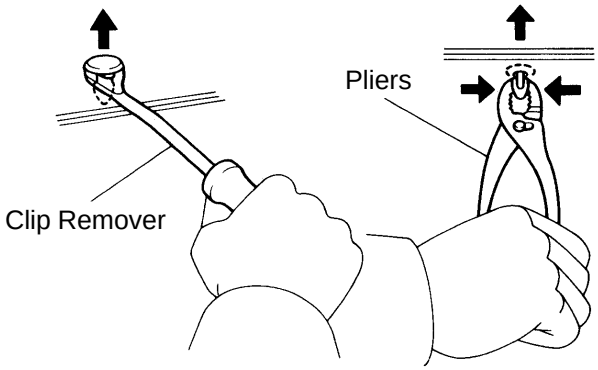
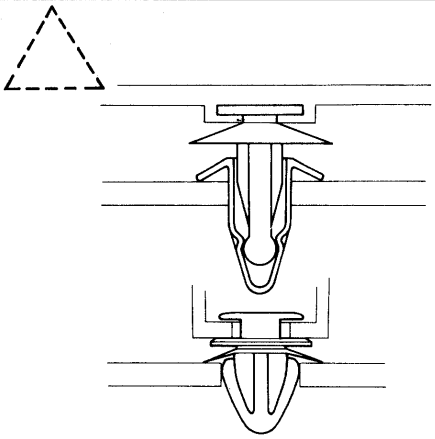
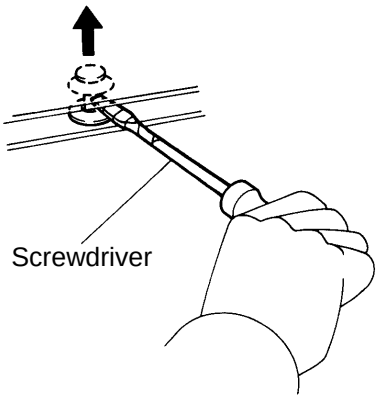
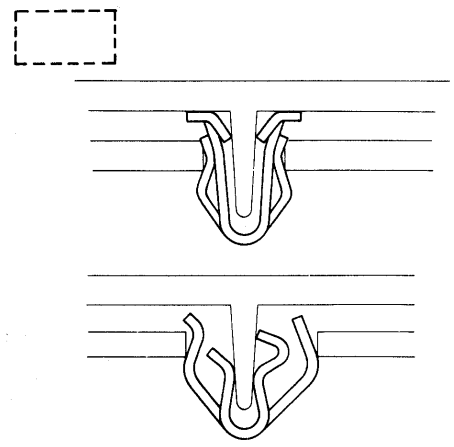
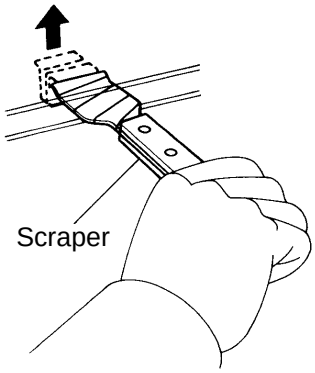
Check that there is continuity between the terminals.
If the continuity is not as specified, replace the coil.

CLIP

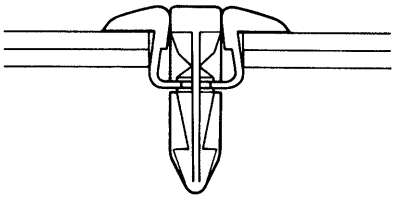
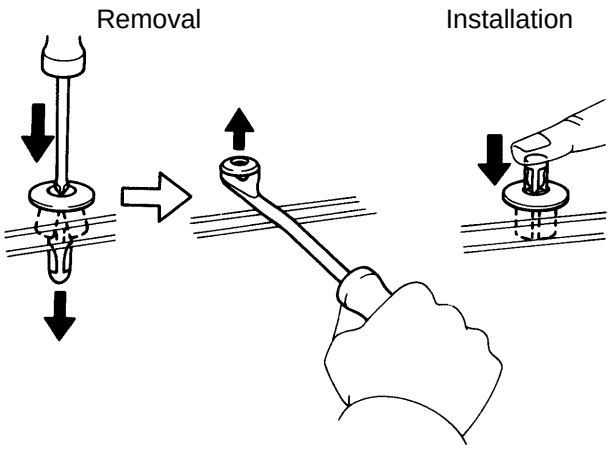
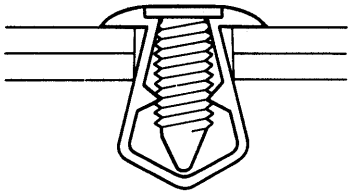
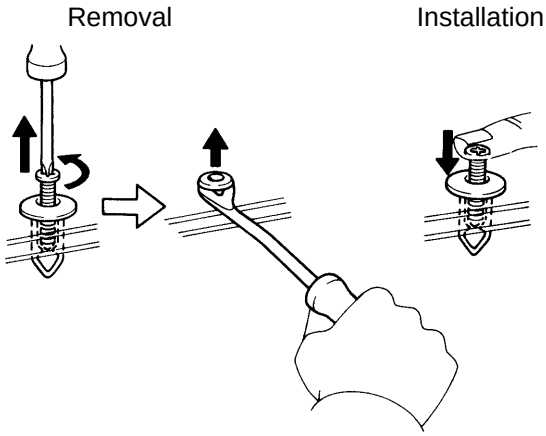
BO0BJ-02

REPLACEMENT

The removal and installation methods of typical clips used in body parts are shown in the table below.
HINT:
If the clip is damaged during the operation, always replace it with a new clip.

Shape (Example)	Removal/Installation
	
	
	

V00005

Shape (Example)	Removal/Installation
	
	

V00012

SRS AIRBAG

BO0BK-02

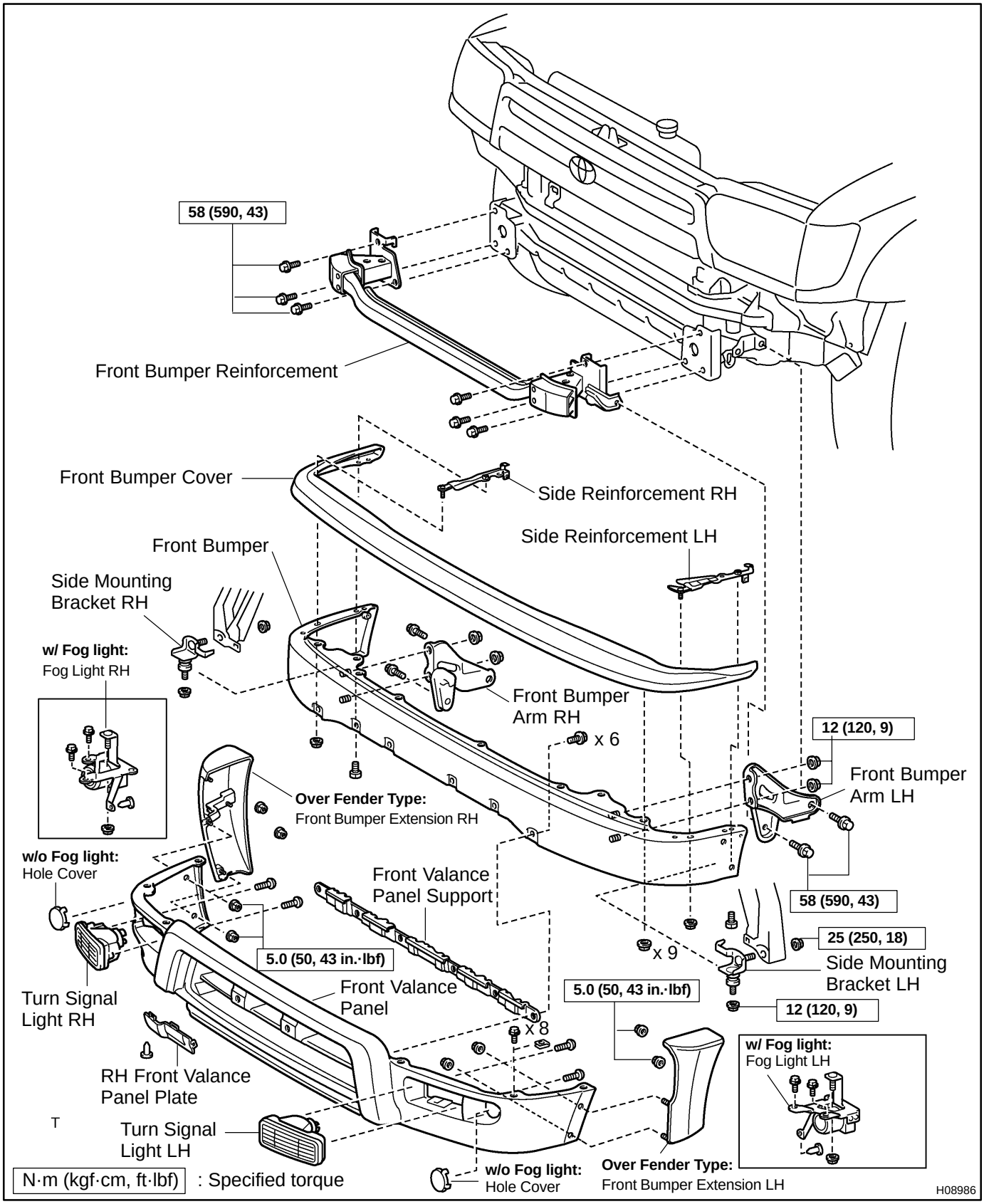
PRECAUTION

The 4 RUNNER is equipped with an SRS (Supplemental Restraint System) such as the driver airbag and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices in the RS section.

FRONT BUMPER

COMPONENTS

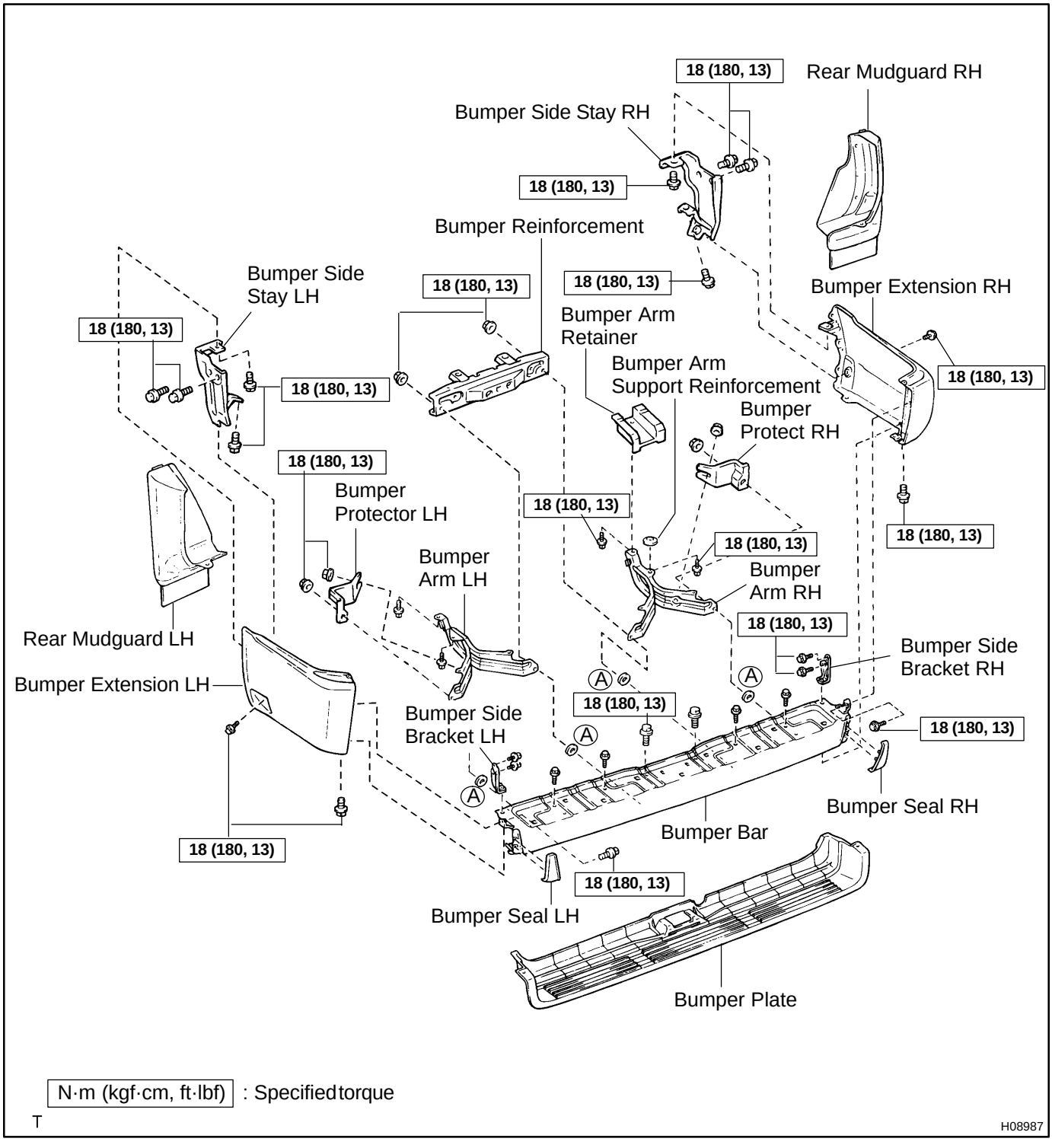
BO0BL-02



REAR BUMPER

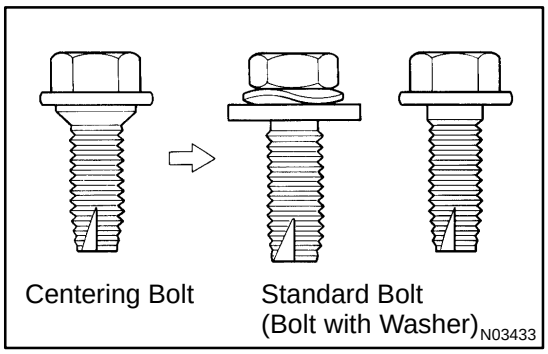
COMPONENTS

BO0BM-02



HINT:
When assembling a washer plate "A", any number of the washer plates shown below can be used as required.

Washer plate part number	Thickness mm (in.)	Washer plate part number	Thickness mm (in.)
90201-08012	0.8 (0.031)	94613-10800	1.6 (0.063)
90201-08258	2.3 (0.091)	90201-08032	3.2 (0.126)



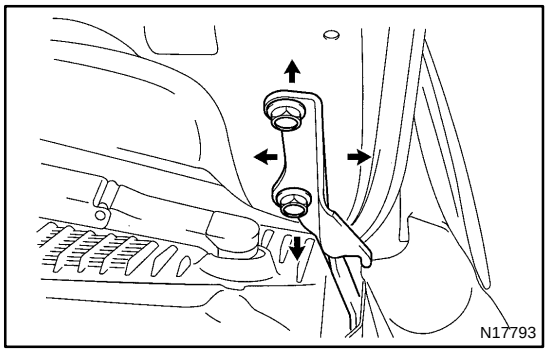
HOOD

ADJUSTMENT

BO0BN-02

1. SUBSTITUTE BOLT WITH WASHER FOR CENTERING BOLT

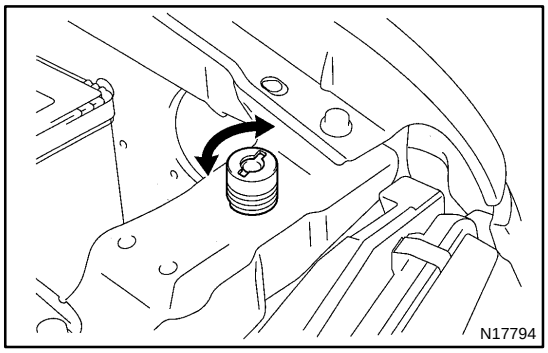
Since the centering bolt is used as the hood hinge set bolt, the hood cannot be adjusted with it on. Substitute the bolt with the washer for the centering bolt.



2. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

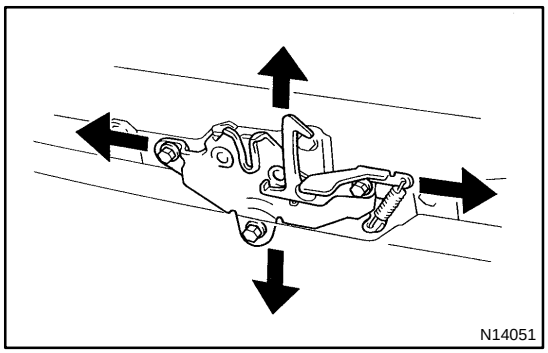
Adjust the hood by loosening the hood side hinge bolts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



3. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



4. ADJUST HOOD LOCK

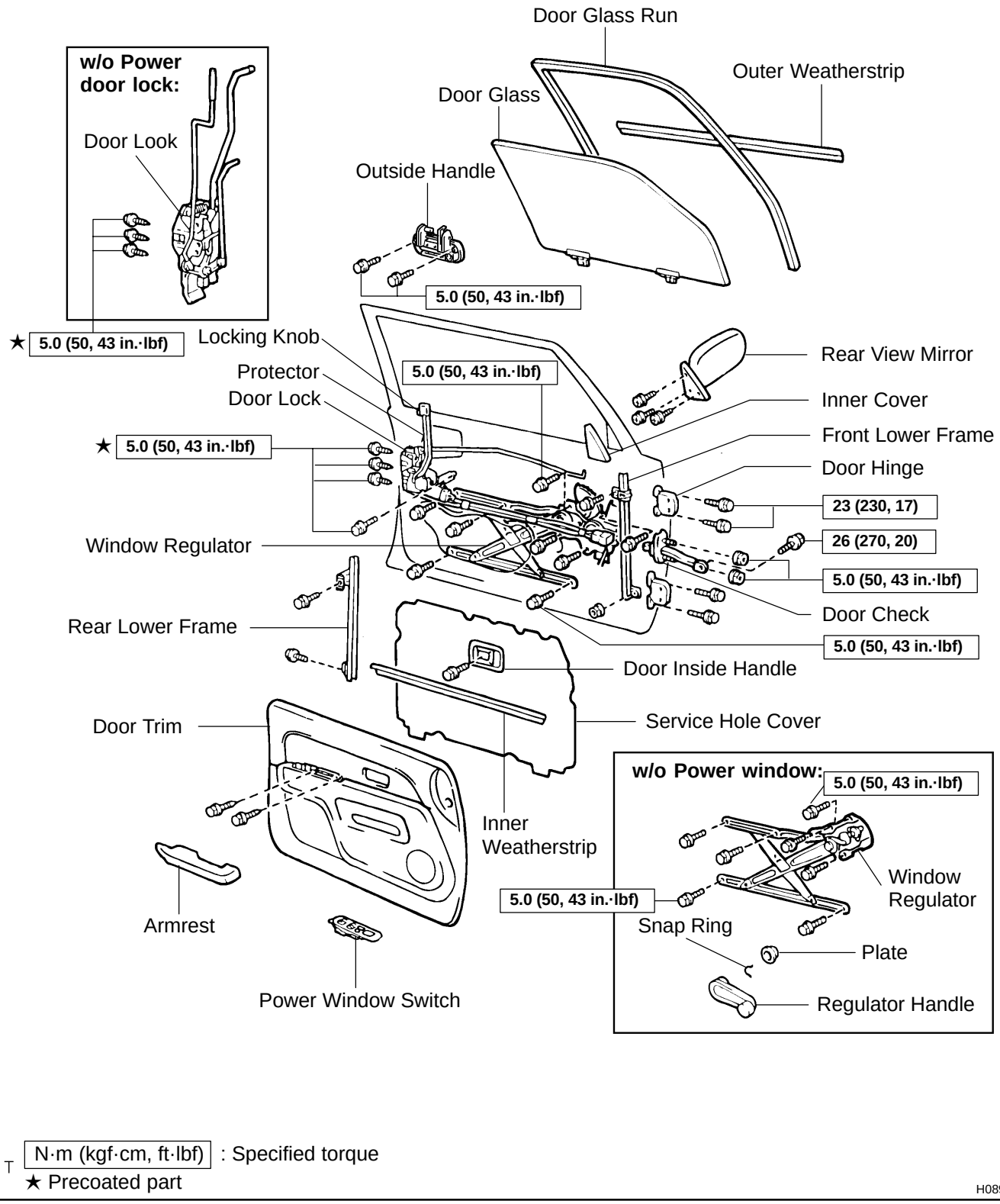
Adjust the lock by loosening the bolts.

Torque: 7.8 N·m (80 kgf·cm, 69 in.·lbf)

FRONT DOOR

COMPONENTS

BO0BO-02

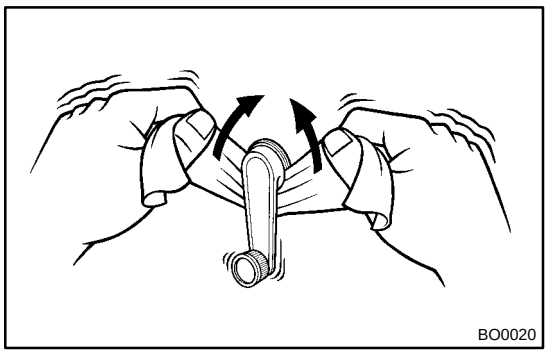


T N·m (kgf·cm, ft·lbf) : Specified torque
★ Precoated part

H08988

BO0BP-02

DISASSEMBLY



1. w/o Power window:

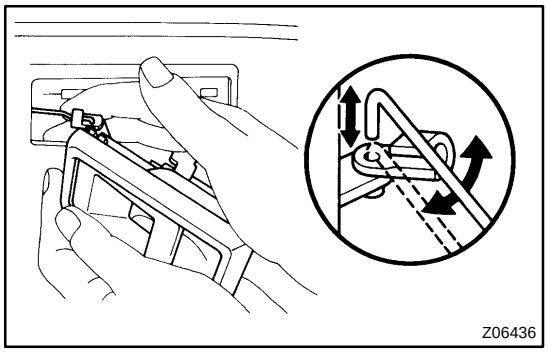
REMOVE REGULATOR HANDLE

Pull off the snap ring with a cloth and remove the regulator handle and plate.

HINT:

At the time of reassembly, please refer to the following item.

With door window fully closed, install the plate and regulator handle with the snap ring.



2. REMOVE DOOR INSIDE HANDLE

(a) Remove the screw, and slide the handle forward.

(b) Disconnect the handle from the control link and remove the handle.

3. REMOVE ARMREST

Using a screwdriver, remove the armrest.

HINT:

Tape the screwdriver tip before use.

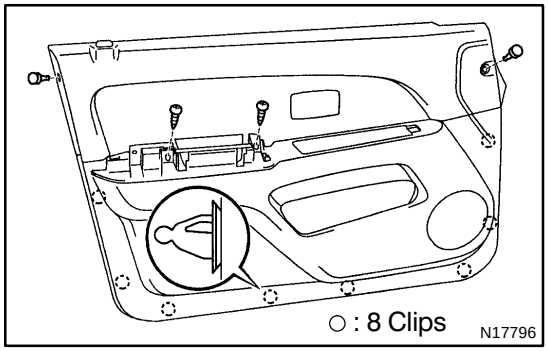
4. w/ Power window:

REMOVE POWER WINDOW SWITCH

Using a screwdriver, remove the power window switch by pulling upward, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.



5. REMOVE DOOR TRIM

(a) Remove the 2 clips and 2 screws.

(b) Insert a screwdriver between the retainer and door trim to pry it loose.

HINT:

Tape the screwdriver tip before use.

(c) Pull the trim upward to remove it.

6. REMOVE INNER COVER AND REAR VIEW MIRROR

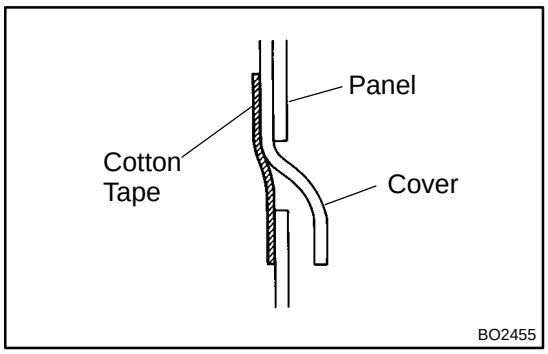
(a) Using a screwdriver, remove the inner cover.

HINT:

Tape the screwdriver tip before use.

(b) w/ Electrical retract system:
Disconnect the connector and remove the clip.

(c) Remove the 3 bolts and rear view mirror.



7. REMOVE SERVICE HOLE COVER

(a) Remove the 2 grommets.

(b) Remove the service hole cover.

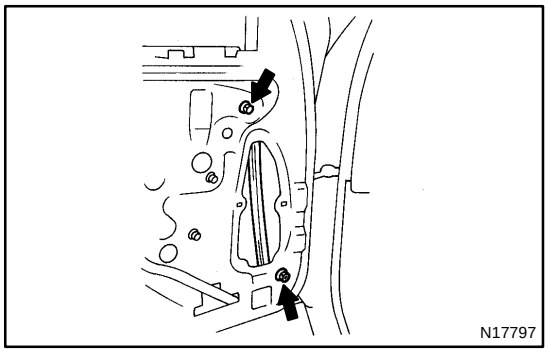
HINT:

At the time of reassembly, please refer to the following item.

Bring out the link and connectors through the service hole cover.

8. REMOVE INNER AND OUTER WEATHERSTRIP

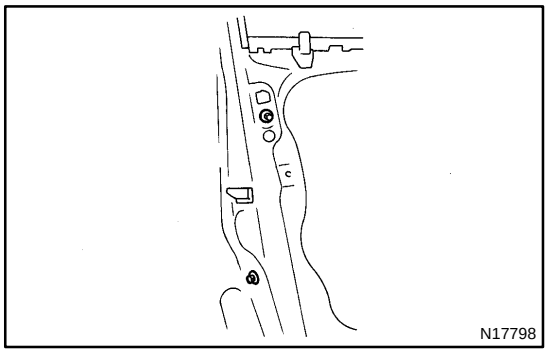
Pry loose the clips from the edge of the panel, and remove the inner and outer weatherstrip.



9. REMOVE FRONT LOWER FRAME

(a) Remove the bolt and nut.

(b) Pull out the front lower frame.



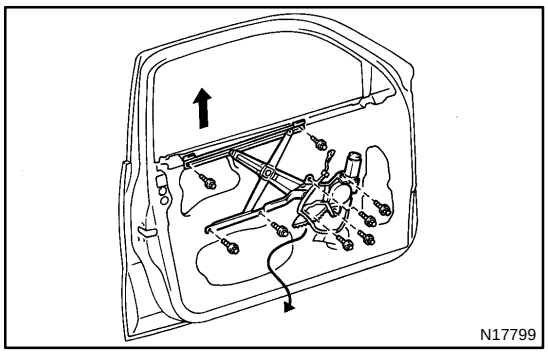
10. REMOVE REAR LOWER FRAME

(a) Remove the 2 bolts.

(b) Pull out the rear lower frame.

11. REMOVE DOOR GLASS RUN

12. REMOVE LOCKING KNOB AND PROTECTOR



13. REMOVE DOOR GLASS AND WINDOW REGULATOR

(a) Remove the 2 glass channel mounting bolts.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(b) Remove the glass by pulling it upward.

NOTICE:

Do not damage the door glass.

(c) w/ Power window:

Disconnect the connector, then remove the 6 regulator mounting bolts.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

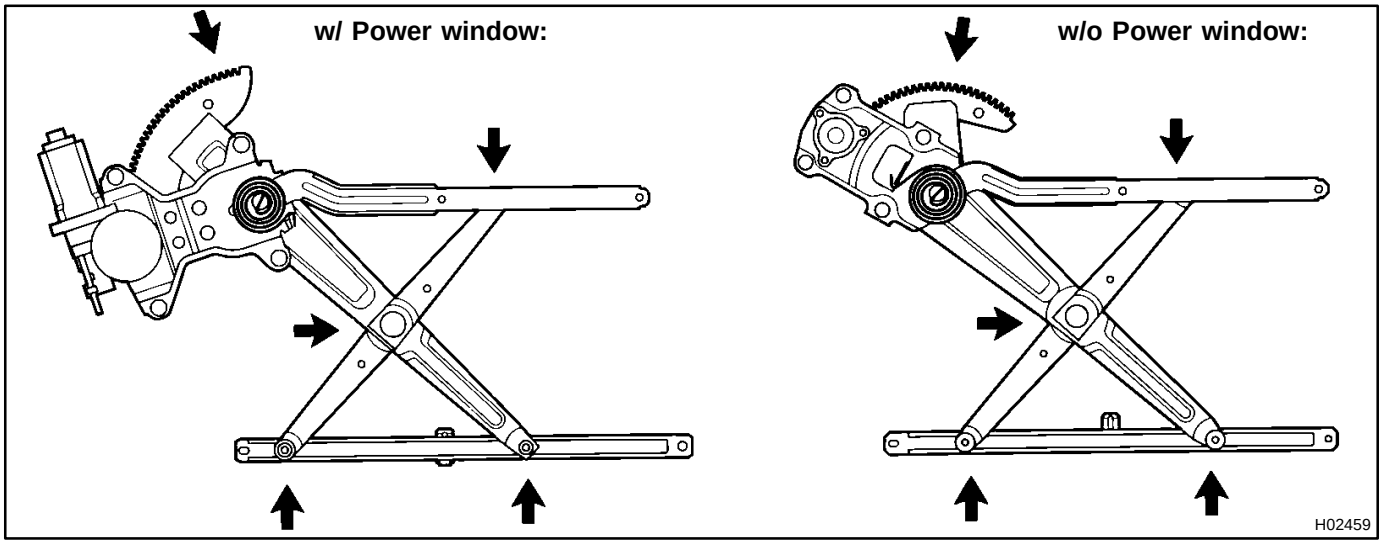
(d) w/o Power window:

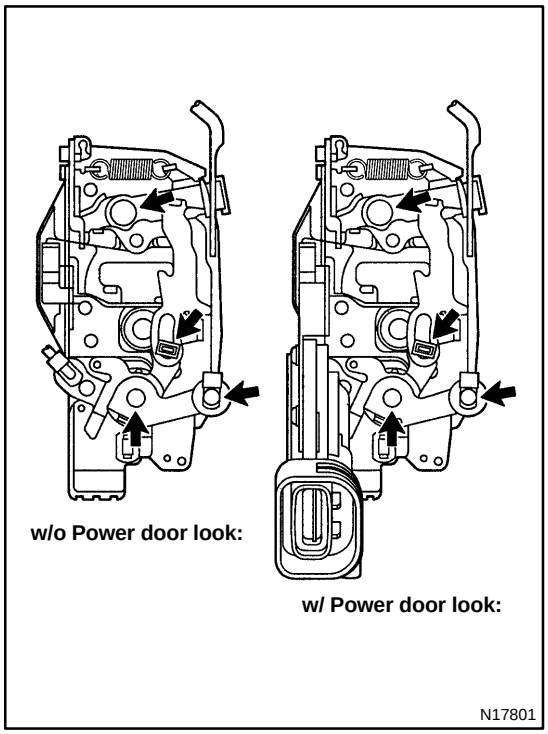
Remove the 5 regulator mounting bolts.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(e) Remove the regulator through the service hole.

HINT:
At the time of reassembly, please refer to the following item.
Apply MP grease to the window regulator rollers.





14. REMOVE DOOR LOCK WITH OUTSIDE HANDLE

(a) Disconnect the link from the outside handle.

(b) w/ Power door lock:
Disconnect the connector.

(c) w/o Power door lock:
Remove the 3 torx screws from the door lock.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(d) w/ Power door lock:
Remove the 3 torx screws and bolt from the door lock.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

HINT:
At the time of reassembly, please refer to the following items.

- Apply adhesive to the 3 torx screws.
  Part No. 08833-00070, THREE BOND 1324 or equivalent
- Apply MP grease to the sliding and rotating parts of the door lock.

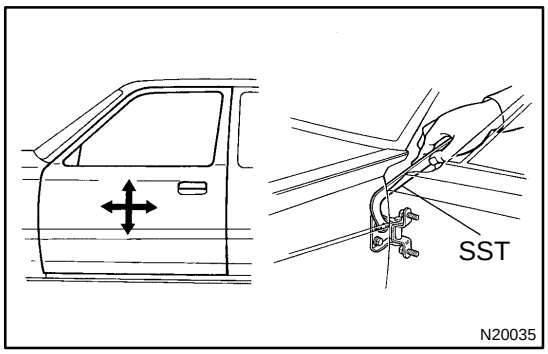
(e) Remove the 2 bolts from the outside handle.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(f) Remove the door lock with outside handle through the service hole.

(g) Disconnect the link from the outside handle and remove the outside handle from the door lock.

BO0BQ-02

ADJUSTMENT

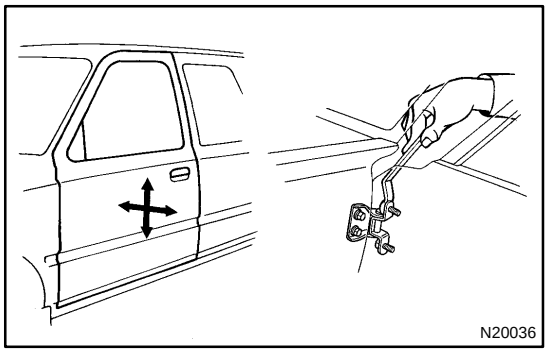


1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Using SST, adjust the door by loosening the body side hinge bolts.

SST 09812-00010

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)



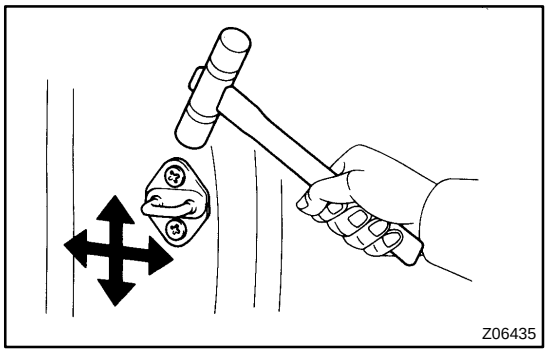
2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

HINT:

Substitute the standard bolt for the centering bolts (See page BO-6).

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)



3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkages are adjusted correctly.

(b) Adjust the striker position by slightly loosening the striker mounting screws, and hitting the striker with a hammer.

(c) Tighten the striker mounting screws again.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

BO0BR-01

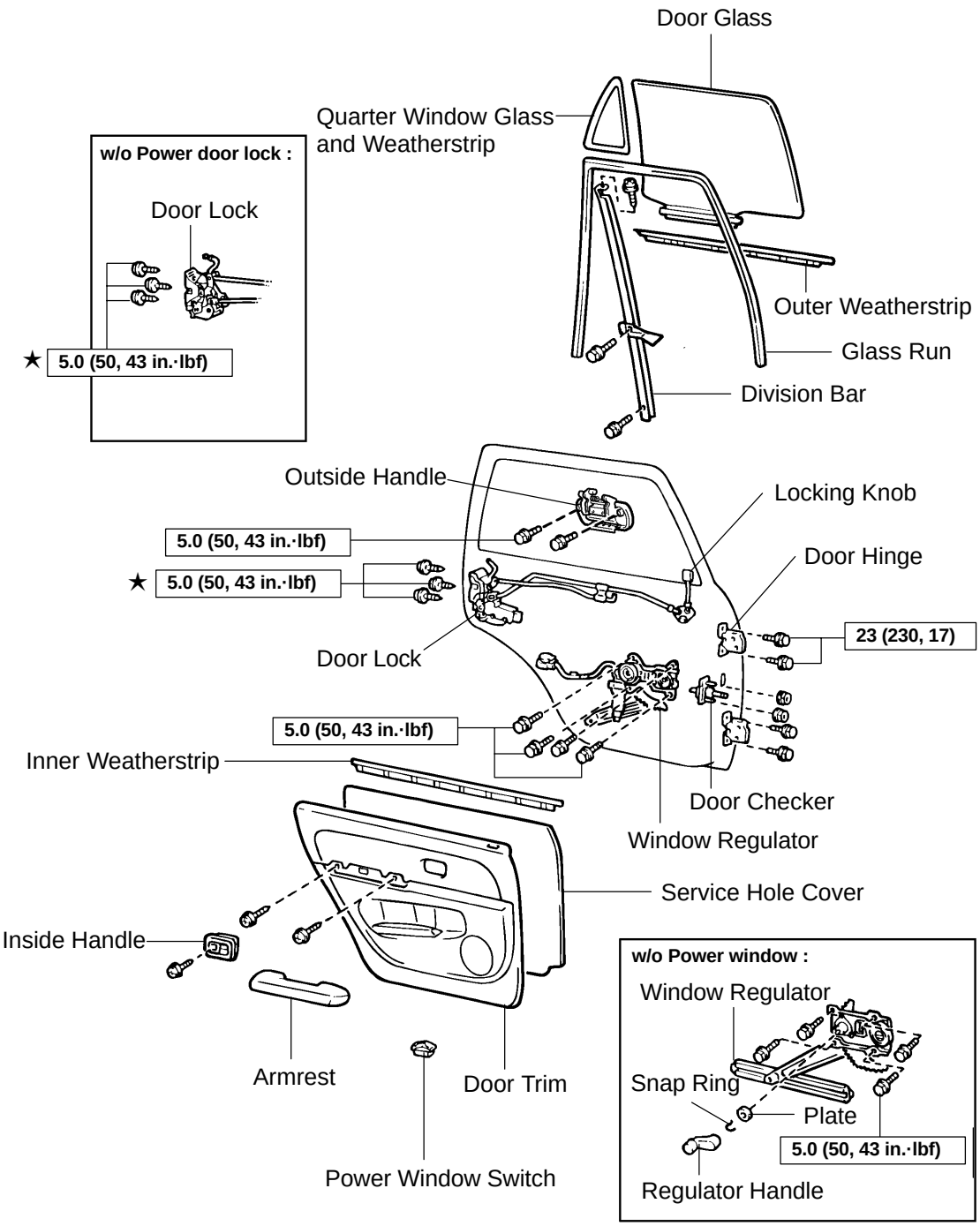
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO-8).

REAR DOOR

COMPONENTS

BO0BS-02



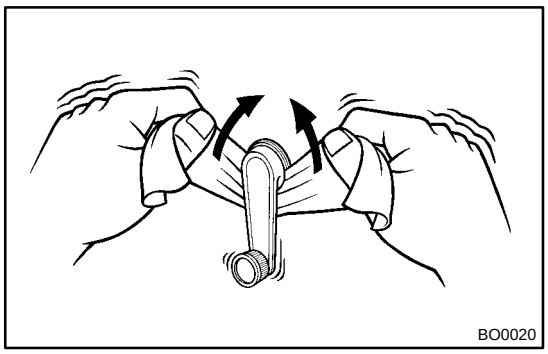
N·m (kgf·cm, ft·lbf) : Specified torque

T ★ Precoated part

H08989

BO26A-01

DISASSEMBLY



1. w/o Power window:

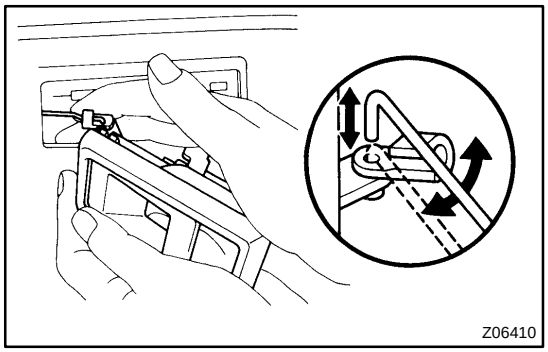
REMOVE REGULATOR HANDLE

Pull off the snap ring with a cloth and remove the regulator handle and plate.

HINT:

At the time of reassembly, please refer to the following item.

With door window fully closed, install the plate and regulator handle with the snap ring.



2. REMOVE DOOR INSIDE HANDLE

(a) Remove the screw, and slide the handle forward.

(b) Disconnect the handle from the control link and remove the handle.

(c) Remove the grommet.

3. REMOVE ARMREST

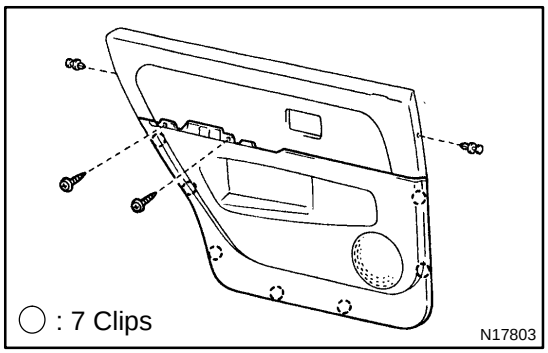
4. w/ Power window:

REMOVE POWER WINDOW SWITCH

Using a screwdriver, remove the power window switch by pulling upward, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.



5. REMOVE DOOR TRIM

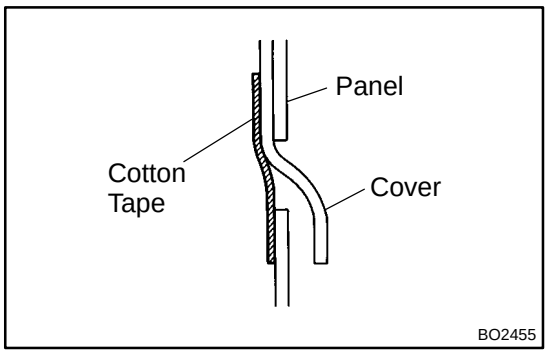
(a) Remove the 2 clips and 2 screws.

(b) Insert a screwdriver between the retainer and door trim to pry it loose.

HINT:

Tape the screwdriver tip before use.

(c) Pull the trim upward to remove it.



6. REMOVE SERVICE HOLE COVER

(a) Remove the 2 grommets.

(b) Remove the service hole cover.

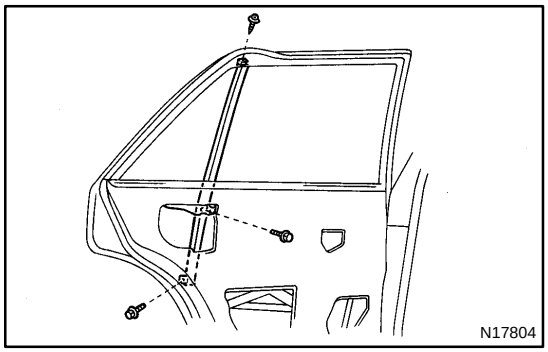
HINT:

At the time of reassembly, please refer to the following item.

Bring out the link and connectors through the service hole cover.

7. REMOVE INNER AND OUTER WEATHERSTRIP

Pry loose the clips from the edge of the panel, and remove the inner and outer weatherstrip.



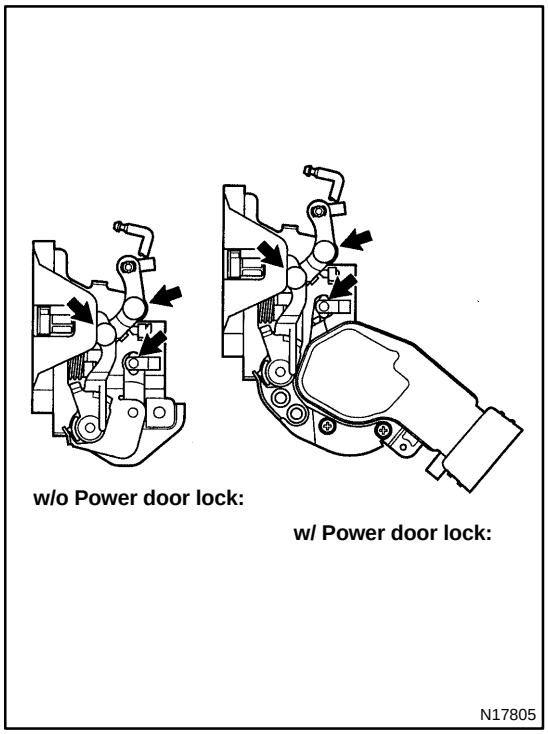
8. REMOVE DIVISION BAR

(a) Remove the screw under the weatherstrip.

(b) Remove the 2 bolts from the door panel.

(c) Pull out the division bar.

9. REMOVE QUARTER WINDOW GLASS WITH WEATHERSTRIP AND GLASS RUN



10. REMOVE DOOR LOCK AND OUTSIDE HANDLE

(a) w/ Power door lock:
Disconnect the connector.

(b) Remove the clip and pull down the locking knob.

(c) Disconnect the control link from the outside handle.

(d) Remove the 3 torx screws and door lock.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

HINT:

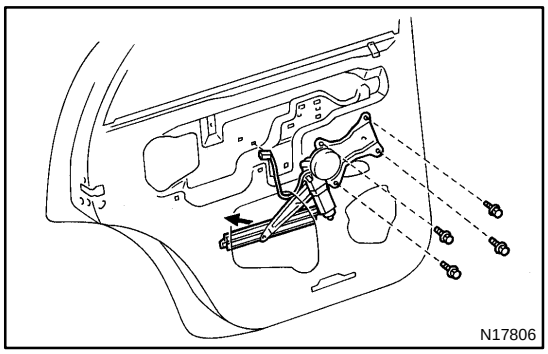
At the time of reassembly, please refer to the following items.

- Apply adhesive to the 3 screws.
Part No. 08833-00070, THREE BOND 1324 or equivalent
- Apply MP grease to the sliding and rotating parts of the door lock.

(e) Remove the 2 bolts and outside handle.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

11. REMOVE WINDOW REGULATOR AND GLASS

(a) w/ Power window:
Disconnect the connector.



(b) Remove the 4 regulator mounting bolts.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(c) Slide the glass so that the regulator arm roller is released, as shown.

(d) Remove the regulator and glass from the service hole.

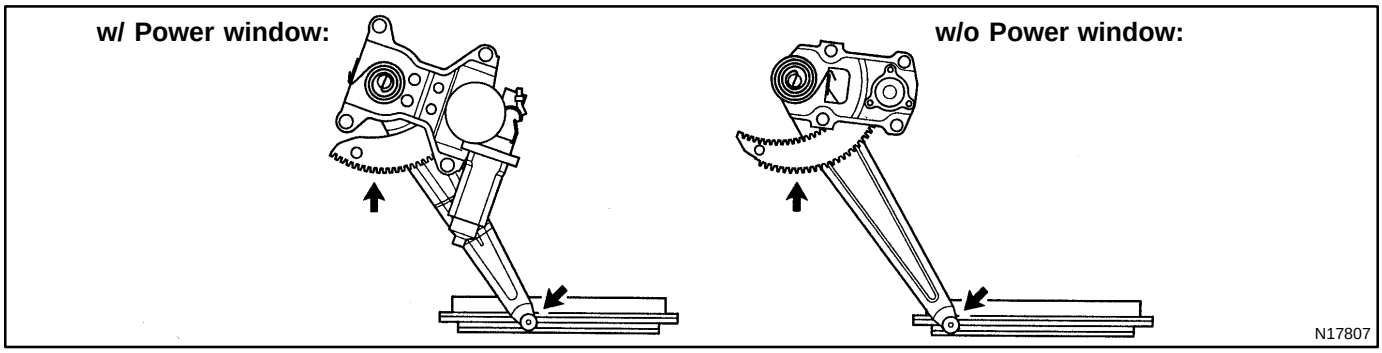
NOTICE:

Do not damage the door glass.

HINT:

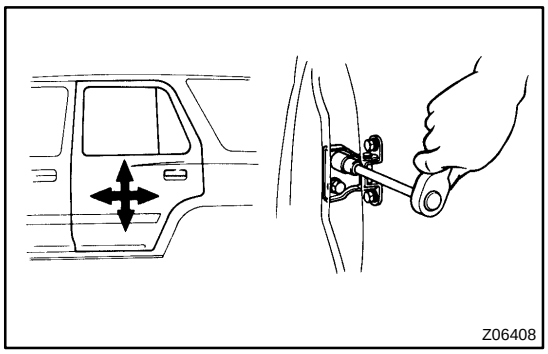
At the time of reassembly, please refer to the following item.

Apply MP grease to the window regulator rollers as shown in the illustration.



BO26B-01

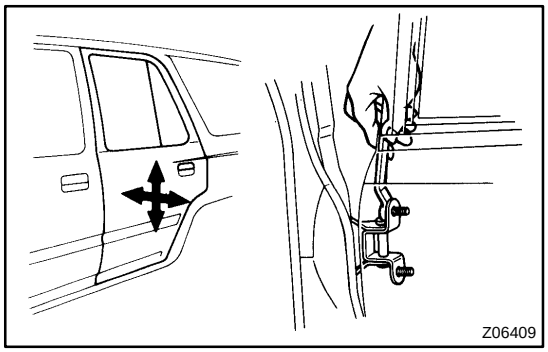
ADJUSTMENT



1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Loosen the body side hinge bolts and nuts to adjust.

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)



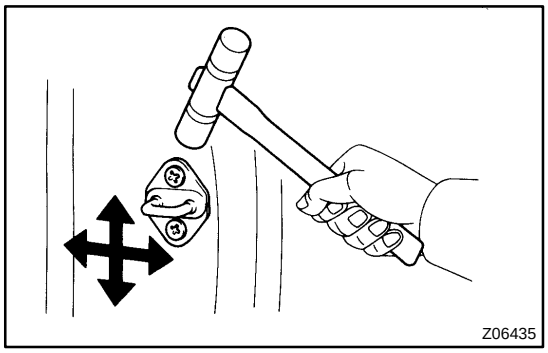
2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

HINT:

Substitute the standard bolt for the centering bolts (See page BO-6).

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)



3. ADJUST DOOR LOCK STRIKER

(a) Check that the door fit and door lock linkages are adjusted correctly.

(b) Adjust the striker position by slightly loosening the striker mounting screws, and hitting the striker with a hammer.

(c) Tighten the striker mounting screws again.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

BO0BV-01

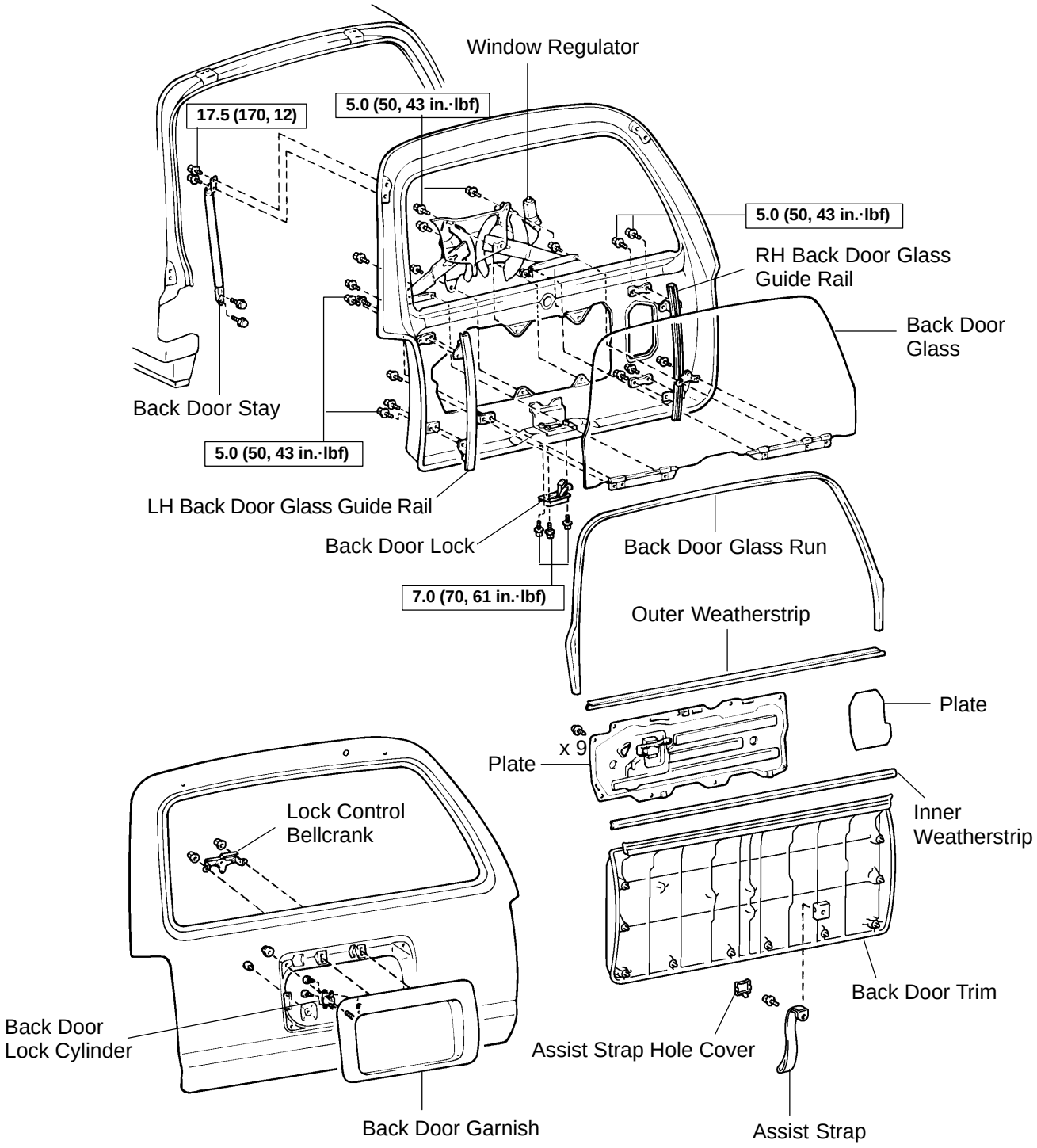
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO-14).

BACK DOOR

COMPONENTS

BO0BW-02



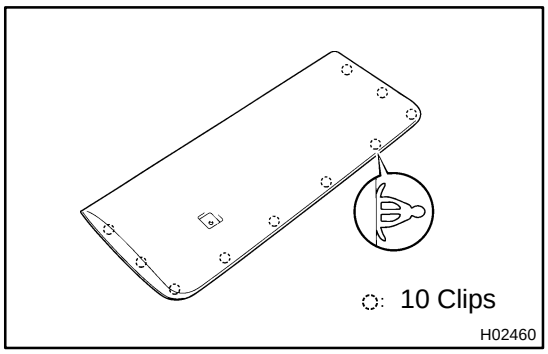
N·m (kgf·cm, ft·lbf) : Specified torque

T

H09010

BO0BX-02

DISASSEMBLY



1. REMOVE BACK DOOR TRIM

(a) Remove the assist strap hole cover, bolt and assist strap.

(b) Using a screwdriver, remove the back door trim.

HINT:

Tape the screwdriver tip before use.

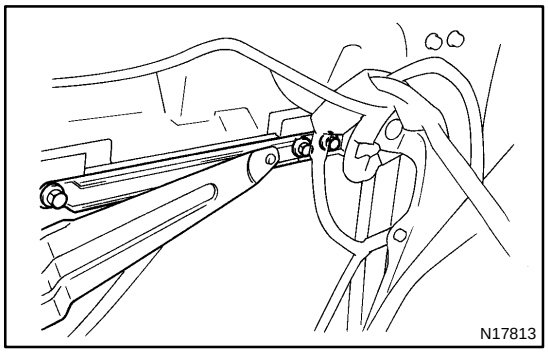
2. REMOVE PLATE

(a) Remove the 9 screws and plate.

(b) Disconnect the connector.

3. REMOVE BACK DOOR GLASS RUN

4. REMOVE OUTER WEATHERSTRIP



5. REMOVE BACK DOOR GLASS

Remove the 6 bolts and door glass.

NOTICE:

Do not damage the door glass.

6. REMOVE WINDOW REGULATOR

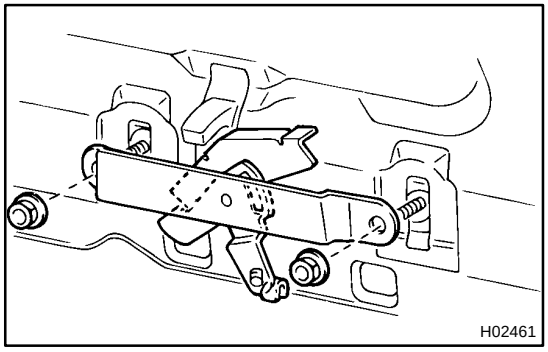
Remove the window regulator mounting bolts.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

7. REMOVE LH AND RH BACK DOOR GLASS GUIDE RAIL

Remove the 8 bolts and LH and RH back door glass guide rails.

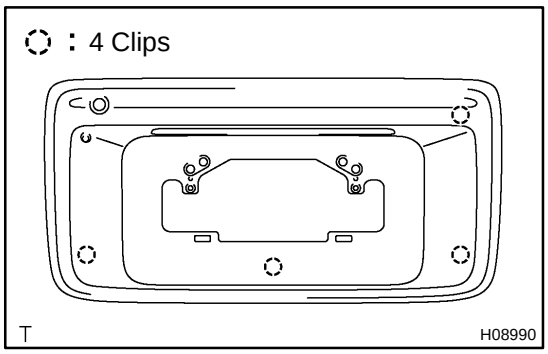
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)



8. REMOVE LOCK CONTROL BELLCRANK

Remove the 2 nuts and lock control bellcrank.

9. REMOVE BACK DOOR REMOTE CONTROL



10. REMOVE BACK DOOR GARNISH

(a) Remove the nut.

(b) Using a screwdriver, remove the back door garnish.

HINT:

Tape the screwdriver tip before use.

11. REMOVE BACK DOOR LOCK CYLINDER

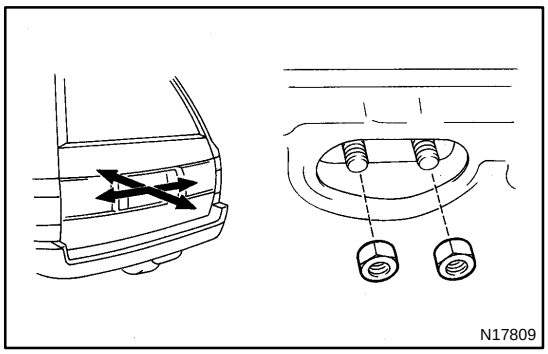
12. REMOVE BACK DOOR LOCK

Remove the 3 bolts and back door lock.

Torque: 7.0 N·m (70 kgf·cm, 61 in.·lbf)

BO0BY-02

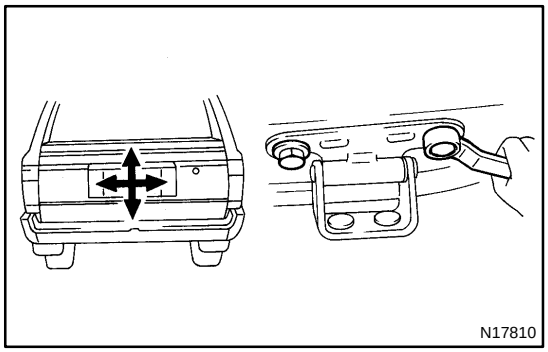
ADJUSTMENT



1. ADJUST DOOR IN FORWARD/REARWARD AND LEFT /RIGHT VERTICAL DIRECTIONS

Loosen the body side hinge nuts to adjust.

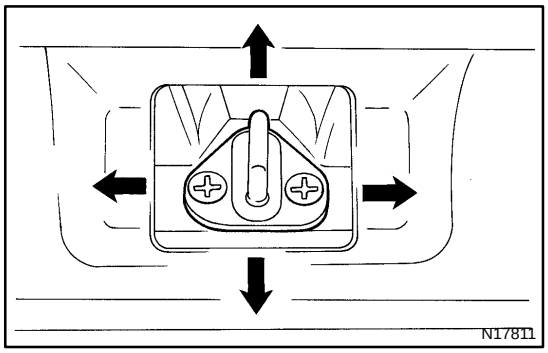
Torque: 33 N·m (330 kgf·cm, 25 ft·lbf)



2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

Torque: 23 N·m (230 kgf·cm, 17 ft·lbf)



3. ADJUST DOOR LOCK STRIKER

(a) Loosen the striker mounting screws to adjust.

(b) Using a plastic hammer, tap the striker to adjust it.

BO0BZ-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO-20).

BACK DOOR STAY

BO0C0-02

REPLACEMENT

1. REMOVE BACK DOOR STAY

(a) Remove the bolts and back door stay from the back door.

HINT:

While supporting the back door with your hand, remove the back door stay.

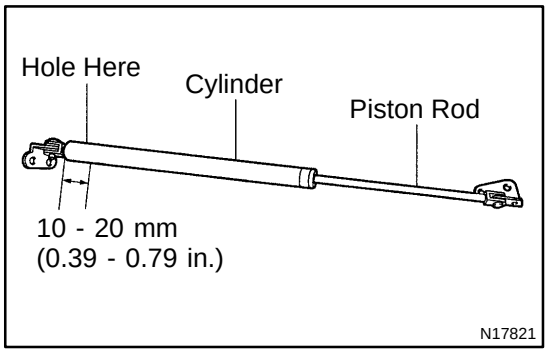
(b) Remove the bolts and door stay from the body.

2. IF NECESSARY, REPLACE BACK DOOR STAY

NOTICE:

Handling the back door stay.

- **Do not disassemble the back door stay because the cylinder is filled with pressured gas.**



- **If the back door stay is to be replaced, drill a 2.0 - 3.0 mm (0.079 - 0.118 in.) hole in the bottom of the back door stay as shown in the illustration to completely release the high-pressure gas before disposing of it.**
- **When drilling, chips may fly out so work carefully.**
- **The gas is colorless, odorless and non-toxic.**
- **When working, handle the back door stay carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.**
- **Do not turn the piston rod and cylinder with the back door stay fully extended.**

3. INSTALL BACK DOOR STAY

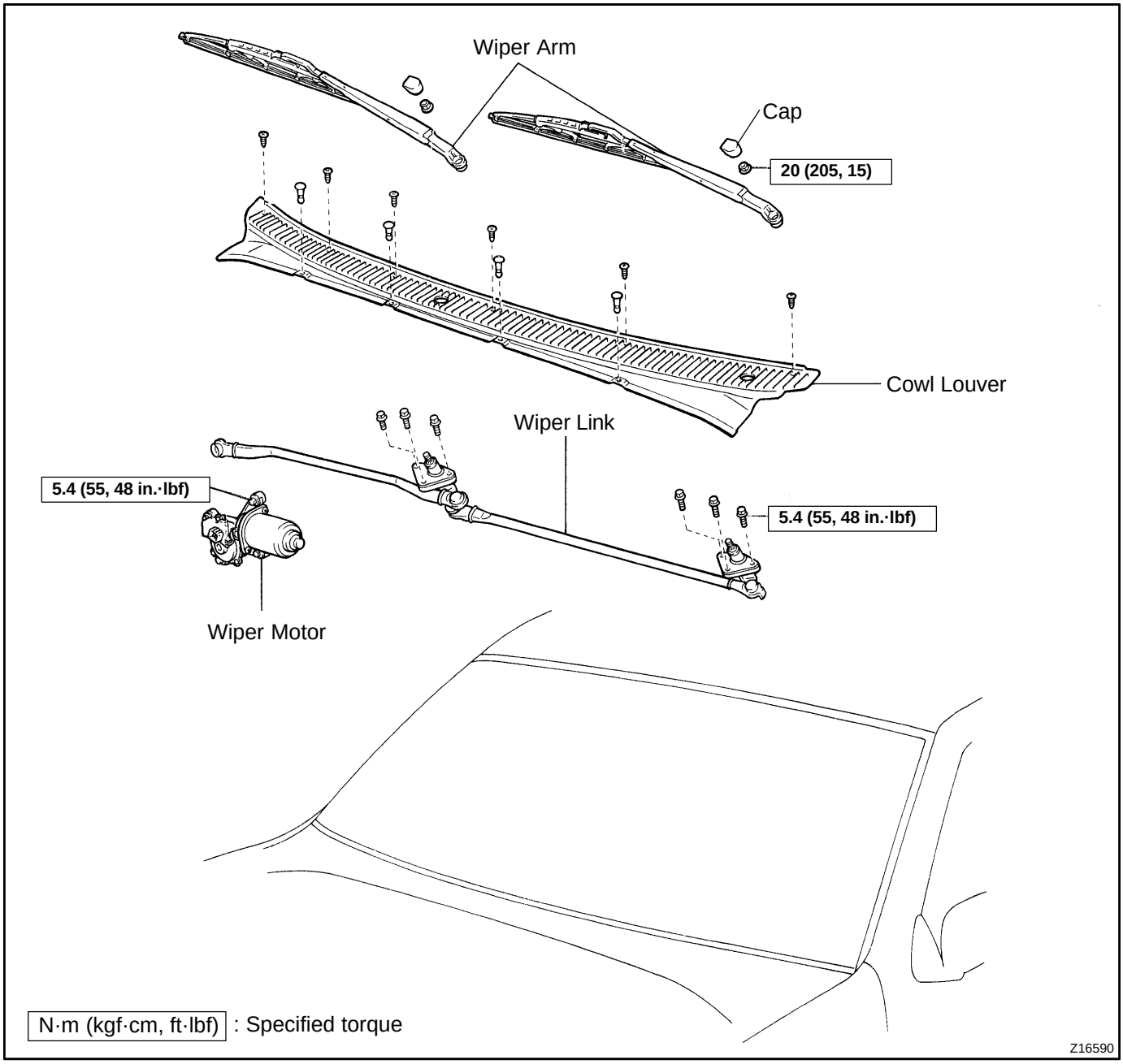
(a) Install the bolts and back door stay to the body.
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)

(b) Install the bolts and back door stay to the back door.
Torque: 17 N·m (170 kgf·cm, 12 ft·lbf)

FRONT WIPER AND WASHER

COMPONENTS

BO0C1-02



BO26C-01

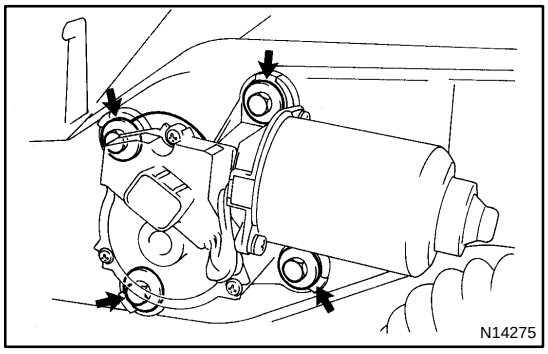
REMOVAL

1. REMOVE WIPER ARMS

Remove the 2 caps, 2 nuts and wiper arms.

2. REMOVE COWL LOUVER

Remove the 6 screws, 4 clips and cowl louver.



3. REMOVE WIPER MOTOR

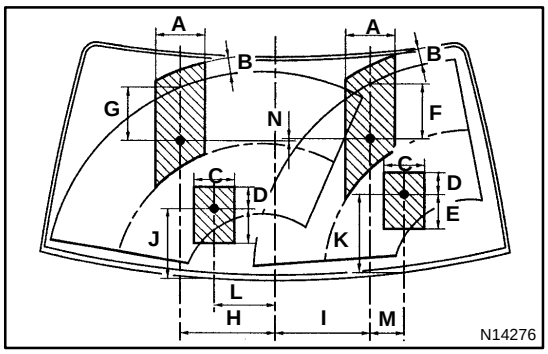
Unfasten the 4 bolts and wiper motor.

4. REMOVE WIPER LINK

Remove the 6 bolts and wiper link.

5. REMOVE WINDOW WASHER NOZZLES

BO0C3-02



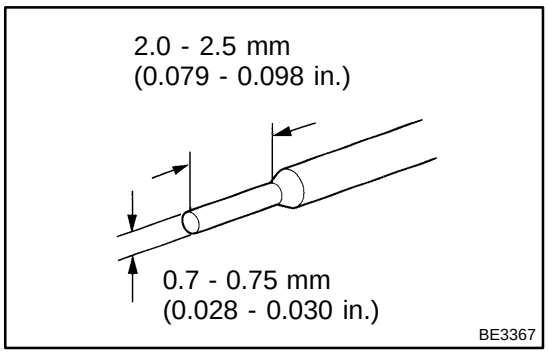
INSPECTION

INSPECT WASHER NOZZLE

While operating the washer, check that both the point where the washer fluid hits the windshield and the surge area are within the range indicated by the hatched line.

A: Approx. 150 mm (5.91 in.)
B: Approx. 50 mm (1.97 in.)
C: Approx. 120 mm (4.72 in.)
D: Approx. 65 mm (2.56 in.)
E: Approx. 105 mm (4.13 in.)
F: Approx. 167 mm (6.57 in.)
G: Approx. 158.4 mm (6.24 in.)
H: Approx. 282.7 mm (11.13 in.)
I: Approx. 287.4 mm (11.31 in.)
J: Approx. 215.3 mm (8.48 in.)
K: Approx. 247.9 mm (9.76 in.)
L: Approx. 151.5 mm (5.96 in.)
M: Approx. 149.4 mm (5.88 in.)
N: Approx. 0 - 50 mm (0 - 1.97 in.)

BO0C4-02



ADJUSTMENT

ADJUST WASHER NOZZLE

Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the windshield.

BO26D-01

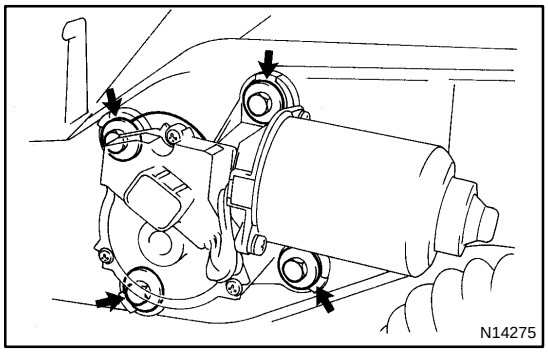
INSTALLATION

1. INSTALL WINDOW WASHER NOZZLES

2. INSTALL WIPER LINK

Install the wiper link with the 6 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)



3. INSTALL WIPER MOTOR

Install the wiper motor and fasten the 4 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

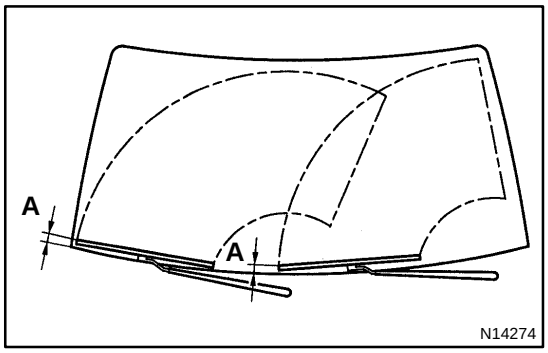
4. INSTALL COWL LOUVER

Install the cowl louver with the 6 screws and 4 clips.

5. INSTALL WIPER ARMS

(a) Operate the wipers once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the 2 nuts by hand.



(c) Adjust the installation positions of the wiper arms to the positions shown in the illustration.

A: Approx. 25 mm (0.98 in.)

(d) Torque the 2 nuts.

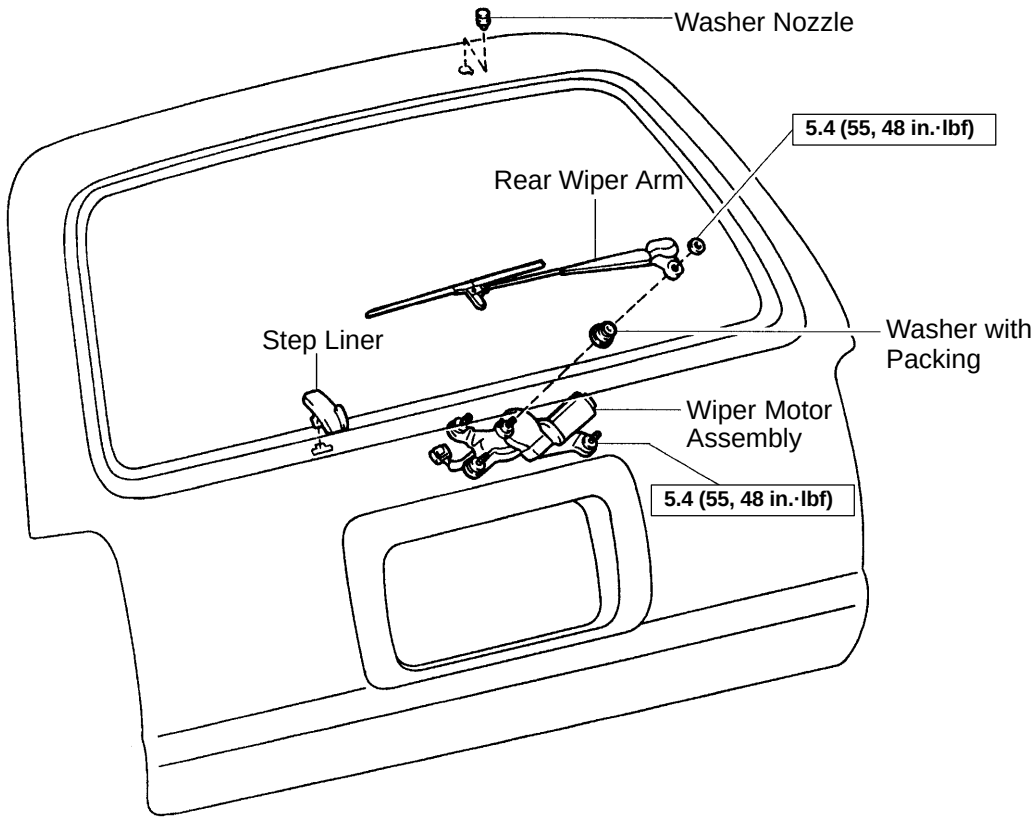
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(e) Install the 2 caps.

REAR WIPER AND WASHER

COMPONENTS

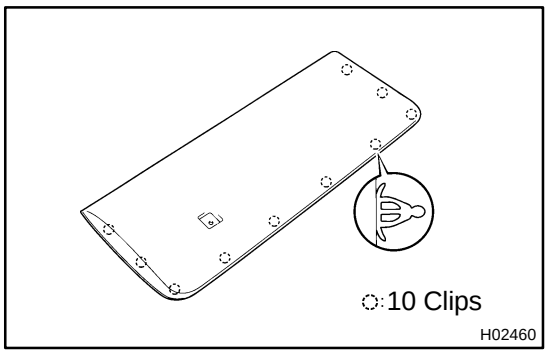
BO0C6-02



N·m (kgf·cm, ft·lbf) : Specified torque

N17822

BO26E-01



REMOVAL

1. REMOVE BACK DOOR TRIM

(a) Remove the assist strap hole cover, bolt and assist strap.

(b) Using a screwdriver, remove the back door trim.

HINT:

Tape the screwdriver tip before use.

2. REMOVE PLATE

(a) Remove the 9 screws and plate.

(b) Disconnect the connector.

3. REMOVE BACK DOOR GLASS RUN

4. REMOVE OUTER WEATHERSTRIP

5. REMOVE BACK DOOR GLASS

Remove the 6 bolts and door glass.

6. REMOVE REAR WIPER ARM

Remove the nut, wiper arm and washer with packing.

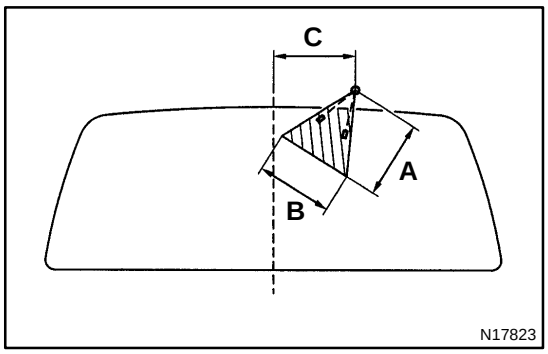
7. REMOVE REAR WIPER MOTOR ASSEMBLY

(a) Disconnect the connector.

(b) Unfasten the 3 wiper motor set bolts, and remove the wiper motor assembly.

8. REMOVE WASHER NOZZLE

BO0C8-02



INSPECTION

INSPECT REAR WASHER NOZZLE

While operating the washer, check whether the point where the washer fluid hits the back door glass and the upsurge area are within the range indicated by the hatched line.

A: Approx. 200 mm (7.87 in.)

B: Approx. 200 mm (7.87 in.)

C: Approx. 212.5 mm (8.366 in.)

BO0C9-02

INSTALLATION

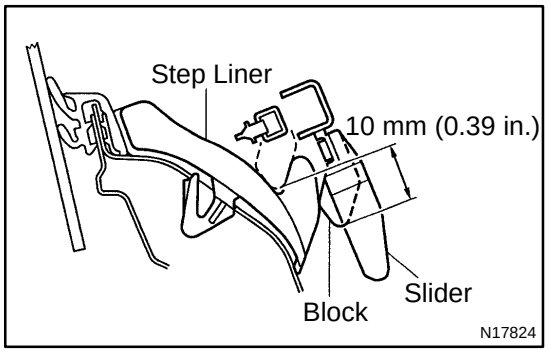
1. INSTALL WASHER NOZZLE

2. INSTALL REAR WIPER MOTOR ASSEMBLY

(a) Install the rear wiper motor assembly with the 3 wiper motor set bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Connect the connector.



3. INSTALL REAR WIPER ARM

(a) Install the washer with packing.

(b) Operate the wiper once and turn the wiper switch OFF and install the wiper arm.

(c) When assembling the rear wiper arm, slide the slider 10 mm (0.39 in.) to the lower side, and tighten the wiper arm set nut with the step liner on the block, as shown in the illustration.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

4. INSTALL BACK DOOR GLASS

5. INSTALL OUTER WEATHERSTRIP

6. INSTALL BACK DOOR GLASS RUN

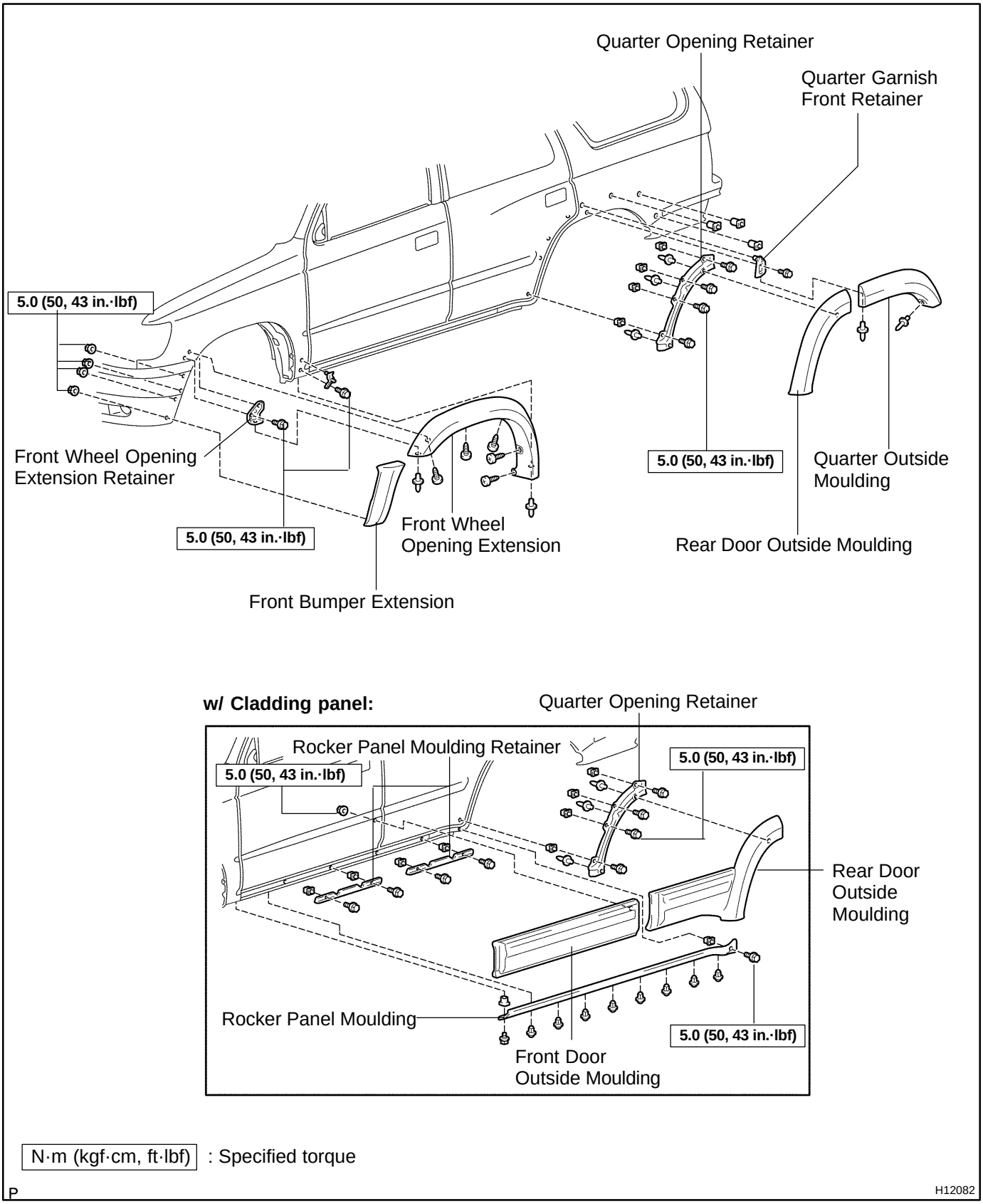
7. INSTALL PLATE

8. INSTALL BACK DOOR TRIM

BODY OUTSIDE MOULDING

COMPONENTS

BO0CA-03

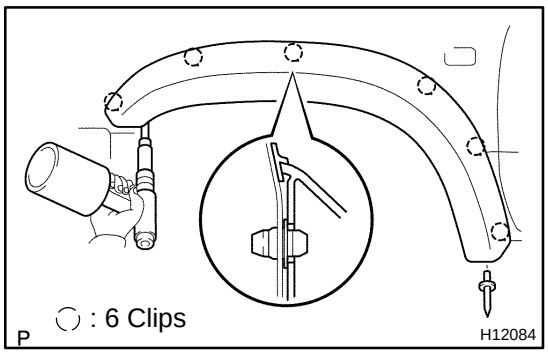


N·m (kgf·cm, ft·lbf) : Specified torque

P

H12082

BO2N3-01



INSTALLATION

1. INSTALL FRONT BUMPER EXTENSION

Install the front bumper extension with the 4 nuts.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

2. INSTALL FRONT FENDER LINER

3. INSTALL FRONT WHEEL OPENING EXTENSION

(a) Install the front wheel opening extension retainer with the bolt.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(b) Using a riveter, install 2 new rivets and front wheel opening extension.

HINT:

- Install them with the rivet firmly pressed perpendicularly against the installation hole.
- When installing new rivets, use ones of proper part numbers.

  Front side: 53888-35010

  Rear side: 90269-04047

(c) Tighten the 5 bolts.

4. INSTALL FRONT MUDGUARD

5. INSTALL FRONT WHEEL

6. w/ Cladding panel:

INSTALL FRONT DOOR OUTSIDE MOULDING

(a) Clean the body moulding surface.

(1) Using a heat light, heat the body moulding surface to 40 - 60 °C (104 - 140 °F).

(2) Remove the adhesive tape from the body.

(3) Wipe off the stain with cleaner.

(b) If reusing the moulding:

Clean the front door outside moulding.

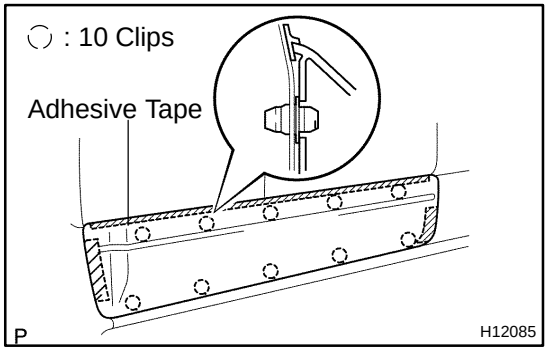
(1) Using a heat light, heat the moulding to 20 - 30 °C (68 - 86 °F).

NOTICE:

Do not heat the moulding excessively.

(2) Remove the adhesive tape from the moulding.

(3) Wipe off the stains with cleaner.



(4) Apply new adhesive tapes to the moulding as shown in the illustration.

(c) Install the front door outside moulding.

(1) Using a heat light, heat the body and moulding.

Body: 40 - 60 °C (104 - 140 °F)

Moulding: 20 - 30 °C (68 - 86 °F)

NOTICE:

Do not heat the moulding excessively.

(2) Lift the moulding release sheet from face of moulding.

NOTICE:

When the moulding release sheet is removed, make sure that no dirt or dust can get onto the uncoated area.

(3) Align the bosses with their corresponding holes in the body, and press firmly on the moulding.

NOTICE:

Do not apply excessive force onto the moulding, but steady pressure with your thumbs.

(4) Torque the nut.

Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

7. w/ Cladding panel:

INSTALL REAR DOOR OUTSIDE MOULDING

(a) Clean the body mounting surface.

(1) Using a heat light, heat the body moulding surface to 40 - 60 ˚C (104 - 140 ˚F).

(2) Remove the adhesive tape from the body.

(3) Wipe off the stain with cleaner.

(b) If reusing the moulding:

Clean the front door outside moulding.

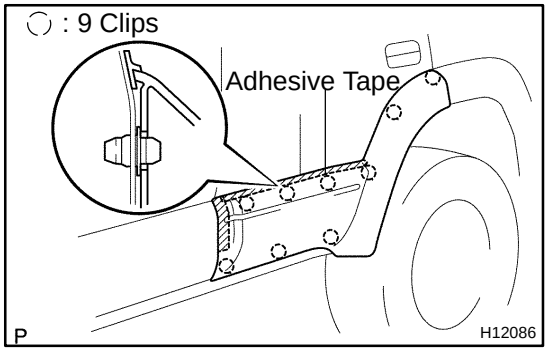
(1) Using a heat light, heat the moulding to 20 - 30 ˚C (68 - 86 ˚F).

NOTICE:

Do not hear the moulding excessively.

(2) Remove the adhesive tape from the moulding.

(3) Wipe off the stains with cleaner.



(4) Apply new adhesive tapes to the moulding as shown in the illustration.

(c) Install the quarter opening retainer with the 4 bolts.

(d) Install the rear door outside moulding.

(1) Using a heat light, heat the body and moulding.

Body: 40 - 60 ˚C (104 - 140 ˚F)

Moulding: 20 - 30 ˚C (68 - 86 ˚F)

NOTICE:

Do not heat the moulding excessively.

(2) Lift the moulding release sheet from face of moulding.

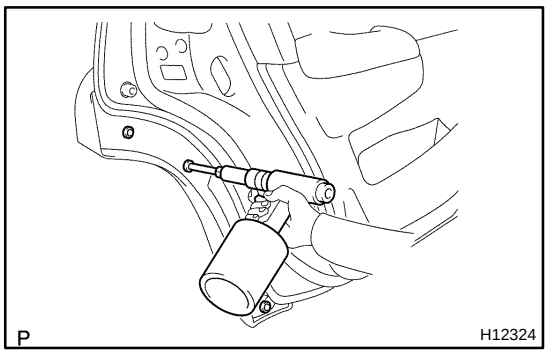
NOTICE:

When the moulding release sheet is removed, make sure that no dirt or dust can get onto the uncoated area.

(3) Align the bosses with their corresponding holes in the body, and press firmly on the moulding.

NOTICE:

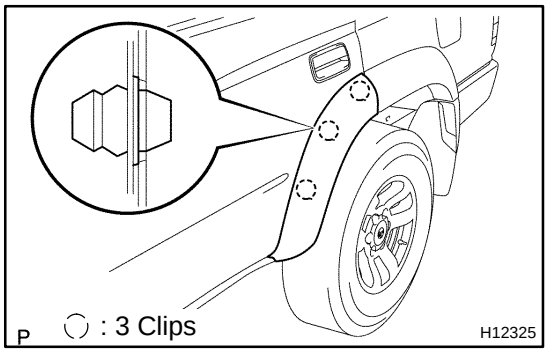
Do not apply excessive force onto the moulding, but steady pressure with your thumbs.



(4) Using a riveter, install 3 new rivets and rear door outside moulding.

HINT:

Install them with the rivet firmly pressed perpendicularly against 0the installation hole.



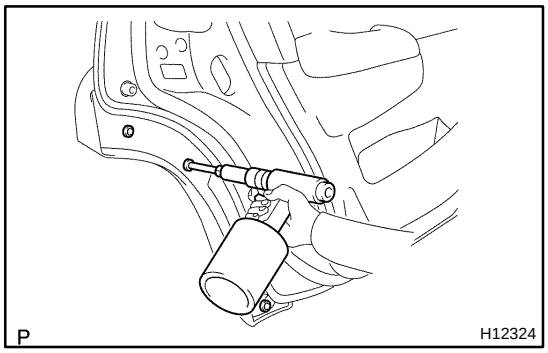
8. w/o Cladding panel:
INSTALL REAR DOOR OUTSIDE MOULDING

(a) Install the quarter opening retainer with the 4 bolts.

(b) Install the rear door outside moulding.

HINT:

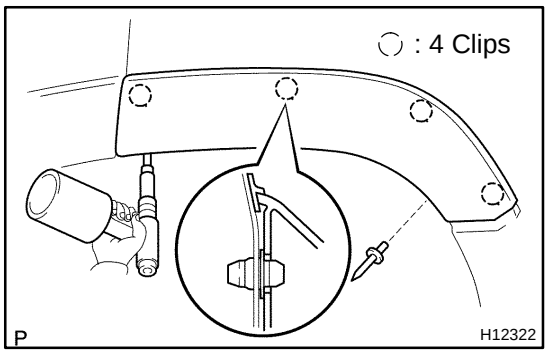
Align the bosses with their corresponding holes in the body, and press firmly on the moulding.



(c) Using a riveter, install 3 new rivets and rear door outside moulding.

HINT:

Install them with the rivet firmly pressed perpendicularly against the installation hole.



9. INSTALL QUARTER OUTSIDE MOULDING

(a) Install the quarter garnish front retainer with the bolt.
Torque: 5.0 N·m (50 kgf·cm, 43 in.·lbf)

(b) Using a riveter, install 2 new rivets and quarter outside moulding.

HINT:

Install them with the rivet firmly pressed perpendicularly against the installation hole.

(c) Install the rear wheel.

10. INSTALL ROCKER PANEL MOULDING

(a) Install the rocker panel moulding retainers with the 4 screws.

(b) Install the rocker panel moulding with the 2 screws.

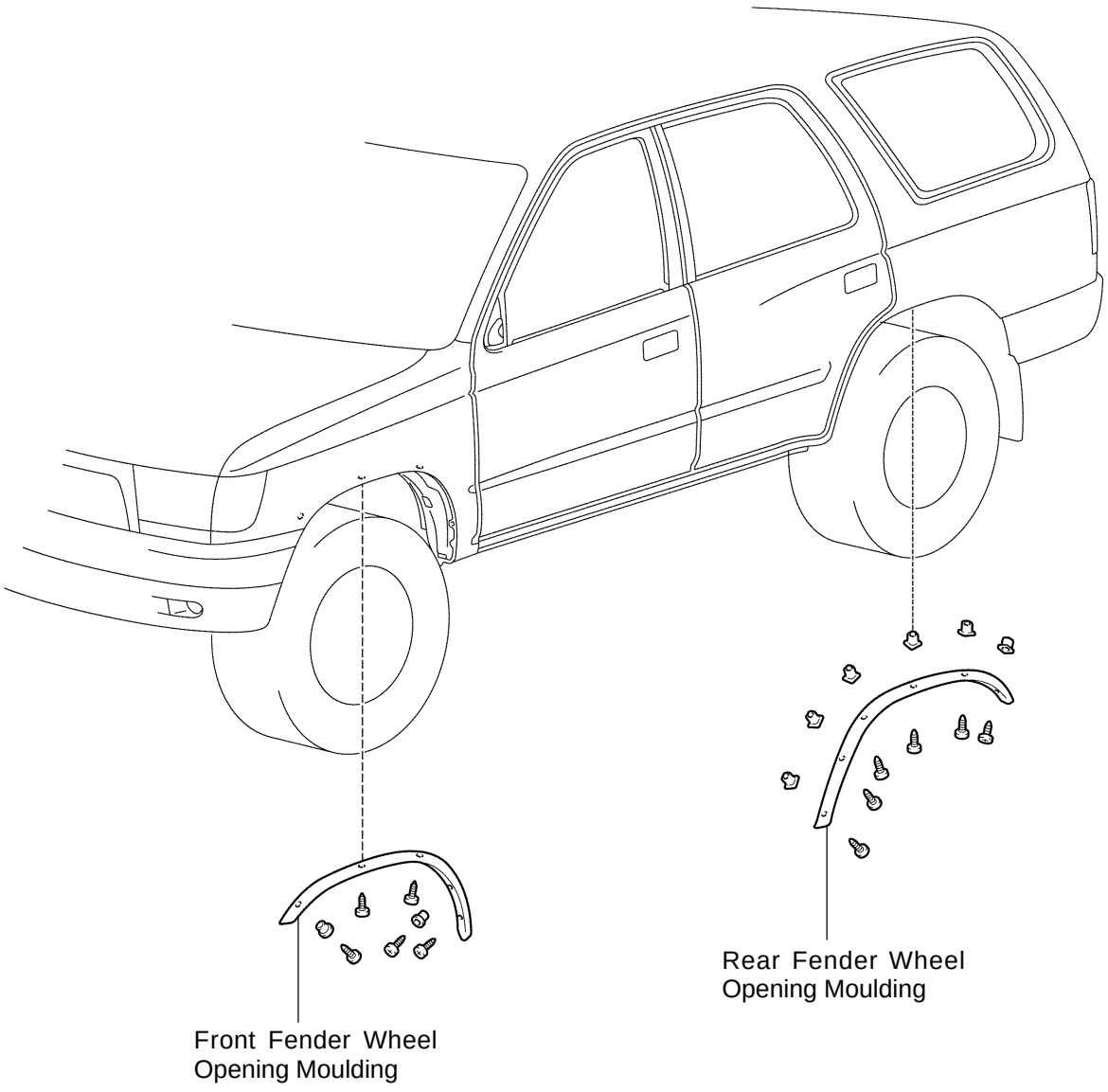
HINT:

Install them with the rivet firmly pressed perpendicularly against the installation hole.

WHEEL ARCH MOULDING

BO2N4-01

COMPONENTS



P

H12328

BO2N5-01

REMOVAL

1. REMOVE FRONT FENDER WHEEL OPENING MOULDING

(a) Remove the 5 screws.

(b) Remove the front fender wheel opening moulding.

2. REMOVE QUARTER WHEEL OPENING MOULDING

(a) Remove the 6 screws.

(b) Remove the quarter wheel opening moulding.

BO2N6-01

INSTALLATION

1. INSTALL QUARTER WHEEL OPENING MOULDING

Install the quarter wheel opening moulding with the 6 screws.

Torque:5.0 N·m (50 kgf·cm, 43 in.·lbf)

2. REMOVE FRONT FENDER WHEEL OPENING MOULDING

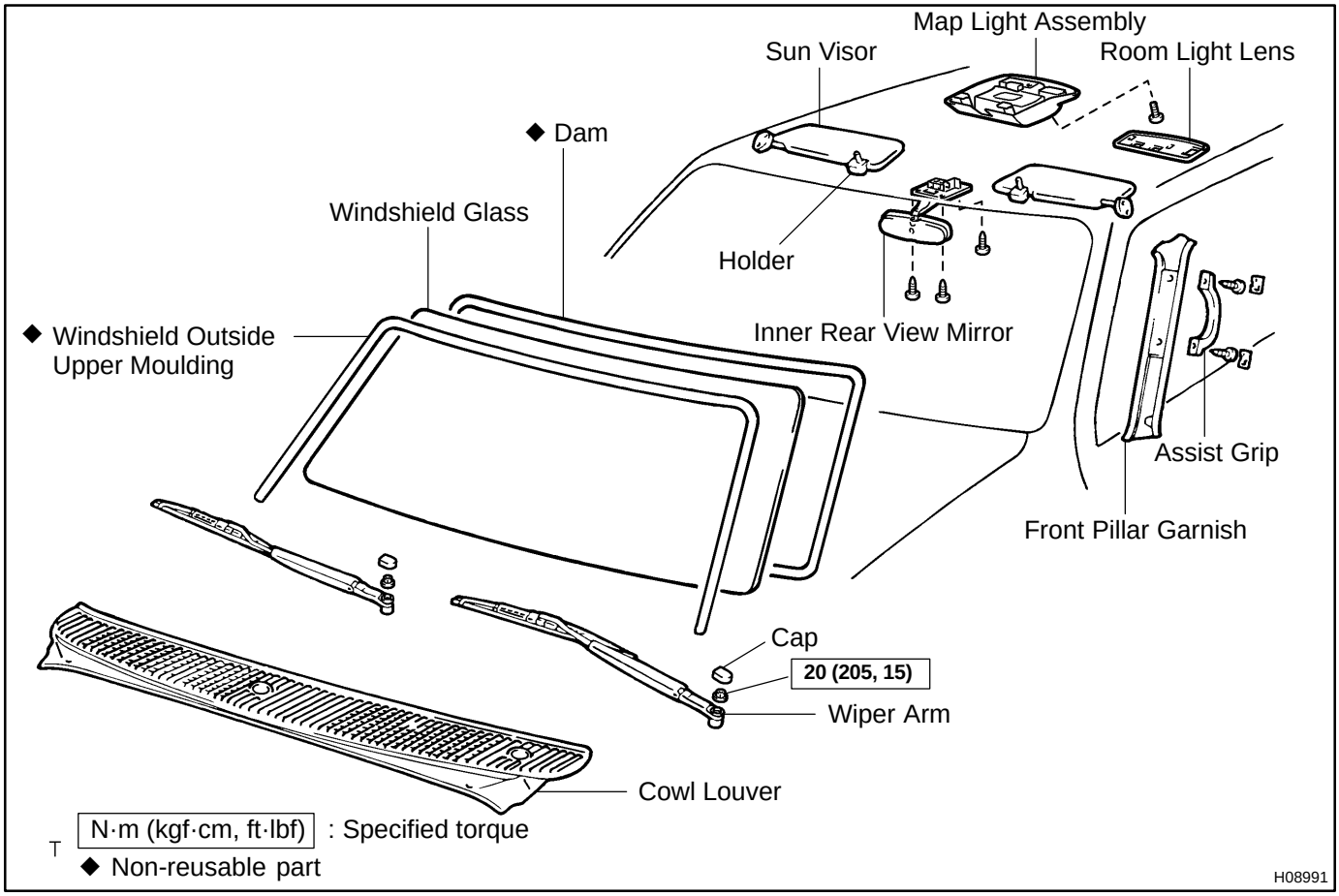
Install the front fender wheel opening moulding with the 5 screws.

Torque:5.0 N·m (50 kgf·cm, 43 in.·lbf)

WINDSHIELD

COMPONENTS

BO0CD-02



BO26G-01

REMOVAL

1. REMOVE ROOM LIGHT LENS AND MAP LIGHT ASSEMBLY

(a) Remove the room light lens, screw and map light assembly.

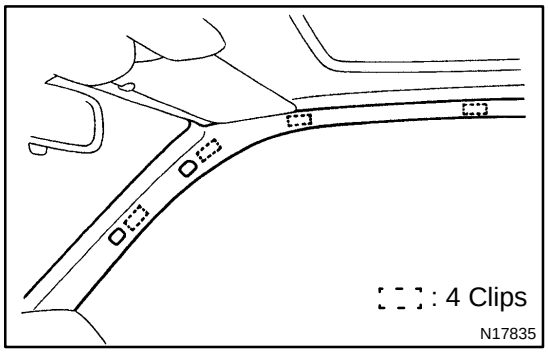
(b) Disconnect the connector.

2. REMOVE INNER REAR VIEW MIRROR

Remove the 3 screws and inner rear view mirror.

3. REMOVE SUN VISORS AND HOLDERS

4. REMOVE ASSIST GRIPS



5. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

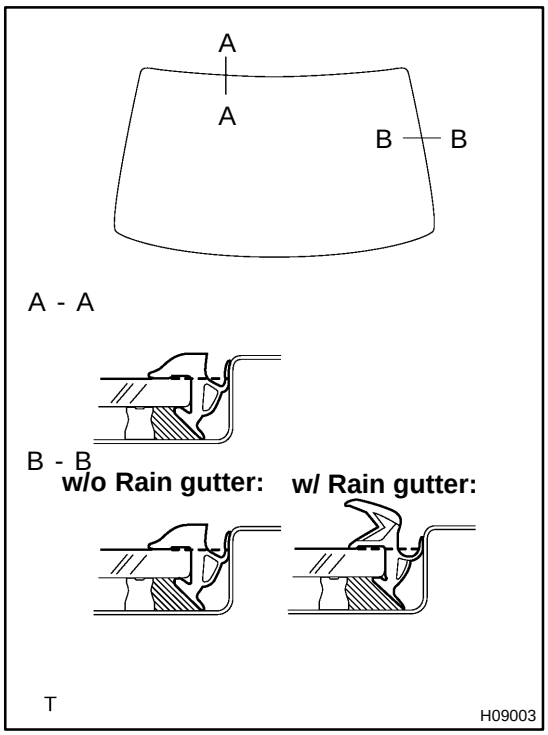
6. REMOVE WIPER ARMS

Remove the 2 caps, 2 nuts and wiper arms.

7. REMOVE COWL LOUVER

Remove the 6 screws, 4 clips and cowl louver.

8. REMOVE WEATHERSTRIP AND PROTECTOR



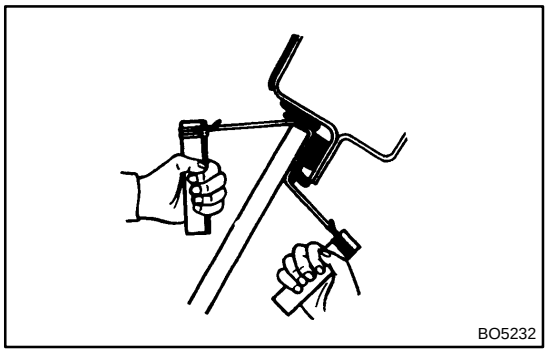
9. REMOVE WINDSHIELD OUTSIDE UPPER MOULDING

(a) Using a knife, cut off the moulding, as shown in the illustration.

NOTICE:

Do not damage the body with the knife.

(b) Remove the remaining moulding.



10. REMOVE WINDSHIELD GLASS

(a) Push piano wire through between the body and glass from the interior.

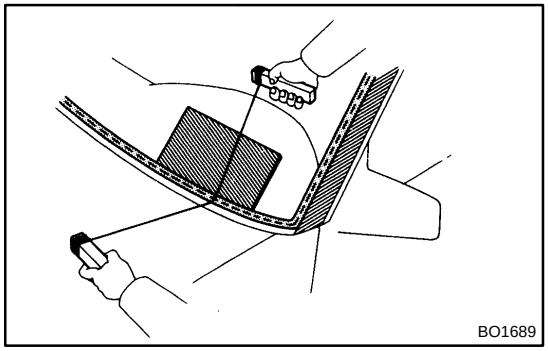
(b) Tie both wire ends to a wooden block or similar object.

HINT:

Apply protective tape to the outer surface to keep the surface from the being scratched.

NOTICE:

When separating the glass, take care not to damage the paint and interior and exterior ornaments. To prevent scratching the safety pad when removing the windshield, place a plastic sheet between the piano wire and safety pad.



(c) Cut the adhesive by pulling the piano wire around it.

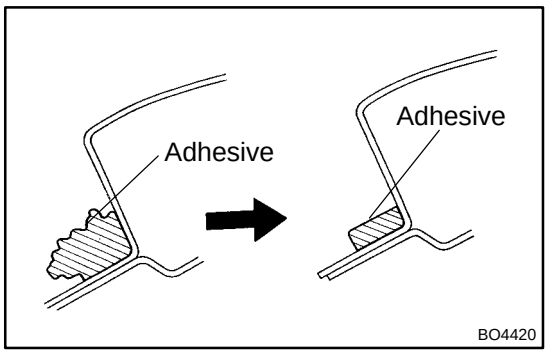
(d) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO26H-01

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

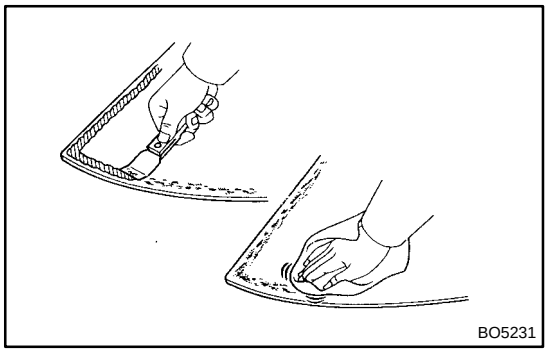
HINT:

Leave as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



2. CLEAN REMOVED GLASS

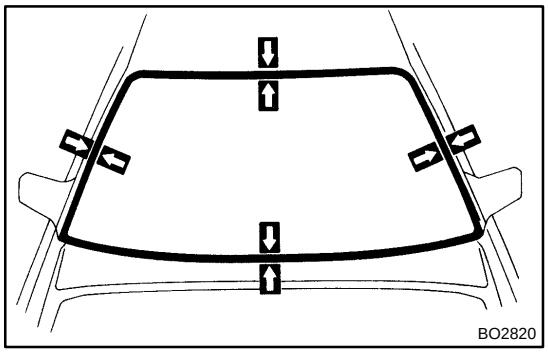
(a) Remove the damaged dam.

(b) Using a scraper, remove the adhesive sticking to the glass.

(c) Clean the glass with cleaner.

NOTICE:

- **Be careful not to damage the glass.**
- **Do not touch the glass after cleaning it.**



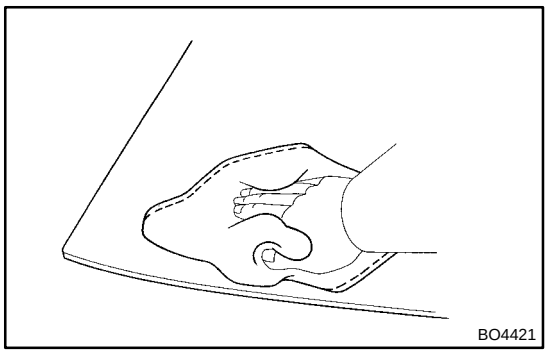
3. POSITION GLASS

(a) Place the glass in the correct position.

(b) Check that all contacting parts of the glass rim are perfectly even and do not make contact with the spacers.

(c) Place reference marks between the glass and body.

(d) Remove the glass.

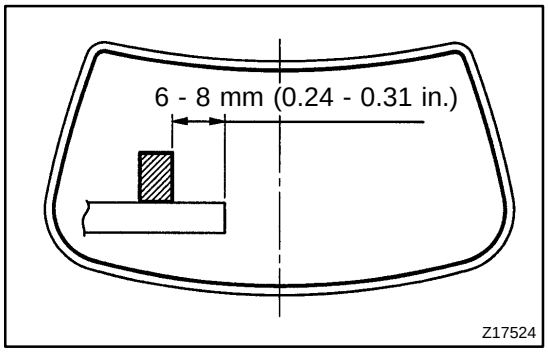


4. CLEAN CONTACT SURFACE OF GLASS

Using a cleaner, clean the contact surface which is black-colored area around the entire glass rim.

NOTICE:

Do not touch the glass face after cleaning it.

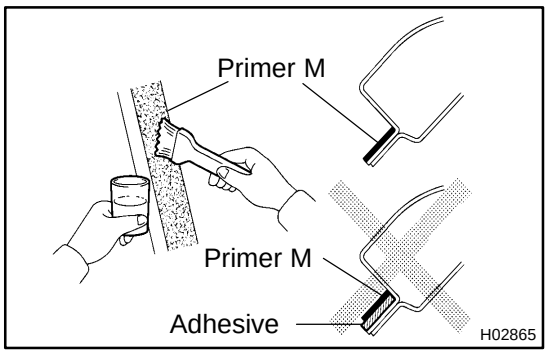


5. INSTALL NEW DAM

Install new dam with double-stick tape as shown in the illustration.

NOTICE:

Do not touch the glass face after cleaning it.

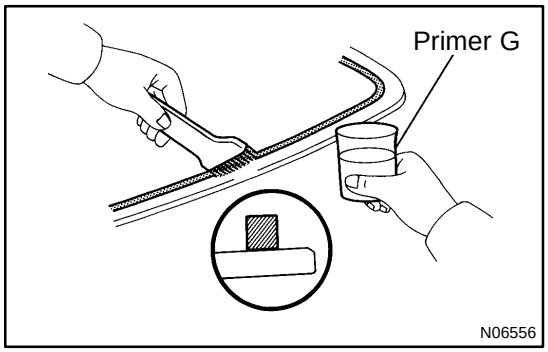


6. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



7. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.

(b) Before the primer dries, wipe it off with a clean shop rag.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**

8. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.

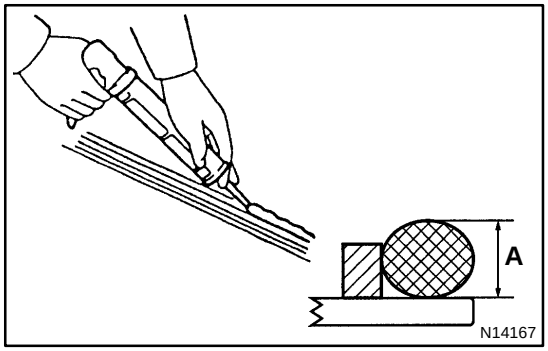
Part No. 08850-00801 or equivalent

HINT:

After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35˚C (95 ˚F)	15 minutes
20˚C (68 ˚F)	100 minutes
5˚C (41 ˚F)	8 hours

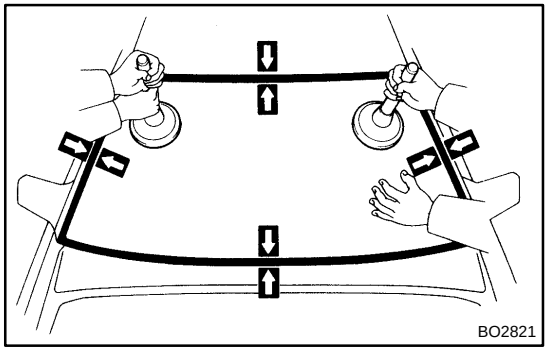
(b) Load the cartridge into the sealer gun.



(c) Coat the glass with adhesive, as shown.

Adhesive height:

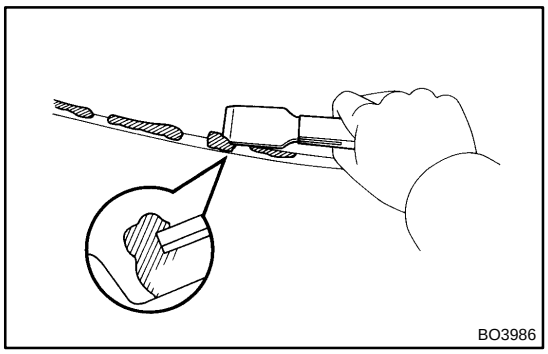
A: 8 - 12 mm (0.31 - 0.47 in.)



9. INSTALL GLASS

(a) Position the glass so that the reference marks are lined up, and press it in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.



(c) Use a scraper to remove any excess or protruding adhesive.

(d) Hold the windshield glass in place securely with a protective tape or equivalent until the adhesive hardens.

NOTICE:

Take care not to drive the vehicle during the time described in the table below.

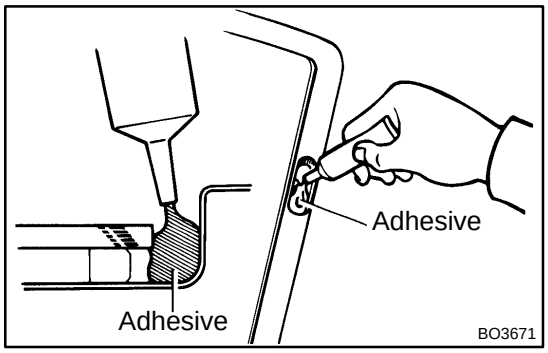
Temperature	Minimum time prior to driving the vehicle
35˚C (95 ˚F)	1.5 hours
20˚C (68 ˚F)	5 hours
5˚C (41 ˚F)	24 hours

10. INSPECT FOR LEAKS AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.

(b) Seal any leak with sealant.

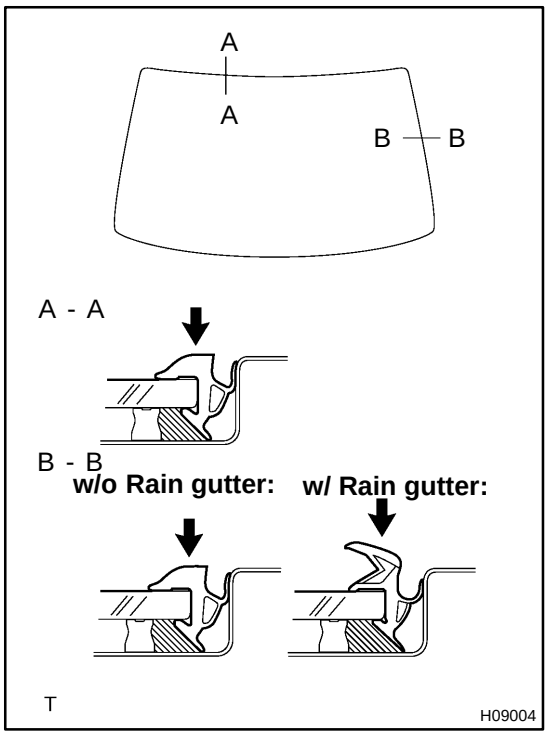
Part No. 08833-00030 or equivalent



11. APPLY ADHESIVE AT MOULDING INSTALLATION AREA

Coat the glass with adhesive at the moulding installation area.

Part No. 08833-00030 or equivalent



12. INSTALL WINDSHIELD OUTSIDE UPPER MOULDING

Place the moulding into the body and tap it by hand.

13. INSTALL PROTECTOR AND WEATHERSTRIP

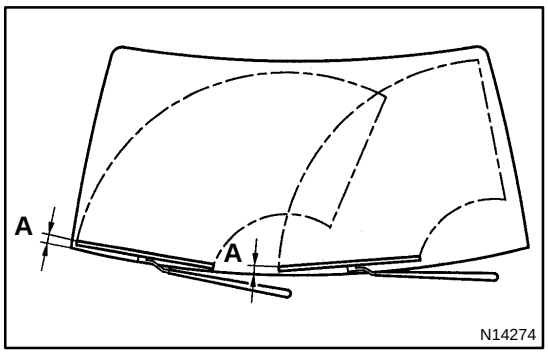
14. INSTALL COWL LOUVER

Install the cowl louver with the 6 screws and 4 clips.

15. INSTALL WIPER ARMS

(a) Operate the wipers once and turn the wiper switch OFF.

(b) Install the wiper arms and tighten the 2 nuts by hand.



(c) Adjust the installation positions of the wiper arms to the positions shown in the illustration.
A: Approx. 25 mm (0.98 in.)

(d) Torque the 2 nuts.
Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

(e) Install the 2 caps.

16. INSTALL FRONT PILLAR GARNISHES

17. INSTALL ASSIST GRIPS

18. INSTALL SUN VISORS AND HOLDERS

19. INSTALL INNER REAR VIEW MIRROR

Install the inner rear view mirror with the 3 screws.

20. INSTALL MAP LIGHT ASSEMBLY AND ROOM LIGHT LENS

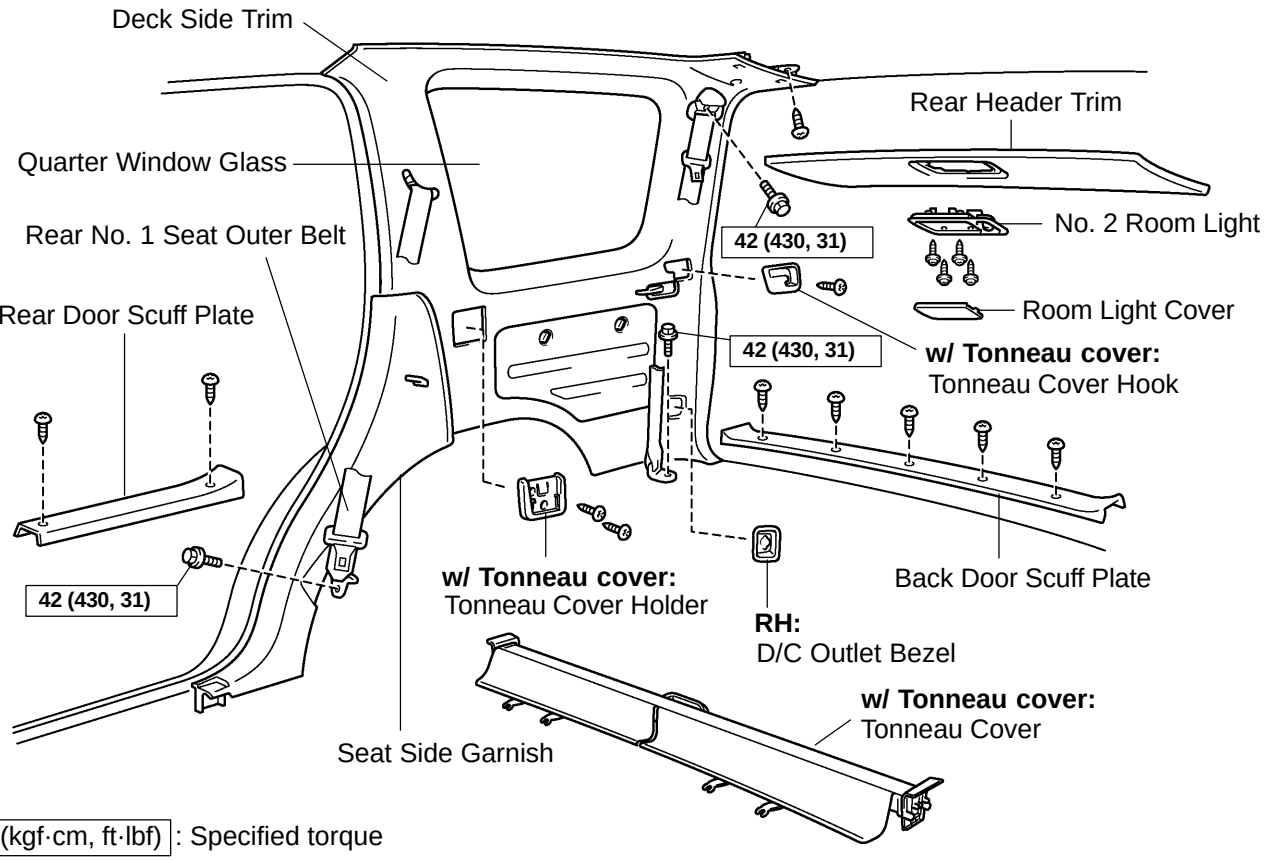
(a) Connect the connector.

(b) Install the map light assembly with the screw and room light lens.

QUARTER WINDOW GLASS

BO0CG-02

COMPONENTS



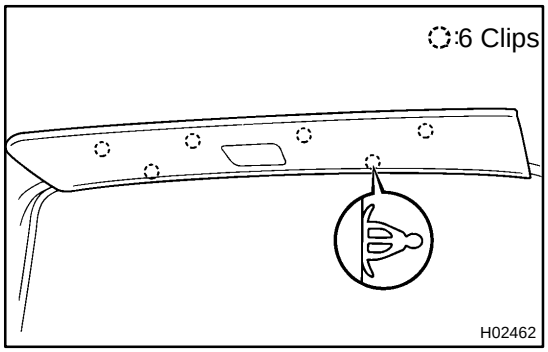
BO0CH-02

REMOVAL

1. REMOVE NO. 2 ROOM LIGHT

(a) Remove the room light cover, 4 screws and No. 2 room light.

(b) Disconnect the connector.



2. REMOVE REAR HEADER TRIM

Using a screwdriver, remove the rear header trim.

HINT:

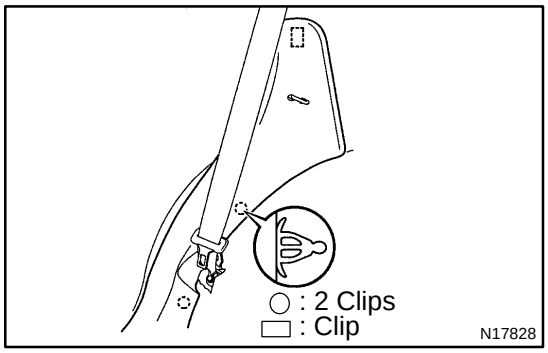
Tape the screwdriver tip before use.

3. REMOVE BACK DOOR SCUFF PLATE

Remove the 5 screws and back door scuff plate.

4. REMOVE REAR DOOR SCUFF PLATE

Remove the 2 screws and rear door scuff plate.

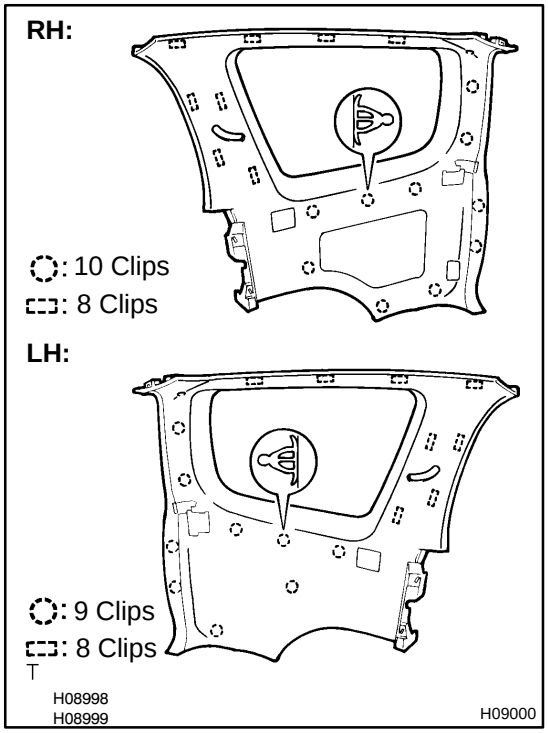


5. REMOVE REAR SEAT SIDE GARNISH

Using a screwdriver, remove the rear seat side garnish.

HINT:

Tape the screwdriver tip before use.



6. REMOVE DECK SIDE TRIM

(a) RH:

Using a screwdriver, remove the D/C outlet bezel, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

(b) w/ Tonneau cover:

Remove the tonneau cover.

(c) w/ Tonneau cover:

Remove the 2 screws and tonneau cover holder.

(d) w/ Tonneau cover:

Remove the screw and tonneau cover hook.

(e) Remove the screw.

(f) Remove the rear No. 1 seat outer belt floor anchor.

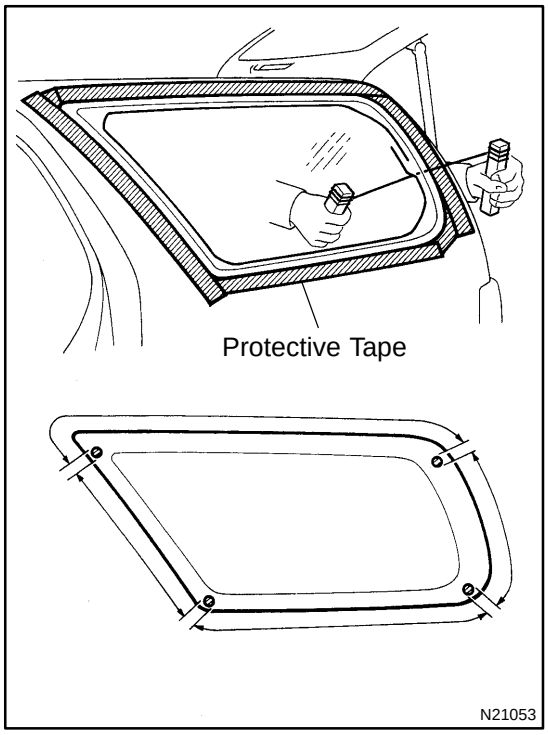
(g) Remove the rear No. 2 seat outer belt.

(h) Insert a screwdriver between the trim and door panel to remove the trim, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

(i) Remove the deck side trim with the rear No. 1 and No. 2 seat belts passed through its hole.



7. REMOVE QUARTER WINDOW GLASS

(a) w/ Diversity antenna:
Disconnect the connector.

(b) Push piano wire through between body and glass from the interior.

(c) Tie both wire ends to a wooden block or similar object.

HINT:

Apply protective tape to the outer surface to keep the surface from being scratched.

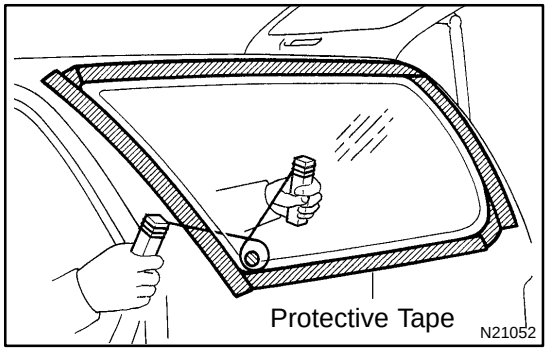
NOTICE:

When separating the glass, take care not to damage the paint and exterior.

(d) Cut the adhesive by pulling the piano wire around it.

HINT:

Cut the adhesive as shown in the illustration, leaving the adhesive where the pins are.



(e) Push the piano wire through as shown in the illustration, cut off the adhered parts to the clip.

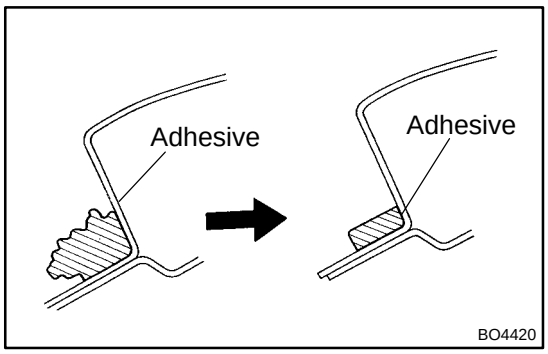
(f) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.

BO0CI-03

INSTALLATION



1. CLEAN AND SHAPE CONTACT SURFACE OF BODY

(a) Using a knife, cut away any rough areas on the body.

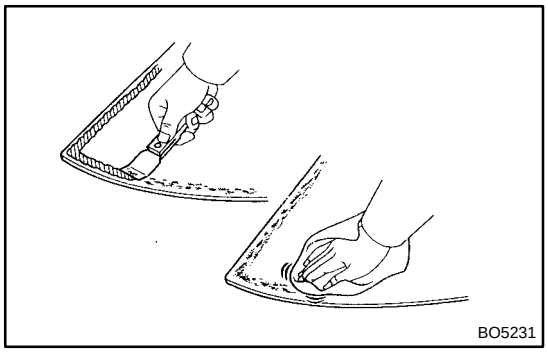
HINT:

Lease as much of the adhesive on the body as possible.

(b) Clean the cutting surface of the adhesive with a piece of shop rag saturated in cleaner.

HINT:

Even if all the adhesive has been removed, clean the body.



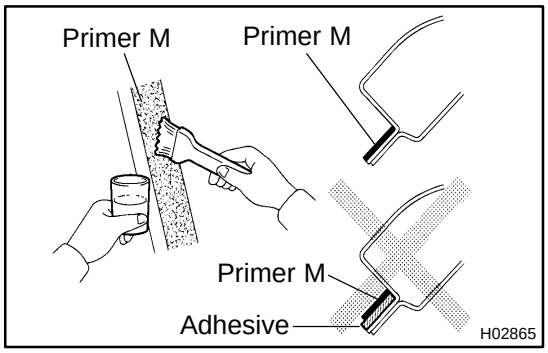
2. CLEAN REMOVED GLASS

(a) Using a scraper, remove the adhesive sticking to the glass.

(b) Clean the glass with cleaner.

NOTICE:

Do not touch the glass after cleaning it.

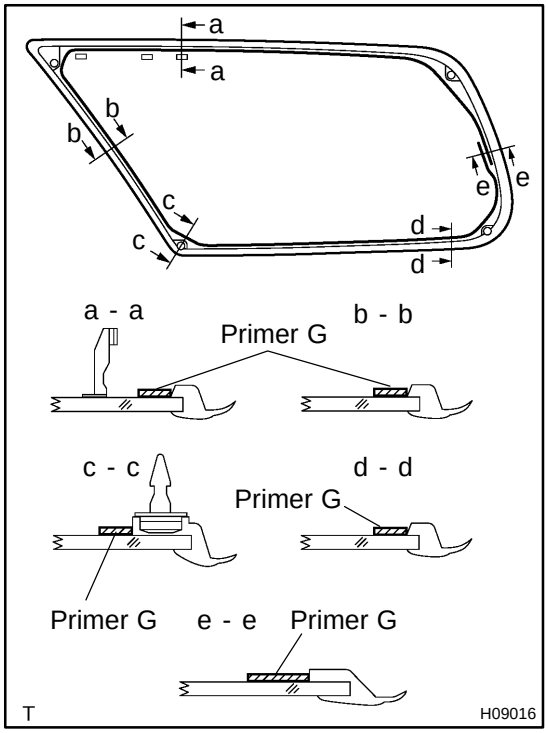


3. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat Primer M to the exposed part of body on the vehicle side.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not coat Primer M to the adhesive.**
- **Do not keep any of the opened Primer M for later use.**



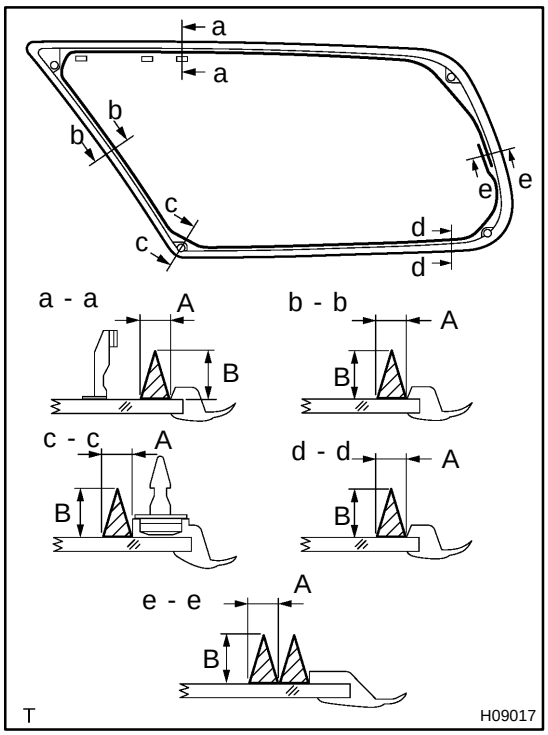
4. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and contact surface with Primer G.

(b) Before the primer dries, wipe it off with a clean shop rag.

NOTICE:

- **Let the primer coating dry for 3 minutes or more.**
- **Do not keep any of the opened Primer G for later use.**



5. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle.
Part No. 08850-00801 or equivalent

HINT:
After cutting off the tip, use all adhesive within the time described in the table below.

Temperature	Tackfree time
35 ˚C (95 ˚F)	15 minutes
20 ˚C (68 ˚F)	100 minutes
5 ˚C (41 ˚F)	8 hours

(b) Load the cartridge into the sealer gun.
(c) Coat the glass with adhesive as shown in the illustration.
A: 8.0 mm (0.315 in.)
B: 12.0 mm (0.472 in.)

6. INSTALL QUARTER WINDOW GLASS

(a) Install the glass to the body.
(b) Use adhesive tape to keep the glass installed tightly against the body.

NOTICE:
Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to driving the vehicle
35 ˚C (95 ˚F)	1.5 hours
20 ˚C (68 ˚F)	5 hours
5 ˚C (41 ˚F)	24 hours

7. INSPECT FOR LEAKS AND REPAIR

(a) Conduct a leak test after the hardening time has elapsed.
(b) Seal any leak with sealant.
Part No. 08833-00030 or equivalent

8. INSTALL DECK SIDE TRIM

(a) Connect the connector, and install the deck side trim with the rear No. 1 and No. 2 seat belts passed through its hole.
(b) Install the rear No. 2 seat outer belt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)
(c) Install the rear No. 1 seat outer belt floor anchor.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)
(d) Install the screw.
(e) w/ Tonneau cover:
Install the tonneau cover hook with the screw.
(f) w/ Tonneau cover:
Install the tonneau cover holder with the 2 screws.
(g) w/ Tonneau cover:
Install the tonneau cover.
(h) RH:
Connect the connector and install the D/C outlet bezel.

9. INSTALL REAR SEAT SIDE GARNISH

10. INSTALL REAR DOOR SCUFF PLATE

Install the rear door scuff plate with the 2 screws.

11. INSTALL BACK DOOR SCUFF PLATE

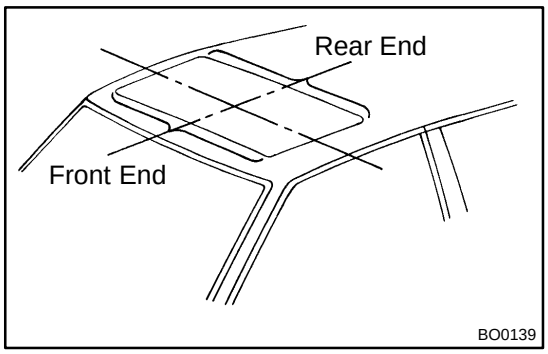
Install the back door scuff plate with the 5 screws.

12. INSTALL REAR HEADER TRIM

13. INSTALL NO. 2 ROOM LIGHT

(a) Connect the connector.

(b) Install the No. 2 room light with the 4 screws and room light cover.



SLIDING ROOF

BO0CJ-02

ON-VEHICLE INSPECTION

INSPECT SLIDING ROOF GLASS ALIGNMENT

(a) Start the engine and check the operation time of the sliding roof.
Operation time: Approx. 5 sec.

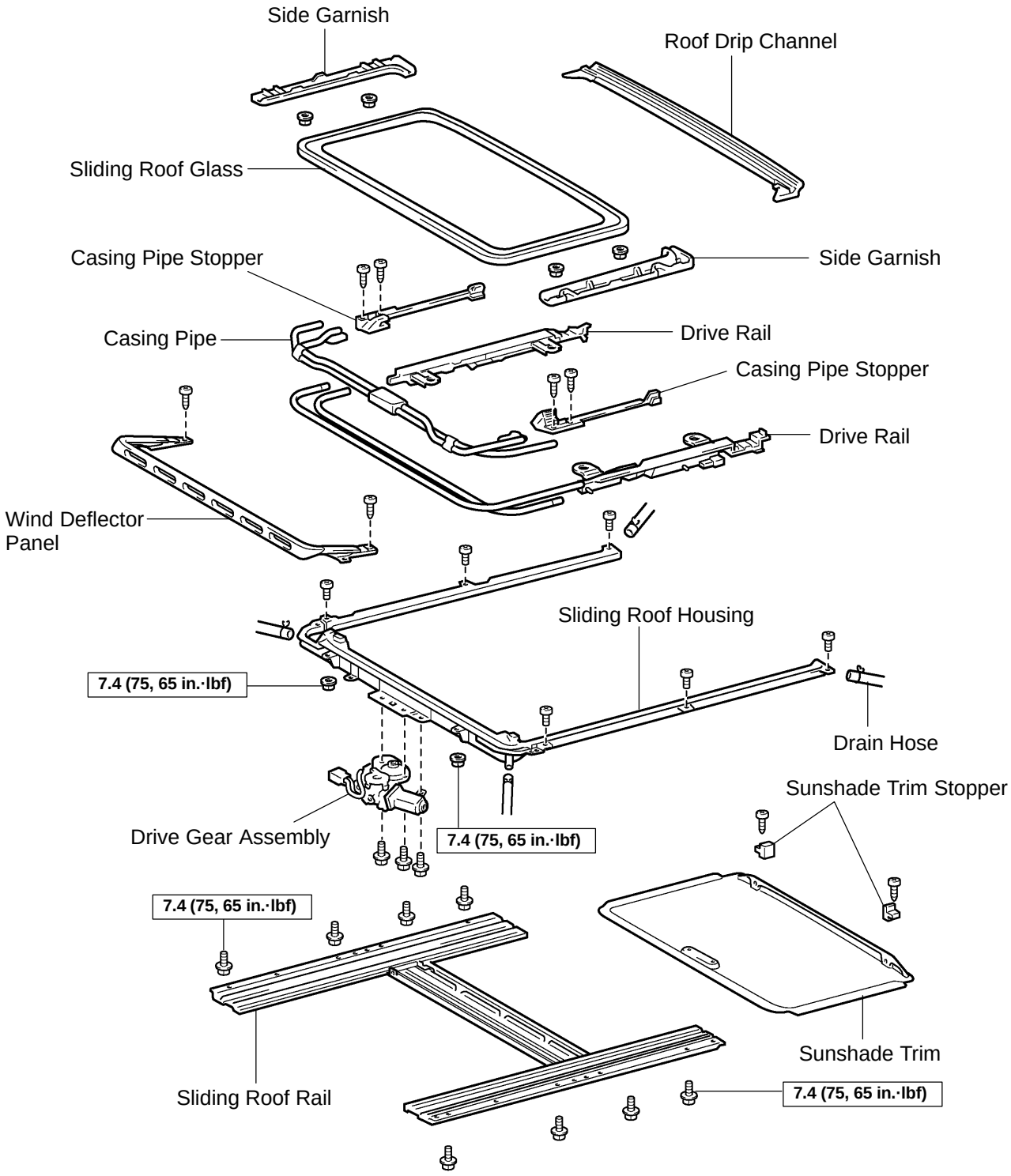
(b) Check for abnormal noise or binding during operation.

(c) With the sliding roof fully closed, check for water leakage.

(d) Check for a difference in level between the sliding roof weatherstrip and roof panel.
Front end: 0 ± 1.5 mm (0 ± 0.059 in.)
Rear end: 0 ± 1.5 mm (0 ± 0.059 in.)

BO26I-01

COMPONENTS



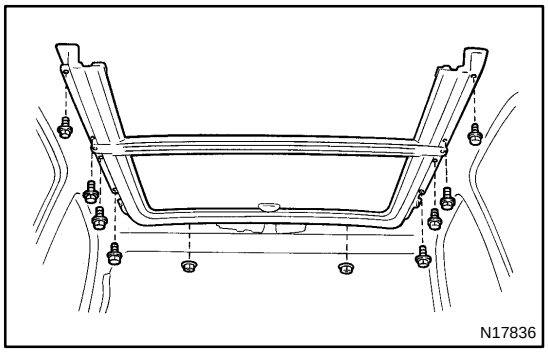
T N·m (kgf·cm, ft·lbf) : Specified torque

H09011

BO26J-01

REMOVAL

1. REMOVE ROOF HEADLINING
(See page BO-78)



2. REMOVE SLIDING ROOF HOUSING ASSEMBLY

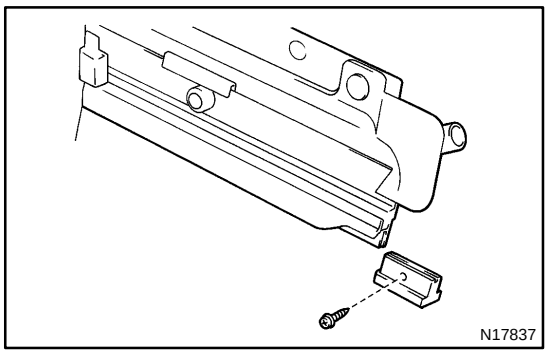
(a) Disconnect the 4 drain hoses and connectors.

(b) Remove the 2 nuts, 8 bolts and sliding roof housing assembly.

Torque: 7.4 N·m (75 kgf·cm, 65 in.·lbf)

BO0CM-02

DISASSEMBLY



1. REMOVE SUNSHADE TRIM STOPPER

(a) Remove the screw and stopper.

(b) Employ the same manner described above to the other side.

2. REMOVE SUNSHADE TRIM

3. REMOVE SIDE GARNISHES

4. REMOVE SLIDING ROOF GLASS

Remove the 4 nuts and glass.

5. REMOVE ROOF DRIP CHANNEL

Using a screwdriver, remove the roof drip channel.

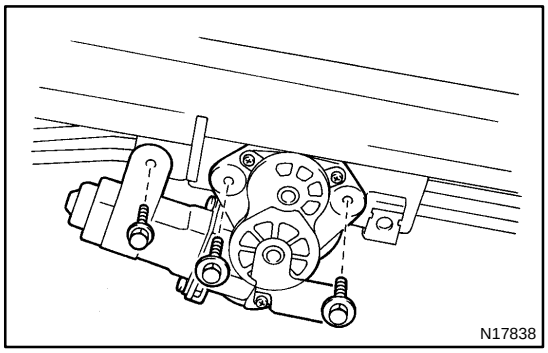
HINT:

Tape the screwdriver tip before use.

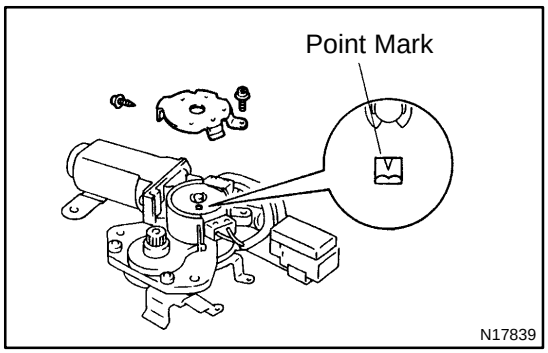
6. REMOVE CONTROL RELAY AND DRIVE GEAR ASSEMBLY

(a) Disconnect the connectors.

(b) Remove the bolt and relay.



(c) Remove the 3 bolts and drive gear assembly.

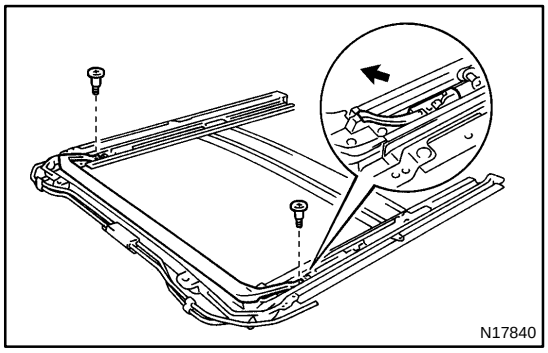


(d) Remove the screw and cam plate cover.

(e) Remove the large screw, washers and shims.

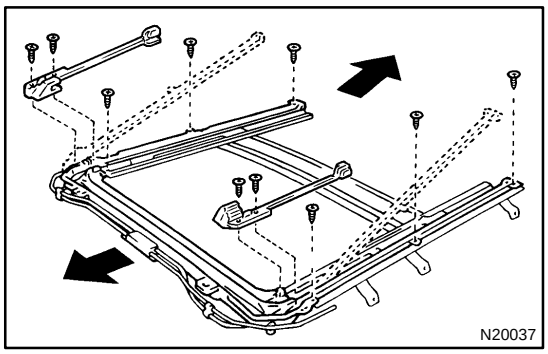
(f) Turn the drive shaft with a screwdriver to align the housing and gear point mark, as shown.

(g) Install the cam plate cover and screw.



7. REMOVE WIND DEFLECTOR PANEL

Remove the 2 screws and panel.



8. REMOVE SLIDING ROOF HOUSING

(a) Remove the 4 screws with casing pipe stoppers.

(b) Remove the 6 screws and housing.

9. REMOVE DRIVE RAIL

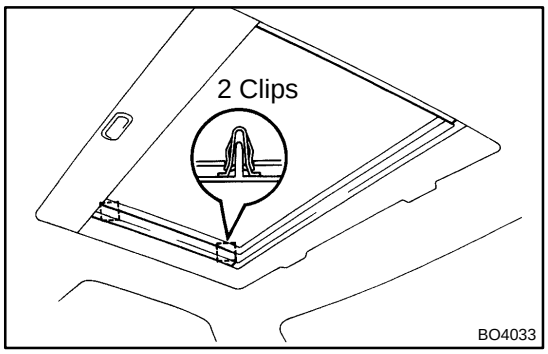
(a) Pull off the cable of drive rail from the casing pipe.

(b) Slide the drive rail forward, then remove it.

10. ADJUST DRIVE RAIL (See page BO-57)

BO0CN-02

ADJUSTMENT

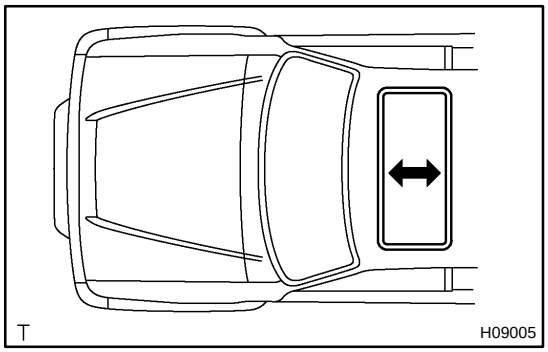


1. REMOVE SIDE GARNISHES

Before making adjustments, remove the left and right side garnishes.

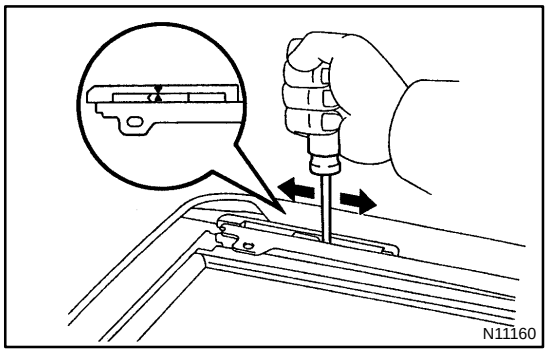
HINT:

After adjustment, reinstall the side garnishes.



2. ADJUST FORWARD OR REARWARD

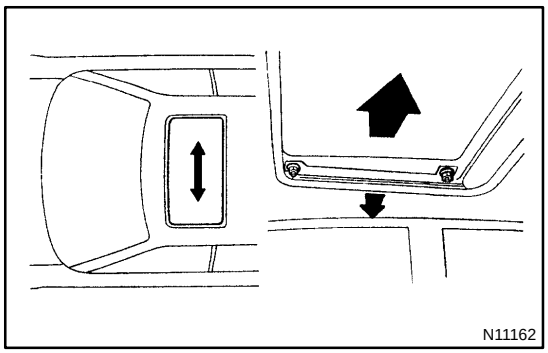
(a) Adjust by loosening the sliding roof installation nuts, and move the sliding roof bracket forward and backward.



(b) When the front or rear alignment is not correct, remove the glass and adjust the drive rail.

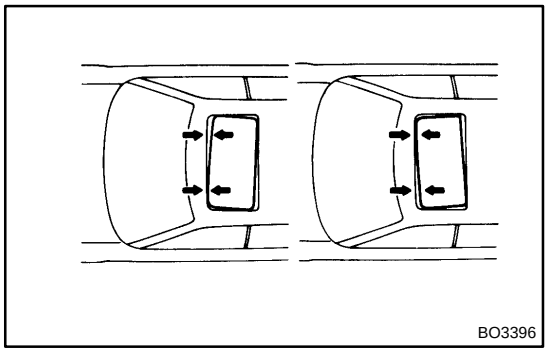
(c) Using a screwdriver, slide the link forward or backward to align the 2 marks as shown.

(d) Slide the bracket to the forefront with your hand.

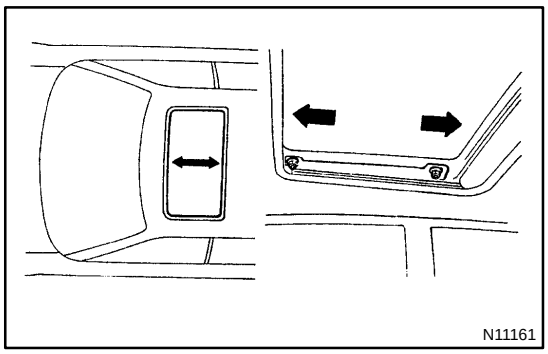


3. ADJUST RIGHT OR LEFT

Adjust by loosening the sliding roof rear shoe installation nuts, and move the sliding roof to the right and left.



4. ADJUST CLEARANCE
(Difference in left and right clearance)



Adjust by loosening the sliding roof installation nuts and readjust the sliding roof to the proper position.

BO0CO-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO-60).

BO0CP-01

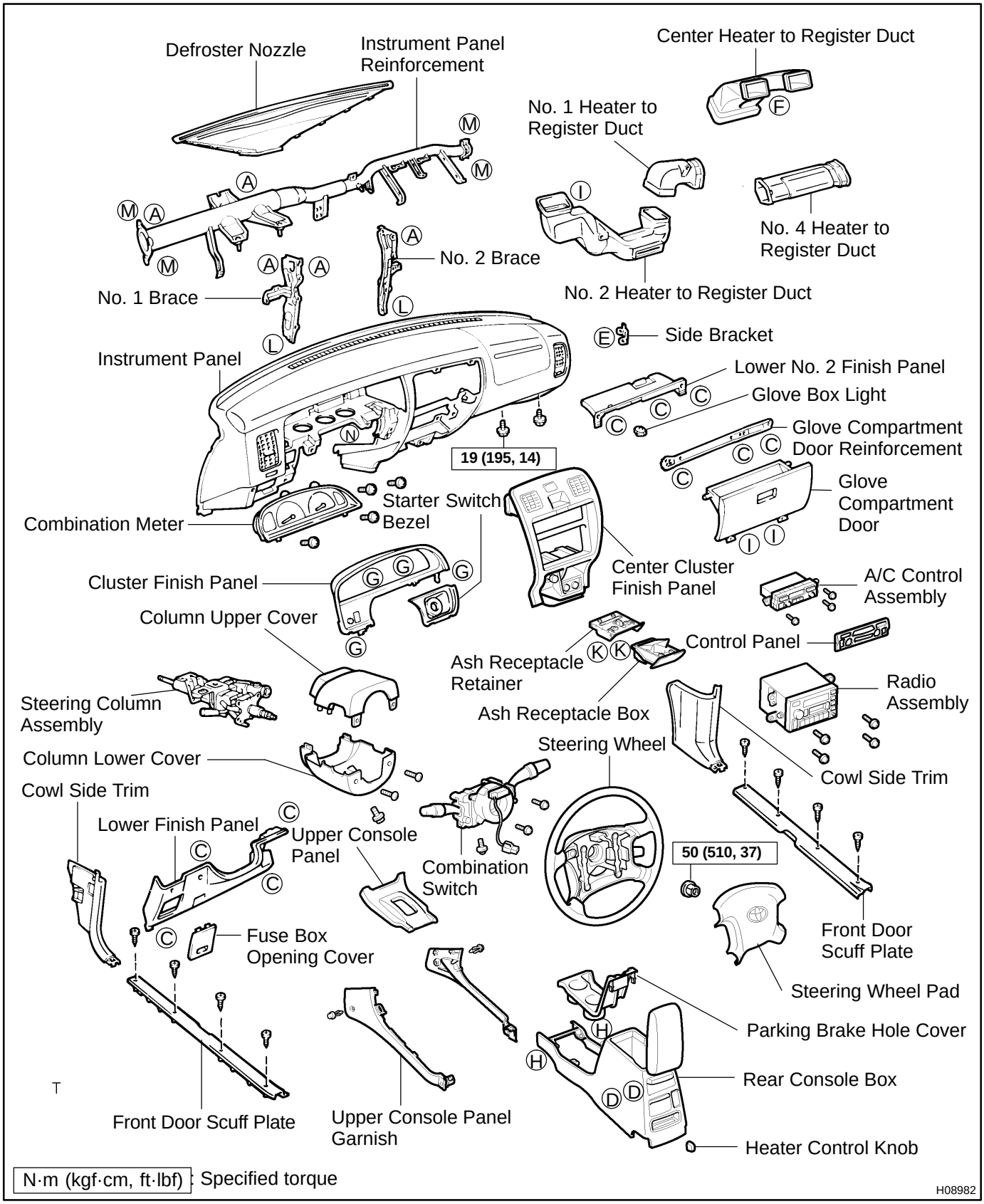
INSTALLATION

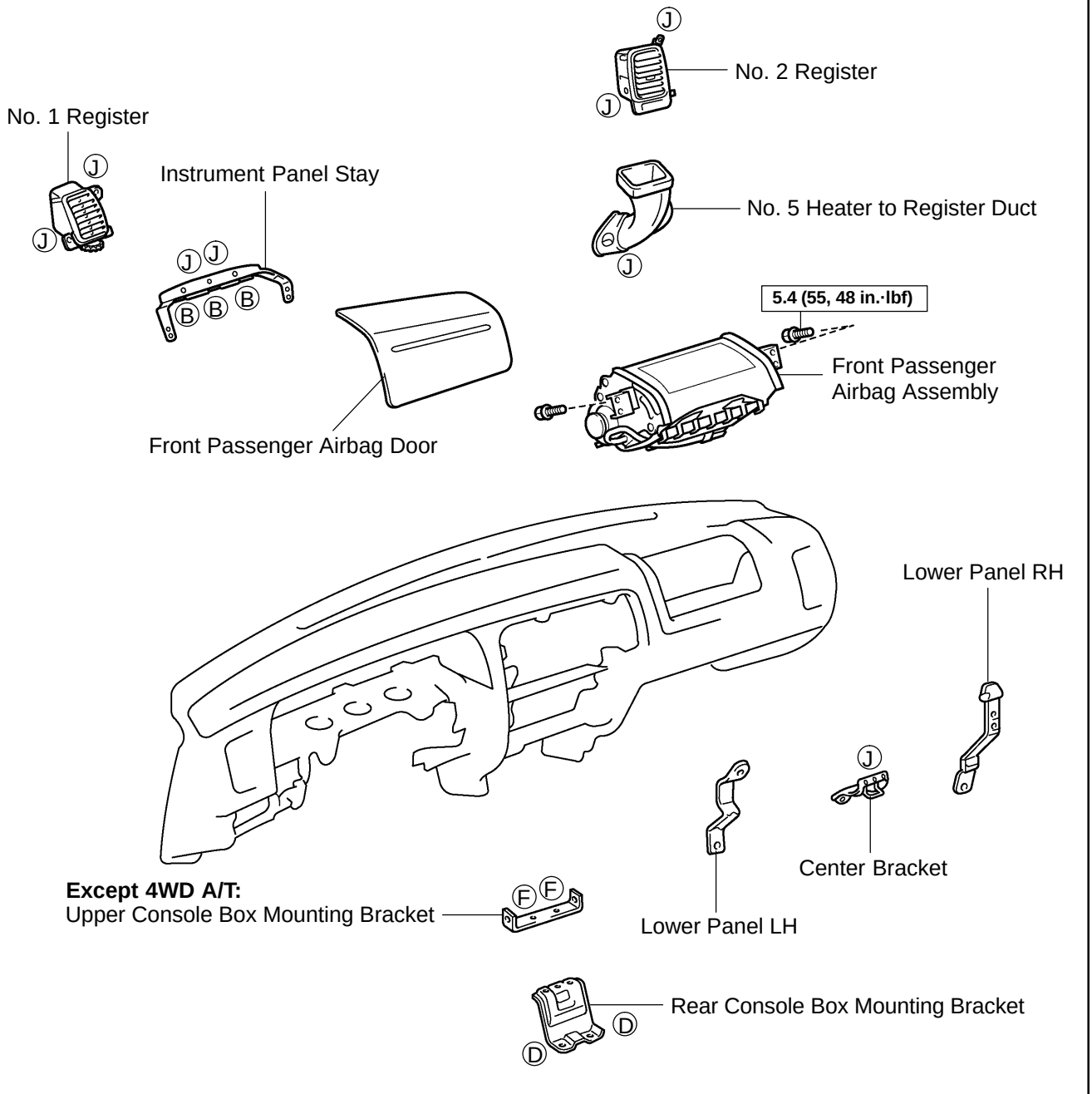
Installation is in the reverse order of removal (See page BO-59).

INSTRUMENT PANEL

COMPONENTS

BO0CQ-03





T

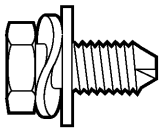
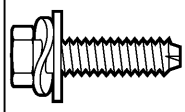
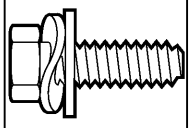
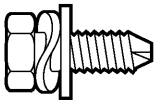
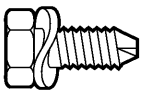
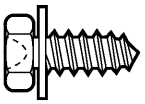
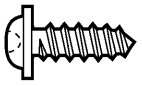
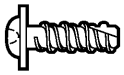
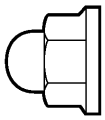
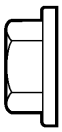
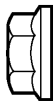
N·m (kgf·cm, ft·lbf) : Specified torque

H08985

HINT:

Screw shapes and sizes are indicated in the table below. The codes (”A” - ”N”) correspond to those indicated on the previous pages.

mm (in.)

	Shape	Size		Shape	Size		Shape	Size
Ⓐ		ø = 8 (0.31) L = 18 (0.71)	Ⓑ		ø = 6 (0.24) L = 24 (0.94)	Ⓒ		ø = 6 (0.24) L = 22 (0.87)
Ⓓ		ø = 6 (0.24) L = 18 (0.71)	Ⓔ		ø = 6 (0.24) L = 16 (0.63)	Ⓕ		ø = 6 (0.24) L = 16 (0.63)
Ⓖ		ø = 5.22 (0.21) L = 16 (0.63)	Ⓗ		ø = 5 (0.20) L = 16 (0.63)	Ⓘ		ø = 5 (0.20) L = 16 (0.63)
Ⓙ		ø = 5 (0.20) L = 14 (0.55)	Ⓚ		ø = 5 (0.20) L = 14 (0.55)	Ⓛ		ø = 8 (0.31)
Ⓜ		ø = 8 (0.31)	Ⓝ		ø = 6 (0.24)			

T

H09001

BO26K-01

REMOVAL

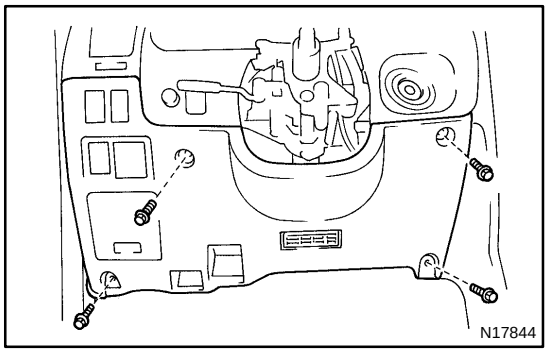
1. REMOVE STEERING WHEEL AND PAD
(See page SR-13)

2. REMOVE FRONT DOOR SCUFF PLATES

Remove the 8 screws and front door scuff plates.

3. REMOVE COWL SIDE TRIMS

4. REMOVE COLUMN UPPER AND LOWER COVERS AND COMBINATION SWITCH WITH SPIRAL CABLE
(See page SR-13)



5. REMOVE LOWER FINISH PANEL

(a) Remove the 4 bolts.

(b) Remove the 2 screws and disconnect the hood lock release lever.

(c) Remove the 2 screws and disconnect the fuel rid release lever.

(d) Using a screwdriver, remove the lower finish panel.

HINT:

Tape the screwdriver tip before use.

6. REMOVE NO. 2 HEATER TO REGISTER DUCT

Remove the screw and No. 2 heater to register duct.

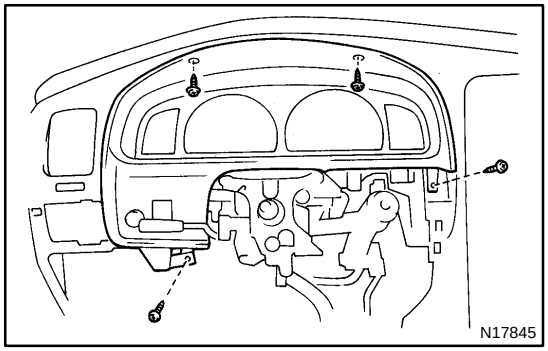
7. REMOVE NO. 1 HEATER TO REGISTER DUCT

8. REMOVE STARTER SWITCH BEZEL

Using a screwdriver, pry out the starter switch bezel.

HINT:

Tape the screwdriver tip before use.



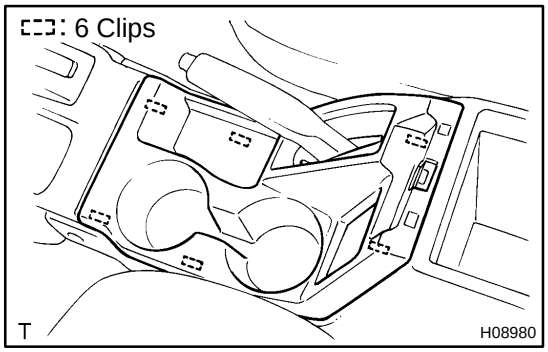
9. REMOVE CLUSTER FINISH PANEL

Remove the 4 screws and cluster finish panel.

10. REMOVE COMBINATION METER

(a) Disconnect the connectors.

(b) Remove the 4 screws and combination meter.

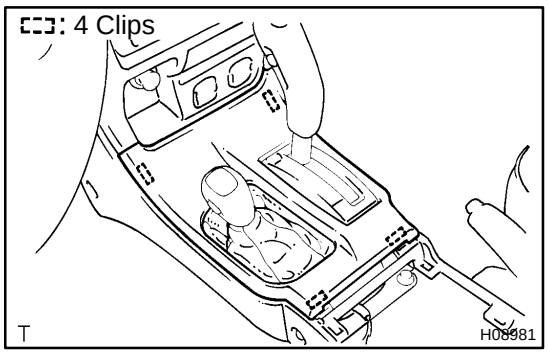


11. REMOVE PARKING BRAKE HOLE COVER

Using a screwdriver, pry out the parking brake hole cover.

HINT:

Tape the screwdriver tip before use.

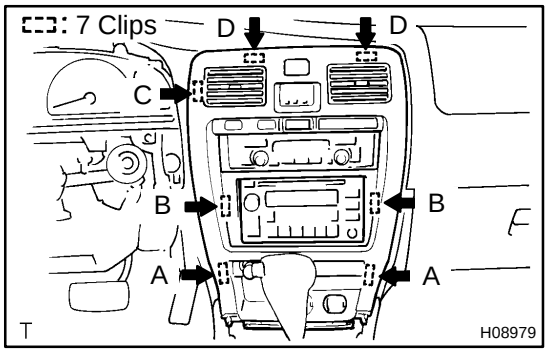


12. REMOVE UPPER CONSOLE PANEL

Using a screwdriver, pry out the upper console panel.

HINT:

Tape the screwdriver tip before use.



13. REMOVE CENTER CLUSTER FINISH PANEL

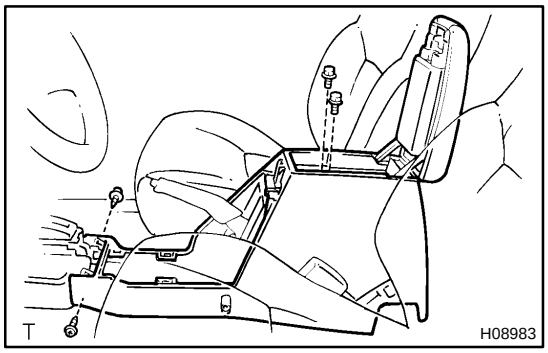
HINT:

Remove the clips in order ”A”, ”B”, ”C” and ”D” shown in the illustration.

(a) Insert your hand under the center cluster finish panel and remove the ”A” clips.

(b) Insert your hand between the instrument panel and center cluster finish panel and remove the rest of clips, then remove the center cluster finish panel.

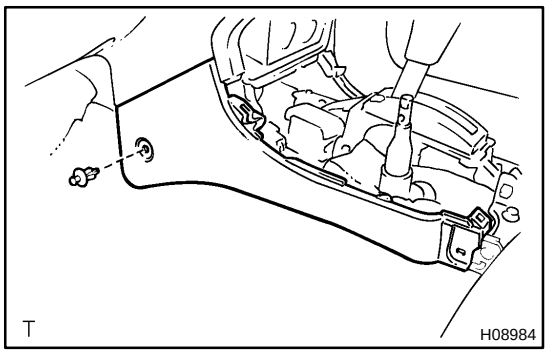
(c) Disconnect the connectors.



14. REMOVE REAR CONSOLE BOX

(a) Remove the heater control knob.

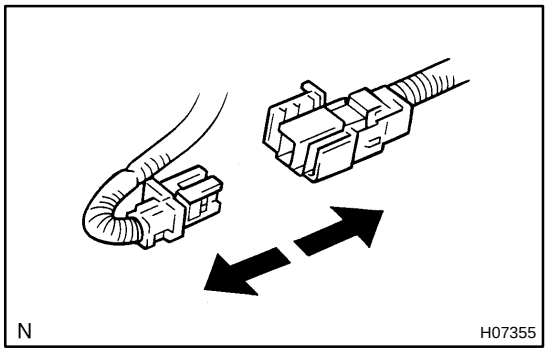
(b) Remove the 2 bolts, 2 screws and rear console box.



15. REMOVE UPPER CONSOLE PANEL GARNISH

(a) Remove the clip and upper console panel garnish.

(b) Employ the same manner described above to the other side.



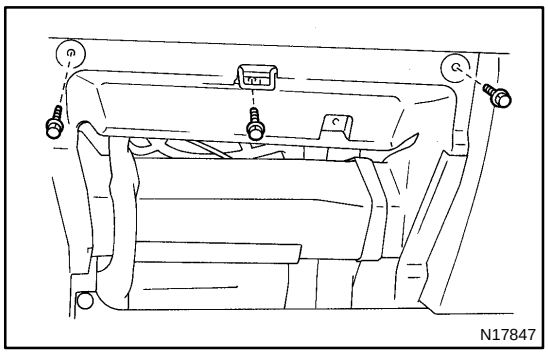
16. REMOVE GLOVE COMPARTMENT DOOR

(a) Remove the 2 screws and glove compartment door.

(b) Disconnect the front passenger airbag connector.

NOTICE:

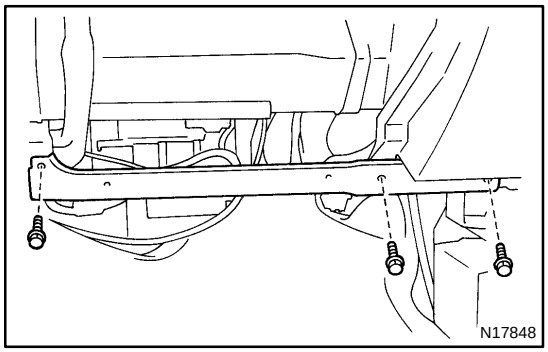
When handling the airbag connector, take care not to damage the airbag wire harness.



17. REMOVE LOWER NO. 2 FINISH PANEL

(a) Remove the glove box light.

(b) Remove the 3 bolts and lower No. 2 finish panel.



18. REMOVE GLOVE COMPARTMENT DOOR REINFORCEMENT

Remove the 3 bolts and glove compartment door reinforcement.

19. REMOVE NO. 4 HEATER TO REGISTER DUCT

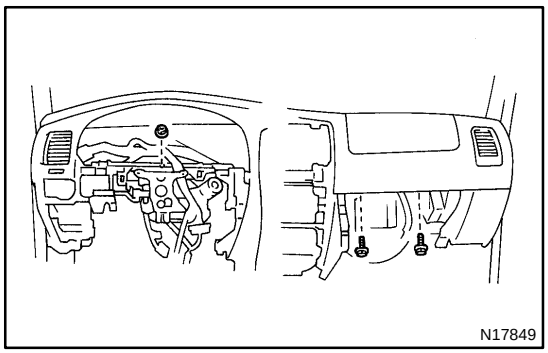
20. REMOVE RADIO ASSEMBLY

21. REMOVE SIDE BRACKET

Remove the bolt and side bracket.

