

LEXUS LS400 MANUAL (YEAR 2000)

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HOW TO USE THIS MANUAL

GENERAL INFORMATION

IN03H-05

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-22](#).

Be sure to read this before performing troubleshooting.

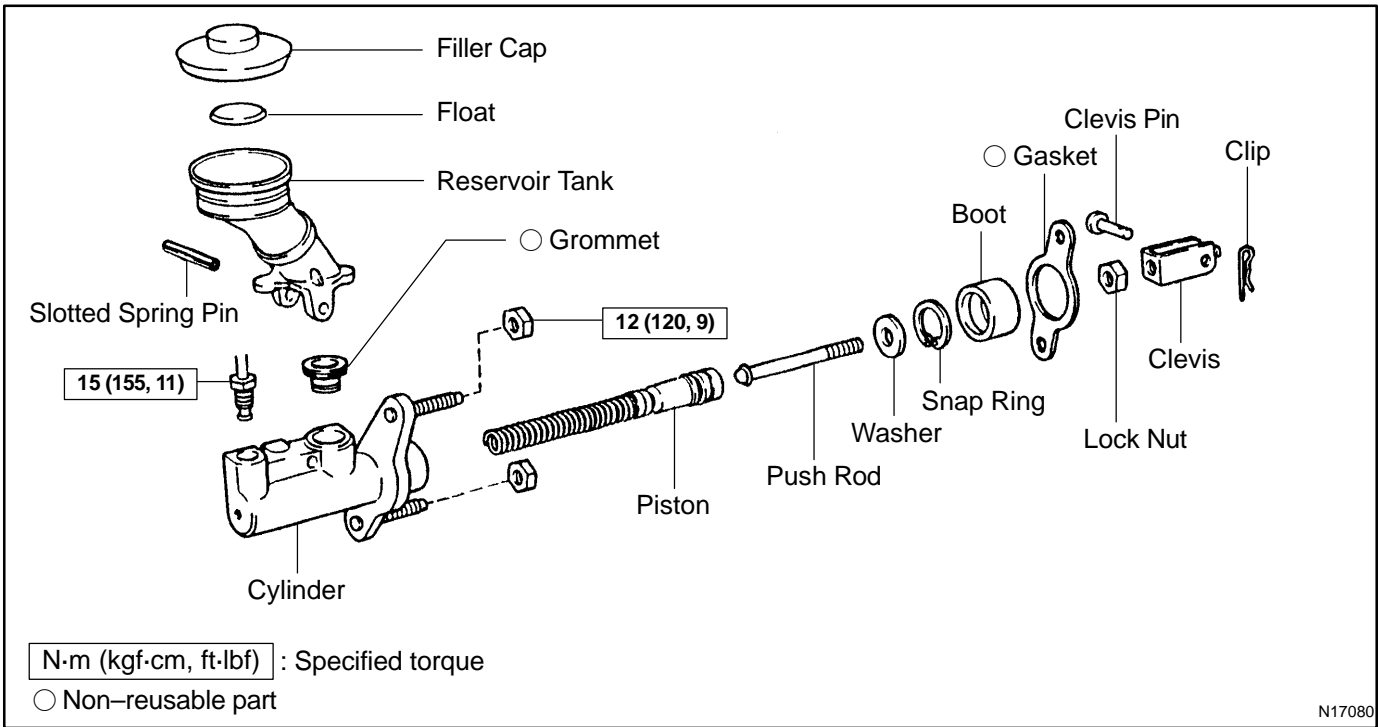
4. PREPARATION

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:



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:

*Illustration:
what to do and where*

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/cm² 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.

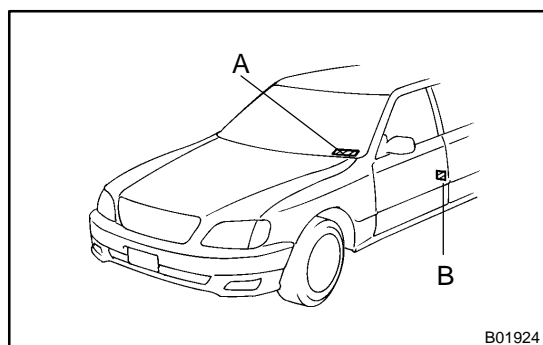
Example:

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

IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION AND ENGINE SERIAL NUMBER

IN03I-02

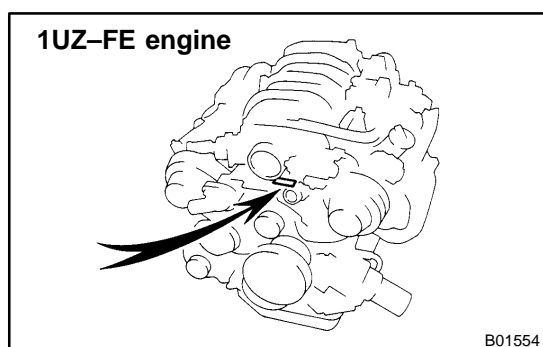


1. VEHICLE IDENTIFICATION NUMBER

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

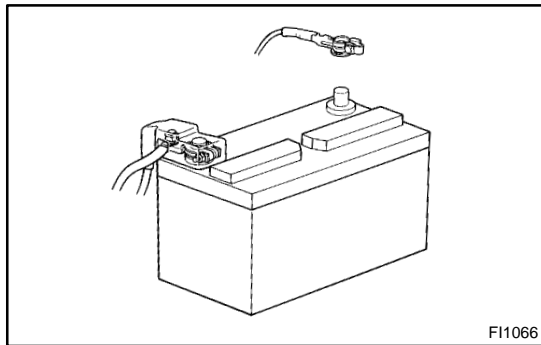
A: Vehicle Identification Number Plate

B: Certification Label



2. ENGINE SERIAL NUMBER

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



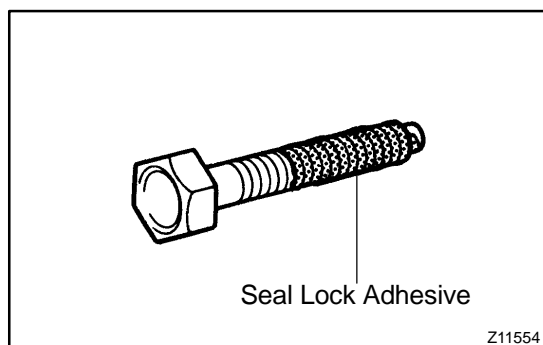
REPAIR INSTRUCTIONS

GENERAL INFORMATION

IN00G-01

BASIC REPAIR HINT

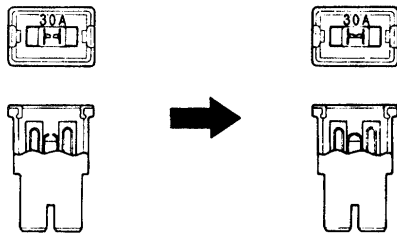
- (a) Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
- (b) During disassembly, keep parts in the appropriate order to facilitate reassembly.
- (c) Installation and removal of battery terminal:
 - (1) Before performing electrical work, disconnect the negative (–) terminal 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.



- (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 Preparation section in this manual.

Medium Current Fuse and High Current Fuse Equal Amperage Rating



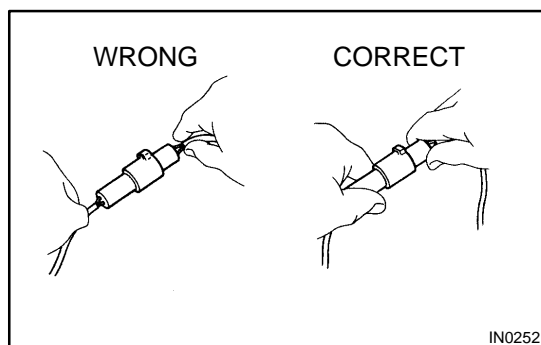
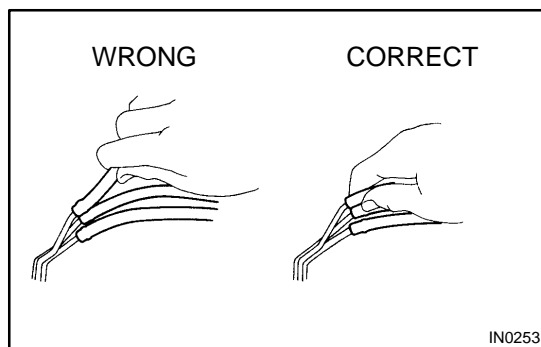
BE1367

- (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

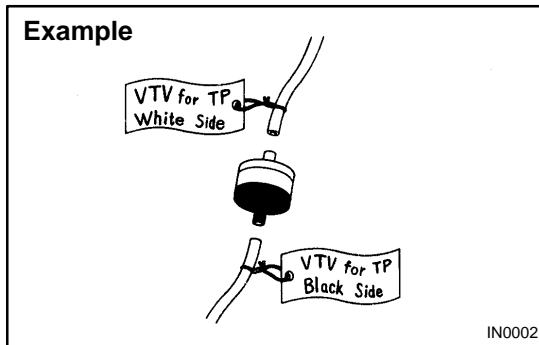
V00076

- (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 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 precaution 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.)



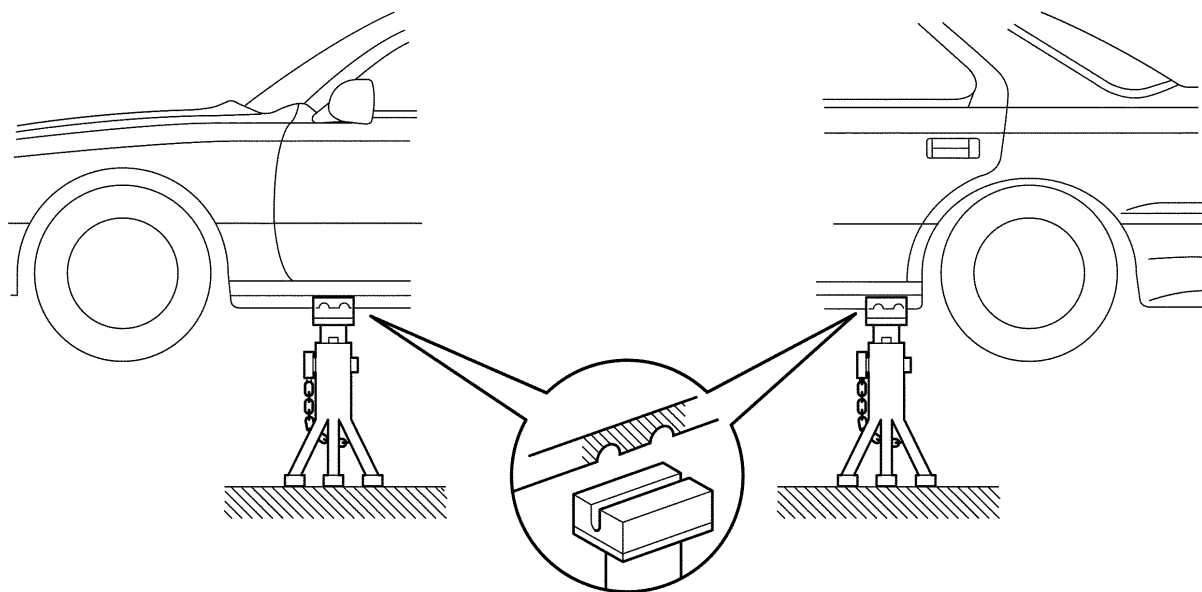
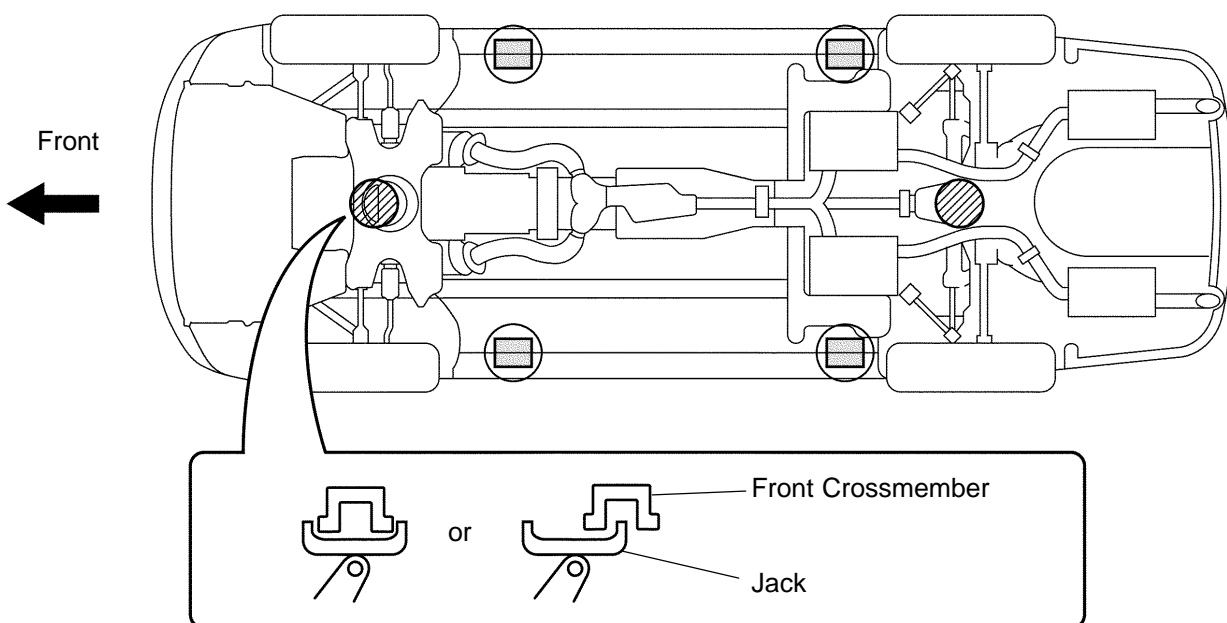
- (2) To disconnect vacuum hoses, pull off the end, not the middle of the hose.
- (3) To pull apart electrical connectors, pull on the connector itself, not the wires.
- (4) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced 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.



- (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) 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.

VEHICLE LIFT AND SUPPORT LOCATIONS



JACK POSITION

Front Front Crossmember

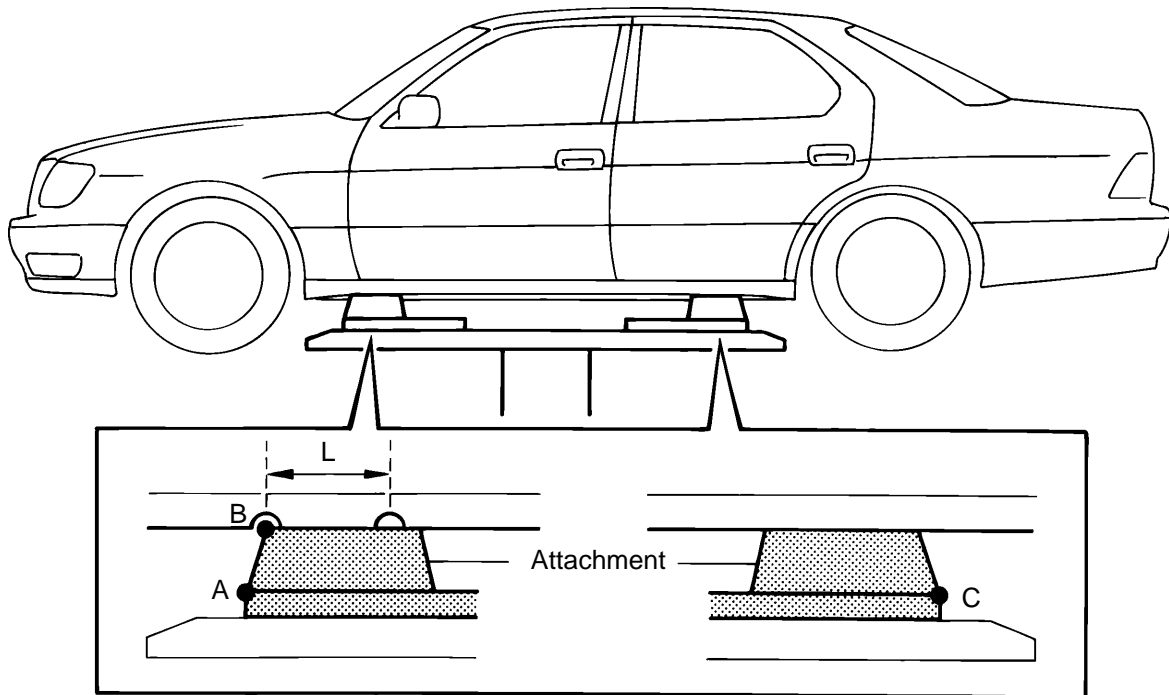
Rear Rear differential carrier

CAUTION: Before jacking-up the front and rear, make sure the vehicle is not carrying and extra wight.

PANTOGRAPH JACK POSITION

SUPPORT POSITION

Safety stand and swing arm type lift

Plate type lift:**HINT:**

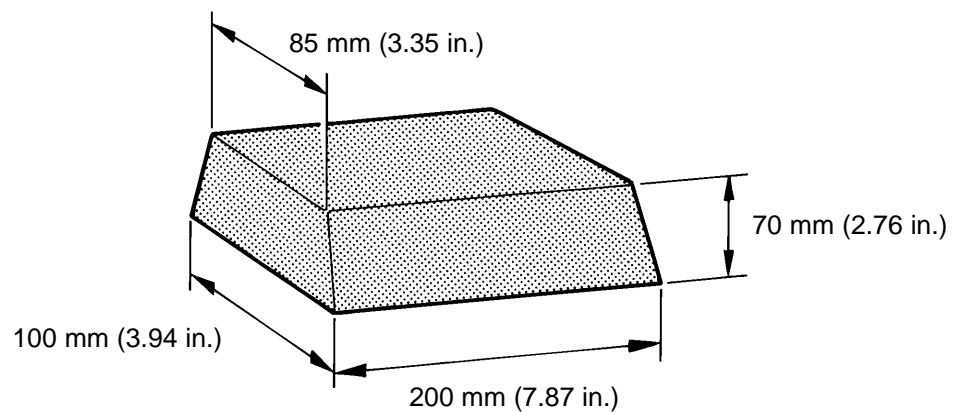
Left and right set position

Front and rear set position

Place the vehicle over the center of the lift.

- Align the cushion gum ends of the plate with the attachment lower ends (A, C).
- Align the attachment upper end (B) with the front jack supporting point (L).

Attachment dimensions



B01926

FOR ALL OF VEHICLES PRECAUTION

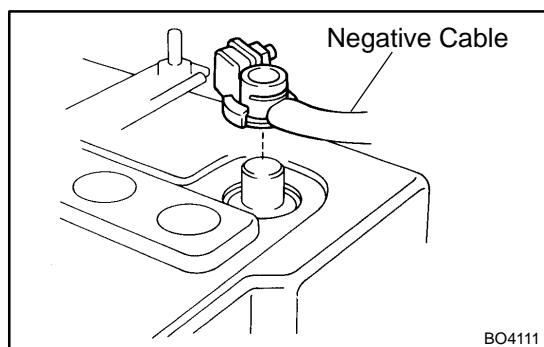
INOEF-01

1. FOR VEHICLES EQUIPPED WITH SRS AIRBAG AND SEAT BELT PRETENSIONER

- (a) The LEXUS LS400 is equipped with an SRS (Supplemental Restraint System), such as the driver airbag, front passenger airbag assembly, side airbag assembly front airbag sensor, side airbag sensor 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-459](#)).

- (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.

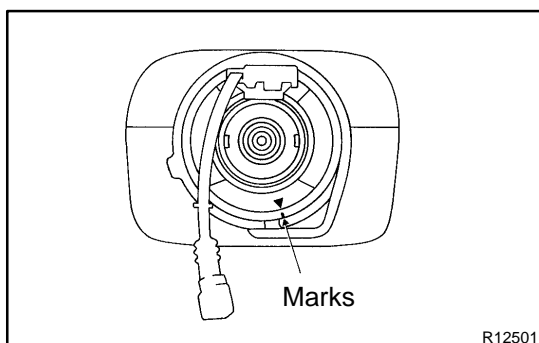
(The supplemental restraint system is equipped with a back-up power source so that if work is started within 90 seconds of disconnecting the negative (–) terminal cable from the battery, the SRS may deploy.)

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. This vehicle has power tilt and power telescopic steering column, power seat, power outside rear view mirror and power shoulder belt anchorage, which are all equipped with memory function, it is not possible to make a record of the memory contents. So when the work is finished, therefore it will be necessary to explain this fact to the customer,

and ask the customer to adjust the features and re-set the memory.

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 airbag assembly, side airbag assembly and seat belt pretensioner should be inspected (See page [RS-16](#), [RS-30](#), and [BO-119](#)).
- (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 airbag assembly, side airbag assembly or seat belt pretensioner.
- (7) If the airbag sensor assembly, steering wheel pad, front passenger airbag assembly, side airbag assembly 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 assembly, side airbag assembly or seat belt pretensioner to hot air or flames.
- (9) Use a volt/ohmmeter with high impedance (10 k Ω /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-459](#)).



(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-23](#) of this manual concerning correct steering wheel installation.

(d) STEERING WHEEL PAD (with Airbag)

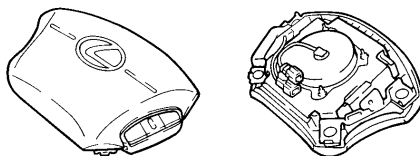
- (1) When removing the steering wheel pad or handling a new steering wheel pad, it should be placed with the pad top surface facing up.
Storing the pad with its metallic surface facing upward may lead to a serious accident if the airbag deploys for some reason. In addition do not store a steering wheel 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-18).
Carry out the operation in a safe place away from electrical noise.

Example:

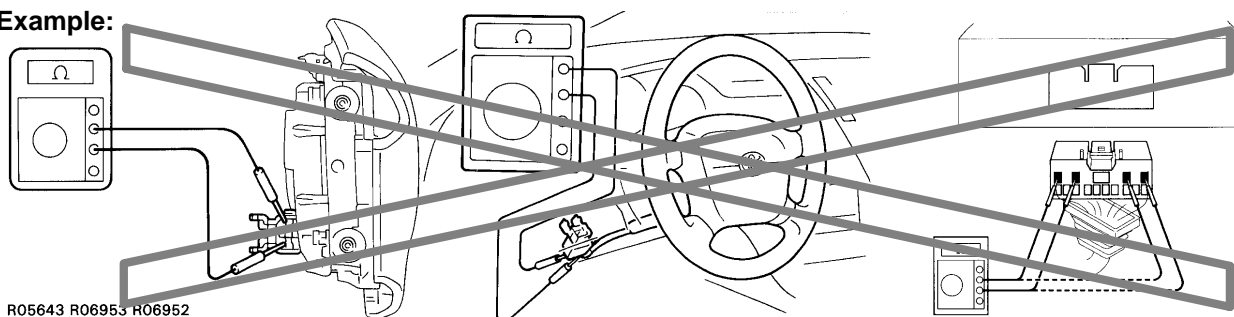
Correct



Wrong



B06940

Example:

R05643 R06953 R06952

Z13950

(e) FRONT PASSENGER AIRBAG ASSEMBLY

- (1) Always store a removed or new front passenger airbag assembly with the airbag deployment direction facing up.

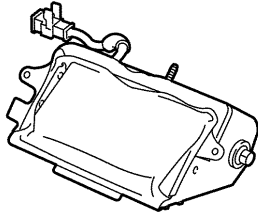
Storing the airbag assembly with the airbag deployment direction facing downward may lead to a serious accident if the airbag deploys for some reason.

- (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 the 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-32).

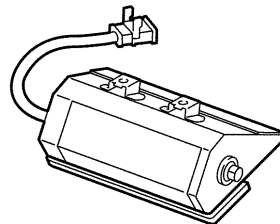
Perform the operation in a safe place away from electrical noise.

Example:

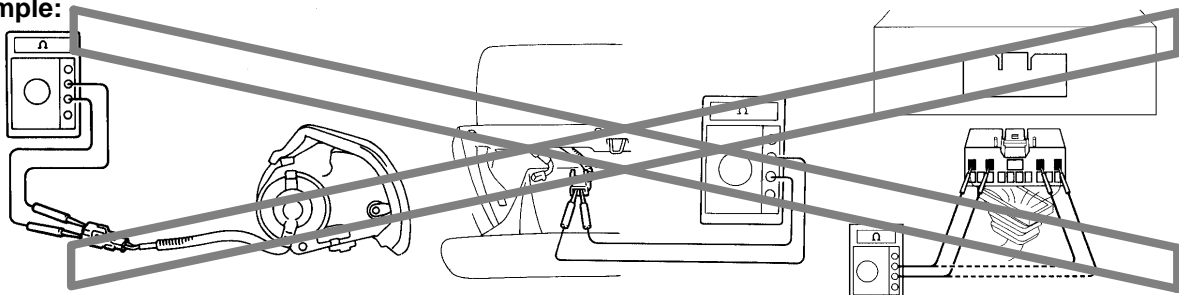
○ Correct



✗ Wrong



B01927

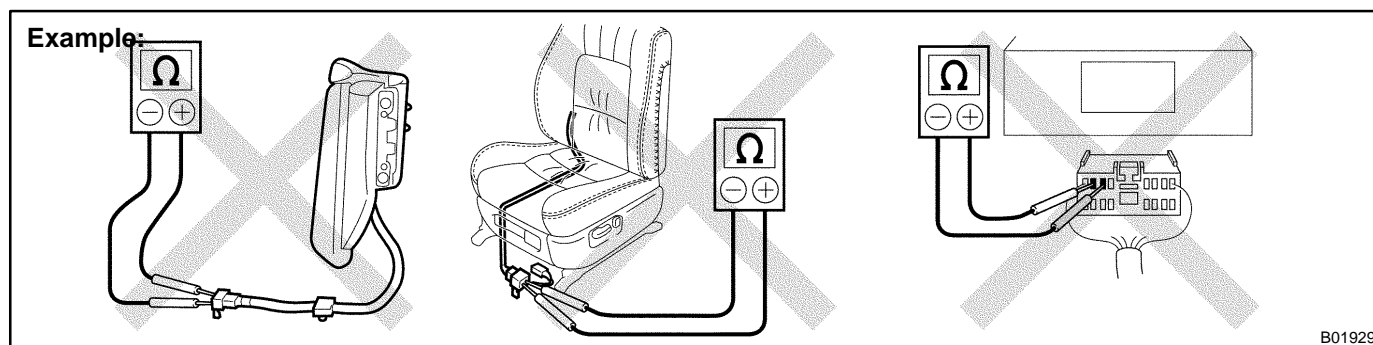
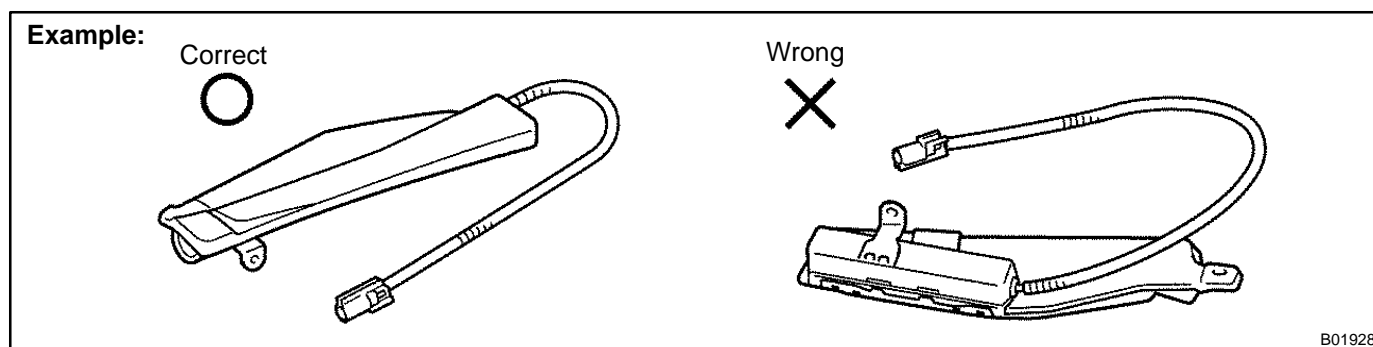
Example:

R05648 R05649 R06952

Z13951

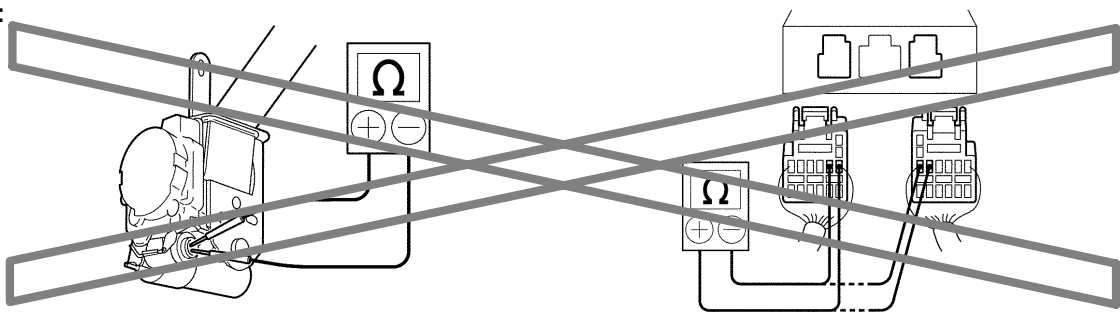
(f) SIDE AIRBAG ASSEMBLY

- (1) Always store a removed or new side airbag assembly with the airbag deployment direction facing up. Storing the airbag assembly with the airbag deployment direction facing downward may lead to a serious accident if the airbag deploys for some.
- (2) Never measure the resistance of the airbag squib reason.
(This may cause the airbag to deploy, which is very dangerous.)
- (3) Grease should not be applied to the side airbag assembly and the surface 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) under the seat before starting work.
- (6) When disposing of a vehicle or the side airbag assembly alone, the airbag should be deployed using an SST before disposal (See page RS-45).
Perform the operation in a safe place away from electrical noise.



(g) 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-120](#)). 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:

B02121

(h) 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.

(i) 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-63](#).

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 harnesses.
- (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 LEXUS HAND-HELD TESTER

CAUTION:

Observe the following items for safety reasons:

- Before using the OBD II scan tool or LEXUS hand-held tester, the OBD II scan tool's instruction book or LEXUS 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 LEXUS 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 LEXUS hand-held tester, one person to drive the vehicle and the other person to operate the OBD II scan tool or LEXUS hand-held tester.

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

NOTICE:

In case of having disconnected the battery terminal cable or ECU harness connectors and replaced the yaw rate sensor or ECU, must perform the zero point calibration of the yaw rate sensor.

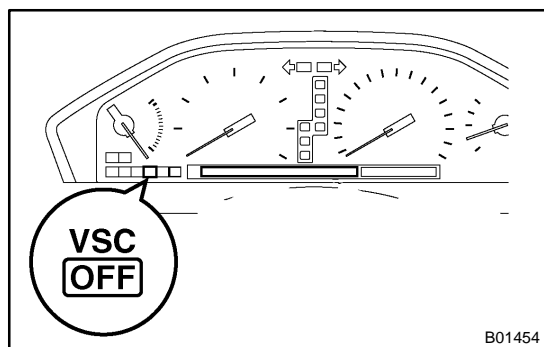
- (a) Obtain the zero point calibration for the yaw rate sensor. After the installation of the ECU or yaw rate sensor and connection of the battery terminal cable, shift the shift lever to the P position and then turn the ignition switch ON, keep the vehicle stationary condition for 15 sec. or more.

HINT:

At this interval of 15 sec. the "CHECK VSC" is displayed and the VSC OFF indicator comes ON. (However the "CHECK VSC" is not displayed at the interval of 5.5 sec. after the ignition switch ON.)

NOTICE:

When using a 2-wheel drum tester such as a speedometer tester or chassis dynamometer, etc., or jacking up the rear wheels and driving the wheels, always push in the VSC OFF switch to turn the TRAC & VSC system OFF.

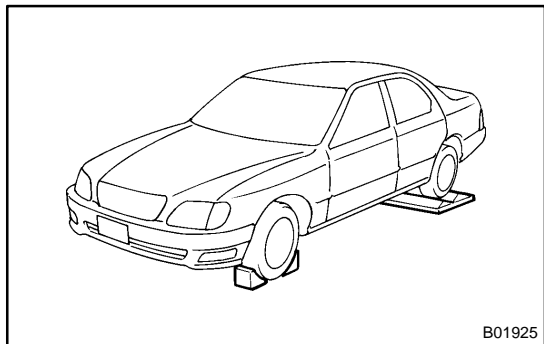


B01454

- (b) Notice for using 2-wheel drum tester.
 - (1) Press the VSC OFF switch.
 - (2) Check that the VSC OFF indicator light comes on.

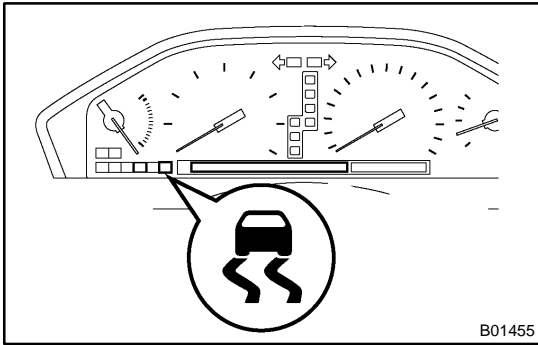
HINT:

The VSC OFF indicator light should be always OFF when the engine is restarted.



B01925

- (3) Begin measurements.



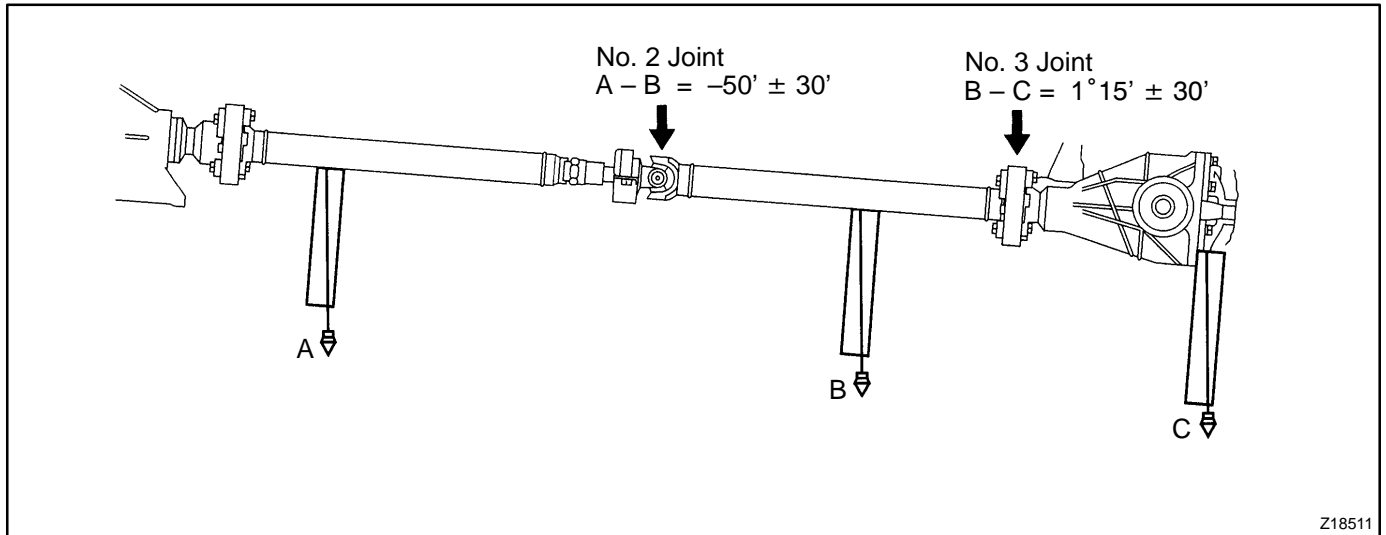
- (4) Press the VSC OFF switch again to change the TRAC & VSC system to operational condition and check that the VSC OFF indicator light goes off.

HINT:

The SLIP indicator light blinks and the VSC buzzer sounds when the TRAC & VSC system is operational.

6. INSPECTION AND ADJUSTMENT OF JOINT ANGLE DURING REMOVAL AND INSTALLATION OF PROPELLER SHAFT

When performing operations which involve the removal and installation of the propeller shaft, always check the joint angle. Make adjustments if necessary (See page [PR-11](#)).



7. FOR VEHICLES EQUIPPED WITH ELECTRONIC MODULATED AIR SUSPENSION (See page [SA-1](#))

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS

GENERAL INFORMATION

IN03M-03

A large number of ECU controlled systems are used in the LEXUS LS400. 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.

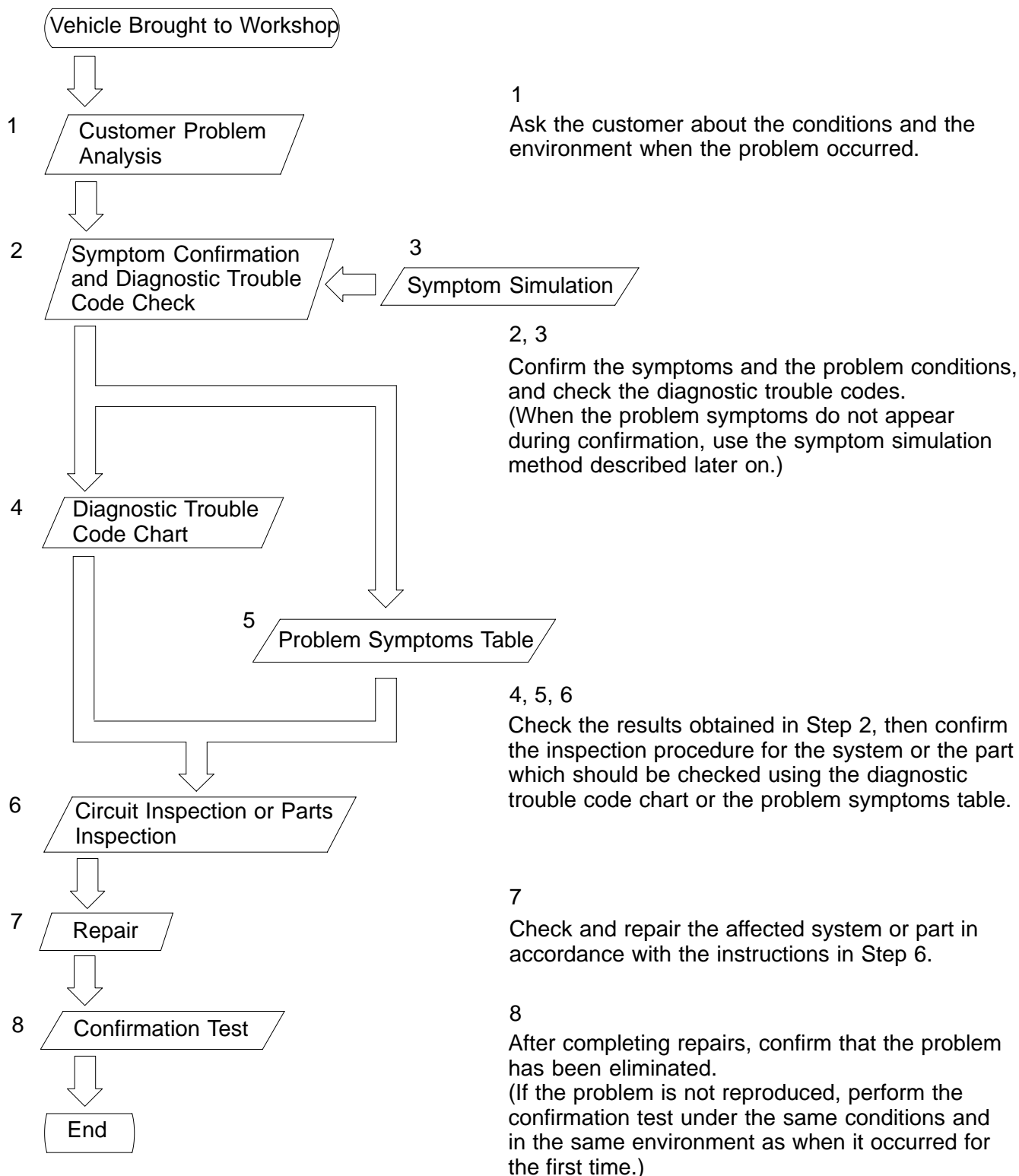
System	Page
1. Engine	DI-1
2. Automatic Transmission	DI-171
3. Electronic Modulated Air Suspension	DI-235
4. Anti-Lock Brake System	DI-305
5. Vehicle Skid Control (VSC) & Brake Assist System	DI-364
6. Power Tilt and Power Telescopic Steering Column	DI-408
7. Supplemental Restraint System	DI-457
8. Power Seat Control System (w/ Driving Position Memory)	DI-582
9. Cruise Control System	DI-600
10. Engine Immobilizer System	DI-615
11. Combination Meter System	DI-631
12. Sliding Roof System	DI-650
13. Body Control System	DI-661
14. Driver Door Control System	DI-727
15. Passenger Door Control System	DI-760
16. Rear Left Door Control System	DI-792
17. Rear Right Door Control System	DI-815
18. Multiplex Communication System	DI-838
19. LEXUS Navigation System	DI-900
20. Air Conditioning System	DI-931

FOR USING OBD II SCAN TOOL OR LEXUS 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.

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. 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

(Sample) Engine control system check sheet.

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	<input type="checkbox"/> Engine does not Start	<input type="checkbox"/> Engine does not crank	<input type="checkbox"/> No initial combustion	<input type="checkbox"/> No complete combustion	
	<input type="checkbox"/> Difficult to Start	<input type="checkbox"/> Engine cranks slowly <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Poor Idling	<input type="checkbox"/> Incorrect first idle <input type="checkbox"/> Idling rpm is abnormal <input type="checkbox"/> High (rpm) <input type="checkbox"/> Low (rpm) <input type="checkbox"/> Rough idling <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Poor Drive ability	<input type="checkbox"/> Hesitation <input type="checkbox"/> Back fire <input type="checkbox"/> Muffler explosion (after-fire) <input type="checkbox"/> Surging <input type="checkbox"/> Knocking <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Engine Stall	<input type="checkbox"/> Soon after starting <input type="checkbox"/> After accelerator pedal depressed <input type="checkbox"/> After accelerator pedal released <input type="checkbox"/> During A/C operation <input type="checkbox"/> Shifting from N to D <input type="checkbox"/> Other _____			
	<input type="checkbox"/> Others				
<input type="checkbox"/> constant <input type="checkbox"/> Sometimes (times per day/month)					

2. SYMPTOM CONFIRMATION AND DIAGNOSTIC TROUBLE CODE CHECK

The diagnostic system in the LEXUS LS400 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 LEXUS LS400.

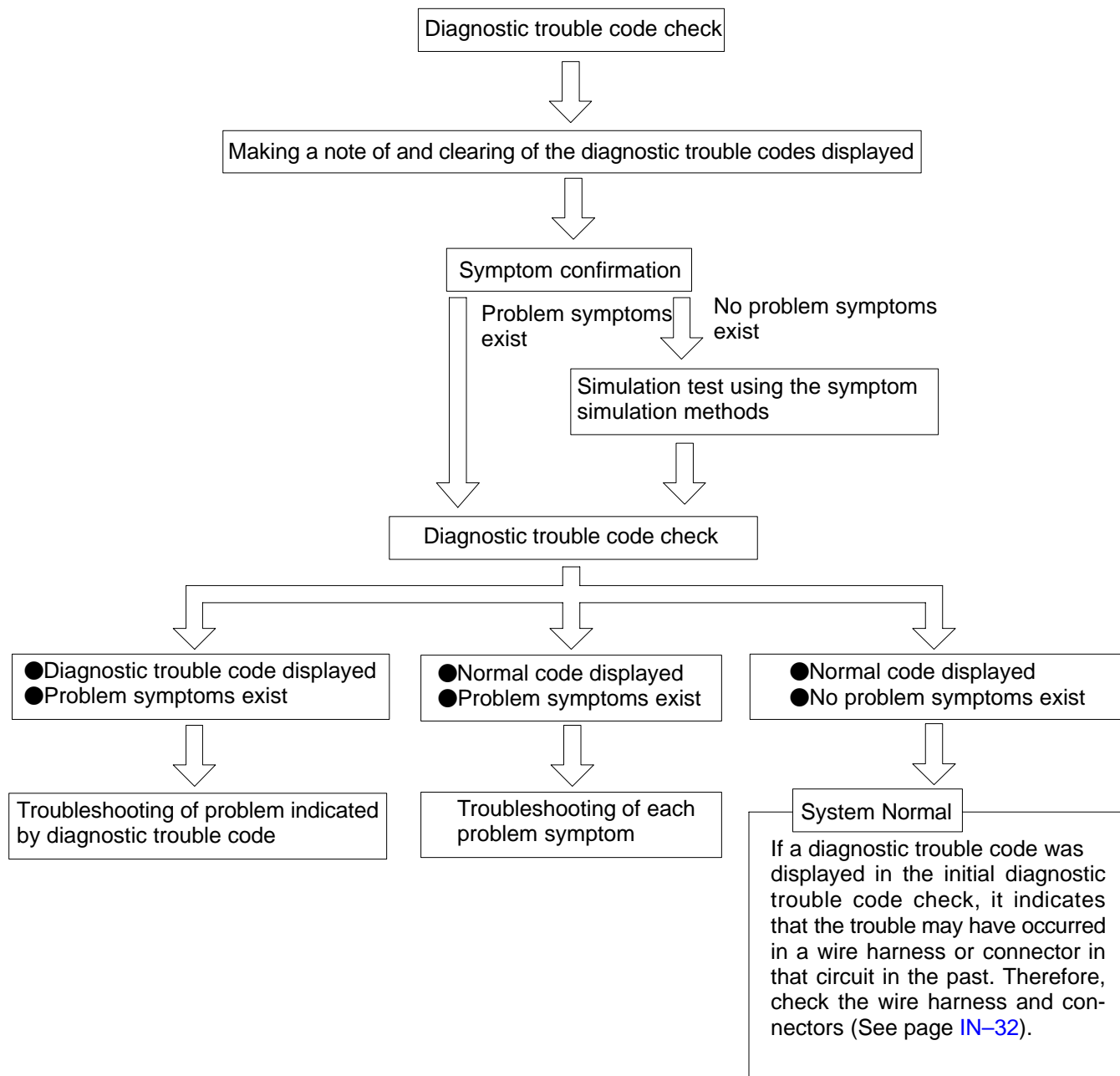
System	Diagnostic Trouble Code Check	Input Signal Check (Sensor Check)	Diagnostic Test Mode (Active Test)
Engine	<input type="radio"/> (with Check Mode)	<input type="radio"/>	<input type="radio"/>
Automatic Transmission	<input type="radio"/> (with Check Mode)	<input type="radio"/>	
Electronic Modulated Air Suspension	<input type="radio"/>		
Anti-Lock Brake (& VSC)	<input type="radio"/>	<input type="radio"/>	
Power Tilt and Power Telescopic Steering Column	<input type="radio"/>		
Supplemental Restraint System	<input type="radio"/>		
Cruise Control System	<input type="radio"/>	<input type="radio"/>	
Engine Immobilizer System	<input type="radio"/>		
Multiplex Communication System	<input type="radio"/>		
LEXUS Navigation System	<input type="radio"/>		
Air Conditioning System	<input type="radio"/>		

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.

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.

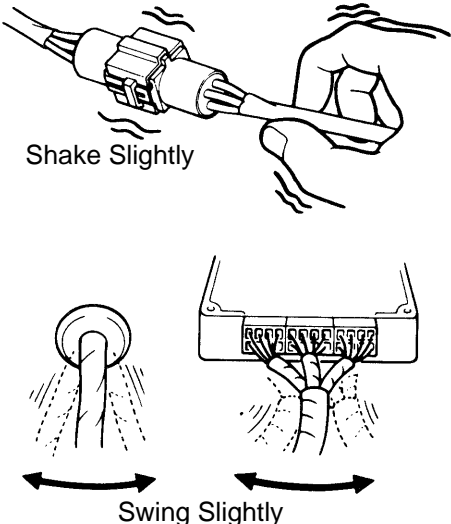
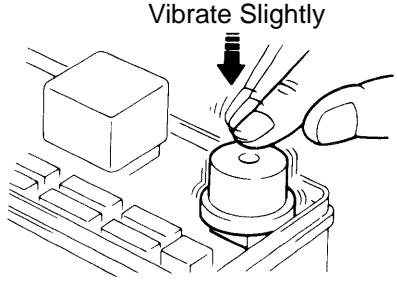


3. SYMPTOM SIMULATION

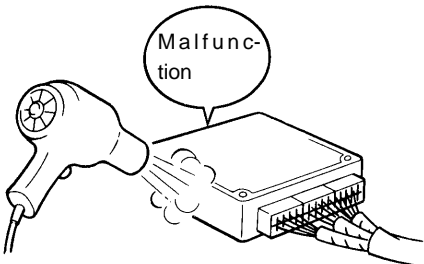
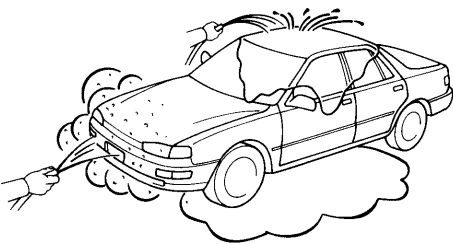
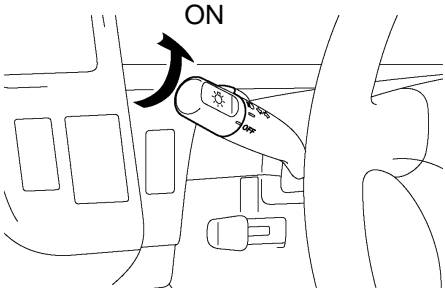
The most difficult case in troubleshooting is when there are no problem symptoms occurring. In such cases, a thorough customer problem analysis must be carried out, then simulate the same or similar conditions and environment in which the problem occurred in the customer's vehicle. No matter how much 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.

1	VIBRATION METHOD: When vibration seems to be the major cause.	
<p>CONNECTORS Slightly shake the connector vertically and horizontally.</p> <p>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.</p>	 <p>FI2331 FI2332</p>	
<p>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.</p> <p>HINT: Applying strong vibration to relays may result in open relays.</p>	 <p>FI2330</p>	

V07268

2	HEAT METHOD: When the problem seems to occur when the suspect area is heated.
<p>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.</p> <p>NOTICE:</p> <p>(1) Do not heat to more than 60 °C (140 °F). (Temperature is limited not to damage the components.)</p> <p>(2) Do not apply heat directly to parts in the ECU.</p>	
 <p>FI2334</p>	
3	WATER SPRINKLING METHOD: When the malfunction seems to occur on a rainy day or in a high-humidity condition.
<p>Sprinkle water onto the vehicle and check to see if the malfunction occurs.</p> <p>NOTICE:</p> <p>(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.</p> <p>(2) Never apply water directly onto the electronic components.</p> <p>HINT:</p> <p>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.</p>	
 <p>FI6649</p>	
4	OTHER: When a malfunction seems to occur when electrical load is excessive.
<p>Turn on all electrical loads including the heater blower, head lights, rear window defogger, etc. and check to see if the malfunction occurs.</p>	
 <p>B02389</p>	

B02390

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 No.**

Indicates the diagnostic trouble code.

● **Page or Instructions**

Indicates the page where the inspection procedure for each circuit is to be found, or gives instructions for checking and repairs.

● **Trouble Area**

Indicates the suspect area of the problem.

● **Detection Item**

Indicates the system of the problem or contents of the problem.

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	○	○
	Throttle Position Sensor/Switch Malfunction	● Open or short in throttle position sensor circuit ● Throttle position sensor ● ECM		
	Throttle Position Sensor/ Switch Range/ Performance Problem	● Throttle position sensor		

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.

●Page
Indicates the page where the flow chart for each circuit is located.

●Circuit Inspection, Inspection Order
Indicates the circuit which needs to be checked for each problem symptom. Check in the order indicated by the numbers.

●Problem Symptom

●Circuit or Part Name
Indicates the circuit or part which needs to be checked.

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
Engine idle speed (Poor idling)	1. A/C signal circuit (Compressor circuit) 2. ECM power source circuit	AC-88
Engine idle speed (Poor idling)	1. A/C signal circuit 2. Fuel pump control circuit	
Engine idle speed (Poor idling)	1. Compression 2. Fuel pump control circuit	

6. CIRCUIT INSPECTION

How to read and use each page is shown below.

●Diagnostic Trouble Code No. and Detection Item

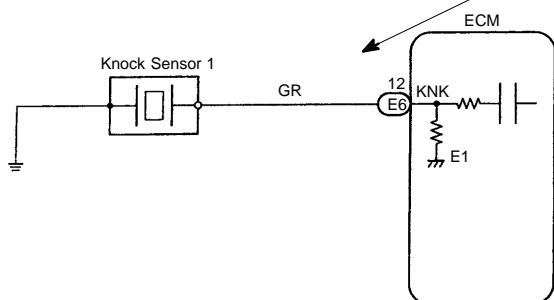
●Circuit Description
The major role and operation, etc. of the circuit and its component parts are explained.

DTC	P0325	Knock Sensor 1 Circuit Malfunction
CIRCUIT DESCRIPTION Knock sensor is fitted to 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 1,200 rpm or more.	●Open or short in knock sensor1 circuit ●Knock sensor 1 (looseness) ●ECM

If the ECM detects the above diagnosis conditions, it operates the fail safe function in which the corrective retard angle value is set to the maximum value.

●Indicates the diagnostic trouble code, diagnostic trouble code set parameter and suspect area of the problem.

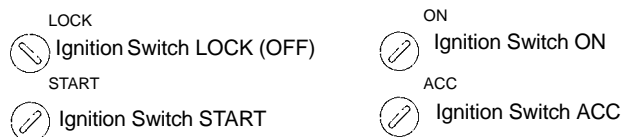
WIRING DIAGRAM



- Wiring Diagram
This shows a wiring diagram of the circuit. Use this diagram together with ELECTRICAL WIRING DIAGRAM to thoroughly understand the circuit.
- Wire colors are indicated by an alphabetical code.
 B = Black, L = Blue, R = Red, BR = Brown,
 LG = Light Green, V = Violet, G = Green,
 O = Orange, W = White, GR = Gray, P = Pink,
 Y = Yellow, SB = Sky Blue
- The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

V08423

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

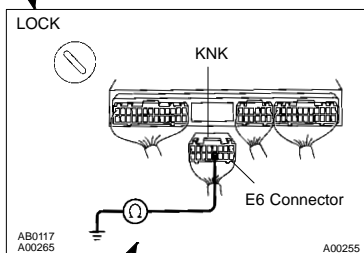


● Inspection Procedure

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:

- Remove the glove compartment (See page SF-68).
- 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.

NG

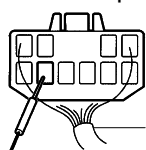
2 Check knock sensor (See page SF-61).

OK

Replace knock sensor.

● Indicates the place to check the voltage or resistance.

● Indicates the connector position to checked, from the front or back side.



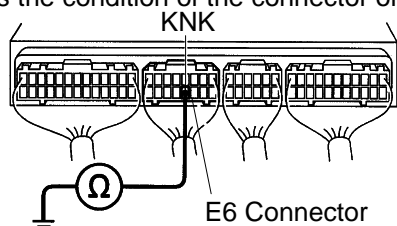
Wire Harness

Check from the connector back side.
(with harness)

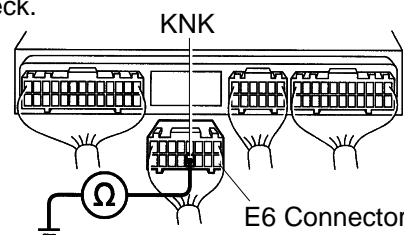


Check from the connector front side. (without harness)
In this case, care must be taken not to bend the terminals.

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

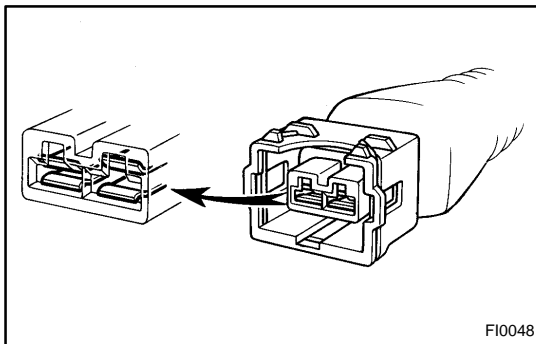
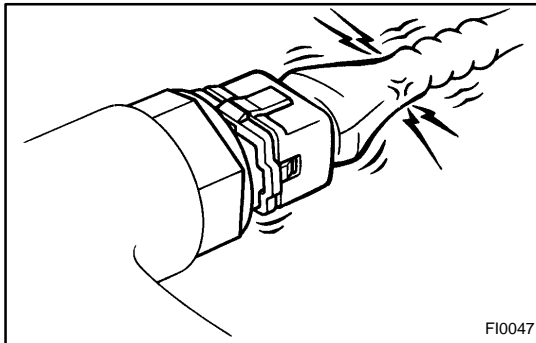
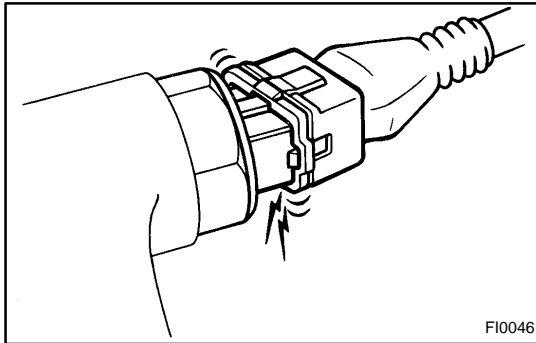


Connector being checked is connected.



Connector being checked is disconnected.

V08425



HOW TO USE THE DIAGNOSTIC CHART AND INSPECTION PROCEDURE

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:

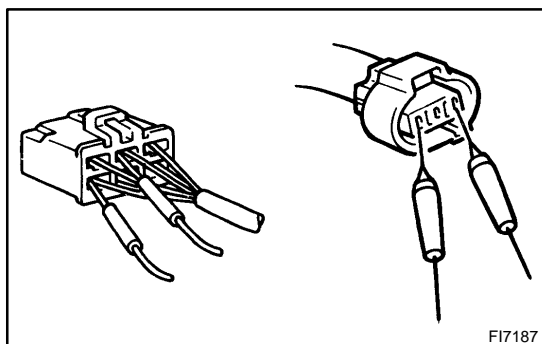
- It is rarely the case that a wire is broken in the middle of it. Most cases occur at the connector. In particular, carefully check the connectors of sensors and actuators
- Faulty contact could be due to rusting of the connector terminals, to foreign materials entering terminals or a deformation of 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.

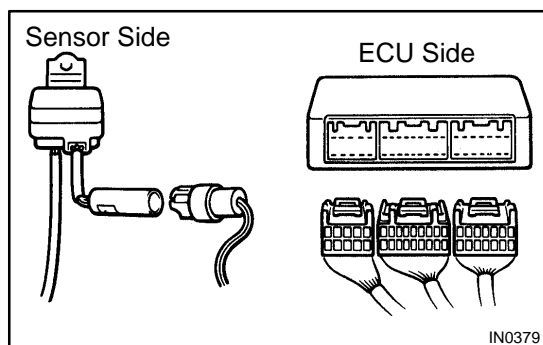
HINT:

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.



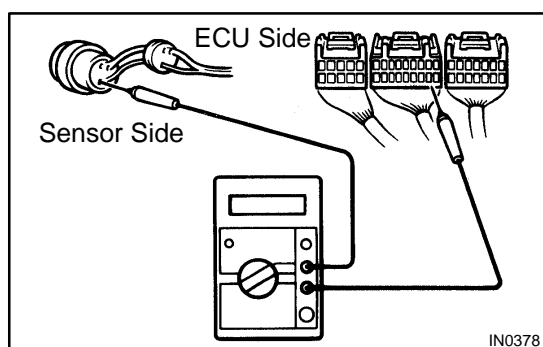
2. CONNECTOR HANDLING

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)

- Disconnect the connectors at both ECU and sensor sides.

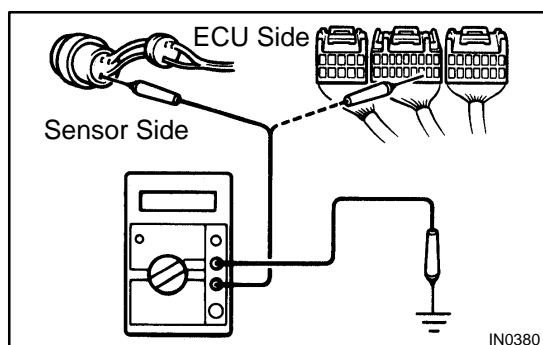


- Measure the resistance between the applicable terminals of the connectors.

Resistance: 1 Ω or less

HINT:

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



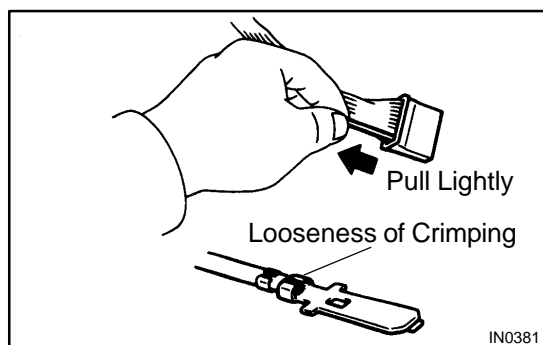
4. RESISTANCE CHECK (SHORT CIRCUIT CHECK)

- Disconnect the connectors on both ends.
- 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 M Ω or higher

HINT:

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



5. VISUAL CHECK AND CONTACT PRESSURE CHECK

- Disconnect the connectors at both ends.
- Check for rust or foreign material, etc. in the terminals of the connectors.
- 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.

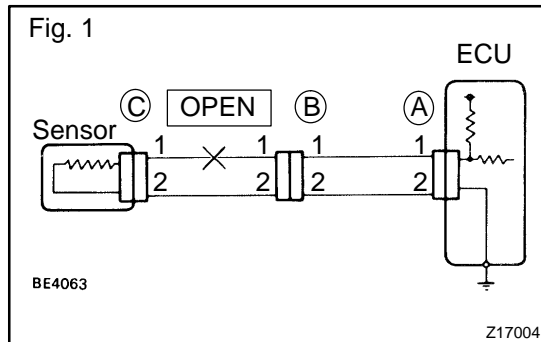
- (d) Prepare a test male terminal and insert it in the female terminal, then pull it out.

NOTICE:

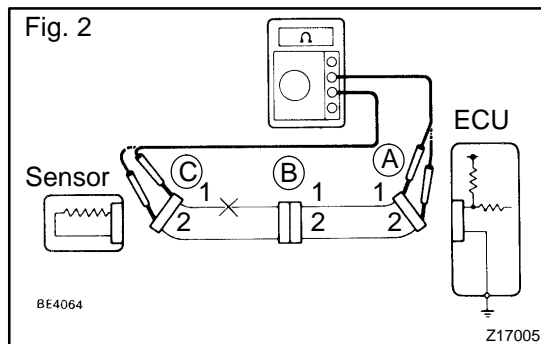
When testing a gold-plated female terminal, always use a gold-plated male terminal.

HINT:

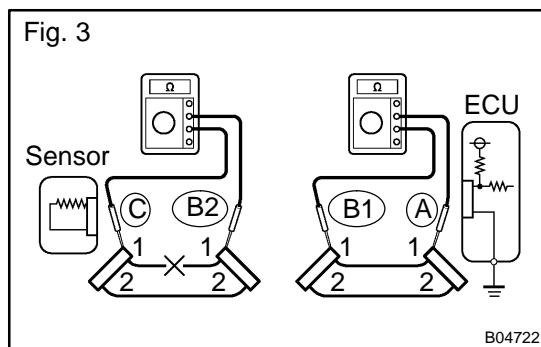
When the test terminal is pulled out more easily than others, there may be poor contact in that section.

**6. CHECK OPEN CIRCUIT**

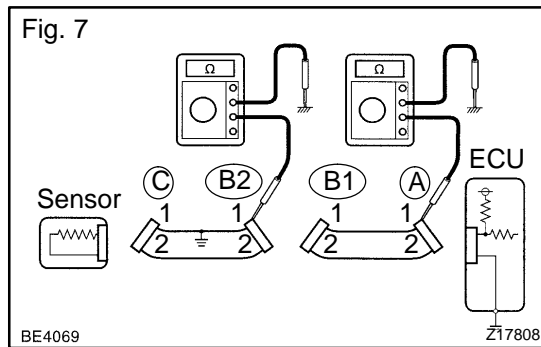
For the open circuit in the wire harness in Fig. 1, perform "(a) Continuity Check" or "(b) Voltage Check" to locate the section.



- (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".



- (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".



- (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.

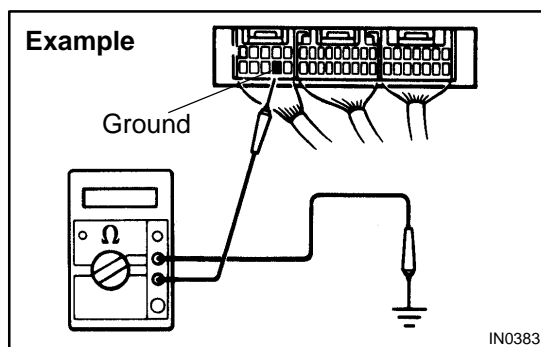
Between terminal 1 of connector "A" and body ground → No continuity

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".

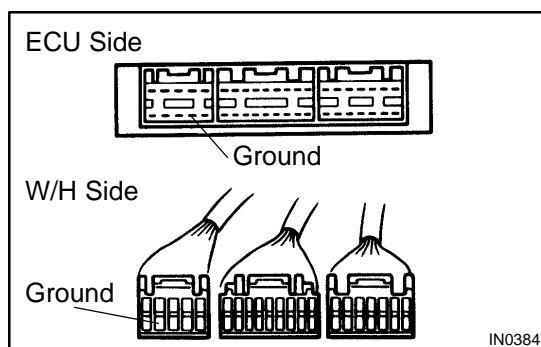
8. CHECK AND REPLACE ECU

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

ABBREVIATIONS USED IN THIS MANUAL

IN04Q-07

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	Egr-Vacuum Modulator
ELR	Emergency Locking Retractor
ENG	Engine
ESA	Electronic Spark Advance
ETCS	Electronic Throttle Control System
EVP	Evaporator
E-VRV	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
GND	Ground
HAC	High Altitude Compensator
H/B	Hatchback

INTRODUCTION – TERMS

H-FUSE	High Current Fuse
HI	High
HID	High Intensity Discharge (Head Lamp)
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
MIC	Microphone
MIL	Malfunction Indicator Lamp
MIN.	Minimum
MP	Multipurpose
MPX	Multiplex Communication System
M/T	Manual Transmission
MT	Mount
MTG	Mounting
N	Neutral
NA	Natural Aspiration
No.	Number
O/D	Overdrive

2000 LEXUS LS400 (RM717U)

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
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

INTRODUCTION – TERMS

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)

GLOSSARY OF SAE AND LEXUS TERMS

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

SAE ABBREVIATIONS	SAE TERMS	LEXUS 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 Communication 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)

INTRODUCTION – TERMS

HO ₂ S	Heated Oxygen Sensor	Heated Oxygen Sensor (HO ₂ S)
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	–
O ₂ S	Oxygen Sensor	Oxygen Sensor, O ₂ Sensor (O ₂ S)
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

2000 LEXUS LS400 (RM717U)

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

GENERAL MAINTENANCE

MA016-01

There are the maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or be 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 services after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.

2. TIRES

- (a) Check the pressure with a gauge. Adjust if necessary.
- (b) Check for cuts, damage or excessive wear.

3. WHEEL NUTS

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

4. TIRE ROTATION

Check the owner's manual supplement in which the maintenance schedule is shown.

5. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do not wipe clean. Replace if necessary.

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 including the trunk lid 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

GENERAL MAINTENANCE

There are the maintenance and inspection items which are considered to be the owner's responsibility. They can be done by the owner or be 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.

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- Maintenance services after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item can 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 aiming.

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 the air comes out from the defroster outlet when operating the heater air conditioner at defroster mode.

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 noise.

11. SEATS

- (a) Check that all front seat controls such as seat adjusters, setback recliner, etc. operate smoothly.
- (b) Check that the front seat head restraints move up and down smoothly.
- (c) Check that the rear seat head restraints move up and down smoothly and that the locks hold securely in any latches position.

12. SEAT BELTS

- (a) Check that the seat belt system such as 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-6](#))

- (a) Check that pedal for smooth operation.
- (b) Check that the pedal has the proper reserve distance and freeplay.

15. BRAKE BOOSTER

(See page [BR-18](#))

Check the brake booster function.

16. BRAKES

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

17. PARKING BRAKE

(See page [BR-8](#))

- (a) Check that the pedal has the proper travel.
- (b) On a safe incline, check that the vehicle is held securely with only the parking brake applied.

18. 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 the "P" position and all brakes released.

UNDER HOOD

MA018-01

GENERAL MAINTENANCE

1. GENERAL NOTICE

- 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 services after the last period should be performed at the same interval as before unless otherwise noted.
- Failure to do even one item can 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 LEVEL lines on the see-through reservoir at normal temperature (20°C (68°F)).

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 the indicator.
- When the indicator color is blue, the condition is satisfactory. A red color indicates that distilled water must be added, and white indicates that charging is necessary.

6. BRAKE FLUID LEVELS

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

7. ENGINE DRIVE BELTS

Check drive belt for fraying, cracks, wear or oiliness.

8. ENGINE OIL LEVEL

Check that 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 and foot brake applied, shift the selector into all positions from "P" to "L", and then shift into "P".
- (c) Turn and pull out the dipstick and wipe off the fluid with a clean rag. Re-insert the dipstick fully 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)).

If the level is at the low side, add fluid.

NOTICE:

Do not overfill.

HINT:

Wait about 30 minutes before checking the fluid level after extended driving at high speeds in hot weather, driving in heavy traffic or with a trailer.

11. EXHAUST SYSTEM

Visually inspect for cracks, holes or loose supports.

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

ENGINE INSPECTION

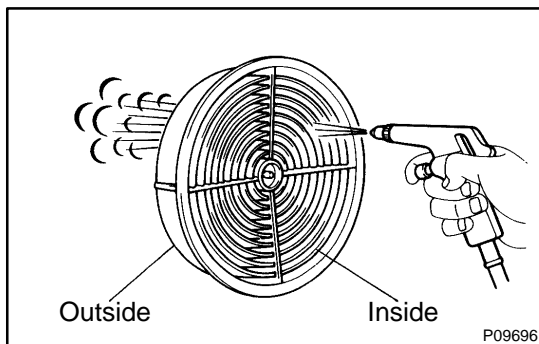
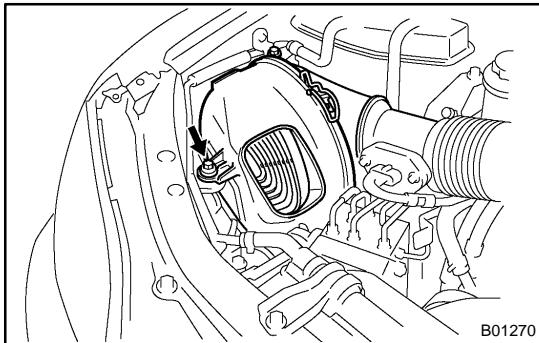
HINT:

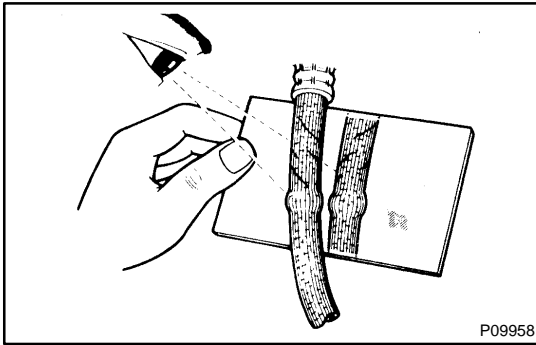
Inspect these items when the engine is cold.

1. **REPLACE TIMING BELT**
(See page [EM-15](#))
2. **INSPECT DRIVE BELT**
(See page [CH-2](#))
3. **REPLACE SPARK PLUGS**
(See page [IG-1](#))
4. **INSPECT AIR FILTER**
 - (a) Remove the battery clamp cover.
 - (b) Remove the air cleaner inlet.
 - (c) Remove the air cleaner case and air filter.
 - (d) Visually check that the air filter is not excessively damaged or oily.

If necessary, replace the air filter.

 - (e) Clean the filter with compressed air.
First blow from the inside thoroughly, then blow off the outside of the filter.
 - (f) Reinstall the air filter and air cleaner case.
 - (g) Reinstall the air cleaner inlet.
 - (h) Reinstall the battery clamp cover.
5. **REPLACE AIR FILTER**
Replace the air filter with a new one.
6. **REPLACE ENGINE OIL AND OIL FILTER**
(See page [LU-3](#))
7. **REPLACE ENGINE COOLANT**
(See page [CO-2](#))
8. **INSPECT CHARCOAL CANISTER**
(See page [EC-7](#))
9. **REPLACE GASKET IN FUEL TANK CAP**
(See page [EC-7](#))
10. **INSPECT FUEL LINES AND CONNECTIONS**
(See page [EC-7](#))
11. **INSPECT EXHAUST PIPES AND MOUNTINGS**
12. **ADJUST VALVE CLEARANCE**
(See page [EM-4](#))





BRAKE INSPECTION

MA01A-01

1. INSPECT BRAKE LINE PIPES AND HOSES

HINT:

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

(a) Check all brake lines and hoses for:

- Damage
- Wear
- Deformation
- Cracks
- Corrosion
- Leaks
- Bends
- Twists

(b) Check all clamps for tightness and connections for leakage.

(c) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.

(d) Check that the lines installed in grommets pass through the center of the grommets.

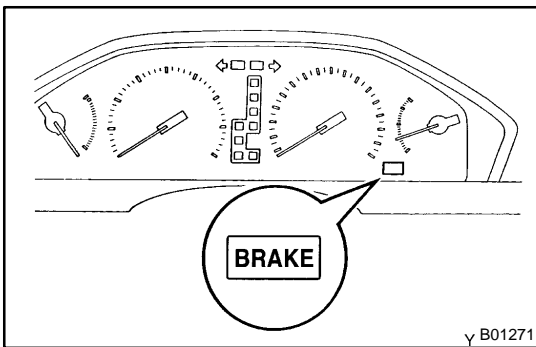
2. INSPECT FRONT AND REAR BRAKE PADS AND DISCS

(FRONT PADS: See page [BR-23](#))

(REAR PADS: See page [BR-33](#))

(FRONT DISCS: See page [BR-28](#))

(REAR DISCS: See page [BR-38](#))



If the pad wear indicator warning light on the instrument panel lights up, check the pad thickness of all the disc brakes.

If necessary, replace the pads and pad wear indicators.

HINT:

The warning light normally comes on when the ignition switch is turned ON and the engine is not running.

3. INSPECT PARKING BRAKE LININGS AND DRUMS

(See page [BR-44](#))

4. INSPECT OR CHANGE BRAKE FLUID

(a) Visually inspect the master cylinder for leaks.

(b) Change brake fluid.

(See page [BR-4](#))

Fluid: SAE J1703 or FMVSS No.116 DOT3

CHASSIS INSPECTION

1. INSPECT STEERING LINKAGE

- (a) Check the steering wheel freeplay.
(See page [SR-9](#))
- (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 SRS AIRBAG

(See page [RS-3](#))

3. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.

4. INSPECT LOWER BALL JOINTS AND DUST COVERS

- (a) Jack up the front of the vehicle and support it with stands.
- (b) Make sure the front wheels are in a straight-ahead position, and depress the brake pedal.
- (c) Jack up the lower suspension arm until there is about half a load on the front coil spring.
- (d) Inspect the dust cover for damage.

5. CHECK AUTOMATIC TRANSMISSION AND DIFFERENTIAL OIL

Visually check the automatic transmission and differential for oil leakage.

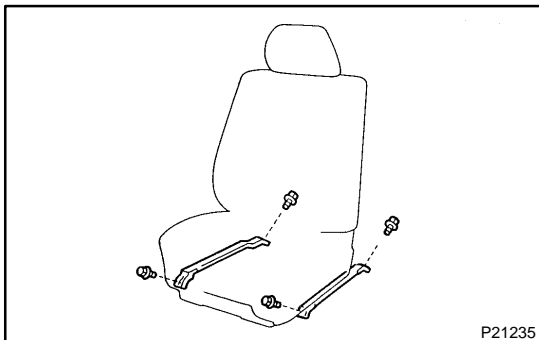
If leakage is found, check for the cause and repair it.

6. REPLACE AUTOMATIC TRANSMISSION FLUID

(See page [DI-173](#))

7. REPLACE DIFFERENTIAL OIL

(See page [SA-71](#))

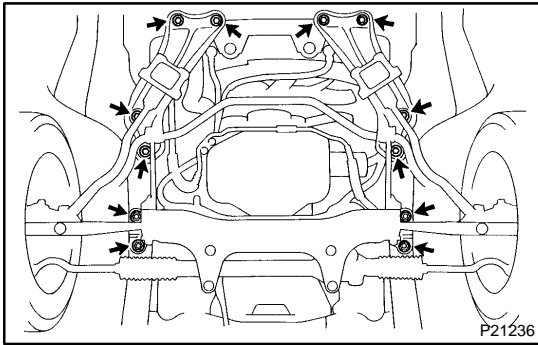


8. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

Tighten these parts:

- Front seat mounting bolts

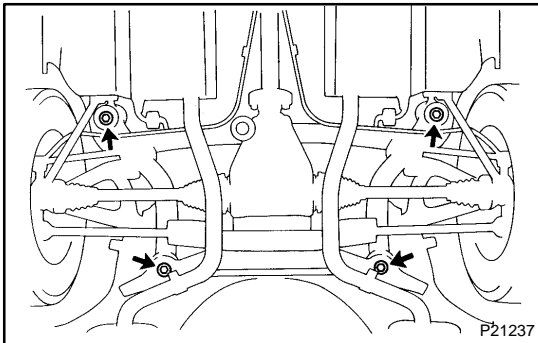
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)



- Strut/stabilizer bar bracket-to-body mounting bolts
Torque: 72 N·m (730 kgf-cm, 53 ft-lbf)

- Front suspension lower crossmember-to-body mounting nuts

Torque: 98 N·m (1,000 kgf-cm, 72 ft-lbf)



- Rear suspension member-to-body mounting bolts
Torque: 180 N·m (1,840 kgf-cm, 133 ft-lbf)

9. BODY INSPECTION

- (a) Check the body exterior for dents, scratches and rust.
- (b) Check the underbody for rust and damage.

If necessary, replace or repair.

10. REPLACE REFINER AIR FILTER

(See page [AC-99](#))

11. ROAD TEST

- (a) Check the engine and chassis for abnormal noises.
- (b) Check that the vehicle does not wander or pull to one side.
- (c) Check that the brakes work properly and do not drag.
- (d) Do setting of the parking brake shoes and drum.

12. FINAL INSPECTION

- (a) Check the operation of the body parts:
 - Hood:
 - Auxiliary catch operates properly
 - Hood locks securely when closed
 - Front and rear doors:
 - Door locks operate properly
 - Doors close properly
 - Luggage compartment door:
 - Door lock operates properly
 - Seats:
 - Seat adjusts easily and locks securely in any position
 - Front seat back locks securely in any position
- (b) Be sure to deliver a clean car. Especially check:
 - Steering wheel
 - Shift lever knob
 - All switch knobs
 - Seats

MAINTENANCE EQUIPMENT

PP0N9-01

Mirror	Brake hose
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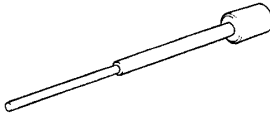
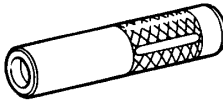
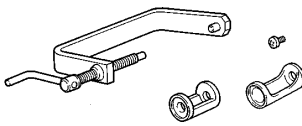
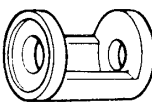

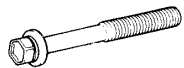

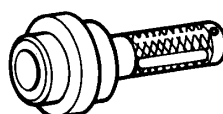
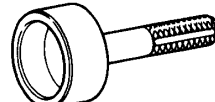
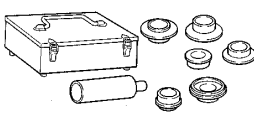
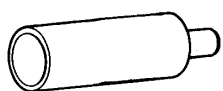
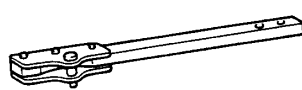
LUBRICANT


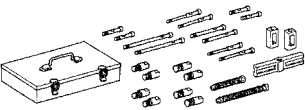
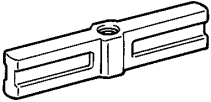
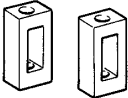

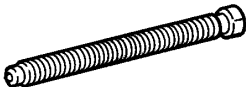
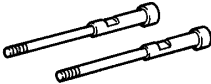
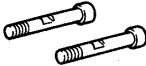
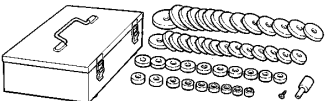


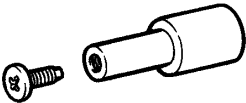
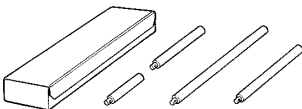
Item	Capacity	Classification
Brake fluid	–	SAE J1703 or FMVSS No.116 DOT3

ENGINE MECHANICAL


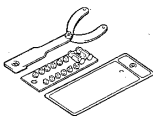
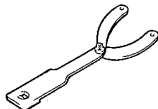




SST (Special Service Tools)

PP0NB-02

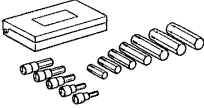

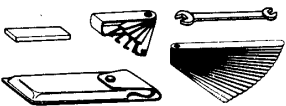
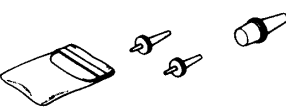
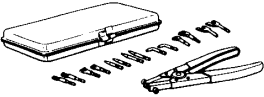
	09201-01055 Valve Guide Bushing Remover & Replacer 5.5	
	09201-41020 Valve Stem Oil Seal Replacer	
	09202-70020 Valve Spring Compressor	
	(09202-00010) Attachment	
	09213-70010 Crankshaft Pulley Holding Tool	
	(90105-08076) Bolt	
	09222-30010 Connecting Rod Bushing Remover & Replacer	
	09223-46011 Crankshaft Front Oil Seal Replacer	Camshaft oil seal Crankshaft pulley Crankshaft timing pulley
	09223-56010 Crankshaft Rear Oil Seal Replacer	
	09316-60011 Transmission & Transfer Bearing Replacer	
	(09316-00011) Replacer Pipe	Crankshaft front oil seal
	09330-00021 Companion Flange Holding Tool	Crankshaft pulley

	09843-18020	Diagnosis Check Wire	
	09950-50012	Puller C Set	
	(09951-05010)	Hanger 150	Crankshaft pulley Crankshaft timing pulley
	(09952-05010)	Slide Arm	Crankshaft pulley Crankshaft timing pulley
	(09953-05010)	Center Bolt 100	Crankshaft pulley Crankshaft timing pulley
	(09953-05020)	Center Bolt 150	Crankshaft pulley Crankshaft timing pulley
	(09954-05010)	Claw No.1	Crankshaft timing pulley
	(09954-05020)	Claw No.2	Crankshaft pulley
	09950-60010	Replacer Set	
	(09951-00240)	Replacer 24	Spark plug tube
	(09951-00460)	Replacer 46	Spark plug tube
	(09952-06010)	Adapter	Spark plug tube
	09950-70010	Handle Set	

PREPARATION – ENGINE MECHANICAL

	(09951-07100) Handle 100	Spark plug tube Valve guide bushing
	09960-10010 Variable Pin Wrench Set	
	(09962-01000) Variable Pin Wrench Arm Assy	Camshaft sub-gear
 	(09963-00350) Pin 3.5	Camshaft
 	(09963-00500) Pin 5	Camshaft sub-gear

RECOMMENDED TOOLS

	09040-00011 Hexagon Wrench Set .	
	09090-04020 Engine Sling Device	For suspension engine
	09200-00010 Engine Adjust Kit .	
	09258-00030 Hose Plug Set .	Plug for vacuum hose, fuel hose etc.
	09904-00010 Expander Set .	

EQUIPMENT

Caliper gauge	
CO/HC meter	
Compression gauge	
Connecting rod aligner	
Cylinder gauge	
Dial indicator	
Dye penetrant	
Engine tune-up tester	
Heater	
Magnetic finger	
Micrometer	
OBD II scan tool	
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	

SSM (Special Service Materials)

08826-00080	Seal Packing Black or equivalent (FIPG)	Camshaft bearing cap Cylinder head semi-circular plug Cylinder head cover Rear oil seal retainer
08826-00100	Seal Packing 1282B, THREE BOND 1282B or equivalent (FIPG)	Coolant drain union
08833-00070	Adhesive 1324, THREE BOND 1324 or equivalent	Drive plate bolt Spark plug tube
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	No.1 idler pulley bolt

EMISSION CONTROL EQUIPMENT

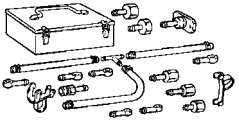
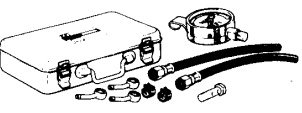
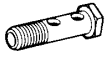

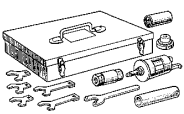
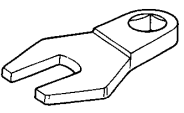
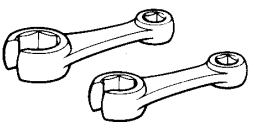


PP0NF-04

Hose clipper	
MITYVAC (Hand-held vacuum pump)	
Pressure gauge	
Torque wrench	
Vacuum gauge	

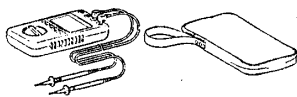


SFI

SST (Special Service Tools)

PP0NG-02

	09268-41047 Injection Measuring Tool Set	
	09268-45012 EFI Fuel Pressure Gauge	
	(09268-41190) Adaptor	
	(90405-06167) Union	
	09612-24014 Steering Gear Housing Overhaul Tool Set	
	(09617-24011) Steering Rack Wrench	Fuel pressure pulsation damper
	09631-22020 Power Steering Hose Nut 14 x 17 mm Wrench Set	Fuel line flare nut
	09816-30010 Oil Pressure Switch Socket	Knock sensor
	09842-30070 Wiring "F" EFI Inspection	

RECOMMENDED TOOLS

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

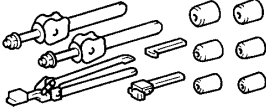

EQUIPMENT

Graduated cylinder	Injector
OBD II scan tool	Engine speed
Soft brush	Throttle body
Sound scope	Injector
Torque wrench	
Vacuum gauge	ACIS

COOLING

SST (Special Service Tools)

PP0NJ-03

	09230-01010 Radiator Service Tool Set	
	09231-14010 Punch	

EQUIPMENT

Heater	
Radiator cap tester	
Thermometer	
Torque wrench	

COOLANT

Item	Capacity	Classification
Engine coolant (w/ Heater)	11.0 liters (11.6 US qts, 9.7 Imp. qts)	"Toyota Long Life Coolant" or equivalent


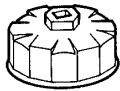
SSM (Special Service Materials)

08826-00100	Seal Packing 1282B, THREE BOND 1282B or equivalent (FIPG)	Water pump Water inlet housing
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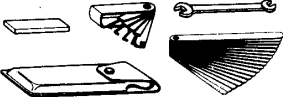
LUBRICATION

SST (Special Service Tools)

PP0NN-02

	09032-00100 Oil Pan Seal Cutter	
	09228-07501 Oil Filter Wrench	

RECOMMENDED TOOLS

	09200-00010 Engine Adjust Kit .	
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EQUIPMENT

Oil pressure gauge	
Precision straight edge	
Torque wrench	

LUBRICANT

Item	Capacity	Classification
Engine oil		API grade SJ, Energy-Conserving or ILSAC multigrade engine oil. SAE 5W-30 is the best choice for your vehicle, for good fuel economy, and good starting in cold weather.
Dry fill	7.0 liters (7.4 US qts, 6.2 Imp. qts)	
Drain and refill		
w/ Oil filter change	5.6 liters (5.9 US qts, 4.9 Imp. qts)	
w/o Oil filter change	5.3 liters (5.6 US qts, 4.7 Imp. qts)	

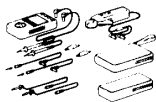
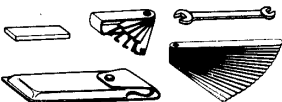
SSM (Special Service Materials)

08826-00080	Seal Packing Black or equivalent (FIPG)	Oil pump No.1 oil pan No.2 oil pan
08833-00080	Adhesive 1344 THREE BOND 1344 LOCTITE 242 or equivalent	Oil pressure switch

IGNITION

RECOMMENDED TOOLS

PP0NS-03

	09082-00050 TOYOTA Electrical Tester Set.	
	09200-00010 Engine Adjust Kit .	

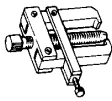
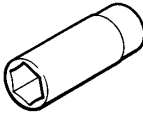

EQUIPMENT

Megger (Insulation resistance meter)	Spark plug
Spark plug cleaner	
Torque wrench	

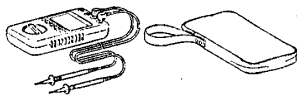
STARTING

SST (Special Service Tools)

PP0NU-01

	09286-46011 Injection Pump Spline Shaft Puller	Armature front bearing
	09810-38140 Starter Magnet Switch Nut Wrench 14	
	09820-00030 Alternator Rear Bearing Replacer	Armature bearing

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
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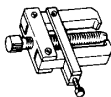
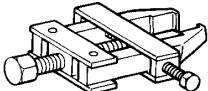

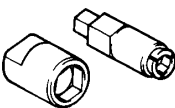
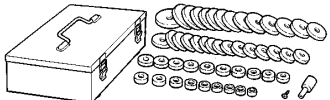


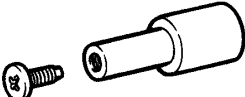
EQUIPMENT

Dial indicator	Commutator
Magnetic finger	Steel ball
Pull scale	Brush spring
Sandpaper	Commutator
Torque wrench	
V-block	Commutator
Vernier calipers	Commutator, Brush

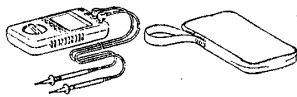
CHARGING

SST (Special Service Tools)

PP0NX-01

	09285-76010 Injection Pump Camshaft Bearing Cone Replacer	Rotor rear bearing cover
	09286-46011 Injection Pump Spline Shaft Puller	Rectifier end frame
	09820-00021 Alternator Rear Bearing Puller	
	09820-00030 Alternator Rear Bearing Replacer	
	09820-63010 Alternator Pulley Set Nut Wrench Set	
	09950-60010 Replacer Set	Rotor front bearing
	(09951-00260) Replacer 26	
	(09951-00500) Replacer 50	
	(09952-06010) Adapter	

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.
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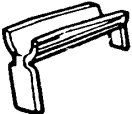
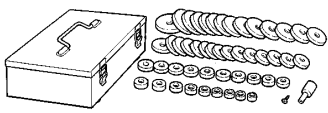

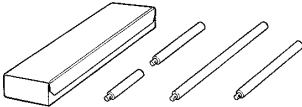

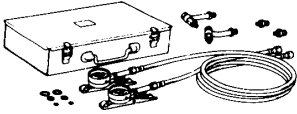
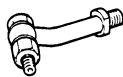

EQUIPMENT

Ammeter(A)	
Torque wrench	
Vernier calipers	Rotor (Slip ring)

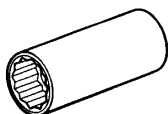

AUTOMATIC TRANSMISSION

SST (Special Service Tools)

PP0N4-01

	09032-00100 Oil Pan Seal Cutter	Oil pan
	09308-00010 Oil Seal Puller	Extension housing rear oil seal
	09309-37010 Transmission Bearing Replacer	Extension housing rear oil seal
	09350-30020 TOYOTA Automatic Transmission Tool Set	
	(09351-32020) Stator Stopper	
	09950-60010 Replacer Set	
	(09951-00350) Replacer 35	
	09950-70010 Handle Set	
	(09951-07100) Handle 100	
	09992-00095 Automatic Transmission Oil Pressure Gauge Set	
	(09992-00231) Adaptor C	
	(09992-00271) Gauge Assy	

RECOMMENDED TOOLS

	09017-12301 Deep Socket Wrench 30 mm .	
	09082-00040 TOYOTA Electrical Tester.	

EQUIPMENT

OBD II scan tool	
Dial indicator or dial indicator with magnetic base	Output shaft, Major bushing
Straight edge	
Torque wrench	


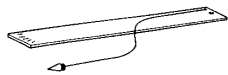
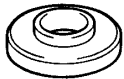
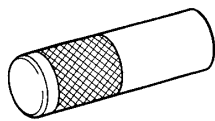
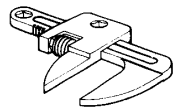
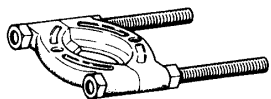
LUBRICANT

Item	Capacity	Classification
Automatic transmission fluid		
Dry fill	8.4 liters (8.9 US qts, 7.4 Imp. qts)	ATF TYPE T-IV
Drain and refill	1.9 liters (2.0 US qts, 1.7 Imp. qts)	

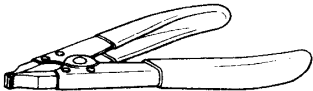
PROPELLER SHAFT

SST (Special Service Tools)

PP0N1-01

	09330-50010 Propeller Shaft Center Bearing Replacer	
	09370-50010 Drive Line Angle Gauge	
	09608-00071 Drive Pinion Rear Bearing Cone Replacer	
	09608-06041 Front Hub Inner Bearing Cone Replacer	
	09922-10010 Variable Open Wrench	Adjusting nut
	09950-00020 Bearing Remover	

RECOMMENDED TOOLS

	09905-00012 Snap Ring No.1 Expander .	
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
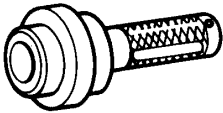
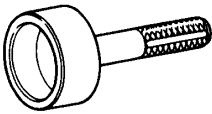
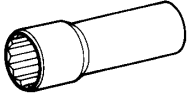
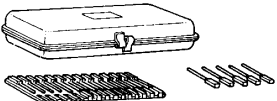


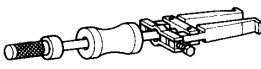
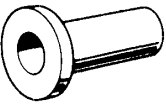

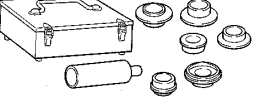
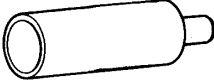
EQUIPMENT





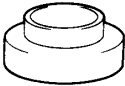
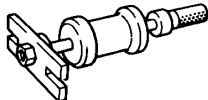
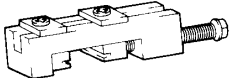

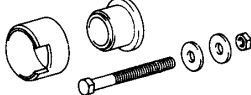
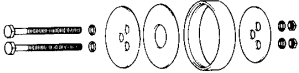

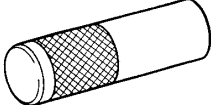

Dial indicator	
Torque wrench	
Vernier calipers	

SUSPENSION AND AXLE

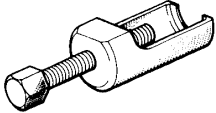
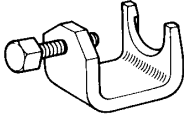
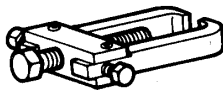
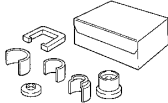


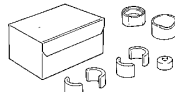

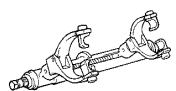

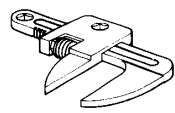
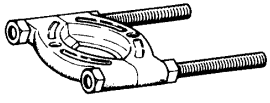
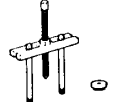
SST (Special Service Tools)

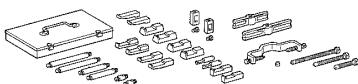
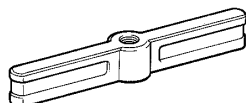
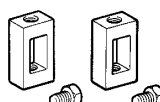
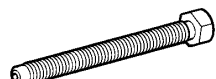
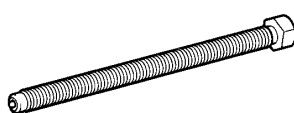
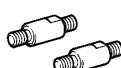
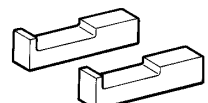
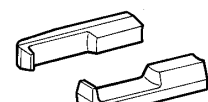

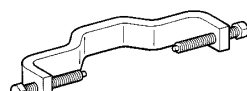
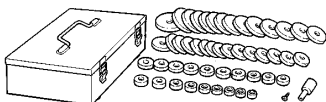


PP0IX-02

	09223-15020 Oil Seal & Bearing Replacer	Rear axle
	09223-46011 Crankshaft Front Oil Seal Replacer	Rear differential
	09223-56010 Crankshaft Rear Oil Seal Replacer	Rear differential
	09229-55010 Oil Cooler Relief Valve Wrench	Rear differential
	09240-00020 Wire Gauge Set	Rear drive shaft
	(09242-00080) Wire Gauge	
	09255-10012 Crankshaft Rear Bearing Remover & Replacer	Rear differential
	09308-00010 Oil Seal Puller	Front axle Rear axle Rear differential
	09309-36010 Transmission Rear Bearing Replacer	Rear drive shaft
	09316-12010 Transfer Bearing Replacer	Rear differential
	09316-60011 Transmission & Transfer Bearing Replacer	Front suspension Rear differential
	(09316-00011) Replacer Pipe	

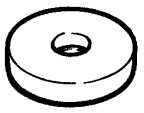
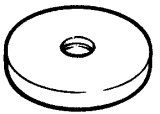
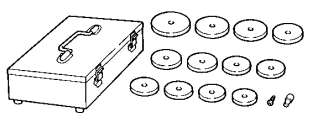
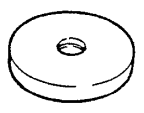
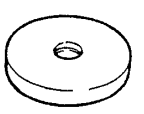
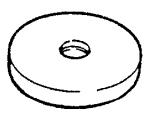
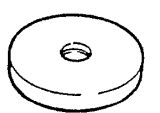
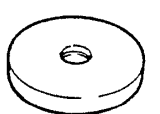

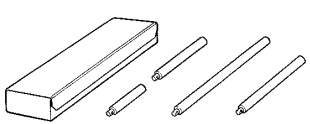


	(09316-00041) Replacer "C"	
	09325-40010 Transmission Oil Plug	Rear differential
	09330-00021 Companion Flange Holding Tool	Rear differential
	09502-12010 Differential Bearing Replacer	Rear drive shaft Rear differential
	09502-24010 Bearing Replacer	Rear differential
	09520-24010 Differential Side Gear Shaft Puller	Rear differential
	09521-24010 Drive Shaft Boot Clamping Tool	Rear drive shaft
	09527-17011 Rear Axle Shaft Bearing Remover	Rear axle Rear differential
	09570-22011 Differential Mounting Cushion Remover & Replacer	Rear differential
	09570-24010 Differential Mounting Cushion Remover & Replacer	Rear differential
	09608-04031 Front Hub Inner Bearing Cone Replacer	Rear differential
	09608-06041 Front Hub Inner Bearing Cone Replacer	Front axle
	09608-32010 Steering Knuckle Oil Seal Replacer	Front axle Rear axle Rear differential

PREPARATION – SUSPENSION AND AXLE

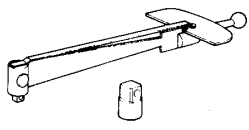
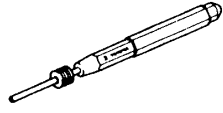
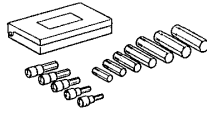
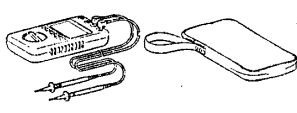
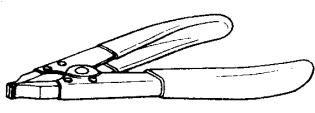
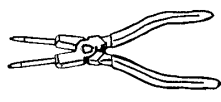
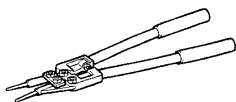
	09610-20012 Pitman Arm Puller	Front axle Front suspension
	09628-10011 Ball Joint Puller	Front wheel hub bolt Rear wheel hub bolt Rear suspension
	09628-62011 Ball Joint Puller	Front suspension
	09710-26011 Front Suspension Bushing Tool Set	Front suspension
	(09710-05081) Rear Base	
	09710-30050 Suspension Arm Bushing Replacer	Rear differential
	09726-12023 Lower Suspension Arm Bushing Remover & Replacer	Rear drive shaft
	(09726-01031) Spacer	
	09727-30021 Coil Spring Compressor	Front suspension Rear suspension
	09843-18020 Diagnosis Check Wire	Diagnosis trouble code check
	09922-10010 Variable Open Wrench	Rear differential
	09950-00020 Bearing Remover	Front axle Rear axle Rear differential
	09950-00030 Bearing Remover Attachment	Rear axle

	09950-40011 Puller B Set	Front axle Rear axle Rear differential
	(09951-04020) Hanger 200	
	(09952-04010) Slide Arm	
	(09953-04020) Center Bolt 150	
	(09953-04030) Center Bolt 200	
	(09954-04010) Arm 25	
	(09955-04051) Claw No.5	
	(09955-04061) Claw No.6	
	(09957-04010) Attachment	
	(09958-04011) Holder	
	09950-60010 Replacer Set	Front axle Rear axle Rear differential
	(09951-00430) Replacer 43	
	(09951-00450) Replacer 45	

PREPARATION – SUSPENSION AND AXLE

	(09951-00510) Replacer 51	
	(09951-00560) Replacer 56	
	09950-60020 Replacer Set No.2	Front axle Rear axle Rear differential
	(09951-00710) Replacer 71	
	(09951-00720) Replacer 72	
	(09951-00780) Replacer 78	
	(09951-00810) Replacer 81	
	(09951-00890) Replacer 89	
	(09951-01030) Replacer 103	
	09950-70010 Handle Set	Rear axle Rear differential
	(09951-07100) Handle 100	
	(09951-07150) Handle 150	

RECOMMENDED TOOLS

	09025-00010 Torque Wrench (30 kgf-cm)	
	09031-00030 Pin Punch .	
	09040-00011 Hexagon Wrench Set .	
	09082-00040 TOYOTA Electrical Tester.	
	09905-00012 Snap Ring No.1 Expander .	
	09905-00013 Snap Ring Pliers .	
	09905-00030 Snap Ring Pliers.	

EQUIPMENT

Dial indicator	
Torque wrench	
Micrometer	
Voltmeter	
Ammeter	
Ohmmeter	

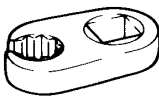

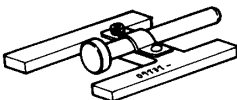

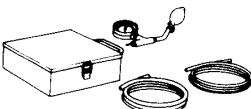
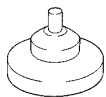
LUBRICANT

Item	Capacity	Classification
Outboard joint grease	100 – 105 g (3.5 – 3.7 oz.)	
Inboard joint grease Boot side	100 – 105 g (3.5 – 3.7 oz.)	
End cover	50 – 55 g (1.8 – 1.9 oz.)	
Differential oil	1.35 liters (1.43 US qts, 1.19 Imp.qts)	Hypoid gear oil API GL-5 Above –18 °C (0 °F): SAE 90 Below –18 °C (0 °F): SAE 80W – 90 or 80W

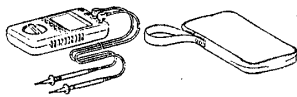
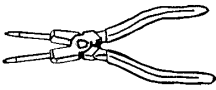
BRAKE

SST (Special Service Tools)

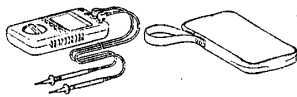
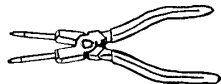
PP0JG-01

	09023-00100 Union Nut Wrench 10 mm	
	09330-00021 Companion Flange Holding Tool	
	09737-00010 Brake Booster Push Rod Gauge	
	09843-18020 Diagnosis Check Wire	
	09992-00242 Turbocharger Pressure Gauge	
	09992-00350 Brake Reservoir Pressure Adapter	

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
	09905-00013 Snap Ring Pliers .	Master Cylinder

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
	09905-00013 Snap Ring Pliers .	Master Cylinder

EQUIPMENT

Torque wrench	
Micrometer	Brake disc
Dial indicator	Brake disc
Vernier calipers	Brake disc
Feeler gauge	

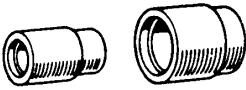
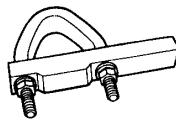
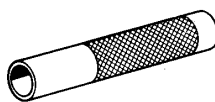
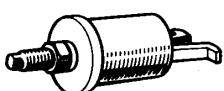
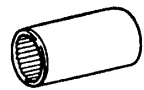
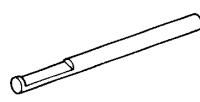
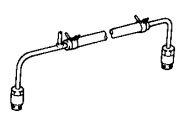

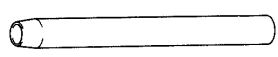
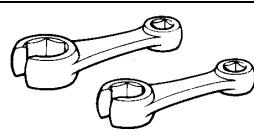
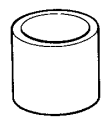
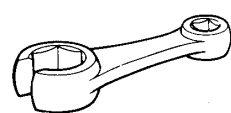
LUBRICANT

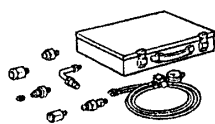
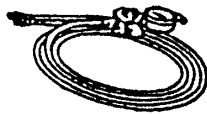
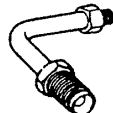
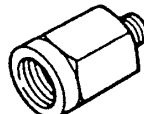
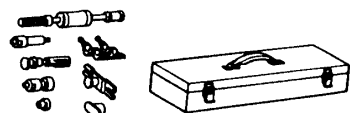

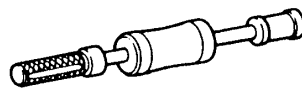
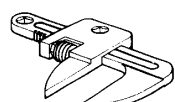

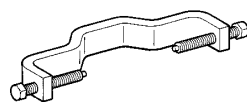
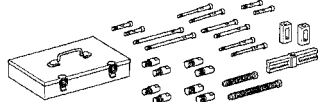
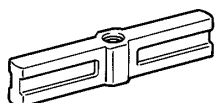
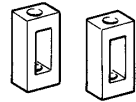
Item	Capacity	Classification
Brake fluid	–	SAEJ1703 or FMVSS No.116, DOT 3

STEERING

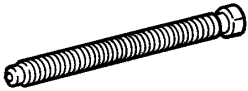
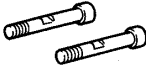
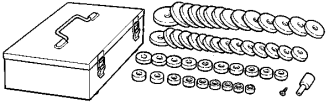










SST (Special Service Tools)

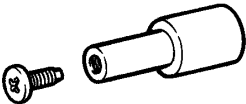
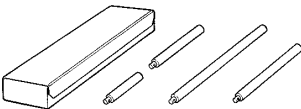


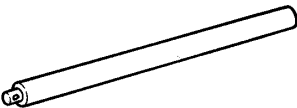
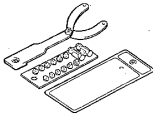
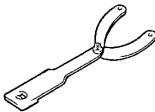
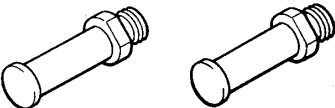
PP1ZW-02

	09238-47012	Water Pump Bearing Remover & Replacer	PS vane pump
	09612-00012	Rack & Pinion Steering Rack Housing Stand	PS gear
	09612-22011	Tilt Handle Bearing Replacer	PS gear
	09612-30012	Steering Worm Bearing Puller	PS gear
	09616-00010	Steering Worm Bearing Adjusting Socket	PS gear
	09631-10030	Oil Seal Remover	PS vane pump
	09631-12071	Steering Rack Oil Seal Test Tool	PS gear
	09631-20081	Seal Ring Tool	PS gear
	09631-20102	Steering Rack Cover "H"	PS gear
	09631-22020	Power Steering Hose Nut 14 x 17 mm Wrench Set	Power steering fluid
	09631-32020	Seal Ring Tool	PS gear
	09633-00020	Power Steering Hose Nut Wrench	PS gear

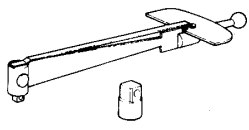
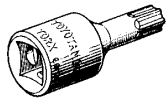
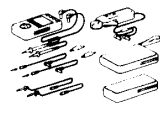
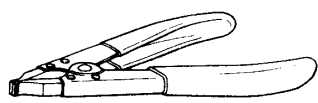
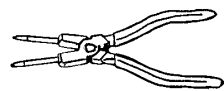
	09640-10010	Power Steering Pressure Gauge Set	Power steering fluid
	(09641-01010)	Gauge Assy	
	(09641-01030)	Attachment B	
	(09641-01040)	Attachment C	
	09910-00015	Puller Set	Power tilt and power telescopic steering column PS vane pump
	(09911-00011)	Puller Clamp	
	(09912-00010)	Puller Slide Hammer	
	09922-10010	Variable Open Wrench	PS gear
	09950-40011	Puller B Set	Power tilt and power telescopic steering column
	(09958-04011)	Holder	
	09950-50012	Puller C Set	Power tilt and power telescopic steering column
	(09951-05010)	Hanger 150	
	(09952-05010)	Slide Arm	

PREPARATION – STEERING

	(09953-05020) Center Bolt 150	
	(09954-05020) Claw No.2	
	09950-60010 Replacer Set	
	(09951-00180) Replacer 18	PS vane pump
	(09951-00240) Replacer 24	PS gear
	(09951-00280) Replacer 28	PS gear
	(09951-00300) Replacer 30	PS vane pump
	(09951-00310) Replacer 31	PS gear
	(09951-00320) Replacer 32	PS gear
	(09951-00340) Replacer 34	PS gear
	(09951-00400) Replacer 40	PS gear
	(09951-00430) Replacer 43	PS gear
	(09951-00460) Replacer 46	PS gear

	(09952-06010) Adapter	PS vane pump PS gear
	09950-70010 Handle Set	
	(09951-07100) Handle 100	PS vane pump PS gear
	(09951-07200) Handle 200	PS gear
	(09951-07360) Handle 360	PS gear
	09960-10010 Variable Pin Wrench Set	PS vane pump
	(09962-01000) Variable Pin Wrench Arm Assy	
	(09963-01000) Pin 10	

RECOMMENDED TOOLS

	09025-00010 Torque Wrench (30 kgf-cm)	PS vane pump PS gear
	09042-00010 Torx Socket T30 .	Power tilt and power telescopic steering column
	09082-00050 TOYOTA Electrical Tester Set.	Progressive power steering (PPS)
	09905-00012 Snap Ring No.1 Expander .	
	09905-00013 Snap Ring Pliers .	

EQUIPMENT

Caliper gauge	PS vane pump
Calipers	PS vane pump
Dial indicator	PS gear
Feeler gauge	PS vane pump
Micrometer	PS vane pump
Torque wrench	

LUBRICANT

Item		Capacity	Classification
Power steering fluid	Total	1.0 liters (1.1 US qts, 0.9 Imp.qts)	ATF DEXRON® II or III

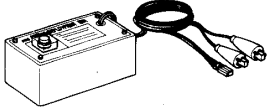
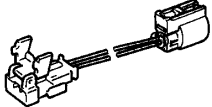
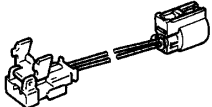

SSM (Special Service Materials)

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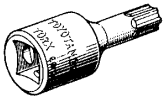
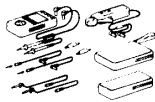
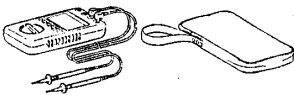
SUPPLEMENTAL RESTRAINT SYSTEM

SST (Special Service Tools)

PP0MQ-02

	09082-00700 SRS Airbag Deployment Tool	
	09082-00750 Airbag Deployment Wire Sub-harness No.3	
	09082-00760 Airbag Deployment Wire Sub-harness No.4	
	09843-18020 Diagnosis Check Wire	

RECOMMENDED TOOLS

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


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.: 360mm (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

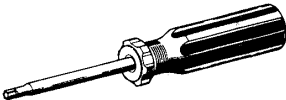
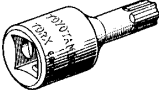

BODY ELECTRICAL

SST (Special Service Tools)

PP000-01

	09843-18020 Diagnosis Check Wire	
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RECOMMENDED TOOLS

	09041-00030 Torx Driver T30 .	For removing and installing steering wheel pad
	09042-00010 Torx Socket T30 .	For removing and installing steering wheel pad
	09082-00040 TOYOTA Electrical Tester.	

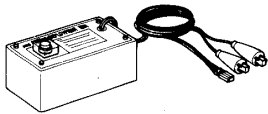
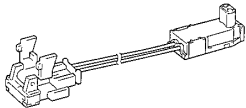

EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Engine coolant temperature sender gauge, Engine oil level warning switch, Seat heater
Syphon	Brake fluid level warning switch
Oil bath	Engine oil level warning switch
Bulb (1.4 W)	Defogger switch
Bulb (3.4 W)	Fuel sender gauge, Engine coolant temperature receiver gauge, Seat belt warning relay
Dry cell battery	Fuel sender gauge, Power mirror
Heat light	Seat heater
Hexagon wrench (6 mm)	Power seat
Torque wrench	
Clip remover	For removing cowl louver
Masking tape	Rear window defogger wire
Tin foil	Rear window defogger wire


BODY

SST (Special Service Tools)

PP0J2-01

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

RECOMMENDED TOOLS

	09070-20010 Moulding Remover .	
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EQUIPMENT

Clip remover	
Torque wrench	
Hexagon wrench	
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	
Glass plate or similar object	
Wooden block or similar object	
Plastic sheet	To avoid surface damage
Heat light	
Piano wire	
Rope (no projections, difficult to break)	Seat belt pretensioner
Tire Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner
Tire with disk wheel Width: 185 mm (7.28 in.) Inner diam: 360 mm (14.17 in.)	Seat belt pretensioner
Vinyl bag	Seat belt pretensioner


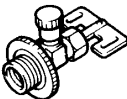








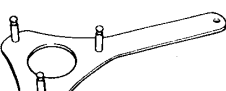

LUBRICANT


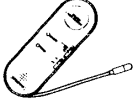
Item	Capacity	Classification
MP grease	–	–

AIR CONDITIONING


SST (Special Service Tools)

PP0B6-01

	07110-58060 Air Conditioner Service Tool Set	
	(07117-58060) Refrigerant Drain Service Valve	
	(07117-58070) T-Joint	
	(07117-58080) Quick Disconnect Adapter	Discharge (diam. 16 mm)
	(07117-58090) Quick Disconnect Adapter	Suction (diam. 13 mm)
	(07117-78050) Refrigerant Charging Gauge	
	(07117-88060) Refrigerant Charging Hose	Discharge (Red)
	(07117-88070) Refrigerant Charging Hose	Suction (Blue)
	(07117-88080) Refrigerant Charging Hose	Utility (Green)
	07112-66040 Magnetic Clutch Remover	
	07112-76060 Magnetic Clutch Stopper	
	07114-84010 Snap Ring Pliers	

	07114-84020 Snap Ring Pliers	
	07116-38360 Gas Leak Detector Assembly	

RECOMMENDED TOOLS

	09082-00040 TOYOTA Electrical Tester.	
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EQUIPMENT

Voltmeter	
Ammeter	
Ohmmeter	
Test lead	
Thermometer	Sensor, ECT switch
Torque wrench	
Dial indicator	Magnetic clutch
Plastic hammer	Magnetic clutch

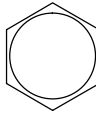
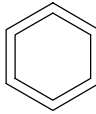
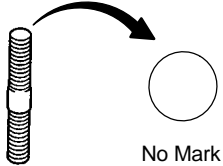
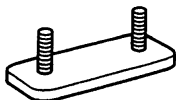
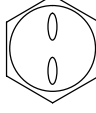
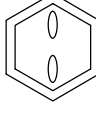
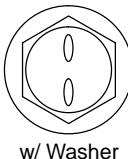
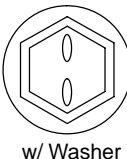









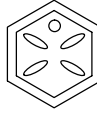

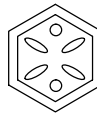
LUBRICANT

Item	Capacity	Classification
Compressor oil	–	ND-OIL 8 or equivalent
When replacing receiver	10 cc (0.34 fl.oz.)	
When replacing condenser	40 cc (1.4 fl.oz.)	
When replacing evaporator	40 cc (1.4 fl.oz.)	
When replacing compressor	140 cc (4.8 fl.oz.)	

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

SS02S-01

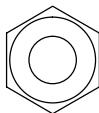
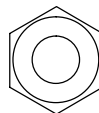
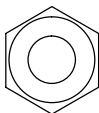

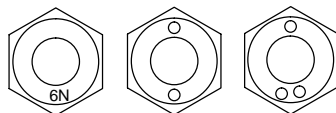
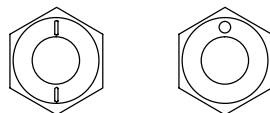
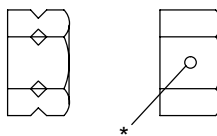
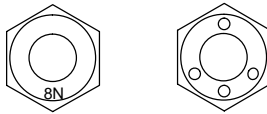
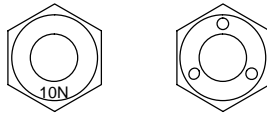
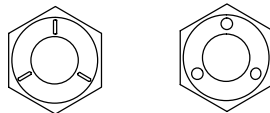

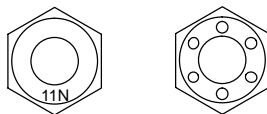
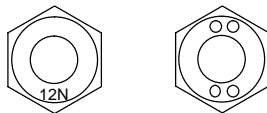
Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
<div><div>4</div><div></div><div>No Mark</div></div>	<div><div></div><div>No Mark</div></div>	<div><div></div><div>No Mark</div></div>	<div><div></div></div>	4T
<div><div>5</div><div></div></div>	<div><div></div></div>			5T
<div><div>6</div><div></div><div>w/ Washer</div></div>	<div><div></div><div>w/ Washer</div></div>	<div><div></div></div>		6T
<div><div>7</div><div></div></div>	<div><div></div><div></div></div>			7T
<div><div>8</div></div>	<div><div></div></div>	<div><div></div><div></div></div>		8T
<div><div>9</div></div>	<div><div></div></div>			9T
<div><div>10</div></div>	<div><div></div><div></div></div>			10T
<div><div>11</div></div>	<div><div></div><div></div></div>			11T

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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

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
			7N (5T)
			8N
		 No Mark	10N (7T)
			11N
			12N

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

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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

2000 LEXUS LS400 (RM717U)

MAINTENANCE

TORQUE SPECIFICATION

SS0C7-01

Part tightened	N·m	kgf·cm	ft·lbf
Front seat bolts	37	375	27
Strut/stabilizer bar bracket x Body	72	730	53
Front suspension lower crossmember x Body	98	1,000	72
Rear suspension member x Body	180	1,840	133

ENGINE MECHANICAL

SERVICE DATA

SS0C8-03

Compression pressure	at 250 rpm STD Minimum Difference of pressure between each cylinder	1,226 kPa (12.5 kgf/cm ² , 178 psi) or more 981 kPa (10.0 kgf/cm ² , 142 psi) 98 kPa (1.0 kgf/cm ² , 14 psi) or less
Valve clearance	at cold Intake Exhaust Valve clearance adjusting shim No.00 No.02 No.04 No.06 No.08 No.10 No.12 No.14 No.16 No.18 No.20 No.22 No.24 No.26 No.28 No.30 No.32 No.34 No.36 No.38 No.40 No.42 No.44 No.46 No.48 No.50 No.52 No.54 No.56 No.58 No.60 No.62 No.64 No.66 No.68 No.70 No.72 No.74 No.76 No.78 No.80	0.15 – 0.25 mm (0.006 – 0.010 in.) 0.25 – 0.35 mm (0.010 – 0.014 in.) 2.000 mm (0.0787 in.) 2.020 mm (0.0795 in.) 2.040 mm (0.0803 in.) 2.060 mm (0.0811 in.) 2.080 mm (0.0819 in.) 2.100 mm (0.0827 in.) 2.120 mm (0.0835 in.) 2.140 mm (0.0843 in.) 2.160 mm (0.0850 in.) 2.180 mm (0.0858 in.) 2.200 mm (0.0866 in.) 2.220 mm (0.0874 in.) 2.240 mm (0.0882 in.) 2.260 mm (0.0890 in.) 2.280 mm (0.0898 in.) 2.300 mm (0.0906 in.) 2.320 mm (0.0913 in.) 2.340 mm (0.0921 in.) 2.360 mm (0.0929 in.) 2.380 mm (0.0937 in.) 2.400 mm (0.0945 in.) 2.420 mm (0.0953 in.) 2.440 mm (0.0961 in.) 2.460 mm (0.0969 in.) 2.480 mm (0.0976 in.) 2.500 mm (0.0984 in.) 2.520 mm (0.0992 in.) 2.540 mm (0.1000 in.) 2.560 mm (0.1008 in.) 2.580 mm (0.1016 in.) 2.600 mm (0.1024 in.) 2.620 mm (0.1031 in.) 2.640 mm (0.1039 in.) 2.660 mm (0.1047 in.) 2.680 mm (0.1055 in.) 2.700 mm (0.1063 in.) 2.720 mm (0.1071 in.) 2.740 mm (0.1079 in.) 2.760 mm (0.1087 in.) 2.780 mm (0.1094 in.) 2.800 mm (0.1102 in.)
Ignition timing	w/ Terminals TC and E1 connected of DLC1	8 –12° BTDC @ idle
Idle speed	–	750 ± 50 rpm
Timing belt tensioner	Protrusion from housing end	10.5 – 11.5 mm (0.413 – 0.453 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	10.285 – 10.306 mm (0.4049 – 0.4057 in.)
Valve guide bushing		O/S 0.05	10.335 – 10.356 mm (0.4069 – 0.4077 in.)
	Cylinder head bolt thread inside diameter	STD	9.770 – 9.960 mm (0.3846 – 0.3921 in.)
		Minimum	9.60 mm (0.3780 in.)
	Inside diameter		5.510 – 5.530 mm (0.2169 – 0.2374 in.)
	Outside diameter (for repair part)	STD	10.333 – 10.344 mm (0.4068 – 0.4072 in.)
		O/S 0.05	10.383 – 10.394 mm (0.4088 – 0.4092 in.)
Valve	Valve overall length	STD Intake	95.05 mm (3.7421 in.)
		Exhaust	95.10 (3.7441 in.)
		Minimum Intake	94.55 mm (3.7224 in.)
		Exhaust	94.60 mm (3.7244 in.)
	Valve face angle		44.5°
	Stem diameter	Intake	5.470 – 5.485 mm (0.2154 – 0.2159 in.)
		Exhaust	5.465 – 5.480 mm (0.2152 – 0.2157 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		54.05 – 54.15 mm (2.1279 – 2.1319 in.)
	Installed tension at 35.0 mm (1.378 in.)		204 – 226 N (20.8 – 23.0 kgf-cm, 45.9 – 50.7 lbf)
Valve lifter	Lifter diameter		30.966 – 30.976 mm (1.2191 – 2.2195 in.)
	Lifter bore diameter		31.000 – 31.016 mm (1.2205 – 1.2211 in.)
	Oil clearance	STD	0.024 – 0.050 mm (0.0009 – 0.0020 in.)
		Maximum	0.07 mm (0.0028 in.)
Camshaft	Thrust clearance	STD Intake	0.060 – 0.100 mm (0.0024 – 0.0039 in.)
		Exhaust	0.040 – 0.090 mm (0.0016 – 0.0035 in.)
		Maximum Intake	0.13 mm (0.0051 in.)
		Exhaust	0.12 mm (0.0047 in.)
	Journal oil clearance	STD	0.030 – 0.067 mm (0.0012 – 0.0026 in.)
		Maximum	0.10 mm (0.0039 in.)
	Journal diameter	Intake (A)	30.984 – 31.000 mm (1.2198 – 1.2205 in.)
		Others	26.954 – 26.970 mm (1.0612 – 1.0618 in.)
	Circle runout		0.08 mm (0.0031 in.)
	Cam lobe height	STD Intake	42.610 – 42.710 mm (1.6776 – 1.6815 in.)
		Exhaust	42.630 – 42.730 mm (1.6783 – 1.6823 in.)
		Minimum Intake	42.46 mm (1.6717 in.)
		Exhaust	42.48 mm (1.6724 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.)
Camshaft timing tube	Journal diameter	Green painted mark	39.958 – 39.964 mm (1.5731 – 1.5734 in.)
		Red painted mark	39.964 – 39.970 mm (1.5734 – 1.5736 in.)
	Journal oil clearance	Sylinder head mark A	0.036 – 0.050 mm (0.0014 – 0.0020 in.)
		Sylinder head mark B	0.038 – 0.052 mm (0.0015 – 0.0021 in.)
Manifold	Warpage	Maximum Intake	0.15 mm (0.0059 in.)
		Exhaust	0.50 mm (0.0197 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Cylinder block	Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
	Cylinder bore diameter	STD Mark 1	87.500 – 87.510 mm (3.4449 – 3.4453 in.)
		Mark 2	87.510 – 87.520 mm (3.4453 – 3.4457 in.)
		Mark 3	87.520 – 87.530 mm (3.4457 – 3.4461 in.)
		Maximum	87.73 mm (3.4539 in.)
	Main bearing cap bolt tension portion diameter	STD	7.500 – 7.600 mm (0.2953 – 0.2992 in.)
		Minimum	7.20 mm (0.2835 in.)
Piston and piston ring	Piston diameter	STD Mark 1	87.406 – 87.416 mm (3.4411 – 3.4416 in.)
		Mark 2	87.416 – 87.426 mm (3.4416 – 3.4420 in.)
		Mark 3	87.426 – 87.436 mm (3.4420 – 3.4424 in.)
	Piston oil clearance	STD	0.084 – 0.104 mm (0.0033 – 0.0041 in.)
		Maximum	0.124 mm (0.0049 in.)
	Piston ring groove clearance	No.1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
		No.2	0.010 – 0.050 mm (0.0004 – 0.0020 in.)
	Piston ring end gap	STD No.1	0.250 – 0.450 mm (0.0098 – 0.0177 in.)
		No.2	0.500 – 0.700 mm (0.0197 – 0.0276 in.)
		Oil	0.150 – 0.500 mm (0.0059 – 0.0197 in.)
		Maximum No.1	1.05 mm (0.0413 in.)
		No.2	1.30 mm (0.0512 in.)
		Oil	1.10 mm (0.0433 in.)
Connecting rod	Thrust clearance	STD	0.160 – 0.290 mm (0.0063 – 0.0138 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod thickness		22.880 – 22.920 mm (0.9008 – 0.9024 in.)
	Connecting rod oil clearance	STD	0.027 – 0.053 mm (0.0011 – 0.0021 in.)
		Maximum	0.065 mm (0.0026 in.)
	Connecting rod bearing center wall thickness (Reference)	Mark 2	1.484 – 1.487 mm (0.0584 – 0.0585 in.)
		Mark 3	1.487 – 1.490 mm (0.0585 – 0.0587 in.)
		Mark 4	1.490 – 1.493 mm (0.0587 – 0.0588 in.)
		Mark 5	1.493 – 1.496 mm (0.0588 – 0.0589 in.)
		Mark 6	1.496 – 1.499 mm (0.0589 – 0.0590 in.)
		Mark 7	1.499 – 1.502 mm (0.0590 – 0.0591 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 – 22.014 mm (0.8663 – 0.8667 in.)
	Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 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 tension portion diameter	STD	7.200 – 7.300 mm (0.2835 – 0.2874 in.)
		Minimum	7.00 mm (0.2756 in.)
Crankshaft	Thrust clearance	STD	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		2.440 – 2.490 mm (0.0961 – 0.0980 in.)
	Main journal bore diameter on cylinder block (with main bearing)		66.986 – 67.000 mm (2.6372 – 2.6378 in.)
	Main journal oil clearance	STD No.1 and No.5	0.017 – 0.033 mm (0.0007 – 0.0013 in.)
		Others	0.029 – 0.045 mm (0.0011 – 0.0018 in.)
		Maximum No.1 and No.5	0.043 mm (0.0017 in.)
		Others	0.055 mm (0.0022 in.)
	Main journal diameter		66.988 – 67.000 mm (2.6373 – 2.6378 in.)

Crankshaft (cont'd)	Main bearing center wall thickness (Reference)		
	No.1 and No.5	Mark 3	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
		Mark 4	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
		Mark 5	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
		Mark 6	2.501 – 2.504 mm (0.0985 – 0.0986 in.)
		Mark 7	2.504 – 2.507 mm (0.0986 – 0.0987 in.)
	Others	Mark 1	2.486 – 2.489 mm (0.0979 – 0.0980 in.)
		Mark 2	2.489 – 2.492 mm (0.0980 – 0.0981 in.)
		Mark 3	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
		Mark 4	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
		Mark 5	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
	Crank pin diameter		51.982 – 52.000 mm (2.0465 – 2.0472 in.)
	Circle runout	Maximum	0.08 mm (0.0031 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.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
No.1 idler pulley, No.2 idler pulley x Cylinder Block	34.5	350	25
Camshaft timing pulley x Camshaft timing tube	7.5	80	66 in.-lbf
Drive belt tensioner x Cylinder block	16	160	12
Timing belt tensioner x Oil pump	26	270	19
Crankshaft pulley x Crankshaft	245	2,500	181
Fan bracket x Cylinder block	12 mm head	16	12
	14 mm head	32	24
No.2 timing belt cover x Cylinder block	16	160	12
No.3 timing belt cover x Cylinder block, cylinder head	7.5	80	66 in.-lbf
Drive belt idler pulley x Fan bracket	37	380	27
Fluid coupling x Fan bracket	21	215	16
Exhaust manifold x Cylinder head	44	450	33
Cylinder head x Cylinder block	1st	39	29
	2nd	Turn 90°	Turn 90°
Camshaft drive gear x Camshaft timing tube	7.5	80	66 in.-lbf
Camshaft timing tube x Camshaft	78	790	58
Staright screw plug x Camshaft timing tube	15	150	11
Camshaft bearing cap x Cylinder head	Bolt C	7.5	66 in.-lbf
	Others	16	12
Cylinder head cover x Cylinder head	6.0	60	53 in.-lbf
Engine hanger x Cylinder head	37	380	27
Front water bypass joint, Rear water bypass joint x Cylinder head	18	185	13
Intake manifold x Cylinder head	18	185	13
V-bank cover bracket x engine hanger	7.5	80	66 in.-lbf
Timing belt rear plate x Cylinder head	7.5	80	66 in.-lbf
Main bearing cap x Cylinder block	2 progressive type 1st	27	20
	2nd	Turn 90°	Turn 90°
	Others	49	36
Connecting rod cap x Connecting rod	1st	25	18
	2nd	Turn 90°	Turn 90°
Rear oil seal retainer x Cylinder block	8.0	80	71 in.-lbf
Engine coolant drain union x Cylinder block	49	500	36
Water seal plate x Cylinder block	14	145	10
Water bypass pipe x Cylinder Block	18	185	13
Engine mounting bracket x Cylinder block	36	370	27
Drive plate x Crankshaft	83	850	61
Transmission x Cylinder block	72	730	53
Transmission x No.1 oil pan	37	380	27
Drive plate x Torque converter clutch	41	420	30
Flywheel housing under cover x Transmission	18.5	185	14
Rear engine mounting member x Body	25	250	19
Rear engine mounting member x Rear engine mounting insulator	13.5	135	10
Transmission control rod x Shift lever	13	130	9
Front suspension crossmember x Engine mounting insulator	70	700	52
A/C compressor x Cylinder block, Fan bracket	49	500	36

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A/C compressor stay x Oil filter bracket		29	300	22
PS pump x Cylinder head	Bolt	39	400	29
	Nut	43	440	32
Front center floor crossmember brace x Body		13	130	9
Rear center floor crossmember brace x Body		13	130	9
TWC x Exhaust manifold		61.8	630	46
Front exhaust pipe x TWC		43.1	440	32
Front exhaust pipe support bracket x Transmission		43.1	440	32
Tailpipe bracket x Body		12.7	130	9
Damper x Front exhaust pipe		19	195	14
Heated oxygen sensor x Front exhaust pipe		44	450	33

EMISSION CONTROL

TORQUE SPECIFICATION

SS0CA-01

Part tightened	N·m	kgf·cm	ft·lbf
TWC x Exhaust manifold	62	630	46
TWC x Front exhaust pipe	44	440	32
Heated oxygen sensor x Front exhaust pipe	44	450	33

SFI

SERVICE DATA

SS0CB-07

Fuel pressure regulator	Fuel pressure	304 – 343 kPa (3.1 – 3.5 kgf/cm ² , 44 – 50 psi)
Fuel pump	Resistance at 20 °C (68 °F)	0.2 – 3.0 Ω
Injector	Resistance at 20 °C (68 °F) Injection volume Difference between each cylinder Fuel leakage	13.4 – 14.2 Ω 60 – 73 cm ³ (3.7 – 4.5 cu in.) per 15 sec. 13 cm ³ (0.6 cu in.) or less One drop or less per minute
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 2.21 – 2.69 kΩ 0.493 – 0.667 kΩ
Throttle body	Throttle body fully closed angle	4°
Throttle position sensor	Resistance (VC – E2) at 20 °C (68 °F)	1.25 – 2.35 kΩ
Accelerator pedal position sensor	Resistance (VC – E2) at 20 °C (68 °F) Standard throttle valve opening percentage Sensor lever full–open position	1.64 – 3.28 kΩ 60 % or more
Throttle control motor w/ clutch	Motor resistance at 20 °C (68 °F) Clutch resistance at 20 °C (68 °F)	0.3 – 100 Ω 4.2 – 5.2 Ω
Camshaft timing oil control valve	Resistance at 20 °C (68 °F)	6.9 – 7.9 Ω
Fuel pump resistor	Resistance at 20 °C (68 °F)	0.70 – 0.76 Ω
VSV for EVAP	Resistance at 20 °C (68 °F)	30 – 34 Ω
VSV for vapor pressure sensor	Resistance at 20 °C (68 °F)	37 – 44 Ω
VSV for acoustic control induction system (ACIS)	Resistance at 20 °C (68 °F)	33 – 39 Ω
ECT sensor	Resistance at –20 °C (–4 °F) 0 °C (32 °F) 20 °C (68 °F) 40 °C (104 °F) 60 °C (140 °F) 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
Heated oxygen sensor	Heater coil resistance at 20 °C (68 °F) 800 °C (1,472 °F)	11 – 16 Ω 23 – 32 Ω
VVT sensor	Resistance Cold Hot	835 – 1,400 Ω 1,060 – 1,645 Ω
Fuel cut rpm	Fuel return rpm	1,400 rpm

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Fuel line	for union bolt	29	300	21
	for flare nut	31	310	23
Fuel pump bracket x Fuel tank		5.5	55	48 in·lbf
Fuel pump set plate x Fuel tank		3.0	30	26 in·lbf
Fuel pressure regulator, Fuel filter x Fuel pump bracket		2.0	20	17 in·lbf
Fuel inlet hose x Fuel tube	for SST	30	310	22
Delivery pipe x Intake manifold		18	185	13
Fuel pressure pulsation damper x delivery pipe		39	400	29
	for SST	33	340	24
VSV for EVAP x Intake manifold		18	185	13
Accelerator cable bracket x Intake manifold		18	185	13
LH front V-bank cover bracket x Engine hanger		7.5	80	66 in·lbf
RH rear V-bank cover bracket x Engine hanger		7.5	80	66 in·lbf
LH rear V-bank cover bracket x Intake manifold		7.5	80	66 in·lbf
Fuel inlet pipe x Fuel tank	Bolt	3	30	26 in·lbf
	Screw	1.5	15	13 in·lbf
Fuel sender gauge x Fuel tank		3	30	26 in·lbf
Fuel tank x Body		25	250	18
Fuel main tube x Fuel tank, Fuel filter		30	300	21
Fuel EVAP tube x Fuel tank		30	300	21
Throttle body x Intake manifold		18	185	13
Camshaft oil control valve x Front bearing cap		7.5	80	66 in·lbf
Intake air control valve x Upper intake manifold		8.5	85	73 in·lbf
Actuator x Upper intake manifold		8.5	85	73 in·lbf
Upper intake manifold x Lower intake manifold		18	185	13
ECT sensor x Front water bypass joint		20	200	14
Knock sensor x Cylinder block		44	450	33
Heated oxygen sensor x Exhaust manifold, Front exhaust pipe		44	450	33

COOLING

SERVICE DATA

SS0CD-01

Thermostat	Valve opening temperature	80 – 84°C (176 – 183°F)
	Valve lift at 95°C (203°F)	10 mm (0.39 in.) or more
Radiator cap	Relief valve opening pressure	74 – 103 kPa (0.75 – 1.05 kgf/cm ² , 10.7 – 14.9 psi)
	STD Minimum	59 kPa (0.6 kgf/cm ² , 8.5 psi)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Drain plug x Union on cylinder block	12.7	130	9
Water pump x Cylinder block	18	185	13
Water inlet housing x Water pump	18	185	13
Water inlet x Water inlet housing	18	185	13
Oil cooler x Radiator lower tank	8.34	85	74 in.·lbf
ECT switch for A/C cooling fan x Radiator	7.4	75	65 in.·lbf
No.1 fan shroud x Radiator	5.0	50	44 in.·lbf
Upper radiator support x Body	13.5	135	10

LUBRICATION

SERVICE DATA

SS0CF-01

Oil pressure		at idle speed at 3,000 rpm	29 kPa (0.3 kgf/cm ² , 43 psi) or more 294 – 588 kPa (3.0 – 6.0 kgf/cm ² , 43 – 85 psi)
Oil pump	Tip clearance	STD Maximum	0.060 – 0.180 mm (0.0024 – 0.0071 in.) 0.180 mm (0.0071 in.)
	Side clearance	STD Maximum	0.030 – 0.090 mm (0.0012 – 0.0035 in.) 0.090 mm (0.0035 in.)
	Body clearance	STD Maximum	0.250 – 0.325 mm (0.0098 – 0.0127 in.) 0.325 mm (0.0127 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
No.2 oil pan x Drain plug	39	400	29
Oil pump body cover x Oil pump body	10	105	8
Oil pump body x Plug	49	500	36
Oil pump x Cylinder block	12 mm head	15.5	11
	14 mm and 6 mm hexagon socket head	30.5	22
Oil strainer x Cylinder block, Oil pump	7.5	80	66 in·lbf
No.1 oil pan x Oil pump, Oil seal retainer	7.5	80	66 in·lbf
No.1 oil pan x Cylinder block	10 mm head	7.5	66 in·lbf
	12 mm head	28	21
Oil pan baffle plate x No.1 oil pan	7.5	80	66 in·lbf
No.2 oil pan x No.1 oil pan	7.5	80	66 in·lbf
Oil filter bracket x Oil pump	18	185	13
Oil level sensor x No.1 oil pan	5.4	55	48 in·lbf

IGNITION

SERVICE DATA

SS0CH-01

Firing order	–		1 – 8 – 4 – 3 – 6 – 5 – 7 – 2
Spark plug	Recommended spark plug	ND NGK	SK20R11 IFR6A11
	Correct electrode gap for new spark plug		1.1 mm (0.043 in.)
	Maximum electrode gap for used spark plug		1.2 mm (0.047 in.)
Camshaft position sensor	Resistance	Cold Hot	835 – 1,400 Ω 1,060 – 1,645 Ω
Crankshaft position sensor	Resistance	Cold Hot	1,630 – 2,740 Ω 2,065 – 3,225 Ω

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	17.5	180	13
Ignition coil x Cylinder head cover	7.5	80	66 in.·lbf
Camshaft position sensor x LH cylinder head	7.5	80	66 in.·lbf
Crankshaft position sensor x Oil pump	6.5	65	56 in.·lbf

STARTING

SERVICE DATA

SS0CJ-01

Starter	Rated voltage and output power		12 V 2.0 kW
	No-load characteristics	Current	100 A or less at 11.5 V
		rpm	2,000 rpm or less
	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 (2.2 – 2.8 kgf, 4.9 – 6.2 lbf)
		Minimum	12.7 N (1.3 kgf, 2.9 lbf)
	Commutator		
	Diameter	STD	35.0 mm (1.378 in.)
		Minimum	34.0 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.)
	Field frame		
	Shunt coil resistance	at 20°C (68°F)	1.5 – 1.9 Ω
Magnetic switch			
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Terminal 30 nut, Terminal C nut x Terminal bolt	17	170	12
End cover x Magnetic switch housing	3.6	37	32 in.·lbf
End cover x Brush holder	3.8	39	34 in.·lbf
Starter housing x Magnetic switch	9.3	95	82 in.·lbf
End cover with field frame x Magnetic switch	9.3	95	82 in.·lbf
Lead wire of field coil x Terminal C	5.9	60	52 in.·lbf
Wire clamp, Starter wire x Starter	9.81	98	84 in.·lbf
Starter x Cylinder block	39	400	29
Water bypass pipe x Cylinder block	18	185	13

CHARGING

SERVICE DATA

SSOCL-01

Battery	Voltage	at 20°C (68°F)	12.2 – 14.8 V
Generator	Rated output		12 V – 100 A
	Rotor coil resistance	at 20°C (68°F)	2.1 – 2.5 Ω
	Slip ring diameter	STD	14.2 mm – 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.)
Voltage regulator	Regulating voltage	at 25°C (77°F)	13.7 – 14.8 V
		at 115°C (239°F)	13.2 – 14.0 V

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Bearing cover x Drive end frame	3.0	31	27 in·lbf
Rectifier end frame without wire clip x Drive end frame	4.5	46	40 in·lbf
Rectifier end frame with cord clip x Drive end frame	5.4	55	48 in·lbf
Generator pulley x Rotor	110.5	1,128	81
Rectifier holder x Lead wire on rectifier end frame	2.94	30	26 in·lbf
Voltage regulator x Rectifier end frame	2.0	20	17 in·lbf
Voltage regulator x Rectifier holder	2.0	20	17 in·lbf
Brush holder x Rectifier holder	2.0	20	17 in·lbf
Brush holder x Voltage regulator	2.0	20	17 in·lbf
Rear end cover x Rectifier holder	4.4	45	39 in·lbf
Plate terminal x Rectifier holder	3.8	39	34 in·lbf
Terminal insulator x Rectifier holder	6.5	66	58 in·lbf
Generator x Cylinder block	39	400	29

AUTOMATIC TRANSMISSION

SERVICE DATA

SS0C5-01

Line pressure (Wheel locked)		
	Idling	
	D position	395 – 455 kPa (4.0 – 4.6 kgf·cm ² , 57 – 65 psi)
	R position	632 – 732 kPa (6.4 – 7.5 kgf·cm ² , 91 – 107 psi)
	Stall	
	D position	1,200 – 1,360 kPa (12.2 – 13.9 kgf·cm ² , 174 – 198 psi)
	R position	1,655 – 1,960 kPa (16.9 – 20.0 kgf·cm ² , 240 – 284 psi)
Accumulator back pressure		
Engine idling and shift lever D position		
ECM SLN terminal condition		245 kPa (2.5 kgf·cm ² , 36 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 (N position and A/C OFF)		750 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch sleeve runout	Max.	0.30 mm (0.0118 in.)
Torque converter clutch installation (Correct distance)		More than 17.1 mm (0.673 in.)
Extension housing oil seal drive in depth from flat end		2.0 mm (0.079 in.)
Shift schedule	Differential gear ratio 3.266	
D, 4 position		
(Throttle valve fully opened)		
	1 → 2	65 – 75 km/h (40 – 47 mph)
	2 → 3	96 – 107 km/h (60 – 66 mph)
	3 → 4	150 – 166 km/h (93 – 103 mph)
	4 → 5	219 – 237 km/h (136 – 147 mph)
	5 → 4	211 – 225 km/h (131 – 140 mph)
	4 → 3	141 – 153 km/h (88 – 95 mph)
	3 → 2	83 – 90 km/h (52 – 60 mph)
	2 → 1	44 – 50 km/h (27 – 31 mph)
(Throttle valve fully closed)		
	4 → 5	35 – 40 km/h (22 – 25 mph)
	5 → 4	26 – 31 km/h (16 – 19 mph)
3 position		
(Throttle valve fully opened)		
	1 → 2	65 – 75 km/h (40 – 47 mph)
	2 → 3	96 – 107 km/h (60 – 66 mph)
	4 → 3	159 – 172 km/h (99 – 107 mph)
	3 → 2	83 – 90 km/h (52 – 60 mph)
	2 → 1	44 – 50 km/h (27 – 31 mph)
2 position		
(Throttle valve fully opened)		
	1 → 2	65 – 75 km/h (40 – 47 mph)
	3 → 2	104 – 111 km/h (65 – 69 mph)
	2 → 1	44 – 50 km/h (27 – 31 mph)
L position		
(Throttle valve fully opened)		
	2 → 1	18 – 23 km/h (11 – 14 mph)
Lock-up point	(Throttle valve opening 5%)	
5th gear (D position)	Lock-up ON	61 – 67 km/h (38 – 42 mph)
	Lock-up OFF	57 – 63 km/h (35 – 39 mph)
4th gear (4 position)	Lock-up ON	146 – 155 km/h (91 – 96 mph)
	Lock-up OFF	139 – 147 km/h (86 – 91 mph)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Transmission output flange x Output shaft	123	1,250	90
Extension housing x Transmission case	34	345	25
Solenoid connector set bolt	5.4	55	48 in·lbf
Solenoid wiring clamp set bolt	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
Shift solenoid valve No.1, No.3, SLU and SLT set bolt	6.4	65	56 in·lbf
Shift solenoid valve No.2, No.4 and SLN set bolt	10	100	7
Valve body x Transmission case	10	100	7
Heated oxygen sensor x Front exhaust pipe	44	450	32
Front exhaust pipe x Front TWC	43	440	32
Pipe support bracket x Transmission	43	440	32
Front exhaust pipe x Center exhaust pipe		See page EM-120	
Front TWC x Exhaust manifold	62	630	46
Engine rear mounting member bracket plate x Engine rear mounting	5.4	55	48 in·lbf
Heat insulator x Body	5.4	55	48 in·lbf
Front center floor crossmember brace x Body	13	130	9
Front center floor crossmember brace x Body	13	130	9
Shift control rod x Shift lever	13	130	9
Oil cooler pipe union nut	44	450	32
Oil cooler pipe clamp set bolt	4.9	50	43 in·lbf
Torque converter clutch x Drive plate	48	490	35
Engine rear mounting x Body	26	270	20
Flywheel housing under cover set bolt	18	185	13
Transmission x Engine	14 mm head	37	27
	17 mm head	72	53
Drive plate x Crankshaft	83	850	61

PROPELLER SHAFT

SS0C3-01

SERVICE DATA

Shaft runout	Max.	0.8 mm (0.031 in.)
Joint angle	No.2 joint	$-50' \pm 30'$
	No.3 joint	$1^{\circ} 15' \pm 30'$

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Intermediate shaft x Transmission	79	805	58
Propeller shaft x Differential	79	805	58
Front center floor crossmember brace x Body	13	130	9
Rear center floor crossmember brace x Body	13	130	9
Heat insulator	5.4	55	48 in.·lbf
Front exhaust pipe x Front TWC	43	440	32
Front exhaust pipe x Center exhaust pipe		See page EM-120	
Center support bearing x Body	37	375	27
Propeller shaft adjusting nut	50 (69)	515 (700)	37 (51)

(): For use without SST

SUSPENSION AND AXLE

SERVICE DATA

SS0C0-01

Cold tire inflation pressure	Tire size P225/60R16 97 V	Front Rear	200 kPa (2.0 kgf/cm ² , 29 psi) 200 kPa (2.0 kgf/cm ² , 29 psi)
Front wheel alignment	Vehicle height		
	Coil suspension	Front Rear	264 mm (10.39 in.) 243 mm (9.57 in.)
	Air suspension	Front Left-right error Rear Left-right error $H_F - F_R$	250 ± 10 mm (9.84 ± 0.39 in.) 10 mm (0.39 in.) or less 222.5 ± 10 mm (8.76 ± 0.39 in.) 10 mm (0.39 in.) or less 27.5 ± 15 mm (1.08 ± 0.59 in.)
	Camber		
	Coil suspension	Left-right error	0° 20' ± 45' (0.33° ± 0.75°) 30' (0.5°) or less
	Air suspension	Left-right error	0° 05' ± 45' (0.08° ± 0.75°) 30' (0.5°) or less
	Caster		
	Coil suspension	Left-right error	7° 00' ± 45' (7° ± 0.75°) 30' (0.5°) or less
	Air suspension	Left-right error	7° 25' ± 45' (7° 42' ± 0.75°) 30' (0.5°) or less
	Steering axis inclination (Reference)		
Rear wheel alignment	Coil suspension	Left-right error	8° 25' ± 45' (8.42° ± 0.75°) 30' (0.5°) or less
	Air suspension	Left-right error	8° 40' ± 45' (8.66° ± 0.75°) 30' (0.5°) or less
	Toe-in (total)		
	Coil suspension Air suspension		0° 18' ± 12' (0.3° ± 0.2°, 2 ± 2 mm, 0.12 ± 0.08 in.) 0° 06' ± 12' (0.1° ± 0.2°, 1 ± 2 mm, 0.04 ± 0.08 in.)
Front axle	Wheel angle		
	Inside wheel		42° 00' ± 1° 30' (42° ± 1.5°)
	Outside wheel (Reference)	Coil suspension Air suspension	34° 20' (34.33°) 34° 00' (34°)
	Wheel bearing backlash		0.05 mm (0.0020 in.) or less
Front suspension	Axle hub deviation		0.05 mm (0.0020 in.) or less
	Upper ball joint turning torque		1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.-lbf)
	Lower ball joint turning torque		1.0 – 2.5 N·m (10 – 25 kgf·cm, 9 – 21.7 in.-lbf)
	Lower ball joint excessive play		0.3 mm (0.0118 in.) or less
Rear suspension	Stabilizer bar ball joint turning torque		0.05 – 1.5 N·m (0.5 – 15 kgf·cm, 0.4 – 13 in.-lbf)

H_F: Measured value of the front vehicle heightF_R: Measured value of the rear vehicle height

SERVICE SPECIFICATIONS – SUSPENSION AND AXLE

Rear axle	Wheel bearing backlash		0.05 mm (0.0020 in.) or less
	Axle hub deviation		0.07 mm (0.0028 in.) or less
Rear drive shaft	Drive shaft length	RH	619.5 mm (24.390 in.)
		LH	573.5 mm (22.579 in.)
Rear suspension	Upper ball joint turning torque		1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.-lbf)
	No.1 lower suspension arm ball joint turning torque		0.8 – 3.4 N·m (8.5 – 35 kgf·cm, 7.4 – 30 in.-lbf)
	Stabilizer bar link ball joint turning torque		0.05 – 1.5 N·m (0.5 – 15 kgf·cm, 0.4 – 13 in.-lbf)
Rear differential	Drive pinion shaft runout	Maximum	0.08 mm (0.0031 in.)
	Ring gear runout	Maximum	0.05 mm (0.0020 in.)
	Ring gear backlash		0.08 – 0.13 mm (0.0031 – 0.0051 in.)
	Drive pinion bearing	New bearing Reused bearing	1.5 – 1.8 N·m (15 – 18 kgf·cm, 13.0 – 15.6 in.-lbf) 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.-lbf)
	Total preload		Drive pinion preload plus 0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.-lbf)
	Pinion gear backlash	Maximum	0.15 mm (0.0059 in.)
	Pinion gear backlash adjusting thrust washer		1.50 mm (0.059 in.)
			1.55 mm (0.061 in.)
			1.60 mm (0.063 in.)
			1.65 mm (0.065 in.)
			1.70 mm (0.067 in.)
			1.75 mm (0.069 in.)
			1.80 mm (0.071 in.)
			1.85 mm (0.073 in.)
			1.90 mm (0.075 in.)

Rear differential (cont'd)	Ring gear backlash adjusting washer	No.	
		02	2.02 mm (0.0795 in.)
		04	2.04 mm (0.0803 in.)
		06	2.06 mm (0.0811 in.)
		08	2.08 mm (0.0819 in.)
		10	2.10 mm (0.0827 in.)
		12	2.12 mm (0.0835 in.)
		14	2.14 mm (0.0843 in.)
		16	2.16 mm (0.0850 in.)
		18	2.18 mm (0.0858 in.)
		20	2.20 mm (0.0866 in.)
		22	2.22 mm (0.0874 in.)
		24	2.24 mm (0.0882 in.)
		26	2.26 mm (0.0890 in.)
		28	2.28 mm (0.0898 in.)
		30	2.30 mm (0.0906 in.)
		32	2.32 mm (0.0913 in.)
		34	2.34 mm (0.0921 in.)
		36	2.36 mm (0.0929 in.)
		38	2.38 mm (0.0937 in.)
		40	2.40 mm (0.0945 in.)
		42	2.42 mm (0.0953 in.)
		44	2.44 mm (0.0961 in.)
		46	2.46 mm (0.0969 in.)
		48	2.48 mm (0.0976 in.)
		50	2.50 mm (0.0984 in.)
		52	2.52 mm (0.0992 in.)
		54	2.54 mm (0.1000 in.)
		56	2.56 mm (0.1008 in.)
		58	2.58 mm (0.1016 in.)
		60	2.60 mm (0.1024 in.)
		62	2.62 mm (0.1031 in.)
		64	2.64 mm (0.1039 in.)
		66	2.66 mm (0.1047 in.)
		68	2.68 mm (0.1055 in.)
		70	2.70 mm (0.1063 in.)
		72	2.72 mm (0.1071 in.)
		74	2.74 mm (0.1079 in.)
		76	2.76 mm (0.1087 in.)
		78	2.78 mm (0.1094 in.)
		80	2.80 mm (0.1102 in.)
		82	2.82 mm (0.1094 in.)
		84	2.84 mm (0.1118 in.)
		86	2.86 mm (0.1126 in.)

SERVICE SPECIFICATIONS – SUSPENSION AND AXLE

Rear differential (cont'd)	Tooth contact pattern adjusting washer	No.	
		87	1.87 mm (0.0736 in.)
		88	1.88 mm (0.0740 in.)
		89	1.89 mm (0.0744 in.)
		90	1.90 mm (0.0748 in.)
		91	1.91 mm (0.0752 in.)
		92	1.92 mm (0.0756 in.)
		93	1.93 mm (0.0760 in.)
		94	1.94 mm (0.0764 in.)
		95	1.95 mm (0.0768 in.)
		96	1.96 mm (0.0772 in.)
		97	1.97 mm (0.0776 in.)
		98	1.98 mm (0.0780 in.)
		99	1.99 mm (0.0784 in.)
		00	2.00 mm (0.0788 in.)
		01	2.01 mm (0.0791 in.)
		02	2.02 mm (0.0795 in.)
		03	2.03 mm (0.0799 in.)
		04	2.04 mm (0.0803 in.)
		05	2.05 mm (0.0807 in.)
		06	2.06 mm (0.0811 in.)
		07	2.07 mm (0.0815 in.)
		08	2.08 mm (0.0819 in.)
		09	2.09 mm (0.0823 in.)
		10	2.10 mm (0.0827 in.)
		11	2.11 mm (0.0831 in.)
		12	2.12 mm (0.0835 in.)
		13	2.13 mm (0.0839 in.)
		14	2.14 mm (0.0843 in.)
		15	2.15 mm (0.0846 in.)
		16	2.16 mm (0.0850 in.)
		17	2.17 mm (0.0854 in.)
		18	2.18 mm (0.0858 in.)
		19	2.19 mm (0.0862 in.)
		20	2.20 mm (0.0866 in.)
		21	2.21 mm (0.0870 in.)
		22	2.22 mm (0.0874 in.)
		23	2.23 mm (0.0878 in.)
		24	2.24 mm (0.0882 in.)
		25	2.25 mm (0.0886 in.)
		26	2.26 mm (0.0890 in.)
		27	2.27 mm (0.0894 in.)
		28	2.28 mm (0.0898 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
FRONT			
Hub bolt	103	1,050	76
Lower suspension arm x Body (Camber adjusting cam nut)	251	2,560	185
Suspension member brace x Body	39	400	29
Strut bar x Strut bar bracket (Caster adjusting cam nut)	181	1,850	134
Rack end x Tie rod end	56	570	41
Brake caliper x Steering knuckle	118	1,200	87
Brake disc x Axle hub	5.0	55	48 in.·lbf
ABS speed sensor installation bolt	7.8	80	69 in.·lbf
ABS speed sensor wire harness installation bolt	7.8	80	69 in.·lbf
Lower ball joint x Steering knuckle	113	1,150	83
Steering knuckle x Upper suspension arm	65	660	48
Dust cover x Steering knuckle	8.4	85	74 in.·lbf
Axle hub lock nut	199	2,030	147
Height control sensor link x Shock absorber lower bracket	5.0	55	48 in.·lbf
Shock absorber x Shock absorber lower bracket	157	1,600	116
Suspension support x Piston rod	28	280	20
Suspension support x Body	58	590	43
Pneumatic cylinder x Shock absorber lower bracket	157	1,600	116
Air tube x Pneumatic cylinder	17	175	13
Actuator cover nut	58	590	43
Actuator x Pneumatic cylinder	7.8	80	69 in.·lbf
Suspension support x Pneumatic cylinder	36	370	27
Shock absorber lower bracket set bolt	A 59	600	43
	B 113	1,150	83
Strut bar x Lower suspension arm	164	1,670	121
Upper suspension arm x Body	113	1,150	83
Tie rod end x Lower ball joint	59	600	43
Lower ball joint x Lower suspension arm	152	1,550	112
Stabilizer bar link nut	95	970	70
Stabilizer bar bracket x Body	28	290	21
Strut bar bracket x Body	72	730	53
Height control compressor bracket x Body	19	195	14
Height control compressor x Dryer	6.4	65	56 in.·lbf
Height control compressor x Bracket	5.9	60	52 in.·lbf
Height control valve x Body	5.4	55	48 in.·lbf

SERVICE SPECIFICATIONS – SUSPENSION AND AXLE

Part tightened	N-m	kgf-cm	ft-lbf
REAR			
Hub nut	103	1,050	76
Height control sensor link x No.1 lower suspension arm	5.0	55	48 in.·lbf
Brake caliper x Axle carrier	104	1,065	77
Brake disc x Axle hub	5.0	55	48 in.·lbf
ABS speed sensor installation bolt	7.8	80	69 in.·lbf
ABS speed sensor wire harness installation bolt	5.4	55	48 in.·lbf
Shock absorber x Axle carrier	137	1,400	101
Upper suspension arm x Body	164	1,670	121
Parking brake cable x Backing plate	7.8	80	69 in.·lbf
Backing plate x Axle carrier	59	600	43
Upper suspension arm x Axle carrier	108	1,100	80
Drive shaft x Axle hub	289	2,950	213
Suspension member brace x Body	50	510	37
Drive shaft x Differential	83	850	61
Stabilizer bar bracket x Body	18	180	13
Propeller shaft x Differential	79	805	58
Propeller shaft x Transmission	79	805	58
Center support bearing x Body	37	375	27
Front center crossmember brace x Body	13	130	9
Rear center crossmember brace x Body	13	130	9
Heated oxygen sensor	44	450	33
Exhaust front pipe x Exhaust manifold	43	440	32
Differential mounting bolt	Front Rear	147 142	1,500 1,450
Ring gear set bolt	64	650	47
Differential carrier retainer x Differential carrier	22	225	16
Companion flange lock nut	See page SA-83		
Oil deflector x Differential carrier cover	7.0	70	62 in.·lbf
Differential carrier cover set bolt	47	475	34
Breather plug	21	210	15
Drain plug	49	500	39
Filler plug	49	500	39
Seatback x Body	18	185	13
Stabilizer bar link nut	65	660	48
Shock absorber cap nut	25	260	18
Suspension support x Piston rod	27	280	20
Suspension support x Body	64	650	47
Air tube x Pneumatic cylinder	17	175	13
Actuator cover nut	25	260	18
Actuator x Pneumatic cylinder	7.8	80	69 in.·lbf
Suspension support x Pneumatic cylinder	36	370	27
Strut rod x Axle carrier	184	1,880	136
Strut rod x Body	78	790	57
No.1 lower suspension arm x Axle carrier	59	600	43

2000 LEXUS LS400 (RM717U)

Author :

Date :

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Part tightened	N-m	kgf-cm	ft-lbf
No.1 lower suspension arm x Body	78	790	57
No.2 lower suspension arm x Axle carrier	81	825	60
No.2 lower suspension arm x Body	78	790	57
Height control valve x Body	5.4	55	48 in.-lbf

BRAKE

SERVICE DATA

SS0A7-01

Brake pedal height from floor panel		133.8 – 143.8 mm (5.268– 5.661 in.)
Brake pedal freeplay		1 – 6 mm (0.04 – 0.24 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)		More than 70 mm (2.76 in.)
Brake booster push rod to piston clearance (w/ SST)		0 mm (0 in.)
Front brake pad thickness	STD	12.0 mm (0.472 in.)
Front brake pad thickness	Minimum	1.0 mm (0.039 in.)
Front brake disc thickness	STD	28.0 mm (1.102 in.)
Front brake disc thickness	Minimum	26.0 mm (1.024 in.)
Front brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake disc pad thickness	STD	10.0 mm (0.394 in.)
Rear brake disc pad thickness	Minimum	1.0 mm (0.039 in.)
Rear brake disc thickness	STD	16.0 mm (0.630 in.)
Rear brake disc thickness	Minimum	15.0 mm (0.591 in.)
Rear brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake disc inside diameter	STD	190 mm (7.48 in.)
Rear brake disc inside diameter	Maximum	191 mm (7.52 in.)
Parking brake lining thickness	STD	2.5 mm (0.098 in.)
Parking brake lining thickness	Minimum	1.0 mm (0.039 in.)
Parking brake pedal travel at 294 N (30 kgf, 66.1 lbf)		5 – 7 clicks
Parking brake clearance between rear shoe and lever		Less than 0.35 mm (0.014 in.)
Parking brake adjusting shim thickness		0.3 mm (0.012 in.) 0.6 mm (0.024 in.) 0.9 mm (0.035 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Master cylinder x Reservoir	1.8	18	16 in.·lbf
Master cylinder x Brake booster	13	130	9
Brake line union nut	15	155	11
Brake booster clevis lock nut	25	260	19
Brake booster x Pedal bracket	13	130	9
Brake booster push rod	7.4	75	65 in.·lbf
Bleeder plug	11	110	8
Brake caliper	8.3	85	74 in.·lbf
Brake actuator	118	1,200	87
Front disc brake caliper x Steering knuckle	39	400	29
Front disc brake caliper x Flexible hose	104	1,065	77
Rear disc brake torque plate x Rear axle carrier	39	400	29
Rear disc brake caliper x Flexible hose	34	350	25
Rear disc brake caliper installation bolt	13	130	9
Parking brake pedal bracket x Body	32	330	24
Parking brake pedal bracket x Parking brake pedal	5.4	55	48 in.·lbf
Parking brake release lever x Lower pad	5.4	55	48 in.·lbf
Brake actuator x Actuator bracket	19	195	14
Actuator bracket x Body	7.8	80	69 in.·lbf
Front speed sensor installation bolt	7.8	80	69 in.·lbf
Rear speed sensor installation bolt	5.4	55	48 in.·lbf
Speed sensor harness clamp bolt			

STEERING

SERVICE DATA

SS0CO-04

POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid 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	Maximum	6.9 N·m (70 kgf·cm, 61 in.-lbf)
POWER STEERING VANE PUMP		
Vane pump rotating torque	Maximum	0.25 N·m (2.5 kgf·cm, 2.2 in.-lbf)
Oil clearance between pump shaft and bushing	STD	0.030 – 0.045 mm (0.0012 – 0.0018 in.)
Oil clearance between pump shaft and bushing	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.0 mm (0.315 in.)
Vane plate thickness	Minimum	1.77 mm (0.0697 in.)
Vane plate length	Minimum	14.97 mm (0.5894 in.)
Clearance between the rotor groove and plate	Maximum	0.030 mm (0.0012 in.)
Vane plate length	Pump rotor and cam ring mark	
	None	14.996 – 14.998 mm (0.59039 – 0.59047 in.)
	1	14.994 – 14.996 mm (0.59032 – 0.59039 in.)
	2	14.992 – 14.994 mm (0.59024 – 0.59032 in.)
	3	14.990 – 14.992 mm (0.59016 – 0.59024 in.)
	4	14.988 – 14.990 mm (0.59008 – 0.59016 in.)
Spring free length	Minimum	36.0 mm (1.417 in.)
POWER STEERING GEAR		
Steering rack runout	Maximum	0.30 mm (0.0118 in.)
Total preload (Control valve rotating torque)	Turning	0.9 – 1.2 N·m (9 – 12 kgf·cm, 7.8 – 10.4 in.-lbf)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
POWER STEERING FLUID			
Pressure line joint	37	375	27
POWER TILT AND POWER TELESCOPIC STEERING COLUMN			
Column upper tube sub-assembly x Column upper tube assembly	20	210	15
Telesco lever lock bolt	20	210	15
Column tube stopper	19	190	14
Telescopic steering slider support set bolt	11	110	8
Column tube support x Column tube	15	150	11
Power tilt motor set bolt	20	210	15
No. 2 intermediate shaft assembly x Main shaft assembly	35	360	26
Steering column assembly set nut	25	260	19
Sliding yoke x Control valve shaft	35	360	26
Sliding yoke x No. 2 intermediate shaft assembly	35	360	26
Steering wheel set nut	35	360	26
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.-lbf
POWER STEERING VANE PUMP			
Front housing x Rear bracket	39	400	29
Pressure port union	69	700	51
Suction port union x Vane pump assembly	13	130	9
Air control valve	29	300	22
Vane pump pulley set nut	43	440	32
Pump assembly set bolt	39	400	29
Pump assembly set nut	43	440	32
Pressure feed tube x Vane pump assembly	49	500	36
POWER STEERING GEAR			
Control valve housing x Rack housing	18	185	13
Self-locking nut	39	400	29
Rack housing cap	69	700	51
Rack guide spring cap lock nut	50 (69)	513 (700)	37 (51)
Rack end x Steering rack	77 (103)	782 (1,050)	57 (76)
Tie rod end lock nut	56	570	41
Turn pressure tube	20 (25)	203 (250)	15 (18)
Pressure control valve x Control valve housing	18	185	13
PS gear assembly set bolt and nut	76	770	56
Pressure feed and return tubes	49	500	36
Sliding yoke x Control valve shaft	35	360	26
Steering knuckle x Tie rod end	59	600	43
Steering wheel set nut	35	360	26

(): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

SS061-03

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	35	360	26
Steering wheel pad	8.8	90	78 in·lbf
Front passenger airbag assembly x Instrument panel reinforcement	21	210	15
Front seat installation bolt	37	375	27
Side airbag assembly x Seatback frame	9.0	92	6.7 in·lbf
Airbag sensor assembly	21	210	15
Side airbag sensor assembly	21	210	15
Front seat outer belt retractor	Upper bolt	7.4	75
	Lower bolt	41	420
			65 in·lbf 30

BODY ELECTRICAL

SERVICE DATA

SSOCN-01

DAYTIME RUNNING LIGHT RELAY (MAIN) (Wire Harness Side)	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON or START)	Battery positive voltage
5 – Ground (Engine Stop)	No voltage
5 – Ground (Engine Running)	Battery positive voltage
7 – Ground (Constant)	Battery positive voltage
9 – Ground (Constant)	Battery positive voltage
AUTOMATIC LIGHT CONTROL SENSOR	
(Connector disconnected)	
4 – Ground (Ignition switch position LOCK or ACC)	No voltage
4 – Ground (Ignition switch position ON)	5.2 – 9.0 V
5 – Ground (Ignition switch position LOCK or ACC)	No voltage
5 – Ground (Ignition switch position ON)	Battery positive voltage
(Connector connected)	
6 – Ground (Constant)	1 V or less
5 – Ground (Ignition switch position LOCK or ACC)	1 V or less
5 – Ground (Ignition switch position ON)	9.5 V or more
4 – Ground (Vehicle's surroundings are dark) (Sensor is covered)	Taillight and headlight are ON
HEADLIGHT BEAM LEVEL CONTROL ECU	
(Connector disconnected)	
1 – 4 (Ignition switch position OFF)	26 – 30 Ω
1 – 5 (Ignition switch position OFF)	26 – 30 Ω
1 – 6 (Ignition switch position OFF)	26 – 30 Ω
1 – 7 (Ignition switch position OFF)	26 – 30 Ω
1 – 17 (Ignition switch position OFF)	26 – 30 Ω
1 – 18 (Ignition switch position OFF)	26 – 30 Ω
1 – 19 (Ignition switch position OFF)	26 – 30 Ω
1 – 20 (Ignition switch position OFF)	26 – 30 Ω
(Connector disconnected)	
1 – 13 (Ignition switch position ON)	Battery positive voltage
10 – 25 (Ignition switch position ON)	Approx. 2.5 V
13 – 15 (Ignition switch position ON and light control switch HEAD)	Below 1.5 V
21 – 25 (Ignition switch position ON)	Approx. 2.5 V
24 – 25 (Ignition switch position ON)	5V
TURN SIGNAL FLASHER	
1 – Ground (Ignition switch position LOCK or ACC)	No voltage
1 – Ground (Ignition switch position ON)	Battery positive voltage
4 – Ground (Constant)	Battery positive voltage
LIGHT FAILURE RELAY (Wire Harness Side)	
1 – Ground (Stop light switch position OFF)	No voltage
1 – Ground (Stop light switch position ON)	Battery positive voltage
8 – Ground (Stop light switch position OFF)	No voltage

SERVICE SPECIFICATIONS – BODY ELECTRICAL

8 – Ground (Stop light switch position ON)	Battery positive voltage
9 – Ground (Ignition switch position LOCK or ACC)	No voltage
9 – Ground (Ignition switch position ON)	Battery positive voltage
14 – Ground (Ignition switch position LOCK or ACC)	No voltage
14 – Ground (Ignition switch position ON)	Battery positive voltage
16 – Ground (Light control switch position OFF)	No voltage
16 – Ground (Light control switch position TAIL or HEAD)	Battery positive voltage
SPEEDOMETER (ON-VEHICLE)	
USA:	
Standard indication (mph)	Allowable range (mph)
20	18.5 – 21.5
40	40 – 43
60	60.5 – 64
80	81 – 85
100	102 – 107
120	122.5 – 128.5
CANADA:	
Standard indication (km/h)	Allowable range (km/h)
20	18 – 23
40	38 – 42
60	57 – 61.5
80	76.5 – 81.5
100	96.5 – 101.5
120	116 – 121.5
160	155.5 – 162.5
200	194.5 – 203.5
TACHOMETER (ON-VEHICLE)/ DC 13.5 V 25 °C at (77 °F)	
Standard indication	Allowable range
700	630 – 770
1,000	925 – 1,125
2,000	1,900 – 2,200
3,000	2,845 – 3,305
4,000	3,870 – 4,330
5,000	4,925 – 5,320
7,000	6,875 – 7,475
FUEL RECEIVER GAUGE	
A – B	Approx. 151.8 Ω
C – D	Approx. 164.2 Ω
FUEL SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 310.5 (12.22)	Approx. 4.6
1/2: Approx. 172.0 (6.77)	Approx. 2.43
E: Approx. 34.3 (1.35)	Approx. 0.35
ENGINE COOLANT TEMPERATURE RECEIVER GAUGE (Resistance)	Resistance (Ω)
A – B	Approx. 151.8 Ω
C – D	Approx. 164.2 Ω

2000 LEXUS LS400 (RM717U)

ENGINE COOLANT TEMPERATURE SENDER GAUGE (Resistance)	
Temperature °C (°F)	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2
MULTI INFORMATION DISPLAY SWITCH	
Switch position	Resistance (Ω)
FUNCTION	0
REST	Approx. 360
MODE	Approx. 1,110
DEFOGGER SWITCH	
2 – Ground (Ignition switch position LOCK or ACC)	No voltage
2 – Ground (Ignition switch position ON)	Battery positive voltage
WIRELESS DOOR LOCK CONTROL RECEIVER	
(Connector disconnected)	
1 – Ground (Constant)	Battery positive voltage
(Connector connected)	
3 – Ground (Ignition switch position OFF, Key removed, Transmitter OFF → ON)	4.5 – 5.5 V → below 1 V
3 – Ground (Ignition switch position OFF, Key removed, Transmitter OFF → ON)	4.5 – 5.5 V → below 1 V
4 – Ground (Ignition switch position OFF, Key removed, Transmitter OFF)	10 – 14 V
RADIO RECEIVER	
(Nakamichi made)	
B6 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
B6 – Ground (Ignition switch position LOCK)	No voltage
B1 – Ground (Constant)	Battery positive voltage
POWER AMPLIFIER	
(Nakamichi made)	
A5 – Ground (Constant)	Battery positive voltage
A6 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
D6 – Ground (Ignition switch position ACC or ON, Radio tape or CD switch ON)	Battery positive voltage
CD AUTO CHANGER	
(Nakamichi made)	
5 – Ground (Constant)	Battery positive voltage
4 – Ground (Ignition switch position LOCK)	No voltage
4 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
RADIO RECEIVER	
(Pioneer made)	
A1 – Ground (Constant)	Battery positive voltage
A6 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
A6 – Ground (Ignition switch position LOCK)	No voltage
POWER AMPLIFIER	
(Pioneer made and LEXUS navigation system)	
B4 – Ground (Constant)	Battery positive voltage

SERVICE SPECIFICATIONS – BODY ELECTRICAL

C12 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
CD AUTO CHANGER	
(Pioneer made and LEXUS navigation system)	
5 – Ground (Constant)	Battery positive voltage
12 – Ground (Ignition switch position LOCK)	No voltage
12 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
RADIO RECEIVER	
(LEXUS navigation system)	
B1 – Ground (Ignition switch position ACC or ON)	Battery positive voltage
B1 – Ground (Ignition switch position LOCK)	No voltage
B4 – Ground (Constant)	Battery positive voltage

BODY

TORQUE SPECIFICATION

SS0C2-02

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER	–	–	–
Front bumper reinforcement x Body	13	130	9
Front bumper cover x Body	5.4	55	48 in·lbf
REAR BUMPER	–	–	–
Rear bumper cover x Body	5.4	55	48 in·lbf
HOOD	–	–	–
Hood hinge x Hood	11	115	8
Hood lock x Body	7.8	80	69 in·lbf
HOOD SUPPORT	–	–	–
Hood support x Hood	22	225	16
Hood support x Body	22	225	16
FRONT DOOR	–	–	–
Window regulator x Door panel	8.0	82	71 in·lbf
Door lock x Door panel	5.0	51	44 in·lbf
Outside handle x Door panel	5.5	56	49 in·lbf
Key cylinder x Door panel	5.5	56	49 in·lbf
Door hinge x Body	33	330	24
Door hinge x Door	26	260	19
REAR DOOR	–	–	–
Window regulator x Door panel	8.0	82	71 in·lbf
Door lock x Door panel	5.0	51	44 in·lbf
Outside handle x Door panel	5.5	56	49 in·lbf
Door hinge x Body	33	330	24
Door hinge x Door	26	260	19
OUTSIDE REAR VIEW MIRROR	–	–	–
Outside rear view mirror x Door panel	5.5	56	49 in·lbf
LUGGAGE COMPARTMENT DOOR AND HINGE	–	–	–
Luggage compartment door x hinge	11	115	8
Door lock x Door panel	5.5	56	49 in·lbf
Key cylinder x Door panel	5.5	56	49 in·lbf
LUGGAGE COMPARTMENT DOOR SUPPORT	–	–	–
Door support x Door hinge	22	225	16
FRONT WIPER AND WASHER	–	–	–
Wiper motor and link assembly x Body	5.5	56	49 in·lbf
Sub arm stay set bolt	5.5	56	49 in·lbf
Wiper arm x Wiper link	22	225	16
INSTRUMENT PANEL	–	–	–
Steering wheel set nut	35	360	26
Front passenger airbag assembly x Reinforcement	21	210	15

SERVICE SPECIFICATIONS – BODY

Part tightened	N·m	kgf·cm	ft·lbf
FRONT SEAT	–	–	–
Seat regulator x Body	37	375	27
Side airbag assembly x Seatback frame	9.0	92	7
Seatback frame x Reclining adjuster	18	185	13
Seat cushion frame x Seat regulator	18	185	13
REAR SEAT	–	–	–
Seatback assembly x Body	18	185	13
SEAT BELT	–	–	–
Power adjuster anchor x Body	41	420	30
Front seat shoulder anchor x Power adjuster anchor	41	420	30
Front seat floor anchor x Body	41	420	30
Front seat retractor x Body (Upper side)	7.8	80	69 in.·lbf
Front seat retractor x Body (Lower side)	41	420	30
Front seat inner belt x Front seat	41	420	30
Rear seat outer belt x Body	41	420	30
Rear seat inner belt x Body	41	420	30
Rear seat center belt x Body	41	420	30
CRS tether anchor bracket x Body	21	210	15

AIR CONDITIONING

SERVICE DATA

SS05V-03

Refrigerant charge volume	700 ± 50 g (24.69 ± 1.76 oz.)
Drive belt tension	–
Idle-up speed	–
Magnetic clutch not engaged	750 ± 50 rpm
Magnetic clutch engaged	800 ± 50 rpm
Magnetic clutch clearance	0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Condenser x Discharge hose	10	100	7
Condenser x Liquid tube	10	100	7
Receiver x Liquid tube	5.4	55	48 in.·lbf
A/C unit x Liquid tube	10	100	7
A/C unit x Suction tube	10	100	7
Expansion valve x Liquid tube	19mm nut	14	10
	24 mm nut	23	17
Expansion valve x Suction tube	10	100	7
Pressure regulator valve x tube	5.4	55	48 in.·lbf
Compressor x Engine	Bolt	49	36
	Nut	29	22
Pressure switch x Liquid tube	10	100	7
Pressure plate x Compressor	13.2	135	9
Suction line (Piping joint)	32	330	24
Discharge line (Piping joint)	22	225	16
Liquid line (Piping joint)	14	140	10

CO/HC INSPECTION

EM09G-02

HINT:

This check is used only to determine whether or not the idle CO/HC complies with regulations.

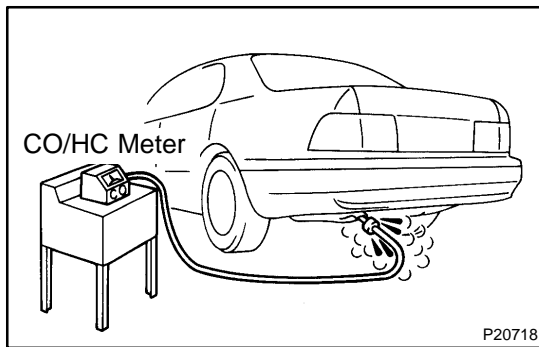
1. INITIAL CONDITIONS

- (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

HINT:

All vacuum hoses should be properly connected.

- (f) SFI system wiring connectors fully plugged
- (g) Ignition timing set correctly
- (h) Transmission in neutral range
- (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 performing 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, perform troubleshooting in the order given below.

See the table below for possible causes, and then inspect and correct the applicable causes if necessary.

CO	HC	Problems	Causes
Normal	High	Rough idle	1. Faulty ignitions: <ul style="list-style-type: none"> ● Incorrect timing ● Fouled, shorted or improperly gapped plugs 2. Incorrect valve clearance 3. Leaky intake and exhaust valves 4. Leaky cylinders
Low	High	Rough idle (fluctuating HC reading)	1. Vacuum leaks: <ul style="list-style-type: none"> ● PCV hoses ● Intake manifold ● Throttle body ● Brake booster line 2. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Faulty SFI systems: <ul style="list-style-type: none"> ● Faulty pressure regulator ● Defective ECT sensor ● Faulty ECM ● Faulty injectors ● Faulty throttle position sensor ● Faulty MAF meter

COMPRESSION INSPECTION

EM09H-02

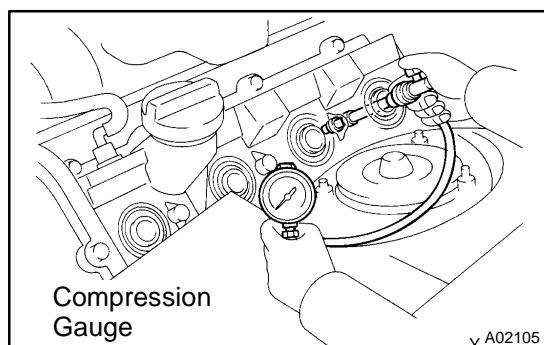
HINT:

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

- Insert a compression gauge into the spark plug hole.
- Fully open the throttle.
- While cranking the engine, measure the compression pressure.

HINT:

Always use a fully charged battery to obtain engine speed of 250 rpm or more.

- Repeat steps (a) through (c) for each cylinder.

NOTICE:

This measurement must be done in as short a time as possible.

Compression pressure:

1,226 kPa (12.5 kgf/cm², 178 psi) or more

Minimum pressure: 981 kPa (10.0 kgf/cm², 142 psi)

Difference between each cylinder:

98 kPa (1.0 kgf/cm², 14 psi) or less

- If the cylinder compression in one 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, chances are 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

EM09I-02

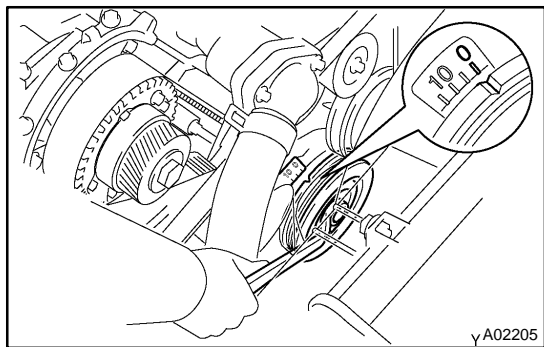
HINT:

Inspect and adjust the valve clearance when the engine is cold.

1. **DRAIN ENGINE COOLANT**
2. **REMOVE BATTERY CLAMP COVER**
3. **REMOVE AIR CLEANER INLET**
4. **REMOVE V-BANK COVER**
5. **REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY**
6. **REMOVE NO.3 TIMING BELT COVERS**
(See page [EM-15](#))
7. **REMOVE IGNITION COILS** (See page [IG-7](#))
8. **REMOVE RH CYLINDER HEAD COVER**

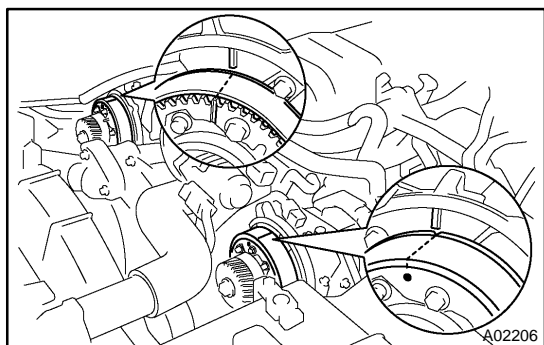
Remove the 9 bolts, 9 seal washers and cylinder head cover.

9. **REMOVE LH CYLINDER HEAD COVER**
 - (a) Remove the oil dipstick for the transmission.
 - (b) Disconnect the PCV hose.
 - (c) Disconnect the engine wire clamp from the wire bracket on the delivery pipe.
 - (d) Remove the 9 bolts, 9 seal washers and cylinder head cover.

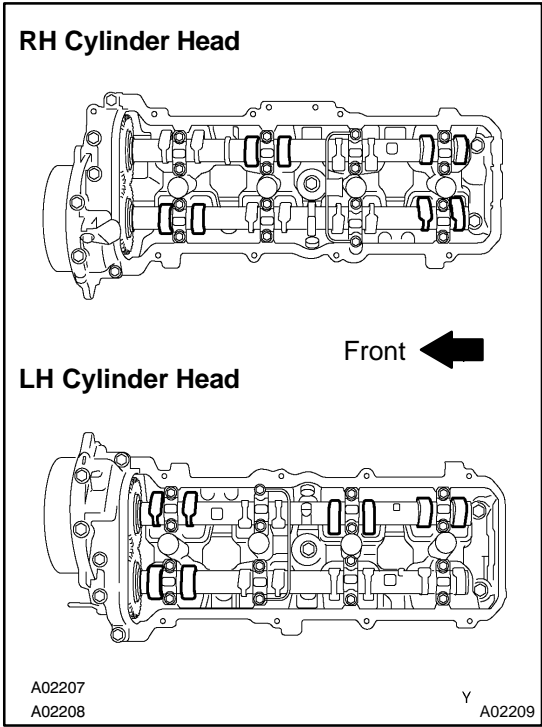


10. SET NO.1 CYLINDER TO TDC/COMPRESSION

- (a) Turn the crankshaft pulley, and align its groove with timing mark "0" of the No.1 timing belt cover.



- (b) Check that the timing marks of the camshaft timing pulleys and timing belt rear plates are aligned.
If not, turn the crankshaft 1 revolution (360°) and align the mark as above.

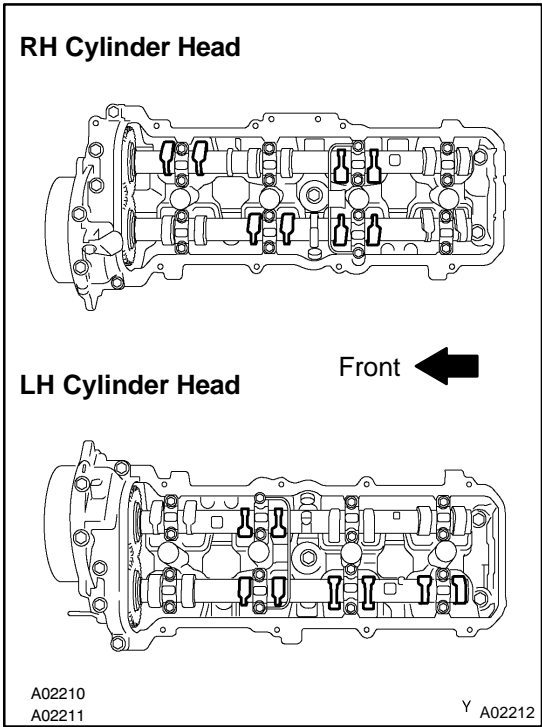


11. INSPECT VALVE CLEARANCE

- (a) Check only the valves indicated.
- Using a feeler gauge, measure the clearance between the valve lifter and camshaft.
 - Record the out-of-specification valve clearance measurements. They will be used later to determine the required replacement adjusting shim.

Valve clearance (Cold):

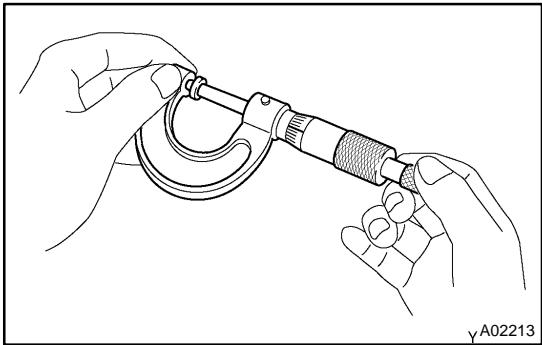
Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)



- (b) Turn the crankshaft 1 revolution (360°) and align the mark as above. (See procedure in step 10)
- (c) Check only the valves indicated as shown. Measure the valve clearance. (See procedure in step (a))

12. ADJUST VALVE CLEARANCE

- (a) Remove the timing belt. (See page [EM-15](#))
- (b) Remove the camshafts. (See page [EM-34](#))
- (c) Remove the valve lifter and adjusting shim.



- (d) Determine the replacement adjusting shim size according to these Formula or Charts:
- Using a micrometer, measure the thickness of the removed shim.
 - Calculate the thickness of a new shim so that the valve clearance comes within the specified value.
- T Thickness of removed shim
A Measured valve clearance
N Thickness of new shim

Intake:

$$N = T + (A - 0.20 \text{ mm (0.008 in.)})$$

Exhaust:

$$N = T + (A - 0.30 \text{ mm (0.012 in.)})$$

- Select a new shim with a thickness as close as possible to the calculated value.

HINT:

Shims are available in 41 increments of 0.020 mm (0.0008 in.), from 2.00 mm (0.0787 in.) to 2.80 mm (0.1102 in.).

- (e) Place a new adjusting shim on the valve.
- (f) Place the valve lifter.
- (g) Reinstall the camshafts. (See page [EM-58](#))
- (h) Reinstall the timing belt. (See page [EM-22](#))
- (i) Recheck the valve clearance.

13. REINSTALL CYLINDER HEAD COVERS**14. REINSTALL IGNITION COILS****15. REINSTALL NO.3 TIMING BELT COVERS**

(See page [EM-22](#))

16. REINSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY**17. REFILL WITH ENGINE COOLANT****18. START ENGINE AND CHECK FOR LEAKS****19. RECHECK ENGINE COOLANT LEVEL****20. REINSTALL V-BANK COVER****21. REINSTALL AIR CLEANER INLET****22. REINSTALL BATTERY CLAMP COVER**

Measured clearance mm (in.)	Installed shim thickness mm (in.)																																																																																																																																																																																																																																																																																																																																																																																																						
	2.000 (0.0787)	2.020 (0.0795)	2.040 (0.0803)	2.060 (0.0811)	2.080 (0.0819)	2.100 (0.0827)	2.120 (0.0835)	2.140 (0.0843)	2.160 (0.0850)	2.180 (0.0858)	2.200 (0.0866)	2.210 (0.0870)	2.220 (0.0874)	2.240 (0.0882)	2.260 (0.0886)	2.280 (0.0890)	2.270 (0.0894)	2.280 (0.0898)	2.290 (0.0902)	2.300 (0.0906)	2.310 (0.0909)	2.320 (0.0913)	2.330 (0.0917)	2.340 (0.0921)	2.350 (0.0925)	2.360 (0.0929)	2.370 (0.0933)	2.380 (0.0937)	2.390 (0.0941)	2.400 (0.0945)	2.410 (0.0949)	2.420 (0.0953)	2.430 (0.0957)	2.440 (0.0961)	2.450 (0.0965)	2.460 (0.0969)	2.470 (0.0972)	2.480 (0.0976)	2.490 (0.0980)	2.500 (0.0984)	2.510 (0.0988)	2.520 (0.0992)	2.530 (0.0996)	2.540 (0.1000)	2.550 (0.1004)	2.560 (0.1008)	2.570 (0.1012)	2.580 (0.1016)	2.590 (0.1020)	2.600 (0.1024)	2.620 (0.1031)	2.640 (0.1039)	2.660 (0.1047)	2.680 (0.1055)	2.700 (0.1063)	2.720 (0.1071)	2.740 (0.1079)	2.760 (0.1087)	2.780 (0.1094)	2.800 (0.1102)																																																																																																																																																																																																																																																																																																																																											
0.000–0.030 (0.0000–0.0012)							00	00	00	00	02	02	04	04	06	06	08	08	10	10	12	12	14	14	16	16	18	18	20	20	22	22	24	24	26	26	28	28	30	30	32	32	34	34	36	36	38	38	40	40	42	42	44	44	46	46	48	48	50	50	52	52	54	54	56	56	58	58	60	60	62	62	64	64	66	66	68	68	70	70	72	72	74	74	76	76	78	78	80	80	82	82	84	84	86	86	88	88	90	90	92	92	94	94	96	96	98	98	100	100	102	102	104	104	106	106	108	108	110	110	112	112	114	114	116	116	118	118	120	120	122	122	124	124	126	126	128	128	130	130	132	132	134	134	136	136	138	138	140	140	142	142	144	144	146	146	148	148	150	150	152	152	154	154	156	156	158	158	160	160	162	162	164	164	166	166	168	168	170	170	172	172	174	174	176	176	178	178	180	180	182	182	184	184	186	186	188	188	190	190	192	192	194	194	196	196	198	198	200	200	202	202	204	204	206	206	208	208	210	210	212	212	214	214	216	216	218	218	220	220	222	222	224	224	226	226	228	228	230	230	232	232	234	234	236	236	238	238	240	240	242	242	244	244	246	246	248	248	250	250	252	252	254	254	256	256	258	258	260	260	262	262	264	264	266	266	268	268	270	270	272	272	274	274	276	276	278	278	280	280	282	282	284	284	286	286	288	288	290	290	292	292	294	294	296	296	298	298	300	300	302	302	304	304	306	306	308	308	310	310	312	312	314	314	316	316	318	318	320	320	322	322	324	324	326	326	328	328	330	330	332	332	334	334	336	336	338	338	340	340	342	342	344	344	346	346	348	348	350	350	352	352	354	354	356	356	358	358	360	360	362	362	364	364	366	366	368	368	370	370	372	372	374	374	376	376	378	378	380	380	382</

Intake valve clearance (Cold):
0.15 – 0.25 mm (0.006 – 0.010 in.)

EXAMPLE:

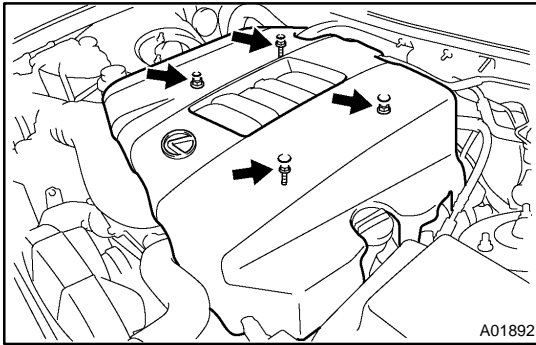
The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No. 54 shim.

New shim thickness						mm (in.)
Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness	
00	2.000 (0.0787)	28	2.280 (0.0898)	56	2.560 (0.1008)	
02	2.020 (0.0795)	30	2.300 (0.0906)	58	2.580 (0.1016)	
04	2.040 (0.0803)	32	2.320 (0.0913)	60	2.600 (0.1024)	
06	2.060 (0.0811)	34	2.340 (0.0921)	62	2.620 (0.1031)	
08	2.080 (0.0819)	36	2.360 (0.0929)	64	2.640 (0.1039)	
10	2.100 (0.0827)	38	2.380 (0.0937)	66	2.660 (0.1047)	
12	2.120 (0.0835)	40	2.400 (0.0945)	68	2.680 (0.1055)	
14	2.140 (0.0843)	42	2.420 (0.0953)	70	2.700 (0.1063)	
16	2.160 (0.0850)	44	2.440 (0.0961)	72	2.720 (0.1071)	
18	2.180 (0.0858)	46	2.460 (0.0969)	74	2.740 (0.1079)	
20	2.200 (0.0866)	48	2.480 (0.0976)	76	2.760 (0.1087)	
22	2.220 (0.0874)	50	2.500 (0.0984)	78	2.780 (0.1094)	
24	2.240 (0.0882)	52	2.520 (0.0992)	80	2.800 (0.1102)	
26	2.260 (0.0890)	54	2.540 (0.1000)			

Exhaust valve clearance (Cold):
0.25 – 0.35 mm (0.010 – 0.014 in.)

The 2.300 mm (0.0906 in.) shim is installed, and the measured clearance is 0.440 mm (0.0173 in.). Replace the 2.300 mm (0.0906 in.) shim with a No. 44 shim.

New shim thickness				mm (in.)	
Shim No.	Thickness	Shim No.	Thickness	Shim No.	Thickness
00	2.000 (0.0787)	28	2.280 (0.0898)	56	2.560 (0.1008)
02	2.020 (0.0795)	30	2.300 (0.0906)	58	2.580 (0.1016)
04	2.040 (0.0803)	32	2.320 (0.0913)	60	2.600 (0.1024)
06	2.060 (0.0811)	34	2.340 (0.0921)	62	2.620 (0.1031)
08	2.080 (0.0819)	36	2.360 (0.0929)	64	2.640 (0.1039)
10	2.100 (0.0827)	38	2.380 (0.0937)	66	2.660 (0.1047)
12	2.120 (0.0835)	40	2.400 (0.0945)	68	2.680 (0.1055)
14	2.140 (0.0843)	42	2.420 (0.0953)	70	2.700 (0.1063)
16	2.160 (0.0850)	44	2.440 (0.0961)	72	2.720 (0.1071)
18	2.180 (0.0858)	46	2.460 (0.0969)	74	2.740 (0.1079)
20	2.200 (0.0866)	48	2.480 (0.0976)	76	2.760 (0.1087)
22	2.220 (0.0874)	50	2.500 (0.0984)	78	2.780 (0.1094)
24	2.240 (0.0882)	52	2.520 (0.0992)	80	2.800 (0.1102)
26	2.260 (0.0890)	54	2.540 (0.1000)		



IGNITION TIMING INSPECTION

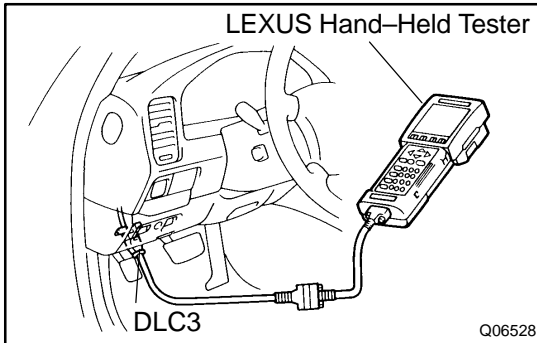
EM09J-02

1. REMOVE BATTERY CLAMP COVER
2. REMOVE AIR CLEANER INLET
3. REMOVE V-BANK COVER

Remove the 2 cap nuts, bolt and V-bank cover.

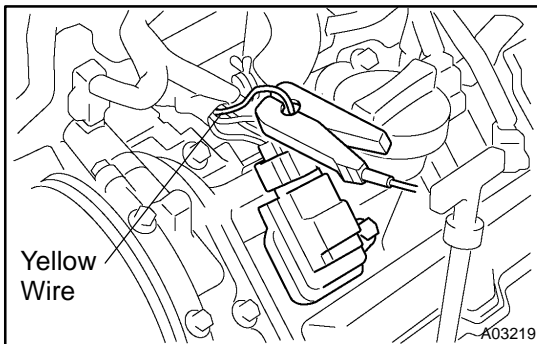
4. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.



5. CONNECT LEXUS HAND-HELD TESTER OR OBD II SCAN TOOL

- (a) Connect the hand-held tester or OBD II scan tool to the DLC3.
- (b) Please refer to the hand-held tester or OBD II scan tool operator's manual for further details.



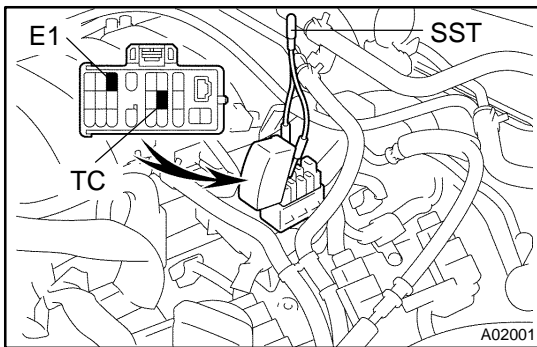
6. CONNECT TIMING LIGHT TO ENGINE

Connect the tester probe of a timing light to the yellow lead wire of the ignition coil connector for No.1 cylinder.

7. CHECK IDLE SPEED

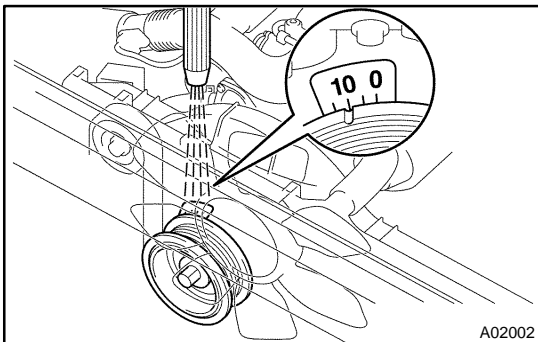
- (a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
- (b) Check the idle speed.

Idle speed: 750 ± 50 rpm



8. INSPECT IGNITION TIMING

- (a) Using SST, connect terminals TC 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

9. DISCONNECT TIMING LIGHT FROM ENGINE

10. DISCONNECT LEXUS HAND-HELD TESTER OR OBD II SCAN TOOL

11. REINSTALL V-BANK COVER

12. REINSTALL AIR CLEANER INLET

13. REINSTALL BATTERY CLAMP COVER

IDLE SPEED INSPECTION

EM09K-02

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

HINT:

All vacuum hoses should be properly connected.

- (f) SFI system wiring connectors fully plugged
- (g) Ignition timing set correctly
- (h) Transmission in neutral position
- (i) Air conditioning switched OFF

2. CONNECT LEXUS HAND-HELD TESTER OR OBD II SCAN TOOL (See page [EM-9](#))

3. INSPECT IDLE SPEED

- (a) Race the engine speed at 2,500 rpm for approx. 90 seconds.
- (b) Check the idle speed.

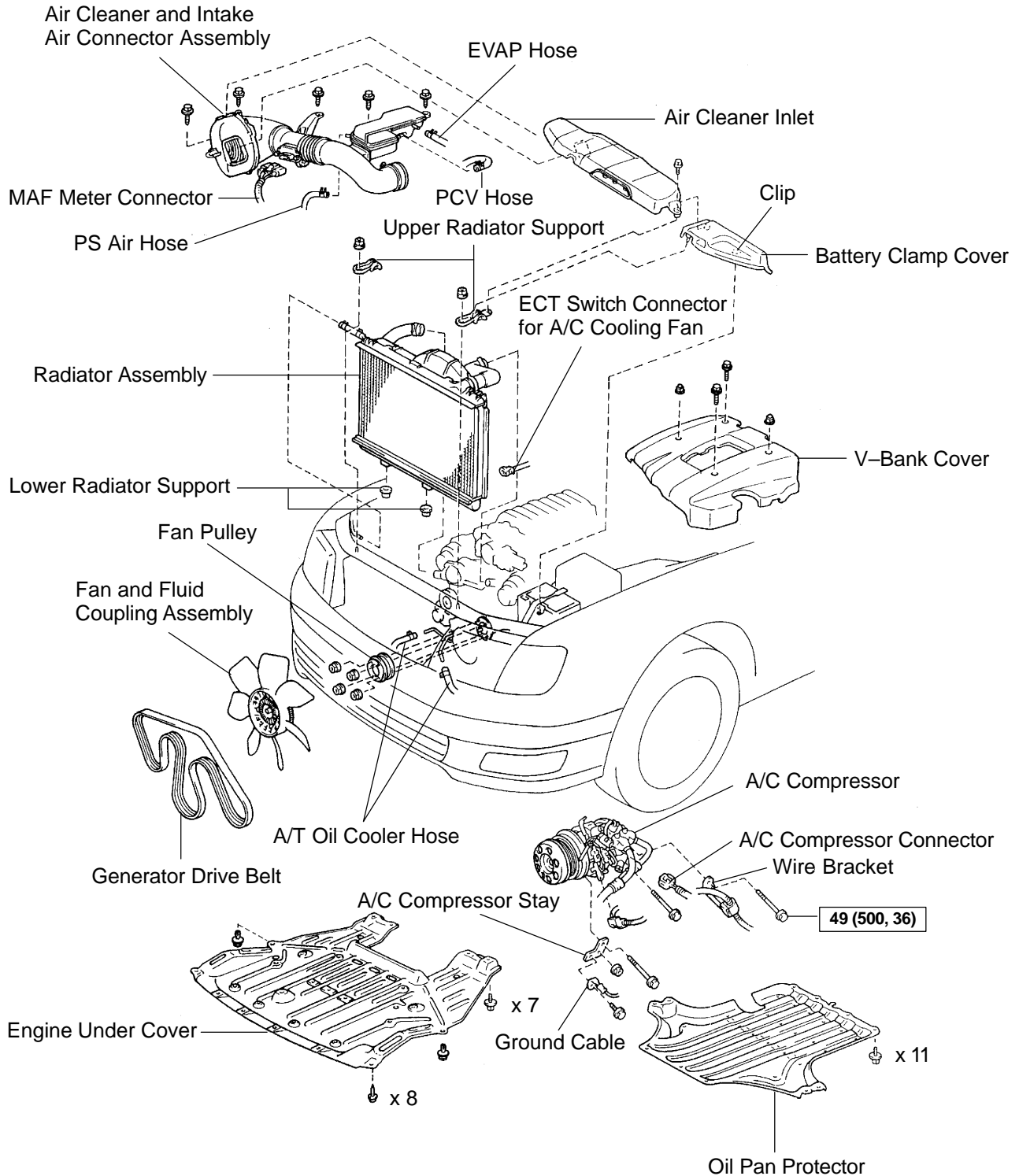
Idle speed: 750 ± 50 rpm

If the idle speed is not as specified, check the air intake system.

4. DISCONNECT LEXUS HAND-HELD TESTER OR OBD II SCAN TOOL

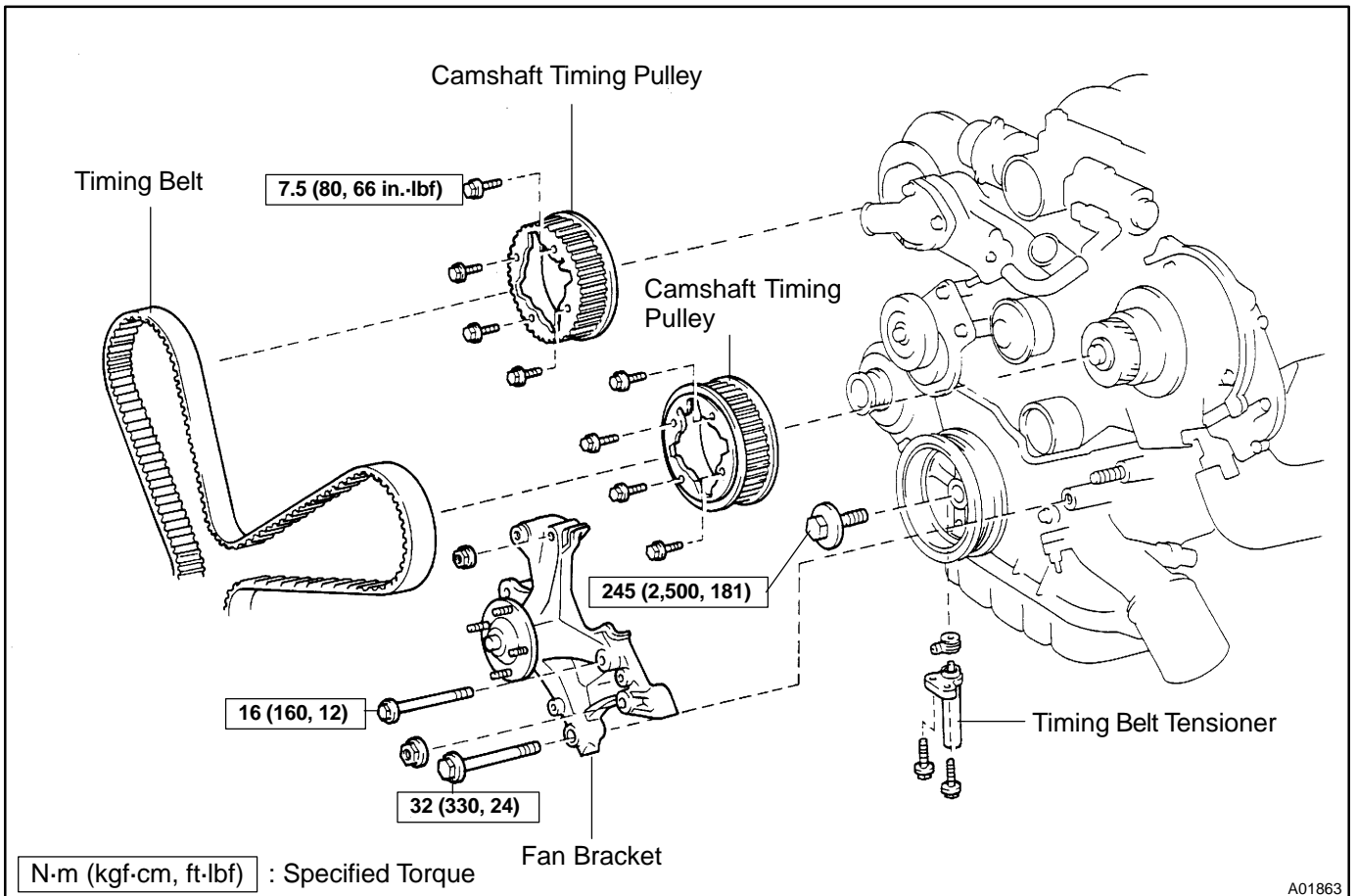
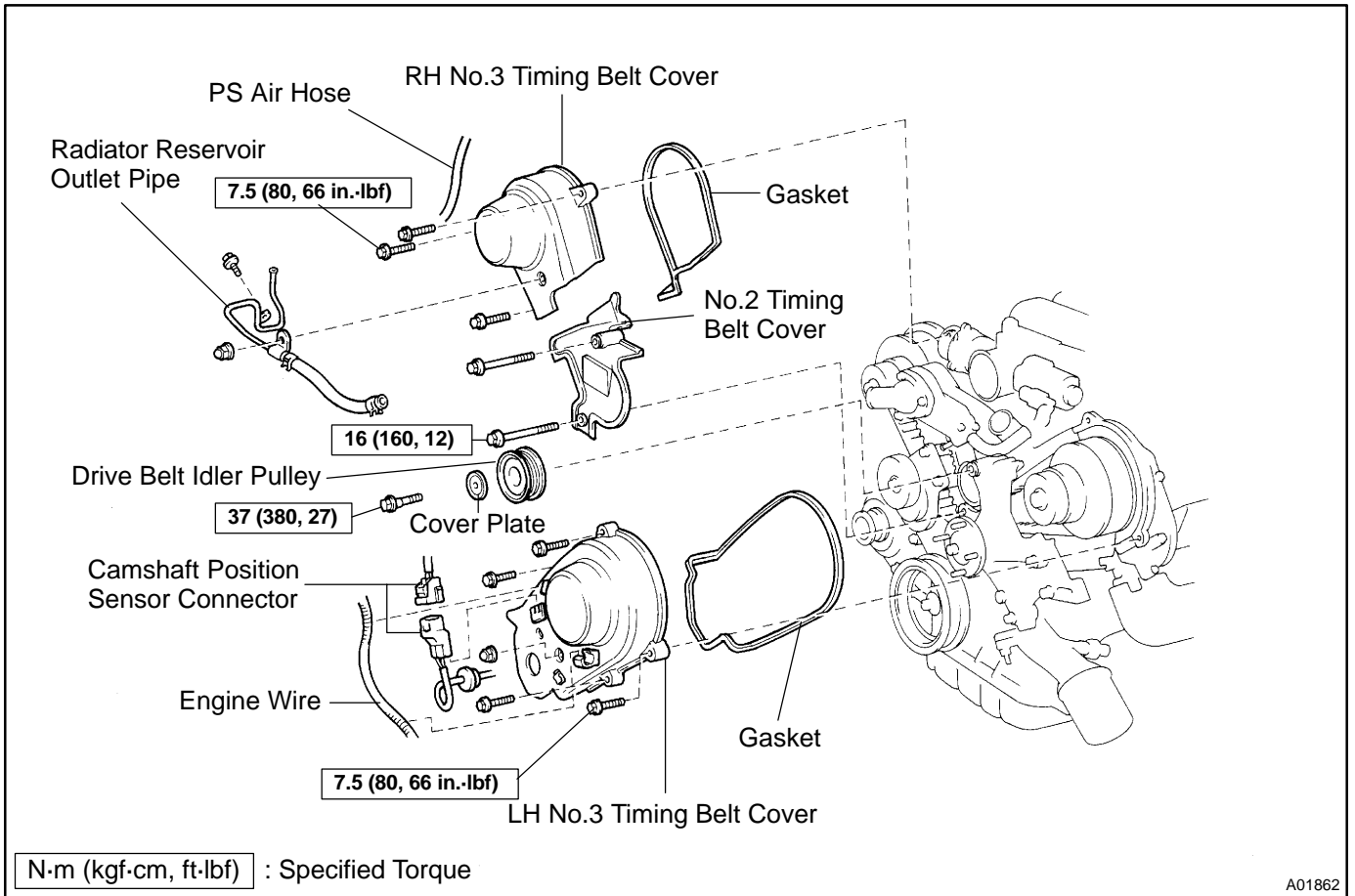
TIMING BELT COMPONENTS

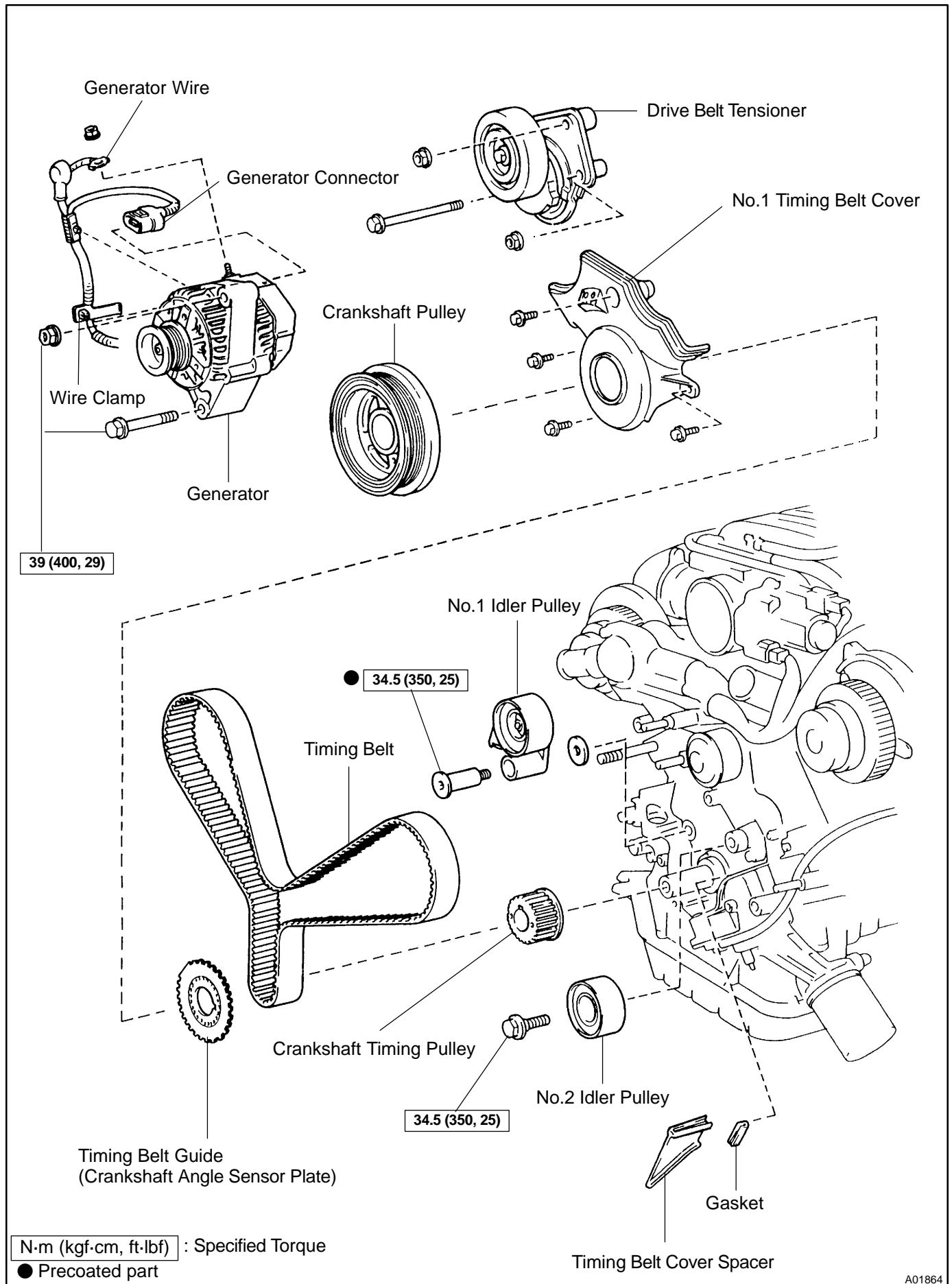
EM09L-02



N·m (kgf·cm, ft·lbf) : Specified Torque

A02232

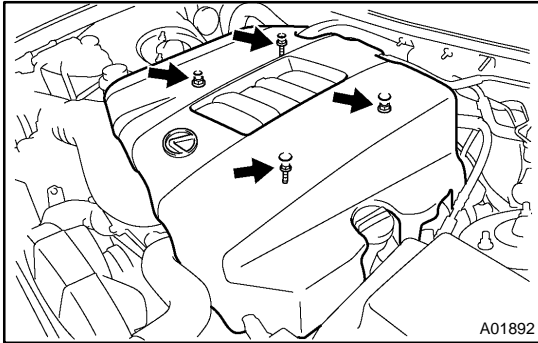




A01864

REMOVAL

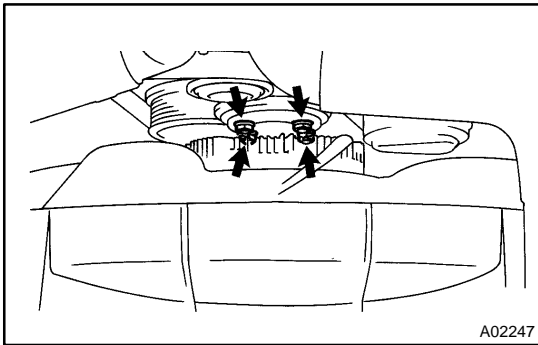
1. REMOVE OIL PAN PROTECTOR
2. REMOVE ENGINE UNDER COVER
3. DRAIN ENGINE COOLANT
4. REMOVE BATTERY CLAMP COVER
5. REMOVE AIR CLEANER INLET



6. REMOVE V-BANK COVER

Remove the bolt, 2 cap nuts and V-bank cover.

7. REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY



8. REMOVE DRIVE BELT, FAN, FLUID COUPLING AND FAN PULLEY

- (a) Loosen the 4 nuts holding the fluid coupling to the fan bracket.
- (b) Remove the generator drive belt. (See page [CH-8](#))
- (c) Remove the 4 nuts, the fan, fluid coupling assembly and fan pulley.

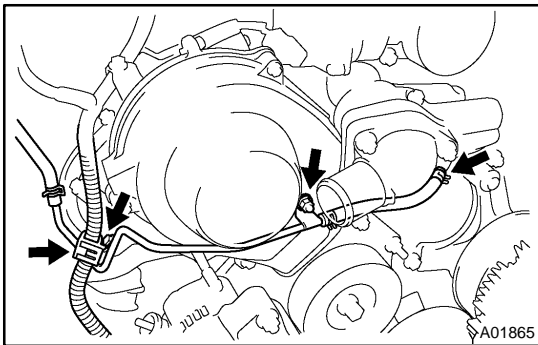
9. REMOVE RADIATOR ASSEMBLY (See page [CO-21](#))

10. REMOVE DRIVE BELT IDLER PULLEY

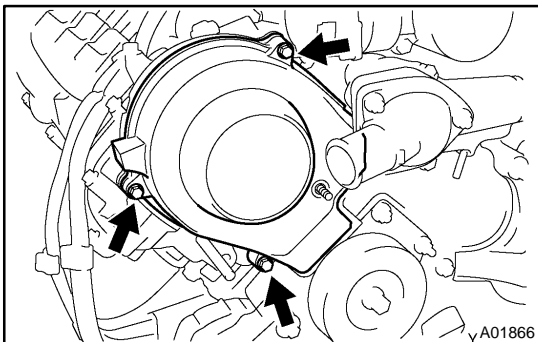
Remove the pulley bolt, cover plate and idler pulley.

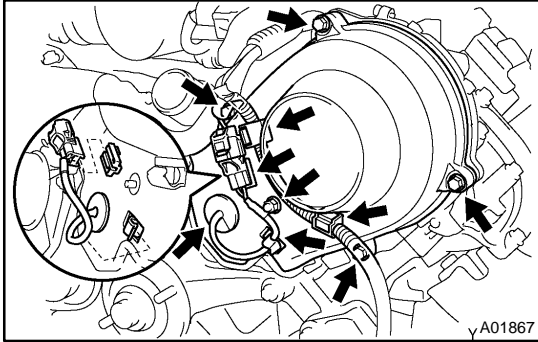
11. REMOVE RH NO.3 TIMING BELT COVER

- (a) Disconnect the PS air hose from the clamp of the timing belt cover.
- (b) Disconnect the wire clamp.
- (c) Disconnect the radiator reservoir outlet hose from the water inlet housing.
- (d) Remove the bolt and nut, disconnect the outlet pipe from the timing belt cover and LH cylinder head.



- (e) Remove the 3 bolts, timing belt cover and gasket.



**12. REMOVE LH NO.3 TIMING BELT COVER**

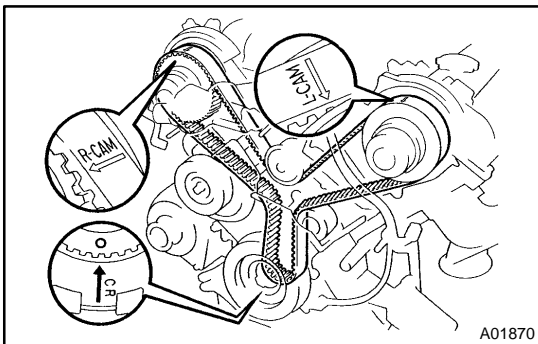
- (a) Disconnect the engine wire from the 2 wire clamps.
- (b) Remove the 4 bolts and nut.
- (c) Disconnect the camshaft position sensor wire from the wire clamp on the timing belt cover.
- (d) Disconnect the sensor connector from the connector bracket.
- (e) Disconnect the sensor connector.
- (f) Remove the wire grommet from the timing belt cover.
- (g) Remove the timing belt cover and gasket.

13. REMOVE NO.2 TIMING BELT COVER

Remove the 2 bolts and No.2 timing belt cover.

14. DISCONNECT A/C COMPRESSOR FROM ENGINE
(See page [EM-77](#))**15. REMOVE FAN BRACKET**

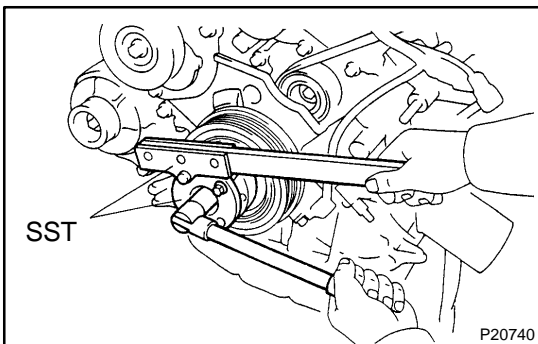
Remove the 2 bolts, 2 nuts and fan bracket.

**16. IF RE-USING TIMING BELT, CHECK INSTALLATION MARKS ON TIMING BELT**

Check that there are 3 installation marks on the timing belt by turning the crankshaft pulley as shown in the illustration.

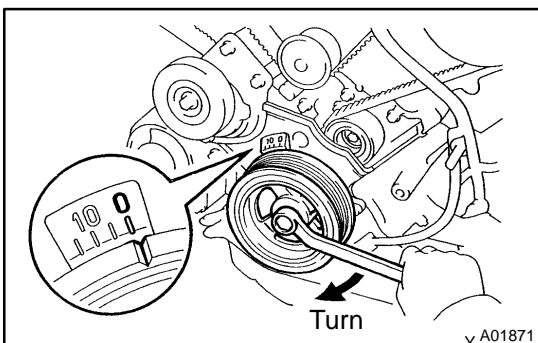
HINT:

If the installation marks have disappeared, place a new installation mark on the timing belt before removing each part.

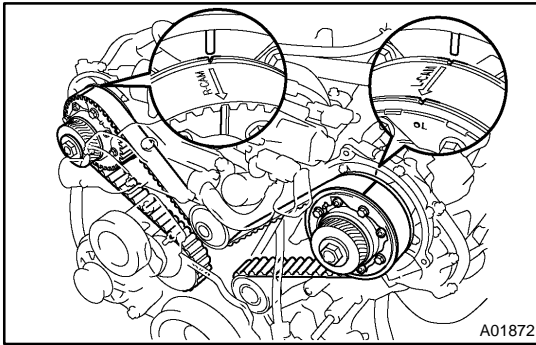
**17. LOOSEN CRANKSHAFT PULLEY BOLT**

Using SST, loosen the pulley bolt.

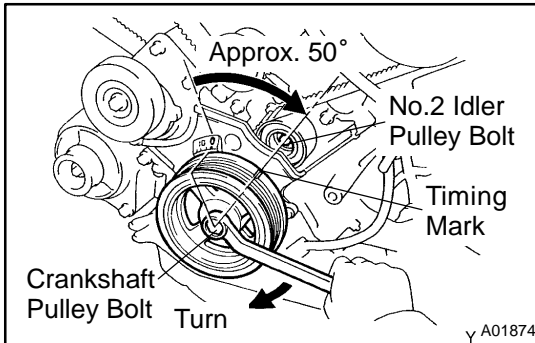
SST 09213-70010 (90105-08076),
09330-00021

**18. SET NO.1 CYLINDER TO APPROX. 50° ATDC/COMPRESSION**

- (a) Turn the crankshaft pulley and align its groove with timing mark "0" of the No.1 timing belt cover.



- (b) Check that the timing marks of the camshaft timing pulleys and timing belt rear plates aligned. If not, turn the crankshaft 1 revolution (360°).



- (c) Turn the crankshaft pulley approx. 50° clockwise, and put the timing mark of the crankshaft pulley in line with the centers of the crankshaft pulley bolt and the idler pulley bolt.

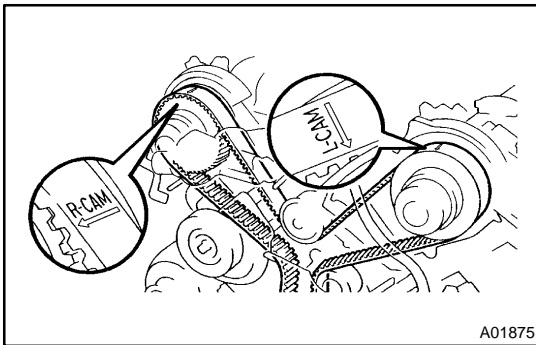
NOTICE:

If the timing belt is disengaged, having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you remove the camshaft timing pulley (step 19), causing damage. So always set the crankshaft pulley at the correct angle.

- (d) Remove the crankshaft pulley bolt.

NOTICE:

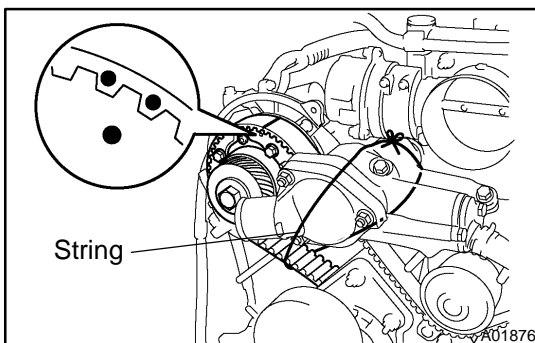
Do not turn the crankshaft pulley.

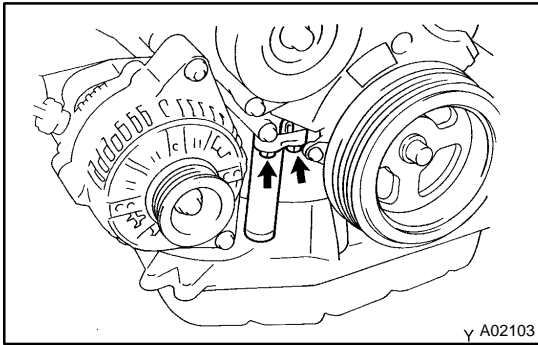


19. REMOVE TIMING BELT TENSIONER

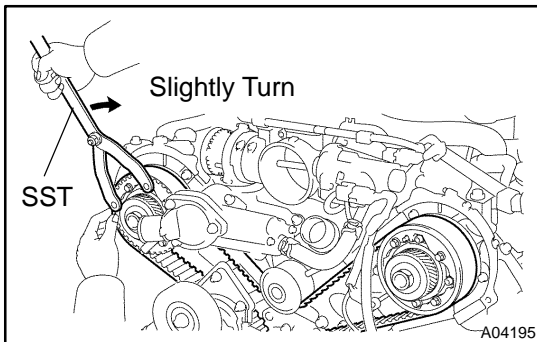
HINT:

- When re-using timing belt:
If the installation marks have disappeared, before remove the timing belt, place 2 new installation marks on the timing belt to match the timing marks of the camshaft timing pulleys.
- When replacing timing belt tensioner only:
To avoid meshing of the timing pulley and timing belt, secure one of them with string. And place matchmarks on the timing belt and RH camshaft timing pulley.



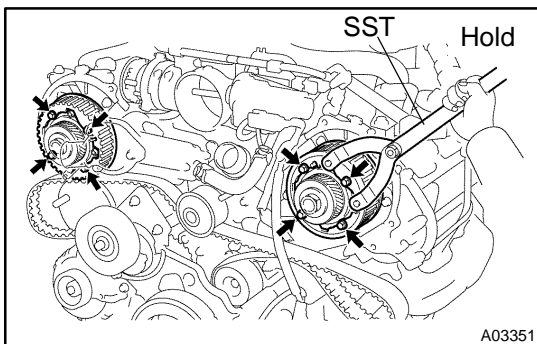


Alternately loosen the 2 bolts, and remove them, the belt tensioner and dust boot.



20. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS

- Using SST, loosen the tension spring between the LH and RH camshaft timing pulleys by slightly turning the RH camshaft timing pulley clockwise.
SST 09960-10010 (09962-01000, 09963-00350)
- Disconnect the timing belt from the camshaft timing pulleys.



21. REMOVE CAMSHAFT TIMING PULLEYS

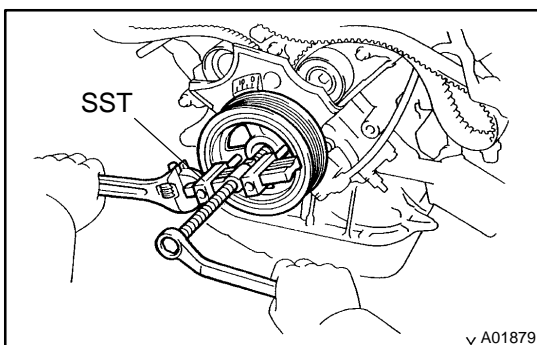
Using SST, remove the 4 bolts and timing pulley. Remove the 2 timing pulleys.

SST 09960-10010 (09962-01000, 09963-00350)

22. REMOVE GENERATOR (See page CH-8)

23. REMOVE DRIVE BELT TENSIONER

Remove the bolt, 2 nuts and belt tensioner.



24. REMOVE CRANKSHAFT PULLEY

Using SST, remove the crankshaft pulley.

SST 09950-50012 (09951-05010, 09952-05010, 09953-05010, 09953-05020, 09954-05020)

NOTICE:

Do not turn the crankshaft pulley.

25. REMOVE NO.1 TIMING BELT COVER

Remove the 4 bolts, timing belt cover.

26. REMOVE TIMING BELT GUIDE

27. REMOVE TIMING BELT COVER SPACER

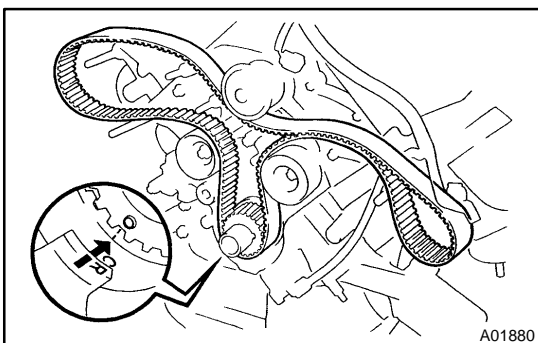
28. REMOVE TIMING BELT

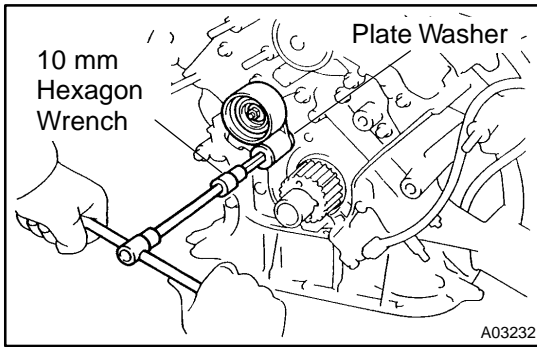
HINT:

If re-using the belt and the installation mark has disappeared from it, place a new installation mark on the timing belt to match the dot mark of the crankshaft timing pulley.

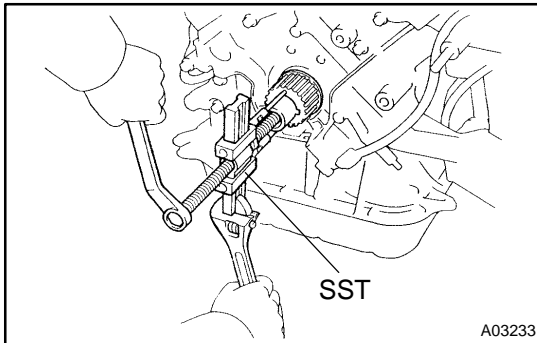
29. REMOVE NO.2 IDLER PULLEY

Remove the bolt and idler pulley.



**30. REMOVE NO.1 IDLER PULLEY**

Using a 10 mm hexagon wrench, remove the bolt, idler pulley and plate washer.

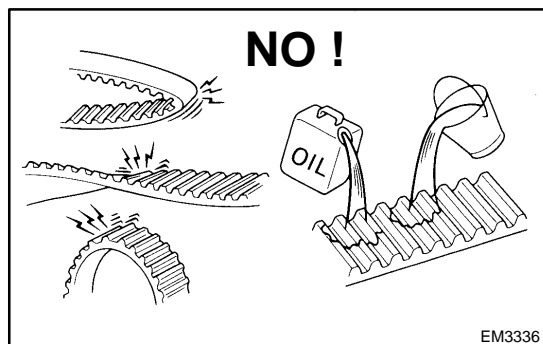
**31. REMOVE CRANKSHAFT TIMING PULLEY**

Using SST, remove the timing pulley.

SST 09950-50012 (09951-05010, 09952-05010, 09953-05010, 09953-05020, 09954-05010)

NOTICE:

Do not turn the timing pulley.



INSPECTION

1. INSPECT TIMING BELT

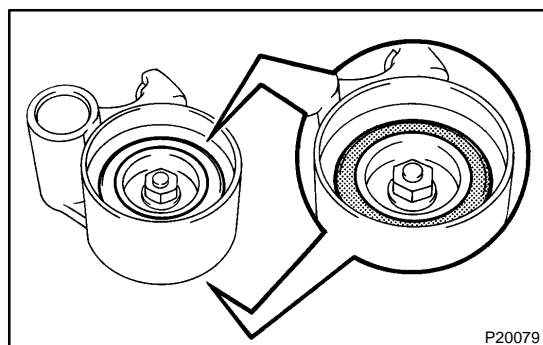
NOTICE:

- 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:

- (a) Premature parting
 - Check for proper installation.
 - Check the timing cover gasket for damage and proper installation.
- (b) If the belt teeth are cracked or damaged, check to see if either camshaft is locked.
- (c) 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.
- (d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.
- (e) If there is noticeable wear on the belt teeth, check timing cover for damage and check gasket has been installed correctly and for foreign material on the pulley teeth.

If necessary, replace the timing belt.



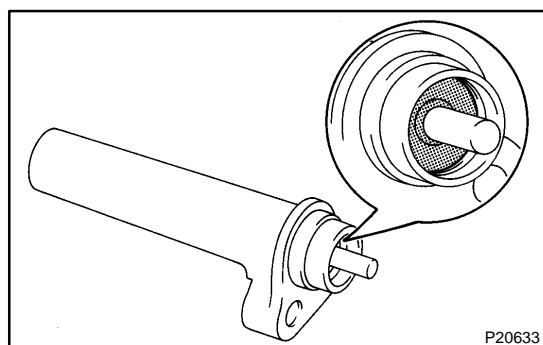
2. INSPECT IDLER PULLEYS

- (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.



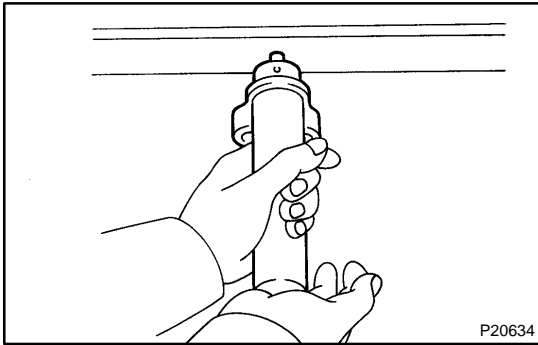
3. INSPECT TIMING BELT TENSIONER

- (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.

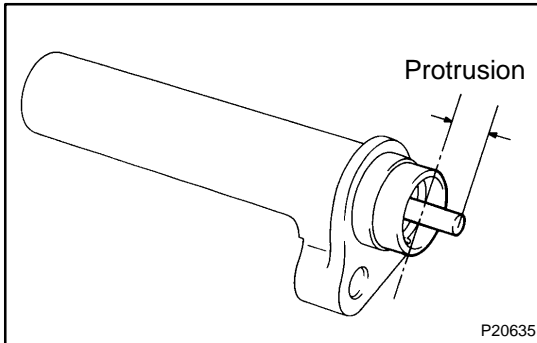
If leakage is found, replace the tensioner.



- (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.

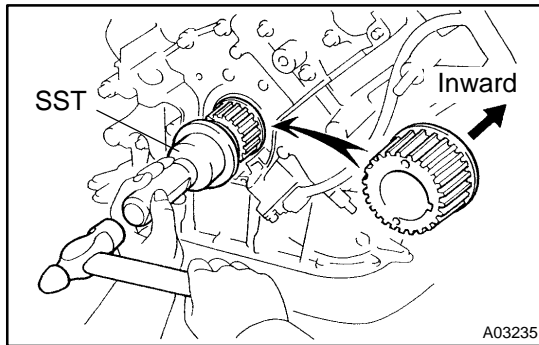


- (c) Measure the protrusion of the push rod from the housing end.

Protrusion: 10.5 – 11.5 mm (0.413 – 0.453 in.)

If the protrusion is not as specified, replace the tensioner.

4. INSPECT WATER PUMP (See page [CO-9](#))

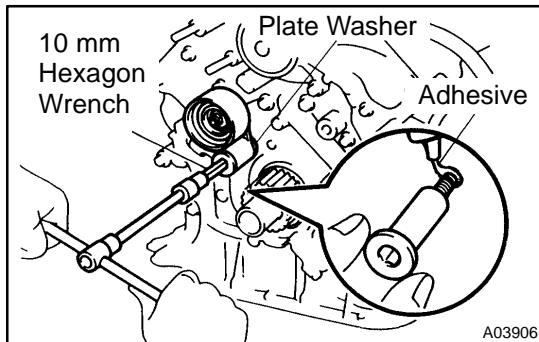


INSTALLATION

1. INSTALL CRANKSHAFT TIMING PULLEY

- (a) Align the timing pulley set key with the key groove of the pulley.
- (b) Using SST and a hammer, tap in the timing pulley, facing the flange side inward.

SST 09223-46011



2. INSTALL NO.1 IDLER PULLEY

- (a) Apply adhesive 2 or 3 threads of the pivot bolt.

Adhesive:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Using a 10 mm hexagon wrench, install the plate washer and idler pulley with the pivot bolt.

Torque: 34.5 N·m (350 kgf·cm, 25 ft·lbf)

- (c) Check that the pulley bracket moves smoothly.

3. INSTALL NO.2 IDLER PULLEY

- (a) Install the idler pulley with the bolt.

Torque: 34.5 N·m (350 kgf·cm, 25 ft·lbf)

- (b) Check that the idler pulley moves smoothly.

4. TEMPORARILY INSTALL TIMING BELT

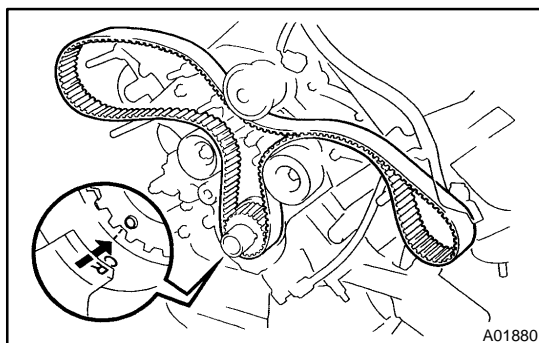
NOTICE:

The engine should be cold.

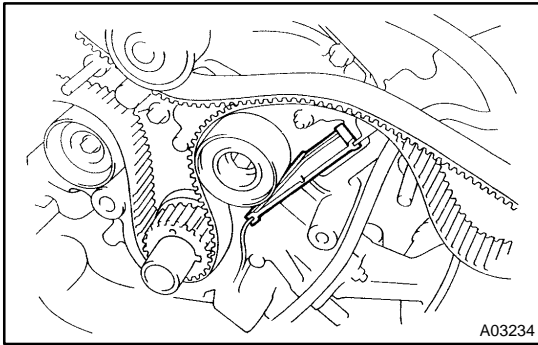
- (a) Remove any oil or water on the crankshaft pulley, oil pump pulley, water pump pulley, No.1 idler pulley and No.2 idler pulley, and keep them clean.

NOTICE:

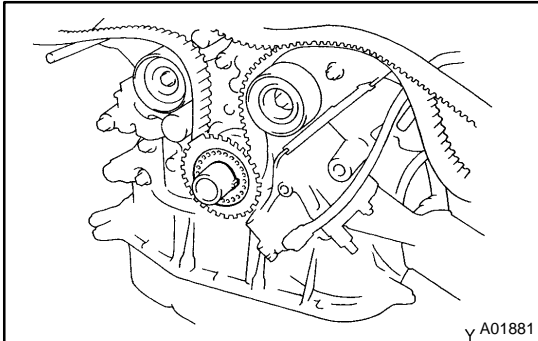
Only wipe the pulleys; do not use any cleansing agent.



- (b) Align the installation mark on the timing belt with the timing mark of the crankshaft timing pulley.
- (c) Install the timing belt on the crankshaft timing pulley, No.1 idler pulley and No.2 idler pulley.

**5. INSTALL TIMING BELT COVER SPACER**

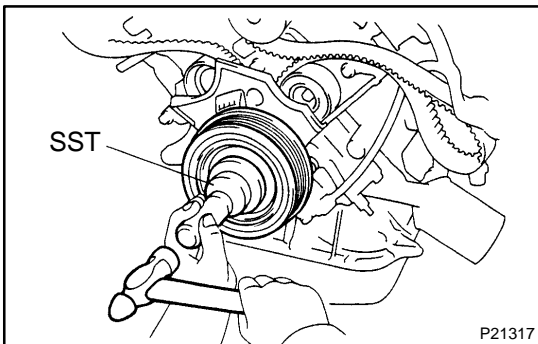
- (a) Install the gasket to the cover spacer.
- (b) Install the cover spacer.

**6. INSTALL TIMING BELT GUIDE**

Install the belt guide, facing the cup side outward.

7. INSTALL NO.1 TIMING BELT COVER

Install the timing belt cover with the 4 bolts.

**8. INSTALL CRANKSHAFT PULLEY**

- (a) Align the pulley set key with the key groove of the crankshaft pulley.
- (b) Using SST and a hammer, tap in the crankshaft pulley.
SST 09223-46011

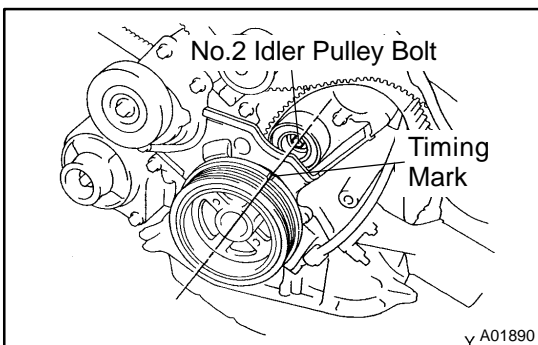
9. INSTALL DRIVE BELT TENSIONER

Install the belt tensioner with the bolt and 2 nuts.

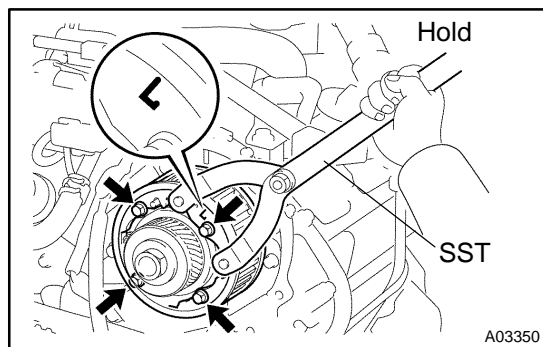
Torque: 16 N·m (160 kgf-cm, 12 ft-lbf)

HINT:

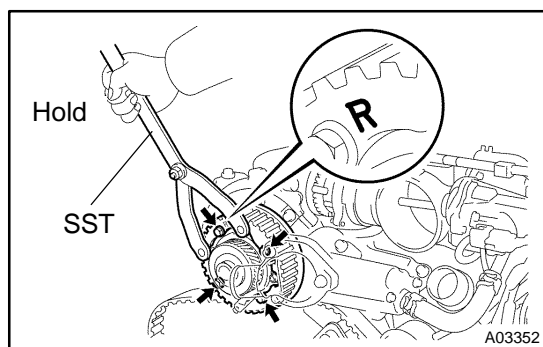
Use a bolt 106 mm (4.18 in.) in length.

10. INSTALL GENERATOR (See page [CH-18](#))**11. CHECK CRANKSHAFT PULLEY POSITION**

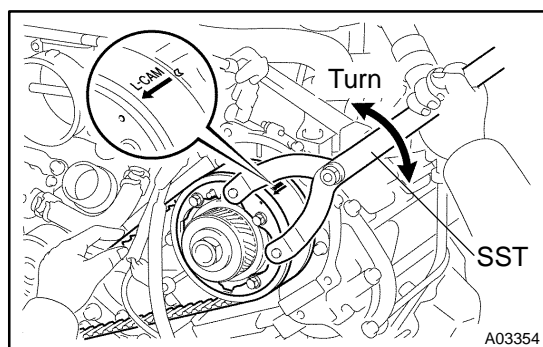
Check that the timing mark of the crankshaft pulley is aligned with the centers of the crankshaft pulley and the idler pulley bolt.

**12. INSTALL LH CAMSHAFT TIMING PULLEY**

- Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- Attach the timing pulley to the camshaft timing tube, facing the "L" mark forward.
- Using SST, install the 4 pulley bolts.
SST 09960-10010 (09962-01000, 09963-00350)
Torque: 7.5 N·m (80 kgf·cm, 66 ft·lbf)

**13. INSTALL RH CAMSHAFT TIMING PULLEY**

- Align the camshaft timing tube knock pin with the knock pin groove of the timing pulley.
- Attach the timing pulley to the camshaft timing tube, facing the "R" mark forward.
- Using SST, install the 4 pulley bolts.
SST 09960-10010 (09962-01000, 09963-00350)
Torque: 7.5 N·m (80 kgf·cm, 66 ft·lbf)

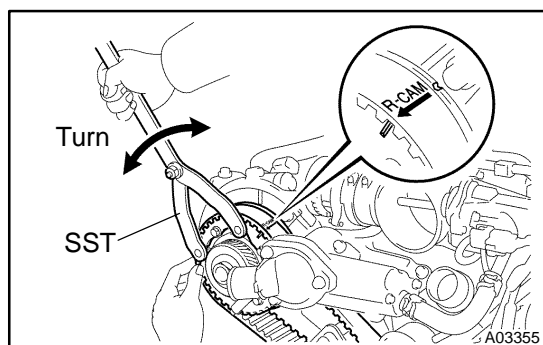
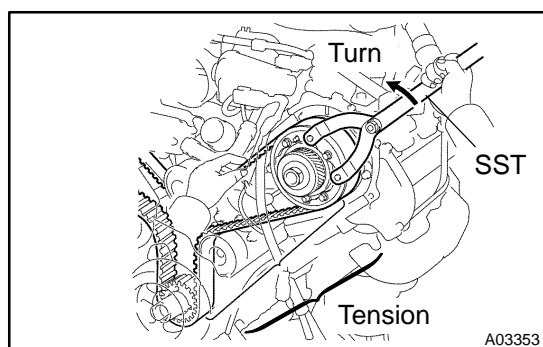
**14. CONNECT TIMING BELT TO LH CAMSHAFT TIMING PULLEY**

- Remove any oil or water on the LH camshaft timing pulley, and keep it clean.

NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

- Using SST, turn the timing pulley. Align the installation mark on the timing belt with the timing mark of the timing pulley, and hang the timing belt on the timing pulley.
SST 09960-10010 (09962-01000, 09963-00350)
- Using SST, turn the LH camshaft timing pulley counter-clockwise until there is tension between the crankshaft timing pulley and LH camshaft timing pulley.
SST 09960-10010 (09962-01000, 09963-00350)

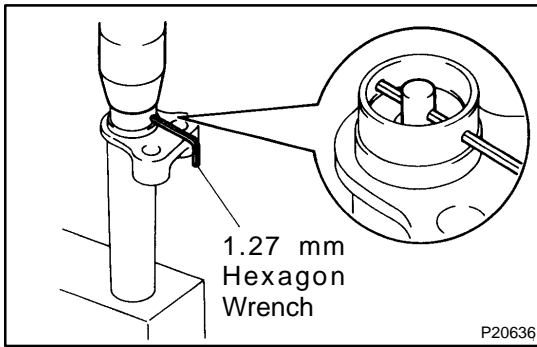
**15. CONNECT TIMING BELT TO RH CAMSHAFT TIMING PULLEY**

- Remove any oil or water on the RH camshaft timing pulley and water pump pulley, and keep them clean.

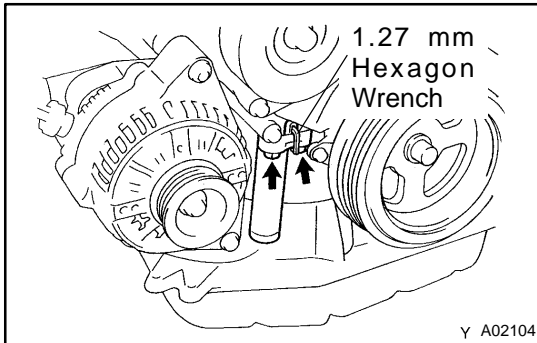
NOTICE:

Only wipe the pulleys; do not use any cleansing agent.

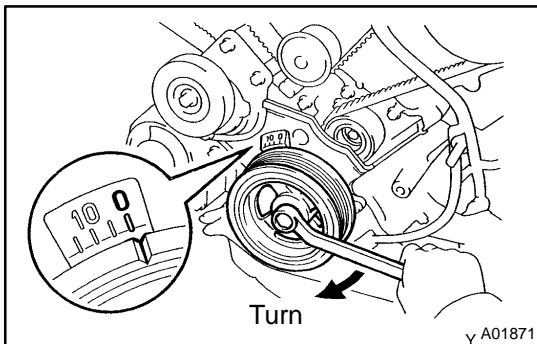
- Using SST, turn the timing pulley. Align the installation mark on the timing belt with the timing mark of the timing pulley, and hang the timing belt on the timing pulley.
SST 09960-10010 (09962-01000, 09963-00350)

**16. SET TIMING BELT TENSIONER**

- Using a press, slowly press in the push rod using 981 – 9,807 N (100 – 1,000 kgf, 220 – 2,205 lbf) of pressure.
- 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.
- Release the press.
- Install the dust boot to the belt tensioner.

**17. INSTALL TIMING BELT TENSIONER**

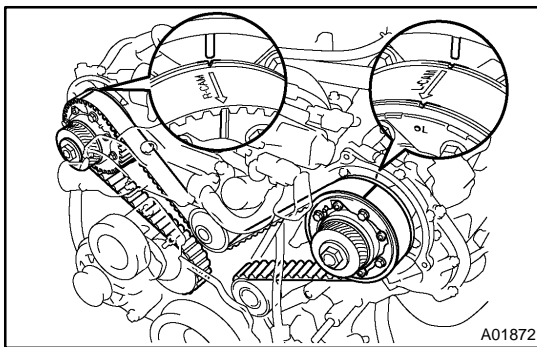
- Temporarily install the belt tensioner with the 2 bolts.
- Alternately tighten the 2 bolts.
Torque: 26 N·m (270 kgf·cm, 19 ft·lbf)
- Using pliers, remove the 1.27 mm hexagon wrench from the belt tensioner.

**18. CHECK VALVE TIMING**

- Temporarily install the crankshaft pulley bolt.
- Slowly turn the crankshaft pulley 2 revolutions from TDC to TDC.

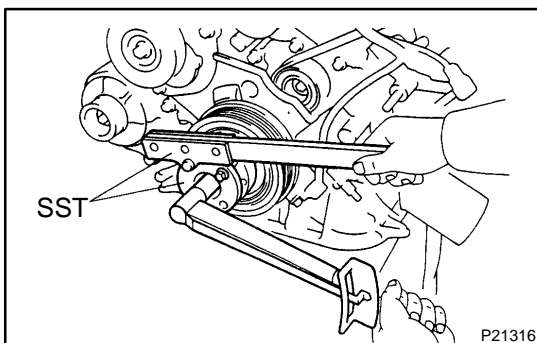
NOTICE:

Always turn the crankshaft pulley clockwise.



- Check that each pulley aligns with the timing marks as shown in the illustration.

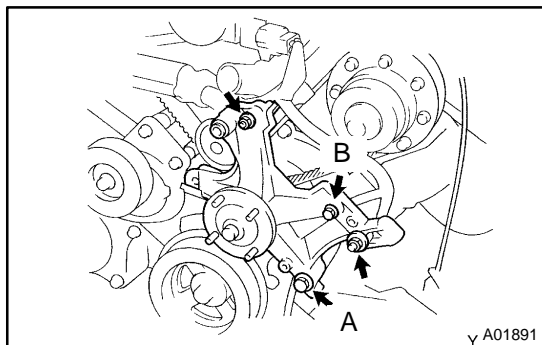
If the timing marks do not align, remove the timing belt and reinstall it.

**19. TIGHTEN CRANKSHAFT PULLEY BOLT**

Using SST, install the pulley bolt.

SST 09213-54015 (90119-08216),
09330-00021

Torque: 245 N·m (2,500 kgf·cm, 181 ft·lbf)

**20. INSTALL FAN BRACKET**

Install the fan bracket with the 2 bolts and 2 nuts.

Torque:

12 mm head: 16 N·m (160 kgf·cm, 12 ft·lbf)

14 mm head: 32 N·m (330 kgf·cm, 24 ft·lbf)

HINT:

Each bolt length is indicated in the illustration.

Bolt Length:

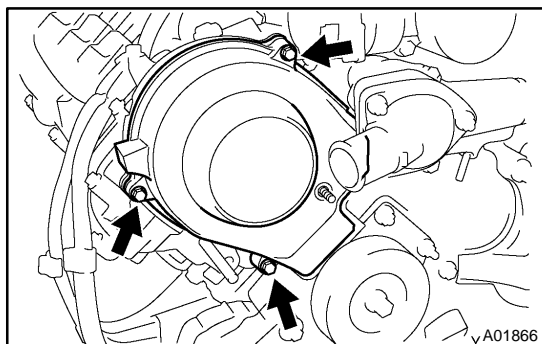
106 mm (4.17 in.) for 12 mm head (A)

114 mm (4.49 in.) for 14 mm head (B)

21. INSTALL A/C COMPRESSOR (See page EM-82)**22. INSTALL NO.2 TIMING BELT COVER**

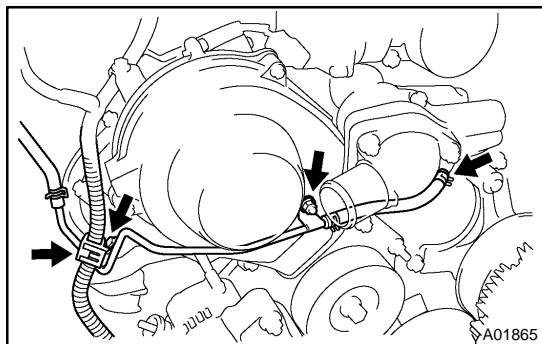
Install the No.2 timing belt cover with the 2 bolts.

Torque: 16 N·m (160 kgf·cm, 12 ft·lbf)

**23. INSTALL RH NO.3 TIMING BELT COVER**

- Install the gasket to the timing belt cover.
- Fit the timing belt cover, matching it with the fan bracket.
- Install the timing belt cover with the 3 bolts.

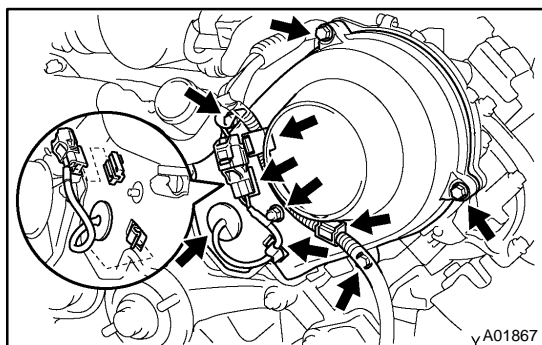
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)



- Install the radiator reservoir outlet pipe to the RH cylinder head and timing belt cover with the bolt and nut.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

- Connect the outlet hose to the water inlet housing.
- Connect the wire clamp.
- Connect the PS air hose to the clamp of the timing belt cover.

**24. INSTALL LH NO.3 TIMING BELT COVER**

- Install the gasket to the timing belt cover.
- Run the camshaft position sensor wire through the timing belt cover hole.
- Fit the timing belt cover, matching it with the fan bracket.
- Install the timing belt cover with the 4 bolts and nut.

Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

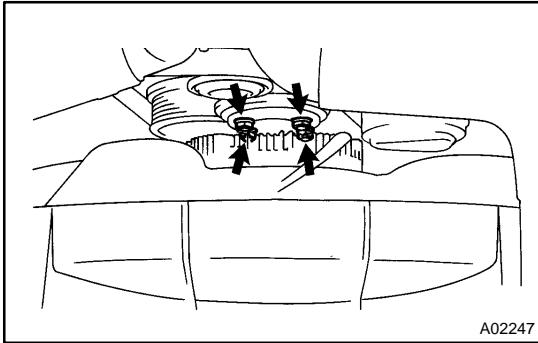
- Install the wire grommet to the timing belt cover.
- Install the sensor connector to the connector bracket.
- Connect the sensor connector.

- (h) Install the sensor wire to the wire clamp on the timing belt cover.
- (i) Install the engine wire to the 2 wire clamps on the timing belt cover.

25. INSTALL DRIVE BELT IDLER PULLEY

Install the idler pulley and cover plate with the bolt.

Torque: 37 N·m (380 kgf-cm, 27 ft-lbf)

26. INSTALL RADIATOR ASSEMBLY (See page [CO-27](#))**27. INSTALL FAN PULLEY, FAN, FLUID COUPLING AND DRIVE BELT**

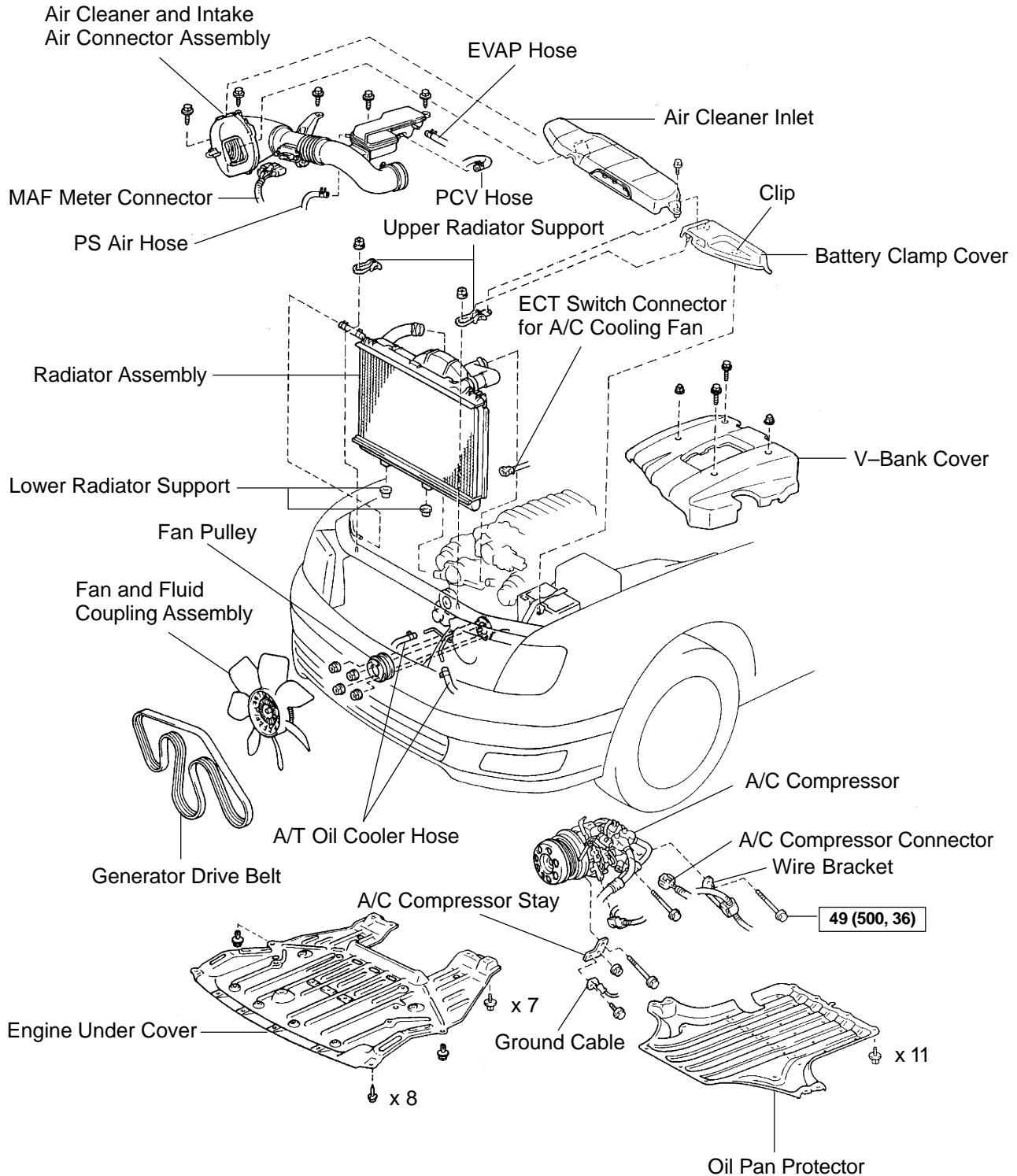
- (a) Temporarily install the fan pulley, the fan, fluid coupling assembly with the 4 nuts.
- (b) Install the generator drive belt. (See page [CH-18](#))
- (c) Tighten the 4 nuts holding the fluid coupling to the fan bracket.