22. Manual A/C:
REMOVE HEATER CONTROL ASSEMBLY
(See page AC-93)

23. Auto A/C:
REMOVE A/C CONTROL ASSEMBLY
(See page AC-84)



24. REMOVE INSTRUMENT PANEL

(a) Disconnect the airbag connector.

(b) Remove the nut and 2 bolts, as shown in the illustration.
Torque:
Bolt: 19 N·m (195 kgf·cm, 14 ft·lbf)

NOTICE:
Make sure the front passenger airbag assembly is installed to the specified torque.

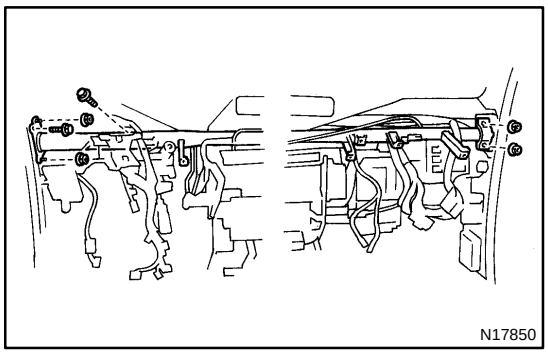
(c) Remove the screw and center heater to register duct.

(d) Remove the instrument panel.

25. REMOVE INSTRUMENT PANEL REINFORCEMENT

(a) Remove the 2 bolts, nut and No. 1 brace.

(b) Remove the bolt, nut and No. 2 brace.



(c) Remove the 4 nuts and 2 bolts, as shown in the illustration.

(d) Remove the steering column assembly (See page SR-13).

(e) Remove the defroster nozzle.

(f) Remove the instrument panel reinforcement.

BO26L-01

DISASSEMBLY

1. REMOVE NO. 5 HEATER TO REGISTER DUCT

Remove the screw and No. 5 heater to register duct.

2. REMOVE NO. 1 REGISTER

Remove the 2 screws and No. 1 register.

3. REMOVE NO. 2 REGISTER

Remove the 2 screws and No. 2 register.

4. REMOVE LOWER PANEL LH AND RH

5. REMOVE CENTER BRACKET

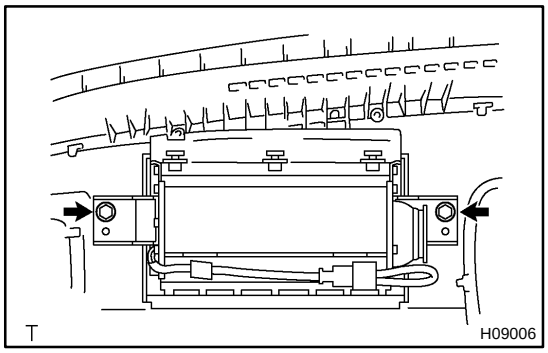
Remove the screw and center bracket.

6. Except 4WD A/T:
REMOVE UPPER CONSOLE BOX MOUNTING BRACKET

Remove the 2 screws and upper console box mounting bracket.

7. REMOVE REAR CONSOLE BOX MOUNTING BRACKET

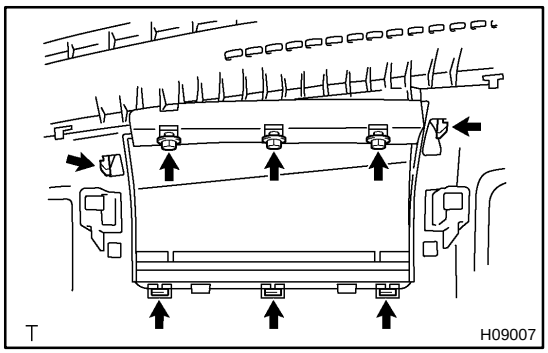
Remove the 2 bolts and rear console box mounting bracket.



8. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

(a) Remove the 2 bolts and front passenger airbag assembly.
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(b) Remove the 2 screws.



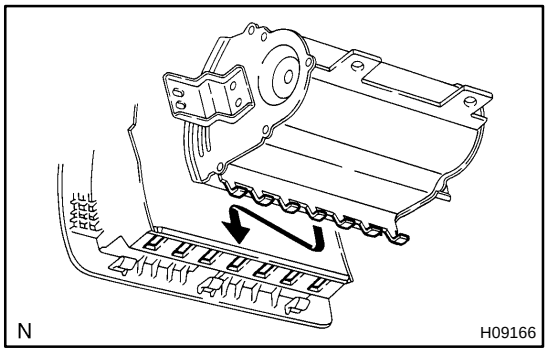
(c) Remove the 3 bolts and instrument panel stay, and pry up the 5 clips shown in the illustration, then remove the airbag door.

CAUTION:

- **Do not store the front passenger airbag assembly with the airbag deployment direction facing down.**
- **Never disassemble the front passenger airbag assembly.**

At the time of reassembly, please refer to the following items.

- **Insert the 7 claws of the passenger airbag assembly into the holes in the airbag door securely.**
- **Make sure that no foreign objects are trapped between the airbag door and bag, and within the module.**



NOTICE:

At the time of reassembly, please refer to the following items.

- **Make sure that the front passenger airbag assembly is installed to the specified torque.**

- **If the front passenger airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front passenger airbag assembly with a new one.**
- **When installing the front passenger airbag assembly, take care that the wiring does not interfere with other parts and is not pinched between other parts.**

BO0CT-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BO-73).

BO0CU-01

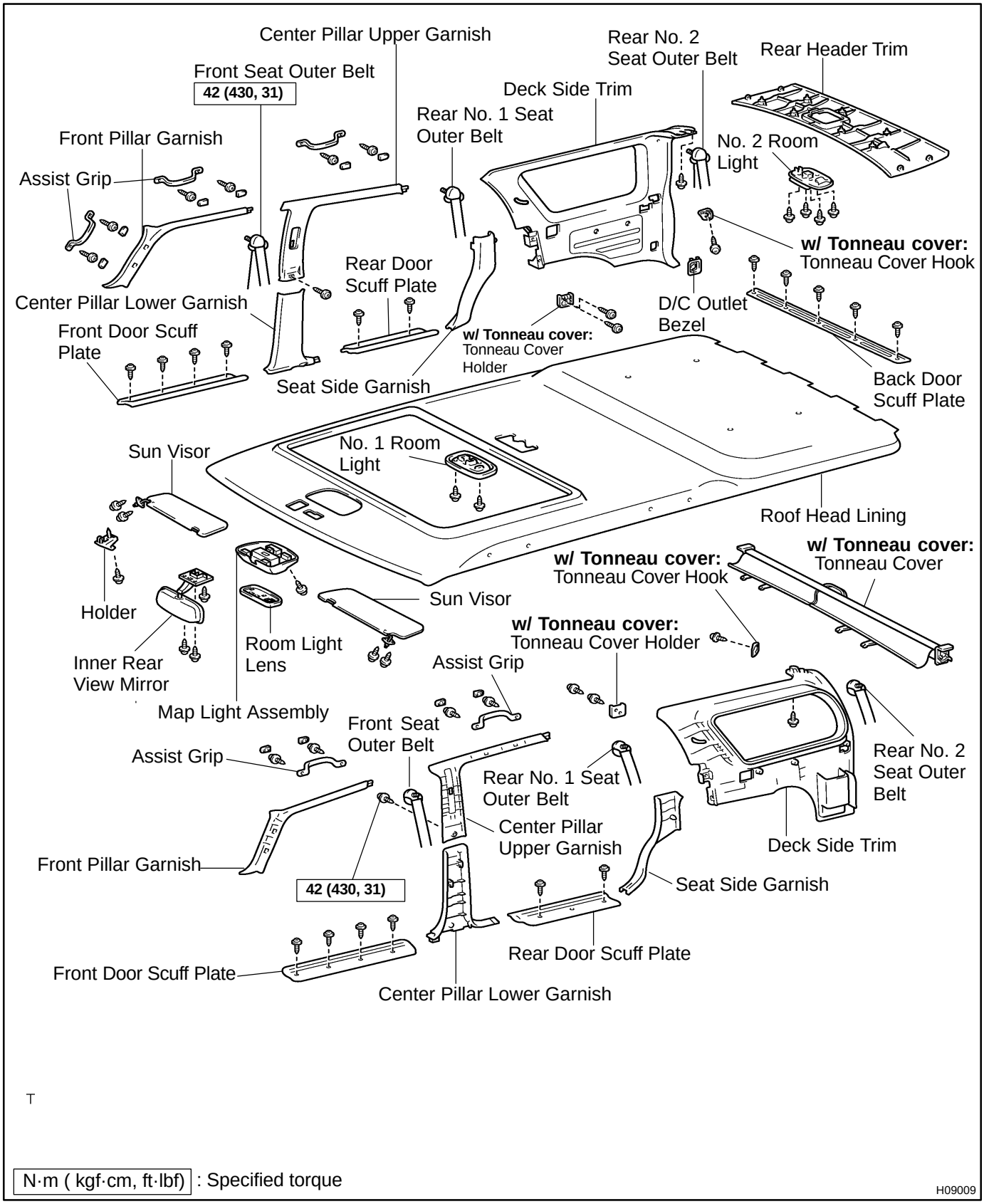
INSTALLATION

Installation is in the reverse order of removal (See page BO-69).

ROOF HEADLINING

COMPONENTS

BO0CV-02



T

N·m (kgf·cm, ft·lbf) : Specified torque

H09009

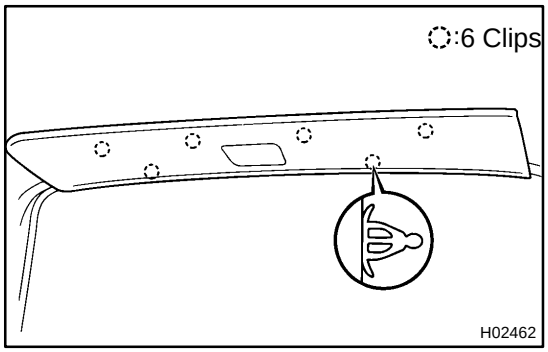
BO26M-01

REMOVAL

1. REMOVE NO. 2 ROOM LIGHT

(a) Remove the room light cover, 4 screws and No. 2 room light.

(b) Disconnect the connector.



2. REMOVE REAR HEADER TRIM

Using a screwdriver, remove the rear header trim.

HINT:

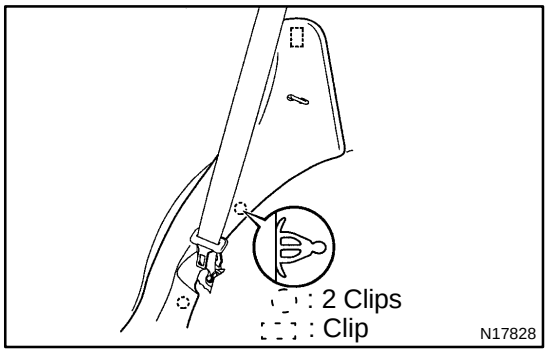
Tape the screwdriver tip before use.

3. REMOVE BACK DOOR SCUFF PLATE

Remove the 5 screws and back door scuff plate.

4. REMOVE REAR DOOR SCUFF PLATES

Remove the 4 screws and rear door scuff plates.



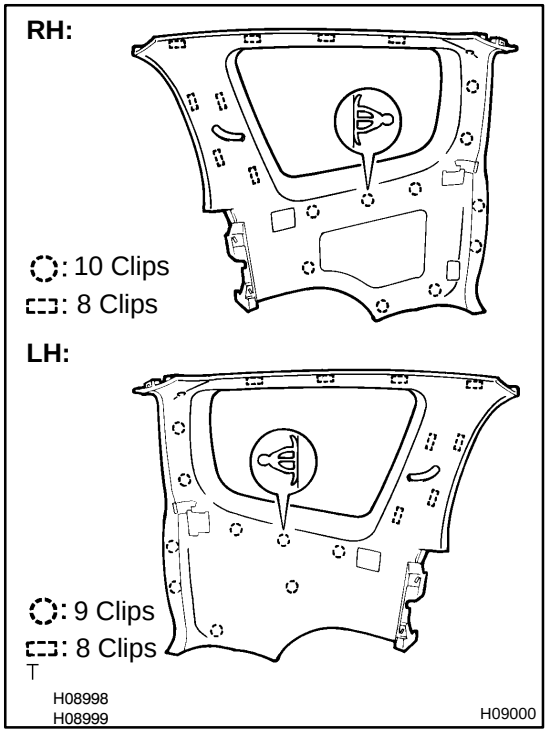
5. REMOVE REAR SEAT SIDE GARNISH

(a) Using a screwdriver, remove the rear seat side garnish.

HINT:

Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.



6. REMOVE DECK SIDE TRIM

(a) RH:

Using a screwdriver, remove the D/C outlet bezel, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

(b) w/ Tonneau cover:

Remove the tonneau cover.

(c) w/ Tonneau cover:

Remove the 2 screws and tonneau cover holder.

(d) w/ Tonneau cover:

Remove the screw and tonneau cover hook.

(e) Remove the screw.

(f) Remove the rear No. 1 seat outer belt floor anchor.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

(g) Remove the rear No. 2 seat outer belt.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

(h) Insert a screwdriver between the trim and door panel to remove the trim, then disconnect the connector.

HINT:
Tape the screwdriver tip before use.

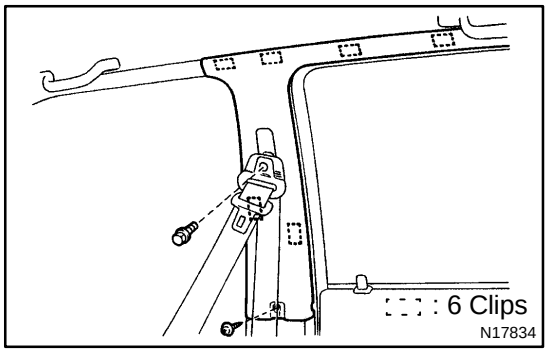
(i) Remove the deck side trim with the rear No. 1 and No. 2 seat belts passed through its hole.

(j) Employ the same manner described above to the other side.

7. REMOVE FRONT DOOR SCUFF PLATES

Remove the 8 screws and front door scuff plates.

8. REMOVE CENTER PILLAR LOWER GARNISHES



9. REMOVE CENTER PILLAR UPPER GARNISH

(a) Remove the front seat belt shoulder anchors.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

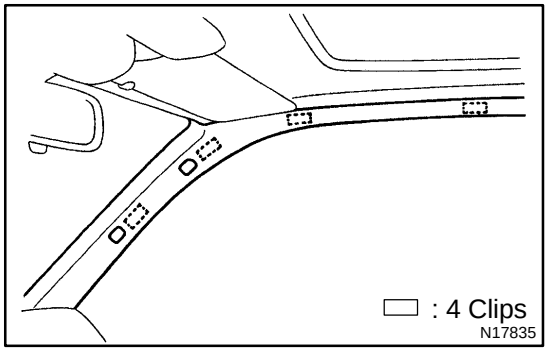
(b) Remove the screw.

(c) Using a screwdriver, remove the center pillar upper garnish.

HINT:
Tape the screwdriver tip before use.

(d) Employ the same manner described above to the other side.

10. REMOVE ASSIST GRIPS



11. REMOVE FRONT PILLAR GARNISH

(a) Using a screwdriver, remove the front pillar garnish.

HINT:
Tape the screwdriver tip before use.

(b) Employ the same manner described above to the other side.

12. REMOVE ROOM LIGHT LENS AND MAP LIGHT ASSEMBLY

(a) Remove the room light lens, screw and map light assembly.

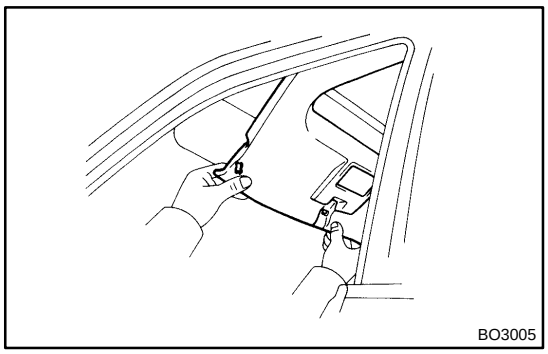
(b) Disconnect the connector.

13. REMOVE INNER REAR VIEW MIRROR

Remove the 3 screws and inner rear view mirror.

14. REMOVE NO. 1 ROOM LIGHT

15. REMOVE SUN VISORS AND HOLDERS



16. REMOVE ROOF HEADLINING

Remove the 6 clips and roof headlining.

NOTICE:

Do not damage the roof headlining.

BO0CX-01

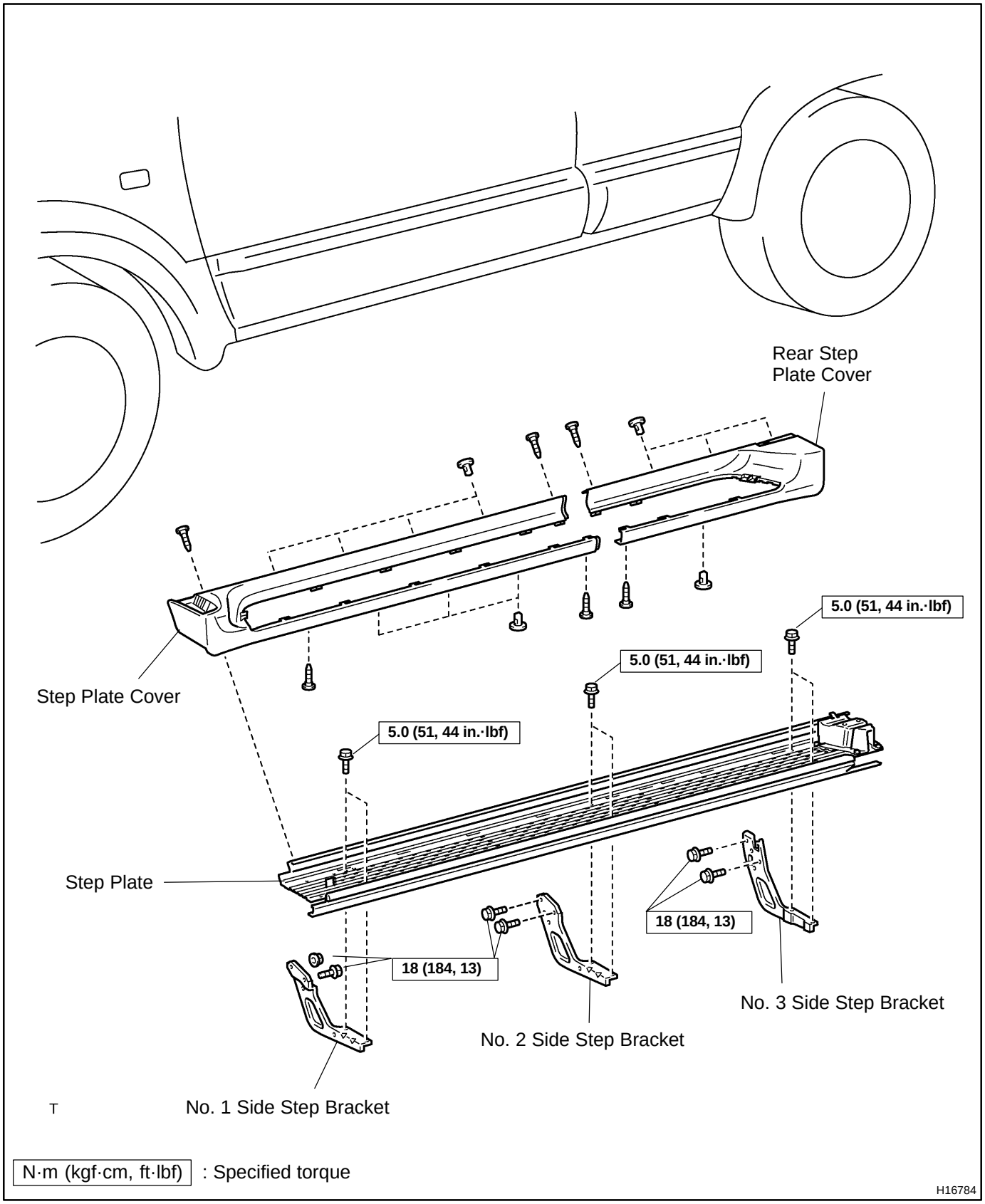
INSTALLATION

Installation is in the reverse order of removal (See page BO-78).

SIDE STEP

COMPONENTS

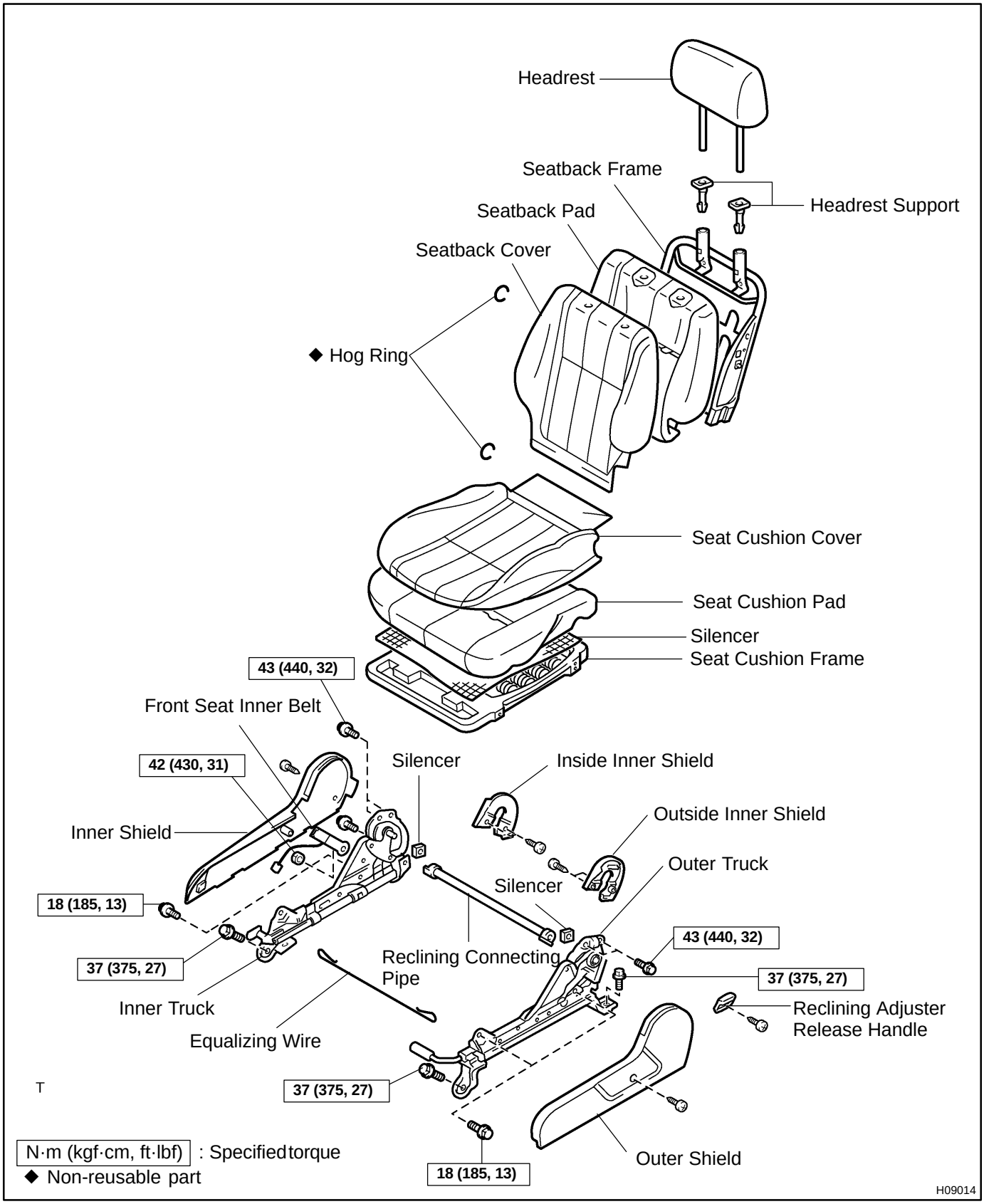
BO41Q-01



FRONT SEAT (Separate Type)

BO0CY-02

COMPONENTS



BO0CZ-01

REMOVAL

REMOVE FRONT SEAT

(a) Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdiver tip before use.

(b) Remove the 4 bolts.

(c) Disconnect the connector.

(d) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO0D0-02

DISASSEMBLY

1. REMOVE HEADREST

2. REMOVE RECLINING ADJUSTER RELEASE HANDLE

Remove the screw and reclining adjuster release handle.

3. REMOVE OUTER SHIELD

Remove the screw and outer shield.

4. REMOVE INNER SHIELD

Remove the screw and inner shield.

5. REMOVE FRONT SEAT INNER BELT

Remove the nut and front seat inner belt.

6. REMOVE SEATBACK ASSEMBLY

(a) Disengage the hooks.
(b) Remove the 4 bolts and seatback assembly.

7. REMOVE SEATBACK COVER

(a) Remove the headrest supports.
(b) Remove the seatback frame from the seatback cover with pad.
(c) Remove the hog rings.
(d) Remove the seatback cover from the pad.

8. REMOVE SEAT CUSHION ASSEMBLY

Remove the 4 bolts and seat cushion assembly from the seat adjuster.

9. REMOVE SEAT CUSHION COVER

(a) Remove the hog rings and seat cushion frame from the seat cushion cover with pad.
(b) Remove the silencer from the seat cushion frame.
(c) Remove the hog rings and seat cushion cover from the seat cushion pad.

10. REMOVE RECLINING CONNECTING PIPE

Remove the reclining connecting pipe and 2 silencers.

11. REMOVE EQUALIZING WIRE

12. REMOVE INSIDE INNER SHIELD

Remove the 2 screws and inside inner shield.

13. REMOVE OUTSIDE INNER SHIELD

Remove the 2 screws and outside inner shield.

BO0D1-01

INSPECTION

INSPECT RECLINING LOCK POSITION AND SLIDING LOCK POSITION SLIPPING OFF

(a) When reclining the seat, inspect that the outer and inner tracks are released at the same time.

HINT:

When the reclining lock positions slip off, disassemble the seat to adjust the position.

(b) When sliding the seat, inspect that the outer and inner track are locked at the same time.

HINT:

When sliding lock positions slip off, loosen the bolts to adjust the position.

BO0D2-02

REASSEMBLY

1. INSTALL OUTSIDE INNER SHIELD

Install the outside inner shield with the 2 screws.

2. INSTALL INSIDE INNER SHIELD

Install the inside inner shield with the 2 screws.

3. INSTALL EQUALIZING WIRE

4. INSTALL RECLINING CONNECTING PIPE

(a) Adjust the reclining lock positions of the seat adjusters.

(b) Slide the seat adjusters to the frontmost position.

(c) Place the adjusters on a spacer to adjust the seat rails in parallel and install the connecting pipe.

HINT:

When installing the connecting pipe with raising up the adjusters, the lock positions adjusted in 4-(a) step slip off, lock error will occur.

(d) Install the 2 silencers to the adjuster pin.

5. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to seat cushion pad.

(b) Install the silencer to the seat cushion frame.

(c) Install the seat cushion cover with pad to the seat cushion frame with new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

6. INSTALL SEAT CUSHION ASSEMBLY

Install the seat cushion assembly with the 4 bolts to the seat adjuster.

HINT:

Tighten the 4 bolts temporarily, then from the bolts on the rear side tighten completely.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

7. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog rings to the seatback pad.

(b) Install the seatback cover with pad to the seatback frame.

(c) Install the headrest supports.

8. INSTALL SEATBACK ASSEMBLY

(a) Install the 4 bolts temporarily, then from the bolt on the front right side tighten completely.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Engage the hooks.

9. INSTALL FRONT SEAT INNER BELT

Install the front seat inner belt with the nut.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

10. INSTALL INNER SHIELD

Install the inner shield with the screw.

11. INSTALL OUTER SHIELD

Install the outer shield with the screw.

12. INSTALL RECLINING ADJUSTER RELEASE HANDLE

Install the reclining adjuster release handle with the screw.

13. INSTALL HEADREST

BO0D3-02

INSTALLATION

INSTALL FRONT SEAT

(a) Slide the front seat to the rearmost position.

NOTICE:

Make sure at seat adjuster locks.

(b) Without holding the seat track handle, mount the seat to the vehicle.

HINT:

If holding the seat track handle, the adjusted rearmost positions slip off.

(c) Tighten the bolts on the front side temporarily, tighten them completely starting from the bolt on the inner side.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

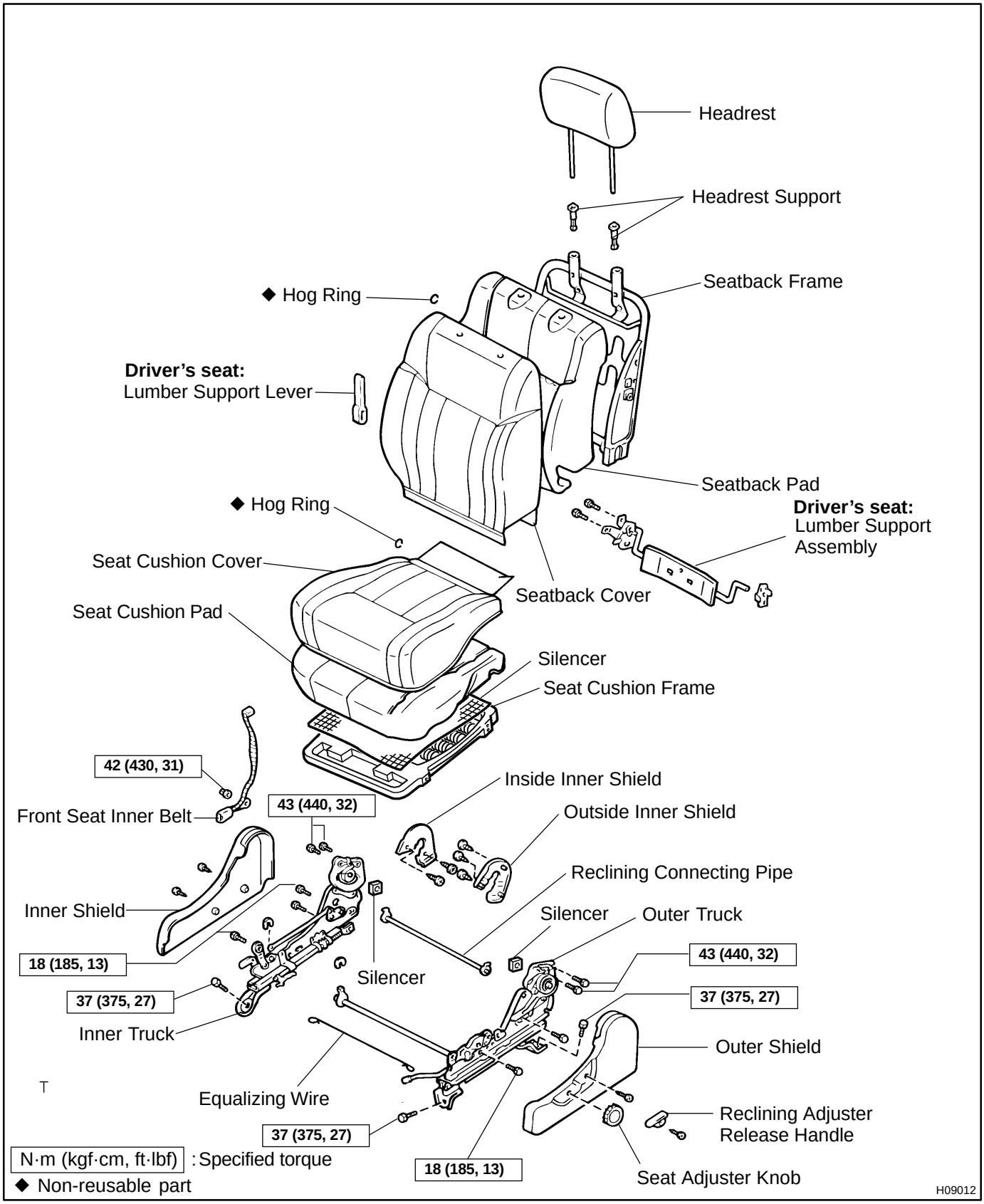
(d) Slide the seat to the frontmost position to tighten the bolts on the rear side temporarily, from the bolt on the inner side tighten completely.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

FRONT SEAT (Sports Type)

BO0D4-02

COMPONENTS



BO0D5-01

REMOVAL

REMOVE FRONT SEAT

(a) Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdiver tip before use.

(b) Remove the 4 bolts.

(c) Disconnect the connector.

(d) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO0D6-02

DISASSEMBLY

1. REMOVE HEADREST

2. REMOVE RECLINING ADJUSTER RELEASE HANDLE

Remove the screw and reclining adjuster release handle.

3. REMOVE SEAT ADJUSTER KNOB

4. REMOVE OUTER SHIELD

Remove the screw and outer shield.

5. REMOVE INNER SHIELD

Remove the 2 screws and inner shield.

6. REMOVE FRONT SEAT INNER BELT

Remove the nut and front seat inner belt.

7. REMOVE SEATBACK ASSEMBLY

(a) Disengage the hooks.
(b) Remove the 4 bolts and seatback assembly.

8. REMOVE SEATBACK COVER

(a) Remove the headrest supports.
(b) Remove the seatback frame from the seatback cover with pad.
(c) Driver's seat:
Using a screwdriver, remove the lumber support lever.
(d) Driver's seat:
Remove the 2 bolts and lumber support assembly from the seatback frame.
(e) Remove the hog rings.
(f) Remove the seatback cover from the pad.

9. REMOVE SEAT CUSHION ASSEMBLY

Remove the 4 bolts and seat cushion assembly from the seat adjuster.

10. REMOVE SEAT CUSHION COVER

(a) Remove the hog rings and seat cushion frame from the seat cushion cover with pad.
(b) Remove the silencer from the seat cushion frame.
(c) Remove the hog rings and seat cushion cover from the seat cushion pad.

11. REMOVE RECLINING CONNECTING PIPE

Remove the reclining connecting pipe and 2 silencers.

12. REMOVE EQUALIZING WIRE

13. REMOVE INSIDE INNER SHIELD

Remove the 2 screws and inside inner shield.

14. REMOVE OUTSIDE INNER SHIELD

Remove the 3 screws and outside inner shield.

BO0D7-01

INSPECTION

INSPECT RECLINING LOCK POSITION AND SLIDING LOCK POSITION SLIPPING OFF

(a) When reclining the seat, inspect that the outer and inner tracks are released at the same time.

HINT:

When the reclining lock positions slip off, disassemble the seat to adjust the position.

(b) When sliding the seat, inspect that the outer and inner track are locked at the same time.

HINT:

When sliding lock positions slip off, loosen the bolts to adjust the position.

BO0D8-02

REASSEMBLY

1. INSTALL OUTSIDE INNER SHIELD

Install the outside inner shield with the 3 screws.

2. INSTALL INSIDE INNER SHIELD

Install the inside inner shield with the 2 screws.

3. INSTALL EQUALIZING WIRE

4. INSTALL RECLINING CONNECTING PIPE

(a) Adjust the reclining lock positions of the seat adjusters.

(b) Slide the seat adjusters to the most front position.

(c) Place the adjusters on a spacer to adjust the seat rails in parallel and install the connecting pipe.

HINT:

When installing the connecting pipe with raising up the adjusters, the lock positions adjusted in 4-(a) step slip off, lock error will occur.

(d) Install the 2 silencers to the adjuster pin.

5. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to set cushion pad.

(b) Install the silencer to the seat cushion frame.

(c) Install the seat cushion cover with pad to the seat cushion frame with new hog rings.

HINT:

When installing the hog rings, take care to prevent wrinkles as little as possible.

6. INSTALL SEAT CUSHION ASSEMBLY

Install the seat cushion assembly with the 4 bolts to the seat adjuster.

HINT:

Tighten the 4 bolts temporarily, then from the bolts on the rear side tighten completely.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

7. INSTALL SEATBACK COVER

(a) Install the seatback cover with new hog rings to the seatback pad.

(b) Driver's seat:
Install the lumber support assembly with he 2 bolts to the seatback frame.

(c) Install the seatback cover with pad to the seatback frame.

(d) Driver's seat:
Install the lumber support lever.

(e) Install the headrest supports.

8. INSTALL SEATBACK ASSEMBLY

(a) Install the 4 bolts temporarily, then from the bolt on the front right side tighten completely.

Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)

(b) Engage the hooks.

9. INSTALL FRONT SEAT INNER BELT

Install the front seat inner belt with the nut.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

10. INSTALL INNER SHIELD

Install the inner shield with the 2 screws.

11. INSTALL OUTER SHIELD

Install the outer shield with the screw.

12. INSTALL SEAT ADJUSTER KNOB

13. INSTALL RECLINING ADJUSTER RELEASE HANDLE

Install the reclining adjuster release handle with the screw.

14. INSTALL HEADREST

BO0D9-02

INSTALLATION

INSTALL FRONT SEAT

(a) Slide the front seat to the rearmost position.

NOTICE:

Make sure at seat adjuster locks.

(b) Without holding the seat track handle, mount the seat to the vehicle.

HINT:

If holding the seat track handle, the adjusted rearmost positions slip off.

(c) Tighten the bolts on the front side temporarily, tighten them completely starting from the bolt on the inner side.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

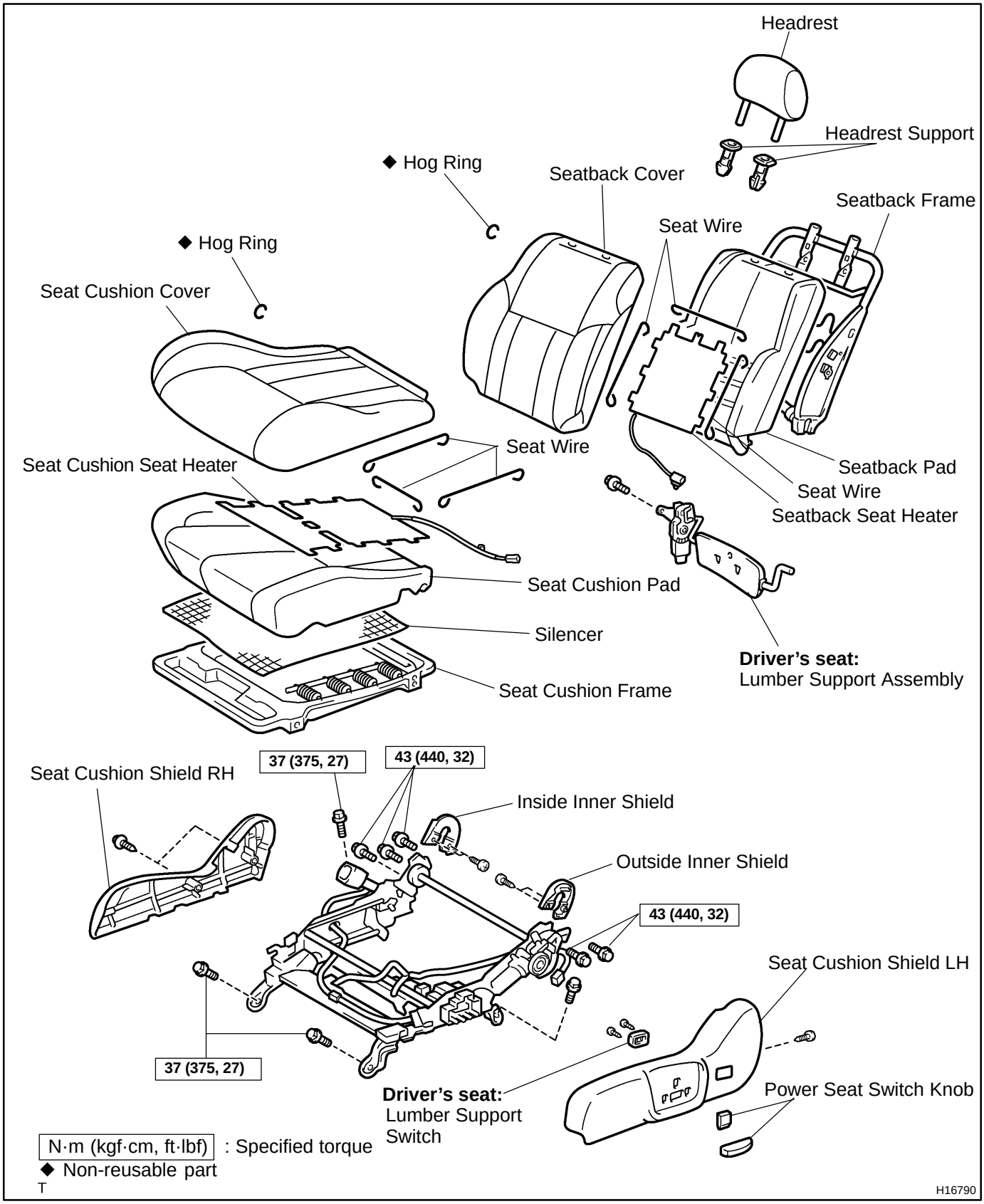
(d) Slide the seat to the frontmost position to tighten the bolts on the rear side temporarily, from the bolt on the inner side tighten completely.

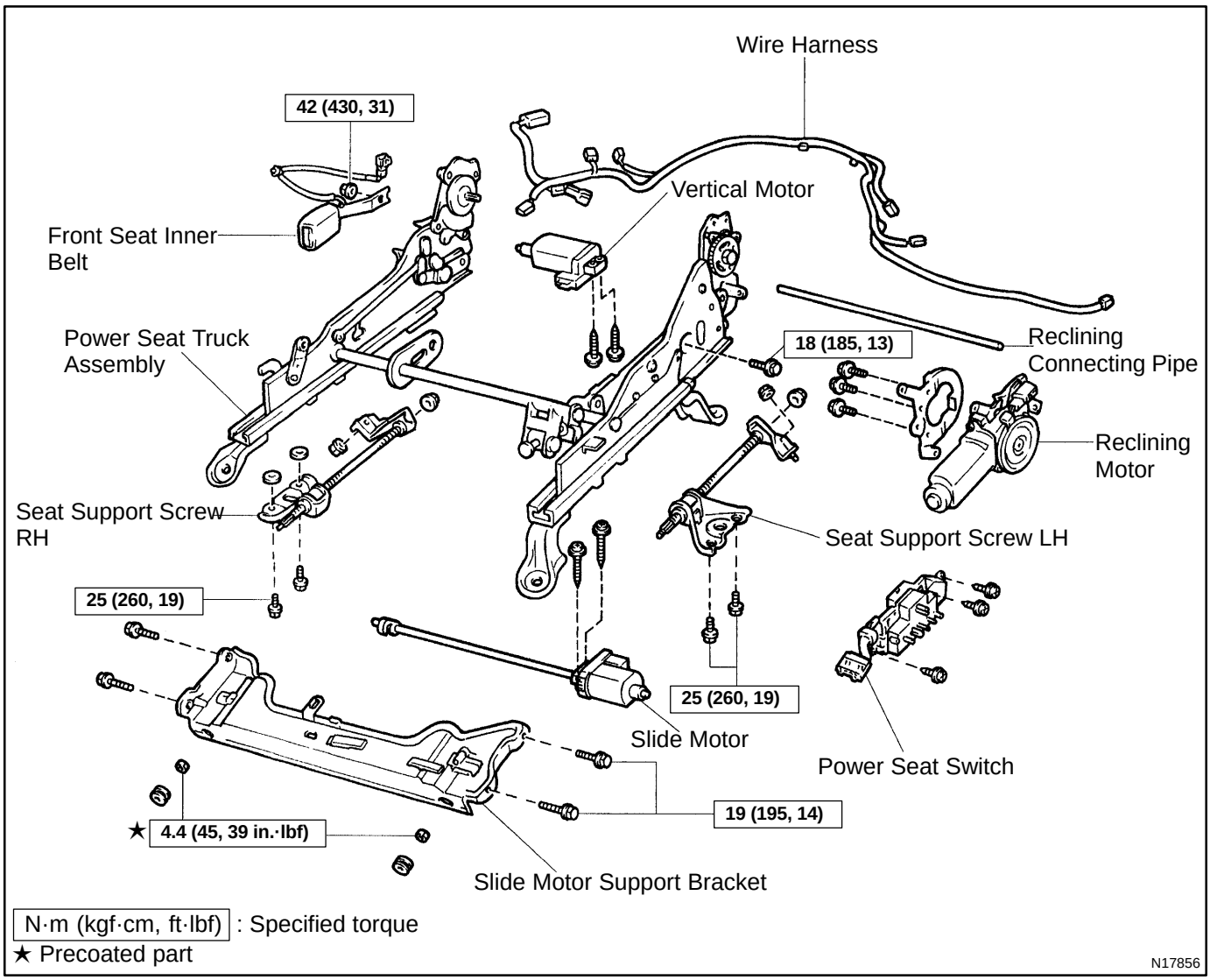
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

FRONT SEAT (Power Adjuster Type)

BO0DN-03

COMPONENTS




Wire Harness
42 (430, 31)
Vertical Motor
Front Seat Inner Belt
Power Seat Truck Assembly
18 (185, 13)
Reclining Connecting Pipe
Reclining Motor
Seat Support Screw RH
Seat Support Screw LH
25 (260, 19)
25 (260, 19)
Slide Motor
Power Seat Switch
19 (195, 14)
★ 4.4 (45, 39 in.·lbf)
Slide Motor Support Bracket
N·m (kgf·cm, ft·lbf) : Specified torque
★ Precoated part
N17856

BO0DO-02

REMOVAL

REMOVE FRONT SEAT

(a) Using a screwdriver, remove the seat track covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 4 bolts.

(c) Disconnect the connectors.

(d) Remove the front seat.

NOTICE:

Be careful not to damage the body.

BO41R-01

DISASSEMBLY

1. REMOVE HEADREST

2. REMOVE POWER SEAT SWITCH KNOBS

Using a screwdriver, remove the power seat switch knobs.

HINT:

Tape the screwdriver tip before use.

3. REMOVE SEAT CUSHION SHIELD LH

(a) Remove the screw.

(b) Disconnect the connector, then remove the seat cushion shield LH.

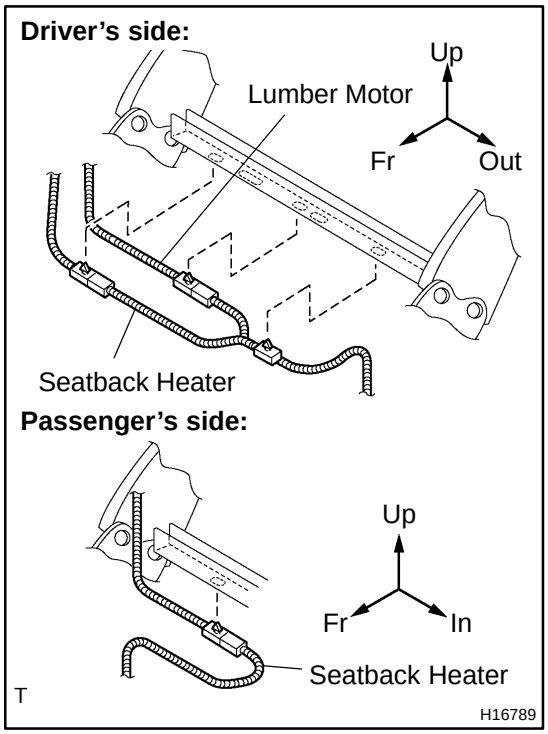
(c) Remove the 2 screws and lumber support switch from the seat cushion shield LH.

4. REMOVE SEAT CUSHION SHIELD RH

Remove the 2 screws and seat cushion shield RH.

5. REMOVE SEATBACK ASSEMBLY

(a) Disengage the hook.



(b) Disconnect the connectors.

(c) Remove the 4 bolts and seatback assembly.

6. REMOVE SEATBACK COVER

(a) Remove the headrest supports.

(b) Remove the seatback frame from the seatback cover with pad.

(c) Driver's seat:
Remove the 2 bolts and lumber support assembly from the seatback frame.

(d) Remove the seatback cover from the seatback pad.

7. IF NECESSARY, REPLACE SEATBACK SEAT HEATER (See page BO-101)

8. REMOVE SEAT CUSHION ASSEMBLY

Remove the 4 bolts and seat cushion assembly.

9. REMOVE SEAT CUSHION COVER

(a) Remove the seat cushion frame from the seat cushion cover with pad.

(b) Remove the silencer from the seat cushion frame.

(c) Remove the seat cushion cover from the seat cushion pad.

10. IF NECESSARY, REPLACE SEAT CUSHION SEAT HEATER (See page BO-101)

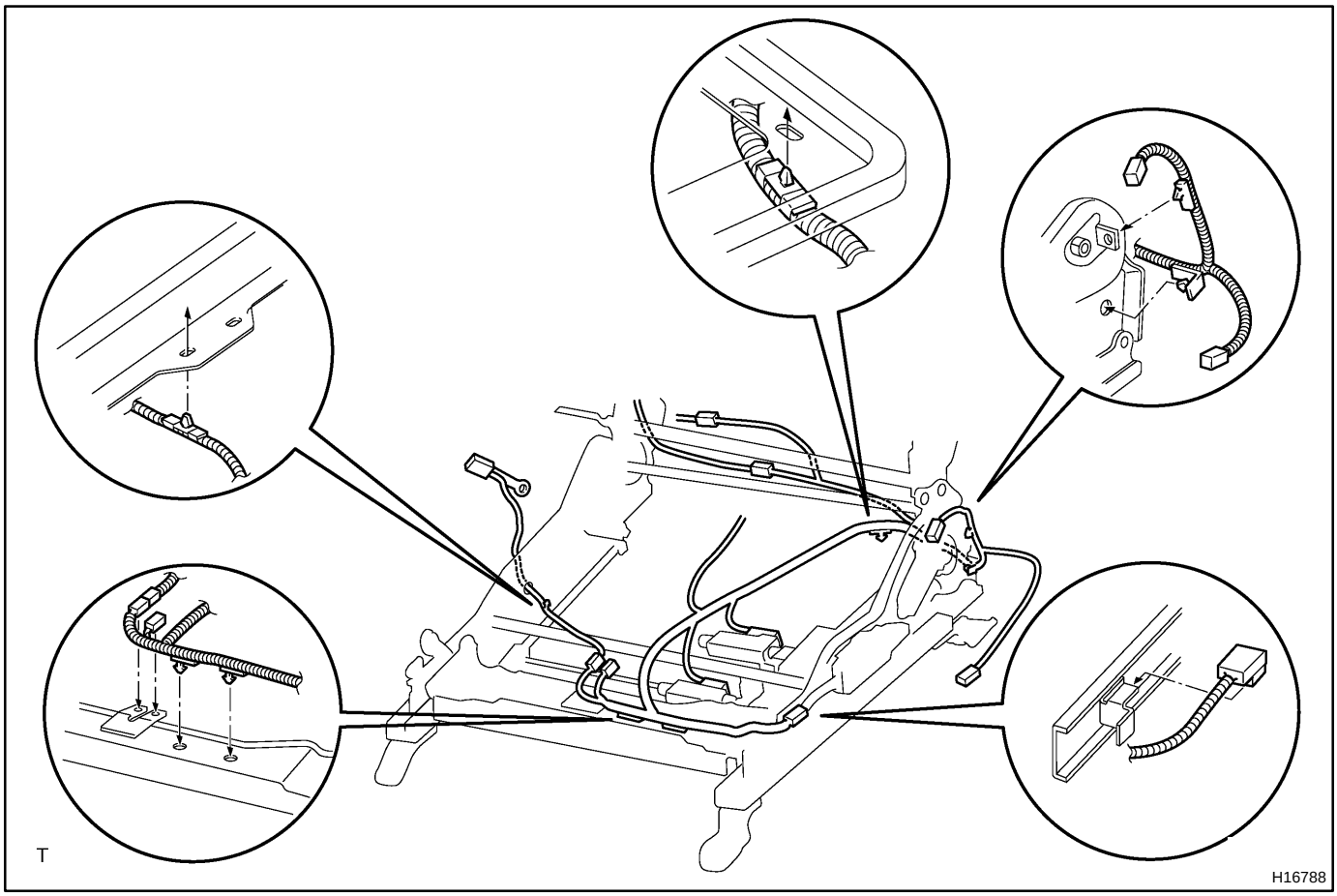
11. REMOVE INSIDE INNER SHIELD

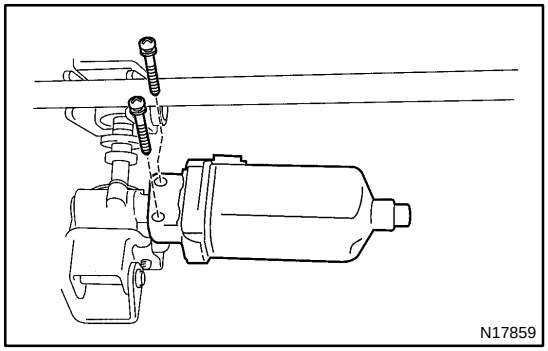
12. REMOVE OUTSIDE INNER SHIELD

13. REMOVE WIRE HARNESS

(a) Disconnect the connectors.

(b) Disengage the clamps of wire harness, them remove the wire harness from the seat adjuster.





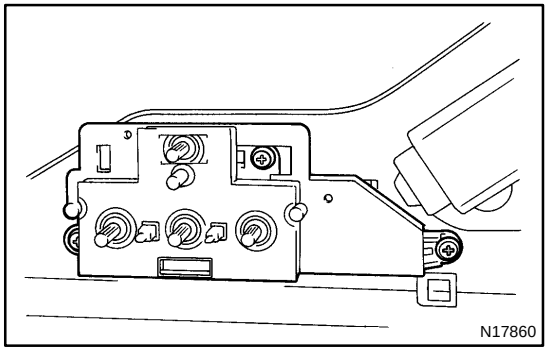
14. REMOVE SLIDE MOTOR

(a) Remove the 2 screws.

(b) Pull out the drive cable.

15. REMOVE VERTICAL MOTOR

Remove the 2 screws and motor.

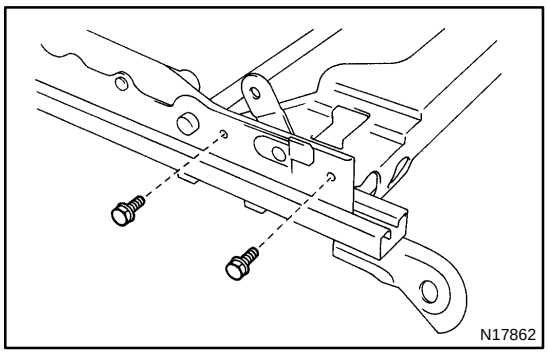


16. REMOVE POWER SEAT SWITCH

Remove the 3 screws and switch.

17. REMOVE RECLINING MOTOR

Remove the 3 screws and motor.



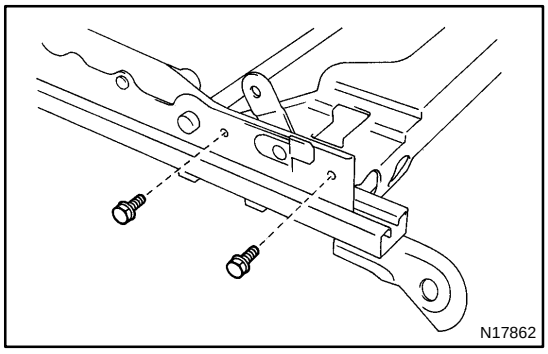
18. REMOVE SEAT SUPPORT SCREW

(a) Remove the 2 bolts, 2 nuts and support screw.

(b) Employ the same manner described above to the other side.

19. REMOVE FRONT SEAT INNER BELT

Remove the nut and inner belt.



20. REMOVE SLIDE MOTOR SUPPORT BRACKET

Remove the 4 bolts and support bracket.

21. REMOVE RECLINING CONNECTING PIPE

BO41T-01

REPLACEMENT

HINT:

- The following is the seat heater replacement procedure.
- Care should be taken during operation to protect the seat cover from scratches, dirt or accidental cuts.

1. TURN SEAT COVER INSIDE OUT

2. REMOVE SEAT WIRES

3. REMOVE SEAT HEATER

(a) Seat cushion cover:
Cut the 10 tack pins which are fastened to the seat heater, then remove the seat heater.

(b) Seatback cover:
Cut the 9 tack pins which are fastened to the seat heater, then remove the seat heater.

4. INSTALL SEAT CUSHION SEAT HEATER

(a) Set a seat heater.

HINT:

Face the marked side (mark: TOYOTA) to the seat cushion pad.

(b) For part A, position the seat heater by aligning the end of the fin with the fold line of the listing pocket.

(c) For part B, position the seat heater by aligning the V-slit of the seat heater with center line of the seat cushion cover.

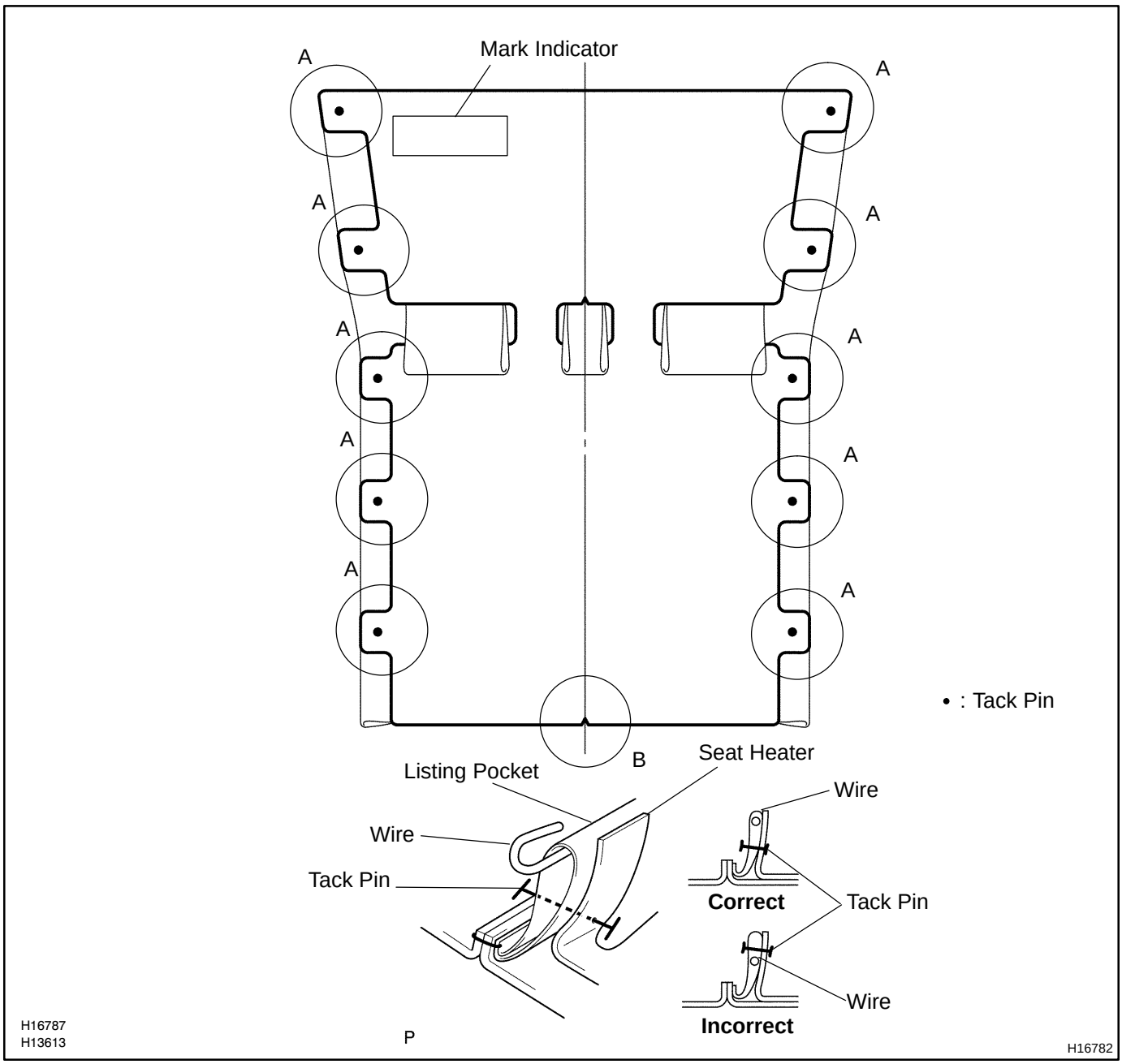
(d) Using tracker, attach tack pins to the seat heater as shown in the illustration.
Tacker: BANZAI 303XT or equivalent.

NOTICE:

- **Do not substitute other metal part in place of tack pins.**
- **Insufficient distance between the heater and cover may result in damage to the heater.**

HINT:

- Attach tack pins on the seam side so that the wire can be threaded through the hole from the fold side.
- Sewing thread can be substituted for tack pins. However, allow a distance of 6 - 7 mm (0.24 - 0.28 in.) between both sewed parts of the heater and cover.



5. INSTALL SEATBACK SEAT HEATER

(a) Set the seat heater.

HINT:

Face the marked side (mark: TOYOTA) to the seat cushion pad.

(b) For Part A, position the seat heater by aligning the end of the fin with the told line of the listing pocket.

(c) For part B, position the seat heater by aligning the V-slit of the seat heater with the center line of the seat cover.

(d) Using a tacker, attach tack pins to the seat heater as shown in the illustration.

Tacker: BANZAI 303XT or equivalent.

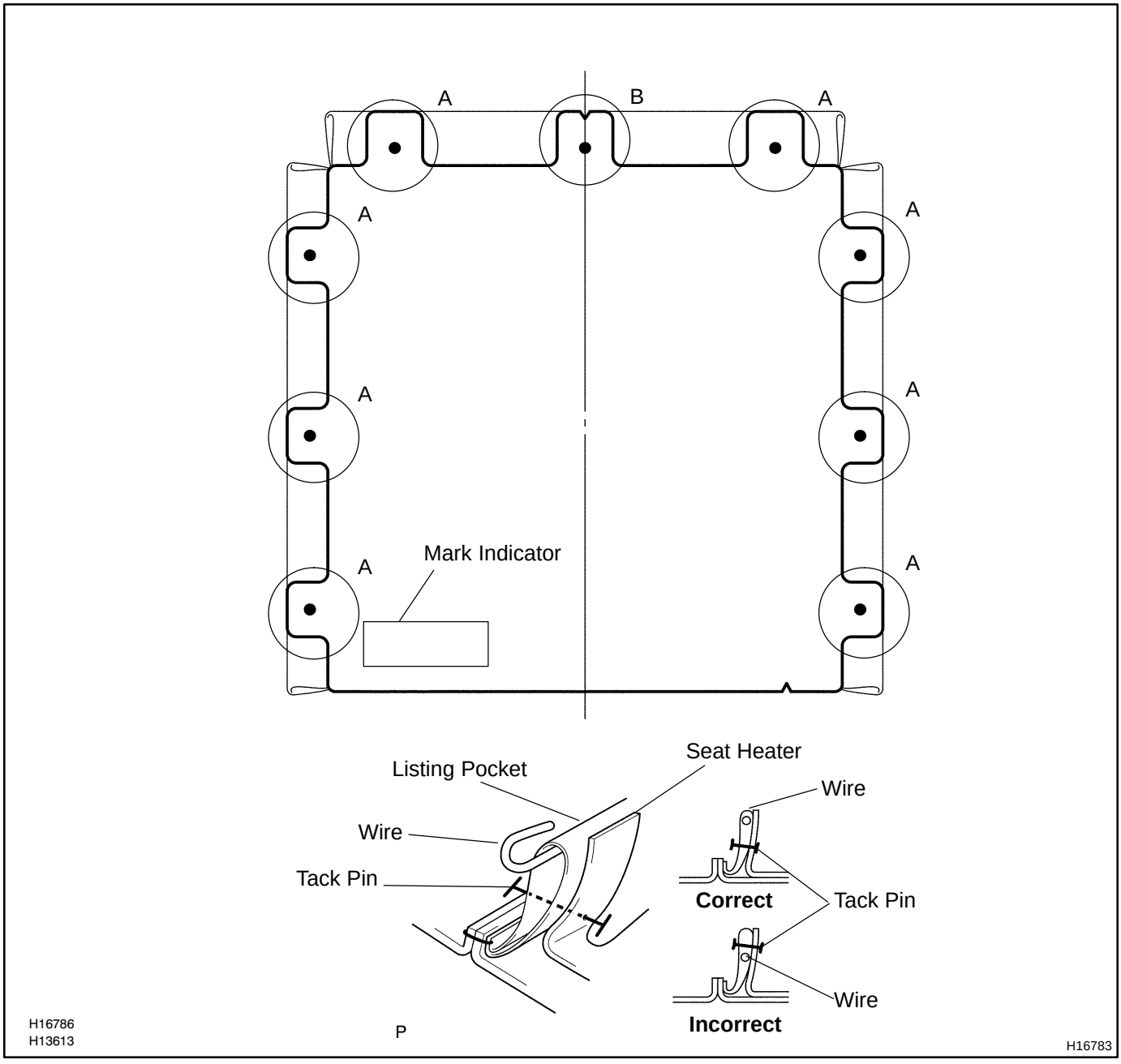
NOTICE:

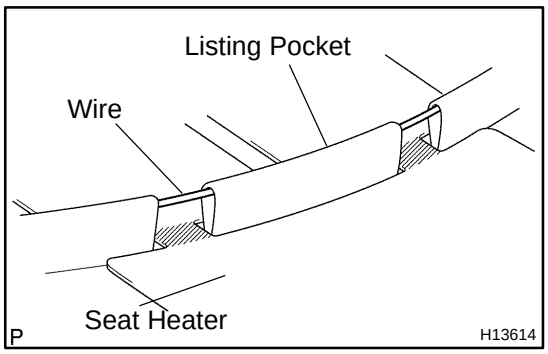
- **Do not substitute other metal part in place of tack pins.**

- **Insufficient distance between the heater and cover may result in damage tot he heater**

HINT:

- Attach tack pins on the seam side so that the wire can be threaded through the hole from the fold side.
- Sewing thread can be substituted for tack pins. However, allow a distance of 6 - 7 mm (0.24 - 0.28 in.) between both sewed part of the heater and cover.





6. INSTALL SEAT WIRES

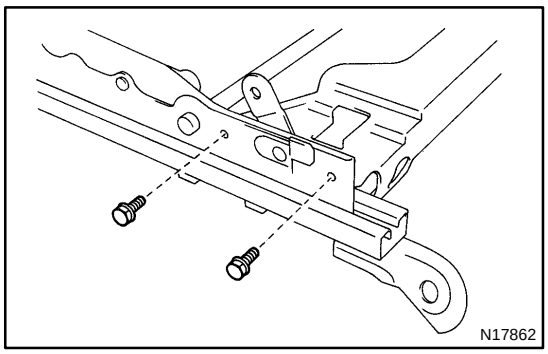
HINT:

Pass the wire over the seat heater as shown in the illustration

7. REVERSE SEAT COVER BACK TO ITS ORIGINAL POSITION

BO41S-01

REASSEMBLY


N17862

HINT:

Before installing the parts, coat them with MP grease while referring to the components.

1. INSTALL RECLINING CONNECTING PIPE

2. INSTALL SLIDE MOTOR SUPPORT BRACKET

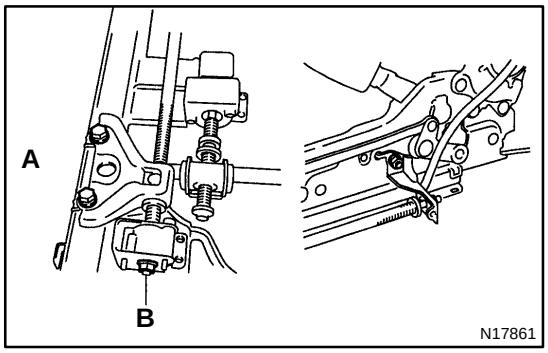
Install the support bracket with 4 bolts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

3. INSTALL FRONT SEAT INNER BELT

Install the inner belt with nut.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)



N17861

4. INSTALL SEAT SUPPORT SCREW

(a) Install the support screw with the 2 bolts and 2 nuts.

Torque:

A bolt: 25 N·m (260 kgf·cm, 19 ft·lbf)

B nut: 4.4 N·m (45 kgf·cm, 39 ft·lbf)

HINT:

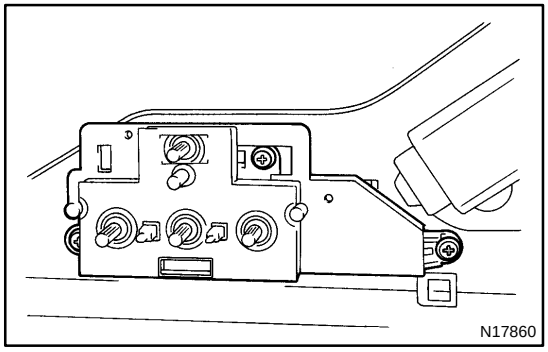
Apply adhesive to the nut.

Part No. 08833-00070, THREE BOND 1324 or equivalent

(b) Employ the same manner described above to the other side.

5. INSTALL RECLINING MOTOR

Install the motor with 3 screws.

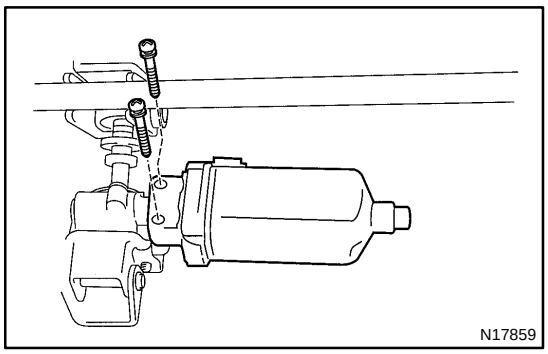

N17860

6. INSTALL POWER SEAT SWITCH

Install the power seat switch with the 3 screws.

7. INSTALL VERTICAL MOTOR

Install the vertical motor with the 2 screws.



8. INSTALL SLIDE MOTOR

(a) Connect the drive cable.

(b) Install the slide motor with 2 screws.

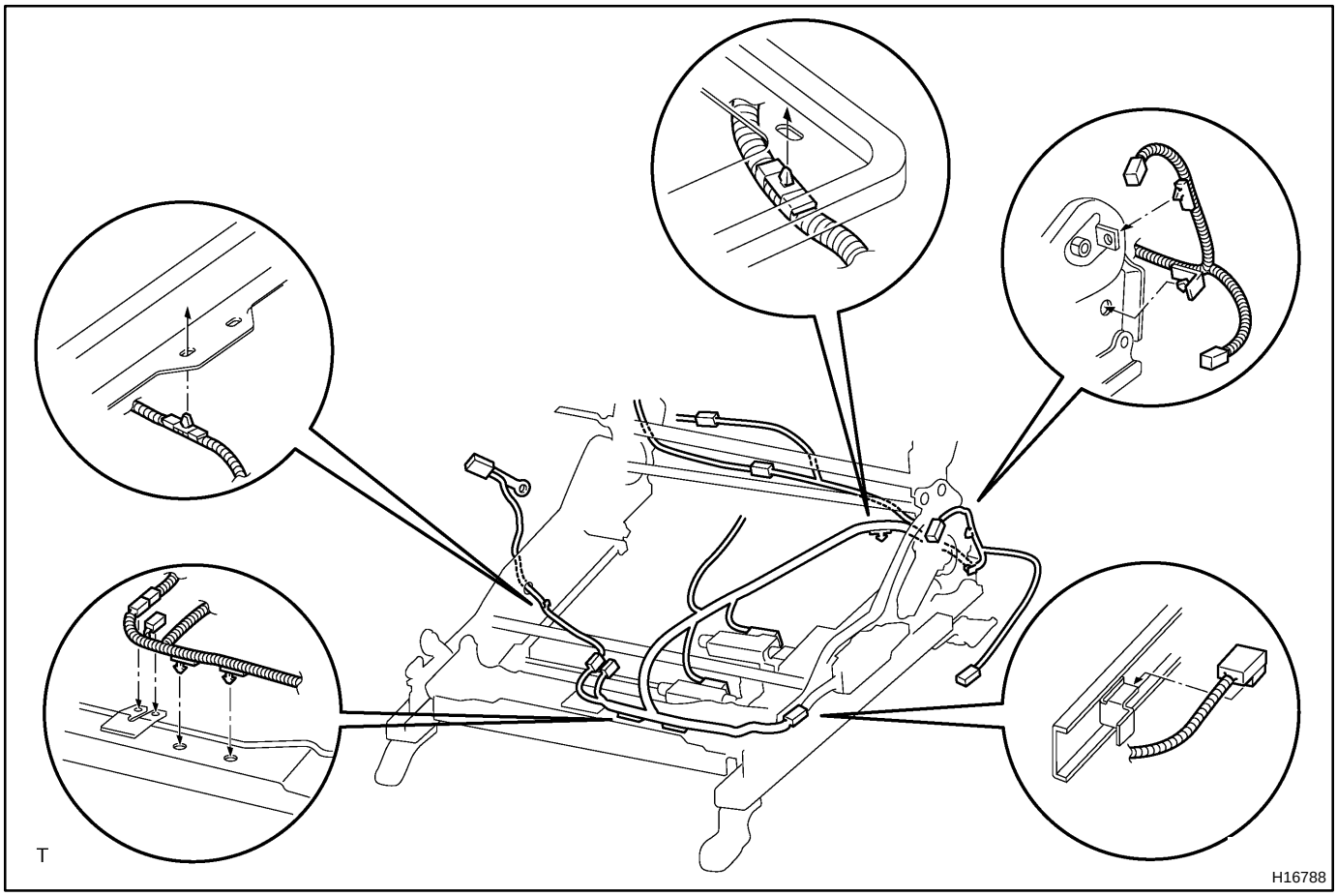
HINT:

When installing the slide motor, tighten both the left and right seat slide screws equally.

9. INSTALL WIRE HARNESS

(a) Install the wire harness to the seat adjuster.

(b) Connect the connectors.



10. INSTALL OUTSIDE INNER SHIELD

11. INSTALL INSIDE INNER SHIELD

12. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion cover with new hog rings to seat cushion pad.

(b) Install the silencer to the seat cushion frame.

(c) Install the seat cushion cover with pad to the seat cushion frame with new hog rings.

HINT:

Install the hog rings to prevent wrinkles as least as possible.

13. INSTALL SEAT CUSHION ASSEMBLY

Install the seat cushion assembly with the 4 bolts to the seat.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

HINT:
Tighten the 4 bolts temporarily, then from the bolts on the rear side tighten completely.

14. INSTALL SEATBACK COVER

(a) Install the lumber support assembly with the 2 bolts to the seatback pad.
(b) Driver's seat:
Install the lumber support assembly with the 2 bolts to the seatback frame.
(c) Install the seatback cover with pad to the seatback frame.
(d) Install the headrest supports.

15. INSTALL SEATBACK ASSEMBLY

(a) Install the 4 bolts temporarily, then from the bolt on the front right side tighten completely.
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
(b) Engage the hooks.

16. INSTALL SEAT CUSHION SHIELD RH

Install the seat cushion shield RH with the 2 screws.

17. INSTALL SEAT CUSHION SHIELD LH

Install the lumber support switch with the 2 screws to the seat cushion shield LH.

18. INSTALL POWER SEAT SWITCH KNOBS

19. INSTALL HEADREST

BO0DR-02

INSTALLATION

INSTALL FRONT SEAT

(a) Mount the seat to the vehicle.

(b) Connect the connectors.

(c) Slide the front seat to the rearmost position.

(d) Tighten the bolts on the front side temporarily, tighten them completely starting from the bolt on the inner side.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

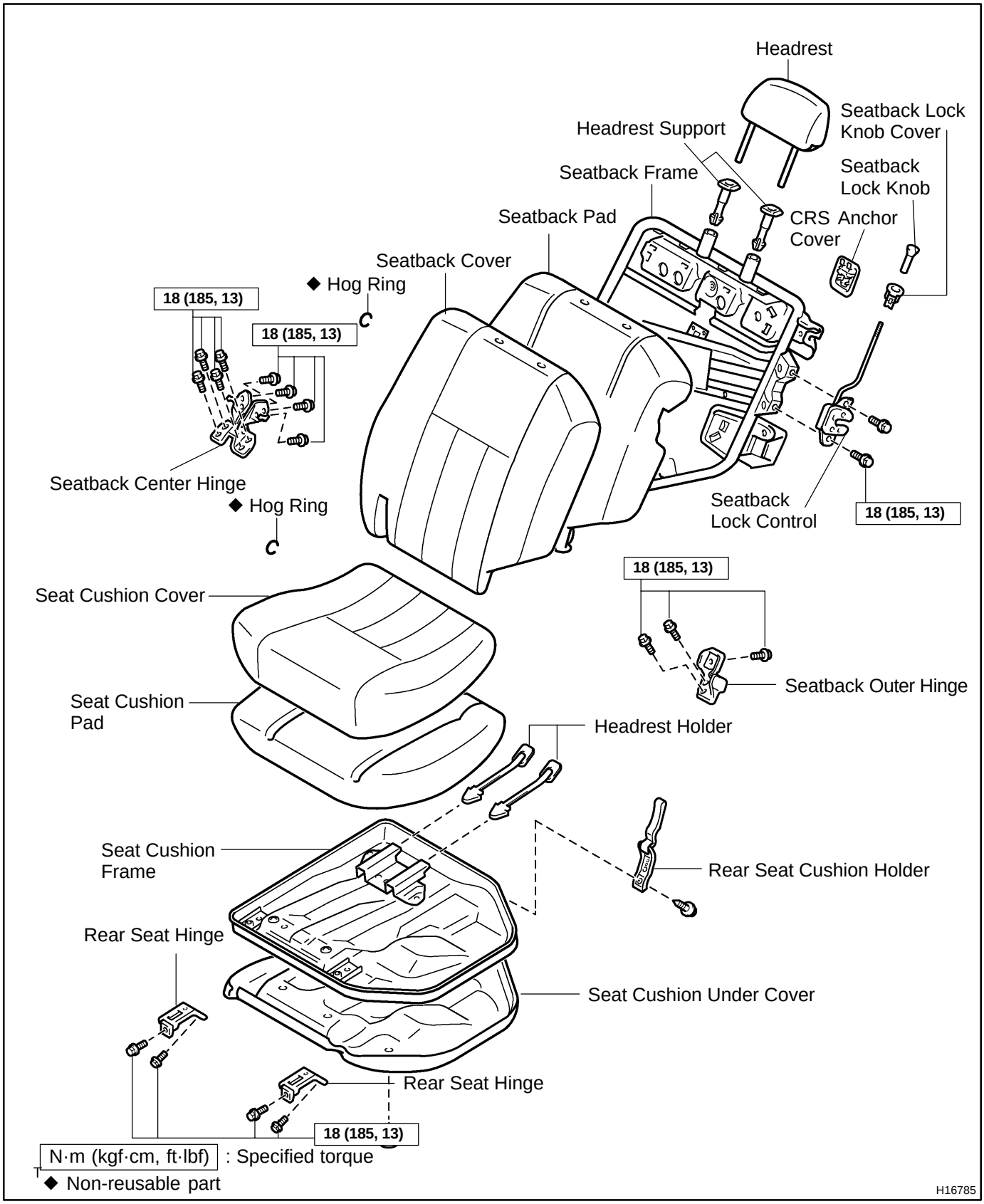
(e) Slide the seat to the frontmost position to tighten the bolts on the rear side temporarily, from the bolt on the inner side tighten completely.

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

REAR NO.1 SEAT

COMPONENTS

BO0DA-03



BO0DB-02

REMOVAL

1. REMOVE SEAT CUSHION ASSEMBLY

(a) Using a screwdriver, remove the rear seat hinge covers.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 2 bolts and seat cushion assembly.

2. REMOVE SEATBACK ASSEMBLY

(a) Insert a screwdriver between the seatback assembly and rear floor carpet to remove the rear floor carpet.

HINT:

Tape the screwdriver tip before use.

(b) Remove the 3 bolts and release the seatback lock to remove the seatback assembly.

(c) Remove the seatback assembly.

3. REMOVE SEATBACK OUTER HINGE

Remove the 2 bolts and seatback outer hinge.

4. REMOVE SEATBACK CENTER HINGE

Remove the 4 bolts and seatback center hinge.

BO0DC-03

DISASSEMBLY

1. REMOVE HEADREST

2. REMOVE SEATBACK LOCK KNOB

3. REMOVE CRS ANCHOR COVER

4. REMOVE SEATBACK LOCK KNOB COVER

5. REMOVE HEADREST SUPPORTS

6. REMOVE SEATBACK COVER

(a) Remove the hog rings and seatback frame from the seatback cover with pad.

(b) Remove the 2 bolts and seatback lock control from the seatback frame.

(c) Remove the hog rings and seatback cover from the seatback pad.

7. REMOVE REAR SEAT CUSHION HOLDER

Remove the screw and rear seat cushion holder.

8. REMOVE SEAT CUSHION COVER

(a) Remove the seat cushion cover with pad.

(b) Remove the hog rings and seat cushion cover from the seat cushion pad.

(c) Remove the 2 headrest holders from the seat cushion frame.

(d) Using a clip remover, remove the clips and seat cushion under cover from the seat cushion frame.

BO0DD-03

REASSEMBLY

1. INSTALL SEAT CUSHION COVER

(a) Install the seat cushion under cover with the clips to the seat cushion frame.
(b) Install the 2 headrest holders to the seat cushion frame.
(c) Install the seat cushion cover with new hog rings to the seat cushion pad.
(d) Install the seat cushion cover with pad.

2. INSTALL REAR SEAT CUSHION HOLDER

Install the rear seat cushion holder with the screw.

3. INSTALL SEATBACK COVER

(a) Install seatback cover with new hog rings to the seatback pad.
(b) Install the seatback lock control with the 2 bolts to the seatback frame.
(c) Install the seatback frame with new hog rings to the seatback cover with pad.

4. INSTALL HEADREST SUPPORTS

5. INSTALL CRS ANCHOR COVER

6. INSTALL SEATBACK LOCK KNOB COVER

7. INSTALL SEATBACK LOCK KNOB

8. INSTALL HEADREST

BO0DE-02

INSTALLATION

1. INSTALL SEATBACK CENTER HINGE

Install the seatback center hinge with the 4 bolts to the body.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

2. INSTALL SEATBACK OUTER HINGE

Install the seatback outer hinge with the 2 bolts to the body.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

3. INSTALL SEATBACK ASSEMBLY

(a) Install the seatback assembly with the 3 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

(b) Install the rear floor carpet to seatback assembly.

4. INSTALL SEAT CUSHION ASSEMBLY

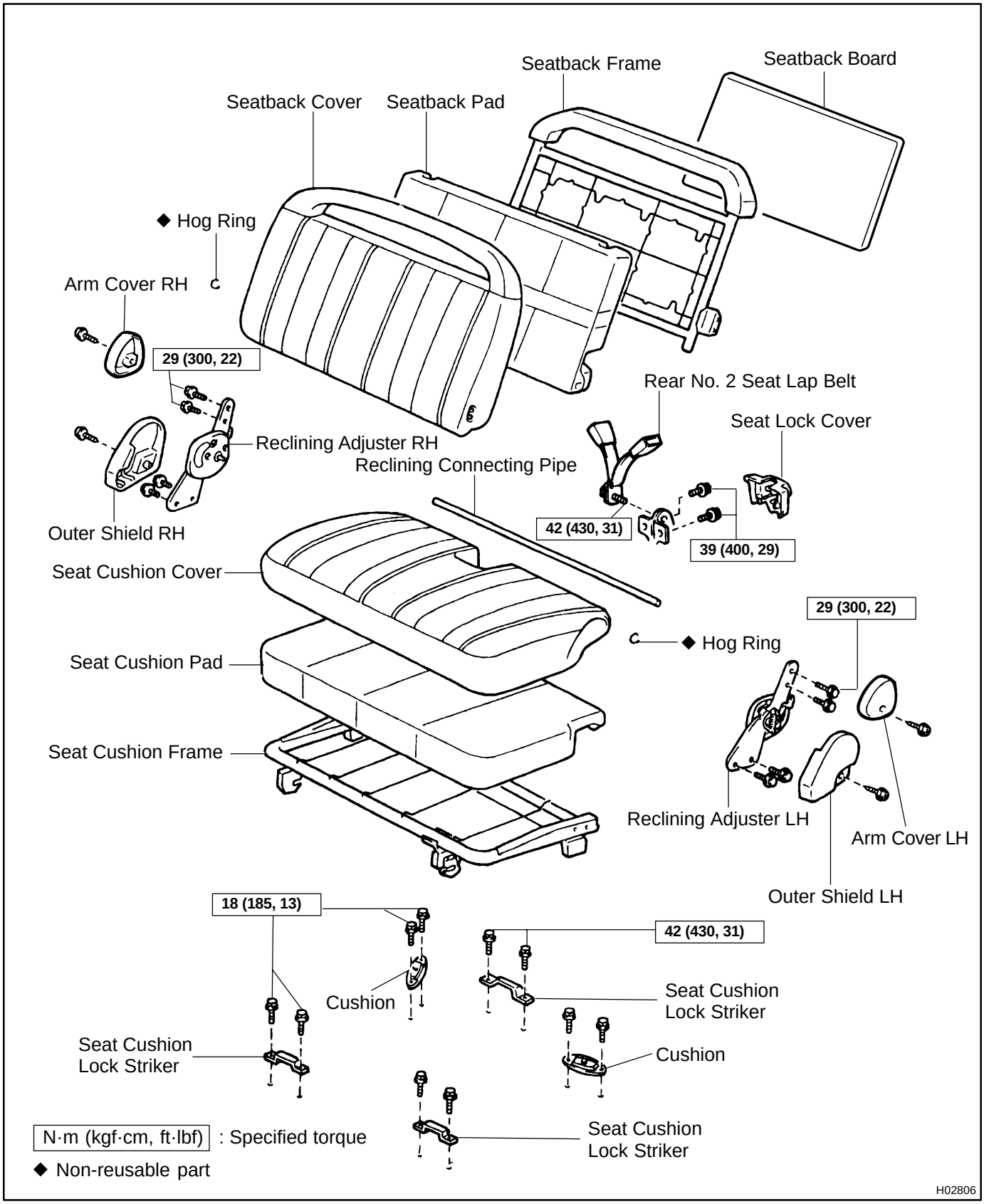
(a) Install the seat cushion assembly wit the 2 bolts to the body.

(b) Install the rear seat hinge covers.

REAR NO.2 SEAT

COMPONENTS

BO0DF-02



BO0DH-02

DISASSEMBLY

1. REMOVE OUTER SHIELD RH

Remove the screw and outer shield RH.

2. REMOVE OUTER SHIELD LH

Remove the screw and outer shield LH.

3. REMOVE SEATBACK ASSEMBLY

(a) Remove the 2 screws and arm covers.
(b) Remove the 4 bolts and seatback assembly.

4. REMOVE SEATBACK COVER

(a) Remove the seatback boad.
(b) Remove the hog rings.
(c) Zip the seatback cover open to remove the seatback cover.

5. REMOVE SEATBACK PAD

Remove the seatback pad from the seatback frame.

6. REMOVE RECLINING ADJUSTER RH AND LH

Remove the 8 bolts, reclining adjuster RH and LH.

7. REMOVE RECLINING CONNECTING PIPE

8. REMOVE SEAT CUSHION COVER

Remove the hog rings and seat cushion cover.

9. REMOVE SEAT CUSHION PAD

Remove the seat cushion pad from the seat cushion frame.

10. REMOVE SEAT LOCK COVER

11. REMOVE REAR NO. 2 SEAT LAP BELT

Remove the bolt and rear No. 2 seat lap belt

12. REMOVE SEAT LOCK ASSEMBLY

BO0DI-01

INSPECTION

INSPECT RECLINING LOCK POSITION SLIPPING OFF

When reclining the seat, inspect that the reclining adjuster RH and LH are released at the same time.
HINT:
When the reclining lock positions slip off, disassemble the seat to adjust the position.

BO0DJ-02

REASSEMBLY

1. INSTALL SEAT LOCK ASSEMBLY

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

2. INSTALL REAR NO. 2 SEAT LAP BELT

Install the rear No. 2 seat lap belt with the bolt.

Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

3. INSTALL SEAT LOCK COVER

4. INSTALL SEAT CUSHION PAD

Install the seat cushion pad to the seat cushion frame.

5. INSTALL SEAT CUSHION COVER

Install the seat cushion cover with new hog rings to seat cushion pad with frame.

6. INSTALL RECLINING CONNECTING PIPE

7. INSTALL RECLINING ADJUSTER RH AND LH

Install the reclining adjuster RH and LH with the 8 bolts.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

8. INSTALL SEATBACK PAD

Install the seatback pad to the seatback frame.

9. INSTALL SEATBACK COVER

(a) Install the seatback cover to the seatback pad with frame, then zip the seatback cover close.

(b) Install new hog rings.

(c) Install seatback board.

10. INSTALL SEATBACK ASSEMBLY

(a) Install the seatback assembly with the 4 bolts.

Torque: 29 N·m (300 kgf·cm, 22 ft·lbf)

(b) Install arm covers with the 2 screws.

11. INSTALL OUTER SHIELD LH

Install the outer shield LH with the screw.

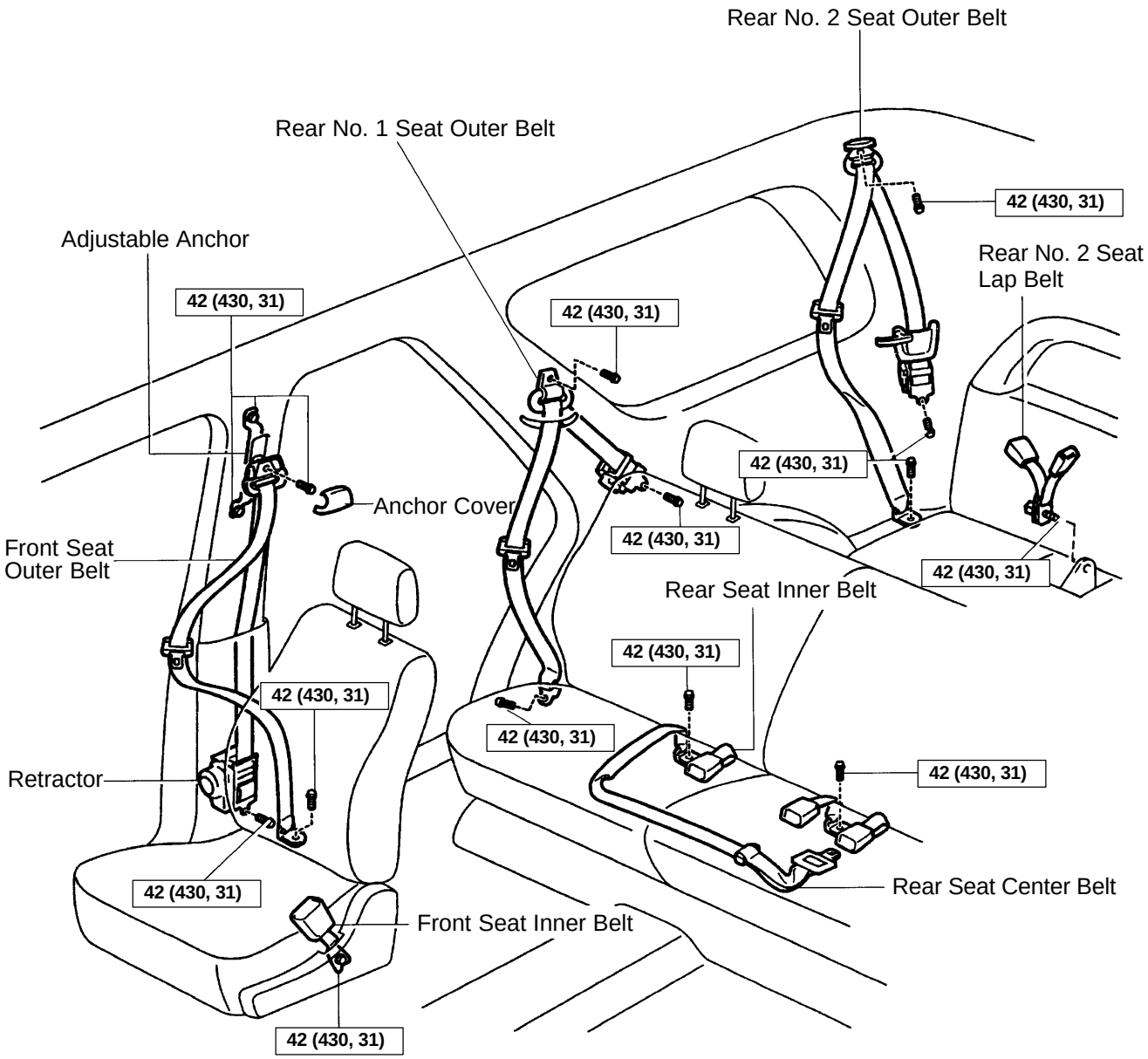
12. INSTALL OUTER SHIELD RH

Install the outer shield RH with the screw.

SEAT BELT

COMPONENTS

BO0DL-02



N·m (kgf·cm, ft·lbf) : Specified torque

N20040

BO26N-01

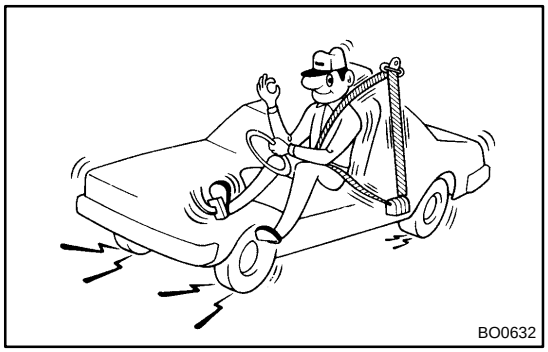
INSPECTION

CAUTION:

Replace the seat belt assembly (outer belt, inner belt, bolts or nuts and sill-bar) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

1. Except manual type seat belt:
RUNNING TEST (IN SAFE AREA)

(a) Fasten the front seat belts.


BO0632

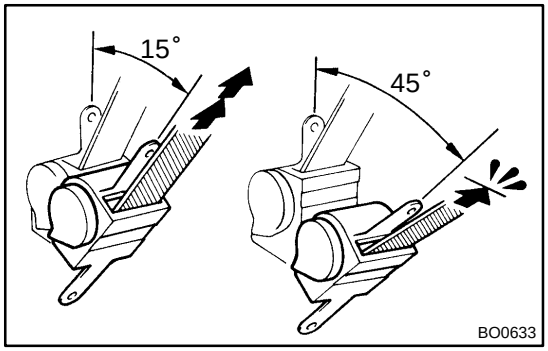
(b) Drive the car at 10 mph (16 km/h) and make a very hard stop.
Check that the belt locks and cannot be extended at this time.

HINT:

Conduct this test in a safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly, verify the proper operation before installation.

2. Driver's seat belt (ELR):
STATIC TEST

(a) Make sure that the belt locks when pulled out quickly.
(b) Remove the locking retractor assembly.
(c) Tilt the retractor slowly.



BO0633

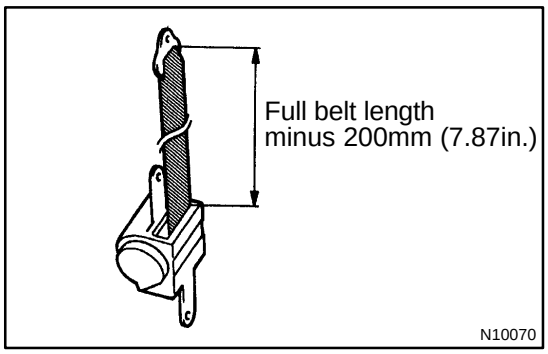
(d) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.

3. Except driver's seat belt (ALR/ELR):
STATIC TEST

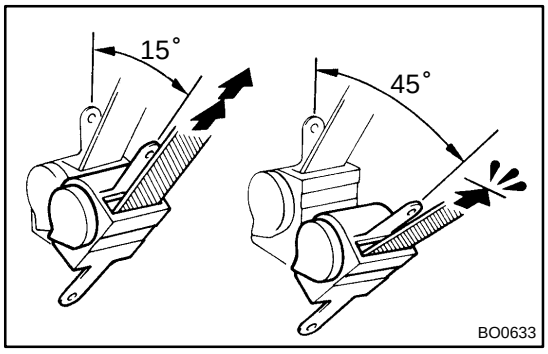
(a) Make sure that the belt locks when pulled out quickly.
(b) Remove the locking retractor assembly.
(c) Pull out the whole belt and measure the length of the whole belt.
Then retract the belt slightly and pull it out again.
(d) Make sure that the belt cannot be extended further.

If a problem is found, replace the assembly.



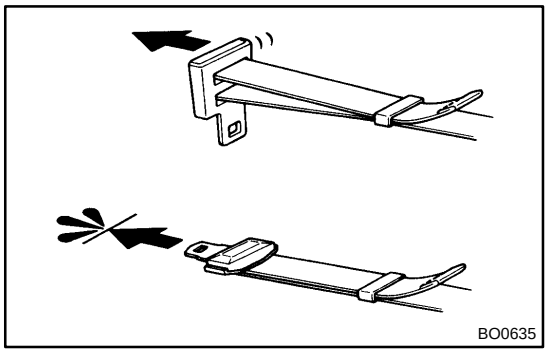
(e) Retract the whole belt, then pull out the belt until 200 mm (7.87 in.) of belt remains retracted.

(f) Tilt the retractor slowly.



(g) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assembly.



4. Manual type seat belt:
TEST

(a) Adjust the belt to the proper length.

(b) Apply a firm load to the belt.

(c) Make sure that the belt does not extend.

SEAT BELT PRETENSIONER

BO21P-02

REMOVAL

NOTICE:

- **If the wiring connector of the seat belt pretensioner is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.**
- **Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.**

1. REMOVE FRONT DOOR SCUFF PLATE

Remove the 4 screws and front door scuff plate.

2. REMOVE REAR DOOR SCUFF PLATE

Remove the 2 screws and rear door scuff plate.

3. REMOVE CENTER PILLAR LOWER GARNISH

4. REMOVE FRONT SEAT OUTER BELT

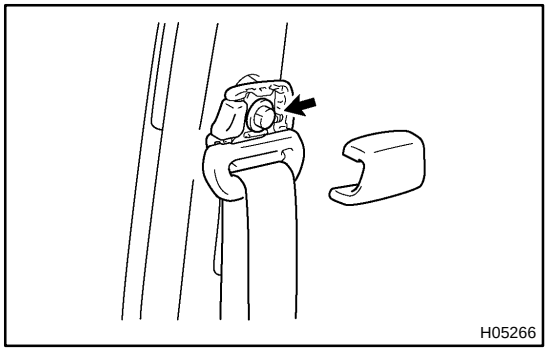
CAUTION:

Never disassemble the front seat outer belt.

NOTICE:

When removing the front seat outer belt, take care not to pull the seat belt pretensioner wire harness.

(a) Remove the bolt and front seat outer belt floor anchor.

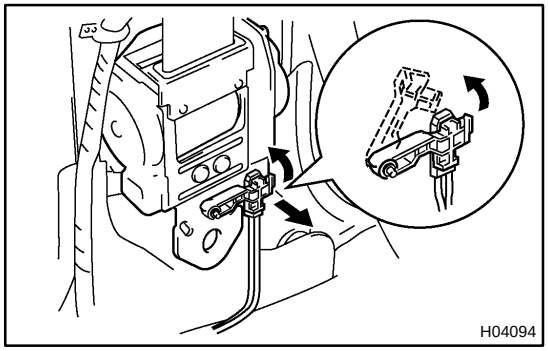

H05266

(b) Using a screwdriver, remove the anchor cover.

HINT:

Tape the screwdriver tip before use.

(c) Remove the bolt and front seat outer belt shoulder anchor.


H04094

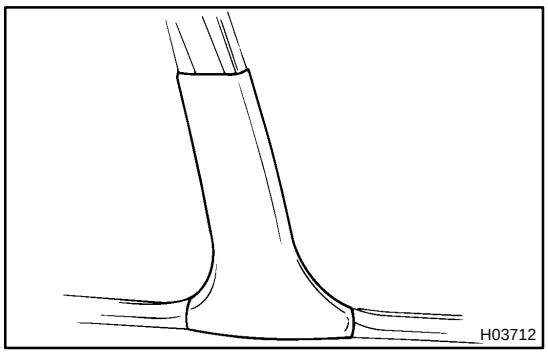
(d) Disconnect the pretensioner connector as shown in the illustration.

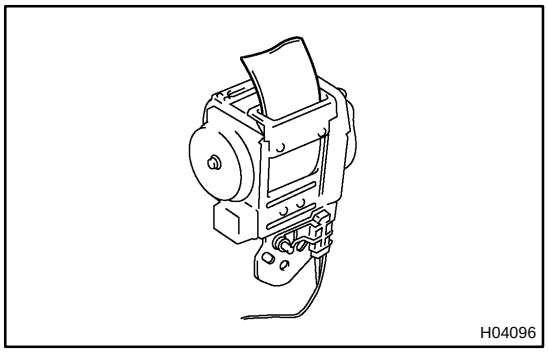
CAUTION:

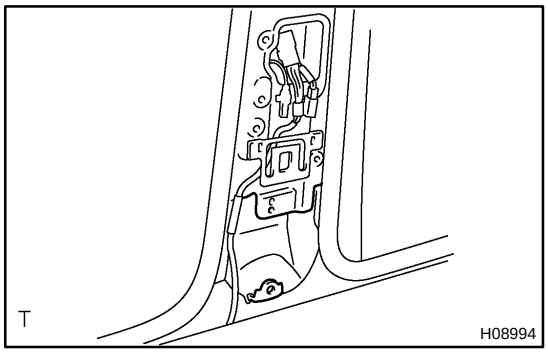
When removing the seat belt pretensioner, work must be started 90 seconds after the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

(e) Remove the 2 bolts and front seat outer belt.

BO0HW-03







INSPECTION

1. PRETENSIONER IS NOT ACTIVATED

(a) Perform a diagnostic system check
(See page DI-377).

(b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.

- Check for cuts and cracks in, or marked discoloration of the center pillar lower garnish.
- Check for cuts and cracks in wire harness, and for chipping in connectors.
- Check for deformation of the center pillar.

CAUTION:

For removal and installation of the front seat outer belt, see page BO-121 and BO-129 .

Be sure to follow the correct procedure.

2. PRETENSIONER IS ACTIVATED

(a) Perform a diagnostic system check
(See page DI-377).

(b) Perform a visual check which includes the following items with the front seat outer belt removed from the vehicle.

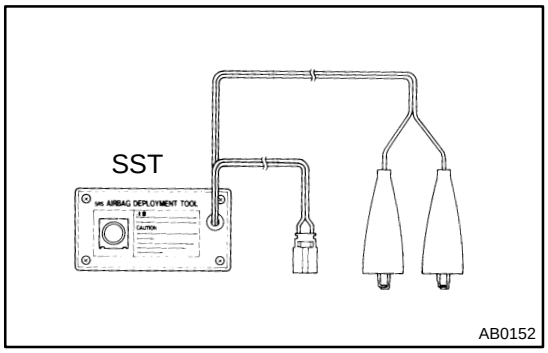
- Check for deformation of the center pillar.
- Check for damage to the connector and wire harness.

BO0GT-03

DISPOSAL

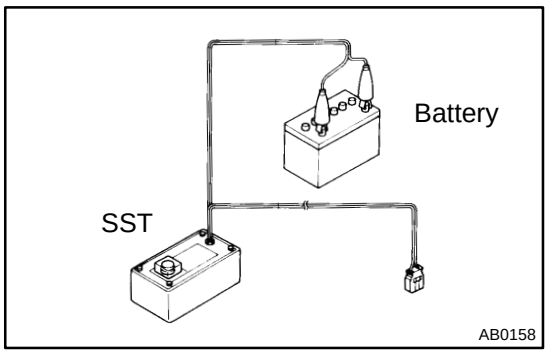
HINT:

When scrapping vehicle equipped with a SRS or disposing of a front seat outer belt (with seat belt pretensioner), always first deploy the airbag in accordance with the procedure given in RS section or activate the seat belt pretensioner. If any abnormality occurs with the airbag deployment or seat belt pretensioner activation, contact the SERVICE DEP. of the TOYOTA MOTOR SALES, U.S.A. INC. When disposing of a front seat outer belt (with seat belt pretensioner) activated in a collision, follow the same procedure given in step 1-(e) in ”DISPOSAL”.



CAUTION:

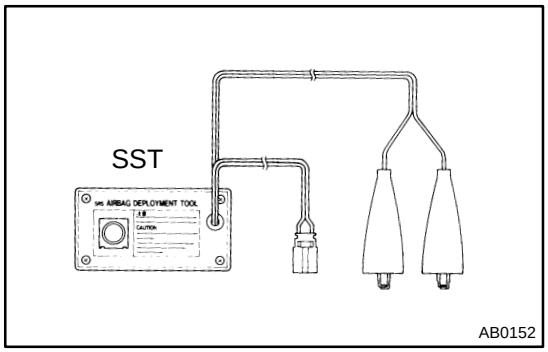
- **Never dispose of front seat outer belt which has inactivated pretensioner.**
- **The seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation out-of-door and where it will not create a nuisance to nearby residents.**
- **When activating the seat belt pretensioner, always use the specified SST. (SRS Airbag Deployment Tool) Perform the operation in a place away from electrical noise.**
  SST 09082-00700, 09082-00740
- **When activating a front seat outer belt (with seat belt pretensioner), perform the operation at least 10 m (33 ft) away from the front seat outer belt.**
- **Use gloves and safety glasses when handling a front seat outer belt with the activated pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with the activated pretensioner.**



1. SEAT BELT PRETENSIONER ACTIVATION WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to activate the seat belt pretensioner.

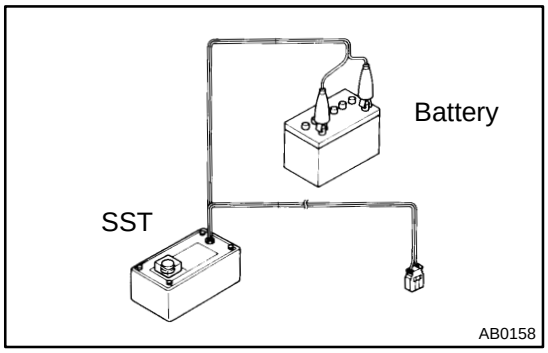


(a) Check functioning of SST.

CAUTION:

When activate the seat belt pretensioner, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082-00700, 09082-00740

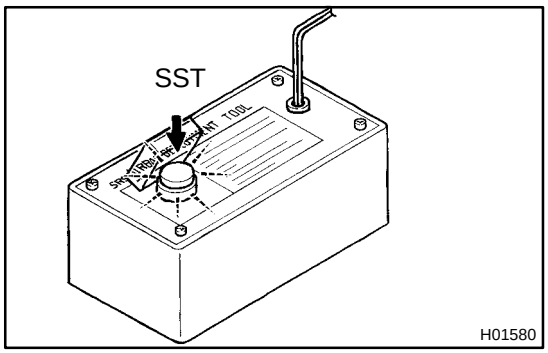


(1) Connect the SST to battery.

Connect the red clip of the SST to the battery positive (+) terminal and the black clip to the battery negative (-) terminal.

HINT:

Do not connect the yellow connector which will be connected with the seat belt pretensioner.



(2) Check functioning of SST.

Press the SST activation switch, and check the LED of the SST activation switch lights up.

CAUTION:

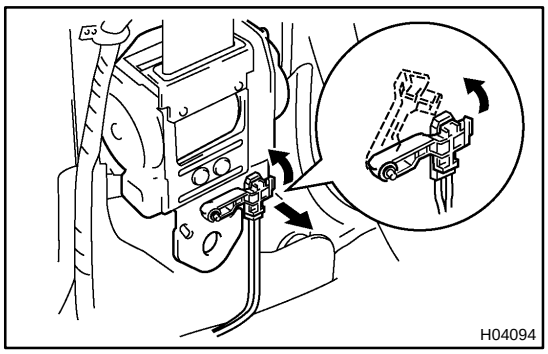
If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

(b) Disconnect the pretensioner connector.

(1) Remove the front door scuff plate.

(2) Remove the rear door scuff plate.

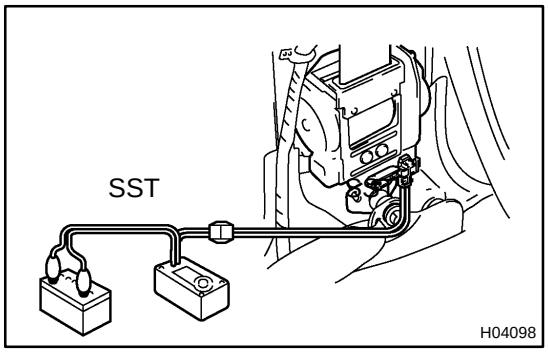
(3) Remove the center pillar lower garnish.



(4) Disconnect the pretensioner connector as shown in the illustration.

(c) Install the SST.

(1) Buckle the front seat belt and check that there is no looseness and slack in the front seat inner belt and front seat outer belt.

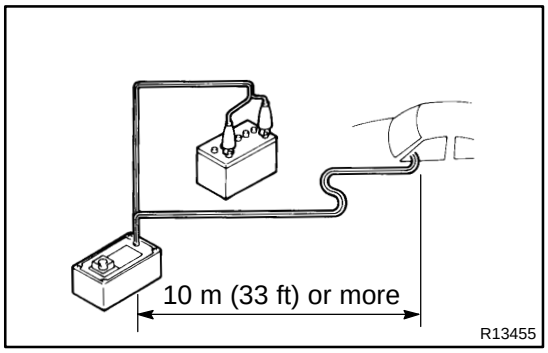


(2) Connect the 2 SST each other, then connect them to the seat belt pretensioner.

SST 09082-00700, 09082-00740

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock secondary lock of the twin lock.



(3) Move the SST to at least 10mm (33 ft) from the front of the vehicle.

(4) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

(5) Connect the SST red clip to the battery positive (-) terminal and the black clip to the negative (+) terminal.

(d) Activate the seat belt pretensioner.

(1) Confirm that no one is inside the vehicle or within 10 m (33 ft) area around the vehicle.

(2) Press the SST activation switch and activate the seat belt pretensioner.

HINT:

The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.

(e) Dispose of the front seat outer belt (with seat belt pretensioner).

CAUTION:

- **The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a front seat outer belt with the activated seat belt pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with the activated seat belt pretensioner.**

HINT:
When scrapping a vehicle, activate the seat belt pretensioner and scrap the vehicle with the activated front seat outer belt still installed.

2. ACTIVATION WHEN DISPOSING OF FRONT SEAT OUTER BELT ONLY

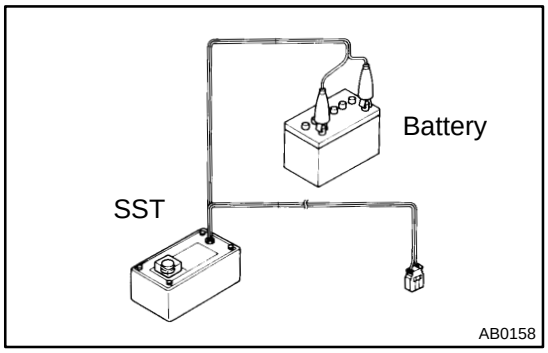
NOTICE:

- **When disposing of the front seat outer belt (with seat belt pretensioner) only, never use the customer's vehicle to activate the seat belt pretensioner.**
- **Be sure to follow the procedure given below when activating the seat belt pretensioner.**

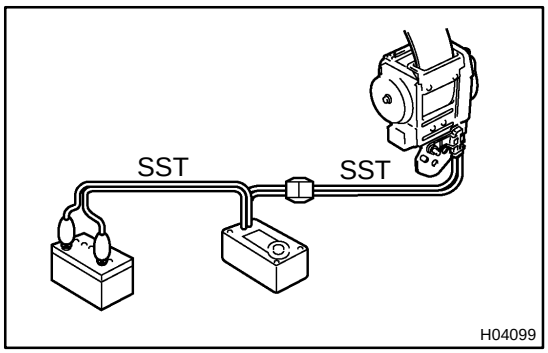
HINT:
Have a battery ready as the power source to activate the seat belt pretensioner.

(a) Remove the front seat outer belt (See page BO-121).

HINT:
Cut the belt near the seat belt retractor.

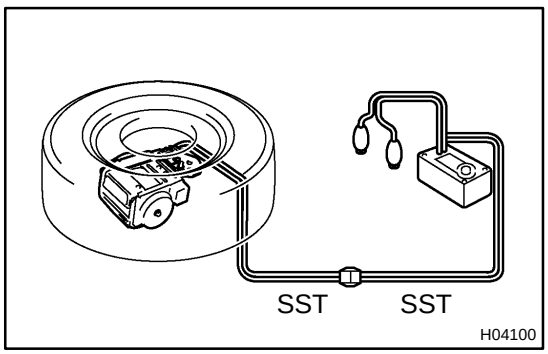


(b) Check functioning of SST (See step 1-(a)).
SST 09082-00700, 09082-00740



(c) Install the SST.
(1) Connect the 2 SST each other, then connect them to the seat belt pretensioner.
SST 09082-00700, 09082-00740

NOTICE:
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



(2) Locate the front seat outer belt on the ground and cover it with the disc wheel with tire.

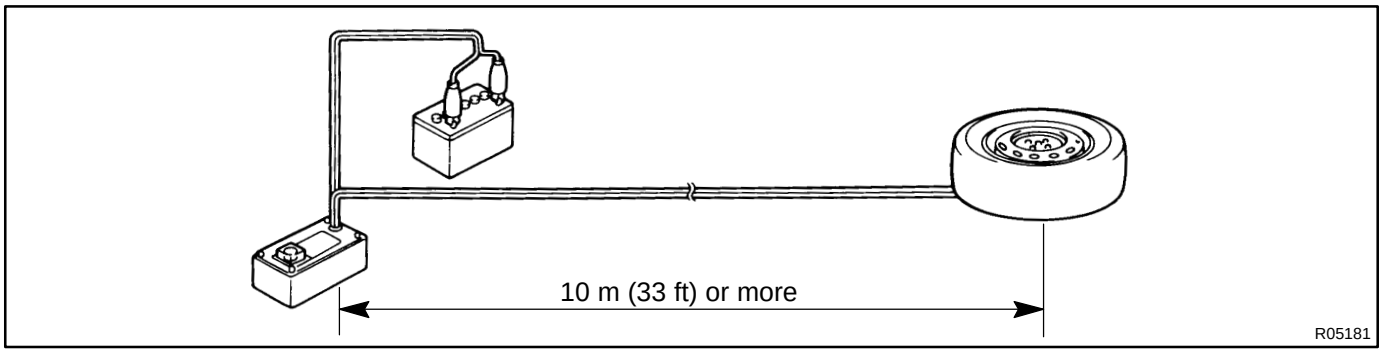
NOTICE:
Place the front seat outer belt shown in the illustration.

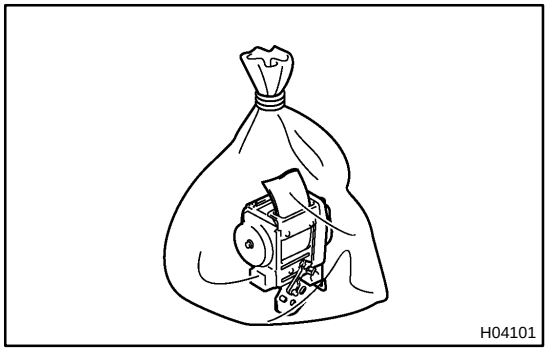
(3) Move the SST to at least 10 m (33 ft) from the disc wheel.

NOTICE:
Take care not to damage the SST wire harness.

(d) Activate the seat belt pretensioner.
   (1) Connect the SST red clip to the battery positive (+) terminal and black clip to the battery negative (-) terminal.
   (2) Check that no one is within 10 m (33 ft) area around the disc wheel.
   (3) Press the SST activation switch and activate the seat belt pretensioner.

HINT:
The seat belt pretensioner operates simultaneously as the LED of the SST activation switch lights up.





(e) Dispose of the front seat outer belt (with seat belt pretensioner).

CAUTION:
- **The front seat outer belt is very hot when the seat belt pretensioner is activated, so leave it alone for at least 30 minutes after activation.**
- **Use gloves and safety glasses when handling a front seat outer belt with the activated seat belt pretensioner.**
- **Always wash your hands with water after completing the operation.**
- **Do not apply water, etc. to a front seat outer belt with the activated seat belt pretensioner.**
   (1) Remove the disc wheel and SST.
   (2) Place the front seat outer belt in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts.

BO0GU-03

REPLACEMENT

REPLACE REQUIREMENTS

In the following cases, replace the seat belt pretensioner.

- If the seat belt pretensioner has been activated.
- If the seat belt pretensioner has been found to be faulty in troubleshooting.
- If the front seat outer belt has been found to be faulty during checking items 1-(b) or 2-(b)
- If the front seat outer belt has been dropped.

CAUTION:

For removal and installation of the seat belt pretensioner, see page BO-121 and BO-129 .
Be sure to follow the correct procedure.

BO26O-01

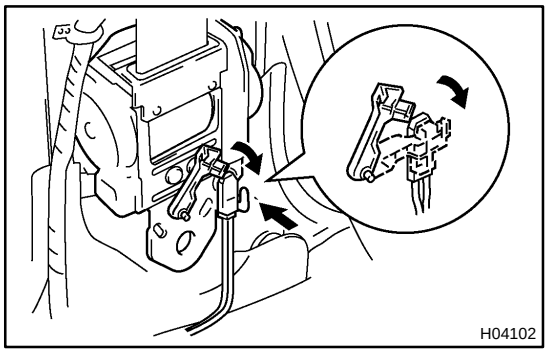
INSTALLATION

NOTICE:

- **Never use seat belt pretensioner from another vehicle. When replacing parts, replace them with new parts.**
- **Make sure that the front seat outer belt is installed to the specified torque.**
- **If the front seat outer belt has been dropped, or there are cracks, dents or other defects in the case or connector, replace the front seat outer belt with a new one.**
- **When installing the front seat outer belt, take care that the wiring does not interfere with other parts and is not pinched between other parts.**

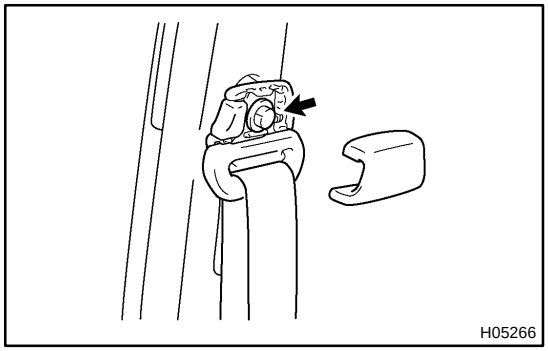
1. INSTALL FRONT SEAT OUTER BELT

(a) Install the retractor of front seat outer belt with the 2 bolts.
Torque:
Upper bolt: 8.5 N·m (85 kgf·cm, 74 in.·lbf)
Lower bolt: 42 N·m (430 kgf·cm, 31 ft·lbf)


H04102

(b) Connect the pretensioner connector as shown in the illustration.

(c) Install the front seat outer belt shoulder anchor with the bolt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)


H05266

(d) Install the anchor cover.

(e) Install the front seat outer belt floor anchor with the bolt.
Torque: 42 N·m (430 kgf·cm, 31 ft·lbf)

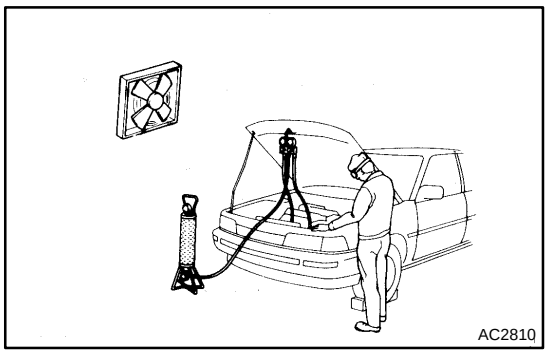
2. INSTALL CENTER PILLAR LOWER GARNISH

3. INSTALL REAR DOOR SCUFF PLATE

Install the rear door scuff plate with the 2 screws.

4. INSTALL FRONT DOOR SCUFF PLATE

Install the front door scuff plate with the 4 screws.


AC2810

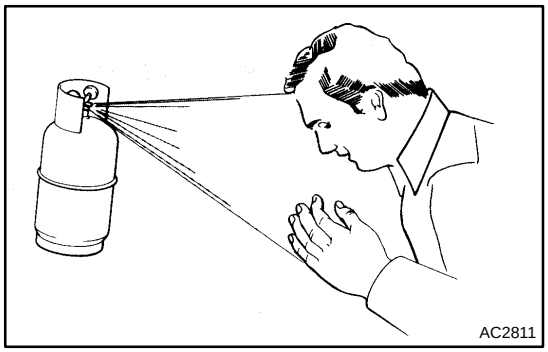
AIR CONDITIONING SYSTEM

AC0C1-11

PRECAUTION

1. DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR WEAR EYE PROTECTION

2. ALWAYS WEAR EYE PROTECTION


AC2811

3. BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN

If liquid refrigerant gets in your eyes or on your skin.

(a) Wash the area with lots of cool water.

CAUTION:

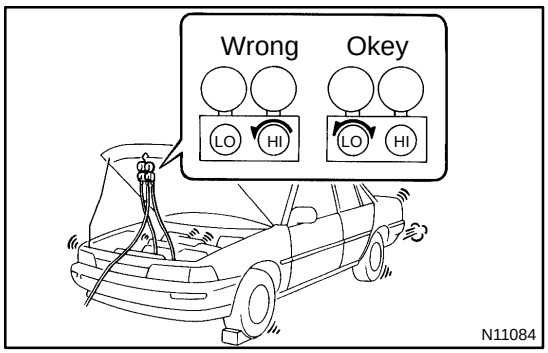
Do not rub your eyes or skin.

(b) Apply clean petroleum jelly to the skin.

(c) Go immediately to a physician or hospital for professional treatment.

4. NEVER HEAT CONTAINER OR EXPOSE IT TO NAKED FLAME

5. BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPLY PHYSICAL SHOCKS TO IT



N11084

6. DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERATION SYSTEM

If there is not enough refrigerant in the refrigerant system oil lubrication will be insufficient and compressor burnout may occur, so that care to avoid this, necessary care should be taken.

7. DO NOT OPEN PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATE

If the high pressure valve is opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the only low pressure valve.

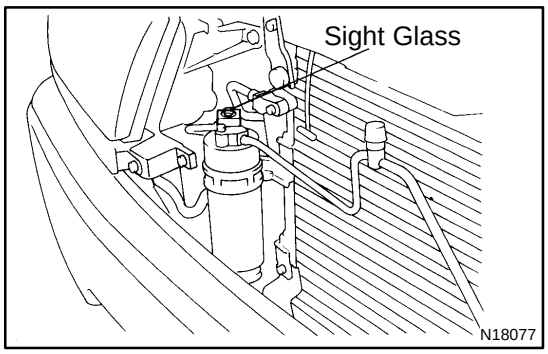
8. BE CAREFUL NOT TO OVERCHARGE SYSTEM WITH REFRIGERANT

If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating etc.

9. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The 4 RUNNER is equipped with an SRS (Supplemental Restraint System) such as the driver and front passenger airbag. Failure to carry out service operation in the correct sequence could cause the SRS to unexpectedly deploy during servicing, possibly leading to a serious accident. Before servicing (including removal or installation of parts, inspection or replacement), be sure to read the precautionary notices tn the RS section.

AC22F-07



ON-VEHICLE INSPECTION

1. INSPECT REFRIGERANT VOLUME

Observe the sight glass on the liquid tube.

Test conditions:

- Running engine at 1,500 rpm
- Blower speed control switch at ”HI” position
- A/C switch ON
- Temperature control dial at ”COOL” position
- Fully open the doors

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient*	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present in sight glass	None, sufficient or too much	Refer item 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Add refrigerant until bubbles disappear
4	Temperature between compressor inlet and outlet is noticeably different	Correct or too much	Refer to items 5 and 6
5	Immediately after air conditioning is turned off, refrigerant in sight glass stays clear	Too much	(1) Discharge refrigerant (2) Evacuate air and charge proper amount or purified refrigerant
6	When air conditioning is turned off, refrigerant foams and then stays clear	Correct	-

*: Bubbles in the sight glass with ambient temperatures higher than usual can be considered normal if cooling is sufficient.

2. INSPECT REFRIGERANT PRESSURE WITH MANIFOLD GAUGE SET

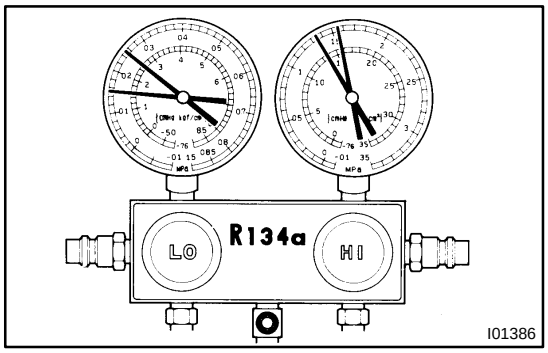
This is a method in witch the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when the these conditions are established.

Test conditions:

- Temperature at the air inlet with the switch set at RECURC is 30 - 35 °C (86 - 95 °F)
- Engine running at 1500 rpm
- Blower speed control switch at "HI" position
- Temperature control dial at "COOL" position

HINT:

It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.



(1) Normally functioning refrigeration system.

Gauge reading:

Low pressure side:

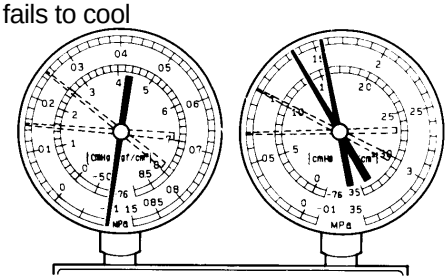
0.15 - 0.25 MPa (1.5 - 2.5 kgf/cm^2)

High pressure side:

1.37 - 1.57 MPa (14 - 16 kgf/cm^2)

(2) Moisture present in refrigeration system.

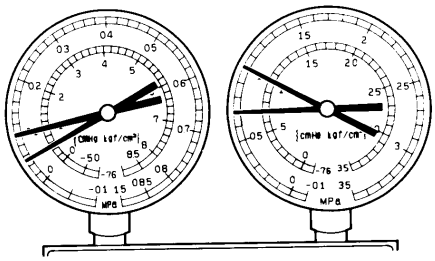
Condition : Periodically cools and then fails to cool



Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure on low pressure side sometimes become a vacuum and sometime normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	• Drier in oversaturected state • Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace receiver (2) Remove moisture in cycle through repeatedly evacuating air (3) Charge proper amount of new refrigerant

(3) Insufficient cooling

Condition: Insufficient cooling

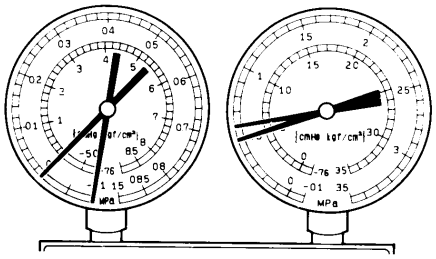


I01388

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure low on both low and high pressure sides • Bubbles seen in sight glass continuously • Insufficient cooling performance	Gas leakage at some place in refrigeration system	• Insufficient refrigerant in system • Refrigerant leaking	(1) Check for gas leakage with gas leak detector and repair if necessary (2) Charge proper amount of refrigerant (3) If indicated pressure value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak

(4) Poor circulation of refrigerant

Condition: Insufficient cooling

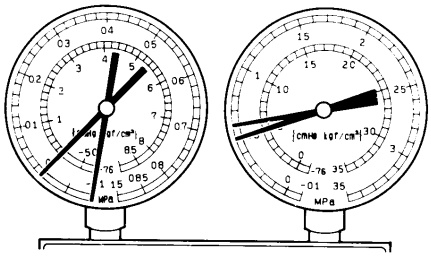


I01389

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure low in both low and high pressure sides • Frost on tube from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace receiver

(5) Refrigerant does not circulate

Condition: Does not cool (Cools from time to time in some cases)

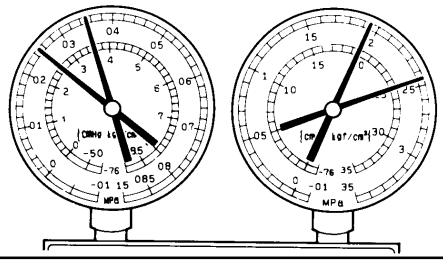


I01449

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Vacuum indicated on low pressure side, very low pressure indicated on high pressure side • Frost or dew seen on piping before and after receiver/ drier or expansion valve	• Refrigerant flow obstructed by moisture or dirt in refrigeration system • Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	(1) Check expansion valve (2) Clean out dirt in expansion valve by blowing with air (3) Replace receiver (4) Evacuate air and charge new refrigerant to proper amount (5) For gas leakage from expansion valve, replace expansion valve

(6) Refrigerant overcharged or insufficient cooling of condenser

Condition: Insufficient cooling

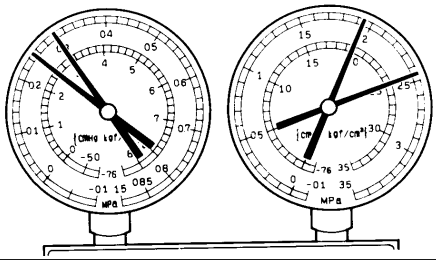


I01390

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • No sir bubbles seen through the sight glass even when the engine rpm is lowered	• Unable to develop sufficient performance due to excessive • Insufficient cooling of condenser	• Excessive refrigerant in cycle→refrigerant overcharged • Condenser cooling insufficient→condenser fins clogged of cooling fan faulty	(1) Clean condenser (2) Check cooling fan with fluid coupling operation (3) If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant

(7) Air present in refrigeration system

Condition: Insufficient cooling



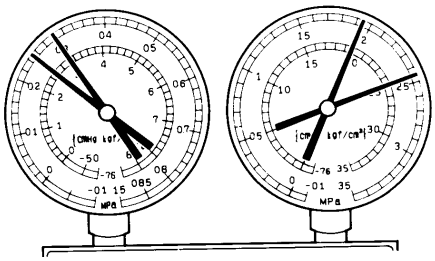
NOTE : These gauge indications are shown when the refrigeration system has been opens and the refrigerant charged without vacuum purging.

I01392

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • The low pressure piping hot to the touch • Bubbles seen in sight glass	Air entered in refrigeration system	• Air present in refrigeration system • Insufficient vacuum purging	(1) Check compressor oil to see if it is see if it is dirty or insufficient (2) Evacuate air and charge new refrigerant

(8) Expansion valve improperly

Condition: Insufficient cooling

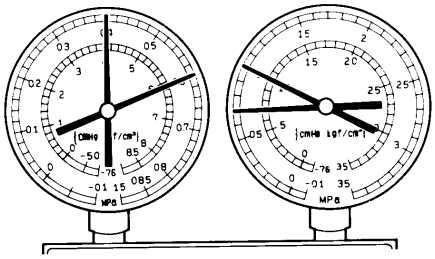


I01450

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on both low and high pressure sides • Frost or large amount of dew on piping on low pressure side	Trouble in expansion valve	• Excessive refrigerant in low pressure piping • Expansion valve opened too wide	Check expansion valve Replace if defective

(9) Defective compression compressor

Condition : Does not cool



I01393

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
• Pressure too high on low high pressure sides • Pressure too low to on high pressure side	Internal leak in compressor	• Compression defective • Valve leaking or broken sliding parts	Repair or replace compressor

3. INSPECT IDLE-UP SPEED

(a) Warm up engine.

(b) Inspect idle-up speed when the these conditions are established.

- Warm up engine
- Blower speed control switch at ”HI” position
- A/C switch ON
- Temperature control dial at ”COOL” position

Magnetic clutch condition	Idle-up speed
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	850 ± 50 rpm

If idle speed is not as specified, check Idle control system.

4. INSPECT FOR LEAKAGE OF REFRIGERANT

(a) Perform in these conditions:

- Stop engine.
- Secure good ventilation (If not the gas leak detector may react to volatile gases witch are not refrigerant, such as evaporated gasoline and exhaust gas.)
- Repeat the test 2 or 3 times.
- Make sure that there is some refrigerant remaining in the refrigeration system.
  When compressor is OFF: approx. 392 - 588 kPa (4 - 6 kgf/ cm^2, 57 - 85 psi)

(b) Bring the gas leak detector close to the drain hose before performing the test.

HINT:

- After the blower motor stopped, leave the cooling unit for more than 15 minutes.
- Expose the gas leak detector sensor the under the drain hose.
- When bring the gas leak detector close to the drain hose, make sure that the gas leak detector does not react to the volatile gases.

If such reaction is unavoidable, the vehicle must be lifted up.

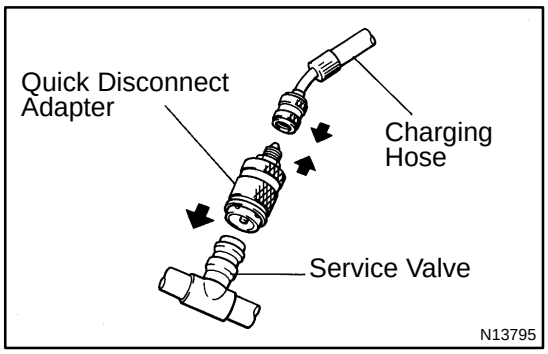
(c) If gas leak is not detected on the drain hose, remove the blower resistor from the cooling unit. Then insert the gas leak detector sensor into the unit and perform the test.

(d) Disconnect the connector and leave the pressure switch for approx. 20 minutes. Then bring the gas leak detector close to the pressure switch and perform the test.

(e) Bring the gas leak detector close to the refrigerant lines and perform the test.

AC0C4-02

EVACUATING



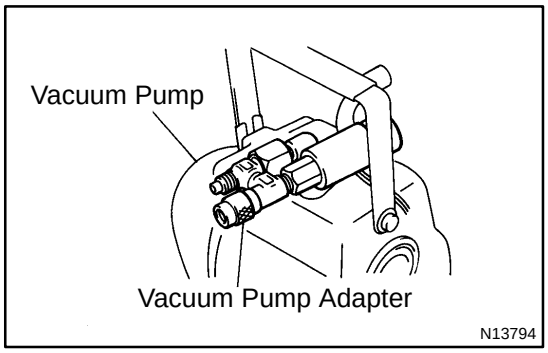
1. CONNECT QUICK DISCONNECT ADAPTER TO CHARGING HOSES

2. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES

3. SET ON MANIFOLD GAUGE SET

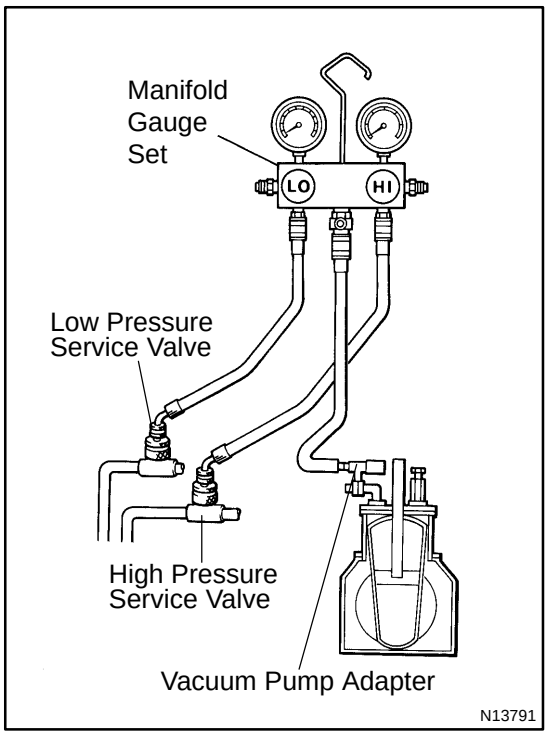
(a) Close both hand valves of manifold gauge set.

(b) Connect the quick disconnect adapters to the service valves.



4. EVACUATE AIR FROM REFRIGERATION SYSTEM

(a) Connect the vacuum pump adapter to the vacuum pump.



(b) Connect the center hose of the manifold gauge set to the vacuum pump adapter.

(c) Open both the high and low hand valves and run the vacuum pump.

(d) After 10 minutes or more, check that the low pressure gauge indicates 750 mmHg (30 in. Hg) or more.

HINT:

If the reading 750 mmHg (30 in. Hg) or more, close both hand valves of manifold gauge set and stop the vacuum pump.

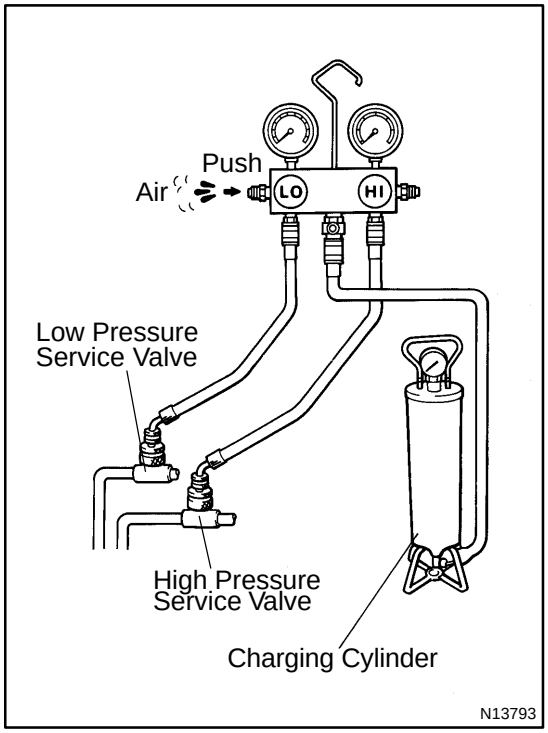
Check the system for leaks and repair necessary.

(e) Close both the high and low hand valves and stop the vacuum pump.

(f) Leave the system in this condition for 5 minutes or more and check that there is no gauge indicator.

AC22G-06

CHARGING



1. INSTALL CHARGING CYLINDER

HINT:

When handling the charging cylinder, always follow the directions given in the instruction manual.

(a) Charge the proper amount of refrigerant into the charging cylinder.

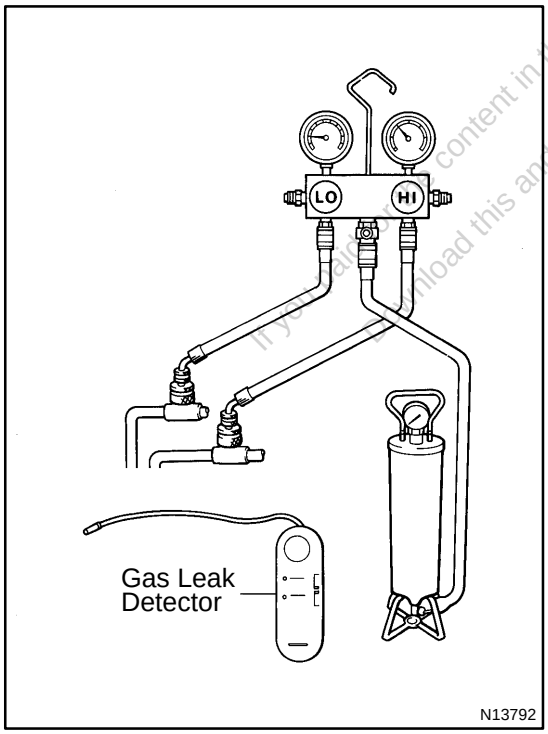
(b) Connect the center hose to the charging cylinder.

CAUTION:

Do not open both high and low hand valves of manifold gauge set.

(c) Open the valve of charging cylinder.

(d) Press the valve core on the side of manifold gauge and expel the air inside of the center hose.



2. INSPECT REFRIGERATION SYSTEM FOR LEAKS

(a) Open the high pressure hand valve and charge refrigerant.

(b) When the low pressure gauge indicates 98 kPa (1 kgf/cm^2, 14 psi) close the high pressure hand valve.

(c) Using a gas leak detector, check the system for leakage.

CAUTION:

Use the refrigerant recovery/ recycling machine to recover the refrigerant whenever replacing parts.

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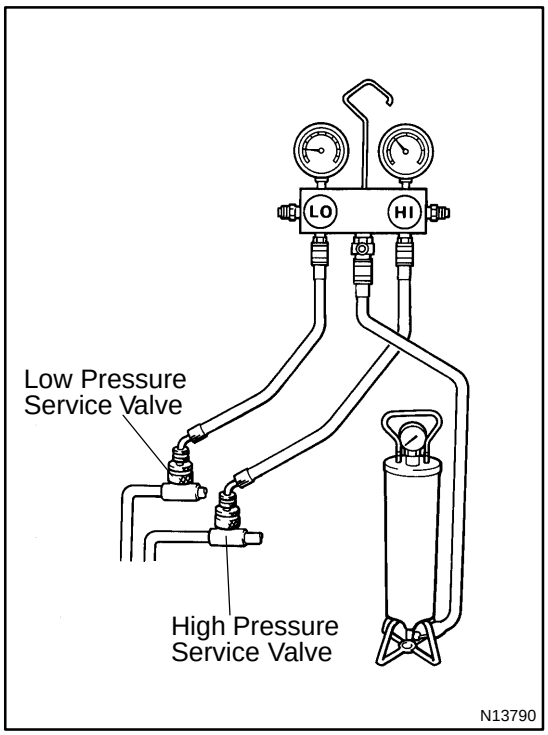

3. CHARGE REFRIGERANT INTO REFRIGERANT SYSTEM

If there is no leak after refrigerant leak check, charge the proper amount of refrigerant into refrigeration system.

CAUTION:

- **Never run the engine when charging the system through the high pressure side.**
- **Do not open the low pressure hand valve when the system is being charged with liquid refrigerant.**

(a) Open the high pressure hand valve fully.

(b) Charge specified amount of refrigerant, then close the high pressure hand valve.

HINT:

A fully charged system is indicated by the sight glass being free of any bubbles.

(c) Charge partially refrigeration system with refrigerant.

(1) Set vehicle in these condition:

- Running engine at 1,500 rpm
- Blower speed control set at "HI"
- Temperature control set at "MAX. COOL"
- Air inlet control set at "RECIRC"
- Fully open doors (Sliding roof: closed)

(2) Open the low pressure hand valve.

CAUTION:

Do not open the high pressure hand valve.

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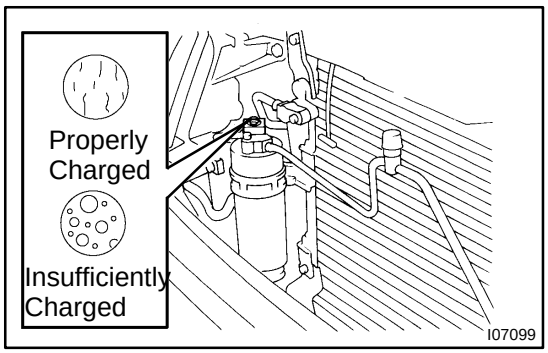
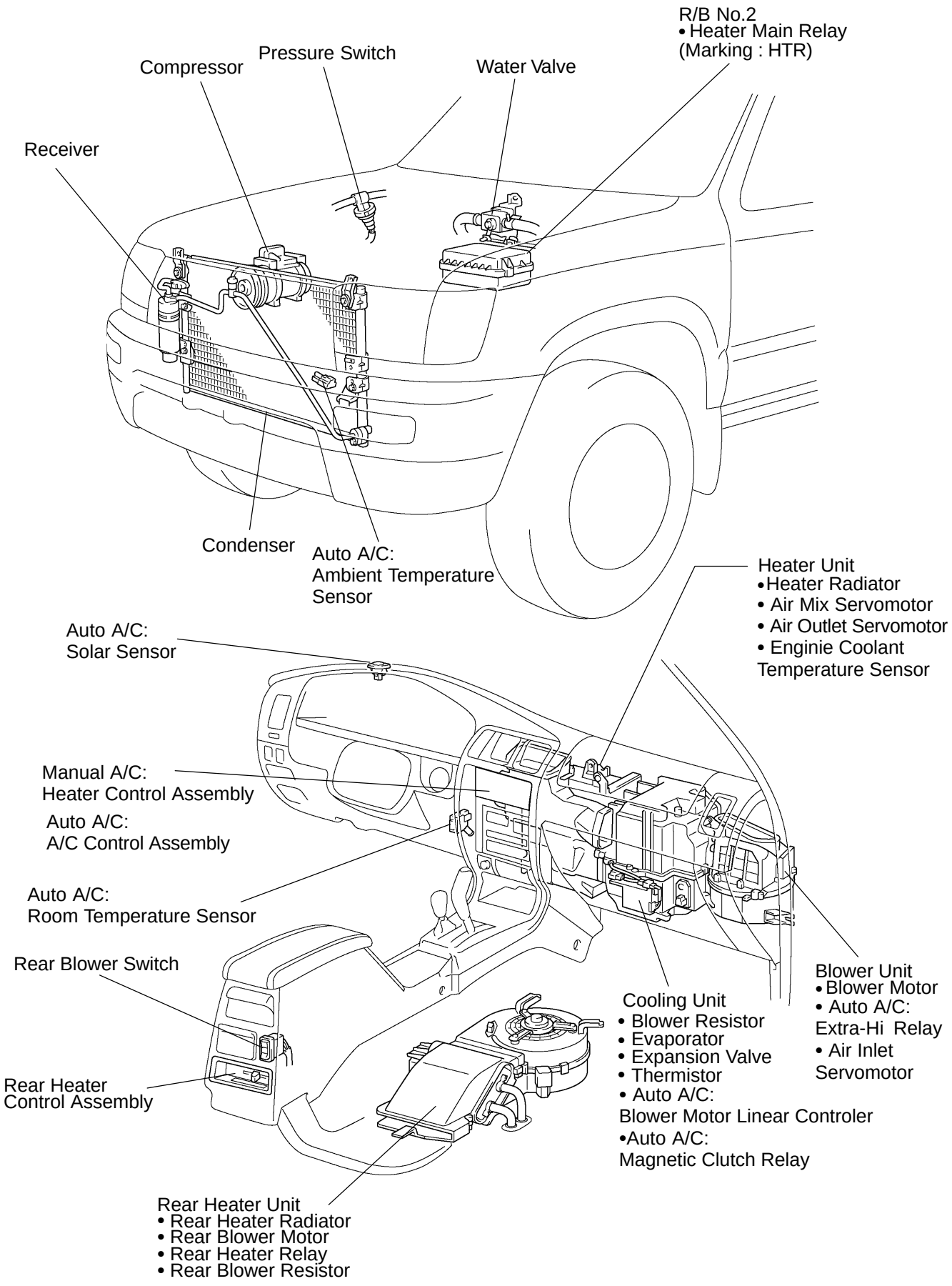


(d) Charge refrigerant until bubbles disappear and check the pressure on the gauge through the sight glass.

AC0C6-11

LOCATION



I07093

TROUBLESHOOTING (Manual A/C)

AC22H-03

PROBLEM SYMPTOMS TABLE

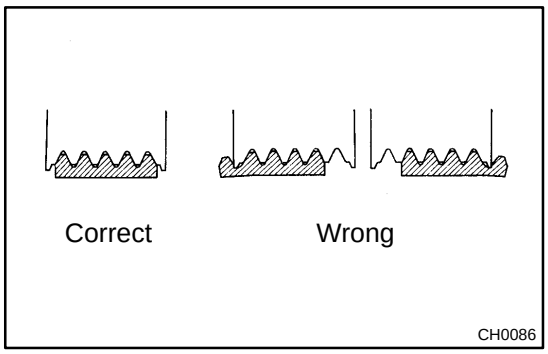
Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
No blower operation	2. HTR Fuse	-
	3. Heater main relay	AC-80
	4. Blower motor	AC-66
	5. Blower resistor	AC-67
	6. Blower speed control switch	AC-95
	7. Wire harness	-
No air temperature control	1. Engine coolant volume	-
	2. Heater control assembly	AC-89
	3. Water valve	AC-63
No compressor operation	1. Refrigerant volume	AC-3
	2. A.C Fuse	-
	3. Magnetic clutch	AC-49
	4. Compressor	AC-49
	5. Pressure switch	AC-77
	6. Heater main relay	AC-80
	7. Blower speed control switch	AC-95
	8. Thermistor	AC-24
	9. Wire harness	-
Compressor operates intermittently	1. Refrigerant volume	AC-3
	2. Pressure switch	AC-77
	3. Thermistor	AC-24
	4. Wire harness	-
No cool air comes out	1. Refrigerant volume	AC-3
	2. Refrigerant pressure	AC-3
	3. Drive belt	AC-16
	4. Magnetic clutch	AC-49
	5. Compressor	AC-49
	6. Pressure switch	AC-77
	7. Thermistor	AC-24
	8. Heater control assembly	AC-89
	9. Wire harness	-
Cool air comes out only at high engine rpm	1. Refrigerant volume	AC-3
	2. Drive belt	AC-16
	3. Magnetic clutch	AC-49
	4. Compressor	AC-49
	5. Condenser	AC-60
	6. Receiver	AC-57
	7. Expansion valve	AC-24
	8. Evaporator	AC-29
	9. Thermistor	AC-24
	10.Wire harness	-

Insufficient cooling	1. Refrigerant volume 2. Drive belt 3. Magnetic clutch 4. Compressor 5. Condenser 6. Receiver 7. Expansion valve 8. Evaporator 9. Refrigerant lines 10. Pressure switch 11. Heater control assembly	AC-3 AC-16 AC-49 AC-49 AC-60 AC-57 AC-24 AC-29 AC-21 AC-77 AC-89
No engine idle-up when A/C switch ON	1. Idle control system 2. Wire harness	DI-105 -
No warm air comes out	1. Engine coolant volume 2. Heater control assembly 3. Water valve 4. Heater radiator	- AC-89 AC-63 AC-35

Rear heater:

No blower operation	1. RR HTR Fuse 2. Rear heater relay 3. Rear blower switch 4. Rear blower resistor 5. Rear blower motor 6. Wire harness	- AC-81 AC-103 AC-70 AC-41 -
No air temperature control	1. Engine coolant volume 2. Rear heater control assembly	- AC-102
No warm air comes out	1. Engine coolant volume 2. Rear heater control assembly 3. Rear heater radiator	- AC-100 AC-41



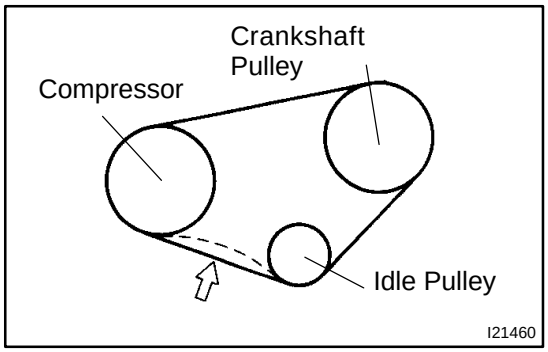
DRIVE BELT

AC0C7-05

ON-VEHICLE INSPECTION

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that the drive belt fits properly in the ribbed grooves.



2. INSPECT DRIVE BELT TENSION

Using a belt tension gauge, check the drive belt tension.

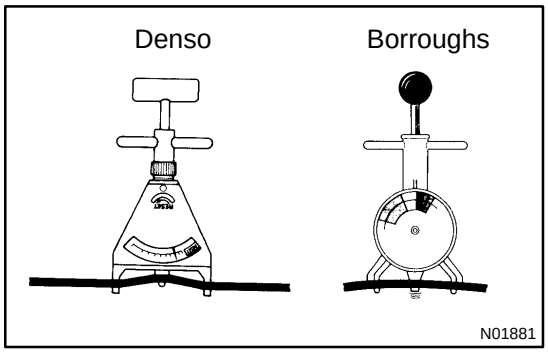
Drive belt tension:

New belt 160 ± 25 lbf

Used belt 100 ± 20 lbf

HINT:

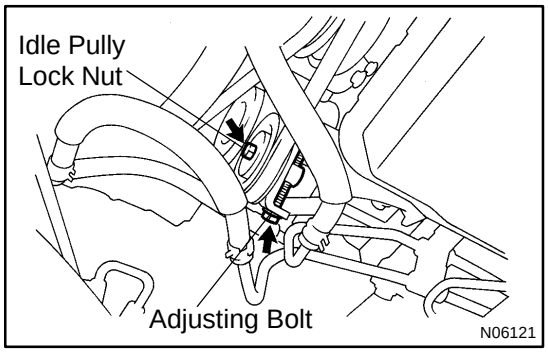
- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing the drive belt, check that it fits properly in the ribbed grooves.



AC0C8-03

REMOVAL

1. **REMOVE PS PUMP DRIVE BELT (See page SR-33)**
2. **REMOVE ENGINE UNDER COVER**

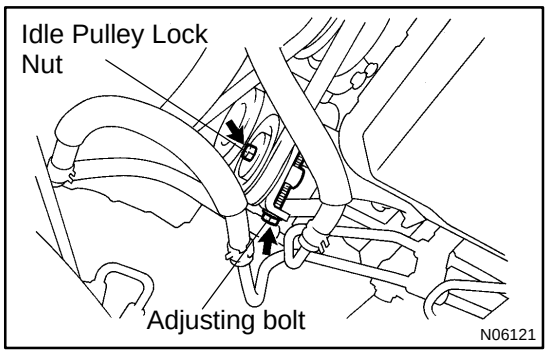


3. **REMOVE DRIVE BELT**

(a) Loosen the idle pully lock nut.

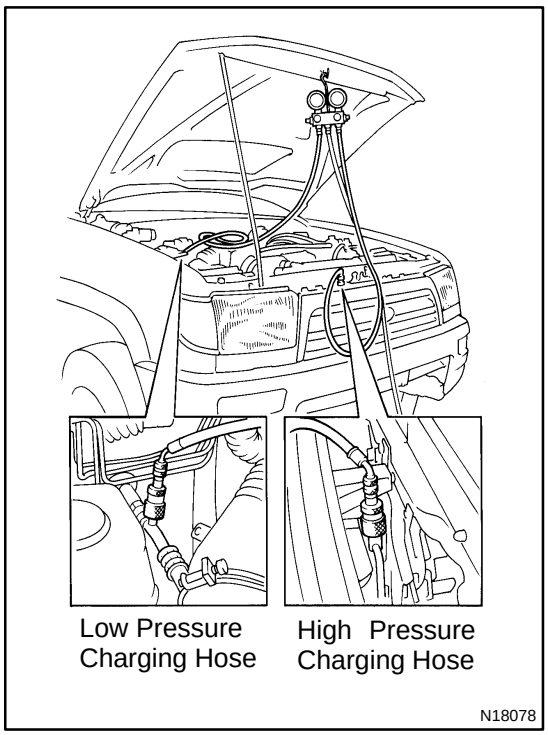
(b) Loosen the drive belt tension by adjusting bolt and remove the dirve belt.

AC0C9-02



INSTALLATION

1. **TIGHTEN IDLE PULLEY LOCK NUT TEMPORALLY**
   Torque: 2.5 N·m (25 kgf·cm, 22 in.·lbf)
2. **INSTALL DRIVE BELT**
3. **USING ADJUSTING BOLT, ADJUST DRIVE BELT TENSION**
   Drive belt tension
   New belt: 160 ± 25 lbf
   Used belt: 100 ± 25 lbf
4. **TIGHTEN IDLE PULLEY LOCK NUT**
   Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
5. **INSTALL PS PUMP DRIVE BELT**
6. **INSTALL ENGINE UNDER COVER**



MANIFOLD GAUGE SET

AC0CA-03

SET ON

1. CONNECT CHARGE HOSE TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

CAUTION:

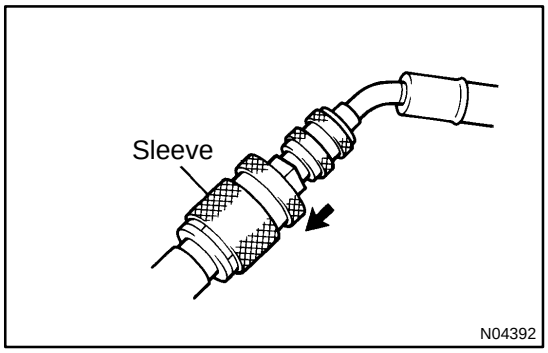
Do not connect the wrong hoses.

2. CONNECT QUICK DISCONNECT ADAPTERS TO CHARGING HOSES

Tighten the nuts by hand.

3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

4. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINE

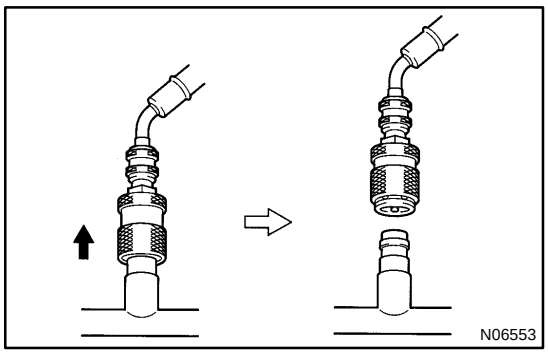


5. CONNECT QUICK DISCONNECT ADAPTERS TO SERVICE VALVES

HINT:

Push the quick disconnect adapter onto the service valve, then slide, then slide the sleeve of the quick disconnect adapter downward to lock it.

AC0CB-02



SET OFF

1. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
2. **DISCONNECT QUICK DISCONNECT ADAPTERS FROM SERVICE VALVES ON REFRIGERANT LINE**

HINT:

Slide the sleeve of the quick disconnect adapter upward to unlock the adapter and remove it from the service valve.

3. **INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE**

REFRIGERANT LINE

AC0CC-01

ON-VEHICLE INSPECTION

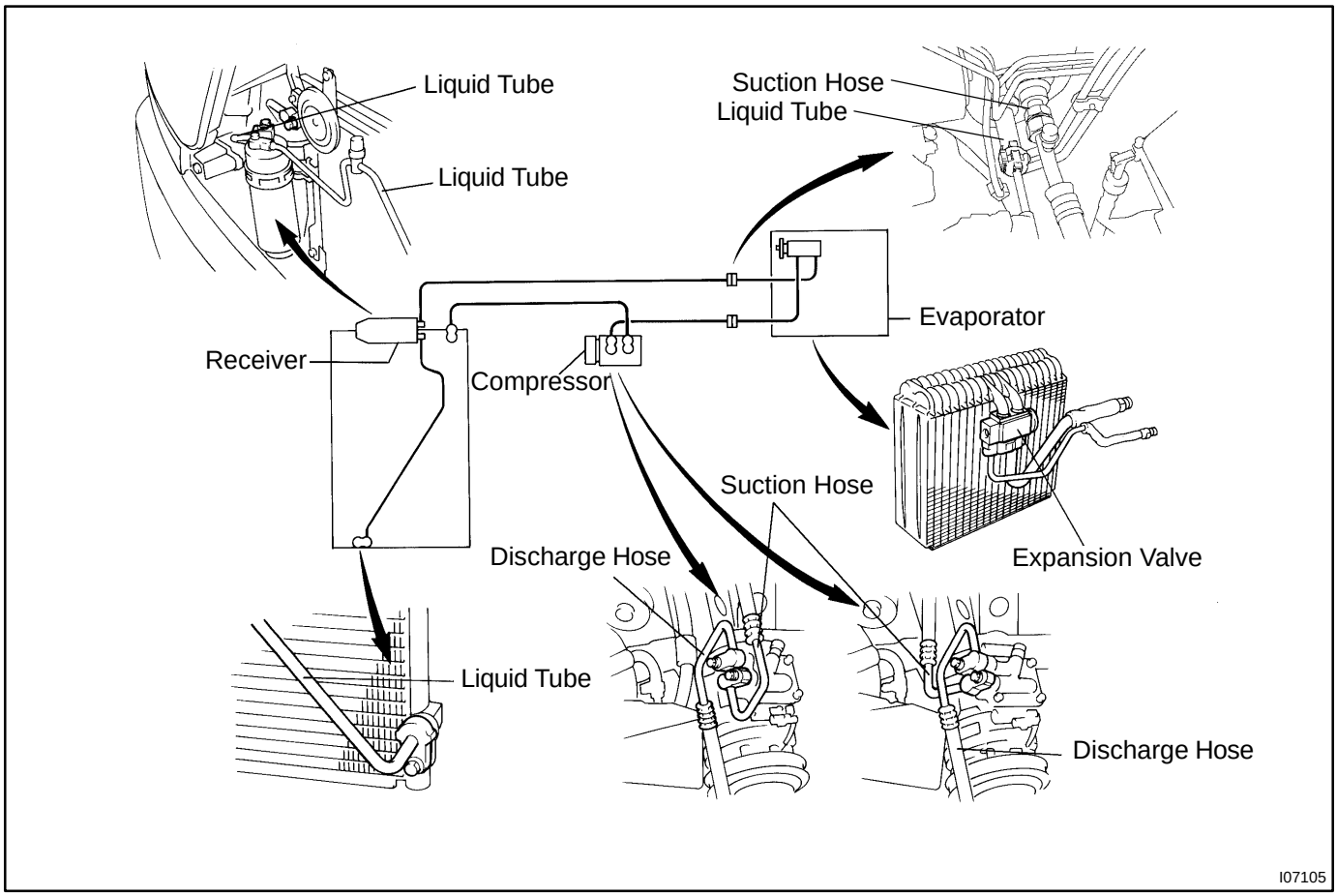
1. INSPECTION HOSE AND TUBE CONNECTIONS FOR LOOSENESS

2. INSPECT HOSES AND TUBES FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

AC0CD-02

LOCATION



AC0CE-02

REPLACEMENT

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

2. REPLACE FAULTY TUBE OR HOSE

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

3. TIGHTEN JOINT OF BOLT OR NUT AT SPECIFIED TORQUE

NOTICE:

Connections should not be torqued tighter than the specified torque.

Part tightened	N·m	kgf·cm	ft·lbf
Receiver x Liquid tube	6.0	60	52 in.·lbf
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	14	140	10
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Cooling unit x Suction tube	32	330	24
Expansion valve x Evaporator	5.4	55	48 in.·lbf
Suction line (Piping joint)	32	330	24
Liquid line (Piping joint)	14	140	10

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE SYSTEM WITH REFRIGERANT

Specified amount: 650 ± 50g (22.92 ± 1.76 oz.)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant.

6. INSPECT AIR CONDITIONING OPERATION

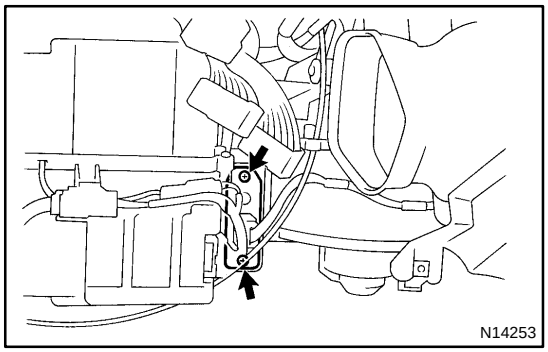
COOLING UNIT

AC3EZ-01

ON-VEHICLE INSPECTION

1. INSPECT FOR LEAKAGE OF REFRIGERANT

(a) Remove the glove compartment door (See page BO-69).



(b) Manual A/C:
Remove the blower resistor.
(1) Disconnect the connector.
(2) Remove the 2 screws and blower resistor.

(c) Using a gas leak detector, check for leakage.

If there is leakage, check the tightening torque at the joints or check the evaporator.

(d) Manual A/C:
Install the blower resistor with the 2 screws.

(e) Install the glove compartment door (See page BO-76).

2. INSPECT EXPANSION VALVE

(a) Check quantity of gas during refrigeration cycle.

(b) Set on manifold gauge set.

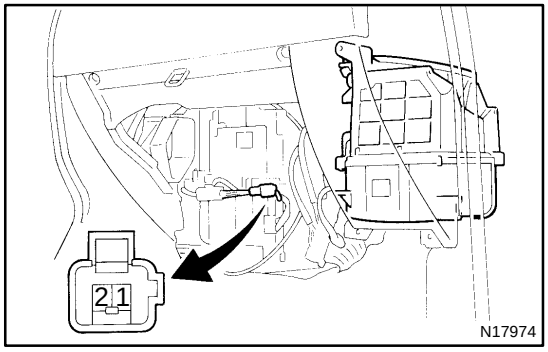
(c) Run engine.
(1) Run the engine at 1,500 rpm for at least 5 minutes.
(2) Then check that the high pressure reading is 1.37 - 1.57 Mpa (14 - 16 kgm/cm^2, 199 - 288 psi).

(d) Check expansion valve.

If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm^2, 0 psi).

HINT:

When the lower pressure drop to 0 kPa (0 kgf/cm^2, 0 psi), feel the receiver's IN and OUT sides for no temperature difference.



3. INSPECT THERMISTOR RESISTANCE

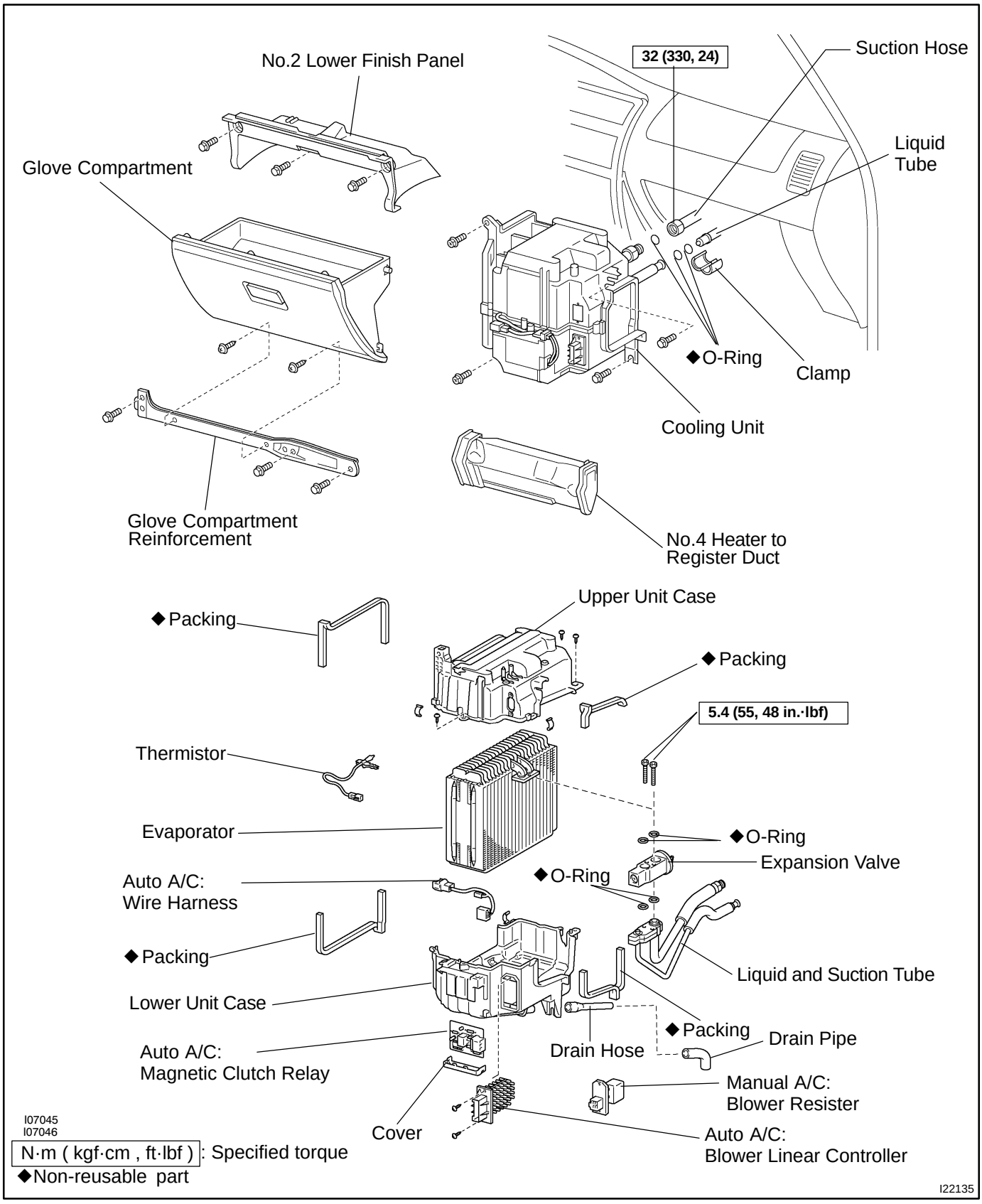
(a) Disconnect the connector.

(b) Measure resistance between terminals.
Standard resistance: 1,500 Ω at 25˚C (77˚F)

If resistance is not as specified, replace the thermistor.

AC0CF-04

COMPONENTS



AC22J-01

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

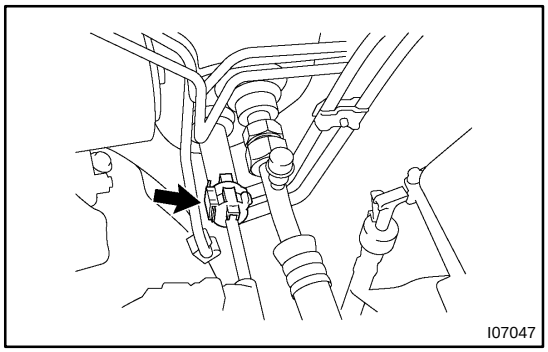
HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

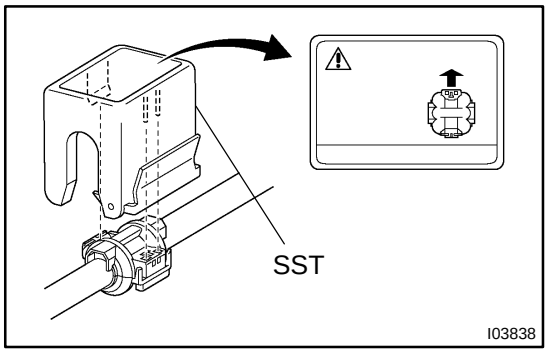
Specified amount: 650 ± 50 g (22.92 ± 1.76 oz.)



2. DISCONNECT LIQUID TUBE

(a) Using SST, remove the piping clamp.

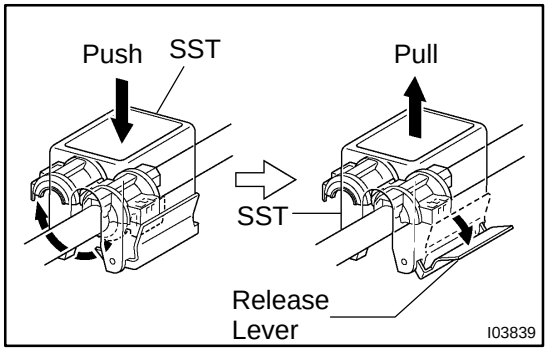
SST 09870-00025 (Liquid tube)



(1) Insert SST to piping clamp.

HINT:

Confirm the direction of the piping clamp claw and SST using the illustration showing on the caution label.



(2) Push down SST and release the clamp lock.

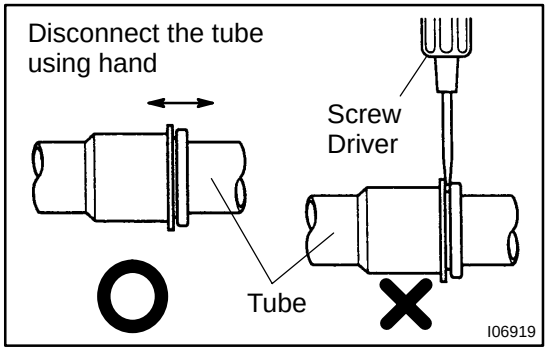
NOTICE:

Be careful not to deform the tubes, when pushing SST.

(3) Pull SST slightly and push the release lever, then remove the piping clamp with SST.

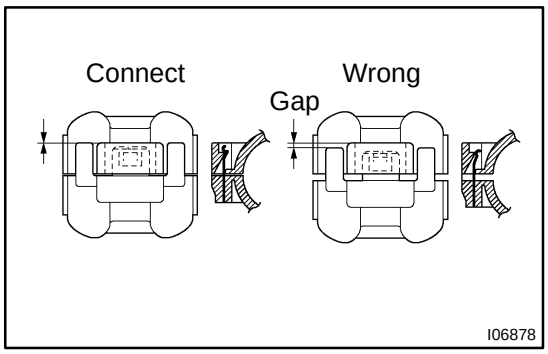
(4) Remove the piping clamp from SST.

(b) Disconnect the both tubes.



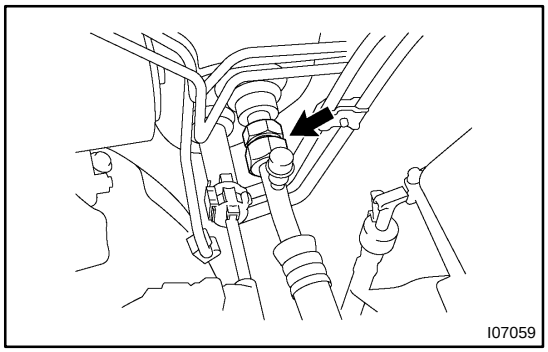
NOTICE:

- **Do not use tools like screwdriver to remove the tube.**
- **Cap the open fittings immediately to keep moisture or dirt out of the system.**



HINT:
At the time of installation, please refer to the following item.

- Lubricate 2 new O-rings with compressor oil and install them to the tubes.
- After connection, check the fitting for claw of the piping clamp.



3. DISCONNECT SUCTION TUBE FROM COOLING UNIT FITTINGS

Loosen the nut and disconnect the both tube.

Torque: 32 N·m (330 kgf·cm, 24 ft·lbf)

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

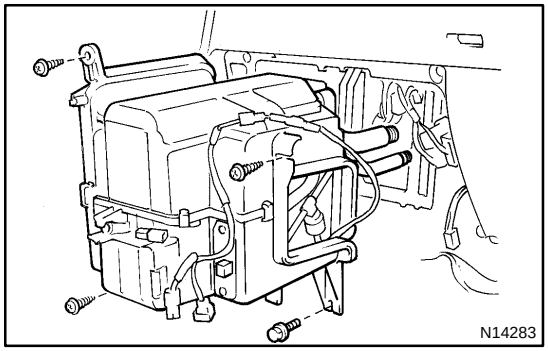
HINT:
At the time of installation, please refer to the following item.
Lubricate a new O-ring with compressor oil and install them to the tube.

4. REMOVE 2 GROMMETS

5. REMOVE DRAIN PIPE GROMMET

6. REMOVE GLOVE COMPARTMENT PARTS (See page BO-69)

7. REMOVE No.4 HEATER TO REGISTER DUCT



8. REMOVE COOLING UNIT

(a) Disconnect the connectors.
(b) Remove the 3 screws, bolt and the cooling unit.

AC22K-02

DISASSEMBLY

1. REMOVE A/C AMPLIFIER

2. REMOVE WIRE HARNESS

3. Manual A/C:

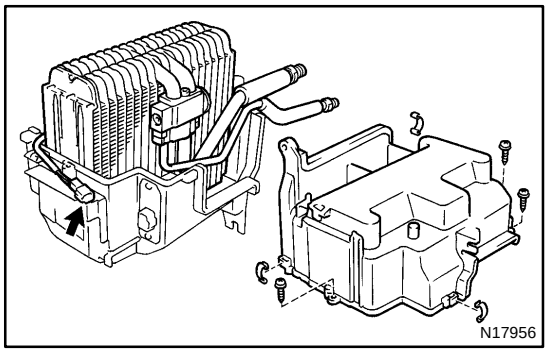
REMOVE BLOWER RESISTOR

Remove the 2 screws and blower resistor.

4. Auto A/C:

REMOVE BLOWER LINEAR CONTROLLER

Remove the 2 screws and blower linear controller.


N17956

5. SEPARATE UPPER AND LOWER UNIT CASES

(a) Using a knife, cut off the each packing.

(b) Remove the 3 clips and 3 screws.

(c) Separate the upper and lower unit case.

6. REMOVE EVAPORATOR FROM LOWER UNIT CASE

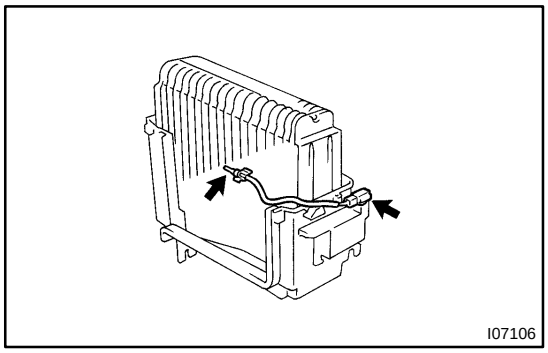
HINT:

At the time of reassembly, please refer to the following item.

If evaporator is replaced, add compressor oil to compressor.

Add 40 - 50 cc (1.4 - 1.7 fl.oz.)

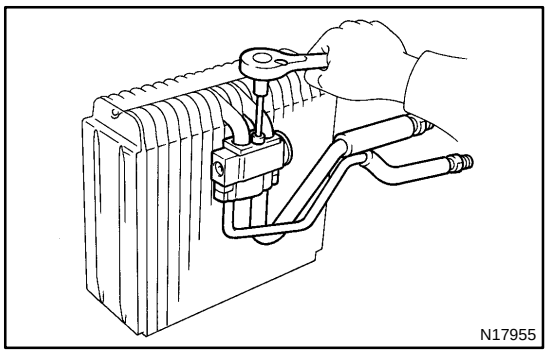
Compressor oil: ND-OIL 8 or equivalent


I07106

7. REMOVE THERMISTOR

(a) Disconnect the connector clamp.

(b) Pull out the thermistor from evaporator.


N17955

8. REMOVE EXPANSION VALVE

Using a hexagon wrench (5.0 mm, 0.20 in.), remove the 2 bolts and separate the expansion valve and evaporator and tubes.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

HINT:

At the time of reassembly, please refer to the following item.

Lubricate 4 new O-rings with compressor oil and install the tubes and valve.

AC22L-01

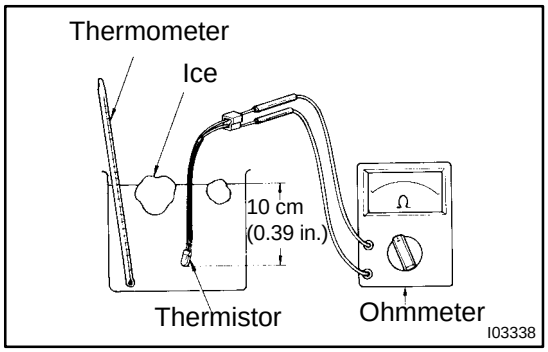
INSPECTION

1. CHECK EVAPORATOR FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

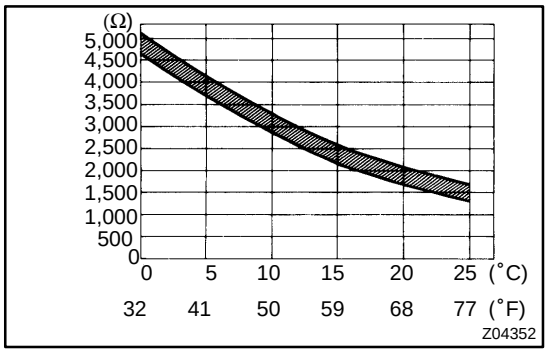
2. CHECK FITTING FOR CRACKS FOR SCRATCHES

If necessary repair or replace.



3. INSPECT THERMISTOR RESISTANCE

(a) Place the thermistor in cold water and while changing the temperature of the water, measure resistance at the connector and at the same time, measure temperature of the water with a thermometer.



(b) Compare the 2 readings on the chart.

If resistance value is not as specified, replace the thermistor.

AC0CI-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC-28).

AC0CJ-01

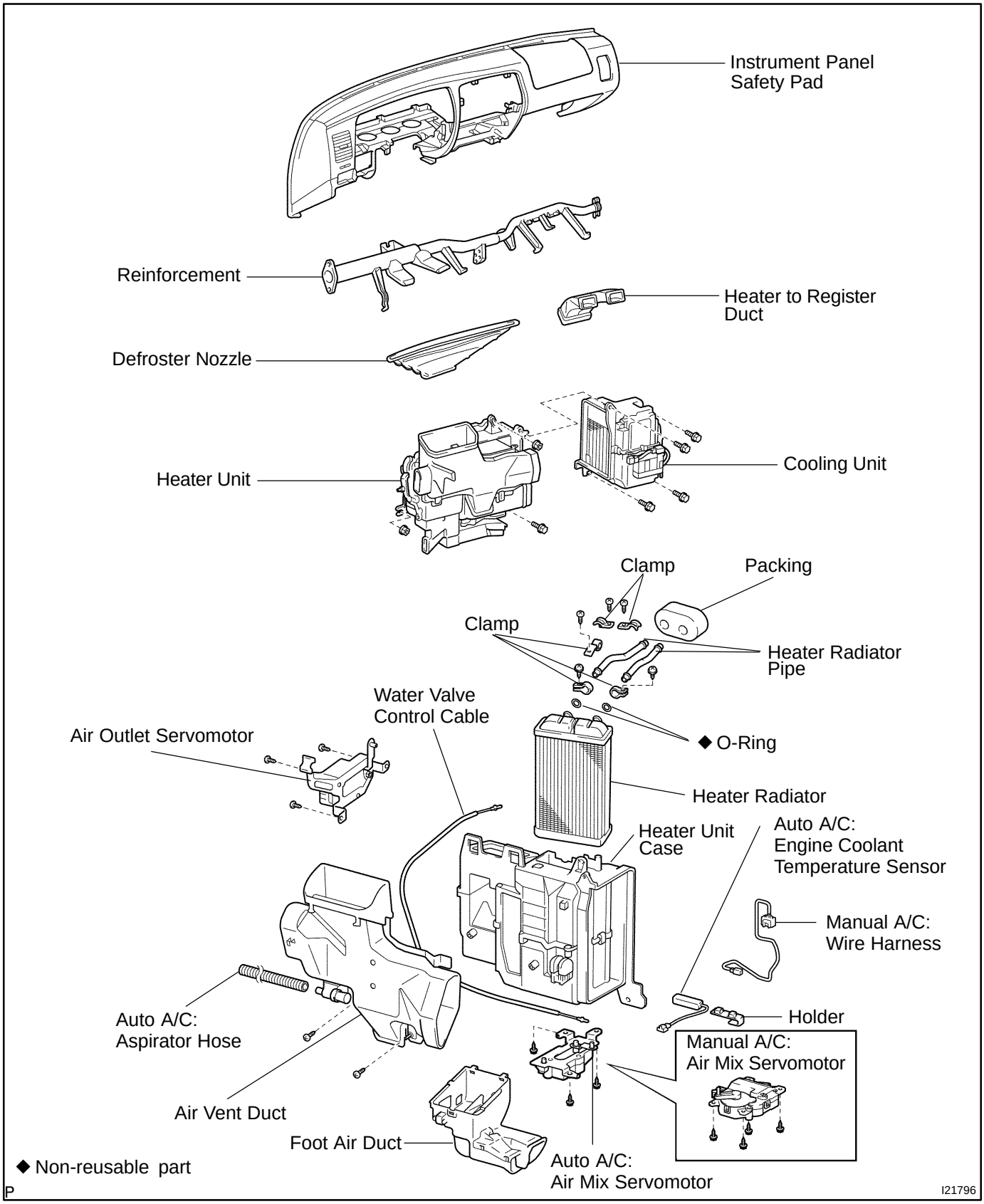
INSTALLATION

Installation is in the reverse order of removal (See page AC-26).

HEATER UNIT

COMPONENTS

AC0CK-04



AC0CL-03

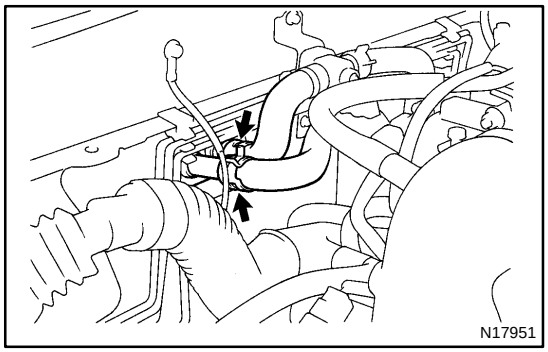
REMOVAL

1. REMOVE COOLING UNIT (See page AC-26)

2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

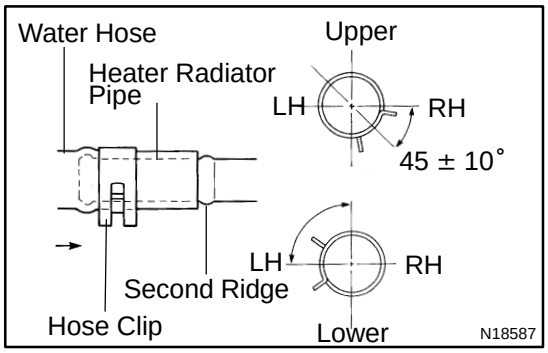
It is not necessary to drain out all the coolant.



3. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

(a) Using pliers, grip the claw of clip and slide the clip along the hose.

(b) Disconnect the water hoses.



HINT:

At the time of installation, please refer to the following items.

- Push the water hose onto the heater radiator pipe as far as the second ridge on the pipe.
- Install the hose clip in a position, as shown in the illustration.

4. REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See page BO-69)

5. REMOVE DEFROSTER NOZZLE AND HEATER TO REGISTER DUCT

6. REMOVE HEATER UNIT

(a) Disconnect the connector from mode control servomotor.

(b) Auto A/C models:
Disconnect the aspirator hose from room temperature sensor.

(c) Disconnect the water valve control cable.

(d) Remove the 2 nuts and heater unit.

AC22M-03

DISASSEMBLY

1. REMOVE AIR MIX SERVOMOTOR

(a) Remove the water valve control cable.

(b) Disconnect the connector.

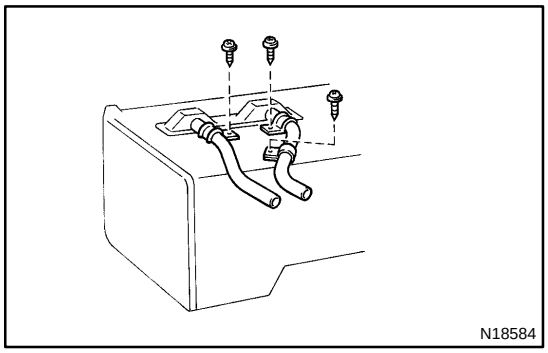
(c) Remove the 3 screws and servomotor.

2. REMOVE AIR OUTLET SERVOMOTOR

Remove the 3 screws and servomotor.

3. Auto A/C models:
REMOVE ENGINE COOLANT TEMPERATURE SENSOR

After pulling off the clamp, pull out the sensor.


N18584

4. REMOVE HEATER RADIATOR

(a) Remove the 3 screws and 2 plates and clamp.

(b) Pull out the heater radiator.

(c) Remove the 2 screws and 2 clips, then disconnect the heater radiator pipes.

5. REMOVE AIR VENT DUCT

Remove the 2 screws and duct.

AC3F0-01

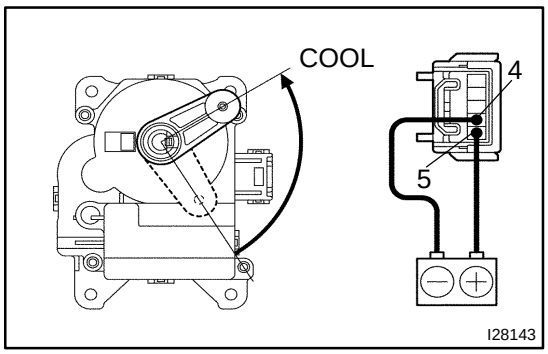
INSPECTION

1. INSPECT HEATER RADIATOR FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

2. INSPECT AIR MIX SERVOMOTOR CIRCUIT
(See page DI-602)

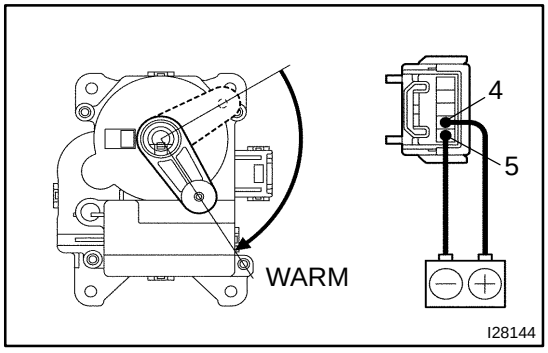
3. INSPECT AIR MIX DAMPER POSITION CIRCUIT
(See page DI-596)



4. Manual A/C model:
INSPECT AIR MIX SERVOMOTOR

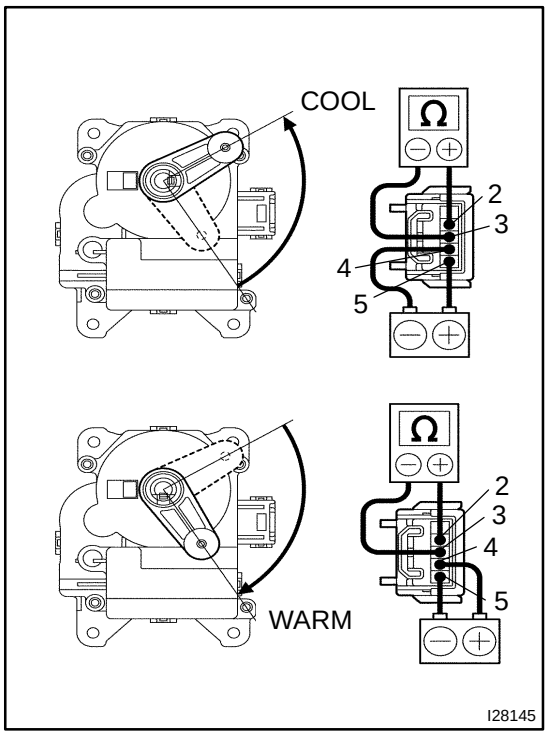
(a) Inspect servomotor operation.

(1) Connect the positive (+) lead from the battery to terminal 5 and negative (-) lead to terminal 4, then check that the arm turns to "COOL" side smoothly.



(2) Connect the positive (+) lead from the battery to terminal 4 and negative (-) lead to terminal 5, then check that the arm turns to "WARM" side smoothly.

If operations are not as specified, replace the air mix servomotor.



(b) Inspect position sensor resistance.
Measure resistance between terminals at servomotor arm each position as shown in the chart.

Tester connection	Condition	Specified condition
2 - 3	Arm position at "COOL"	3.8 - 5.8 kΩ
2 - 3	Arm position at "WARM"	0.95 - 1.45 kΩ

If resistance is not as specified, replace the servomotor.

AC0CN-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC-34).

AC0CO-01

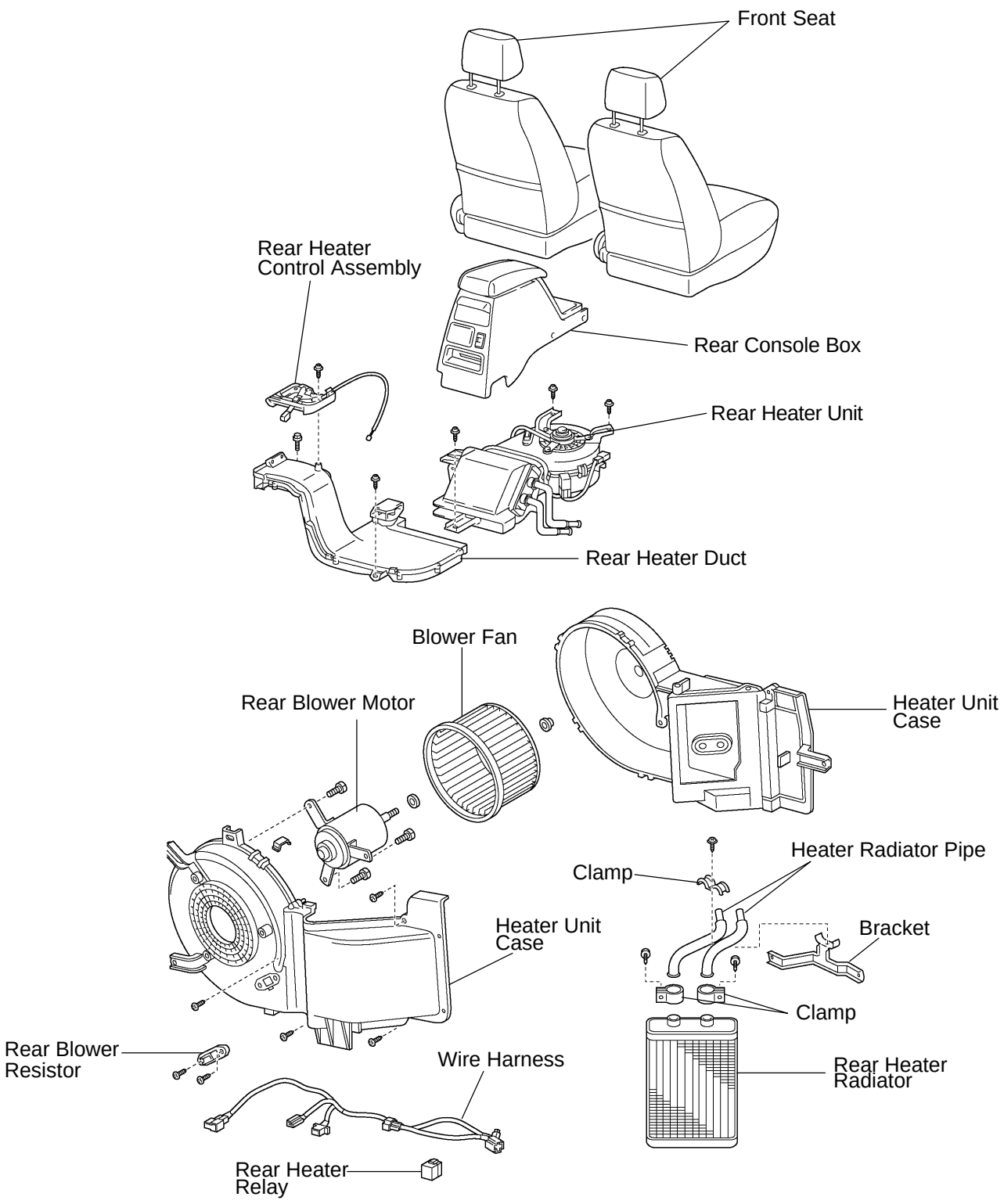
INSTALLATION

Installation is in the reverse order of removal (See page AC-33).

REAR HEATER UNIT

COMPONENTS

AC0CP-02



AC0CQ-02

REMOVAL

1. DRAIN ENGINE COOLANT

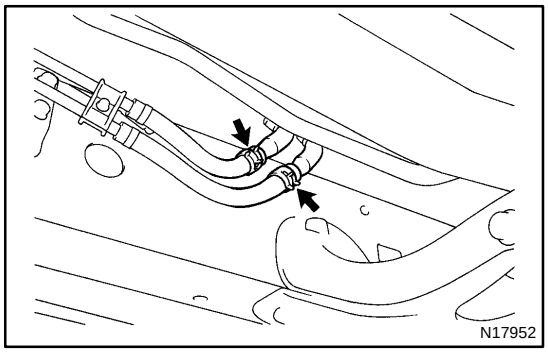
HINT:

It is not necessary to drain out all coolant.

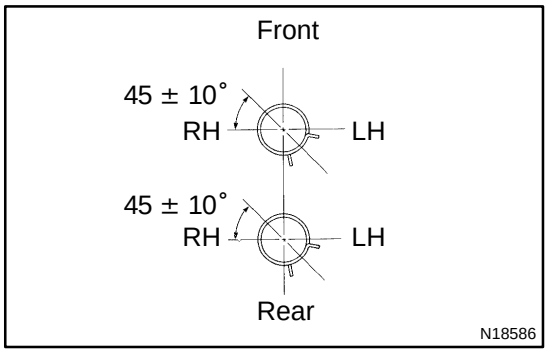
2. REMOVE FRONT SEATS

3. REMOVE CENTER CONSOLE BOX

4. SLIDE FLOOR CARPET BACKWARD



5. DISCONNECT WATER HOSES



HINT:

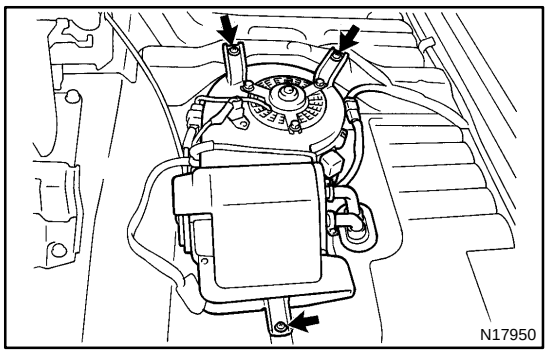
At the time of installation, please refer to the following item.

Install the hose clip in a position, as shown in the illustration.

6. REMOVE REAR HEATER DUCT

Remove the bolt, screw and duct.

7. REMOVE REAR HEATER CONTROL ASSEMBLY (See page AC-101)



8. REMOVE REAR HEATER DUCT

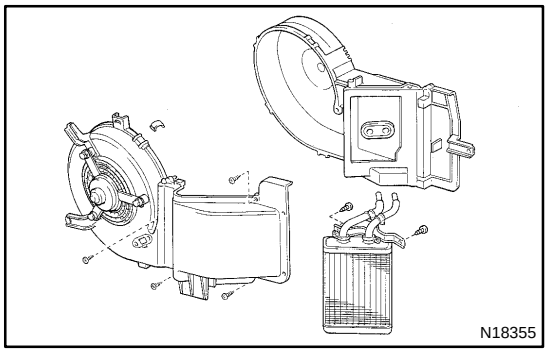
(a) Disconnect the connectors.

(b) Remove the 3 screws and heater unit.

AC22O-01

DISASSEMBLY

1. **REMOVE BLOWER RESISTOR**
2. **REMOVE REAR HEATER RELAY**
3. **REMOVE WIRE HARNESS**
4. **SEPARATE HEATER CASES**

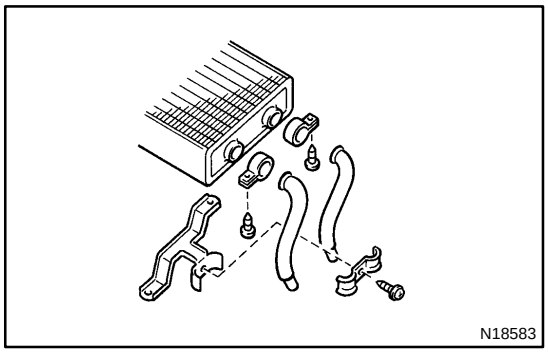


5. REMOVE HEATER RADIATOR

(a) Remove the wire harness clamps.

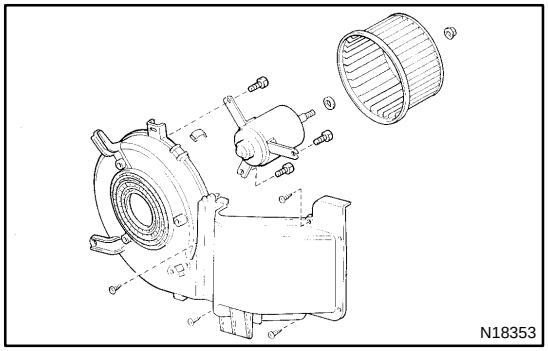
(b) Remove the 4 screws and 5 clips, then separate the heater cases.

(c) Remove the 2 screws and heater radiator.



(d) Remove the 2 screws and 2 piping clamps.

(e) Remove the 2 screws and 2 heater radiator pipes.



6. REMOVE BLOWER MOTOR

(a) Remove the wire harness clamps.

(b) Remove the 4 screws 5 clips and separate the heater cases.

(c) Remove the 3 screws and blower motor.

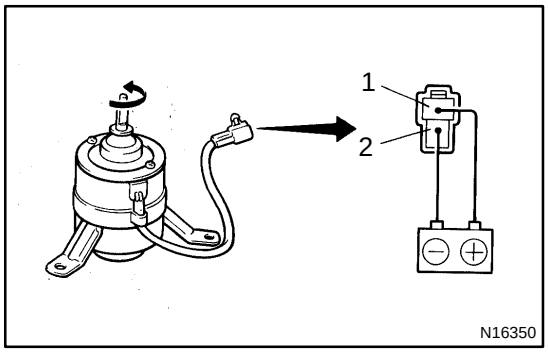
(d) Remove the nut and blower fan.

AC22P-01

INSPECTION

1. INSPECT FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.



2. INSPECT BLOWER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, then check that the motor operations smoothly.

If operation is not as specified, replace the motor.

AC0CS-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC-40).

AC0CT-01

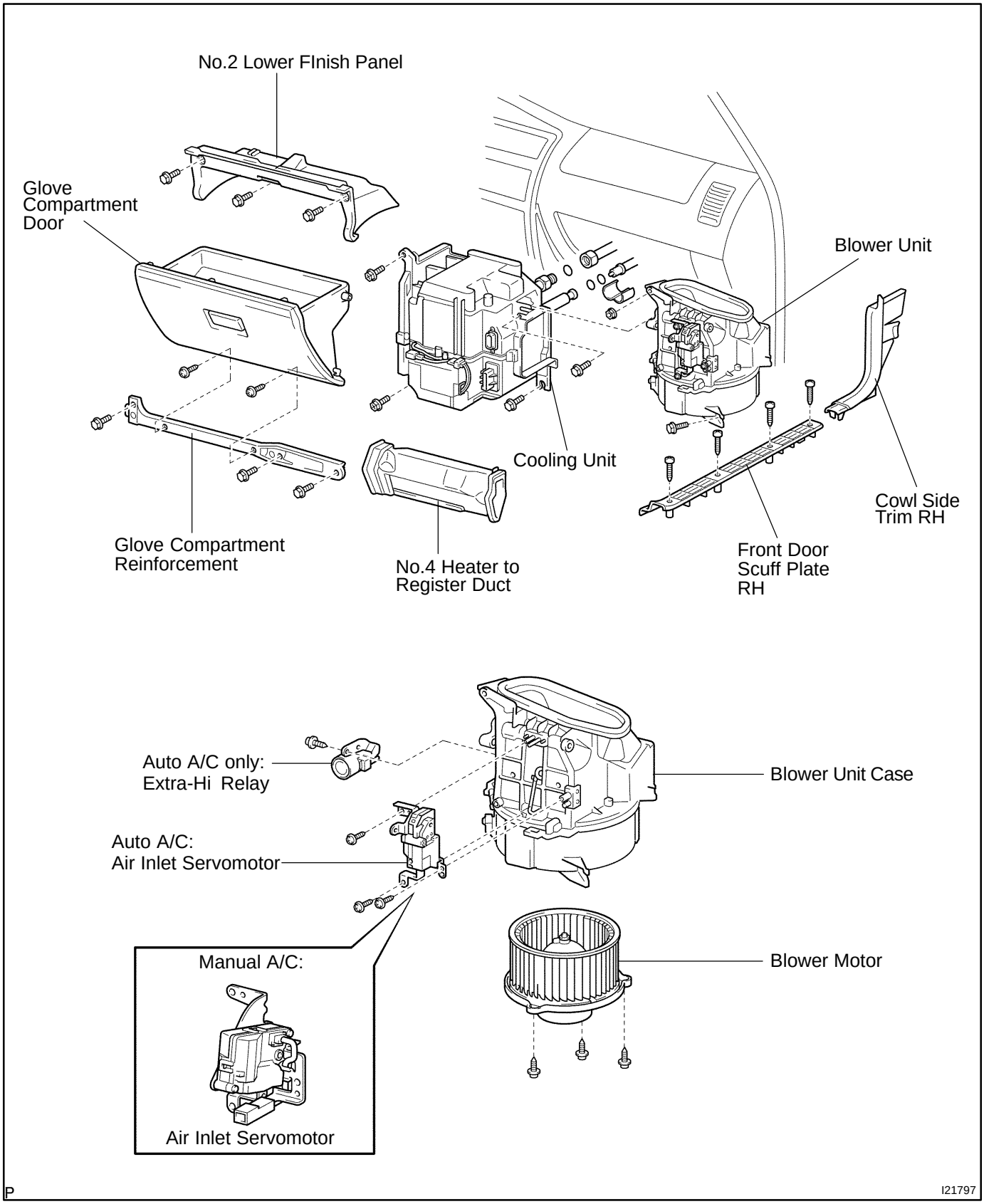
INSTALLATION

Installation is in the reverse order of removal (See page AC-39).

BLOWER UNIT

COMPONENTS

AC0CU-04



AC0CV-02

REMOVAL

1. REMOVE GLOVE COMPARTMENT DOOR

2. REMOVE GLOVE COMPARTMENT REINFORCEMENT

3. REMOVE NO. 2 INSTRUMENT PANEL LOWER FINISH PANEL

4. REMOVE NO. 4 HEATER TO REGISTER DUCT

5. REMOVE FRONT DOOR SCUFF PLATE RH

6. REMOVE COWL SIDE TRIM RH

7. REMOVE COOLING UNIT (See page AC-26)

8. REMOVE BLOWER UNIT

(a) Disconnect the connector from the blower motor.

(b) Disconnect the air inlet damper control cable from the blower unit.

HINT:

At the time of installation, please refer to the following item.

After connection, adjust the control cable.

(c) Remove the nut, bolt and blower unit.

AC0CW-04

DISASSEMBLY

1. Auto A/C models:

REMOVE EXTRA-HI RELAY

Remove the screw and extra-hi relay.

2. REMOVE AIR INLET SERVOMOTOR

Remove the 3 screws and servomotor.

3. REMOVE BLOWER MOTOR

Remove the 3 screws and blower motor.

AC0CY-01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC-46).

AC0CX-01

INSTALLATION

Installation is in the reverse order of removal (See page AC-45).

COMPRESSOR AND MAGNETIC CLUTCH

AC0CZ-02

ON-VEHICLE INSPECTION

1. **SET ON MANIFOLD GAUGE SET (See page AC-19)**
2. **START ENGINE**
3. **INSPECT COMPRESSOR FOR METALLIC SOUND**

Check if there is a metallic sound from the compressor when the A/C switch is on.

If metallic sound is heard, replace the compressor assembly.

4. **INSPECT REFRIGERANT PRESSURE (See page AC-3)**
5. **STOP ENGINE**
6. **INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT FROM SAFETY SEAL**

Using a gas leak detector, check for leakage of refrigerant.

If there is any leakage, replace the compressor assembly.

7. **SET OFF MANIFOLD GAUGE SET (See page AC-20)**
8. **CHECK FOR LEAKAGE OF GREASE FROM CLUTCH BEARING**
9. **CHECK FOR SIGNS OF OIL ON PRESSURE PLATE**

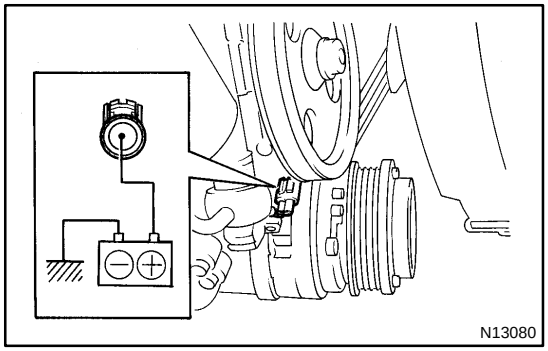
If necessary, repair or replace.

10. **INSPECT MAGNETIC CLUTCH BEARING FOR NOISE**

(a) Start engine.

(b) Check for abnormal noise from near the compressor when the A/C switch is OFF.

If abnormal noise is being emitted, replace the magnetic clutch.



11. **INSPECT MAGNETIC CLUTCH OPERATION**

(a) Disconnect the connector.

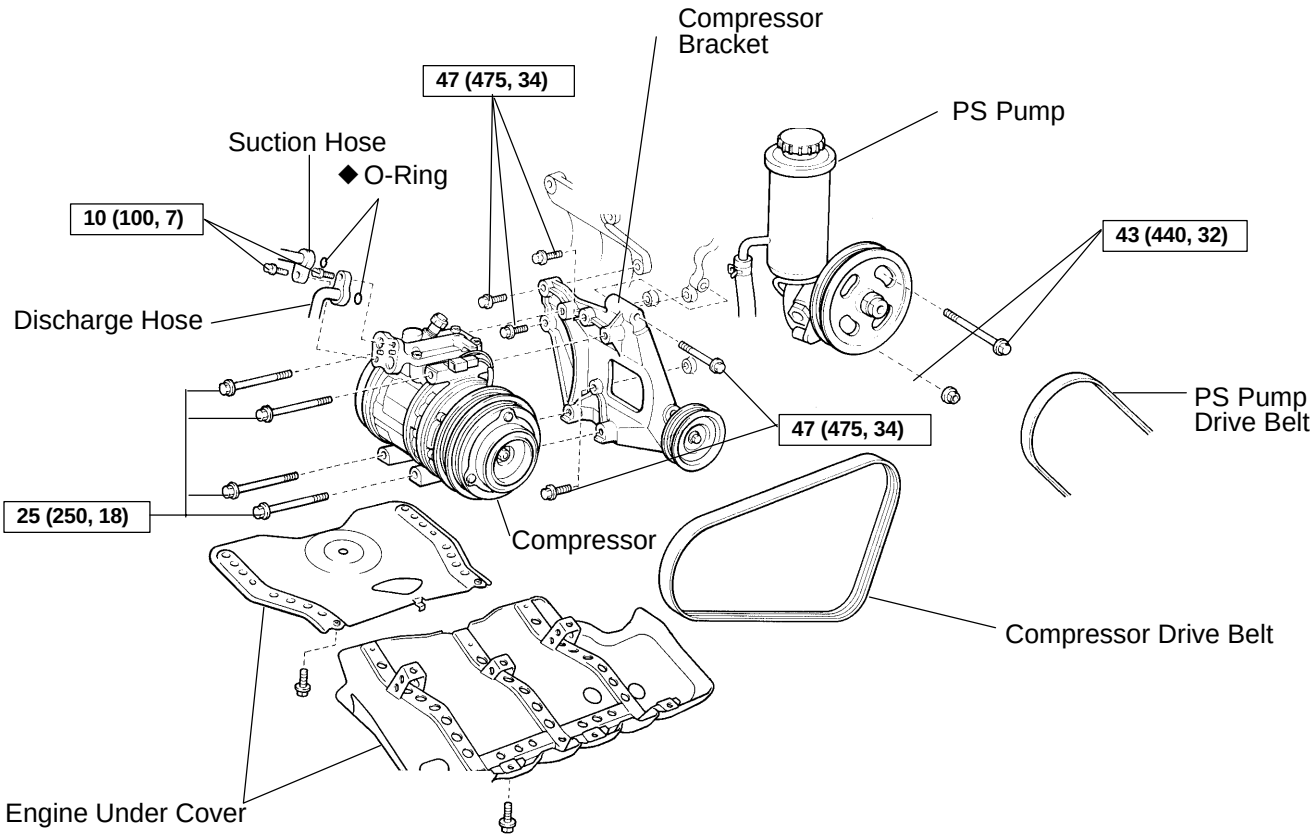
(b) Connect the positive (+) lead from the battery to terminal on the magnetic clutch connector and the negative (-) lead to the body ground.

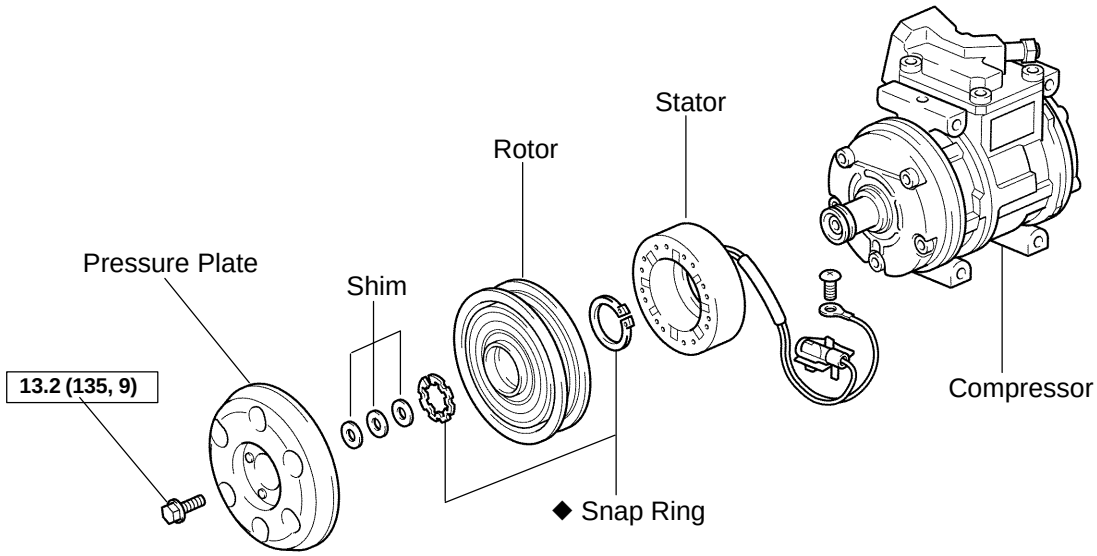
(c) Check that the magnetic clutch is energized.

If operation is not as specified, replace the magnetic clutch.

AC3F1-01

COMPONENTS





N·m (kgf·cm,ft·lbf) : Specified torque

◆ Non-reusable part

I21461

AC0D1-04

REMOVAL

1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX. 10 MINUTES

2. STOP ENGINE

3. DISCONNECT NEGATIVE (-) TERMINAL CABLE FROM BATTERY

4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

5. REMOVE ENGINE UNDER COVER

6. DISCONNECT DISCHARGE AND SUCTION HOSES

Remove the 2 bolts and disconnect the both hoses.

NOTICE:

Cap the open fitting immediately to keep moisture or dirt out of the system.

7. REMOVE DRIVE BELT (See page AC-17)

8. REMOVE PS PUMP SET BOLTS

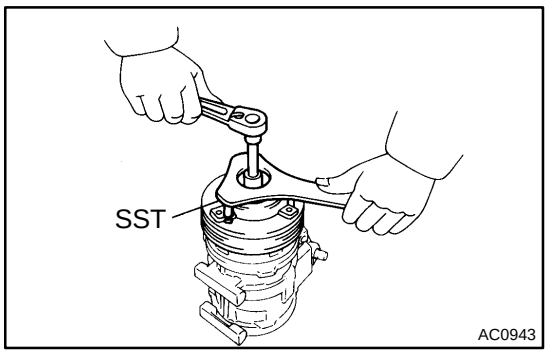
9. REMOVE COMPRESSOR

(a) Disconnect the connector.

(b) Remove the 4 bolts and compressor.

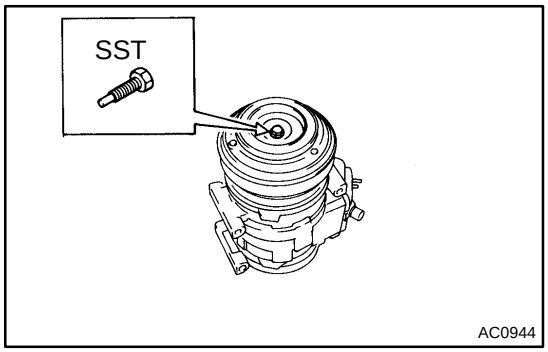
AC0D2-05

DISASSEMBLY

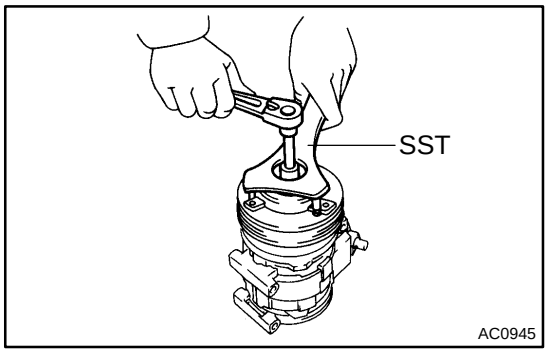


1. REMOVE PRESSURE PLATE

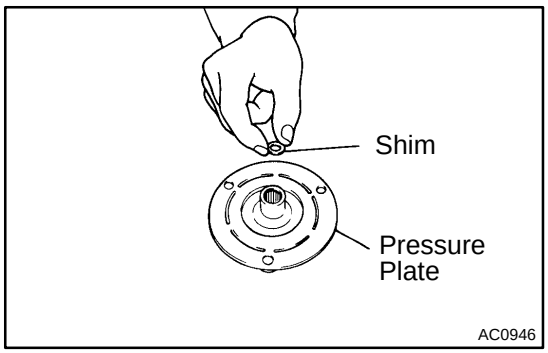
(a) Using SST and a socket wrench, remove the shaft bolt.
SST 07112-76060
Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)



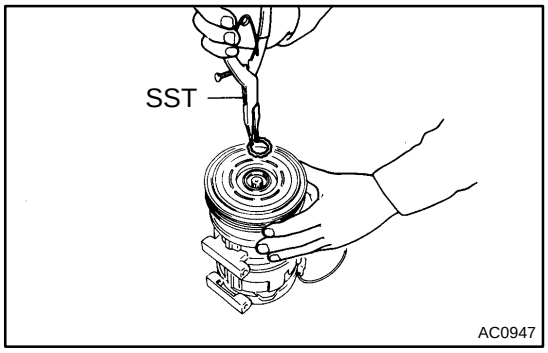
(b) Install SST on the pressure palate.
SST 07112-66040



(c) Using SST and socket wrench, remove the pressure plate.
SST 07112-66040, 07112-76060,

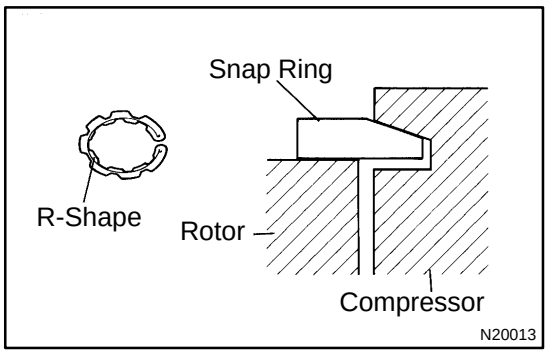


(d) Remove the shims from the pressure palate.

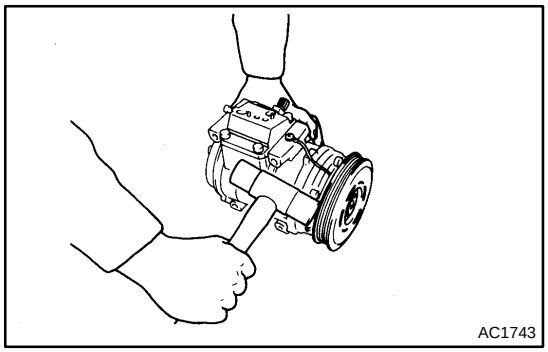


2. REMOVE ROTOR

(a) Using SST, remove the snap ring.
SST 95994-10020

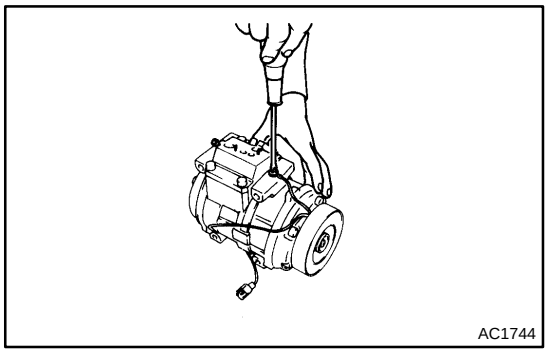


NOTICE:
The snap ring should be installed so that beveled side faces up.



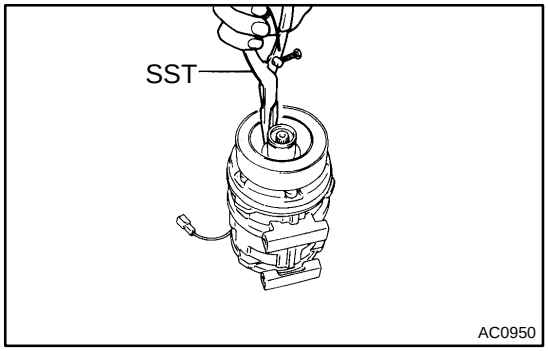
(b) Using a plastic hammer, tap the rotor off the shaft.

NOTICE:
Be careful not to damage the pulley when tapping on the rotor.

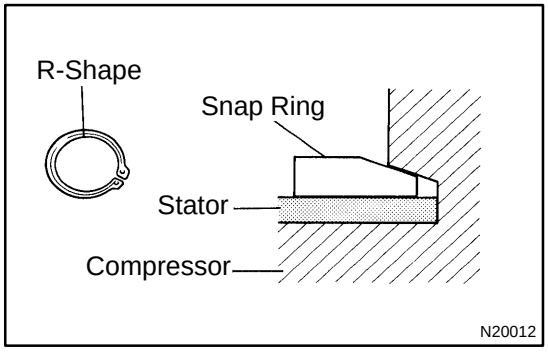


3. REMOVE STATOR

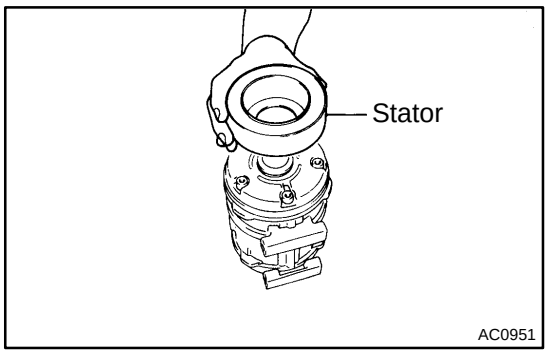
(a) Disconnect the stator lead wire from the compressor housing.



(b) Using SST, remove the snap ring.
SST 95994-10020

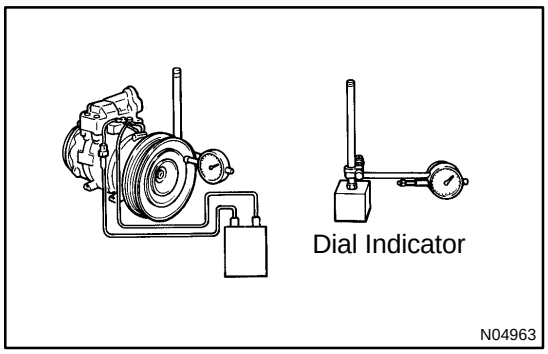


NOTICE:
The snap ring should be installed so that its beveled side faces up.



(c) Remove the stator.

AC0D3-02



REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC-52).

AFTER REASSEMBLY, CHECK MAGNETIC CLUTCH CLEARANCE

(a) Set the dial indicator to the pressure plate of the magnetic clutch.

(b) Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.

(c) Check the clearance between the pressure plate and rotor when connecting the negative (-) terminal to the battery.

Standard clearance:
0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

If the clearance is not within the standard clearance, adjust the clearance using shims to obtain the standard clearance.

Standard thickness:
0.1 mm (0.004 in.)
0.3 mm (0.012 in.)
0.5 mm (0.020in.)

AC0D4-04

INSTALLATION

1. INSTALL COMPRESSOR

(a) Install the compressor with the 4 bolts.

Torque: 25 N·m (250 kgf·cm, 18 in.·lbf)

(b) Install the fan shroud.

(c) Connect the connector.

2. CONNECT DISCHARGE AND SUCTION HOSES

Connect the both hoses with the 2 bolts.

Torque: 10 N·m (100 kgf·cm, 7 in.·lbf)

NOTICE:

Hose should be connected immediately after the caps have been removed.

HINT:

Lubricate 2 new O-rings with compressor oil and install them to the hoses.

3. INSTALL AND CHECK DRIVE BELT (See page AC-18 and AC-16)

4. INSTALL ENGINE UNDER COVER

5. INSTALL PS PUMP SET BOLTS

Torque: 43 N·m (440 kgf·cm, 32 in.·lbf)

6. CONNECT NEGATIVE (-) TERMINAL CABLE TO BATTERY

7. EVACUATE AIR FROM REFRIGERATION SYSTEM

8. CHARGE SYSTEM WITH REFRIGERANT

Specified amount: 650 ± 50 g (22.92 ± 1.76 oz.)

9. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant.

If there is leakage, check the tightening torque at the joints.

RECEIVER

AC0D5-01

ON-VEHICLE INSPECTION

INSPECT FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leakage.
If there is leakage, check the tightening toque at the joints.

AC0D6-02

REMOVAL

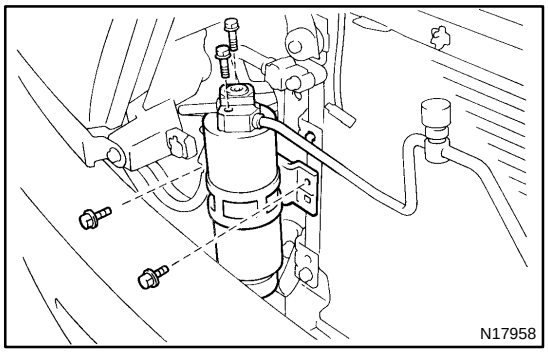
1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

At the time of the installation, please refer to the following item.
Evacuate air from refrigeration system.
Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 650 ± 50 g (22.92 ± 1.76 oz.)

2. REMOVE RADIATOR GRILLE



3. DISCONNECT 2 LIQUID TUBES FROM RECEIVER

Remove the 2 bolts and disconnect the both tubes.

Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of the installation, please refer to the following item.
Lubricate 2 new O-rings with compressor oil and install them to the tubes.

4. REMOVE RECEIVER

(a) Remove the holder bolt and pull receiver downward.

HINT:

At the time of the installation, please refer to the following item.
If receiver is replaced, add compressor oil to compressor.

Add 20 cc (0.71 fl.oz.)

Compressor oil: ND-OIL 8 or equivalent

(b) Remove the bolt and holder.

AC0D7-01

INSTALLATION

Installation is in the reverse order of removal (See page AC-58).

CONDENSER

AC0D8-01

ON-VEHICLE INSPECTION

1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE

If the fins are clogged, wash them with water and dry with compressed air.

NOTICE:

Be careful not to damage the fins.

If the fins are bent, straighten them with a screwdriver or pliers.

2. INSPECT CONDENSER AND FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

If there is leakage, check the tightening torque at the joints.

AC0D9-03

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

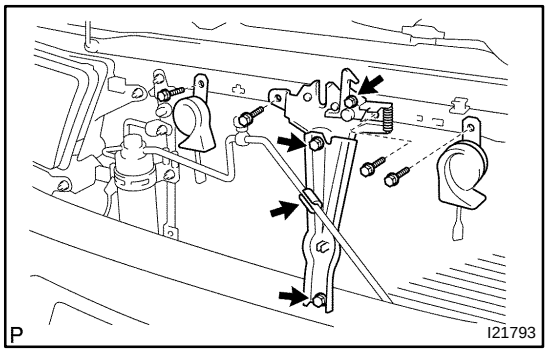
HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 650 ± 50 g (22.92 ± 1.76 oz.)



2. REMOVE RADIATOR GRILL

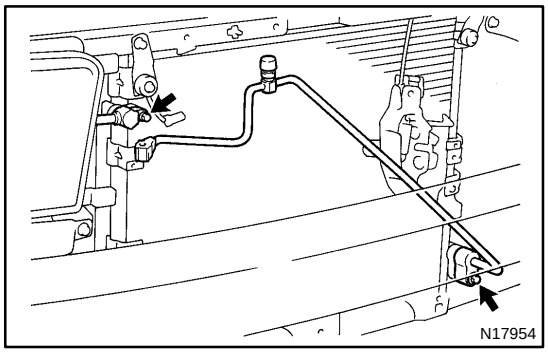
3. REMOVE HORN

4. REMOVE HOOD LOCK

5. REMOVE CENTER BRACE

6. REMOVE RECEIVER AND HOLDER

(See page AC-58)



7. DISCONNECT LIQUID TUBE AND DISCHARGE HOSE

Remove the 2 bolts and disconnect the both tube and hose.

Torque:10 N·m (100 kgf·cm, 7 ft·lbf)

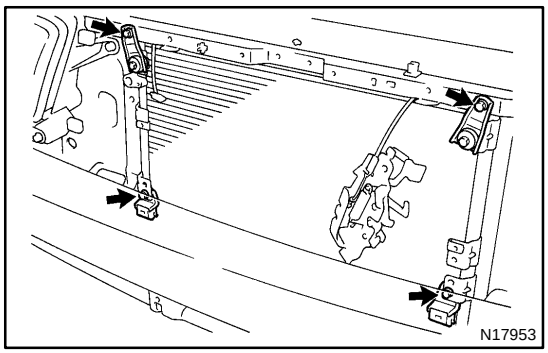
NOTICE:

Cap open the fittings immediately to keep moisture or dirt out of the system.

HINT:

At the time of installation, please refer to the following item.

Lubricate 2 new O-rings with compressor oil and install them to the tubes.



8. REMOVE CONDENSER

(a) Remove the 2 bolts and 2 lower brackets.

(b) Remove the 4 bolts and 2 upper brackets.

(c) Pull the condenser forward and pull it upward.

HINT:

At the time of installation, please refer to the following item.

If condenser is replaced, add compressor oil to the compressor.

Add 40 - 50 cc (1.4 - 1.7 fl.oz.)

Compressor oil: ND-OIL 8 or equivalent

AC0DA-01

INSTALLATION

Installation is in the reverse order of removal (See page AC-61).

WATER VALVE

AC0DO-01

ON-VEHICLE INSPECTION

1. WARM UP ENGINE

2. DISCONNECT WATER VALVE CONTROL CABLE

3. INSPECT WATER VALVE OPERATION

(a) Check that warm air blown out the vent when the water valve lever is moved to ”WARM” position.

(b) Check that cool air blown out when the water valve is moved to the ”COOL” position.

If operation is not as specified, replace the water valve.

4. CONNECT WATER VALVE CONTROL CABLE

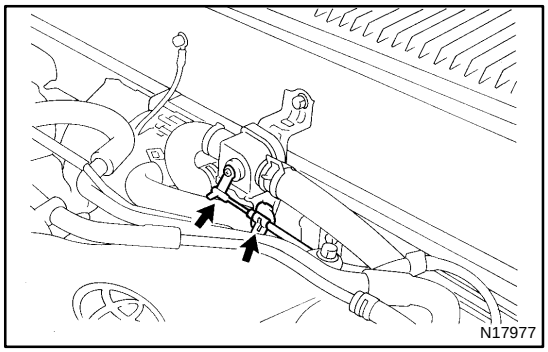
AC0DP-03

REMOVAL

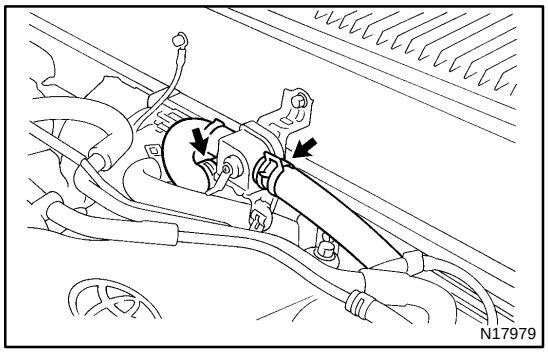
1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all the coolant.



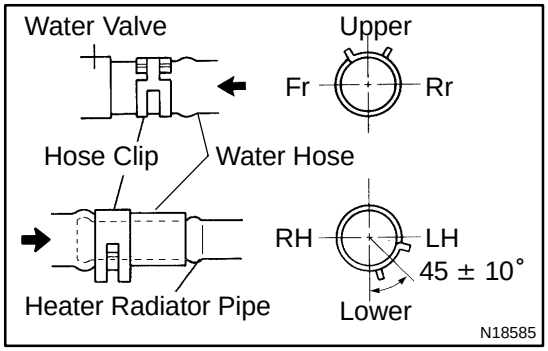
2. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE



3. DISCONNECT WATER HOSES

(a) Using pliers, grip the claws of the hose clip and slide the hose clip along the hose.

(b) Disconnect the water hose.



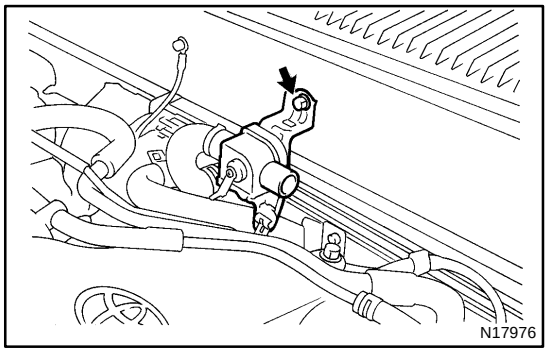
HINT:

At the time of installation, please refer to the following item.

- Heater radiator pipe:
  Push the water hose onto the heater radiator pipe as far as second ridge on the pipe.
- Water valve:
  Push the water hose onto the water valve pipe as far as water valve.
- Install the hose clip in a position, as shown in the illustration.

4. REMOVE WATER VALVE

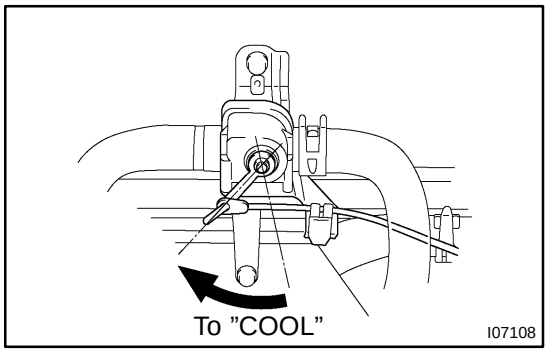
Remove the bolt and water valve.



AC22R-02

INSTALLATION

Installation is in the reverse order of removal (See page AC-64).



AFTER INSTALLATION, ADJUST WATER VALVE CONTROL CABLE

(a) Ignition switch ON.

(b) Set the temperature control door to ”COOL” position and connect the control cable and lock the clamp.

HINT:

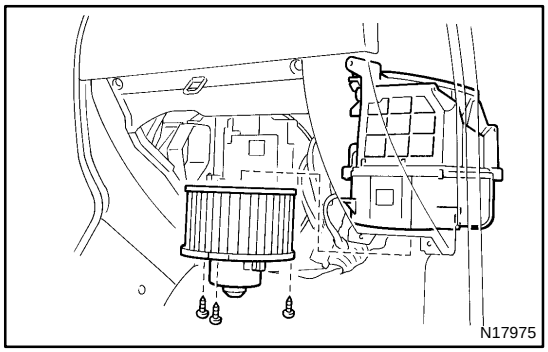
Lock the clamp during lightly pushing the outer cable in the direction, as shown in the illustration by an arrow.

BLOWER MOTOR

AC22S-03

INSPECTION

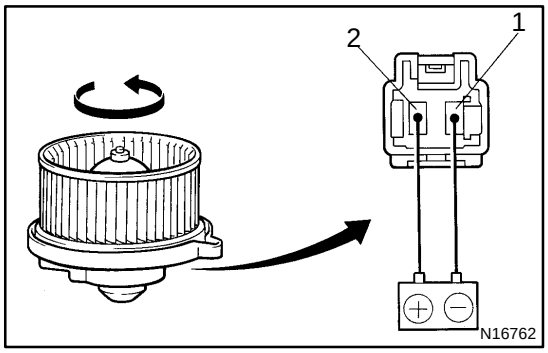
1. REMOVE GLOVE COMPARTMENT DOOR
(See page BO-69)



2. REMOVE BLOWER MOTOR

(a) Disconnect the connector.

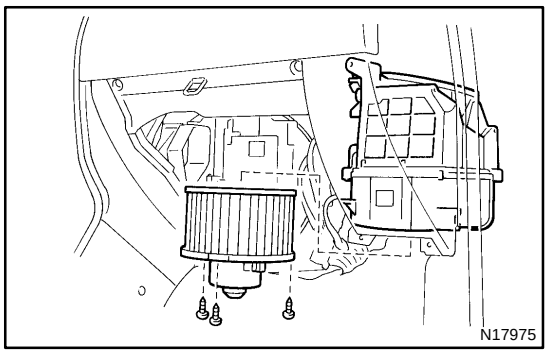
(b) Remove the 3 screws and motor.



3. INSPECT BLOWER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, then check that the motor operations smoothly.

If operation is not as specified, replace the blower motor.



4. INSTALL BLOWER MOTOR

(a) Install the motor with the 3 screws.

(b) Connect the connector.

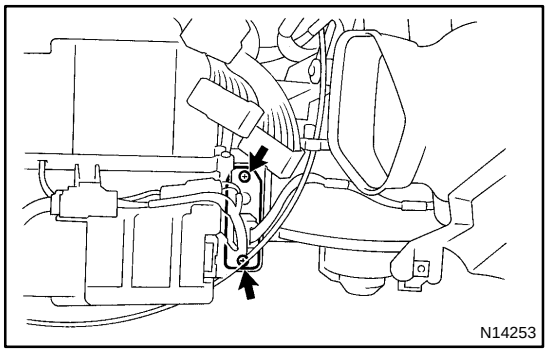
5. INSTALL GLOVE COMPARTMENT DOOR
(See page BO-76)

BLOWER RESISTOR (Manual A/C)

AC23E-03

INSPECTION

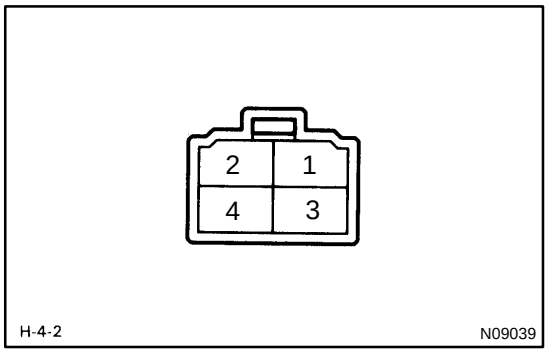
1. REMOVE GLOVE COMPARTMENT PARTS
(See page BO-69)



2. REMOVE BLOWER RESISTOR

(a) Disconnect the connector.

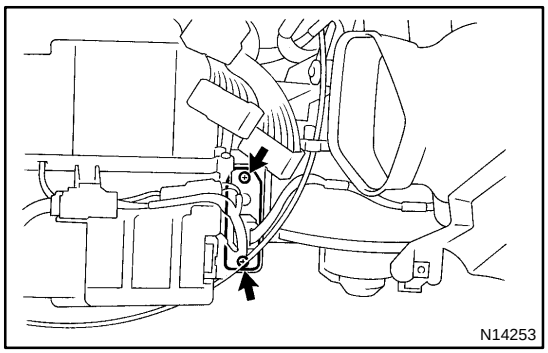
(b) Remove the 2 screws and blower resistor.



3. INSPECT BLOWER RESISTOR RESISTANCE

Tester connection	Condition	Specified condition
1-4	Constant	2.2 ± 0.1 Ω
1-3	Constant	1.2 ± 0.2 Ω
1-2	Constant	1.8 ± 0.2 Ω

If resistance is not as specified, replace the blower resistor.



4. INSTALL BLOWER RESISTOR

(a) Install the blower resistor with the 2 screws.

(b) Connect the connector.

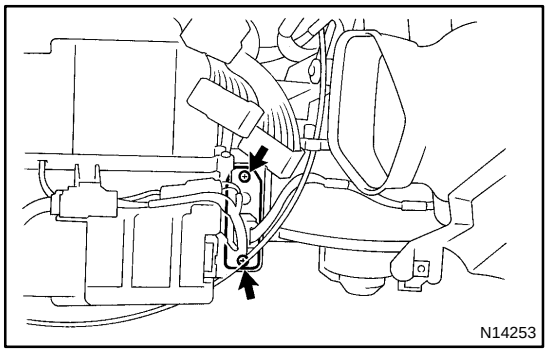
5. INSTALL GLOVE COMPARTMENT PARTS
(See page BO-76)

BLOWER MOTOR LINEAR CONTROLLER (Auto A/C)

AC23C-02

INSPECTION

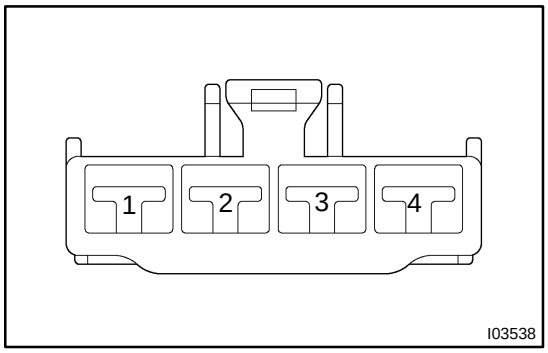
1. **REMOVE GLOVE COMPARTMENT PARTS (See page BO-69)**



2. **REMOVE BLOWER MOTOR LINEAR CONTROLLER**

(a) Disconnect the connector.

(b) Remove the 2 screws and blower motor linear controller.



3. **INSPECT BLOWER MOTOR LINEAR CONTROLLER CIRCUIT**

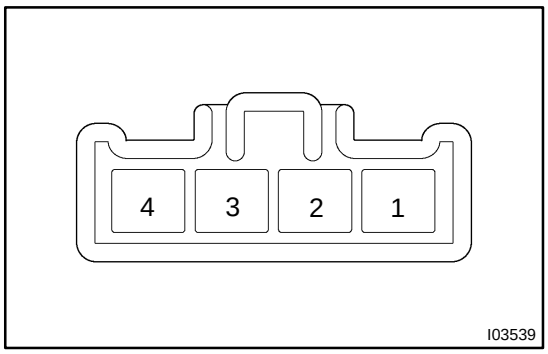
(a) Disconnect the connector from the relay and inspect the connector on wire harness side, as shown in the chart below.

Test condition:

Ignition switch ON

Tester connection	Condition	Specified condition
1 - Ground	Constant	Continuity
3 - Ground	Constant	Battery voltage

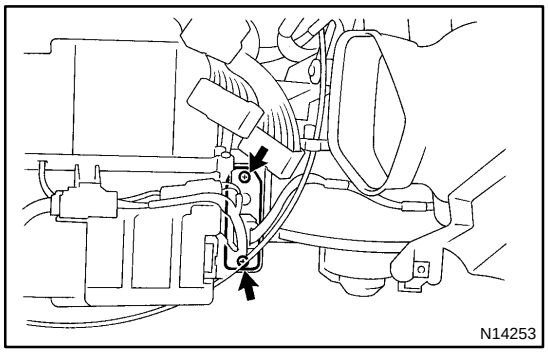
If the circuit is as specified, try to replace the controller with a new one. If the circuit is not as specified, inspect the connected to other parts.



(b) Connect the connector to the relay and inspect the wire harness connector from the back side, as shown in the chart below.
Test condition:
Ignition switch ON

Tester connection	Condition	Specified condition
4 - Ground	Constant	Battery voltage

If the circuit is as specified, try to replace the controller with a new one. If the circuit is not as specified, inspect the connected to other parts.



4. INSTALL BLOWER MOTOR LINEAR CONTROLLER

(a) Install the blower motor linear controller with the 2 screws.

(b) Connect the connector.

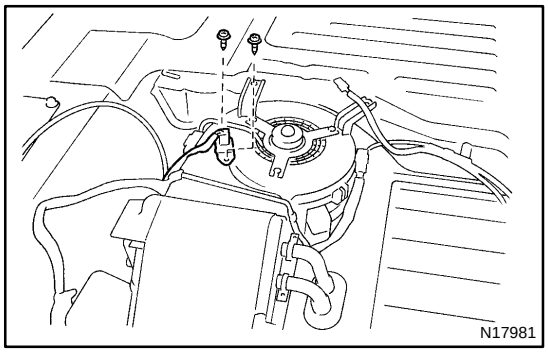
5. INSTALL GLOVE COMPARTMENT PARTS (See page BO-76)

REAR BLOWER RESISTOR

AC22T-02

INSPECTION

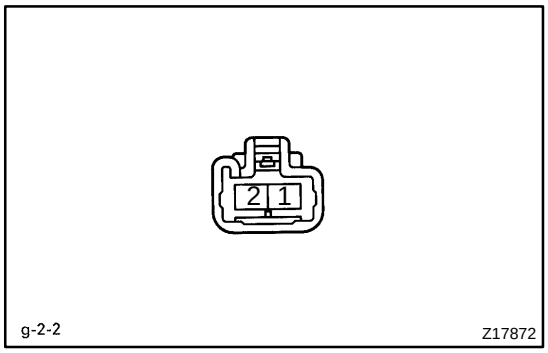
1. **REMOVE FRONT SEATS**
2. **SLIDE FLOOR CARPET BACKWARD**



3. **REMOVE BLOWER RESISTOR**

(a) Disconnect the connector.

(b) Remove the 2 screws and blower resistor.

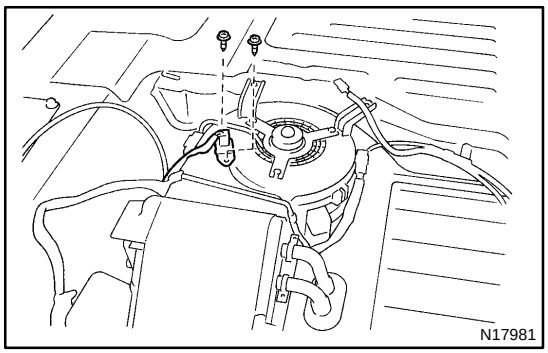


4. **INSPECT BLOWER RESISTOR RESISTANCE**

Measure resistance between terminals.

Standard resistance: 3.2 ± 0.2 Ω

If resistance is not as specified, replace the blower resistor.



5. **INSTALL BLOWER RESISTOR**

(a) Install the blower resistor with the 2 screws.

(b) Connect the connector.

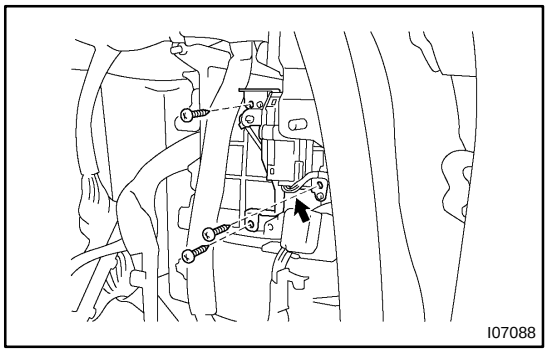
6. **SLIDE FLOOR CARPET FORWARD**
7. **INSTALL FRONT SEATS**

AIR INLET SERVOMOTOR

AC3F2-01

INSPECTION

1. **REMOVE GLOVE COMPARTMENT PARTS (See page BO-69)**
2. **REMOVE AIR DUCT**

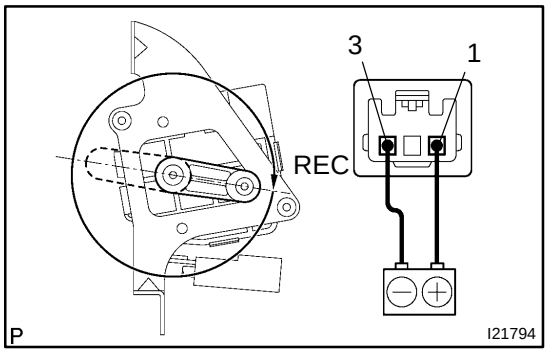


3. **REMOVE AIR INLET SERVOMOTOR**

(a) Disconnect the connector.

(b) Remove the 3 screws and servomotor.

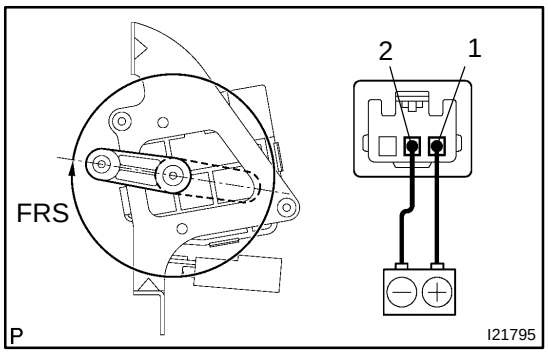
4. **Auto A/C model:**
   INSPECT AIR INLET CONTROL SERVOMOTOR CIRCUIT (See page DI-616)
5. **Auto A/C model:**
   INSPECT AIR INLET DAMPER POSITION SENSOR CIRCUIT (See page DI-609)



6. **Manual A/C model:**
   INSPECT AIR INLET SERVOMOTOR

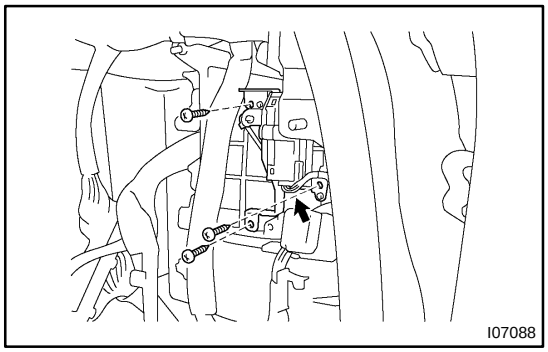
Inspect servomotor operation.

(1) Connect the positive (+) lead to terminal 2 and negative (-) lead to terminal 1, then check that the arm rotates clockwise and stop to REC position.



(2) Connect the positive (+) lead to terminal 2 and negative (-) lead to terminal 3, then check that the arm rotates clockwise and stop to FRS position.

If operations are not as specified, replace the servomotor



7. **INSTALL AIR INLET SERVOMOTOR**

(a) Install the servomotor with the 3 screws.

(b) Connect the connector.

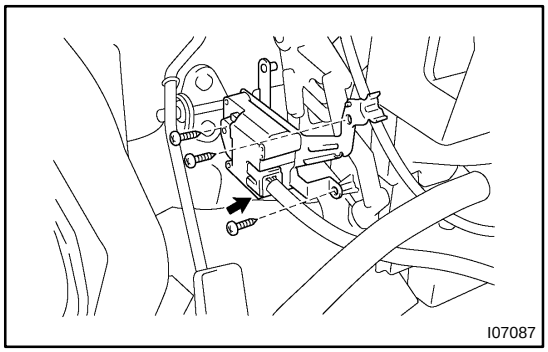
8. **INSTALL AIR DUCT**
9. **INSTALL GLOVE COMPARTMENT PARTS (See page BO-76)**

AIR OUTLET SERVOMOTOR

AC3F3-01

INSPECTION

1. **REMOVE LOWER FINISH PANEL LH (See page BO-69)**



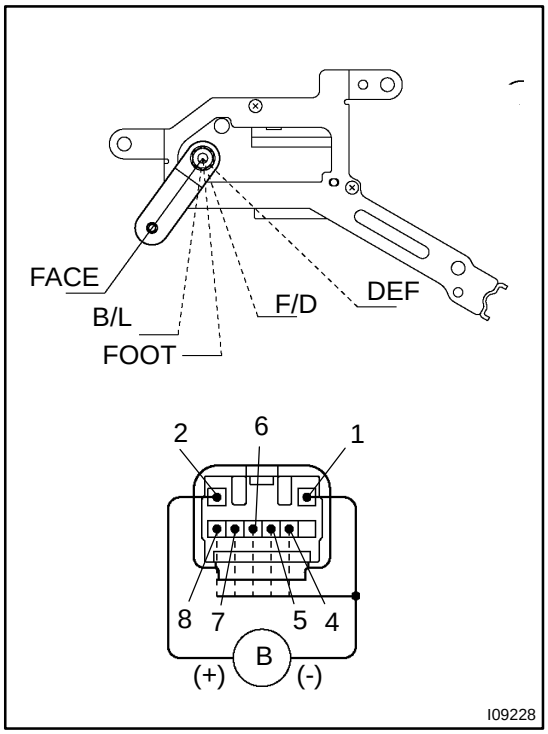
2. **REMOVE AIR OUTLET SERVOMOTOR**

(a) Disconnect the connector.

(b) Remove the 3 screws and servomotor.

3. **Auto A/C model:**

INSPECT AIR OUTLET CONTROL SERVOMOTOR CIRCUIT (See page DI-619)



4. **Manual A/C model:**

INSPECT AIR OUTLET SERVOMOTOR

Inspect servomotor operation.

(1) Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1.

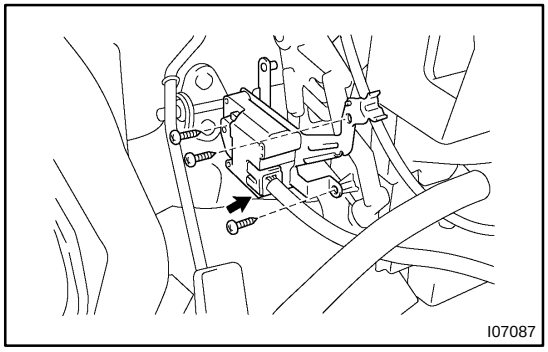
(2) Check the lever operation when the negative (-) lead is connected to the termianls shown below.

HINT:

The lever moves smoothly to the position for each mode.

Ground Terminals	Mode
8	DEF.
7	FOOT/DEF
6	FOOT
5	B/L
4	FACE

If resistance is not as specified, replace the servomotor.

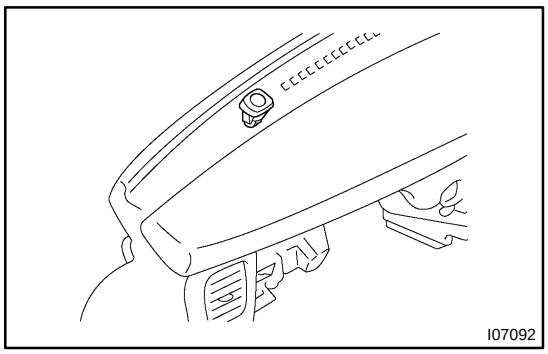


5. **INSTALL AIR OUTLET SERVOMOTOR**

(a) Install the servomotor with the 3 screws.

(b) Connect the connector.

6. **INSTALL LOWER FINISH PANEL LH (See page BO-76)**



SOLAR SENSOR (Auto A/C)

AC22W-01

INSPECTION

1. REMOVE SOLAR SENSOR

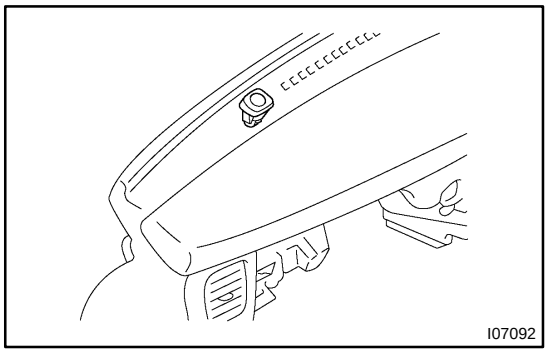
Using a screwdriver, pull out the sensor with the holder, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

2. INSPECT SOLAR SENSOR CIRCUIT

(See page DI-600)



3. INSTALL SOLAR SENSOR

(a) Install the sensor to the holder.

(b) Install the sensor with holder to instrument panel, then connect the connector.

HINT:

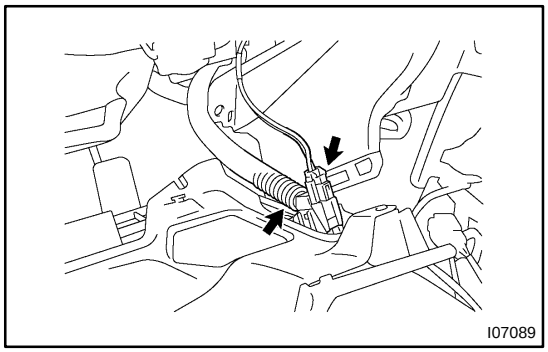
Assemble the holder with the triangular cut-out facing forward.

ROOM TEMPERATURE SENSOR (Auto A/C)

AC22X-02

INSPECTION

1. **REMOVE LOWER FINISH PANEL LH**
   (See page BO-69)

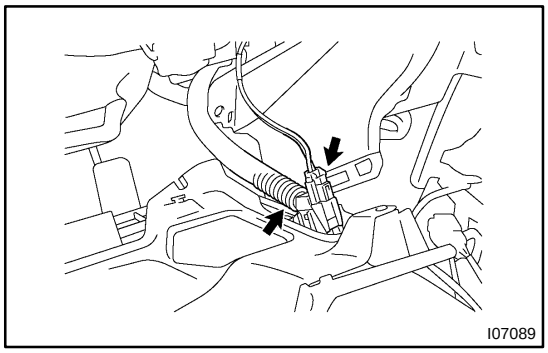


2. **REMOVE ROOM TEMPERATURE SENSOR**

(a) Disconnect the connector and aspirator hose.

(b) Pull out the sensor from lower finish panel.

3. **INSPECT ROOM TEMPERATURE SENSOR CIRCUIT**
   (See page DI-588)



4. **INSTALL ROOM TEMPERATURE SENSOR**

(a) Install the sensor to lower finish panel.

(b) Connect the connector and aspirator hose.

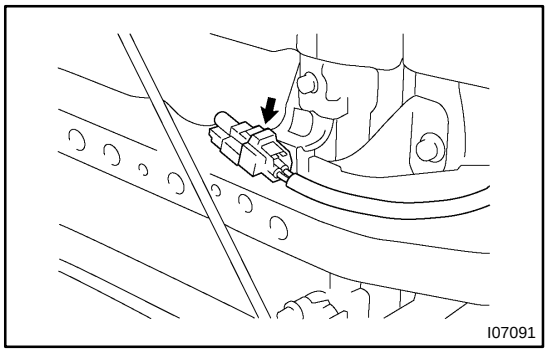
5. **INSTALL LOWER FINISH PANEL LH**
   (See page BO-76)

AMBIENT TEMPERATURE SENSOR (Auto A/C)

AC22Y-02

INSPECTION

1. REMOVE FRONT GRILL

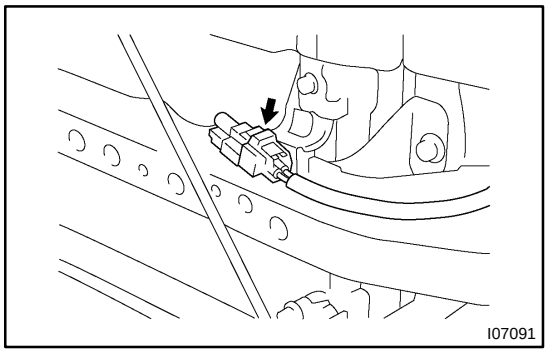


2. REMOVE AMBIENT TEMPERATURE SENSOR

(a) Disconnect the connector.

(b) Remove the sensor from the bumper reinforcement.

3. INSPECT AMBIENT TEMPERATURE SENSOR CIRCUIT (See page DI-591)



4. INSTALL AMBIENT TEMPERATURE SENSOR

(a) Install the sensor to the bumper reinforcement.

(b) Connect the connector.

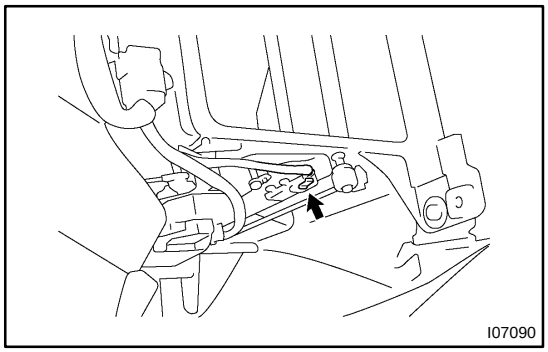
5. INSTALL FRONT GRILL

ENGINE COOLANT TEMPERATURE (ECT) SENSOR (Auto A/C)

AC22Z-02

INSPECTION

1. **REMOVE COOLING UNIT (See page AC-26)**

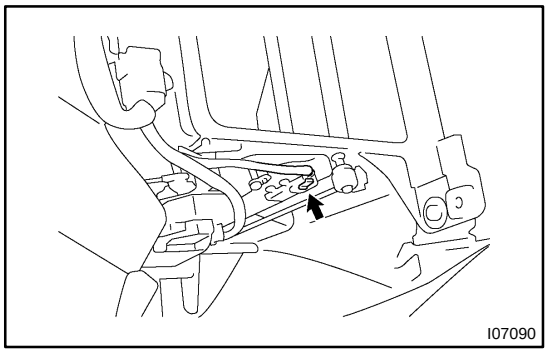


2. **REMOVE ENGINE COOLANT TEMPERATURE SENSOR**

(a) Disconnect the connector from air mix servomotor.

(b) After pulling off the clamp, pull out the sensor.

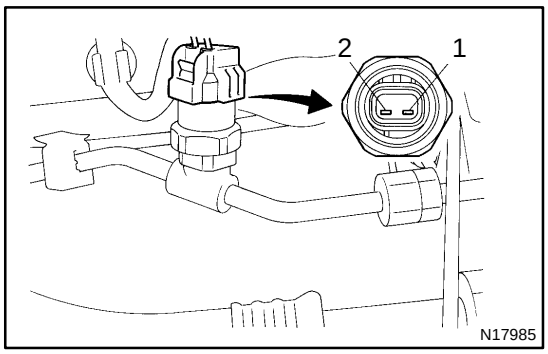
3. **INSPECT ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT (See page DI-597)**

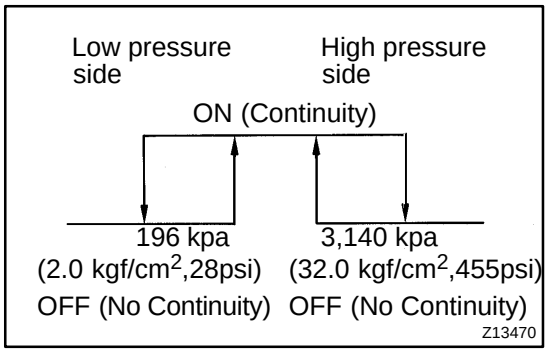


4. **INSTALL ENGINE COOLANT TEMPERATURE SENSOR**

Install the sensor with the holder.

5. **INSTALL COOLING UNIT (See page AC-31)**





PRESSURE SWITCH

AC0E7-02

ON-VEHICLE INSPECTION

1. **SET ON MANIFOLD GAUGE SET (See page AC-19)**
2. **DISCONNECT CONNECTOR**
3. **RUN ENGINE AT APPROX. 2,000 rpm**
4. **SET BLOWER SPEED CONTROL SWITCH TO "HI" POSITION**
5. **SET TEMPERATURECONTROL LEVER TO "MAX. COOL" POSITION**
6. **A/C SWITCH ON**
7. **INSPECT PRESSURE SWITCH OPERATION**

(a) Connect the positive (+) lead from the ohmmeter to terminal 1 and negative (-) lead to terminal 2.

(b) Check continuity between terminals when refrigerant pressure is changed, as shown in the illustration.

If operation is not as specified, replace the pressure switch.

AC0E8-02

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

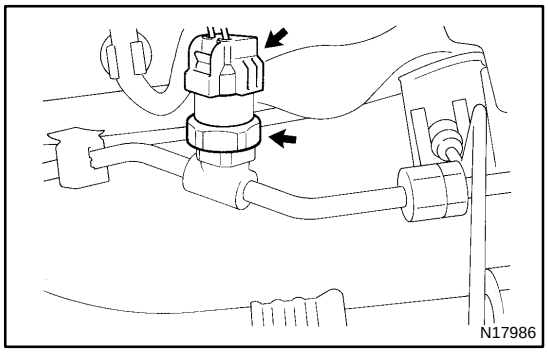
HINT:

At the time of installation, please refer to the following item.

Evacuate sir from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount: 650 ± 50 g (22.92 ± 1.76 oz.)



2. REMOVE PRESSURE SWITCH FROM LIQUID TUBE

Disconnect the connector and remove the pressure switch.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

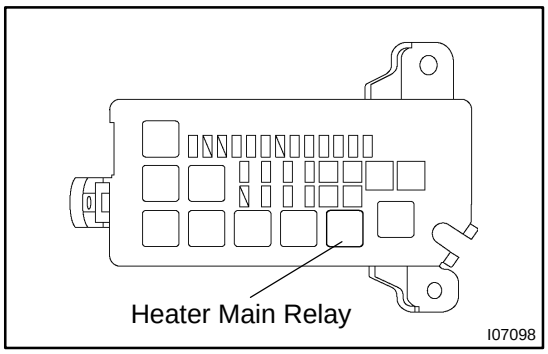
HINT:

- Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and remove the switch.
- At the time of installation, please refer to the following item.
  Lubricate a new O-ring with the compressor oil and install them to the switch.

AC0E9-01

INSTALLATION

Installation is in the reverse order of remval (See page AC-78).

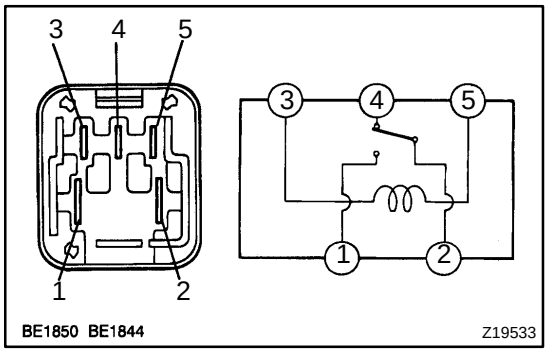


HEATER MAIN RELAY

AC230-01

INSPECTION

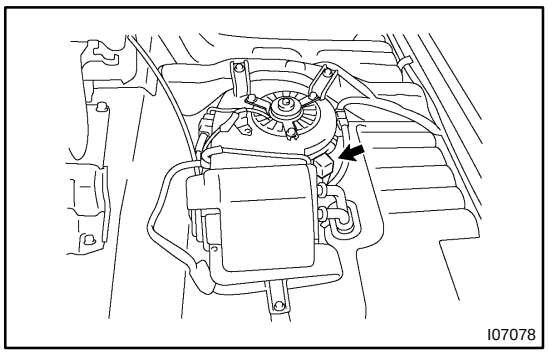
1. REMOVE HEATER MAIN RELAY FROM NO. 2 RELAY BLOCK



2. INSPECT HEATER MAIN RELAY (Making: HTR) CONTINUITY

Condition	Tester connection	Specified condition
Constant	2 - 4 3 - 5	Continuity
Apply B+ between terminals 3 and 5	1 - 2	Continuity

If continuity is not as specified, replace the relay.

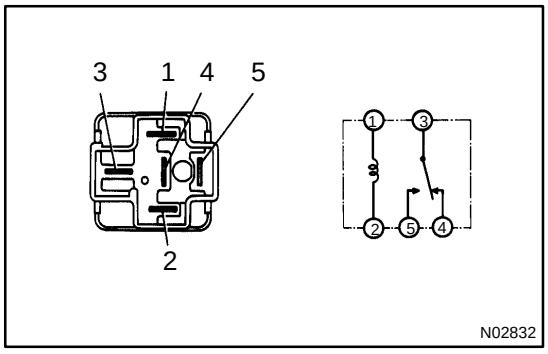

I07078

REAR HEATER RELAY

AC231-01

INSPECTION

1. REMOVE REAR HEATER RELAY FROM REAR HEATER UNIT

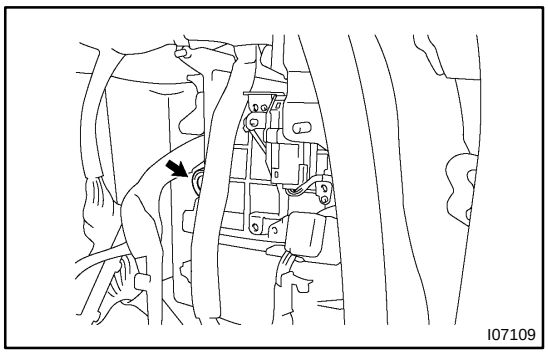


N02832

2. INSPECT REAR HEATER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 - 2 3 - 5	Continuity
Apply B+ between terminals 1 and 2	3 - 5	Continuity

If continuity is not as specified, replace the relay.



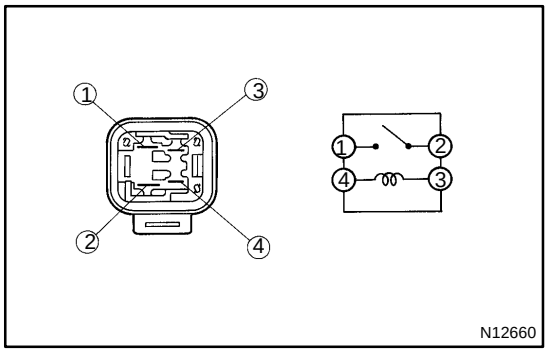
EXTRA-HI RELAY (Auto A/C)

AC232-01

INSPECTION

1. REMOVE EXTRA-HI RELAY FROM BLOWER UNIT

Remove the screw and extra-hi relay.



2. INSPECT EXTRA-HI RELAY CONTINUITY

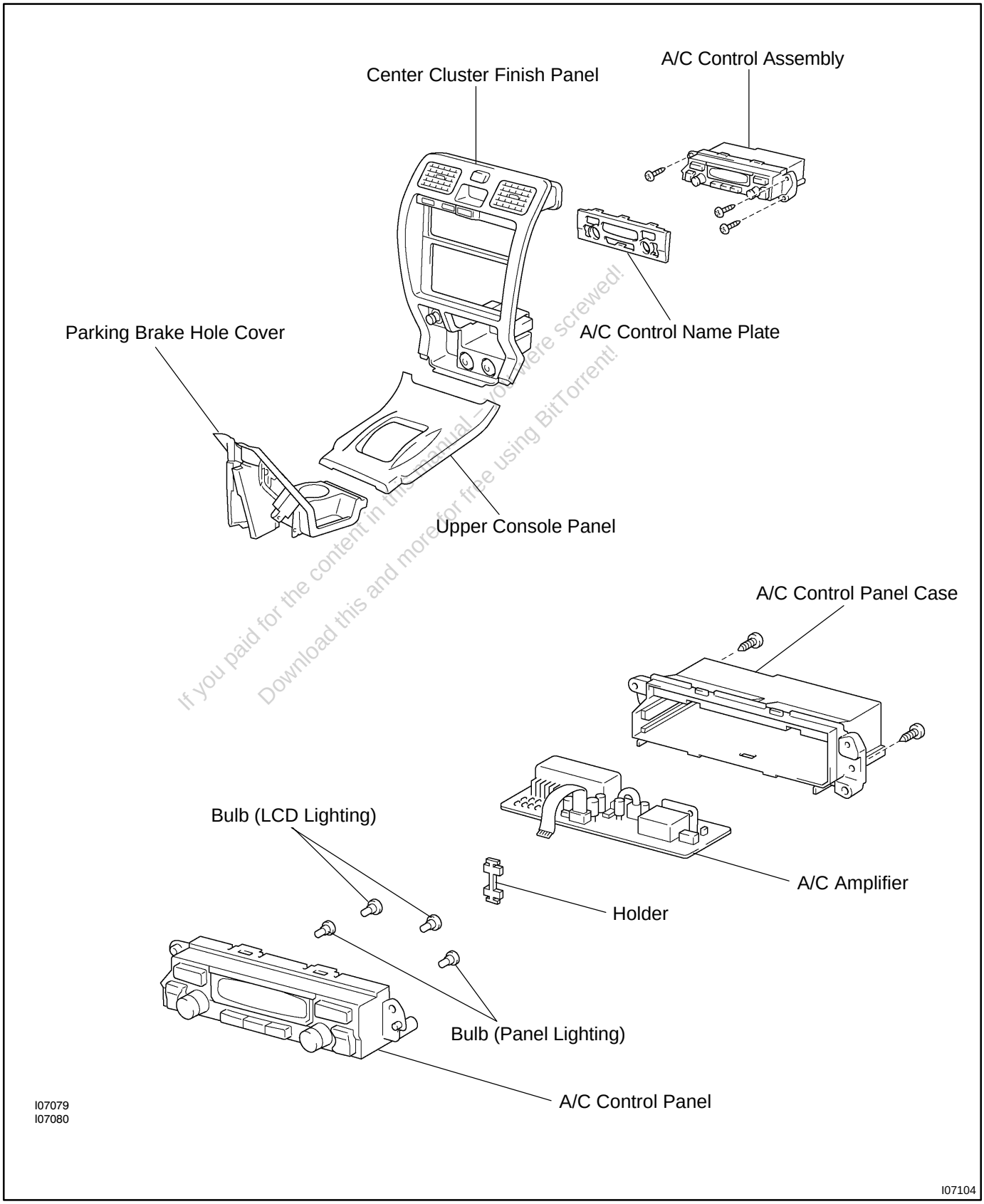
Condition	Tester connection	Specified condition
Constant	3 - 4	Continuity
Apply B+ between terminals 3 and 4.	1 - 2	Continuity

If continuity is not as specified, replace the relay.

AIR CONDITIONING CONTROL ASSEMBLY (Auto A/C)

AC233-01

COMPONENTS



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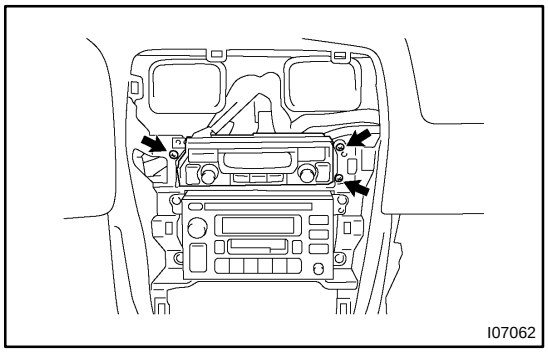
AC234-01

REMOVAL

1. REMOVE PARKING BRAKE HOLE COVER
2. REMOVE UPPER CONSOLE PANEL
3. REMOVE CENTER CLUSTER FINISH PANEL
   (See page BO-69)



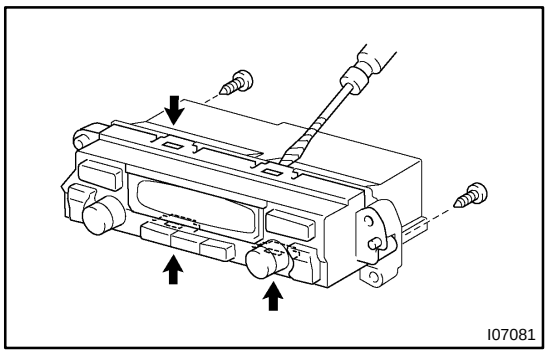
4. REMOVE A/C CONTROL ASSEMBLY

(a) Remove the A/C control name plate.

(b) Remove the 3 screws and A/C control assembly, then disconnect the connector.

AC235-01

DISASSEMBLY



1. REMOVE A/C CONTROL PANEL

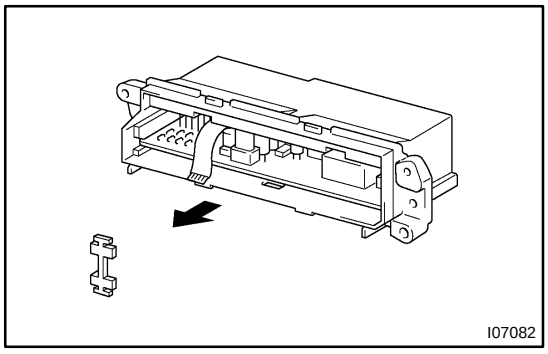
(a) Remove the 2 screws.

(b) Using a screwdriver, release the 4 claws.

HINT:

Tape the screwdriver tip before use.

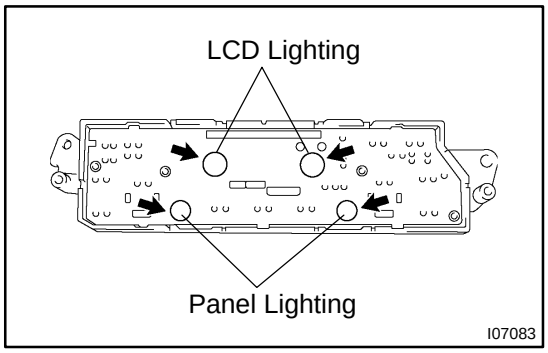
(c) Unlock the connector's lock and pull out the flat harness from the A/C control panel.



2. REMOVE A/C AMPLIFIER

(a) Release the 4 claws and remove the holder.

(b) Hold the connector of amplifier and pull out the amplifier.



3. REMOVE BULB

Using a screwdriver, turn the bulb to the left and pull out the bulb.

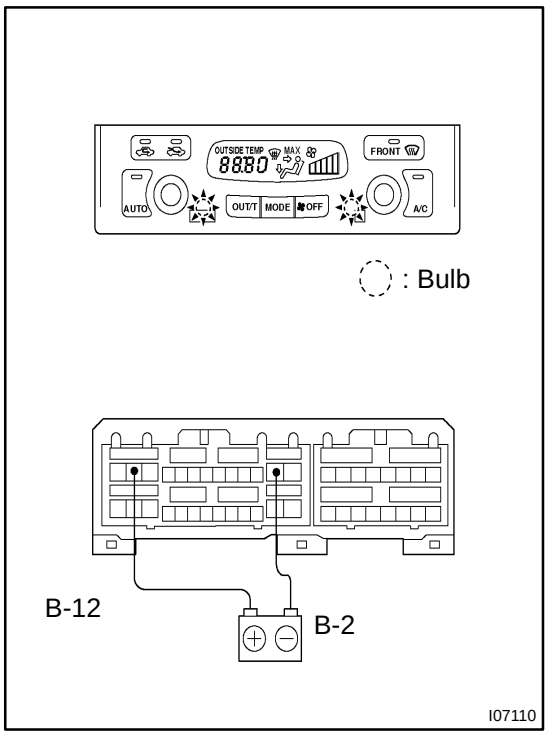
AC236-02

INSPECTION

1. INSPECT PANEL LIGHTING

Connect the positive (+) lead from the battery to terminal B-12 and the negative (-) lead to terminal B-2, then check that the illumination lights up.

If there is bulb not light up, replace the bulb only. If all bulbs do not light up, replace the A/C control panel.



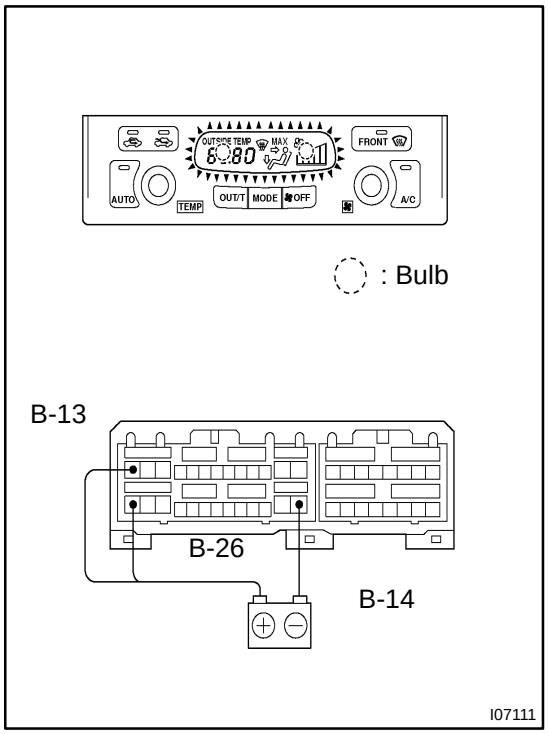
2. INSPECT LCD LIGHTING

Connect the positive (+) lead from the battery to terminal B-13, B-26 and the negative (-) lead to terminal B-14, then check that the illumination lights up.

If there is bulb not light up, replace the bulb only. If the 2 bulbs do not light up, try replace the bulb with a new one. If the bulbs do not light up, replace the A/C control panel.

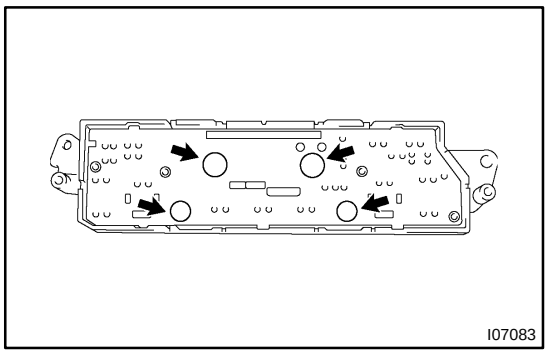
3. INSPECT A/C CONTROL ASSEMBLY CIRCUIT

(See page DI-584)



AC237-02

REASSEMBLY



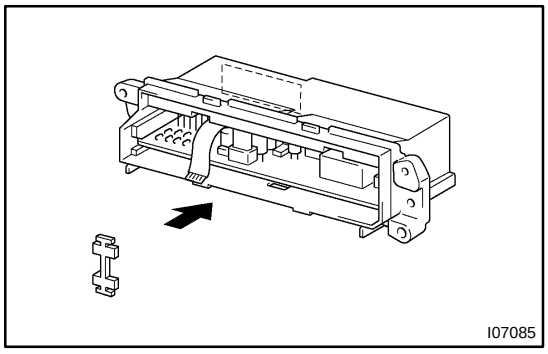
1. INSTALL BULB

(a) Install the bulb to the A/C control panel.

(b) Using a screwdriver, turn the bulb to the right and lock the bulb.

2. INSTALL A/C AMPLIFIER

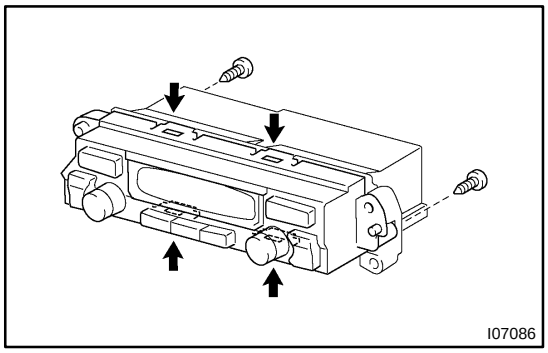
(a) Hold the connector of supply parts amplifier and pull out the amplifier from electrostatic prevention bag.



(b) Hold the connector of amplifier and insert the amplifier to the A/C control panel case.

(c) Install the holder.

(d) Check the fitting for connector of amplifier.



3. INSTALL A/C CONTROL PANEL

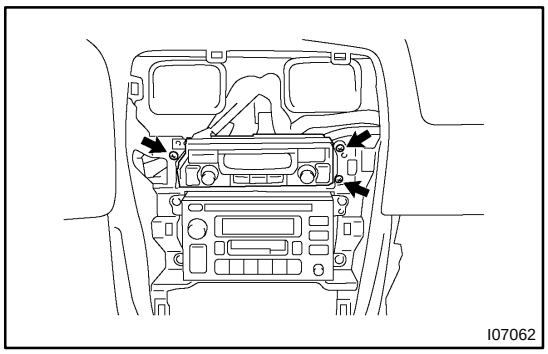
(a) Unlock the connector's lock and push into the flat cable.

(b) Install the A/C control panel.

(c) Check the fitting for 4 claws.

(d) Install the 2 screws.

AC238-02



INSTALLATION

1. INSTALL A/C CONTROL ASSEMBLY

(a) Install the A/C control assembly with the 3 screws, then connect the connector.

(b) Install the A/C control name plate.

2. INSTALL CENTER CLUSTER FINISH PANEL

3. INSTALL UPPER CONSOLE PANEL

4. INSTALL PARKING BRAKE HOLE COVER

(See page BO-76)

HEATER CONTROL ASSEMBLY (Manual A/C)

AC3F4-01

ON-VEHICLE INSPECTION

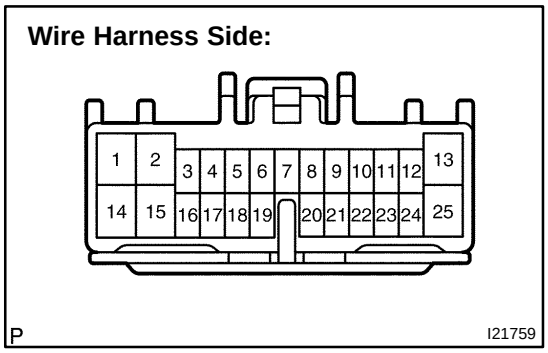
1. INSPECT HEATER CONTROL LEVER AND DIALS OPERATION

Move the control dials left and right check for stiffness and binding the full range of the dials.

2. REMOVE HEATER CONTROL ASSEMBLY

3. INSPECT AMPLIFIER CIRCUIT

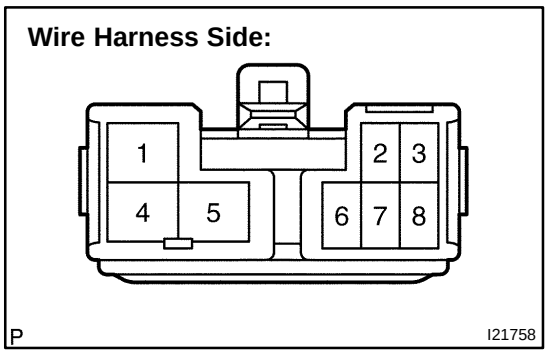
(a) Remove the glove compartment door (See page BO-69).



(b) Disconnect the amplifier connector and inspect the connector on wire harness side, as shown in the chart below.
Test conditions:

- Turn ignition switch to ON
- Blower speed switch HI
- Temperature control lever Max. COOL

Tester connection	Condition	Specified condition
1 - Ground	Always	Battery voltage
2 - Ground	Turn ignition switch to ON	Battery voltage
2 - Ground	Turn ignition switch to OFF	No voltage
11 - 13	Always	4.5 - 5.5
15 - 16	Turn light control switch to TAIL	Battery voltage
15 - 16	Turn light control switch to OFF	No voltage

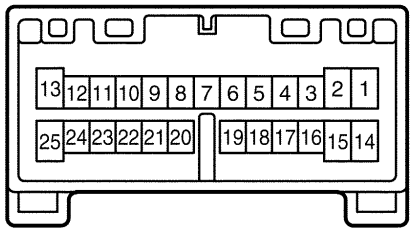


(c) Disconnect the amplifier connector and inspect the connector on wire harness side, as shown in the chart below.
Test conditions:

- Turn ignition switch to ON
- Blower speed switch HI
- Temperature control lever Max. COOL

Tester connection	Condition	Specified condition
1 - Ground	Always	Below 1 Ω

From back side:



P I21756

(d) Connect the connector to amplifier and inspect wire harness side connector from the back side, as shown in the chart below.

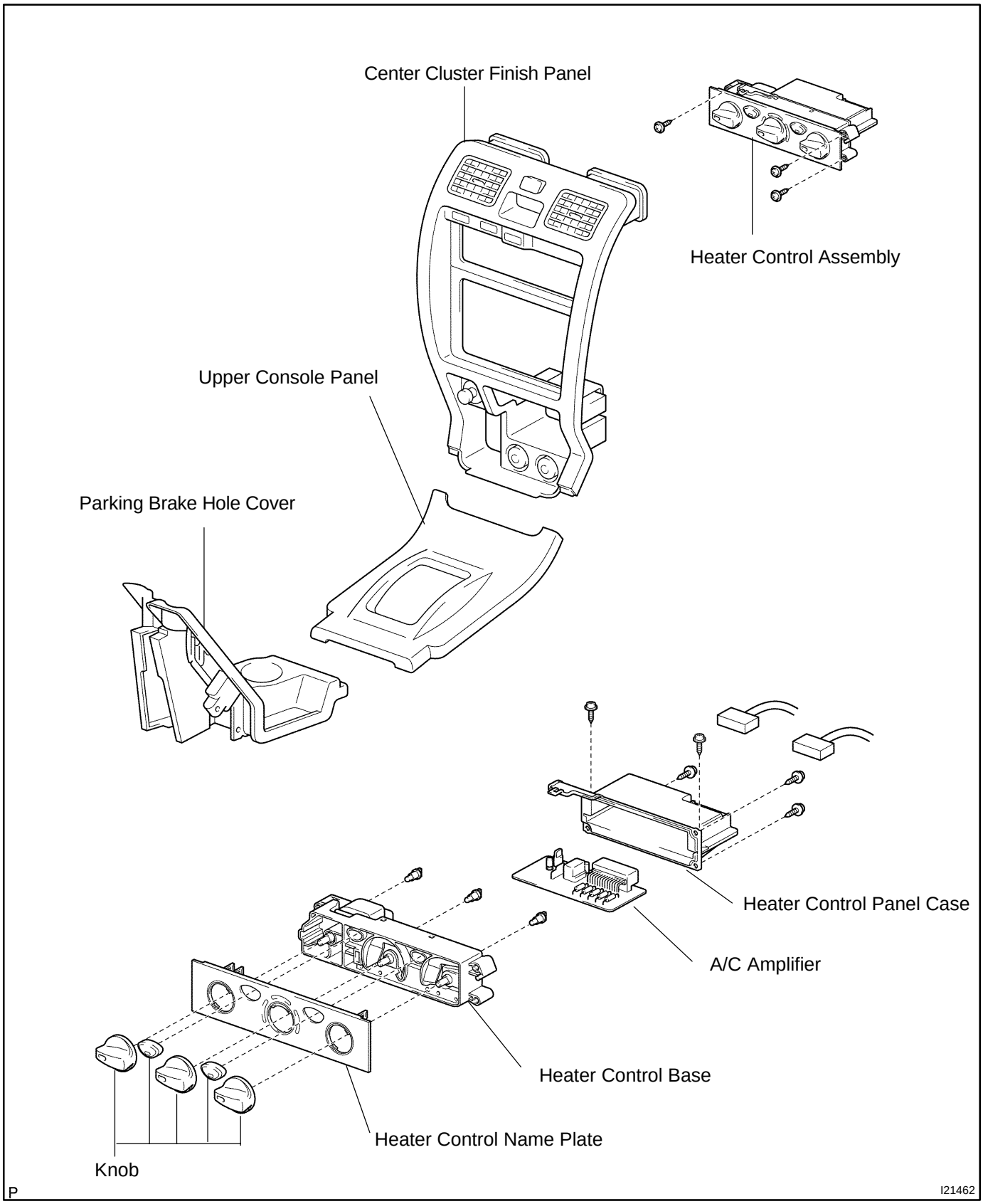
Test conditions:

- Running engine at idle speed
- Blower speed switch HI
- A/C switch ON
- Temperature control lever Max. COOL

Tester connection	Condition	Specified condition
3 - Ground	IG ON.	10 -14 V
3 - Ground	IG ON. Disconnect pressure switch connector	Below 1.0 V
4 - Ground	IG ON. Set temp. MAX. COOL	Below 1.0 V
4 - Ground	IG ON. Set temp. MAX. HOT	Below 1.0 V
5 - Ground	IG ON. Set temp. MAX. HOT	Below 1.0 V
5 - Ground	IG ON. Set temp. MAX. COOL	Below 1.0 V
6 - Ground	IG ON. Air inlet selector: FRESH	Below 1.0 V
6 - Ground	IG ON. Air inlet selector: RECIRCULATE	10 - 14 V
7 - Ground	IG ON. Air inlet selector: RECIRCULATE	Below 1.0 V
7 - Ground	IG ON. Air inlet selector: FRESH	10 - 14 V
8 - Ground	IG ON. Operate blower motor	10 - 14 V
9 - Ground	A/C switch to OFF	4.5 - 5.5 V
9 - Ground	A/C switch to ON	4.5 - 5.5 V
10 - Ground	A/C switch to ON	Below 1.0 V
10 - Ground	A/C switch to OFF	Below 1.0 V
14 - Ground	A/C switch to ON	10 - 14 V
14 - Ground	A/C switch to OFF	10 - 14 V
17 - Ground	Mode selector: FACE	Below 1.0 V
17 - Ground	Mode selector: Except FACE	10 - 14 V
18 - Ground	Mode selector: B/L	Below 1.0 V
18 - Ground	Mode selector: Except B/L	10 - 14 V
19 - Ground	Mode selector: FOOT	Below 1.0 V
19 - Ground	Mode selector: Except FOOT	10 - 14 V
20 - Ground	Mode selector: F/D	Below 1.0 V
20 - Ground	Mode selector: Except F/D	10 - 14 V
21 - Ground	Mode selector: DEF	Below 1.0 V
21 - Ground	Mode selector: Except DEF	10 - 14 V
23 - Ground	Ambient temp. 25 ˚C (77 ˚F)	1.8 - 2.2 V
23 - Ground	Ambient temp. 40 ˚C (104 ˚F)	-

AC0EF-03

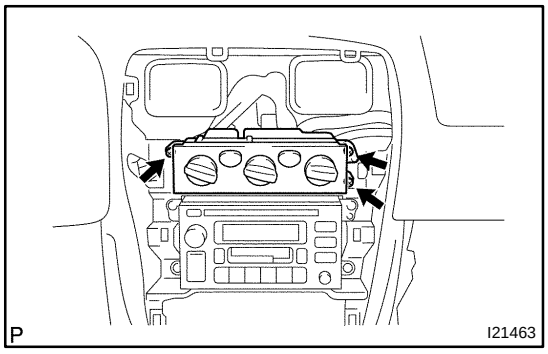
COMPONENTS



AC3F5-01

REMOVAL

1. REMOVE PARKING BRAKE HOLE COVER
2. REMOVE UPPER CONSOLE PANEL
3. REMOVE CENTER CLUSTER FINISH PANEL (See page BO-69)

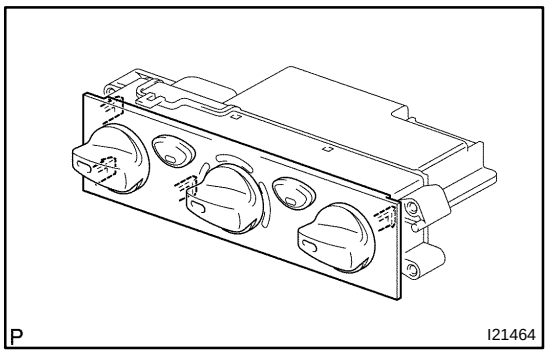


4. REMOVE HEATER CONTROL ASSEMBLY

Remove the 3 screws and pull out the heater control assembly, then disconnect the connectors.

AC3F6-01

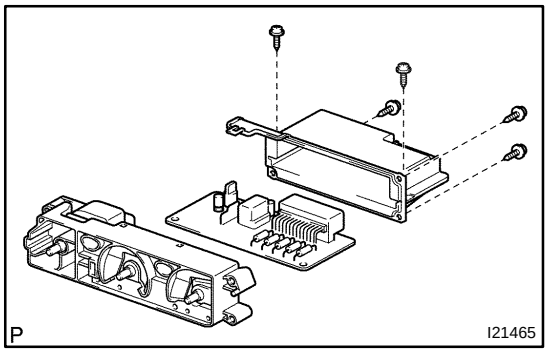
DISASSEMBLY



1. REMOVE A/C CONTROL PANEL

(a) Remove the 3 knobs and 2 switch.

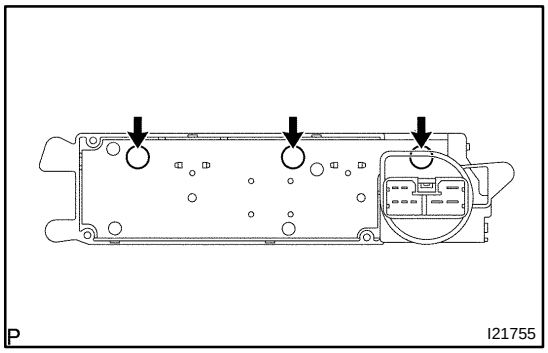
(b) Remove the A/C control panel.



2. REMOVE A/C AMPLIFIER

(a) Remove the 5 screws.

(b) Remove the A/C control panel case and amplifier.



3. REMOVE BULB

Using a screwdriver, turn the bulb to the left and pull out the bulb.

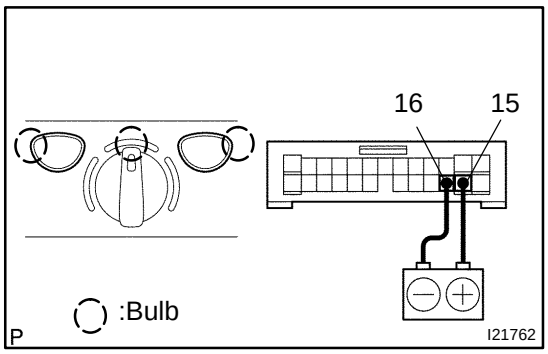
AC3F7-01

INSPECTION

1. INSPECT ILLUMINATION OPERATION

Connect the positive (+) lead from the battery to terminal 15 and negative (-) lead to terminal 16 then check that the illuminations lights up.

If operation is not as specified, check the faulty bulb.

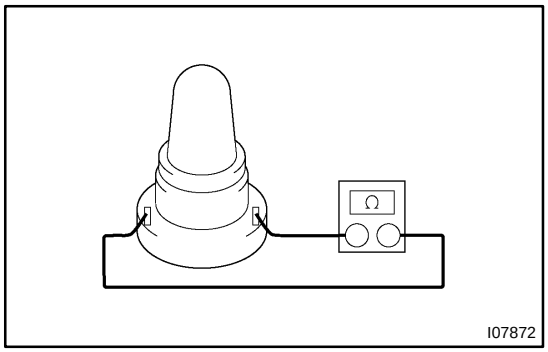


2. INSPECT BULB

Apply the tester as shown in the illustration to the test for continuity.

If continuity exists, replace the heater control.

If no continuity exists, replace the bulb.

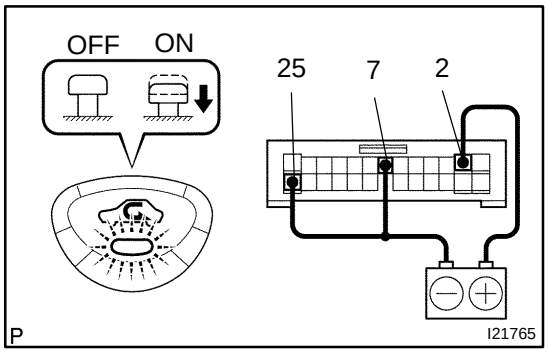


3. INSPECT RECIRC INDICATOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 7, 25.

(b) Push the REC button in and then check that the indicator lights up.

If operation is not as specified, replace the switch circuit board.



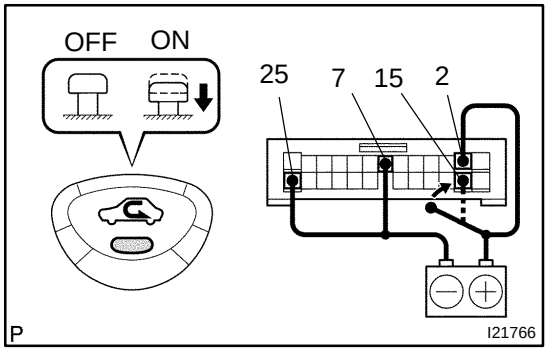
4. INSPECT DIMMING OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 7, 25 while press the switch.

(b) Push the REC button in and then check that the indicator lights up.

(c) Connect the positive (+) lead from the battery to terminal 15 and then check that the indicator dims.

If operation is not as specified, replace the switch circuit board.

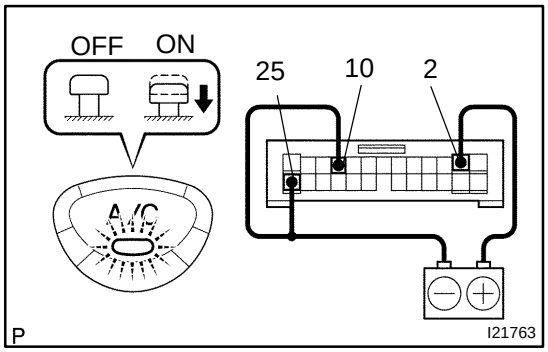


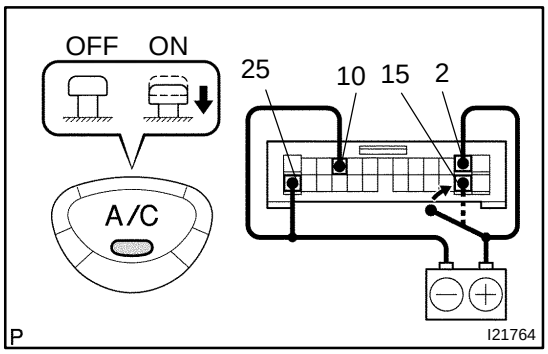
5. INSPECT A/C INDICATOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 10, 25.

(b) Push the A/C button in and then check that the indicator lights up.

If operation is not as specified, replace the switch circuit board.





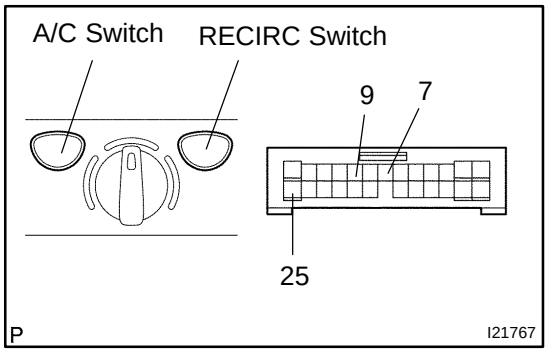
6. INSPECT DIMMING OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 10, 25 while press the switch.

(b) Push the A/C button in and then check that the indicator lights up.

(c) Connect the positive (+) lead from the battery to terminal 20 and then check that the indicator dims.

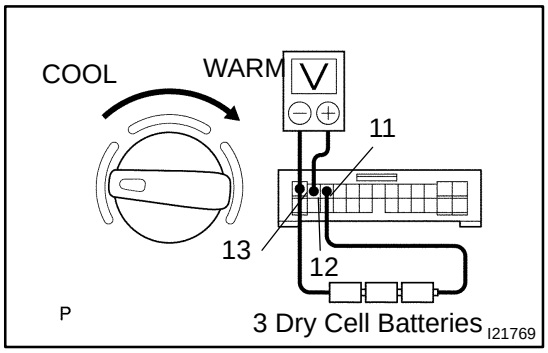
If operation is not as specified, replace the switch circuit board.



7. INSPECT SWITCH CONTINUITY

Check the continuity between terminals while switch is pressed, as shown in the chart.

Switch	Tester connection	Specified condition
A/C	9 - 25	Continuity
RECIRC	7 - 25	Continuity



8. INSPECT TEMPERATURE CONTROL SWITCH OPERATION

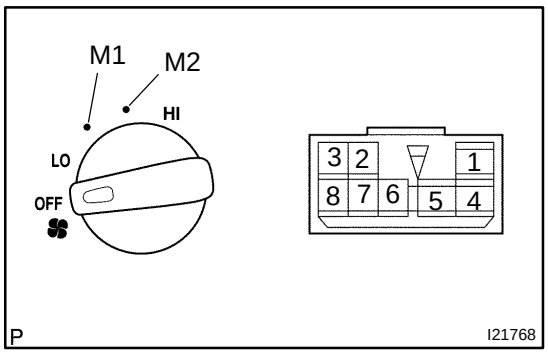
(a) Check that the resistance between terminals 11 and 13 is approx. 3.0 kΩ.

(b) Connect the positive (+) lead from the three 1.5 V dry cell batteries to terminal 11 and negative (-) lead to terminal 13.

(c) Connect the positive (+) lead from the tester to terminal 12 and negative (-) lead to terminal 13.

(d) Gradually turn the switch from ”MAX. WARM” side to ”MAX. COOL” side and check that the voltage increase from 0 to 4.5 V.

If operation is not as specified, replace the heater control base.

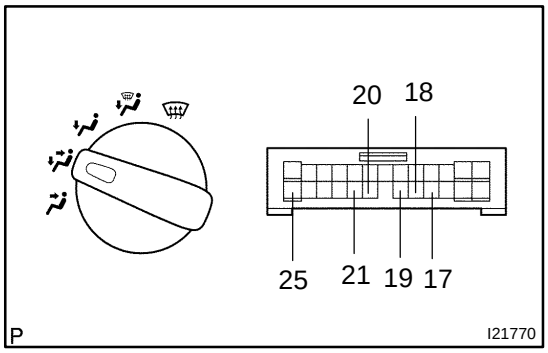


9. INSPECT BLOWER SPEED CONTROL SWITCH OPERATION

Check the continuity between terminals at each switch position as shown in the chart.

Position/ Circuit	Tester connection	Specified condition
OFF	-	No continuity
LO	1 - 8	Continuity
M1	1 - 6 - 8	Continuity
M2	1 - 5 - 8	Continuity
HI	1 - 4 - 8	Continuity

If continuity is not as specified, replace the heater control base.



10. INSPECT MODE SWITCH CONTINUITY

Check the continuity between terminals at each switch position as shown in the chart.

Switch position	Tester connection	Specified condition
FACE	17 - 25	Continuity
B/L	18 - 25	Continuity
FOOT	19 - 25	Continuity
FOOT/DEF.	20 - 25	Continuity
DEF.	21 - 25	Continuity

If continuity is not as specified, replace the switch.

AC0EJ-02

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page AC-94).

AC3F8-01

INSTALLATION

Installation is in the reverse order of removal (See page AC-93).

REAR HEATER CONTROL ASSEMBLY

AC0EO-01

ON-VEHICLE INSPECTION

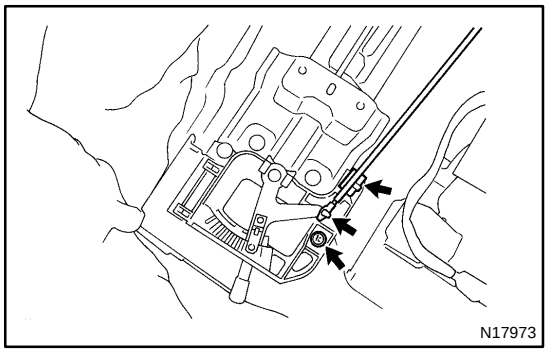
INSPECT HEATER CONTROL LEVER OPERATION

Move the control lever left and right check for stiffness and binding the full range of the lever.

AC0EP-02

REMOVAL

1. REMOVE REAR CONSOL BOX
(See page BO-69)



2. REMOVE HEATER CONTROL ASSEMBLY

(a) Disconnect the control cable.

HINT:

At the time of installation, please refer to the following item.

For installing the control cable refer to ”INSTALLATION”.

(b) Remove the screw and heater control assembly.

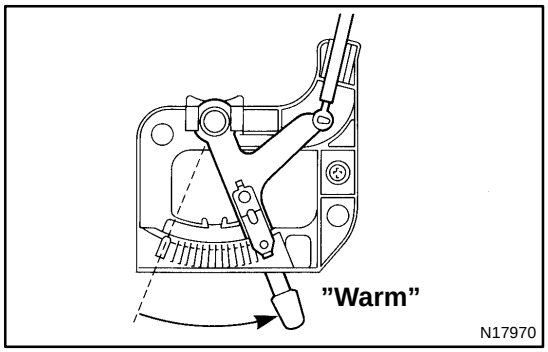
AC0EQ-02

INSTALLATION

Installation is in the reverse order of removal
(See page AC-101).

1. AFTER INSTALLATION, CHECK HEATER CONTROL LEVER OPERATION

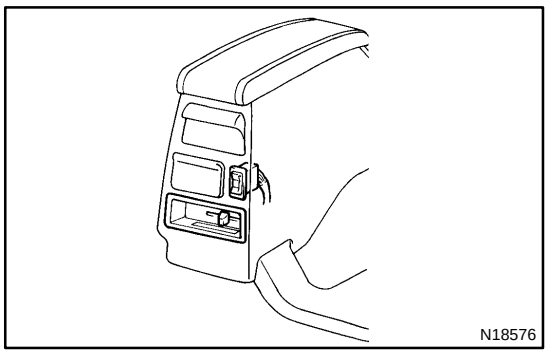
Move the control lever left and right check for stiffness and binding the full range of the lever.
If there is stiffness or binding, proceed next step.



2. ADJUST HEATER CONTROL CABLE

(a) Set damper control lever to ”WARM” position.
(b) Set the rear heater control lever to ”WARM” position, install the control cable and lock the clamp.

HINT:
Lock the clamp during lightly pushing the outer cable in the direction, as shown in the illustration by an arrow.



REAR BLOWER SWITCH

AC23B-01

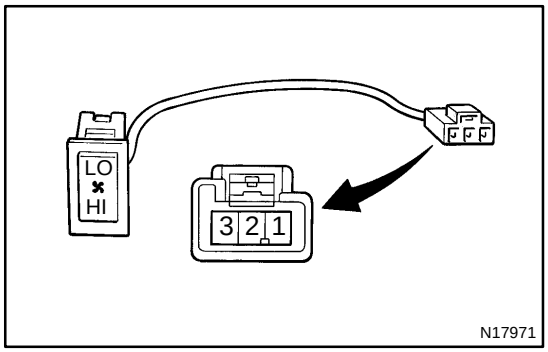
INSPECTION

1. REMOVE REAR BLOWER SWITCH

Using a screwdirver, pry out the switch, then disconnect the connector.

HINT:

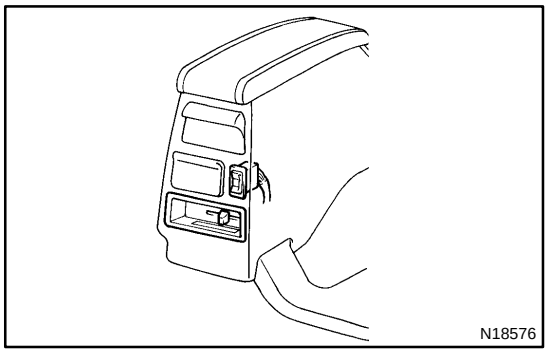
Tape the screwdriver tip before use.



2. INSPECT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	-	No continuity
LO	2 - 3	Continuity
HI	1 - 2 - 3	Continuity

If continuity is not as specified, replace the switch.



3. INSTALL REAR BLOWER RESISTOR

Install the switch, then connect the connector.

FOREWORD

This wiring diagram manual has been prepared to provide information on the electrical system of the 2002 4RUNNER.

Applicable models: VZN180, 185 Series

For service specifications and repair procedures of the above models other than those listed in this manual, refer to the following manuals;

Manual Name	Pub. No.
● 2002 4RUNNER Repair Manual	
Volume 1	RM887U1
Volume 2	RM887U2
● 2002 TOYOTA New Car Features	NCF214U

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All information in this manual is based on the latest product information at the time of publication. However, specifications and procedures are subject to change without notice.

TOYOTA MOTOR CORPORATION

NOTICE

When handling supplemental restraint system components (removal, installation or inspection, etc.), always follow the direction given in the repair manuals listed above to prevent accidents and supplemental restraint system malfunction.

A INTRODUCTION

This manual consists of the following 13 sections:

No.	Section	Description
A	INDEX	Index of the contents of this manual.
	INTRODUCTION	Brief explanation of each section.
B	HOW TO USE THIS MANUAL	Instructions on how to use this manual.
C	TROUBLE-SHOOTING	Describes the basic inspection procedures for electrical circuits.
D	ABBREVIATIONS	Defines the abbreviations used in this manual.
E	GLOSSARY OF TERMS AND SYMBOLS	Defines the symbols and functions of major parts.
F	RELAY LOCATIONS	Shows position of the Electronic Control Unit, Relays, Relay Block, etc. This section is closely related to the system circuit.
G	ELECTRICAL WIRING ROUTING	Describes position of Parts Connectors, Splice points, Ground points, etc. This section is closely related to the system circuit.
H	INDEX	Index of the system circuits.
	SYSTEM CIRCUITS	Electrical circuits of each system are shown from the power supply through ground points. Wiring connections and their positions are shown and classified by code according to the connection method. (Refer to the section, ”How to use this manual”). The ”System Outline” and ”Service Hints” useful for troubleshooting are also contained in this section.
I	GROUND POINT	Shows ground positions of all parts described in this manual.
J	POWER SOURCE (Current Flow Chart)	Describes power distribution from the power supply to various electrical loads.
K	CONNECTOR LIST	Describes the form of the connectors for the parts appeared in this book. This section is closely related to the system circuit.
L	PART NUMBER OF CONNECTORS	Indicates the part number of the connectors used in this manual.
M	OVERALL ELECTRICAL WIRING DIAGRAM	Provides circuit diagrams showing the circuit connections.

This manual provides information on the electrical circuits installed on vehicles by dividing them into a circuit for each system.

The actual wiring of each system circuit is shown from the point where the power source is received from the battery as far as each ground point. (All circuit diagrams are shown with the switches in the OFF position.)

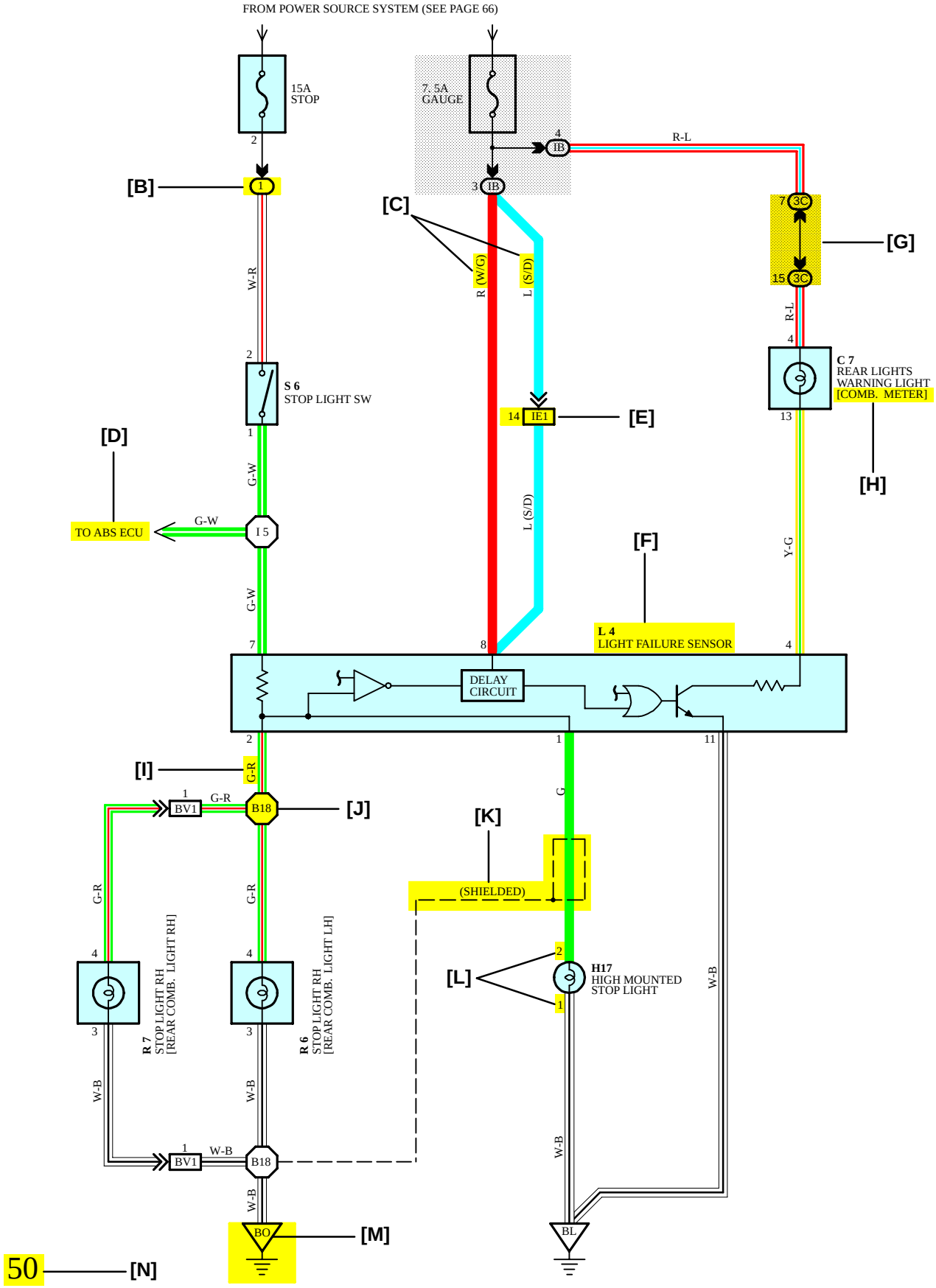
When troubleshooting any problem, first understand the operation of the circuit where the problem was detected (see System Circuit section), the power source supplying power to that circuit (see Power Source section), and the ground points (see Ground Point section). See the System Outline to understand the circuit operation.

When the circuit operation is understood, begin troubleshooting of the problem circuit to isolate the cause. Use Relay Location and Electrical Wiring Routing sections to find each part, junction block and wiring harness connectors, wiring harness and wiring harness connectors, splice points, and ground points of each system circuit. Internal wiring for each junction block is also provided for better understanding of connection within a junction block.
Wiring related to each system is indicated in each system circuit by arrows (from__, to__). When overall connections are required, see the Overall Electrical Wiring Diagram at the end of this manual.

[A]

STOP LIGHT

* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.



[A] : System Title

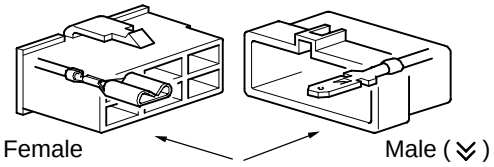
[B] : Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B

Example: (1) Indicates Relay Block No.1

[C] : ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

[D] : Indicates related system.

[E] : Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (»).
Outside numerals are pin numbers.



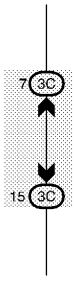
The first letter of the code for each wiring harness and wiring harness connector(s) indicates the component's location, e.g, "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

When more than one code has the first and second letters in common, followed by numbers (e.g, IH1, IH2), this indicates the same type of wiring harness and wiring harness connector.

[F] : Represents a part (all parts are shown in sky blue). The code is the same as the code used in parts position.

[G] : Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts.

Example:



3C indicates that it is inside Junction Block No.3

[H] : When 2 parts both use one connector in common, the parts connector name used in the wire routing section is shown in square brackets [ ].

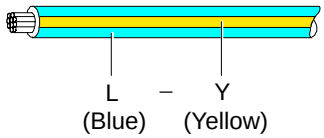
[I] : Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

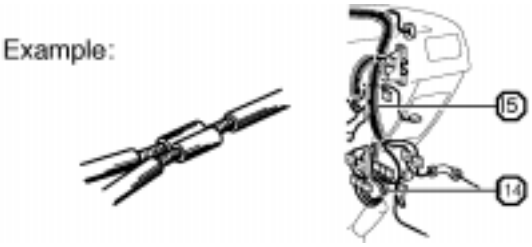
B	= Black	W	= White	BR	= Brown
L	= Blue	V	= Violet	SB	= Sky Blue
R	= Red	G	= Green	LG	= Light Green
P	= Pink	Y	= Yellow	GR	= Gray
O	= Orange				

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

Example: L - Y

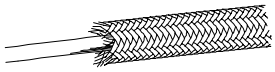


[J] : Indicates a wiring Splice Point (Codes are "E" for the Engine Room, "I" for the Instrument Panel, and "B" for the Body).



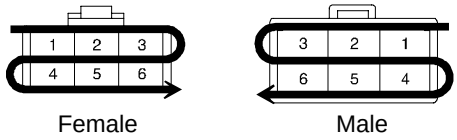
The Location of splice Point I 5 is indicated by the shaded section.

[K] : Indicates a shielded cable.



[L] : Indicates the pin number of the connector.
The numbering system is different for female and male connectors.

Example:



[M] : Indicates a ground point.

The first letter of the code for each ground point(s) indicates the component's location, e.g, "E" for the Engine Compartment, "I" for the Instrument Panel and Surrounding area, and "B" for the Body and Surrounding area.

[N] : Page No.

[O] **SYSTEM OUTLINE**

Current is applied at all times through the STOP fuse to TERMINAL 2 of the stop light SW.
When the ignition SW is turned on, current flows from the GAUGE fuse to TERMINAL 8 of the light failure sensor, and also flows through the rear lights warning light to TERMINAL 4 of the light failure sensor.

STOP LIGHT DISCONNECTION WARNING

When the ignition SW is turned on and the brake pedal is pressed (Stop light SW on), if the stop light circuit is open, the current flowing from TERMINAL 7 of the light failure sensor to TERMINALS 1, 2 changes, so the light failure sensor detects the disconnection and the warning circuit of the light failure sensor is activated.
As a result, the current flows from TERMINAL 4 of the light failure sensor to TERMINAL 11 to GROUND and turns the rear lights warning light on. By pressing the brake pedal, the current flowing to TERMINAL 8 of the light failure sensor keeps the warning circuit on and holds the warning light on until the ignition SW is turned off.

[P] **SERVICE HINTS**

S6 STOP LIGHT SW

2-1 : Closed with the brake pedal depressed

L4 LIGHT FAILURE SENSOR

1, 2, 7-GROUND : Approx. **12** volts with the stop light SW on
4, 8-GROUND : Approx. **12** volts with the ignition SW at **ON** position
11-GROUND : Always continuity

[Q] **: PARTS LOCATION**

Code	See Page	Code	See Page	Code	See Page
C7	34	L4	36	R7	37
H17	36	R6	37	S6	35

[R] **: RELAY BLOCKS**

Code	See Page	Relay Blocks (Relay Block Location)
1	18	R/B No.1 (Instrument Panel Left)

[S] **: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR**

Code	See Page	Junction Block and Wire Harness (Connector Location)
IB	20	Instrument Panel Wire and Instrument Panel J/B (Lower Finish Panel)
3C	22	Instrument Panel Wire and J/B No.3 (Instrument Panel Left Side)

[T] **: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS**

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	42	Floor Wire and Instrument Panel Wire (Left Kick Panel)
BV1	50	Luggage Room Wire and Floor Wire (Luggage Compartment Left)

[U] **: GROUND POINTS**

Code	See Page	Ground Points Location
BL	50	Under the Left Quarter Pillar
BO	50	Back Panel Center

[V] **: SPLICE POINTS**

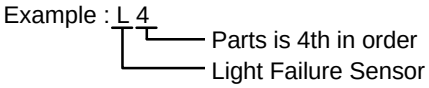
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I5	44	Cowl Wire	B18	50	Luggage Room Wire

[O] : Explains the system outline.

[P] : Indicates values or explains the function for reference during troubleshooting.

[Q] : Indicates the reference page showing the position on the vehicle of the parts in the system circuit.

Example : Part ”L4” (Light Failure Sensor) is on page 36 of the manual.
∗ The letter in the code is from the first letter of the part, and the number indicates its order in parts starting with that letter.



[R] : Indicates the reference page showing the position on the vehicle of Relay Block Connectors in the system circuit.

Example : Connector ”1” is described on page 18 of this manual and is installed on the left side of the instrument panel.

[S] : Indicates the reference page showing the position on the vehicle of J/B and Wire Harness in the system circuit.

Example : Connector ”3C” connects the Instrument Panel Wire and J/B No.3. It is described on page 22 of this manual, and is installed on the instrument panel left side.

[T] : Indicates the reference page describing the wiring harness and wiring harness connector (the female wiring harness is shown first, followed by the male wiring harness).

Example : Connector ”IE1” connects the floor wire (female) and Instrument panel wire (male). It is described on page 42 of this manual, and is installed on the left side kick panel.

[U] : Indicates the reference page showing the position of the ground points on the vehicle.

Example : Ground point ”BO” is described on page 50 of this manual and is installed on the back panel center.

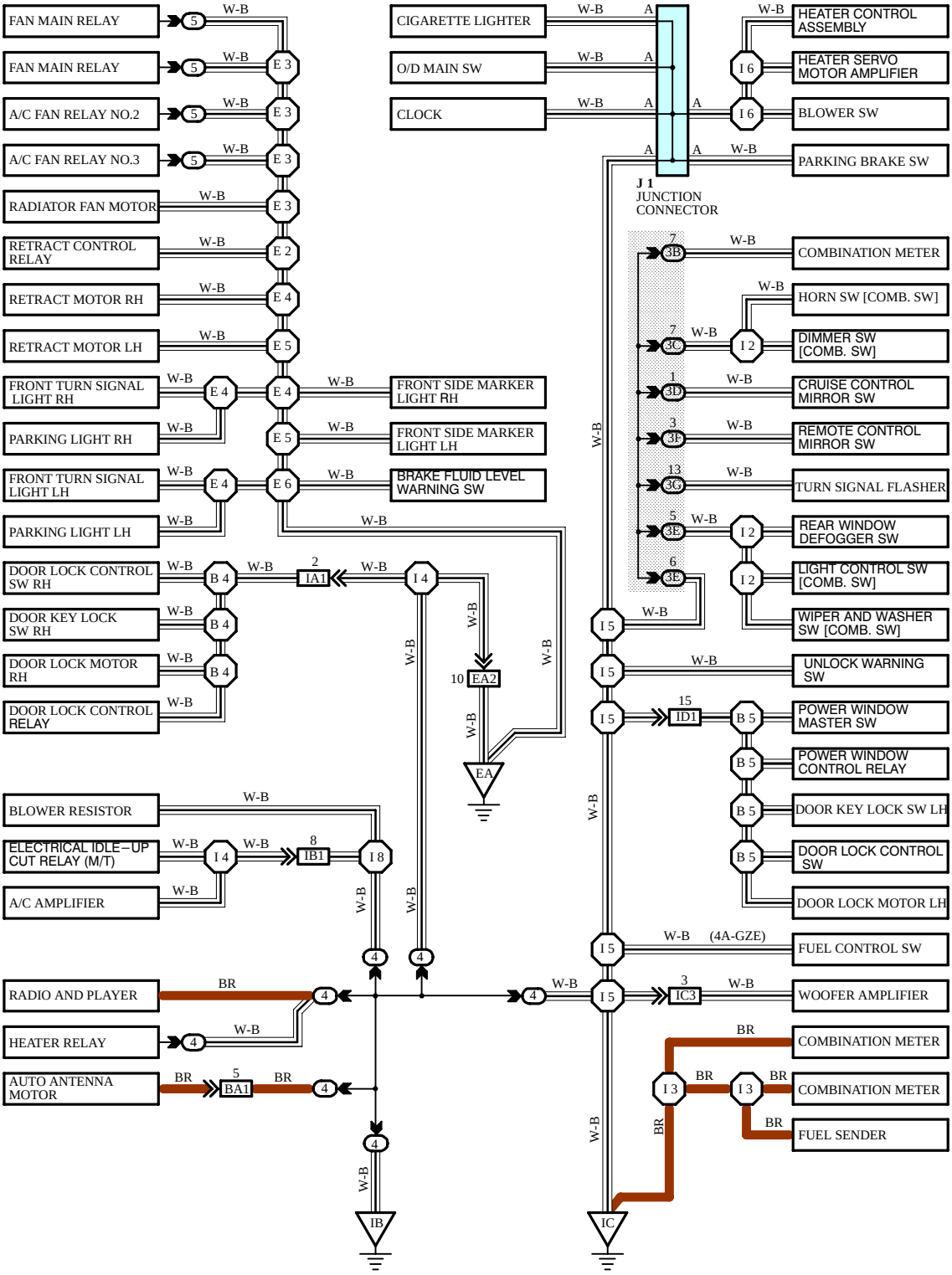
[V] : Indicates the reference page showing the position of the splice points on the vehicle.

Example : Splice point ”I5” is on the Cowl Wire Harness and is described on page 44 of this manual.

B HOW TO USE THIS MANUAL

The ground points circuit diagram shows the connections from all major parts to the respective ground points. When troubleshooting a faulty ground point, checking the system circuits which use a common ground may help you identify the problem ground quickly. The relationship between ground points (EA , IB and IC shown below) can also be checked this way.

I GROUND POINT

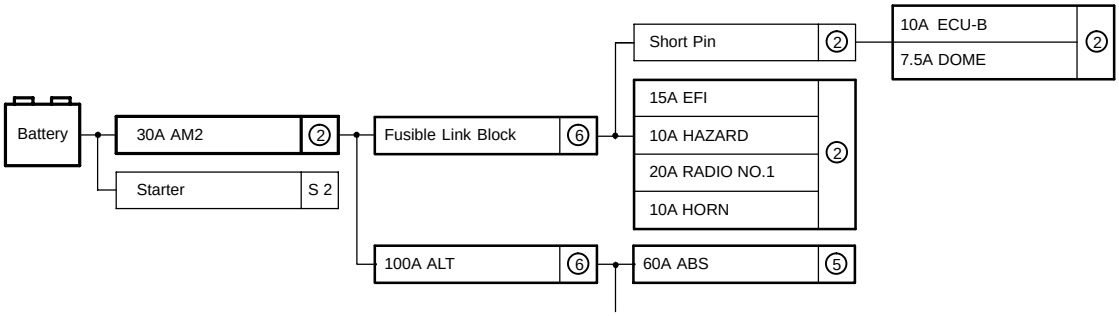


* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

The ”Current Flow Chart” section, describes which parts each power source (fuses, fusible links, and circuit breakers) transmits current to. In the Power Source circuit diagram, the conditions when battery power is supplied to each system are explained. Since all System Circuit diagrams start from the power source, the power source system must be fully understood.

J POWER SOURCE (Current Flow Chart)

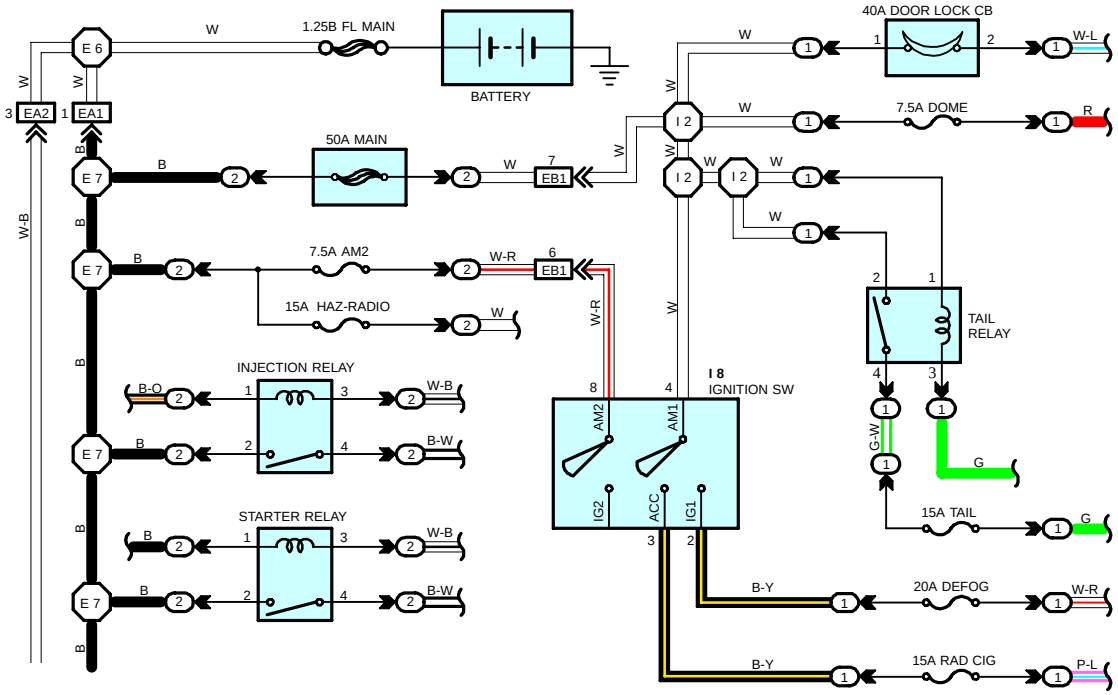
The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.



Engine Room R/B (See Page 20)

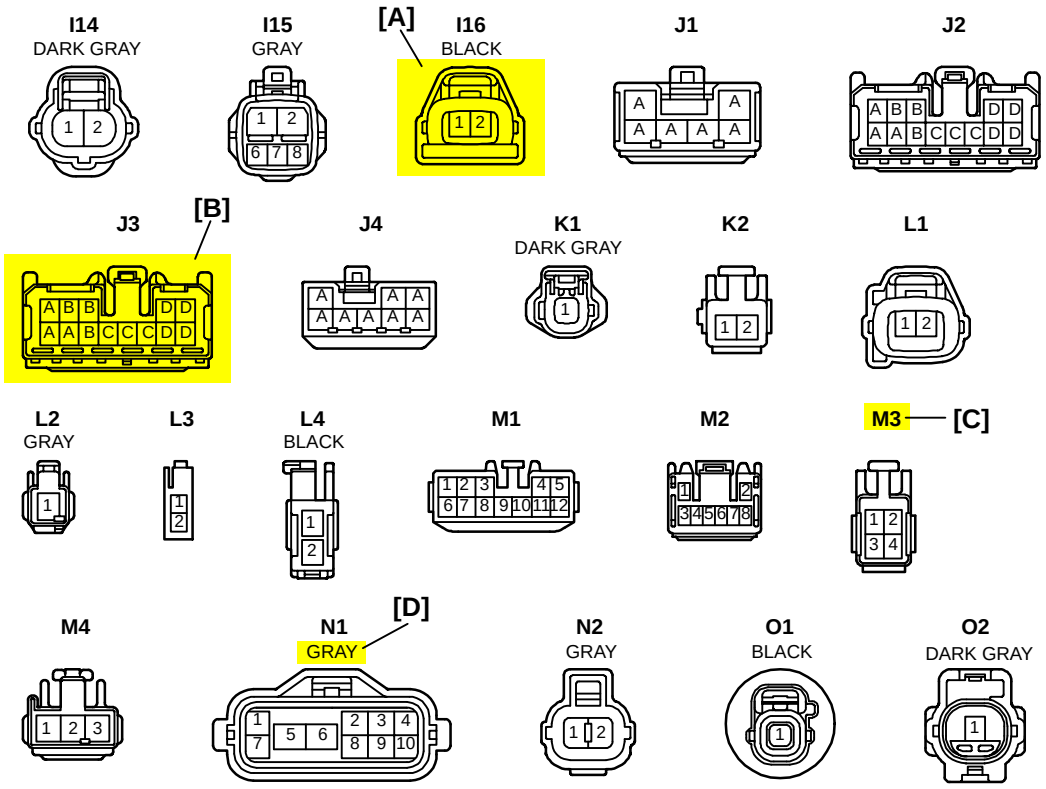
Fuse		System	Page
20A	STOP	ABS ABS and Traction Control Cruise Control Electronically Controlled Transmission and A/T Indicator Multiplex Communication System	194 187 180 166 210
10A	DOME	Cigarette Lighter and Clock Combination Meter Headlight Interior Light Key Reminder and Seat Belt Warning Light Auto Turn Off	214 230 112 122

POWER SOURCE



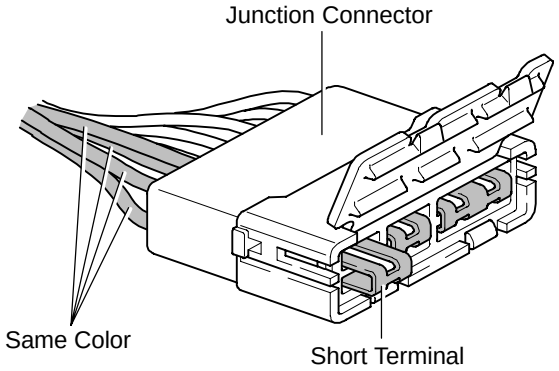
* The system shown here is an EXAMPLE ONLY. It is different to the actual circuit shown in the SYSTEM CIRCUITS SECTION.