Torque: 21 N·m (215 kgf-cm, 16 ft-lbf)

28. INSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY**29. INSTALL V-BANK COVER****30. FILL WITH ENGINE COOLANT****31. START ENGINE AND CHECK FOR LEAKS****32. RECHECK ENGINE COOLANT LEVEL****33. INSTALL AIR CLEANER INLET****34. INSTALL BATTERY CLAMP COVER****35. INSTALL ENGINE UNDER COVER****36. INSTALL OIL PAN PROTECTOR**

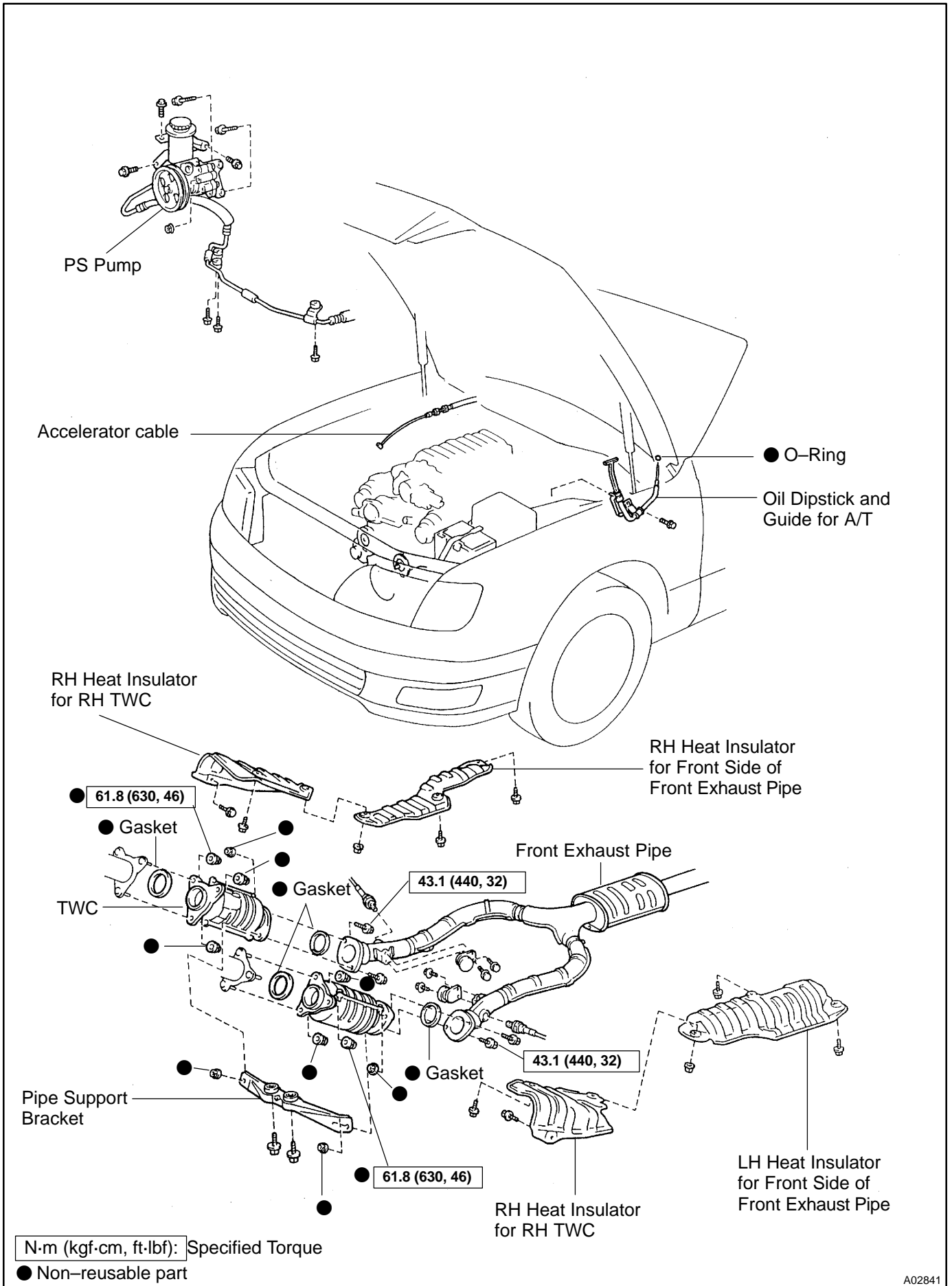
CYLINDER HEAD COMPONENTS

EM09P-02

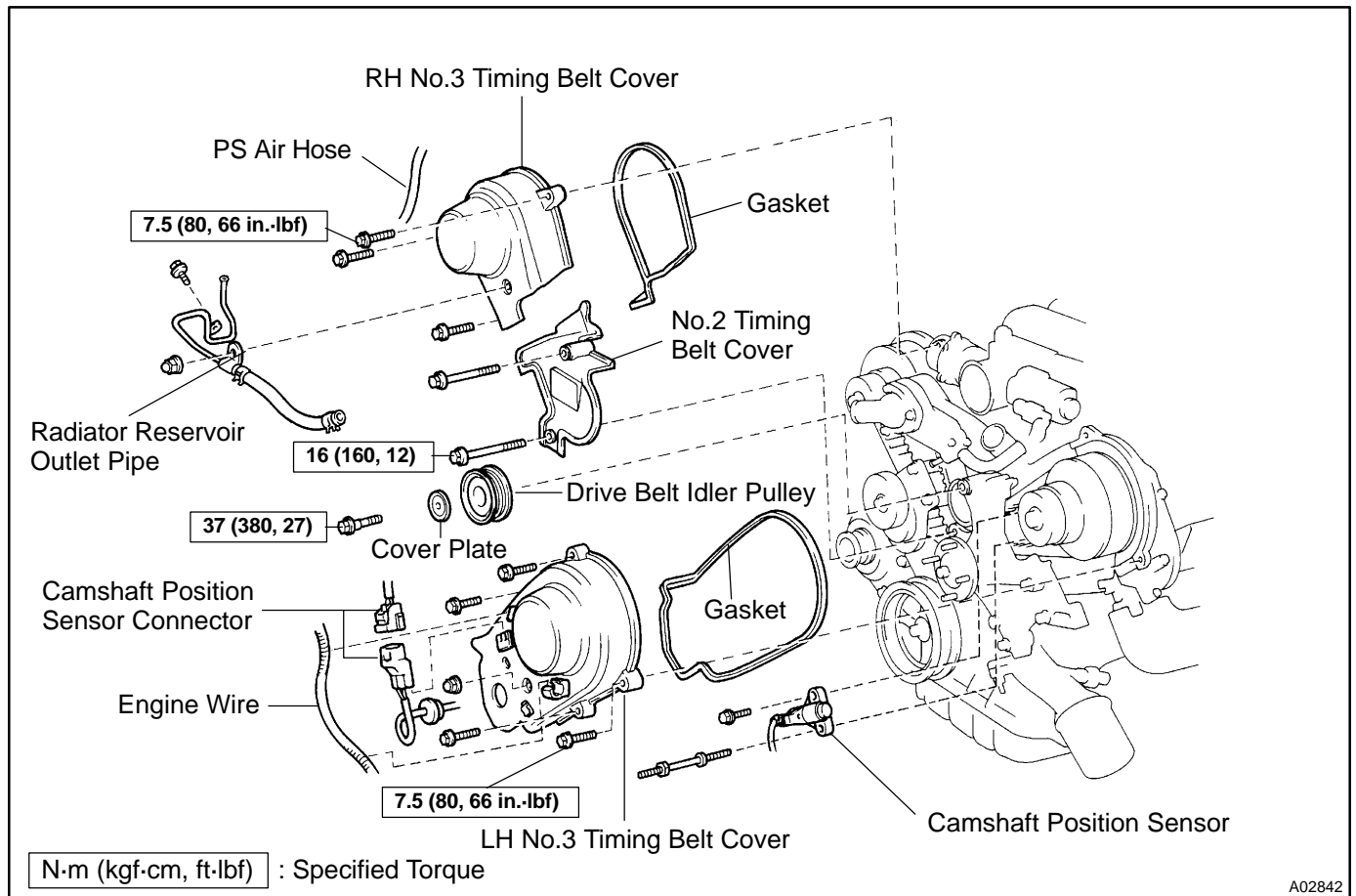


N·m (kgf·cm, ft·lbf) : Specified Torque

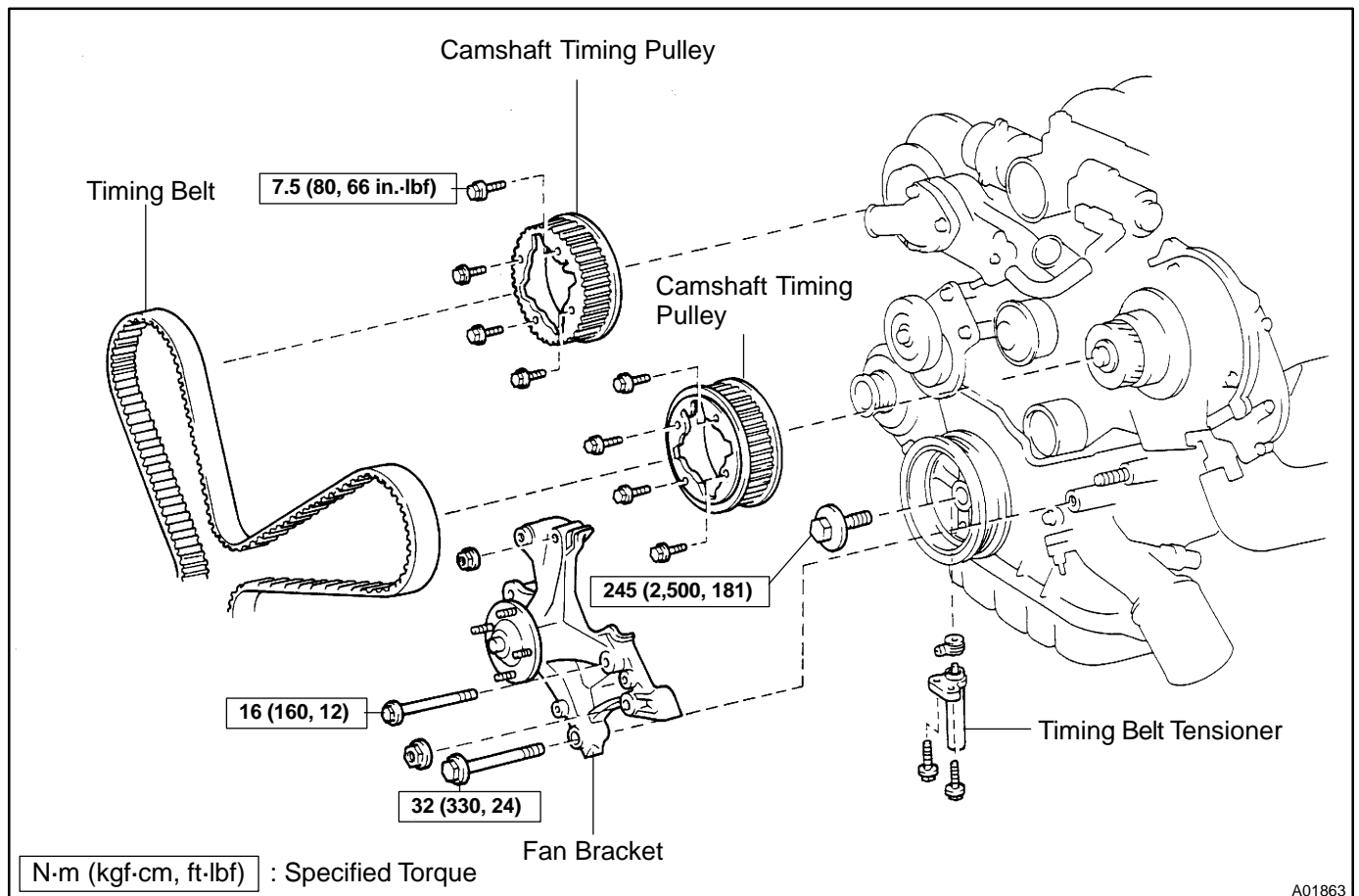
A02232



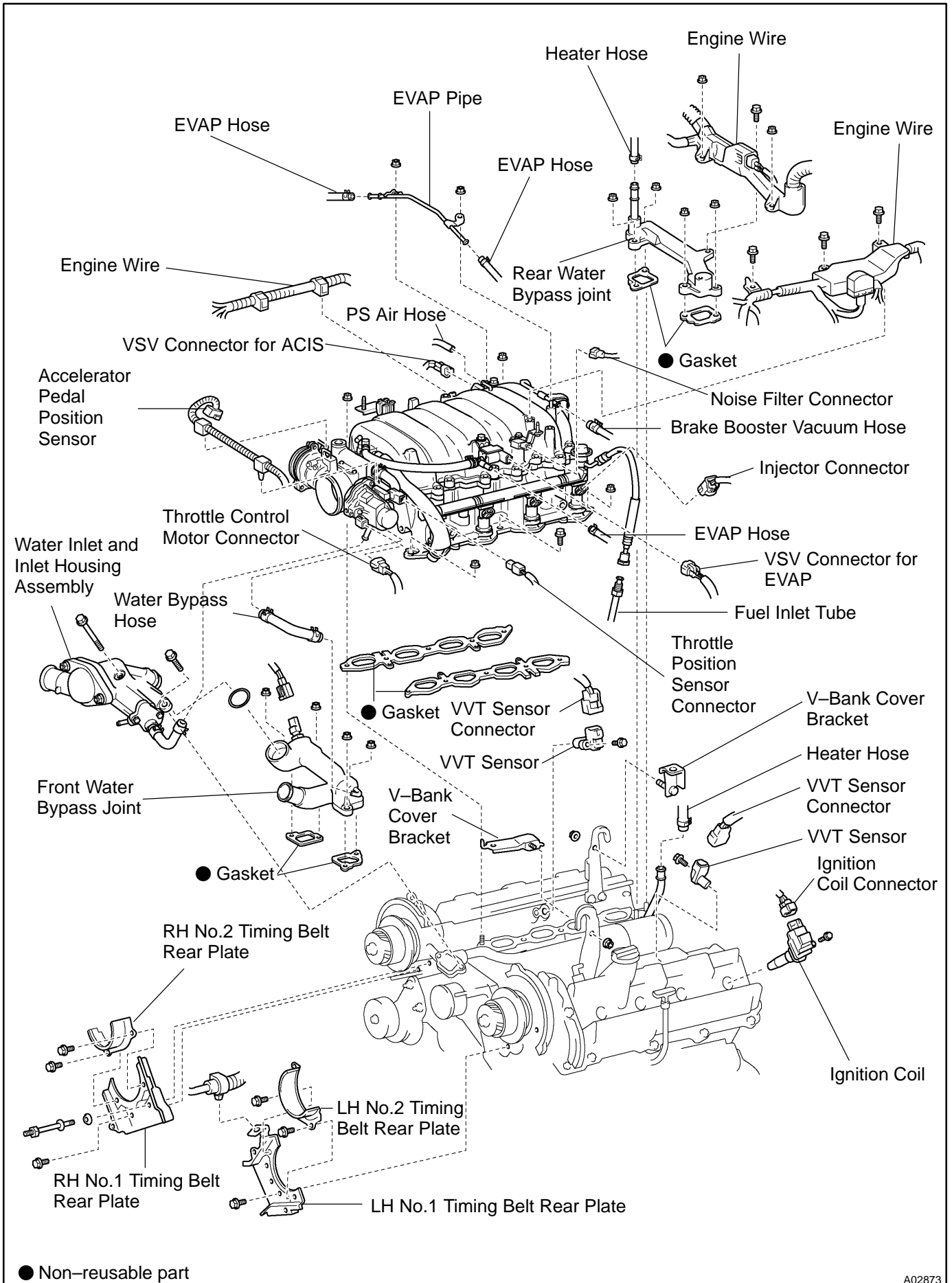
A02841



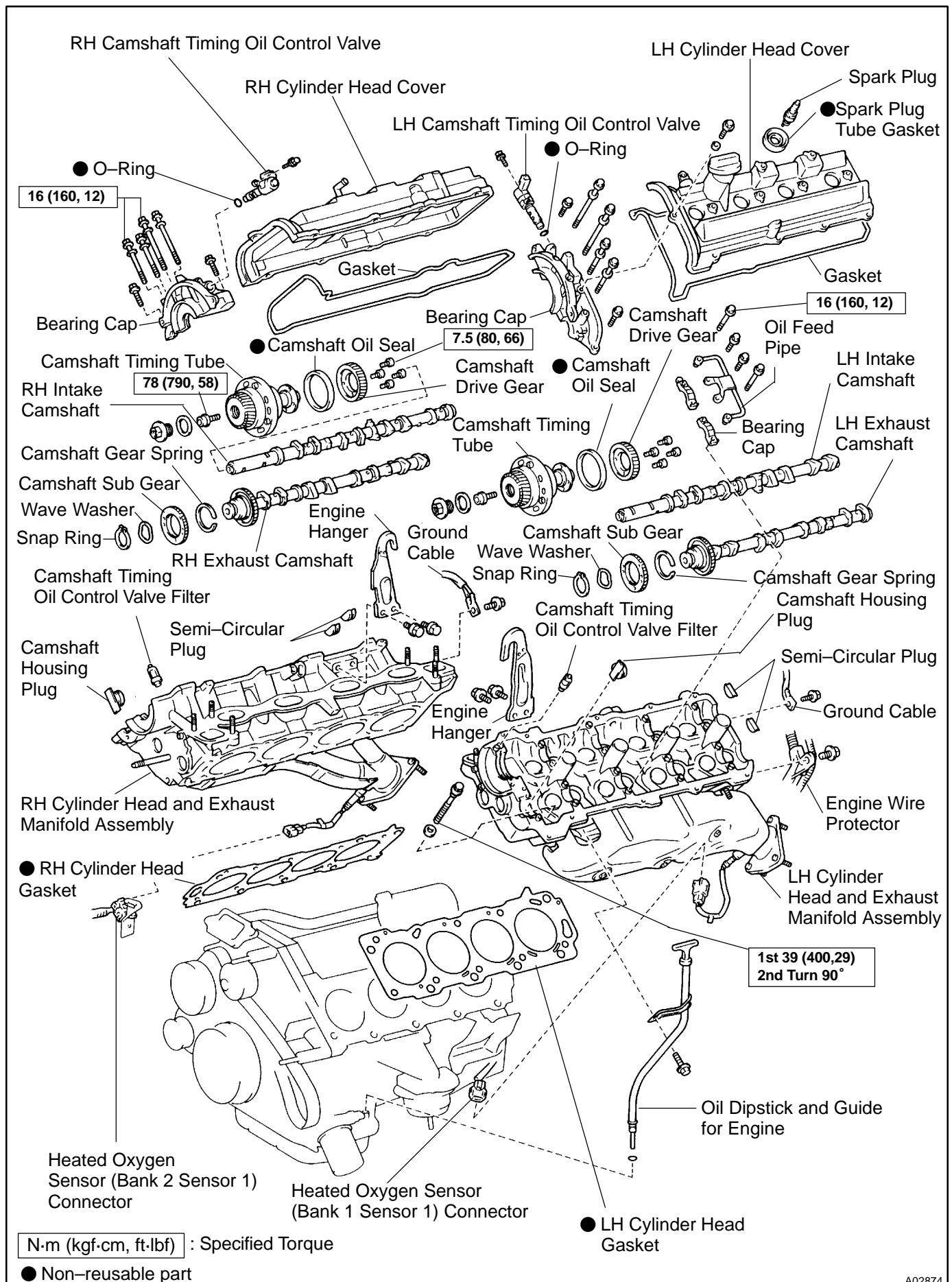
A02842

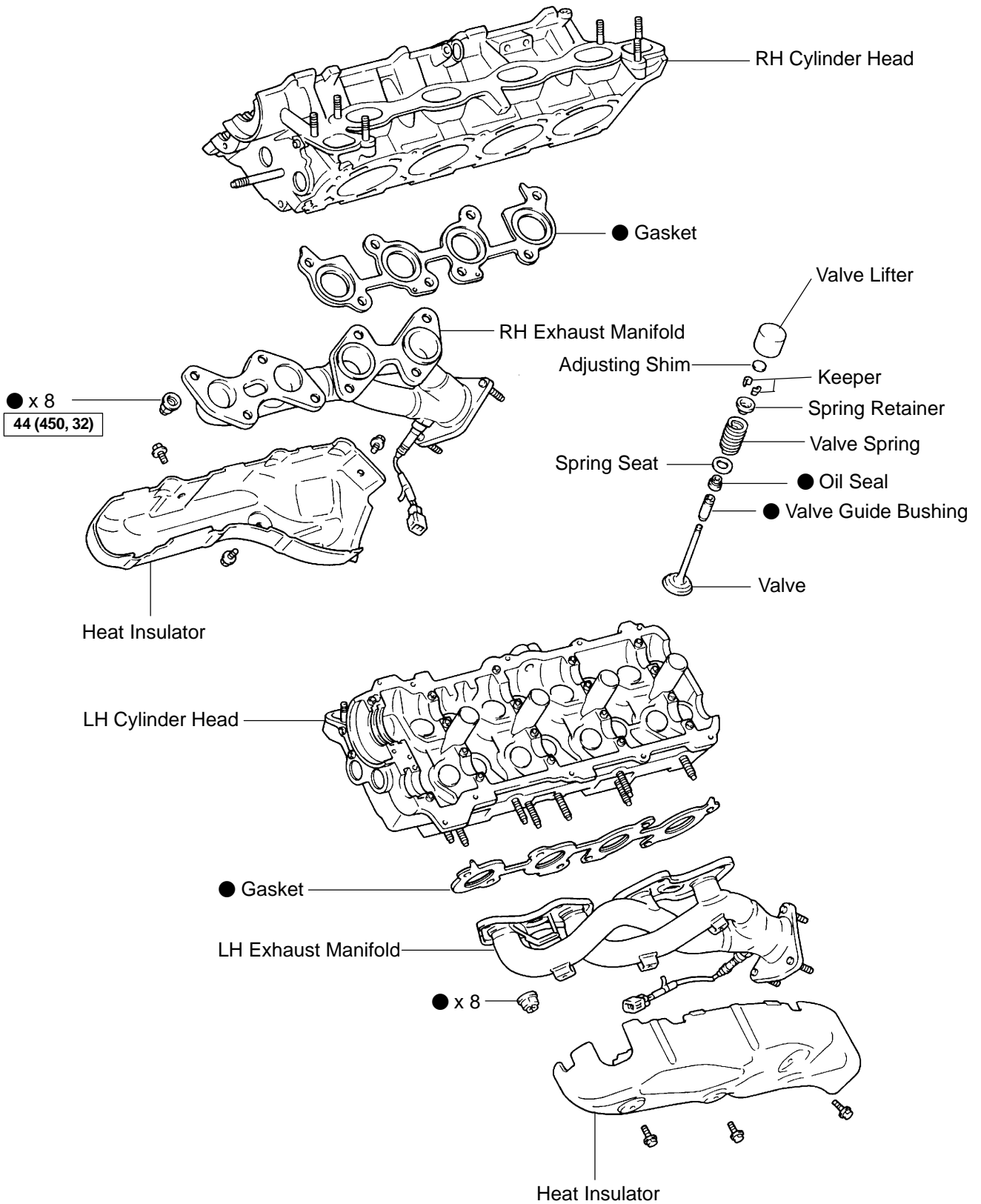


A01863



A02873





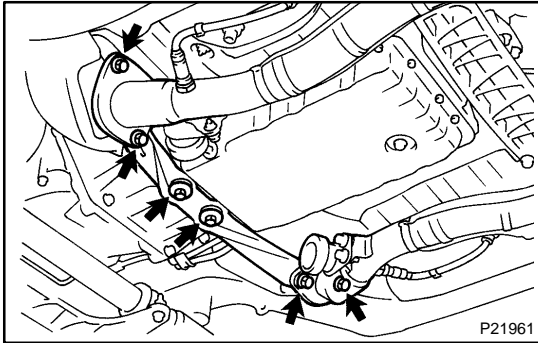
N·m (kgf·cm, ft·lbf) : Specified Torque

● Non-reusable part

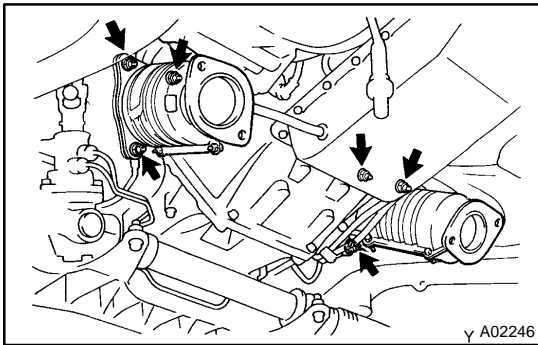
A02875

REMOVAL

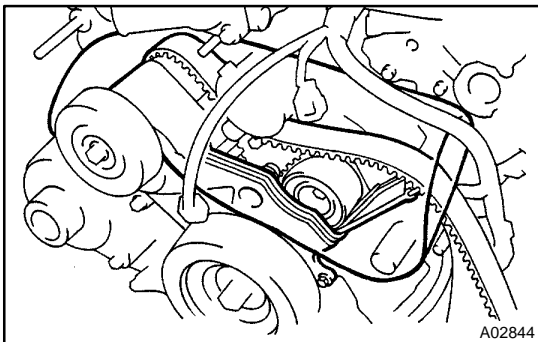
1. DISCONNECT TIMING BELT FROM CAMSHAFT TIMING PULLEYS (See page [EM-15](#))
2. REMOVE CAMSHAFT TIMING PULLEYS (See page [EM-15](#))
3. REMOVE CAMSHAFT POSITION SENSOR (See page [IG-10](#))
4. DISCONNECT PS PUMP FROM ENGINE (See page [EM-77](#))



5. DISCONNECT FRONT EXHAUST PIPE FROM TWC
 - (a) Remove the 4 bolts and 4 nuts holding the front exhaust pipe to the TWC.
 - (b) Disconnect the front exhaust pipe from the 2 TWC, and remove the 2 gaskets.
 - (c) Remove the 2 bolts and pipe support bracket.



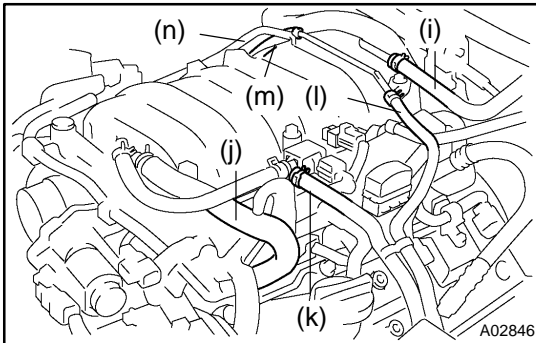
6. REMOVE TWC
Remove the 3 nuts, TWC and gasket. Remove the 2 TWC.
7. REMOVE IGNITION COILS (See page [IG-7](#))
8. REMOVE TIMING BELT REAR PLATES
 - (a) Remove the 3 bolts, stud bolt, and RH No.1 and No.2 timing belt rear plates.
 - (b) Disconnect the wire clamp from the LH timing belt rear plate.
 - (c) Remove the 3 bolts, LH No.1 and No.2 timing belt rear plates.



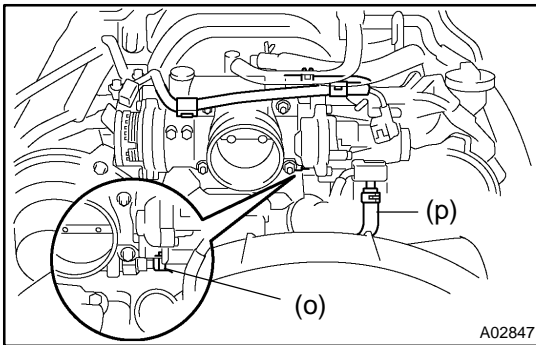
NOTICE:

- Be careful not to drop anything inside the timing belt cover.
 - Do not allow the belt to come into contact with oil, water or dust.
9. DISCONNECT FUEL INLET HOSE (See page [SF-23](#))
 10. REMOVE INTAKE MANIFOLD ASSEMBLY
 - (a) Disconnect the accelerator cable.
 - (b) Disconnect the throttle position sensor connector.

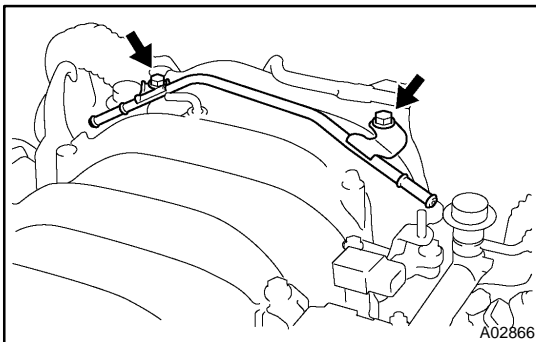
- (c) Disconnect the accelerator pedal position sensor connector.
- (d) Disconnect the throttle motor connector.
- (e) Disconnect the VSV connector for EVAP.
- (f) Disconnect the VSV connector for ACIS.
- (g) Disconnect the 8 injector connectors.
- (h) Disconnect the noise filter connector.



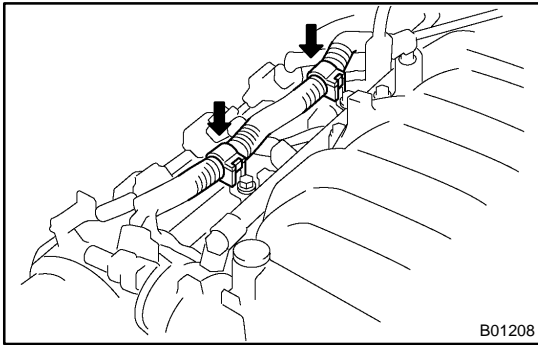
- (i) Disconnect the brake booster vacuum hose from the union on the intake manifold.
- (j) Disconnect the PCV hose from the PCV valve on the LH cylinder head.
- (k) Disconnect the EVAP hose (from the charcoal canister) from the VSV for EVAP.
- (l) Disconnect the EVAP hose (from the charcoal canister) from the EVAP pipe on the intake manifold.
- (m) Disconnect the EVAP hose (from the intake air connector) from the EVAP pipe on the intake manifold.
- (n) Disconnect the PS air hose from the intake manifold.



- (o) Disconnect the No.1 water bypass hose (from the water inlet housing) from the throttle body.
- (p) Disconnect the No.7 water bypass hose (from the front water bypass joint) from the throttle body.
- (q) Disconnect the 2 wire clamp from the throttle body.

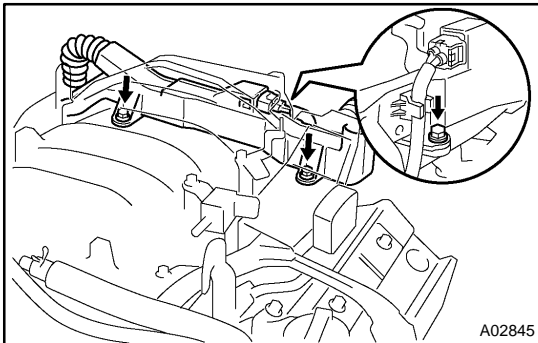


- (r) Remove the 2 bolts and EVAP pipe from the intake manifold.
- (s) Remove the 2 nuts and accelerator cable bracket.
- (t) Disconnect the VSV connector for ACIS from the No.1 V-bank cover bracket.
- (u) Remove the 4 bolts and 3 V-bank cover brackets.
- (v) Remove the bolt and VSV for EVAP.

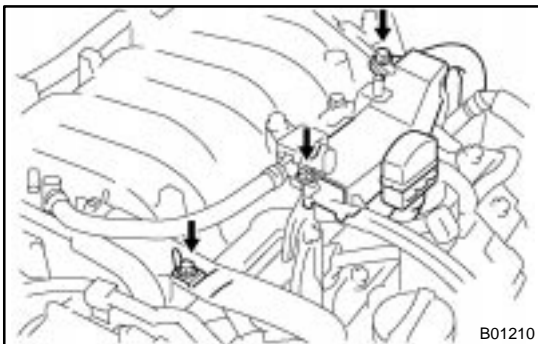


- (w) Disconnect the engine wire from the RH delivery pipe, rear water bypass joint, intake manifold and cylinder head.

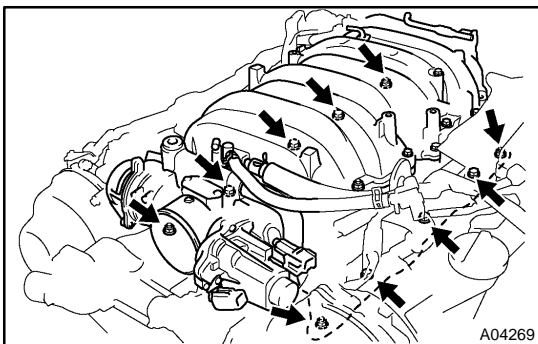
- (1) Disconnect the 2 wire clamps from the wire clamp bracket on the RH delivery pipe.



- (2) Remove the 3 bolts, and disconnect the engine wire protector from the rear water bypass joint and RH cylinder head.

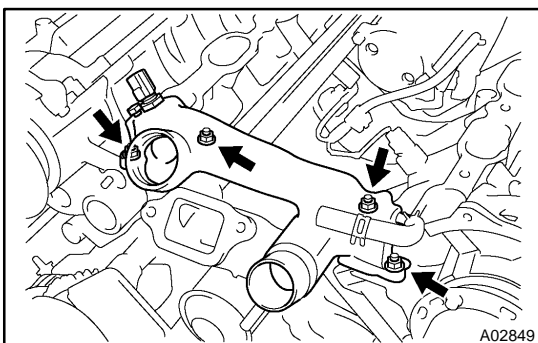


- (3) Remove the 3 bolts, and disconnect the engine wire protector and wire clamp bracket from the intake manifold.



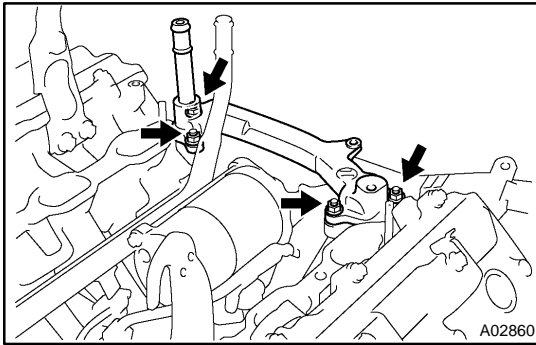
- (x) Remove the 6 bolts, 4 nuts, intake manifold assembly and 2 gaskets.

11. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY (See page [CO-8](#))



12. REMOVE FRONT WATER BYPASS JOINT

- (a) Disconnect the ECT sensor connector.
(b) Remove the 4 nuts, water bypass joint and 2 gaskets.



13. REMOVE REAR WATER BYPASS JOINT

Remove the 4 nuts, water bypass joint and 2 gaskets.

14. REMOVE VVT SENSORS

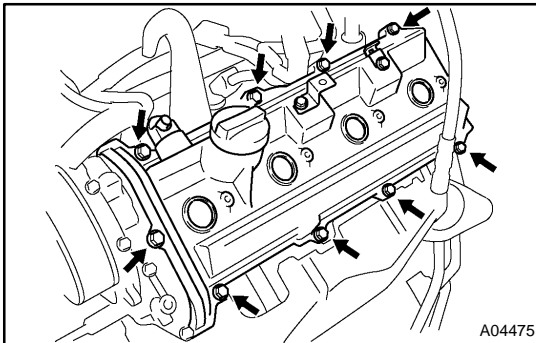
15. REMOVE ENGINE HANGERS

16. REMOVE OIL DIPSTICK AND GUIDE FOR A/T

(See page [EM-77](#))

17. REMOVE OIL DIPSTICK AND GUIDE FOR ENGINE

(See page [LU-9](#))



18. REMOVE CYLINDER HEAD COVERS

Remove the 9 bolts, 9 seal washers, cylinder head cover and gasket. Remove the 2 cylinder head covers.

19. IF NECESSARY, REMOVE SEMI-CIRCULAR PLUGS AND CAMSHAFT HOUSING PLUGS

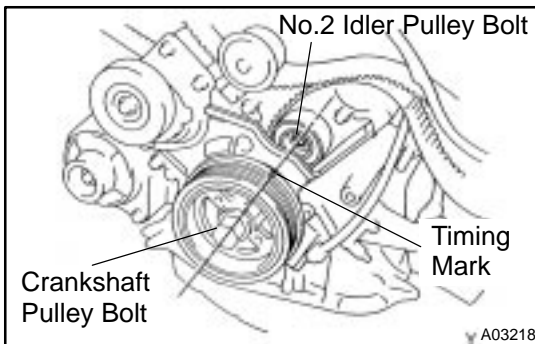
20. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE

(See page [SF-51](#))

21. 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, the following steps should be carried out.

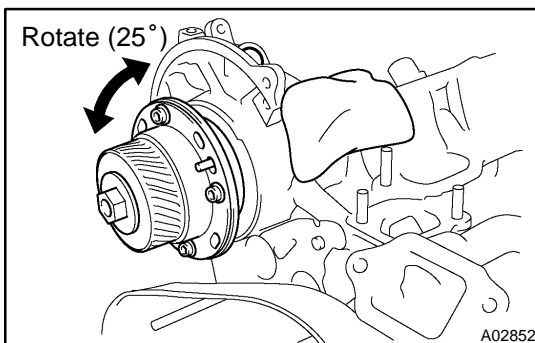


(a) Check the crankshaft pulley position.

Check that the timing mark of the crankshaft pulley is in aligned with the centers of the crankshaft pulley bolt and idler pulley bolt.

NOTICE:

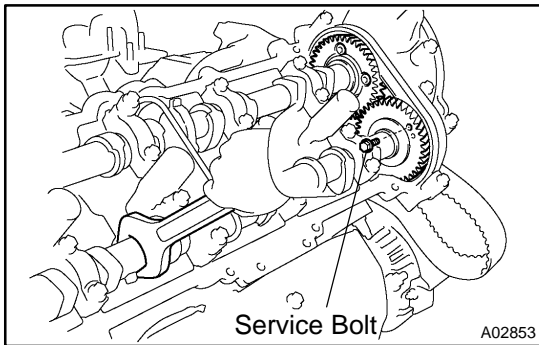
Having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you remove the camshaft, causing damage. So always set the crankshaft pulley at the correct angle.



(b) Rotate the VVT-i pulley from left to right 2 to 3 times within its range of movement ($25^{\circ} < 50^{\circ} \text{ CA}$) and use a waste cloth to collect the oil from the camshaft timing oil control valve installation hole.

NOTICE:

Approximately 20 cc (1.2 cu in.) of oil will be ejected, so take care not to spill it.



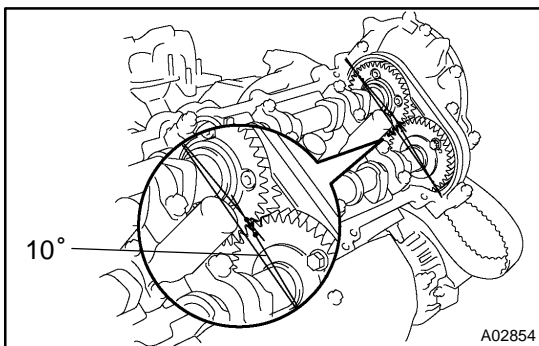
- (c) Remove the RH camshafts.
- (1) Boring the service bolt hole of the sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

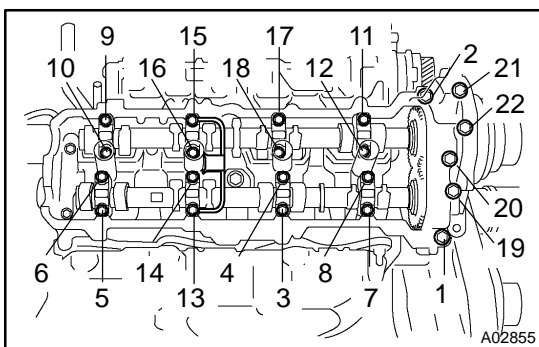
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 – 20 mm

HINT:

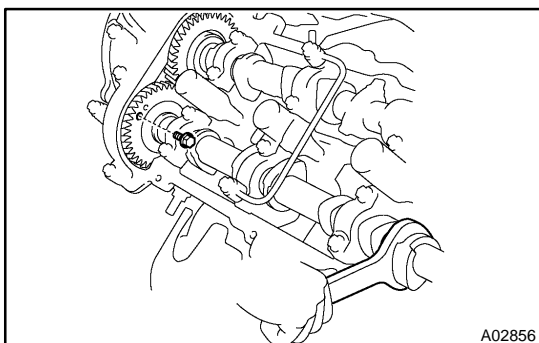
When removing the camshafts, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



- (3) Set the timing mark (1 dot mark) of the camshaft main gear at approx. 10° angle by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.



- (4) Uniformly loosen and remove the 22 bearing cap bolts in several passes, in the sequence shown.
- (5) Remove the oil feed pipe, 9 bearing caps, cam shaft timing oil control valve and camshafts.



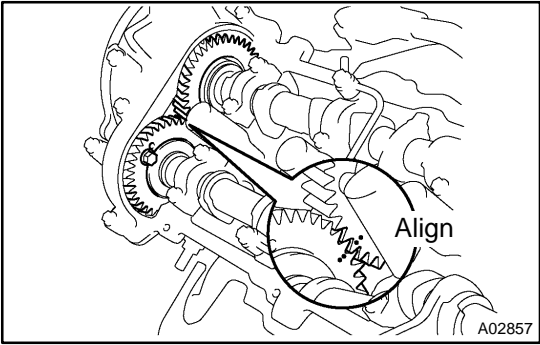
- (d) Remove the LH camshafts.
- (1) Boring the service bolt hole of the sub-gear upward by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.
 - (2) Secure the sub-gear to the main gear with a service bolt.

Recommended service bolt:

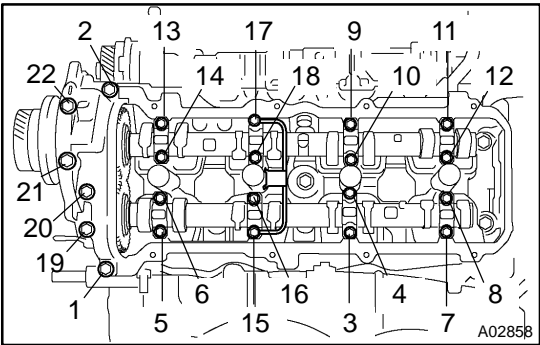
Thread diameter	6 mm
Thread pitch	1.0 mm
Bolt length	16 – 20 mm

HINT:

When removing the camshaft, make sure that the torsional spring force of the sub-gear has been eliminated by the above operation.



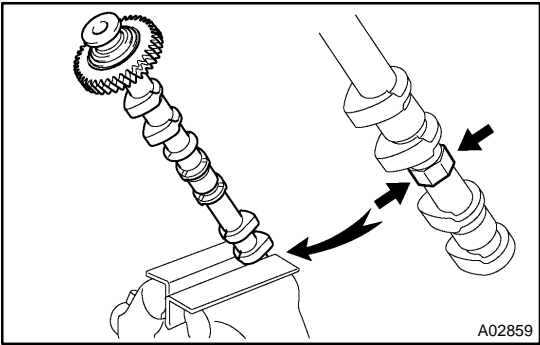
- (3) Align the timing mark (2 dot marks) of the camshaft drive gear by turning the hexagon wrench head portion of the exhaust camshaft with a wrench.



- (4) Uniformly loosen and remove the 22 bearing cap bolts in several passes, in the sequence shown.
 (5) Remove the oil feed pipe, 9 bearing caps, cam shaft timing oil control valve filter and camshafts.

HINT:

Arrange the bearing caps in correct order.

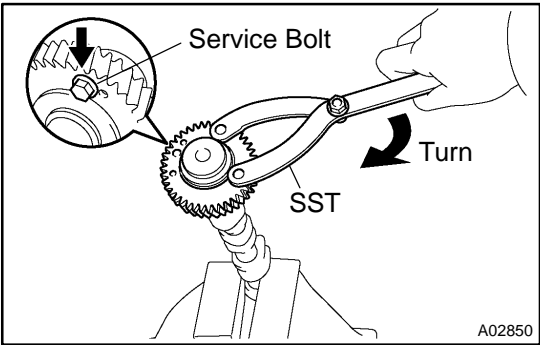


22. DISASSEMBLE EXHAUST CAMSHAFTS

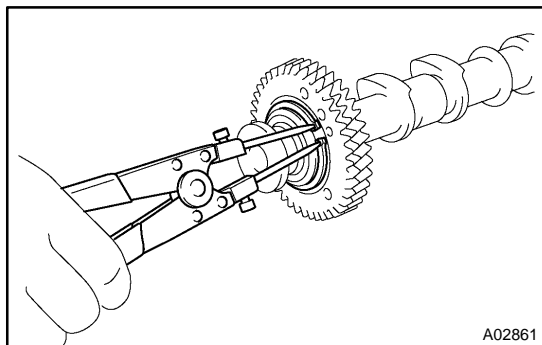
- (a) Mount the hexagon wrench head portion of the camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



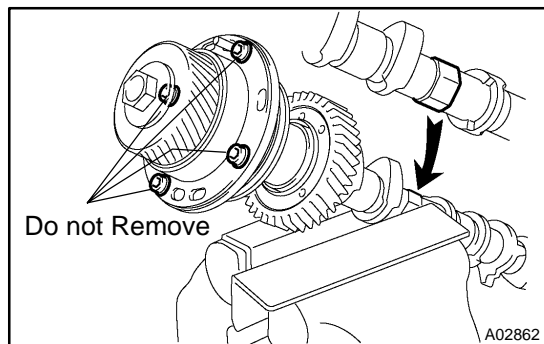
- (b) Using SST, turn the sub-gear clockwise, and remove the service bolt.
 SST 09960-10010 (09962-01000, 09963-00500)



- (c) Using snap ring pliers, remove the snap ring.
- (d) Remove the wave washer.
- (e) Remove the camshaft sub-gear.
- (f) Remove the camshaft gear spring.

HINT:

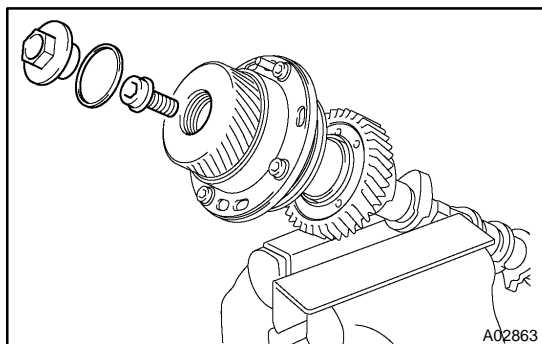
Arrange the camshaft sub-gears and gear spring (RH and LH sides).

**23. REMOVE CAM SHAFT TIMING TUBES**

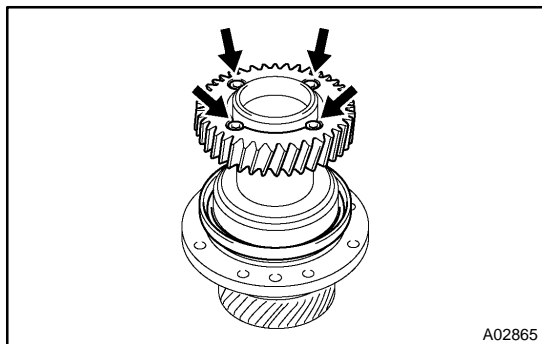
- (a) Mount the hexagon wrench head portion of the intake camshaft in a vise.

NOTICE:

- Be careful not to damage the camshaft.
- The 4 bolts shown in the illustration determine the backlash of the gear in the timing tube, so do not remove them. If any of the 4 bolts are removed, install a new camshaft timing tube assembly.



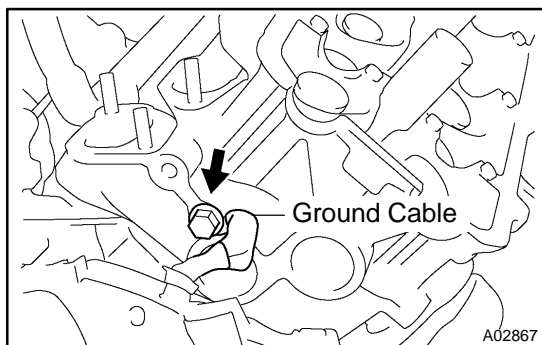
- (b) Remove the straight screw plug and seal washer.
- (c) Using a 10 mm hexagon wrench, and remove the set bolt and camshaft timing tube.



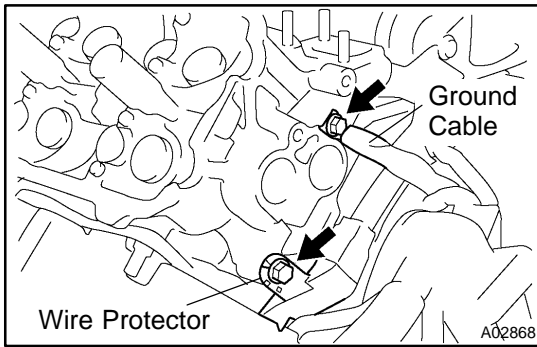
- (d) Using a 5 mm hexagon wrench, and remove the 4 bolts, camshaft drive gear and oil seal.

NOTICE:

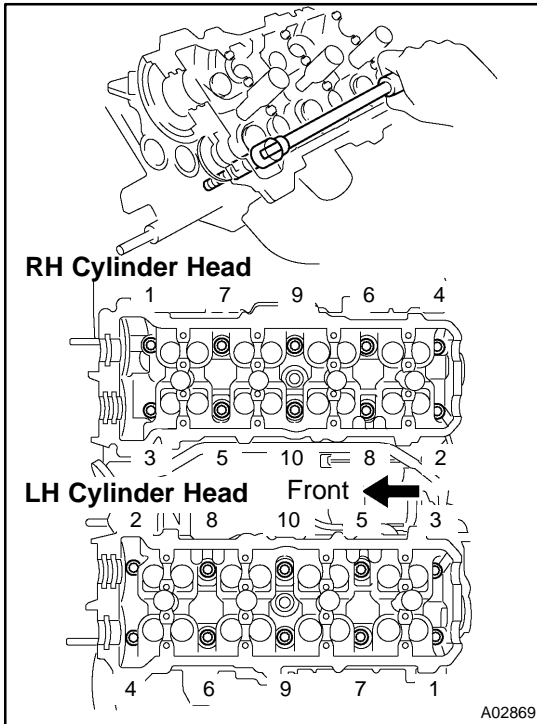
Be careful not to damage the camshaft timing tube.

24. REMOVE SPARK PLUGS**25. REMOVE CYLINDER HEAD AND EXHAUST MANIFOLD ASSEMBLIES**

- (a) Disconnect the 2 heated oxygen sensor connectors.
- (b) Remove the bolt, and disconnect the ground cable from the RH cylinder head.



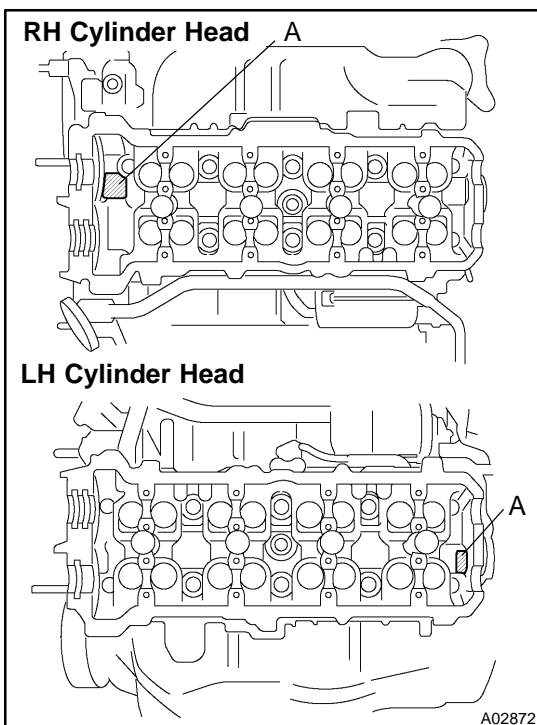
- (c) Remove the bolt, and disconnect the ground cable from the LH cylinder head.
- (d) Remove the bolt, and disconnect the engine wire protector from the LH cylinder head.



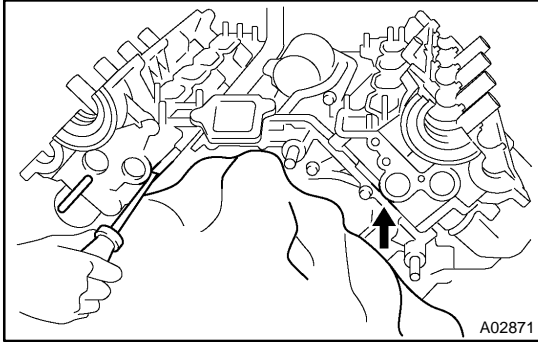
- (e) Uniformly loosen the 10 cylinder head bolts on one side of each cylinder head in several passes, in the sequence shown, then do the other side as shown. Remove the 20 cylinder head bolts and plate washers.

NOTICE:

- Cylinder head warpage or cracking could result from removing bolts in incorrect order.



- Do not drop the plate washer for cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.



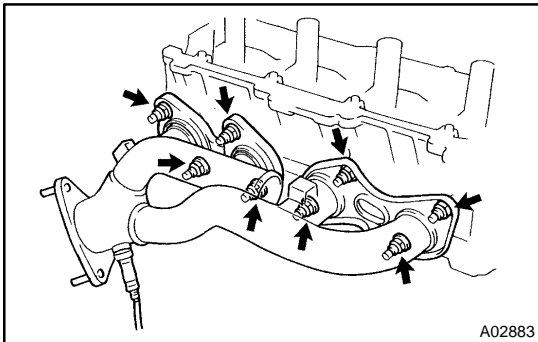
- (f) Lift the cylinder head from the dowels on the cylinder block, and place the 2 cylinder heads on wooden blocks on a bench.

HINT:

If the cylinder head is lift off, pry between the cylinder head and cylinder block with a screwdriver.

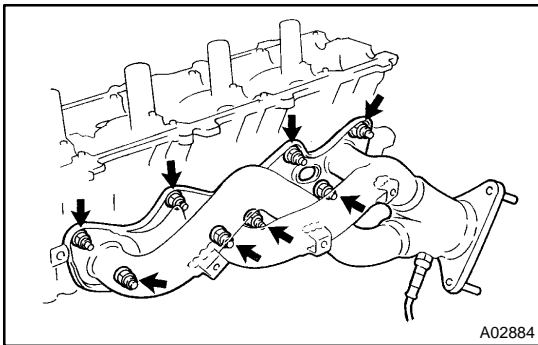
NOTICE:

- Be careful not to damage the contact surfaces of the cylinder head and cylinder block.
- The cylinder head should not be tilted so as to secure the valve lifter. If the cylinder head is tilted, remove the valve lifter and check that the adjusting shim is set correctly.



26. REMOVE RH EXHAUST MANIFOLD FROM CYLINDER HEAD

- (a) Remove the 3 bolts and heat insulator.
- (b) Remove the 8 nuts, exhaust manifold and gasket.



27. REMOVE LH EXHAUST MANIFOLD FROM CYLINDER HEAD

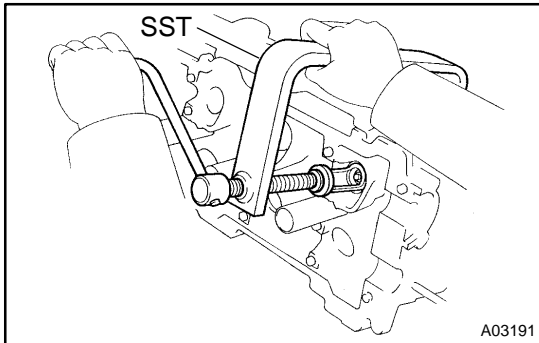
- (a) Remove the 3 bolts and heat insulator.
- (b) Remove the 8 nuts, exhaust manifold and gasket.

DISASSEMBLY

1. REMOVE VALVE LIFTERS AND SHIMS

HINT:

Arrange the valve lifters and shims in correct order.



2. REMOVE VALVES

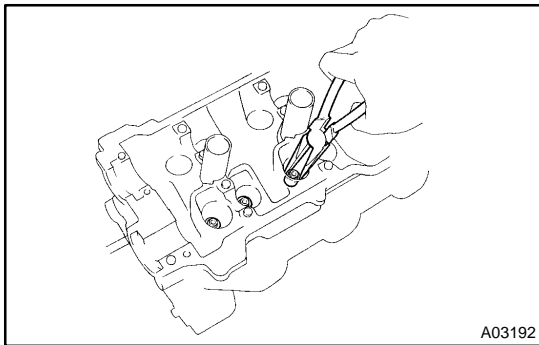
- (a) Using SST, compress the valve spring and remove the 2 keepers.

SST 09202-70020

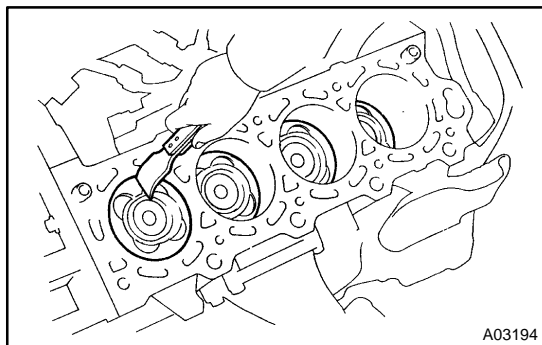
- (b) Remove the spring retainer.
(c) Remove the valve spring.
(d) Remove the valve.
(e) Remove the spring seat.

HINT:

Arrange the valves, valve springs, spring seats and spring retainers incorrect order.



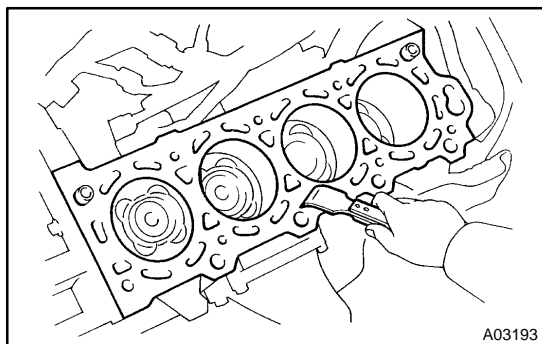
- (f) Using needle-nose pliers, remove the oil seal.



INSPECTION

1. CLEAN TOP SURFACES OF PISTONS AND CYLINDER BLOCK

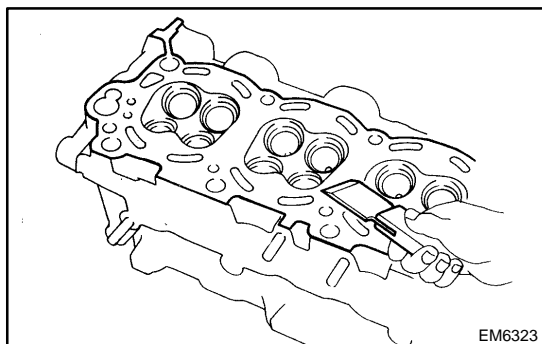
- (a) Turn the crankshaft, and bring each piston to top dead center (TDC). Using a gasket scraper, remove all the carbon from the piston top surface.



- (b) Using a gasket scraper, remove all the gasket material from the cylinder block surface.
- (c) Using compressed air, blow carbon and oil from the bolt holes.

CAUTION:

Protect your eyes when using high pressure compressed air.

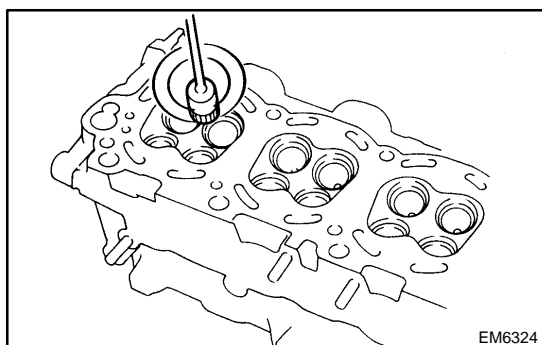


2. REMOVE GASKET MATERIAL

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 surface.

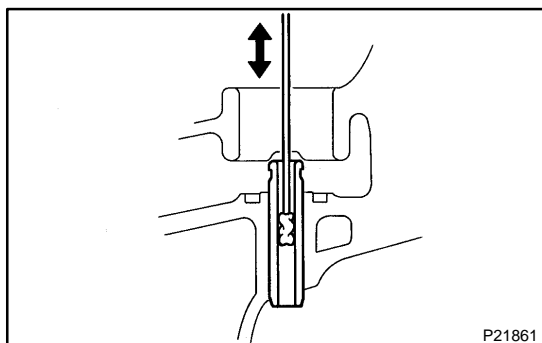


3. CLEAN COMBUSTION CHAMBERS

Using a wire brush, remove all the carbon from the combustion chambers.

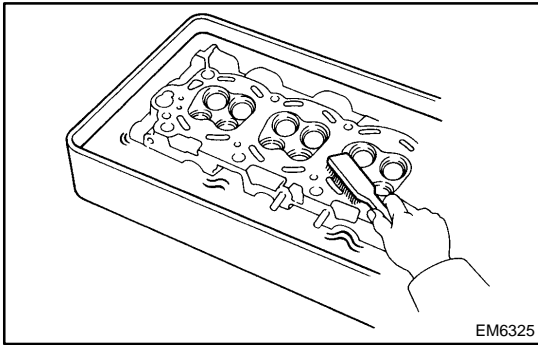
NOTICE:

Be careful not to scratch the cylinder block contact surface.



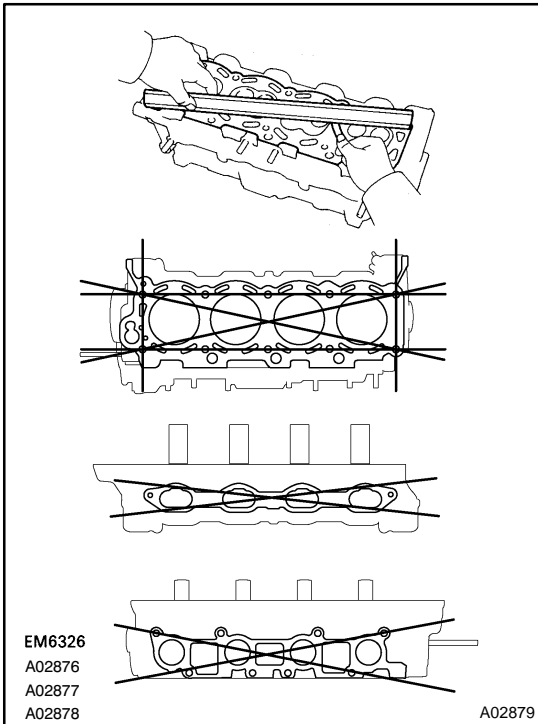
4. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide bushing brush and solvent, clean all the guide bushings.



5. CLEAN CYLINDER HEAD

Using a soft brush and solvent, thoroughly clean the cylinder head.

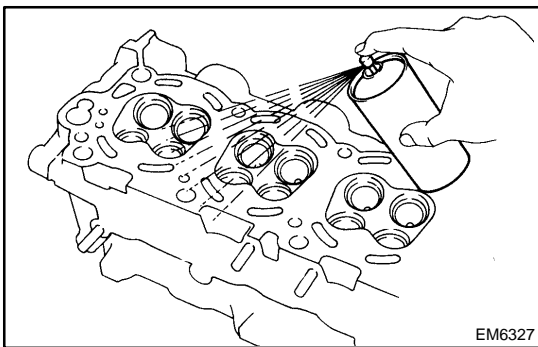


6. INSPECT FOR FLATNESS

Using a precision straight edge and feeler gauge, measure the surfaces contacting the cylinder block and the manifolds for warpage.

Maximum warpage: 0.10 mm (0.0039 in.)

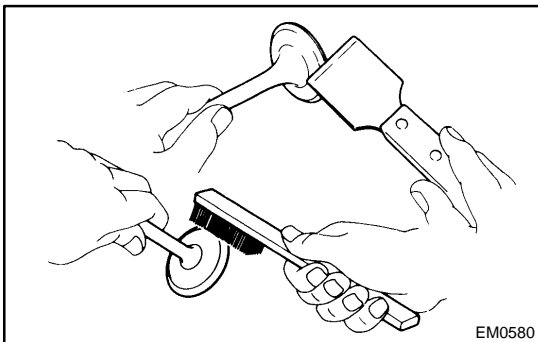
If warpage is greater than maximum, replace the cylinder head.



7. INSPECT FOR CRACKS

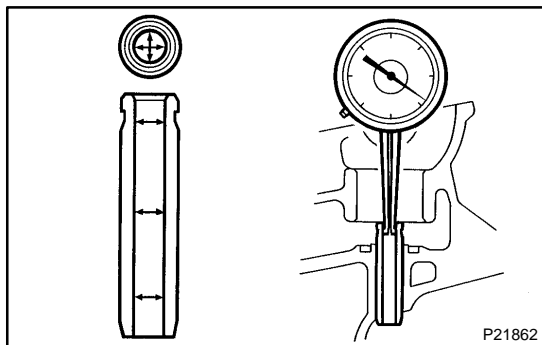
Using a dye penetrant, check the combustion chamber, intake ports, exhaust ports and cylinder block surface for cracks.

If cracked, replace the cylinder head.



8. CLEAN VALVES

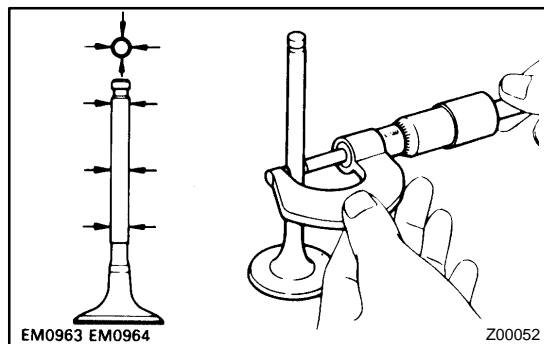
- (a) Using a gasket scraper, chip off any carbon from the valve head.
- (b) Using a wire brush, thoroughly clean the valve.

**9. INSPECT VALVE STEMS AND GUIDE BUSHINGS**

- (a) Using a caliper gauge, measure the inside diameter of the guide bushing.

Bushing inside diameter:

5.510 – 5.530 mm (0.2169 – 0.2177 in.)



- (b) Using a micrometer, measure the diameter of the valve stem.

Valve stem diameter:

Intake	5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Exhaust	5.465 – 5.480 mm (0.2152 – 0.2157 in.)

- (c) Subtract the valve stem diameter measurement from the guide bushing inside diameter measurement.

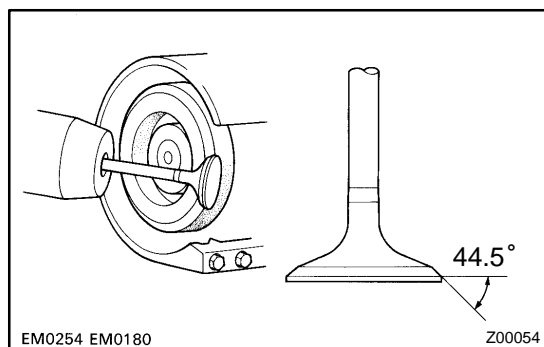
Standard oil clearance:

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:

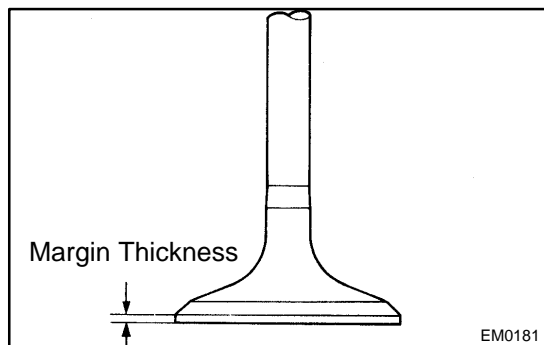
Intake	0.08 mm (0.0031 in.)
Exhaust	0.10 mm (0.0039 in.)

If the clearance is greater than maximum, replace the valve and guide bushing. (See Page [EM-54](#))

**10. 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°

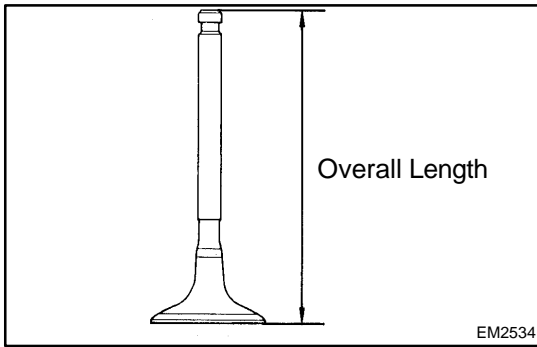


- (c) Check the valve head margin thickness.

Margin thickness:

Standard	1.0 mm (0.039 in.)
Minimum	0.5 mm (0.020 in.)

If the margin thickness is less than minimum, replace the valve.



- (d) Check the valve overall length.

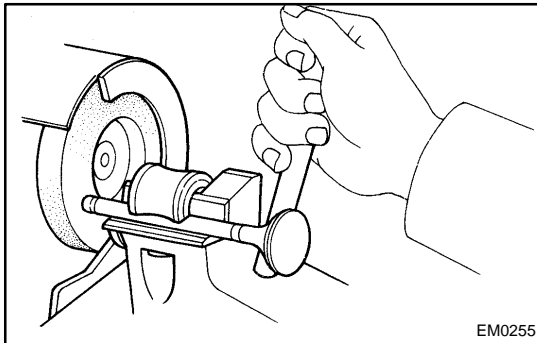
Standard overall length:

Intake	95.05 mm (3.7421 in.)
Exhaust	95.10 mm (3.7441 in.)

Minimum overall length:

Intake	94.55 mm (3.7224 in.)
Exhaust	94.60 mm (3.7244 in.)

If the overall length is less than minimum, replace the valve.

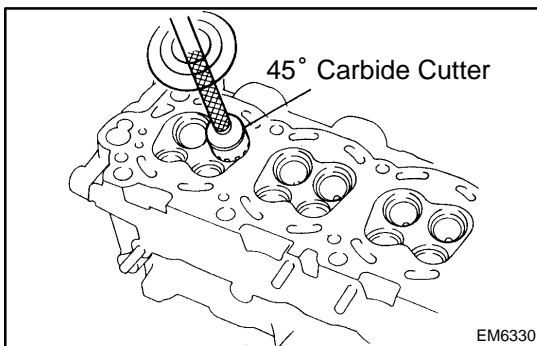


- (e) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resurface the tip with a grinder or replace the valve.

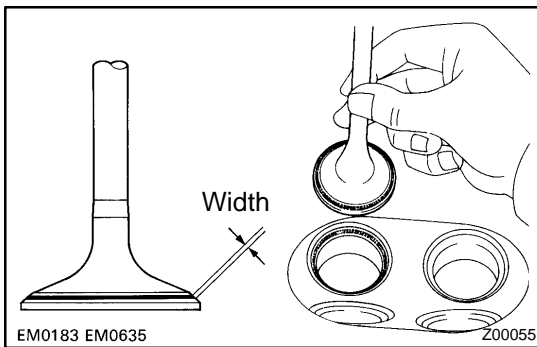
NOTICE:

Do not grind off more than minimum.



11. 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 light coat of prussian blue (or white lead) to the valve face. Lightly press the valve against the seat. Do not rotate valve.

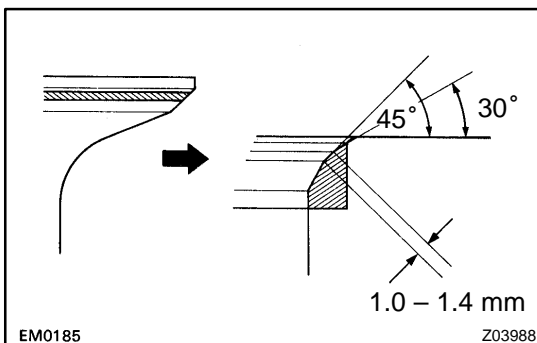
- (c) Check the valve face and seat for the following:

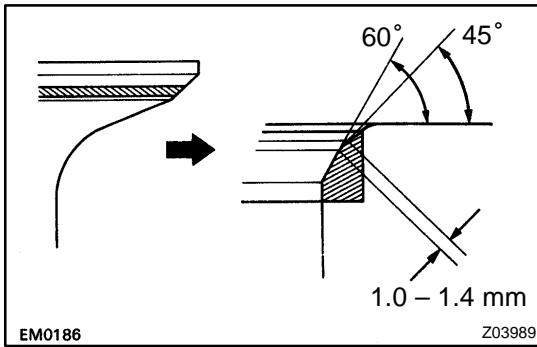
- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360° around the valve seat, the guide and face are concentric. If not, resurface the seat.
- Check that the seat contact is in the middle of the valve face with the following width:

1.0 – 1.4 mm (0.039 – 0.055 in.)

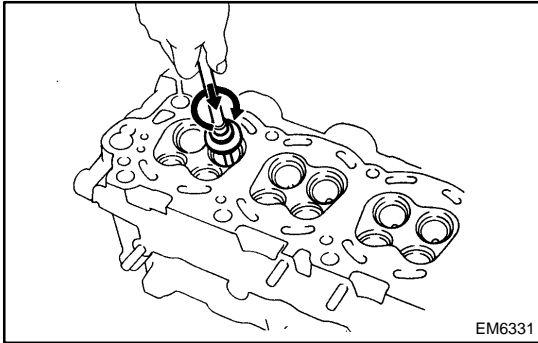
If not, correct the valve seats as follows:

- If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

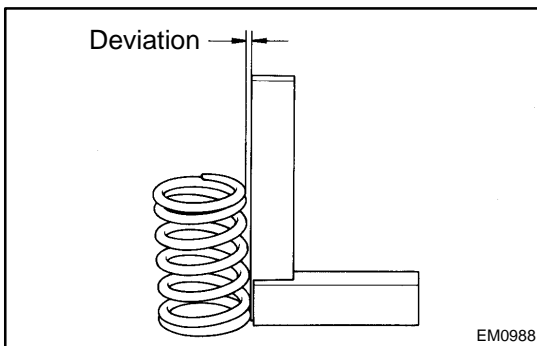




- If the seating is too low on the valve face, use 60° and 45° cutters to correct the seat.



- Hand-lap the valve and valve seat with an abrasive compound.
- After hand-lapping, clean the valve and valve seat.

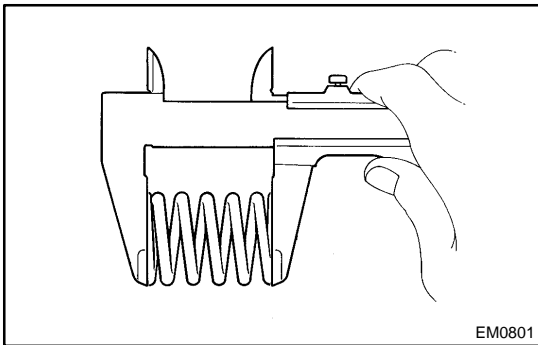


12. INSPECT VALVE SPRINGS

- Using a steel square, measure the deviation of the valve spring.

Maximum deviation: 2.0 mm (0.079 in.)

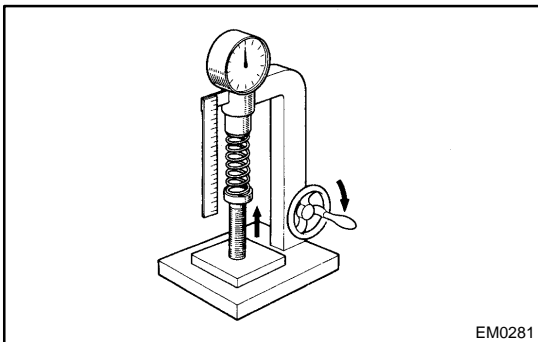
If the deviation is greater than maximum, replace the valve spring.



- Using vernier calipers, measure the free length of the valve spring.

Free length: 54.05 – 54.15 mm (2.1279 – 2.1319 in.)

If the free length is not as specified, replace the valve spring.



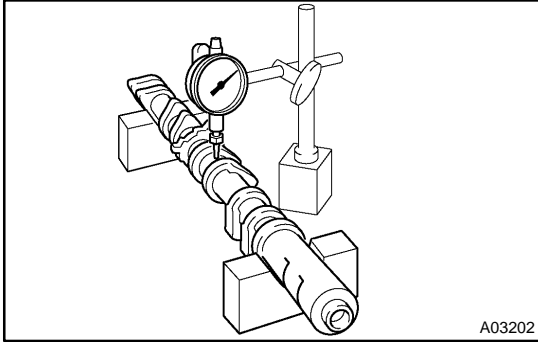
- Using a spring tester, measure the tension of the valve spring at the specified installed length.

Installed tension:

204 – 226 N (20.8 – 23.0 kgf, 45.9 – 50.7 lbf)

at 35.0 mm (1.378 in.)

If the installed tension is not as specified, replace the valve spring.

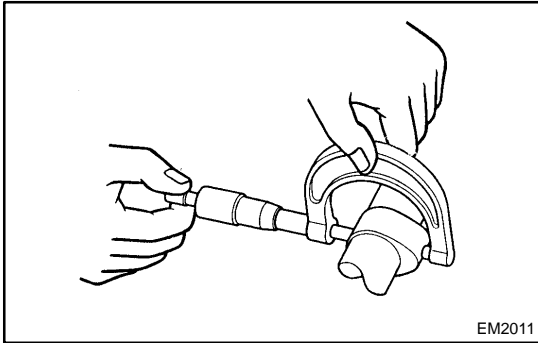


13. INSPECT CAMSHAFT FOR RUNOUT

- Place the camshaft on V-blocks.
- Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.08 mm (0.0031 in.)

If the circle runout is greater than maximum, replace the camshaft.



14. INSPECT CAM LOBES

Using a micrometer, measure the cam lobe height.

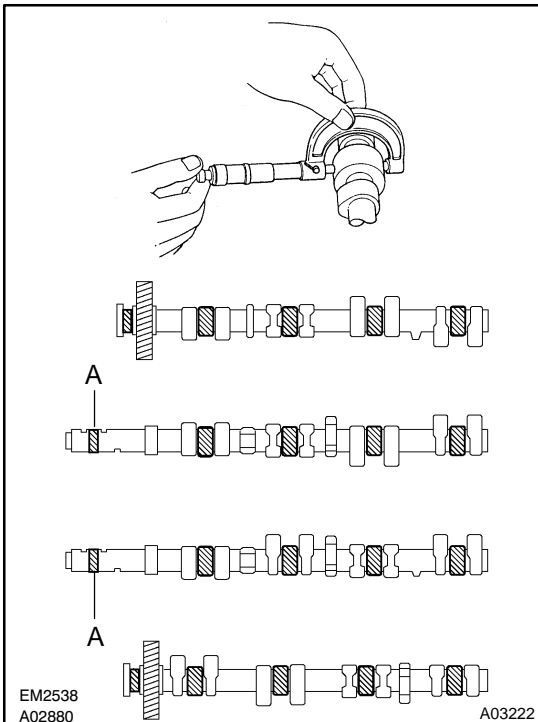
Standard cam lobe height:

Intake	42.610 – 42.710 mm (1.6776 – 1.6815 in.)
Exhaust	42.630 – 42.730 mm (1.6783 – 1.6823 in.)

Minimum cam lobe height:

Intake	42.46 mm (1.6717 in.)
Exhaust	42.48 mm (1.6724 in.)

If the cam lobe height is less than minimum, replace the camshaft.



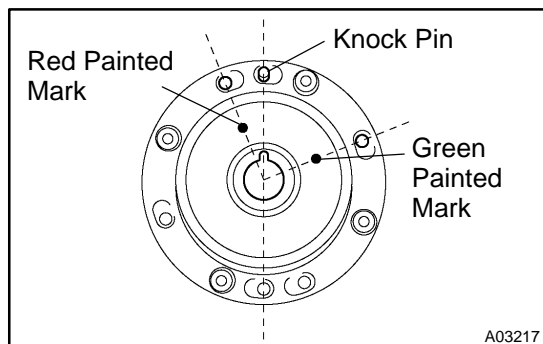
15. INSPECT CAMSHAFT JOURNALS

Using a micrometer, measure the journal diameter.

Journal diameter:

Intake camshaft (A)	30.984 – 31.000 mm (1.2198 – 1.2205 in.)
Others	26.954 – 26.970 mm (1.0612 – 1.0618 in.)

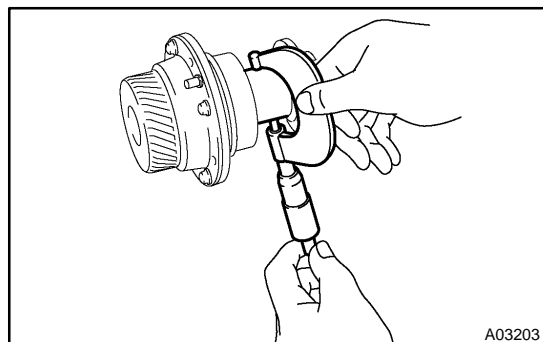
If the journal diameter is not as specified, check the oil clearance.



16. INSPECT CAMSHAFT TIMING TUBE JOURNALS

HINT:

There are 2 size of the camshaft timing tube journal diameter, green and red painted mark accordingly. The mark is painted on the face of the camshaft timing tube.

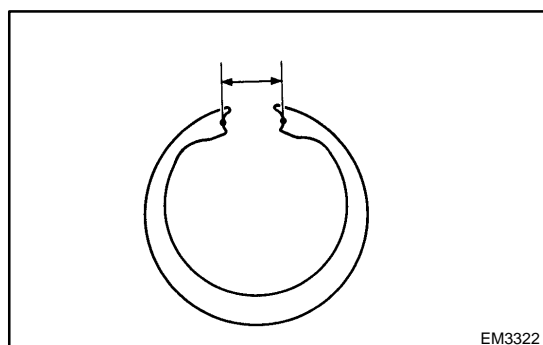


Using a micrometer, measure the journal diameter.

Journal diameter:

Green painted mark	39.958 – 39.964 mm (1.5731 – 1.5734 in.)
Red painted mark	39.964 – 39.970 mm (1.5734 – 1.5736 in.)

If the journal diameter is not as specified, check the oil clearance.



17. INSPECT CAMSHAFT GEAR SPRING

Using vernier calipers, measure the free distance between the spring ends.

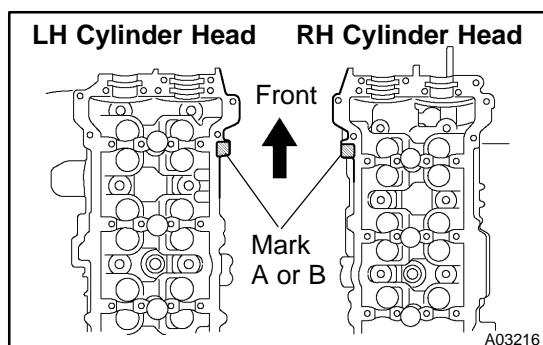
Free distance: 18.2 – 18.8 mm (0.712 – 0.740 in.)

If the free distance is not as specified, replace the gear spring.

18. INSPECT CAMSHAFT BEARINGS

Check that bearings for flaking and scoring.

If the bearings are damaged, replace the bearing caps and cylinder head as a set.

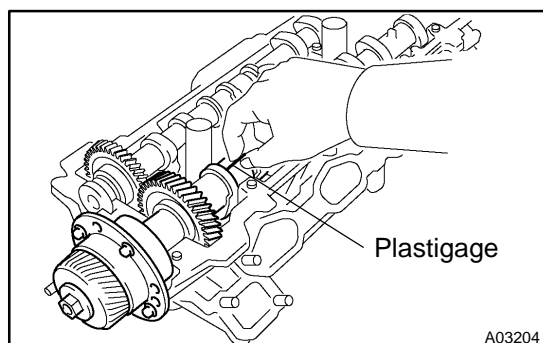


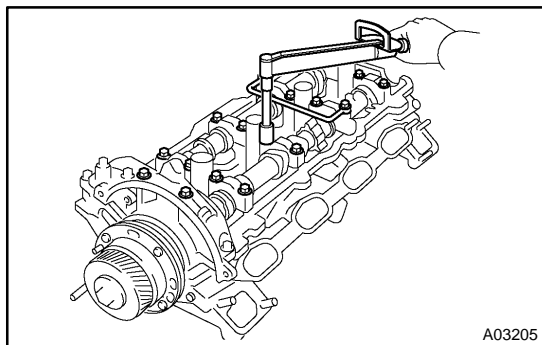
19. INSPECT CAMSHAFT TIMING TUBE AND CAMSHAFT JOURNAL OIL CLEARANCE

HINT:

There are 2 size of the camshaft timing tube journal oil clearance, Marked "A" and "B" accordingly. The mark is stamped on the top of the cylinder heads.

- Install the camshaft timing tube. (See page [EM-58](#))
- Clean the bearing caps and camshaft journals.
- Place the camshafts on the cylinder head.
- Lay a strip of Plastigage across each of the camshaft journals.





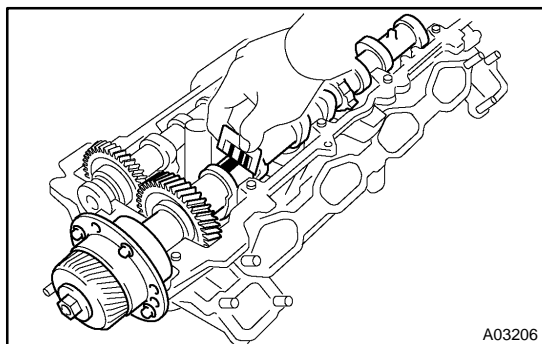
- (e) Install the bearing caps. (See page [EM-58](#))

Torque: 16 N·m (160 kgf-cm, 12 ft-lbf)

NOTICE:

Do not turn the camshaft.

- (f) Remove the bearing caps.



- (g) Measure the Plastigage at its widest point.

Standard Oil clearance:

Camshaft timing tube Mark "A"	0.036 – 0.050 mm (0.0014 – 0.0020 in.)
Camshaft timing tube Mark "B"	0.038 – 0.052 mm (0.0015 – 0.0021 in.)
Others	0.030 – 0.067 mm (0.0012 – 0.0026 in.)

Maximum oil clearance:

Camshaft timing tube	0.085 mm (0.0033 in.)
Others	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.

- (h) Completely remove the plastigage.
(i) Remove the camshafts.
(j) Remove the camshaft timing tube.

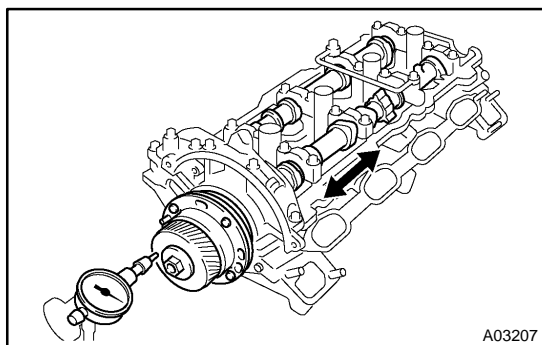
20. IF NECESSARY REPLACE CAMSHAFT TIMING TUBE

Select a camshaft timing tube according to mark on the cylinder head.

Cylinder Head	Camshaft timing tube
Mark "A"	Green painted mark
Mark "B"	Red painted mark

21. INSPECT CAMSHAFT THRUST CLEARANCE

- (a) Install the camshaft timing tube. (See page [EM-58](#))
(b) Install the camshaft. (See page [EM-58](#))



- (c) Using a dial indicator, measure the thrust clearance while moving the camshaft back and forth.

Standard thrust clearance:

Intake	0.060 – 0.100 mm (0.0024 – 0.0039 in.)
Exhaust	0.040 – 0.090 mm (0.0016 – 0.0035 in.)

Maximum thrust clearance:

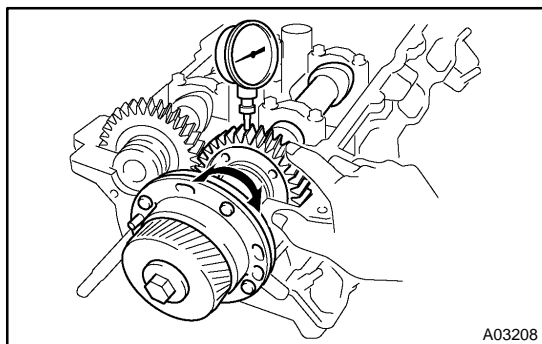
Intake	0.13 mm (0.0051 in.)
Exhaust	0.12 mm (0.0047 in.)

If the thrust clearance is greater than maximum, replace the camshaft. If necessary, replace the bearing caps and cylinder head as a set.

- (d) Remove the camshafts.
- (e) Remove the camshaft timing tube.

22. INSPECT CAMSHAFT GEAR BACKLASH

- (a) Install the camshaft timing tube. (See page [EM-58](#))
- (b) Install the camshafts without installing the exhaust cam sub-gear and front bearing cap. (See page [EM-58](#))



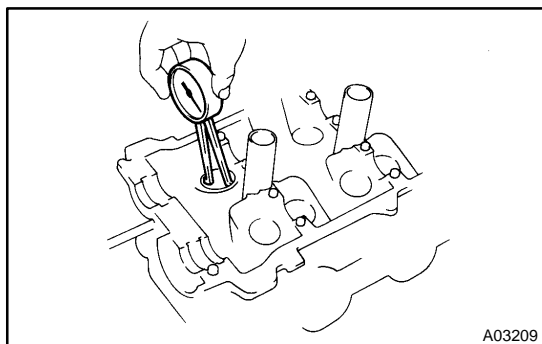
- (c) Using a dial indicator, measure the backlash.

Backlash:

Standard	0.020 – 0.200 mm (0.0008 – 0.0079 in.)
Maximum	0.30 mm (0.0188 in.)

If the backlash is greater than maximum, replace the camshafts.

- (d) Remove the camshafts.

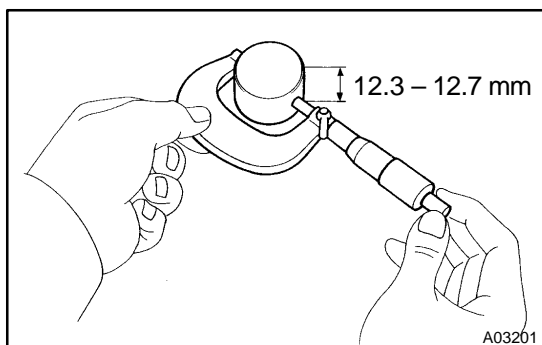


23. INSPECT VALVE LIFTERS AND LIFTER BORES

- (a) Using a caliper gauge, measure the lifter bore diameter of the cylinder head.

Lifter bore diameter:

31.000 – 31.016 mm (1.2205 – 1.2211 in.)



- (b) Using a micrometer, measure the lifter diameter at the valve lifter center line, 12.3 – 12.7 mm (0.484 – 0.500 in.) from the valve lifter head.

Lifter diameter:

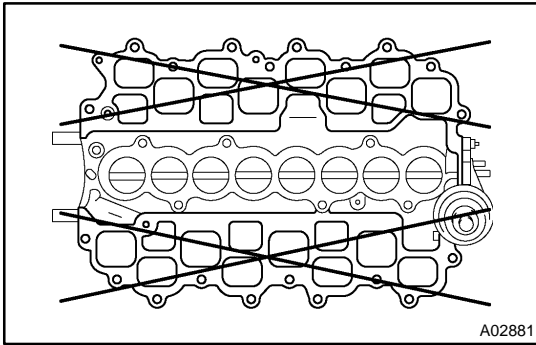
30.966 – 30.976 mm (1.2191 – 1.2195 in.)

- (c) Subtract the lifter diameter measurement from the lifter bore diameter measurement.

Standard oil clearance:

Standard	0.024 – 0.050 mm (0.0009 – 0.0020 in.)
Maximum	0.07 mm (0.0028 in.)

If the oil clearance is greater than maximum, replace the lifter. If necessary, replace the cylinder head.



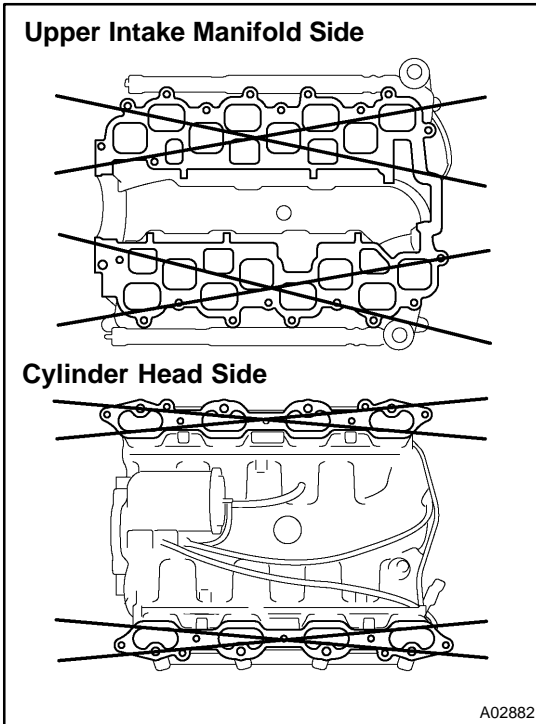
24. INSPECT INTAKE MANIFOLD

(a) Upper intake manifold:

Using a precision straight edge and feeler gauge, measure the surface contacting the lower intake manifold for warpage.

Maximum warpage: 0.15 mm (0.0059 in.)

If warpage is greater than maximum, replace the upper intake manifold.

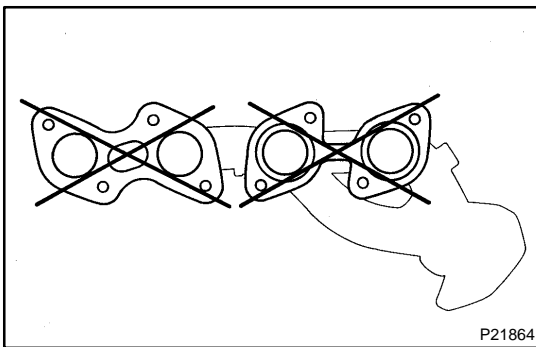


(b) Lower intake manifold:

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head and upper intake manifold for warpage.

Maximum warpage: 0.15 mm (0.0059 in.)

If warpage is greater than maximum, replace the lower intake manifold.

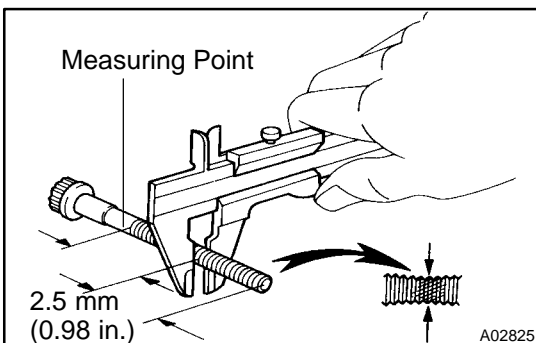


25. INSPECT EXHAUST MANIFOLD

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head for warpage.

Maximum warpage: 0.50 mm (0.0197 in.)

If warpage is greater than maximum, replace the manifold.



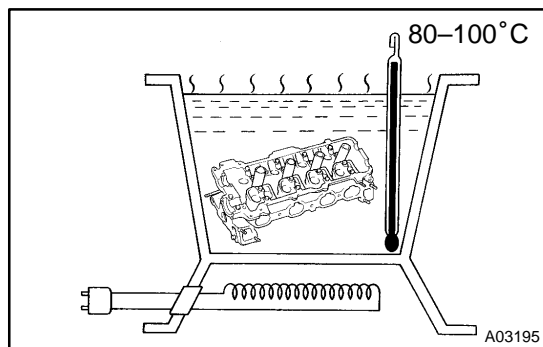
26. INSPECT CYLINDER HEAD BOLTS

Using vernier calipers, measure the thread outside diameter of the bolt.

Outside diameter:

Standard	9.770 – 9.960 mm (0.3846 – 0.3921 in.)
Minimum	9.60 mm (0.3780 in.)

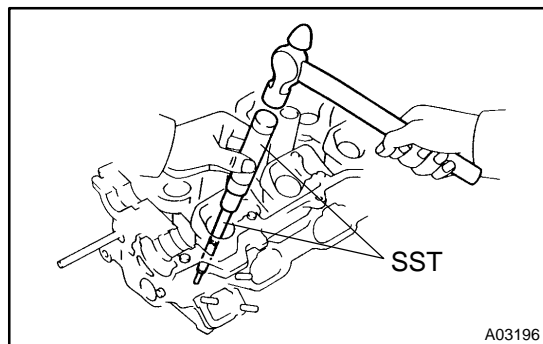
If the diameter is less than minimum, replace the bolt.



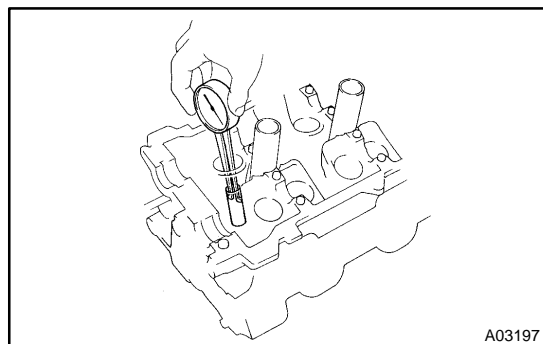
REPLACEMENT

1. REPLACE VALVE GUIDE BUSHINGS

- (a) Gradually heat the cylinder head to 80 – 100°C (176 – 212°F).



- (b) Using SST and a hammer, tap out the guide bushing.
SST 09201-01055, 09950-70010 (09951-07100)



- (c) Using a caliper gauge, measure the bushing bore diameter of the cylinder head.

Both intake and exhaust

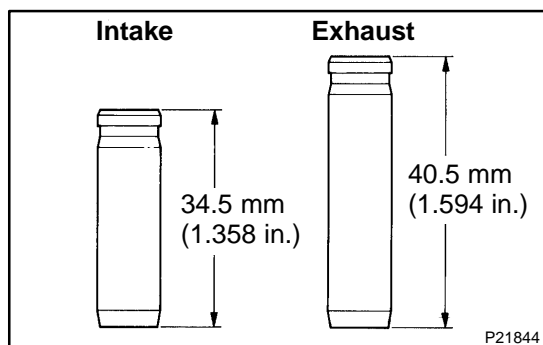
Bushing bore diameter mm (in.)	Bushing size
10.285 – 10.306 (0.4049 – 0.4057)	Use STD
10.335 – 10.356 (0.4069 – 0.4077)	Use O/S STD

- (d) Select a new guide bushing (STD or O/S 0.05).

If the bushing bore diameter of the cylinder head is greater than 10.306 mm (0.4057 in.), machine the bushing bore to the following dimension:

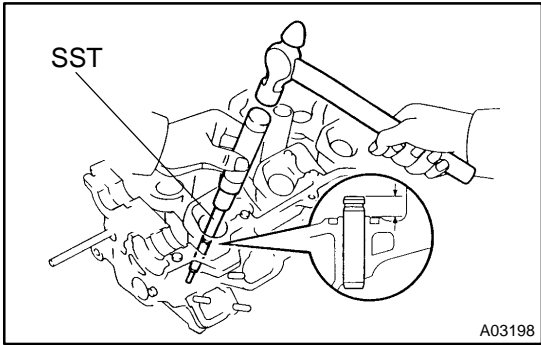
10.335 – 10.356 mm (0.4069 – 0.4077 in.)

If the bushing bore diameter of the cylinder head is greater than 10.356 mm (0.4077 in.), replace the cylinder head.



HINT:

Different the bushings are used for the intake and exhaust.

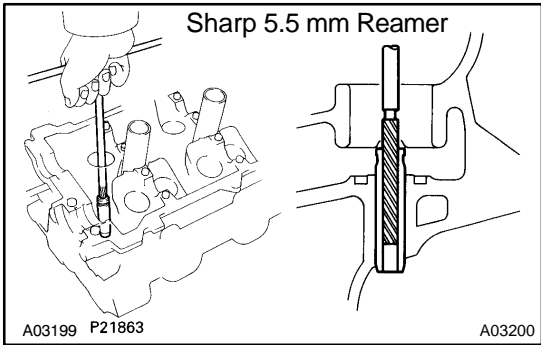


- (e) Gradually heat the cylinder head to 80 – 100°C (176 – 212°F).
- (f) Using SST and a hammer, tap in a new guide bushing to the specified protrusion height.

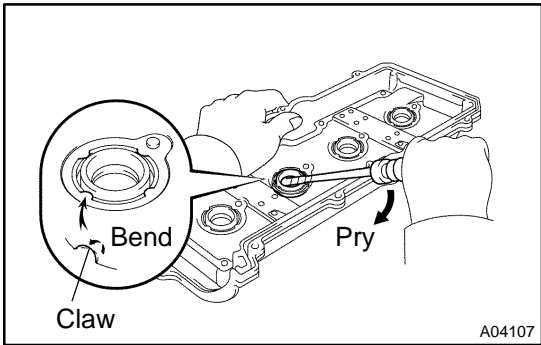
Protrusion height:

Intake	9.2 – 9.8 mm (0.362 – 0.386 in.)
Exhaust	8.2 – 8.8 mm (0.323 – 0.346 in.)

SST 09201-01055, 09950-70010 (09951-07100)



- (g) Using a sharp 5.5 mm reamer, ream the guide bushing to obtain the standard specified clearance (See page [EM-44](#)) between the guide bushing and valve stem.

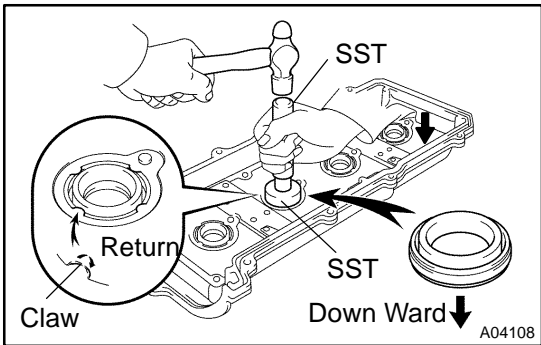


2. REPLACE SPARK PLUG TUBE GASKETS

- (a) Bend the 4 ventilation case claw installed on the cylinder head cover to an angle of 90° or more.
- (b) Using a screwdriver, pry out the gasket.

NOTICE:

Be careful not to damage the cylinder head cover, Tape the screwdriver tip.



- (c) Using SST and a hammer, tap in a new gasket until its surface is flush with the upper edge of the cylinder head cover.

SST 09950-60010 (09551-00240, 09951-00440, 09952-06010), 09950-70010 (09951-07100)

NOTICE:

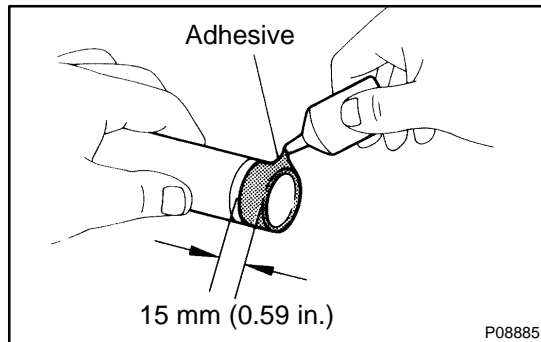
Be careful of the installation direction.

- (d) Apply a light coat of MP grease to the gasket lip.
- (e) Return the ventilation case claw to its original position.

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

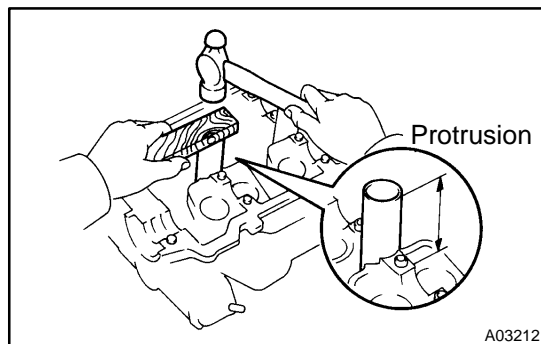
HINT:

When using a new cylinder head, spark plug tubes must be installed.

- (a) Apply adhesive to the end of the spark plug tube.

Adhesive:

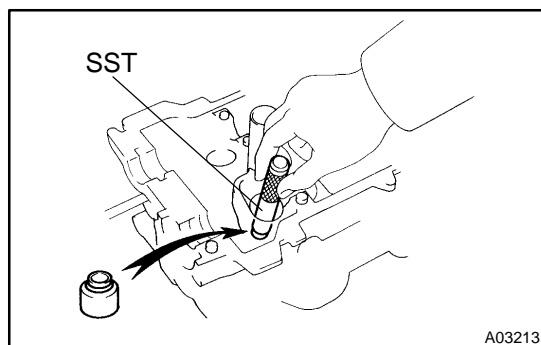
Part No. 08833-00070, THREE BOND 1324 or equivalent



- (b) Using a wooden block and hammer, tap in a new spark tube until there is 48.4 – 49.6 mm (1.906 – 1.953 in.) protruding from the camshaft bearing cap installation surface of the cylinder head.

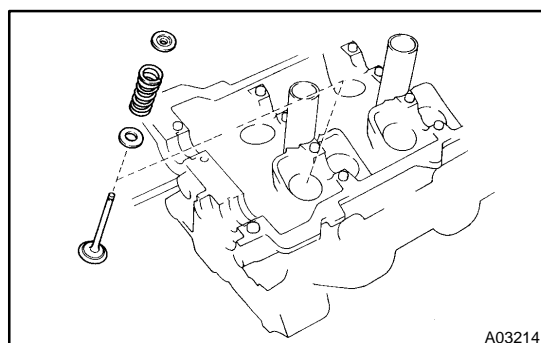
NOTICE:

Avoid tapping a new spark plug tube in too far by measuring the amount of the protrusion while tapping.

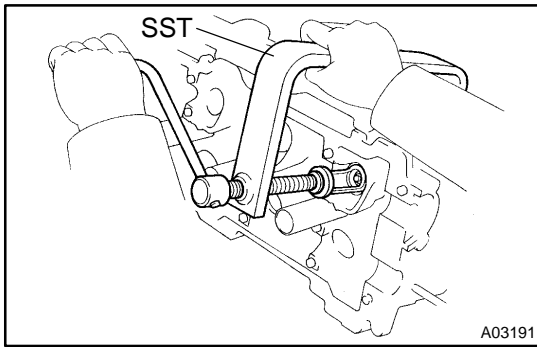


2. INSTALL VALVES

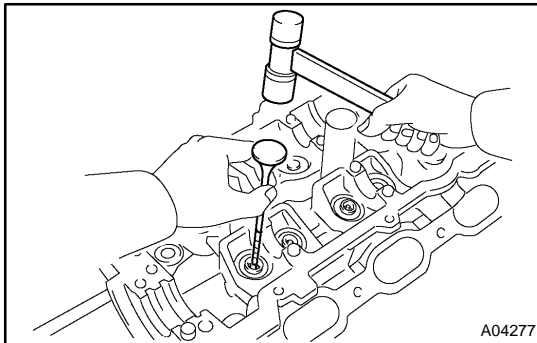
- (a) Using SST, push in a new oil seal.
SST 09201-41020



- (b) Install the valve.
(c) Install the spring seat.
(d) Install the valve spring.
(e) Install the spring retainer.



- (f) Using SST, compress the valve spring and place the 2 keepers around the valve stem.
SST 09202-70020



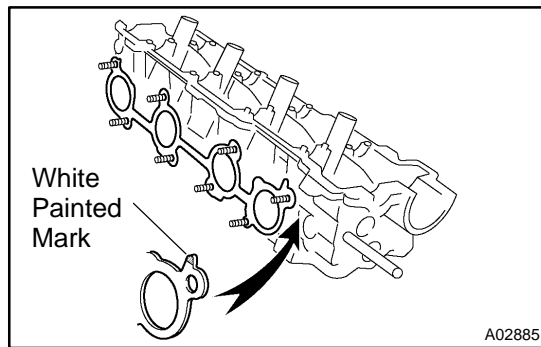
- (g) Using a plastic-faced hammer and the valve stem (not in use) tip wound with vinyl tape, lightly tap the valve stem tip to assure proper fit.

NOTICE:

Be careful not to damage the valve stem tip.

3. INSTALL SHIMS AND VALVE LIFTERS

- (a) Install the shim and valve lifter.
(b) Check that the valve lifter rotates smoothly by hand.



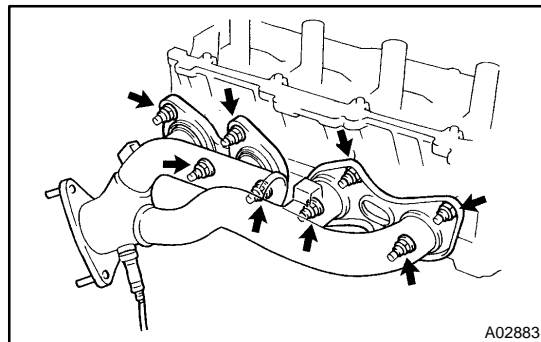
INSTALLATION

1. INSTALL RH EXHAUST MANIFOLD TO CYLINDER HEAD

- (a) Place a new gasket on the cylinder head with the white painted marks facing the manifold side.

NOTICE:

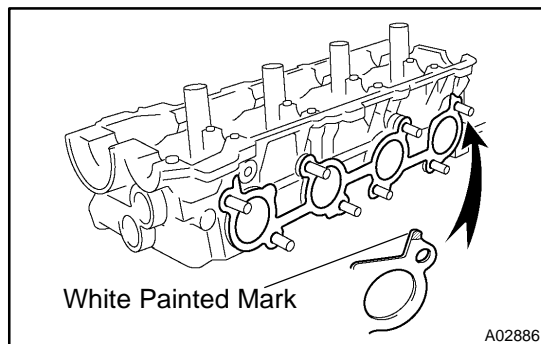
Be careful of the installation direction.



- (b) Install the exhaust manifold with 8 new nuts. Uniformly tighten the nuts in several passes.

Torque: 44 N·m (450 kgf-cm, 32 ft-lbf)

- (c) Install the heat insulator with the 3 bolts.

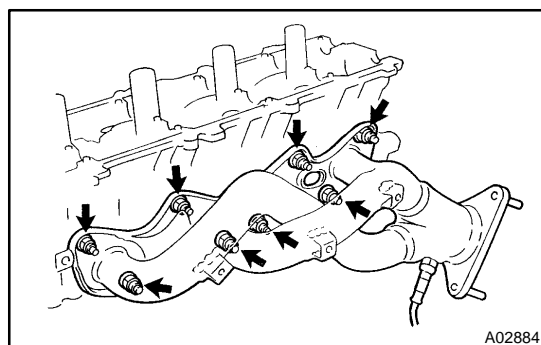


2. INSTALL LH EXHAUST MANIFOLD TO CYLINDER HEAD

- (a) Place a new gasket on the cylinder head with the white painted marks facing the manifold side.

NOTICE:

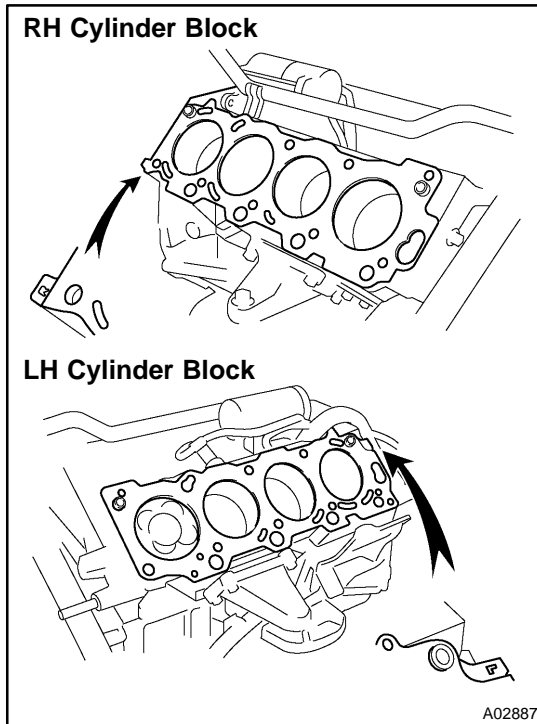
Be careful of the installation direction.



- (b) Install the exhaust manifold with 8 new nuts. Uniformly tighten the nuts in several passes.

Torque: 44 N·m (450 kgf-cm, 32 ft-lbf)

- (c) Install the heat insulator with the 3 bolts.



3. PLACE CYLINDER HEAD ON CYLINDER BLOCK

- (a) Place 2 new cylinder head gaskets in position on the cylinder block.

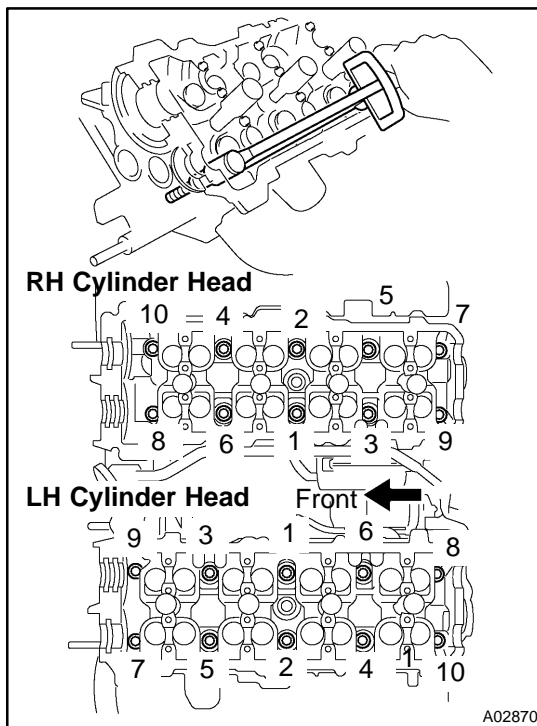
HINT:

On the rear side of the cylinder head gasket are marks to distinguish the LH and RH banks, a "R" mark for the RH bank and a "L" mark for the LH bank.

NOTICE:

Be careful of the installation direction.

- (b) Place the 2 cylinder heads in position on the cylinder head gaskets.



4. INSTALL CYLINDER HEAD BOLTS

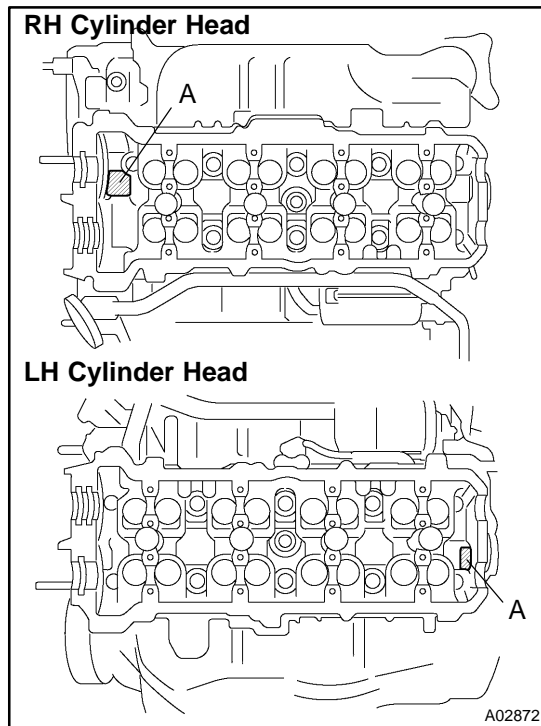
HINT:

- The cylinder head bolts are tightened in 2 progressive steps (steps (c) and (e)).
- If any cylinder head bolt is broken or deformed, replace it.

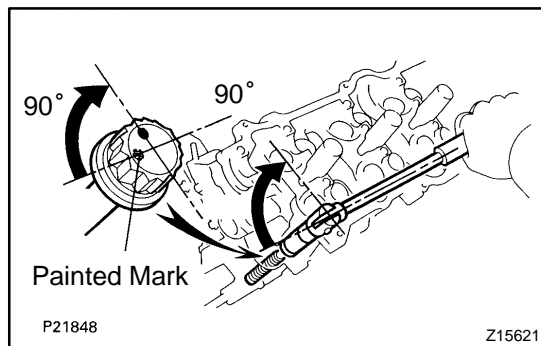
- (a) Apply a light coat of engine oil on the threads and under the heads of the cylinder head bolts.
- (b) Install the plate washer to the cylinder head bolt.
- (c) Install and uniformly tighten the 10 cylinder head bolts on one side of the cylinder head in several passes in the sequence shown, then do the other side as shown.

Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

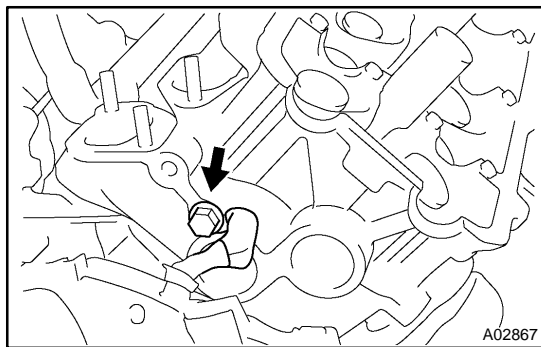
If any one of the cylinder head bolts does not meet the torque specification, replace the cylinder head bolt.

**NOTICE:**

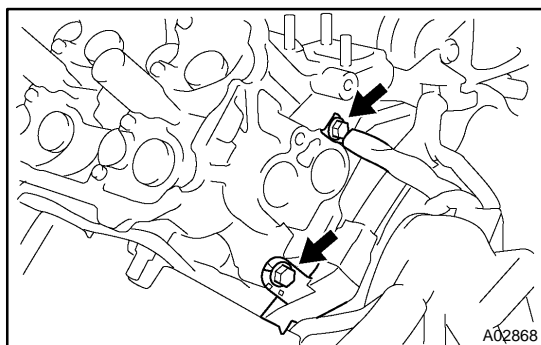
Do not drop the plate washer for cylinder head bolt into portion A of the cylinder head. If dropped into portion A, the plate washer will pass through the cylinder head and cylinder block into the oil pan.



- (d) Mark the front of the cylinder head bolt head with paint.
- (e) Retighten the cylinder head bolts by 90° in the numerical order shown.
- (f) Check that the painted mark is now at a 90° angle to front.

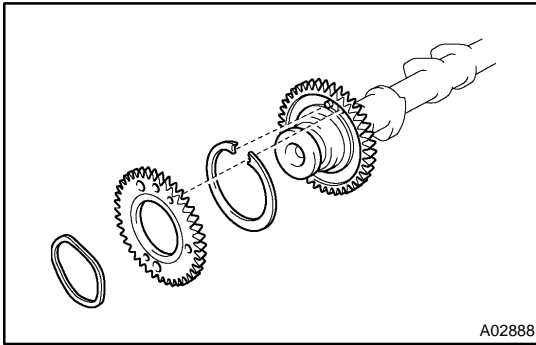
**5. INSTALL ENGINE WIRE**

- (a) Install the ground cable to RH cylinder head with the bolt.



- (b) Install the engine wire protector to the LH cylinder head with the bolt.
- (c) Install the ground cable to LH cylinder head with the bolt.
- (d) Connect the 2 heated oxygen sensor connectors.

6. INSTALL SPARK PLUGS



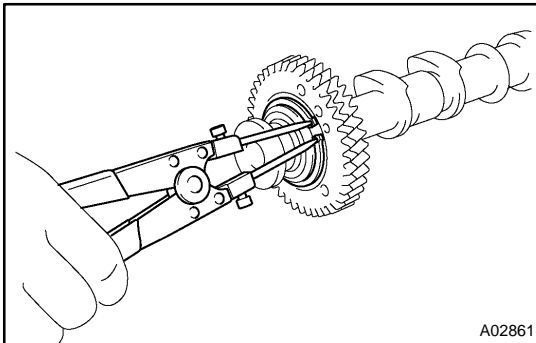
7. ASSEMBLE EXHAUST CAMSHAFT

- (a) Install the camshaft gear spring.
- (b) Install the camshaft sub-gear.

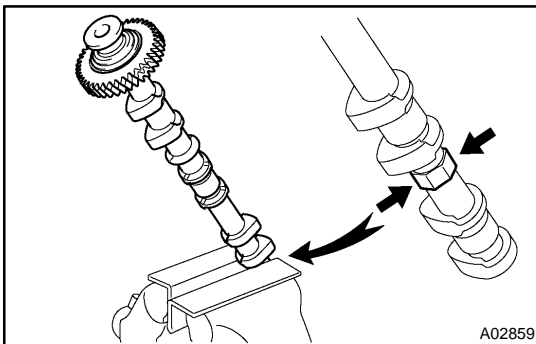
HINT:

Attach the pins on the gears to the gear spring ends.

- (c) Install the wave washer.



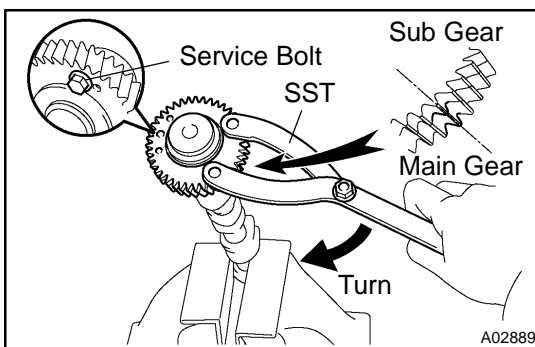
- (d) Using snap ring pliers, install the snap ring.



- (e) Mount the hexagon wrench head portion of the camshaft in a vise.

NOTICE:

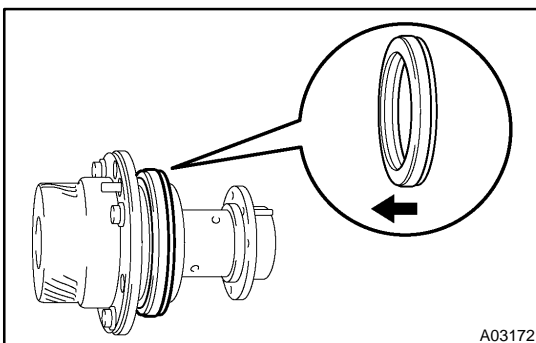
Be careful not to damage the camshaft.



- (f) Using SST, align the holes of the camshaft main gear and sub-gear by turning camshaft sub-gear counterclockwise, and temporarily install a service bolt.

SST 09960-10010 (09962-01000, 09963-00500)

- (g) Align the gear teeth of the main gear and sub-gear, and tighten the service bolt.

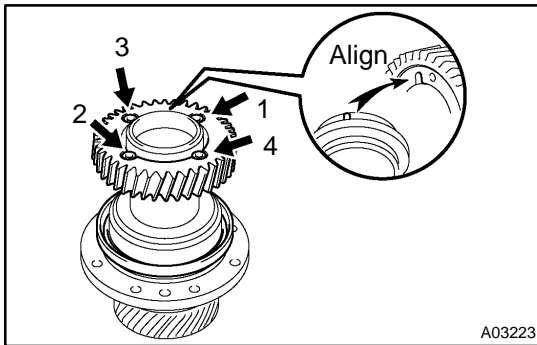


8. INSTALL CAMSHAFT TIMING TUBES

- (a) Place a new oil seal to the timing tube.

NOTICE:

Be careful installation direction.

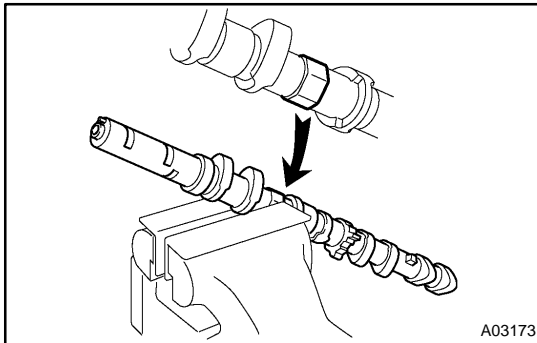


- (b) Align the timing tube knock pin with the knock pin groove of the camshaft drive gear, and temporarily install the camshaft drive gear with the 4 bolts.
- (c) Using a 5 mm hexagon wrench, uniformly tighten the 4 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

NOTICE:

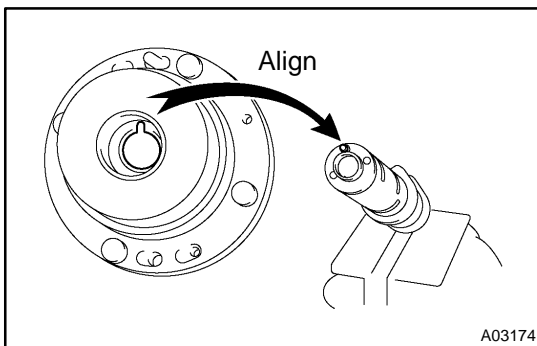
Be careful not to damage the camshaft timing tube.



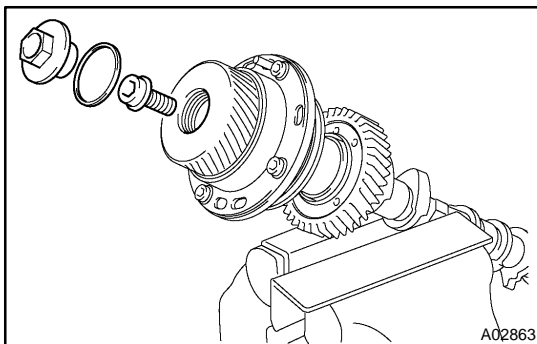
- (d) Mount the hexagon wrench head portion of the intake camshaft in a vise.

NOTICE:

Be careful not to damage the camshaft.



- (e) Align the camshaft knock pin with the camshaft timing tube, and push the camshaft timing tube by hand until you feel it touch the bottom.

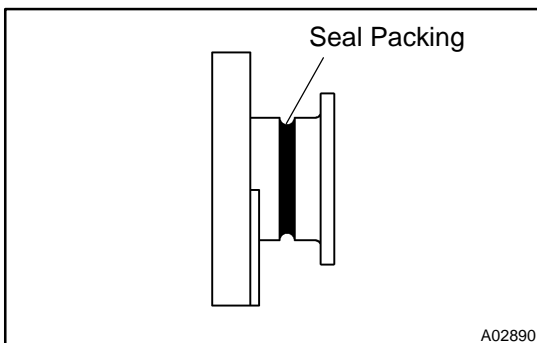


- (f) Using a 10 mm hexagon wrench, install the set bolt.

Torque: 78 N·m (790 kgf·cm, 58 ft-lbf)

- (g) Install the seal washer and straight screw plug.

Torque: 15 N·m (150 kgf·cm, 11 ft-lbf)

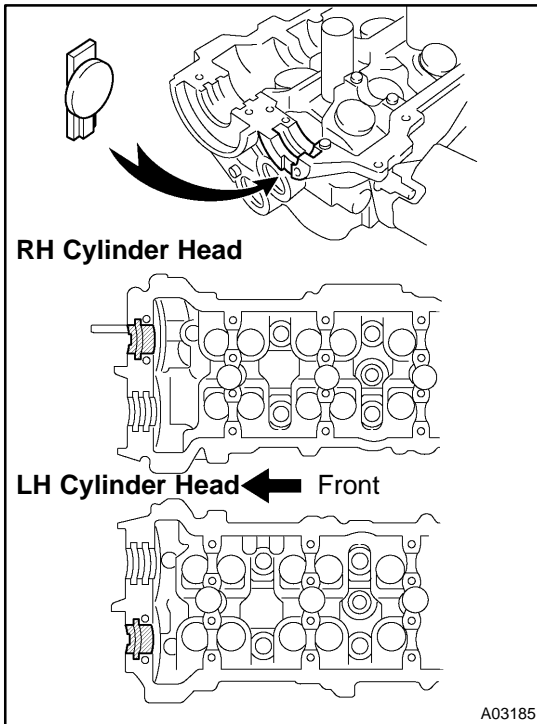


9. INSTALL CAMSHAFT HOUSING PLUGS

- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the camshaft housing plug grooves.

Seal packing:

Part No. 08826-00080 or equivalent

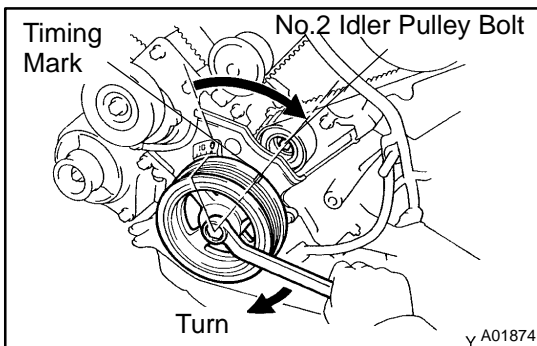


- (c) Install the 2 camshaft housing plugs to the cylinder heads.

10. INSTALL CAMSHAFTS

NOTICE:

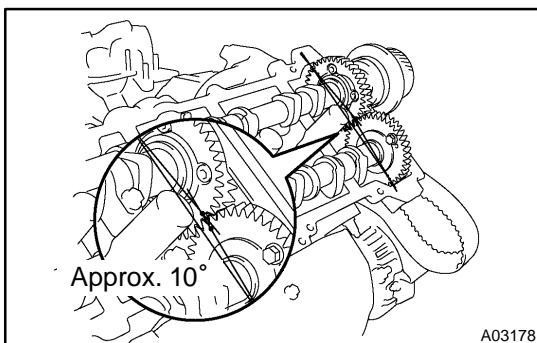
Since the thrust clearance of the camshaft is small, the camshaft must be kept level while it is being installed. If the camshaft is not kept level, the portion of the cylinder head receiving the shaft thrust may crack or be damaged, causing the camshaft to seize or break. To avoid this, the following steps should be carried out.



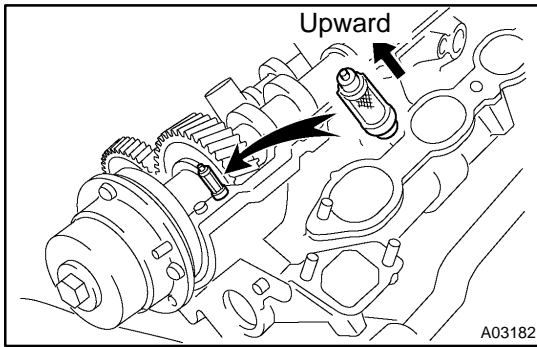
- (a) Set the crankshaft pulley position.
Turn the crankshaft pulley clockwise or counterclockwise, and put the timing mark of the crankshaft pulley in line with the centers of the crankshaft pulley bolt and idler pulley bolt.

NOTICE:

Having the crankshaft pulley at the wrong angle can cause the piston head and valve head to come into contact with each other when you install the camshaft, causing damage. So always set the crankshaft pulley at the correct angle.



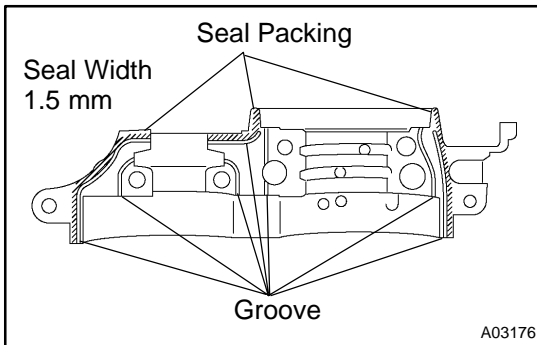
- (b) Install the RH camshafts.
- (1) Apply MP grease to the thrust portion of the intake and exhaust camshafts.
 - (2) Place the intake and exhaust camshafts.
 - (3) Set the timing mark (1 dot mark) of the camshaft main gear at approx. 10° angle.



- (4) Place the camshaft oil control valve filter to the cylinder head.

NOTICE:

Be careful installation direction.



- (5) Remove any old packing (FIPG) material from front bearing cap.
 (6) Apply seal packing to the front bearing cap as shown in the illustration.

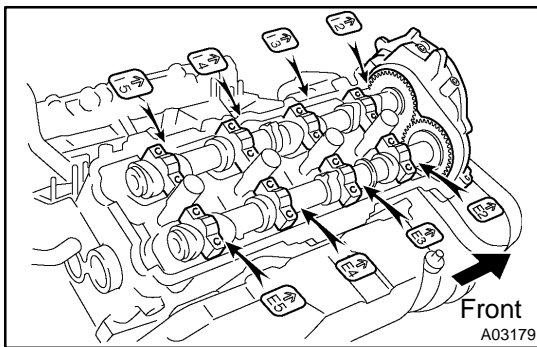
Seal packing:

Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 1.5 mm (0.06 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.

NOTICE:

Do not apply seal packing to the front bearing cap grooves.



- (7) Install the front bearing cap.

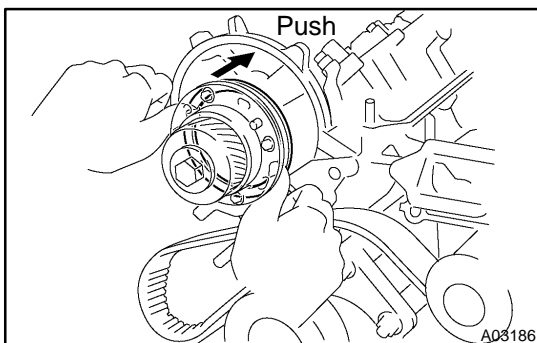
HINT:

Installing the front bearing cap will determine the thrust portion of the camshaft.

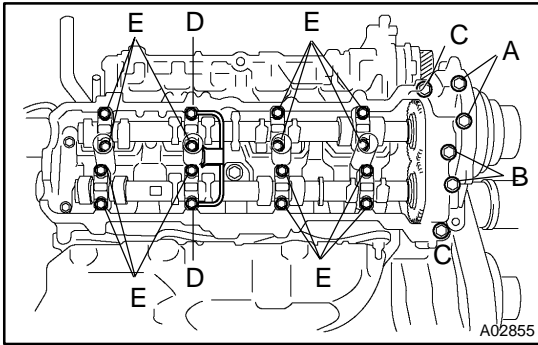
- (8) Install the other bearing cap in the sequence shown with the arrow mark facing forward.

HINT:

Align the arrow marks at the front and rear of the cylinder head with the mark on the bearing cap.



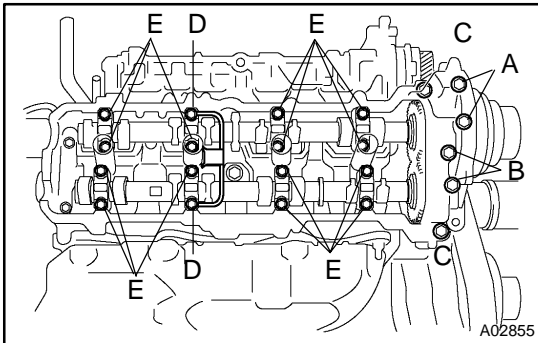
- (9) Push in the camshaft oil seal.



- (10) Apply a light coat of engine oil on the threads and under the heads (D and E) of the bearing cap bolts.

HINT:

Do not apply engine oil under the heads of the bearing cap bolt (A), (B) and (C).



- (11) Install the oil feed pipe and the 22 bearing cap bolts as shown.

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

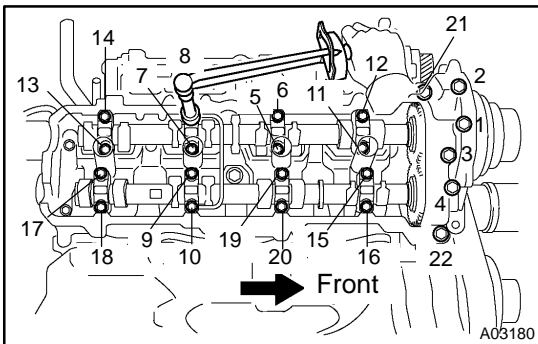
94 mm (3.70 in.) for A

72 mm (2.83 in.) for B

25 mm (0.98 in.) for C

52 mm (2.05 in.) for D

38 mm (1.50 in.) for E

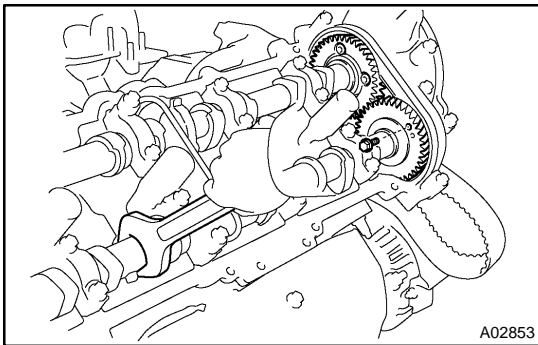


- (12) Uniformly tighten the 22 bearing cap bolts in several passes, in the sequence shown.

Torque:

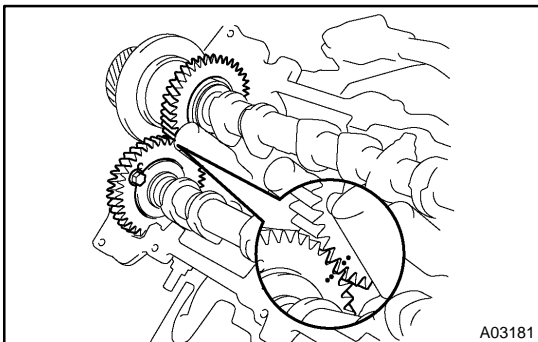
Bolt C: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

Others: 16 N·m (160 kgf·cm, 12 ft-lbf)



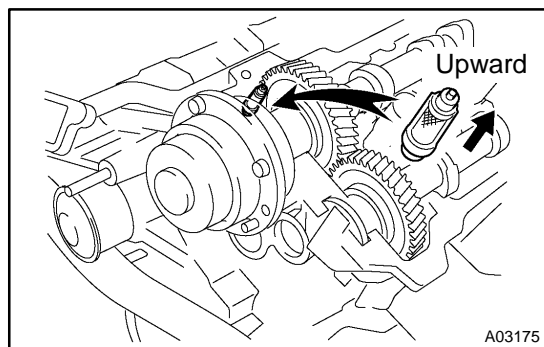
- (13) Boring the service bolt installed in the driven sub-gear upward by turning the hexagon wrench head portion of the camshaft with a wrench.

- (14) Remove the service bolt.



- (c) Install the LH camshafts.

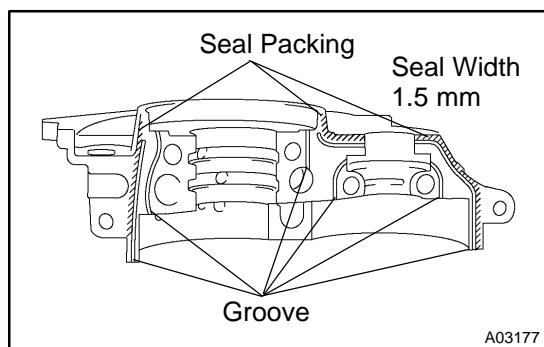
- (1) Apply MP grease to the thrust portion of the intake and exhaust camshafts.
- (2) Place the intake and exhaust camshafts.
- (3) Engage the intake to the exhaust gear by meeting the timing marks (2 dot marks) on each gear.



- (4) Place the camshaft oil control valve filter to the cylinder head.

NOTICE:

Be careful installation direction.



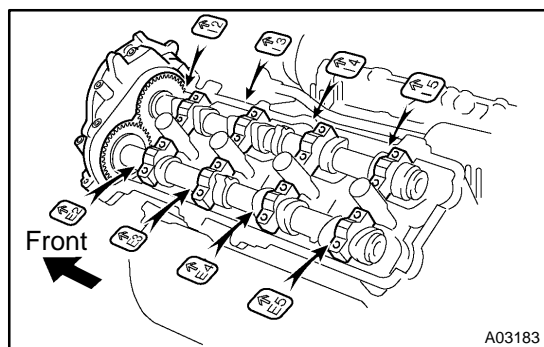
- (5) Remove any old packing (FIPG) material.
(6) Apply seal packing to the front bearing cap.

Seal packing:**Part No. 08826-00080 or equivalent**

- Install a nozzle that has been cut to a 1.5 mm (0.06 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.

NOTICE:

Do not apply seal packing to the front bearing cap grooves.



- (7) Install the front bearing cap.

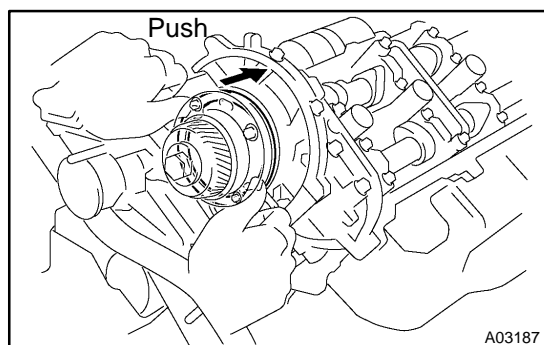
HINT:

Installing the front bearing cap will determine the thrust portion of the camshaft.

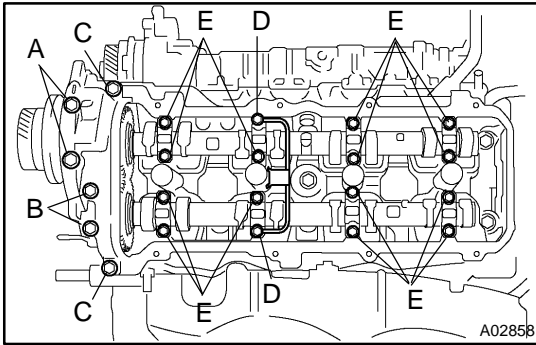
- (8) Install the other bearing cap in the sequence shown with the arrow mark facing forward.

HINT:

Align the arrow marks at the front and rear of the cylinder head with the mark on the bearing cap.



- (9) Push in the camshaft oil seal.



- (10) Apply a light coat of engine oil on the threads and under the heads (D and E) of the bearing cap bolts.

HINT:

Do not apply engine oil under the heads of the bearing cap bolt (A), (B) and (C).

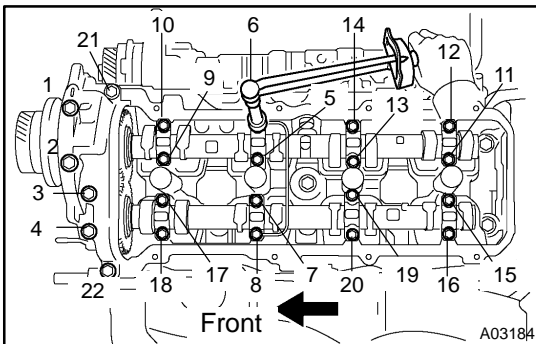
- (11) Install the oil feed pipe and the 22 bearing cap bolts as shown.

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

- 94 mm (3.70 in.) for A
- 72 mm (2.83 in.) for B
- 25 mm (0.98 in.) for C
- 52 mm (2.05 in.) for D
- 38 mm (1.50 in.) for E

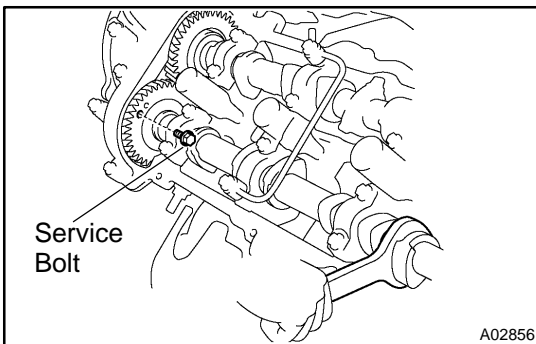


- (12) Uniformly tighten the 22 bearing cap bolts in several passes, in the sequence shown.

Torque:

Bolt C: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

Others: 16 N·m (160 kgf·cm, 12 ft-lbf)

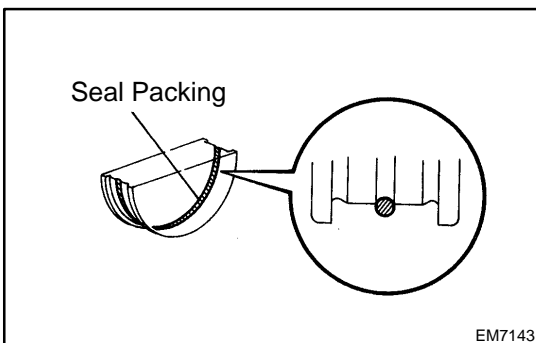


- (13) Boring the service bolt installed in the driven sub-gear upward by turning the hexagon wrench head portion of the camshaft with a wrench.

- (14) Remove the service bolt.

11. CHECK AND ADJUST VALVE CLEARANCE
(See page [EM-4](#))

Turn the camshaft and position the cam lobe upward, and check and adjust the valve clearance.

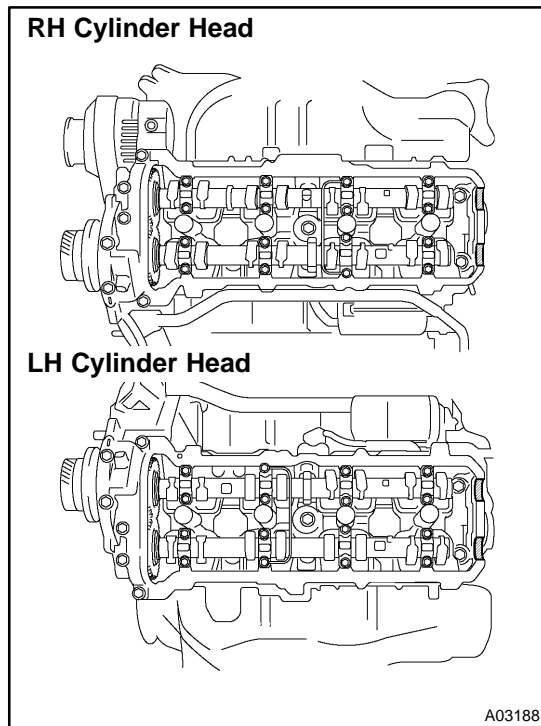


12. INSTALL SEMI-CIRCULAR PLUGS

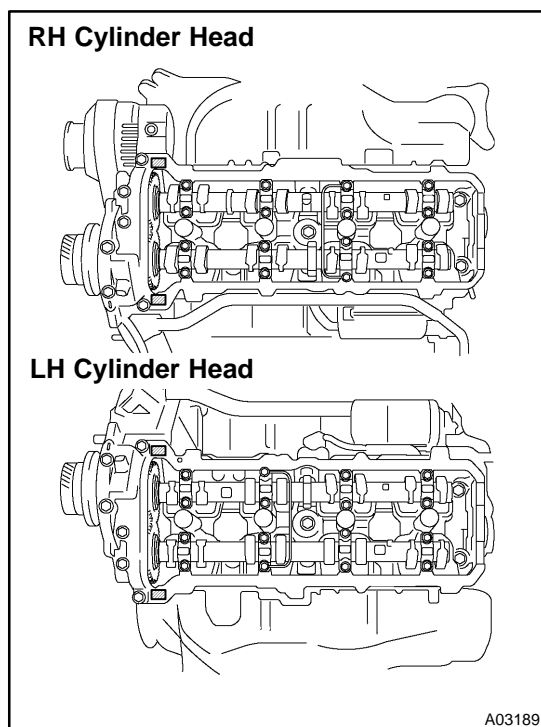
- (a) Remove any old packing (FIPG) material.
- (b) Apply seal packing to the semi-circular plug grooves.

Seal packing:

Part No. 08826-00080 or equivalent



- (c) Install the 4 semi-circular plugs to the cylinder heads.



13. INSTALL CYLINDER HEAD COVER

- (a) Remove any old packing (FIPG) material.
 (b) Apply seal packing to the cylinder heads as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

- (c) Install the gasket to the cylinder head cover.
 (d) Install the seal washer to the bolt.
 (e) Install the cylinder head cover with the 9 bolts. Uniformly tighten the bolts in several passes. Install the 2 cylinder head covers.

Torque: 6.0 N·m (60 kgf·cm, 53 in.-lbf)

14. INSTALL ENGINE HANGERS

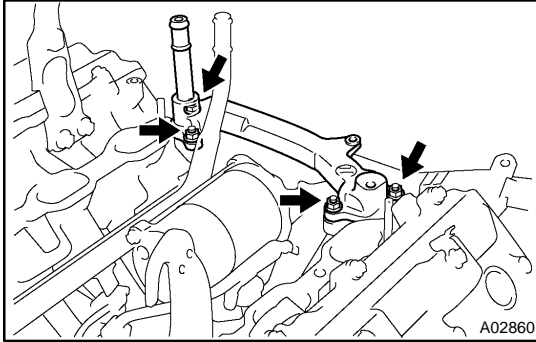
Torque: 37 N·m (380 kgf·cm, 27 ft-lbf)

15. INSTALL VVT SENSORS

16. INSTALL CAMSHAFT TIMING OIL CONTROL VALVE (See page [SF-51](#))

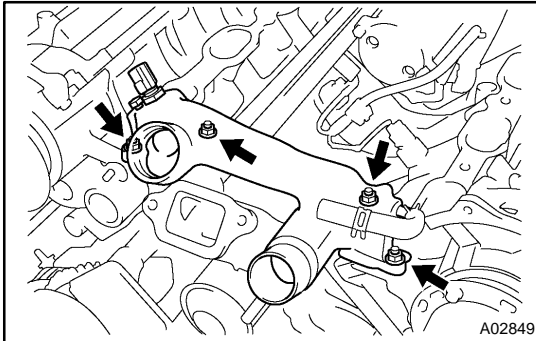
17. INSTALL OIL DIPSTICK AND GUIDE FOR ENGINE (See page [LU-16](#))

18. INSTALL OIL DIPSTICK AND GUIDE FOR A/T (See page [EM-82](#))

**19. INSTALL REAR WATER BYPASS JOINT**

- (a) Install 2 new gaskets to the cylinder head.
- (b) Install the 4 nuts holding the water bypass joint to the cylinder heads. Alternately tighten the nuts.

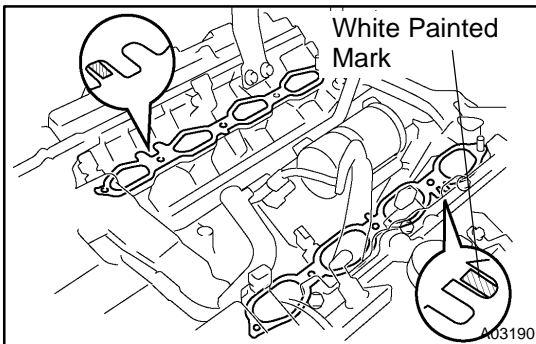
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

**20. INSTALL FRONT WATER BYPASS JOINT**

- (a) Install 2 new gaskets and the water bypass joint with the 4 nuts. Alternately tighten the nuts.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

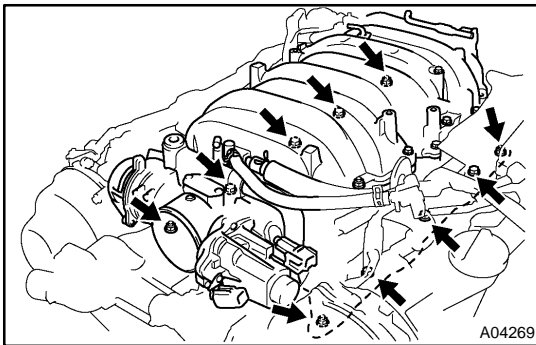
- (b) Connect ECT sensor connector.

21. INSTALL WATER INLET AND INLET HOUSING ASSEMBLY (See page CO-10)**22. INSTALL INTAKE MANIFOLD ASSEMBLY**

- (a) Place 2 new gaskets on the cylinder heads with white painted mark facing upward.

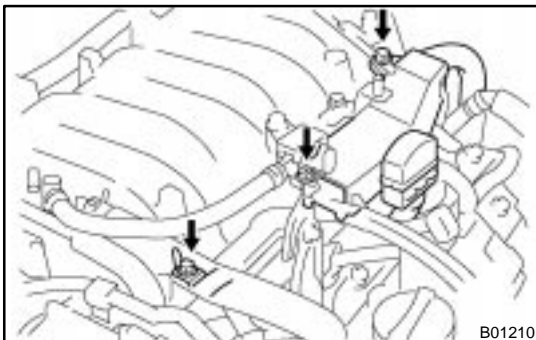
NOTICE:

- Align the port holes of the gasket and cylinder head.
- Be careful of the installation direction.

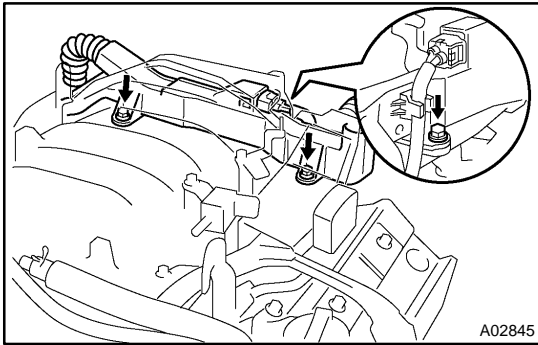


- (b) Place the intake manifold assembly on the cylinder heads.
- (c) Install and uniformly tighten the 6 bolts and 4 nuts in several passes.

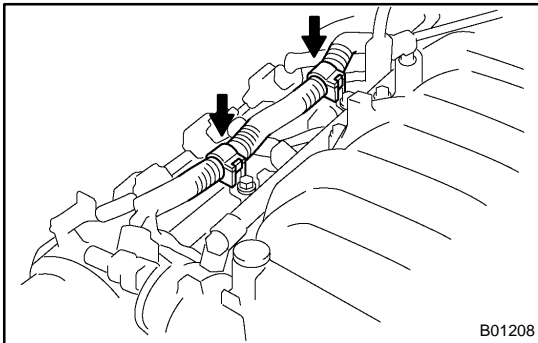
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)



- (d) Connect the engine wire to the RH delivery pipe, rear water bypass joint, intake manifold and RH cylinder head.
 - (1) Connect the wire clamp bracket and wire protector to the intake manifold with the 3 bolts.

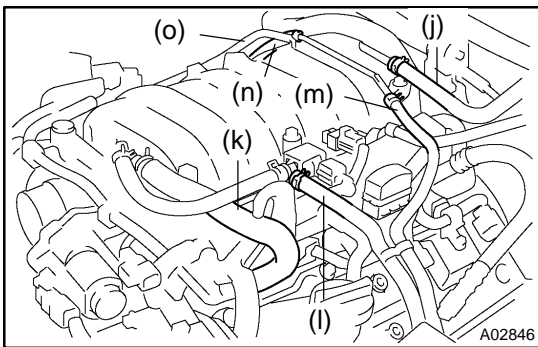
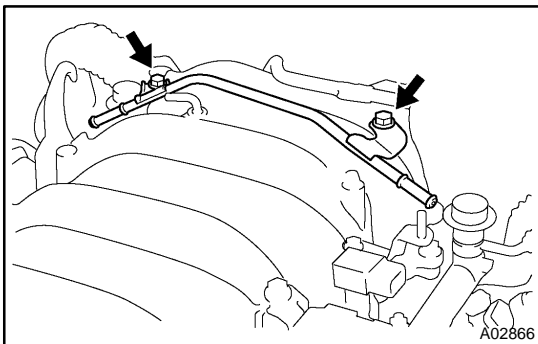


- (2) Connect the wire protector to the rear water bypass joint and RH cylinder head with the 3 bolts.

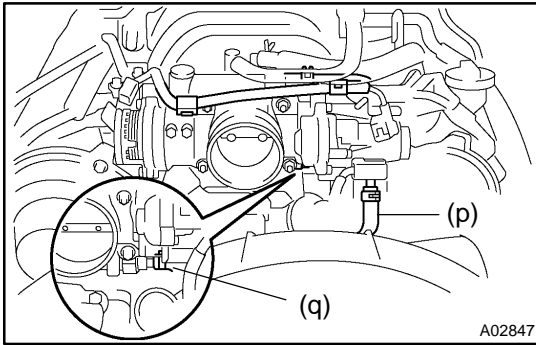


- (3) Connect the 2 wire clamp to the wire clamp bracket on the RH delivery pipe.

- (e) Install the 3 V-bank cover brackets with the 4 bolts.
Torque: 7.5 N·m (80 kgf-cm, 66 ft-lbf)
- (f) Connect the VSV connector for ACIS to the No.1 V-bank cover bracket.
- (g) Install the accelerator cable bracket with the 2 nuts.
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
- (h) Install the VSV for EVAP with the bolt.
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
- (i) Install the EVAP pipe to the intake manifold with the 2 bolts.



- (j) Connect the brake booster vacuum hose to the union on the intake manifold.
- (k) Connect the PCV hose to the PCV valve on the LH cylinder head.
- (l) Connect the EVAP hose (from the charcoal canister) to the VSV for EVAP.
- (m) Connect the EVAP hose (from the charcoal canister) to the EVAP pipe on the intake manifold.
- (n) Connect the EVAP hose (from the intake air connector) to the EVAP pipe on the intake manifold.
- (o) Connect the PS air hose to the intake manifold.



- (p) Connect the No.1 water bypass hose (from the water inlet housing) to the throttle body.
- (q) Connect the No.7 water bypass hose (from the front water bypass joint) to the throttle body.
- (r) Connect the 2 wire clamp to the throttle body.
- (s) Connect the throttle position sensor connector.
- (t) Connect the accelerator pedal position sensor connector.
- (u) Connect the throttle motor connector.
- (v) Connect the VSV connector for EVAP.
- (w) Connect the VSV connector for ACIS.
- (x) Connect the 8 injector connectors.
- (y) Connect the noise filter connector.
- (z) Connect the accelerator cable.

23. CONNECT FUEL INLET HOSE (See page [SF-23](#))

24. INSTALL TIMING BELT REAR PLATES

- (a) Install the RH timing belt rear plates.
 - (1) Install the No.1 timing belt rear plate to the cylinder head with the bolt and stud bolt.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

- (2) install the No.2 timing belt rear plate to the No.1 timing belt rear plate with the 2 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

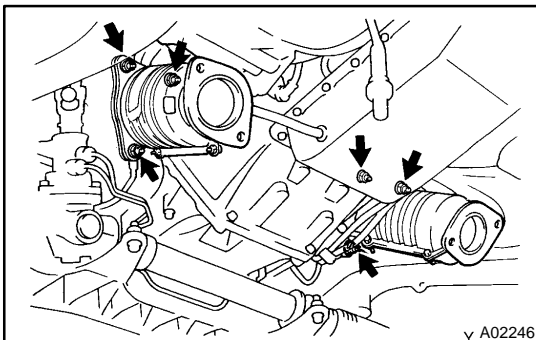
- (b) Install the LH timing belt rear plates.
 - (1) Connect the wire clamp to the No.1 timing belt rear plate.
 - (2) Install the No.1 timing belt rear plate to the cylinder head with the bolt.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

- (3) install the No.2 timing belt rear plate to the No.1 timing belt rear plate with the 2 bolts.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

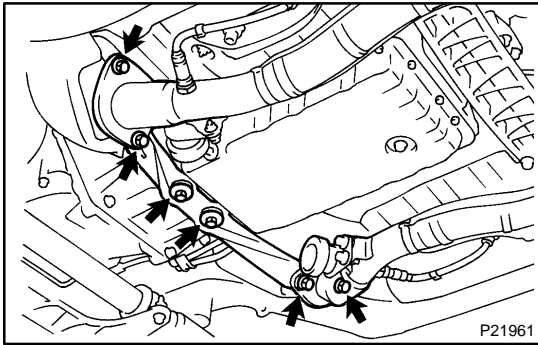
25. INSTALL IGNITION COILS (See page [IG-7](#))



26. INSTALL TWC

Install a new gasket and the TWC with 3 new nuts. Install the 2 TWC.

Torque: 61.8 N·m (630 kgf·cm, 46 ft·lbf)

**27. CONNECT FRONT EXHAUST PIPE TO TWC**

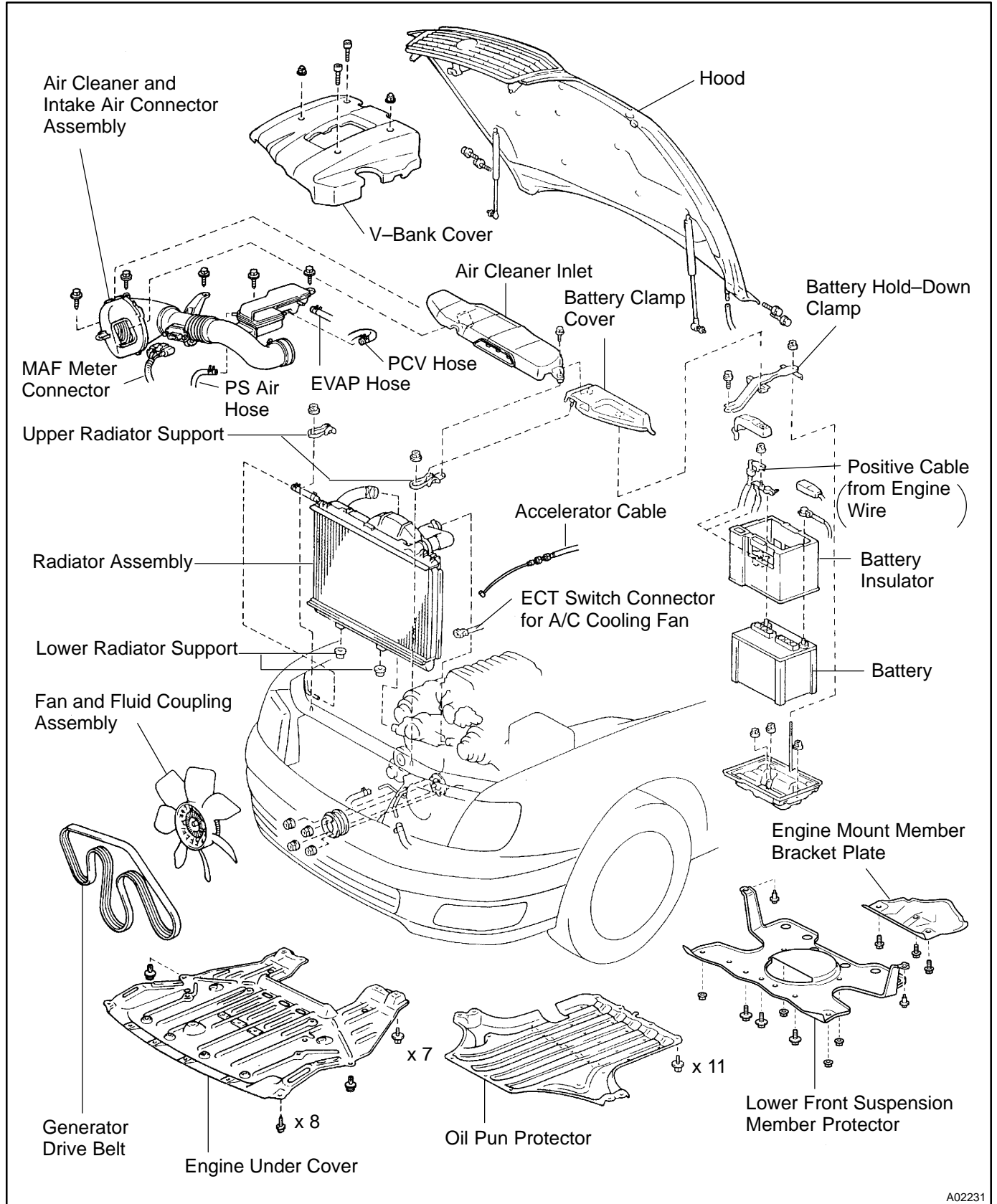
- (a) Temporarily install the pipe support bracket to the transmission with the 2 bolts.
- (b) Install a new gasket to each rear end of the TWC.
- (c) Connect the front exhaust pipe to the 2 front TWC and pipe support bracket with the 4 bolts and 4 new nuts.
Torque: 43.1 N·m (440 kgf·cm, 32 ft·lbf)
- (d) Tighten the 2 bolts holding the pipe support bracket to the transmission.

Torque: 43.1 N·m (440 kgf·cm, 32 ft·lbf)

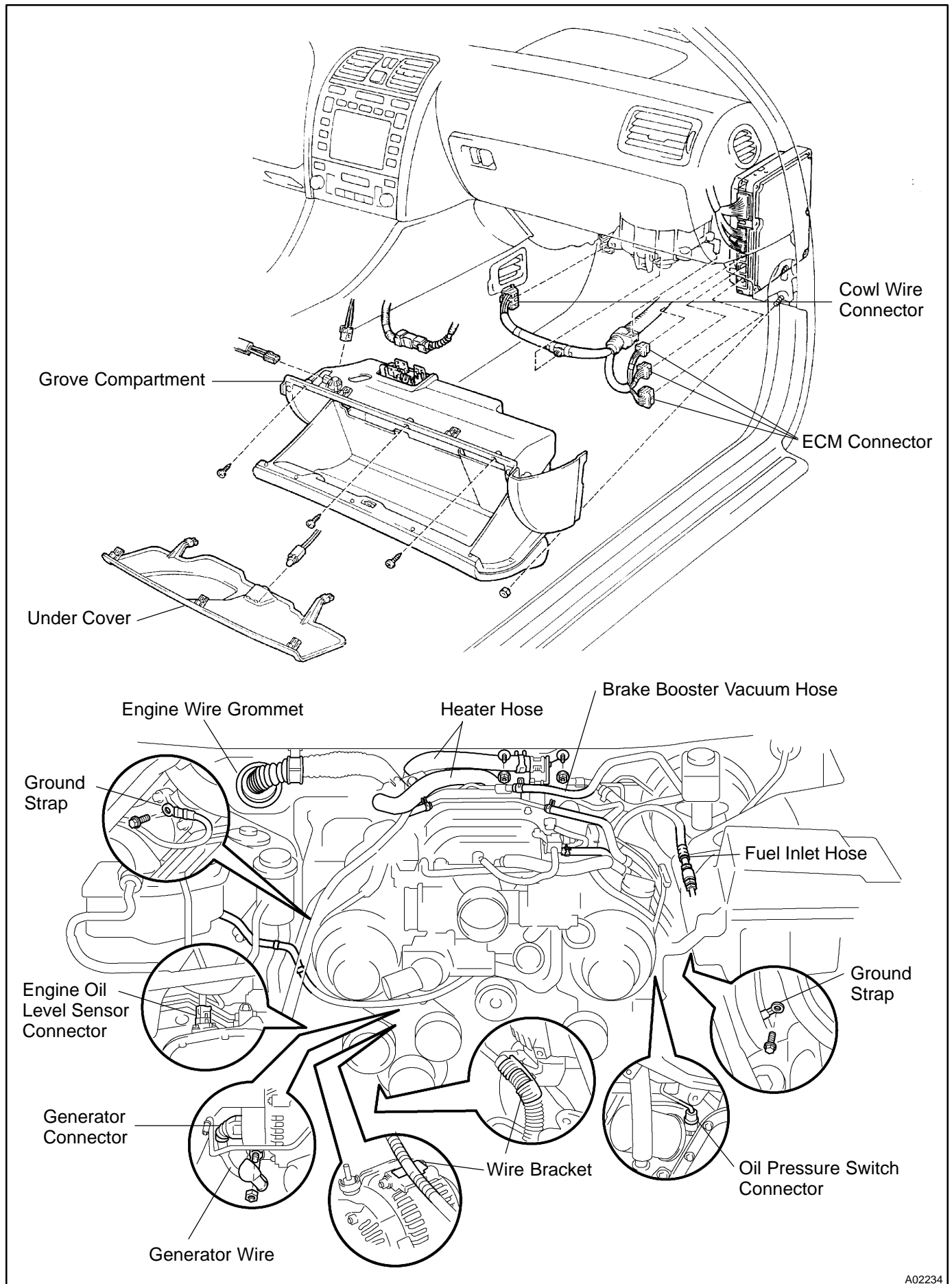
28. INSTALL PS PUMP (See page [EM-82](#))**29. INSTALL CAMSHAFT POSITION SENSOR
(See page [IG-11](#))****30. INSTALL CAMSHAFT TIMING PULLEYS
(See page [EM-22](#))****31. CONNECT TIMING BELT TO CAMSHAFT TIMING PULLEYS (See page [EM-22](#))****32. CHECK ENGINE OIL LEVEL**

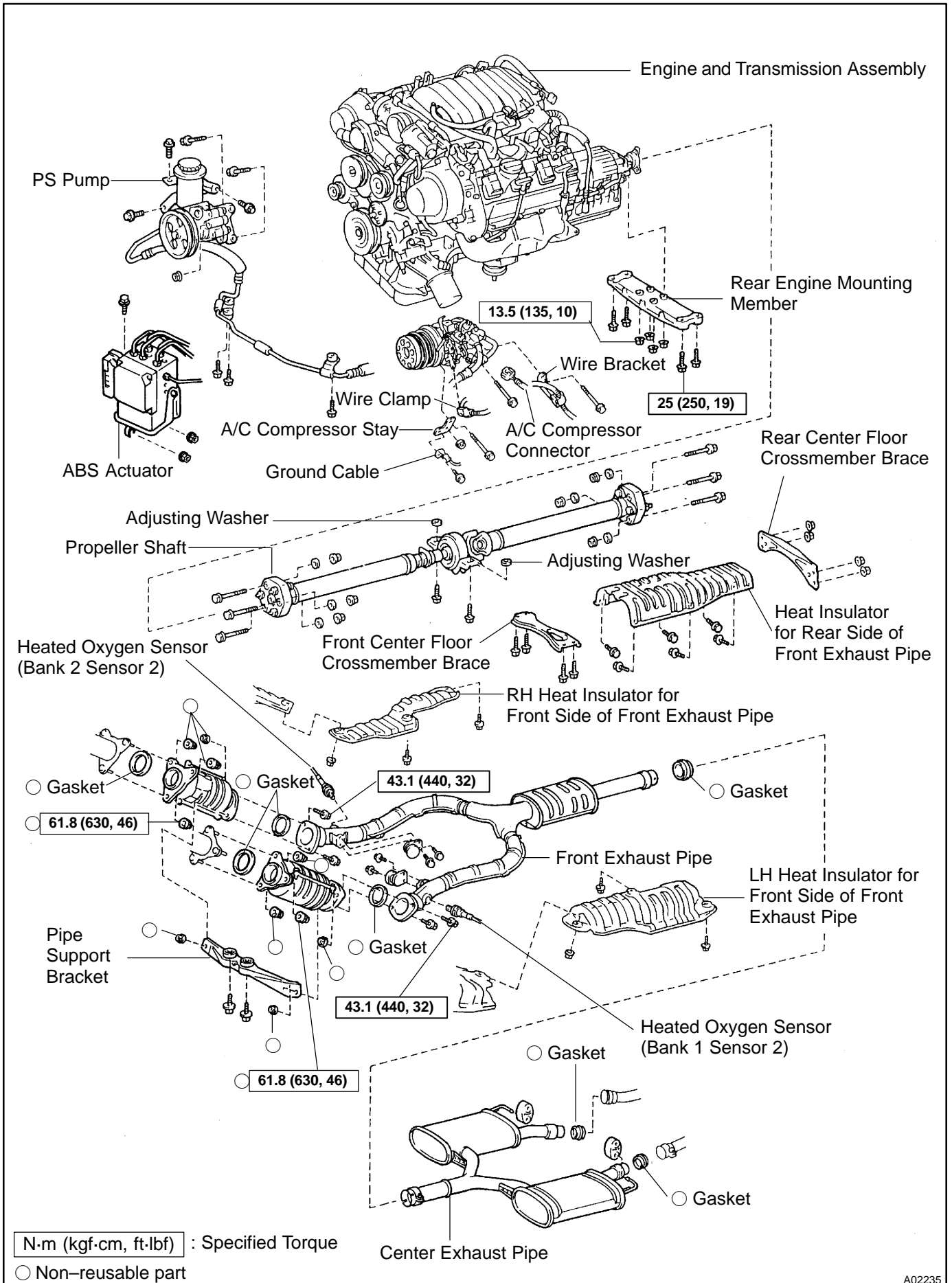
ENGINE UNIT COMPONENTS

EM09W-02

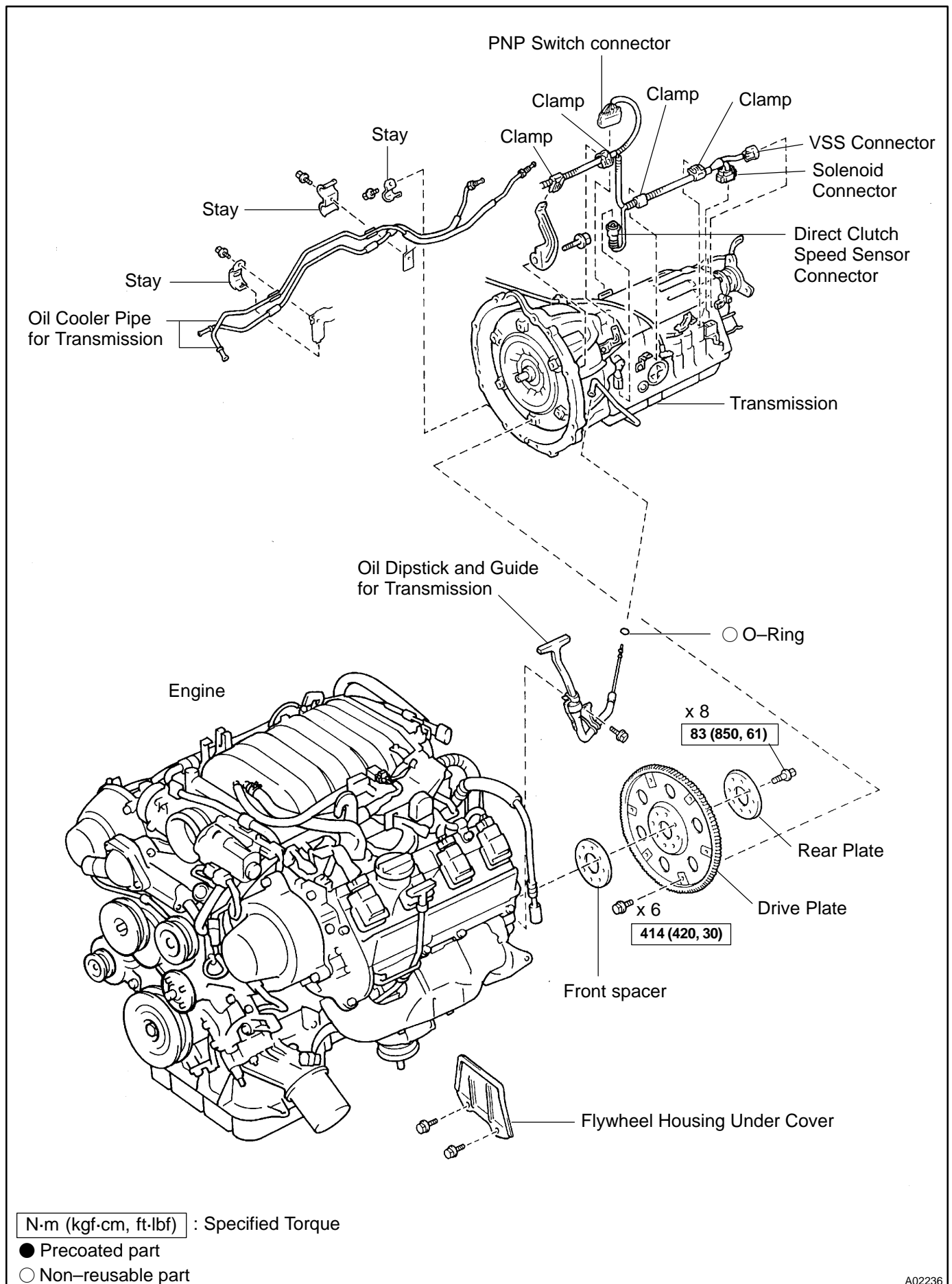


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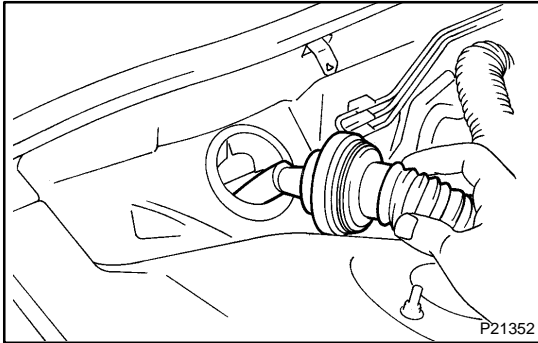


A02236

REMOVAL

1. REMOVE HOOD
2. REMOVE OIL PAN PROTECTOR
3. REMOVE ENGINE UNDER COVER
4. REMOVE LOWER FRONT SUSPENSION MEMBER PROTECTOR
5. REMOVE ENGINE MOUNT MEMBER BRACKET PLATE
6. DRAIN ENGINE COOLANT
7. DRAIN ENGINE OIL
8. REMOVE V-BANK COVER
9. REMOVE BATTERY CLAMP COVER
10. REMOVE AIR CLEANER INLET
11. REMOVE AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY
12. REMOVE BATTERY
13. REMOVE DRIVE BELT, FAN FLUID COUPLING AND FAN PULLEY (See page [EM-15](#))
14. DISCONNECT ACCELERATOR CABLE TO THROTTLE BODY
15. REMOVE RADIATOR ASSEMBLY (See page [CO-21](#))
16. REMOVE V-BANK COVER BRACKETS FROM ENGINE HANGERS
17. DISCONNECT CONNECTORS, WIRE, STRAPS, CLAMPS AND HOSES
 - (a) Disconnect the engine oil level sensor connector.
 - (b) Disconnect the generator connector.
 - (c) Disconnect the generator wire.
 - (d) Disconnect the engine wire clamp from the bracket on generator.
 - (e) Disconnect the ground strap from the RH engine mounting bracket.
 - (f) Disconnect the ground strap from under of the LH fender apron.
 - (g) Disconnect the engine wire clamp from the cowl panel.
 - (h) Disconnect the radiator reservoir hose from the water bypass pipe.
 - (i) Disconnect the brake booster vacuum hose from the intake manifold.
 - (j) Disconnect the heater hose from the heater water valve.
 - (k) Disconnect the heater hose from the water bypass pipe.
 - (l) Disconnect the fuel inlet hose from the fuel inlet pipe.
 - (m) Disconnect the PS air hose from the intake manifold.
 - (n) Disconnect the 2 EVAP hoses from the pipes (from charcoal canister).
 - (o) Disconnect the oil pressure switch connector.
18. DISCONNECT ENGINE WIRE FROM CABIN
 - (a) Remove the under cover.
 - (b) Remove the glove compartment.

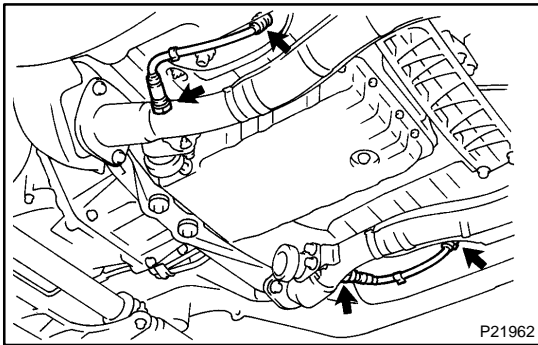
- (c) Disconnect the 3 ECM connectors.
- (d) Disconnect the cowl wire connector from the connector on the bracket.
- (e) Disconnect the engine wire clamp from the bracket.



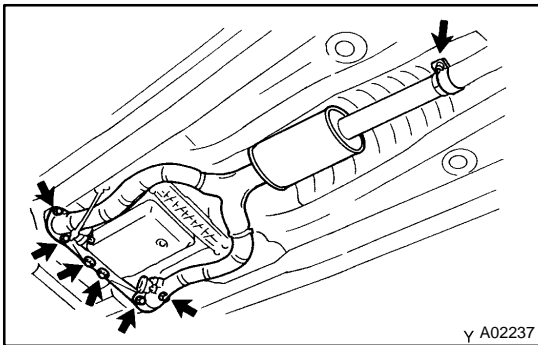
- (f) Disconnect the grommet from the cowl panel, and pull out the engine wire.

NOTICE:

Be careful not to damage the engine wire.

19. DISCONNECT PS OIL COOLER PIPE FROM OIL PAN**20. DISCONNECT HEATED OXYGEN SENSORS FROM FRONT EXHAUST PIPE**

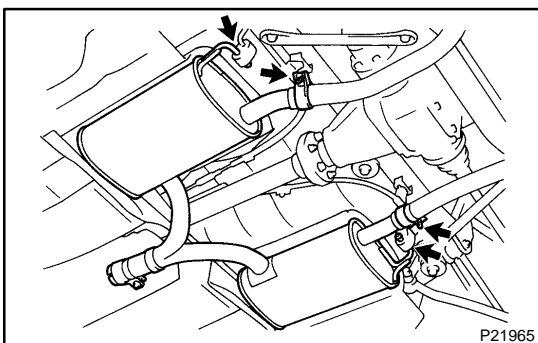
- (a) Disconnect the 2 wire grommets from the floor panel.
- (b) Disconnect the 2 oxygen sensors from the exhaust pipe.

**21. REMOVE FRONT EXHAUST PIPE**

- (a) Loosen the clamp bolt holding the front exhaust pipe to the center exhaust pipe.
- (b) Remove the 4 bolts and 4 nuts holding the front exhaust pipe to the TWC.
- (c) Remove the front exhaust pipe and 3 gaskets.
- (d) Remove the 2 bolts and pipe support bracket.

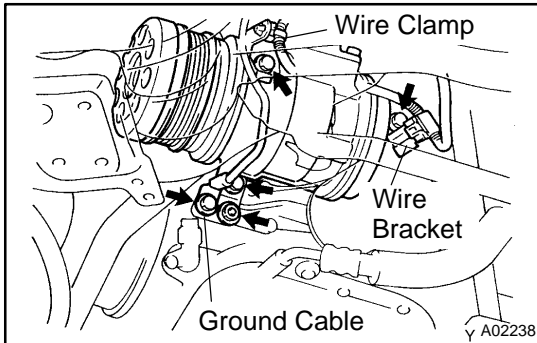
22. REMOVE TWC

Remove the 3 nuts, TWC and gasket. Remove the 2 TWC.

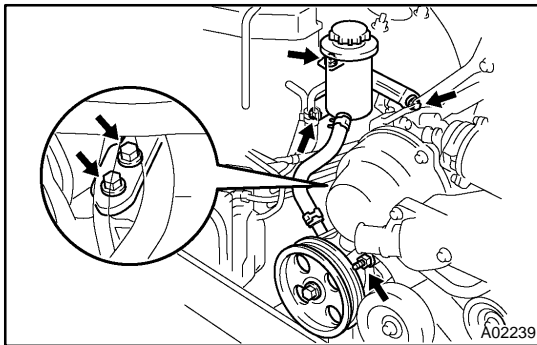
**23. REMOVE CENTER EXHAUST PIPE**

- (a) Loosen the 2 clamp bolts, and disconnect the center exhaust pipe from the tailpipes.
- (b) Disconnect the exhaust pipe from the 2 rings on the body brackets, and remove the center exhaust pipe and 2 gaskets.

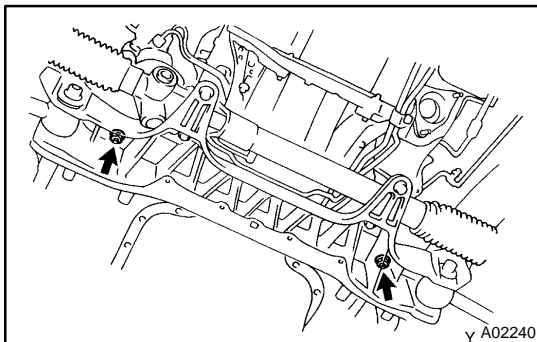
24. REMOVE HEAT INSULATOR FOR REAR SIDE OF FRONT EXHAUST PIPE**25. REMOVE FRONT AND REAR CENTER FLOOR CROSSMEMBER BRACES**

26. REMOVE PROPELLER SHAFT (See page PR-3)**27. DISCONNECT A/C COMPRESSOR FROM ENGINE**

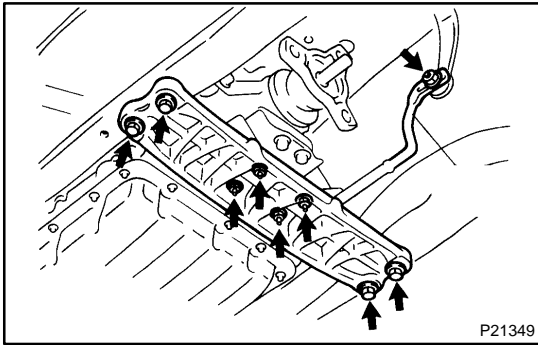
- (a) Disconnect the A/C compressor connector.
- (b) Disconnect the wire clamp from the wire bracket on the A/C compressor.
- (c) Remove the bolt, and disconnect the ground cable from the A/C compressor stay.
- (d) Remove the bolt, nut and A/C compressor stay.
- (e) Remove the bolt, and disconnect the wire bracket from the A/C compressor.
- (f) Remove the bolt, and disconnect the A/C compressor from the engine.

28. REMOVE ABS ACTUATOR**29. REMOVE PS PUMP AND OIL RESERVOIR**

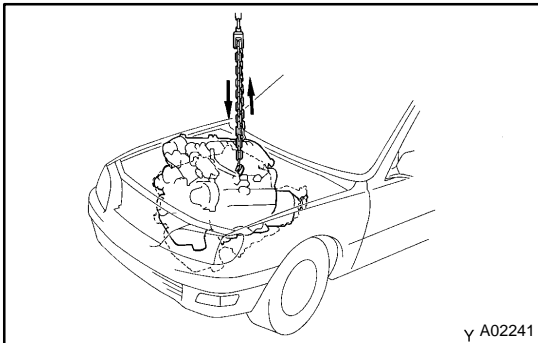
- (a) Remove the 2 bolts, nut and PS pump from the engine.
- (b) Remove the 3 bolts and PS oil reservoir from the RH fender apron.

30. REMOVE HEAT INSULATORS FOR FRONT SIDE OF FRONT EXHAUST PIPE**31. REMOVE ENGINE AND TRANSMISSION ASSEMBLY FROM VEHICLE**

- (a) Remove the 2 nuts, and disconnect the heater water valve from the cowl panel.
- (b) Attach the engine chain hoist to the engine hangers.
- (c) Remove the 2 nuts holding the engine mounting insulators to the front suspension crossmember.



- (d) Remove the nut, and disconnect the transmission control rod from the shift lever.
- (e) Remove the 4 bolts, 4 nuts and rear engine mounting member.



- (f) Lift the engine out of the vehicle slowly and carefully.

HINT:

Make sure the engine is clear of all wiring, hoses and cables.

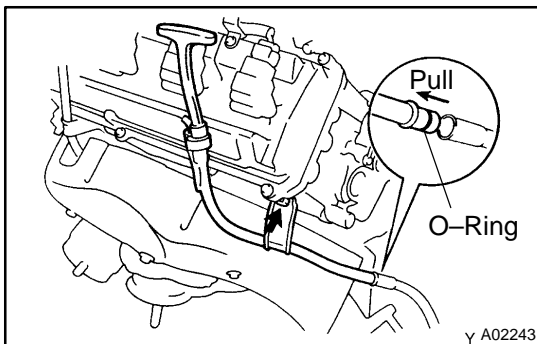
NOTICE:

Be careful not hit the PS gear housing and PNP switch.

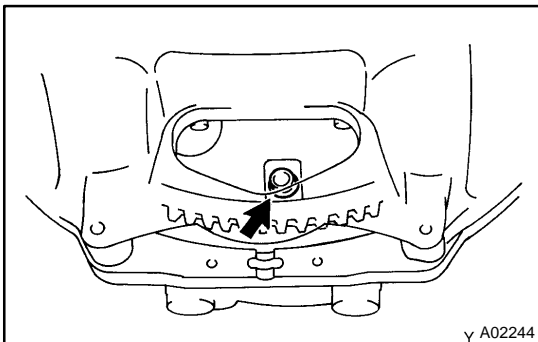
- (g) Place the engine and transmission assembly onto the stand.

32. DISCONNECT ENGINE WIRE FROM TRANSMISSION

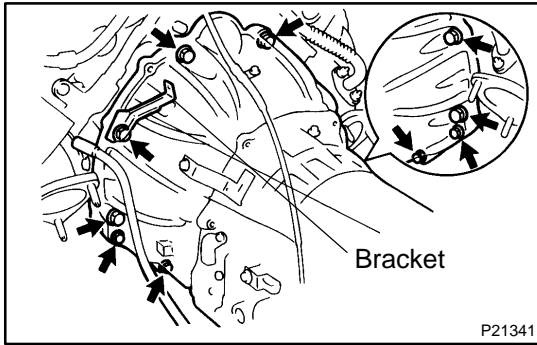
- (a) Disconnect the VSV connector.
- (b) Disconnect the PNP switch connector.
- (c) Disconnect the solenoid connector.
- (d) Disconnect the direct clutch speed sensor connector.
- (e) Disconnect the 4 engine wire clamps from the bracket.

**33. REMOVE OIL DIPSTICK GUIDE AND DIPSTICK FOR TRANSMISSION**

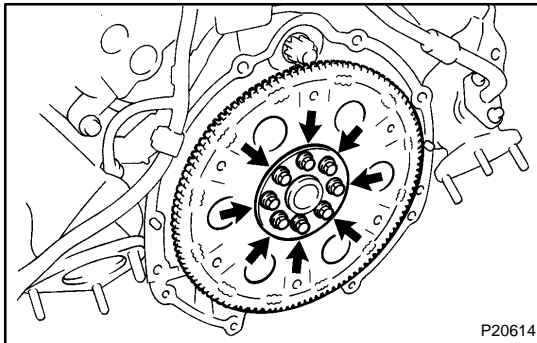
- (a) Remove the bolt.
- (b) Pull out the dipstick guide and dipstick from the port of transmission.
- (c) Remove the O-ring from the dipstick guide.

34. REMOVE OIL COOLER PIPES FOR TRANSMISSION**35. REMOVE TORQUE CONVERTER CLUTCH BOLTS**

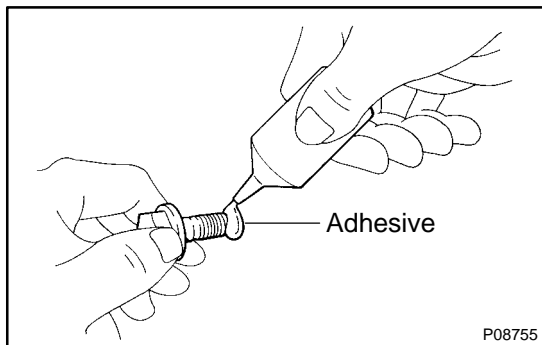
- (a) Remove the 2 bolts and flywheel housing under cover.
- (b) Turn the crankshaft pulley bolt to gain access to each bolt.
- (c) Hold the crankshaft pulley bolt with a wrench, and remove the 6 bolts.

**36. REMOVE TRANSMISSION**

- (a) Remove the 10 bolts and engine wire bracket.
- (b) Remove the transmission together with the torque converter clutch from the engine.

**37. REMOVE DRIVE PLATE**

Remove the 8 bolts, front spacer, drive plate and rear spacer.



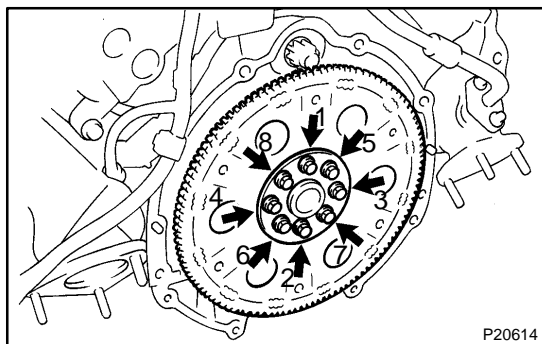
INSTALLATION

1. INSTALL DRIVE PLATE

- (a) Apply adhesive to 2 or 3 threads of the mounting bolt end.

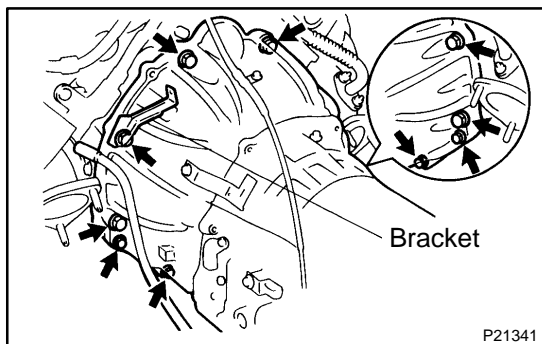
Adhesive:

**Part No. 08833-00070, THREE BOND 1324
or equivalent**



- (b) Install the front spacer, drive plate and rear plate on the crankshaft.
(c) Install and uniformly tighten the mounting bolts in several passes, in the sequence shown.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)



2. INSTALL TRANSMISSION TO ENGINE

- (a) Attach the transmission to the engine.
(b) Install the engine wire bracket and 10 bolts.

Torque:

14 mm head: 37 N·m (380 kgf·cm, 27 ft·lbf)

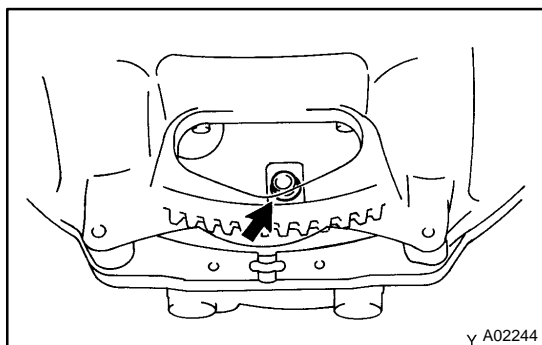
17 mm head: 72 N·m (730 kgf·cm, 53 ft·lbf)

3. INSTALL TORQUE CONVERTER CLUTCH BOLTS

- (a) Apply adhesive to 2 or 3 threads of the bolt end.

Adhesive:

**Part No. 08833-00070, THREE BOND 1324
or equivalent**



- (b) Hold the crankshaft pulley bolt with a wrench, and install the 6 bolts evenly.

Torque: 41 N·m (420 kgf·cm, 30 ft·lbf)

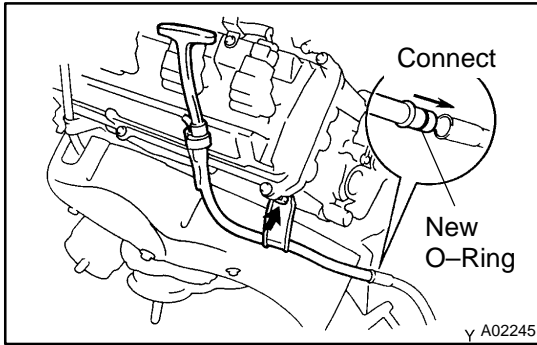
HINT:

First install the dark green colored bolt, install the other bolts.

- (c) Install the flywheel housing under cover with the 2 bolts.

Torque: 18.5 N·m (185 kgf·cm, 14 ft·lbf)

4. INSTALL OIL COOLER PIPE FOR TRANSMISSION

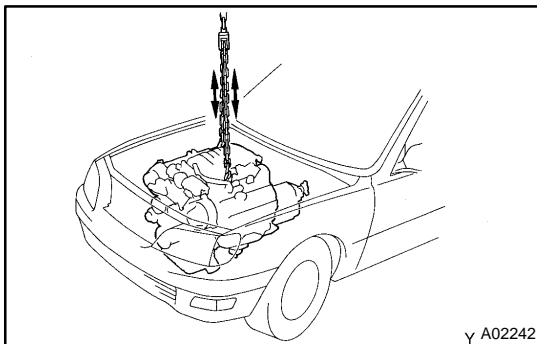


5. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK FOR TRANSMISSION

- Install a new O-ring to the dipstick guide.
- Apply soapy water to the O-ring.
- Connect the dipstick guide end to the dipstick tube of the oil pan.
- Install the dipstick guide with the bolt.
- Install the dipstick.

6. CONNECT ENGINE WIRE TO TRANSMISSION

- Connect the VSV connector.
- Connect the PNP switch connector.
- Connect the solenoid connector.
- Connect the direct clutch speed sensor connector.
- Connect the 4 wire clamps to bracket.



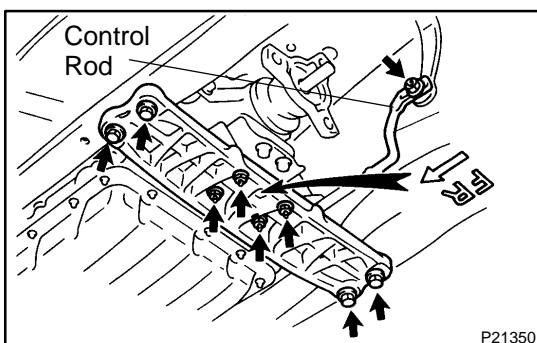
7. INSTALL ENGINE AND TRANSMISSION ASSEMBLY IN VEHICLE

- Attach the engine chain hoist to the engine hangers.
- Slowly lower the engine and transmission assembly into the engine compartment.

NOTICE:

Be careful not to hit the PS gear housing and PNP switch.

- Insert the stud bolts of the front engine mounting brackets into the stud bolt holes of the front suspension crossmember.
- Keep the engine level.



- Install the rear engine mounting member with the 4 bolts and 4 nuts.

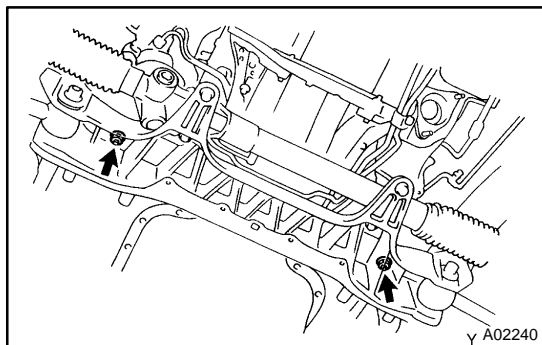
Torque:

Bolt: 25 N·m (250 kgf·cm, 19 ft·lbf)

Nut : 13.5 N·m (135 kgf·cm, 10 ft·lbf)

NOTICE:

Be careful of installation direction.



- (f) Connect the transmission control rod to the shift lever with the nut.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

- (g) Install the 2 nuts holding the engine mounting brackets to the front suspension crossmember.

Torque: 70 N·m (700 kgf·cm, 52 ft·lbf)

- (h) Remove the engine chain hoist.

- (i) Install the heater water valve with the 2 nuts.

8. INSTALL HEAT INSULATORS FOR FRONT SIDE OF FRONT EXHAUST PIPE

9. INSTALL A/C COMPRESSOR

- (a) Install the A/C compressor, compressor stay and wire bracket with the 3 bolts and nut.

Torque:

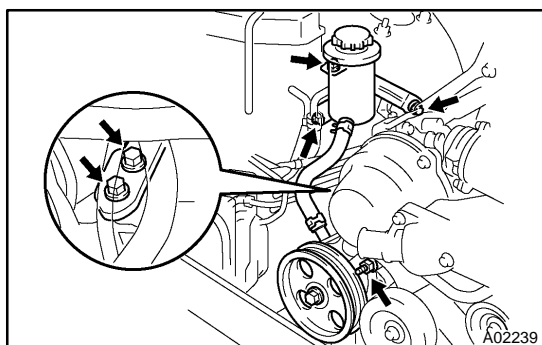
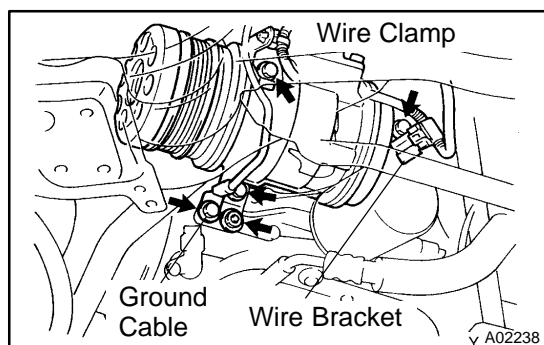
Bolt: 49 N·m (500 kgf·cm, 36 ft·lbf)

Nut : 29 N·m (300 kgf·cm, 22 ft·lbf)

- (b) Connect the ground cable to the compressor stay with the bolt.

- (c) Install the wire clamp to the bracket on the A/C compressor.

- (d) Connect the A/C compressor connector.



10. INSTALL PS PUMP AND OIL RESERVOIR

- (a) Install the PS pump with the 2 bolts and nut. Alternately tighten the bolts and nut.

Torque:

Bolt: 39 N·m (400 kgf·cm, 29 ft·lbf)

Nut : 43 N·m (440 kgf·cm, 32 ft·lbf)

- (b) Install the PS oil reservoir with the 3 bolts.

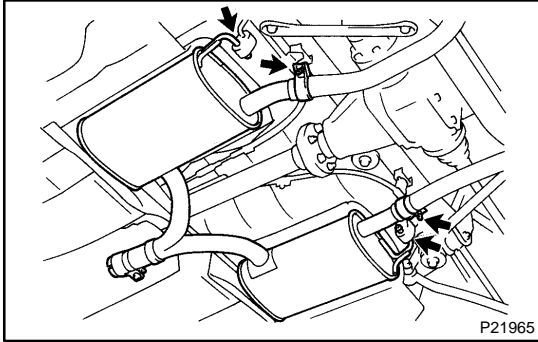
11. INSTALL ABS ACTUATOR

12. INSTALL PROPELLER SHAFT (See page [PR-9](#))

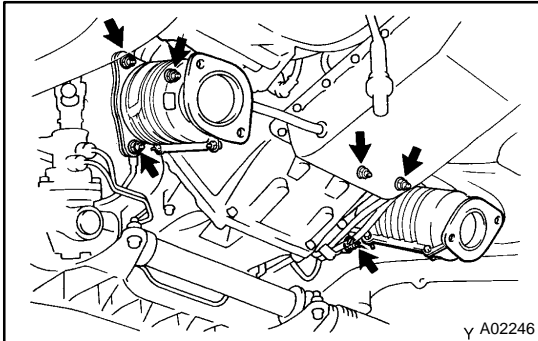
13. INSTALL FRONT CENTER FLOOR CROSSMEMBER BRACE

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

14. INSTALL HEAT INSULATOR FOR REAR SIDE OF FRONT EXHAUST PIPE

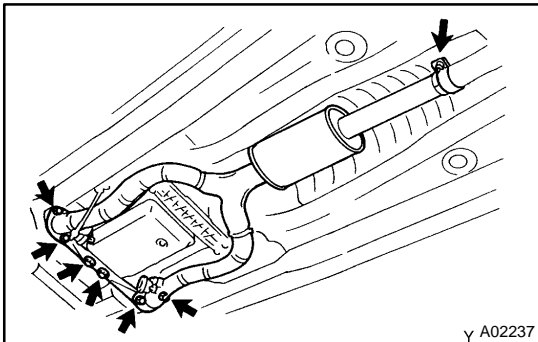
**15. INSTALL CENTER EXHAUST PIPE**

- (a) Install 2 new gaskets.
- (b) Install the center exhaust pipe to the rings on the body brackets.
- (c) Connect the center exhaust pipe to the tailpipes.
(See page [EM-120](#))

**16. INSTALL TWC**

Install a new gasket and the TWC with 3 new nuts. Install the 2 TWC.

Torque: 61.8 N·m (630 kgf·cm, 46 ft·lbf)

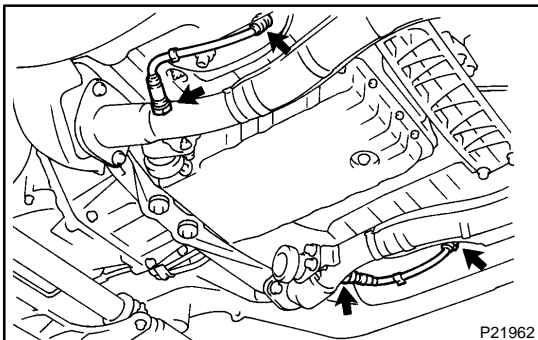
**17. INSTALL FRONT EXHAUST PIPE**

- (a) Temporarily install the pipe support bracket with the 2 bolts.
- (b) Install 2 new gaskets to the rear end of the TWC.
- (c) Install a new gasket to the rear of the front exhaust pipe.
- (d) Temporarily connect the front exhaust pipe to the center exhaust pipe.
- (e) Install the front exhaust pipe to the TWC and pipe support bracket with 4 new nuts and the 4 bolts.

Torque: 43.1 N·m (440 kgf·cm, 32 ft·lbf)

- (f) Tighten the clamp bolt holding the front exhaust pipe to the center exhaust pipe. (See page [EM-120](#))
- (g) Tighten the 4 bolts holding the pipe support bracket to the transmission.

Torque: 43.1 N·m (440 kgf·cm, 32 ft·lbf)

**18. INSTALL HEATED OXYGEN SENSORS**

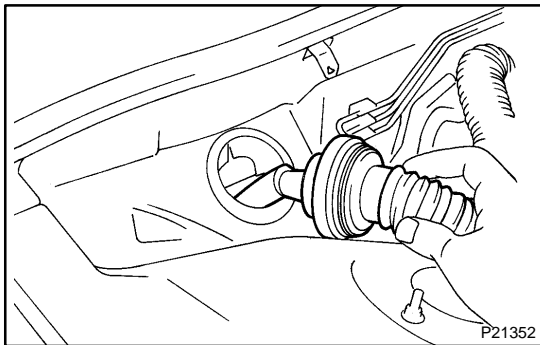
Install the 2 oxygen sensors to the front exhaust pipe.

Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)

HINT:

- Before installing the oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing the oxygen sensor, check that the sensor wire is not twisted. If it is twisted, remove the oxygen sensor and reinstall it.

19. INSTALL PS OIL COOLER PIPE



20. CONNECT ENGINE WIRE TO CABIN

- (a) Push in the engine wire through the cowl panel. Install the grommet.
- (b) Connect the 3 ECM connectors.
- (c) Connect the cowl wire connector to the connector on the bracket.
- (d) Connect the engine wire clamp to the bracket.
- (e) Install the glove compartment.
- (f) Install the under cover.

21. CONNECT CONNECTORS, WIRE, STRAPS, CLAMPS AND HOSES

- (a) Connect the engine oil level sensor connector.
- (b) Connect the generator connector.
- (c) Connect the generator wire.
- (d) Connect the engine wire clamp to the bracket on the generator.
- (e) Connect the ground strap to the RH engine mounting bracket.
- (f) Connect the ground strap to under of the LH fender apron.
- (g) Connect the engine wire clamp to the bracket on the cowl panel.
- (h) Connect the radiator reservoir hose to the water bypass pipe.
- (i) Connect the brake booster vacuum hose to the intake manifold.
- (j) Connect the heater hose to the heater water valve.
- (k) Connect the heater hose to the water bypass pipe.
- (l) Connect the fuel inlet hose to the fuel inlet pipe.
(See page [SF-23](#))
- (m) Connect the PS air hose to the intake manifold.
- (n) Connect the 2 EVAP hoses to the pipes (from the charcoal canister).
- (o) Connect the oil pressure switch connector.

22. INSTALL V-BANK COVER BRACKETS TO ENGINE HANGERS

23. INSTALL RADIATOR ASSEMBLY (See page [CO-27](#))

24. INSTALL BATTERY

25. CONNECT ACCELERATOR CABLES TO THROTTLE BODY

26. INSTALL FAN PULLEY, FAN, FLUID COUPLING AND DRIVE BELT (See page [EM-22](#))

27. INSTALL AIR CLEANER AND INTAKE AIR CONNECTOR ASSEMBLY

28. INSTALL AIR CLEANER INLET

29. INSTALL BATTERY CLAMP COVER

30. FILL WITH ENGINE COOLANT

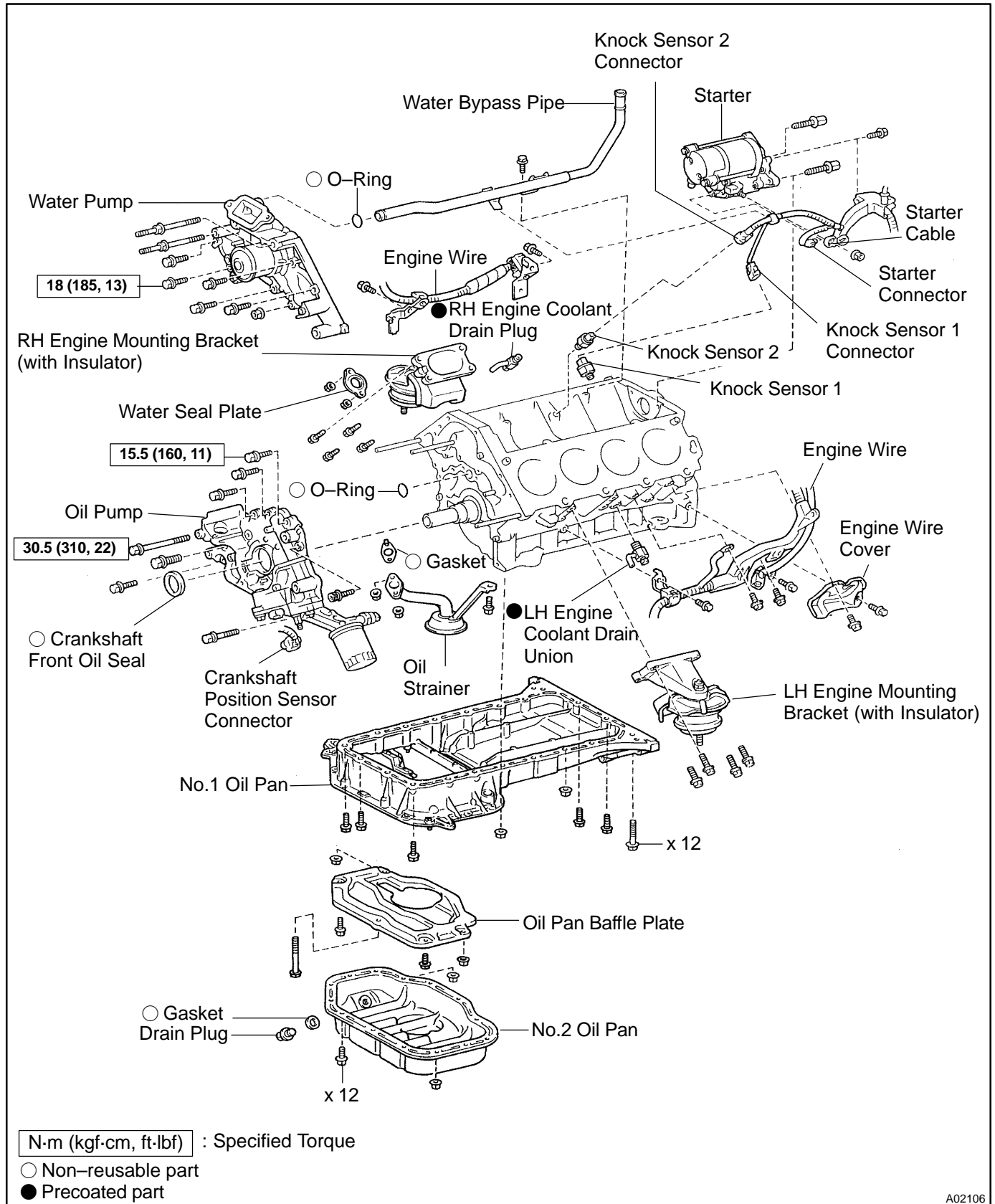
31. FILL WITH ENGINE OIL

32. START ENGINE AND CHECK FOR LEAKS

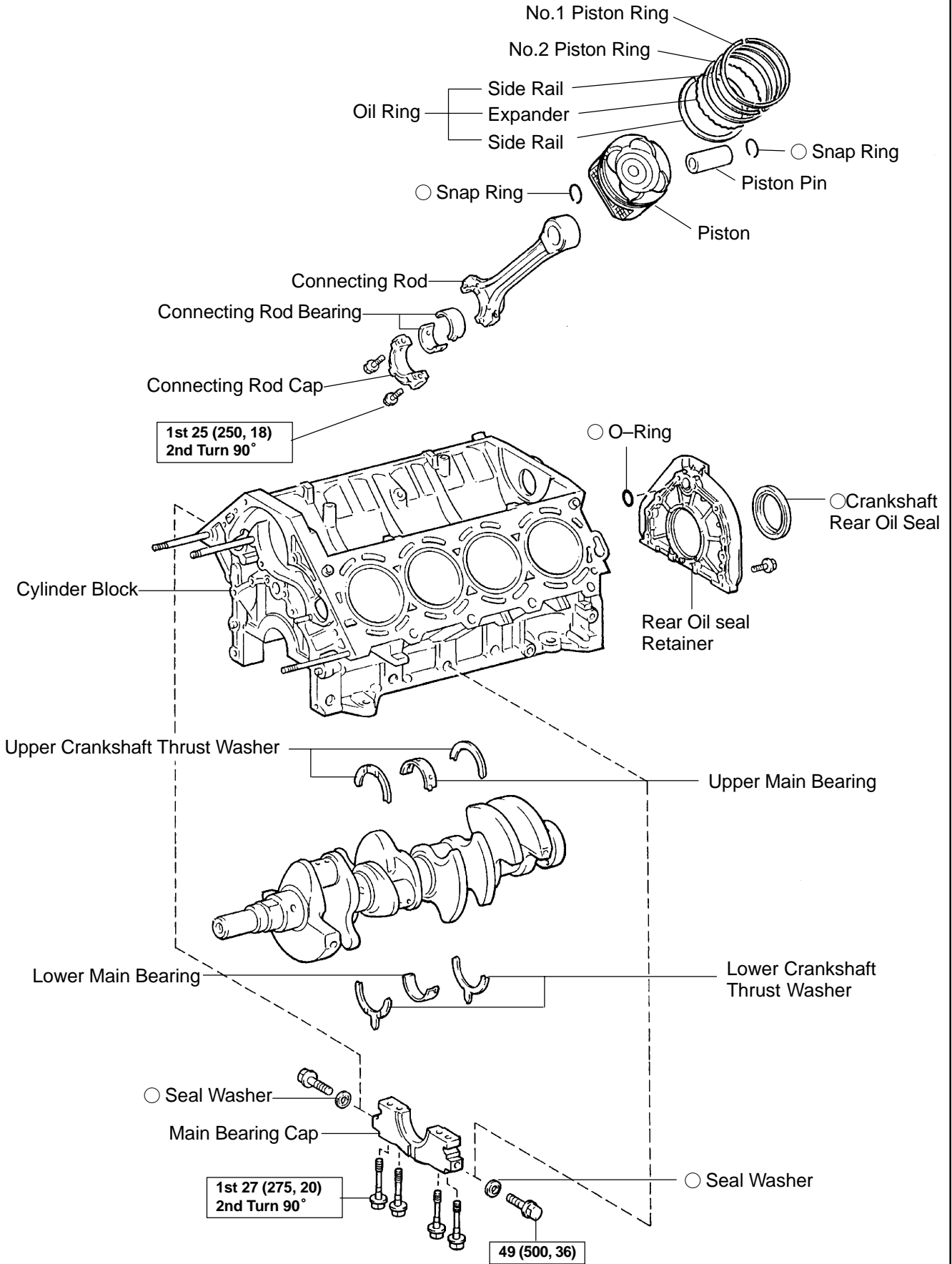
- 33. INSTALL ENGINE MOUNT MEMBER BRACKET PLATE**
- 34. INSTALL LOWER FRONT SUSPENSION MEMBER PROTECTOR**
- 35. INSTALL V-BANK COVER**
- 36. INSTALL ENGINE UNDER COVER**
- 37. INSTALL OIL PAN PROTECTOR**
- 38. INSTALL HOOD**
- 39. PERFORM ROAD TEST**
Check for abnormal noise, shock, slippage, correct shift points and smooth operation.
- 40. RECHECK ENGINE COOLANT AND OIL LEVELS**

CYLINDER BLOCK COMPONENTS

EM09Z-02



A02106



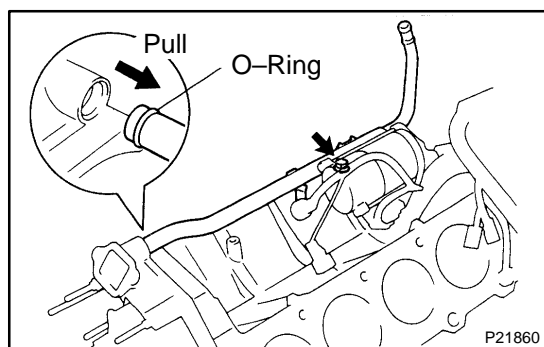
N·m (kgf·cm, ft·lbf) : Specified Torque

○ Non-reusable part

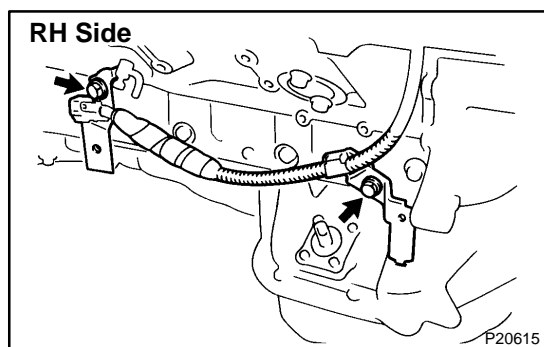
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DISASSEMBLY

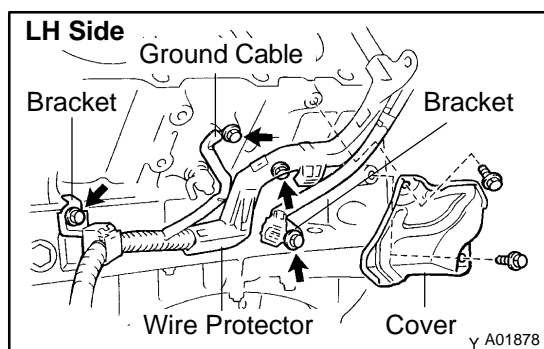
1. INSTALL ENGINE TO ENGINE STAND FOR DISASSEMBLY
2. REMOVE TIMING BELT AND PULLEYS
(See page [EM-15](#))
3. REMOVE CYLINDER HEAD (See page [EM-34](#))
4. REMOVE RH ENGINE MOUNTING BRACKET
5. REMOVE LH ENGINE MOUNTING BRACKET



6. REMOVE WATER BYPASS PIPE
 - (a) Disconnect the engine wire clamp from the bracket on the water bypass pipe.
 - (b) Remove the bolt.
 - (c) Pull out the water bypass pipe from the water pump.
 - (d) Remove the O-ring from the water bypass pipe.
7. REMOVE STARTER (See page [ST-5](#))
8. REMOVE KNOCK SENSORS (See page [SF-85](#))



9. REMOVE ENGINE WIRE
 - (a) Disconnect the crankshaft position sensor connector.
 - (b) Remove the 2 bolts, and disconnect the engine wire from the RH side of the cylinder block.



- (c) Remove the 2 bolts and engine wire cover from the LH side of the cylinder block.
- (d) Remove the 4 bolts and engine wire.

10. REMOVE WATER PUMP (See page [CO-8](#))

11. REMOVE NO.2 OIL PAN (See page [LU-9](#))

12. REMOVE OIL PAN BAFFLE PLATE
(See page [LU-9](#))

13. REMOVE NO.1 OIL PAN (See page [LU-9](#))

14. REMOVE OIL STRAINER (See page [LU-9](#))

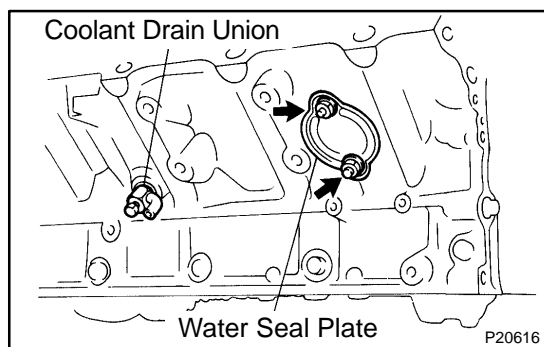
15. REMOVE OIL PUMP (See page [LU-9](#))

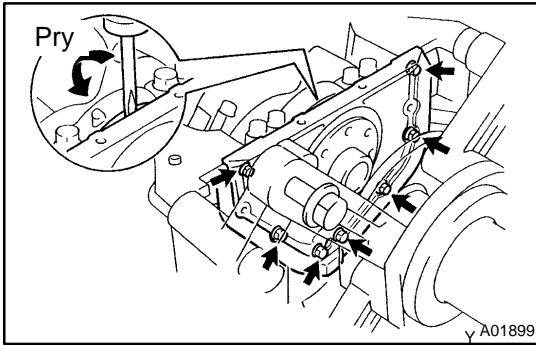
16. REMOVE WATER SEAL PLATE

Remove the 2 bolts and seal plate.

17. REMOVE ENGINE COOLANT DRAIN UNIONS

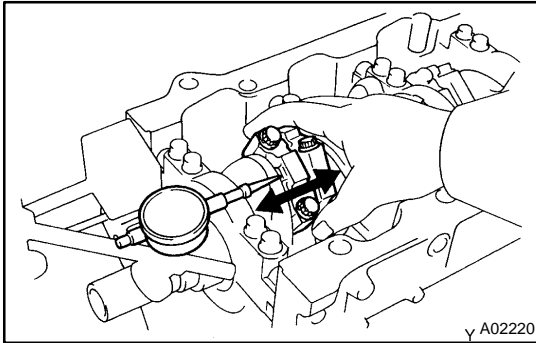
Remove the RH and LH drain unions.





18. REMOVE REAR OIL SEAL RETAINER

- Remove the 7 bolts.
- Using a screwdriver, remove the oil seal retainer by prying the portions between the oil seal retainer and main bearing cap.
- Remove the O-ring.



19. CHECK CONNECTING ROD THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while moving the connecting rod back and forth.

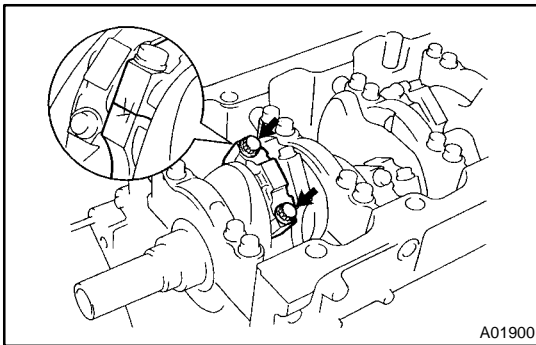
Thrust clearance:

Standard	0.160 – 0.290 mm (0.0063 – 0.0138 in.)
Maximum	0.35 mm (0.0138 in.)

If the thrust clearance is greater than maximum, replace the connecting rod assembly(s). If necessary, replace the crankshaft.

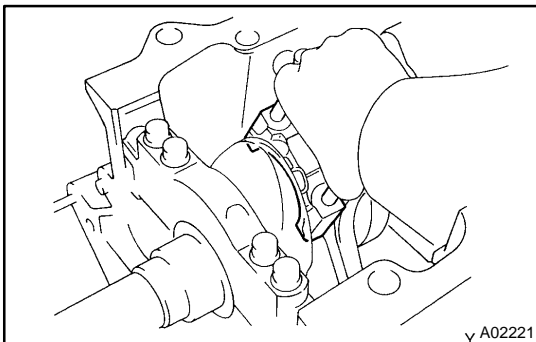
Connecting rod thickness:

22.880 – 22.920 mm (0.9008 – 0.9024 in.)



20. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

- Check the matchmarks on the connecting rod and cap to ensure correct reassembly.
- Remove the 2 connecting rod cap bolts.

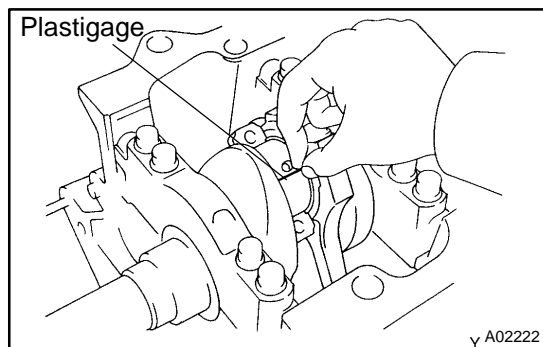


- Using the 2 removed connecting rod cap bolts, remove the connecting rod cap and lower bearing by wiggling the connecting rod cap right and left.

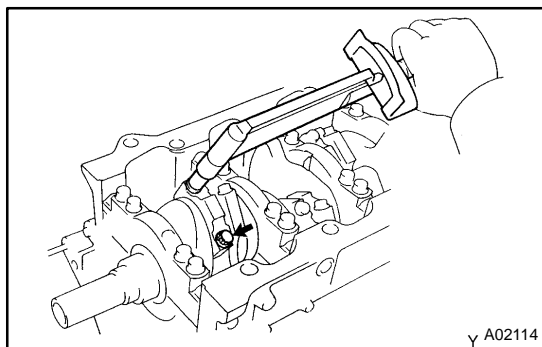
HINT:

Keep the lower bearing inserted with the connecting rod cap.

- Clean the crank pin and bearing.
- Check the crank pin and bearing for pitting and scratches. If the crank pin or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



- (f) Lay a strip of Plastigage across the crank pin.

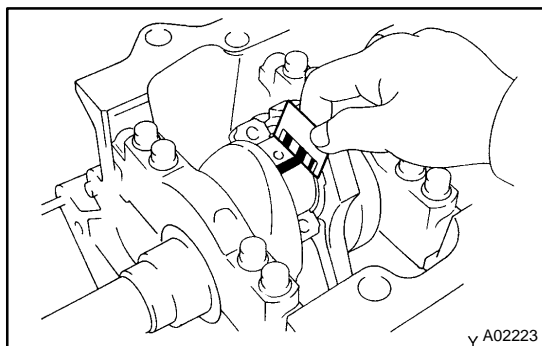


- (g) Install the connecting rod cap with the 2 bolts.
(See page [EM-110](#))

NOTICE:

Do not turn the crankshaft.

- (h) Remove the 2 bolts, connecting rod cap and lower bearing. (See procedure (b) and (c) above)

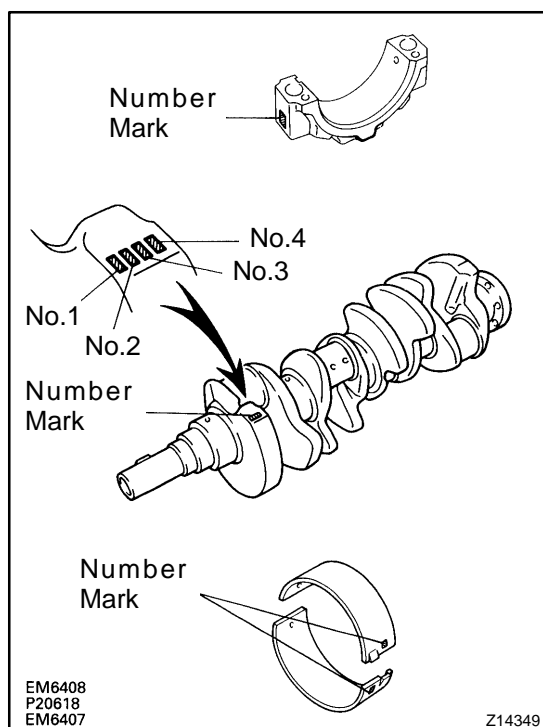


- (i) Measure the Plastigage at its widest point.

Oil clearance:

Standard	0.027 – 0.053 mm (0.0011 – 0.0021 in.)
Maximum	0.065 mm (0.0026 in.)

If the oil clearance is greater than maximum, replace the bearings. If necessary, replace the crankshaft.



HINT:

If using a standard bearing, replace it 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 connecting rod cap and crankshaft, then selecting the bearing with the same number as the total. There are 6 sizes of standard bearings, marked "2", "3", "4", "5", "6" and "7".

	Number mark											
Connecting rod cap	1	1	2	1	2	3	2	3	4	3	4	4
Crankshaft	1	2	1	3	2	1	3	2	1	3	2	3
Use bearing	2	3	4	4	5	5	5	6	6	7	7	7

EXAMPLE:

Connecting rod cap "3" + Crankshaft "1"
= Total number 4 (Use bearing "4")

Reference**Connecting rod big end inside diameter:**

Mark "1"	55.000 – 55.006 mm (2.1654 – 2.1656 in.)
Mark "2"	55.006 – 55.012 mm (2.1656 – 2.1658 in.)
Mark "3"	55.012 – 55.018 mm (2.1658 – 2.1661 in.)
Mark "4"	55.018 – 55.024 mm (2.1661 – 2.1663 in.)

Crankshaft crank pin diameter:

Mark "1"	51.994 – 52.000 mm (2.0470 – 2.0472 in.)
Mark "2"	51.988 – 51.994 mm (2.0468 – 2.0470 in.)
Mark "3"	51.982 – 51.988 mm (2.0465 – 2.0468 in.)

Standard sized bearing center wall thickness:

Mark "2"	1.484 – 1.487 mm (0.0584 – 0.0585 in.)
Mark "3"	1.487 – 1.490 mm (0.0585 – 0.0587 in.)
Mark "4"	1.490 – 1.493 mm (0.0587 – 0.0588 in.)
Mark "5"	1.493 – 1.496 mm (0.0588 – 0.0589 in.)
Mark "6"	1.496 – 1.499 mm (0.0589 – 0.0590 in.)
Mark "7"	1.499 – 1.502 mm (0.0590 – 0.0591 in.)

- (j) Completely remove the Plastigage.

21. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

- (a) Using a ridge reamer, remove all the carbon from the top of the cylinder.
- (b) 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.

22. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

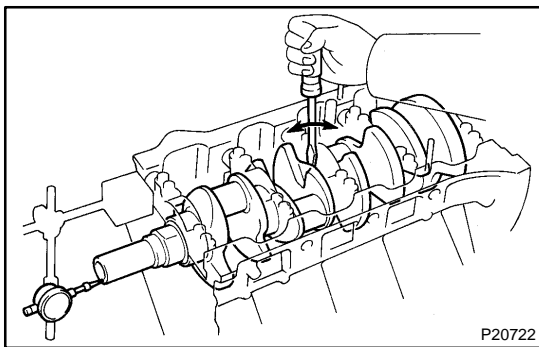
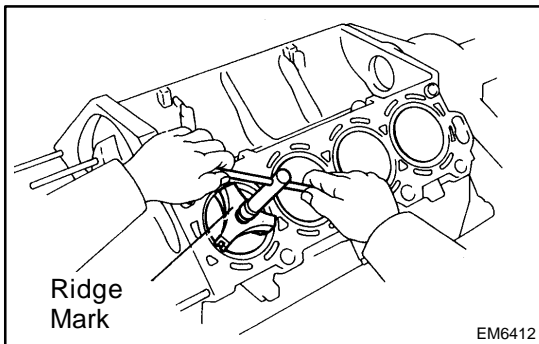
Thrust clearance:

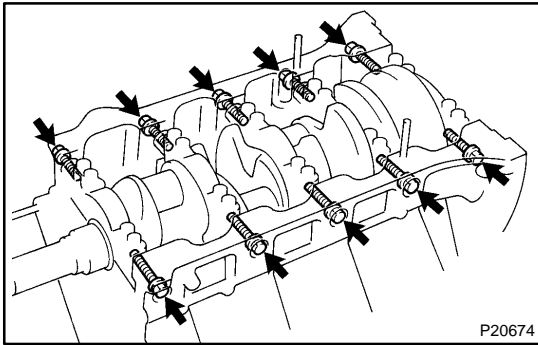
Standard	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
Maximum	0.30 mm (0.0118 in.)

If the thrust clearance is greater than maximum, replace the thrust washers as a set.

Thrust washer thickness:

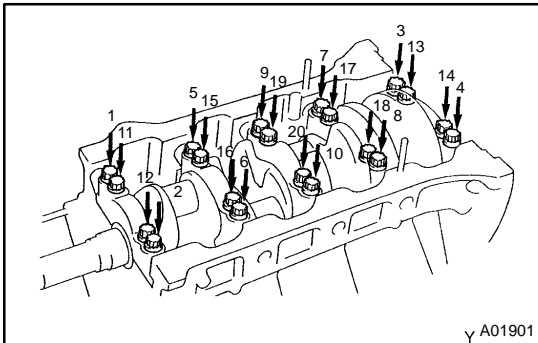
2.440 – 2.490 mm (0.0961 – 0.0980 in.)



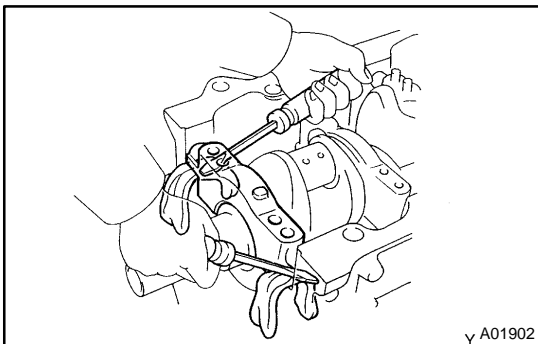


23. REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

- (a) Remove the 10 main bearing cap bolts.



- (b) Uniformly loosen and remove the 20 main bearing cap bolts in several passes, in the sequence shown.



- (c) Using 2 screwdrivers, pry out the main bearing cap, and remove the 5 main bearing caps, 5 lower bearings and 2 lower thrust washers (No.3 main bearing cap only).

NOTICE:

Be careful not to damage the cylinder block.

HINT:

- Keep the lower bearing and main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.

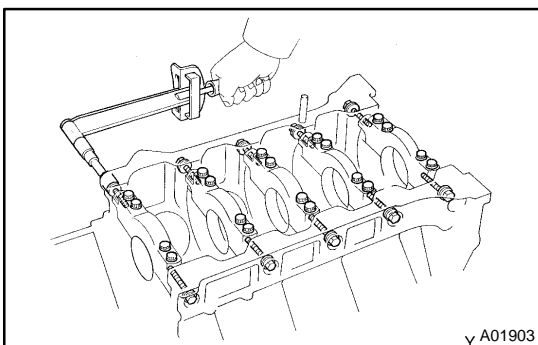
- (d) Lift out the crankshaft.
(e) Remove the 2 upper thrust washers.

HINT:

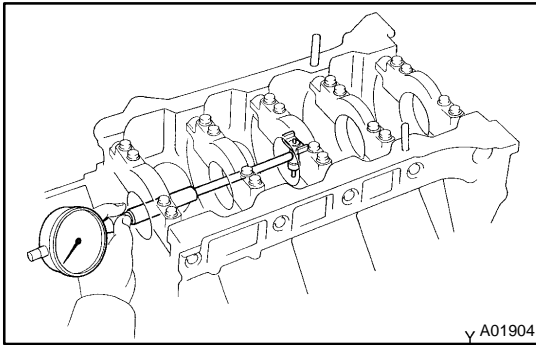
- Arrange the upper thrust washers in correct order.
- Keep the upper bearings together with the cylinder block.

- (f) Clean each main journal and bearing.
(g) Check each main journal and bearing for pitting and scratches.

If the journal or bearing is damaged, replace the bearings. If necessary, replace the crankshaft.



- (h) Install the 10 main bearings and 5 main bearing caps with the 30 bolts. Do not install the crankshaft.
(See page [EM-110](#))



- (i) Using a cylinder gauge, measure the inside diameter of the main bearing.

Bearing inside diameter:

66.986 – 67.000 mm (2.6372 – 2.6378 in.)

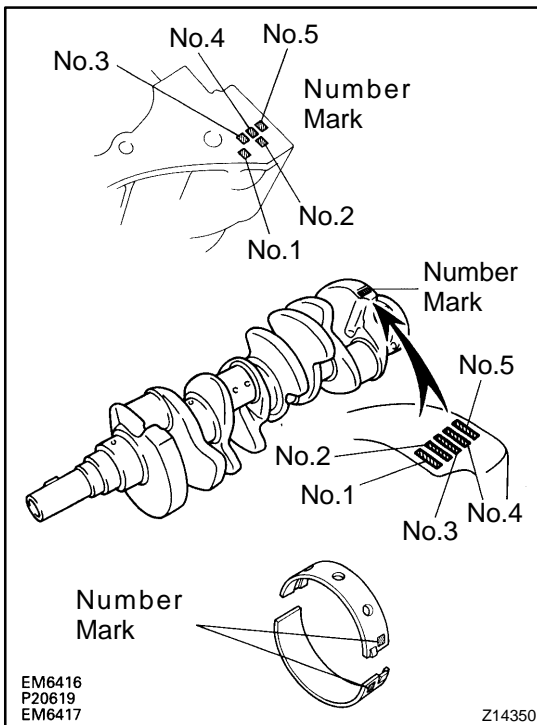
- (j) Measure the diameter of the main journal.
(See page [EM-100](#))
- (k) Subtract the main journal diameter measurement from the main bearing inside diameter measurement.

Standard clearance:

No.1 and No.5	0.017 – 0.033 mm (0.0007 – 0.0013 in.)
Others	0.029 – 0.045 mm (0.0011 – 0.0018 in.)

Maximum clearance:

No.1 and No.5	0.043 mm (0.0017 in.)
Others	0.055 mm (0.0022 in.)



If the oil clearance is greater than maximum, replace the bearings. If necessary, replace the crankshaft.

HINT:

If using a standard bearing, replace it 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 refer to the table below for the appropriate bearing number. There are 5 sizes of the standard bearings. For No.1 and No.5 position bearings, use bearings marked "3", "4", "5", "6" and "7". For others position bearings, use bearings marked "1", "2", "3", "4" and "5".

No.1, No.5:

		Use bearing	
		Upper	Lower
Cylinder block (A) + Crankshaft (B)	0 – 5	3	3
	6 – 8	3	4
	9 – 11	4	4
	12 – 14	4	5
	15 – 17	5	5
	18 – 20	5	6
	21 – 23	6	6
	24 – 26	6	7
	27 – 28	7	7

EXAMPLE:

Cylinder block "08" + Crankshaft "06"

= Total number 14 (Use bearing "4" (Upper), "5" (Lower))

Others:

		Use bearing	
		Upper	Lower
Cylinder block (A) + Crankshaft (B)	0 – 5	1	1
	6 – 8	1	2
	9 – 11	2	2
	12 – 14	2	3
	15 – 17	3	3
	18 – 20	3	4
	21 – 23	4	4
	24 – 26	4	5
	27 – 28	5	5

EXAMPLE:

Cylinder block "08" + Crankshaft "06"

= Total number 14 (Use bearing "2" (Upper), "3" (Lower))

Reference**Cylinder block main journal bore diameter (A):**

Mark "00"	72.000 mm (2.8346 in.)
Mark "01"	72.001 mm (2.8347 in.)
Mark "02"	72.002 mm (2.8347 in.)
Mark "03"	72.003 mm (2.8348 in.)
Mark "04"	72.004 mm (2.8348 in.)
Mark "05"	72.005 mm (2.8348 in.)
Mark "06"	72.006 mm (2.8349 in.)
Mark "07"	72.007 mm (2.8349 in.)
Mark "08"	72.008 mm (2.8350 in.)
Mark "09"	72.009 mm (2.8350 in.)
Mark "10"	72.010 mm (2.8350 in.)
Mark "11"	72.011 mm (2.8351 in.)
Mark "12"	72.012 mm (2.8351 in.)
Mark "13"	72.013 mm (2.8352 in.)
Mark "14"	72.014 mm (2.8352 in.)
Mark "15"	72.015 mm (2.8352 in.)
Mark "16"	72.016 mm (2.8353 in.)

Crankshaft main journal diameter (B):

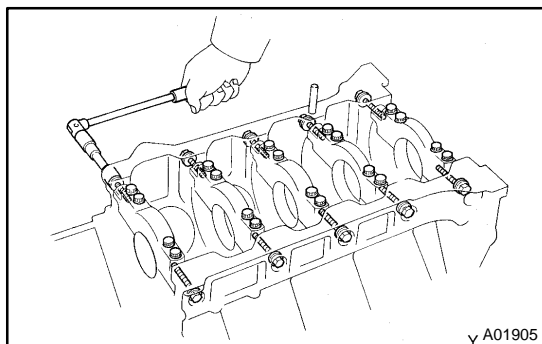
Mark "00"	67.000 mm (2.6378 in.)
Mark "01"	66.999 mm (2.6378 in.)
Mark "02"	66.998 mm (2.6377 in.)
Mark "03"	66.997 mm (2.6377 in.)
Mark "04"	66.996 mm (2.6376 in.)
Mark "05"	66.995 mm (2.6376 in.)
Mark "06"	66.994 mm (2.6376 in.)
Mark "07"	66.993 mm (2.6375 in.)
Mark "08"	66.992 mm (2.6375 in.)
Mark "09"	66.991 mm (2.6374 in.)
Mark "10"	66.990 mm (2.6374 in.)
Mark "11"	66.989 mm (2.6374 in.)
Mark "12"	66.988 mm (2.6373 in.)

Standard bearing center wall thickness:**No.1 and No.5**

Mark "3"	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
Mark "4"	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
Mark "5"	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
Mark "6"	2.501 – 2.504 mm (0.0985 – 0.0986 in.)
Mark "7"	2.504 – 2.507 mm (0.0986 – 0.0987 in.)

Others

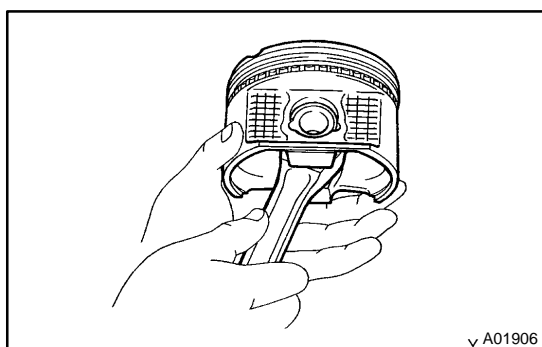
Mark "1"	2.486 – 2.489 mm (0.0979 – 0.0980 in.)
Mark "2"	2.489 – 2.492 mm (0.0980 – 0.0981 in.)
Mark "3"	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
Mark "4"	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
Mark "5"	2.498 – 2.501 mm (0.0983 – 0.0985 in.)



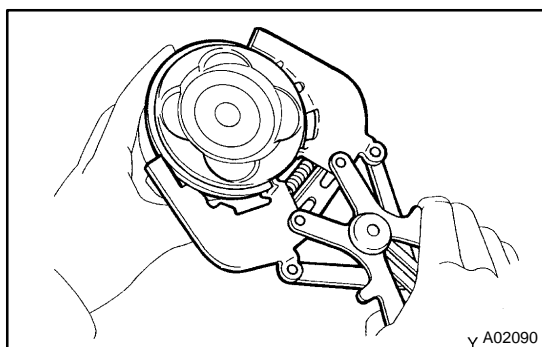
- (l) Remove the 10 bolts, 20 nuts, 5 main bearing caps and 5 lower main bearing.
(See procedure (a) to (c) above)
- (m) Remove the 5 upper main bearings from the cylinder block.

HINT:

Arrange the main bearing caps, bearings and thrust washers in correct order.

**24. CHECK FIT BETWEEN PISTON AND PISTON PIN**

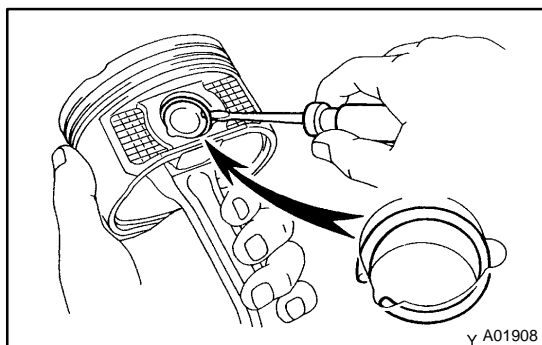
Try to move the piston back and forth on the piston pin.
If any movement is felt, replace the piston and pin as a set.

**25. REMOVE PISTON RINGS**

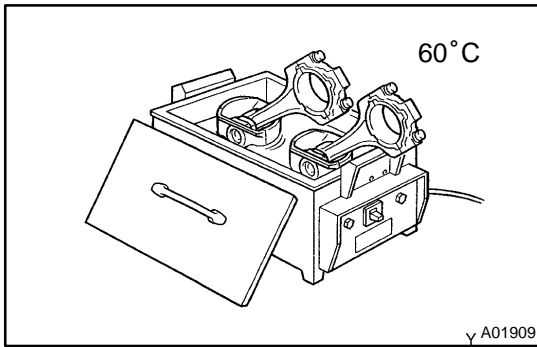
- (a) Using a piston ring expander, remove the 2 compression rings.
- (b) Remove the 2 side rails and oil ring by hand.

HINT:

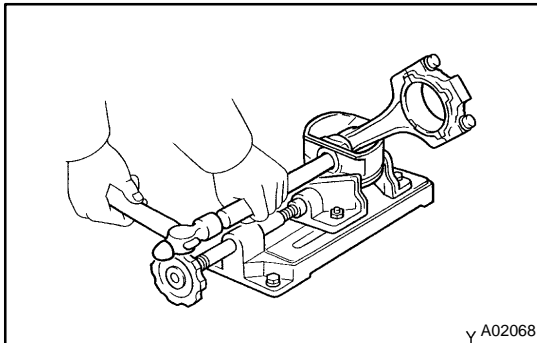
Arrange the piston rings in correct order only.

**26. DISCONNECT CONNECTING ROD FROM PISTON**

- (a) Using a small screwdriver, pry out the 2 snap rings.



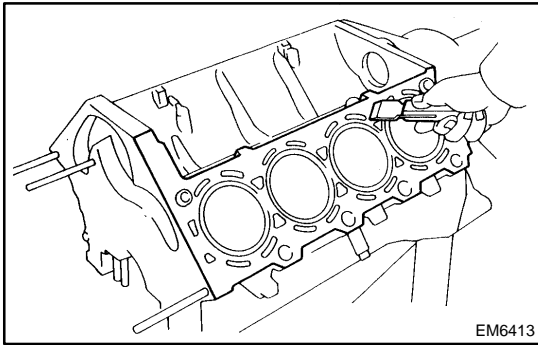
(b) Gradually heat the piston to approx. 60°C (140°F).



(c) Using a plastic-faced hammer and brass bar, lightly tap out the piston pin and 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 correct order.



EM6413

INSPECTION

1. REMOVE GASKET MATERIAL

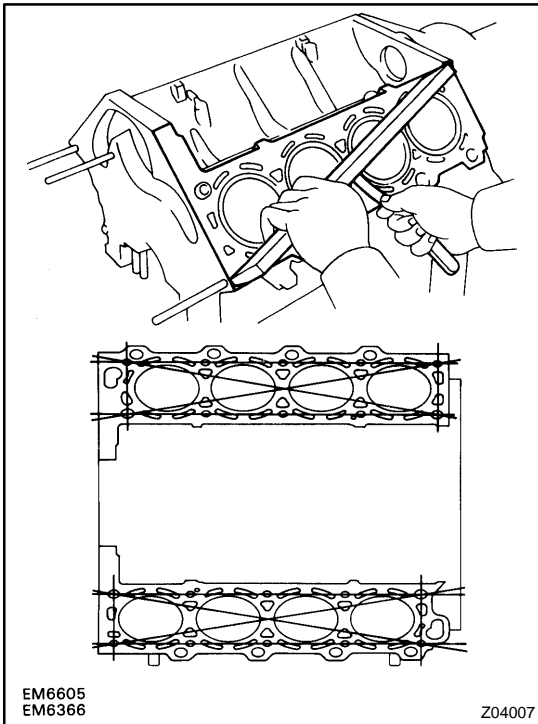
Using a gasket scraper, remove all the gasket material from the top surface of the cylinder block.

2. CLEAN CYLINDER BLOCK

Using a soft brush and solvent, thoroughly clean the cylinder block.

NOTICE:

If the cylinder is washed at high temperatures, the cylinder liner sticks out beyond the cylinder block, so always wash the cylinder block at a temperature of 45° or less.

EM6605
EM6366

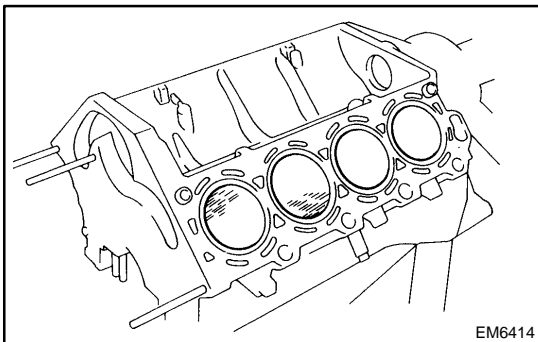
Z04007

3. INSPECT TOP SURFACE OF CYLINDER BLOCK FOR FLATNESS

Using a precision straight edge and feeler gauge, measure the surface contacting the cylinder head gasket for warpage.

Maximum warpage: 0.07 mm (0.0028 in.)

If warpage is greater than maximum, replace the cylinder block.

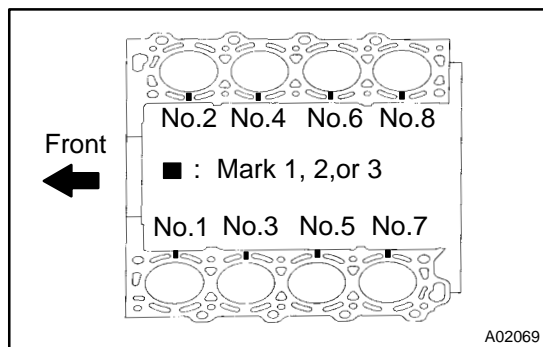


EM6414

4. INSPECT CYLINDER FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

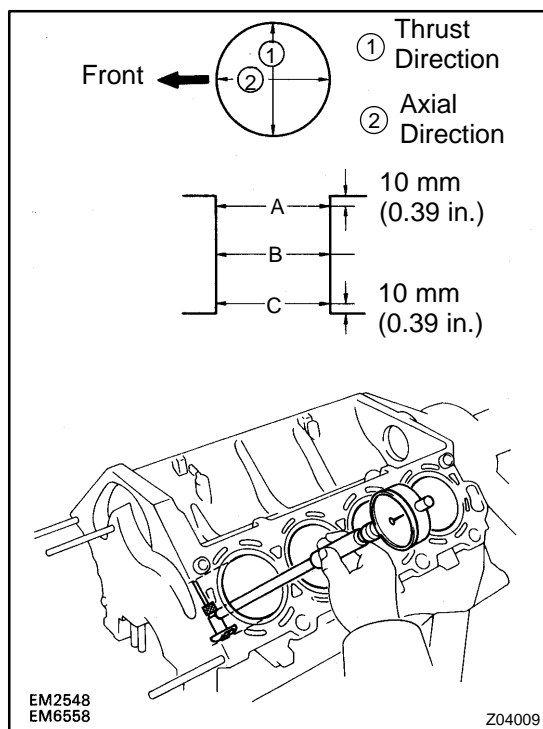
If deep scratches are present, replace the cylinder block.



5. INSPECT 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.



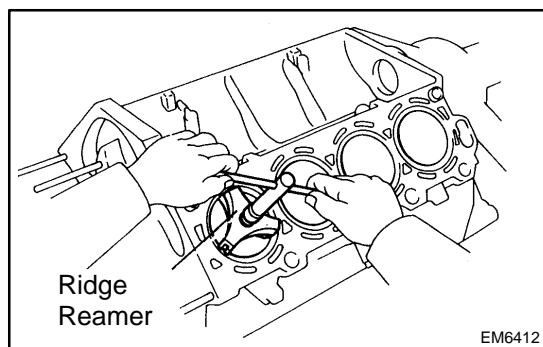
Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

Standard diameter:

Mark "1"	87.500 – 87.510 mm (3.4449 – 3.4453 in.)
Mark "2"	87.510 – 87.520 mm (3.4453 – 3.4457 in.)
Mark "3"	87.520 – 87.530 mm (3.4457 – 3.4461 in.)

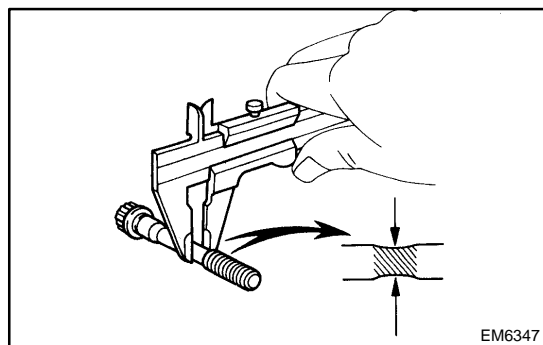
Maximum diameter: 87.73 mm (3.4539 in.)

If the diameter is greater than maximum, replace the cylinder block.



6. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), using a ridge reamer, grind the top of the cylinder.



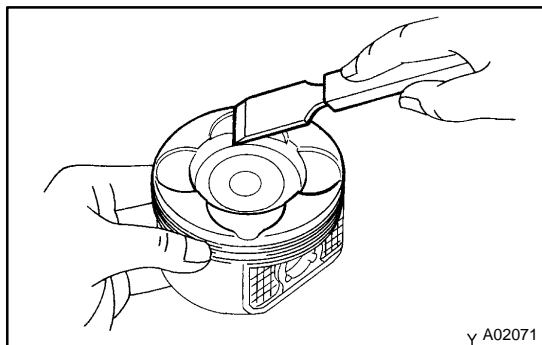
7. INSPECT MAIN BEARING CAP BOLTS

Using vernier calipers, measure the tension portion diameter of the bolt.

Diameter:

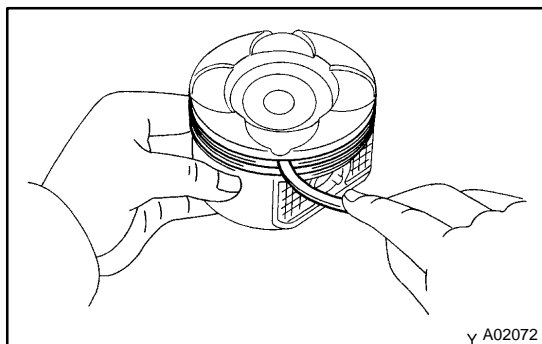
Standard	7.500 – 7.600 mm (0.2953 – 0.2992 in.)
Minimum	7.20 mm (0.2835 in.)

If the diameter is less than minimum, replace the stud bolt.

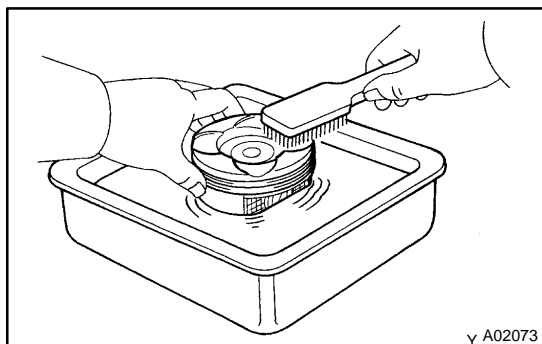


8. CLEAN PISTON

- (a) Using a gasket scraper, remove the carbon from the piston top.



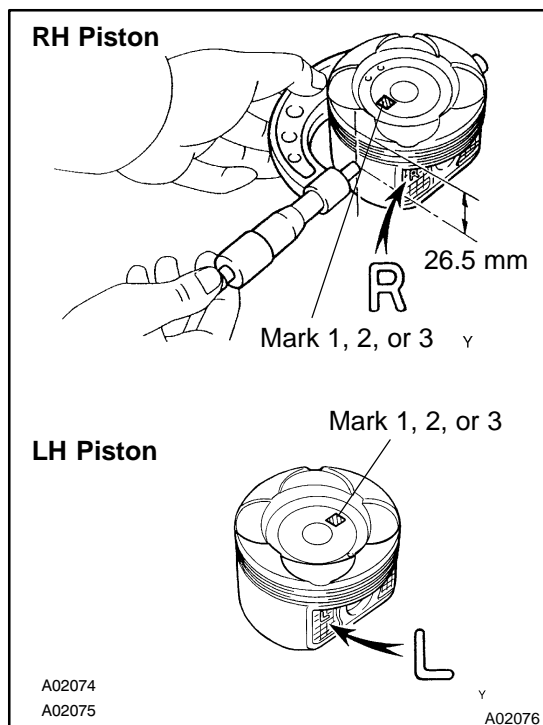
- (b) Using a groove cleaning tool or broken ring, clean the piston ring grooves.



- (c) Using solvent and a brush, thoroughly clean the piston.

NOTICE:

Do not use a wire brush.



9. INSPECT 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.

- (a) Using a micrometer, measure the piston diameter at right angles to the piston pin center line, 26.5 mm (1.04 in.) from the piston head.

Piston diameter:

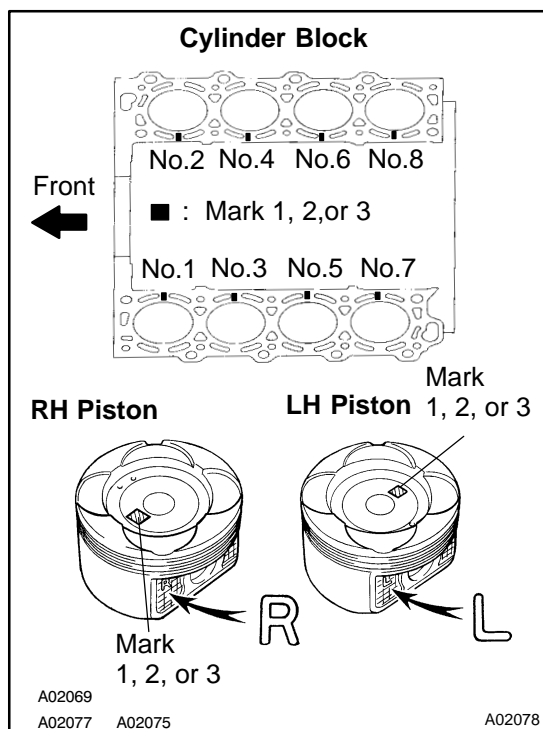
Mark "1"	87.406 – 87.416 mm (3.4411 – 3.4416 in.)
Mark "2"	87.416 – 87.426 mm (3.4416 – 3.4420 in.)
Mark "3"	87.426 – 87.436 mm (3.4420 – 3.4424 in.)

- (b) Measure the cylinder bore diameter in the thrust directions. (See step 5 above)
- (c) Subtract the piston diameter measurement from the cylinder bore diameter measurement.

Oil clearance:

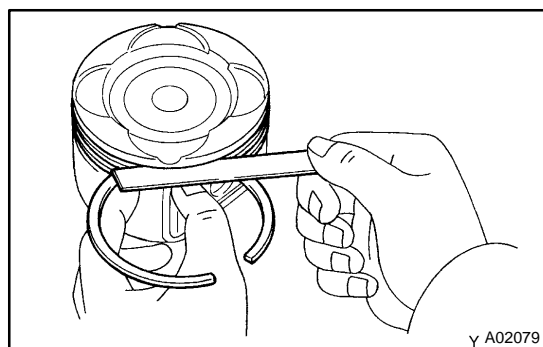
Standard	0.084 – 0.104 mm (0.0033 – 0.0041 in.)
Maximum	0.124 mm (0.0049 in.)

If the oil clearance is greater than maximum, replace all the 8 pistons. If necessary, replace the cylinder block.

**HINT**

Use new cylinder block:

- Use a piston with the same number mark as the cylinder diameter marked on the cylinder block.
- The shape of the piston varies for the RH and LH banks. The RH piston is marked with "R", the LH piston with "L".

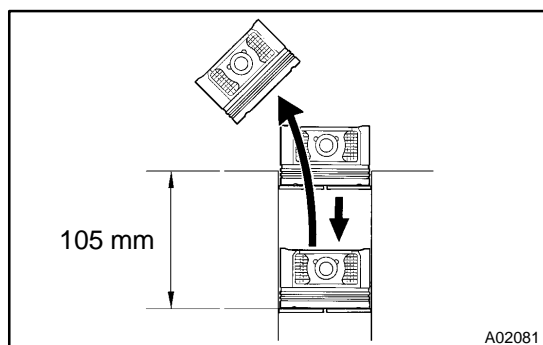
**10. INSPECT PISTON RING GROOVE CLEARANCE**

Using a feeler gauge, measure the clearance between new piston ring and the wall of the ring groove.

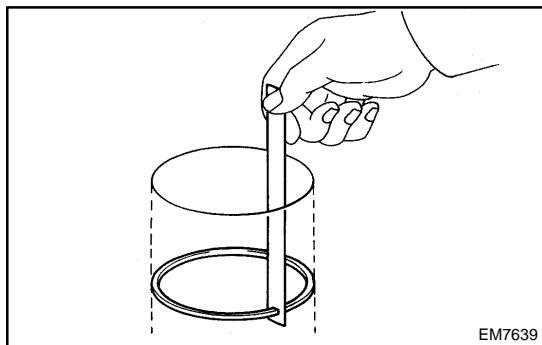
Ring groove clearance:

No.1	0.020 – 0.070 mm (0.0008 – 0.0028 in.)
No.2	0.010 – 0.050 mm (0.0004 – 0.0020 in.)

If the clearance is not as specified, replace the piston.

**11. INSPECT PISTON RING END GAP**

- Insert the piston ring into the cylinder bore.
- Using a piston, push the piston ring a little beyond the bottom of the ring travel, 105 mm (4.13 in.) from the top of the cylinder block.



(c) Using a feeler gauge, measure the end gap.

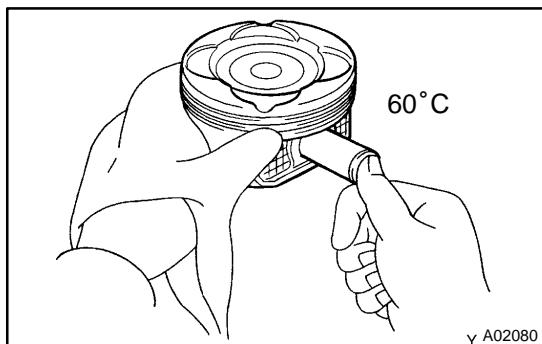
Standard end gap:

No.1	0.250 – 0.450 mm (0.0098 – 0.0177 in.)
No.2	0.500 – 0.700 mm (0.0197 – 0.0276 in.)
Oil (Side rail)	0.150 – 0.500 mm (0.0059 – 0.0197 in.)