K CONNECTOR LIST



[A] : Indicates connector to be connected to a part. (The numeral indicates the pin No.)

[B] : Junction Connector
Indicates a connector which is connected to a short terminal.



Junction connector in this manual include a short terminal which is connected to a number of wire harnesses. Always perform inspection with the short terminal installed. (When installing the wire harnesses, the harnesses can be connected to any position within the short terminal grouping. Accordingly, in other vehicles, the same position in the short terminal may be connected to a wire harness from a different part.)
Wire harness sharing the same short terminal grouping have the same color.

[C] : Parts Code
The first letter of the code is taken from the first letter of part, and the numbers indicates its order in parts which start with the same letter.

[D] : Connector Color
Connectors not indicated are milky white in color.

L PART NUMBER OF CONNECTORS

Code	Part Name	Part Number
A 1	A/C Ambient Temp. Sensor	90980-11070
A 2	A/C Condenser Fan Motor	90980-11237
A 3	A/C Condenser Fan Relay	90980-10940
A 4	A/C Triple Pressure SW (A/C Dual and Single Pressure SW)	90980-10943
[A]	A/T Oil Temp. Sensor [B]	909 [C] 413
A 6	ABS Actuator	90980-11151
A 7	ABS Actuator	90980-11009
A 8	ABS Speed Sensor Front LH	90980-10941
A 9	ABS Speed Sensor Front RH	90980-11002
A10	Airbag Sensor Front LH	90980-11856
A11	Airbag Sensor Front RH	
A12		90980-11194
		90980-11

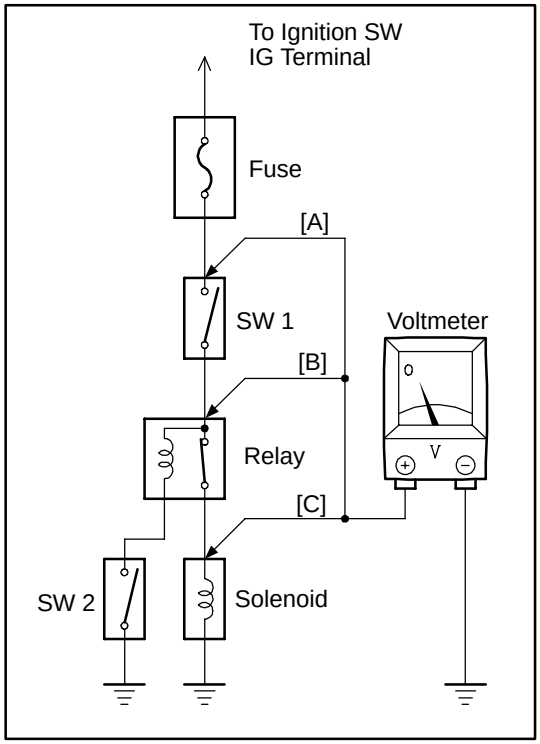
Code	Part Name	Part Number
D 4	Diode (Door Courtesy Light)	90980-11608
D 5	Diode (Key Off Operation)	90980-10962
D 6	Diode (Luggage Compartment Light)	90980-11608
D 7	Door Lock Control Relay	90980-10848
D 8	Door Courtesy Light LH	90980-11148
D 9	Door Courtesy Light RH	
D10	Door Courtesy SW LH	90980-11097
D11	Door Courtesy SW RH	
D12	Door Courtesy SW Front LH	90980-11156
D13	Door Courtesy SW Front RH	
D14	Door Courtesy SW Rear LH	
D15	Door Courtesy SW Rear RH	
D16	nd Unlock SW LH	90980-11170
	RH	

[A] : Part Code

[B] : Part Name

[C] : Part Number
Toyota Part Number are indicated.

Not all of the above part numbers of the connector are established for the supply. In case of ordering a connector or terminal with wire, please confirm in advance if there is supply for it using “Parts Catalog News” (published by Parts Engineering Administration Dept.).

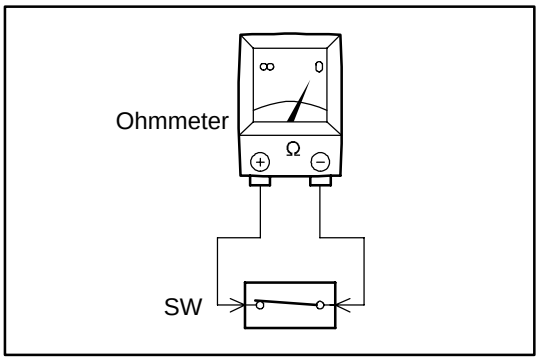


VOLTAGE CHECK

(a) Establish conditions in which voltage is present at the check point.

Example:
[A] - Ignition SW on
[B] - Ignition SW and SW 1 on
[C] - Ignition SW, SW 1 and Relay on (SW 2 off)

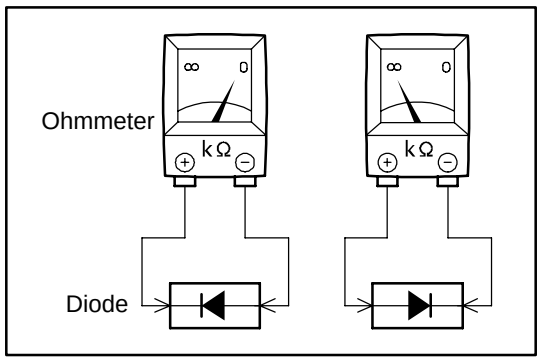
(b) Using a voltmeter, connect the negative lead to a good ground point or negative battery terminal, and the positive lead to the connector or component terminal.
This check can be done with a test light instead of a voltmeter.



CONTINUITY AND RESISTANCE CHECK

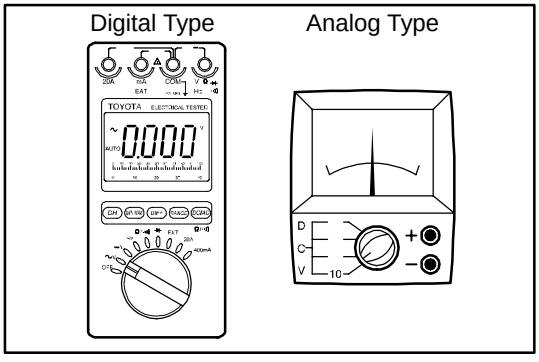
(a) Disconnect the battery terminal or wire so there is no voltage between the check points.

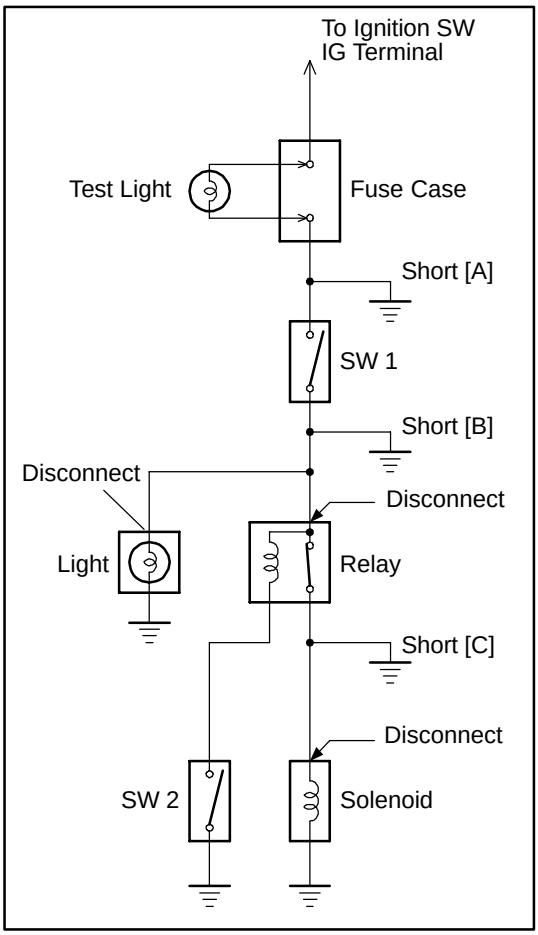
(b) Contact the two leads of an ohmmeter to each of the check points.



If the circuit has diodes, reverse the two leads and check again.
When contacting the negative lead to the diode positive side and the positive lead to the negative side, there should be continuity.
When contacting the two leads in reverse, there should be no continuity.

(c) Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting of the electrical circuit.





FINDING A SHORT CIRCUIT

(a) Remove the blown fuse and disconnect all loads of the fuse.

(b) Connect a test light in place of the fuse.

(c) Establish conditions in which the test light comes on.

Example:

[A] - Ignition SW on
[B] - Ignition SW and SW 1 on
[C] - Ignition SW, SW 1 and Relay on (Connect the Relay) and SW 2 off (or Disconnect SW 2)

(d) Disconnect and reconnect the connectors while watching the test light.
The short lies between the connector where the test light stays lit and the connector where the light goes out.

(e) Find the exact location of the short by lightly shaking the problem wire along the body.

CAUTION:

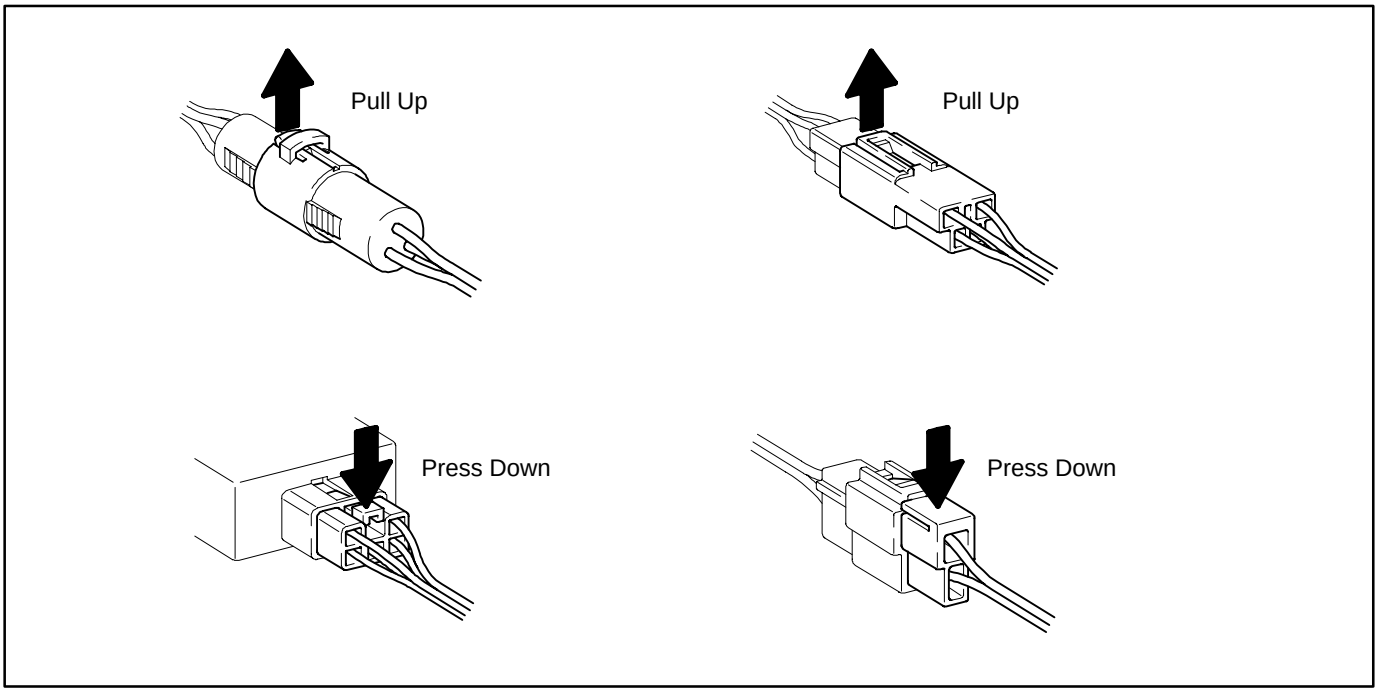
(a) Do not open the cover or the case of the ECU unless absolutely necessary. (If the IC terminals are touched, the IC may be destroyed by static electricity.)

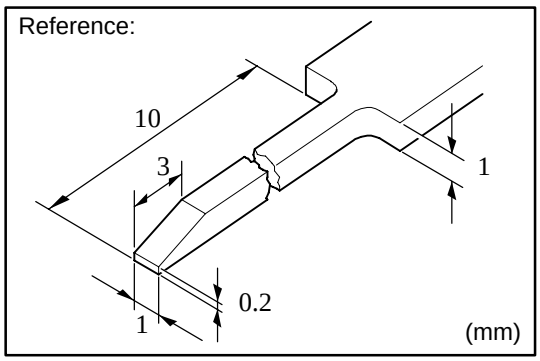
(b) When replacing the internal mechanism (ECU part) of the digital meter, be careful that no part of your body or clothing comes in contact with the terminals of leads from the IC, etc. of the replacement part (spare part).

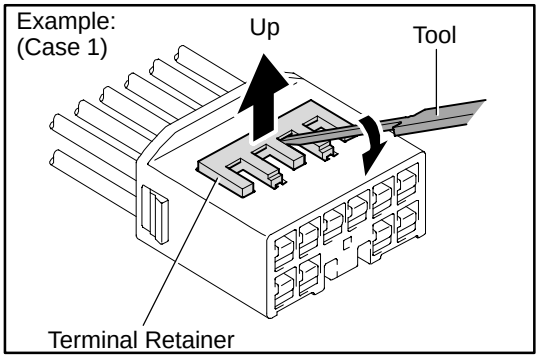
DISCONNECTION OF MALE AND FEMALE CONNECTORS

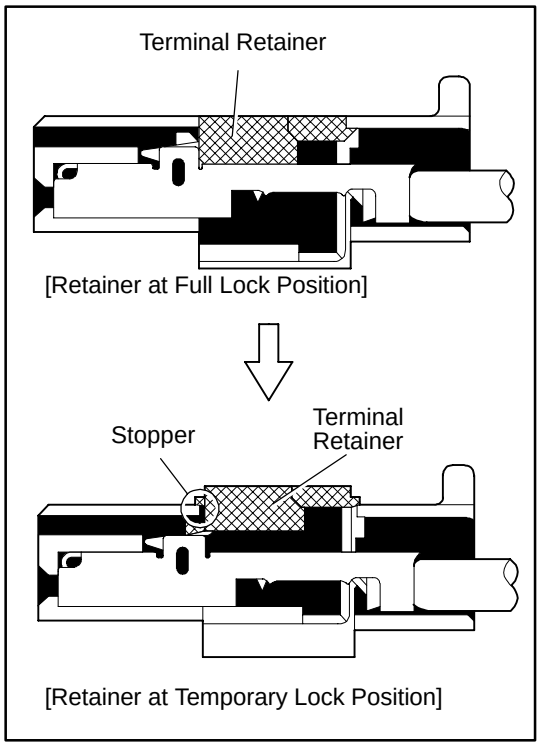
To pull apart the connectors, pull on the connector itself, not the wire harness.

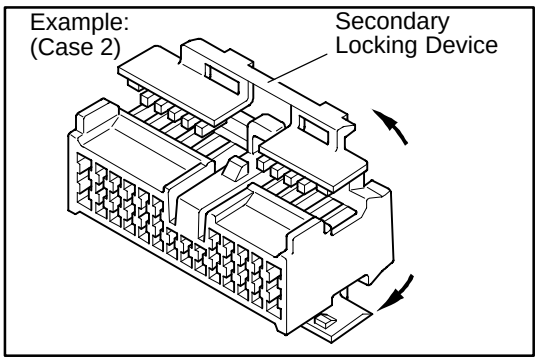
HINT : Check to see what kind of connector you are disconnecting before pulling apart.











HOW TO REPLACE TERMINAL (with terminal retainer or secondary locking device)

1. PREPARE THE SPECIAL TOOL

   HINT : To remove the terminal from the connector, please construct and use the special tool or like object shown on the left.

2. DISCONNECT CONNECTOR

3. DISENGAGE THE SECONDARY LOCKING DEVICE OR TERMINAL RETAINER.

   (a) Locking device must be disengaged before the terminal locking clip can be released and the terminal removed from the connector.

   (b) Use a special tool or the terminal pick to unlock the secondary locking device or terminal retainer.

   NOTICE:
   Do not remove the terminal retainer from connector body.

   [A] For Non-Waterproof Type Connector

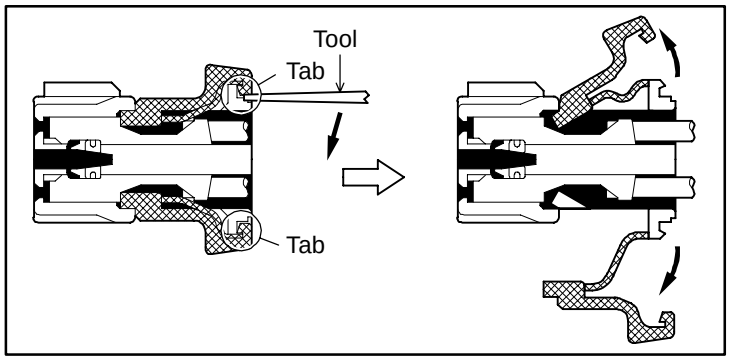
   HINT : The needle insertion position varies according to the connector's shape (number of terminals etc.), so check the position before inserting it.

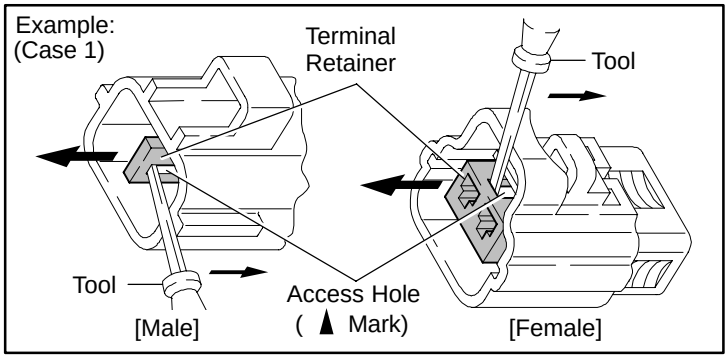
   "Case 1"

   Raise the terminal retainer up to the temporary lock position.

   "Case 2"

   Open the secondary locking device.



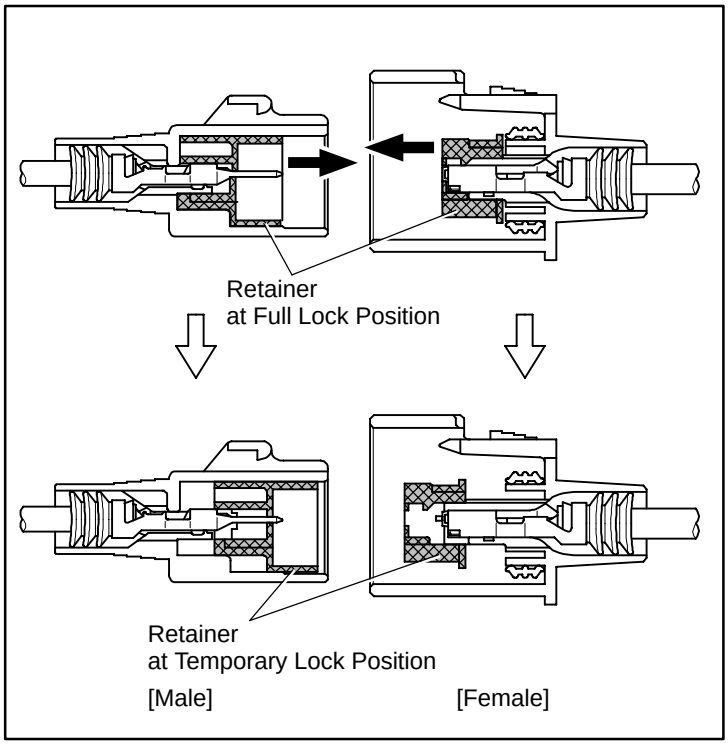


[B] For Waterproof Type Connector

HINT : Terminal retainer color is different according to connector body.

Example:

Terminal Retainer	: Connector Body
Black or White	: Gray
Black or White	: Dark Gray
Gray or White	: Black

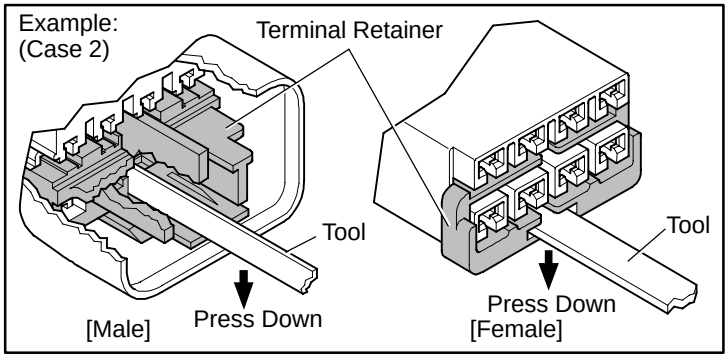


”Case 1”

Type where terminal retainer is pulled up to the temporary lock position (Pull Type).

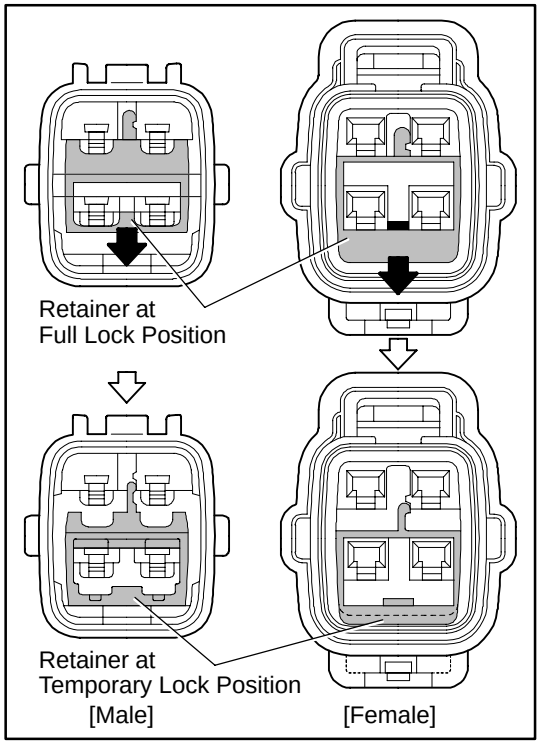
Insert the special tool into the terminal retainer access hole (▲Mark) and pull the terminal retainer up to the temporary lock position.

HINT : The needle insertion position varies according to the connector’s shape (Number of terminals etc.), so check the position before inserting it.

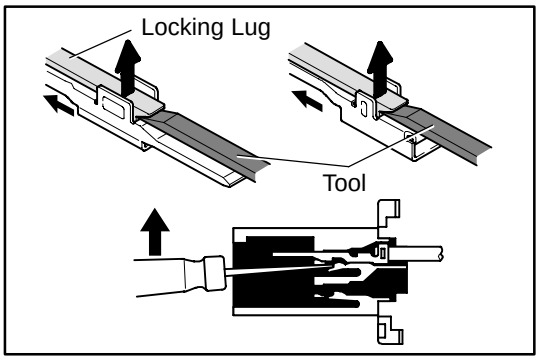


”Case 2”

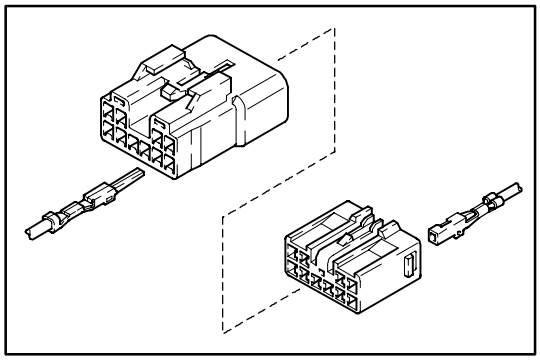
Type which cannot be pulled as far as Power Lock insert the tool straight into the access hole of terminal retainer as shown.



Push the terminal retainer down to the temporary lock position.



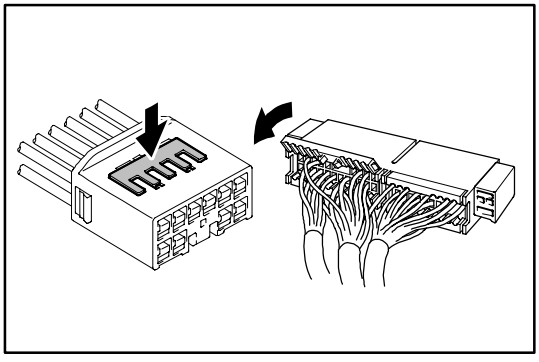
(c) Release the locking lug from terminal and pull the terminal out from rear.



4. INSTALL TERMINAL TO CONNECTOR

(a) Insert the terminal.

HINT:
1. Make sure the terminal is positioned correctly.
2. Insert the terminal until the locking lug locks firmly.
3. Insert the terminal with terminal retainer in the temporary lock position.



(b) Push the secondary locking device or terminal retainer in to the full lock position.

5. CONNECT CONNECTOR

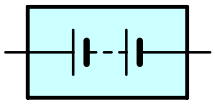
ABBREVIATIONS

The following abbreviations are used in this manual.

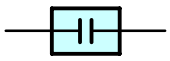
ABS	=	Anti-Lock Brake System
A/C	=	Air Conditioning
ADD	=	Automatic Disconnecting Differential
A/T	=	Automatic Transmission
COMB.	=	Combination
DIFF.	=	Differential
ECU	=	Electronic Control Unit
ESA	=	Electronic Spark Advance
EVAP	=	Evaporative Emission
J/B	=	Junction Block
LH	=	Left-Hand
O/D	=	Overdrive
R/B	=	Relay Block
RH	=	Right-Hand
SFI	=	Sequential Multiport Fuel Injection
SRS	=	Supplemental Restraint System
SW	=	Switch
TEMP.	=	Temperature
TRAC	=	Traction Control
VSC	=	Vehicle Skid Control
VSV	=	Vacuum Switching Valve
w/	=	With
w/o	=	Without
2WD	=	Two Wheel Drive
4WD	=	Four Wheel Drive

* The titles given inside the components are the names of the terminals (terminal codes) and are not treated as being abbreviations.

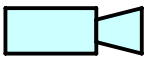
E GLOSSARY OF TERMS AND SYMBOLS



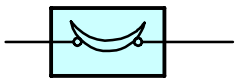
BATTERY
Stores chemical energy and converts it into electrical energy. Provides DC current for the auto's various electrical circuits.



CAPACITOR (Condenser)
A small holding unit for temporary storage of electrical voltage.



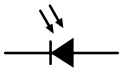
CIGARETTE LIGHTER
An electric resistance heating element.



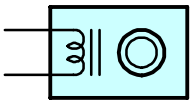
CIRCUIT BREAKER
Basically a reusable fuse, a circuit breaker will heat and open if too much current flows through it. Some units automatically reset when cool, others must be manually reset.

DIODE
A semiconductor which allows current flow in only one direction.

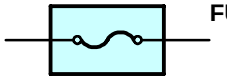
DIODE, ZENER
A diode which allows current flow in one direction but blocks reverse flow only up to a specific voltage. Above that potential, it passes the excess voltage. This acts as a simple voltage regulator.



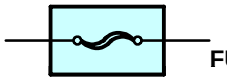
PHOTODIODE
The photodiode is a semiconductor which controls the current flow according to the amount of light.



DISTRIBUTOR, IIA
Channels high-voltage current from the ignition coil to the individual spark plugs.

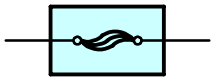


FUSE
A thin metal strip which burns through when too much current flows through it, thereby stopping current flow and protecting a circuit from damage.



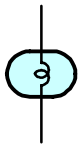
(for Medium Current Fuse)

FUSIBLE LINK
A heavy-gauge wire placed in high amperage circuits which burns through on overloads, thereby protecting the circuit. The numbers indicate the crosssection surface area of the wires.



(for High Current Fuse or Fusible Link)

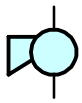
GROUND
The point at which wiring attaches to the Body, thereby providing a return path for an electrical circuit; without a ground, current cannot flow.



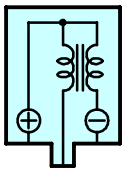
1. SINGLE FILAMENT

2. DOUBLE FILAMENT

HEADLIGHTS
Current flow causes a headlight filament to heat up and emit light. A headlight may have either a single (1) filament or a double (2) filament



HORN
An electric device which sounds a loud audible signal.



IGNITION COIL
Converts low-voltage DC current into high-voltage ignition current for firing the spark plugs.

LIGHT
Current flow through a filament causes the filament to heat up and emit light.

LED (LIGHT EMITTING DIODE)
Upon current flow, these diodes emit light without producing the heat of a comparable light.

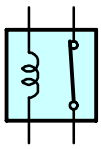
METER, ANALOG
Current flow activates a magnetic coil which causes a needle to move, thereby providing a relative display against a background calibration.

METER, DIGITAL
Current flow activates one or many LED's, LCD's, or fluorescent displays, which provide a relative or digital display.

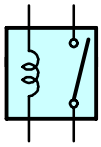
MOTOR
A power unit which converts electrical energy into mechanical energy, especially rotary motion.

RELAY

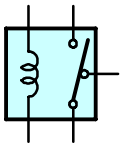
Basically, an electrically operated switch which may be normally closed (1) or open (2). Current flow through a small coil creates a magnetic field which either opens or closes an attached switch.



1. NORMALLY CLOSED

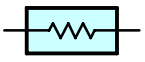


2. NORMALLY OPEN



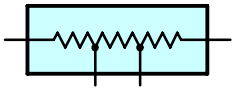
RELAY, DOUBLE THROW

A relay which passes current through one set of contacts or the other.



RESISTOR

An electrical component with a fixed resistance, placed in a circuit to reduce voltage to a specific value.

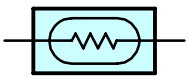


RESISTOR, TAPPED

A resistor which supplies two or more different non adjustable resistance values.

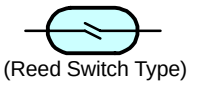
RESISTOR, VARIABLE or RHEOSTAT

A controllable resistor with a variable rate of resistance.
Also called a potentiometer or rheostat.



SENSOR (Thermistor)

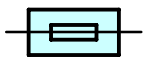
A resistor which varies its resistance with temperature.



(Reed Switch Type)

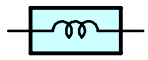
SENSOR, SPEED

Uses magnetic impulses to open and close a switch to create a signal for activation of other components.



SHORT PIN

Used to provide an unbroken connection within a junction block.



SOLENOID

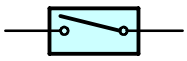
An electromagnetic coil which forms a magnetic field when current flows, to move a plunger, etc.

SPEAKER

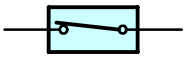
An electromechanical device which creates sound waves from current flow.

SWITCH, MANUAL

Opens and closes circuits, thereby stopping (1) or allowing (2) current flow.



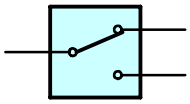
1. NORMALLY OPEN



2. NORMALLY CLOSED

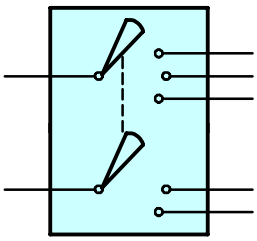
SWITCH, DOUBLE THROW

A switch which continuously passes current through one set of contacts or the other.



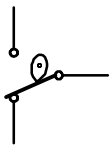
SWITCH, IGNITION

A key operated switch with several positions which allows various circuits, particularly the primary ignition circuit, to become operational.



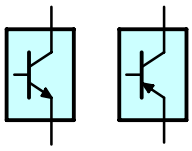
SWITCH, WIPER PARK

Automatically returns wipers to the stop position when the wiper switch is turned off.



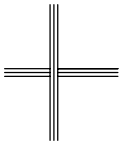
TRANSISTOR

A solidstate device typically used as an electronic relay; stops or passes current depending on the voltage applied at "base".

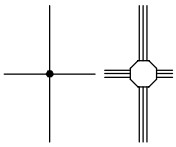


WIRES

Wires are always drawn as straight lines on wiring diagrams.
Crossed wires (1) without a black dot at the junction are not joined;
crossed wires (2) with a black dot or octagonal ( ) mark at the junction are spliced (joined) connections.



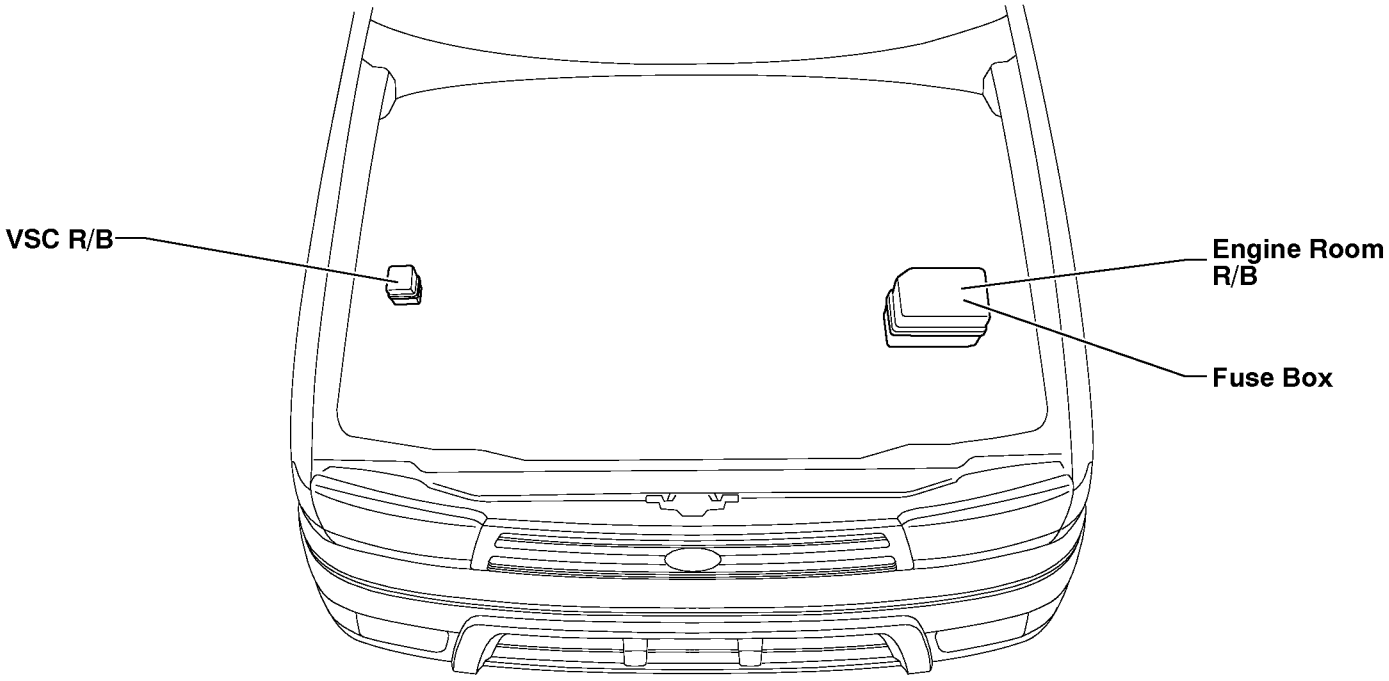
(1) NOT CONNECTED



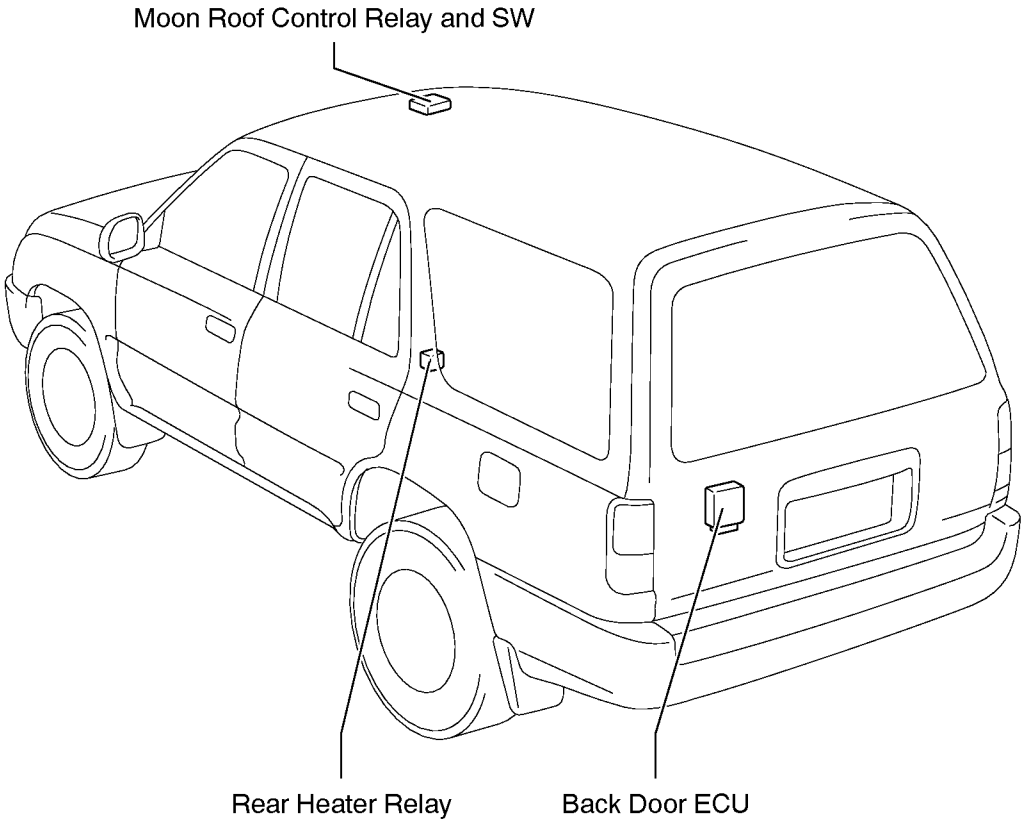
(2) SPLICED

F RELAY LOCATIONS

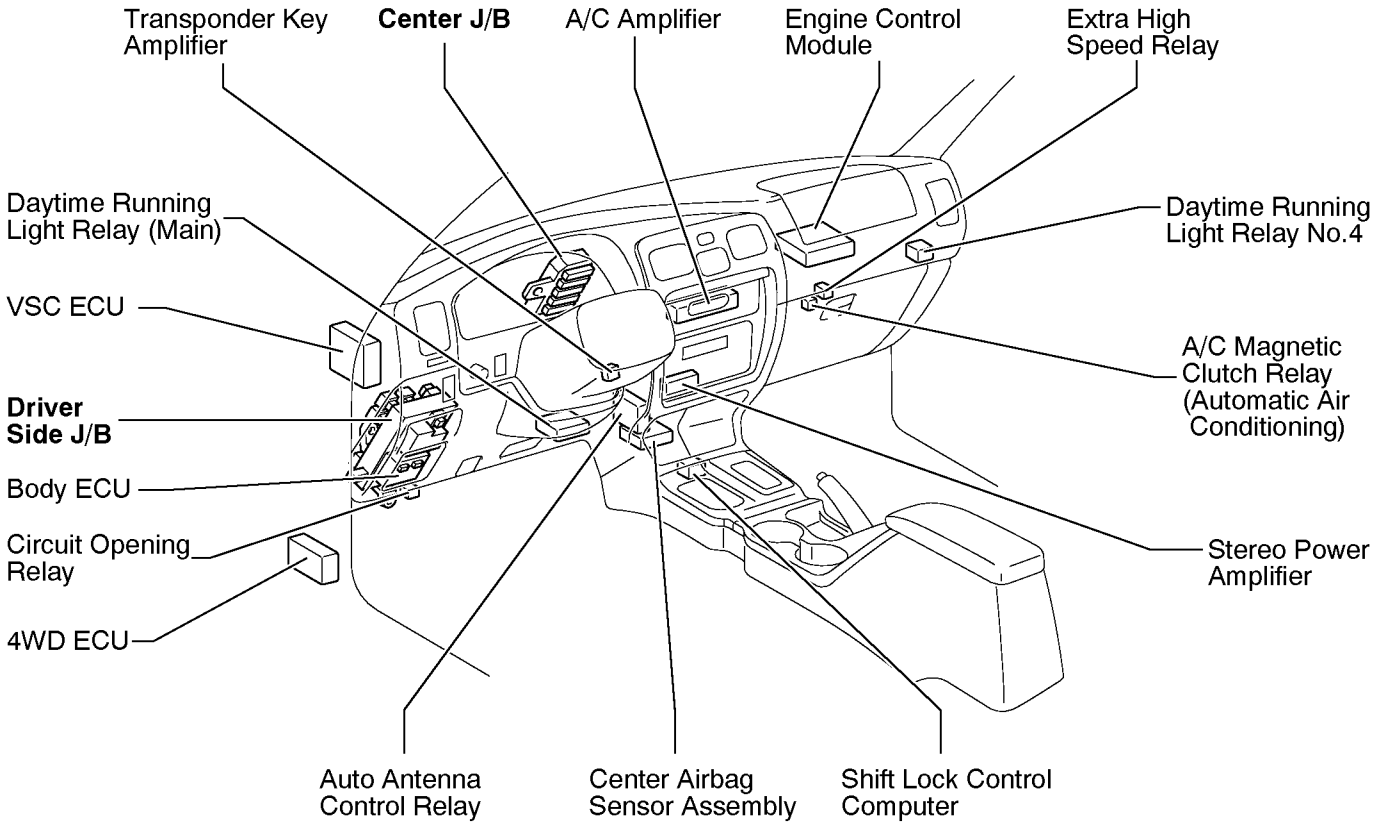
[Engine Compartment]



[Body]

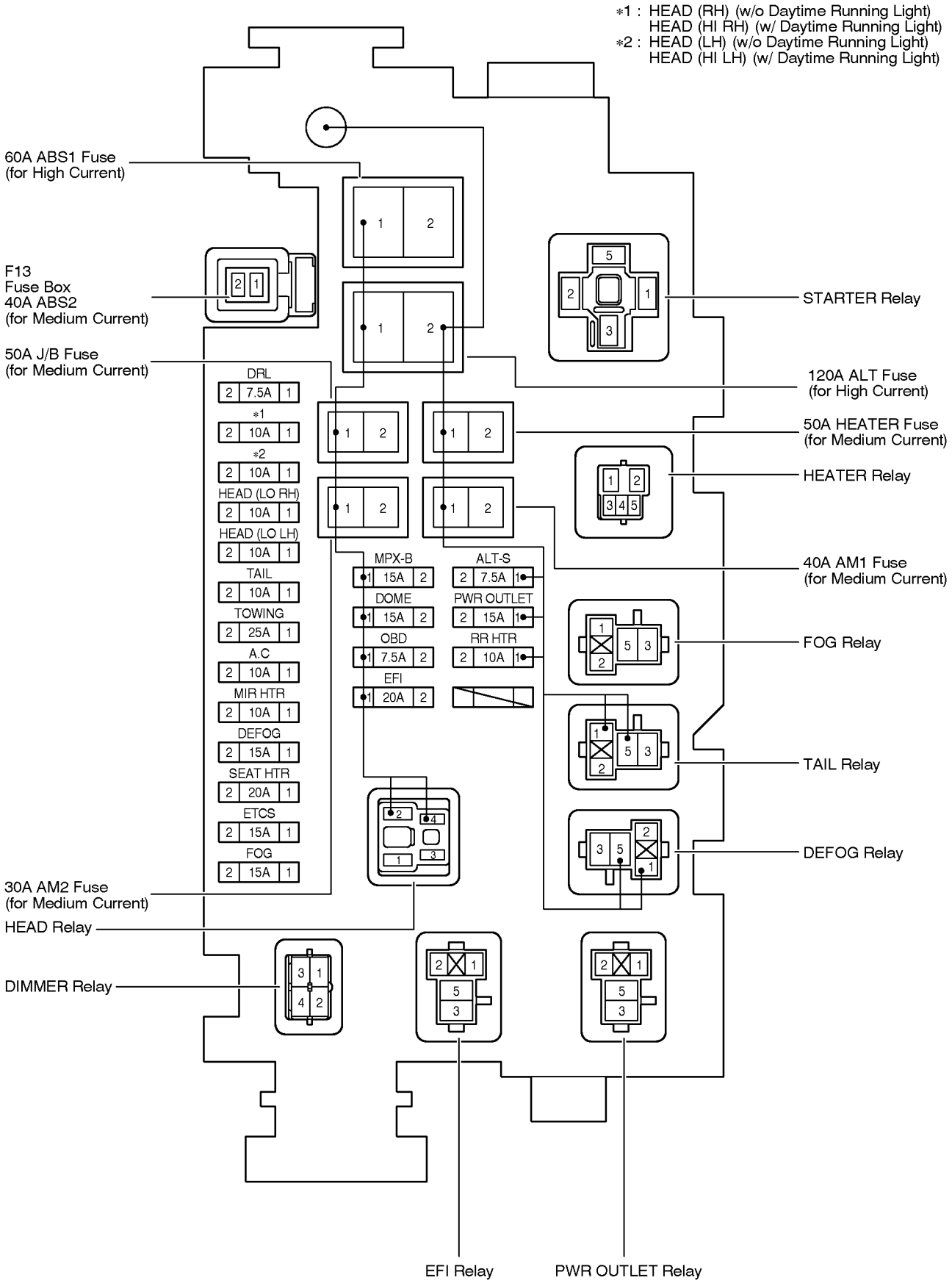


[Instrument Panel]

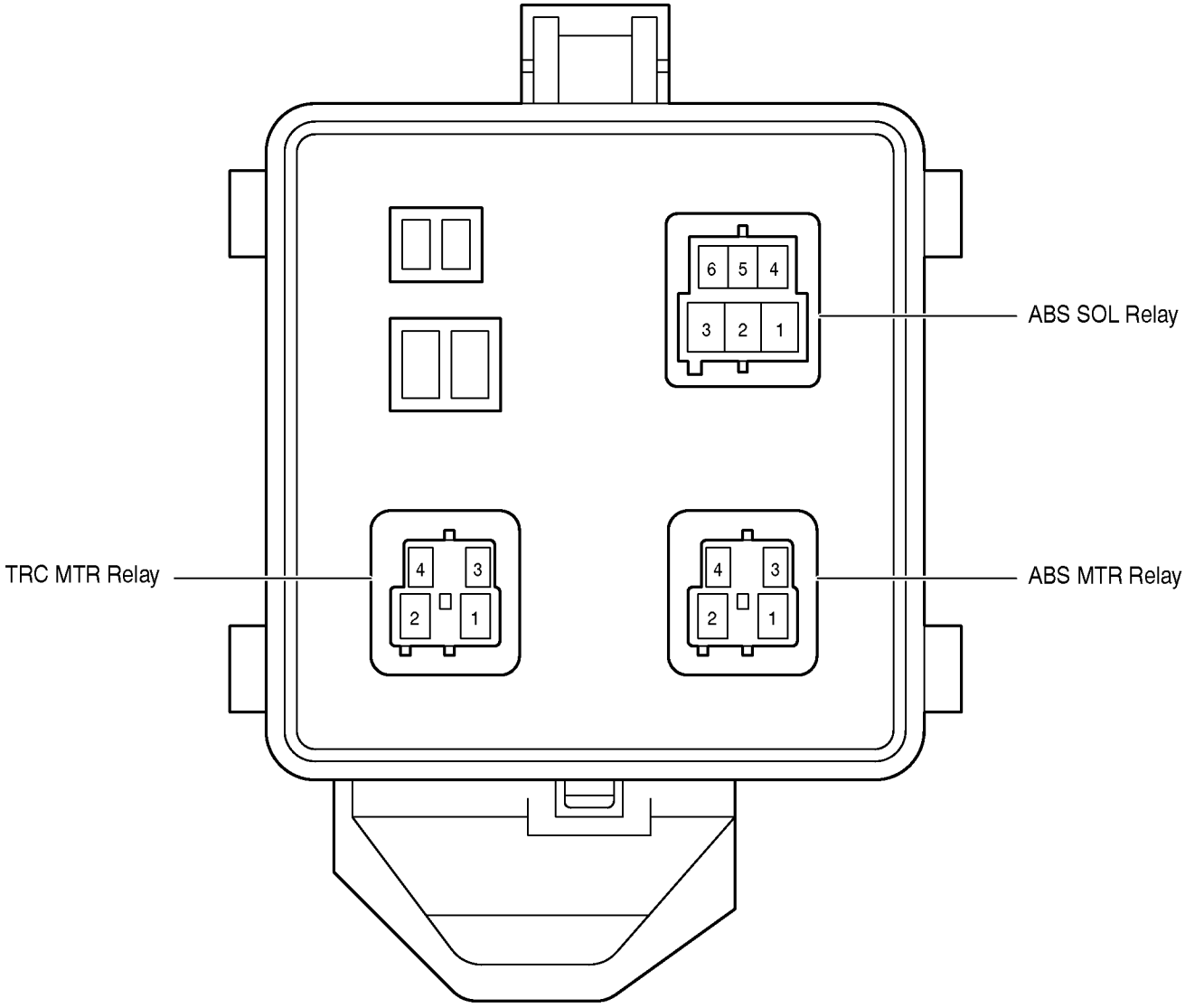


F RELAY LOCATIONS

② : Engine Room R/B	Engine Compartment Left (See Page 20)

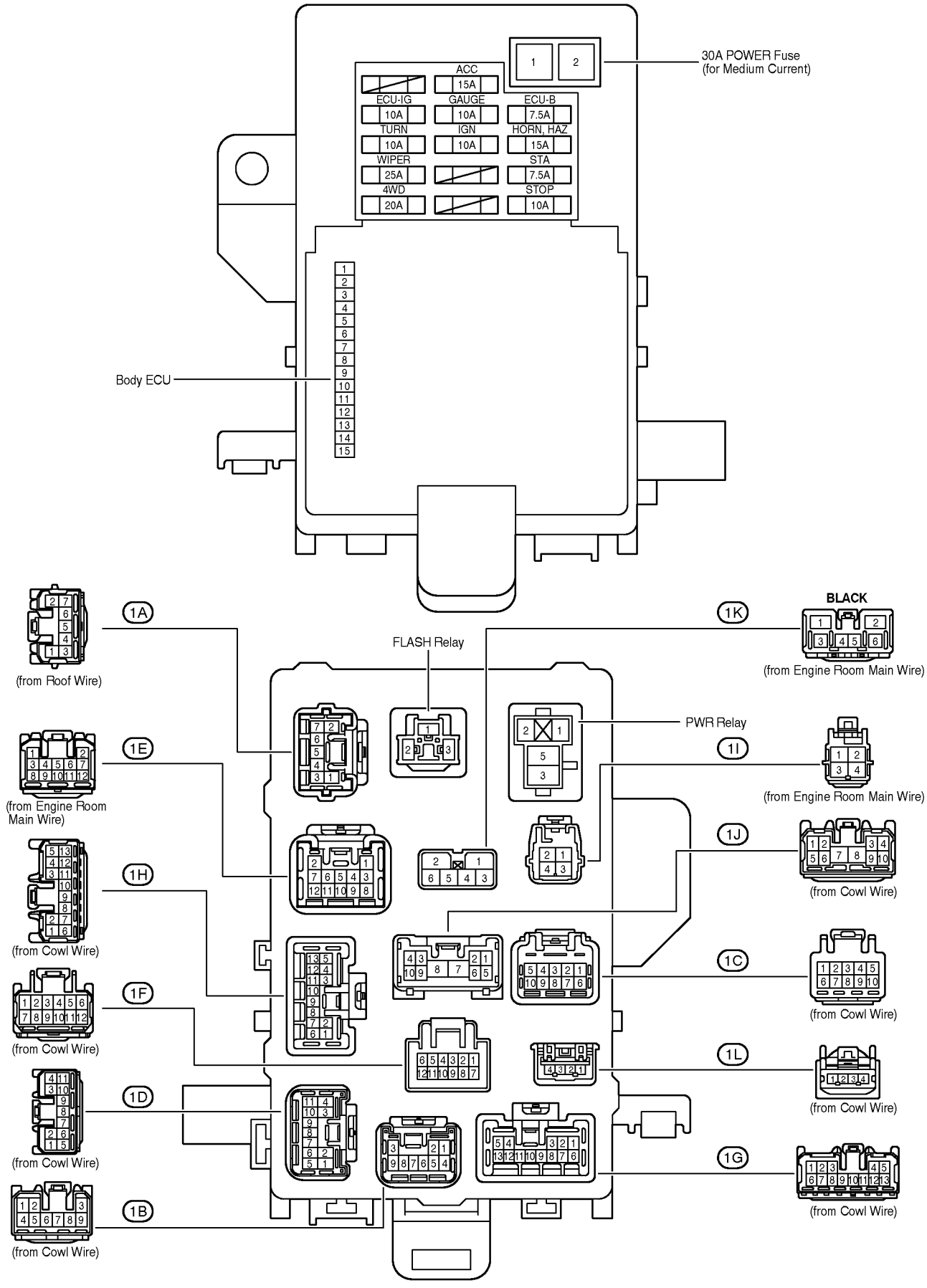


⑤ : VSC R/B	Engine Compartment Right (See Page 20)

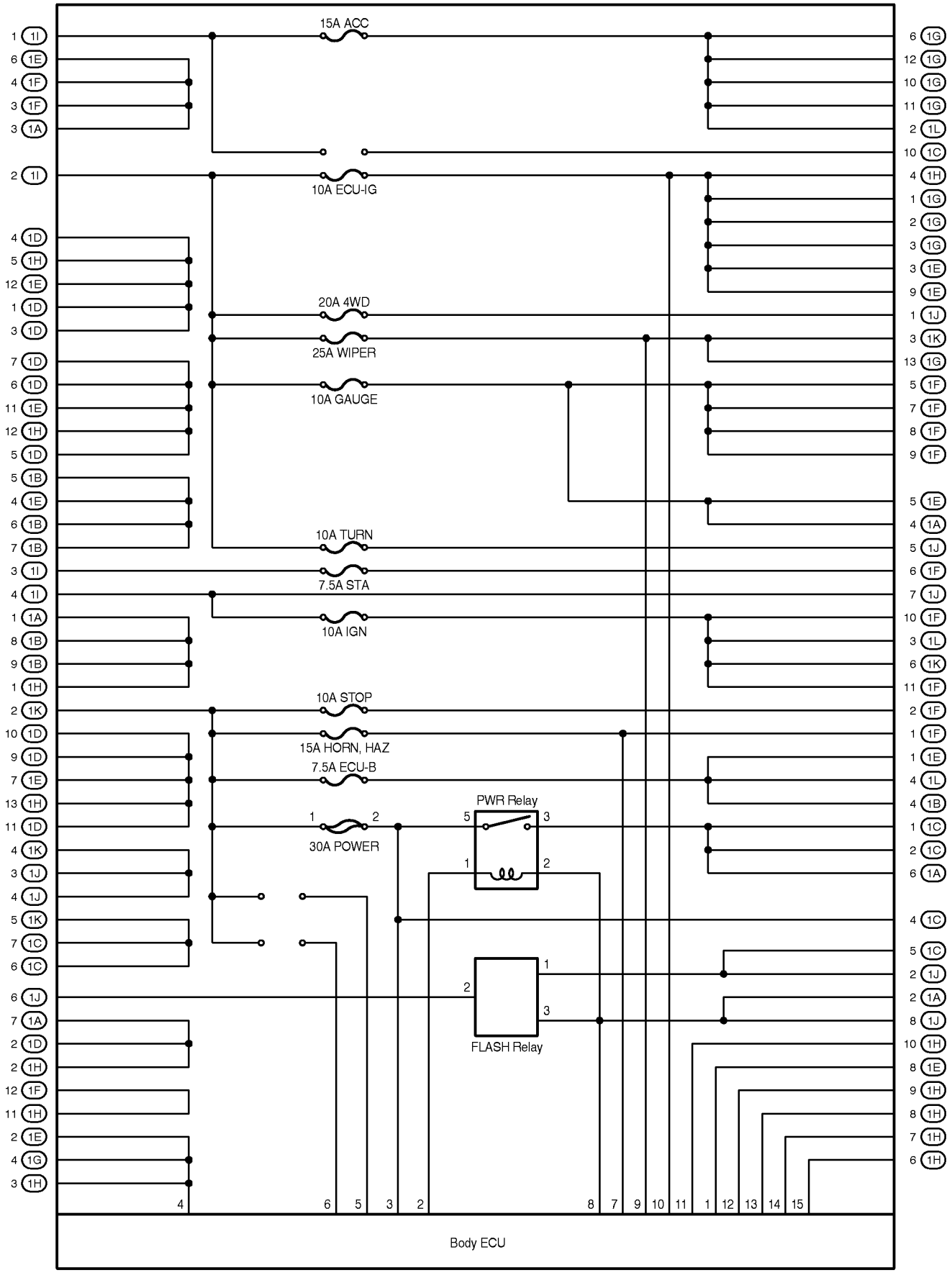


F RELAY LOCATIONS

: Driver Side J/B	Lower Finish Panel (See Page 21)

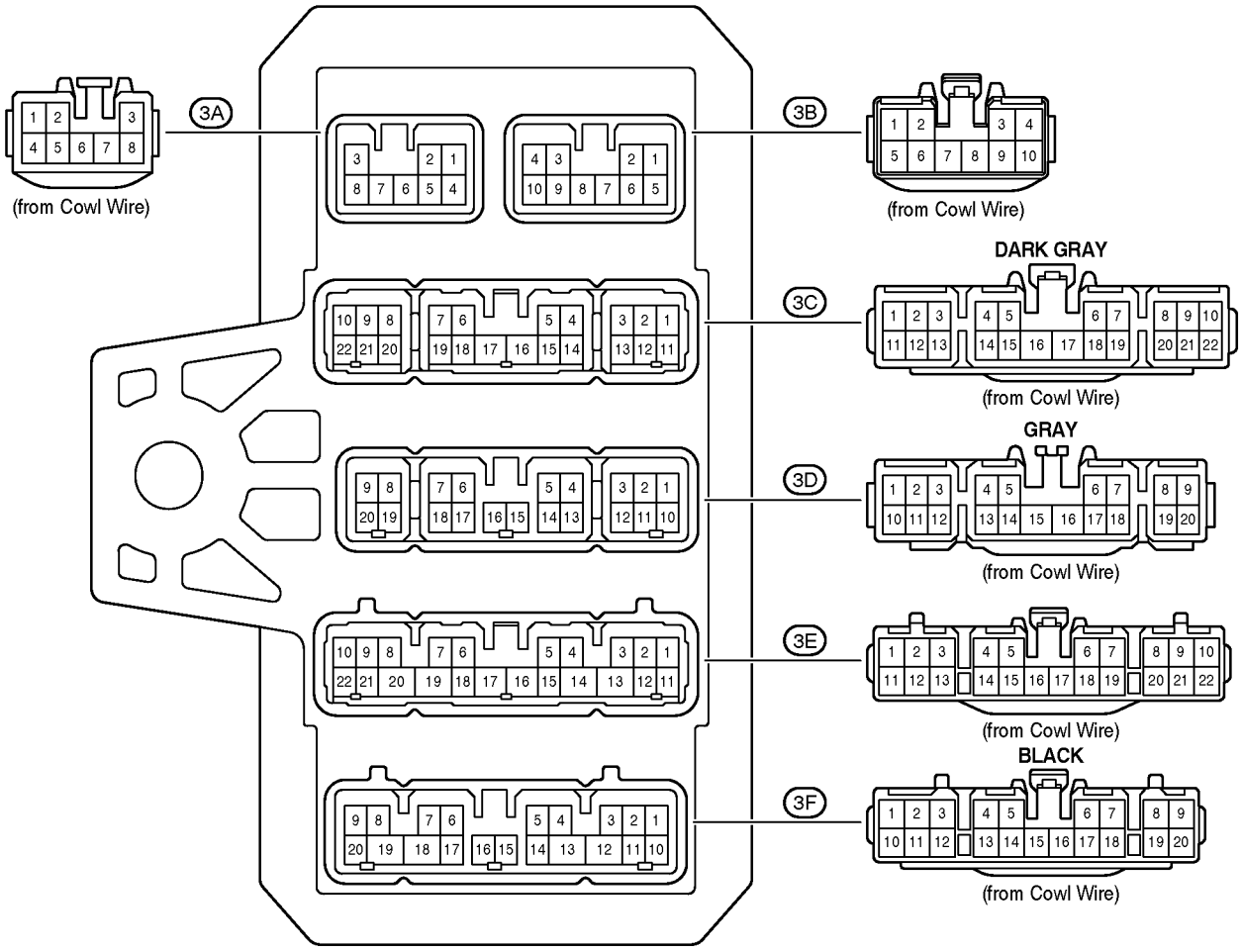


[Driver Side J/B Inner Circuit]

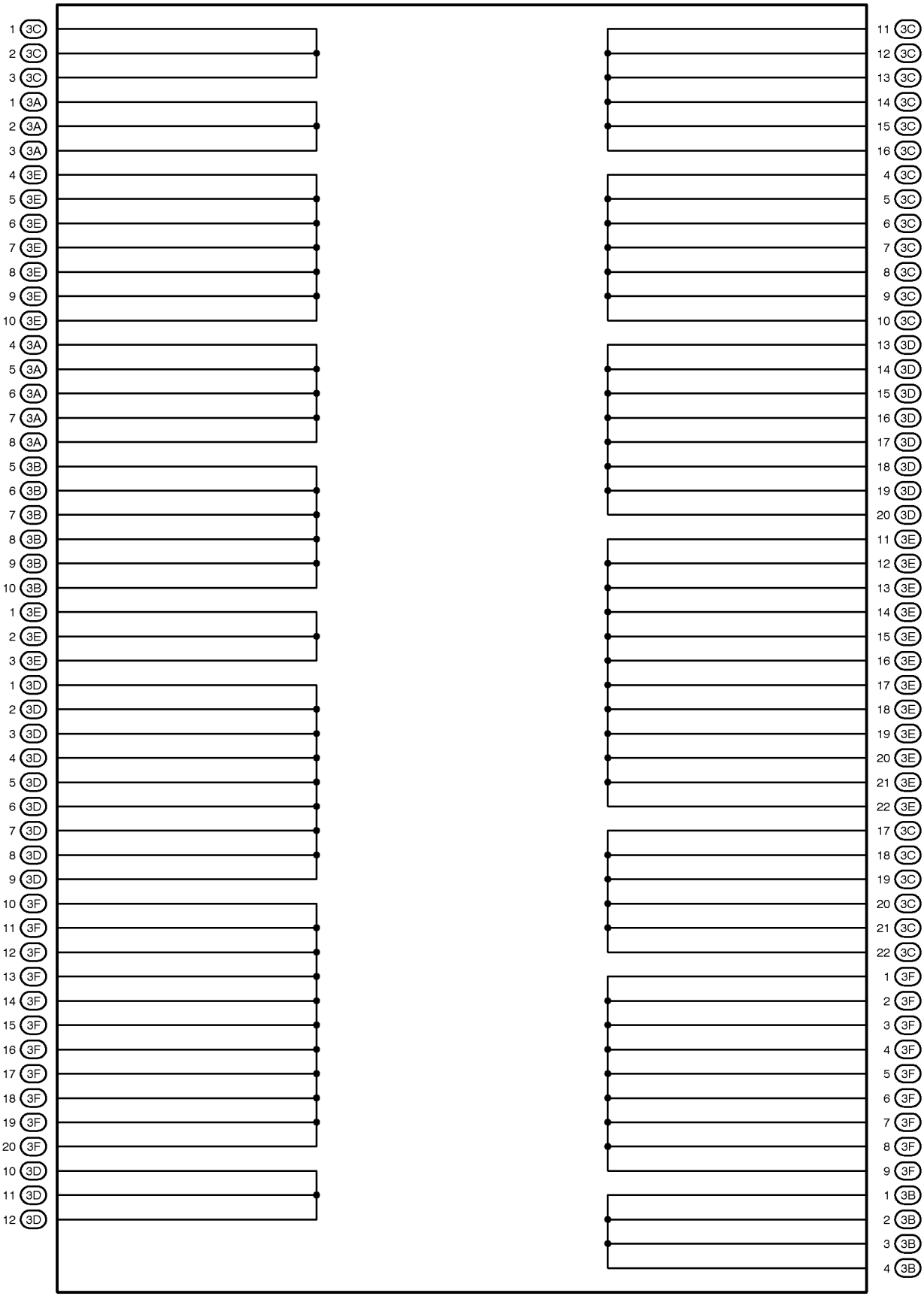


F RELAY LOCATIONS

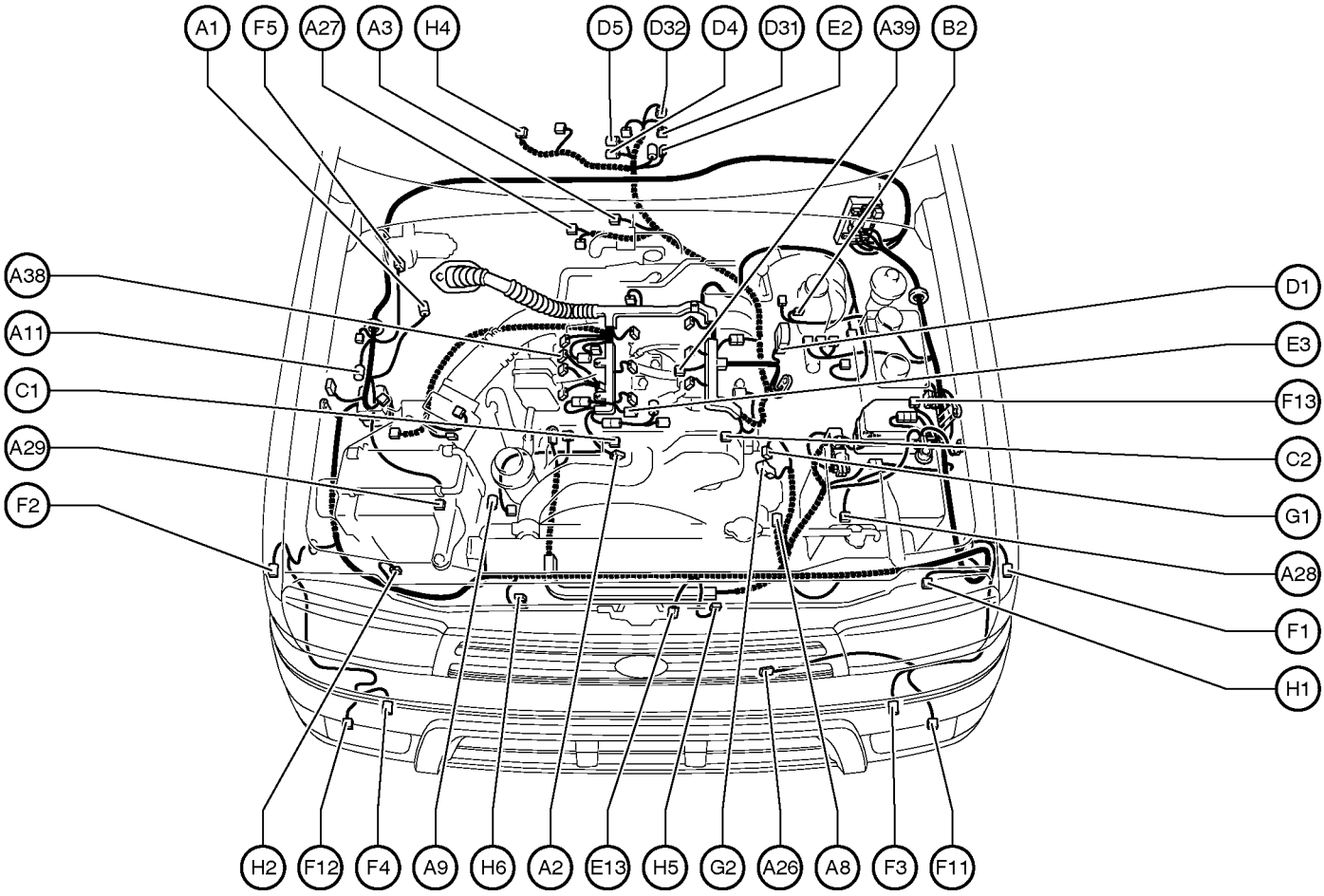
: Center J/B	Near the Steering Column Tube (See Page 21)



[Center J/B Inner Circuit]



Position of Parts in Engine Compartment



A 1 A/C Dual Pressure SW
A 2 A/C Magnetic Clutch
A 3 A/T Fluid Temp. Sensor
A 8 ABS Speed Sensor Front LH
A 9 ABS Speed Sensor Front RH
A 11 Auto Antenna Motor
A 26 A/C Ambient Temp. Sensor
A 27 Air Fuel Ratio Sensor
A 28 Airbag Sensor Front LH
A 29 Airbag Sensor Front RH
A 38 Accel Position Sensor
A 39 ADD Actuator

B 2 Brake Fluid Level Warning SW

C 1 Camshaft Position Sensor
C 2 Crankshaft Position Sensor

D 1 Data Link Connector 1
D 4 Detection SW (Transfer L4 Position)
D 5 Detection SW (Transfer Neutral Position)
D 31 Detection SW (Transfer 4WD Position)
D 32 Detection SW (Transfer H4L Position)

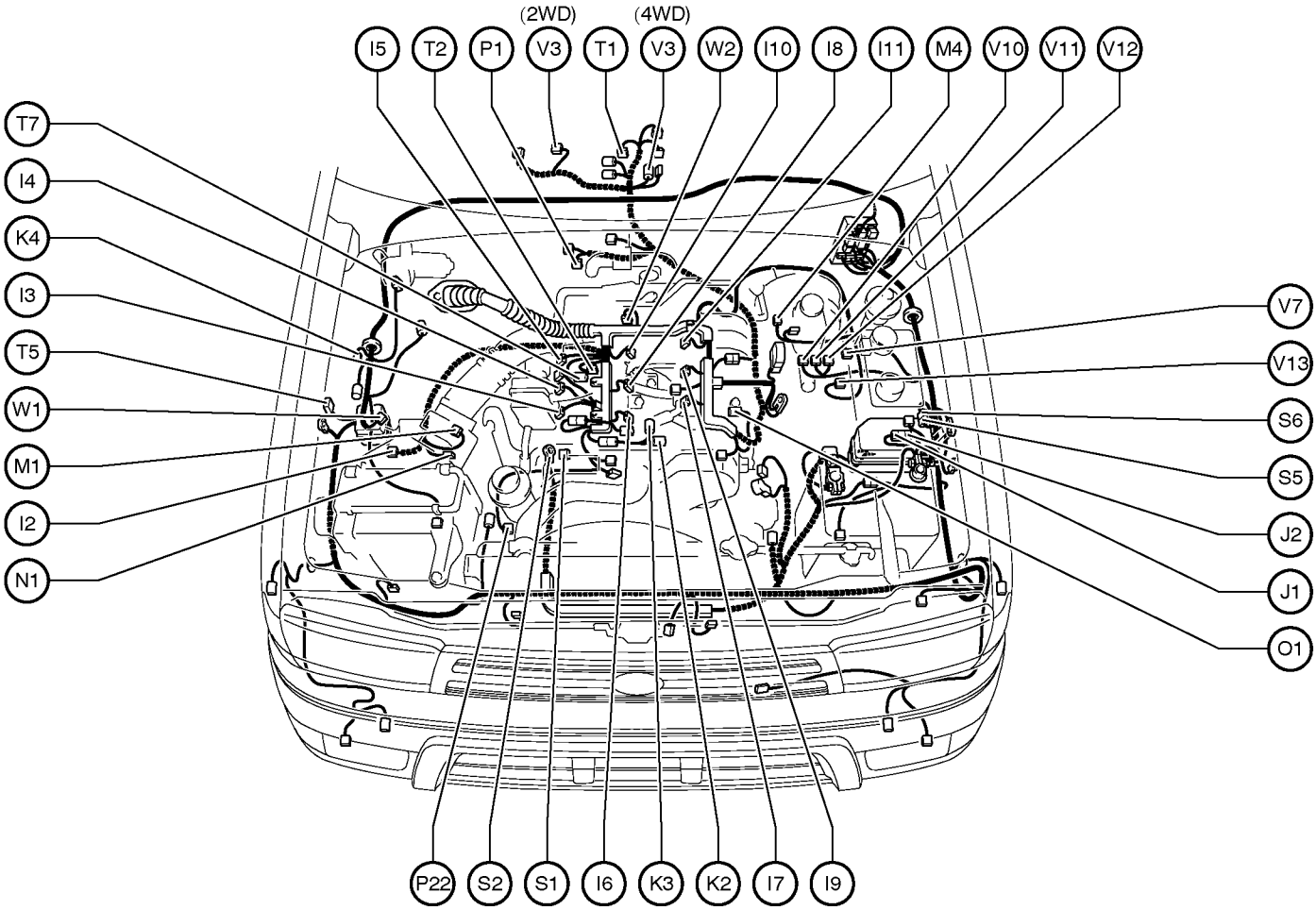
E 2 Electronically Controlled Transmission Solenoid
E 3 Engine Coolant Temp. Sensor
E 13 Engine Hood Courtesy SW

F 1 Front Parking Light LH
F 2 Front Parking Light RH
F 3 Front Turn Signal Light LH
F 4 Front Turn Signal Light RH
F 5 Front Wiper Motor
F 11 Front Fog Light LH
F 12 Front Fog Light RH
F 13 Fuse Box

G 1 Generator
G 2 Generator

H 1 Headlight LH
H 2 Headlight RH
H 4 Heated Oxygen Sensor (Bank 1 Sensor 2)
H 5 Horn LH
H 6 Horn RH

Position of Parts in Engine Compartment



I 2 Igniter
I 3 Ignition Coil No.1
I 4 Ignition Coil No.2
I 5 Ignition Coil No.3
I 6 Injector No.1
I 7 Injector No.2
I 8 Injector No.3
I 9 Injector No.4
I 10 Injector No.5
I 11 Injector No.6

J 1 Junction Connector
J 2 Junction Connector

K 2 Knock Sensor No.1
K 3 Knock Sensor No.2
K 4 Keyless Buzzer

M 1 Mass Air Flow Meter
M 4 Master Cylinder Pressure Sensor

N 1 Noise Filter

O 1 Oil Pressure SW

P 1 Park/Neutral Position SW
P 22 Power Steering Oil Pressure SW

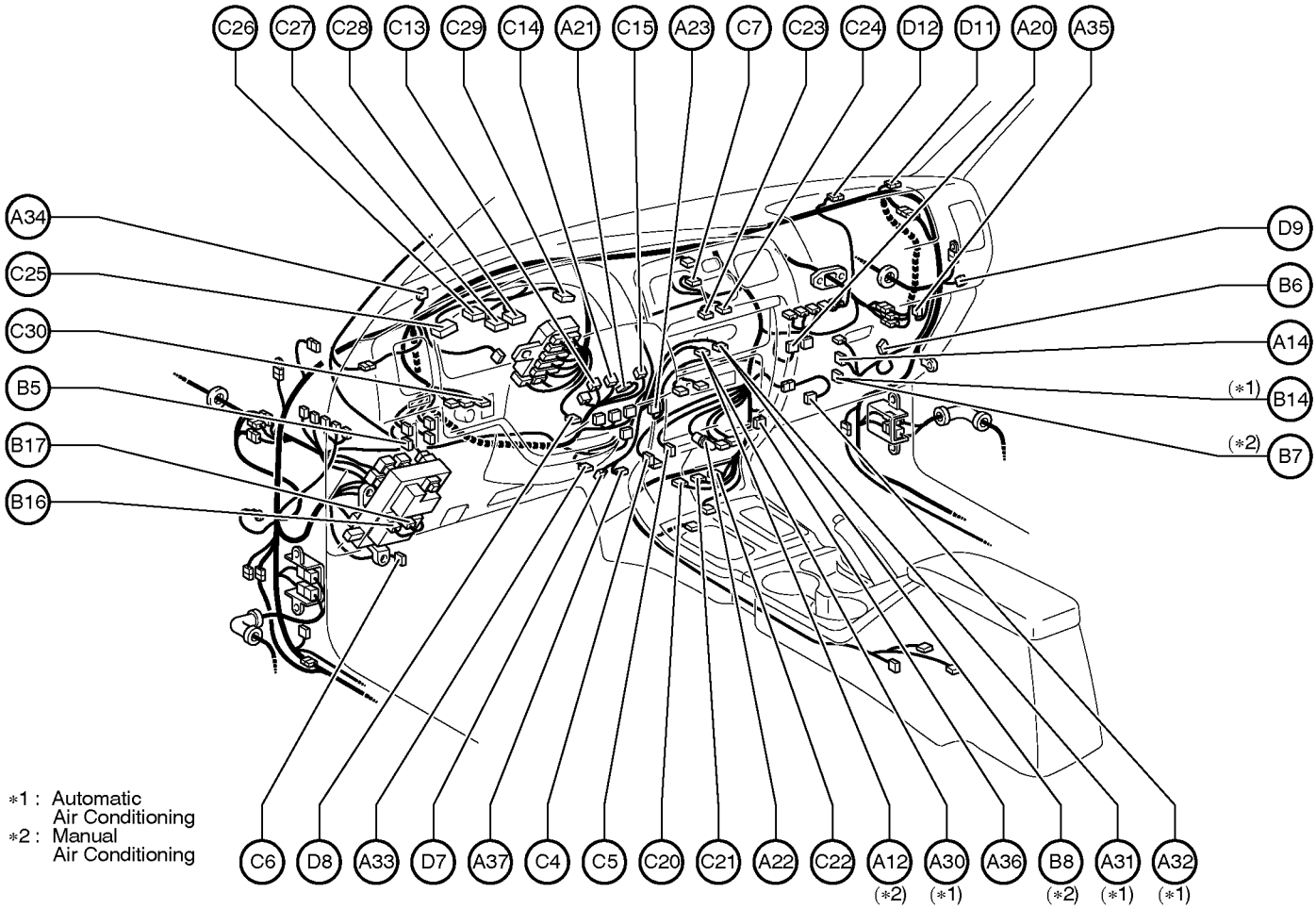
S 1 Starter
S 2 Starter
S 5 Short Connector (VSC)
S 6 Short Connector (VSC)

T 1 2-4 Select Motor
T 2 Throttle Position Sensor
T 5 Theft Deterrent Horn
T 7 Throttle Control Motor and Clutch

V 3 Vehicle Speed Sensor
(Electronically Controlled Transmission)
V 7 VSV (EVAP)
V 10 VSC Actuator
V 11 VSC Actuator
V 12 VSC Actuator
V 13 VSV (Canister Closed Valve)

W 1 Washer Motor (w/o Daytime Running Light),
Washer Motor and Washer Level Warning SW
(w/ Daytime Running Light)
W 2 Water Temp. Sender

Position of Parts in Instrument Panel



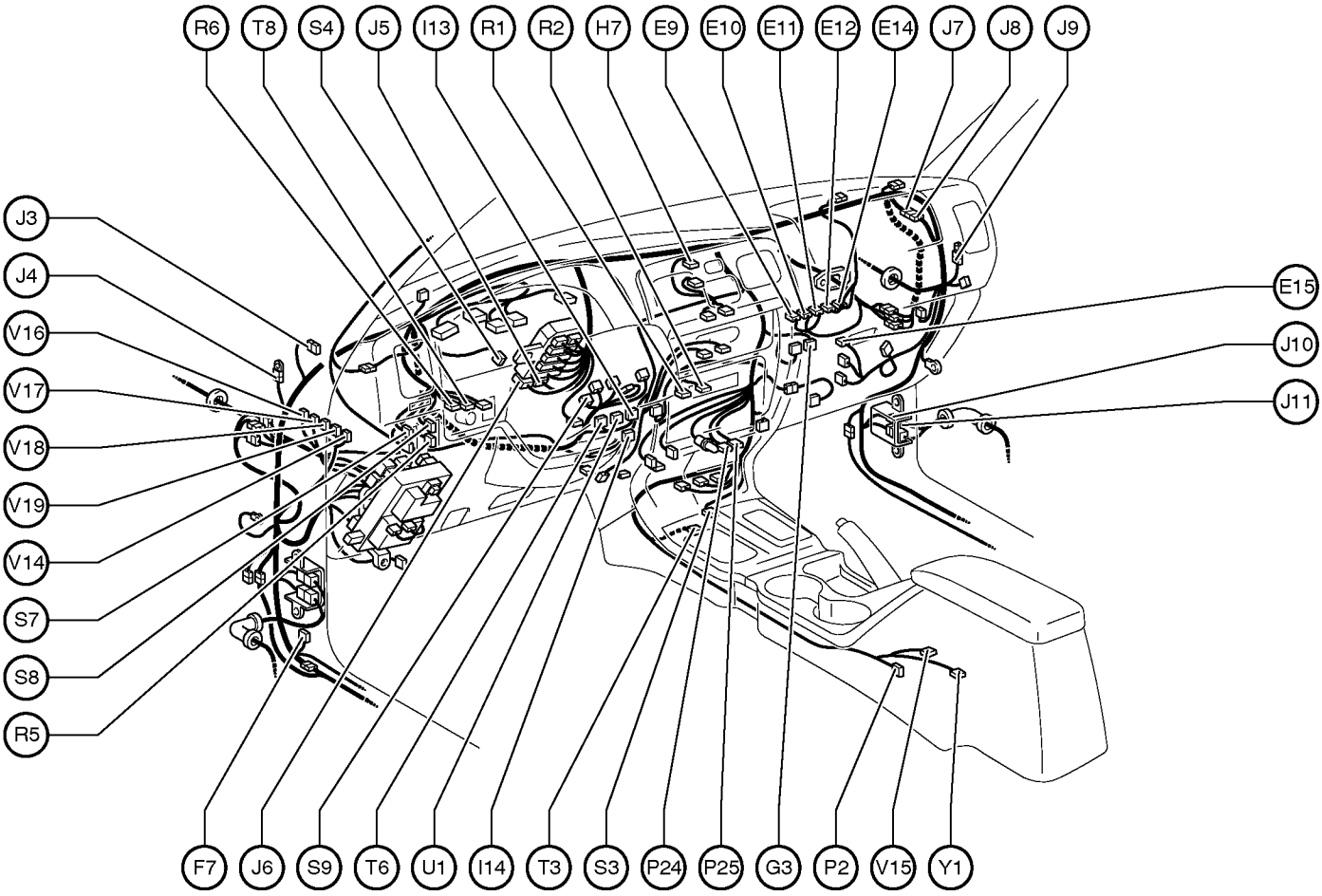
A12 A/C Amplifier
A14 A/C Thermistor
A20 Airbag Squib (Front Passenger Airbag Assembly)
A21 Airbag Squib (Steering Wheel Pad)
A22 Ashtray Illumination
A23 Auto Antenna Control Relay
A30 A/C Amplifier
A31 A/C Amplifier
A32 A/C Magnetic Clutch Relay
A33 A/C Room Temp. Sensor
A34 A/C Solar Sensor
A35 Air Inlet Control Servo Motor
A36 Air Mix Control Servo Motor and A/C Water Temp. Sensor
A37 Air Vent Mode Control Servo Motor

B 5 Back Window Lock SW
B 6 Blower Motor
B 7 Blower Resistor
B 8 Blower SW
B14 Blower Motor Linear Controller
B16 Body ECU
B17 Body ECU

C 4 Cigarette Lighter
C 5 Cigarette Lighter Illumination
C 6 Circuit Opening Relay
C 7 Clock
C13 Combination SW
C14 Combination SW
C15 Combination SW
C20 Center Airbag Sensor Assembly
C21 Center Airbag Sensor Assembly
C22 Center Airbag Sensor Assembly
C23 Center Cluster SW
C24 Center Cluster SW
C25 Combination Meter
C26 Combination Meter
C27 Combination Meter
C28 Combination Meter
C29 Combination Meter
C30 Center Diff. Lock SW

D 7 Data Link Connector 3
D 8 Daytime Running Light Relay (Main)
D 9 Daytime Running Light Relay No.4
D11 Diode (Back Window)
D12 Diode (Daytime Running Light No.1)

Position of Parts in Instrument Panel



E 9 Engine Control Module
E10 Engine Control Module
E11 Engine Control Module
E12 Engine Control Module
E14 Engine Control Module
E15 Extra High Speed Relay

F 7 4WD ECU

G 3 Glove Box Light

H 7 Hazard SW

I 13 Ignition Key Cylinder Light
I 14 Ignition SW

J 3 Junction Connector
J 4 Junction Connector
J 5 Junction Connector
J 6 Junction Connector
J 7 Junction Connector
J 8 Junction Connector
J 9 Junction Connector
J 10 Junction Connector
J 11 Junction Connector

P 2 Parking Brake SW
P24 Power Outlet Front LH
P25 Power Outlet Front RH

R 1 Radio and Player (Built-In Type Amplifier) or Stereo Power Amplifier (Separate Type Amplifier)
R 2 Radio and Player (Built-In Type Amplifier) or Stereo Power Amplifier (Separate Type Amplifier)
R 5 Remote Control Mirror SW
R 6 Rheostat

S 3 Shift Lock Control Computer
S 4 Stop Light SW
S 7 Seat Heater SW LH
S 8 Seat Heater SW RH
S 9 Steering Sensor

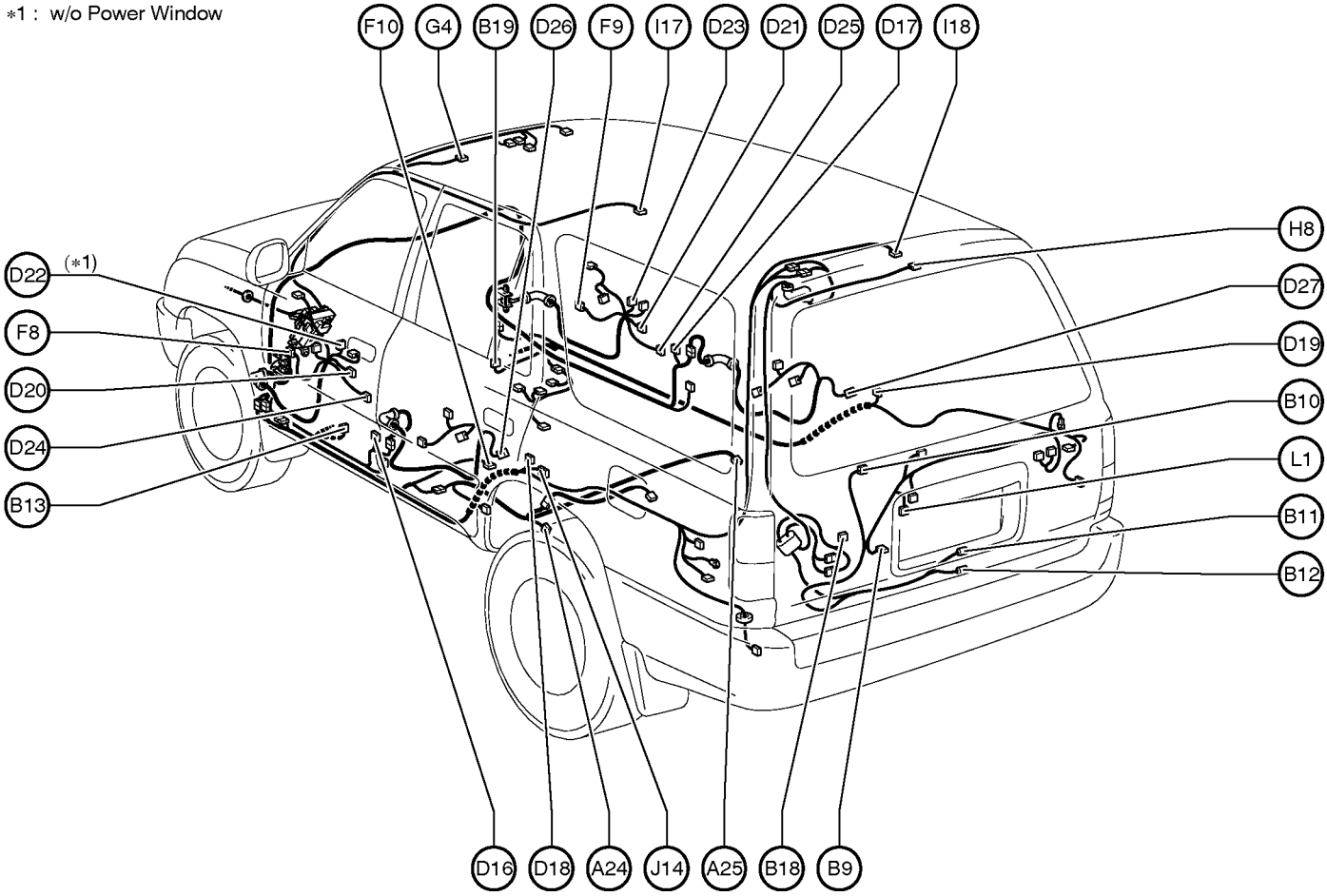
T 3 2-4 Select SW
T 6 Transponder Key Amplifier
T 8 TRAC Off SW

U 1 Unlock Warning SW

V14 VSC Buzzer
V15 VSC Deceleration Sensor
V16 VSC ECU
V17 VSC ECU
V18 VSC ECU
V19 VSC ECU

Y 1 Yaw Rate Sensor

Position of Parts in Body



A24 ABS Speed Sensor Rear LH
A25 ABS Speed Sensor Rear RH

B 9 Back Door Courtesy SW
B10 Back Door Lock Motor and Back Door Unlock Detection SW
B11 Back Window Limit SW
B12 Back Window Motor
B13 Buckle SW LH (w/o Power Seat)
B18 Back Door ECU
B19 Buckle SW RH (w/o Power Seat)

D16 Door Courtesy SW Front LH
D17 Door Courtesy SW Front RH
D18 Door Courtesy SW Rear LH
D19 Door Courtesy SW Rear RH
D20 Door Key Lock and Unlock SW Front LH
D21 Door Key Lock and Unlock SW Front RH
D22 Door Lock Control SW Front LH (w/o Power Window)
D23 Door Lock Control SW Front RH
D24 Door Lock Motor and Door Unlock Detection SW Front LH
D25 Door Lock Motor and Door Unlock Detection SW Front RH
D26 Door Lock Motor and Door Unlock Detection SW Rear LH
D27 Door Lock Motor and Door Unlock Detection SW Rear RH

F 8 Front Door Speaker LH
F 9 Front Door Speaker RH
F10 Fuel Sender and Fuel Pump

G 4 Garage Door Opener

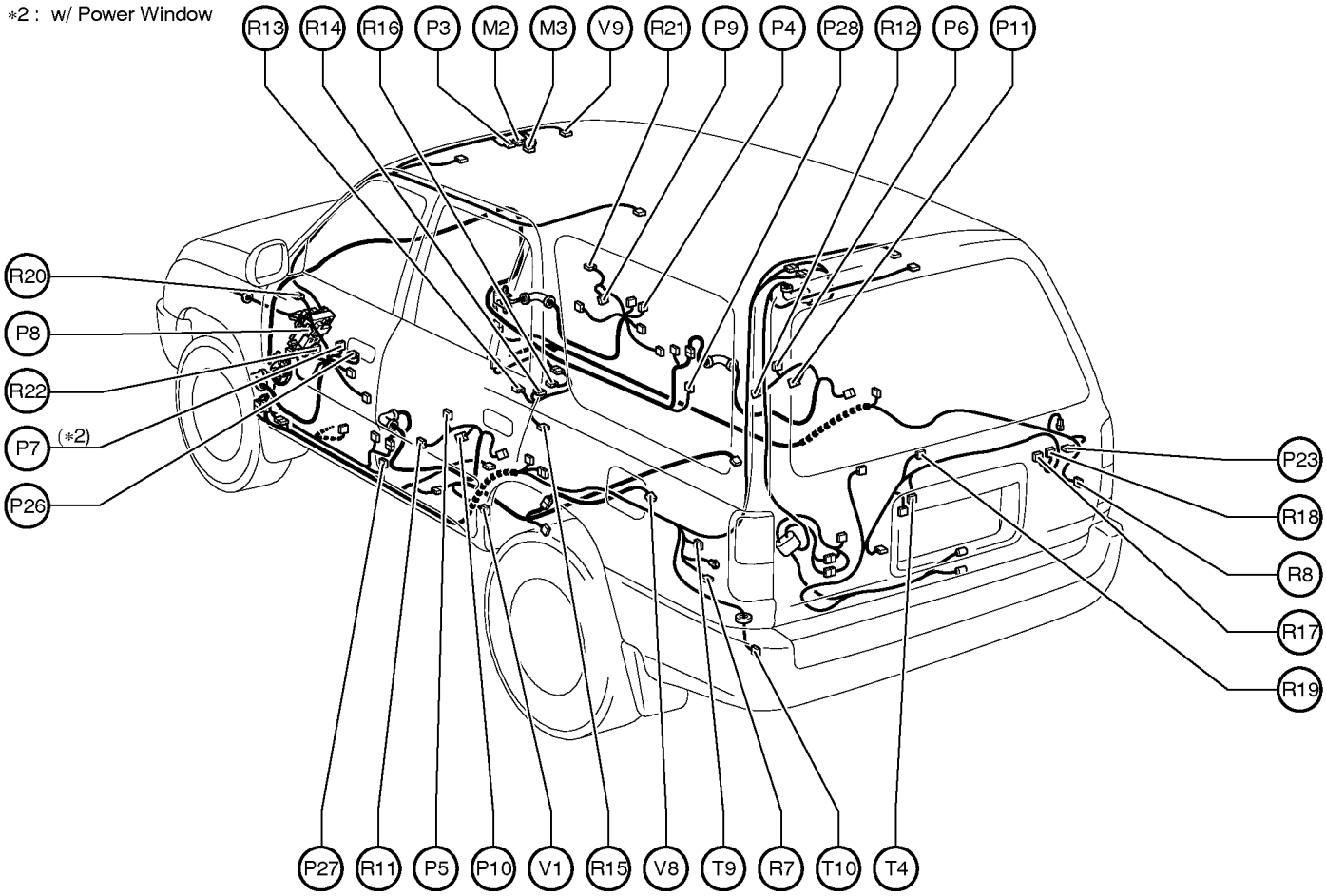
H 8 High Mounted Stop Light

I 17 Interior Light (Front)
I 18 Interior Light (Rear)

J 14 Junction Connector

L 1 License Plate Light

Position of Parts in Body



M 2 Moon Roof Control Motor and Limit SW
M 3 Moon Roof Control Relay and SW

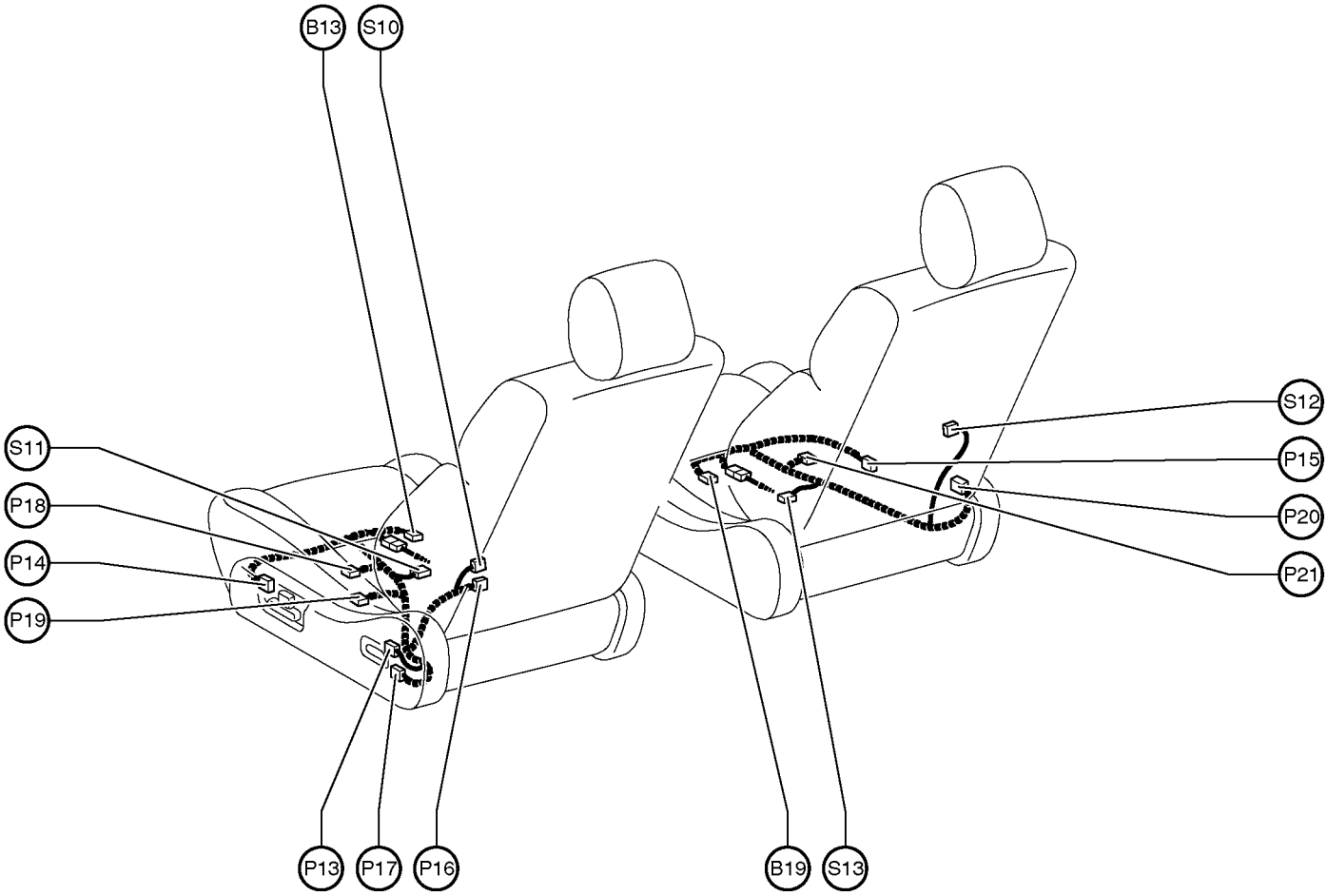
P 3 Personal Light
P 4 Power Window Control SW Front RH
P 5 Power Window Control SW Rear LH
P 6 Power Window Control SW Rear RH
P 7 Power Window Master SW
P 8 Power Window Motor Front LH
P 9 Power Window Motor Front RH
P 10 Power Window Motor Rear LH
P 11 Power Window Motor Rear RH
P 23 Power Outlet (Rear)
P 26 Power Window Master SW
P 27 Pretensioner LH
P 28 Pretensioner RH

R 7 Rear Combination Light LH
R 8 Rear Combination Light RH
R 11 Rear Door Speaker LH
R 12 Rear Door Speaker RH
R 13 Rear Heater Blower Motor
R 14 Rear Heater Blower Resistor
R 15 Rear Heater Blower SW
R 16 Rear Heater Relay
R 17 Rear Window Defogger
R 18 Rear Window Defogger
R 19 Rear Wiper Motor
R 20 Remote Control Mirror LH
R 21 Remote Control Mirror RH
R 22 Remote Control Mirror SW

T 4 Tailgate Control SW
T 9 Trailer Converter
T 10 Trailer Socket

V 1 Vapor Pressure Sensor
V 8 VSV (Vapor Pressure Sensor)
V 9 Vanity Light RH

Position of Parts in Seat



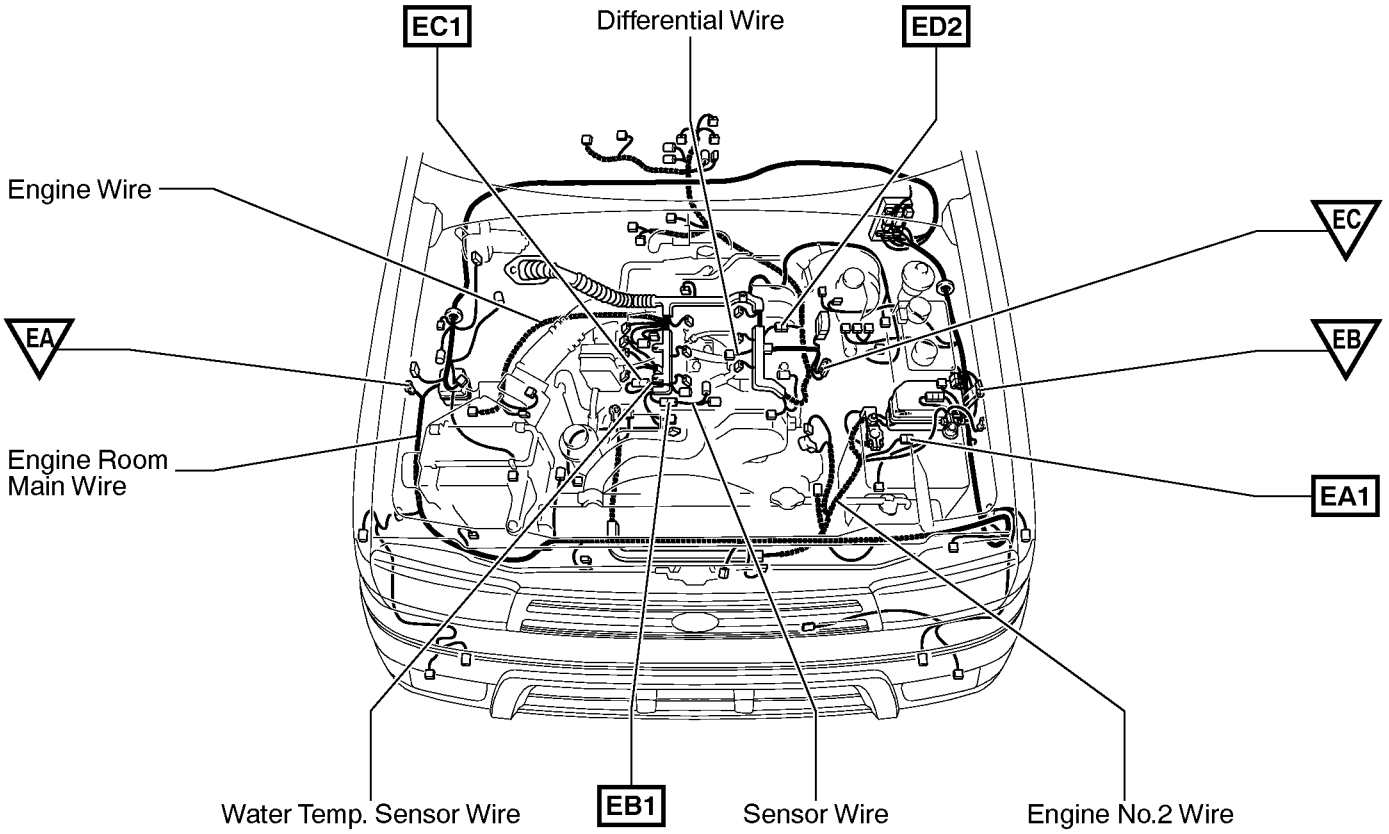
B13 Buckle SW LH (w/ Power Seat)
B19 Buckle SW RH (w/ Power Seat)

P13 Power Seat Control SW (Driver's Seat Lumbar Support)
P14 Power Seat Control SW (Driver's Side)
P15 Power Seat Control SW (Front Passenger's Side)
P16 Power Seat Motor (Driver's Seat Lumbar Support)
P17 Power Seat Motor (Driver's Seat Reclining Control)
P18 Power Seat Motor (Driver's Seat Slide Control)
P19 Power Seat Motor (Driver's Seat Vertical Control)
P20 Power Seat Motor
(Front Passenger's Seat Reclining Control)
P21 Power Seat Motor
(Front Passenger's Seat Slide Control)

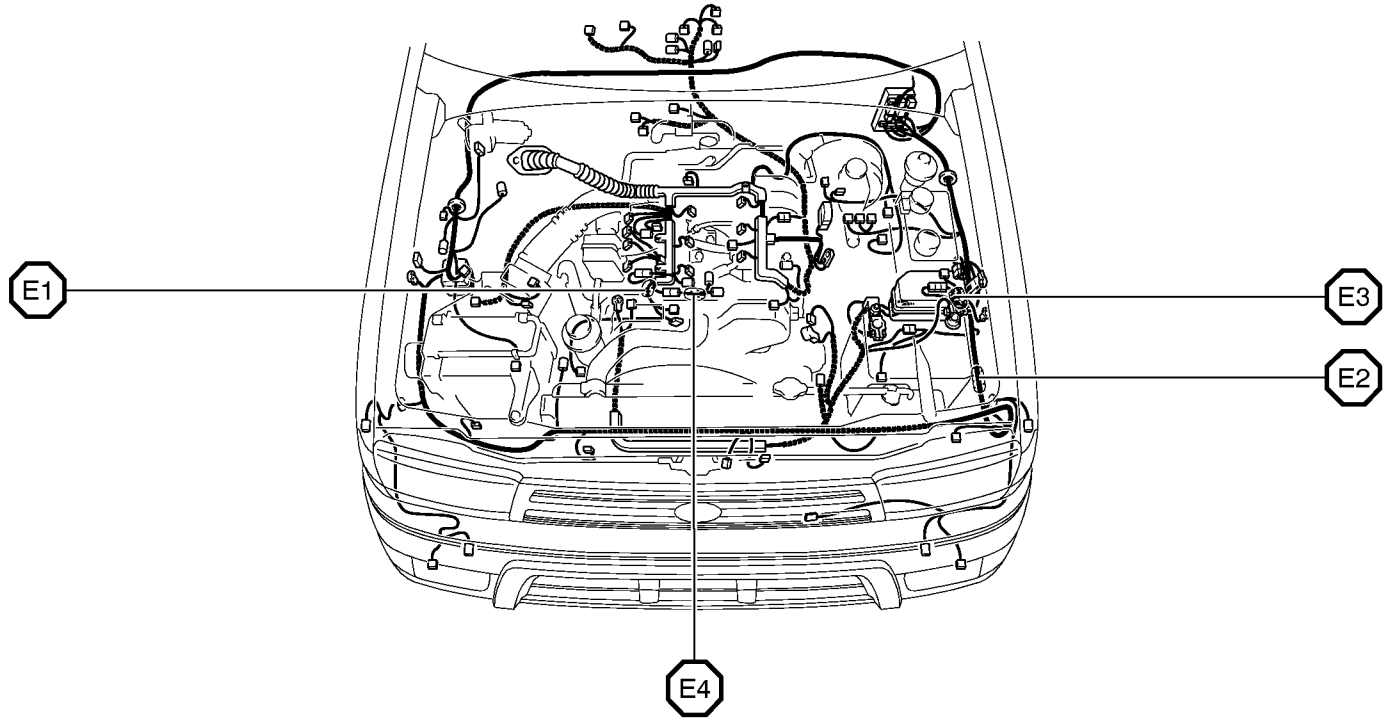
S10 Seat Heater (Driver's Seat Back)
S11 Seat Heater (Driver's Seat Cushion)
S12 Seat Heater (Front Passenger's Seat Back)
S13 Seat Heater (Front Passenger's Seat Cushion)

▭ : Location of Connector Joining Wire Harness and Wire Harness

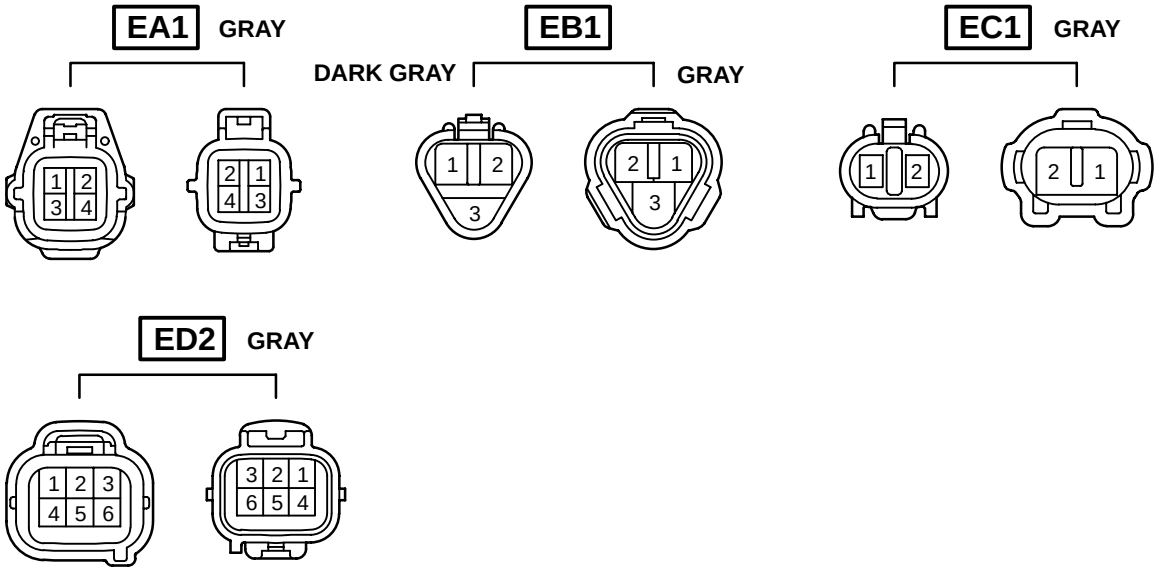
▽ : Location of Ground Points



○ : Location of Splice Points

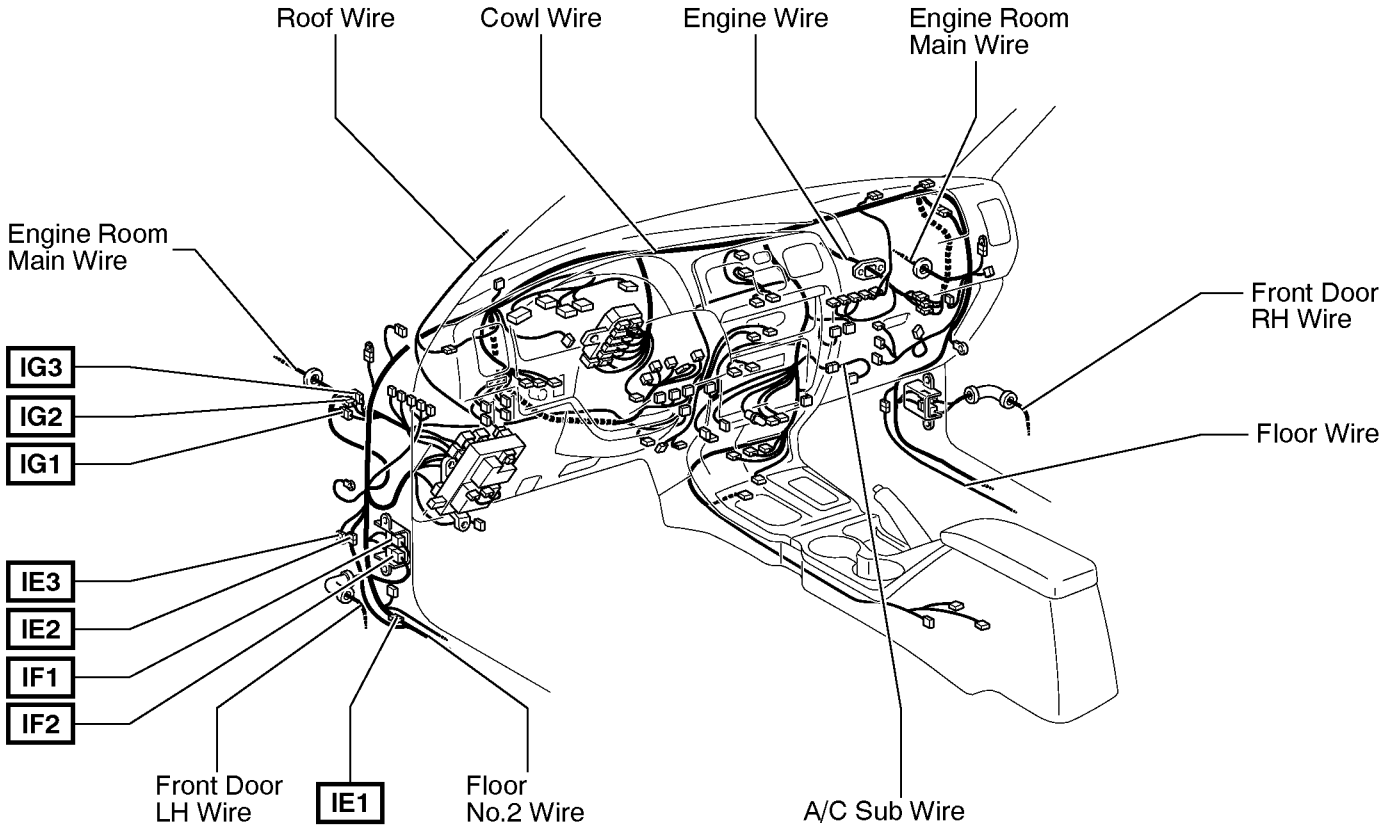


Connector Joining Wire Harness and Wire Harness

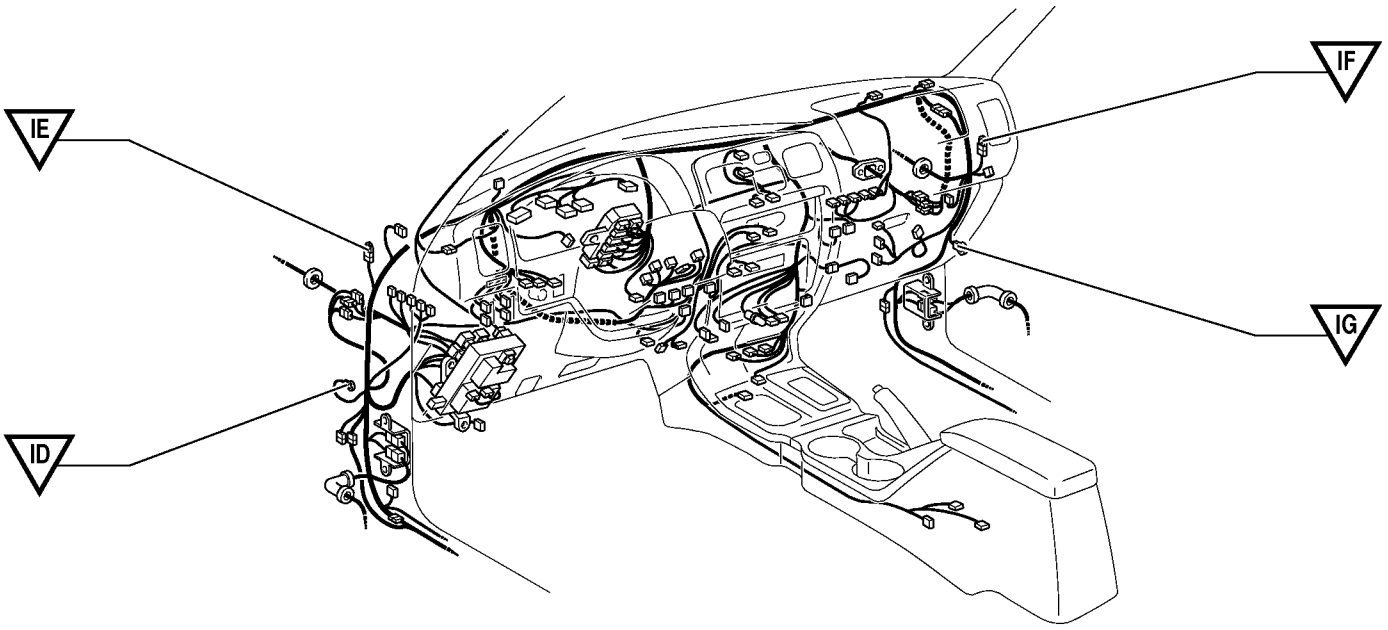


Code	Joining Wire Harness and Wire Harness (Connector Location)
EA1	Engine No.2 Wire and Engine Room Main Wire (Near the Engine Room R/B)
EB1	Sensor Wire and Engine Wire (Front Side of Cylinder Head Cover Right)
EC1	Engine Wire and Water Temp. Sensor Wire (Front Side of Cylinder Head Cover Right)
ED2	Engine Wire and Differential Wire (Near the Front Differential)

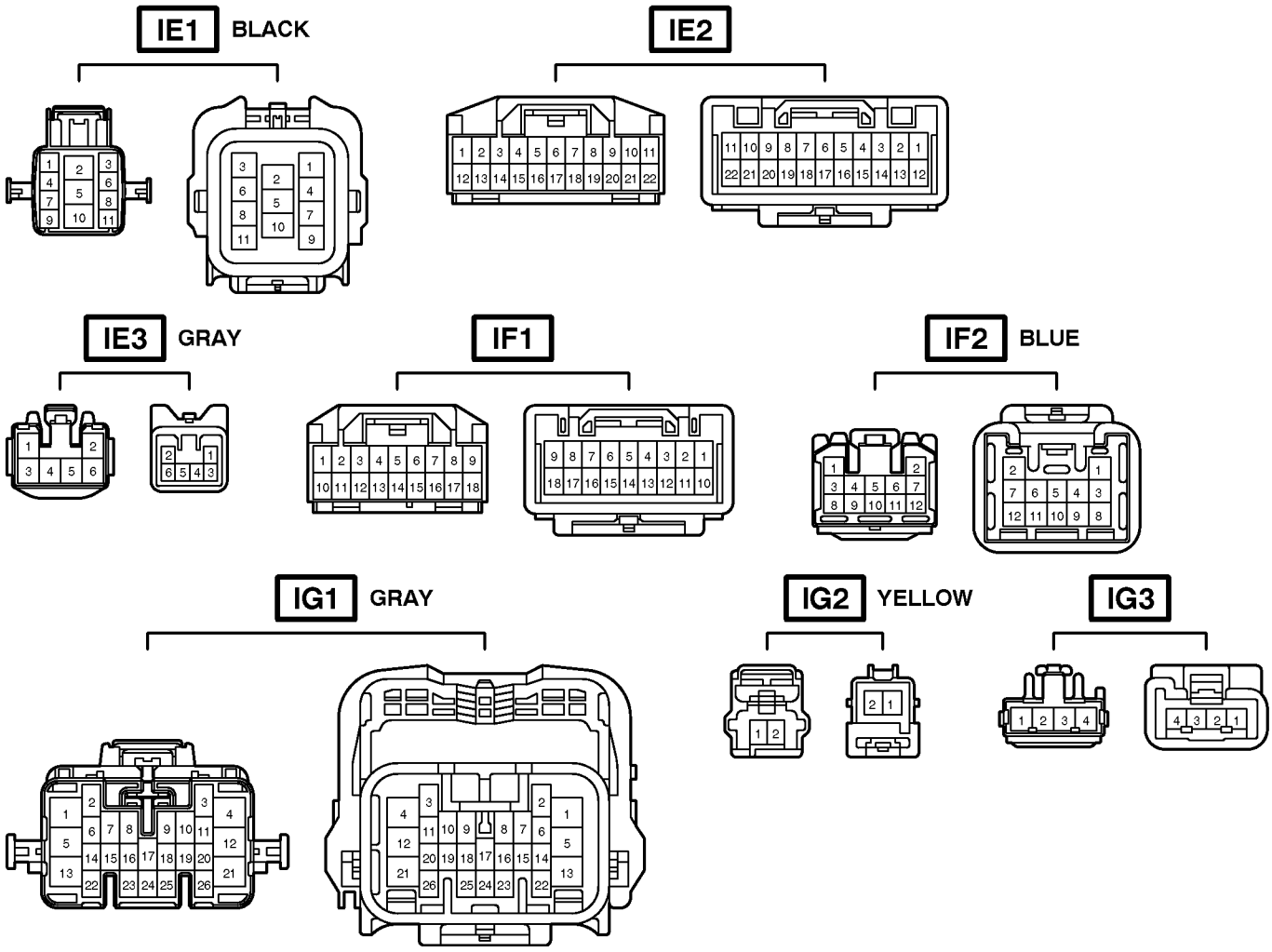
▭ : Location of Connector Joining Wire Harness and Wire Harness



▽ : Location of Ground Points

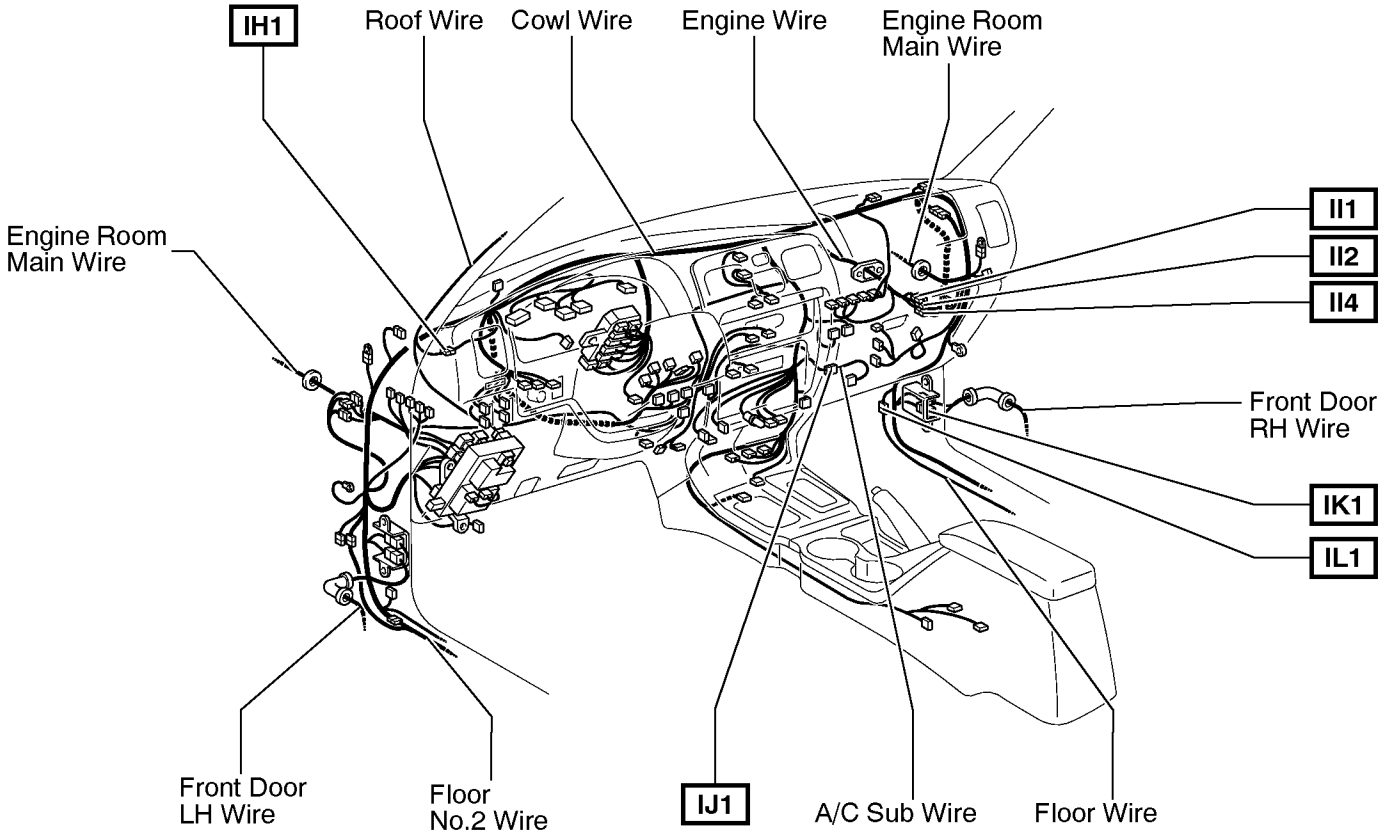


Connector Joining Wire Harness and Wire Harness

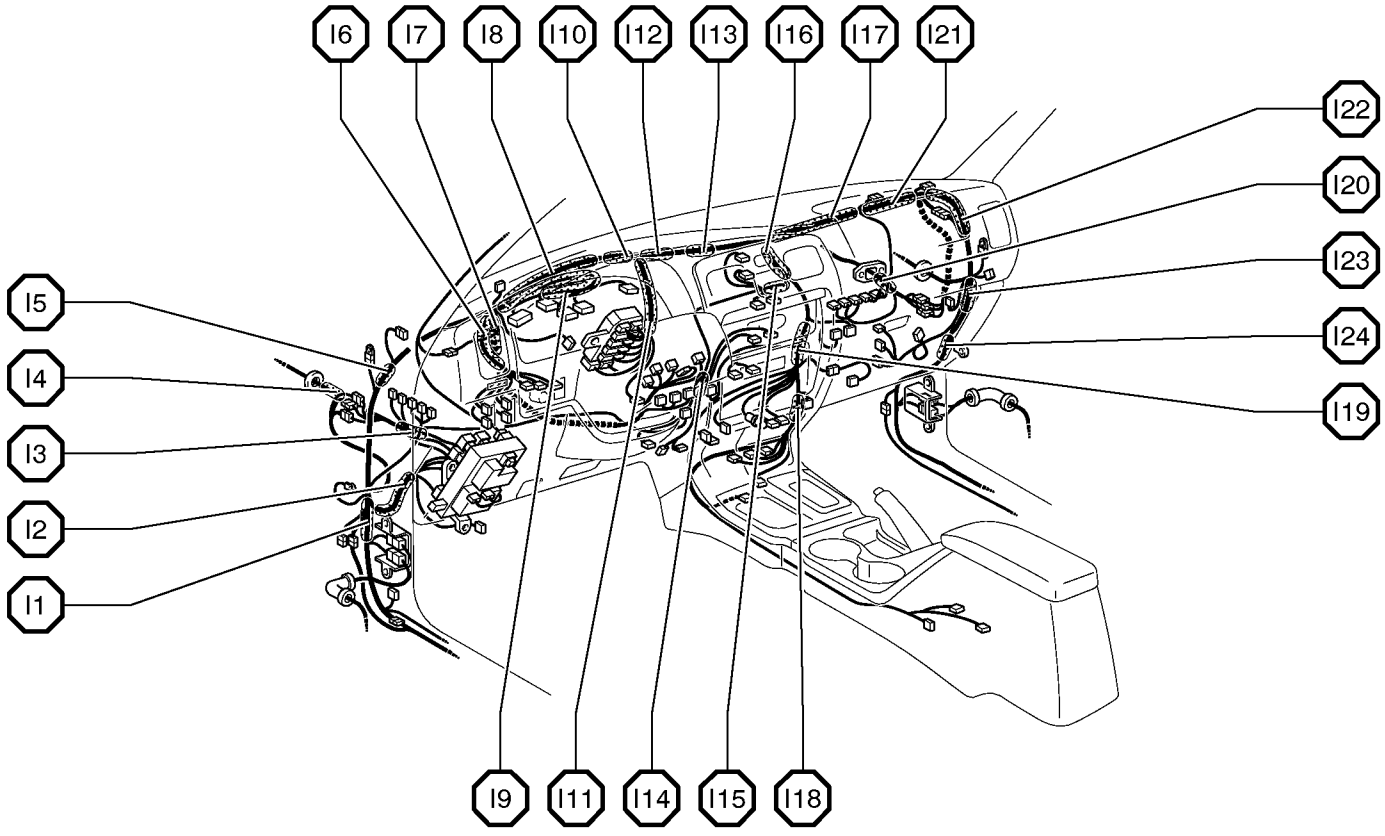


Code	Joining Wire Harness and Wire Harness (Connector Location)
IE1	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2	
IE3	
IF1	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2	
IG1	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IG2	
IG3	

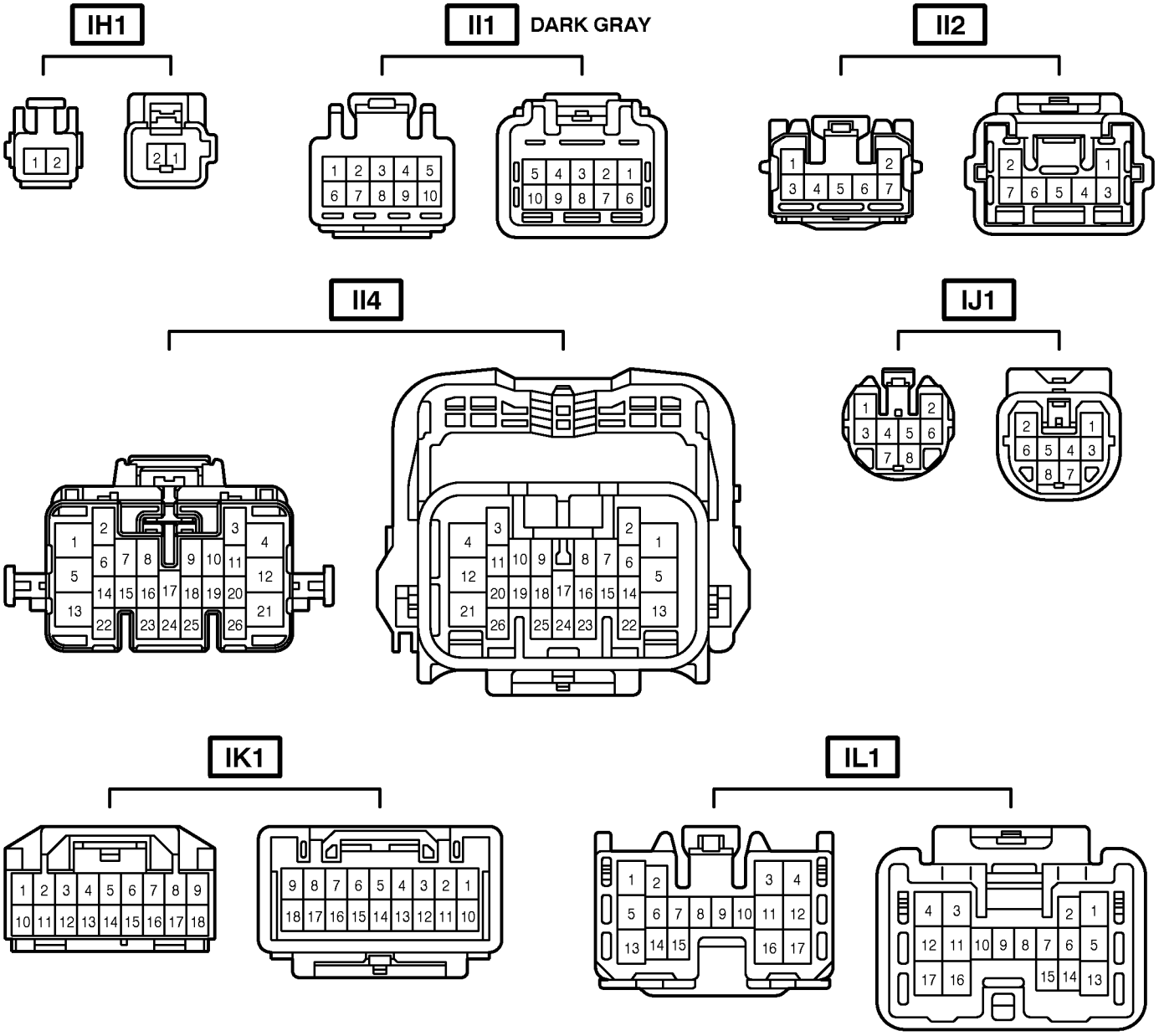
▭ : Location of Connector Joining Wire Harness and Wire Harness



⬡ : Location of Splice Points



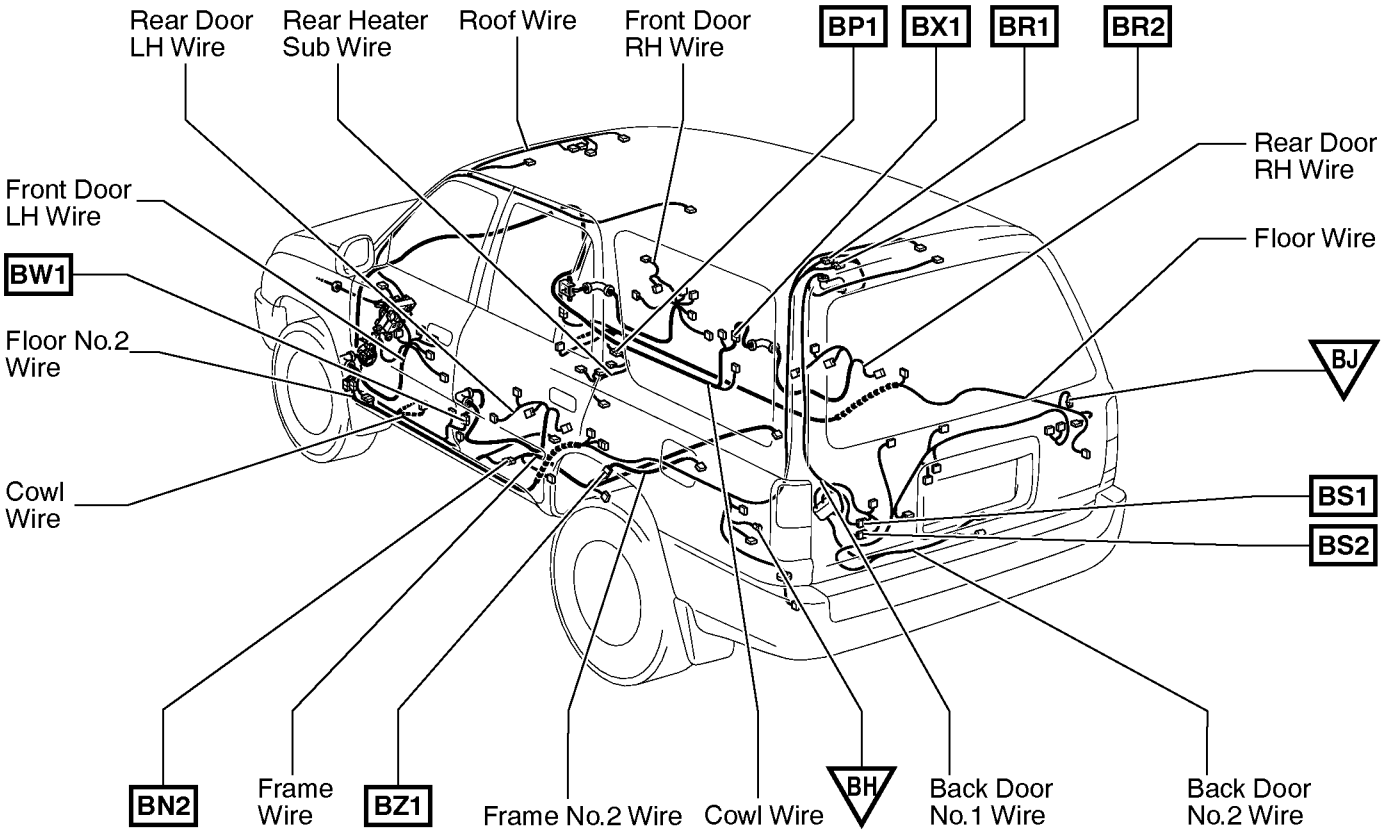
Connector Joining Wire Harness and Wire Harness



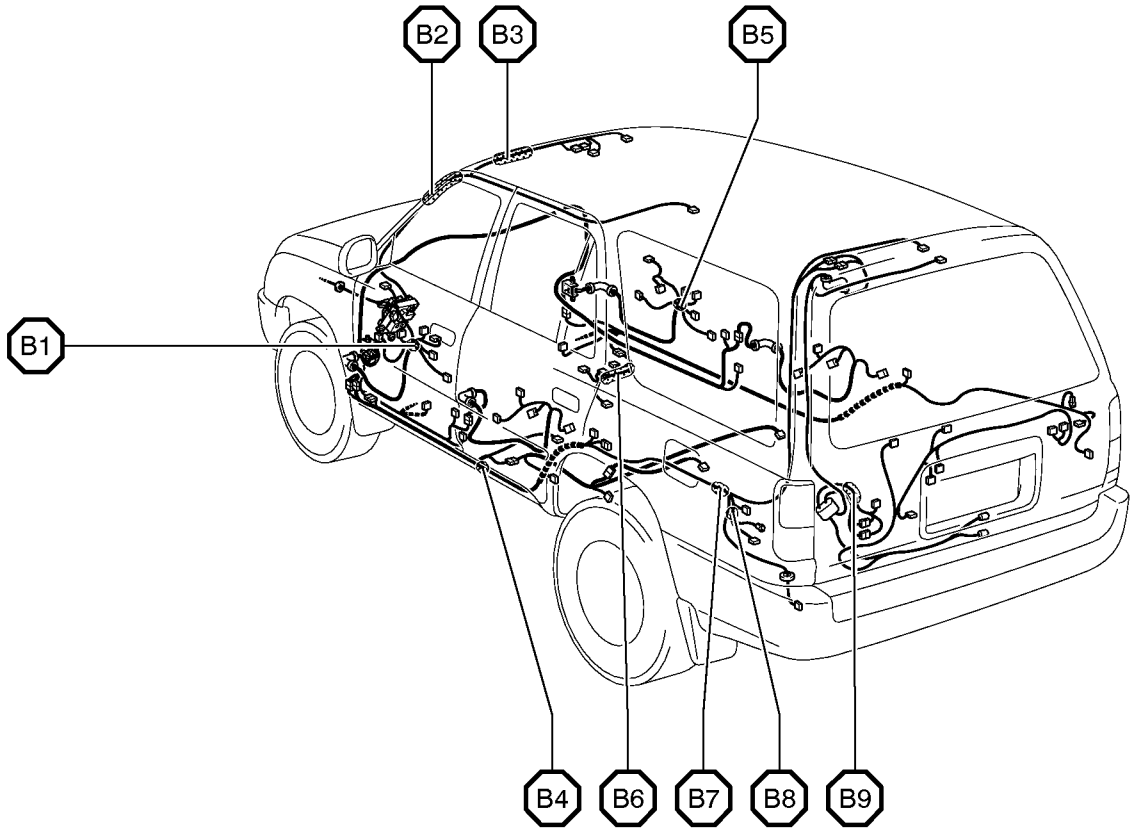
Code	Joining Wire Harness and Wire Harness (Connector Location)
IH1	Roof Wire and Cowl Wire (Instrument Panel Reinforcement Left)
II1	Engine Wire and Cowl Wire (On the Glove Box)
II2	
II4	
IJ1	Cowl Wire and A/C Sub Wire (Near the A/C Unit)
IK1	Front Door RH Wire and Cowl Wire (Right Kick Panel)
IL1	Cowl Wire and Floor Wire (Right Kick Panel)

▭ : Location of Connector Joining Wire Harness and Wire Harness

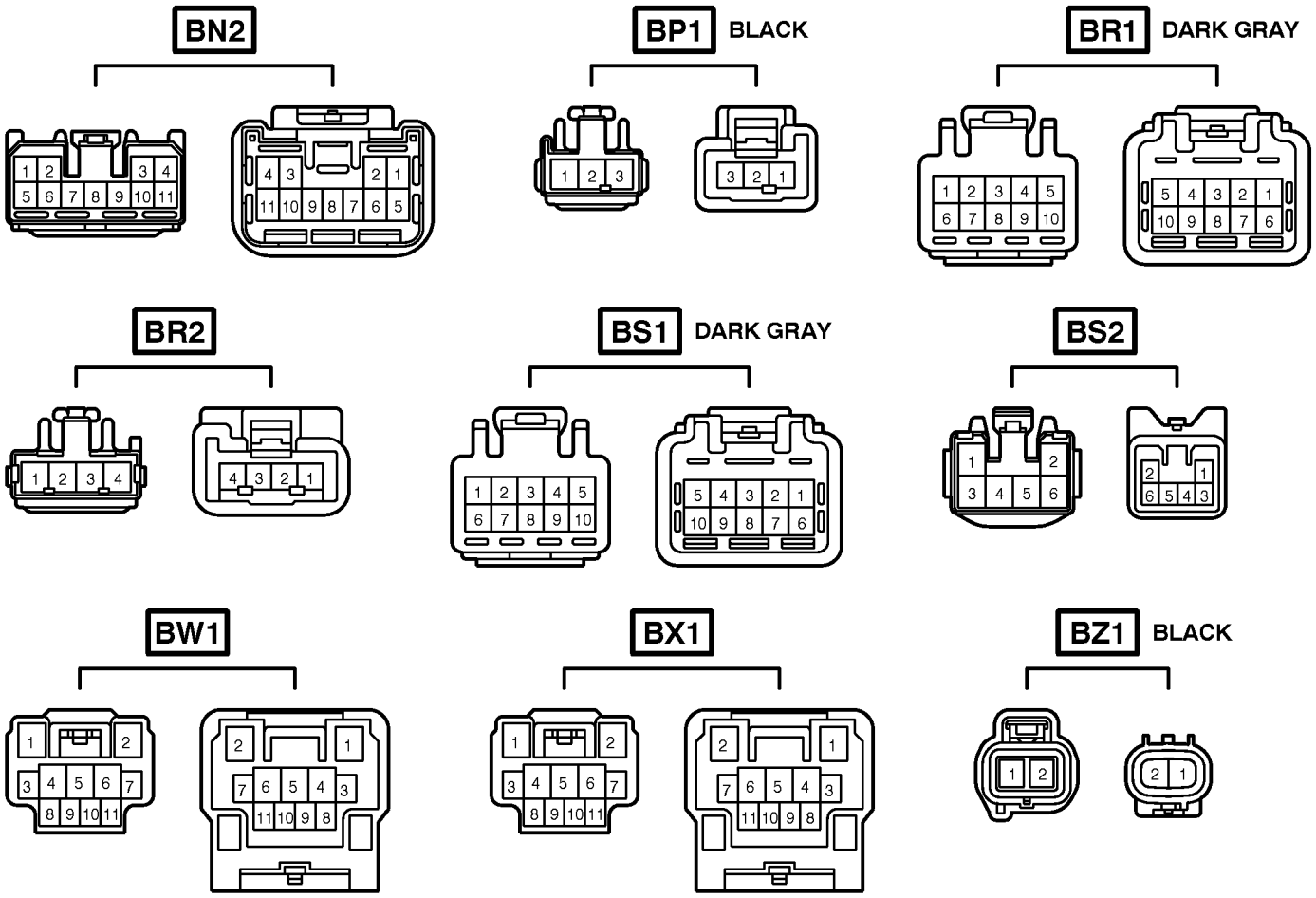
▽ : Location of Ground Points



○ : Location of Splice Points

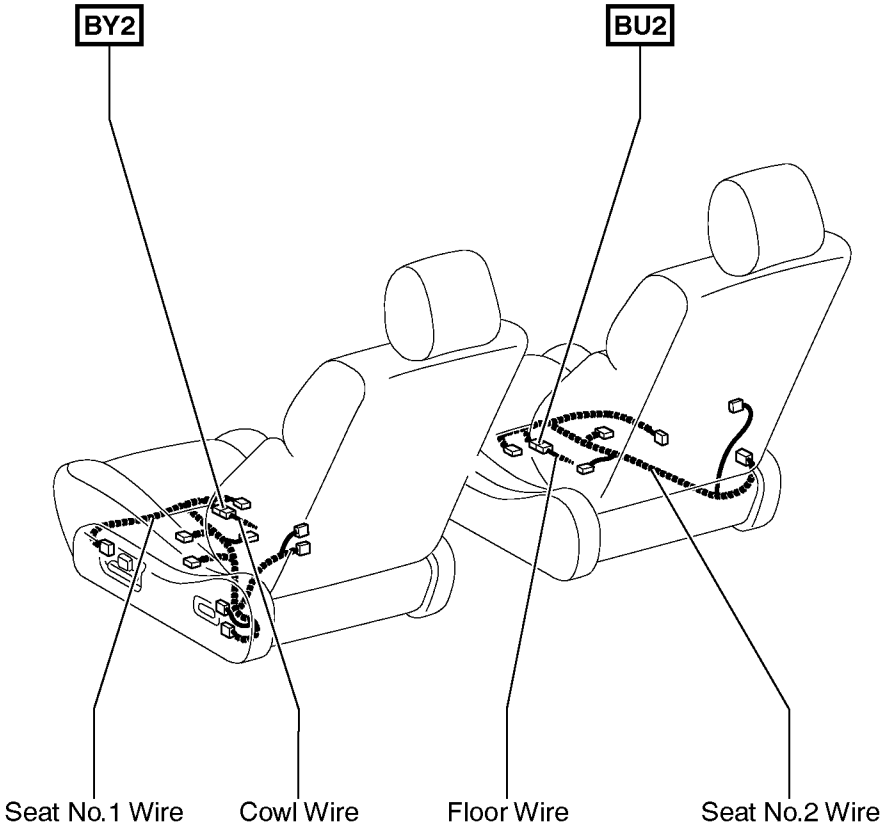


Connector Joining Wire Harness and Wire Harness

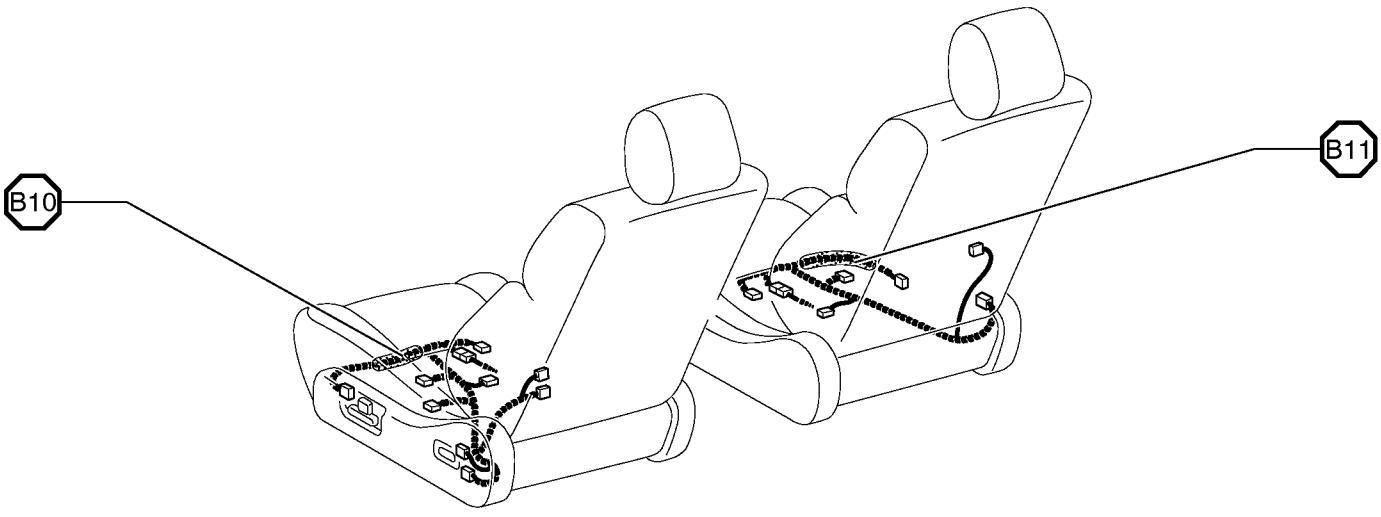


Code	Joining Wire Harness and Wire Harness (Connector Location)
BN2	Frame Wire and Floor No.2 Wire (Under the Left Side of Rear Seat Cushion)
BP1	Floor Wire and Rear Heater Sub Wire (Under the Front Passenger's Seat)
BR1	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2	
BS1	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BS2	
BW1	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	Rear Door RH Wire and Cowl Wire (Right Center Pillar)
BZ1	Frame Wire and Frame No.2 Wire (Upper the Rear Axle Housing Left)

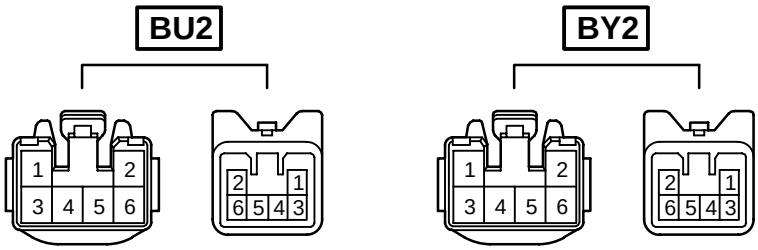
: Location of Connector Joining Wire Harness and Wire Harness



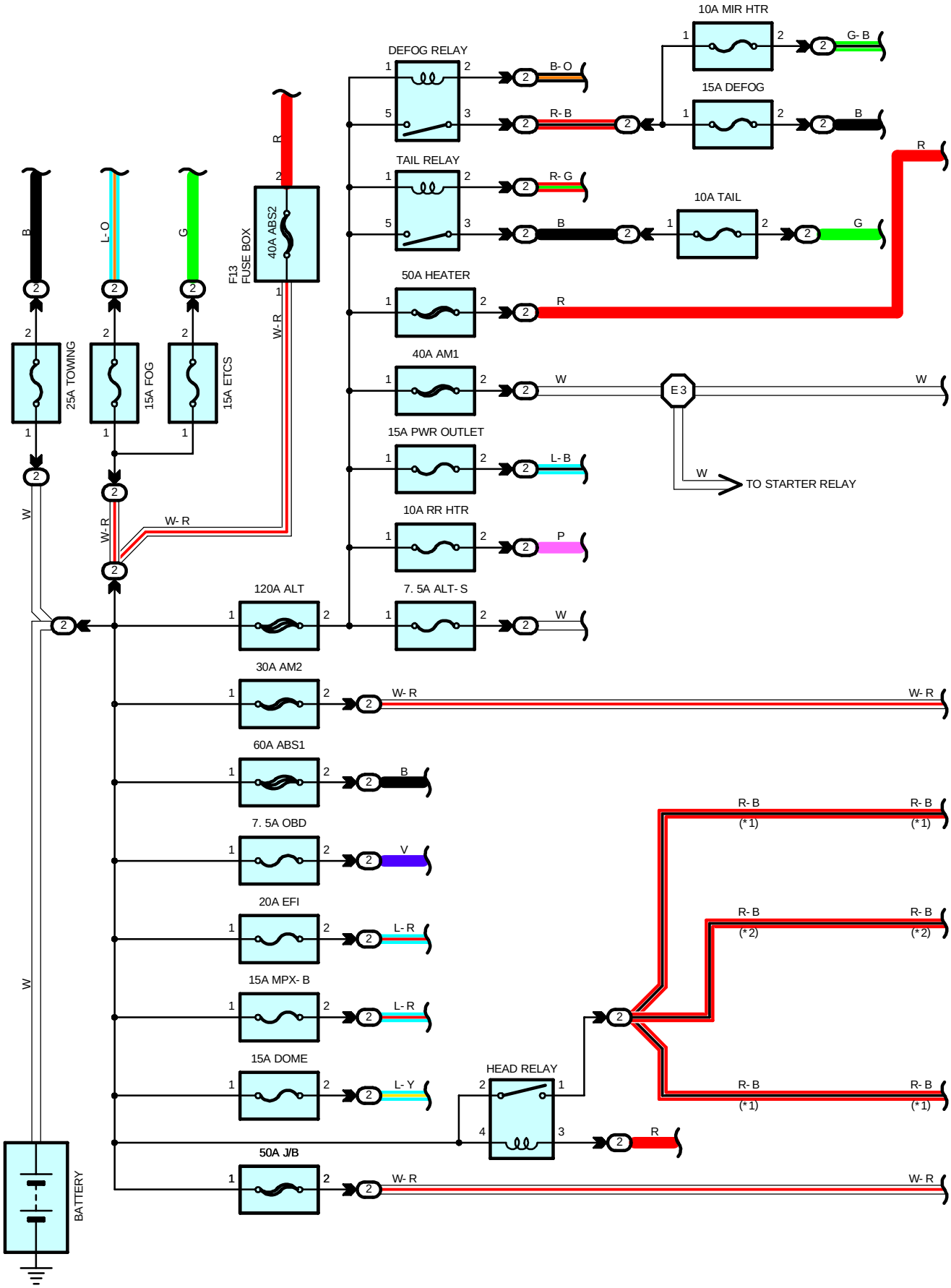
: Location of Splice Points

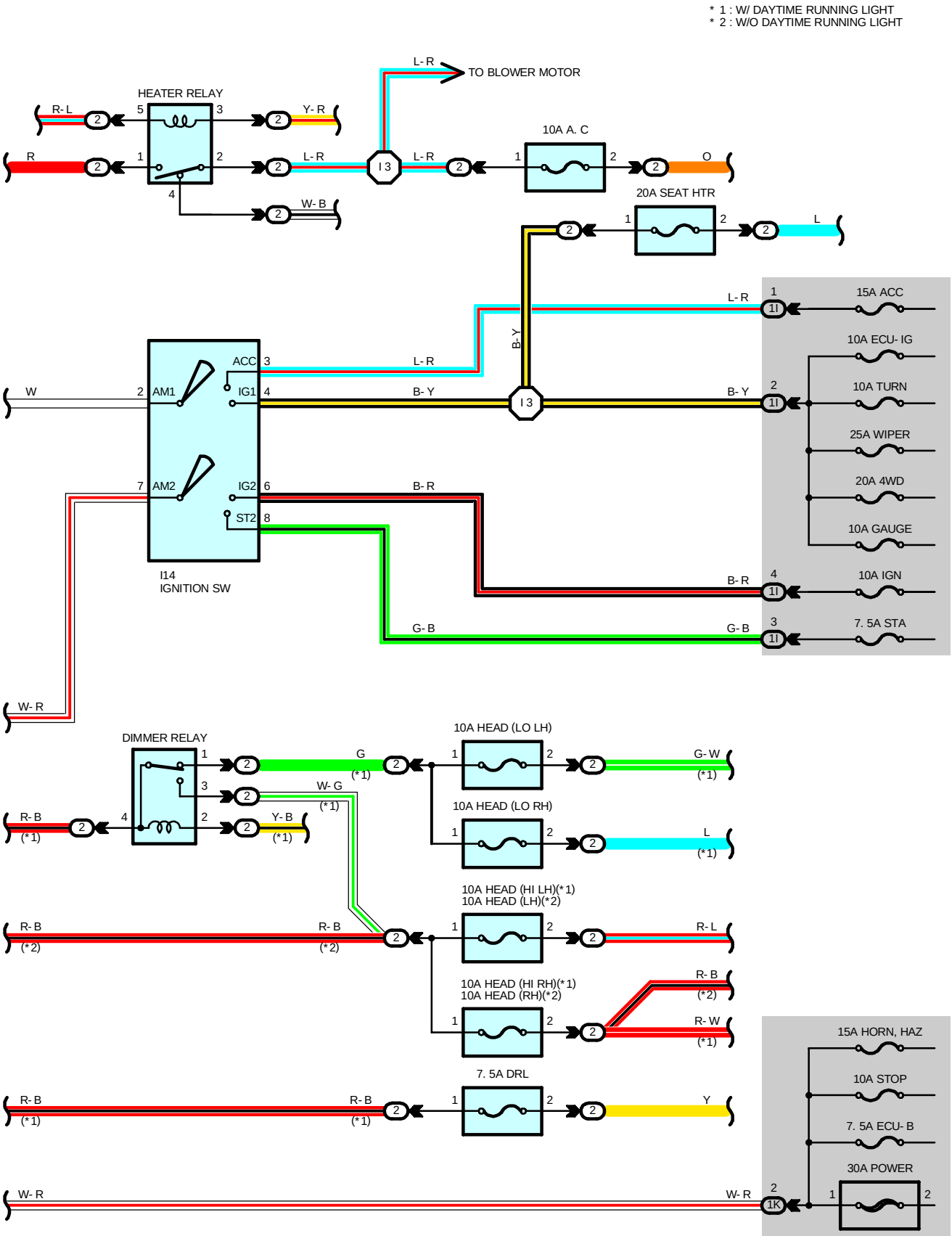


Connector Joining Wire Harness and Wire Harness



Code	Joining Wire Harness and Wire Harness (Connector Location)
BU2	Floor Wire and Seat No.2 Wire (Under the Front Passenger's Seat)
BY2	Cowl Wire and Seat No.1 Wire (Under the Driver's Seat)


10A MIR HTR
G- B
DEFOG RELAY
B- O
15A DEFOG
R- B
B
TAIL RELAY
R- G
10A TAIL
G
R
50A HEATER
F13
FUSE BOX
40A ABS2
40A AM1
W
E 3
TO STARTER RELAY
15A PWR OUTLET
L- B
10A RR HTR
P
120A ALT
7. 5A ALT- S
30A AM2
60A ABS1
7. 5A OBD
V
20A EFI
L- R
15A MPX- B
15A DOME
L- Y
HEAD RELAY
50A J/B
25A TOWING
15A FOG
15A ETCS
BATTERY
W- R
L- O
(*1)
(*2)


* 1 : W/ DAYTIME RUNNING LIGHT
* 2 : W/O DAYTIME RUNNING LIGHT
L- R
TO BLOWER MOTOR
HEATER RELAY
R- L
Y- R
R
L- R
I 3
10A A. C
O
20A SEAT HTR
W- B
L
15A ACC
10A ECU- IG
10A TURN
25A WIPER
20A 4WD
10A GAUGE
10A IGN
7. 5A STA
B- Y
ACC
IG1
AM1
W
B- R
AM2
IG2
ST2
I14
IGNITION SW
G- B
W- R
DIMMER RELAY
G
(*1)
W- G
R- B
(*1)
Y- B
10A HEAD (LO LH)
G- W
10A HEAD (LO RH)
10A HEAD (HI LH)(*1)
10A HEAD (LH)(*2)
R- L
10A HEAD (HI RH)(*1)
10A HEAD (RH)(*2)
R- W
7. 5A DRL
Y
15A HORN, HAZ
10A STOP
7. 5A ECU- B
30A POWER

POWER SOURCE

SERVICE HINTS

HEATER RELAY

2-1 : Closed with ignition SW on and blower SW on (Manual Air Conditioning),
heater control panel SW [A/C amplifier] on (Automatic Air Conditioning)

HEAD RELAY

2-1 : Closed with light control SW at **HEAD** position or dimmer SW at **FLASH** position
Closed with engine running and parking brake lever released (w/ daytime running light)

I14 IGNITION SW

2-3 : Closed with ignition key at **ACC** or **ON** position
2-4 : Closed with ignition key at **ON** or **ST** position
7-6 : Closed with ignition key at **ON** or **ST** position
7-8 : Closed with ignition key at **ST** position

TAIL RELAY

3-5 : Closed with light control SW at **TAIL** or **HEAD** position

DIMMER RELAY

Changed from HEAD (LO) to HEAD (HI) with dimmer SW at **FLASH** position or with HEAD relay on and dimmer SW at **HIGH** position (w/ daytime running light)

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
F13	28	I14	31		

: RELAY BLOCKS

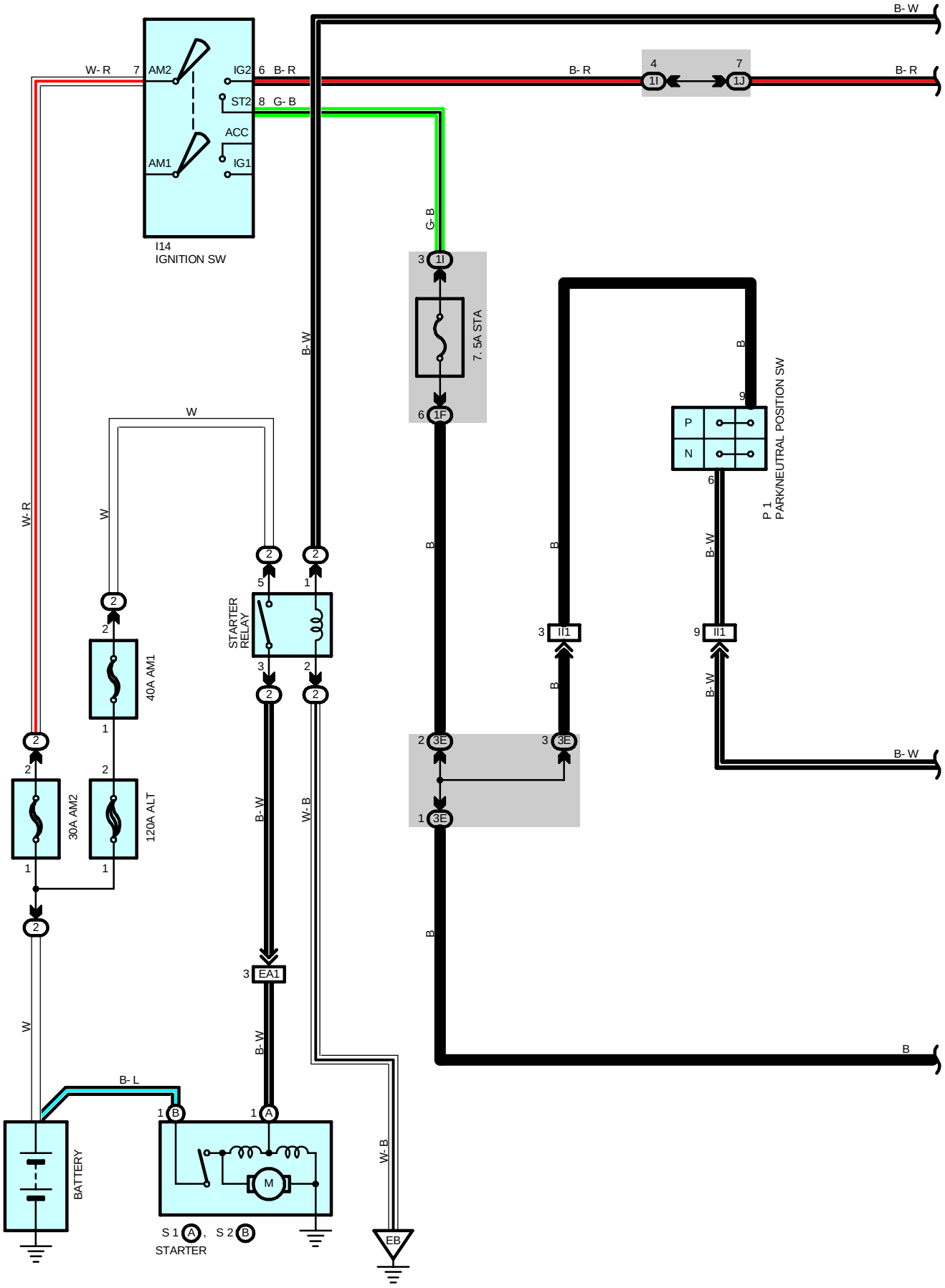
Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

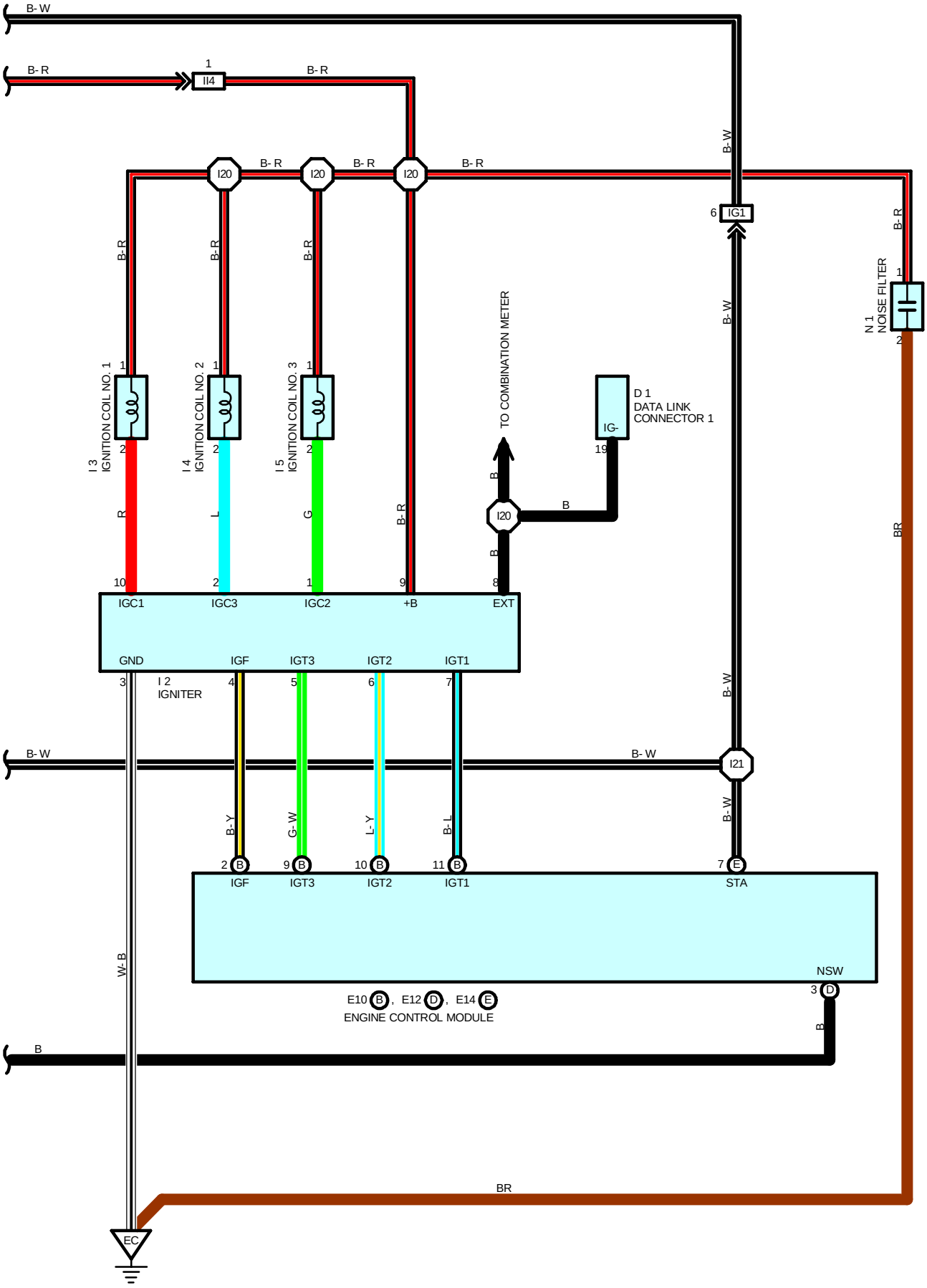
: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1I	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1K		

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E3	36	Engine Room Main Wire	I3	40	Engine Room Main Wire


B- W
W- R
7
AM2
IG2
6
B- R
B- R
4
1I
7
1J
B- R
ST2
8
G- B
ACC
AM1
IG1
I14
IGNITION SW
G- B
3
1I
7. 5A STA
6
1F
B- W
W
W
W- R
B
9
P
N
6
P 1
PARK/NEUTRAL POSITION SW
B- W
2
2
5
1
STARTER
RELAY
3
2
2
2
2
40A AM1
1
2
2
30A AM2
120A ALT
1
1
2
3
II1
9
II1
B
B
B- W
2
3E
3
3E
B- W
1
3E
B
3
EA1
B- W
W- B
B
W
B- L
1
B
1
A
BATTERY
M
W- B
S 1
A
,
S 2
B
STARTER
EB