Maximum end gap:

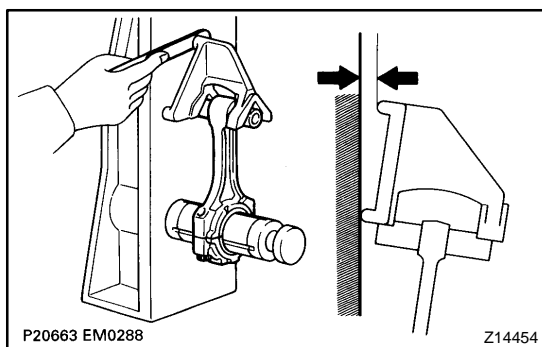
No.1	1.05 mm (0.0413 in.)
No.2	1.30 mm (0.0512 in.)
Oil (Side rail)	1.10 mm (0.0433 in.)

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, replace the cylinder block.



12. INSPECT 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.



13. INSPECT CONNECTING ROD ALIGNMENT

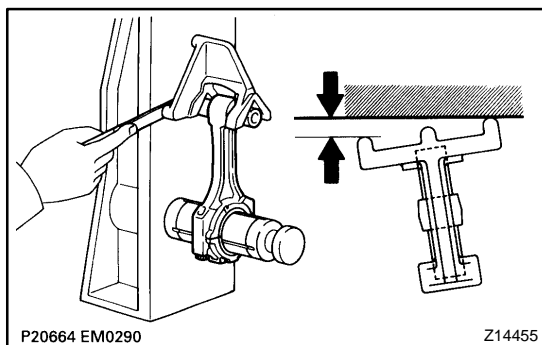
Using a rod aligner and feeler gauge, check the connecting rod alignment.

- 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.

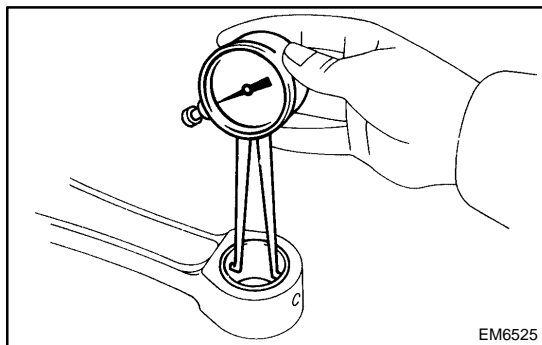


- Check for twist

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.

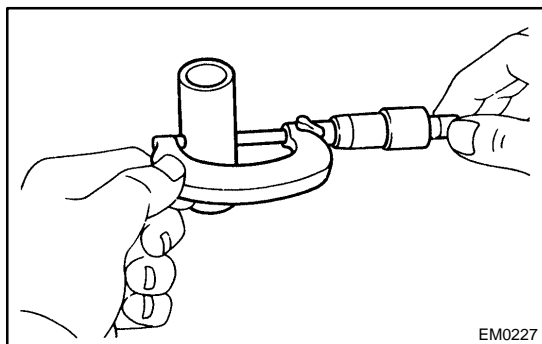


14. INSPECT PISTON PIN OIL CLEARANCE

- (a) Using a caliper gauge, measure the inside diameter of the connecting rod bushing.

Bushing inside diameter:

22.005 – 22.014 mm (0.8663 – 0.8667 in.)



- (b) Using a micrometer, measure the piston pin diameter.

Piston pin diameter:

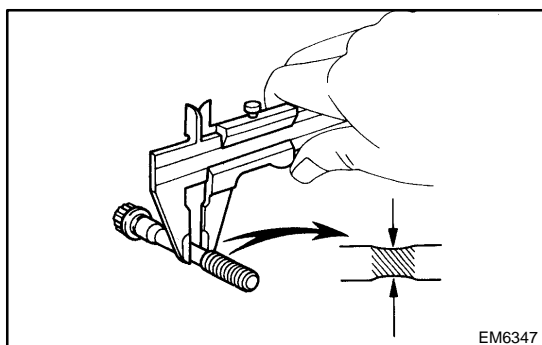
21.997 – 22.006 mm (0.8660 – 0.8664 in.)

- (c) Subtract the piston pin diameter measurement from the bushing inside diameter measurement.

Oil clearance:

Standard	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
Maximum	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.



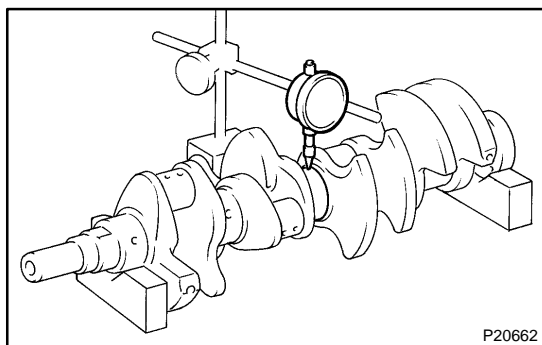
15. INSPECT CONNECTING ROD BOLTS

Using vernier calipers, measure the tension portion of the connecting rod bolt.

Diameter:

Standard	7.200 – 7.300 mm (0.2835 – 0.2874 in.)
Minimum	7.00 mm (0.2756 in.)

If the diameter is less than minimum, replace the bolt.

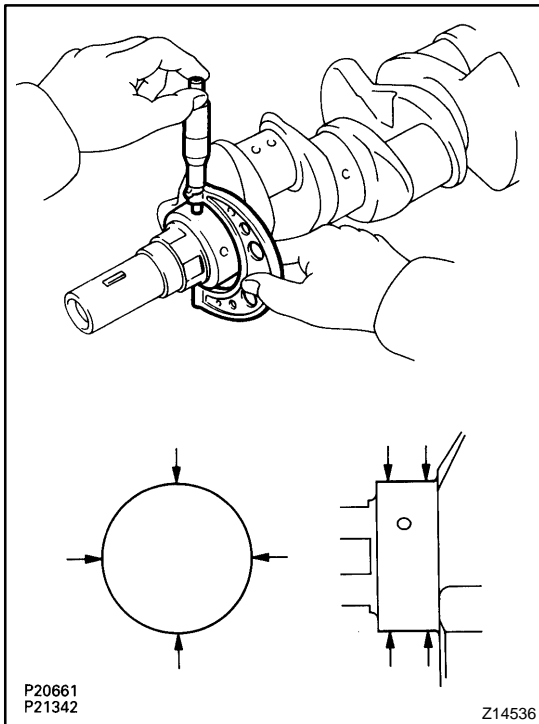


16. INSPECT CRANKSHAFT FOR CIRCLE RUNOUT

- (a) Place the crankshaft on V-blocks.
 (b) Using a dial indicator, measure the circle runout at the center journal.

Maximum circle runout: 0.08 mm (0.0031 in.)

If the circle runout is greater than maximum, replace the crankshaft.

**17. INSPECT MAIN JOURNALS AND CRANK PINS**

- (a) Using a micrometer, measure the diameter of each main journal and crank pin.

Diameter:

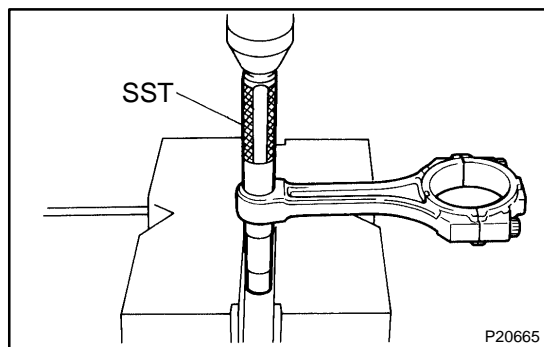
Main journal	66.988 – 67.000mm (2.6373 – 2.6378 in.)
Crank pin	51.982 – 52.000 mm (2.0465 – 2.0472 in.)

If the diameter is not as specified, check the oil clearance (See disassembly). If necessary, replace the crankshaft.

- (b) 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.)**

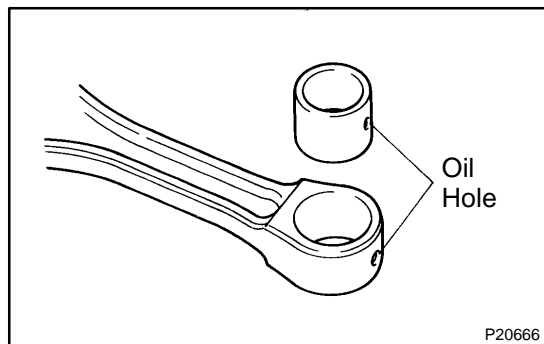
If the taper and out-of-round is greater than maximum, replace the crankshaft.



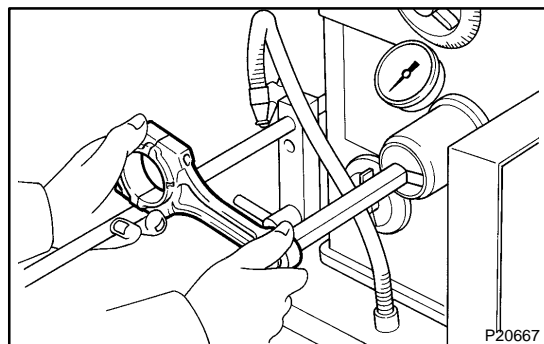
REPLACEMENT

1. REPLACE CONNECTING ROD BUSHINGS

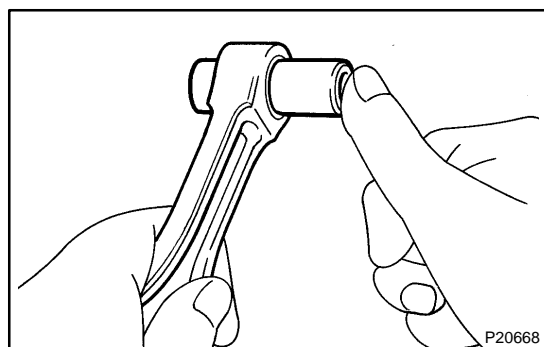
- (a) Using SST and a press, press out the bushing.
SST 09222-30010



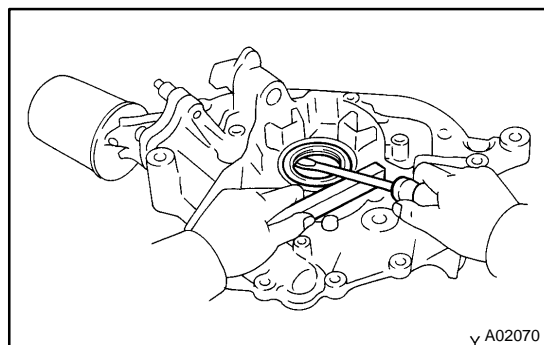
- (b) Align the oil holes of a new bushing and the connecting rod.
(c) Using SST and a press, press in the bushing.
SST 09222-30010



- (d) Using a pin hole grinder, hone the bushing to obtain the standard specified clearance (See page [EM-100](#)) 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.

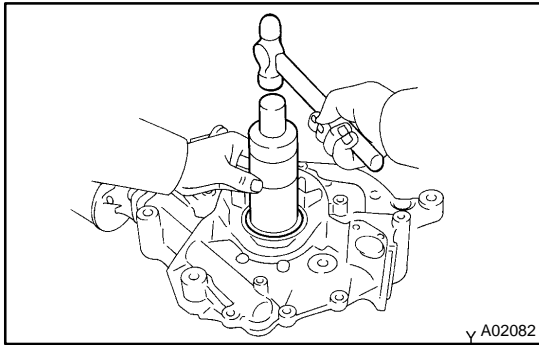


2. REPLACE CRANKSHAFT FRONT OIL SEAL

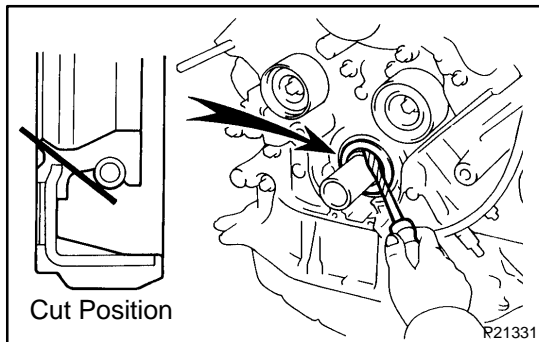
HINT:

There are 2 methods ((a) and (b)) to replace the oil seal.

- (a) If oil pump is removed from cylinder block:
(1) Using a screwdriver, pry out the oil seal.



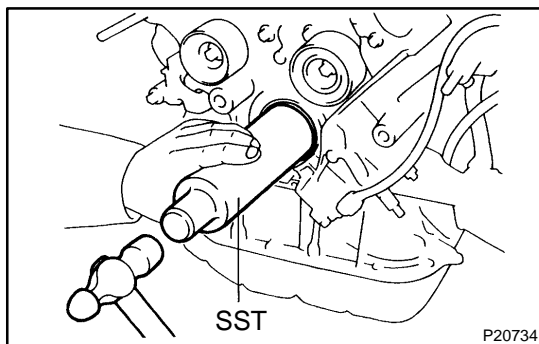
- (2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the oil pump body edge.
- SST 09316-60011 (09316-00011)
- (3) Apply MP grease to the oil seal lip.



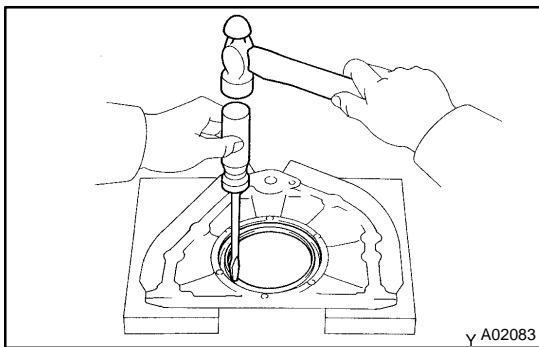
- (b) If oil pump is installed to the cylinder block:
 - (1) Using a knife, cut off the oil seal lip.
 - (2) Using a screwdriver, pry out the oil seal.

NOTICE:

Be careful not to damage the crankshaft. Tape the screwdriver tip.

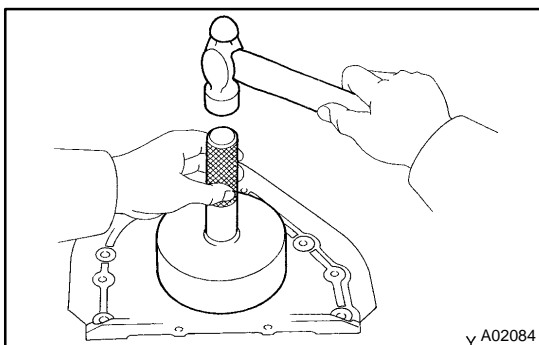


- (3) Apply MP grease to a new oil seal lip.
- (4) Using SST and a hammer, tap in the oil seal until its surface is flush with the oil pump body edge.
- SST 09316-60011 (09316-00011)

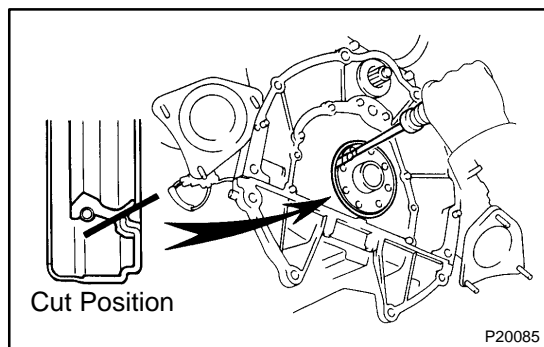
**3. REPLACE CRANKSHAFT REAR OIL SEAL****HINT:**

There are 2 methods ((a) and (b)) to replace the oil seal which.

- (a) If rear oil seal retainer is removed from cylinder block:
 - (1) Using a screwdriver and hammer, tap out the oil seal.



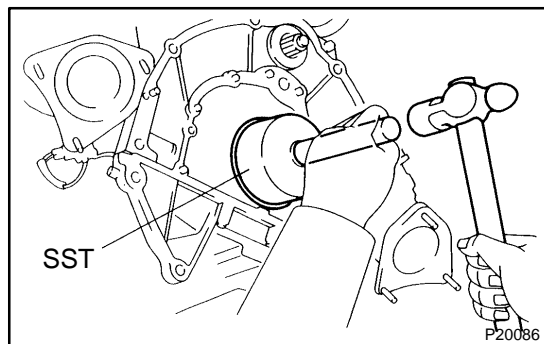
- (2) Using SST and a hammer, tap in a new oil seal until its surface is flush with the rear oil seal retainer edge.
- SST 09223-56010
- (3) Apply MP grease to the oil seal lip.



- (b) If rear oil seal retainer is installed to cylinder block:
- (1) Using a knife, cut off the oil seal lip.
 - (2) Using a screwdriver, pry out the oil seal.

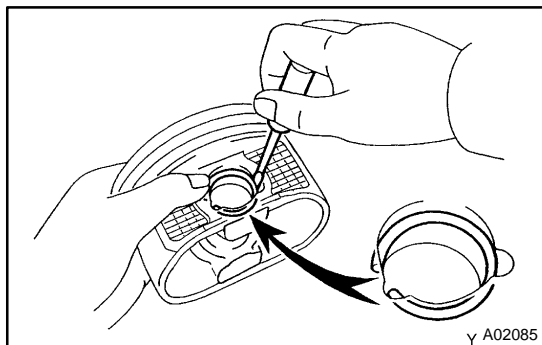
NOTICE:

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 09223-56010



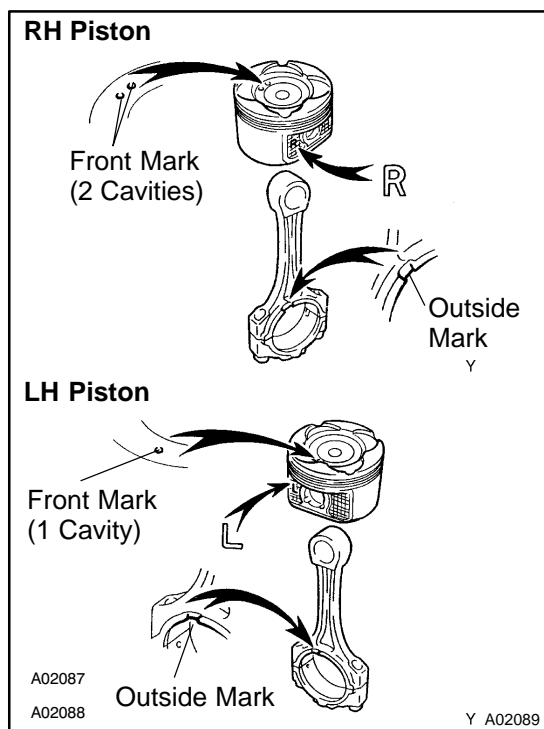
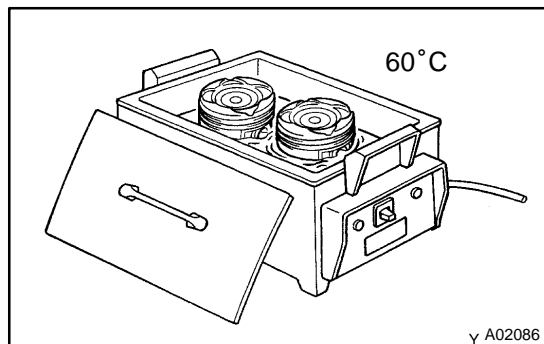
REASSEMBLY

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 on one side of the piston pin hole.
- (b) Gradually heat the piston to about 60°C (140°F).

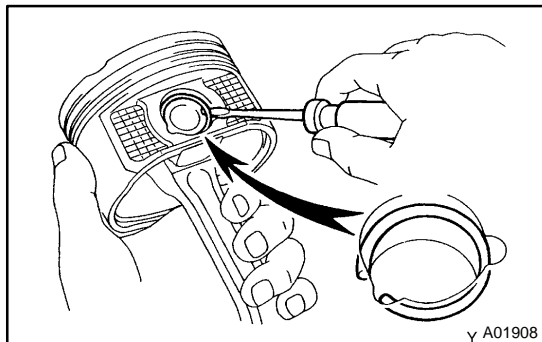


- (c) Coat the piston pin with engine oil.
- (d) Position the piston front mark with respect to the outside mark on the connecting rod as shown in the diagram.

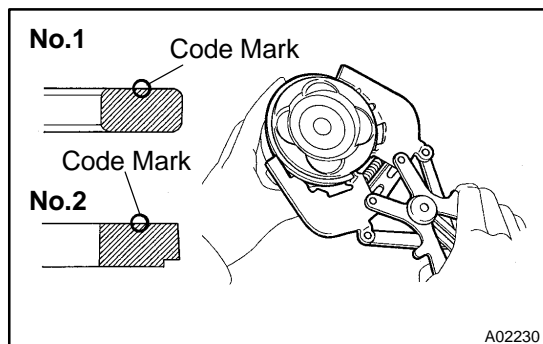
NOTICE:

The installation directions of the piston and connecting rod are different for the RH and LH banks. The RH piston is marked with "R", the LH piston with "L".

- (e) Align the piston pin holes of the piston and connecting rod, and push in the piston pin with your thumb.



- (f) Using a small screwdriver, install a new snap ring on the other side of the piston pin hole.

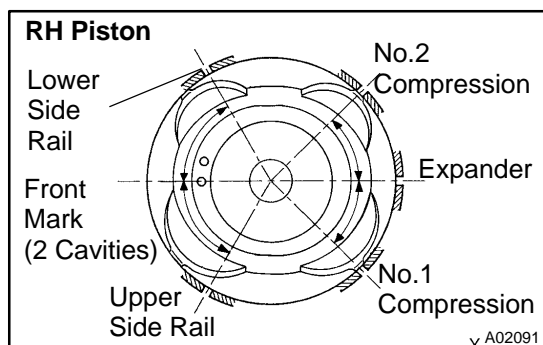


2. INSTALL PISTON RINGS

- Install the oil ring expander and 2 side rails by hand.
- Using a piston ring expander, install the 2 compression rings with the code mark facing upward.

Code mark:

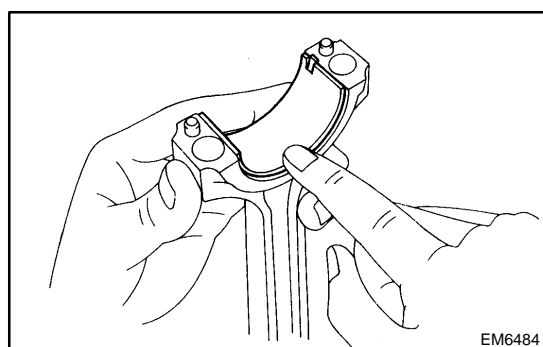
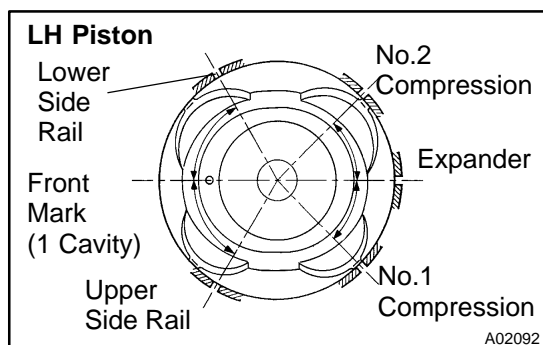
No.1	1R
No.2	2R



- Position the piston rings so that the ring ends are as shown.

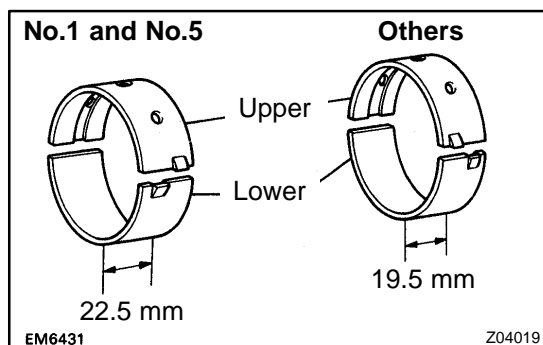
NOTICE:

Do not align the ring ends.



3. INSTALL BEARINGS

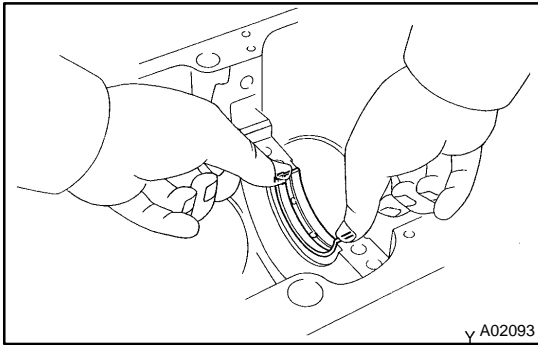
- Align the bearing claw with the groove of the connecting rod or connecting cap.
- Install the bearings in the connecting rod and connecting rod cap.



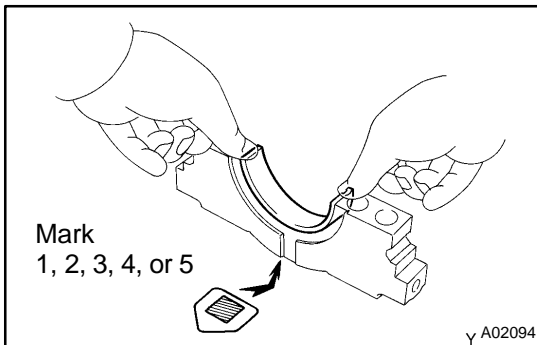
4. INSTALL MAIN BEARINGS

HINT:

- Main bearings come in widths of 19.5 mm (0.768 in.) and 22.5 mm (0.886 in.). Install the 22.5 mm (0.886 in.) bearings in the No.1 and No.5 cylinder block journal positions with the main bearing cap. Install the 19.5 mm (0.768 in.) bearings in the other positions.
- Upper bearings have an oil groove and oil holes; lower bearings do not.



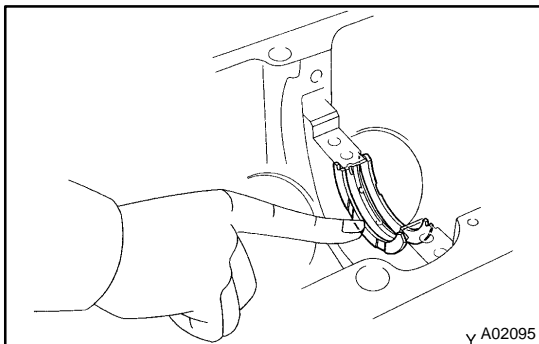
- (a) Align the bearing claw with the claw groove of the cylinder block, and push in the 5 upper bearings.



- (b) Align the bearing claw with the claw groove of the main bearing cap, and push in the 5 lower bearings.

HINT:

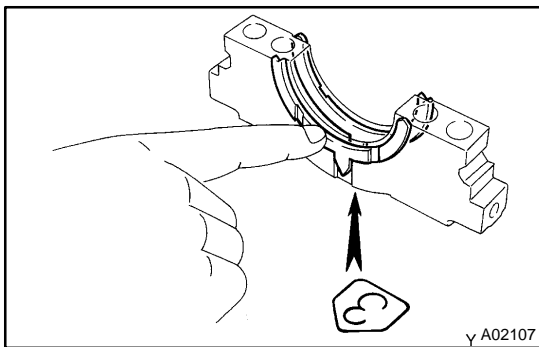
A number is marked on each main bearing cap to indicate the installation position.



5. INSTALL UPPER THRUST WASHERS

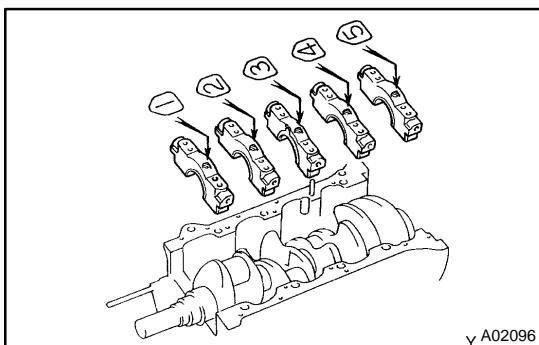
Install the 2 thrust washers under the No.3 journal position of the cylinder block with the oil grooves facing outward.

6. PLACE CRANKSHAFT ON CYLINDER BLOCK

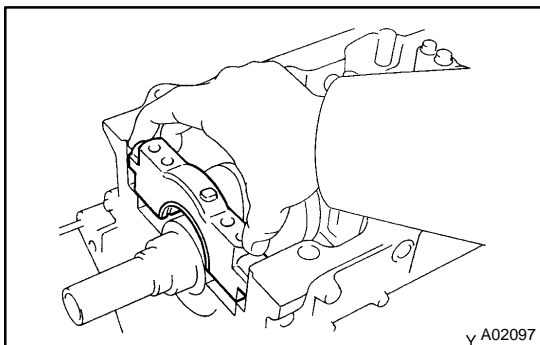


7. PLACE MAIN BEARING CAPS AND LOWER THRUST WASHERS ON CYLINDER BLOCK

- (a) Install the 2 thrust washers on the No.3 bearing cap with the grooves facing outward.



- (b) Install the 5 main bearing caps in their proper locations.

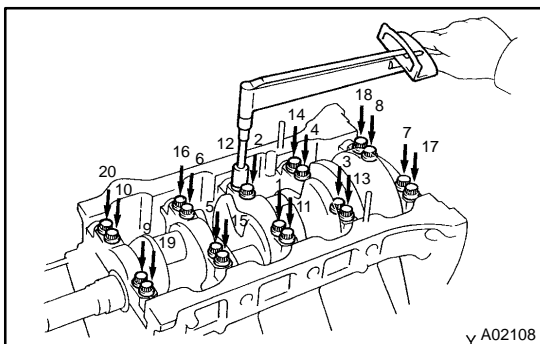


HINT:

Place the bearing caps level and let them return to their original position by their own weight.

NOTICE:

Do not install the main bearing cap by tapping it.



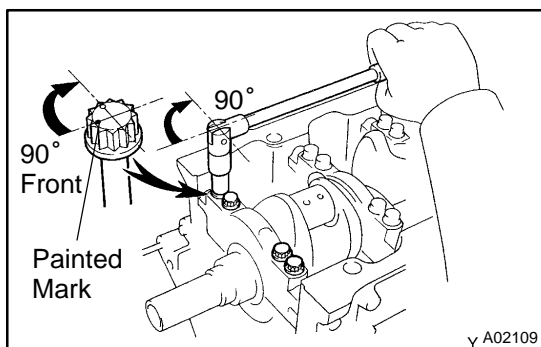
8. INSTALL MAIN BEARING CAP BOLTS

HINT:

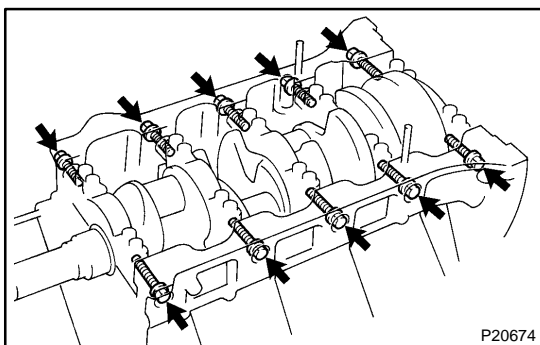
- The main bearing cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any one of the main bearing cap bolts is broken or deformed, replace it.
- (a) Apply a light coat of engine oil on the threads and under the main bearing cap bolts.
 - (b) Install and uniformly tighten the 20 main bearing cap bolts in several passes, in the sequence shown.

Torque: 27 N·m (275 kgf-cm, 20 ft-lbf)

If any one of the main bearing cap bolts does not meet the torque specification, replace the main bearing 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.

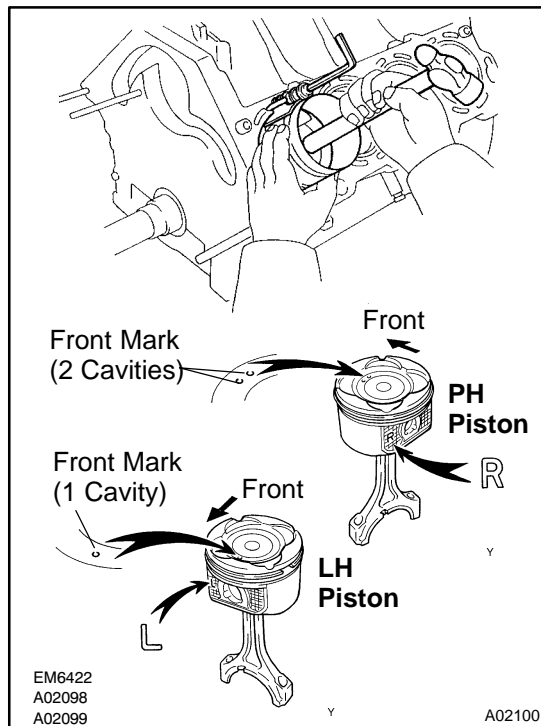


- (f) Install a new seal washer to the main bearing cap bolt.
- (g) Install and uniformly tighten the 10 main bearing cap bolts.

Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)

- (h) Check that the crankshaft turns smoothly.

9. CHECK CRANKSHAFT THRUST CLEARANCE (See page [EM-90](#))

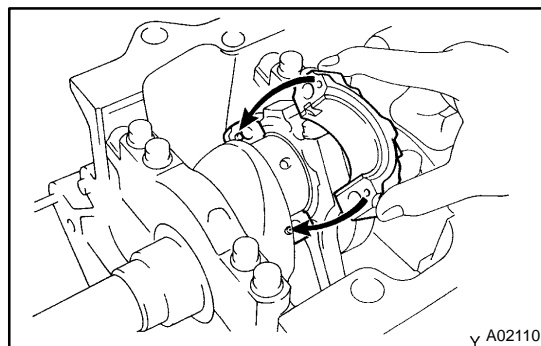


10. INSTALL PISTON AND CONNECTING ROD ASSEMBLES

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.

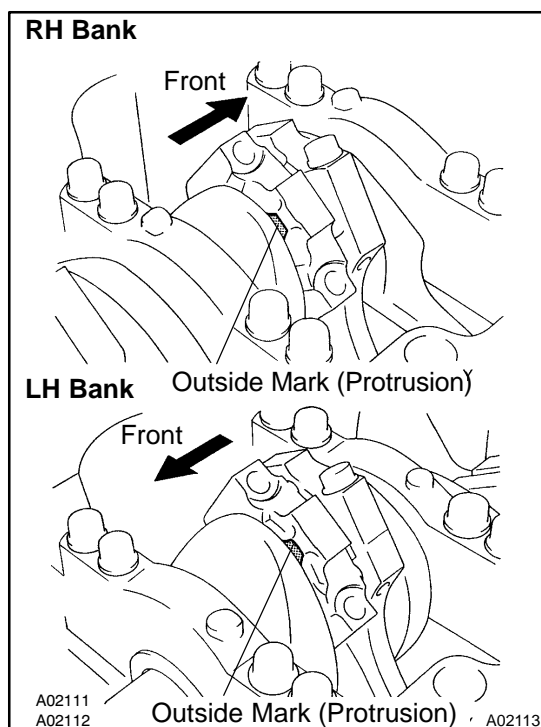
NOTICE:

The shape of the piston varies for the RH and LH banks. The RH piston is marked with "R", the LH piston with "L".



11. PLACE CONNECTING ROD CAP ON CONNECTING ROD

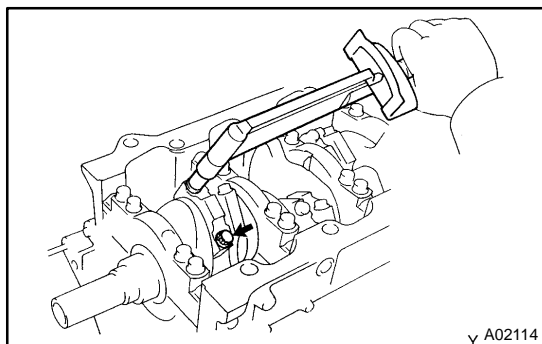
- Match the numbered connecting rod cap with the connecting rod.
- Align the pin groove of the connecting rod cap with the pins of the connecting rod, and install the connecting rod cap.



- Check that the outside mark of the connecting rod cap is facing in correct direction.

12. INSTALL CONNECTING ROD CAP BOLTS**HINT:**

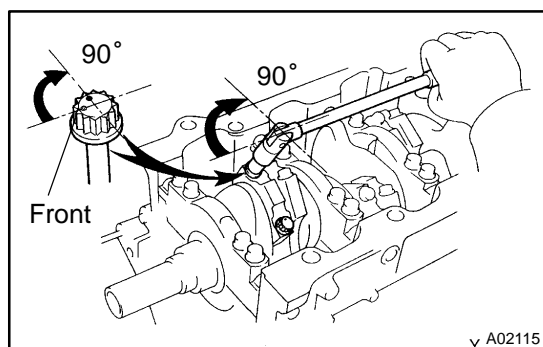
- The connecting rod cap bolts are tightened in 2 progressive steps (steps (b) and (d)).
 - If any one of the connecting rod cap bolts is broken or deformed, replace it.
- (a) Apply a light coat of engine oil on the threads and under the heads of the connecting rod cap bolts.



- (b) Install and alternately tighten the 2 connecting rod cap bolts in several passes.

Torque: 25 N·m (250 kgf-cm, 18 ft-lbf)

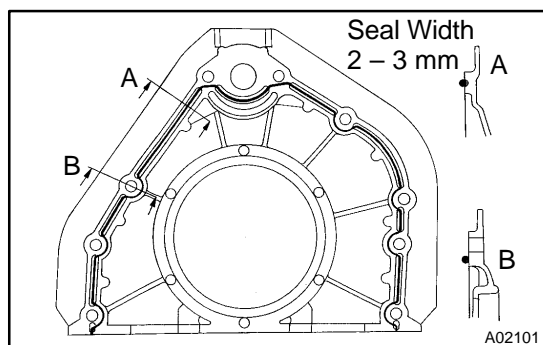
If any one of the connecting rod cap bolts does not meet the torque specification, replace the connecting rod cap bolts.



- (c) Mark the front of the connecting cap bolt with paint.
 (d) Retighten the cap bolts 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.

13. CHECK CONNECTING ROD THRUST CLEARANCE
(See page [EM-90](#))**14. 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 oil seal retainer and cylinder block.
- Using a razor blade and gasket scraper, remove all the oil 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.



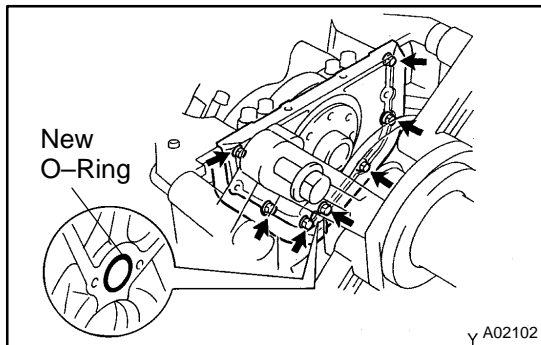
- (b) Apply seal packing to the oil seal retainer as shown in the illustration.

Seal packing:

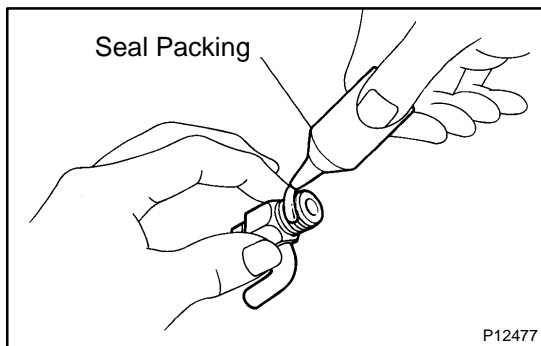
Part No. 08826-00080 or equivalent

- 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.



- Install a new O-ring to the cylinder block.
- Install the oil seal retainer with the 7 bolts.
Torque: 8.0 N·m (80 kgf·cm, 71 in.-lbf)

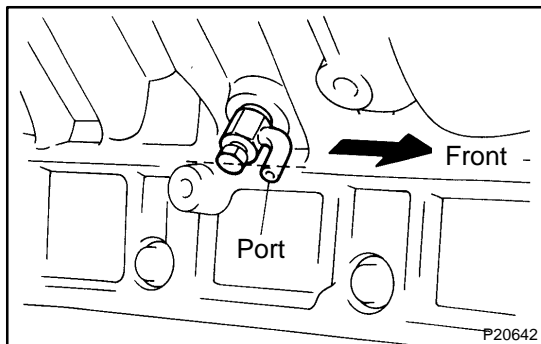


15. INSTALL ENGINE COOLANT DRAIN UNIONS

- Apply seal packing to 2 or 3 threads.

Seal packing:

Part No. 08826-00100 or equivalent



- Install the RH and LH drain unions.

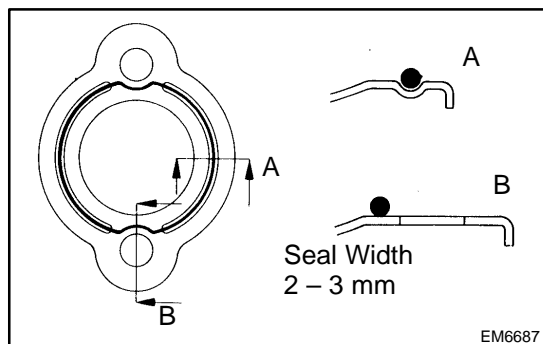
Torque: 49 N·m (500 kgf·cm, 36 ft-lbf)

HINT:

After applying the specified torque, rotate the drain union clockwise until its drain port is facing forward.

16. INSTALL WATER SEAL PLATE

- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the seal plate 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 seal plate as shown in the illustration.

Seal packing:

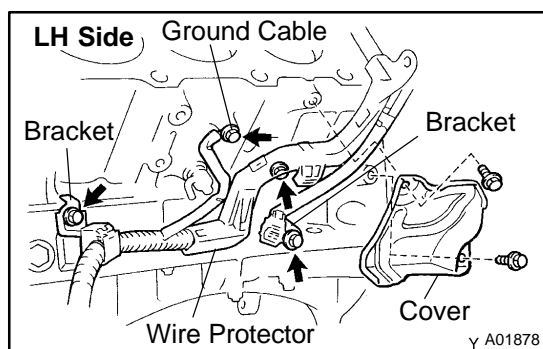
Part No. 08826-00080 or equivalent

- 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 seal plate with the 2 nuts. Alternately tighten the nuts in several passes.

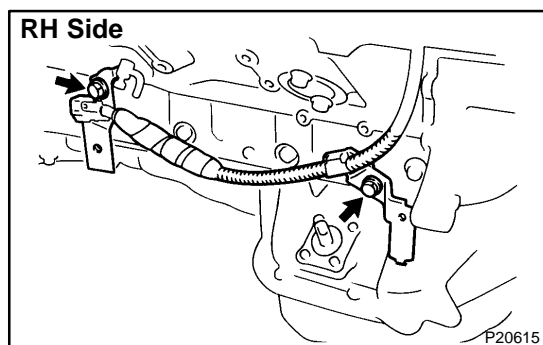
Torque: 14 N·m (145 kgf·cm, 10 ft·lbf)

17. **INSTALL OIL PUMP** (See page [LU-16](#))
18. **INSTALL OIL STRAINER** (See page [LU-16](#))
19. **INSTALL NO.1 OIL PAN** (See page [LU-16](#))
20. **INSTALL OIL PAN BAFFLE PLATE**
(See page [LU-16](#))
21. **INSTALL NO.2 OIL PAN** (See page [LU-16](#))
22. **INSTALL WATER PUMP** (See page [CO-10](#))

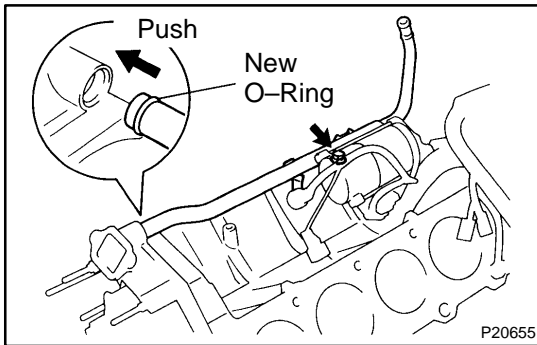


23. INSTALL ENGINE WIRE

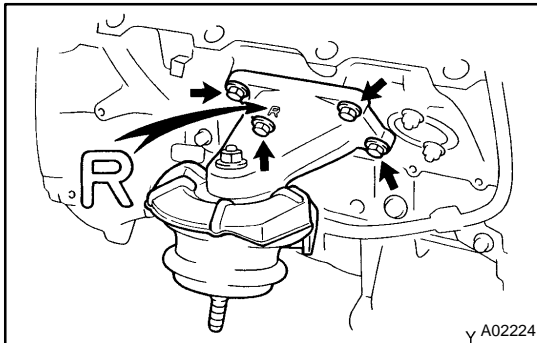
- (a) Install the engine wire to the LH side of the cylinder block with the 4 bolts.
- (b) Install the engine wire cover with the 2 bolts.



- (c) Install the engine wire to the RH side of the cylinder block with the 2 bolts.
- (d) Connect the crankshaft position connector.
24. **INSTALL KNOCK SENSORS** (See page [SF-85](#))
25. **INSTALL STARTER** (See page [ST-17](#))

**26. INSTALL WATER BYPASS PIPE**

- (a) Install a new O-ring to the water bypass pipe.
- (b) Apply soapy water to the O-ring.
- (c) Push the water bypass pipe end into the pipe hole of the water pump.
- (d) Install the water bypass pipe with the bolt.
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
- (e) Install the engine wire clamp to the bracket on the water bypass pipe.

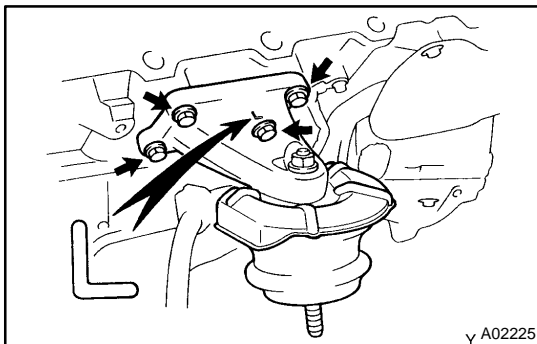
**27. INSTALL RH ENGINE MOUNTING BRACKET**

Install the mounting bracket with the 4 bolts.

Torque: 36 N·m (370 kgf-cm, 27 ft-lbf)

HINT:

The RH mounting bracket is marked with "R".

**28. INSTALL LH ENGINE MOUNTING BRACKET**

Install the mounting bracket with the 4 bolts.

HINT:

The LH mounting bracket is marked with "L".

Torque: 36 N·m (370 kgf-cm, 27 ft-lbf)

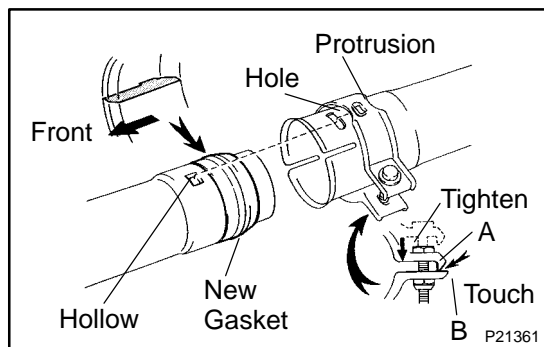
29. INSTALL CYLINDER HEADS (See page [EM-58](#))**30. INSTALL TIMING BELT AND PULLEYS**

(See page [EM-22](#))

31. DISCONNECT ENGINE FROM ENGINE STAND

EM044-02





INSTALLATION

CONNECT CENTER EXHAUST PIPE TO FRONT EXHAUST PIPE AND TAILPIPES

HINT:

- Install a new gasket to the exhaust pipe in the correct direction.
- Fit together the clamp protrusion and pipe hollow, and tighten the clamp bolt until A and B of the clamp are just touching.

EMISSION CONTROL SYSTEM

EC03T-01

PURPOSE

The emission control systems are installed to reduce the amount of HC, CO 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 the following table:

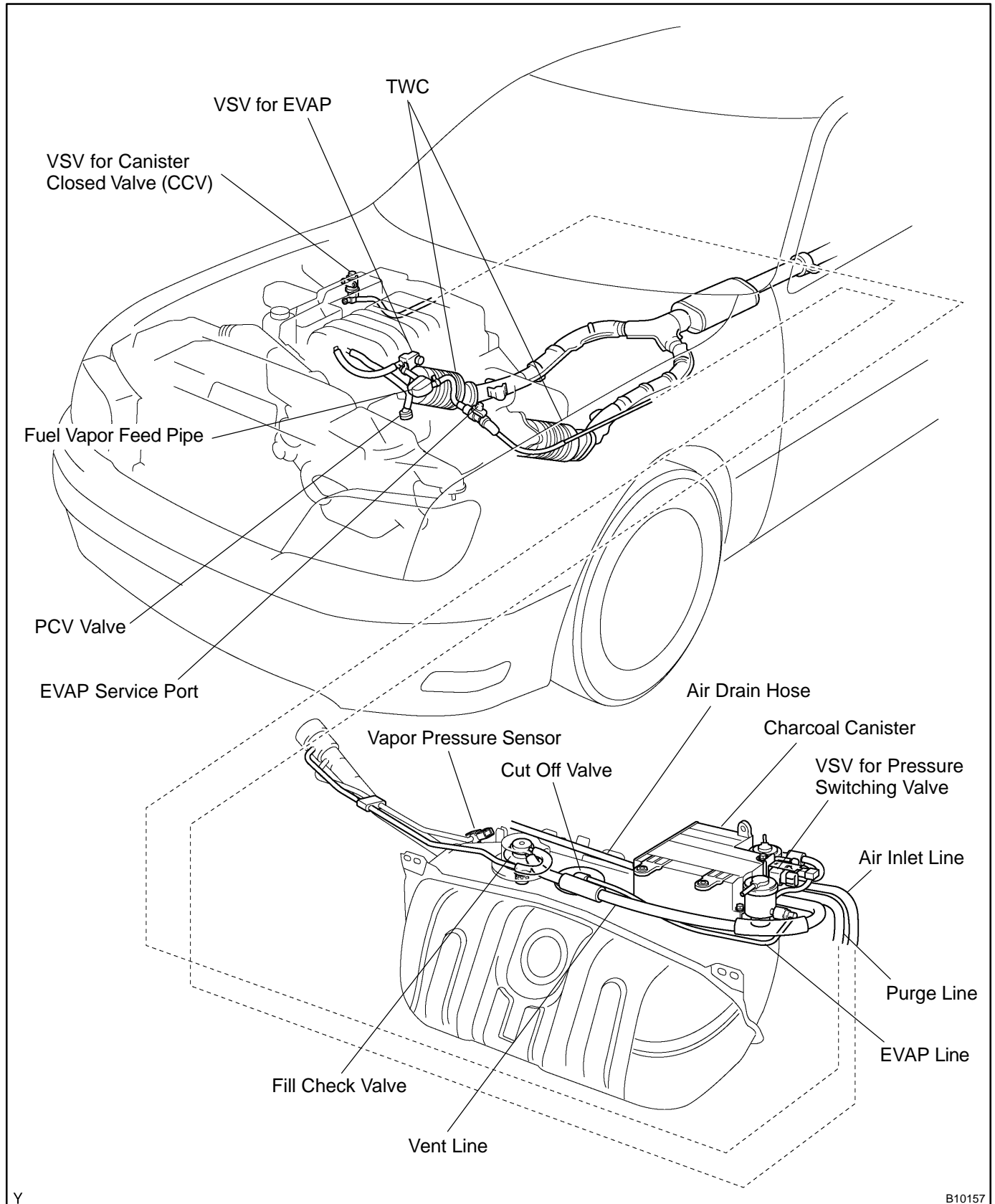
System	Abbreviation	Function
(1) Positive Crankcase Ventilation	PCV	Reduces HC
(2) Evaporative Emission Control	EVAP	Reduces evaporated HC
(3) Three-Way Catalytic Converter	TWC	Reduces HC, CO and NOx
(4) Sequential Multiport Fuel Injection*	SFI	Injects a precisely timed, optimum amount of fuel for reduced exhaust emissions

Remark: * For inspection and repair of the SFI system, refer to the SF section in this manual.

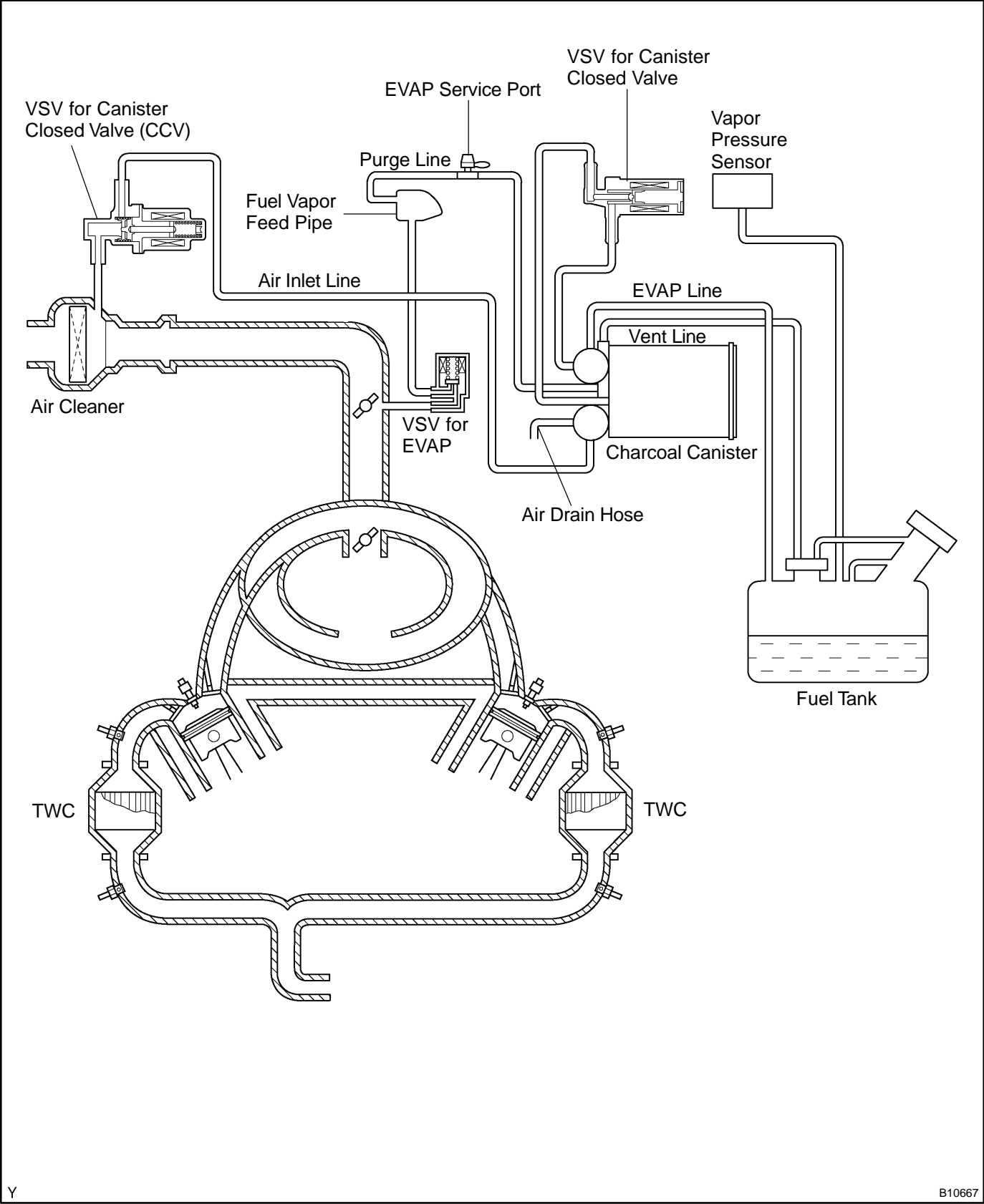
PARTS LAYOUT AND SCHEMATIC DRAWING

LOCATION

EC03U-03



DRAWING



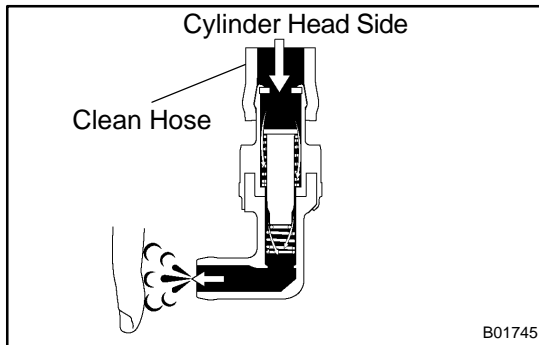
Y

B10667

POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM INSPECTION

EC03W-02

1. REMOVE PCV VALVE
2. INSTALL CLEAN HOSE TO PCV VALVE



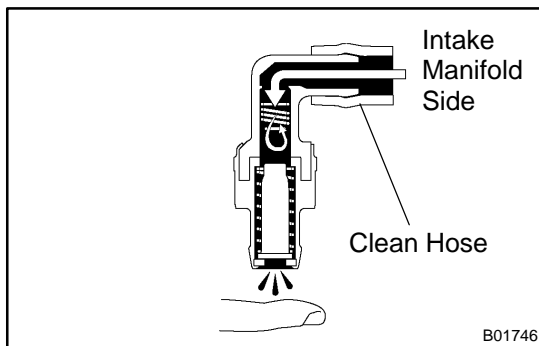
3. INSPECT PCV VALVE OPERATION

- (a) Blow air into the cylinder head side, and check that air passes through easily.

CAUTION:

Do not suck air through the valve.

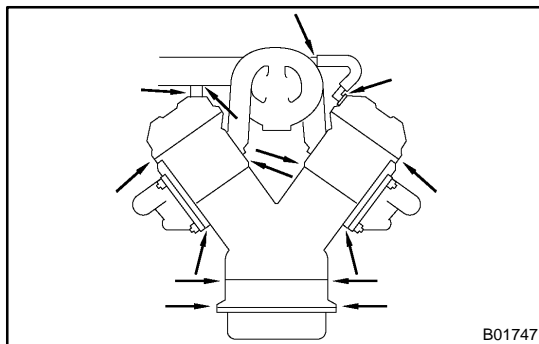
Petroleum substances inside the valve are harmful.



- (b) Blow air into the air intake chamber side, and check that air passes through with difficulty.

If operation is not as specified, replace the PCV valve.

4. REMOVE CLEAN HOSE FROM PCV VALVE
5. REINSTALL PCV VALVE



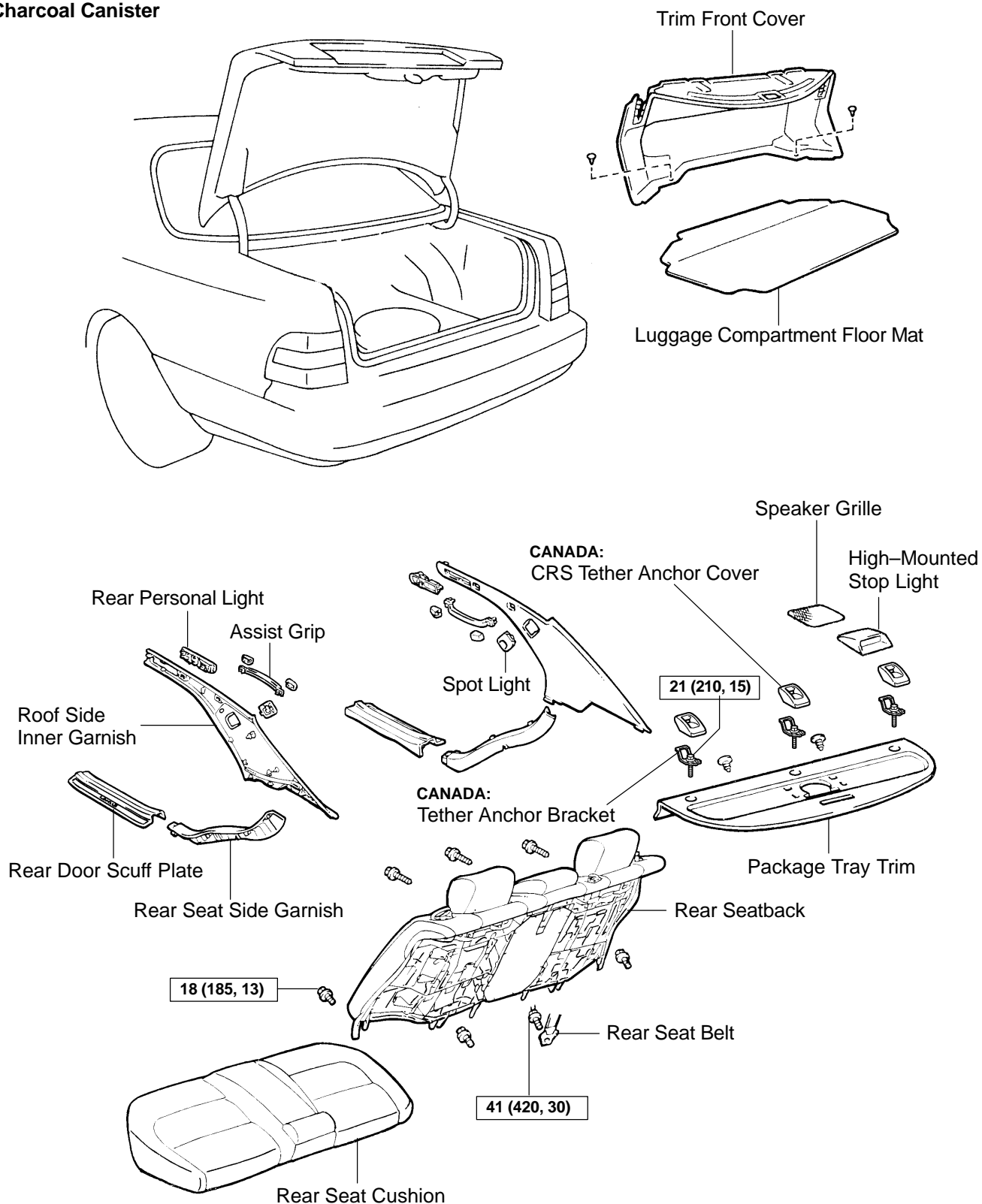
6. VISUALLY INSPECT HOSE, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM COMPONENTS

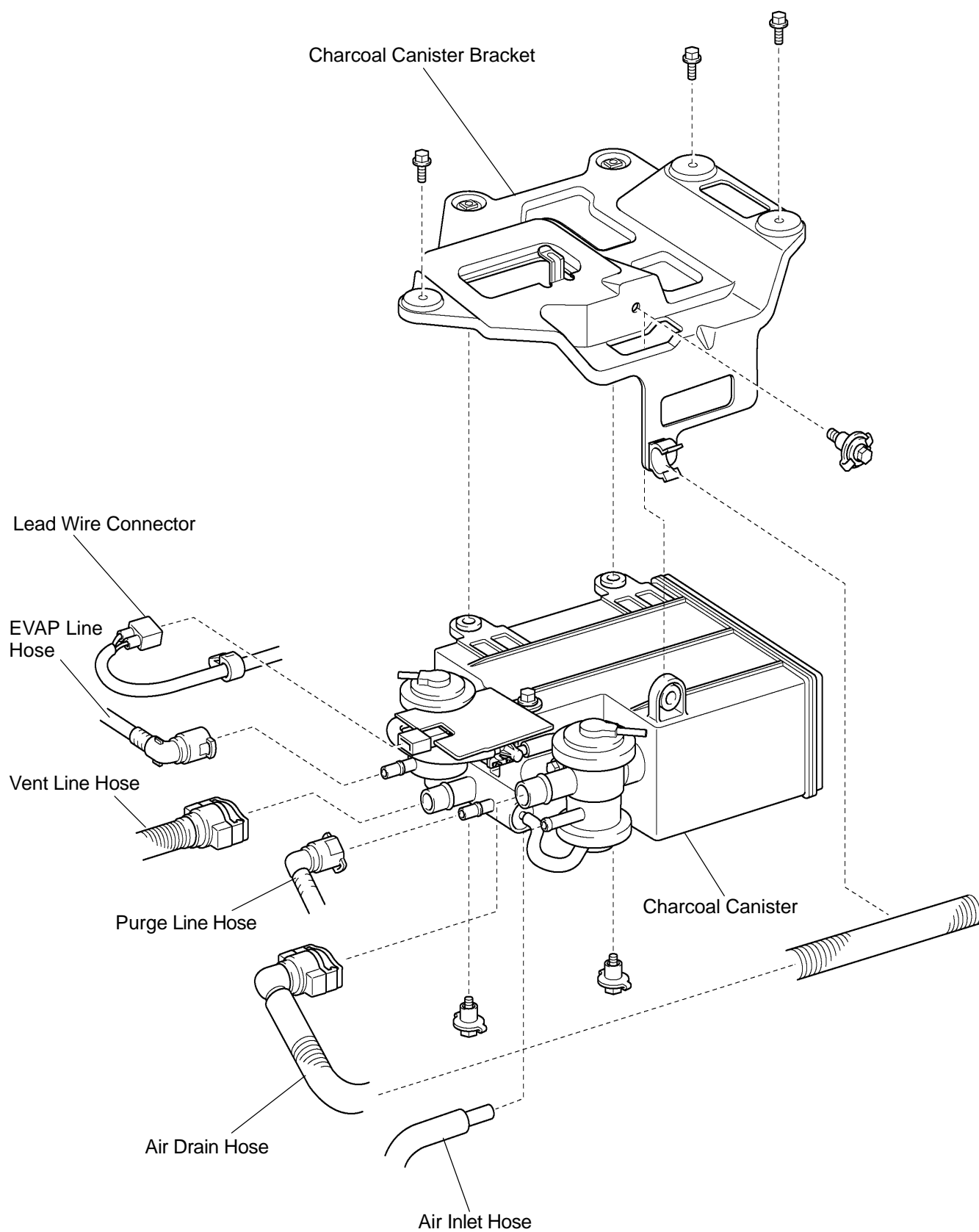
ECOER-01

Charcoal Canister



N·m (kgf·cm, ft·lbf) : Specified torque

B10152

Charcoal Canister

Y

B10158

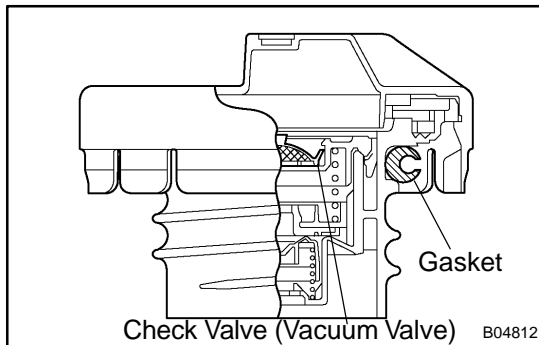
INSPECTION

1. INSPECT LINES AND CONNECTIONS

Visually check for loose connections, sharp bends or damage.

2. INSPECT FUEL TANK

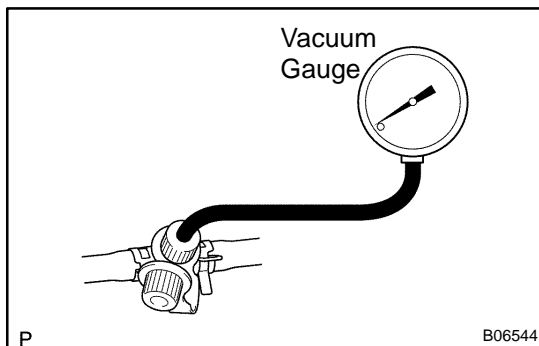
Visually check for deformation, cracks or fuel leakage.



3. INSPECT FUEL TANK CAP

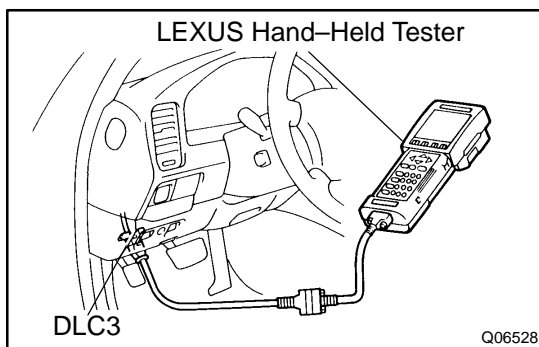
Visually check if the cap and/or gasket are deformed or damaged.

If necessary, repair or replace the cap.

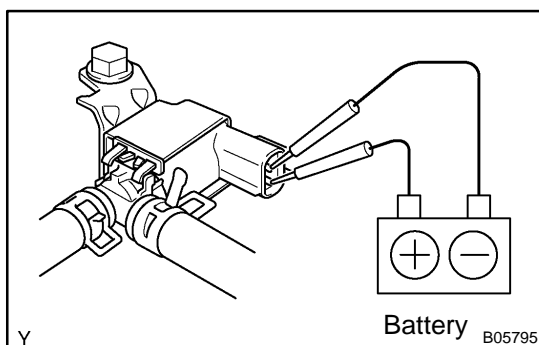


4. INSPECT EVAP SYSTEM LINE

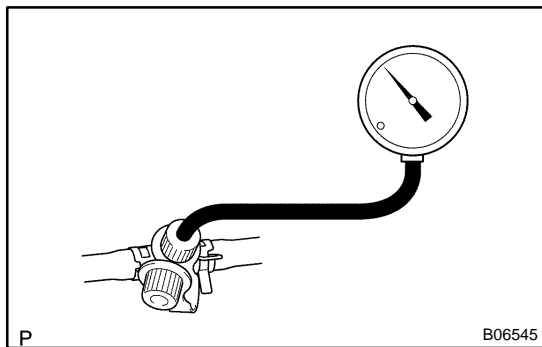
- (a) Warm up the engine and stop the engine.
Allow the engine to warm up to normal operating temperature.
- (b) Install a vacuum gauge (EVAP control system test equipment vacuum gauge) to the EVAP service port on the purge line.



- (c) LEXUS Hand-Held Tester:
Forced driving of the VSV for the EVAP.
 - (1) Connect a LEXUS hand-held tester to the DLC3.
 - (2) Start the engine.
 - (3) Push the LEXUS hand-held tester main switch ON.
 - (4) Use the ACTIVE TEST mode on the LEXUS hand-held tester to operate the VSV for the EVAP.



- (d) If you have no LEXUS Hand-Held Tester:
Forced driving of the VSV for the 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.

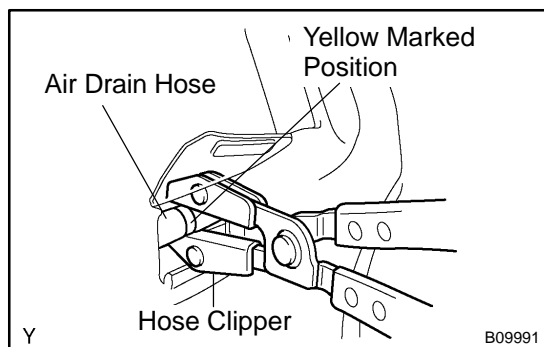
Vacuum:

Maintain at 0.368 – 19.713 in.Hg (5 – 268 in.Aq) for over 5 seconds

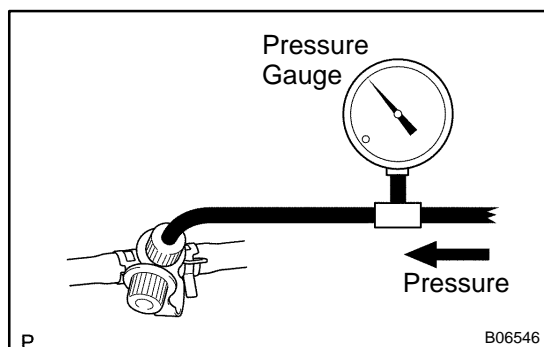
HINT:

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) LEXUS Hand-Held Tester:
Conclude forced driving of the VSV for the EVAP.
- (1) Stop the engine.
 - (2) Disconnect the LEXUS hand-held tester from the DLC3.
- (g) If you have no LEXUS Hand-Held Tester:
Conclude forced driving of the VSV for the EVAP.
- (1) Stop the engine.
 - (2) Disconnect the positive (+) and negative (–) leads from the battery from the VSV terminals for the EVAP.
 - (3) Connect the VSV connector for the EVAP.
- (h) Disconnect the vacuum gauge from the EVAP service port on the purge line.
- (i) Connect a pressure gauge to the EVAP service port on the purge line.



- (j) Check the Pressure.
- (1) Pull off the service hole cover of the trim front cover.
 - (2) Close off at the yellow marked position of the air drain hose with a hose clipper or similar instrument.



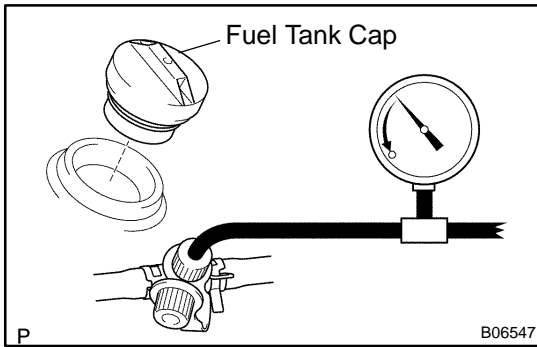
- (3) Add the pressure (13.5 – 15.5 in.Aq) from the EVAP service port.

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.

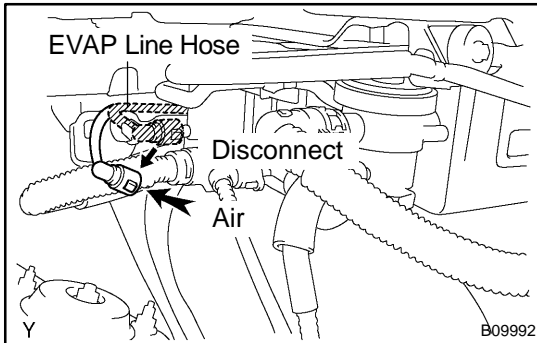


- (4) Check if the pressure decreases when the fuel tank cap is removed while adding pressure.

HINT:

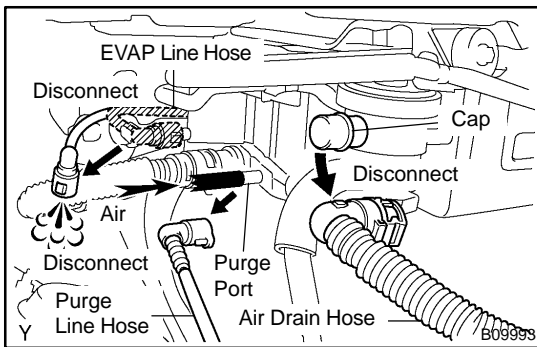
If the pressure does not decrease when the filler cap is removed, then you can conclude that the hose connecting the service port to the fuel tank is blocked, etc.

- (k) Disconnect the pressure gauge from the EVAP service port on the purge line.



5. CHECK AIRTIGHTNESS IN FUEL TANK AND FILLER PIPE

- Disconnect the EVAP line hose from the charcoal canister side (See step 8) and then pressurize and make the internal pressure in the fuel tank 4 kPa (41 gf/cm², 0.58 psi).
 - Check that the internal pressure of the fuel tank can be hold for 1 minute.
 - Check the connected portions of each hose and pipe.
 - Check the installed parts on the fuel tank.
- If there is no abnormality, replace the fuel tank and filler pipe.
- Reconnect the EVAP line hose to the charcoal canister.



6. INSPECT FUEL CUTOFF VALVE AND FILL CHECK VALVE

- Disconnect the purge line hose, EVAP line hose and air drain hose from the charcoal canister (See step 8).
- Plug the cap to the air drain port.
- Pressurize 4 kPa (41 gf/cm², 0.58 psi) to the purge port and check that there is ventilation through the EVAP line hose.

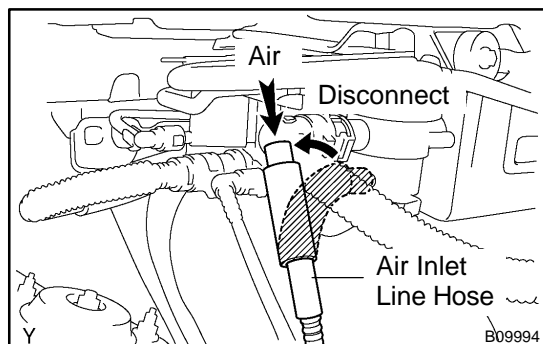
HINT:

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).

- Check if there is any stuck 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.

- Reconnect the purge line hose, EVAP line hose and air drain hose to the charcoal canister.

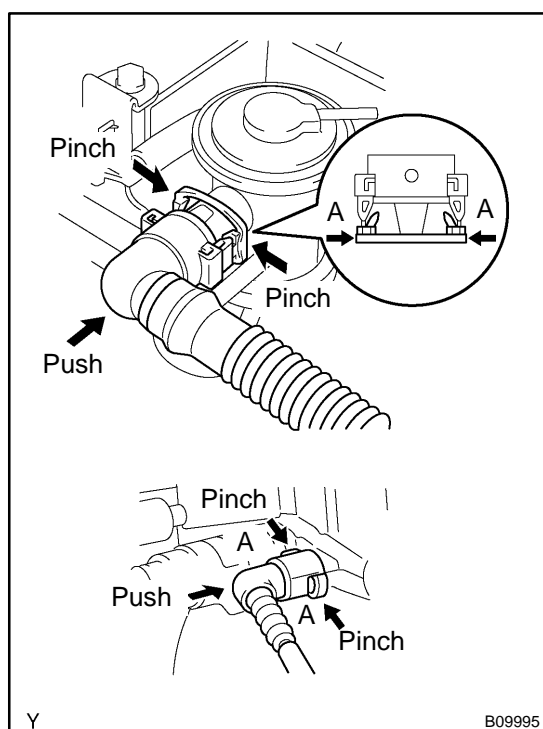


7. CHECK AIR INLET LINE

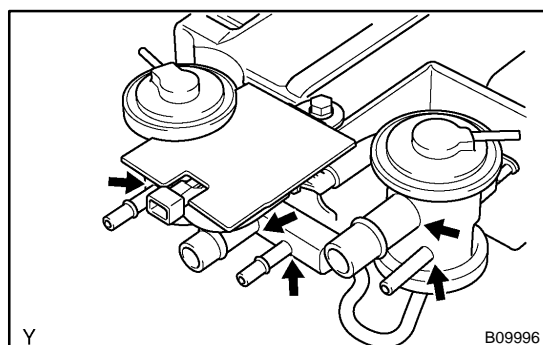
- (a) Disconnect the air inlet line hose from the charcoal canister.
- (b) Check that there is ventilation in the air inlet line.
- (c) Reconnect the air inlet line hose to the charcoal canister.

8. REMOVE CHARCOAL CANISTER ASSEMBLY

- (a) Remove the rear seat cushion and rear seat back.
- (b) Remove the front scuff plate, assist grip, front pillar garnish, quarter trim, front seat outer belt, roof side inner garnish and package tray trim (See page [BO-64](#)).
- (c) Remove the luggage compartment floor mat and trim front cover.
- (d) Disconnect the VSV connector for the pressure switching valve.
- (e) Disconnect the wire clip from the charcoal canister bracket.
- (f) Disconnect the air inlet line hose from the charcoal canister.

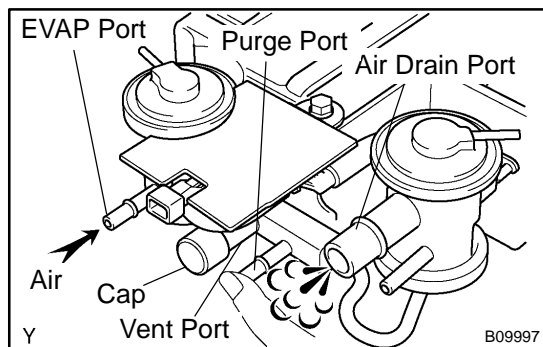


- (g) Disconnect the purge line hose, EVAP line hose, vent line hose and air drain hose from the charcoal canister.
 - (1) Push the connector deep inside.
 - (2) Pinch portion A.
 - (3) Pull out the connector.
- (h) Remove the 3 bolts, charcoal canister and bracket assembly.
- (i) Remove the 3 charcoal canister mounting bolts and charcoal canister.

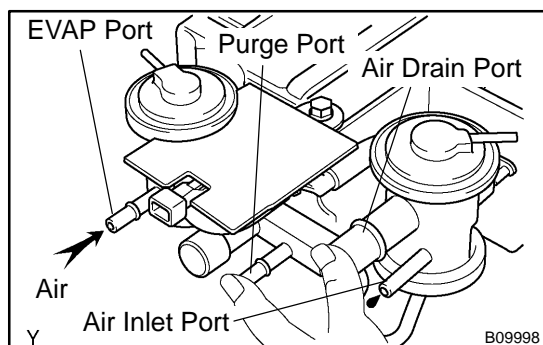


9. INSPECT CHARCOAL CANISTER

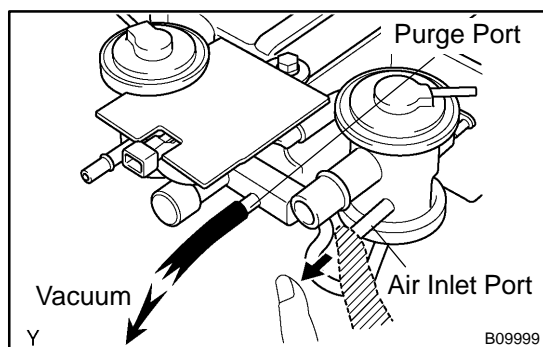
- (a) Visually check the charcoal canister for cracks or damage.



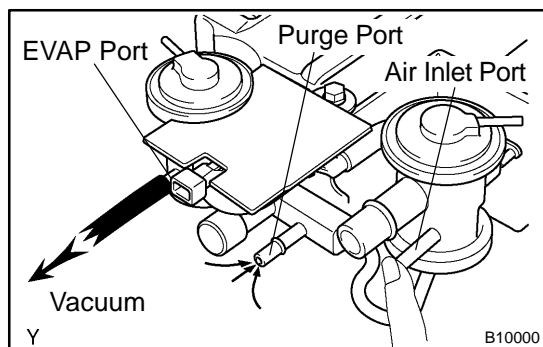
- (b) Inspect the charcoal canister operation.
- (1) Plug the vent port with the cap.
 - (2) While holding the purge port closed, blow air (1.76 kPa, 18 gf/cm², 0.26 psi) into the EVAP port and check that air flows from the air drain port.



- (3) While holding the purge port and the air drain port closed, blow air (1.76 kPa, 18 gf/cm², 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.

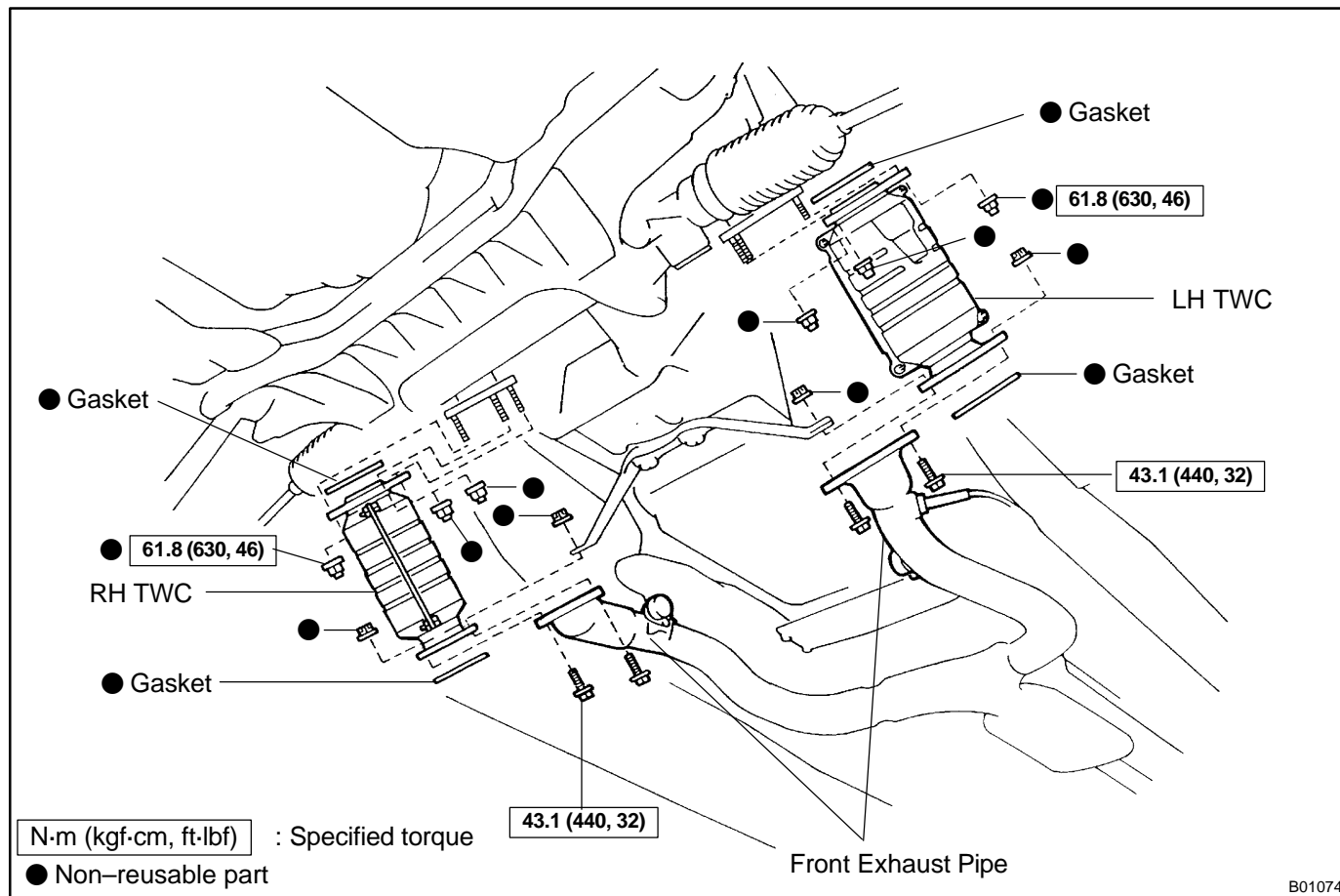
If operation is not as specified, replace the charcoal canister.

- (6) Remove the hose and cap from vent port.

10. **INSPECT VSV FOR EVAP (See page SF-69)**
11. **INSPECT VSV FOR CANISTER CLOSED VALVE (CCV) (See page SF-76)**
12. **INSPECT VSV FOR PRESSURE SWITCHING VALVE (See page SF-77)**
13. **INSPECT VAPOR PRESSURE SENSOR (See page SF-82)**
14. **REINSTALL CHARCOAL CANISTER ASSEMBLY**

THREE-WAY CATALYTIC CONVERTER (TWC) SYSTEM COMPONENTS

EC03Y-02



B01074

INSPECTION

1. CHECK EXHAUST PIPE ASSEMBLY

- (a) Check the connections for looseness or damage.
- (b) Check the clamps for weakness, cracks or damage.

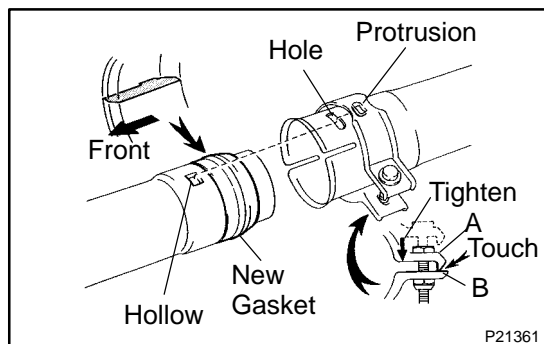
2. INSPECT TWC

Check for dents or damage.

If any part of protector is damaged or dented to the extent that it contacts the TWC, repair or replace it.

3. INSPECT HEAT INSULATOR

- (a) Check the heat insulator for damage.
- (b) Check for adequate clearance between the TWC and heat insulator.



INSTALLATION

CONNECT FRONT AND CENTER EXHAUST PIPES

HINT:

- Install a new gasket to the exhaust pipe in the correct direction.
- Fit together the clamp protrusion and pipe hollow, and tighten the clamp bolt until A and B of the clamp are just touching.

SFI SYSTEM PRECAUTION

SF0EP-02

1. BEFORE WORKING ON FUEL SYSTEM, DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY

HINT:

Any diagnostic trouble code retained by the computer will be erased when the negative (–) terminal cable is removed from the battery.

Therefore, if necessary, read the diagnosis before disconnecting 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) In event of the engine misfire, following the precautions should be taken.

- (1) Check proper connection of battery terminals, etc.
- (2) After repair work, check that the ignition coil terminals and all other ignition system lines are reconnected securely.
- (3) When cleaning the engine compartment, be especially careful to protect the electrical system from water.

(b) Precautions when handling the oxygen sensor.

- (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

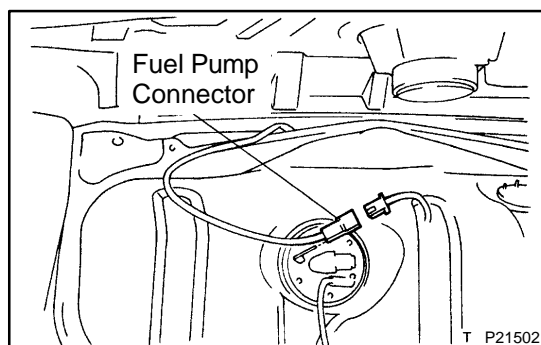
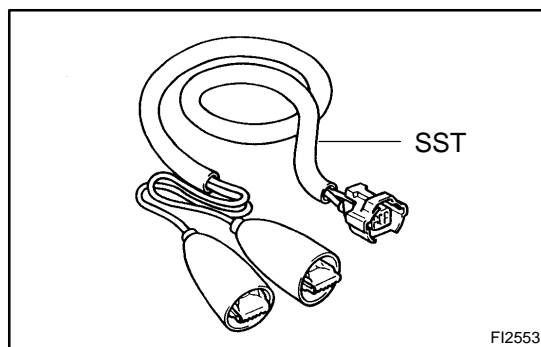
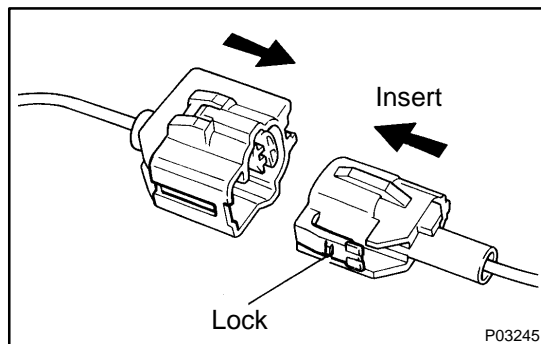
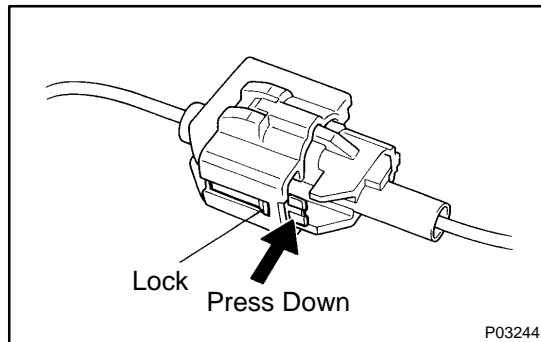
- (a) Separation of the engine oil dipstick, oil filler cap, PCV hose, etc. may cause the engine to run out of tune.
- (b) Disconnection, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will allow air suction and cause the engine to run out of 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:

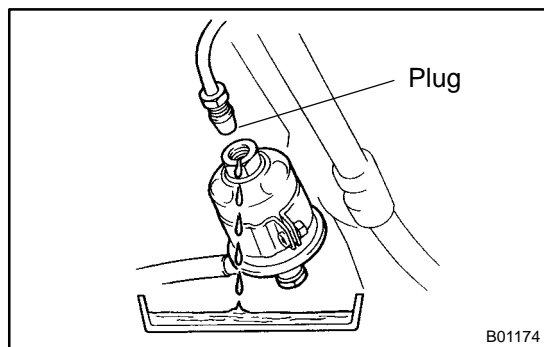
Always check the diagnostic trouble code before disconnecting the negative (–) terminal cable from the battery.



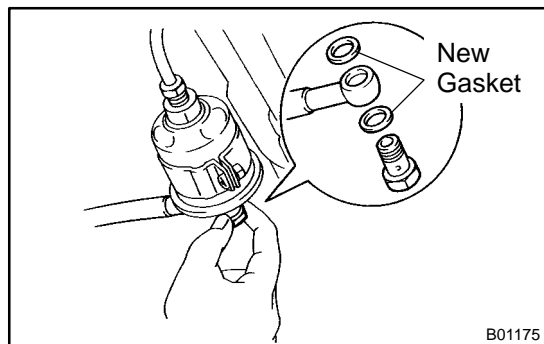
- (b) When installing the battery, be especially careful not to incorrectly connect the positive (+) and negative (–) cables.
- (c) Do not permit parts to receive a severe impact during removal or installation. Handle all SFI parts carefully, especially the ECM.
- (d) Do not be careless during troubleshooting 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.
- (i) Release the lock and pull out the connector, pulling on the connectors.
- (j) Fully insert the connector and check that it is locked.
- (k) When inspecting a connector with a volt/ohmmeter
- (l) Carefully take out the water-proofing rubber if it is a water-proof type connector.
- (m) Insert the test probe into the connector from the wiring side when checking the continuity, amperage or voltage.
- (n) Do not apply unnecessary force to the terminal.
- (o) After checking, install the water-proofing rubber on the connector securely.
- (p) Use SST for inspection or test of the injector or its wiring connector.
SST 09842–30070

8. FUEL SYSTEM

- (a) When disconnecting the high fuel pressure line, a large amount of gasoline will spill out, so observe the following 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.
- (7) Reconnect the fuel pump connector.



- (b) When connecting the flare nut 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: 29 N·m (300 kgf-cm, 21 ft-lbf)

- (c) When connecting the union bolt 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 09631-22020

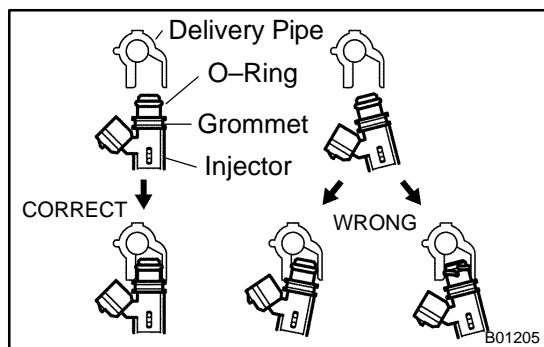
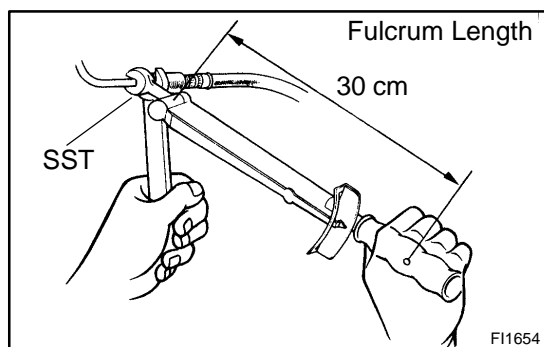
NOTICE:

Do not rotate the fuel pipe, when tightening the flare nut.

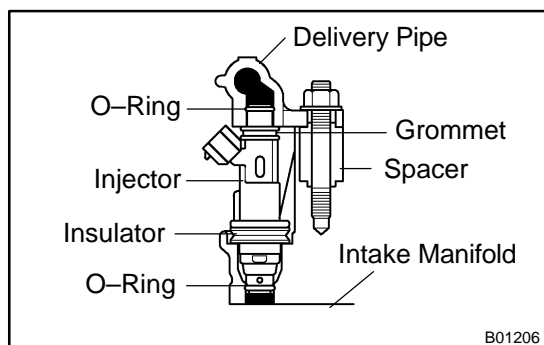
Torque: 31 N·m (310 kgf-cm, 23 ft-lbf)

HINT:

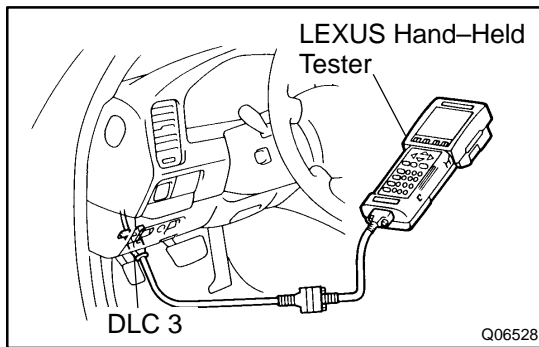
Use a torque wrench with a fulcrum length of 30 cm (11.81 in.)



- (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. Before installing the injector must apply spindle oil or gasoline on the place where a delivery pipe or an intake manifold touches an O-ring of the injector.

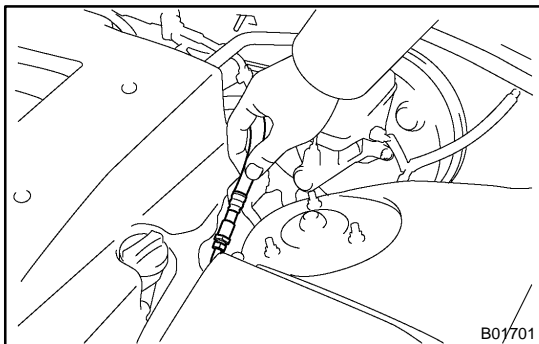


- (f) Check that there are no fuel leaks after doing maintenance anywhere on the fuel system.
- (1) Connect a LEXUS hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.

NOTICE:

Do not start the engine.

- (3) Select the active test mode on the LEXUS hand-held tester.
- (4) Please refer to the LEXUS hand-held tester operator's manual for further details.
- (5) If you have no LEXUS hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector.
(See page [SF-5](#))

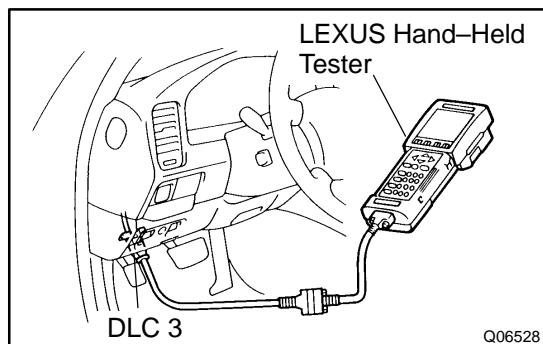


- (6) Pinch the fuel inlet hose.
The pressure in the high pressure line will rise to approx. 392 kPa (4 kgf/cm², 57 psi). In this state, check to see that there are no leaks from any part of the fuel system.

NOTICE:

Always pinch the hose. Avoid bending as it may cause the hose to crack.

- (7) Turn the ignition switch OFF.
- (8) Disconnect the LEXUS hand-held tester from the DLC3.



FUEL PUMP

ON-VEHICLE INSPECTION

SF0EQ-02

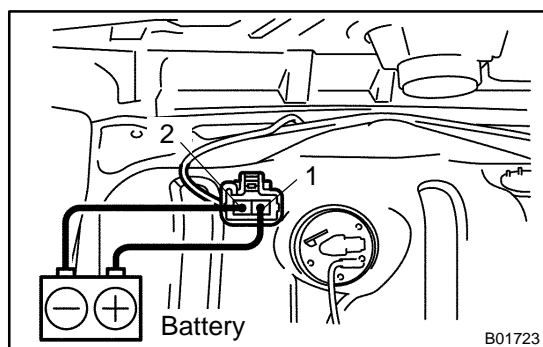
1. CHECK FUEL PUMP OPERATION

- Connect a LEXUS hand-held tester to the DLC3.
- Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.

NOTICE:

Do not start the engine.

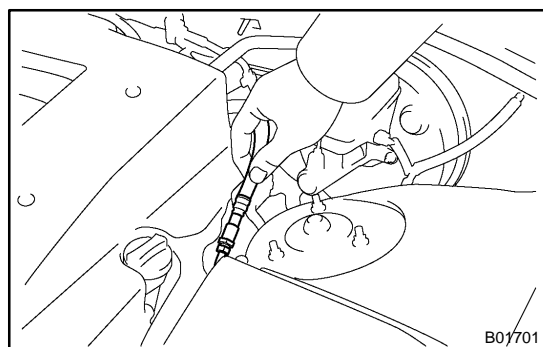
- Select the active test mode on the LEXUS hand-held tester.
- Please refer to the LEXUS hand-held tester operator's manual for further details.



- If you have no LEXUS hand-held tester, connect the positive (+) lead from the battery to terminal 1 of the connector, and the negative (-) lead to terminal 2.

NOTICE:

- These test 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 the switching at the battery side.



- Check that there is pressure in the fuel inlet hose.

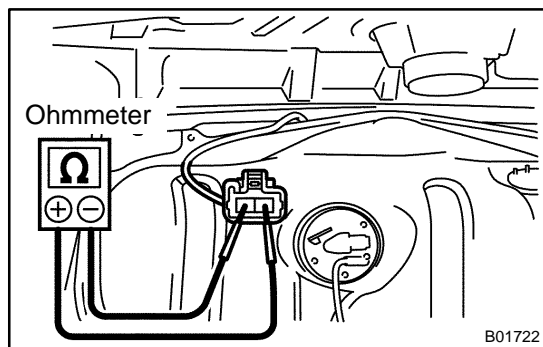
HINT:

If there is fuel pressure, you will hear the sound of fuel flowing.

If there is no pressure, check these parts:

- Fusible link
- Fuses
- EFI main relay
- Fuel pump
- Fuel pump relay
- Fuel pump resistor
- ECM
- Wiring connections

- Turn the ignition switch OFF.
- Disconnect the LEXUS hand-held tester from the DLC3.

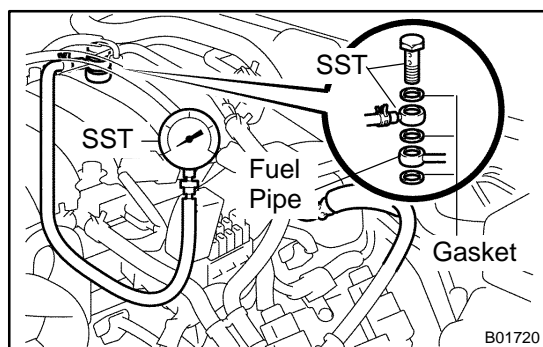


2. INSPECT FUEL PUMP RESISTANCE

Using an ohmmeter, measure the resistance between the terminals.

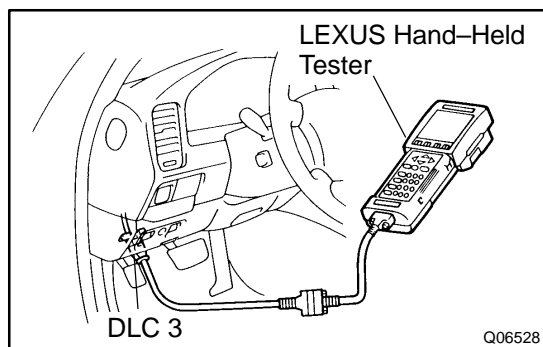
Resistance: 0.2 – 3.0 Ω at 20°C (68°F)

If the resistance is not as specified, replace the fuel pump and/or set plate.



3. CHECK FUEL PRESSURE

- Check the battery positive voltage is above 12 V.
- Disconnect the negative (–) terminal cable from the battery.
- Remove the RH fuel pressure pulsation damper (See page [SF-28](#)).
- Install the fuel inlet hose and SST (pressure gauge) to the delivery pipe with 3 lower gaskets and the SST (union bolt).
SST 09268–45014 (09268–41190, 90405–06167)
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- Wipe off any splattered gasoline.



- Connect the LEXUS hand-held tester to the DLC3. (See step 1. (a) to (e) above)
- Reconnect the negative (–) terminal cable to the battery.
- Turn the ignition switch ON.
- Measure the fuel pressure.

Fuel pressure:

304 – 343 kPa (3.1 – 3.5 kgf/cm², 44 – 50 psi)

If pressure is high, replace the fuel pressure regulator.

If pressure is low, check these parts:

- Fuel hoses and connections
- Fuel pump
- Fuel filter
- Fuel pressure regulator

- Remove the LEXUS hand-held tester from the DLC3.
- Start the engine.
- Measure the fuel pressure at idle.

Fuel pressure:

304 – 343 kPa (3.1 – 3.5 kgf/cm², 44 – 50 psi)

If pressure is not as specified, check the vacuum sensing hose and fuel pressure regulator.

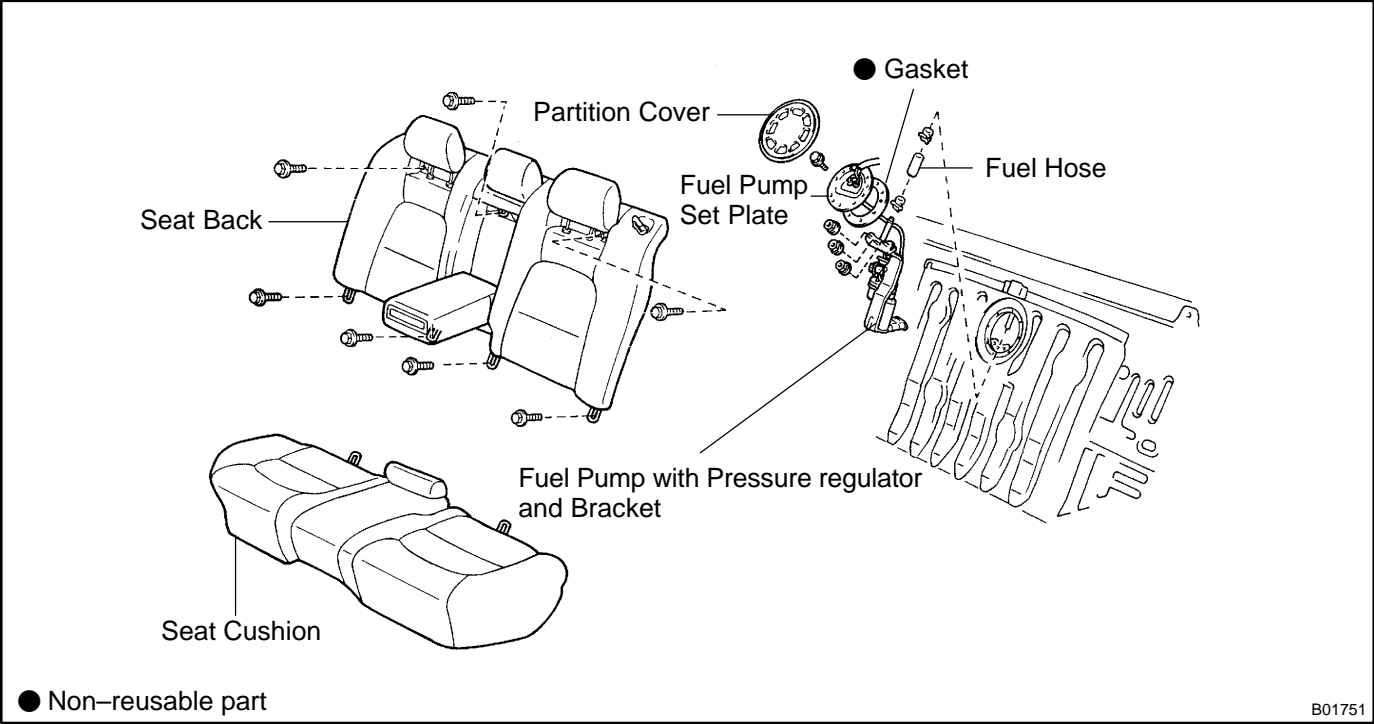
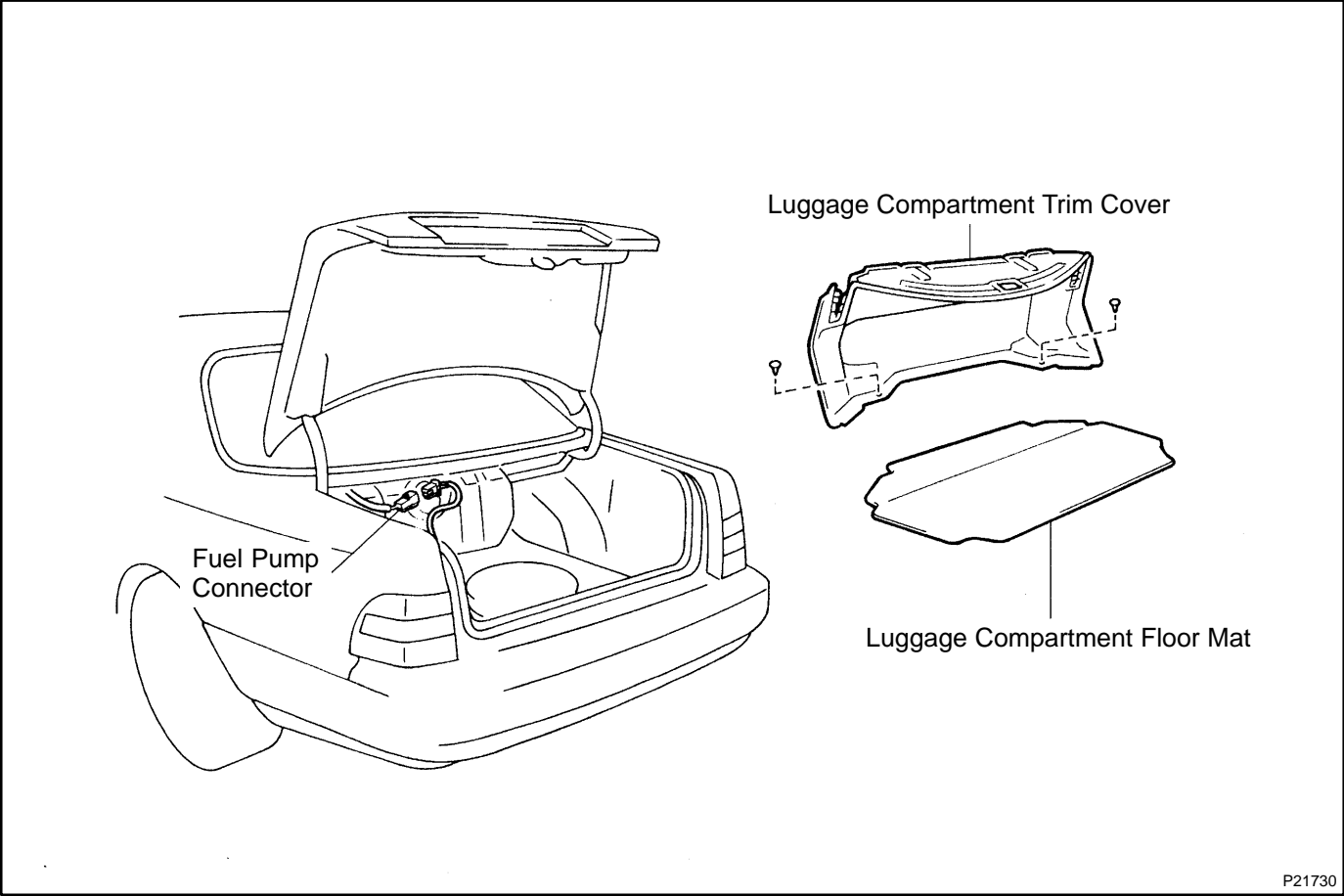
- (m) Stop the engine.
- (n) Check that the fuel pressure remains as specified for 5 minutes after the engine has stopped.

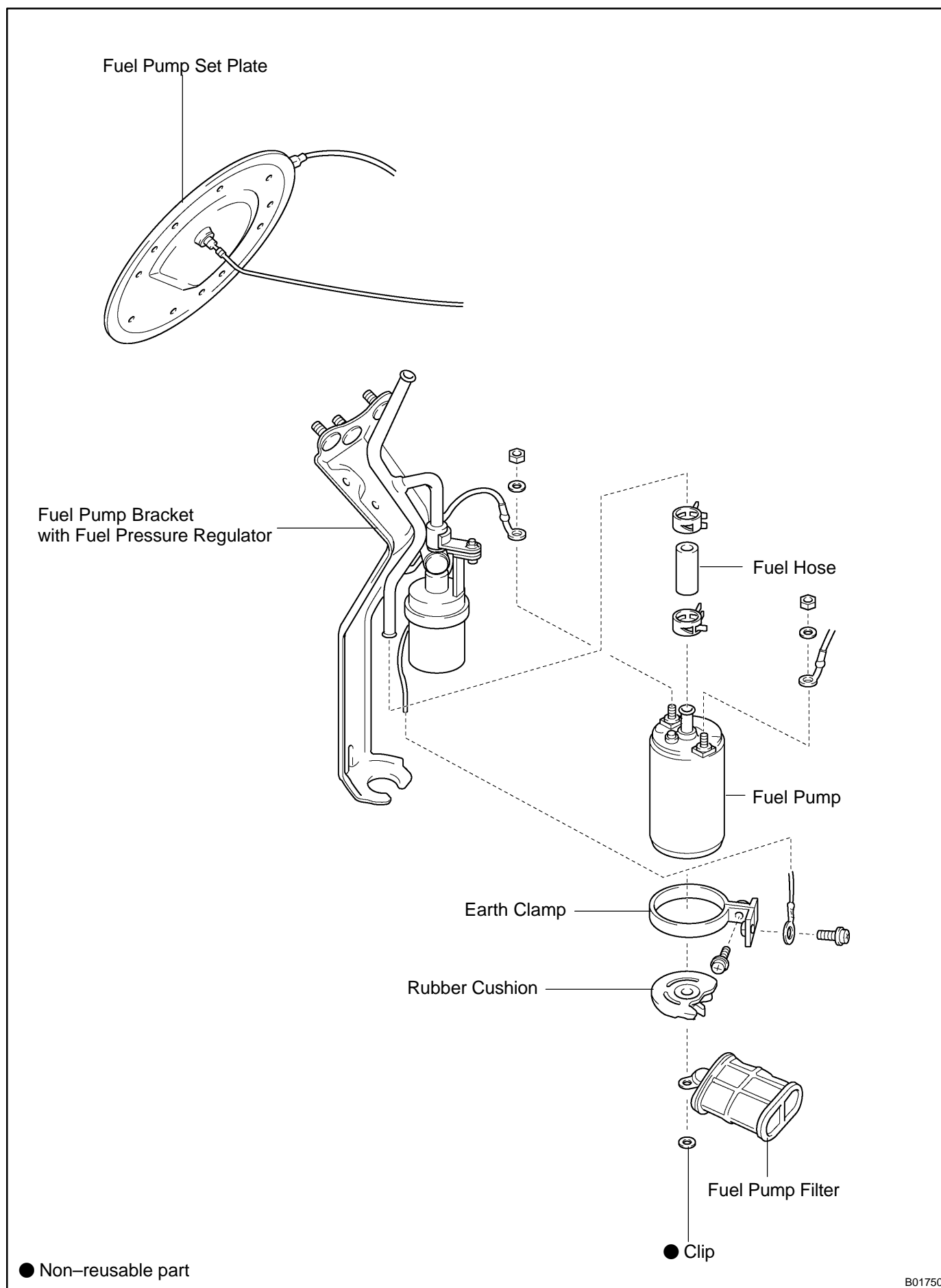
Fuel pressure:**147 kPa (1.5 kgf/cm², 21 psi) or more**

If pressure is not as specified, check the fuel pump, pressure regulator and/or injectors.

- (o) 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
- (p) Reinstall the fuel pressure pulsation damper
(See page [SF-29](#)).
- (q) Reconnect the negative (–) terminal cable to the battery.
- (r) Check for fuel leaks. (See page [SF-1](#))

COMPONENTS





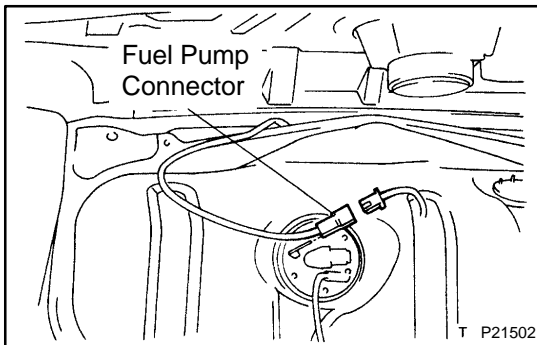
B01750

REMOVAL

CAUTION:

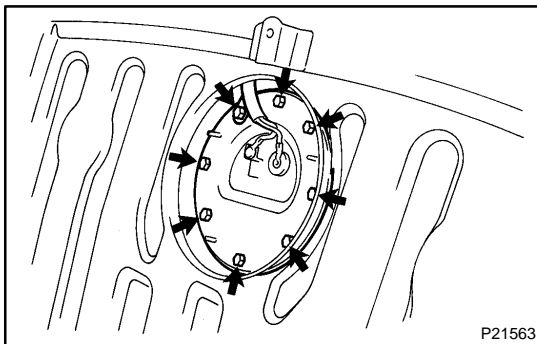
Do not smoke or work near an open flame when working on the fuel pump.

1. REMOVE LUGGAGE COMPARTMENT FLOOR MAT
2. REMOVE LUGGAGE COMPARTMENT TRIM COVER



3. DISCONNECT FUEL PUMP CONNECTOR
4. REMOVE SEAT CUSHION AND BACK
5. REMOVE PARTITION COVER

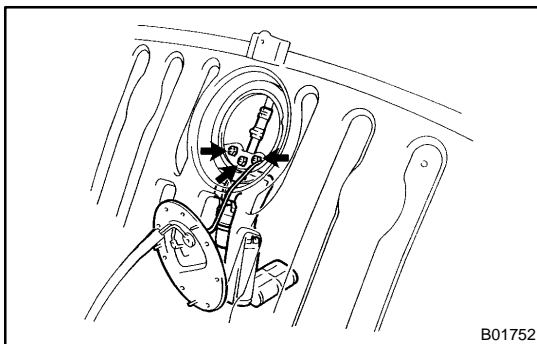
Using a scraper, pry out the partition cover.



6. REMOVE FUEL PUMP, BRACKET AND SET PLATE ASSEMBLY

- (a) Remove the 8 bolts, and disconnect the fuel pump set plate from the fuel tank.

Torque: 3.0 N·m (30 kgf·cm, 26 in.-lbf)



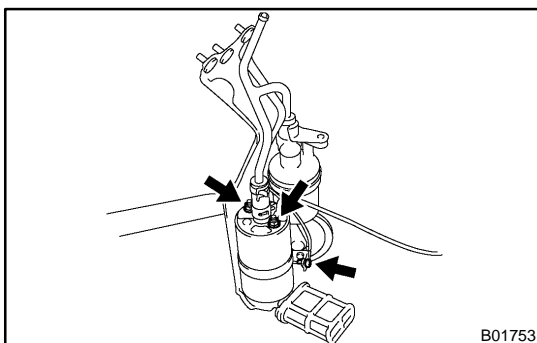
- (b) Remove the 3 nuts, and disconnect the fuel pump bracket from the fuel tank.

Torque: 5.5 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Disconnect the fuel hose from the fuel pump bracket, and remove the fuel pump, bracket, set plate, assembly and gasket.

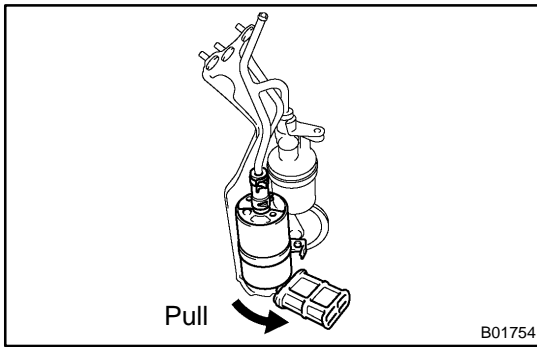
HINT:

At the time of installation, please refer to the following item.
Use a new gasket.

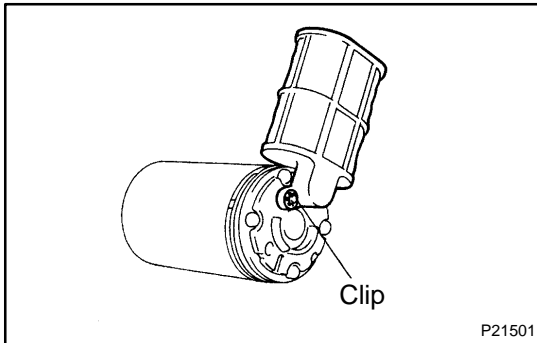


7. REMOVE PUMP SET PLATE FROM FUEL PUMP

- (a) Remove the 2 nuts, 2 spring washers, and disconnect the 2 wires from the fuel pump.
- (b) Remove the fuel pump set plate.
- (c) Remove the screw, and disconnect the wire from the fuel pump earth clamp.

**8. REMOVE FUEL PUMP FROM PUMP BRACKET**

- (a) Pull out the lower side of the fuel pump from the pump bracket.
- (b) Disconnect the fuel hose from the fuel pump, and remove the fuel pump.
- (c) Remove the rubber cushion from the fuel pump.
- (d) Remove the screw and fuel pump earth clamp.

**9. REMOVE FUEL PUMP FILTER FROM FUEL PUMP**

Remove the clip and pull out the filter.

HINT:

At the time of assembly, please refer to the following item.
Use a new clip.

INSTALLATION

Installation is in the reverse order of removal. (See page [SF-10](#))

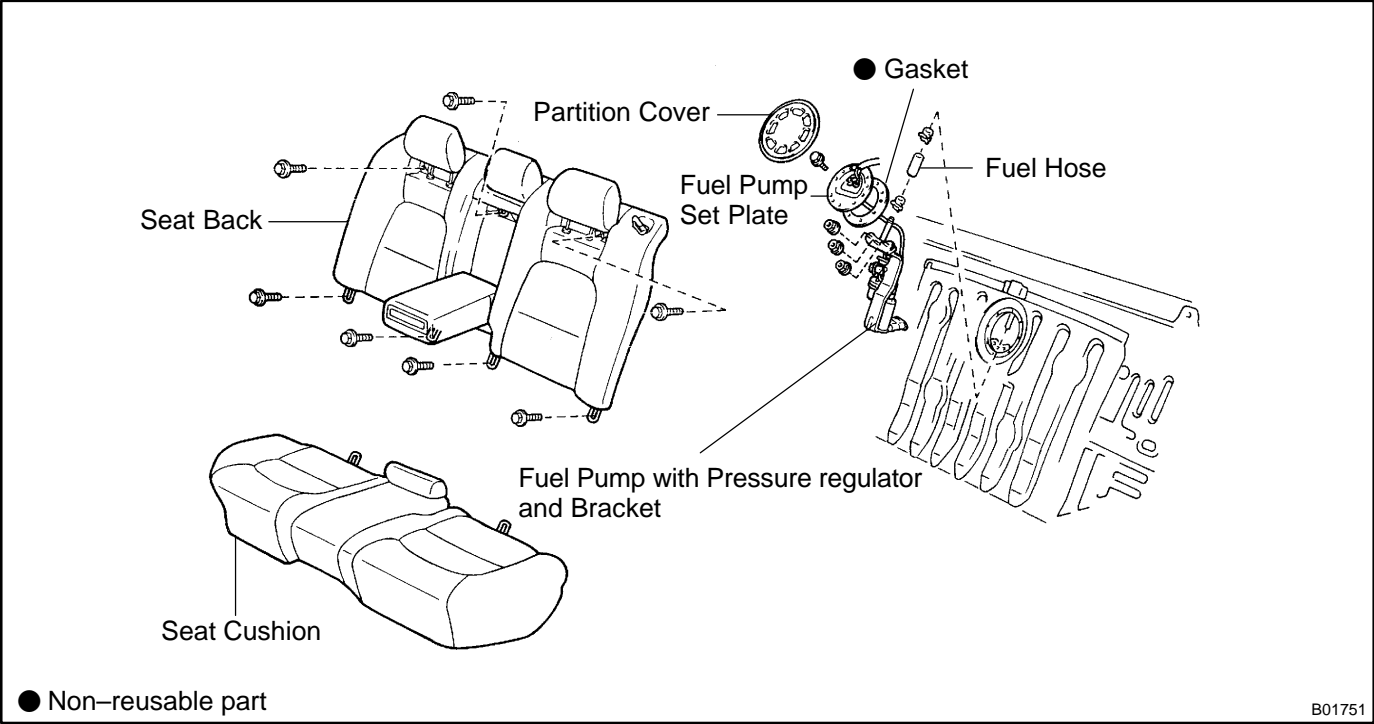
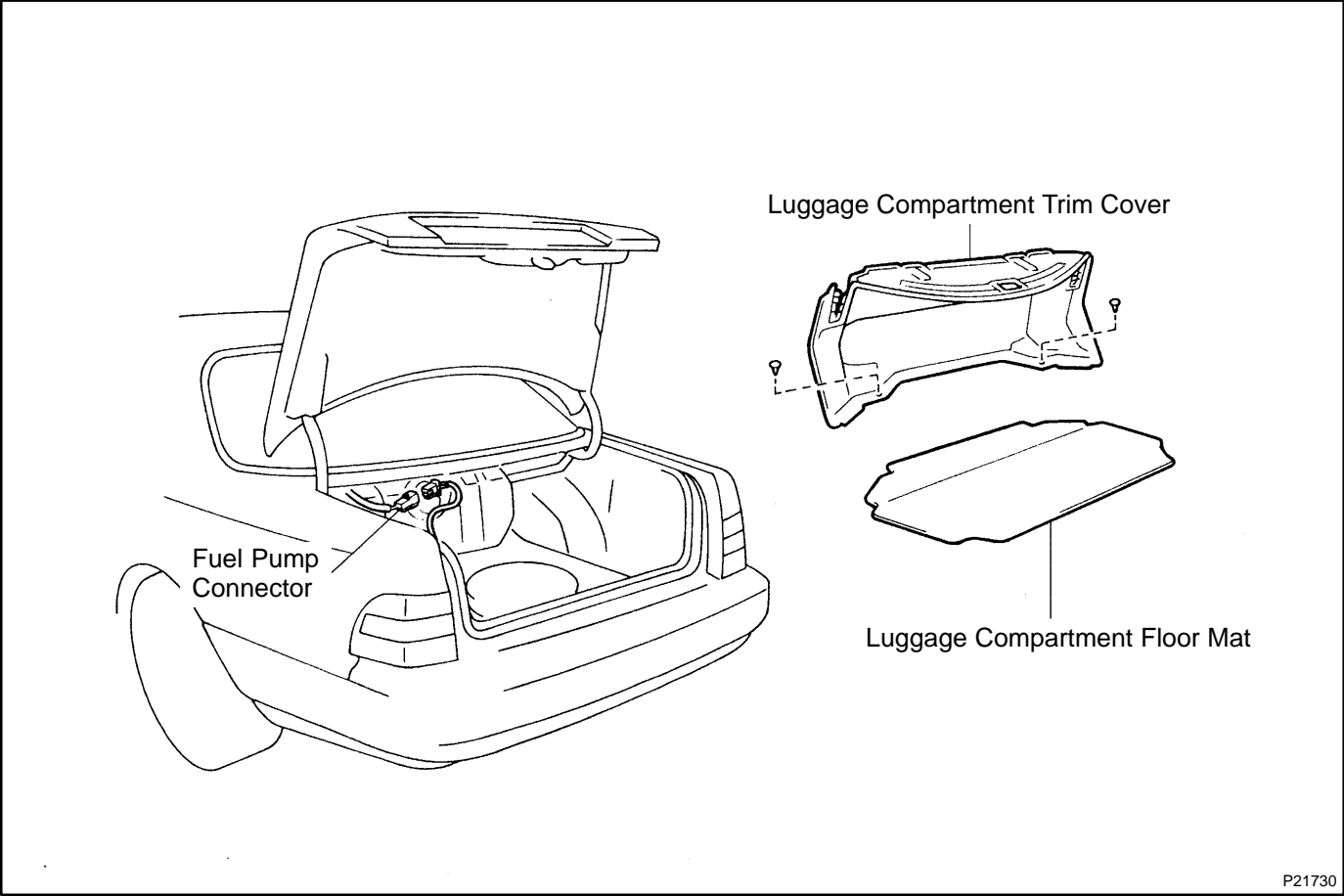
FUEL PRESSURE REGULATOR

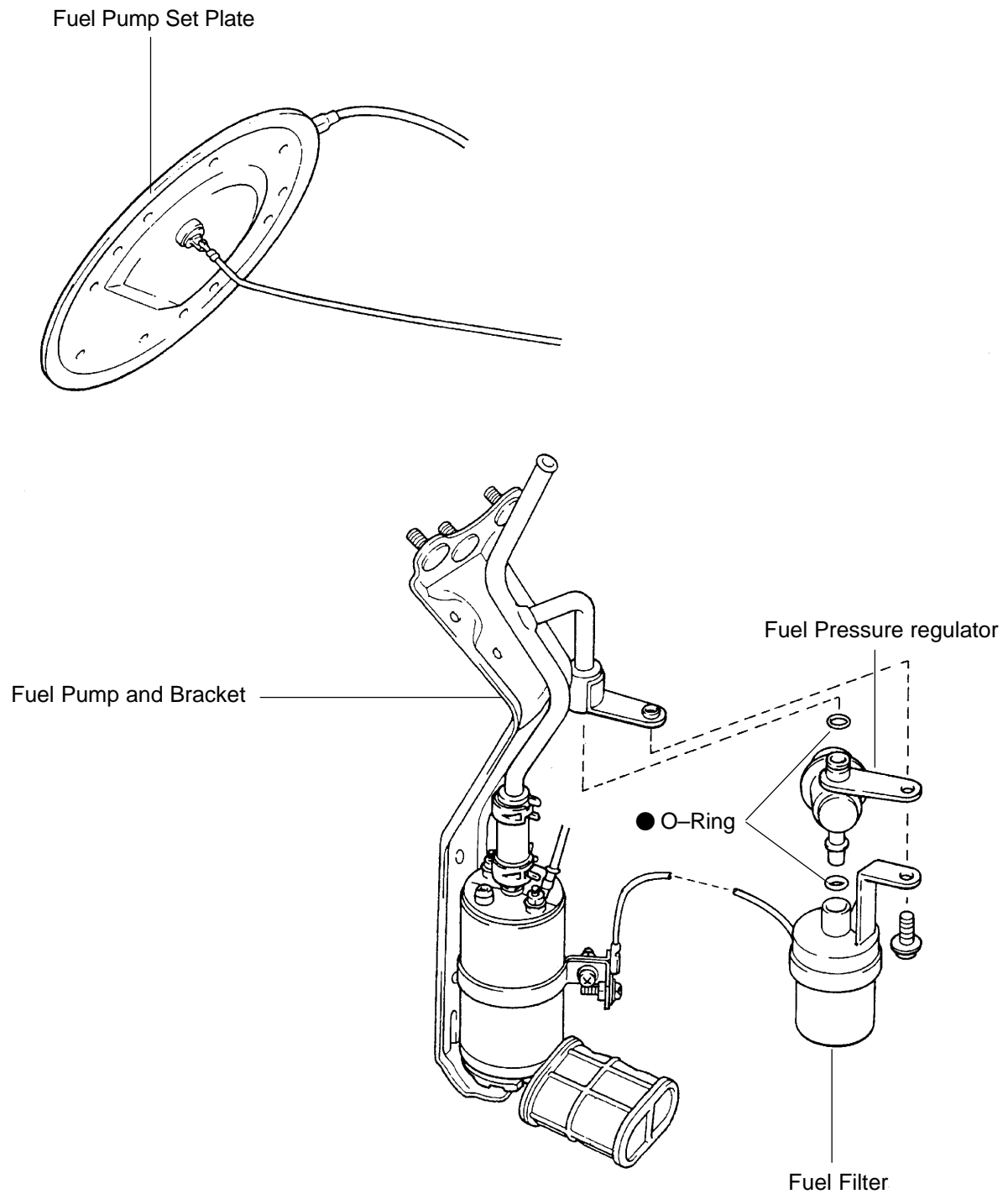
ON-VEHICLE INSPECTION

INSPECT FUEL PRESSURE (See page [SF-5](#))

SF0EW-02

COMPONENTS



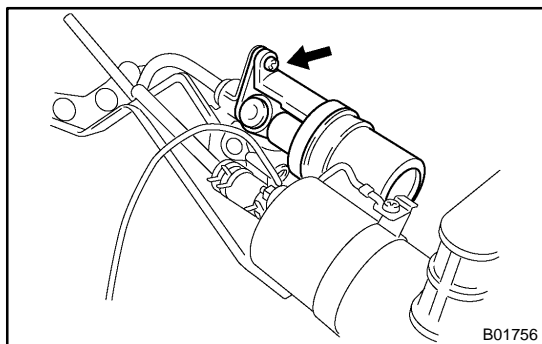


● Non-reusable part

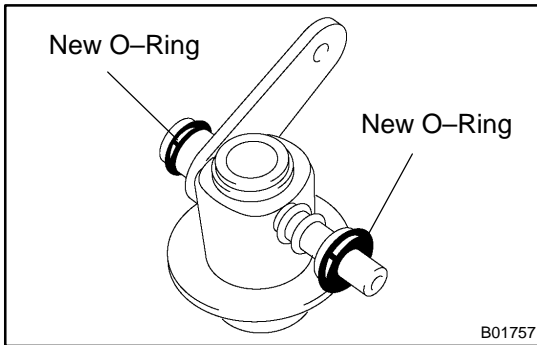
B01755

REMOVAL

1. **REMOVE FUEL PUMP ASSEMBLY FROM FUEL TANK**
(See page [SF-10](#))



2. **REMOVE FUEL PRESSURE REGULATOR**
 - (a) Remove the screw, fuel filter and fuel pressure regulator.
 - (b) Remove the O-rings from fuel pressure regulator and fuel filter.



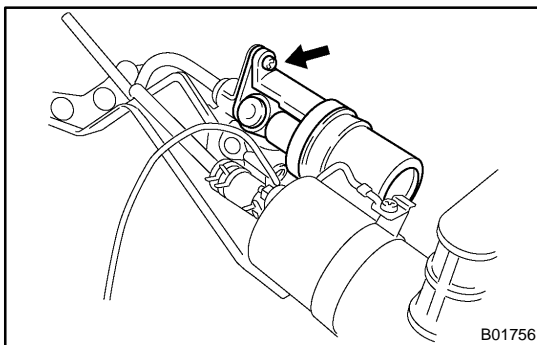
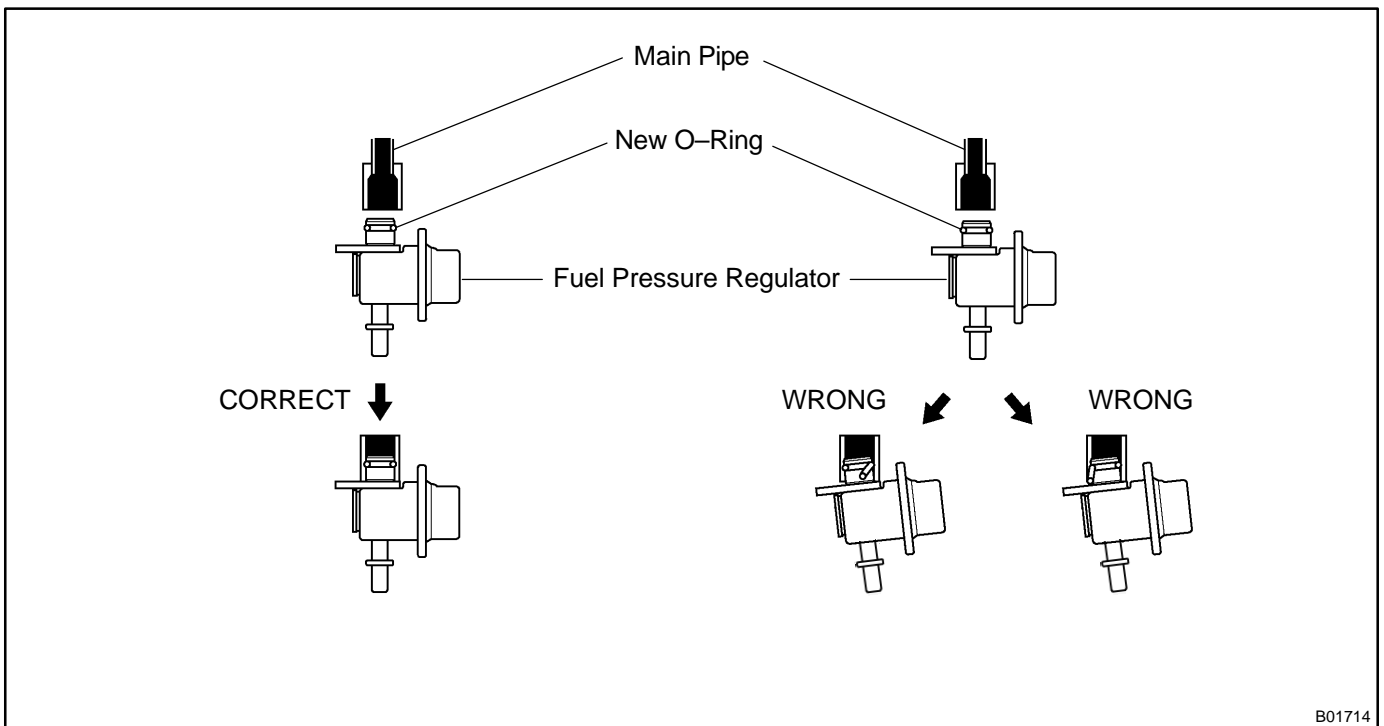
INSTALLATION

1. INSTALL FUEL PRESSURE REGULATOR

- Apply a light coat of gasoline to 2 new O-rings, and install them to the pressure regulator.
- Insert the pressure regulator into the fuel filter by hand completely.
- Insert the pressure regulator and fuel filter assembly into the delivery pipe by hand completely.
- Check that the fuel pressure regulator and fuel filter rotate smoothly

NOTICE:

If it does not rotate smoothly, the O-ring may be pinched, so remove the pressure regulator, fuel filter and do steps (a) and (b) above again.



- Install the screw.

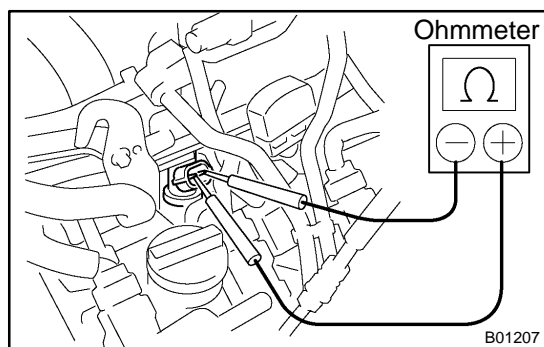
Torque: 2.0 N·m (20 kgf·cm, 17 in.-lbf)

- INSTALL FUEL PUMP ASSEMBLY TO FUEL TANK**
(See page [SF-10](#))

INJECTOR ON-VEHICLE INSPECTION

SF0F0-02

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER AND AIR CLEANER INLET
3. REMOVE INTAKE AIR CONNECTOR
4. INSPECT INJECTOR RESISTANCE
 - (a) Disconnect the 8 injector connectors.



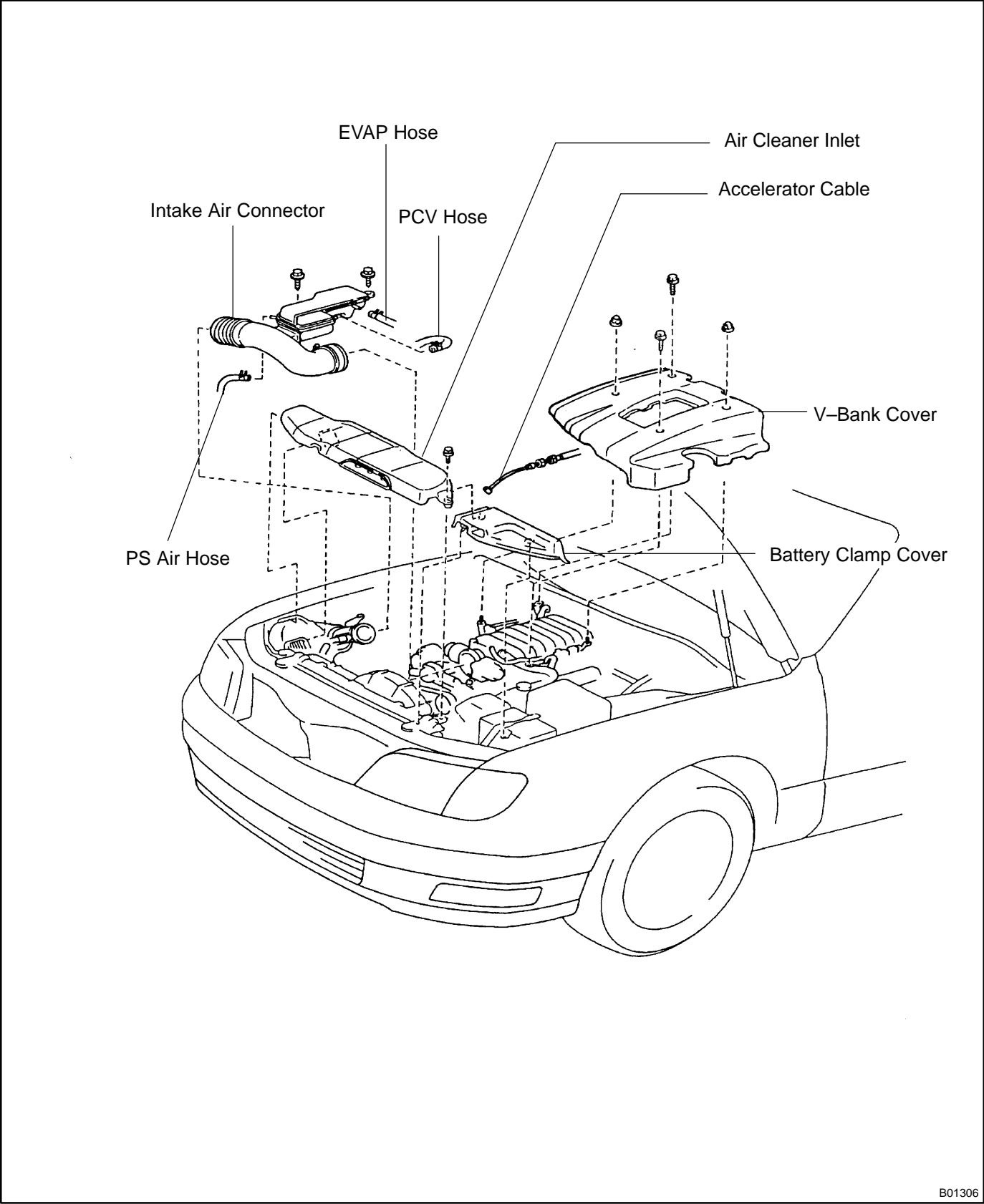
- (b) Using a ohmmeter, measure the resistance between the terminals.

Resistance: 13.4 – 14.2 Ω at 20°C (68°F)

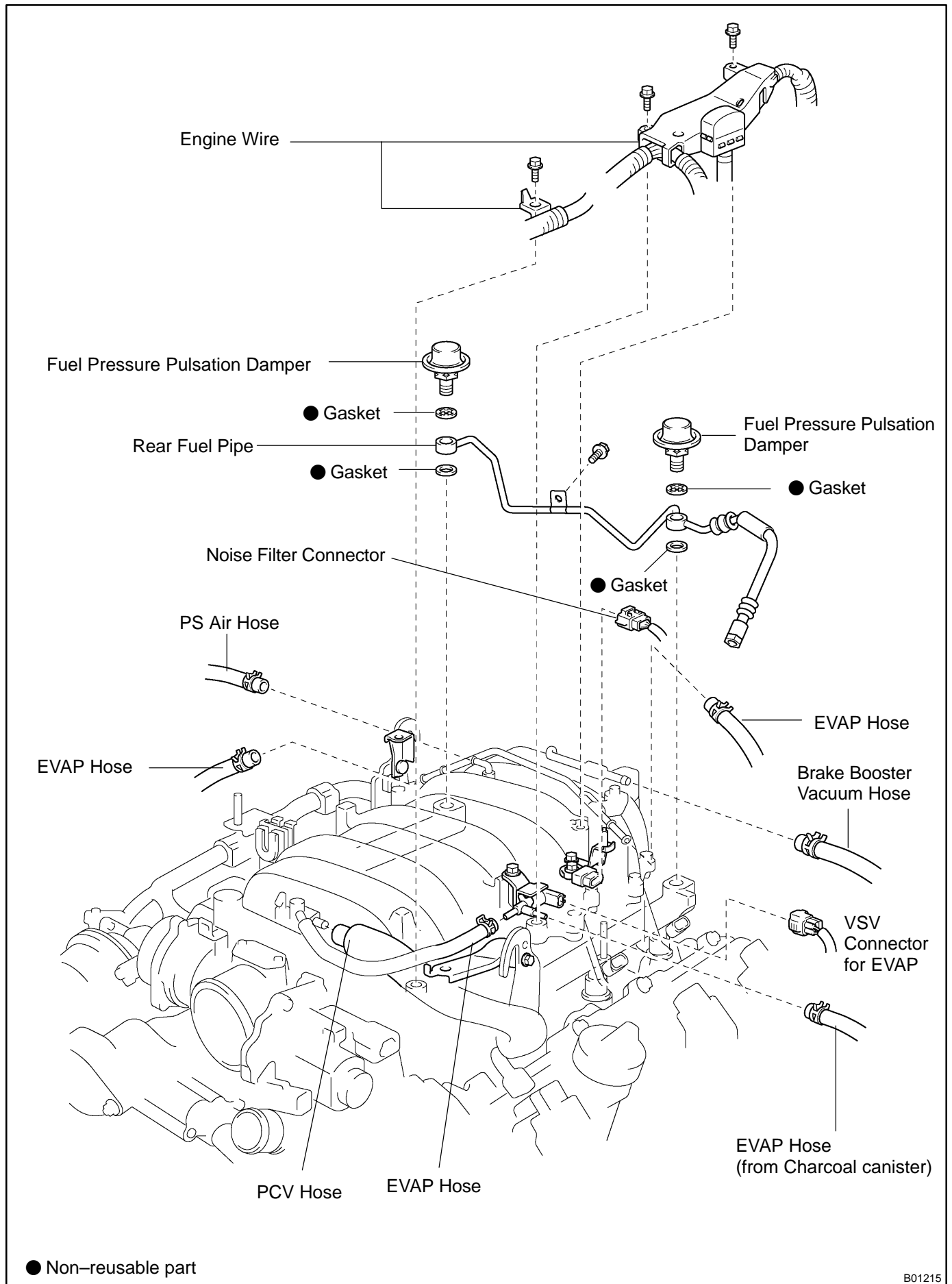
If the resistance is not as specified, replace the injector.

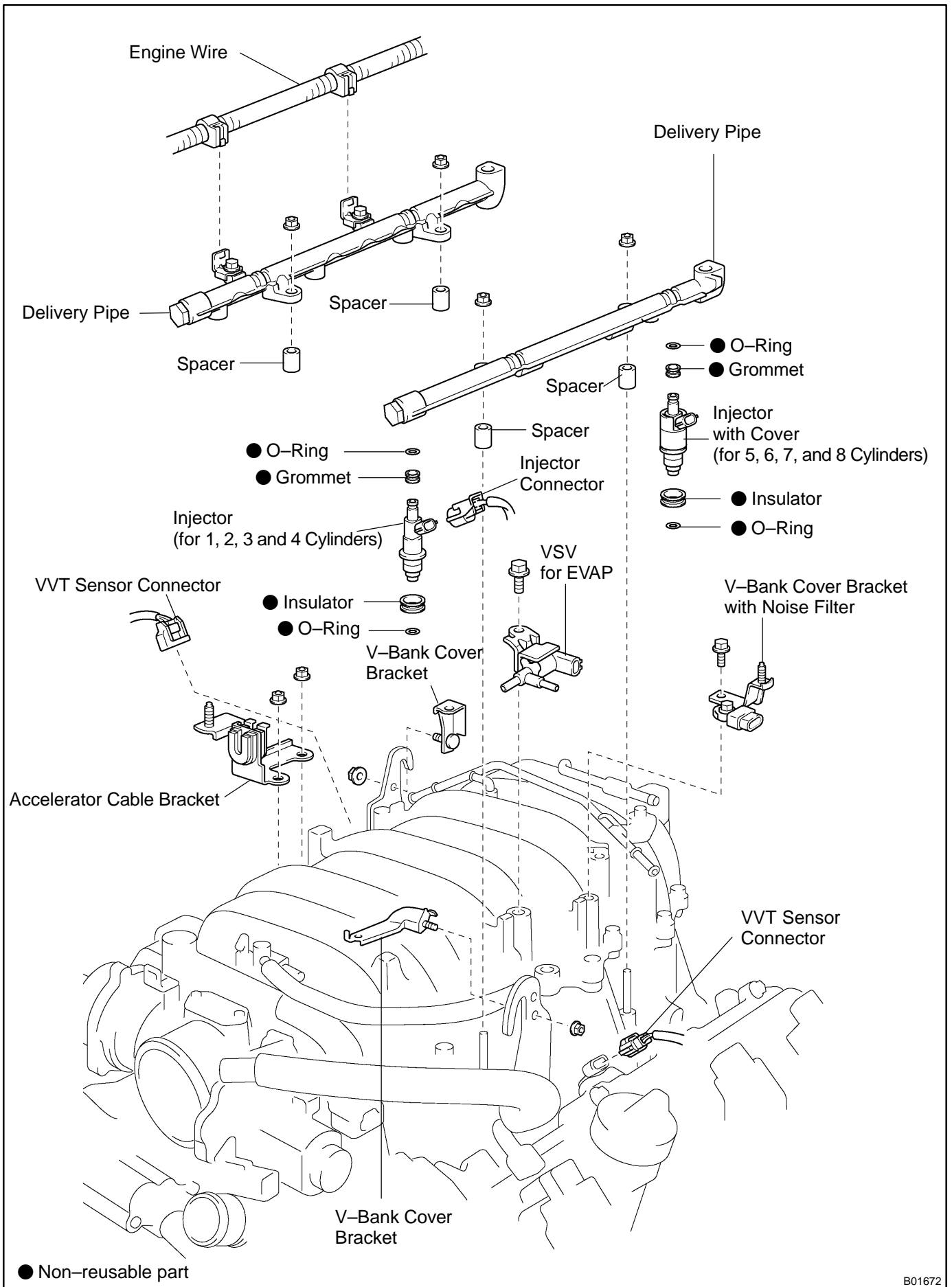
- (c) Reconnect the 8 injector connectors.
5. REINSTALL INTAKE AIR CONNECTOR
6. REINSTALL BATTERY CLAMP COVER AND AIR CLEANER INLET
7. REINSTALL V-BANK COVER

COMPONENTS



B01306





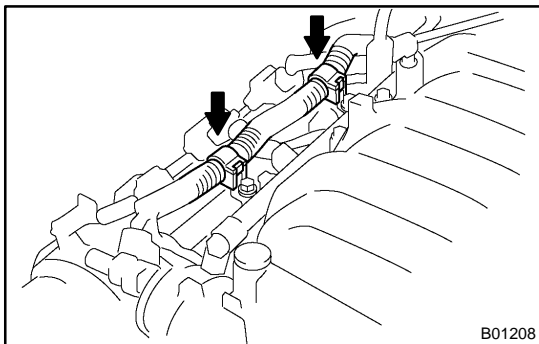
B01672

REMOVAL

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER AND AIR CLEANER INLET
3. REMOVE INTAKE AIR CONNECTOR
4. REMOVE FUEL PRESSURE PULSATION DAMPERS
(See page [SF-28](#))
5. DISCONNECT VVT SENSOR CONNECTORS
6. REMOVE ACCELERATOR CABLE BRACKET

Remove the 2 nuts and accelerator cable bracket.

7. REMOVE 3 V-BANK COVER BRACKETS
 - (a) Disconnect the VSV connector for ACIS from the No.1 V-bank cover bracket.
 - (b) Disconnect the noise filter connector from the noise filter on the No.3 V-bank cover bracket.
 - (c) Remove the 4 bolts and 3 V-bank cover brackets.
8. REMOVE VSV FOR EVAP



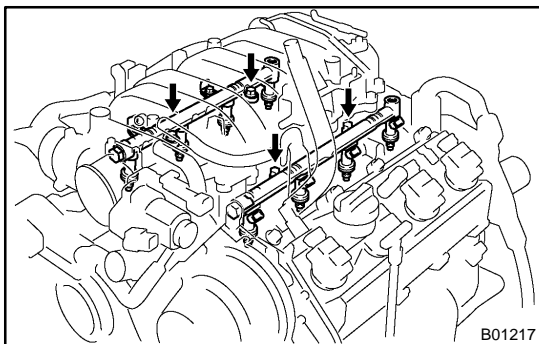
9. DISCONNECT ENGINE WIRE FROM DELIVERY PIPE
 - (a) Disconnect the 2 wire clamps from the wire clamp bracket on the RH delivery pipe.
 - (b) Disconnect the 8 injector connectors.

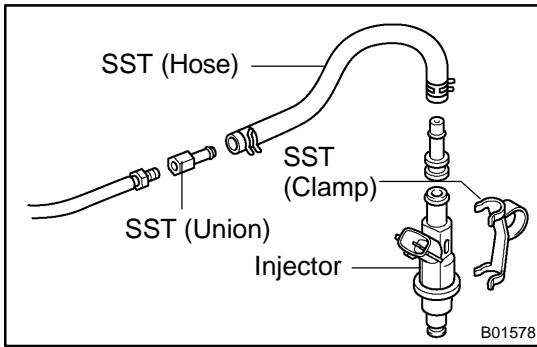
10. REMOVE DELIVERY PIPES AND INJECTORS

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 nuts holding the delivery pipe to the intake manifold.
- (b) Remove the 2 delivery pipes and 8 injectors assembly and 4 spacers.
- (c) Pull out the 8 injectors from the delivery pipes.
- (d) Remove the 2 O-rings, grommet and insulator from each injector.



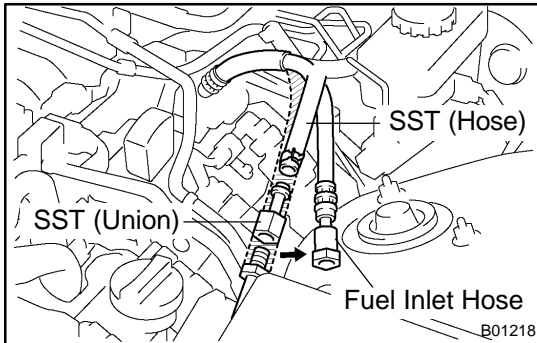


INSPECTION

1. INSPECT INJECTOR INJECTION

CAUTION:

Keep injector clear of sparks during the test.



- (a) Disconnect the fuel inlet hose from the fuel tube.
- (b) Connect SST (hose) to the fuel inlet tube with SST (union). Tighten the flare nut on the fuel tube.

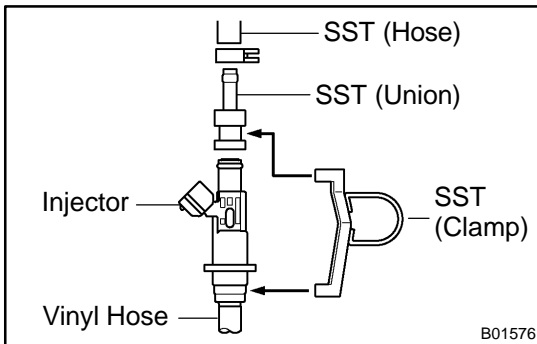
SST 09268-41047

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

HINT:

Use SST. (See page [SF-1](#))

SST 09631-22020



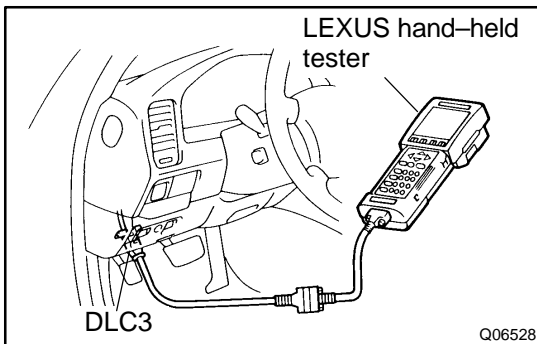
- (c) Install the grommet and O-ring to the injector.
- (d) Connect SST (hose) to the injector with SST (union), and hold the injector and union with SST (clamp).

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.

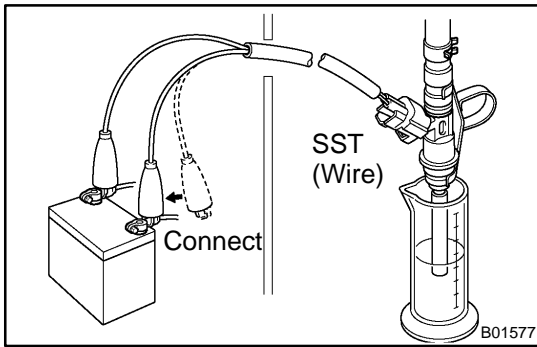


- (f) Connect the LEXUS hand-held tester to the DLC3.
- (g) Turn the ignition switch ON, and push the LEXUS hand-held tester main switch ON.

NOTICE:

DO not start the engine.

- (h) Select the active test mode on the LEXUS hand-held tester.
- (i) Please refer to the LEXUS hand-held tester operator's manual for further details.
- (j) If you have no LEXUS hand-held tester, connect the positive (+) and negative (–) leads from the battery to the fuel pump connector. (See page [SF-5](#))



- (k) 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

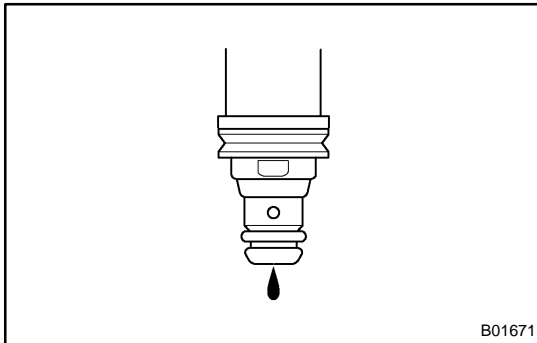
Injection volume:

60 – 73 cm³ (3.7 – 4.5 cu in.) per 15 sec.

Difference between each injector:

13 cm³ (0.6 cu in.) or less

If the injection volume is not as specified, replace the injector.



2. INSPECT LEAKAGE

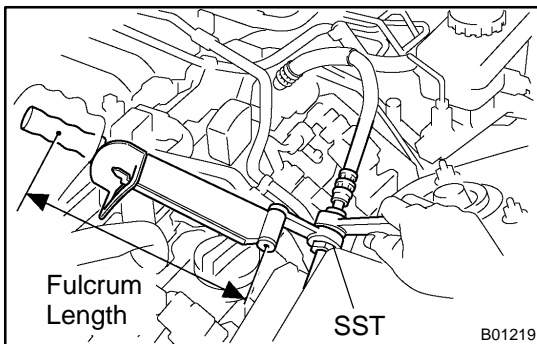
- (a) In the condition above, disconnect the test probes of SST (wire) from the battery and check the fuel leakage from the injector.

SST 09842-30070

Fuel drop: One drop or less per minute

- (b) Turn the ignition switch OFF.
 (c) Disconnect the negative (–) terminal cable from the battery.
 (d) Remove SST.

SST 09268-41047



- (e) Reconnect the fuel inlet hose to the fuel tube.

SST 09631-22020

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

HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

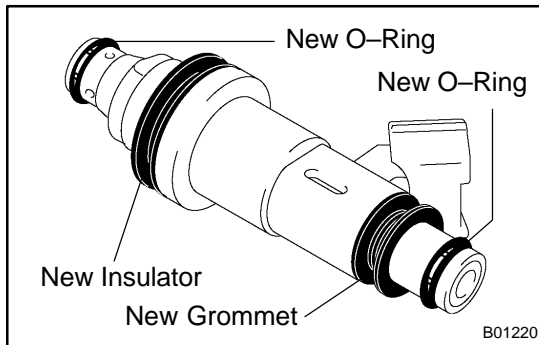
- (f) Disconnect the LEXUS hand-held tester from the DLC3.

INSTALLATION

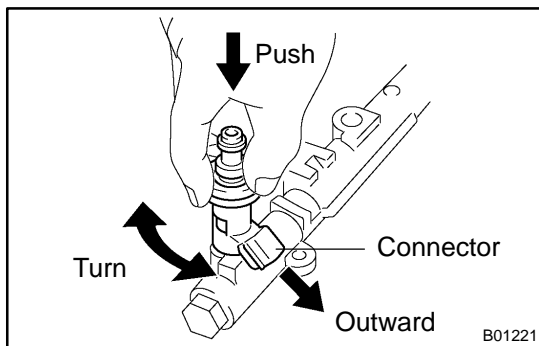
1. INSTALL INJECTORS AND DELIVERY PIPES

NOTICE:

- Be careful not to drop the injectors when installing the delivery pipes.
- Pay attention to put any hung load on the injector to and from the side direction.



- (a) Install a new grommet and new insulator to each injector.
- (b) Apply a light coat of gasoline to 2 new O-rings and install them to each injector.

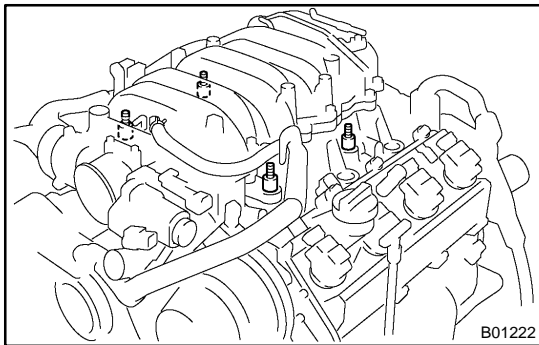


- (c) While turning the injector clockwise and counterclockwise, push it to the delivery pipes. Install the 8 injectors.

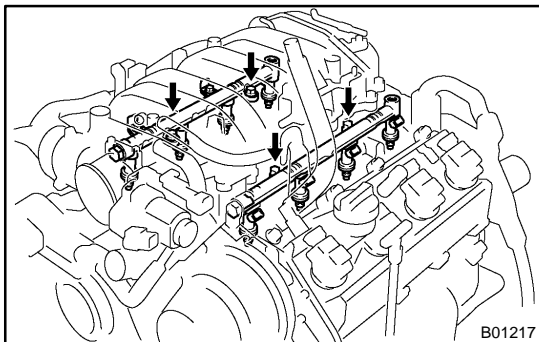
HINT:

Install the injector with cover for No. 5, 6, 7 and 8 cylinders.

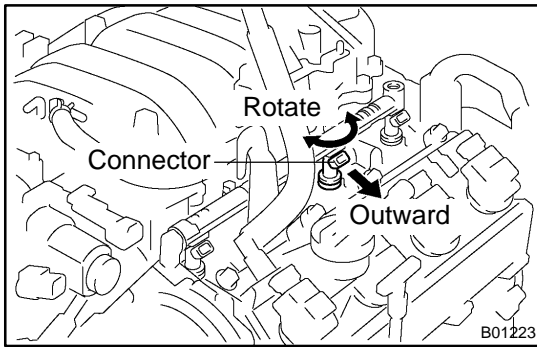
- (d) Position injector connector outward.



- (e) Place the 4 spacers on the intake manifold.



- (f) Place the 8 injectors and 2 delivery pipes assembly in position on the intake manifold.
- (g) Temporarily install the 4 nuts.



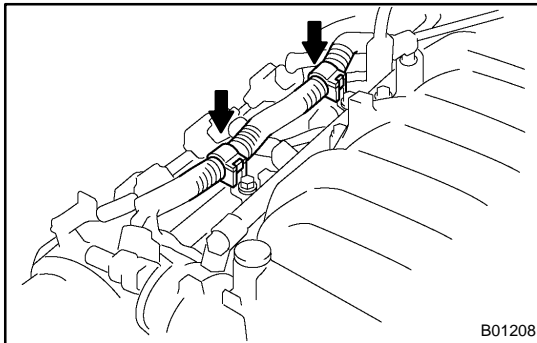
- (h) Check that the injectors rotate smoothly.

HINT:

If injectors do not rotate smoothly, the probable cause is incorrect installation of O-rings. Replace the O-rings.

- (i) Position injector connector outward.
- (j) Tighten the 4 nuts holding the delivery pipes to the intake manifold.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)



2. CONNECT ENGINE WIRE TO DELIVERY PIPE

- (a) Connect the 8 injector connectors.
- (b) Connect the 2 wire clamps to the wire clamp bracket on the RH delivery pipe.

3. INSTALL VSV FOR EVAP

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

4. INSTALL 3 V-BANK COVER BRACKETS

- (a) Install the 3 V-bank cover brackets with the 4 bolts.
Torque: 7.5 N·m (80 kgf-cm, 66 in.-lbf)
- (b) Connect the VSV connector for ACIS to the No.1 V-bank cover bracket.
- (c) Connect the noise filter connector to the noise filter on the No.3 V-bank cover bracket.

5. INSTALL ACCELERATOR CABLE BRACKET

Install the accelerator cable bracket with the 2 nuts.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

6. CONNECT VVT SENSOR CONNECTORS

7. INSTALL FUEL PRESSURE PULSATION DAMPER

(See page [SF-29](#))

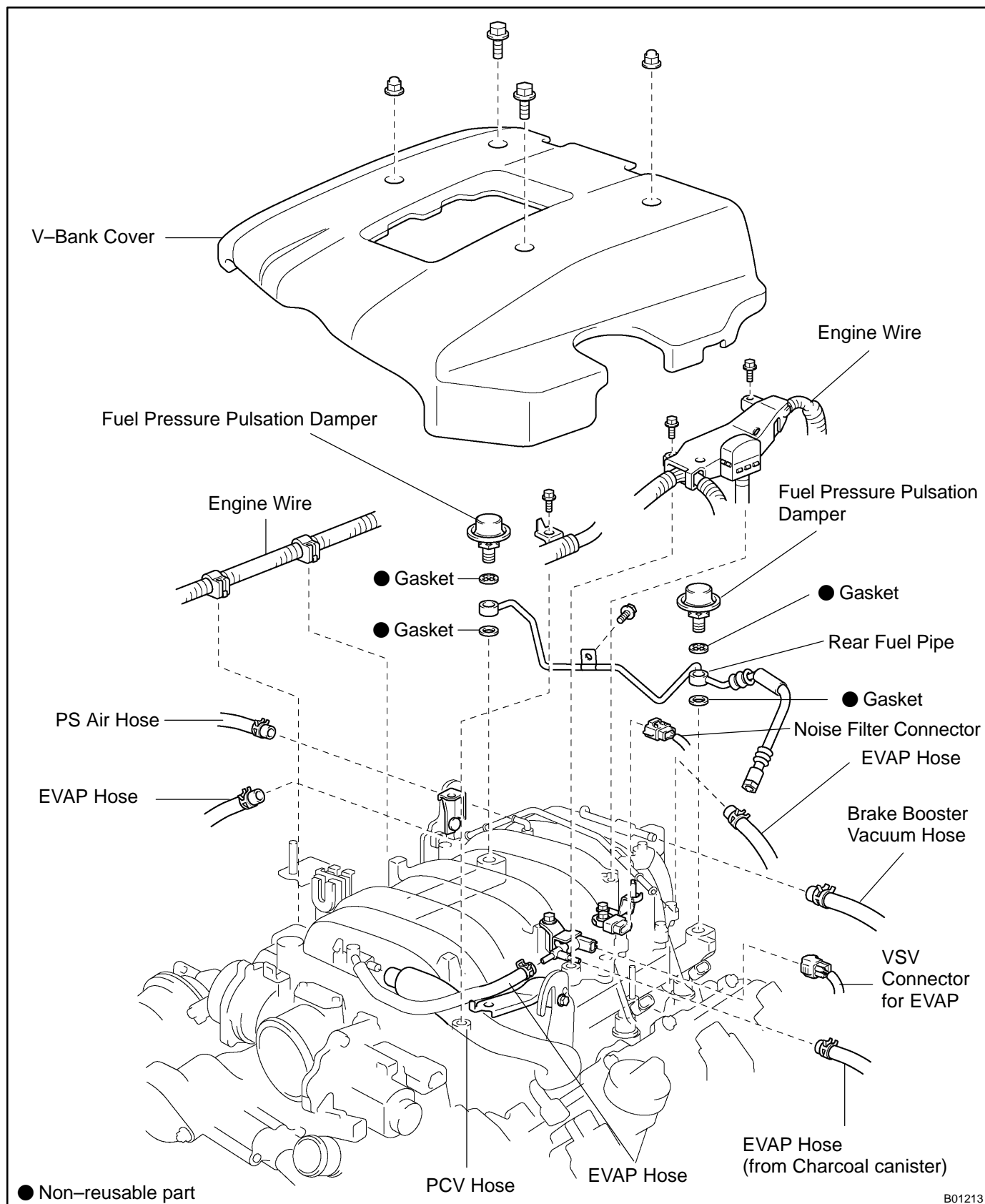
8. INSTALL INTAKE AIR CONNECTOR

9. INSTALL AIR CLEANER INLET AND BATTERY CLAMP COVER

10. INSTALL V-BANK COVER

FUEL PRESSURE PULSATION DAMPER COMPONENTS

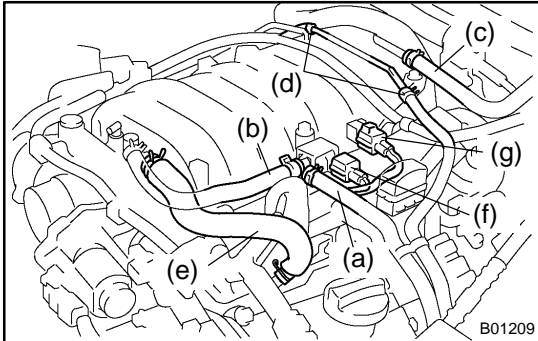
SF0F5-02



B01213

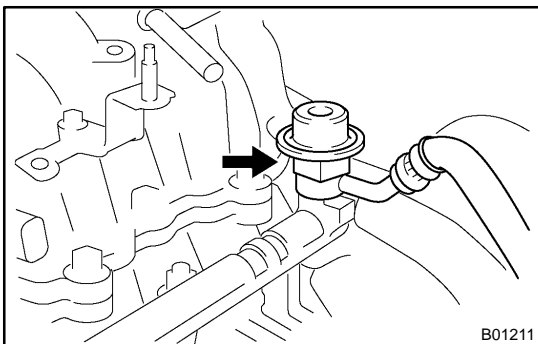
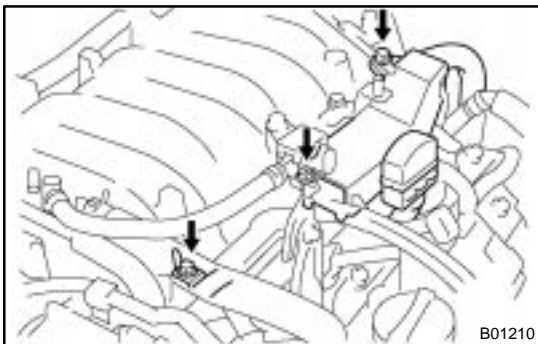
REMOVAL

1. REMOVE V-BANK COVER
2. DISCONNECT ACCELERATOR CABLE



3. DISCONNECT ENGINE WIRE FROM INTAKE MANIFOLD

- (a) Disconnect the EVAP hose (from the charcoal canister).
- (b) Disconnect the EVAP hose.
- (c) Disconnect the brake booster vacuum hose.
- (d) Disconnect the 2 EVAP hoses.
- (e) Disconnect the PCV hose.
- (f) Disconnect the VSV connector for EVAP.
- (g) Disconnect the noise filter connector.
- (h) Remove the 3 bolts, and disconnect the engine wire protector and wire clamp bracket from the intake manifold.

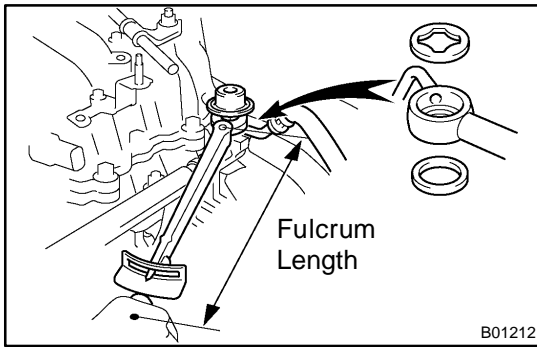


4. REMOVE FUEL PRESSURE PULSATION DAMPERS

- (a) Remove pulsation damper and upper gasket. Remove the 2 pulsation dampers and 2 upper gaskets.
- (b) Disconnect the rear fuel pipe from the RH and LH delivery pipes, and remove the 2 lower gaskets.

CAUTION:

- Put a shop towel under the delivery pipe.
- Slowly loosen the pulsation damper.



INSTALLATION

1. **INSTALL FUEL PRESSURE PULSATION DAMPERS**
Using SST, install 2 new gaskets, the rear fuel pipe and pulsation damper. Install the 2 pulsation dampers.

SST 09612-24014 (09617-24011)

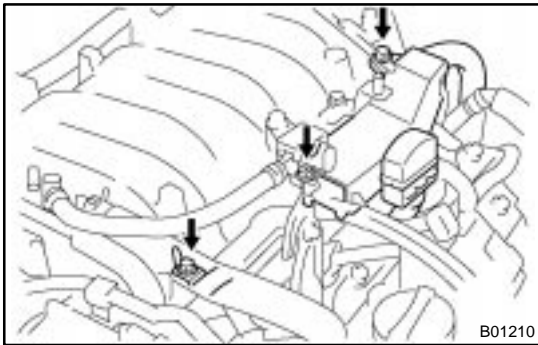
Torque:

39 N·m (400 kgf·cm, 29 ft·lbf)

33 N·m (340 kgf·cm, 24 ft·lbf) for SST

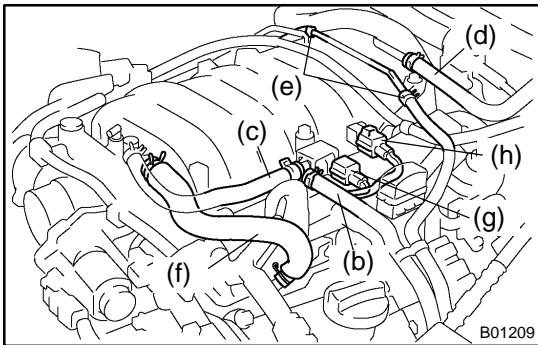
HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).



2. **CONNECT ENGINE WIRE**

- (a) Connect the engine wire with cover and wire clamp bracket with 3 bolts to intake manifold.



- (b) Connect the EVAP hose (from the charcoal canister).
- (c) Connect the EVAP hose.
- (d) Connect the brake booster vacuum hose.
- (e) Connect the 2 EVAP hoses.
- (f) Connect the PCV hose.
- (g) Connect the VSV connector for EVAP.
- (h) Connect the noise filter connector.

3. **CHECK FOR FUEL LEAKS (See page [SF-1](#))**

4. **CONNECT ACCELERATOR CABLE**

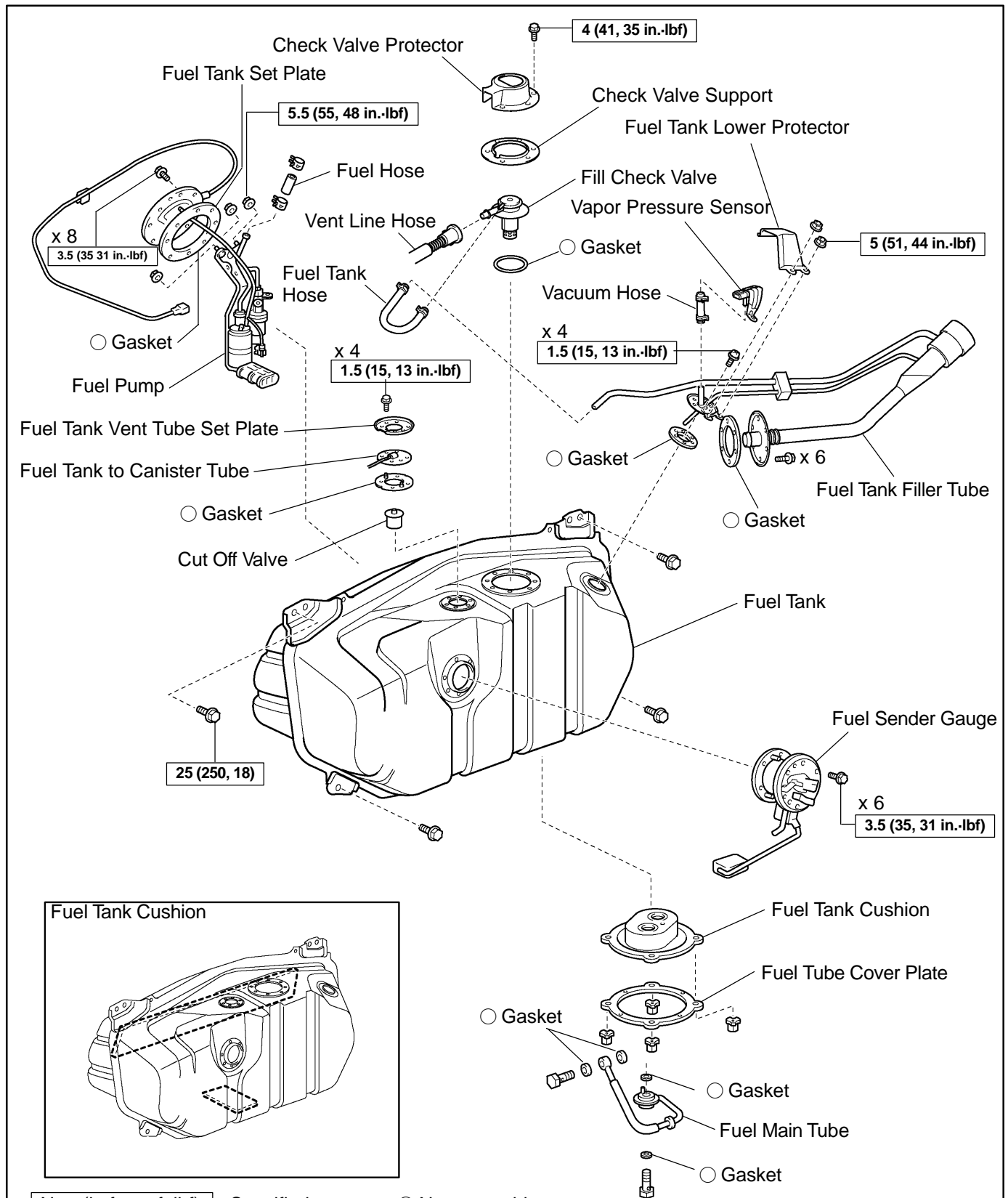
5. **INSTALL V-BANK COVER**

FUEL TANK AND LINE COMPONENTS

SF0F8-03

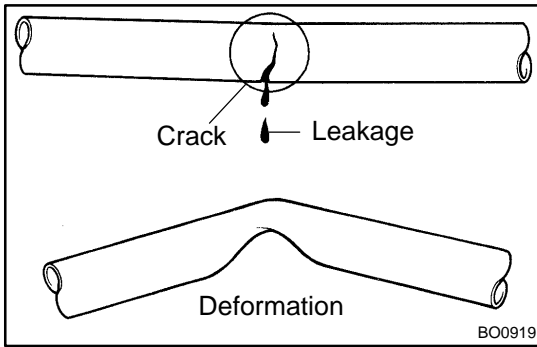
CAUTION:

- Always use new gaskets when replacing the fuel tank or components part.
- Apply the proper torque to all parts tightened.



☐ N·m (kgf·cm, ft·lbf) : Specified torque ☐ Non-reusable part

B10372

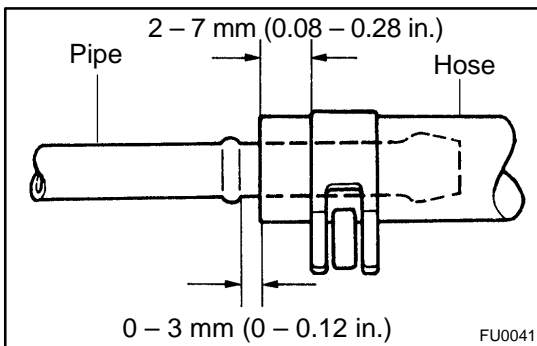
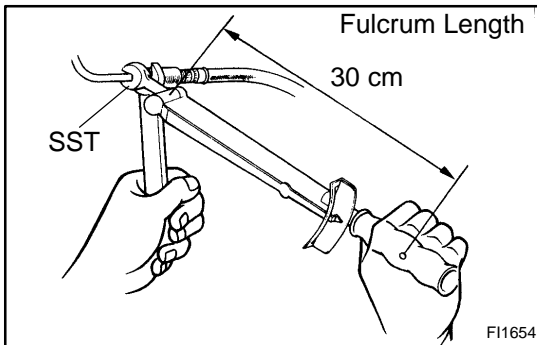


INSPECTION

INSPECT FUEL TANK AND LINE

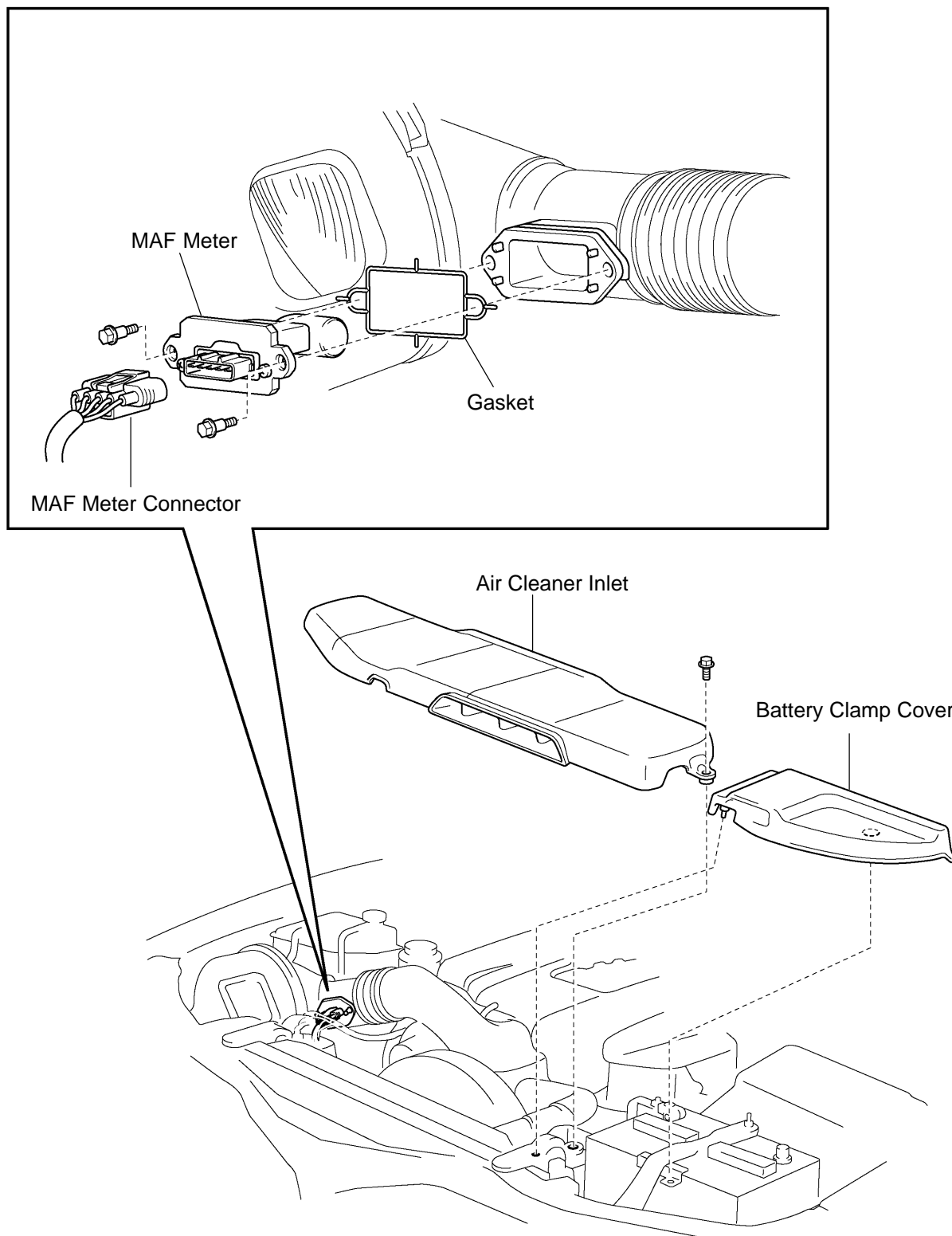
- Inspect the fuel lines and connections for cracks, leakage or deformation.
- Inspect the fuel tank vapor vent system hoses and connections for looseness, kinks or damage.
- Inspect the fuel tank for deformation, cracks, fuel leakage or tank band looseness.
- Check the filter neck for damage or fuel leakage.
- Hose and tube connections are as shown in the illustration.

If the problem is found, repair or replace the parts as necessary.



MASS AIR FLOW (MAF) METER COMPONENTS

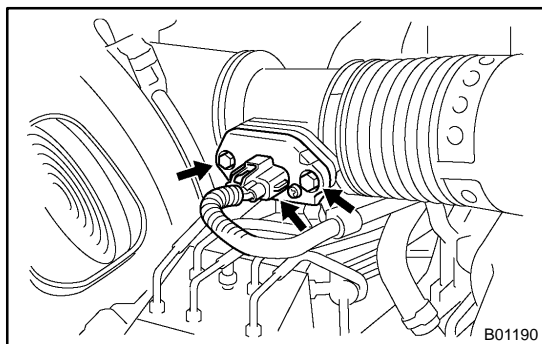
SF0FA-02



B01189

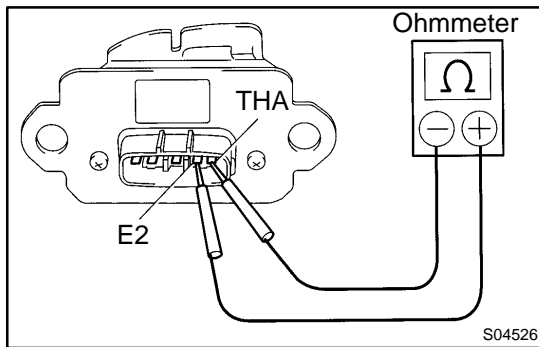
REMOVAL

1. REMOVE BATTERY CLAMP COVER AND AIR CLEANER INLET



2. REMOVE MAF METER

- (a) Disconnect the MAF meter connector.
- (b) Remove the 2 bolts, MAF meter and gasket.



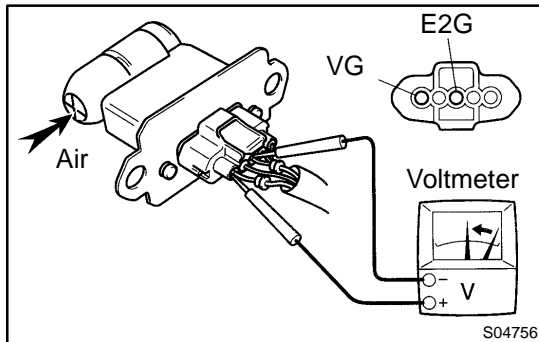
INSPECTION

1. INSPECT MAF METER RESISTANCE

Using an ohmmeter, measure the resistance between terminals THA and E2.

Terminals	Resistance	Temperature
THA – E2	13.6 – 18.4 kΩ	–20°C (–4°F)
THA – E2	2.21 – 2.69 kΩ	20°C (68°F)
THA – E2	0.493 – 0.667 kΩ	60°C (140°F)

If the resistance is not as specified, replace the MAF meter.



2. INSPECT MAF METER OPERATION

- Connect the MAF meter connector.
- Turn the ignition switch ON.
- Using a voltmeter, connect the positive (+) tester probe to terminal VG, and negative (–) tester probe to terminal E2G.
- Blow air into the MAF meter, and check that the voltage fluctuates.

If operation is not as specified, replace the MAF meter.

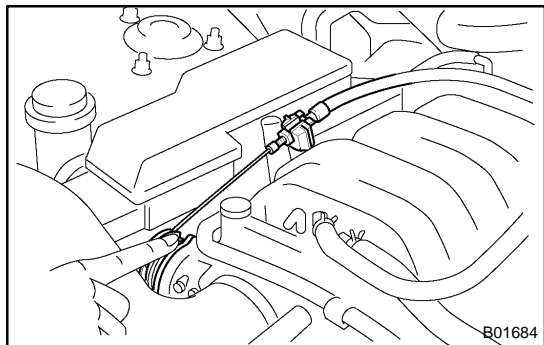
- Turn the ignition switch LOCK.
- Disconnect the MAF meter connector.

INSTALLATION

Installation is in the reverse order of removal. (See page [SF-33](#))

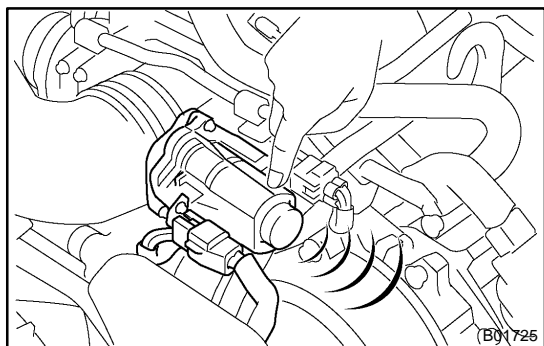
THROTTLE BODY ON-VEHICLE INSPECTION

1. REMOVE V-BANK COVER



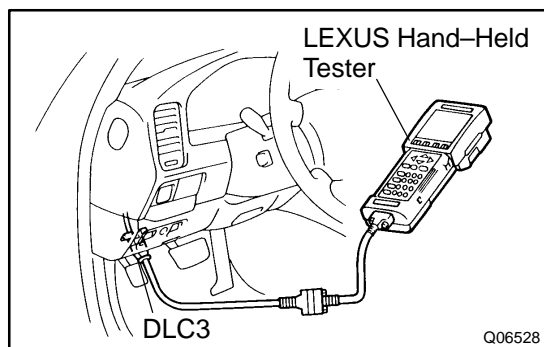
2. INSPECT SYSTEM OPERATION

- (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.

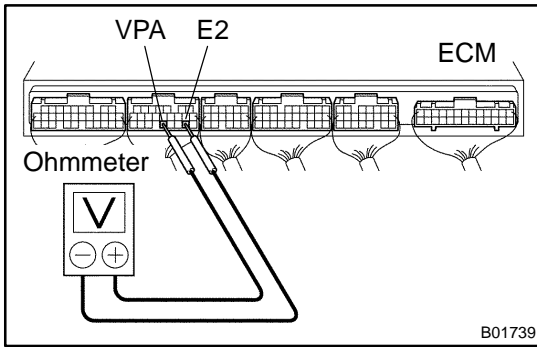
If operation is not as specified, check the throttle control motor (See step 4), wiring and ECM.



- (c) Inspect the accelerator pedal position sensor.
- (1) Connect the LEXUS 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 shows 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 LEXUS hand-held tester, measure voltage between terminals VPA and E2 of the ECM connector.

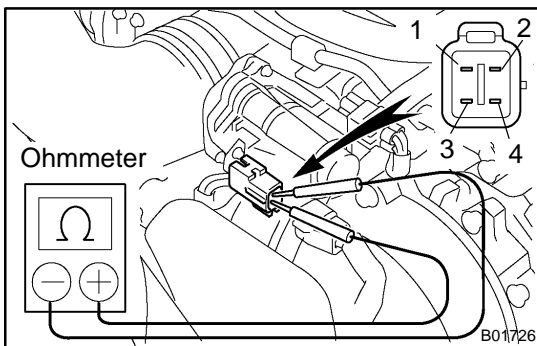
- (d) Inspect the air assist system.
 - (1) Start the engine and check that the MIL does not light up.
 - (2) Allow the engine to warm up to normal operating temperature.
 - (3) Turn the A/C conditioning ON to OFF, and check the idle speed.

Idle speed (Transmission in neutral): 750 ± 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.



3. INSPECT THROTTLE CONTROL MOTOR w/ CLUTCH

- (a) Disconnect the throttle control motor w/ clutch connector.
- (b) Using an ohmmeter, measure the motor resistance between terminal 1 (M+) and 2 (M-).

Motor resistance: $0.3 - 100 \Omega$ at 20°C (68°F)

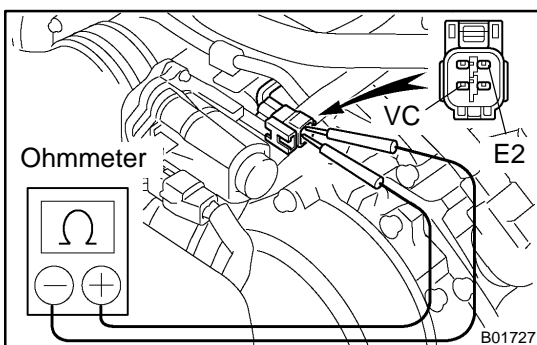
If the resistance is not as specified, replace the throttle control motor w/ clutch. (See page [SF-43](#))

- (c) Using an ohmmeter, measure the clutch resistance between terminal 3 (CL-) and 4 (CL+).

Clutch resistance: $4.2 - 5.2 \Omega$ at 20°C (68°F)

If the resistance is not as specified, replace the throttle control motor w/ clutch. (See page [SF-43](#))

- (d) Reconnect the throttle control motor connector.



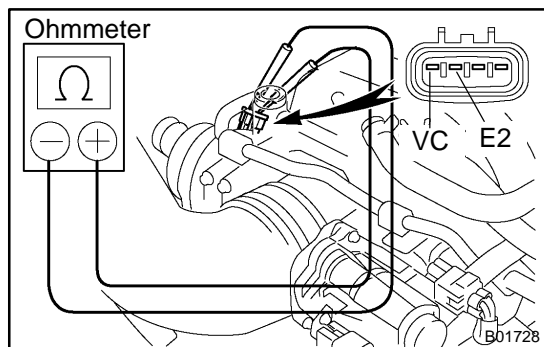
4. INSPECT THROTTLE POSITION SENSOR

- (a) Disconnect the throttle position sensor connector.
- (b) Using an ohmmeter, measure the resistance between terminals VC and E2.

Resistance: $1.25 - 2.35 \text{ k}\Omega$ at 20°C (68°F)

If the resistance is not as specified, replace the throttle position sensor. (See page [SF-43](#))

- (c) Reconnect the throttle position sensor connector.



5. INSPECT ACCELERATOR PEDAL POSITION SENSOR

- (a) Disconnect the accelerator position sensor connector.
- (b) Using an ohmmeter, measure the resistance between terminals VC and E2.

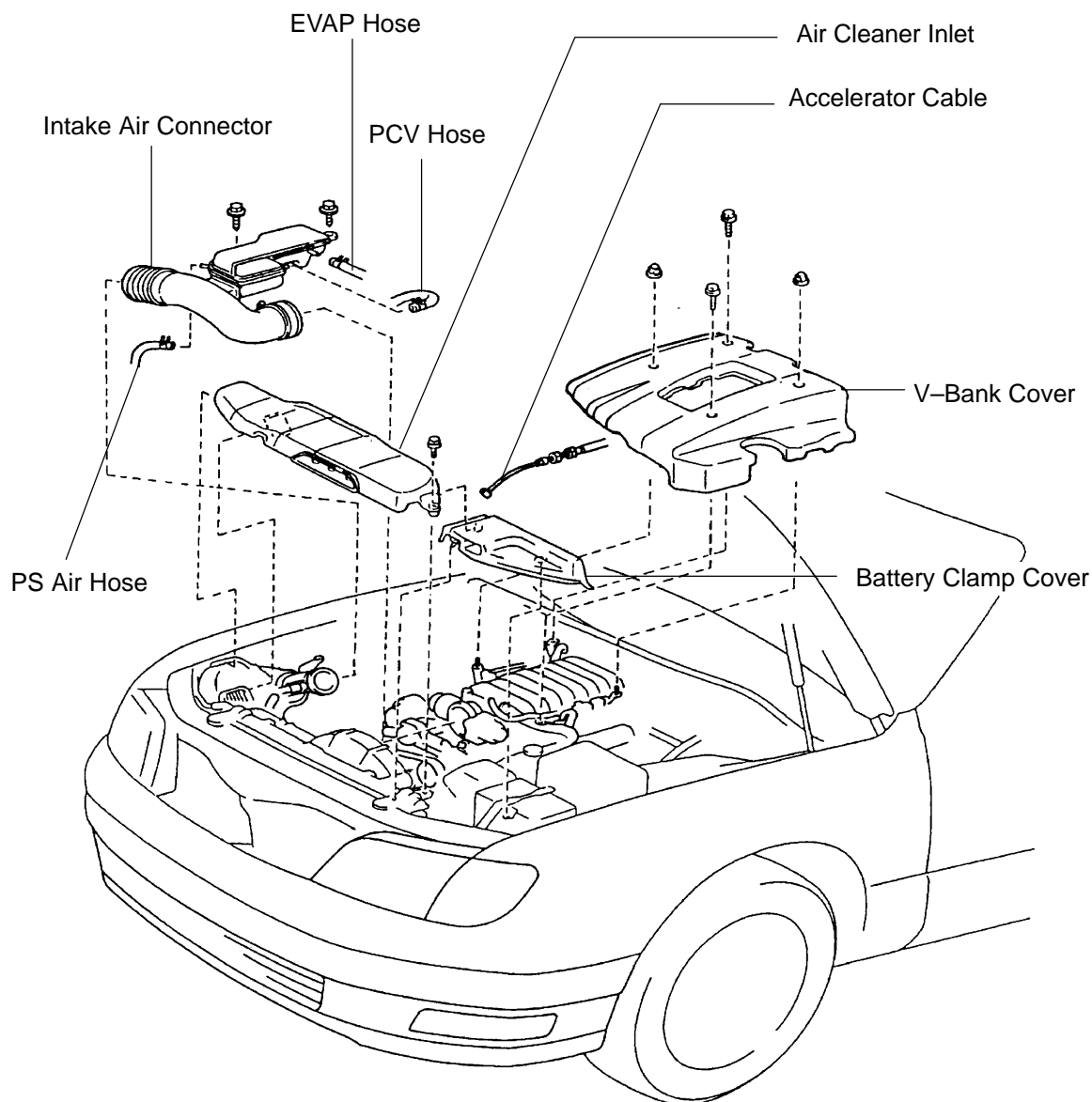
Resistance: 1.64 – 3.28 kΩ at 20°C (68°F)

If the resistance is not as specified, replace the accelerator pedal position sensor. (See page [SF-43](#))

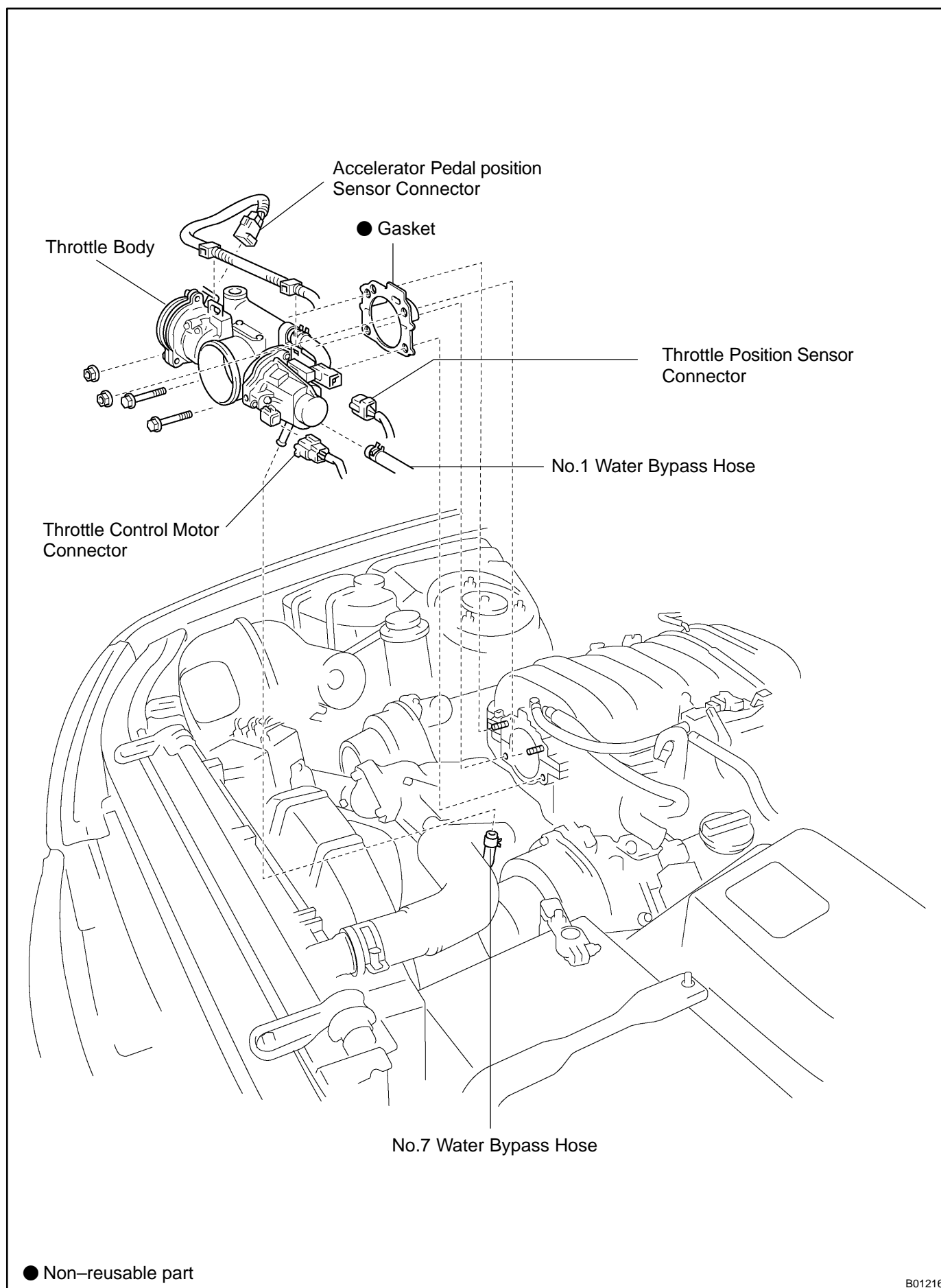
- (c) Reconnect the accelerator pedal position sensor connector.

6. REINSTALL V-BANK COVER

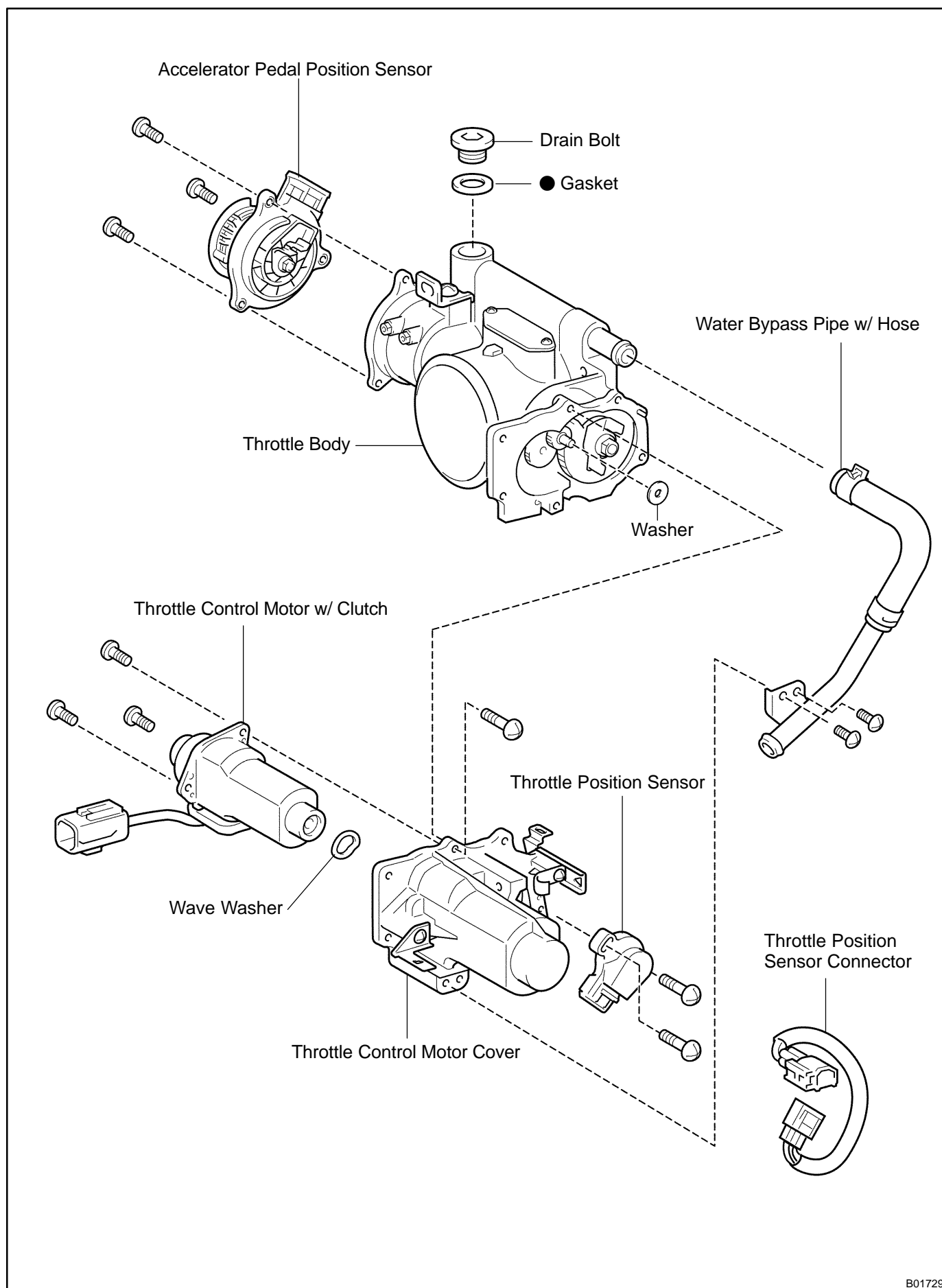
COMPONENTS



B01306



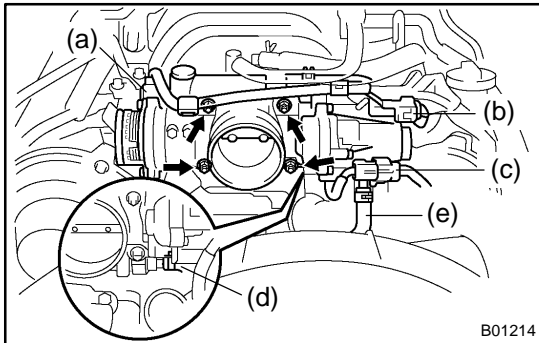
B01216



B01729

REMOVAL

1. REMOVE V-BANK COVER
2. DRAIN ENGINE COOLANT
3. REMOVE BATTERY CLAMP COVER AND AIR CLEANER INLET
4. REMOVE INTAKE AIR CONNECTOR
5. DISCONNECT ACCELERATOR CABLE FROM THROTTLE BODY



6. REMOVE THROTTLE BODY

- (a) Disconnect the accelerator pedal position sensor connector.
- (b) Disconnect the throttle position sensor connector.
- (c) Disconnect the throttle control motor connector.
- (d) Disconnect the No.1 water bypass hose.
- (e) Disconnect the No.7 water bypass hose.
- (f) Disconnect the 2 wire clamps from the throttle body.
- (g) Remove the 2 bolts, 2 nuts, throttle body and gasket.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

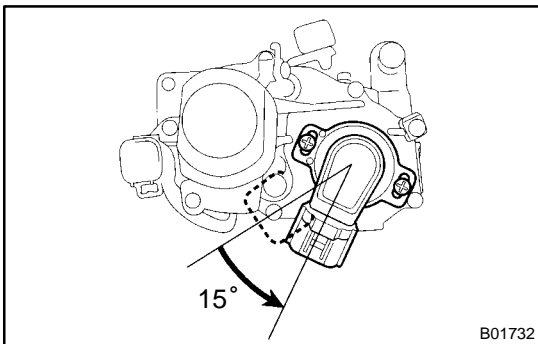
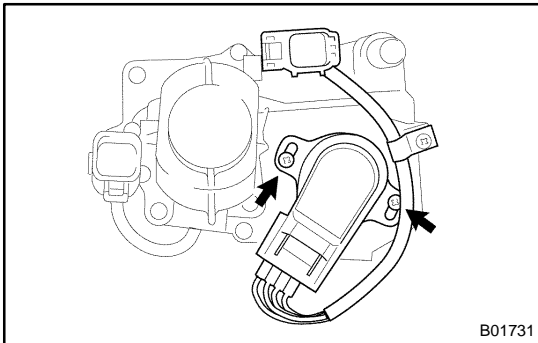
HINT:

At the time of installation, please refer to the following item.
Use a new gasket.

REPLACEMENT

NOTICE:

- To prevent deterioration, do not shock the throttle position sensor and accelerator pedal position sensor.
- Mixing of the foreign objects may cause the gear locking, so thoroughly check that there is no stuck of any foreign objects and clean up if any.



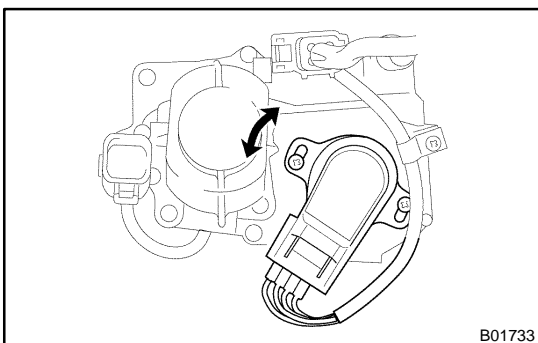
1. REPLACE THROTTLE POSITION SENSOR

- (a) Remove the 2 screws and water bypass pipe w/ hose.
- (b) Disconnect the connector from the throttle position sensor and bracket.
- (c) Widen the clamp with your hand and remove the wire harness from the clamp.
- (d) Remove the 2 set screws and throttle position sensor.
- (e) Reinstall the throttle position sensor.
 - (1) Check that the throttle valve is under the condition of the opener opening angle (about 4°).
 - (2) Install the sensor to the place where is at 15° rotated to the right from the specified installation position.
 - (3) Gradually turn sensor counterclockwise until it touches the throttle valve shaft and temporarily torque the 2 set screws.
- (f) Install the wire harness to the clamp, and connect the connector to the throttle position sensor and bracket.
- (g) Adjust the throttle position sensor.
 - (1) Connect the throttle position sensor connector.

NOTICE:

Do not connect the accelerator pedal position sensor connector.

- (2) Connect the LEXUS hand-held tester or OBDII scan tool to the DLC3.
- (3) Turn the ignition switch ON.



- (4) While reading the value of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA, turn the throttle position sensor slowly to left and right and set the sensor at the center value of the standard value, and then torque the screws.

Standard throttle valve opening percentage:

14.4 – 16 %

Torque: 2 N·m (20 kgf·cm, 17in.-lbf)

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

- (5) Recheck throttle valve opening percentage.

If the throttle valve opening percentage is not as specified, repeat step (4).

- (6) Perform fully closed throttle valve by hand and check that the valve of the throttle valve opening percentage (THROTTLE POS) of the CURRENT DATA stays with the standard value.

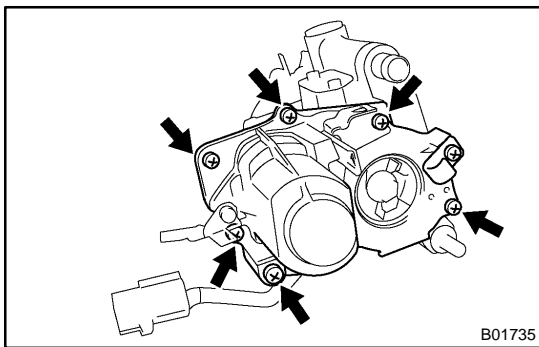
Standard throttle valve opening percentage:

10 – 14 %

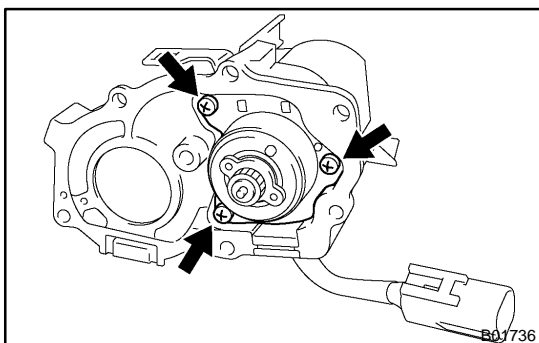
If the throttle valve opening percentage is not as specified, repeat steps (4) to (6).

- (7) Paint the sensor set screw.
 (8) Turn the ignition switch OFF.
 (9) Disconnect the LEXUS hand-held tester or OBDII scan tool from the DLC3.
 (10) Disconnect the throttle position sensor connector.
 (h) Reinstall the water bypass pipe w/ hose with the 2 screws.

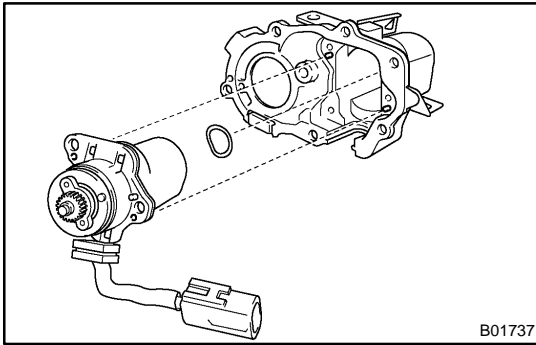
Torque: 5.4 N·m (55 kgf·cm, 47in.·lbf)

**2. REPLACE THROTTLE CONTROL MOTOR w/ CLUTCH**

- (a) Remove the water bypass pipe w/ hose.
 (b) Remove the throttle position sensor.
 (c) Remove the throttle control motor w/ clutch.
 (1) Disconnect the connector from the bracket.
 (2) Remove the 6 screws, cover and motor assembly and washer.



- (3) Remove the 3 screws, throttle control motor w/ clutch and wave washer from the cover.



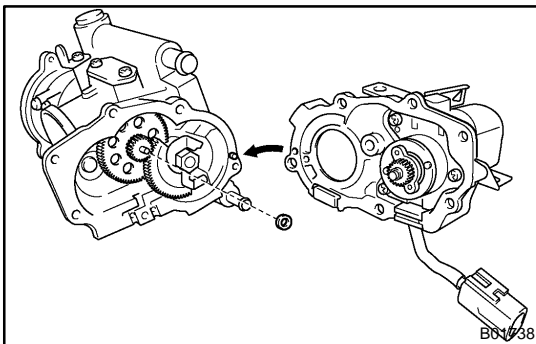
- (d) Reinstall the throttle control motor w/ clutch.
- (1) Place the wave washer to the cover.
 - (2) Match the holes of the positioning pin of the cover and the motor, and then install the throttle control motor w/ clutch with the 3 set screws.

Torque: 3.4 N·m (35 kgf·cm, 30 in.-lbf)

- (3) Apply the grease thinly on the whole surface of the gear teeth.

NOTICE:

Do not apply the grease other than specified because grease has been already applied to the component to be replaced.



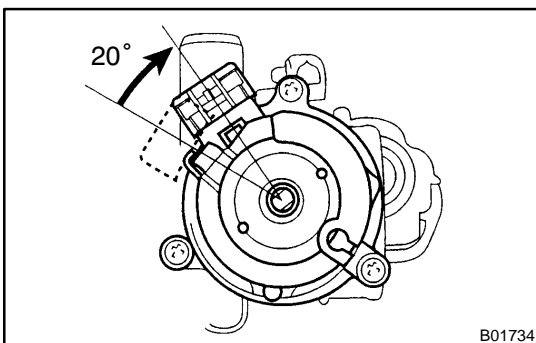
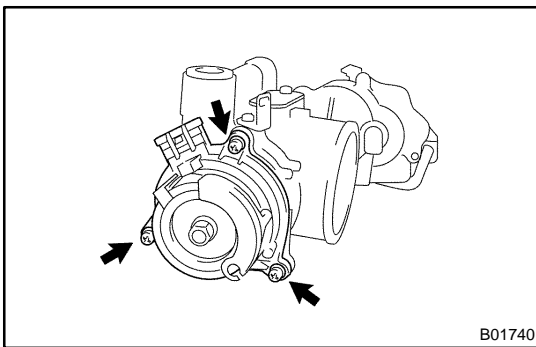
- (4) Place the washer as shown in the illustration.
- (5) Match the holes of the positioning pin of the throttle body and the motor cover, and then install the throttle control motor and cover assembly with the 6 set screws.

Torque: 3.4 N·m (35 kgf·cm, 30 in.-lbf)

- (6) Connect the connector to the bracket.
- (e) Reinstall and adjust the throttle position sensor. (See step 1)
- (f) Reinstall the water bypass pipe w/ hose.

3. REPLACE ACCELERATOR PEDAL POSITION SENSOR

- (a) Remove the 3 set screws and accelerator position sensor.



- (b) Reinstall the accelerator pedal position sensor.
 - (1) Check that the throttle valve is under the condition of the opener opening angle (about 4°).
 - (2) Install the sensor to the place where is at 20° rotated to the left from the specified installation position.
 - (3) Gradually turn sensor clockwise until it touches the throttle valve shaft and temporarily torque the 3 set screws.

Torque: 5.4 N·m (55 kgf·cm, 47in.-lbf)

- (c) Inspect the accelerator pedal position sensor.
 - (1) Connect the accelerator pedal position sensor connector.
 - (2) Connect the LEXUS hand-held tester or OBDII scan tool to the DLC3.
 - (3) Turn the ignition switch ON.
 - (4) Check that the ACCEL POS #1 (VPA) voltage of the CURRENT DATA shows the standard value.

Standard accelerator pedal position voltage:

0.35 – 0.85 V

NOTICE:

After turning the ignition switch ON, do not depress the accelerator pedal.

4. CHECK SYSTEM OPERATION (See page [SF-36](#))

INSTALLATION

Installation is in the reverse order of removal. (See page [SF-42](#))

CAMSHAFT TIMING OIL CONTROL VALVE

SF0FJ-02

ON-VEHICLE INSPECTION

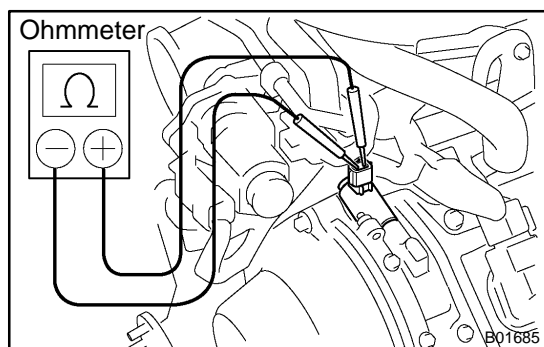
INSPECT OIL CONTROL VALVE RESISTANCE

- (a) Remove the V-bank cover.
- (b) Remove the battery clamp cover, air cleaner inlet and intake air connector.
- (c) Disconnect the oil control valve connector.
- (d) Using an Ohmmeter, measure the resistance between the terminals.

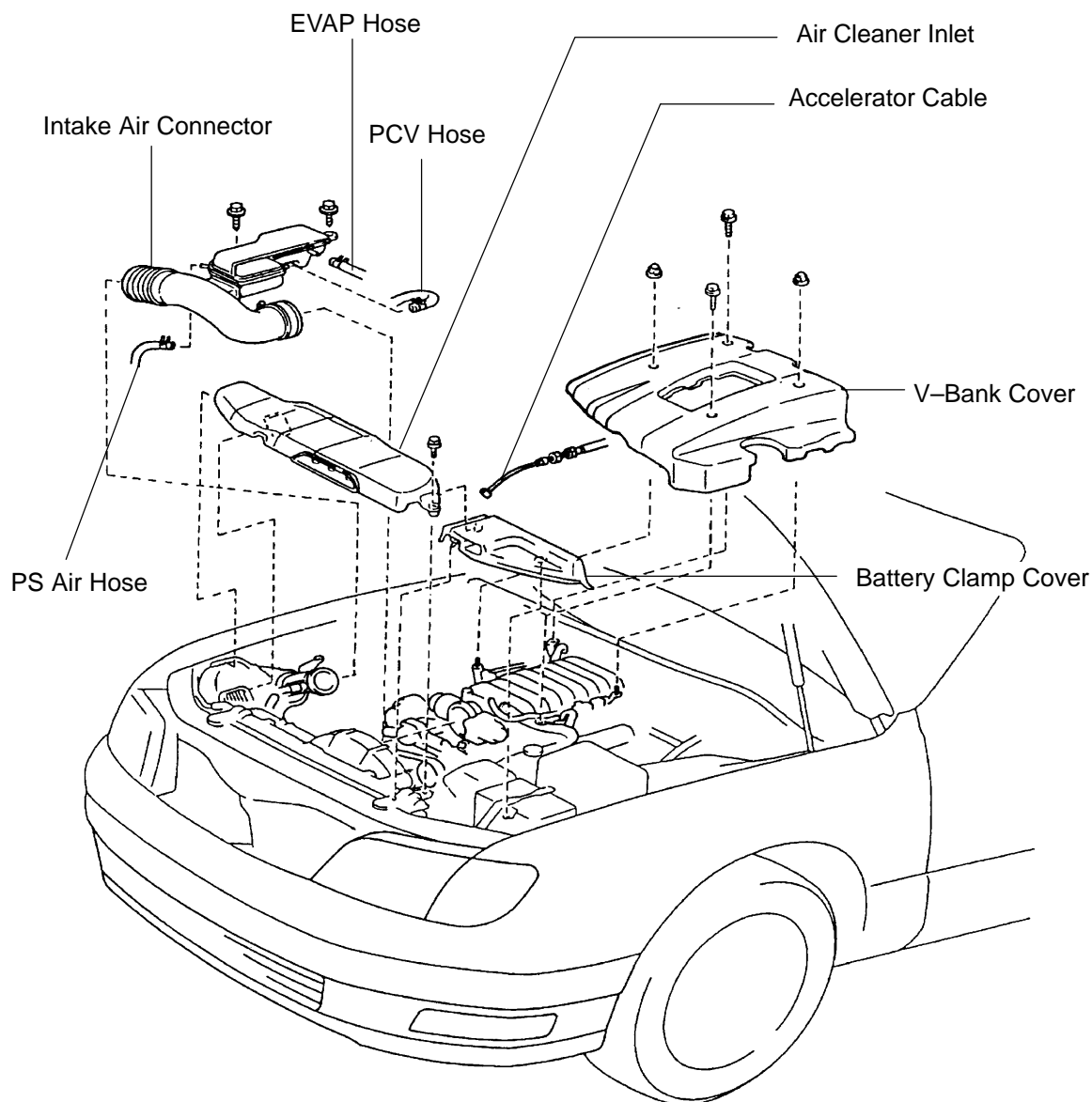
Resistance: 6.9 – 7.9 Ω at 20°C (68°F)

If the resistance is not as specified, replace the valve.

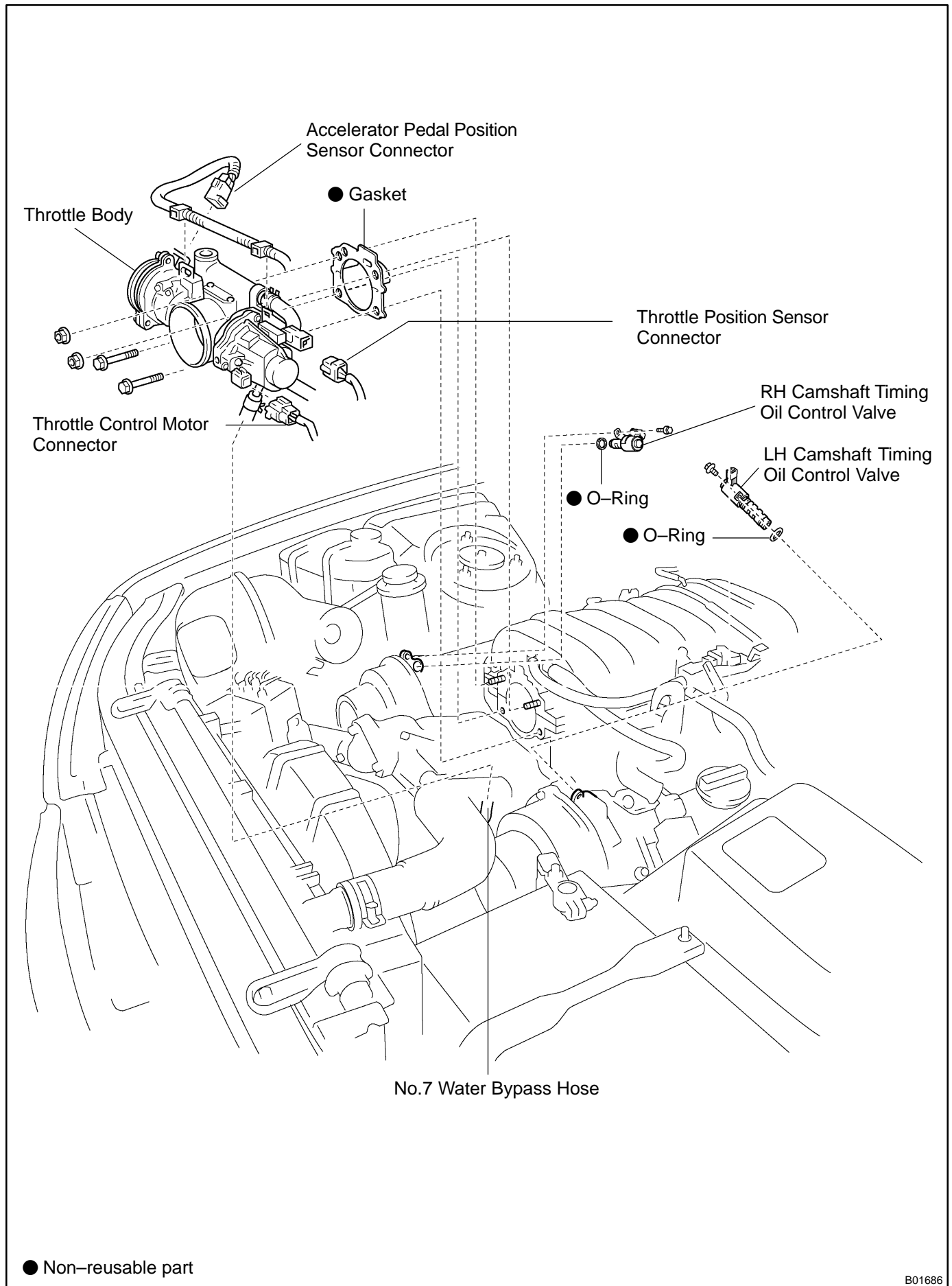
- (e) Reconnect the oil control valve connector.
- (f) Reinstall the V-bank cover.



COMPONENTS



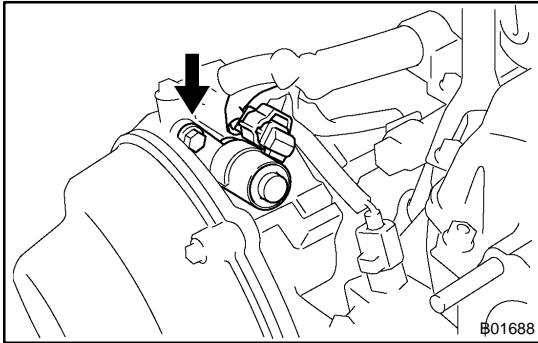
B01306



B01686

REMOVAL

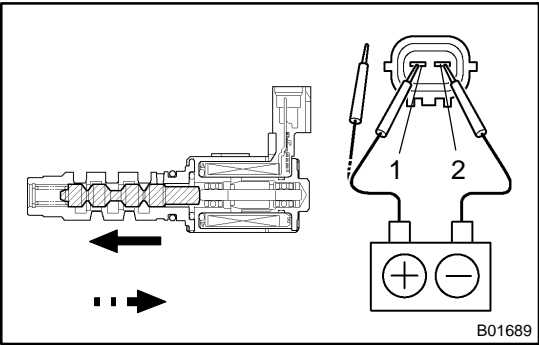
1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER, AIR CLEANER INLET AND INTAKE AIR CONNECTOR
3. DISCONNECT THROTTLE BODY FROM INTAKE MANIFOLD (See page [SF-59](#))



4. REMOVE CAMSHAFT TIMING OIL CONTROL VALVE
 - (a) Disconnect the 2 camshaft oil control valve connectors.
 - (b) Remove the bolt, camshaft oil control valve and O-ring. Remove the 2 camshaft oil control valves.
Torque: 7.5 N·m (80 kgf-cm, 66 in.-lbf)
 - (c) Remove the O-ring from the each camshaft oil control valve.

HINT:



At the time of installation, please refer to the following items.
Use a new O-rings.



INSPECTION

INSPECT OIL CONTROL VALVE OPERATION

Connect positive ~ lead to terminal 1 of connector and negative ⊖ lead to terminal 2, then check the movement of the valve.

When battery positive voltage is applied.	Valve moves in  direction.
When battery positive voltage is cut off.	Valve moves in  direction.

If operation is not as specified, replace the oil control valve.

INSTALLATION

Installation is in the reverse order of removal. (See page [SF-51](#))

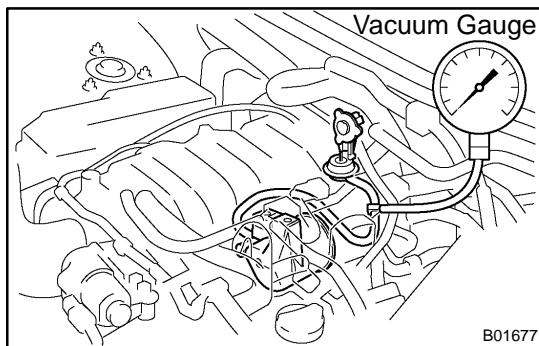
ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS)

SF0FO-02

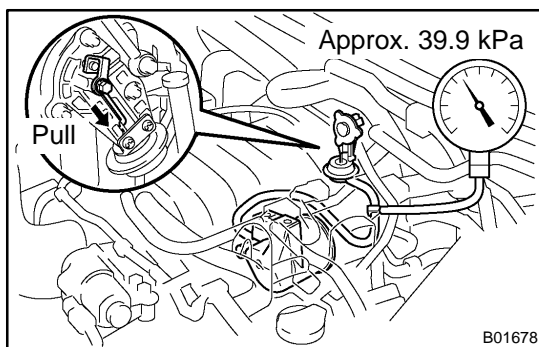
ON-VEHICLE INSPECTION

INSPECT INTAKE AIR CONTROL VALVE

- (a) Remove V-bank cover.
- (b) Remove the battery clamp cover, air cleaner and intake air connector.
- (c) Disconnect the throttle body from the intake manifold.
(See page [SF-59](#))
- (d) Remove the intake manifold. (See page [EM-34](#))

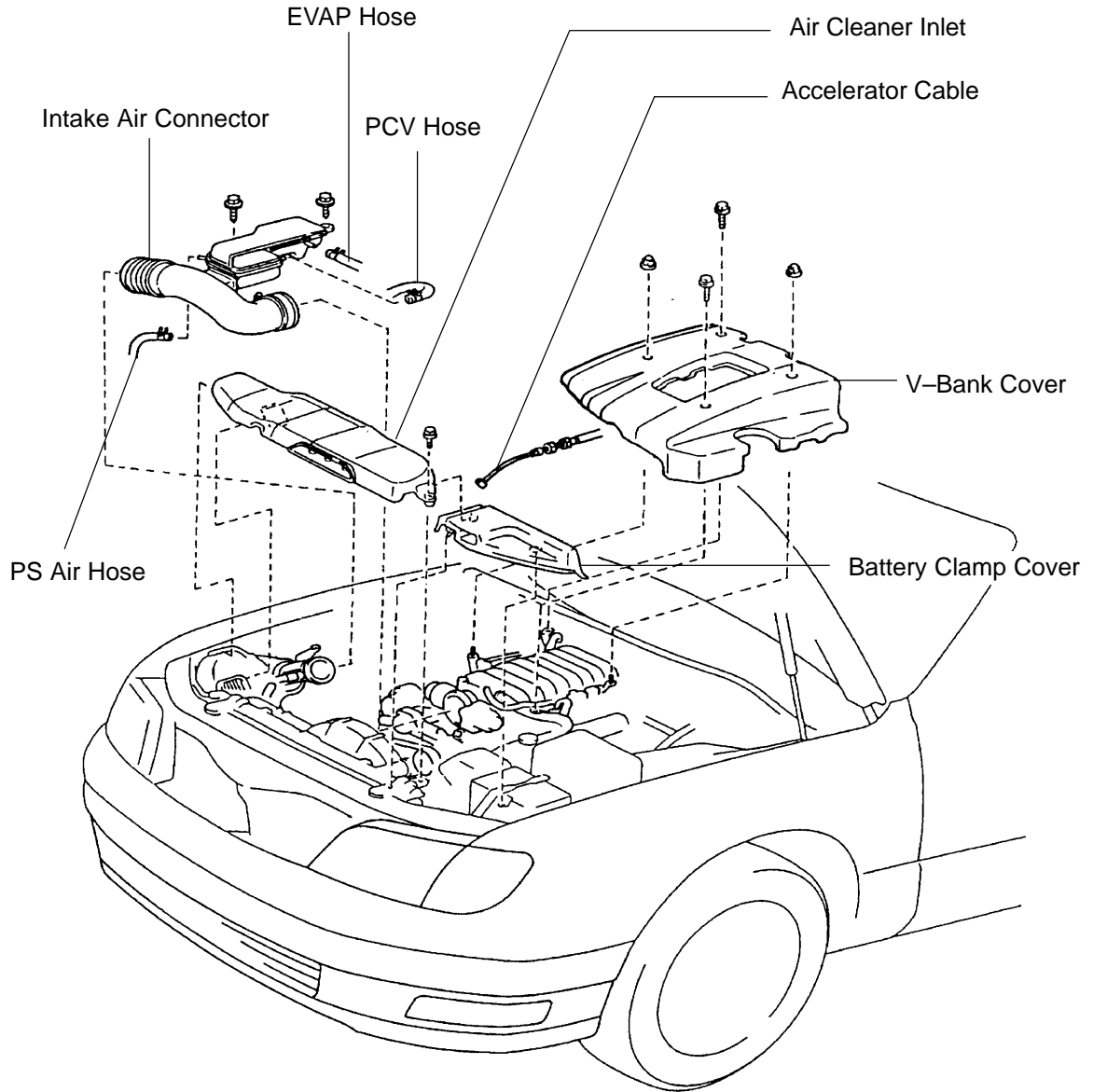


- (e) Using a 3-way connector, connect vacuum gauge to the actuator hose.
- (f) Reinstall the intake manifold.
- (g) Reconnect the throttle body.
- (h) Start the engine.

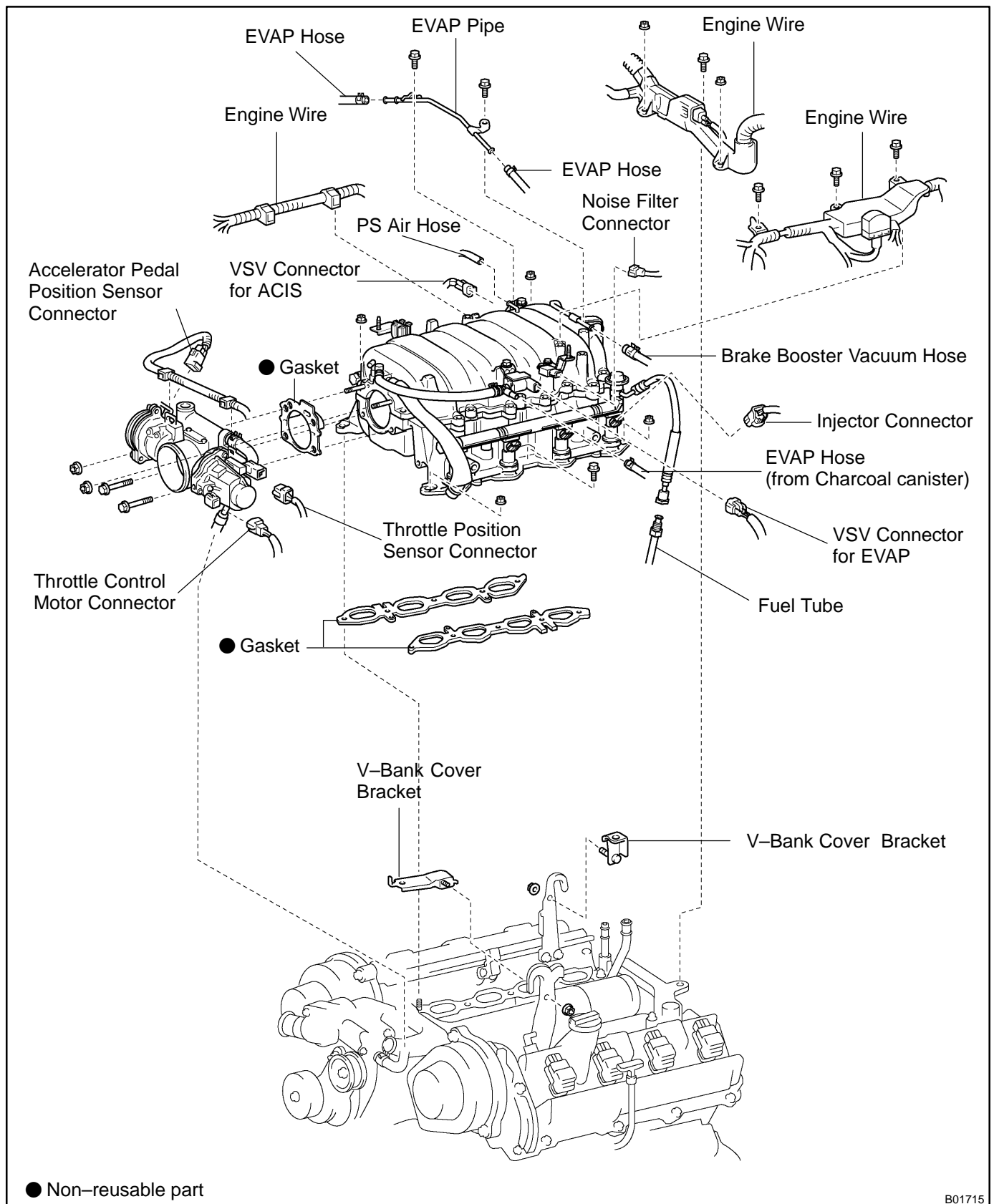


- (i) While the engine is idling, check that the vacuum gauge needle momentarily fluctuates up to approx. 39.9 kPa (300 mmHg, 11.8 in.Hg). (The actuator rod is pulled out.)
- (j) Rapidly depress the accelerator pedal to fully open position and check that the vacuum gauge needle points to 0 kPa (0 mmHg, 0 in.Hg). (The actuator rod is returned.)
- (k) Disconnect the throttle body.
- (l) Remove the intake manifold.
- (m) Remove the vacuum gauge, and connect the vacuum hose to the actuator.
- (n) Reinstall the intake manifold.
- (o) Reconnect the throttle body.
- (p) Reinstall the intake air connector, air cleaner inlet and battery clamp cover.
- (q) Reinstall V-bank cover.

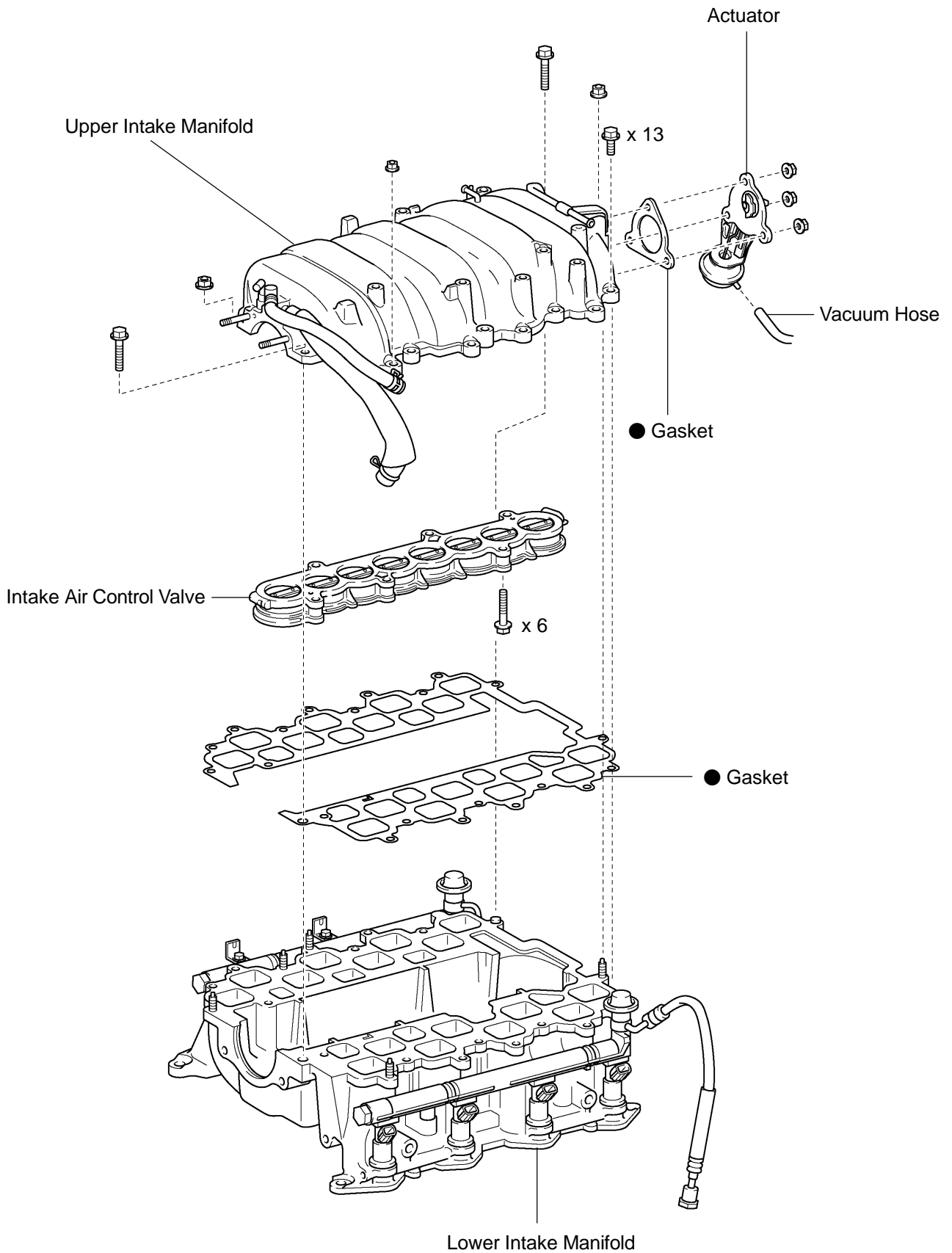
COMPONENTS



B01306

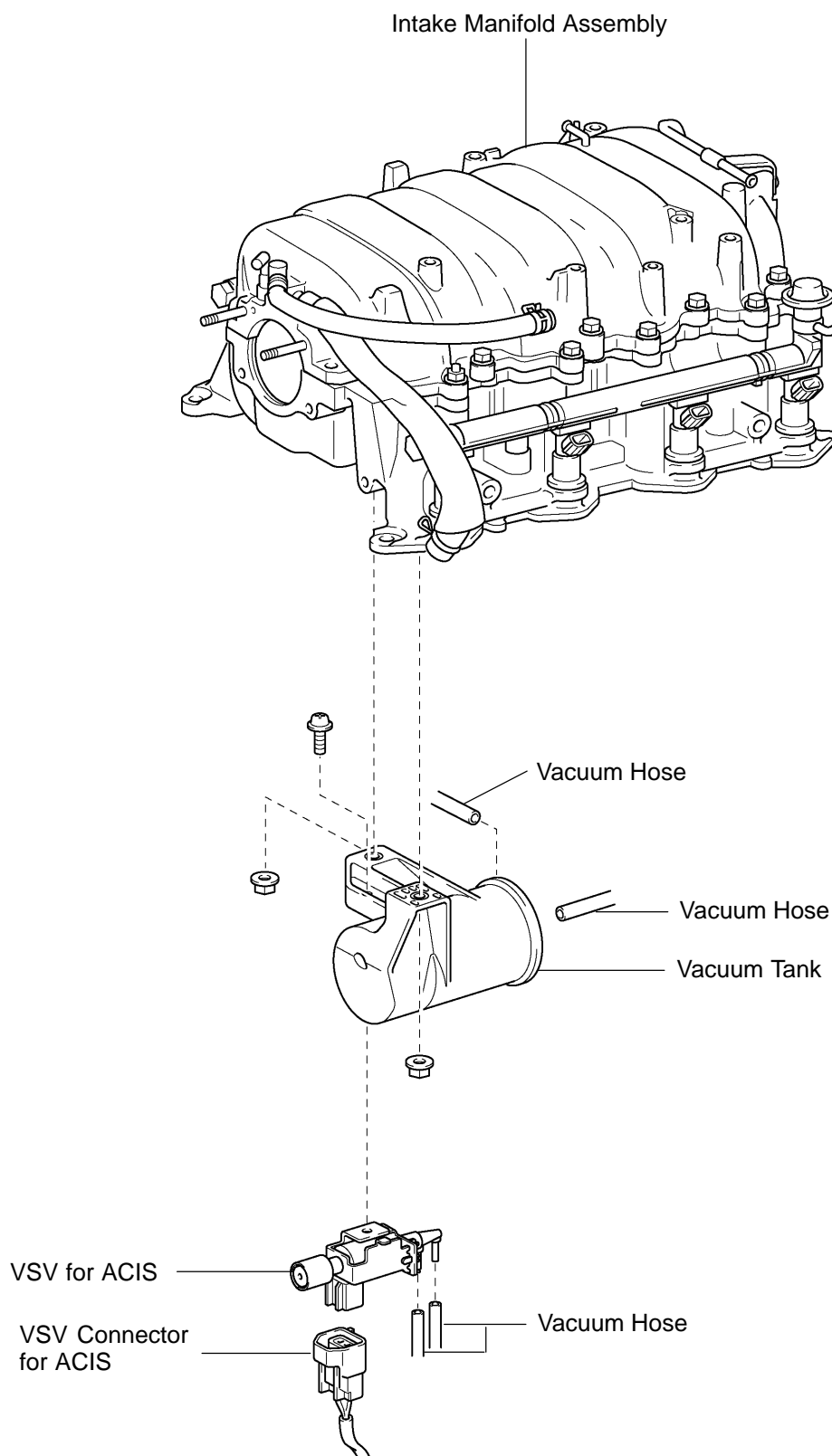


B01715



Y

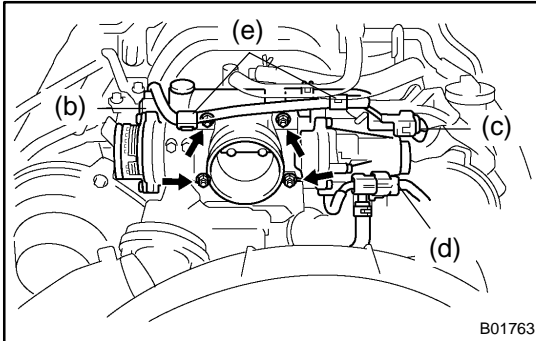
B01761



REMOVAL

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER, AIR CLEANER INLET AND INTAKE AIR CONNECTOR
3. DISCONNECT THROTTLE BODY FROM INTAKE MANIFOLD

(a) Disconnect the accelerator cable.

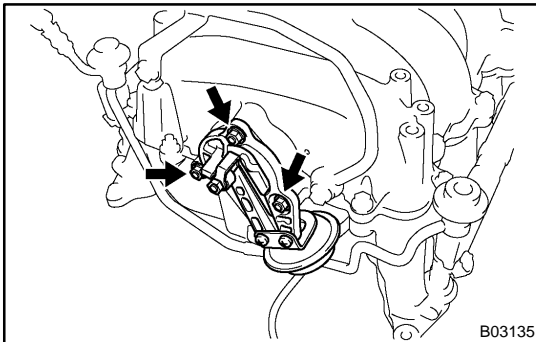


- (b) Disconnect the accelerator pedal position sensor connector.
- (c) Disconnect the throttle position sensor connector.
- (d) Disconnect the throttle control motor connector.
- (e) Disconnect the wire clamps.
- (f) Remove the 2 bolts and 2 nuts, and disconnect the throttle body.
- (g) Remove the gasket.

4. REMOVE INTAKE MANIFOLD ASSEMBLY (See page [EM-34](#))

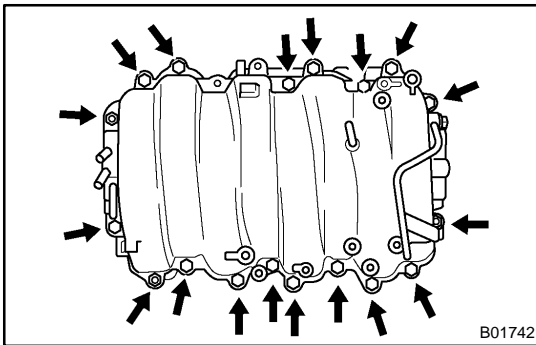
5. REMOVE ACTUATOR

- (a) Disconnect the vacuum hose from the actuator.
- (b) Remove the 3 nuts, actuator and gasket.



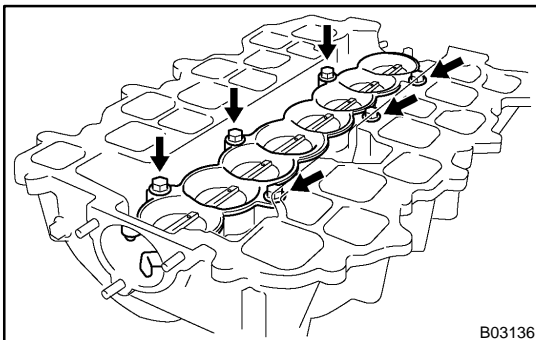
6. REMOVE UPPER INTAKE MANIFOLD

Remove the 3 nuts, 15 bolts, upper intake manifold and gasket.



7. REMOVE INTAKE AIR CONTROL VALVE

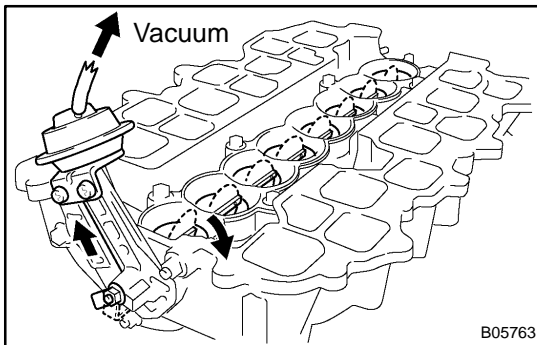
Remove the 6 bolts and intake air control valve.



INSPECTION

1. INSPECT INTAKE AIR CONTROL VALVE

- (a) Install the air control valve and actuator to the upper intake manifold. (See page [SF-61](#))

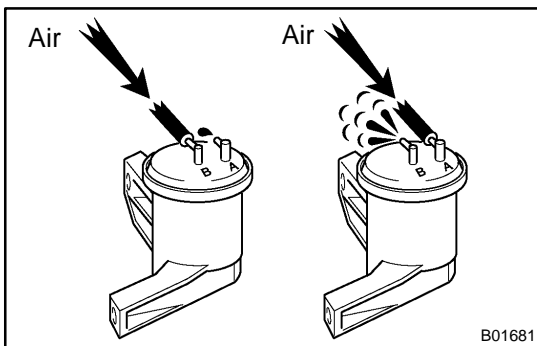


- (b) With 39.9 kPa (300 mmHg, 11.8 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.
 (c) One minute after applying the vacuum in (a), check that the actuator rod does not return.

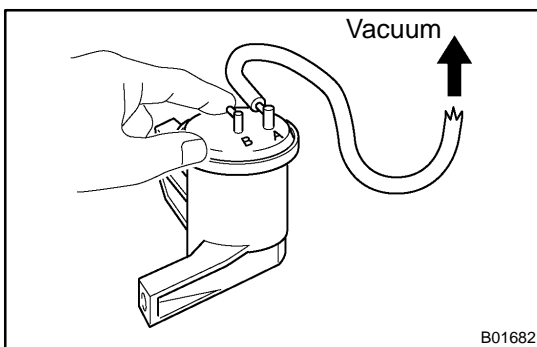
If the operation is not as specified, replace the intake air control valve actuator.

2. INSPECT VACUUM TANK

- (a) Remove the vacuum tank.



- (b) Check that air does not flow from port B to port A.
 (c) Check that air flows from port A to port B.

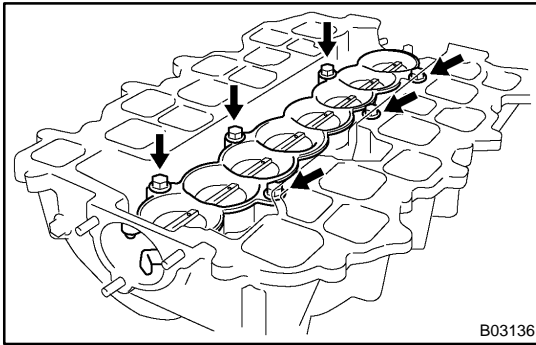


- (d) Plug port B with your finger, and apply 39.9 kPa (300 mmHg, 11.8 in.Hg) of vacuum to port A, and check that there is no change in vacuum after one minute.

If the operation is not as specified, replace the vacuum tank.

- (e) Reinstall the vacuum tank.

3. INSPECT VSV (See page [SF-73](#))

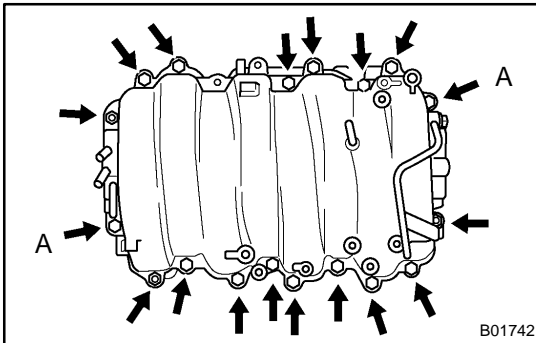


INSTALLATION

1. INSTALL INTAKE AIR CONTROL VALVE

Install the intake air control valve to the upper intake manifold with the 6 bolts.

Torque: 8.5 N·m (85 kgf·cm, 75 in.-lbf)



2. INSTALL UPPER INTAKE MANIFOLD

- Place a new gasket on the lower intake manifold.
- Install the upper intake manifold with the 3 nuts and 15 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

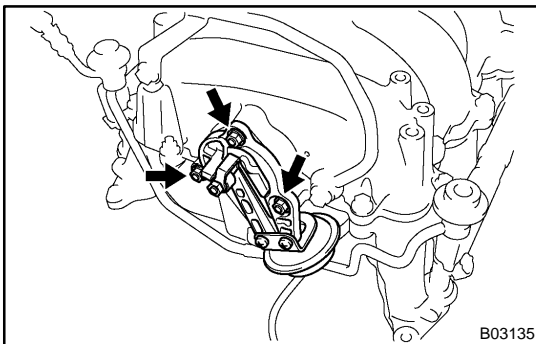
HINT:

Each bolt length is indicated in the illustration.

Bolt length:

30 mm (1.18 in.) for A

20 mm (0.79 in.) for others



3. INSTALL ACTUATOR

- Place a new gasket to the upper intake manifold.
- Install the actuator to the upper intake manifold with the 3 nuts.

Torque: 8.5 N·m (85 kgf·cm, 75 in.-lbf)

- Connect the vacuum hose to the actuator.

HINT:

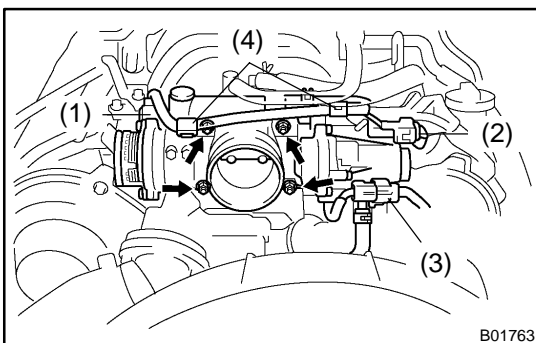
Pass the vacuum hose under the fuel pipe.

4. INSTALL INTAKE MANIFOLD ASSEMBLY

(See page [EM-58](#))

5. CONNECT THROTTLE BODY

- Place a new gasket to the intake manifold.

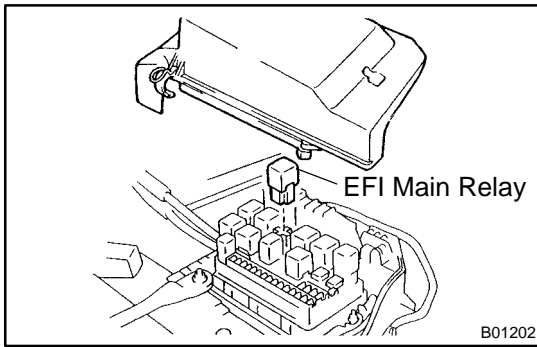


- Connect the throttle body with the 2 bolts and 2 nuts.
- Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)**
- Connect the accelerator pedal position sensor connector.
 - Connect the throttle position sensor connector.
 - Connect the throttle control motor connector.
 - Connect the wire clamps.
 - Connect the accelerator cable.

6. CHECK FOR FUEL LEAKS (See page [SF-1](#))

7. INSTALL INTAKE AIR CONNECTOR, AIR CLEANER INLET AND BATTERY CLAMP COVER

8. INSTALL V-BANK COVER

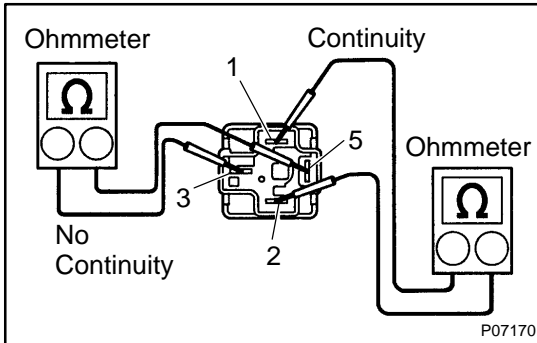


EFI MAIN RELAY INSPECTION

SF0FT-02

1. REMOVE EFI MAIN RELAY (Marking: EFI)

LOCATION: In the engine compartment relay box.



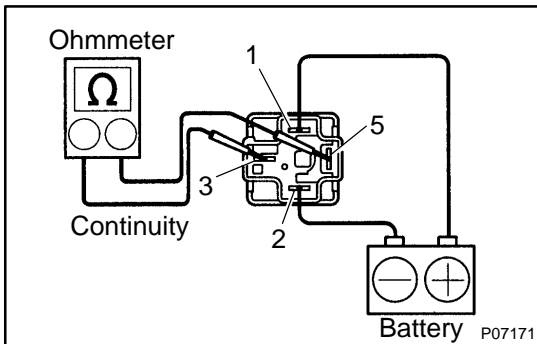
2. INSPECT EFI MAIN RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



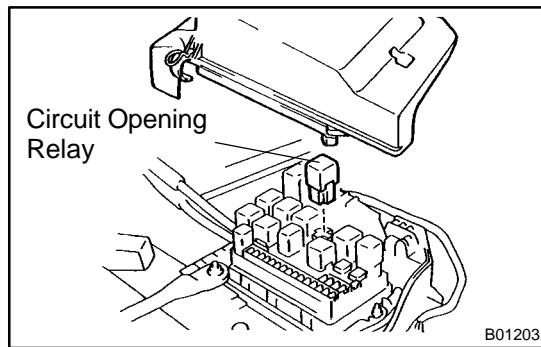
3. INSPECT EFI MAIN RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.

- (b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL EFI MAIN RELAY

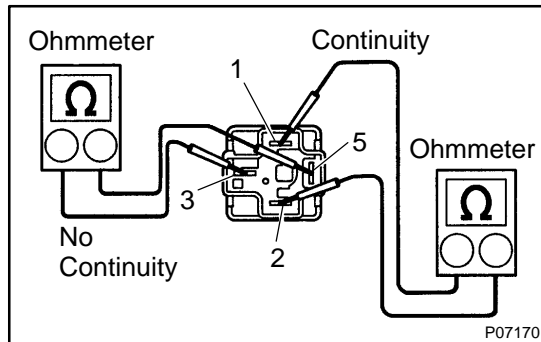


CIRCUIT OPENING RELAY INSPECTION

SF0FU-02

1. REMOVE CIRCUIT OPENING RELAY (Marking: CIR OPN)

LOCATION: In the engine compartment relay box.



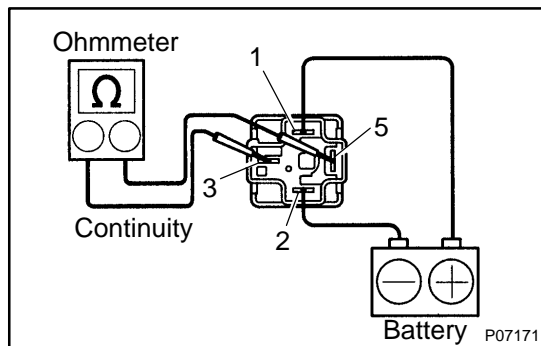
2. INSPECT CIRCUIT OPENING RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



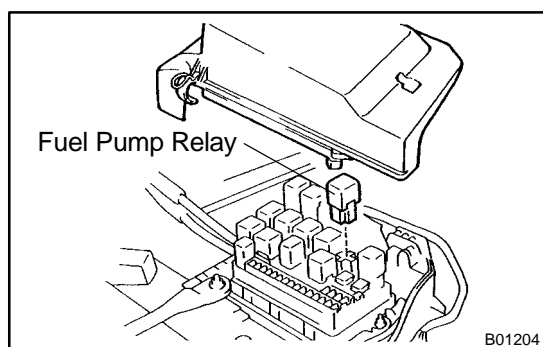
3. INSPECT CIRCUIT OPENING RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.