B- W
B- R
1
II4
B- R
I20
B- R
I20
B- R
I20
B- R
B- W
6
IG1
B- R
1
N 1
NOISE FILTER
2
B- R
B- R
B- R
B- W
I 3
IGNITION COIL NO. 1
I 4
IGNITION COIL NO. 2
I 5
IGNITION COIL NO. 3
1
2
TO COMBINATION METER
D 1
DATA LINK
CONNECTOR 1
IG-
19
B
I20
B
B
B- R
R
L
G
B
10
2
1
9
8
IGC1
IGC3
IGC2
+B
EXT
GND
IGF
IGT3
IGT2
IGT1
3
4
5
6
7
I 2
IGNITER
B- W
B- W
I21
B- W
B- Y
G- W
L- Y
B- L
2
B
9
B
10
B
11
B
7
E
IGF
IGT3
IGT2
IGT1
STA
NSW
3
D
B
E10 B , E12 D , E14 E
ENGINE CONTROL MODULE
W- B
B
BR
EC
BR

STARTING AND IGNITION

SERVICE HINTS

S1 (A), S2 (B) STARTER

Points closed with Park/Neutral position SW at **P** or **N** position and ignition SW at **ST** position

I14 IGNITION SW

7-6 : Closed with ignition SW at **ON** or **ST** position
7-8 : Closed with ignition SW at **ST** position

P1 PARK/NEUTRAL POSITION SW

9-6 : Closed with A/T shift lever in **P** or **N** position

STARTER RELAY

3-5 : Closed with Park/Neutral position SW at **P** or **N** position and ignition SW at **ST** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
D1	28	I3	29	P1	29
E10 B	31	I4	29	S1 A	29
E12 D	31	I5	29	S2 B	29
E14 E	31	I14	31		
I2	29	N1	29		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1I	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1J	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

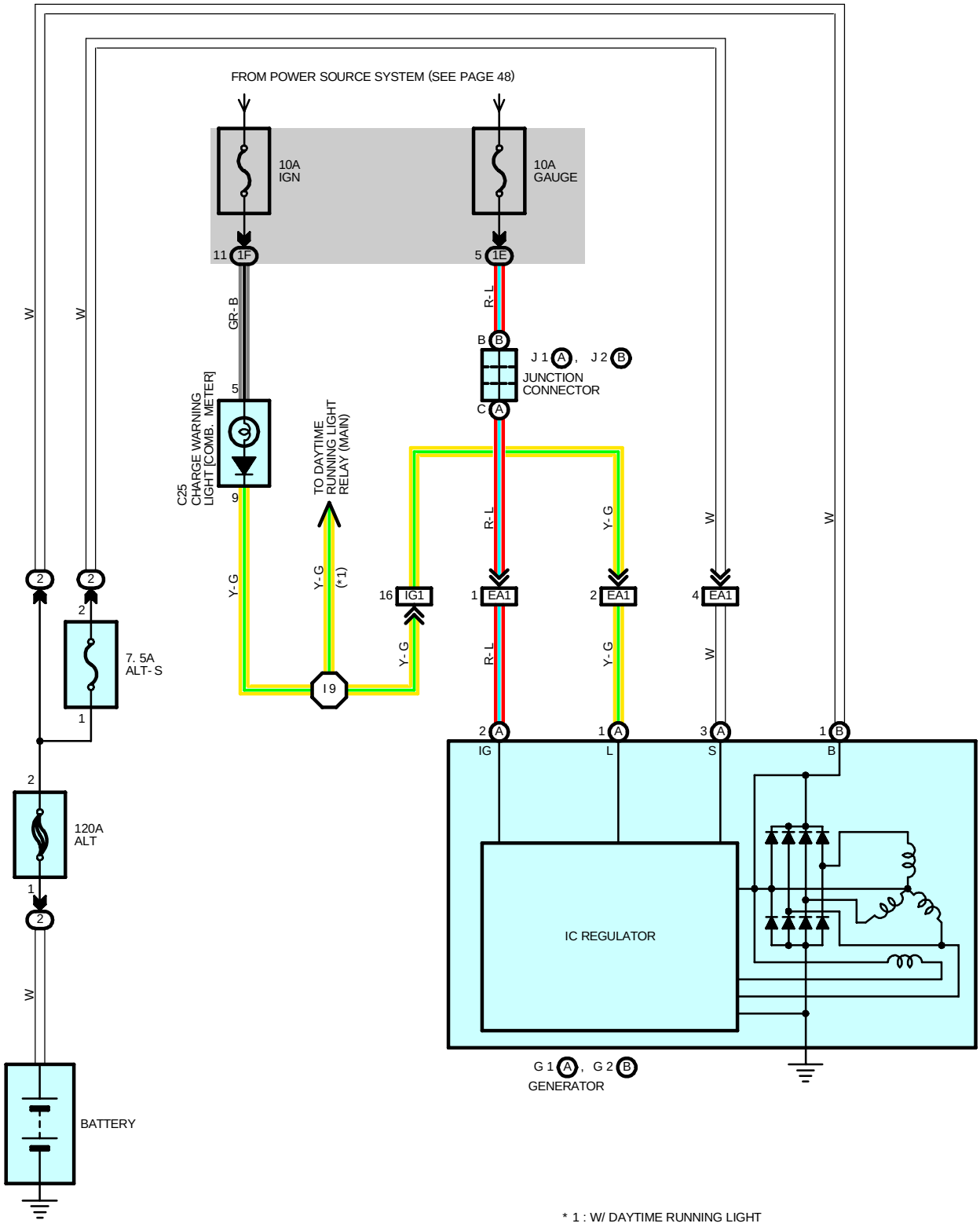
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	36	Engine No.2 Wire and Engine Room Main Wire (Near the Engine Room R/B)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II1	40	Engine Wire and Cowl Wire (On the Glove Box)
II4		

: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
EC	36	Intake Manifold Left

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I20	40	Engine Wire	I21	40	Cowl Wire



* 1 : W/ DAYTIME RUNNING LIGHT

SERVICE HINTS

G1 (A), G2 (B) GENERATOR

(B) 1-GROUND : **13.9**- **15.1** volts with engine running at **2000** rpm and **25**˚C (**77**˚F)
13.5- **14.3** volts with engine running at **2000** rpm and **115**˚C (**239**˚F)

(A) 1-GROUND : **0**- **4** volts with ignition SW at **ON** position and engine not running

: PARTS LOCATION

Code		See Page	Code		See Page	Code		See Page
C25		30	G2	B	28	J2	B	29
G1	A	28	J1	A	29			

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

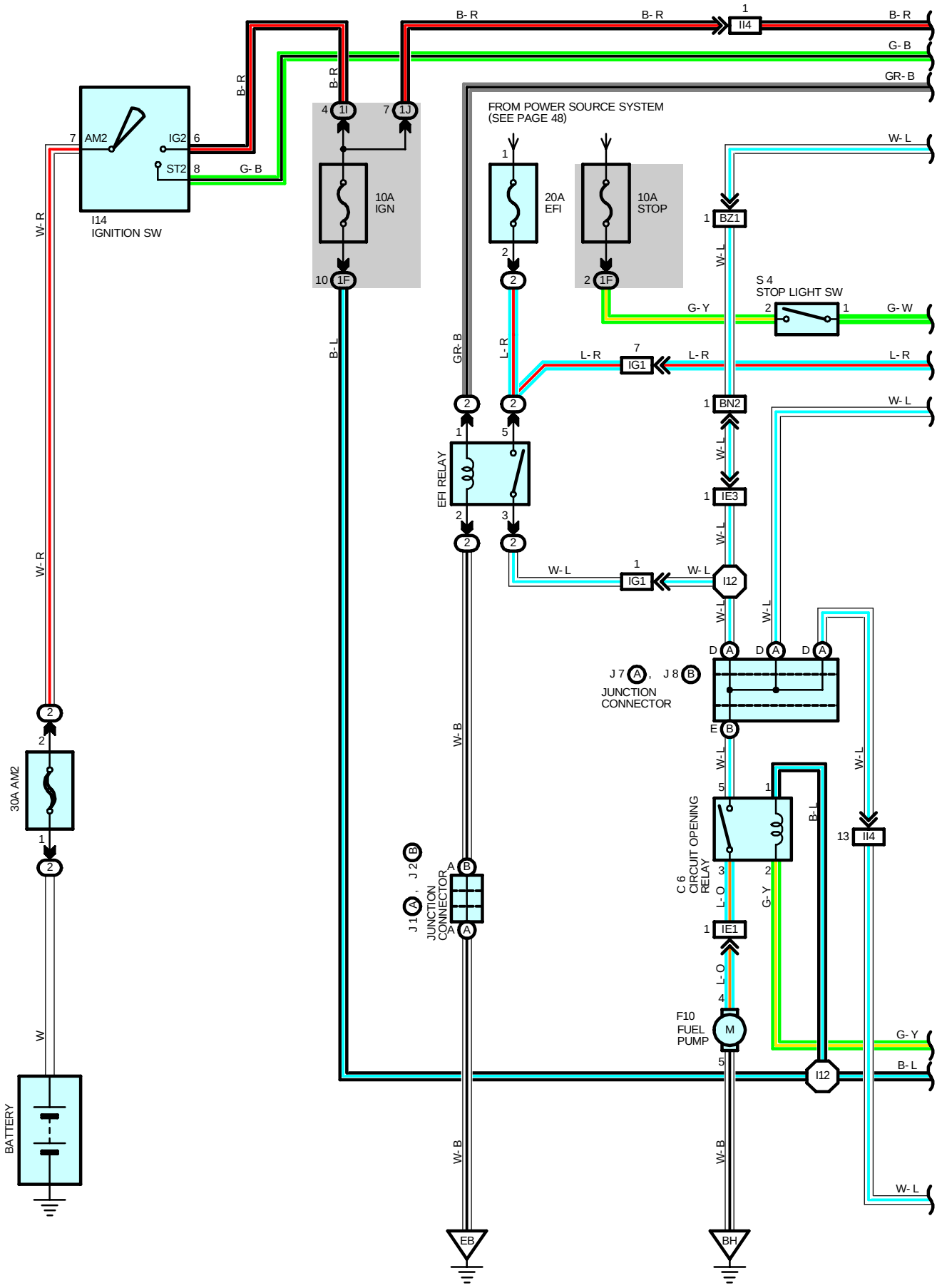
Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)

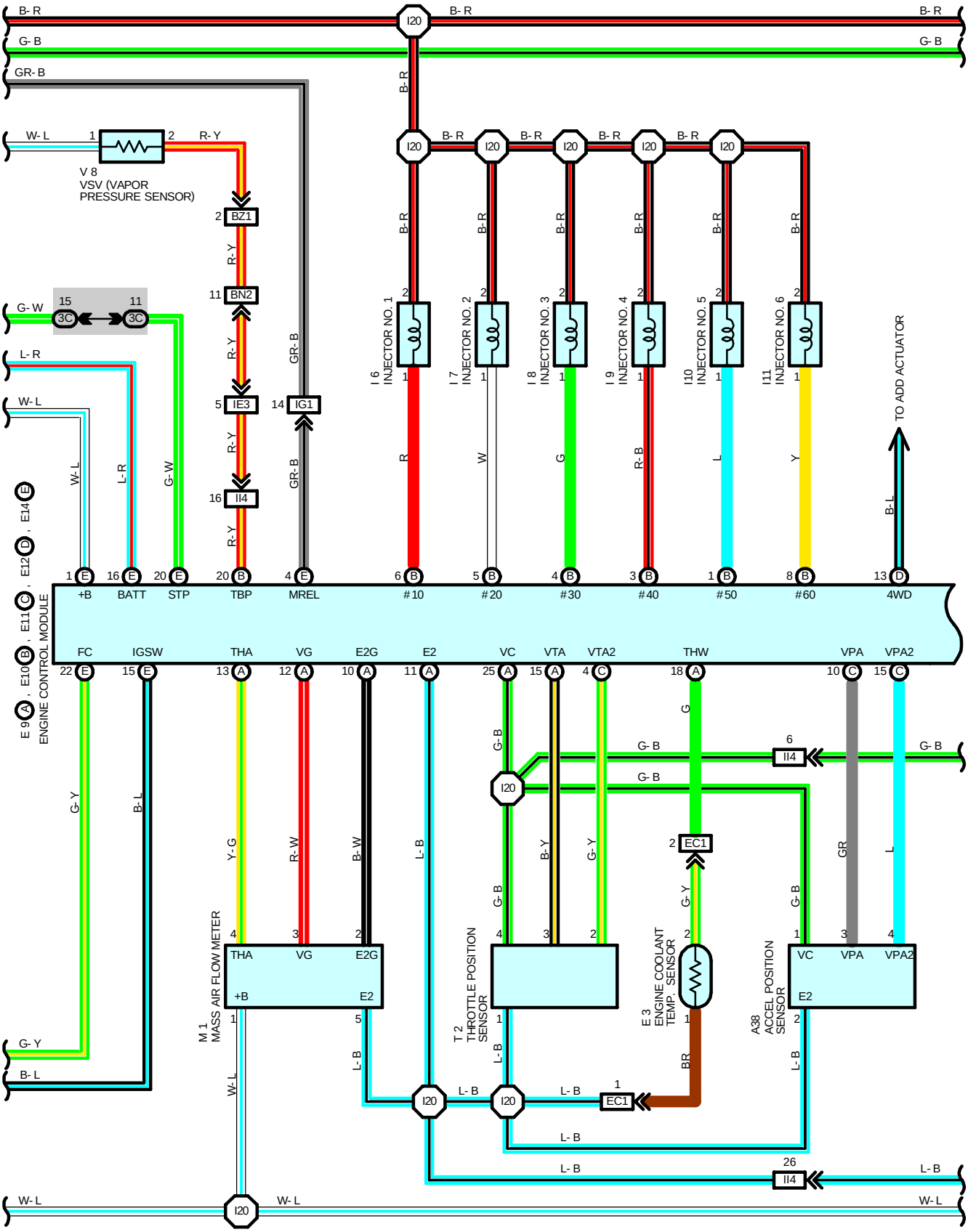
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

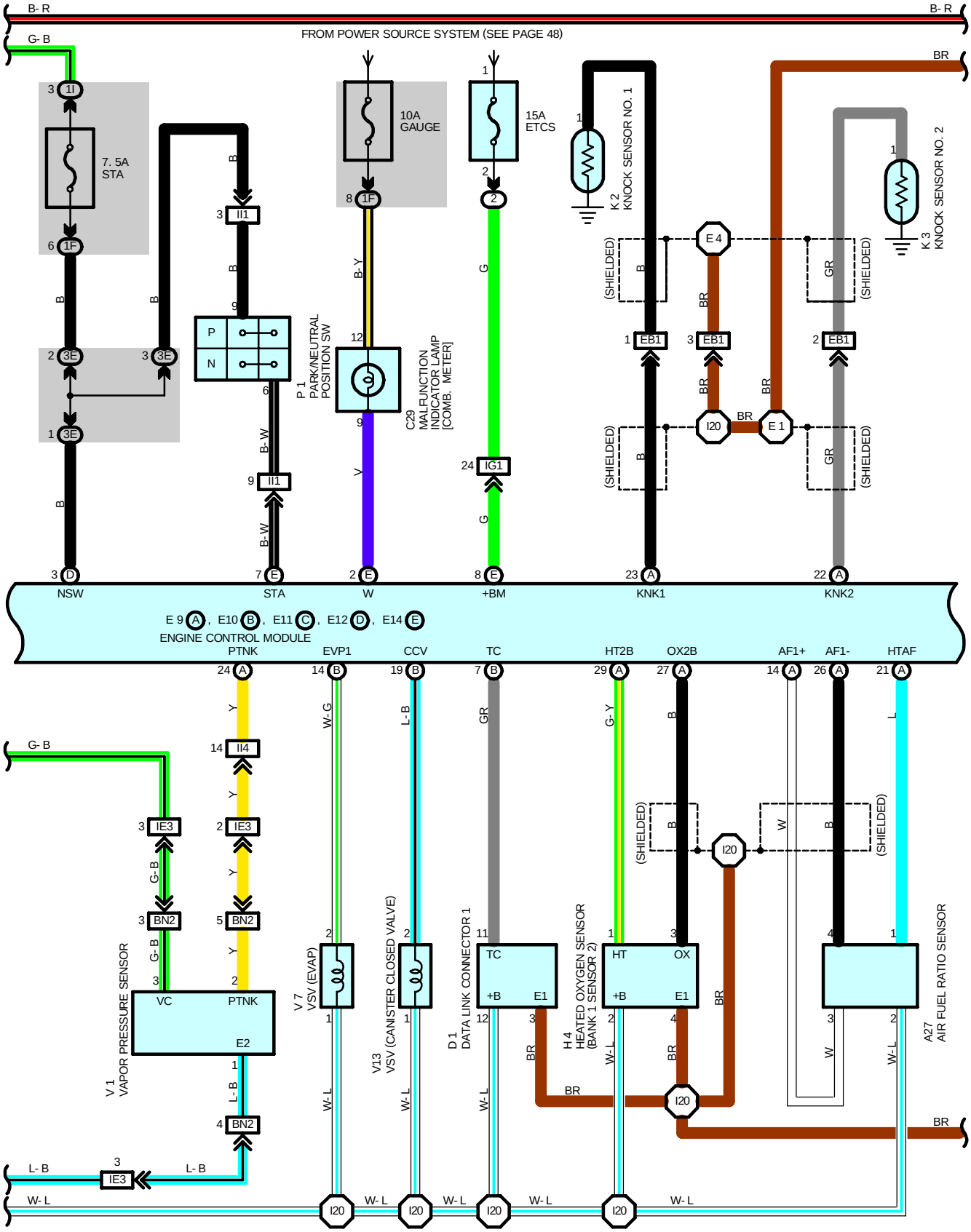
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	36	Engine No.2 Wire and Engine Room Main Wire (Near the Engine Room R/B)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

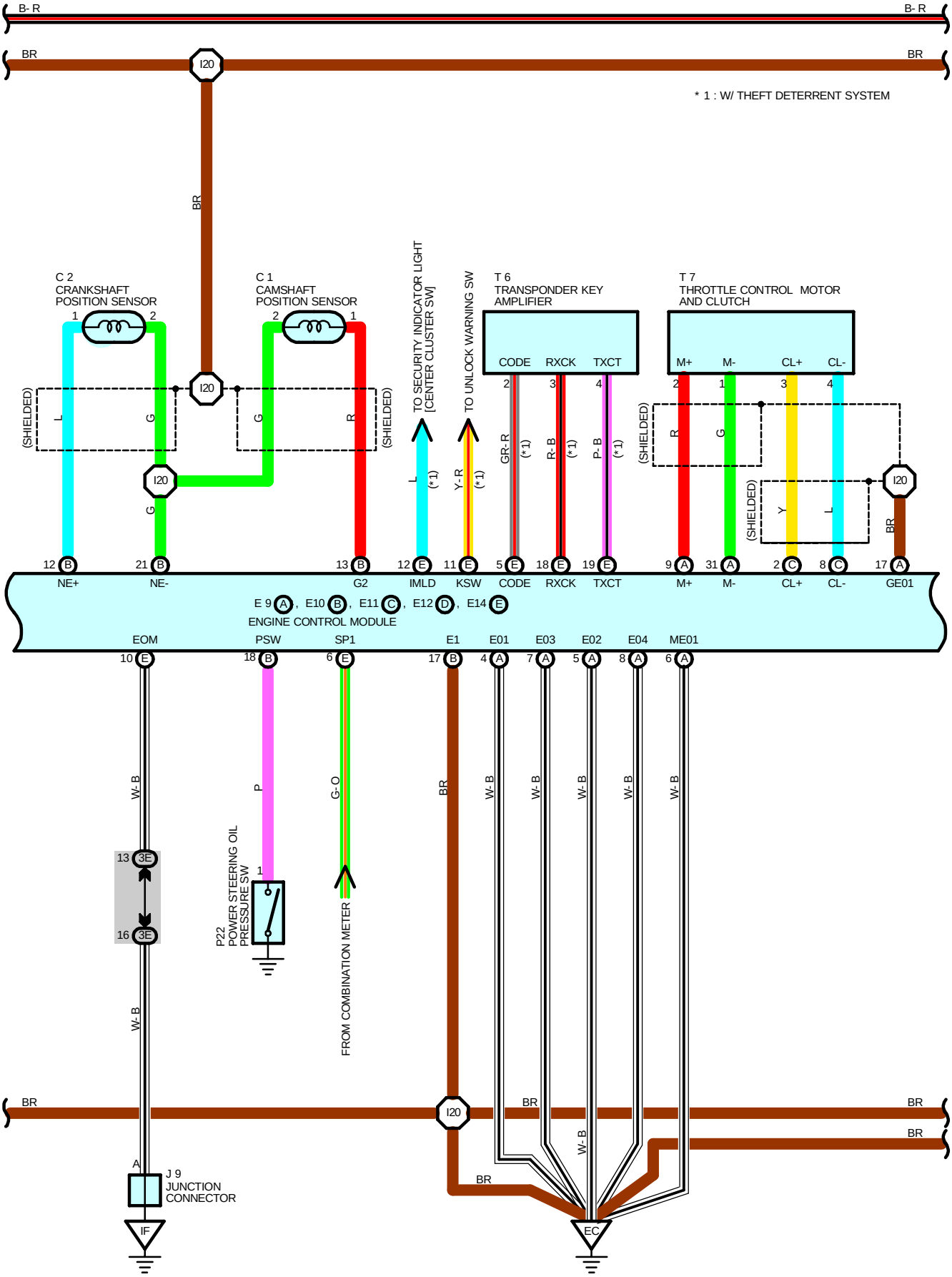
: SPLICE POINTS

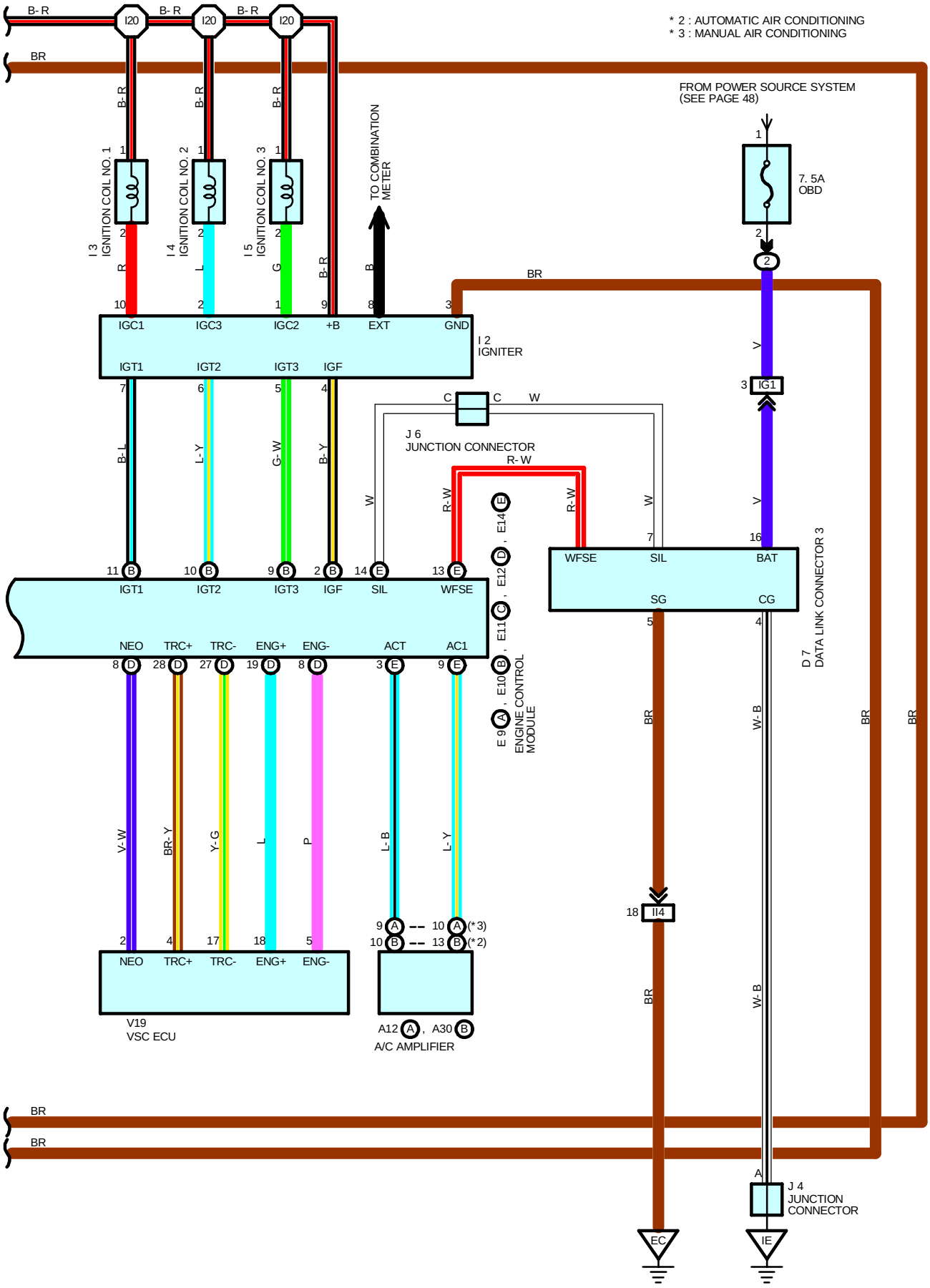
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I9	40	Cowl Wire			


B-R
B-R
1
II4
B-R
G-B
GR-B
FROM POWER SOURCE SYSTEM
(SEE PAGE 48)
W-L
7 AM2
IG2 6
ST2 8
G-B
I14
IGNITION SW
W-R
B-R
B-R
4 1I
7 1J
10A
IGN
10 1F
B-L
20A
EFI
10A
STOP
2 1F
1 BZ1
W-L
S 4
STOP LIGHT SW
G-Y
2
1
G-W
GR-B
L-R
L-R
7
IG1
L-R
L-R
1 BN2
W-L
EFI RELAY
1
5
2
3
1 IE3
W-L
W-L
IG1
1
W-L
I12
W-L
W-L
D A D A D A
J 7 A , J 8 B
JUNCTION
CONNECTOR
E B
W-L
5
1
B-L
13 II4
C 6
CIRCUIT OPENING
RELAY
3
2
L-O
G-Y
1 IE1
L-O
4
F10
FUEL
PUMP
M
5
G-Y
B-L
I12
W-L
W-R
2
2
30A AM2
1
2
W
BATTERY
J 2 B
J 1 A , A B
JUNCTION
CONNECTOR
A A
W-B
W-B
EB
BH


B- R
G- B
GR- B
W- L
R- Y
V 8
VSV (VAPOR
PRESSURE SENSOR)
BZ1
BN2
IE3
II4
IG1
G- W
L- R
W- L
GR- B
I20
I 6
INJECTOR NO. 1
I 7
INJECTOR NO. 2
I 8
INJECTOR NO. 3
I 9
INJECTOR NO. 4
I10
INJECTOR NO. 5
I11
INJECTOR NO. 6
TO ADD ACTUATOR
B- L
E14 , E12 , E11 , E10 , E 9
ENGINE CONTROL MODULE
+B
BATT
STP
TBP
MREL
#10
#20
#30
#40
#50
#60
4WD
FC
IGSW
THA
VG
E2G
E2
VC
VTA
VTA2
THW
VPA
VPA2
G- Y
B- L
Y- G
R- W
B- W
L- B
B- Y
G- B
G
GR
L
EC1
M 1
MASS AIR FLOW METER
THA
VG
E2G
+B
E2
T 2
THROTTLE POSITION
SENSOR
E 3
ENGINE COOLANT
TEMP. SENSOR
BR
A38
ACCEL POSITION
SENSOR
VC
VPA
VPA2
E2
26


B- R
B- R
FROM POWER SOURCE SYSTEM (SEE PAGE 48)
G- B
7. 5A
STA
10A
GAUGE
15A
ETCS
K 2
KNOCK SENSOR NO. 1
K 3
KNOCK SENSOR NO. 2
P 1
PARK/NEUTRAL
POSITION SW
C29
MALFUNCTION
INDICATOR LAMP
[COMB. METER]
(SHIELDED)
NSW
STA
W
+BM
KNK1
KNK2
E 9 A, E10 B, E11 C, E12 D, E14 E
ENGINE CONTROL MODULE
PTNK
EVP1
CCV
TC
HT2B
OX2B
AF1+
AF1-
HTAF
V 1
VAPOR PRESSURE SENSOR
V 7
VSV (EVAP)
V13
VSV (CANISTER CLOSED VALVE)
D 1
DATA LINK CONNECTOR 1
H 4
HEATED OXYGEN SENSOR
(BANK 1 SENSOR 2)
A27
AIR FUEL RATIO SENSOR
VC
PTNK
E2
HT
OX
+B
E1
TC
W- L
L- B
G- B
B- Y
B- W
G
Y
GR
G- Y
BR
W
L


B- R
B- R
BR
I20
BR
* 1 : W/ THEFT DETERRENT SYSTEM
C 2
CRANKSHAFT
POSITION SENSOR
C 1
CAMSHAFT
POSITION SENSOR
TO SECURITY INDICATOR LIGHT
[CENTER CLUSTER SW]
TO UNLOCK WARNING SW
T 6
TRANSPONDER KEY
AMPLIFIER
CODE
RXCK
TXCT
T 7
THROTTLE CONTROL MOTOR
AND CLUTCH
M+
M-
CL+
CL-
(SHIELDED)
L
G
R
Y
GR- R
R- B
P- B
Y- R
BR
(*1)
12 B NE+
21 B NE-
13 B G2
12 E IMLD
11 E KSW
5 E CODE
18 E RXCK
19 E TXCT
9 A M+
31 A M-
2 C CL+
8 C CL-
17 A GE01
E 9 A, E10 B, E11 C, E12 D, E14 E
ENGINE CONTROL MODULE
EOM
PSW
SP1
E1
E01
E03
E02
E04
ME01
10 E
18 B
6 E
17 B
4 A
7 A
5 A
8 A
6 A
W- B
P
G- O
BR
13 3E
16 3E
P22
POWER STEERING OIL
PRESSURE SW
FROM COMBINATION METER
A
J 9
JUNCTION
CONNECTOR
IF
EC


* 2 : AUTOMATIC AIR CONDITIONING
* 3 : MANUAL AIR CONDITIONING
FROM POWER SOURCE SYSTEM (SEE PAGE 48)
7. 5A OBD
TO COMBINATION METER
I 3 IGNITION COIL NO. 1
I 4 IGNITION COIL NO. 2
I 5 IGNITION COIL NO. 3
I 2 IGNITER
IGC1 IGC3 IGC2 +B EXT GND
IGT1 IGT2 IGT3 IGF
J 6 JUNCTION CONNECTOR
IG1
WFSE SIL BAT
SG CG
D 7 DATA LINK CONNECTOR 3
E 9 ENGINE CONTROL MODULE
NEO TRC+ TRC- ENG+ ENG-
ACT AC1
V19 VSC ECU
A12 A/C AMPLIFIER A30
II4
J 4 JUNCTION CONNECTOR
EC
IE

SYSTEM OUTLINE

The engine control system utilize a microcomputer and maintains overall control of the engine, transmission, etc. An outline of engine control is given here.

1. INPUT SIGNAL

(1) Engine coolant temp. signal system

The engine coolant temp. sensor detects the engine coolant temp. and has a built-in thermistor with a resistance which varies according to the engine coolant temp. The engine coolant temp. is input as a control signal to TERMINAL THW of the engine control module.

(2) Heated oxygen sensor signal system

The oxygen density in the exhaust emissions is detected and input as a control signal to TERMINAL OXB2 of the engine control module. To maintain stable detection performance by the heated oxygen sensor, the heated oxygen sensors are warmed. The heater is also controlled by the engine control module (HT2B).

(3) RPM signal system

Camshaft position and crankshaft position are detected by the camshaft position sensor and crankshaft position sensor, camshaft position is input as a control signal to TERMINAL G2 of the engine control module, and engine RPM is input to TERMINAL NE+.

(4) Throttle signal system

The throttle position sensor detects the throttle valve opening angle, which is input as a control signal to TERMINALS VTA and VTA2 of the engine control module.

(5) Vehicle speed signal system

The vehicle speed sensor, detects the vehicle speed and input to ABS speed sensor of the VSC ECU, from VSC ECU to TERMINAL SP1 of the engine control module, via combination meter.

(6) A/C SW signal system

The operating voltage of the A/C magnetic clutch is detected and input as a control signal to TERMINAL AC1 of the engine control module.

(7) Battery signal system

Voltage is constantly applied to TERMINAL BATT of the engine control module. When the ignition SW is turned to on, voltage for engine control module operation is applied via the EFI relay to TERMINAL +B of the engine control module.

(8) Intake air volume signal system

Intake air volume is detected by the mass air flow meter and a signal is input into TERMINAL VG of the engine control module as a control signal.

(9) Stop light SW signal system

The stop light SW is used to detect whether or not the vehicle is braking and the information is input as a control signal to TERMINAL STP of the engine control module.

(10) Starter signal system

To confirm that the engine is cranking, the voltage applied to the starter motor during cranking is detected and is input as a control signal to TERMINAL STA of the engine control module.

(11) Engine knock signal system

Engine knocking is detected by the knock sensor no. 1 and no. 2 and the signals are input to TERMINALS KNK1 and KNK2 of the engine control module.

(12) 4WD signal system (4WD)

Whether or not the vehicle is operating in 4WD mode is determined, and a control signal is input to TERMINAL 4WD of the engine control module.

(13) Intake air temp. signal circuit

The intake air temp. sensor is installed in the mass air flow meter and detects the intake air temp., which is input as a control signal into TERMINAL THA of the engine control module.

(14) Air fuel ratio signal system

The air fuel ratio is detected and input as a control signal into TERMINAL AF1+ of the engine control module.

2. CONTROL SYSTEM

* SFI system
  The SFI system monitors the engine conditions through the signals each sensor inputs to the engine control module. Based on this data and the program memorized in the engine control module, the most appropriate fuel injection timing is detected and current is output to TERMINALS #10**,** #20**,** #30**,** #40**,** #50 AND #60 of the engine control module, causing the injectors to operate (to inject fuel). It is this system which, through the work of the engine control module, finely controls fuel injection in response to driving conditions.
* ESA system
  The ESA system monitors the engine conditions using the signals input to the engine control module from each sensor. Based on this data and the program memorizes in the engine control module, the most appropriate ignition timing is decided and current is output to TERMINALS IGT1, IGT2 and IGT3 of the engine control module. This output controls the igniter to produce the most appropriate ignition timing for the driving conditions.
* Heated oxygen sensor heater control system
  The heated oxygen sensor heater control system turns the heater to on when the intake air volume is low (Temp. of exhaust emissions is low). And warms up the heated oxygen sensors to improve detection performance of the sensors. The engine control module evaluates the signals from each sensor current is output to TERMINAL HT2B and controls the heater.

3. DIAGNOSIS SYSTEM

With the diagnosis system, when there is a malfunction in the ECU signal system, the malfunctioning system is recorded in the memory. The malfunctioning system can then be found by reading the display (Code) of the malfunction indicator lamp.

4. FAIL- SAFE SYSTEM

When a malfunction occurs in any system, if there is a possibility of engine being caused by continued control based on the signals from that system, the fail-safe system either controls the system by using data (Standard values) recorded in the engine control module memory or else stops the engine.

SERVICE HINTS

EFI RELAY

5-3 : Closed with ignition SW at **ON** or **ST** position

C6 CIRCUIT OPENING RELAY

5-3 : Closed with starter running or ignition SW at **ON** position

I6, I7, I8, I9, I10, I11 INJECTOR

1-2 : **13.4**- **14.2** Ω

E3 ENGINE COOLANT TEMP. SENSOR

1-2 : **10**- **20** kΩ (**-20** ˚C, **-4** ˚F)
4- **7** kΩ (**0**˚C, **32**˚F)
2- **3** kΩ (**20**˚C, **68**˚F)
0.9- **1.3** kΩ (**40**˚C, **104**˚F)
0.4- **0.7** kΩ (**60**˚C, **140**˚F)
0.2- **0.4** kΩ (**80**˚C, **176**˚F)

E9 (A), E10 (B), E11 (C), E12 (D), E14 (E) ENGINE CONTROL MODULE

Voltage at engine control module wiring connectors
+B-E1 : **9**- **14** volts (Ignition SW on)
BATT-E1 : **9**- **14** volts (Always)
VC-E2 : **4.5**- **5.5** volts (Ignition SW on)
VTA-E2 : Approx. **0.6** volts (Ignition SW on and throttle valve fully closed)
Approx. **4** volts (ignition SW on and throttle valve fully open)
STA-E1 : **6** volts or more (Ignition SW at **ST** position)
W-E1 : **9**- **14** volts (No trouble and engine running)
THW-E1 : **0.2**- **1.0** volts (Ignition SW on and coolant temp. **80**˚C, **176**˚F)
SP1-E1 : Pulse generation with vehicle moving
STP-E1 : **7.5**- **14** volts (Stop light SW on)
IGT1, IGT2, IGT3-E1 : Pulse generation (Cranking or idling)
#10, #20, #30, #40, #50, #60-E1 : **9**- **14** volts (Ignition SW on)

RESISTANCE AT ECU WIRING CONNECTOR

(Disconnect wiring connector)
THW-E2 : **0.2**- **0.4** kΩ (Coolant temp. **80**˚C, **176**˚F)
NE+-E2 : **140**- **180** Ω

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A12 A	30	H4	28	J8 B	31
A27	28	I2	29	J9	31
A30 B	30	I3	29	K2	29
A38	28	I4	29	K3	29
C1	28	I5	29	M1	29
C2	28	I6	29	P1	29
C6	30	I7	29	P22	29
C29	30	I8	29	S4	31
D1	28	I9	29	T2	29
D7	30	I10	29	T6	31
E3	28	I11	29	T7	29
E9 A	31	I14	31	V1	33
E10 B	31	J1 A	29	V7	29
E11 C	31	J2 B	29	V8	33
E12 D	31	J4	31	V13	29
E14 E	31	J6	31	V19	31
F10	32	J7 A	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1I	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1J	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3C 3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EB1	36	Sensor Wire and Engine Wire (Front Side of Cylinder Head Cover Right)
EC1	36	Engine Wire and Water Temp. Sensor Wire (Front Side of Cylinder Head Cover Right)
IE1 IE3	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II1 II4	40	Engine Wire and Cowl Wire (On the Glove Box)
BN2	42	Frame Wire and Floor No.2 Wire (Under the Left Side of Rear Seat Cushion)
BZ1	42	Frame Wire and Frame No.2 Wire (Upper the Rear Axle Housing Left)

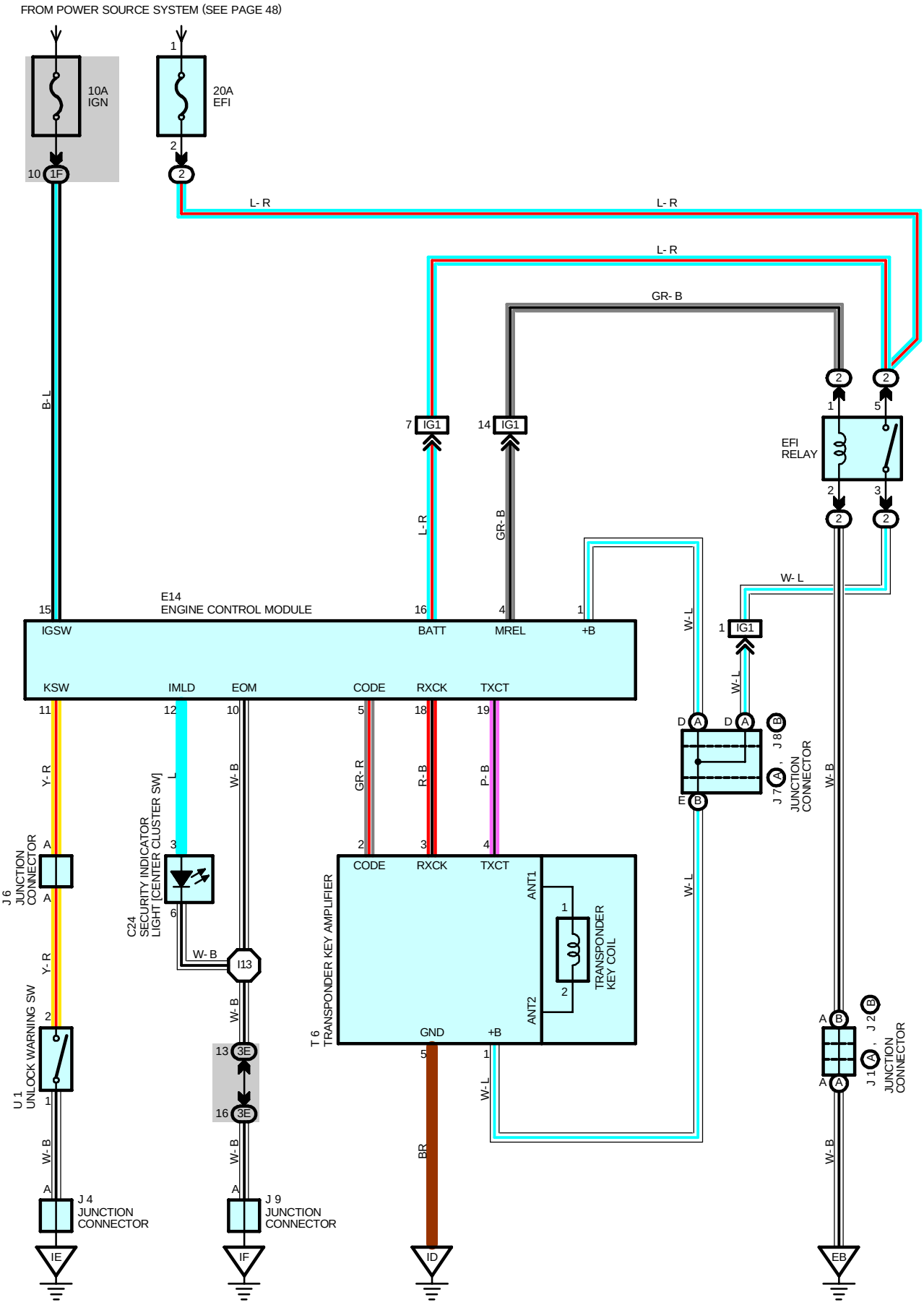
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
EC	36	Intake Manifold Left
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E1	36	Engine Wire	I12	40	Cowl Wire
E4	36	Sensor Wire	I20	40	Engine Wire

ENGINE IMMOBILISER SYSTEM



SERVICE HINTS

E14 ENGINE CONTROL MODULE

11-GROUND : Continuity with ignition key in cylinder
16-GROUND : Always Approx. **12** volts
15-GROUND : Approx. **12** volts with ignition SW on
10-GROUND : Always continuity

: PARTS LOCATION

Code		See Page	Code		See Page	Code	See Page
C24		30	J4		31	J9	31
E14		31	J6		31	T6	31
J1	A	29	J7	A	31	U1	31
J2	B	29	J8	B	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

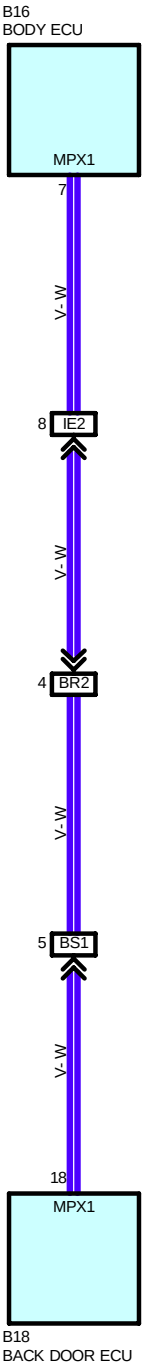
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
ID	38	Left Kick Panel
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

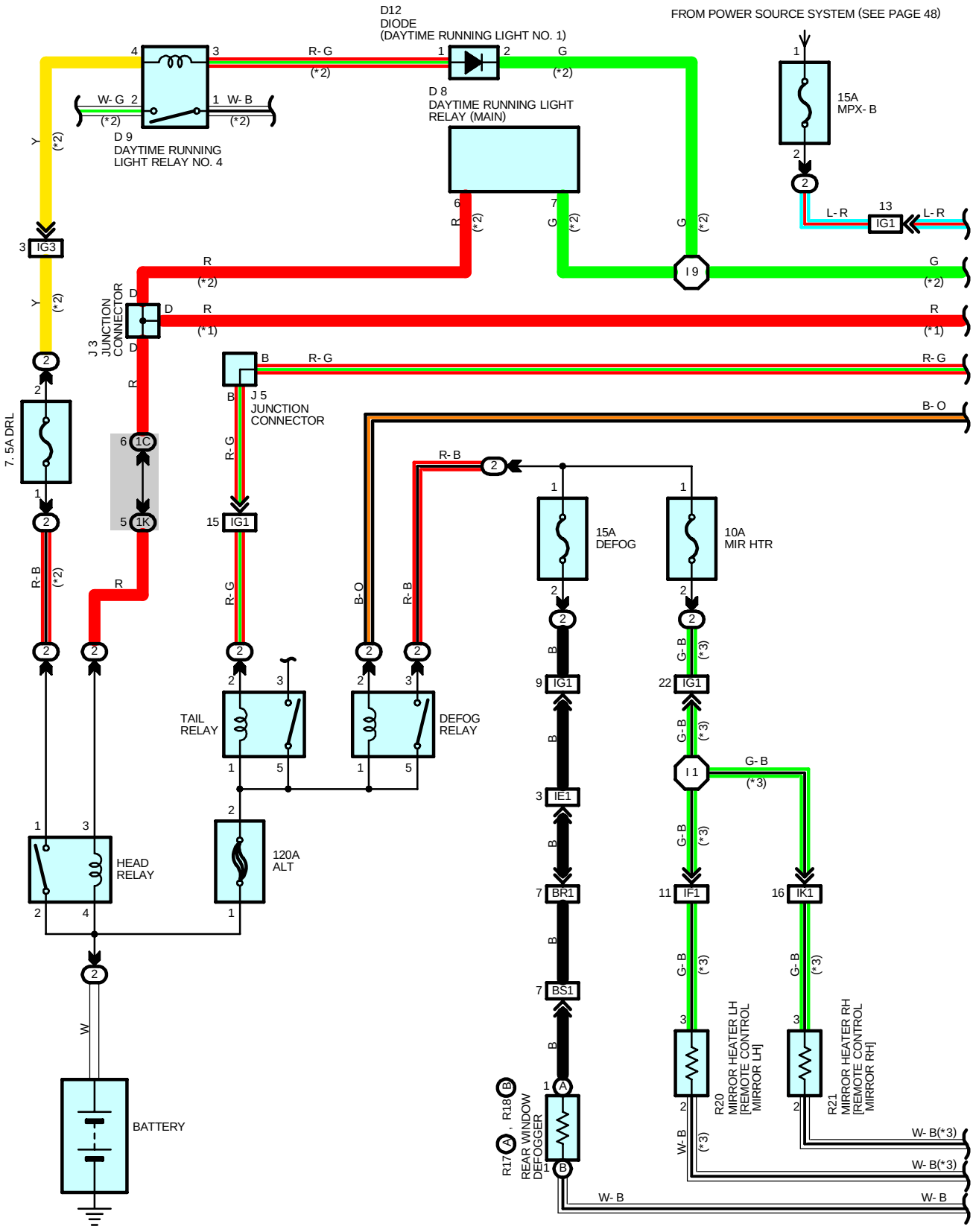
: SPLICE POINTS

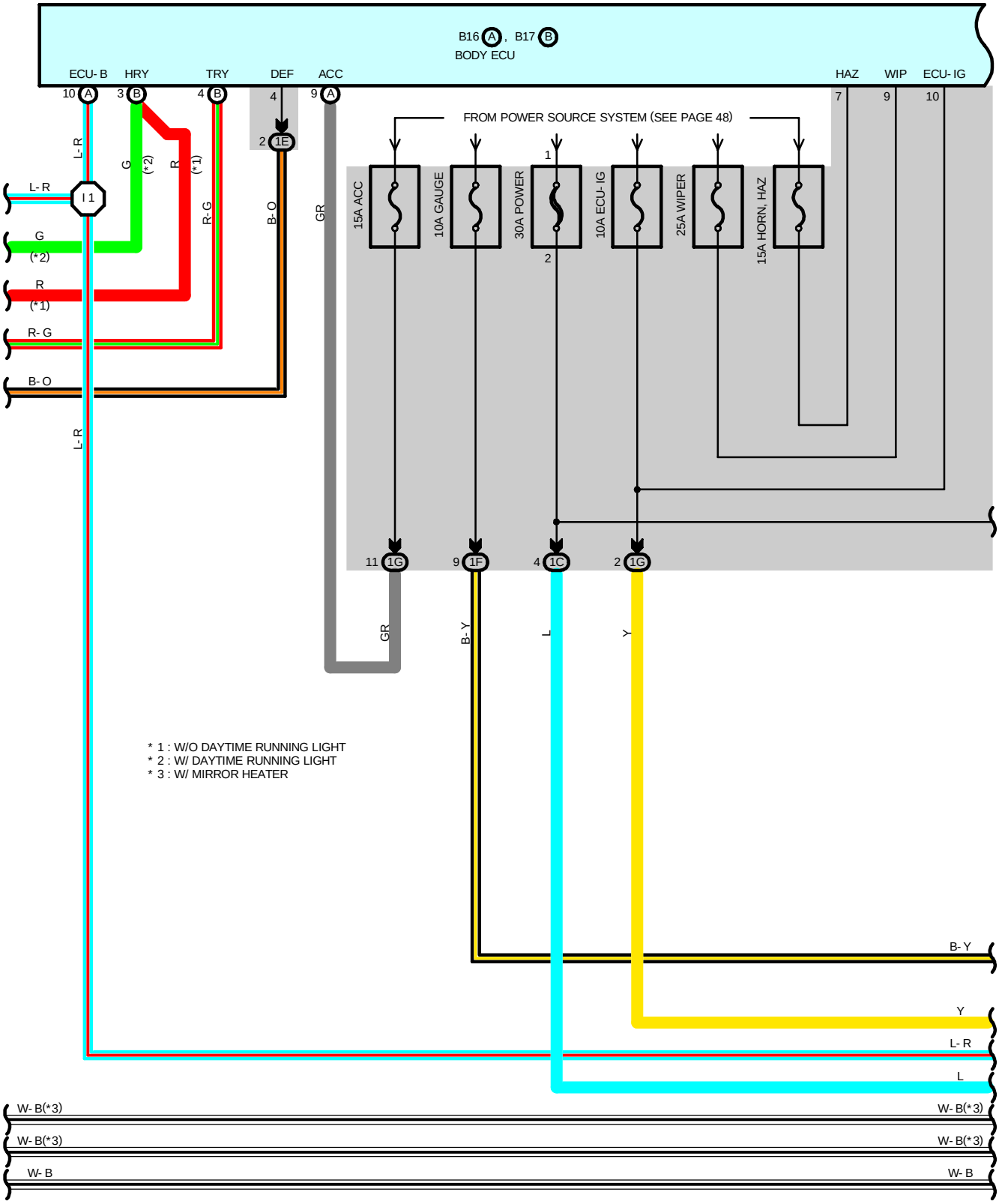
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I13	40	Cowl Wire			

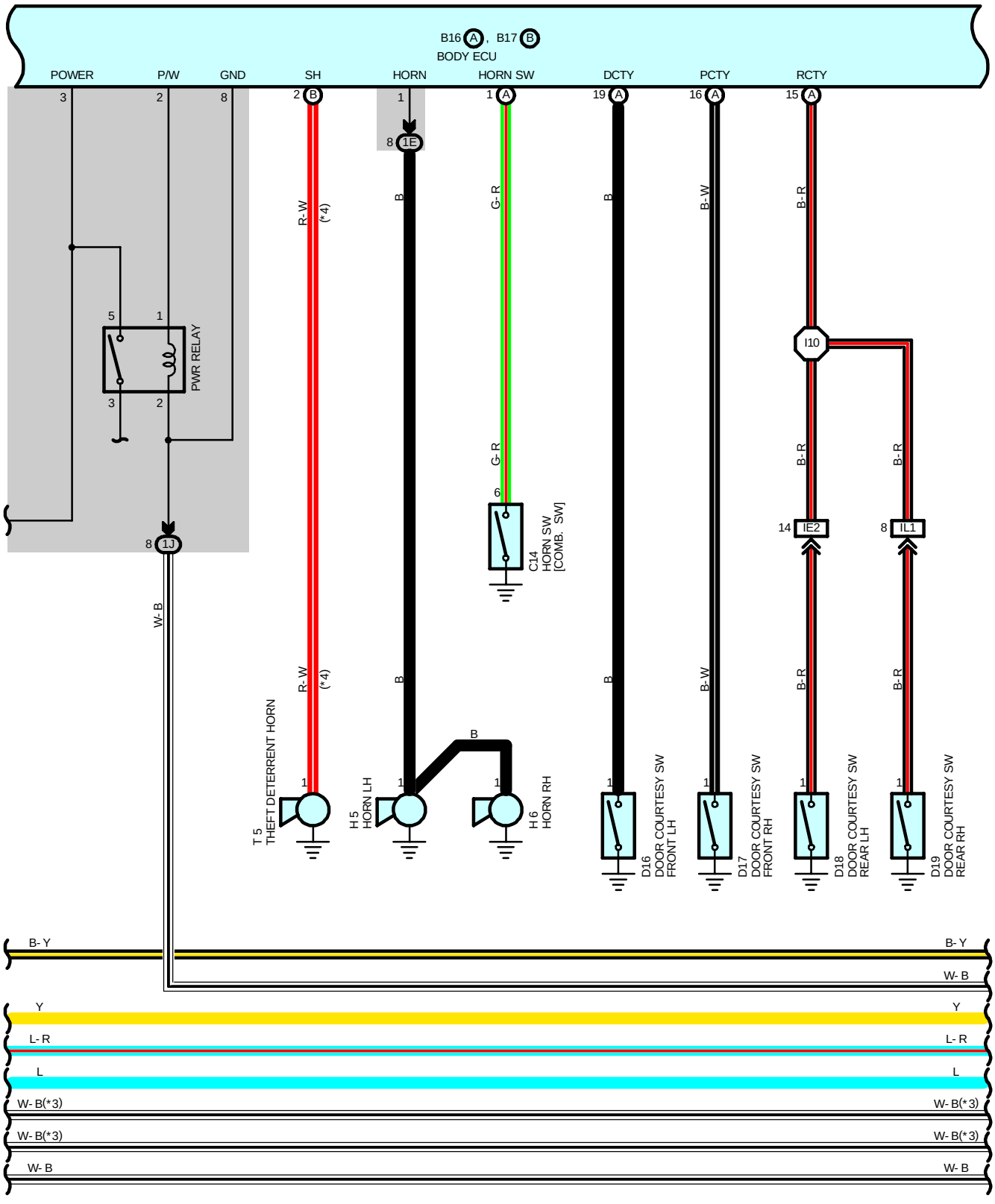

B16
BODY ECU
MPX1
7
V-W
8
IE2
V-W
4
BR2
V-W
5
BS1
V-W
18
MPX1
B18
BACK DOOR ECU

MULTIPLEX COMMUNICATION SYSTEM INCLUDES FOLLOWING SYSTEMS

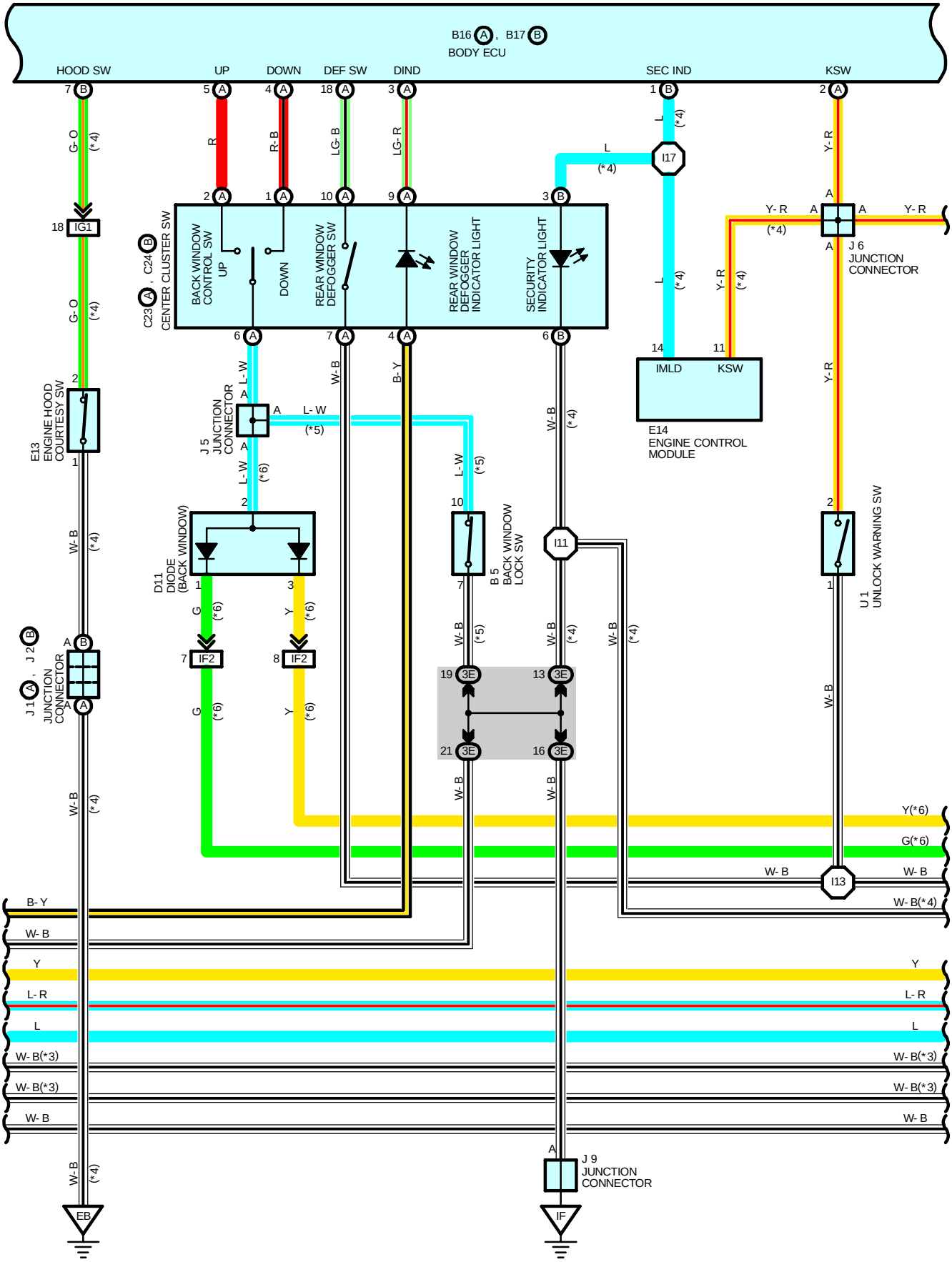
- **DOOR LOCK CONTROL**
- **HORN**
- **MIRROR HEATER**
- **POWER WINDOW (REAR)**
- **REAR WINDOW DEFOGGER**
- **REAR WIPER AND WASHER**
- **THEFT DETERRENT**
- **WIRELESS DOOR LOCK CONTROL**

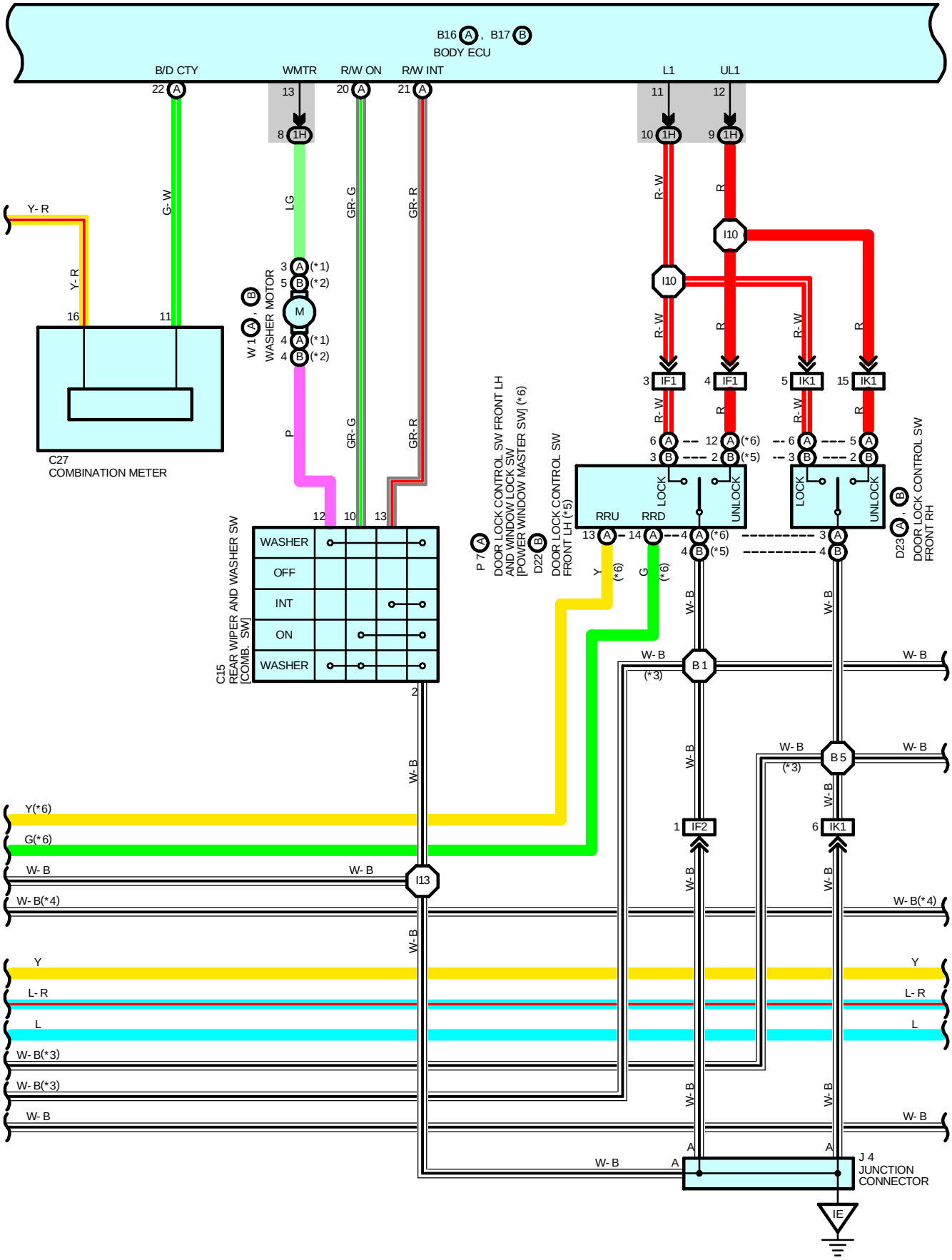

D12
DIODE
(DAYTIME RUNNING LIGHT NO. 1)
FROM POWER SOURCE SYSTEM (SEE PAGE 48)
D 8
DAYTIME RUNNING LIGHT RELAY (MAIN)
D 9
DAYTIME RUNNING LIGHT RELAY NO. 4
15A MPX- B
IG1
IG3
I 9
J 3 JUNCTION CONNECTOR
J 5 JUNCTION CONNECTOR
7. 5A DRL
1C
1K
15A DEFOG
10A MIR HTR
TAIL RELAY
DEFOG RELAY
HEAD RELAY
120A ALT
BATTERY
IE1
BR1
BS1
I 1
IF1
IK1
R18
R17
REAR WINDOW DEFOGGER
R20 MIRROR HEATER LH [REMOTE CONTROL MIRROR LH]
R21 MIRROR HEATER RH [REMOTE CONTROL MIRROR RH]
R- G (*2)
W- G (*2)
W- B (*2)
Y (*2)
R (*2)
G (*2)
L- R
R (*1)
R- G
B- O
R- B (*2)
G- B (*3)
W
W- B
W- B(*3)

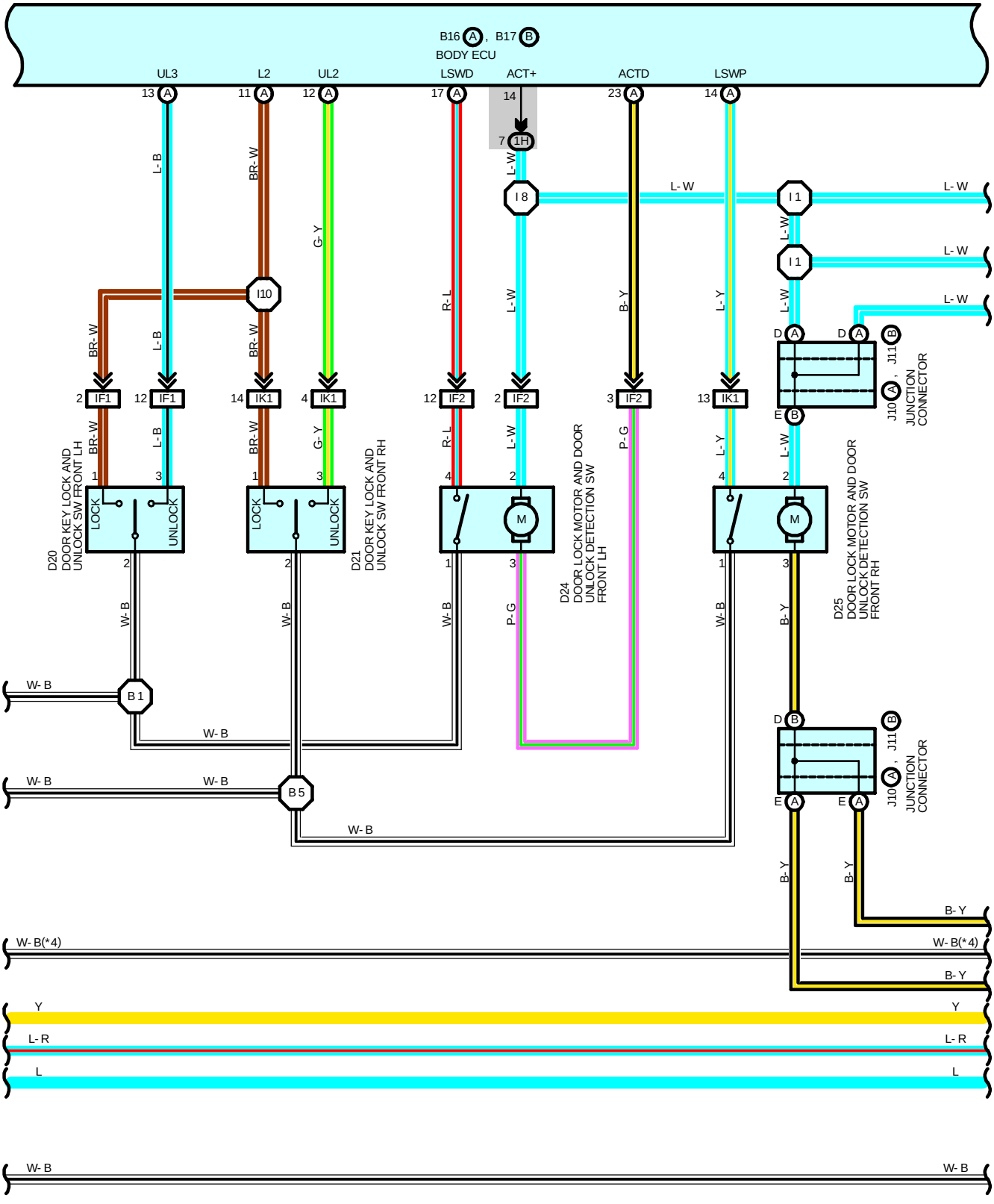

B16 A , B17 B
BODY ECU
ECU- B
HRY
TRY
DEF
ACC
HAZ
WIP
ECU- IG
10 A
3 B
4 B
4
2 1E
9 A
7
9
10
FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A ACC
10A GAUGE
30A POWER
10A ECU- IG
25A WIPER
15A HORN, HAZ
1
2
11 1G
9 1F
4 1C
2 1G
L- R
G
(*2)
R
(*1)
R- G
B- O
GR
B- Y
L
Y
I 1
* 1 : W/O DAYTIME RUNNING LIGHT
* 2 : W/ DAYTIME RUNNING LIGHT
* 3 : W/ MIRROR HEATER
W- B(*3)
W- B



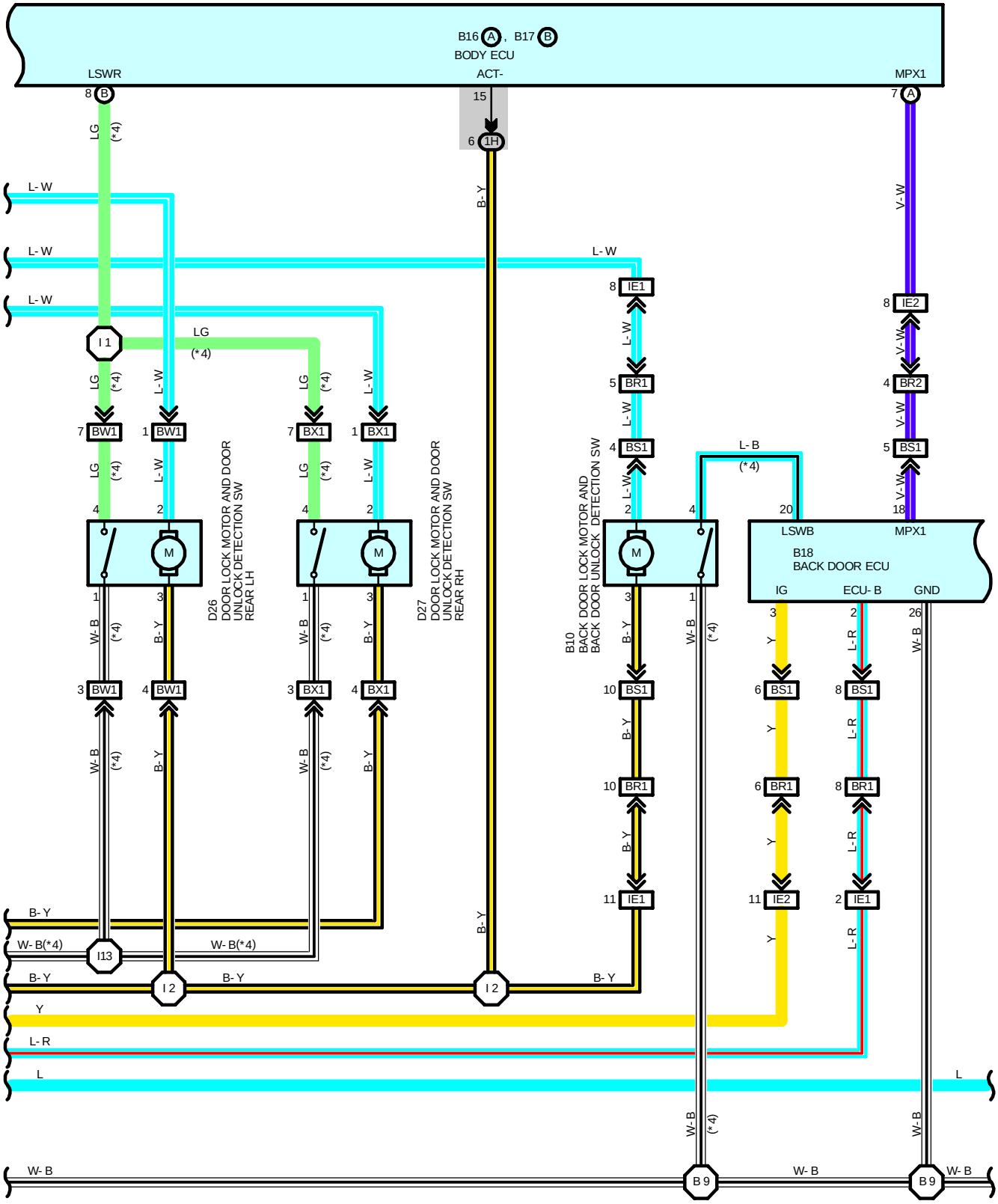
* 3 : W/ MIRROR HEATER
* 4 : W/ THEFT DETERRENT SYSTEM
* 5 : W/O POWER WINDOW
* 6 : W/ POWER WINDOW


B16 A , B17 B
BODY ECU
HOOD SW
UP
DOWN
DEF SW
DIND
SEC IND
KSW
BACK WINDOW CONTROL SW
UP
DOWN
REAR WINDOW DEFOGGER SW
REAR WINDOW DEFOGGER INDICATOR LIGHT
SECURITY INDICATOR LIGHT
C23 A , C24 B
CENTER CLUSTER SW
IG1
E13
ENGINE HOOD COURTESY SW
J 5
JUNCTION CONNECTOR
D11
DIODE (BACK WINDOW)
IF2
B 5
BACK WINDOW LOCK SW
I11
I17
IMLD
KSW
E14
ENGINE CONTROL MODULE
J 6
JUNCTION CONNECTOR
U 1
UNLOCK WARNING SW
I13
J 1 A , J 2 B
JUNCTION CONNECTOR
3E
J 9
JUNCTION CONNECTOR
EB
IF
G- O
R
R- B
LG- B
LG- R
L
Y- R
L- W
W- B
B- Y
G
Y
Y(*6)
G(*6)
W- B(*3)
W- B(*4)
(*4)
(*5)
(*6)

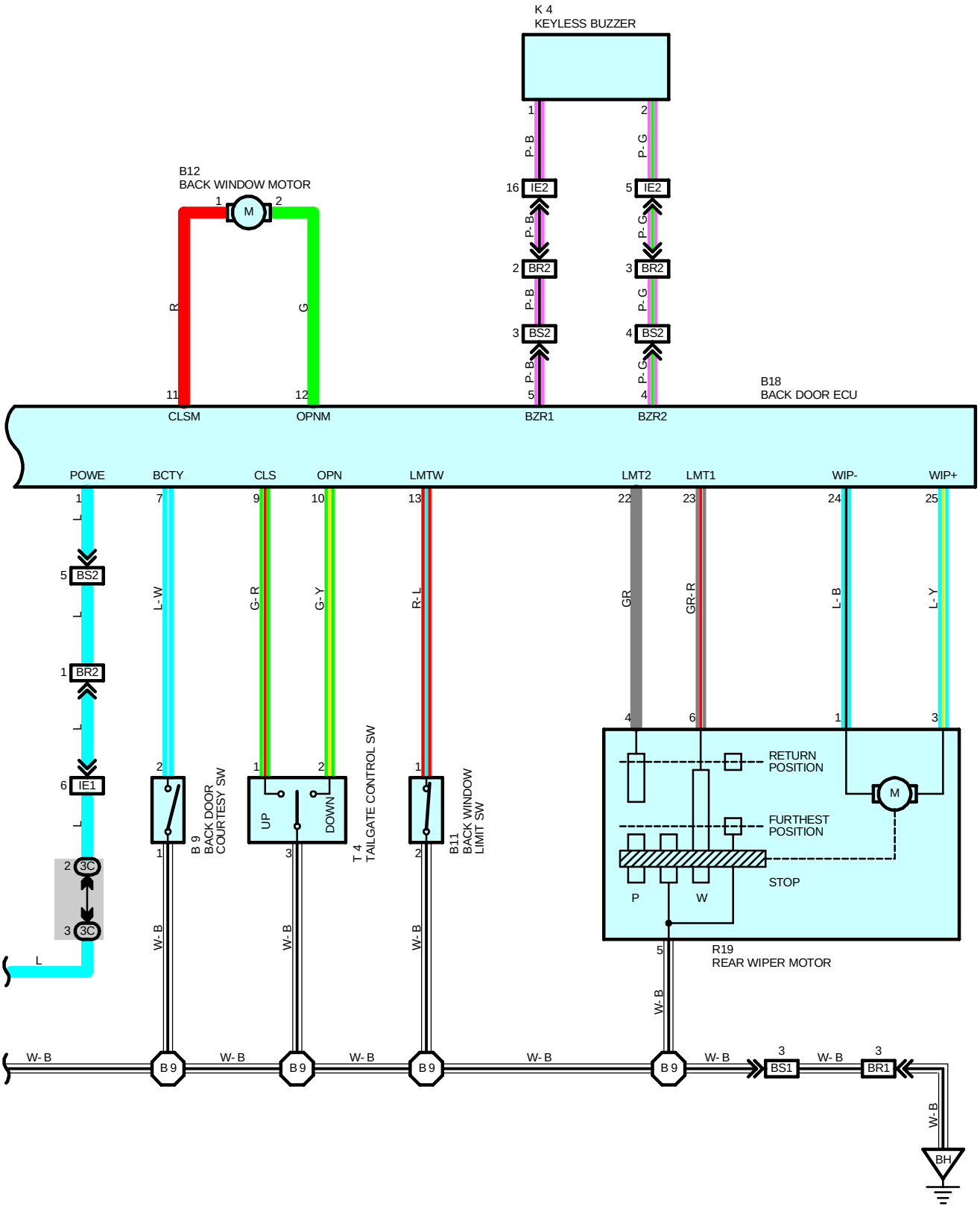

B16 A , B17 B
BODY ECU
B/D CTY
WMTR
R/W ON
R/W INT
L1
UL1
22 A
13
20 A
21 A
11
12
8 1H
10 1H
9 1H
Y- R
G- W
LG
GR- G
GR- R
R- W
R
I10
3 A (*1)
5 B (*2)
M
W 1
WASHER MOTOR
4 A (*1)
4 B (*2)
16
11
C27
COMBINATION METER
P
3 IF1
4 IF1
5 IK1
15 IK1
6 A
3 B
12 A (*6)
2 B (*5)
5 A
DOOR LOCK CONTROL SW FRONT LH AND WINDOW LOCK SW [POWER WINDOW MASTER SW] (*6)
DOOR LOCK CONTROL SW FRONT LH (*5)
DOOR LOCK CONTROL SW FRONT RH
LOCK
UNLOCK
RRU
RRD
P 7
D22
D23
13 A
14 A
4 A (*6)
4 B (*5)
3 A
4 B
Y
(*6)
G
(*6)
12
10
13
WASHER
OFF
INT
ON
WASHER
C15
REAR WIPER AND WASHER SW [COMB. SW]
2
W- B
W- B
(*3)
B 1
B 5
Y(*6)
G(*6)
W- B
W- B
I13
W- B(*4)
Y
L- R
L
W- B(*3)
W- B(*3)
W- B
1 IF2
6 IK1
A
A
W- B
A
J 4
JUNCTION CONNECTOR
IE



* 1 : W/O DAYTIME RUNNING LIGHT
* 2 : W/ DAYTIME RUNNING LIGHT
* 3 : W/ MIRROR HEATER
* 4 : W/ THEFT DETERRENT SYSTEM
* 5 : W/O POWER WINDOW
* 6 : W/ POWER WINDOW


B16 A , B17 B
BODY ECU
LSWR
ACT-
MPX1
8 B
15
6 1H
7 A
LG
(*4)
L-W
B-Y
V-W
I 1
8 IE1
8 IE2
5 BR1
4 BR2
7 BW1
1 BW1
7 BX1
1 BX1
4 BS1
5 BS1
L-B
(*4)
4
2
20
18
M
LSWB
MPX1
B18
BACK DOOR ECU
IG
ECU-B
GND
D26
DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW REAR LH
D27
DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW REAR RH
B10
BACK DOOR LOCK MOTOR AND BACK DOOR UNLOCK DETECTION SW
1
3
W-B
3 BW1
4 BW1
3 BX1
4 BX1
10 BS1
10 BR1
11 IE1
6 BS1
6 BR1
11 IE2
8 BS1
8 BR1
2 IE1
26
Y
L-R
L
W-B(*4)
I13
I 2
B 9
W-B

* 4 : W/ THEFT DETERRENT SYSTEM



MULTIPLEX COMMUNICATION SYSTEM

SYSTEM OUTLINE

1. COMMUNICATION OUTLINE

Communication is made among the body and back door ECUs.
When the ECU receives a signal from related switches, i.e., the rear wiper SW, the body ECU sends signals to the back door ECU, and moves rear wiper.
For details, please refer to the new car features and/or the repair manual.

SERVICE HINTS

B16 (A) BODY ECU

(A) 9-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position
3, 7, (A)10-GROUND : Always approx. **12** volts
9,10-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position
8-GROUND : Always continuity

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B5	30	D18	32	J5	31
B9	32	D19	32	J6	31
B10	32	D20	32	J9	31
B11	32	D21	32	J10 A	31
B12	32	D22 B	32	J11 B	31
B16 A	30	D23 A	32	K4	29
B17 B	30	D23 B	32	P7 A	33
B18	32	D24	32	R17 A	33
C14	30	D25	32	R18 B	33
C15	30	D26	32	R19	33
C23 A	30	D27	32	R20	33
C24 B	30	E13	28	R21	33
C27	30	E14	31	T4	33
D8	30	H5	28	T5	29
D9	30	H6	28	U1	31
D11	30	J1 A	29	W1 A	29
D12	30	J2 B	29	W1 B	29
D16	32	J3	31		
D17	32	J4	31		

▭ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

▭ : JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1H		
1J		
1K	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2		
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IG3		
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2		
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BS2		
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)

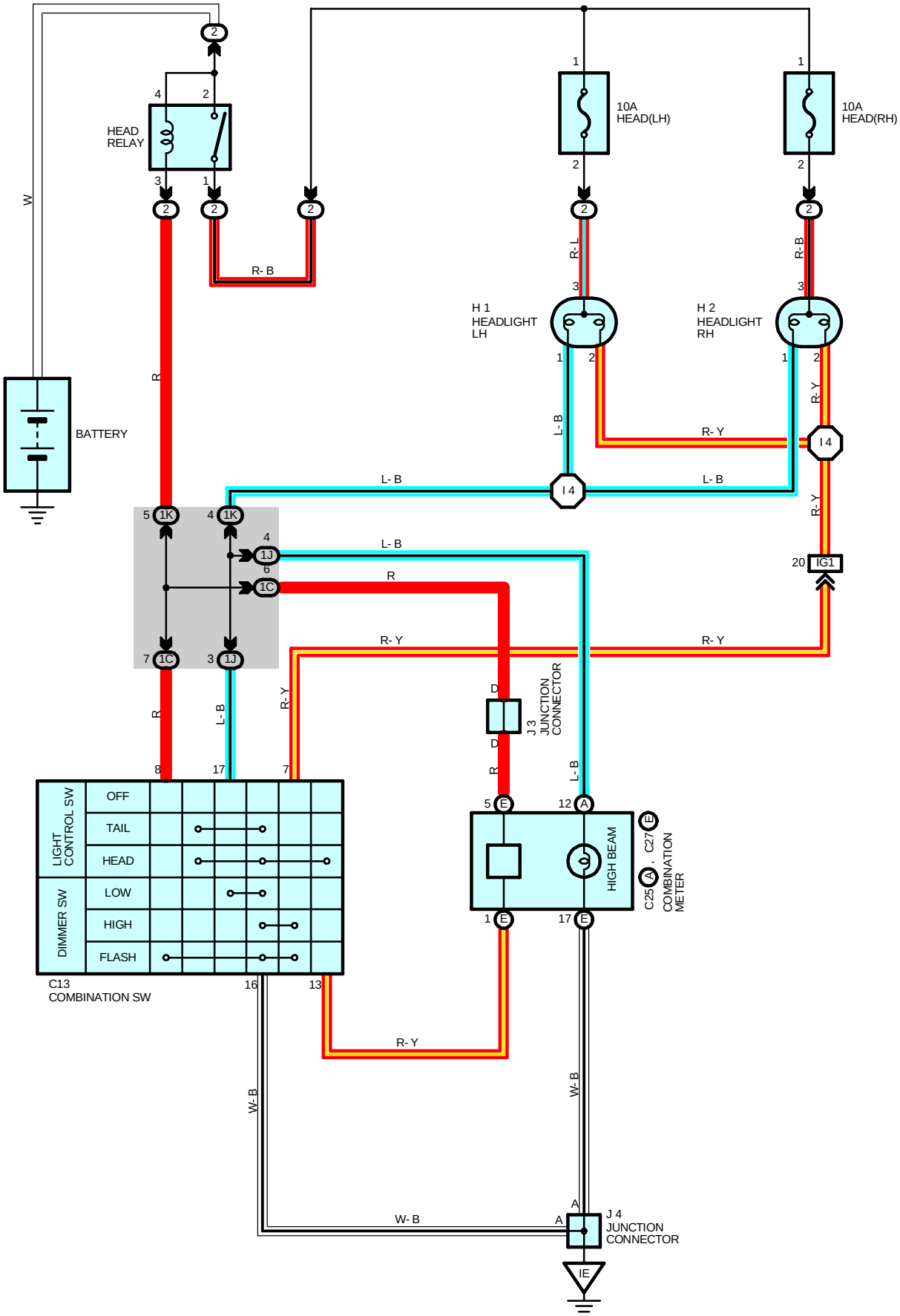
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	I13	40	Cowl Wire
I2			I17		
I8			B1	42	Front Door LH Wire
I9			B5	42	Front Door RH Wire
I10			B9	42	Back Door No.2 Wire
I11					

HEADLIGHT (w/o DAYTIME RUNNING LIGHT)



SERVICE HINTS

HEAD RELAY

2-1 : Closed with light control SW at **HEAD** position or dimmer SW at **FLASH** position

: PARTS LOCATION

Code		See Page	Code	See Page	Code	See Page
C13		30	H1	28	J4	31
C25	A	30	H2	28		
C27	E	30	J3	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1J		
1K	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

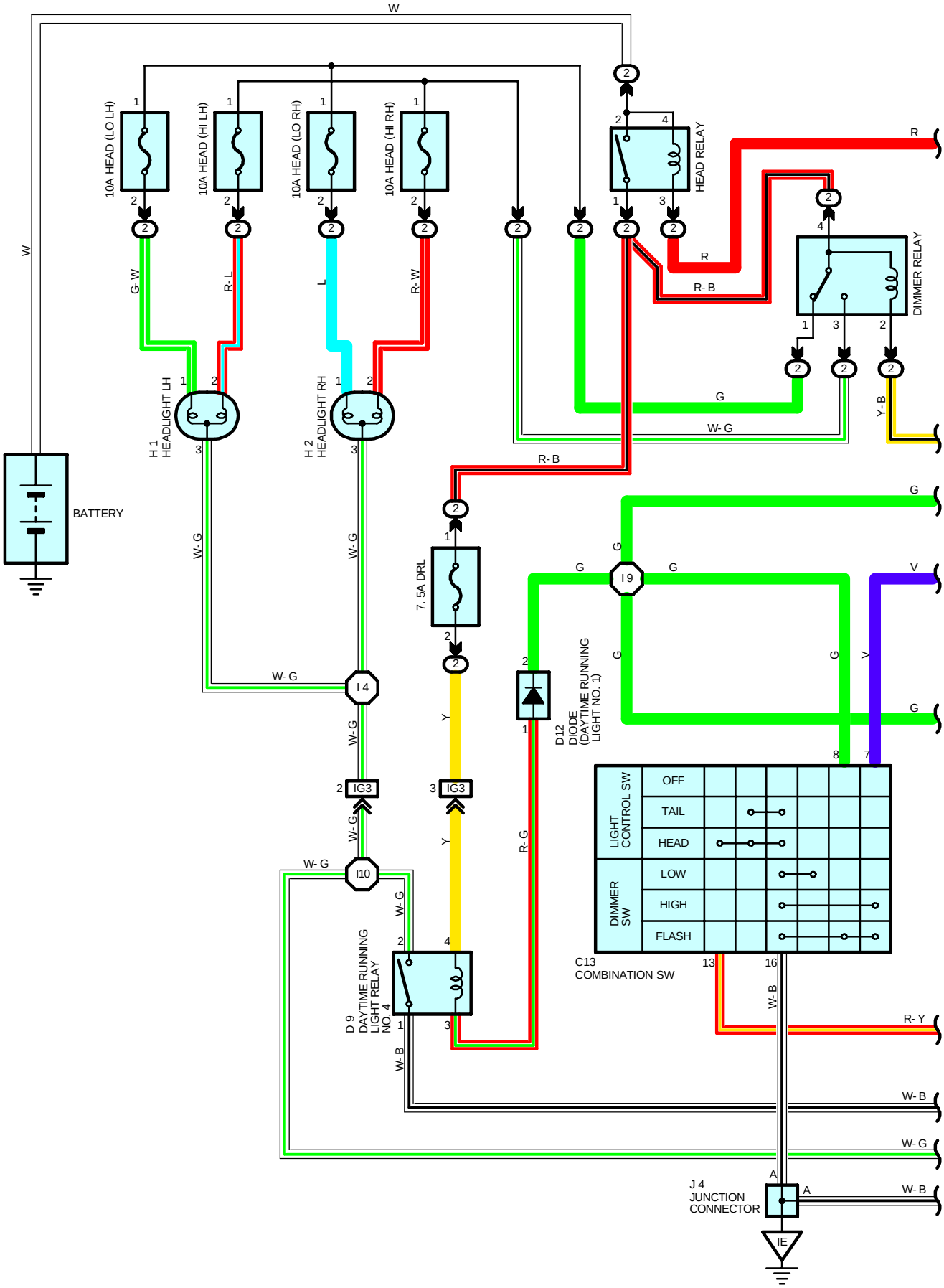
: GROUND POINTS

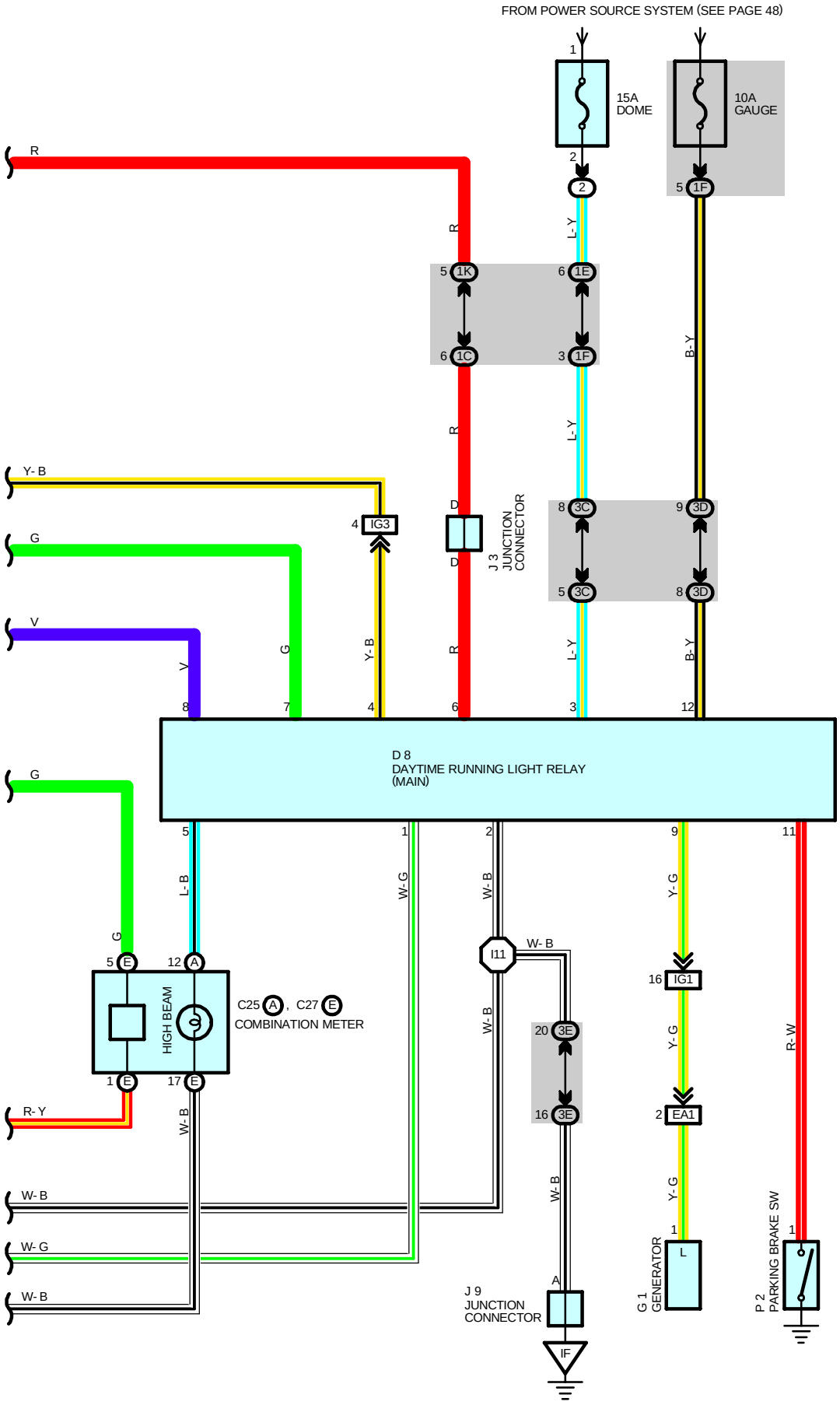
Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I4	40	Engine Room Main Wire			

HEADLIGHT (w/ DAYTIME RUNNING LIGHT)




FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A DOME
10A GAUGE
D 8 DAYTIME RUNNING LIGHT RELAY (MAIN)
J 3 JUNCTION CONNECTOR
C25 A , C27 E COMBINATION METER
HIGH BEAM
J 9 JUNCTION CONNECTOR
G 1 GENERATOR
P 2 PARKING BRAKE SW
R
Y- B
G
V
L- Y
B- Y
L- B
W- G
W- B
Y- G
R- W
R- Y

HEADLIGHT (w/ DAYTIME RUNNING LIGHT)

SYSTEM OUTLINE

1. DAYTIME RUNNING LIGHT OPERATION

When the engine is started, voltage generated at TERMINAL L of the generator is applied to TERMINAL 9 of the daytime running light relay (Main).

If the parking brake lever is pulled up (Parking brake SW on) at this time, the relay is not activated so the daytime running light system does not operate. If the parking brake lever is then released (Parking brake SW off), a signal is input to TERMINAL 11 of the relay. This activates the relay, so current flows from battery to the HEAD relay (Point side) to TERMINAL 4 of the DIMMER relay to TERMINAL 1 to HEAD (LO LH), (LO RH) fuse to TERMINAL 1 of the headlights to TERMINAL 3 to TERMINAL 1 of the daytime running light relay (Main) to TERMINAL 2 to GROUND. This causes the headlights to light up (The headlights light up dimmer than full brightness.).

Once the daytime running light system operates and headlights light up, headlights remain on even if the parking brake lever is pulled up (Parking brake SW on).

If the engine stalls and the ignition SW remains on, headlights remain lighted up even though current is no longer output from TERMINAL L of the generator. If the ignition SW is then turned off, the headlights go off. If the engine is started with the parking brake lever released (Parking brake SW off), the daytime running light system operates and the headlights light up when the engine starts.

2. HEADLIGHT OPERATION

When the light control SW is switched to HEAD position, current flows from the DRL fuse to TERMINAL 4 of the daytime running light relay no. 4 to TERMINAL 3 to TERMINAL 1 of the diode (Daytime running light no. 1) to TERMINAL 2 to TERMINAL (E) 5 of the combination meter to TERMINAL (E) 1 to TERMINAL 13 of the light control SW to TERMINAL 16 to GROUND, activating the daytime running light relay no. 4. Current then flows from the HEAD (LO LH), (LO RH) fuse to TERMINAL 1 of the headlights to TERMINAL 3 to TERMINAL 2 of the daytime running light relay no. 4 to TERMINAL 1 to GROUND, causing the headlights to light up at normal intensity.

When the dimmer SW is switched to the HIGH position, the signal from the dimmer SW is input to the daytime running light relay (Main). This activates the relay and current flows from TERMINAL 4 of the DIMMER relay to TERMINAL 2 to TERMINAL 4 of the daytime running light relay (Main), activating the DIMMER relay.

This causes current to flow from TERMINAL 4 of the DIMMER relay to TERMINAL 3 to HEAD (HI LH), (HI RH) fuse to TERMINAL 2 of the headlights to TERMINAL 3 to TERMINAL 2 of the daytime running light relay no. 4 to TERMINAL 1 to GROUND, causing the headlights to light up at high beam.

When the dimmer SW is switched to FLASH position, the daytime running light relay (Main) is activated and current flows from TERMINAL 4 of the DIMMER relay to TERMINAL 3. Current from the DRL fuse flows to TERMINAL 4 of the daytime running light relay no. 4 to TERMINAL 3 to TERMINAL 1 of the diode (Daytime running light no. 1) to TERMINAL 2 to TERMINAL 8 of the dimmer SW to TERMINAL 16 to GROUND, and also flows from the HEAD (HI LH), (HI RH) fuse to TERMINAL 2 of the headlights to TERMINAL 3 to TERMINAL 2 of the daytime running light relay no. 4 to TERMINAL 1 to GROUND, causing the high beam to operate.

SERVICE HINTS

HEAD RELAY

2-1 : Closed with light control SW at **HEAD** position or dimmer SW at **FLASH** position
Closed with engine running and parking brake lever released

DIMMER RELAY

Changes from HEAD(LO) to HEAD(HI) with dimmer SW at **FLASH** position or with HEAD relay on and dimmer SW at **HIGH** position

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
C13	30	D12	30	J4	31
C25 A	30	G1	28	J9	31
C27 E	30	H1	28	P2	31
D8	30	H2	28		
D9	30	J3	31		

▭ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1K	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3D		
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EA1	36	Engine No.2 Wire and Engine Room Main Wire (Near the Engine Room R/B)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IG3		

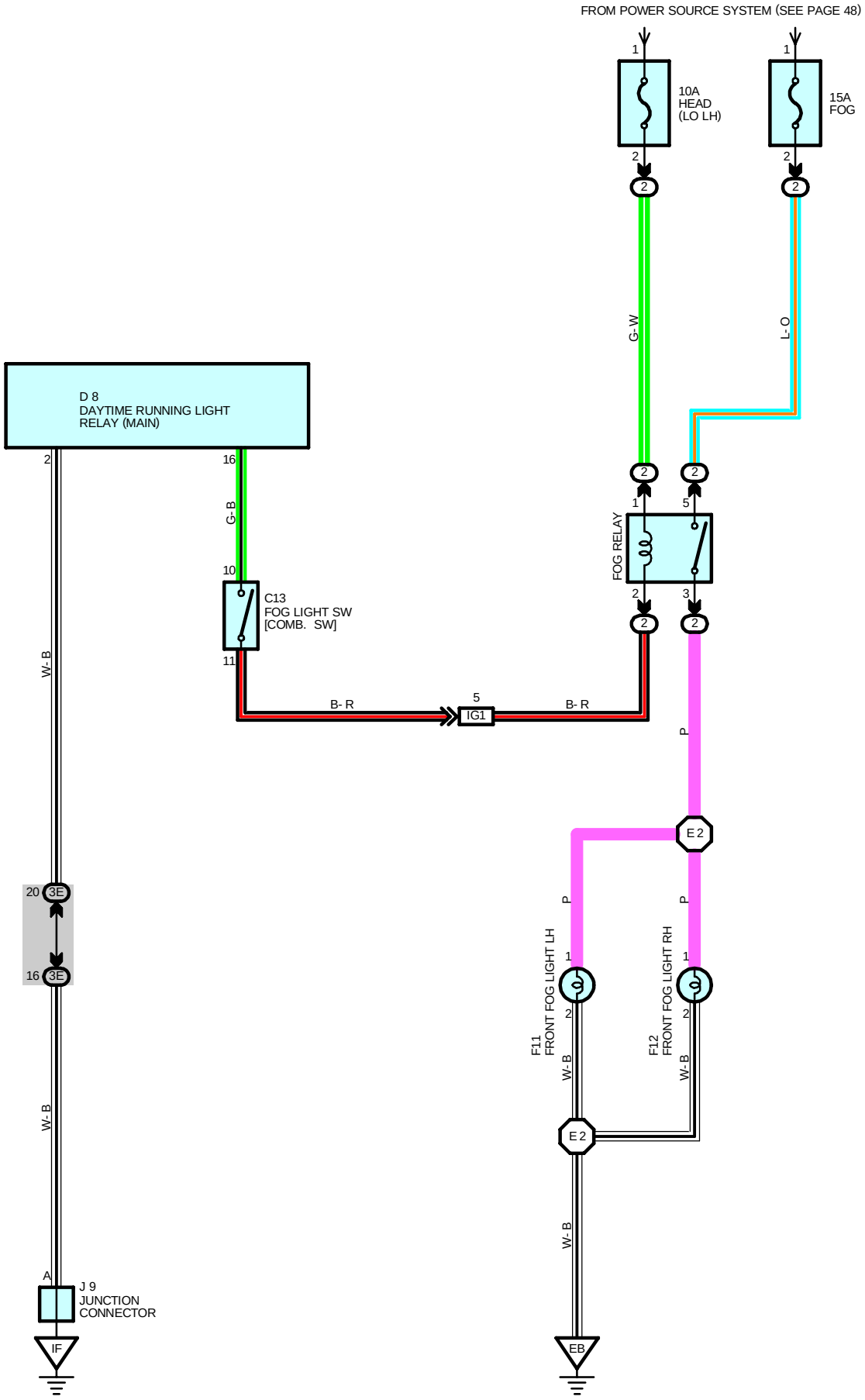
: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I4	40	Engine Room Main Wire	I10	40	Cowl Wire
I9	40	Cowl Wire	I11		

FRONT FOG LIGHT



SERVICE HINTS

FOG RELAY

5-3 : Closed with light control SW at **HEAD** position, dimmer SW at **LOW** position and fog light SW at **ON** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
C13	30	F11	28	J9	31
D8	30	F12	28		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

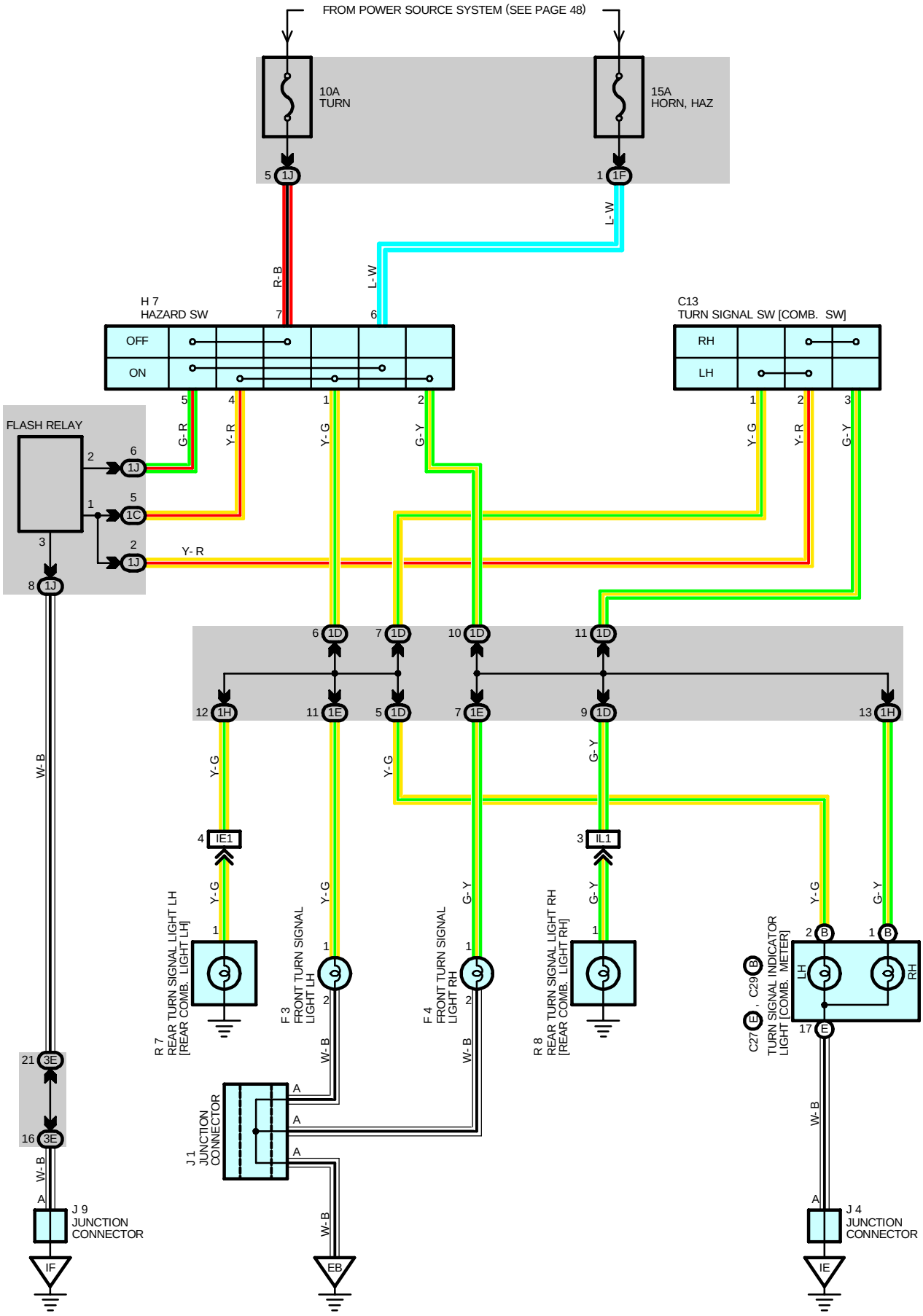
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E2	36	Engine Room Main Wire			

TURN SIGNAL AND HAZARD WARNING LIGHT



SERVICE HINTS

FLASH RELAY

2-GROUND : Approx. **12** volts with ignition SW on or hazard SW on
1-GROUND : Changes from **12** to **0** volts with ignition SW on and turn signal SW at **LH** or **RH** position, or with hazard SW on
3-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
C13	30	F4	28	J9	31
C27 E	30	H7	31	R7	33
C29 B	30	J1	29	R8	33
F3	28	J4	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1D		
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1H		
1J		
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

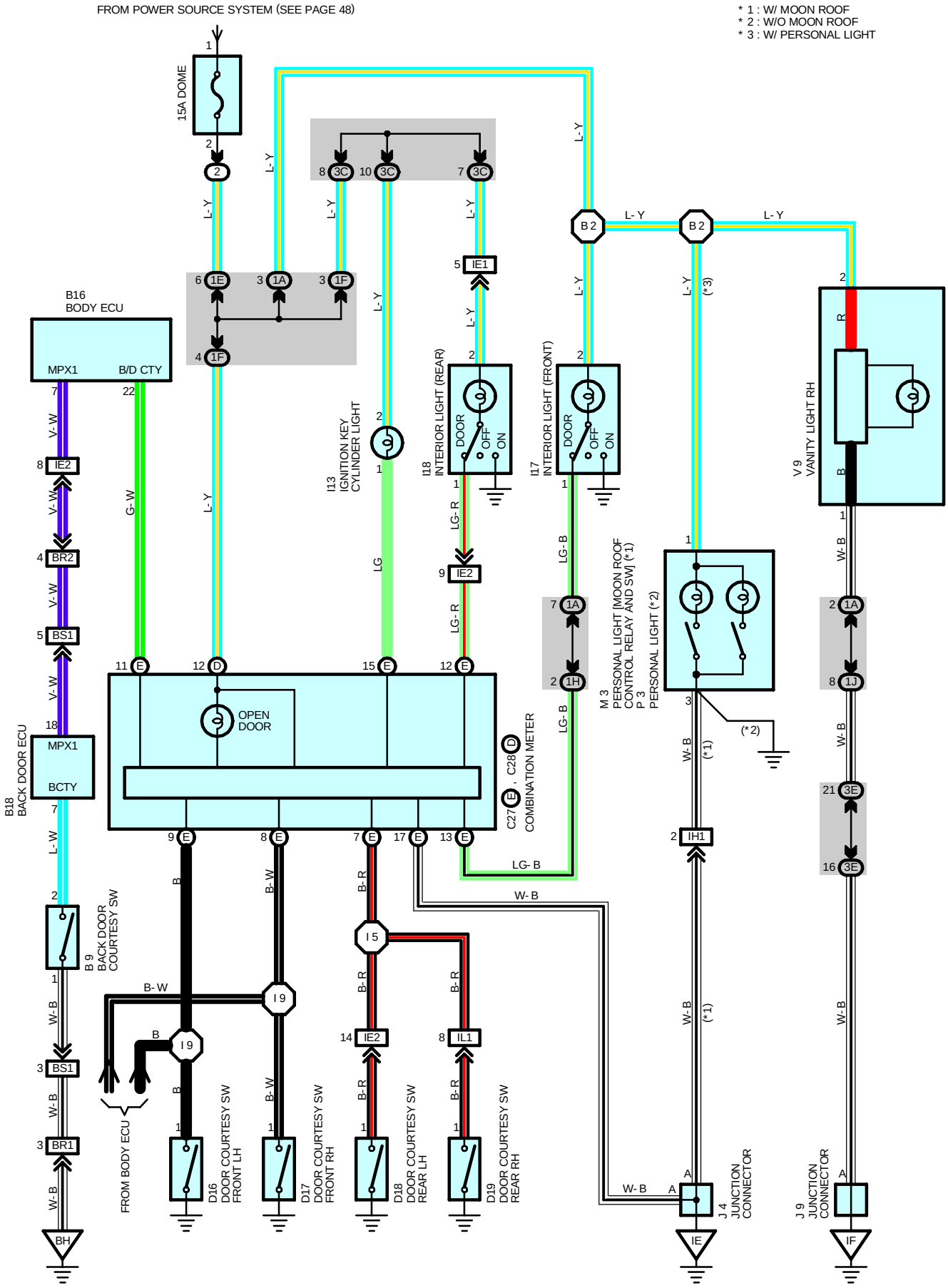
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)

: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

INTERIOR LIGHT



SYSTEM OUTLINE

NORMAL OPERATION

* When the front door LH, RH rear door LH or RH is opened
  When the door is opened, the interior light (Front) and open door warning light is turned on. When the front door LH, RH rear door LH and RH are closed, the interior light (Front) is turned off.
* When the back door is opened, interior light (Rear) and the open door warning light is turned on. When back door is closed, the interior light (Rear) is turned off.
* When all the doors are closed, the open door warning light is turned off.

ILLUMINATED ENTRY SYSTEM

* When driver's door is opened, the ignition key cylinder light is turned on.
* The ignition key cylinder light remains on for approx. 5 seconds after driver's door is closed.

SERVICE HINTS

D16, D17, D18, D19 DOOR COURTESY SW FRONT LH, RH, REAR LH, RH

1-GROUND : Closed with door open

B9 BACK DOOR COURTESY SW

1-2 : Closed with door open

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B9	32	D17	32	J4	31
B16	30	D18	32	J9	31
B18	32	D19	32	M3	33
C27 E	30	I13	31	P3	33
C28 D	30	I17	32	V9	33
D16	32	I18	32		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Roof Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1H		
1J		
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IH1	40	Roof Wire and Cowl Wire (Instrument Panel Reinforcement Left)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2		
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)

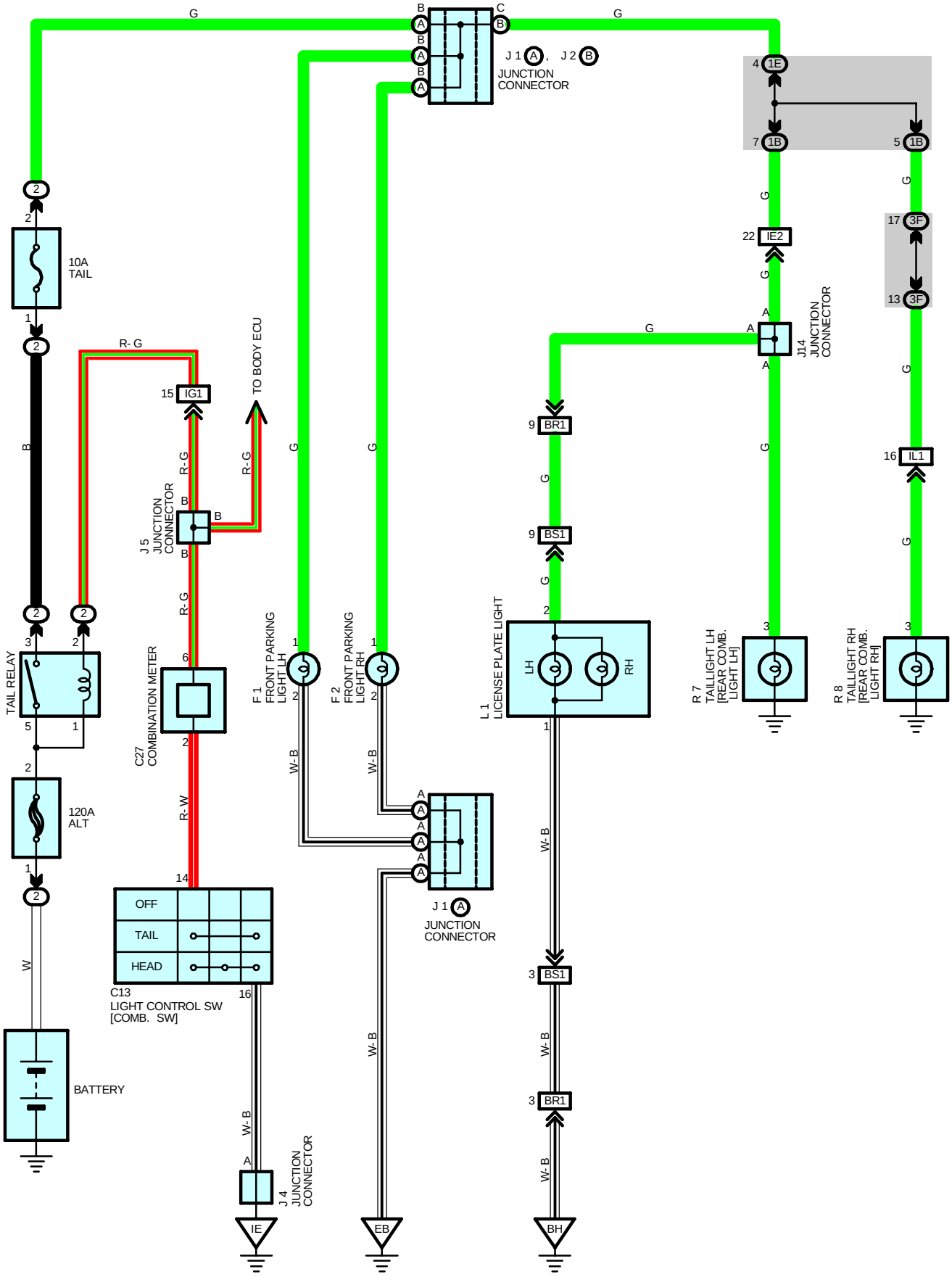
INTERIOR LIGHT

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I5	40	Cowl Wire	B2	42	Roof Wire
I9					


J 1 A , J 2 B
JUNCTION CONNECTOR
10A TAIL
120A ALT
TAIL RELAY
BATTERY
TO BODY ECU
IG1
J 5 JUNCTION CONNECTOR
C27 COMBINATION METER
C13 LIGHT CONTROL SW [COMB. SW]
OFF
TAIL
HEAD
J 4 JUNCTION CONNECTOR
IE
F 1 FRONT PARKING LIGHT LH
F 2 FRONT PARKING LIGHT RH
EB
J 1 JUNCTION CONNECTOR
L 1 LICENSE PLATE LIGHT
LH
RH
BH
BR1
BS1
J14 JUNCTION CONNECTOR
IE2
1E
1B
3F
IL1
R 7 TAILLIGHT LH [REAR COMB. LIGHT LH]
R 8 TAILLIGHT RH [REAR COMB. LIGHT RH]
G
R- G
W- B
R- W
B
W

SERVICE HINTS

C13 LIGHT CONTROL SW [COMB. SW]

14-16 : Closed with light control SW at **TAIL** or **HEAD** position

TAIL RELAY

5-3 : Closed with light control SW at **TAIL** or **HEAD** position

: PARTS LOCATION

Code	See Page	Code		See Page	Code	See Page
C13	30	J1	A	29	J14	32
C27	30	J2	B	29	L1	32
F1	28	J4		31	R7	33
F2	28	J5		31	R8	33

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

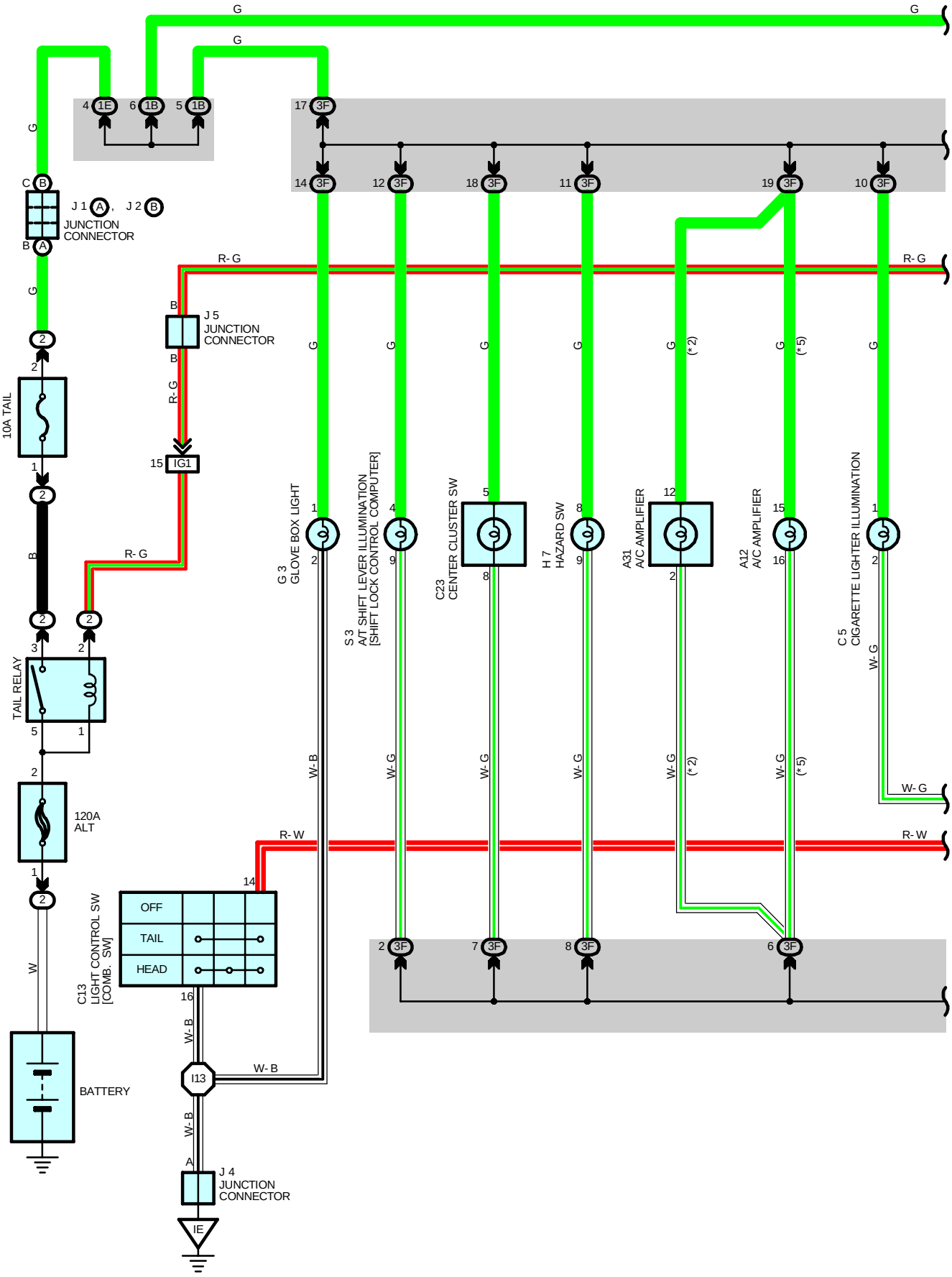
Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
3F	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

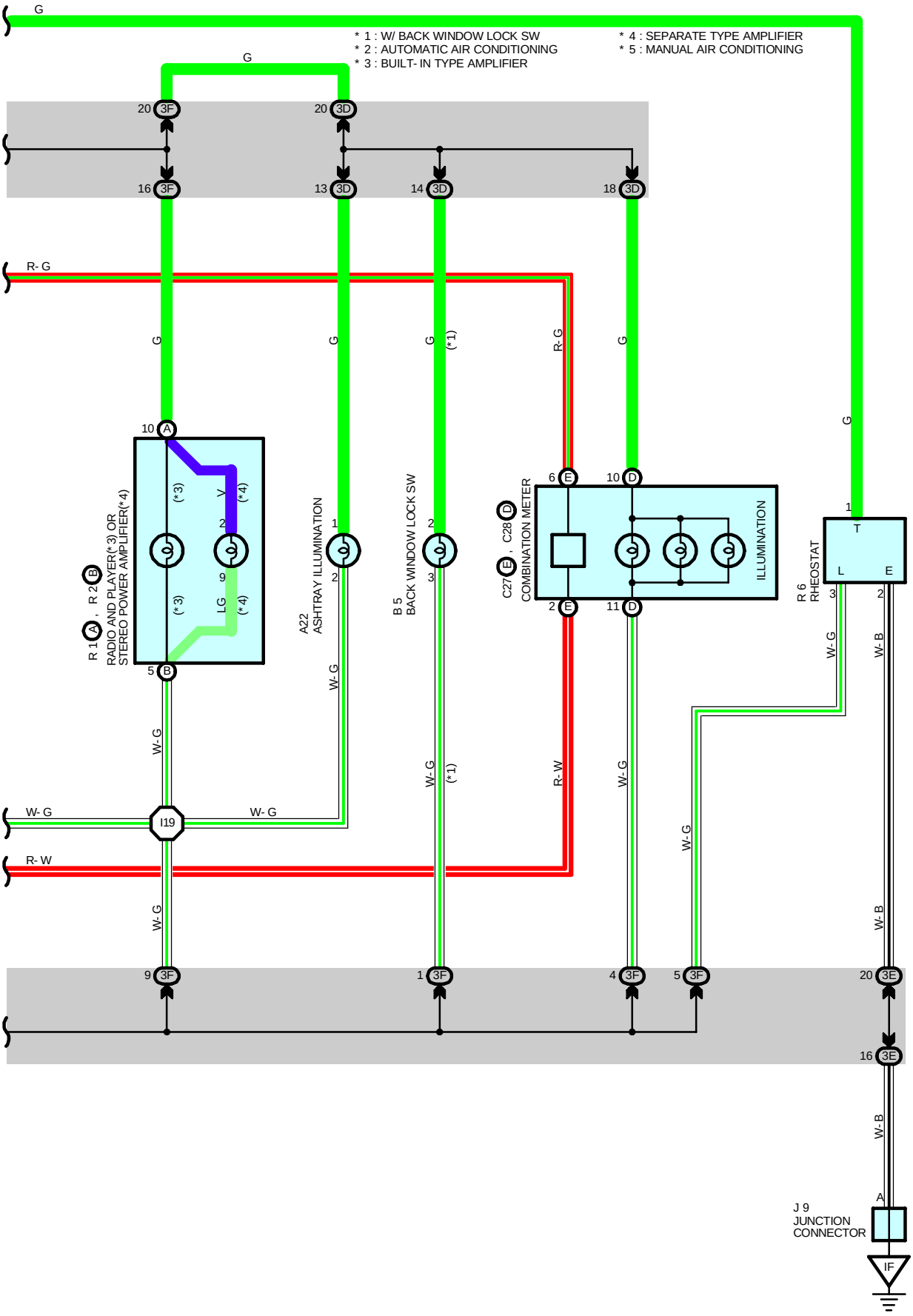
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE2	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)

: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
BH	42	Left Quarter Panel Inner


G
G
G
4 1E
6 1B
5 1B
17 3F
14 3F
12 3F
18 3F
11 3F
19 3F
10 3F
C B
J 1 A, J 2 B
JUNCTION CONNECTOR
B A
R- G
R- G
B
J 5
JUNCTION CONNECTOR
B
R- G
15 IG1
10A TAIL
TAIL RELAY
120A ALT
R- G
R- W
R- W
W
W- B
W- B
W- B
W- B
W- G
W- G
W- G
W- G
W- G
W- G
(* 2)
(* 2)
(* 5)
(* 5)
G 3
GLOVE BOX LIGHT
S 3
A/T SHIFT LEVER ILLUMINATION
[SHIFT LOCK CONTROL COMPUTER]
C23
CENTER CLUSTER SW
H 7
HAZARD SW
A31
A/C AMPLIFIER
A12
A/C AMPLIFIER
C 5
CIGARETTE LIGHTER ILLUMINATION
C13
LIGHT CONTROL SW
[COMB. SW]
OFF
TAIL
HEAD
BATTERY
I13
J 4
JUNCTION CONNECTOR
IE
2 3F
7 3F
8 3F
6 3F


* 1 : W/ BACK WINDOW LOCK SW
* 2 : AUTOMATIC AIR CONDITIONING
* 3 : BUILT- IN TYPE AMPLIFIER
* 4 : SEPARATE TYPE AMPLIFIER
* 5 : MANUAL AIR CONDITIONING
G
R- G
W- G
R- W
W- B
LG
V
(*1)
(*3)
(*4)
R 1 (A) , R 2 (B)
RADIO AND PLAYER(*3) OR STEREO POWER AMPLIFIER(*4)
A22
ASHTRAY ILLUMINATION
B 5
BACK WINDOW LOCK SW
C27 (E) , C28 (D)
COMBINATION METER
ILLUMINATION
R 6
RHEOSTAT
I19
J 9
JUNCTION CONNECTOR
IF
20 3F
20 3D
16 3F
13 3D
14 3D
18 3D
10 A
5 B
6 E
10 D
2 E
11 D
1 T
L
E
9 3F
1 3F
4 3F
5 3F
20 3E
16 3E

ILLUMINATION

SERVICE HINTS

C13 LIGHT CONTROL SW [COMB. SW]

14-16 : Closed with light control SW at **TAIL** or **HEAD** position

TAIL RELAY

5-3 : Closed with light control SW at **TAIL** or **HEAD** position

R6 RHEOSTAT

1-2 : Approx. **12** volts with rheostat fully turned counterclockwise and **0** volts with fully turned clockwise

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A12	30	C27 E	30	J5	31
A22	30	C28 D	30	J9	31
A31	30	G3	31	R1 A	31
B5	30	H7	31	R2 B	31
C5	30	J1 A	29	R6	31
C13	30	J2 B	29	S3	31
C23	30	J4	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
3D	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		
3F		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

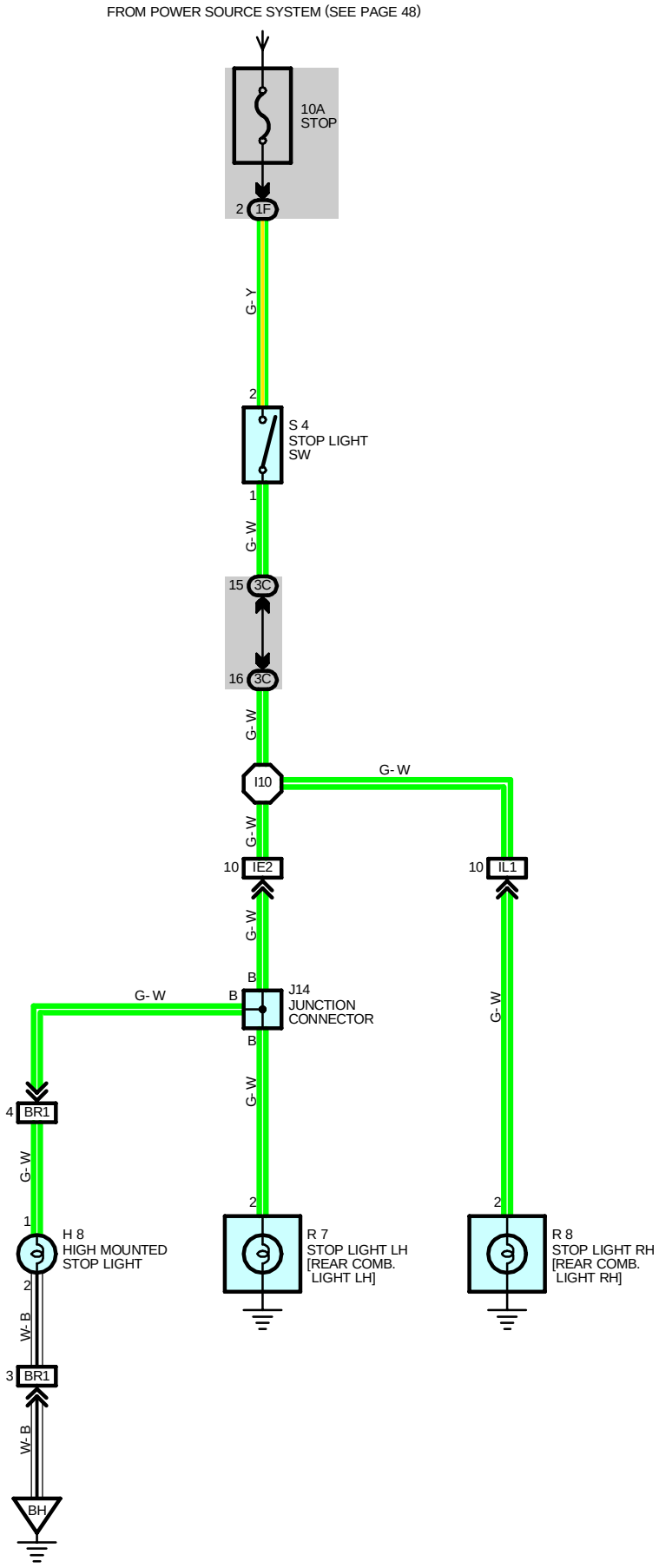
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I13	40	Cowl Wire	I19	40	Cowl Wire


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
STOP
2
1F
G- Y
2
S 4
STOP LIGHT
SW
1
G- W
15
3C
16
3C
G- W
I10
G- W
G- W
10
IE2
10
IL1
G- W
B
G- W
B
J14
JUNCTION
CONNECTOR
B
G- W
4
BR1
G- W
1
H 8
HIGH MOUNTED
STOP LIGHT
2
W- B
3
BR1
W- B
BH
2
R 7
STOP LIGHT LH
[REAR COMB.
LIGHT LH]
G- W
2
R 8
STOP LIGHT RH
[REAR COMB.
LIGHT RH]

SERVICE HINTS

S4 STOP LIGHT SW

2-1 : Closed with brake pedal depressed

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
H8	32	R7	33	S4	31
J14	32	R8	33		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE2	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)

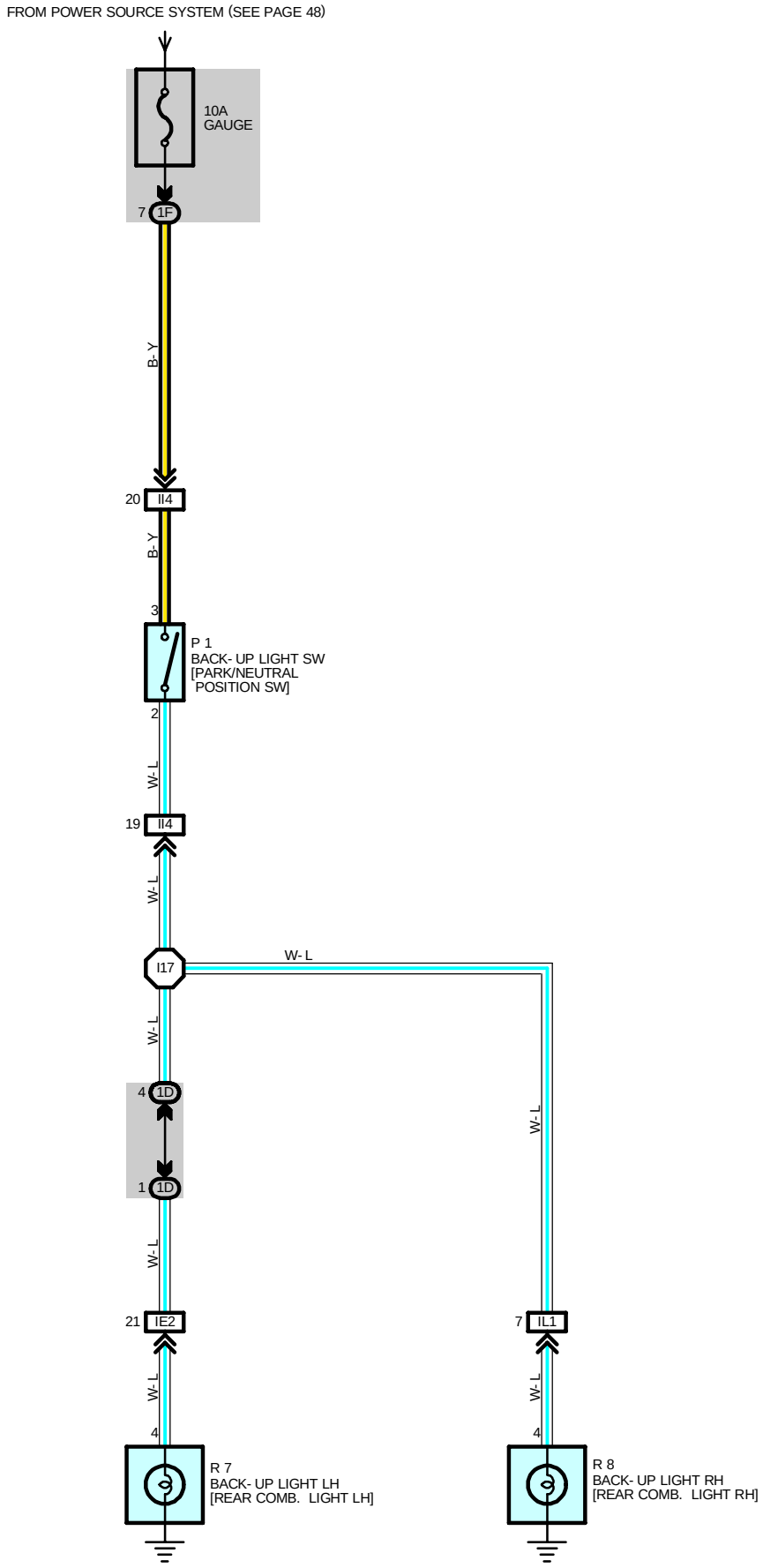
: GROUND POINTS

Code	See Page	Ground Points Location
BH	42	Left Quarter Panel Inner

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I10	40	Cowl Wire			

BACK-UP LIGHT



SERVICE HINTS

P1 BACK-UP LIGHT SW [PARK/NEUTRAL POSITION SW]

3-2 : Closed with shift lever in **R** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
P1	29	R7	33	R8	33

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1D	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1F		

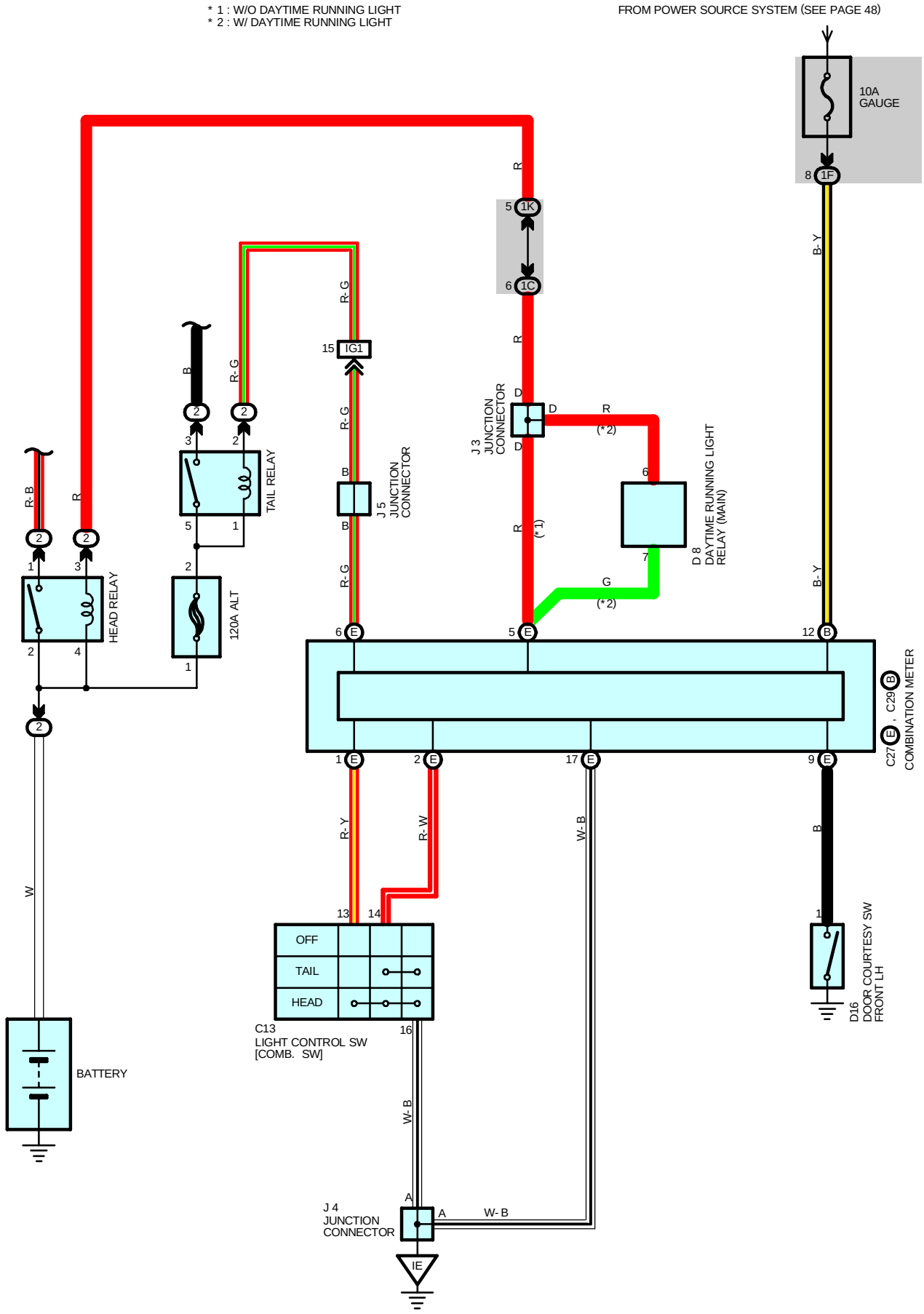
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE2	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
II4	40	Engine Wire and Cowl Wire (On the Glove Box)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I17	40	Cowl Wire			

LIGHT AUTO TURN OFF



SYSTEM OUTLINE

With the ignition SW turned on, the current flows to TERMINAL (B) 12 of the combination meter through GAUGE fuse.
Voltage is applied at all times to TERMINAL (E) 6 of the combination meter through the TAIL relay (Coil side), and to TERMINAL (E) 5 of the combination meter through the HEAD relay (Coil side) [w/o daytime running light] or through the daytime running light relay (Main) [w/ daytime running light].

1. NORMAL LIGHTING OPERATION

(Turn taillight on)
With the light control SW turned to TAIL position, a signal is input into TERMINAL (E) 2 of the combination meter. According to this signal, the current flowing to TERMINAL (E) 6 of the combination meter flows from TERMINAL (E) 2 to TERMINAL 14 of the light control SW to TERMINAL 16 to GROUND and TAIL relay causes taillight to turn on.

(Turn headlight on)
With the light control SW turned to HEAD position, the signals are input into TERMINALS (E) 1 and (E) 2 of the combination meter. According to these signals, the current flowing to TERMINAL (E) 5 of the combination meter flows to TERMINAL (E) 1 to TERMINAL 13 of the light control SW to TERMINAL 16 to GROUND in the headlight circuit, and causes TAIL and HEAD relay to turn the light on. The taillight circuit is same as above.

2. LIGHT AUTO TURN OFF OPERATION

With the lights on and the ignition SW turned off (Input signal goes to TERMINAL (B) 12 of the combination meter), when door on front LH side is opened (Input signal goes to TERMINAL (E) 9 of the combination meter), the relay operates and the current is cut off which flows from TERMINAL (E) 6 of the combination meter to TERMINAL (E) 2 in taillight circuit and from TERMINAL (E) 5 to TERMINAL (E) 1 in headlight circuit. As a result, all lights are turned off automatically.

SERVICE HINTS

C27 (E), C29 (B) COMBINATION METER

(E) 1-GROUND : Continuity with the light control SW at **HEAD** position
(E) 2-GROUND : Continuity with the light control SW at **TAIL** or **HEAD** position
(E) 9-GROUND : Continuity with the front LH door open
(B)12-GROUND : Approx. **12** volts with the ignition SW at **ON** position
(E)17-GROUND : Always continuity

: PARTS LOCATION

Code		See Page	Code	See Page	Code	See Page
C13		30	D8	30	J4	31
C27	E	30	D16	32	J5	31
C29	B	30	J3	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

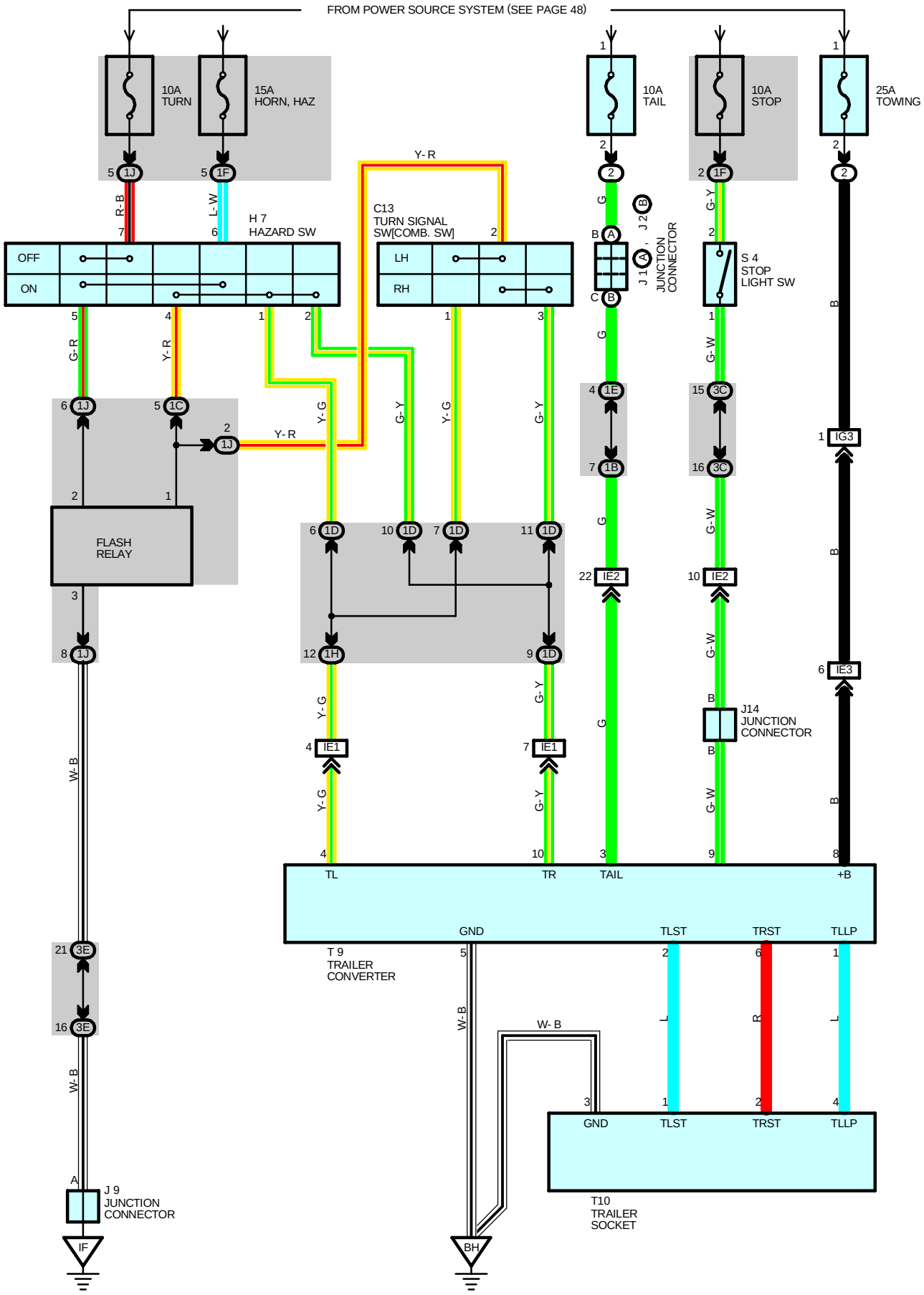
Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1F		
1K	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A TURN
15A HORN, HAZ
10A TAIL
10A STOP
25A TOWING
H 7 HAZARD SW
OFF
ON
C13 TURN SIGNAL SW[COMB. SW]
LH
RH
J 1 , J 2 JUNCTION CONNECTOR
S 4 STOP LIGHT SW
FLASH RELAY
J14 JUNCTION CONNECTOR
TL
TR
TAIL
+B
GND
TLST
TRST
TLLP
T 9 TRAILER CONVERTER
T10 TRAILER SOCKET
J 9 JUNCTION CONNECTOR
IF
BH

SERVICE HINTS

T9 TRAILER CONVERTER

8-GROUND : Always approx. **12** volts

5-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
C13	30	J2 B	29	S4	31
H7	31	J9	31	T9	33
J1 A	29	J14	32	T10	33

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1C		
1D		
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1H		
1J		
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

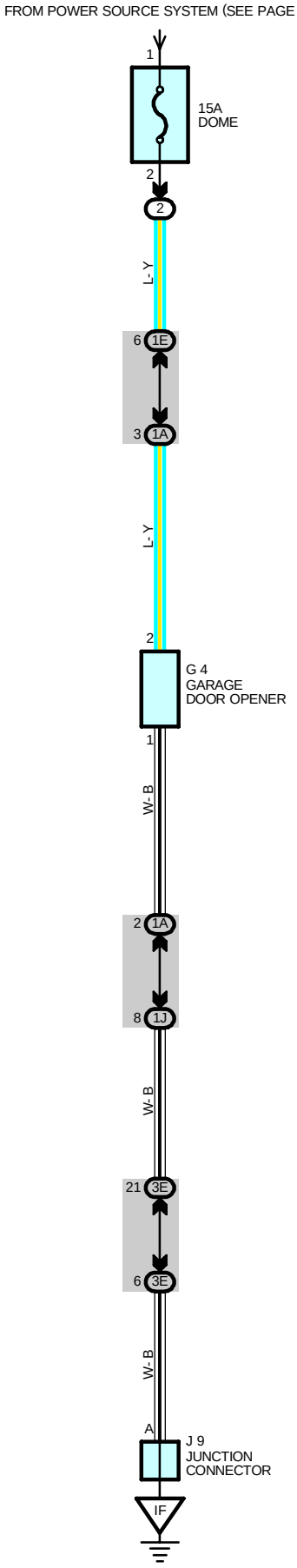
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IE3		
IG3	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)

: GROUND POINTS

Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

GARAGE DOOR OPENER



SERVICE HINTS

G4 GARAGE DOOR OPENER

2-GROUND : Always approx. **12** volts
1-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
G4	32	J9	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

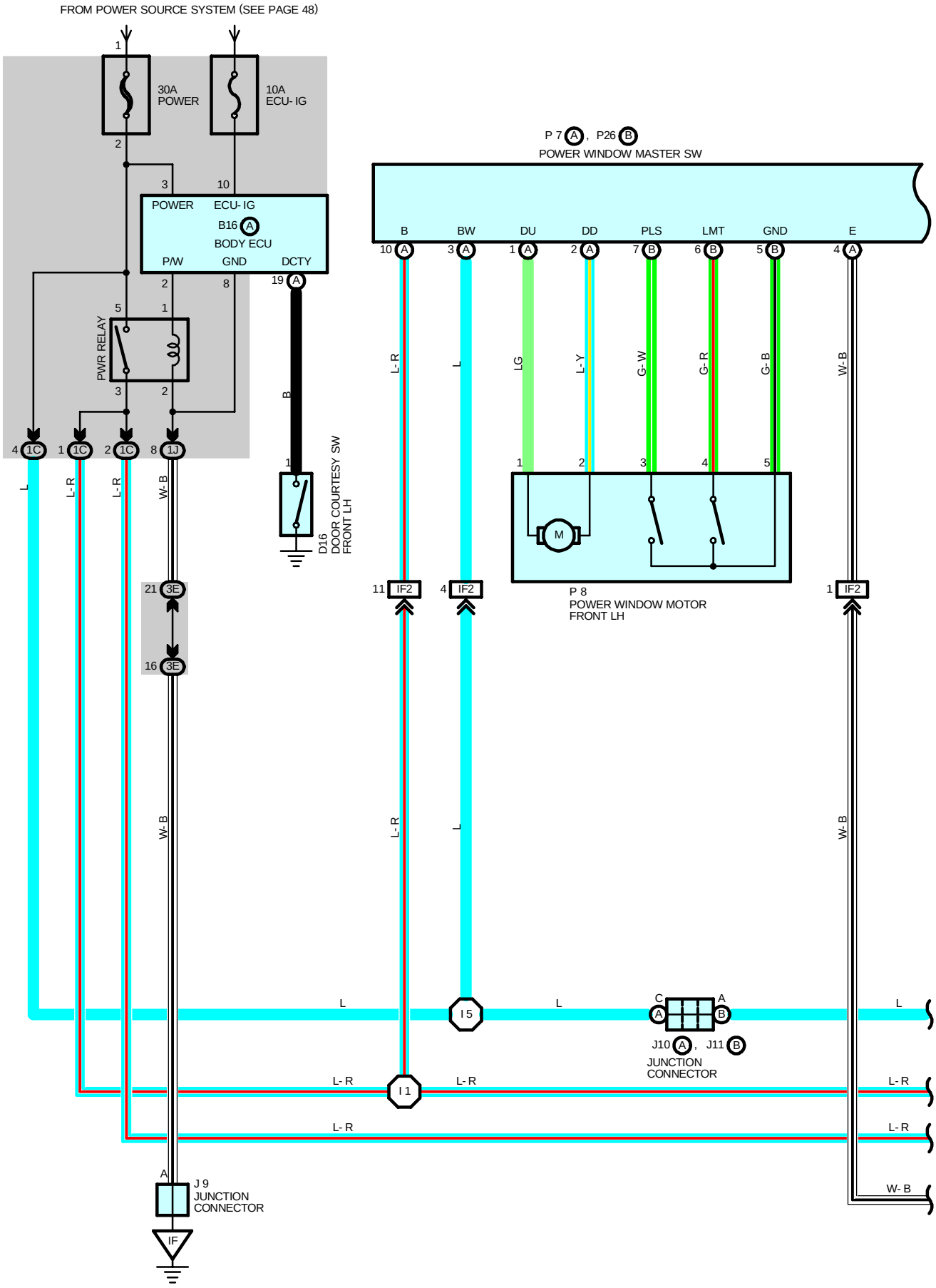
: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

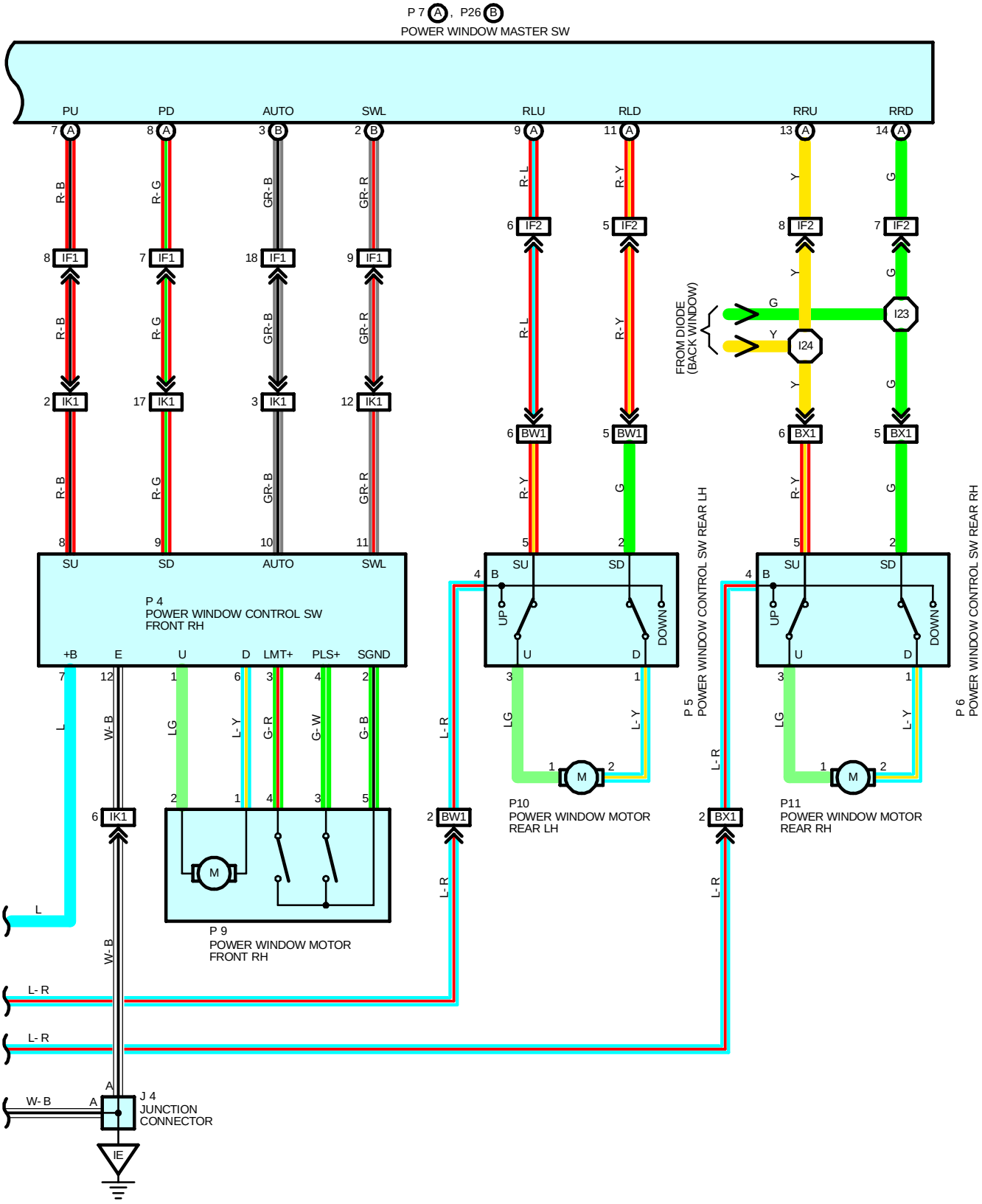
Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Roof Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1J	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: GROUND POINTS

Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH

POWER WINDOW




P 7 A, P26 B
POWER WINDOW MASTER SW
PU
PD
AUTO
SWL
RLU
RLD
RRU
RRD
R-B
R-G
GR-B
GR-R
R-L
R-Y
Y
G
IF1
IF2
IK1
BW1
BX1
I23
I24
FROM DIODE (BACK WINDOW)
SU
SD
AUTO
SWL
P 4
POWER WINDOW CONTROL SW FRONT RH
+B
E
U
D
LMT+
PLS+
SGND
L
W-B
LG
L-Y
G-R
G-W
G-B
L-R
M
P 9
POWER WINDOW MOTOR FRONT RH
UP
DOWN
P10
POWER WINDOW MOTOR REAR LH
P11
POWER WINDOW MOTOR REAR RH
P 5
POWER WINDOW CONTROL SW REAR LH
P 6
POWER WINDOW CONTROL SW REAR RH
J 4
JUNCTION CONNECTOR
IE

SYSTEM OUTLINE

With the ignition SW turned on, current flows through the ECU-IG fuse to TERMINAL 10 of the body ECU. This activates the ECU and at all times the current flowing to TERMINAL 3 of the ECU, TERMINAL (A) 3 of the power window master SW and TERMINAL 7 of the power window control SW front RH from POWER fuse. When the ignition SW turned on, current flows to TERMINAL 5 of the PWR relay to TERMINAL 3 to TERMINAL (A) 10 of the power window master SW and TERMINAL 4 of the power window control SW (Rear LH, rear RH).

1. MANUAL OPERATION (DRIVER'S SW)

With the ignition SW turned on and with the power window master SW (Manual SW) in UP position, the current flowing to TERMINAL (A) 10 of the power window master SW flows to TERMINAL (A) 1 to TERMINAL 1 of the power window motor front LH to TERMINAL 2 to TERMINAL (A) 2 of the power window master SW to TERMINAL (A) 4 to GROUND and causes the power window motor to rotate in the up direction. The window ascends only while the SW is being pushed (Manual up position). In down operation, the flow of current from TERMINAL (A) 10 of the power window master SW to TERMINAL (A) 2 to TERMINAL 2 of the power window motor front LH to TERMINAL 1 to TERMINAL (A) 1 of the power window master SW to TERMINAL (A) 4 to GROUND, flowing in the opposite direction to manual up operation and causing the motor to rotate in reverse, lowering the window.

For the other windows, as the power window master SW is operated, the relevant door window is opened or closed.

2. MANUAL OPERATION (FRONT PASSENGER'S SW)

With the power window control SW pulled to the up side, current flowing from TERMINAL 7 of the power window control SW to TERMINAL 1 to TERMINAL 2 of the power window motor to TERMINAL 1 to TERMINAL 6 of the power window control SW to TERMINAL 12 to GROUND and causes the power window motor to rotate in the up direction. Up operation continues only while the power window control SW is pulled to the up side (Manual up position). When the window descends, the current flowing to the motor flows in the opposite direction, from TERMINAL 2 to TERMINAL 1, and the motor rotates in reverse. When the window lock SW is pushed to the lock side, the ground circuit to the front passenger's SW becomes open. As a result, even if Open/Close operation of the front passenger's window is tried, the current from TERMINAL 12 of the power window control SW is not grounded and the motor does not rotate, so the front passenger's window can not be operated and window lock occurs.

3. MANUAL OPERATION (REAR LH, RH SW)

With the power window control SW pulled to the up side, current flowing from TERMINAL 4 of the power window control SW to TERMINAL 3 to TERMINAL 1 of the power window motor to TERMINAL 2 to TERMINAL 1 of the power window control SW to TERMINAL 2 to TERMINAL (A) 11 or (A) 14 of the power window master SW to TERMINAL (A) 4 to GROUND and causes the power window motor to rotate in the up direction. Up operation continues only while the power window control SW is pulled to the up side. When the window descends, the current flowing to the motor flows in the opposite direction, from TERMINAL 1 to TERMINAL 2, and the motor rotates in reverse. When the window lock SW is pushed to the lock side, the ground circuit to the rear LH, RH window becomes open. As a result, even if Open/Close operation of the rear LH, RH window is tried, the current from TERMINAL (A) 4 of the power window master SW is not grounded and the motor does not rotate, so the rear LH, RH window can not be operated and window lock occurs.

4. STOPPING OF AUTO DOWN (DRIVER'S WINDOW)

When the manual SW (Power window master SW) is pulled to the up side during auto down operation, a ground circuit opens in the master SW and current does not flow from TERMINAL (A) 1 of the power window master SW to TERMINAL (A) 4, so the motor stops, causing auto down operation to stop. If the manual SW is pulled continuously, the motor rotates in the up direction in manual up operation.

5. STOPPING OF AUTO DOWN (FRONT PASSENGER'S WINDOW)

When the manual SW (Power window master SW or power window control SW front RH) is pulled to the up side during auto down operation, a ground circuit opens in the control SW and current does not flow from TERMINAL 1 of the power window control SW front RH to TERMINAL 12, so the motor stops, causing auto down operation to stop. If the manual SW is pulled continuously, the motor rotates in the up direction in manual up operation.

6. STOPPING OF AUTO UP (DRIVER'S WINDOW)

When the manual SW (Power window master SW) is pushed to the down side during auto up operation, a ground circuit opens in the master SW and current does not flow from TERMINAL (A) 2 of the power window master SW to TERMINAL (A) 4, so the motor stops, causing auto up operation to stop. If the manual SW is pushed continuously, the motor rotates in the down direction in manual down operation.

7. STOPPING OF AUTO UP (FRONT PASSENGER'S WINDOW)

When the manual SW (Power window master SW or power window control SW front RH) is pushed to the down side during auto up operation, a ground circuit opens in the control SW and current does not flow from TERMINAL 6 of the power window control SW front RH to TERMINAL 12, so the motor stops, causing auto up operation to stop. If the manual SW is pushed continuously, the motor rotates in the down direction in manual down operation.

8. AUTO DOWN OPERATION (DRIVER'S WINDOW)

With the ignition SW on and with the auto SW of the power window master SW in DOWN position, current flowing to TERMINAL (A) 10 of the power window master SW to TERMINAL (A) 2 to TERMINAL 2 of the power window motor front LH to TERMINAL 1 to TERMINAL (A)1 of the power window master SW to TERMINAL (A) 4 to GROUND, causing the motor to rotate towards the down side. Then the solenoid in the power window master SW is activated and it locks the auto SW being pushed, causing the motor to continue to rotate in auto down operation. When the window has completely descended, the current flow between TERMINAL (A) 1 of the power window master SW and TERMINAL (A) 4 increases. As a result, the solenoid stops operating, the auto SW turns off and flow from TERMINAL (A) 10 of the power window master SW to TERMINAL (A) 2 is cut off, stopping the motor so that auto stop occurs.

9. AUTO DOWN OPERATION (FRONT PASSENGER'S WINDOW)

With the ignition SW on and with the auto SW of the power window master SW or power window control SW front RH in DOWN position, current flowing to TERMINAL 7 of the power window control SW front RH to TERMINAL 6 to TERMINAL 1 of the power window motor front RH to TERMINAL 2 to TERMINAL 1 of the power window control SW front RH to TERMINAL 12 to GROUND, causing the motor to rotate towards the down side. Then the solenoid in the power window control SW front RH is activated and it locks the auto SW being pushed, causing the motor to continue to rotate in auto down operation. When the window has completely descended, the current flow between TERMINAL 6 of the power window control SW front RH and TERMINAL 12 increases. As a result, the solenoid stops operating, the auto SW turns off and flow from TERMINAL 7 of the power window control SW front RH to TERMINAL 6 is cut off, stopping the motor so that auto stop occurs.

10. AUTO UP OPERATION (DRIVER'S WINDOW)

With the ignition SW on and with the auto SW of the power window master SW in UP position, current flowing to TERMINAL (A) 10 of the power window master SW to TERMINAL (A) 1 to TERMINAL 1 of the power window motor front LH to TERMINAL 2 to TERMINAL (A) 2 of the power window master SW to TERMINAL (A) 4 to GROUND, causing the motor to rotate towards the up side. Then the solenoid in the power window master SW is activated and it locks the auto SW being pulled, causing the motor to continue to rotate in auto up operation. When the window has completely descended, the current flow between TERMINAL (A) 2 of the power window master SW and TERMINAL (A) 4 increases. As a result, the solenoid stops operating, the auto SW turns off and flow from TERMINAL (A) 10 of the power window master SW to TERMINAL (A) 1 is cut off, stopping the motor so that auto stop occurs.

11. AUTO UP OPERATION (FRONT PASSENGER'S WINDOW)

With the ignition SW on and with the auto SW of the power window master SW or power window control SW front RH in UP position, current flowing to TERMINAL 7 of the power window control SW front RH to TERMINAL 1 to TERMINAL 2 of the power window motor front RH to TERMINAL 1 to TERMINAL 6 of the power window control SW front RH to TERMINAL 12 to GROUND, causing the motor to rotate towards the up side. Then the solenoid in the power window control SW front RH is activated and it locks the auto SW being pulled, causing the motor to continue to rotate in auto up operation. When the window has completely descended, the current flow between TERMINAL 6 of the power window control SW front RH and TERMINAL 12 increases. As a result, the solenoid stops operating, the auto SW turns off and flow from TERMINAL 7 of the power window control SW front RH to TERMINAL 1 is cut off, stopping the motor so that auto stop occurs.

12. KEY OFF POWER WINDOW OPERATION

With the ignition SW turned from on to off, the body ECU operates and current flows from the POWER fuse to TERMINAL 3 of the body ECU to TERMINAL 2 to TERMINAL 1 of the PWR relay to TERMINAL 2 to GROUND for about 43 seconds. The same as normal operation, the current flows from the POWER fuse to TERMINAL 5 of the PWR relay to TERMINAL 3 to TERMINAL (A) 10 of the power window master SW, TERMINAL 4 (Rear LH, RH) of the power window control SW and signal input in to the TERMINAL 11 of the power window control SW front RH. As a result, for about 43 seconds after the ignition SW is turned off, it is possible to raise and lower the power window by the functioning of this ECU. Also, by opening the front door LH (the door courtesy SW front LH on) within about 43 seconds after turning the ignition SW to off, a signal is input to TERMINAL (A) 19 of the body ECU. As a result, the ECU turns off and up and down movement of the window stops.
Furthermore, front RH, rear LH, RH window operate the same as the above circuit.

13. CATCHING PREVENTION FUNCTION (DRIVER'S, FRONT PASSENGER'S WINDOW)

When any foreign matter is caught in the window during power window auto up operation, the pulse sensor in the power window motor detects the changes in the number of motor rotations and forcibly opens the door window 50 mm, or when the window opening is less then 200 mm, it opens the window until the opening is 200 mm.