- (b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

4. REINSTALL CIRCUIT OPENING RELAY

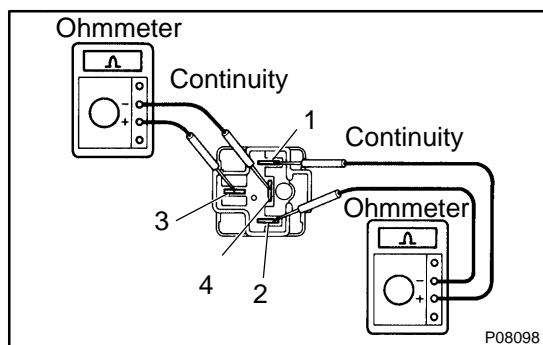


FUEL PUMP RELAY INSPECTION

SF0FV-02

1. REMOVE FUEL PUMP RELAY (Marking: FUEL PUMP)

LOCATION: In the engine compartment relay box.



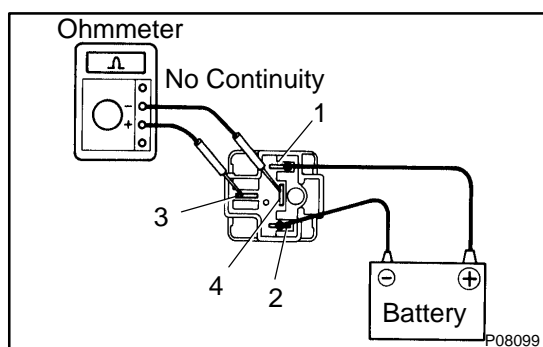
2. INSPECT FUEL PUMP RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.



3. INSPECT FUEL PUMP RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.

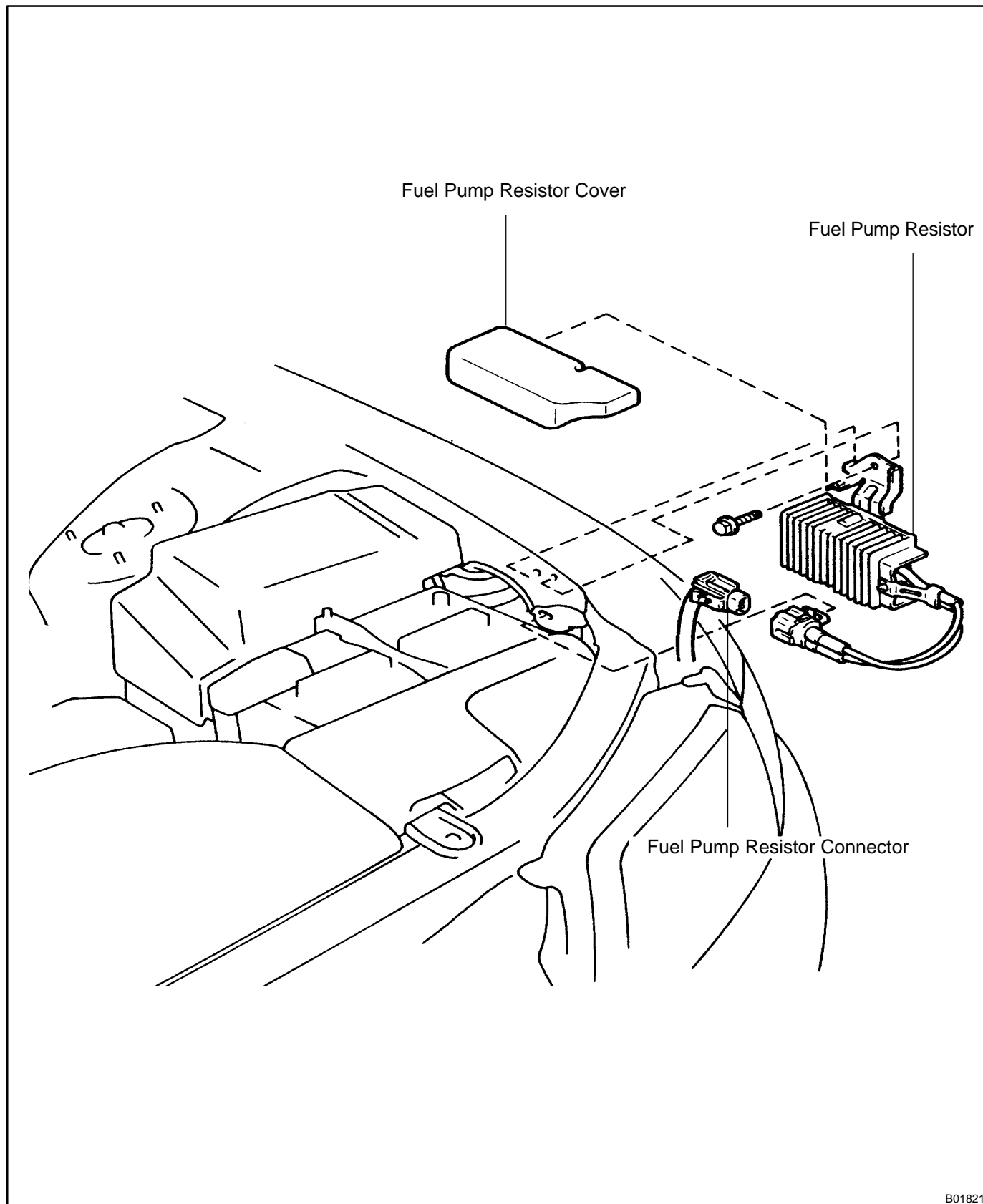
- (b) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

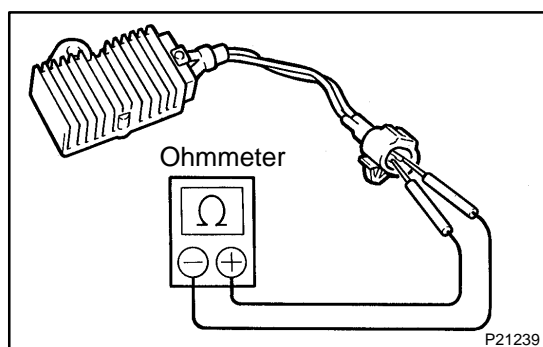
4. REINSTALL FUEL PUMP RELAY

FUEL PUMP RESISTOR COMPONENTS

SF0FW-02



B01821



INSPECTION

INSPECT FUEL PUMP RESISTOR

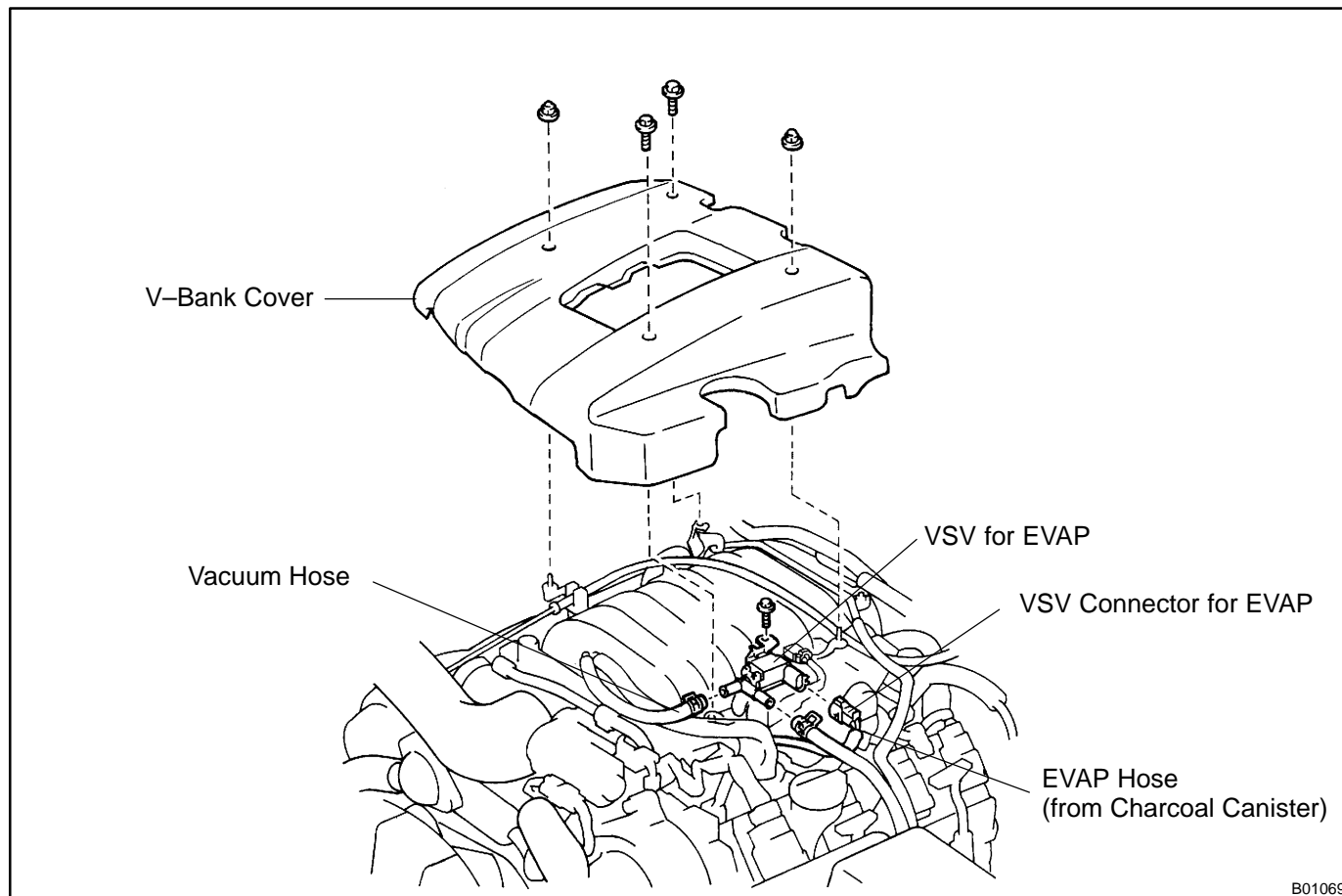
Using an ohmmeter, measure the resistance between the terminals.

Resistance: 0.70 – 0.76 Ω at 20°C (68°F)

If the resistance is not as specified, replace the resistor.

VSV FOR EVAPORATIVE EMISSION (EVAP) COMPONENTS

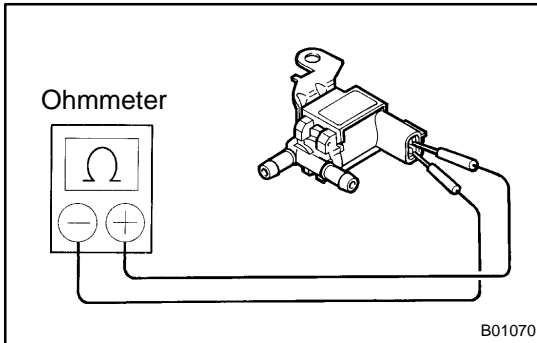
SF0FY-02



B01069

INSPECTION

1. REMOVE V-BANK COVER
2. REMOVE VSV FOR EVAP

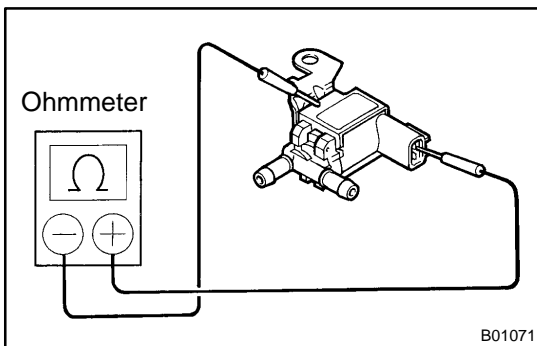


3. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance: 30 – 34 Ω at 20°C (68°F)

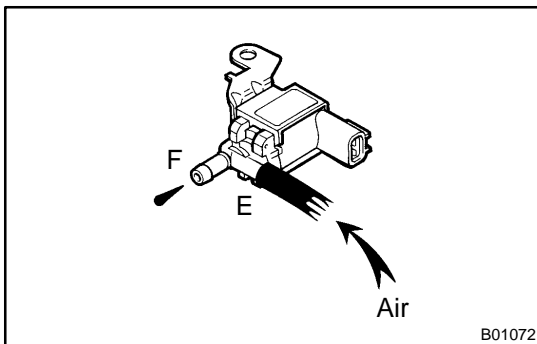
If there is no continuity, replace the VSV.



4. INSPECT VSV FOR GROUND

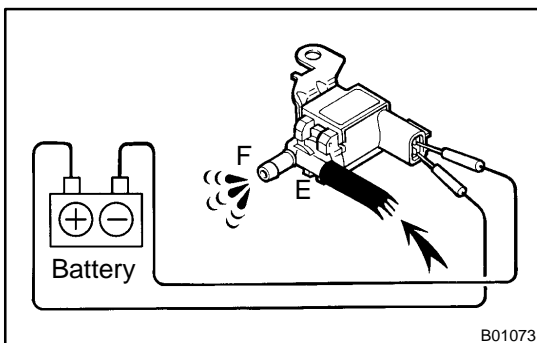
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



5. INSPECT VSV OPERATION

- (a) Check that the air flows with difficulty from port E to F.



- (b) Apply battery voltage across the terminals.
- (c) Check that the air flows without resistance from port E to F.

If operation is not as specified, replace the VSV.

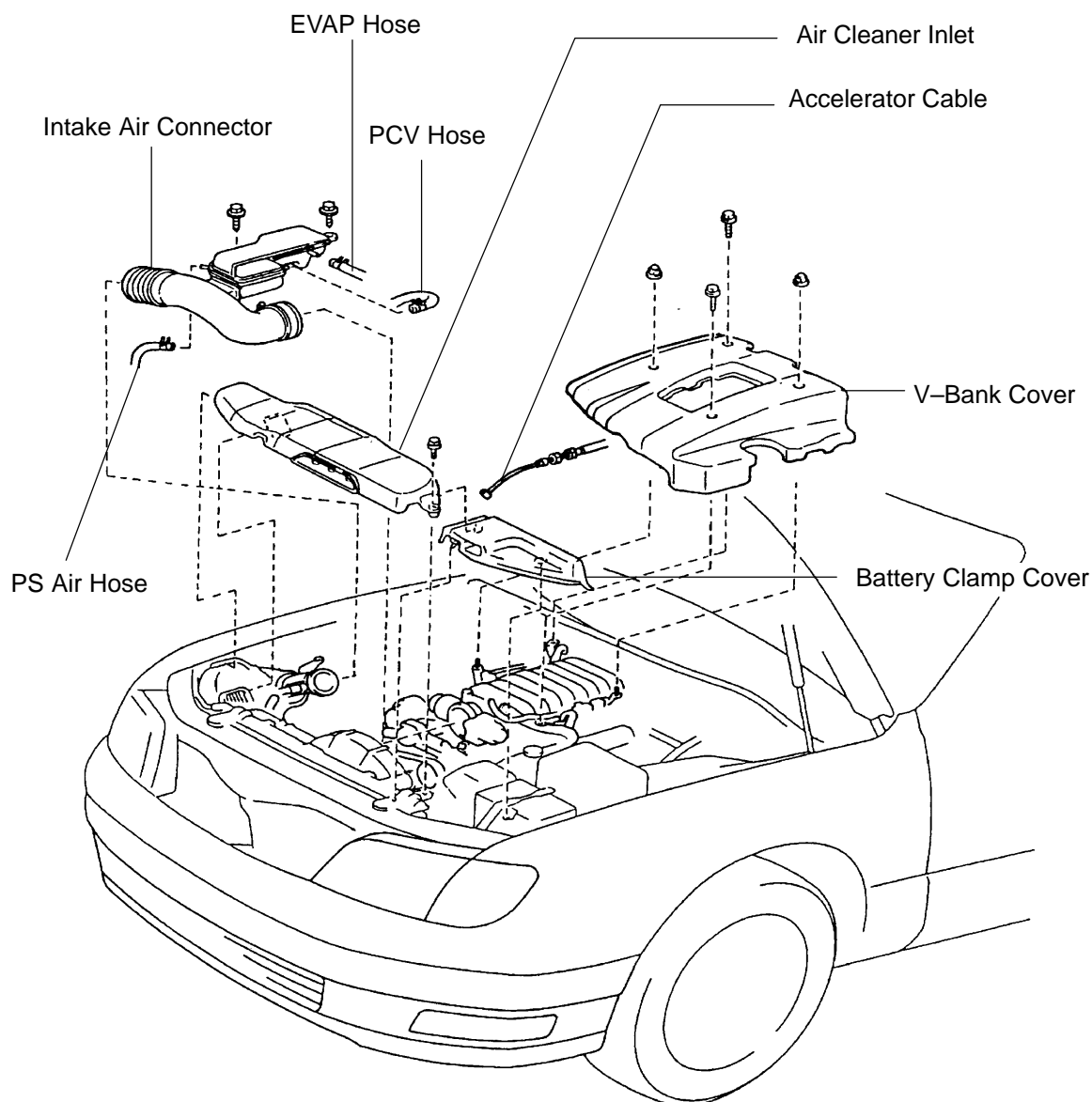
6. REINSTALL VSV

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

7. REINSTALL V-BANK COVER

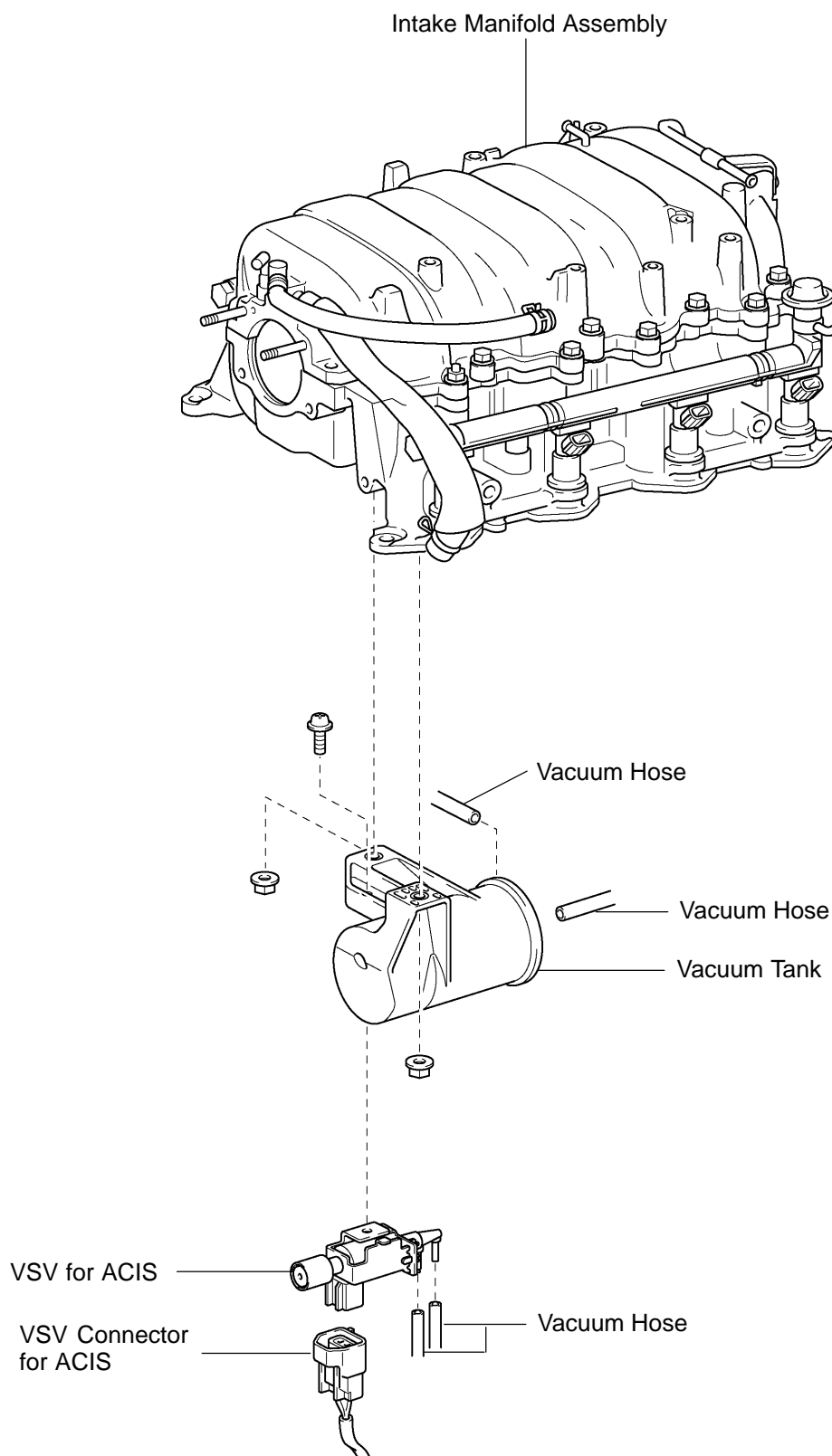
VSV FOR ACOUSTIC CONTROL INDUCTION SYSTEM (ACIS) COMPONENTS

SF0G0-02



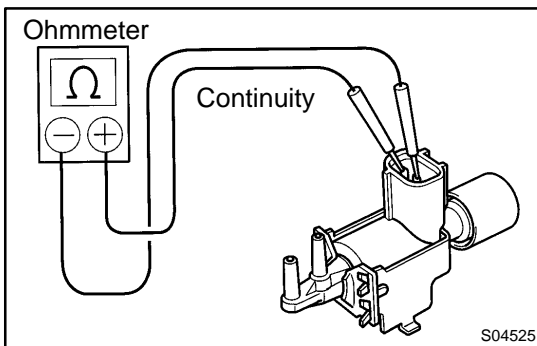
B01306





INSPECTION

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER, AIR CLEANER INLET AND INTAKE AIR CONNECTOR
3. DISCONNECT THROTTLE BODY (See page [SF-59](#))
4. REMOVE INTAKE MANIFOLD ASSEMBLY (See page [EM-34](#))
5. REMOVE VACUUM TANK
6. REMOVE VSV
 - (a) Disconnect the 2 vacuum hoses and connector from the VSV.
 - (b) Remove the screw and VSV.

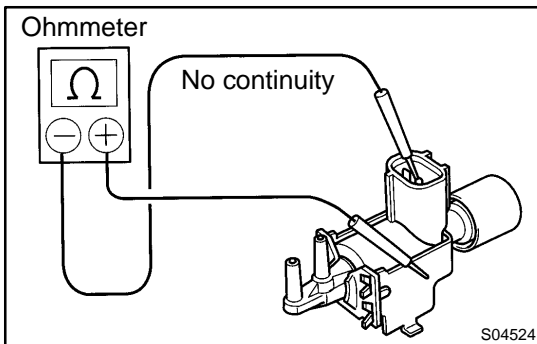


7. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between each terminals.

Resistance: 33 – 39 Ω at 20°C (68°F)

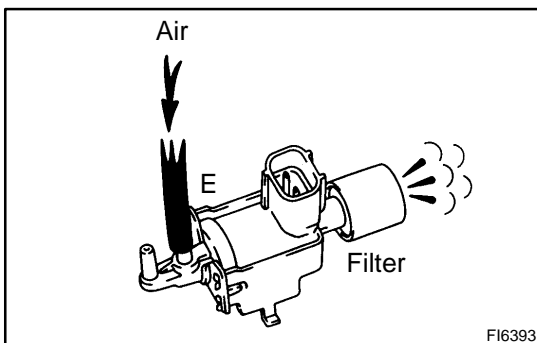
If there is no continuity, replace the VSV.



8. INSPECT VSV FOR GROUND

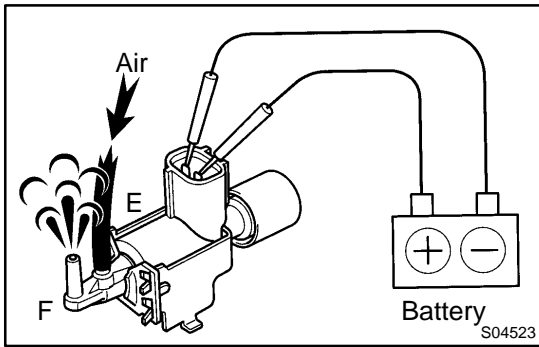
Using an ohmmeter, check that there is no continuity between each terminal and the body.

If there is continuity, replace the VSV.



9. INSPECT VSV OPERATION

- (a) Check that air flows from port E to the filter



(b) Apply battery voltage across the terminals.

(c) Check that air flows from port E to port F.

If operation is not as specified, replace the VSV.

10. REINSTALL VSV

(a) Install the VSV with the screw.

(b) Connect the 2 vacuum to the VSV.

11. REINSTALL VACUUM TANK

12. REINSTALL INTAKE MANIFOLD ASSEMBLY

(See page [EM-58](#))

13. RECONNECT THROTTLE BODY (See page [SF-61](#))

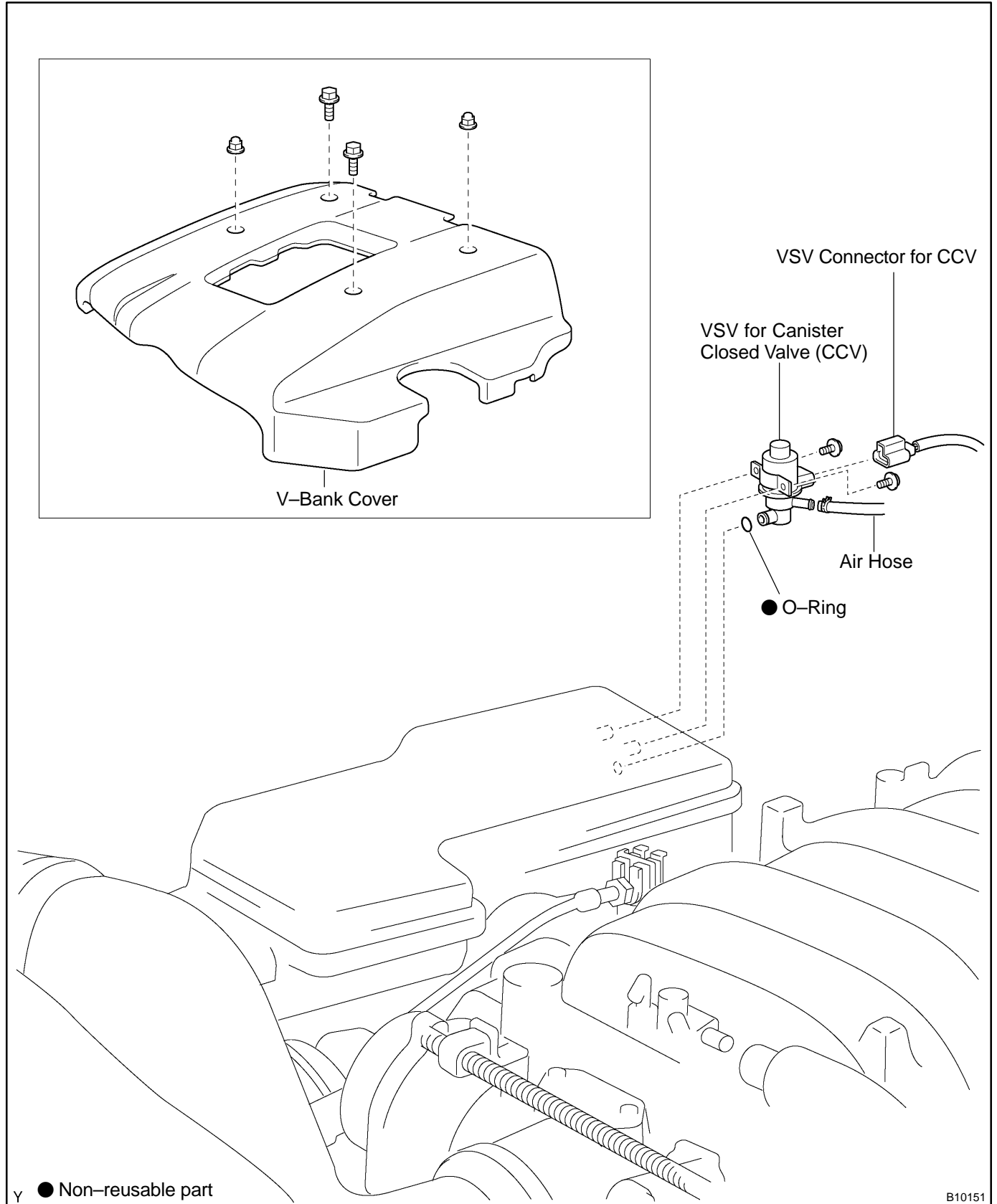
14. CHECK FOR FUEL LEAKS (See page [SF-1](#))

15. REINSTALL INTAKE AIR CONNECTOR, AIR CLEANER INLET AND BATTERY CLAMP COVER

16. REINSTALL V-BANK COVER

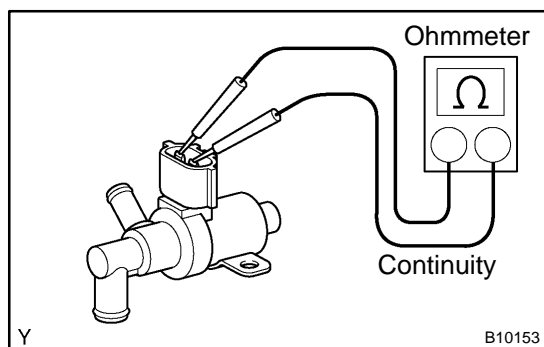
VSV FOR CANISTER CLOSED VALVE (CCV) COMPONENTS

SF195-01



INSPECTION

1. REMOVE VSV



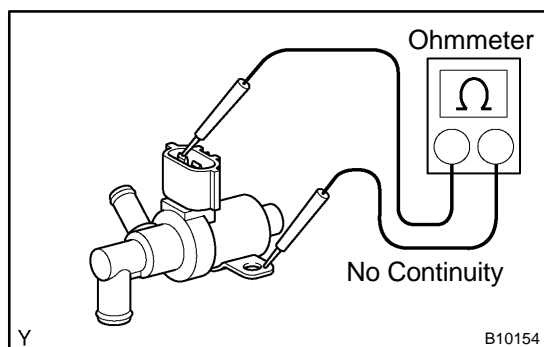
2. INSPECT VSV FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the terminals.

Resistance:

At 20°C (68°F)	25 – 30 Ω
At 120°C (248°F)	33 – 42 Ω

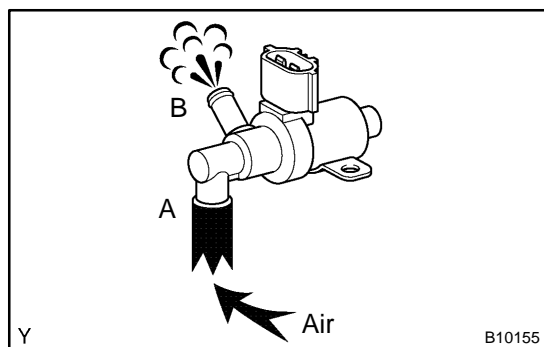
If there is no continuity, replace the VSV.



3. INSPECT VSV FOR GROUND

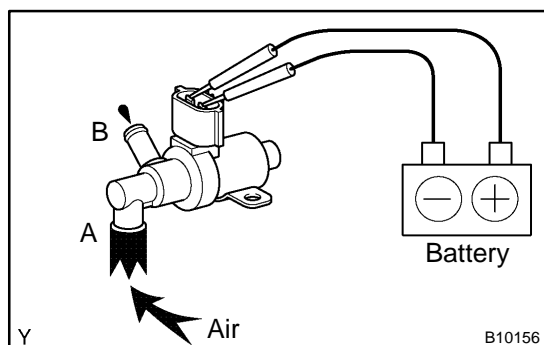
Using an ohmmeter, check that there is no continuity between each terminal and the body.

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.

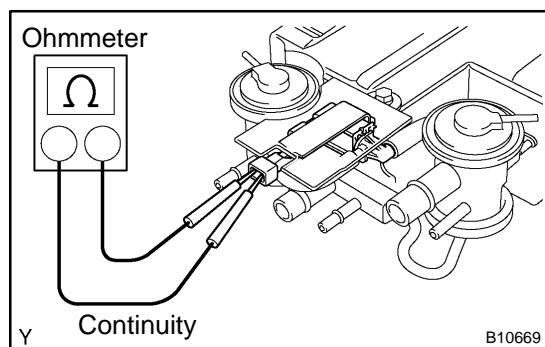
5. REINSTALL VSV

VSV FOR PRESSURE SWITCHING VALVE

INSPECTION

SF197-01

1. REMOVE CHARCOAL CANISTER (See page EC-7)



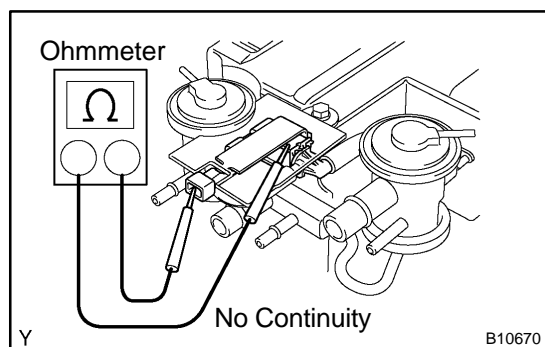
2. INSPECT VSV FOR OPEN CIRCUIT

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

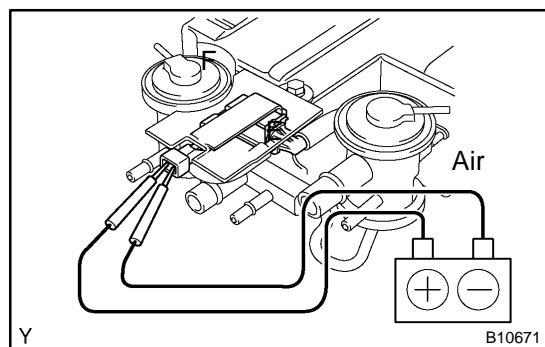
If there is no continuity, replace the VSV.



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 FOR OPERATING SOUND

(a) Apply battery positive voltage across the terminals.

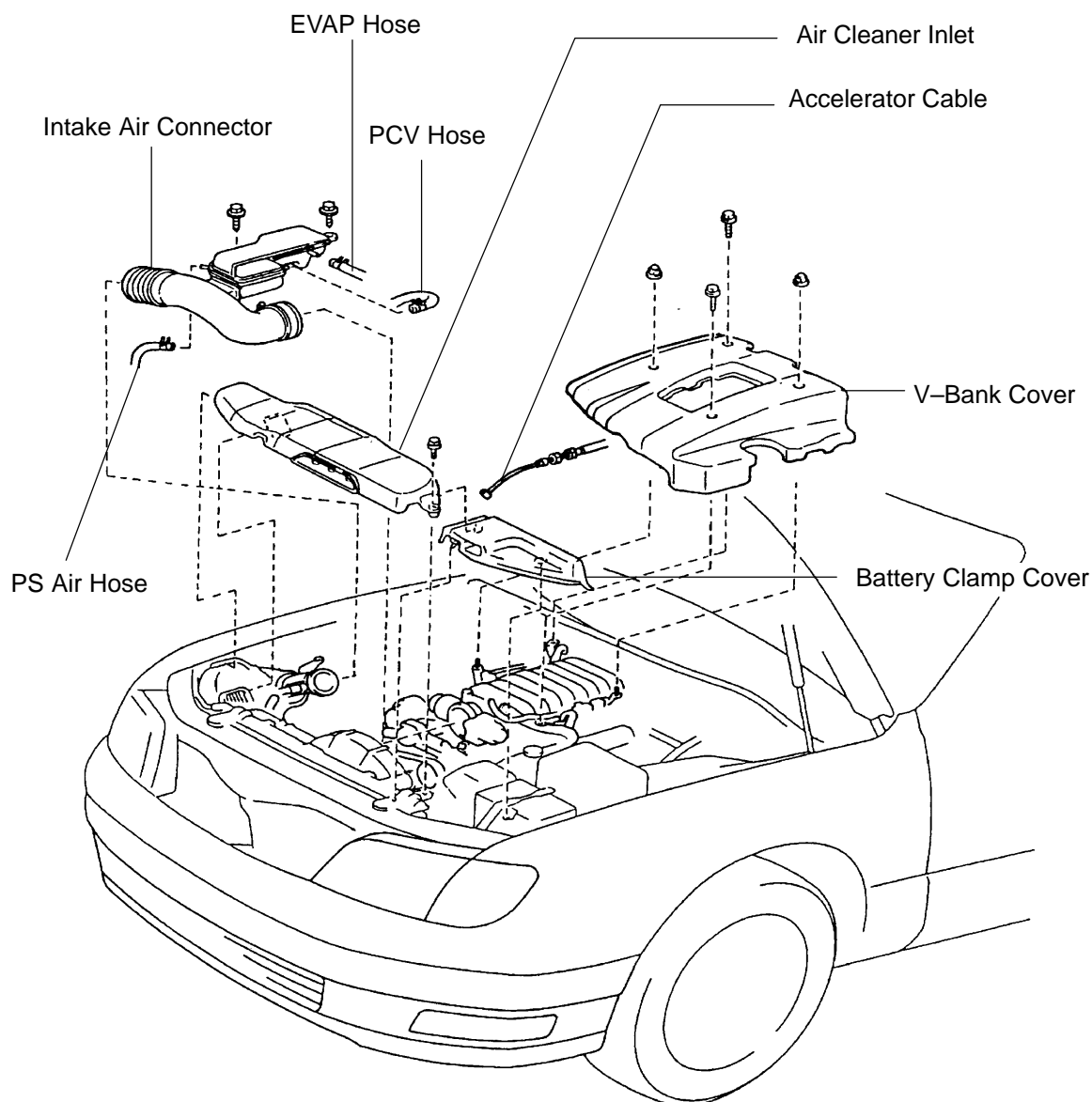
(b) Check that there is a operating sound.

If operation is not as specified, replace the charcoal canister assembly.

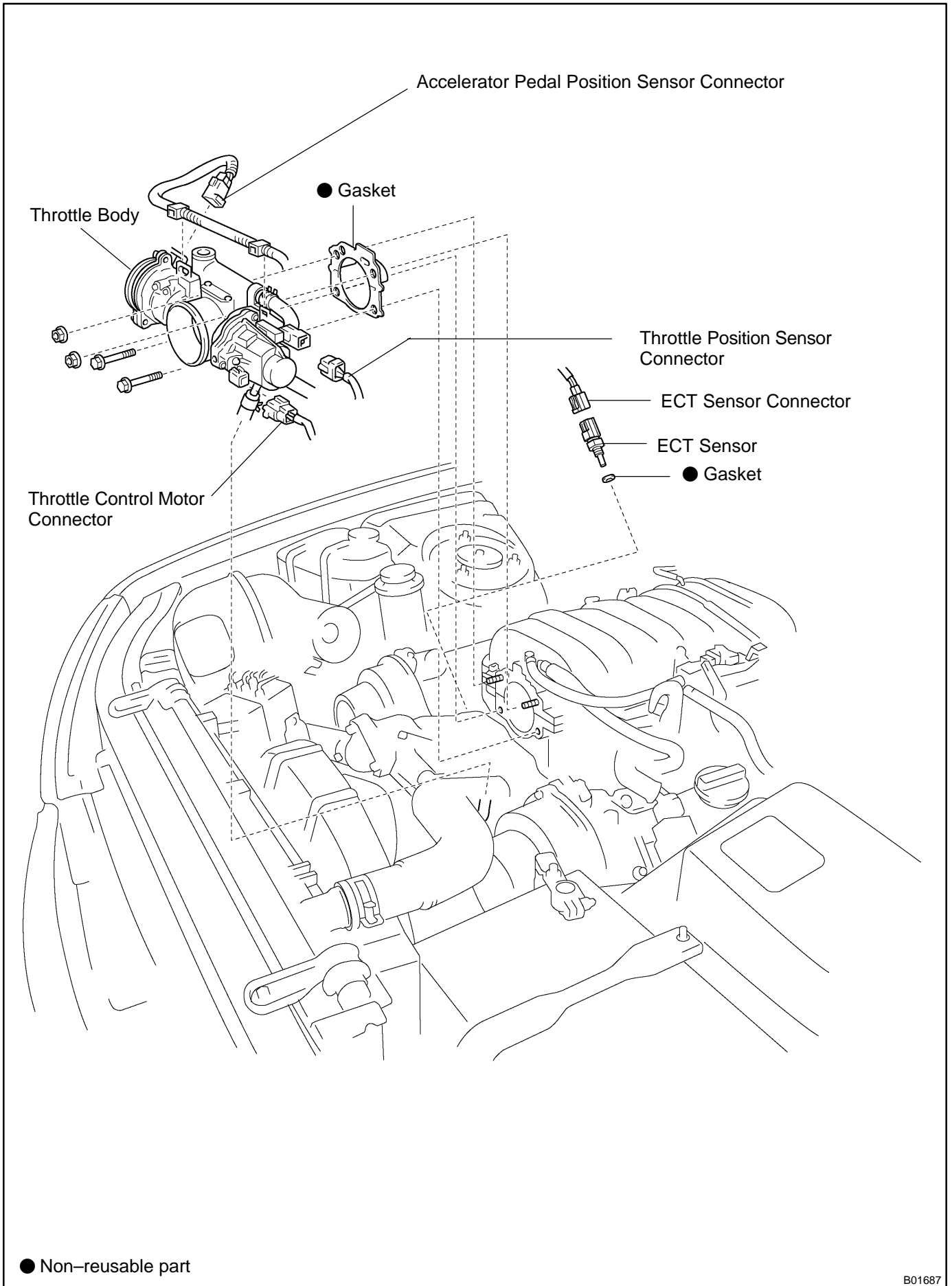
5. REINSTALL CHARCOAL CANISTER (See page EC-7)

ENGINE COOLANT TEMPERATURE (ECT) SENSOR COMPONENTS

SF0G3-02

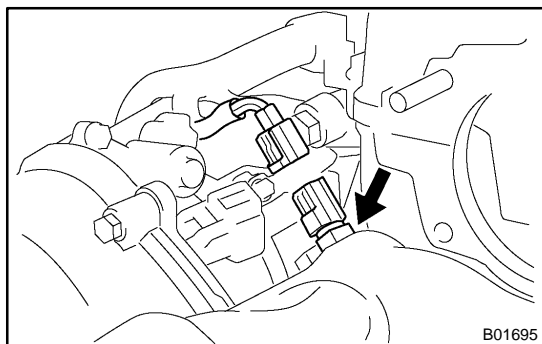


B01306

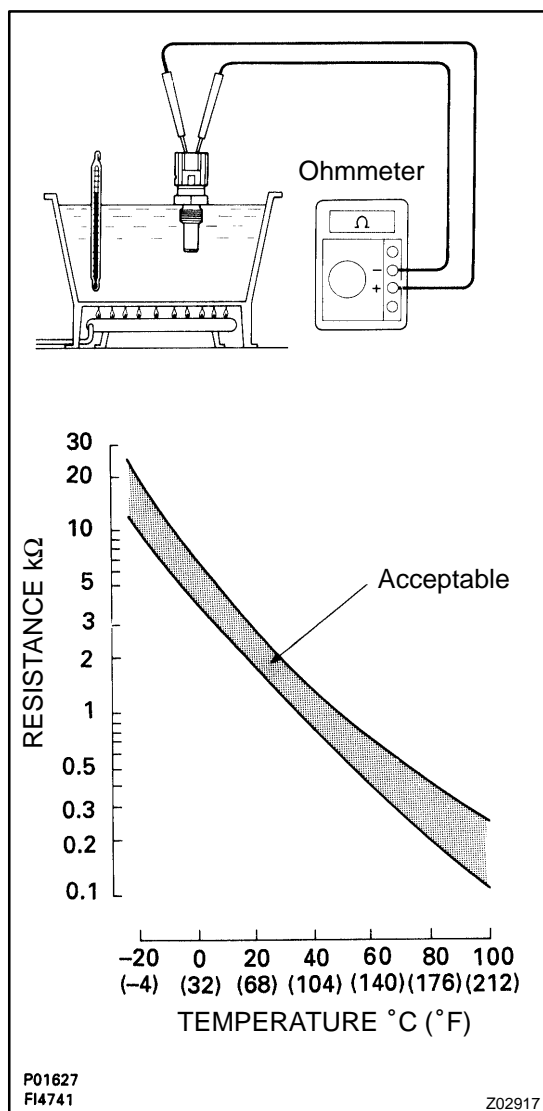


INSPECTION

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER, AIR CLEANER INLET AND INTAKE AIR CONNECTOR
3. DRAIN ENGINE COOLANT
4. DISCONNECT THROTTLE BODY (See page [SF-59](#))



5. REMOVE ECT SENSOR
 - (a) Disconnect the ECT sensor connector.
 - (b) Remove the ECT sensor and gasket.



6. INSPECT ECT SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance: Refer to the chart graph

If the resistance is not as specified, replace the sensor.

7. REINSTALL ECT SENSOR

- (a) Install a new gasket and the ECT sensor.
- Torque: 20 N·m (200 kgf-cm, 14 ft·lbf)**
- (b) Connect the ECT sensor connector.

8. RECONNECT THROTTLE BODY (See page [SF-61](#))

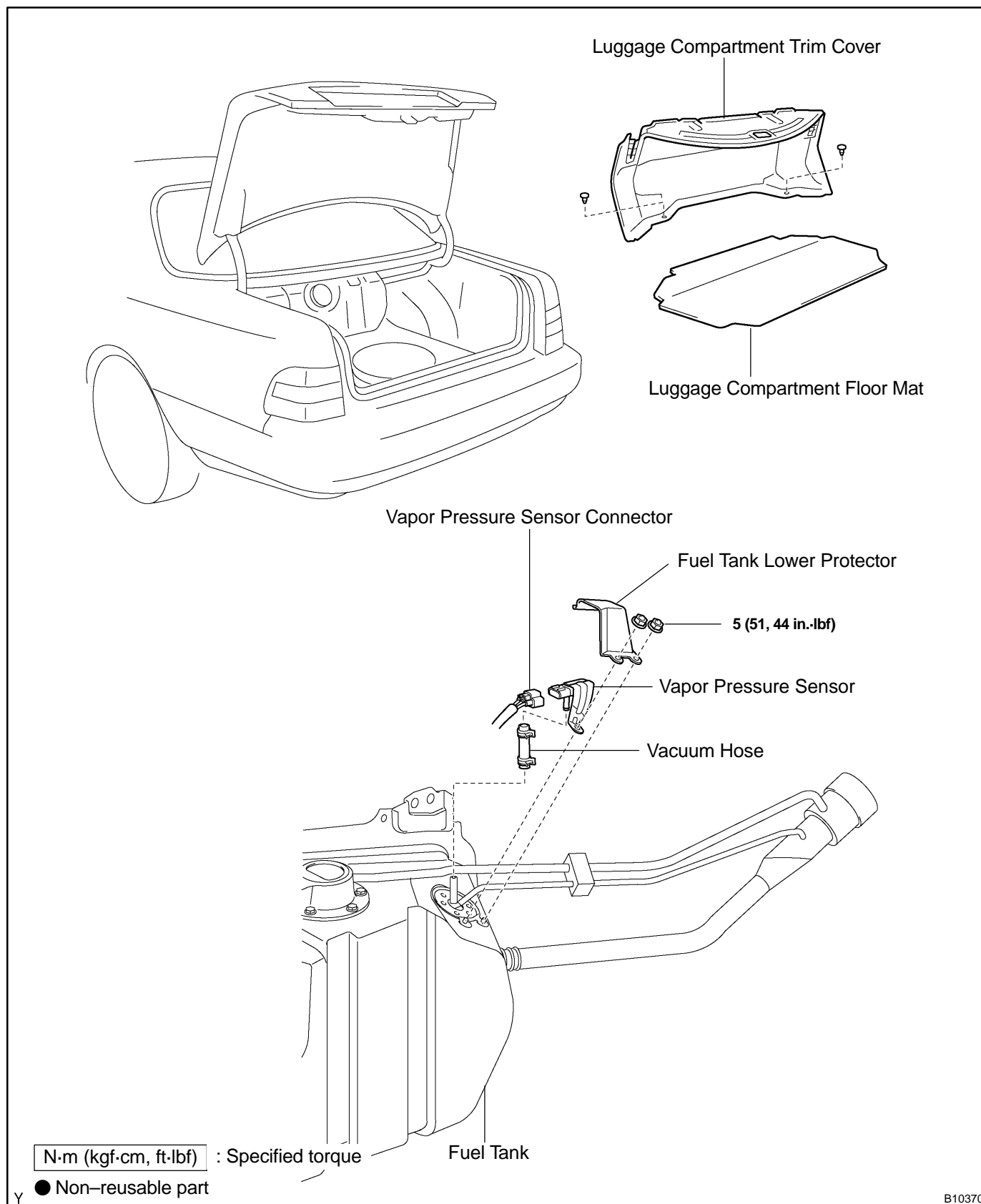
9. REFILL WITH ENGINE COOLANT

10. REINSTALL INTAKE AIR CONNECTOR, AIR CLEANER INLET AND BATTERY CLAMP COVER

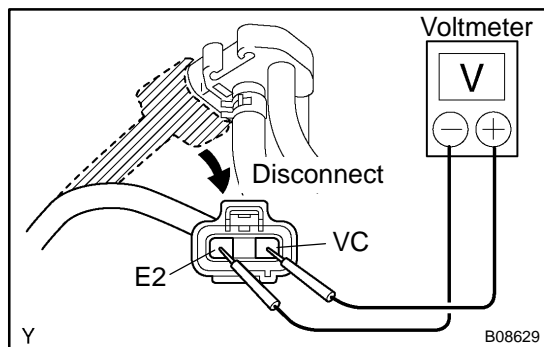
11. REINSTALL V-BANK COVER

VAPOR PRESSURE SENSOR COMPONENTS

SF198-01



B10370



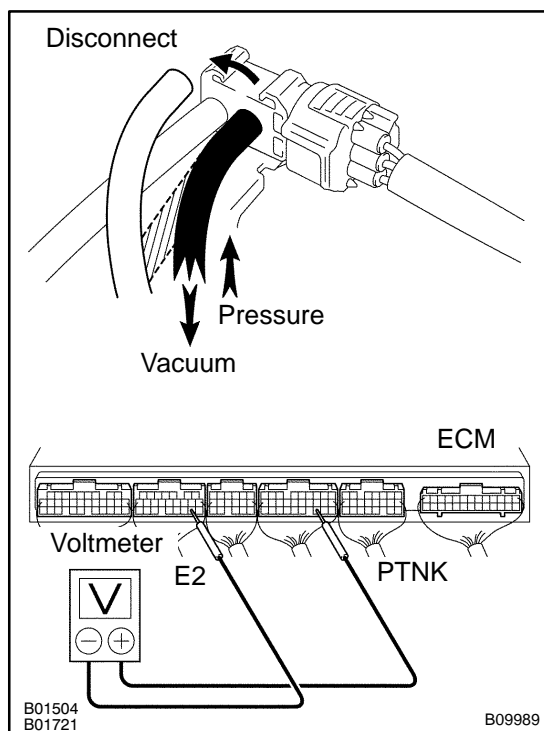
INSPECTION

1. INSPECT POWER SOURCE VOLTAGE OF VAPOR PRESSURE SENSOR

- Disconnect the vapor pressure sensor connector.
- Turn the ignition switch ON.
- Using a voltmeter, measure the voltage between connector terminals VC and E2 of the wiring harness side.

Voltage: 4.5 – 5.5 V

- Turn the ignition switch OFF.
- Reconnect the vapor pressure sensor connector.



2. INSPECT POWER OUTPUT OF VAPOR PRESSURE SENSOR

- Turn the ignition switch ON.
- Disconnect the fuel hose from the vapor pressure sensor.
- Connect a voltmeter to terminals PTNK and E2 of the ECM, and measure the output voltage under the following conditions:

- Apply vacuum (2.0 kPa (15 mmHg, 0.59 in.Hg)) to the vapor pressure sensor.

Voltage: 1.3 – 2.1 V

- Release the vacuum from the vapor pressure sensor.

Voltage: 3.0 – 3.6 V

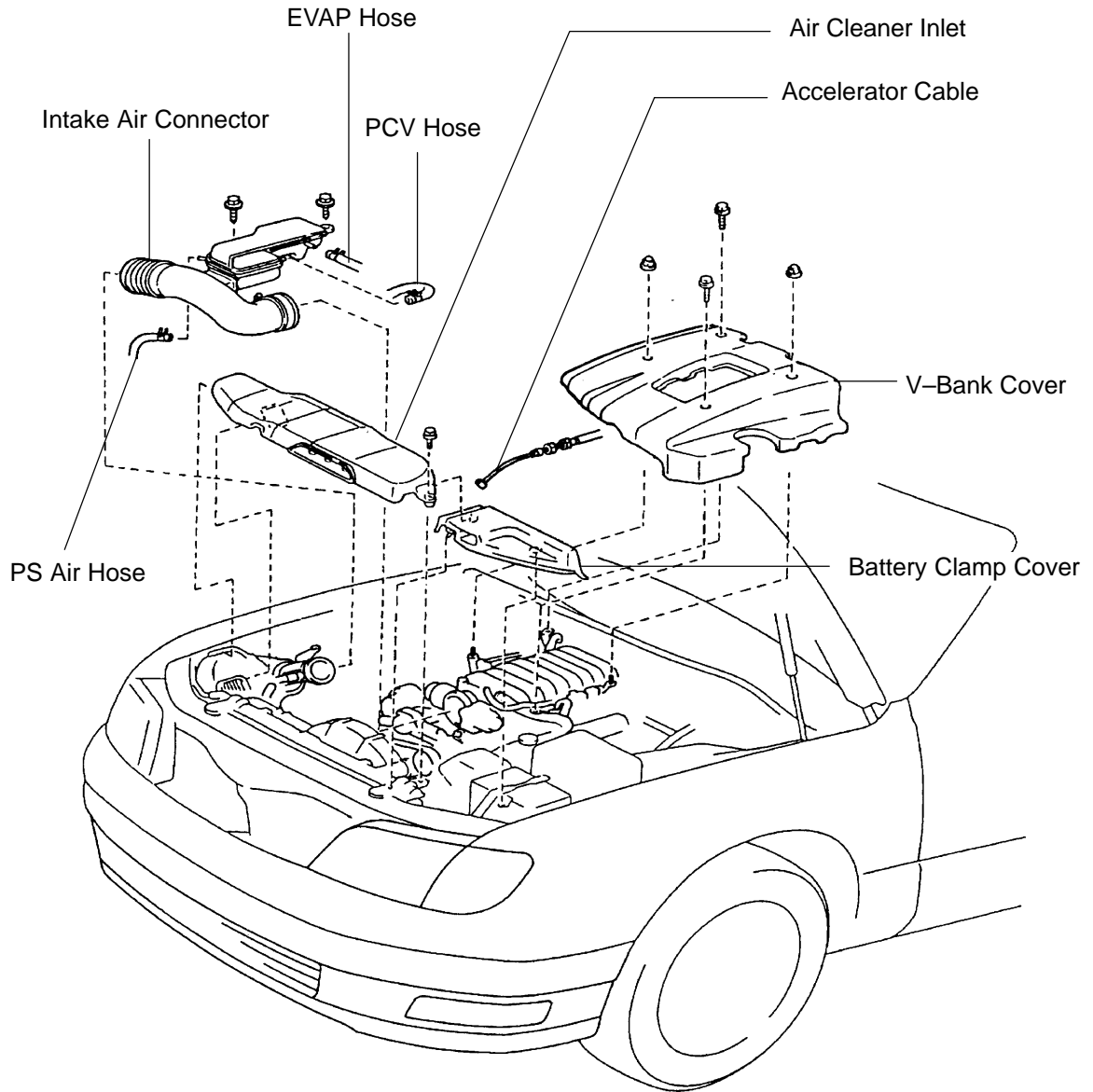
- Apply pressure (1.5 kPa (15 gf/cm², 0.22 psi)) to the vapor pressure sensor.

Voltage: 4.2 – 4.8 V

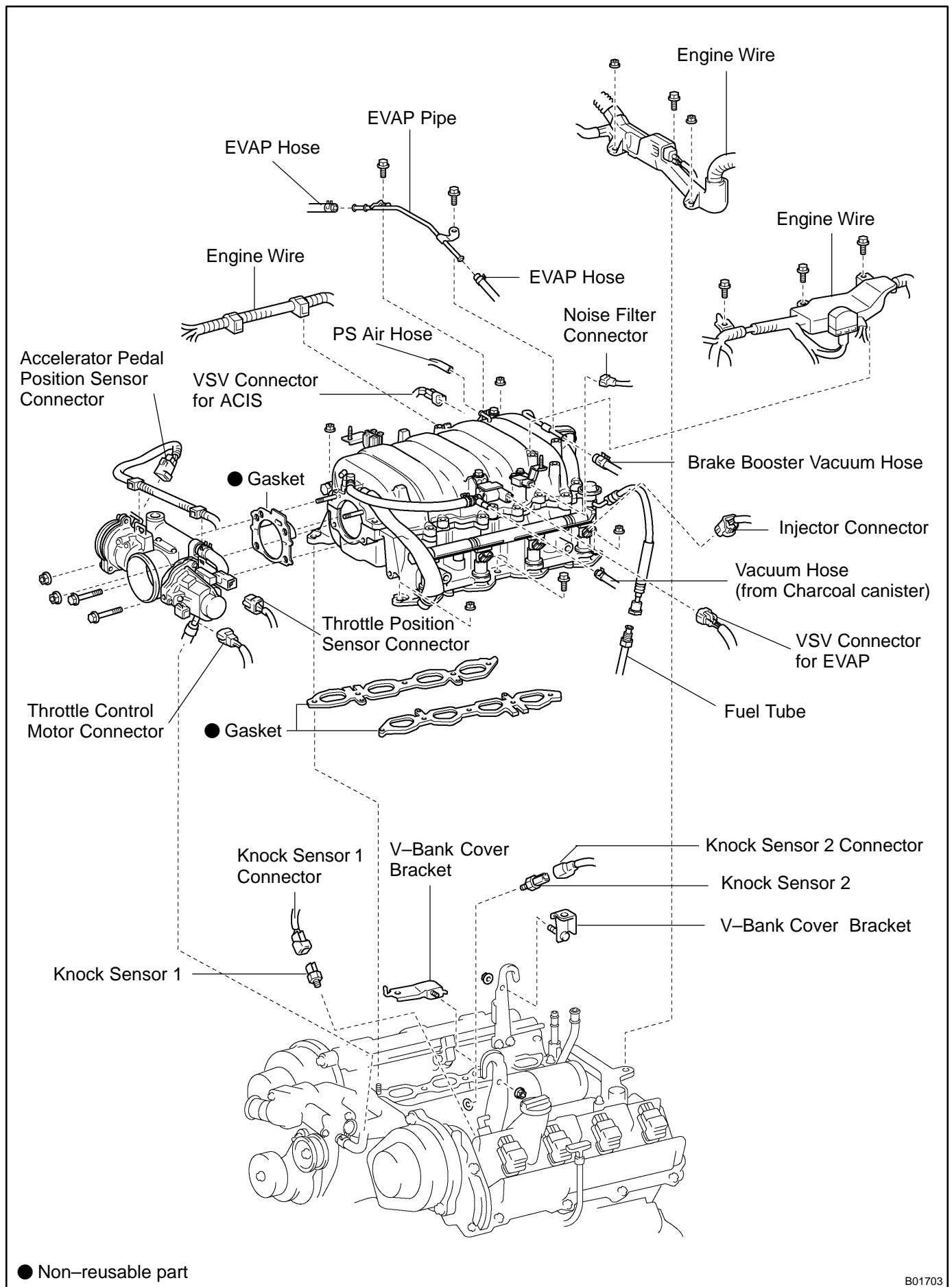
- Turn the ignition switch OFF.
- Reconnect the fuel hose to the vapor pressure sensor.

KNOCK SENSOR COMPONENTS

SF0G6-02



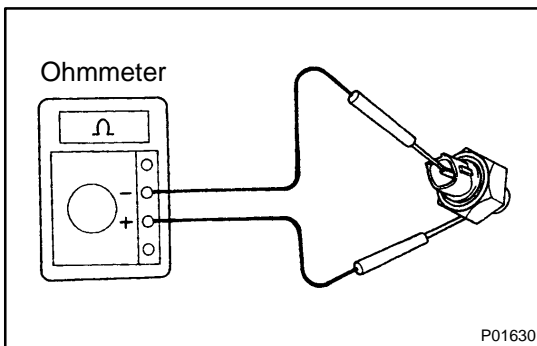
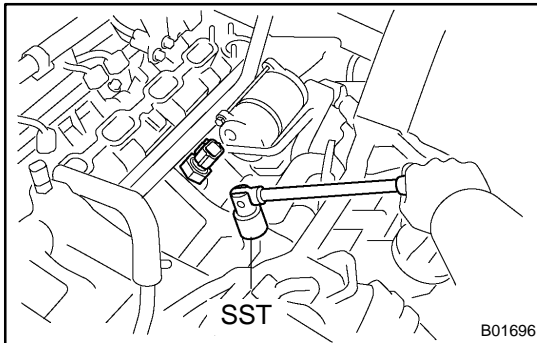
B01306



B01703

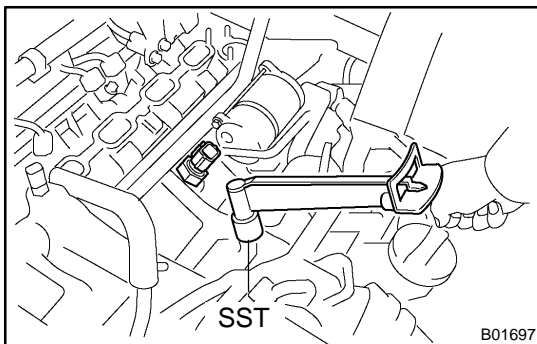
INSPECTION

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER, AIR CLEANER INLET AND INTAKE AIR CONNECTOR
3. DISCONNECT THROTTLE BODY (See page [SF-59](#))
4. REMOVE INTAKE MANIFOLD ASSEMBLY (See page [EM-34](#))
5. REMOVE KNOCK SENSOR
 - (a) Disconnect the knock sensor connectors.
 - (b) Using SST, remove the 2 knock sensors.
SST 09816-30010



6. INSPECT KNOCK SENSOR

Using an ohmmeter, check that there is no continuity between the terminal and body.
If there is continuity, replace the sensor.

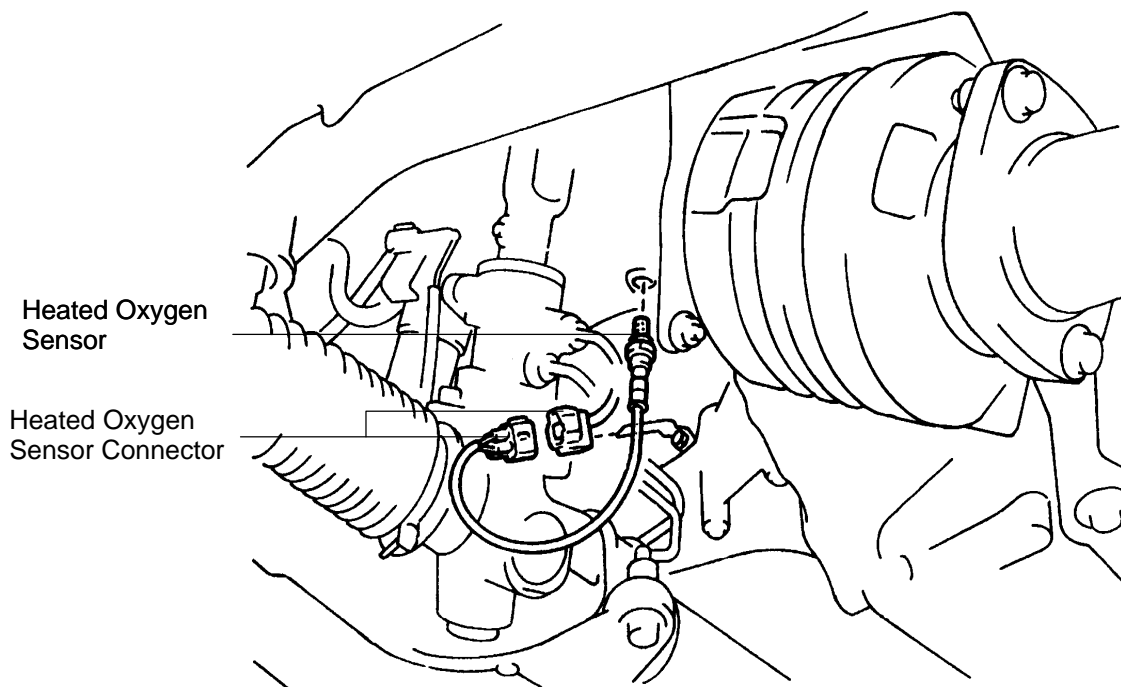
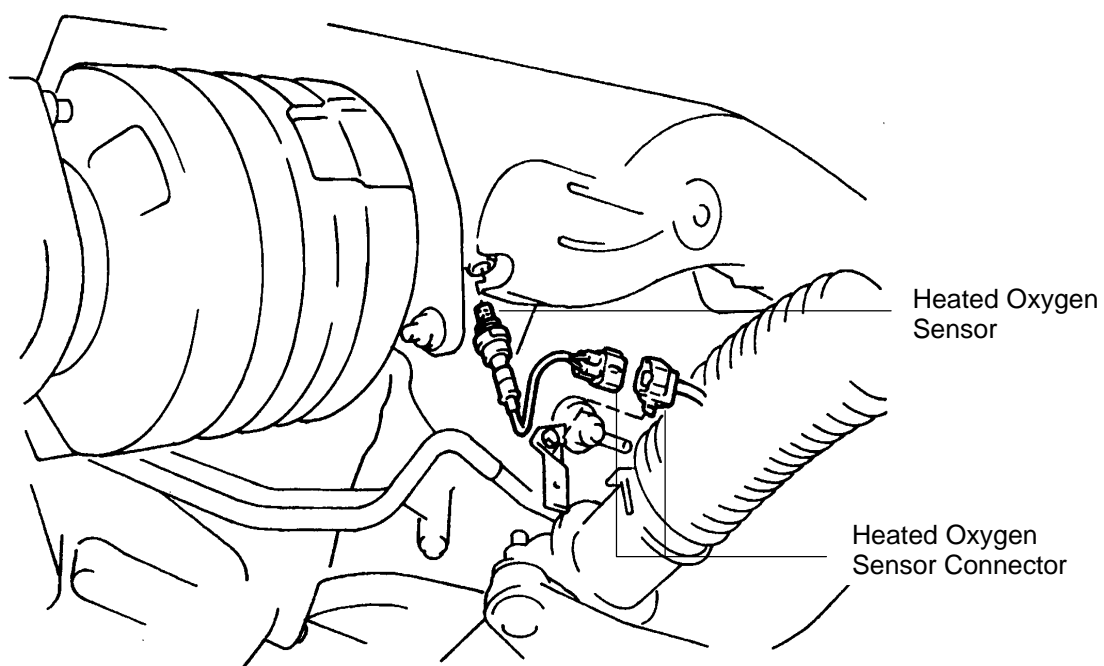


7. REINSTALL KNOCK SENSOR

- (a) Using SST, install the 2 knock sensors.
SST 09816-30010
Torque: 44 N·m (450 kgf·cm, 33 ft·lbf)
- (b) Connect the knock sensor connectors.
8. REINSTALL INTAKE MANIFOLD ASSEMBLY (See page [EM-58](#))
9. RECONNECT THROTTLE BODY (See page [SF-61](#))
10. CHECK FOR FUEL LEAKS (See page [SF-1](#))
11. REINSTALL INTAKE AIR CONNECTOR, AIR CLEANER INLET AND BATTERY CLAMP COVER
12. REINSTALL V-BANK COVER

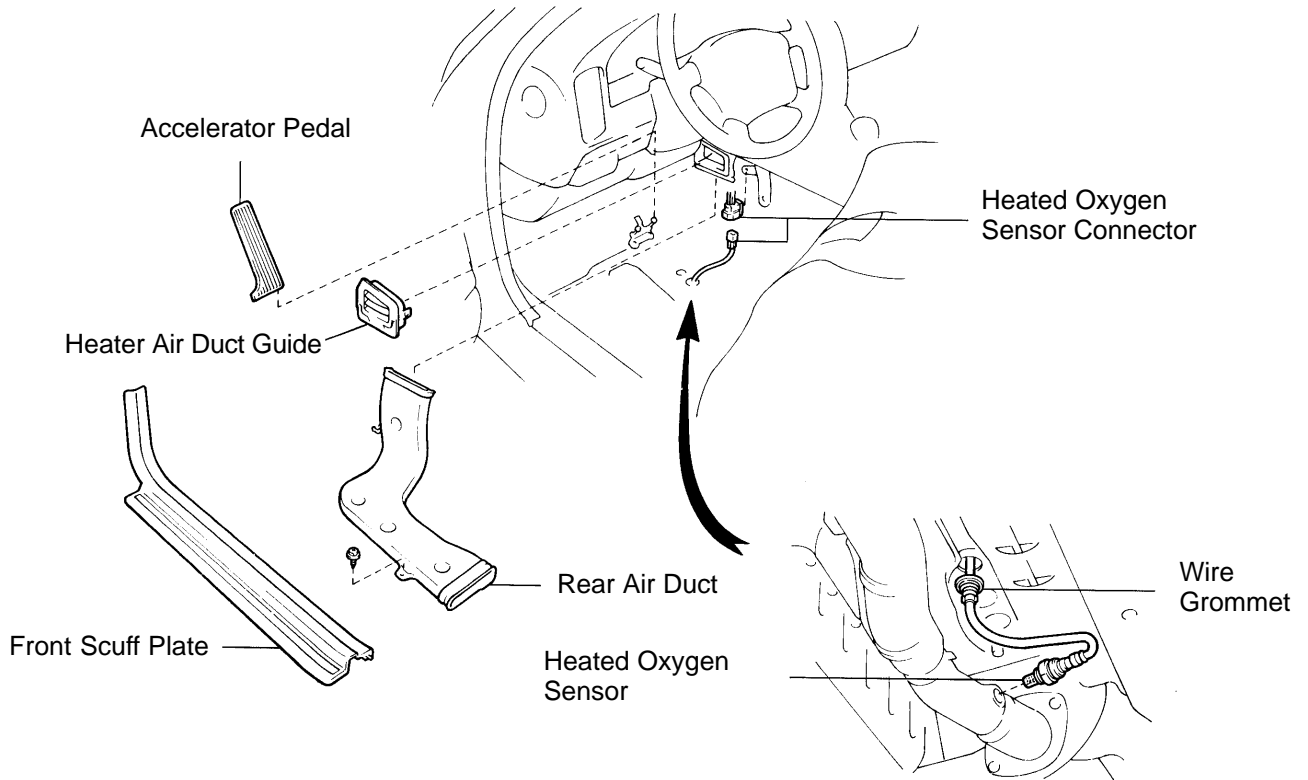
HEATED OXYGEN SENSOR COMPONENTS

SF0G8-02

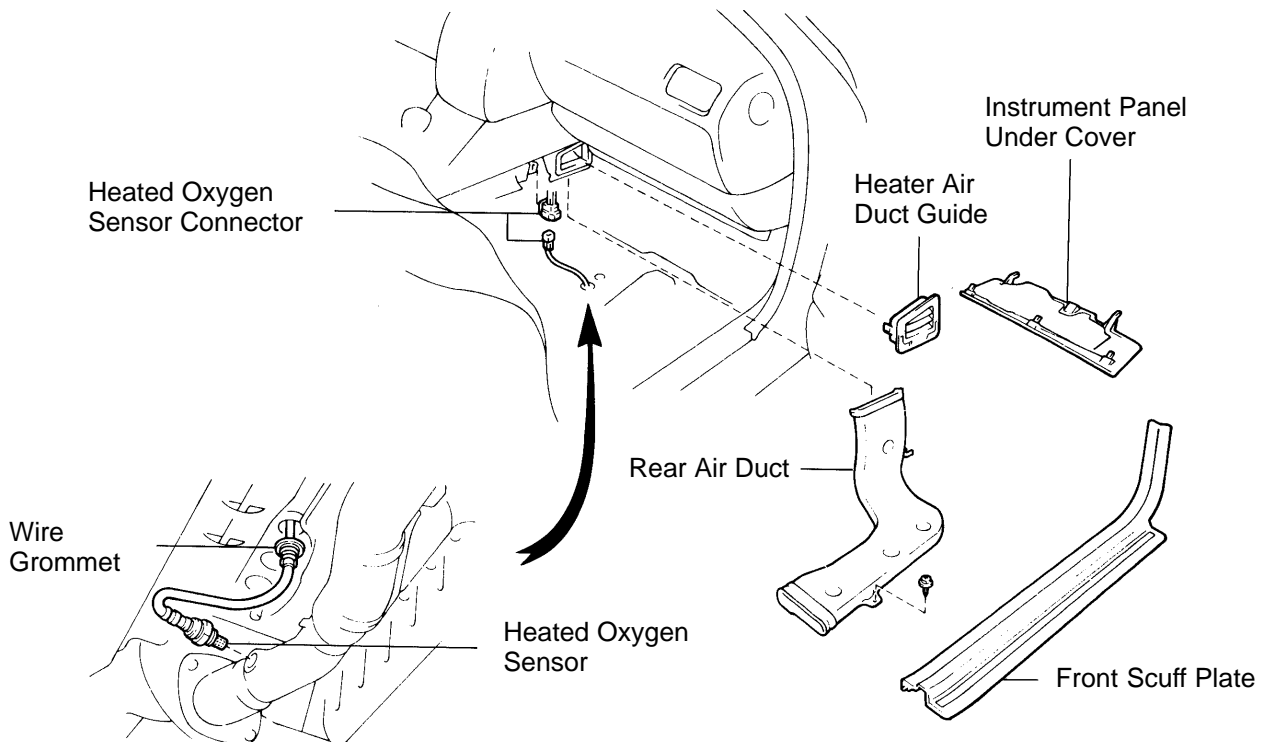
Bank 1 Sensor 1**Bank 2 Sensor 1**

B01698

Bank 1 Sensor 2



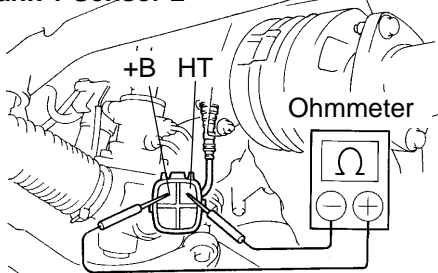
Bank 2 Sensor 2



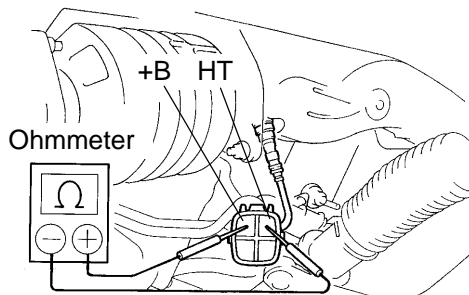
P23624
P23625

Z15685

Bank 1 Sensor 2



Bank 2 Sensor 2



B01705

INSPECTION

1. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSORS (BANK 1, 2 SENSOR 1)

- Disconnect the oxygen sensor connectors.
- Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance:

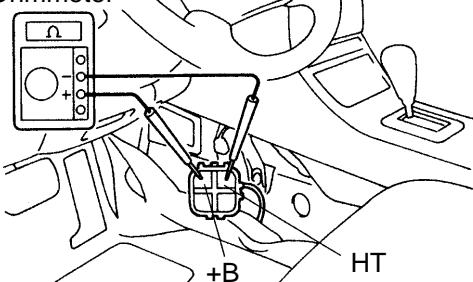
20°C (68°F)	11 – 16 Ω
800°C (1,472°F)	23 – 32 Ω

If the resistance is not as specified, replace the sensor.

- Reconnect the oxygen sensor connectors.

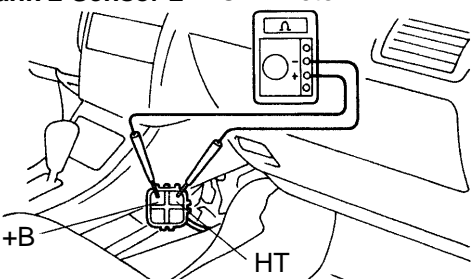
Bank 1 Sensor 2

Ohmmeter



Bank 2 Sensor 2

Ohmmeter



P21480
P21479

T Z14738

2. INSPECT HEATER RESISTANCE OF HEATED OXYGEN SENSORS (BANK 1, 2 SENSOR 2)

- Disconnect the oxygen sensor connectors.
- Using an ohmmeter, measure the resistance between the terminals +B and HT.

Resistance:

20°C (68°F)	11 – 16 Ω
800°C (1,472°F)	23 – 32 Ω

If the resistance is not as specified, replace the sensor.

- Reconnect the oxygen sensor connectors.

3. INSPECT OPERATION OF HEATED OXYGEN SENSORS (See page DI-51)

COOLANT

INSPECTION

CO07C-03

1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR

The engine coolant level should be between the "LOW" and "FULL" lines at normal temperature (20°C (68°F)).

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 reservoir.

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 reservoir filler hole, and the coolant should be free from oil.

If excessively dirty, clean the coolant passages and replace the coolant.

- (c) Reinstall the radiator cap.

REPLACEMENT

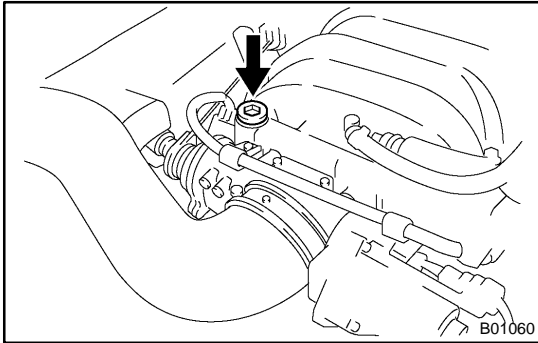
1. REMOVE V-BANK COVER

2. DRAIN ENGINE COOLANT

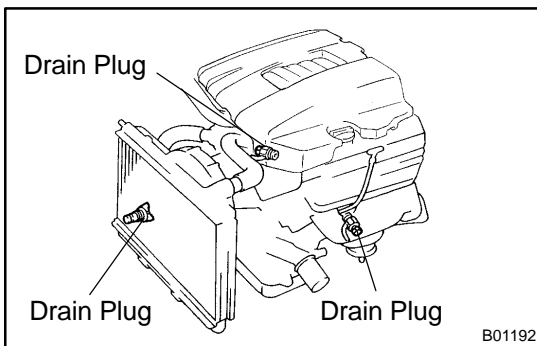
- (a) Remove the radiator cap from the radiator reservoir.

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) Remove the water filler plug from the throttle body.



- (c) Remove the 3 drain plugs on the engine and radiator, and drain the coolant.

- (d) Close the 3 drain plugs.

Torque: 12.7 N·m (130 kgf·cm, 9 ft·lbf) for engine drain plug

3. REFILL WITH ENGINE COOLANT

- (a) Slowly fill coolant to the throttle body until it is full.

- 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:

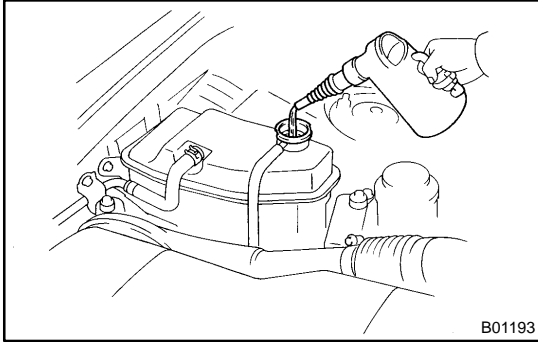
- Do not use an alcohol type coolant or plain water alone.
- The coolant should be mixed with plain water (preferably demineralized water or distilled water).

Capacity (w/ Heater):

11.0 liters (11.6 US qts, 9.7 Imp. qts)

- (b) Install the water filler plug to the throttle body.

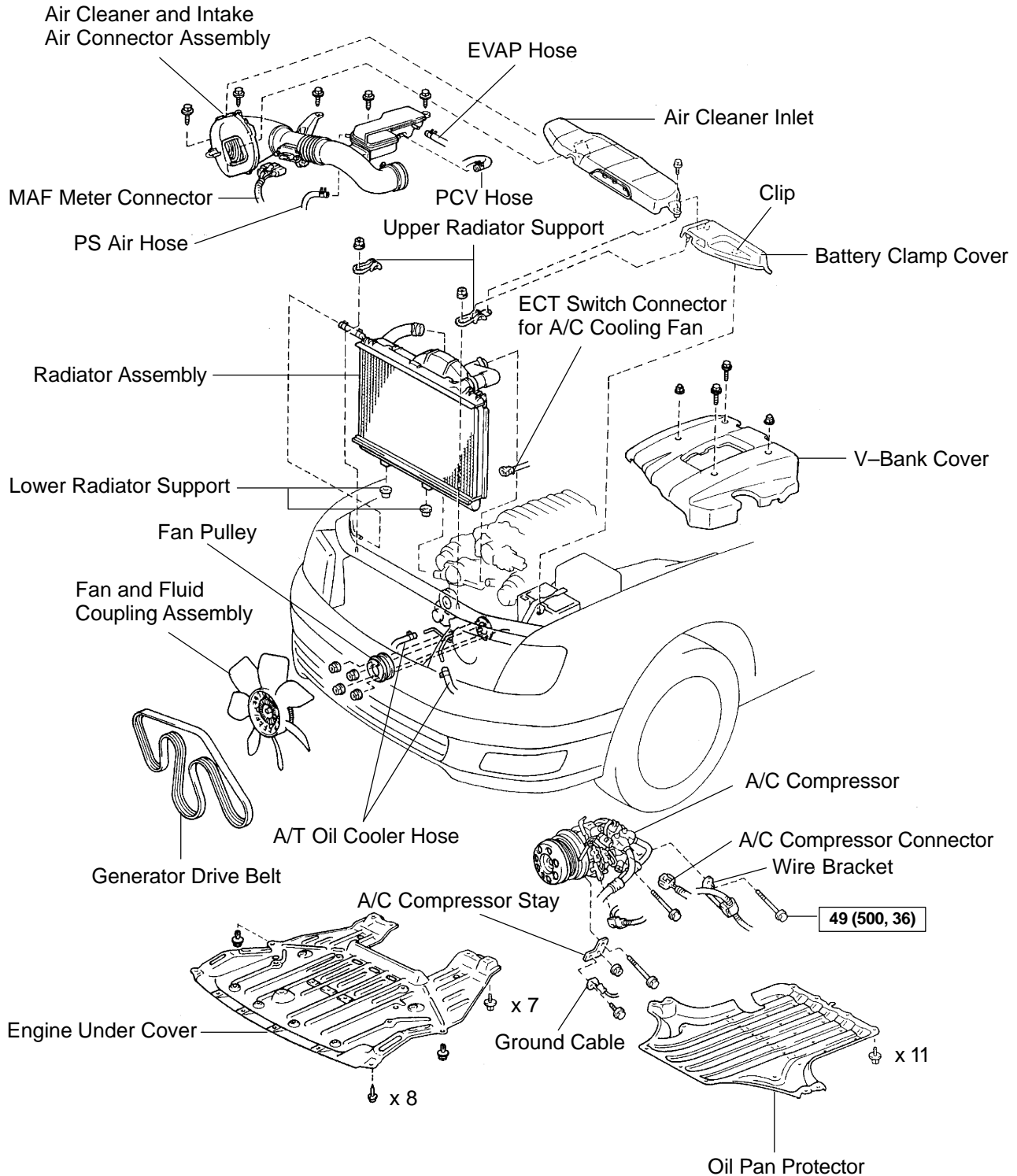
Torque: 45 N·m (459 kgf·cm, 33 ft·lbf)



- (c) Slowly pour coolant into the radiator reservoir until it is "FULL".
 - (d) Install the radiator cap.
 - (e) Bleed the cooling system.
 - Start the engine, and open the heater water valve.
 - Maintain the engine speed at 2,000 – 2,500 rpm, and warm up the engine.
 - (f) Stop the engine, and wait until the engine coolant cools down.
 - (g) Refill coolant into the reservoir until it is "FULL".
- 4. CHECK ENGINE COOLANT FOR LEAKS**
 - 5. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY**
 - 6. REINSTALL V-BANK COVER**

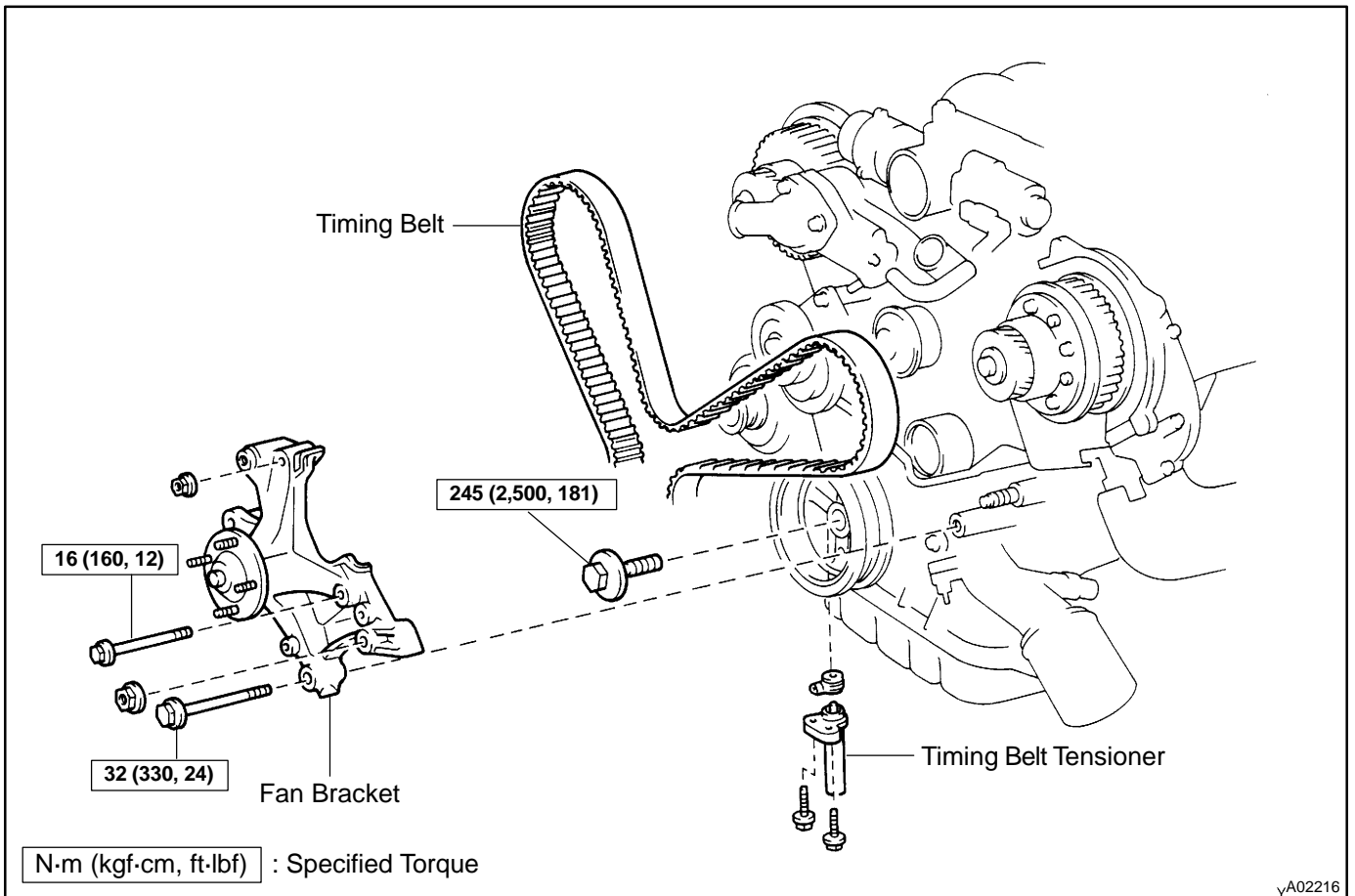
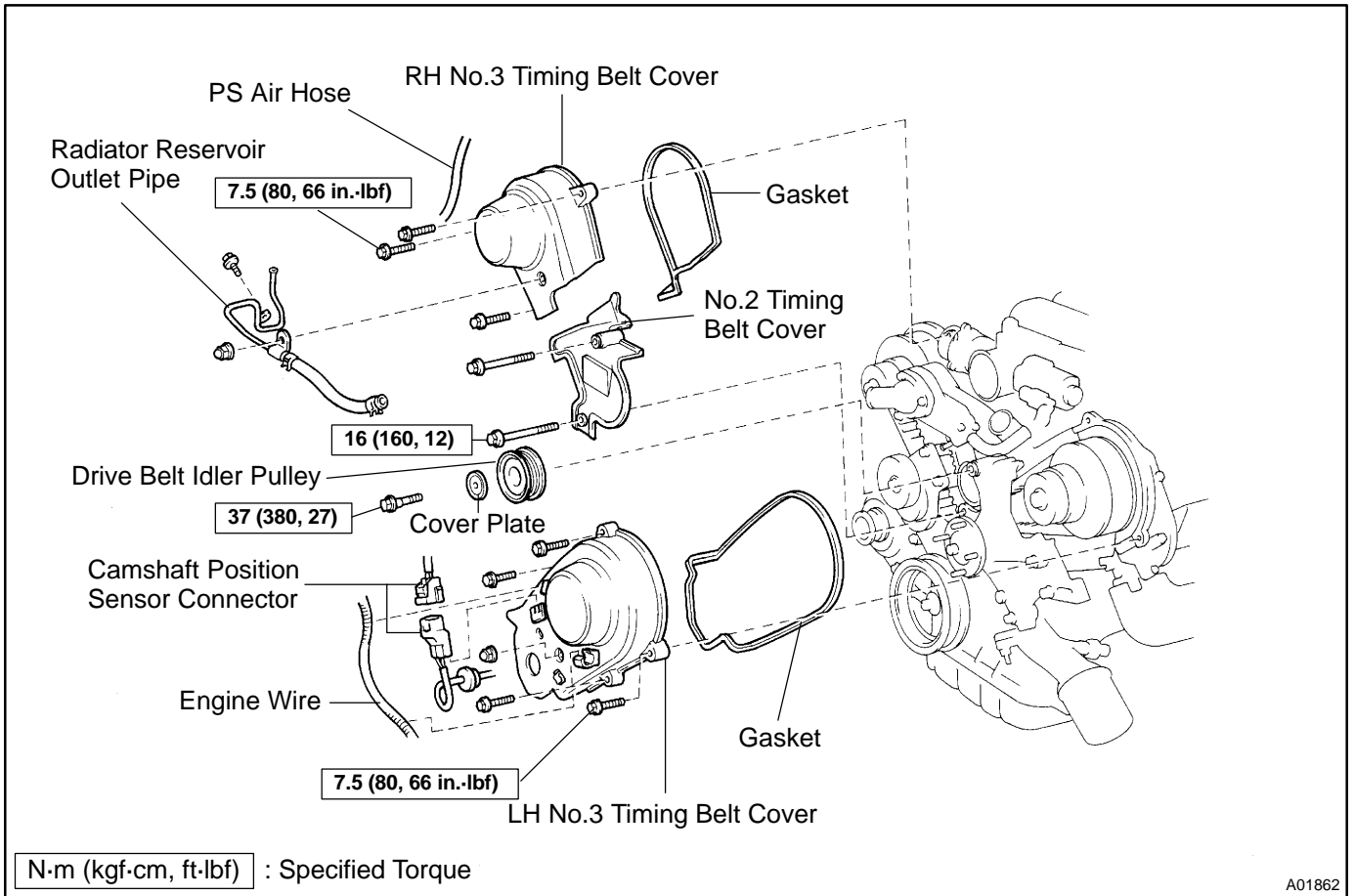
WATER PUMP COMPONENTS

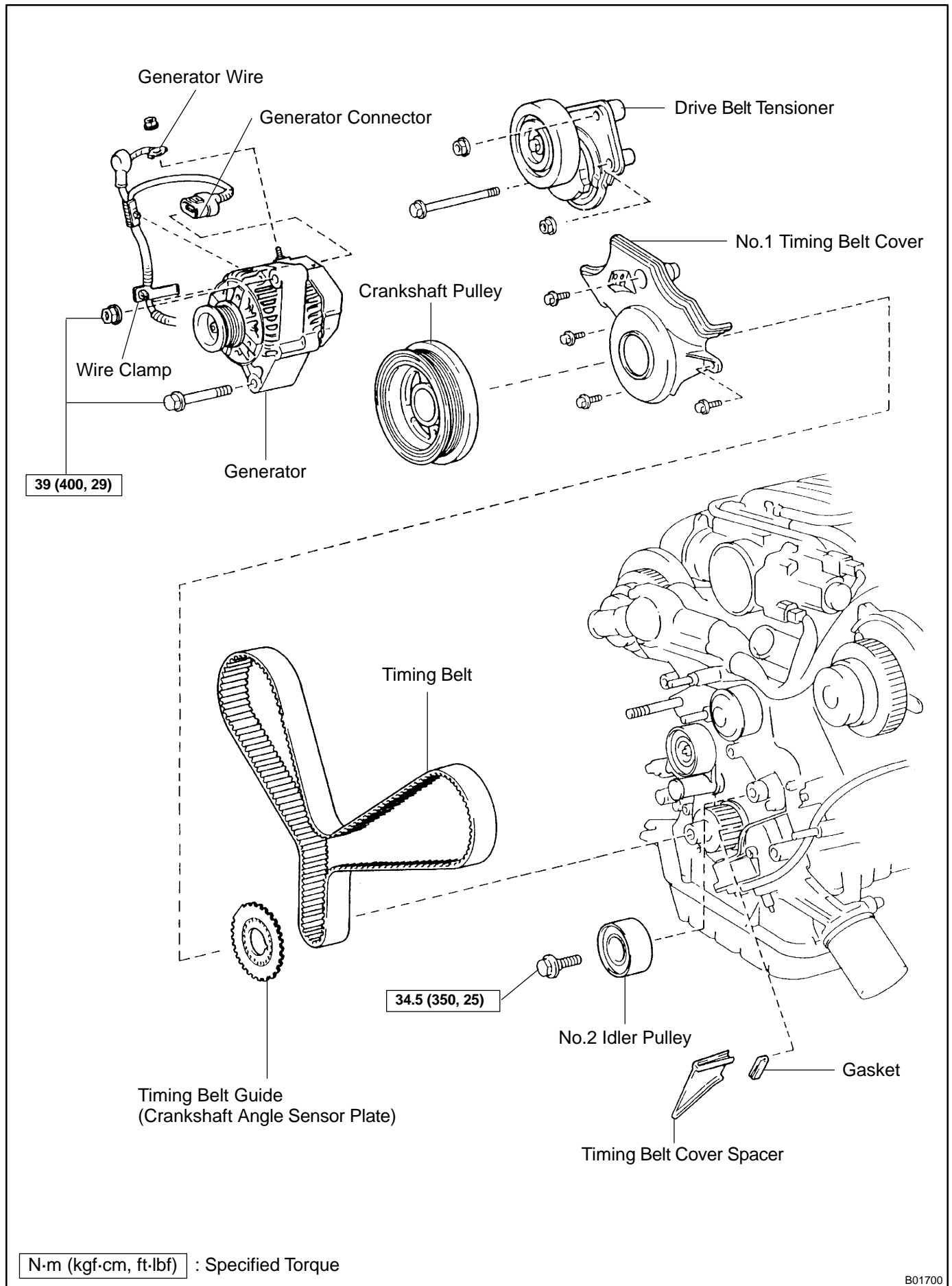
C007E-02



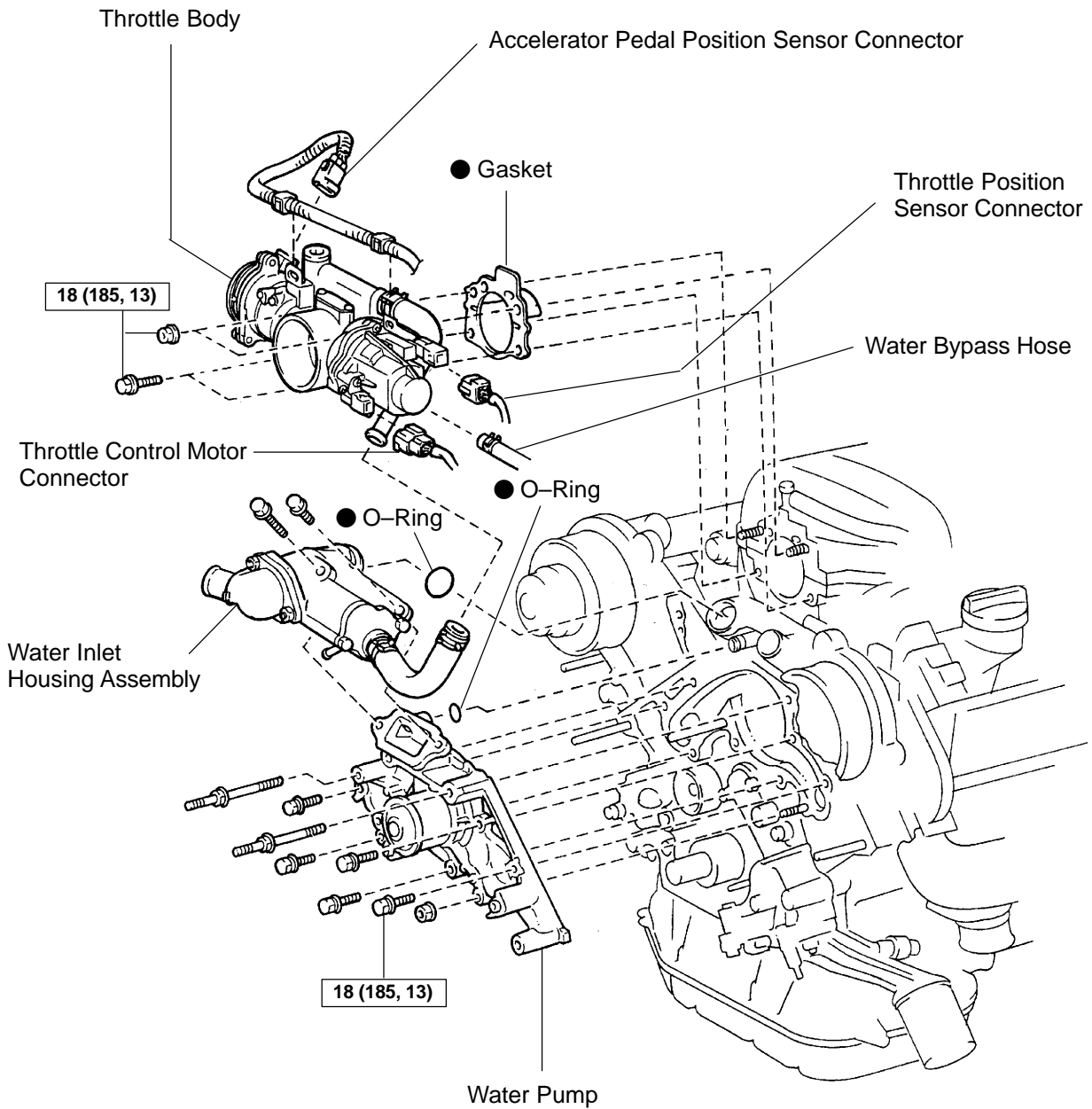
N·m (kgf·cm, ft·lbf) : Specified Torque

A02232





B01700



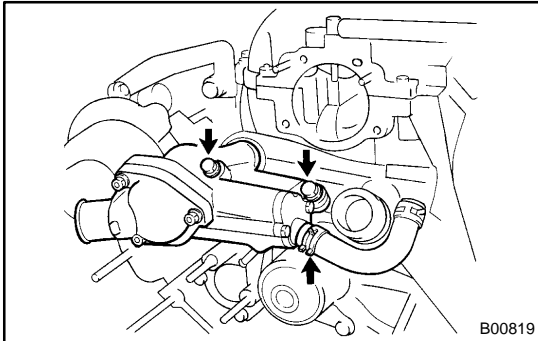
N·m (kgf·cm, ft·lbf) : Specified Torque

● Non-reusable part

B01040

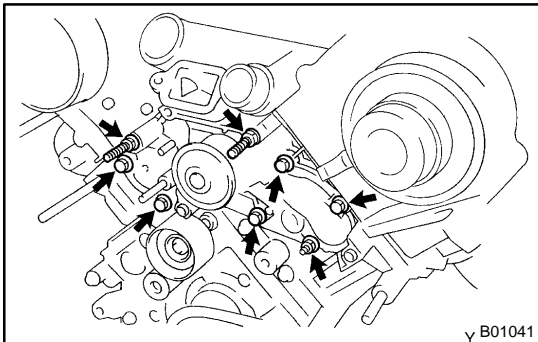
REMOVAL

1. REMOVE TIMING BELT (See page [EM-15](#))
2. REMOVE NO.2 IDLER PULLEY (See page [EM-15](#))
3. REMOVE THROTTLE BODY (See page [SF-42](#))



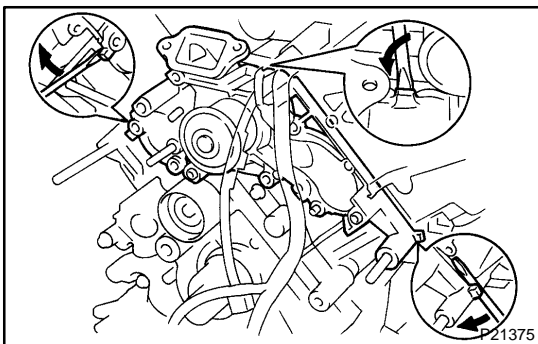
4. REMOVE WATER INLET AND INLET HOUSING ASSEMBLY

- (a) Remove the 2 bolts and water inlet and inlet housing assembly.
- (b) Remove the water bypass hose (from the throttle body) from the water inlet housing.
- (c) Remove the O-ring from the water inlet housing.

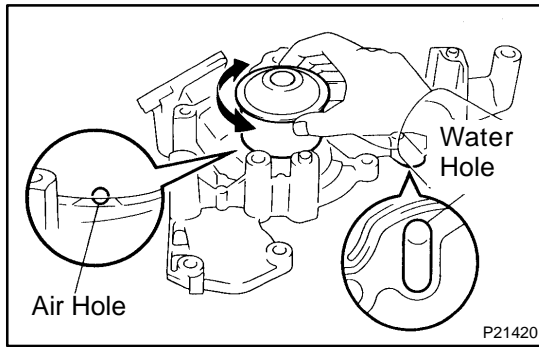


5. REMOVE WATER PUMP

- (a) Remove the 5 bolts, 2 stud bolts and nut.



- (b) Using a screwdriver, remove the water pump by prying the portions between the water pump and cylinder block.
- (c) Remove the O-ring from the water bypass pipe.



INSPECTION

1. INSPECT WATER PUMP

- (a) Visually check the air hole and water hole for coolant leakage.

If leakage is found, replace the water pump and timing belt.

- (b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

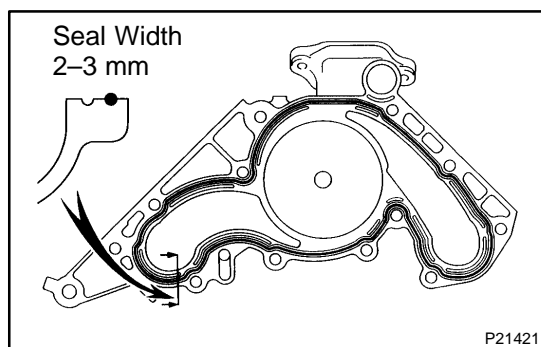
2. INSPECT TIMING BELT COMPONENTS

(See page [EM-20](#))

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.

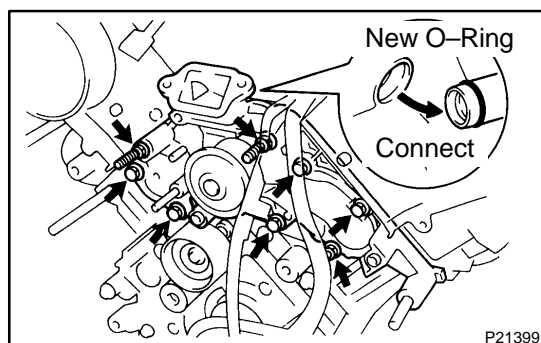


- (b) Apply seal packing to the water pump as shown in the illustration.

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 a new O-ring to the water bypass pipe end.
- (d) Apply soapy water to the O-ring.
- (e) Connect the water pump to the water bypass pipe end.
- (f) Install the water pump with the 5 bolts, 2 stud bolts and nut. Uniformly tighten the bolts, stud bolts and nut in several passes.

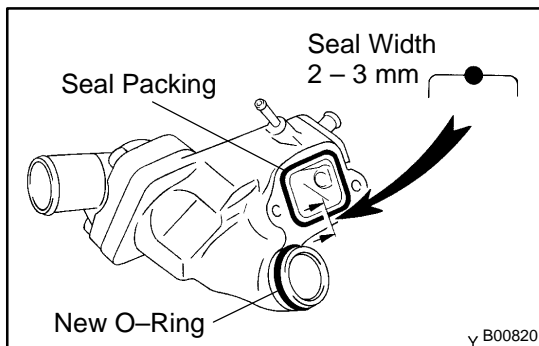
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

HINT:

Use bolts 30 mm (1.18 in.) in length.

2. INSTALL WATER INLET AND INLET HOUSING ASSEMBLY

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water inlet housing and water pump.
 - 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.

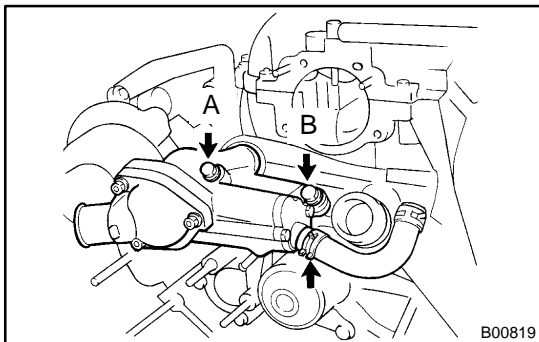


- (b) Apply seal packing to the sealing groove of water inlet housing as shown in the illustration.

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 a new O-ring to the water inlet housing.
 - (d) Apply soapy water on the O-ring.
 - (e) Push the water inlet housing end into the water pump hole.
 - (f) Connect the water bypass hose (from the throttle body) to the water inlet housing.



- (g) Install the water inlet and housing assembly with the 2 bolts. Alternately tighten the bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

75 mm (2.95 in.) for A

25 mm (0.98 in.) for B

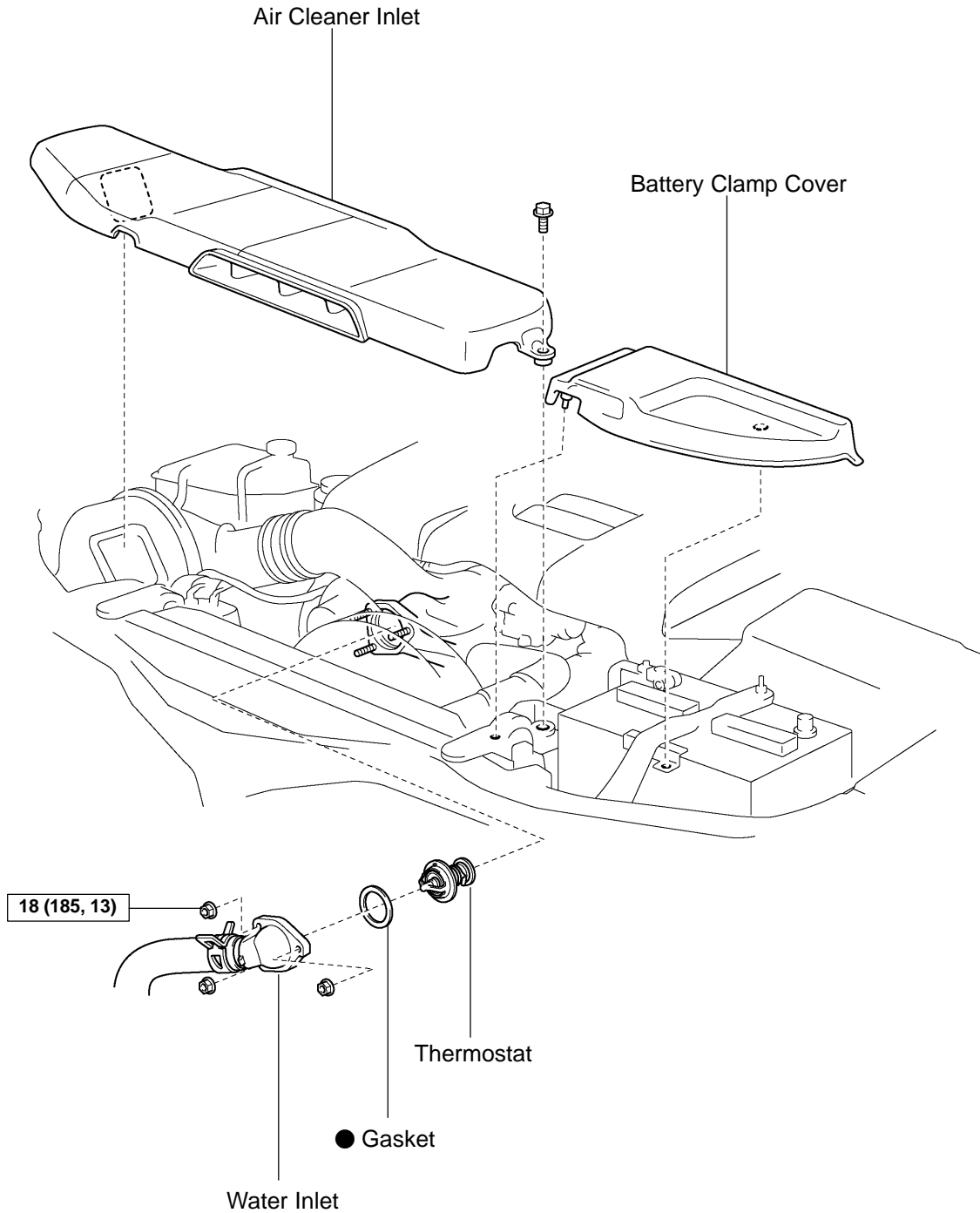
3. INSTALL THROTTLE BODY (See page [SF-42](#))

4. INSTALL NO.2 IDLER PULLEY (See page [EM-22](#))

5. **INSTALL TIMING BELT** (See page [EM-22](#))
6. **RECHECK ENGINE COOLANT LEVEL**

THERMOSTAT COMPONENTS

CO071-03



N·m (kgf·cm, ft·lbf) : Specified Torque

● Non-reusable part

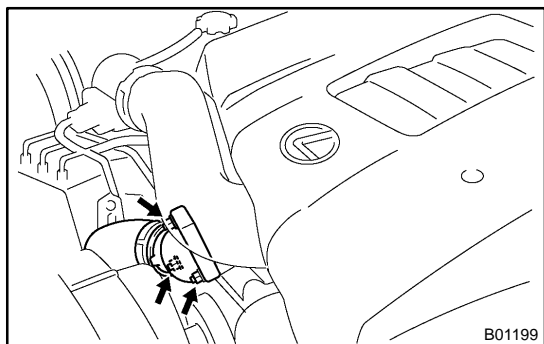
B01198

REMOVAL

HINT:

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. **DRAIN ENGINE COOLANT**
2. **REMOVE BATTERY CLAMP COVER AND AIR CLEANER INLET**

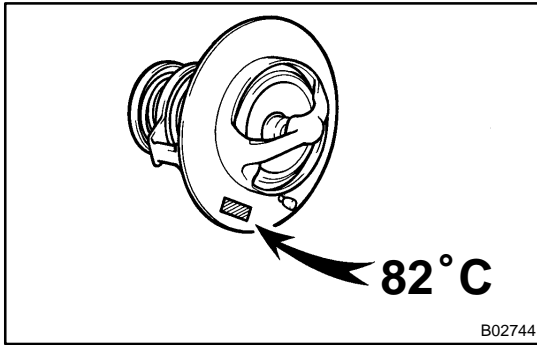


3. **DISCONNECT WATER INLET FROM WATER INLET HOUSING**

Remove the 3 nuts holding the water inlet to the inlet housing, and disconnect the water inlet together with the radiator hose from the water inlet housing.

4. **REMOVE THERMOSTAT FROM WATER INLET HOUSING**

- (a) Remove the thermostat.
- (b) Remove the gasket from the thermostat.

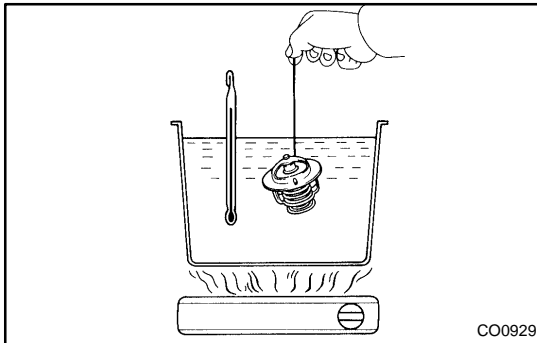


INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.

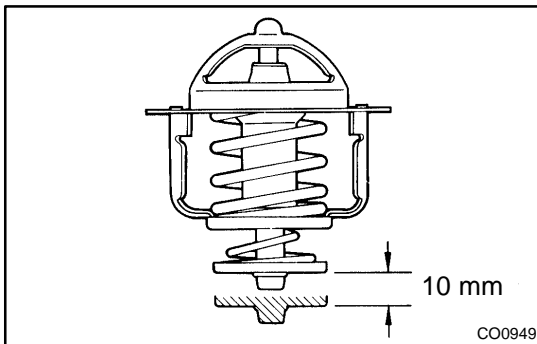


(a) Immerse the thermostat in water and gradually heat the water.

(b) Check the valve opening temperature.

Valve opening temperature: 80 – 84°C (176 – 183°F)

If the valve opening temperature is not as specified, replace the thermostat.



(c) Check the valve lift.

Valve lift: 10 mm (0.39 in.) or more at 95°C (203°F)

If the valve lift is not as specified, replace the thermostat.

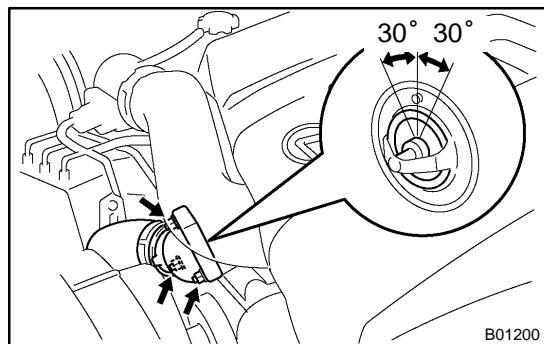
(d) Check that the valve is fully closed when the thermostat is at low temperatures (below 40°C (104°F)).

If not closed, replace the thermostat.

INSTALLATION

1. PLACE THERMOSTAT IN WATER INLET HOUSING

- (a) Install a new gasket to the thermostat.



- (b) Insert the thermostat into the water inlet housing with the jiggle valve facing straight upward.

HINT:

The jiggle valve may be set within 30° of either side of the prescribed position.

2. INSTALL WATER INLET

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR COOLANT LEAKS

5. RECHECK ENGINE COOLANT LEVEL

6. INSTALL AIR CLEANER INLET AND BATTERY CLAMP COVER

RADIATOR

ON-VEHICLE CLEANING

CO07M-01

Using water or a steam cleaner, remove any mud and dirt from the radiator core.

NOTICE:

If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. (i.e. Maintain a distance between the cleaner nozzle and radiator core.)

ON-VEHICLE INSPECTION

1. REMOVE RADIATOR CAP FROM RESERVOIR TANK

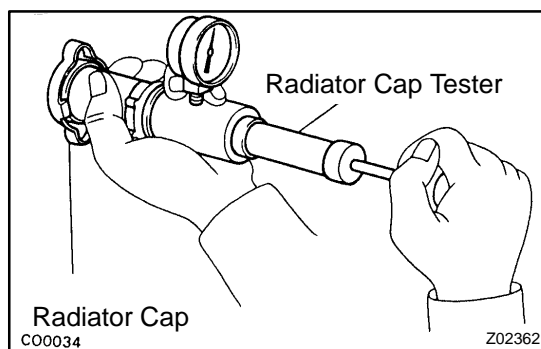
CAUTION:

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.
- Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.



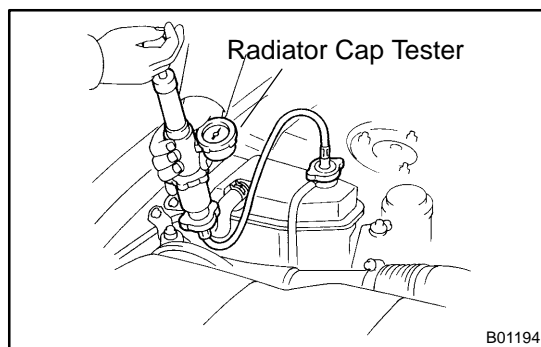
Using a radiator cap tester, pump the tester and measure the relief valve opening pressure.

Opening pressure:

Standard	74 – 103 kPa (0.75 – 1.05 kgf/cm ² , 10.7 – 14.9 psi)
Minimum	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.



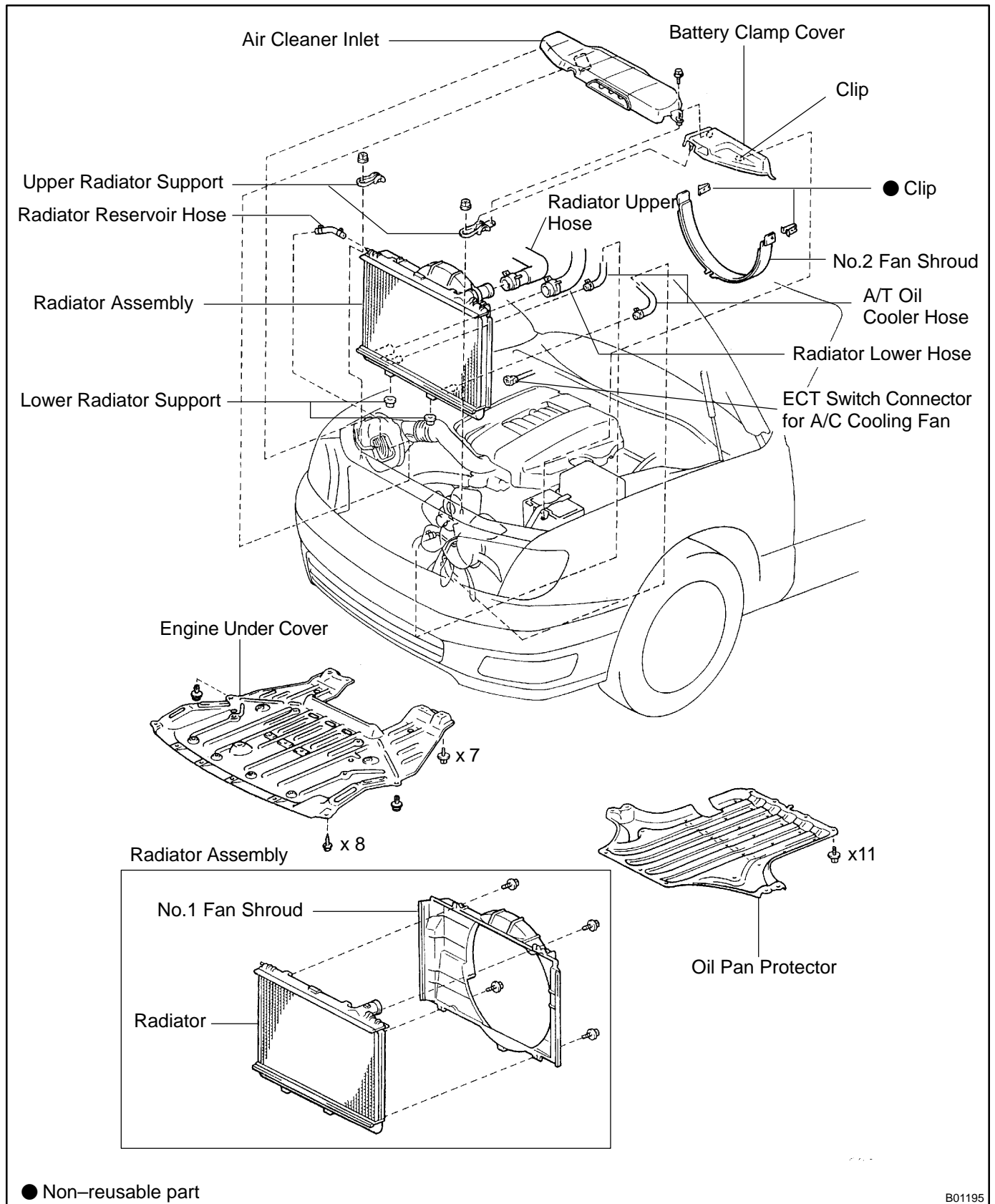
3. INSPECT COOLING SYSTEM FOR LEAKS

- Fill the radiator with coolant and attach a radiator cap tester to the water filler.
- Warm up the engine.
- Pump it to 118 kPa (1.2 kgf/cm², 17.1 psi), and check that the pressure does not drop.

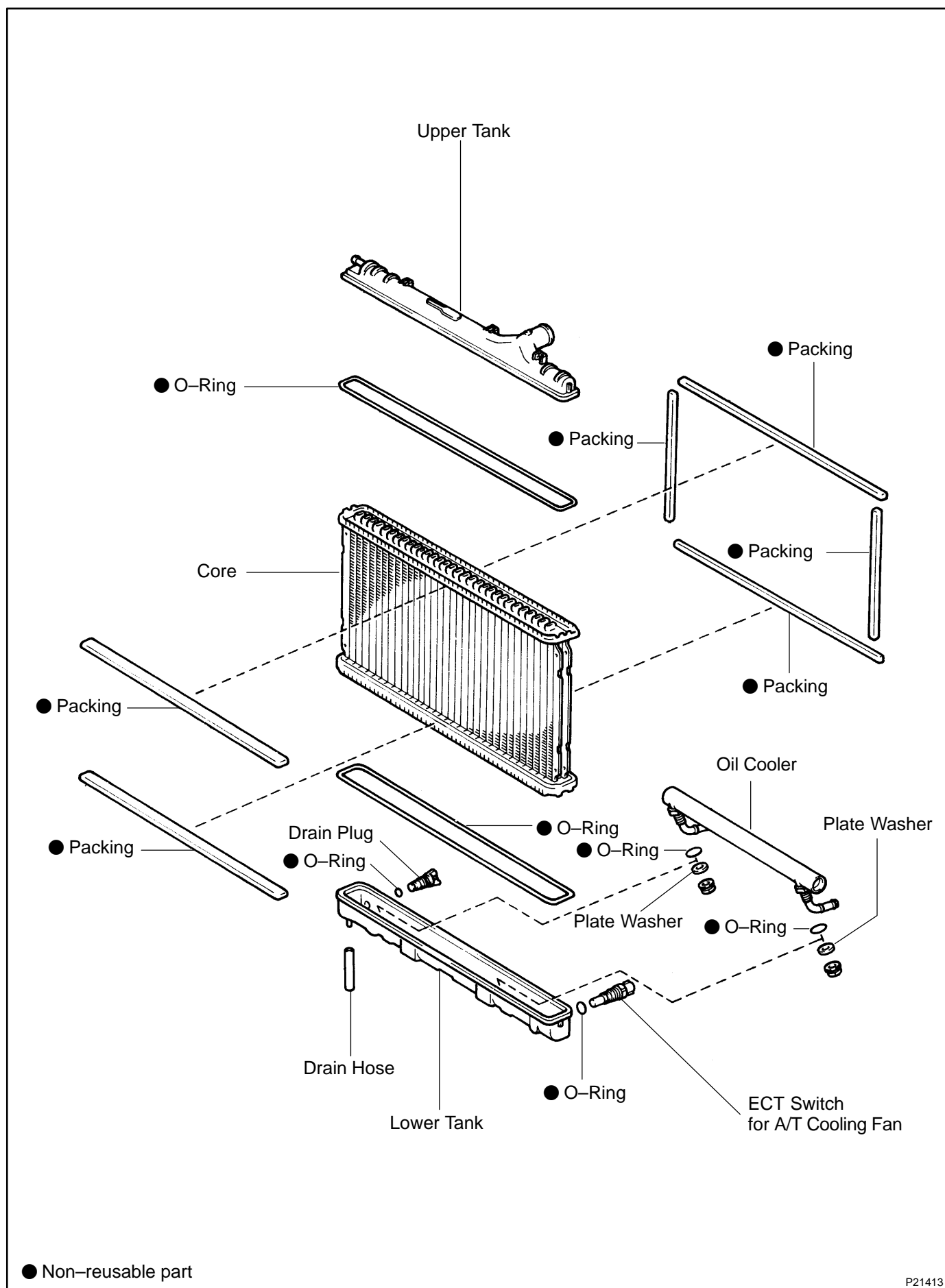
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and cylinder head.

4. REINSTALL RADIATOR CAP

COMPONENTS

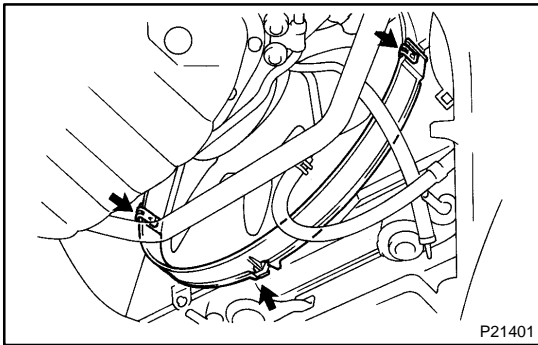


B01195



REMOVAL

1. REMOVE OIL PAN PROTECTOR
2. REMOVE ENGINE UNDER COVER
3. DRAIN ENGINE COOLANT
4. REMOVE BATTERY CLAMP COVER
5. REMOVE AIR CLEANER INLET
6. REMOVE RADIATOR RESERVOIR HOSE
7. DISCONNECT UPPER RADIATOR HOSE FROM RADIATOR
8. DISCONNECT LOWER RADIATOR HOSE FROM RADIATOR
9. DISCONNECT A/T OIL COOLER HOSES FROM RADIATOR

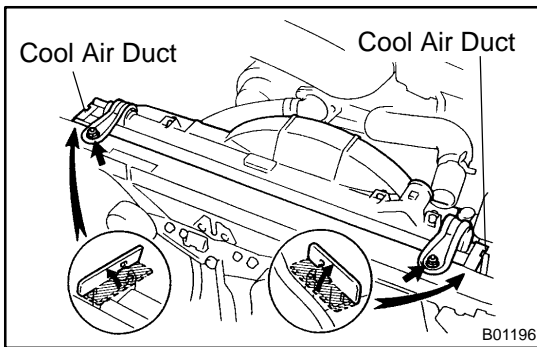


10. REMOVE NO.2 FAN SHROUD

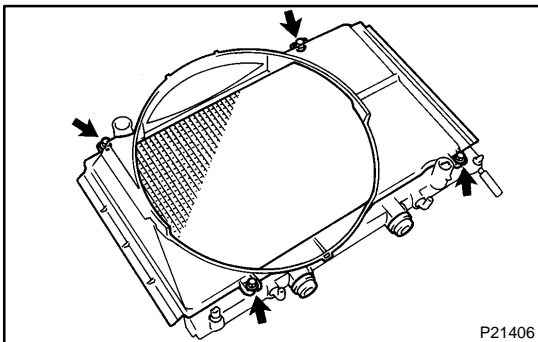
- (a) Remove the 2 clips.
- (b) Disconnect the claw of the No.2 fan shroud from the hook of the No.1 fan shroud, and remove the No.2 fan shroud.

11. REMOVE RADIATOR ASSEMBLY

- (a) Disconnect the ECT switch connector for the A/C cooling fan.

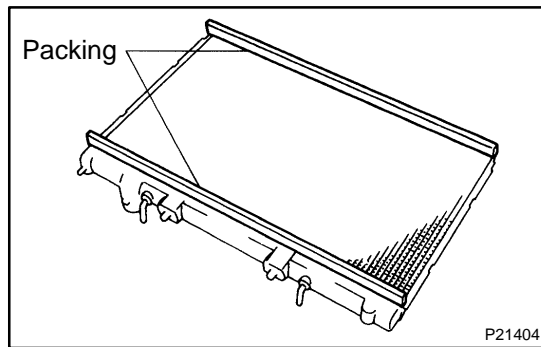


- (b) Disconnect the upper sides of the RH and LH cool air ducts.
- (c) Remove the nut and upper radiator support. Remove the 2 upper radiator supports.
- (d) Lift out the radiator assembly.
- (e) Remove the 2 lower radiator supports from the radiator.



12. REMOVE NO.1 FAN SHROUD FROM RADIATOR

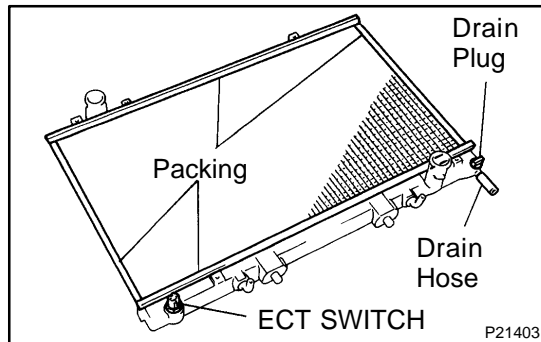
Remove the 4 bolts and fan shroud.



DISASSEMBLY

1. REMOVE PACKINGS

- (a) Remove the 2 packings from the radiator front side.



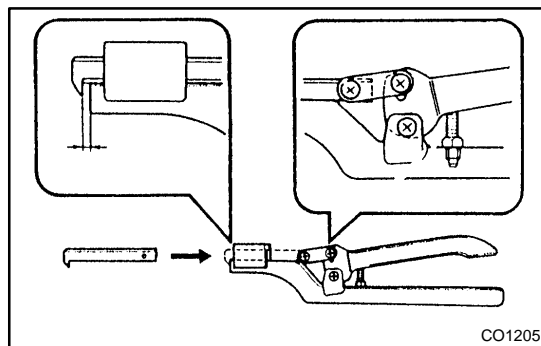
- (b) Remove the 4 packings from the radiator rear side.

2. REMOVE ECT SWITCH FOR A/C COOLING FAN

- (a) Remove the ECT switch.
- (b) Remove the O-ring from the ECT switch.

3. REMOVE DRAIN PLUG

- (a) Remove the drain hose.
- (b) Remove the drain plug.
- (c) Remove the O-ring from the drain plug.



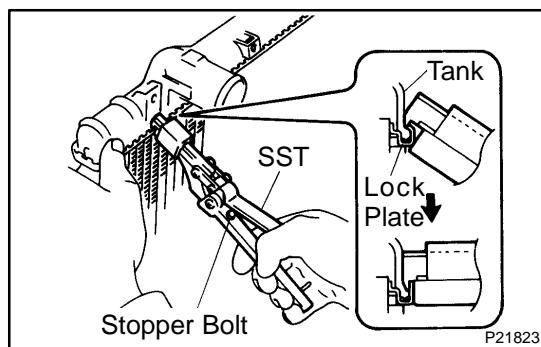
4. ASSEMBLE SST

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:

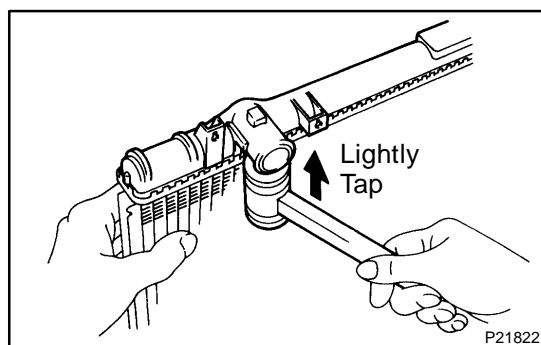
If this adjustment is not done, the claw may be damaged.



5. UNCAULK LOCK PLATES

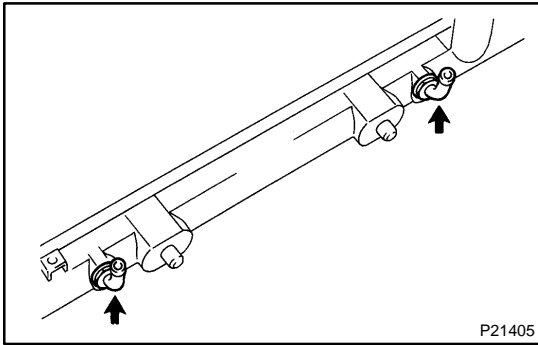
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230-01010

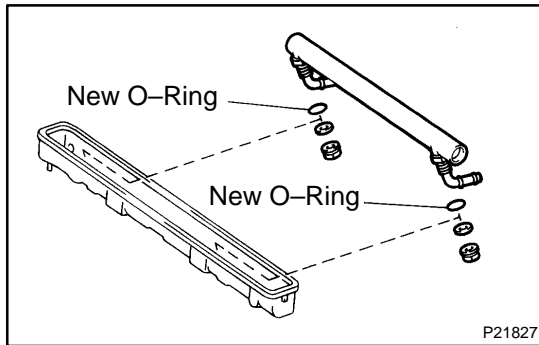


6. REMOVE TANKS AND O-RINGS

- (a) Lightly tap the radiator port (inlet or outlet) with a soft-faced hammer, and remove the tank.
- (b) Remove the O-ring.

**7. REMOVE OIL COOLER FROM LOWER TANK**

- (a) Remove the 2 nuts and 2 plate washers.
- (b) Remove the oil cooler and 2 O-rings.

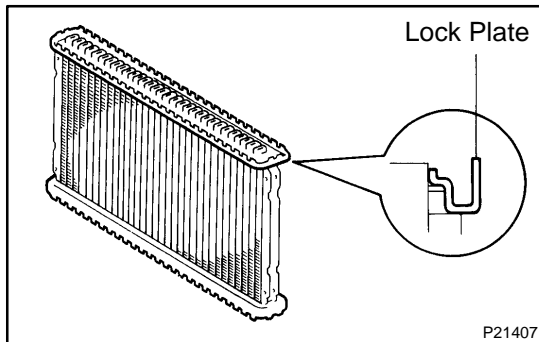


REASSEMBLY

1. INSTALL OIL COOLER TO LOWER TANK

- Install 2 new O-rings to the oil cooler.
- Install the oil cooler to the lower tank.
- Install the 2 plate washers and 2 nuts.

Torque: 8.34 N·m (85 kgf-cm, 74 in.-lbf)



2. INSPECT LOCK PLATE

Inspect the lock plate for damage.

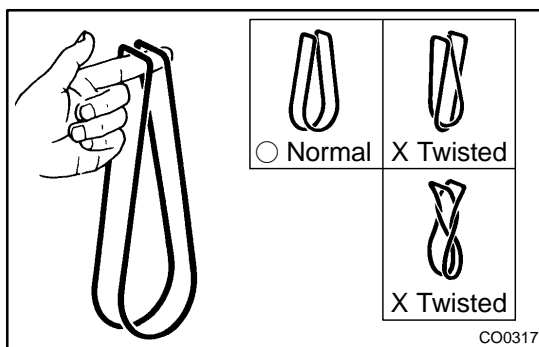
HINT:

- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.
- Therefore, first correct any deformation with pliers or similar object. Water leakage will result if the bottom of the lock plate groove is damaged or dented. Therefore, repair or replace if necessary.

NOTICE:

The radiator can only be recaulked 2 times.

After the 2nd time, the radiator core must be replaced.

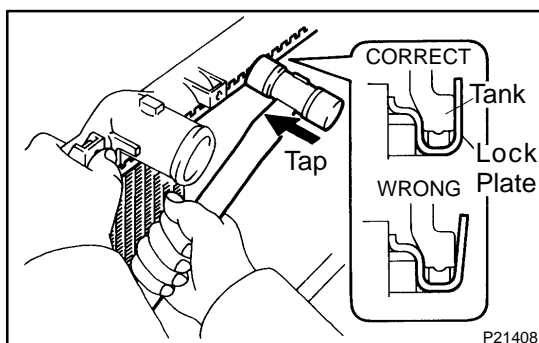


3. INSTALL NEW O-RINGS AND TANKS

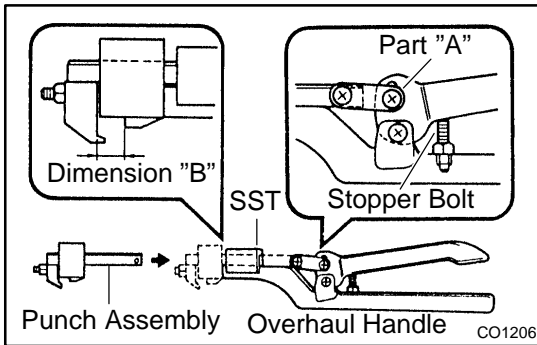
- After checking that there are no foreign objects in the lock plate groove, install the new O-ring without twisting it.

HINT:

When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.



- Install the tank without damaging the O-ring.
- Tap the lock plate with a soft-faced hammer so that there is no gap between it and the tank.

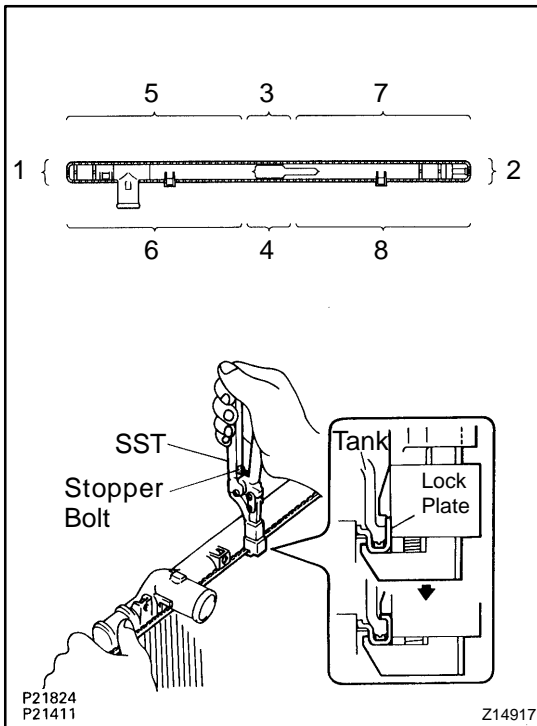


4. ASSEMBLE SST

SST 09230-01010, 09231-14010

- Install the punch assembly to the overhaul handle, inserting it in the hole in part "A" as shown in the illustration.
- While gripping the handle, adjust the stopper bolt so that dimension "B" shown in the diagram.

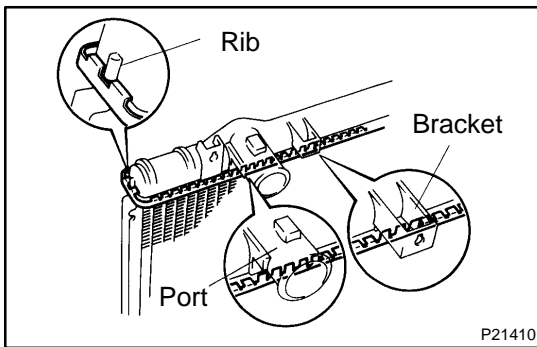
Dimension "B": 8.8 mm (0.35 in.)



5. CAULK LOCK PLATE

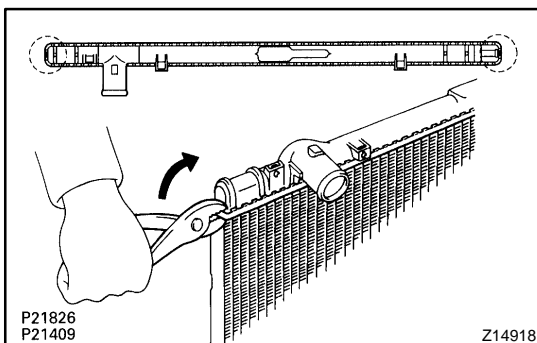
- Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper bolt.

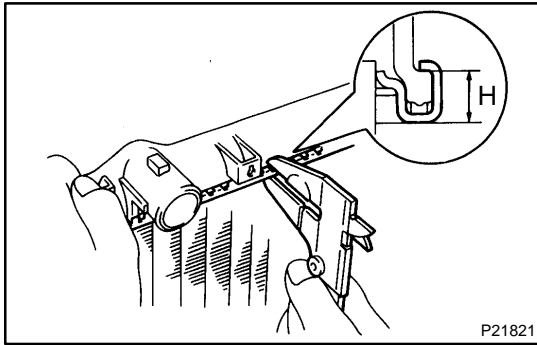
SST 09230-01010



HINT:

- Do not stake the areas protruding around the ports, brackets or tank ribs.
- The points shown in the rib sides and oil cooler near here cannot be staked with SST. Use pliers or similar object and be careful not to damage the core plates.



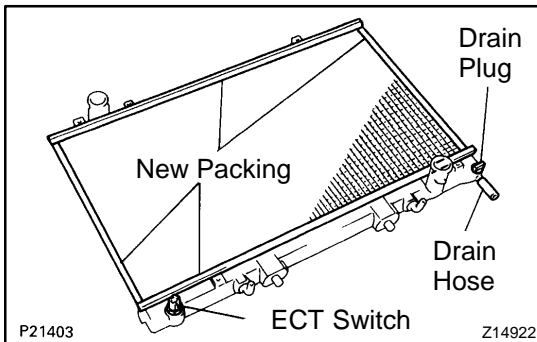


- (b) Check the lock plate height (H) after completing the caulking.

Plate height (H): 7.40 – 7.80 mm (0.2959 – 0.3119 in.)

If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

6. PAINT LOCK PLATES



7. INSTALL ECT SWITCH FOR A/C COOLING FAN

- Install a new O-ring to the ECT switch.
- Apply soapy water to the O-ring.
- Install the ECT switch.

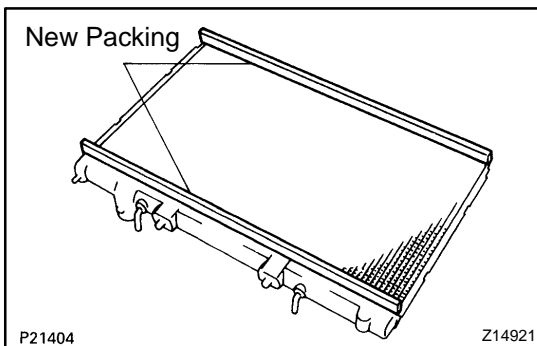
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

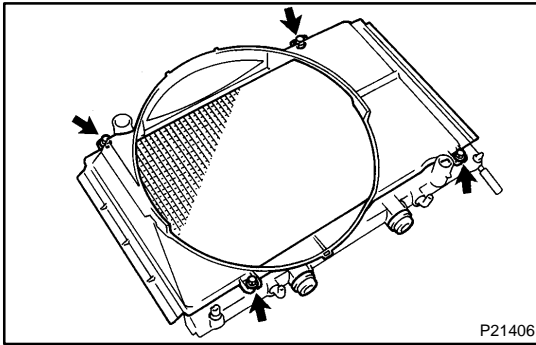
8. INSTALL DRAIN PLUG TO RADIATOR

- Install a new O-ring to the drain plug.
- Apply soapy water to the O-ring.
- Install the drain plug.
- Install the drain hose.

9. INSTALL PACKINGS

- Install 4 new packings to the radiator rear side.
- Install 2 new packings to the radiator front side.





INSTALLATION

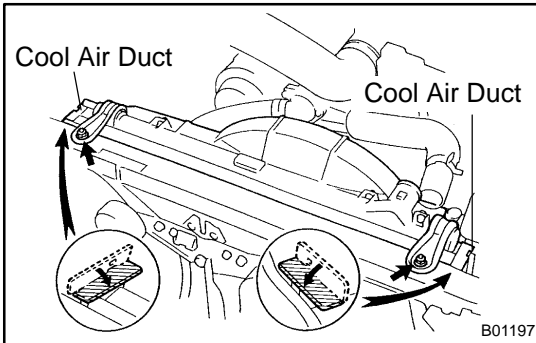
1. INSTALL NO.1 FAN SHROUD TO RADIATOR

Install the fan shroud with the 4 bolts.

Torque: 5.0 N·m (50 kgf·cm, 44 ft·lbf)

2. INSTALL RADIATOR ASSEMBLY

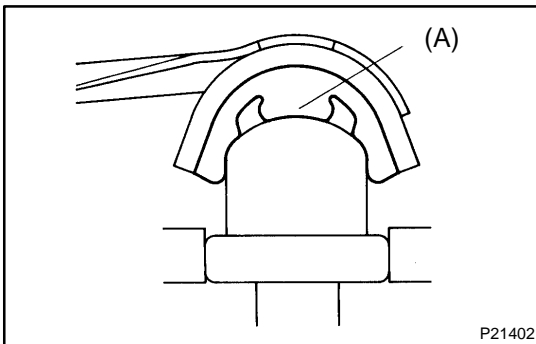
- (a) Install the 2 lower radiator supports to the radiator.
- (b) Place the radiator assembly on the body bracket.



- (c) Install the radiator with the 2 upper radiator supports and 2 nuts.

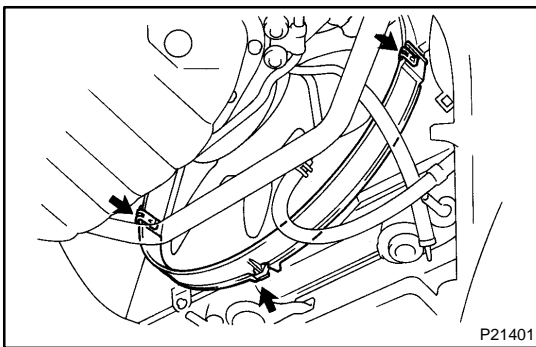
Torque: 13.5 N·m (135 kgf·cm, 10 ft·lbf)

- (d) Install the upper sides of the RH and LH cool air ducts.
- (e) Connect the ECT switch connector for the A/C cooling fan.



HINT:

After installation, check that the rubber cushion (A) of the support is depressed.

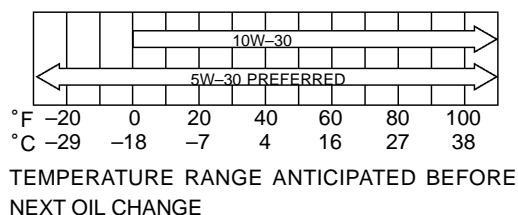


3. INSTALL NO.2 FAN SHROUD

- (a) Connect the claw of the No.2 fan shroud to the hook of the No.1 fan shroud.
- (b) Install the No.2 fan shroud with the 2 clips.

4. **CONNECT UPPER RADIATOR HOSE TO RADIATOR**
5. **CONNECT LOWER RADIATOR HOSE TO RADIATOR**
6. **CONNECT A/T OIL COOLER HOSES TO RADIATOR**
7. **INSTALL RADIATOR RESERVOIR HOSE**
8. **FILL WITH ENGINE COOLANT**
9. **START ENGINE AND CHECK FOR LEAKS**
10. **RECHECK ENGINE COOLANT LEVEL**
11. **INSTALL AIR CLEANER INLET**
12. **INSTALL BATTERY CLAMP COVER**
13. **INSTALL ENGINE UNDER COVER**
14. **INSTALL OIL PAN PROTECTOR**

Recommended Viscosity (SAE):



B00319

OIL AND FILTER INSPECTION

LU044-03

1. CHECK ENGINE OIL QUALITY

Check the oil for deterioration, entry of water, discoloring or thinning.

If oil quality is 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.

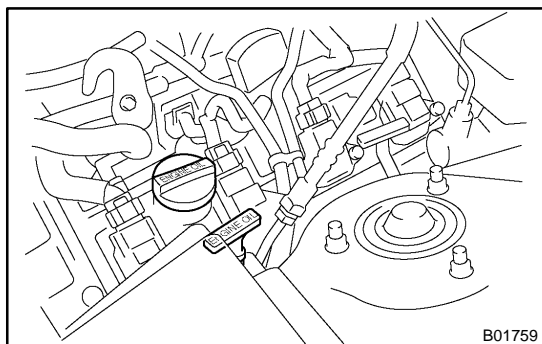
2. CHECK ENGINE OIL LEVEL

The oil level should be between the "L" and "F" marks on the dipstick.

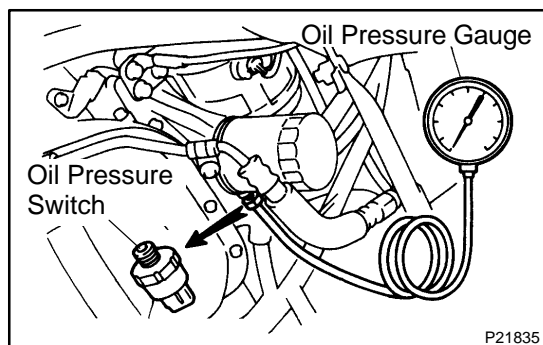
If low, check for leakage and add oil up to the "F" mark.

NOTICE:

- Do not fill with engine oil above the "F" mark.
 - Install the oil dipstick and oil filler cap facing the direction shown in the illustration.
3. REMOVE OIL PAN PROTECTOR
 4. REMOVE ENGINE UNDER COVER



B01759



P21835

5. REMOVE OIL PRESSURE SWITCH, AND INSTALL OIL PRESSURE GAUGE

6. WARM UP ENGINE

Allow the engine to warm up to normal operating temperature.

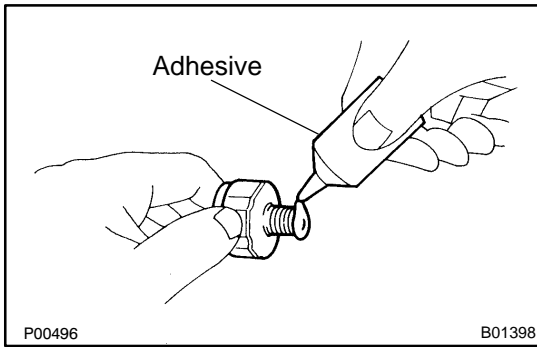
7. CHECK OIL PRESSURE

Oil pressure:

Idle	29 kPa (0.3 kgf/cm ² , 4.3 psi)
3,000 rpm	294 – 588 kPa (3.0 – 6.0 kgf/cm ² , 43 – 85 psi)

8. REMOVE OIL PRESSURE GAUGE, AND REINSTALL OIL PRESSURE SWITCH

- (a) Remove the oil pressure gauge.



- (b) Apply adhesive to 2 or 3 threads of the oil pressure switch.

Adhesive:

**Part No. 08833-00080, THREE BOND 1344,
LOCTITE 242 or equivalent**

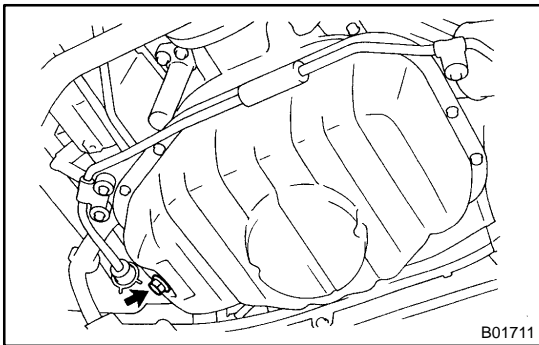
- (c) Install the oil pressure switch.

- 9. START ENGINE, AND CHECK FOR OIL LEAKS**
- 10. REINSTALL ENGINE UNDER COVER**
- 11. REINSTALL OIL PAN PROTECTOR**

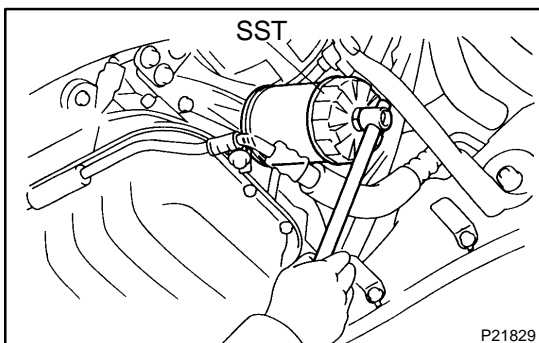
REPLACEMENT

CAUTION:

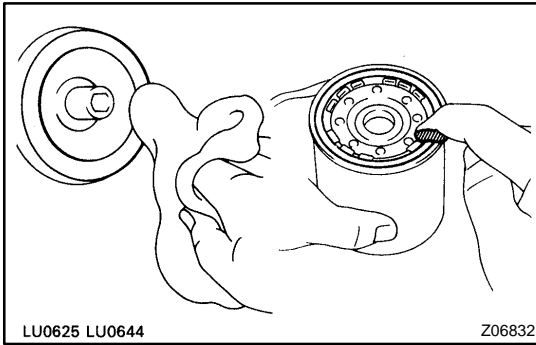
- Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
 - Care should be taken, therefore, when changing 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. **REMOVE OIL PAN PROTECTOR**
 2. **REMOVE ENGINE UNDER COVER**
 3. **DRAIN ENGINE OIL**
 - (a) Remove the oil filler cap.



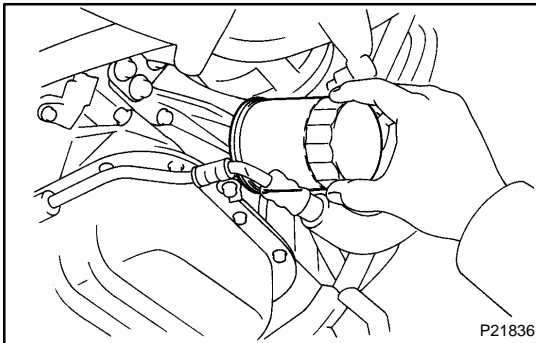
- (b) Remove the oil drain plug, and drain the oil into a container.



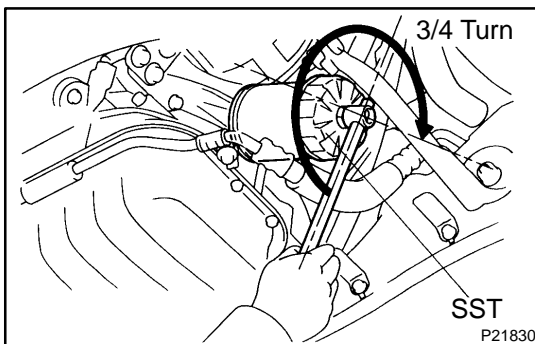
4. **REPLACE OIL FILTER**
 - (a) Using SST, remove the oil filter.
SST 09228-07501



- (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

5. REFILL WITH ENGINE OIL

- (a) Clean the drain plug, and install a new gasket and it.
- (b) Fill with new engine oil.

Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

Oil grade: See step 1 in oil pressure check

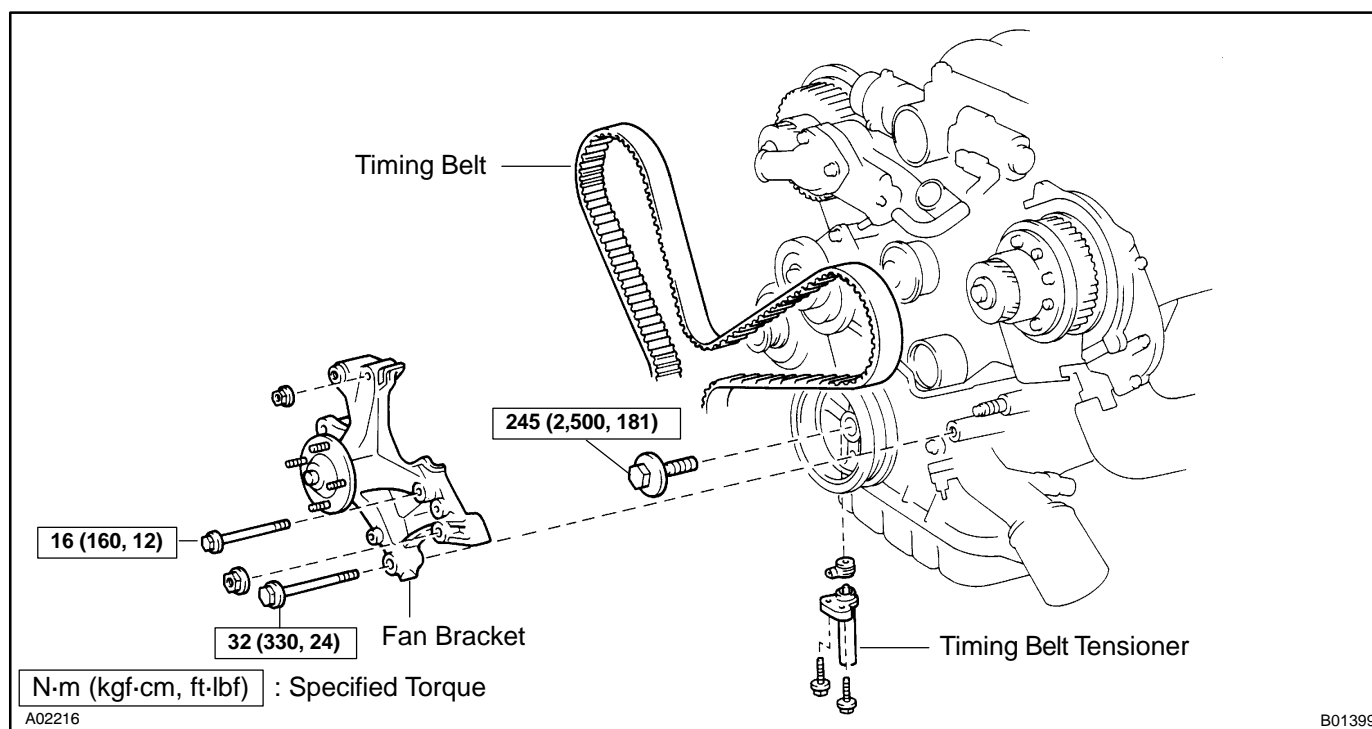
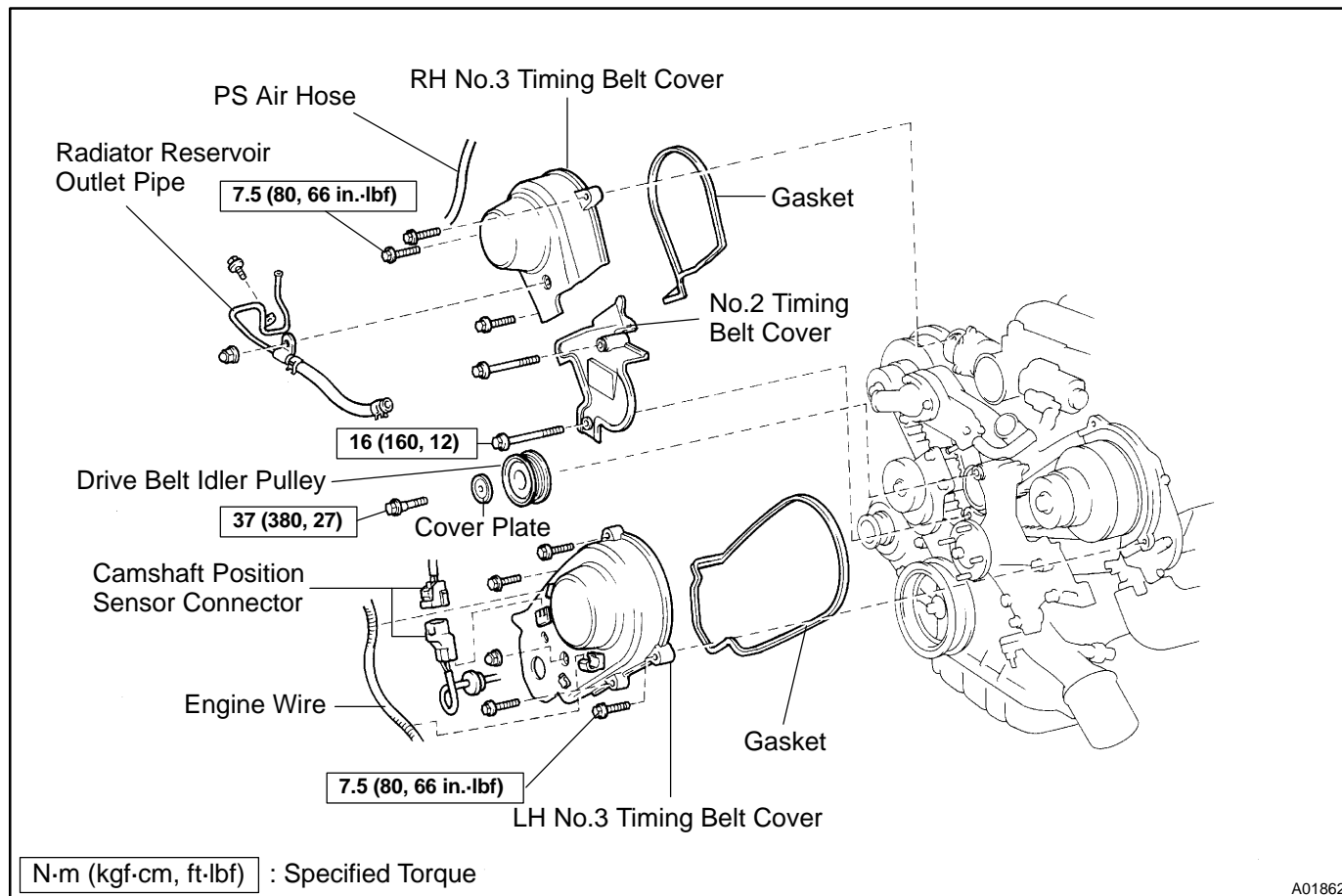
Capacity:

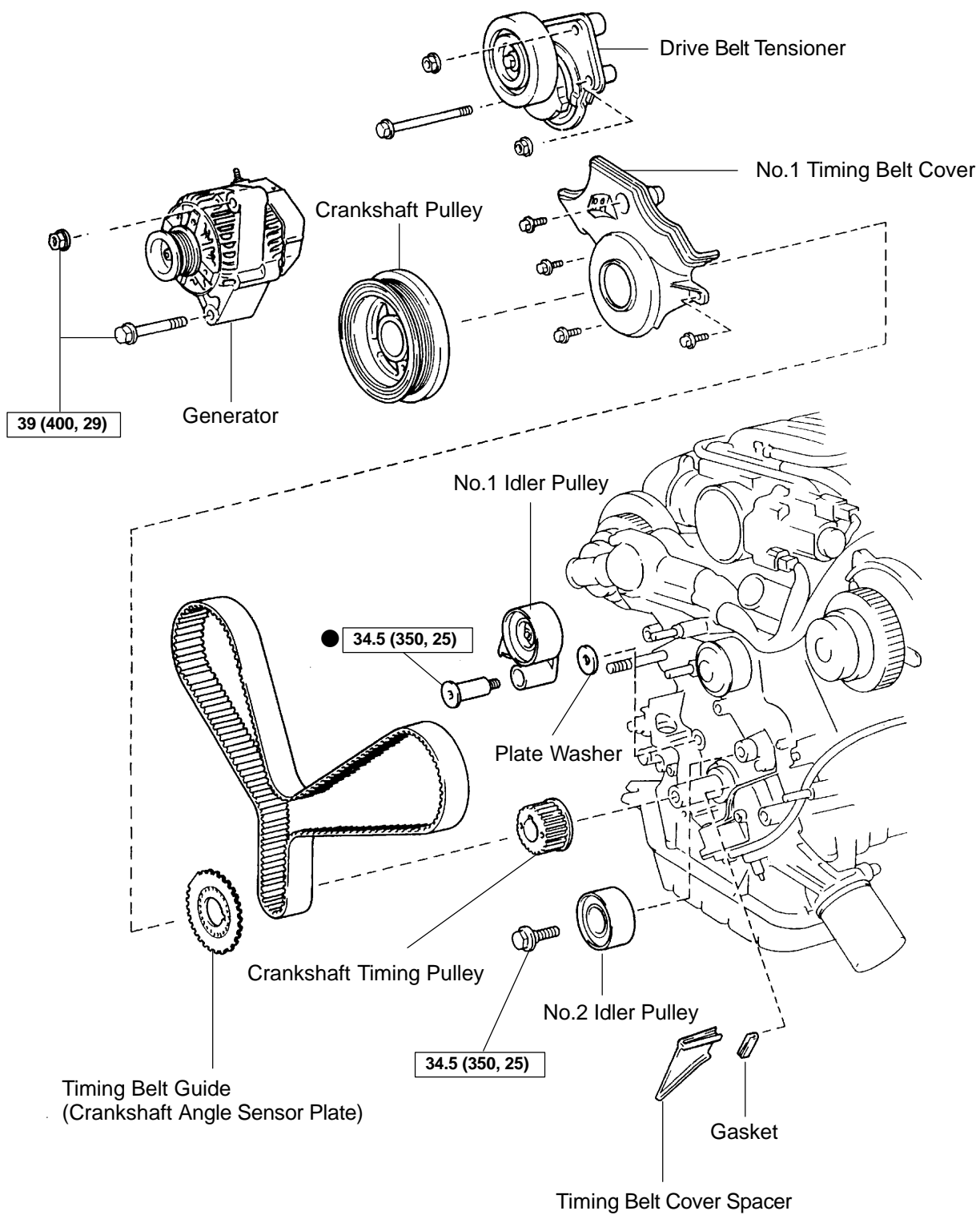
Dry fill	7.0 liters (7.4 US qts, 6.2 Imp. qts)
Drain and refill	
w/ Oil filter change	5.6 liters (5.9 US qts, 4.9 Imp. qts)
w/o Oil filter change	5.3 liters (5.6 US qts, 4.7 Imp. qts)

- (c) Reinstall the oil filler cap.
- 6. **START ENGINE AND CHECK FOR OIL LEAKS**
- 7. **RECHECK ENGINE OIL LEVEL**
- 8. **REINSTALL ENGINE UNDER COVER**
- 9. **REINSTALL OIL PAN PROTECTOR**

OIL PUMP COMPONENTS

LU046-02

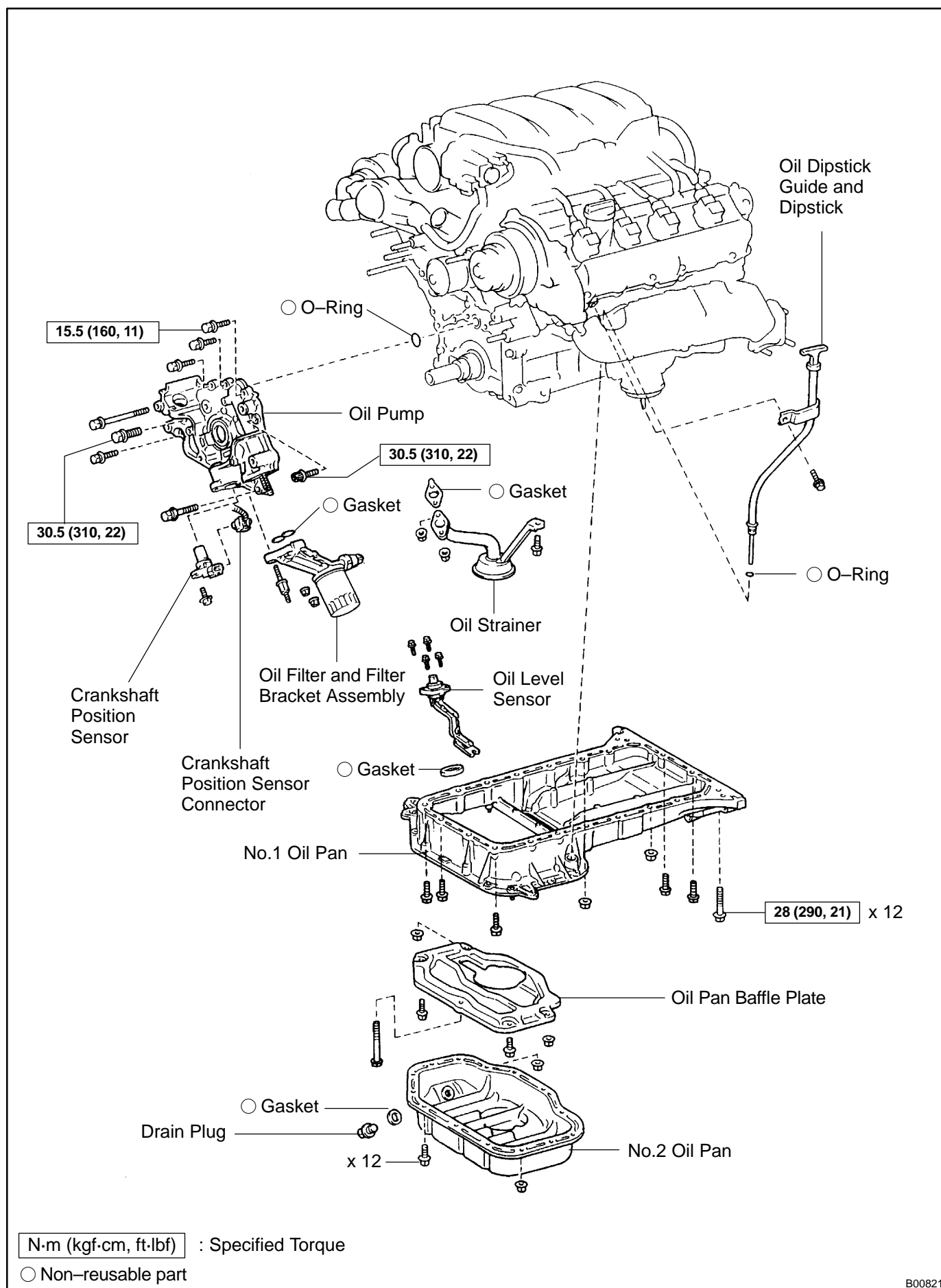




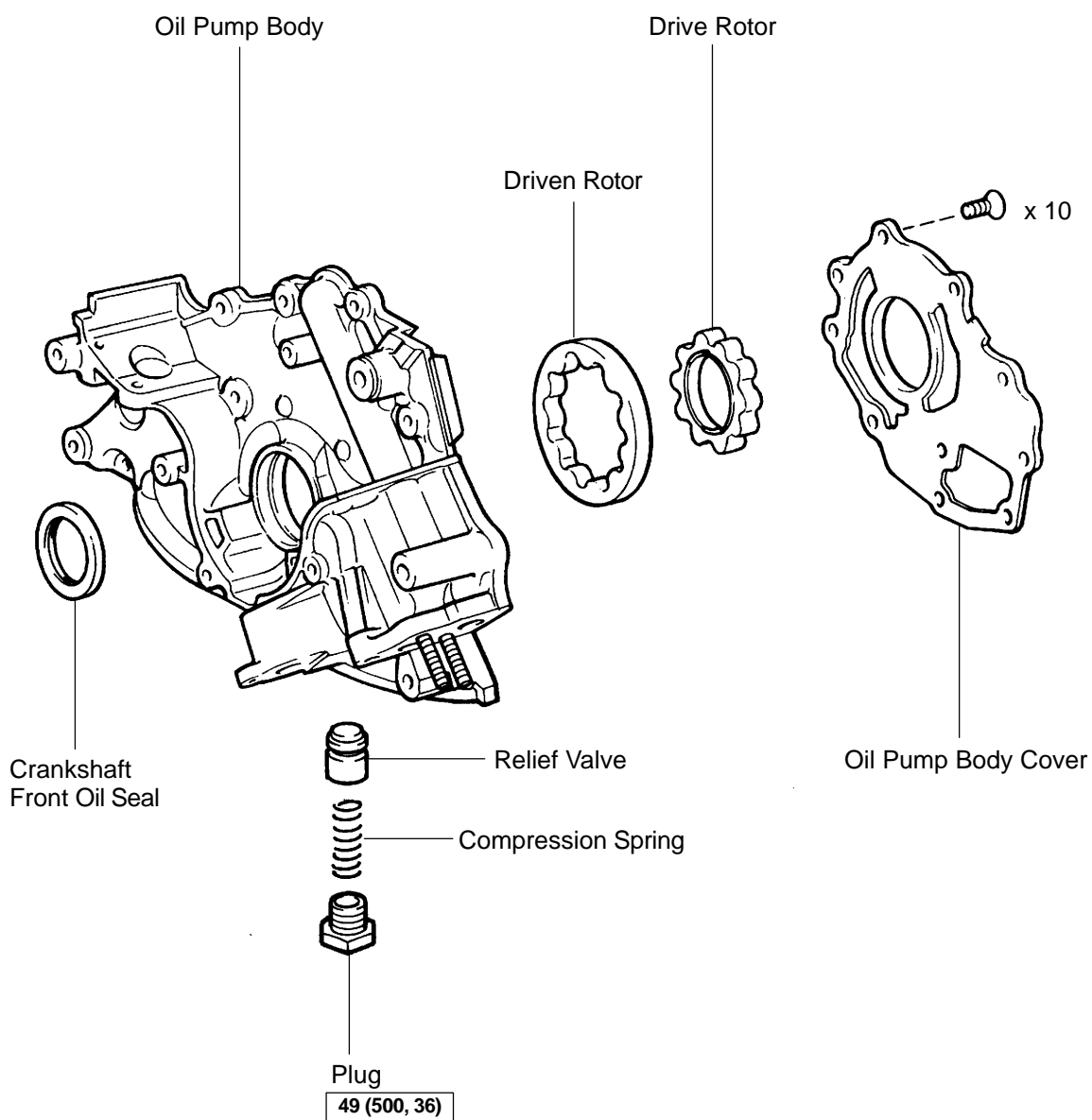
N·m (kgf-cm, ft-lbf) : Specified Torque

● Precoated part

B01712



B00821



N·m (kgf·cm, ft·lbf) : Specified Torque

○ Non-reusable part

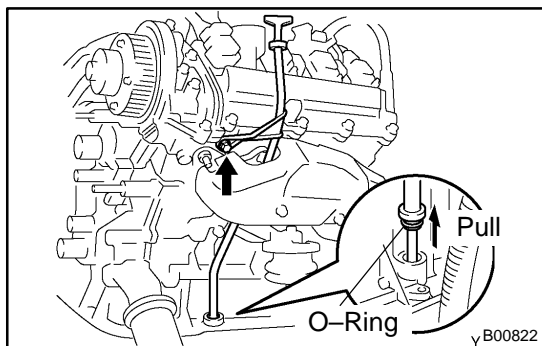
B00952

REMOVAL

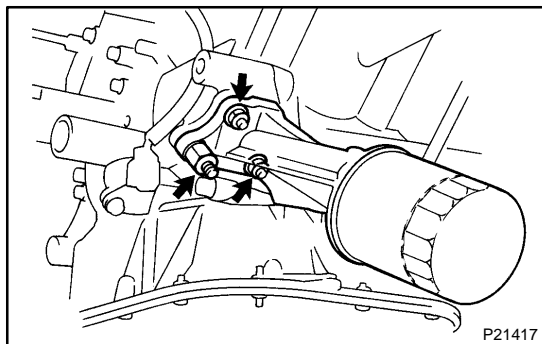
HINT:

When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

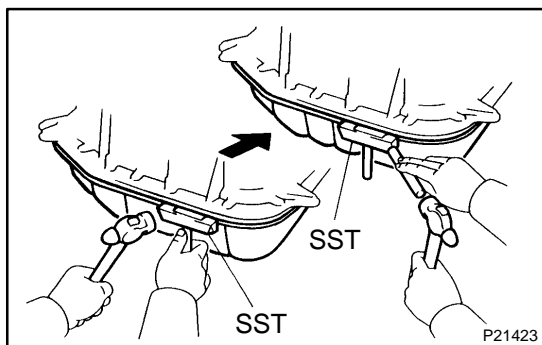
1. **REMOVE ENGINE FROM BODY** (See page [EM-77](#))
2. **SEPARATE ENGINE AND TRANSMISSION**
(See page [EM-77](#))
3. **INSTALL ENGINE TO ENGINE STAND FOR DIS-ASSEMBLY**
4. **REMOVE TIMING BELT** (See page [EM-15](#))
5. **REMOVE NO.2 AND NO.1 IDLER PULLEYS**
(See page [EM-15](#))
6. **REMOVE CRANKSHAFT TIMING PULLEY**
(See page [EM-15](#))



7. **REMOVE OIL DIPSTICK AND GUIDE**
 - (a) Remove the bolt holding the oil dipstick to the LH cylinder head.
 - (b) Pull out the dipstick guide together with the dipstick from the No.1 oil pan.
 - (c) Remove the O-ring from the dipstick guide.
8. **REMOVE OIL LEVEL SENSOR**



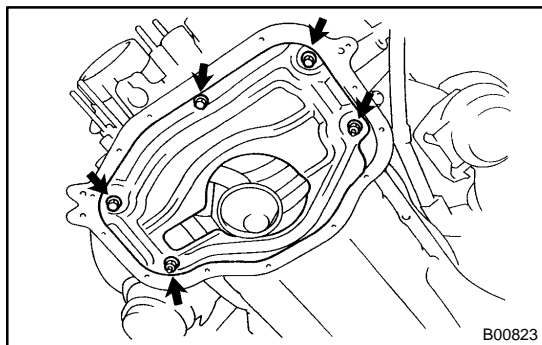
9. **REMOVE OIL FILTER AND FILTER BRACKET ASSEMBLY**
 - (a) Remove the stud bolt, 2 nuts, the oil filter and filter bracket assembly.
 - (b) Remove the gasket from the filter bracket.
10. **REMOVE CRANKSHAFT POSITION SENSOR**
11. **REMOVE NO.2 OIL PAN**
 - (a) Remove the 12 bolts and 2 nuts.



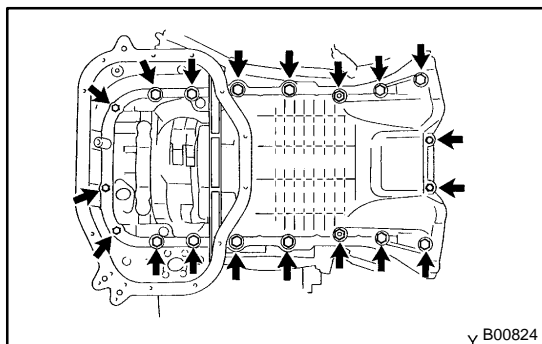
- (b) Insert the blade of SST between the No.1 and No.2 oil pans, cut off applied sealer and remove the No.2 oil pan.
SST 09032-00100

NOTICE:

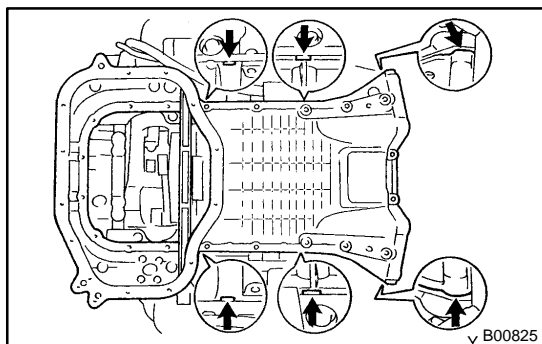
- Be careful not to damage the No.2 oil pan contact surface of the No.1 oil pan.
- Be careful not to damage the No.2 oil pan flange.

**12. REMOVE OIL PAN BAFFLE PLATE**

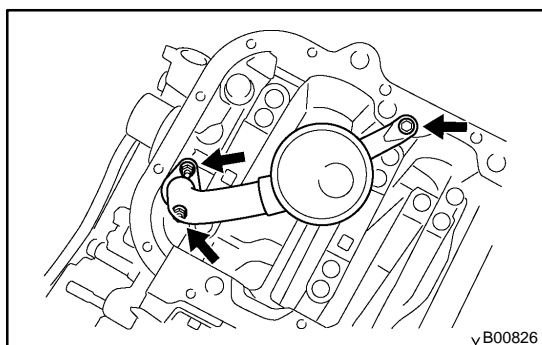
Remove the 3 bolts, 2 nuts and baffle plate.

**13. REMOVE NO.1 OIL PAN**

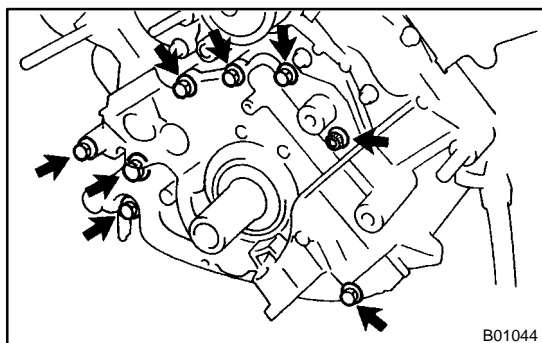
(a) Remove the 17 bolts and 2 nuts.



(b) Using a screwdriver, remove the No.1 oil pan by prying between the oil pan and cylinder block in the sequence shown.

**14. REMOVE OIL STRAINER**

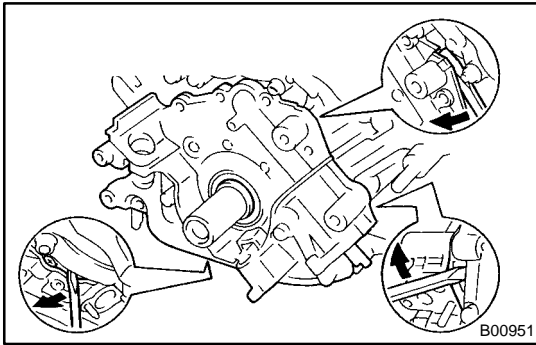
Remove the bolt, 2 nuts, oil strainer and gasket.

**15. REMOVE OIL PUMP**

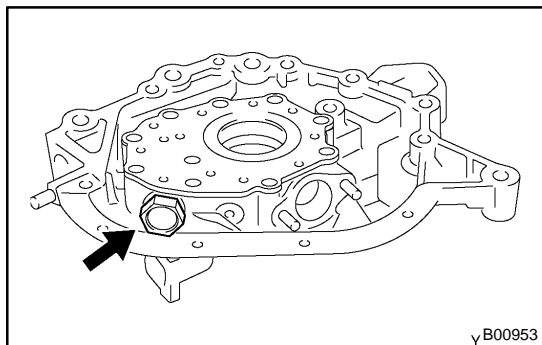
(a) Remove the 8 bolts.

HINT:

Use a 6 mm hexagon socket wrench for hexagon socket head bolt.



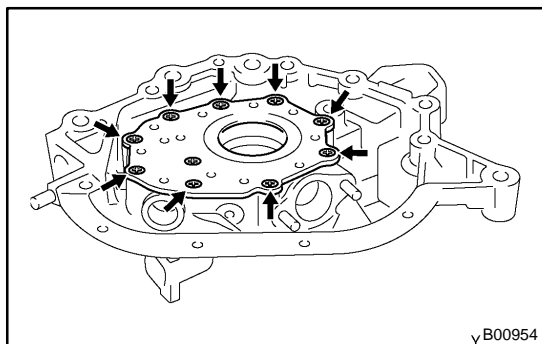
- (b) Using a screwdriver, remove the oil pump by prying the portions between the oil pump and cylinder block.
- (c) Remove the O-ring from the cylinder block.



DISASSEMBLY

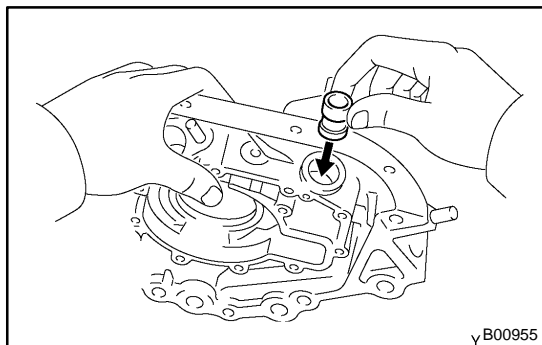
1. REMOVE RELIEF VALVE

Remove the plug, compression spring and relief valve.



2. REMOVE DRIVE AND DRIVEN ROTORS

Remove the 10 screws, pump body cover, the drive and driven rotors.



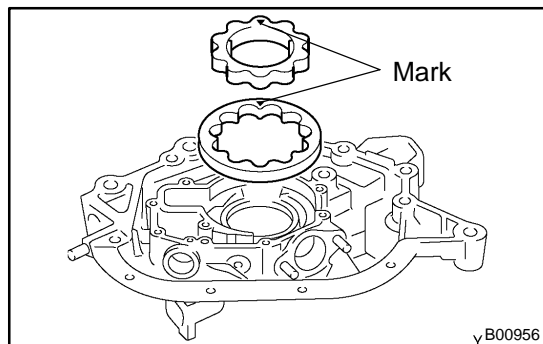
√B00955

INSPECTION

1. INSPECT RELIEF VALVE

Coat the valve with engine oil and check that it falls smoothly into the valve hole by its own weight.

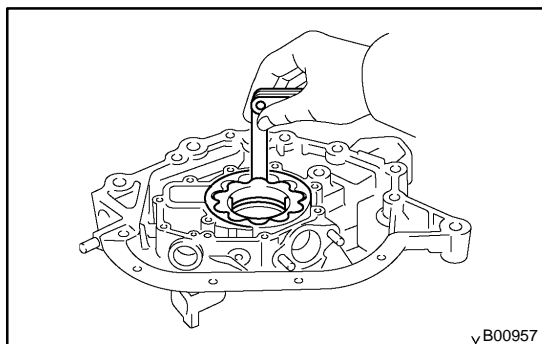
If it doesn't, replace the relief valve. If necessary, replace the oil pump assembly.



√B00956

2. PLACE DRIVE AND DRIVEN ROTORS INTO OIL PUMP BODY

Place the drive and driven rotors into the oil pump body with the mark facing upward.



√B00957

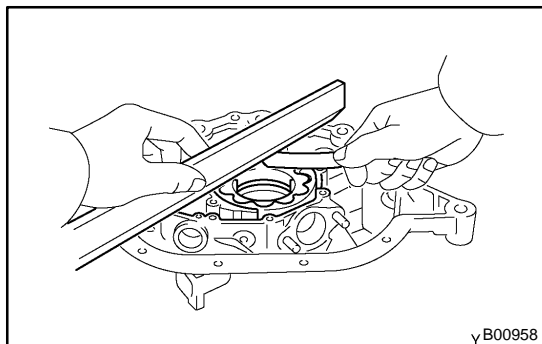
3. INSPECT ROTOR TIP CLEARANCE

Using a feeler gauge, measure the clearance between the drive and driven rotor tips.

Tip clearance:

Standard	0.060 – 0.180 mm (0.0024 – 0.0071 in.)
Maximum	0.18 mm (0.0071 in.)

If the tip clearance is greater than maximum, replace the rotors as a set.



√B00958

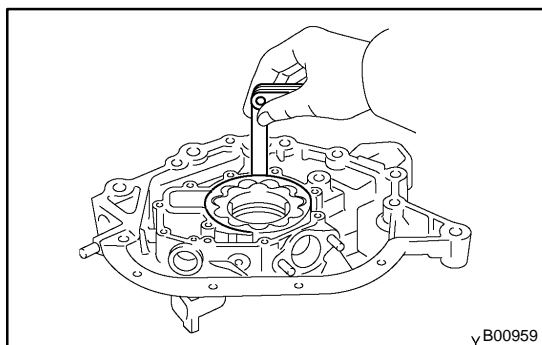
4. INSPECT ROTOR SIDE CLEARANCE

Using a feeler gauge and precision straight edge, measure the clearance between the rotors and precision straight edge.

Side clearance:

Standard	0.030 – 0.090 mm (0.0012 – 0.0035 in.)
Maximum	0.09 mm (0.0035 in.)

If the side clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.



√B00959

5. INSPECT ROTOR BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven rotor and body.

Body clearance:

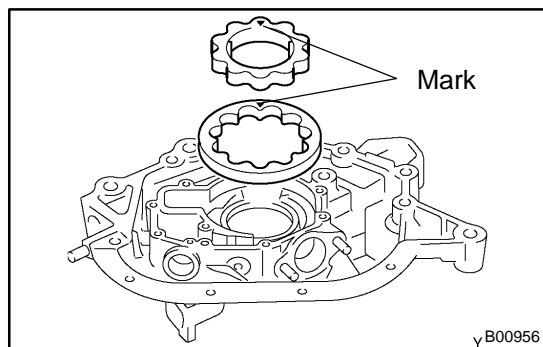
Standard	0.250 – 0.325 mm (0.0098 – 0.0127 in.)
Maximum	0.325 mm (0.0127 in.)

If the body clearance is greater than maximum, replace the rotors as a set. If necessary, replace the oil pump assembly.

6. REMOVE DRIVE AND DRIVEN ROTORS

REPLACEMENT

REPLACE CRANKSHAFT FRONT OIL SEAL (See page [EM-107](#))

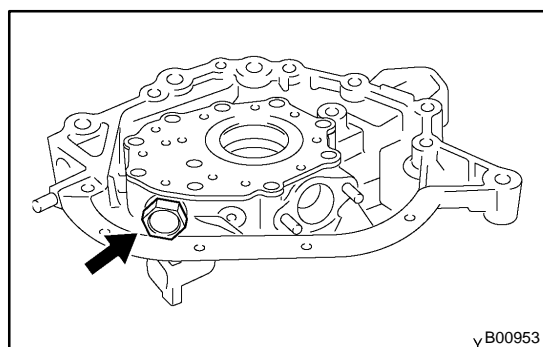


REASSEMBLY

1. INSTALL DRIVE AND DRIVEN ROTORS

- (a) Place the drive and driven rotors into pump body with the marks facing the pump body cover side.
- (b) Install the oil pump body cover with the 10 screws.

Torque: 10 N·m (105 kgf-cm, 7 ft-lbf)



2. INSTALL RELIEF VALVE

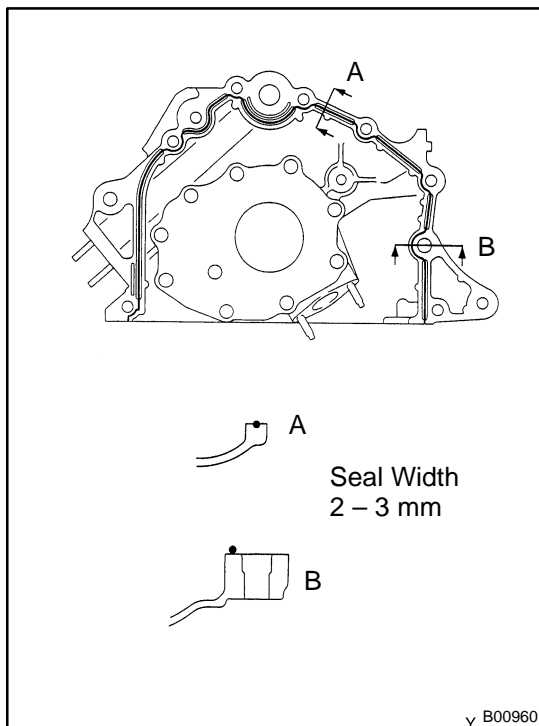
- (a) Insert the relief valve, compression spring into the oil pump body hole:
- (b) Install the plug.

Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)

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 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 pump as shown in the illustration.

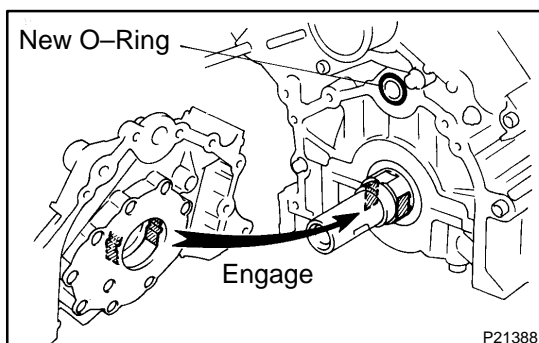
Seal packing:

Part No. 08826-00080 or equivalent

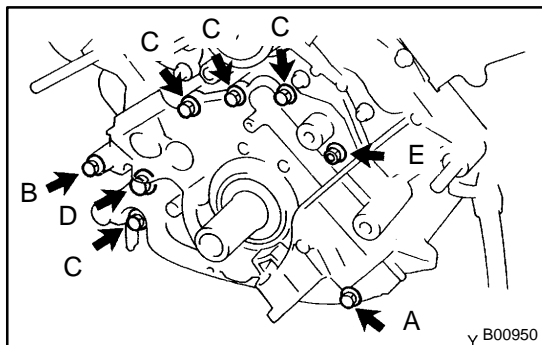
NOTICE:

Avoid applying an excessive amount to the surface. Be particularly careful near oil passage.

- 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 a new O-ring to the cylinder block.
- (d) Engage the spline teeth of the oil pump drive gear with the large teeth of the crankshaft, and slide the oil pump on the crankshaft.



- (e) Install the oil pump with the 8 bolts. Uniformly tighten the bolts in several passes.

Torque:

12 mm head:

15.5 N·m (160 kgf·cm, 11 ft·lbf)

14 mm and 6 mm hexagon socket head

30.5 N·m (310 kgf·cm, 22 ft·lbf)

HINT:

- Use a 6mm hexagon wrench for the hexagon socket head bolt.
- Each bolt length is indicated in the illustration.
Bolt length:
50 mm (1.97 in.) for A of 12 mm head
106 mm (4.17 in.) for B of 12 mm head
30 mm (1.18 in.) for C of 12 mm head
44 mm (1.73 in.) for D of 14 mm head
28 mm (1.10 in.) for E of 6 mm hexagon socket head

2. INSTALL OIL STRAINER

Install a new gasket and the oil strainer with the bolt and 2 nuts.

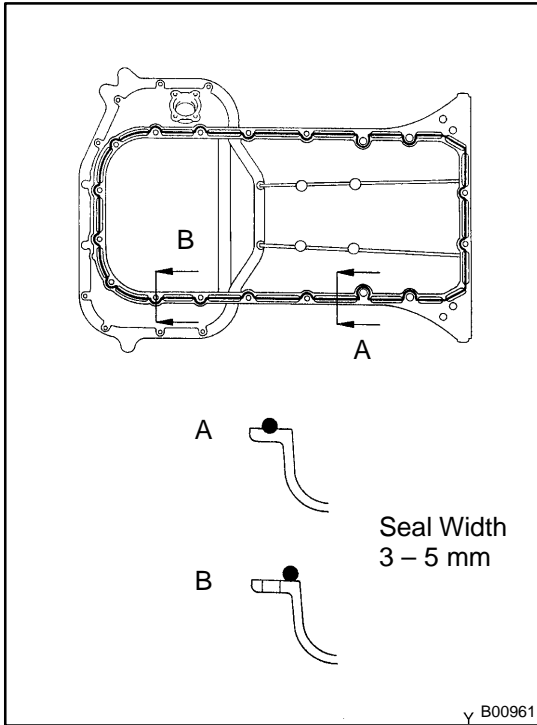
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

HINT:

Use bolt 12 mm (0.47 in.) in length.

3. INSTALL NO.1 OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 oil pan, cylinder block, oil pump and rear oil seal retainer.
- 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.

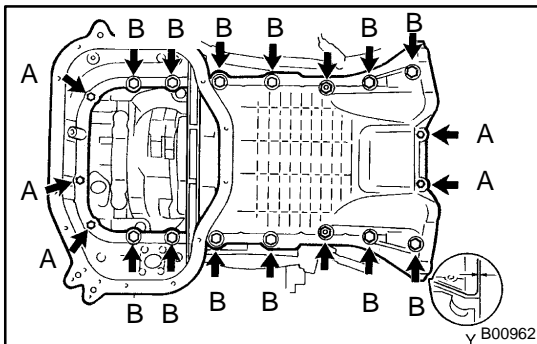


- (b) Apply seal packing to the No.1 oil pan as shown in the illustration.

Seal packing:

Part No. 08826-00080 or equivalent

- Install a nozzle that has been cut to a 3 – 5 mm (0.12 – 0.20 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) Temporarily install the No.1 oil pan with the 17 bolts, stud bolt and 2 nuts.

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

35 mm (1.38 in.) for A of 10 mm head

56 mm (2.21 in.) for B of 12 mm head

- (d) Set the No.1 oil pan as shown in the illustration.

NOTICE:

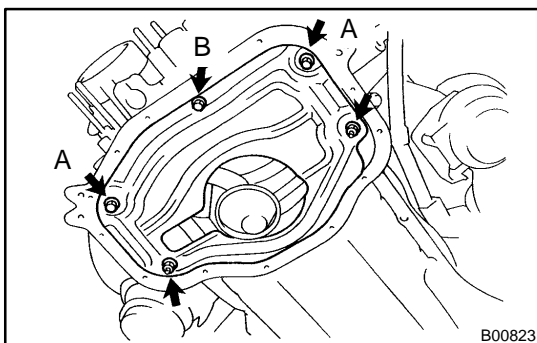
Make sure the clearance between the rear ends of the No.1 oil pan and cylinder block is 0.2 mm (0.008 in.) or less. If the clearance is more than 0.2 mm (0.008 in.), the No.1 oil pan will be stretched.

- (e) Uniformly tighten the bolts, stud bolts and nuts in several passes.

Torque:

10 mm head: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

12 mm head: 28 N·m (290 kgf·cm, 21 ft-lbf)



4. INSTALL OIL PAN BAFFLE PLATE

Install the baffle plate with the 3 bolts and 2 nuts.

Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

HINT:

Each bolt length is indicated in the illustration.

Bolt length:

12 mm (0.47 in.) for A

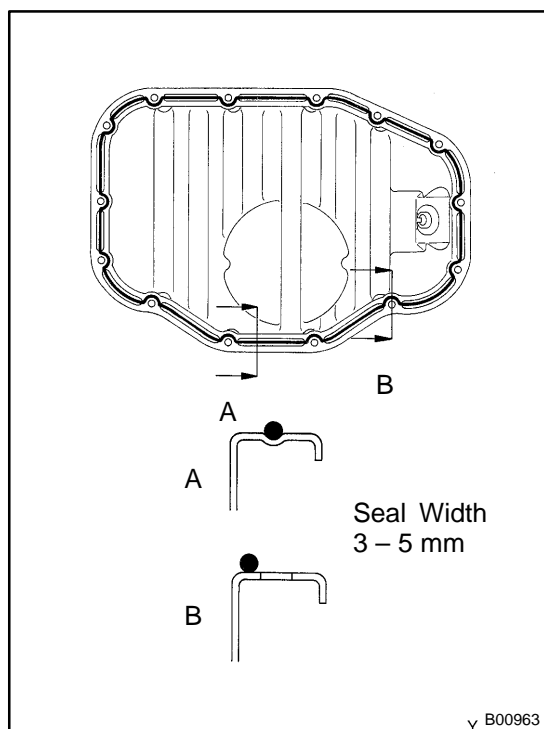
80 mm (3.15 in.) for B

5. INSTALL NO.2 OIL PAN

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the No.1 and No.2 oil pans.
- 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.

NOTICE:

Do not use a solvent which will affect the painted surfaces.



- (b) Apply seal packing to the No.2 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 – 5 mm (0.12 – 0.20 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 No.2 oil pan with the 12 bolts and 2 nuts. Uniformly tighten the bolts and nuts in several passes.
- Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)**

HINT:

Use bolts 14 mm (0.55 in.) in length.

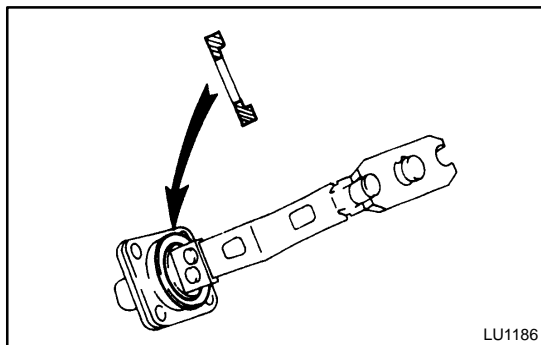
6. INSTALL CRANKSHAFT POSITION SENSOR

(See page [IG-13](#))

7. INSTALL OIL FILTER AND FILTER BRACKET ASSEMBLY

- (a) Install the a new gasket to the oil filter bracket.
- (b) Install the oil filter and filter bracket assembly with the stud bolt and 2 nuts.

Torque: 18 N·m (185 kgf·cm, 13 ft-lbf)



8. INSTALL OIL LEVEL SENSOR

- (a) Install a new gasket to the level sensor.

NOTICE:

Be careful of the installation direction.

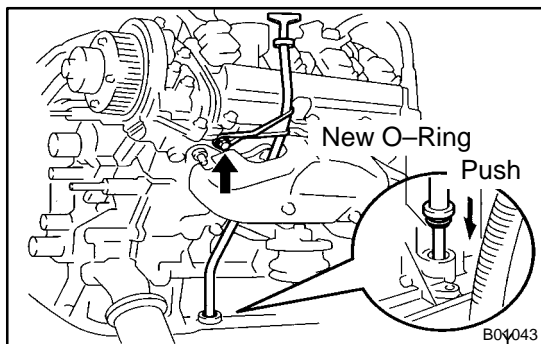
- (b) Install the level sensor with the 4 bolts.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

Use bolts 16 mm (0.63 in.) in length.

- (c) Connect the level sensor connector.



9. INSTALL OIL DIPSTICK GUIDE AND DIPSTICK

- (a) Install a new O-ring to the dipstick guide.

- (b) Apply soapy water to the O-ring.

- (c) Push in the dipstick guide end into the guide hole of the No.1 oil pan.

- (d) Install the dipstick guide with the bolt.

- (e) Install the dipstick.

10. INSTALL CRANKSHAFT TIMING PULLEY

(See page [EM-22](#))

11. INSTALL NO.1 AND NO.2 IDLER PULLEYS

(See page [EM-22](#))

12. INSTALL TIMING BELT (See page [EM-22](#))

13. DISCONNECT ENGINE FROM ENGINE STAND

14. REASSEMBLE ENGINE AND TRANSMISSION

(See page [EM-82](#))

15. INSTALL ENGINE TO BODY (See page [EM-82](#))

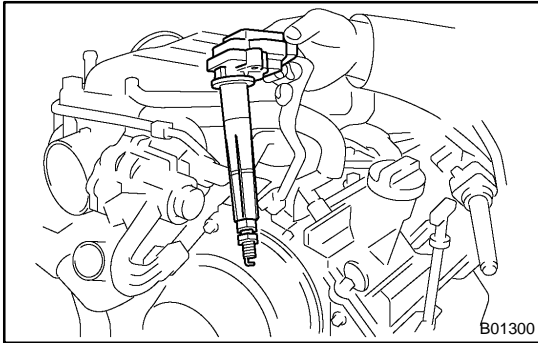
IGNITION SYSTEM

ON-VEHICLE INSPECTION

IG04M-02

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).



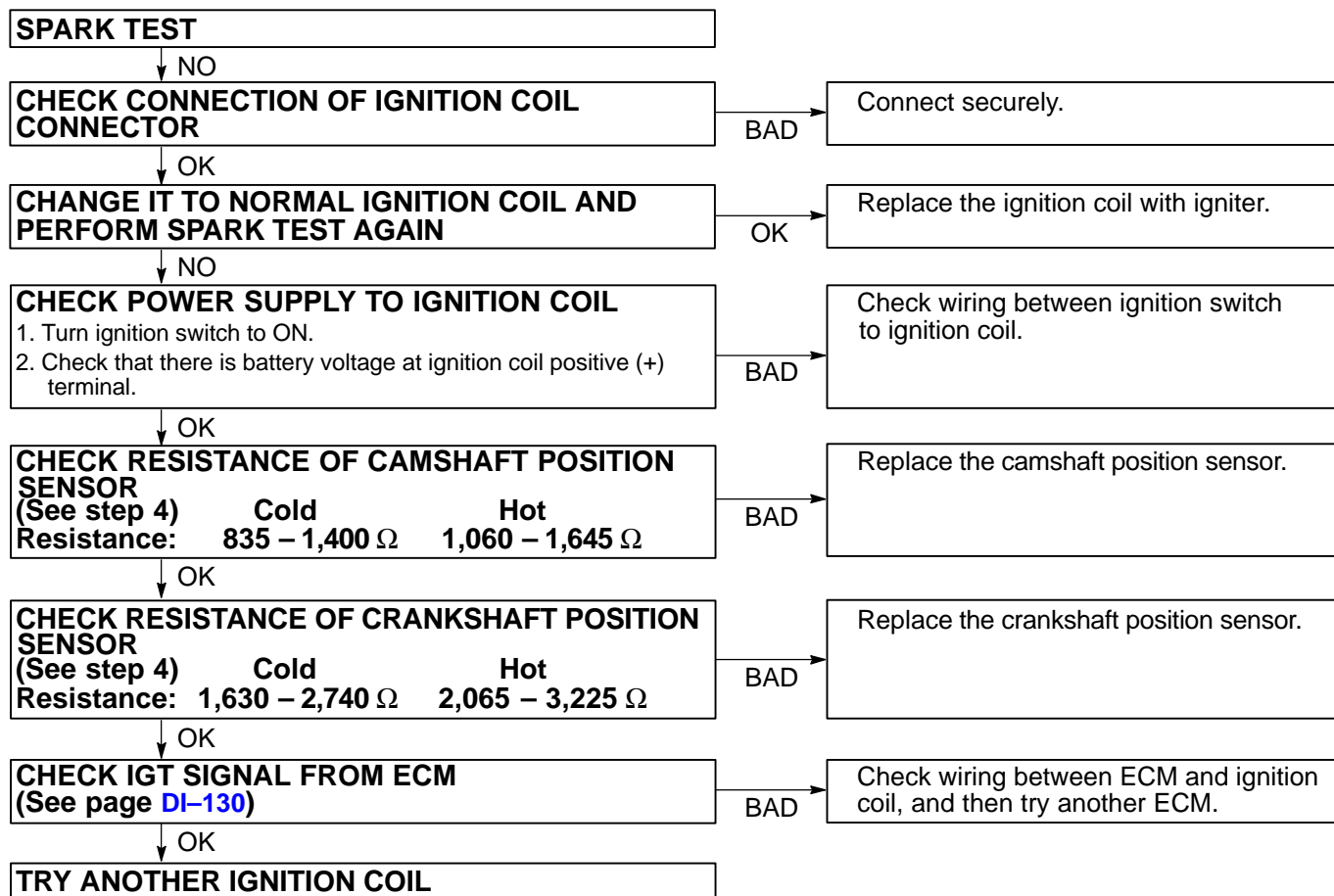
1. INSPECT IGNITION COIL WITH IGNITER AND SPARK TEST

Check that the spark occurs.

- (1) Remove the ignition coils. (See page [IG-7](#))
- (2) Using a 16 mm plug wrench, remove the spark plugs.
- (3) Install the spark plugs to each ignition coil, and connect the ignition coil connector.
- (4) Disconnect the injector connector.
- (5) Ground the spark plug.
- (6) Check if spark occurs while engine is being cranked.

NOTICE:

To prevent gasoline from being injected from injectors during this test, crank the engine for no more than 5 – 10 seconds at time. If the spark does not occur, do the test as follows:



(7) Using a 16 mm plug wrench, install the spark plugs.

Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)

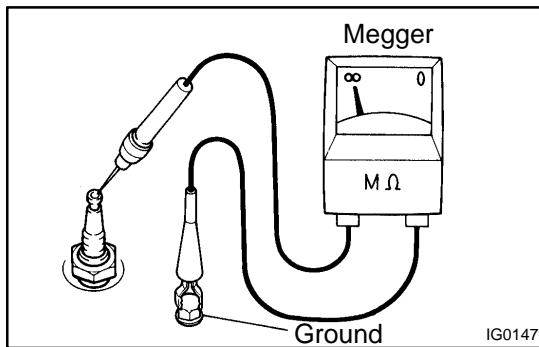
(8) Reinstall the ignition coil. (See page [IG-8](#))

2. INSPECT SPARK PLUGS

NOTICE:

- Never use a wire brush for cleaning.
- Never attempt to adjust the electrode gap on used spark plug.
- Spark plug should be replaced every 144,000 km (90,000 miles).

(a) Remove the ignition coils. (See page [IG-7](#))



(b) Check the electrode.

- Using a megger (insulation resistance meter), measure the insulation resistance.

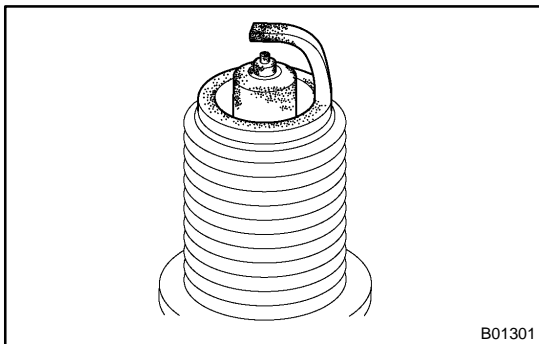
Correct insulation resistance: 10 MΩ or more

If the resistance is less than specified, proceed to step (d).

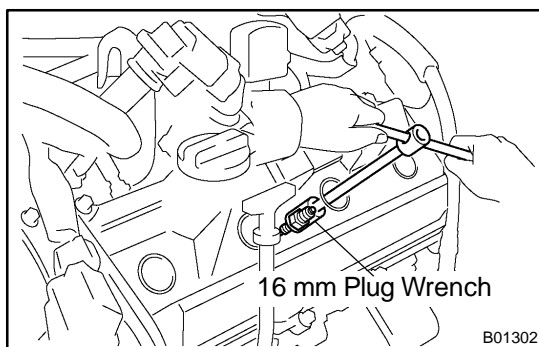
HINT:

If a megger is not available, the following simple method of inspection provides fairly accurate results.

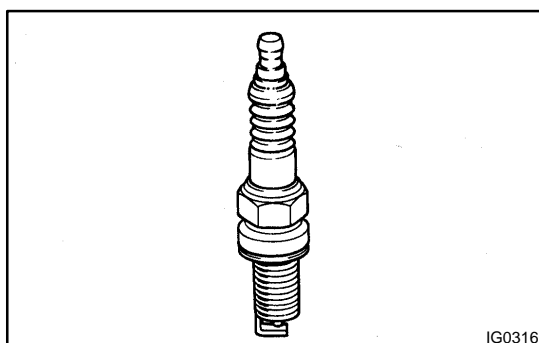
- Simple Method:
 - Quickly race the engine to 4,000 rpm 5 times.
 - Remove the spark plug. (See step (c))



- Visually check the spark plug.
If the electrode is dry ... Okay.
If the electrode is wet ... Proceed to step (d).
- Reinstall the spark plug. (See step (g))



(c) Using a 16 mm plug wrench, remove the spark plugs.

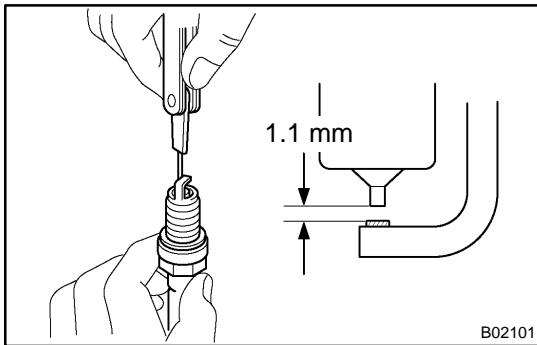


(d) Check the spark plug for thread damage and insulator damage.

If abnormal, replace the spark plug.

Recommended spark plug:

DENSO made	SK20R11
NGK made	IFR6A11



- (e) Check the spark plug electrode gap.

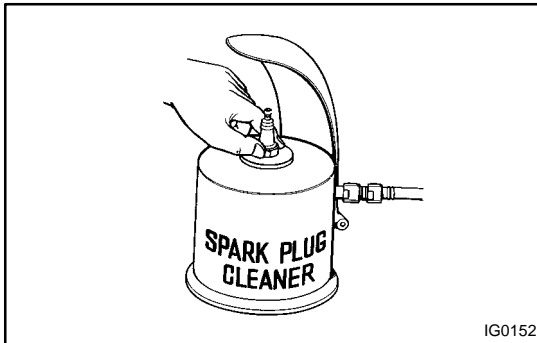
Maximum electrode gap for used spark plug:
1.2 mm (0.047 in.)

If the gap is greater than maximum, replace the spark plug.

Correct electrode gap for new spark plug:
1.1 mm (0.043 in.)

NOTICE:

If adjusting the gap of a new spark plug, bend only the base of the ground electrode. Do not touch the tip. Never attempt to adjust the gap on a used plug.



- (f) Clean the spark plugs.

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/cm², 85 psi)

Duration:

20 seconds or less

HINT:

If there are traces of oil, remove it with gasoline before using the spark plug cleaner.

- (g) Using a 16 mm plug wrench, install the spark plugs.

Torque: 17.5 N·m (180 kgf·cm, 13 ft·lbf)

- (h) Reinstall the ignition coils. (See page [IG-8](#))

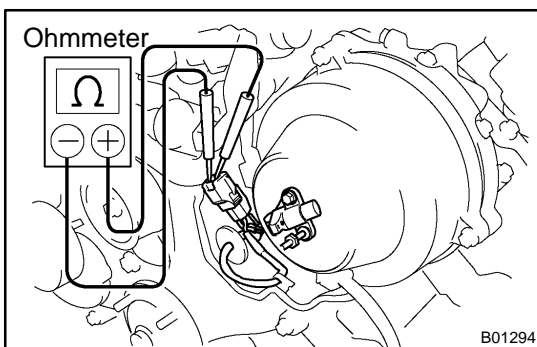
3. INSPECT CAMSHAFT POSITION SENSOR

- (a) Remove the V-bank cover.

- (b) Remove the battery clamp cover.

- (c) Remove the air cleaner inlet.

- (d) Disconnect the camshaft position sensor connector.



- (e) Using an ohmmeter, measure the resistance between terminals.

Resistance:

Cold	835 – 1,400 Ω
Hot	1,060 – 1,645 Ω

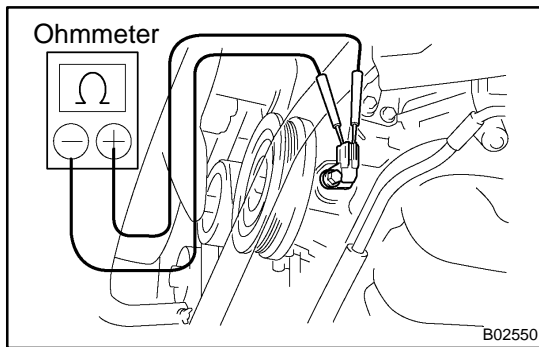
If the resistance is not as specified, replace the camshaft position sensor.

- (f) Reconnect the camshaft position sensor connector.

- (g) Reinstall the air cleaner inlet.

- (h) Reinstall the battery clamp cover.

- (i) Reinstall the V-bank cover.

**4. INSPECT CRANKSHAFT POSITION SENSOR**

- (a) Remove the oil pan protector and engine under cover.
- (b) Using an ohmmeter, measure the resistance between terminals.

Resistance:

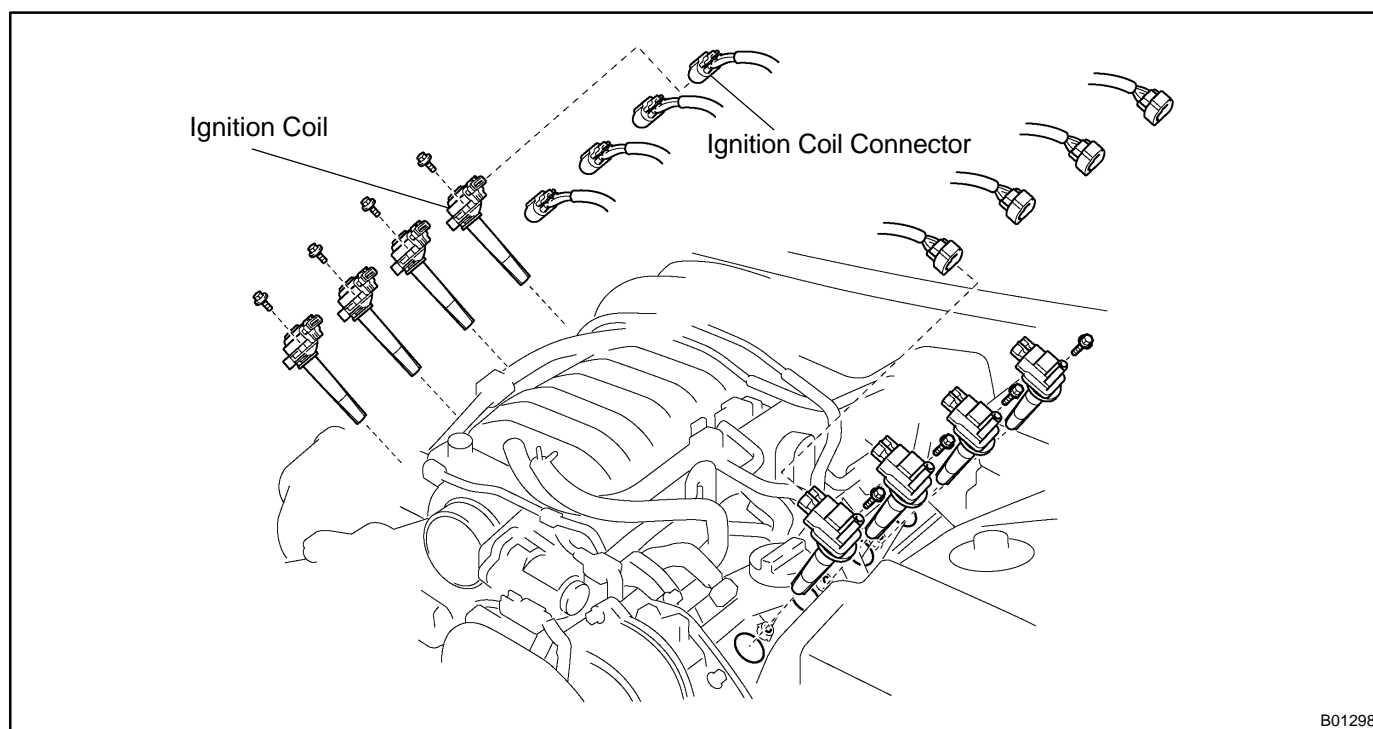
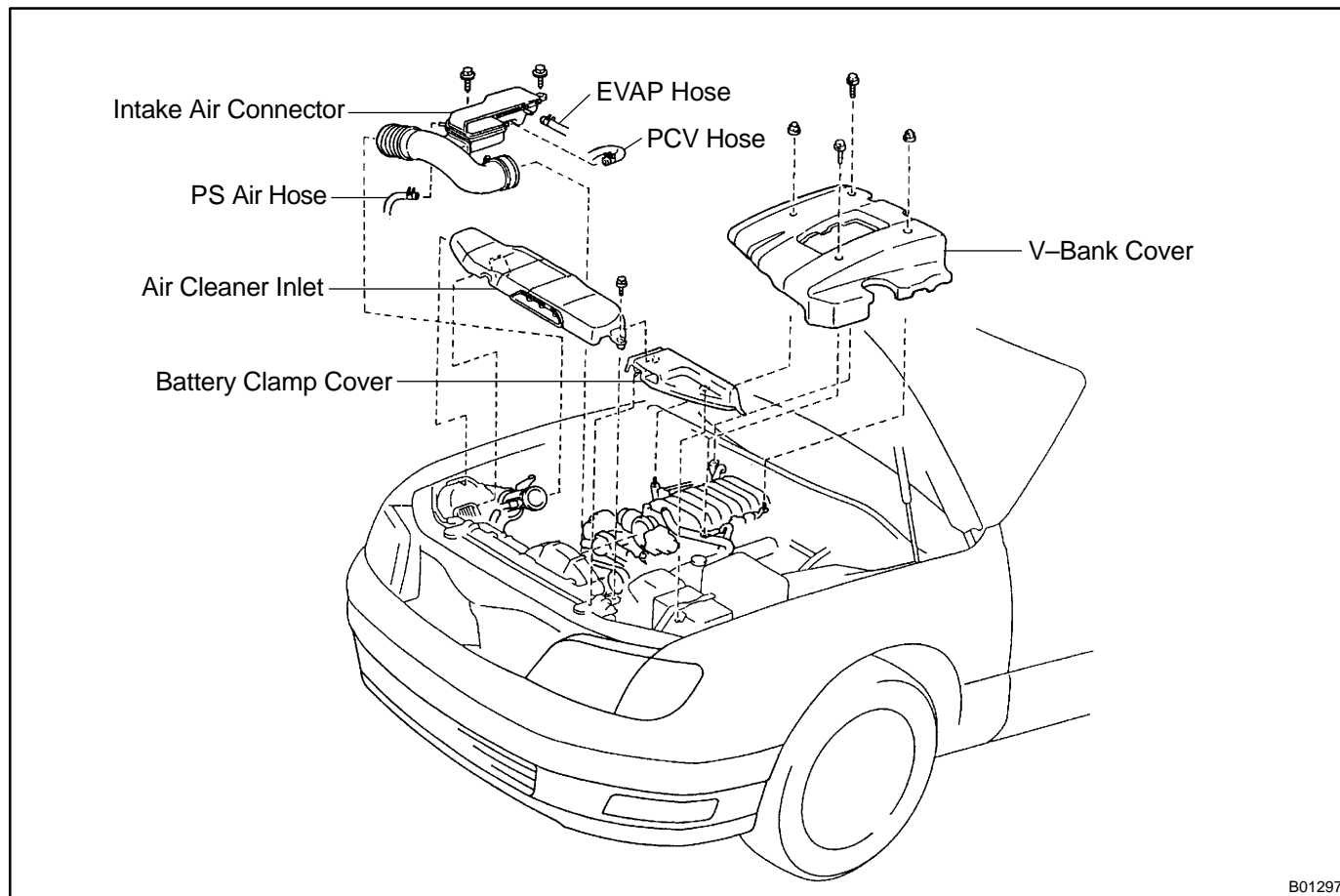
Cold	1,630 – 2,740 Ω
Hot	2,065 – 3,225 Ω

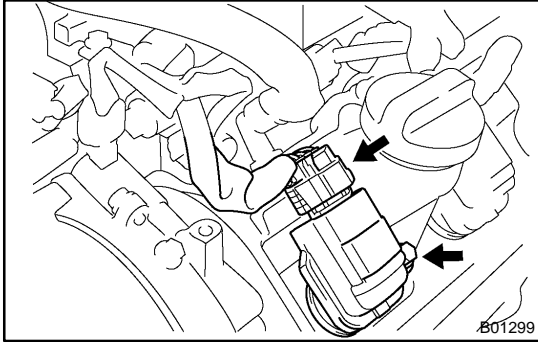
If the resistance is not as specified, replace the crankshaft position sensor.

- (c) Reinstall the engine under cover and oil pan protector.

IGNITION COIL COMPONENTS

IG04N-02





REMOVAL

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER
3. REMOVE AIR CLEANER INLET
4. REMOVE INTAKE AIR CONNECTOR
5. DISCONNECT IGNITION COIL CONNECTORS
6. REMOVE IGNITION COILS FROM SPARK PLUGS

Remove the 8 bolt and 8 ignition coils.

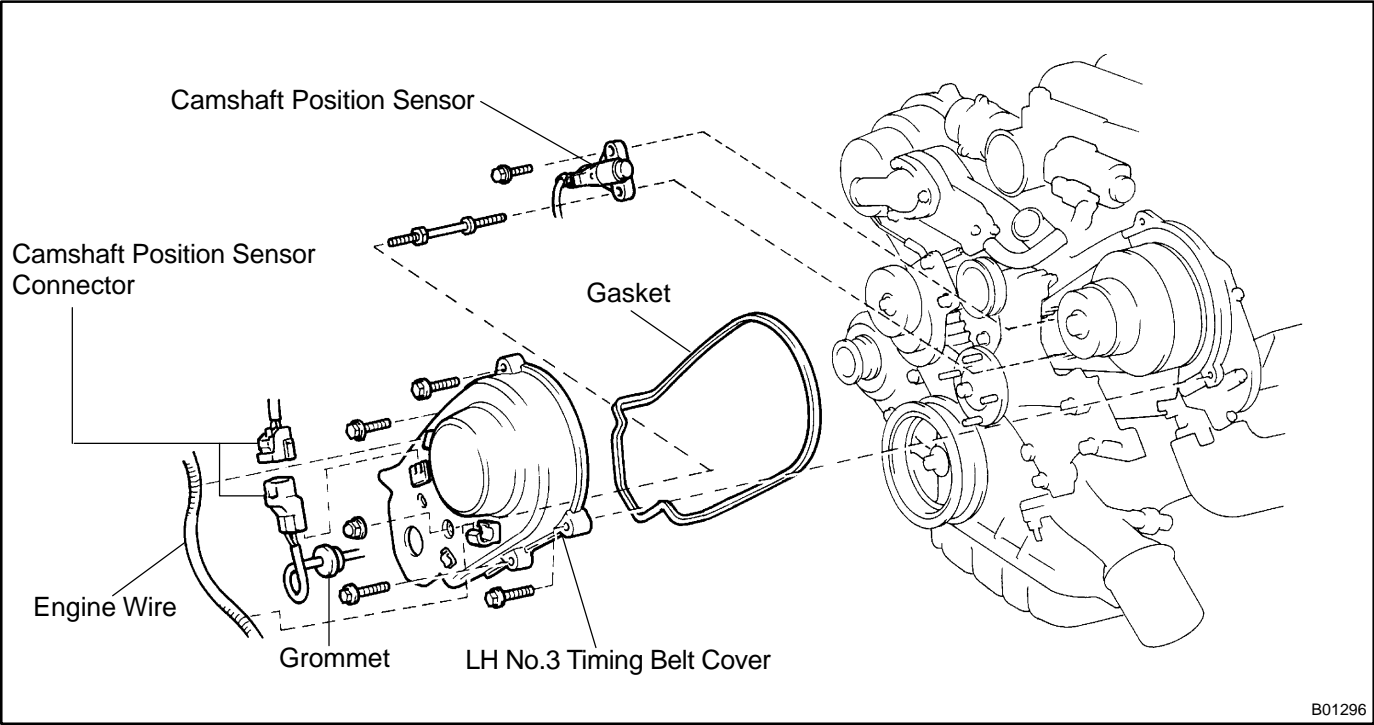
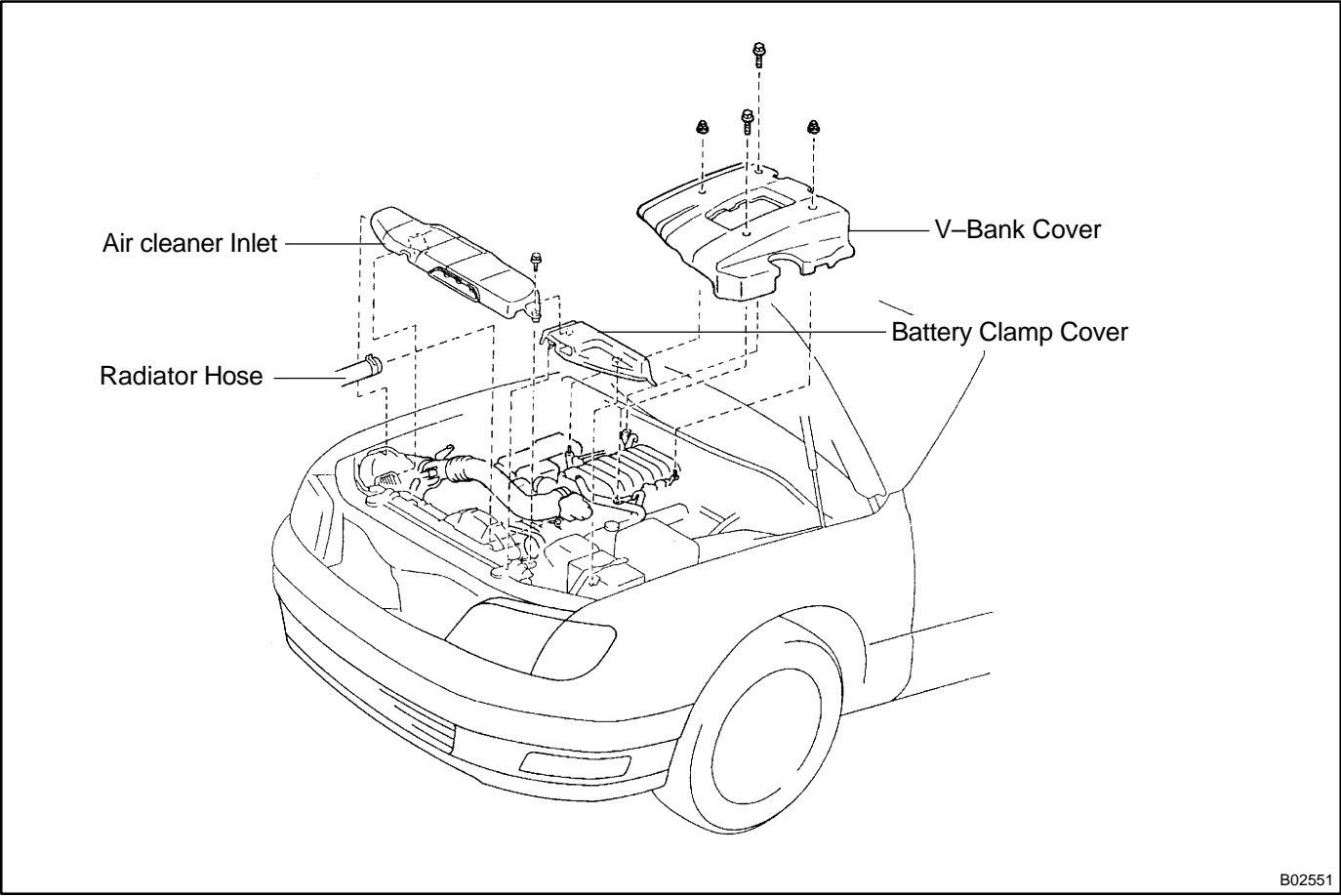
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)

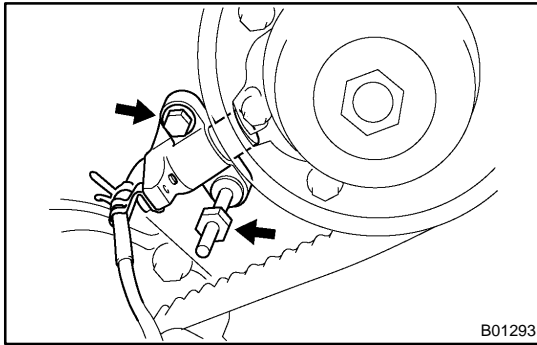
INSTALLATION

Installation is in the reverse order of removal. (See page [IG-7](#))

CAMSHAFT POSITION SENSOR COMPONENTS

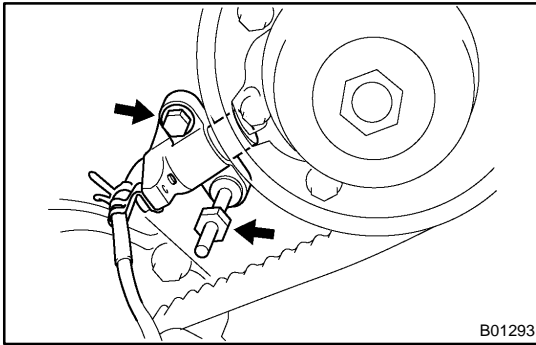
IG04Q-02





REMOVAL

1. REMOVE V-BANK COVER
2. REMOVE BATTERY CLAMP COVER
3. REMOVE AIR CLEANER INLET
4. DRAIN ENGINE COOLANT (See page [CO-2](#))
5. DISCONNECT RADIATOR HOSE
6. REMOVE NO.3 TIMING BELT COVER
(See page [EM-15](#))
7. DISCONNECT CAMSHAFT POSITION SENSOR CONNECTOR
8. REMOVE CAMSHAFT POSITION SENSOR
Remove the bolt, stud bolt and camshaft position sensor.

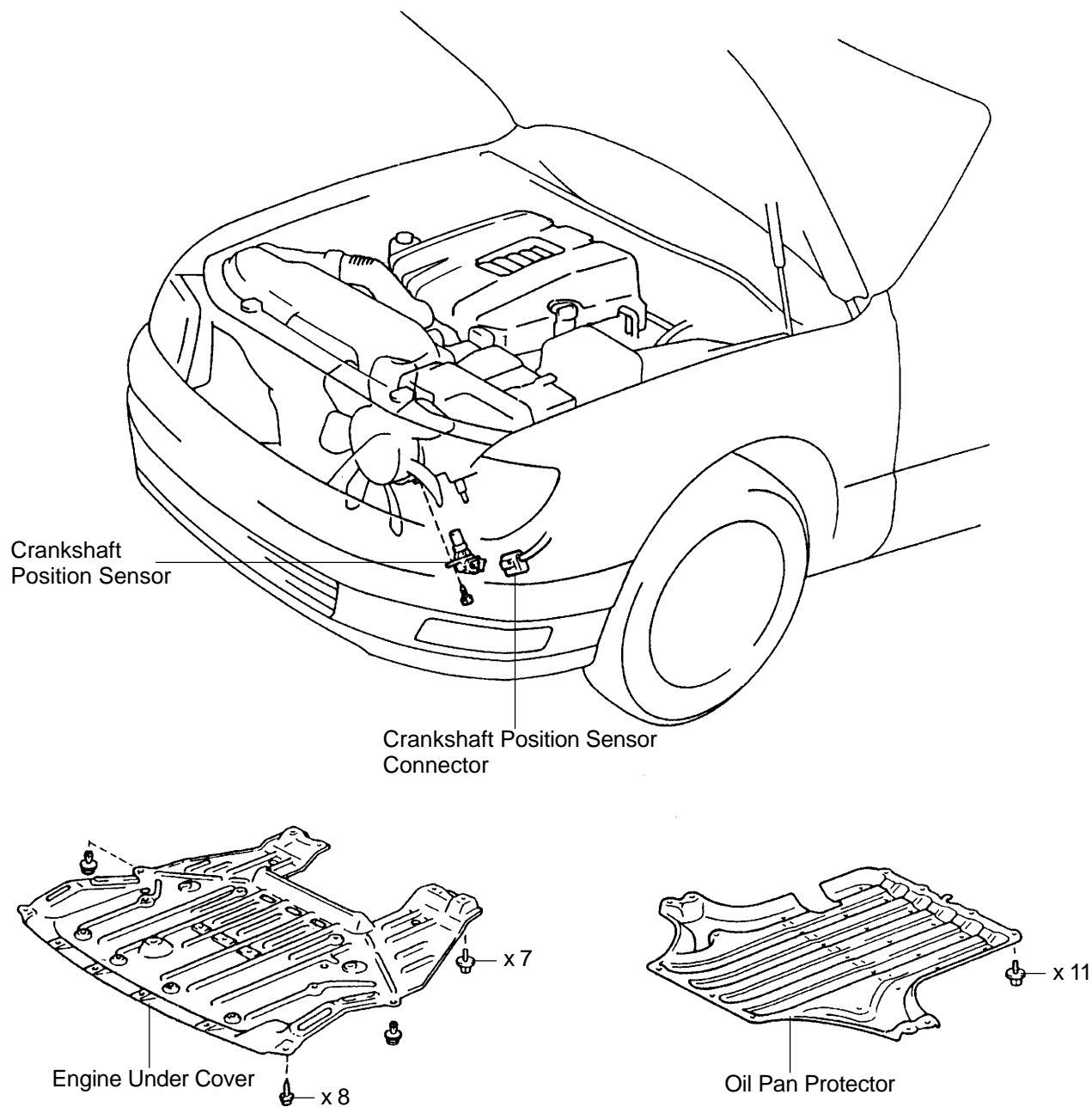


INSTALLATION

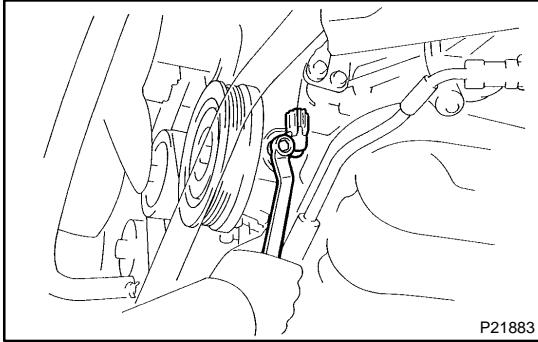
1. **INSTALL CAMSHAFT POSITION SENSOR**
Torque: 7.5 N·m (80 kgf·cm, 66 in.-lbf)
2. **CONNECT CAMSHAFT POSITION SENSOR CONNECTOR**
3. **INSTALL NO.3 TIMING BELT COVER**
(See page [EM-22](#))
4. **CONNECT RADIATOR HOSE**
5. **INSTALL AIR CLEANER INLET**
6. **INSTALL BATTERY CLAMP COVER**
7. **INSTALL V-BANK COVER**
8. **FILL ENGINE COOLANT** (See page [CO-2](#))
9. **CHECK ENGINE COOLANT FOR LEAKS**
10. **CHECK IGNITION TIMING** (See page [EM-9](#))

CRANKSHAFT POSITION SENSOR COMPONENTS

IG04T-02



B01304



REMOVAL

1. REMOVE OIL PAN PROTECTOR
2. REMOVE ENGINE UNDER COVER
3. DISCONNECT CRANKSHAFT POSITION SENSOR CONNECTOR
4. REMOVE CRANKSHAFT POSITION SENSOR

Remove the bolt and crankshaft position sensor.

Torque: 6.5 N·m (65 kgf·cm, 58 in.-lbf)

INSTALLATION

Installation is in the reverse order of removal. (See page [IG-13](#))

STARTING SYSTEM

ON-VEHICLE INSPECTION

ST040-01

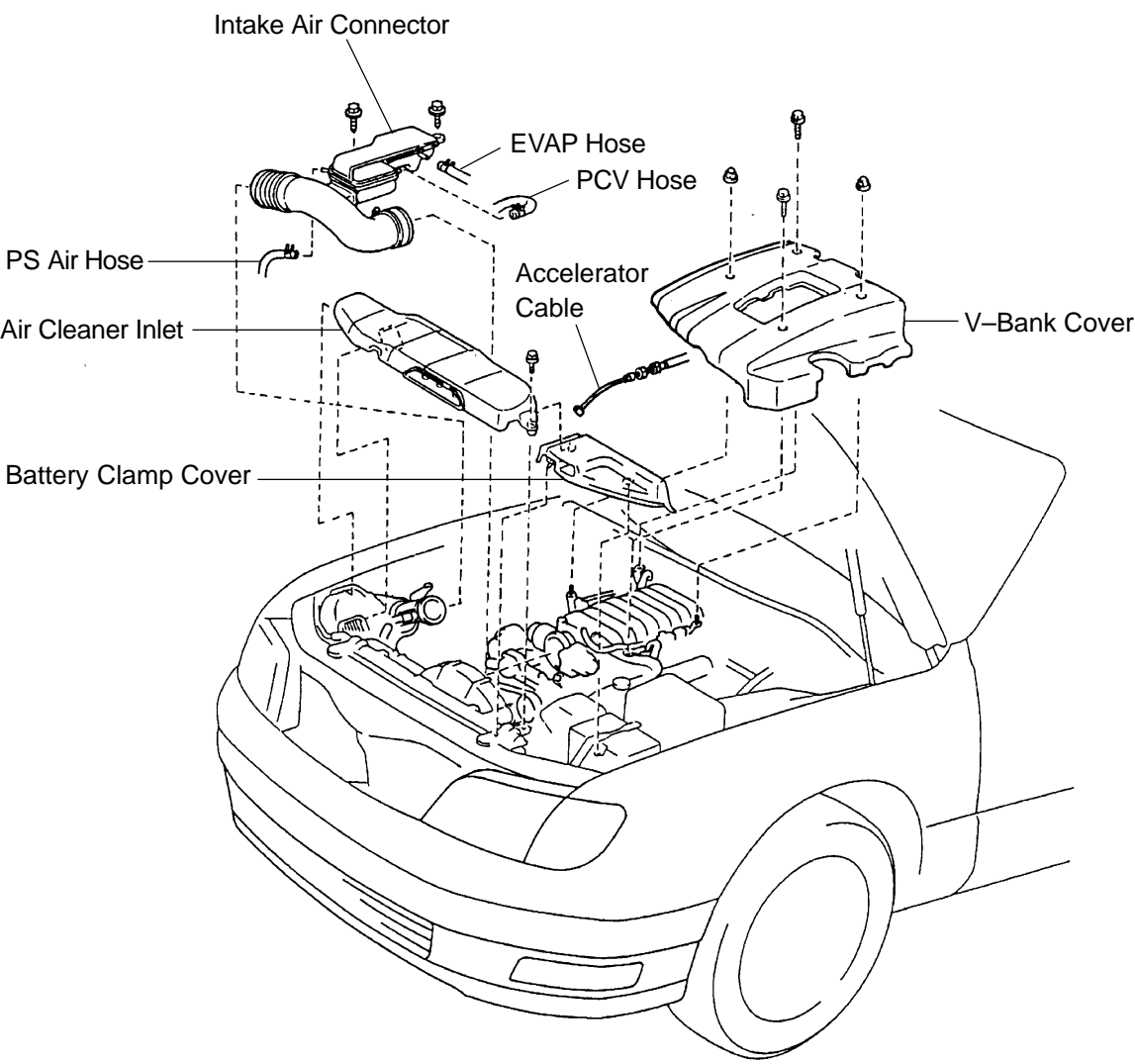
NOTICE:

Before changing the starter, check these items again:

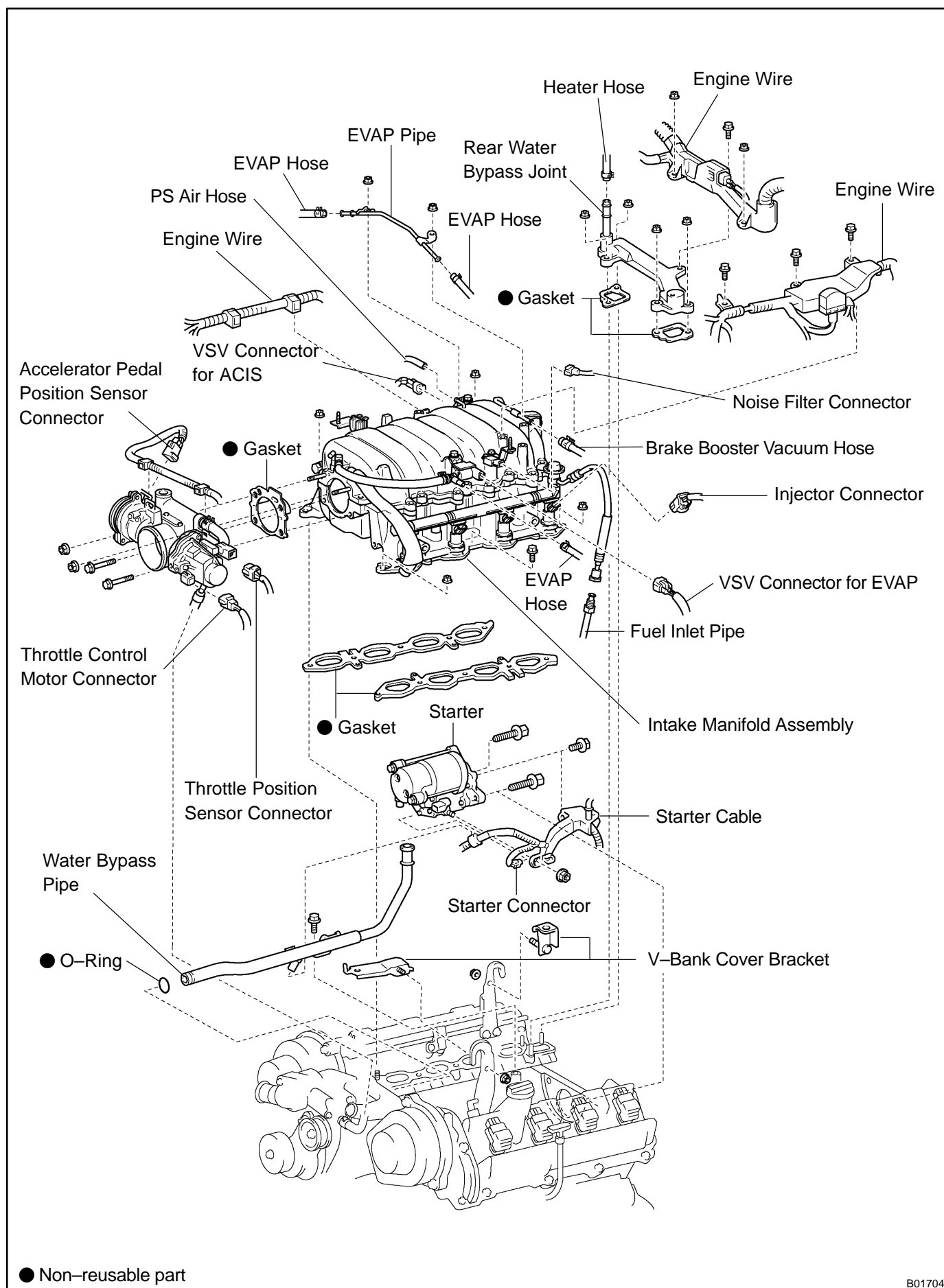
- Connector connection
- Accessory installation, e.g.: theft deterrent system

STARTER COMPONENTS

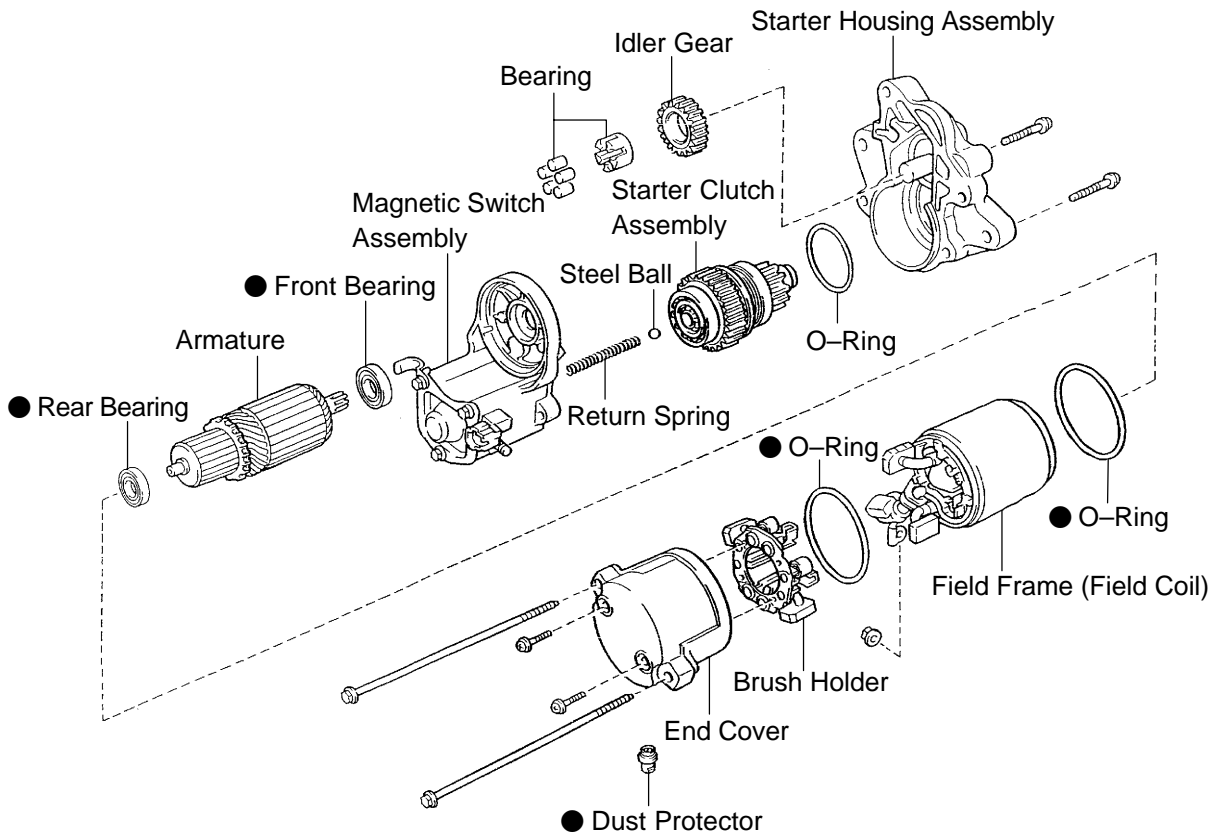
ST041-01



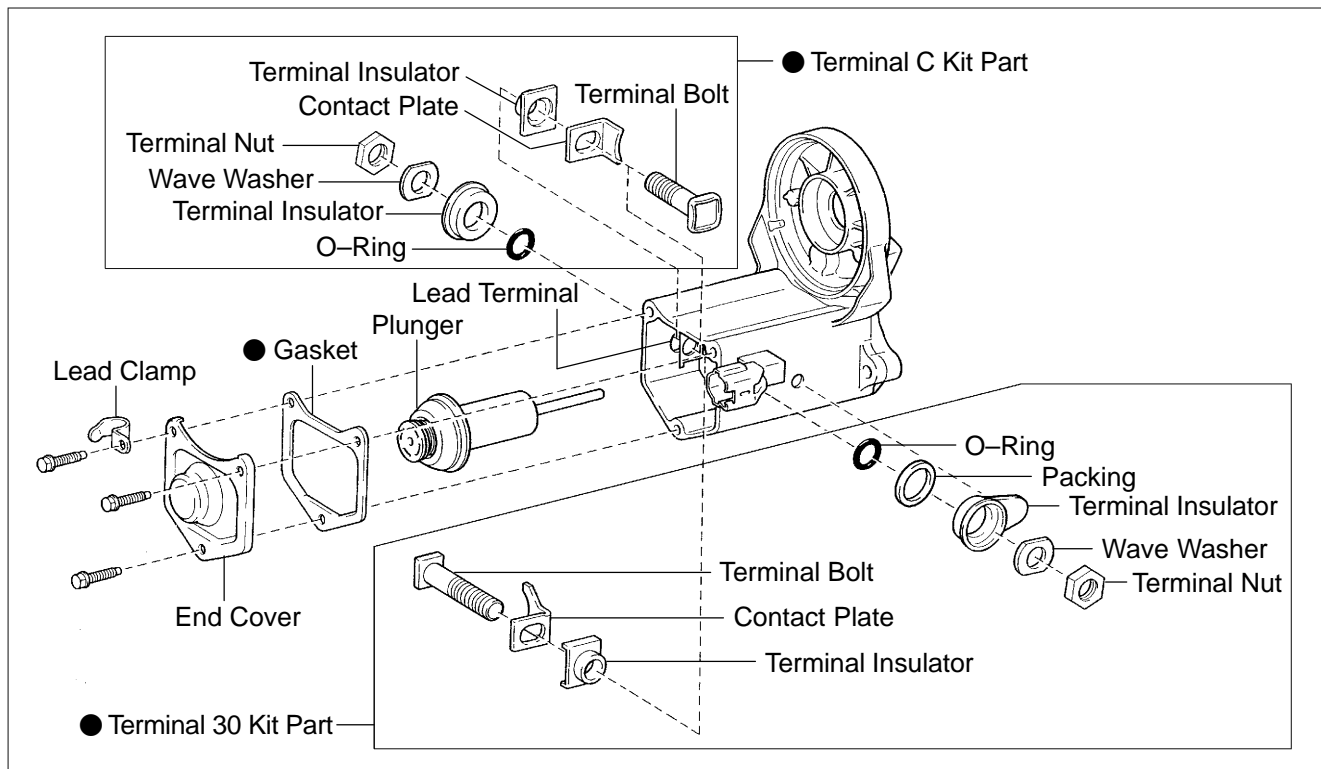
B01306



B01704



Magnetic Switch Assembly

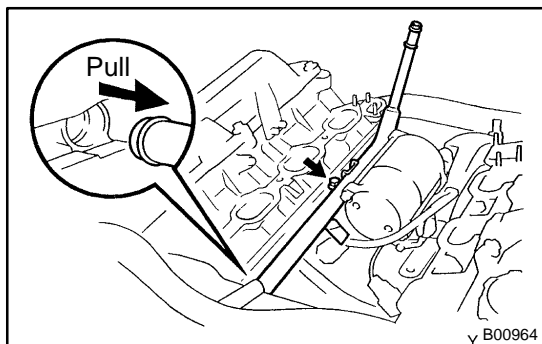


● Non-reusable part

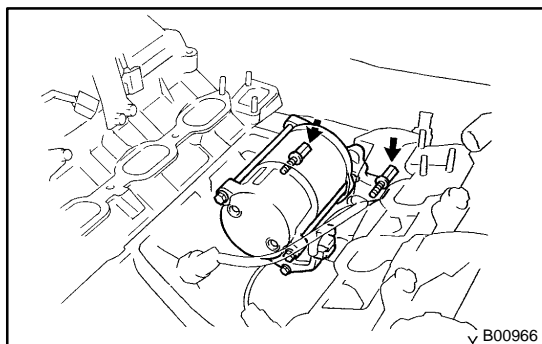
B00968

REMOVAL

1. REMOVE V-BANK COVER
2. DISCONNECT ACCELERATOR CABLE
3. REMOVE BATTERY CLAMP COVER,
AIR CLEANER INLET AND INTAKE AIR CONNECTOR
4. DISCONNECT THROTTLE BODY
(See page [SF-59](#))
5. REMOVE INTAKE MANIFOLD ASSEMBLY
(See page [EM-34](#))
6. REMOVE REAR WATER BYPASS JOINT
(See page [EM-34](#))
7. REMOVE WATER BYPASS PIPE

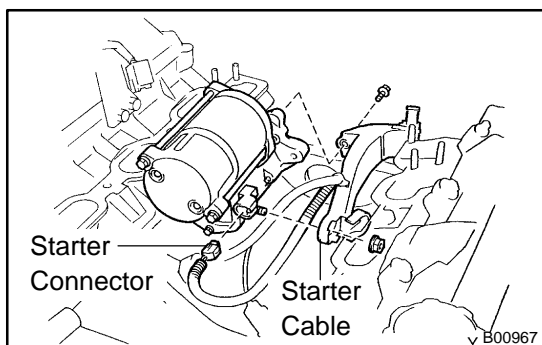


- (a) Remove the bolt.
- (b) Pull out the water bypass pipe from the water pump.
- (c) Disconnect the wire clamp from the bracket on the water bypass pipe.
- (d) Remove the O-ring from the water bypass pipe.

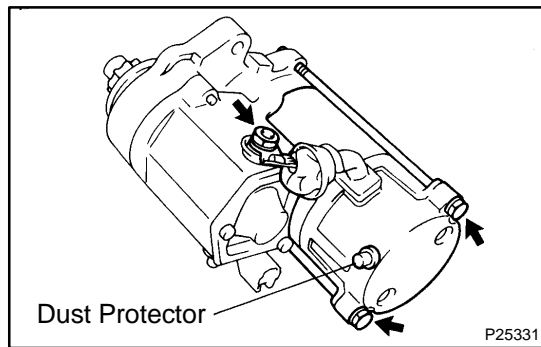


8. REMOVE STARTER

- (a) Remove the 2 bolts holding the starter to the cylinder block.
- (b) Disconnect the starter from the cylinder block.



- (c) Disconnect the starter connector.
- (d) Remove the nut, and disconnect the starter wire.
- (e) Remove the bolt, and disconnect the wire clamp from the starter and remove the starter.



DISASSEMBLY

1. REMOVE DUST PROTECTOR

2. 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)

- (b) Remove the 2 through bolts.

Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)

- (c) Pull out the field frame together with the armature.

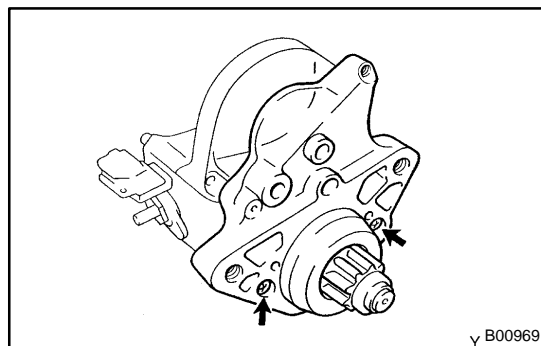
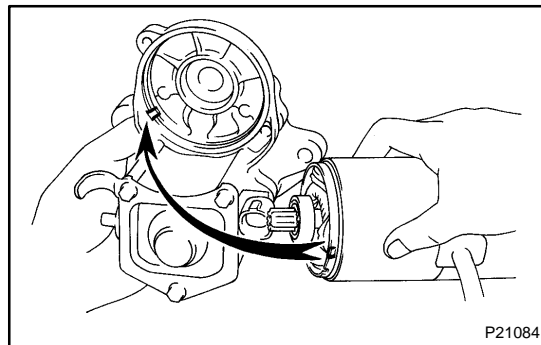
NOTICE:

At the time of notice, please refer to the following items. Align the protrusion of the field frame with the groove of the magnetic switch.

- (d) Remove the O-ring from the field frame.

HINT:

At the time of assembly, please refer to the following items. Use a new O-ring.



3. REMOVE STARTER HOUSING, CLUTCH ASSEMBLY AND GEAR

- (a) Remove the 2 screws.

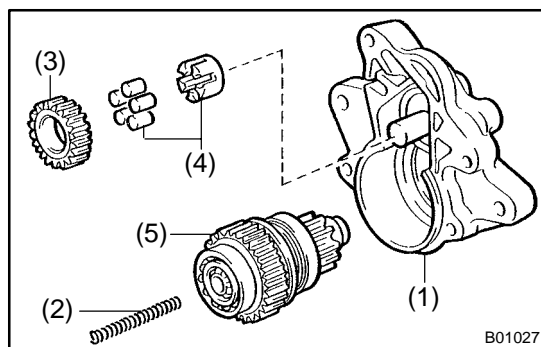
Torque: 9.3 N·m (95 kgf·cm, 82 in.-lbf)

- (b) Remove these parts from the magnetic switch:

- (1) Starter housing
- (2) Return spring
- (3) Idler gear
- (4) Bearing
- (5) Starter clutch assembly

HINT:

At the time of assembly, please refer to the following items. Apply grease to the return spring and insert the return spring into the clutch shaft hole.

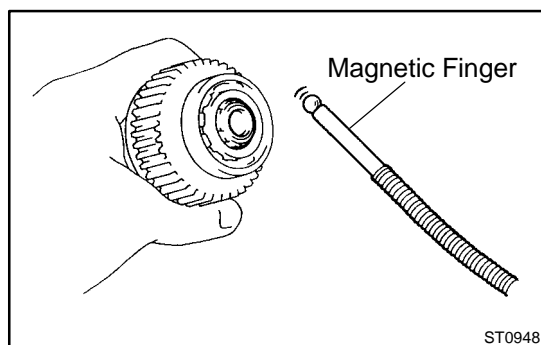


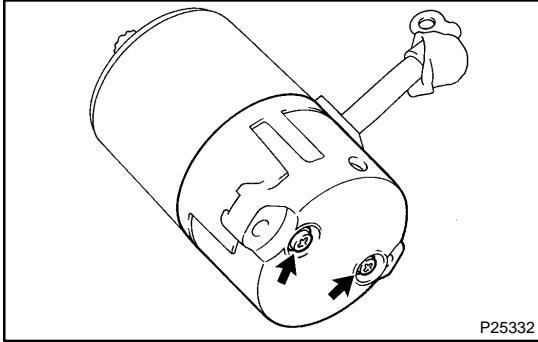
4. REMOVE STEEL BALL

Using a magnetic finger, remove the steel ball from the clutch shaft hole.

HINT:

At the time of assembly, please refer to the following items. Apply grease to the steel ball and insert the steel ball into the clutch shaft hole.

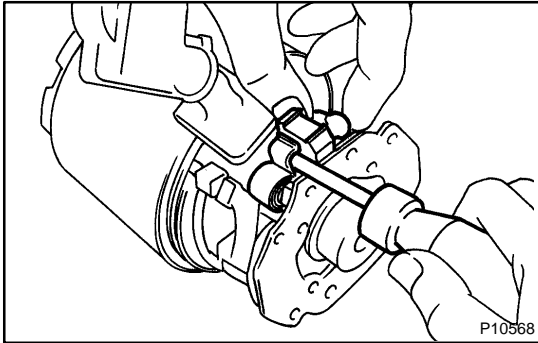


**5. REMOVE BRUSH HOLDER**

- (a) Remove the 2 screws, and end cover from the field frame.
Torque: 3.8 N·m (39 kgf·cm, 34 in.-lbf)
- (b) Remove the O-ring from the field frame.

HINT:

At the time of assembly, please refer to the following items.
Use a new O-ring.

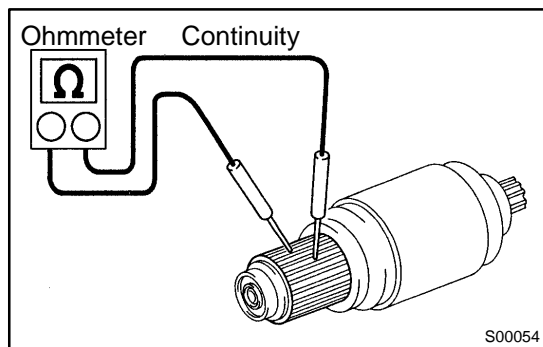


- (c) Using a screwdriver, hold the spring back and disconnect the brush from the brush holder. Disconnect the 4 brushes, and remove the brush holder.

NOTICE:

Check that the positive (+) lead wires are not grounded.

6. REMOVE ARMATURE FROM FIELD FRAME

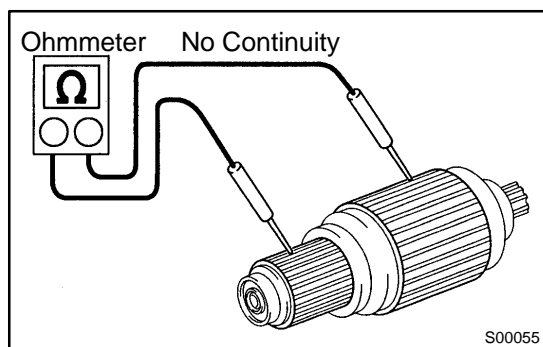


INSPECTION

1. INSPECT COMMUTATOR 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.



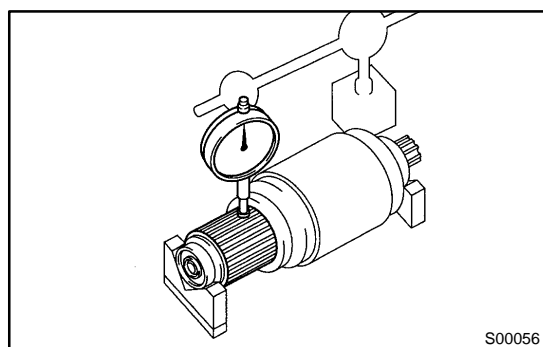
2. INSPECT COMMUTATOR FOR GROUND

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 SURFACE

If the surface is dirty or burnt, correct it with sandpaper (No.400) or on a lathe.



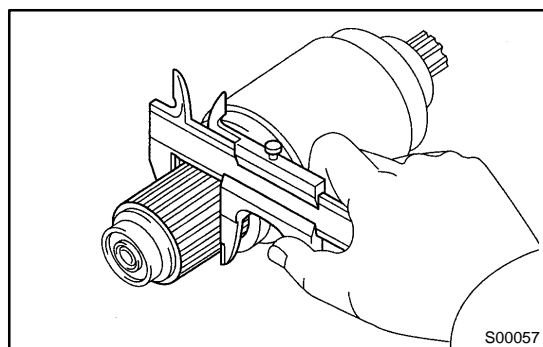
4. INSPECT COMMUTATOR CIRCLE RUNOUT

(a) Place the commutator on V-blocks.

(b) Using a dial indicator 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.



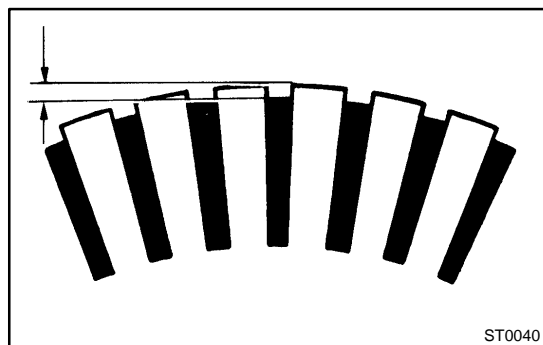
5. INSPECT COMMUTATOR DIAMETER

Using vernier calipers, measure the commutator diameter.

Standard diameter: 35.0 mm (1.378 in.)

Minimum diameter: 34.0 mm (1.339 in.)

If the diameter is less than minimum, replace the armature.



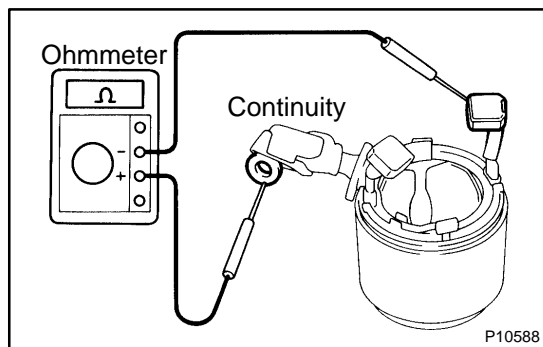
6. INSPECT UNDERCUT DEPTH

Check that the undercut depth is clean and free of foreign materials. Smooth out the edge.

Standard undercut depth: 0.7 mm (0.028 in.)

Minimum undercut depth: 0.2 mm (0.008 in.)

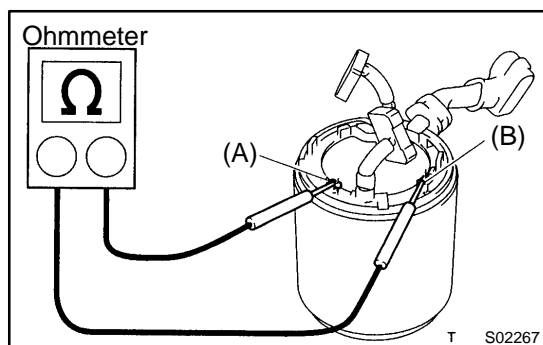
If the undercut depth is less than minimum, correct it with a hacksaw blade.



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.

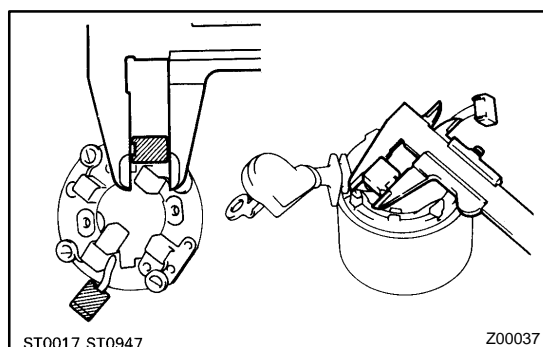


8. INSPECT SHUNT COIL FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between shunt coil terminals (A) and (B).

Resistance: 1.5 – 1.9 Ω at 20 °C (68 °F)

If the resistance is not as specified, replace the field frame.



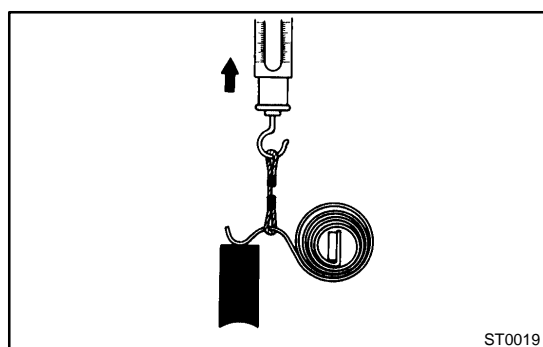
9. INSPECT BRUSH LENGTH

Using vernier calipers, measure the brush length.

Standard length: 15.0 mm (0.591 in.)

Minimum length: 9.0 mm (0.354 in.)

If the length is less than minimum, replace the brush holder and field frame.



10. INSPECT BRUSH SPRING LOAD

Take the pull scale reading the instant the brush spring separates from the brush.

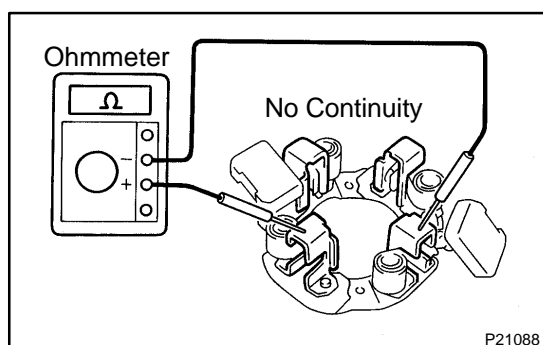
Standard spring installed load:

21.5 – 27.5 N (2.2 – 2.8 kgf, 4.8 – 6.2 lbf)

Minimum spring installed load:

12.7 N (1.3 kgf, 2.9 lbf)

If the installed load is less than minimum, replace the brush springs.



11. INSPECT BRUSH HOLDER INSULATION

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brush holders.

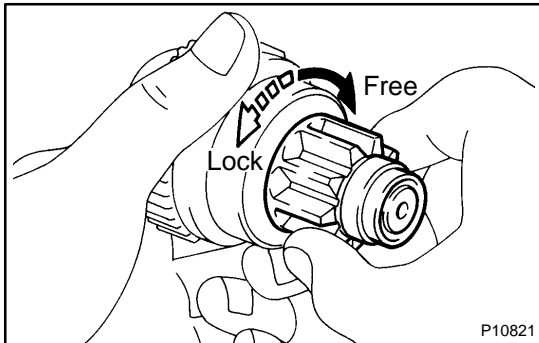
If there is continuity, repair or replace the brush holder.

12. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idle gear and the clutch assembly for wear or damage.

If damaged, replace the gear or clutch assembly.

If damaged, also check the drive plate ring gear for wear or damage.

**13. INSPECT CLUTCH PINION GEAR**

Rotate the pinion gear clockwise, and check that it turns freely. Try to rotate the pinion gear counterclockwise and check that it locks.

If necessary, replace the clutch assembly.

14. INSPECT REAR BEARING

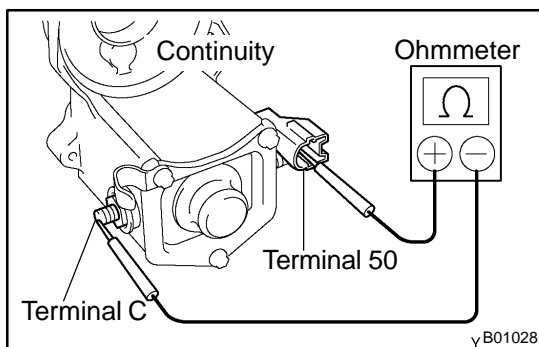
Turn the bearing by hand while applying inward force.

If resistance is felt or the bearing sticks, replace the bearing.

15. INSPECT FRONT BEARING

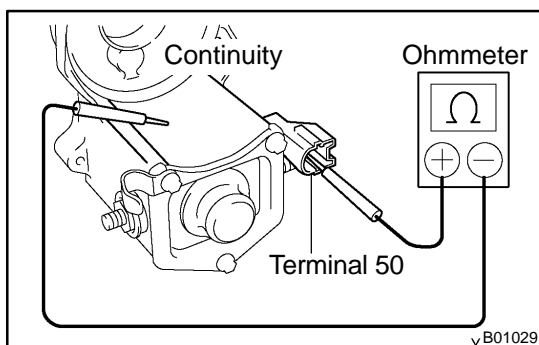
Turn the bearing by hand while applying inward force.

If resistance is felt or the bearing sticks, replace the bearing.

**16. DO PULL-IN COIL OPEN CIRCUIT TEST**

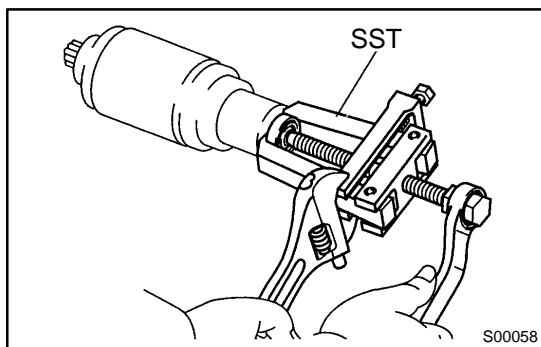
Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, check and replace the magnetic switch.

**17. DO HOLD-IN COIL OPEN CIRCUIT TEST**

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

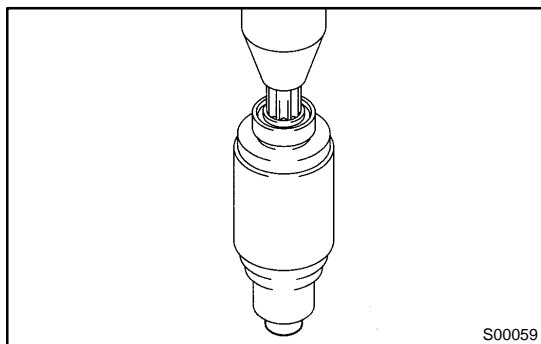
If there is no continuity, replace the magnetic switch.



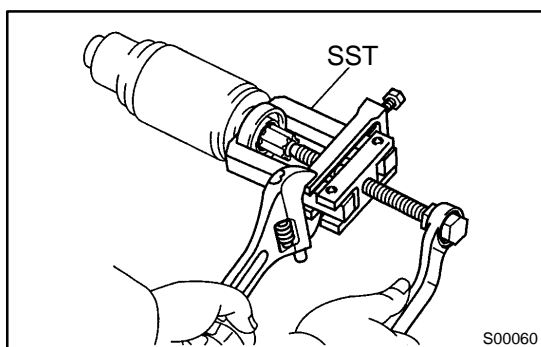
REPLACEMENT

1. REPLACE REAR BEARING

- (a) Using SST, remove the bearing.
SST 09286-46011

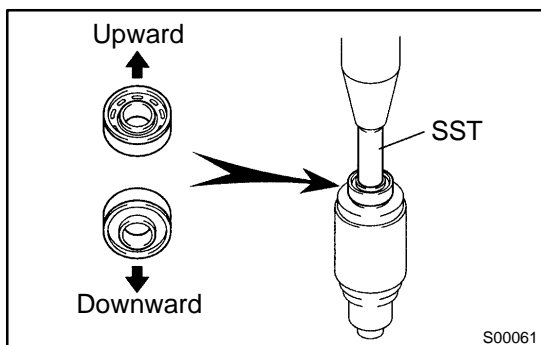


- (b) Using a press, press in a new bearing.



2. REPLACE FRONT BEARING

- (a) Using SST, remove the bearing.
SST 09286-46011

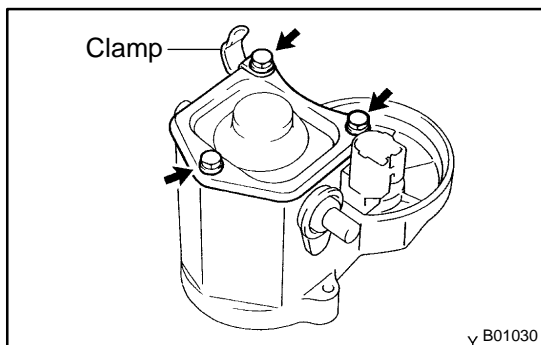


- (b) Using SST and a press, press in a new bearing.

NOTICE:

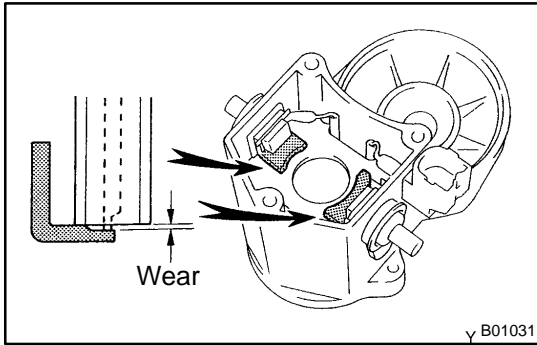
Be careful of the bearing installation direction.

SST 09820-00030



3. REPLACE MAGNETIC SWITCH TERMINAL KIT PARTS

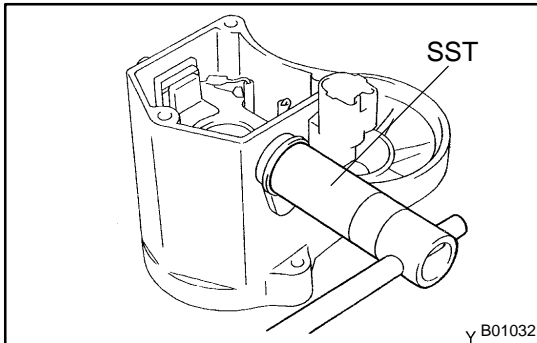
- (a) Remove magnetic switch end cover.
Remove the 3 bolts, lead clamp, end cover, gasket and plunger.



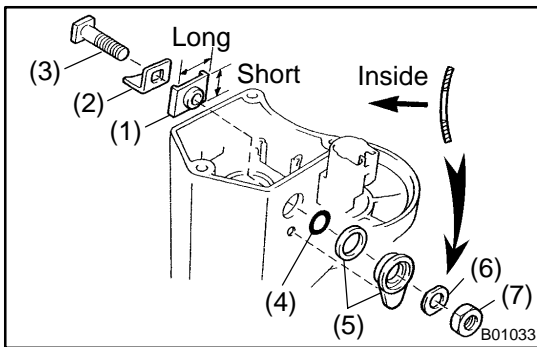
- (b) Inspect contact plate for wear.
Using vernier calipers, measure the contact plate for depth of wear.

Maximum wear: 0.9 mm (0.035 in.)

If the depth of wear is greater than the maximum, replace the contact plate.



- (c) Remove terminal kit parts.
- (1) Using SST, loosen the terminal nuts.
SST 09810-38140
 - (2) Terminal C:
Remove the terminal nut, wave washer, terminal insulator (outside), O-ring, terminal bolt, contact plate and terminal insulator (inside).
 - (3) Terminal 30:
Remove the terminal nut, wave washer, terminal insulator (outside), O-ring, terminal bolt, contact plate, terminal insulator (inside) and insulation paper.



- (d) Temporarily install these new terminal 30 kit parts:
- (1) Terminal insulator (inside)
 - (2) Contact plate
 - (3) Terminal bolt
 - (4) O-ring
 - (5) Packing and terminal insulator (outside)
- Install the packing to the terminal insulator, and install them.

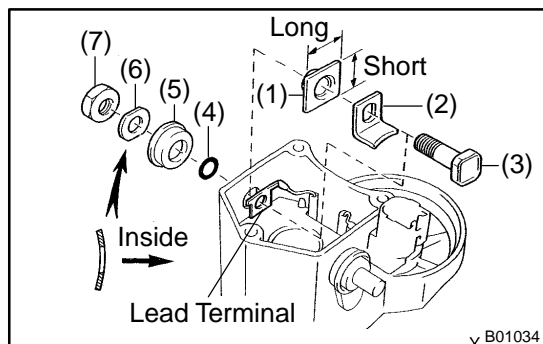
HINT:

Match the protrusion of the insulator with the indentation of the housing.

- (6) Wave washer
- (7) Terminal nut

NOTICE:

Be careful to install the terminal insulator (inside) and wave washer in the correct direction.



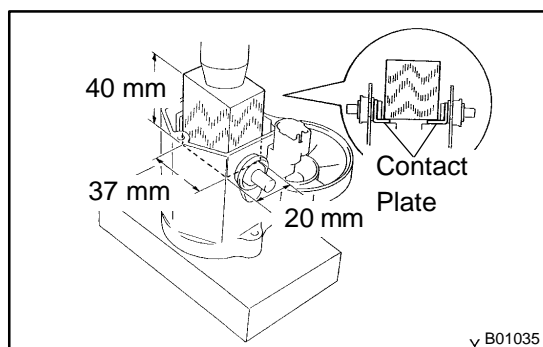
(e) Temporarily install these new terminal C kit parts:

- (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) and wave washer in the correct direction.

(f) Temporarily tighten the terminal nuts.



(g) Tighten terminal nuts.

- (1) 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:

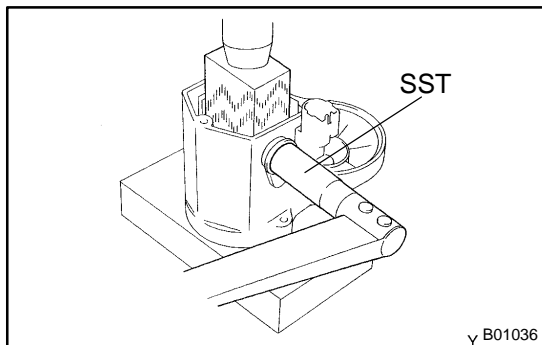
$$(\text{kgf/cm}^2) = \frac{100 \text{ kgf}}{\left(\frac{\text{Ram diameter (cm)}}{2} \right)^2 \times 3.14 (\pi)}$$

$$(\text{psi}) = \frac{221 \text{ lbf}}{\left(\frac{\text{Ram diameter (in.)}}{2} \right)^2 \times 3.14 (\pi)}$$

$$(\text{kPa}) = (\text{kgf/cm}^2) \times 98.1$$

$$(\text{kPa}) = (\text{psi}) \times 6.9$$

- If the contact plate is not pressed down with the specified pressure, the contact plate may tilt due to coil deformation or the tightening of the nut.

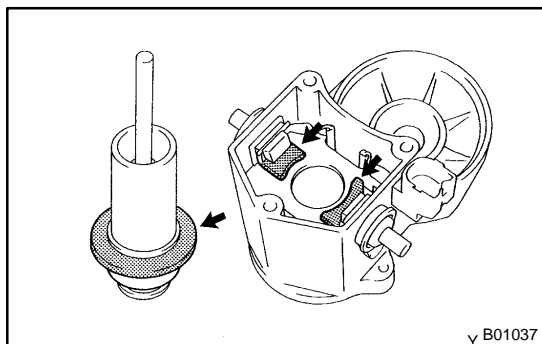


- (2) Using SST, tighten the nuts to the specified torque.
SST 09810-38140

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.



- (h) Clean contact surfaces of contact plate and plunger.
Clean the contact surfaces of the remaining contact plate and plunger with a dry shop rag.
- (i) Reinstall magnetic switch end cover.
Install the plunger, new gasket, end cover and lead clamp with the 3 bolts.

Torque: 3.6 N·m (37 kgf-cm, 32 in.-lbf)

REASSEMBLY

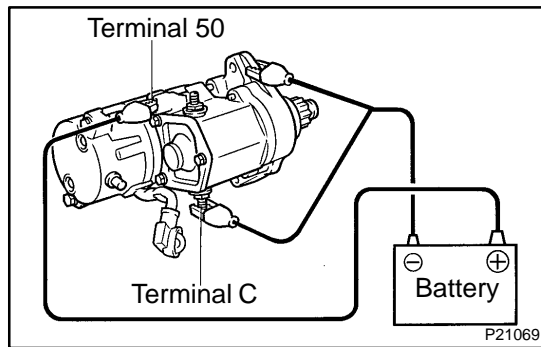
Reassembly is in the reverse order of disassembly.

(See page [ST-6](#))

HINT:

At the time of assembly, please refer to the following items.

Use high-temperature grease to lubricate the bearing and gears when assembling the starter.



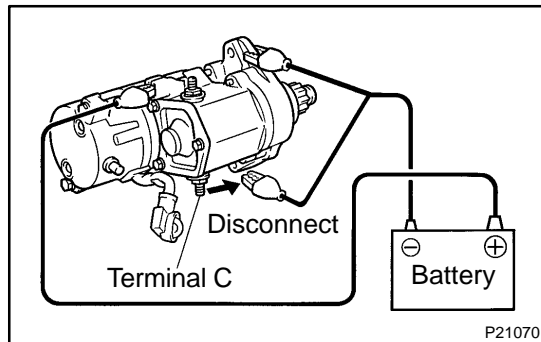
TEST

NOTICE:

These tests must be done within 3 to 5 seconds to avoid burning out the coil.

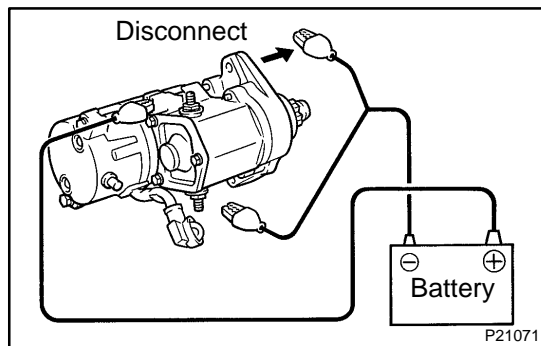
1. DO PULL-IN TEST

- Disconnect the field coil lead wire from terminal C.
- Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.



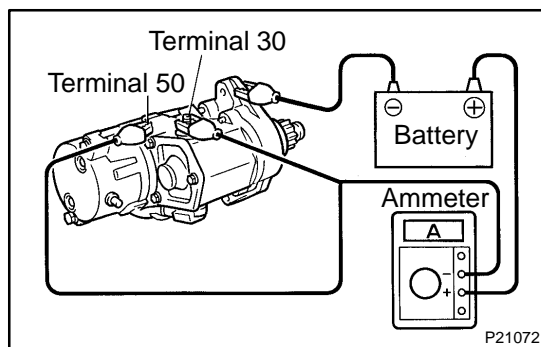
2. DO HOLD-IN TEST

While connected as above with the 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 starter body. Check that the pinion gear returns inward.

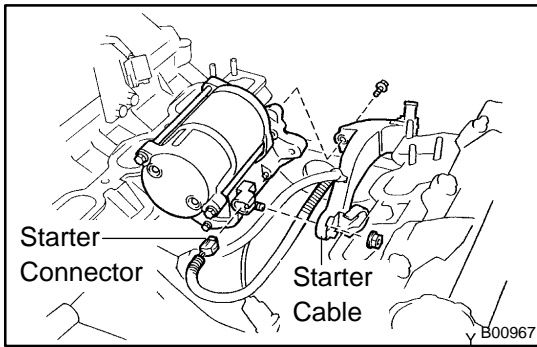


4. DO NO-LOAD PERFORMANCE TEST

- Connect the battery and ammeter to the starter as shown.
- Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter shows the specified current.

Specified current:

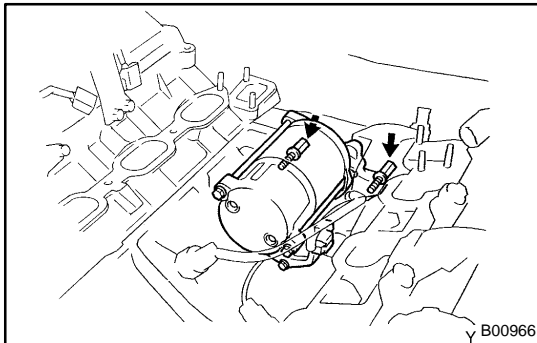
At 11.5 V: 100 A or less



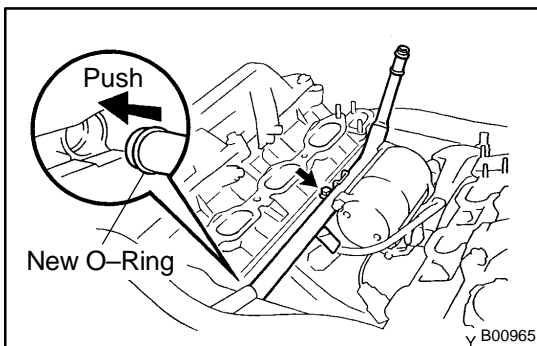
INSTALLATION

1. INSTALL STARTER

- (a) Install the wire clamp to the wire bracket with the bolt.
Torque: 9.81 N·m (98 kgf-cm, 84 in.-lbf)
- (b) Connect the starter wire with the nut.
Torque: 9.81 N·m (98 kgf-cm, 84 in.-lbf)
- (c) Connect the starter connector.



- (d) Install the starter with the 2 bolts.
Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)



2. INSTALL WATER BYPASS PIPE

- (a) Install a new O-ring to the water bypass pipe.
- (b) Apply soapy water to the O-ring.
- (c) Push in the water bypass pipe end into the pipe hole of the water pump.
- (d) Install the wire clamp to the bracket on the water bypass pipe.
- (e) Install the water bypass pipe with the bolt.
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

3. INSTALL REAR WATER BYPASS JOINT

(See page [EM-58](#))

4. INSTALL INTAKE MANIFOLD ASSEMBLY

(See page [EM-58](#))

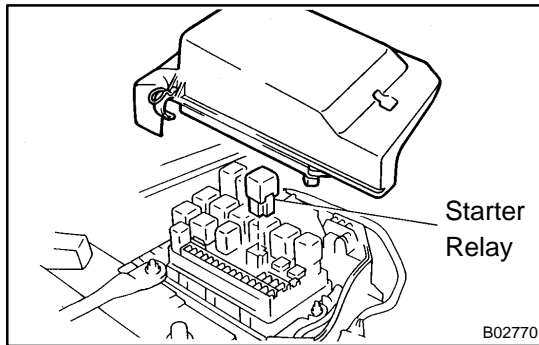
5. CONNECT THROTTLE BODY

(See page [SF-61](#))

6. INSTALL INTAKE AIR CONNECTOR, AIR CLEANER INLET AND BATTERY CLAMP COVER

7. CONNECT ACCELERATOR CABLE

8. INSTALL V-BANK COVER

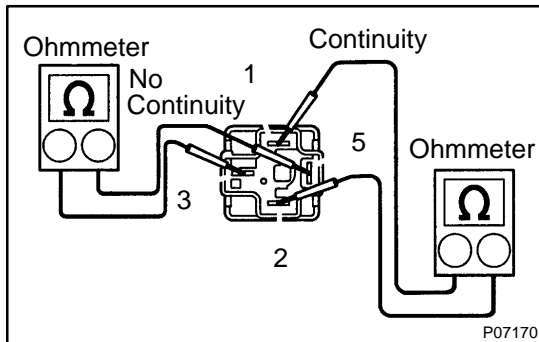


STARTER RELAY INSPECTION

ST049-01

1. REMOVE STARTER RELAY (Marking: "ST")

Remove the relay box cover and starter relay.



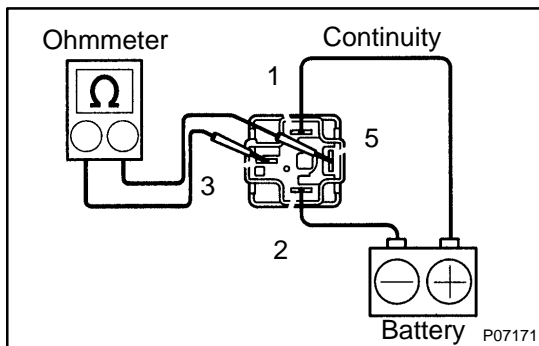
2. INSPECT RELAY CONTINUITY

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

- (b) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



3. INSPECT RELAY OPERATION

- (a) Apply battery voltage across terminals 1 and 2.

- (b) Using an ohmmeter, check that there is continuity between terminals 2 and 5.

If there is no continuity, replace the relay.

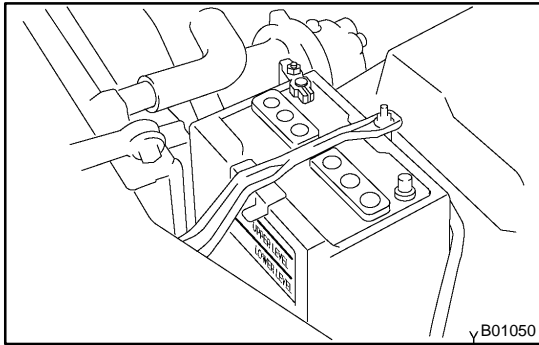
4. REINSTALL STARTER RELAY

CHARGING SYSTEM

CH03A-01

PRECAUTION

- 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.



ON-VEHICLE INSPECTION

1. **REMOVE BATTERY CLAMP COVER**
2. **CHECK BATTERY ELECTROLYTE LEVEL**

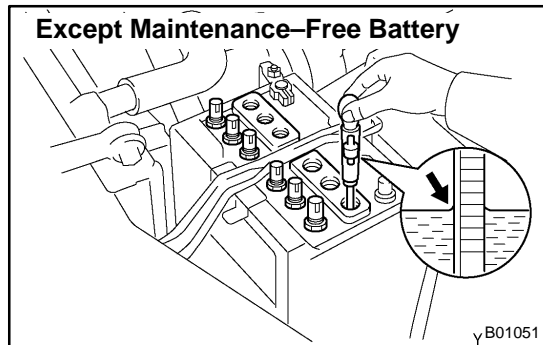
Check the electrolyte quantity of each cell.

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.

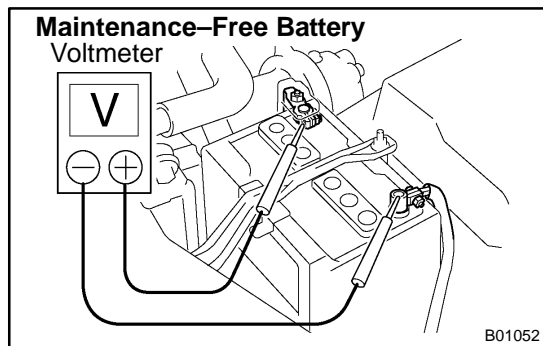


3. **Except Maintenance-Free Battery: CHECK BATTERY SPECIFIC GRAVITY**

Check the specific gravity of each cell.

Standard specific gravity: 1.25 – 1.29 at 20°C (68°F)

If the specific gravity is less than specification, charge the battery.



4. **Maintenance-Free Battery: CHECK BATTERY VOLTAGE**

Measure the battery voltage between the negative (–) and positive (+) terminals of the battery.

Standard voltage: 12.2 – 14.8 V at 20°C (68°F)

HINT:

- Before measuring the voltage, turn the ignition switch OFF and turn off the electrical systems (headlight, blower motor, rear defogger etc.) to remove the surface charge.
- If the vehicle has been running, wait 20 minutes or more after the vehicle stops before measuring the battery voltage.

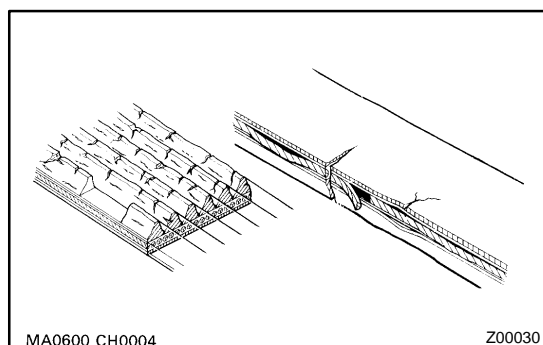
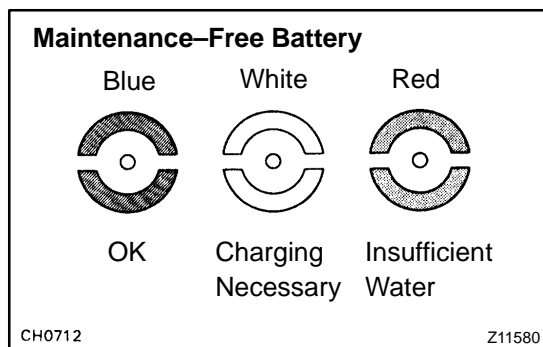
If the voltage is less than specification, charge the battery.

HINT:

Check the indicator as shown in the illustration.

5. **CHECK BATTERY TERMINALS AND FUSES**

- (a) Check that the battery terminals are not loose or corroded.
- (b) Check the fuses for continuity.



6. **REMOVE AIR CLEANER INLET**
7. **INSPECT DRIVE BELT**

HINT:

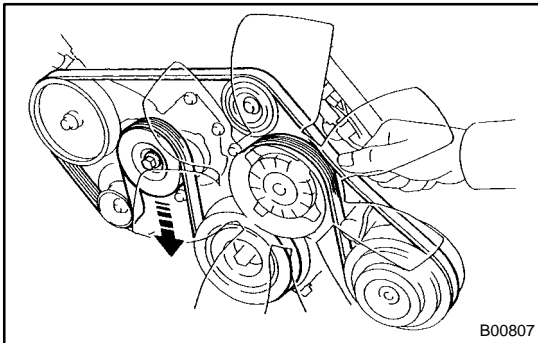
A belt tensioner is used, so checking the belt tension is not necessary.

- (a) Visually check the drive belt for excessive wear, frayed cords etc.

If necessary, replace the drive belt.

HINT:

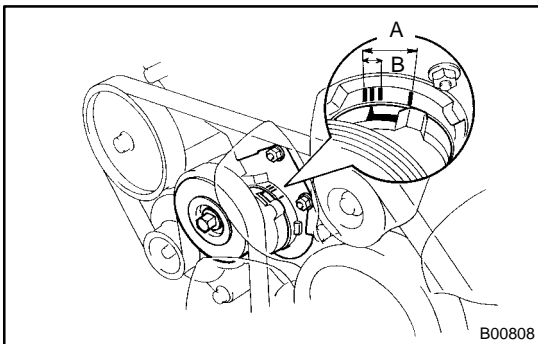
- Cracks on the rib side of a drive belt are considered acceptable. If the drive belt has chunks missing from the ribs, it should be replaced.
- The drive belt tension can be released by turning the belt tensioner counterclockwise. The pulley bolt for the belt tensioner has a left-hand thread.



(b) Check the belt tensioner operation.

- Check that the belt tensioner moves downward when the drive belt is pressed down at the points indicated in the illustration with approx. 98 N (10 kgf, 22.0 lbf) of force.
- Check the alignment of the belt tensioner pulley to make sure the drive belt has not slipped off the pulley.

If necessary, replace the belt tensioner.

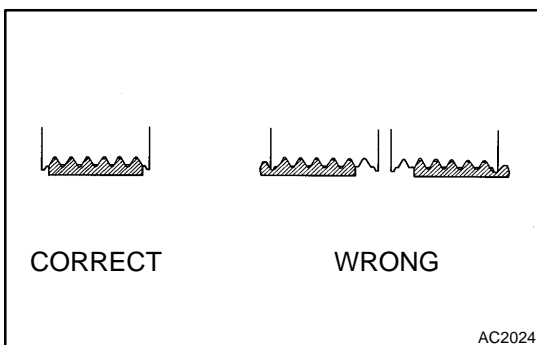


- Check that the arrow mark on the belt tensioner falls within area A of the scale.

If it is outside area A, replace the drive belt.

HINT:

- When a new belt is installed, it should lie within area B. If not, the drive belt is not correct.



- After installing a belt, check that it fits properly in the ribbed grooves.
- Check by hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.

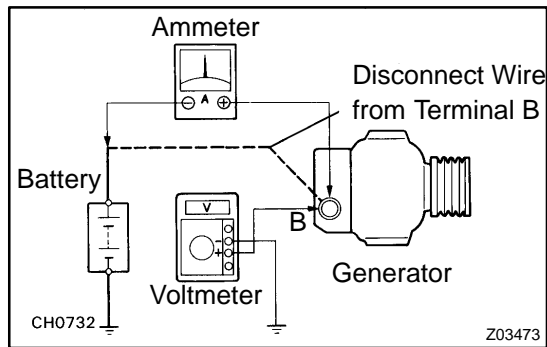
8. REMOVE OIL PAN PROTECTOR**9. REMOVE ENGINE UNDER COVER****10. VISUALLY CHECK GENERATOR WIRING AND LISTEN FOR ABNORMAL NOISES**

- Check that the wiring is in good condition.
- Check that there is no abnormal noise from the generator while the engine is running.

11. CHECK CHARGE WARNING LIGHT CIRCUIT

- Warm up the engine and then turn it off.
- Switch off all accessories.
- Turn the ignition switch ON, and check that the charge warning light is lit.
- Start the engine, and check that the light goes off.

If the light does not go off as specified, troubleshoot the charge light circuit.



12. INSPECT CHARGING CIRCUIT WITHOUT LOAD

HINT:

If a battery/generator tester is available, connect the tester to the charging circuit as per manufacturer'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 it to the negative (–) tester probe of the ammeter.
 - Connect the positive (+) tester probe of the ammeter to terminal B of the generator.
 - Connect the positive (+) tester probe of the voltmeter to terminal B of the generator.
 - Ground the negative (–) tester probe 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:

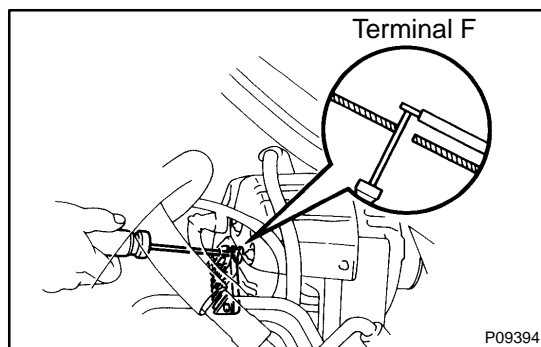
10 A or less

Standard voltage:

13.7 – 14.8 V at 25°C (77°F)

13.2 – 14.0 V at 115°C (239°F)

If the voltmeter reading is more than standard voltage, replace the voltage regulator.



If the voltmeter reading is less than standard voltage, check the voltage regulator and generator as follows:

- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than standard voltage, replace the voltage regulator.
- If the voltmeter reading is less than standard voltage, check the generator.

13. INSPECT CHARGING CIRCUIT WITH LOAD

- (a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at HI.
- (b) Check the reading on the ammeter.

Standard amperage: 30 A or more

If the ammeter reading is less than the standard amperage, repair the generator.

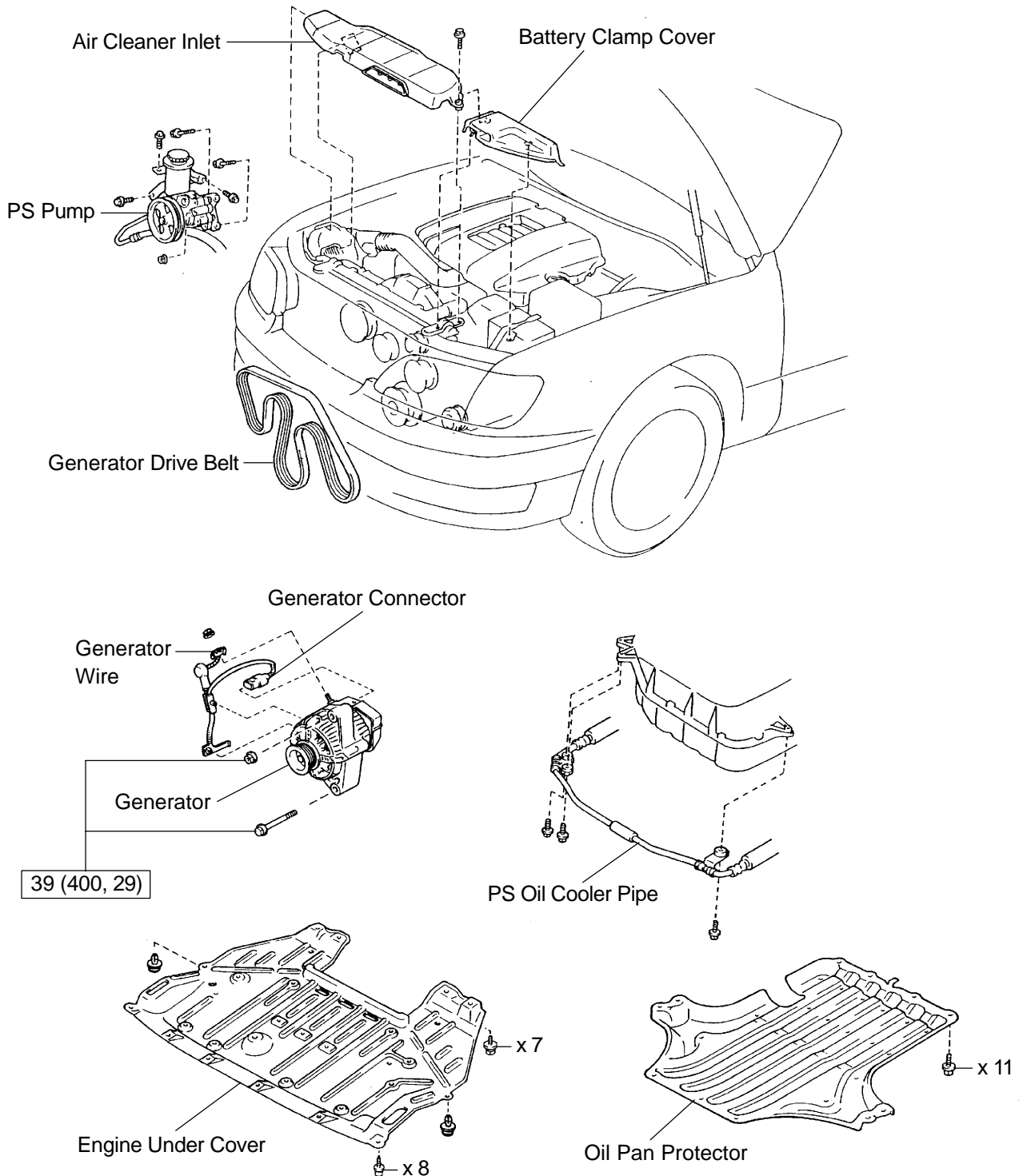
HINT:

If the battery is fully charged, the indication will sometimes be less than standard amperage.

14. REINSTALL ENGINE UNDER COVER
15. REINSTALL OIL PAN PROTECTOR
16. REINSTALL AIR CLEANER INLET
17. REINSTALL BATTERY CLAMP COVER

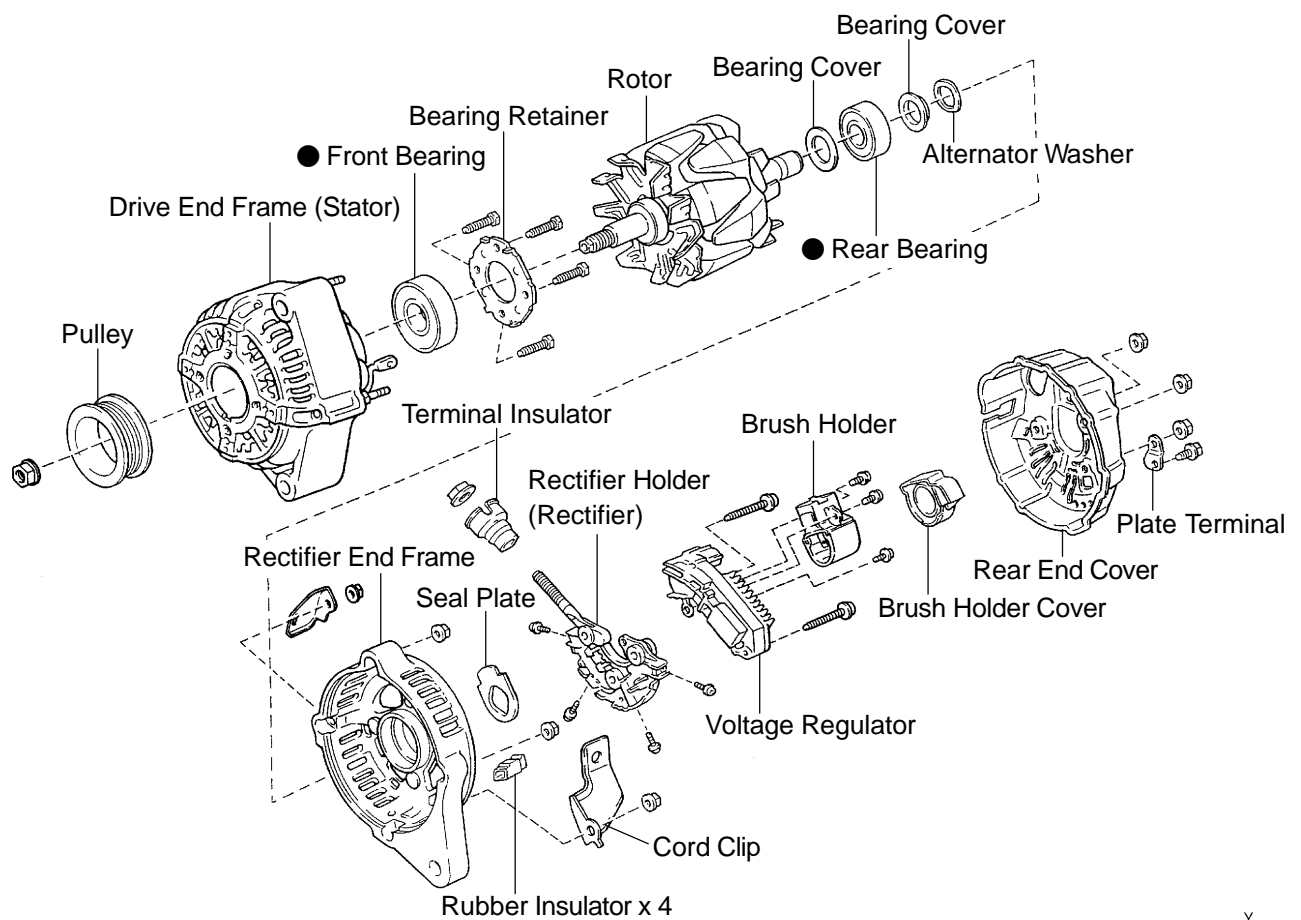
GENERATOR COMPONENTS

CH03C-01



N·m (kgf·cm, ft·lbf) : Specified torque

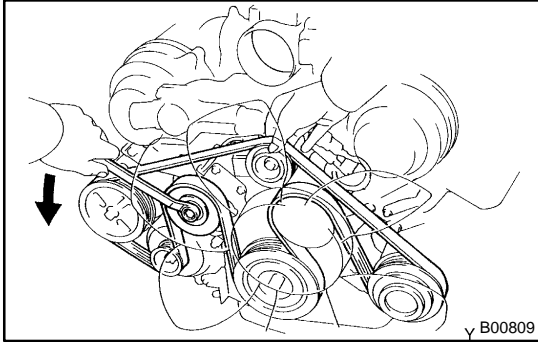
B01055



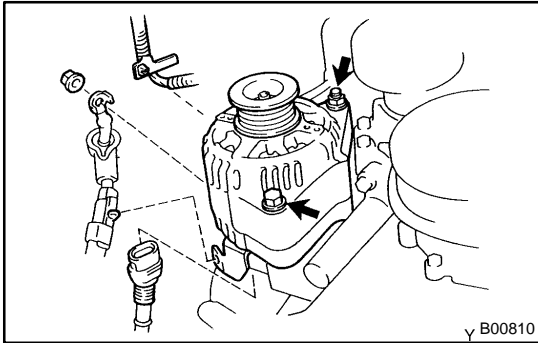
Y

● Non-reusable part

B00818



B00809



B00810

REMOVAL

1. REMOVE BATTERY CLAMP COVER
2. REMOVE AIR CLEANER INLET
3. REMOVE GENERATOR DRIVE BELT

Loosen the belt tension by turning the belt tensioner counter-clockwise, and remove the drive belt.

HINT:

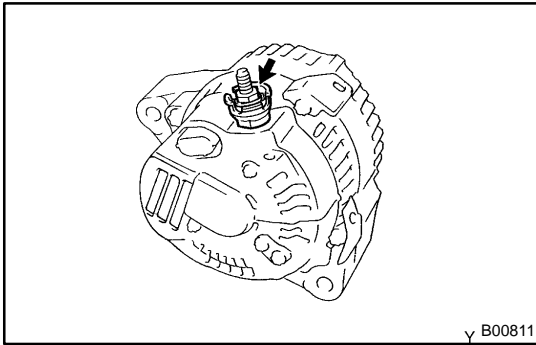
The pulley bolt for the belt tensioner has a left – hand thread.

4. REMOVE OIL PAN PROTECTOR
5. REMOVE ENGINE UNDER COVER
6. DISCONNECT PS OIL COOLER PIPE FROM OIL PAN
7. REMOVE PS PUMP

(See page [EM-77](#))

8. REMOVE GENERATOR

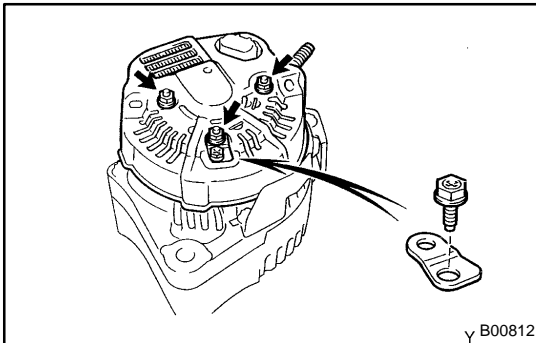
- (a) Disconnect the generator connector.
- (b) Remove the rubber cap and nut, and disconnect the generator wire.
- (c) Disconnect the generator wire clamp from the cord clip on the generator.
- (d) Disconnect the heated oxygen sensor wire clamp from the cord clip on the generator.
- (e) Remove the bolt, nut and generator.



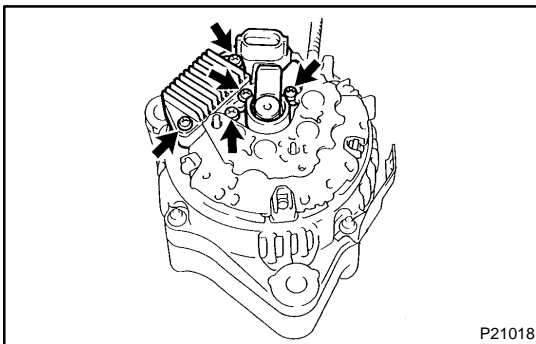
DISASSEMBLY

1. REMOVE REAR END COVER

- (a) Remove the nut and terminal insulator.

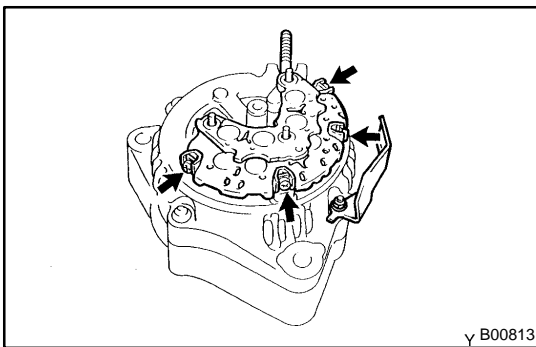


- (b) Remove the 3 nuts, bolt, plate terminal and rear end cover.



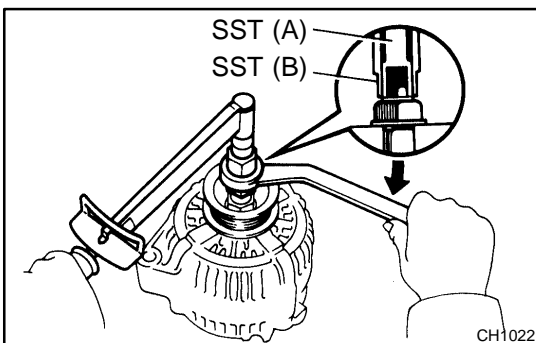
2. REMOVE BRUSH HOLDER AND VOLTAGE REGULATOR

- (a) Remove the brush holder cover from the brush holder.
- (b) Remove the 5 screws, brush holder and voltage regulator.
- (c) Remove the seal plate from the rectifier end frame.



3. REMOVE RECTIFIER HOLDER

- (a) Remove the nut and cord clip.
- (b) Remove the 4 screws and rectifier holder.
- (c) Remove the 4 rubber insulators.



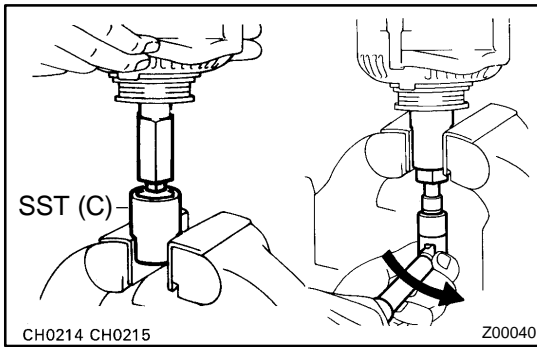
4. REMOVE PULLEY

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-63010

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 to SST (C).
- (d) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

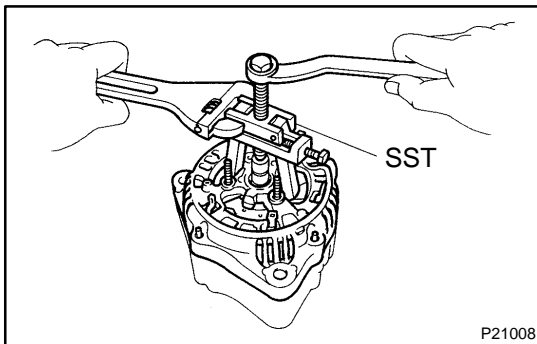
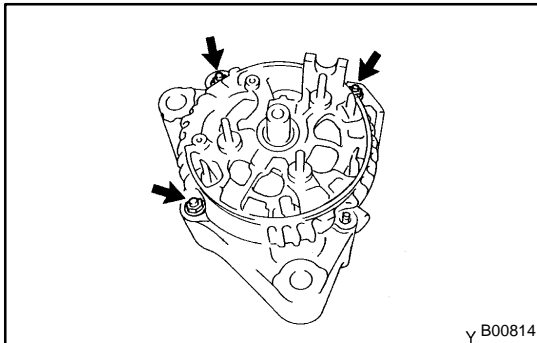
NOTICE:

To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.

- (e) Remove the generator from SST (C).
- (f) Turn SST (B), and remove SST (A and B).
- (g) Remove the pulley nut and pulley.

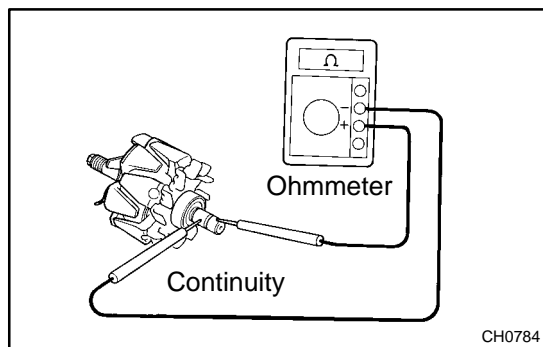
5. REMOVE RECTIFIER END FRAME

- (a) Remove the 3 nuts and cord clip.



- (b) Using SST, remove the rectifier end frame.
SST 09286-46011
- (c) Remove the generator washer.

6. REMOVE ROTOR FROM DRIVE END FRAME



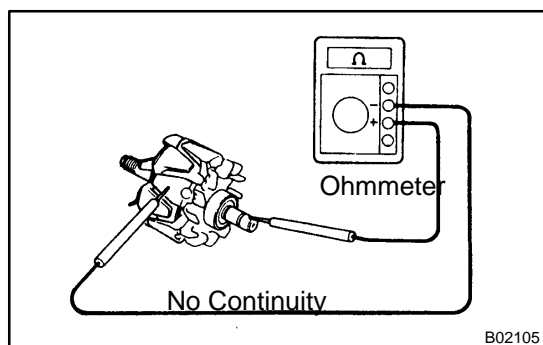
INSPECTION

1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 2.1 – 2.5 Ω at 20°C (68°F)

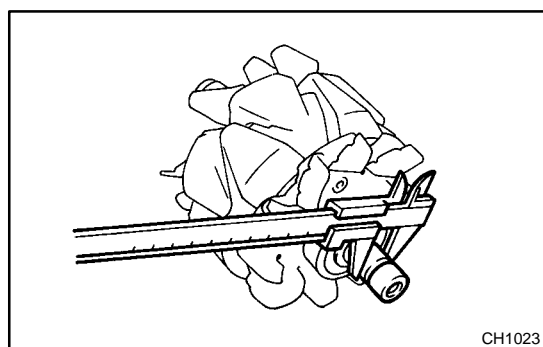
If there is no continuity, replace the rotor.



2. 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.



3. INSPECT SLIP RINGS

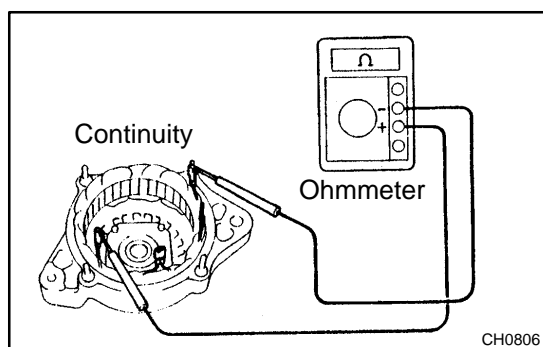
(a) Check that the slip rings are not rough or scored. If rough or scored, replace the rotor.

(b) Using vernier calipers, measure the slip ring diameter.

Standard diameter: 14.2 – 14.4 mm (0.559 – 0.567 in.)

Minimum diameter: 12.8 mm (0.504 in.)

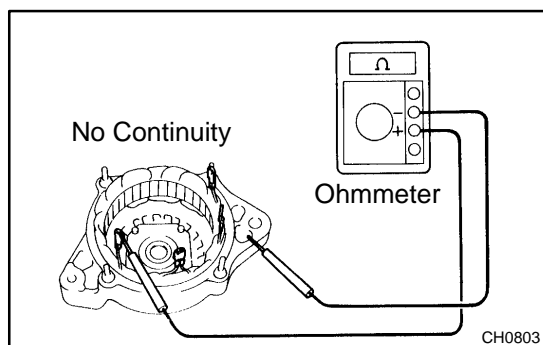
If the diameter is less than minimum, replace the rotor.



4. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

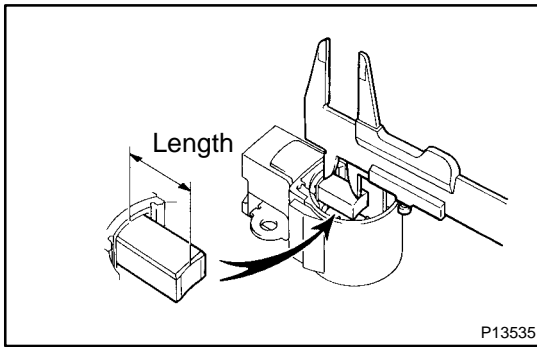
If there is no continuity, replace the drive end frame assembly.



5. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly.

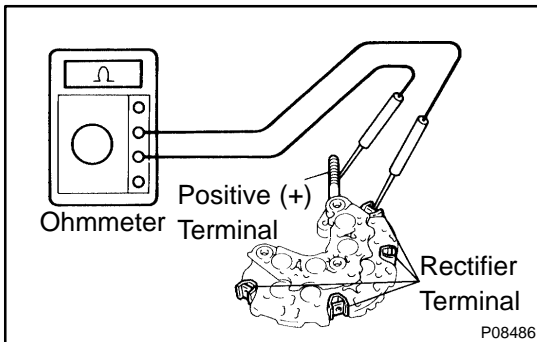
**6. INSPECT EXPOSED BRUSH LENGTH**

Using vernier calipers, measure the exposed brush length.

Standard exposed length: 10.5 mm (0.413 in.)

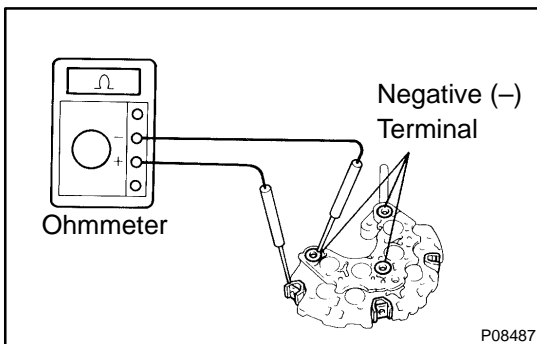
Minimum exposed length: 1.5 mm (0.059 in.)

If the exposed length is less than minimum, replace the brush holder.

**7. 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.

**8. 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.

9. INSPECT FRONT BEARING

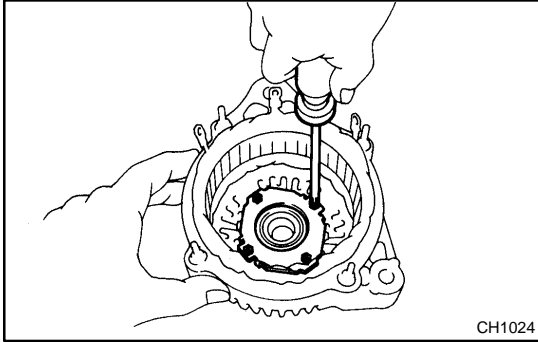
Check that the bearing is not rough or worn.

If necessary, replace the front bearing.

10. INSPECT REAR BEARING

Check that the bearing is not rough or worn.

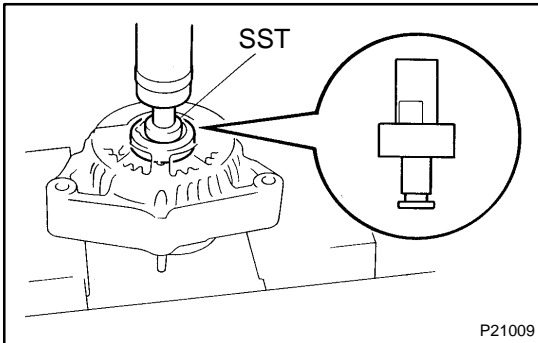
If necessary, replace the rear bearing.



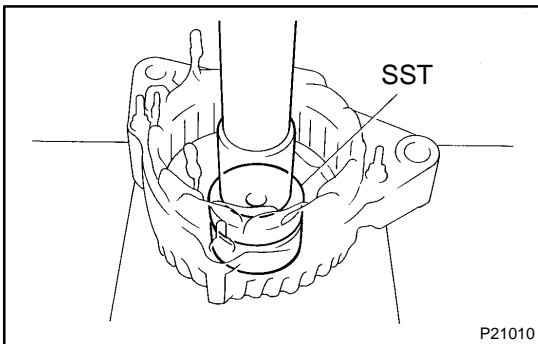
REPLACEMENT

1. REPLACE FRONT BEARING

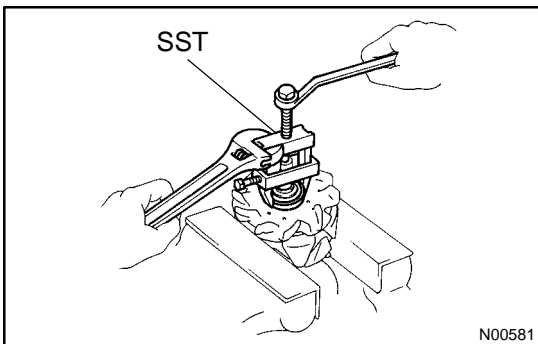
- (a) Remove the 4 screws and bearing retainer.



- (b) Using SST and a press, press out the bearing.
SST 09950-60010 (09951-00260, 09952-06010)



- (c) Using SST and a press, press in a new bearing.
SST 09950-60010 (09951-00500)
(d) Install the bearing retainer with the 4 screws.
Torque: 3.0 N·m (31 kgf·cm, 27 in.-lbf)



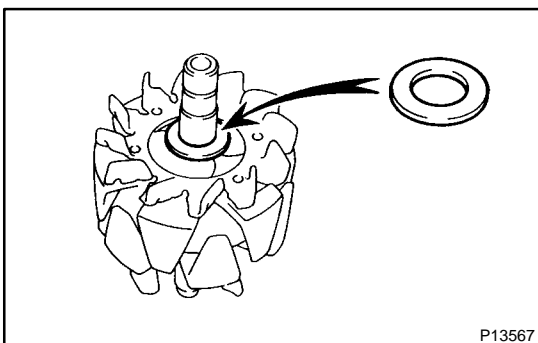
2. REPLACE REAR BEARING

- (a) Using SST, remove the bearing cover (outside) and bearing.
SST 09820-00021

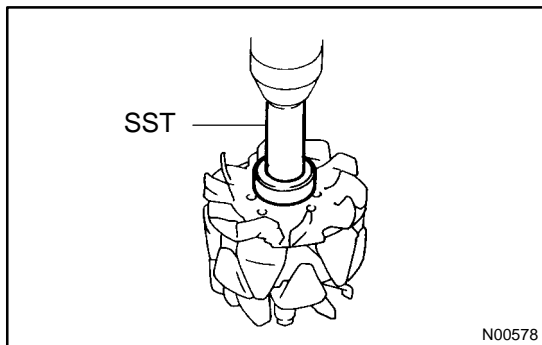
NOTICE:

Be careful not to damage the fan.

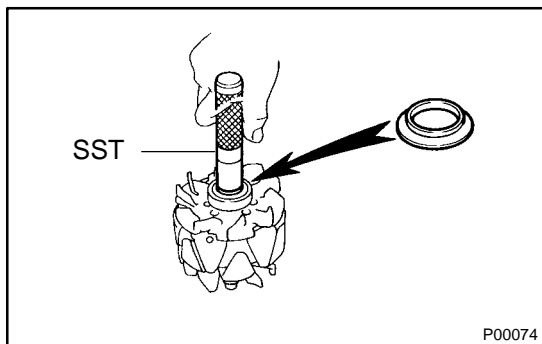
- (b) Remove the bearing cover (inside).



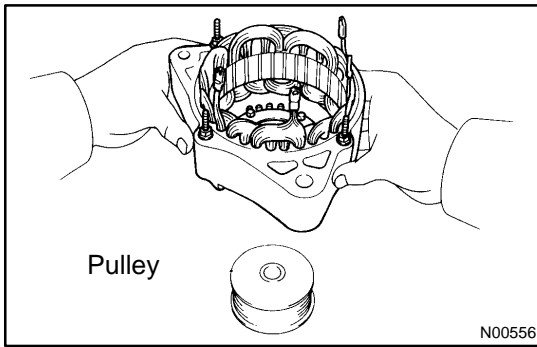
- (c) Place the bearing cover (inside) on the rotor.



- (d) Using SST and a press, press in a new bearing.
SST 09820-00030

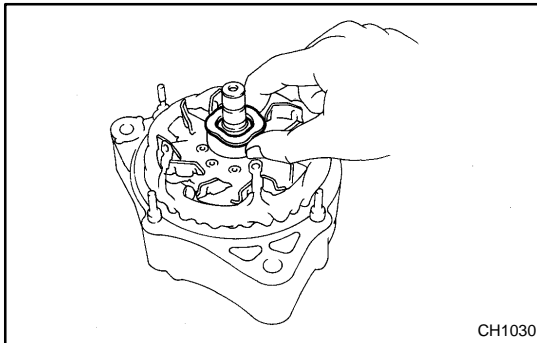


- (e) Using SST, push in the bearing cover (outside).
SST 09285-76010



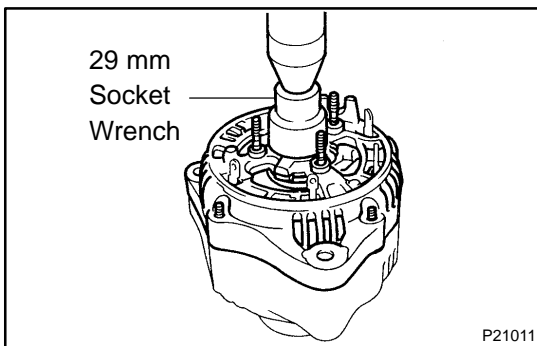
REASSEMBLY

1. PLACE DRIVE END FRAME ON PULLEY
2. INSTALL ROTOR TO DRIVE END FRAME

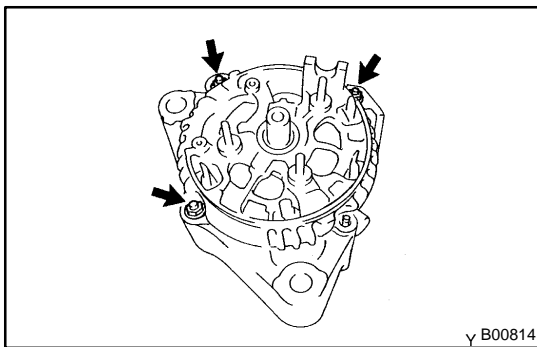


3. INSTALL RECTIFIER END FRAME

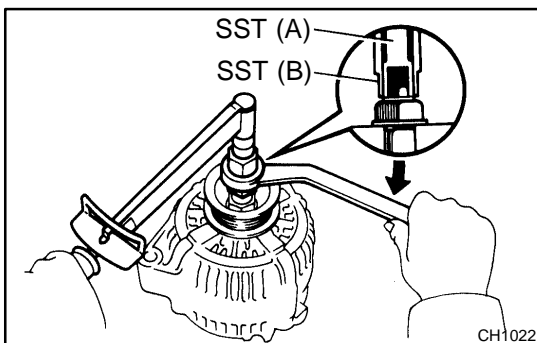
- (a) Place the generator washer on the rotor.



- (b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.

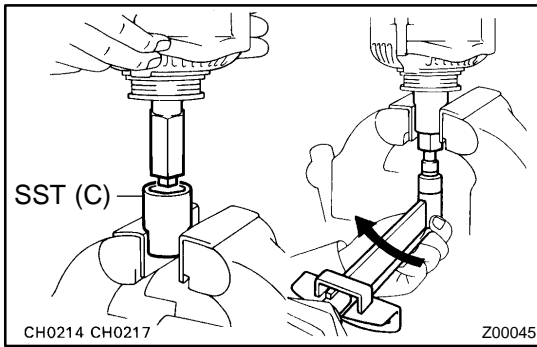


- (c) Temporarily install the cord clip and 3 nuts.

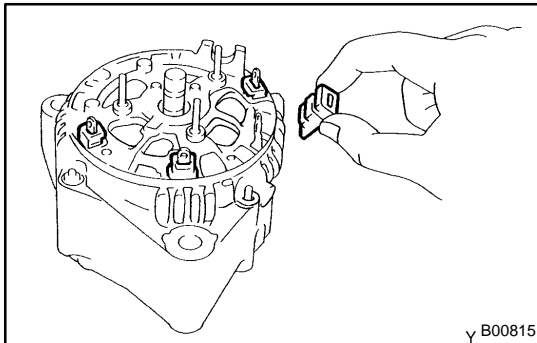


4. INSTALL PULLEY

- (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 09820-63010
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (c) Check that SST (A) is secured to the pulley shaft.

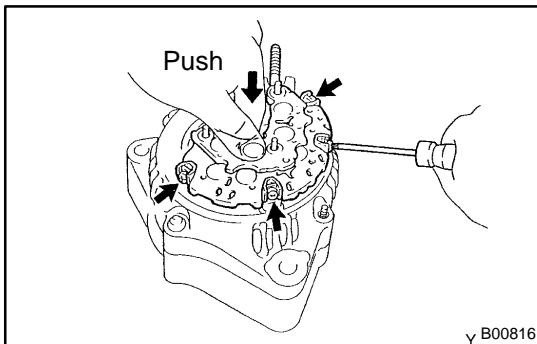


- (d) As shown in the illustration, mount SST (C) in a vise, and install the generator to SST (C).
- (e) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.
Torque: 110.5 N·m (1,128 kgf·cm, 81 ft·lbf)
- (f) Remove the generator from SST (C).
- (g) Turn SST (B), and remove SST (A and B).



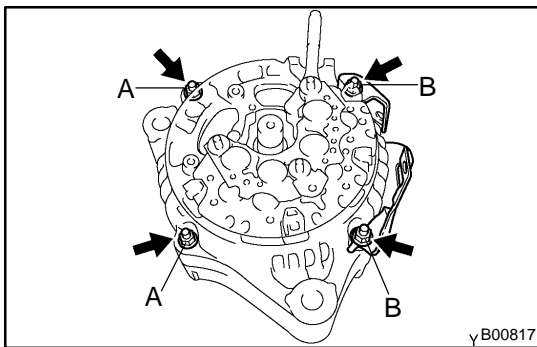
5. INSTALL RECTIFIER HOLDER

- (a) Install the 4 rubber insulators on the lead wires.



- (b) Install the rectifier holder while pushing it with the 4 screws.

Torque: 2.94 N·m (30 kgf·cm, 26 in·lbf)

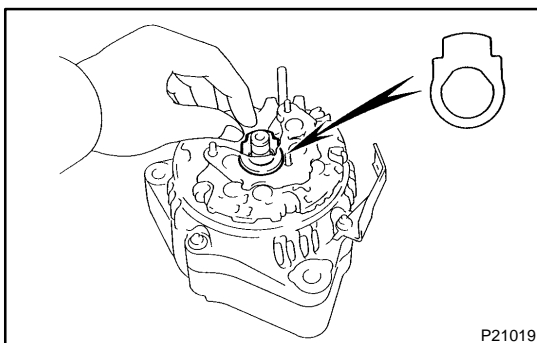


- (c) Install the cord clip and nut.
Tighten the 4 nuts.

Torque:

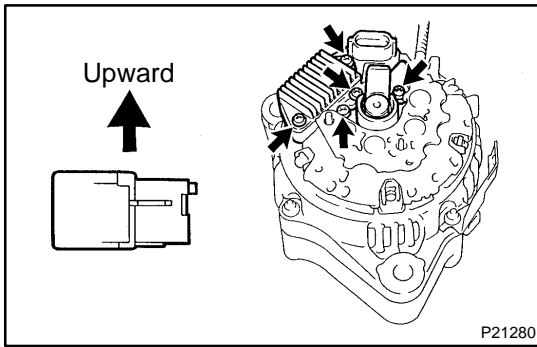
A: 4.5 N·m (46 kgf·cm, 40 in·lbf)

B: 5.4 N·m (55 kgf·cm, 48 in·lbf)



6. INSTALL VOLTAGE REGULATOR AND BRUSH HOLDER

- (a) Place the seal plate on the rectifier end frame.



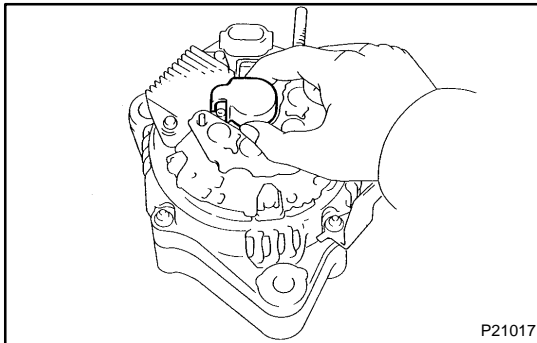
- (b) Place the voltage regulator and brush holder on the rectifier end frame.

NOTICE:

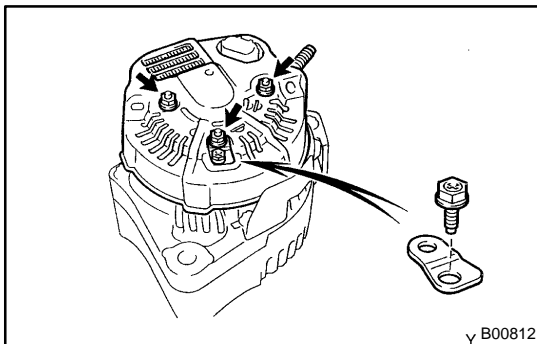
Be careful of the holder installation direction.

- (c) Install the 5 screws.

Torque: 2.0 N·m (20 kgf·cm, 17 in.-lbf)



- (d) Place the brush holder cover on the brush holder.

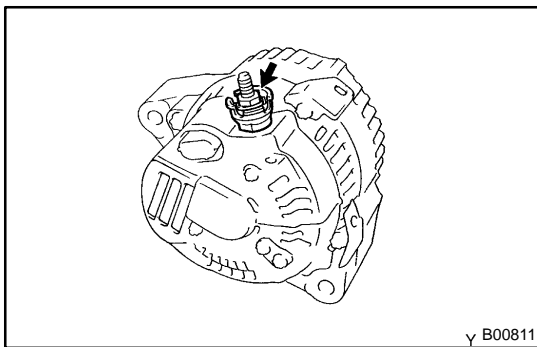
**7. INSTALL REAR END COVER**

- (a) Install the end cover and plate terminal with the 3 nuts and bolt.

Torque:

Bolt: 3.8 N·m (39 kgf·cm, 34 in.-lbf)

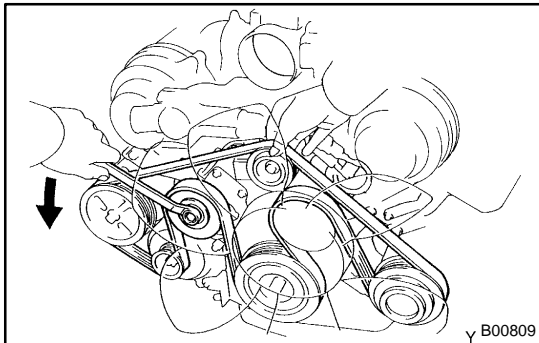
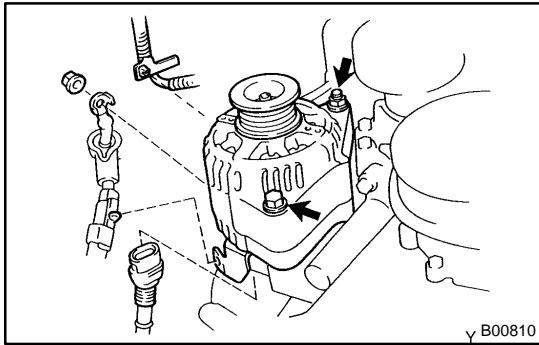
Nut: 4.4 N·m (45 kgf·cm, 39 in.-lbf)



- (b) Install the terminal insulator with the nut.

Torque: 6.5 N·m (66 kgf·cm, 58 in.-lbf)

8. CHECK THAT ROTOR ROTATES SMOOTHLY



INSTALLATION

1. INSTALL GENERATOR

- (a) Install the generator with the bolt and nut.
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)
- (b) Connect the generator connector.
- (c) Connect the generator wire with the nut and rubber cap.
- (d) Install the generator wire clamp to the cord clip on the generator.
- (e) Install the heated oxygen sensor wire clamp to the cord clip on the generator.

2. INSTALL PS PUMP

(See page [EM-82](#))

3. INSTALL PS OIL COOLER PIPE

4. INSTALL GENERATOR DRIVE BELT

Install the belt by turning the belt tensioner counterclockwise.

HINT:

The pulley bolt for the belt tensioner has a left – hand thread.

5. PERFORM ON-VEHICLE INSPECTION

(See page [CH-2](#))

6. INSTALL ENGINE UNDER COVER

7. INSTALL OIL PAN PROTECTOR

8. INSTALL AIR CLEANER INLET

9. INSTALL BATTERY CLAMP COVER

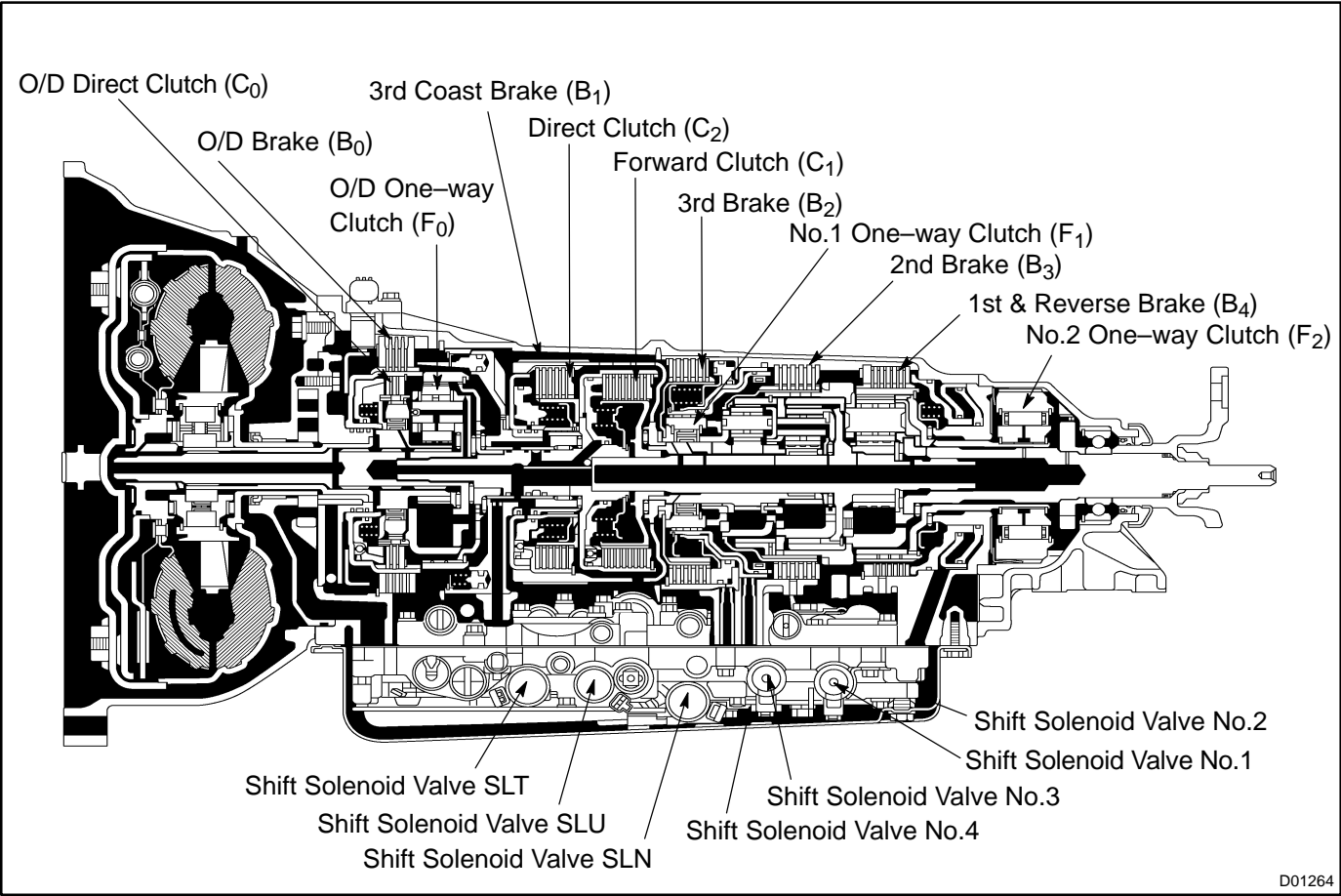
AUTOMATIC TRANSMISSION SYSTEM

AT033-01

PRECAUTION

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

OPERATION



D01264

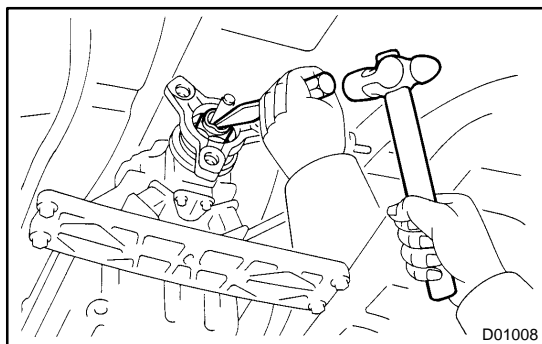
Shift Lever Position	Gear Position	S1	S2	S3	S4	C ₀	C ₁	C ₂	B ₀	B ₁	B ₂	B ₃	B ₄	F ₀	F ₁	F ₂
P	Park	ON	OFF	ON	OFF	○										
R	Reverse	ON	OFF	OFF	OFF			○	○				○			
N	Neutral	ON	OFF	ON	OFF	○										
D	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
	5th	OFF	OFF	OFF	ON		○	○	○		○					
4	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	OFF	OFF	○	○				○			○	○	
	4th	OFF	OFF	ON	OFF	○	○	○			○			○		
3	1st	ON	OFF	OFF	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
	3rd	OFF	ON	ON	OFF	○	○			○	○			○	○	
2	1st	ON	OFF	ON	OFF	○	○							○		○
	2nd	ON	ON	OFF	OFF	○	○					○		○		
L	1st	ON	OFF	OFF	OFF	○	○						○	○		○

○ : Operating

EXTENSION HOUSING OIL SEAL ON-VEHICLE REPAIR

AT035-01

1. DRAIN ATF
2. REMOVE FRONT EXHAUST PIPE AND HEAT INSULATOR
(See page [AT-16](#))
3. REMOVE PROPELLER SHAFT
(See page [PR-3](#))

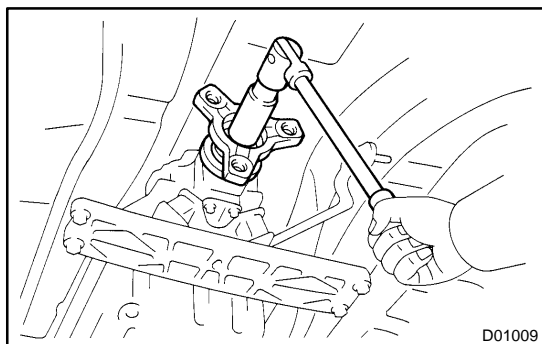


4. REMOVE TRANSMISSION OUTPUT FLANGE

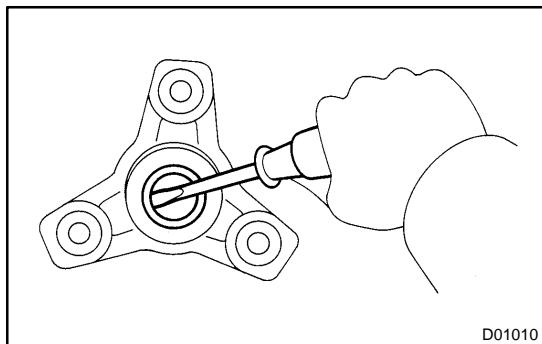
- (a) Using a chisel and hammer, loosen the staked part of the nut.

HINT:

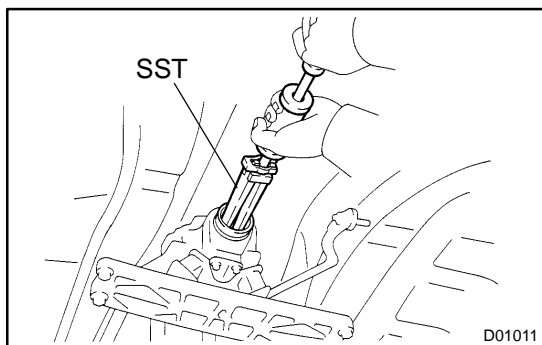
Shift the shift lever to the P position.



- (b) Using a 30 mm deeper socket wrench, remove the nut.
- (c) Tap the output flange with a plastic hammer to remove it.



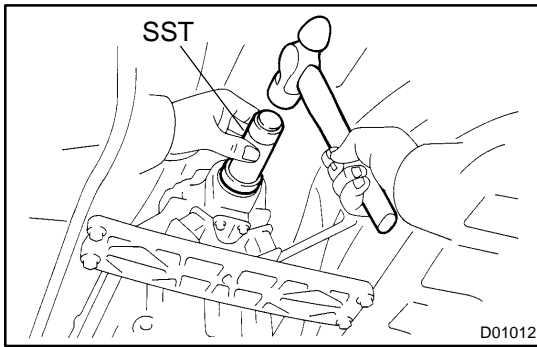
- (d) Using a screwdriver, remove the oil seal from the output flange.



5. REMOVE EXTENSION HOUSING REAR OIL SEAL

Using SST, remove the oil seal.

SST 09308-00010

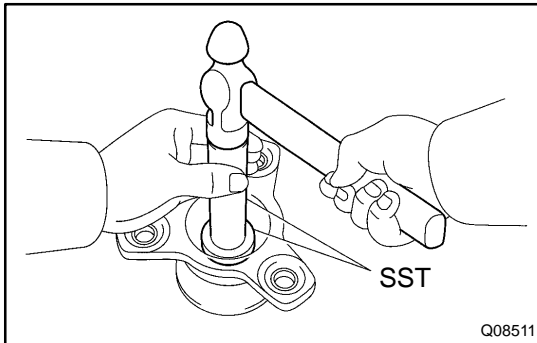


6. INSTALL EXTENSION HOUSING REAR OIL SEAL

- (a) Coat the lip of a new oil seal with MP grease.
- (b) Using SST and a hammer, drive in the oil seal with the lip facing downward.

SST 09309-37010

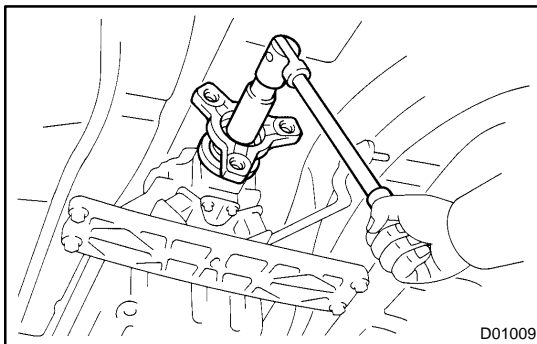
Oil seal depth from flat end: 2.0 mm (0.079 in.)



7. INSTALL TRANSMISSION OUTPUT FLANGE

- (a) Using SST and a hammer, drive in a new oil seal.

SST 09950-60010 (09951-00350), 09950-70010
(09951-07100)

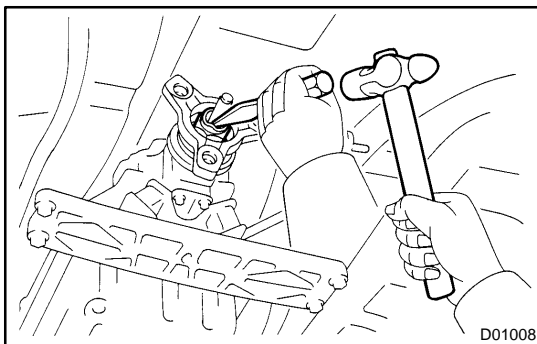


- (b) Install the output flange.
- (c) Using a 30 mm deeper socket wrench, install and torque a new nut.

Torque: 123 N·m (1,250 kgf·cm, 90 ft·lbf)

HINT:

Shift the shift lever to P position.



- (d) Using a chisel and hammer, stake the nut.

8. INSTALL PROPELLER SHAFT

(See page [PR-9](#))

9. INSTALL FRONT EXHAUST PIPE AND HEAT INSULATOR

(See page [AT-16](#))

10. FILL AND CHECK FLUID LEVEL

(See page [DI-173](#))

ATF TEMPERATURE SENSOR ON-VEHICLE REPAIR

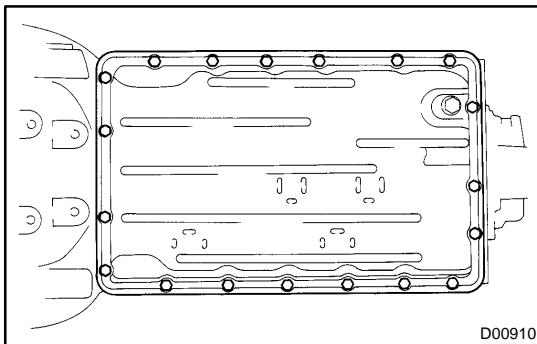
AT036-01

CAUTION:

When working with FIPG material, you must observe the following items.

- 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 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 WITH GASKET AND DRAIN ATF

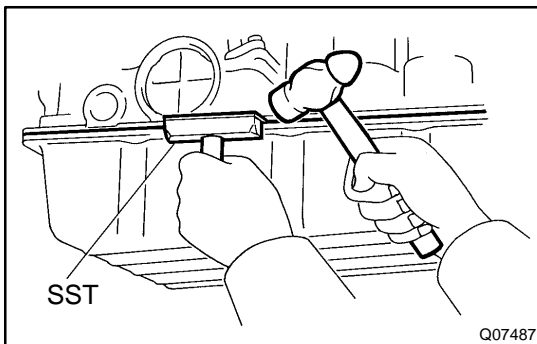


2. REMOVE OIL PAN

NOTICE:

Some fluid will remain in the oil pan.

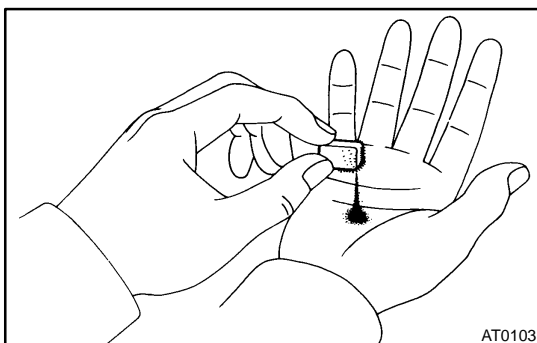
- (a) Remove the 19 bolts.



- (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.

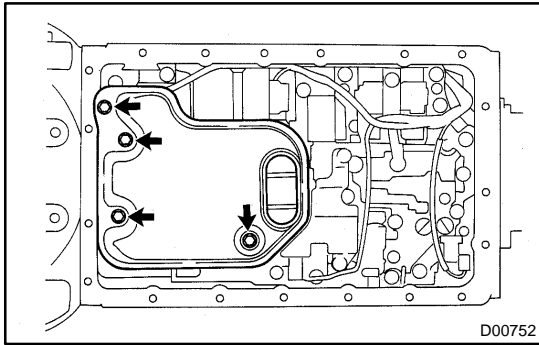


3. EXAMINE PARTICLES IN PAN

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

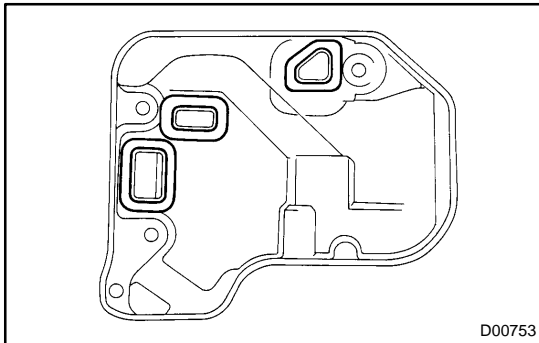


4. REMOVE OIL STRAINER

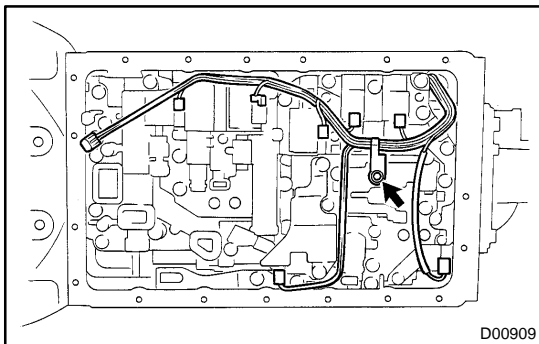
NOTICE:

Be careful as some fluid will come out of the oil strainer.

- (a) Remove the 4 bolts and oil strainer.

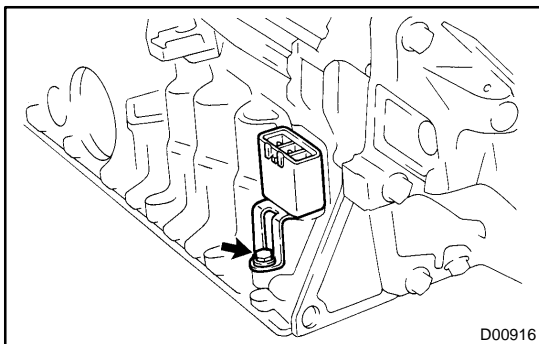


- (b) Remove the 3 gaskets from the oil strainer.



5. REMOVE SOLENOID WIRING WITH ATF TEMPERATURE SENSOR

- (a) Disconnect the ATF temperature sensor.
- (b) Remove the bolt and clamp.
- (c) Disconnect the 7 connectors from the solenoid valves.

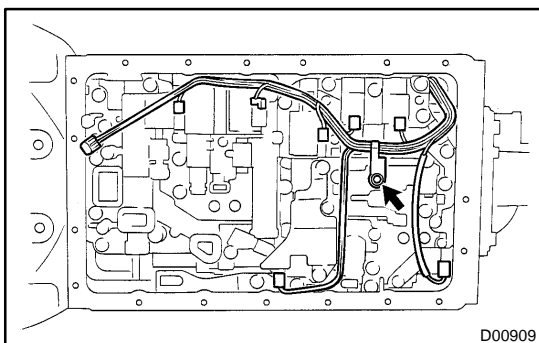


- (d) Remove the bolt and pull out the solenoid connector.

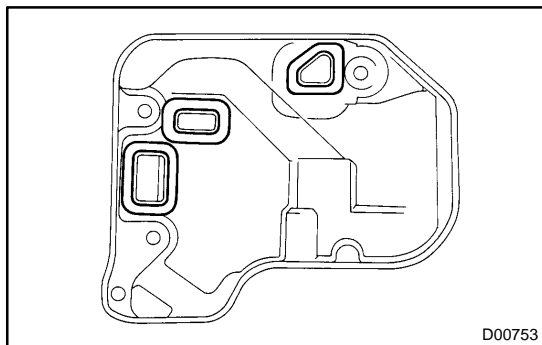
6. INSTALL SOLENOID WIRING WITH ATF TEMPERATURE SENSOR

- (a) Install the solenoid connector with the bolt.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

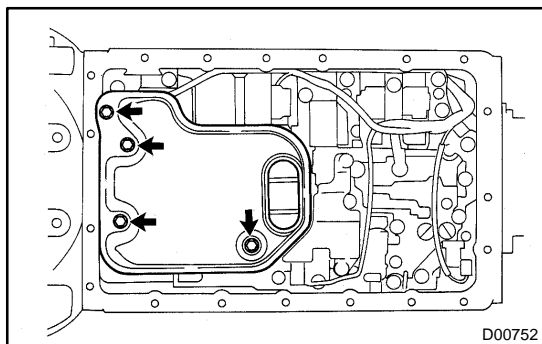


- (b) Connect the 7 connectors to the solenoid valves.
 - (c) Install the clamp with the bolt.
- Torque: 6.4 N·m (65 kgf·cm, 56 in.-lbf)**
- (d) Connect the ATF temperature sensor.

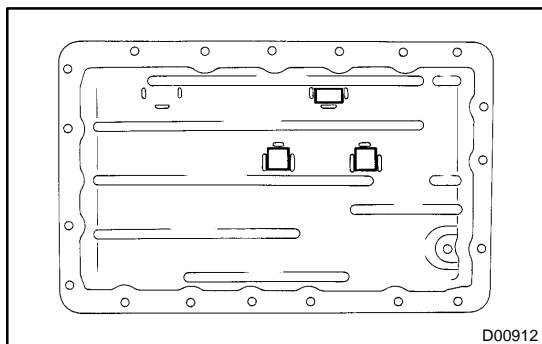


7. INSTALL OIL STRAINER

- (a) Install 3 new gaskets.

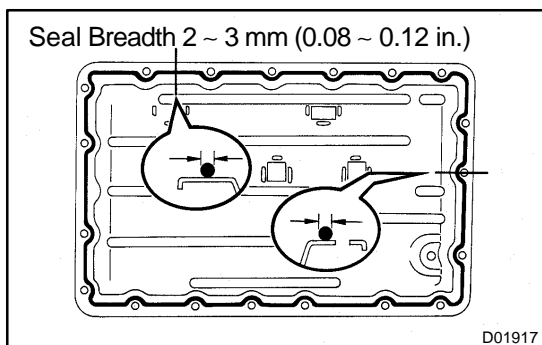


- (b) Install the oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)



8. INSTALL OIL PAN

- (a) Install the 3 magnets in the indications of the oil pan.

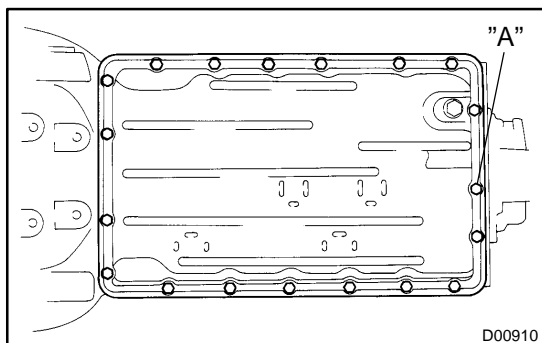


Seal Breadth 2 ~ 3 mm (0.08 ~ 0.12 in.)

- (b) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.
 (c) Apply FIPG to the oil pan.

FIPG:

Part No. 08826 – 00090, THREE BOND 1281 or equivalent



- (d) Install the oil pan with the 19 bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

HINT:

Replace the only "A" bolt with a new one.

9. INSTALL DRAIN PLUG WITH NEW GASKET

Torque: 20 N·m (205 kgf·cm, 15 ft·lbf)

10. FILL FLUID AND CHECK FLUID

(See page [DI-173](#))

VALVE BODY ASSEMBLY ON-VEHICLE REPAIR

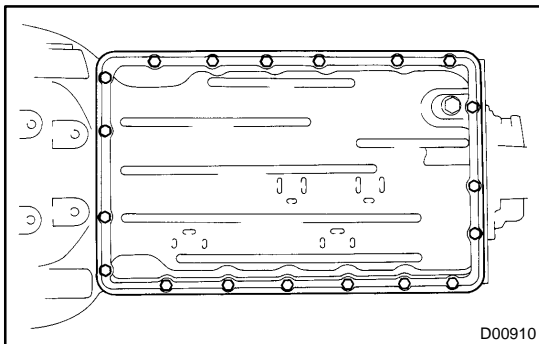
AT037-01

CAUTION:

When working with FIPG material, you must observe the following items.

- 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 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 WITH GASKET AND DRAIN ATF

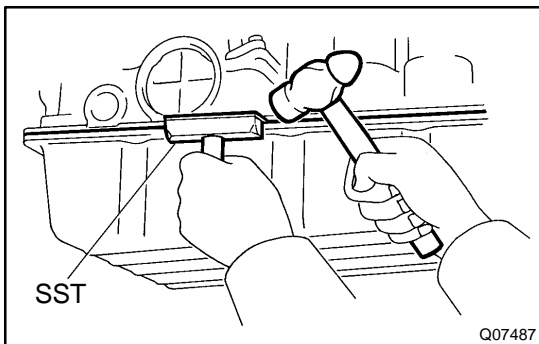


2. REMOVE OIL PAN

NOTICE:

Some fluid will remain in the oil pan.

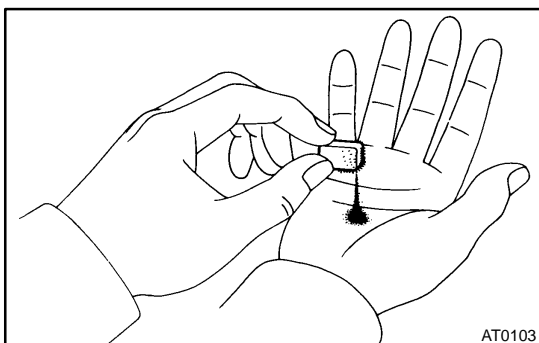
- (a) Remove the 19 bolts.



- (b) Install the blade of SST between the transmission case on 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.

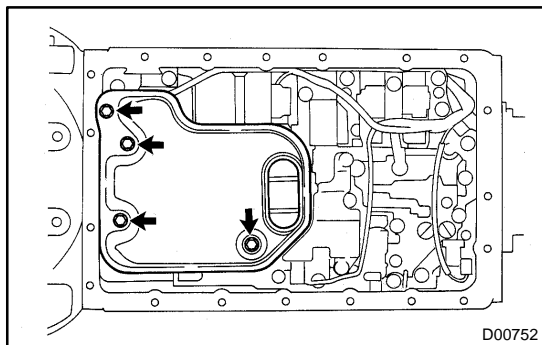


3. EXAMINE PARTICLES IN PAN

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

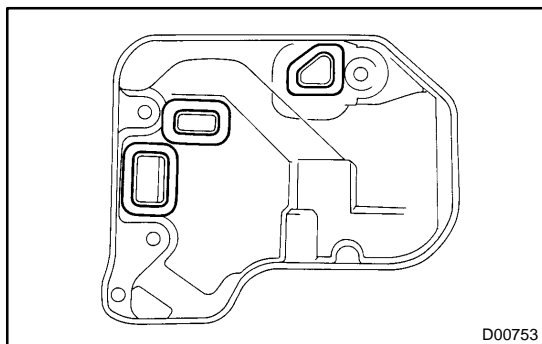


4. REMOVE OIL STRAINER

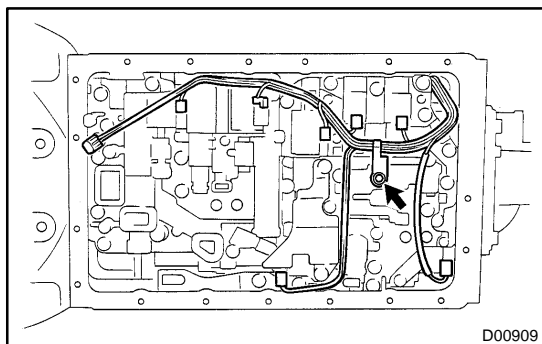
NOTICE:

Be careful as some fluid will come out of the oil strainer.

- (a) Remove the 4 bolts and oil strainer.

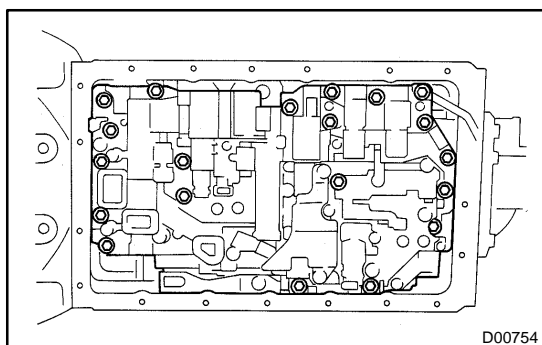


- (b) Remove the 3 gaskets from the oil strainer.



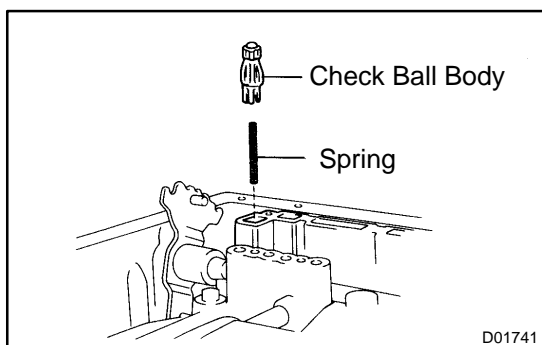
5. REMOVE SOLENOID WIRING

- (a) Disconnect the ATF temperature sensor.
 (b) Remove the bolt and clamp.
 (c) Disconnect the 7 connectors from the solenoid valves.



6. REMOVE VALVE BODY

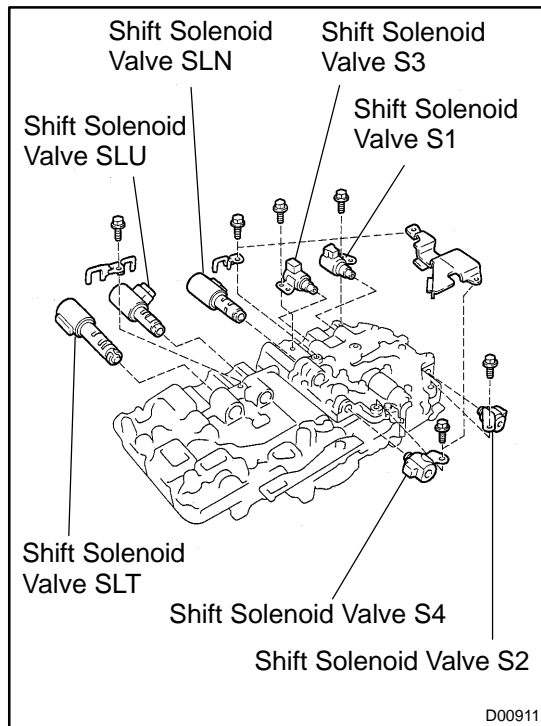
Remove the 21 bolts and valve body.



7. REMOVE CHECK BALL BODY AND SPRING

NOTICE:

Do not drop the check ball body and spring.



8. REMOVE SOLENOID VALVE

- Remove the 3 bolts and shift solenoid valve No.1, No.2 and No.3.
- Remove the 2 bolts, oil guide plate, lock plate, shift solenoid valve SLN and No.4.
- Remove the 6 O-rings from each shift solenoid valve.
- Remove the bolt, lock plate and shift solenoid valve SLU and SLT.

9. INSTALL SOLENOID VALVE

- Install the shift solenoid valve SLU and SLT and the lock plate with the bolt.

Torque: 6.4 N·m (65 kgf·cm, 56 in.-lbf)

- Coat 6 new O-rings with ATF.
- Install the 6 O-rings to the each solenoid valve.
- Install the shift solenoid valve SLN, No.4, lock plate and oil guide plate with the 2 bolts.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

- Install the shift solenoid valve No.1, No.2 and No.3 with the 3 bolts.

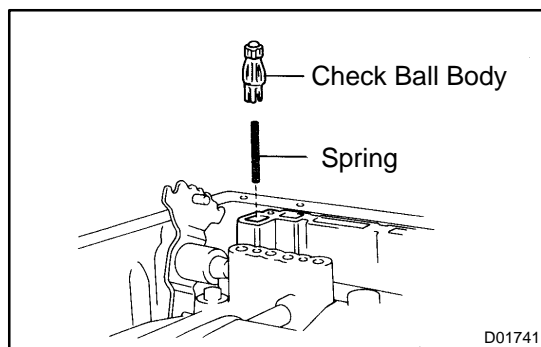
Torque:

Shift solenoid valve No.1 and No.3:

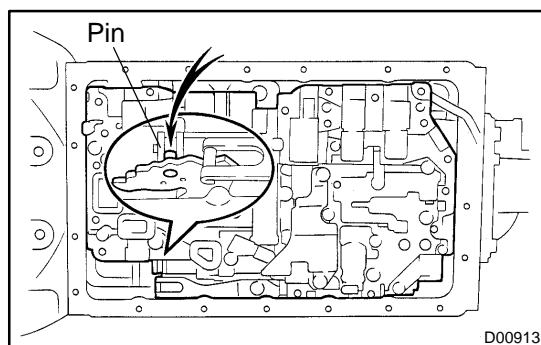
6.4 N·m (65 kgf·cm, 56 in.-lbf)

Shift solenoid valve No.2:

10 N·m (100 kgf·cm, 7 ft·lbf)

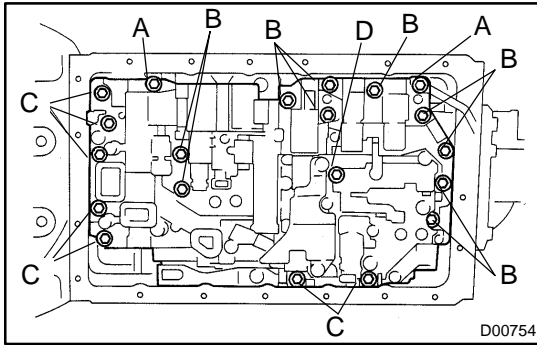


10. INSTALL CHECK BALL BODY AND SPRING

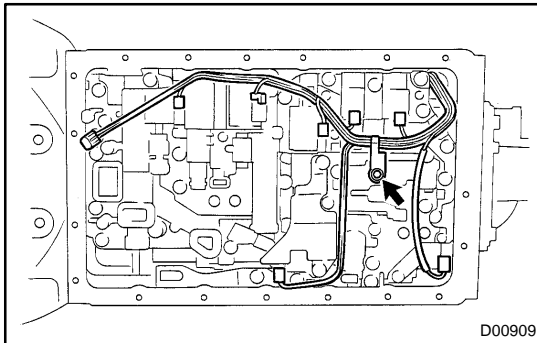


11. INSTALL VALVE BODY

- Align the groove of the manual valve to pin of the lever.

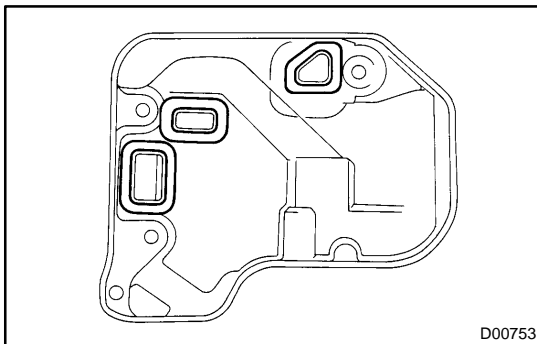


- (b) Install the 21 bolts.
Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)
Bolt length:
Bolt A: 23 mm (0.91 in.)
Bolt B: 28 mm (1.10 in.)
Bolt C: 36 mm (1.42 in.)
Bolt D: 55 mm (2.17 in.)



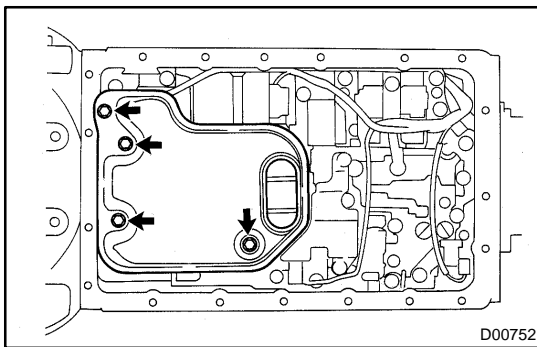
12. INSTALL SOLENOID WIRING

- (a) Connect the 7 connectors to the solenoid valves.
 (b) Install the clamp with the bolt.
Torque: 6.4 N·m (65 kgf-cm, 56 in.-lbf)
 (c) Connect the ATF temperature sensor.

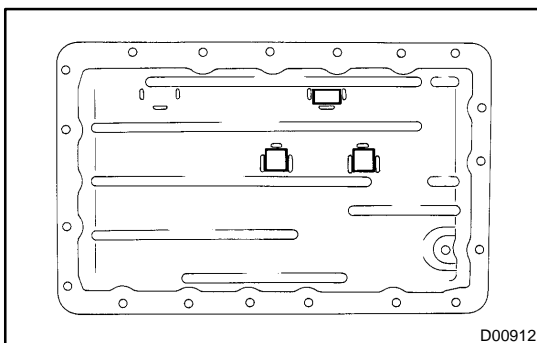


13. INSTALL OIL STRAINER

- (a) Install 3 new gaskets.

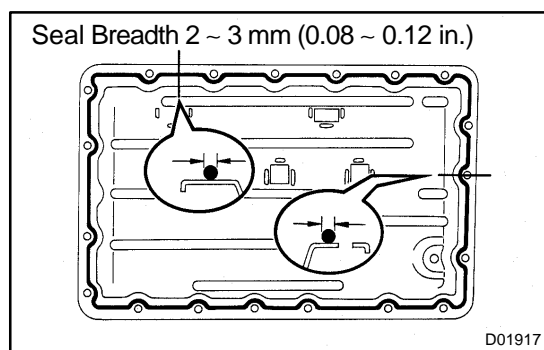


- (b) Install the oil strainer with the 4 bolts.
Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)



14. INSTALL OIL PAN

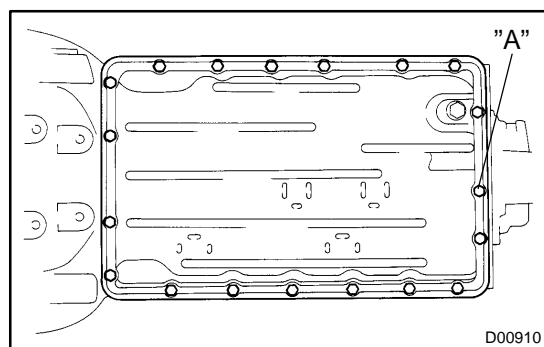
- (a) Install the 3 magnets in the indications of the oil pan.



- (b) Remove any packing material and be careful not to drop oil on the contacting surfaces of the transmission case and oil pan.
- (c) Apply FIPG to the oil pan.

FIPG:

Part No. 08826 – 00090, THREE BOND 1281 or equivalent



- (d) Install the oil pan with the 19 bolts.
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

HINT:

Replace the only "A" bolt with a new one.

15. INSTALL DRAIN PLUG WITH NEW GASKET

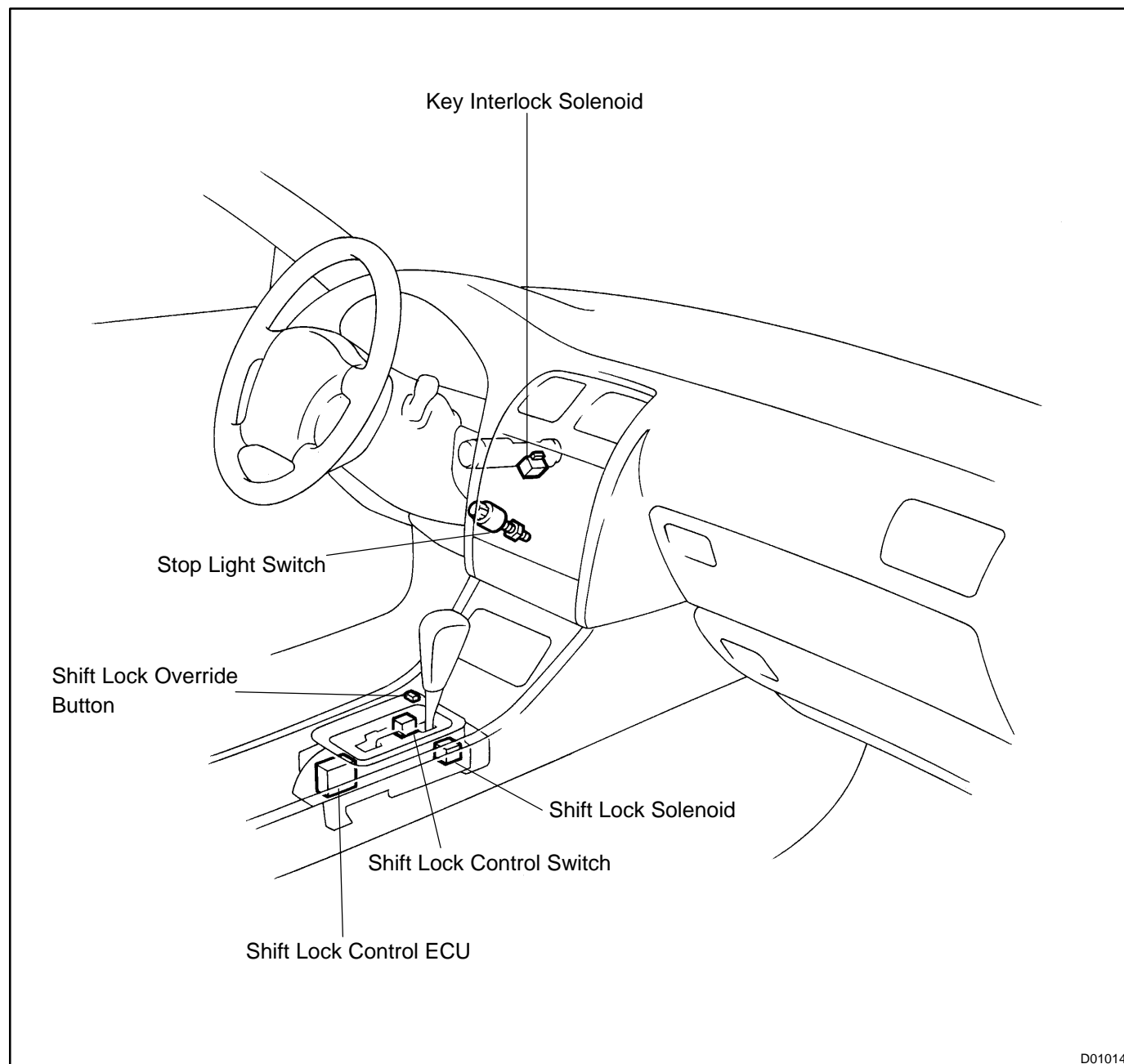
Torque: 20 N·m (205 kgf·cm, 15 ft-lbf)

16. FILL FLUID AND CHECK FLUID

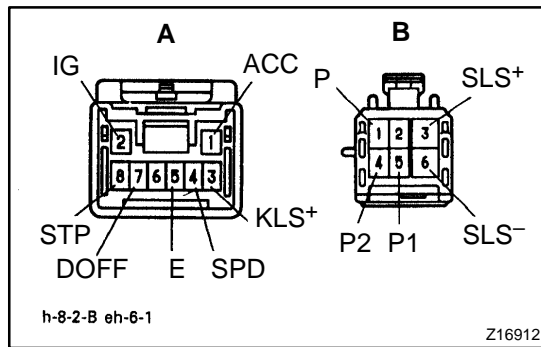
(See page [DI-173](#))

SHIFT LOCK SYSTEM LOCATION

AT038-01



D01014



INSPECTION

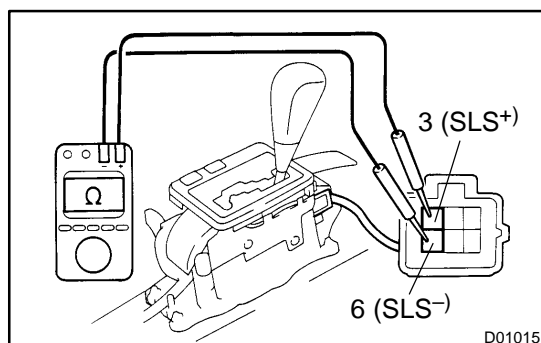
1. INSPECT SHIFT LOCK CONTROL ECU

Using a voltmeter, measure the voltage at each terminal.

HINT:

Do not disconnect the ECU connector.

Terminal	Measuring Condition	Voltage (V)
A, 1 – A, 5 (ACC – E)	IG SW ACC	10 – 14
A, 2 – A, 5 (IG – E)	IG SW ON	10 – 14
A, 8 – A, 5 (STP – E)	Depress brake pedal	10 – 14
A, 3 – A, 5 (KLS+ – E)	(1) IG SW ACC and shift lever P position	Below 1.5
	(2) IG SW ON and shift lever R, N, D, 3, 2, L position	8.5 – 10.5
	(3) IG SW ON and shift lever R, N, D, 3, 2, L position (after 1 second)	7.0 – 8.5
A, 4 – A, 5 (SPD – E)	(1) IG SW ON, shift lever D or 3 position and vehicle speed more than 11 km/h (6.8 mph)	Below 2
	(2) IG SW ON, shift lever D or 3 position and vehicle speed less than 11 km/h (6.8 mph)	10 – 14
A, 7 – A, 5 (DOFF – E)	(1) IG SW ON and shift lever D, 3 position	10 – 14
	(2) IG SW ON and shift lever P, R, N, 2, L position	0
B, 3 – B, 6 (SLS+ – SLS-)	(1) IG SW ON and shift lever P position	0
	(2) IG SW ON and depress brake pedal	8.8 – 12.5
	(3) IG SW ON and depress brake pedal (after 20 seconds)	6.5 – 9.2
	(4) IG SW ON and shift lever D, 3, 2, L position	0
B, 5 – B, 1 (P1 – P)	(1) IG SW ON and shift lever P position	0
	(2) IG SW ON and shift lever R, N, D, 3, 2, L position	10 – 14
B, 4 – B, 1 (P2 – P)	(1) IG SW ACC and shift lever P position	10 – 14
	(2) IG SW ACC and shift lever R, N, D, 3, 2, L position	0

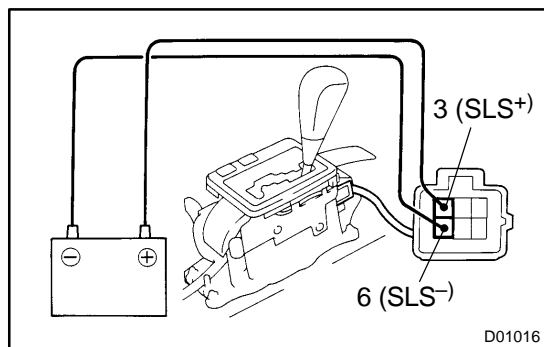


2. INSPECT SHIFT LOCK SOLENOID

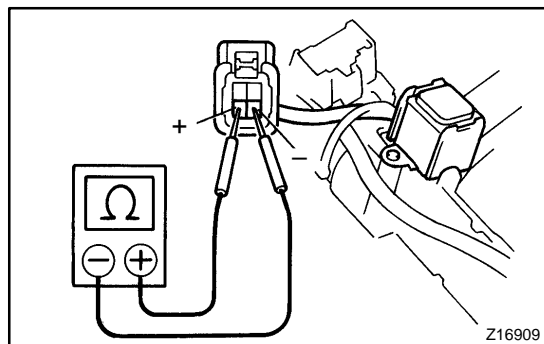
- Disconnect the solenoid connector.
- Using an ohmmeter, measure the resistance between terminals 3 and 6.

Standard resistance: 20 – 28 Ω

If the resistance is not as specified, replace the solenoid.



- (c) Apply the battery voltage between terminals 3 and 6. At this time, confirm that the solenoid operates. If the operation is not as specified, replace the solenoid.

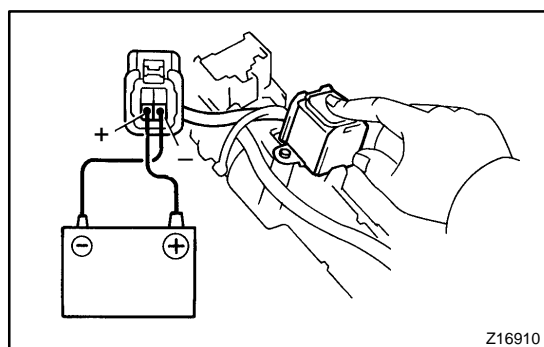


3. INSPECT KEY INTERLOCK SOLENOID

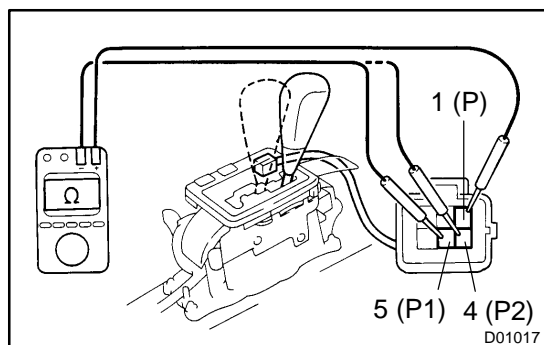
- (a) Disconnect the solenoid connector.
(b) Using an ohmmeter, measure the resistance between terminals 3 and 4.

Standard resistance: 12 – 17 Ω

If the resistance value is not as specified, replace the solenoid.



- (c) Touch the solenoid with your finger and check that the solenoid operation can be felt when battery voltage is applied intermittently to terminals 3 and 4. If the operation is not as specified, replace the solenoid.



4. INSPECT SHIFT LOCK CONTROL SWITCH

Inspect that there is continuity between each terminal.

Shift position	Tester condition	Specified value
P position (Shift lever at left side)	5 – 1 (P1 – P)	Continuity
P position (Shift lever at right side)	5 – 1 (P1 – P) 4 – 1 (P2 – P)	Continuity
R, N, D, 3, 2, L position	4 – 1 (P2 – P)	Continuity

If the continuity is not as specified, replace the switch.

AT03A-01



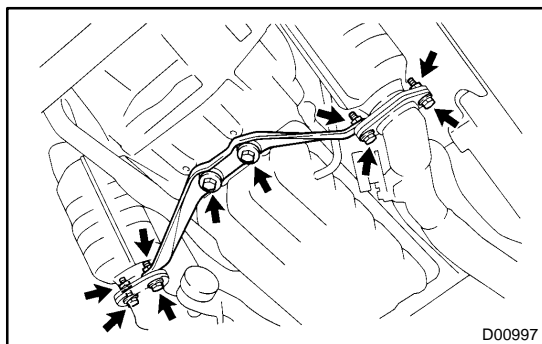
REMOVAL

1. REMOVE LEVEL GAUGE
2. RAISE VEHICLE

NOTICE:

Make sure that the vehicle is securely supported.

3. REMOVE ENGINE UNDER COVER
4. REMOVE FRONT SUSPENSION PROTECTOR



5. REMOVE FRONT EXHAUST PIPE

- (a) Disconnect the 2 heated oxygen sensors.

Torque: 44 N·m (450 kgf-cm, 32 ft-lbf)

HINT:

At the time of installation, please refer to the following items.

- Before installing the heated oxygen sensor, twist the sensor wire counterclockwise 3 and 1/2 turns.
- After installing the heated oxygen sensor wire is not twisted. If it is twisted, remove the heated oxygen sensor and reinstall it.

- (b) Remove the 4 bolts, nuts and 2 gaskets from the LH and RH front TWC.

Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)

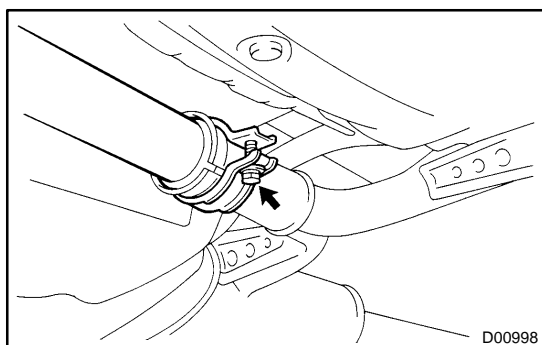
HINT:

At the time of installation, please refer to the following item.

Replace the used nuts and gaskets with new ones.

- (c) Remove the 2 bolts and support bracket.

Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)



- (d) Remove the pipe clamp set bolt and gasket.

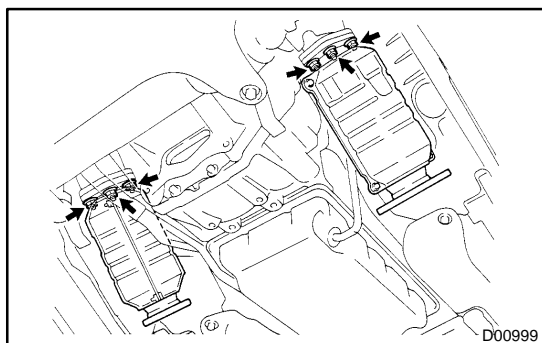
(See page [EM-120](#))

HINT:

At the time of installation, please refer to the following item.

Replace the used gasket with a new one.

- (e) Remove the front exhaust pipe.



6. REMOVE LH AND RH FRONT TWC

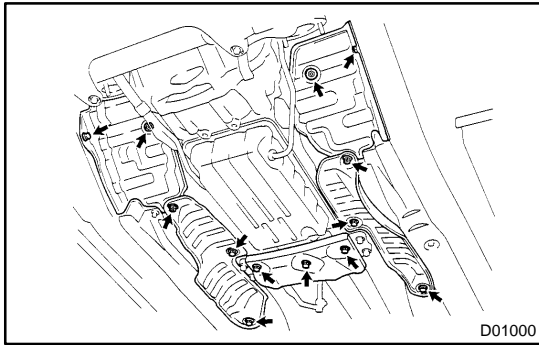
Remove the 6 nuts, 2 gaskets, LH and RH front TWC.

Torque: 62 N·m (630 kgf-cm, 46 ft-lbf)

HINT:

At the time of installation, please refer to the following item.

Replace the used nuts and gaskets with new ones.



7. REMOVE HEAT INSULATOR AND ENGINE REAR MOUNTING MEMBER BRACKET PLATE

- (a) Remove the 4 nuts, 6 bolts and heat insulators.
- (b) Remove the 3 bolts and bracket plate.

Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

8. REMOVE BOLT AND FILLER PIPE

HINT:

At the time of installation, please refer to the following item.
Replace the used O-ring with a new one.

9. REMOVE HEAT INSULATOR

Remove the 6 bolts and heat insulator.

Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

10. REMOVE CROSSMEMBER BRACE

- (a) Remove the 4 bolts and front center floor crossmember brace.

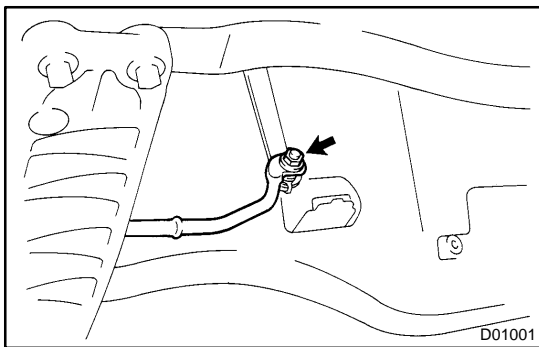
Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

- (b) Remove the 4 nuts and rear center floor crossmember brace.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

11. REMOVE PROPELLER SHAFT

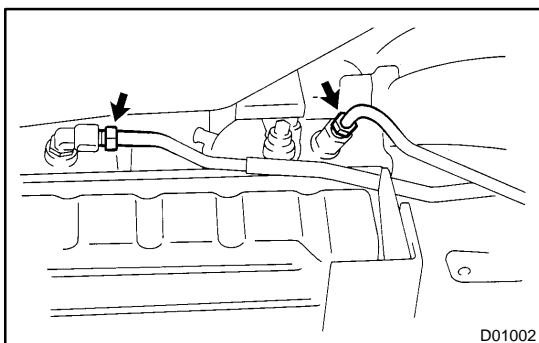
(See page [PR-3](#))



12. REMOVE SHIFT CONTROL ROD

Remove the nut and disconnect the rod.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)



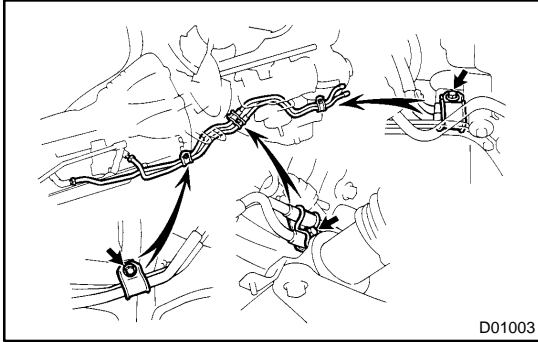
13. DISCONNECT OIL COOLER PIPE

- (a) Loosen the 2 union nuts from the transmission.

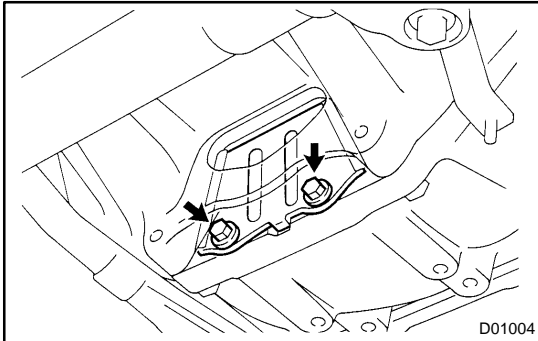
Torque: 44 N·m (450 kgf-cm, 32 ft-lbf)

NOTICE:

Be careful not to damage the oil cooler pipe.

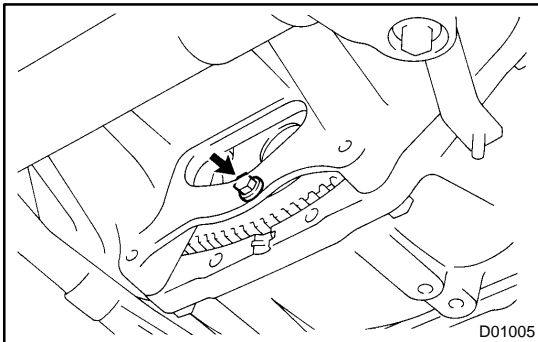


- (b) Disconnect the 3 set bolts of the clamp.
Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)
- (c) Disconnect the 2 oil cooler pipes from the transmission.



14. REMOVE TORQUE CONVERTER CLUTCH MOUNTING BOLT

- (a) Remove the 2 bolts and flywheel housing under cover.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

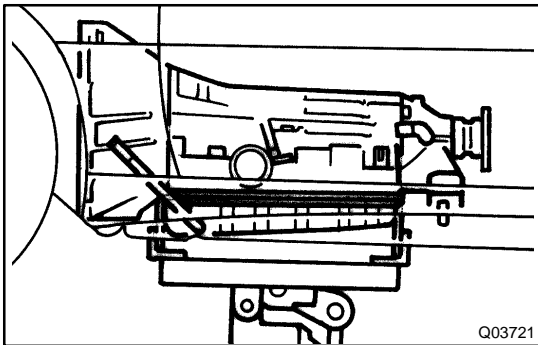


- (b) Turn the crankshaft to gain access to each bolt.
- (c) Hold the crankshaft pulley nut with a wrench and remove the 6 bolts.

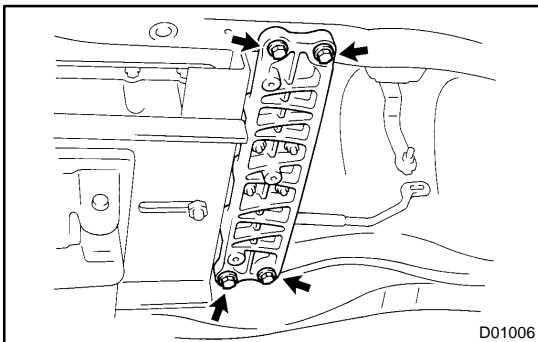
Torque: 48 N·m (490 kgf·cm, 35 ft·lbf)

HINT:

At the time of installation, please refer to the following item.
First install black colored bolt and then the 5 other bolts.

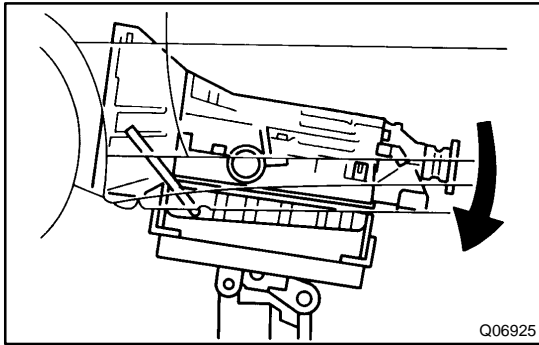


15. SUPPORT TRANSMISSION WITH JACK



16. REMOVE ENGINE REAR MOUNTING 4 SET BOLTS

Torque: 26 N·m (270 kgf·cm, 20 ft·lbf)



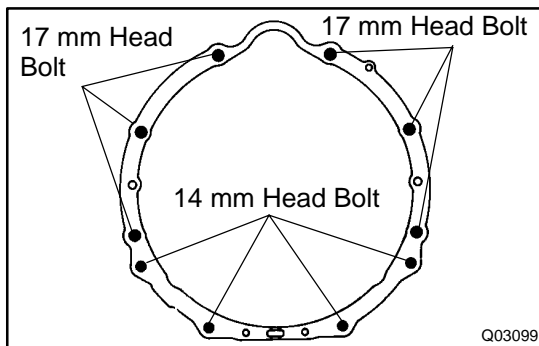
17. DISCONNECT CONNECTORS AND WIRE HARNESS

- (a) Tilt down the transmission.

NOTICE:

Take care so that the cooling fan does not come in contact with the fan shroud.

- (b) Disconnect the following connectors:
- (1) O/D direct clutch speed sensor connector
 - (2) Vehicle speed sensor connector
 - (3) Park/neutral position switch connector
 - (4) Solenoid connector
- (c) Disconnect the wire harness from the clamp on transmission.



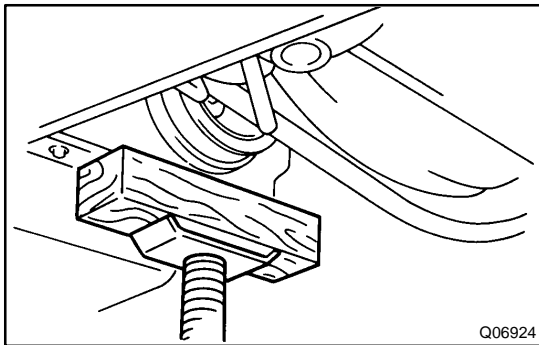
18. REMOVE TRANSMISSION

Remove the 10 bolts and transmission.

Torque:

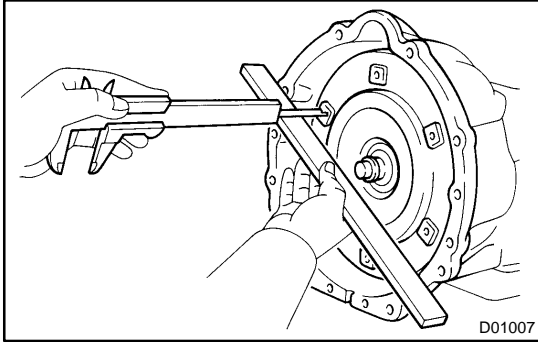
14 mm head bolt: 37 N·m (380 kgf·cm, 27 ft·lbf)

17 mm head bolt: 72 N·m (730 kgf·cm, 53 ft·lbf)



HINT:

At the time of installation, please refer to the following item.
Lift the engine front side.



INSTALLATION

1. CHECK TORQUE CONVERTER CLUTCH INSTALLATION

Using calipers and a straight edge, measure from the installed surface of the torque converter clutch to the front surface of the transmission housing.

Correct distance: More than 17.1 mm (0.673 in.)

If the distance is less than the standard, check for an improper installation.

2. INSTALL TRANSMISSION

Installation is in the reverse order of removal.

(See page [AT-17](#))

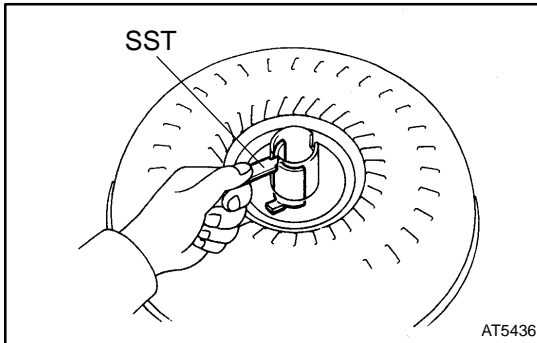
HINT:

After installation, check and inspect items as follows.

- Adjust the shift lever position. (See page [DI-173](#))
- Check fluid level. (See page [DI-173](#))
- Do the road test. (See page [DI-173](#))

TORQUE CONVERTER CLUTCH AND DRIVE PLATE INSPECTION

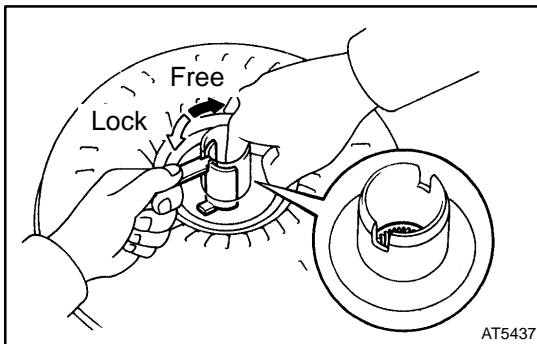
AT03D-01



1. INSPECT ONE-WAY CLUTCH

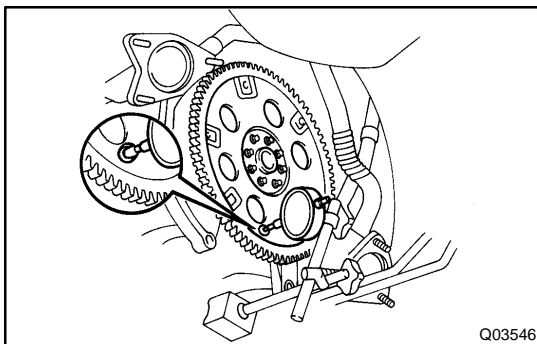
- (a) Install SST so that it fits in the notch of the converter hub and outer race of the one-way clutch.

SST 09350-30020 (09351-32020)



- (b) Press on the serrations of starter with a finger and rotate it.

Check if it rotates smoothly when turned clockwise and locks up when turned counterclockwise.



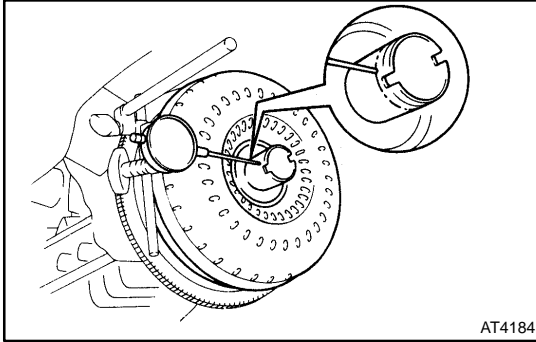
2. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.

Maximum runout: 0.20 mm (0.0079 in.)

If runout exceeds 0.20 mm (0.0079 in.) or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tighten the bolts.

Torque: 83 N·m (850 kgf-cm, 61 ft-lbf)



3. MEASURE TORQUE CONVERTER CLUTCH SLEEVE RUNOUT

- (a) 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 exceeds 0.30 mm (0.0118 in.), try to correct by reorienting the installation of the torque converter clutch.

If excessive runout cannot be corrected, replace the torque converter clutch.

HINT:

Mark the position of the torque converter clutch to ensure correct installation.

- (b) Remove the torque converter clutch.

TROUBLESHOOTING

PR029-01

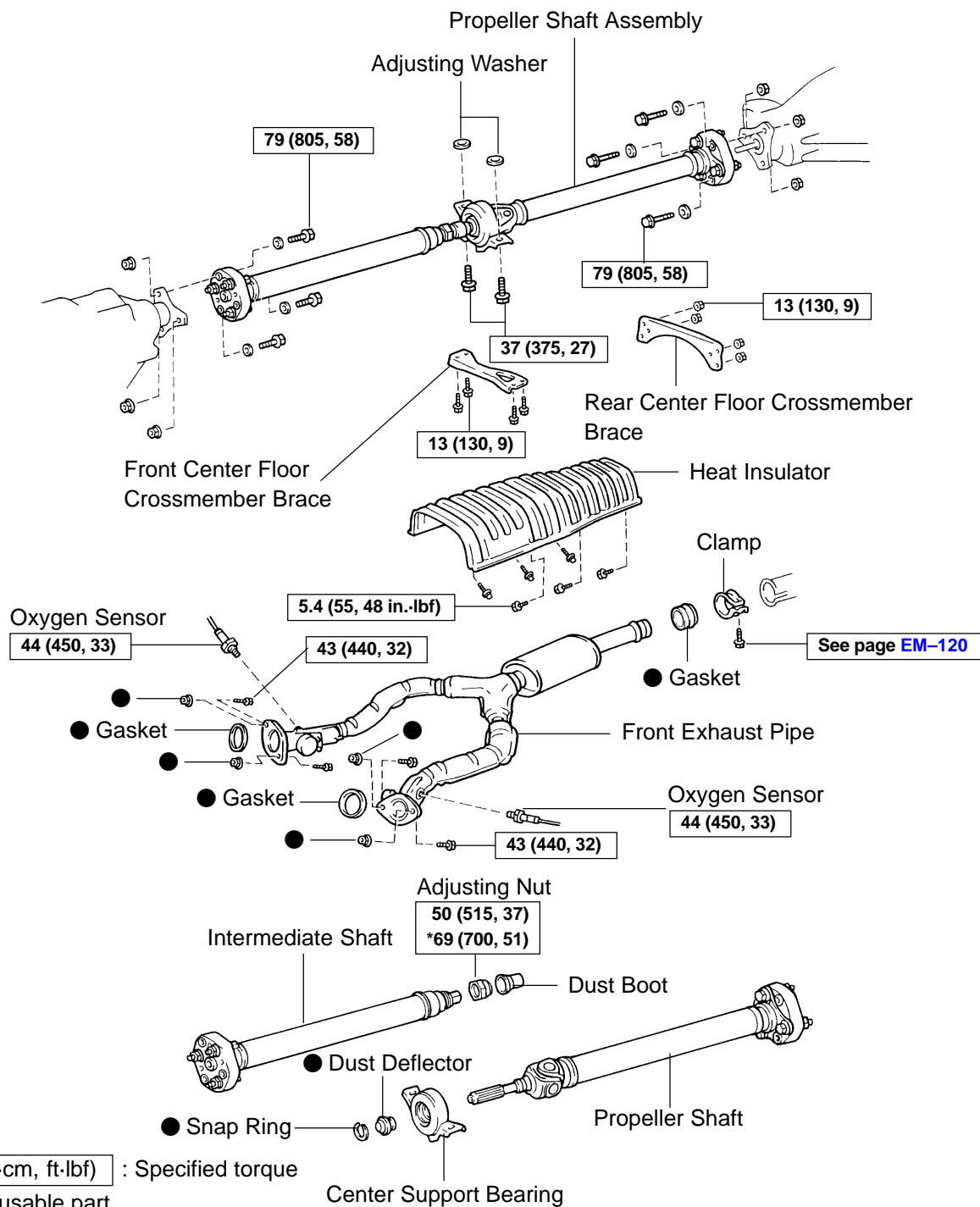
PROBLEM SYMPTOMS TABLE

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. Center bearing (Worn) 2. Sleeve yoke spline (Worn) 3. Spider bearing (Worn or stuck) 4. Flexible coupling (Worn)	PR-5 – PR-6 PR-5
Vibration	1. Transmission extension housing rear bushing (Worn) 2. Flexible coupling (Worn) 3. Sleeve yoke spline (Stuck) 4. Propeller shaft (Runout) 5. Propeller shaft (Imbalance)	– PR-5 – PR-6 –

PROPELLER SHAFT ASSEMBLY COMPONENTS

PR02A-01



F02406

REMOVAL

1. REMOVE FRONT EXHAUST PIPE

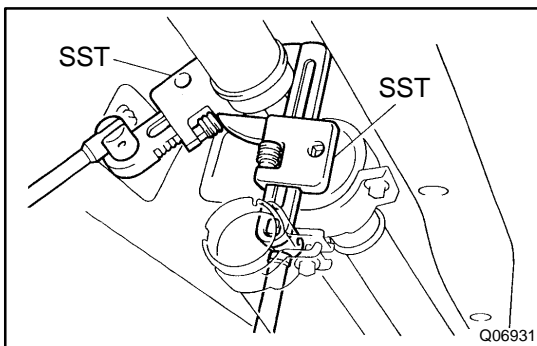
(See page [EM-119](#))

2. REMOVE HEAT INSULATOR

Remove the 6 bolts and heat insulator.

3. REMOVE CROSSMEMBER BRACES

- (a) Remove the 4 bolts and front center floor crossmember brace.
- (b) Remove the 4 nuts and rear center floor crossmember brace.



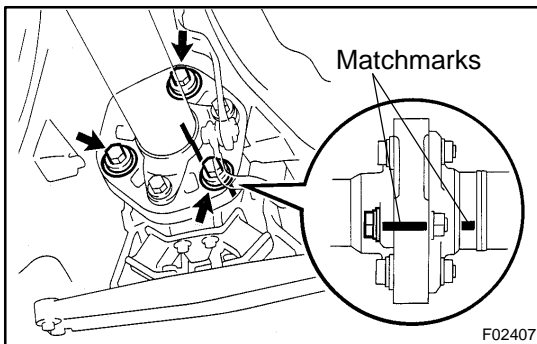
4. REMOVE PROPELLER SHAFT

- (a) Using SST, loosen the adjusting nut until it can be turned by hand.

SST 09922-10010

HINT:

Use 2 of the same type of SST.

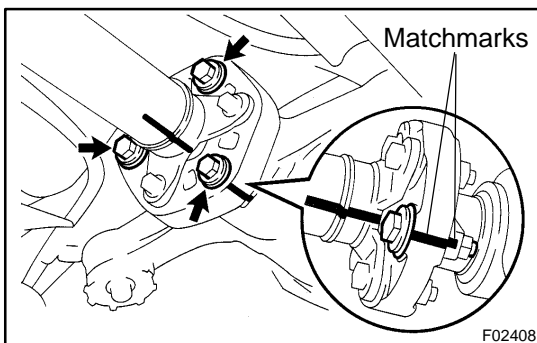


- (b) Place matchmarks on the transmission companion flange and flexible coupling.

- (c) Remove the 3 bolts installed from the transmission side.

NOTICE:

The bolts installed from the propeller shaft side should not be removed.

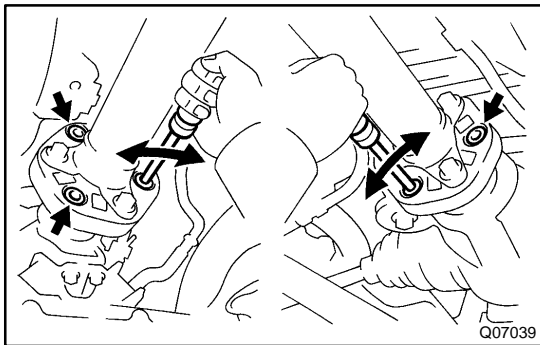


- (d) Place matchmarks on the differential companion flange and flexible coupling.

- (e) Remove the 3 bolts installed from the differential side.

NOTICE:

The bolts installed from the propeller shaft side should not be removed.



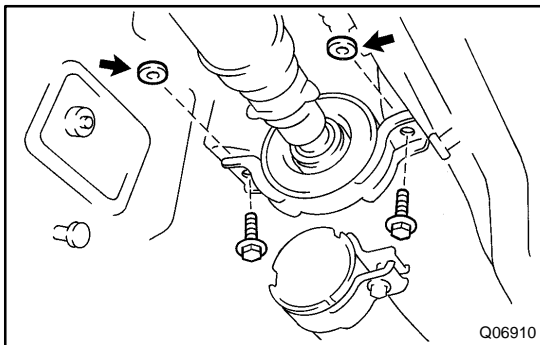
- (f) Separate the flexible couplings from the transmission and differential.

HINT:

If the flexible coupling cannot be easily separated by hand, insert a screwdriver into the bolt hole of the flexible coupling as shown in the illustration, then pry the coupling out.

NOTICE:

Do not bring the screwdriver blade in direct contact with the flexible coupling's rubber portion.



- (g) Remove the 2 center support bearing set bolts and adjusting washers.

HINT:

Some vehicles are not equipped with an adjusting washer.

NOTICE:

When removing the set bolts, support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.

Maximum joint angle: 5°

- (h) Push the rear propeller shaft straight forward to compress the propeller shaft and pull out the propeller shaft from the centering pin of the differential.

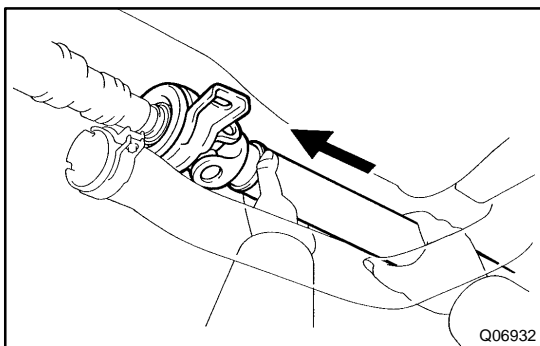
NOTICE:

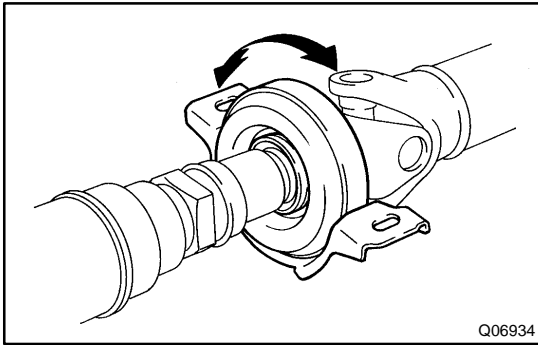
Press the propeller shaft straight ahead to keep the transmission and intermediate shaft aligned straight.

- (i) Pull the propeller shaft out toward the vehicle's rear.

NOTICE:

The intermediate shaft and propeller shaft should not be separated.



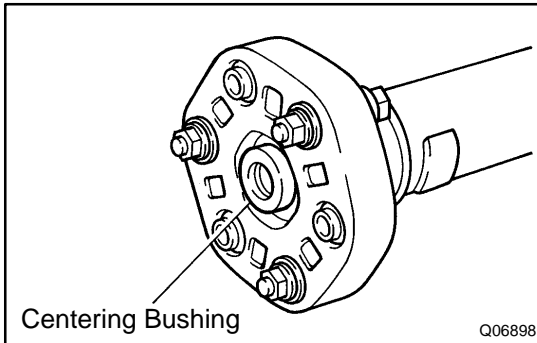


INSPECTION

1. INSPECT CENTER SUPPORT BEARING

- (a) Check for cracks in or damage to the cushion.
- (b) Check if the bearing turns smoothly.

If the center support bearing is damaged, worn or does not turn smoothly, replace it.



2. INSPECT FLEXIBLE COUPLINGS

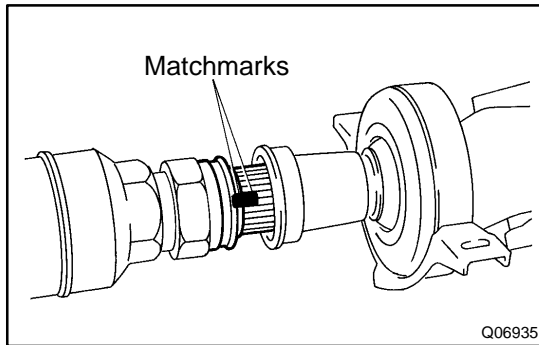
Check for cracks in or damage to the front and rear flexible couplings.

If the flexible coupling is damaged, replace the propeller shaft assembly.

3. INSPECT FLEXIBLE COUPLING CENTERING BUSHING

Check for damage to the bushing.

If the bushing is damaged, replace the propeller shaft assembly.



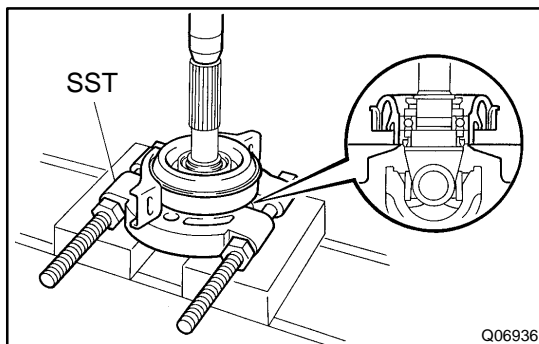
REPLACEMENT

1. SEPARATE INTERMEDIATE SHAFT AND PROPELLER SHAFT

- Place matchmarks on the intermediate shaft and propeller shaft.
- Separate the intermediate shaft and propeller shaft.
- Remove the dust boot from the propeller shaft.

HINT:

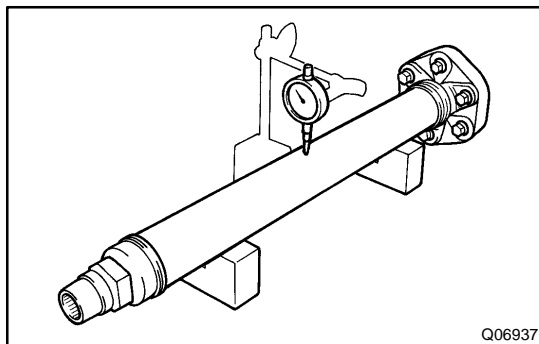
If the dust boot is reused, remove it after wrapping vinyl tape around the spline, so it will not be damaged.



2. REMOVE CENTER SUPPORT BEARING

- Using a snap ring expander, remove the snap ring.
- Using SST and a press, remove the center support bearing and dust deflector.

SST 09950-00020

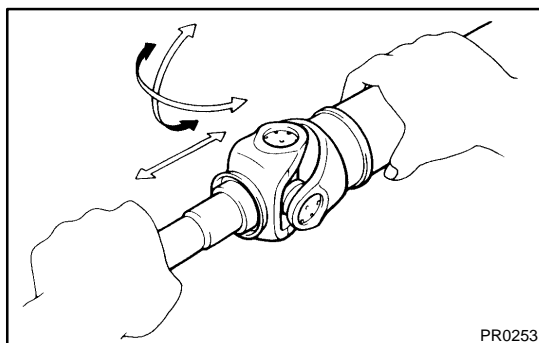


3. INSPECT INTERMEDIATE SHAFT AND PROPELLER SHAFT RUNOUT

Using a dial indicator, check the runout of the shafts.

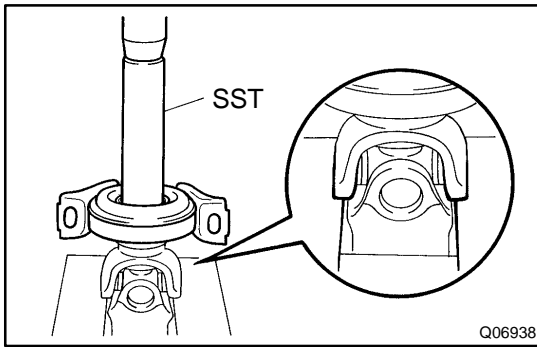
Maximum runout: 0.8 mm (0.031 in.)

If the runout exceeds the maximum, replace the propeller shaft assembly.



4. INSPECT SPIDER BEARING

- Check if the spider bearing rotates smoothly.
 - Check if there is any play in the spider bearing.
- If necessary, replace the propeller shaft.

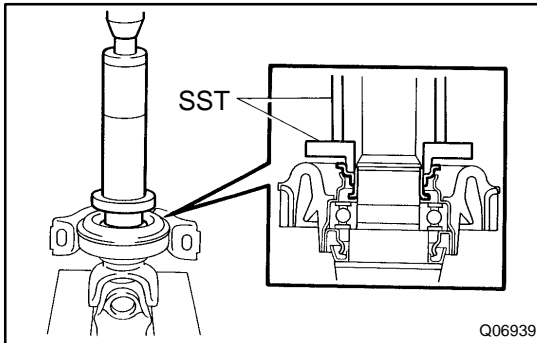


5. INSTALL CENTER SUPPORT BEARING

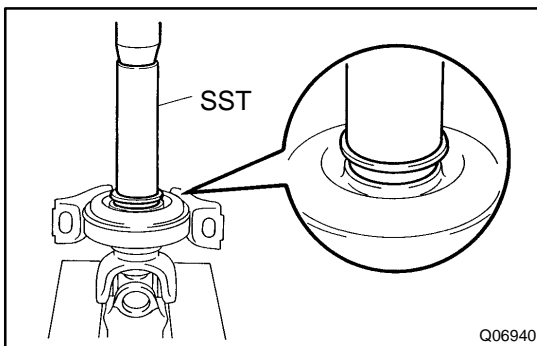
NOTICE:

Be careful not to grip the propeller shaft tube too tightly in a vise as this will cause deformation.

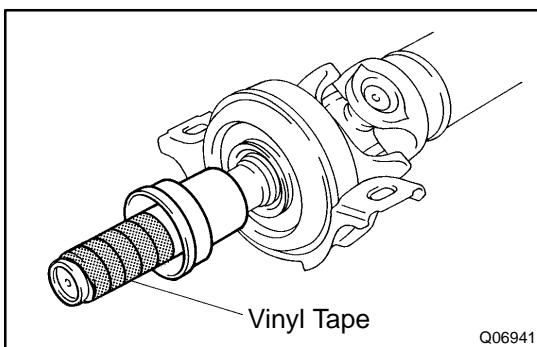
- (a) Using SST and a press, install the center support bearing.
SST 09330-50010



- (b) Using SST and a press, insert a new dust deflector until it almost touches the rubber of the center support bearing.
SST 09608-00071, 09608-06041



- (c) Using SST and a press, install a new dust deflector.
SST 09330-50010
- (d) Using a snap ring expander, install a new snap ring.



6. ASSEMBLE INTERMEDIATE SHAFT AND PROPELLER SHAFT

- (a) Install the dust boot.

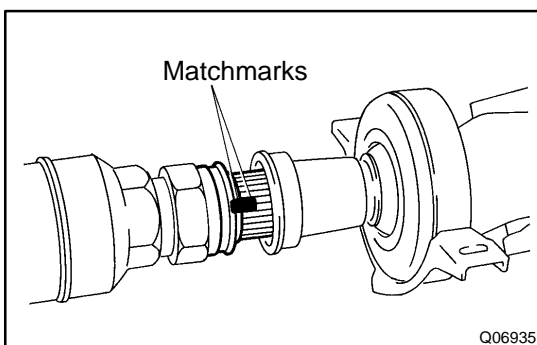
NOTICE:

Assemble after wrapping vinyl tape around the spline so it will not damage the boot.

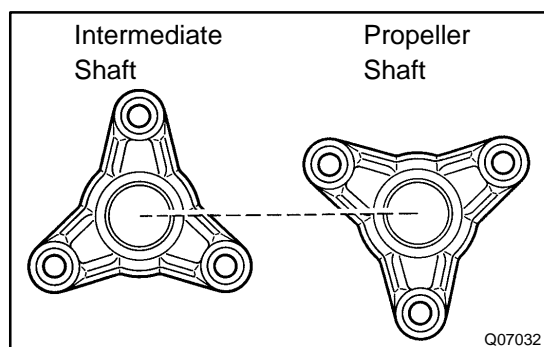
- (b) Apply grease to the spline.

Grease:

Molybdenum disulphide lithium base, NLGI No.2

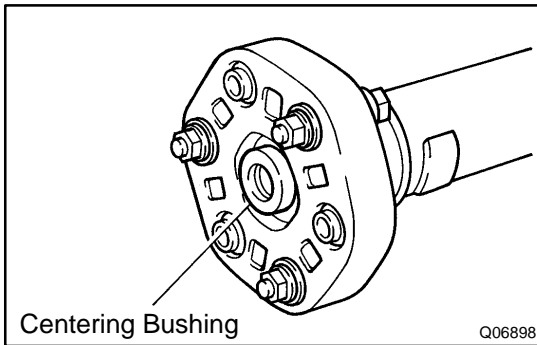


- (c) Align the matchmarks and assemble the intermediate shaft and propeller shaft.
- (d) Cover the adjusting nut with the dust boot.

**NOTICE:**

The directions of the intermediate shaft companion flange and the propeller shaft companion flange should differ by 180°.

- (e) Tighten the adjusting nut fully by hand.



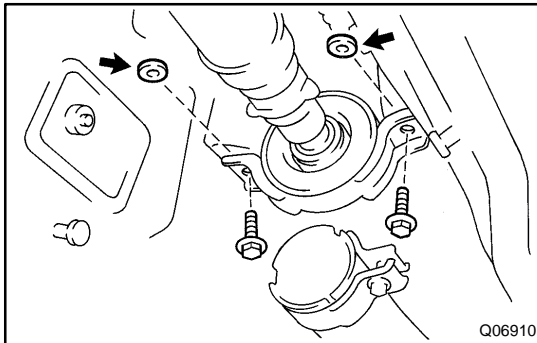
INSTALLATION

1. INSTALL PROPELLER SHAFT

- (a) Apply grease to the flexible coupling centering bushings.

Grease:

Molybdenum disulphide lithium base, NLGI No.2



- (b) Install the propeller shaft from the vehicle's rear and connect the transmission and differential.

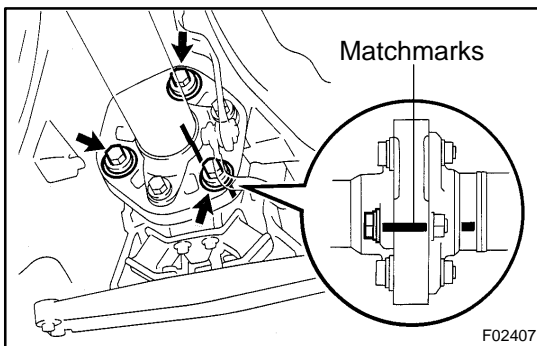
NOTICE:

Support the center support bearing by hand so that the transmission and intermediate shaft, and propeller shaft and differential, remain in a straight line.

- (c) Temporarily install the 2 center support bearing set bolts with the adjusting washers.

HINT:

Use the adjusting washers which were removed.



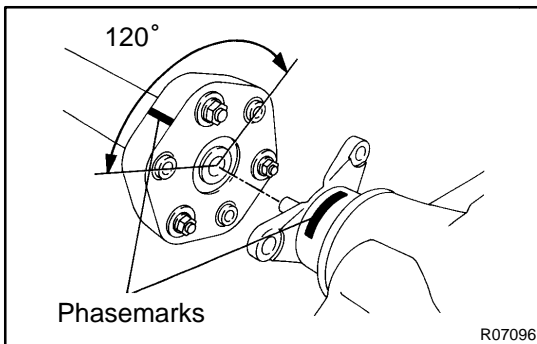
- (d) Align the matchmarks and connect the propeller shaft to the transmission/differential.

- (e) Install and torque the 3 bolts, washers and nuts.

NOTICE:

The bolts should be installed from the propeller shaft side.

Torque: 79 N·m (805 kgf-cm, 58 ft-lbf)



- (f) If using a new propeller shaft (w/ Phasemarks):
Install the propeller shaft phasemarks and differential/transmission phasemarks so that their respective alignment phasemarks match.

If the propeller shaft phasemarks and differential/transmission phasemarks do not align, install the propeller shaft and differential alignment phasemarks as close together as possible.

- (g) If using a new propeller shaft (w/o Phasemarks):
Install the propeller shaft.

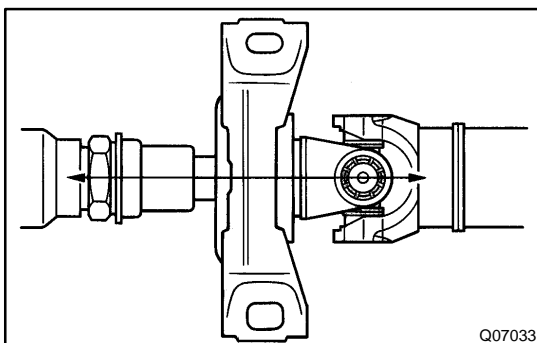
- (h) Torque the 2 center support bearing set bolts.

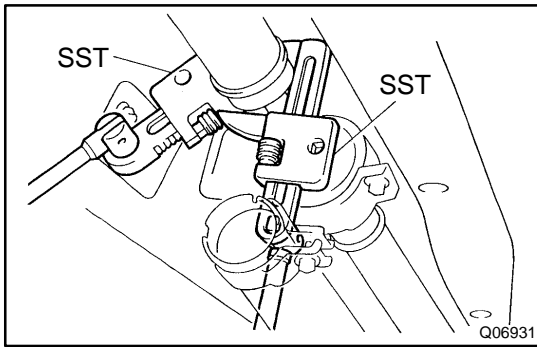
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)

HINT:

Adjust the center support bearing to keep the intervals as shown with the vehicle in the unladen condition.

Under the same condition, check if the center line of the center support bearing is at right angles to the shaft axial direction.





- (i) Using SST, tighten the adjusting nut.

SST 09922-10010

Torque: 50 N·m (515 kgf-cm, 37 ft-lbf)

HINT:

Use a torque wrench with a fulcrum length of 34.5 cm (13.6 in.).

2. INSPECT JOINT ANGLE

(See page [PR-11](#))

NOTICE:

The joint angle should by all means be checked when the propeller shaft is removed and installed.

3. INSTALL CROSSMEMBER BRACES

- (a) Install the front center floor crossmember brace and torque the 4 bolts.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

- (b) Install the rear center floor crossmember brace and torque the 4 bolts.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

4. INSTALL HEAT INSULATOR

Install the heat insulator and torque the 6 bolts.

Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

5. INSTALL FRONT EXHAUST PIPE

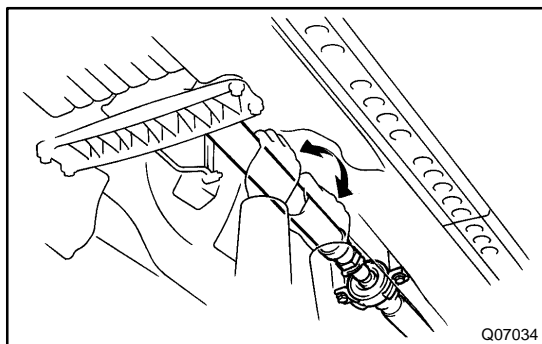
(See page [EM-119](#))

JOINT ANGLE INSPECTION

PR02F-01

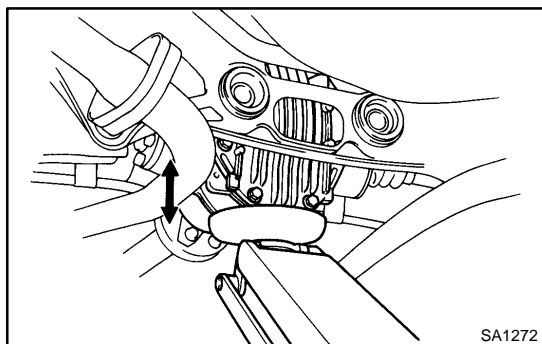
NOTICE:

When performing operations which involve the removal and installation of the propeller shaft, always check the joint angle. Make adjustments if necessary.

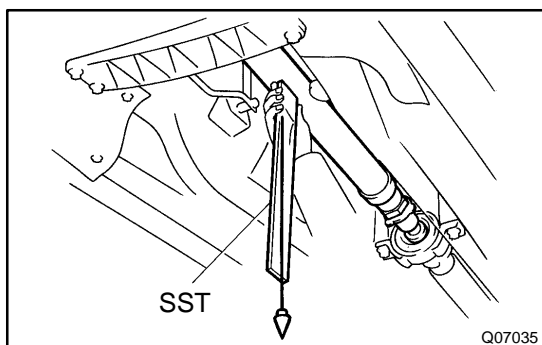


1. STABILIZE PROPELLER SHAFT AND DIFFERENTIAL

- (a) Turn the propeller shaft several times by hand to stabilize the center support bearing and flexible couplings.



- (b) Using a jack, raise and lower the differential to stabilize the differential mounting cushion.



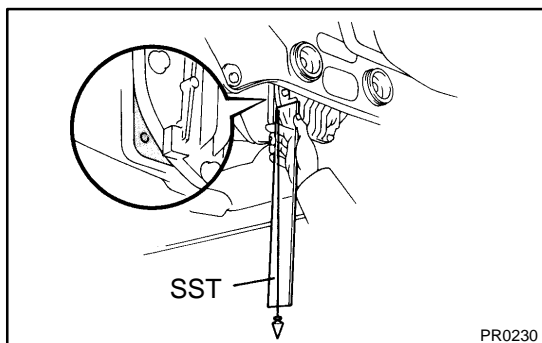
2. CHECK NO.2 AND NO.3 JOINT ANGLE

- (a) Using SST, measure the installation angle of the intermediate shaft and propeller shaft.

SST 09370-50010

HINT:

The SST should be directly underneath the tube.



- (b) Using SST, measure the installation angle of the differential.

SST 09370-50010

HINT:

Measure the installation angle by placing the SST in the position, as shown in the illustration.

- (c) Calculate the No.2 joint angle.

No.2 joint angle:

$$A-B = -50' \pm 30'$$

A: Intermediate shaft installation angle

B: Propeller shaft installation angle

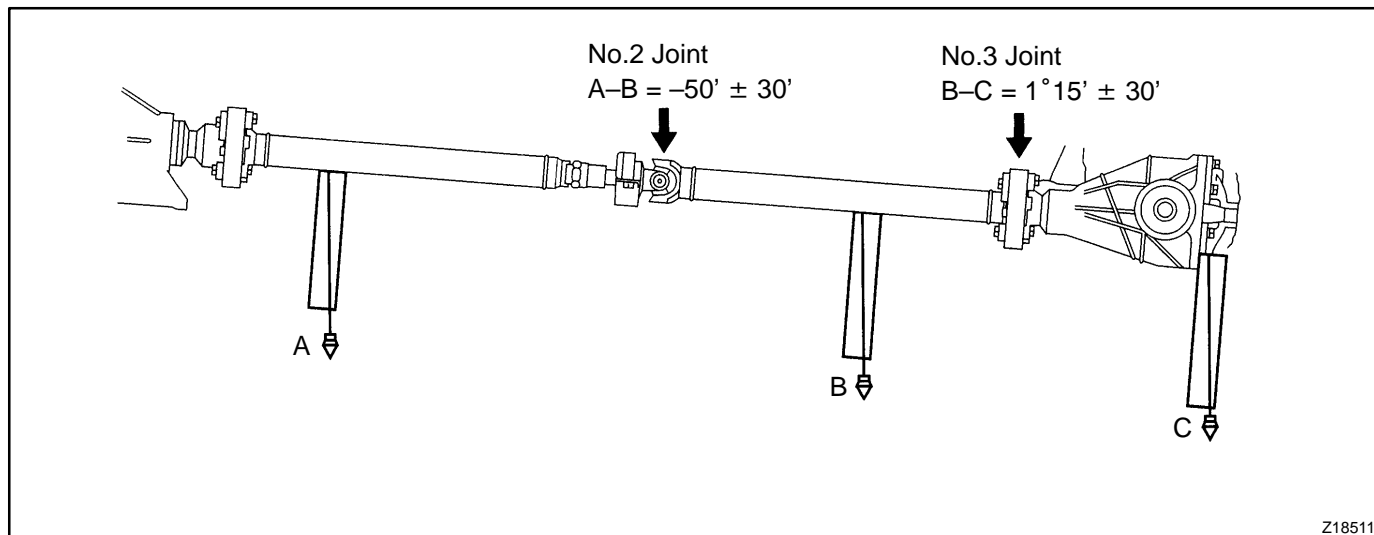
- (d) Calculate the No.3 joint angle.

No.3 joint angle:

$$B-C = 1^{\circ}15' \pm 30'$$

B: Propeller shaft installation angle

C: Differential installation angle

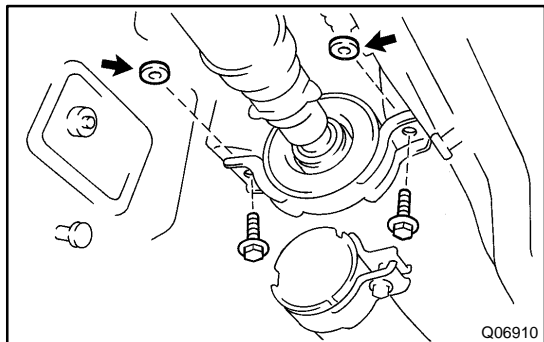


Z18511

If the measured angle is not within the specification, adjust the joint angle.

HINT:

Adjust joint angle using the adjustment chart, adjusting it with the center support bearing adjusting washer and differential shim.



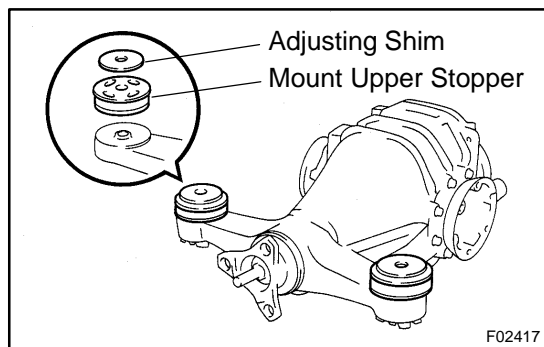
3. ADJUST NO.2 JOINT ANGLE

Select the proper center support bearing adjusting washer for adjustment.

Thickness mm (in.)	Thickness mm (in.)
1.0 (0.039)	4.5 (0.177)
2.0 (0.079)	6.5 (0.256)

HINT:

- Left and right washers should be the same thickness.
- 2 washers should not be assembled together.



4. ADJUST NO.3 JOINT ANGLE

Select the proper differential adjusting shim for adjustment.

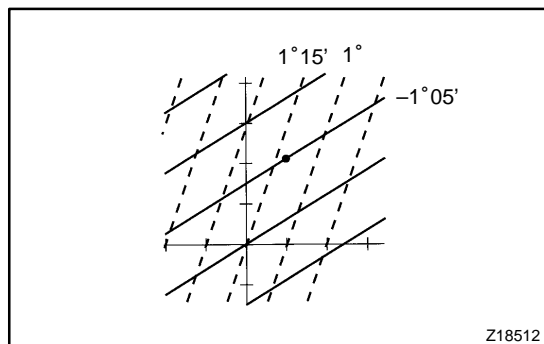
Thickness mm (in.)	Thickness mm (in.)
1.0 (0.039)	2.0 (0.079)
1.6 (0.063)	–

HINT:

- Left and right washers should be the same thickness.
- 2 washers should not be assembled together.
- This shim is installed on top of the mount stopper and is used for adjustment.

5. HOW TO READ ADJUSTMENT CHART

- (a) Take measurements, then calculate the No.2 and No.3 joint angles.
- (b) Mark the calculated values on the chart and read the coordinates.
- (c) Replace the adjusting washer and shim in accordance with the coordinates read and adjust the joint angles.



Example

Measurements (Installation angle):

Intermediate shaft: 2°00'

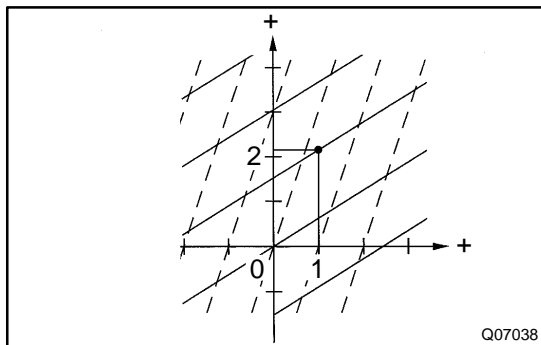
Propeller shaft: 3°05'

Differential: 1°54'

Joint angle:

No.2: 2°00' – 3°05' = –1°05'

No.3: 3°05' – 1°54' = 1°11'

**Adjustment (Center support bearing):**

Use an adjusting washer which is 2.0 mm (0.079 in.) thicker.

Adjustment (Differential):

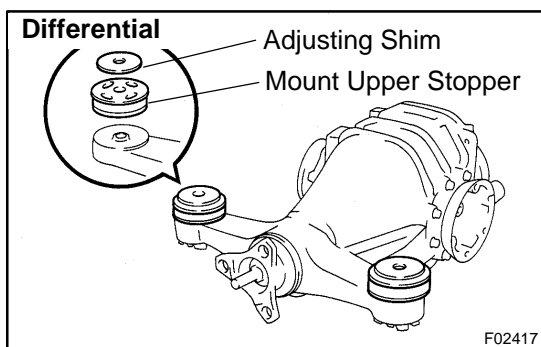
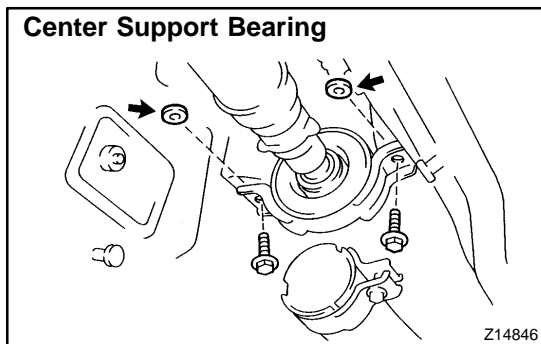
Use an adjusting shim which is 1.0 mm (0.039 in.) thicker.

HINT:

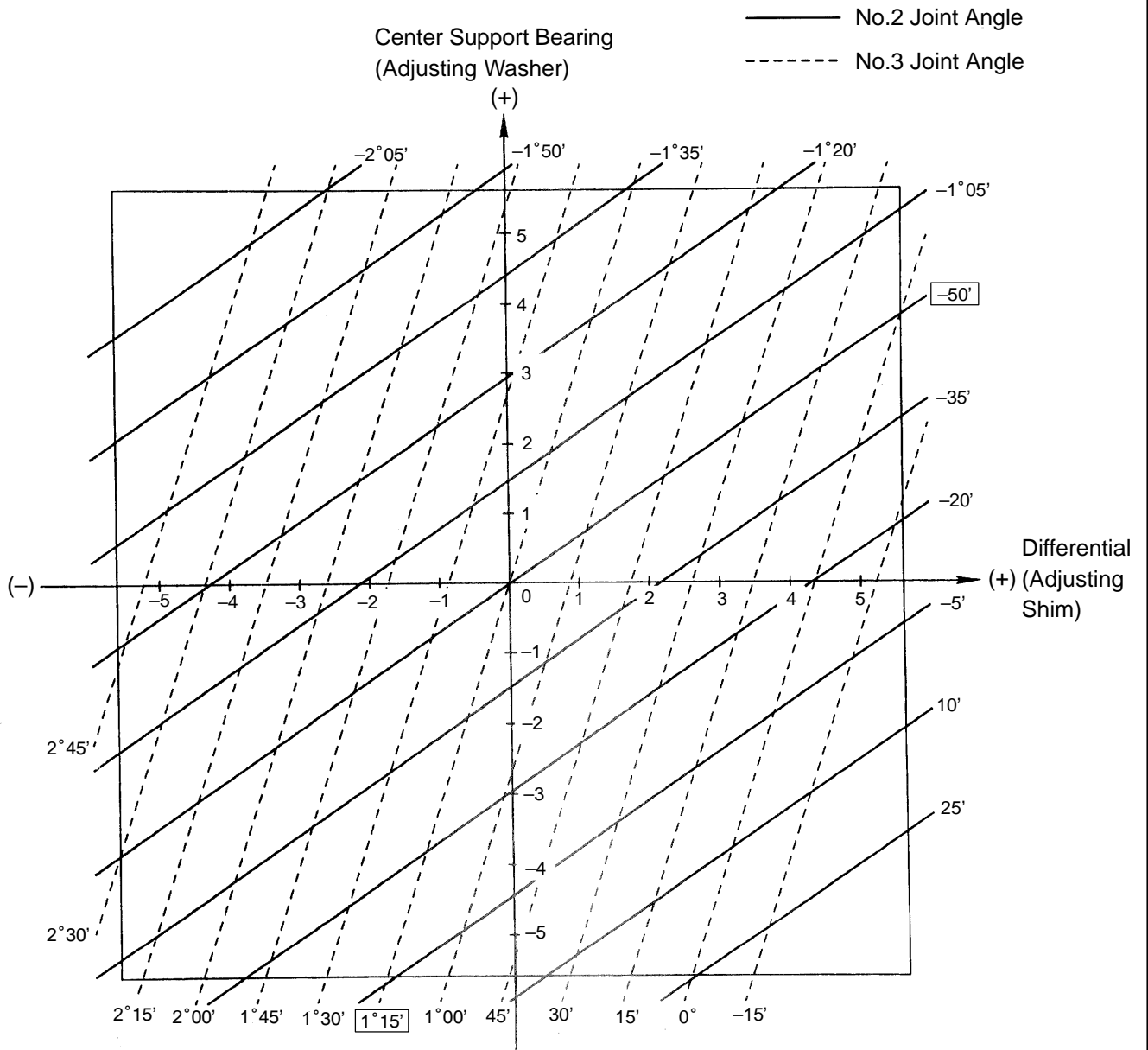
If a washer and shim of the exact thickness are not available, use the parts which are nearest in thickness.

NOTICE:

Check the joint angle once again after making the adjustment.



ADJUSTMENT CHART



Z18589

ELECTRONIC MODULATED AIR SUSPENSION SYSTEM

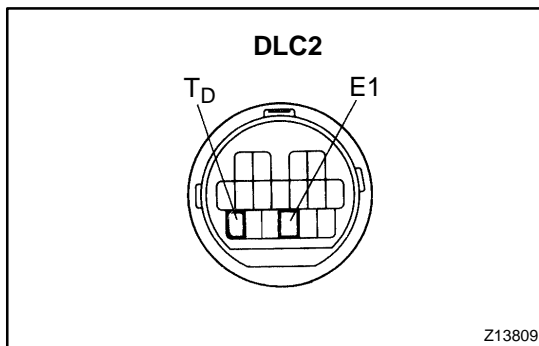
PRECAUTION

SA01K-01

HINT:

The Electronic Modulated Air Suspension is used in the LEXUS LS400.

Observe the following precautions strictly when performing operations on vehicles equipped with the Electronic Modulated Air Suspension.

**1. TURN IGNITION SWITCH OFF WHEN JACKING UP VEHICLE****NOTICE:**

If a vehicle is jacked up with the ignition switch ON (engine running), connect terminals T_D and E₁ of DLC2.

SST 09843-18020

2. REMOVE ALL ITEMS FROM UNDER VEHICLE BEFORE LOWERING JACK**NOTICE:**

When the jack is lowered, the vehicle is extremely low because the air in the pneumatic cylinder escapes.

3. ADJUST VEHICLE HEIGHT TO NORMAL CONDITION BEFORE MOVING VEHICLE**HINT:**

When the ignition switch is turned ON (engine running), the vehicle height is automatically adjusted to normal condition.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

SA01L-02

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
Wander/pulls	2. Tires (Worn or improperly inflated) 3. Wheel alignment (Incorrect) 4. Steering linkage (Loosen or worn) 5. Hub bearings (Loosen or worn) 6. Steering gear (Out of adjustment or broken) 7. Suspension parts (Worn out)	SA-3 SA-5 SA-9 – SA-13 SA-54 – –
Bottoming	1. Vehicle (Overloaded) 2. Spring (Weak) 3. Shock absorber (Worn out)	– SA-19 SA-96 SA-19 SA-26 SA-96 SA-104
Sways/pitches	1. Tires (Worn or improperly inflated) 2. Stabilizer bar (Bent or broken) 3. Shock absorber (Worn out)	SA-3 SA-49 SA-119 SA-19 SA-26 SA-96 SA-104
Front wheel shimmy	1. Tires (Worn or improperly inflated) 2. Wheels (Out of balance) 3. Shock absorber (Worn out) 4. Wheel alignment (Incorrect) 5. Ball joints (Worn) 6. Hub bearings (Loosen or worn) 7. Steering linkage (Loosen or worn) 8. Steering gear (Out of adjustment or broken)	SA-3 SA-5 SA-9 SA-19 SA-26 SA-36 SA-44 SA-13 – –
Abnormal tire wear	1. Tires (Improperly inflated) 2. Wheel alignment (Incorrect) 3. Suspension parts (Worn out) 4. Shock absorber (Worn out)	SA-3 SA-5 SA-9 – SA-19 SA-26 SA-96 SA-104
Noise in rear differential	1. Oil level (Low or wrong grade) 2. Excessive backlash between pinion and ring gear 3. Ring, pinion or side gears (Worn or chipped) 4. Pinion shaft bearing (Worn) 5. Side bearing (Worn)	SA-71 SA-83 SA-73 SA-73 SA-73
Oil leak from rear differential	1. Oil level (Too high or wrong grade) 2. Drive pinion oil seal (Worn or damaged) 3. Side gear oil seal (Worn or damaged) 4. Companion flange (Loose or damaged) 5. Side gear shaft (Damaged)	SA-71 SA-73 SA-71 – SA-71

TIRE AND WHEEL INSPECTION

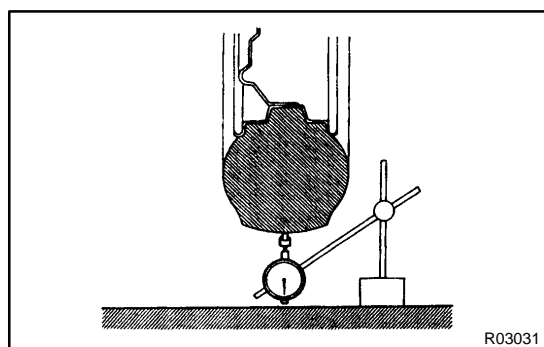
SA01M-01

1. INSPECT TIRE

- (a) Check the tires for wear and for the proper inflation pressure.

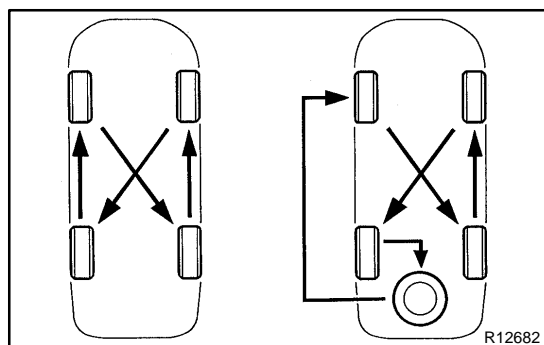
Cold tire inflation pressure:

Tire size	Front kPa (kgf/cm ² , psi)	Rear kPa (kgf/cm ² , psi)
P225/60R16 97V	200 (2.0, 29)	200 (2.0, 29)



- (b) Check the tire runout.

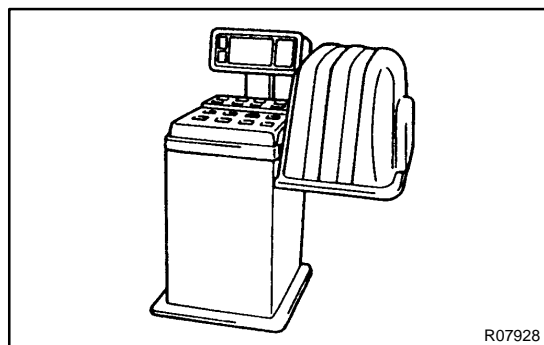
Tire runout: 1.4 mm (0.055 in.) or less



2. ROTATING TIRES

HINT:

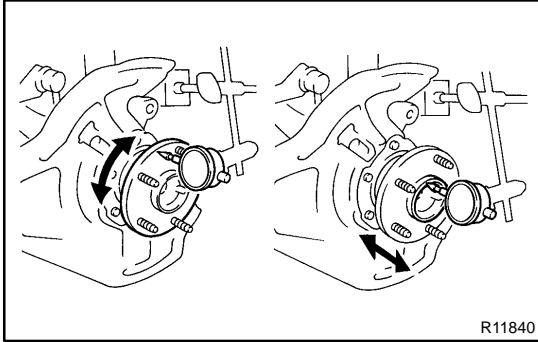
See the illustration for where to rotate each tire when you include the spare tire in the rotation and when you do not.



3. INSPECT WHEEL BALANCE

- (a) Check and adjust the Off-the-car balance.
 (b) If necessary, check and adjust the On-the-car balance.

Unbalance after adjustment: 5.0 g (0.011 lb) or less

**4. CHECK WHEEL BEARING LOOSENESS**

- (a) Check the backlash in bearing shaft direction.

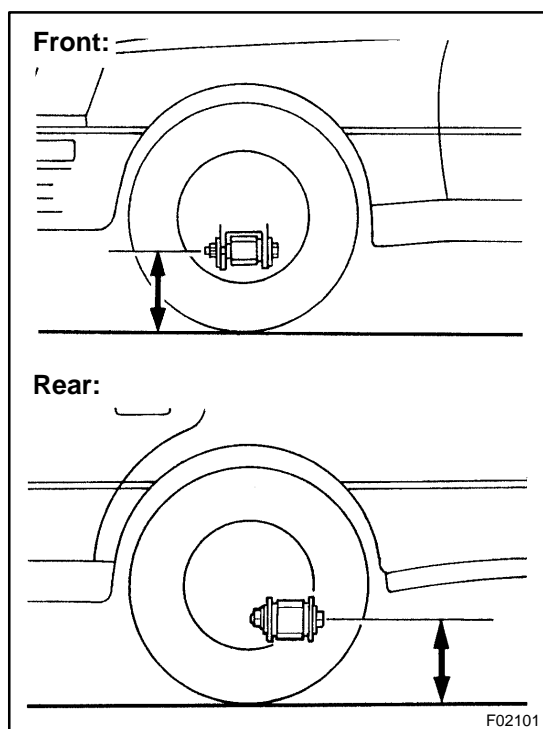
Maximum: 0.05 mm (0.0020 in.)

- (b) Check the axle hub deviation.

Maximum: 0.05 mm (0.0020 in.)

5. CHECK FRONT SUSPENSION FOR LOOSENESS**6. CHECK STEERING LINKAGE FOR LOOSENESS****7. CHECK BALL JOINT FOR LOOSENESS AND EXCESSIVE PLAY (See page [SA-44](#))****8. CHECK SHOCK ABSORBER WORKS PROPERLY**

- Check for oil leak
- Check mounting bushings for wear
- Bounce front and rear of the vehicle



FRONT WHEEL ALIGNMENT INSPECTION

SA01N-02

1. COIL SUSPENSION:

MEASURE VEHICLE HEIGHT

When the radius of a tire is 308 mm (12.12 in.) vehicle height will be the value described in the chart below.

Tire size	Front* ¹ mm (in.)	Rear* ² mm (in.)
P225/60R16	264 (10.39)	243 (9.57)

*1: Front measuring point

Measure from the ground to the center of the lower suspension arm mounting bolt.

*2: Rear measuring point

Measure from the ground to the center of the lower suspension arm No.2 mounting bolt.

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to specification.

If the vehicle height is not within the standard, try to adjust it by pushing down on or lifting the body.

2. AIR SUSPENSION:

MEASURE VEHICLE HEIGHT

- Bounce the vehicle up and down several times to stabilize the suspension.
- Move the vehicle forward and backward by pushing it to settle the tires.
- Place the shift lever in the N range.
- Release the parking brake.

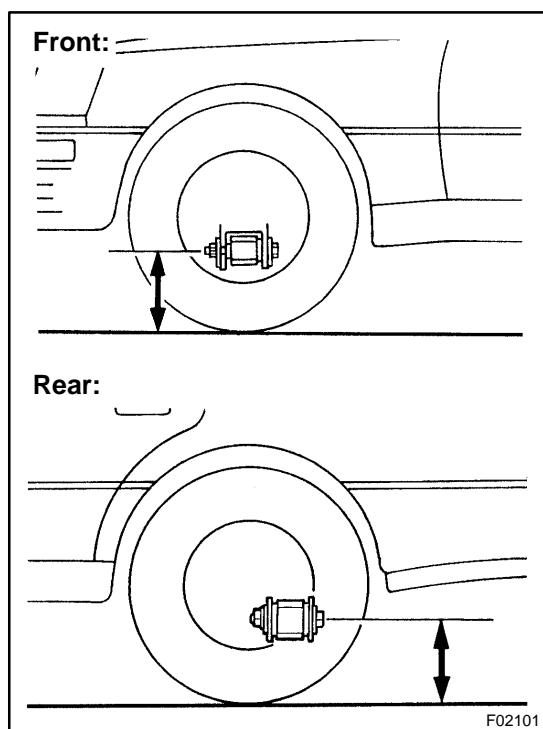
NOTICE:

Block the wheels to keep the vehicle from rolling.

- Start the engine.
- Set the height control switch in the HIGH position, then after waiting 1 minute with the vehicle height in the raised condition, set the switch in the NORM position to lower the vehicle's height.
Wait 50 seconds with it in this condition. Repeat this operation one more.

HINT:

Be sure to perform this operation 2 times so that each suspension part settles down.



- (g) When the radius of a tire is 308 mm (12.12 in.) vehicle height will be the value described in the chart below.

Tire size	Front*1 mm (in.)	Rear*2 mm (in.)
P225/60R16	250 ± 10 (9.84 ± 0.39)	222.5 ± 10 (8.76 ± 0.39)

Left-right error: 10 mm (0.39 in.) or less

Hf – Hr = 27.5 ± 15 mm (1.08 ± 0.59 in.)

Hf = Measured value of the front vehicle height

Hr = Measured value of the rear vehicle height

***1: Front measuring point**

Measure from the ground to the center of the lower suspension arm mounting bolt.

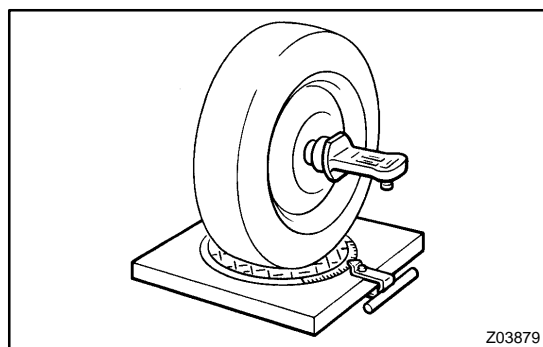
***2: Rear measuring point**

Measure from the ground to the center of the lower suspension arm No.2 mounting bolt.

NOTICE:

Before inspecting the wheel alignment, adjust the vehicle height to specification.

If the vehicle height is not standard, adjust it by turning the height control sensor link (See page [SA-125](#)).



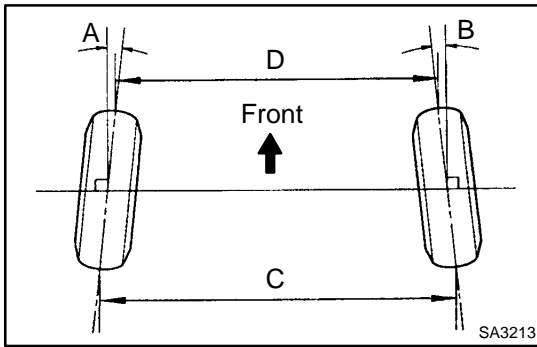
3. INSTALL CAMBER-CASTER-KINGPIN GAUGE ONTO WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

4. INSPECT CAMBER, CASTER AND STEERING AXIS INCLINATION

	Coil suspension	Air suspension
Camber	0°20' ± 45' (0.33° ± 0.75°)	0°05' ± 45' (0.08° ± 0.75°)
Left-right error	30' (0.5°) or less	30' (0.5°) or less
Caster	7°00' ± 45' (7° ± 0.75°)	7°25' ± 45' (7.42° ± 0.75°)
Left-right error	30' (0.5°) or less	30' (0.5°) or less
Steering axis inclination	8°25' ± 45' (8.42° ± 0.75°)	8°40' ± 45' (8.66° ± 0.75°)
Left-right error	30' (0.5°) or less	30' (0.5°) or less

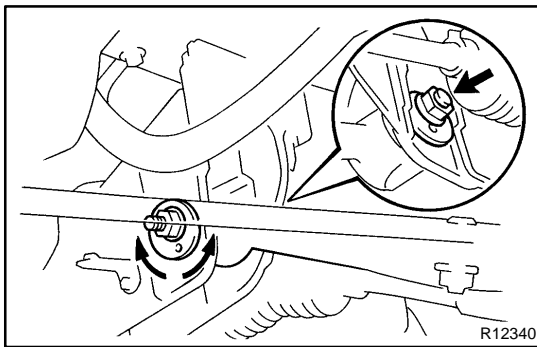
If the steering axis inclination is not as specified, after camber and caster have correctly adjusted, recheck the steering knuckle and front wheel for bearing or looseness.



5. INSPECT TOE-IN

Coil suspension	A + B: $0^{\circ}18' \pm 12'$ ($0.3^{\circ} \pm 0.2^{\circ}$) C – D: 3 ± 2 mm (0.12 ± 0.08 in.)
Air suspension	A + B: $0^{\circ}06' \pm 12'$ ($0.1^{\circ} \pm 0.2^{\circ}$) C – D: 1 ± 2 mm (0.04 ± 0.08 in.)

If the toe-in is not within the specification, adjust it at the tie rod end.



6. ADJUST CAMBER

HINT:

- After adjusting the camber, inspect the caster and toe-in.
 - Try to adjust the camber to the center value.
- (a) Remove the suspension member brace.
 - (b) Loosen the camber adjusting cam nut.
 - (c) Turn the camber adjusting cam and adjust camber.

HINT:

Camber changes about $7'20''$ (0.12°) with each graduation of the cam.

- (d) Torque the camber adjusting cam.

Torque: 251 N·m (2,560 kgf·cm, 185 ft·lbf)

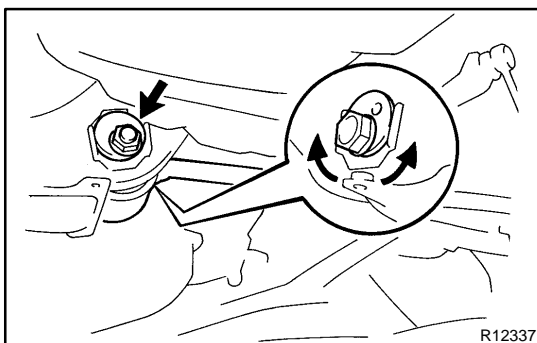
- (e) Install the suspension member brace.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

7. ADJUST CASTER

HINT:

- After adjusting the caster, inspect the toe-in.
- Try to adjust the caster to the center value.



- (a) Loosen the caster adjusting cam nut.

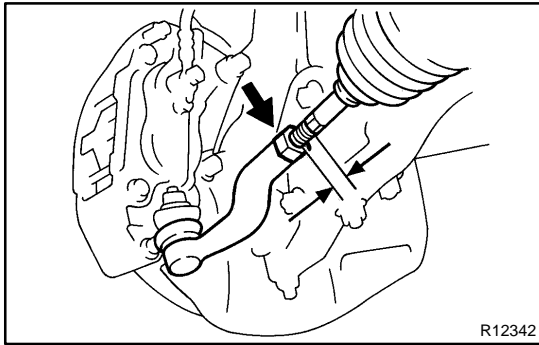
- (b) Turn the caster adjusting cam and adjust camber.

HINT:

Caster changes about $8'20''$ (0.14°) with each graduation of the cam.

- (c) Torque the caster adjusting cam.

Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)



8. ADJUST TOE-IN

- Remove the boot clips.
- Loosen the tie rod end lock nut.
- 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.
- Make sure that the length of the left and right rack ends length is same.

Rack end length difference: 1.0 mm (0.039 in.) or less

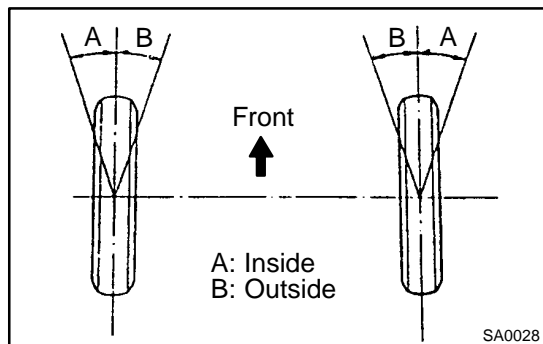
- Torque the tie rod end lock nuts.

Torque: 56 N·m (570 kgf-cm, 41 ft-lbf)

- Place the boot on the seat and clamp it.

HINT:

Make sure that the boots are not twisted.



9. INSPECT WHEEL ANGLE

Turn the steering wheel fully, and measure the turning angle.

	Coil suspension	Air suspension
Inside wheel	42°00' ± 1°30' (42° ± 1.5°)	42°00' ± 1°30' (42° ± 1.5°)
Outside wheel: Reference	34°20' (34.33°)	34°00' (34°)

If the wheel angles differ from the standard of the specification, inspect the toe-in.

REAR WHEEL ALIGNMENT INSPECTION

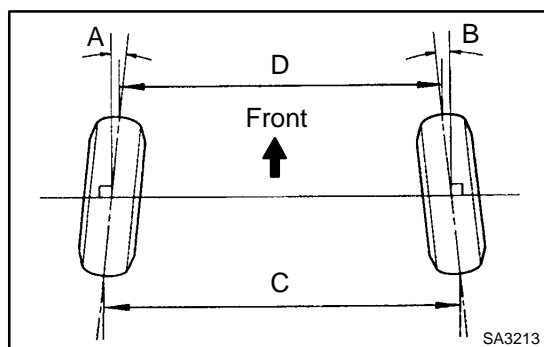
SA010-01

1. MEASURE VEHICLE HEIGHT (See page SA-5)
2. INSTALL CAMBER-CASTER-KINGPIN GAUGE ONTO WHEEL ALIGNMENT TESTER

Follow the specific instructions of the equipment manufacturer.

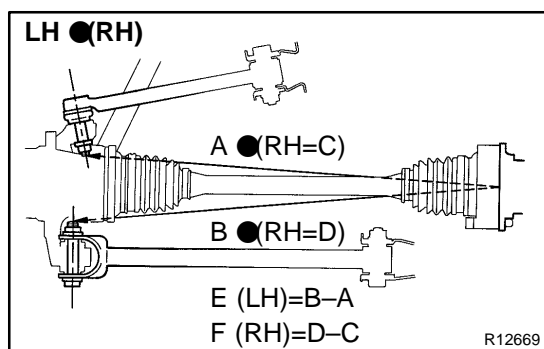
3. INSPECT CAMBER

	Coil suspension	Air suspension
Camber	$-0^{\circ}50' \pm 45'$ ($-0.83^{\circ} \pm 0.75^{\circ}$)	$-1^{\circ}25' \pm 45'$ ($-1.42^{\circ} \pm 0.75^{\circ}$)
Left-right error	30' (0.5°) or less	30' (0.5°) or less



4. INSPECT TOE-IN

Coil suspension	A + B: $0^{\circ}12' \pm 12'$ ($0.2^{\circ} \pm 0.2^{\circ}$) C - D: 2 ± 2 mm (0.08 ± 0.08 in.)
Air suspension	A + B: $0^{\circ}18' \pm 12'$ ($0.3^{\circ} \pm 0.2^{\circ}$) C - D: 3 ± 2 mm (0.12 ± 0.08 in.)



5. ADJUST CAMBER AND TOE-IN

- (a) Measure the length of the lower suspension arm No.1 and No.2, as shown in the illustration.

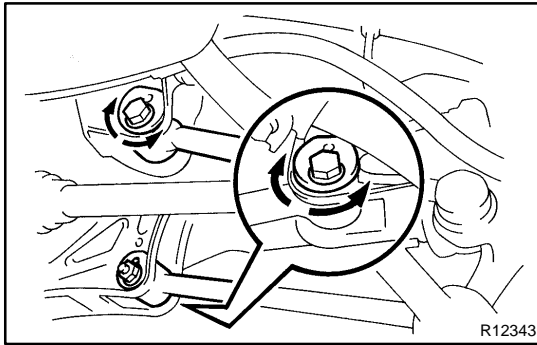
Length:

(E-F) or (F-E) should be less 4.0 mm (0.16 in.).

If it is not within the specification, adjust the length of the arms by turning the adjusting cam, as shown, until (E-F) or (F-E) is less than 4.0 mm (0.16 in.).

- (b) Measure the camber and toe-in.

If the camber and toe-in are still not within the specification, adjust the camber and toe-in with the adjusting cam. (See step 6.)

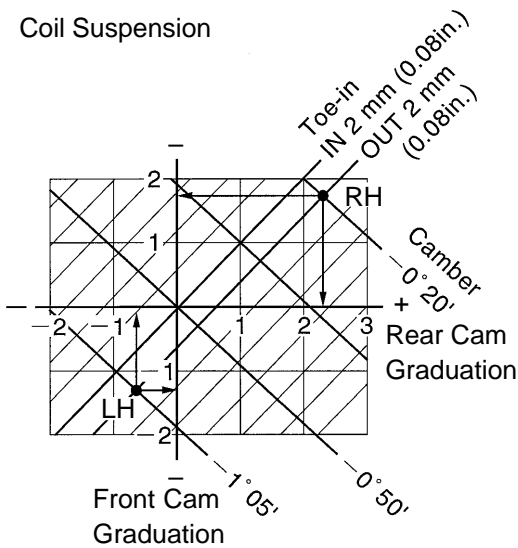


- (c) Loosen the front and/or rear cams.
- (d) Adjust camber and toe-in by turning the front and/or rear cams.
- (e) Torque the front and/or rear cam nuts.

Torque: 78 N·m (790 kgf-cm, 57 ft-lbf)

Example

Coil Suspension



R12758

6. HOW TO READ ADJUSTMENT CHART

- (a) Mark on the graph the measurements taken from the vehicle.

Example (Coil suspension):

Camber (LH): $-1^{\circ}05'$ (-1.08°)

Camber (RH): $-0^{\circ}20'$ (-0.33°)

Toe-in (total): OUT 2 mm (0.08 in.)

- (b) As shown the illustration, from the graph the amounts by which the front and/or rear cam are to be adjusted.

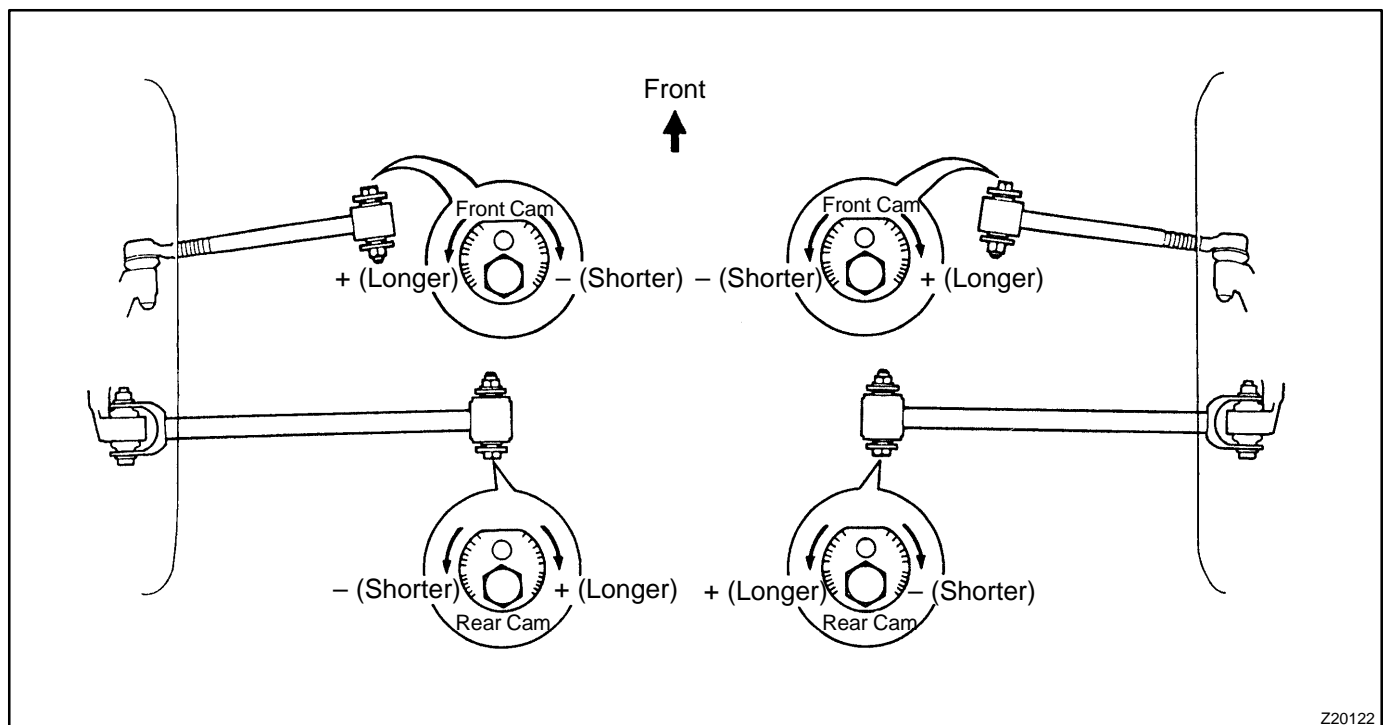
Amount to turn adjusting cam (by graduation):

LH Front cam: -(Shorter) 1.2

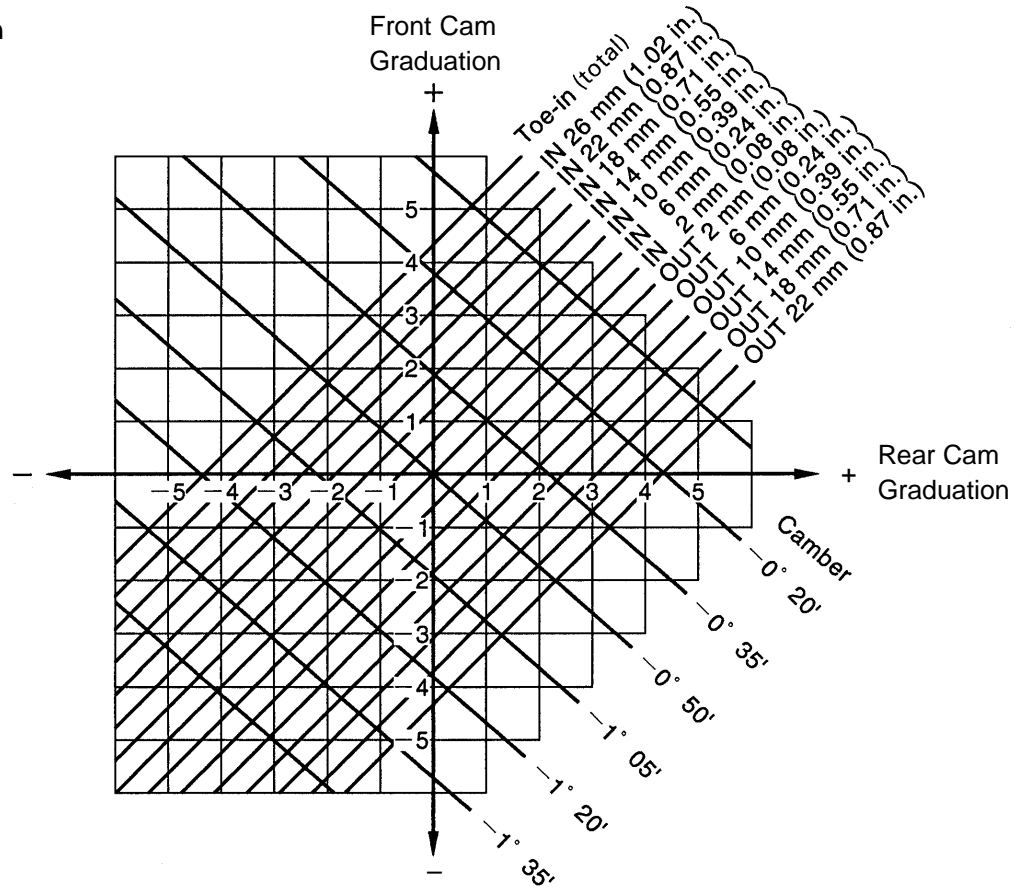
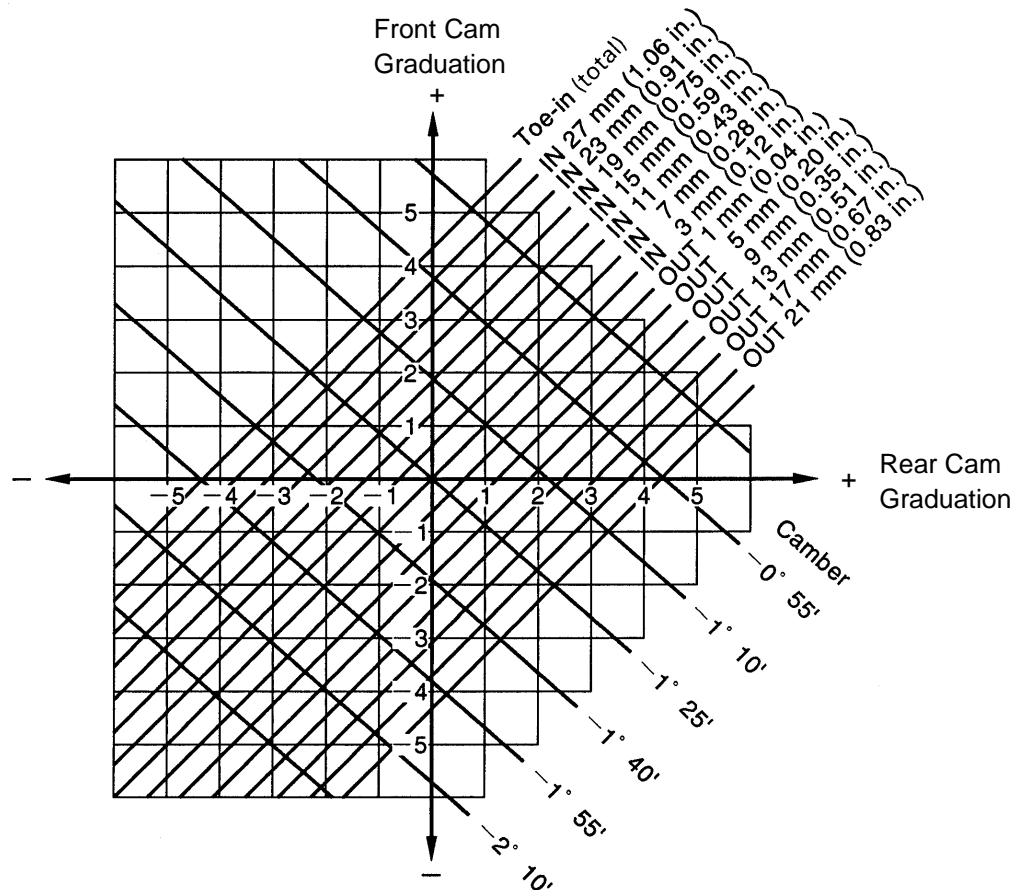
LH Rear cam: -(Shorter) 0.7

RH Front cam: +(Longer) 1.8

LH Rear cam: +(Longer) 2.3



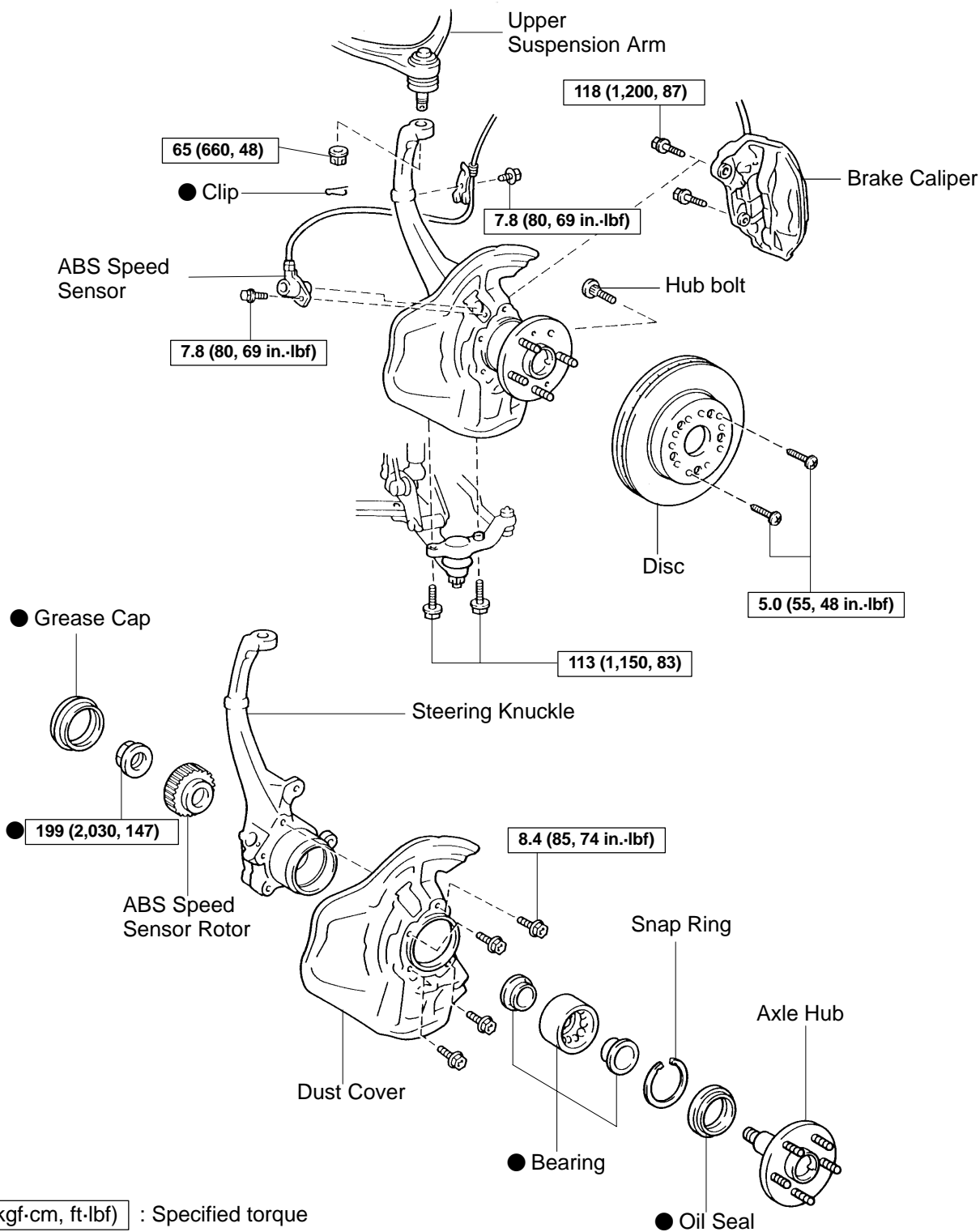
Z20122

Coil Suspension**Air Suspension**

Z14546

FRONT AXLE HUB COMPONENTS

SA01P-01



F01937

REMOVAL

1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE FRONT BRAKE CALIPER AND DISC

(a) Place matchmarks on the brake disc and axle hub.

(b) Remove the 2 bolts and brake caliper.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

(c) Support the brake caliper securely.

(d) Remove the 2 screws and disc.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)

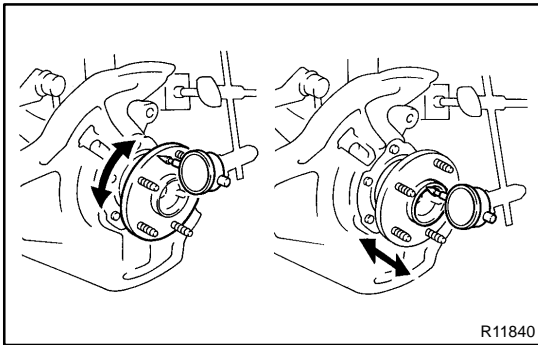
3. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

Remove the 2 bolts, ABS speed sensor and wire harness.

NOTICE:

When removing them from the right side, do not disconnect the pad wear indicator connector.

Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)



4. CHECK BACKLASH BEARING SHAFT AND AXLE HUB DEVIATION

(a) Using a dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

(b) Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum: 0.05 mm (0.0020 in.)

If the deviation exceeds the maximum, replace the bearing.

5. DISCONNECT STEERING KNUCKLE FROM BALL JOINT

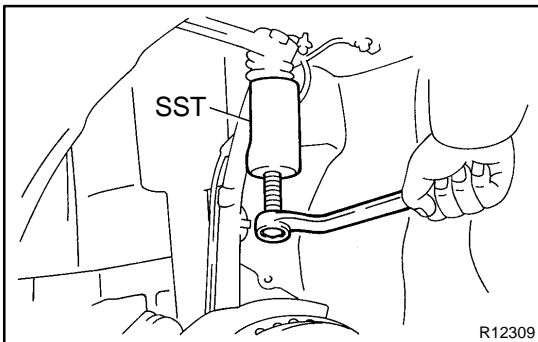
Remove the 2 bolts and disconnect the steering knuckle.

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

6. REMOVE STEERING KNUCKLE

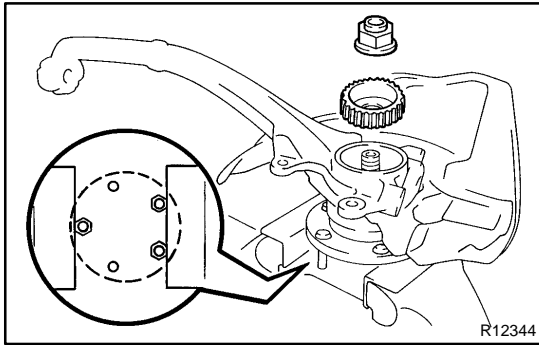
(a) Remove the clip and nut.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



(b) Using SST, disconnect the steering knuckle and remove it from the upper ball joint.

SST 09610-20012



DISASSEMBLY

1. REMOVE LOCK NUT AND ABS SPEED SENSOR ROTOR

- Using a screwdriver, remove the grease cap.
- Clamp the axle hub in a soft jaw vise.

HINT:

Close vise until it holds hub bolts. Do not tighten further.

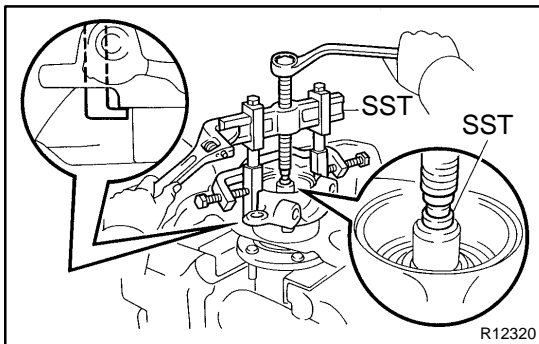
- Using a chisel and hammer, loosen the staked part of the lock nut.
- Remove the lock nut.
- Remove the ABS speed sensor rotor.

NOTICE:

Take care not to scratch the serration of the speed sensor rotor.

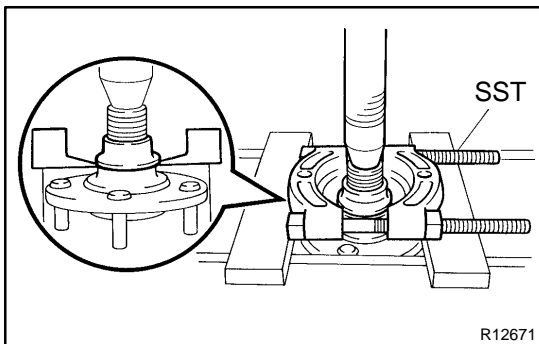
2. REMOVE AXLE HUB FROM STEERING KNUCKLE

- Remove the 4 bolts and shift the brake dust cover towards the hub side (outside).



- Using SST, remove the axle hub from the steering knuckle.

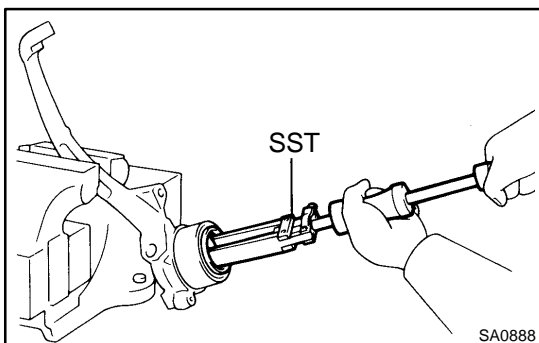
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04051, 09957-04010, 09958-04011)



3. REMOVE INNER RACE (OUTSIDE) FROM AXLE HUB

Using SST and a press, remove the inner race from the axle hub.

SST 09950-00020



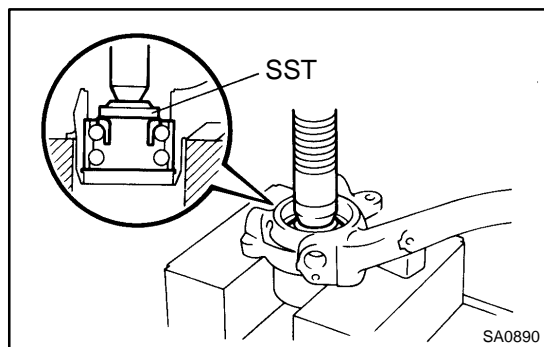
4. REMOVE OIL SEAL

Using SST, remove the oil seal from the steering knuckle.

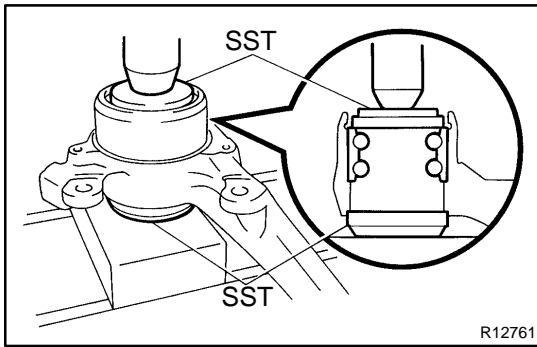
SST 09308-00010

5. REMOVE BEARING FROM STEERING KNUCKLE

- Using snap ring pliers, remove the snap ring.
- Place the inner race above the bearings on the inner side.



- (c) Using SST and a press, remove the bearing from the steering knuckle.
SST 09950-60010 (09951-00560)



REASSEMBLY

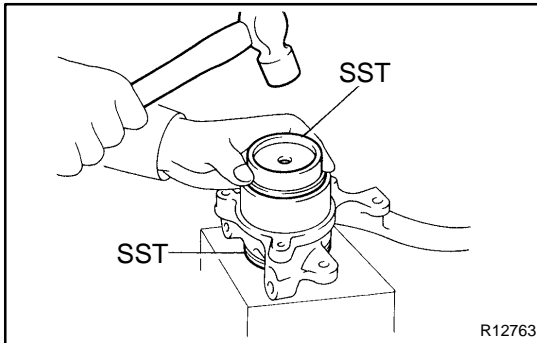
1. INSTALL NEW BEARING

- (a) Using SST, install a new bearing to steering knuckle.
SST 09950-60020 (09951-00720, 09951-00810)

NOTICE:

If the inner race and balls come loose from the bearing outer race, be sure to install them on the same side as before.

- (b) Using snap ring pliers, install the snap ring.



2. INSTALL NEW OIL SEAL

- (a) Place the inner race (outside).
(b) Using SST, install a new oil seal until it is flush with end surface of steering knuckle.
SST 09608-32010, 09950-60020 (09951-00810)
(c) Coat MP grease to the oil seal lip.

3. INSTALL AXLE HUB TO STEERING KNUCKLE

- (a) Install the brake dust cover with the 4 bolts.

Torque: 8.4 N·m (85 kgf·cm, 74 in.-lbf)

- (b) Using SST and a press, install the axle hub.

SST 09608-32010, 09608-06041

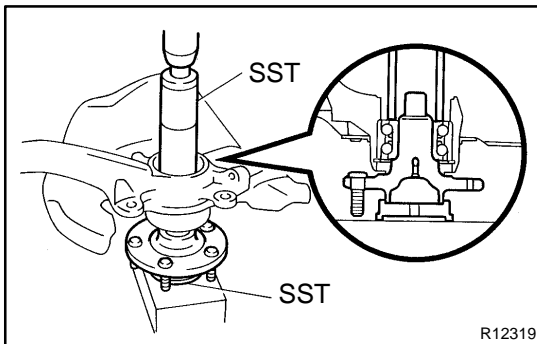
4. INSTALL ABS SPEED SENSOR ROTOR

NOTICE:

Do not scratch the serrations of the speed sensor rotor.

5. INSTALL NEW LOCK NUT

- (a) Install and torque a new nut to the axle shaft.
Torque: 199 N·m (2,030 kgf·cm, 147 ft·lbf)
(b) Using a punch and hammer, stake the nut.
(c) Using a screwdriver, install the grease cap.



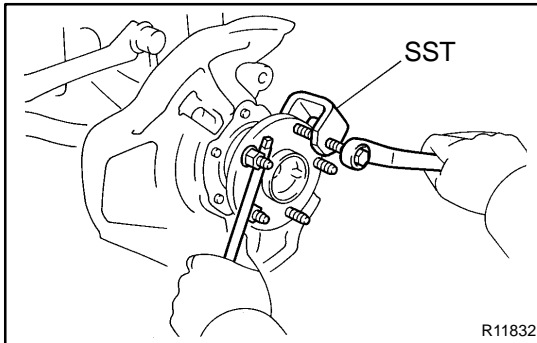
INSTALLATION

Installation is in the reverse order of removal (See page [SA-13](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)), AND FRONT WHEEL ALIGNMENT (See page [SA-5](#))

FRONT WHEEL HUB BOLT REPLACEMENT

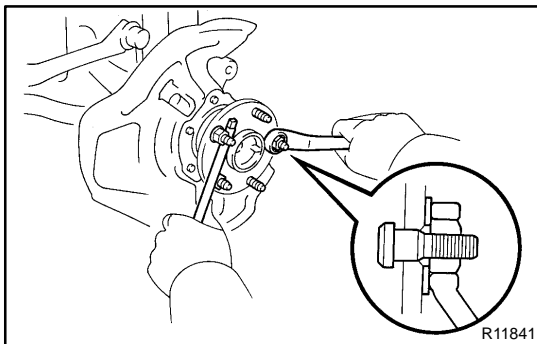
1. **REMOVE FRONT WHEEL**
2. **REMOVE BRAKE CALIPER AND DISC**
 - (a) Place matchmarks on the disc and axle hub.
 - (b) Remove the 2 bolts and brake caliper.
 - (c) Support the brake caliper securely.
 - (d) Remove the 2 screws and disc.



3. **REMOVE HUB BOLT**

Using SST, remove hub bolt.

SST 09628-10011



4. **INSTALL HUB BOLT**

Install washer and nut to the hub bolt as shown in the illustration, and install the hub bolt with torquing the nut.

5. **INSTALL DISC AND BRAKE CALIPER**

- (a) Align the matchmarks on the axle hub and disc.
- (b) Install the disc and 2 screws.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Install the brake caliper and 2 bolts.

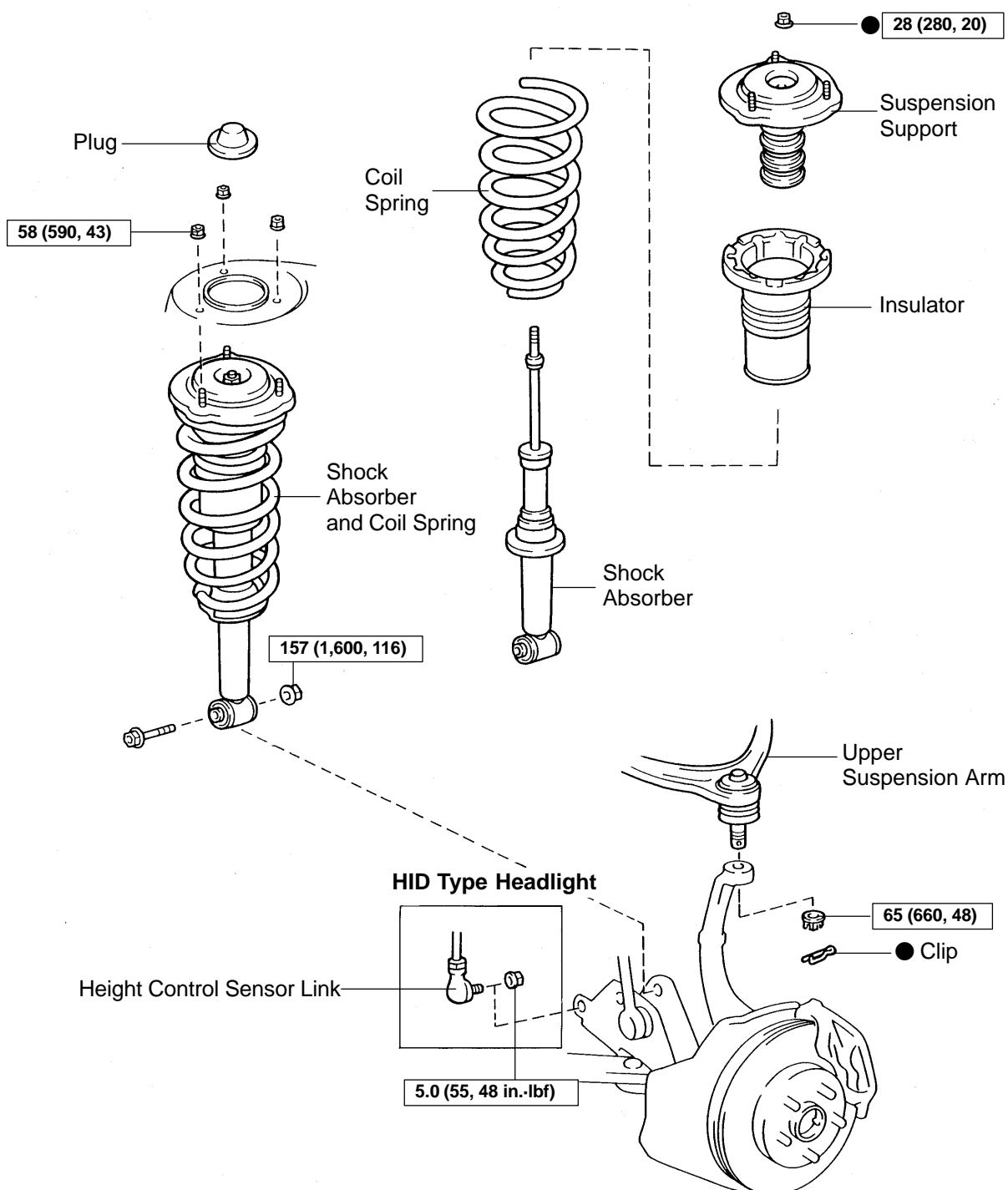
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

6. **INSTALL FRONT WHEEL**

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

FRONT SHOCK ABSORBER COMPONENTS

SA0IV-01



N·m (kgf·cm, ft·lbf) : Specified torque

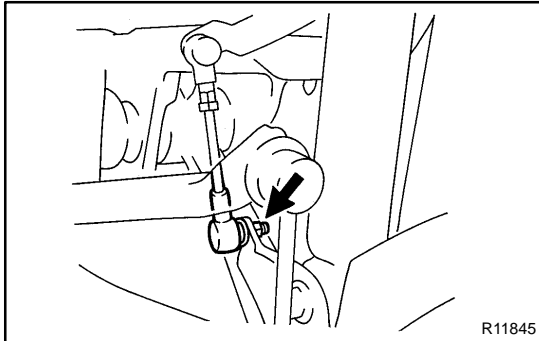
● Non-reusable part

F04695

REMOVAL

1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



2. HID TYPE HEADLIGHT: DISCONNECT HEIGHT CONTROL SENSOR LINK FROM SHOCK ABSORBER LOWER BRACKET

Remove the nut and disconnect the sensor link.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)

3. DISCONNECT STEERING KNUCKLE FROM UPPER BALL JOINT

(a) Remove the clip and nut.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

(b) Using SST, disconnect the steering knuckle from the upper ball joint.

SST 09610-20012

(c) Support the steering knuckle securely.

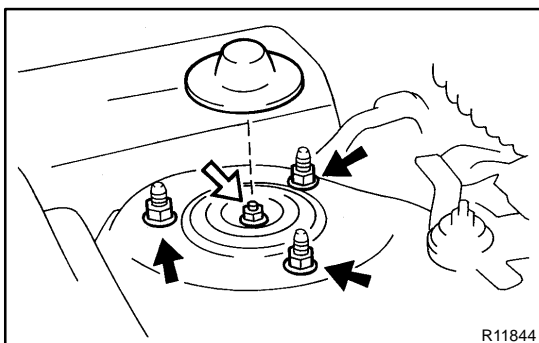
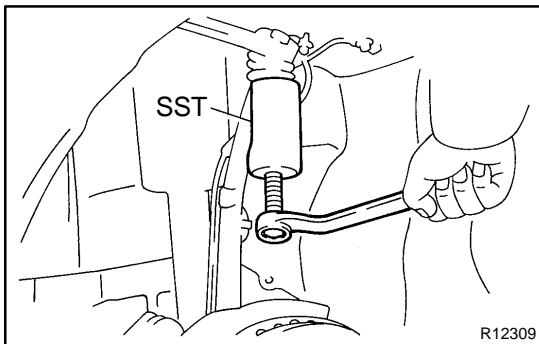
4. DISCONNECT SHOCK ABSORBER FROM SHOCK ABSORBER LOWER BRACKET

Remove the bolt and nut.

Torque: 157 N·m (1,600 kgf·cm, 116 ft·lbf)

HINT:

At the time of installation, after stabilizing the suspension, torque the bolt.



5. REMOVE SHOCK ABSORBER WITH COIL SPRING

(a) Remove the plug from the suspension support.

(b) Loosen the suspension support center nut.

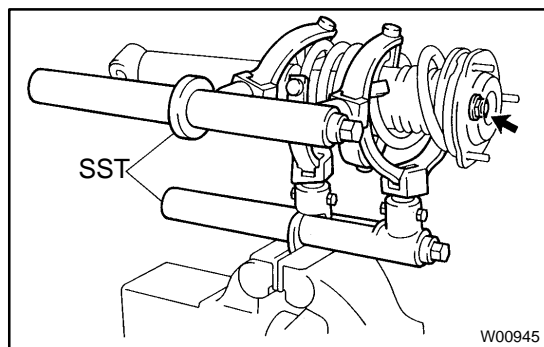
NOTICE:

Do not remove the nut.

Torque: 28 N·m (280 kgf·cm, 20 ft·lbf)

(c) Remove the 3 nuts and shock absorber with coil spring.

Torque: 58 N·m (590 kgf·cm, 43 ft·lbf)



DISASSEMBLY

1. REMOVE SUSPENSION SUPPORT AND COIL SPRING

- (a) Using 2 SST, compress the coil spring until there is a clearance on both ends.

SST 09727-30021

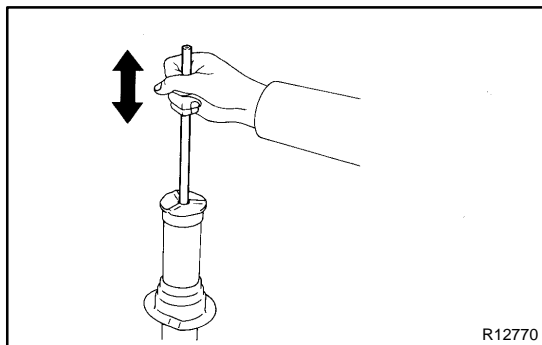
NOTICE:

Do not use an impact wrench. It will damage the SST.

HINT:

- Set the 2 SST crosswise taking care not to interfere each other's arms.
 - When compressing the coil spring, tighten the 2 SST alternately so that the spring is compressed uniformly.
- (b) Remove suspension support center nut.
- (c) Remove the suspension support and coil spring with insulator.

2. REMOVE INSULATOR FROM COIL SPRING



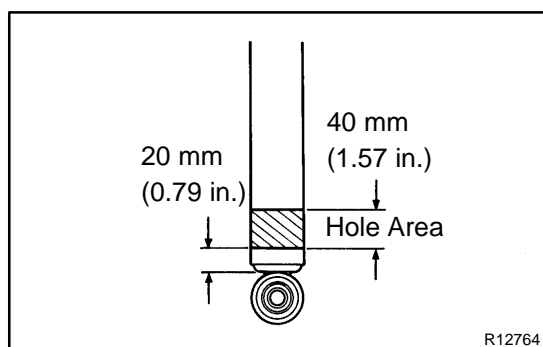
INSPECTION

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-23](#).



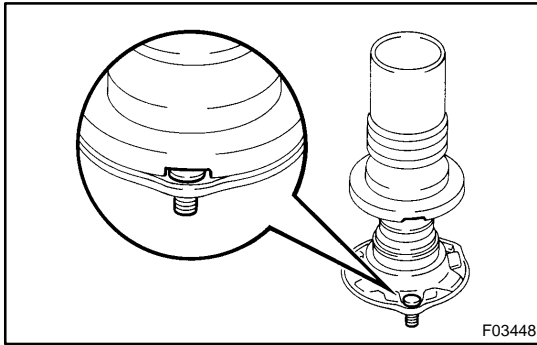
DISPOSAL

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.

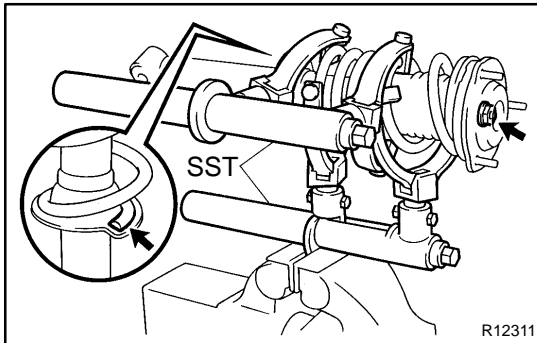


REASSEMBLY

1. INSTALL INSULATOR TO SUSPENSION SUPPORT

HINT:

Match the bolt of the suspension support with the cut-out part of the insulator.



2. INSTALL COIL SPRING TO SHOCK ABSORBER

(a) Using SST, compress coil spring.

SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

HINT:

- Set 2 SST crosswise taking care not to interfere each other's arms.
- When compressing the coil spring, tighten the 2 SST alternately so that the spring is compressed uniformly.

(b) Install the coil spring to the shock absorber.

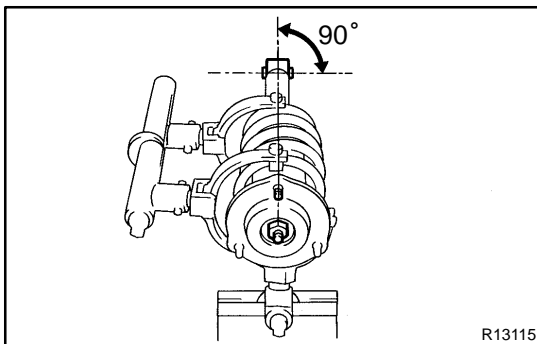
HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

3. INSTALL SUSPENSION SUPPORT

(a) Install the suspension support to the rod.

(b) Temporarily tighten a new suspension support center nut.



(c) Turn the suspension support so that one of the bolts on the suspension support faces the same direction as shown in the illustration.

HINT:

Align the bolt so that a line drawn between the rod and the bolt would be parallel to the direction of the lower bushing.

4. REMOVE SST

HINT:

After removing the SST, check again the direction of the suspension support.

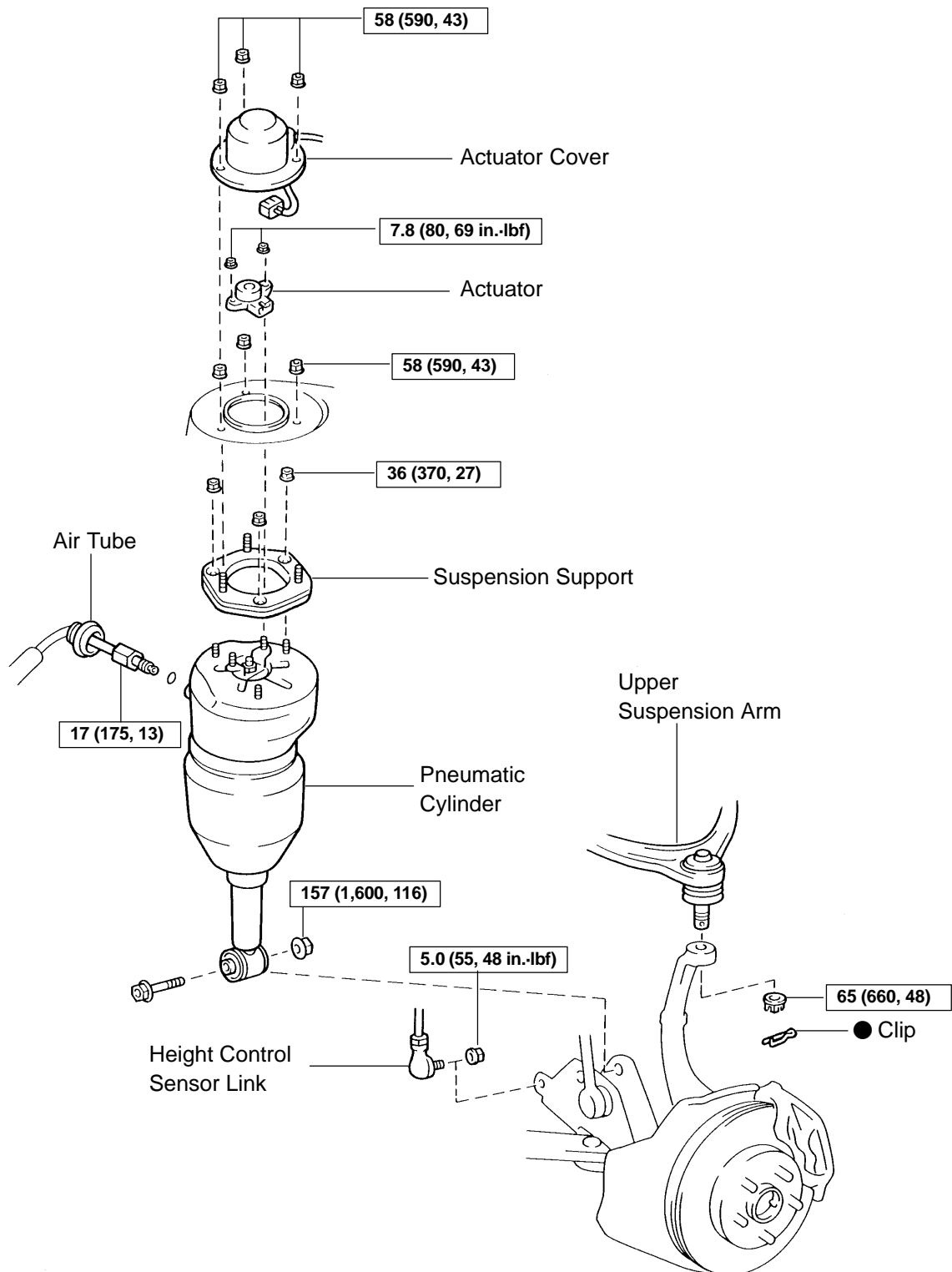
INSTALLATION

Installation is in the reverse order of removal (See page [SA-20](#)).

AFTER INSTALLATION, CHECK FRONT WHEEL ALIGNMENT (See page [SA-5](#))

FRONT PNEUMATIC CYLINDER COMPONENTS

SA0J2-01



N·m(kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

F01939

REMOVAL

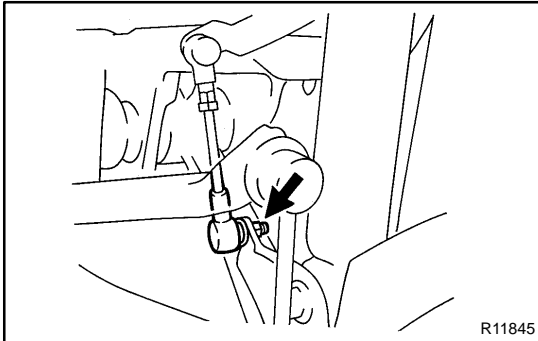
1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. BLEED AIR (See page SA-131)

HINT:

Disconnect the necessary one touch air connector of the height control valves and bleed the air.



3. DISCONNECT HEIGHT CONTROL SENSOR LINK FROM SHOCK ABSORBER LOWER BRACKET

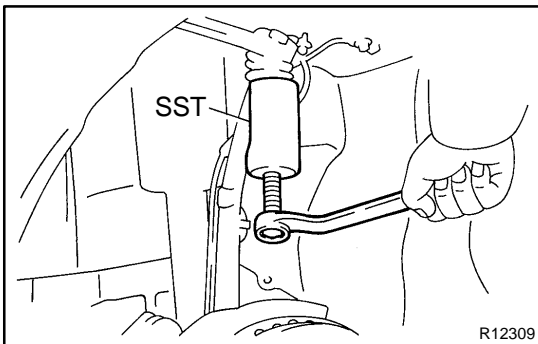
Remove the nut and disconnect the sensor link.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)

4. DISCONNECT STEERING KNUCKLE FROM UPPER BALL JOINT

(a) Remove the clip and nut.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



(b) Using SST, disconnect the steering knuckle from the upper ball joint.

SST 09610-20012

(c) Support the steering knuckle securely.

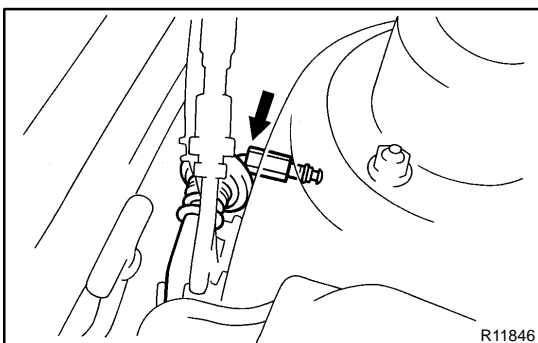
5. DISCONNECT PNEUMATIC CYLINDER FROM SHOCK ABSORBER LOWER BRACKET

Remove the bolt and nut.

Torque: 157 N·m (1,600 kgf·cm, 116 ft·lbf)

HINT:

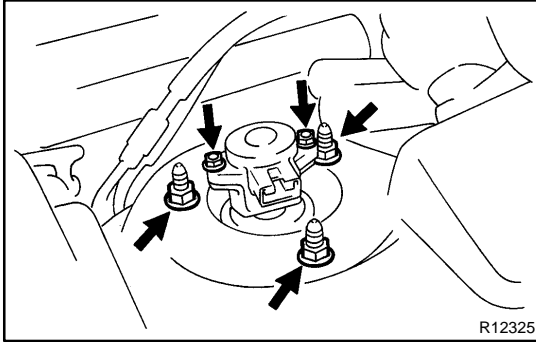
At the time of installation, after stabilizing the suspension, torque the bolt.



6. DISCONNECT AIR TUBE FROM PNEUMATIC CYLINDER

Remove the grommet and disconnect the air tube from the pneumatic cylinder.

Torque: 17 N·m (175 kgf·cm, 13 ft·lbf)

**7. REMOVE SUSPENSION CONTROL ACTUATOR**

- (a) Remove the 3 nuts and actuator cover.
Torque: 58 N·m (590 kgf-cm, 43 ft-lbf)
- (b) Disconnect the actuator connector.
- (c) Remove the 2 nuts and actuator.
Torque: 7.8 N·m (80 kgf-cm, 69 in.-lbf)

HINT:

At the time of installation, match the rod of pneumatic cylinder with the hole in the actuator.

8. REMOVE FRONT PNEUMATIC CYLINDER

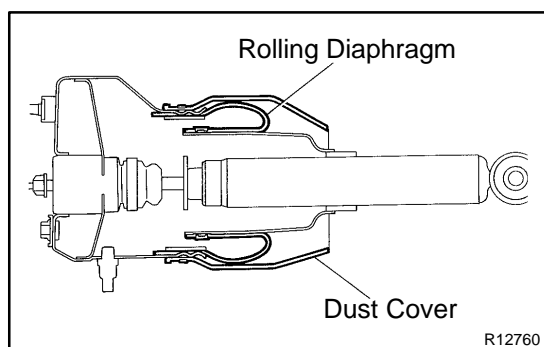
Remove the 3 nuts and pneumatic cylinder from the vehicle.

Torque: 58 N·m (590 kgf-cm, 43 ft-lbf)

9. REMOVE SUSPENSION SUPPORT

Remove the 3 nuts and suspension support from the pneumatic cylinder.

Torque: 36 N·m (370 kgf-cm, 27 ft-lbf)



INSPECTION

1. INSPECT ROLLING DIAPHRAGM

- (a) Lift up the dust cover and check that the rolling diaphragm is not damaged or cracked.

If damage or cracks exist, replace the pneumatic cylinder.

- (b) Return the dust cover back to position.

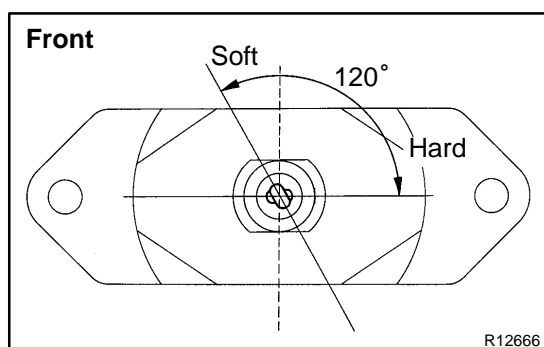
2. INSPECT DAMPING FORCE

- (a) Compress and extend the pneumatic cylinder and check that there is no abnormal resistance or unusual operation sounds.

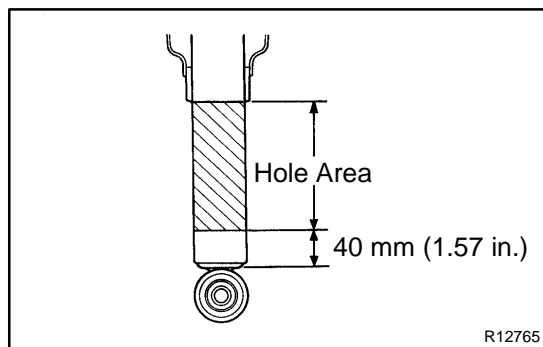
If the pneumatic cylinder is not normal, replace it.

NOTICE:

When removing the shock absorber, see **DISPOSAL** on page [SA-30](#).



- (b) Check that there is a difference in the damping force when the rod is positioned as shown.



DISPOSAL

MAKE A HOLE IN SHOCK ABSORBER AND REMOVE GAS

- (a) Fully extend the pneumatic cylinder.
- (b) 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.

INSTALLATION

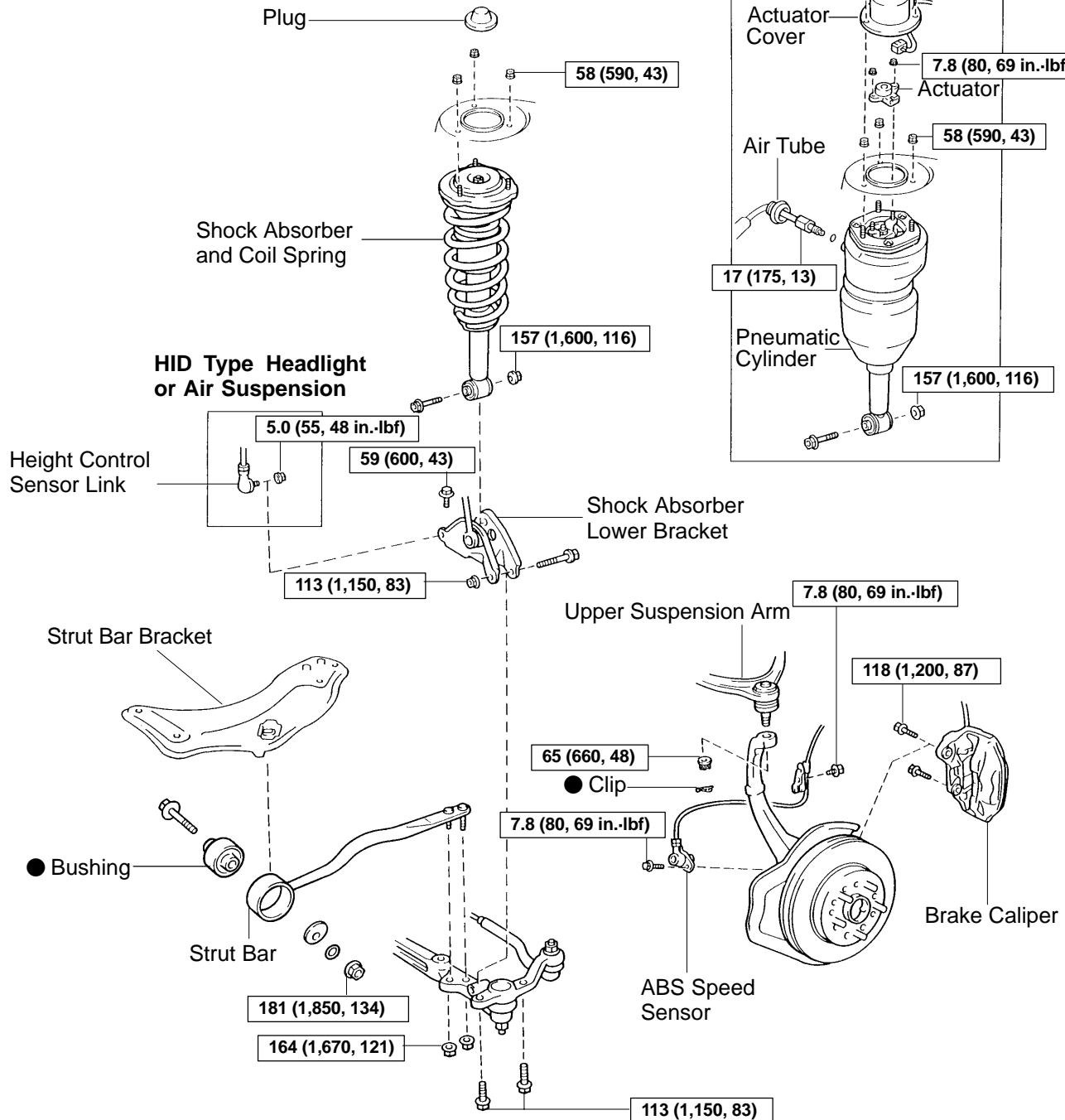
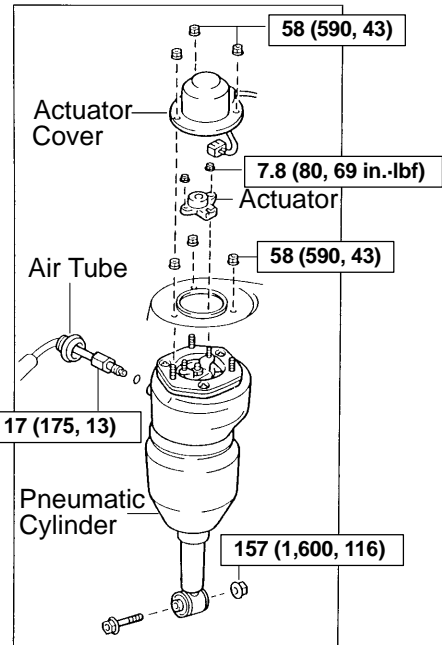
Installation is in the reverse order of removal (See page [SA-27](#)).