POWER WINDOW

SERVICE HINTS

B16 (A) BODY ECU

3-GROUND : Always approx. **12** volts
10-GROUND : Approx. **12** volts with ignition SW at **ON** position
(A)19-GROUND : Continuity with front LH door opened
8-GROUND : Always continuity

PWR RELAY

5-3 : Closed with ignition SW on and stays at **12** volts for **43** seconds after the ignition SW is turned off, but if a door is opened in this **43** seconds period, voltage will drop to **0** volts

D16 DOOR COURTESY SW FRONT LH

1-GROUND : Continuity with door opened

P4 POWER WINDOW CONTROL SW FRONT RH

7-GROUND : Always approx. **12** volts
12-GROUND : Always continuity

P5, P6 POWER WINDOW CONTROL SW REAR LH, RH

4-GROUND : Approx. **12** volts with ignition SW on and stays at **12** volts for **43** seconds after the ignition SW is turned off, but if a door is opened in this **43** seconds period, voltage will drop to **0** volts

P7 (A) POWER WINDOW MASTER SW

(A) 4-GROUND : Always continuity
(A)10-GROUND : Approx. **12** volts with ignition SW on and stays at **12** volts for **43** seconds after the ignition SW is turned off, but if a door is opened in this **43** seconds period, voltage will drop to **0** volts
(A) 3-GROUND : Always approx. **12** volts

WINDOW LOCK SW

Open with window lock SW at **LOCK** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B16 A	30	J11 B	31	P8	33
D16	32	P4	33	P9	33
J4	31	P5	33	P10	33
J9	31	P6	33	P11	33
J10 A	31	P7 A	33	P26 B	33

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C 1J	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF1 IF2	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)

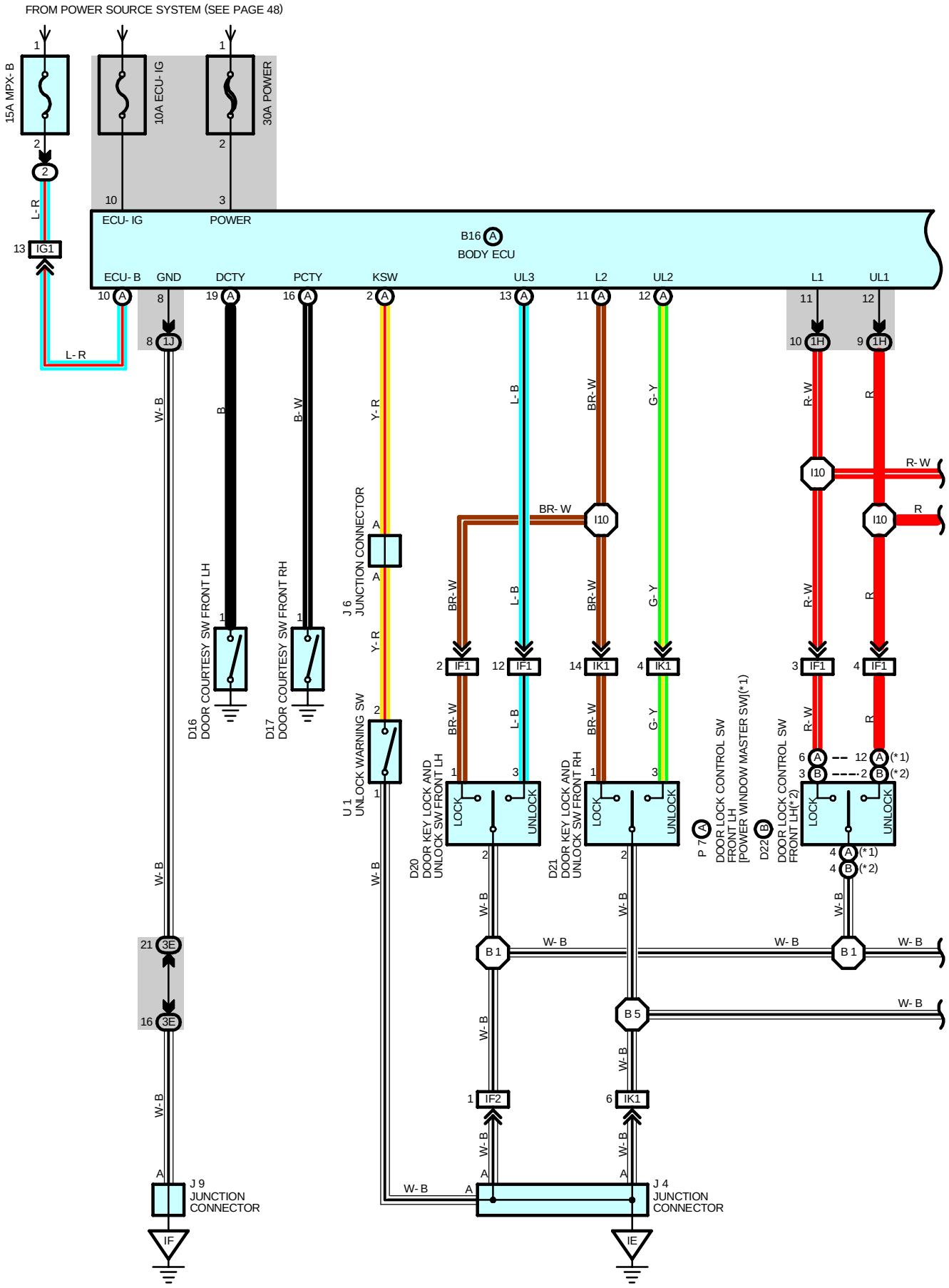
: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

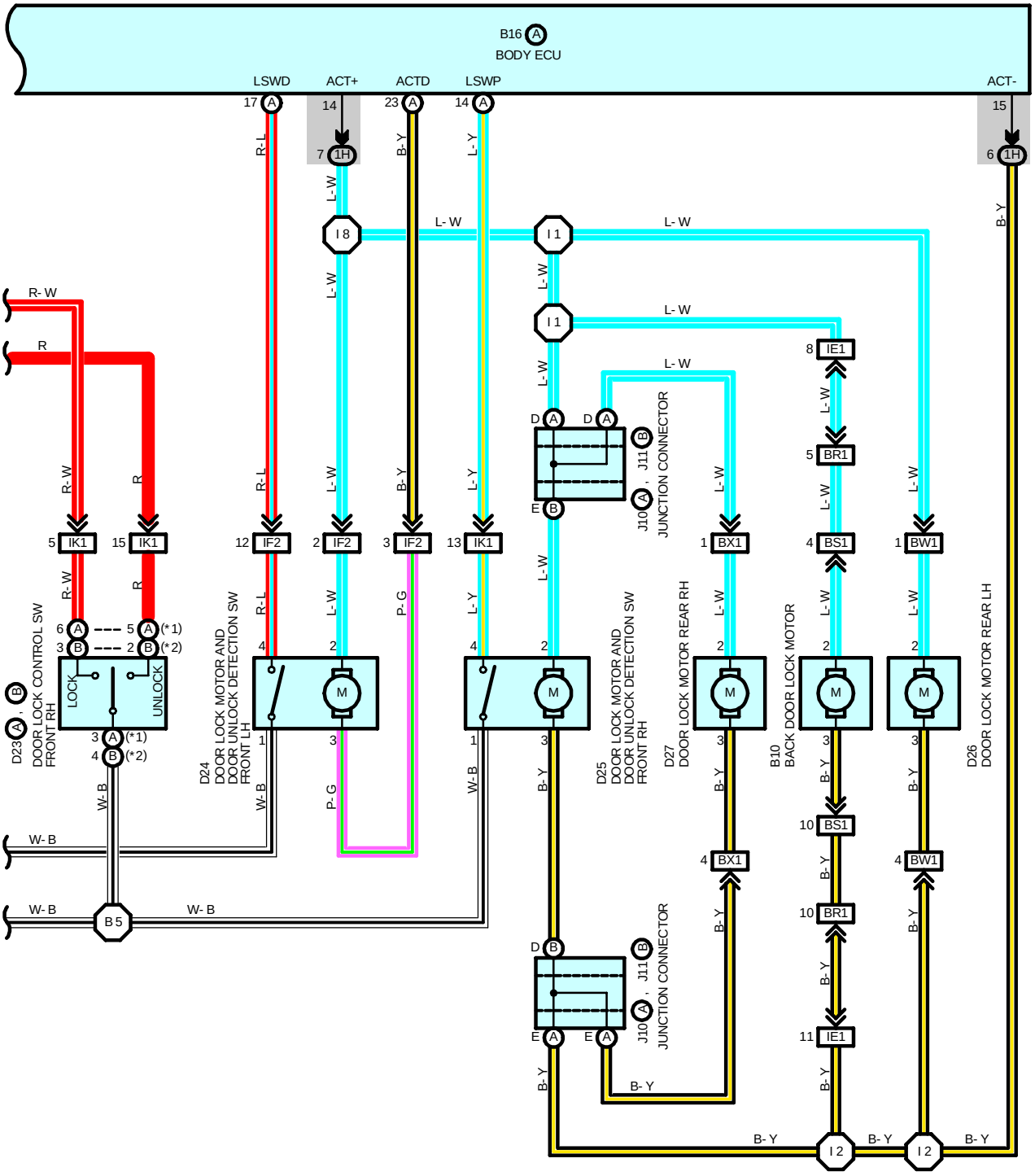
: **SPLICE POINTS**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	I23	40	Cowl Wire
I5			I24		

DOOR LOCK CONTROL



* 1 : W/ POWER WINDOW
* 2 : W/O POWER WINDOW



DOOR LOCK CONTROL

SYSTEM OUTLINE

Current always flows to TERMINAL POWER of the body ECU through the POWER fuse.

1. MANUAL LOCK OPERATION

To push door lock control SW or door key lock and unlock SW to LOCK position, a lock signal is input to TERMINAL L1 or L2 of the body ECU and causes the body ECU to function. Current flows from TERMINAL POWER of the body ECU to TERMINAL ACT+ to TERMINAL 2 of the door lock motors to TERMINAL 3 to TERMINAL ACT- and ACTD of the body ECU to TERMINAL GND to GROUND and the door lock motor causes the door to lock.

2. MANUAL UNLOCK OPERATION

To push door lock control SW or door key lock and unlock SW to UNLOCK position, an unlock signal is input to TERMINAL UL1, UL2 or UL3 of the body ECU and causes the body ECU to function. Current flows from TERMINAL POWER of the body ECU to TERMINAL ACT- and ACTD to TERMINAL 3 of the door lock motors to TERMINAL 2 to TERMINAL ACT+ of the body ECU to TERMINAL GND to GROUND and the door lock motor causes the door to unlock.

3. IGNITION KEY REMINDER OPERATION

* Operating door lock knob (in door lock motor operation)
  With ignition key in cylinder (Unlock warning SW on), when the driver's door is opened (Door courtesy SW on) and locked using the driver's door lock knob (Door lock motor), the driver's door is locked once but all door is unlocked soon by the function of the body ECU. As a result, the current flows from TERMINAL POWER of the body ECU to TERMINAL ACT- and ACTD to TERMINAL 3 of the door lock motors to TERMINAL 2 to TERMINAL ACT+ of the body ECU to TERMINAL GND to GROUND and causes all the door to unlock.
  For front passenger's door, as driver's door lock knob operated, the door lock motor is operated.

* Operating door lock control SW or door key lock and unlock SW
  With ignition key in cylinder (Unlock warning SW on), when the door is opened (Door courtesy SW on) and locked using door lock control SW or door key lock and unlock SW, all door lock is locked once but all door is unlocked by the function of SW contained in motor, which inputs the signal to TERMINAL LSWD or LSWP of the body ECU. According to this input signal, the current in the body ECU flows from TERMINAL POWER of the body ECU to TERMINAL ACT- and ACTD to TERMINAL 3 of the door lock motors to TERMINAL 2 to TERMINAL ACT+ of the body ECU to TERMINAL GND to GROUND and causes all the doors to unlock.

4. DOUBLE OPERATION UNLOCK OPERATION

When the door key lock and unlock SW front LH is turned to the unlock side, only the driver's door is unlocked. Turning the door key lock and unlock SW front LH to the unlock side causes a signal to be input to TERMINAL UL3 of the body ECU, and if the signal input again within 3 seconds by turning the SW to the unlock side again, current flows from TERMINAL POWER of the body ECU to TERMINAL ACT- and ACTD to TERMINAL 3 of the door lock motors to TERMINAL 2 to TERMINAL ACT+ of the body ECU to TERMINAL GND to GROUND and the door lock motor causes all the doors to unlock.

SERVICE HINTS

B16 (A) BODY ECU

10-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position
8-GROUND : Always continuity
3-GROUND : Always approx. **12** volts
15-GROUND : Approx. **12** volts for **0.2** seconds with following operations.
∗ Door lock control SW unlocked.
∗ Door lock control SW locked with ignition key in cylinder and driver's door open. (Ignition key reminder function)
∗ Door lock knob locked with ignition key in cylinder and driver's door open. (Ignition key reminder function)
∗ Unlocking the passenger's door cylinder with key.
∗ Double operation unlocking the driver's door cylinder with key.
14-GROUND : Approx. **12** volts for **0.2** seconds with following operations.
∗ Door lock control SW locked.
∗ Locking the driver's, passenger's door cylinder with key.
(A)17-GROUND : Continuity with driver's door lock knob unlocked.
(A)14-GROUND : Continuity with Front passenger's door lock knob unlocked.
(A)23-GROUND : Approx. **12** volts for **0.2** seconds with following operations.
∗ Door lock control SW unlocked.
∗ Door lock control SW locked with ignition key in cylinder and driver's door open. (Ignition key reminder function)
∗ Door lock knob locked with ignition key in cylinder and driver's door open. (Ignition key reminder function)
∗ Unlocking the driver's door cylinder with key.

D20, D21 DOOR KEY LOCK AND UNLOCK SW FRONT LH, RH

3-2 : Closed with door lock cylinder unlocked with key.
1-2 : Closed with door lock cylinder locked with key.

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B10	32	D23 A	32	J6	31
B16 A	30	D23 B	32	J9	31
D16	32	D24	32	J10 A	31
D17	32	D25	32	J11 B	31
D20	32	D26	32	P7 A	33
D21	32	D27	32	U1	31
D22 B	32	J4	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1H	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1J		
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

DOOR LOCK CONTROL

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2		
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)

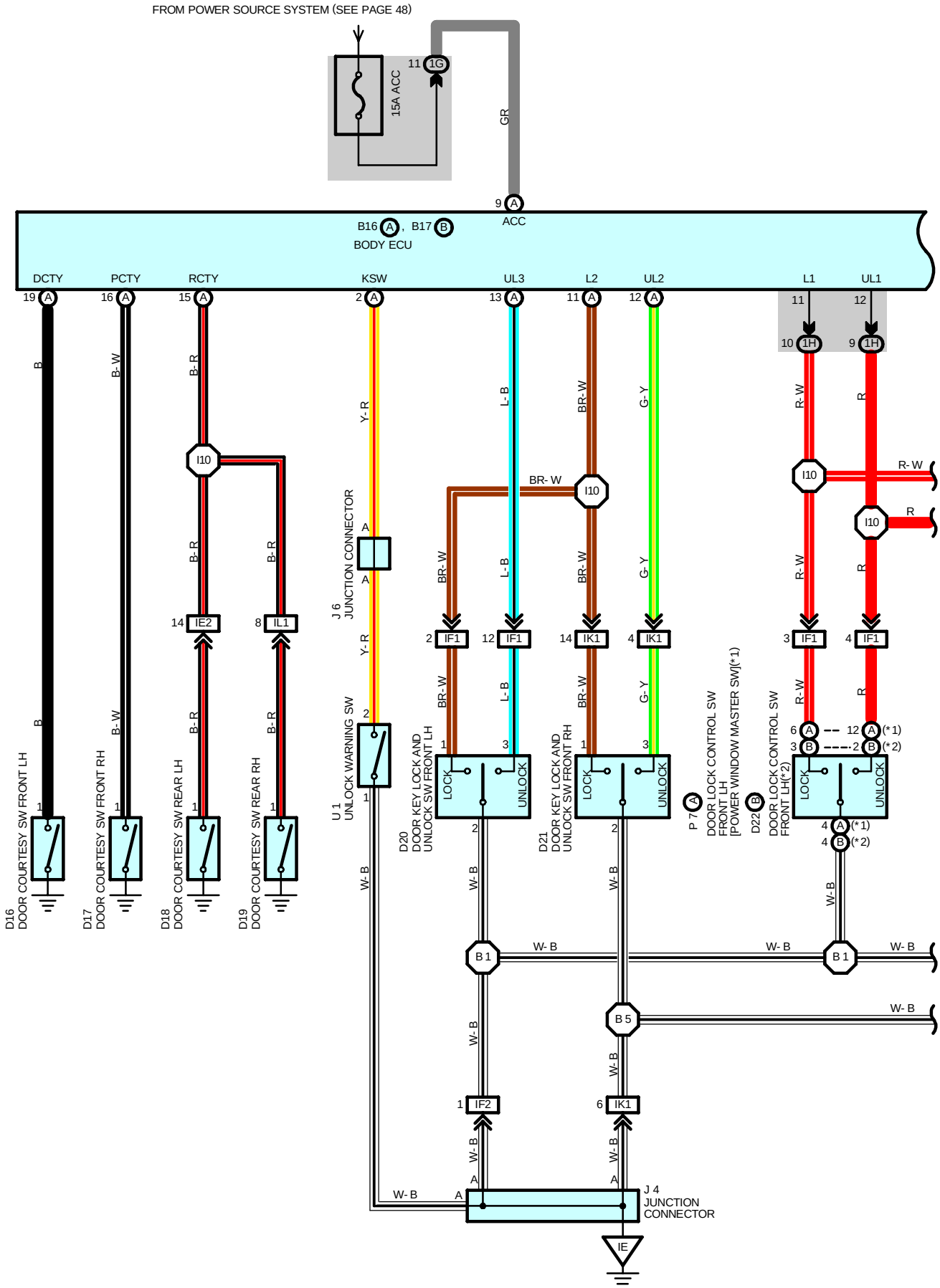
: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

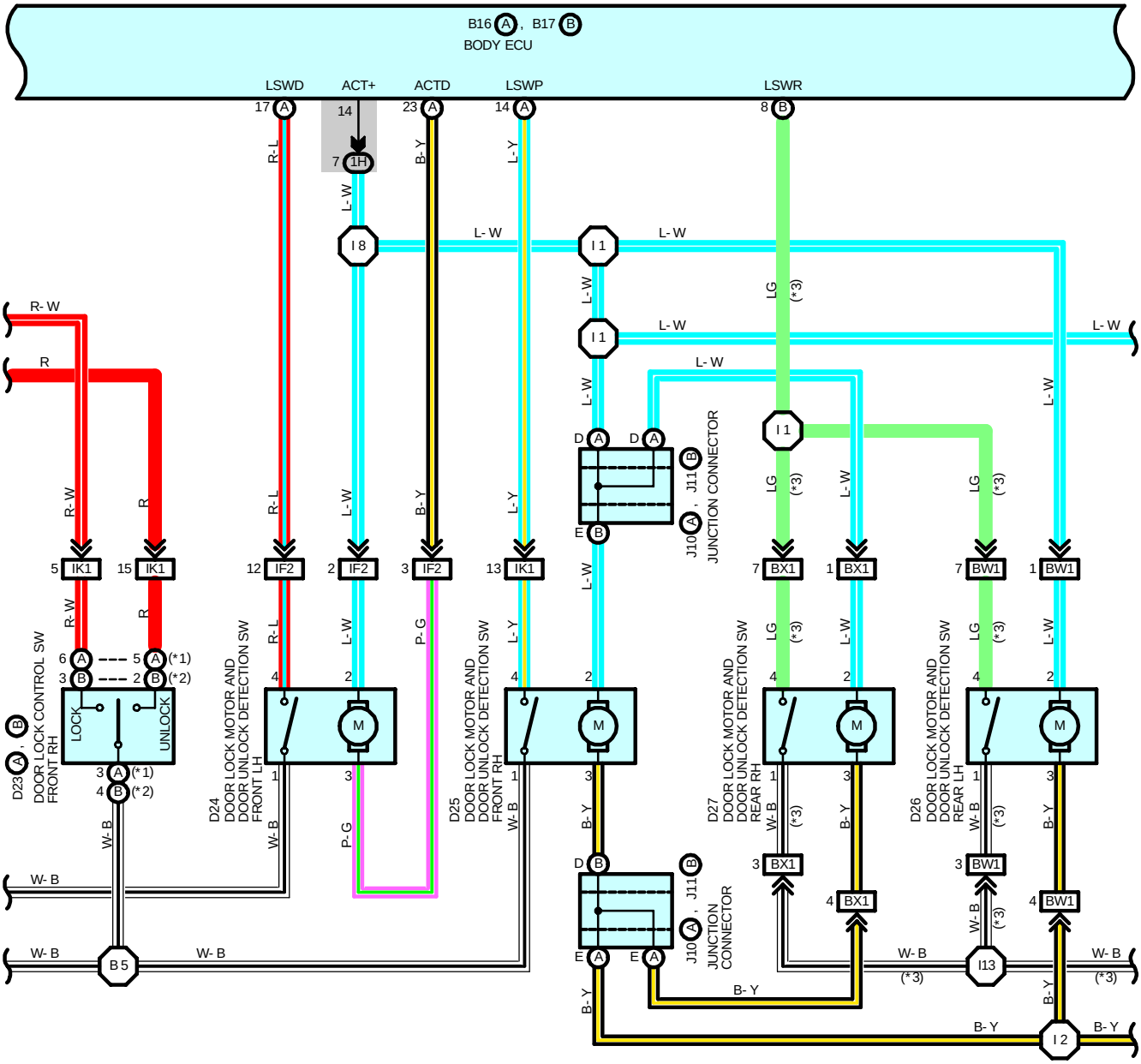
: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	I10	40	Cowl Wire
I2			B1	42	Front Door LH Wire
I8			B5	42	Front Door RH Wire

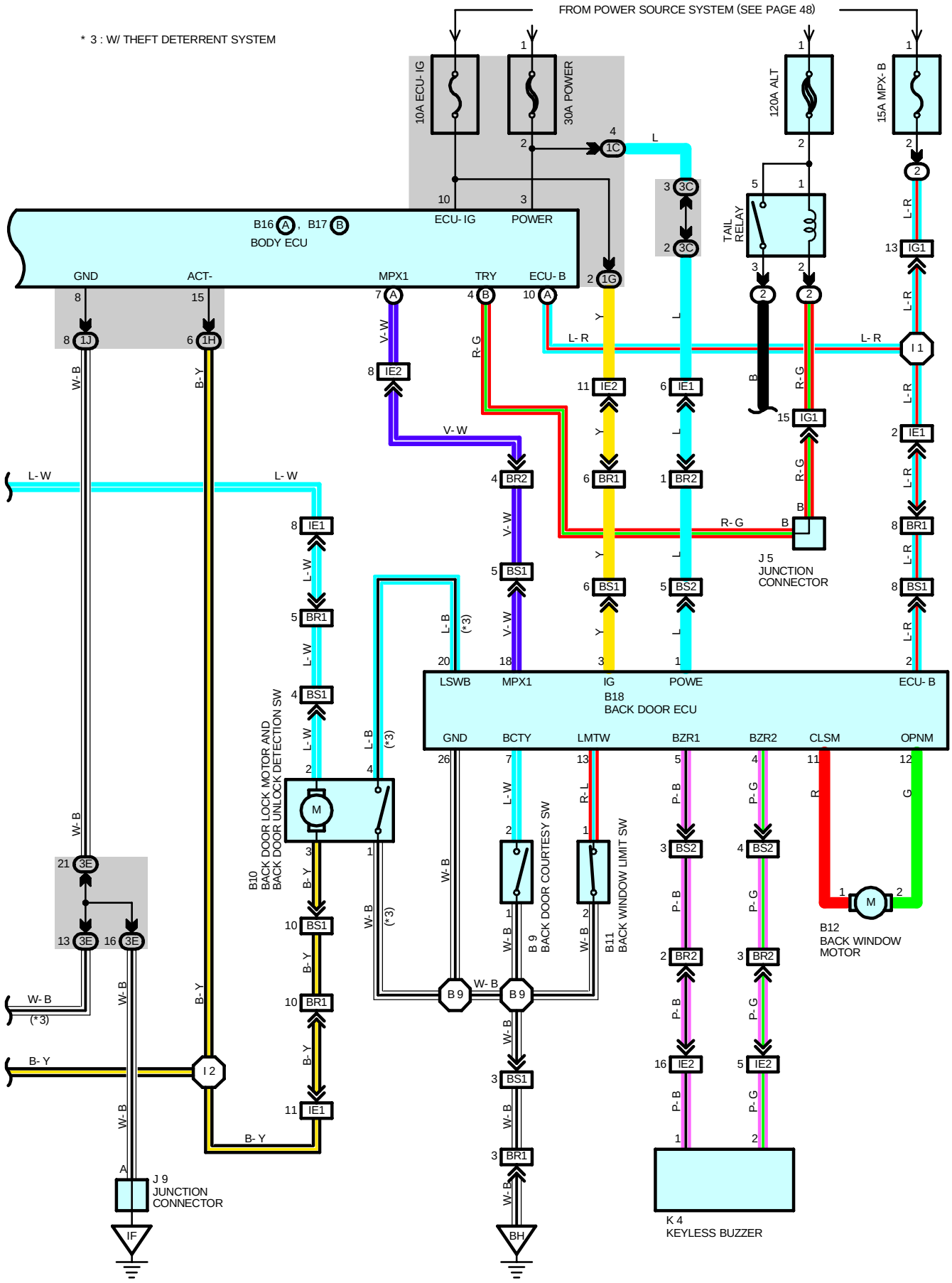
WIRELESS DOOR LOCK CONTROL



* 1 : W/ POWER WINDOW
* 2 : W/O POWER WINDOW
* 3 : W/ THEFT DETERRENT SYSTEM



WIRELESS DOOR LOCK CONTROL



SYSTEM OUTLINE

In this system, the back door ECU receivers weak radio wave transmitted from the transmitter built-into the ignition key, and outputs a signal to the body ECU. Accordingly, all the doors are can be locked and unlocked by remote control.

1. NORMAL OPERATION

* Lock operation
  When the lock SW on the transmitter is pressed, all the doors are locked.
* Unlock operation
  When the unlock SW on the transmitter is pressed once, only the driver door is unlocked. When the unlock SW is pressed again within 3 seconds, all the doors are unlocked.

2. AUTO LOCK FUNCTION

When the door is not actually opened within 30 seconds after the door has been unlocked by the unlock SW on the transmitter, all the doors are automatically locked. If any of the following conditions are detected, the wireless door lock does not function.

* Any door is opened.
* The ignition key is inserted into the ignition SW.
* When the unlock detection SW of all the doors are locked.

3. WIRELESS DOOR LOCK STOP FUNCTION

If any of the following conditions are detected, the wireless door lock does not function.
Lock operation

* When any door is open (Door courtesy SW on)
* The ignition key is inserted into the ignition SW (Unlock warning SW on)
* Ignition SW is on

Unlock operation

* Ignition SW is on

4. BUZZER SOUND FUNCTION

During lock operation, when the back door ECU receives a lock signal from the door unlock detection SW, the wireless door lock buzzer goes on once. During unlock operation, when the back door ECU receives an unlock signal from the door unlock detection SW, the keyless buzzer goes on twice.
With any door open, when the back door ECU receives a lock signal from the transmitter, the keyless buzzer goes on for approx. 10 seconds. If the door is closed, or ignition SW is on, or if the unlock signal is received from the transmitter while the buzzer is on, the buzzer stops.

5. VISUAL CONFIRMATION OF LOCK OR UNLOCK

During lock operation, when the back door ECU receives a lock signal from the door unlock detection SW, the taillight and front parking light is flashed once. During unlock operation, when the back door ECU receives an unlock signal from the door unlock detection SW, the taillight and front parking light is flashed twice.

6. PANIC MODE FUNCTION

When the panic SW on the transmitter is pressed, the back door ECU receives a signal and enters the panic mode. The signal input into the body ECU from the back door ECU turns on (during 60 seconds) the theft deterrent horn, the horn LH and RH, and flashes the front parking light, taillight and headlight. When the panic SW or the unlock SW of the transmitter is pressed during the panic mode, the panic mode is canceled, and the theft deterrent horn, the horn LH and RH stop, and the front parking light, taillight and headlight are turned off.

7. REPEAT FUNCTION

If the lock detection signal in response to the output signal is not received after the back door ECU has output the lock signal, the lock signal is output again.

8. BUZZER VOLUME CONTROL

The volume of the keyless buzzer can be set among 5 steps by operating the transmitter, when the ignition SW is off, any door open, and the ignition key is not in the ignition key cylinder.

9. BACK WINDOW CONTROL

When the ignition SW is off, the ignition key is not inserted into the ignition key cylinder, the back window can be opened by pressing the back window open SW of the transmitter for approximately 0.8 seconds. At that time, the keyless buzzer beeps once.

WIRELESS DOOR LOCK CONTROL

SERVICE HINTS

B16 (A) BODY ECU

8-GROUND : Always continuity
3, (A)10-GROUND : Always approx. **12** volts
10-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position

D24, D25, D26, D27 DOOR LOCK MOTOR AND DOOR UNLOCK DETECTION SW FRONT LH, RH, REAR LH, RH

2-GROUND : Approx. **12** volts with door lock motor at lock operation
3-GROUND : Approx. **12** volts with door lock motor at unlock operation

B10 BACK DOOR LOCK MOTOR AND BACK DOOR UNLOCK DETECTION SW

2-GROUND : Approx. **12** volts with door lock motor at lock operation
3-GROUND : Approx. **12** volts with door lock motor at unlock operation

B18 BACK DOOR ECU

2-GROUND : Always approx. **12** volts
3-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position
26-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B9	32	D19	32	J4	31
B10	32	D20	32	J5	31
B11	32	D21	32	J6	31
B12	32	D22 B	32	J9	31
B16 A	30	D23 A	32	J10 A	31
B17 B	30	D23 B	32	J11 B	31
B18	32	D24	32	K4	29
D16	32	D25	32	P7 A	33
D17	32	D26	32	U1	31
D18	32	D27	32		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1H		
1J		
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

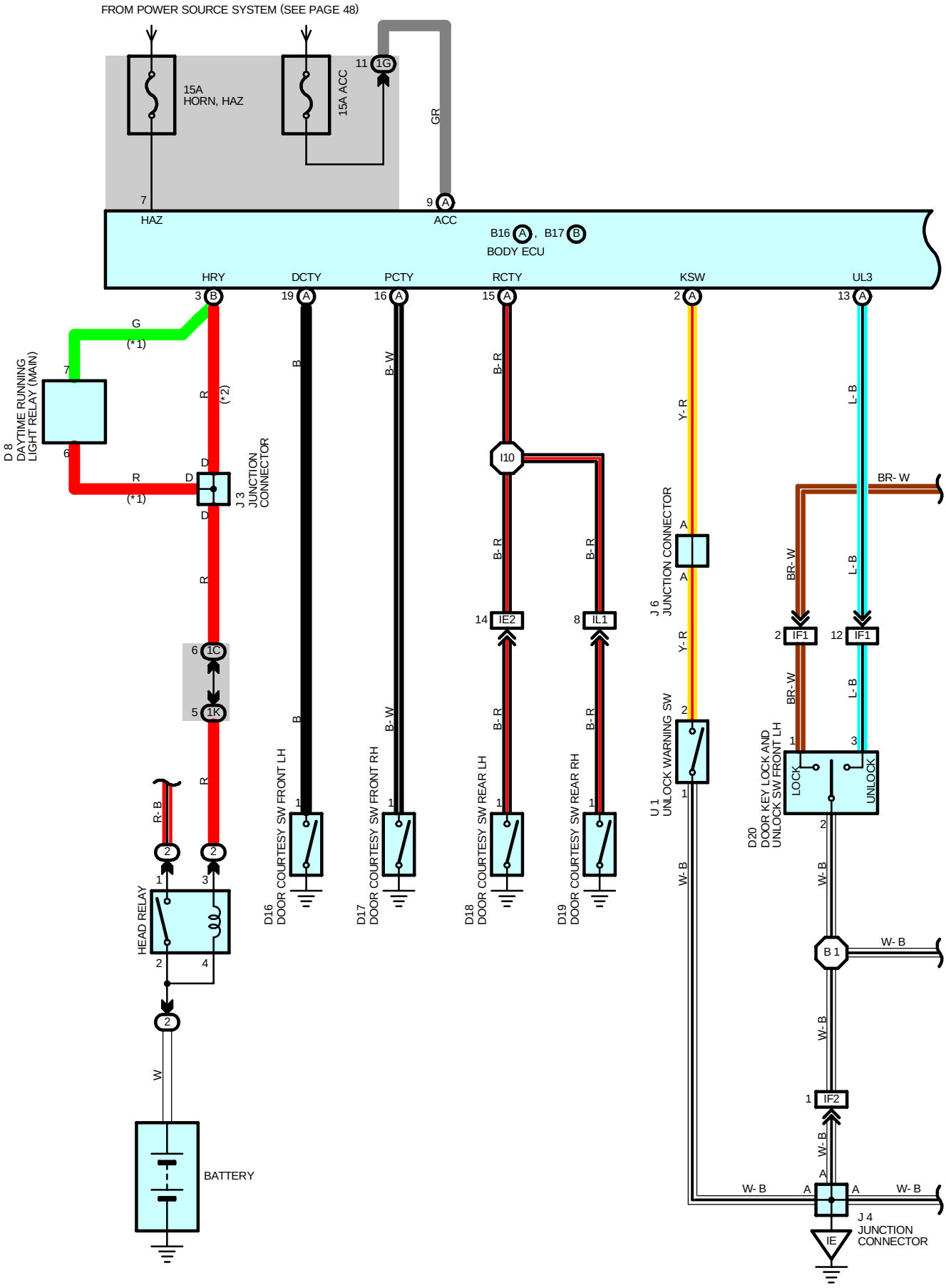
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2		
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2		
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BS2		
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)

: GROUND POINTS

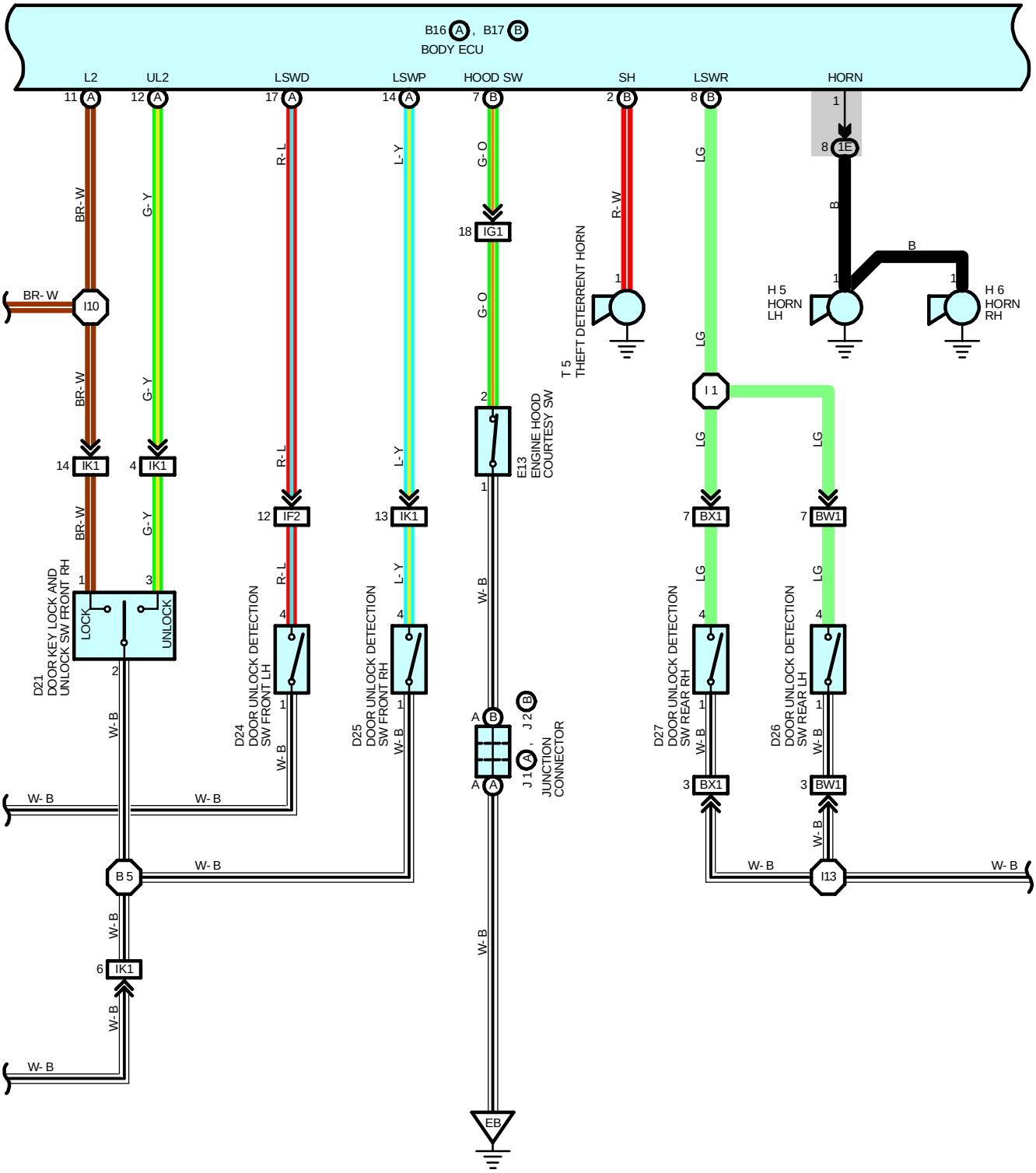
Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

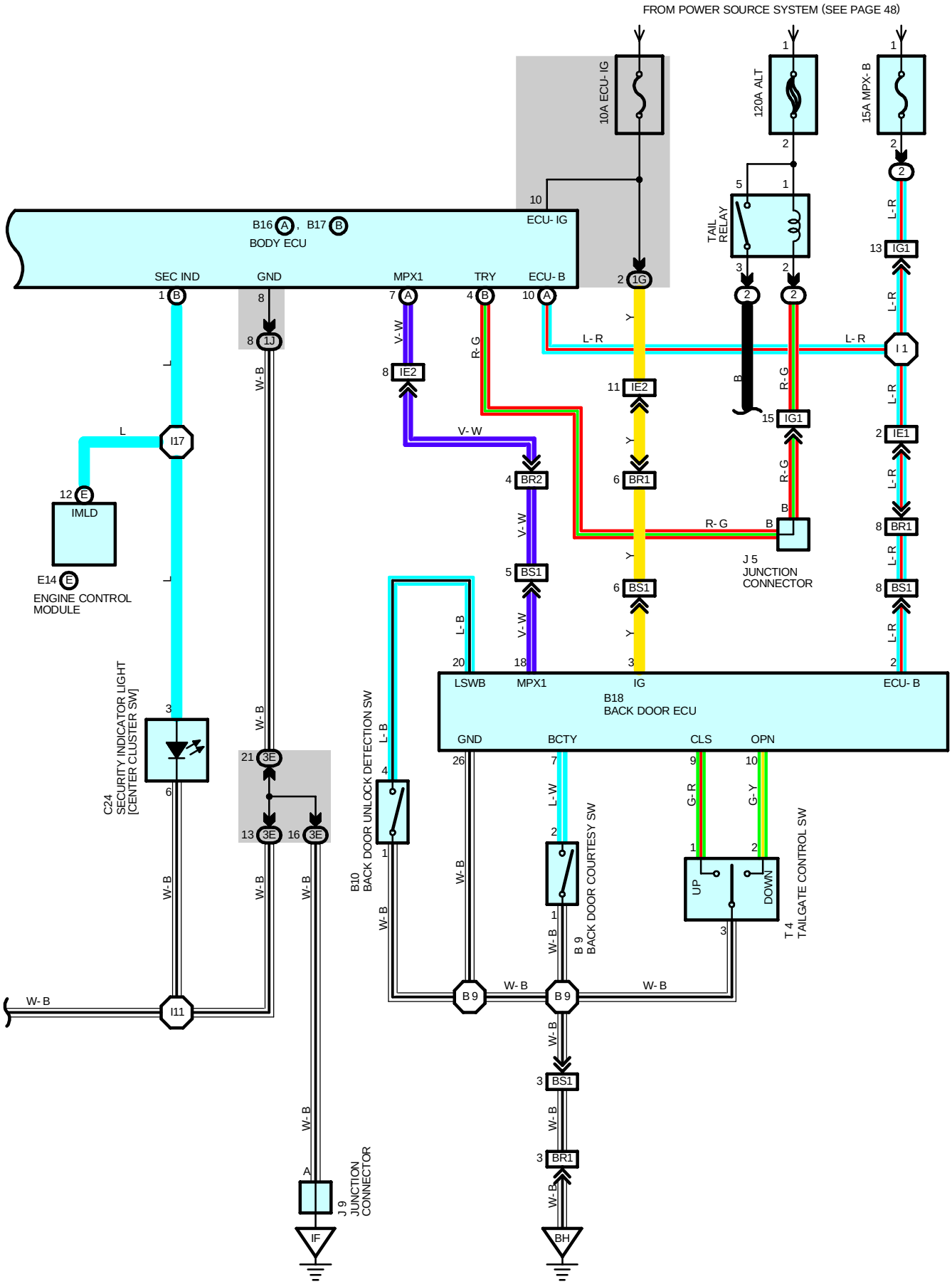
: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	I13	40	Cowl Wire
I2			B1	42	Front Door LH Wire
I8			B5	42	Front Door RH Wire
I10			B9	42	Back Door No.2 Wire


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A
HORN, HAZ
15A ACC
11 1G
GR
7
HAZ
9 A
ACC
B16 A , B17 B
BODY ECU
HRY
DCTY
PCTY
RCTY
KSW
UL3
3 B
19 A
16 A
15 A
2 A
13 A
G
(*1)
7
D 8
DAYTIME RUNNING
LIGHT RELAY (MAIN)
6
R
(*1)
R
(*2)
D
D
D
J 3
JUNCTION
CONNECTOR
R
6 1C
5 1K
R
R-B
2
1
3
2
HEAD RELAY
2
4
2
W
BATTERY
B
B
D16
DOOR COURTESY SW FRONT LH
1
B-W
B-W
D17
DOOR COURTESY SW FRONT RH
1
B-R
I10
B-R
14 IE2
B-R
B-R
D18
DOOR COURTESY SW REAR LH
1
B-R
8 IL1
B-R
D19
DOOR COURTESY SW REAR RH
1
Y-R
A
A
J 6
JUNCTION CONNECTOR
Y-R
2
U 1
UNLOCK WARNING SW
1
W-B
L-B
BR-W
BR-W
2 IF1
L-B
12 IF1
BR-W
L-B
1
3
LOCK
UNLOCK
2
D20
DOOR KEY LOCK AND
UNLOCK SW FRONT LH
W-B
B 1
W-B
W-B
1 IF2
W-B
A
W-B
A
A
W-B
J 4
JUNCTION
CONNECTOR
IE

* 1 : W/ DAYTIME RUNNING LIGHT
* 2 : W/O DAYTIME RUNNING LIGHT




FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A ECU-IG
120A ALT
15A MPX-B
TAIL RELAY
B16 A , B17 B
BODY ECU
ECU-IG
SEC IND
GND
MPX1
TRY
ECU-B
IMLD
E14 E
ENGINE CONTROL MODULE
C24
SECURITY INDICATOR LIGHT [CENTER CLUSTER SW]
J 5
JUNCTION CONNECTOR
B18
BACK DOOR ECU
LSWB
MPX1
IG
ECU-B
GND
BCTY
CLS
OPN
B10
BACK DOOR UNLOCK DETECTION SW
B 9
BACK DOOR COURTESY SW
T 4
TAILGATE CONTROL SW
UP
DOWN
J 9
JUNCTION CONNECTOR
IF
BH

SERVICE HINTS

D20, D21 DOOR KEY LOCK AND UNLOCK SW FRONT LH, RH

2-3 : Closed with door lock cylinder unlocked with key
1-2 : Closed with door lock cylinder locked with key

T4 TAILGATE CONTROL SW

2-3 : Closed with door lock cylinder unlocked with key
1-3 : Closed with door lock cylinder locked with key

E13 ENGINE HOOD COURTESY SW

2-1 : Open with engine hood open

U1 UNLOCK WARNING SW

2-1 : Closed with ignition key in cylinder

B16 (A), B17 (B) BODY ECU

(A) 2-GROUND : Continuity with ignition key in cylinder
(A)16-GROUND : Continuity with front RH door open
(A)19-GROUND : Continuity with front LH door open
(A)11-GROUND : Continuity with door key lock and unlock SW at **LOCK** position
8-GROUND : Always continuity
(B) 7-GROUND : Continuity with engine hood closed
(A)13-GROUND :
Continuity with door key lock and unlock SW front LH at **UNLOCK** position
(A)12-GROUND :
Continuity with door key lock and unlock SW front RH at **UNLOCK** position
(A) 9-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position
10-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position
7, (A) 10-GROUND : Always approx. **12** volts

B18 BACK DOOR ECU

2-GROUND : Always approx. **12** volts
3-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position
26-GROUND : Always continuity

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B9	32	D20	32	J2 B	29
B10	32	D21	32	J3	31
B16 A	30	D24	32	J4	31
B17 B	30	D25	32	J5	31
B18	32	D26	32	J6	31
C24	30	D27	32	J9	31
D8	30	E13	28	T4	33
D16	32	E14	31	T5	29
D17	32	H5	28	U1	31
D18	32	H6	28		
D19	32	J1 A	29		

▭ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1G	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1J		
1K	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2		
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2		
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)

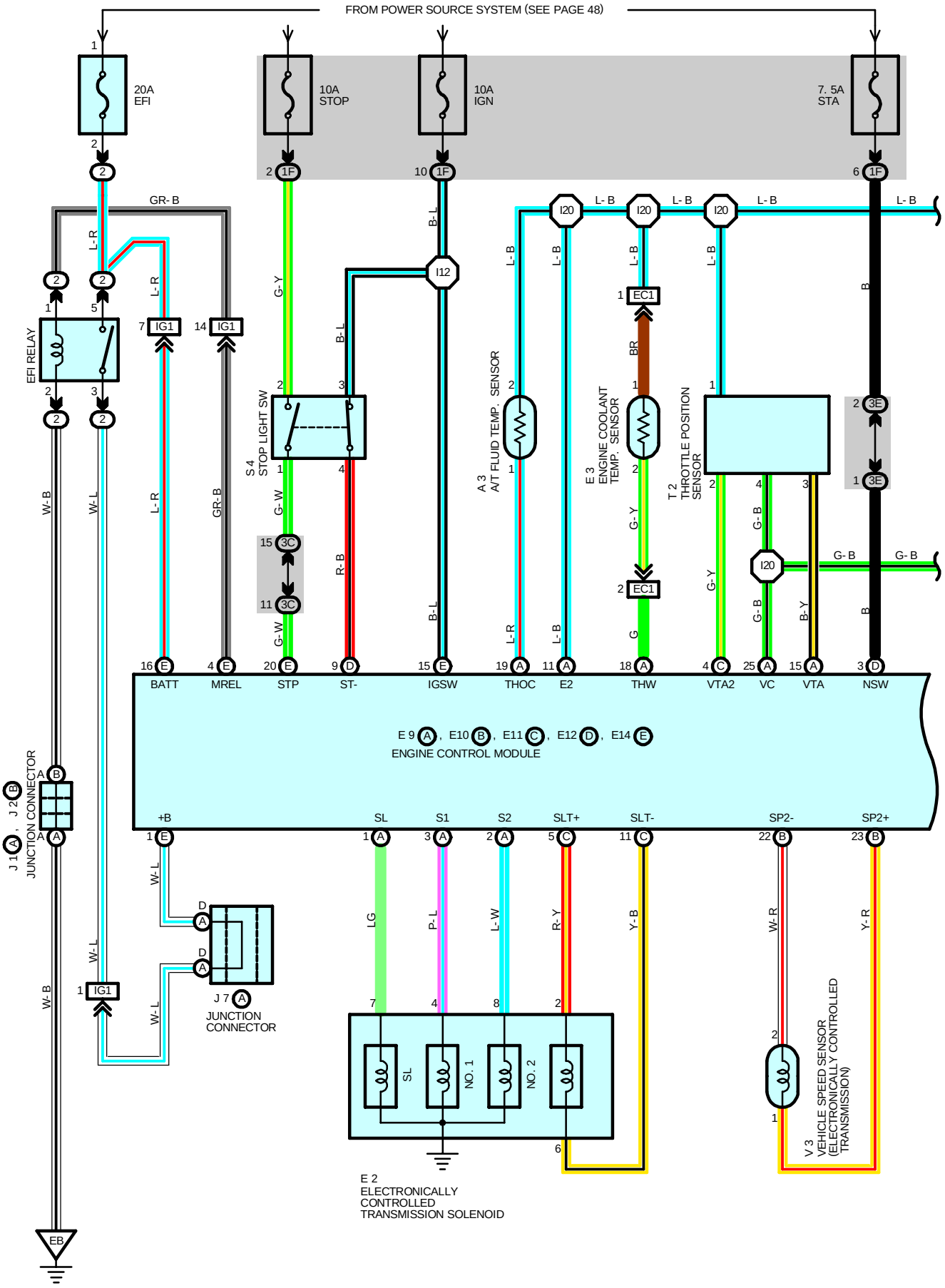
: GROUND POINTS

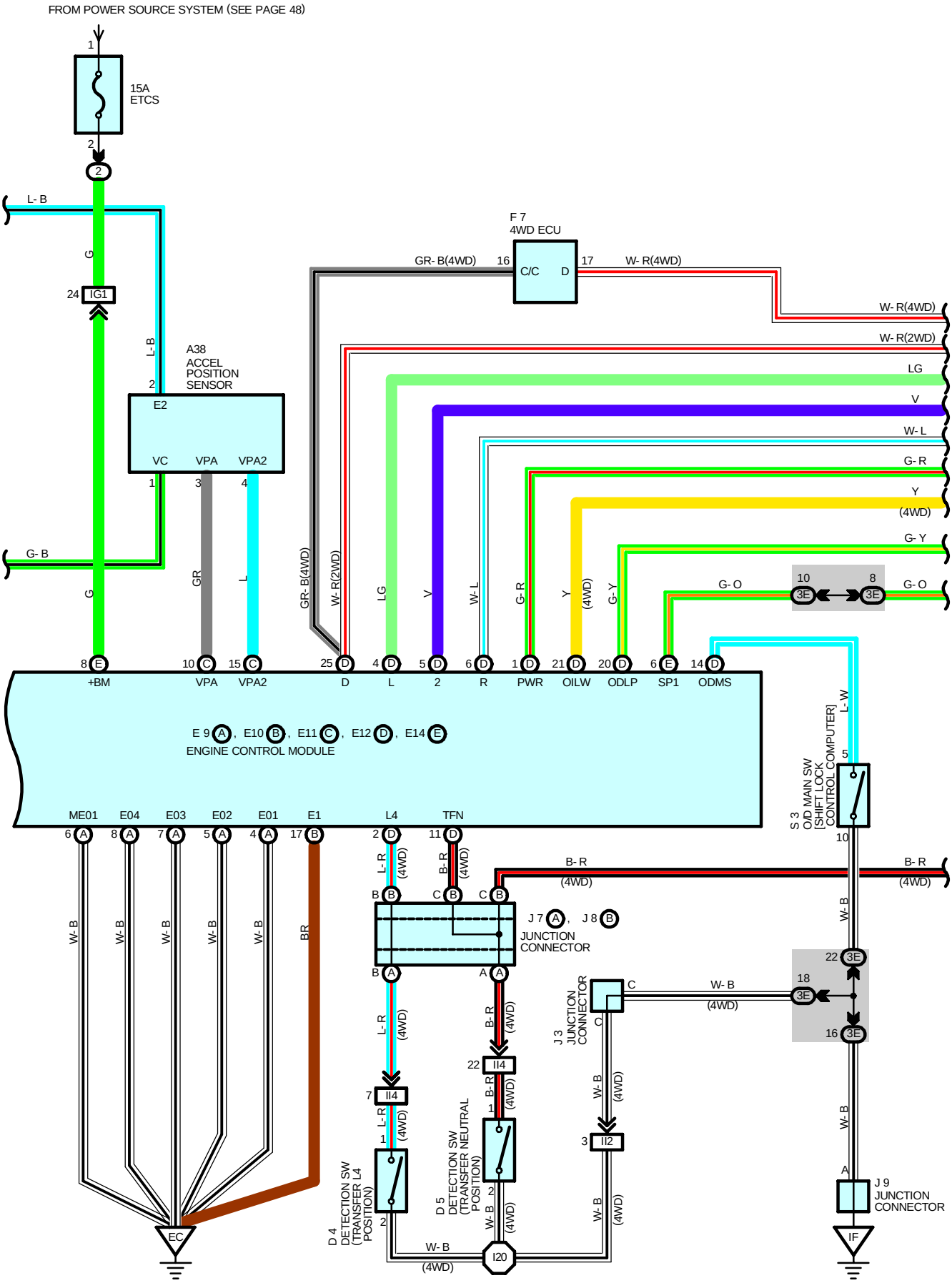
Code	See Page	Ground Points Location
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

: SPLICE POINTS

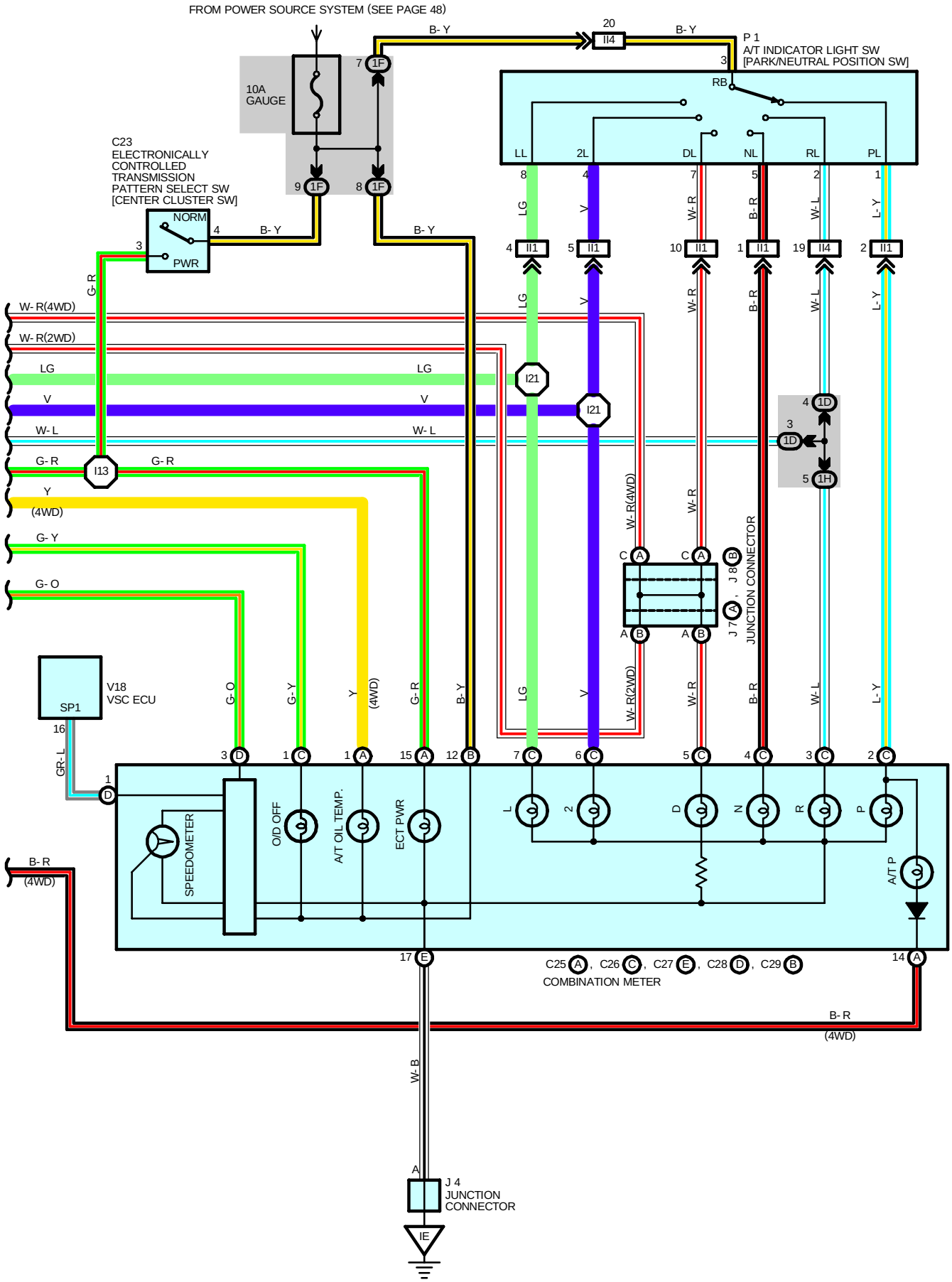
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	I17	40	Cowl Wire
I10			B1	42	Front Door LH Wire
I11			B5	42	Front Door RH Wire
I13			B9	42	Back Door No.2 Wire

ELECTRONICALLY CONTROLLED TRANSMISSION AND A/T INDICATOR




FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A
ETCS
L- B
G
IG1
A38
ACCEL
POSITION
SENSOR
E2
VC
VPA
VPA2
G- B
GR
L
F 7
4WD ECU
C/C
GR- B(4WD)
W- R(4WD)
W- R(2WD)
LG
V
W- L
G- R
Y
(4WD)
G- Y
G- O
+BM
D
L
2
R
PWR
OILW
ODLP
SP1
ODMS
E 9 A , E10 B , E11 C , E12 D , E14 E
ENGINE CONTROL MODULE
S 3
O/D MAIN SW
[SHIFT LOCK
CONTROL COMPUTER]
ME01
E04
E03
E02
E01
E1
L4
TFN
W- B
BR
L- R
B- R
J 7 A , J 8 B
JUNCTION
CONNECTOR
J 3
JUNCTION
CONNECTOR
D 4
DETECTION SW
(TRANSFER L4
POSITION)
D 5
DETECTION SW
(TRANSFER NEUTRAL
POSITION)
J 9
JUNCTION
CONNECTOR
EC
IF
I20
I14
I12

ELECTRONICALLY CONTROLLED TRANSMISSION AND A/T INDICATOR



SYSTEM OUTLINE

Previous automatic transmissions have selected each gear shift using mechanically controlled throttle hydraulic pressure, governor hydraulic pressure and lock-up hydraulic pressure. The electronically controlled transmission, however, electrically controls the governor pressure and lock-up through the solenoid valve. Control of the solenoid valve by the engine control module based on the input signals from each sensor makes smooth driving possible by shift selection for each is most appropriate to the driving conditions at that time.

1. GEAR SHIFT OPERATION

During driving, the engine control module selects the shift for each gear which is most appropriate to the driving conditions, based on input signals from the engine coolant temp. sensor to TERMINAL THW of the engine control module and also the input signals to TERMINAL SP2+ of the engine control module from the vehicle speed sensor devoted to the electronically controlled transmission. Current is then output to the electronically controlled transmission solenoid.

When shifting to 1st speed, current flows from TERMINAL S1 of the engine control module to TERMINAL 4 of the electronically controlled transmission solenoid to GROUND, and continuity to the no. 1 solenoid causes the shift.

For 2nd speed, current flows from TERMINAL S1 of the engine control module to TERMINAL 4 of the electronically controlled transmission solenoid to GROUND, and from TERMINAL S2 of the engine control module to TERMINAL 8 of the electronically controlled transmission solenoid to GROUND. And continuity to solenoid no.1 and no.2 causes the shift.

For 3rd speed, there is no continuity to no.1 solenoid, only to no.2 causing the shift. Shifting into 4th speed (Overdrive) takes place when there is no continuity to the either no. 1 or no.2 solenoid.

2. LOCK-UP OPERATION

When the engine control module judges from each signal that lock-up operation conditions have been met, current flows from TERMINAL SL of the engine control module to TERMINAL 7 of the electronically controlled transmission solenoid to GROUND, causing continuity to the lock-up solenoid and causing lock-up operation.

3. STOP LIGHT SW CIRCUIT

If the brake pedal is depressed (Stop light SW on) when driving in lock-up condition, a signal is input to TERMINAL STP of the engine control module, the engine control module operates and continuity to the lock-up solenoid is cut.

4. OVERDRIVE CIRCUIT

∗ O/D main SW on

When the O/D main SW is turned on, a signal is input to TERMINAL ODMS of the engine control module and engine control module operation causes gear shift when the conditions for overdrive are met.

∗ O/D main SW off

When the O/D main SW is turned off, a signal is input into TERMINAL ODMS of the engine control module, and turns on the O/D off indicator light. This activates the ECU, and the transmission system is controlled not to shift to overdrive.

5. A/T OIL TEMP. WARNING

When the A/T fluid temp. sensor affixed to the transmission case detects that the fluid temp. is 150°C (302°F) or more, the engine control module operates and the current flowing through the GAUGE fuse flows to the A/T oil temp. warning light to TERMINAL OILW of the engine control module to GROUND, so that warning light lights up, informing that the A/T oil temp. is high. When the A/T oil temp. drops to 120°C (248°F) or less, the engine control module stops operating and the warning light goes out.

ELECTRONICALLY CONTROLLED TRANSMISSION AND A/T INDICATOR

SERVICE HINTS

P1 A/T INDICATOR LIGHT SW [PARK/NEUTRAL POSITION SW]

3-GROUND : Approx. **12** volts with ignition SW at **ON** position

S4 STOP LIGHT SW

1-2 : Closed with brake pedal depressed

E9 (A), E10 (B), E11 (C), E12 (D), E14 (E) ENGINE CONTROL MODULE

S1-E1 : **9**- **14** volts
S2-E1 : **9**- **14** volts
SL-E1 : **9**- **14** volts
STP-E1 : **7.5**- **14** volts with brake pedal depressed
: **0**- **1.5** volts with brake pedal released
THW-E2 : **0.2**- **1.0** volts with coolant temp. **80**˚C (**176**˚F)
THO-E2 : **4**- **5** volts with fluid temp. **20**˚C (**68**˚F)
VTA-E2 : Approx. **4** volts with throttle valve fully closed
: Approx. **0.6** volts with throttle valve fully open
VC-E2 : **4.5**- **5.5** volts
ODMS-E1 : **9**- **14** volts O/D main SW turned on
: **0** volts O/D main SW turned off
SP1-E1 : Pulse generation with vehicle moving
2-E1 : **10**- **14** volts with shift lever at **2** position
: **0**- **2** volts with shift lever at except **2** position
L-E1 : **10**- **14** volts with shift lever at **L** position
: **0**- **2** volts with shift lever at except **L** position
OILW-E1 : **0.1**- **4.9** volts
+B-E1 :**9**- **14** volts
BATT-E1 : **9**- **14** volts

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A3	28	E3	28	J7 A	31
A38	28	E9 A	31	J8 B	31
C23	30	E10 B	31	J9	31
C25 A	30	E11 C	31	P1	29
C26 C	30	E12 D	31	S3	31
C27 E	30	E14 E	31	S4	31
C28 D	30	F7	31	T2	29
C29 B	30	J1 A	29	V3	29
D4	28	J2 B	29	V18	31
D5	28	J3	31		
E2	28	J4	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1D	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1F		
1H		
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

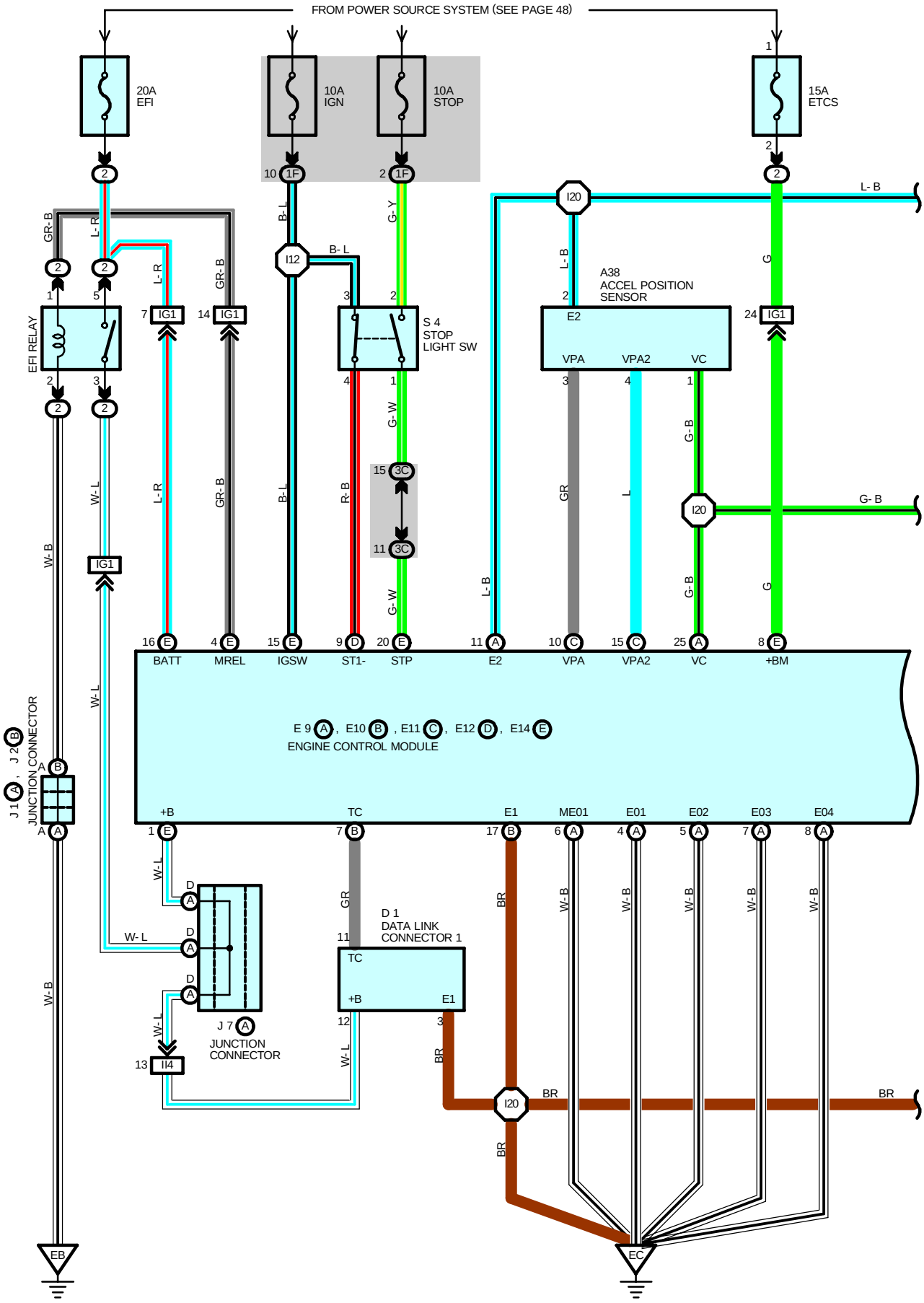
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
EC1	36	Engine Wire and Water Temp. Sensor Wire (Front Side of Cylinder Head Cover Right)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II1	40	Engine Wire and Cowl Wire (On the Glove Box)
II2		
II4		

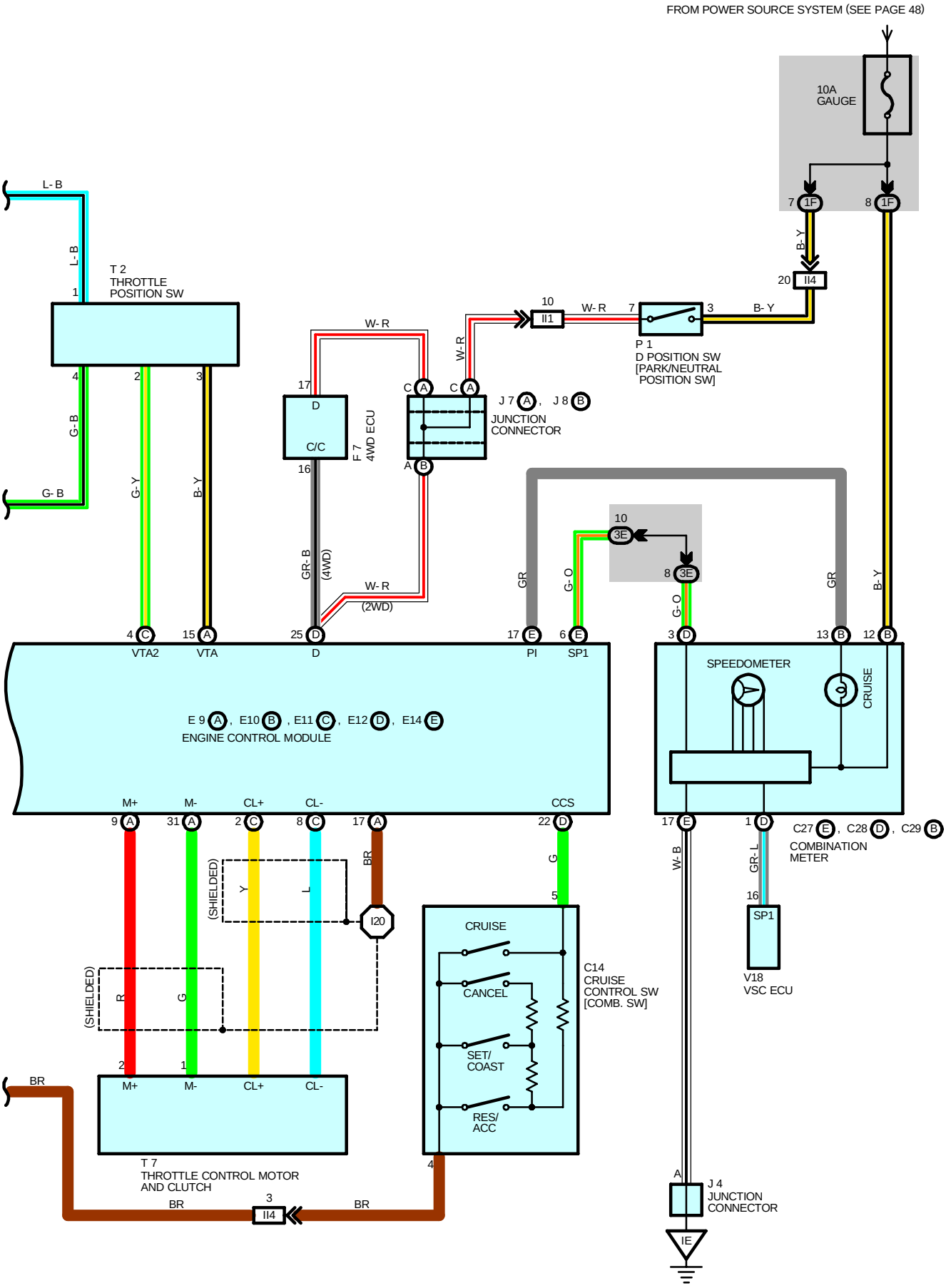
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
EC	36	Intake Manifold Left
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I12	40	Cowl Wire	I20	40	Engine Wire
I13			I21	40	Cowl Wire


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
20A EFI
10A IGN
10A STOP
15A ETCS
EFI RELAY
S 4 STOP LIGHT SW
A38 ACCEL POSITION SENSOR
E2
VPA
VPA2
VC
BATT
MREL
IGSW
ST1-
STP
+BM
E 9 A , E10 B , E11 C , E12 D , E14 E
ENGINE CONTROL MODULE
JUNCTION CONNECTOR
J 7 A
JUNCTION CONNECTOR
D 1 DATA LINK CONNECTOR 1
TC
+B
E1
ME01
E01
E02
E03
E04
EB
EC


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A GAUGE
7 1F
8 1F
B- Y
20 II4
L- B
T 2 THROTTLE POSITION SW
1
4
2
3
G- B
G- B
G- Y
B- Y
W- R
17 D
C/C
F 7 4WD ECU
16
GR- B (4WD)
W- R (2WD)
C A
C A
A B
W- R
10 II1
W- R
7
3
B- Y
P 1 D POSITION SW [PARK/NEUTRAL POSITION SW]
J 7 A , J 8 B
JUNCTION CONNECTOR
GR
G- O
10 3E
8 3E
G- O
GR
B- Y
4 C VTA2
15 A VTA
25 D D
17 E PI
6 E SP1
3 D
13 B
12 B
SPEEDOMETER
CRUISE
E 9 A , E10 B , E11 C , E12 D , E14 E
ENGINE CONTROL MODULE
M+
M-
CL+
CL-
CCS
9 A
31 A
2 C
8 C
17 A
22 D
(SHIELDED)
Y
L
BR
I20
G
5
CRUISE
CANCEL
SET/ COAST
RES/ ACC
C14 CRUISE CONTROL SW [COMB. SW]
17 E
1 D
C27 E , C28 D , C29 B
COMBINATION METER
W- B
GR- L
16
SP1
V18 VSC ECU
(SHIELDED)
R
G
2
1
M+
M-
CL+
CL-
BR
T 7 THROTTLE CONTROL MOTOR AND CLUTCH
4
BR
3 II4
BR
A
J 4 JUNCTION CONNECTOR
IE

CRUISE CONTROL

SYSTEM OUTLINE

The cruise control system allows to travel at a constant speed, by the operation of the switch, without having to depress the accelerator pedal. In this system, the engine throttle valve opening angle is adjusted automatically to control the vehicle at a constant speed.

1. SET CONTROL

When the SET/COAST SW is operated while traveling with the CRUISE SW ON, the speed when the SW is operated to OFF (SW released) is memorized, and the vehicle speed is controlled at that speed.

2. COAST CONTROL

When the SET/COAST SW is operated to ON, the motor in the actuator rotates the throttle valve until it is closed fully to decrease the vehicle speed, and the speed when the SW is operated to OFF is memorized, and the vehicle speed is controlled at that speed.
Furthermore, every time the SET/COAST SW is operated momentarily (Approx. 0.5 sec.) to ON, the memorized vehicle speed is decreased by approx. 1.5 km/h.

3. ACCEL CONTROL

When the RESUME/ACCEL SW is operated to ON, the motor in the actuator rotates the throttle valve to open direction to increase the vehicle speed, and the speed when the SW is operated to OFF is memorized, and the vehicle speed is controlled at that speed.
Furthermore, every time the RES/ACC SW is operated momentarily (Approx. 0.5 sec.) to ON, the memorized vehicle speed is increased by approx. 1.5 km/h.

4. MANUAL CANCEL MECHANISM

If any of the following signals are input during cruise control traveling, the magnetic clutch of the actuator is turned off, and the current to the motor flows in the direction to close the throttle valve, and cancel the cruise control.

(1) Stop light SW is ON (Brake pedal is depressed)

(2) The CANCEL SW of the control SW is ON

(3) CRUISE SW is OFF

5. RESUME CONTROL

After canceling the cruise control (Except when the CRUISE SW is OFF) if the vehicle speed is above the minimum speed limit (Approx. 40 km/h, 25 mph), operating the RES/ACC SW from OFF to ON will cause the system to accelerate and resume to the vehicle speed before manual cancellation.

6. OVERDRIVE FUNCTION

The overdrive may be cut on an uphill grade, while traveling with the cruise control.
After the overdrive is cut, if the vehicle seed reaches the overdrive resume speed (Set speed minus 2 km/h), and if the system determines that the uphill grade has finished, the overdrive will resume after the overdrive timer operation.

7. AUTO CANCEL OPERATION

If any of the following conditions is encountered, the cruise control is automatically cancelled.

* The stop light SW wiring is faulty or short-circuited.
* The vehicle speed signal is faulty.
* The electronically controlled throttle malfunctions.

SERVICE HINTS

E9 (A), E10 (B), E12 (D), E14 (E) ENGINE AND ECT ECU

(E)15-GROUND : Approx. **12** volts with ignition SW at **ON** or **ST** position
(E)16-GROUND : Always approx. **12** volts
(A)4, (A) 5, (A) 6, (A) 7, (A) 8, (B) 17-GROUND: Always continuity
(E)20-GROUND : Approx. **12** volts with stop light SW at on
(D)22-GROUND : Continuity with cruise control SW at on
Approx. **1540** Ω with CANCEL SW on in cruise control SW
Approx. **240** Ω with RES/ACC SW on in cruise control SW
Approx. **630** Ω with SET/COAST SW on in cruise control SW

C14 CRUISE CONTROL SW [COMB. SW]

5-4 : Approx. **1540** Ω with CANCEL SW on
Approx. **240** Ω with RES/ACC SW on
Approx. **630** Ω with SET/COAST SW on

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A38	28	E11 C	31	J8 B	31
C14	30	E12 D	31	P1	29
C27 E	30	E14 E	31	S4	31
C28 D	30	F7	31	T2	29
C29 B	30	J1 A	29	T7	29
D1	28	J2 B	29	V18	31
E9 A	31	J4	31		
E10 B	31	J7 A	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

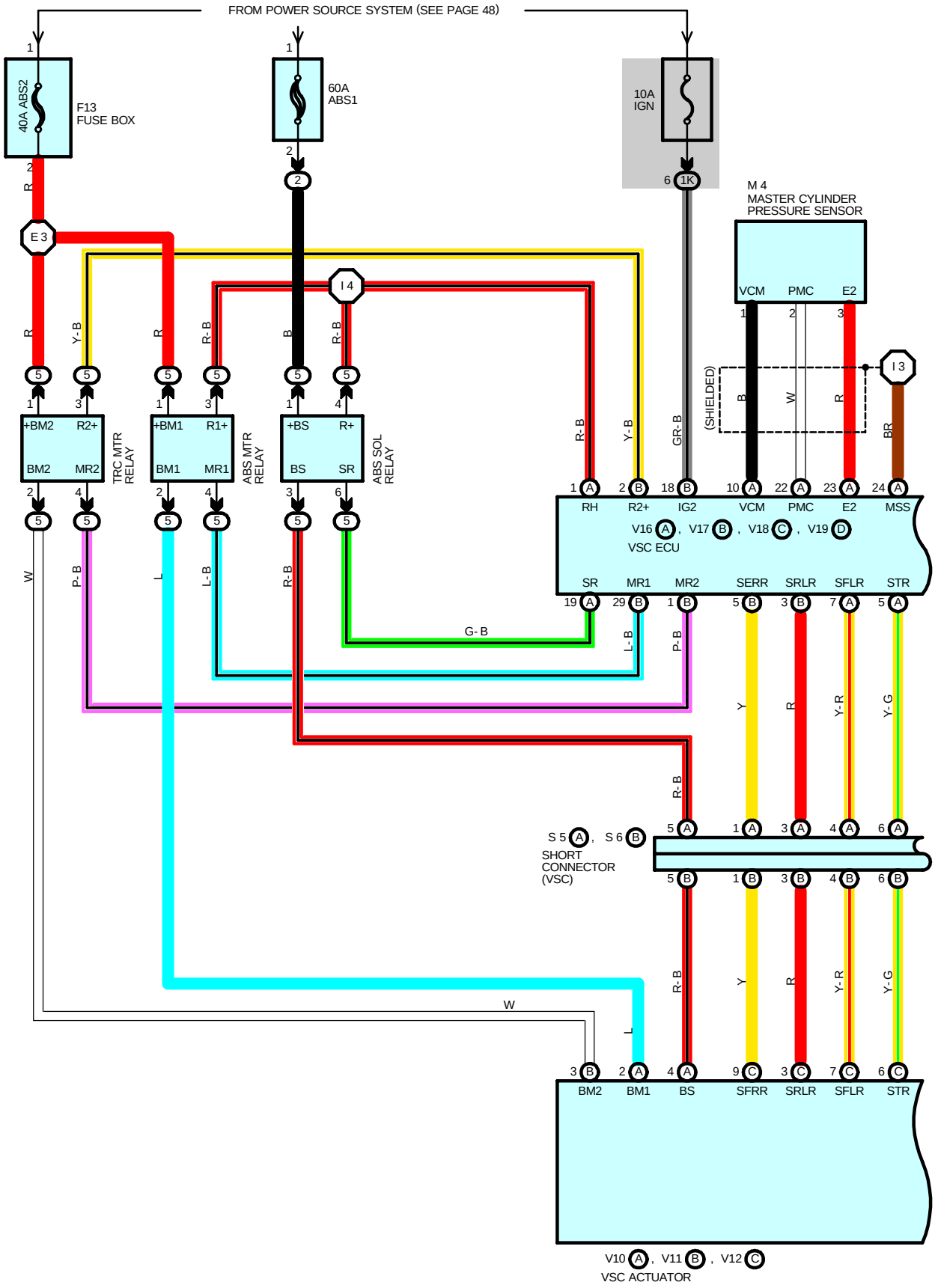
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II1	40	Engine Wire and Cowl Wire (On the Glove Box)
II4		

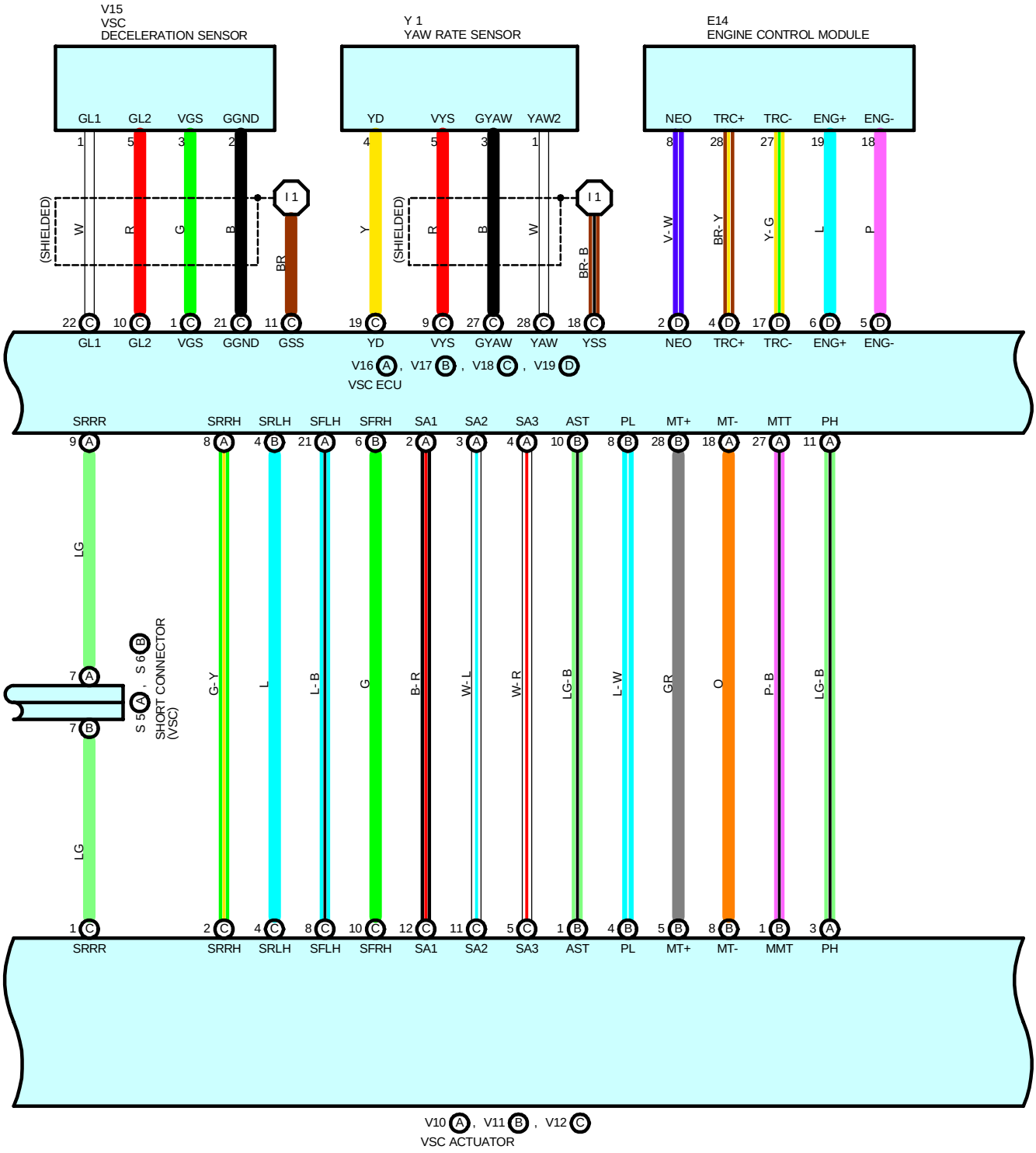
: GROUND POINTS

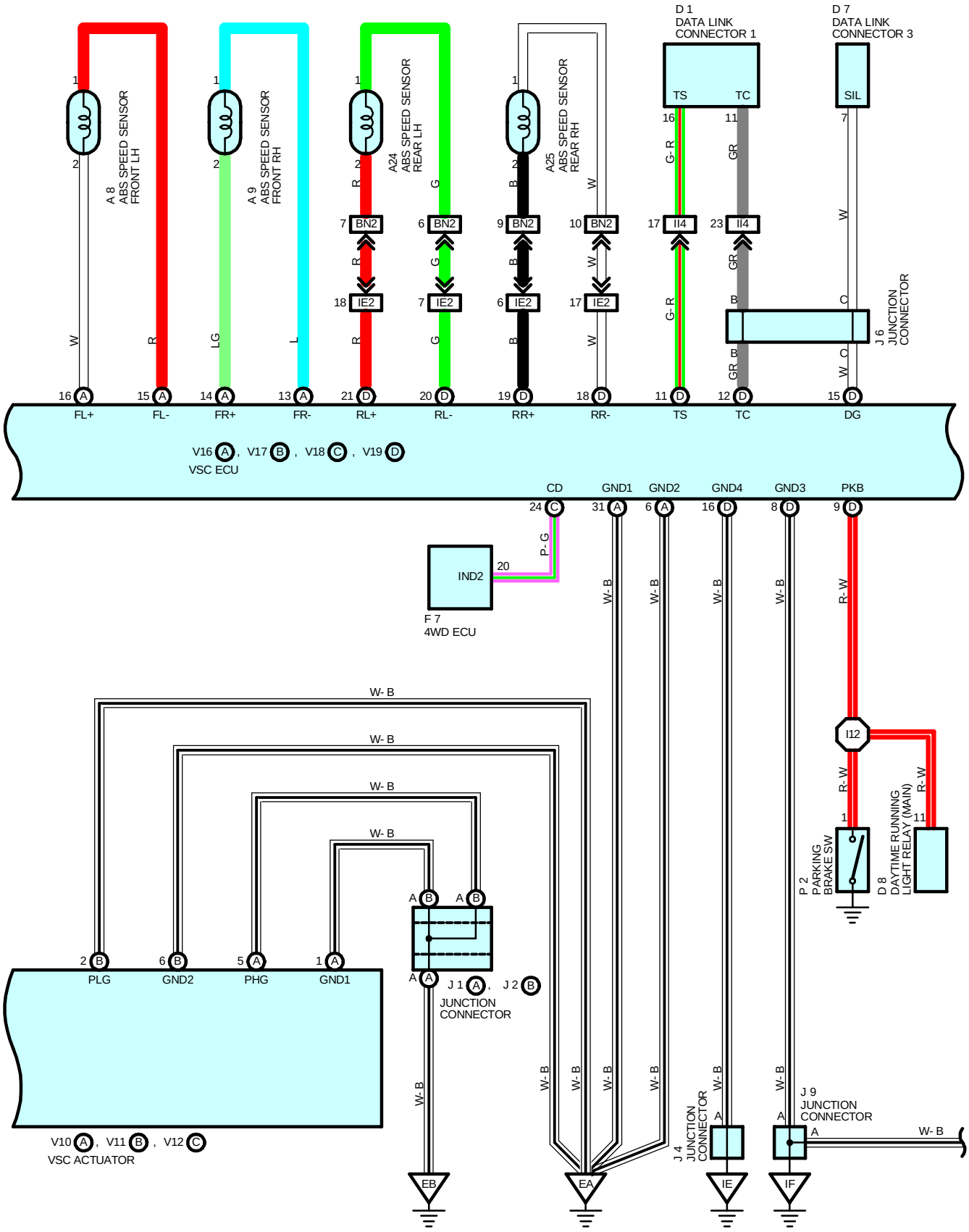
Code	See Page	Ground Points Location
EB	36	Front Left Fender
EC	36	Intake Manifold Left
IE	38	Cowl Side Panel LH

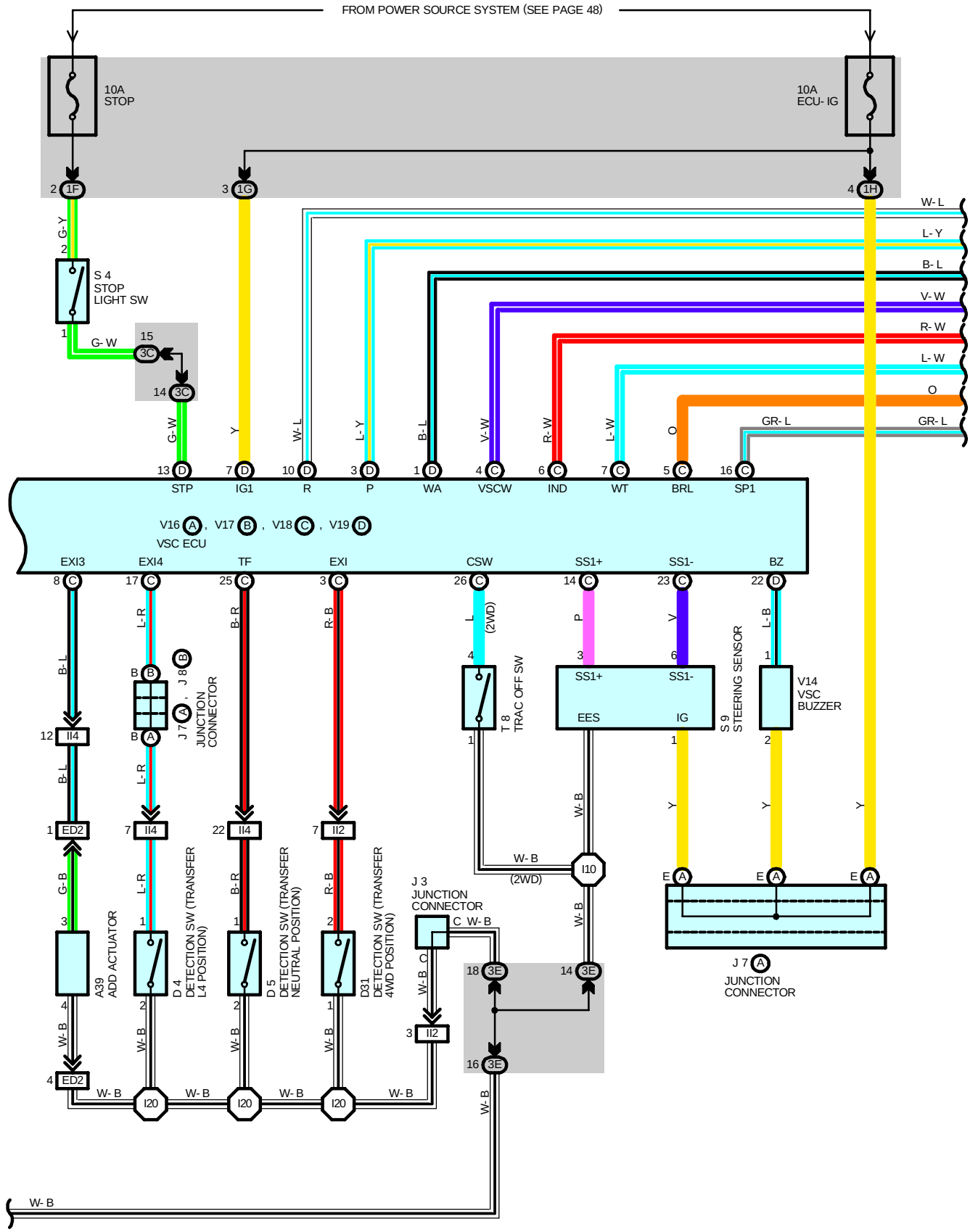
: SPLICE POINTS

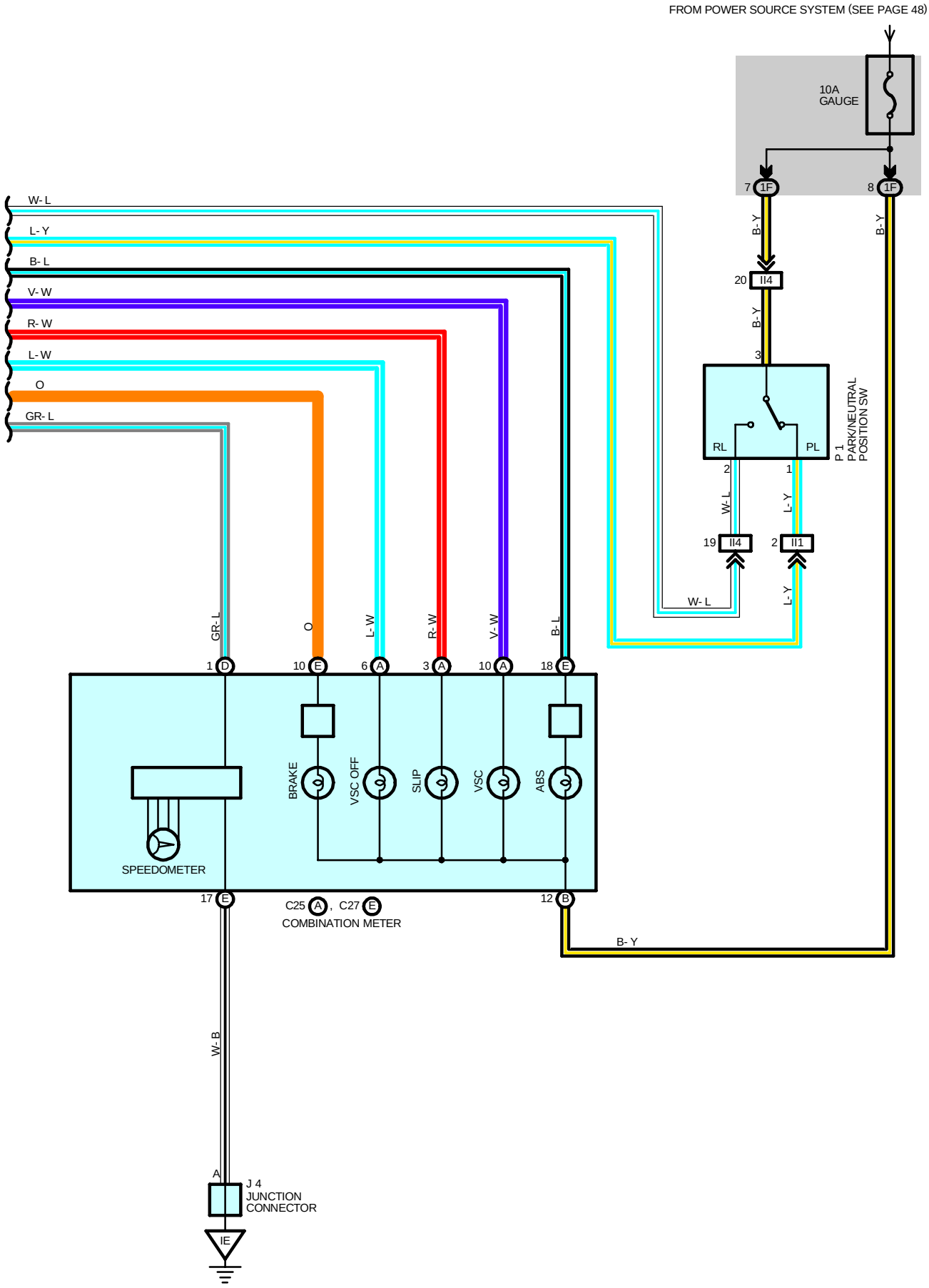
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I12	40	Cowl Wire	I20	40	Engine Wire


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
40A ABS2
F13
FUSE BOX
60A
ABS1
10A
IGN
1K
M 4
MASTER CYLINDER
PRESSURE SENSOR
VCM
PMC
E2
E 3
I 4
I 3
(SHIELDED)
+BM2
R2+
BM2
MR2
TRC MTR
RELAY
+BM1
R1+
BM1
MR1
ABS MTR
RELAY
+BS
R+
BS
SR
ABS SOL
RELAY
RH
R2+
IG2
VCM
PMC
E2
MSS
V16 A , V17 B , V18 C , V19 D
VSC ECU
SR
MR1
MR2
SERR
SRLR
SFLR
STR
G- B
S 5 A , S 6 B
SHORT
CONNECTOR
(VSC)
BM2
BM1
BS
SFRR
SRLR
SFLR
STR
V10 A , V11 B , V12 C
VSC ACTUATOR


V15
VSC
DECELERATION SENSOR
Y 1
YAW RATE SENSOR
E14
ENGINE CONTROL MODULE
GL1
GL2
VGS
GGND
YD
VYS
GYAW
YAW2
NEO
TRC+
TRC-
ENG+
ENG-
(SHIELDED)
W
R
G
B
BR
Y
R
B
W
BR- B
V- W
BR- Y
Y- G
L
P
I 1
GL1
GL2
VGS
GGND
GSS
YD
VYS
GYAW
YAW
YSS
NEO
TRC+
TRC-
ENG+
ENG-
V16 A , V17 B , V18 C , V19 D
VSC ECU
SRRR
SRRH
SRLH
SFLH
SFRH
SA1
SA2
SA3
AST
PL
MT+
MT-
MTT
PH
LG
LG
S 5 A , S 6 B
SHORT CONNECTOR
(VSC)
G- Y
L
L- B
G
B- R
W- L
W- R
LG- B
L- W
GR
O
P- B
LG- B
V10 A , V11 B , V12 C
VSC ACTUATOR


A 8
ABS SPEED SENSOR
FRONT LH
A 9
ABS SPEED SENSOR
FRONT RH
A24
ABS SPEED SENSOR
REAR LH
A25
ABS SPEED SENSOR
REAR RH
D 1
DATA LINK
CONNECTOR 1
D 7
DATA LINK
CONNECTOR 3
TS
TC
SIL
BN2
IE2
II4
J 6
JUNCTION
CONNECTOR
FL+
FL-
FR+
FR-
RL+
RL-
RR+
RR-
TS
TC
DG
V16 A , V17 B , V18 C , V19 D
VSC ECU
CD
GND1
GND2
GND4
GND3
PKB
IND2
F 7
4WD ECU
W- B
R- W
P- G
I12
P 2
PARKING
BRAKE SW
D 8
DAYTIME RUNNING
LIGHT RELAY (MAIN)
PLG
GND2
PHG
GND1
J 1 A , J 2 B
JUNCTION
CONNECTOR
V10 A , V11 B , V12 C
VSC ACTUATOR
J 4
JUNCTION
CONNECTOR
J 9
JUNCTION
CONNECTOR
EB
EA
IE
IF


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
STOP
10A
ECU- IG
2 1F
3 1G
4 1H
G- Y
S 4
STOP
LIGHT SW
G- W
15
3C
14 3C
G- W
W- L
L- Y
B- L
V- W
R- W
L- W
O
GR- L
GR- L
13 D
STP
7 D
IG1
10 D
R
3 D
P
1 D
WA
4 C
VSCW
6 C
IND
7 C
WT
5 C
BRL
16 C
SP1
V16 A , V17 B , V18 C , V19 D
VSC ECU
EXI3
EXI4
TF
EXI
CSW
SS1+
SS1-
BZ
8 C
17 C
25 C
3 C
26 C
14 C
23 C
22 D
B- L
L- R
B- R
R- B
L
(2WD)
P
V
L- B
12 II4
B B
B A
J 7 A , J 8 B
JUNCTION
CONNECTOR
4
T 8
TRAC OFF SW
3
SS1+
6
SS1-
EES
IG
1
S 9
STEERING SENSOR
2
V14
VSC
BUZZER
B- L
L- R
B- R
R- B
W- B
Y
1 ED2
7 II4
22 II4
7 II2
G- B
3
A39
ADD ACTUATOR
L- R
1
D 4
DETECTION SW (TRANSFER
L4 POSITION)
B- R
1
D 5
DETECTION SW (TRANSFER
NEUTRAL POSITION)
R- B
2
D31
DETECTION SW (TRANSFER
4WD POSITION)
W- B
(2WD)
I10
J 3
JUNCTION
CONNECTOR
C W- B
W- B
O
18 3E
14 3E
16 3E
3 II2
4 ED2
W- B
I20
W- B
I20
W- B
I20
W- B
E A
E A
E A
J 7 A
JUNCTION
CONNECTOR
W- B


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
GAUGE
7 1F
8 1F
B- Y
B- Y
20 II4
B- Y
3
RL
PL
P 1
PARK/NEUTRAL
POSITION SW
2
1
W- L
L- Y
19 II4
2 II1
W- L
L- Y
W- L
L- Y
O
GR- L
GR- L
O
L- W
R- W
V- W
B- L
1 D
10 E
6 A
3 A
10 A
18 E
BRAKE
VSC OFF
SLIP
VSC
ABS
SPEEDOMETER
17 E
C25 A , C27 E
COMBINATION METER
12 B
B- Y
W- B
A
J 4
JUNCTION
CONNECTOR
IE

SERVICE HINTS

V16 (A), V17 (B), V19 (D) VSC ECU

(B) 18, (D) 7-GROUND : Approx. **12** volts with the ignition SW at **ON** or **ST** position

(A) 6, (A) 31, (D) 8, (D) 16-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A8	28	F7	31	S5 A	29
A9	28	F13	28	S6 B	29
A24	32	J1 A	29	S9	31
A25	32	J2 B	29	T8	31
A39	28	J3	31	V10 A	29
C25 A	30	J4	31	V11 B	29
C27 E	30	J6	31	V12 C	29
D1	28	J7 A	31	V14	31
D4	28	J8 B	31	V15	31
D5	28	J9	31	V16 A	31
D7	30	M4	29	V17 B	31
D8	30	P1	29	V18 C	31
D31	28	P2	31	V19 D	31
E14	31	S4	31	Y1	31

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)
5	23	VSC R/B (Engine Compartment Right)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1H		
1K	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
ED2	36	Engine Wire and Differential Wire (Near the Front Differential)
IE2	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
II1	40	Engine Wire and Cowl Wire (On the Glove Box)
II2		
II4		
BN2	42	Frame Wire and Floor No.2 Wire (Under the Left Side of Rear Seat Cushion)

: GROUND POINTS

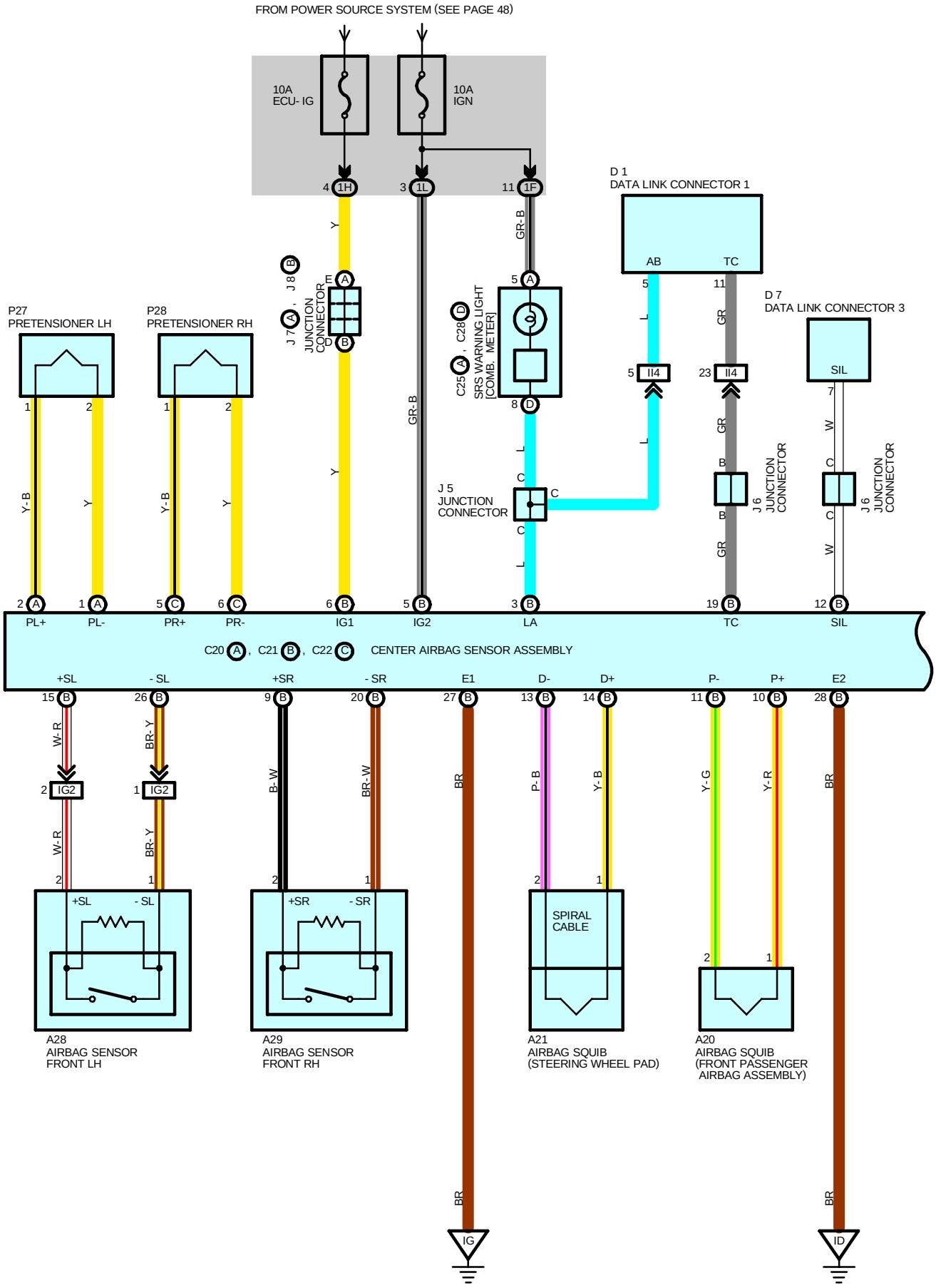
Code	See Page	Ground Points Location
EA	36	Front Right Fender
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

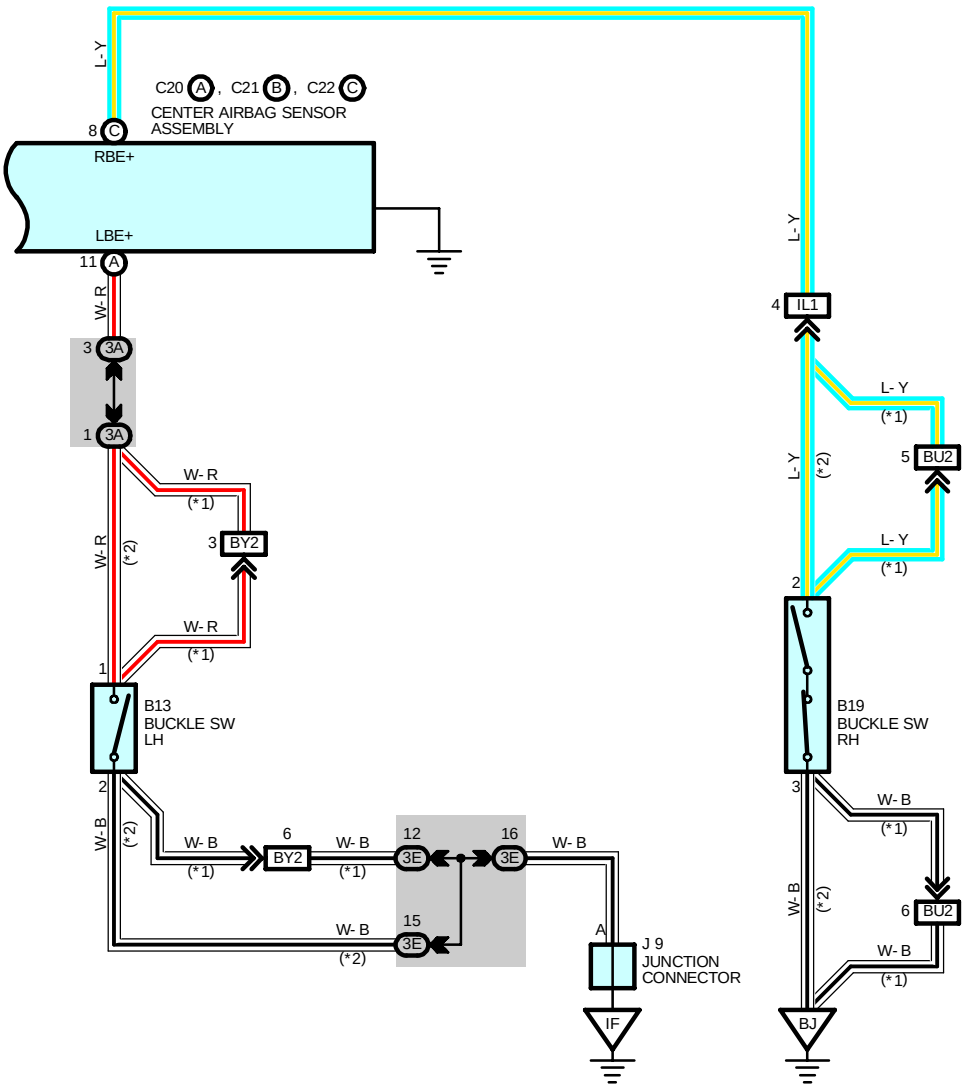
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E3	36	Engine Room Main Wire	I10	40	Cowl Wire
I1	40	Cowl Wire	I12		
I3	40	Engine Room Main Wire	I20	40	Engine Wire
I4					

NOTICE: When inspecting or repairing the SRS, perform the operation in accordance with the following precautionary instructions and the procedure and precautions in the Repair Manual for the applicable model year.

- Malfunction symptoms of the SRS are difficult to confirm, so the DTCs become the most important source of information when troubleshooting. When troubleshooting the SRS, always inspect the DTCs before disconnecting the battery.
- **Work must be started after 90 seconds from when the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.**
  (The SRS is equipped with a back-up power source so that if work is started within 90 seconds from disconnecting the negative (-) terminal cable of the battery, the SRS may be deployed.)
- When the negative (-) terminal cable is disconnected from the battery, the memory of the clock and audio system will be canceled. So before starting work, make a record of the contents memorized in the audio memory system. When work is finished, reset the audio systems as they were before and adjust the clock. This vehicle has power tilt and power telescopic steering, power seat and power outside rear view mirror which are all equipped with memory function. However, it is not possible to make a record of the memory contents. So when the work is finished, it will be necessary to explain this fact tot the customer, and ask the customer to adjust the features and reset the memory. To avoid erasing the memory in each memory system, never use a back-up power supply from outside the vehicle.
- Before repairs, remove the airbag sensor if shocks are likely to be applied to the sensor during repairs.
- Do not expose the steering wheel pad, front passenger airbag assembly, pretensioner assembly, airbag sensor front assembly or center airbag sensor assembly directly to hot air or flames.
- Even in cases of a minor collision where the SRS does not deploy, the steering wheel pad, front passenger airbag assembly, pretensioner assembly, airbag sensor front assembly and center airbag sensor assembly should be inspected.
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.
- Never disassemble and repair the steering wheel pad, front passenger airbag assembly, pretensioner assembly, airbag sensor front assembly or center airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly, pretensioner assembly, airbag sensor front assembly or center airbag sensor assembly has been dropped, or if there are cracks, dents or other defects in the case, bracket or connector, replace them with new ones.
- Use a volt/ohmmeter with high impedance (10 kΩ/V minimum) for troubleshooting the system's electrical circuits.
- Information labels are attached to the periphery of the SRS components. Follow the instructions on the notices.
- After work on the SRS is completed, perform the SRS warning light check.
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section of the Repair Manual.


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
ECU- IG
10A
IGN
4 1H
3 1L
11 1F
D 1
DATA LINK CONNECTOR 1
AB
TC
J 8 , J 7
JUNCTION CONNECTOR
C25 , C28
SRS WARNING LIGHT [COMB. METER]
P27
PRETENSIONER LH
P28
PRETENSIONER RH
J 5
JUNCTION CONNECTOR
D 7
DATA LINK CONNECTOR 3
SIL
J 6
JUNCTION CONNECTOR
PL+
PL-
PR+
PR-
IG1
IG2
LA
TC
SIL
C20 , C21 , C22 CENTER AIRBAG SENSOR ASSEMBLY
+SL
- SL
+SR
- SR
E1
D-
D+
P-
P+
E2
IG2
SPIRAL CABLE
A28
AIRBAG SENSOR
FRONT LH
A29
AIRBAG SENSOR
FRONT RH
A21
AIRBAG SQUIB
(STEERING WHEEL PAD)
A20
AIRBAG SQUIB
(FRONT PASSENGER
AIRBAG ASSEMBLY)
IG
ID

* 1 : W/ POWER SEAT
* 2 : W/O POWER SEAT



SYSTEM OUTLINE

The SRS is a driver and front passenger protection device which has a supplemental role to the seat belts.
When the ignition SW is turned to ON position, the current from the ECU-IG, IGN fuse flows to the center airbag sensor assembly TERMINAL IG1, IG2.
In case an accident occurs while driving, when the frontal impact exceeds a predetermined level, the current from the ECU-IG or IGN fuse flows to center airbag sensor assembly TERMINALS D+, P+, PL+, PR+ to airbag squibs and pretensioners to center airbag sensor assembly TERMINALS D-, P-, PL-, PR- to TERMINALS E1, E2 or BODY GROUND to GROUND.
The current flows to the airbag squibs and pretensioners, and operates the airbag.
The airbag stored in the steering wheel pad is instantaneously expanded to soften the shock to the driver.
The airbag stored in the front passenger's instrument panel is instantaneously expanded to soften the shock to the front passenger.
The pretensioners ensure the seat belt restrainability.

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A20	30	C20 A	30	J6	31
A21	30	C21 B	30	J7 A	31
A28	28	C22 C	30	J8 B	31
A29	28	C25 A	30	J9	31
B13	32 (w/o Power Seat)	C28 D	30	P27	33
	34 (w/ Power Seat)	D1	28	P28	33
B19	32 (w/o Power Seat)	D7	30		
	34 (w/ Power Seat)	J5	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

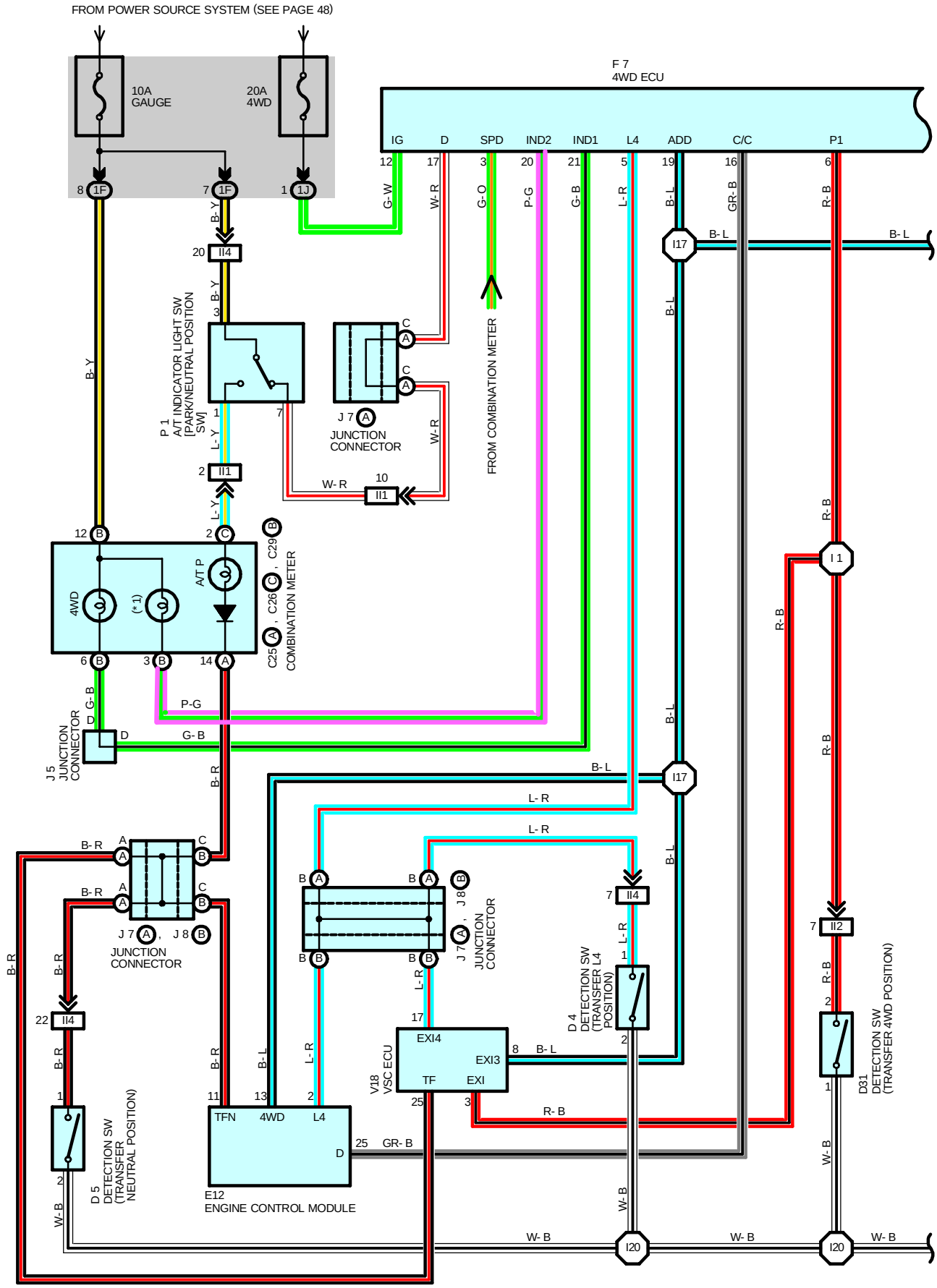
Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1H		
1L		
3A	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

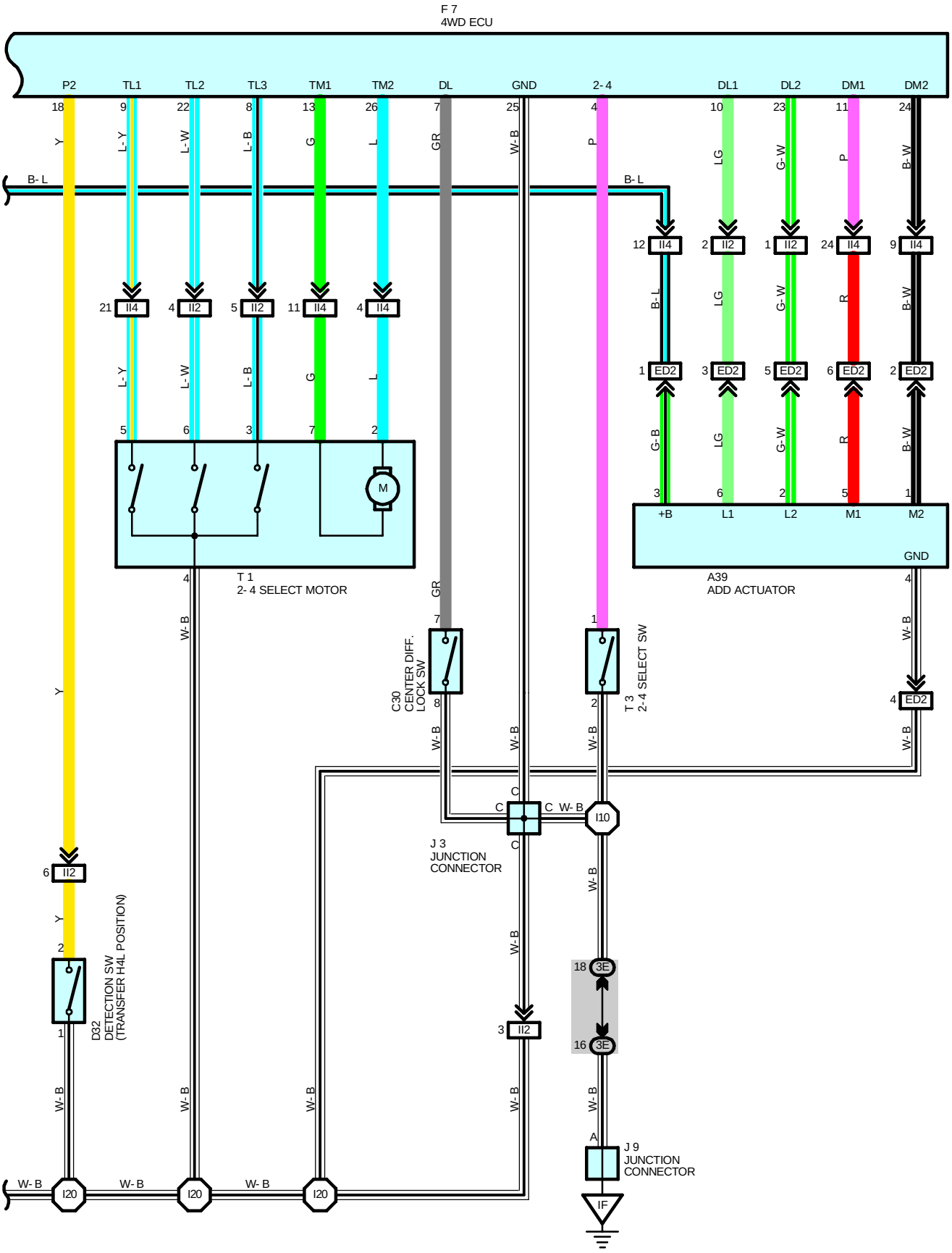
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG2	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II4	40	Engine Wire and Cowl Wire (On the Glove Box)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BU2	44	Floor Wire and Seat No.2 Wire (Under the Front Passenger's Seat)
BY2	44	Cowl Wire and Seat No.1 Wire (Under the Driver's Seat)

: GROUND POINTS

Code	See Page	Ground Points Location
ID	38	Left Kick Panel
IF	38	Cowl Side Panel RH
IG	38	Right Kick Panel
BJ	42	Right Quarter Panel Inner


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A GAUGE
20A 4WD
F 7 4WD ECU
IG
D
SPD
IND2
IND1
L4
ADD
C/C
P1
G-W
W-R
G-O
P-G
G-B
L-R
B-L
GR-B
R-B
FROM COMBINATION METER
P 1 A/T INDICATOR LIGHT SW [PARK/NEUTRAL POSITION SW]
J 7 JUNCTION CONNECTOR
C25, C26, C29 COMBINATION METER
A/T P
4WD
(*1)
J 5 JUNCTION CONNECTOR
J 7, J 8 JUNCTION CONNECTOR
D 4 DETECTION SW (TRANSFER L4 POSITION)
D31 DETECTION SW (TRANSFER 4WD POSITION)
D 5 DETECTION SW (TRANSFER NEUTRAL POSITION)
V18 VSC ECU
EXI4
EXI3
TF
EXI
E12 ENGINE CONTROL MODULE
TFN
4WD
L4
I17
I20
I 1
I2
II1
II4
B-Y
L-Y
B-R
W-B

* 1 : CENTER DIFF. LOCK



SYSTEM OUTLINE

The 4WD ECU detects the condition of the detection SW ((Transfer 4WD position), (Transfer H4L Position)), 2-4 select SW and the vehicle speed, and controls the 2-4 select motor and center diff. lock SW.

4WD CONTROL

(1) Shift position

The target shift position determined through the condition of the 2-4 select SW and center diff. lock SW, and operates the 2-4 select motor.

* When the 2-4 select SW and the center diff. lock SW are both off, put in to H2 position. At this time, current flows from the 4WD fuse to TERMINAL 12 of the 4WD ECU to TERMINAL 26 to TERMINAL 2 of the 2-4 select motor to TERMINAL 7 to TERMINAL 13 of the 4WD ECU to TERMINAL 25 to GROUND, so the 2-4 select motor rotates at H2 position.
* When the 2-4 select SW is on and the center diff. lock SW is off, put in to H4 position. At this time, current flows from the 4WD fuse to TERMINAL 12 of the 4WD ECU to TERMINAL 13 to TERMINAL 7 of the 2-4 select motor to TERMINAL 2 to TERMINAL 26 of the 4WD ECU to TERMINAL 25 to GROUND, so the 2-4 select motor rotates at H4 position.
* When the 2-4 select SW and the center diff. lock SW are both on, or the 2-4 select SW is off, and the center diff. lock SW is on, put in to H4L position. When switched from H4F to H4L, current flows from the 4WD fuse to TERMINAL 12 of the 4WD ECU to TERMINAL 26 to TERMINAL 2 of the 2-4 select motor to TERMINAL 7 to TERMINAL 13 of the 4WD ECU to TERMINAL 25 to GROUND, so the 2-4 select motor rotates at H4L position. When switched from H2 to H4L, current flows from the 4WD fuse to TERMINAL 12 of the 4WD ECU to TERMINAL 13 to TERMINAL 7 of the 2-4 select motor to TERMINAL 2 to TERMINAL 26 of the 4WD ECU to TERMINAL 25 to GROUND, so the 2-4 select motor rotates at H4L position.

(2) Shift limit control

When the vehicle speed is over 100 km/h, shift change to H4 or H4L mode can not be made. The vehicle speed signal is input to TERMINAL 3 of the 4WD ECU. At this time, the 4WD indicator light and the center diff. lock indicator light flashes, and the buzzer installed in the 4WD ECU goes on. This condition can be canceled by decelerating the vehicle speed to below 100 km/h, or by selecting H2 mode.

(3) Shift control

When the 2-4 select motor will not switch after approximately 3 seconds from shifting (When there are no changes to the signals to TERMINAL 8, TERMINAL 9 and TERMINAL 22 of the 4WD ECU), the 4WD indicator light and the center diff. lock indicator light flashes. The cruise control is canceled if in use. When the 2-4 select motor switch is completed, the indicator lights go off and the cruise control can be set again.

(4) ADD valve control

When switching between 2WD to 4WD, the ADD actuator is controlled to free or lock the ADD. At this time, current flows from the 4WD fuse to TERMINAL 12 of the 4WD ECU to TERMINAL 23 to TERMINAL 2 of the ADD actuator to GROUND, or flows from the 4WD fuse to TERMINAL 12 of the 4WD ECU to TERMINAL 10 to TERMINAL 6 of the ADD actuator to GROUND, so the ADD actuator is controlled.

SERVICE HINTS

F7 4WD ECU

12-GROUND : Approx. **12** volts with ignition SW on
25-GROUND : Always continuity
3-GROUND : Pulse generation with vehicle moving

T3 2-4 SELECT SW

1-2 : Closed with 2-4 select SW on

P1 A/T INDICATOR LIGHT SW [PARK/NEUTRAL POSITION SW]

3-1 : Closed with A/T shift lever at **P** position
3-7 : Closed with A/T shift lever at **D** position

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A39	28	D31	28	J8 B	31
C25 A	30	D32	28	J9	31
C26 C	30	E12	31	P1	29
C29 B	30	F7	31	T1	29
C30	30	J3	31	T3	31
D4	28	J5	31	V18	31
D5	28	J7 A	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1J		
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
ED2	36	Engine Wire and Differential Wire (Near the Front Differential)
II1	40	Engine Wire and Cowl Wire (On the Glove Box)
II2		
II4		

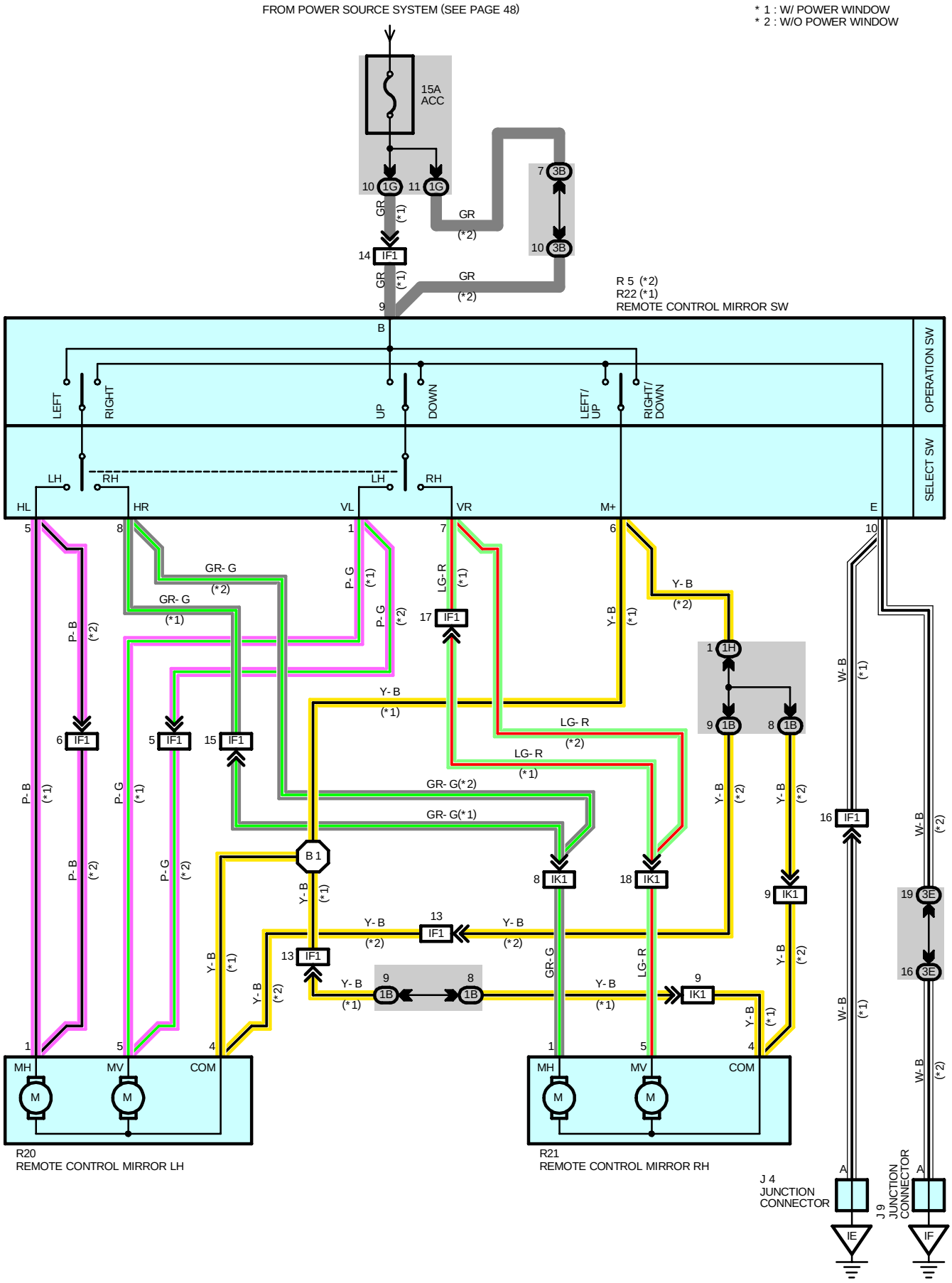
: GROUND POINTS

Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	I17	40	Cowl Wire
I10			I20	40	Engine Wire

REMOTE CONTROL MIRROR



SERVICE HINTS

R5, R22 REMOTE CONTROL MIRROR SW

10-GROUND : Always continuity
10-6 : Continuity with operation SW at **UP** or **LEFT** position
9-6 : Continuity with operation SW at **DOWN** or **RIGHT** position
9-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
J4	31	R5	31	R21	33
J9	31	R20	33	R22	33

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1H		
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

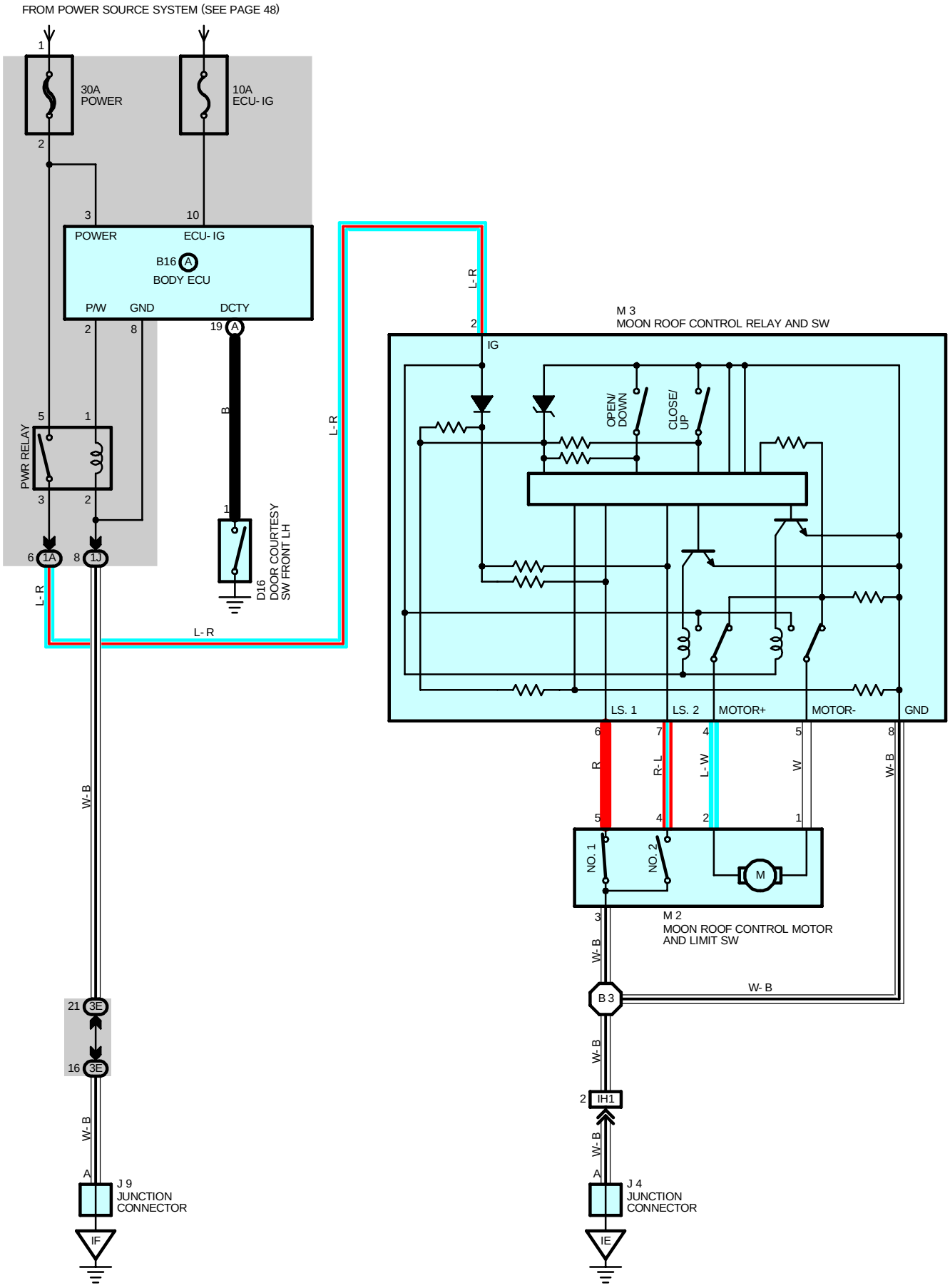
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B1	42	Front Door LH Wire			


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
30A POWER
10A ECU- IG
POWER
ECU- IG
B16 A
BODY ECU
P/W
GND
DCTY
PWR RELAY
D16 DOOR COURTESY SW FRONT LH
L- R
B
W- B
M 3
MOON ROOF CONTROL RELAY AND SW
IG
OPEN/ DOWN
CLOSE/ UP
LS. 1
LS. 2
MOTOR+
MOTOR-
GND
R
R- L
L- W
W
W- B
NO. 1
NO. 2
M
M 2
MOON ROOF CONTROL MOTOR AND LIMIT SW
B 3
IH1
J 9 JUNCTION CONNECTOR
J 4 JUNCTION CONNECTOR
IF
IE

SYSTEM OUTLINE

Current is applied at all times through the POWER fuse to TERMINAL 5 of the PWR relay.
With the ignition SW turned on, the current flows from TERMINAL 1 of the PWR relay to TERMINAL 2 to GROUND through the ECU-IG fuse. As a result, the PWR relay is activated and the current to TERMINAL 5 of the PWR relay flows from TERMINAL 3 of the relay to TERMINAL 2 of the moon roof control relay and SW.

1. SLIDE OPEN OPERATION

When the ignition SW is turned on and the moon roof control SW is pushed to the OPEN position, a signal is input to HALL IC of the moon roof control relay and SW. The moon roof limit SW no. 2 is turned on at this time.
This activates the moon roof control relay and SW and rotates the motor to fully open the moon roof automatically. If other operation SW or the open SW is operated while the moon roof is being opened, the moon roof control relay and SW is activated to stop the moon roof operation.

2. SLIDE CLOSE OPERATION

With the ignition SW turned on, moon roof completely open and the moon roof limit switch no. 1 and no. 2 both are on, when the moon roof control SW is pushed to the CLOSE position, a signal is input to HALL IC of the moon roof control relay and SW.
When this occurs, the relay is activated and the current to TERMINAL 2 of the moon roof control relay and SW flows from TERMINAL 4 to TERMINAL 2 of the moon roof control motor to TERMINAL 1 to TERMINAL 5 of the moon roof control relay and SW to TERMINAL 8 to GROUND, rotating the motor to close the moon roof while the SW is being pushed to CLOSE position.
When the moon roof limit SW no. 1 is turned off (The moon roof limit SW no. 2 is on), and moon roof reaches 100mm from fully close position, signal is input from TERMINAL 5 of the moon roof limit SW to TERMINAL 6 of the moon roof control relay and SW. This signal activates the relay and stops continuity from TERMINAL 2 of the moon roof control relay and SW to TERMINAL 8, as a result, the moon roof stops at this position.
To close the moon roof completely, pushing the moon roof control SW again to the close side causes a signal to be input again to HALL IC of the moon roof control relay and SW. This activates the relay and the moon roof will close as long as the moon roof control SW is being pushed, allowing the moon roof to fully close.

3. TILT UP OPERATION

When the moon roof control SW is pushed to UP position, with the ignition SW turned on and the moon roof completely closed (Moon roof limit SW no.2 is off), a signal is input to HALL IC of the moon roof control relay and SW. As a result, the relay is activated and the current to TERMINAL 2 of the moon roof control relay and SW flows from TERMINAL 4 of the moon roof control relay and SW to TERMINAL 2 of the moon roof control motor to TERMINAL 1 to TERMINAL 5 of the moon roof control relay and SW to TERMINAL 8 to GROUND, rotating the motor so that tilt up operation occurs as long as the moon roof control SW is pushed on the tilt up side.

4. TILT DOWN OPERATION

When the moon roof control SW is pushed to DOWN position, with the ignition SW turned on and the moon roof tilted up (The moon roof limit SW no.1 and no.2 are both off.), a signal input to HALL IC of the moon roof control relay and SW.
As the result, the moon roof control relay is activated and the current to TERMINAL 2 of the moon roof control relay and SW flows from TERMINAL 5 of the moon roof control relay and SW to TERMINAL 1 of the moon roof control motor to TERMINAL 2 to TERMINAL 4 of the moon roof control relay and SW to TERMINAL 8 to GROUND, rotating the motor so that tilt down operation occurs as long as the moon roof control SW is pushed on the tilt down side. (During tilt down, the moon roof limit SW no. 1 is changes off to on.)

5. KEY OFF MOON ROOF OPERATION

With the ignition SW turned from on to off, the body ECU operates and the current flows from the POWER fuse to TERMINAL 3 of the body ECU to TERMINAL 2 to TERMINAL 1 of the PWR relay to TERMINAL 2 to GROUND, at this time, for about 43 seconds the same as normal operation, the current flows from the POWER fuse to TERMINAL 5 of the PWR relay to TERMINAL 3 to TERMINAL 2 of the moon roof control relay and SW. As a result, for about 43 seconds after the ignition SW is turned off, the function of this relay makes it possible to open and close the moon roof. Also, by opening the front door LH (Door courtesy SW front LH on) within about 43 seconds after turning the ignition SW to off, a signal is input to TERMINAL (A) 19 of the body ECU. As a result, the relay turns off, and open and close, movement of the moon roof stops.

MOON ROOF

SERVICE HINTS

PWR RELAY

5-3 : Closed with the ignition SW at **ON** position or key off operated

M3 MOON ROOF CONTROL RELAY AND SW

8-GROUND : Always continuity
2-GROUND : Approx. **12** volts with the ignition SW at **ON** position or key off operated
4-GROUND : Approx. **12** volts with the ignition SW on and the moon roof control SW at **CLOSE** or **UP** position
5-GROUND : Approx. **12** volts with the ignition SW on and the moon roof control SW at **OPEN** or **DOWN** position

: PARTS LOCATION

Code		See Page	Code	See Page	Code	See Page
B16	A	30	J4	31	M2	33
D16		32	J9	31	M3	33

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Roof Wire and Driver Side J/B (Lower Finish Panel)
1J	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

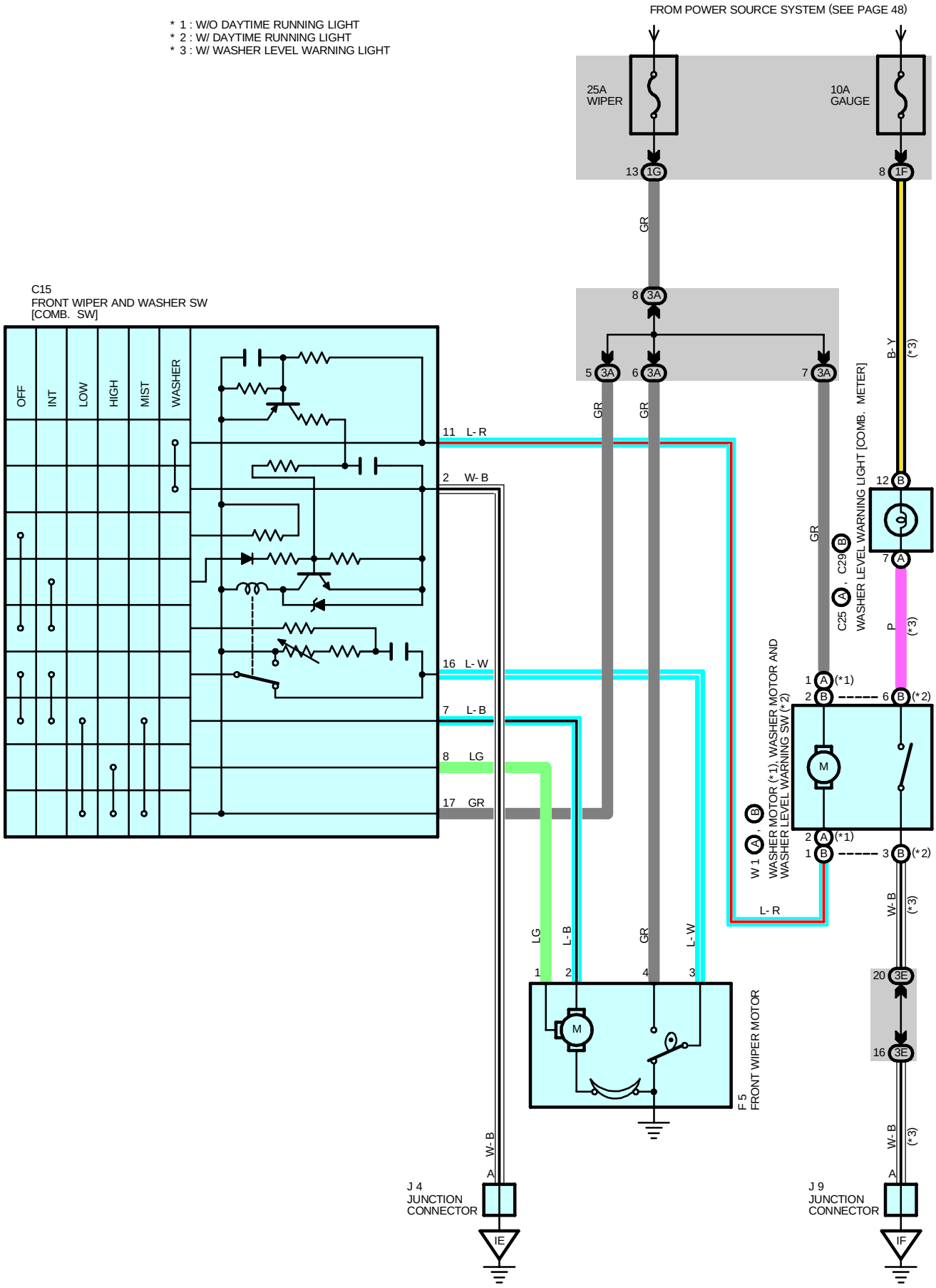
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IH1	40	Roof Wire and Cowl Wire (Instrument Panel Reinforcement Left)

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B3	42	Roof Wire			


* 1 : W/O DAYTIME RUNNING LIGHT
* 2 : W/ DAYTIME RUNNING LIGHT
* 3 : W/ WASHER LEVEL WARNING LIGHT
FROM POWER SOURCE SYSTEM (SEE PAGE 48)
25A WIPER
10A GAUGE
13 1G
8 1F
GR
8 3A
5 3A
6 3A
7 3A
C15
FRONT WIPER AND WASHER SW [COMB. SW]
OFF
INT
LOW
HIGH
MIST
WASHER
11 L- R
2 W- B
16 L- W
7 L- B
8 LG
17 GR
B- Y (*3)
12 B
7 A
C29 B
C25 A
WASHER LEVEL WARNING LIGHT [COMB. METER]
P (*3)
1 A (*1)
2 B
6 B (*2)
M
2 A (*1)
1 B
3 B (*2)
W 1 B
W 1 A
WASHER MOTOR (*1), WASHER MOTOR AND WASHER LEVEL WARNING SW (*2)
L- R
W- B (*3)
LG
L- B
GR
L- W
1
2
4
3
M
F 5
FRONT WIPER MOTOR
20 3E
16 3E
W- B (*3)
W- B
A
J 4
JUNCTION CONNECTOR
IE
J 9
JUNCTION CONNECTOR
IF

SYSTEM OUTLINE

With the ignition SW turned on, current flows to TERMINAL 17 of the front wiper and washer SW, TERMINAL 1 (w/o daytime running light) or 2 (w/ daytime running light) of the washer motor and TERMINAL 4 of the front wiper motor through the WIPER Fuse.

1. LOW SPEED POSITION

With the wiper SW turned to LOW position, the current flows from TERMINAL 17 of the front wiper and washer SW to TERMINAL 7 to TERMINAL 2 of the front wiper motor to GROUND and causes to the front wiper motor to run at low speed.

2. HIGH SPEED POSITION

With the wiper SW turned to HIGH position, the current flows from TERMINAL 17 of the front wiper and washer SW to TERMINAL 8 to TERMINAL 1 of the front wiper motor to GROUND and causes to the front wiper motor to run at high speed.

3. INT POSITION (w/ INTERMITTENT OPERATION)

With the wiper SW turned to INT position, the relay operated and the current which is connected by relay function flows from TERMINAL 17 of the front wiper and washer SW to TERMINAL 2 to GROUND. This flow of the current operates the intermittent circuit and the current flows from TERMINAL 17 of the front wiper and washer SW to TERMINAL 7 to TERMINAL 2 of the front wiper motor to GROUND and functions. The intermittent operation is controlled by a condenser's charged and discharged function installed in relay.

4. MIST POSITION (w/o INTERMITTENT OPERATION)

With wiper SW turned to MIST position, the current flows TERMINAL 17 of the front wiper and washer SW to TERMINAL 7 to TERMINAL 2 of the front wiper motor to GROUND and causes to the front wiper motor to run at low speed.

5. WASHER CONTINUITY OPERATION (w/ INTERMITTENT OPERATION)

With the washer SW turned to on, the current flows through TERMINAL 1 (w/o daytime running light) or 2 (w/ daytime running light) of the washer motor to TERMINAL 2 (w/o daytime running light) or 1 (w/ daytime running light) to TERMINAL 11 of the front wiper and washer SW to TERMINAL 2 to GROUND and causes the washer motor to run and window washer to spray. Simultaneously, current flows from the WIPER fuse to TERMINAL 17 of the front wiper and washer SW to TERMINAL 7 to TERMINAL 2 of the front wiper motor to GROUND, causing the wiper to function.

6. WASHER OPERATION (w/o INTERMITTENT OPERATION)

With the washer SW turned to on, the current flows from TERMINAL 1 (w/o daytime running light) or 2 (w/ daytime running light) of the washer motor to TERMINAL 2 (w/o daytime running light) or 1 (w/ daytime running light) to TERMINAL 11 of the front wiper and washer SW to TERMINAL 2 to GROUND and causes the washer motor to run and the window washer to spray, operates only while the washer SW is pressed.

SERVICE HINTS

C15 FRONT WIPER AND WASHER SW [COMB. SW]

2-GROUND : Always continuity
17-GROUND : Approx. **12** volts with ignition SW at **ON** position
7-GROUND : Approx. **12** volts with front wiper and washer SW at **LOW** position
Approx. **12** volts every approx. **1** to **10** seconds intermittently with front wiper and washer SW at **INT** position
(w/ intermittent operation)
Approx. **12** volts front wiper and washer SW at **MIST** position (w/o intermittent operation)
16-GROUND : Approx. **12** volts with ignition SW on unless front wiper motor at **STOP** position
8-GROUND : Approx. **12** volts with ignition SW on and front wiper and washer SW at **HIGH** position

F5 FRONT WIPER MOTOR

3-4 : Closed unless front wiper motor at **STOP** position

○ : PARTS LOCATION

Code		See Page	Code	See Page	Code		See Page
C15		30	F5	28	W1	A	29
C25	A	30	J4	31		B	29
C29	B	30	J9	31			

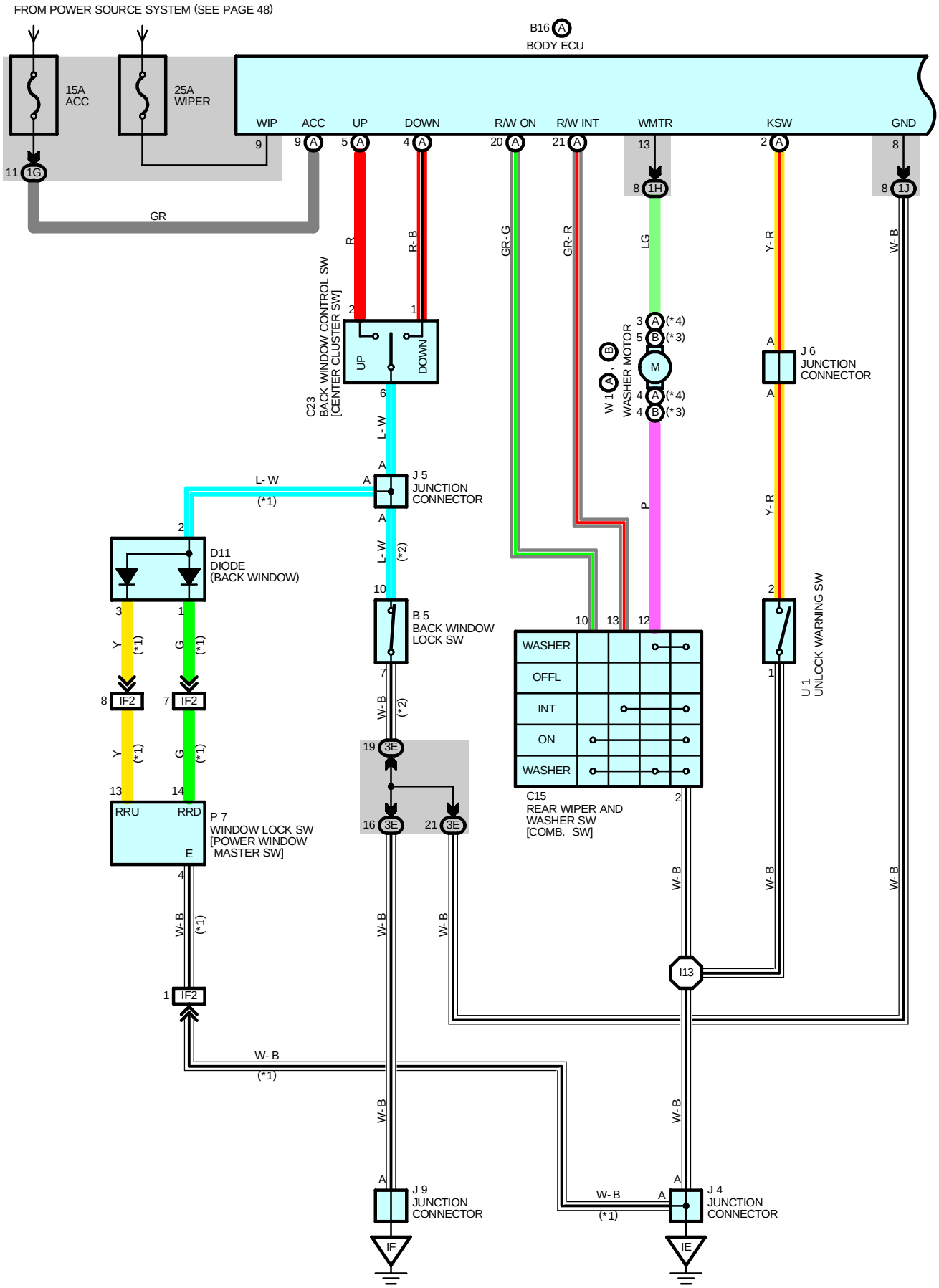
: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

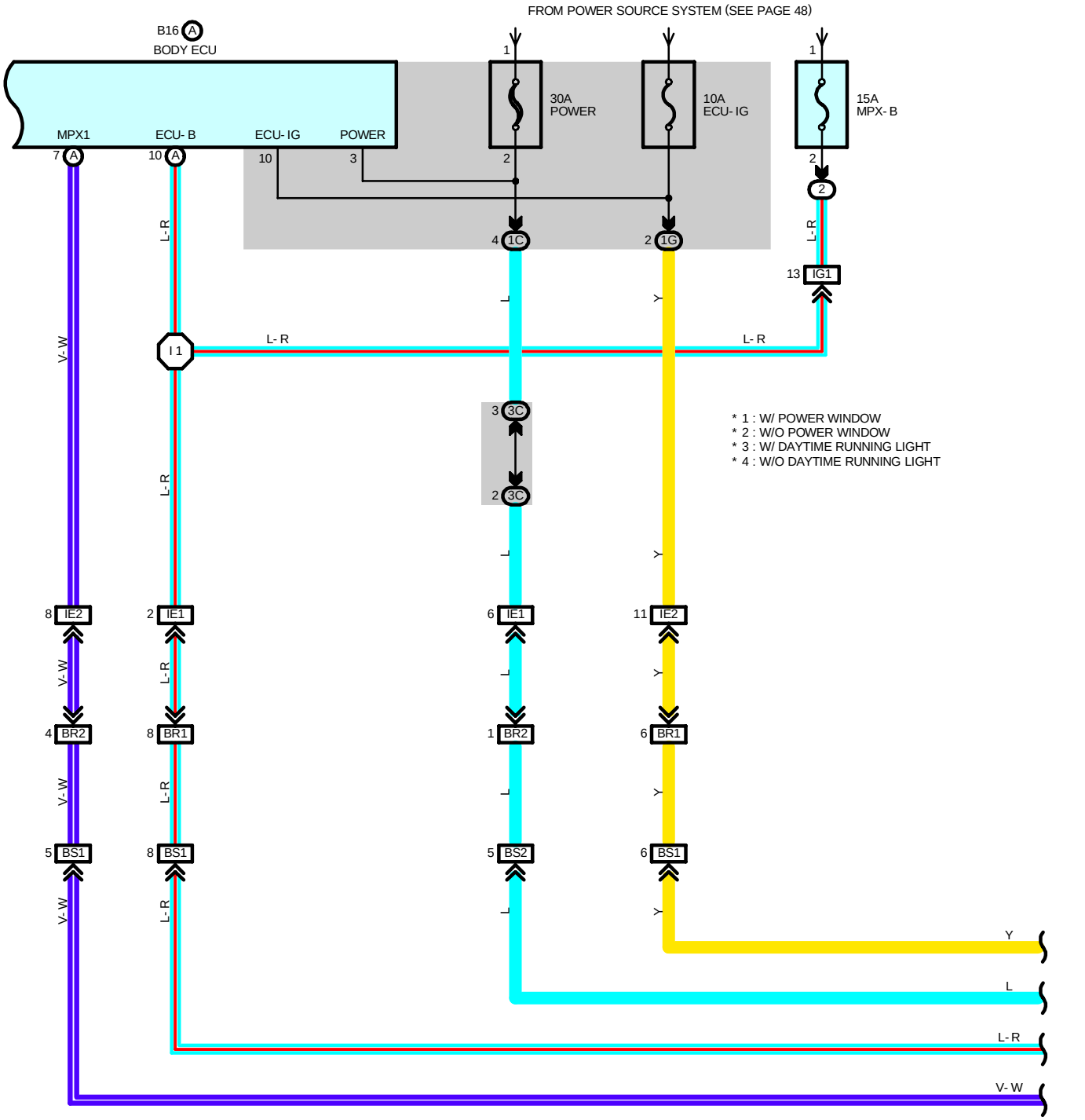
Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
3A	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: GROUND POINTS

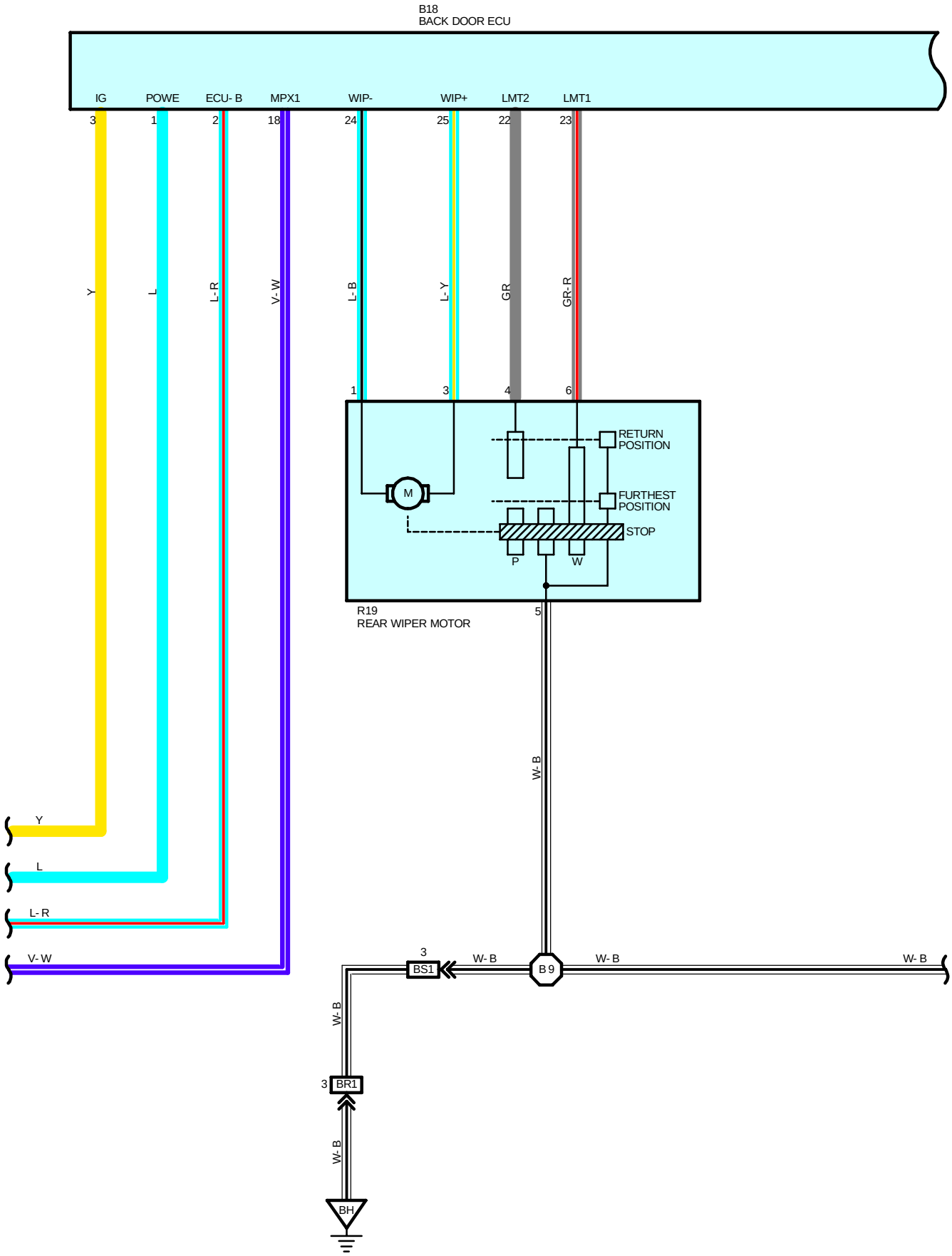
Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

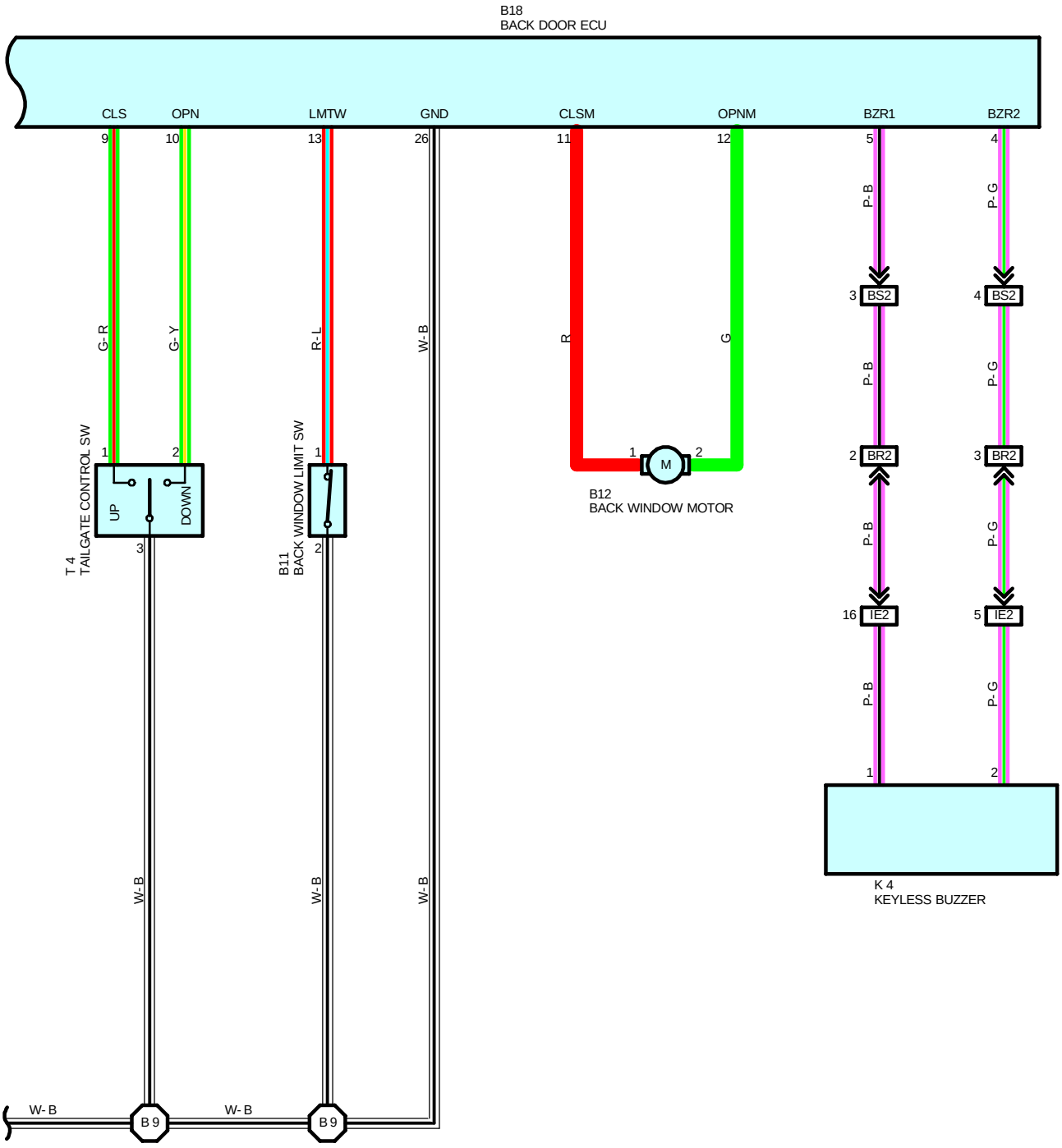
POWER WINDOW (REAR), REAR WIPER AND WASHER




FROM POWER SOURCE SYSTEM (SEE PAGE 48)
B16 A
BODY ECU
MPX1
ECU- B
ECU- IG
POWER
7 A
10 A
10
3
1
2
30A
POWER
10A
ECU- IG
15A
MPX- B
4 1C
2 1G
13 IG1
L- R
L
Y
V- W
I 1
3 3C
2 3C
* 1 : W/ POWER WINDOW
* 2 : W/O POWER WINDOW
* 3 : W/ DAYTIME RUNNING LIGHT
* 4 : W/O DAYTIME RUNNING LIGHT
8 IE2
2 IE1
6 IE1
11 IE2
4 BR2
8 BR1
1 BR2
6 BR1
5 BS1
8 BS1
5 BS2
6 BS1
Y
L
L- R
V- W

POWER WINDOW (REAR), REAR WIPER AND WASHER




B18
BACK DOOR ECU
CLS
OPN
LMTW
GND
CLSM
OPNM
BZR1
BZR2
9
10
13
26
11
12
5
4
G- R
G- Y
R- L
W- B
R
G
P- B
P- G
3 BS2
4 BS2
2 BR2
3 BR2
16 IE2
5 IE2
1
2
1
2
3
UP
DOWN
T 4
TAILGATE CONTROL SW
B11
BACK WINDOW LIMIT SW
M
B12
BACK WINDOW MOTOR
K 4
KEYLESS BUZZER
W- B
B 9
W- B
B 9

SYSTEM OUTLINE

Current always flows through the POWER fuse to TERMINAL 3 of the body ECU and TERMINAL 1 of the back door ECU. With the ignition SW turned on, the WIPER fuse to TERMINAL 9 of the body ECU, the ECU-IG fuse to TERMINAL 10 of the body ECU and TERMINAL 3 of the back door ECU.

1. REAR POWER WINDOW MANUAL OPERATION (BACK WINDOW CONTROL SW)

When the back window control SW is pushed to the up side (With the ignition SW on), an "ON" signal is input from TERMINAL 2 of the back window control SW to TERMINAL (A) 5 of the body ECU to TERMINAL (A) 7 to TERMINAL 18 of the back door ECU. Thus, the back door ECU is activated and the current to TERMINAL 1 of the back door ECU flows to TERMINAL 26 of the back door ECU to GROUND so that the current to back window motor flows from TERMINAL 1 of the back door ECU to TERMINAL 11 to TERMINAL 1 of the back window motor to TERMINAL 2 to TERMINAL 12 of the back door ECU to TERMINAL 26 to GROUND. This causes the back window motor to rotate toward the up side and the window ascends only while the back window control SW is being pushed.

To lower the window, the signal input from TERMINAL 1 of the back window control SW to TERMINAL (A) 4 of the body ECU to TERMINAL (A) 7 to TERMINAL 18 of the back door ECU. Causes current to the back window motor to flow from TERMINAL 1 of the back door ECU to TERMINAL 12 to TERMINAL 2 of the back window motor to TERMINAL 1 to TERMINAL 11 of the back door ECU to TERMINAL 26 to GROUND, so the current flows in the revers direction to manual up operation and causes the motor to rotate in the opposite direction, thus lowering the window.

When the back window lock SW is pushed the lock side, the ground circuit of the back window control SW becomes open. Thus even if the driver operates the Open/Close function of the power window (Rear), the power window (Rear) will not operate because the back door ECU dose not receive the on signal and the back door ECU does not operate.

2. REAR POWER WINDOW MANUAL OPERATION (TAILGATE CONTROL SW)

When the tailgate control SW to the up side a signal is input to TERMINAL 9 of the back door ECU from TERMINAL 1 of the tailgate control SW. This activates the back door ECU regardless of whether the ignition SW is on or off, and the current flows from TERMINAL 1 of the back door ECU to TERMINAL 26. So the current to the back window motor flows to TERMINAL 1 of the back door ECU to TERMINAL 11 to TERMINAL 1 of the back window motor to TERMINAL 2 to TERMINAL 12 of the back door ECU to TERMINAL 26 to GROUND and causes the back window motor to rotate in the up direction so the back window ascends only while the tailgate control SW is being pushed to lower the window. The on signal of the tailgate control SW (Rotate to down side) is input to TERMINAL 10, causing the current to the motor to flow to TERMINAL 1 of the back door ECU to TERMINAL 12 to TERMINAL 2 of the back window motor to TERMINAL 1 to TERMINAL 11 of the back door ECU to TERMINAL 26 to GROUND. This flow is the reverse of manual up, so the motor rotates in the reverse direction and the window is lowered.

3. WIRELESS BACK WINDOW CONTROL

When the ignition SW is off, the back window can be opened by pressing the back window open SW of the transmitter for approximately 0.8 seconds. At that time, the keyless buzzer beeps once.