AFTER INSTALLATION, CHECK FRONT WHEEL ALIGNMENT (See page [SA-5](#))

FRONT STRUT BAR COMPONENTS

SA0J7-03

Air Suspension



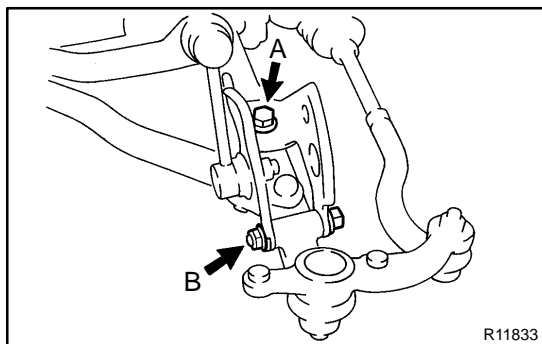
N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

F01940

REMOVAL

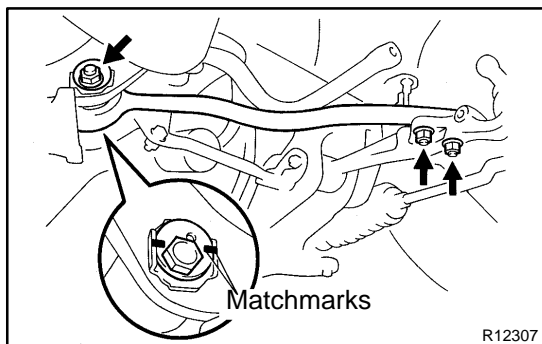
1. REMOVE STEERING KNUCKLE WITH AXLE HUB
(See page [SA-13](#))
2. COIL SUSPENSION:
REMOVE FRONT SHOCK ABSORBER (See page [SA-20](#))
3. AIR SUSPENSION:
REMOVE FRONT PNEUMATIC CYLINDER (See page [SA-27](#))



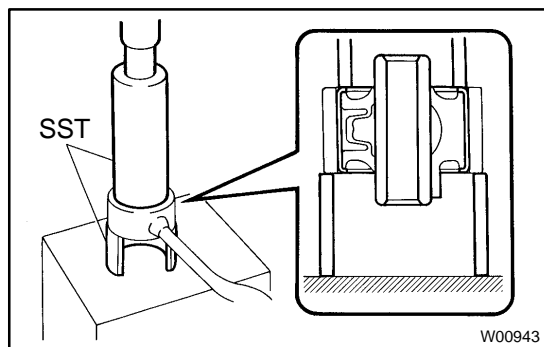
4. REMOVE SHOCK ABSORBER LOWER BRACKET
Torque:

A: 59 N·m (600 kgf·cm, 43 ft·lbf)

B: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



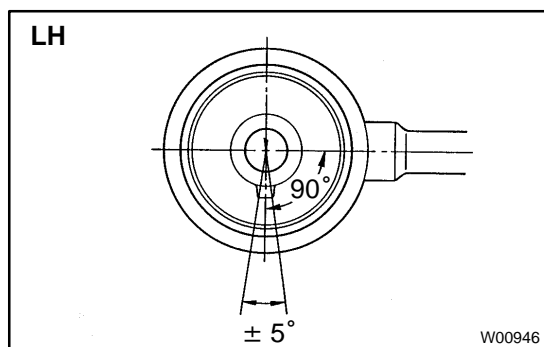
5. REMOVE STRUT BAR
 - (a) Place matchmarks on the caster adjust cam and bracket.
 - (b) Remove the nut and caster adjust cam, and disconnect the strut bar.
Torque: 181 N·m (1,850 kgf·cm, 134 ft·lbf)
 - (c) Remove the 2 nuts and strut bar from the lower suspension arm.
Torque: 164 N·m (1,670 kgf·cm, 121 ft·lbf)



REPLACEMENT

REPLACE STRUT BAR CUSHION

- (a) Using SST and a press, remove the cushion.
 SST 09316-60011 (09316-00011),
 09710-26011 (09710-05081)



- (b) Using SST and a press, install a new cushion as shown in the illustration.

SST 09316-60011 (09316-00011),
 09710-26011 (09710-05081)

HINT:

The index tab of the new cushion should be at a right angle ($\pm 5^\circ$) to the center of the strut bar, and facing downwards when seen from outside the vehicle.

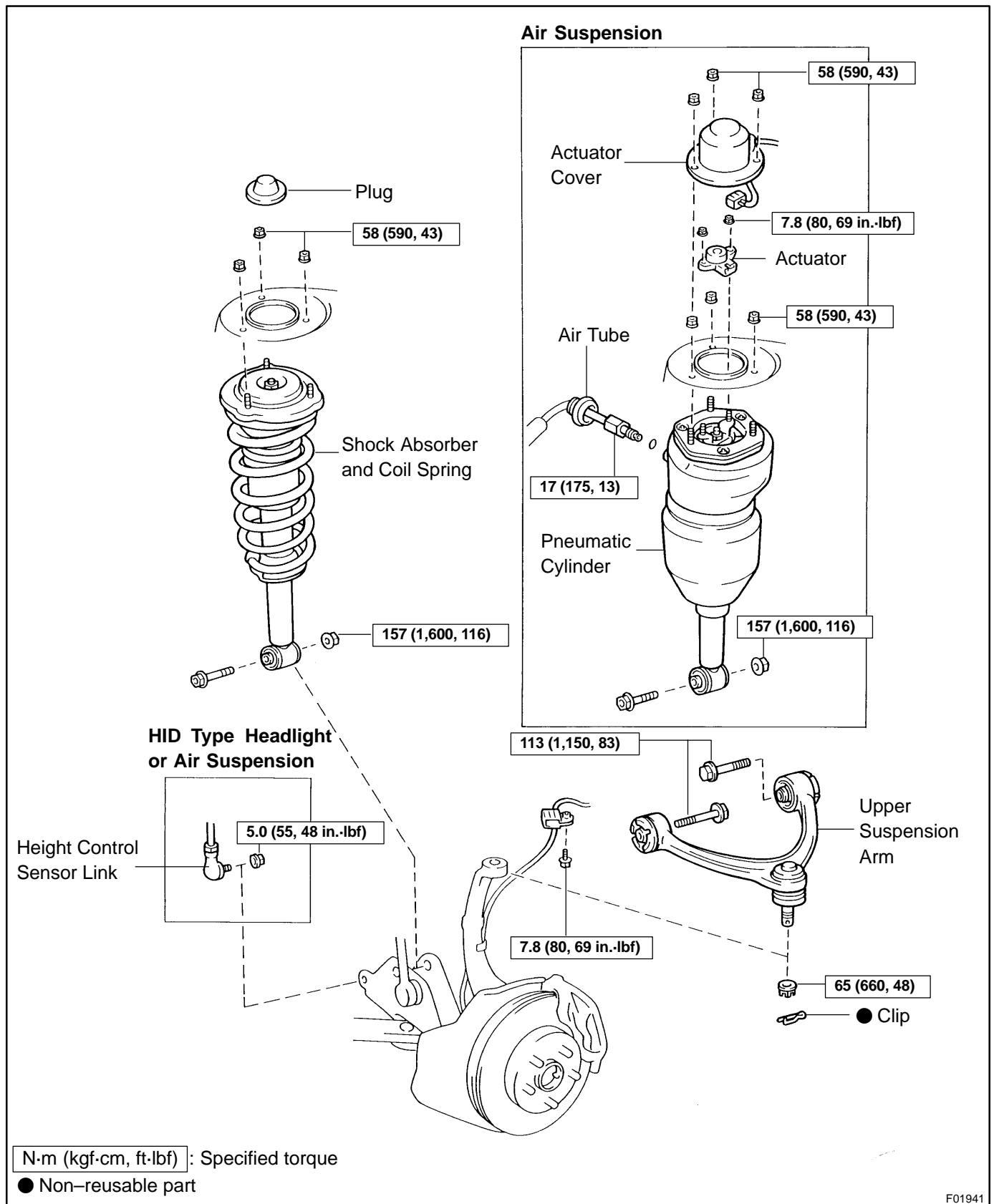
INSTALLATION

Installation is in the reverse order of removal (See page [SA-33](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-5](#))

FRONT UPPER SUSPENSION ARM COMPONENTS

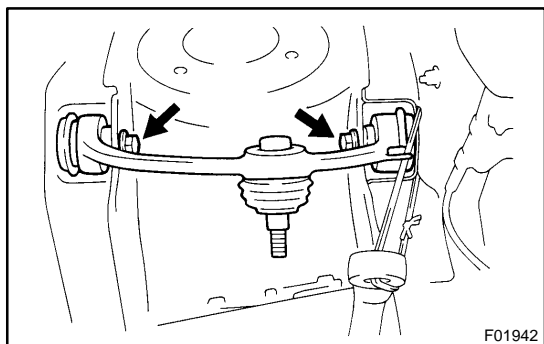
SA0JB-01



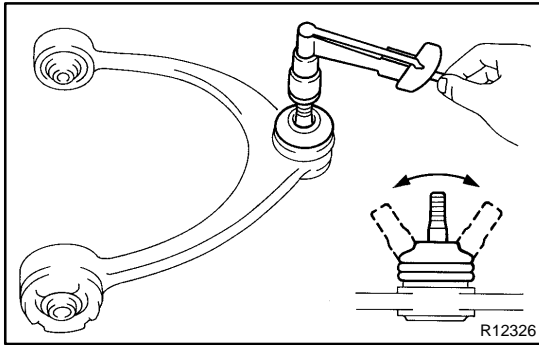
F01941

REMOVAL

1. **COIL SUSPENSION:**
REMOVE FRONT SHOCK ABSORBER (See page [SA-20](#))
2. **AIR SUSPENSION:**
REMOVE FRONT PNEUMATIC CYLINDER (See page [SA-27](#))
3. **REMOVE UPPER SUSPENSION ARM**
 - (a) Remove the bolt and disconnect the ABS speed sensor wire harness from the upper suspension arm.



- (b) Remove the 2 bolts and the upper suspension arm.
Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- Flip the ball joint stud back and forth 5 times before installing the nut.
- Using a torque wrench, turn the nut continuously one turn every 2–4 seconds and take the torque reading on the 5th turn.

Torque (turning):

1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.-lbf)

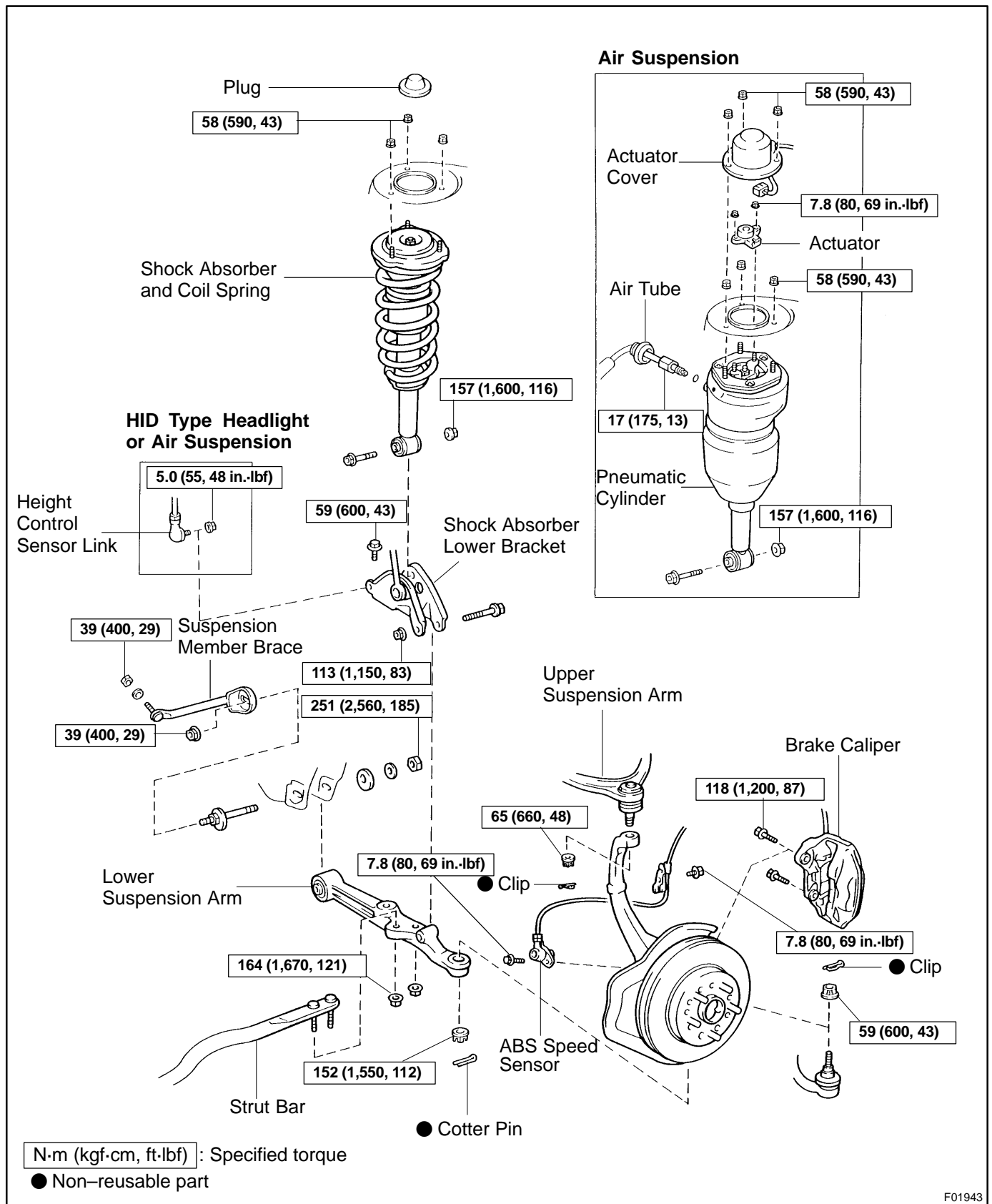
INSTALLATION

Installation is in the reverse order of removal (See page [SA-37](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-5](#))

FRONT LOWER SUSPENSION ARM COMPONENTS

SA0JF-01



F01943

REMOVAL

1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE FRONT BRAKE CALIPER

(a) Remove the 2 bolts and brake caliper.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

(b) Support the brake caliper securely.

3. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

Remove the 2 bolts, ABS speed sensor and wire harness.

NOTICE:

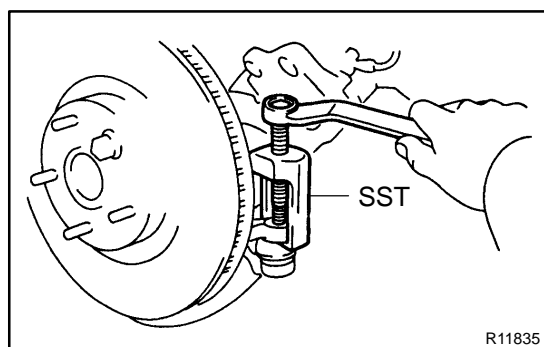
When removing them right side, do not disconnect the pad wear indicator connector.

Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

4. DISCONNECT TIE ROD END FROM LOWER BALL JOINT

(a) Remove the clip and nut from the tie rod end.

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



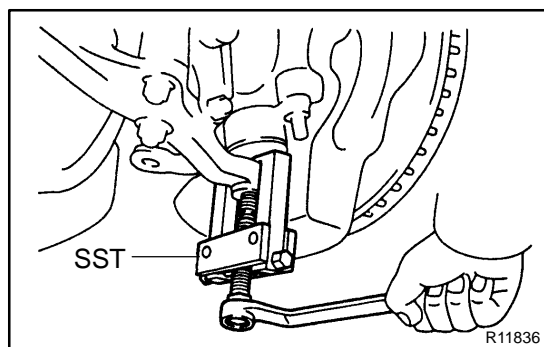
(b) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09610-20012

5. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM

(a) Remove the cotter pin and nut from the lower ball joint.

Torque: 152 N·m (1,550 kgf·cm, 112 ft·lbf)



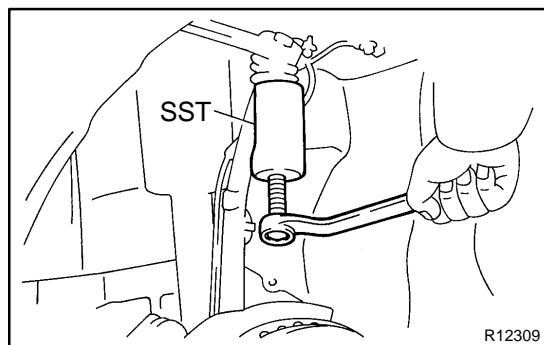
(b) Using SST, remove the lower ball joint from the lower suspension arm.

SST 09628-62011

6. REMOVE STEERING KNUCKLE WITH LOWER BALL JOINT

(a) Remove the clip and nut.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)



(b) Using SST, disconnect the steering knuckle from the upper ball joint.

SST 09610-20012

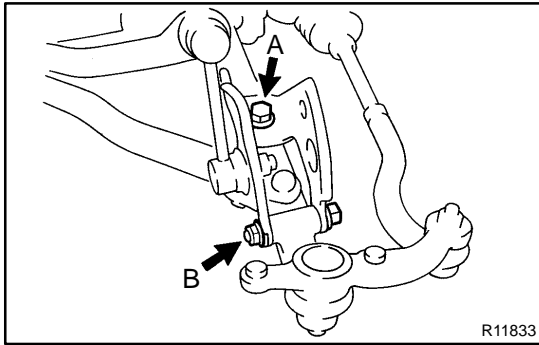
(c) Remove the steering knuckle with lower ball joint.

7. COIL SUSPENSION:

REMOVE FRONT SHOCK ABSORBER (See page [SA-20](#))

8. AIR SUSPENSION:

REMOVE FRONT PNEUMATIC CYLINDER (See page [SA-27](#))

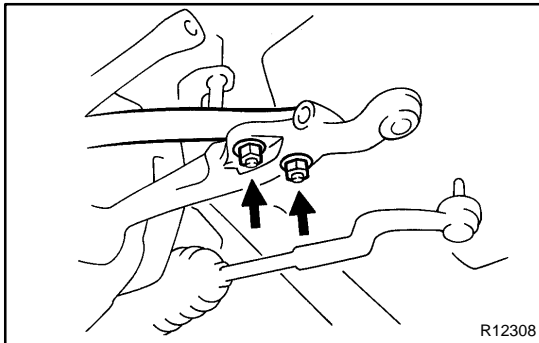


9. REMOVE FRONT SHOCK ABSORBER LOWER BRACKET

Torque:

A: 59 N·m (600 kgf·cm, 43 ft·lbf)

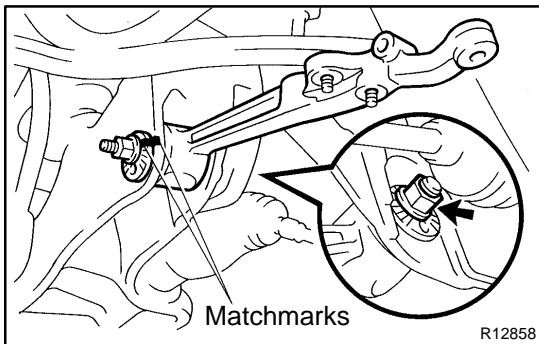
B: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



10. DISCONNECT STRUT BAR FROM LOWER SUSPENSION ARM

Remove the 2 nuts and disconnect the strut bar from the lower suspension arm.

Torque: 164 N·m (1,670 kgf·cm, 121 ft·lbf)



11. REMOVE LOWER SUSPENSION ARM

- (a) Remove the 2 nuts and suspension member brace.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

- (b) Place matchmarks on the camber adjusting cam.

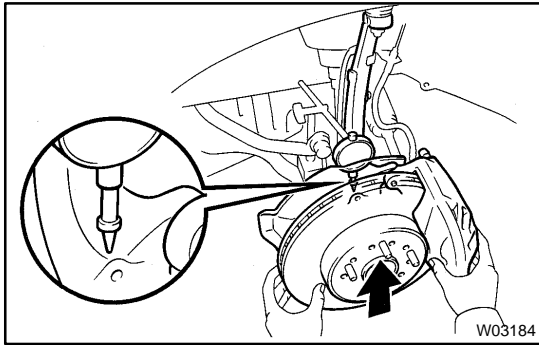
- (c) Remove the nut, adjusting cam and lower suspension arm.

Torque: 251 N·m (2,560 kgf·cm, 185 ft·lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [SA-41](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-5](#))



FRONT LOWER BALL JOINT ON-VEHICLE INSPECTION

SAQJI-01

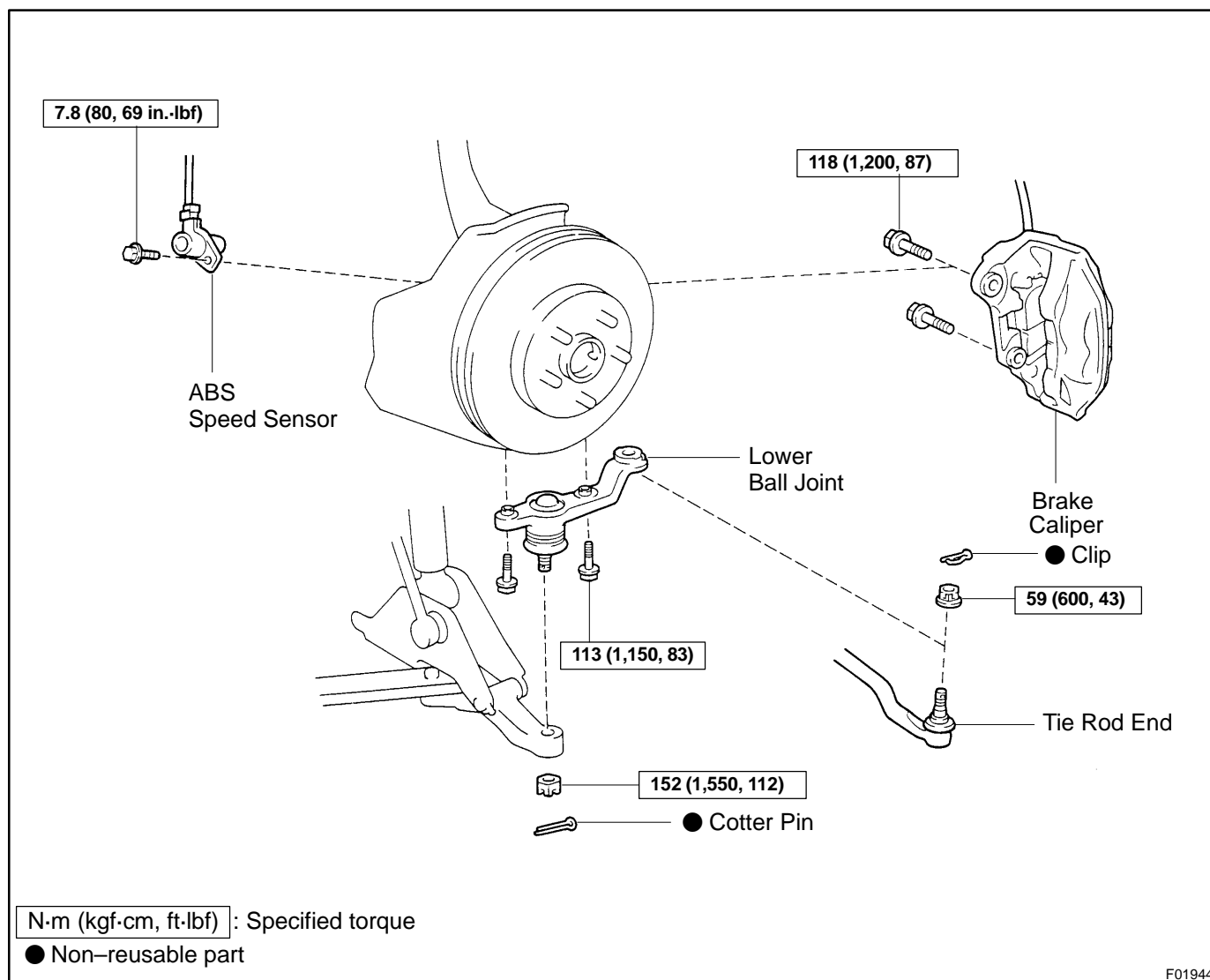
INSPECT LOWER BALL JOINT EXCESSIVE PLAY

- Remove the tire and check the lower ball joint boot. If the boot is damaged, replace the lower ball joint.
- Place the magnetic base on the strut bar and position the spindle of the dial indicator to the knuckle arm as shown below.
- Check the excessive play of the lower ball joint when you push the axle up with hands.

Maximum play: 0.3 mm (0.0118 in.)

If it is not within the specification, replace the lower ball joint.

COMPONENTS



REMOVAL

1. REMOVE FRONT WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE FRONT BRAKE CALIPER

(a) Remove the 2 bolts and brake caliper.

Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)

(b) Support the brake caliper securely.

3. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

Remove the 2 bolts, ABS speed sensor and wire harness.

NOTICE:

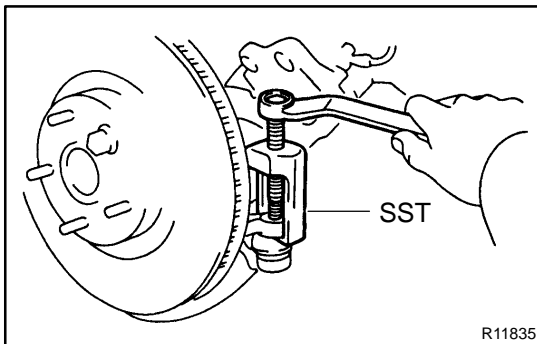
When removing them from right side do not disconnect the pad wear indicator connector.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

4. DISCONNECT TIE ROD END FROM LOWER BALL JOINT

(a) Remove the clip and nut from the tie rod end.

Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



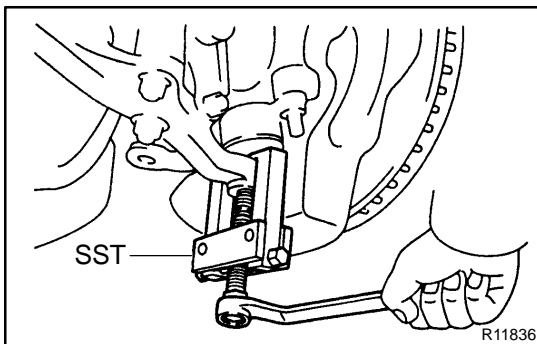
(b) Using SST, disconnect the tie rod end from the steering knuckle.

SST 09610-20012

5. DISCONNECT LOWER BALL JOINT FROM LOWER SUSPENSION ARM

(a) Remove the cotter pin and nut from the lower ball joint.

Torque: 152 N·m (1,550 kgf·cm, 112 ft·lbf)



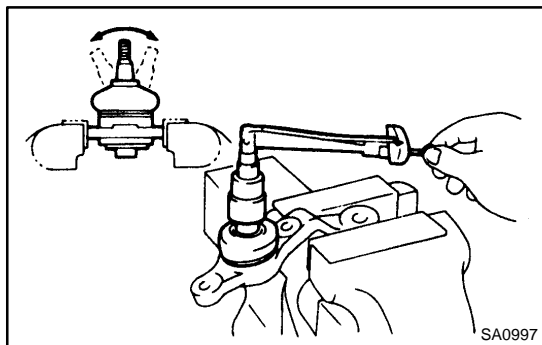
(b) Using SST, remove the lower ball joint from the lower suspension arm.

SST 09628-62011

6. REMOVE LOWER BALL JOINT FROM STEERING KNUCKLE

Remove the 2 bolts and lower ball joint.

Torque: 113 N·m (1,150 kgf·cm, 83 ft·lbf)



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- (a) Flip the ball joint stud back and 4–5 times before installing the nut.
- (b) Using a torque wrench, turn the nut continuously one turn every 2–4 seconds and take the torque reading on the 5th turn.

Torque (turning):

1.0 – 2.5 N·m (1 – 25 kgf·cm, 9 – 21.7 in.-lbf)

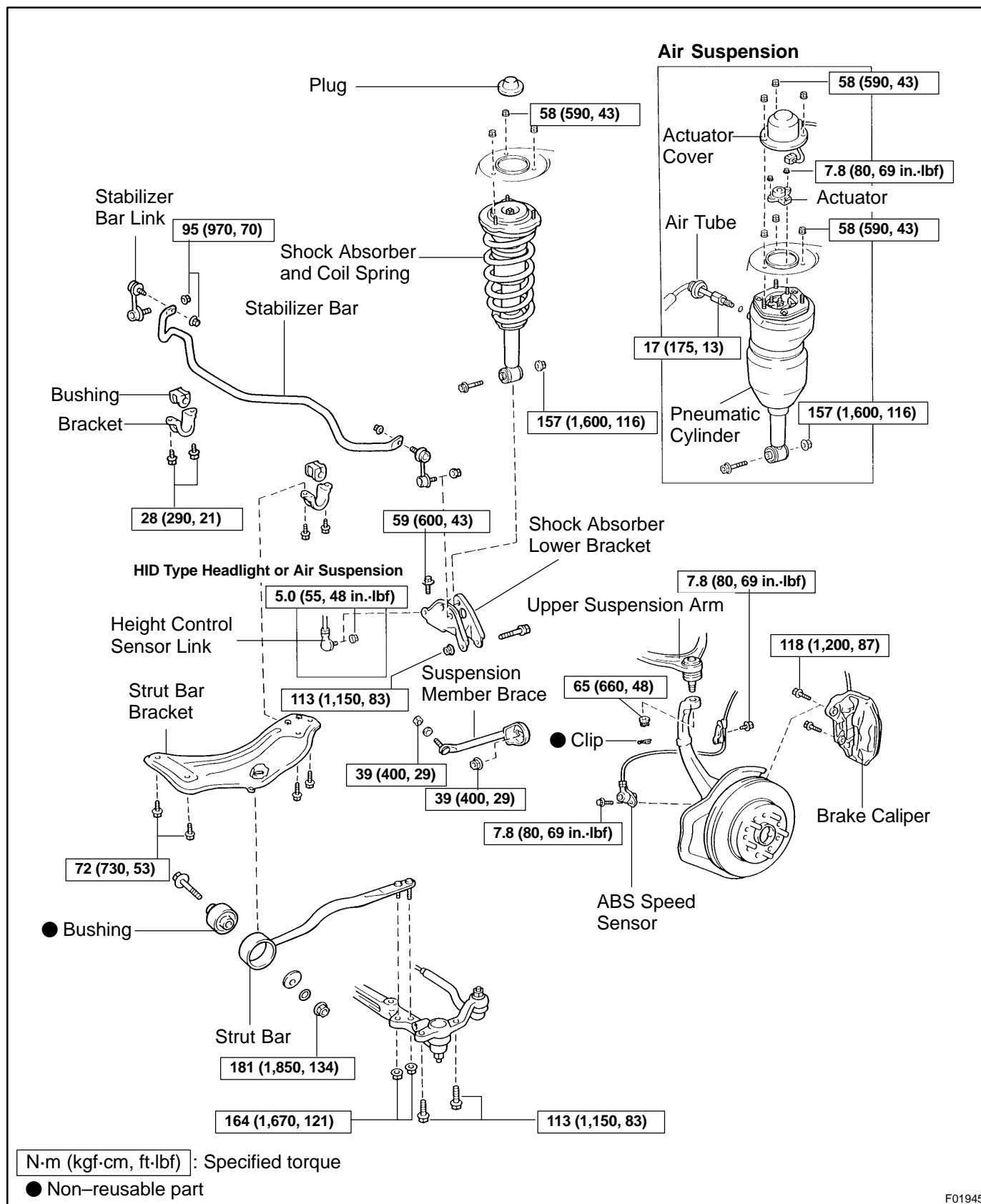
INSTALLATION

Installation is in the reverse order of removal (See page [SA-46](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-5](#))

FRONT STABILIZER BAR COMPONENTS

SA0JN-02



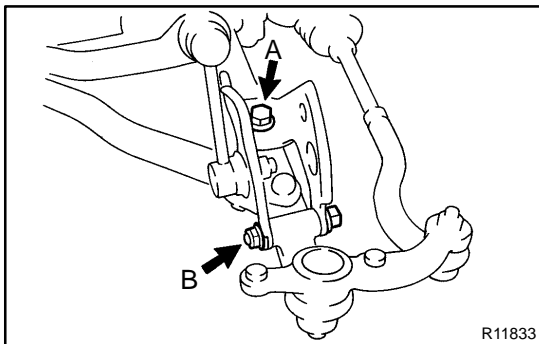
F01945

REMOVAL

1. REMOVE STEERING KNUCKLE WITH AXLE HUB
(See page [SA-13](#))
2. COIL SUSPENSION:
REMOVE SHOCK ABSORBER AND COIL SPRING
(See page [SA-20](#))
3. AIR SUSPENSION:
REMOVE PNEUMATIC CYLINDER (See page [SA-27](#))
4. REMOVE STABILIZER BAR LINKS

Remove the right and left stabilizer bar links.

Torque: 95 N·m (970 kgf·cm, 70 ft·lbf)



5. REMOVE SHOCK ABSORBER LOWER BRACKET

Torque:

A: 59 N·m (600 kgf·cm, 43 ft·lbf)

B: 113 N·m (1,150 kgf·cm, 83 ft·lbf)

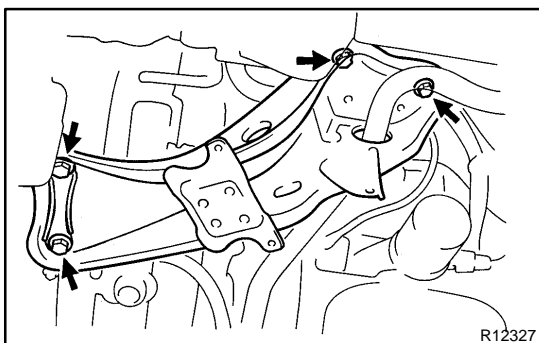
6. REMOVE STRUT BAR (See page [SA-33](#))
7. REMOVE STABILIZER BAR BUSHINGS

Remove the right and left stabilizer bar brackets and bushings.

Torque: 28 N·m (290 kgf·cm, 21 ft·lbf)

HINT:

At the time of installation, install the bushing to the outside of the paint line.



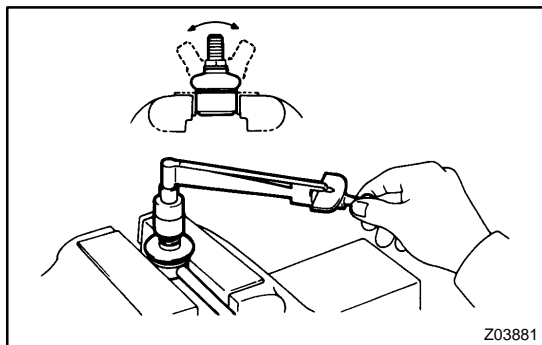
8. REMOVE STABILIZER BAR

(a) Remove the 4 strut bar bracket bolts.

Torque: 72 N·m (730 kgf·cm, 53 ft·lbf)

(b) Pull out the strut bar bracket from the stabilizer bar.

(c) Pull out the stabilizer bar from the other strut bar bracket.



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- Flip the ball joint stud back and forth 5 times before installing the nut.
- Using a torque wrench, turn the stud continuously one turn every 2–4 seconds and take the torque reading on the 5th turn.

Turning Torque:

0.05 – 1.5 N·m (0.5 – 15 kgf·cm, 0.4 – 13 in.-lbf)

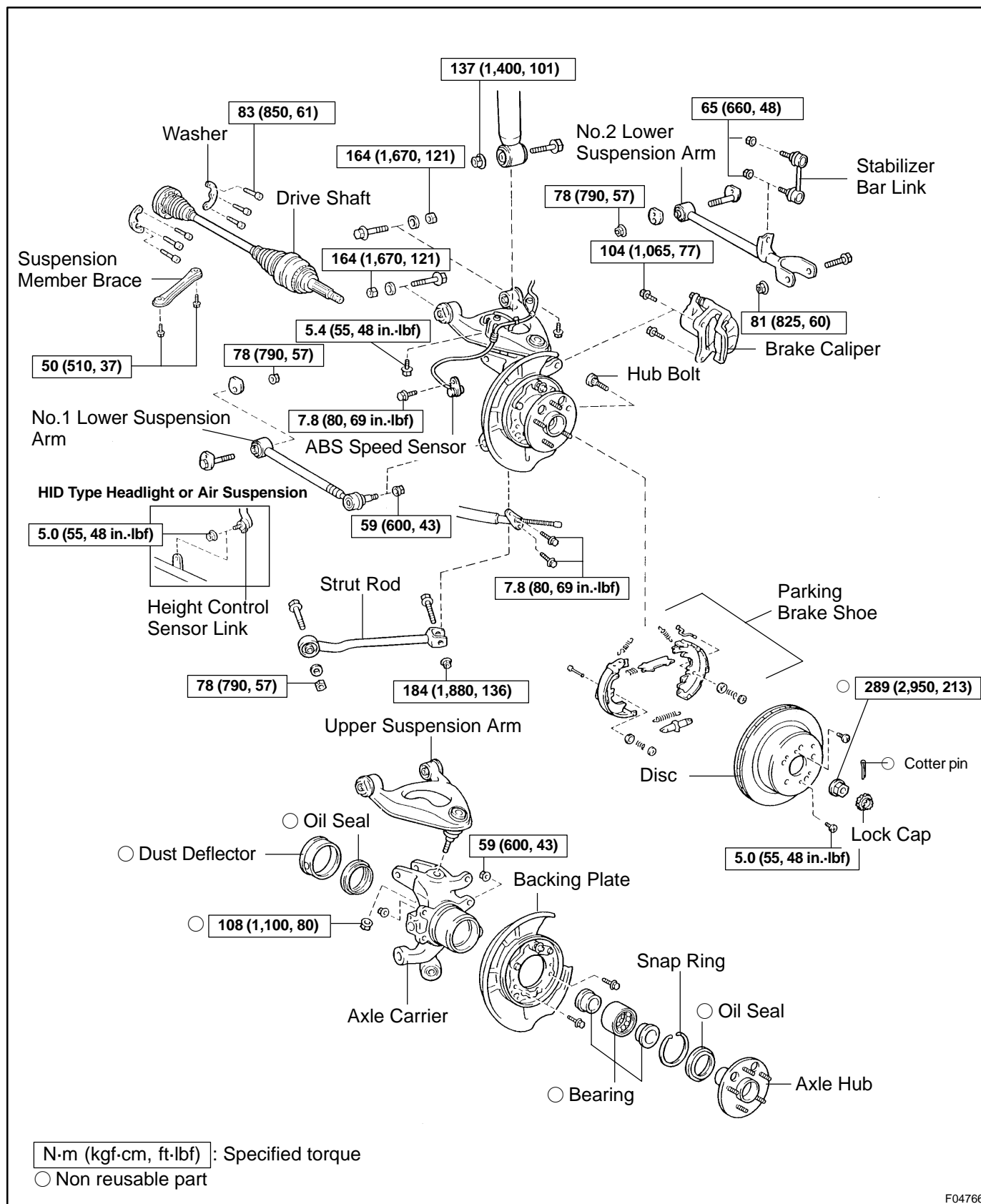
INSTALLATION

Installation is in the reverse order of removal (See page [SA-50](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND FRONT WHEEL ALIGNMENT (See page [SA-5](#))

REAR AXLE CARRIER COMPONENTS

SAQR-03

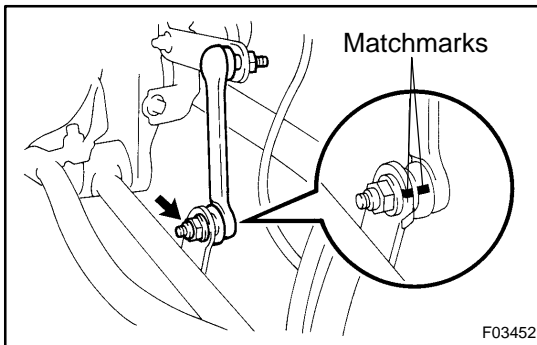


F04766

REMOVAL

1. REMOVE REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



2. HID TYPE HEADLIGHT OR AIR SUSPENSION: DISCONNECT HEIGHT CONTROL SENSOR LINK

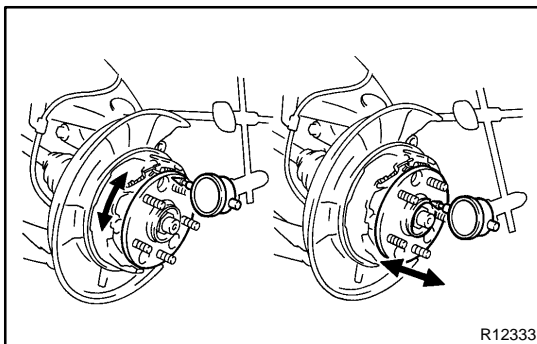
- Place matchmarks on the link and bracket.
- Remove the nut and disconnect the sensor link.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)

3. REMOVE REAR BRAKE CALIPER AND DISC

- Remove the 2 bolts and brake caliper.
- Support the brake caliper securely.
- Place matchmarks on the disc and axle hub.
- Remove the 2 screws and disc.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)



4. CHECK BEARING BACKLASH AND AXLE HUB DEVIATION

- Place the dial indicator near the center of the axle hub and check the backlash in the bearing shaft direction.

Maximum runout: 0.05 mm (0.0020 in.)

If the backlash exceeds the maximum, replace the bearing.

- Using a dial indicator, check the deviation at the surface of the axle hub outside the hub bolt.

Maximum runout: 0.07 mm (0.0028 in.)

If the deviation exceeds the maximum, replace the axle hub.

5. INSTALL DISC AND BRAKE CALIPER

6. REMOVE DRIVE SHAFT (See page SA-63)

7. REMOVE BRAKE CALIPER AND DISC

8. REMOVE PARKING BRAKE SHOE AND CABLE (See page BR-43)

9. DISCONNECT ABS SPEED SENSOR AND WIRE HARNESS

Remove the 3 bolts, ABS speed sensor and wire harness.

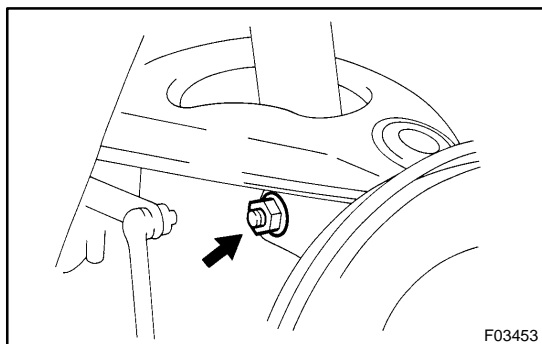
NOTICE:

When removing them from right side do not disconnect the pad wear indicator connector.

Torque:

Sensor: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

Wire harness: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

10. REMOVE STRUT ROD AND LOWER SUSPENSION ARMS (See page SA-115)**11. LOOSEN BOLT ON LOWER SIDE OF SHOCK ABSORBER****HINT:**

Do not remove the bolt.

Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)

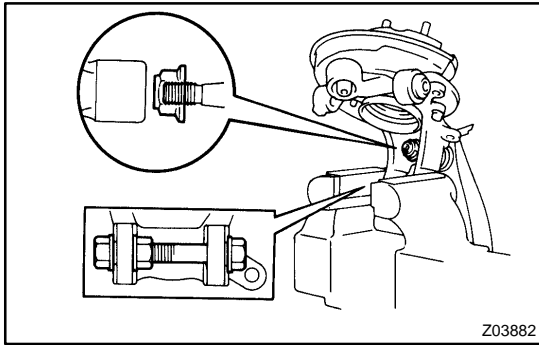
12. REMOVE AXLE CARRIER WITH UPPER SUSPENSION ARM

(a) Remove the 2 upper suspension arm set nuts.

Torque: 164 N·m (1,670 kgf·cm, 121 ft·lbf)

(b) Remove the bolt on lower side of the shock absorber.

(c) Remove the 2 upper suspension arm set bolts and axle carrier with upper suspension arm.



DISASSEMBLY

1. REMOVE UPPER SUSPENSION ARM

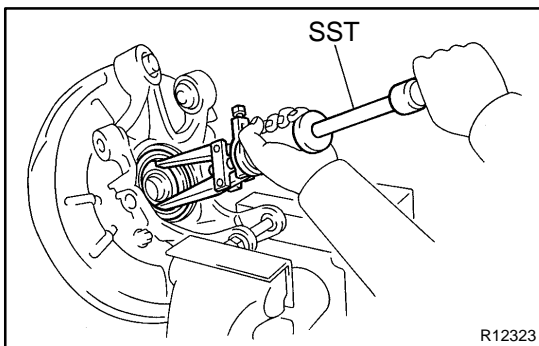
- (a) Install a bolt and 2 nuts to the axle carrier and secure it in a vise.
- (b) Loosen the nut to the position shown in the illustration. Then tap the nut with a hammer and remove the upper suspension arm.

2. REMOVE DUST DEFLECTOR

Using a screwdriver, remove the dust deflector.

3. REMOVE OIL SEAL (INNER)

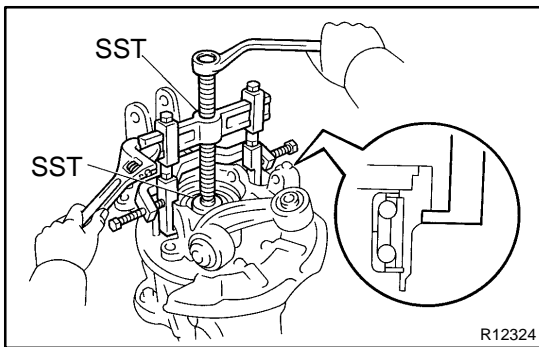
- (a) Install a bolt and 2 nuts to the axle carrier and secure it in a vise.



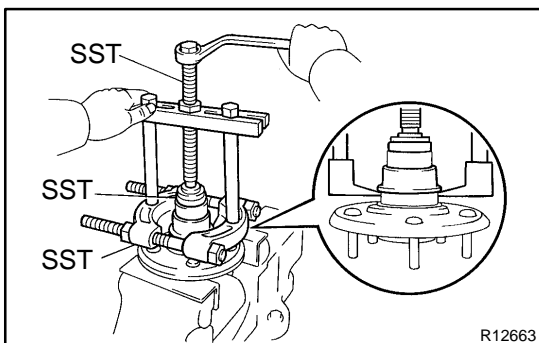
- (b) Using SST, remove the oil seal.
SST 09308-00010

4. REMOVE AXLE HUB FROM AXLE CARRIER

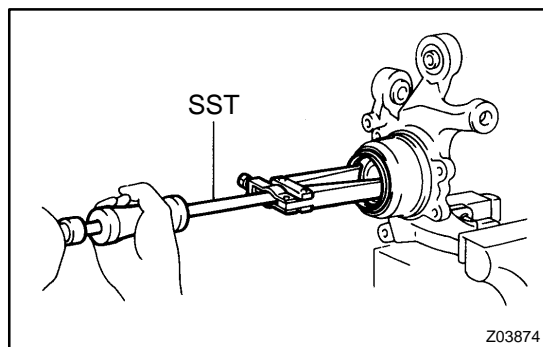
- (a) Remove the 2 bolts and nuts and shift the backing plate towards the hub side (outside).



- (b) Using SST, remove the axle hub.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04051, 09957-04010, 09958-04011), 09950-60010 (09951-00430)
- (c) Remove the backing plate.



- (d) Using SST, remove the inner race (outside) from the axle hub.
SST 09950-00020, 09950-00030, 09950-60010 (09951-00430)

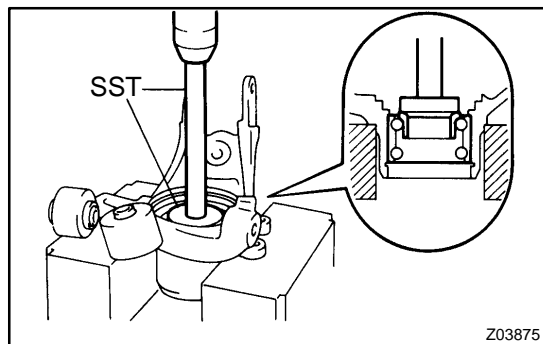
**5. REMOVE OIL SEAL (OUTER)**

Using SST, remove the oil seal.

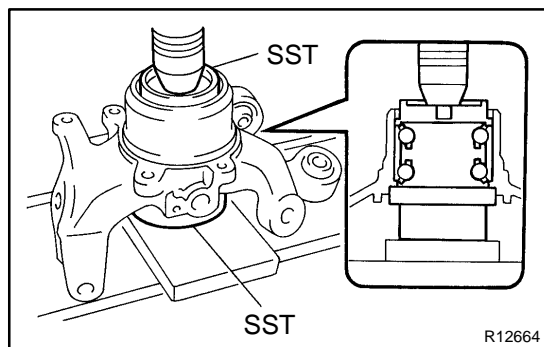
SST 09308-00010

6. REMOVE BEARING

- (a) Using snap ring pliers, remove the snap ring.
- (b) Place the inner race (inside) to the bearing.



- (c) Using SST, remove the bearing.
SST 09950-60010 (09951-00560),
09950-70010 (09951-07100)



REASSEMBLY

1. INSTALL NEW BEARING

- (a) Using SST, install a new bearing to the axle carrier.
SST 09527-17011, 09608-32010

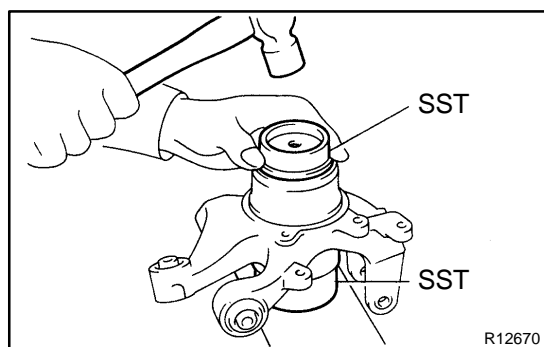
NOTICE:

If the inner races come loose from the bearing outer race, be sure to install them on the same side as before.

- (b) Using snap ring pliers, install the snap ring.

2. INSTALL NEW OIL SEAL (OUTER)

- (a) Place the inner race (outside).



- (b) Using SST, install a new oil seal until it is flush with end surface of axle carrier.
SST 09527-17011, 09608-32010

- (c) Coat MP grease to the oil seal lip.

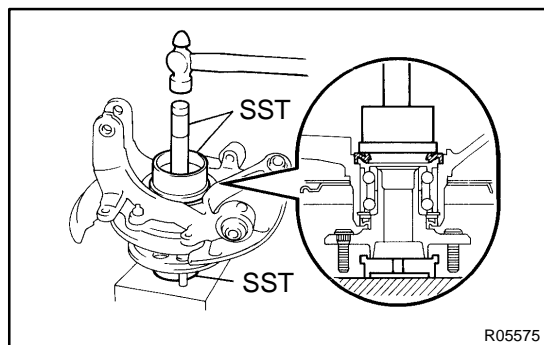
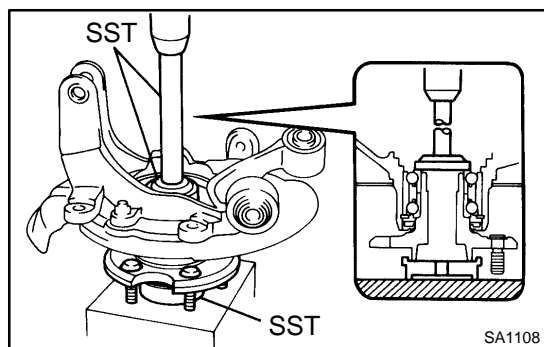
3. INSTALL BACKING PLATE

Install the backing plate to the axle carrier with the 2 bolts and nuts.

Torque: 59 N·m (600 kgf-cm, 43 ft-lbf)

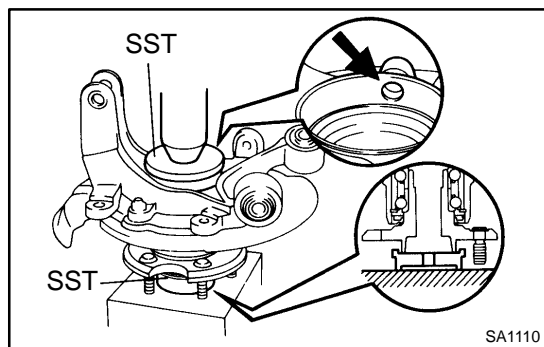
4. INSTALL AXLE HUB

- (a) Place the inner race (inside).
(b) Using SST and a press, install the axle hub.
SST 09608-32010, 09950-60010 (09951-00430),
09950-70010 (09951-07100)



5. INSTALL NEW OIL SEAL (INNER)

- (a) Using SST, install a new oil seal.
SST 09223-15020, 09608-32010,
09950-70010 (09951-07100)
(b) Coat MP grease to the oil seal lip.

**6. INSTALL NEW DUST DEFLECTOR**

Using SST and a press, install a new dust deflector.

SST 09608-32010, 09950-60020 (09951-01030)

HINT:

Align the holes for the ABS speed sensor in the dust deflector and axle carrier.

7. INSTALL UPPER SUSPENSION ARM

- (a) Install a bolt and 2 nuts to the axle carrier and secure it in a vise.
- (b) Install the upper suspension arm to the axle carrier.
- (c) Install a new nut.

Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)

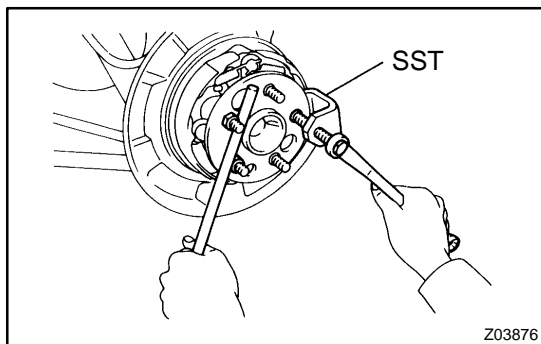
INSTALLATION

Installation is in the reverse order of removal (See page [SA-54](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND REAR WHEEL ALIGNMENT (See page [SA-9](#))

REAR WHEEL HUB BOLT REPLACEMENT

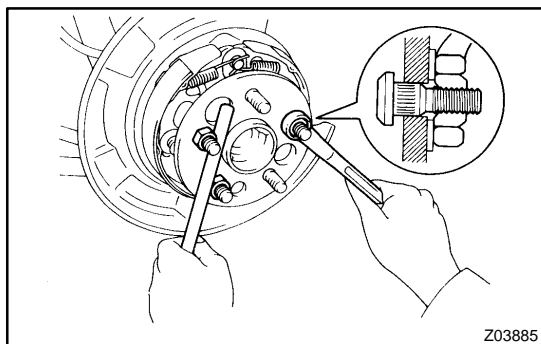
1. **REMOVE REAR WHEEL**
2. **REMOVE BRAKE CALIPER AND DISC**
 - (a) Remove the 2 bolts and brake caliper.
 - (b) Support the brake caliper securely.
 - (c) Place matchmarks on the disc and axle hub.
 - (d) Remove the 2 screws and disc.



3. REMOVE HUB BOLT

Using SST, remove the hub bolt.

SST 09628-10011



4. INSTALL HUB BOLT

Install washer and nut to the hub bolt as shown in the illustration, and install the hub bolt with torquing the nut.

5. INSTALL DISC AND BRAKE CALIPER

- (a) Align the matchmarks on the disc and axle hub.
- (b) Install the brake disc and 2 screws.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Install the brake caliper and 2 bolts.

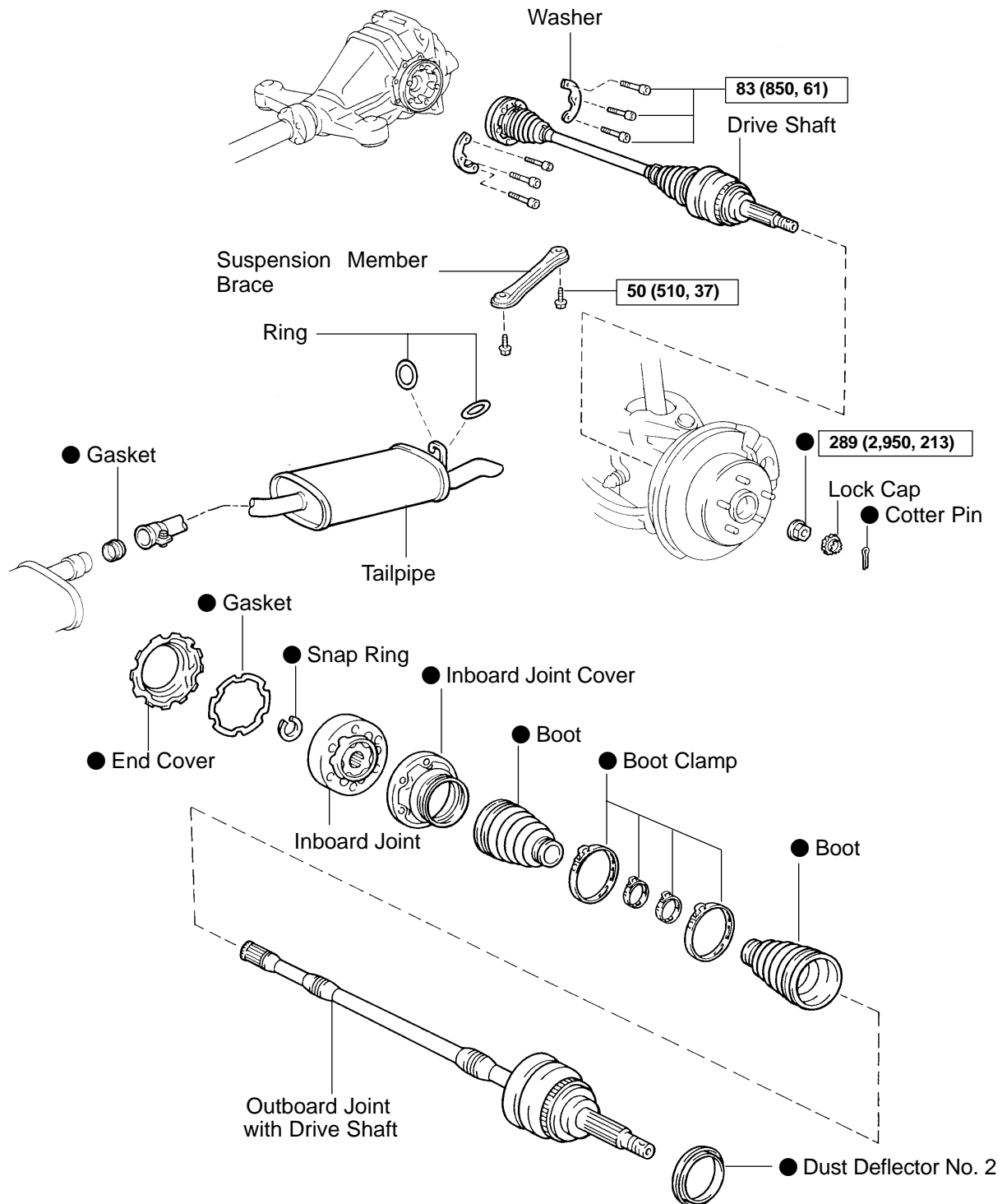
Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

6. INSTALL REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

REAR DRIVE SHAFT COMPONENTS

SA0JX-01



N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

F01947

REMOVAL

1. REMOVE REAR WHEEL

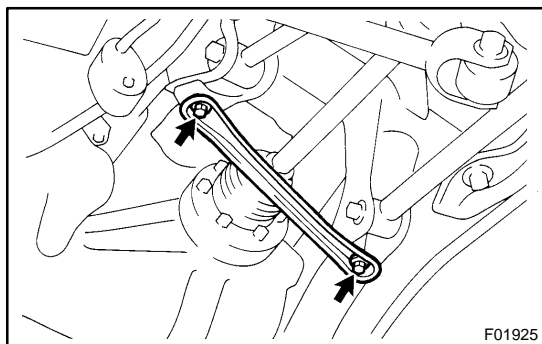
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE EXHAUST PIPE (See page EM-119)

3. REMOVE COTTER PIN, LOCK CAP AND LOCK NUT

- Remove the cotter pin and lock cap.
- With depressing the brake pedal, remove the nut.

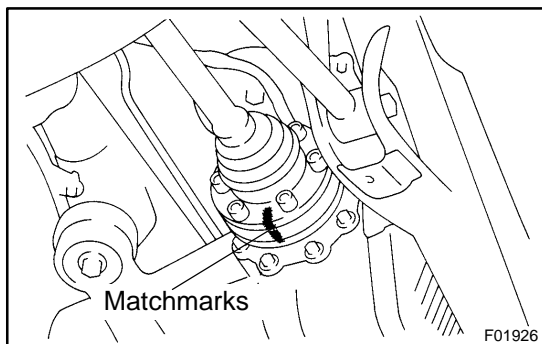
Torque: 289 N·m (2,950 kgf·cm, 213 ft·lbf)



4. REMOVE REAR DRIVE SHAFT

- Remove the 2 bolts and suspension member brace.

Torque: 50 N·m (510 kgf·cm, 37 ft·lbf)



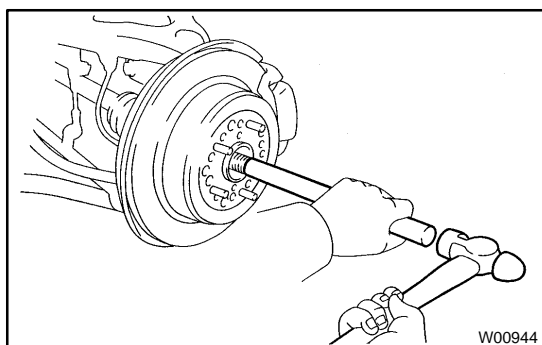
- Place matchmarks on the drive shaft and side gear shaft.
- Using a 10 mm hexagon wrench, remove the 6 hexagon bolts and 2 washers with depressing the brake pedal.

Torque: 83 N·m (850 kgf·cm, 61 ft·lbf)

HINT:

At the time of installation, apply a light coat of engine oil on the threads of the bolts.

- Hold the inboard joint side of the drive shaft so that the outboard joint side does not bend too much.



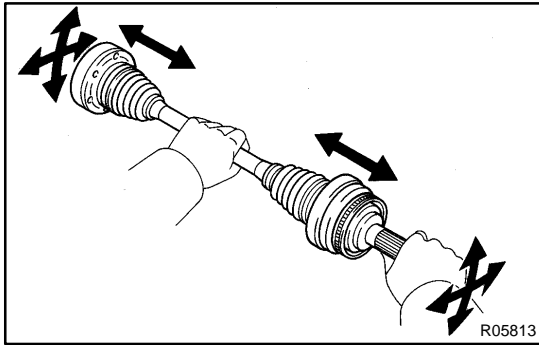
- Using a brass bar and hammer, lightly tap the end of the drive shaft, disengage the axle hub and remove the drive shaft.

NOTICE:

Be careful not to damage the boots, end cover and speed sensor rotor of the drive shaft, and oil seal of the axle hub.

HINT:

At the time of installation, temporarily tighten the lock nut and connect the drive shaft to the axle hub side.



DISASSEMBLY

1. CHECK DRIVE SHAFT

- Check that operation of the joint is smooth within the sliding region in the axial direction.

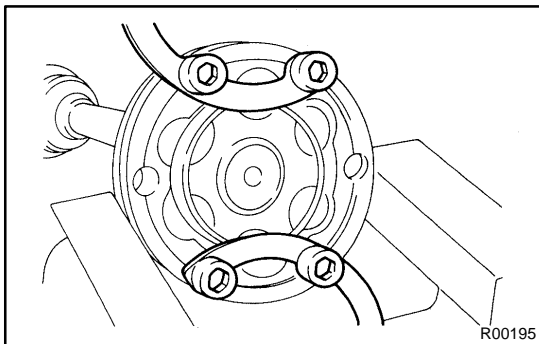
HINT:

If a large angle is used for the cross-groove type joint, the joint will be felt like it is catching, but this does not indicate an abnormality.

- Check that the boots are not cracked, damaged or leaking.
- Check that there are no scratches on the speed sensor rotor.

2. REMOVE END COVER

- Using a screwdriver, remove the end cover.



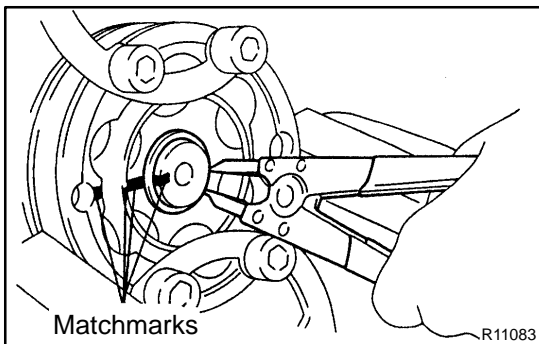
- Use bolts, nuts and washers to keep the inboard joint together.

NOTICE:

Tighten the bolt by hand to avoid scratching the flange surface.

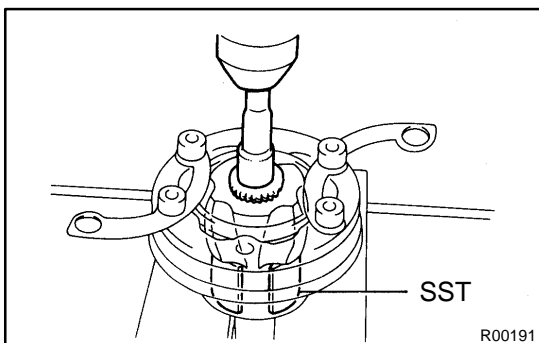
3. REMOVE BOOT CLAMPS

Using a side cutter or pliers, remove the clamps.



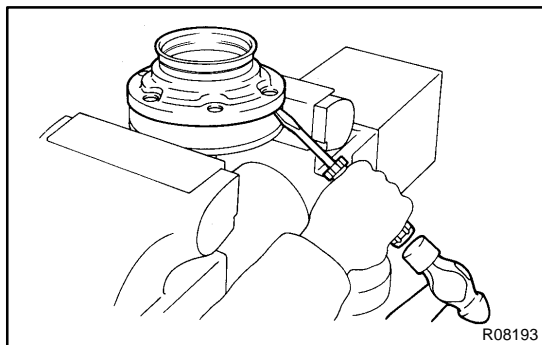
4. REMOVE INBOARD JOINT

- Place matchmarks on the inboard joint and drive shaft.
- Using a snap ring expander, remove the snap ring.



- Using SST, an extension bar and a press, press out the inboard joint from the drive shaft.

SST 09726-12023 (09726-01031)



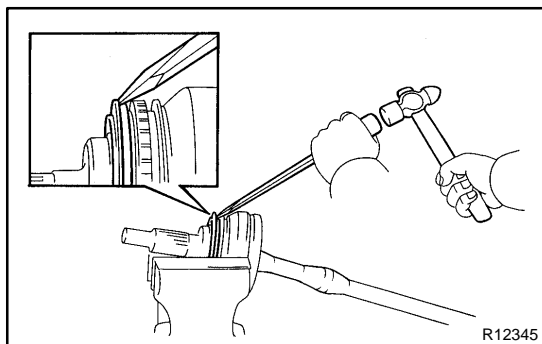
- (d) Mount the inboard joint in a soft jaw vise.
- (e) Using a screwdriver and hammer, tap out the inboard joint cover from the inboard joint.

NOTICE:

Make sure the cage and inner race are not positioned too much to one side of the outer race.

5. REMOVE BOOTS

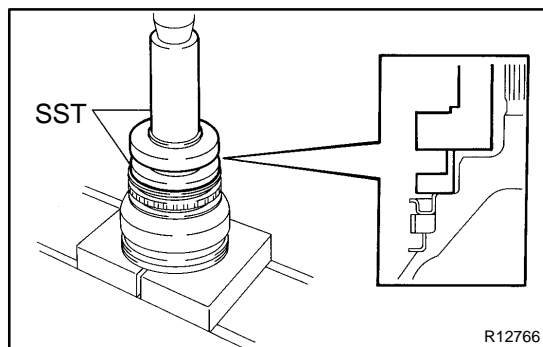
Remove the inboard and outboard joint boots.

**6. REMOVE DUST DEFLECTOR NO. 2**

- (a) Mount the outboard joint in a soft jaw vise.
- (b) Using a screwdriver, remove the dust deflector No. 2.

NOTICE:

Be careful not to damage the ABS speed sensor rotor.



REASSEMBLY

1. INSTALL NEW DUST DEFLECTOR NO. 2

Using SST and a press, install a new dust deflector No. 2.

SST 09309-36010, 09502-12010

NOTICE:

Be careful not to damage the ABS speed sensor rotor.

2. ASSEMBLE INBOARD JOINT

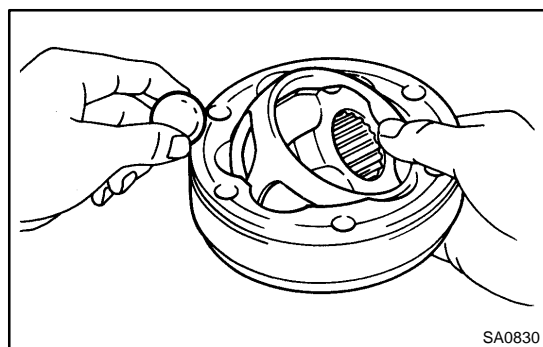
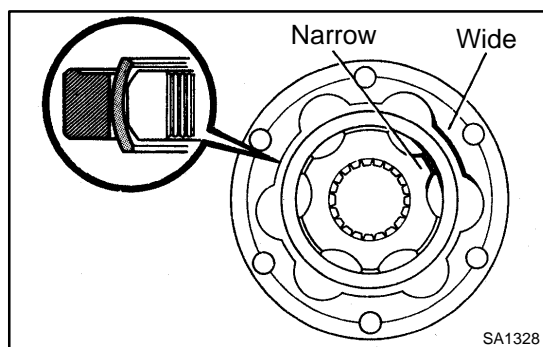
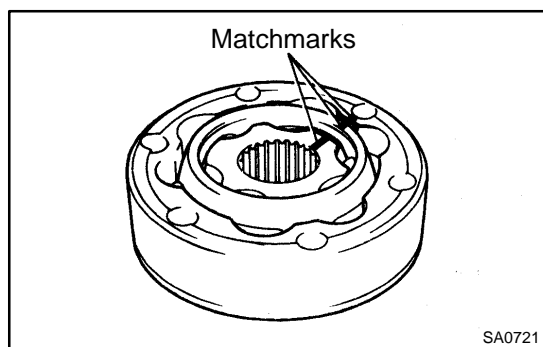
If the joint has come apart, reassemble it in the following order.

(a) Align the matchmarks placed before removal.

HINT:

When the matchmarks have disappeared, do the following procedure.

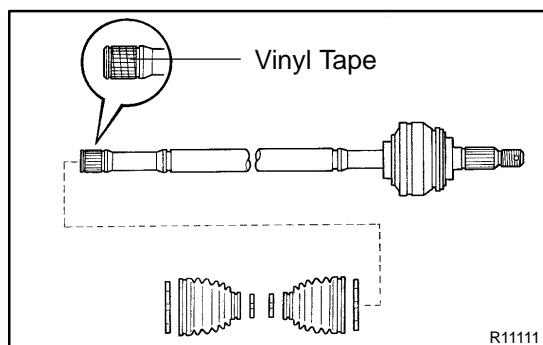
- (1) Install the inner race to the cage so that the indented bevelled part of the inner race is on the opposite side to the bevelled top of the cage.
- (2) Install the outer race so that the indented side of the outer race is facing the same side as the bevelled surface of the cage.
- (3) Match the narrow projections of the inner race with the wide projections of the outer race.



(b) Tilt the cage and inner race to the side and insert the balls one by one.

NOTICE:

When the cage and inner race are tilted over, support the joint with your hand to prevent the balls from falling out.



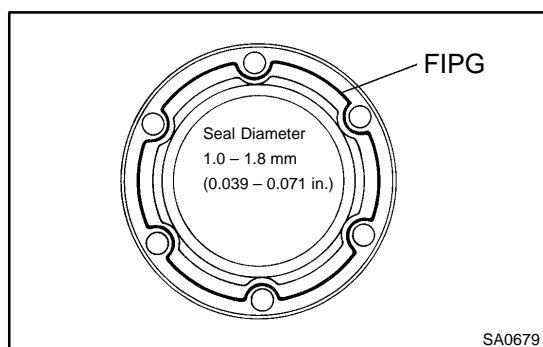
3. TEMPORARILY INSTALL NEW BOOTS AND NEW BOOT CLAMPS

(a) Place 4 new boot clamps to each boots.

HINT:

Before installing the boots, wrap vinyl tape around the spline of the shaft to prevent damaging the boots.

(b) Install the 2 boots to the drive shaft.



4. INSTALL INBOARD JOINT COVER

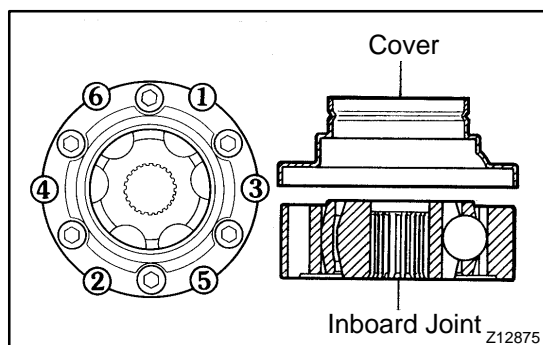
- (a) Apply FIPG to the inboard joint cover as shown in the illustration.

FIPG:

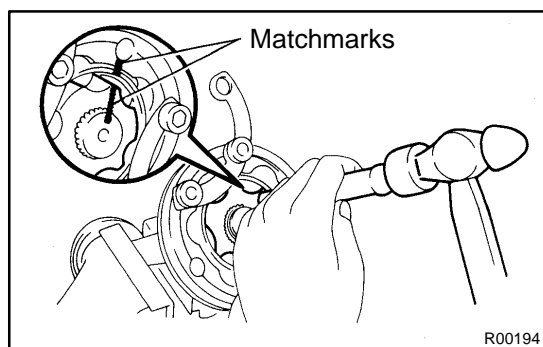
Part No.08826-00801, THREE BOND 1121 or equivalent

HINT:

Avoid applying an excessive amount to the surface.



- (b) Remove grease from the surface of the inboard joint facing the cover.
- (c) Align the bolt holes of the cover with those of the inboard joint, then insert the hexagon bolts.
- (d) Use a plastic-faced hammer to tap the rim of the inboard joint cover into place. Do this in the order shown, and repeat several times.



5. INSTALL INBOARD JOINT

- (a) Align the matchmarks placed before removal.
- (b) Using a brass bar and hammer, tap the inboard joint onto the drive shaft.

NOTICE:

Check that the brass bar is touching the inner race, and not the cage.

- (c) Using a snap ring expander, install a new snap ring.

6. ASSEMBLE BOOTS TO JOINTS

Before assembling the boots, pack with only the same amount of grease that was wiped off.

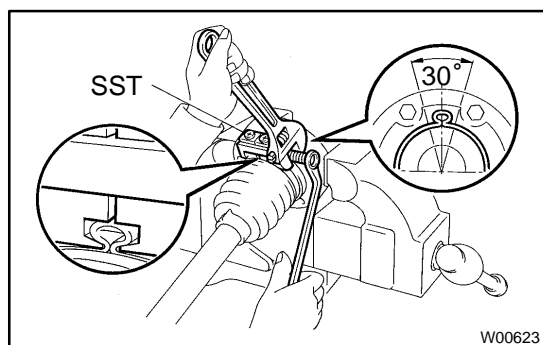
Grease capacity	100 – 105 g (3.5 – 3.7 oz.)
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HINT:

Use the grease supplied in the boot kit.

NOTICE:

- **Keep grease off the joint connection groove of the boot.**
- **Pack with grease all over the ball contact surface inside the joint.**



7. INSTALL NEW BOOT CLAMPS TO BOTH BOOTS

- (a) Position the clamp onto the boot.

HINT:

Pinch the inboard side of the boot clamp, as shown in the illustration.

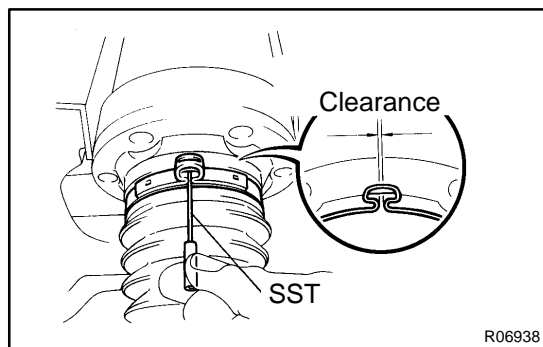
- (b) Place SST onto the clamp.

SST 09521-24010

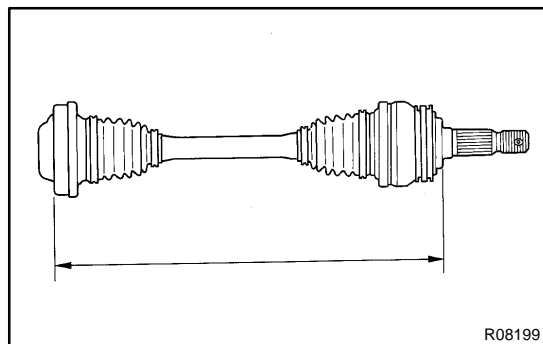
- (c) Tighten SST so that the clamp is pinched.

NOTICE:

Do not overtighten the SST.



- (d) Using SST, adjust the clearance of the clamp.
SST 09240-00020 (09242-00080)
Clearance: 0.8 mm (0.031 in.) or less



- (e) The drive shaft is designed to move ± 20 mm (0.79 in.) from the normal position.

Drive shaft standard length:

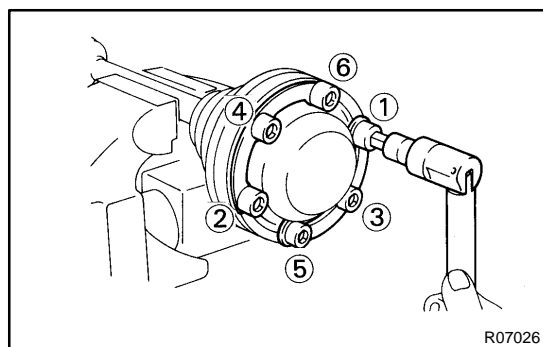
RH	619.5 mm (24.390 in.)
LH	573.5 mm (22.579 in.)

8. INSTALL NEW END COVER

- (a) Pack grease into the end cover.

Grease capacity	50 – 55 g (1.8 – 1.9 oz.)
-----------------	---------------------------

- (b) Remove grease from the surface of the inboard joint facing the cover.
(c) Glue on a new gasket, with the glued side facing toward the outer race side of the inboard joint.
(d) Align the bolt holes of the cover with those of the inboard joint.



- (e) Install the 6 hexagon bolts and washers from the end cover side.
(f) Install the 6 nuts to the boot side.
(g) Using a 10 mm hexagon wrench, tighten the bolts. Do this in the order shown, and repeat several times.
(h) Check that the claw of the end cover touches the inboard joint.

9. CHECK DRIVE SHAFT (See page SA-64)

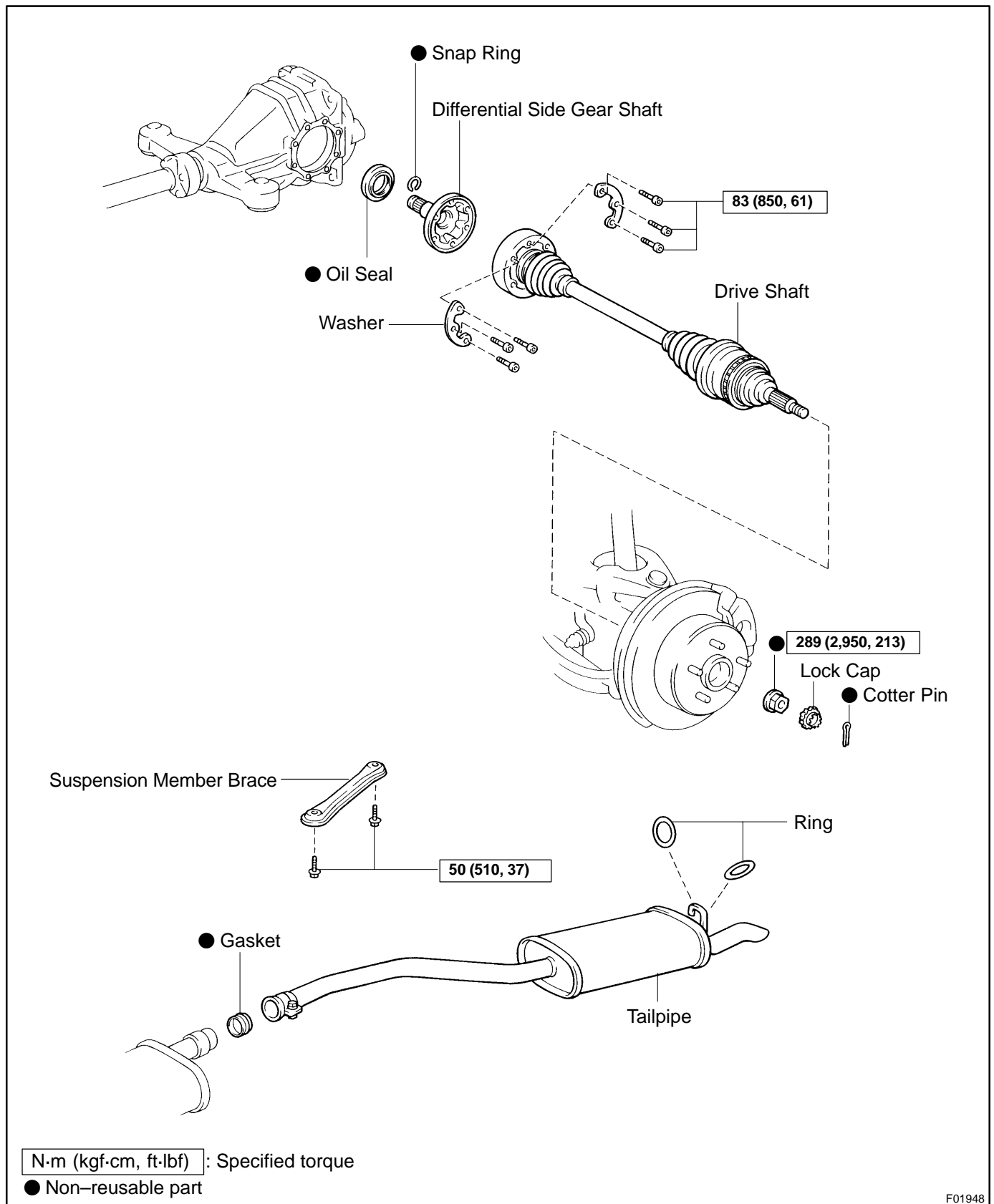
INSTALLATION

Installation is in the reverse order of removal (See page [SA-63](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#))

REAR DIFFERENTIAL SIDE GEAR SHAFT OIL SEAL COMPONENTS

SA0K2-01



F01948

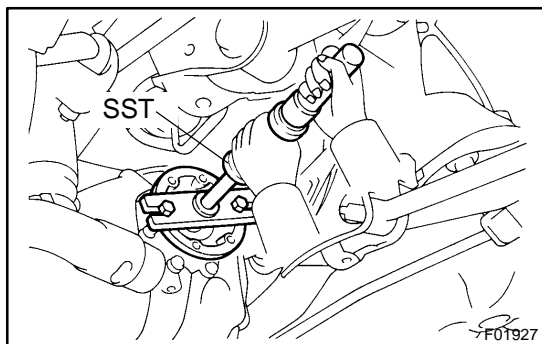
REPLACEMENT

1. DRAIN DIFFERENTIAL OIL
2. DISCONNECT EXHAUST TAILPIPE (See page [EM-119](#))

HINT:

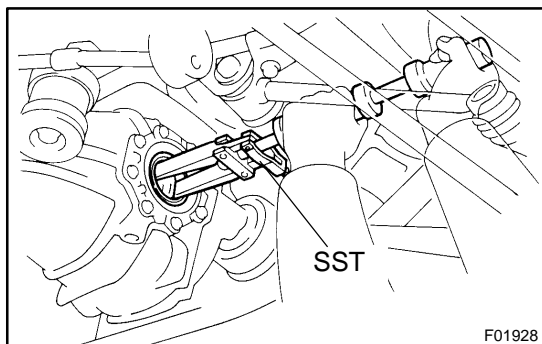
Support the exhaust pipe securely.

3. REMOVE DRIVE SHAFT (See page [SA-63](#))



4. REMOVE SIDE GEAR SHAFT

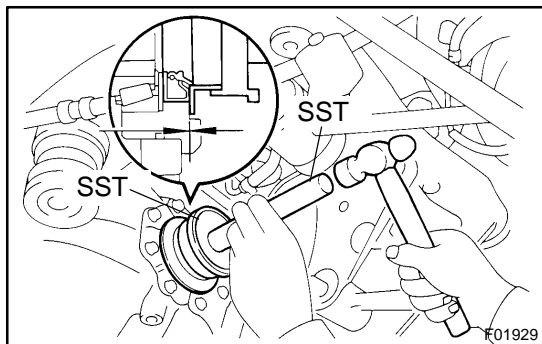
- (a) Using SST and 2 bolts, remove the side gear shaft.
SST 09520-24010
- (b) Remove the snap ring from the side gear shaft.



5. REMOVE SIDE GEAR SHAFT OIL SEAL

Using SST, remove the oil seal.

SST 09308-00010

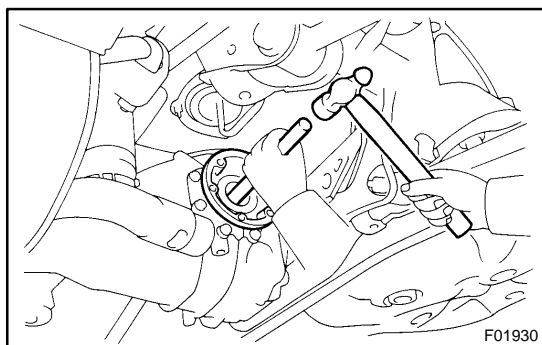


6. INSTALL SIDE GEAR SHAFT OIL SEAL

- (a) Using SST and a hammer, install a new oil seal.
SST 09608-32010, 09950-70010 (09951-07150)
- (b) Apply MP grease to the oil seal lip.

7. INSTALL SIDE GEAR SHAFT

- (a) Install a new snap ring to the side gear shaft.



- (b) Using a brass bar and hammer, install the side gear shaft to the differential.

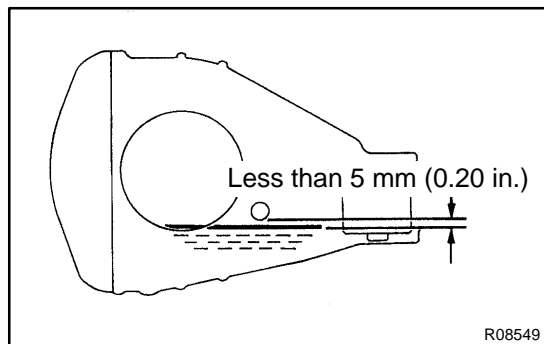
NOTICE:

Be careful not to damage the side gear shaft and oil seal.

8. CHECK INSTALLATION OF SIDE GEAR SHAFT

- (a) Check that there is 2 – 3 mm (0.08 – 0.12 in.) of play in the axial direction.
- (b) Check that the side gear shaft will not come out by trying to pull it out by hand.

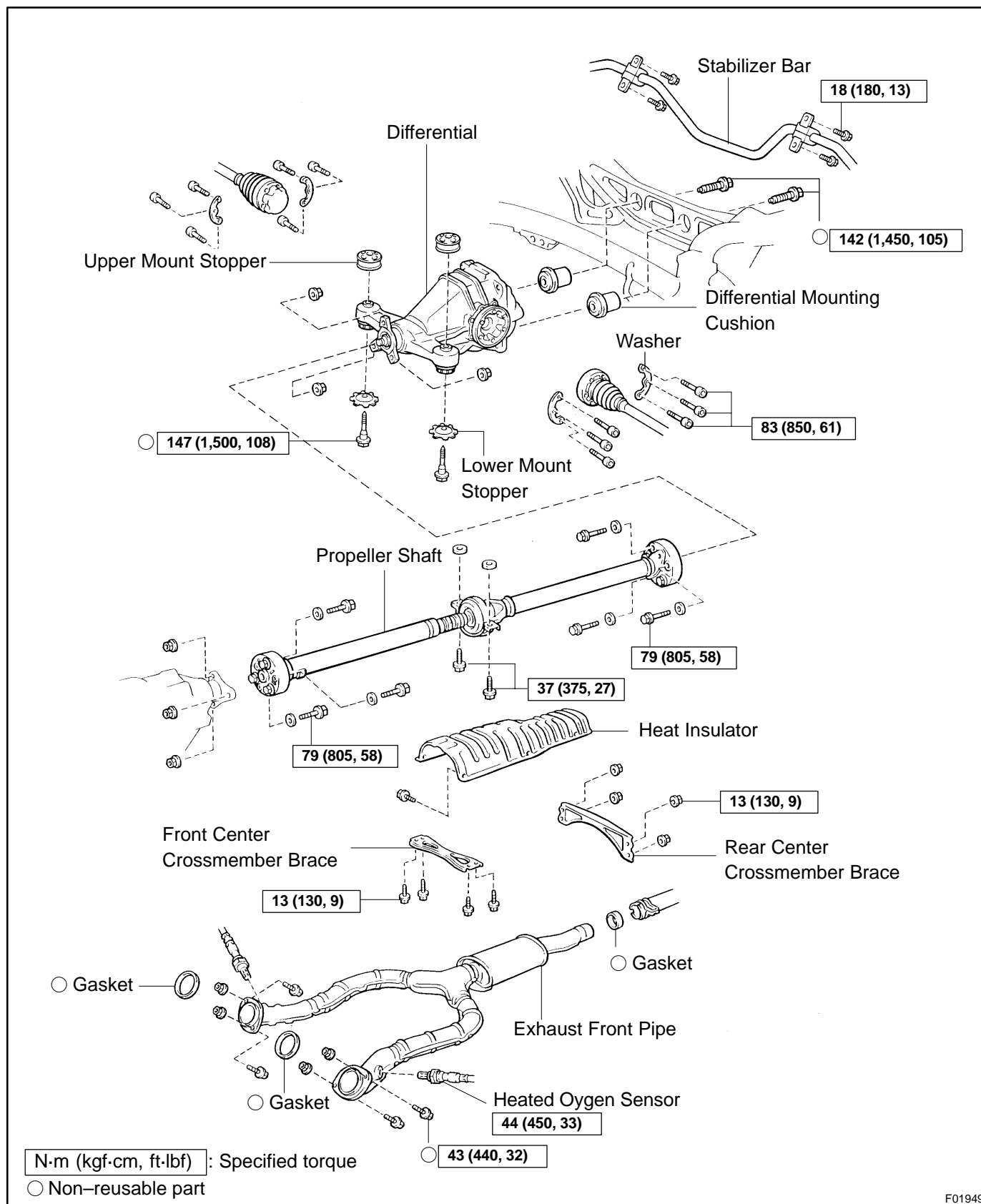
9. **INSTALL DRIVE SHAFT** (See page [SA-69](#))
10. **CONNECT EXHAUST TAILPIPE** (See page [EM-120](#))



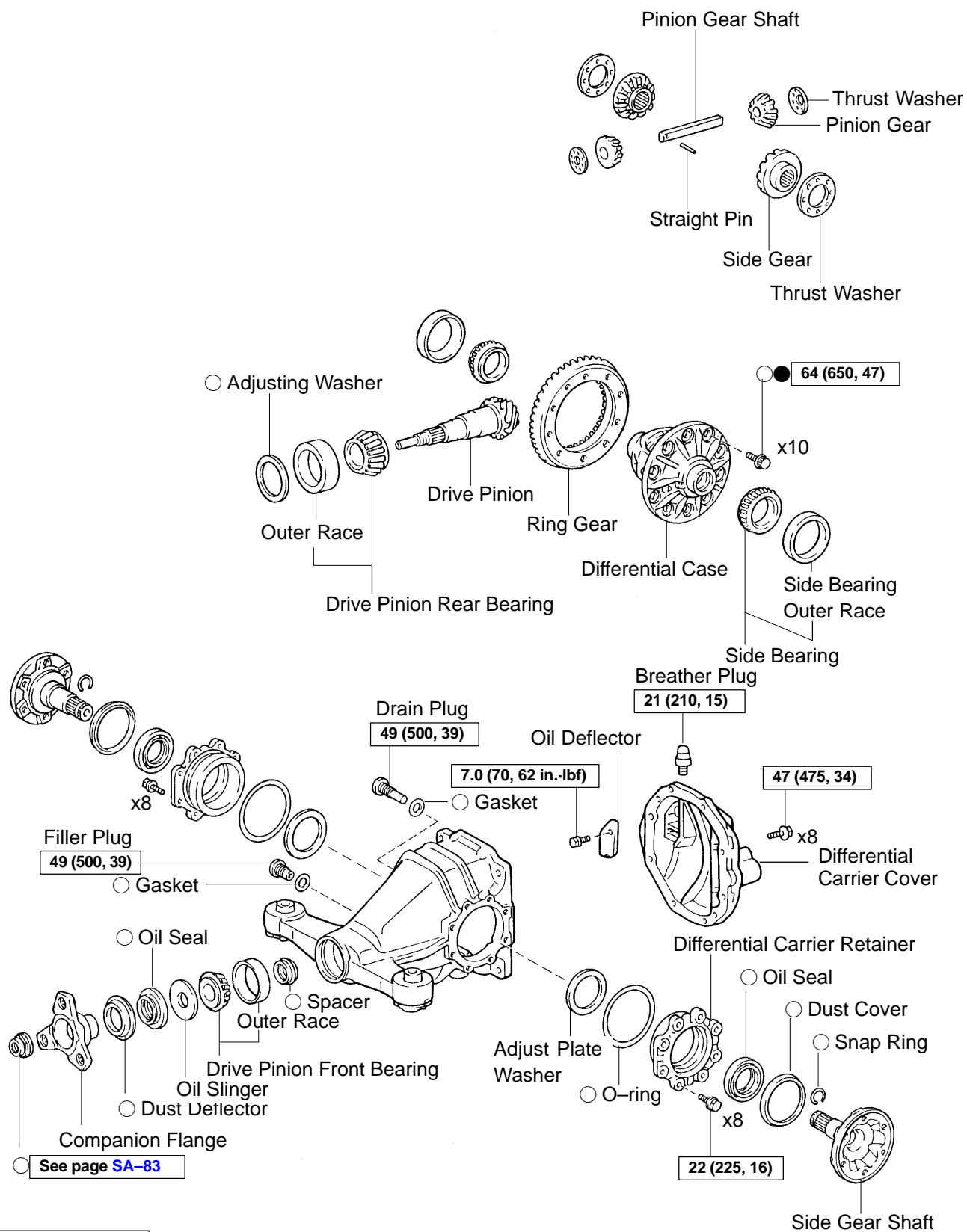
11. **FILL AND CHECK DIFFERENTIAL OIL LEVEL**
Torque: 49 N·m (500 kgf·cm, 39 ft·lbf)
Oil grade: Hypoid gear oil API GL-5
Viscosity:
Above -18°C (0°F) SAE 90
Below -18°C (0°F) SAE 80W-90 or 80W
Capacity: 1.35 liters (1.43 US qts, 1.19 Imp. qts)

REAR DIFFERENTIAL CARRIER COMPONENTS

SA0K4-01



F01949



N·m (kgf·cm, ft·lbf) : Specified torque

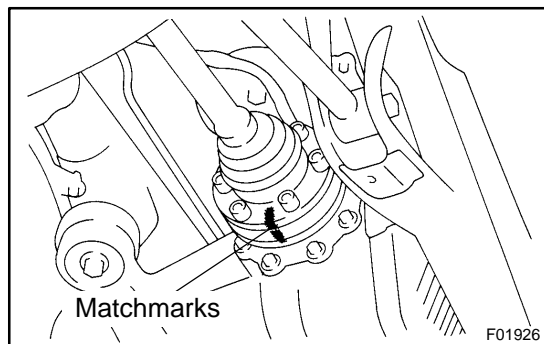
○ Non-reusable part

● Precoated part

F01950

REMOVAL

1. REMOVE EXHAUST PIPE (See page [EM-119](#))
2. REMOVE PROPELLER SHAFT



3. DISCONNECT REAR DRIVE SHAFTS

- (a) Place matchmarks on the drive shafts and side gear shafts.
- (b) Using a 10 mm hexagon wrench, disconnect the drive shafts from the differential.

Torque: 83 N·m (850 kgf-cm, 61 ft-lbf)

HINT:

At the time of installation, apply a light coat of engine oil on the thread of the bolts.

- (c) Support the drive shafts securely.

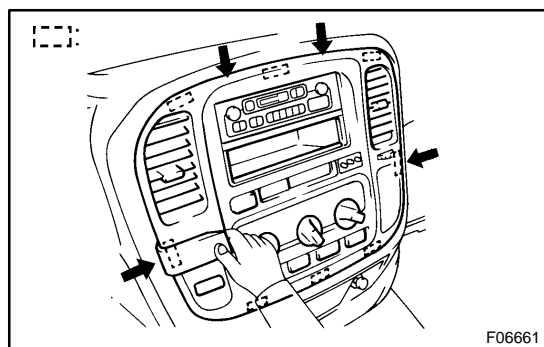
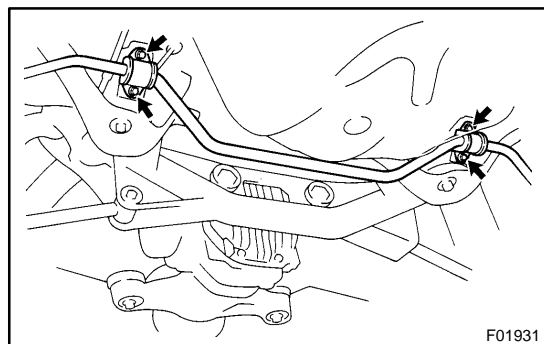
4. REMOVE BOTH STABILIZER BAR BRACKETS

Remove the 4 bolts and both stabilizer bar brackets.

Torque: 18 N·m (180 kgf-cm, 13 ft-lbf)

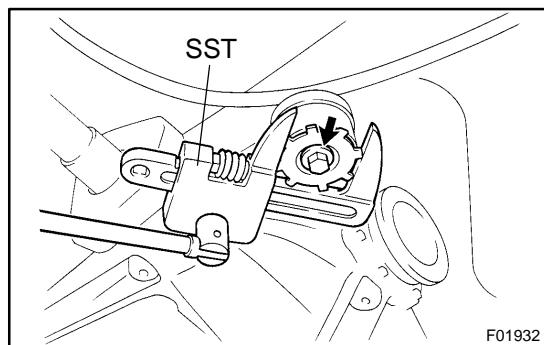
5. REMOVE DIFFERENTIAL

- (a) Support the differential with a jack.



- (b) Using a 12 mm hexagon wrench, remove the 2 bolts.

Torque: 142 N·m (1,450 kgf-cm, 105 ft-lbf)



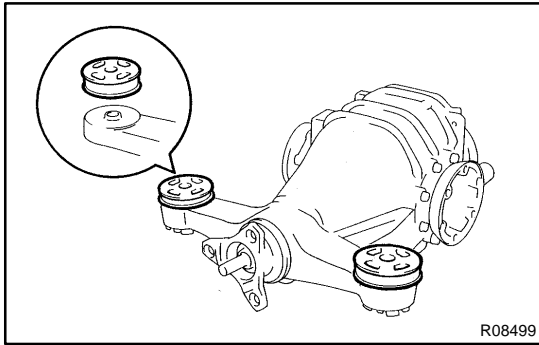
- (c) Remove the 2 bolts, lower mount stoppers and differential.

HINT:

At the time of installation, please refer to the following item.
With holding the lower mount stopper with SST so that the front mounting cushion does not twist, install the 2 mounting bolts of front side.

Torque: 147 N·m (1,500 kgf-cm, 108 ft-lbf)

SST 09922-10010

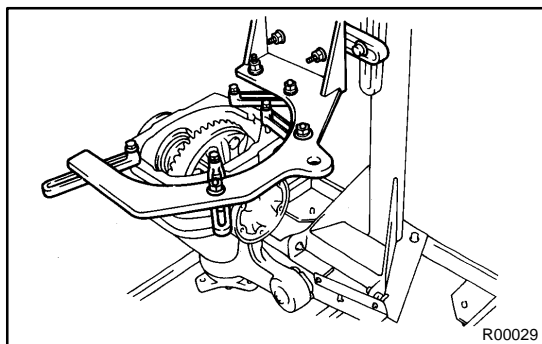


- (d) Remove the upper mount stopper from the differential carrier.

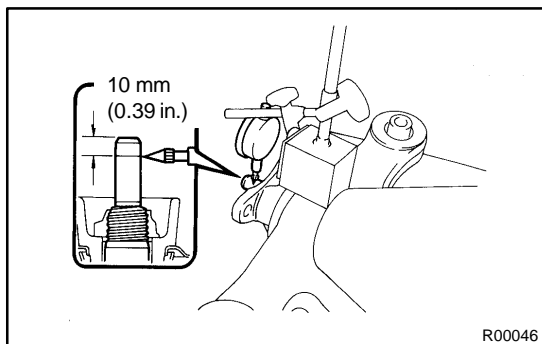
DISASSEMBLY

1. REMOVE DIFFERENTIAL CARRIER COVER

- (a) Remove the 8 bolts from the carrier cover.
- (b) Using a brass bar and hammer, separate the cover from carrier.
- (c) Remove the breather plug from the differential carrier cover.



2. SET DIFFERENTIAL CARRIER TO OVERHAUL STAND ETC., AS SHOWN

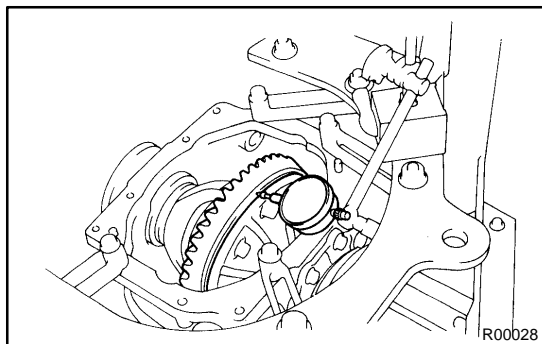


3. CHECK RUNOUT OF DRIVE PINION SHAFT

Using a dial indicator, measure the runout of the drive pinion shaft at a position 10 mm (0.39 in.) away from the end of the shaft.

Maximum runout: 0.08 mm (0.0031 in.)

If the runout is greater than the maximum, replace the drive pinion and ring gear.

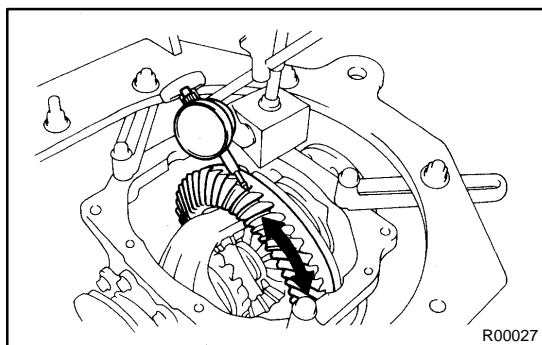


4. CHECK RING GEAR RUNOUT

Using a dial indicator, measure the ring gear runout.

Maximum runout: 0.05 mm (0.0020 in.)

If the runout is greater than the maximum, replace the drive pinion, ring gear and differential case.



5. CHECK RING GEAR BACKLASH

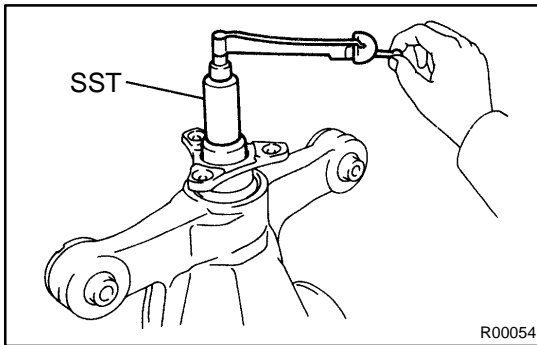
Using a dial indicator, measure the backlash of the ring gear at 3 points at least and check that the average value is within the specification.

Backlash: 0.08 – 0.13 mm (0.0031 – 0.0051 in.)

NOTICE:

The difference between the maximum and minimum measured values must be less than 0.05 mm (0.0020 in.).

If the backlash is not within the specification, adjust the backlash (See page [SA-83](#)).



6. MEASURE DRIVE PINION PRELOAD

Using SST and a torque wrench, measure the preload using the backlash of 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)

HINT:

For vehicles which have run less than 8,000 km (5,000 miles), the preload may be large.

SST 09229-55010

Maximum preload (at starting):

1.8 N·m (18 kgf-cm, 15.6 in.-lbf)

7. CHECK TOTAL PRELOAD

Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

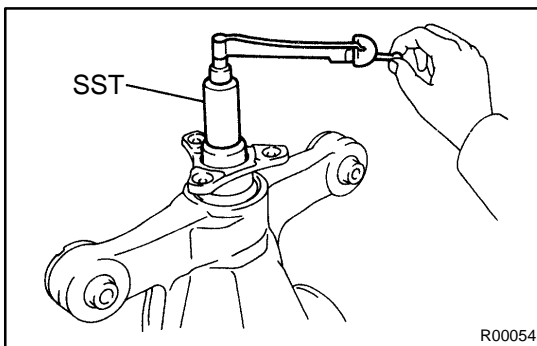
SST 09229-55010

Total preload (at starting):

Drive pinion preload plus

0.5 – 0.8 N·m (5 – 8 kgf-cm, 4.3 – 6.9 in.-lbf)

If necessary, disassemble and inspect the differential.



8. CHECK PINION GEAR BACKLASH

Using a dial indicator, measure the pinion gear backlash with holding one side gear toward the case.

Maximum: 0.15 mm (0.0059 in.)

NOTICE:

Differential gears should be able to rotate.

If the backlash is not within the specification, install the correct thrust washer (See page SA-83).

9. CHECK TOOTH CONTACT PATTERN

(See page SA-83)

10. REMOVE SIDE GEAR SHAFTS

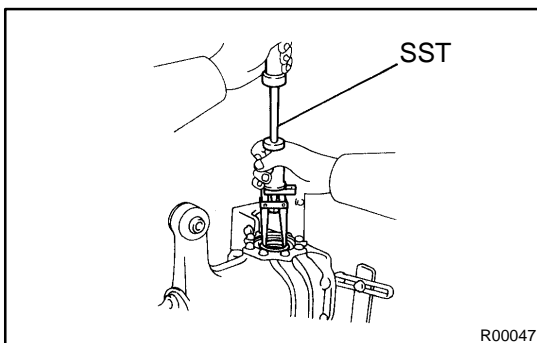
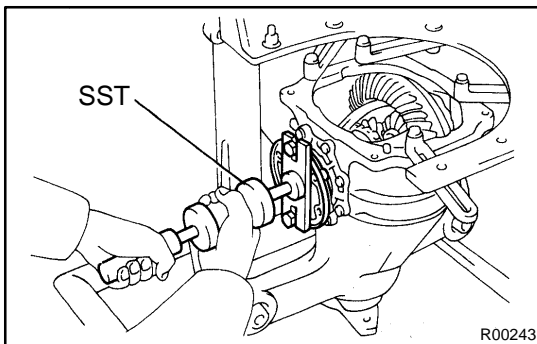
(a) Using SST, remove the 2 side gear shafts.

SST 09520-24010

NOTICE:

Be careful not to damage the oil seal.

(b) Using screwdriver, remove the 2 snap rings from the side gear shafts.



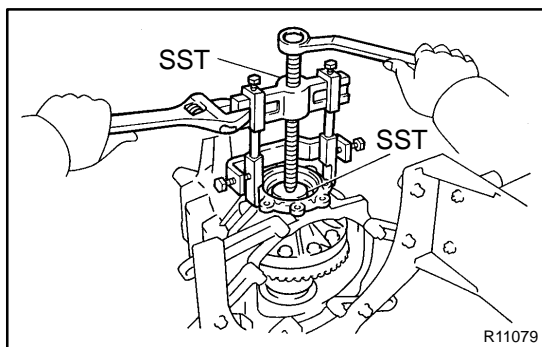
11. REMOVE SIDE GEAR SHAFT OIL SEALS

Using SST, remove the 2 oil seals.

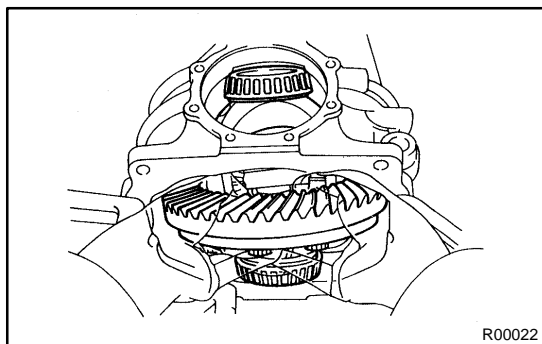
SST 09308-00010

12. REMOVE DIFFERENTIAL CARRIER RETAINERS

(a) Remove the 16 bolts.



- (b) Using SST, remove the 2 carrier retainers and washers.
 SST 09950-40011, (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00450)

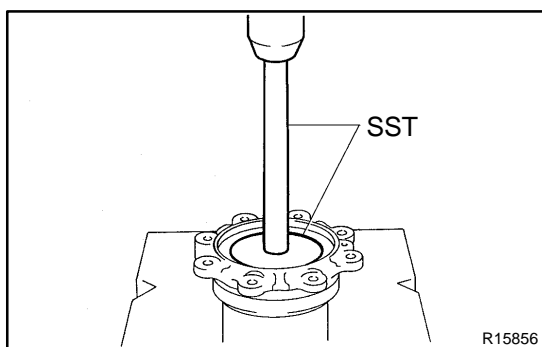


13. REMOVE DIFFERENTIAL CASE

Take the differential case out of the carrier with lifting the ring gear side, as shown in the illustration.

14. REMOVE O-RINGS FROM DIFFERENTIAL CARRIER RETAINERS

Using a screwdriver, remove the 2 O-rings.



15. REMOVE SIDE BEARING OUTER RACES AND ADJUSTING PLATE WASHERS

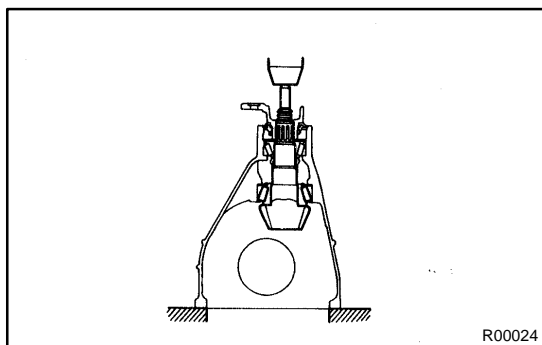
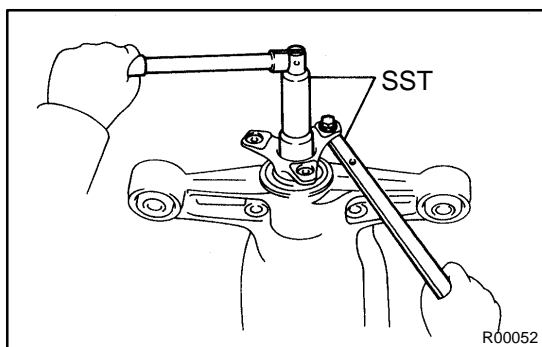
Using SST and a press, remove the 2 outer races and adjusting plate washers.

SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)

16. REMOVE DRIVE PINION, SPACER AND COMPANION FLANGE

- (a) Using a chisel and hammer, loosen the staked part of the nut.

- (b) Using SST, remove the nut.
 SST 09229-55010, 09330-00021

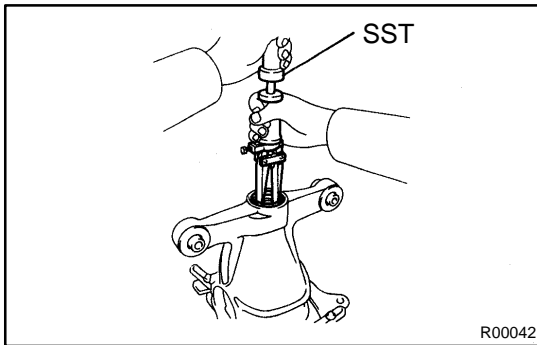


- (c) Using a press, remove the drive pinion with the rear bearing and remove the companion flange.

NOTICE:

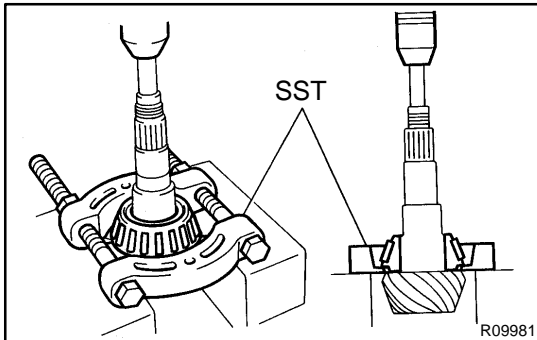
Be careful not to drop the drive pinion.

- (d) Remove the spacer from the drive pinion.

**17. REMOVE OIL SEAL**

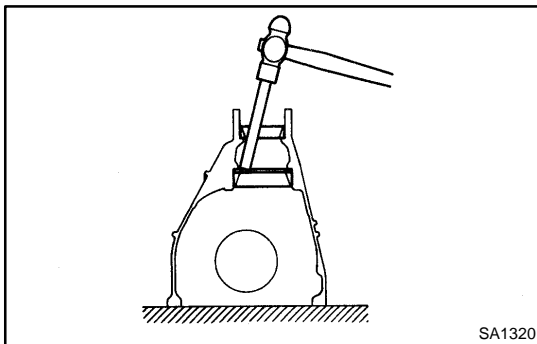
Using SST, remove the oil seal.

SST 09308-00010

18. REMOVE OIL SLINGER AND FRONT BEARING**19. REMOVE REAR BEARING FRONT DRIVE PINION**

Using SST and a press, remove the rear bearing from the drive pinion.

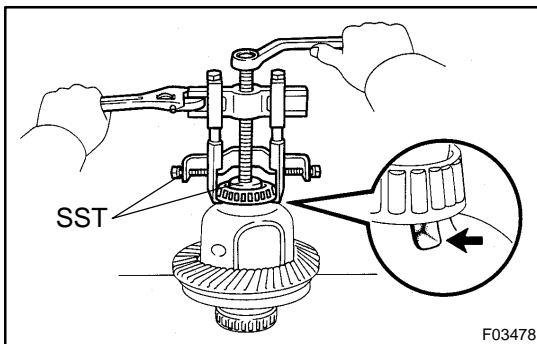
SST 09950-00020

**20. REMOVE FRONT AND REAR BEARING OUTER RACES AND ADJUSTING PLATE WASHER****NOTICE:**

Do not remove the outer race except when replacing the bearings.

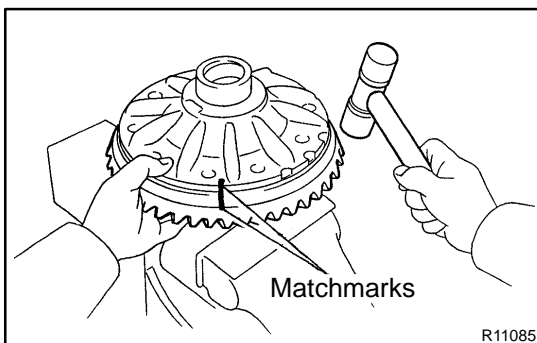
HINT:

Measure the washer and note the thickness for reassembly.

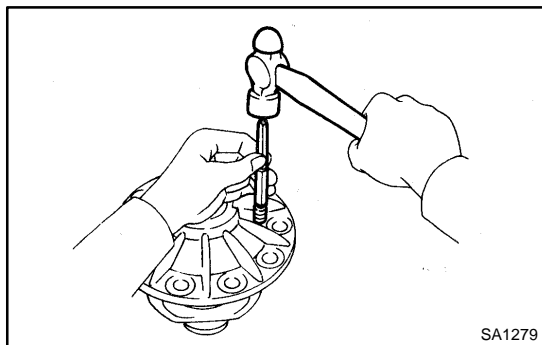
**21. REMOVE SIDE BEARINGS**

Using SST, remove the 2 side bearings from the differential case.

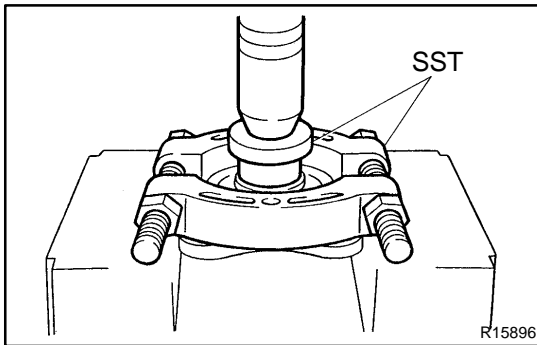
SST 09950-40011, (09951-04020, 09952-04010, 09953-04030, 09954-04010, 09955-04061, 09957-04010, 09958-04011), 09950-60010 (09951-00450)

**22. REMOVE RING GEAR**

- Place matchmarks on the ring gear and differential case.
- Remove the 10 ring gear set bolts.
- Using a plastic hammer, tap on the ring gear to separate it from the differential case.

**23. DISASSEMBLE DIFFERENTIAL CASE**

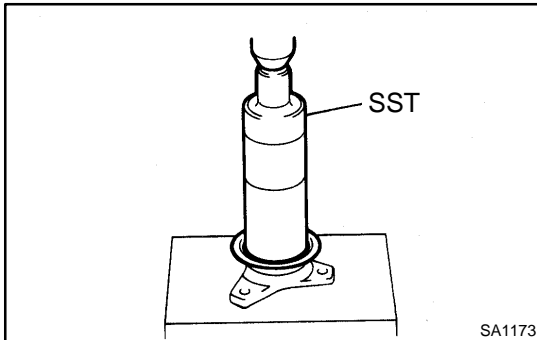
- (a) Using a pin punch and hammer, remove the straight pin.
- (b) Remove these parts from the differential case:
 - Pinion shaft
 - 2 pinion gears
 - 2 pinion gear thrust washers
 - 2 side gears
 - 2 side gear thrust washers



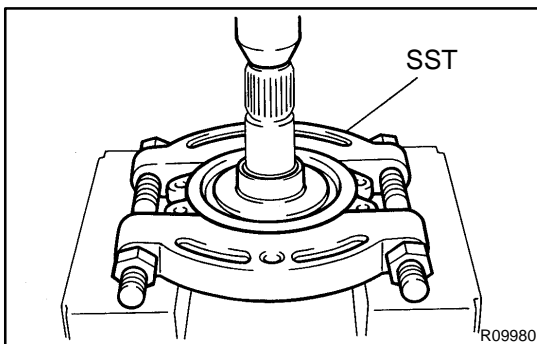
REPLACEMENT

1. REPLACE COMPANION FLANGE DUST DEFLECTOR

- (a) Using SST and a press, remove the dust deflector.
SST 09950-00020, 09950-60010 (09951-00510)

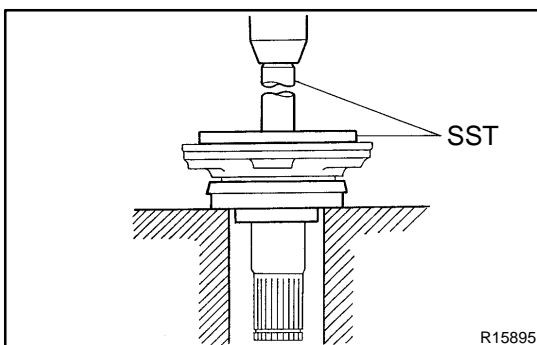


- (b) Using SST and a press, install a new dust deflector.
SST 09316-60011 (09316-00011)

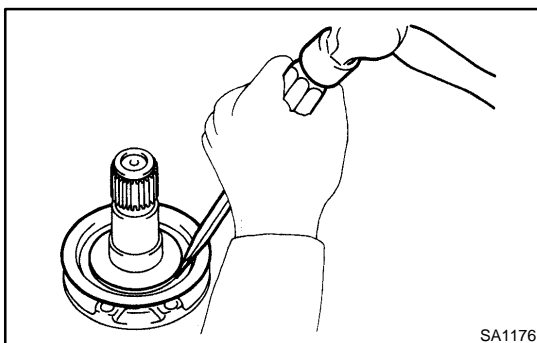


2. REPLACE SIDE GEAR SHAFT DUST COVER

- (a) Using SST and a press, remove the dust cover.
SST 09950-00020

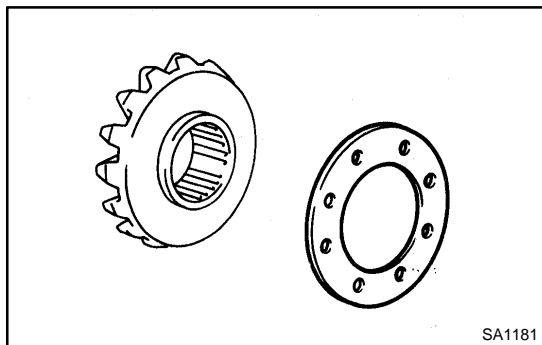


- (b) Using SST and a press, install a new dust cover.
SST 09502-24010, 09950-60020 (09951-00780),
09950-70010 (09951-07150)



HINT:

If the dust cover does not fit snugly against the flange of the side gear shaft, use a screwdriver to drive it down.



REASSEMBLY

1. ADJUST DIFFERENTIAL PINION GEAR BACKLASH

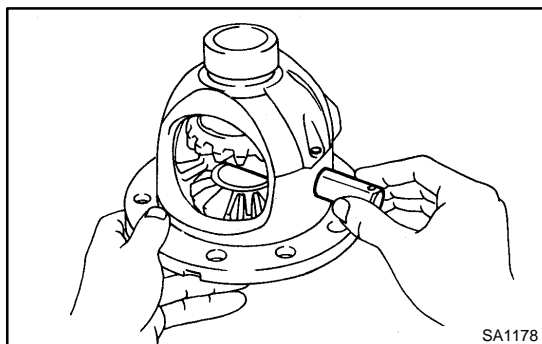
- (a) Install the 2 proper thrust washers on the side gears.

HINT:

Using the table below, select thrust washers which will ensure that the backlash is within the specification.

Thrust washer thickness:

Thickness	mm (in.)	Thickness	mm (in.)
1.50 (0.059)		1.75 (0.069)	
1.55 (0.061)		1.80 (0.071)	
1.60 (0.063)		1.85 (0.073)	
1.65 (0.065)		1.90 (0.075)	
1.70 (0.067)		—	

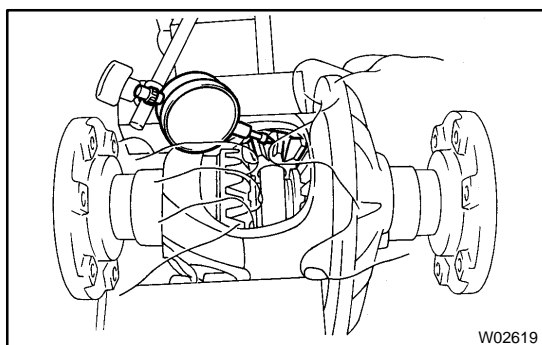


- (b) Install the 2 side gears, pinion gears, pinion gear thrust washers and pinion shaft in the differential case.

HINT:

Align the holes of the differential case and pinion shaft.

- (c) Push the 2 side gear shafts gently into the differential case by hand and install them.



- (d) Using a dial indicator, measure the pinion gear backlash with holding one side gear toward the case.

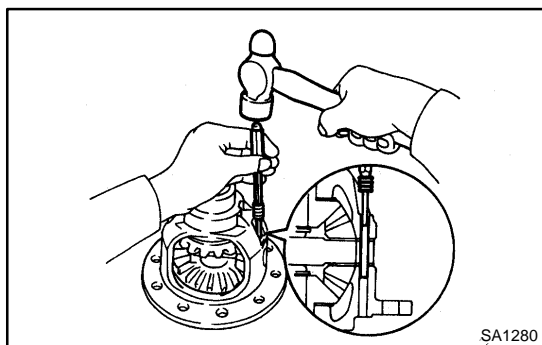
Maximum: 0.15 mm (0.0059 in.)

NOTICE:

Differential gears should be able to rotate.

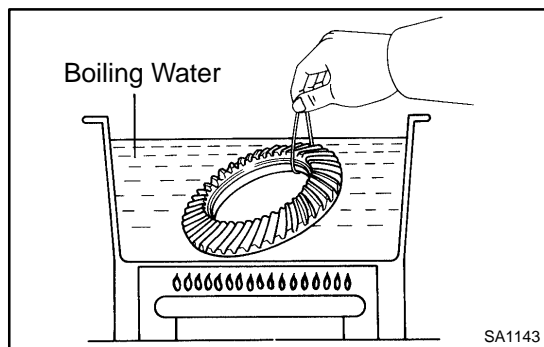
If the backlash is not within the specification, install the 2 side gear thrust washers with different thicknesses.

- (e) Remove the 2 side gear shafts.



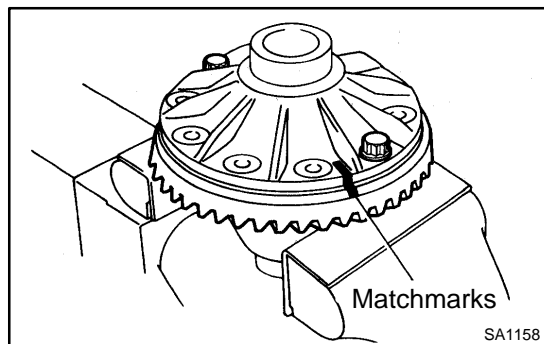
2. INSTALL STRAIGHT PIN AND STAKE DIFFERENTIAL CASE

- (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.



3. INSTALL RING GEAR ON DIFFERENTIAL CASE

- Clean the contact surfaces of the differential case and the threads of the ring gear and differential case.
- Heat the ring gear in boiling water.
- Carefully remove the ring gear from the boiling water.



- After the moisture on the ring gear has completely evaporated, quickly install the ring gear to the differential case.

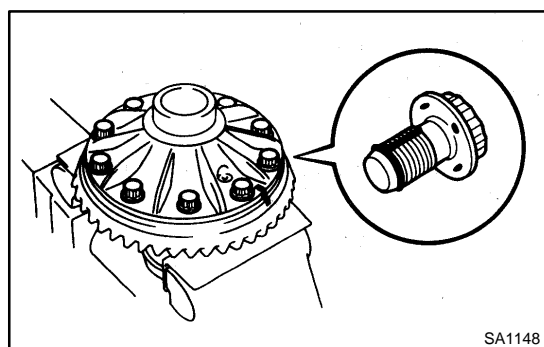
HINT:

Align the matchmarks on the ring gear and the differential case.

- Tighten 2 of the bolts temporarily so that the bolt holes in the ring gear and differential case are not misaligned.

NOTICE:

The ring gear set bolts should not be tightened until the ring gear has cooled sufficiently.



4. INSTALL RING GEAR SET BOLTS

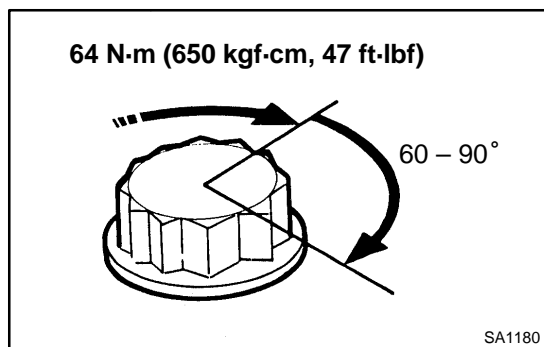
- After the ring gear has cooled sufficiently, install new 10 ring gear set bolts to which thread lock has been applied.

Thread lock:

Part No. 08833-00100, THREE BOND 1360 K or equivalent.

NOTICE:

New ring gear set bolts should be used in every case.



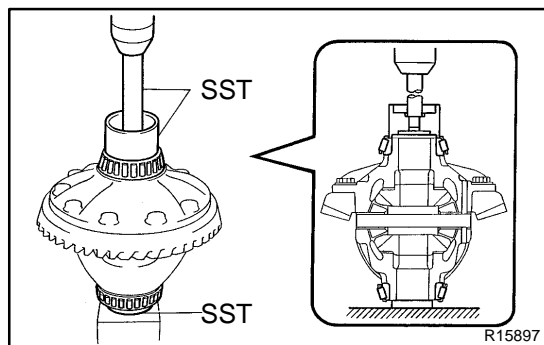
- Torque the 10 set bolts uniformly and a little at a time.

Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)

- Tighten the bolts further by 60 – 90°.

NOTICE:

Tighten the bolts in diagonally opposite pairs.



5. INSTALL SIDE BEARINGS

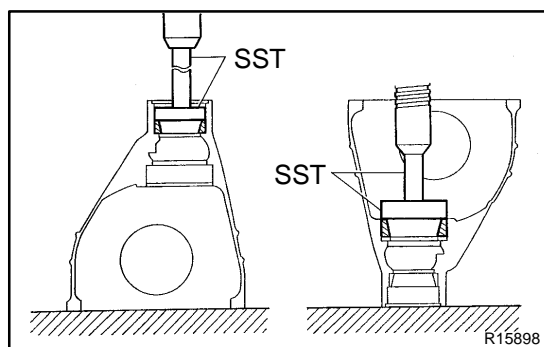
Using SST and a press, install the 2 side bearings.

SST 09710-30050, 09950-60010 (09951-00450),
09950-70010 (09951-07150)

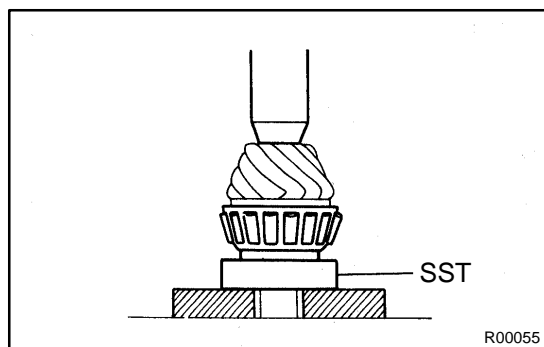
6. INSTALL DRIVE PINION BEARING OUTER RACES AND ADJUSTING WASHER

HINT:

- The adjusting washer is used for adjusting the tooth contact pattern. 42 types of washer with different thicknesses are available.
- First fit a washer with the same thickness as the washer which was removed, then after checking the tooth contact pattern, replace the washer with one of a different thickness if necessary.
- When removing an adjusting washer, be sure to replace it with a new one.



- Using SST and a press, install the front bearing outer race.
SST 09950-60020 (09951-00710), 09950-70010 (09951-07150)
- Using SST and a press, install a new adjusting washer to the rear bearing outer race.
SST 09255-10012, 09950-70010 (09951-07150)



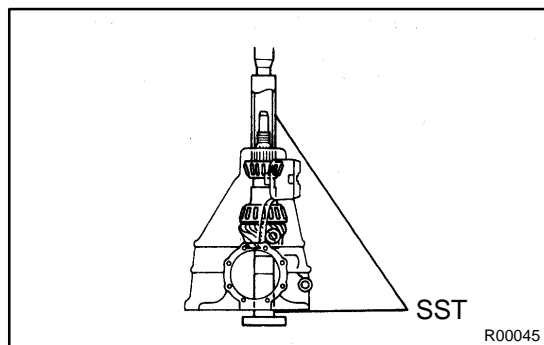
7. INSTALL REAR BEARING TO DRIVE PINION

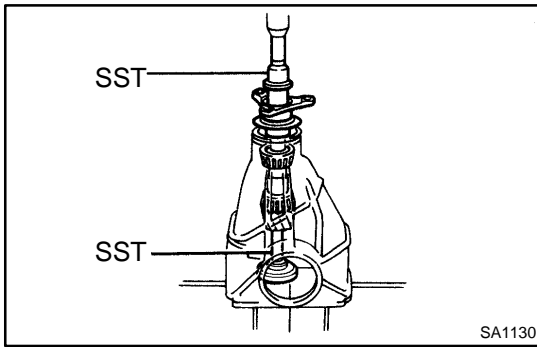
Using SST and a press, install the rear bearing.

SST 09502-24010

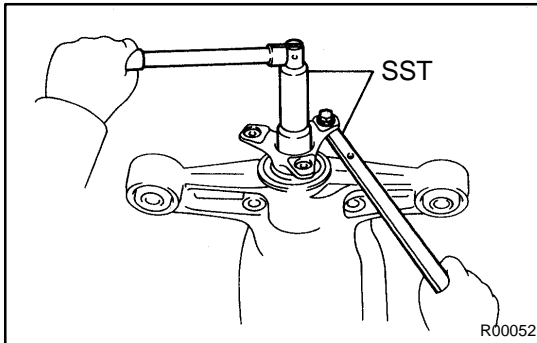
8. TEMPORARILY INSTALL DRIVE PINION, FRONT BEARING, OIL SLINGER AND COMPANION FLANGE

- Install the drive pinion in the differential carrier.
 - Using SST and a press, install the front bearing on the drive pinion.
SST 09316-60011 (09316-00011), 09608-04031
- HINT:
Assemble the spacer and oil seal after adjusting the tooth contact pattern.
- Install the oil slinger.





- (d) Using SST and a press, install the companion flange.
SST 09223-46011, 09325-40010



9. TEMPORARILY ADJUST DRIVE PINION PRELOAD

- (a) Adjust the drive pinion preload by tightening the companion flange nut.

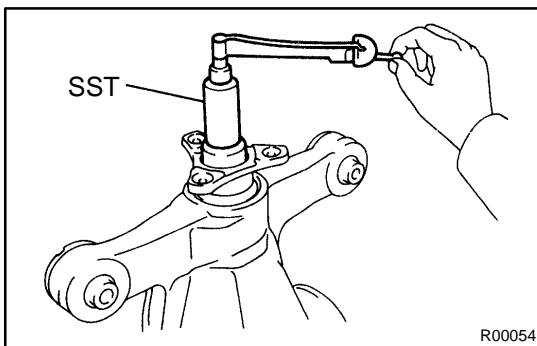
HINT:

Using SST to hold the flange, tighten the nut.

SST 09229-55010, 09330-00021

NOTICE:

As there is no spacer, tighten the nut a little at a time, being careful not to overtighten it.



- (b) Using SST and a torque wrench, measure the preload.

SST 09229-55010

Preload (at starting):

New bearing:

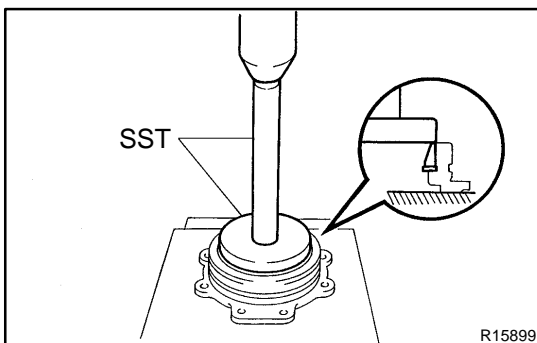
1.5 – 1.8 N·m (15 – 18 kgf-cm, 13.0 – 15.6 in.-lbf)

Reused bearing:

0.5 – 0.8 N·m (5 – 8 kgf-cm, 4.3 – 6.9 in.-lbf)

HINT:

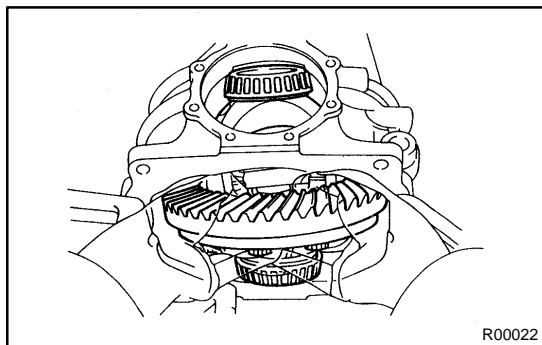
For vehicles which have run 8,000 km (5,000 miles) or less, if the preload value measured before disassembly is greater than the specification for a reused bearing, return the preload to the same as before disassembly.



10. INSTALL SIDE BEARING OUTER RACES AND ADJUSTING PLATE WASHERS

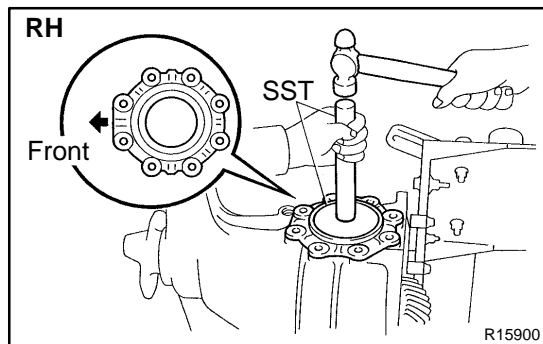
Using SST and a press, install the 2 adjusting plate washers and outer races.

SST 09950-60020 (09951-00810),
09950-70010 (09951-07150)



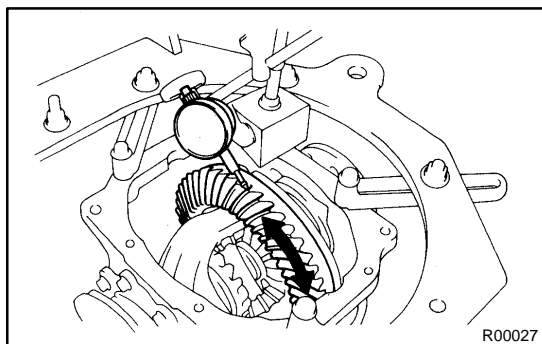
11. INSTALL DIFFERENTIAL CASE IN CARRIER

Install the drive side bearing in the differential carrier first, as shown in the illustration, then install the differential case.



12. INSTALL DIFFERENTIAL CARRIER RETAINERS

- (a) Using SST and a hammer, install 2 carrier retainers.
SST 09950-60020 (09951-00890),
09950-70010 (09951-07150)
- (b) Tighten the 16 bolts.
Torque: 22 N·m (225 kgf-cm, 16 ft-lbf)



13. CHECK RING GEAR BACKLASH

Using a dial indicator, measure the backlash of the ring gear at 3 positions at least.

Backlash: 0.08 – 0.13 mm (0.0031 – 0.0051 in.)

NOTICE:

The difference between the maximum and minimum measure values must be less than 0.05 mm (0.0020 in.).

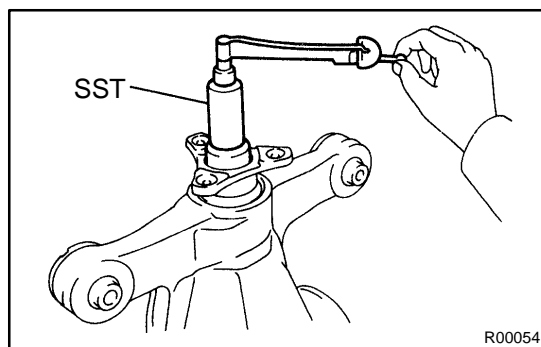
HINT:

The measured values should be used as reference when selecting washers, so take a note of the values.

If the backlash is not within the specification replace the washer on the ring gear side with one of a different thickness using the following procedure.

Adjusting washer thickness

No.	Thickness mm (in.)	No.	Thickness mm (in.)	No.	Thickness mm (in.)
02	2.02 (0.0795)	32	2.32 (0.0913)	62	2.62 (0.1031)
04	2.04 (0.0803)	34	2.34 (0.0921)	64	2.64 (0.1039)
06	2.06 (0.0811)	36	2.36 (0.0929)	66	2.66 (0.1047)
08	2.08 (0.0819)	38	2.38 (0.0937)	68	2.68 (0.1055)
10	2.10 (0.0827)	40	2.40 (0.0945)	70	2.70 (0.1063)
12	2.12 (0.0835)	42	2.42 (0.0953)	72	2.72 (0.1071)
14	2.14 (0.0843)	44	2.44 (0.0961)	74	2.74 (0.1079)
16	2.16 (0.0850)	46	2.46 (0.0969)	76	2.76 (0.1087)
18	2.18 (0.0858)	48	2.48 (0.0976)	78	2.78 (0.1094)
20	2.20 (0.0866)	50	2.50 (0.0984)	80	2.80 (0.1102)
22	2.22 (0.0874)	52	2.52 (0.0992)	82	2.82 (0.1100)
24	2.24 (0.0882)	54	2.54 (0.1000)	84	2.84 (0.1118)
26	2.26 (0.0890)	56	2.56 (0.1008)	86	2.86 (0.1126)
28	2.28 (0.0898)	58	2.58 (0.1016)		–
30	2.30 (0.0906)	60	2.60 (0.1024)		–



14. MEASURE TOTAL PRELOAD

Using SST and a torque wrench, measure the preload with the teeth of the drive pinion and ring gear in contact.

SST 09229-55010

Total preload (at starting):

Drive pinion preload plus

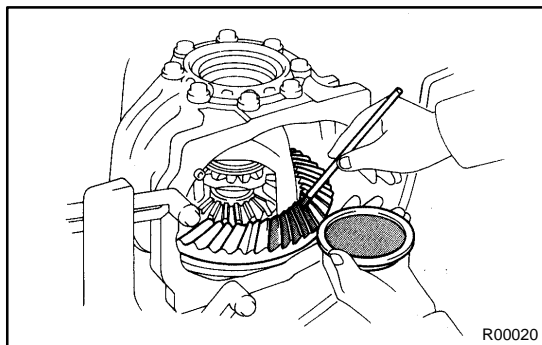
0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.-lbf)

If the measured preload is less than the specification, replace the washer of the ring gear's tooth surface side with a thicker one.

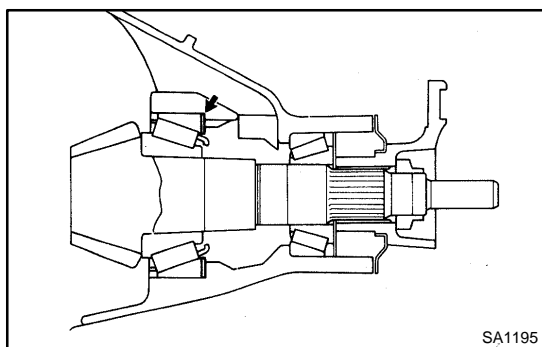
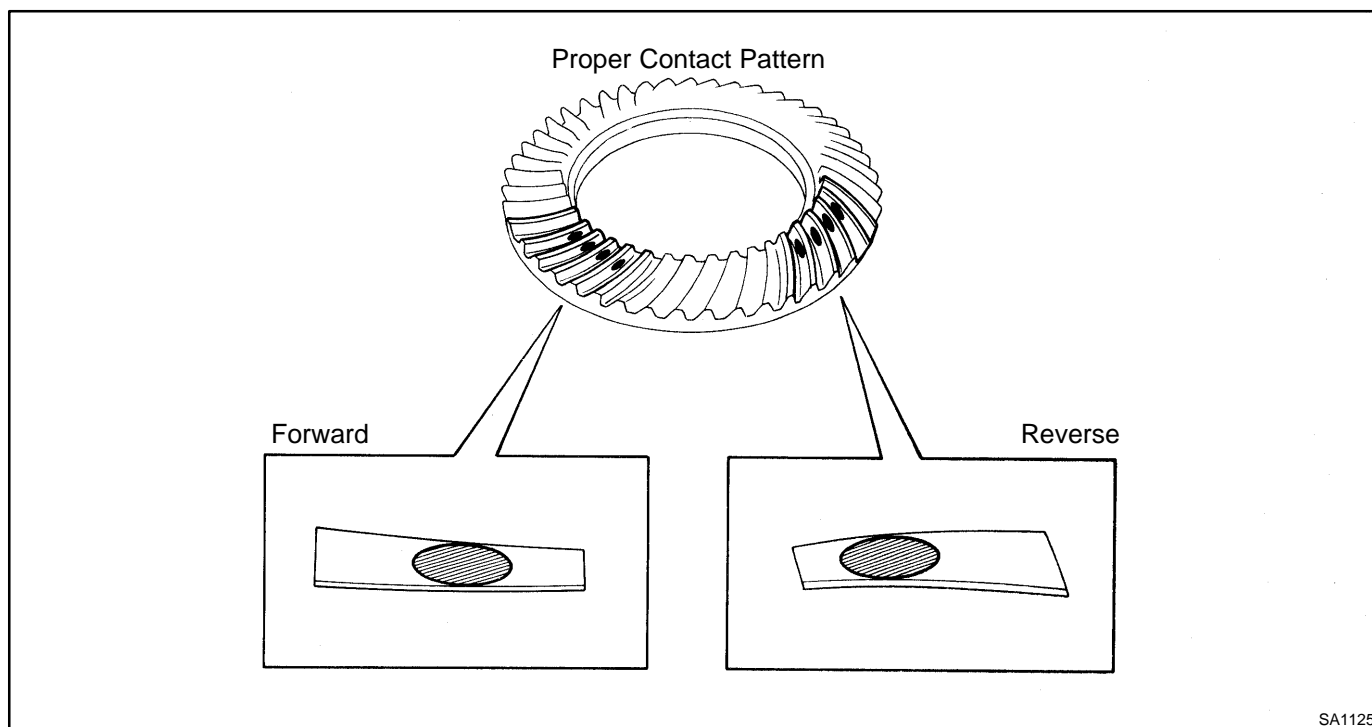
If the preload is greater than the specification, replace the washer of the ring gear's tooth surface side with a thinner one.

HINT:

Changing the snap ring thickness by 0.02 mm (0.0008 in.) will change the total preload by approx. 0.1 N·m (1 kgf·cm, 0.9 in.-lbf).

**15. INSPECT TOOTH CONTACT PATTERN**

- (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 contact pattern.



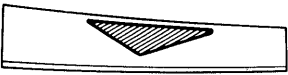



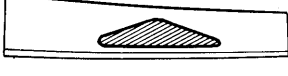

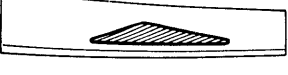

If tooth contact pattern is not correct, replace the adjusting washer installed on the front of the drive pinion rear bearing to adjust it.

NOTICE:

Make sure to always use a new one when replacing adjusting washer.

HINT:

Refer to the table on the next page for selection of the adjusting washer.

Tooth contact pattern		Adjusting washer selection	
Forward	Reverse		
		+ 0.08 mm (+ 0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thicker will give proper contact pattern.
		+ 0.14 mm (+ 0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thicker will give proper contact pattern.
		– 0.08 mm (– 0.0031 in.)	Replacing the washer with one 0.08 mm (0.0031 in.) thicker will give proper contact pattern.
		– 0.14 mm (– 0.0055 in.)	Replacing the washer with one 0.14 mm (0.0055 in.) thicker will give proper contact pattern.

V02917

HINT:

Adjust washers in 42 (different thickness in 0.01 mm (0.004 in.)) units are available.

No.	Thickness mm (in.)	No.	Thickness mm (in.)	No.	Thickness mm (in.)
87	1.87 (0.0736)	01	2.01 (0.0791)	15	2.15 (0.0846)
88	1.88 (0.0740)	02	2.02 (0.0795)	16	2.16 (0.0850)
89	1.89 (0.0744)	03	2.03 (0.0799)	17	2.17 (0.0854)
90	1.90 (0.0748)	04	2.04 (0.0803)	18	2.18 (0.0858)
91	1.91 (0.0752)	05	2.05 (0.0807)	19	2.19 (0.0862)
92	1.92 (0.0756)	06	2.06 (0.0811)	20	2.20 (0.0866)
93	1.93 (0.0760)	07	2.07 (0.0815)	21	2.21 (0.0870)
94	1.94 (0.0764)	08	2.08 (0.0819)	22	2.22 (0.0874)
95	1.95 (0.0768)	09	2.09 (0.0823)	23	2.23 (0.0878)
96	1.96 (0.0772)	10	2.10 (0.0827)	24	2.24 (0.0882)
97	1.97 (0.0776)	11	2.11 (0.0831)	25	2.25 (0.0886)
98	1.98 (0.0780)	12	2.12 (0.0835)	26	2.26 (0.0890)
99	1.99 (0.0783)	13	2.13 (0.0839)	27	2.27 (0.0894)
00	2.00 (0.0787)	14	2.14 (0.0843)	28	2.28 (0.0898)

16. REMOVE DIFFERENTIAL CARRIER RETAINERS(See page [SA-77](#))**17. REMOVE DIFFERENTIAL CASE (See page [SA-77](#))****18. REMOVE DRIVE PINION (See page [SA-77](#))****19. INSTALL SPACER ON DRIVE PINION**

Install a new spacer on the drive pinion.

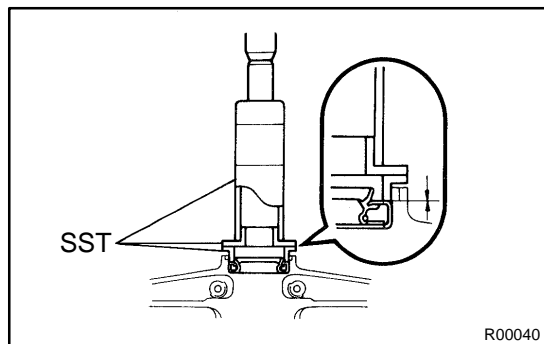
20. INSTALL DRIVE PINION AND FRONT BEARING

(See step 8)

21. INSTALL OIL SLINGER (See step 8)

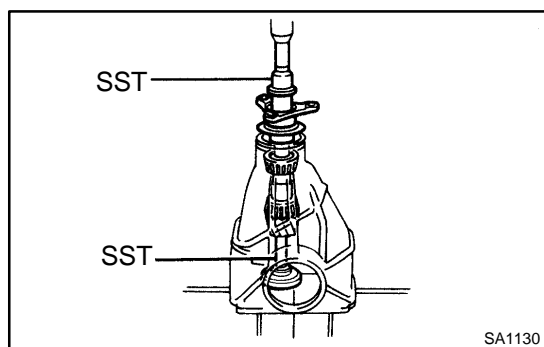
22. INSTALL OIL SEAL

- (a) Apply MP grease to a new oil seal lip.



- (b) Using SST, install the oil seal until its end is flush with the surface of the differential carrier.

SST 09316-60011 (09316-00011, 09316-00041),
09502-12010

**23. INSTALL COMPANION FLANGE**

Using SST and a press, install the companion flange.

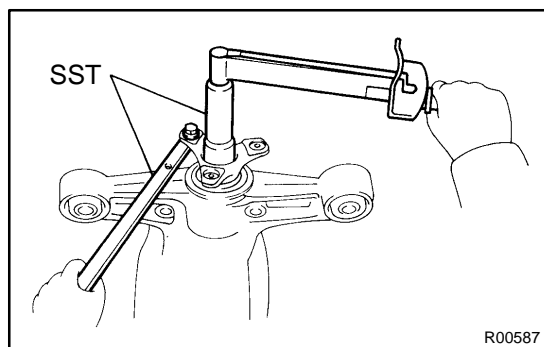
SST 09223-56010, 09325-40010

NOTICE:

Be careful not to damage the oil seal.

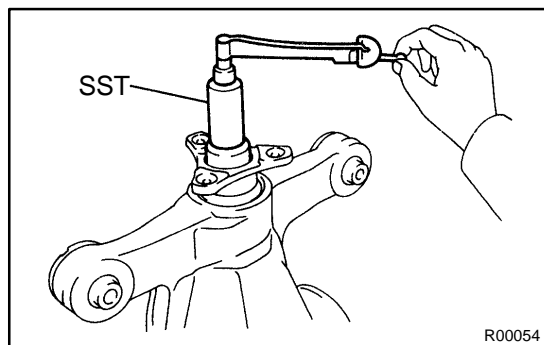
24. ADJUST DRIVE PINION PRELOAD

- (a) Coat the threads and flange of a new nut with hypoid gear oil for LSD.



- (b) Using SST, tighten the nut.

SST 09229-55010, 09330-00021



- (c) Using SST and a torque wrench, measure the preload.

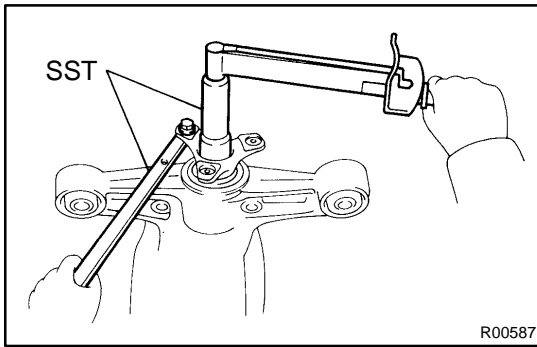
SST 09229-55010

Preload (at starting):**New bearing:**

1.5 – 1.8 N·m (15 – 18 kgf·cm, 13.0 – 15.6 in.-lbf)

Reused bearing:

0.5 – 0.8 N·m (5 – 8 kgf·cm, 4.3 – 6.9 in.-lbf)



If the preload is greater than the specification, replace the spacer.

If the preload is less than the specification, retighten the nut with a force of 13 N·m (130 kgf·cm, 9 ft·lbf) at a time until the specified preload is reached.

Torque: 490 N·m (5,000 kgf·cm, 362 ft·lbf) or less

If the maximum torque is exceeded while retightening the nut, replace the spacer and repeat the preload procedure.

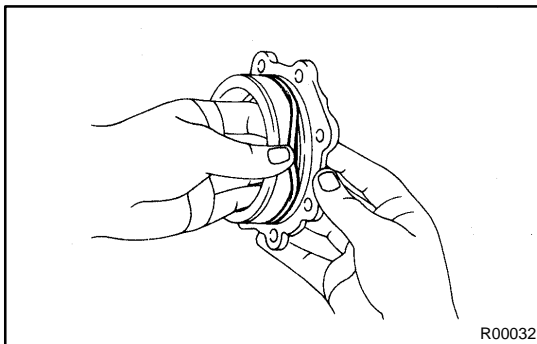
Do not back off the nut to reduce the preload.

25. CHECK RUNOUT OF DRIVE PINION SHAFT

(See page SA-77)

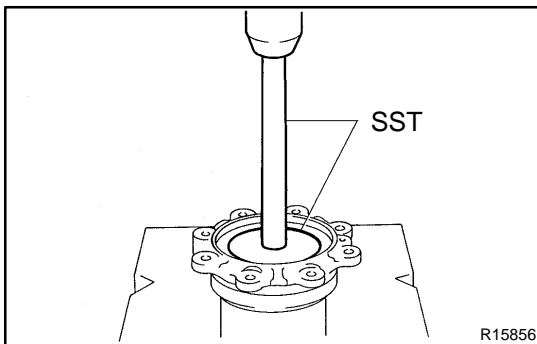
26. INSTALL DIFFERENTIAL CASE IN CARRIER

(See step 11)



27. INSTALL O-RING FROM DIFFERENTIAL CARRIER RETAINERS

- (a) Coat 2 new O-rings with hypoid gear oil.
- (b) Install the 2 O-rings to the carrier retainers.



28. INSTALL OIL SEALS FROM DIFFERENTIAL CARRIER RETAINERS

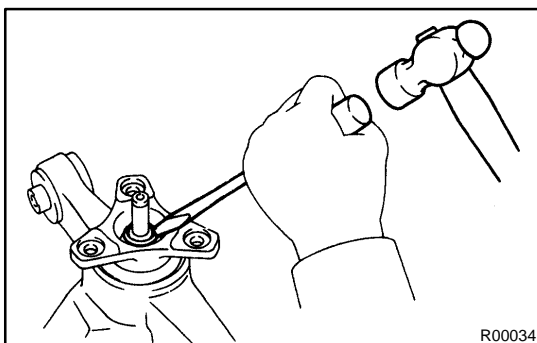
- (a) Using SST and a press, install 2 new oil seals to the carrier retainers.

SST 09608-32010, 09950-70010 (09950-07150)

- (b) Coat the MP grease to the oil seal lip.

29. INSTALL DIFFERENTIAL CARRIER RETAINERS

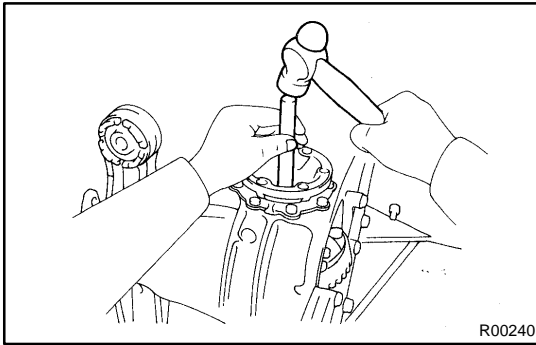
30. RECHECK BACKLASH, TOTAL PRELOAD AND TOOTH CONTACT PATTERN



31. STAKE DRIVE PINION NUT

32. INSTALL SNAP RINGS TO SIDE GEAR SHAFTS

- (a) Install 2 new snap rings to the side gear shafts.
- (b) Coat the MP grease to the snap rings.

**33. INSTALL SIDE GEAR SHAFTS**

Using a brass and hammer, install the 2 side gear shafts.

HINT:

Whether or not the side gear shaft is making contact with the pinion shaft can be known by the sound or feeling when driving it in.

NOTICE:

Be careful not to damage the oil seal.

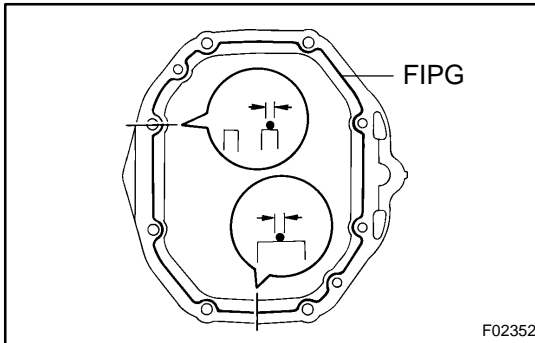
34. REMOVE DIFFERENTIAL CARRIER FROM OVERHAUL STAND, ETC.**35. INSTALL DIFFERENTIAL CARRIER COVER**

- (a) Clean the contact surfaces of the carrier and cover of any residual FIPG material using cleaner.
- (b) Coat FIPG to the carrier or cover.

FIPG:

Part No. 08826-00090, THREE BOND 1281 or equivalent

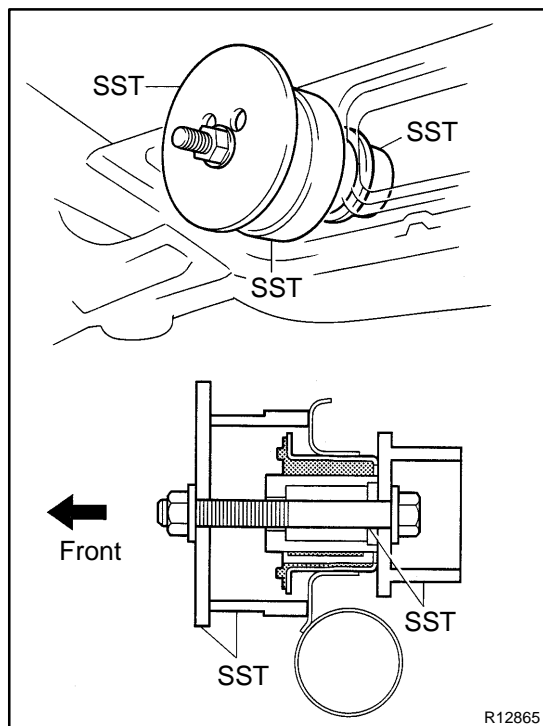
- (c) Install the carrier cover to the carrier with the 8 bolts.
Torque: 47 N·m (475 kgf-cm, 34 ft-lbf)
- (d) Install the breather plug.
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)



INSTALLATION

Installation is in the reverse order of removal (See page [SA-75](#)).

AFTER INSTALLATION, FILL DIFFERENTIAL OIL (See page [SA-71](#))



DIFFERENTIAL MOUNTING CUSHION REPLACEMENT

SAOKA-01

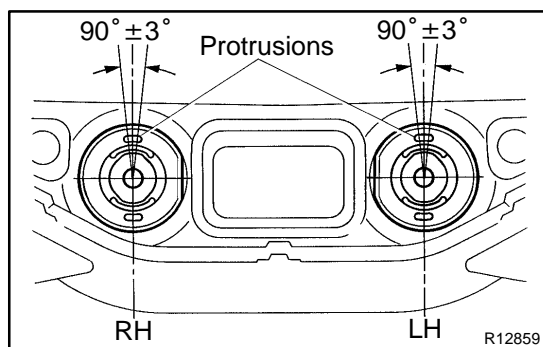
1. REMOVE DIFFERENTIAL (See page [SA-75](#))
2. REMOVE DIFFERENTIAL MOUNTING CUSHION

Using SST, remove the cushion.

HINT:

- Check that the edge of SST (09527-17011) is fully contact with the crossmember.
- Align the SST straight so that the bolt of the SST is on the center line of the cushion.

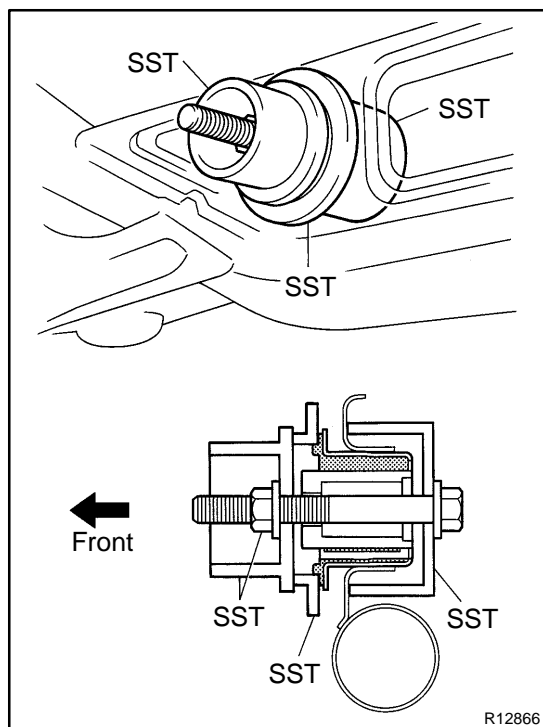
SST 09527-17011, 09570-22011, 09570-24010



3. INSTALL NEW DIFFERENTIAL MOUNTING CUSHION
 - (a) Set a new differential mounting cushion to the crossmember.

HINT:

- Install the cushion with the flat face faced inside of the vehicle.
- Position the cushion so that the upper and lower protrusions align horizontally $90^\circ \pm 3^\circ$ against the ground.



- (b) Using SST, install the cushion.
SST 09316-12010, 09570-22011

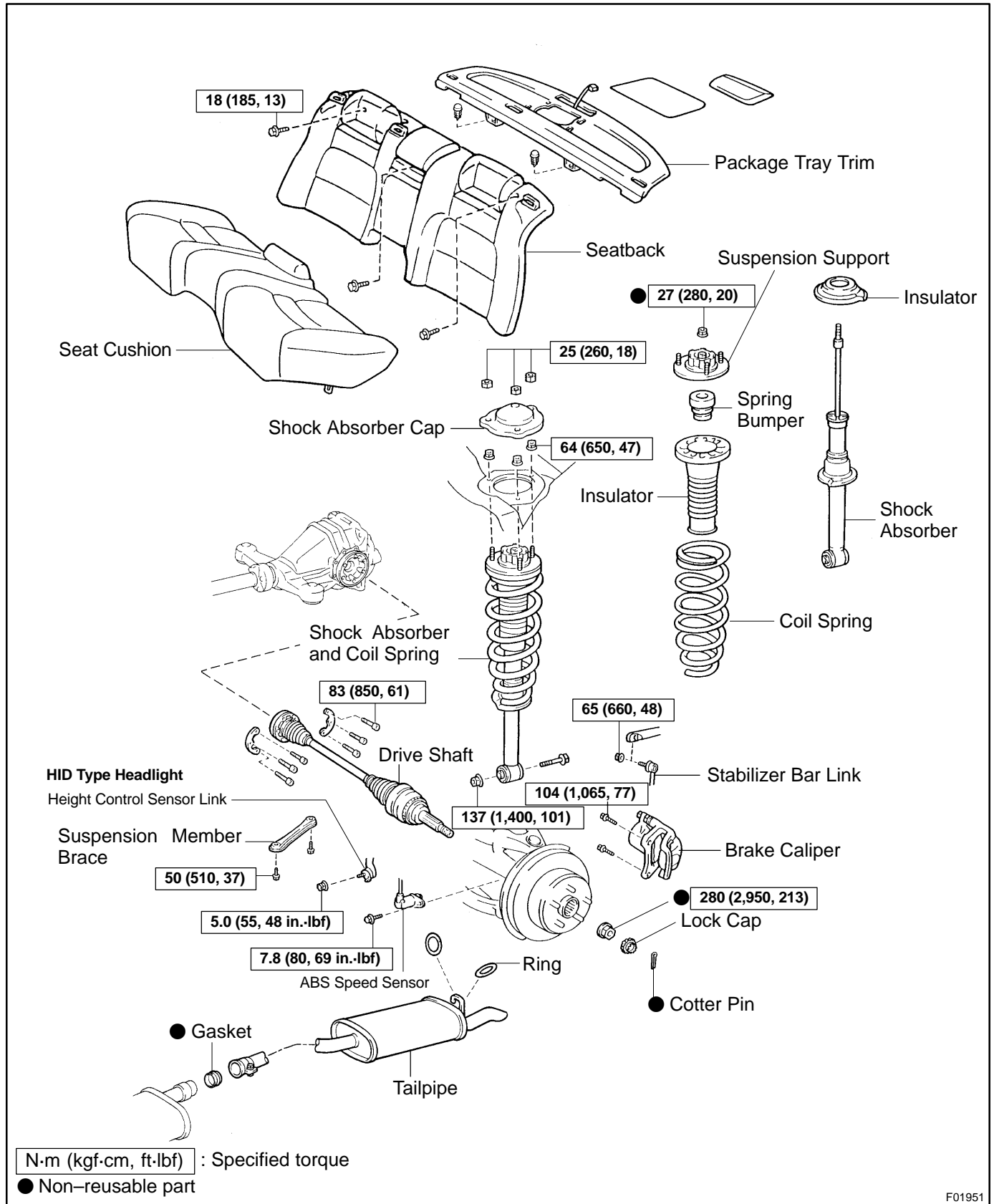
HINT:

Align the SST straight so that the bolt of the SST is on the center line of the cushion.

4. INSTALL DIFFERENTIAL (See page [SA-94](#))

REAR SHOCK ABSORBER COMPONENTS

SAOKB-01



F01951

REMOVAL

1. REMOVE REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REMOVE THESE PARTS

- Rear seat cushion and rear seatback (See page [BO-111](#))
- Package tray trim (See page [BO-31](#))

3. REMOVE REAR DRIVE SHAFT (See page [SA-63](#))

4. DISCONNECT STABILIZER BAR LINK

Disconnect the stabilizer bar link from the stabilizer bar.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

5. REMOVE REAR BRAKE CALIPER

- (a) Remove the 2 bolts and brake caliper.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

- (b) Support the brake caliper securely.

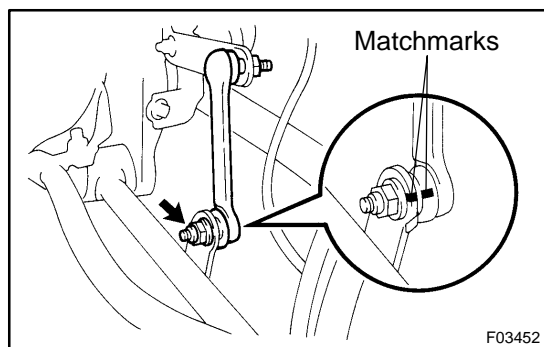
6. REMOVE ABS SPEED SENSOR

Remove the bolt and ABS speed sensor.

NOTICE:

When removing them from right side, do not disconnect the pad wear indicator connector.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

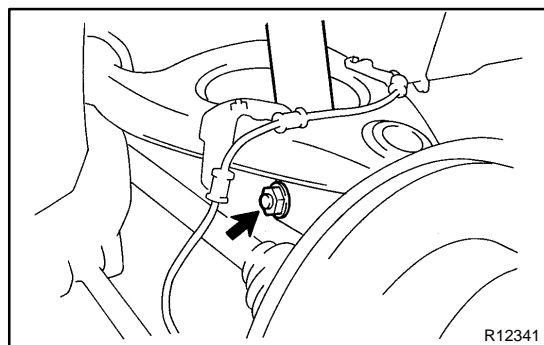


7. HID TYPE HEADLIGHT:

DISCONNECT HEIGHT CONTROL SENSOR LINK FROM NO.1 LOWER SUSPENSION ARM

- (a) Place matchmarks on the link and bracket.
- (b) Remove the nut and disconnect the height control sensor link.

Torque: 5.0 N·m (55 kgf·cm, 48 in·lbf)



8. REMOVE SHOCK ABSORBER AND COIL SPRING

- (a) Loosen the bolt and remove the nut on lower side of the shock absorber.

HINT:

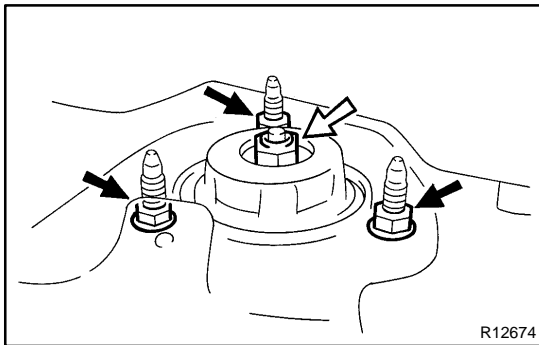
Do not remove the bolt.

Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)

- (b) Support the rear axle carrier with a jack.

- (c) Remove the 3 nuts and shock absorber cap.

Torque: 25 N·m (260 kgf·cm, 18 ft·lbf)



- (d) Loosen the suspension support center nut.

NOTICE:

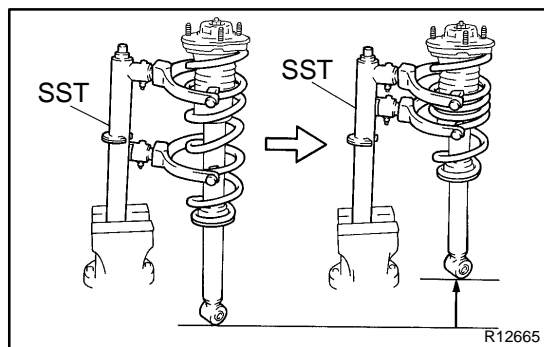
Do not remove the nut.

Torque: 27 N·m (280 kgf-cm, 20 ft-lbf)

- (e) Remove the 3 nuts.

Torque: 64 N·m (650 kgf-cm, 47 ft-lbf)

- (f) Lower the rear axle carrier and remove the bolt on lower side of shock absorber.
- (g) Remove the shock absorber and coil spring.



DISASSEMBLY

REMOVE SUSPENSION SUPPORT AND COIL SPRING

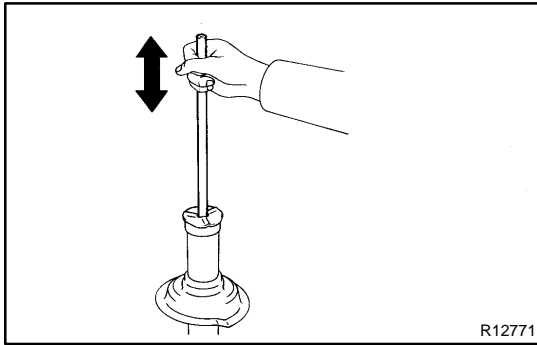
- (a) Using SST, compress the coil spring until there is a clearance on both ends.

SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

- (b) Remove the suspension support nut.
(c) Remove the suspension support, insulator and coil spring.
(d) Remove the insulator and spring bumper from the suspension support.



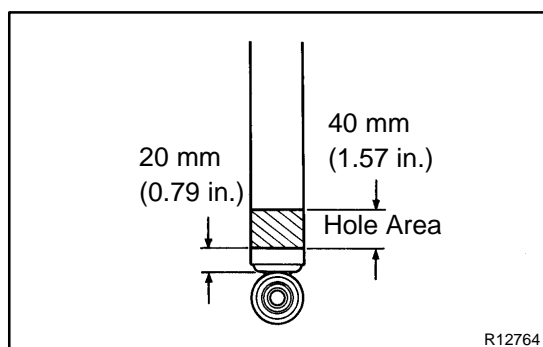
INSPECTION

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-101](#).



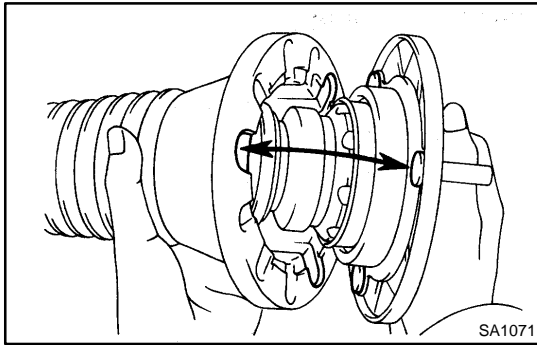
DISPOSAL

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 bleed the gas inside.

CAUTION:

The gas coming out is harmless, but be careful of chips which may fly up when drilling.



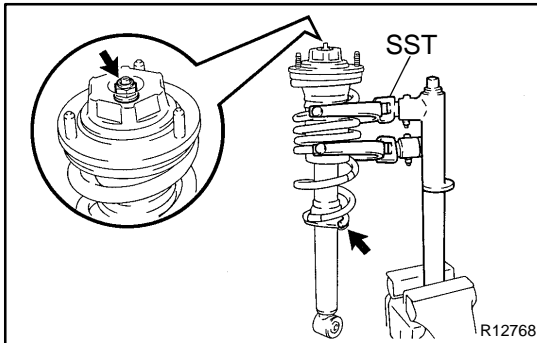
REASSEMBLY

INSTALL SUSPENSION SUPPORT AND COIL SPRING

- (a) Install the spring bumper to the suspension support.
- (b) Install the insulator to the suspension support.

HINT:

Match the bolt of the suspension support with the cut-off part of the insulator.



- (c) Using SST, compress coil spring.
SST 09727-30021

NOTICE:

Do not use an impact wrench. It will damage the SST.

- (d) Install the coil spring to the shock absorber.

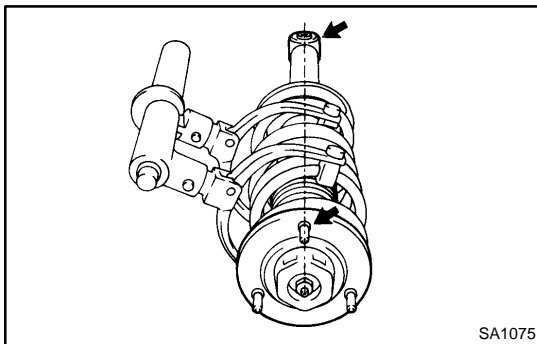
HINT:

Fit the lower end of the coil spring into the gap of the spring seat of the shock absorber.

- (e) Install the suspension support to the rod and temporarily tighten a new nut.
- (f) Rotate the suspension support so that the rod and one of the bolts on suspension support are aligned with the lower bushing.
- (g) Remove the SST.

HINT:

After removing the SST, again check the direction of the suspension support.



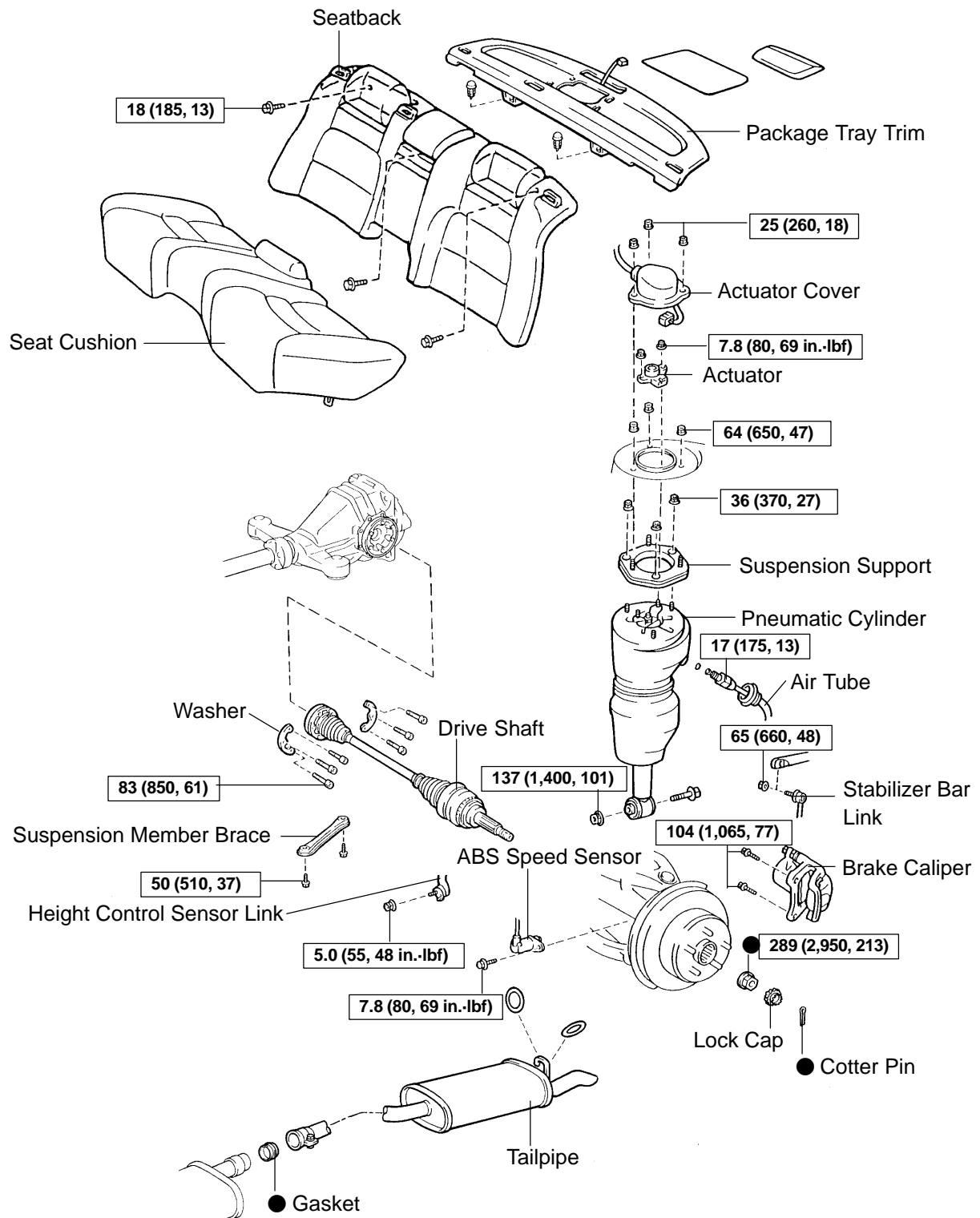
INSTALLATION

Installation is in the reverse order of removal (See page [SA-97](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND REAR WHEEL ALIGNMENT (See page [SA-9](#))

REAR PNEUMATIC CYLINDER COMPONENTS

SAOKI-01



N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

F01952

REMOVAL

1. REMOVE REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. BLEED AIR (See page SA-131)

HINT:

Disconnect the necessary one touch air connector of the height control valves and bleed the air.

3. REMOVE THESE PARTS

- Rear seat cushion and rear seatback
(See page BO-111)
- Package tray trim (See page BO-31)

4. REMOVE REAR DRIVE SHAFT (See page SA-63)

5. DISCONNECT STABILIZER BAR LINKS

Disconnect the stabilizer bar link from stabilizer bar.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

6. REMOVE BRAKE CALIPER

- (a) Remove the 2 bolts and brake caliper.
Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)
- (b) Support brake caliper securely.

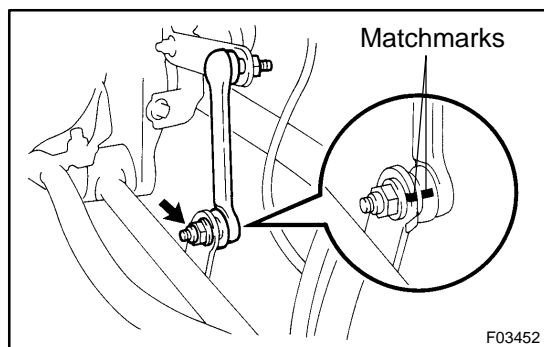
7. REMOVE ABS SPEED SENSOR

Remove the bolt and ABS speed sensor.

NOTICE:

When removing them from right side, do not disconnect the pad wear indicator connector.

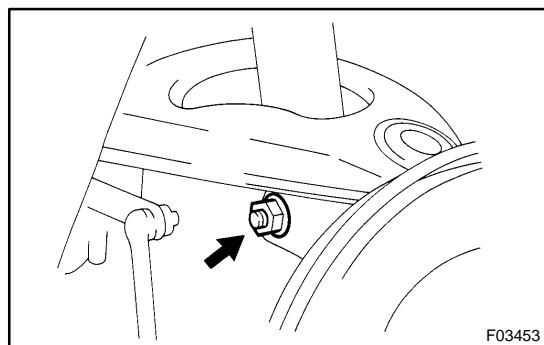
Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)



8. DISCONNECT HEIGHT CONTROL SENSOR LINK FROM NO.1 LOWER SUSPENSION ARM

- (a) Place matchmarks on the link and bracket.
- (b) Remove the nut and disconnect the height control sensor link.

Torque: 5.0 N·m (55 kgf·cm, 48 in·lbf)



9. LOOSEN BOLT ON LOWER SIDE OF PNEUMATIC CYLINDER

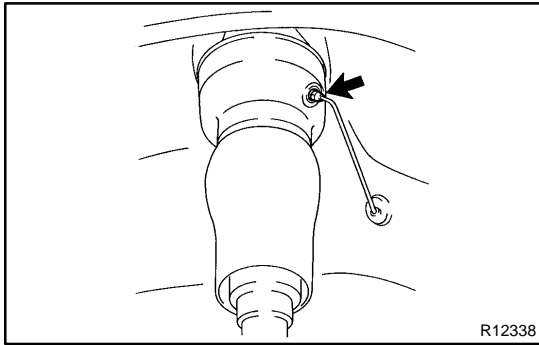
- (a) Loosen the bolt on lower side of the pneumatic cylinder.

HINT:

Do not remove the bolt.

Torque: 137 N·m (1,400 kgf·cm, 101 ft·lbf)

- (b) Support the rear axle carrier with a jack.

**10. DISCONNECT AIR TUBE FROM PNEUMATIC CYLINDER**

Disconnect the air tube from the pneumatic cylinder.

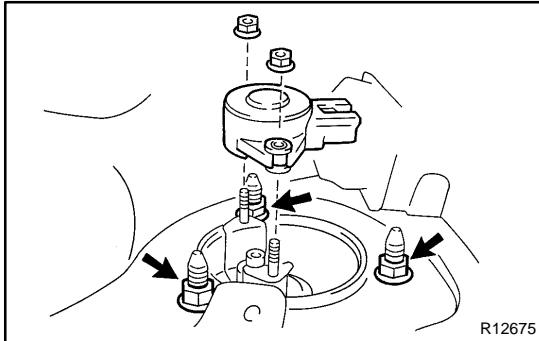
Torque: 17 N·m (175 kgf-cm, 13 ft-lbf)

11. REMOVE SUSPENSION CONTROL ACTUATOR

(a) Remove the 3 nuts and actuator cover.

Torque: 25 N·m (260 kgf-cm, 18 ft-lbf)

(b) Disconnect the actuator connector.



(c) Remove the 2 nuts and actuator.

Torque: 7.8 N·m (80 kgf-cm, 69 in.-lbf)

12. REMOVE PNEUMATIC CYLINDER

(a) Remove the 3 nuts.

Torque: 64 N·m (650 kgf-cm, 47 ft-lbf)

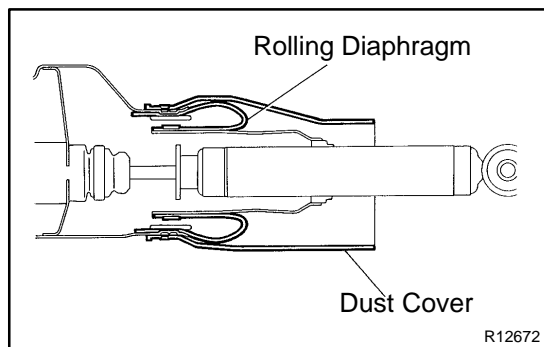
(b) Lower the rear axle carrier and remove the bolt on lower side of pneumatic cylinder.

(c) Remove the pneumatic cylinder.

13. REMOVE SUSPENSION SUPPORT

Remove the 3 nuts and suspension support from the pneumatic cylinder.

Torque: 36 N·m (370 kgf-cm, 27 ft-lbf)



INSPECTION

1. INSPECT ROLLING DIAPHRAGM

- (a) Lift up the dust cover and check that the rolling diaphragm is not damaged or cracked.

If damage or cracks exist replace the pneumatic cylinder.

- (b) Return the dust cover back to position.

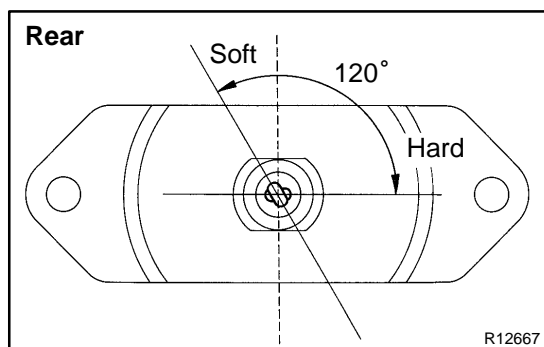
2. INSPECT DAMPING FORCE

- (a) Compress and extend the pneumatic cylinder and check that there is no abnormal resistance or unusual operation sounds.

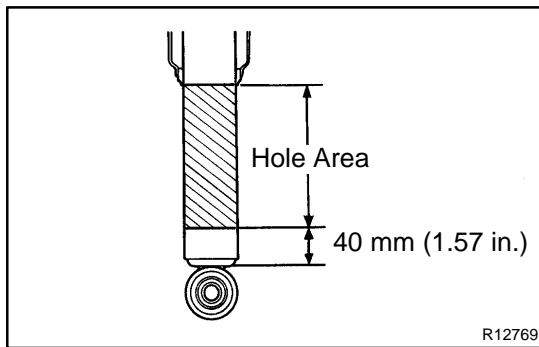
If the pneumatic cylinder is not normal, replace it.

NOTICE:

When discarding the shock absorber, see **DISPOSAL** on page [SA-108](#).



- (b) Check that there is a difference in the damping force when the rods are positioned as shown.



DISPOSAL

MAKE A HOLE IN SHOCK ABSORBER AND REMOVE GAS

- (a) Fully extend the pneumatic cylinder.
- (b) 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.

INSTALLATION

Installation is in the reverse order of removal (See page [SA-105](#)).

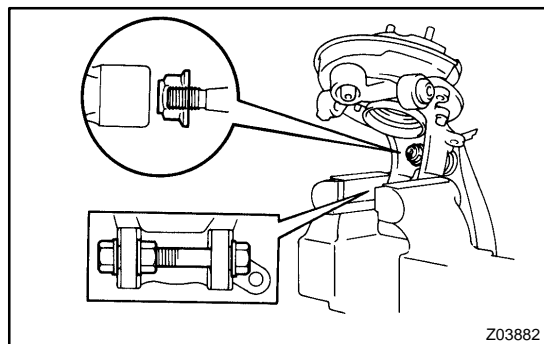
AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND REAR WHEEL ALIGNMENT (See page [SA-9](#))

SA0KN-01

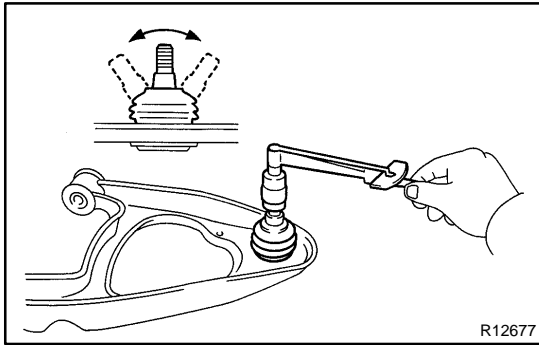


REMOVAL

1. REMOVE REAR AXLE HUB WITH UPPER SUSPENSION ARM (See page [SA-54](#))



2. REMOVE UPPER SUSPENSION ARM
 - (a) Install a bolt and 2 nuts to the axle carrier and secure it in a vise.
 - (b) Loosen the nut to the position. Then tap the nut with a hammer and remove the upper suspension arm.
- Torque: 108 N·m (1,100 kgf·cm, 80 ft·lbf)**



INSPECTION

INSPECT BALL JOINT FOR ROTATION CONDITION

- Flip the ball joint stud back and 4 – 5 times, before installing the nut.
- Using a torque wrench, turn the nut continuously one turn every 2–4 seconds and take the torque reading on the 5th turn.

Torque (turning):

1.0 – 3.4 N·m (10 – 35 kgf·cm, 9 – 30 in.-lbf)

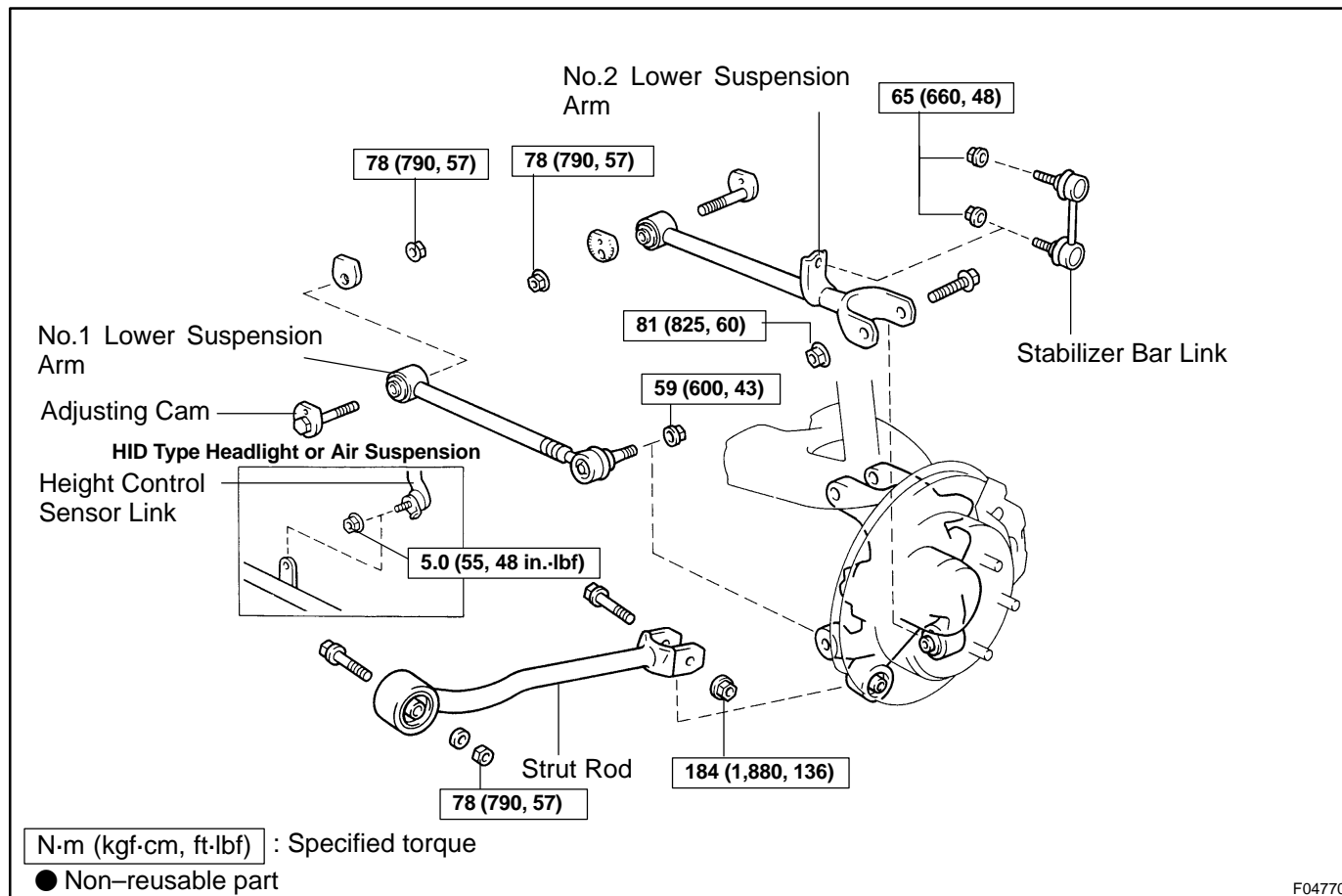
INSTALLATION

Installation is in the reverse order of removal (See page [SA-37](#)).

AFTER INSTALLATION, CHECK ABS SPEED SENSOR SIGNAL (See page [DI-307](#)) AND REAR WHEEL ALIGNMENT (See page [SA-9](#))

REAR LOWER SUSPENSION ARM AND STRUT ROD COMPONENTS

SAOKR-01

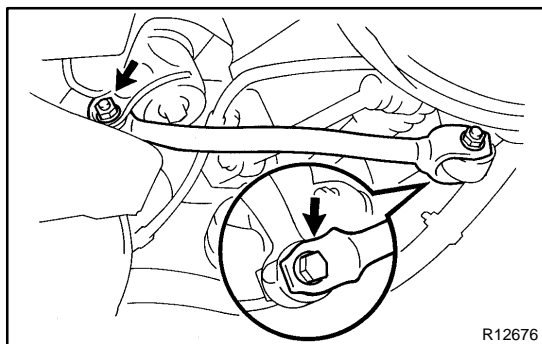


F04770

REMOVAL

1. REMOVE REAR WHEEL

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



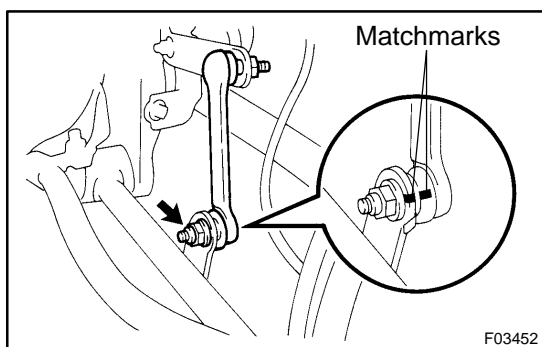
2. REMOVE STRUT ROD

- (a) Loosen the bolt and remove the nut and disconnect the strut rod from the rear axle carrier.

Torque: 184 N·m (1,880 kgf·cm, 136 ft·lbf)

- (b) Remove the nut, bolt and strut rod from the body.

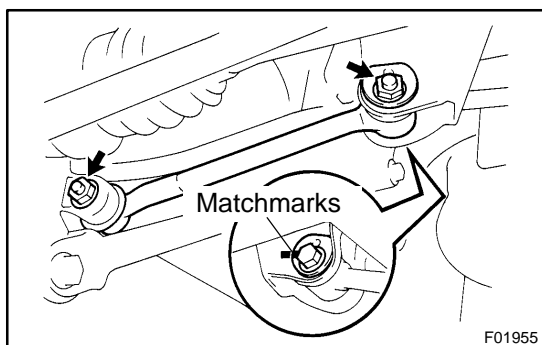
Torque: 78 N·m (790 kgf·cm, 57 ft·lbf)



3. REMOVE NO.1 LOWER SUSPENSION ARM

- (a) HID type headlight or air suspension:
Place matchmarks on the link and bracket, remove the nut and disconnect the height control sensor link from the No.1 lower suspension arm.

Torque: 5.0 N·m (55 kgf·cm, 48 in.-lbf)



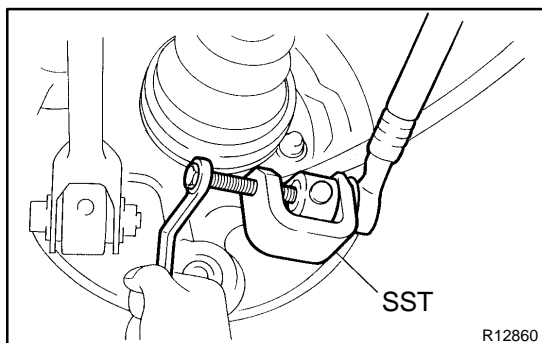
- (b) Place matchmarks on the adjusting cam and body.

- (c) Remove the nut and adjusting cam.

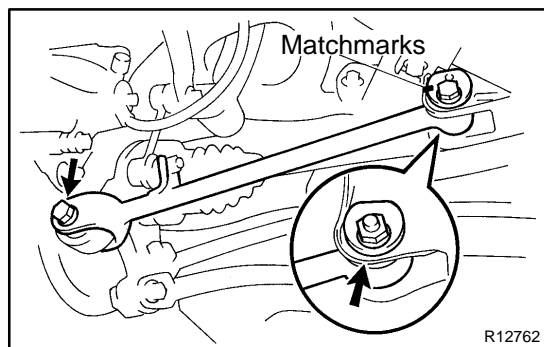
Torque: 78 N·m (790 kgf·cm, 57 ft·lbf)

- (d) Remove the nut on axle carrier side of No.1 lower suspension arm.

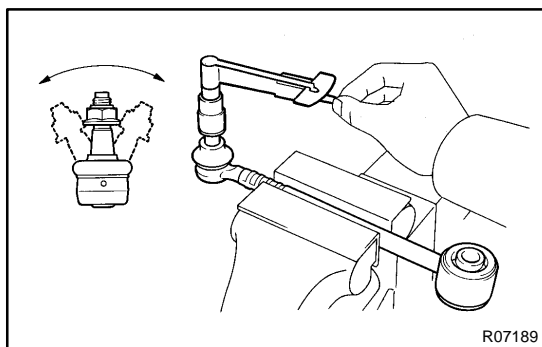
Torque: 59 N·m (600 kgf·cm, 43 ft·lbf)



- (e) Using SST, remove the No.1 lower suspension arm.
SST 09628-10011

**4. REMOVE NO.2 LOWER SUSPENSION ARM**

- (a) Remove the stabilizer bar link.
Torque: 65 N·m (660 kgf-cm, 48 ft-lbf)
- (b) Place matchmarks on the adjusting cam and body.
- (c) Remove the nut and adjusting cam.
Torque: 78 N·m (790 kgf-cm, 57 ft-lbf)
- (d) Loosen the bolt and remove the nut and No.2 lower suspension arm.
Torque: 81 N·m (825 kgf-cm, 60 ft-lbf)



INSPECTION

INSPECT NO.1 LOWER SUSPENSION ARM BALL JOINT FOR ROTATION CONDITION

- Flip the ball joint stud back and 4 – 5 times, before installing the nut.
- Using a torque wrench, turn the nut continuously one turn every 2–4 seconds and take the torque reading on the 5th turn.

Turning torque:

0.8 – 3.4 N·m (8.5 – 35 kgf·cm, 7.4 – 30 in.-lbf)

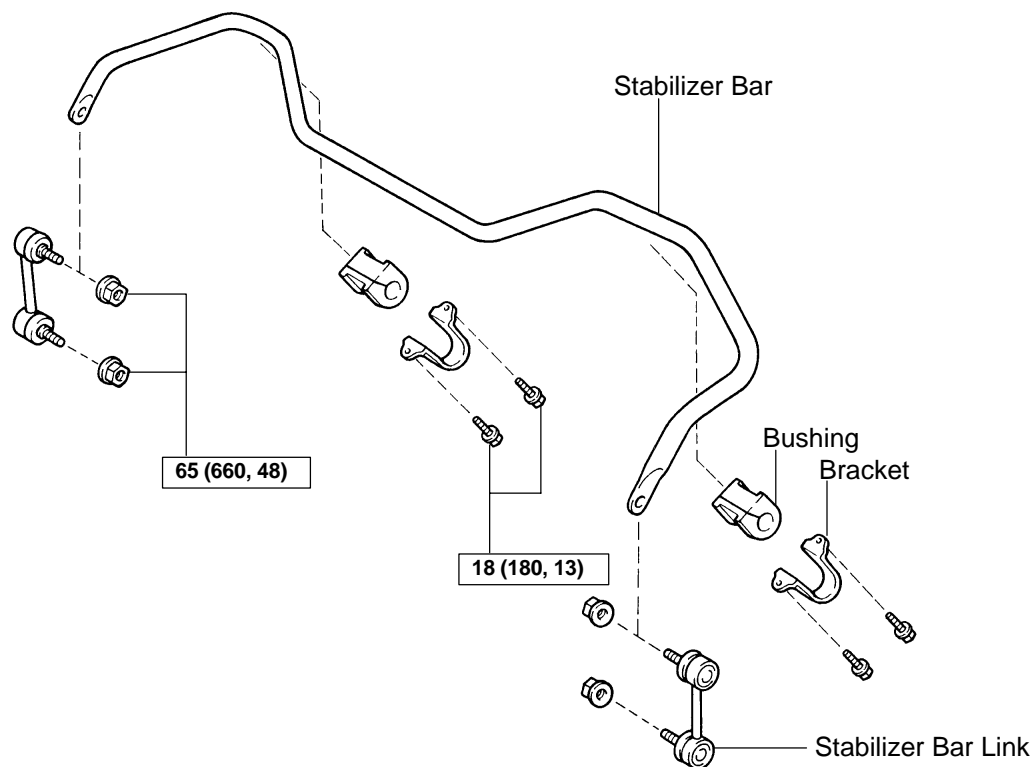
INSTALLATION

Installation is in the reverse order of removal (See page [SA-115](#)).

AFTER INSTALLATION, CHECK REAR WHEEL ALIGNMENT (See page [SA-9](#))

REAR STABILIZER BAR COMPONENTS

SAOKV-01



N·m (kgf·cm, ft·lbf) : Specified torque

F01956

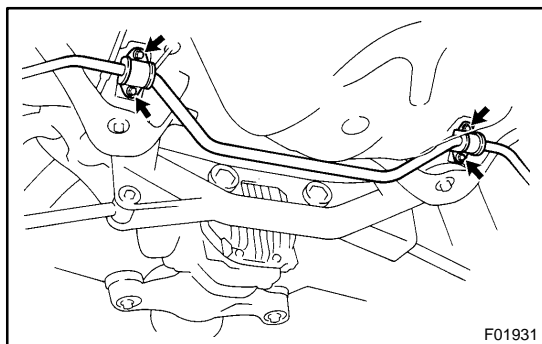
REMOVAL

1. REMOVE BOTH STABILIZER BAR LINKS

- (a) Remove the 2 nuts and stabilizer bar link.

Torque: 65 N·m (660 kgf·cm, 48 ft·lbf)

- (b) Employ the same manner described above to the other side.

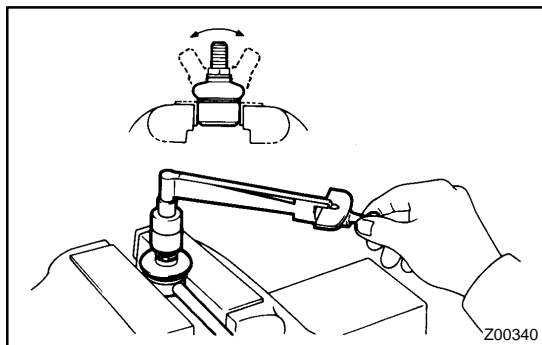


2. REMOVE BOTH STABILIZER BAR BRACKETS

Remove the 4 bolts and both stabilizer bar brackets.

Torque: 18 N·m (180 kgf·cm, 13 ft·lbf)

3. REMOVE BOTH BUSHINGS



INSPECTION

INSPECT STABILIZER BAR LINK BALL JOINT FOR ROTATION CONDITION

- Flip the ball joint stud back and 4 – 5 times before installing the nut.
- Using a torque wrench, turn the stud continuously one turn every 2–4 seconds and take the torque reading on the 5th turn.

Turning torque:

0.05 – 1.5 N·m (0.5 – 15 kgf·cm, 0.4 – 13 in.-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [SA-120](#)).

ELECTRONIC MODULATED AIR SUSPENSION

INSPECTION

SA0KZ-01

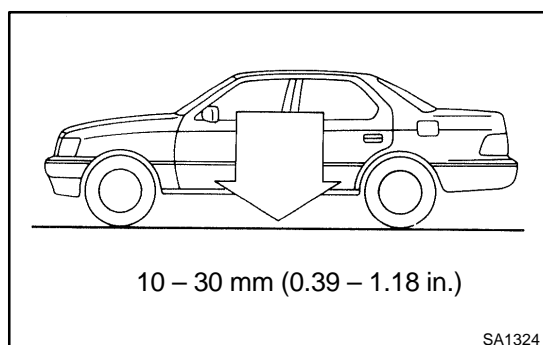
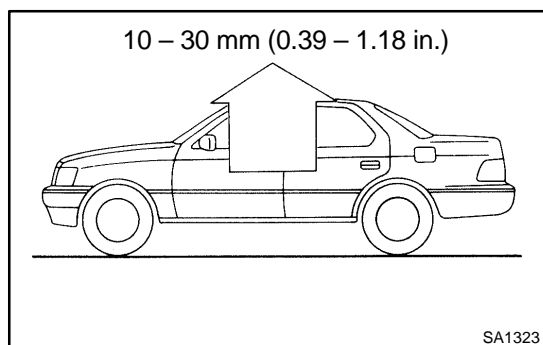
1. OPERATE HEIGHT CONTROL SWITCH AND CHECK CHANGE OF VEHICLE HEIGHT

- (a) Check the tires for the proper inflation pressure (See page SA-3).
- (b) Check the vehicle height (See page SA-5).
- (c) Start the engine and change the height control switch from the NORM position to the HIGH position. Check the time until the height adjustment is completed and the amount of change in the vehicle height.

Adjustment time

From operation of height control switch to start of compressor.	Approx. 2 sec.
From start of compressor to completion of height adjustment.	20 – 40 sec.

Amount of change in vehicle height:
10 – 30 mm (0.39 – 1.18 in.)



- (d) With the vehicle in the HIGH position height adjustment, start the engine and change the height control switch from the HIGH position to the NORM position. Check the time until the height adjustment is completed and the amount of change in the vehicle height.

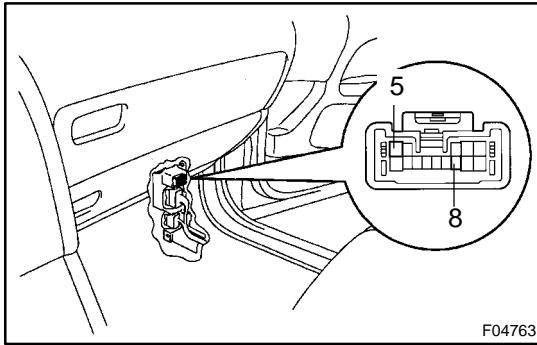
Adjustment time

From operation of height control switch to open of exhaust valve.	Approx. 2 sec.
From open of exhaust valve to completion of height adjustment.	20 – 40 sec.

Amount of change in vehicle height:
10 – 30 mm (0.39 – 1.18 in.)

2. CHECK OPERATION OF RELIEF VALVE

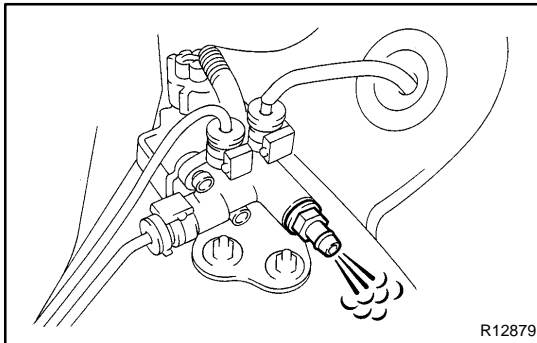
- (a) Remove the instrument panel box assembly, scuff plate, floor carpet.



- (b) Turn the ignition switch ON and connect terminals 5 and 8 of the height control connector to operate the compressor.

NOTICE:

Connect terminals 5 and 8 of the height control connector for no longer than 15 seconds.



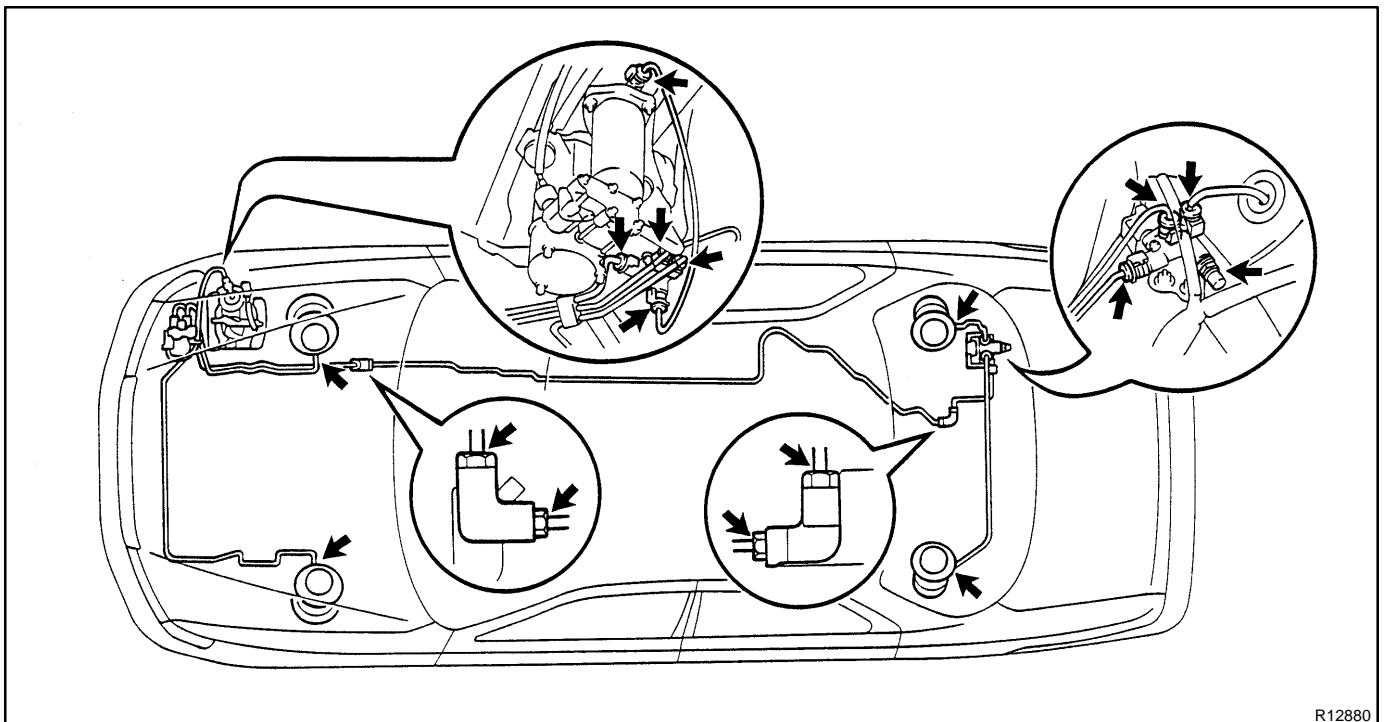
- (c) Operate the compressor, wait a short period of time, then check if air is blown from the relief valve.
 (d) Turn the ignition switch OFF.
 (e) Clear the diagnostic trouble code (See page [DI-237](#)).

NOTICE:

When the compressor is forcedly operated, a diagnostic trouble code is recorded in the ECU. Be sure to clear the diagnostic trouble code after the inspection is completed.

3. CHECK CONNECTIONS OF TUBES AND HOSES FOR AIR LEAKAGE

- (a) Set the height control switch in the HIGH position and raise the vehicle height.
 (b) Stop the engine.
 (c) Apply soapy water to the connections of the tubes and hoses and check if there is any air leakage.

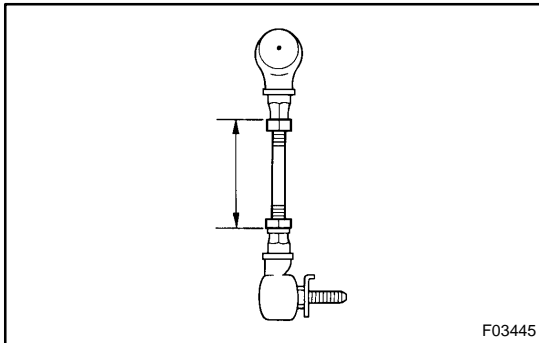


ADJUSTMENT

NOTICE:

- Adjustment of the vehicle height should be performed with the height control switch in the **NORM** position. Perform height adjustments in a level place.
- Be sure to adjust the vehicle height so that it is within the range of standard values.
- Perform height adjustments in a level place.

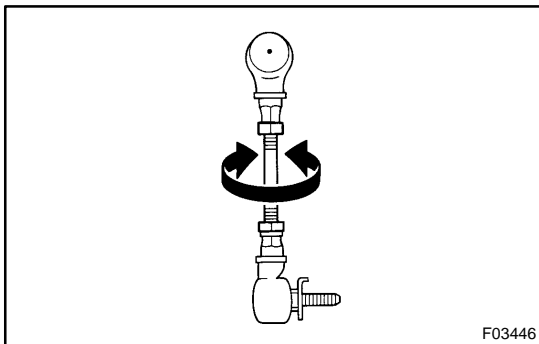
1. INSPECT VEHICLE HEIGHT (See page SA-5)



2. INSPECT FRONT HEIGHT CONTROL SENSOR LINK LENGTH

Inspect the link dimension shown in the illustration.

Link length (reference): 59.3 mm (2.335 in.)

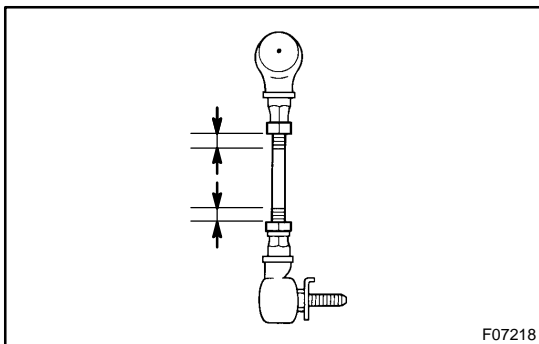


3. ADJUST FRONT VEHICLE HEIGHT

- (a) Loosen the 2 lock nuts on the height control sensor link.
- (b) Turn the bolt of the height control sensor link to adjust the length.

HINT:

Turning the bolt of the height control sensor link one revolution changes the vehicle height by about 5 mm (0.20 in.).



- (c) Check if the height control sensor link dimension shown in the illustration is less than the maximum value.

Maximum: 10 mm (0.39 in.)

- (d) Tighten the 2 lock nuts temporarily.

HINT:

Coat the thread of the bolt with sealer.

Sealer:

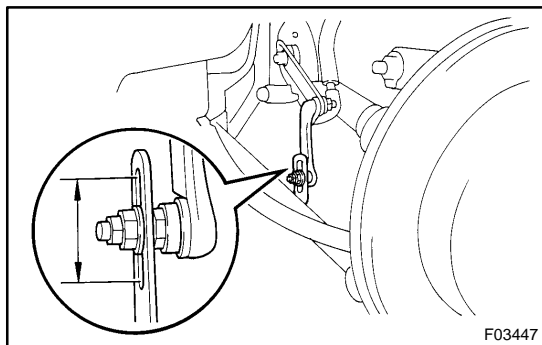
Part No.08833-00070, THREE BOND 1324 or equivalent

- (e) Inspect the vehicle height one more time.
- (f) Tighten the lock nuts.

Torque: 4.9 N·m (50 kgf·cm, 43 in.-lbf)

NOTICE:

Make sure the ball joint and bracket are parallel when tightening the lock nuts.

**4. ADJUST REAR VEHICLE HEIGHT**

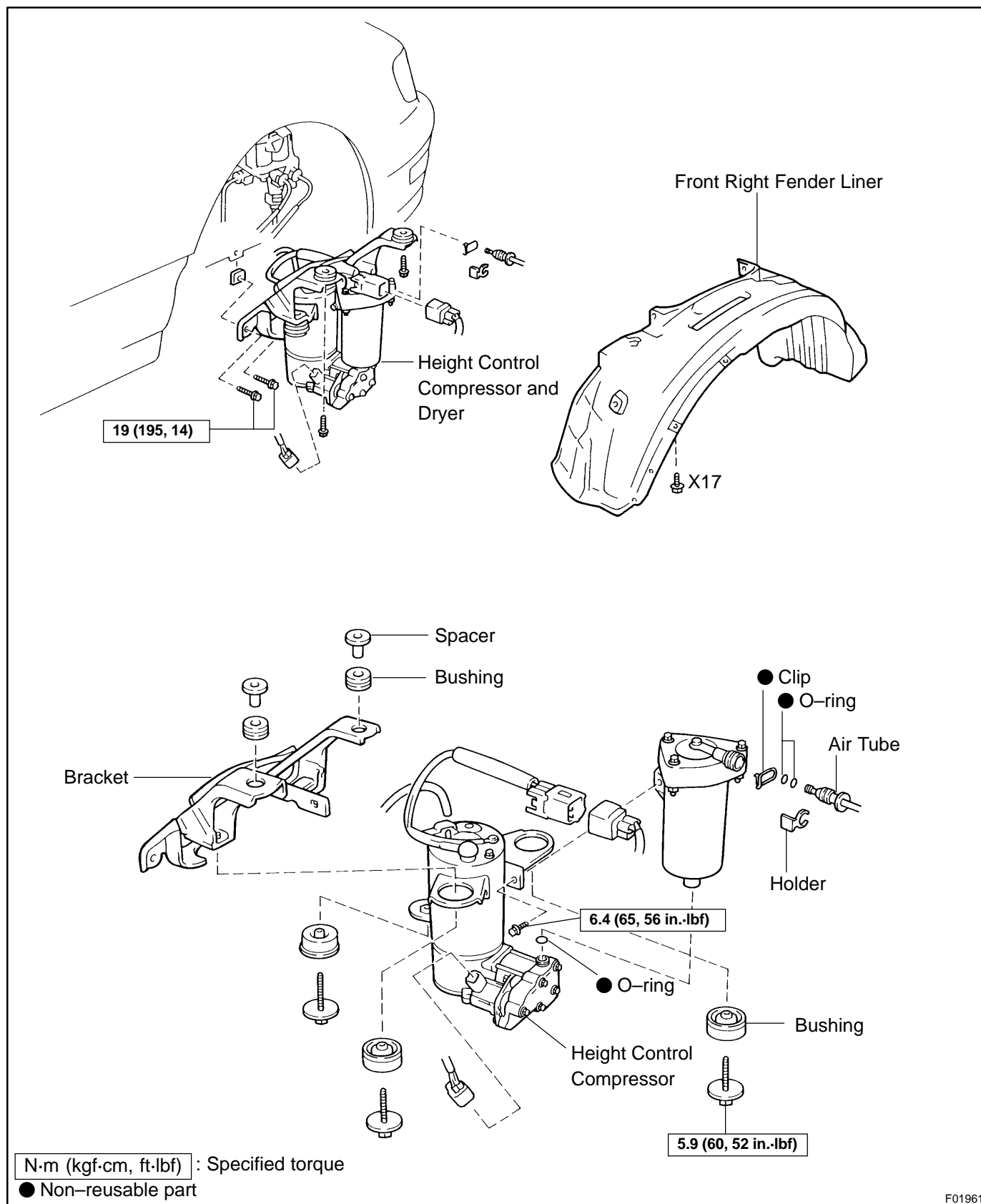
The rear vehicle height can be adjusted by moving the installation position of the link on the lower arm.

When the link is moved 1 mm (0.04 in.), the vehicle height is adjusted by about 2 mm (0.08 in.).

5. INSPECT WHEEL ALIGNMENT (See page [SA-5](#))

HEIGHT CONTROL COMPRESSOR AND DRYER COMPONENTS

SA0L1-01



F01961

REMOVAL

1. **REMOVE FRONT RIGHT WHEEL**
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
2. **REMOVE FRONT RIGHT FENDER LINER**
3. **REMOVE HEIGHT CONTROL COMPRESSOR AND DRYER**

HINT:

At the time of installation, after installation, check for air leakage (See page [SA-123](#)).

- (a) Remove the connector.
- (b) Remove the air tube.
 - (1) Remove the holder.
 - (2) Spread the clip and pull the air tube out straight and slowly.

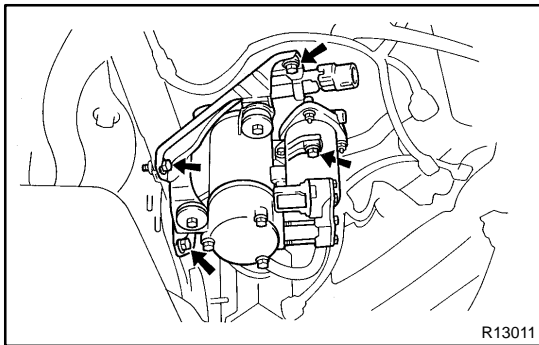
NOTICE:

Do not get scratches or foreign particles on the O-ring, O-ring seal and flare section.

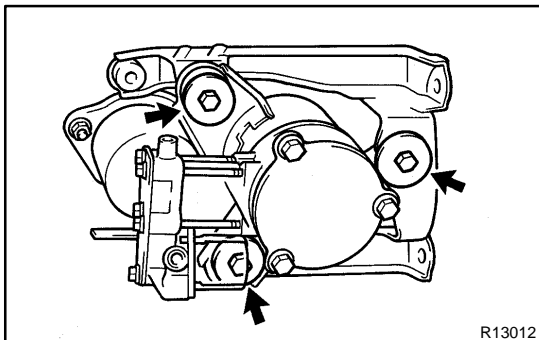
HINT:

At the time of installation, please refer to the following items.

- If replacing the O-ring, coat it with MP grease.
- Push the air tube in straight to connect it until the clip makes "click" sound.
- (3) Remove the clip.



- (c) Remove the 4 bolts and the height control compressor and dryer with the bracket.
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



- (d) Remove the 3 bolts and the bracket from the height control compressor.
Torque: 5.9 N·m (60 kgf·cm, 52 in.-lbf)

- (e) Remove the bolt and the dryer from the height control compressor.

Torque: 6.4 N·m (65 kgf·cm, 56 in.-lbf)

NOTICE:

Slowly pull out or push in the dryer along the dryer axis and do not damage the O-ring on the compressor side.

HINT:

At the time of installation, if replacing the O-ring, coat it with MP grease.

4. REMOVE BUSHING AND SPACER

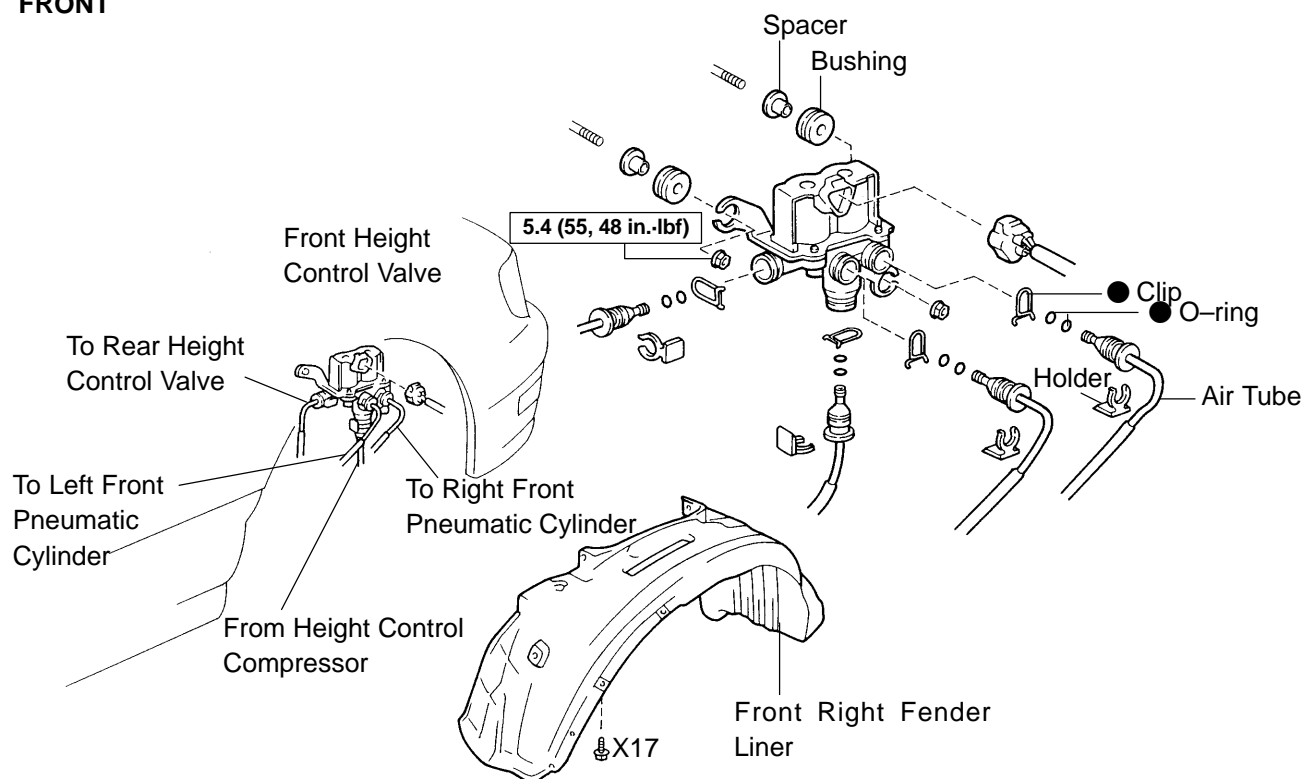
INSTALLATION

Installation is in the reverse order of removal (See page [SA-128](#)).

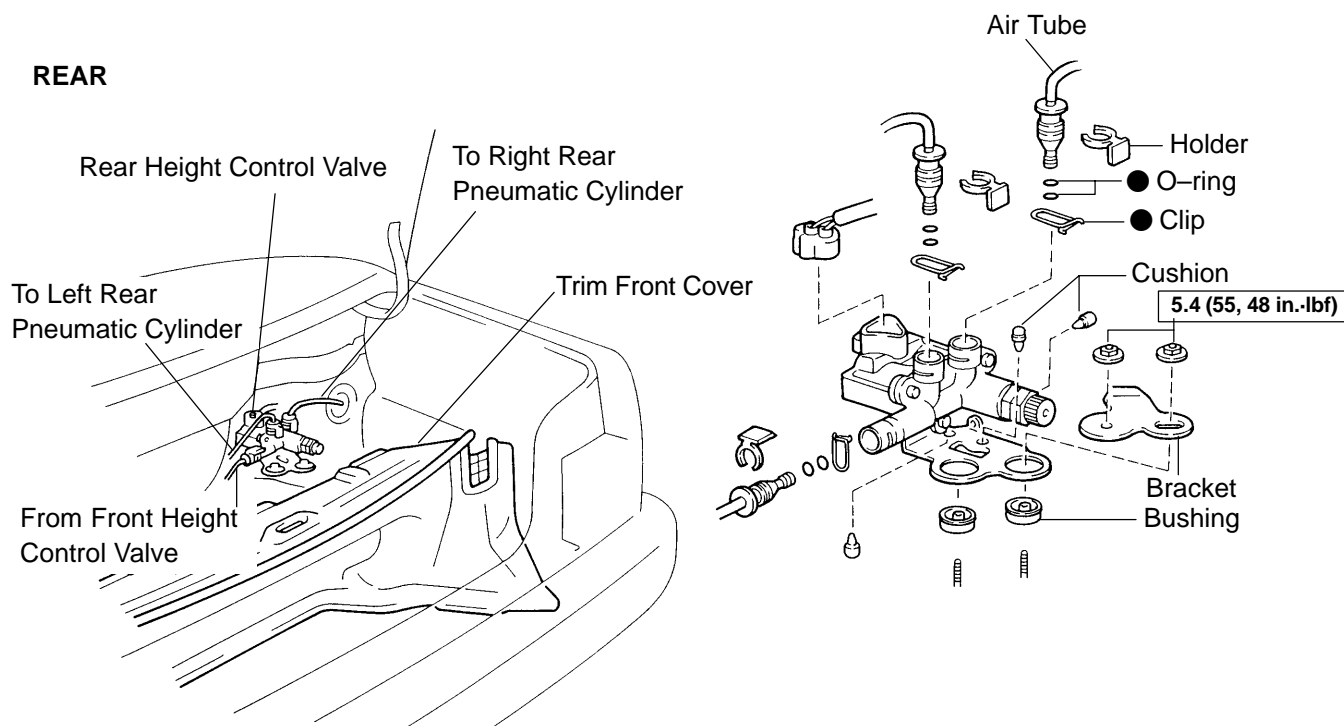
HEIGHT CONTROL VALVE COMPONENTS

SA0L4-01

FRONT



REAR



N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

F01976

REMOVAL

1. FRONT:

REMOVE FRONT RIGHT WHEEL AND FENDER LINER

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

2. REAR:

REMOVE LUGGAGE COMPARTMENT TRIM FRONT COVER (See page [BO-31](#))

3. REMOVE HEIGHT CONTROL VALVE

HINT:

At the time of installation, after installation, check for air leakage (See page [SA-123](#)).

(a) Remove the connector.

(b) Remove the air tube.

(1) Remove the holder.

(2) Spread the clip and pull the air tube out straight and slowly.

NOTICE:

Do not get scratches or foreign particles on the O-ring, O-ring seal and flare section.

HINT:

At the time of installation, please refer to the following items.

● If replacing O-ring, coat it with MP grease.

● Push the air tube in straight to correct it until the clip makes "click" sound.

(3) Remove the clip.

(c) Remove the 2 nuts and the height control valve.

Torque: 5.4 N·m (55 kgf·cm, 48 in·lbf)

4. REMOVE BUSHING, CUSHION AND SPACER

INSTALLATION

Installation is in the reverse order of removal (See page [SA-132](#)).

BRAKE SYSTEM

BR0BW-01

GENERAL DESCRIPTION

- 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 of 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 precautions in the IN section.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BR0BX-03

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	1. Fluid leaks for brake system 2. Air in brake system 3. Piston seals (Worn or damaged) 4. Master cylinder (Faulty) 5. Booster push rod (Out of adjustment)	DI-407 BR-4 BR-25 BR-35 BR-12 BR-21
Brake drag	1. Brake pedal freeplay (Minimum) 2. Parking brake lever travel (Out of adjustment) 3. Parking brake wire (Sticking) 4. Rear brake shoe clearance (Out of adjustment) 5. Pad (Cracked or distorted) 6. Piston (Stuck) 7. Piston (Frozen) 8. Tension or return spring (Faulty) 9. Booster push rod (Out adjustment) 10. Vacuum leaks for booster system 11. Master cylinder (Faulty)	BR-6 BR-8 — BR-46 — BR-22 BR-32 BR-25 BR-35 BR-25 BR-35 BR-46 BR-21 BR-18 BR-12
Brake pull	1. Piston (Stuck) 2. Pad (Cracked or distorted) 3. Piston (Frozen) 4. Disk (Scored) 5. Pad (Cracked or distorted)	BR-25 BR-35 BR-22 BR-32 BR-25 BR-35 BR-25 BR-35 BR-22 BR-32

BRAKE – TROUBLESHOOTING

Hard pedal but brake inefficient	<ol style="list-style-type: none"> 1. Fluid leaks for brake system 2. Air in brake system 3. Pad (Worn) 4. Pad (Cracked or distorted) 5. Pad (Oily) 6. Pad (Glazed) 7. Disk (Scored) 8. Booster push rod (Out of adjustment) 9. Vacuum leaks for booster system 	DI-407 BR-4 BR-22 BR-32 BR-22 BR-32 BR-22 BR-32 BR-22 BR-32 BR-25 BR-35 BR-21 BR-18
Noise from brakes	<ol style="list-style-type: none"> 1. Pad (Cracked or distorted) 2. Installation bolt (Loose) 3. Disk (Scored) 4. Pad support plate (Loose) 5. Sliding pin (Worn) 6. Pad (Dirty) 7. Pad (Glazed) 8. Tension or return spring (Faulty) 9. Anti-squeal shim (Damaged) 10. Shoe hold-down spring (Damaged) 	BR-22 BR-32 BR-25 BR-35 BR-25 BR-35 BR-35 BR-35 BR-35 BR-22 BR-32 BR-22 BR-32 BR-46 BR-22 BR-32 BR-46

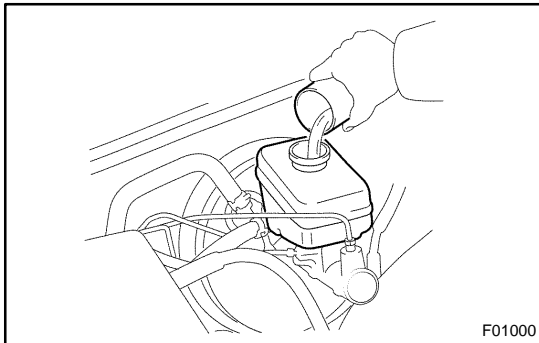
BRAKE FLUID BLEEDING

HINT:

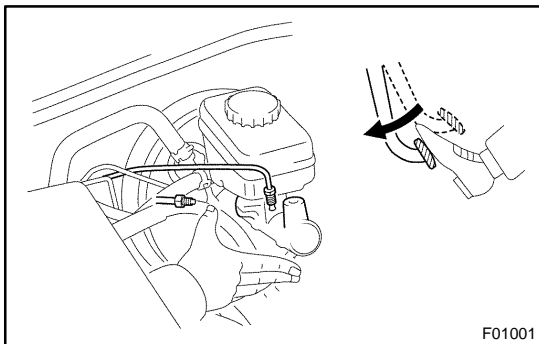
If any work is done on the brake system or if air in the brake lines is suspected, bleed the system of air.

NOTICE:

Do not let brake fluid remain on painted surfaces. Wash it off immediately.



- 1. FILL RESERVOIR WITH BRAKE FLUID**
Fluid: SAE J1703 or FMVSS NO.116DOT3

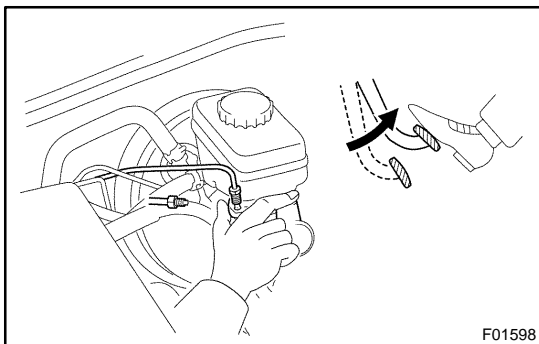


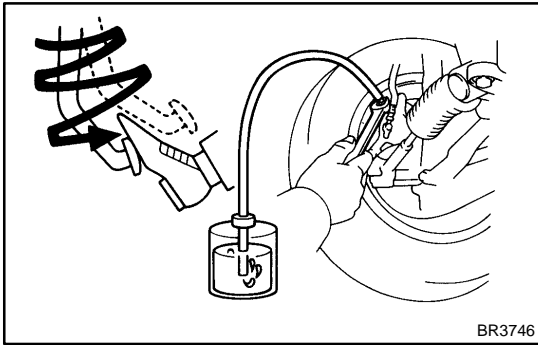
- 2. BLEED MASTER CYLINDER**

HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

- Disconnect the brake lines from the master cylinder.
- Slowly depress the brake pedal and hold it.
- Block off the outer holes with your fingers, and release the brake pedal.
- Repeat (b) and (c) 3 or 4 times.

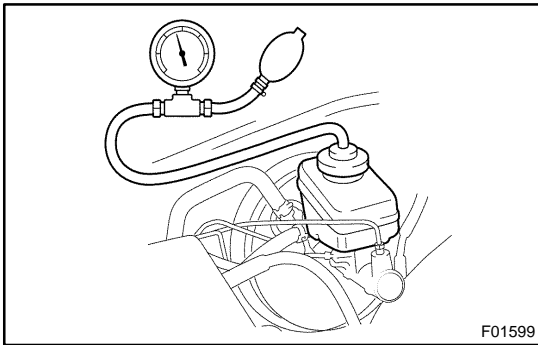




3. BLEED BRAKE LINE

- Connect the vinyl tube to the brake caliper.
- Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.
- At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.
- Repeat (b) and (c) until all the air in the fluid has been bled out.
- Repeat the above procedure to bleed the air out of the brake line for each wheel.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



4. BLEED BRAKE ACTUATOR

- Remove the reservoir cap.
- Install the SST to the reservoir.
SST 09992-00242, 09992-00350
- Connect the vinyl tube to the bleeder plug of the brake actuator.
- Using SST, apply the pressure described below to the reservoir.

Pressure: 98.1 kpa (1.0 kgf/cm², 14.2 psi)

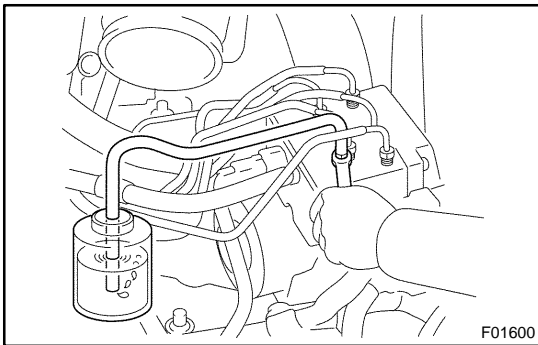
- Loosen the bleeder plug.
- Bleed the air out of the brake actuator, tighten the bleeder plug.

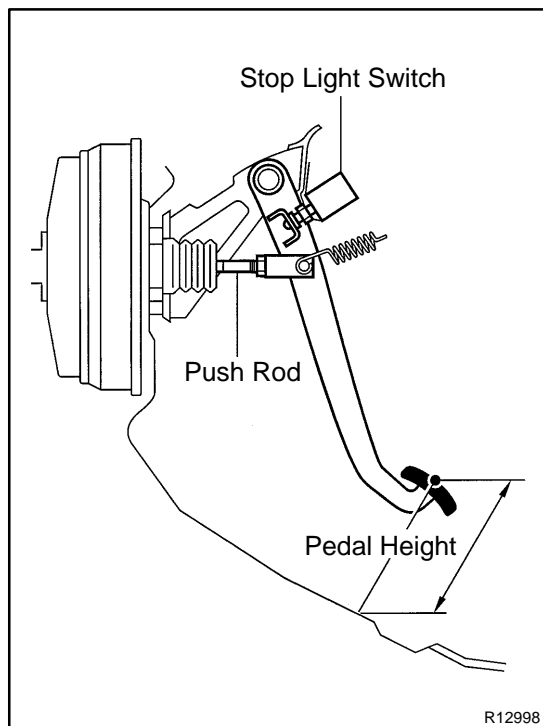
Torque: 8.3 N·m (85 kgf·cm, 74 in.-lbf)

5. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.

Fluid: SAE J1703 or FMVSS NO.116DOT3





BRAKE PEDAL ON-VEHICLE INSPECTION

BR0BZ-01

1. CHECK PEDAL HEIGHT

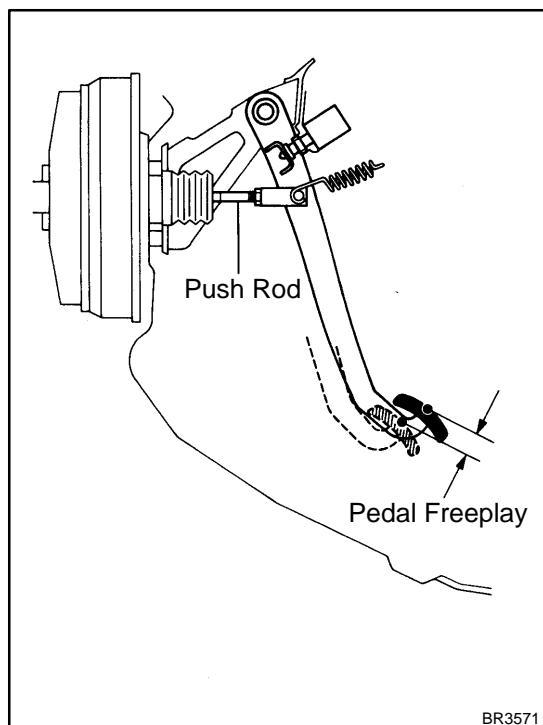
Pedal height from floor panel:

133.8–143.8 mm (5.268–5.661 in.)

If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

- Remove the under cover, lower pad and air duct.
 - Disconnect the connector from the stop light switch.
 - Loosen the stop light switch lock nut and remove the stop light switch.
 - Loosen the push rod lock nut.
 - Adjust the pedal height by turning the pedal push rod.
 - Tighten the push rod lock nut.
- Torque: 25 N·m (260 kgf-cm, 19 ft-lbf)**
- Install the stop light switch.
 - 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.
 - Connect the connector to the stop light switch.
 - After installation, push the brake pedal in 5–15 mm (0.20–0.59 in.), check that stop light lights up.
 - After adjusting the pedal height, check the pedal freeplay.



3. CHECK PEDAL FREEPLAY

- Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
- Push in the pedal by hand until the beginning of the second point of resistance is felt, then measure the distance, as shown.

Pedal freeplay:

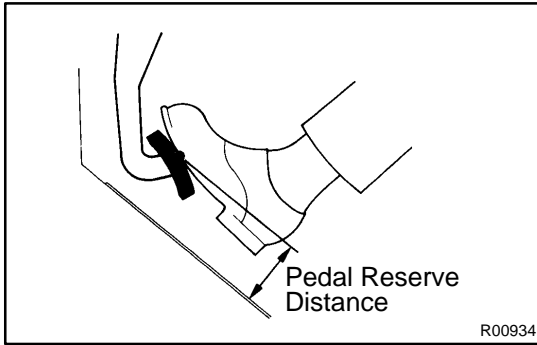
1–6 mm (0.04–0.24 in.)

If the clearance is incorrect, check the stop light switch clearance. If it is OK, then troubleshoot the brake system.

HINT:

The freeplay to the 1st point of resistance is due to the play between the clevis and pin. It is 1–3 mm (0.04–0.12 in.) on the pedal.

- Install the air duct, lower pad and under cover.



4. CHECK PEDAL RESERVE DISTANCE

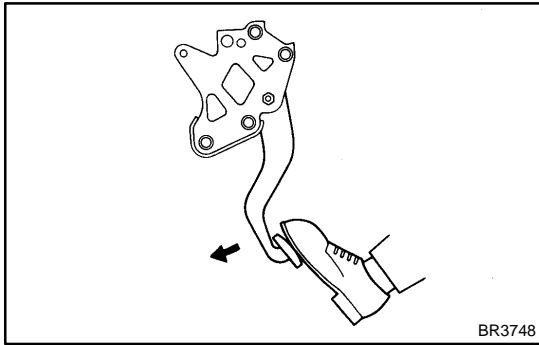
Release the parking brake.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance at 490 N (50 kgf, 110.2 lbf):

More than 70 mm (2.76 in.)

If the reserve distance is incorrect, troubleshoot the brake system.



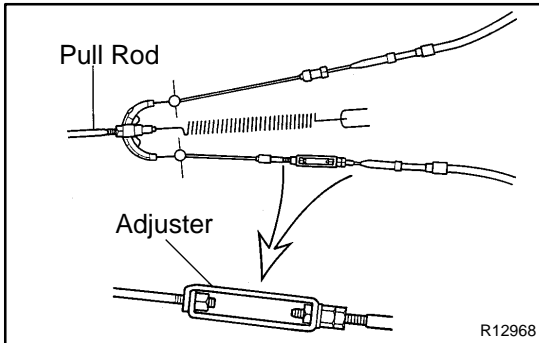
PARKING BRAKE PEDAL ON-VEHICLE INSPECTION

BROC0-01

1. CHECK PARKING BRAKE PEDAL TRAVEL

Depress the parking brake pedal all the way and count the number of clicks.

**Parking brake pedal travel at 294 N (30 kgf, 66.1 lbf):
5–7 clicks**



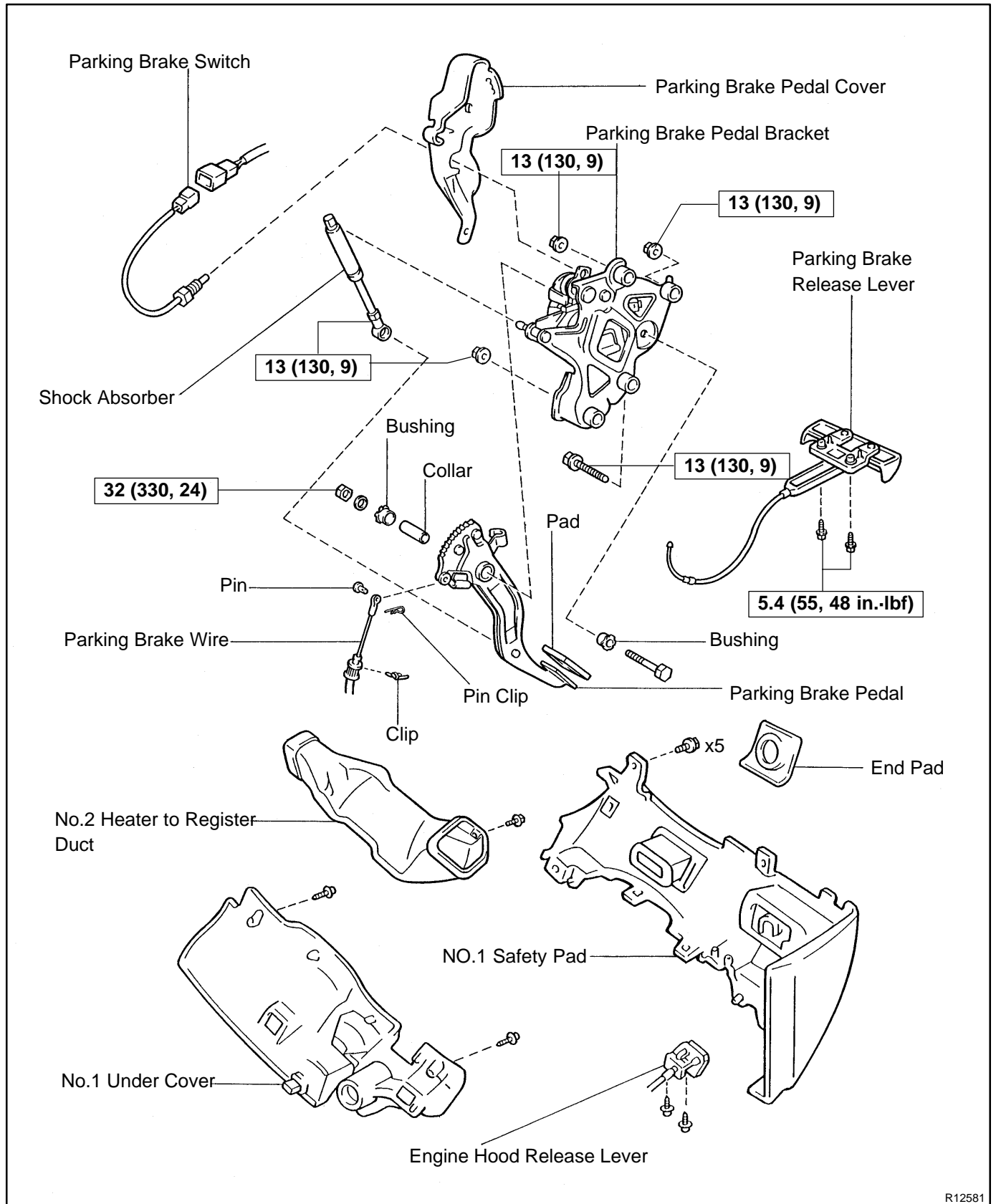
2. IF NECESSARY, ADJUST PARKING BRAKE

- Adjust the parking brake shoe clearance.
- Loosen the adjuster lock nut and adjuster until the parking brake pedal travel becomes correct.

HINT:

If the adjustment cannot be made within the range of travel of the adjuster, remove the propeller shaft and make an adjustment at the pull rod.

COMPONENTS



R12581

REMOVAL

1. REMOVE THESE PARTS:

(See page [BO-83](#))

- (a) No.1 under cover
- (b) End pad
- (c) No.1 safety pad
- (d) No.2 heater to register duct
- (e) Scuff plate

2. REMOVE PARKING BRAKE PEDAL ASSEMBLY

- (a) Disconnect the parking brake switch connector.
- (b) Remove the 2 bolts, and disconnect the parking brake release lever from the safety pad.

Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

- (c) Remove the pin clip and pull out the pin from the parking brake wire.
- (d) Remove the clip, and disconnect the parking brake wire.
- (e) Remove the bolt, 3 nuts and parking brake pedal assembly.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

3. REMOVE PARKING BRAKE PEDAL COVER

4. REMOVE PARKING BRAKE SWITCH

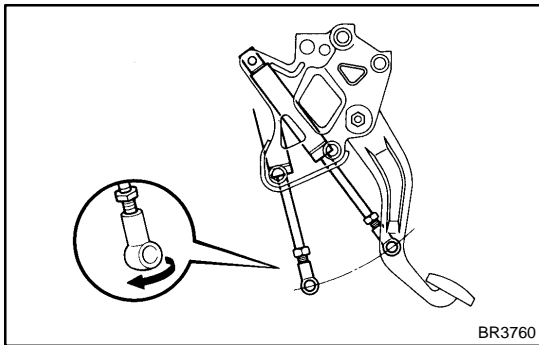
5. REMOVE PARKING BRAKE RELEASE WIRE

6. REMOVE SHOCK ABSORBER

7. REMOVE PARKING BRAKE PEDAL

Remove the bolt, nut, 2 bushings, collar and pedal.

Torque: 32 N·m (330 kgf-cm, 24 ft-lbf)



8. IF NECESSARY, ADJUST SHOCK ABSORBER

- (a) Loosen the union lock nut.
- (b) Install the shock absorber to the pin on the pedal bracket side, then extend the piston rod fully.
- (c) Return the pedal until it hits the cushion.
- (d) Make adjustments so that the shock absorber's union and the pin on the pedal side are aligned, then turn the union one turn counterclockwise.
- (e) Install the shock absorber to the pedal and torque the lock nut.

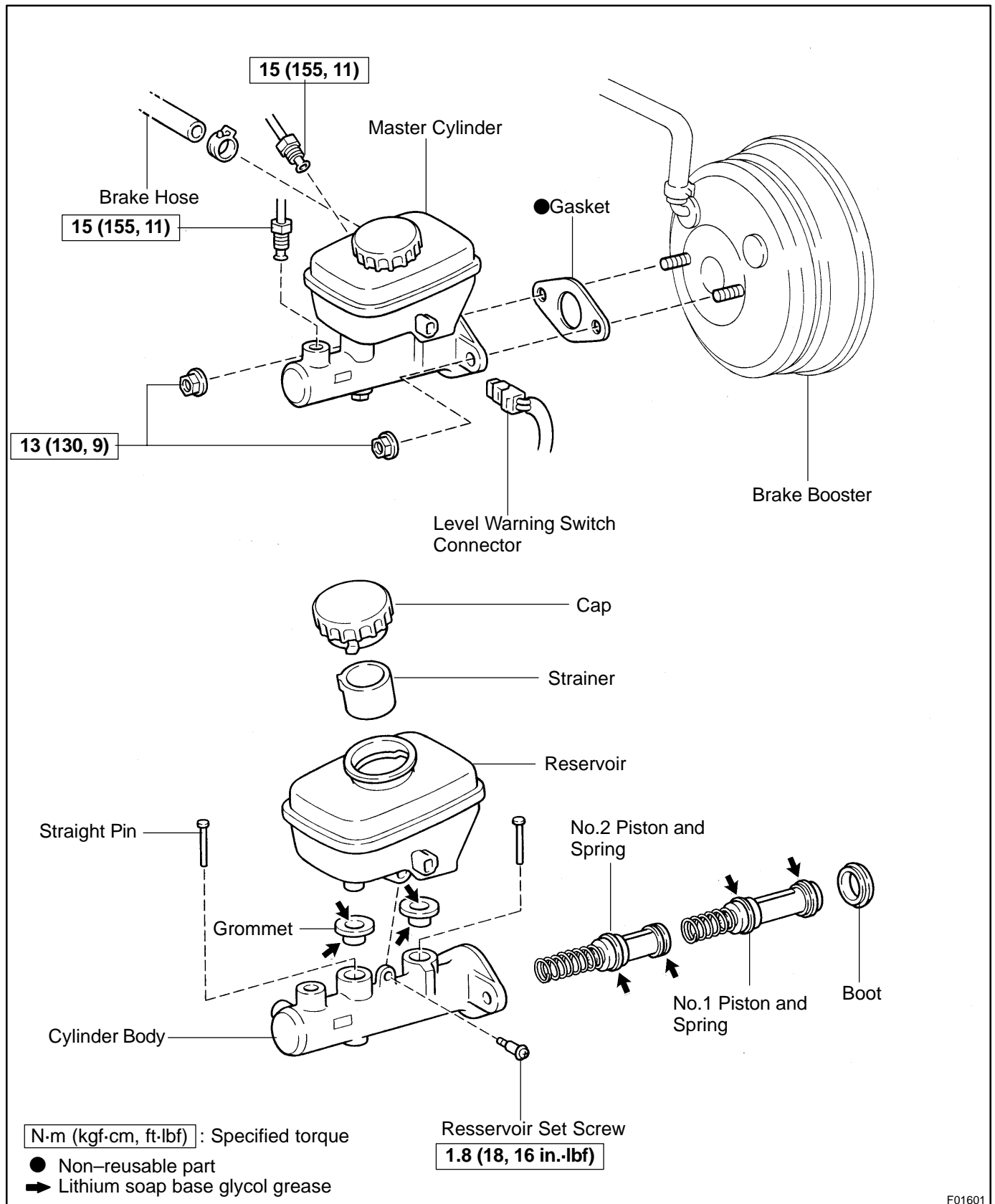
Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [BR-10](#)).

BRAKE MASTER CYLINDER COMPONENTS

BROC4-01



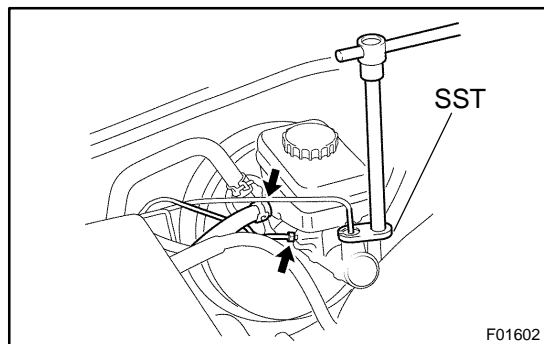
F01601

REMOVAL

1. **DISCONNECT LEVEL WARNING SWITCH CONNECTOR**
2. **DRAW OUT FLUID WITH SYRINGE**

NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.



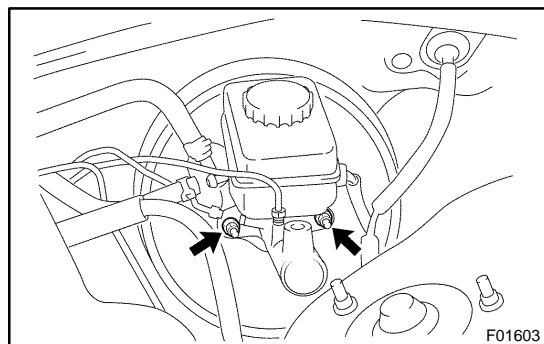
3. **DISCONNECT BRAKE LINES**

- (a) Using SST, disconnect the 2 brake lines from the master cylinder.

SST 09023-00100

Torque: 15 N·m (155 kgf-cm, 11 ft-lbf)

- (b) Disconnect the brake hose from the reservoir.

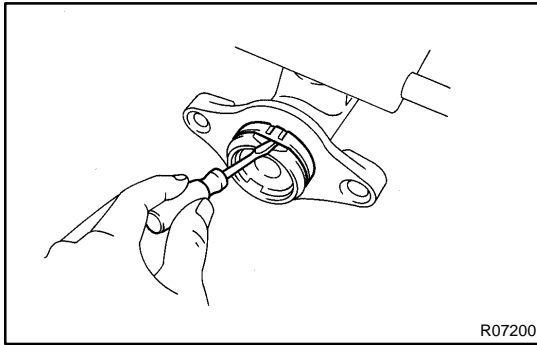


4. **REMOVE MASTER CYLINDER**

- (a) Remove the 2 nuts.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

- (b) Pull out the master cylinder and gasket from the brake booster.



DISASSEMBLY

1. REMOVE MASTER CYLINDER BOOT

Using a screwdriver, remove the master cylinder boot.

HINT:

At the time of installation, please refer to the following item.
With the UP mark on the master cylinder boot facing upwards, install the cylinder boot on the master cylinder.

2. REMOVE RESERVOIR CAP AND STRAINER

- Turn the reservoir cap to the "open" side and remove it.
- Remove the strainer.

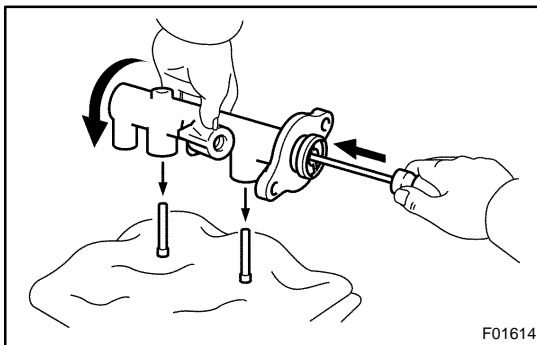
3. REMOVE RESERVOIR

Remove the set screw and pull out the reservoir.

Torque: 1.8 N·m (18 kgf·cm, 16 in.-lbf)

4. REMOVE 2 GROMMETS

5. PLACE CYLINDER IN VISE



6. REMOVE 2 PISTONS AND SPRINGS

- Push in the piston with a screwdriver and remove the 2 straight pins by turning over the cylinder body.

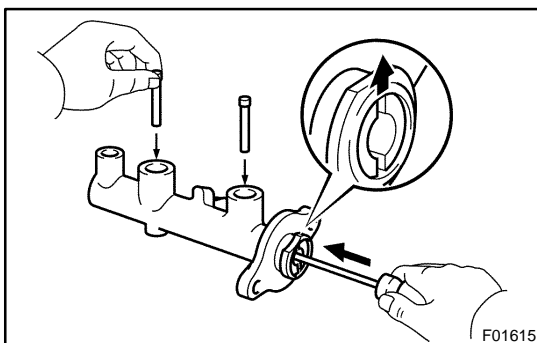
HINT:

Tape the screwdriver tip before use.

- Remove the 2 pistons and springs by hand, pulling straight out, not at an angle.

NOTICE:

- If they are 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.



HINT:

At the time of reassembly, please refer to the following item.
Insert the piston with elliptic hole facing vertically.

INSPECTION

HINT:

Clean the disassembled parts with compressed air.

- 1. INSPECT CYLINDER BORE FOR RUST OR SCORING**
- 2. INSPECT CYLINDER FOR WEAR OR DAMAGE**

If necessary, clean or replace the cylinder.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-14](#)).

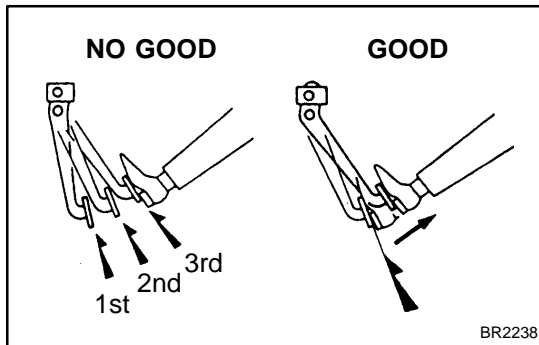
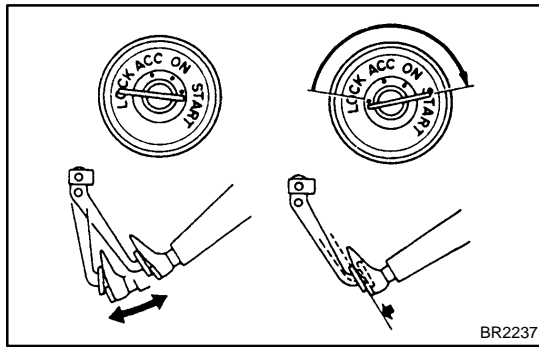
NOTICE:

Apply lithium soap base glycol grease to the rubber parts indicated by arrows (See page [BR-12](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [BR-13](#)).