4. REAR WIPER OPERATION

With ignition SW turned on and the back door window completely closed (Back window limit SW on), when the rear wiper and washer SW is turned on, the signal is input from TERMINAL 10 of the rear wiper and washer SW to TERMINAL (A) 20 of the body ECU to TERMINAL 7 to TERMINAL 18 of the back door ECU. Thus the back door ECU activates and the current flows from TERMINAL 1 of the back door ECU to TERMINAL 25 to TERMINAL 3 of the rear wiper motor to TERMINAL 1 to TERMINAL 24 of the back door ECU to TERMINAL 26 to GROUND and operates the rear wiper to the upper limit of the wiping area. When the upper limit of the wiping area is reached, the point (Cam plate P point) on the wiper motor is turned on (in the case, W point of cam plate is off), and the signal to reverse the rear wiper motor is input to TERMINAL 22 of the back door ECU. The back door ECU stops the rear wiper motor for about 0.1 seconds and the current flows from TERMINAL 24 of the back door ECU to TERMINAL 1 of the rear wiper motor to TERMINAL 3 to TERMINAL 25 of the back door ECU to TERMINAL 26 to GROUND. As a result, the rear wiper motor reverses and stops the rear wiper before the retraction position. At that time, the point (Cam plate W point) on the rear wiper motor is turned on (in this case, P point of cam plate is off), and the signal to rotate the motor is input to TERMINAL 25 of the back door ECU to TERMINAL 3 of the rear wiper motor to TERMINAL 1 to TERMINAL 24 of the back door ECU to TERMINAL 26 to GROUND and the rear wiper SW off, the signal to TERMINAL 23 of the back door ECU from W point of cam plate is cancelled and the wiping function is continued when P point is turned on. The rear wiper continues beyond the rear wiper area to the retraction position. At that time, P and W points are turned on, the power window relay stops operating, and the current to the rear wiper is cut off to cam plate rear wiper operation.

5. WASHER OPERATION

With the ignition SW turned on and back window closed completely (Back window limit SW on), when the rear wiper and washer SW is turned strongly (Rear washer SW on), current flows from TERMINAL 9 of the body ECU to TERMINAL 13 to TERMINAL 3 (w/o daytime running light), 5 (w/ daytime running light) of the washer motor to TERMINAL 4 to TERMINAL 12 of the rear wiper and washer SW to TERMINAL 2 to GROUND and causes the rear window washer emits a water spray only while the rear washer SW is turned. When the rear wiper SW is off, and the rear wiper SW is then turned in the off direction, washer liquid will also spray.

SERVICE HINTS

T4 TAILGATE CONTROL SW

2-3 : Continuity with tailgate control SW at down side
1-3 : Continuity with tailgate control SW at up side

C15 REAR WIPER AND WASHER SW [COMB. SW]

12-2 : Continuity with rear wiper and washer SW at **WASHER** position
10-2 : Continuity with rear wiper and washer SW at **ON** position

B18 BACK DOOR ECU

3-GROUND : Approx. **12** volts with ignition SW at **ON** position
1-GROUND : Always approx. **12** volts
26-GROUND : Always continuity
11-GROUND : Approx. **12** volts with back window at **UP** operation
12-GROUND : Approx. **12** volts with back window at **DOWN** operation
9-GROUND : Continuity with tailgate control SW at **UP** position
10-GROUND : Continuity with tailgate control SW at **DOWN** position

B11 BACK WINDOW LIMIT SW

1-2 : Closed with back power window fully closed

R19 REAR WIPER MOTOR

4, 6-5 : Continuity with rear wiper retracted
4-5 : Continuity with rear wiper at **RETURN** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B5	30	D11	30	R19	33
B11	32	J4	31	T4	33
B12	32	J5	31	U1	31
B16 A	30	J6	31	W1 A	29
B18	32	J9	31	W1 B	29
C15	30	K4	29		
C23	30	P7	33		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1H		
1J		
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IF2	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2		
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BS2		

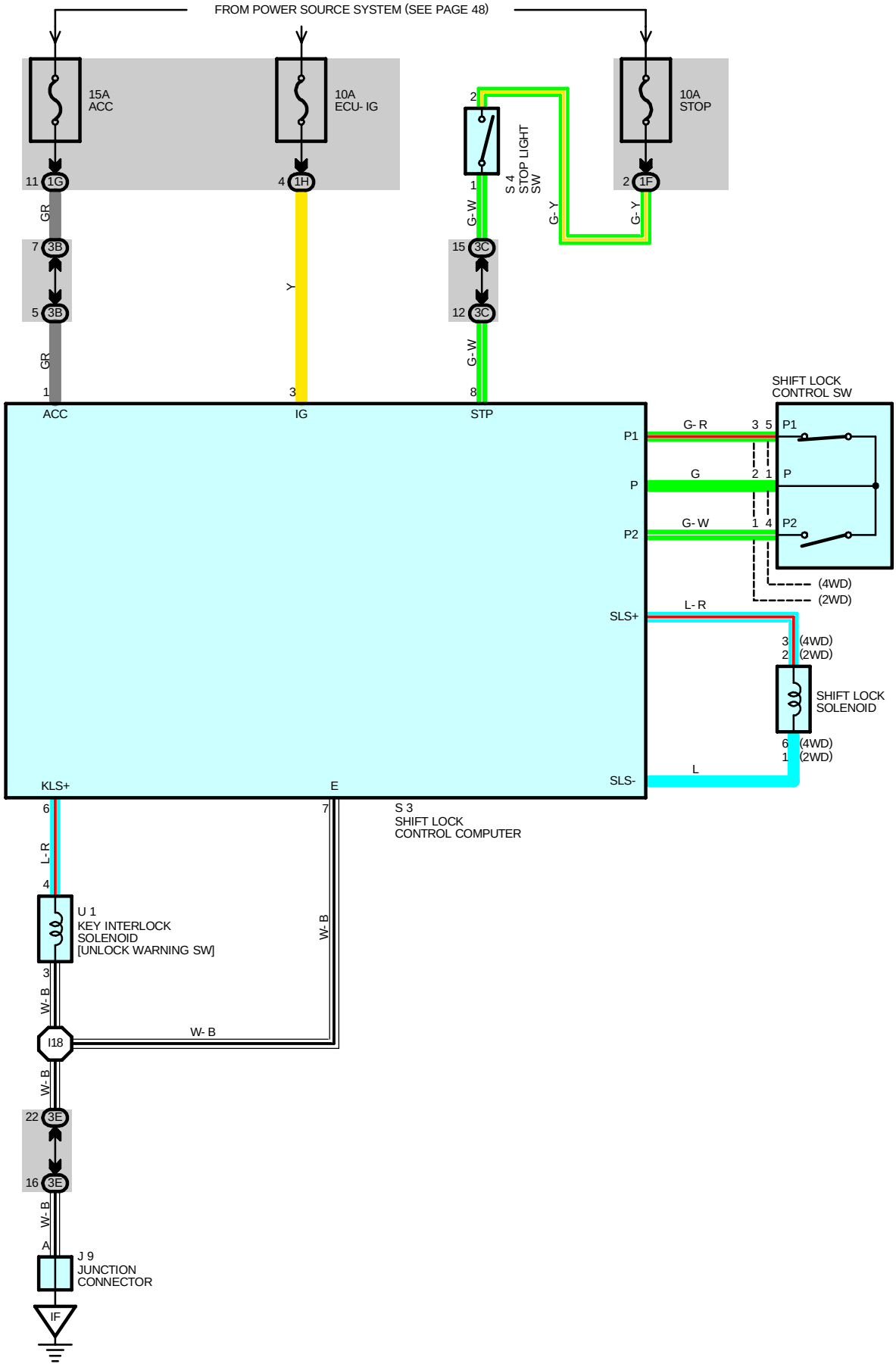
POWER WINDOW (REAR), REAR WIPER AND WASHER

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	B9	42	Back Door No.2 Wire
I13					


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A
ACC
10A
ECU- IG
10A
STOP
S 4
STOP LIGHT
SW
11 1G
4 1H
2 1F
2
1
G- W
G- Y
G- Y
GR
7 3B
5 3B
GR
Y
15 3C
12 3C
G- W
1
3
8
ACC
IG
STP
SHIFT LOCK
CONTROL SW
P1
G- R
3 5 P1
P
G
2 1 P
P2
G- W
1 4 P2
(4WD)
(2WD)
SLS+
L- R
3 (4WD)
2 (2WD)
SHIFT LOCK
SOLENOID
6 (4WD)
1 (2WD)
L
SLS-
KLS+
E
S 3
SHIFT LOCK
CONTROL COMPUTER
6
7
L- R
4
U 1
KEY INTERLOCK
SOLENOID
[UNLOCK WARNING SW]
W- B
3
W- B
W- B
I18
W- B
22 3E
16 3E
W- B
A
J 9
JUNCTION
CONNECTOR
IF

SYSTEM OUTLINE

When the ignition SW is turned to ACC position the current from the ACC fuse flows to TERMINAL 1 of the shift lock control computer. When the ignition SW is turned to ON position, the current from the ECU-IG fuse flows to TERMINAL 3 of the shift lock control computer.

1. SHIFT LOCK MECHANISM

With the ignition SW on, when a signal that the brake pedal is depressed (Stop light SW on) and a signal that the shift lever is put in P position (Continuous between P1 and P of the shift lock control SW) is input to the shift lock control computer, the shift lock control computer operates and current from the ECU-IG fuse flows to TERMINAL 3 of the shift lock control computer to TERMINAL SLS+ to TERMINAL 3 (4WD) or 2 (2WD) of the shift lock solenoid to TERMINAL 6 (4WD) or 1 (2WD) to TERMINAL SLS- of the shift lock control computer to TERMINAL 7 to GROUND. This causes the shift lock solenoid to turn on (Plate stopper disengages) and the shift lever can shift into position other than P.

2. KEY INTERLOCK MECHANISM

With the ignition SW at ON or ACC position, when the shift lever is put in P position (No continuous between P2 and P of the shift lock control SW), the current flowing from TERMINAL 6 of the shift lock control computer to key interlock solenoid is cut off. This causes the key interlock solenoid to turn off (Lock lever disengages from LOCK position) and the ignition key can be turned from ACC to LOCK position.

SERVICE HINTS

S3 SHIFT LOCK CONTROL COMPUTER

1-GROUND : Approx. **12** volts with the ignition SW at **ACC** or **ON** position
3-GROUND : Approx. **12** volts with the ignition SW at **ON** position
6-GROUND : **0** volts with ignition SW at **ACC** position and shift lever position in **P** position
6- **12** volts with shift lever position in except **P** position
7-GROUND : Always continuity
8-GROUND : Approx. **12** volts with the brake pedal depressed

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
J9	31	S4	31		
S3	31	U1	31		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1H		
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3C		
3E		

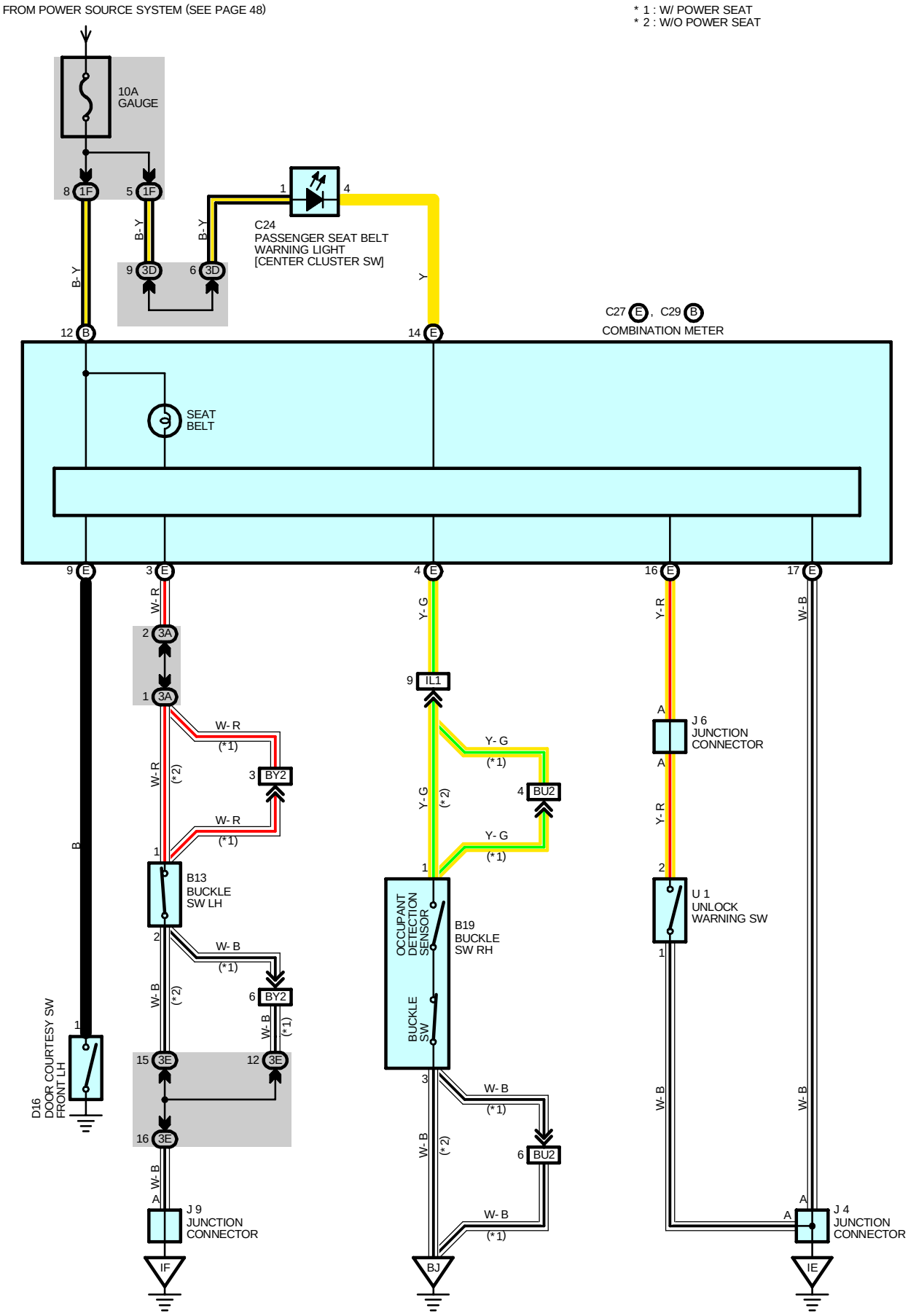
: GROUND POINTS

Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I18	40	Cowl Wire			

KEY REMINDER AND SEAT BELT WARNING



SYSTEM OUTLINE

1. SEAT BELT WARNING SYSTEM

When the ignition SW turned on, a signal is input to the combination meter. To determine whether the driver has fastened the seat belt, a signal is input from the buckle SW LH to the combination meter TERMINAL (E) 3. When the seat belt is not fastened, the seat belt warning light in the combination meter blinks, and emits a warning sound.
In addition, the front passenger is recognized by a sensor (Seat belt warning occupant detection sensor (Buckle SW RH)) is installed in the front passenger seat, and determines whether the seat belt is fastened. When not fastened, the signals from the buckle SW RH is input to combination meter TERMINAL (E) 4, and the passenger seat belt warning light blinks to warn the passenger.

2. KEY REMINDER SYSTEM

When the driver door is opened with the ignition SW off and ignition key remaining in the key cylinder (Unlock warning SW on), a signal is input from the unlock warning SW to the combination meter TERMINAL (E) 16, and from the door courtesy SW front LH to combination meter TERMINAL (E) 9. As a result, the buzzer in the combination meter goes on and warns the driver that the key is remaining in the key cylinder.

SERVICE HINTS

C27 (E), C29 (B) COMBINATION METER

(B)12-GROUND : Approx. **12** volts with ignition SW at **ON** position
(E)17-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code		See Page	Code	See Page
B13	32 (w/o Power Seat)	C24		30	J4	31
	34 (w/ Power Seat)	C27	E	30	J6	31
B19	32 (w/o Power Seat)	C29	B	30	J9	31
	34 (w/ Power Seat)	D16		32	U1	31

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

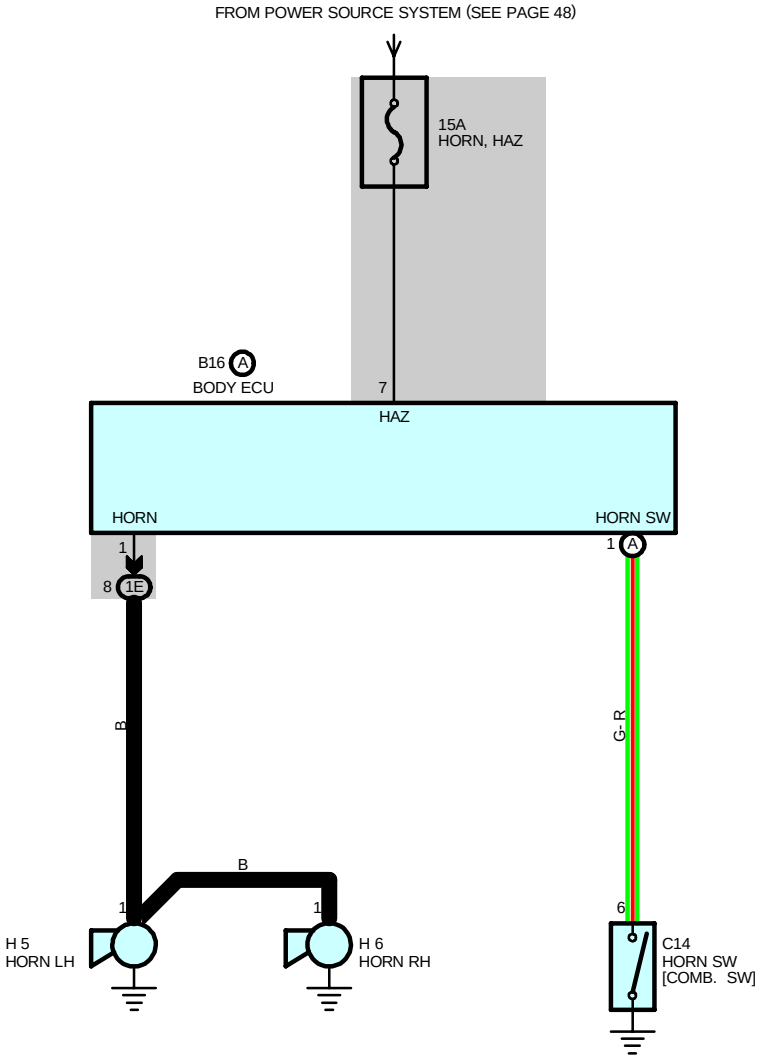
Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3A	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3D		
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BU2	44	Floor Wire and Seat No.2 Wire (Under the Front Passenger's Seat)
BY2	44	Cowl Wire and Seat No.1 Wire (Under the Driver's Seat)

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BJ	42	Right Quarter Panel Inner


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
15A
HORN, HAZ
B16 A
BODY ECU
7
HAZ
HORN
HORN SW
1
8 1E
1 A
B
G-R
B
1
1
6
H 5
HORN LH
H 6
HORN RH
C14
HORN SW
[COMB. SW]

SERVICE HINTS

B16 (A) BODY ECU

7-GROUND : Always approx. **12** volts

(A)1-GROUND : Continuity with horn SW on

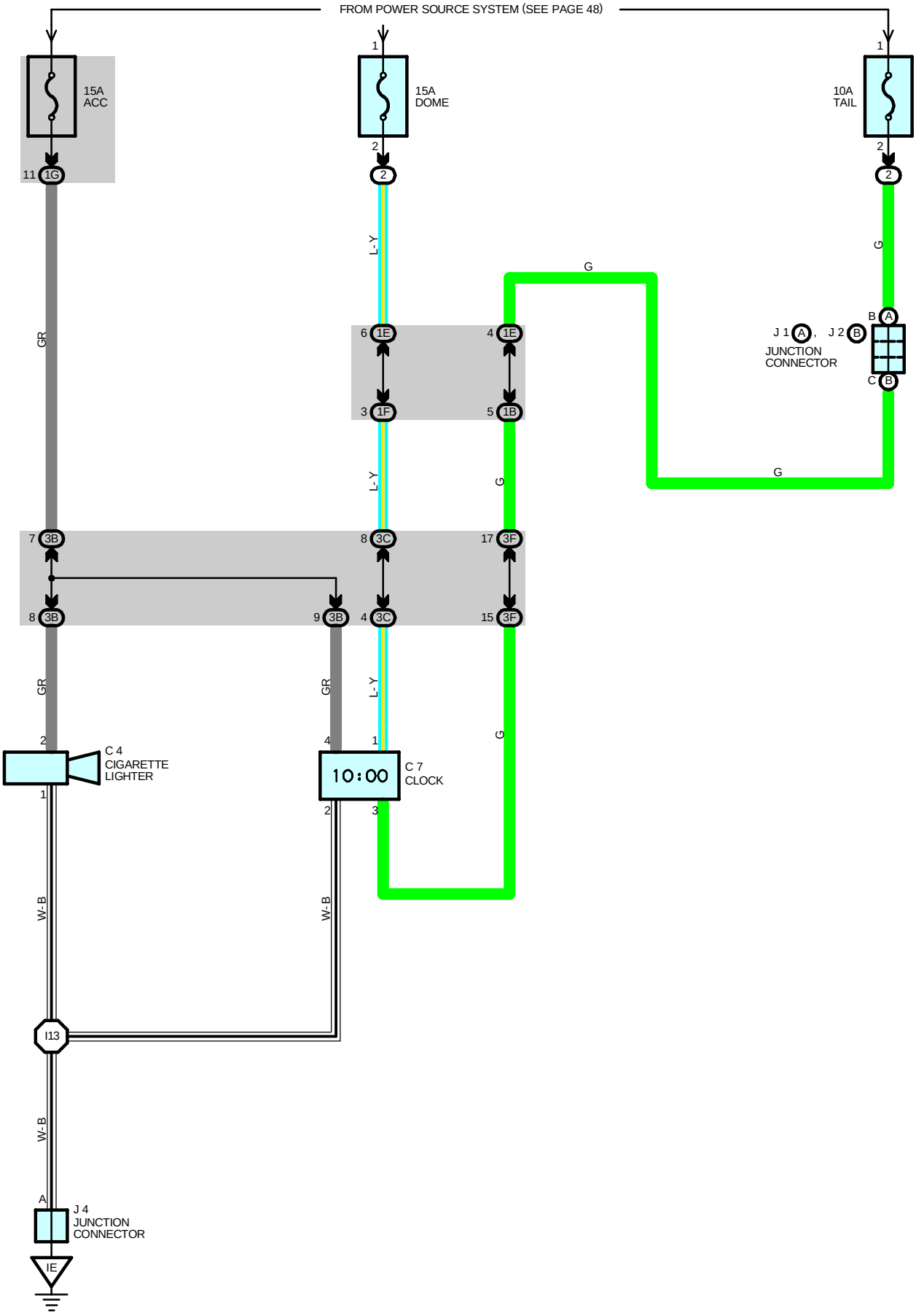
: PARTS LOCATION

Code		See Page	Code	See Page	Code	See Page
B16	A	30	H5	28		
C14		30	H6	28		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)

CIGARETTE LIGHTER AND CLOCK



SERVICE HINTS

C4 CIGARETTE LIGHTER

2-GROUND : Approx. **12** volts with ignition SW at **ON** or **ACC** position
1-GROUND : Always continuity

C7 CLOCK

1-GROUND : Always approx. **12** volts (Power for clock)
4-GROUND : Approx. **12** volts with ignition SW at **ON** or **ACC** position (Power for indication)
3-GROUND : Approx. **12** volts with light control SW at **TAIL** or **HEAD** position (Signal of indication)
2-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code		See Page	Code	See Page
C4	30	J1	A	29	J4	31
C7	30	J2	B	29		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3C		
3F		

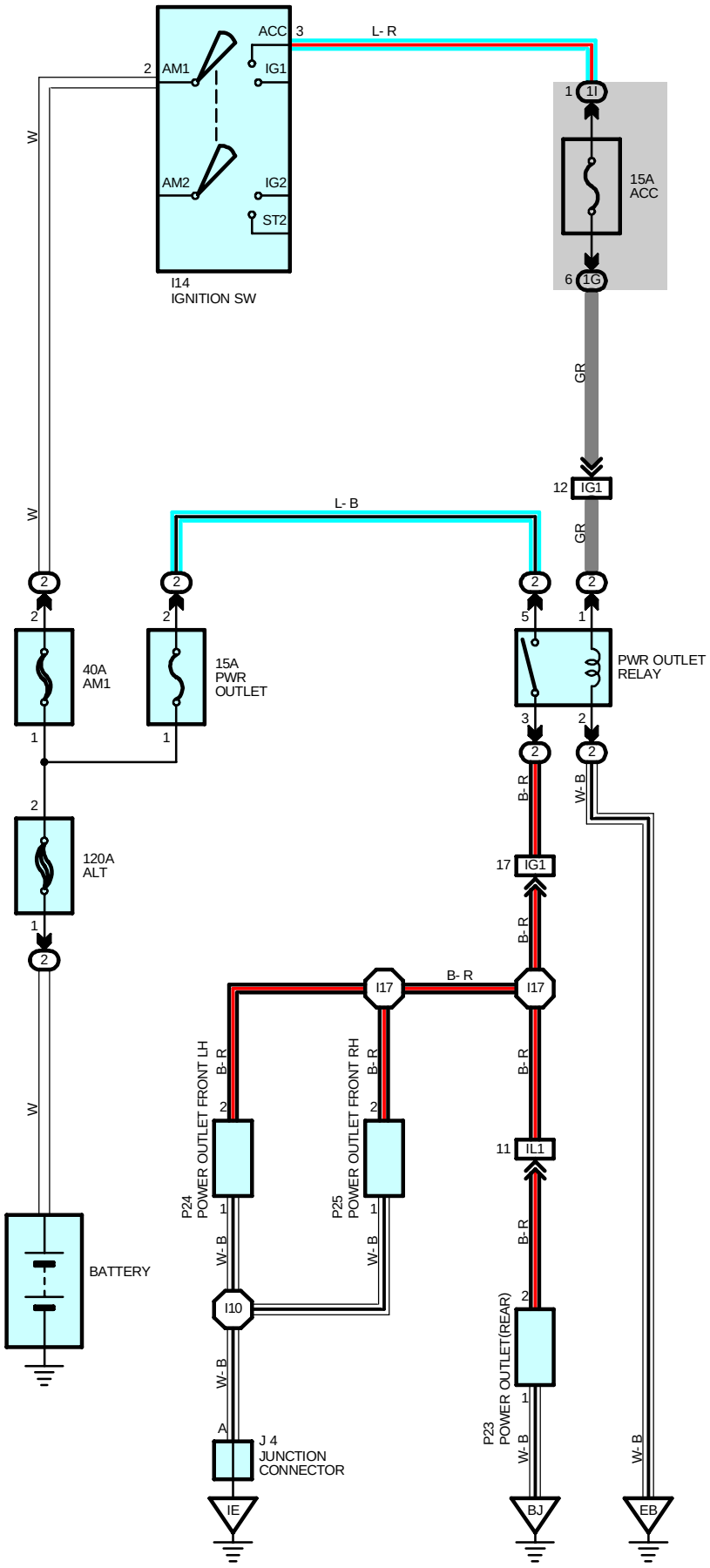
: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I13	40	Cowl Wire			

POWER OUTLET



SERVICE HINTS

PWR OUTLET RELAY

3-5 : Closed with ignition SW at **ACC** or **ON** position
1-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position
5-GROUND : Always approx. **12** volts
2-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
I14	31	P23	33	P25	31
J4	31	P24	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1G	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1I	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

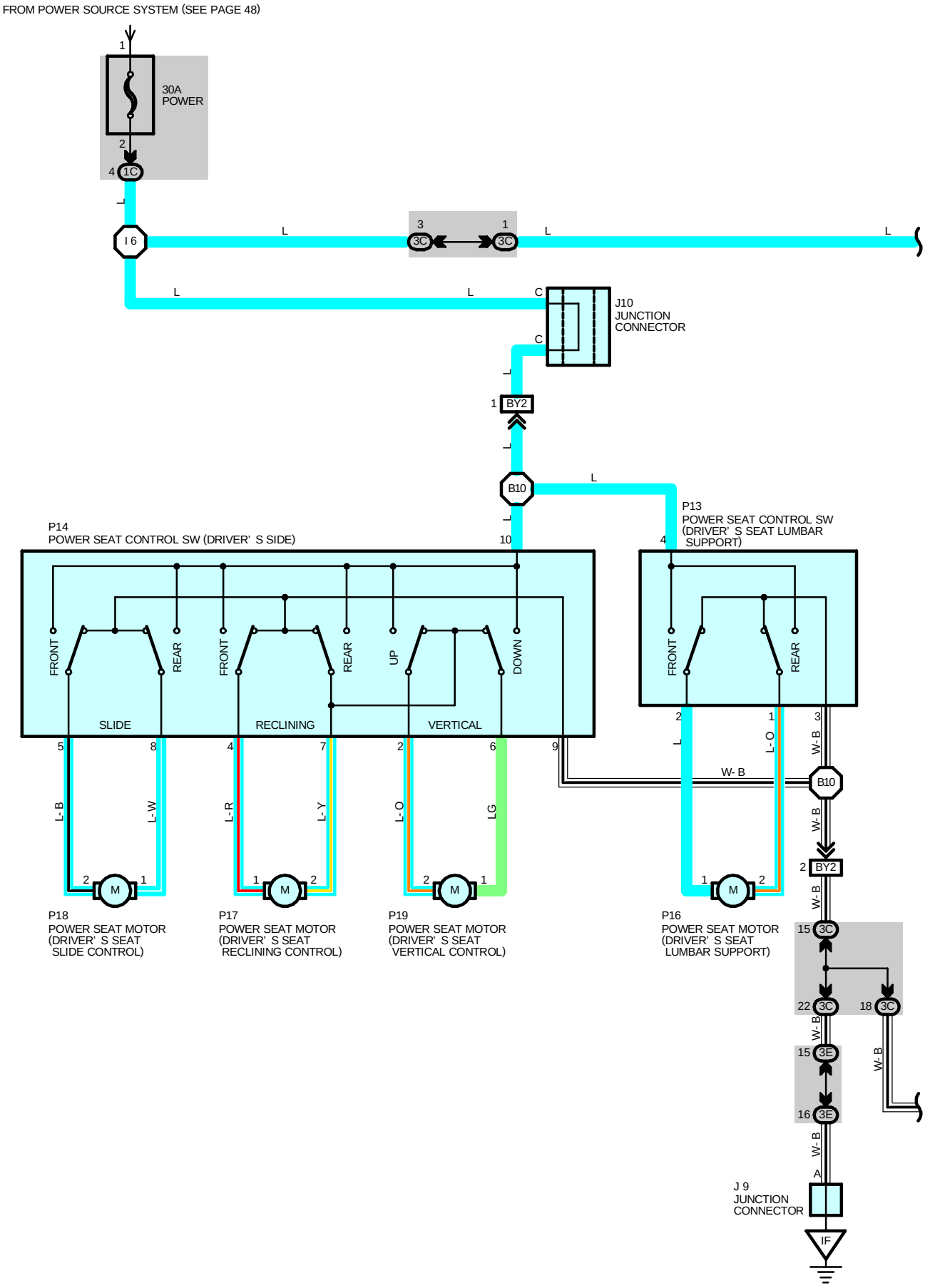
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)

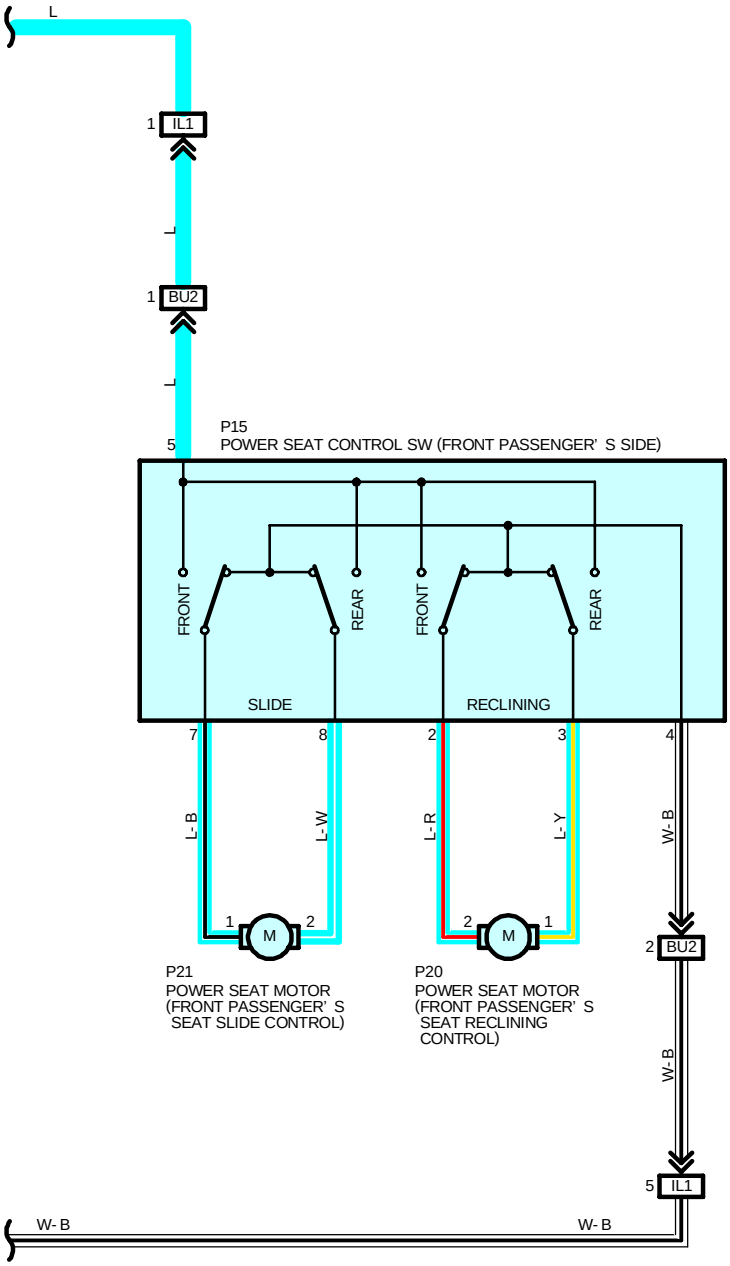
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
BJ	42	Right Quarter Panel Inner

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I10	40	Cowl Wire	I17	40	Cowl Wire


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
30A POWER
I 6
J10 JUNCTION CONNECTOR
BY2
B10
P14 POWER SEAT CONTROL SW (DRIVER' S SIDE)
P13 POWER SEAT CONTROL SW (DRIVER' S SEAT LUMBAR SUPPORT)
FRONT
REAR
SLIDE
RECLINING
UP
DOWN
VERTICAL
L-B
L-W
L-R
L-Y
L-O
LG
W-B
P18 POWER SEAT MOTOR (DRIVER' S SEAT SLIDE CONTROL)
P17 POWER SEAT MOTOR (DRIVER' S SEAT RECLINING CONTROL)
P19 POWER SEAT MOTOR (DRIVER' S SEAT VERTICAL CONTROL)
P16 POWER SEAT MOTOR (DRIVER' S SEAT LUMBAR SUPPORT)
J 9 JUNCTION CONNECTOR
IF


L
1
IL1
L
1
BU2
L
5
P15
POWER SEAT CONTROL SW (FRONT PASSENGER' S SIDE)
FRONT
REAR
FRONT
REAR
SLIDE
RECLINING
7
8
2
3
4
L-B
L-W
L-R
L-Y
W-B
1
M
2
2
M
1
2
BU2
P21
POWER SEAT MOTOR
(FRONT PASSENGER' S
SEAT SLIDE CONTROL)
P20
POWER SEAT MOTOR
(FRONT PASSENGER' S
SEAT RECLINING
CONTROL)
W-B
5
IL1
W-B
W-B

POWER SEAT

SERVICE HINTS

P13 POWER SEAT CONTROL SW (DRIVER'S SEAT LUMBAR SUPPORT)

4-2 : Closed with the driver's seat at lumbar support front operation
4-1 : Closed with the driver's seat at lumbar support rear operation
3-GROUND : Always continuity

P14 POWER SEAT CONTROL SW (DRIVER'S SIDE)

10-5 : Closed with the driver's seat at front slide operation
10-8 : Closed with the driver's seat at rear slide operation
10-4 : Closed with the driver's seat at front reclining operation
10-7 : Closed with the driver's seat at rear reclining operation
10-2 : Closed with the driver's seat at vertical up operation
10-6 : Closed with the driver's seat at vertical down operation
9-GROUND : Always continuity

P15 POWER SEAT CONTROL SW (FRONT PASSENGER'S SIDE)

5-7 : Closed with the front passenger's seat at front slide operation
5-8 : Closed with the front passenger's seat at rear slide operation
5-2 : Closed with the front passenger's seat at front reclining operation
5-3 : Closed with the front passenger's seat at rear reclining operation
4-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
J9	31	P15	34	P19	34
J10	31	P16	34	P20	34
P13	34	P17	34	P21	34
P14	34	P18	34		

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1C	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

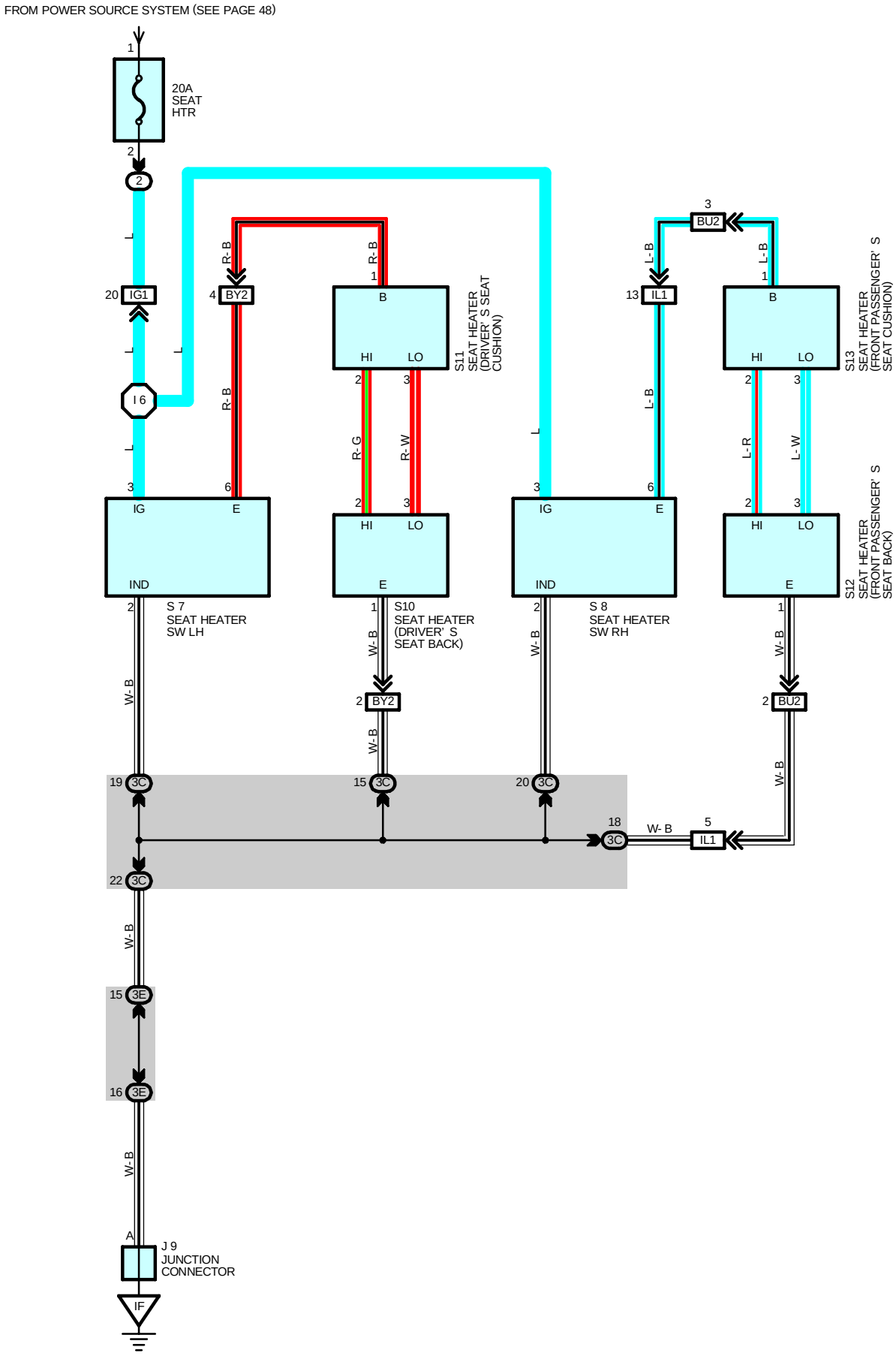
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BU2	44	Floor Wire and Seat No.2 Wire (Under the Front Passenger's Seat)
BY2	44	Cowl Wire and Seat No.1 Wire (Under the Driver's Seat)

: GROUND POINTS

Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I6	40	Cowl Wire	B10	44	Seat No.1 Wire


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
20A SEAT HTR
IG1
I 6
BY2
BU2
IL1
S11 SEAT HEATER (DRIVER' S SEAT CUSHION)
S13 SEAT HEATER (FRONT PASSENGER' S SEAT CUSHION)
S12 SEAT HEATER (FRONT PASSENGER' S SEAT BACK)
S 7 SEAT HEATER SW LH
S10 SEAT HEATER (DRIVER' S SEAT BACK)
S 8 SEAT HEATER SW RH
J 9 JUNCTION CONNECTOR
IF
IG
E
IND
HI
LO
B
3C
3E
R-B
L
L-B
R-G
R-W
L-R
L-W
W-B

SERVICE HINTS

S7, S8 SEAT HEATER SW LH, RH

3-GROUND : Approx. **12** volts with the ignition SW at **ON** or **ST** position
2-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
J9	31	S10	34	S13	34
S7	31	S11	34		
S8	31	S12	34		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BU2	44	Floor Wire and Seat No.2 Wire (Under the Front Passenger's Seat)
BY2	44	Cowl Wire and Seat No.1 Wire (Under the Driver's Seat)

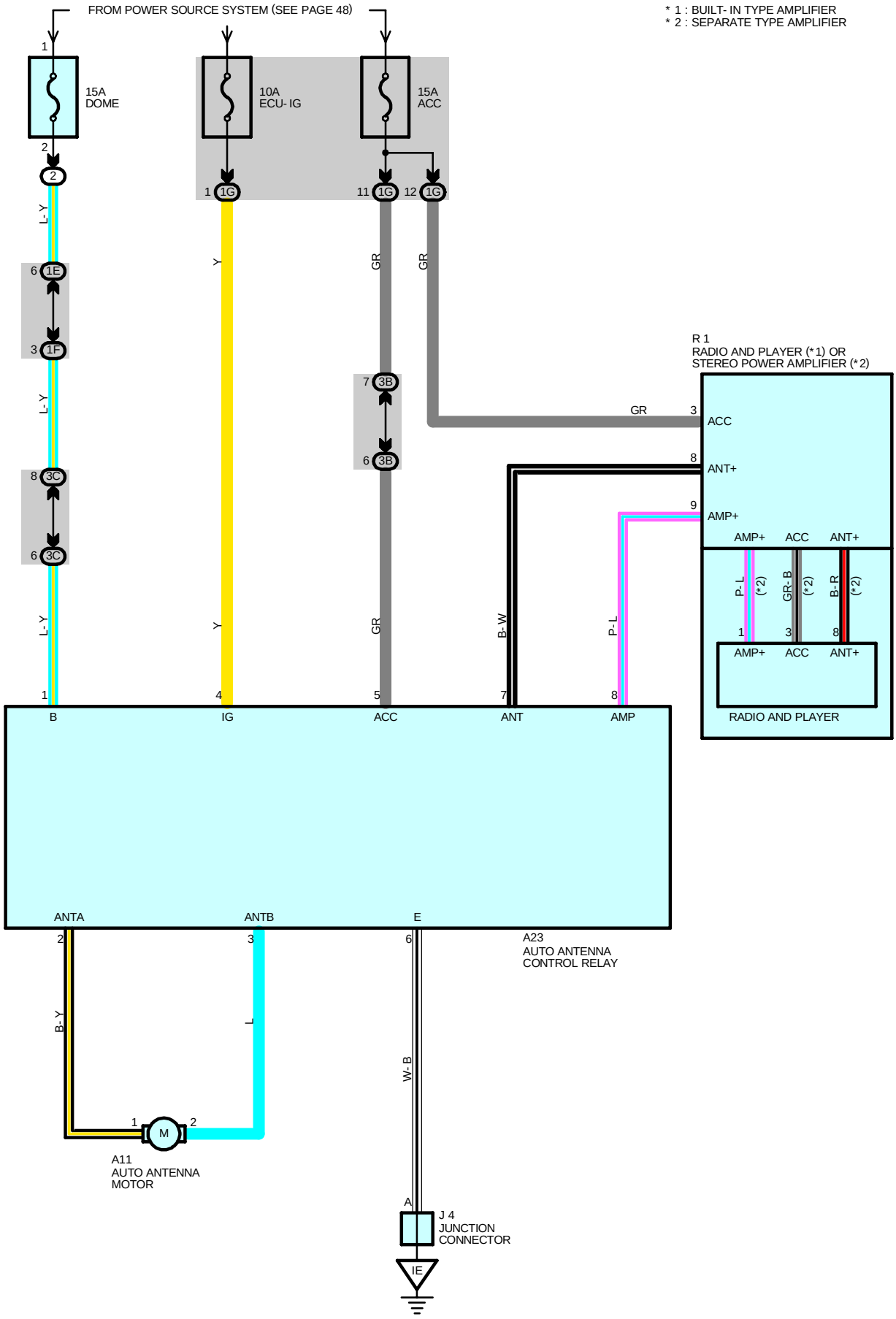
: GROUND POINTS

Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I6	40	Cowl Wire			

AUTO ANTENNA



SERVICE HINTS

A23 AUTO ANTENNA CONTROL RELAY

1-GROUND : Always approx. **12** volts
5-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position
4-GROUND : Approx. **12** volts with ignition SW at **ON** position
6-GROUND : Always continuity
7-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position and radio SW on and player SW off
8-GROUND : Approx. **12** volts with ignition SW at **ACC** or **ON** position and radio SW off and player SW on

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A11	28	J4	31		
A23	30	R1	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

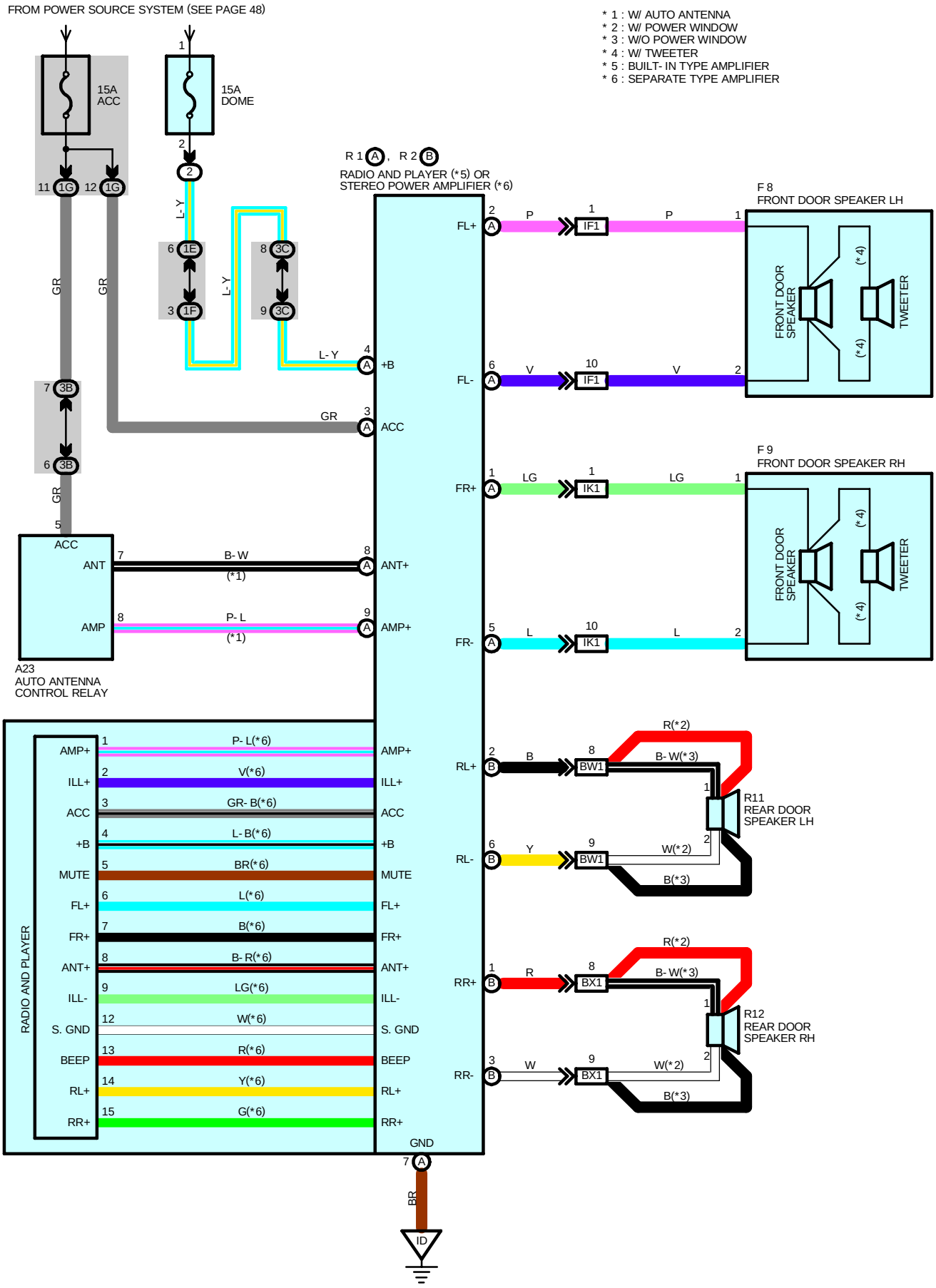
: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3C		

: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH

RADIO AND PLAYER



SERVICE HINTS

R1 (A) RADIO AND PLAYER (BUILT-IN TYPE AMPLIFIER) OR STEREO POWER AMPLIFIER (SEPARATE TYPE AMPLIFIER)

(A) 3-GROUND : Approx. **12** volts with ignition SW at **ON** or **ACC** position
(A) 4-GROUND : Always approx. **12** volts
(A) 7-GROUND : Always continuity

: PARTS LOCATION

Code	See Page	Code		See Page	Code	See Page
A23	30	R1	A	31	R12	33
F8	32	R2	B	31		
F9	32	R11		33		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3C		

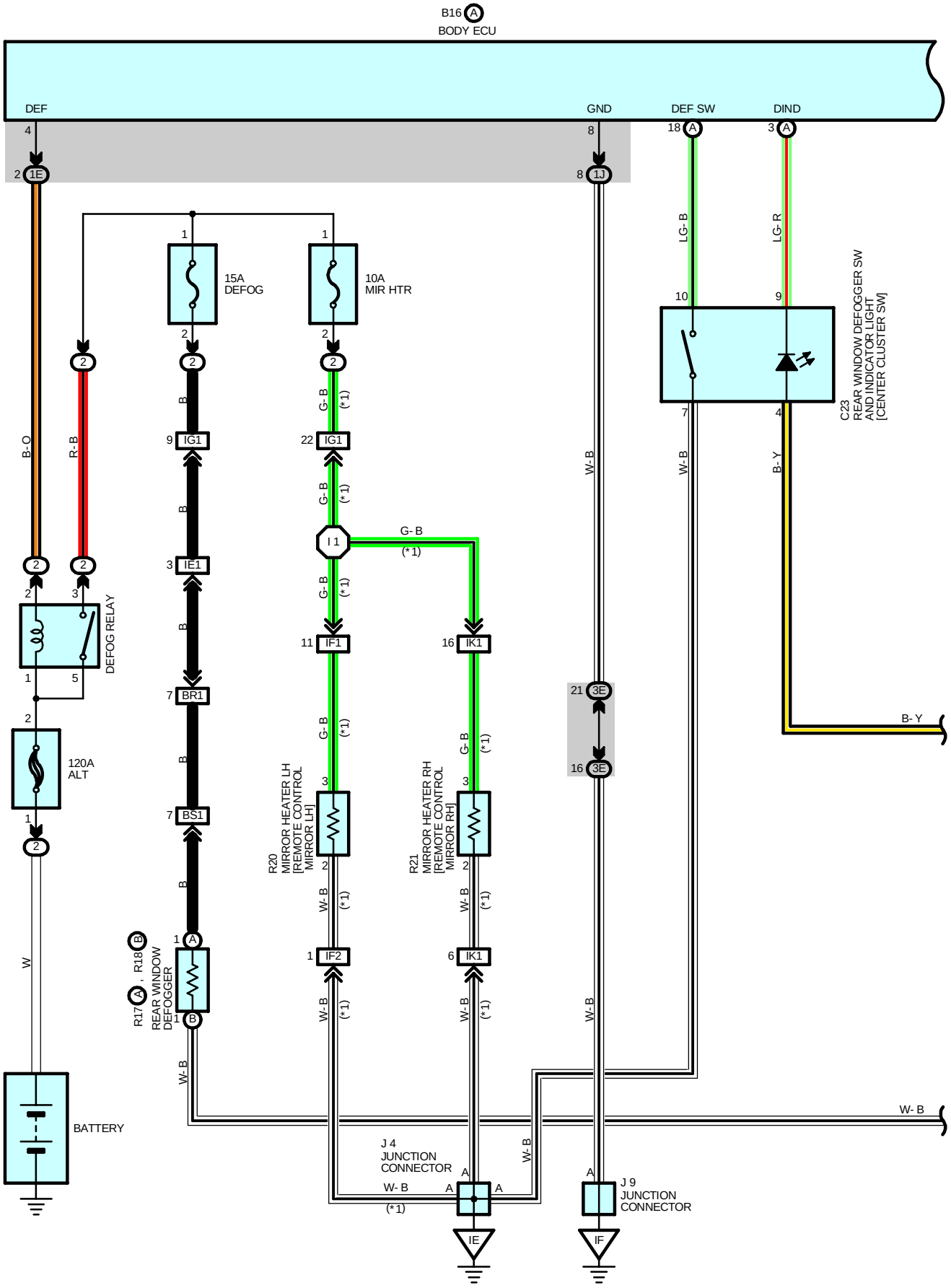
: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

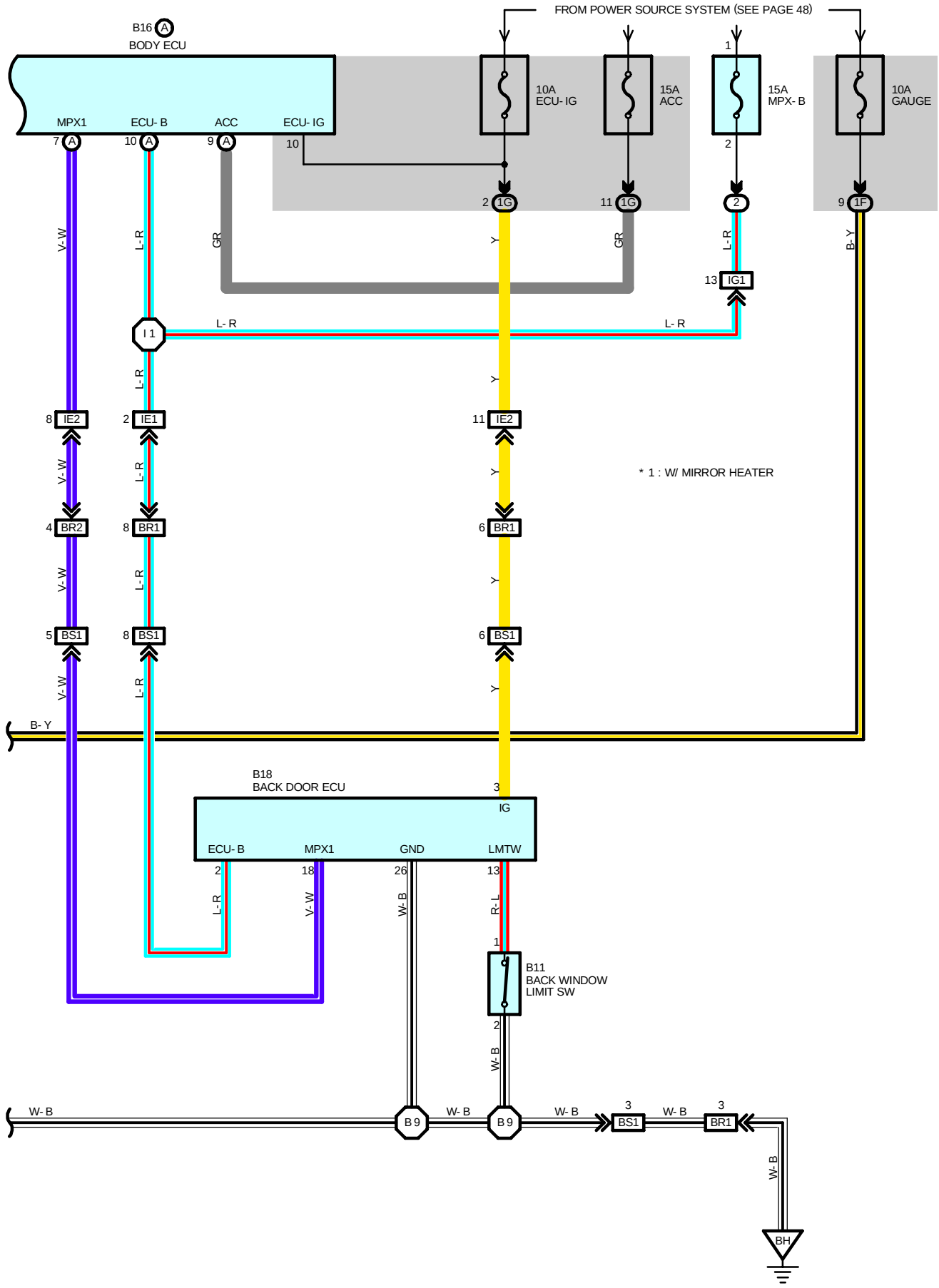
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)

: GROUND POINTS

Code	See Page	Ground Points Location
ID	38	Left Kick Panel

REAR WINDOW DEFOGGER AND MIRROR HEATER




FROM POWER SOURCE SYSTEM (SEE PAGE 48)
B16 A
BODY ECU
MPX1
ECU- B
ACC
ECU- IG
7 A
10 A
9 A
10
10A
ECU- IG
15A
ACC
1
15A
MPX- B
2
10A
GAUGE
2 1G
11 1G
2
9 1F
V- W
L- R
GR
Y
GR
L- R
B- Y
13 IG1
I 1
L- R
L- R
L- R
Y
8 IE2
2 IE1
11 IE2
V- W
L- R
Y
* 1 : W/ MIRROR HEATER
4 BR2
8 BR1
6 BR1
V- W
L- R
Y
5 BS1
8 BS1
6 BS1
V- W
L- R
Y
B- Y
B18
BACK DOOR ECU
3
IG
ECU- B
MPX1
GND
LMTW
2
18
26
13
L- R
V- W
W- B
R- L
1
B11
BACK WINDOW
LIMIT SW
2
W- B
W- B
B 9
W- B
B 9
W- B
3
BS1
W- B
3
BR1
W- B
BH

REAR WINDOW DEFOGGER AND MIRROR HEATER

SYSTEM OUTLINE

When the rear window defogger SW (Center cluster SW) is turned on while the ignition SW is on and the back window is closed, the rear window defogger and mirror heater is operated through the control of the body ECU, and the rear window defogger indicator light comes on.

SERVICE HINTS

B11 BACK WINDOW LIMIT SW

1-2 : Closed with back power window fully closed

DEFOG RELAY

3-5 : Closed with ignition SW at **ON** position, rear window fully closed (Limit SW on) and rear window defogger SW on

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
B11	32	J4	31	R20	33
B16 A	30	J9	31	R21	33
B18	32	R17 A	33		
C23	30	R18 B	33		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1G		
1J		
3E	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

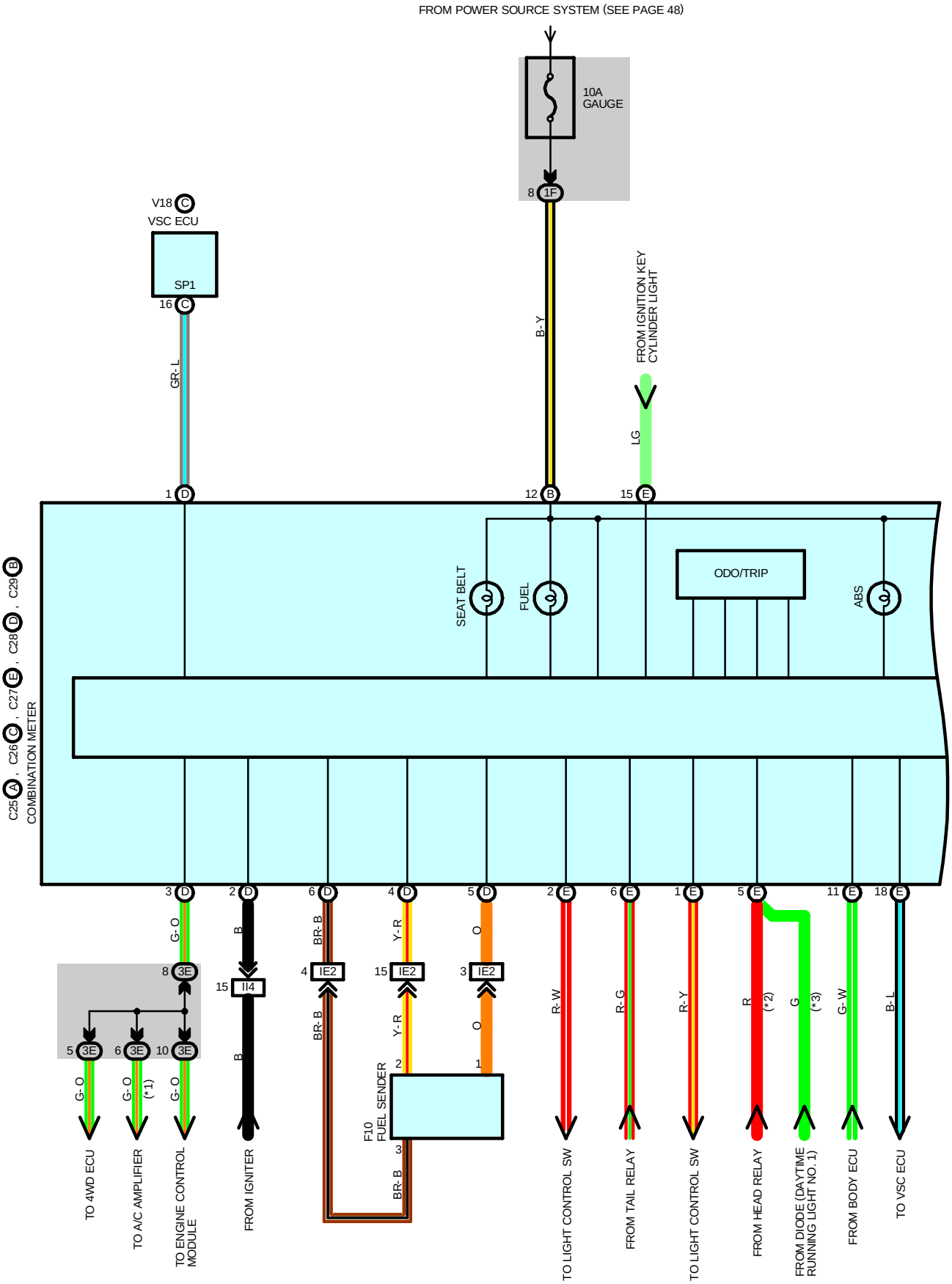
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IE2		
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2		
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BR2		
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)

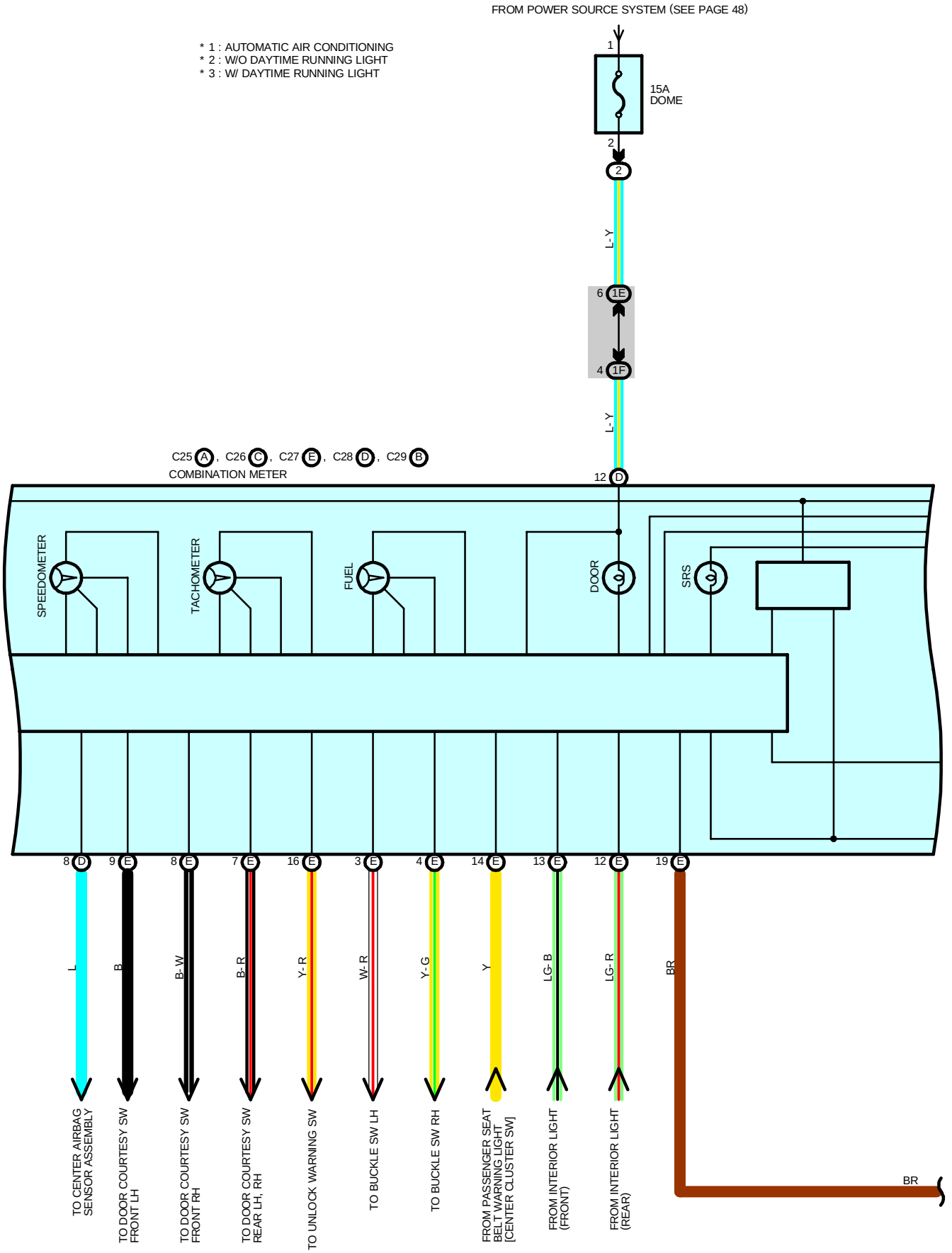
: GROUND POINTS

Code	See Page	Ground Points Location
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
BH	42	Left Quarter Panel Inner

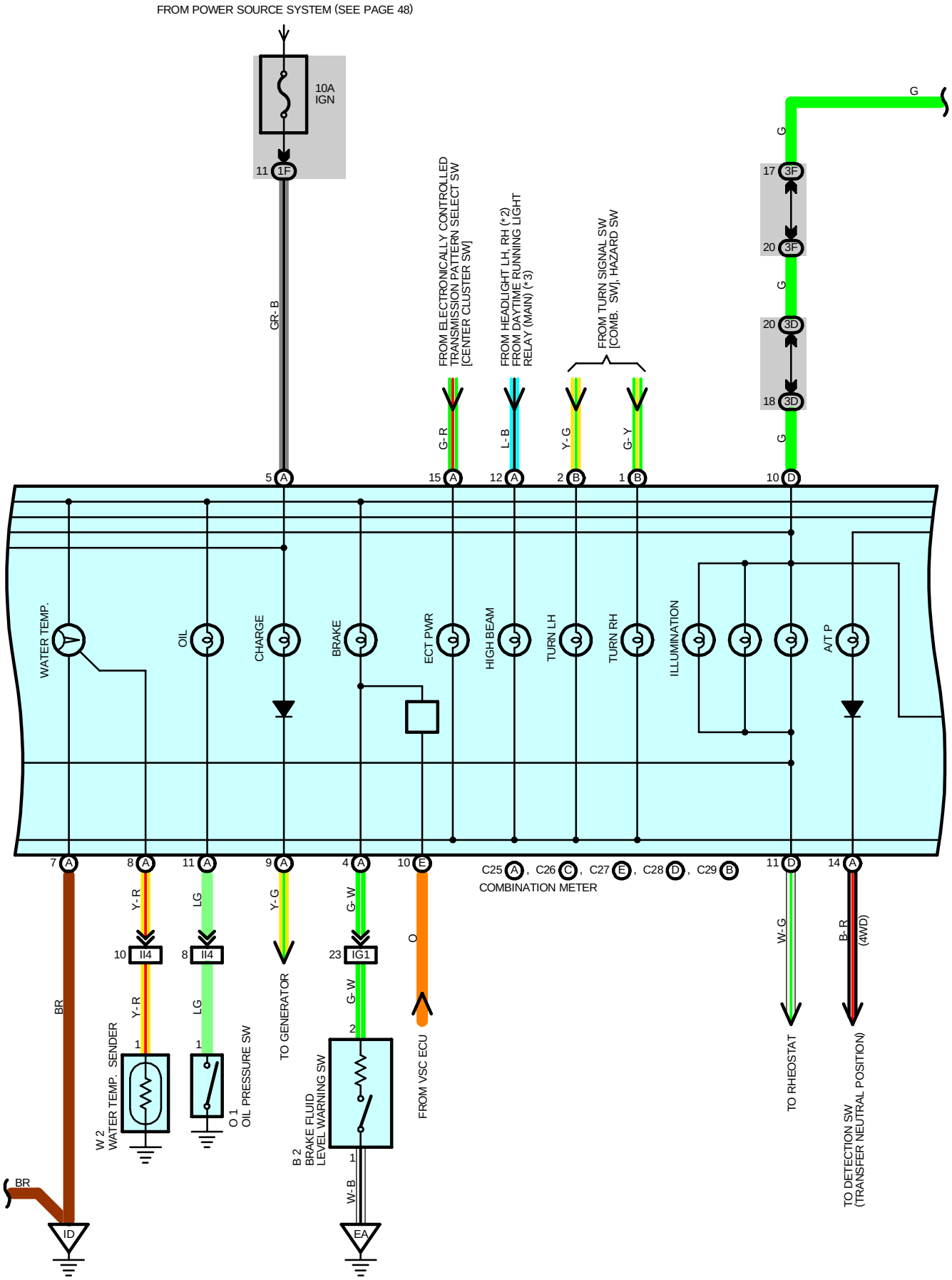
: SPLICE POINTS

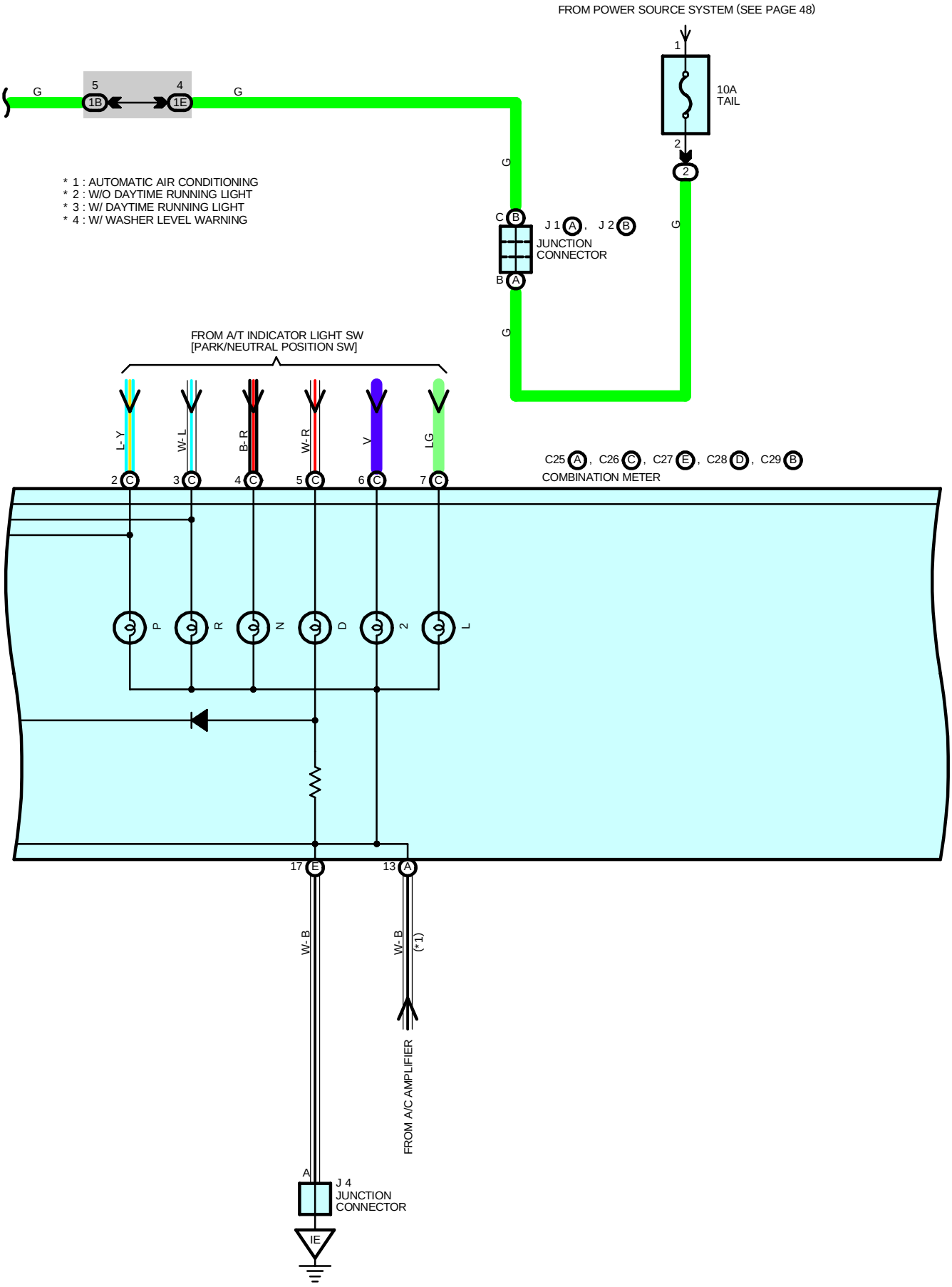
Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I1	40	Cowl Wire	B9	42	Back Door No.2 Wire

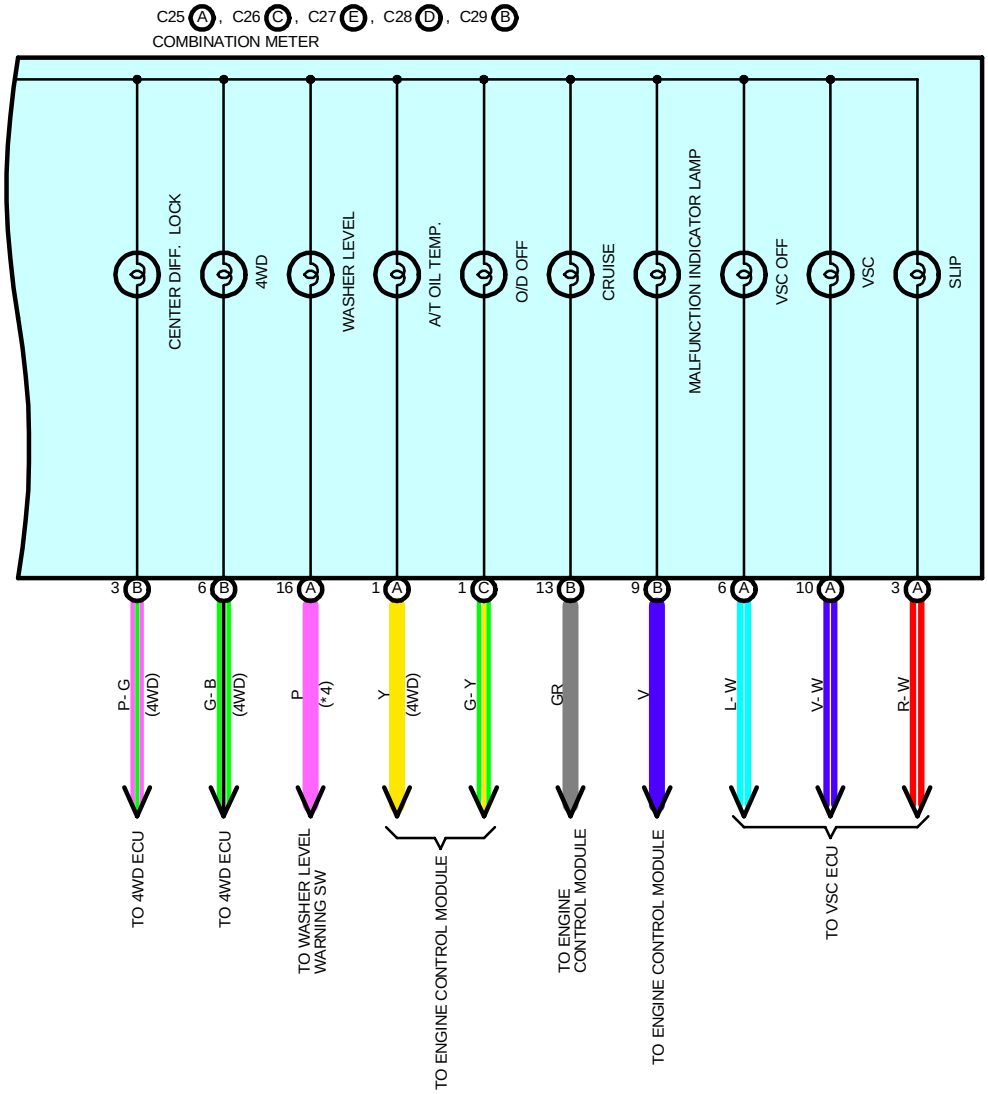

FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A GAUGE
8 1F
V18 C
VSC ECU
SP1
16 C
GR-L
B-Y
FROM IGNITION KEY CYLINDER LIGHT
LG
1 D
12 B
15 E
C25 A , C26 C , C27 E , C28 D , C29 B
COMBINATION METER
SEAT BELT
FUEL
ODO/TRIP
ABS
3 D
2 D
6 D
4 D
5 D
2 E
6 E
1 E
5 E
11 E
18 E
G-O
B
BR-B
Y-R
O
R-W
R-G
R-Y
R
G
G-W
B-L
8 3E
15 I14
4 IE2
15 IE2
3 IE2
5 3E
6 3E
10 3E
(*1)
(*2)
(*3)
F10 FUEL SENDER
2
1
3
TO 4WD ECU
TO A/C AMPLIFIER
TO ENGINE CONTROL MODULE
FROM IGNITER
TO LIGHT CONTROL SW
FROM TAIL RELAY
TO LIGHT CONTROL SW
FROM HEAD RELAY
FROM DIODE (DAYTIME RUNNING LIGHT NO. 1)
FROM BODY ECU
TO VSC ECU


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
* 1 : AUTOMATIC AIR CONDITIONING
* 2 : W/O DAYTIME RUNNING LIGHT
* 3 : W/ DAYTIME RUNNING LIGHT
1
15A
DOME
2
2
L - Y
6 1E
4 1F
L - Y
C25 A , C26 C , C27 E , C28 D , C29 B
COMBINATION METER
12 D
SPEEDOMETER
TACHOMETER
FUEL
DOOR
SRS
8 D
9 E
8 E
7 E
16 E
3 E
4 E
14 E
13 E
12 E
19 E
L
B
B - W
B - R
Y - R
W - R
Y - G
Y
LG - B
LG - R
BR
TO CENTER AIRBAG SENSOR ASSEMBLY
TO DOOR COURTESY SW FRONT LH
TO DOOR COURTESY SW FRONT RH
TO DOOR COURTESY SW REAR LH, RH
TO UNLOCK WARNING SW
TO BUCKLE SW LH
TO BUCKLE SW RH
FROM PASSENGER SEAT BELT WARNING LIGHT [CENTER CLUSTER SW]
FROM INTERIOR LIGHT (FRONT)
FROM INTERIOR LIGHT (REAR)
BR

COMBINATION METER




FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
TAIL
* 1 : AUTOMATIC AIR CONDITIONING
* 2 : W/O DAYTIME RUNNING LIGHT
* 3 : W/ DAYTIME RUNNING LIGHT
* 4 : W/ WASHER LEVEL WARNING
J 1 , J 2
JUNCTION CONNECTOR
FROM A/T INDICATOR LIGHT SW [PARK/NEUTRAL POSITION SW]
C25 , C26 , C27 , C28 , C29
COMBINATION METER
L-Y
W-L
B-R
W-R
V
LG
P
R
N
D
2
L
W-B
W-B (*1)
FROM A/C AMPLIFIER
J 4
JUNCTION CONNECTOR
IE


C25 A, C26 C, C27 E, C28 D, C29 B
COMBINATION METER
CENTER DIFF. LOCK
4WD
WASHER LEVEL
A/T OIL TEMP.
O/D OFF
CRUISE
MALFUNCTION INDICATOR LAMP
VSC OFF
VSC
SLIP
3 B
6 B
16 A
1 A
1 C
13 B
9 B
6 A
10 A
3 A
P - G (4WD)
G - B (4WD)
P (*4)
Y (4WD)
G - Y
GR
V
L - W
V - W
R - W
TO 4WD ECU
TO 4WD ECU
TO WASHER LEVEL WARNING SW
TO ENGINE CONTROL MODULE
TO ENGINE CONTROL MODULE
TO ENGINE CONTROL MODULE
TO VSC ECU

SERVICE HINTS

B2 BRAKE FLUID LEVEL WARNING SW

1-2 : Closed with float down

C25 (A), C27 (E), C28 (D), C29 (B) COMBINATION METER

(B)12-GROUND : Approx. **12** volts with ignition SW at **ON** position
(A) 5-GROUND : Approx. **12** volts with ignition SW at **ON** position
(A) 7, (E) 17, (E) 19-GROUND : Always continuity
(D)12-GROUND : Always approx. **12** volts

: PARTS LOCATION

Code		See Page	Code		See Page	Code	See Page
B2		28	C29	B	30	O1	29
C25	A	30	F10		32	V18	31
C26	C	30	J1	A	29	W2	29
C27	E	30	J2	B	29		
C28	D	30	J4		31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

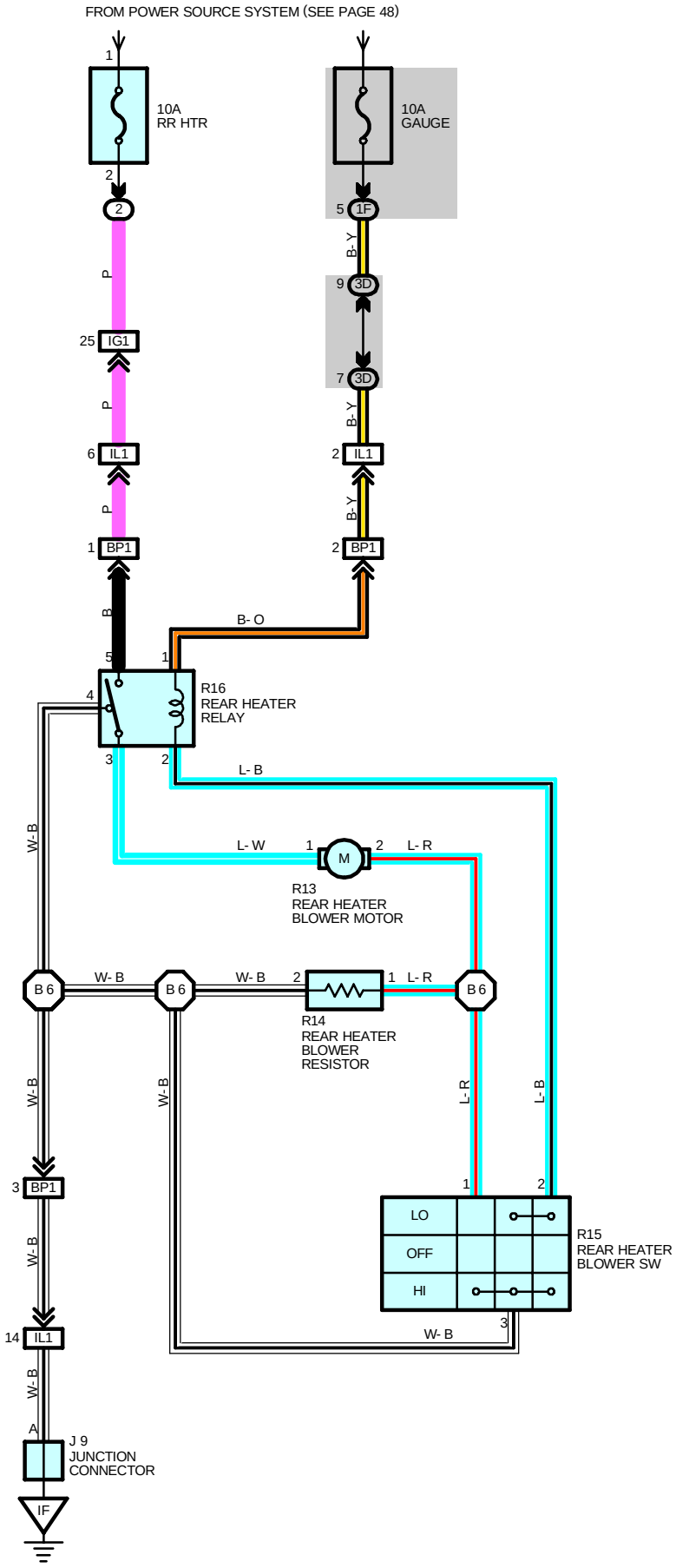
Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3D	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		
3F		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IE2	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II4	40	Engine Wire and Cowl Wire (On the Glove Box)

: GROUND POINTS

Code	See Page	Ground Points Location
EA	36	Front Right Fender
ID	38	Left Kick Panel
IE	38	Cowl Side Panel LH


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
RR HTR
10A
GAUGE
1F
3D
IG1
IL1
BP1
B- Y
B- O
L- B
L- W
L- R
W- B
R16
REAR HEATER
RELAY
R13
REAR HEATER
BLOWER MOTOR
R14
REAR HEATER
BLOWER
RESISTOR
R15
REAR HEATER
BLOWER SW
LO
OFF
HI
B 6
M
J 9
JUNCTION
CONNECTOR
IF

SERVICE HINTS

R15 REAR HEATER BLOWER SW

2-3 : Closed with the ignition SW at on and rear heater blower SW at **LO** position

1, 2-3 : Closed with the ignition SW at on and rear heater blower SW at **HI** position

R16 REAR HEATER RELAY

5-3 : Closed with the ignition SW at **ON** position and rear heater blower SW at **HI** or **LO** position

: PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
J9	31	R14	33	R16	33
R13	33	R15	33		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3D	26	Cowl Wire and Center J/B (Near the Steering Column Tube)

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

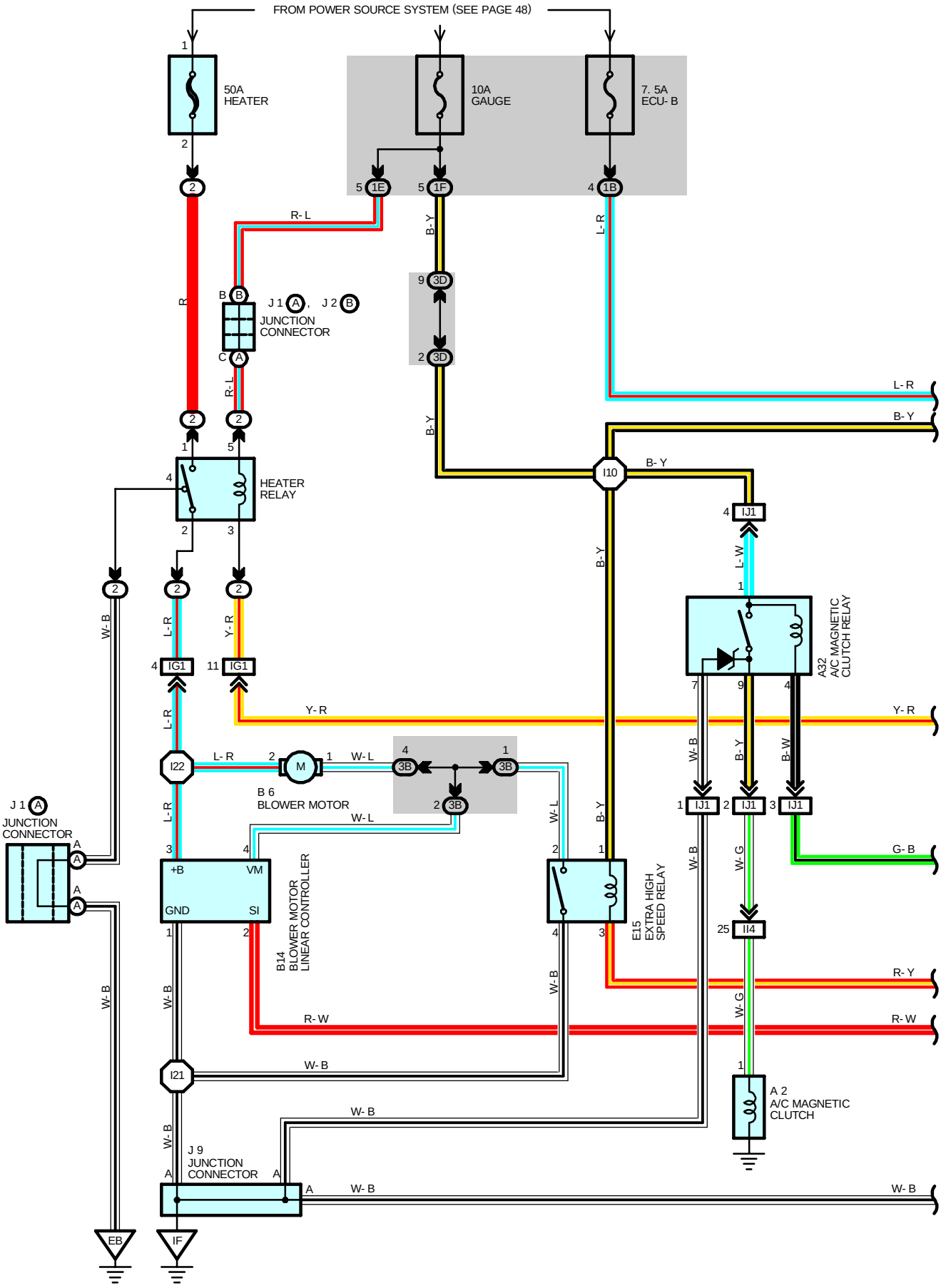
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BP1	42	Floor Wire and Rear Heater Sub Wire (Under the Front Passenger's Seat)

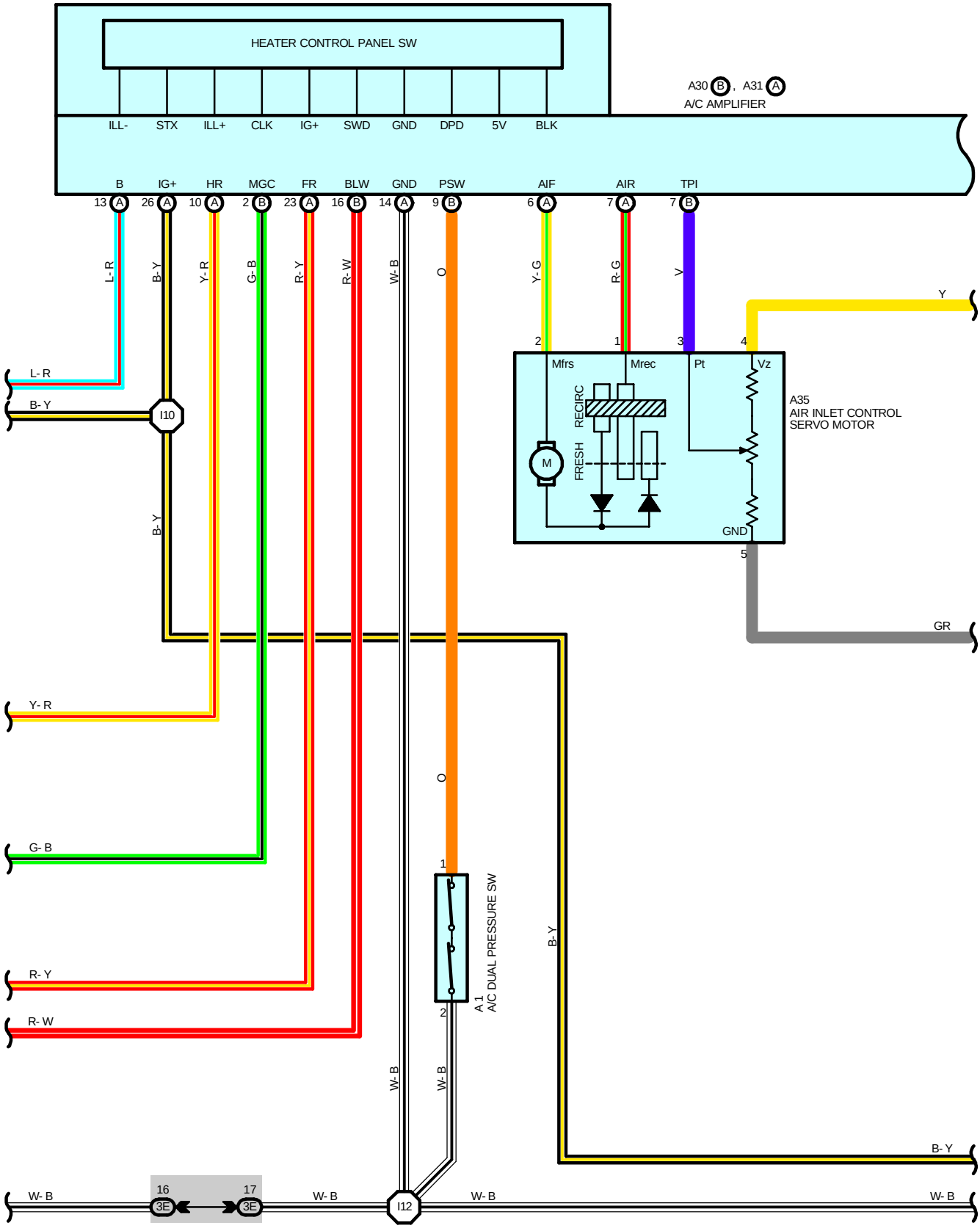
: GROUND POINTS

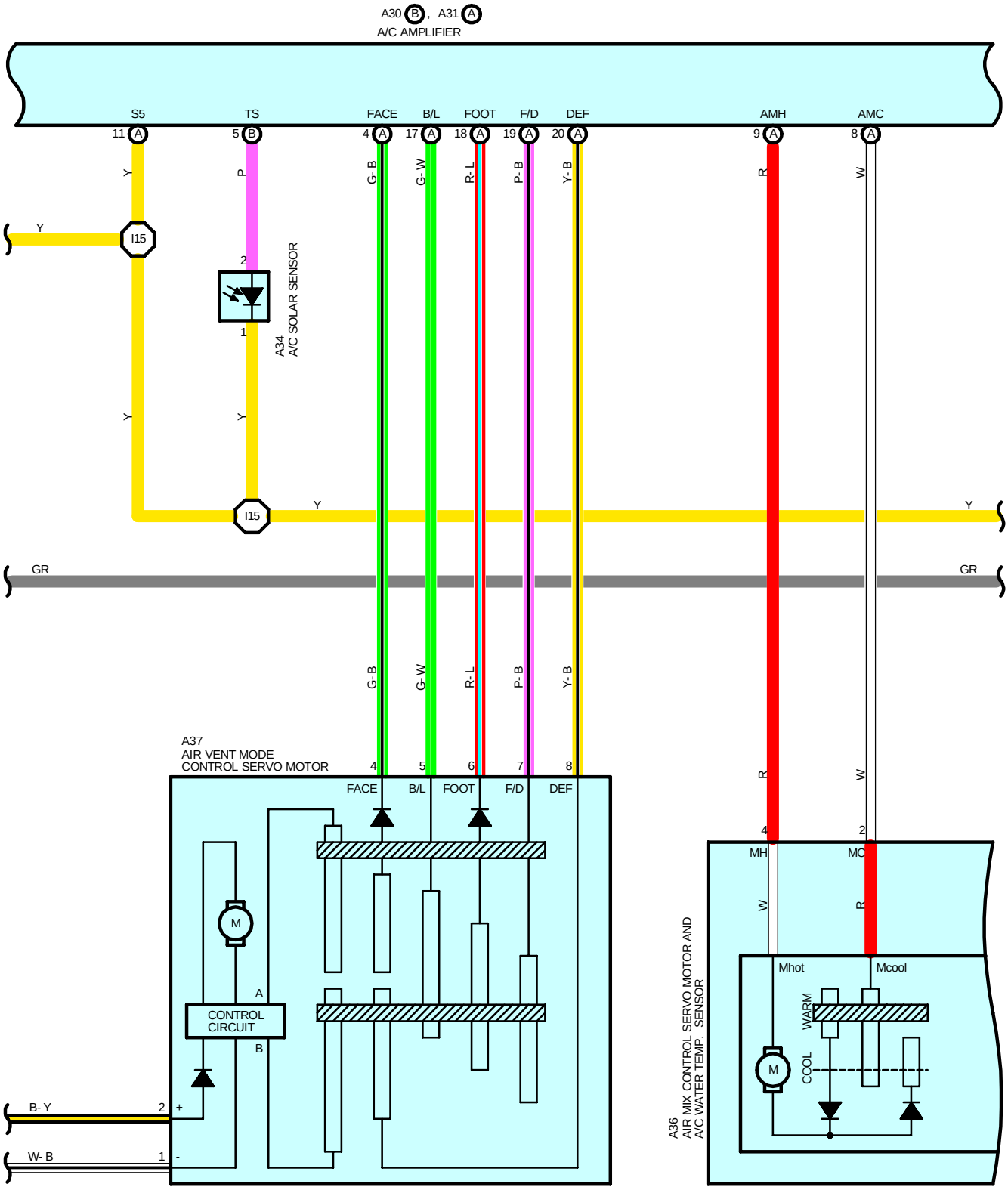
Code	See Page	Ground Points Location
IF	38	Cowl Side Panel RH

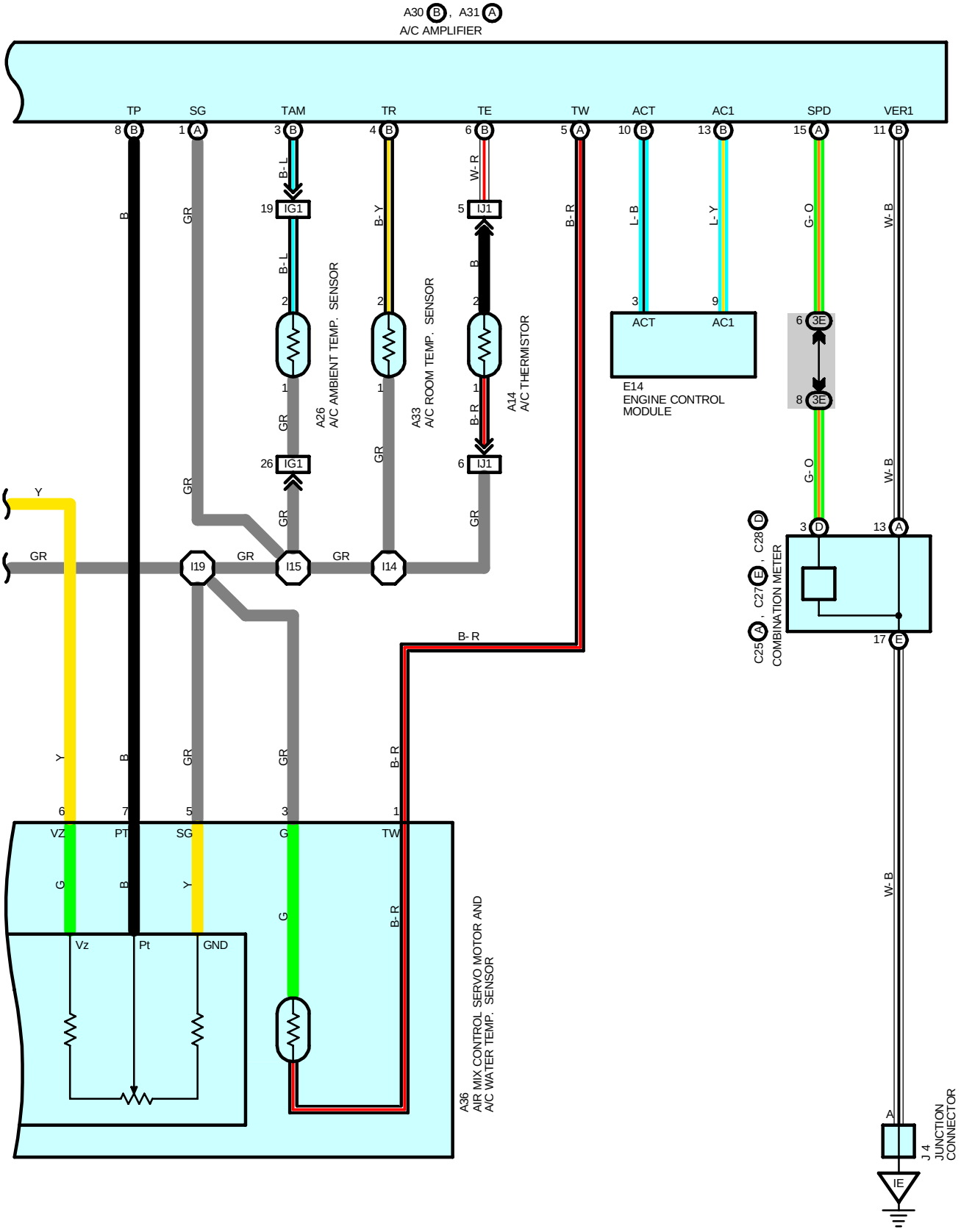
: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
B6	42	Rear Heater Sub Wire			


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
50A HEATER
10A GAUGE
7. 5A ECU- B
JUNCTION CONNECTOR
J 1 A, J 2 B
HEATER RELAY
R- L
B- Y
L- R
W- B
Y- R
L- W
B- W
G- B
W- G
R- Y
R- W
I10
IJ1
IG1
I22
I21
M
B 6 BLOWER MOTOR
W- L
B14 BLOWER MOTOR LINEAR CONTROLLER
+B
VM
GND
SI
E15 EXTRA HIGH SPEED RELAY
A32 A/C MAGNETIC CLUTCH RELAY
A 2 A/C MAGNETIC CLUTCH
J 9 JUNCTION CONNECTOR
EB
IF


HEATER CONTROL PANEL SW
ILL-
STX
ILL+
CLK
IG+
SWD
GND
DPD
5V
BLK
A30 B , A31 A
A/C AMPLIFIER
B
IG+
HR
MGC
FR
BLW
GND
PSW
AIF
AIR
TPI
13 A
26 A
10 A
2 B
23 A
16 B
14 A
9 B
6 A
7 A
7 B
L- R
B- Y
Y- R
G- B
R- Y
R- W
W- B
O
Y- G
R- G
V
Y
2
1
3
4
Mfrs
Mrec
Pt
Vz
RECIRC
FRESH
M
GND
5
A35
AIR INLET CONTROL
SERVO MOTOR
GR
L- R
B- Y
I10
B- Y
Y- R
G- B
R- Y
R- W
O
1
2
A 1
A/C DUAL PRESSURE SW
B- Y
W- B
W- B
B- Y
16
3E
17
3E
W- B
W- B
I12
W- B
W- B


A30 B , A31 A
A/C AMPLIFIER
S5
TS
FACE
B/L
FOOT
F/D
DEF
AMH
AMC
11 A
5 B
4 A
17 A
18 A
19 A
20 A
9 A
8 A
Y
P
G- B
G- W
R- L
P- B
Y- B
R
W
I15
2
1
A34
A/C SOLAR SENSOR
GR
A37
AIR VENT MODE
CONTROL SERVO MOTOR
4
5
6
7
8
M
A
CONTROL
CIRCUIT
B
B- Y
W- B
2 +
1 -
MH
MC
4
2
Mhot
Mcool
WARM
COOL
A36
AIR MIX CONTROL SERVO MOTOR AND
A/C WATER TEMP. SENSOR


A30 B , A31 A
A/C AMPLIFIER
TP
SG
TAM
TR
TE
TW
ACT
AC1
SPD
VER1
A26
A/C AMBIENT TEMP. SENSOR
A33
A/C ROOM TEMP. SENSOR
A14
A/C THERMISTOR
E14
ENGINE CONTROL MODULE
C25 A , C27 E , C28 D
COMBINATION METER
A36
AIR MIX CONTROL SERVO MOTOR AND A/C WATER TEMP. SENSOR
Vz
Pt
GND
J 4
JUNCTION CONNECTOR
IE
I19
I15
I14
IG1
IJ1
3E

SYSTEM OUTLINE

1. HEATER BLOWER MOTOR OPERATION

Current is applied at all times through HEATER fuse to TERMINAL 1 of the HEATER relay. When the ignition SW is turned on, current flows through the GAUGE fuse to TERMINAL 5 of the HEATER relay to TERMINAL 3 to TERMINAL HR of the A/C amplifier. At the same time, current also flows from GAUGE fuse to TERMINAL IG+ of the A/C amplifier.

* Low speed operation
  When the blower SW (Heater control panel SW) is pushed to LOW SPEED position, the current to TERMINAL HR of the A/C amplifier flows to TERMINAL GND of the A/C amplifier to GROUND and turns the HEATER relay on. As a result, the current to TERMINAL 1 of the HEATER relay flows to TERMINAL 2 of the relay to TERMINAL 2 of the blower motor to TERMINAL 1 to TERMINAL 2 of the blower resistor (Low) to TERMINAL 1 to GROUND and causes the blower motor to rotate at low speed.

* High speed operation
  When the blower SW (Heater control panel SW) is pushed to HIGH SPEED position, the current to TERMINAL HR of the A/C amplifier flows to TERMINAL GND of the A/C amplifier to GROUND and turns the HEATER relay on. As a result, the current to TERMINAL 1 of the HEATER relay flows to TERMINAL 2 to TERMINAL 2 of the blower motor to TERMINAL 1 to TERMINAL 4 of the blower motor linear controller to TERMINAL 2 to TERMINAL BLW of the A/C amplifier (Which is activated when the blower SW is pushed to high speed position) to TERMINAL GND to GROUND without passing through the blower resistor (Low), causing the blower motor to rotate at high speed.

2. AIR INLET CONTROL SERVO MOTOR OPERATION

(Switching from FRESH to RECIRC)
With the ignition SW turned on, the current flows from GAUGE fuse to TERMINAL IG+ of the A/C amplifier to TERMINAL AIR to TERMINAL 1 of the air inlet control servo motor to TERMINAL 2 to TERMINAL AIF of the A/C amplifier to TERMINAL GND to GROUND, the motor rotates and the damper moves to the RECIRC side. when the damper operates with the heater control panel SW at RECIRC position, the damper position signal is input from TERMINAL 3 of the servo motor to TERMINAL TPI of the A/C amplifier. As a result, current to the servo motor circuit is cut off by the A/C amplifier, so the damper stops at that position.
(Switching from RECIRC to FRESH)
With the ignition SW turned on, when the heater control panel SW is switched to the FRESH side, the current flows from TERMINAL IG+ of the A/C amplifier to TERMINAL AIF to TERMINAL 2 of the air inlet control servo motor to TERMINAL 1 to TERMINAL AIR of the A/C amplifier to TERMINAL GND to GROUND, The motor rotates and the damper stops at that position.

3. AIR VENT MODE CONTROL SERVO MOTOR OPERATION

When the ignition SW turned on, the current flows from GAUGE fuse to TERMINAL IG+ of the A/C amplifier.
(Switching from DEF to FACE)
The current flows from TERMINAL FACE of the A/C amplifier to TERMINAL 4 of the air vent mode control servo motor to TERMINAL 8 to TERMINAL DEF of the A/C amplifier to TERMINAL GND to GROUND. The motor rotates and the damper moves to the FACE side. When the damper operates with the heater control panel SW at FACE position, the damper position signal is input from TERMINAL 8 of the servo motor to the TERMINAL DEF of the A/C amplifier. As a result, current to the servo motor circuit is cut off by the A/C amplifier, so the damper stops at that position.
(Switching from FACE to DEF)
The current flows from TERMINAL DEF of the A/C amplifier to TERMINAL 8 of the air vent control servo motor to TERMINAL 4 to TERMINAL FACE of the A/C amplifier to TERMINAL GND to GROUND, the motor rotates and the damper stops at that position.

4. AIR MIX CONTROL SERVO MOTOR OPERATION

When the temperature control SW (Heater control panel SW) is turned to the ”COOL” side the current flows from TERMINAL AMC of the A/C amplifier to TERMINAL 2 of the air mix control servo motor to motor to TERMINAL 4 to TERMINAL AMH of the A/C amplifier to GROUND and the motor rotates. The damper opening angle at this time is input from TERMINAL 7 of the servo motor to TERMINAL TP of the A/C amplifier, this is used to determine the DAMPER STOP position and maintain the set temperature.
When the temperature control SW (Heater control panel SW) is turned to the ”HOT” side, the current flows from servo motor to TERMINAL AMH of the A/C amplifier to TERMINAL 4 of the air mix control servo motor to motor to TERMINAL 2 to TERMINAL AMC of the A/C amplifier, rotating the motor in reverse and switching the damper from ”COOL” to ”HOT” side.

5. AIR CONDITIONING OPERATION

The A/C amplifier receives various signals, I.E., out side air temperature signal from the A/C ambient temp. sensor, coolant temperature from water temp. sensor, etc.
When the engine is started and the A/C SW (Heater control panel SW) is on, a signal is input to the A/C amplifier.
As a result, the ground circuit in A/C amplifier is closed and current flows from GAUGE fuse to TERMINAL 1 of the A/C magnetic clutch relay to TERMINAL 4 to TERMINAL MGC of the A/C amplifier to TERMINAL GND to GROUND, turning the A/C magnetic clutch relay on, so that the magnetic clutch is on and the A/C compressor operates.
At the same time, the engine control module. Detects the magnetic clutch is on and the A/C compressor operates.
If the A/C amplifier detects the following conditions, it stops the air conditioning:

* Evaporator outlet air is too low.
* The refrigerant pressure is abnormally high or abnormally low.
* The engine speed is too low.
* Rapid acceleration occurs.

SERVICE HINTS

A1 A/C DUAL PRESSURE SW

1-2 : Open above approx. **2.0** kgf/cm^2 (**28** psi, **196** kpa) or **32** kgf/cm^2 (**455** psi, **3138** kpa)

A2 A/C MAGNETIC CLUTCH

1-GROUND : Approx. **3.7** Ω

A30 (B), A31 (A) A/C AMPLIFIER

B-GROUND : Always approx. **12** volts
IG+ -GROUND : Approx. **12** volts with the ignition SW at **ON** position
HR -GROUND : Approx. **12** volts with the ignition SW at **ON** position and do not turn the blower motor
Below **1** volts with the ignition SW at **ON** position and turn the blower motor
PSW-GROUND : Below **1** volts with the ignition SW at **ON** position
AC1-GROUND : Below **1** volts at start the engine, operate the compressor
+ OR MORE volts at start the engine, do not operate the compressor
BLW-GROUND : Below **1.5** volts with the ignition SW on and turn the blower motor
S5-SG : **4**- **6** volts with the ignition SW at **ON** position
SG-GROUND : Always continuity
AMH-AMC : **1.3**- **1.9** volts with the ignition SW off
AIF-GROUND : Approx. **12** volts with the FRESH SW on
AIR-GROUND : Approx. **12** volts with the RECIRC SW on
FACE-GROUND : Approx. **12** volts with the FACE SW on
DEF-GROUND : Approx. **12** volts with the DEF SW on
GND-GROUND : Always continuity

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code	See Page
A1	28	A34	30	C28 D	30
A2	28	A35	30	E14	31
A14	30	A36	30	E15	31
A26	28	A37	30	J1 A	29
A30 B	30	B6	30	J2 B	29
A31 A	30	B14	30	J4	31
A32	30	C25 A	30	J9	31
A33	30	C27 E	30		

▭ : RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3D		
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

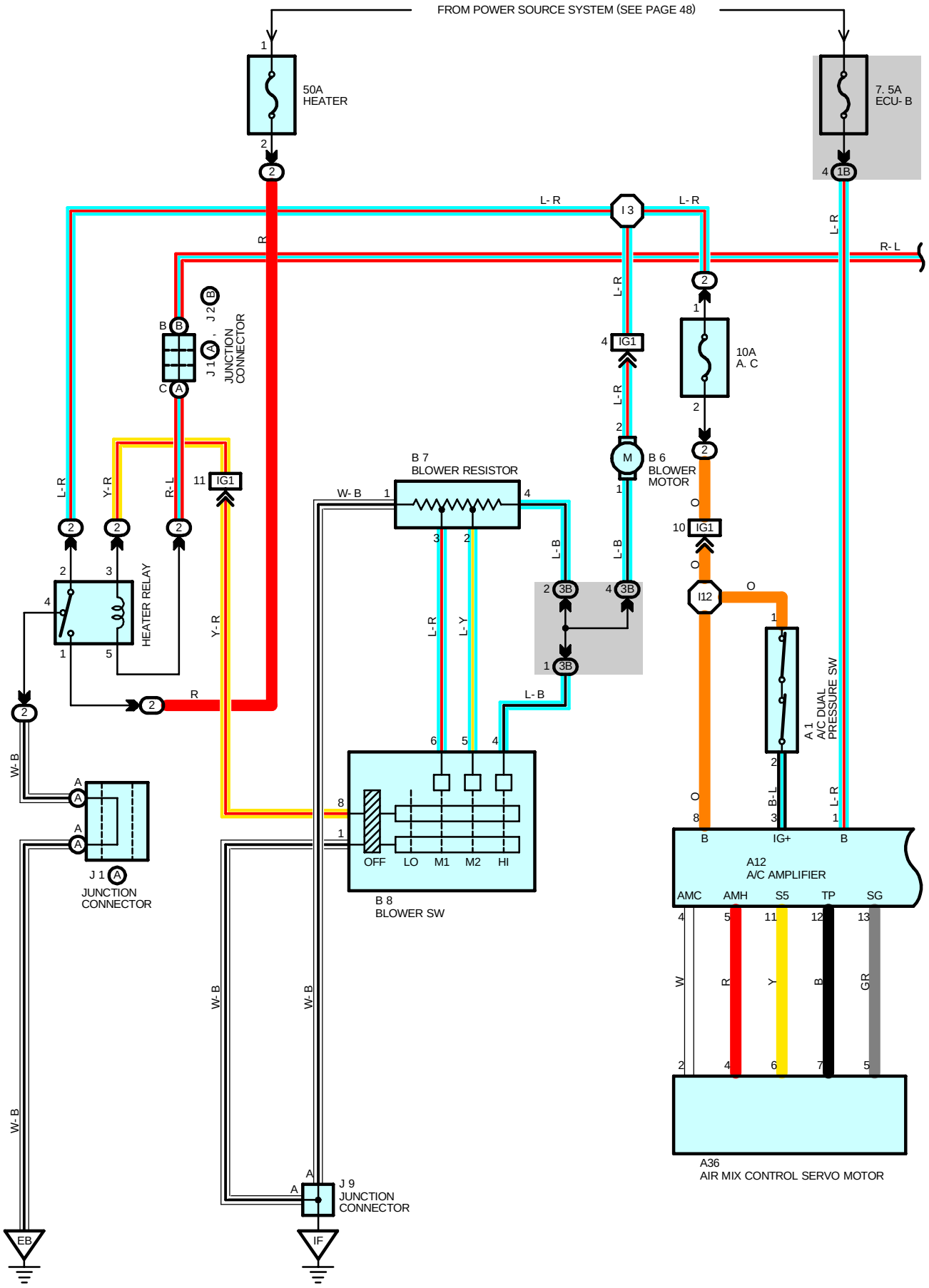
Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II4	40	Engine Wire and Cowl Wire (On the Glove Box)
IJ1	40	Cowl Wire and A/C Sub Wire (Near the A/C Unit)

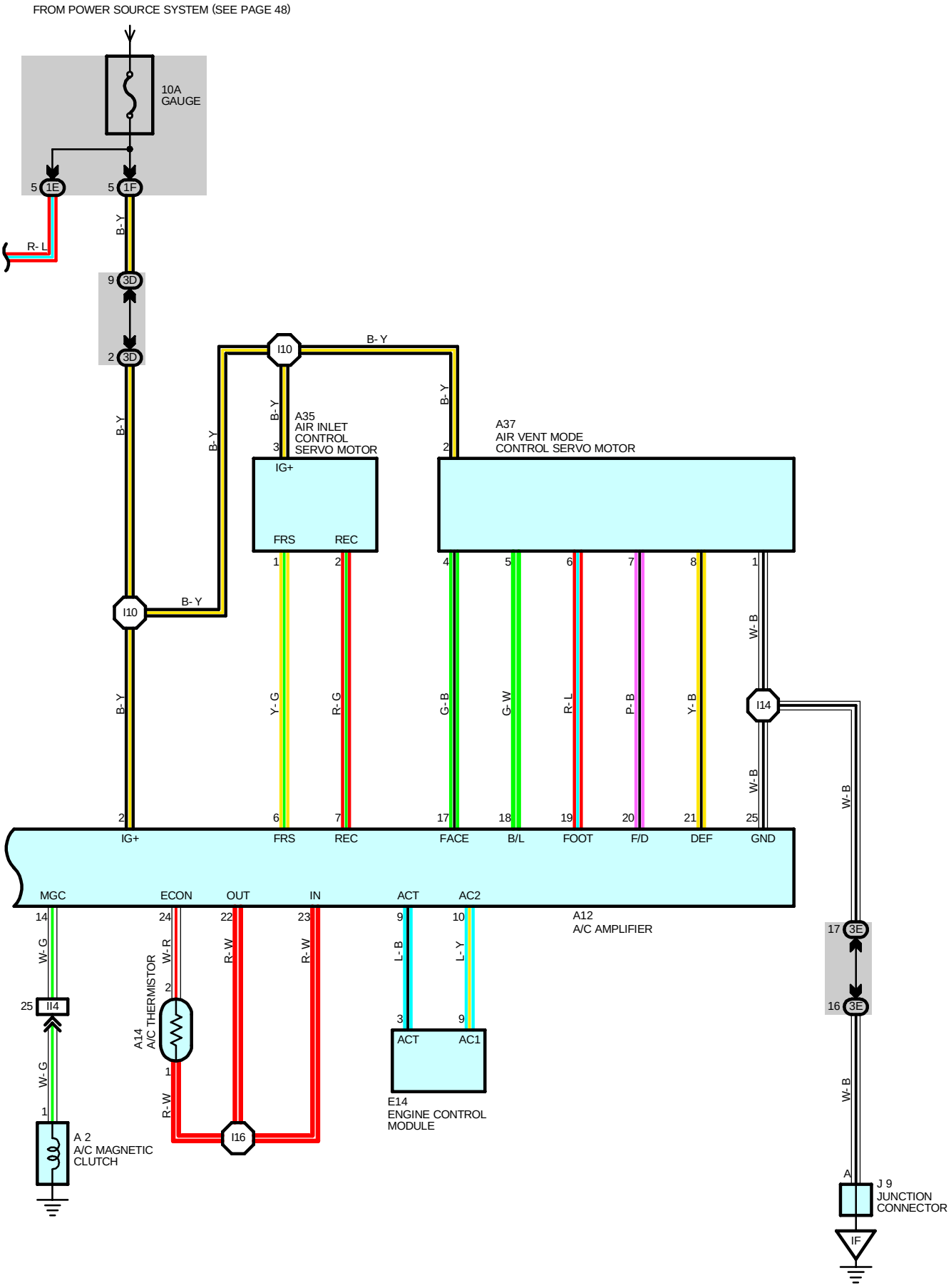
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH

: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I10	40	Cowl Wire	I19	40	Cowl Wire
I12			I21		
I14			I22		
I15					


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
50A HEATER
7. 5A ECU- B
10A A. C
I 3
IG1
J 2
J 1
JUNCTION CONNECTOR
HEATER RELAY
B 7 BLOWER RESISTOR
B 6 BLOWER MOTOR
B 8 BLOWER SW
OFF
LO
M1
M2
HI
A 1 A/C DUAL PRESSURE SW
I12
A12 A/C AMPLIFIER
AMC
AMH
S5
TP
SG
IG+
A36 AIR MIX CONTROL SERVO MOTOR
J 9 JUNCTION CONNECTOR
EB
IF
L- R
Y- R
R- L
W- B
L- B
L- Y
B- L
R
O
W
R
Y
B
GR


FROM POWER SOURCE SYSTEM (SEE PAGE 48)
10A
GAUGE
5 1E
5 1F
R- L
B- Y
9 3D
2 3D
I10
B- Y
A35
AIR INLET
CONTROL
SERVO MOTOR
3
IG+
FRS
REC
1
2
A37
AIR VENT MODE
CONTROL SERVO MOTOR
2
4
5
6
7
8
1
Y- G
R- G
G- B
G- W
R- L
P- B
Y- B
W- B
I14
W-B
25
2
6
7
17
18
19
20
21
IG+
FRS
REC
FACE
B/L
FOOT
F/D
DEF
GND
MGC
ECON
OUT
IN
ACT
AC2
A12
A/C AMPLIFIER
14
24
22
23
9
10
W- G
W-R
R- W
R- W
L- B
L- Y
17 3E
16 3E
25 II4
A14
A/C THERMISTOR
2
1
3
9
ACT
AC1
E14
ENGINE CONTROL
MODULE
I16
A 2
A/C MAGNETIC
CLUTCH
A
J 9
JUNCTION
CONNECTOR
IF

SYSTEM OUTLINE

1. BLOWER MOTOR OPERATION

With the ignition SW on, current from the GAUGE fuse flows to TERMINAL 5 of the HEATER relay to TERMINAL 3 to TERMINAL 1 of the blower SW.

∗ Low speed operation

When the blower SW is moved to LO position, the current flows to TERMINAL 1 of the blower SW to TERMINAL 8 to GROUND, causing the HEATER relay to come on. Then the current from HEATER fuse to TERMINAL 1 of the HEATER relay to TERMINAL 2 to TERMINAL 2 of the blower motor to TERMINAL 1 to TERMINAL 4 of the blower resistor to TERMINAL 1 to GROUND, causing the blower motor to rotate. At this time, the current flows against the full resistance of the blower resistor, so the motor turns slowly at low speed.

∗ Medium speed operation (Operation at speed M1, M2)

When the blower SW is moved to the M1 position, the current flows to TERMINAL 1 of the blower SW to TERMINAL 8 to GROUND, turning the HEATER relay to on. Then, the same as low speed operation, the current passing through the TERMINAL 2 of the HEATER relay flows to the TERMINAL 2 of the blower motor to TERMINAL 1 to TERMINAL 4 of the blower resistor to TERMINAL 3 to TERMINAL 3 of the blower SW to TERMINAL 8 to GROUND. At this time, the blower resistance of the blower resistor is less than at low speed, so the blower motor rotates at medium low speed.

When the blower SW is moved to M2 position, the current flowing through the blower motor flows from TERMINAL 4 of the blower resistor to TERMINAL 2 to TERMINAL 2 of the blower SW to TERMINAL 8 to GROUND. At this time, blower resistance of the blower resistor is less than at M1 position, so the blower motor rotates at medium high speed.

∗ High speed operation

When the blower SW is moved to HI position, the current flows to TERMINAL 1 of the blower SW to TERMINAL 8 to GROUND, turning the HEATER relay to on. Then, the same as medium speed operation, the current passing through the blower motor flows from TERMINAL 6 of the blower SW to TERMINAL 8 to GROUND, causing the blower motor to rotates at high speed.

2. AIR CONDITIONING OPERATION

When the blower SW is set to on, current from the HEATER fuse flows through the A.C fuse to TERMINAL 1 of the A/C dual pressure SW to TERMINAL 2 to TERMINAL 3 of the A/C amplifier. The engine speed signal from engine control Module and the evaporator temp. signal from the A/C thermistor are all supplied to the A/C amplifier. When the A/C SW is turned on, the A/C SW on signal is sent to activate the A/C amplifier. Current flows from the A/C amplifier to the magnetic clutch, turning the compressor on. The A/C operation is shut off when a signal indicating low evaporator temp., or abnormally high or low refrigerant pressure, is supplied while the engine high speed signal exists. When one of these signals is received, the amplifier shuts off the A/C operation.

SERVICE HINTS

A1 A/C DUAL PRESSURE SW

1-2 : Open with refrigerant pressure at less than approx. **2.0** kgf/cm^2 (**28.4** psi, **196** kpa) or more than approx. **32** kgf/cm^2 (**455** psi, **3138** kpa)

HEATER RELAY

1-2 : Closed with ignition SW at **ON** position and blower SW on
1-GROUND : Always approx. **12** volts
5-GROUND : Approx. **12** volts with ignition SW at **ON** position
4-GROUND : Always continuity

B8 BLOWER SW

8-1 : Closed with blower SW at **LO** position
8-6, 1 : Closed with blower SW at **M1** position
8-5, 1 : Closed with blower SW at **M2** position
8-4, 1 : Closed with blower SW at **HI** position

A2 A/C MAGNETIC CLUTCH

1-GROUND : Approx. **3.7** Ω

○ : PARTS LOCATION

Code	See Page	Code	See Page	Code		See Page
A1	28	A36	30	E14		31
A2	28	A37	30	J1	A	29
A12	30	B6	30	J2	B	29
A14	30	B7	30	J9		31
A35	30	B8	30			

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1B	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
1E	24	Engine Room Main Wire and Driver Side J/B (Lower Finish Panel)
1F	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3B	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3D		
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
II4	40	Engine Wire and Cowl Wire (On the Glove Box)

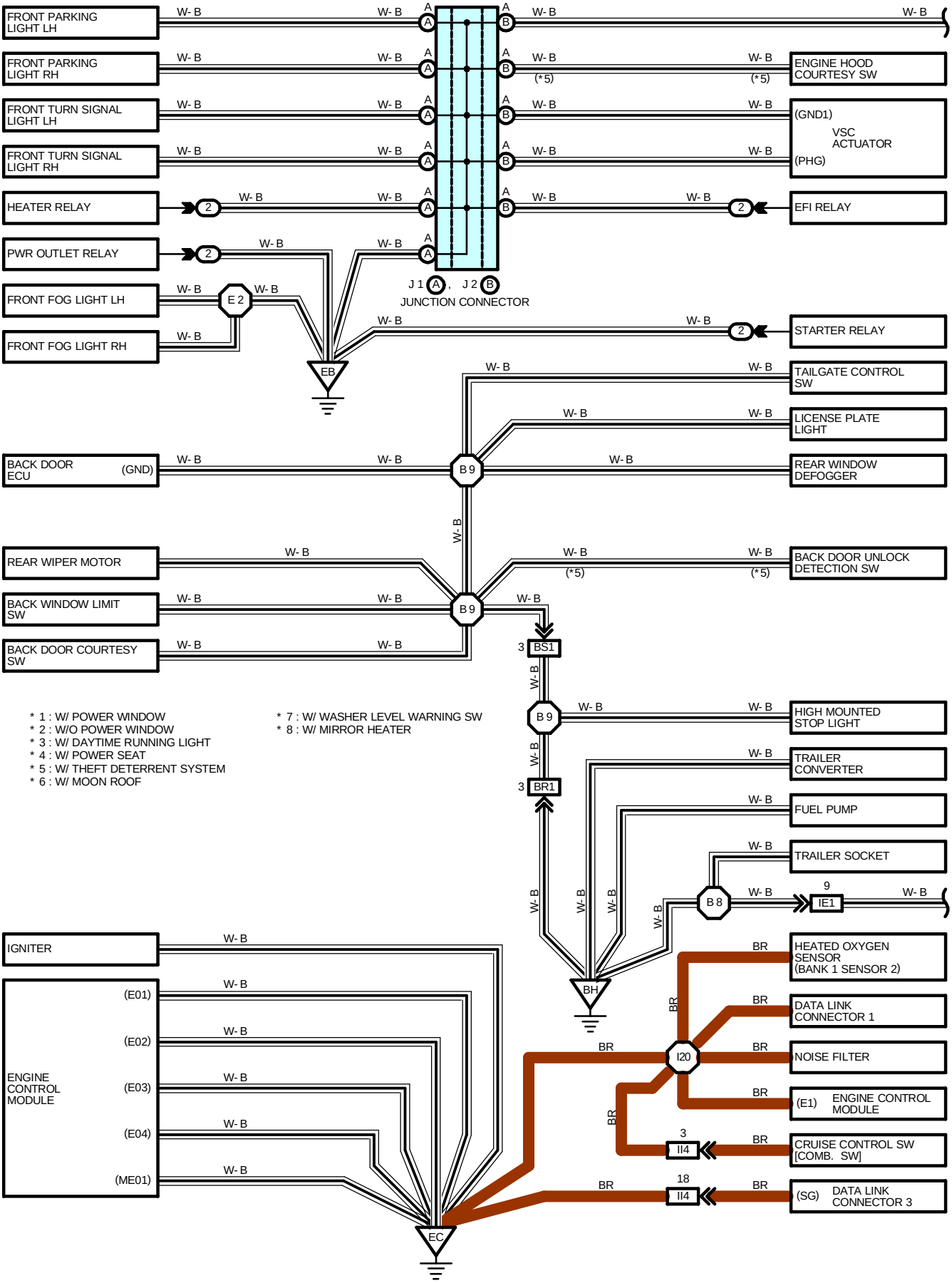
: GROUND POINTS

Code	See Page	Ground Points Location
EB	36	Front Left Fender
IF	38	Cowl Side Panel RH

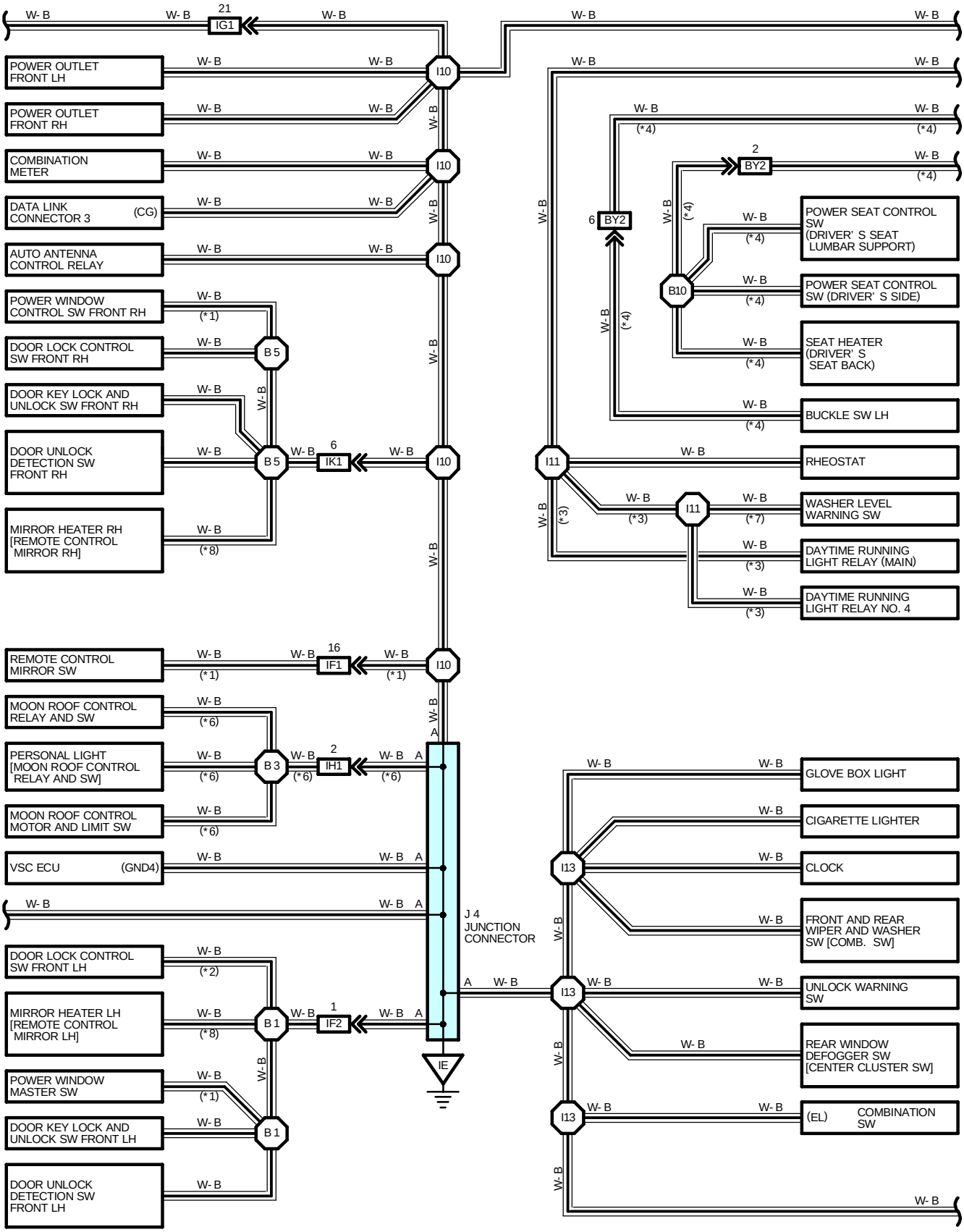
: SPLICE POINTS

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
I3	40	Engine Room Main Wire	I14	40	Cowl Wire
I10	40	Cowl Wire	I16		
I12					

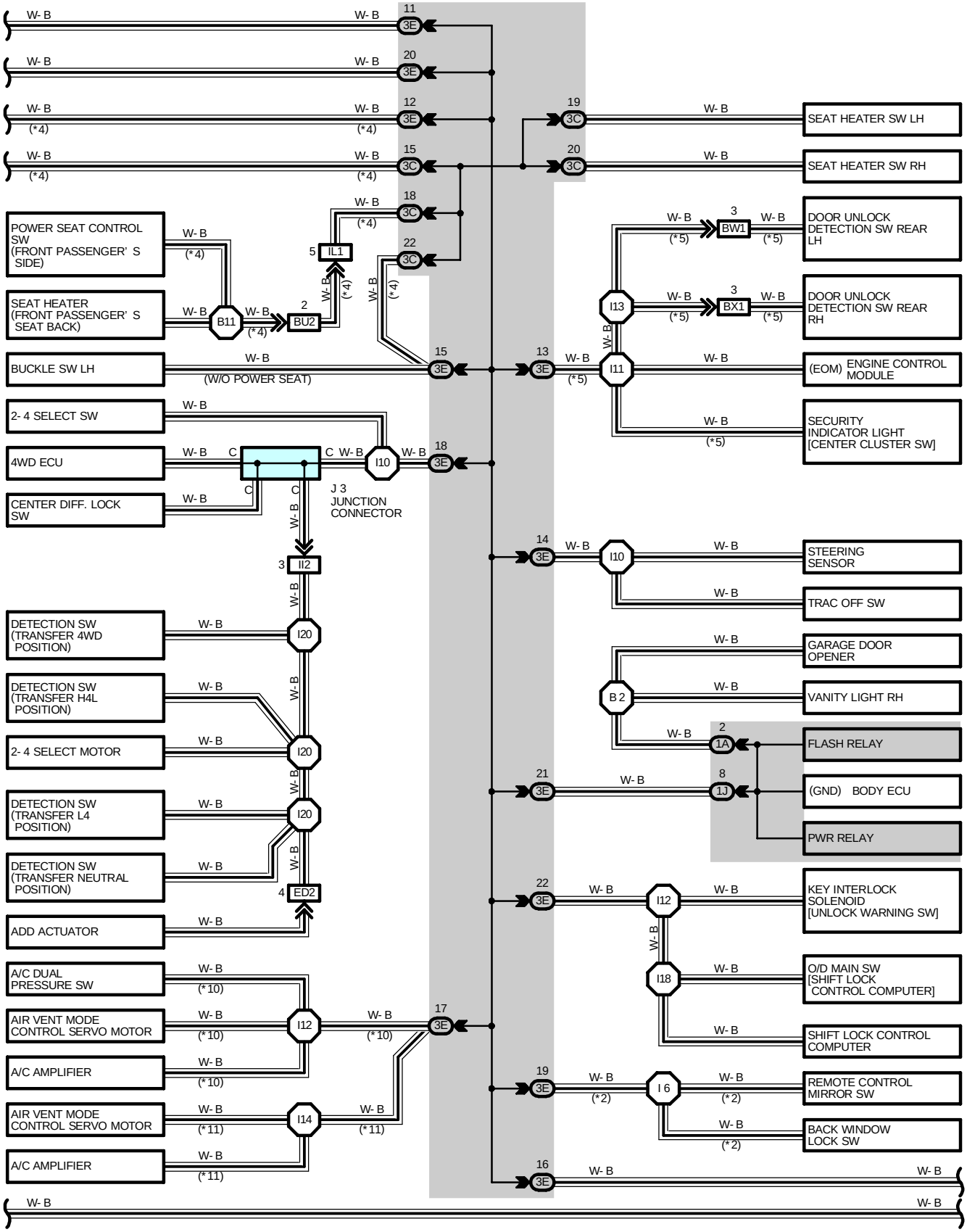
I GROUND POINT



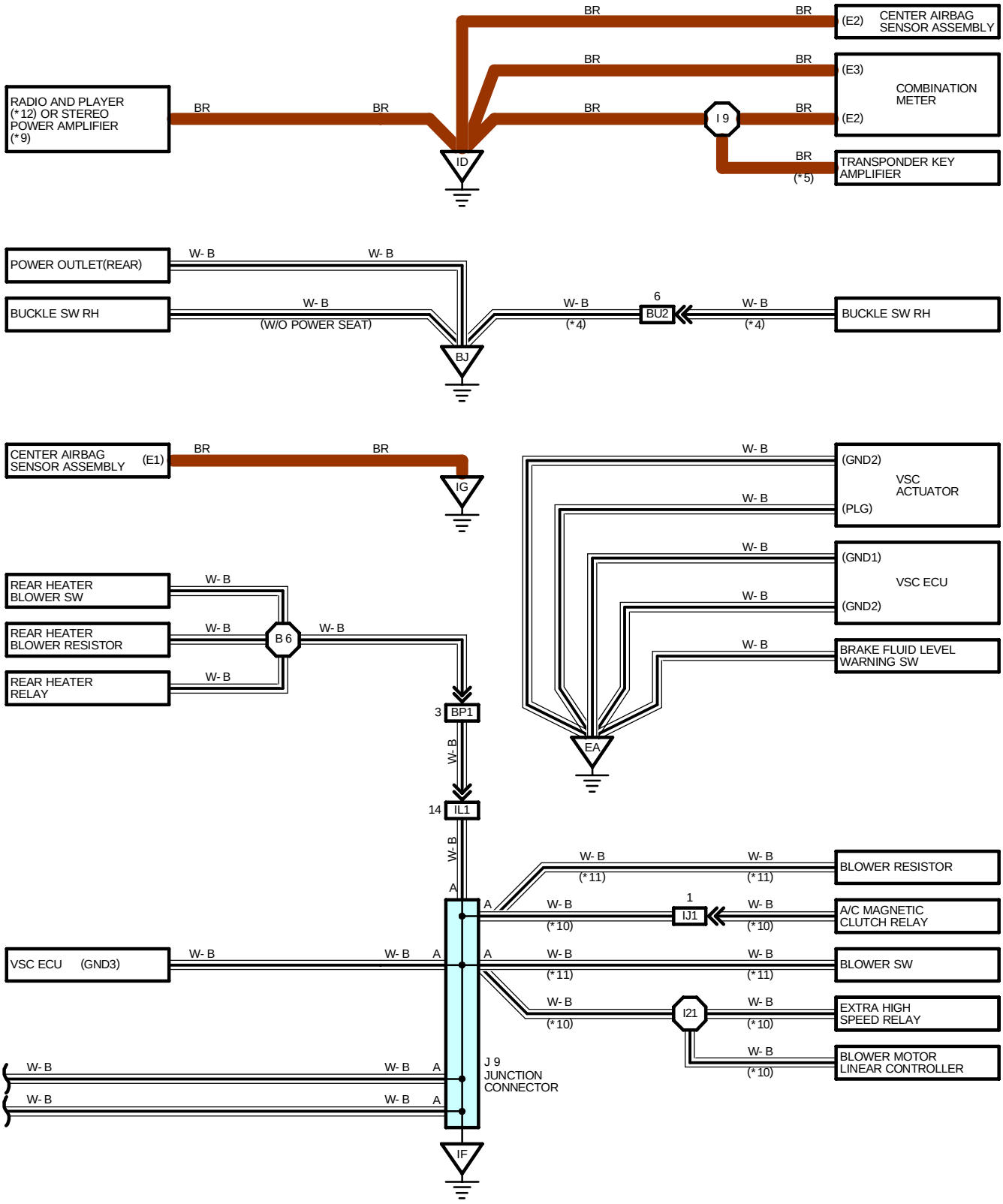
* 1 : W/ POWER WINDOW
* 2 : W/O POWER WINDOW
* 3 : W/ DAYTIME RUNNING LIGHT
* 4 : W/ POWER SEAT
* 5 : W/ THEFT DETERRENT SYSTEM
* 6 : W/ MOON ROOF
* 7 : W/ WASHER LEVEL WARNING SW
* 8 : W/ MIRROR HEATER


IG1
21
POWER OUTLET FRONT LH
POWER OUTLET FRONT RH
COMBINATION METER
DATA LINK CONNECTOR 3
(CG)
AUTO ANTENNA CONTROL RELAY
POWER WINDOW CONTROL SW FRONT RH
DOOR LOCK CONTROL SW FRONT RH
DOOR KEY LOCK AND UNLOCK SW FRONT RH
DOOR UNLOCK DETECTION SW FRONT RH
MIRROR HEATER RH [REMOTE CONTROL MIRROR RH]
I10
B5
IK1
6
REMOTE CONTROL MIRROR SW
IF1
16
MOON ROOF CONTROL RELAY AND SW
PERSONAL LIGHT [MOON ROOF CONTROL RELAY AND SW]
MOON ROOF CONTROL MOTOR AND LIMIT SW
B3
IH1
2
VSC ECU
(GND4)
J 4 JUNCTION CONNECTOR
IE
DOOR LOCK CONTROL SW FRONT LH
MIRROR HEATER LH [REMOTE CONTROL MIRROR LH]
POWER WINDOW MASTER SW
DOOR KEY LOCK AND UNLOCK SW FRONT LH
DOOR UNLOCK DETECTION SW FRONT LH
B1
IF2
1
BY2
B10
POWER SEAT CONTROL SW (DRIVER' S SEAT LUMBAR SUPPORT)
POWER SEAT CONTROL SW (DRIVER' S SIDE)
SEAT HEATER (DRIVER' S SEAT BACK)
BUCKLE SW LH
I11
RHEOSTAT
WASHER LEVEL WARNING SW
DAYTIME RUNNING LIGHT RELAY (MAIN)
DAYTIME RUNNING LIGHT RELAY NO. 4
I13
GLOVE BOX LIGHT
CIGARETTE LIGHTER
CLOCK
FRONT AND REAR WIPER AND WASHER SW [COMB. SW]
UNLOCK WARNING SW
REAR WINDOW DEFOGGER SW [CENTER CLUSTER SW]
(EL)
COMBINATION SW
W- B
(*1)
(*2)
(*3)
(*4)
(*6)
(*7)
(*8)

I GROUND POINT



* 2 : W/O POWER WINDOW
* 4 : W/ POWER SEAT
* 5 : W/ THEFT DETERRENT SYSTEM
* 9 : SEPARATE TYPE AMPLIFIER
*10 : AUTOMATIC AIR CONDITIONING
*11 : MANUAL AIR CONDITIONING
*12 : BUILT- IN TYPE AMPLIFIER



I GROUND POINT

: PARTS LOCATION

Code		See Page	Code	See Page	Code	See Page
J1	A	29	J3	31	J9	31
J2	B	29	J4	31		

: RELAY BLOCKS

Code	See Page	Relay Blocks (Relay Block Location)
2	22	Engine Room R/B (Engine Compartment Left)

: JUNCTION BLOCK AND WIRE HARNESS CONNECTOR

Code	See Page	Junction Block and Wire Harness (Connector Location)
1A	24	Roof Wire and Driver Side J/B (Lower Finish Panel)
1J	24	Cowl Wire and Driver Side J/B (Lower Finish Panel)
3C	26	Cowl Wire and Center J/B (Near the Steering Column Tube)
3E		

: CONNECTOR JOINING WIRE HARNESS AND WIRE HARNESS

Code	See Page	Joining Wire Harness and Wire Harness (Connector Location)
ED2	36	Engine Wire and Differential Wire (Near the Front Differential)
IE1	38	Cowl Wire and Floor No.2 Wire (Left Kick Panel)
IF1	38	Front Door LH Wire and Cowl Wire (Left Kick Panel)
IF2		
IG1	38	Engine Room Main Wire and Cowl Wire (Left Kick Panel)
IH1	40	Roof Wire and Cowl Wire (Instrument Panel Reinforcement Left)
II2	40	Engine Wire and Cowl Wire (On the Glove Box)
II4		
IJ1	40	Cowl Wire and A/C Sub Wire (Near the A/C Unit)
IK1	40	Front Door RH Wire and Cowl Wire (Right Kick Panel)
IL1	40	Cowl Wire and Floor Wire (Right Kick Panel)
BP1	42	Floor Wire and Rear Heater Sub Wire (Under the Front Passenger's Seat)
BR1	42	Back Door No.1 Wire and Floor No.2 Wire (Left Rear Side of Roof)
BS1	42	Back Door No.1 Wire and Back Door No.2 Wire (Back Door Left)
BU2	44	Floor Wire and Seat No.2 Wire (Under the Front Passenger's Seat)
BW1	42	Rear Door LH Wire and Cowl Wire (Left Center Pillar)
BX1	42	Rear Door RH Wire and Cowl Wire (Right Center Pillar)
BY2	44	Cowl Wire and Seat No.1 Wire (Under the Driver's Seat)

: GROUND POINTS

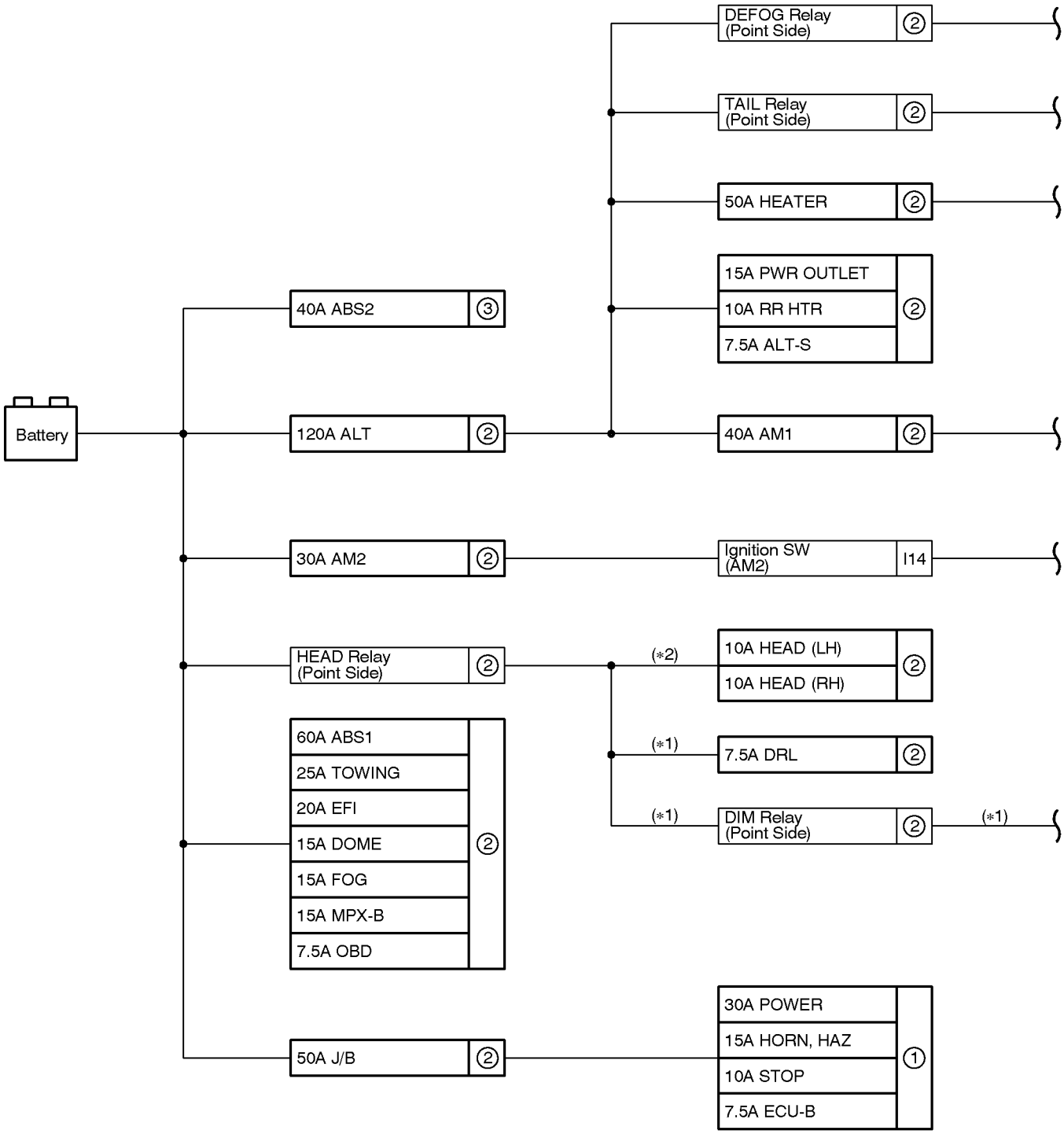
Code	See Page	Ground Points Location
EA	36	Front Right Fender
EB	36	Front Left Fender
EC	36	Intake Manifold Left
ID	38	Left Kick Panel
IE	38	Cowl Side Panel LH
IF	38	Cowl Side Panel RH
IG	38	Right Kick Panel
BH	42	Left Quarter Panel Inner
BJ	42	Right Quarter Panel Inner

: **SPLICE POINTS**

Code	See Page	Wire Harness with Splice Points	Code	See Page	Wire Harness with Splice Points
E2	36	Engine Room Main Wire	I21	40	Cowl Wire
I6	40	Cowl Wire	B1	42	Front Door LH Wire
I9			B2	42	Roof Wire
I10			B3		
I11			B5	42	Front Door RH Wire
I12			B6	42	Rear Heater Sub Wire
I13			B8	42	Floor No.2 Wire
I14			B9	42	Back Door No.2 Wire
I18			B10	44	Seat No.1 Wire
I20	40	Engine Wire	B11	44	Seat No.2 Wire

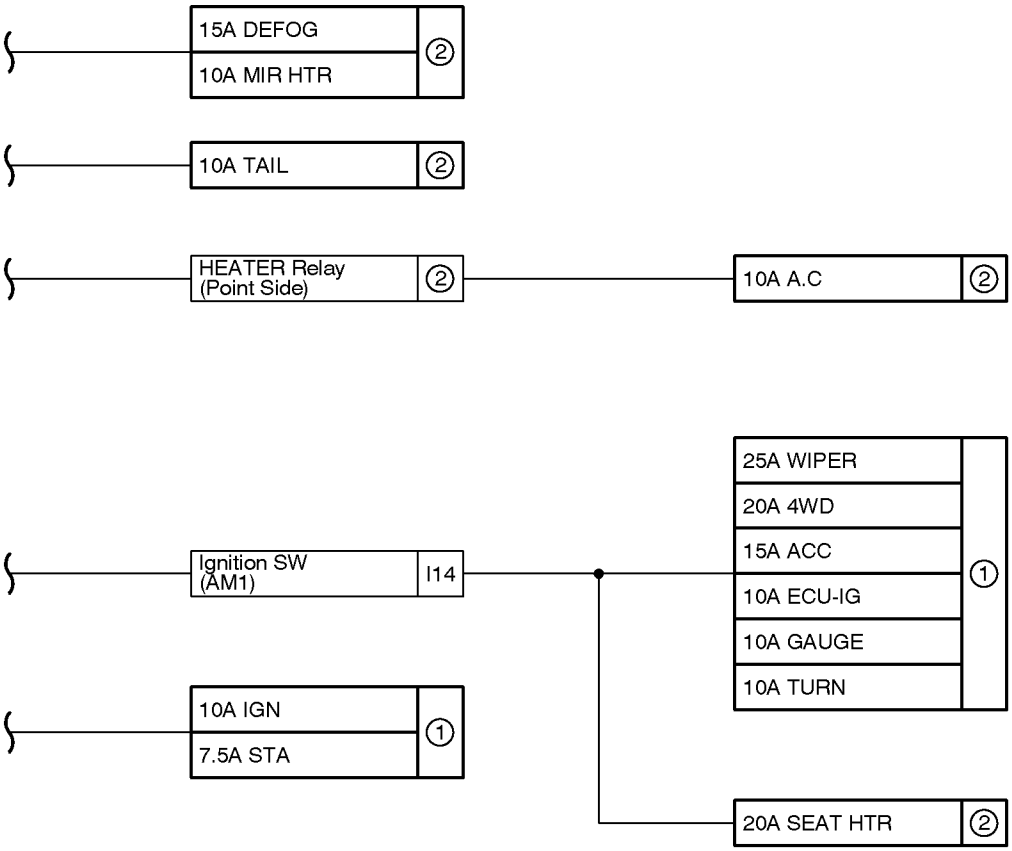
J POWER SOURCE (Current Flow Chart)

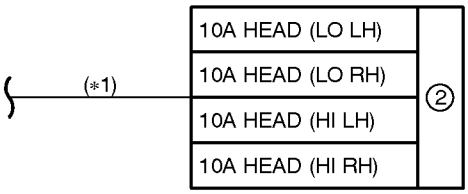
The chart below shows the route by which current flows from the battery to each electrical source (Fusible Link, Circuit Breaker, Fuse, etc.) and other parts.

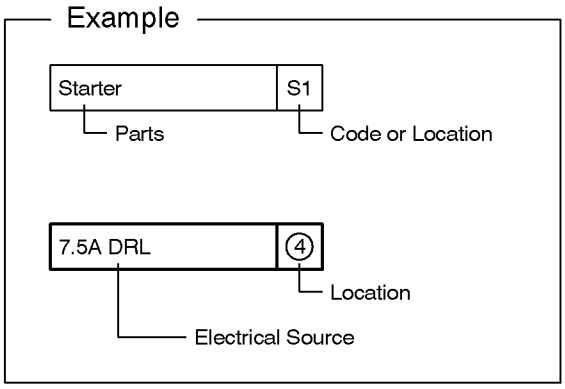


[LOCATION] ① : Driver Side J/B (See page 24) ② : Engine Room R/B (See page 22)
③ : Fuse Box (See page 22)

∗1 : w/ Daytime Running Light
∗2 : w/o Daytime Running Light







Engine Room R/B (See Page 22)

Fuse		System	Page
7.5A	ALT-S	Charging	56
7.5A	DRL	Headlight (w/ Daytime Running Light)	84
		Multiplex Communication System	72
7.5A	OBD	Engine Control	58
10A	A.C	Air Conditioning (Manual A/C)	220
10A	HEAD (HI LH)	Headlight (w/ Daytime Running Light)	84
10A	HEAD (HI RH)	Headlight (w/ Daytime Running Light)	84
10A	HEAD (LH)	Headlight (w/o Daytime Running Light)	82
10A	HEAD (LO LH)	Headlight (w/ Daytime Running Light)	84
		Front Fog Light	88
10A	HEAD (LO RH)	Headlight (w/ Daytime Running Light)	84
10A	HEAD (RH)	Headlight (w/o Daytime Running Light)	82
10A	MIR HTR	Multiplex Communication System	72
		Rear Window Defogger and Mirror Heater	200
10A	RR HTR	Rear Heater	210
10A	TAIL	Cigarette Lighter and Clock	186
		Combination Meter	204
		Illumination	98
		Taillight	96
		Trailer Towing	108
15A	DEFOG	Multiplex Communication System	72
		Rear Window Defogger and Mirror Heater	200
15A	DOME	Auto Antenna	196
		Cigarette Lighter and Clock	186
		Combination Meter	204
		Garage Door Opener	110
		Headlight (w/ Daytime Running Light)	84
		Interior Light	92
		Radio and Player	198
15A	FOG	Front Fog Light	88
15A	MPX-B	Door Lock Control	118
		Multiplex Communication System	72
		Power Window (Rear), Rear Wiper and Washer	172
		Rear Window Defogger and Mirror Heater	200
		Theft Deterrent	130
		Wireless Door Lock Control	124
15A	PWR OUTLET	Power Outlet	188
20A	EFI	Cruise Control	142
		Electronically Controlled Transmission and A/T Indicator	136
		Engine Control	58
		Engine Immobiliser System	68

∗ These are the page numbers of the first page on which the related system is shown.

Fuse		System	Page
20A	SEAT HTR	Seat Heater	194
25A	TOWING	Trailer Towing	108
30A	AM2	Engine Control	58
		Starting and Ignition	52
40A	AM1	Power Outlet	188
		Starting and Ignition	52
50A	HEATER	Air Conditioning (Manual A/C)	220
		Automatic Air Conditioning	212
60A	ABS1	VSC	146
120A	ALT	Charging	56
		Illumination	98
		Light Auto Turn Off	106
		Multiplex Communication System	72
		Power Outlet	188
		Rear Window Defogger and Mirror Heater	200
		Starting and Ignition	52
		Taillight	96
		Theft Deterrent	130
		Wireless Door Lock Control	124

Driver Side J/B (See Page 24)

Fuse		System	Page
7.5A	ECU-B	Air Conditioning (Manual A/C)	220
		Automatic Air Conditioning	212
7.5A	STA	Electronically Controlled Transmission and A/T Indicator	136
		Engine Control	58
		Starting and Ignition	52
10A	ECU-IG	Auto Antenna	196
		Door Lock Control	118
		Moon Roof	164
		Multiplex Communication System	72
		Power Window	112
		Power Window (Rear), Rear Wiper and Washer	172
		Rear Window Defogger and Mirror Heater	200
		Shift Lock	180
		SRS	153
		Theft Deterrent	130
		VSC	146
		Wireless Door Lock Control	124
10A	GAUGE	Air Conditioning (Manual A/C)	220
		Automatic Air Conditioning	212
		Back-Up Light	104
		Charging	56
		Combination Meter	204

* These are the page numbers of the first page on which the related system is shown.

J POWER SOURCE (Current Flow Chart)

Fuse		System	Page
10A	GAUGE	Cruise Control	142
		Electronically Controlled Transmission and A/T Indicator	136
		Engine Control	58
		Front Wiper and Washer	168
		Headlight (w/ Daytime Running Light)	84
		Key Reminder and Seat Belt Warning	182
		Light Auto Turn Off	106
		Multiplex Communication System	72
		Rear Heater	210
		Rear Window Defogger and Mirror Heater	200
		SRS	153
		4WD	158
10A	IGN	Charging	56
		Combination Meter	204
		Cruise Control	142
		Electronically Controlled Transmission and A/T Indicator	136
		Engine Control	58
		Engine Immobiliser System	68
		SRS	153
		VSC	146
10A	STOP	Cruise Control	142
		Electronically Controlled Transmission and A/T Indicator	136
		Engine Control	58
		Shift Lock	180
		Stop Light	102
		Trailer Towing	108
		VSC	146
10A	TURN	Trailer Towing	108
		Turn Signal and Hazard Warning Light	90
15A	ACC	Auto Antenna	196
		Cigarette Lighter and Clock	186
		Multiplex Communication System	72
		Power Outlet	188
		Power Window (Rear), Rear Wiper and Washer	172
		Radio and Player	198
		Rear Window Defogger and Mirror Heater	200
		Remote Control Mirror	162
		Shift Lock	180
		Theft Deterrent	130
		Wireless Door Lock Control	124
15A	HORN, HAZ	Horn	184
		Multiplex Communication System	72
		Theft Deterrent	130

* These are the page numbers of the first page on which the related system is shown.

Fuse		System	Page
15A	HORN, HAZ	Trailer Towing	108
		Turn Signal and Hazard Warning Light	90
20A	4WD	4WD	158
25A	WIPER	Front Wiper and Washer	168
		Multiplex Communication System	72
		Power Window (Rear), Rear Wiper and Washer	172
30A	POWER	Door Lock Control	118
		Moon Roof	164
		Multiplex Communication System	72
		Power Seat	190
		Power Window	112
		Power Window (Rear), Rear Wiper and Washer	172
		Wireless Door Lock Control	124

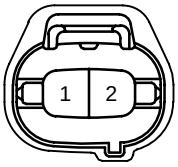
Fuse Box (See Page 22)

Fuse		System	Page
40A	ABS2	VSC	146

* These are the page numbers of the first page on which the related system is shown.

K CONNECTOR LIST

A 1
Gray



A 2
Gray

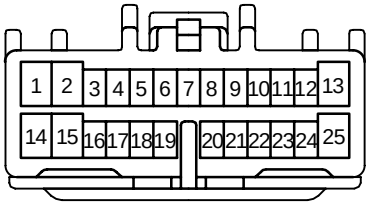
A 3
Gray

A 8
Gray

A 9
Gray

A11
Gray

A12



A14
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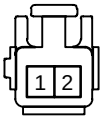
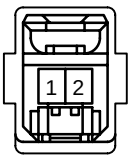
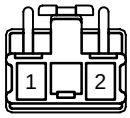


A20
Yellow



A21
Yellow



A22
Black

A23
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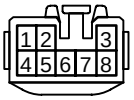


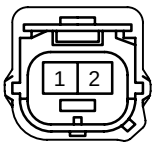
A24
Gray

A25
Gray

A26
Black

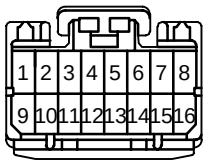
A27
Dark Gray

A28
Yellow

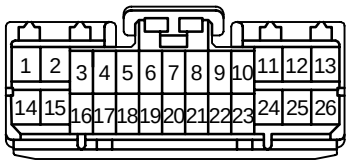


A29
Yellow

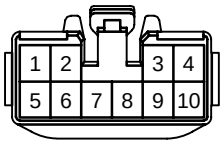
A30



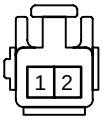
A31



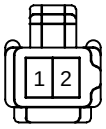
A32
Dark Gray



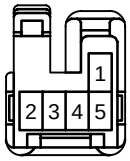
A33
Black



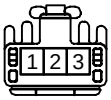
A34
Black



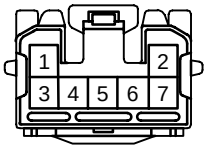
A35
(Automatic A/C)



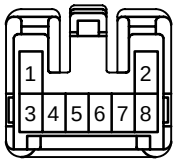
A35
(Manual A/C)



A36
Gray

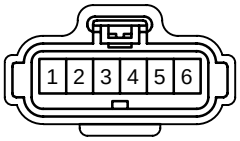


A37



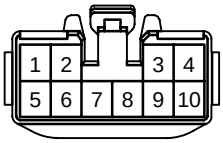
A38
Black

A39
Black

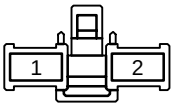


B 2
Dark Gray

B 5
Black

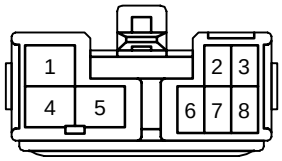


B 6
Black



B 7
Black

B 8



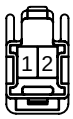
B 9

B10
Black

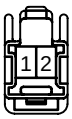
B11

B12
Gray

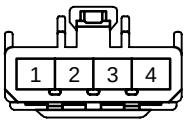
B13
(w/ Power Seat) Black



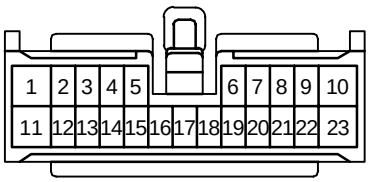
B13
(w/o Power Seat)



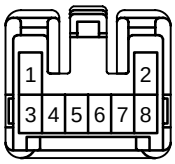
B14
Black



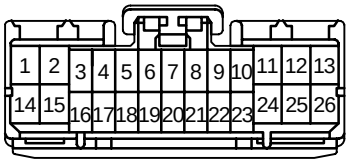
B16



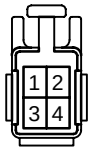
B17



B18



B19



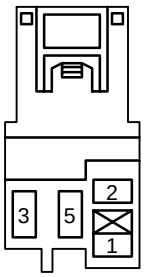
C 1
Black

C 2
Black

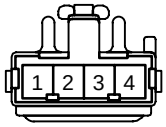
C 4

C 5
Gray

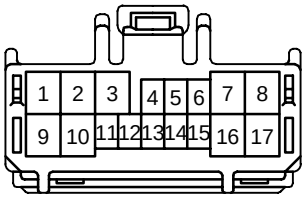
C 6



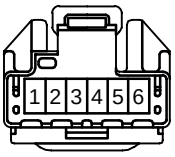
C 7
Black



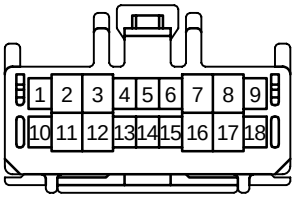
C13
Black



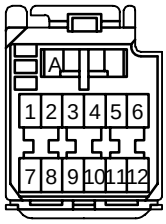
C14
Black



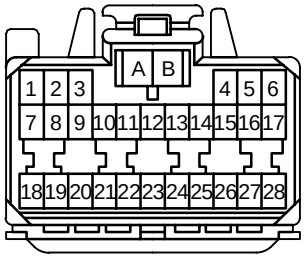
C15
Black



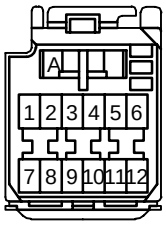
C20
Yellow



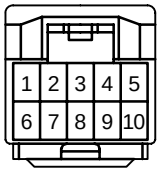
C21
Yellow



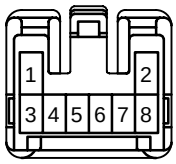
C22
Yellow



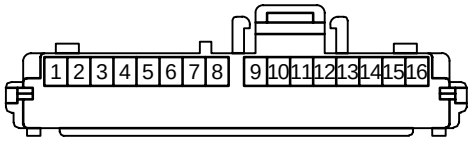
C23



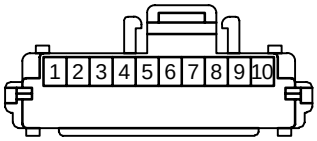
C24
Orange



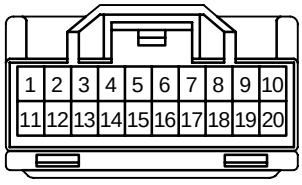
C25



C26
Gray



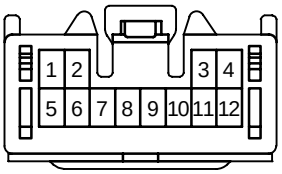
C27



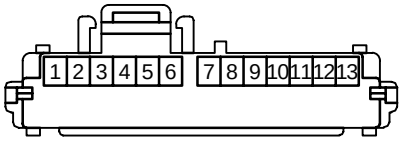
K CONNECTOR LIST

*1 : w/o Power Window
*2 : w/ Power Window

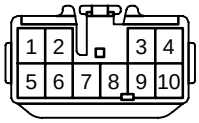
C28
Blue



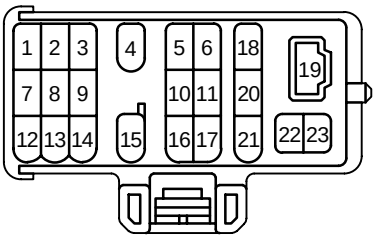
C29
Brown



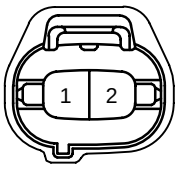
C30



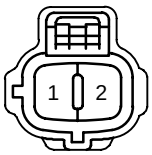
D 1
Black



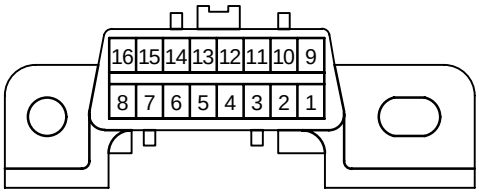
D 4
Blue



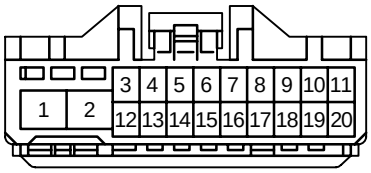
D 5
Gray



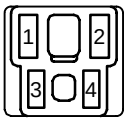
D 7
Black



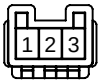
D 8



D 9



D11



D12
Black

D16

D17

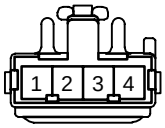
D18

D19

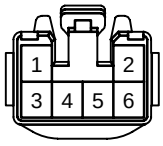
D20
Gray

D21
Gray

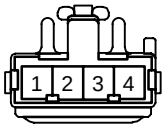
D22
(*1)



D23
(*2)



D23
(*1)



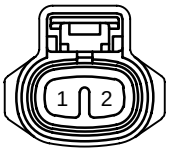
D24
Black

D25
Black

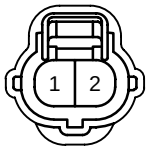
D26
Black

D27
Black

D31
Gray



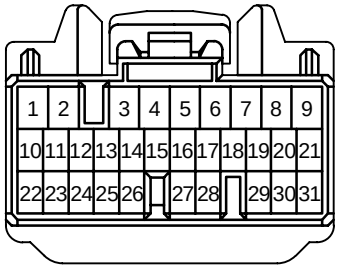
D32
Gray



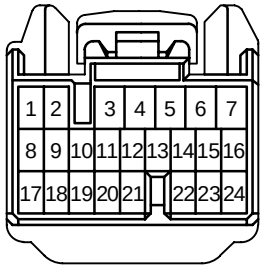
E 2
Gray

E 3
Dark Gray

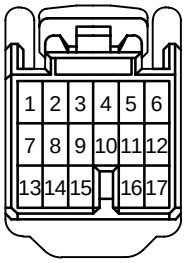
E 9



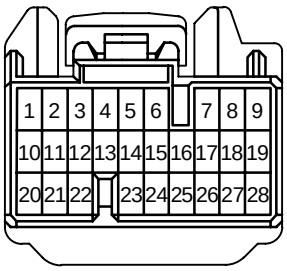
E10



E11

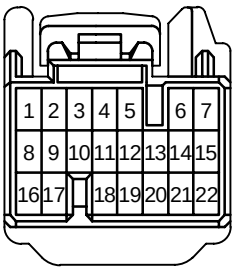


E12
Black

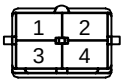


E13
Black

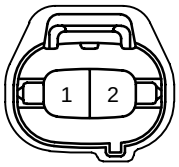
E14



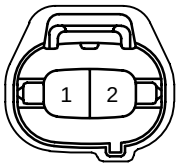
E15



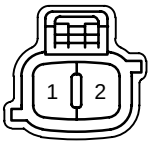
F 1
Gray



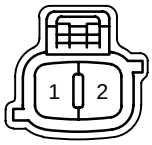
F 2
Gray



F 3
Gray

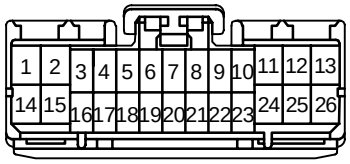


F 4
Gray



F 5
Black

F 7



F 8

F 9

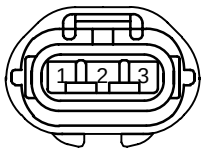
F10
Dark Gray

F11

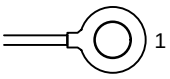
F12

F13
Black
(See Page 22)

G 1
Gray

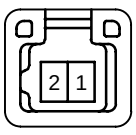


G 2

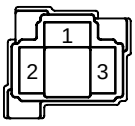


G 3
Black

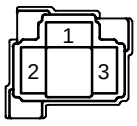
G 4
Blue



H 1
Brown

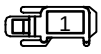


H 2
Brown



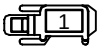
H 4
Dark Gray

H 5
Black

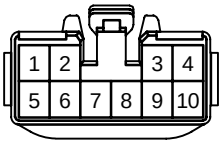


K CONNECTOR LIST

H 6
Black



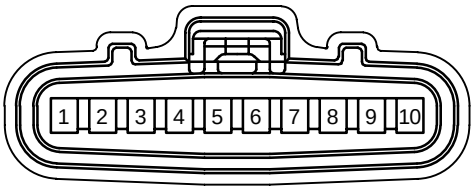
H 7
Black



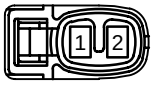
H 8
Brown

I 2
Black

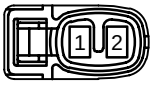
*3 : w/ Engine immobillser System
*4 : w/o Engine immobillser System



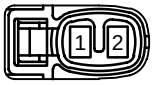
I 3
Black



I 4
Black



I 5
Black



I 6
Brown

I 7
Brown

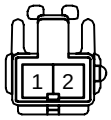
I 8
Brown

I 9
Brown

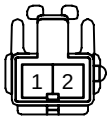
I10
Brown

I11
Brown

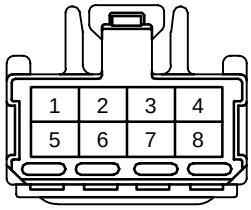
I13
(*3) Gray



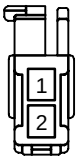
I13
(*4)



I14

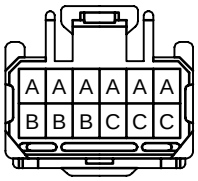


I17

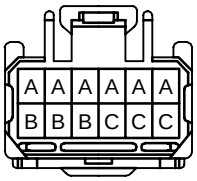


I18

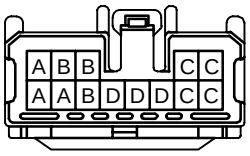
J 1
Gray



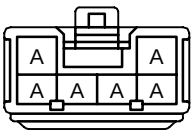
J 2
Gray



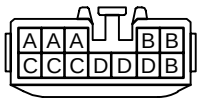
J 3
Blue



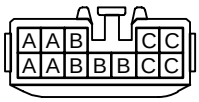
J 4



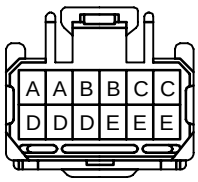
J 5
Black



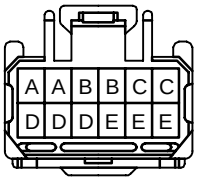
J 6
Gray



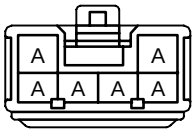
J 7
Black



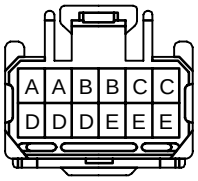
J 8
Black



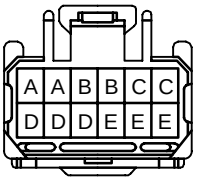
J 9



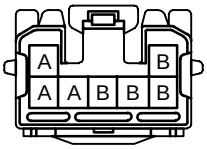
J10
Black



J11
Black



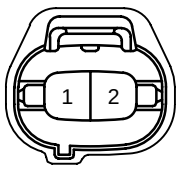
J14



K 2
Black

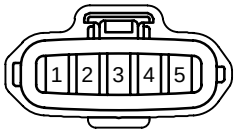
K 3
Black

K 4
Black

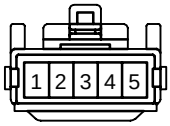


L 1
Gray

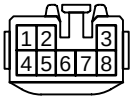
M 1
Black



M 2



M 3
Blue

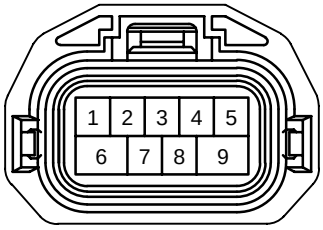


M 4
Gray

N 1
Gray

O 1
Gray

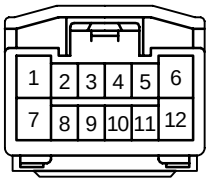
P 1
Black



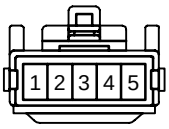
P 2
Black

P 3

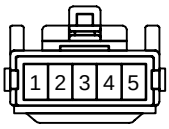
P 4



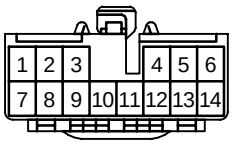
P 5



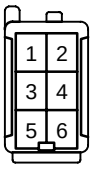
P 6



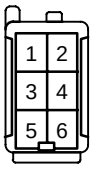
P 7



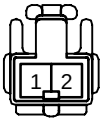
P 8
Black



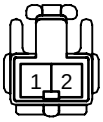
P 9
Black



P10

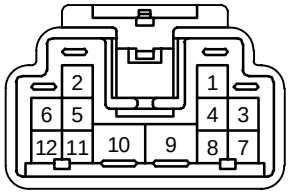


P11

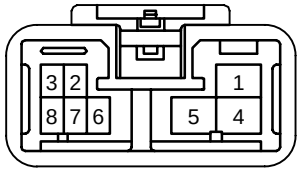


P13

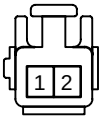
P14
Gray



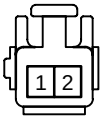
P15
Blue



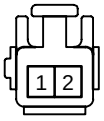
P16
Gray



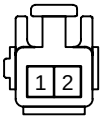
P17



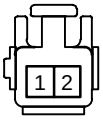
P18



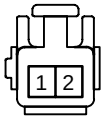
P19



P20



P21



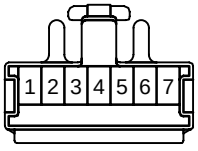
P22
Black

P23

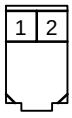
P24
Blue

P25
Blue

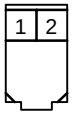
P26



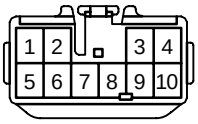
P27
Yellow



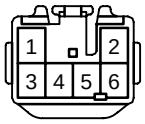
P28
Yellow



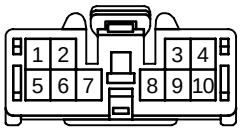
R 1



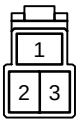
R 2



R 5



R 6



R 7

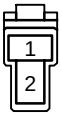
K CONNECTOR LIST

R 8

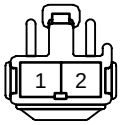
R11

R12

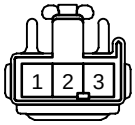
R13
Black



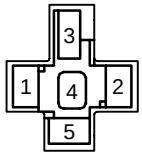
R14



R15



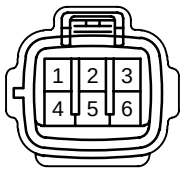
R16



R17
Gray

R18

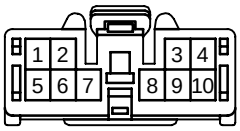
R19
Black



R20

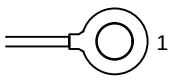
R21

R22

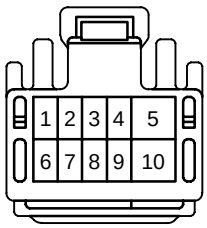


S 1
Black

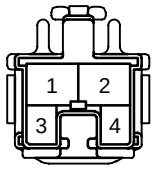
S 2



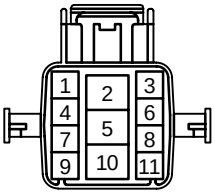
S 3



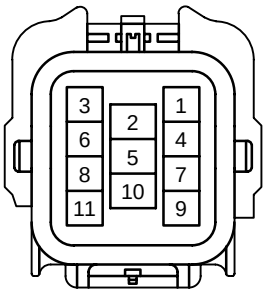
S 4



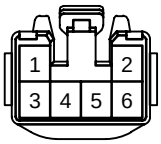
S 5
Black



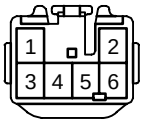
S 6
Black



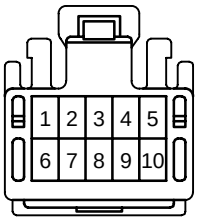
S 7
Black



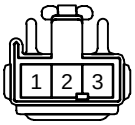
S 8
Brown



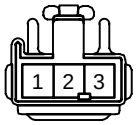
S 9
Gray



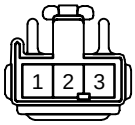
S10



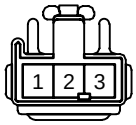
S11



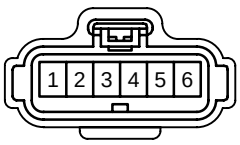
S12



S13



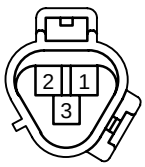
T 1
Black



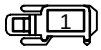
T 2
Black

T 3

T 4
Gray

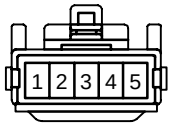


T 5
Black



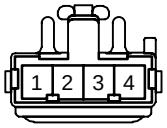
*5 : w/ Daytime Running Light
*6 : w/o Daytime Running Light

T 6

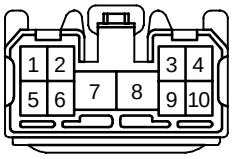


T 7
Gray

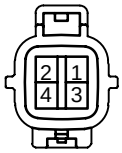
T 8
Black



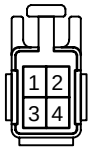
T 9



T10

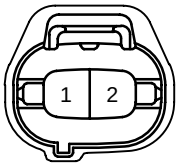


U 1



V 1
Black

V 3
Black



V 7
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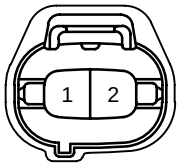
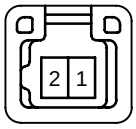
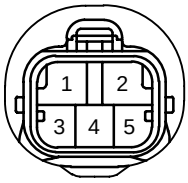


V 8
Blue

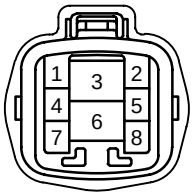
V 9
Blue



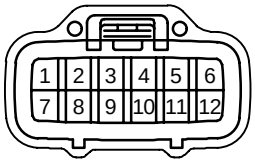
V10



V11
Gray

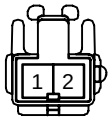


V12
Black



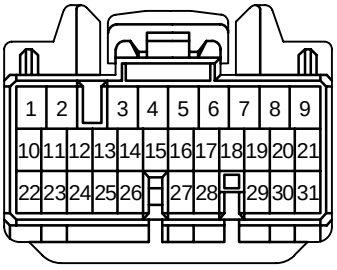
V13
Gray

V14
Black

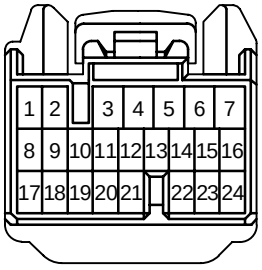


V15
Black

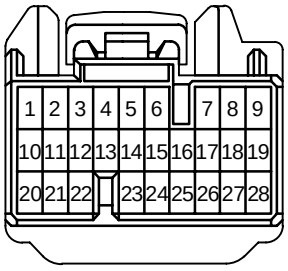
V16



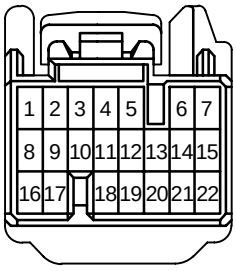
V17
Black



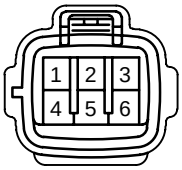
V18



V19
Black



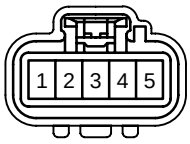
W 1
(*5) Black



W 1
(*6) Dark Gray

W 2

Y 1
Black



L PART NUMBER OF CONNECTORS

Code	Part Name	Part Number
A 1	A/C Dual Pressure SW	90980-11149
A 2	A/C Magnetic Clutch	90980-11271
A 3	A/T Fluid Temp. Sensor	90980-10498
A 8	ABS Speed Sensor Front LH	90980-11075
A 9	ABS Speed Sensor Front RH	
A11	Auto Antenna Motor	90980-11003
A12	A/C Amplifier	90980-11877
A14	A/C Thermistor	90980-10825
A20	Airbag Squib (Front Passenger Airbag Assembly)	90980-11884
A21	Airbag Squib (Steering Wheel Pad)	90980-10850
A22	Ashtray Illumination	-
A23	Auto Antenna Control Relay	90980-10799
A24	ABS Speed Sensor Rear LH	90980-11075
A25	ABS Speed Sensor Rear RH	
A26	A/C Ambient Temp. Sensor	90980-11070
A27	Air Fuel Ratio Sensor	90980-11178
A28	Airbag Sensor Front LH	90980-11856
A29	Airbag Sensor Front RH	
A30	A/C Amplifier	90980-11391
A31	A/C Amplifier	90980-11390
A32	A/C Magnetic Clutch Relay	90980-10801
A33	A/C Room Temp. Sensor	90980-10825
A34	A/C Solar Sensor	90980-11369
A35	Air Inlet Control Servo Motor (Automatic A/C)	90980-11319
	Air Inlet Control Servo Motor (Manual A/C)	90980-11471
A36	Air Mix Control Servo Motor and A/C Water Temp. Sensor	90980-11529
A37	Air Vent Mode Control Servo Motor	90980-11321
A38	Accele Position Sensor	90980-11150
A39	ADD Actuator	90980-11858
B 2	Brake Fluid Level Warning SW	90980-11009
B 5	Back Window Lock SW	90980-10801
B 6	Blower Motor	90980-10385
B 7	Blower Resistor	90980-10171
B 8	Blower SW	90980-10877
B 9	Back Door Courtesy SW	90980-11003
B10	Back Door Lock Motor and Back Door Unlock Detection SW	90980-11150
B11	Back Window Limit SW	90980-11247
B12	Back Window Motor	90980-11003
B13	Buckle SW LH	90980-11212
B14	Blower Motor Linear Controller	90980-11676
B16	Body ECU	90980-10921
B17	Body ECU	90980-11321
B18	Back Door ECU	90980-11423
B19	Buckle SW RH	90980-10795

Code	Part Name	Part Number
C 1	Camshaft Position Sensor	90980-10947
C 2	Crankshaft Position Sensor	
C 4	Cigarette Lighter	90980-10760
C 5	Cigarette Lighter Illumination	90980-11148
C 6	Circuit Opening Relay	82602-35150
C 7	Clock	90980-11013
C13	Combination SW	90980-11672
C14	Combination SW	90980-11616
C15	Combination SW	90980-11594
C20	Center Airbag Sensor Assembly	90980-11873
C21	Center Airbag Sensor Assembly	90980-11872
C22	Center Airbag Sensor Assembly	90980-11871
C23	Center Cluster SW	90980-11923
C24	Center Cluster SW	90980-11321
C25	Combination Meter	90980-11113
C26	Combination Meter	90980-11116
C27	Combination Meter	90980-11974
C28	Combination Meter	90980-11475
C29	Combination Meter	90980-11115
C30	Center Diff. Lock SW	90980-10997
D 1	Data Link Connector 1	90980-11323
D 4	Detection SW (Transfer L4 Position)	90980-11156
D 5	Detection SW (Transfer Neutral Position)	90980-10923
D 7	Data Link Connector 3	90080-98012
D 8	Daytime Running Light Relay (Main)	90980-12034
D 9	Daytime Running Light Relay No.4	90980-10759
D11	Diode (Back Window)	90980-11251
D12	Diode (Daytime Running Light No.1)	90980-10962
D16	Door Courtesy SW Front LH	90980-11097
D17	Door Courtesy SW Front RH	
D18	Door Courtesy SW Rear LH	
D19	Door Courtesy SW Rear RH	
D20	Door Key Lock and Unlock SW Front LH	90980-11245
D21	Door Key Lock and Unlock SW Front RH	
D22	Door Lock Control SW Front LH	90980-11013
D23	Door Lock Control SW Front RH (w/ Power Window)	90980-10797
	Door Lock Control SW Front RH (w/o Power Window)	90980-11013
D24	Door Lock Motor and Door Unlock Detection SW Front LH	90980-11150
D25	Door Lock Motor and Door Unlock Detection SW Front RH	
D26	Door Lock Motor and Door Unlock Detection SW Rear LH	
D27	Door Lock Motor and Door Unlock Detection SW Rear RH	
D31	Detection SW (Transfer 4WD Position)	90980-11250

Note: Not all of the above part numbers of the connector are established for the supply.

Code	Part Name	Part Number
D32	Detection SW (Transfer H4L Position)	90980-11025
E 2	Electronically Controlled Transmission Solenoid	90980-10891
E 3	Engine Coolant Temp. Sensor	90980-10737
E 9	Engine Control Module	90980-11421
E10	Engine Control Module	90980-11476
E11	Engine Control Module	90980-11586
E12	Engine Control Module	90980-11637
E13	Engine Hood Courtesy SW	90980-11273
E14	Engine Control Module	90980-11638
E15	Extra High Speed Relay	90980-10221
F 1	Front Parking Light LH	90980-11149
F 2	Front Parking Light RH	
F 3	Front Turn Signal Light LH	90980-11019
F 4	Front Turn Signal Light RH	
F 5	Front Wiper Motor	90980-10551
F 7	4WD ECU	90980-11423
F 8	Front Door Speaker LH	90980-10935
F 9	Front Door Speaker RH	
F10	Fuel Sender and Fuel Pump	90980-11077
F11	Front Fog Light LH	90980-11003
F12	Front Fog Light RH	
F13	Fuse Box	82610-35020
G 1	Generator	90980-11349
G 2	Generator	90980-09212
G 3	Glove Box Light	90980-11148
G 4	Garage Door Opener	90980-11368
H 1	Headlight LH	90980-11314
H 2	Headlight RH	
H 4	Heated Oxygen Sensor (Bank 1 Sensor 2)	90980-11028
H 5	Horn LH	90980-10619
H 6	Horn RH	
H 7	Hazard SW	90980-10801
H 8	High Mounted Stop Light	90980-11162
I 2	Igniter	90980-11653
I 3	Ignition Coil No.1	90980-11246
I 4	Ignition Coil No.2	
I 5	Ignition Coil No.3	
I 6	Injector No.1	90980-11153
I 7	Injector No.2	
I 8	Injector No.3	
I 9	Injector No.4	
I10	Injector No.5	
I11	Injector No.6	
I13	Ignition Key Cylinder Light	90980-10906
I14	Ignition SW	90980-11615
I17	Interior Light (Front)	90980-10935

Code	Part Name	Part Number
I18	Interior Light (Rear)	90980-10121
J 1	Junction Connector	90980-11661
J 2	Junction Connector	
J 3	Junction Connector	90980-11714
J 4	Junction Connector	90980-10976
J 5	Junction Connector	90980-10803
J 6	Junction Connector	
J 7	Junction Connector	90980-11661
J 8	Junction Connector	
J 9	Junction Connector	90980-10976
J10	Junction Connector	90980-11661
J11	Junction Connector	
J14	Junction Connector	90980-11529
K 2	Knock Sensor No.1	90980-11166
K 3	Knock Sensor No.2	
K 4	Keyless Buzzer	90980-11156
L 1	License Plate Light	90980-11075
M 1	Mass Air Flow Meter	90980-11317
M 2	Moon Roof Control Motor and Limit SW	90980-10789
M 3	Moon Roof Control Relay and SW	90980-10799
M 4	Master Cylinder Pressure Sensor	90980-11451
N 1	Noise Filter	90980-10843
O 1	Oil Pressure SW	90980-11363
P 1	Park/Neutral Position SW	90980-11784
P 2	Parking Brake SW	90980-10871
P 3	Personal Light	90980-10935
P 4	Power Window Control SW Front RH	90980-11947
P 5	Power Window Control SW Rear LH	90980-10789
P 6	Power Window Control SW Rear RH	
P 7	Power Window Master SW	90980-11791
P 8	Power Window Motor Front LH	90980-11011
P 9	Power Window Motor Front RH	
P10	Power Window Motor Rear LH	90980-10860
P11	Power Window Motor Rear RH	
P13	Power Seat Control SW (Driver's Seat Lumbar Support)	90980-10601
P14	Power Seat Control SW (Driver's Side)	90980-10878
P15	Power Seat Control SW (Front Passenger's Side)	90980-10876
P16	Power Seat Motor (Driver's Seat Lumbar Support)	90980-10825
P17	Power Seat Motor (Driver's Seat Reclining Control)	
P18	Power Seat Motor (Driver's Seat Slide Control)	
P19	Power Seat Motor (Driver's Seat Vertical Control)	
P20	Power Seat Motor (Front Passenger's Seat Reclining Control)	

L PART NUMBER OF CONNECTORS

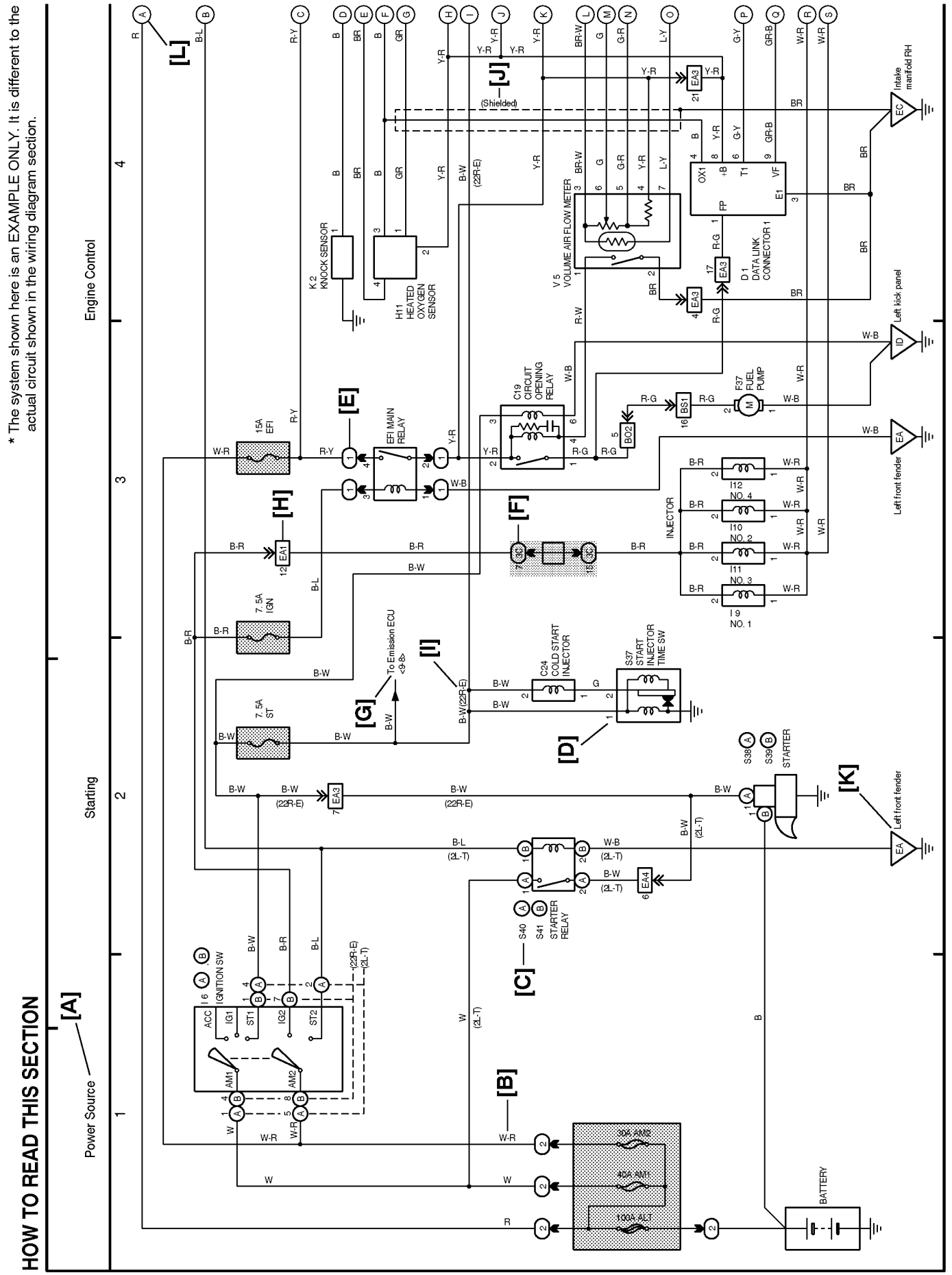
Code	Part Name	Part Number
P21	Power Seat Motor (Front Passenger's Seat Slide Control)	90980-10825
P22	Power Steering Oil Pressure SW	90980-11428
P23	Power Outlet (Rear)	90980-10760
P24	Power Outlet Front LH	
P25	Power Outlet Front RH	
P26	Power Window Master SW	90980-11165
P27	Pretentioner LH	90980-11862
P28	Pretentioner RH	
R 1	Radio and Player (Built-In Type Amplifier) or Stereo Power Amplifier (Separate Type Amplifier)	90980-10997
R 2	Radio and Player (Built-In Type Amplifier) or Stereo Power Amplifier (Separate Type Amplifier)	90980-10996
R 5	Remote Control Mirror SW	90980-11450
R 6	Rheostat	90980-10216
R 7	Rear Combination Light LH	90980-11399
R 8	Rear Combination Light RH	
R11	Rear Door Speaker LH	90980-10935
R12	Rear Door Speaker RH	
R13	Rear Heater Blower Motor	90980-10214
R14	Rear Heater Blower Resistor	90980-10916
R15	Rear Heater Blower SW	90980-11296
R16	Rear Heater Relay	90980-35050
R17	Rear Window Defogger	90980-10359
R18	Rear Window Defogger	
R19	Rear Wiper Motor	90980-11194
R20	Remote Control Mirror LH	90980-11492
R21	Remote Control Mirror RH	
R22	Remote Control Mirror SW	90980-11450
S 1	Starter	90980-11400
S 2	Starter	90980-09584
S 3	Shift Lock Control Computer	90980-11614
S 4	Stop Light SW	90980-11118
S 5	Short Connector (VSC)	90980-11612
S 6	Short Connector (VSC)	90980-11609
S 7	Seat Heater SW LH	90980-10797
S 8	Seat Heater SW RH	90980-10996
S 9	Steering Sensor	90980-11581
S10	Seat Heater (Driver's Seat Back)	90980-10908
S11	Seat Heater (Driver's Seat Cushion)	
S12	Seat Heater (Front Passenger's Seat Back)	
S13	Seat Heater (Front Passenger's Seat Cushion)	
T 1	2-4 Select Motor	90980-11858
T 2	Throttle Position Sensor	90980-10711
T 3	2-4 Select SW	90980-10355

Code	Part Name	Part Number
T 4	Tailgate Control SW	90980-11015
T 5	Theft Deterrent Horn	90980-10619
T 6	Transponder Key Amplifier	90980-10789
T 7	Thrrottle Control Motor and Clutch	90980-10942
T 8	TRAC Off SW	90980-11013
T 9	Trailer Converter	90980-11527
T10	Trailer Socket	90980-10941
U 1	Unlock Warning SW	90980-10795
V 1	Vapor Pressure Sensor	90980-11143
V 3	Vehicle Speed Sensor (Electronically Controlled Transmission)	90980-11156
V 7	VSV (EVAP)	
V 8	VSV (Vapor Pressure Sensor)	90980-11859
V 9	Vanity Light RH	90980-11368
V10	VSC Actuator	90980-11413
V11	VSC Actuator	90980-10895
V12	VSC Actuator	90980-11151
V13	VSV (Canister Closed Valve)	90980-11162
V14	VSC Buzzer	90980-10906
V15	VSC Deceleration Sensor	90980-11182
V16	VSC ECU	90980-11935
V17	VSC ECU	90980-11476
V18	VSC ECU	90980-11637
V19	VSC ECU	90980-11638
W 1	Washer Motor (w/o Daytime Running Light)	90980-11177
	Washer Motor and Washer Level Warning SW (w/ Daytime Running Light)	90980-11194
W 2	Water Temp. Sender	90980-10359
Y 1	Yaw Rate Sensor	90980-11904

Note: Not all of the above part numbers of the connector are established for the supply.

Code	Part Name	Part Number	Code	Part Name	Part Number

M OVERALL ELECTRICAL WIRING DIAGRAM



[A] : System Title

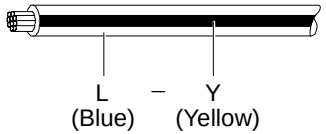
[B] : Indicates the wiring color.

Wire colors are indicated by an alphabetical code.

B	= Black	W	= White	BR	= Brown
L	= Blue	V	= Violet	SB	= Sky Blue
R	= Red	O	= Orange	LG	= Light Green
P	= Pink	Y	= Yellow	GR	= Gray
G	= Green				

The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

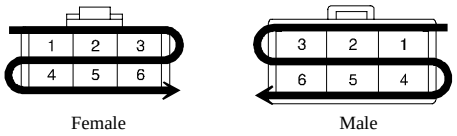
Example: L - Y



[C] : The position of the parts is the same as shown in the wiring diagram and wire routing.

[D] : Indicates the pin number of the connector. The numbering system is different for female and male connectors.

Example : Numbered in order from upper left to lower right / Numbered in order from upper right to lower left



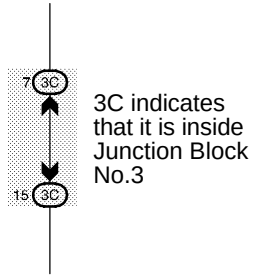
The numbering system for the overall wiring diagram is the same as above

[E] : Indicates a Relay Block. No shading is used and only the Relay Block No. is shown to distinguish it from the J/B.

Example : (1) Indicates Relay Block No.1

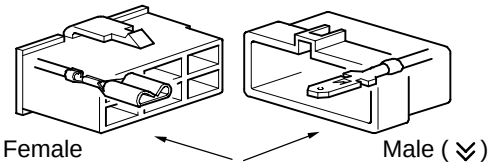
[F] : Junction Block (The number in the circle is the J/B No. and the connector code is shown beside it). Junction Blocks are shaded to clearly separate them from other parts.

Example:



[G] : Indicates related system.

[H] : Indicates the wiring harness and wiring harness connector. The wiring harness with male terminal is shown with arrows (»). Outside numerals are pin numbers.



[I] : ( ) is used to indicate different wiring and connector, etc. when the vehicle model, engine type, or specification is different.

[J] : Indicates a shielded cable.

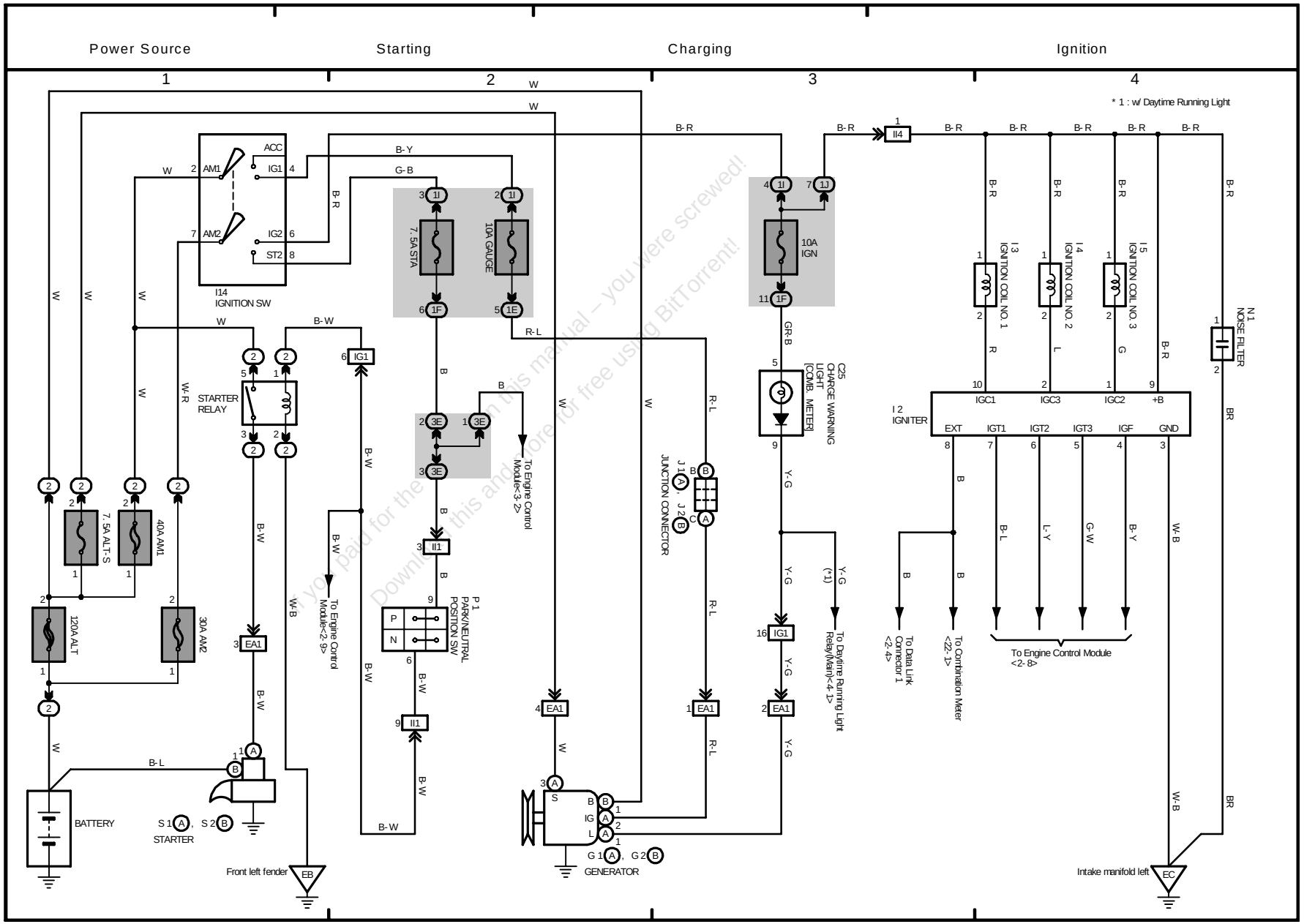
[K] : Indicates and located on ground point.

[L] : The same code occuring on the next page indicates that the wire harness is continuous.

SYSTEM INDEX

SYSTEMS	LOCATION
Air Conditioning (Manual A/C)	24-2
Auto Antenna	21-2
Automatic Air Conditioning	23-2
Back-Up Light	6-3
Charging	1-3
Cigarette Lighter	15-4
Clock	15-4
Combination Meter	22-2
Cruise Control	2-9
Electronically Controlled Transmision and A/T Indicator	3-2
Engine Control	2-2
Engine Immobiliser System	2-11
Front Fog Light	4-4
Front Wiper and Washer	16-2
Garage Door Opener	9-4
Headlight (w/ Daytime Running Light)	4-2
Headlight (w/o Daytime Running Light)	5-2
Ignition	1-4
Illumination	7-2
Interior Light	9-3
Key Reminder	9-2
Light Auto Turn Off	17-2
Moon Roof	17-3
Multiplex Communication System	10-2
∗ Door Lock Control	
∗ Horn	
∗ Mirror Heater	
∗ Power Window (Rear)	
∗ Rear Window Defogger	
∗ Rear Wiper and Washer	
∗ Theft Deterrent	
∗ Wireless Door Lock Control	
Power Outlet	18-4
Power Seat	13-2
Power Source	1~24-1
Power Window	11-2
Radio and Player	21-3
Rear Heater	24-6
Remote Control Mirror	12-2
Seat Belt Warning	9-2
Seat Heater	14-2
Shift Lock	15-2
SRS	18-2
Starting	1-2
Stop Light	5-4
Taillight	6-2
Trailer Towing	14-4
Turn Signal and Hazard Warning Light	8-2
VSC	19-2
4WD	20-2

1 4RUNNER ELECTRICAL WIRING DIAGRAM



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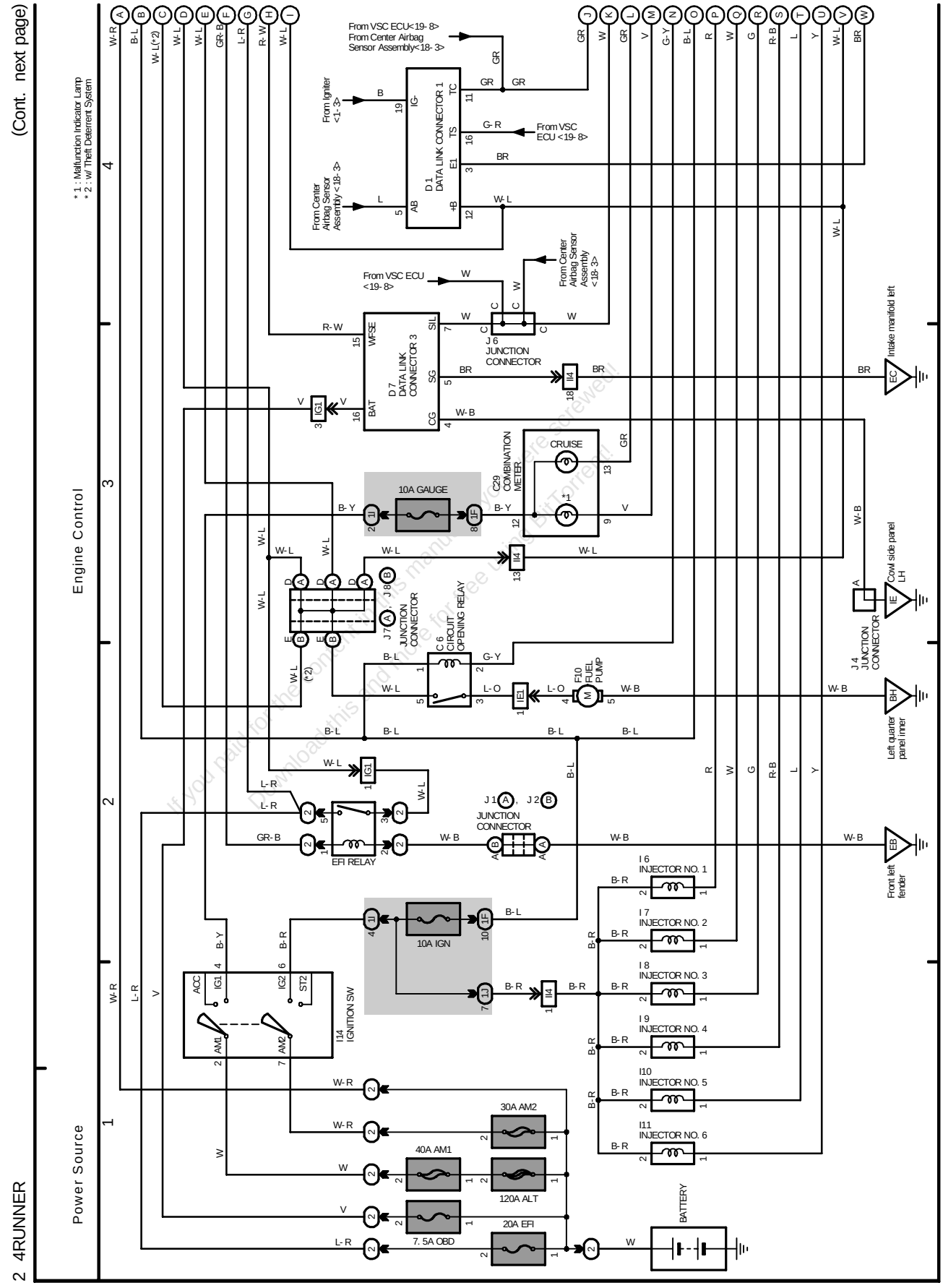

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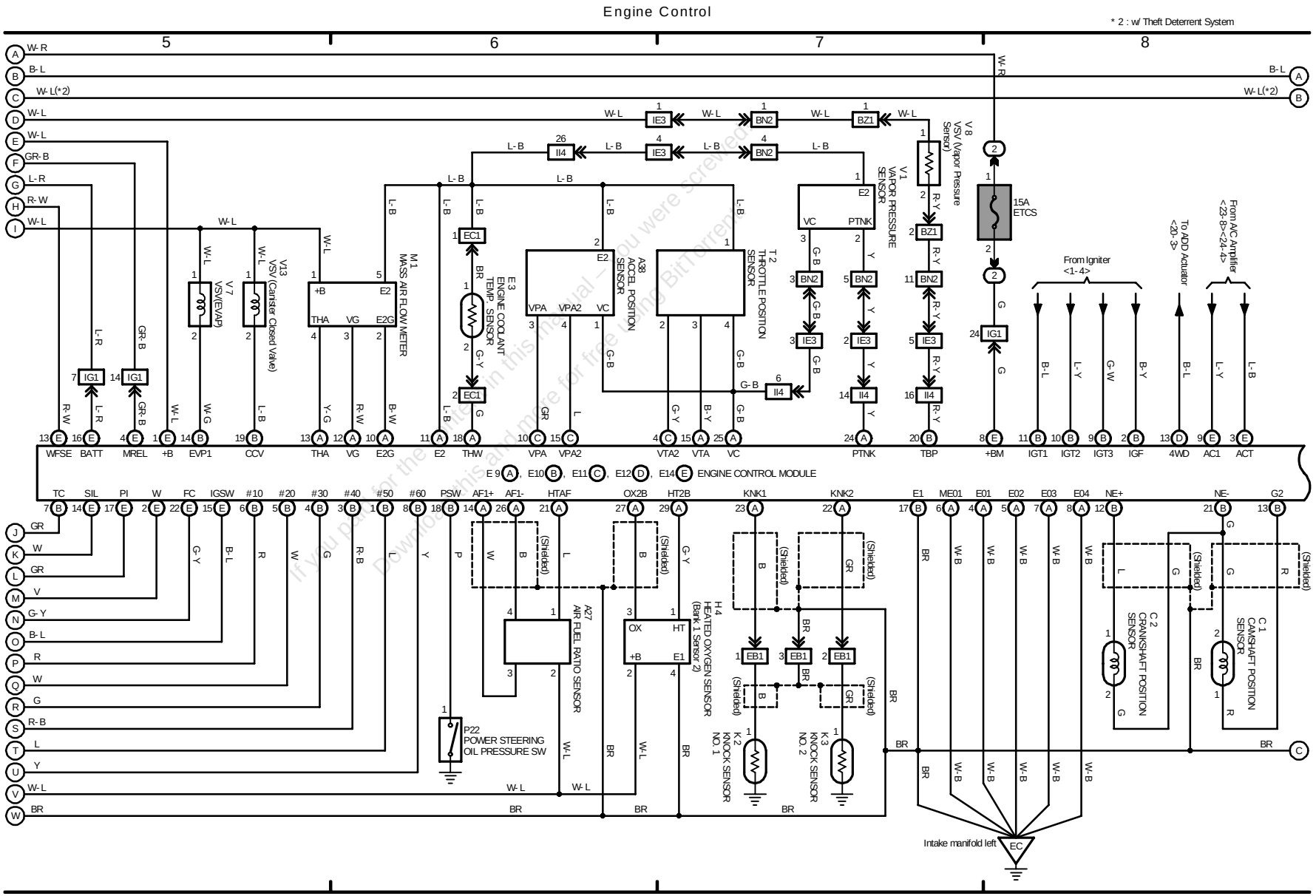

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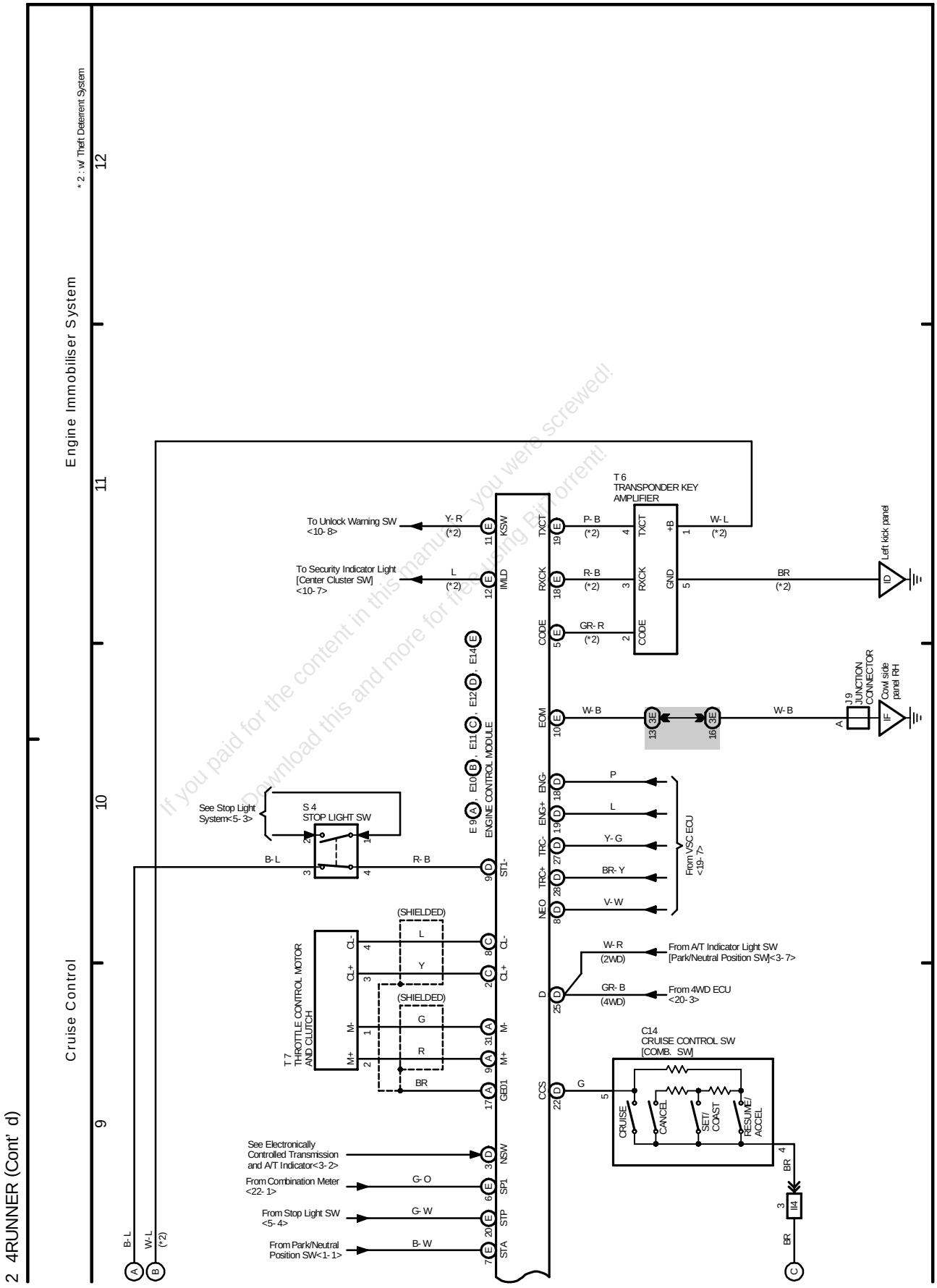

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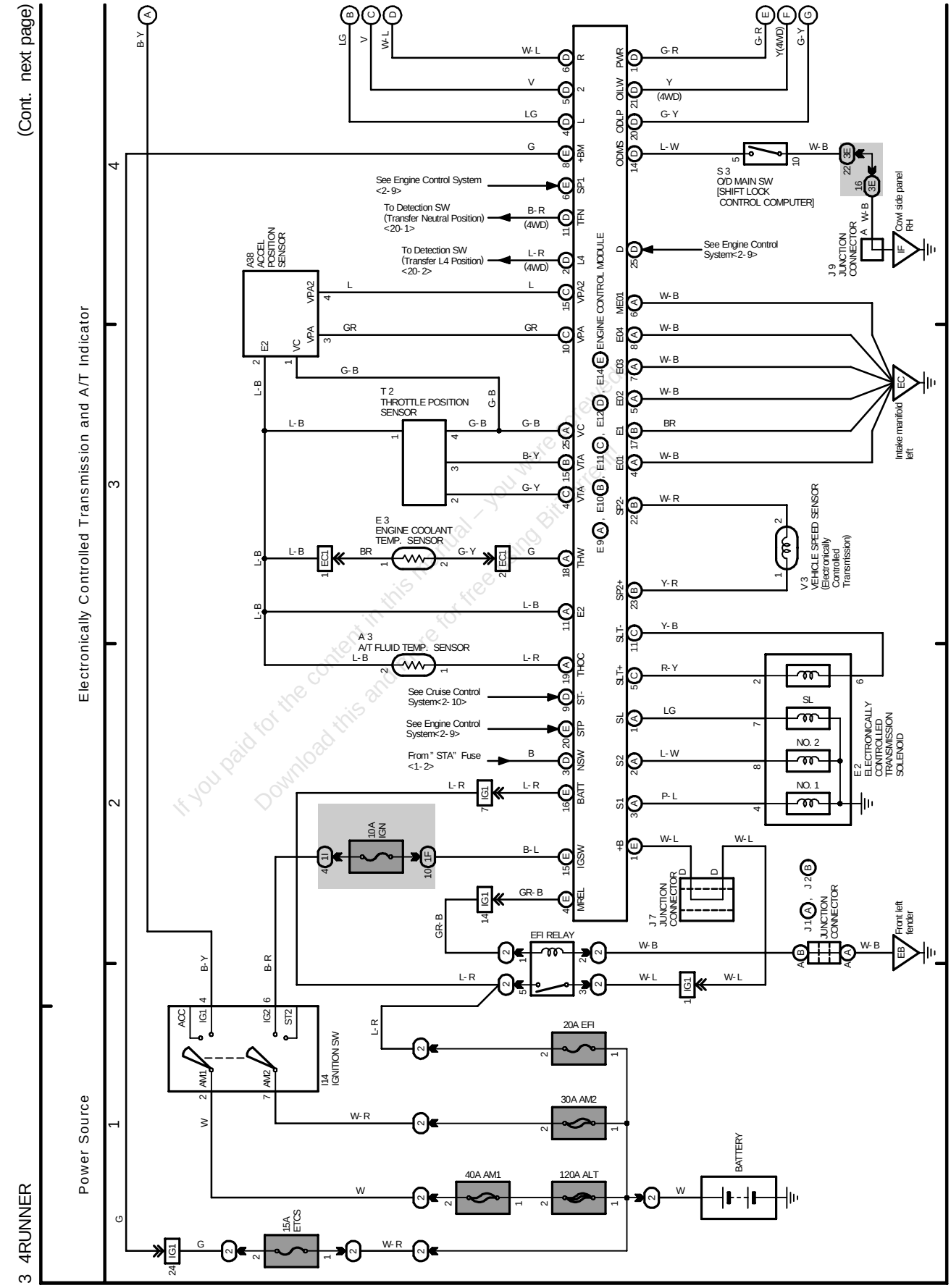

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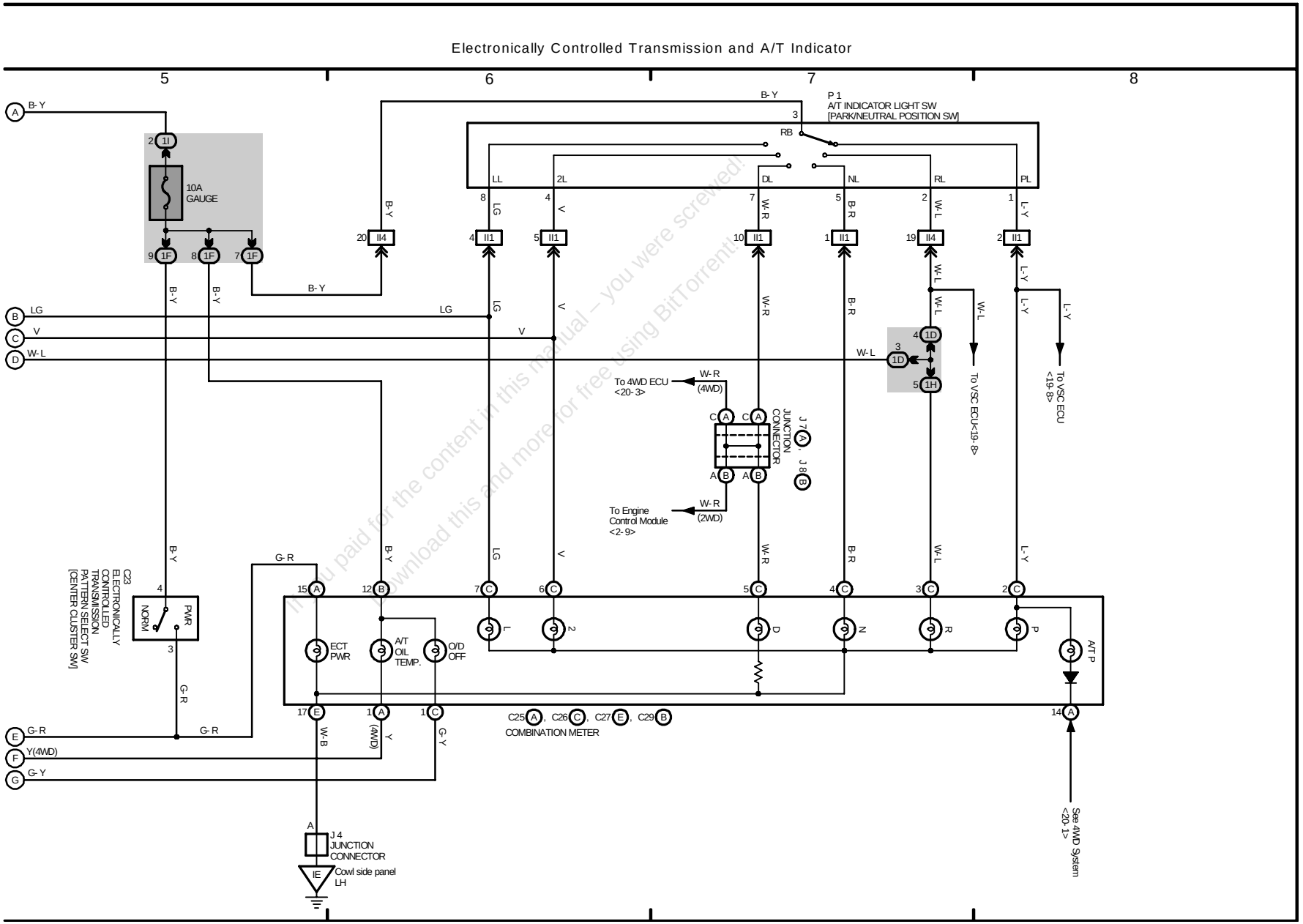

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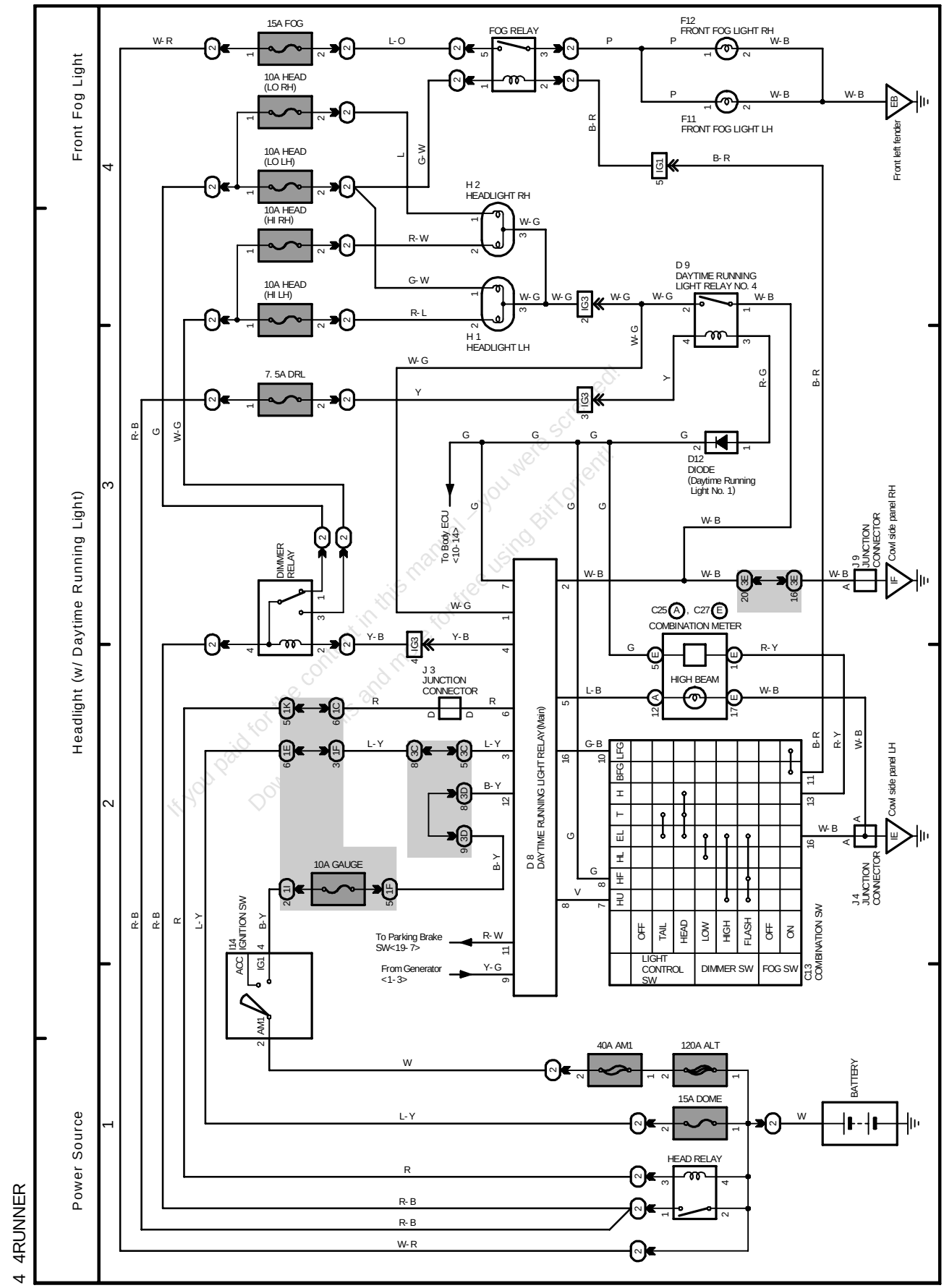

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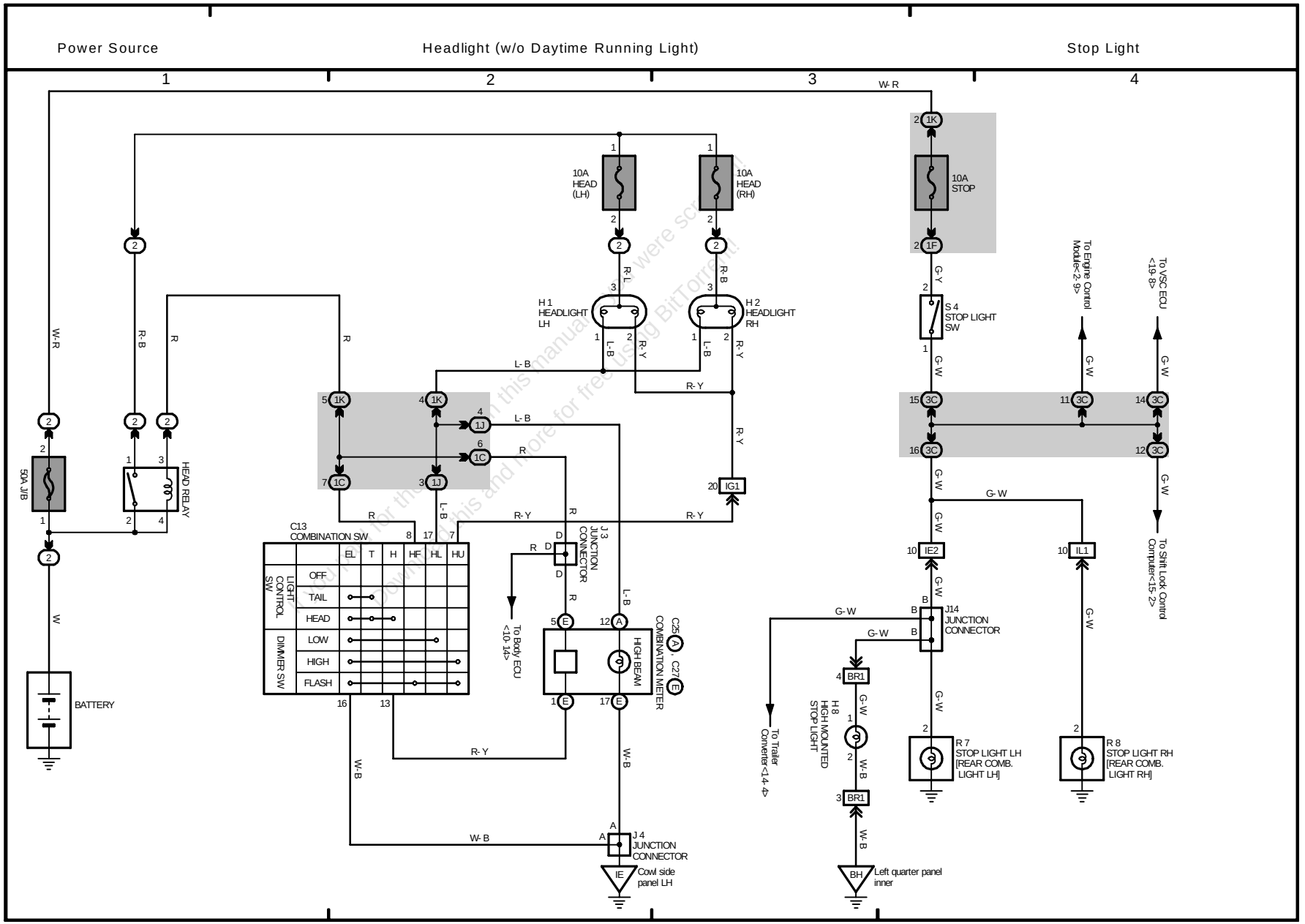

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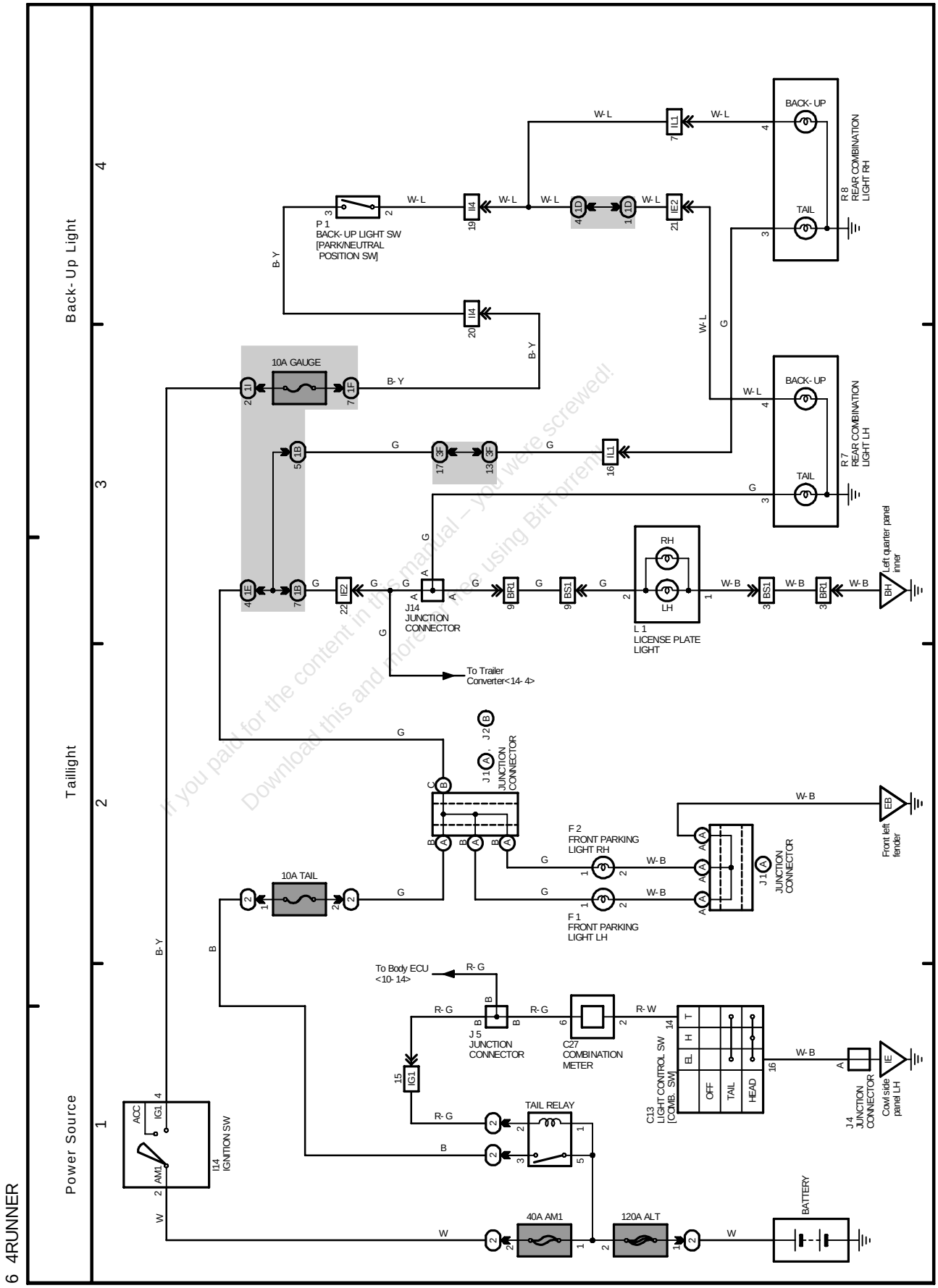

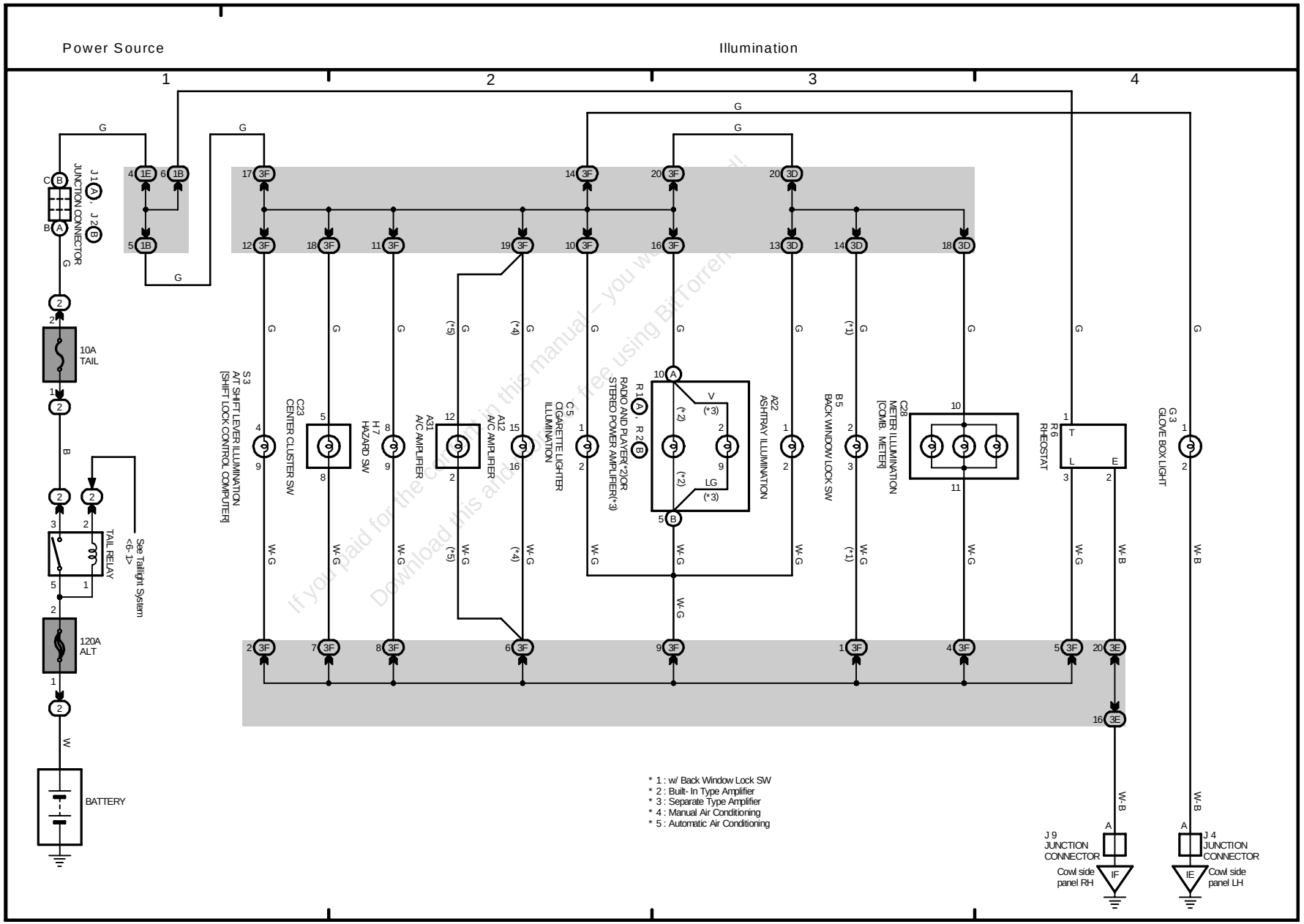

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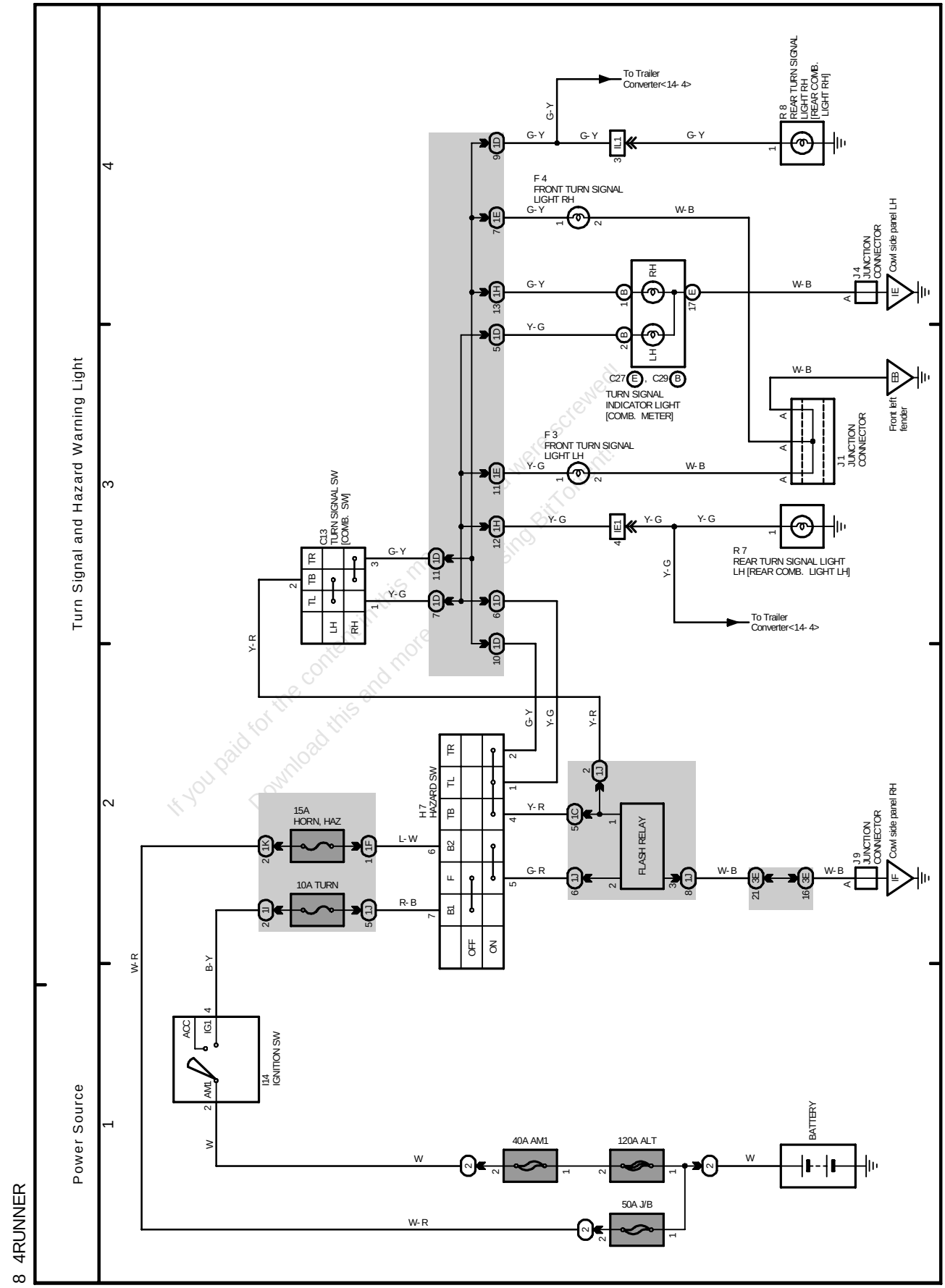

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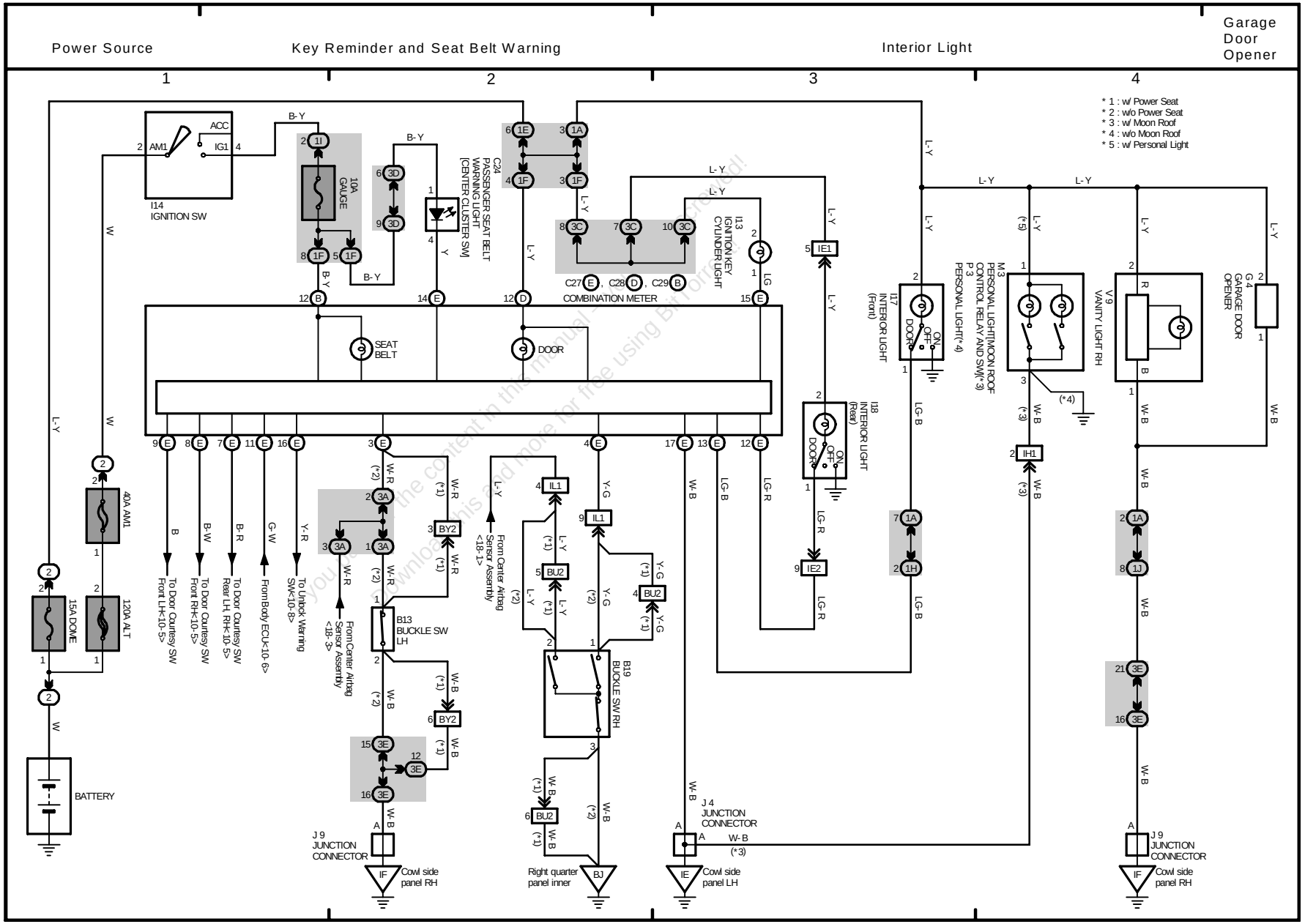

2002 4RUNNER (EWD471U)

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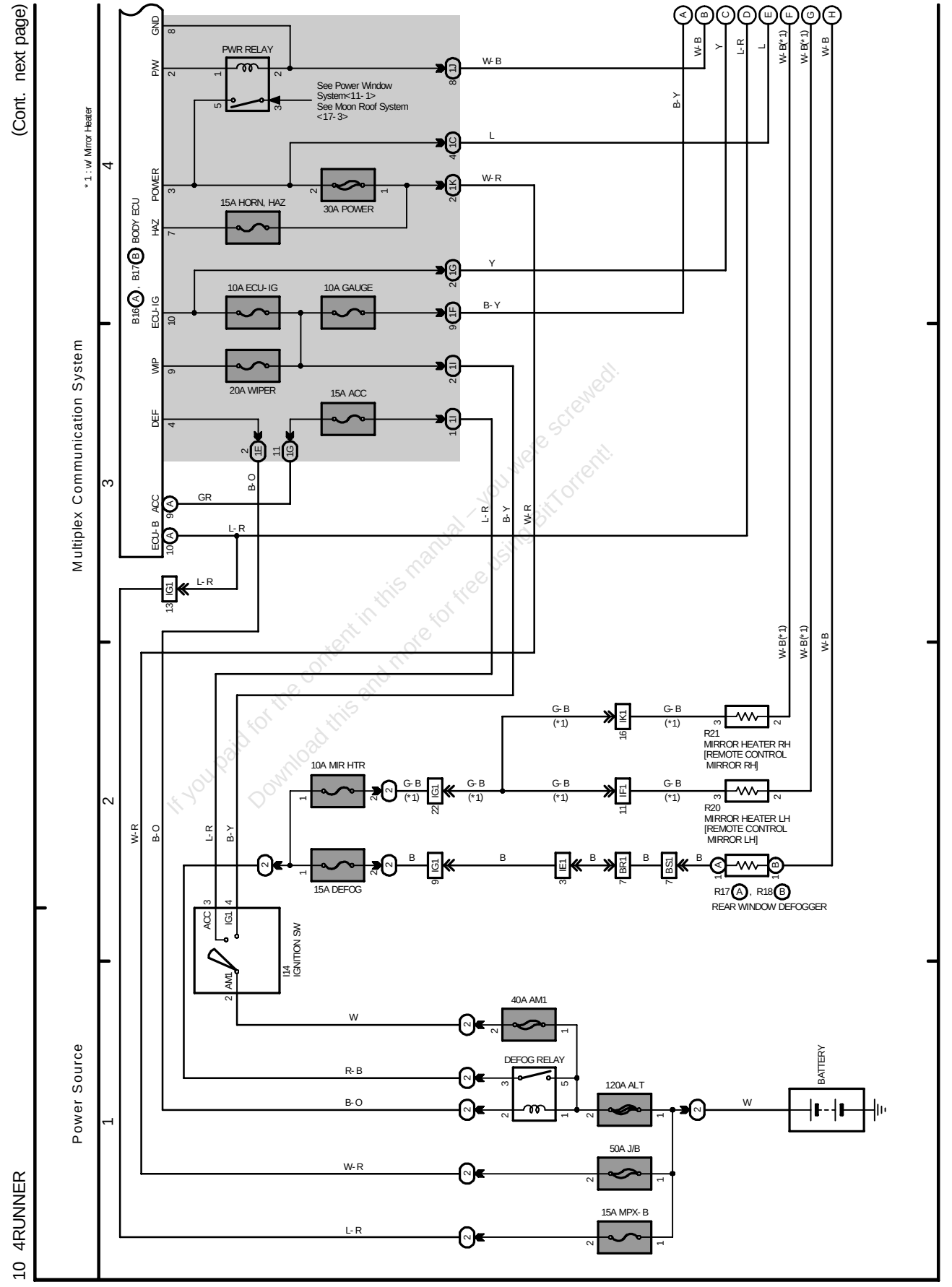

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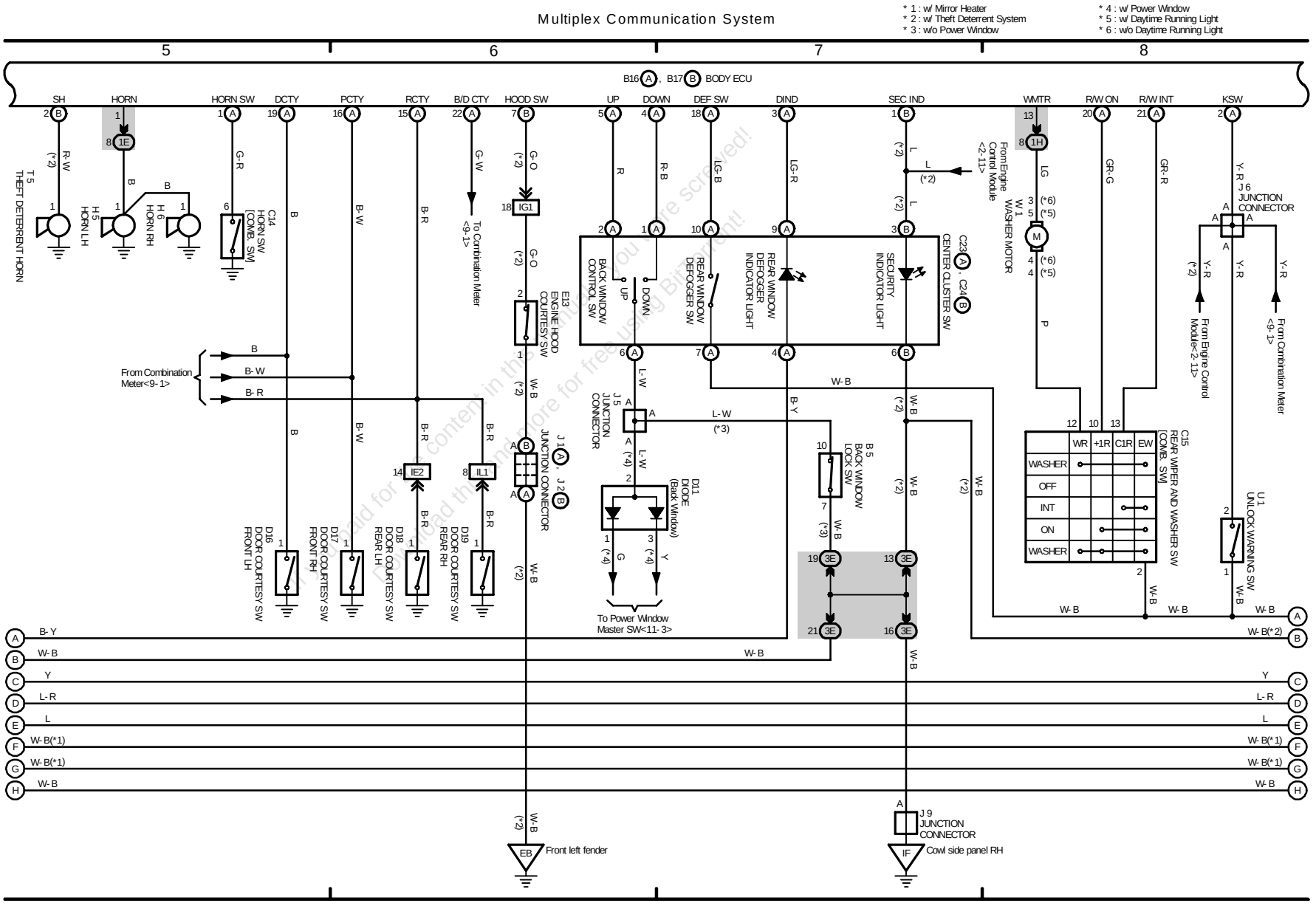

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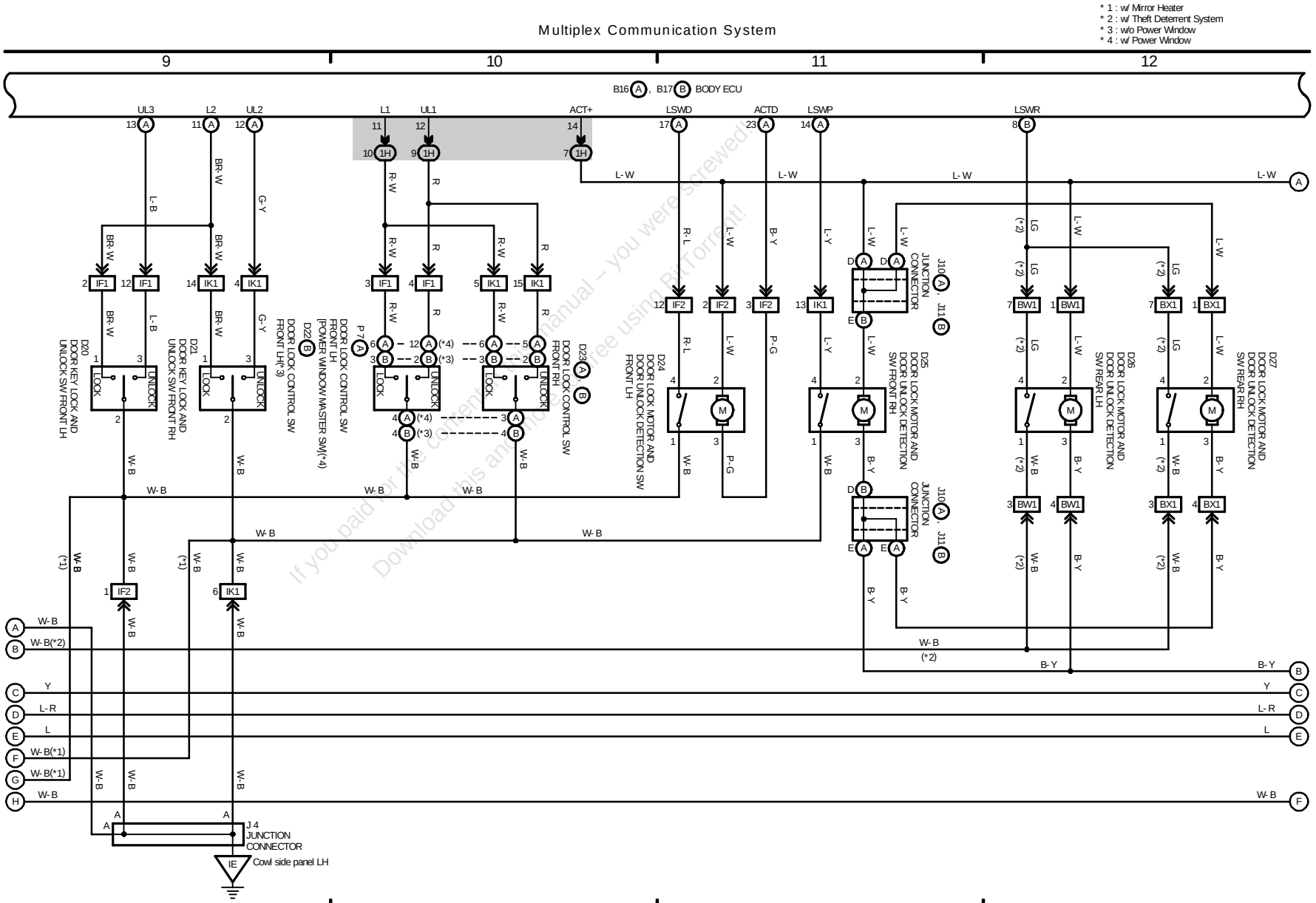

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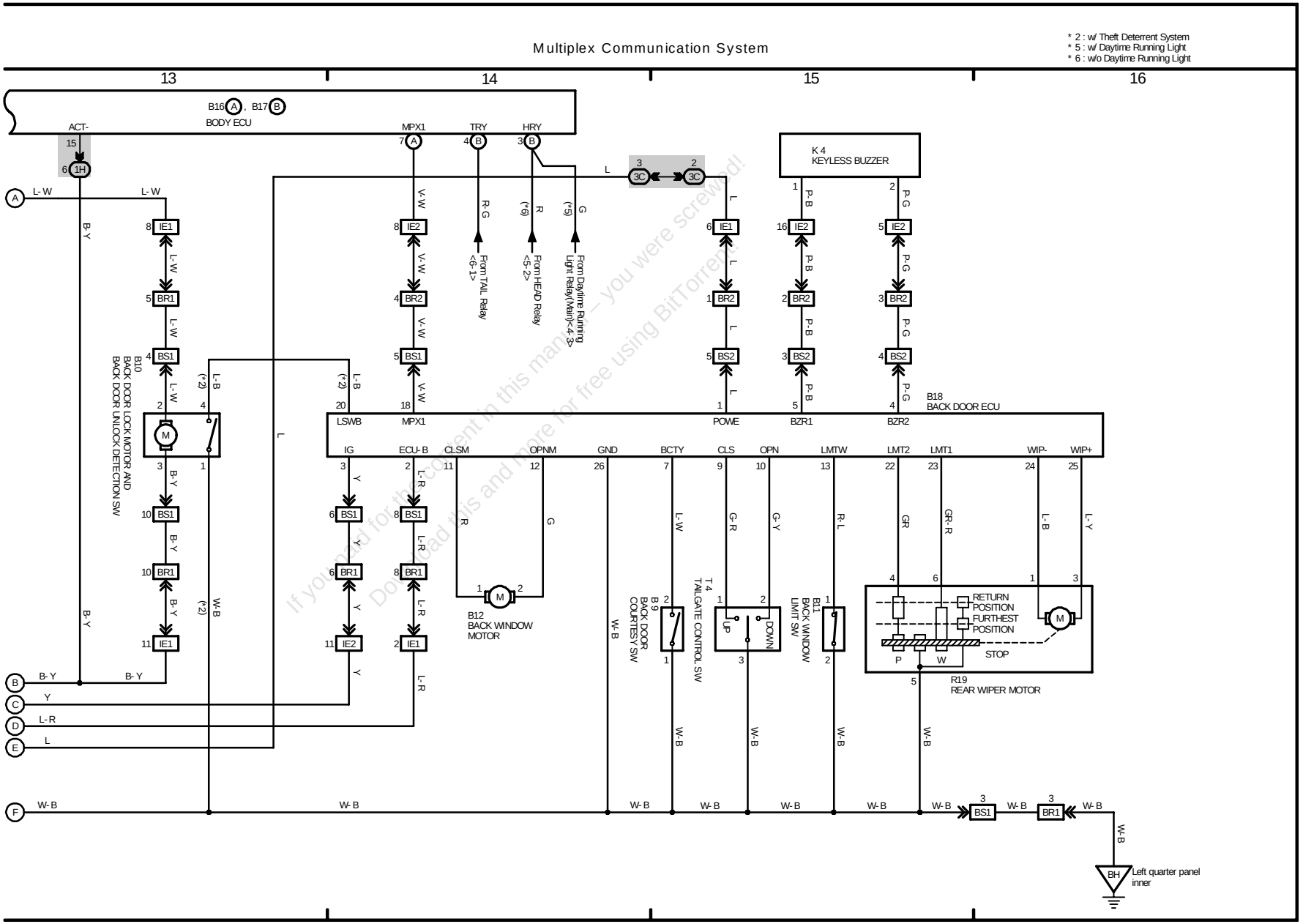

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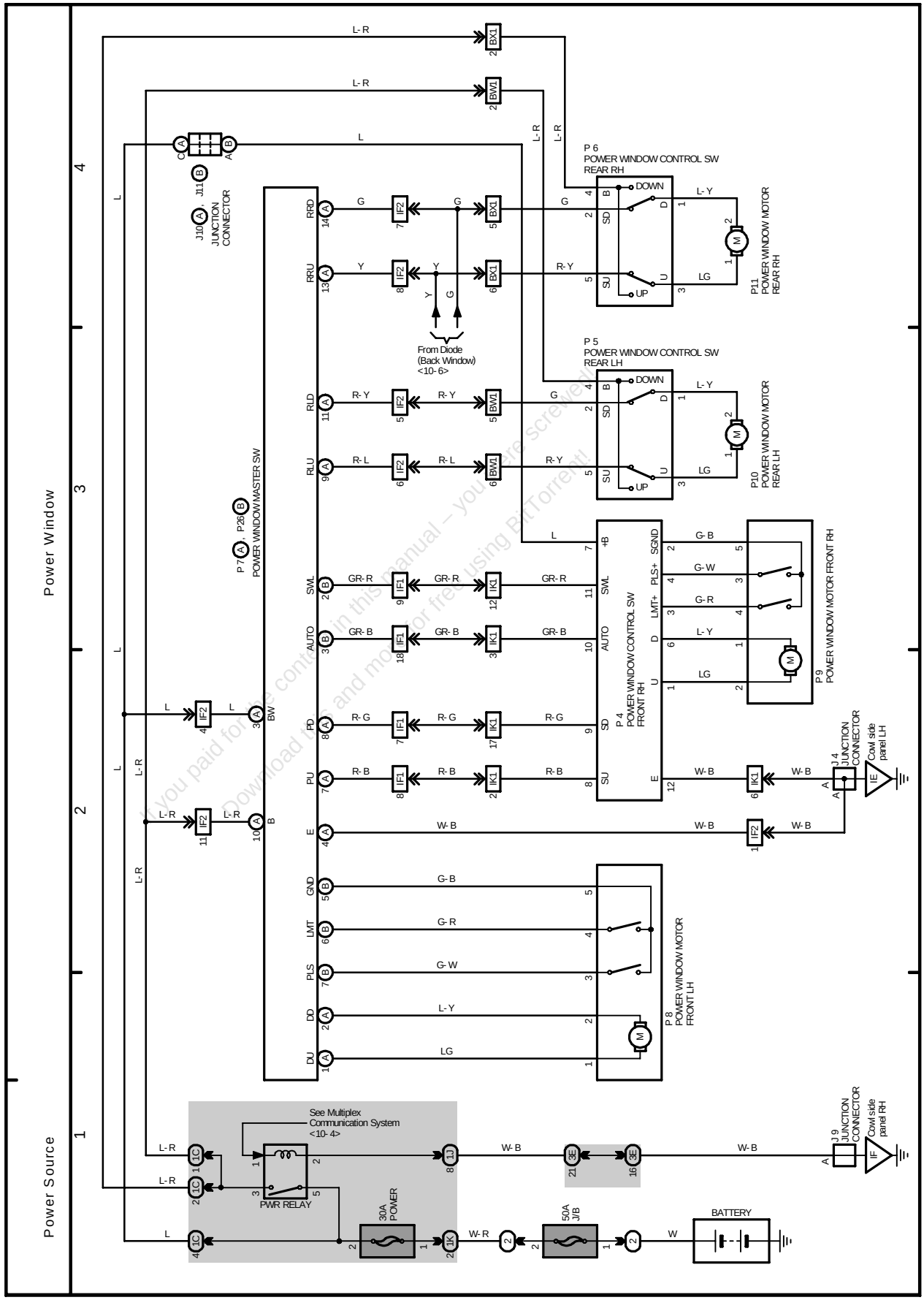

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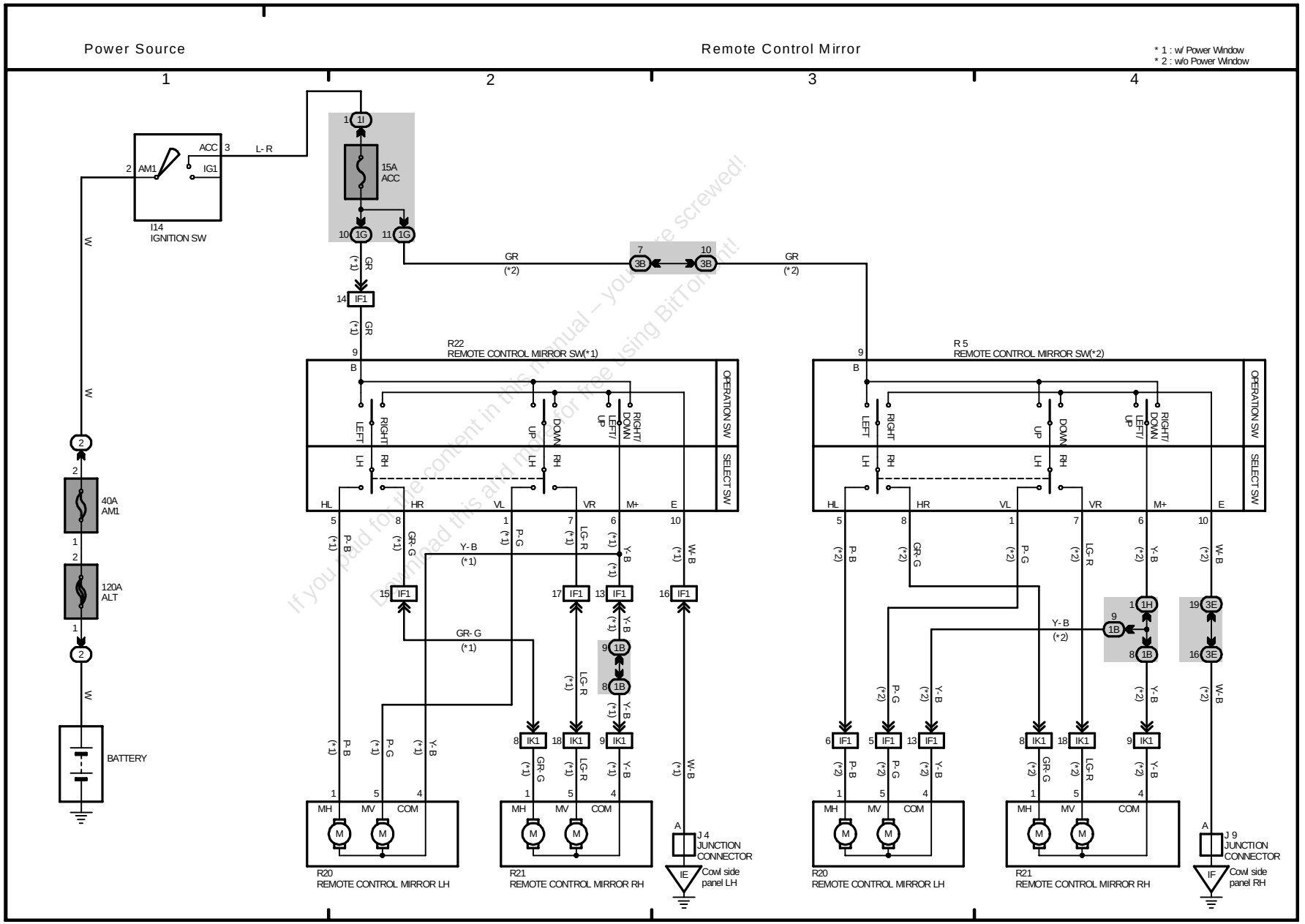

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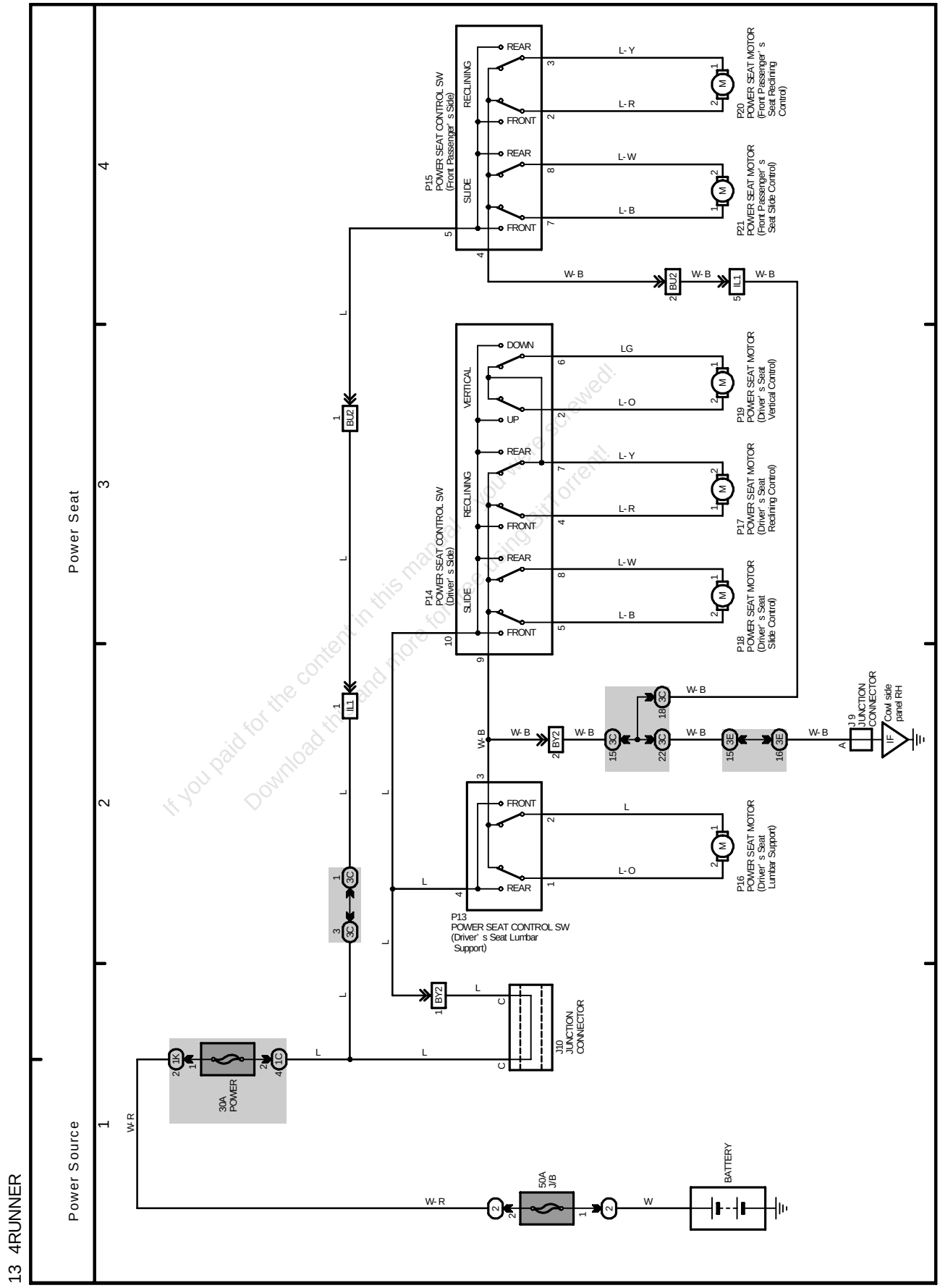

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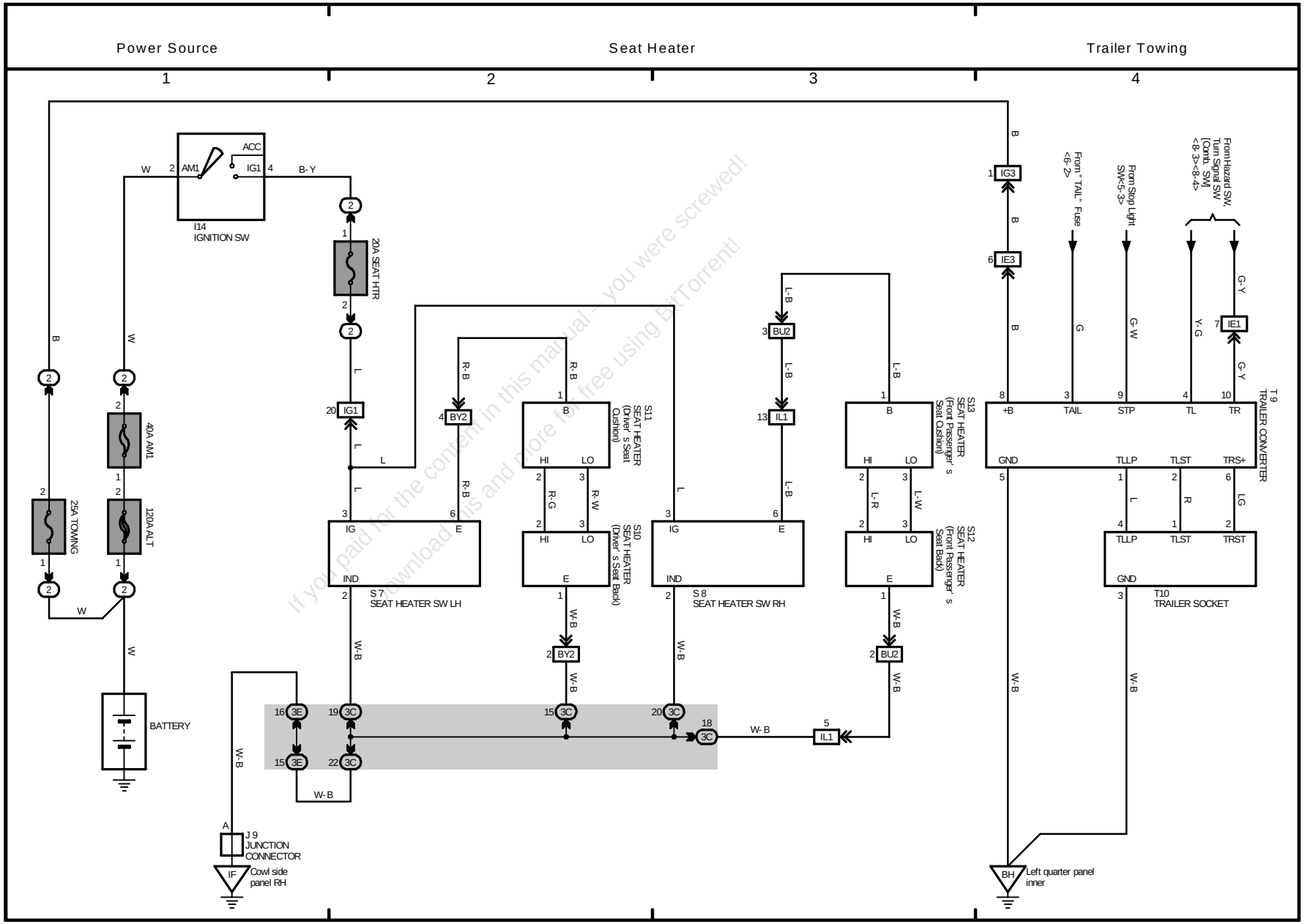

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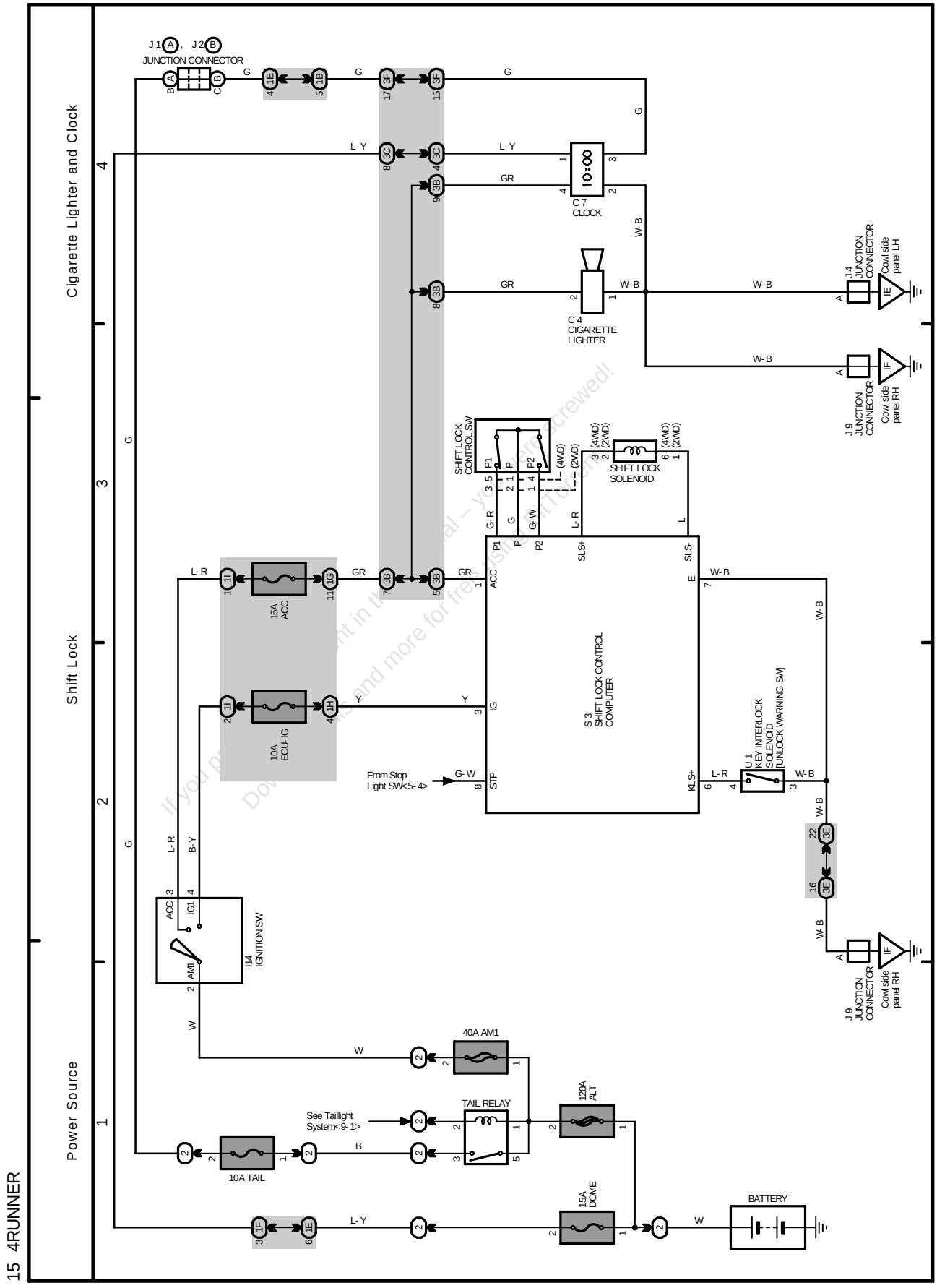
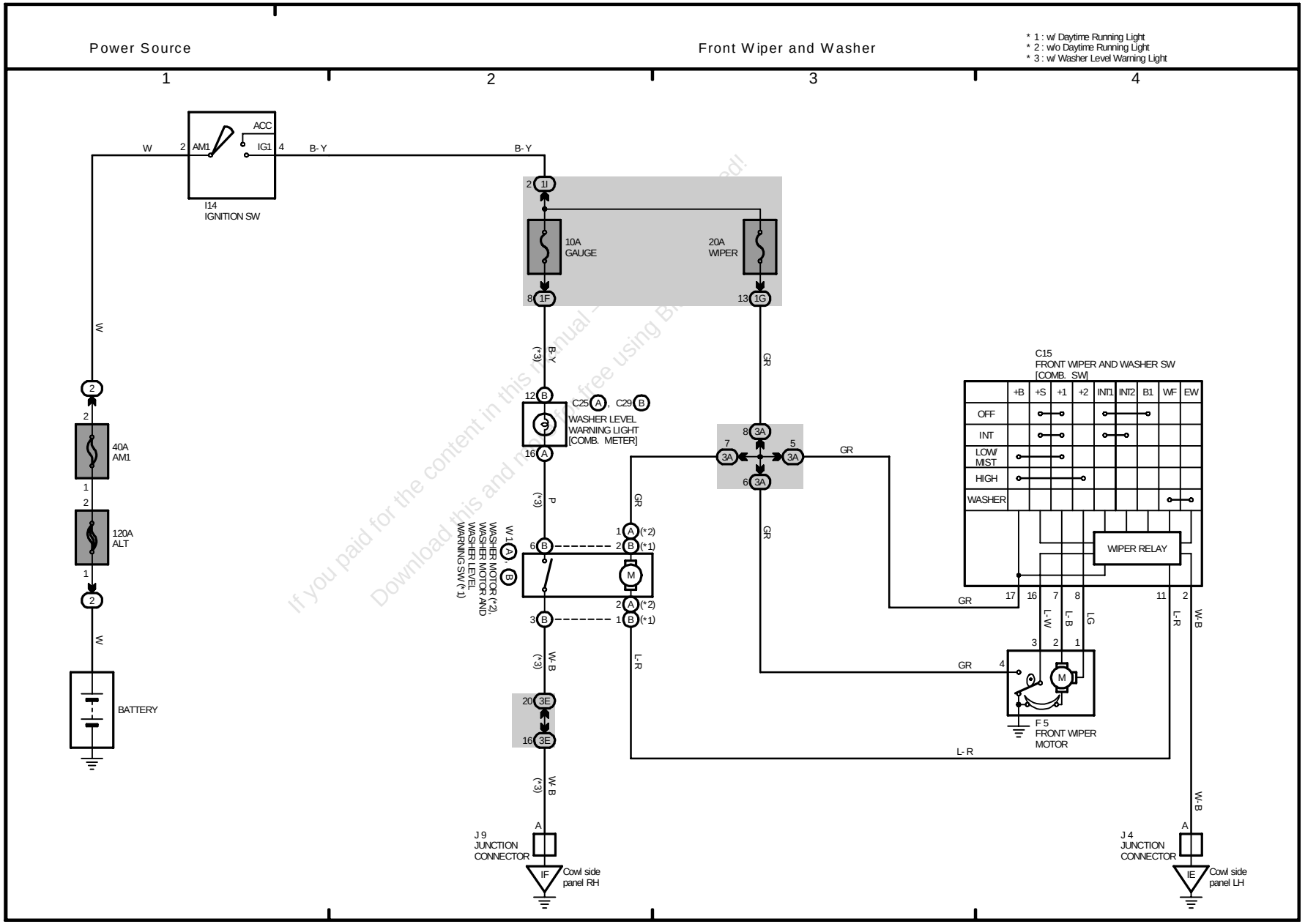


15 4RUNNER



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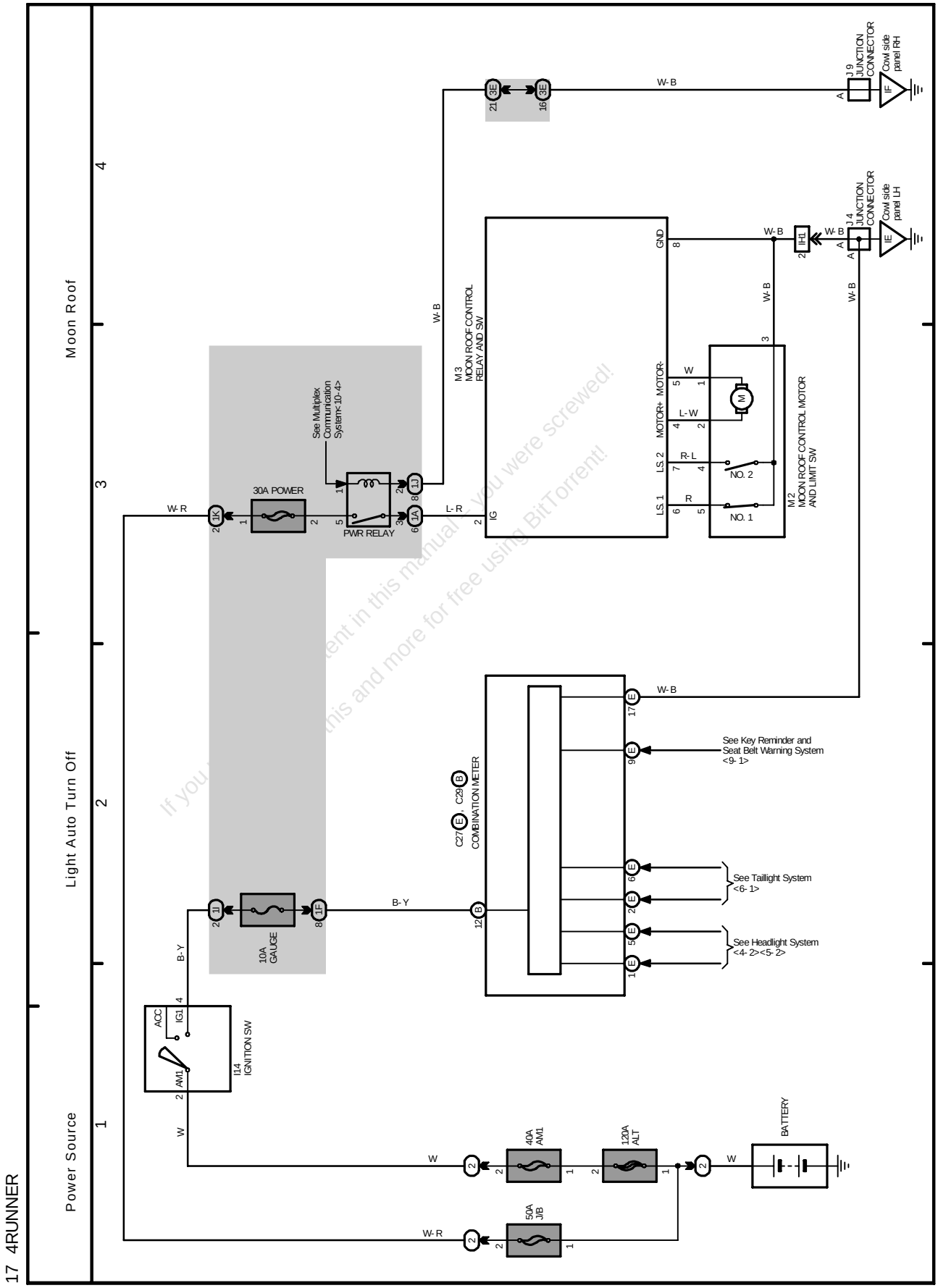

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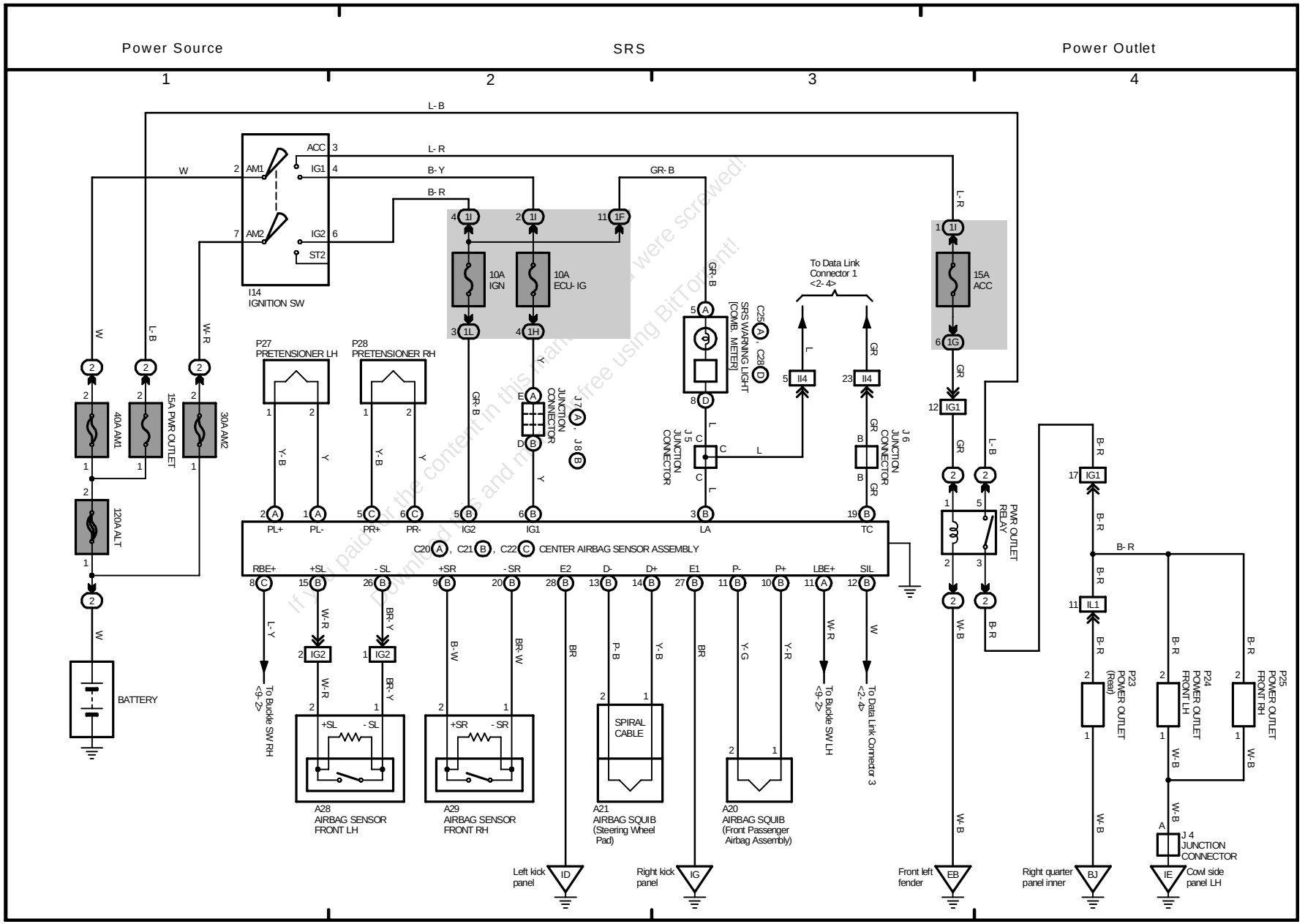

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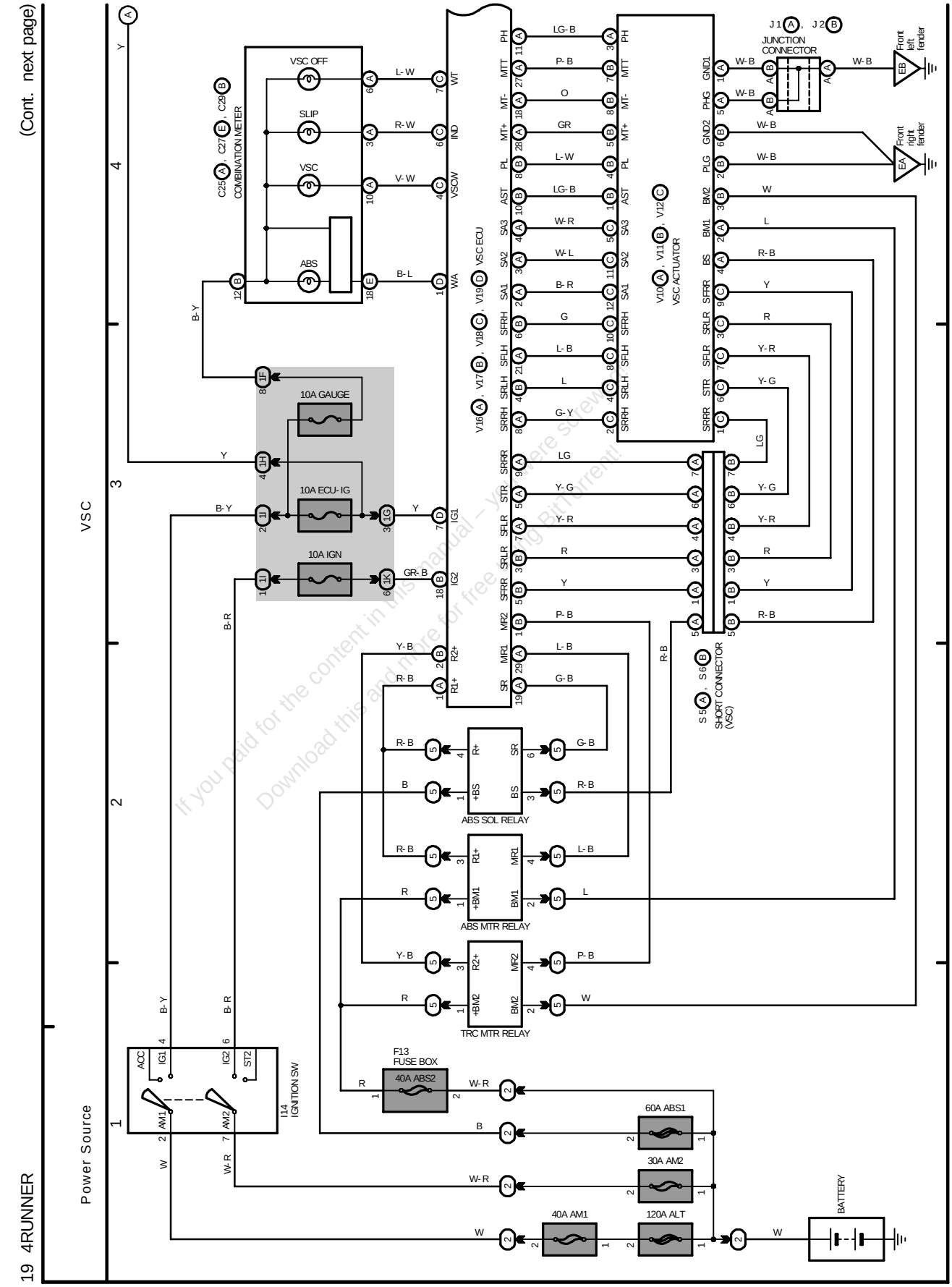

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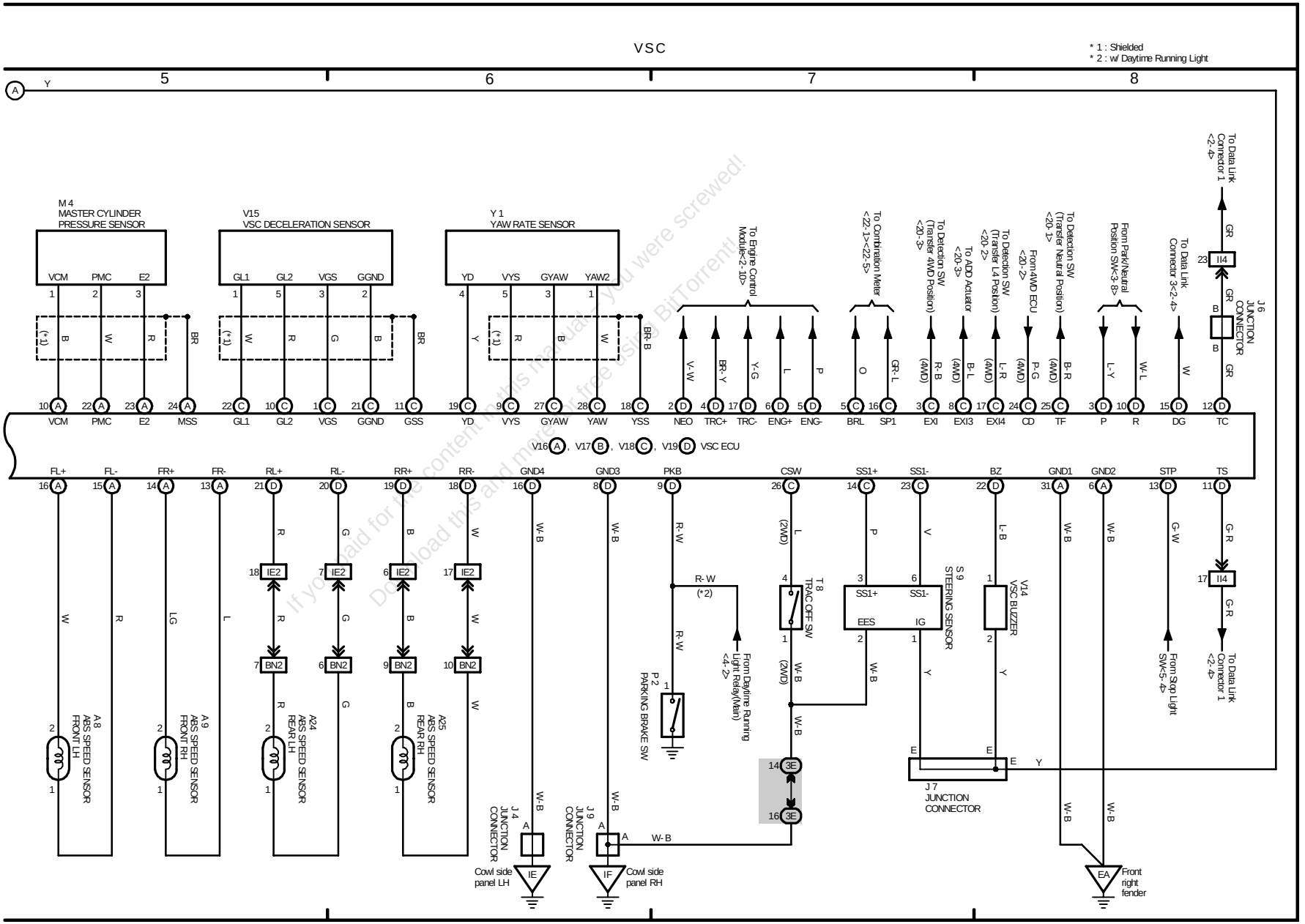

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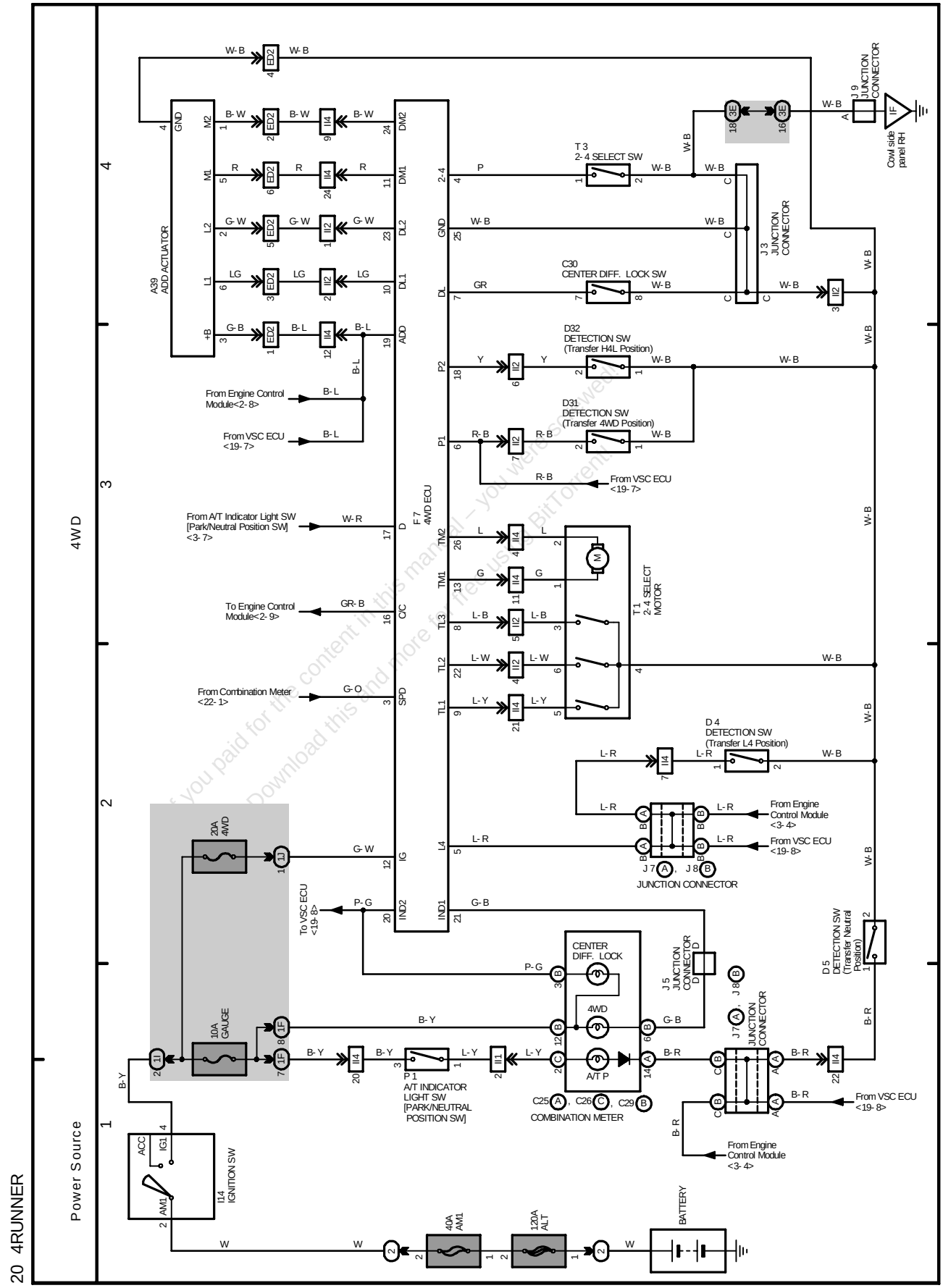

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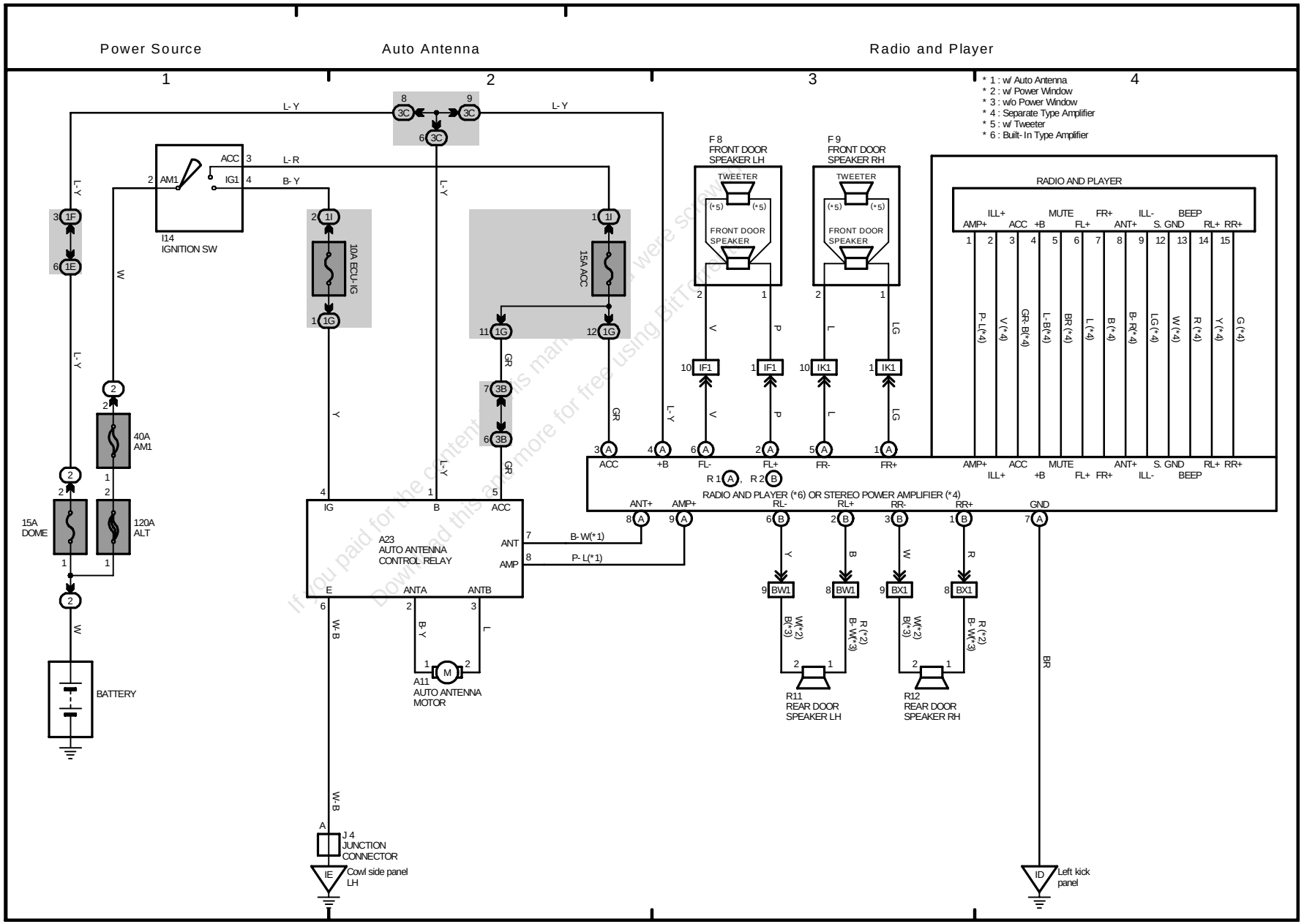

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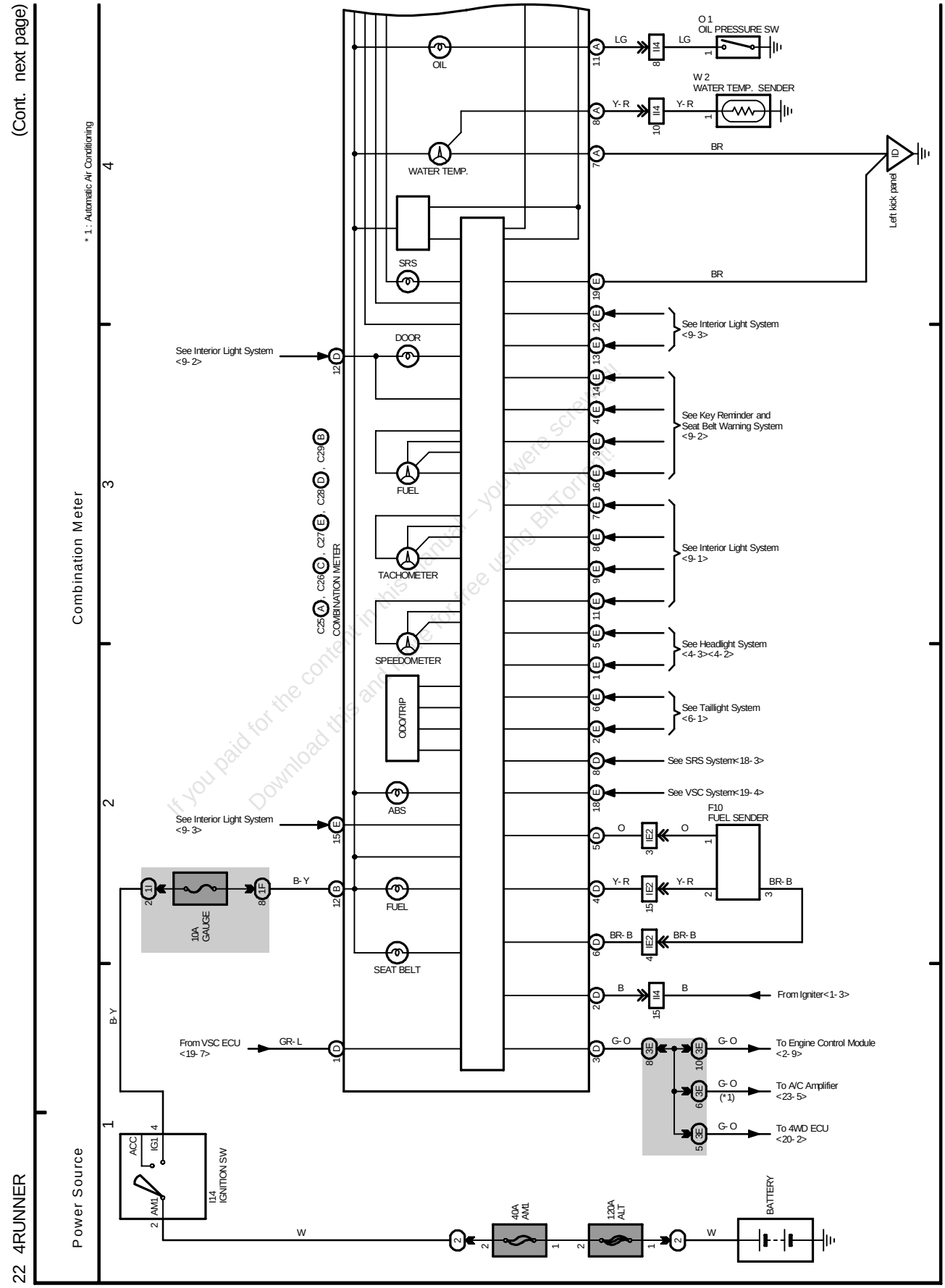

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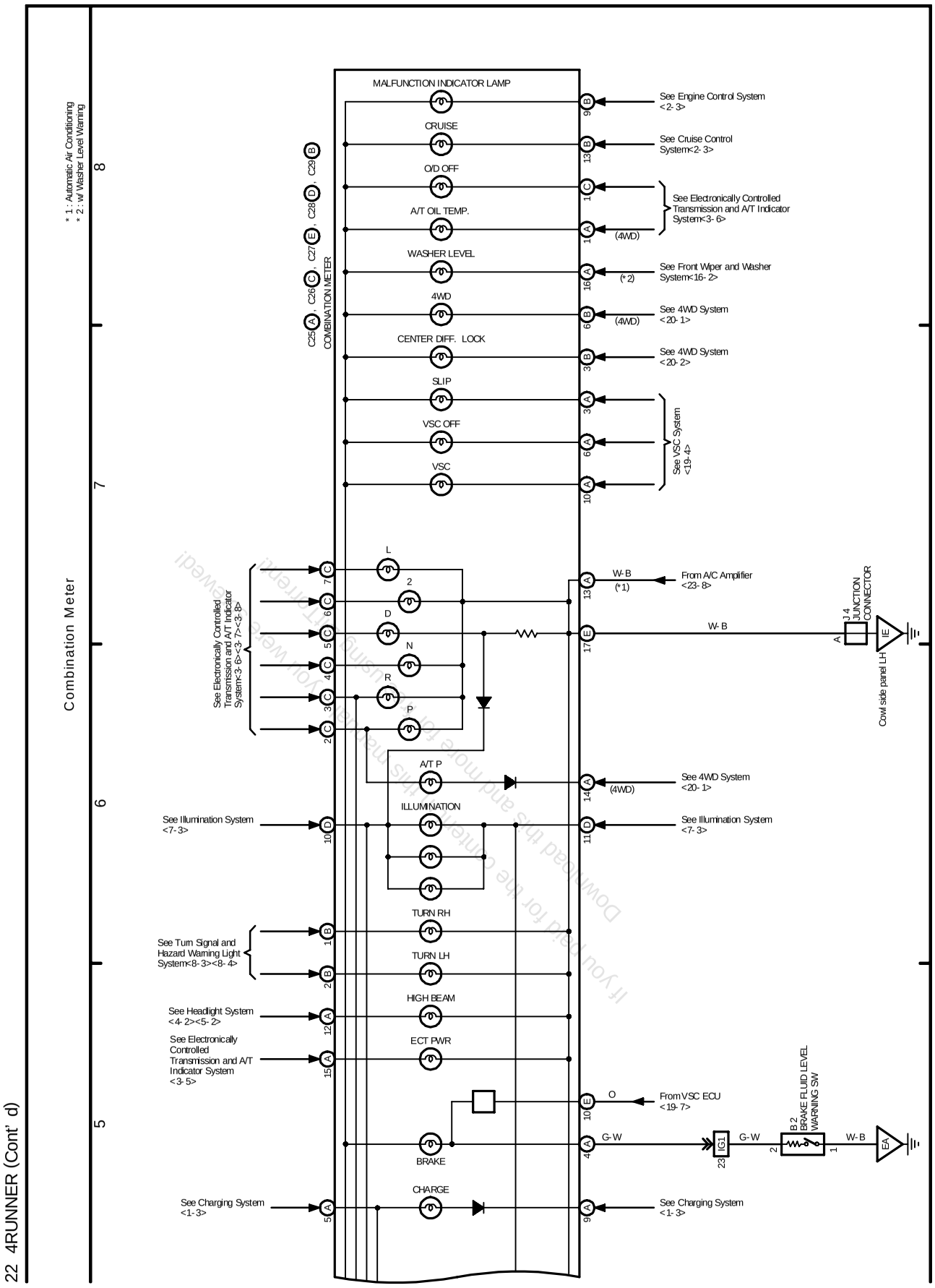
* 1 : Automatic Air Conditioning
* 2 : w/ Washer Level Warning
Combination Meter
22 4RUNNER (Cont' d)
COMBINATION METER
C25 (A), C26 (C), C27 (E), C28 (D), C29 (B)
MALFUNCTION INDICATOR LAMP
See Engine Control System <2- 3>
CRUISE
See Cruise Control System<2- 3>
O/D OFF
A/T OIL TEMP.
See Electronically Controlled Transmission and A/T Indicator System<3- 6>
(4WD)
WASHER LEVEL
See Front Wiper and Washer System<16- 2>
(* 2)
4WD
See 4WD System <20- 1>
(4WD)
CENTER DIFF. LOCK
See 4WD System <20- 2>
SLIP
VSC OFF
VSC
See VSC System <19- 4>
See Electronically Controlled Transmission and A/T Indicator System<3- 6><3- 7><3- 8>
L
2
D
N
R
P
W-B
(*1)
From A/C Amplifier <23- 8>
W-B
J 4 JUNCTION CONNECTOR
Cowl side panel LH
A/T P
See 4WD System <20- 1>
(4WD)
See Illumination System <7- 3>
ILLUMINATION
See Illumination System <7- 3>
TURN RH
See Turn Signal and Hazard Warning Light System<8- 3><8- 4>
TURN LH
HIGH BEAM
See Headlight System <4- 2><5- 2>
See Electronically Controlled Transmission and A/T Indicator System <3- 5>
ECT PWR
O
From VSC ECU <19- 7>
G-W
IG1
G-W
B 2 BRAKE FLUID LEVEL WARNING SW
W-B
EA
BRAKE
CHARGE
See Charging System <1- 3>
See Charging System <1- 3>
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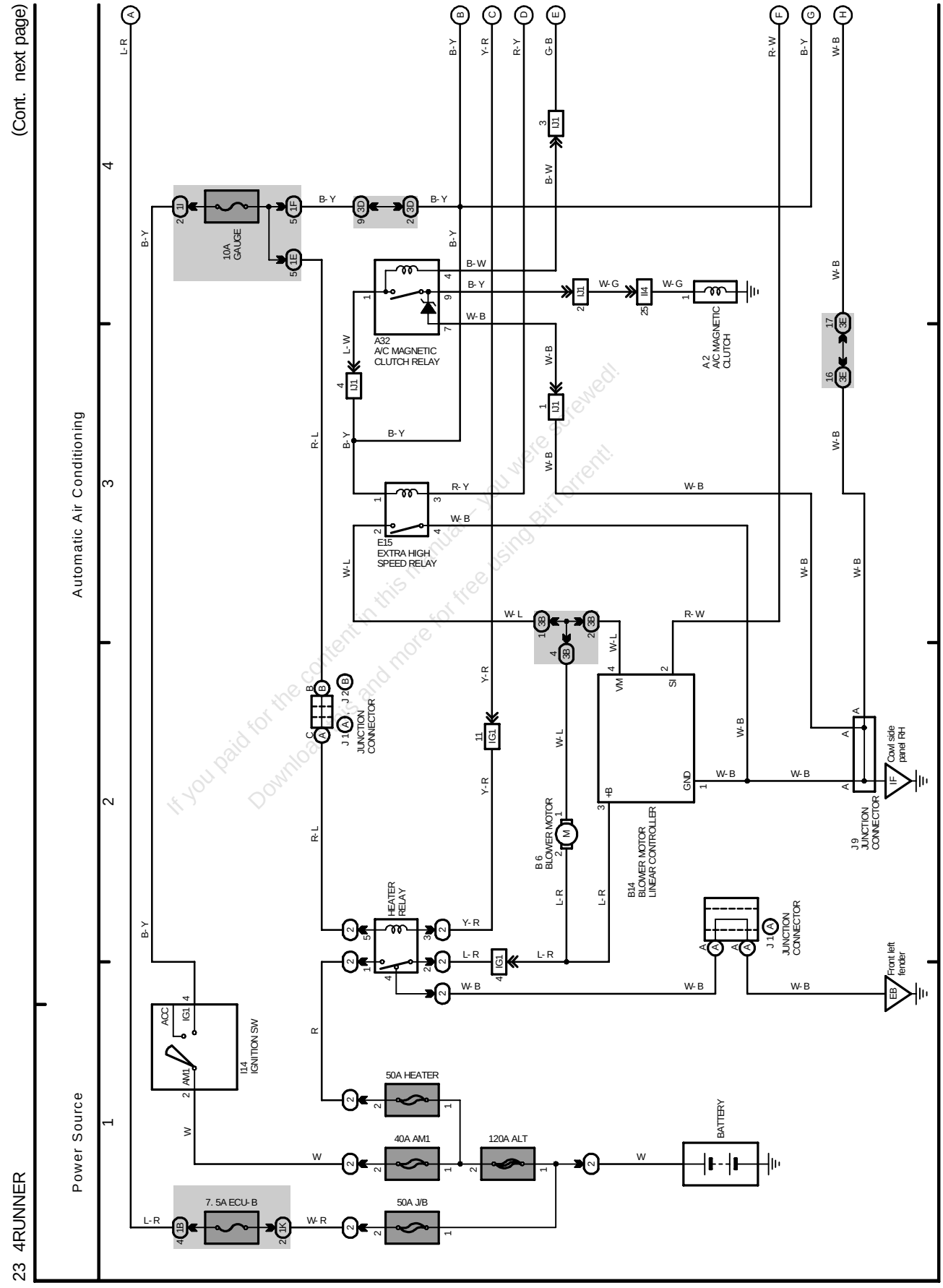

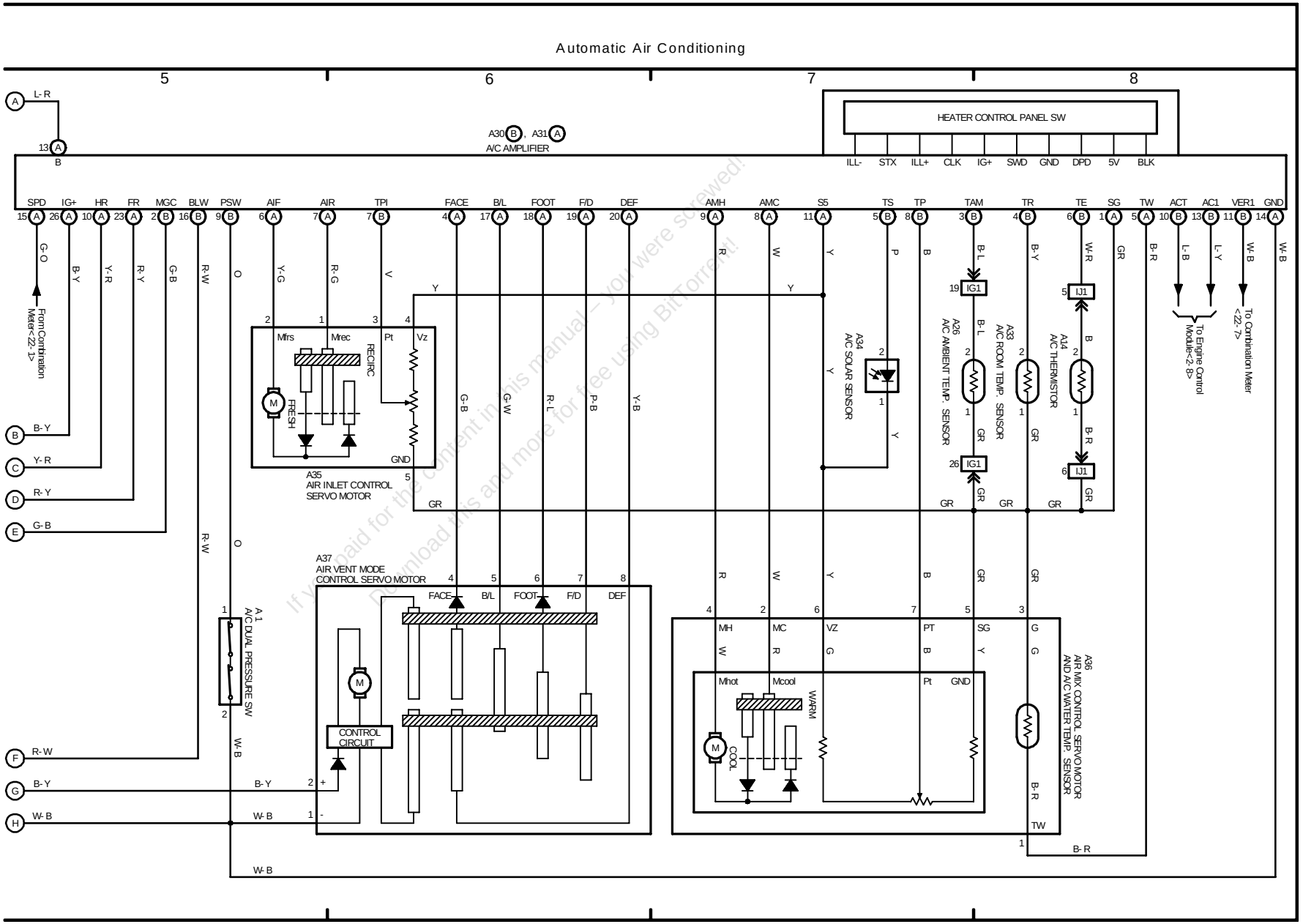

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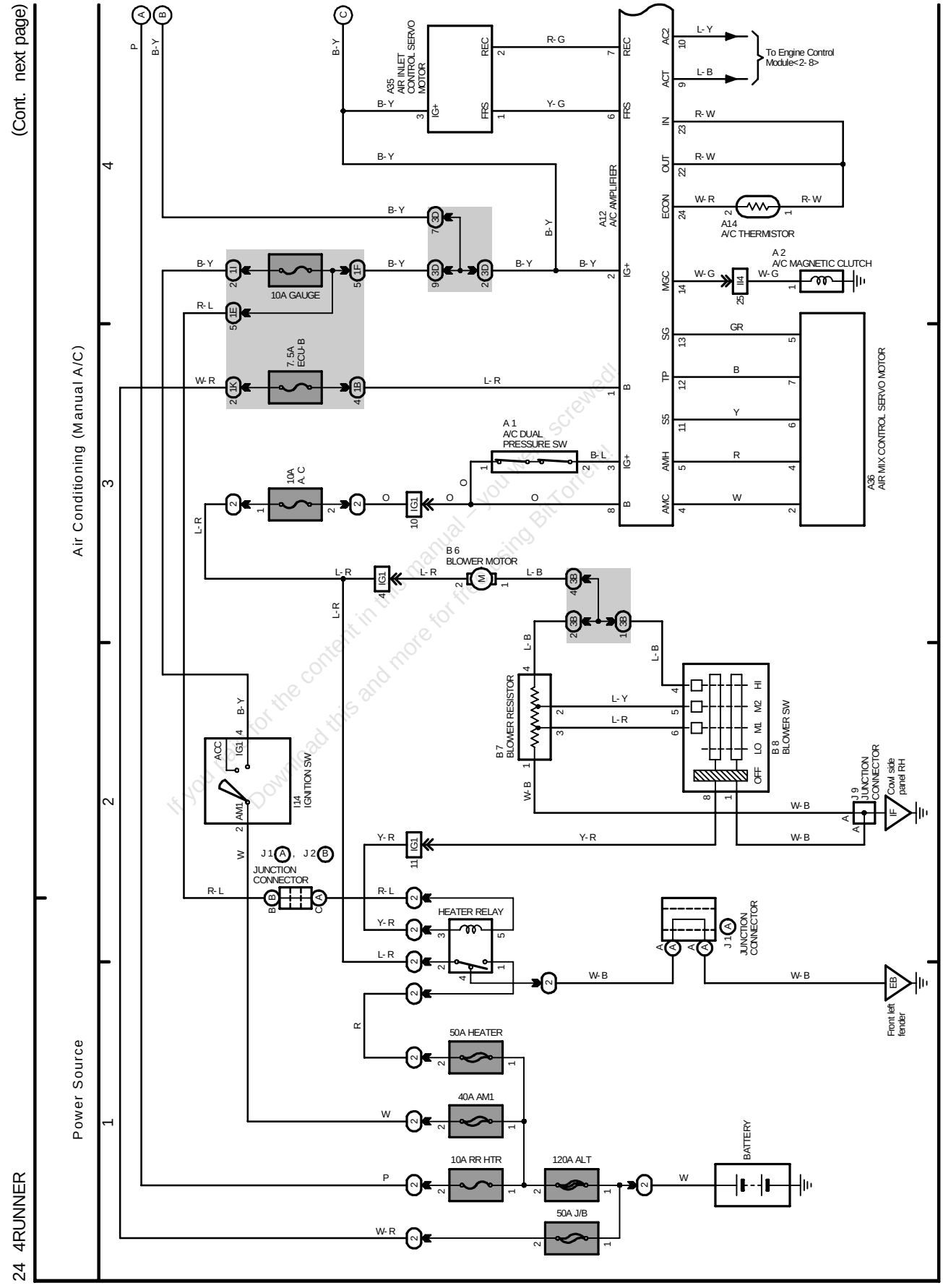

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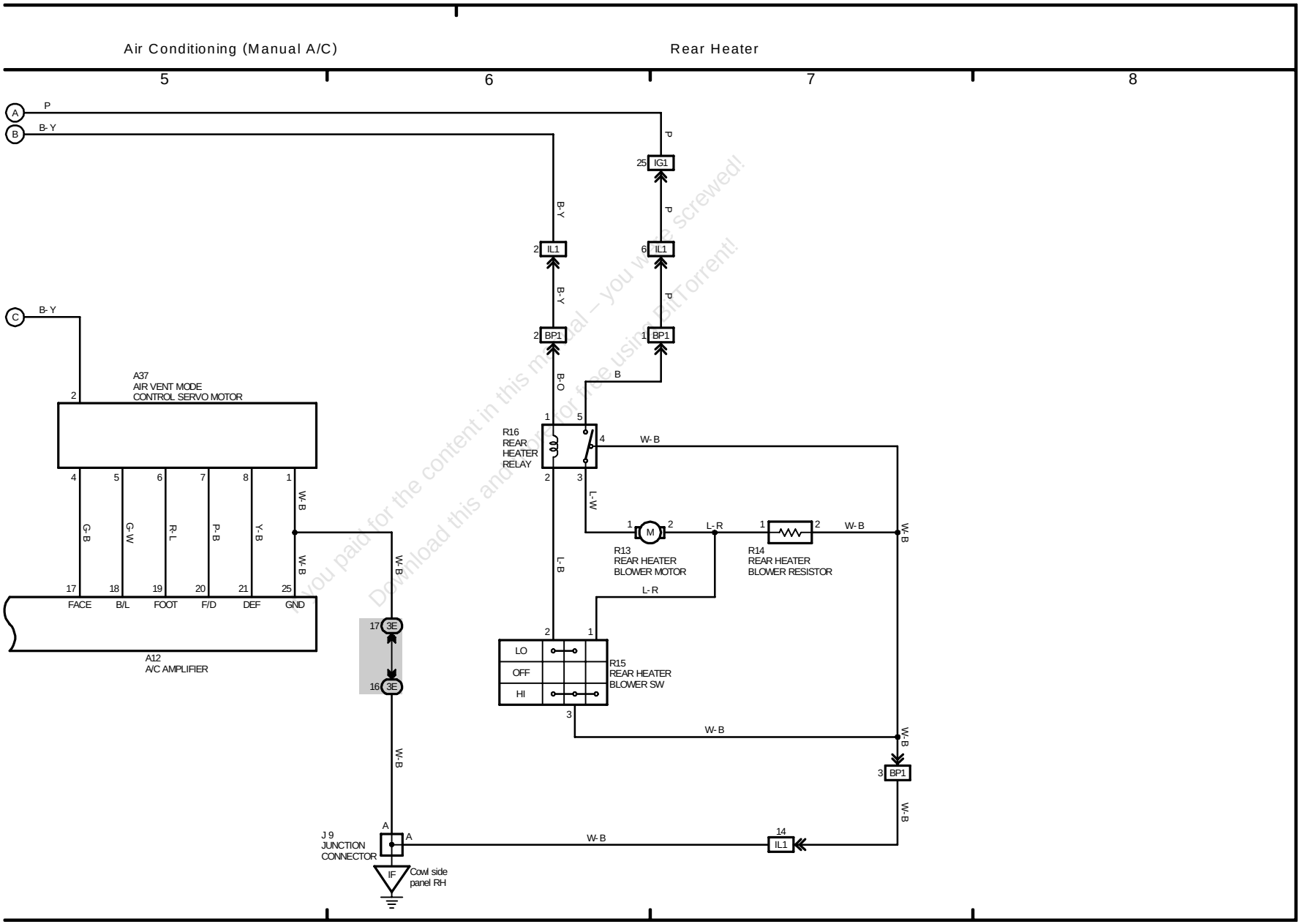

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