1. BEFORE INSTALLATION, ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD (See page [BR-21](#))
2. AFTER INSTALLATION, FILL BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#)), CHECK FOR FLUID LEAKAGE
3. CHECK AND ADJUST BRAKE PEDAL (See page [BR-6](#))



BRAKE BOOSTER ASSEMBLY ON-VEHICLE INSPECTION

BROCA-01

1. OPERATING CHECK

- (a) Depress the brake pedal several times with the engine off and check that there is no change in the pedal reserve distance.
- (b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.

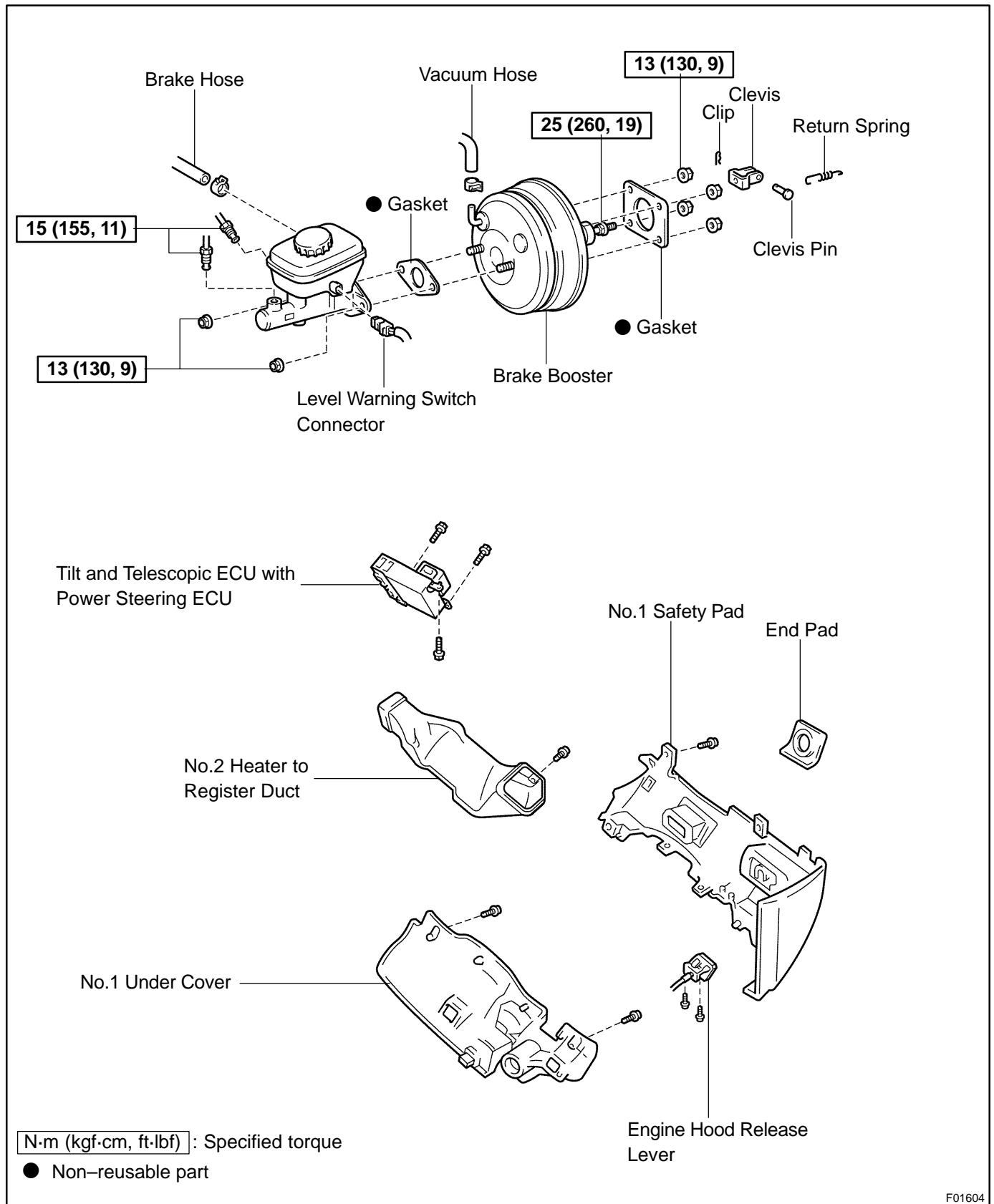
2. AIR TIGHTNESS CHECK

- (a) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

If the pedal goes down farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air tight.

- (b) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed. If there is no change in the pedal reserve travel after holding the pedal for 30 seconds, the booster is air tight.

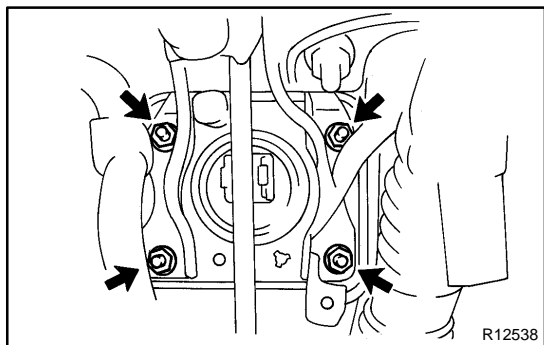
COMPONENTS



F01604

REMOVAL

1. REMOVE MASTER CYLINDER (See page [BR-13](#))
2. REMOVE NO.1 UNDER COVER, NO.1 SAFETY PAD AND NO.2 HEATER TO REGISTER DUCT (See page [BO-83](#))
3. REMOVE TILT AND TELESCOPIC ECU WITH POWER STEERING ECU
4. REMOVE CLIP AND RETURN SPRING
5. REMOVE CLEVIS PIN
6. REMOVE VACUUM HOSE
7. REMOVE BRAKE BOOSTER
 - (a) Remove the 4 booster installation nuts and clevis.
 - (b) Pull out the brake booster and gasket.



INSTALLATION

1. INSTALL BRAKE BOOSTER

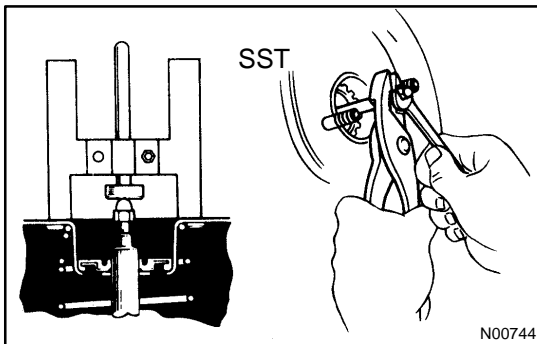
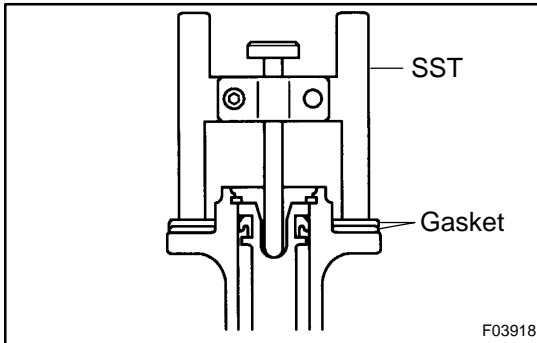
- Install the clevis to the operating rod.
- Install the booster and a new gasket.
- Install and torque the booster installation nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
- Insert the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.
- Install the pedal return spring.

2. ADJUST LENGTH OF BOOSTER PUSH ROD

NOTICE:

When adjusting the length of the booster push rod, install 2 new gaskets to the master cylinder. When installing the master cylinder, remove one gasket before installing the master cylinder.

- Install 2 new gaskets on the master cylinder.
- Set SST on the gasket, and lower the pin until its tip slightly touches the piston.
SST 09737-00010



- Turn the SST upside down, and set it on the booster.
SST 09737-00010
- Measure the clearance between the booster push rod and pin head (SST).
Clearance: 0 mm (0 in.)
- Adjust the booster push rod length until the push rod lightly touches the pin head.

Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

3. INSTALL THESE PARTS:

- Tilt and telescopic ECU with power steering ECU
- No.1 under cover, No.1 safety pad and No.2 heater to register duct (See page [BO-90](#))
- Vacuum hose
- Master cylinder (See page [BR-17](#))

4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))

5. CHECK FOR FLUID LEAKAGE

6. CHECK AND ADJUST BRAKE PEDAL

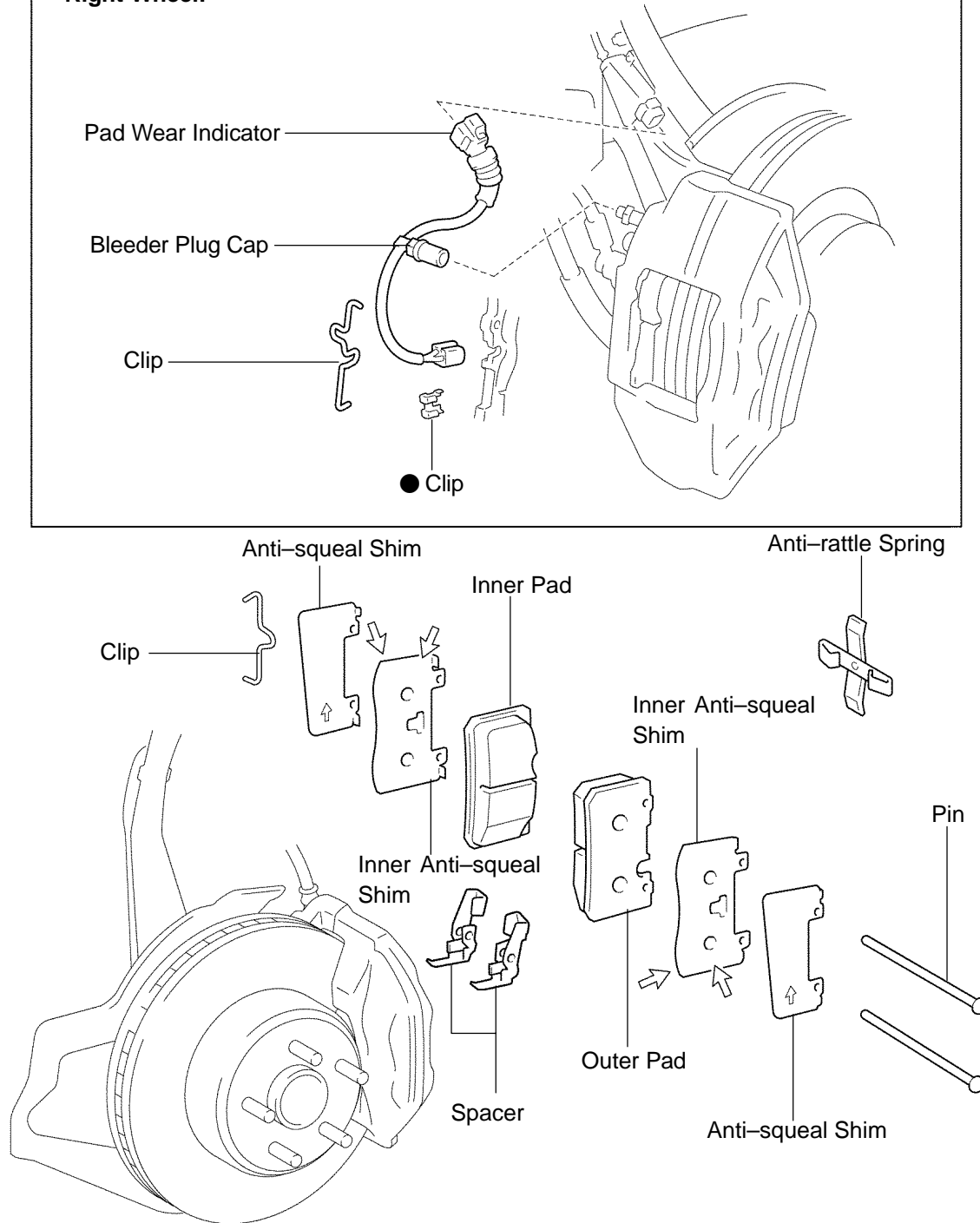
(See page [BR-6](#))

7. DO OPERATIONAL CHECK (See page [BR-18](#))

FRONT BRAKE PAD COMPONENTS

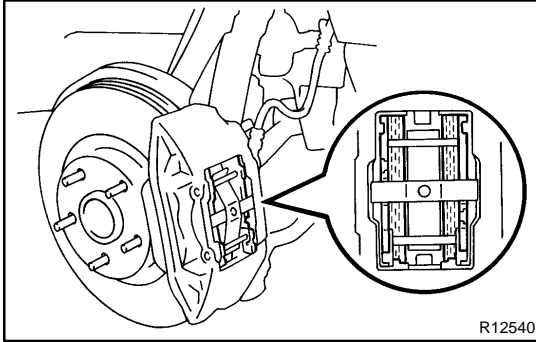
BROCE-01

Right Wheel:



⇒ Disc brake grease

F01605

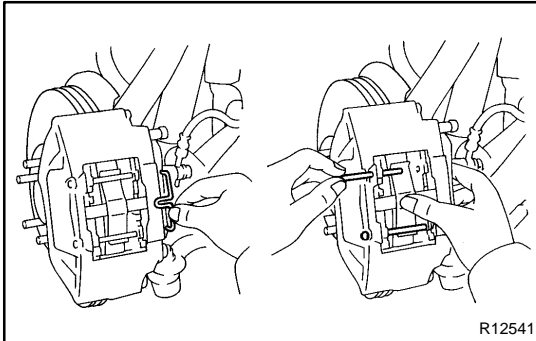


REPLACEMENT

1. REMOVE FRONT WHEEL
2. INSPECT PAD LINING THICKNESS

Check the pad thickness and replace pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. REMOVE THESE PARTS:

- (a) Clip and 2 pins
- (b) Anti-rattle spring

NOTICE:

The anti-rattle springs, spacers and clips 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.

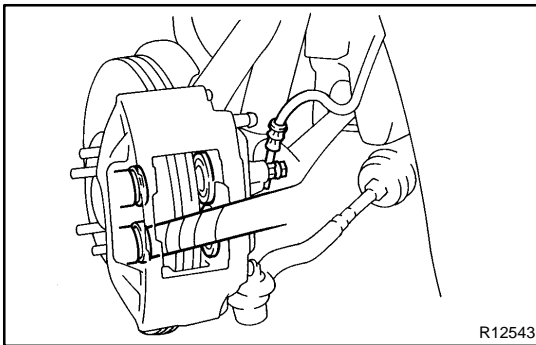
4. REMOVE PADS

- (a) Remove the 2 pads.
- (b) Right wheel:
Remove the clip and bleeder cap, disconnect the pad wear indicator from the inner pad.
- (c) Remove the spacer and 2 anti-squeal shims from each pad.

5. RIGHT WHEEL:

CHECK PAD WEAR INDICATOR (See page BR-28)

6. CHECK DISC THICKNESS AND RUNOUT
(See page BR-28)



7. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

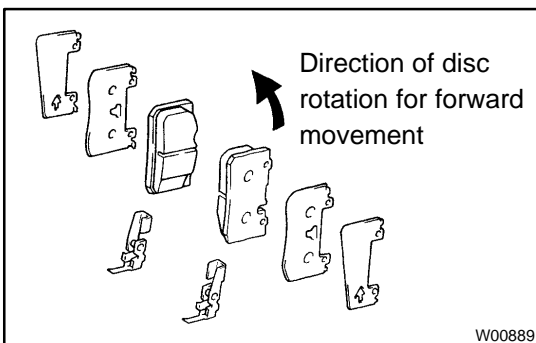
- (a) Draw out a small amount of brake fluid from the reservoir.
- (b) Press in the pistons with a monkey wrench handle or equivalent.

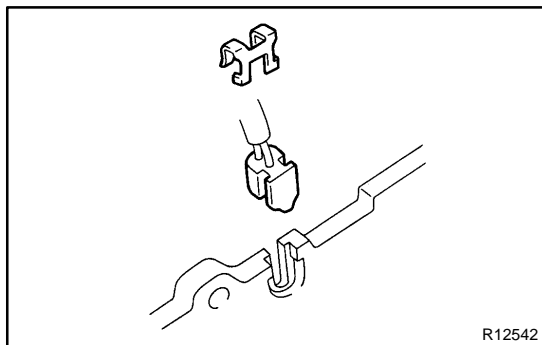
HINT:

- Tape the monkey wrench handle before use.
- If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.
- (c) Apply disc brake grease to both sides of the inner anti-squeal shims (See page BR-22).
- (d) Install the 2 anti-squeal shims and spacer on each pad.

HINT:

Make sure the shims and spacers are facing the front (rotation direction) as shown in the illustration.





- (e) Right wheel:
Connect the pad wear indicator to the inner pads, and install a new clip.

HINT:

Install the clip lock securely in the grooves of the pad.

- (f) Install the 2 pads with the spacer facing downward.

8. INSTALL ANTI-RATTLE SPRING AND 2 PINS

9. RIGHT WHEEL:

INSTALL CLIP

Install the pad wear indicator wire harness to the clip, then install the clip and bleeder cap to the caliper.

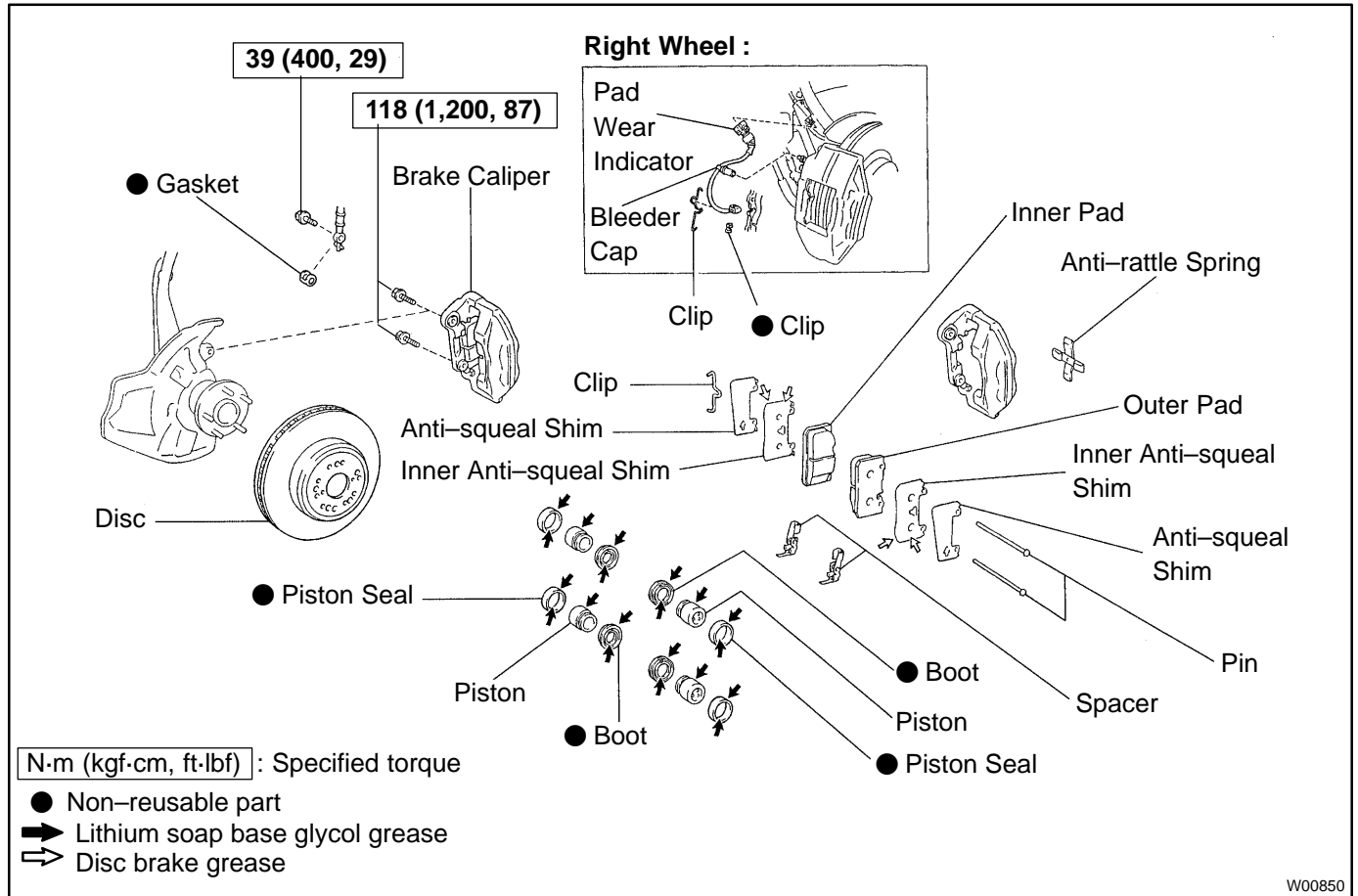
NOTICE:

Make sure the wire harness does not interfere with the caliper, etc.

10. INSTALL FRONT WHEEL

FRONT BRAKE CALIPER COMPONENTS

BR0CG-01



W00850

REMOVAL

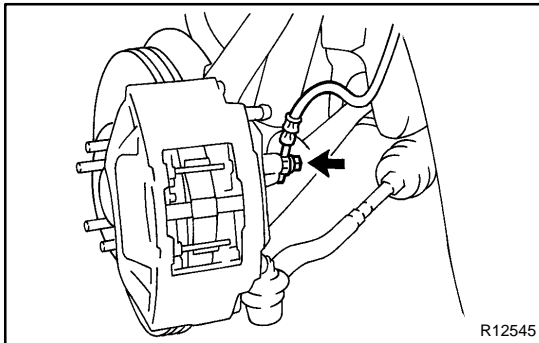
1. REMOVE FRONT WHEEL

2. REMOVE THESE PARTS:

- (a) Clip and 2 pins
- (b) Anti-rattle spring
- (c) 2 pads with anti-squeal shims and spacers

HINT:

Do not disconnect the pad wear indicator unless you are replacing the brake pads.



3. DISCONNECT BRAKE HOSE

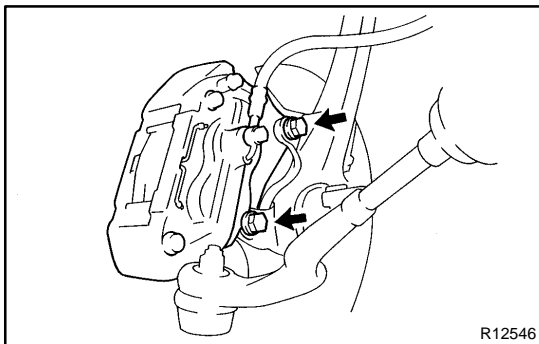
- (a) Remove the union bolt and gasket from the caliper, then disconnect the brake hose from the caliper.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:

At the time of installation, please refer to the following item. Install the flexible hose lock securely in the lock hole in the caliper.

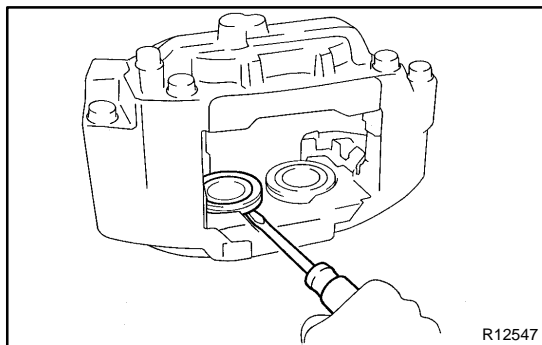
- (b) Use a container to catch the brake fluid as it drains out.



4. REMOVE CALIPER

Remove the 2 bolts and caliper from the knuckle.

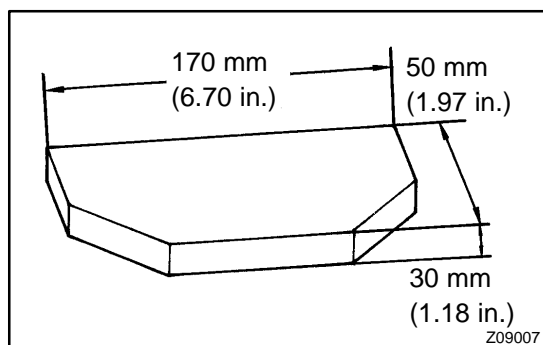
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)



DISASSEMBLY

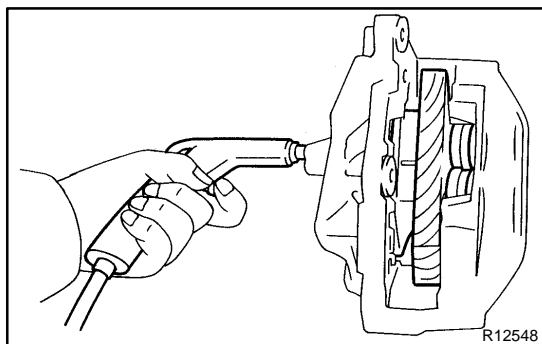
1. REMOVE CYLINDER BOOTS

Using a screwdriver, remove the cylinder boots from the cylinder.



2. REMOVE PISTONS

(a) Prepare a wooden plate to hold the pistons.

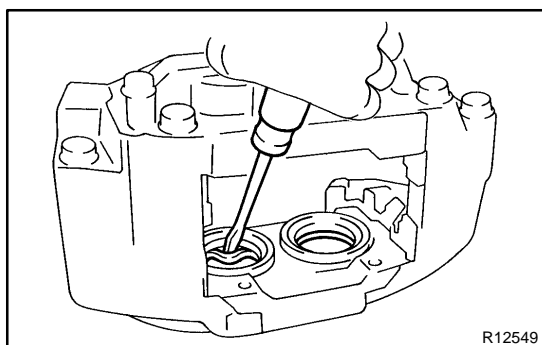


(b) Place the plate between the pistons and insert a pad on one side.

(c) Use compressed air to remove the pistons alternately from the cylinder.

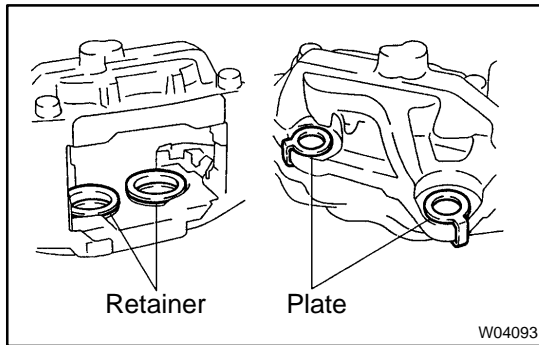
CAUTION:

Do not place your fingers in front of the pistons when using compressed air.



3. REMOVE PISTON SEALS

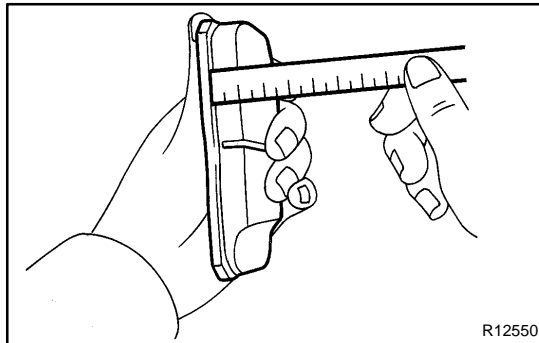
Using a screwdriver, remove the 4 piston seals from the cylinder.



INSPECTION

1. INSPECT 4 RETAINERS AND 2 PLATES

The retainers and plates are non-reusable part, replace the caliper if they are cracked or deformed, or if they come off.



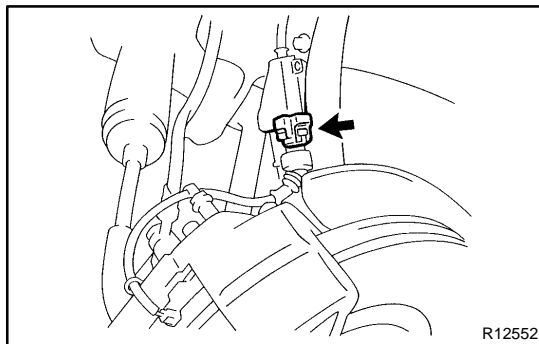
2. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 12.0 mm (0.472 in.)

Minimum thickness: 1.0 mm (0.039 in.)

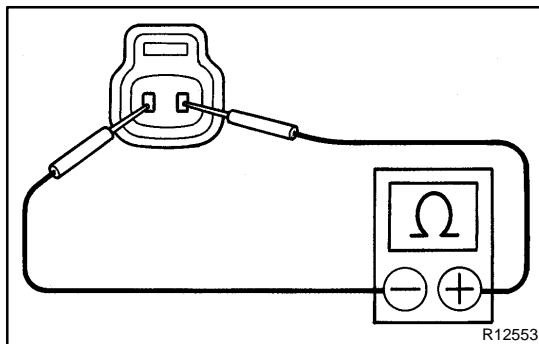
Replace the pad if the pad's thickness is at the minimum or less, or if the pad has severe, uneven wear.



3. RIGHT WHEEL:

INSPECT PAD WEAR INDICATOR

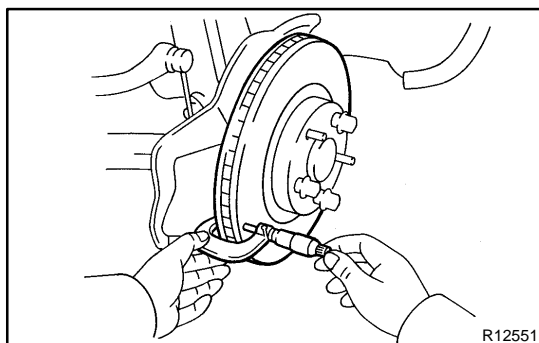
- (a) Disconnect the pad wear indicator connector from the speed sensor wire harness.



- (b) Check that continuity exists of pad wear indicator connector.

If no continuity exists, replace the pad wear indicator.

- (c) Connect the connector to the speed sensor wire harness until the clicking sound can be heard.



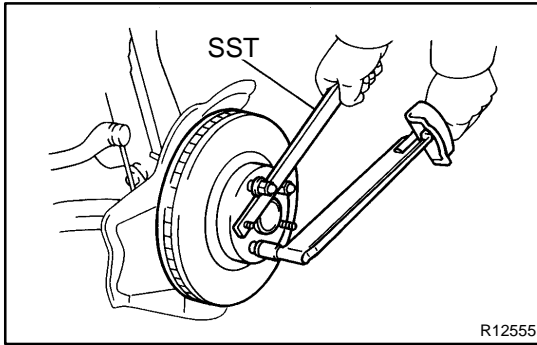
4. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 28.0 mm (1.102 in.)

Minimum thickness: 26.0 mm (1.024 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.



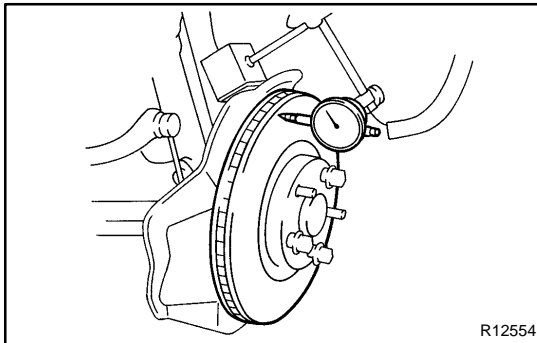
5. MEASURE DISC RUNOUT

- (a) Tighten the disc with the 3 hub nuts.

HINT:

Using SST 09330-00021 to hold the disc during measurement.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



- (b) Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the out side edge.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page [SA-13](#)). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On-Car" brake lathe.

6. IF NECESSARY, ADJUST DISC RUNOUT

- (a) Remove the 3 hub nuts, 2 screws and disc. Reinstall the disc 1/5 of a turn round from its original position on the hub. Install and torque the 3 hub nuts.

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

HINT:

Use SST 09330-00021 to hold the disc during loosening/torquing the hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

- (b) Repeat (a) until the disc has been installed on the 3 remaining hub position.
- (c) If the minimum runout recorded in (a) and (b) is less than 0.05 mm (0.0020 in.), install the disc in that position.
- (d) If the minimum runout recorded in (a) and (b) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 5.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-27](#)).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-25](#)).

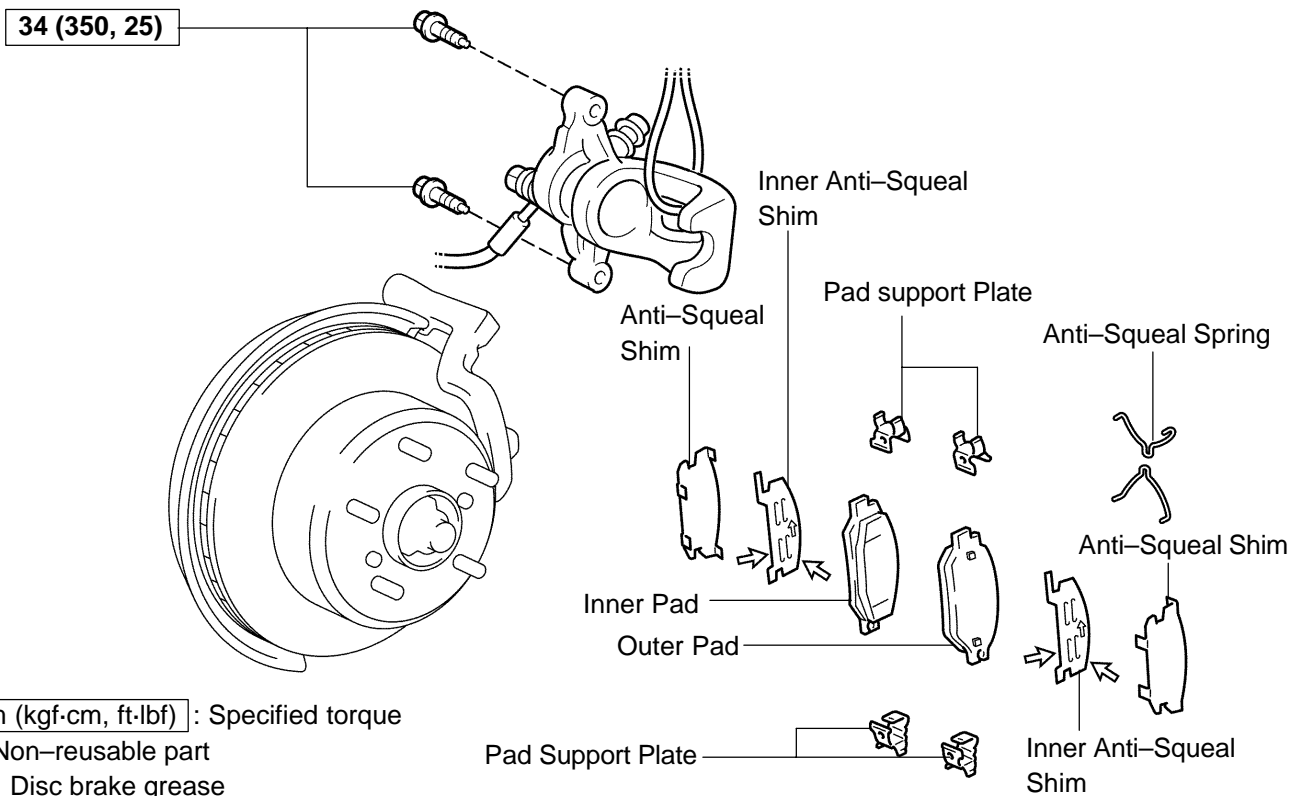
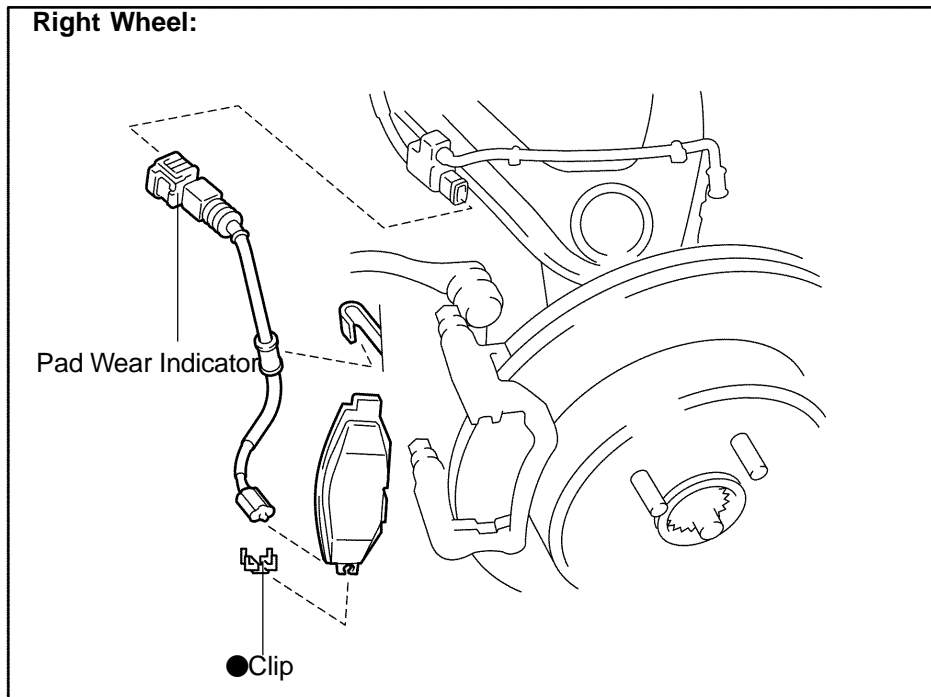
INSTALLATION

Installation is in the reverse order of removal (See page [BR-26](#)).

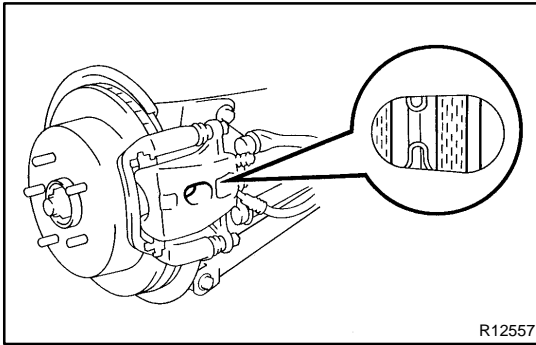
1. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))
2. CHECK FOR FLUID LEAKAGE

REAR BRAKE PAD COMPONENTS

BROC-01



F01606



REPLACEMENT

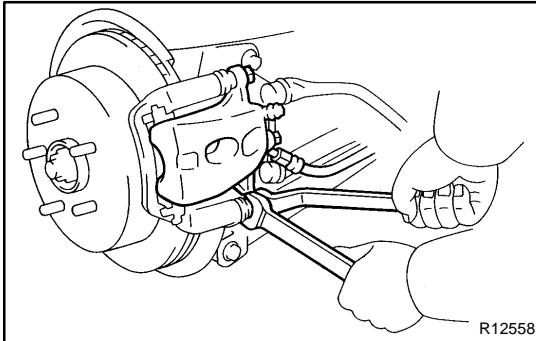
1. **REMOVE REAR WHEEL**
2. **INSPECT PAD LINING THICKNESS**

Check the pad thickness through the caliper inspection hole and replace pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)

3. **REMOVE CALIPER**

(a) Hold the sliding pin and loosen the installation bolt.



(b) Remove the 2 installation bolts.

(c) Remove the caliper and suspend it securely.

HINT:

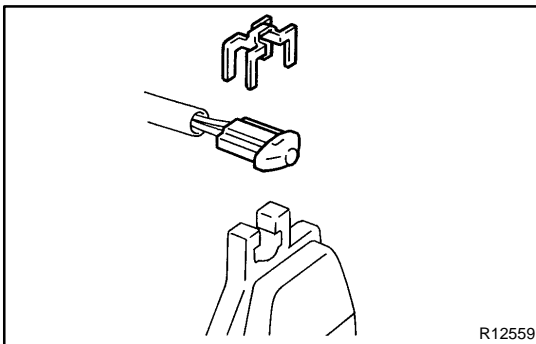
Do not disconnect the flexible hose from the caliper.

4. **REMOVE PADS**

(a) Remove the 2 anti-squeal springs.

(b) Remove the 2 pads.

(c) Remove the 4 anti-squeal shims.



(d) Right wheel:

Remove the clip, and disconnect the pad wear indicator from the inner pad.

(e) Remove the 4 pad support plates.

NOTICE:

The anti-squeal springs and support plates 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.

5. **RIGHT WHEEL:**

CHECK PAD WEAR INDICATOR (See page [BR-38](#))

6. **CHECK DISC THICKNESS AND RUNOUT**
(See page [BR-38](#))

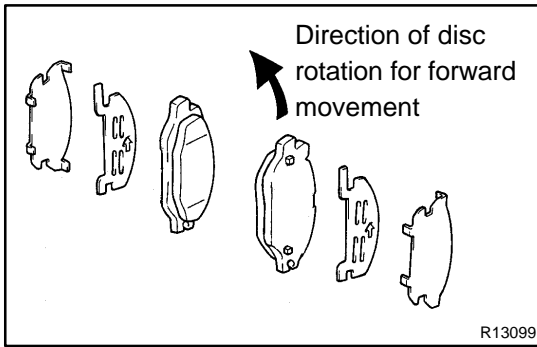
7. **INSTALL 4 PAD SUPPORT PLATES**

8. **INSTALL NEW PADS**

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

(a) Apply disc brake grease to both sides of the inner anti-squeal shims (See page [BR-32](#)).



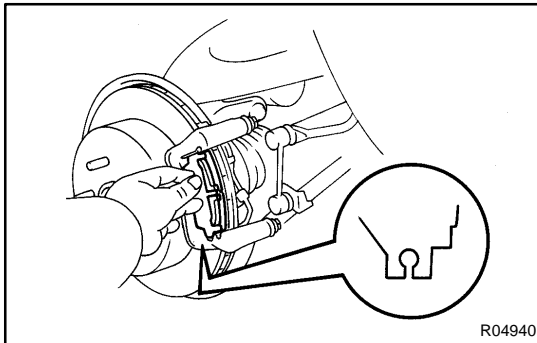
- (b) Install the 2 anti-squeal shims to each pad.

HINT:

Make sure the inner anti-squeal shims are facing the front (rotation direction) as shown in the illustration.

- (c) Right wheel:

Connect the pad wear indicator to the inner pad, and install a new clip. Then install the inner pad with the pad wear indicator facing downward.

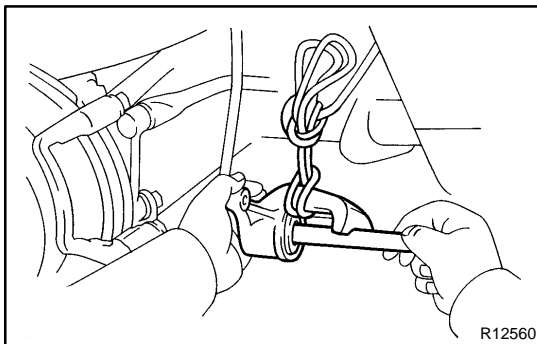


- (d) Install the other pads, as shown in the illustration.

NOTICE:

There should be no oil or grease adhering to the friction surfaces of the pads or disc.

- (e) Install the 2 anti-squeal springs.



9. INSTALL CALIPER

- (a) Draw out a small amount of brake fluid from the reservoir.
 (b) Press in the piston with a hammer handle or similar implement.

HINT:

If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

- (c) Temporarily install the caliper on the torque plate with the 2 installation bolts.
 (d) Hold the sliding pin and torque the 2 installation bolts.

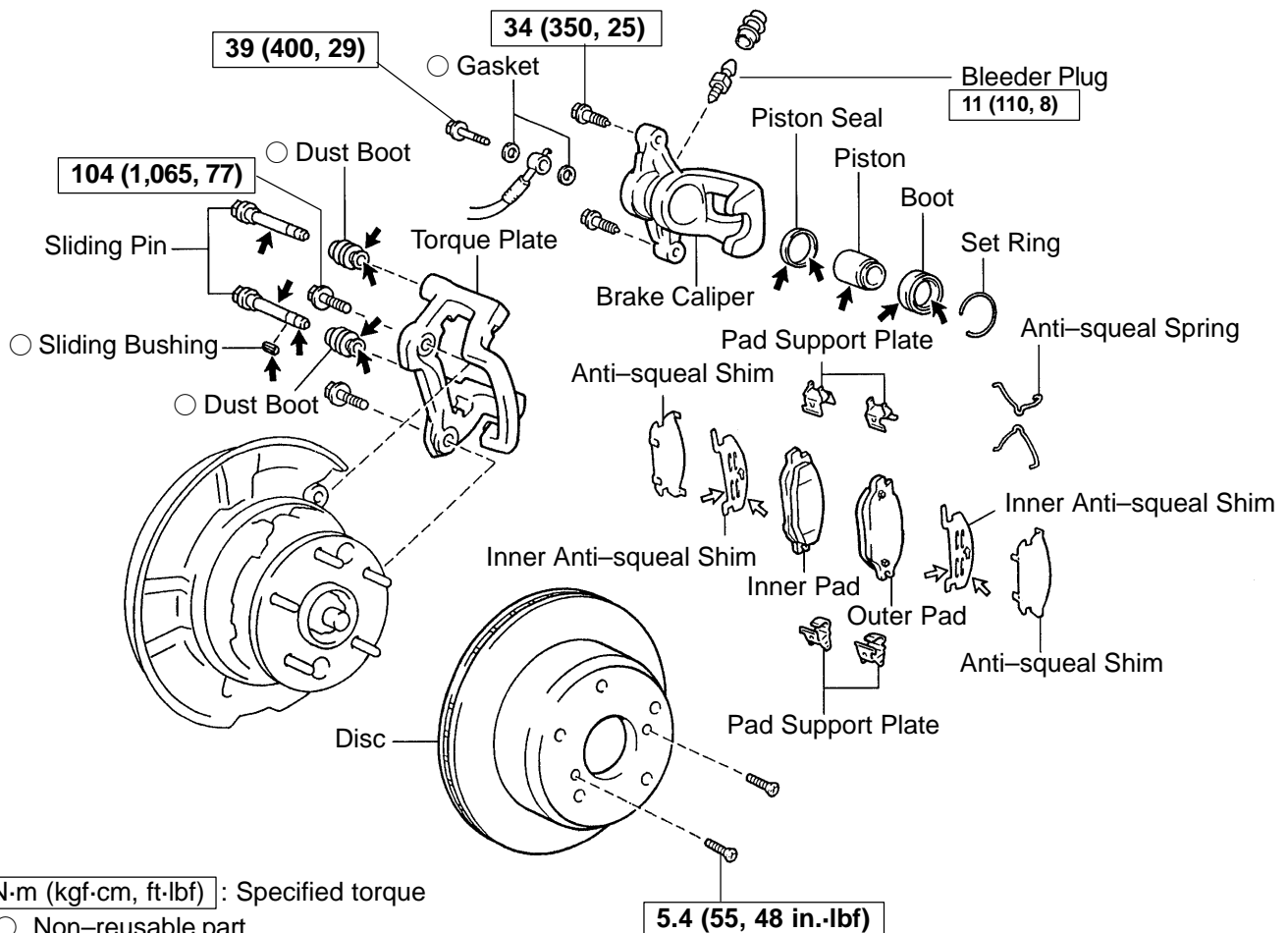
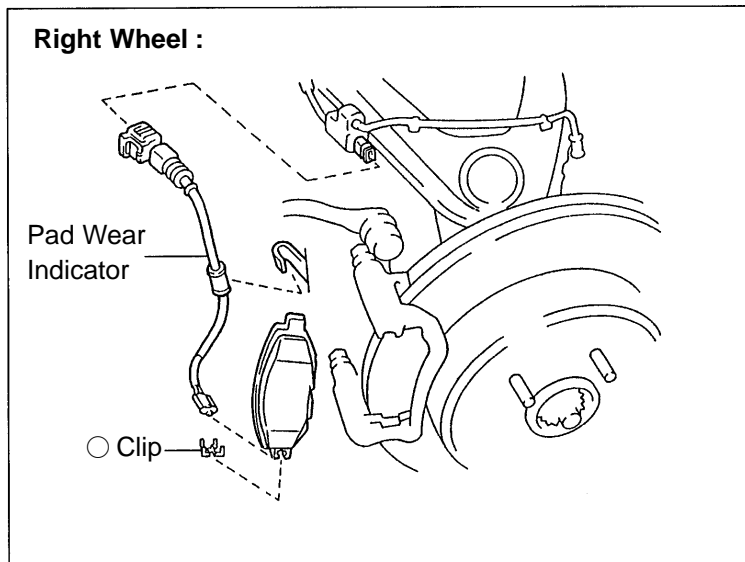
Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)

10. INSTALL REAR WHEEL

11. CHECK THAT FLUID LEVEL IS AT MAX LINE

REAR BRAKE CALIPER COMPONENTS

BR0CO-01



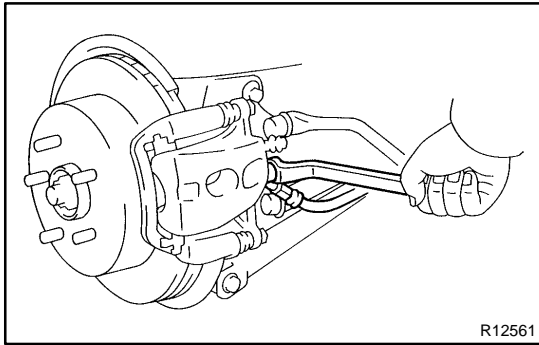
N·m (kgf·cm, ft·lbf) : Specified torque

○ Non-reusable part

➡ Lithium soap base glycol grease

➡ Disc brake grease

W04095



REMOVAL

1. DISCONNECT FLEXIBLE HOSE

- (a) Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper.

Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

- (b) Use a container to catch the brake fluid as it drains out.

2. REMOVE CALIPER

- (a) Hold the sliding pin and loosen the 2 installation bolts.

- (b) Remove the 2 installation bolts.

Torque: 104 N·m (1,065 kgf-cm, 77 ft-lbf)

- (c) Remove the caliper from the torque plate.

3. REMOVE 2 PADS (See page BR-33)

- (a) Remove the 2 anti-squeal springs.

- (b) Remove the 2 pads with anti-squeal shims.

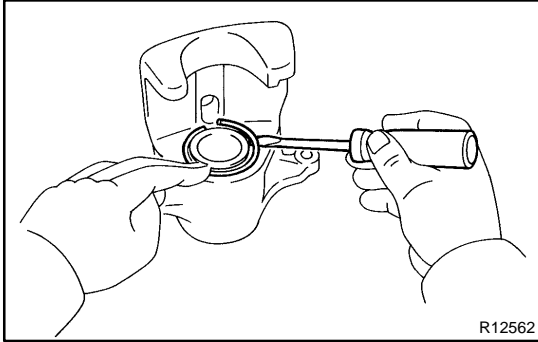
- (c) Right wheel:

Remove the clip, and disconnect the pad wear indicator from the inner pad.

- (d) Remove the 4 pad support plates.

HINT:

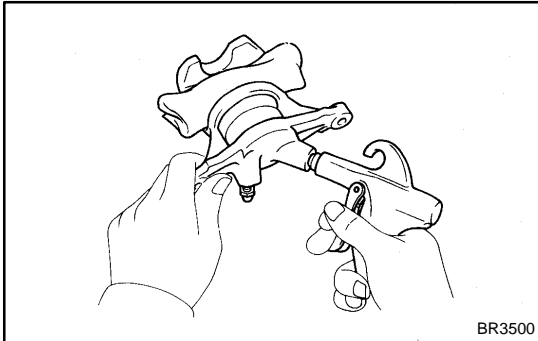
Do not disconnect the pad wear indicators unless you are replacing the brake pads.



DISASSEMBLY

1. REMOVE CYLINDER BOOT SET RING AND BOOT

Using a screwdriver, remove the cylinder boot set ring and cylinder boot from the cylinder.



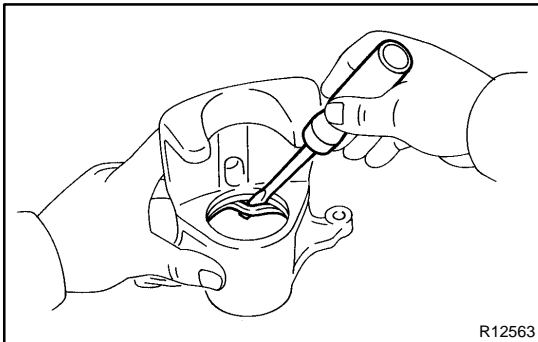
2. REMOVE PISTON

- Place a piece of cloth or similar article between the piston and caliper.
- Use compressed air to remove the piston from the cylinder.

CAUTION:

At the time of disassembly, please refer to the following item.

Do not place your fingers in front of the piston when using compressed air.



3. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.

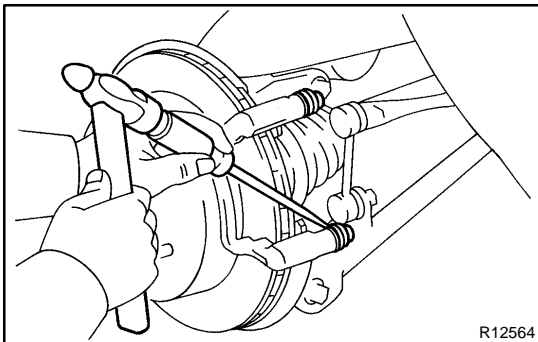
4. REMOVE SLIDING PINS AND DUST BOOTS

- Remove the 2 sliding pins from the torque plate.

NOTICE:

At the time of resassembly, please refer to the following item.

Insert the sliding pin with the sliding bushing into the bottom side.



- Using a screwdriver and hammer, tap out the 2 dust boots.

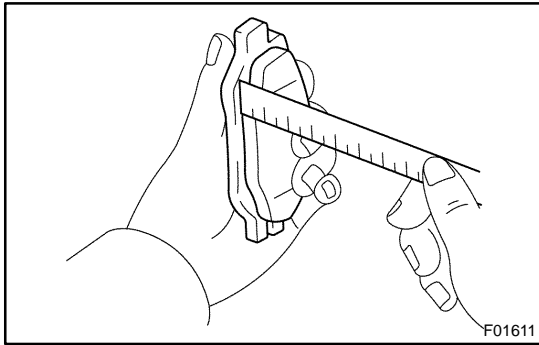
HINT:

At the time of installation, use a 21 mm socket and tap in 2 new dust boots into the torque plate.

NOTICE:

At the time of resassembly, please refer to the following item.

Confirm that the metal plate portion of the dust boot fits correctly in the torque plate.



INSPECTION

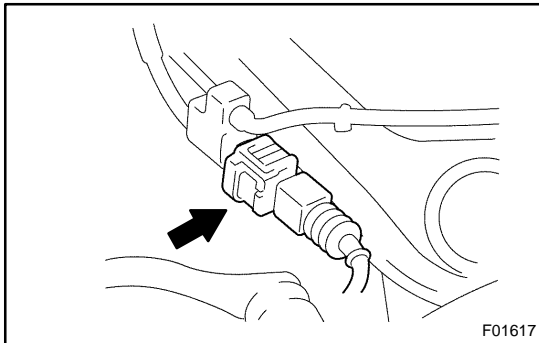
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 10.0 mm (0.394 in.)

Minimum thickness: 1.0 mm (0.039 in.)

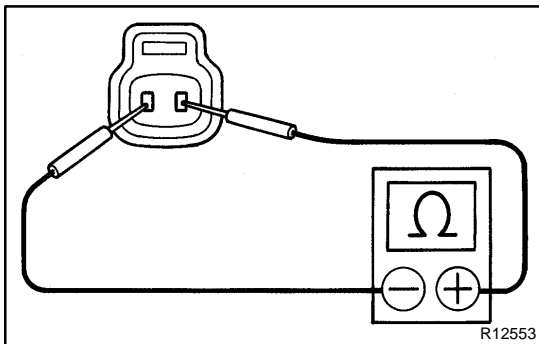
Replace the pad if the pad's thickness is at the minimum or less, or if the pad has severe, uneven wear.



2. RIGHT WHEEL:

INSPECT BRAKE PAD WEAR INDICATOR

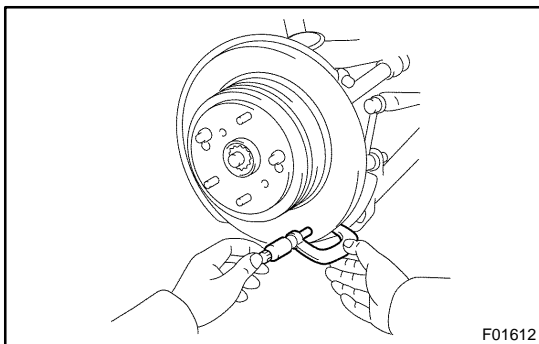
- (a) Disconnect the pad wear indicator connector from the speed sensor wire harness.



- (b) Check that continuity exists of pad wear indicator connector.

If no continuity exists, replace the pad wear indicator.

- (c) Connect the connector to the speed sensor wire harness until the clicking sound can be heard.



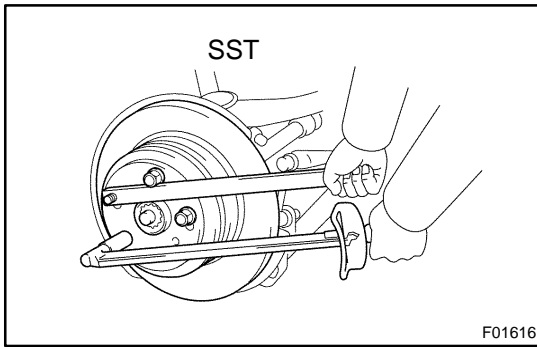
3. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 16.0 mm (0.630 in.)

Minimum thickness: 15.0 mm (0.591 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.



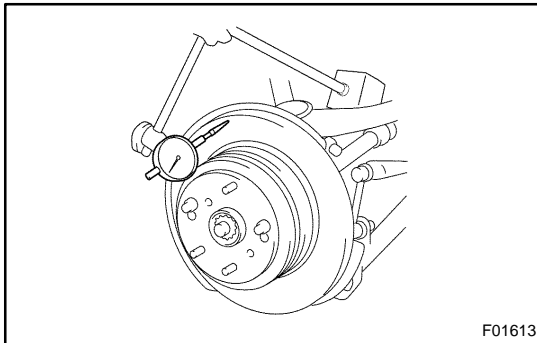
4. MEASURE DISC RUNOUT

- (a) Tighten the disc with the 3 hub nuts.

HINT:

Using SST 09330-00021 to hold the disc during measurement.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



- (b) Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the outside edge.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is at the maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page SA-54). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grid it on a "On-Car" brake lathe.

5. IF NECESSARY, ADJUST DISC

- (a) Remove the 2 bolts and torque plate.

- (b) Remove the 3 hub nuts, 2 screws and disc. Reinstall the disc 1/5 of a turn round from its original position on the hub. Install and torque the 3 hub nuts and 2 screws.

HINT:

Use SST 09330-00021 to hold the disc during loosening/torquing the hub nuts.

Torque:

Hub nut 103 N·m (1,050 kgf·cm, 76 ft·lbf)

Screw 5.4 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.
- (d) Repeat (b) until the disc has been installed on the 3 remaining hub positions.
- If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.
 - If the minimum runout recorded in (b) and (c) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 4.
- (e) Install the 2 bolts and torque plate.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-37](#)).

NOTICE:

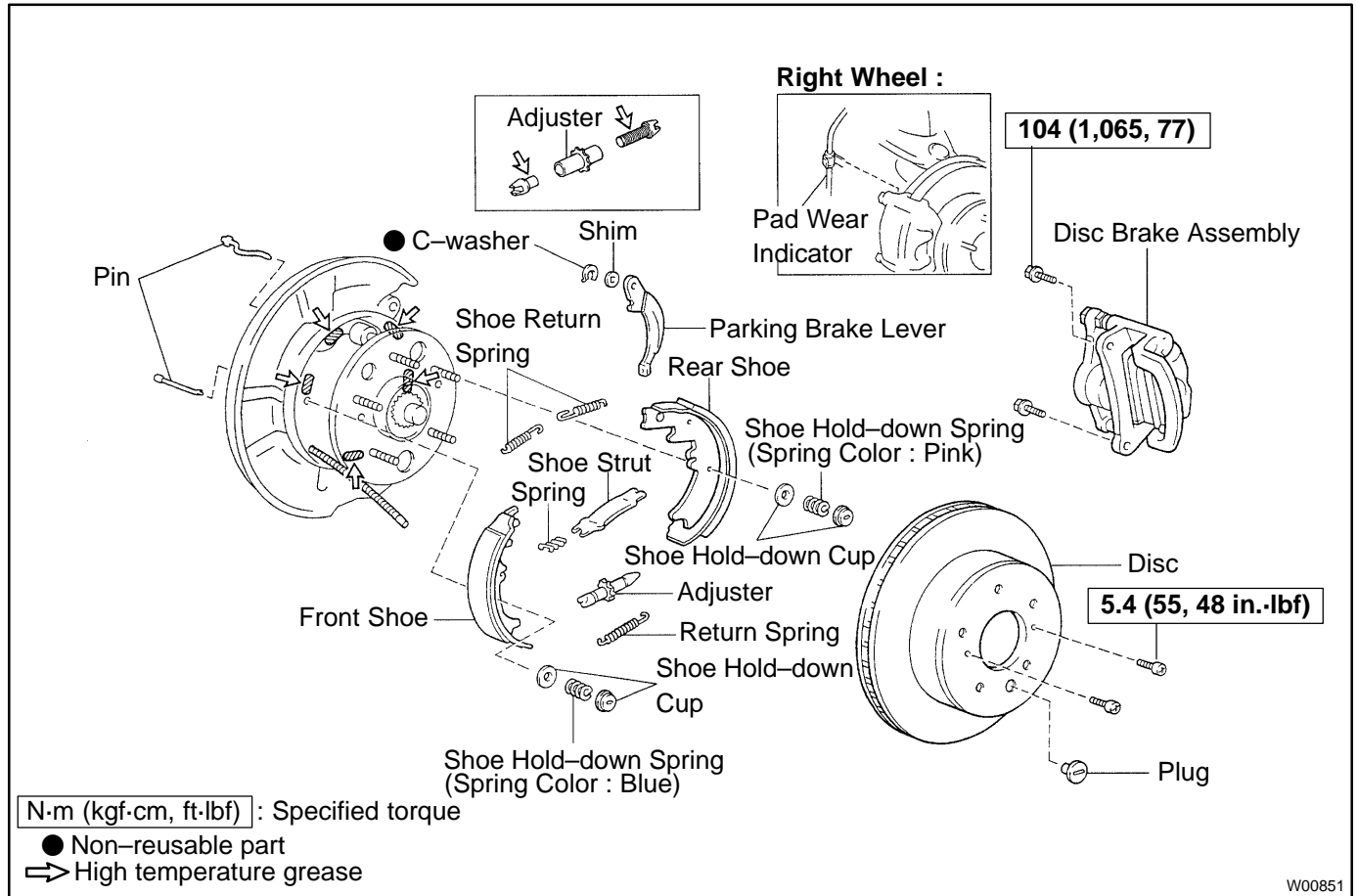
Apply lithium soap base glycol gerase to the parts indicated by the arrows (See page [BR-35](#)).

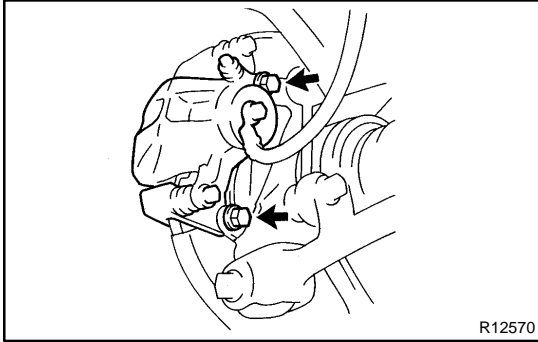
INSTALLATION

Installation is in the reverse order of removal (See page [BR-36](#)).

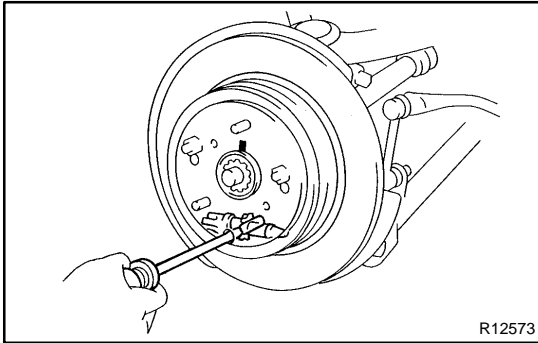
1. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))
2. CHECK FOR FLUID LEAKAGE

PARKING BRAKE COMPONENTS

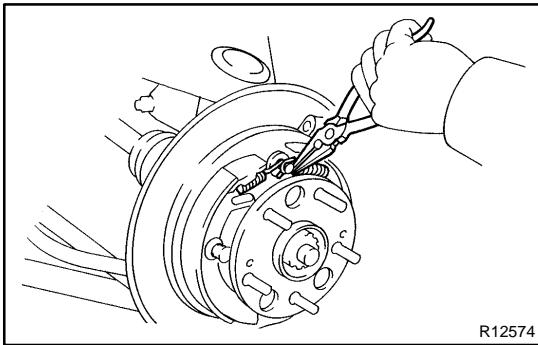




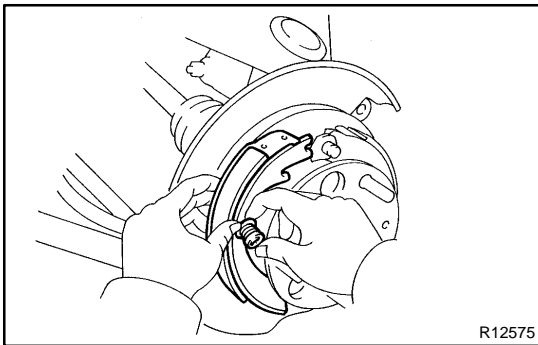
R12570



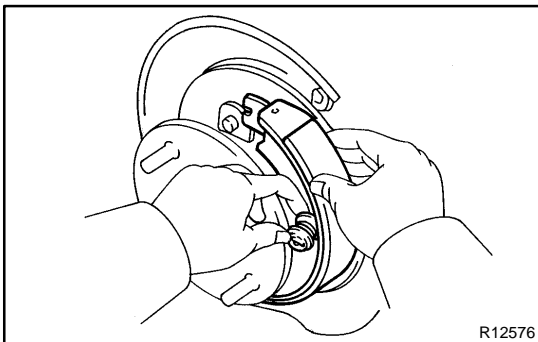
R12573



R12574



R12575



R12576

DISASSEMBLY

1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE ASSEMBLY

- (a) Right wheel:
Disconnect the pad wear indicator wire harness from the clamp.
- (b) Remove the 2 mounting bolts and disc brake assembly.
Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)
- (c) Suspend the disc brake securely. Make sure the hose is not stretched.

3. REMOVE DISC

- (a) Place matchmarks on the disc and rear axle hub.
- (b) Remove the 2 screws and disc.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

If the disc cannot be removed easily, return the shoe adjuster until the wheel turns freely.

4. REMOVE SHOE RETURN SPRINGS

Using needle-nose pliers, remove the 2 shoe return springs.

5. REMOVE SHOE STRUT WITH SPRING

6. REMOVE FRONT SHOE, ADJUSTER AND TENSION SPRING

- (a) Slide out the front shoe and remove the shoe adjuster.
- (b) Disconnect the tension spring and remove the front shoe.

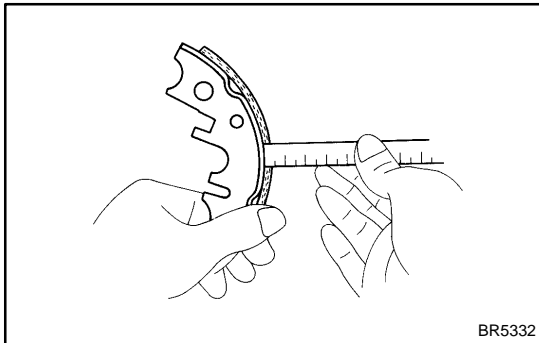
7. REMOVE REAR SHOE

- (a) Slide out the rear shoe.
- (b) Remove the tension spring from the rear shoe.
- (c) Disconnect the parking brake cable from the parking brake shoe lever.
- (d) Remove the shoe hold-down spring cups, springs and pins.

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



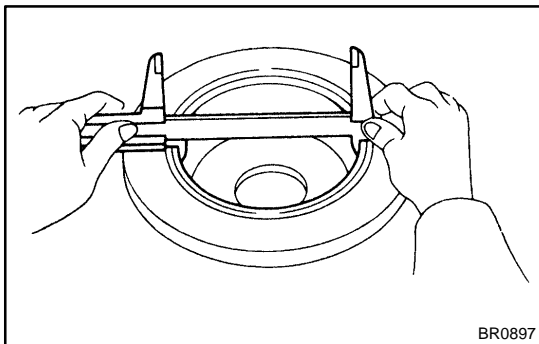
2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness: 2.5 mm (0.098 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum or less, or if there is severe, uneven wear, replace the brake shoe.



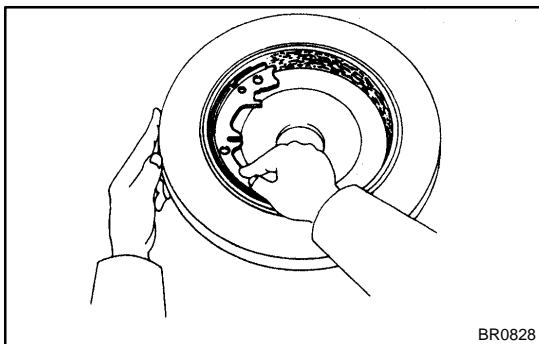
3. MEASURE DISC INSIDE DIAMETER

Using a vernier calipers, measure the inside diameter of the disc.

Standard inside diameter: 190 mm (7.48 in.)

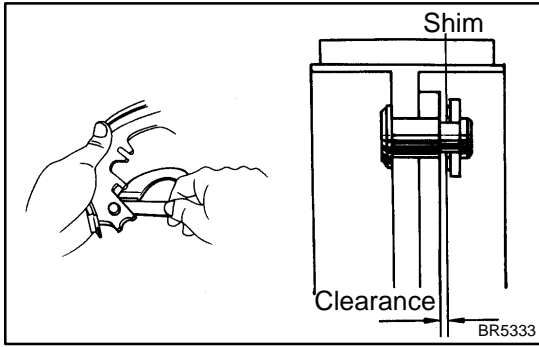
Maximum inside diameter: 191 mm (7.52 in.)

Replace the disc if the inside diameter is at the maximum value or more. Replace the disc or grind it with a lathe if the disc is scored or worn unevenly.



4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and the brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.



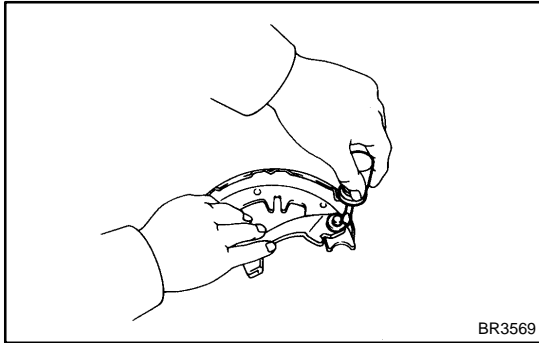
5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

Standard clearance: Less than 0.35 mm (0.0138 in.)

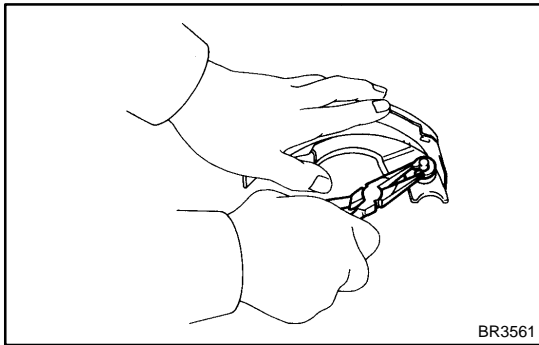
If the clearance is not within the specification, replace the shim with one of the correct size.

Thickness	mm (in.)	Thickness	mm (in.)
0.3	(0.012)	0.9	(0.035)
0.6	(0.024)	—	



6. IF NECESSARY, REPLACE SHIM

- Using a screwdriver, remove the C-washer.
- Remove the parking brake shoe lever, and install the correct size shim.



- Install the parking brake shoe lever with a new C-washer.
- Remeasure the clearance.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-43](#)).

NOTICE:

Apply high temperature grease to the parts indicated by the arrows (See page [BR-42](#)).

1. ADJUST PARKING BRAKE SHOE CLEARANCE

- (a) Temporarily install the hub nuts.
- (b) Install the 2 screws.

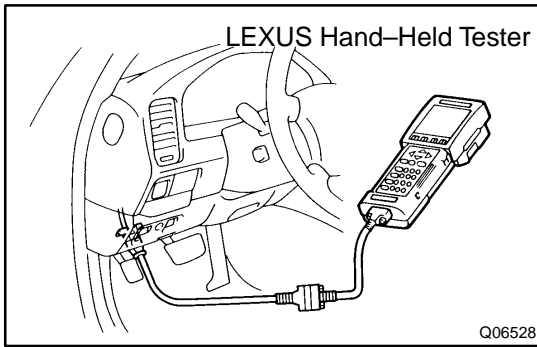
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Remove the hole plug.
- (d) Turn the adjuster and expand the shoes until the disc locks.
- (e) Return the adjuster 8 notches.
- (f) Install the hole plug.

2. SETTLING PARKING BRAKE SHOES AND DISC

- (a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.
- (b) Depress the parking brake pedal with a force of 147 N (15 kgf, 33 lbf).
- (c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.
- (d) Repeat this procedure 2 or 3 times.

3. CHECK AND ADJUST PARKING BRAKE PEDAL TRAVEL (See page [BR-8](#))



BRAKE ACTUATOR ON-VEHICLE INSPECTION

BR0EA-01

1. CONNECT THE LEXUS HAND-HELD TESTER

- Connect the LEXUS hand-held tester to the DLC3.
- Start the engine and run it at idle.
- Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- Please refer to the LEXUS hand-held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- With the motor relay ON, check the actuator motor operation noise.
- Turn the motor relay OFF.
- Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
- With the motor relay ON, check that the pedal does not pulsate.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

- Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn ON the solenoid which is not described below.

- With the brake pedal depressed, perform the following operations.
- Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

- Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.
- Turn the motor relay ON, and check that the pedal returns.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

- Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

As in the same procedure, check the solenoids of other wheels.

HINT:

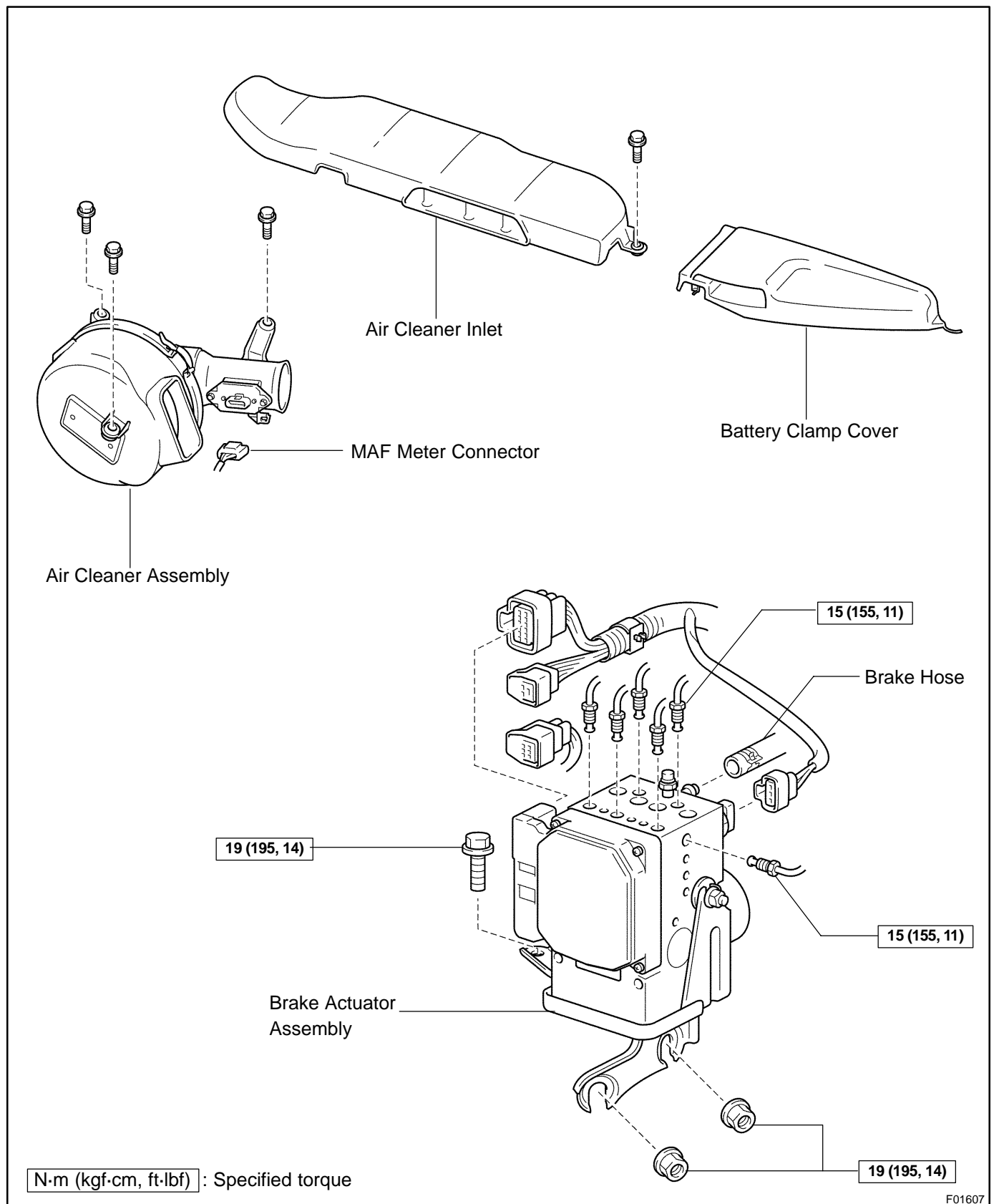
Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

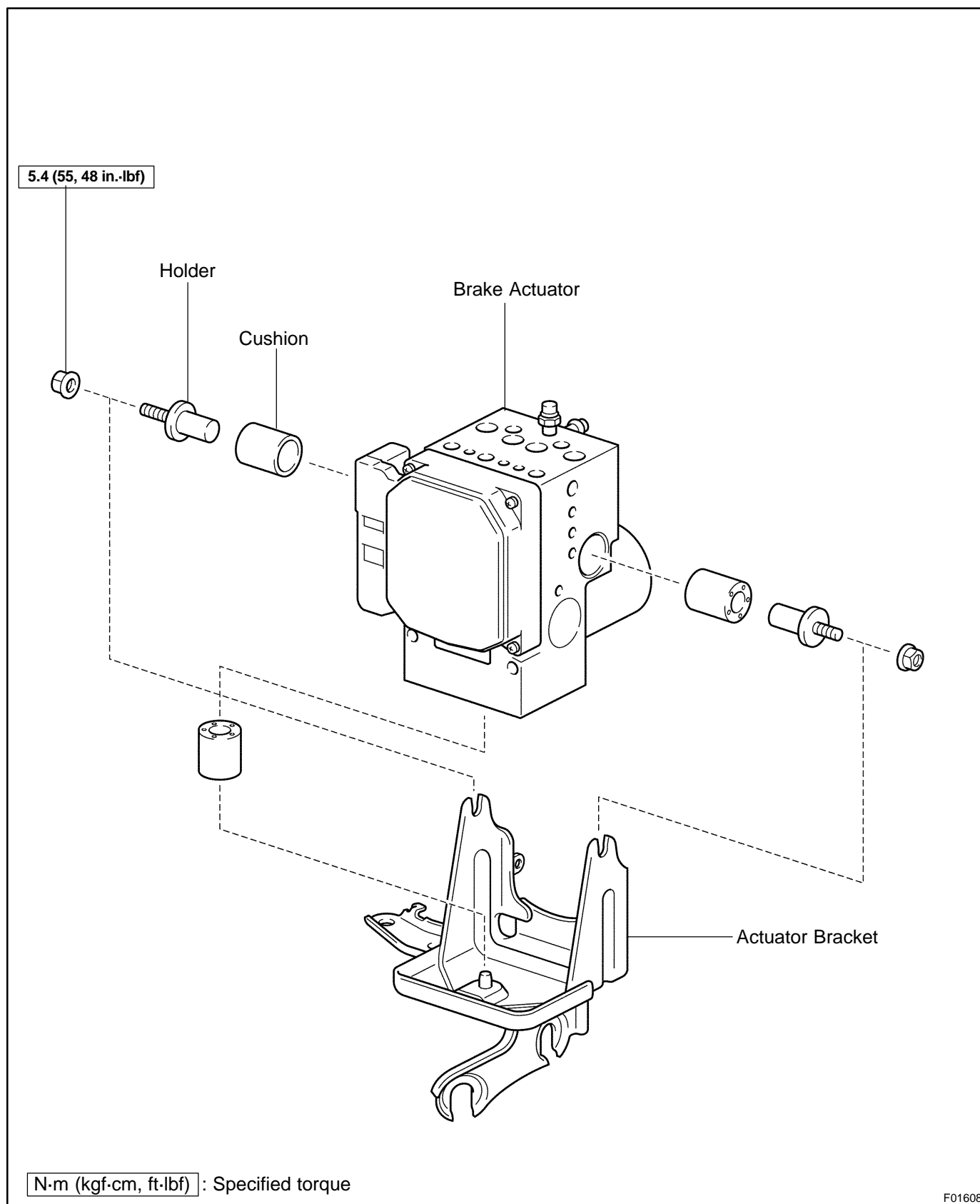
Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page [DI-307](#))

COMPONENTS



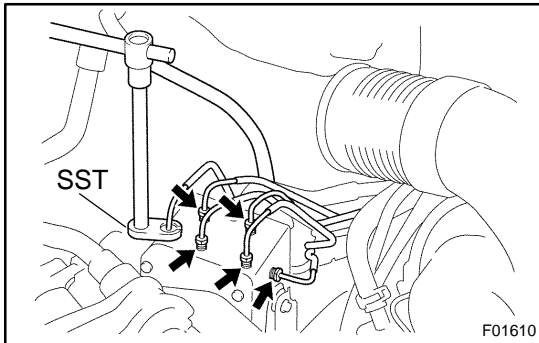
F01607



REMOVAL

1. REMOVE AIR CLEANER ASSEMBLY AND AIR CLEANER INLET

- Remove the battery clamp cover, bolt and air cleaner inlet.
- Disconnect the MAF meter connector.
- Remove the 3 bolts and loosen the hose clamp, pull out the air cleaner assembly with the cleaner hose.

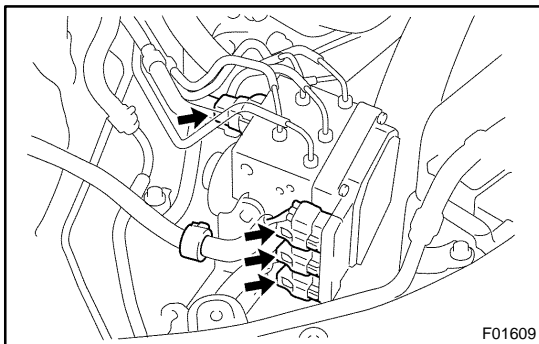


2. DISCONNECT BRAKE LINE

Using SST, disconnect the 6 brake lines from the brake actuator.

SST 09023-00100

Torque: 15 N·m (155 kgf-cm, 11 ft-lbf)



3. REMOVE BRAKE ACTUATOR ASSEMBLY

- Disconnect the 2 connectors from the brake actuator.
- Remove the bolt, 2 nuts and brake actuator assembly.

Torque: 19 N·m (195 kgf-cm, 14 ft-lbf)

4. REMOVE BRAKE ACTUATOR

- Remove the 2 nuts and actuator from the actuator bracket.

Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

- Remove the 2 cushion bolts and 3 cushions from the brake actuator.

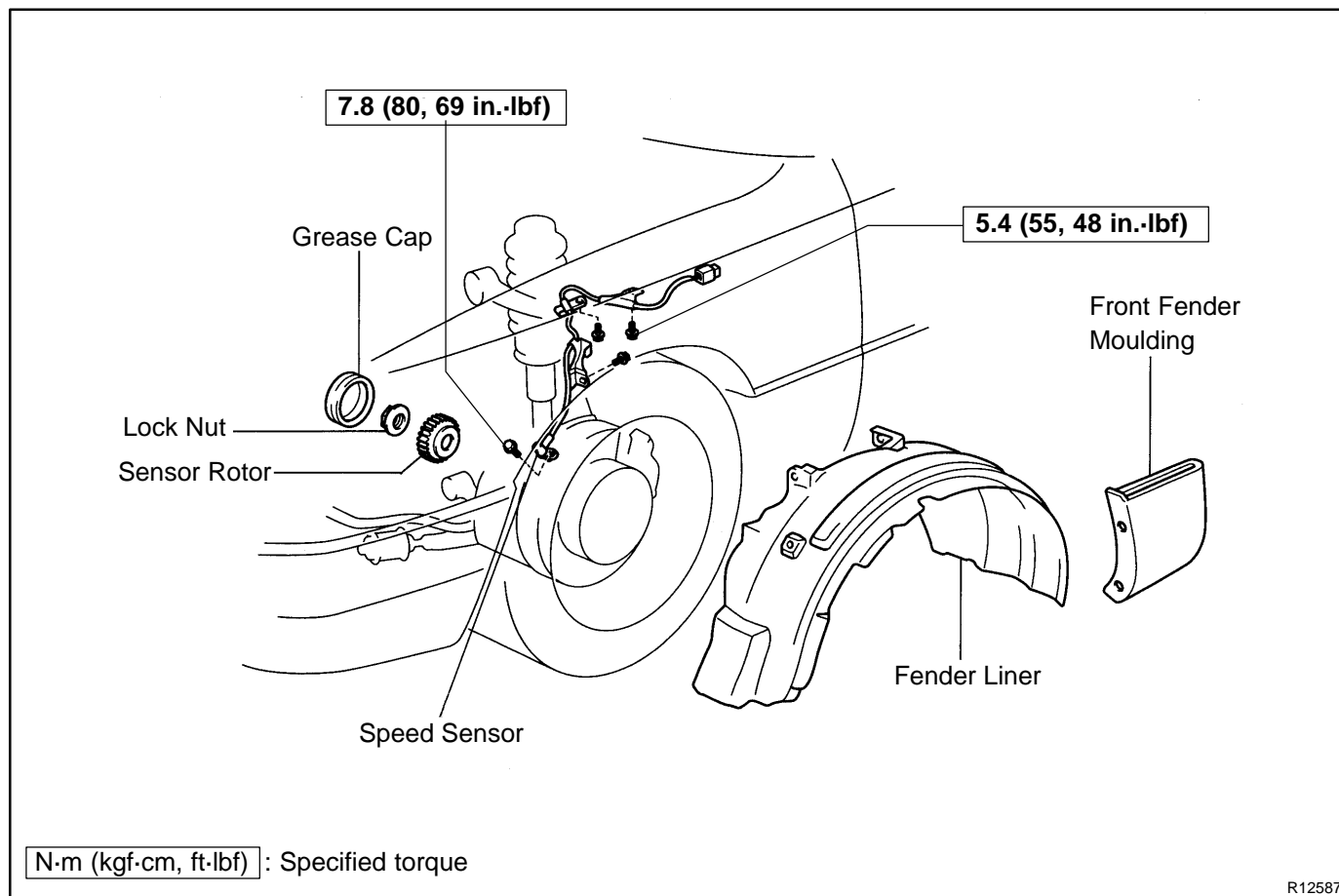
INSTALLATION

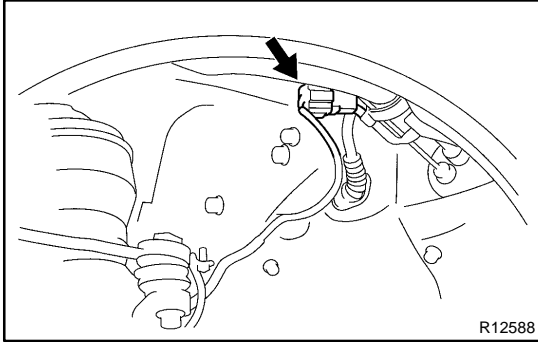
Installation is in the reverse order of removal (See page [BR-50](#)).

1. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))
2. CHECK FOR FLUID LEAKAGE

FRONT SPEED SENSOR COMPONENTS

BR02-01

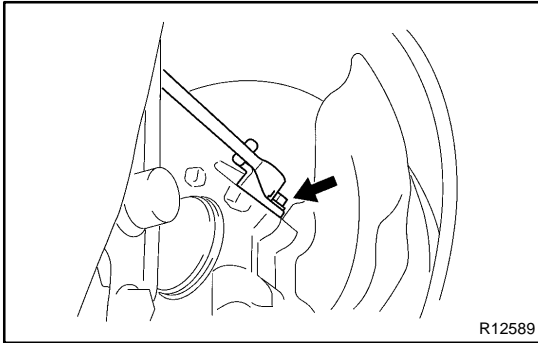




REMOVAL

1. DISCONNECT CONNECTOR

- Remove the front fender moulding and fender liner.
- Disconnect the speed sensor connector.



2. REMOVE SPEED SENSOR

- Remove the 3 clamp bolts holding the sensor harness to the body and steering knuckle.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

- Right wheel:
Disconnect the pad wear indicator connector from the speed sensor wire harness.
- Remove the speed sensor from the steering knuckle.

Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

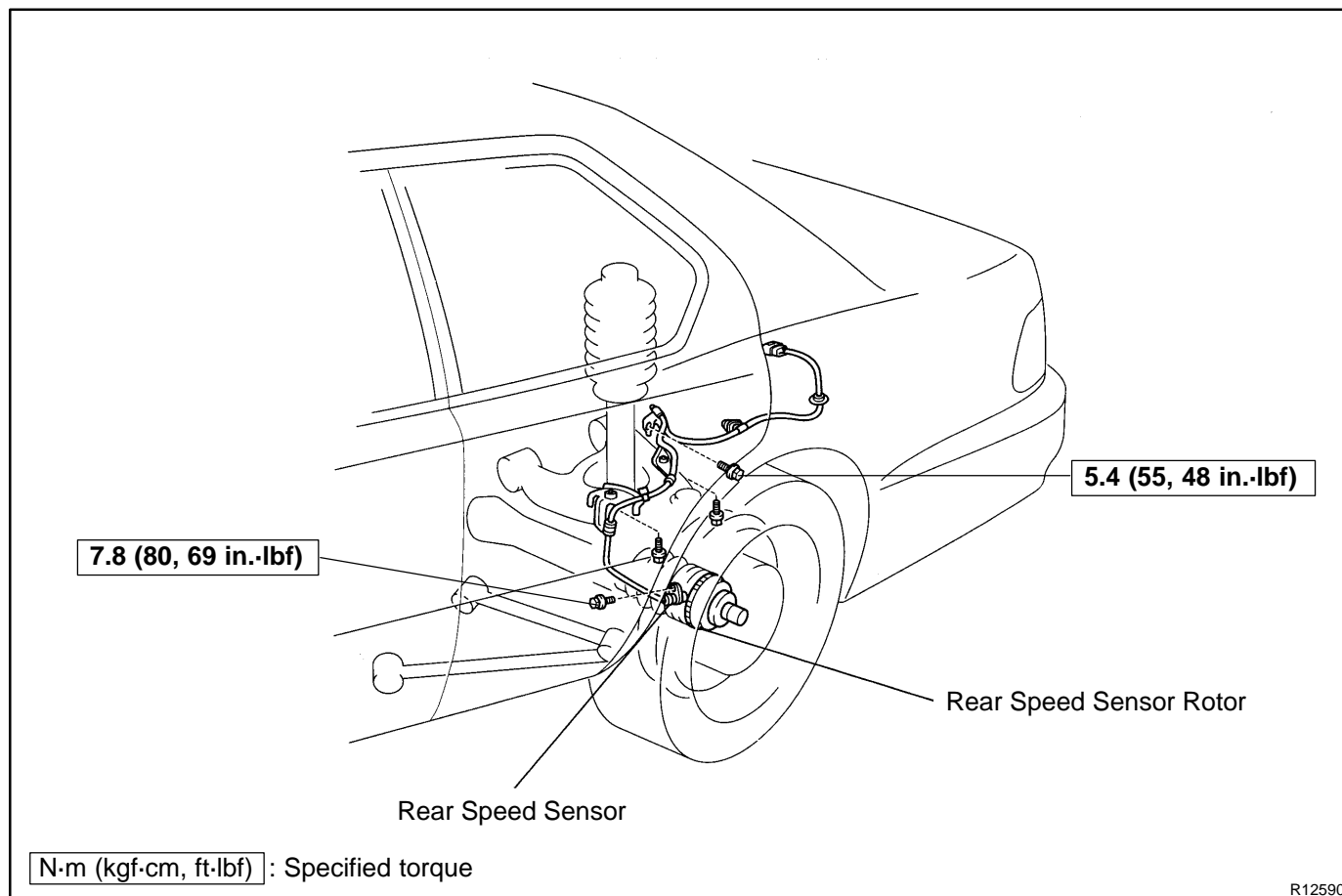
INSTALLATION

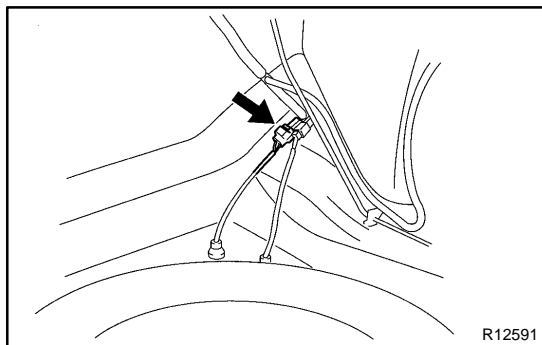
Installation is in the reverse order of removal (See page [BR-53](#)).

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page [DI-307](#))

REAR SPEED SENSOR COMPONENTS

BR05-01



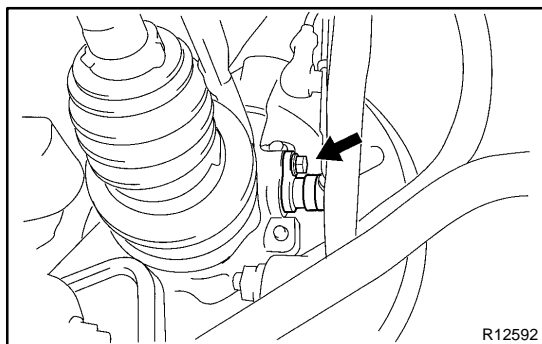


R12591

REMOVAL

1. DISCONNECT SPEED SENSOR CONNECTOR

- (a) Remove the trim front cover of the luggage compartment.
- (b) Disconnect the speed sensor connector, and pull out the sensor wire harness with the grommet.



R12592

2. REMOVE SPEED SENSOR

- (a) Remove the 3 clamp bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
- (b) Remove the 4 clamps from the upper arm and body.
- (c) Right wheel:
Disconnect the pad wear indicator connector from the speed sensor.
- (d) Remove the speed sensor from the axle carrier.
Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [BR-56](#)).

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page [DI-307](#))

STEERING SYSTEM

SR0BE-02

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 LEXUS LS400 is equipped with 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

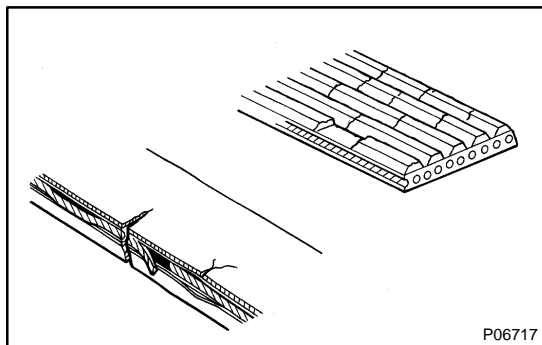
SR0BF-02

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	6. Tires (Improperly inflated) 7. Power steering fluid level (Low) 8. Drive belt (Loose) 9. Front wheel alignment (Incorrect) 10. Steering system joints (Worn) 11. Suspension arm ball joints (Worn) 12. Steering column (Binding) 13. Power steering gear 14. PPS system	SA-3 SR-5 – SA-5 – SA-38 SA-47 – SR-40 SR-61
Poor return	1. Tires (Improperly inflated) 2. Front wheel alignment (Incorrect) 3. Steering column (Binding) 4. Power steering gear	SA-3 SA-5 – SR-40
Excessive play	1. Steering system joints (Worn) 2. Suspension arm ball joints (Worn) 3. Intermediate shaft, Universal joint, Sliding yoke (Worn) 4. Front wheel bearing (Worn) 5. Power steering gear 6. PPS system	– SA-38 SA-47 – SA-13 SR-40 SR-61
Abnormal noise	1. Power steering fluid level (Low) 2. Steering system joints (Worn) 3. Power steering gear	SR-5 – SR-40

HINT:

When the problem occurs on the power tilt and telescopic steering system, refer to the DI section (See page [DI-408](#)).



DRIVE BELT INSPECTION

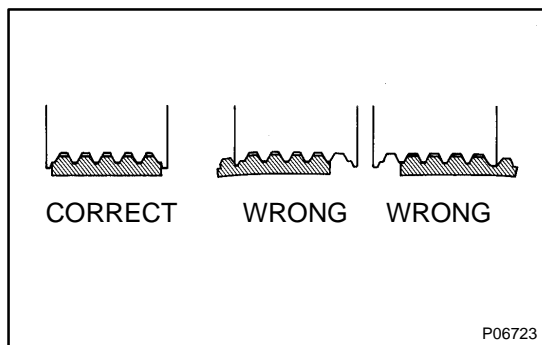
SR070-01

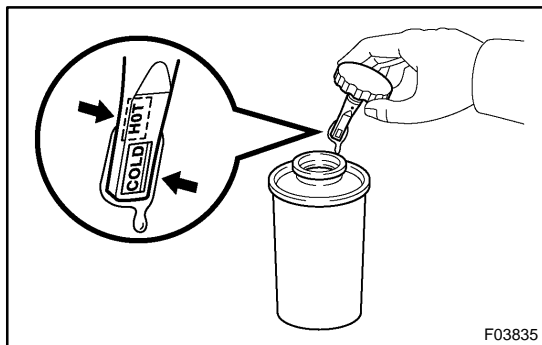
INSPECT DRIVE BELT

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.
- 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.





INSPECTION

1. CHECK FLUID LEVEL

- Keep the vehicle level.
- With the engine stopped, check the fluid level in the oil reservoir.

If necessary, add fluid.

Fluid: ATF DEXRON® II or III

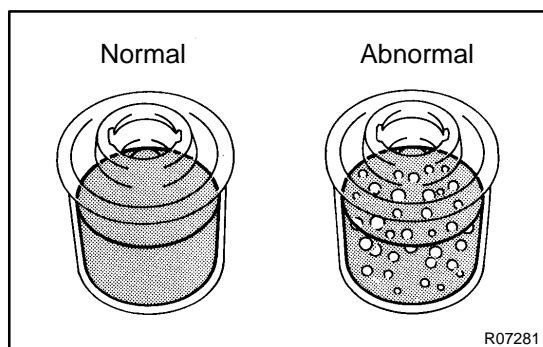
HINT:

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.

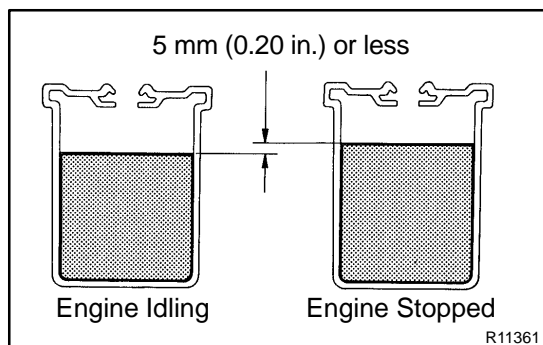
- Start the engine and run it at idle.
- Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80°C (176°F)



- Check for foaming or emulsification.

If there is foaming or emulsification, bleed power steering system (See page [SR-4](#)).



- With the engine idling, measure the fluid level in the oil reservoir.

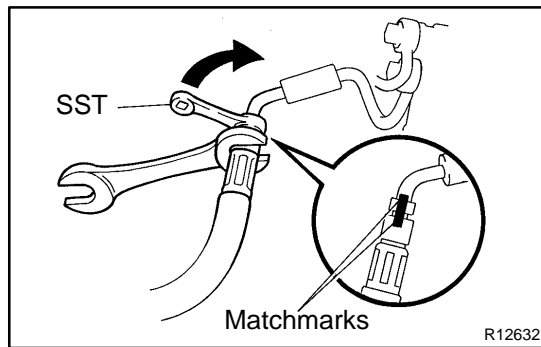
- Stop the engine.

- 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](#)).

- Check the fluid level.

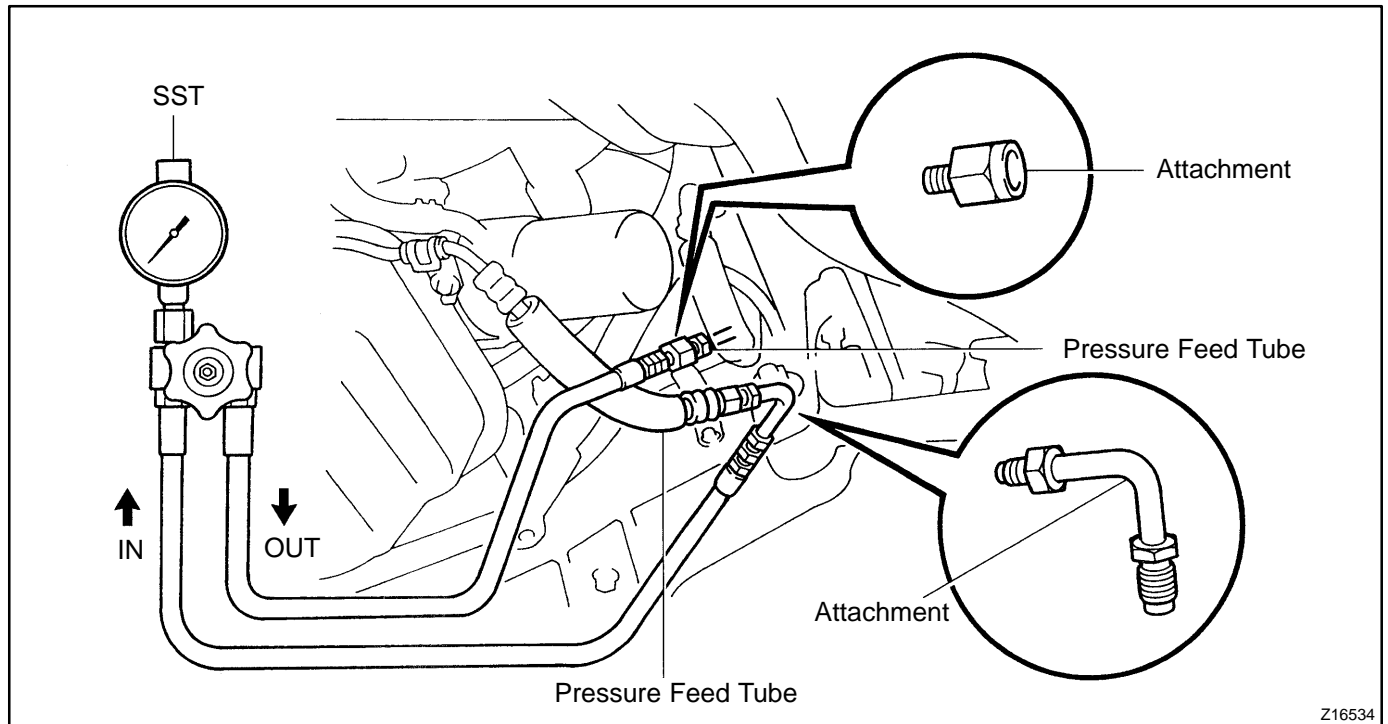


2. CHECK STEERING FLUID PRESSURE

- Place matchmarks on the pressure feed tubes.
- Using SST, disconnect the pressure line joint.
SST 09631-22020
- Connect SST, as shown in the illustration below.
SST 09640-10010 (09641-01010, 09641-01030, 09641-01040)

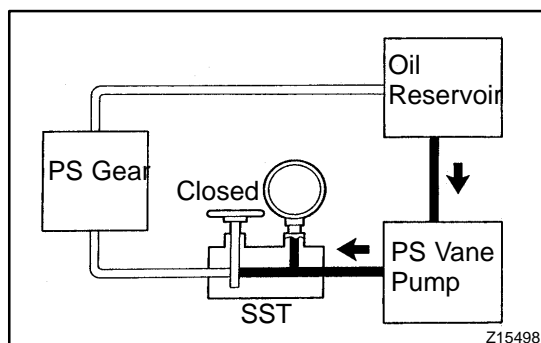
NOTICE:

Check that the valve of the SST is in the open position.



- Bleed the power steering system (See page [SR-4](#)).
- Start the engine and run it at idle.
- Turn the steering wheel from lock to lock several times to boost fluid temperature.

Fluid temperature: 80 °C (176 °F)

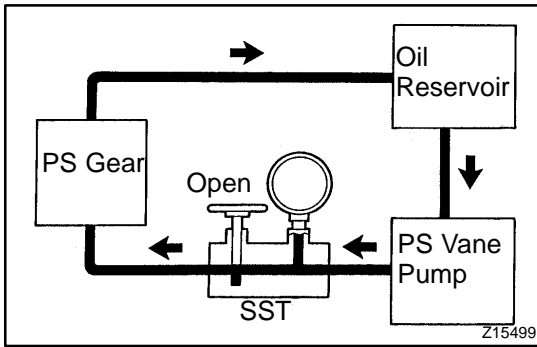


- With the engine idling, close the valve of the SST and observe the reading on the SST.

Minimum fluid pressure:
8,336 kPa (85 kgf/cm², 1,209 psi)

NOTICE:

- Do not keep the valve closed for more than 10 seconds.
- Do not let the fluid temperature become too high.

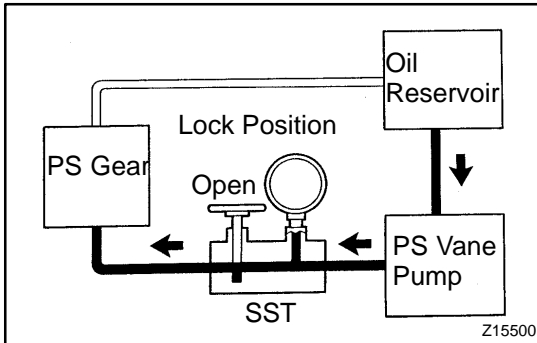


- (h) With the engine idling, open the valve fully.
 (i) Measure the fluid pressure at engine speeds of 1,000 rpm and 3,000 rpm.

Difference fluid pressure:
490 kPa (5 kgf/cm², 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.

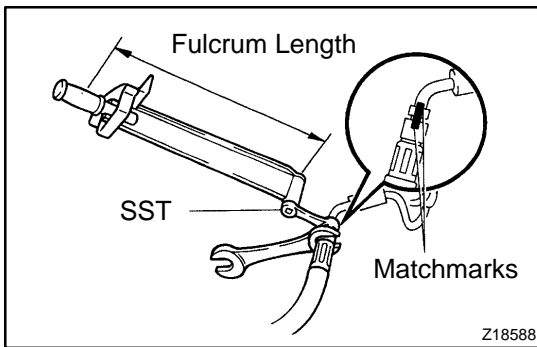
Minimum fluid pressure:
8,336 kPa (85 kgf/cm², 1,209 psi)

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, 09641-01040)



- (l) Align the matchmarks on the pressure feed tubes and connect them with SST.

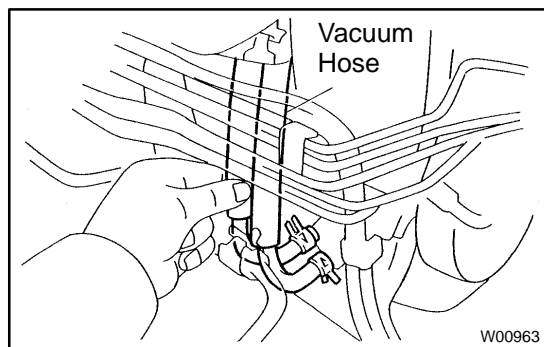
SST 09631-22020

Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)

HINT:

- Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).
- This torque value is effective in case that SST is parallel to a torque wrench.

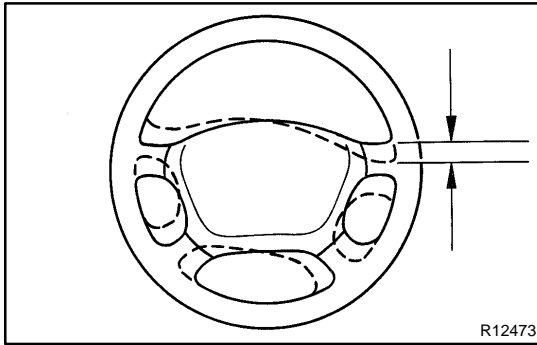
- (m) Bleed the power steering system (See page [SR-4](#)).



SR0BI-02

AIR CONTROL VALVE INSPECTION

1. **TURN AIR CONDITIONING SWITCH OFF**
2. **CHECK IDLE-UP**
 - (a) Start the engine and run it at idle.
 - (b) Fully turn the steering wheel.
 - (c) Check that the engine rotations decrease when the vacuum hose of the air control valve is pinched.
 - (d) Check that the engine rotations increase when the hose is released.



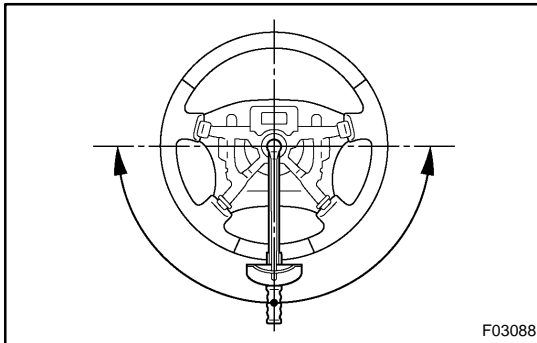
STEERING WHEEL INSPECTION

SR0BJ-03

1. CHECK STEERING WHEEL FREEPLAY

- Stop the vehicle and face the tires straight ahead.
- 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

- Center the steering wheel.
- Remove the steering wheel pad (See page [SR-12](#)).
- Start the engine and run it at idle.
- Measure the steering effort in both directions.

Steering effort (Reference):

6.9 N·m (70 kgf·cm, 61 in.-lbf)

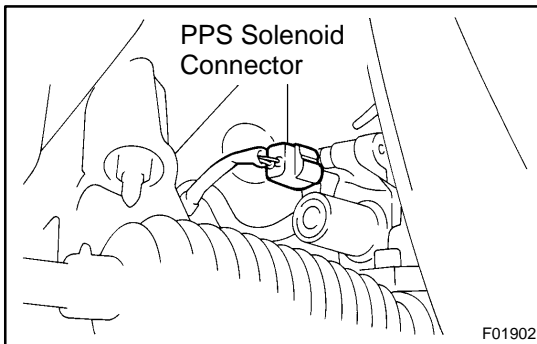
HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.

- Disconnect the PPS solenoid connector.
- Measure the steering effort in both directions and check that the steering effort exceeds the reference value in (d), and that the power assist is operating. If steering effort is not heavier than (d), check the solenoid.

HINT:

Take the tire type, pressure and contact surface into consideration before making your diagnosis.



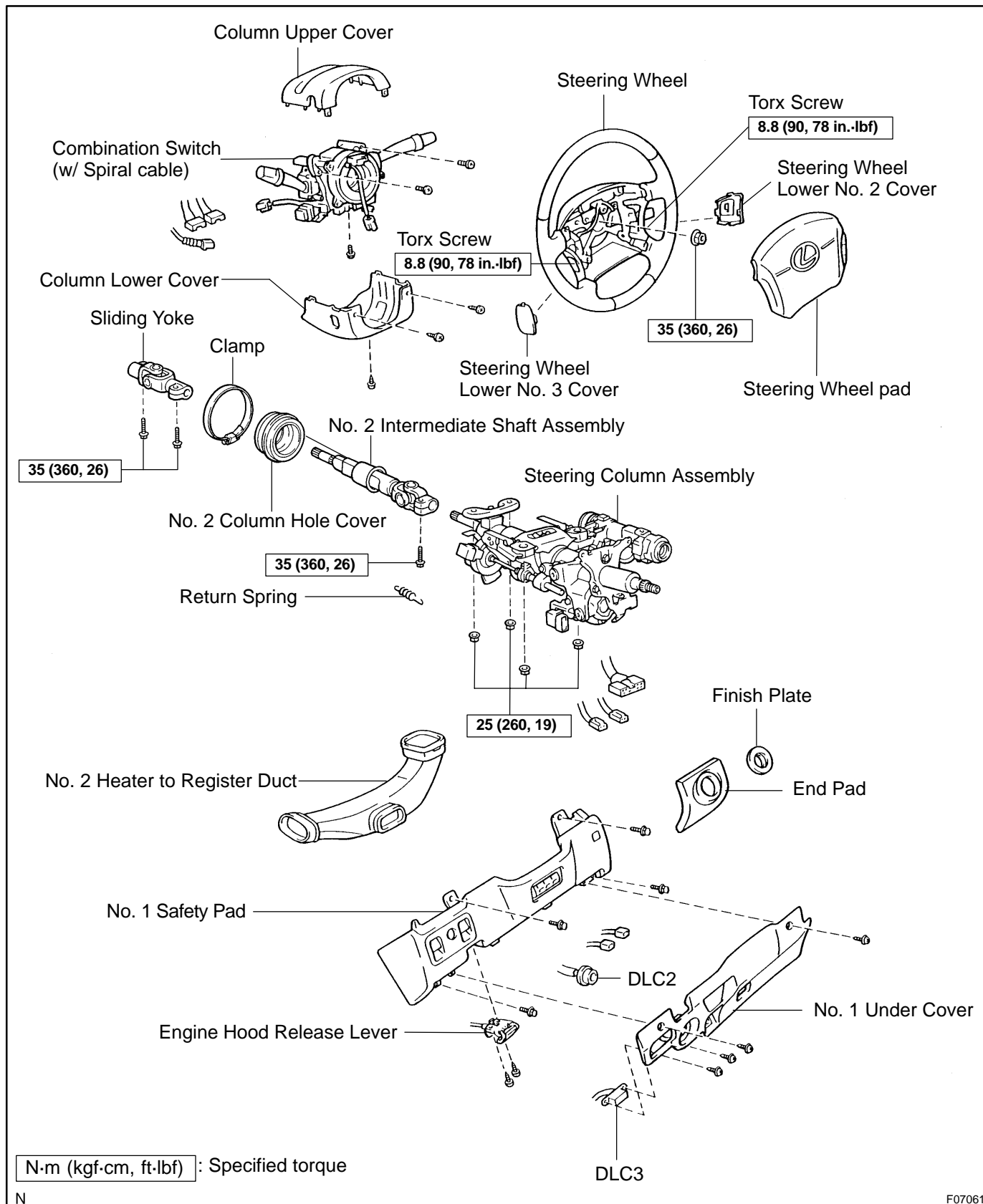
- Connect the connector.
- Torque the steering wheel set nut.

Torque: 35 N·m (360 kgf·cm, 26 ft-lbf)

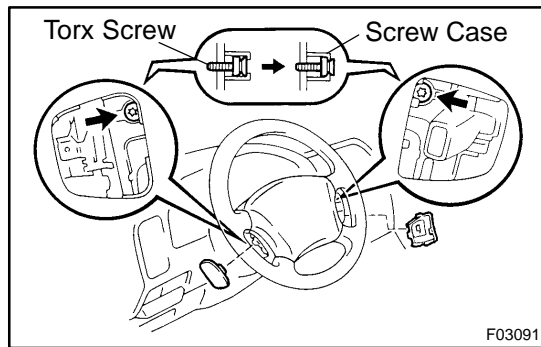
- Install the steering wheel pad (See page [SR-23](#)).

POWER TILT AND POWER TELESCOPIC STEERING COLUMN COMPONENTS

SR071-01







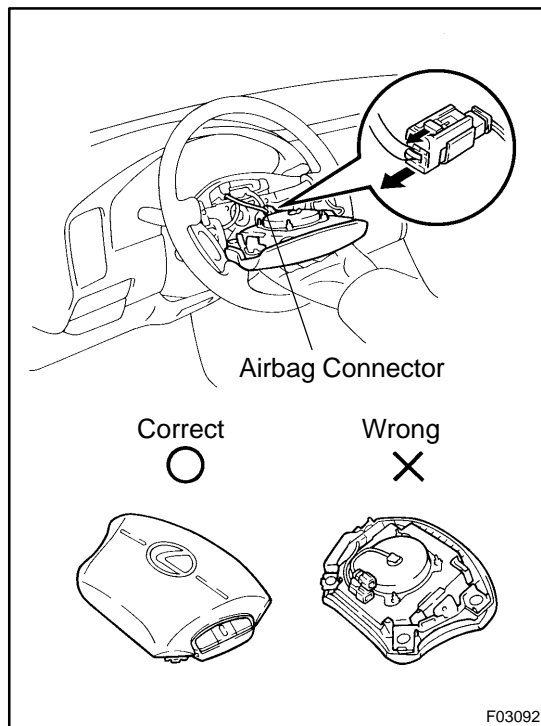
REMOVAL

1. REMOVE STEERING WHEEL PAD

NOTICE:

If the airbag connector is disconnected with the ignition switch at ON or ACC, DTCs will be recorded.

- Place the front wheels facing straight ahead.
- Remove the steering wheel lower No. 2 and No. 3 covers.
- Using a torx socket wrench, loosen the 2 torx screws until the groove along the screw circumference catches on the screw case.



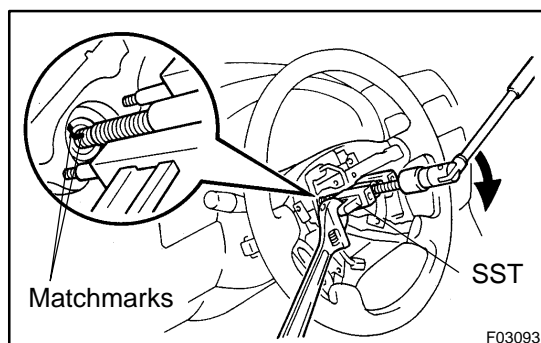
- Pull out the wheel pad from the steering wheel and disconnect the airbag connector.
- Disconnect the connector.

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

- Disconnect the connectors.
- Remove the steering wheel set nut.
- Place matchmarks on the steering wheel and main shaft assembly.
- Using SST, remove the steering wheel.
SST 09950-50012 (09951-05010, 09952-05010, 09953-05020, 09954-05020)

3. REMOVE NO. 1 UNDER COVER

- (a) Remove the 2 screws and No. 1 under cover.
- (b) Disconnect the 2 connectors and DLC 2.
- (c) Remove the 2 screws and DLC3.

4. REMOVE END PAD AND FINISH PLATE**5. REMOVE NO. 1 SAFETY PAD**

- (a) Remove the 2 screws and disconnect the engine hood release lever.
- (b) Remove the 4 pad set bolts and No. 1 safety pad.

6. REMOVE NO. 2 HEATER TO REGISTER DUCT**7. REMOVE COLUMN UPPER AND LOWER COVERS**

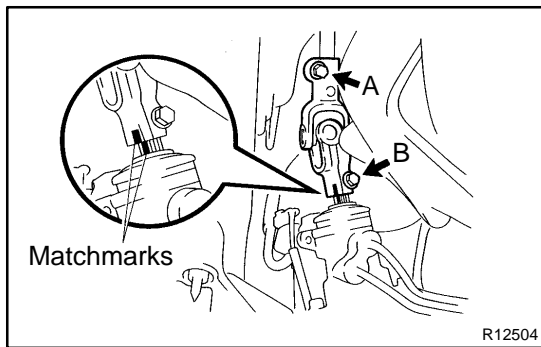
Remove the 3 screws, column upper and lower covers.

8. REMOVE COMBINATION SWITCH WITH SPIRAL CABLE

- (a) Disconnect the connectors.
- (b) Disconnect the airbag connector.
- (c) Remove the 3 screws and combination switch with spiral cable.

9. REMOVE SPIRAL CABLE (See page [BE-36](#))**NOTICE:**

Do not disassemble the cable or apply oil to it.

**10. DISCONNECT SLIDING YOKE**

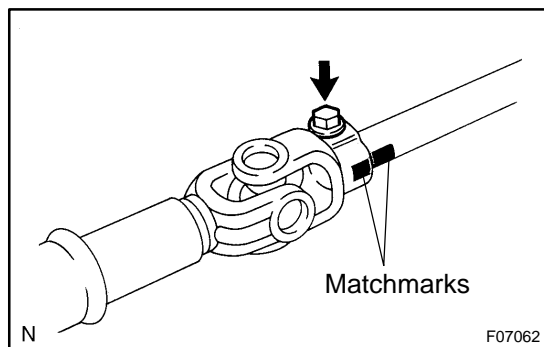
- (a) Place matchmarks on the sliding yoke and control valve shaft.
- (b) Loosen the bolt A and remove the bolt B.

11. REMOVE STEERING COLUMN ASSEMBLY

- (a) Disconnect the connectors.
- (b) Disconnect the No. 2 column hole cover.
- (c) Loosen the clamp.
- (d) Remove the return spring.
- (e) Remove the 4 column assembly set nuts and steering column assembly.
- (f) Remove the No. 2 column hole cover and clamp from the No. 2 intermediate shaft assembly.

12. REMOVE SLIDING YOKE

Remove the bolt A and sliding yoke.

**13. REMOVE NO. 2 INTERMEDIATE SHAFT ASSEMBLY**

- (a) Place matchmarks on the No. 2 intermediate shaft assembly and main shaft assembly.
- (b) Remove the bolt and No. 2 intermediate shaft assembly.

DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. REMOVE TRANSPONDER KEY COIL AND KEY CYLINDER LAMP ASSEMBLY

Remove the screw, transponder key coil and key cylinder lamp assembly.

2. REMOVE CONNECTOR BRACKET

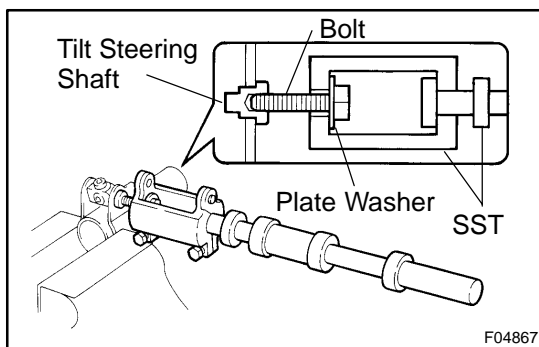
- Disconnect the connector.
- Remove the screw and connector bracket.

3. REMOVE TURN SIGNAL BRACKET

Remove the 3 bolts and turn signal bracket.

4. REMOVE POWER TILT MOTOR

- Using a hexagon wrench, remove the support stopper bolt.
- Remove the stopper spring and stopper No. 1.
- Using a screwdriver, remove the 2 E-rings.
- Using a hexagon wrench, remove the 2 tilt steering bolts and power tilt motor.
- Remove the 2 support stopper bolt bushings from the power tilt motor.



5. REMOVE ADJUSTING NUT NO. 1

- Set SST, a plate washer (36 mm outer diameter) and bolt (6 mm normal diameter, 1.0 mm pitch, 50 mm length), as shown in the illustration.

SST 09910-00015 (09911-00011, 09912-00010)

Reference:

Plate washer 90201-10201

Bolt 91111-51050

- Remove the 2 tilt steering shafts by using the sliding hammer on SST and adjusting nut No. 1.
- Remove the 2 support stopper bolt bushings from the adjusting nut No. 1.

6. REMOVE NO. 1 STEERING LOWER TUBE BRACKET

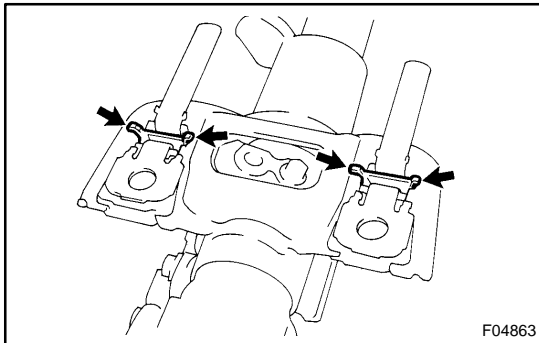
Remove the bolt and No. 1 steering lower tube bracket.

7. REMOVE POWER TELESCOPIC MOTOR

- Remove the 2 bolts and power telescopic motor.
- Remove the telescopic steering column cable.

8. REMOVE COLUMN TUBE SUPPORT

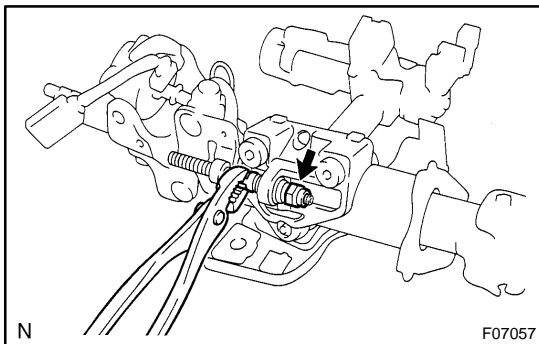
- Remove the bolt.
- Remove the column tube support with tube attachment.
- Remove the tube attachment from the column tube support.

**9. REMOVE 2 ENERGY ABSORBING PLATES**

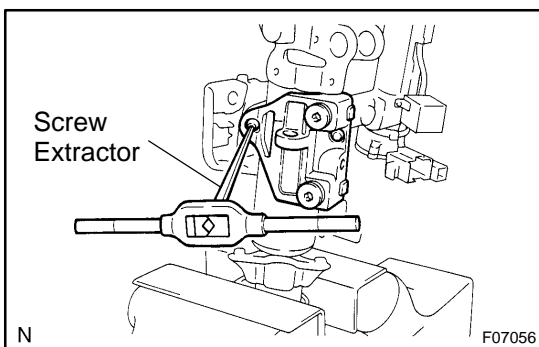
- Using pliers, remove the 2 energy absorbing clips.
- Remove the 2 energy absorbing plates and 2 energy absorbing guides.

10. REMOVE TELESCOPIC STEERING SLIDER SUPPORT

Remove the 2 bolts and telescopic steering slider support.

**11. REMOVE TELESCOPIC STEERING SCREW**

Using Pliers, remove the nut, 4 energy absorber cushions, 2 bearings and telescopic steering screw.

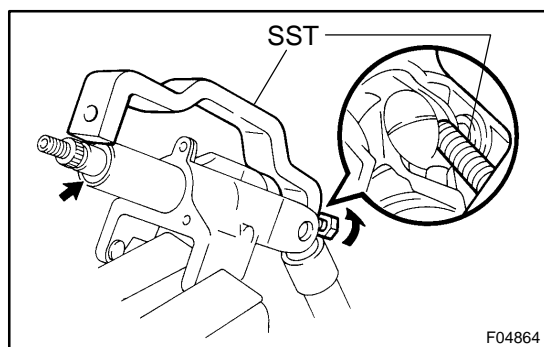
12. REMOVE TELESCOPIC STEERING BUSHING, STEERING COLUMN BRACKET SPACER AND TELESCOPIC STEERING SLIDER FROM TELESCOPIC STEERING SCREW**13. REMOVE COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP**

- Remove column tube stopper.
- Using a centering punch, mark the center of the 2 tapered-head bolts.
- Using a 3 – 4 mm (0.12 – 0.16 in.) drill, drill into the 2 tapered-head bolts.
- Using a screw extractor, remove 2 tapered-head bolts, column upper bracket, column upper clamp and 2 steering lock wedges.
- Using a hexagon wrench, remove the 2 telescopic lever lock bolts and 2 telescopic steering wedge lock springs.

14. REMOVE COLUMN UPPER TUBE SUB-ASSEMBLY WITH MAIN SHAFT ASSEMBLY

- Using a screwdriver, remove the snap ring.
- Remove the 2 screws and tilt steering support bond cable.
- Using a hexagon wrench, remove the 2 tilt steering bolts and column upper tube sub-assembly with main shaft assembly.

- (d) Remove the column upper tube assembly from the column tube.
- (e) Remove the 2 support stopper bolt bushings from the column upper tube assembly.
- (f) Remove the 3 bushings from the column tube.

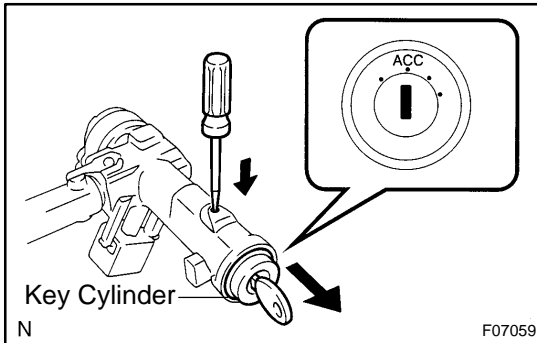
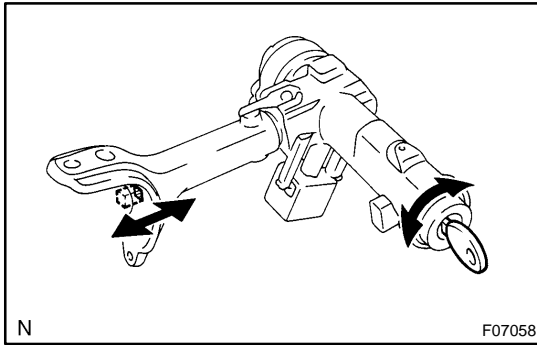
**15. REMOVE MAIN SHAFT ASSEMBLY**

- (a) Using SST, compress the compression spring.
SST 09950-40011 (09958-04011)

NOTICE:

Do not bend the universal joint of the shaft assembly more than 20°.

- (b) Using a snap ring expander, remove the snap ring.
- (c) Remove the main shaft assembly from the column upper tube sub-assembly.
- (d) Remove the compression spring, bearing thrust collar and bearing from the main shaft assembly.



INSPECTION

NOTICE:

When using a vise, do not overtighten it.

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.

2. IF NECESSARY, REPLACE KEY CYLINDER

- Place the ignition key at the ACC position.
- Using a screwdriver, push down the stop pin of the cylinder, and pull out the key cylinder.
- Install a new cylinder.

HINT:

Make sure the key is at the ACC position.

3. INSPECT IGNITION SWITCH

(See page [BE-33](#))

4. IF NECESSARY, REPLACE IGNITION SWITCH

- Remove the 2 screws and ignition switch.
- Install a new ignition switch with the 2 screws.

5. INSPECT KEY UNLOCK WARNING SWITCH

(See page [BE-33](#))

6. IF NECESSARY, REPLACE KEY UNLOCK WARNING SWITCH

- Slide the key unlock warning switch out of the column upper bracket.
- Slide a new key unlock warning switch in the column upper bracket.

7. INSPECT KEY INTERLOCK SOLENOID

(See page [AT-14](#))

8. IF NECESSARY, REPLACE KEY INTERLOCK SOLENOID

- Remove the 2 screws and key interlock solenoid.
- Install a new key interlock solenoid with the 2 screws.

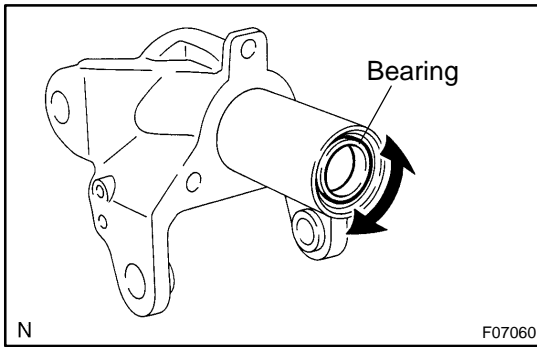
9. INSPECT TRANSPONDER KEY COIL

(See page [BE-255](#))

10. IF NECESSARY, REPLACE TRANSPONDER KEY COIL

11. IF NECESSARY, REPLACE TRANSPONDER KEY AMPLIFIER

- Remove the nut and transponder key amplifier.
- Install a new transponder key amplifier with the nut.

**12. INSPECT BEARING**

- (a) Check the bearing rotation condition and check for abnormal noise.

If the bearing is worn or damaged, replace the column upper tube sub-assembly.

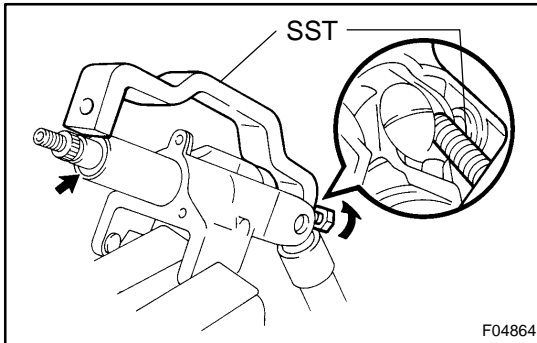
- (b) Coat the bearing with molybdenum disulfide lithium base grease.

REASSEMBLY

NOTICE:

When using a vise, do not over tighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH MOLYBDENUM DISULFIDE LITHIUM BASE GREASE (See page [SR-10](#))**



2. INSTALL MAIN SHAFT ASSEMBLY

- (a) Install a new bearing, bearing thrust collar and compression spring to the main shaft assembly.
- (b) Install the main shaft assembly to the column upper tube sub-assembly.
- (c) Using SST, compress the compression spring.
SST 09950-40011 (09958-04011)

NOTICE:

Do not bend the universal joint of the shaft more than 20°.

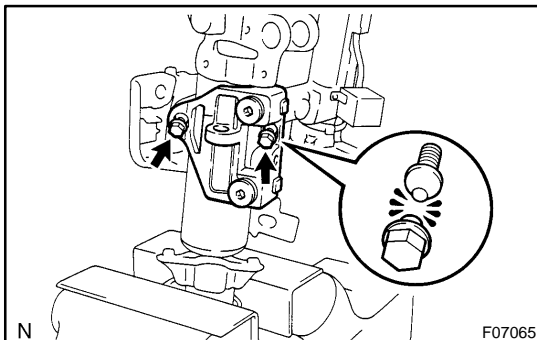
- (d) Using a snap ring expander, install a new snap ring to the main shaft.

3. INSTALL COLUMN UPPER TUBE SUB-ASSEMBLY WITH MAIN SHAFT ASSEMBLY

- (a) Install the 3 bushings to the column tube.
- (b) Install 2 new support stopper bolt bushings to the column upper tube assembly.
- (c) Install the column upper tube assembly to the column tube.
- (d) Using a hexagon wrench, install the column upper tube sub-assembly with main shaft assembly with the 2 tilt steering bolts.

Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)

- (e) Install the tilt steering support bond cable with the 2 screws.
- (f) Install a new snap ring.



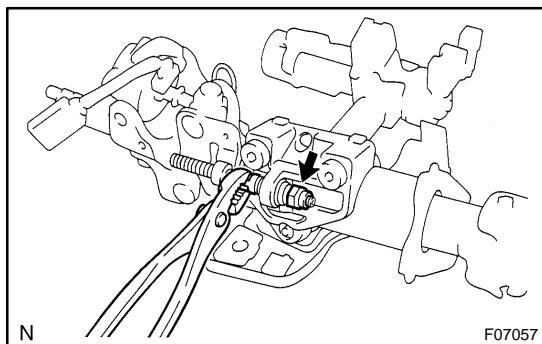
4. INSTALL COLUMN UPPER BRACKET AND COLUMN UPPER CLAMP

- (a) Using a hexagon wrench, install the 2 telescopic steering wedge lock springs and 2 telescopic lever lock bolts.

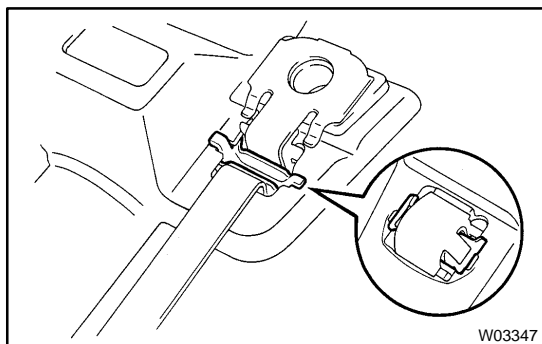
Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)

- (b) Install the 2 steering lock wedges, column upper clamp and column upper bracket with 2 new tapered-head bolts.
- (c) Tighten the 2 tapered-head bolts until the bolt heads break off.

- (d) Install the column tube stopper.
Torque: 19 N·m (190 kgf·cm, 14 ft·lbf)
- 5. **INSTALL TELESCOPIC STEERING SLIDER, STEERING COLUMN BRACKET SPACER AND TELESCOPIC STEERING BUSHING TO TELESCOPIC STEERING SCREW**
- 6. **INSTALL TELESCOPIC STEERING SCREW**
 - (a) Install the 4 energy absorber cushions, 2 bearings and telescopic steering screw.



- (b) Using pliers, install the nut.
- (c) Using a punch, stake the nut.
- 7. **INSTALL TELESCOPIC STEERING SLIDER SUPPORT**
Install the telescopic steering slider support with the 2 bolts.
Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



- 8. **INSTALL 2 ENERGY ABSORBING PLATES**
 - (a) Install 2 new energy absorbing guides and energy absorbing plates.
 - (b) Install 2 new energy absorbing clips.
- 9. **INSTALL COLUMN TUBE SUPPORT**
 - (a) Install the tube attachment to the column tube support.
 - (b) Install the column tube support with tube attachment with the bolt.
Torque: 15 N·m (150 kgf·cm, 11 ft·lbf)
- 10. **INSTALL POWER TELESCOPIC MOTOR**
 - (a) Install the telescopic steering column cable.
 - (b) Install the power telescopic motor with the 2 bolts.
- 11. **INSTALL NO. 1 STEERING LOWER TUBE BRACKET**
Install the No. 1 steering lower tube bracket with the bolt.
- 12. **INSTALL ADJUSTING NUT NO. 1**
 - (a) Install 2 new support stopper bolt bushings to the adjusting nut No. 1.
 - (b) Install the adjusting nut No. 1 with the 2 tilt steering shafts.
- 13. **INSTALL POWER TILT MOTOR**
 - (a) Install 2 new support stopper bolt bushings to the power tilt motor.
 - (b) Using a hexagon wrench, install the power tilt motor with the 2 tilt steering bolts.
Torque: 20 N·m (210 kgf·cm, 15 ft·lbf)
 - (c) Install 2 new E-rings.
 - (d) Install the stopper No. 1 and stopper spring.
 - (e) Using a hexagon wrench, install the support stopper bolt.

14. INSTALL TURN SIGNAL BRACKET

Install the turn signal bracket with the 3 screws.

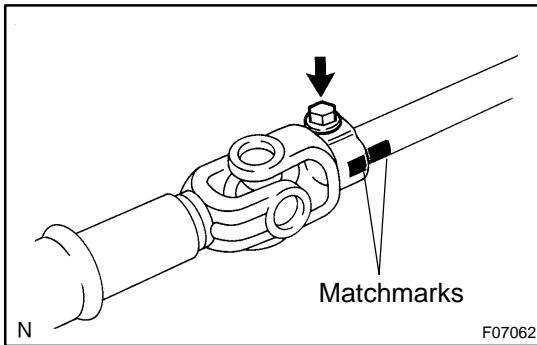
15. INSTALL CONNECTOR BRACKET

(a) Install the connector bracket with the screw.

(b) Connect the connector.

**16. INSTALL KEY CYLINDER LAMP ASSEMBLY AND
TRANSPONDER KEY COIL**

Install the key cylinder lamp assembly and transponder key coil with the screw.



INSTALLATION

1. INSTALL NO. 2 INTERMEDIATE SHAFT ASSEMBLY

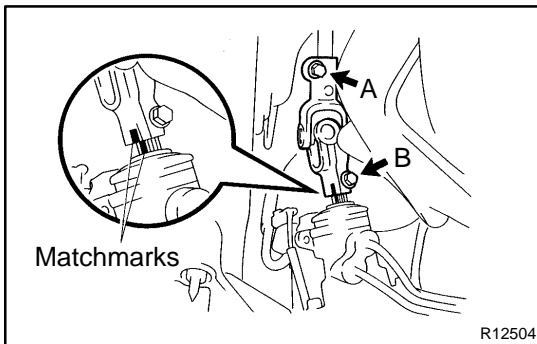
- Align the matchmarks on the No. 2 intermediate shaft assembly and main shaft assembly.
- Install the No. 2 intermediate shaft assembly with the bolt.
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)

2. INSTALL SLIDING YOKE

Temporarily install the sliding yoke with the bolt A.

3. INSTALL STEERING COLUMN ASSEMBLY

- Install the No. 2 column hole cover and clamp to the No. 2 intermediate shaft assembly.
- Install the steering column assembly with the 4 column assembly set nuts.
Torque: 25 N·m (260 kgf-cm, 19 ft-lbf)
- Install the return spring.
- Tighten the clamp.
- Connect the No. 2 column hole cover.
- Connect the connectors.



4. CONNECT SLIDING YOKE

- Align the matchmarks on the sliding yoke and control valve shaft.
- Install the bolt B.
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)
- Torque the bolt A.
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)

5. INSTALL SPIRAL CABLE (See page [BE-36](#))

6. INSTALL COMBINATION SWITCH WITH SPIRAL CABLE

- Install the combination switch with spiral cable with the 3 screws.
- Connect the airbag connector.
- Connect the connectors.

7. INSTALL COLUMN UPPER AND LOWER COVERS

Install the column upper and lower covers with the 3 screws.

8. INSTALL NO. 2 HEATER TO REGISTER DUCT

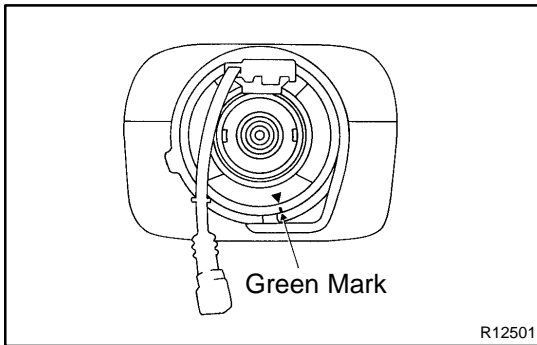
9. INSTALL NO. 1 SAFETY PAD

- Install the No. 1 safety pad with the 4 pad set bolts.
- Connect the engine hood release lever with the 2 screws.

10. INSTALL END PAD AND FINISH PLATE

11. INSTALL NO. 1 UNDER COVER

- Connect the DLC3 with the 2 screws.
- Connect the 2 connectors and DLC2.
- Install the No. 1 under cover with the 2 screws.



12. CENTER SPIRAL CABLE

- Check that the front wheels are facing straight ahead.
- Turn the cable counterclockwise by hand until it becomes harder to turn.
- Then rotate the cable clockwise about 2.5 turns to align the marks.

HINT:

The cable will rotate about 2.5 turns to either left or right of the center.

13. INSTALL STEERING WHEEL

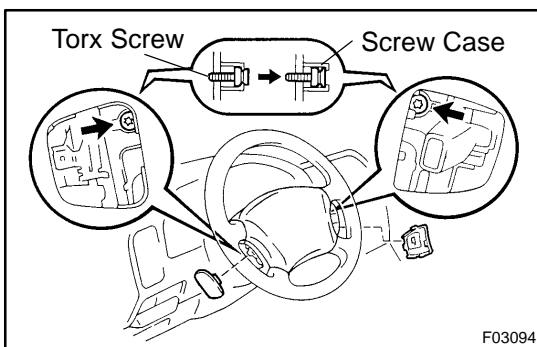
- Align the matchmarks on the steering wheel and main shaft assembly.
- Install the steering wheel set nut.
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)
- Connect the connectors.

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 with the specified torque.
- If the wheel pad has been dropped, or there are cracks, dents or other defects on 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 that they are not pinched between other parts.

- Connect the connector.
- Connect the airbag connector.

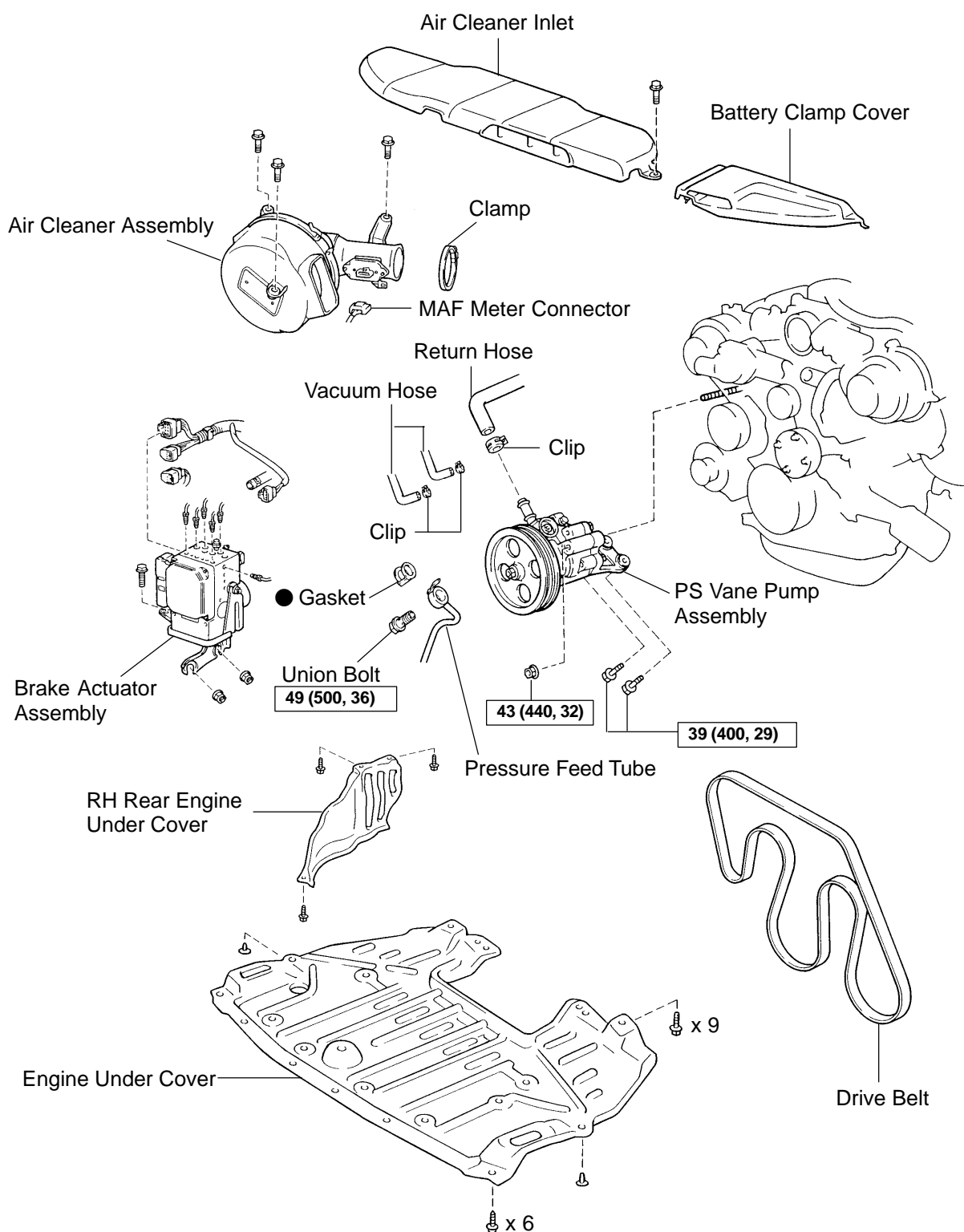


- Install the steering wheel pad after confirming that the circumference groove of the torx screws is caught on the screw case.
- Using a torx socket wrench, torque the 2 screws.
Torque: 8.8 N·m (90 kgf-cm, 78 in.-lbf)
- Install the steering wheel lower No. 2 and No. 3 covers.

15. CHECK STEERING WHEEL CENTER POINT

POWER STEERING VANE PUMP COMPONENTS

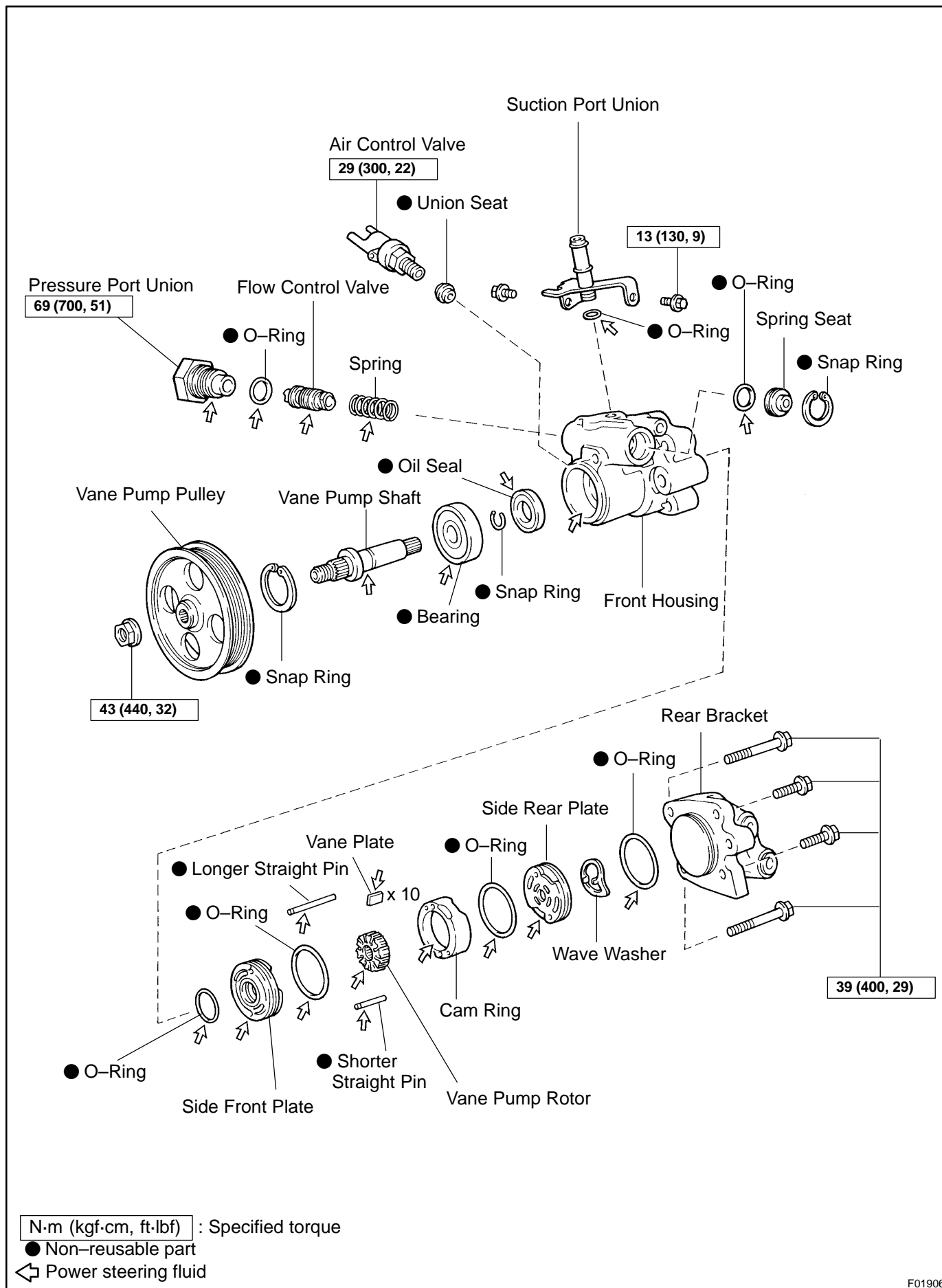
SR0BQ-03



N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

F01901



F01906

REMOVAL

1. REMOVE ENGINE UNDER COVER

Remove the 9 bolts, 6 screws, 2 clips and engine under cover.

2. REMOVE RH REAR ENGINE UNDER COVER

Remove the 3 bolts and RH rear engine under cover.

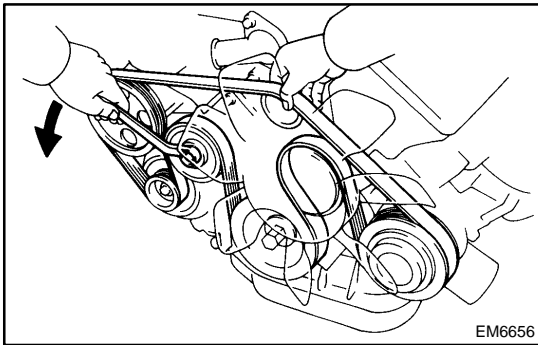
3. REMOVE AIR CLEANER INLET AND BATTERY CLAMP COVER

Remove the bolt, air cleaner inlet and battery clamp cover.

4. REMOVE AIR CLEANER ASSEMBLY WITH AIR CLEANER HOSE

- (a) Disconnect the MAF meter connector.
- (b) Remove the clamp.
- (c) Remove the 3 bolts and air cleaner assembly with air cleaner hose.

5. REMOVE BRAKE ACTUATOR ASSEMBLY (See page [BR-50](#))



6. REMOVE DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise, and remove the drive belt.

7. DISCONNECT 2 VACUUM HOSES

Remove the 2 clips and disconnect the 2 vacuum hoses.

8. DISCONNECT RETURN HOSE

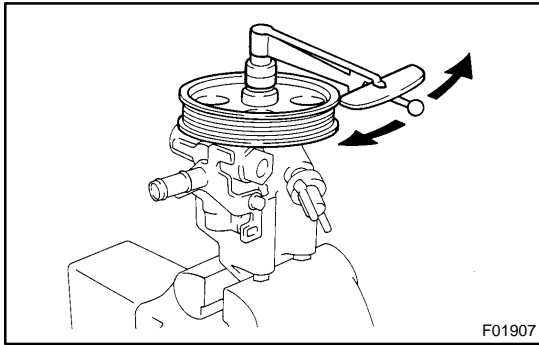
Remove the clip and disconnect the return hose.

9. DISCONNECT PRESSURE FEED TUBE

Remove the union bolt and gasket, and disconnect the pressure feed tube.

10. REMOVE PS VANE PUMP ASSEMBLY

Remove the 2 bolts, nut and PS vane pump assembly.



DISASSEMBLY

NOTICE:

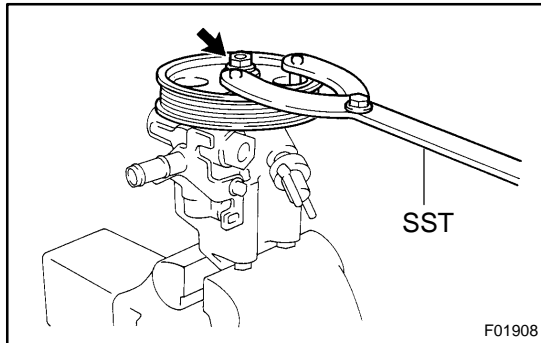
When using a vise, do not overtighten it.

1. MEASURE PS VANE PUMP ROTATION TORQUE

- Check that the pump rotates smoothly without abnormal noise.
- Using a torque wrench, check the pump rotating torque.

Rotating torque:

0.25 N·m (2.5 kgf·cm, 2.2 in.-lbf) or less



2. REMOVE VANE PUMP PULLEY

- Using SST, stop the pulley rotating and loosen the nut. SST 09960-10010 (09962-01000, 09963-01000)
- Remove the nut and vane pump pulley from the vane pump shaft.

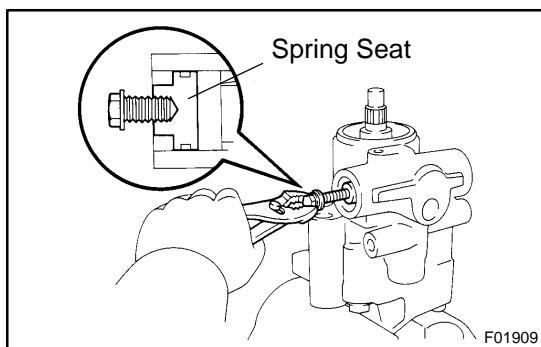
3. REMOVE AIR CONTROL VALVE

4. REMOVE SUCTION PORT UNION

- Remove the 2 bolts and suction port union.
- Remove the O-ring from the suction port union.

5. REMOVE PRESSURE PORT UNION, FLOW CONTROL VALVE AND SPRING

- Remove the pressure port union, flow control valve and spring.
- Remove the O-ring from the pressure port union.



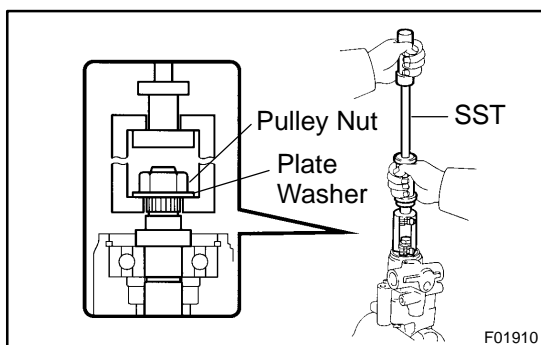
6. REMOVE SPRING SEAT

- Using snap ring pliers, remove the snap ring from the front housing.
- Temporarily install a bolt to the spring seat and pull it out together with the spring seat.

HINT:

Use a bolt with diameter 6 mm (0.24 in.) and pitch 1.0 mm (0.039 in.).

- Remove the O-ring from the spring seat.

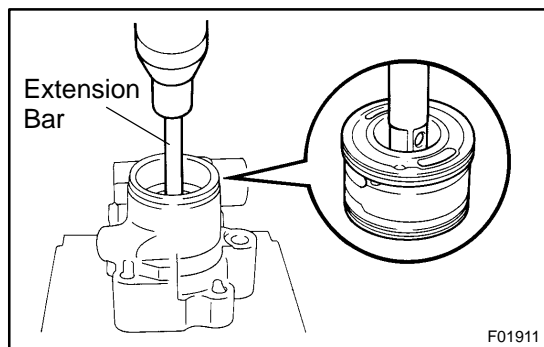


7. REMOVE VANE PUMP SHAFT WITH BEARING

- Using snap ring pliers, remove the snap ring from the front housing.
- Temporarily install a appropriate plate washer and the pulley set nut to the vane pump shaft.
- Using SST, pull out the vane pump shaft with the bearing. SST 09910-00015 (09911-00011, 09912-00010)

8. REMOVE REAR BRACKET

- Remove the 4 bolts and rear bracket.
- Remove the O-ring from the rear bracket.

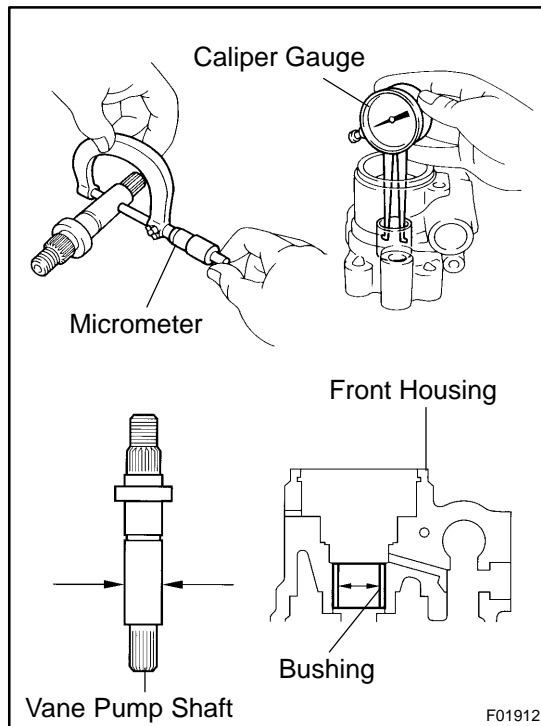
**9. REMOVE WAVE WASHER****10. REMOVE SIDE FRONT PLATE, CAM RING, VANE PUMP ROTOR, 10 VANE PLATES AND SIDE REAR PLATE**

- (a) Using an extension bar, press out the side front plate, cam ring, vane pump rotor, 10 vane plates and side rear plate as an assembly.
- (b) Remove the O-ring from the side rear plate.
- (c) Remove the cam ring, vane pump rotor and the 10 vane plates.

NOTICE:

Take care not to drop the vane plate.

- (d) Remove the shorter straight pin from the side front plate.
- (e) Remove the 2 O-rings from the side front plate.
- (f) Using pliers, remove the longer straight pin from the front housing.



INSPECTION

NOTICE:

When using a vise, do not overtighten it.

1. MEASURE OIL CLEARANCE BETWEEN VANE PUMP SHAFT AND BUSHING

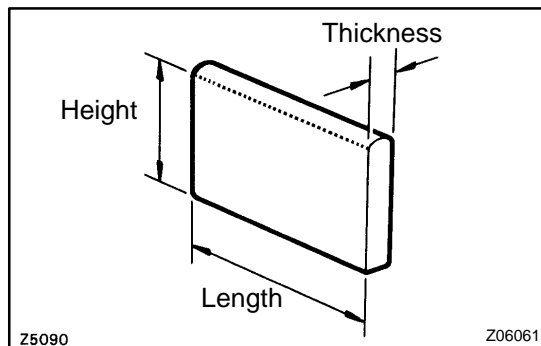
Using a micrometer and caliper gauge, measure the oil clearance.

Standard clearance:

0.030 – 0.045 mm (0.0012 – 0.0018 in.)

Maximum clearance: 0.07 mm (0.0028 in.)

If it is more than the maximum, replace the front housing and vane pump shaft.



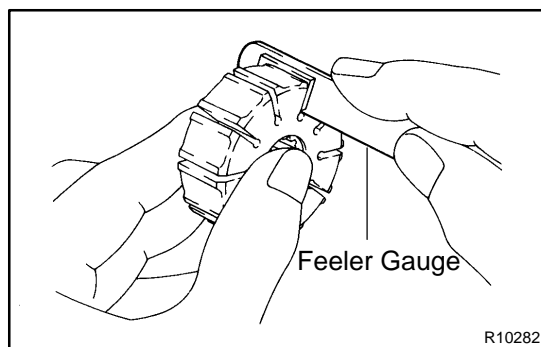
2. INSPECT VANE PUMP ROTOR AND VANE PLATES

- (a) Using a micrometer, measure the height, thickness and length of the 10 vane plates.

Minimum height: 8.0 mm (0.315 in.)

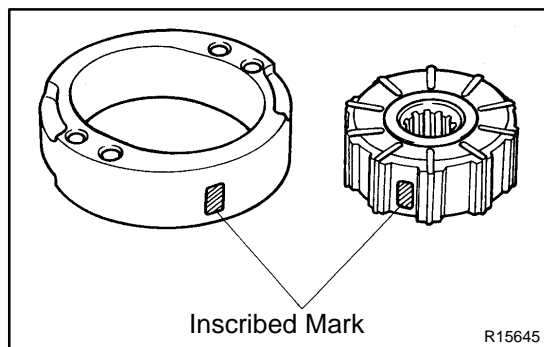
Minimum thickness: 1.77 mm (0.0697 in.)

Minimum length: 14.97 mm (0.5894 in.)



- (b) Using a feeler gauge, measure the clearance between the vane pump rotor groove and vane plate.

Maximum clearance: 0.030 mm (0.0012 in.)



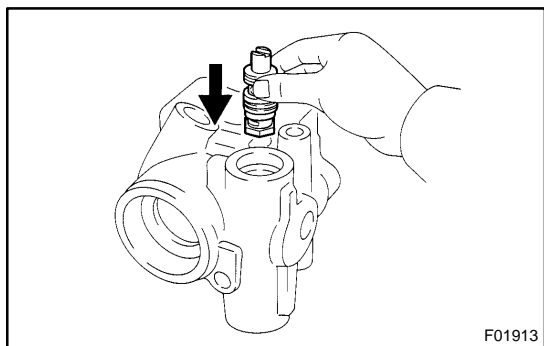
If it is more than the maximum, replace the vane plate and/or vane pump rotor with the one having the same mark stamped on the cam ring.

Inscribed mark: 1, 2, 3, 4 or None

HINT:

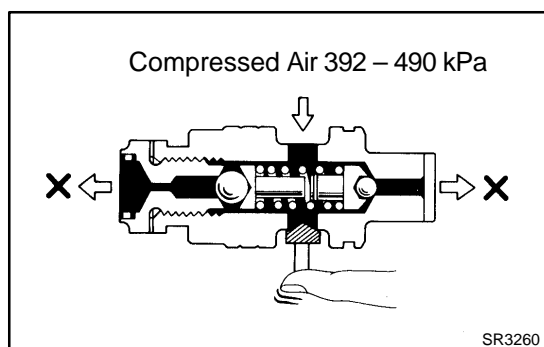
There are 5 vane plate lengths corresponding to the following vane pump rotor and cam ring marks:

Vane pump rotor and cam ring mark	Vane plate part number	Vane plate length mm (in.)
None	44345-12010	14.996 – 14.998 (0.59039 – 0.59047)
1	44345-12020	14.994 – 14.996 (0.59032 – 0.59039)
2	44345-12030	14.992 – 14.994 (0.59024 – 0.59032)
3	44345-12040	14.990 – 14.992 (0.59016 – 0.59024)
4	44345-12050	14.988 – 14.990 (0.59008 – 0.59016)

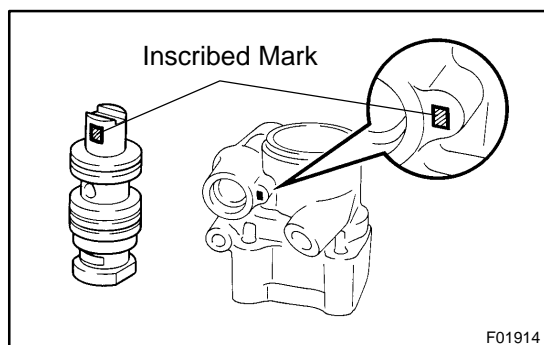


3. INSPECT FLOW CONTROL VALVE

- (a) Coat the flow control valve with power steering fluid and check that it falls smoothly into the valve hole of the front housing by its own weight.

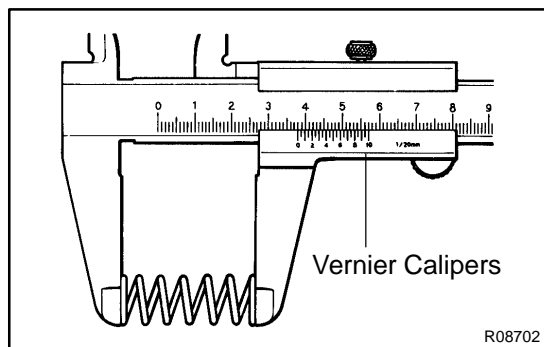


- (b) Check the flow control valve for leakage. Close one of the holes and apply compressed air of 392 – 490 kPa (4 – 5 kgf/cm², 57 – 71 psi) into the opposite side hole, and confirm that air does not come out from the end holes.



If necessary, replace the flow control valve with the one having the same letter as inscribed on the front housing.

Inscribed mark: A, B, C, D, E or F

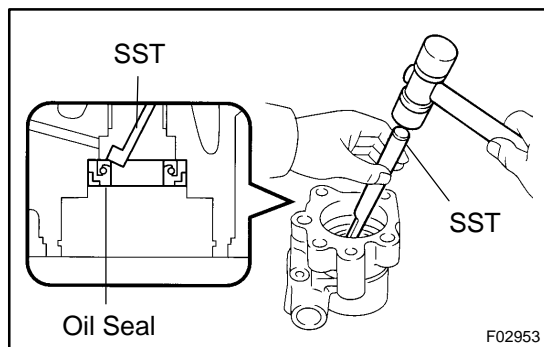


4. INSPECT SPRING

Using vernier calipers, measure the free length of the spring.

Minimum free length: 36.0 mm (1.417 in.)

If it is not within the specification, replace the spring.



REPLACEMENT

NOTICE:

When using a vise, do not overtighten it.

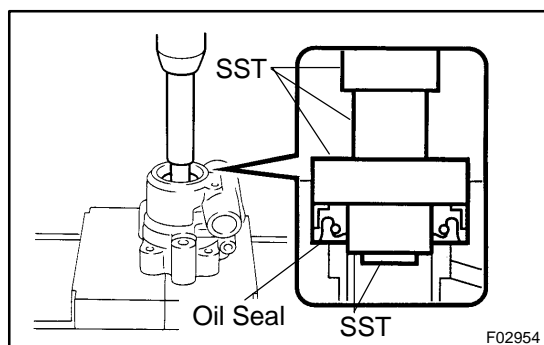
1. IF NECESSARY, REPLACE OIL SEAL

- (a) Using SST, tap out the oil seal.

SST 09631-10030

NOTICE:

Be careful not to damage the front housing.



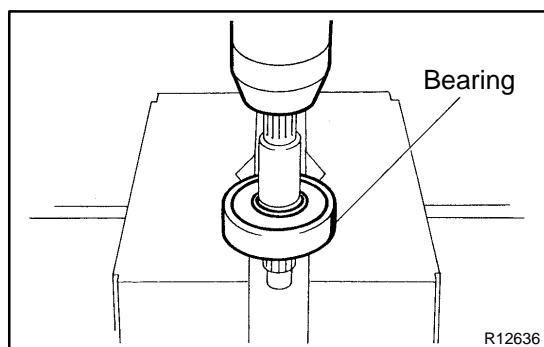
- (b) Coat a new oil seal lip with power steering fluid.

- (c) Using SST, press in the oil seal.

SST 09950-60010 (09951-00180, 09951-00300,
09952-06010), 09950-70010 (09951-07100)

NOTICE:

Make sure to install the oil seal facing in the correct direction.



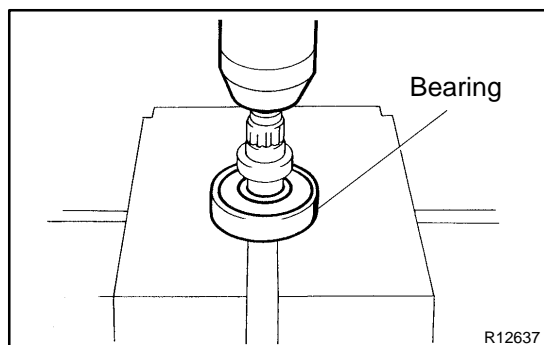
2. IF NECESSARY, REPLACE BEARING

- (a) Using a snap ring expander, remove the snap ring from the vane pump shaft.

NOTICE:

Be careful not to damage the shaft.

- (b) Press out the bearing.



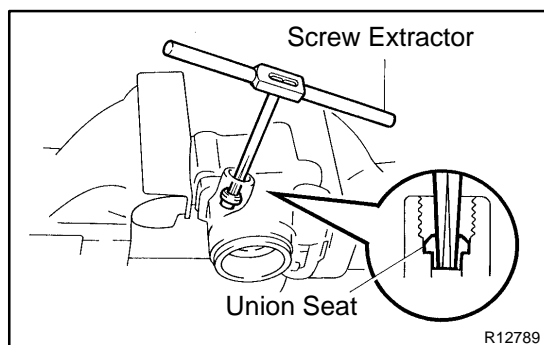
- (c) Coat a new bearing with power steering fluid.

- (d) Press in the bearing.

- (e) Using a snap ring expander, install a new snap ring.

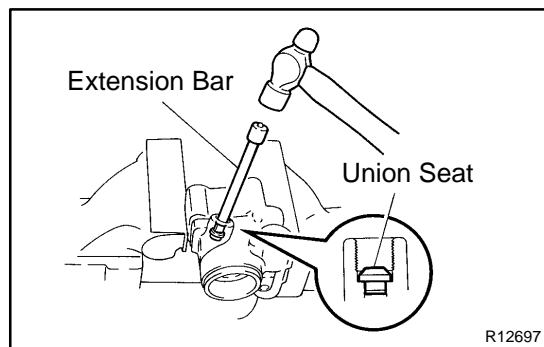
NOTICE:

Be careful not to damage the shaft.



3. IF NECESSARY, REPLACE UNION SEAT

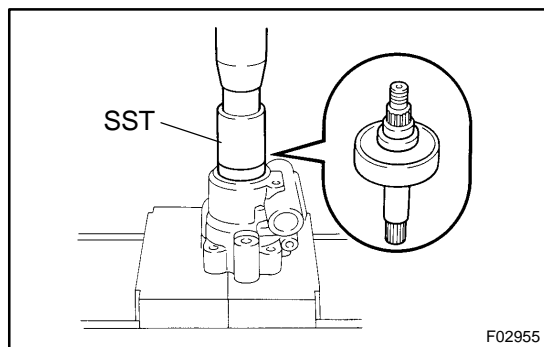
- (a) Using a screw extractor, remove the union seat.



- (b) Using an extension bar and hammer, tap in a new union seat.

NOTICE:

Before installing the union seat, remove dust sticking to the front housing.



REASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

1. **COAT PARTS INDICATED BY ARROWS WITH POWER STEERING FLUID (See page SR-25)**
2. **INSTALL VANE PUMP SHAFT WITH BEARING**
 - (a) Using SST, press in the vane pump shaft with the bearing. SST 09238-47012
 - (b) Using snap ring pliers, install a new snap ring to the front housing.

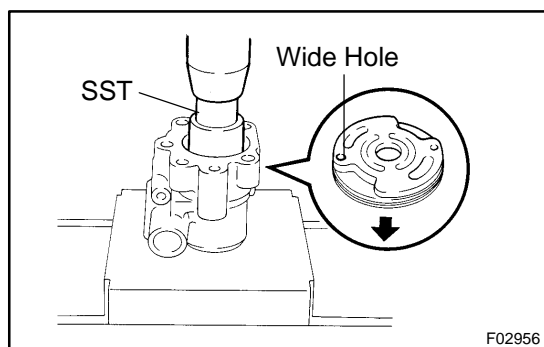
3. INSTALL SIDE FRONT PLATE

- (a) Install a new longer straight pin to the front housing.

NOTICE:

Be careful not to damage the pin.

- (b) Coat 2 new O-rings with power steering fluid and install them to the side front plate.



- (c) Using SST, press in the side front plate. SST 09238-47012

NOTICE:

- Make sure to install the side front plate facing in the correct direction.
- Be careful not to damage the O-ring.

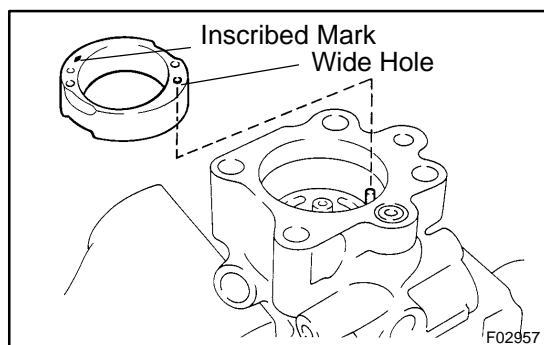
HINT:

Align the wide hole of the side front plate and longer straight pin.

- (d) Install a new shorter straight pin to the side front plate.

NOTICE:

Be careful not to damage the pin.

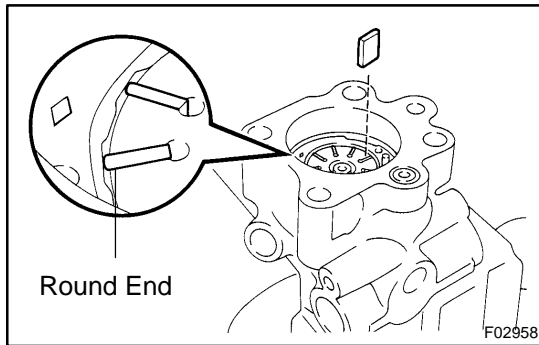


4. INSTALL CAM RING

Align the wide hole of the cam ring and longer straight pin, and install the cam ring with the inscribed mark facing outward.

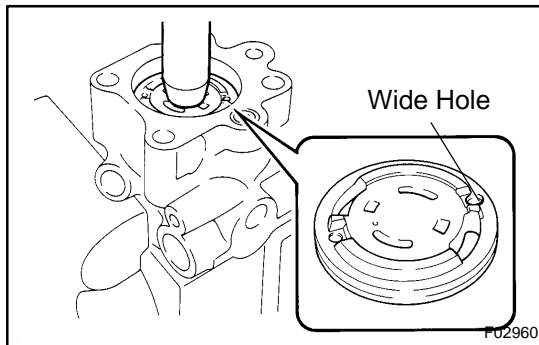
5. INSTALL VANE PUMP ROTOR

Install the vane pump rotor with the inscribed mark facing outward.



6. INSTALL 10 VANE PLATES

Install the 10 vane plates with the round end facing outward.



7. INSTALL SIDE REAR PLATE

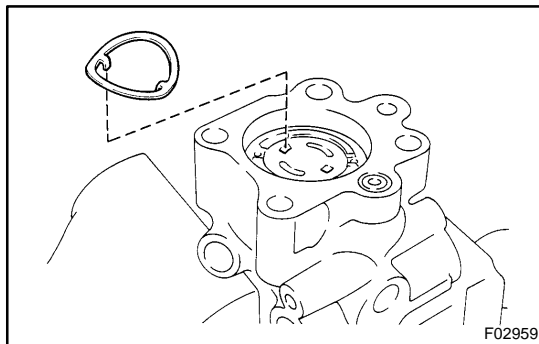
- Coat a new O-ring with power steering fluid and install it to the side rear plate.
- Press in the side rear plate.

NOTICE:

Be careful not to damage the O-ring.

HINT:

Align the wide hole of the side rear plate and longer straight pin.



8. INSTALL WAVE WASHER

Install the wave washer so that its protrusions fit into the slots in the side rear plate.

9. INSTALL REAR BRACKET

- Coat a new O-ring with power steering fluid and install it to the rear bracket.
- Install the rear bracket with the 4 bolts.

Torque: 39 N·m (400 kgf-cm, 29 ft-lbf)

10. INSTALL SPRING SEAT

- Coat a new O-ring with power steering fluid and install it to the spring seat.
- Install the spring seat with the bolt hole facing outward.
- Using snap ring pliers, install a new snap ring.

11. INSTALL SPRING, FLOW CONTROL VALVE AND PRESSURE PORT UNION

- Install the spring.
- Install the flow control valve facing in the correct direction (See page [SR-25](#)).
- Coat a new O-ring with power steering fluid and install it to the pressure port union.
- Install the pressure port union.

Torque: 69 N·m (700 kgf-cm, 51 ft-lbf)

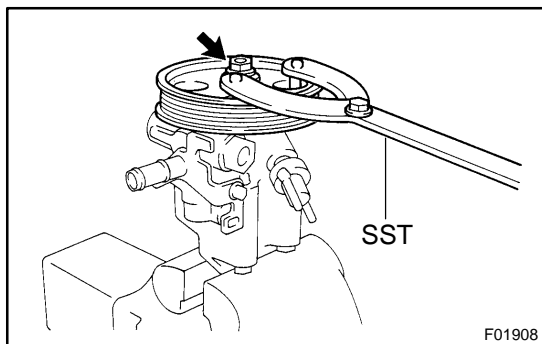
12. INSTALL SUCTION PORT UNION

- (a) Coat a new O-ring with power steering fluid and install it to the suction port union.
- (b) Install the suction port union with the 2 bolts.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

13. INSTALL AIR CONTROL VALVE

Torque: 29 N·m (300 kgf-cm, 22 ft-lbf)

**14. INSTALL VANE PUMP PULLEY**

- (a) Install the nut and vane pump pulley to the vane pump shaft.
- (b) Using SST, stop the pulley rotating and 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-28](#))

INSTALLATION

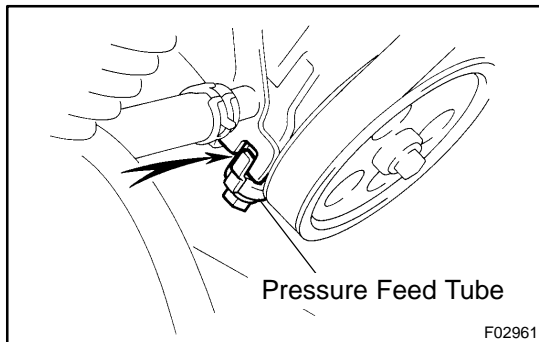
1. INSTALL PS VANE PUMP ASSEMBLY

Install the PS vane pump assembly with the 2 bolts and nut.

Torque:

Bolt: 39 N·m (400 kgf·cm, 29 ft·lbf)

Nut: 43 N·m (440 kgf·cm, 32 ft·lbf)



2. INSTALL PRESSURE FEED TUBE

Install a new gasket, then connect the pressure feed tube with the union bolt.

Torque: 49 N·m (500 kgf·cm, 36 ft·lbf)

HINT:

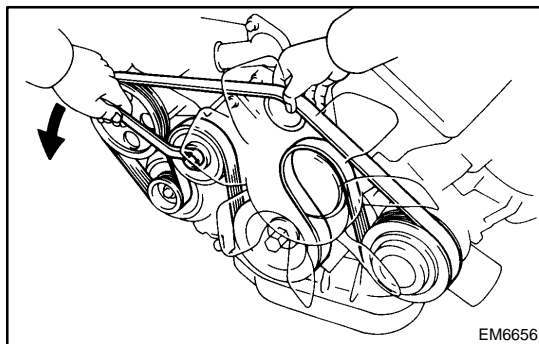
Make sure the stopper of the pressure feed tube touches the PS vane pump body as shown in the illustration, then torque the union bolt.

3. CONNECT RETURN HOSE

Connect the return hose with the clip.

4. CONNECT 2 VACUUM HOSES

Connect the 2 vacuum hoses with the 2 clips.



5. INSTALL DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise, and install the belt.

6. INSTALL BRAKE ACTUATOR ASSEMBLY

(See page [BR-51](#))

7. INSTALL AIR CLEANER ASSEMBLY WITH AIR CLEANER HOSE

(a) Install the air cleaner assembly with air cleaner hose with the 3 bolts.

(b) Install the clamp.

(c) Connect the MAF meter connector.

8. INSTALL AIR CLEANER INLET AND BATTERY CLAMP COVER

Install the air cleaner inlet and battery clamp cover with the bolt.

9. INSTALL RH REAR ENGINE UNDER COVER

Install the RH rear engine under cover with the 3 bolts.

10. INSTALL ENGINE UNDER COVER

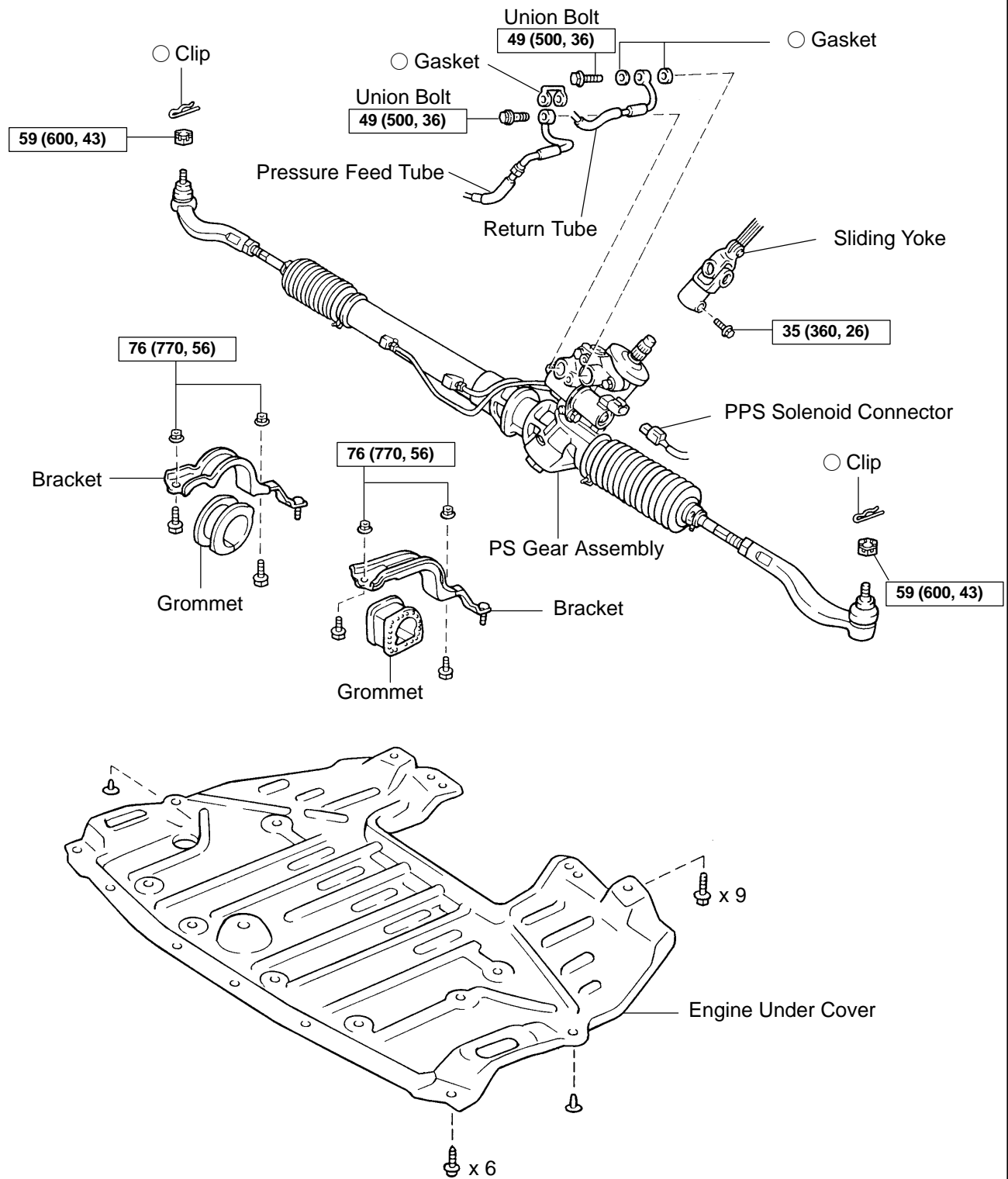
Install the engine under cover with the 9 bolts, 6 screws and 2 clips.

11. BLEED POWER STEERING SYSTEM

(See page [SR-4](#))

POWER STEERING GEAR COMPONENTS

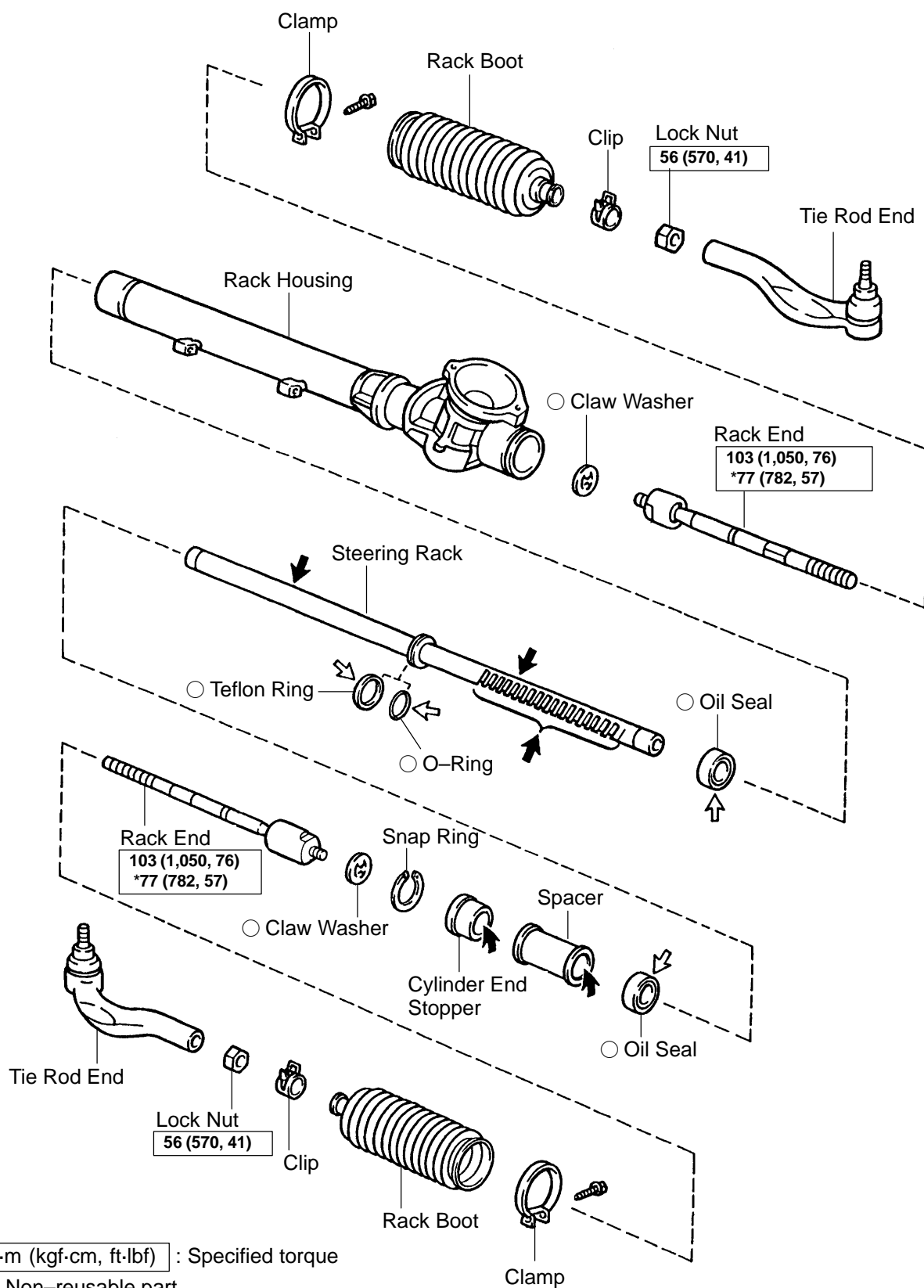
SROBW-03



N·m (kgf·cm, ft·lbf) : Specified torque

○ Non-reusable part

F02980



N·m (kgf·cm, ft·lbf) : Specified torque

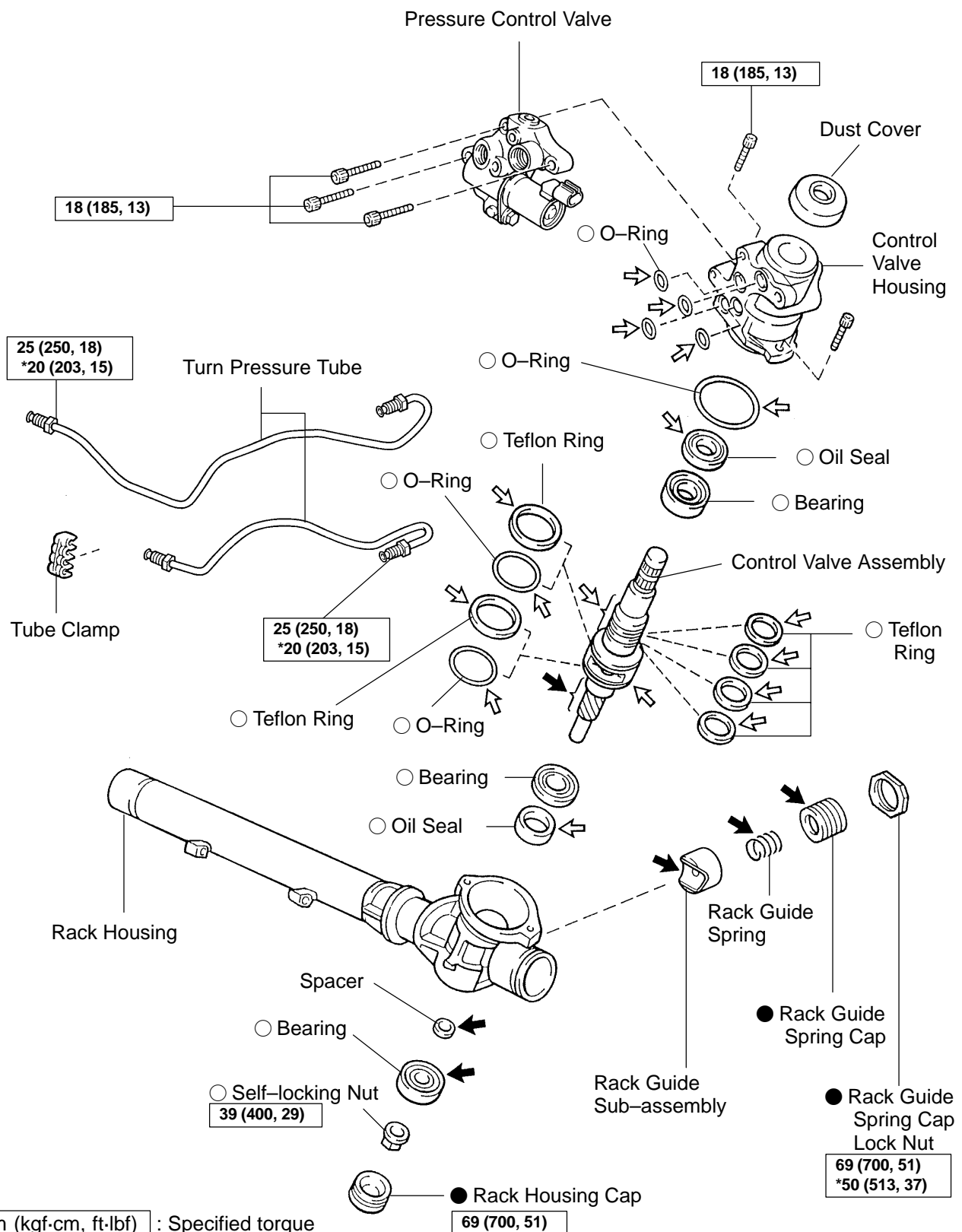
○ Non-reusable part

◀ Molybdenum disulfide lithium base grease

↻ Power steering fluid

* For use with SST

F03831



F02981

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-12](#))
3. REMOVE STEERING WHEEL (See page [SR-12](#))
4. REMOVE ENGINE UNDER COVER

Remove the 9 bolts, 6 screws, 2 clips and engine under cover.

5. DISCONNECT RH AND LH TIE ROD ENDS
(See page [SA-41](#))

6. DISCONNECT SLIDING YOKE (See page [SR-12](#))

7. DISCONNECT PRESSURE FEED TUBE

Remove the union bolt and gasket, and disconnect the pressure feed tube.

8. DISCONNECT RETURN TUBE

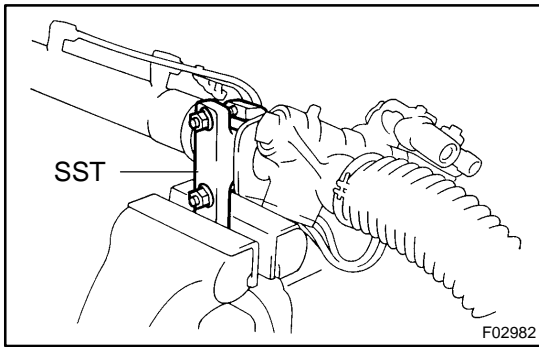
Remove the union bolt and 2 gaskets, and disconnect the return tube.

9. REMOVE PS GEAR ASSEMBLY

- (a) Disconnect the PPS solenoid connector.
- (b) Remove the 4 mount bolts and nuts.
- (c) Remove the 2 brackets, 2 grommets and PS gear assembly.

NOTICE:

Do not damage the turn pressure tubes.



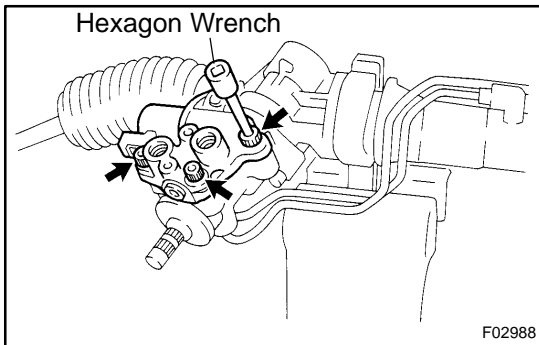
DISASSEMBLY

NOTICE:

When using a vise, do not overtighten it.

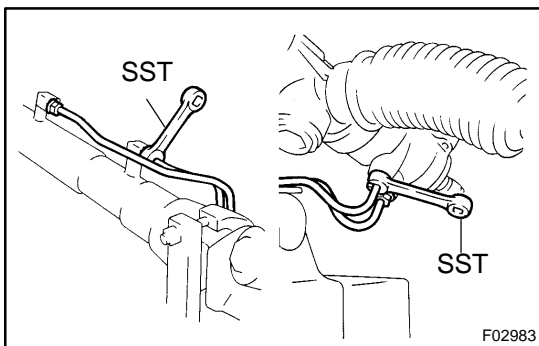
1. SECURE PS GEAR ASSEMBLY IN VISE

- Using SST, secure the PS gear assembly in a vise. SST 09612-00012
- Remove the tube clamp.



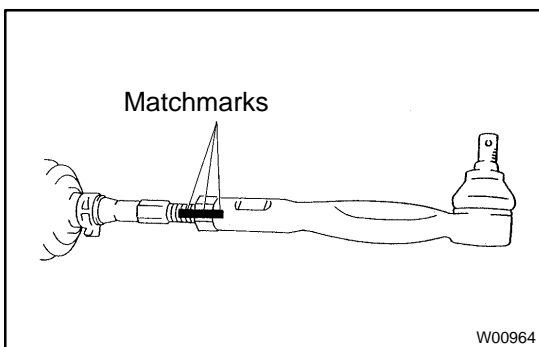
2. REMOVE PRESSURE CONTROL VALVE

- Using a hexagon wrench (6 mm), remove the 3 bolts and pressure control valve.
- Remove the 4 O-rings from the pressure control valve.



3. REMOVE 2 TURN PRESSURE TUBES

Using SST, remove the 2 turn pressure tubes.
SST 09633-00020



4. REMOVE RH AND LH TIE ROD ENDS AND LOCK NUTS

- Place matchmarks on the tie rod end and rack end.
- Loosen the lock nut and remove the tie rod end and lock nut.
- Employ the same manner described above to the other side.

5. REMOVE RH AND LH CLIPS, RACK BOOTS AND CLAMPS

- Remove the screw and loosen the clamp.

NOTICE:

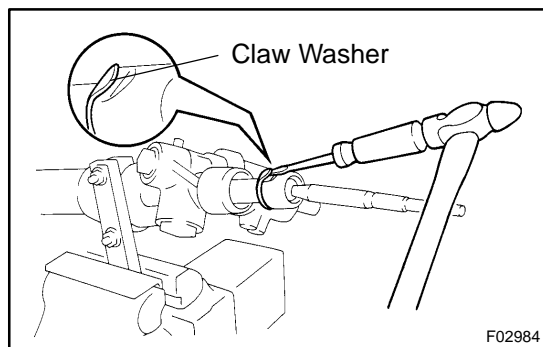
Be careful not to damage the boot.

- Remove the clip and rack boot.

HINT:

Mark the RH and LH rack boots.

- Employ the same manner described above to the other side.

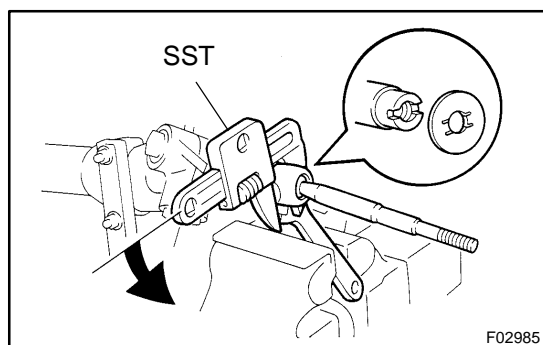


6. REMOVE RH AND LH RACK ENDS AND CLAW WASHERS

- (a) Using a screwdriver and hammer, unstake the washer.

NOTICE:

Avoid any impact on the steering rack.



- (b) Using a wrench, hold the steering rack steadily and using SST, remove the rack end.

SST 09922-10010

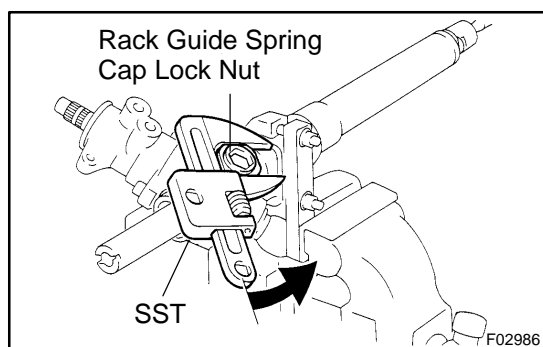
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Mark the RH and LH rack ends.

- (c) Remove the claw washer.
(d) Employ the same manner described above to the other side.



7. REMOVE RACK GUIDE SPRING CAP LOCK NUT

Using SST, remove the rack guide spring cap lock nut.

SST 09922-10010

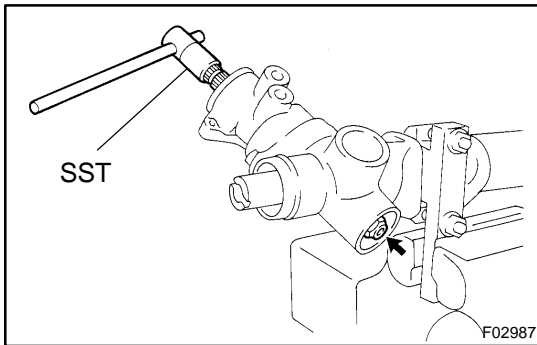
NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

8. REMOVE RACK GUIDE SPRING CAP, RACK GUIDE SPRING, RACK GUIDE SUB-ASSEMBLY

- (a) Using a hexagon wrench (24 mm), remove the rack guide spring cap.
(b) Remove the rack guide spring and rack guide sub-assembly.

9. REMOVE RACK HOUSING CAP

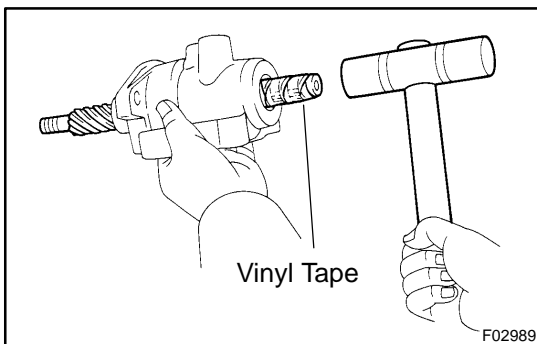
**10. REMOVE SELF-LOCKING NUT**

Using SST, stop the control valve shaft rotating and remove the self-locking nut.

SST 09616-00010

11. REMOVE DUST COVER**12. REMOVE CONTROL VALVE HOUSING WITH CONTROL VALVE ASSEMBLY**

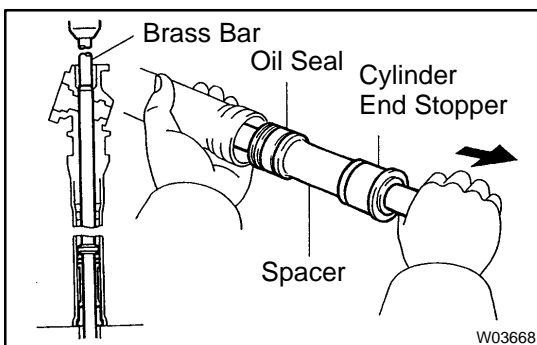
- Using a hexagon wrench (6 mm), remove the 2 bolts.
- Pull out the control valve housing with control valve assembly.
- Remove the O-ring from the valve housing.

**13. REMOVE CONTROL VALVE ASSEMBLY**

- To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.
- Using a plastic hammer, tap out the control valve assembly.

14. REMOVE BEARING AND SPACER

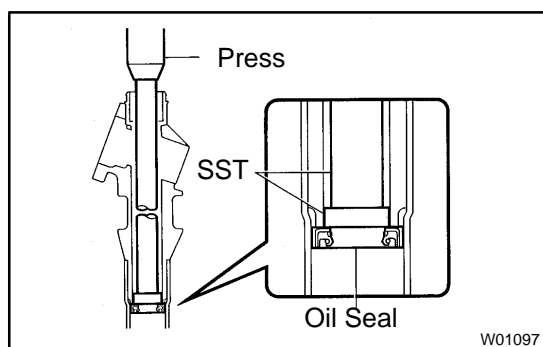
Remove the bearing and spacer from the rack housing.

**15. REMOVE CYLINDER END STOPPER, SPACER, OIL SEAL AND STEERING RACK**

- Using snap ring pliers, remove the snap ring from the rack housing.
- Using a brass bar, press the steering rack until the cylinder end stopper slightly touches the press block.
- Pull out the steering rack with the cylinder end stopper, spacer and oil seal.

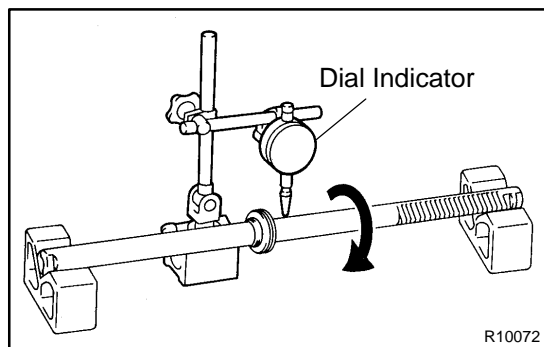
HINT:

If necessary, slightly tap the rack end with a brass bar and hammer.

**16. REMOVE OIL SEAL**

Using SST, press out the oil seal.

SST 09950-60010 (09951-00310),
09950-70010 (09951-07360)



INSPECTION

NOTICE:

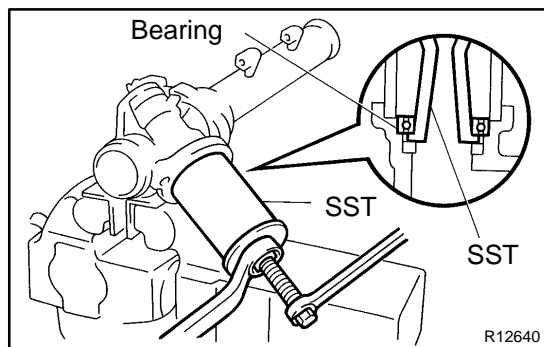
When using a vise, do not overtighten it.

INSPECT STEERING RACK

- (a) Using a dial indicator, check the rack for runout and for teeth wear and damage.

Maximum runout: 0.30 mm (0.0118 in.)

- (b) Check the back surface for wear and damage.



REPLACEMENT

NOTICE:

When using a vise, do not overtighten it.

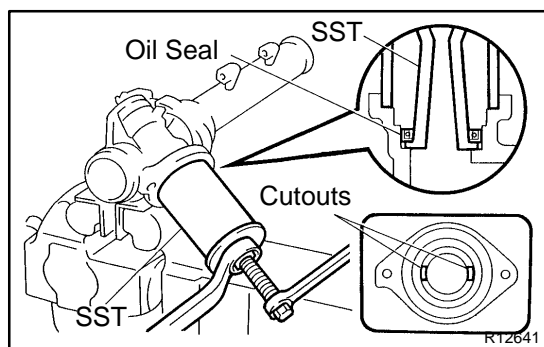
1. IF NECESSARY, REPLACE BEARING AND OIL SEAL

- (a) Using SST, remove the bearing from the rack housing.

SST 09612-30012

NOTICE:

Be careful not to damage the rack housing.



- (b) Using SST, remove the oil seal from the rack housing.

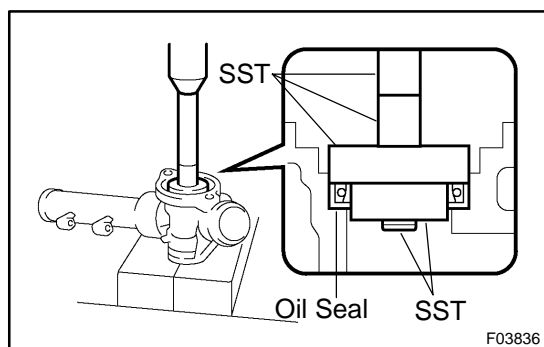
SST 09612-30012

NOTICE:

Be careful not to damage the rack housing.

HINT:

When using SST, apply the tips of SST to the cutouts in the rack housing.



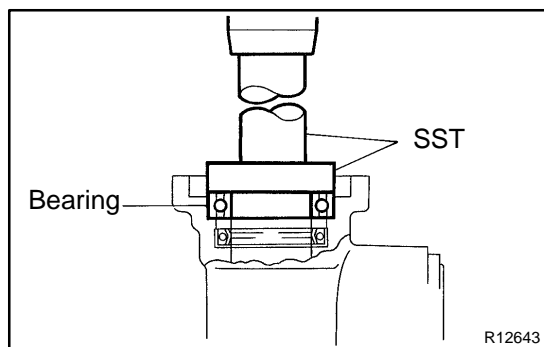
- (c) Coat a new oil seal lip with power steering fluid.

- (d) Using SST, press in the oil seal.

SST 09950-60010 (09951-00280, 09951-00400,
09952-06010), 09950-70010 (09951-07100)

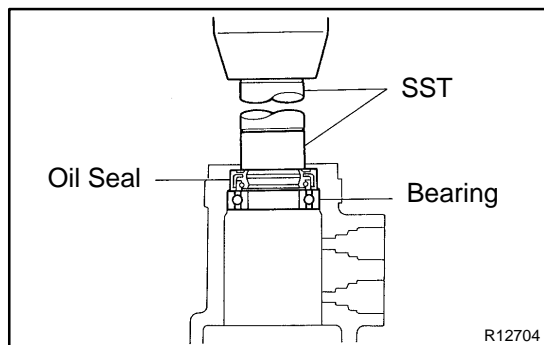
NOTICE:

Make sure to install the oil seal facing in the correct direction.



- (e) Using SST, press in a new bearing.

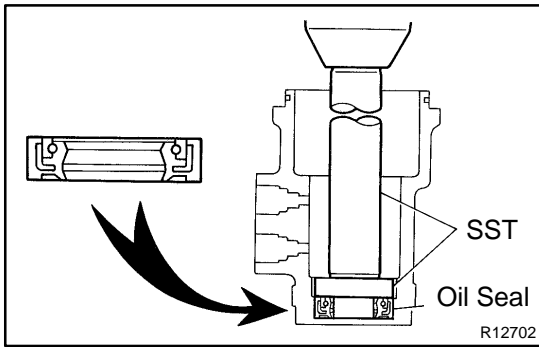
SST 09950-60010 (09951-00460),
09950-70010 (09951-07100)



2. IF NECESSARY, REPLACE BEARING AND OIL SEAL

- (a) Using SST, press out the oil seal and bearing from the control valve housing.

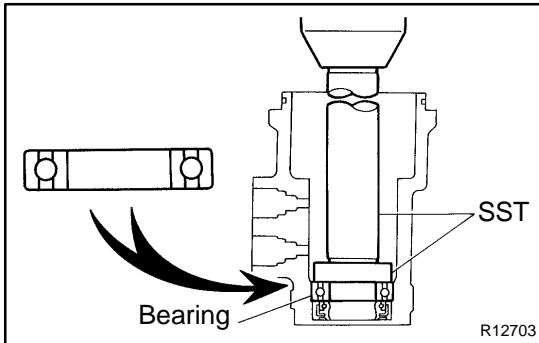
SST 09950-60010 (09951-00240),
09950-70010 (09951-07100)



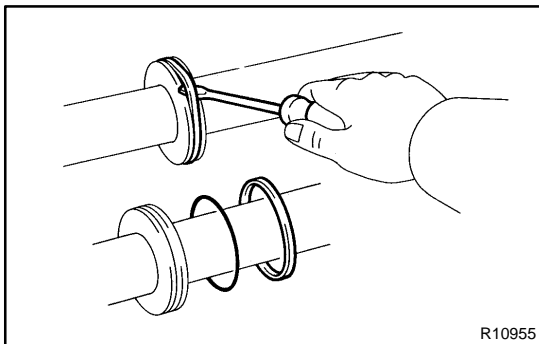
- (b) Coat a new oil seal lip with power steering fluid.
- (c) Using SST, press in the oil seal.
SST 09950-60010 (09951-00320),
09950-70010 (09951-07200)

NOTICE:

Make sure to install the oil seal facing in the correct direction.



- (d) Using SST, press in a new bearing.
SST 09950-60010 (09951-00340),
09950-70010 (09951-07200)



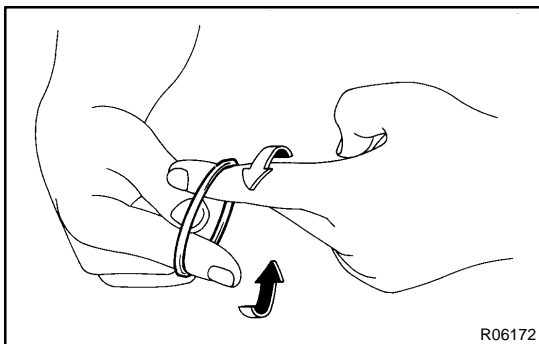
3. IF NECESSARY, REPLACE TEFLON RING AND O-RING

- (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.

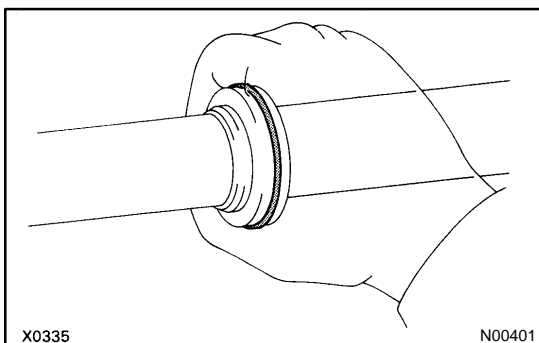
- (b) Coat a new O-ring with power steering fluid and install it to the steering rack.



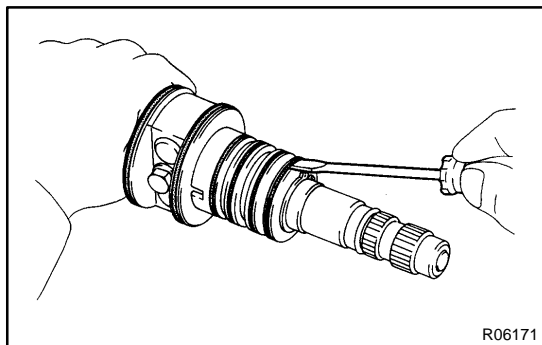
- (c) Expand a new teflon ring with your fingers.

NOTICE:

Be careful not to overexpand the teflon ring.



- (d) Coat the teflon ring with power steering fluid.
- (e) Install the teflon ring to the steering rack and settle it down with your fingers.



4. 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 ring.

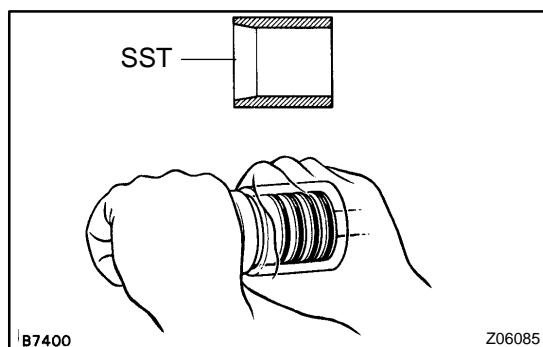
- (b) Expand 4 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon rings.

- (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.

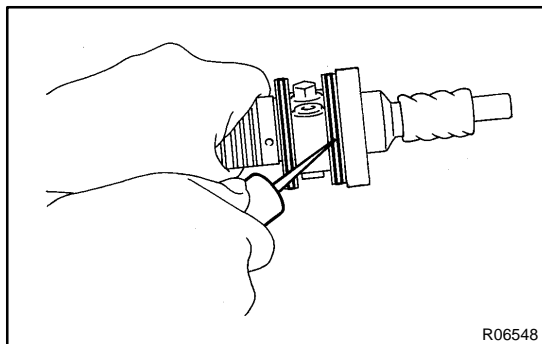


- (e) Carefully slide the tapered end of SST over the teflon rings until they fit to the control valve assembly.

SST 09631-20081

NOTICE:

Be careful not to damage the teflon rings.



5. IF NECESSARY, REPLACE TEFLON RINGS AND O-RINGS

- (a) Using a screwdriver, remove the 2 teflon rings and O-rings from the control valve assembly.

NOTICE:

Be careful not to damage the grooves for the ring.

- (b) Coat 2 new O-rings with power steering fluid and install them to the control valve assembly.

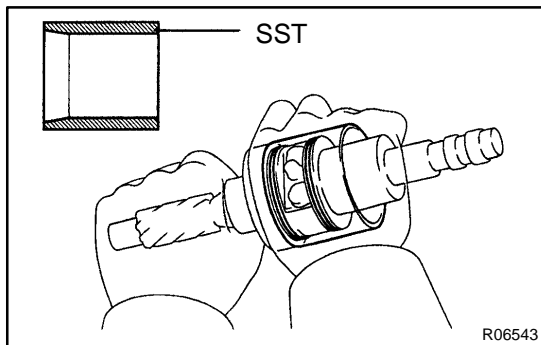
- (c) Expand 2 new teflon rings with your fingers.

NOTICE:

Be careful not to overexpand the teflon rings.

- (d) Coat the teflon rings with power steering fluid.

- (e) Install the teflon rings to the control valve assembly, and settle them down with your fingers.

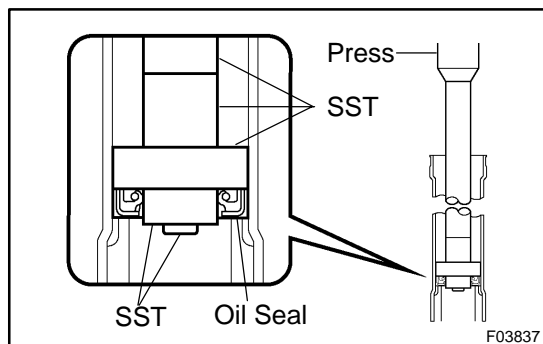


- (f) Carefully slide the tapered end of SST over the rings until they fit to the control valve assembly.

SST 09631-32020

NOTICE:

Be careful not to damage the rings.



REASSEMBLY

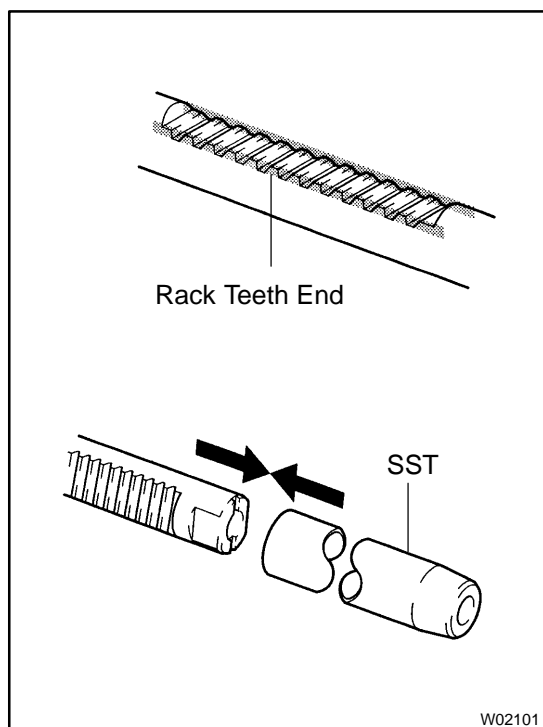
NOTICE:

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-40](#))**
2. **INSTALL OIL SEAL**
 - (a) Coat a new oil seal lip with power steering fluid.
 - (b) Using SST, press in the oil seal.
SST 09950-60010 (09951-00240, 09951-00430, 09952-06010), 09950-70010 (09951-07360)

NOTICE:

- Make sure to install the oil seal 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 steering rack.
SST 09631-20102

HINT:

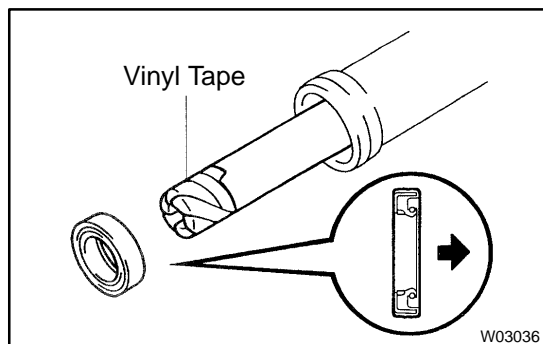
If necessary, scrape the burrs off the rack teeth end and bur-nish.

- (b) Coat SST with power steering fluid.
- (c) Install the steering rack into the rack housing.

NOTICE:

Be careful not to damage the oil seal lip.

- (d) Remove the SST.
SST 09631-20102

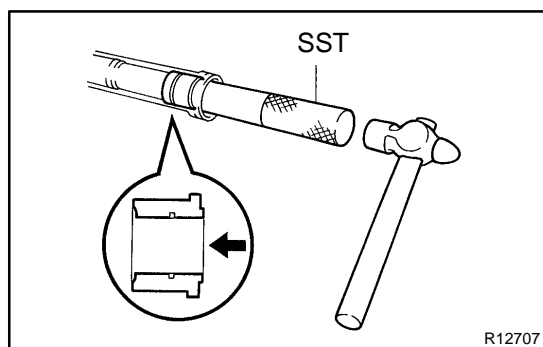


4. INSTALL OIL SEAL AND SPACER

- Coat a new oil seal lip with power steering fluid.
- To prevent oil seal lip damage, wind vinyl tape on the steering rack end, and apply power steering fluid.
- Install the oil seal by pushing it into the rack housing without tilting.

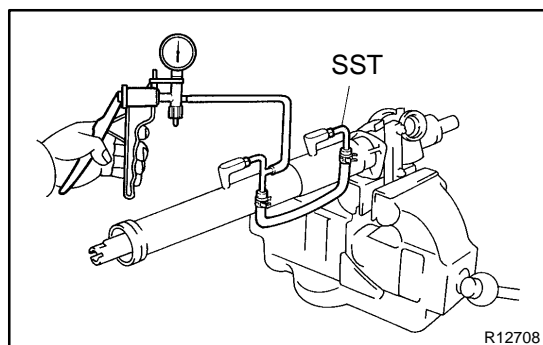
NOTICE:

- Make sure to install the oil seal facing in the correct direction.
 - Be careful not to damage the oil seal lip.
- Install the spacer.



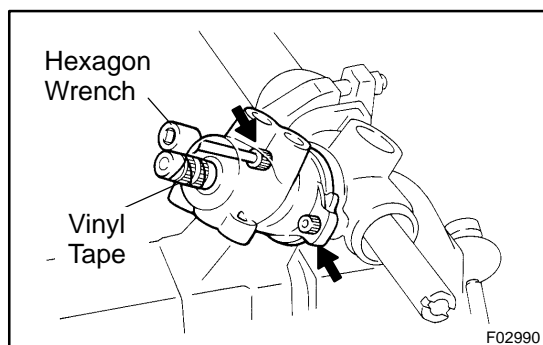
5. INSTALL CYLINDER END STOPPER

- Using SST and a hammer, drive in the cylinder end stopper.
SST 09612-22011
- Using snap ring pliers, install the snap ring.



6. AIR TIGHTNESS TEST

- Install SST to the rack housing.
SST 09631-12071
 - Apply 53 kPa (400 mmHg, 15.75 in.Hg) of vacuum for about 30 seconds.
 - 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

- Coat the teflon rings of the control valve assembly with power steering fluid.
- To prevent oil seal lip damage, wind vinyl tape on the serrated part of the control valve shaft.
- Install the control valve assembly into the control valve housing.

NOTICE:

Be careful not to damage the teflon rings and oil seal.

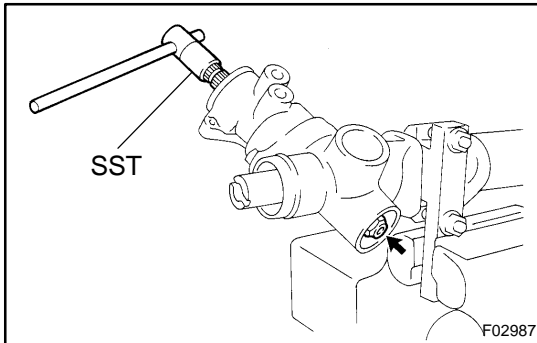
8. INSTALL CONTROL VALVE HOUSING

- (a) Coat a new O-ring with power steering fluid and install it to the control valve housing.
- (b) Using a hexagon wrench (6 mm), install the control valve housing with the 2 bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

9. INSTALL DUST COVER**10. INSTALL BEARING AND SPACER**

Install the spacer and a new bearing to the rack housing.

**11. INSTALL SELF-LOCKING NUT**

Using SST, stop the control valve shaft rotating and install a new self-locking nut.

SST 09616-00010

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

12. INSTALL RACK HOUSING CAP

- (a) Apply sealant to 2 or 3 threads of the rack housing cap.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Install the rack housing cap.

Torque: 69 N·m (700 kgf·cm, 51 ft·lbf)

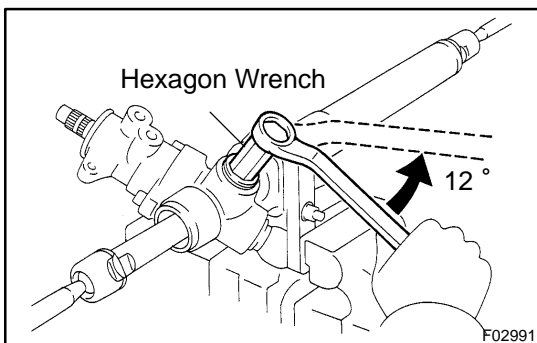
13. INSTALL RACK GUIDE SUB-ASSEMBLY, RACK GUIDE SPRING AND RACK GUIDE SPRING CAP

- (a) Install the rack guide sub-assembly 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

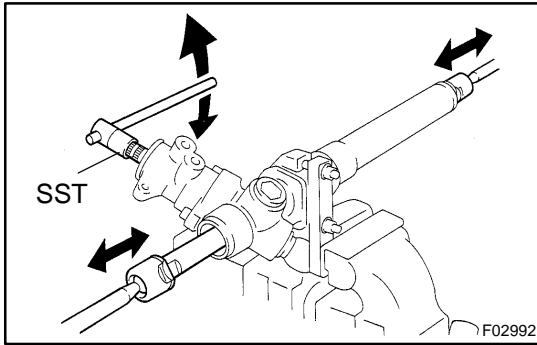
- (c) Temporarily install the rack guide spring cap.

**14. 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) Using a hexagon wrench (24 mm), torque the rack guide spring cap.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf)

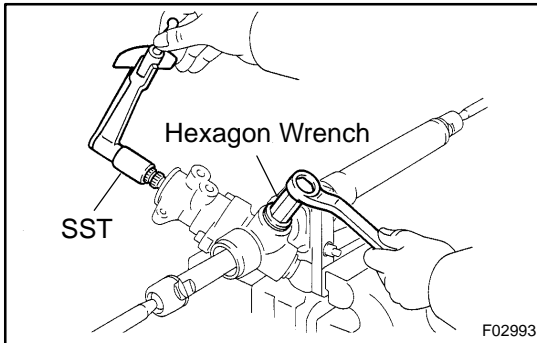
- (c) Using a hexagon wrench (24 mm), return the rack guide spring cap 12°.



- (d) Using SST, turn the control valve shaft right and left 1 or 2 times.

SST 09616-00010

- (e) Using a hexagon wrench (24 mm), loosen the rack guide spring cap until the rack guide spring is not functioning.



- (f) Using SST, a torque wrench and hexagon wrench (24 mm), tighten the rack guide spring cap until the preload is within specification.

SST 09616-00010

Preload (turning):

0.9 – 1.2 N·m (9 – 12 kgf·cm, 7.8 – 10.4 in.-lbf)

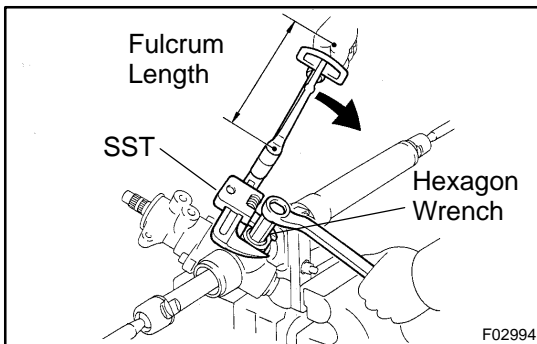
15. INSTALL RACK GUIDE SPRING CAP LOCK NUT

- (a) Apply sealant to 2 or 3 threads of the rack guide spring cap lock nut.

Sealant:

Part No. 08833-00080, THREE BOND 1344, LOCTITE 242 or equivalent

- (b) Temporarily install the rack guide spring cap lock nut.



- (c) Using a hexagon wrench (24 mm), hold the rack guide spring cap and using SST, torque the rack guide spring cap lock nut.

SST 09922-10010

Torque: 50 N·m (513 kgf·cm, 37 ft·lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

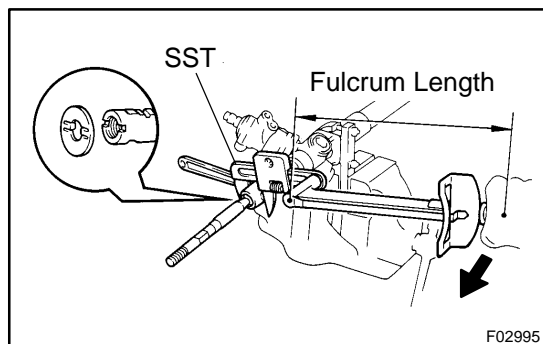
Use a torque wrench with a fulcrum length of 345 mm (13.58 in.).

- (d) Recheck the total preload.

Preload (turning):

0.9 – 1.2 N·m (9 – 12 kgf·cm, 7.8 – 10.4 in.-lbf)

- (e) Remove the RH and LH rack ends.



16. INSTALL RH AND LH CLAW WASHERS AND RACK ENDS

- (a) Install a new claw washer, and temporarily install the rack end.

HINT:

Align the claws of the washer with the steering rack grooves.

- (b) Using a wrench, hold the steering rack steadily and using SST, torque the rack end.

SST 09922-10010

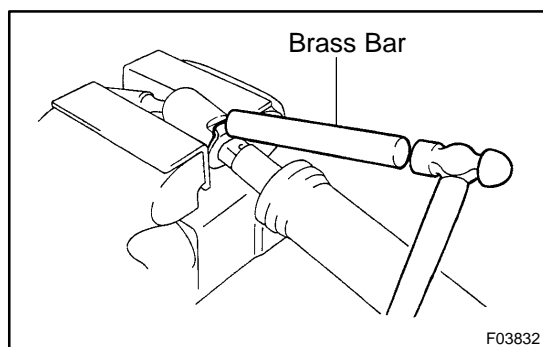
Torque: 77 N·m (782 kgf-cm, 57 ft-lbf)

NOTICE:

Use SST 09922-10010 in the direction shown in the illustration.

HINT:

Use a torque wrench with a fulcrum length of 380 mm (14.96 in.).

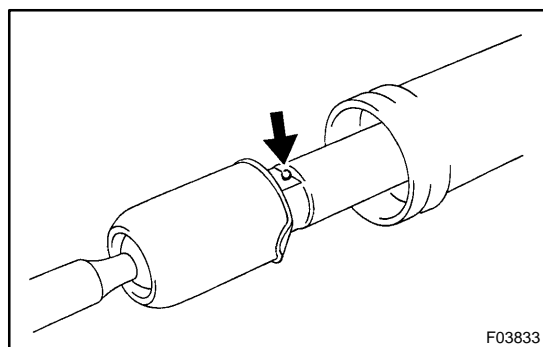


- (c) Using a brass bar and hammer, stake the washer.

NOTICE:

Avoid any impact on the steering rack.

- (d) Employ the same manner described above to the other side.



17. INSTALL RH AND LH RACK BOOTS, CLAMPS AND CLIPS

- (a) Ensure that the steering rack hole is not clogged with grease.

HINT:

If the hole is clogged, the pressure inside the boot will change after it is assembled and the steering wheel is turned.

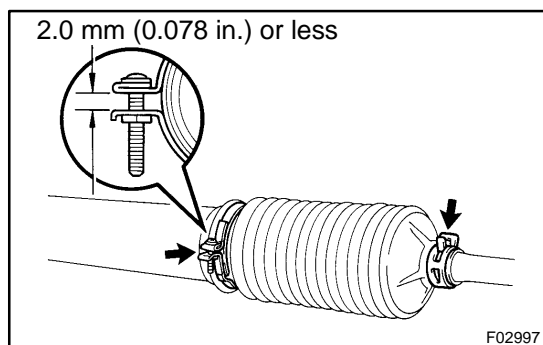
- (b) Install the boot, clip and clamp.

NOTICE:

Be careful not to damage or twist the boot.

- (c) Tighten the clamp with the screw as shown in the illustration.

- (d) Employ the same manner described above to the other side.

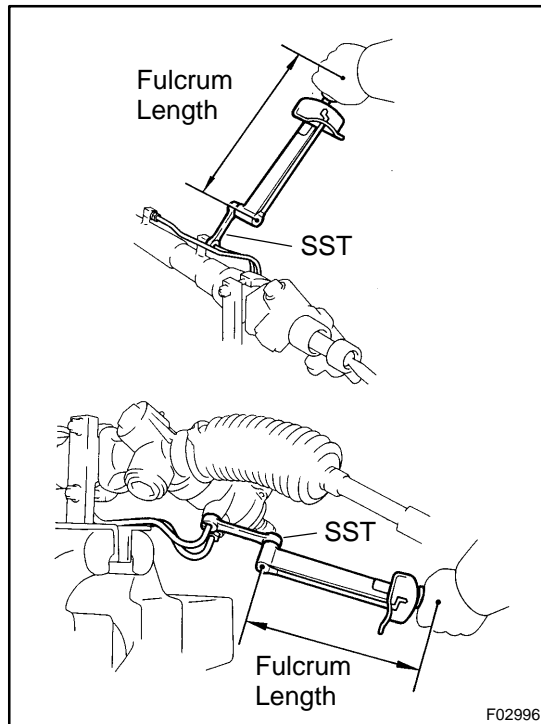


18. INSTALL RH AND LH TIE ROD ENDS AND LOCK NUTS

- (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: 56 N·m (570 kgf-cm, 41 ft-lbf)

- (c) Employ the same manner described above to the other side.

**19. INSTALL 2 TURN PRESSURE TUBES**

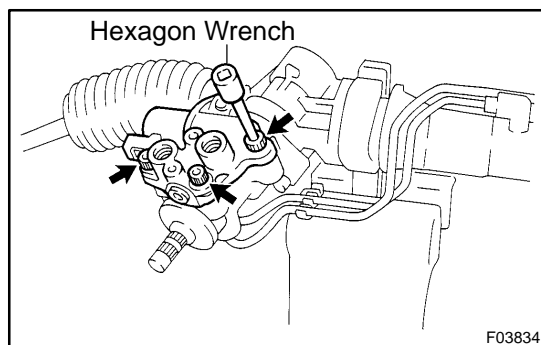
- (a) Using SST, install the 2 turn pressure tubes.

SST 09633-00020

Torque: 20 N·m (203 kgf-cm, 15 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.
- (b) Install the tube clamp.

**20. INSTALL PRESSURE CONTROL VALVE**

- (a) Coat 4 new O-rings with power steering fluid and install them to the pressure control valve.
- (b) Using hexagon wrench (6 mm), install the pressure control valve with the 3 bolts.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

INSTALLATION

1. INSTALL PS GEAR ASSEMBLY

- (a) Install the PS gear assembly, 2 grommets and 2 brackets.

NOTICE:

Do not damage the turn pressure tubes.

- (b) Install the 4 mount bolts and nuts.

Torque: 76 N·m (770 kgf-cm, 56 ft-lbf)

- (c) Connect the PPS solenoid connector.

2. CONNECT PRESSURE FEED TUBE

Install a new gasket, then connect the pressure feed tube with the union bolt.

Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)

3. CONNECT RETURN TUBE

Install new gasket on each side of the return tube and connect the return tube with the union bolt.

Torque: 49 N·m (500 kgf-cm, 36 ft-lbf)

4. CONNECT SLIDING YOKE (See page [SR-23](#))

5. CONNECT RH AND LH TIE ROD ENDS (See page [SA-43](#))

6. INSTALL ENGINE UNDER COVER

Install the engine under cover with the 9 bolts, 6 screws and 2 clips.

7. PLACE FRONT WHEELS FACING STRAIGHT AHEAD

HINT:

Do it with the front of the vehicle jacked up.

8. CENTER SPIRAL CABLE (See page [SR-23](#))

9. INSTALL STEERING WHEEL

- (a) Align the matchmarks on the steering wheel and 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

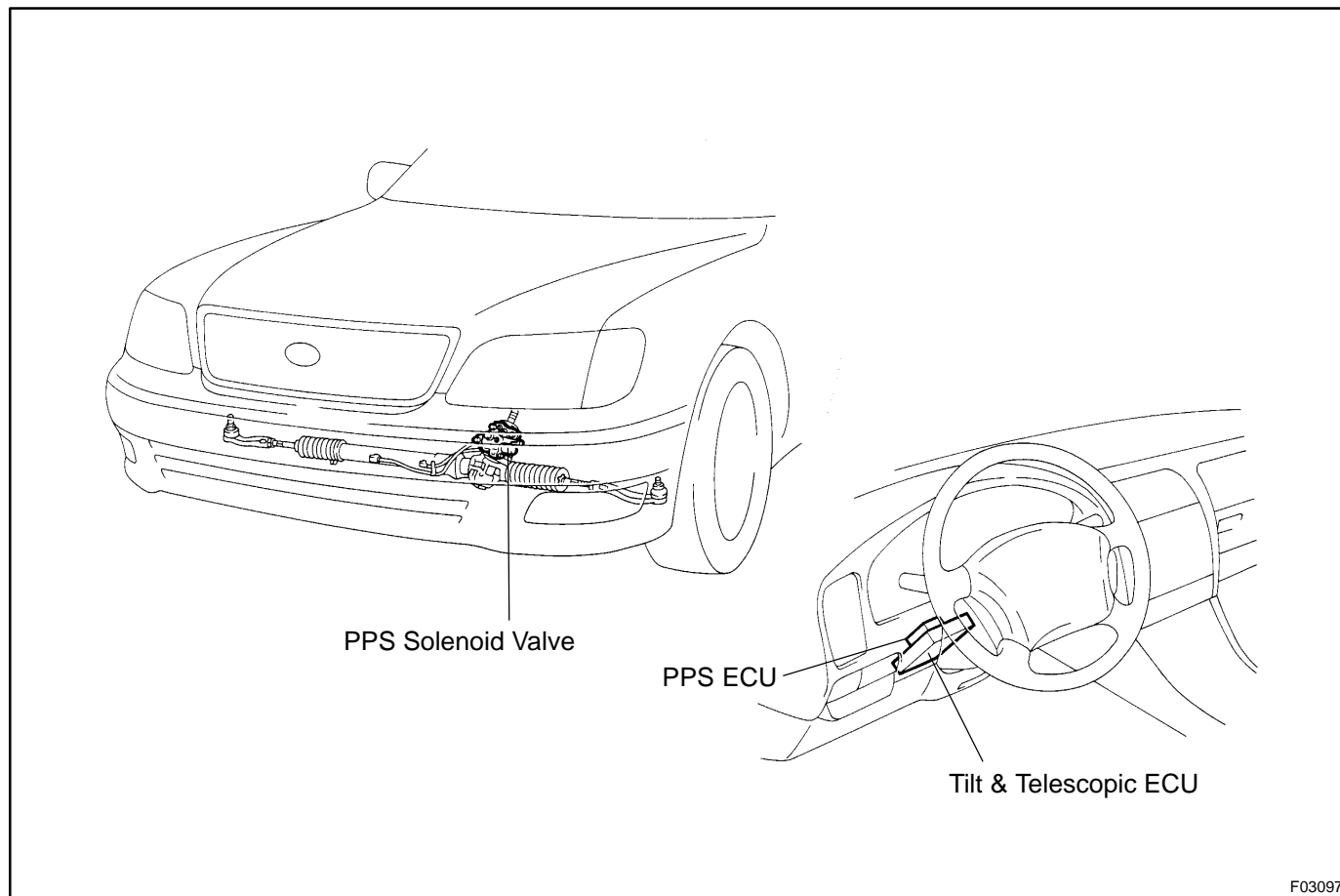
Torque: 35 N·m (360 kgf-cm, 26 ft-lbf)

13. INSTALL STEERING WHEEL PAD (See page [SR-23](#))

14. CHECK FRONT WHEEL ALIGNMENT (See page [SA-5](#))

PROGRESSIVE POWER STEERING (PPS) LOCATION

SROC2-03

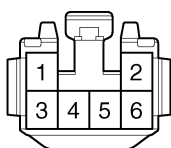


INSPECTION

NOTICE:

- When jacking or lifting up vehicles which have air suspension and running the engine, connect terminals T_D and E₁ of DLC 2 before starting the inspection (See page SA-1).
- When replacing PPS ECU, be careful not to also replace tilt and telescopic ECU.

Wire harness side:



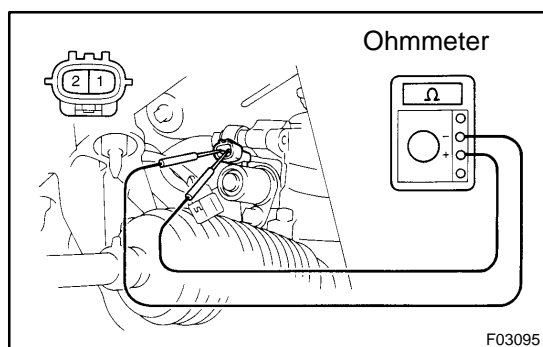
F03098

1. **INSPECT ECU-IG FUSE (Instrument panel J/B)**
(See page BE-23)
2. **INSPECT PPS ECU CIRCUIT**
 - (a) Disconnect the PPS ECU connector.
 - (b) Inspect the connector on wire harness side, as shown in the illustration.

Tester connection	Condition	Specified condition
4 – Body ground	Ignition switch ON	Battery positive voltage
6 – Body ground	Ignition switch ON	Continuity
*5 – 6	Ignition switch ON. Spin the rear wheel on one side with jacking or lifting UP.	0 → ∞ → 0 → ∞ →

If the circuit is not as specified, check and replace the wire harness.

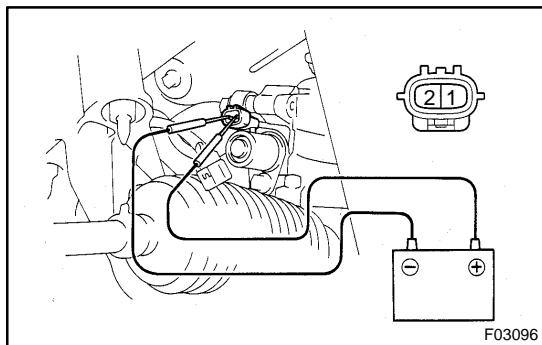
*If the circuit is not as specified, inspect the speed sensor.



3. **INSPECT PPS SOLENOID VALVE**
 - (a) Disconnect the PPS solenoid connector.
 - (b) Measure the resistance between the terminals of the solenoid 1 and 2.

Resistance: 6 – 11 Ω

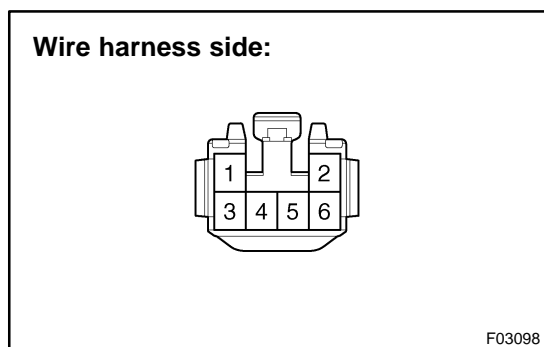
If it is not as specified, replace the pressure control valve with the solenoid valve.



- (c) Check the PPS solenoid operation.
- (1) Connect the battery positive terminal to the solenoid terminal 1.
 - (2) Connect the battery negative terminal to the solenoid terminal 2.
 - (3) Check that the solenoid makes a "clicks" sound.
- If it is faulty, replace the pressure control valve with the solenoid valve.

NOTICE:

- Do not apply voltage for more than 30 seconds to avoid burning out the solenoid.
 - If repeating this step, wait until the solenoid cools down enough that it can be touched by hand.
- (d) Connect the PPS solenoid connector.

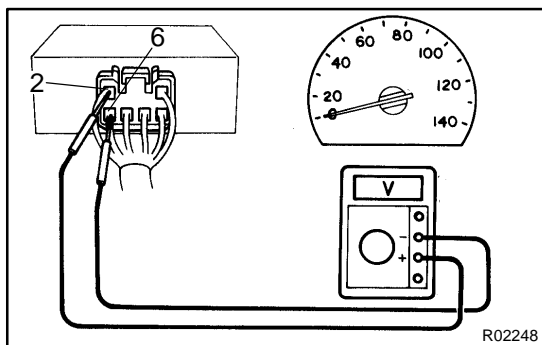


- (e) Inspect the PPS solenoid valve circuit.
- (1) Disconnect the PPS ECU connector.
 - (2) Check continuity between the terminals of the connector on wire harness side, as shown in the illustration.

Tester connection	Specified condition
1 – 6	No continuity
2 – 6	No continuity

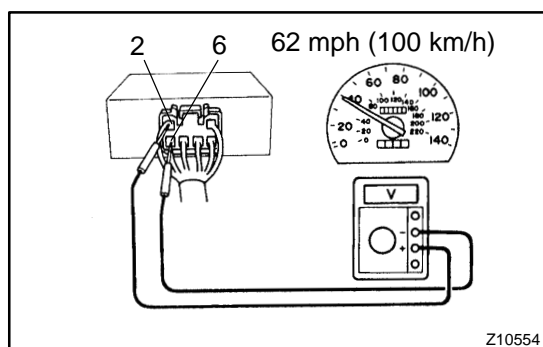
If it is not as specified, repair or replace wire harness or connector.

- (3) Connect the PPS ECU connector.

**4. INSPECT PPS ECU**

- (a) Jack up the vehicle and support it on stands.
- (b) Start the engine.
- (c) Measure the voltage of ECU.
 - (1) Using a voltmeter, measure the voltage between ECU terminals 2 and 6 while the engine is idling.

Standard voltage: 0.33 – 0.43 V



- (2) Place the transmission in gear and while running at about 62 mph (100 km/h), measure the voltage between ECU terminals 2 and 6.

Standard voltage: 0.12 – 0.25 V

If no voltage, try another ECU for LEXUS LS400.

- (d) Lower the vehicle.

SRS AIRBAG

PRECAUTION

RS01Y-04

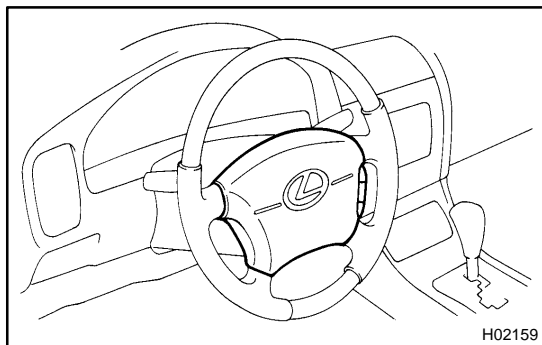
NOTICE:

- The LEXUS LS400 is equipped with SRS, which comprises a driver airbag, front passenger airbag, side airbag and seat belt pretensioner. 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 that 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 procedures 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. 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, side airbag assembly, seat belt pretensioner, airbag sensor assembly and side airbag sensor assembly should be inspected (See page [RS-16](#), [RS-30](#), [RS-44](#) and [BO-119](#)).
- 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, side airbag assembly, seat belt pretensioner, airbag sensor assembly or side airbag sensor assembly in order to reuse it.
- If the steering wheel pad, front passenger airbag assembly, side airbag assembly, seat belt pretensioner, airbag sensor assembly or side 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 (See page [DI-459](#)).
- If the vehicle is equipped with a mobile communication system, refer to the precaution in the IN section.

CAUTION:

- 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 to 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.

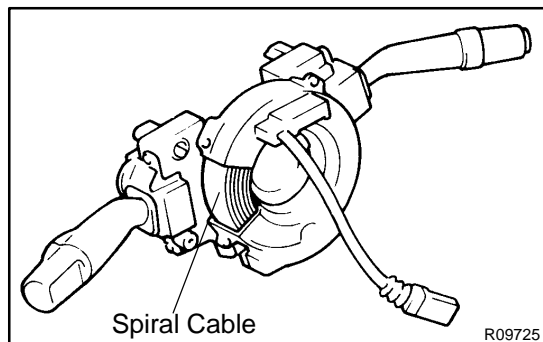
- Do not expose the steering wheel pad, front passenger airbag assembly, side airbag assembly, seat belt pretensioner, airbag sensor assembly or side airbag sensor assembly directly to hot air or flames.



OPERATION

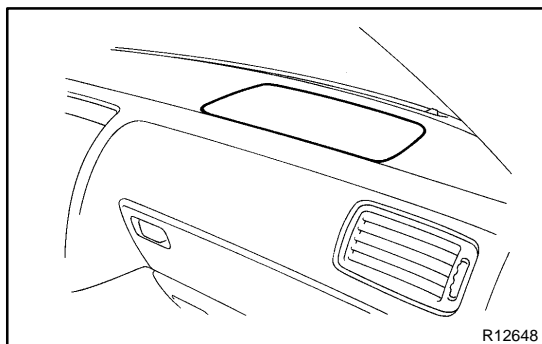
1. STEERING WHEEL PAD (with AIRBAG)

The inflator and bag of the SRS are stored in the steering wheel pad and cannot be disassembled. The inflator contains a squib, igniter charge, gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



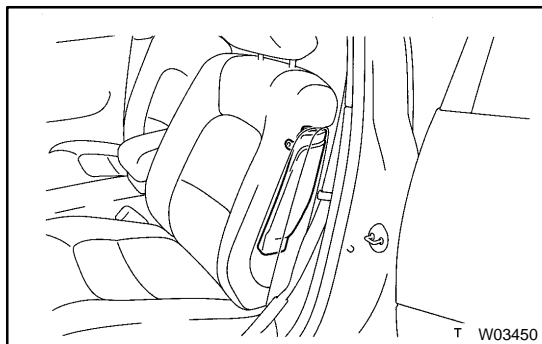
2. SPIRAL CABLE (in COMBINATION SWITCH)

A spiral cable is used as an electrical joint from the vehicle body side to the steering wheel.



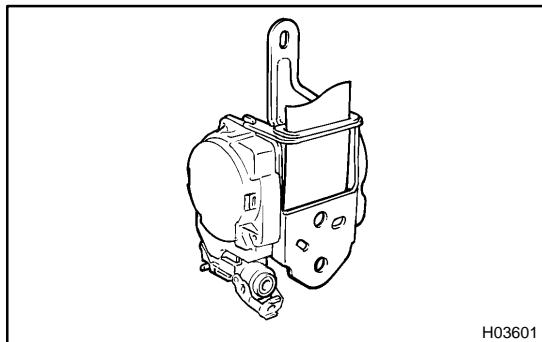
3. FRONT PASSENGER AIRBAG ASSEMBLY

The inflator and bag of the SRS are stored in the front passenger airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge, and gas generant, etc., and inflates the bag when instructed by the airbag sensor assembly.



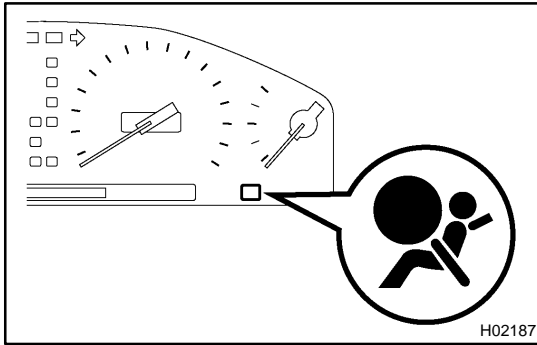
4. SIDE AIRBAG ASSEMBLY

The inflator and bag of the SRS side airbag are stored in the side airbag assembly and cannot be disassembled. The inflator contains a squib, igniter charge and gas generant, etc., and inflates the bag when instructed by the side airbag sensor assembly.



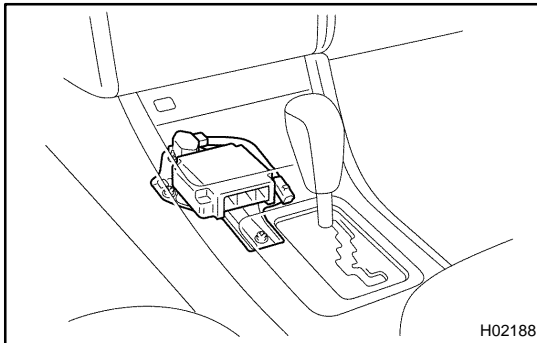
5. SEAT BELT PRETENSIONER

The seat belt pretensioner system is a component of the front seat outer belt. The pretensioner contains a squib, gas generant, wire, piston, etc., and operates in the event of a frontal collision.



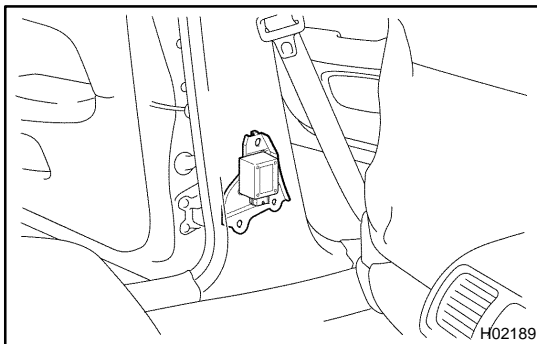
6. SRS WARNING LIGHT

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. In normal operation 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.



7. AIRBAG SENSOR ASSEMBLY

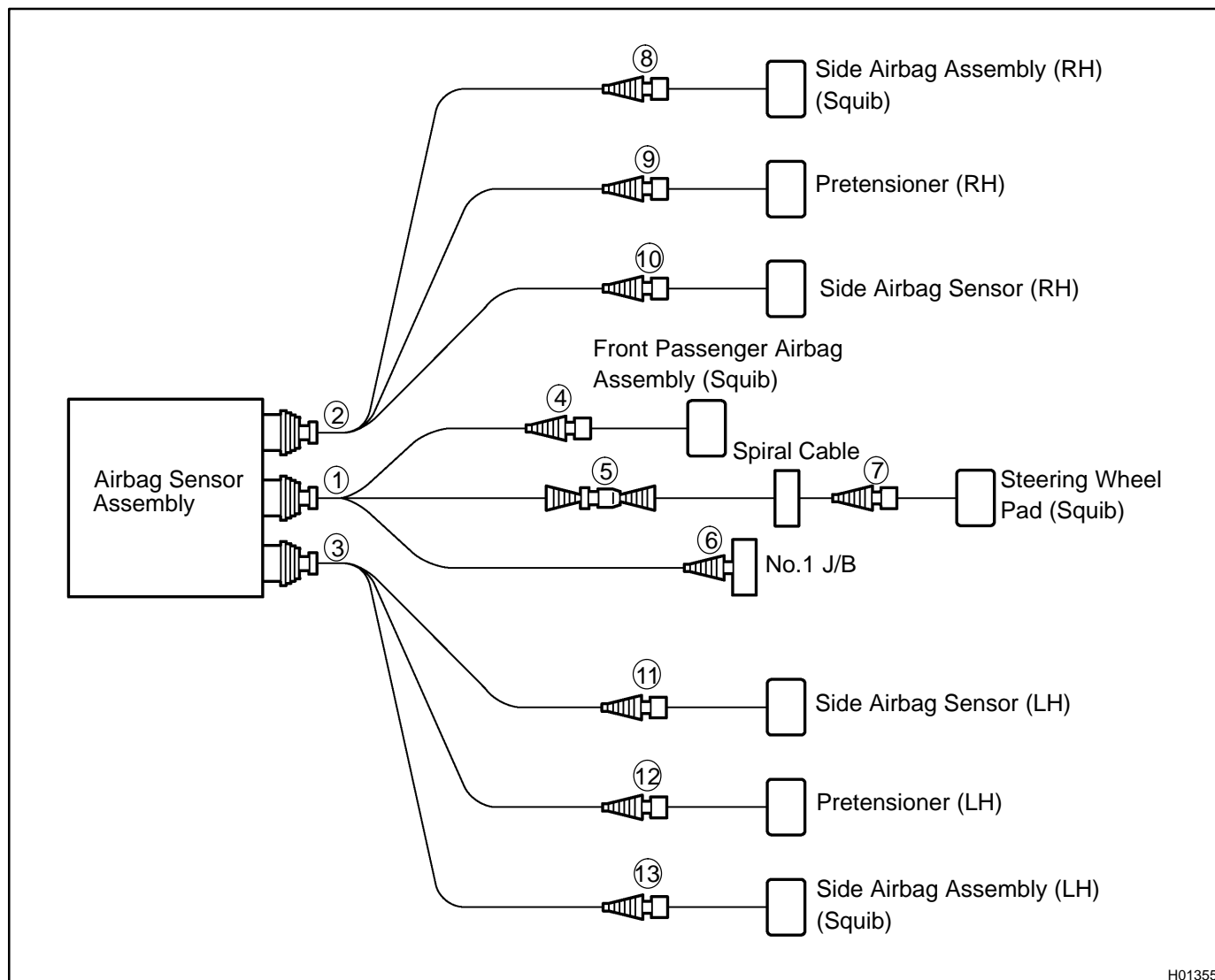
The airbag sensor assembly is mounted on the floor inside the lower center finish panel. The airbag sensor assembly consists of an airbag sensor, safing sensor, diagnosis circuit ignition control and drive circuit, etc. It receives signals from the airbag sensor and judges whether the SRS must be activated or not.



8. SIDE AIRBAG SENSOR ASSEMBLY

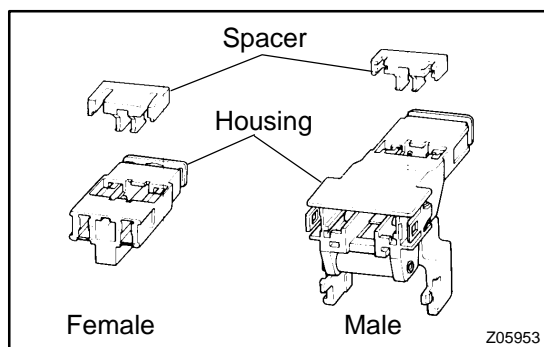
The side airbag sensor assembly is mounted in the LH and RH center pillar. The side airbag sensor assembly consists of a side airbag, sensor, safing sensor and diagnosis circuit, etc. It receives signals from the side airbag sensors and judges whether the SRS side airbag must be activated or not.

9. SRS CONNECTORS

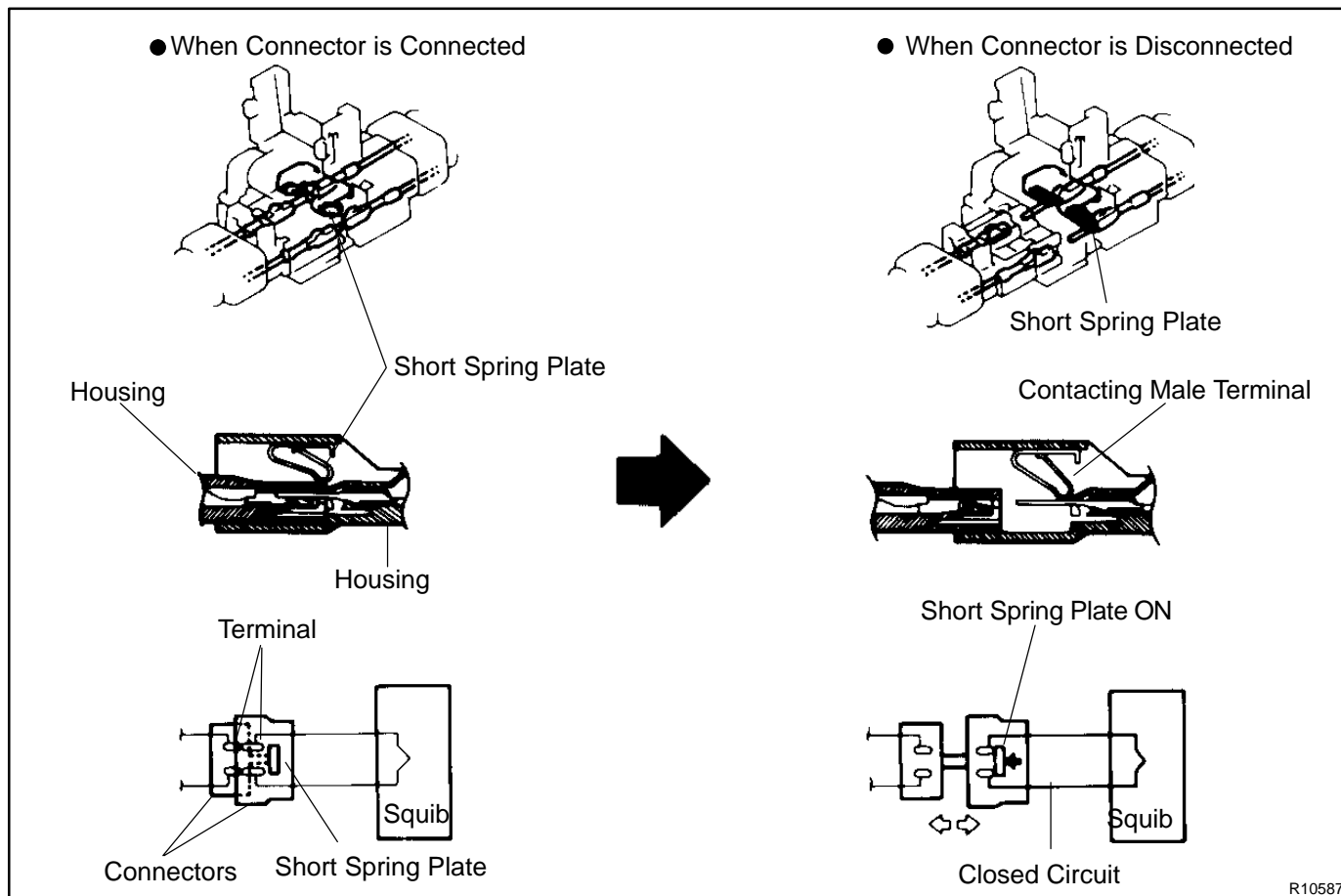


No.	Item	Application
(1)	Terminal Twin-Lock Mechanism	Connectors 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
(2)	Airbag Activation Prevention Mechanism	Connectors 1, 2, 3, 4, 5, 7, 8, 9, 12, 13
(3)	Electrical Connection Check Mechanism	Connectors 1, 2, 3
(4)	Connector Twin-Lock Mechanism	Connectors 5, 6

- (a) All connectors in the SRS are colored in yellow to distinguish them from other connectors. Connectors having special functions and specifically designed for the SRS are used in the locations shown on the previous page to ensure high reliability. These connectors use durable gold-plated terminals.

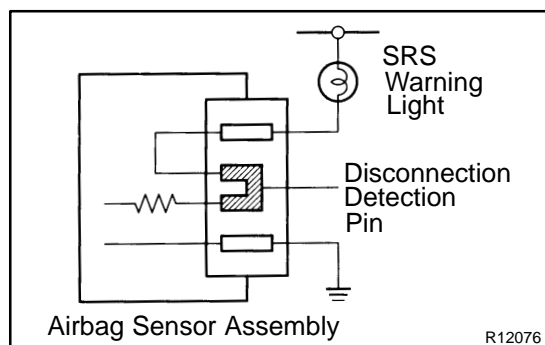


- (1) **Terminal Twin-Lock Mechanism**
Each connector has a two-piece component consisting of a housing and a spacer. This design enables the terminal to be locked securely by two locking devices (the retainer and the lance) to prevent terminals from coming out.
- (2) **Airbag Activation Prevention Mechanism**
Each connector contains a short spring plate. When the connector is disconnected, the short spring plate automatically connects positive (+) terminal and negative (–) terminal of the squib.

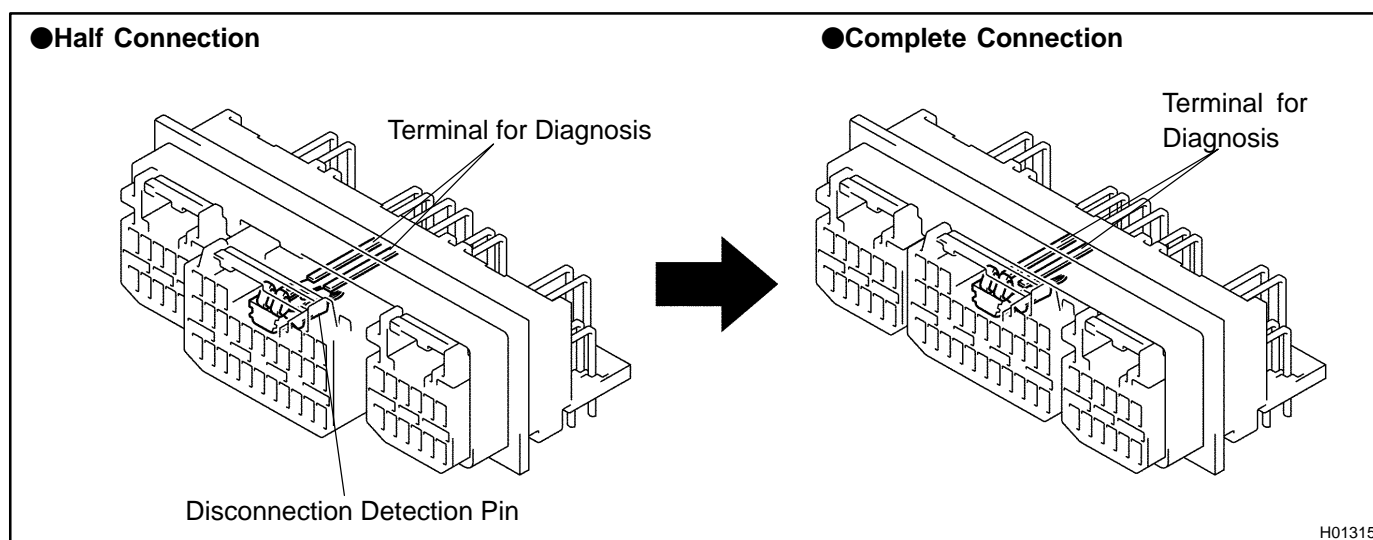


HINT:

The type of connector is shown in the diagram on the previous page.

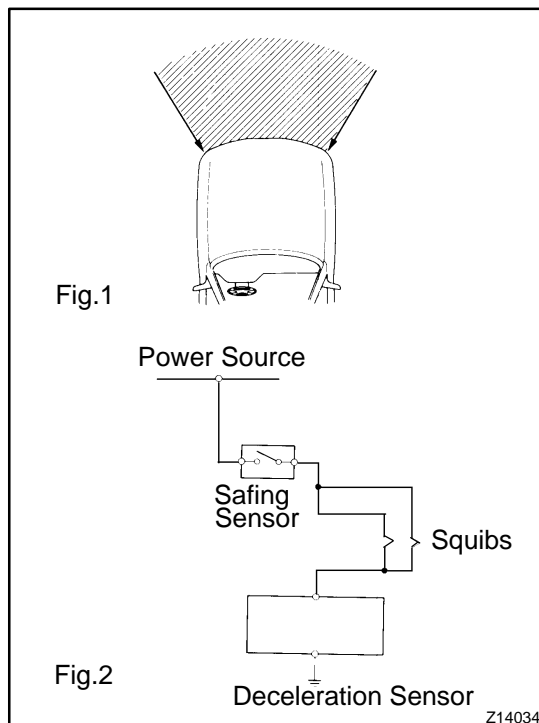
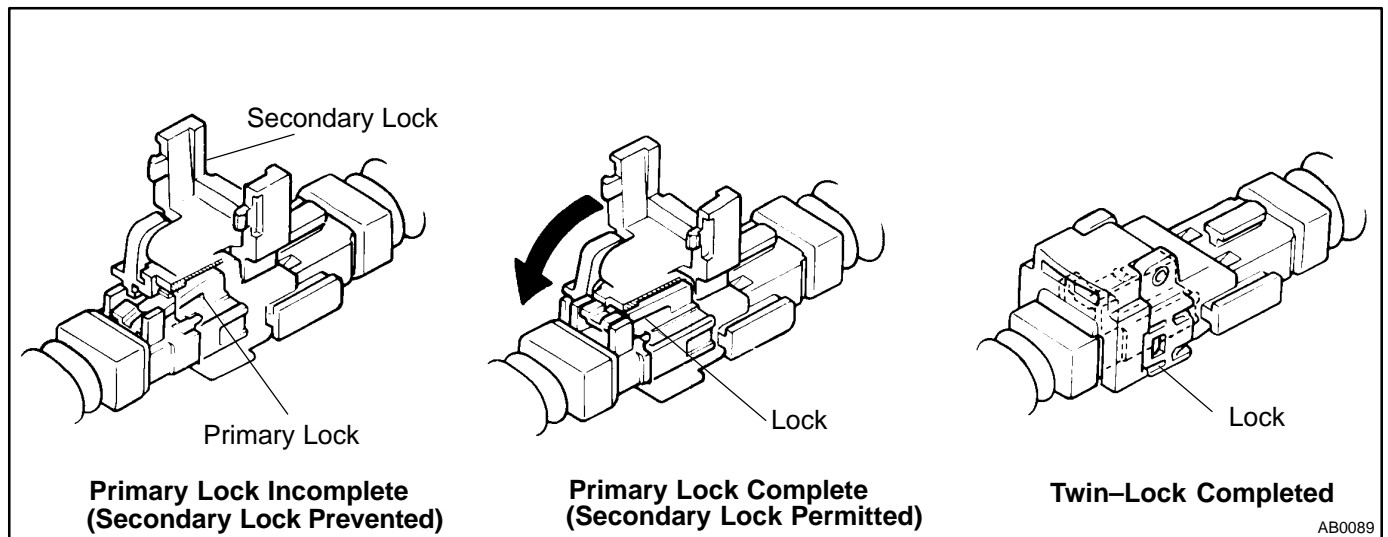


- (3) **Electrical Connection Check Mechanism**
 This mechanism electrically checks that connectors are connected correctly and completely. The electrical connection check mechanism is designed so that the disconnection detection pin connects with the diagnosis terminals when the connector housing lock is locked.

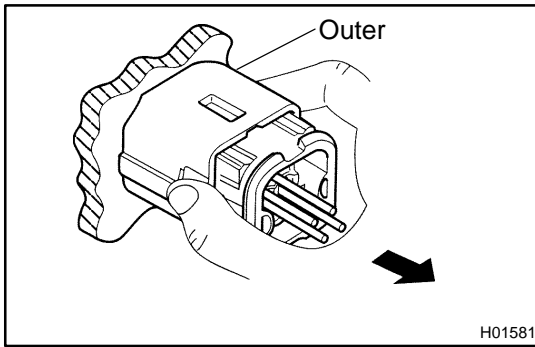
**HINT:**

The illustration shows connectors "1", "2", and "3".

- (4) **Connector Twin-Lock Mechanism**
 With this mechanism connectors (male and female connectors) are locked by 2 locking devices to increase the 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 the predetermined level, the SRS is activated automatically. A safing sensor is designed to go on at a smaller deceleration rate than the airbag sensor. As illustrated in Fig. 2, ignition is caused when current flows to the squib, which happens when a safing sensor and the deceleration sensor go on simultaneously. When a deceleration force acts on the sensors, 2 squibs in the driver airbag and front passenger airbag ignite and generate gas. The gas discharging into the driver airbag and front passenger airbag 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.

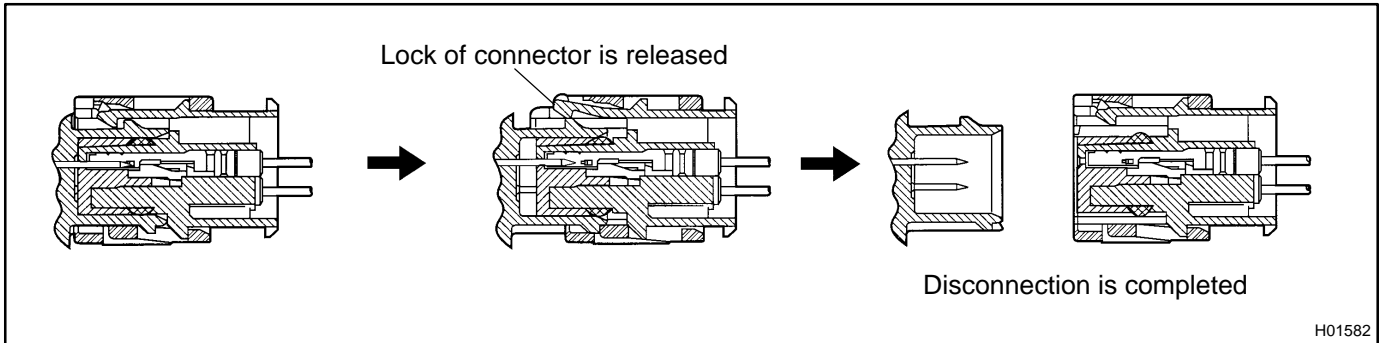


10. DISCONNECTION OF SIDE AIRBAG SENSOR CONNECTOR

- (a) With holding both flank sides of the outer, slide the outer to the direction shown by an arrow.
- (b) Lock of the connectors is released, then 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.



11. CONNECTION OF SIDE AIRBAG SENSOR CONNECTOR

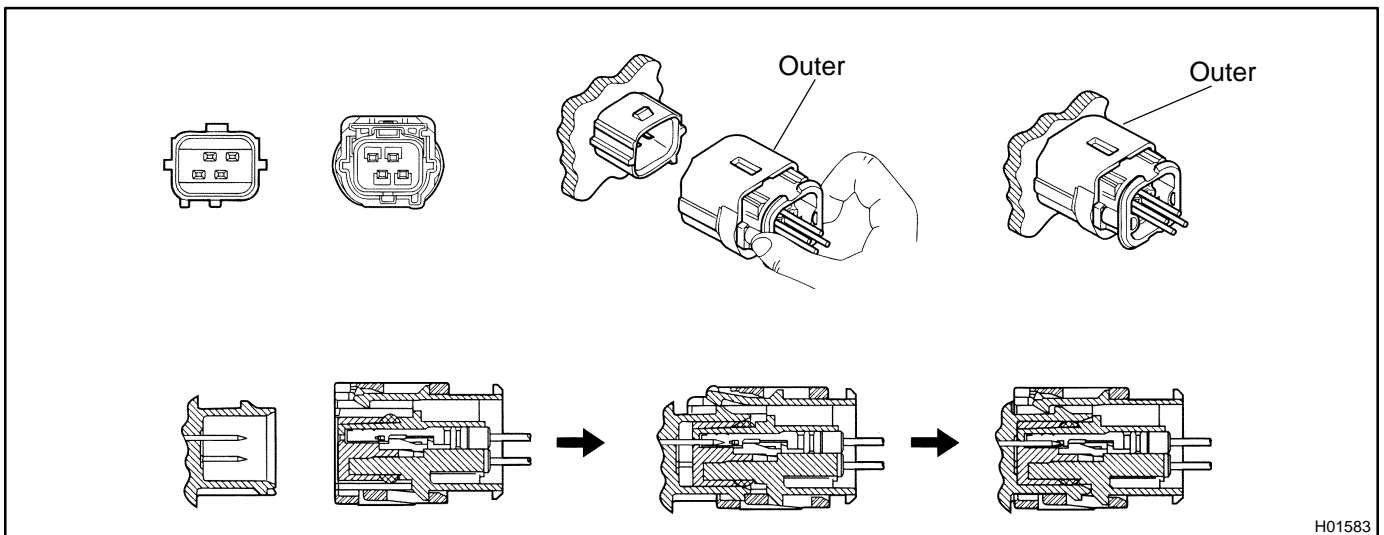
- (a) Align the male connector (of the side of sensor) and female connector in same direction as shown in the illustration and fit in them without rubbing.
- (b) As they are fitted in, the outer slides rearward. Press it until the outer returns to its original position again.

If fitting stops on the half way, connectors will separate.

- (c) 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.)

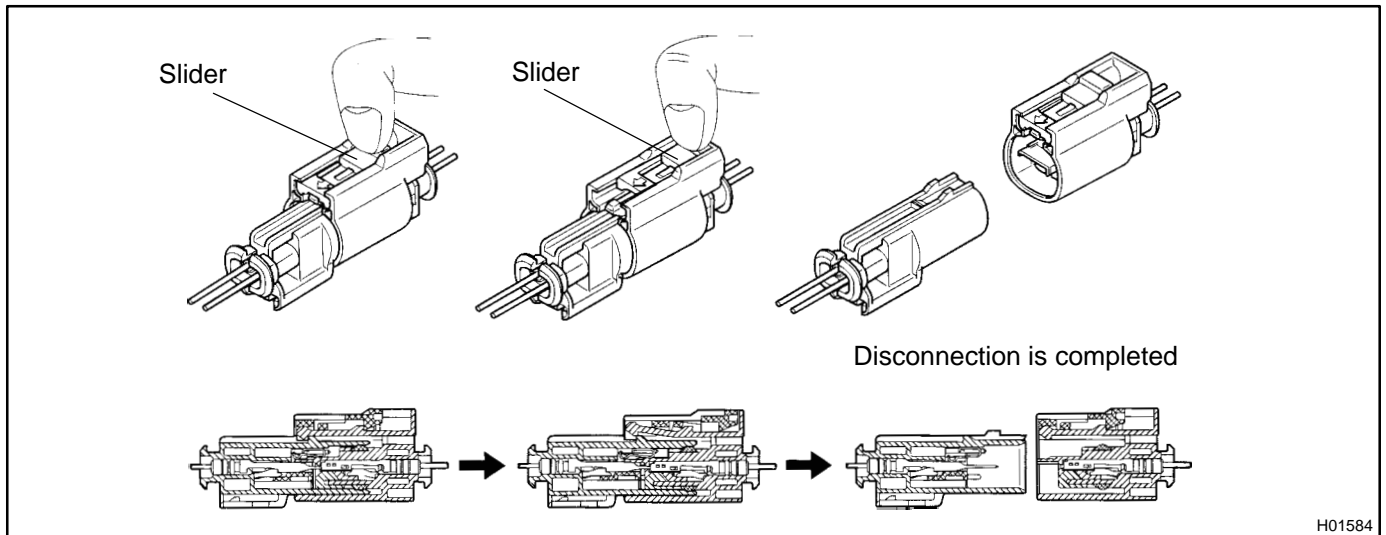
HINT:

- Do not fit in with holding the outer.
- When fitting in, the outer slides. Do not touch it.



12. DISCONNECTION OF SIDE AIRBAG CONNECTOR

- (a) Place a finger on the slider.
- (b) Slide the slider to release lock.
- (c) Disconnect the connector.

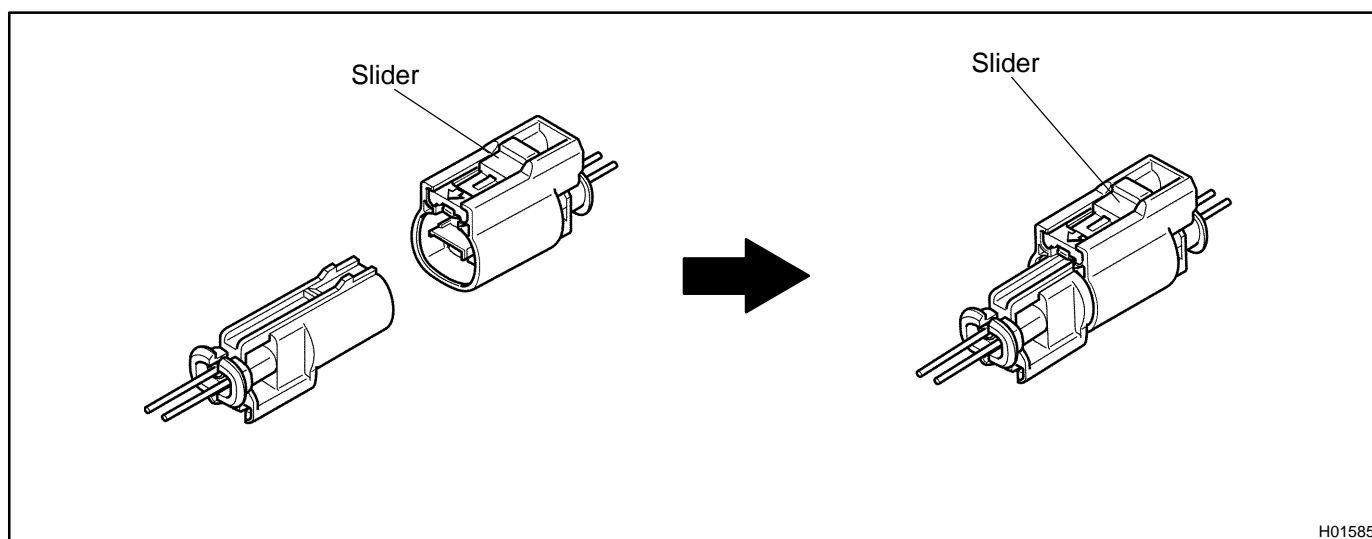


13. CONNECTION OF SIDE AIRBAG CONNECTOR

- (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.)

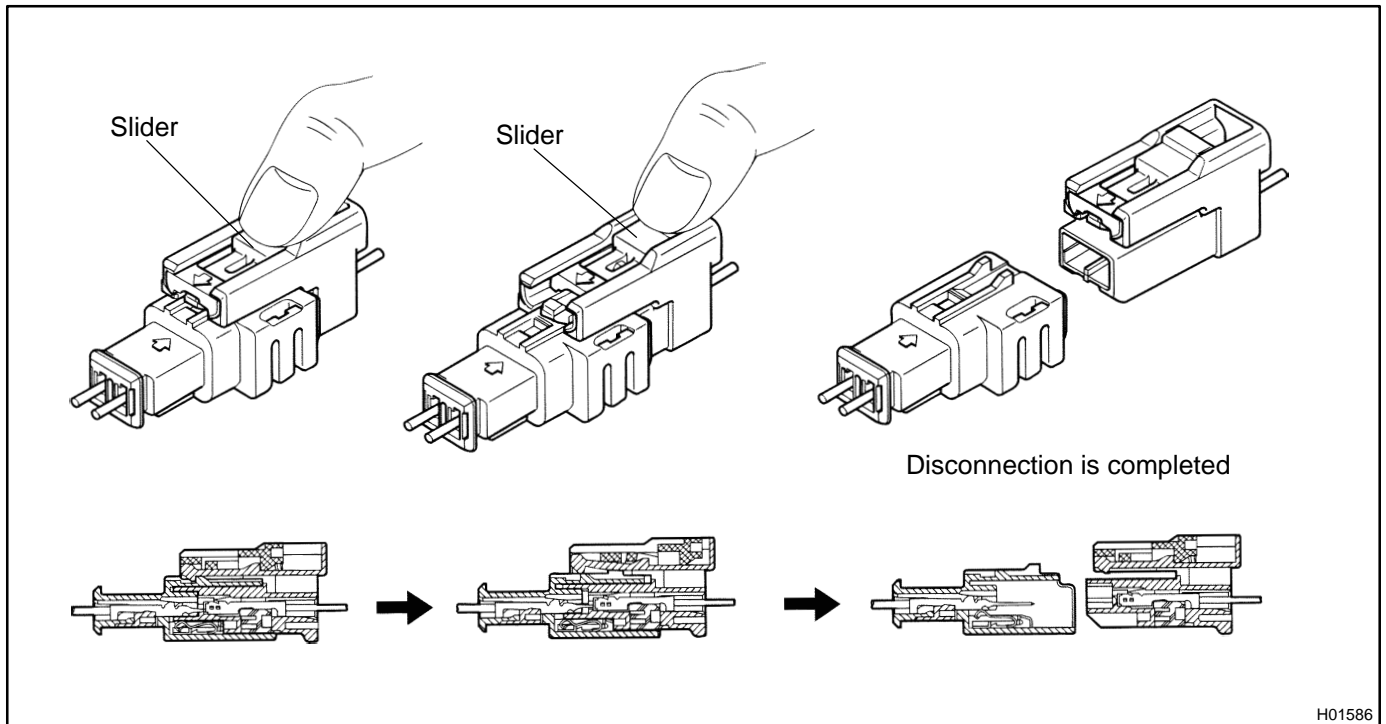
HINT:

- 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.



14. 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.



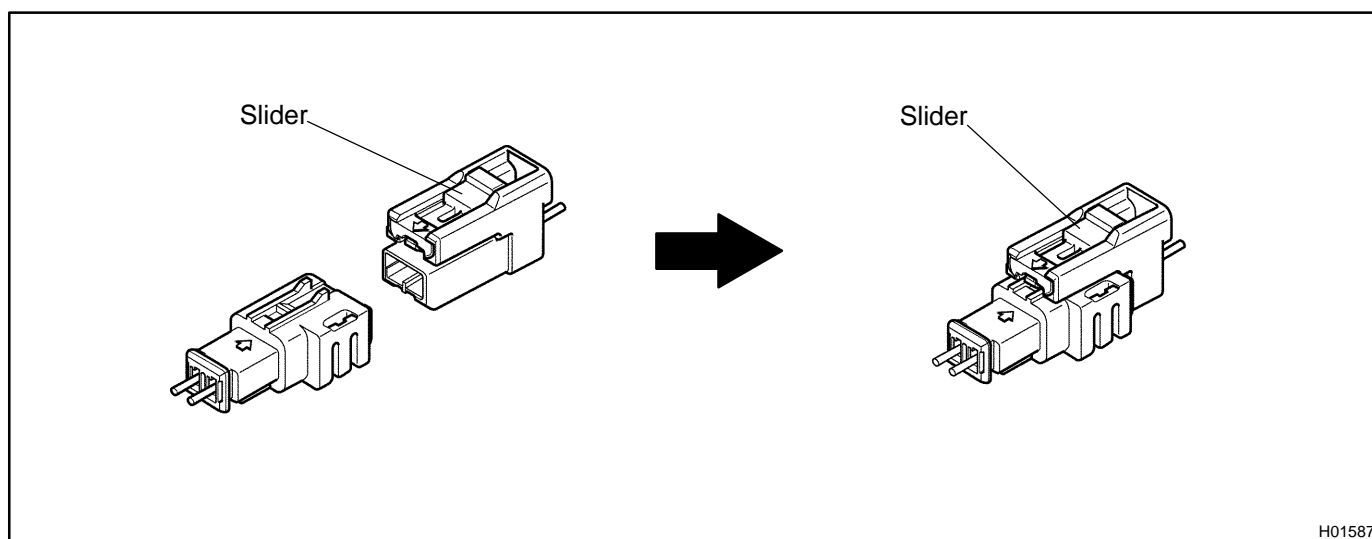
H01586

15. 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:

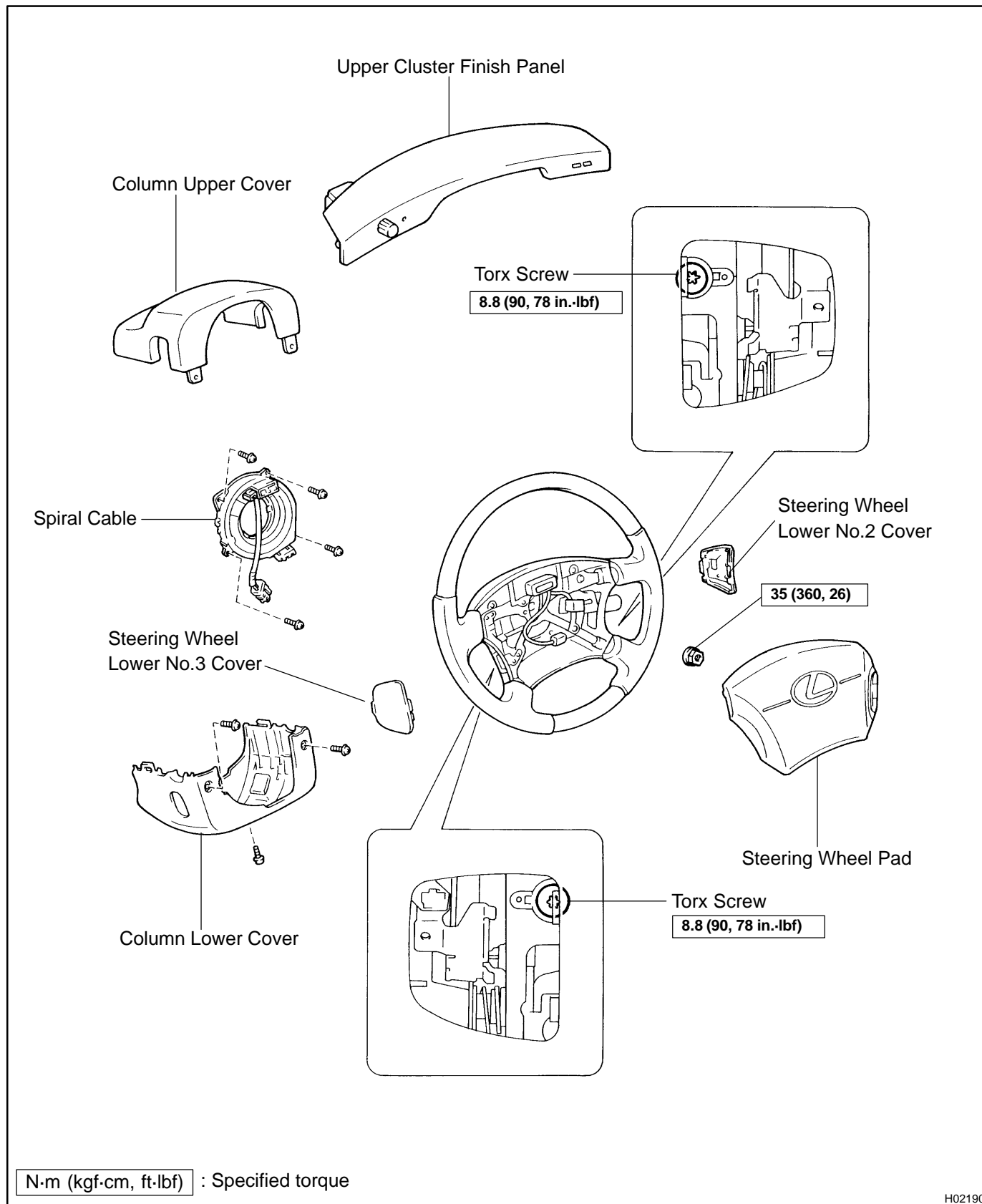
- As the slider slides, do not touch it.
- Be careful not to deform the release board. If the release board is deformed, replace it with a new one.



H01587

STEERING WHEEL PAD AND SPIRAL CABLE COMPONENTS

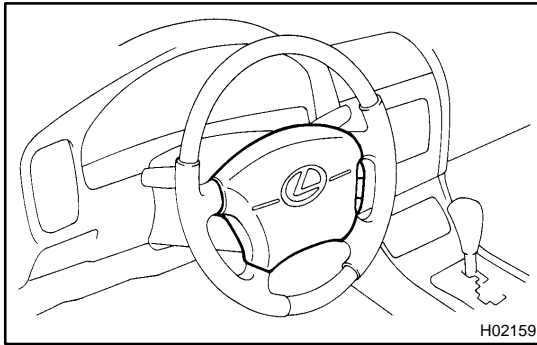
RS00Y-04



H02190

REMOVAL

(See page [SR-12](#))

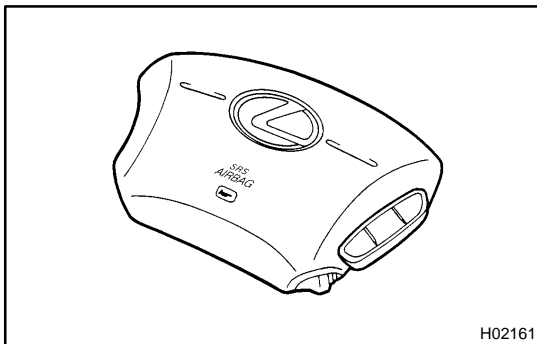


INSPECTION

1. VEHICLES NOT INVOLVED IN A COLLISION

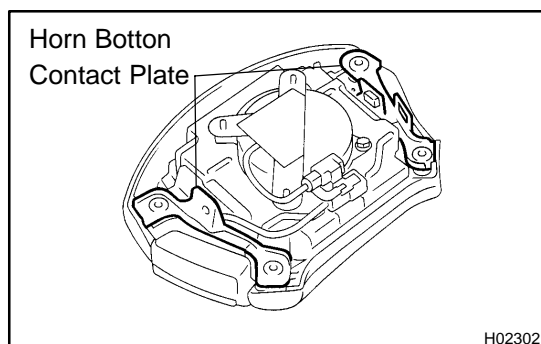
- (a) Do a diagnostic system check.
(See page [DI-459](#))
- (b) Do a visual check which includes the following items with the steering wheel pad (with airbag) installed in the vehicle.

Check cuts, minute cracks or marked discoloration on the steering wheel pad top surface and in the grooved portion.



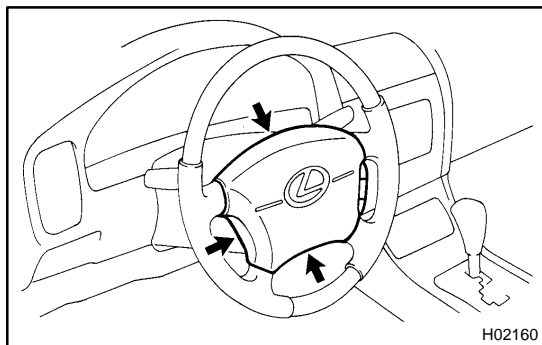
2. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS NOT DEPLOYED

- (a) Do a diagnostic system check.
(See page [DI-459](#))
- (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 of the horn button contact plate of the steering wheel pad.
 - Check the deformation of the steering wheel.



HINT:

- If the horn button contact plate of the steering wheel pad is deformed, never repair it. Always replace the steering wheel pad 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-12](#) and [SR-23](#), and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS DEPLOYED

- Do a diagnostic system check.
(See page [DI-459](#))
- Do a visual check which includes the following items with the steering wheel pad (with airbag) removed from the vehicle.
 - Check the deformation on the horn button contact plate of the steering wheel.
 - Check the damage on the spiral cable connector and wire harness.

HINT:

- If the horn button contact plate of the steering wheel is deformed, never repair it. Always replace the steering wheel assembly 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.

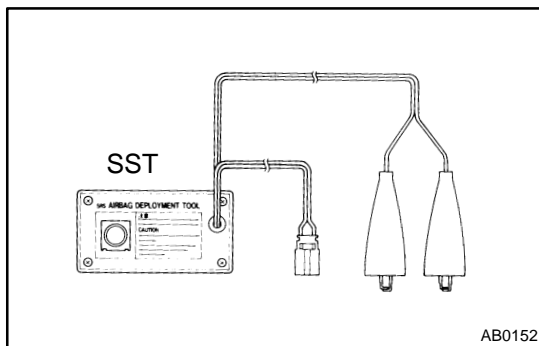
DISPOSAL

HINT:

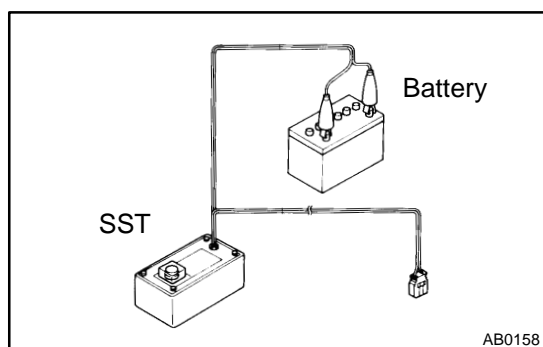
When scrapping vehicle equipped with an SRS or disposing of a steering wheel pad (with airbag), always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC. When disposing of a steering wheel pad with an airbag deployed in a collision, follow the same procedure given in step 1–(g) 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.



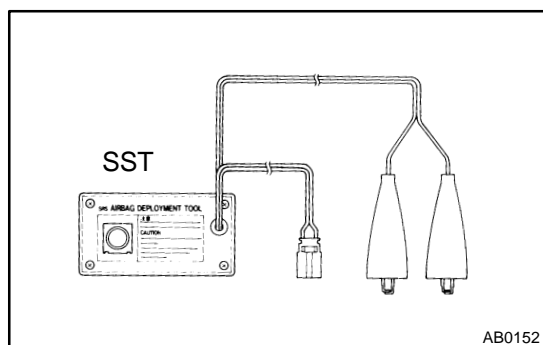
- When deploying the airbag, always use the specified SST (SRS Airbag Deployment Tool). Perform the operation in a place away from electrical noise.
SST 09082-00700, 09082-00760
- When deploying an airbag, perform the operation at least 10 m (33 ft) away from the steering wheel pad.
- The steering wheel 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.

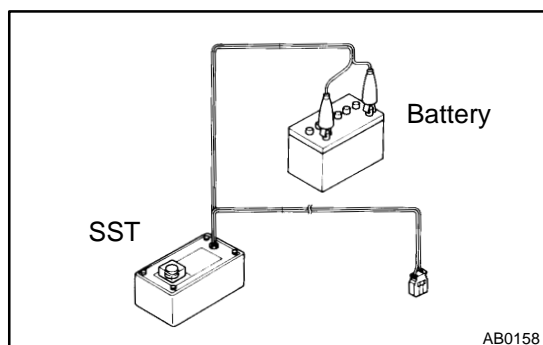


(a) Check functioning of the SST

CAUTION:

When deploying the airbag, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082-00700

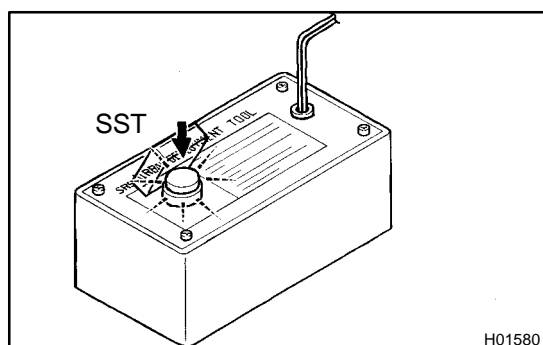


(1) Connect the SST to the battery.

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.

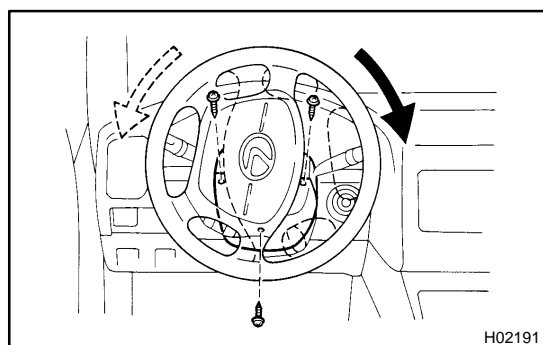


(2) Check functioning of the SST.

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.

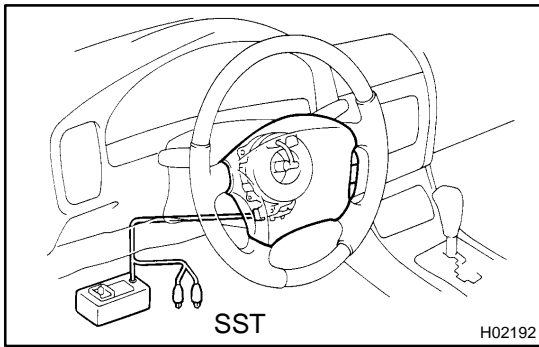
CAUTION:

Check that there is no looseness in the steering wheel and steering wheel pad.

(1) Remove the steering column lower cover.

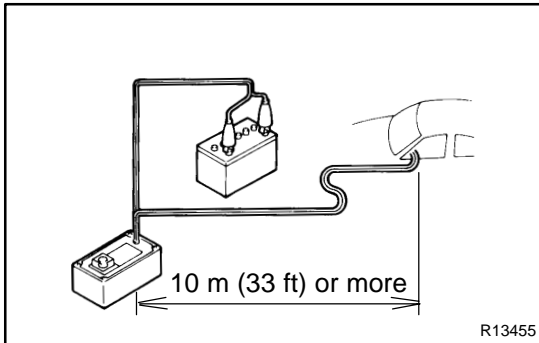
Remove the 3 screws and steering column lower cover as shown in the illustration.

(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



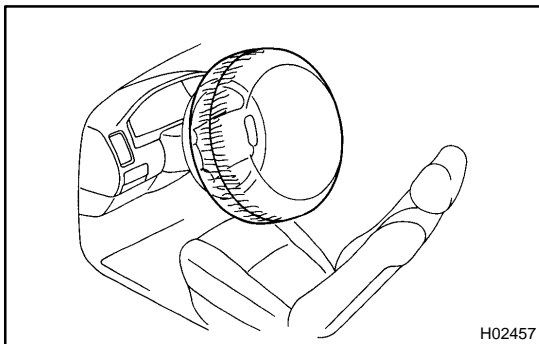
- (4) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

- (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.

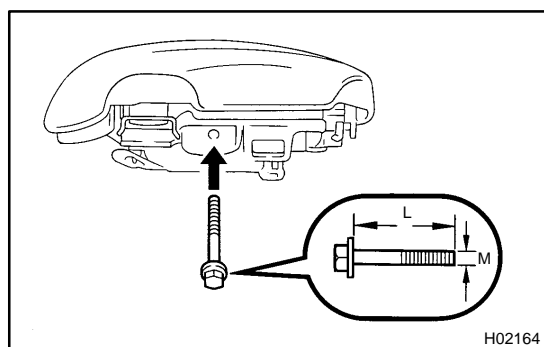
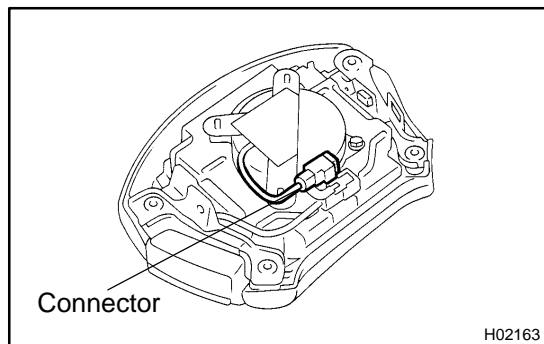
- (a) Remove the steering wheel pad.

(See page [SR-12](#))

CAUTION:

When storing the steering wheel pad, keep the upper surface of the pad facing upward.

- (b) Remove the steering wheel pad connector.
Remove the connector on the rear surface of the steering wheel pad from the bracket.



- (c) Fix the steering wheel pad to the disc wheel with tire.
(1) Install the 2 bolts with washer in the 2 bolt holes on the steering wheel pad.

Bolt:

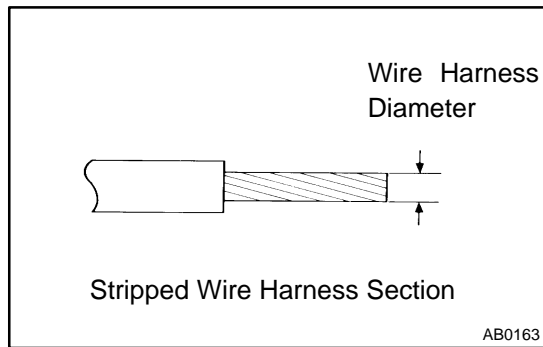
L: 35. mm (1.387 in.)

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 a service-purpose wire harness tie down the steering wheel pad to the disc wheel.

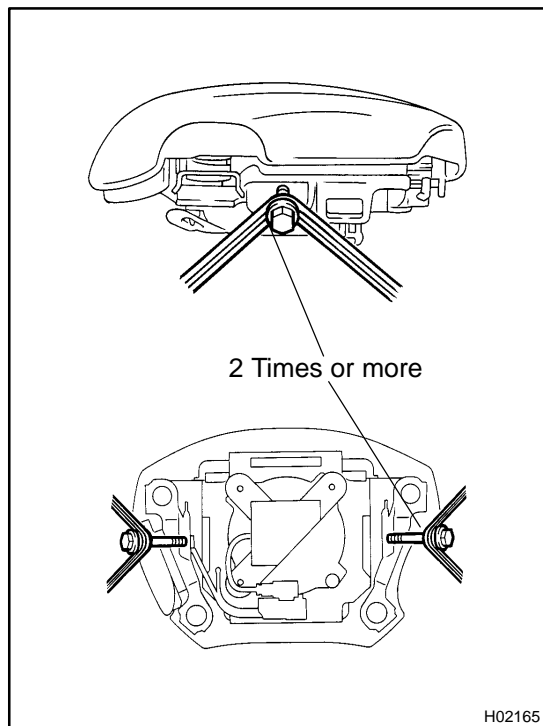
Wire harness: Stripped wire harness section 1.25 mm² or more (0.0019 in². or more).

HINT:

To calculate the square of the stripped wire harness section:
 Square – 3.14 x (Diameter)² divided by 4

CAUTION:

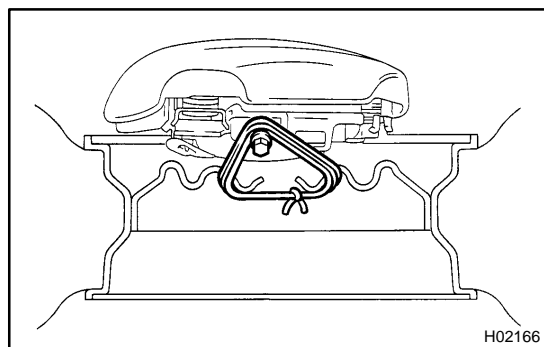
If a wire harness which is too thin or some other thing is used to tie down the steering wheel pad, it may be snapped by the shock when the airbag is deployed. This is highly dangerous. Always use a wire harness for vehicle use which is at least 1.25 mm² (0.0019 in²).



- (3) 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 slackness in the wire harness, the steering wheel pad may come loose due to the shock when the airbag is deployed. This is highly dangerous.**



- (4) 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:

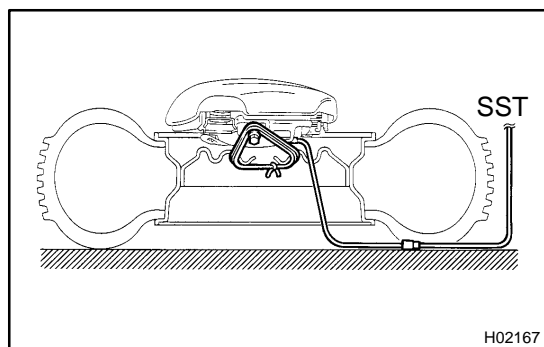
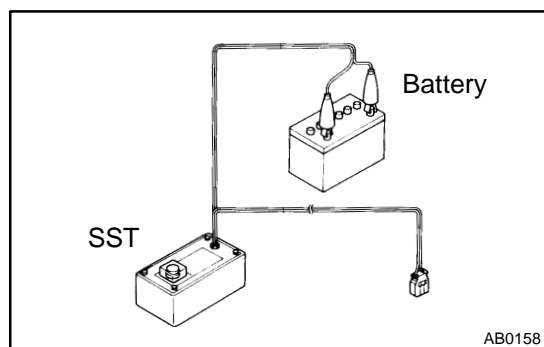
- Make sure that the wire harness is tight. It is very dangerous when looseness in the wire harness results in the steering wheel pad coming free through the shock from the airbag deploying.
- Always tie down the steering wheel pad with the pad side facing upward. It is very dangerous if the steering wheel pad is tied down with the metal surface facing upward as the wire harness will be cut by the shock of 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.

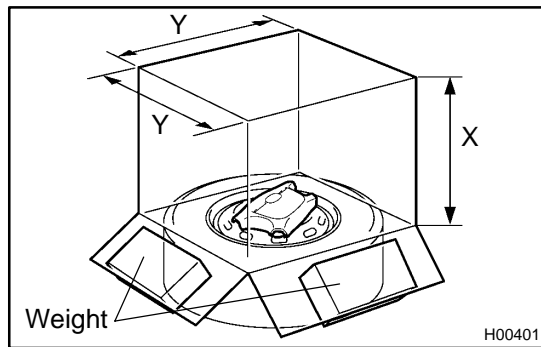
- (1) Connect the connector of 2 SST to the steering wheel pad connector.

SST 09082-00700, 09082-00760

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock. 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 cardboard box or tires.
- Covering method using 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.)

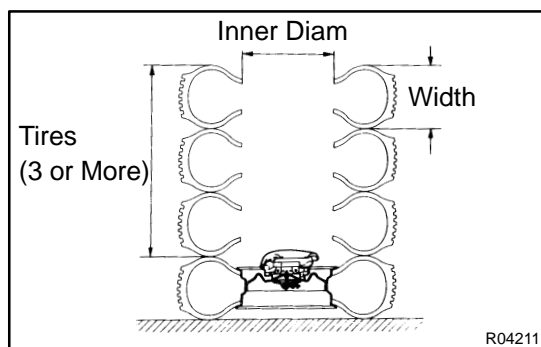
When dimension of the cardboard box exceeds the diameter of the disc wheel with tire to which the steering wheel pad is tied

x=460 mm (18.11 in.) + width of tire

y= 650 mm (25.59 in.)

NOTICE:

If a cardboard box smaller than the specified size is used, the cardboard box will be broken by the shock from the air-bag 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 spare tires.

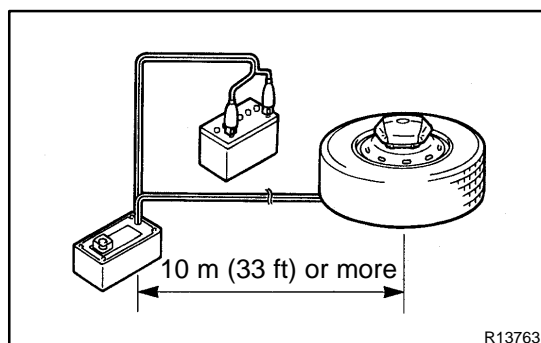
- (g) Deploy the airbag.

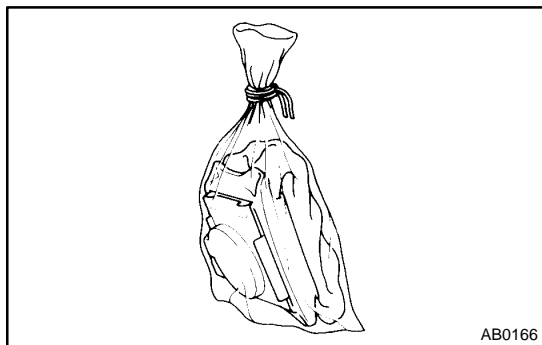
- (1) Connect the SST red clip to the battery positive (+) terminal and the black clip to the battery negative (–) terminal.
- (2) Check that no one is within 10 m (33 ft) area around the disc wheel which the steering wheel pad is tied to.

- (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.





(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.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the steering wheel pad, steering wheel or spiral cable.

- If the airbag has been deployed.
- If the steering wheel pad or spiral cable has been found to be faulty in troubleshooting.
- If the steering wheel pad, steering or spiral cable has been found to be faulty during checking items (See page [RS-16](#))
- If the steering wheel pad has been dropped.

CAUTION:

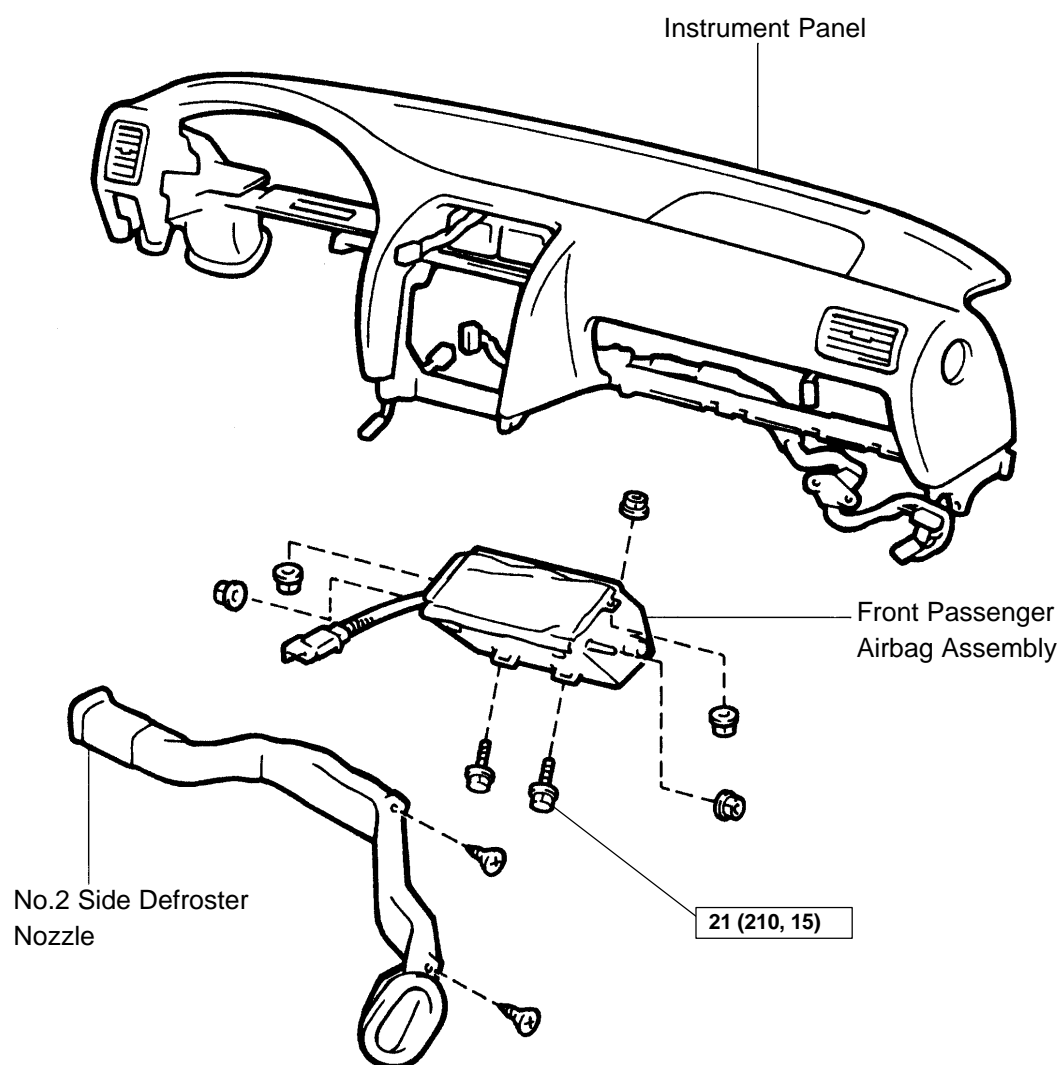
For removal and installation of the steering wheel pad, see page [SR-12](#) and [SR-23](#), and be sure to follow the correct procedure.

INSTALLATION

(See page [SR-23](#))

FRONT PASSENGER AIRBAG ASSEMBLY COMPONENTS

RS014-04



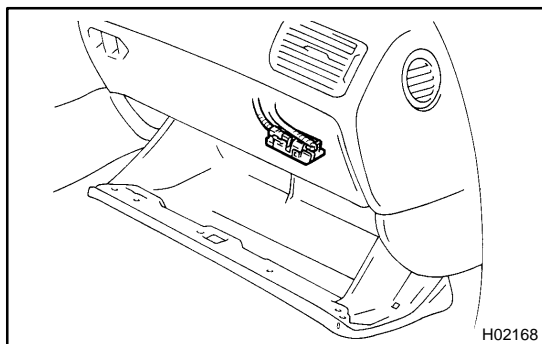
N·m (kgf·cm, ft·lbf) : Specified torque

R12660

REMOVAL

NOTICE:

- If the wiring connector of the SRS is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded.
- Never use the airbag parts from another vehicle. When replacing parts, replace with new parts.

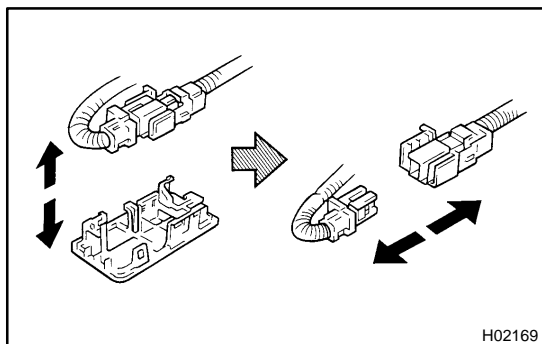


1. DISCONNECT AIRBAG CONNECTOR

- Remove the glove compartment door finish plate inside the instrument panel box.

NOTICE:

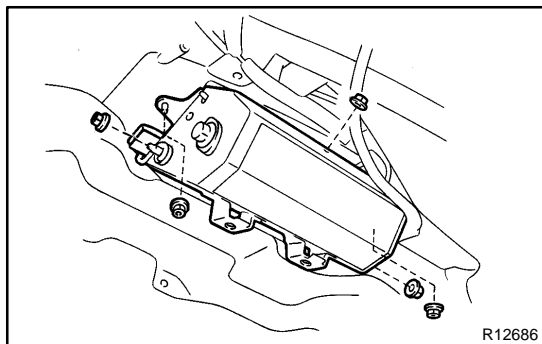
When handling the airbag connector, take care not to damage the airbag wire harness.



- Pull up the connector.
- Disconnect the front passenger airbag connector.

2. REMOVE INSTRUMENT PANEL

(See page [BO-79](#))

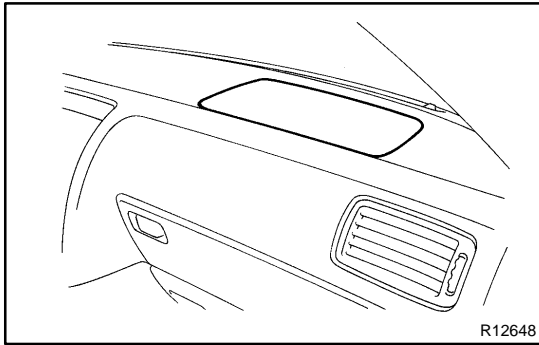


3. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY

- Remove the No.2 side defroster nozzle.
- Remove the 5 nuts, then remove the front passenger airbag assembly.

CAUTION:

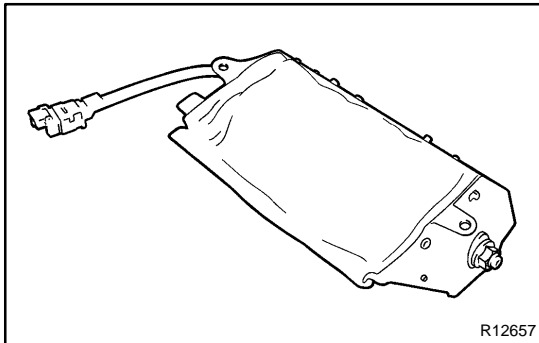
- Do not store the front passenger airbag assembly with the airbag deployment side facing downward.
- Never disassemble the front passenger airbag assembly.



INSPECTION

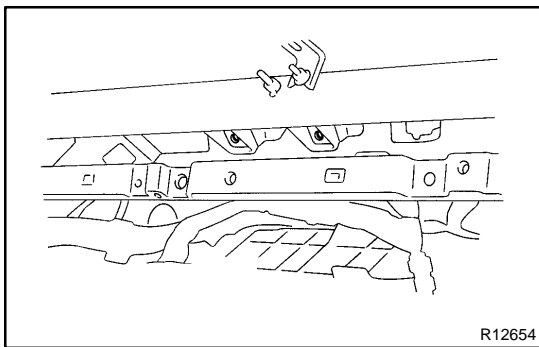
1. VEHICLES NOT INVOLVED IN A COLLISION

- (a) Do a diagnostic system check.
(See page [DI-459](#))
- (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.



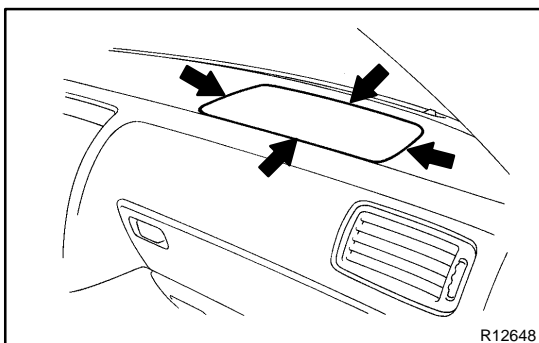
2. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS NOT DEPLOYED

- (a) Do a diagnostic system check.
(See page [DI-459](#))
- (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.



- There should be no interference between the instrument panel and the front passenger airbag assembly.

CAUTION:

For removal and installation of the front passenger airbag assembly, see page [RS-29](#) and [RS-39](#) and be sure to follow the correct procedure.

3. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS DEPLOYED

- (a) Do a diagnostic system check.
(See page [DI-459](#))
- (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.

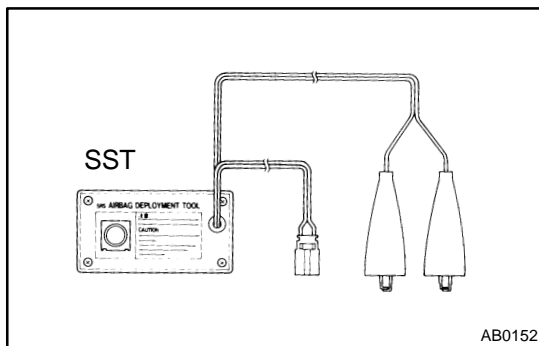
HINT:

If the instrument panel or instrument panel reinforcement is deformed or cracked, never repair it. Always replace it with a new one.

DISPOSAL

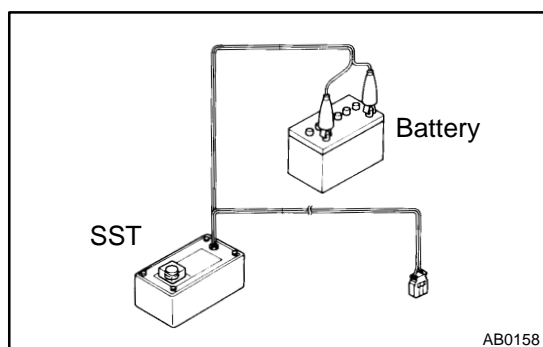
HINT:

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.

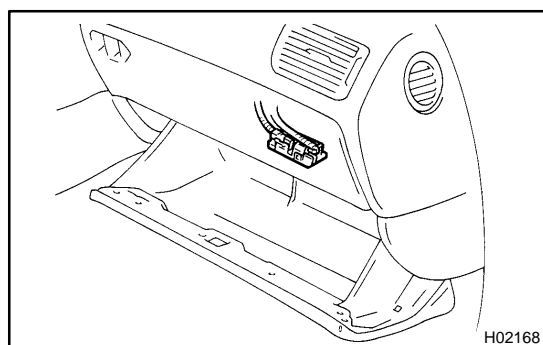


1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Check functioning of the SST.
(See page RS-18)

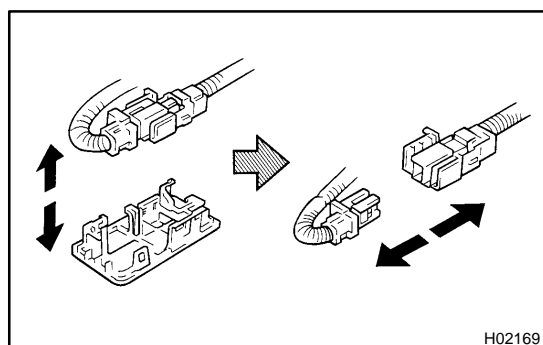


- (b) Disconnect the airbag connector.
 - (1) Remove the lower instrument cover inside the No.2 under cover.

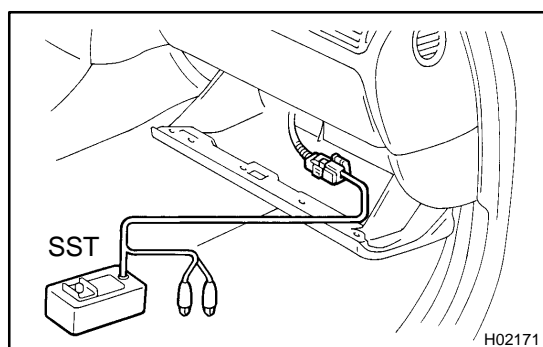
NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

- (2) Pull up the connector.



- (3) Disconnect the airbag connector.

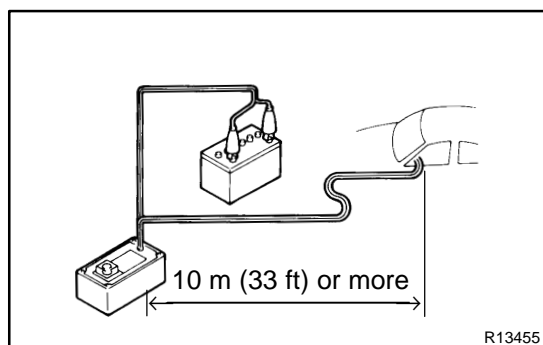


- (c) Install the SST.
 - (1) Connect the SST connector to the front passenger airbag assembly connector.

SST 09082-00700

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

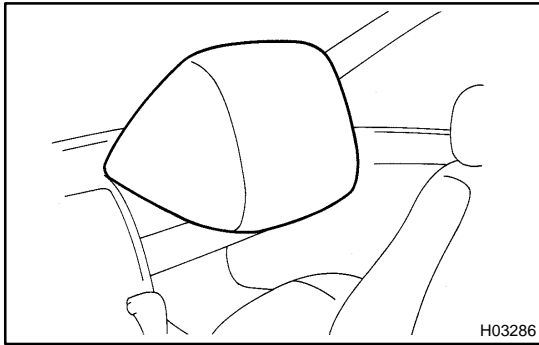


- (2) Move the SST to at least 10 m (33 ft) away from the front of the vehicle.
- (3) Close all the doors and windows of the vehicle.

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.



- (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.

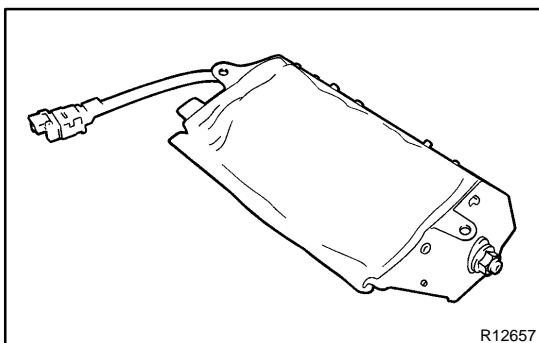
2. DEPLOYMENT WHEN DISPOSING OF FRONT PASSENGER AIRBAG ASSEMBLY ONLY

NOTICE:

- When disposing of the front passenger airbag assembly only, never use the customers vehicle to deploy the airbag.
- Be sure to follow the procedure given below when deploying the airbag.

HINT:

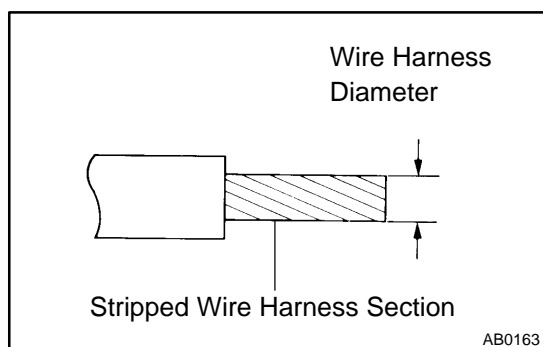
Have a battery ready as the power source to deploy the airbag.



- (a) Remove the front passenger airbag assembly.
(See page [RS-29](#))

CAUTION:

- When removing the front passenger airbag assembly, 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.
- Store the front passenger airbag assembly with the airbag deployment side facing upward.



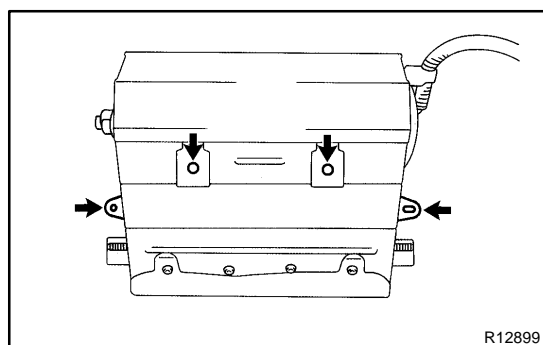
- (b) Fix the front passenger airbag assembly to a tire.
- (1) Using a service-purpose wire harness for the vehicle, tie down the front passenger airbag assembly to the tire.

Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in.² or more)

HINT:

To calculate the square of the stripped wire harness section:

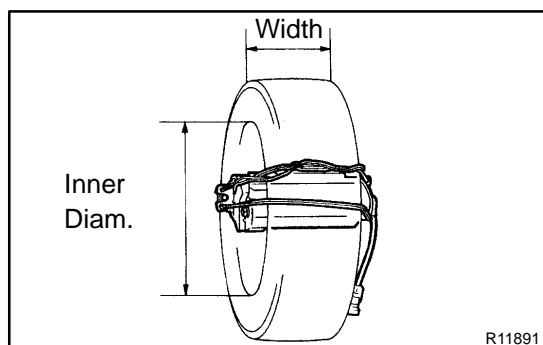
$$\text{Square} = 3.14 \times (\text{Diameter})^2 \text{ divided by } 4$$



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 mm² (0.0019 in.²)

- (2) Wind the wire harness around the tire, passing the wire harness through the installation holes indicated by arrows in the illustration.



- (3) 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.)

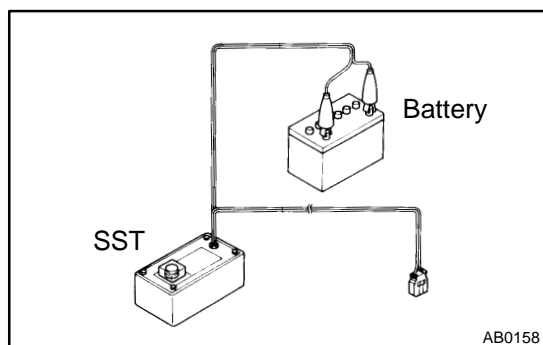
Inner diameter: 360 mm (14.17 in.)

CAUTION:

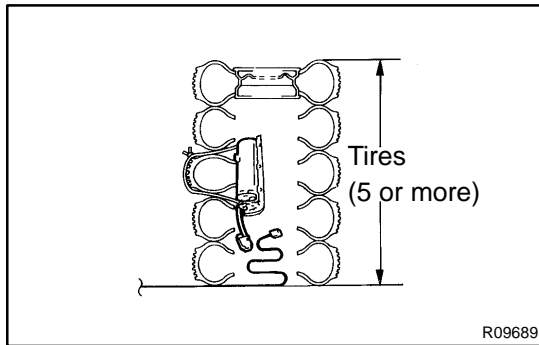
- Make sure that the wire harness is tight. It is very dangerous if looseness in the wire harness results in the front passenger airbag assembly coming free due to the shock of the airbag deploying.
- Always tie down the front passenger airbag assembly with the airbag door facing inside.

NOTICE:

The tire will be marked by the airbag deployment, so use a redundant tire.

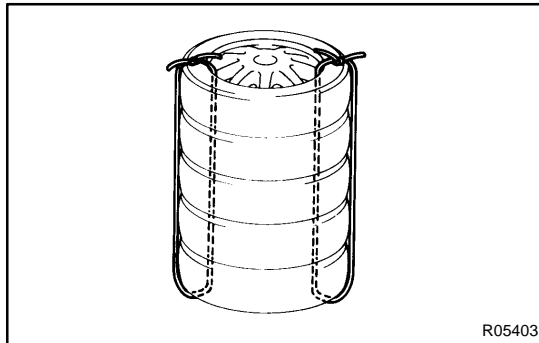


- (c) Check functioning of the SST.
 SST 09082-00700



(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.



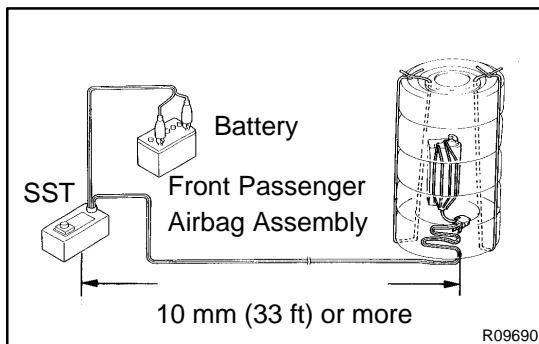
- (3) Tie the tires together with 2 wire harnesses.

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 of 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:

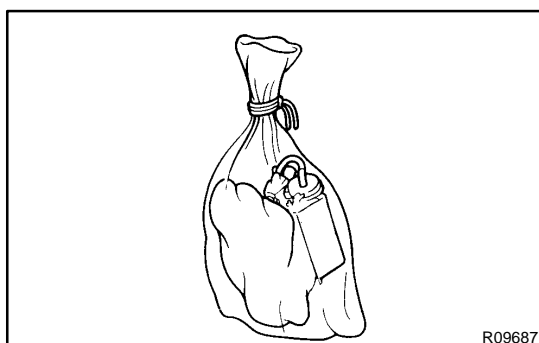
To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.

(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.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the front passenger airbag assembly, instrument panel or instrument panel reinforcement.

- If the airbag has been deployed.
- If the front passenger airbag assembly has been found to be faulty in troubleshooting.
- If the front passenger airbag assembly, instrument panel or instrument panel reinforcement has been found to be faulty during checking items. (See page [RS-30](#))
- If the front passenger airbag assembly has been dropped.

CAUTION:

For replacement of the front passenger airbag assembly, see page [RS-29](#) and [RS-39](#).

Be sure to follow the correct procedure.

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 front passenger airbag assembly to the instrument panel.

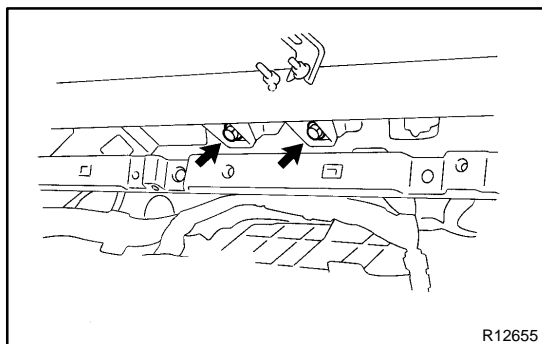
CAUTION:

- Make sure that no foreign objects are trapped between the airbag bag, and within the module.
- Do not damage the strap when installing the module.

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.

- (b) Install the No.2 side defroster nozzle.



2. INSTALL INSTRUMENT PANEL

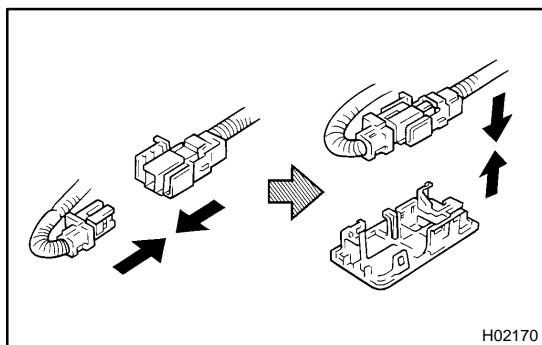
(See page [BO-90](#))

Install the 2 bolts to instrument panel reinforcement.

Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

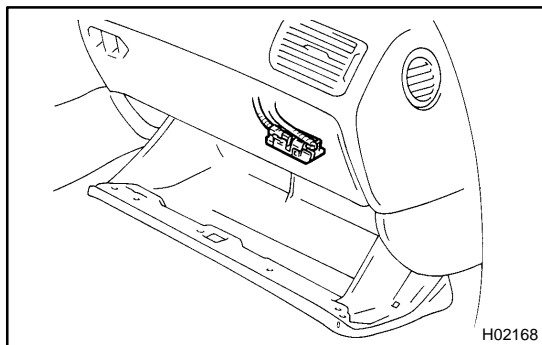
NOTICE:

- Make sure the front passenger airbag assembly is installed to 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.
- When installing the instrument panel box, carefully put out the airbag wire harness from the glove compartment upper hole.



3. CONNECT AIRBAG CONNECTOR

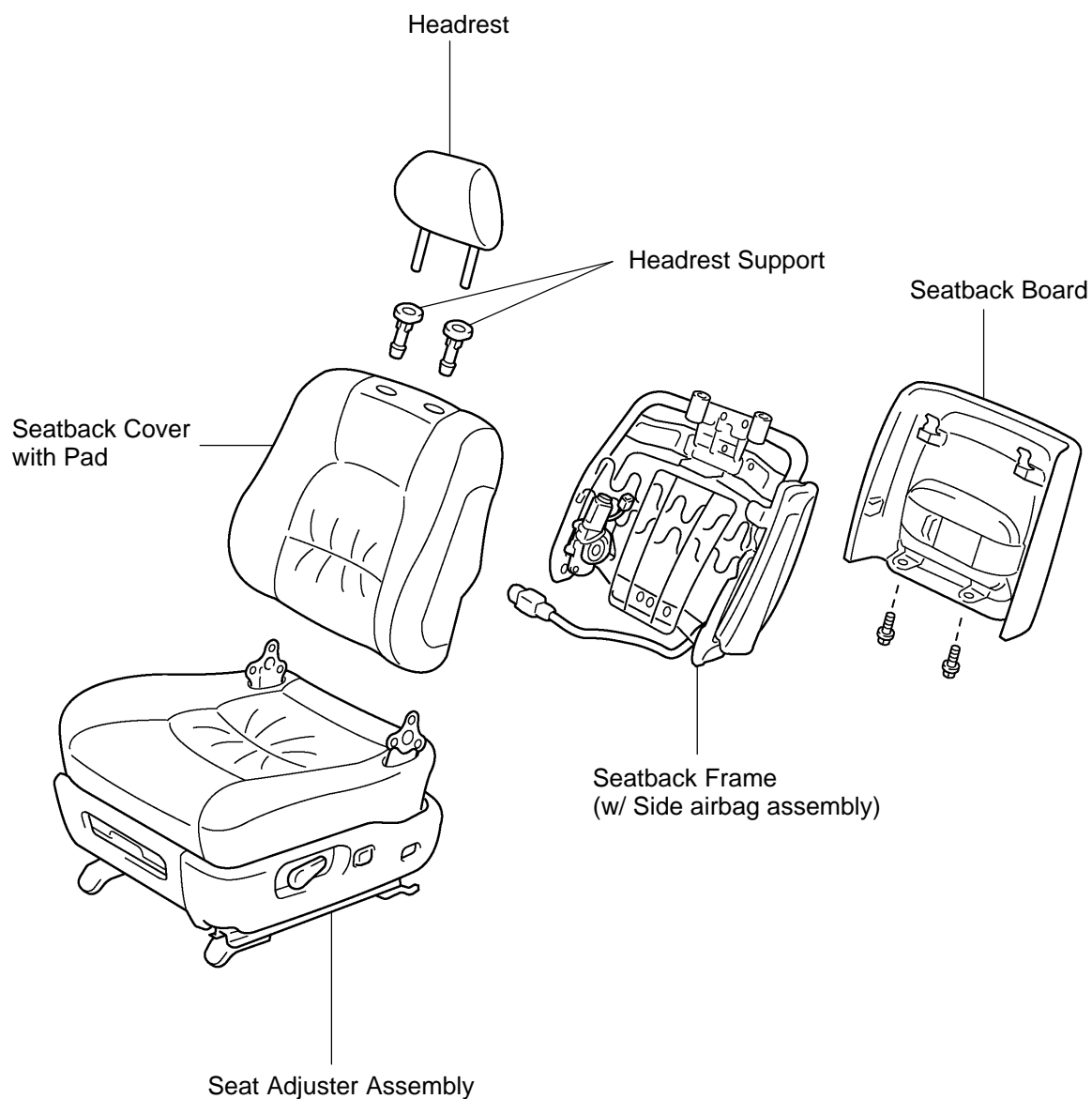
- (a) Connect the airbag connector.



- (b) Put the connector on the glove compartment door finish plate.
- (c) Install the glove compartment door finish plate to the instrument panel box.

SIDE AIRBAG ASSEMBLY COMPONENTS

RS061-03



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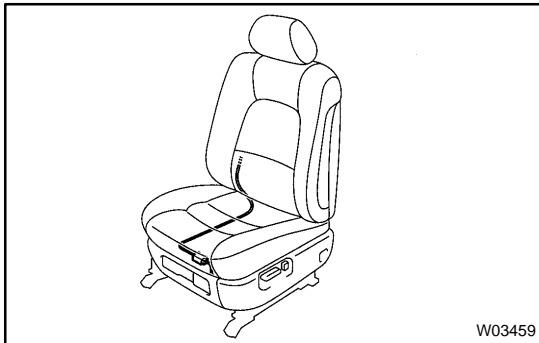
N·m (kgf·cm, ft·lbf) : Specified torque

H11418

REMOVAL

NOTICE:

- If the wiring connector of the SRS is disconnected and the ignition switch is at ON or ACC position, DTCs will be recorded.
- Never use the airbag parts from another vehicle. When replacing parts, replace them with new parts.



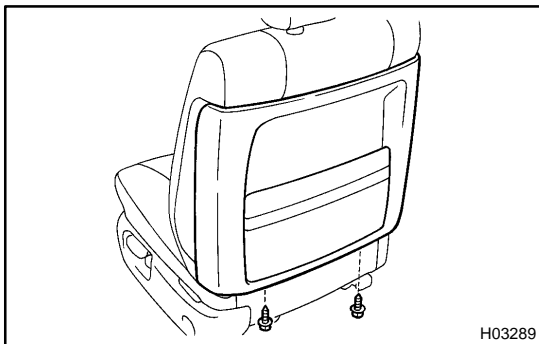
1. REMOVE FRONT SEAT

- (a) Remove the bolt and seat belt lap outer anchor.
- (b) Remove the 4 bolts.
- (c) Disconnect the side airbag connector and power seat connector at the position shown in the illustration.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.

- (d) Remove the front seat.



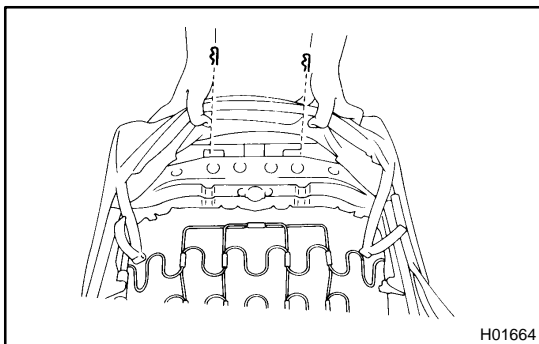
2. REMOVE FRONT SEATBACK BOARD

Remove the 2 screws and front seatback board.

3. w/o Power headrest:

REMOVE HEADREST

While pushing the lock button, pull up the headrest to remove it.



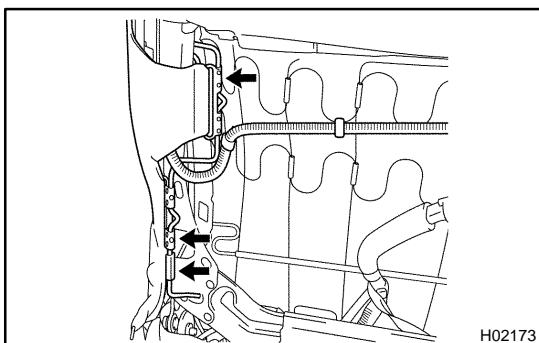
4. w/ Power headrest:

REMOVE HEADREST

- (a) Remove the hog rings from the seatback assembly.
- (b) Using a screwdriver, remove the 2 pins shown in the illustration.
- (c) Remove the headrest from the seatback assembly.

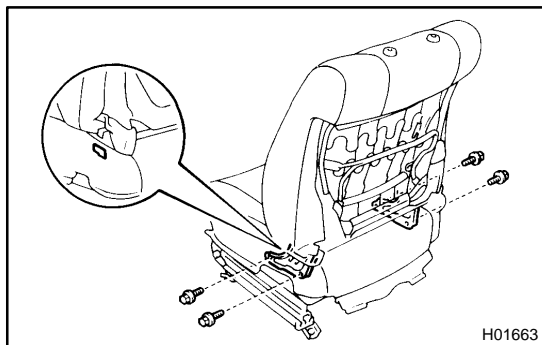
HINT:

After the headrest has been removed, install the pins to the adjuster temporarily.

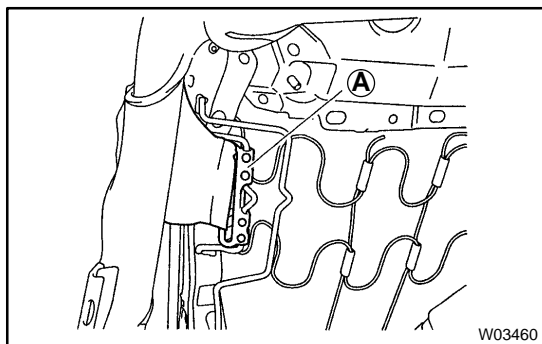


5. REMOVE SEATBACK ASSEMBLY

- (a) Remove the 2 yellow hooks and a black hook at the position shown in the illustration.
- (b) Remove the 2 clamps for wire harness of side airbag installed under the seat, then pull out the wire harness.
- (c) Remove the side airbag connector from the bracket under the seat.



- (d) Remove the 4 bolts and seatback assembly.



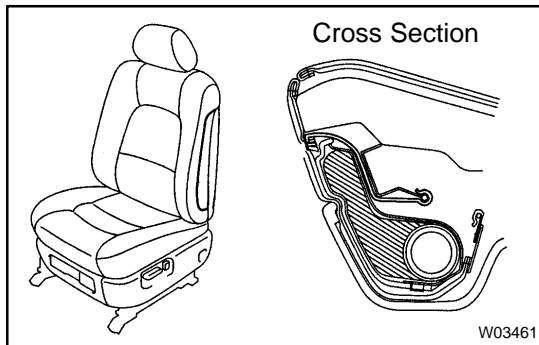
6. REMOVE SEATBACK COVER

- (a) Remove the hook.
The position shown in the illustration is made to be hold by installing the side airbag assembly with the hook shown as "A" hanged onto the seatback frame.
- (b) Remove the 2 headrest supports.
- (c) Remove the seatback frame from the seatback cover with pad.

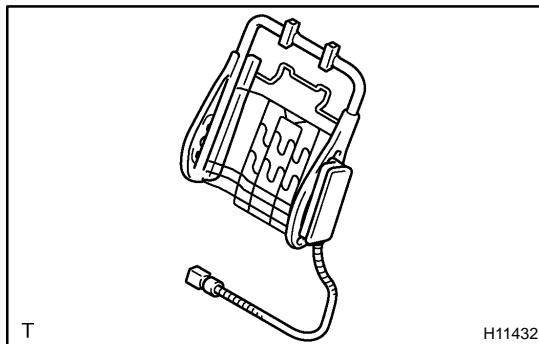
INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

- (a) Do a diagnostic system check. (See page [DI-459](#))
- (b) Do a visual check which includes the following item with the side airbag assembly installed in the vehicle.



Check that there are no cuts or the frayed on seams and out side of seatback cover.



2. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS NOT DEPLOYED

- (a) Do a diagnostic system check. (See page [DI-459](#))
- (b) Do a visual check which includes the following items with the side airbag assembly removed from the vehicle.
 - Check cuts and cracks, or marked discoloration of the side airbag assembly.
 - Check cuts and cracks in wire harnesses, and chipping in connectors.

3. VEHICLE INVOLVED IN A COLLISION AND AIRBAG IS DEPLOYED

Do a visual check which includes the following items with the side airbag assembly removed from the vehicle.

- Check the side airbag installation part of the seat frame.
- Check the damage to the connector and wire harness.

HINT:

If the seat frame is deformed, never repair it. Always replace it with new one.

CAUTION:

For removal and installation of the side airbag assembly, see page [RS-42](#) and [RS-51](#). Be sure to follow the correct procedure.

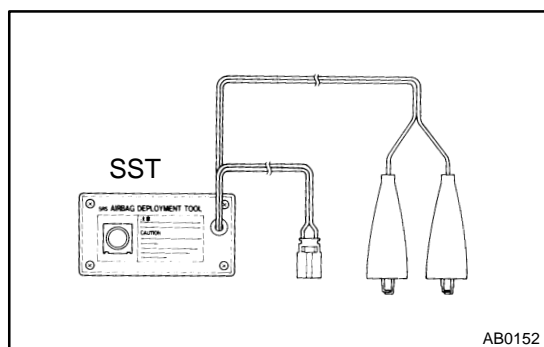
DISPOSAL

HINT:

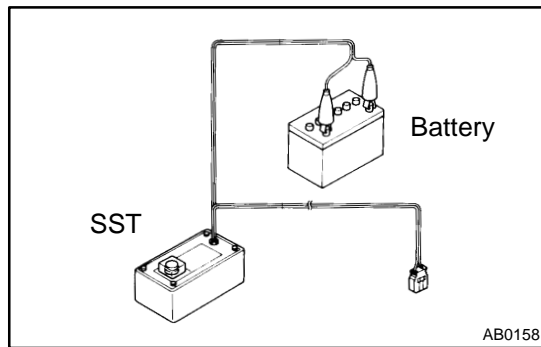
When scrapping vehicles equipped with an SRS or disposing of the side airbag assembly always first deploy the airbag in accordance with the procedure described below. If any abnormality occurs with the airbag deployment, contact the SERVICE DEPT. of TOYOTA MOTOR SALES, U.S.A., INC. When disposing of a side 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 side 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, 09082-00750
- When deploying an airbag, perform the operation at least 10 m (33 ft) away from the airbag assembly.
- The side 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 side airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a side airbag assembly with the deployed airbag.



1. AIRBAG DEPLOYMENT WHEN SCRAPPING VEHICLE

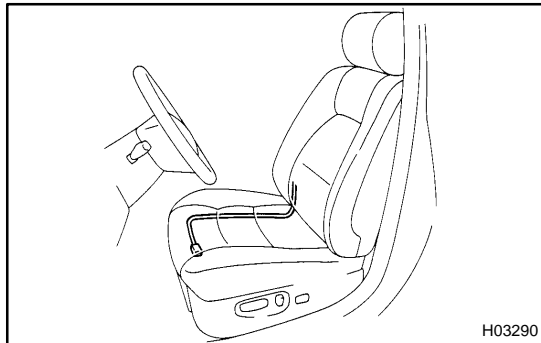
HINT:

Have a battery ready as the power source to deploy the airbag.

- (a) Check functioning of the SST.

(See page RS-18)

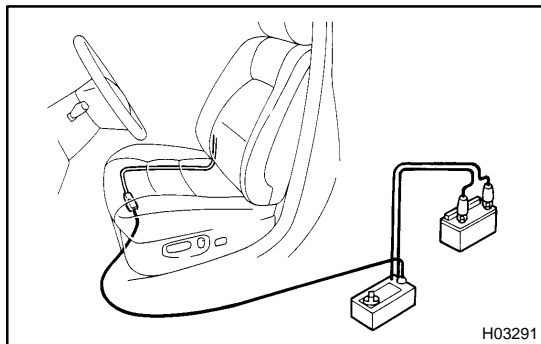
SST 09082-00700



- (b) Disconnect the side airbag connector.

NOTICE:

When handling the airbag connector, take care not to damage the airbag wire harness.



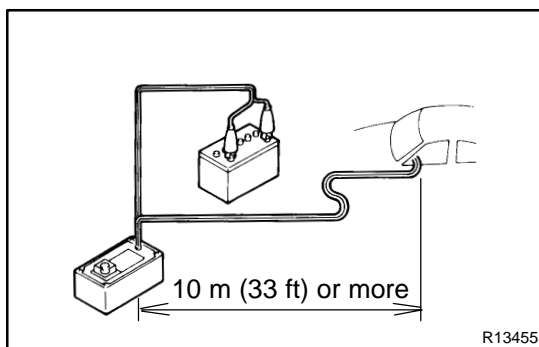
- (c) Install the SST.

- (1) Connect the connector of 2 SST to the airbag connector.

SST 09082-00700, 09082-00750

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock the secondary lock of the twin lock.



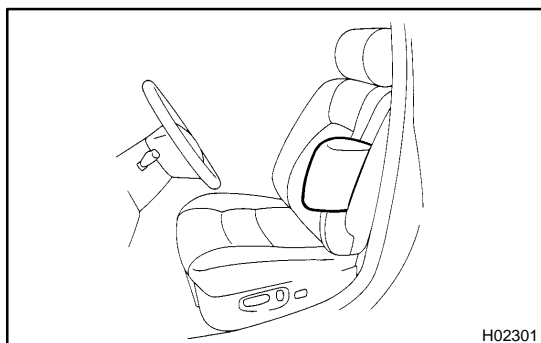
- (2) Move the SST at least 10 m (33 ft) away from the front of the vehicle.

- (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 battery negative (–) terminal.



- (d) Deploy the airbag.

- (1) Check 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 SST activation switch lights up.

(e) Dispose of side airbag assembly.

CAUTION:

- The side 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 side airbag assembly with the deployed airbag.
- Do not apply water, etc. to a side airbag assembly with the deployed airbag.
- Always wash your hands with water after completing the operation.

When scrapping a vehicle, deploy the airbag and scrap the vehicle with the side airbag assembly still installed.

2. DEPLOYMENT WHEN DISPOSING OF SIDE AIRBAG ASSEMBLY

NOTICE:

- When disposing of the side 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.

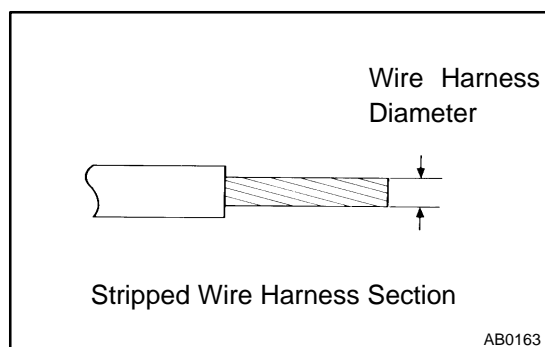
HINT:

Have a battery ready as the power source to deploy the airbag.

(a) Remove the side airbag assembly.

CAUTION:

Store the side airbag assembly with the airbag deployment side facing upward.



(b) Fix the side airbag assembly.

- (1) Using a service-purpose wire harness for tying down the side airbag assembly.

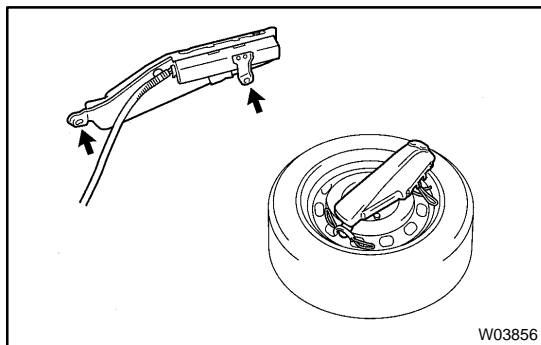
**Wire harness: Stripped wire harness section
1.25 mm² or more (0.0019 in² or more)**

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 side airbag assembly, 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 mm² (0.0019 in²).



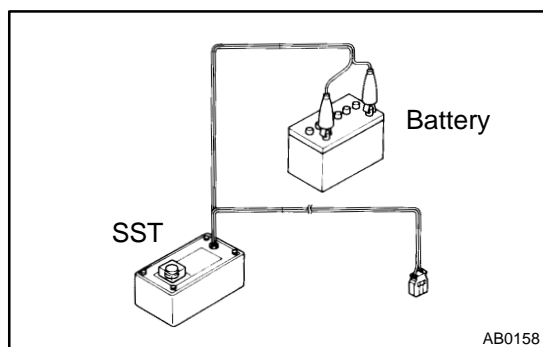
- (2) Put the wire harness through the holes shown in the illustration and then tie and fix the wheel with tire.

CAUTION:

- Make sure the wire harness is tight. It is very dangerous when a loose wire harness results in the side airbag assembly coming free due to the shock from the airbag deploying.
- Always tie down the side airbag assembly with the airbag deployment side facing upward. It is very dangerous if the side airbag assembly is tied down with the metal surface facing upward as the wire harness will be cut by the shock of the airbag deploying.

NOTICE:

The disc wheel will be marked by the airbag deployment, so when disposing of the airbag use a redundant disc wheel.



- (c) Check functioning of the SST.

SST 09082-00700

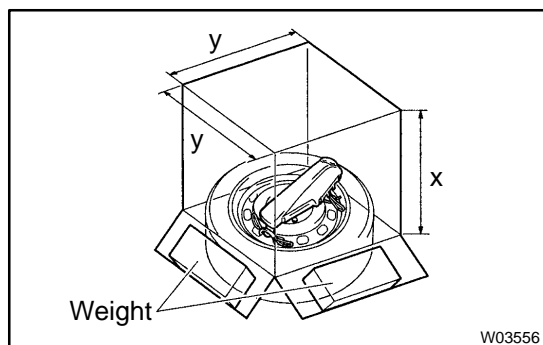
- (d) Install the SST.

CAUTION:

Place the disk wheel on level ground.

- (1) Connect the connector of 2 SST to the side airbag assembly connector.

SST 09082-00700, 09082-00750



- (2) Cover the side airbag assembly with cardboard box or tires.

- Covering method using cardboard box:
Cover the side airbag assembly with the cardboard box and weight the cardboard box down in 4 places with at least 196 N (20 kg, 44 lb).

Size of cardboard box:

Must exceed the following dimensions:

x=460 mm (18.11 in.)

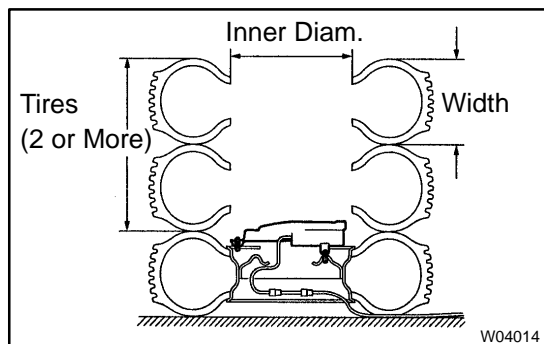
When dimension of the cardboard box exceeds the diameter of the disc wheel with tire to which the side airbag assembly is tied

x=460 mm (18.11 in.) + width of tire

y= 650 mm (25.59 in.)

NOTICE:

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 2 tires without disc wheel on top of the disc wheel with tire to which the side airbag assembly 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.

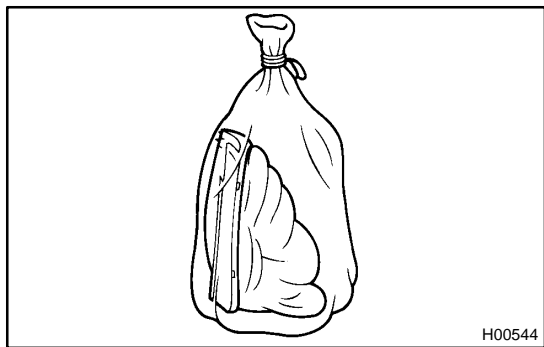
NOTICE:

The disk wheel may be marked by the airbag deployment, so when disposing of the airbag use the redundant disk wheel.

- (e) 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 side 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.



- (f) Dispose of the side airbag assembly.

CAUTION:

- The side 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 side airbag assembly with the deployed airbag.
 - Do not apply water etc. to a side airbag assembly with the deployed airbag.
 - Always wash your hands with water after completing the operation.
- (1) Remove the side airbag assembly from the tire.
 - (2) Place the side airbag assembly in a vinyl bag, tie the end tightly and dispose of it in the same way as other general parts disposal.

REPLACEMENT

REPLACEMENT REQUIREMENTS

In the following cases, replace the seatback assembly or seatback cover.

Case	Replacing part
If the front side airbag has been deployed.	Seatback assembly
If the front side airbag assembly has been found to be faulty in troubleshooting.	Seatback assembly
If the front side airbag assembly has cuts during checking items. (See page RS-44)	Seatback assembly
If the seatback cover has cuts and frayed seams during checking items. (See page RS-44)	Seatback cover
If the front side airbag assembly has been found to be faulty during checking items. (See page RS-44)	Seatback assembly
If the seatback cover has been found to be faulty during checking items. (See page RS-44)	Seatback cover
If the seatback assembly has been dropped.	Seatback assembly

CAUTION:

For removal and installation of the seatback assembly, see page RS-42 and RS-51. Be sure to follow the correct procedure.

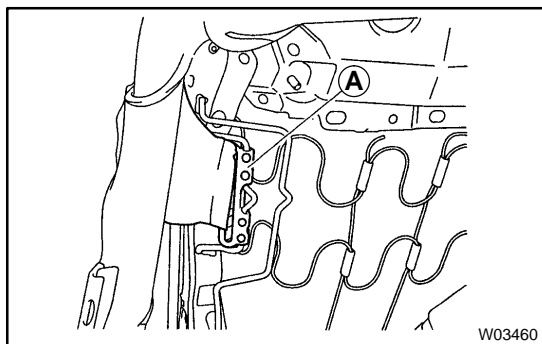
INSTALLATION

NOTICE:

Never use airbag parts from another vehicle. When replacing parts, replace them with new parts.

1. INSTALL SEATBACK FRAME

- (a) Install the seatback frame to the seatback cover with pad.
- (b) Install the 2 headrest supports.



- (c) Install the hook.
The position shown in the illustration is made to be hold by installing the side airbag assembly with the hook shown as "A" hanged onto the seatback frame.

CAUTION:

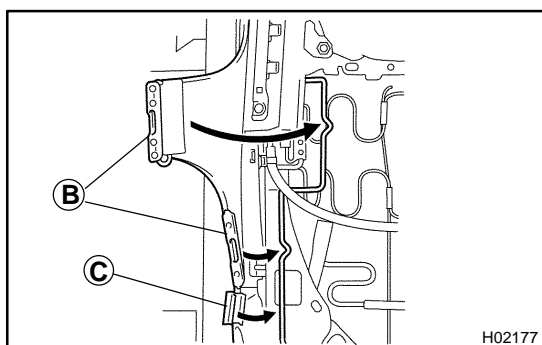
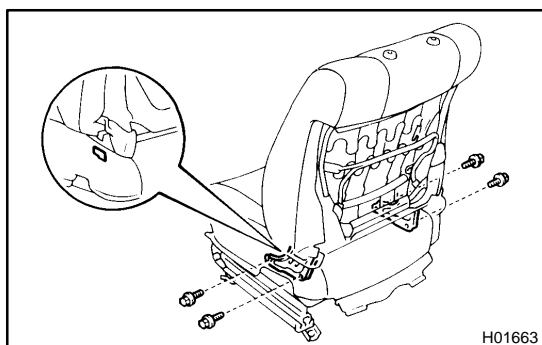
- Check that hook shown in the illustration "A" is hanging on the seat frame securely before installing the side airbag assembly.
- If the hook shown as "A" is not securely hang, there is fear of incorrect deploying caused by sliding of seat cover position.

NOTICE:

- Make sure that the side airbag assembly is installed with the specified torque.
- If the side airbag assembly has been dropped, or there are cracks, dents or other defects in the case or connector, replace the side airbag assembly with a new one.
- When Installing the side airbag assembly, take care it is not pinched between other parts.

2. INSTALL SEATBACK ASSEMBLY

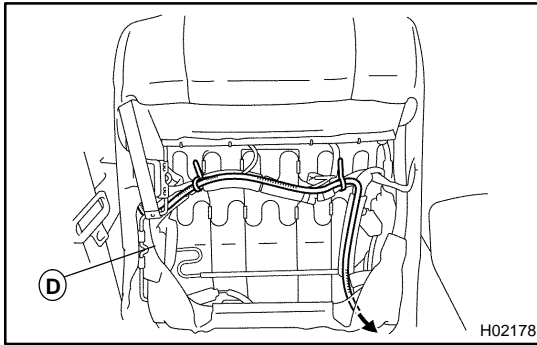
- (a) Install the seatback assembly with the 4 bolts.
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)



- (b) Hang the hook "B" and "C" onto the seatback frame.

CAUTION:

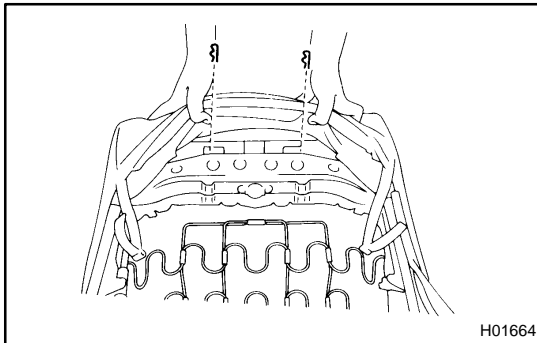
As well as "A", if not installing "B" hooks securely there is fear of incorrect deploying.



- (c) Hang the hook "D" onto the seatback frame and pass the wire harness through as shown in the illustration, then install clamps at the 2 positions under the seat.
- (d) Install the side airbag connector to the bracket under the seat.

CAUTION:

Hang the seatback cover hook securely to the fitting, or the side airbag does not operate correctly.



**3. w/Power headrest:
INSTALL HEADREST**

- (a) Using a screwdriver, remove the 2 pins from the adjuster.
- HINT:**

Tape the screwdriver tip before use.

- (b) Install the headrest with 2 pins.
- (c) Install the new hog rings to the seatback assembly.

HINT:

When installing hog ring, take care to prevent wrinkles as little as possible.

**4. w/Power headrest:
INSTALL HEADREST**

5. INSTALL FRONT SEATBACK BOARD

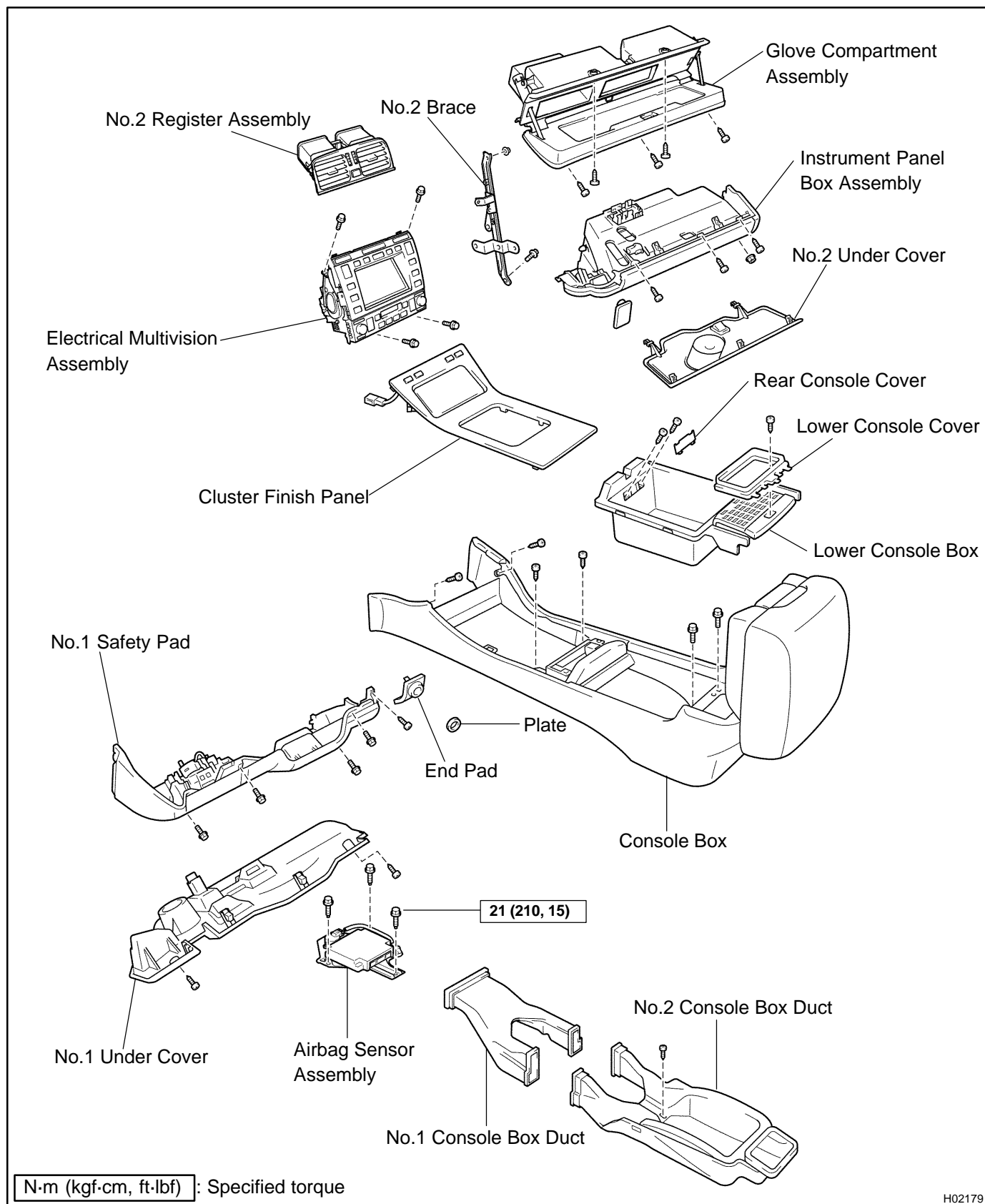
Install front seatback board to the front seat.

6. INSTALL FRONT SEAT

- (a) Mount the seat to the vehicle.
- (b) Connect the power seat connector and side airbag connector.
- (c) Install the outer bolt and inner bolt on the front side after sliding the seat to the rearmost position.
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)
- (d) Tighten the bolts on the rear side temporarily, from the bolt on the inner side tighten them completely.
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)
- (e) Install the seat belt lap outer anchor.
Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)

AIRBAG SENSOR ASSEMBLY COMPONENTS

RS067-01



H02179

REMOVAL

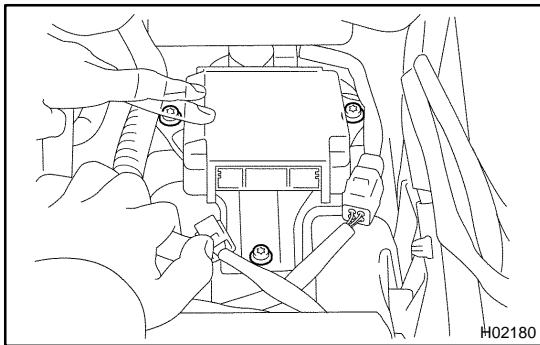
NOTICE:

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.)

1. REMOVE THESE PARTS

- (a) No.1 under cover
- (b) No.1 safety pad
- (c) End pad
- (d) No.2 under cover
- (e) Instrument panel box assembly
- (f) Upper console panel
- (g) Cluster finish panel
- (h) Lower console box
- (i) Console box
- (j) No.2 console box duct
- (k) No.1 console box duct
- (l) Lower console cover
- (m) Rear console cover
- (n) Glove compartment assembly
- (o) No.2 brace
- (p) No.2 register assembly
- (q) Electrical multivision assembly



2. REMOVE AIRBAG SENSOR ASSEMBLY

- (a) Disconnect the airbag sensor connectors.

NOTICE:

Remove the connectors 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)

INSPECTION

1. VEHICLE NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page [DI-459](#))

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check. (See page [DI-459](#))

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly. (See page [RS-53](#))

REPLACEMENT

REPLACEMENT REQUIREMENT

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.

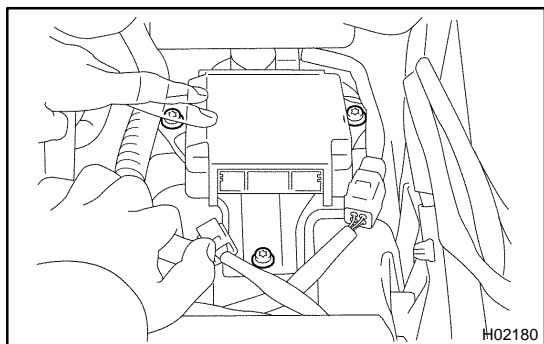
CAUTION:

For removal and installation of the airbag sensor assembly, see page [RS-54](#) and [RS-57](#). Be sure to follow the correct procedure.

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 connectors.

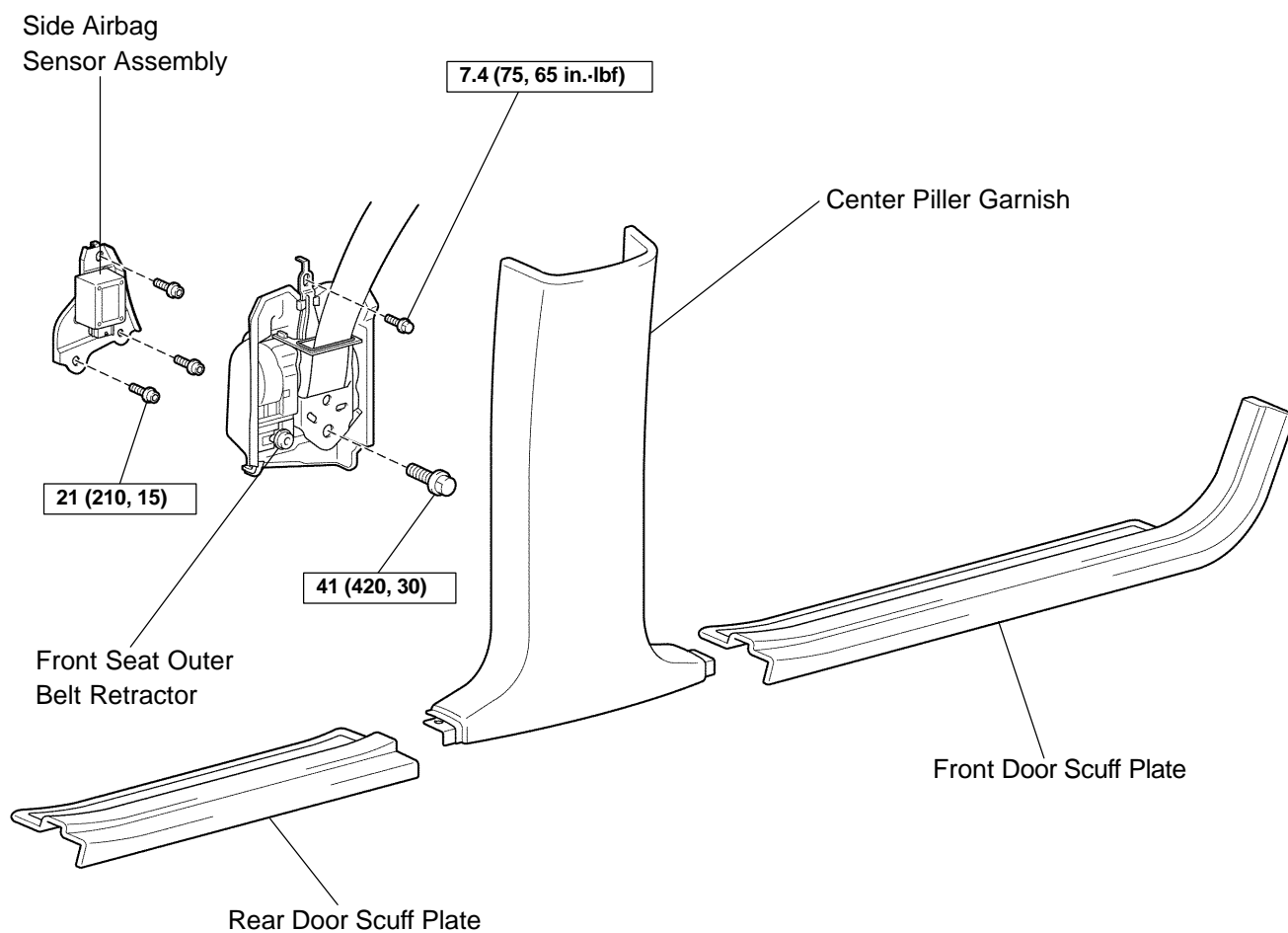
NOTICE:

- 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 sensor 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

SIDE AIRBAG SENSOR ASSEMBLY COMPONENTS

RS06C-01



N·m (kgf·cm, ft·lbf) : Specified torque

H02181

REMOVAL

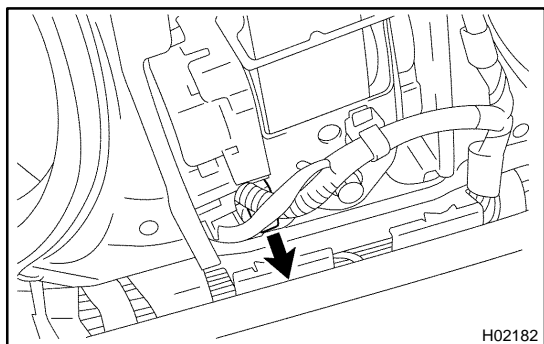
NOTICE:

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.)

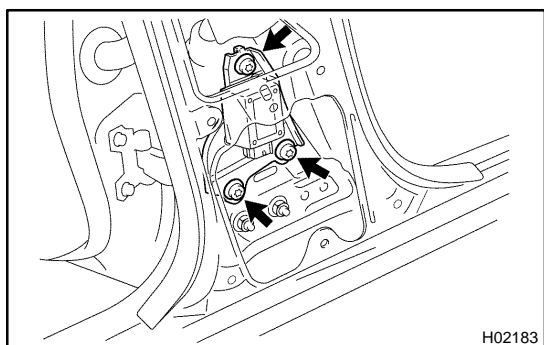
1. REMOVE THESE PARTS:

- (a) Front door scuff plate
- (b) Rear door scuff plate
- (c) Center pillar lower garnish



2. REMOVE FRONT SEAT OUTER BELT RETRACTOR (See page [BO-118](#))

- (a) Disconnect the pretensioner connector.
- (b) Disconnect the retractor switch connector.
- (c) Remove the 2 bolts and retractor.



3. REMOVE SIDE AIRBAG SENSOR ASSEMBLY

- (a) Disconnect the connector.

NOTICE:

Remove the connector with the sensor assembly installed.

- (b) Using a torx wrench, remove the 3 screws and side airbag sensor assembly.

Torx wrench: T40 (Part No.09042-00020 or locally manufactured tool)

INSPECTION

1. VEHICLES NOT INVOLVED IN COLLISION

Do a diagnostic system check. (See page [DI-459](#))

2. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS NOT DEPLOYED

Do a diagnostic system check. (See page [DI-459](#))

3. VEHICLE INVOLVED IN COLLISION AND AIRBAG IS DEPLOYED

Replace the airbag sensor assembly. (See page [RS-53](#))

REPLACEMENT

REPLACEMENT REQUIREMENT

In the following cases, replace the side airbag sensor assembly.

- If the side airbag sensor assembly has been deployed in a collision.
- If the side airbag sensor assembly has been found to be faulty in troubleshooting.
- If the side airbag sensor assembly has been dropped.

CAUTION:

For removal and installation of the side airbag sensor assembly, see page [RS-59](#) and [RS-62](#).

Be sure to follow the correct procedure.

INSTALLATION

NOTICE:

- Never use SRS parts from another vehicle. When replacing parts, replace them with new ones.
- Never reuse the side airbag sensor assembly involved in a collision when the airbag has deployed.
- Never repair a sensor in order to reuse it.

1. INSTALL SIDE AIRBAG SENSOR

- (a) Using a torx wrench, install the side airbag 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 side airbag sensor connector.

NOTICE:

- Installation of the connector is done with the sensor assembly 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 sensor assembly, take care that the SRS wiring does not interfere with other parts and is not pinched between other parts.
- After installation, shake the sensor assembly to check that there is no looseness.

2. INSTALL FRONT SEAT OUTER BELT RETRACTOR (See page [BO-126](#))

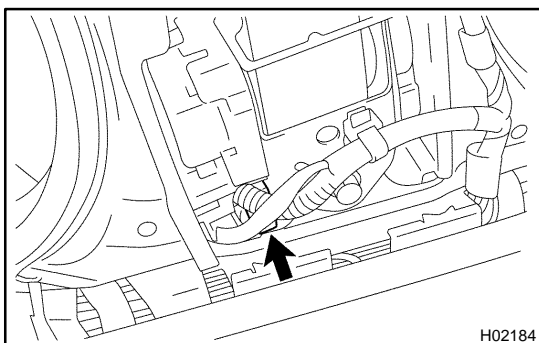
- (a) Install the retractor with 2 bolts.

Torque: 20 N·m (200 kgf-cm, 14 ft-lbf)

Upper bolt: 7.4 N·m (75 kgf-cm, 65 in.-lbf)

Lower bolt: 41 N·m (420 kgf-cm, 30 ft-lbf)

- (b) Connect the retractor switch connector.



H02184

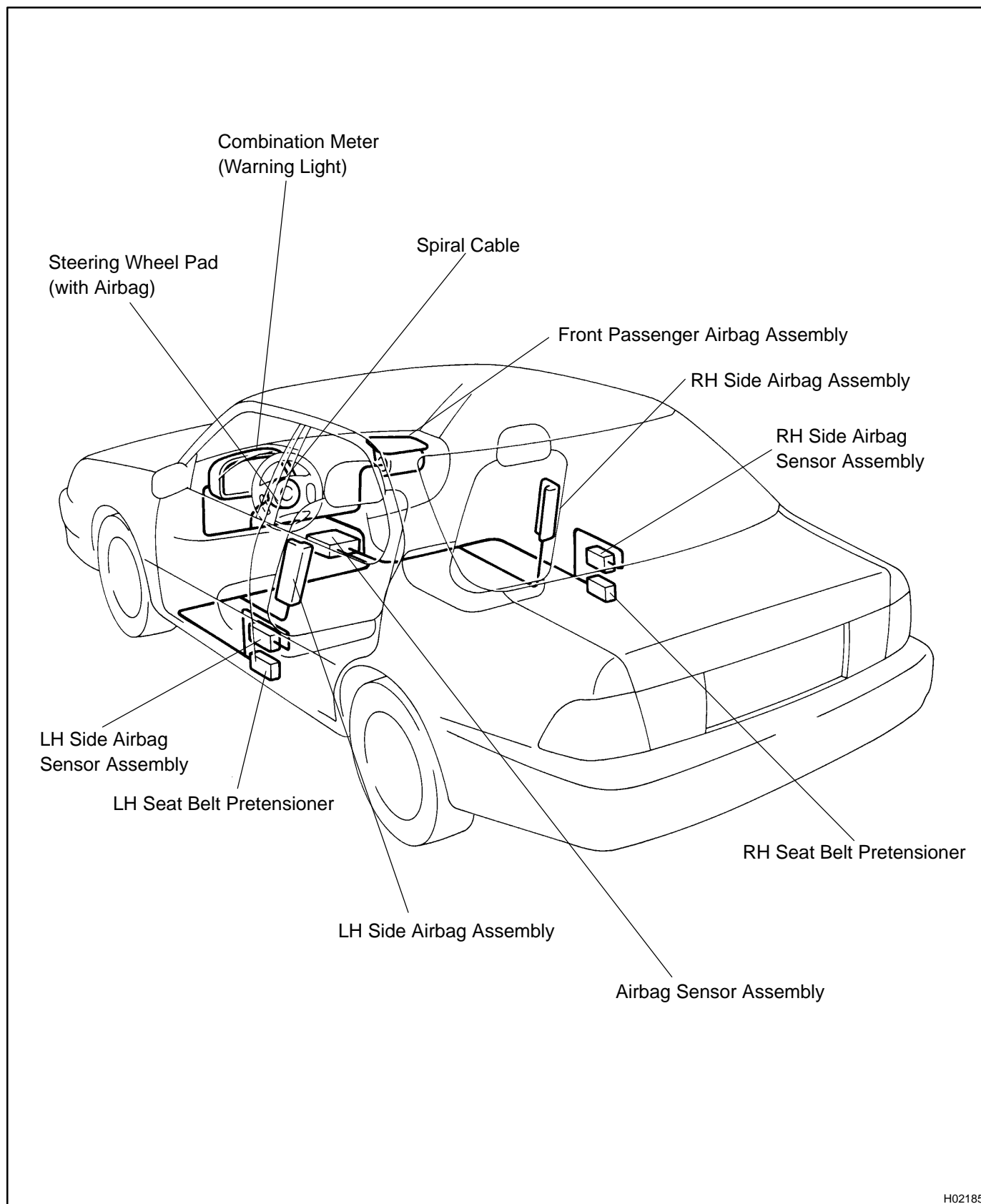
- (c) Connect the pretensioner connector.

3. INSTALL THESE PARTS:

- (a) Center pillar lower garnish
(b) Front door scuff plate
(c) Rear door scuff plate

WIRE HARNESS AND CONNECTOR LOCATION

RS06H-01



H02185

INSPECTION

HINT:

The SRS wire harness is integrated with the instrument panel wire harness assembly. The wires for the SRS wire harness are encased in a yellow corrugated tube and 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-459](#))

2. VEHICLES INVOLVED IN COLLISION

(a) Do a diagnostic system check.

(See page [DI-459](#))

(b) Check breaks in all wires of the SRS wire harness, and exposed conductors.

(c) Check to see if the SRS wire harness connectors are cracked or chipped.

REPLACEMENT

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. (See page [RS-64](#))

CAUTION:

If the wire harness used in the SRS is damaged, replace the whole wire harness assembly.

BODY ELECTRICAL SYSTEM

BE0DC-01

PRECAUTION

Take care to observe the following precautions when performing inspections or removal and replacement of body electrical related parts.

1. SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

The Lexus LS400 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 deployed 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 codices in the RS section.

2. COMBINATION METER SYSTEM

The cold cathode tube connectors (Connectors "N", "P" and "Q") in the combination meter are charged with high voltage AC current when power is supplied, so do not touch them when they are charged.

3. MICRO COMPUTER PRESET DRIVING POSITION SYSTEM

Power Seat Control System

Power Mirror Control System

Power Tilt and Telescopic Steering System

If the battery negative (–) terminal is disconnected, the preset driving positions stored in memory are erased, so be sure to note the positions and reset them after the battery terminal is reconnected.

4. AUDIO SYSTEM

- If the battery negative (–) terminal is disconnected, the preset AM, FM 1 and FM 2 stations stored in memory are erased, so be sure to not the stations and reset them after the battery terminal is reconnected.
- If the battery negative (–) terminal is disconnected, the "ANTI-THEFT SYSTEM" will operate when the terminal is reconnected, but the radio, tape player and CD player will not operate. Be sure to input the correct ID number so that the radio, tape player and CD player can be operated again.

5. MOBILE COMMUNICATION SYSTEM

If the vehicle is equipped with a mobile communication system, refer to precautions in the IN section.

6. LIGHTING SYSTEM

- Halogen bulbs have pressurized gas inside and require special handling. They can burst or scatter if scratched or dropped. Hold a bulb only by its plastic or metal case. Don't touch the glass part of a bulb with bare hands.
- When high voltage socket of discharge headlight is touched with the light control switch HEAD, high voltage of 20,000 V is momentarily generated. This might lead to a serious accident.
- Never connect the tester to the high voltage socket of discharge headlight for measurement, as this leads to a serious because of high voltage.
- When performing operation related to the discharge headlight, make sure to do it in the place with no water or rain to prevent electric shock, with light control switch OFF, battery terminal removed, connector of light control ECU disconnected.
- When performing operation related to the discharge headlight, make sure to do it after assembling has been completely over and never light up without a bulb installed.
- Do not light up the discharge headlight using another power source except vehicle's.
- When there is a defect on the discharge headlight or any shock has been applied to it, replace the light with a new one.

Even if the light operates normally, there is a possibility that the fail-safe function not works.

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

The table below will be useful for you in troubleshooting these electrical problems. The most likely causes of the malfunction are shown in the order of their probability. Inspect each part in the order shown, and replace the part when it is found to be faulty.

POWER OUTLET

Symptom	Suspect Area	See page
Electric power source cannot be taken out of the power outlet	1. Battery 2. RR CIG Fuse (Instrument panel J/B) 3. Wire Harness	

IGNITION SWITCH:

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Ignition switch is not set to each position.	1. Ignition switch 2. Power source circuit	BE-33 BE-23

KEY UNLOCK WARNING SWITCH:

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Key unlock warning system does not operate. (The buzzer does not sound when the driver's door is opened with the ignition OFF and key inserted)	1. Key Unlock Warning Switch 2. Door Courtesy Switch 3. Driver Door ECU 4. Multiplex Communication Circuit 5. Body ECU 6. Wire Harness	BE-33 BE-70 DI-727 DI-838 DI-661
Key unlock warning system does not operate. (The buzzer sounds when the ignition key is ACC or ON)	1. Ignition Switch 2. RADIO No.2 Fuse (Instrument Panel J/B) 3. GAUGE Fuse (Instrument Panel J/B) 4. Wire Harness	BE-33

HEADLIGHT AND TAILLIGHT SYSTEM:

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

HINT:

To inspect the bulb and light control ECU, replace them with the ones working normally and judge whether they work normally or not.

(AUTOMATIC LIGHT CONTROL SYSTEM)

Symptom	Suspect Area	See page
"Automatic light control system" does not operate.	1. ECU-IG Fuse (Instrument Panel J/B) 2. DOME Fuse (Engine Room J/B) 3. Automatic Light Control Sensor 4. Light Control Switch 5. Door Courtesy Switch 6. Body ECU 7. Driver Door ECU 8. Wire Harness	BE-38 BE-38 BE-70 DI-661 DI-727

(AUTO TURN OFF SYSTEM)

Symptom	Suspect Area	See page
Auto turn-off system does not operate when the driver's door is opened.	1. Drivers Door Courtesy Switch 2. Driver Door ECU 3. Multiplex Communication Circuit 4. Body ECU	BE-70 DI-727 DI-838 DI-661
Headlight and taillight does not come on.	1. Body ECU 2. Wire Harness	DI-661
Headlight and taillight stays on.	1. Body ECU 2. Wire Harness	DI-661

(USA)

Symptom	Suspect Area	See page
Only one headlight comes on. (Headlight main)	1. H-LP Fuse (LH-LWR) (Engine Room No.1 R/B) 2. H-LP Fuse (RH-LWR) (Engine Room No.1 R/B) 3. Headlight Main Bulb 4. *Light Control ECU 5. Wire Harness	BE-38
Only one headlight comes on. (Headlight sub)	1. H-LP Fuse (LH-UPR) (Engine Room J/B) 2. H-LP Fuse (RH-UPR) (Engine Room J/B) 3. Headlight Sub Bulb 4. *Light Control ECU 5. Wire Harness	BE-38
"LO-Beam" does not light.	1. H-LP Fuse (LH-LWR) (Engine Room No.1 R/B) 2. H-LP Fuse (RH-LWR) (Engine Room No.1 R/B) 3. Headlight Dimmer Relay (Engine Room J/B) 4. Headlight Dimmer Switch 5. Headlight Main Bulb 6. *Light Control ECU 7. Wire Harness	BE-38 BE-38 BE-38
"HI-Beam" does not light. (Headlight main and sub)	1. H-LP Fuse (LH-UPR) (Engine Room J/B) 2. H-LP Fuse (RH-UPR) (Engine Room J/B) 3. Headlight Dimmer Relay (Engine Room J/B) 4. Headlight Dimmer Switch 5. *Light Control ECU 6. Wire Harness	BE-38 BE-38 BE-38
"HI-Beam" does not light. (Headlight main or sub)	1. Headlight Main or Sub Bulb 2. *Light Control ECU 3. Wire Harness	BE-38
"Flash" does not light. (Headlight main and sub)	1. H-LP Fuse (LH-UPR) (Engine Room J/B) 2. H-LP Fuse (RH-UPR) (Engine Room J/B) 3. Headlight Dimmer Relay (Engine Room J/B) 4. Headlight Dimmer Switch 5. *Light Control ECU 6. Wire Harness	BE-38 BE-38 BE-38
"Flash" does not light. (Headlight main or sub)	1. Headlight Main or Sub Bulb 2. *Light Control ECU 3. Wire Harness	BE-38
Headlight does not come on. (Headlight main and sub)	1. Headlight Control Relay (Engine Room J/B) 2. Headlight Dimmer Relay (Engine Room J/B) 3. Light Control Switch 4. Body ECU 5. *Light Control ECU 6. Wire Harness	BE-38 BE-38 BE-38 DI-661 BE-38

BODY ELECTRICAL – TROUBLESHOOTING

Headlight does not come on. (Headlight main or sub)	1. Headlight Main or Sub 2. *Light Control ECU 3. Wire Harness	BE-38
Headlight is flicker.	1. Headlight Main or Sub Bulb 2. Headlight Dimmer Relay (Engine Room J/B) 3. *Light Control ECU 4. Wire Harness	BE-38 BE-38
Headlight is dark.	1. Headlight Main or Sub Bulb 2. *Light control ECU 3. Wire Harness	BE-38
Only one taillight comes on.	1. Taillight Bulb 2. Wire Harness	
Taillight does not come on. (Headlight is normal)	1. TAIL Fuse (Instrument Panel J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. Taillight Control Relay (Instrument Panel J/B) 4. Light Failure Sensor 5. Light Control Switch 6. Body ECU 7. Wire Harness	BE-38 BE-76 BE-38 DI-661
Taillight does not come on. (Headlight does not light)	1. Light Control Switch 2. Wire Harness	BE-38
Rear combination light does not come on.	1. Light Failure Sensor 2. Wire Harness 3. Bulb	BE-76

*: HID Type

CANADA:

Symptom	Suspect Area	See page
Only one headlight comes on. (Headlight main)	1. H-LP Fuse (LH) (Engine Room R/B No.1) 2. H-LP Fuse (RH) (Engine Room R/B No.1) 3. Headlight Main Bulb 4. *Light Control ECU 5. Wire Harness	BE-38
Only one headlight comes on. (Headlight sub RH)	1. H-LP Fuse (LH-UPR) (Engine Room J/B) 2. H-LP Fuse (RH-UPR) (Engine Room J/B) 3. Daytime Running Light No.3 Relay 4. Headlight Sub Bulb 5. *Light Control ECU 6. Wire Harness	BE-38 BE-38
Only one headlight comes on. (Headlight sub LH)	1. H-LP Fuse (LH-UPR) (Engine Room J/B) 2. H-LP Fuse (RH-UPR) (Engine Room J/B) 3. Headlight Sub Bulb 4. *Light Control ECU 5. Wire Harness	BE-38
"LO-Beam" does not light (All). (Headlight main)	1. Headlight Dimmer Switch 2. *Light Control ECU 3. Wire Harness	BE-38 BE-38
"LO-Beam" does not light (One side). (Headlight main)	1. Headlight Main Bulb 2. *Light Control ECU 3. Wire Harness	BE-38
"HI-Beam" does not light (All). (Headlight main)	1. Headlight Dimmer Switch 2. *Light Control ECU 3. Wire Harness	BE-38 BE-38

"HI-Beam" does not light (One side). (Headlight main)	1. Headlight Main Bulb 2. *Light Control ECU 3. Wire Harness	BE-38
"Flash" does not light. (Headlight main)	1. Headlight Dimmer Switch 2. *Light Control ECU 3. Wire Harness	BE-38 BE-38
Headlight does not come on. (Headlight main)	1. Headlight Control Relay (Engine Room J/B) 2. Daytime Running Light Relay 3. Headlight Dimmer Switch 4. Light Control Switch 5. Body ECU 6. Wire Harness 7. *Light Control ECU 8. Headlight Main Bulb	BE-38 BE-38 BE-38 BE-38 DI-661 BE-38
Headlight does not come on. (Headlight sub)	1. Headlight Dimmer Relay (Engine Room J/B) 2. Daytime Running Light Relay 3. Daytime Running Light No.4 Relay 4. *Light Control ECU 5. Wire Harness	BE-38 BE-38 BE-38 BE-38
Headlight does not come on with light control switch in HEAD. (Headlight main)	1. Light Control Switch 2. Body ECU 3. *Light Control ECU 4. Wire Harness	BE-38 DI-661 BE-38
Headlight does not go out with light control switch in OFF. (Headlight main)	1. Headlight Control Relay (Engine Room J/B) 2. *Light Control ECU 3. Wire Harness	BE-38 BE-38
Headlight is flicker.	1. Headlight Main or sub Bulb 2. Headlight Dimmer Relay (Engine Room J/B) 3. *Light Control ECU 4. Wire Harness	BE-38 BE-38
Headlight is dark.	1. Headlight Main or Sub Bulb 2. *Light control ECU 3. Wire Harness	BE-38
Taillight does not come on with light control switch in TAIL. (Headlight main)	1. Taillight Control Relay (Instrument Panel J/B) 2. Light Control Switch 3. Wire Harness	BE-38 BE-38
Taillight does not go out with light control switch in OFF. (Headlight main)	1. Taillight Control Relay (Instrument Panel J/B) 2. Light Control Switch 3. Wire Harness	BE-38 BE-38
Headlight do not come on with engine running and light control switch in OFF. (Headlight main)	1. ECU-B Fuse (Engine Room J/B) 2. GAUGE Fuse (Instrument Panel J/B) 3. DRL Fuse (Engine Room R/B No.1) 4. Daytime Running Light Relay 5. Daytime Running Light No.3 and No.4 Relay 6. Body ECU 7. Generator L Terminal 8. Parking Brake Switch 9. Brake Fluid Level Warning Switch 10. *Light Control ECU 11. Wire Harness	BE-38 BE-38 DI-661 BE-98 BE-98 BE-38

*: HID Type

HEADLIGHT BEAM LEVEL CONTROL SYSTEM

Symptom	Suspect Area	See page
Beam axis is not controlled. (It is not initialized.) Headlight Beam Level Control System does not operate.	1. PWR-IG Fuse (Engine Room J/B) 2. Headlight Beam Level Control Actuator 3. Headlight Beam Level Control ECU 4. Wire Harness Side	BE-52 BE-52
Beam axis is not controlled. (It is initialized.) Headlight Beam Level Control System does not operate.	1. Headlight Beam Level Control ECU 2. Power Source Circuit 3. Height Control Sensor 4. Suspension ECU 5. Headlight Beam Level Control ECU 6. Wire Harness Side	BE-52 BE-19 DI-251 IN-32 BE-52
Controlled angle of head light is unusual. (The angle is controlled.)	1. Height Control Sensor 2. Suspension ECU 3. Headlights 4. Wire Harness Side	DI-251 IN-32
Beam axis position is not stable during driving.	1. ABS System 2. Headlights 3. Wire Harness Side	

FOG LIGHT SYSTEM

Symptom	Suspect Area	See page
Fog light does not light up with light control SW HEAD (Headlight is normal.)	1. FOG Fuse (Instrument Panel J/B) 2. Fog Light Relay (Instrument Panel J/B) 3. Fog Light Switch 4. Wire Harness	BE-56 BE-38
Fog light does not light up with light control SW HEAD (Headlight does not light).	1. *1 Other Parts 2. Wire Harness	
Only one light does not light up.	1. Bulb 2. Wire Harness	

*1: Inspect Headlight System

TURN SIGNAL AND HAZARD WARNING SYSTEM

Symptom	Suspect Area	See page
"Hazard" and "Turn" do not light up.	1. Hazard Warning Switch 2. Turn Signal Switch 3. Turn Signal Flasher 4. Wire Harness	BE-59 BE-38 BE-59
The flashing frequency is abnormal.	1. Bulb 2. Turn Signal Switch 3. Wire Harness	BE-38
Hazard warning light does not light up. (Turn is normal)	1. HAZ Fuse (Engine Room J/B) 2. Wire Harness	
Hazard warning light does not light up in one direction.	1. Hazard Warning Switch 2. Wire Harness	BE-59
*1 Turn signal does not light up.	1. Ignition Switch 2. TURN Fuse (Instrument Panel J/B) 3. Turn Signal Switch 4. Wire Harness	BE-33 BE-38
*2 Turn signal does not light up.	1. TURN Fuse (Instrument Panel J/B) 2. Turn Signal Switch 3. Wire Harness	BE-38

Turn signal does not light up in one direction.	1. Turn Signal Switch 2. Wire Harness	BE-38
Only one bulb does not light up.	1. Bulb 2. Wire Harness	

*1: Combination Meter, Wiper and Washer do not operate.

*2: Combination Meter, Wiper and Washer are normal.

ILLUMINATION LIGHT SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Illumination light do not light. (Taillight is normal)	1. PANEL Fuse (Instrument Panel J/B) 2. Rheostat Light Control 3. Wire Harness	BE-62
Illumination light do not light. (Taillight does not light)	1. Taillight Control Relay (Instrument Panel J/B) 2. Taillight System 3. Rheostat Light Control 4. Wire Harness 5. PANEL Fuse (Instrument Panel J/B)	BE-38 BE-38 BE-62
Only one light does not light.	1. Bulb 2. Wire Harness	

INTERIOR LIGHT SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the lights do not come ON.	1. DOME Fuse (Engine Room J/B) 2. DOME Fuse (Engine Room J/B) 3. Body ECU	DI-661
The light does not come ON when the driver's door is opened.	1. Driver's Door Courtesy Switch 2. Driver Door ECU 3. Multiplex Communication Circuit 4. Body ECU 5. Wire Harness	BE-70 DI-727 DI-838 DI-661
The light does not come ON when the passenger's door is opened.	1. Passenger's Door Courtesy Switch 2. Front Passenger Door ECU 3. Multiplex Communication Circuit 4. Body ECU 5. Wire Harness	BE-70 DI-760 DI-838 DI-661
The light does not come on when the rear-right door is opened.	1. Rear-Right Door Courtesy Switch 2. Body ECU 3. Wire Harness	BE-70 DI-661
The light does not come on when the rear-left door is opened.	1. Rear-Left Door Courtesy Switch 2. Body ECU 3. Wire Harness	BE-70 DI-661
Only one of the bulbs comes ON.	1. Bulb	
The illumination does not fade out when all the doors are closed.	1. Courtesy Switch 2. Driver Door ECU 3. Front Passenger Door ECU 4. Multiplex Communication Circuit 5. Body ECU 6. Wire Harness	BE-70 DI-727 DI-760 DI-838 DI-661

BODY ELECTRICAL – TROUBLESHOOTING

The illumination does not fade out immediately when the ignition switch is turned to ACC or ON within 15 seconds after all the doors are closed.	1. Ignition Switch 2. RADIO NO.2 Fuse (Instrument Panel J/B) 3. GAUGE Fuse (Instrument Panel J/B) 4. Body ECU 5. Wire Harness	BE-33 DI-661
The illumination does not fade out immediately when all the doors are locked within 15 seconds after they are closed.	1. Door Unlock Detection Switch 2. Driver Door ECU 3. Front Passenger Door ECU 4. Multiplex Communication Circuit 5. Body ECU 6. Wire Harness	BE-139 DI-727 DI-760 DI-838 DI-661
Interior light does not light up. (in front personal light)	1. Bulb 2. Front Personal Light 3. Wire Harness	BE-70
Front personal light does not light up.	1. Bulb 2. Front Personal Light 3. Wire Harness	BE-70
Rear personal light does not light up.	1. Bulb 2. Rear Personal Light 3. Wire Harness	BE-70
Vanity light does not light up.	1. Bulb 2. Vanity Light 3. Wire Harness	BE-70
Luggage compartment light does not light up.	1. Bulb 2. Luggage Compartment Door Courtesy Switch 3. Wire Harness	BE-70
Courtesy light does not light up.	1. Bulb 2. Door Courtesy Switch 3. Wire Harness	BE-70

STOP LIGHT SYSTEM

Symptom	Suspect Area	See page
Stop light does not light up.	1. STOP Fuse (Instrument Panel J/B) 2. Stop Light Switch 3. Light Failure Sensor 4. Wire Harness	BE-76 BE-76
Stop light always lights up.	1. Stop Light Switch 2. Wire Harness	BE-76
Only one light always lights up.	1. Wire Harness	
Only one light does not light up.	1. Bulb 2. Wire Harness	

HEADLIGHT CLEANER SYSTEM

Symptom	Suspect Area	See page
"Headlight Cleaner System" does not operate (Using light control switch)	1. Light control switch 2. Wire Harness	BE-38
"Headlight Cleaner System" does not operate (When operating "Running Light System")	1. Daytime Running Light Relay (Main) 2. Wire Harness	BE-38

"Headlight Cleaner System" does not operate (All)	<ol style="list-style-type: none"> 1. AM1 H-Fuse 2. WIPER Fuse 3. Ignition Switch 4. Headlight Cleaner Switch 5. Headlight Cleaner Relay 6. Headlight Cleaner Motor 7. Headlight Cleaner Nozzle and Hose 8. Wire Harness 	BE-33 BE-79 BE-79 BE-79
Washer fluid does not spray	1. Headlight Cleaner Nozzle and Hose	

WIPER AND WASHER SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Wiper and washers do not operate.	<ol style="list-style-type: none"> 1. WIPER Fuse (Instrument Panel J/B) 2. Wiper Switch 3. Wiper Motor 4. Body ECU 5. Wire Harness 	BE-82 BE-82 DI-661
Wipers do not operate in LO, HI or MIST.	<ol style="list-style-type: none"> 1. Wiper Switch 2. Wiper Motor 3. Wire Harness 	BE-82 BE-82
Wipers do not operate in INT.	<ol style="list-style-type: none"> 1. Wiper Switch 2. Wiper Motor 3. Body ECU 4. Wire Harness 	BE-82 BE-82 DI-661
Washer motor does not operate.	<ol style="list-style-type: none"> 1. Washer Switch 2. Washer Motor 3. Wire Harness 	BE-82 BE-82
Wipers do not operate when washer switch in ON.	<ol style="list-style-type: none"> 1. Washer Motor 2. Body ECU 3. Wire Harness 	BE-82 DI-661
Washer fluid does not operate.	1. Washer Hose and Nozzle	
<p>●When wiper switch is at HI position, the wiper blade is in contact with the body.</p> <p>●When the wiper switch is OFF, the wiper blade does not retract or the retract position wrong.</p>	<ol style="list-style-type: none"> 1. Wiper Motor * 2. Wire harness * 3. Body ECU 	BE-82 DI-661

*: Inspect wiper arm and blade set position.

COMBINATION METER

Symptom	Suspect Area	See page
SRS warning light does not light up.	<ol style="list-style-type: none"> 1. MPX-B Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. Airbag Sensor Assembly 	BE-86 DI-574
Hi-beam indicator light does not light up.	<ol style="list-style-type: none"> 1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Headlight System 	BE-86 BE-36
Turn indicator light does not light up.	<ol style="list-style-type: none"> 1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Turn Signal and Hazard Warning System 	BE-86 BE-58

ABS warning light does not light up.	1. GAUGE Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. ABS, TRAC and VSC ECU	BE-86 DI-305
TRAC warning light does not light up.	1. GAUGE Fuse 2. Bulb 3. Meter Circuit Plate 4. Wire Harness 5. ABS, TRAC and VSC ECU	BE-86 DI-364
AIRSUS warning light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. Suspension ECU	BE-86 IN-32
Malfunction indicator light does not light up.	1. Bulb 2. Meter Circuit Plate 3. Wire Harness 4. ECM	BE-86
Fuel level warning light does not light up.	1. Bulb 2. Fuel level warning switch 3. Meter Circuit Plate 4. Wire Harness	BE-98 BE-86

ELECTRIC TENSION REDUCER SYSTEM

Symptom	Suspect Area	See page
Tension Reducer does not operate. (Driver's and Passenger's)	1. PWR-IG Fuse (Instrument Panel J/B) 2. Wire Harness	
Tension Reducer does not operate. (Only one side)	1. Buckle Switch 2. Tension Reducer Solenoid 3. Wire Harness	BE-113 BE-113

DEFOGGER SYSTEM

Symptom	Suspect Area	See page
All defogger systems do not operate.	1. HTR Fuse (Instrument Panel J/B) 2. DEF H-Fuse (Engine Room J/B) 3. Defogger Switch 4. Defogger Relay (Engine Room J/B) 5. Wire Harness	BE-116 BE-116
Rear window defogger does not operate.	1. Defogger Wire 2. Wire Harness	BE-116
Mirror defogger does not operate.	1. MIR-HTR Fuse (Engine Room J/B) 2. Mirror Defogger 3. Wire Harness	BE-116

POWER WINDOW CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the power windows do not operate. (Power Door Lock System is normal.)	1. Power Window Master Switch 2. Wire Harness	BE-126
Only the driver's window does not operate.	1. Power Window Master Switch 2. Power Window Switch 3. Power Window Motor 4. Wire Harness	BE-126 BE-126 BE-126
"Window lock function" does not operate.	1. Power Window Master Switch	BE-126

Window does not operate with power window master switch. (Manual or Automatic operation can be performed.)	TROUBLESHOOTING NO.1	BE-120
Remove control of all windows (Except driver's) does not functions with master switch. (Window operate normally with each of master switch.)	TROUBLESHOOTING NO.2	BE-120
The Key related power window operations does not operate with driver side door key cylinder. (Master switch operation is normal.)	TROUBLESHOOTING NO.3	BE-120
Power window does not operate with multi-function transmitter. (Windows operate normally with master switch.)	TROUBLESHOOTING NO.4	BE-120
Window moves down without being ordered during the up operation.	TROUBLESHOOTING NO.5	BE-120

POWER DOOR LOCK CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
All the doors cannot be locked or unlocked.	1. Door Lock Control Switch 2. Driver Door ECU 3. Front Passenger Door ECU 4. Multiplex Communication Circuit 5. Body ECU 6. Wire Harness	BE-139 DI-727 DI-760 DI-838 DI-661
Only driver's side door lock control does not operate.	1. Driver Door ECU 2. Driver's Door Lock Motor 3. Wire Harness	DI-727 BE-139
Other doors than the driver's side door do not operate.	1. Driver Door ECU 2. Multiplex Communication Circuit 3. Body ECU 4. Wire Harness 5. Door Lock Motor	DI-727 DI-838 DI-661 BE-139
Door key related function does not operate.	1. Door Key Lock and Unlock Switch 2. Wire Harness	BE-139
Key confinement prevention function does not operate.	1. Key Unlock Warning Switch 2. Wire Harness 3. Body ECU	BE-33 DI-661
Luggage compartment door opener function does not operate.	1. Luggage Compartment Door Opener Switch 2. Luggage Compartment Door Key Lock and Unlock Switch 3. Luggage Compartment Door Opener Motor 4. Wire Harness 5. Body ECU	BE-139 BE-139 BE-139 DI-661

THEFT DETERRENT SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
The system cannot be set.	1. Indicator Light 2. Key Unlock Warning Switch 3. Door Unlock Detection Switch 4. Engine Hood Courtesy Switch 5. Luggage Room Door Courtesy Switch 6. Wire Harness 7. Body ECU 8. Driver Door ECU 9. Multiplex Communication Circuit 10. Transmitter	BE-151 BE-33 BE-139 BE-151 BE-70 DI-661 DI-727 DI-838
The system cannot be canceled when the ignition switch is turned to ACC with key.	1. Key Unlock Warning Switch 2. Ignition Switch 3. Body ECU 4. RADIO NO.2 Fuse (Instrument panel J/B) 5. Wire Harness	BE-33 BE-33 DI-661
The system cannot be canceled when the luggage compartment door is unlocked with key.	1. Luggage Room Door Courtesy Switch 2. Body ECU 3. Wire Harness	BE-70 DI-661
The system does not operate when the engine hood is opened.	1. Engine Hood Courtesy Switch 2. Body ECU 3. Wire Harness	BE-151 DI-661
The system does not operate when the door is opened or unlocked without using a key or transmitter.	1. Door Courtesy Switch 2. Driver Door ECU 3. Front Passenger Door ECU 4. Body ECU 5. Multiplex Communication Circuit 6. Door Unlock Detection Switch 7. Wire Harness 8. Transmitter	BE-70 DI-727 DI-760 DI-661 DI-838 BE-139
The system does not operate when the ignition switch is turned to ACC without using a key or transmitter.	1. Ignition Switch 2. Key Unlock Warning Switch 3. Body ECU 4. Wire Harness 5. Transmitter	BE-33 BE-33 DI-661
Some of the does not operate. (Headlight does not light up)	1. Headlight System 2. Wire Harness 3. Body ECU	BE-36 DI-661
Some of the system does not operate. (Taillight does not light up)	1. Taillight System 2. Wire Harness 3. Body ECU	BE-36 DI-661
Some of the system does not operate. (Theft deterrent horn or horn does not sound)	1. Theft Deterrent Horn 2. Horn 3. Horn Relay 4. HORN Fuse (Engine Room J/B) 5. Wire Harness 6. Body ECU	BE-151 BE-257 BE-257 DI-661

While the warning is given, the system cannot be canceled by unlocking the door with key or transmitter.	<ol style="list-style-type: none"> 1. Door Key Lock and Unlock Switch 2. Body ECU 3. Wire Harness 4. Driver Door ECU 5. Front Passenger Door ECU 6. Multiplex Communication Circuit 7. Transmitter 	BE-139 DI-661 DI-727 DI-760 DI-838
While the warning is given, the system cannot be canceled by turning the ignition switch to ON with key.	<ol style="list-style-type: none"> 1. Ignition Switch 2. Key Unlock Warning Switch 3. RADIO NO.2 Fuse (Instrument Panel J/B) 4. GAUGE Fuse (Instrument Panel J/B) 5. Body ECU 6. Wire Harness 	BE-33 BE-33 DI-661
The system operates for more than 60 seconds.	<ol style="list-style-type: none"> 1. Body ECU 	BE-33

WIRELESS DOOR LOCK CONTROL SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

- Whole wireless door lock control system does not operate.
 - Problem occurs only at a specific locality→ Precheck type I (See page [BE-154](#))
 - Problem occurs everywhere→ Precheck type II (See page [BE-154](#))
- Some functions of wireless door lock control system do not operate.

HINT:

- Troubleshooting of the wireless door lock control system is based on the premise that the door lock control system is operating normally. Accordingly, before troubleshooting the wireless door lock control system, first make certain that the door lock control system is operating normally.
- If the trouble still reappears even though there are no abnormalities in any of the other circuits, then check and replace the Wireless Door Lock Control Receiver as the last step.

Symptom	Suspect Area	See page
All functions of wireless door lock control system do not operate.	<ol style="list-style-type: none"> 1. Wireless Door Lock Control Receiver 2. Wire Harness 	BE-161
Wireless door lock operates, but the buzzer does not sound.	<ol style="list-style-type: none"> 1. Wireless Door Lock Buzzer 2. Wireless Door Lock Control Receiver 3. Wire Harness 	BE-161 BE-161

POWER SEAT CONTROL SYSTEM

Symptom	Suspect Area	See page
Power seat does not operate. (Door lock does not operate.)	<ol style="list-style-type: none"> 1. Wire Harness 2. Power Seat Switch (D) 3. Power Seat Switch (P) 	BE-172 BE-172
Power seat does not operate. (Door lock is normal.)	<ol style="list-style-type: none"> 1. Wire Harness 2. Power Seat Switch (D) 3. Power Seat Switch (P) 	BE-172 BE-172
Driver's seat does not operate.	<ol style="list-style-type: none"> 1. Power Seat Switch (D) 2. Wire Harness 	BE-172
Passenger's seat does not operate.	<ol style="list-style-type: none"> 1. Power Seat Switch (P) 2. Wire Harness 	BE-172
"Slide operation" does not operate.	<ol style="list-style-type: none"> 1. Power Seat Switch (D) 2. Power Seat Switch (P) 3. Wire Harness 4. Slide Motor (D, P) 	BE-172 BE-172 BE-172

"Front Vertical Operation" does not operate.	1. Power Seat Switch (D) 2. Power Seat Switch (P) 3. Wire Harness 4. Front Vertical Motor (D, P)	BE-172 BE-172 BE-172
"Rear Vertical Operation" does not operate.	1. Power Seat Switch (D) 2. Wire Harness 3. Rear Vertical Motor (D, P)	BE-172 BE-172
"Reclining Operation" does not operate.	1. Power Seat Switch (D) 2. Power Seat Switch (P) 4. Wire Harness 4. Reclining Motor (D, P)	BE-172 BE-172 BE-172
"Lumbar Support Operation" does not operate.	1. Power Seat Switch (D, P) 2. Wire Harness 3. Lumbar Support Motor (D, P)	BE-172 BE-172

(D): Driver's Seat

(P): Passenger's Seat

w/ Memory System:**POWER MIRROR CONTROL SYSTEM**

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Both right and left mirror does not operate.	1. RADIO NO.2 Fuse (Instrument Panel J/B) 2. Mirror Switch 3. Tilt & Telescopic ECU 4. Multiplex Communication Circuit 5. Wire Harness	BE-183 DI-408 DI-838
Only one side of interior does not operate.	1. Driver Door ECU (Left Side Mirror) 2. Front Passenger Door ECU (Right Side Mirror) 3. Mirror Motor 4. Wire Harness	DI-727 DI-760 BE-183
The mirror does not return to the memorized position.	1. Driving Position Memory (Position is not set) 2. Driving Position Switch 3. Driver Door ECU 4. Multiplex Communication Circuit 5. Wire Harness	BE-183 BE-183 DI-727 DI-838
The memorized position is moved.	1. Driving Position Memory (Position is not set) 2. Wire Harness	DI-727

w/o Memory System:**POWER MIRROR CONTROL SYSTEM**

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Mirror does not operate.	1. RADIO NO.2 Fuse (Instrument Panel J/B) 2. Mirror Switch 3. Mirror Motor 4. Wire Harness	DI-727 DI-727
Mirror operates abnormally.	1. Mirror Switch 2. Mirror Motor 3. Wire Harness	DI-727 DI-727

POWER SHOULDER BELT ANCHORAGE SYSTEM

This system uses the multiplex communication system, so check diagnosis system of the multiplex communication system before you proceed with troubleshooting.

Symptom	Suspect Area	See page
Driver's belt anchor can not be operated manually.	1. Shoulder Belt Adjust Switch (Driver's) 2. Driver Door ECU 3. Multiplex Communication Circuit 4. Tilt and Telescopic ECU 5. Height Adjustable Anchor Motor 6. Wire Harness	BE-188 DI-727 DI-838 DI-408 BE-188
The anchor does not return to the memorized position.	1. Driving Position Memory and Return Switch 2. Driver Door ECU 3. Multiplex Communication Circuit 4. Tilt and Telescopic ECU 5. Wire Harness	BE-188 DI-727 DI-838 DI-408
The memorized position is moved.	1. Height Adjustable Anchor Sensor	BE-188
Passenger's belt anchor can not be operated manually.	1. Shoulder Belt Adjust Switch (Passenger's) 2. Shoulder Belt Anchor Relay 3. Wire Harness 4. Height Adjustable Anchor Motor	BE-188 BE-188 BE-188

ELECTRO CHROMIC MIRROR SYSTEM

Symptom	Suspect Area	See page
Electro Chromic Inner Mirror does not operate.	1. ECU-IG Fuse (Instrument Panel J/B) 2. Elector Chromic Inner Mirror 3. Wire Harness	BE-195
Electro Chromic Outer Mirror does not operate.	1. ECU-IG Fuse (Instrument Panel J/B) 2. Electro Chromic Outer Mirror 3. Elector Chromic Inner Mirror 4. Wire Harness	BE-195 BE-195

SEAT HEATER SYSTEM

Symptom	Suspect Area	See page
Seat heaters do not operate. (Driver's and Passenger's)	1. FR S/HTR Fuse (Engine Room J/B) 2. Engine Main Relay (Engine Room J/B) 3. Seat Heater Switch 4. Wire Harness 5. Seat Heater	BE-198 BE-198 BE-198
Driver's seat heater does not operate.	1. Seat Heater Switch 2. Wire Harness	BE-198
Passenger's seat heater does not operate.	1. Seat Heater Switch 2. Wire Harness	BE-198
Seat heater temperature is too hot.	1. Seat Heater	BE-198

FUEL LID OPENER SYSTEM

Symptom	Suspect Area	See page
Fuel lid opener system does not operate.	1. FUEL OPN Fuse (Instrument Panel J/B) 2. Fuel Lid Opener Switch 3. Fuel Lid Opener Solenoid 4. Wire Harness	BE-202 BE-202

GARAGE DOOR OPENER SYSTEM

Symptom	Suspect Area	See page
The equipment of which code has been registered does not operate.	1. Garage Door Opener 2. Wire Harness 3. *	BE-242
LED does not light up. (Even though either switch is pressed.)	1. Garage Door Opener 2. Wire Harness	BE-242
LED does not light up. (Only one switch is pressed.)	1. Garage Door Opener	BE-242

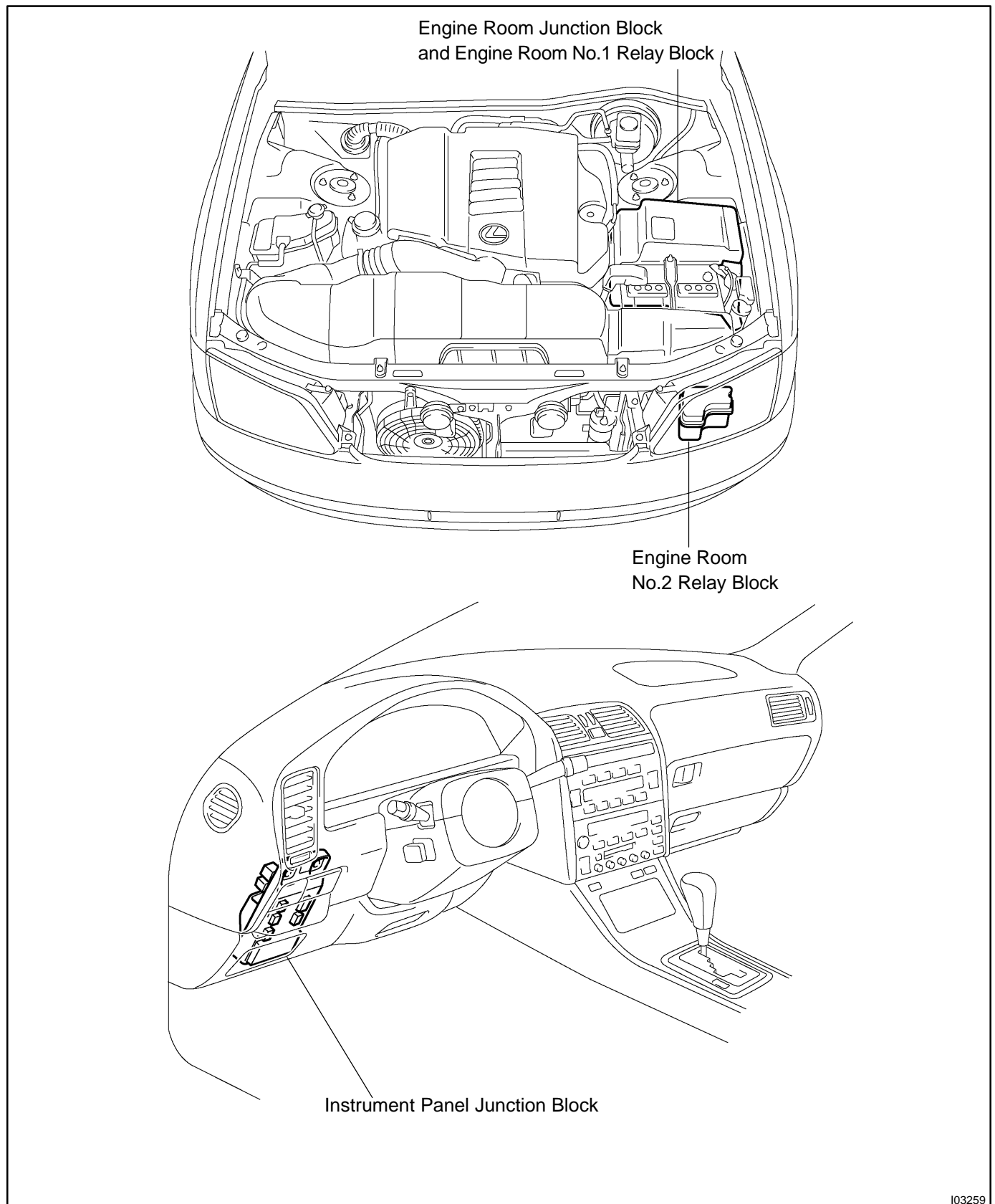
* As the GARAGE DOOR OPENER on the vehicle side seems to be normal, check the OPENER on the equipment side, of which code has been registered.

HORN SYSTEM

Symptom	Suspect Area	See page
Horn system does not operate.	1. HORN Fuse (Engine Room J/B) 2. Horn Relay (Engine Room J/B) 3. Horn Switch 4. Horn 5. Wire Harness	BE-257 BE-257 BE-257
Horns blow all the time.	1. Horn Relay (Engine Room J/B) 2. Horn Switch 3. Wire Harness	BE-257 BE-257
One horn operates but other horn does not operate.	1. Horn 2. Wire Harness	BE-257
Horns operate abnormally.	1. Horn Relay (Engine Room J/B) 2. Horn 3. Wire Harness	BE-257 BE-257

POWER SOURCE LOCATION

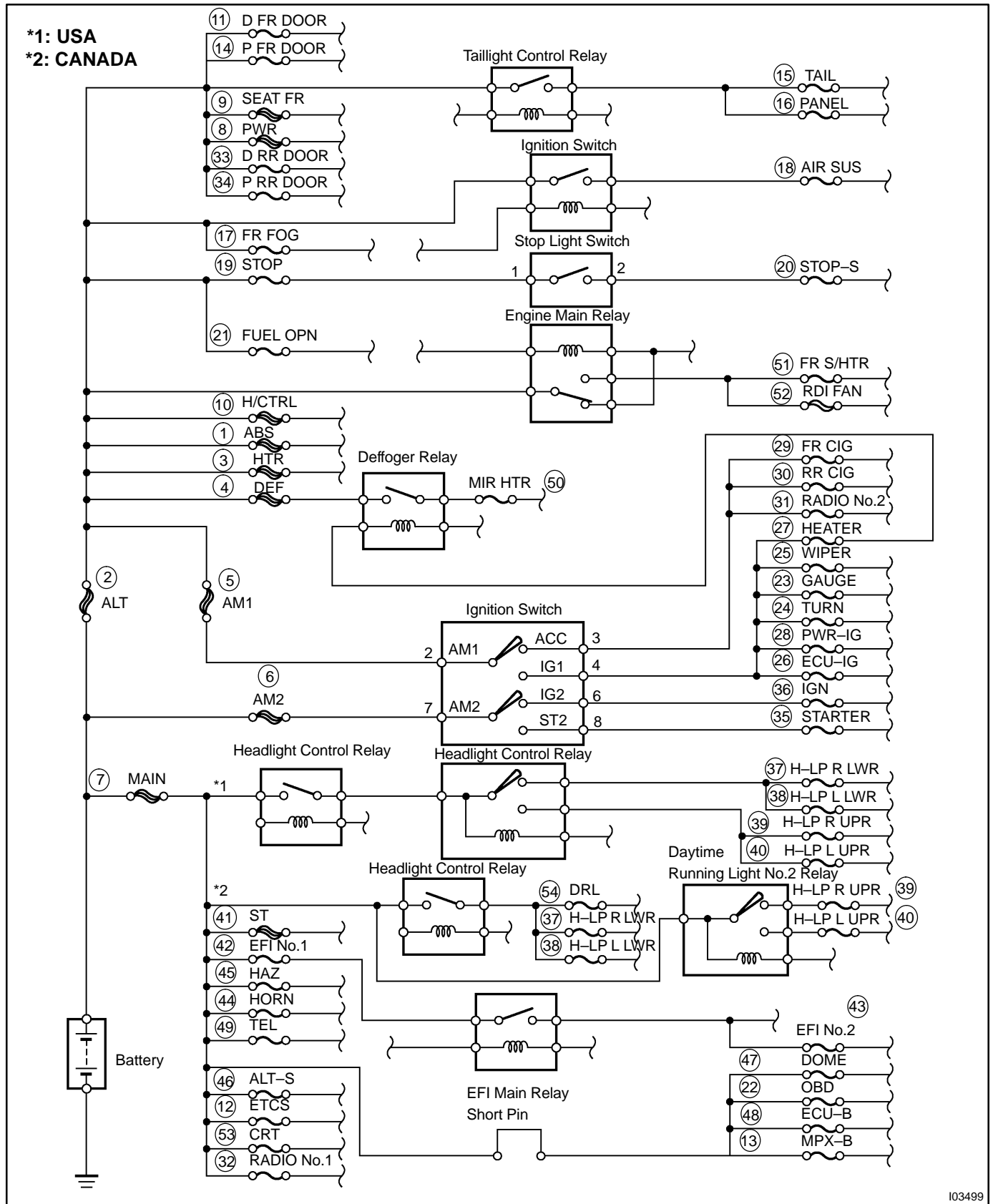
BE0B6-01



103259

CIRCUIT

1. WIRING DIAGRAM



I03499

The power source supplies power to each of the vehicle's electrical devices. It is composed of the battery, fuses and relays, which are located centrally at engine room junction block, engine room No.1 relay block, fusible link block and engine room No.2 relay block in the engine compartment, and instrument panel junction block in the cabin near the driver's feet.

2. RELATED SYSTEMS FOR EACH FUSIBLE LINK, MEDIUM CURRENT FUSE AND FUSE

Parts Name	Related Systems or Parts	Related Systems or Parts
1. ABS H-Fuse	● ABS System	● TRAC System
2. ALT H-Fuse	<ul style="list-style-type: none"> ● A/C System ● Air Suspension System ● Defogger System ● Electrically Controlled Transmission System ● Fog Light System ● Fuel Lid Opener System ● Illumination Light System ● Light Fuller Relay 	<ul style="list-style-type: none"> ● Power Shoulder Belt Anchorage System ● Radiator Fan System ● Rear Combination Light System ● Seat Heater System ● Stop Light System ● Taillight System ● Tilt & Telescopic Steering System ● VSC
3. HTR H-Fuse	● A/C System	
4. DEF H-Fuse	● Defogger System	
5. AM1 H-Fuse	<ul style="list-style-type: none"> ● A/C System ● Air Suspension System ● Audio System ● Auto Antenna System ● Back-up Light System ● Body ECU System ● Cellular Phone ● Cigarette Lighter System ● Combination Meter ● Defogger System ● Electro Chromic Mirror System ● Electric Tension Reducer System ● Electrically Controlled Transmission System ● EMV 	<ul style="list-style-type: none"> ● Generator System ● Headlight Cleaner System ● Heater System ● Illuminated Entry System ● Light Failure Sensor ● Shift Lock System ● Power Seat System ● Progressive Power Steering System ● Rheostat Light Control ● SRS ● Tilt & Telescopic Steering System ● Turn Signal Light System ● VSC System ● Wiper System
6. AM2 H-Fuse	<ul style="list-style-type: none"> ● Electrically Controlled Transmission System ● Engine 	● Starter
7. MAIN H-Fuse	<ul style="list-style-type: none"> ● A/C System ● Air Suspension System ● Auto Antenna System ● Cellular Phone ● Check Connector ● Combination Meter System ● Daytime Running Light System ● Defogger System ● Electrically Controlled Transmission System ● Engine ● Generator System 	<ul style="list-style-type: none"> ● Hazard Warning System ● Heater System ● Headlight System ● Horn ● OBD II ● Power Seat Control System ● Power Shoulder Belt Anchorage System ● SRS ● Starter ● Tilt & Telescopic Steering System
8. PWR H-Fuse	<ul style="list-style-type: none"> ● Power Shoulder Belt Anchorage System ● Sliding Roof System 	● Tilt & Telescopic Steering System
9. SEAT FR H-Fuse	● Power Seat System	
10. H/CTRL H-Fuse	● Air Suspension System	

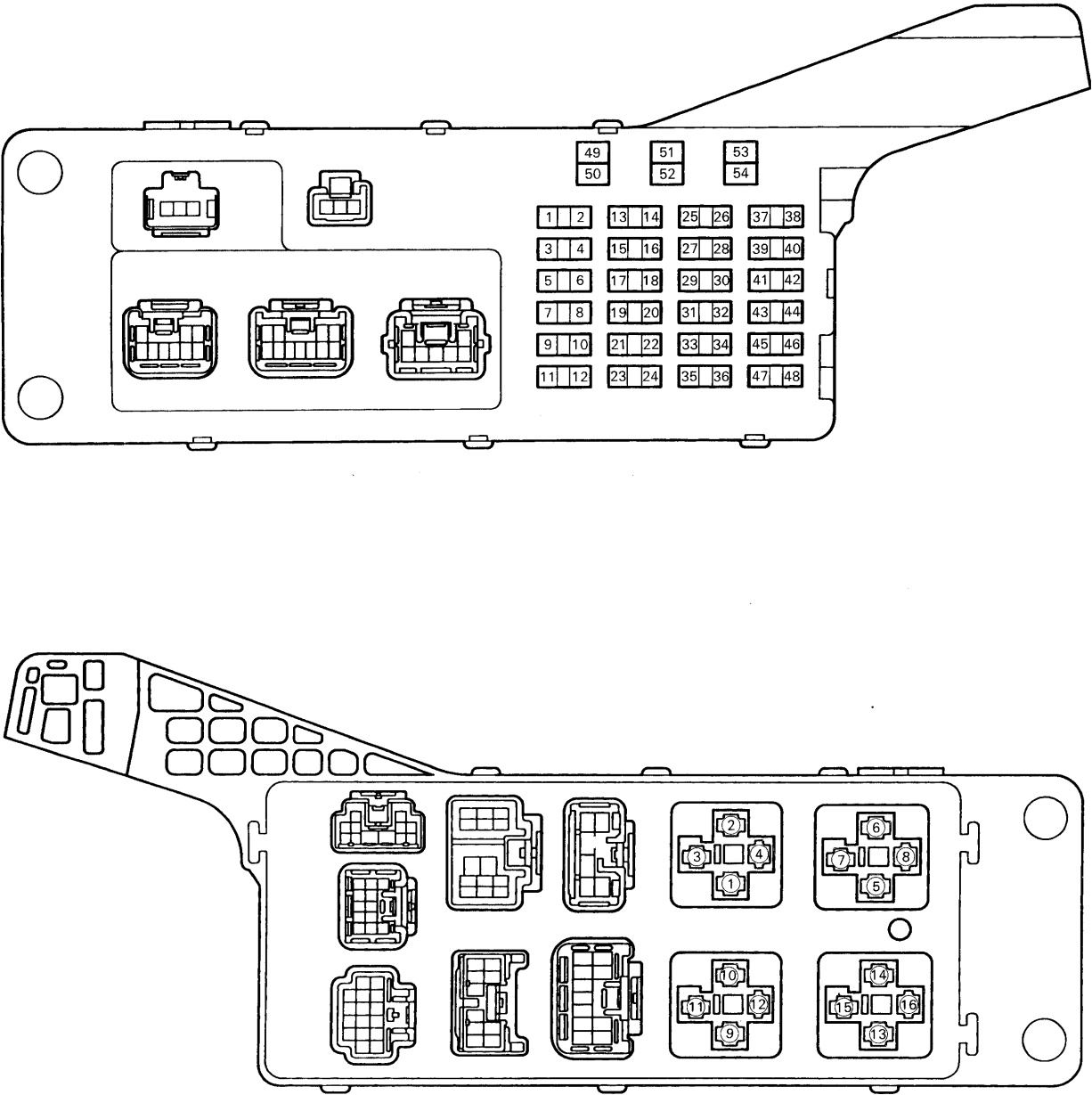
BODY ELECTRICAL – POWER SOURCE

11. D FR DDOR Fuse	● Driver Door Control System	
12. ETCS Fuse	● Engine	
13. MPX-B Fuse	● Combination Meter	● MPX
14. P FR DOOR Fuse	● Front Passenger Door Control System	
15. TAIL Fuse	● Parking Light ● Rear Combination Light	● Side Marker Light ● Taillight
16. PANEL Fuse	● Illumination Light System	
17. FR FOG LP Fuse	● Fog Light System	
18. AIR SUS Fuse	● Air Suspension System	
19. STOP Fuse	● Stop Light System	
20. STOP-S Fuse	● Electrically Controlled Transmission System ● Shift Lock System	● Stop Light System
21. FUEL OPN Fuse	● Power Shoulder Belt Anchorage System	● Fuel Lid Opener System
22. OBD Fuse	● OBD II	
23. GAUGE Fuse	● Back-up Light System ● Combination Meter ● Daytime Running Light System ● Electrically Controlled Transmission System ● Engine ● Illuminated Entry System	● Light Failure Sensor ● Power Shoulder Belt Anchorage System ● Rheostat Light Control ● Shift Lock System ● Tilt & Telescopic System
24. TURN Fuse	● Turn Signal Light System	
25. WIPER Fuse	● Headlight Cleaner System	● Wiper and Washer System
26. ECU-IG Fuse	● Air Suspension System ● Cellular Phon ● Electro Chromic Inner Mirror System ● Generator	● Power Seat System ● Progressive Power Steering ● Shift Lock System ● VSC
27. HEATER Fuse	● A/C System ● Defogger System	● Heater System
28. PWR-IG Fuse	● Auto Antenna System ● Electric Tension Reducer System	● Headlight Level Control System ● MPX
29. FR CIG Fuse	● A/C System ● Front Cigarette Lighter	● SRS
30. RR CIG Fuse	● Rear Cigarette Lighter	● Shift Lock System
31. RADIO No.2 Fuse	● Audio System ● Auto Antenna System	● Body Control System ● EMV
32. RADIO No.1 Fuse	● Audio System ● EMV System	
33. D RR DOOR Fuse	● Rear Door Control System	
34. P RR DOOR-Fuse	● Rear Door Control System	
35. STARTER Fuse	● Starter	
36. IGN Fuse	● Electrically Controlled Transmission System ● Engine	● SRS

37. H-LP R LWR Fuse	● Headlight (RH)	
38. H-LP L LWR LH Fuse	● Headlight (LH)	
39. H-LP R UPR RH Fuse (CANADA)	● Headlight HI-Beam (RH)	
40. H-LP L UPR LH Fuse (CANADA)	● Headlight HI-Beam (LH)	
41. ST H-Fuse	● Starter	
42. EFI No.1 Fuse	● Check Connector ● Electrically Controlled Transmission System	● Engine
43. EFI No.2 Fuse	● Engine	
44. HORN Fuse	● Horn	
45. HAZ Fuse	● Hazard Warning System	
46. ALT-S Fuse	● Generator	
47. DOME Fuse	● MPX	● Power Seat Control System
48. ECU-B Fuse	● Air Suspension System ● Daytime running Light System	● SRS ● VSC
49. TEL Fuse	● Cellular Phone	
50. MIR HTR Fuse	● Mirror Defogger System	
51. FR S/HTR HTR Fuse	● Seat Heater System	
52. RDI FAN M-Fuse	● Radiator Fan	
53. CRT Fuse	● EMV	
54. DRL Fuse	● Daytime Running Light System	

INSPECTION

1. INSPECT INSTRUMENT PANEL JUNCTION BLOCK



N13426
N13427

Z14947

2. FUSE CIRCUIT

Remove the fuse from the junction block and inspect the connector on junction block side.

Connect numbers are shown in the illustration.

Fuse	Tester connection	Condition	Specified condition
PANEL	3 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
A/C	5 – Ground	Constant	Battery positive voltage
ECU-IG	10 – Ground	Ignition switch ON	Battery positive voltage
TURN	12 – Ground	Ignition switch ON	Battery positive voltage
WASHER	14 – Ground	Ignition switch ON	Battery positive voltage
ST	15 – Ground	Ignition switch START	Battery positive voltage
P RR DOOR	18 – Ground	Constant	Battery positive voltage
FUEL OPN	20 – Ground	Constant	Battery positive voltage
PWR-IG	21 – Ground	Ignition switch ON	Battery positive voltage
WIPER	24 – Ground	Ignition switch ON	Battery positive voltage
AIR SUS	25 – Ground	Ignition switch ON	Battery positive voltage
TAIL	27 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
STOP	29 – Ground	Constant	Battery positive voltage
RR CIG	32 – Ground	Ignition switch ACC or ON	Battery positive voltage
GAUGE	33 – Ground	Ignition switch ON	Battery positive voltage
HEATER	35 – Ground	Ignition switch ON	Battery positive voltage
D RR DOOR	38 – Ground	Constant	Battery positive voltage
STOP-S	39 – Ground	Stop light switch ON	Battery positive voltage
RADIO No.2	42 – Ground	Ignition switch ACC or ON	Battery positive voltage
FR CIG	44 – Ground	Ignition switch ACC or ON	Battery positive voltage
IGN	46 – Ground	Ignition switch ON	Battery positive voltage
FR FOG	47 – Ground	Constant	Battery positive voltage
SEAT FR H	49 – Ground	Constant	Battery positive voltage
PWR H	51 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

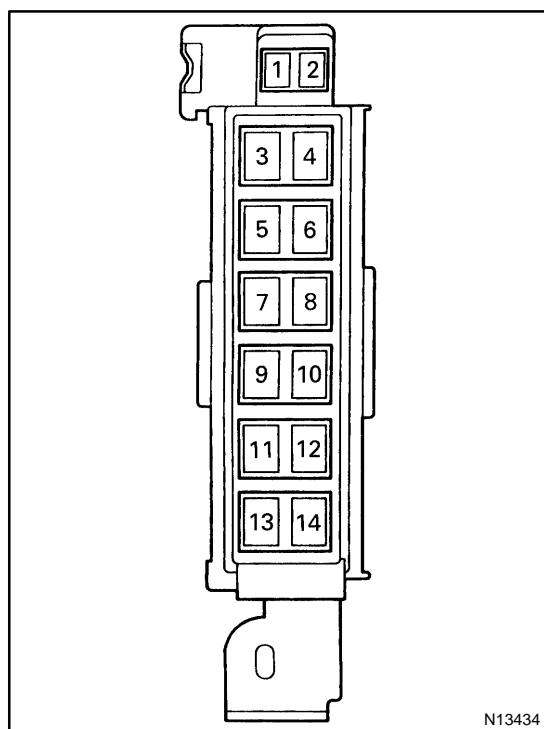
3. RELAY CIRCUIT

Remove the relay from the junction block and inspect the connector on junction block side.

Connect numbers are shown in the illustration.

Relay	Tester connection	Condition	Specified condition
Taillight Control	(2) – Ground	Light control switch TAIL or HEAD	Continuity
Taillight Control	(3) – Ground	Constant	Continuity
Taillight Control	(1) – Ground	Constant	Battery positive voltage
Taillight Control	(4) – Ground	Constant	Battery positive voltage
Ignition Main	(6) – Ground	Constant	Continuity
Ignition Main	(7) – Ground	Constant	Continuity
Ignition Main	(5) – Ground	Ignition switch ON	Battery positive voltage
Power Main	(12) – Ground	Constant	Battery positive voltage
Fog Light Control	(13) – Ground	Light control switch HEAD	Battery positive voltage
Fog Light Control	(16) – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



4. Bolted type: FUSIBLE LINK CIRCUIT

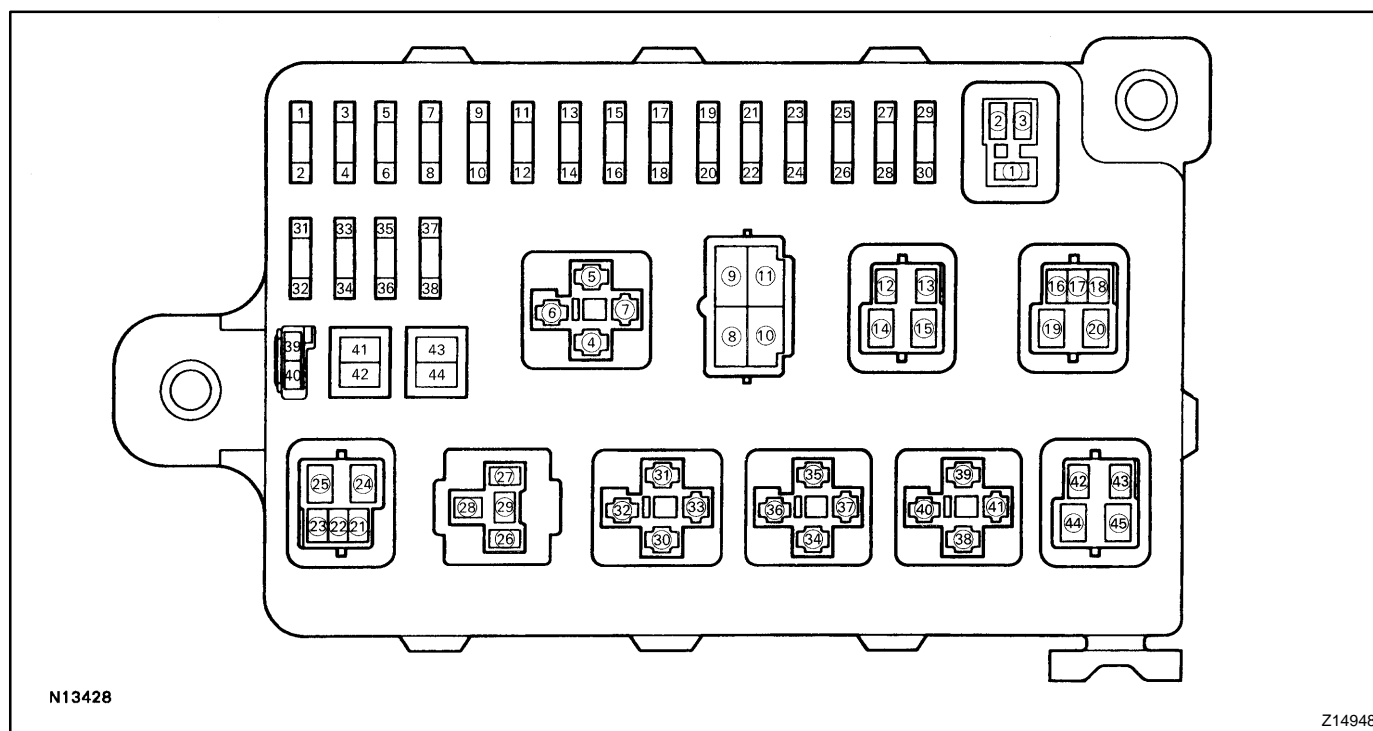
- Remove the battery.
- Remove the fusible link set bolts.
- Inspect the continuity between terminals and connected parts.
- Connect numbers are shown in the illustration.

Terminal	Connected parts
1	Ignition switch
2	Battery positive voltage
3	ALT-S Fuse
3	ST Fuse
3	HORN Fuse
3	HAZ Fuse
3	EFI Fuse
3	RADIO Fuse
3	TEL Fuse
3	SRS Fuse
4	Battery positive voltage
6	Battery positive voltage
6	HTR H-Fuse
6	AM1 H-Fuse
6	ABS H-Fuse
6	DEF H-Fuse
6	H/CTRL H-Fuse
6	FOG Fuse
6	STOP Fuse
6	OBD Fuse

6	FUEL OPN Fuse
6	IG1 Main Relay
7	ABS H-Fuse
8	ABS Motor Relay
8	ABS SOL Relay
9	HTR H-Fuse
10	Heater Main Relay
11	DEF H-Fuse
12	Defogger Relay
13	AM1 H-Fuse
14	Ignition switch

If circuit is not as specified, inspect wire harness between fusible link and connected parts.

5. INSPECT ENGINE ROOM JUNCTION BLOCK



6. FUSE CIRCUIT

Remove the fuse from the junction block and inspect the connector on junction block side.

Connect numbers are shown in the illustration.

Fuse	Tester connection	Condition	Specified Condition
ECU-B	2 – Ground	Light control switch TAIL or HEAD	Battery positive voltage
MPX-B	4 – Ground	Constant	Battery positive voltage
RADIO NO.1	5 – Ground	Constant	Battery positive voltage
CRT	8 – Ground	Engine Running	Battery positive voltage
TEL	9 – Ground	Constant	Battery positive voltage
ALT-S	11 – Ground	Constant	Battery positive voltage
FR S/HTR	14 – Ground	Engine Running	Battery positive voltage
MIR-HTR	16 – Ground	Ignition switch ON and Defogger switch ON	Battery positive voltage
EFI NO.2	18 – Ground	Engine Running	Battery positive voltage
H-LP R-UPR	19 – Ground	*Engine running or Light control switch HEAD and Dimmer switch HI	Battery positive voltage
H-LP L-UPR	21 – Ground	*Engine running or Light control switch HEAD and Dimmer switch HI	Battery positive voltage
ETCS	27 – Ground	Constant	Battery positive voltage
HORN	29 – Ground	Constant	Battery positive voltage
OBD	32 – Ground	Constant	Battery positive voltage
DOME	33 – Ground	Constant	Battery positive voltage
EFI NO.1	35 – Ground	Constant	Battery positive voltage
HAZ	38 – Ground	Constant	Battery positive voltage
Short Pin	40 – Ground	Ignition switch ACC or ON	Battery positive voltage
ST H	41 – Ground	Constant	Battery positive voltage
RDI FAN H	43 – Ground	Engine Running	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

7. RELAY CIRCUIT

Remove the relay from the relay block and inspect the connector on relay block side.

Connect numbers are shown in the illustration.

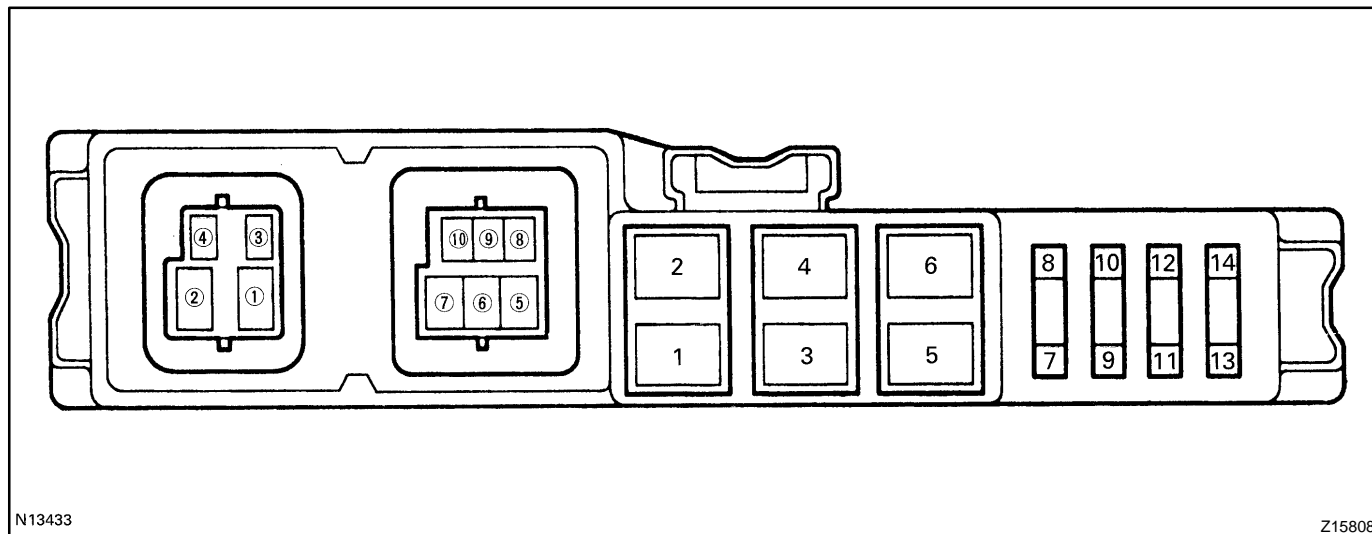
Relay	Tester connection	Condition	Specified condition
Horn	(1) – Ground	Horn switch ON	Continuity
Horn	(2) – Ground	Constant	Continuity
Horn	(3) – Ground	Constant	Battery positive voltage
Starter	(4) – Ground	Ignition switch START	Battery positive voltage
Starter	(7) – Ground	Constant	Battery positive voltage
*1Headlight Dimmer	(8) – Ground	Constant	Continuity
*1Headlight Dimmer	(9) – Ground	Headlight dimmer switch HI	Continuity
*1Headlight Dimmer	(10) – Ground	Constant	Continuity
*1Headlight Dimmer	(11) – Ground	Light control switch HEAD	Battery positive voltage
*2Headlight Dimmer	(8) – Ground	Constant	No continuity
*2Headlight Dimmer	(9) – Ground	Light control switch HEAD and Headlight dimmer switch HI	Continuity
*2Headlight Dimmer	(10) – Ground	Constant	Continuity

*2Headlight Dimmer	(11) – Ground	Constant	Battery positive voltage
Headlight Control	(13) – Ground	Light control switch HEAD	Continuity
Headlight Control	(12) – Ground	Constant	Battery positive voltage
Headlight Control	(14) – Ground	Light control switch HEAD	Battery positive voltage
Headlight Control	(15) – Ground	Constant	Battery positive voltage
Engine Main	(17) – Ground	Constant	Continuity
Engine Main	(18) – Ground	Constant	Continuity
Engine Main	(20) – Ground	Constant	Battery positive voltage
Engine Main	(16) – Ground	Ignition switch ON	Battery positive voltage
Heater Main	(22) – Ground	Constant	Continuity
Heater Main	(25) – Ground	Constant	Battery positive voltage
Heater Main	(21) – Ground	Ignition switch ON	Battery positive voltage
Fuel Pump	(26) – Ground	Engine running	Battery positive voltage
Fuel Pump	(29) – Ground	Engine running	Battery positive voltage
Fuel Pump	(27) – Ground	Engine running	Continuity
Circuit Opening	(31) – Ground	Engine running	Continuity
Circuit Opening	(30) – Ground	Engine running	Battery positive voltage
EFI Main	(35) – Ground	Constant	Continuity
EFI Main	(36) – Ground	Ignition switch ON	Battery positive voltage
A/C	(39) – Ground	A/C switch ON	Continuity
A/C	(41) – Ground	Ignition switch ON	Battery positive voltage
A/C	(38) – Ground	Ignition switch ON	Battery positive voltage
Defogger	(42) – Ground	Defogger switch ON	Continuity
Defogger	(44) – Ground	Defogger switch ON	Continuity
Defogger	(43) – Ground	Ignition switch ON	Battery positive voltage
Defogger	(45) – Ground	Constant	Battery positive voltage

*1: USA Models

*2: CANADA Models

If the circuit is not as specified, inspect the circuits connected to other parts.

8. INSPECT ENGINE ROOM NO.1 RELAY BLOCK**9. FUSE CIRCUIT**

Remove the fuse from the junction block and inspect the connector on junction block side.

Connect numbers are shown in the illustration.

Fuse	Tester connection	Condition	Specified condition
H/CTRL H	1 – Ground	Constant	Battery positive voltage
*2DRL	7 – Ground	Engine running, Light control switch HEAD or Dimmer switch FLASH	Battery positive voltage
H-LP R LWR	9 – Ground	Light control switch HEAD or Dimmer switch FLASH	Battery positive voltage
H-LP L LWR	11 – Ground	Light control switch HEAD or Dimmer switch FLASH	Battery positive voltage

*1 USA models

*2 CANADA models

If the circuit is not as specified, inspect the circuits connected to other parts.

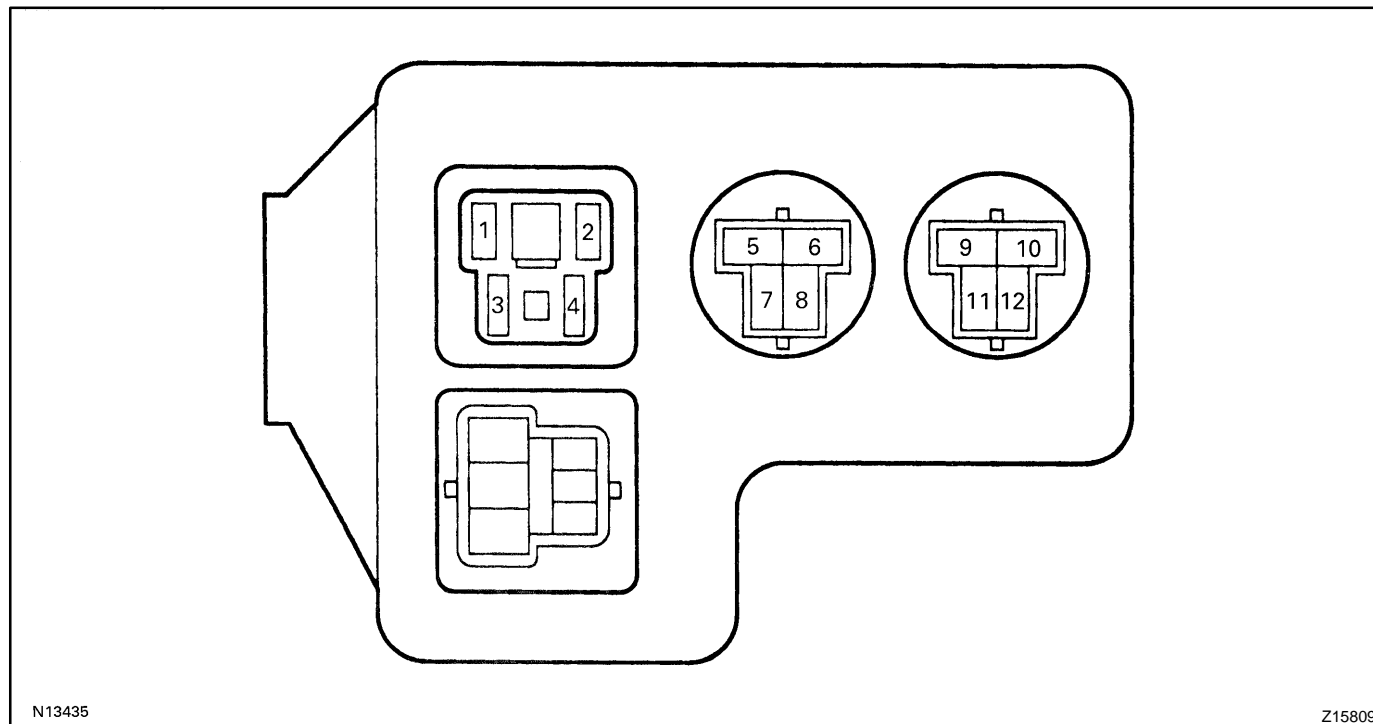
10. RELAY CIRCUIT

Remove the relay from the relay block and inspect the connector on relay block side.

Connect numbers are shown in the illustration.

If the circuit is not as specified, inspect the circuits connected to other parts.

Relay	Tester connection	Condition	Specified condition
ABS MTR	(1) – Ground	Constant	Battery positive voltage
ABS SOL	(6) – Ground	Constant	Continuity
ABS SOL	(5) – Ground	Constant	Battery positive voltage

11. INSPECT ENGINE ROOM RELAY BLOCK NO.2

N13435

Z15809

12. RELAY CIRCUIT

Remove the relay from the relay block and inspect the connector on relay block side.

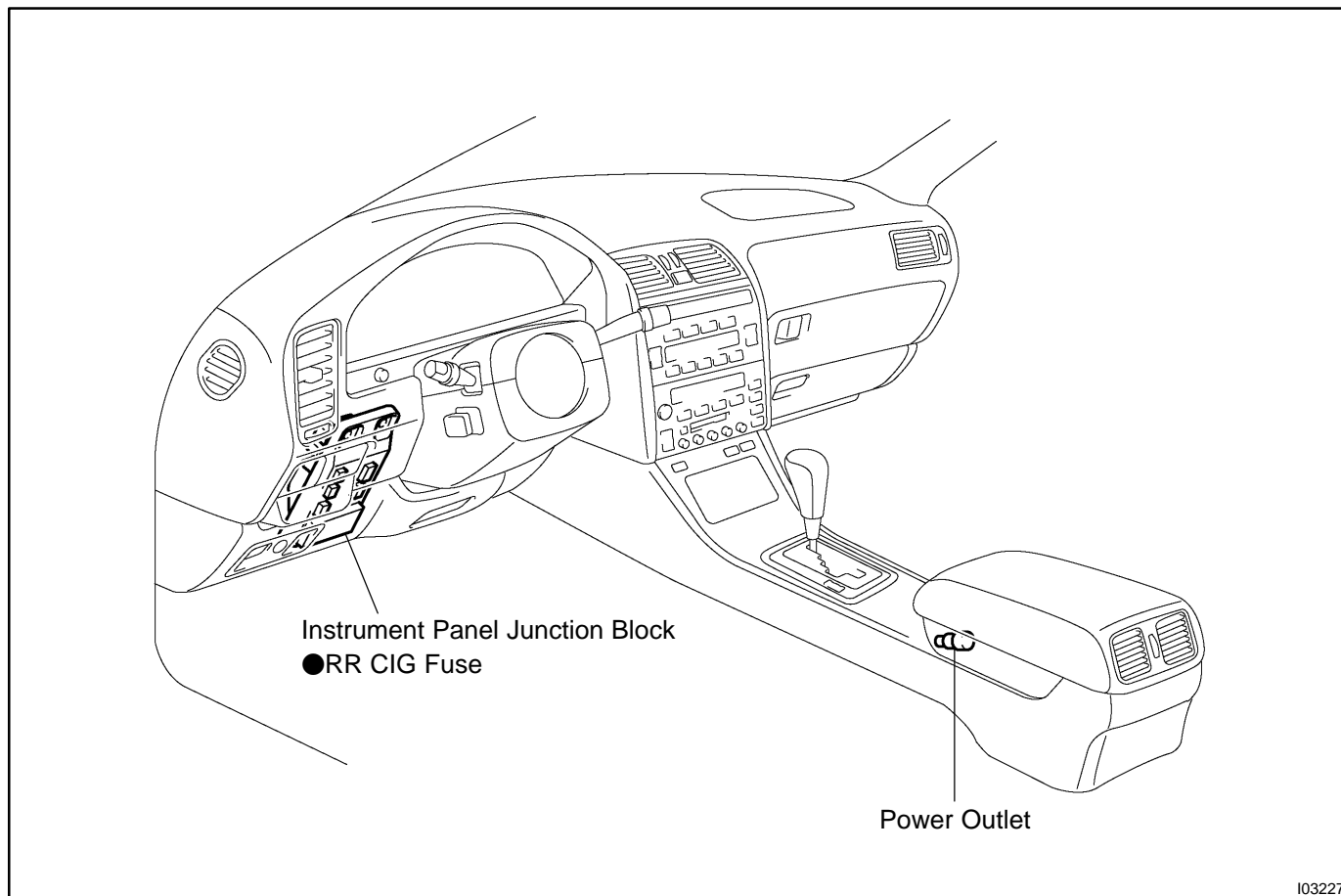
Connect numbers are shown in the illustration.

Relay	Tester connection	Condition	Specified condition
Height Control	(1) – Ground	Constant	Battery positive voltage
Condenser Fan No.1	(5) – Ground	Ignition switch ON	Battery positive voltage
Condenser Fan No.1	(8) – Ground	Ignition switch ON	Battery positive voltage
Condenser Fan No.2	(9) – Ground	Ignition switch ON	Battery positive voltage
Condenser Fan No.2	(12) – Ground	Ignition switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

POWER OUTLET LOCATION

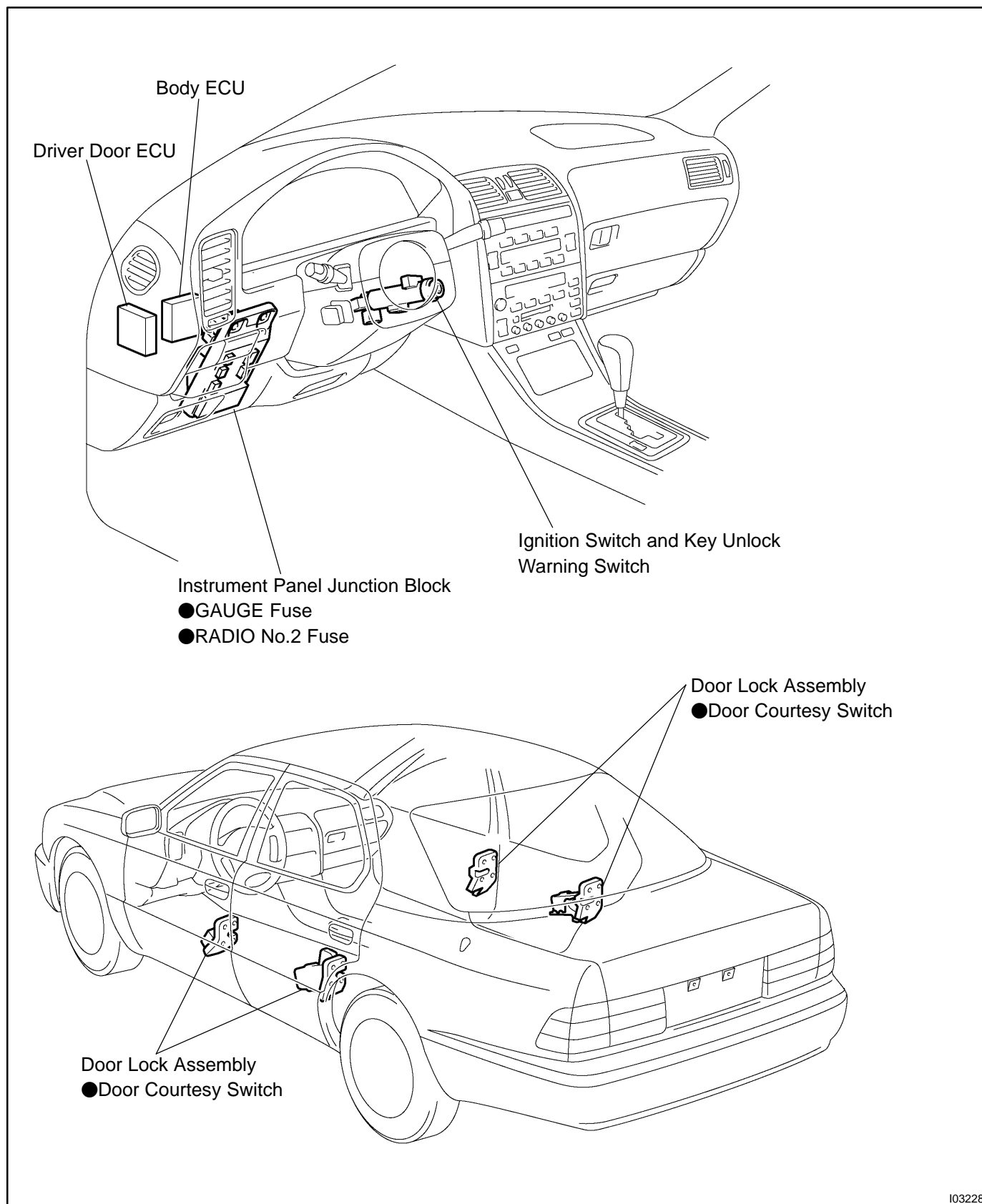
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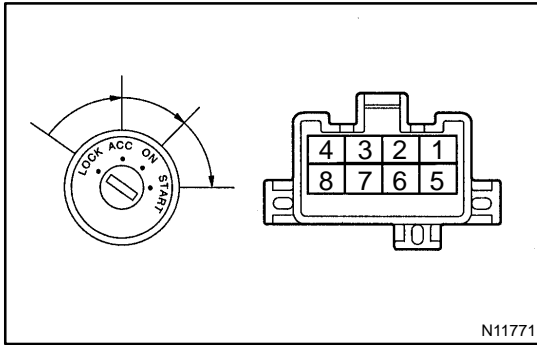
I03227

IGNITION SWITCH AND KEY UNLOCK WARNING SWITCH LOCATION

BE0BA-01



I03228

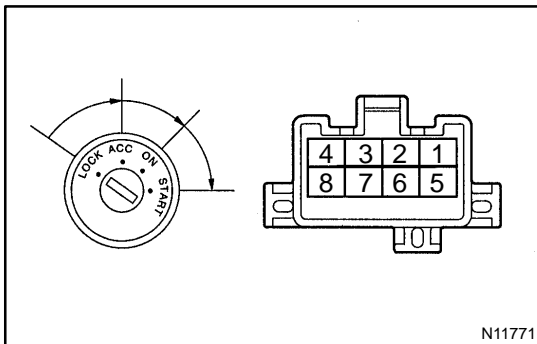


INSPECTION

1. INSPECT IGNITION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
ACC	2 – 3	Continuity
ON	2 – 3 – 4 6 – 7	Continuity
START	1 – 2 – 4 6 – 7 – 8	Continuity

If continuity is not as specified, replace the switch.

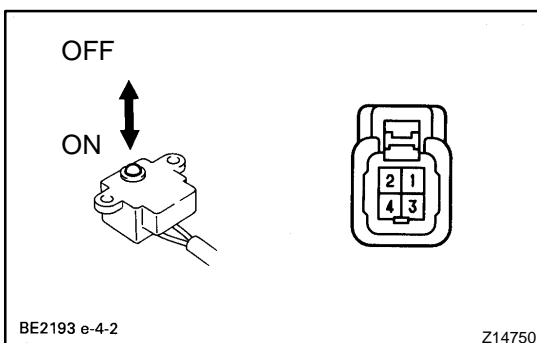


2. INSPECT IGNITION SWITCH CIRCUIT

Connect the switch connector and inspect the connector on the wire harness side from the back side, as shown.

If circuit is not as specified, inspect the switch and circuits connected to other parts.

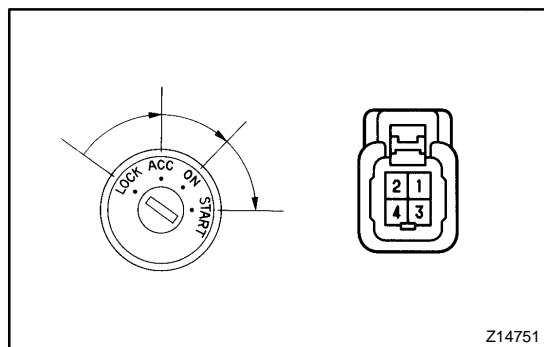
Tester connection	Condition	Specified condition
1 – Ground	Ignition switch turned to START	Battery positive voltage
2 – Ground	Constant	Battery positive voltage
3 – Ground	Ignition switch turned to ACC or ON	Battery positive voltage
4 – Ground	Ignition switch turned to ON	Battery positive voltage
6 – Ground	Ignition switch turned to ON	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
8 – Ground	Ignition switch turned to START	Battery positive voltage



3. INSPECT KEY UNLOCK WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Ignition key removed)	–	No continuity
ON (Ignition key set)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

**4. INSPECT KEY UNLOCK WARNING SWITCH CIRCUIT**

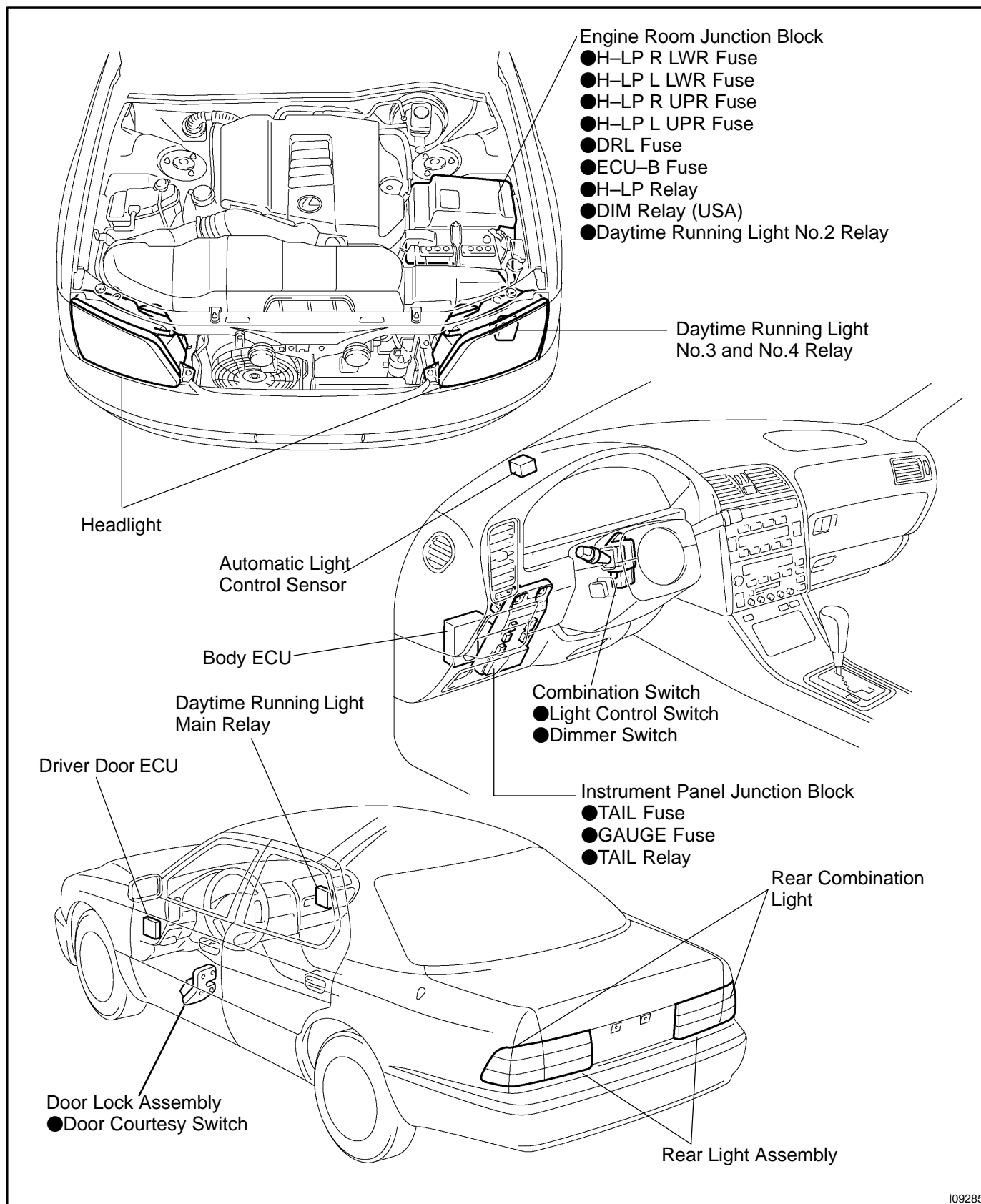
Connect the switch connector and inspect the connector on the wire harness side from the back side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Ignition key removed	No continuity
2 – Ground	Ignition key set	Continuity
1 – Ground	Constant	Continuity

If circuit is not as specified, inspect the switch or wire harness.

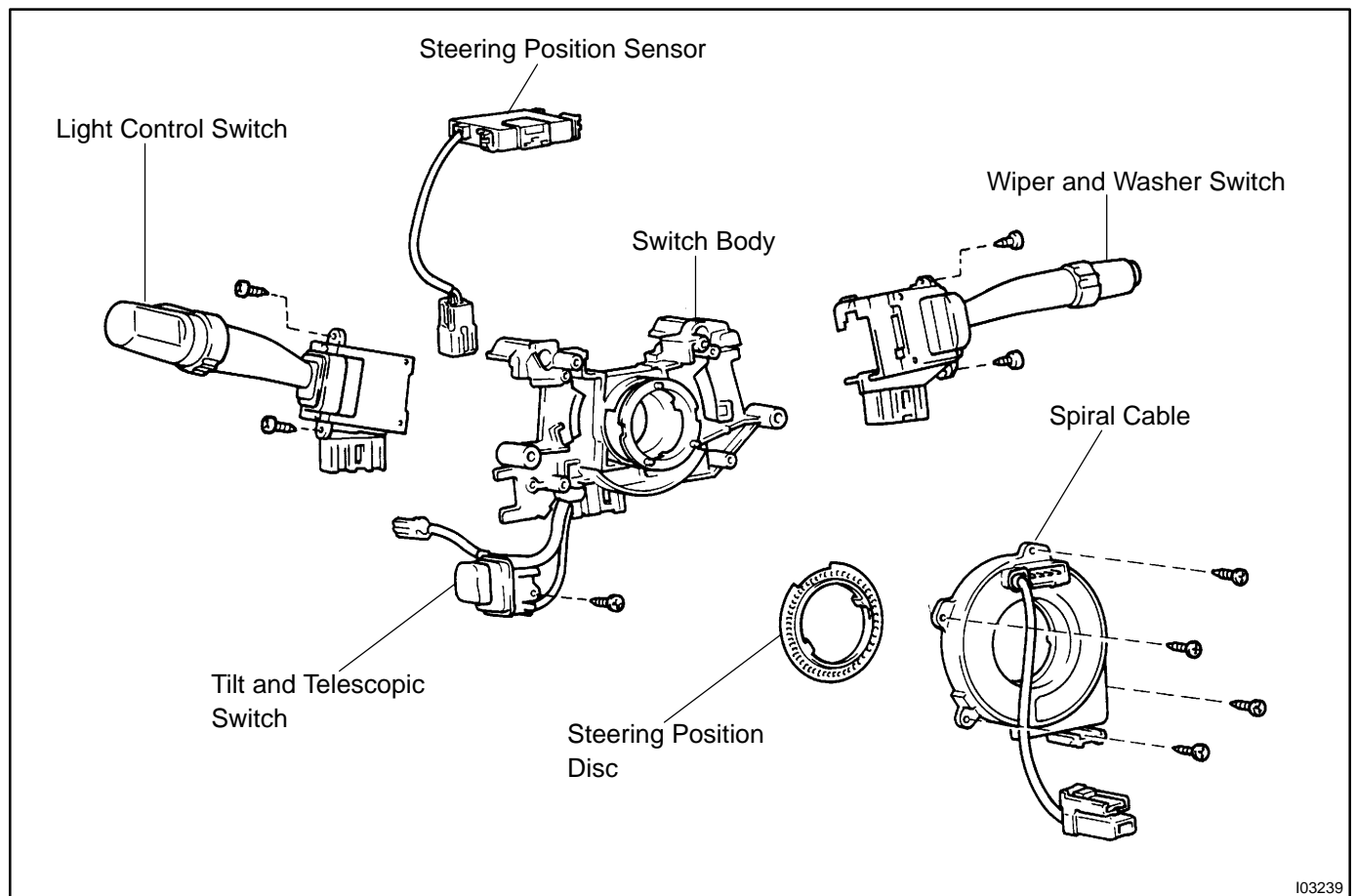
HEADLIGHT AND TAILLIGHT SYSTEM LOCATION

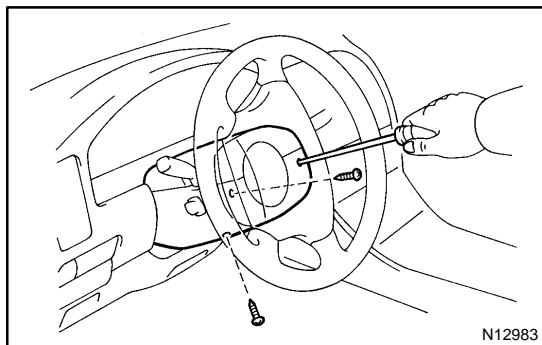
BE0BC-03



109285

COMPONENTS



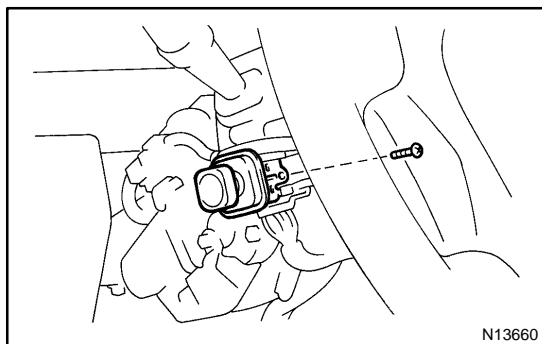


REMOVAL

Installation is in the reverse order of removal.

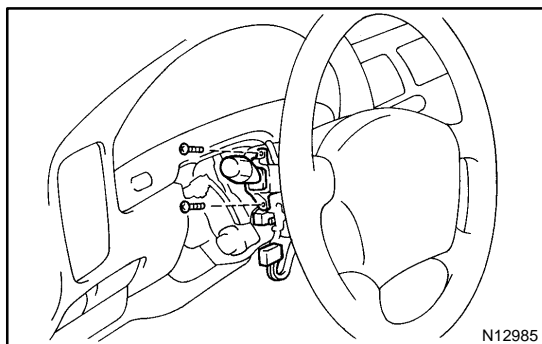
1. REMOVE COLUMN COVER

- (a) Remove the 3 screws.
- (b) Remove the column cover.



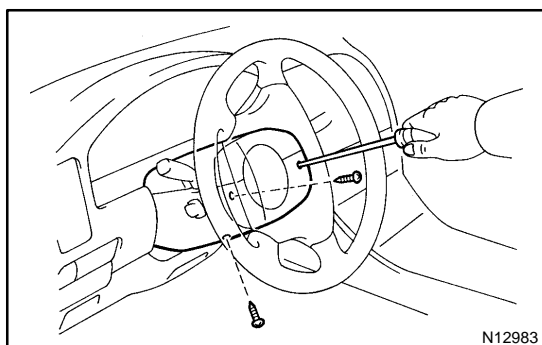
2. REMOVE POWER TILT AND TELESCOPIC SWITCH

- (a) Remove the screw.
- (b) Remove the power tilt and telescopic switch.



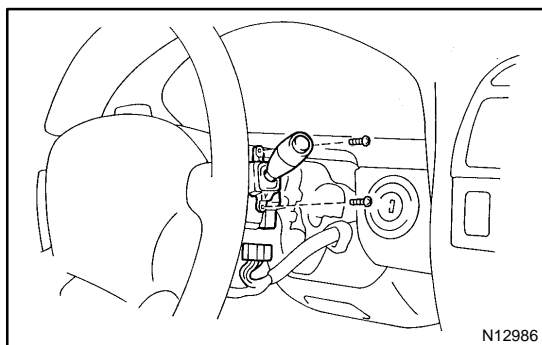
3. REMOVE LIGHT CONTROL SWITCH

- (a) Disconnect the light control switch connector.
- (b) Remove the 2 screws.
- (c) Remove the switch.



4. REMOVE COLUMN COVER

- (a) Remove the 3 screws.
- (b) Remove the column cover.



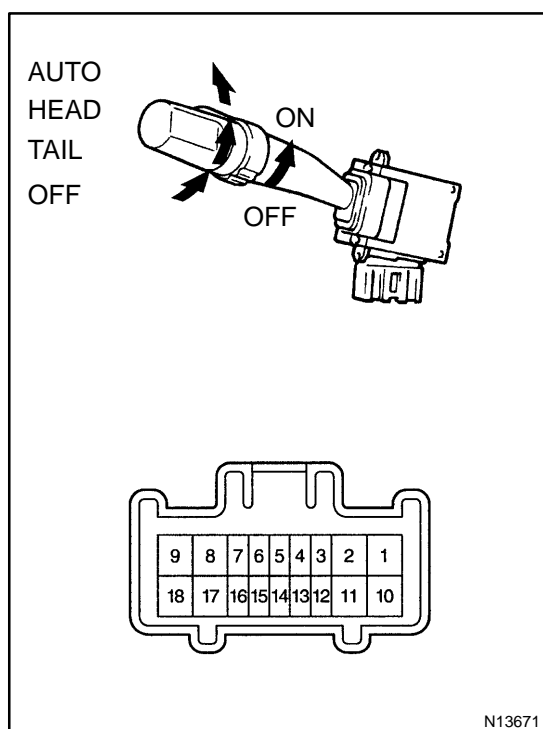
5. REMOVE WIPER AND WASHER SWITCH

- (a) Disconnect the wiper and washer switch connector.
- (b) Remove the 2 screws.
- (c) Remove the switch.

INSPECTION

1. FAIL-SAFE FUNCTION (Light Control ECU)

When input error is inspected.	When input voltage is not within the range of operation voltage (9 to 16 V), lighting of the headlight stops. As soon as the voltage comes within the range, it lit up again. However if the input voltage becomes low after lighting up, sufficient voltage is maintained until light of bulb completely goes off.
When output error is inspected (Open or short). When light flushing is inspected.	When an error occurs in the output voltage (open or short) or flushing symptom occurs on the bulb, lighting of the headlight stops, the condition is maintained until power is turned ON again (headlight dimmer switch OFF → ON). In this case, it can not be judged whether lighting malfunction is caused by an output error or other reasons (fuse blown out, etc.). Check that there is no error in fuse and wiring (including power source) and replace the bulb in the first place, when the error still appears, replace the light control ECU.



2. INSPECT LIGHT CONTROL SWITCH CONTINUITY

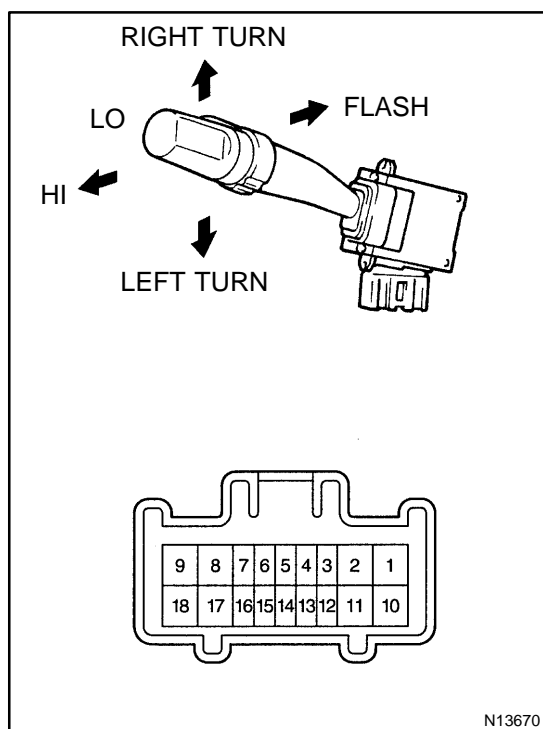
Switch position	Tester connection	Specified condition
OFF	–	No continuity
TAIL	15 – 16	Continuity
HEAD	14 – 15 – 16	Continuity
AUTO	13 – 16	Continuity

If continuity is not as specified, replace the switch.

3. INSPECT FOG LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	11 – 12	Continuity

If continuity is not as specified, replace the switch.



4. INSPECT HEADLIGHT DIMMER SWITCH CONTINUITY

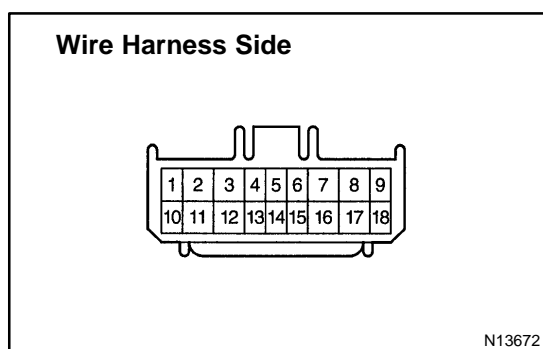
Switch position	Tester connection	Specified condition
Flash	8 – 9 – 17	Continuity
Low beam	17 – 18	Continuity
High beam	8 – 17	Continuity

If continuity is not as specified, replace the switch.

5. INSPECT TURN SIGNAL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Left turn	1 – 2	Continuity
Neutral	–	No continuity
Right turn	2 – 3	Continuity

If continuity is not as specified, replace the switch.



6. USA: INSPECT SWITCH CIRCUIT

- (a) Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Light Control Switch Circuit

Tester connection	Condition	Specified condition
16 – Ground	Constant	Continuity

Fog Light Switch Circuit

Tester connection	Condition	Specified condition
11 – 18	Constant	Continuity
12 – Ground	Constant	Battery positive voltage

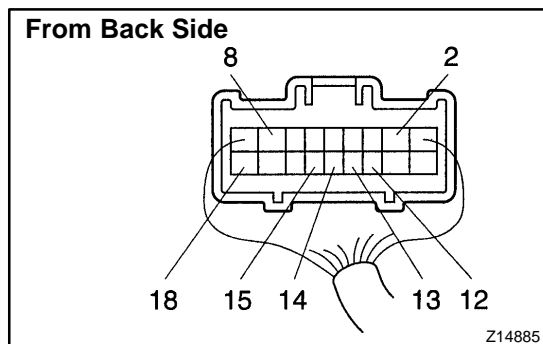
Dimmer Switch Circuit

Tester connection	Condition	Specified condition
17 – Ground	Constant	Continuity
9 – Ground	Constant	Battery positive voltage

Turn Signal Switch Circuit

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If the circuit is not as specified, inspect the wire harness.



- (b) Connect the wire harness side connector to the light control switch and inspect the connector from the back side, as shown.

Light Control Switch Circuit

See page [DI-678](#)

Fog Light Switch Circuit

Tester connection	Condition	Specified condition
12 – Ground	Light control switch HEAD and dimmer switch position HI or FLASH	No voltage
12 – Ground	Light control switch HEAD and dimmer switch position LO	Battery positive voltage

Dimmer Switch Circuit

Tester connection	Condition	Specified condition
8 – Ground	Light control switch HEAD and dimmer switch LOW	No voltage
8 – Ground	Headlight dimmer switch FLASH or Light control switch HEAD and dimmer switch HIGH	Battery positive voltage
18 – Ground	Light control switch HEAD and dimmer switch HIGH or FLASH	No voltage
18 – Ground	Light control switch HEAD and dimmer switch LOW	Battery positive voltage

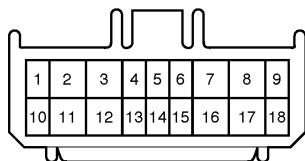
Turn Signal Switch Circuit

Tester connection	Condition	Specified condition
1 – Ground	Ignition switch ON and turn signal switch position Left	Battery positive voltage
3 – Ground	Ignition switch ON and turn signal switch position Right	Battery positive voltage

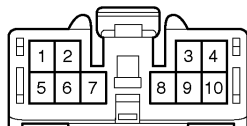
If the circuit is not as specified, inspect the circuits connected to other parts.

Wire Harness Side

Light Control Switch
Connector "A"



Daytime Running Light Relay
Connector "B"



I03478

7. CANADA:
INSPECT SWITCH CIRCUIT

- (a) Disconnect the light control switch and daytime running light relay connectors, and inspect the each connector on the wire harness side, as shown.

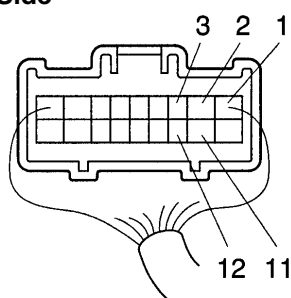
Light Control Switch Circuit

Tester connection	Condition	Specified condition
A16 – Ground	Constant	Continuity

Dimmer Switch Circuit

Tester connection	Condition	Specified condition
A17 – Ground	Constant	Continuity
A8 – B8	Constant	Continuity
A9 – B2	Constant	Continuity

If the circuit is not as specified, inspect the wire harness.

From Back Side

Z14887

- (b) Connect the wire harness side connector to the light control switch and inspect the connector from the back side, as shown.

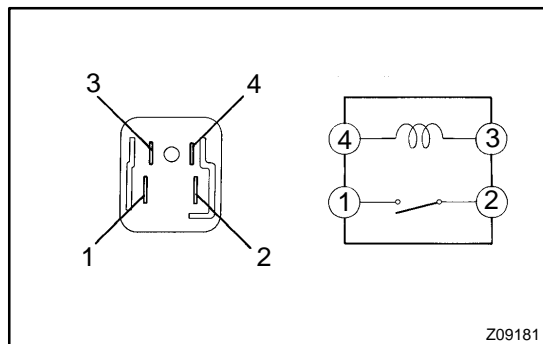
Fog Light Switch Circuit

Tester connection	Condition	Specified condition
11 – Ground	Light control switch OFF	No voltage
11 – Ground	Light control switch TAIL, HEAD or AUTO and Fog light switch ON	Battery positive voltage
12 – Ground	Light control switch OFF	No voltage
12 – Ground	Light control switch TAIL, HEAD or AUTO	Battery positive voltage

Turn Signal Switch Circuit

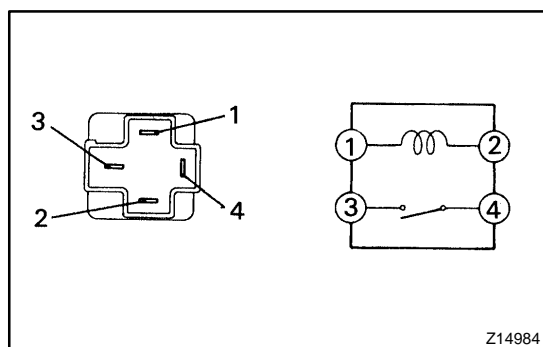
Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Ignition switch ON and Turn signal switch position Left	No voltage
3 – Ground	Ignition switch ON and Turn signal switch position Right	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

**8. INSPECT HEADLIGHT CONTROL RELAY CONTINUITY**

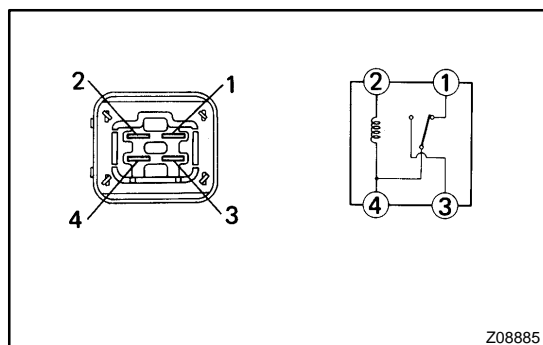
Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

If continuity is not as specified, replace the relay.

9. INSPECT HEADLIGHT CONTROL RELAY CIRCUIT (See page BE-23)**10. INSPECT TAILLIGHT CONTROL RELAY CONTINUITY**

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 4	Continuity

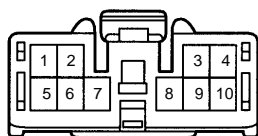
If continuity is not as specified, replace the relay.

11. INSPECT TAILLIGHT CONTROL RELAY CIRCUIT (See page BE-23)**12. INSPECT HEADLIGHT DIMMER AND DAYTIME RUNNING LIGHT NO.2 RELAY CONTINUITY**

Condition	Tester connection	Specified condition
Constant	1 – 4 2 – 4	Continuity
Apply B+ between terminals 2 and 4.	3 – 4	Continuity

If continuity is not as specified, replace the relay.

13. INSPECT HEADLIGHT DIMMER RELAY CIRCUIT (See page BE-23)

Wire Harness Side

h-10-1-A

N21564

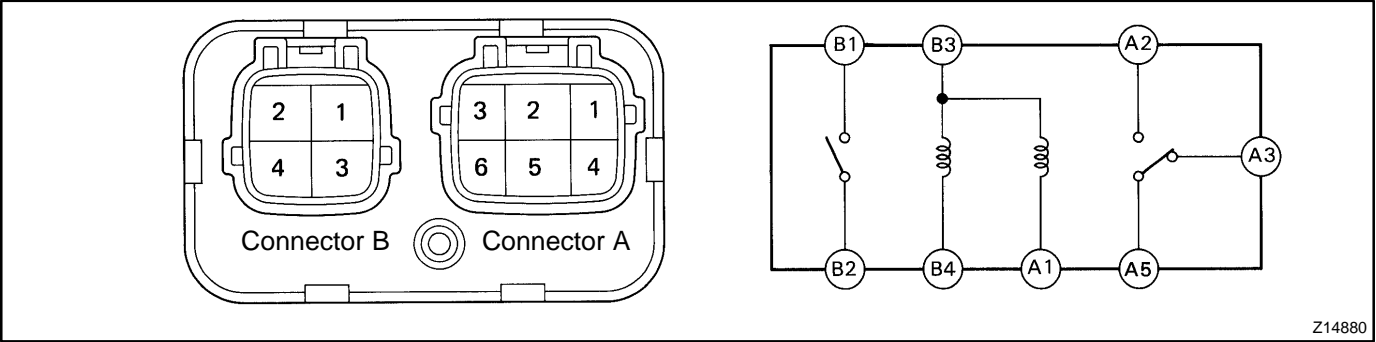
14. INSPECT DAYTIME RUNNING LIGHT RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on the wire harness side.

Tester connection	Condition	Specified condition
2 – Ground	Light control switch position OFF or TAIL	No continuity
2 – Ground	Light control switch position HEAD	Continuity
4 – Ground	Parking brake switch position OFF (Parking brake lever released)	No continuity
4 – Ground	Parking brake switch position ON (Parking brake lever pulled up)	Continuity
6 – Ground	Constant	Continuity
8 – Ground	Headlight dimmer switch position Low beam	No continuity
8 – Ground	Headlight dimmer switch position High beam or Flash	Continuity
10 – Ground	Brake fluid level warning switch position OFF	No continuity
10 – Ground	Brake fluid level warning switch position ON	Continuity
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON or START	Battery positive voltage
5 – Ground	Engine Stop	No voltage
5 – Ground	Engine Running	Battery positive voltage
7 – Ground	Constant	Battery positive voltage
9 – Ground	Constant	Battery positive voltage

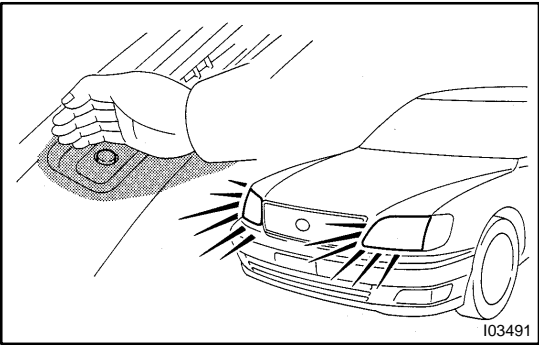
If circuit is as specified, try replacing the relay with a new one.
If circuit is not as specified, inspect the circuits connected to other parts.

15. INSPECT DAYTIME RUNNING LIGHT RELAY NO.3 AND NO.4 CONTINUITY



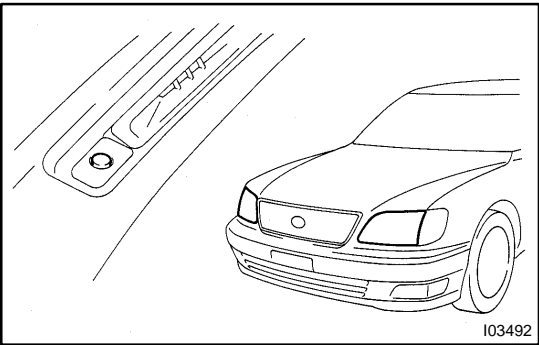
Tester connection	Condition	Specified condition
A1 – B3	Constant	Continuity
A3 – A5	Constant	Continuity
B3 – B4	Constant	Continuity
A2 – A5	Apply battery positive voltage between terminal A1 and B3.	Continuity
B1 – B2	Apply battery positive voltage between terminal B3 and B4.	Continuity

If continuity is not as specified, replace the relay.



16. INSPECT AUTOMATIC LIGHT CONTROL
AUTO ON:

- (a) Turn the ignition switch ON.
- (b) Turn the light control switch to AUTO.
- (c) Gradually cover the top of the sensor.
- (d) Verify that the lights should turn ON the accessory lights and the headlights.



17. INSPECT AUTOMATIC LIGHT CONTROL
AUTO OFF:

- (a) Gradually expose the sensor.
- (b) Verify that the lights should turn OFF the headlights and the accessory lights.

18. INSPECT LIGHT-OFF CONDITION

- (a) Turn the ignition switch ON.
- (b) Gradually cover the top of the sensor.
Lights auto ON:
- (c) Verify that the lights will go out when light control switch position OFF or the area surrounding the sensor gets bright or open the driver's door while the ignition switch is OFF.

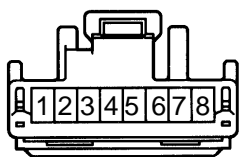
19. INSPECT LIGHTS-ON CONDITION

- (a) Open the driver's door while the ignition switch is OFF.
- (b) Turn the light control switch to AUTO leaving the door open and cover the top of the sensor, and verify that the lights go on when the ignition switch is turned ON.

20. ADJUST AUTOMATIC LIGHT CONTROL SENSOR

Using the LEXUS hand-held tester with customize soft installed, adjust the automatic light control sensor.

- If response is too quick, turn the knob counterclockwise.
- If response is too slow, turn the knob clockwise.

Wire Harness Side

Z14888

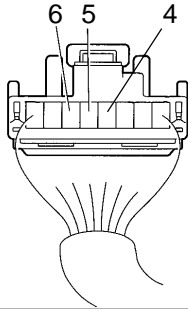
21. INSPECT AUTOMATIC LIGHT CONTROL SENSOR CIRCUIT**Connector disconnected**

Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown in the chart.

Tester connection	Condition	Specified condition
6 – Ground	Constant	Continuity
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	5.2 – 9.0 V
5 – Ground	Ignition switch position LOCK or ACC	No voltage
5 – Ground	Ignition switch position ON	Battery positive voltage

If circuit is as specified, perform the inspection on the following page.

If the circuit is not as specified, inspect the circuit connected to other parts.

From Back Side

N12999

Connector connected

Connect the wire harness side connector to the sensor and inspect wire harness side connector from the back side, as shown.

HINT:

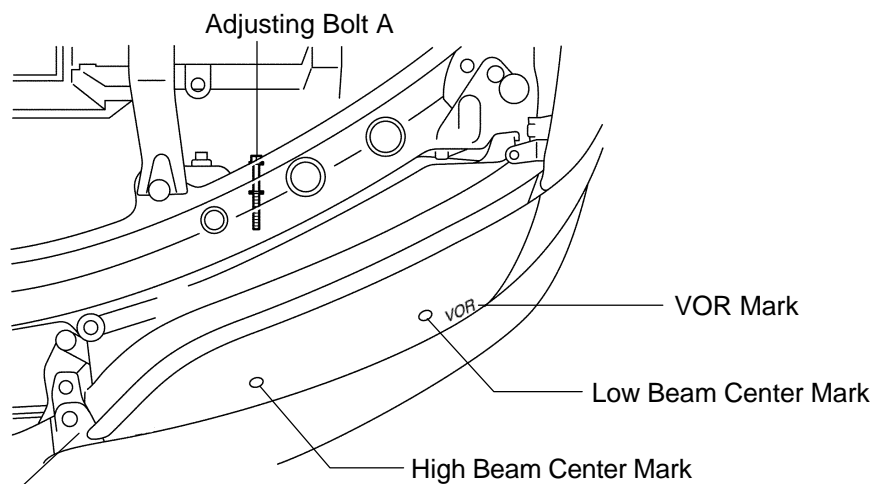
- Ignition switch ON.
- Light control switch AUTO.
- Vehicle's surroundings are bright.

Tester connection	Condition	Specified condition
6 – Ground	Constant	1 V or less
5 – Ground	Ignition switch position LOCK or ACC	1 V or less
5 – Ground	Ignition switch position ON	9.5 V or more
4 – Ground	Vehicle's surroundings are dark. (Sensor is covered)	Taillight and headlight are ON

If circuit is as specified, try replacing the sensor with a new one.
If the circuit is not as specified, inspect the circuit connected to other parts.

ADJUSTMENT

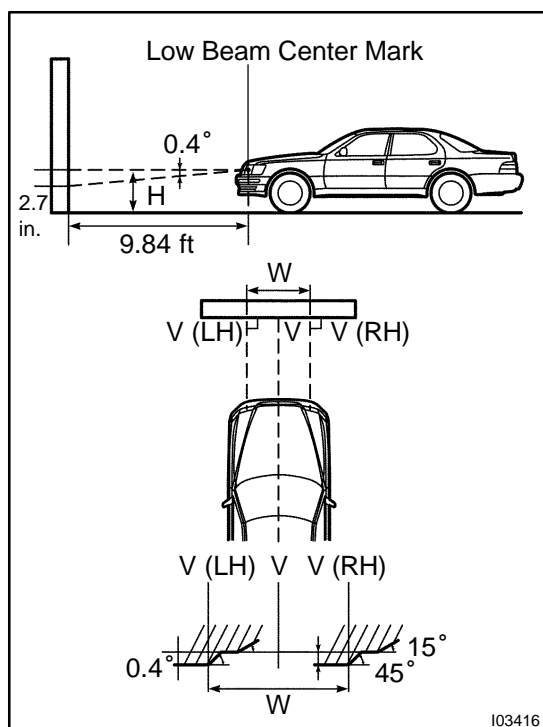
Halogen Type:



I09287

1. Halogen Type: ADJUST HEADLIGHT AIM ONLY

- (a) Put the vehicle in below conditions.
 - Make sure the body around the headlight is not deformed.
 - Park the vehicle on a level spot.
 - The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
 - Bounce the vehicle several times.

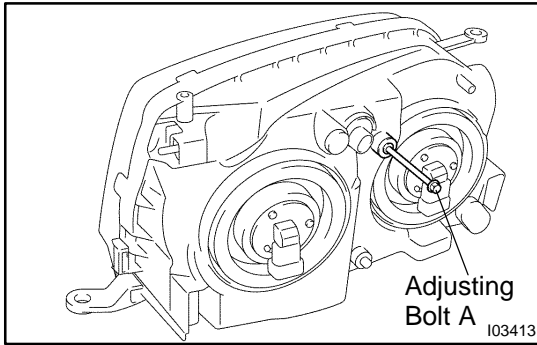


I03416

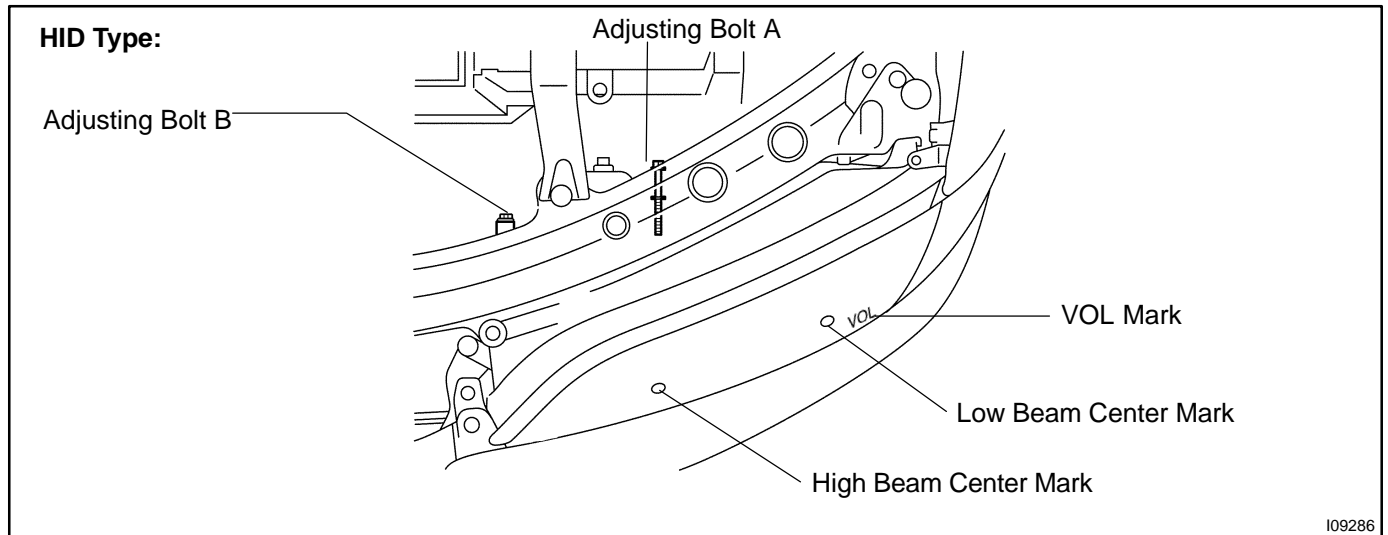
- (b) Prepare the thick white colored paper.
- (c) Stand the paper perpendicularly and ensure the distance from it to the head lights is 9.84 ft.
- (d) Ensure that the center line of vehicle and the paper are at a 90 degree angle as shown in the illustration.
- (e) Draw a horizontal line on the paper where the head lights (low beam center mark) of the vehicle are to be.
- (f) Draw a vertical line on the paper where the center line of the vehicle is to be. (V line)
- (g) Turn the head lights ON.
- (h) Check that the head lights light up the paper as shown in the illustration.

HINT:

As shown in the illustration, adjust aiming of the LH and RH lights respectively.



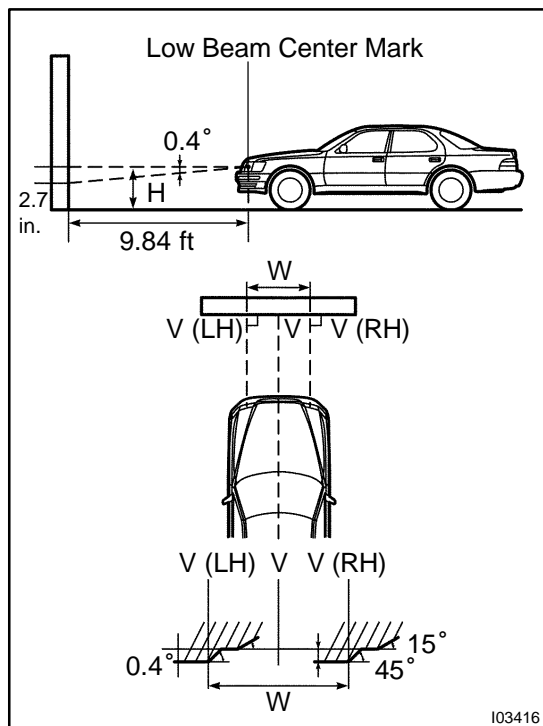
- (i) When the paper is not lighted up properly, using the adjusting bolt A, adjust the lights in the vertical direction.



2. HID Type:

ADJUST HEADLIGHT AIM ONLY

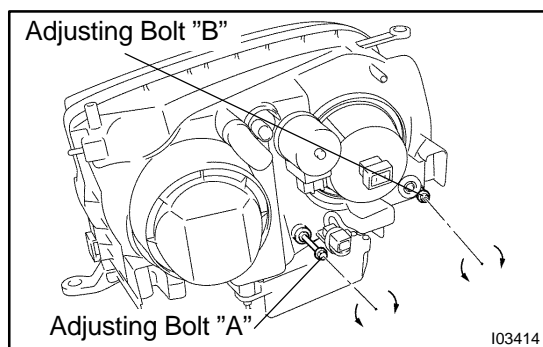
- (a) Put the vehicle in below conditions.
- Make sure the body around the headlight is not deformed.
 - Park the vehicle on a level spot.
 - The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
 - Bounce the vehicle several times.



- (b) Prepare the thick white colored paper.
- (c) Stand the paper perpendicularly and ensure the distance from it to the head lights is 9.84 ft.
- (d) Ensure that the center line of vehicle and the paper are at a 90 degree angle as shown in the illustration.
- (e) Engine running.
- (f) Draw a horizontal line on the paper where the head lights of the vehicle are to be.
- (g) Draw a vertical line on the paper where the center line of the vehicle is to be. (V line)
- (h) Turn the head lights ON.
- (i) Check that the head lights light up the paper as shown in the illustration.
- (j) When the paper is not lighted up properly, adjust the lights in the vertical or horizontal direction.

HINT:

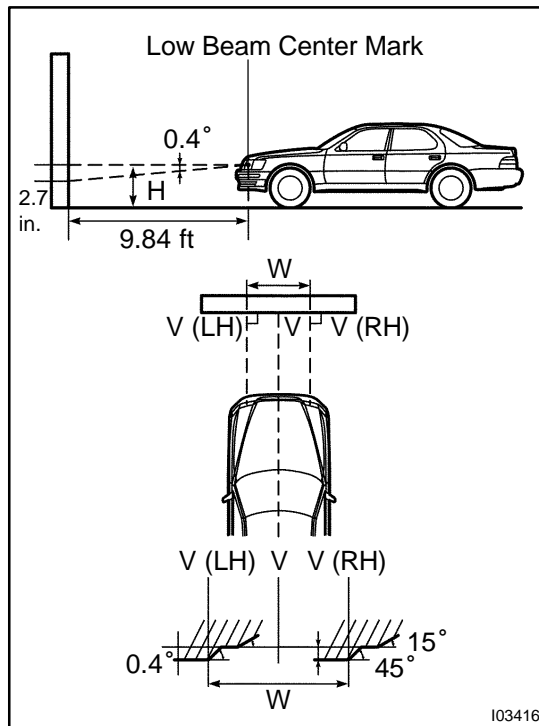
As shown in the illustration, adjust aiming of the LH and RH lights respectively.



- (k) Adjust headlight in vertical alignment.
 - (1) Turn the vertical movement adjusting bolt "A" in either direction. At this time, keep the turning direction and number of turns in mind.
 - (2) Turn the vertical movement adjusting bolt "A" the same number of turns and in the same direction at step (1).

3. REPLACE HEADLIGHT

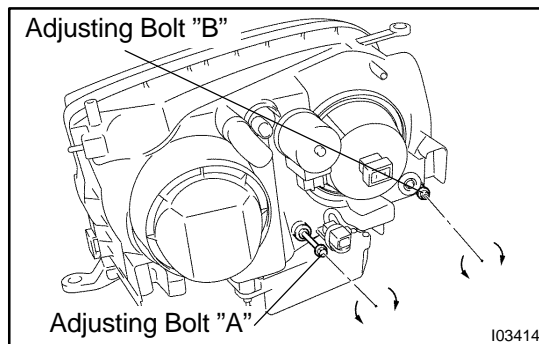
- (a) Replace the headlight.
- (b) Put the vehicle in below conditions.
 - Make sure the body around the headlight is not deformed.
 - Park the vehicle on a level spot.
 - The driver gets into the driver's seat and puts the vehicle in a state ready for driving (with a full tank).
 - Bounce the vehicle several times.



- (c) Prepare the thick white colored paper.
- (d) Stand the paper perpendicularly and ensure the distance from it to the head lights is 9.84 ft.
- (e) Ensure that the center line of vehicle and the paper are at a 90 degree angle as shown in the illustration.
- (f) Engine running.
- (g) Draw a horizontal line on the paper where the head lights of the vehicle are to be.
- (h) Draw a vertical line on the paper where the center line of the vehicle is to be. (V line)
- (i) Turn the head lights ON.
- (j) Check that the head lights light up the paper as shown in the illustration.
- (k) When the paper is not lighted up properly, adjust the lights in the vertical or horizontal direction.

HINT:

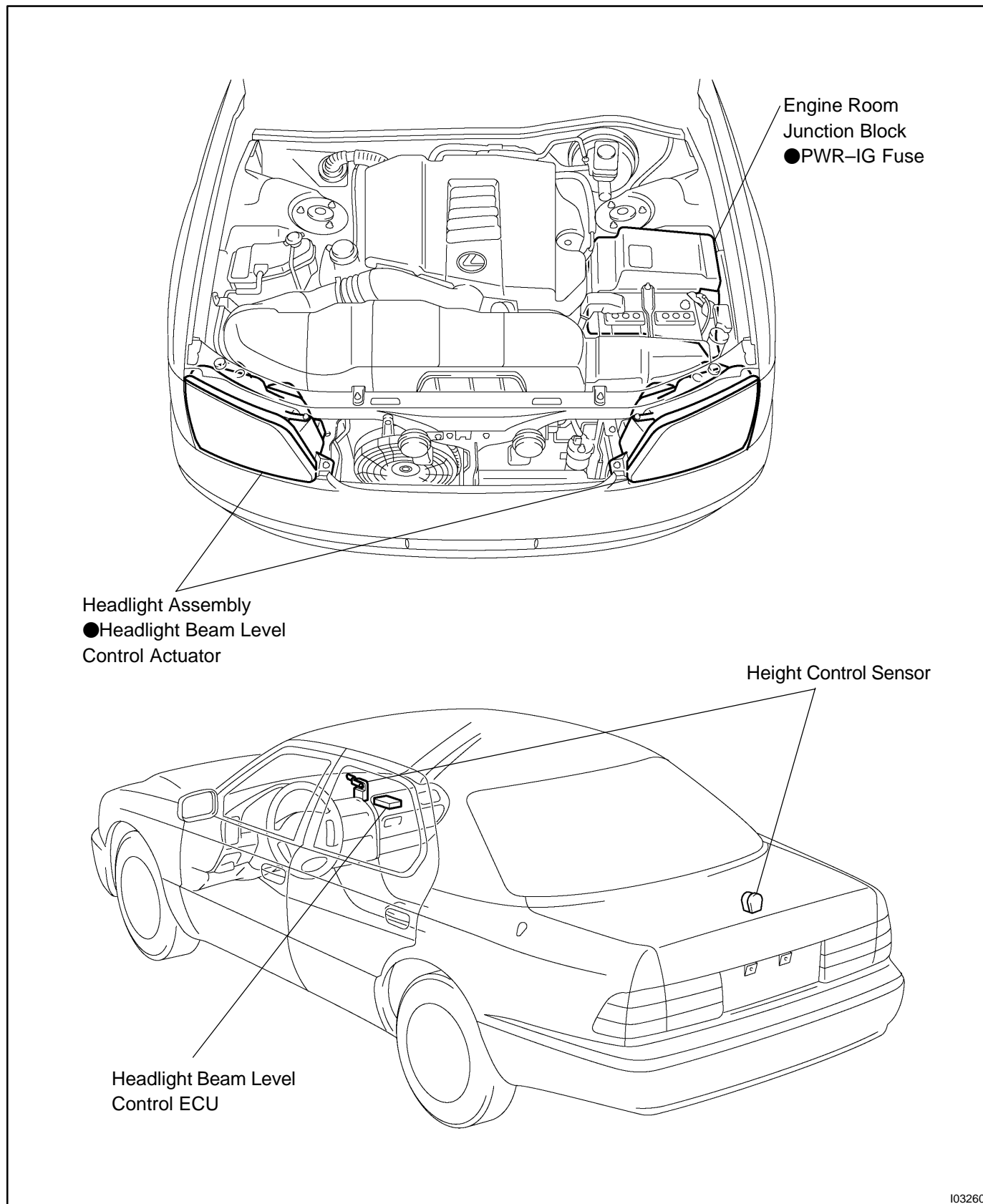
As shown in the illustration, adjust aiming of the LH and RH lights respectively.



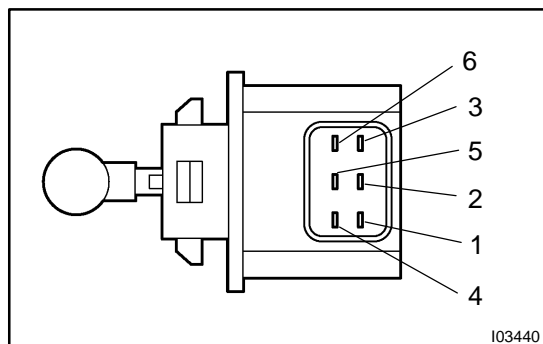
- (l) Adjust headlight in vertical alignment.
 - (1) Turn the vertical movement adjusting bolt "A" in either direction. At this time, keep the turning direction and number of turns in mind.
 - (2) Turn the vertical movement adjusting bolt "A" the same number of turns and in the same direction at step (1).

HEADLIGHT BEAM LEVEL CONTROL SYSTEM LOCATION

BE0BH-01



103260



INSPECTION

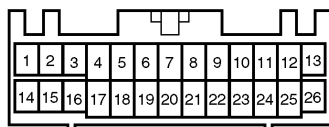
1. INSPECT HEADLIGHT BEAM LEVEL CONTROL ACTUATOR RESISTANCE

- Check that continuity exists between terminal 2 and 5.
- Check that resistance exists between terminal, as shown in the chart.

Terminal	Resistance (Ω)
2 – 1	26 – 30
2 – 3	26 – 30
2 – 4	26 – 30
2 – 6	26 – 30
5 – 1	26 – 30
5 – 3	26 – 30
5 – 4	26 – 30
5 – 6	26 – 30

If resistance value is not as specified, replace the actuator.

Wire Harness Side



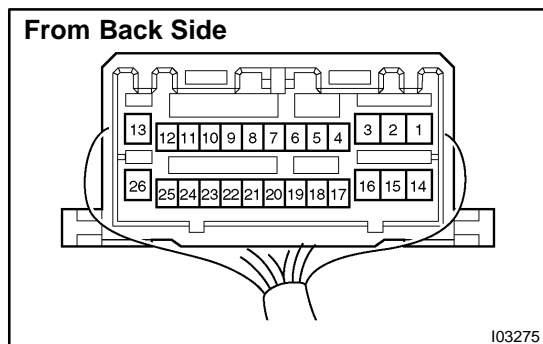
2. INSPECT HEADLIGHT BEAM LEVEL CONTROL ECU CIRCUIT

Connector disconnected:

Disconnect the connector from the ECU and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – 4	Ignition switch OFF	26 – 30 Ω
1 – 5	Ignition switch OFF	26 – 30 Ω
1 – 6	Ignition switch OFF	26 – 30 Ω
1 – 7	Ignition switch OFF	26 – 30 Ω
1 – 17	Ignition switch OFF	26 – 30 Ω
1 – 18	Ignition switch OFF	26 – 30 Ω
1 – 19	Ignition switch OFF	26 – 30 Ω
1 – 20	Ignition switch OFF	26 – 30 Ω
10 – 25	Ignition switch OFF	Continuity
21 – 25	Ignition switch OFF	Continuity
24 – 25	Ignition switch OFF	Continuity
13 – Ground	Ignition switch OFF	Continuity
26 – Ground	Ignition switch OFF	Continuity

If circuit is not as specified, perform the inspection on the following page.



3. INSPECT HEADLIGHT BEAM LEVEL CONTROL ECU CIRCUIT

Connector connected:

Connect the connector from the ECU and inspect the connector on the back side, as shown in the chart.

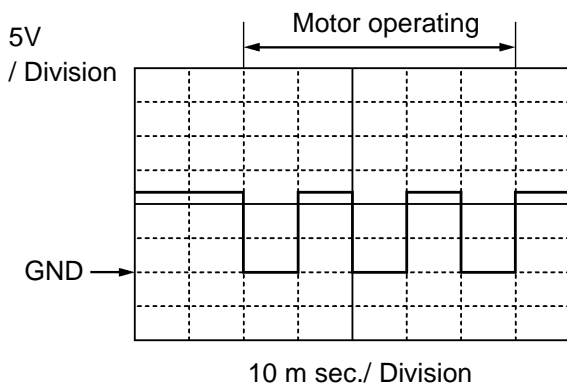
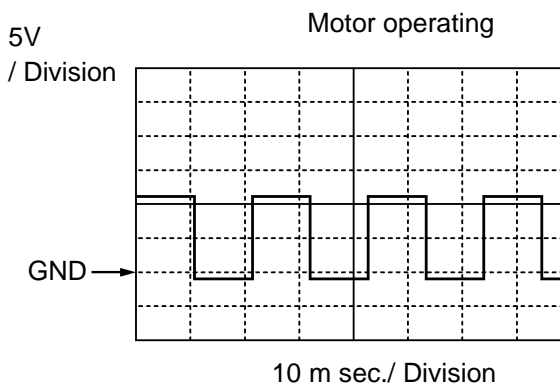
Tester connection	Condition	Specified condition
1 – 13	Ignition switch ON	Battery positive voltage
4 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
5 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
6 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
7 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
10 – 25	Ignition switch ON	Approx. 2.5 V
12 – 13	Ignition switch ON	No continuity
26 – Body ground	Ignition switch OFF	Continuity (w/ Electrical modulated air suspension)
13 – 15	Ignition switch ON and light control switch HEAD	Below 1.5 V
17 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
18 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
19 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
20 – 13, 26	Ignition switch ON, when keep and bounce the vehicle	*1 Pulse generation
21 – 25	Ignition switch ON	Approx. 2.5 V
13 – 22		*2 Pulse generation
13 – 23		*2 Pulse generation
24 – 25	Ignition switch ON	5 V
13 – 25	Ignition switch OFF	Continuity
13 – Body ground	Ignition switch OFF	Continuity

If the circuit is not as specified, replace the ECU.

Reference INSPECTION USING OSCILLOSCOPE

HINT:

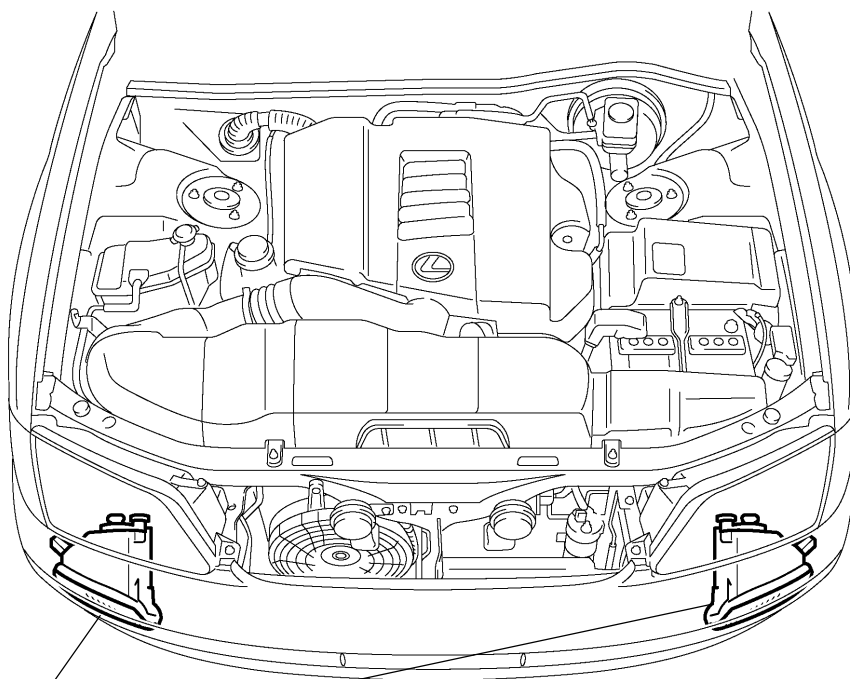
The correct waveform is as shown in the illustration.

1 Pulse generation**2 Pulse generation**

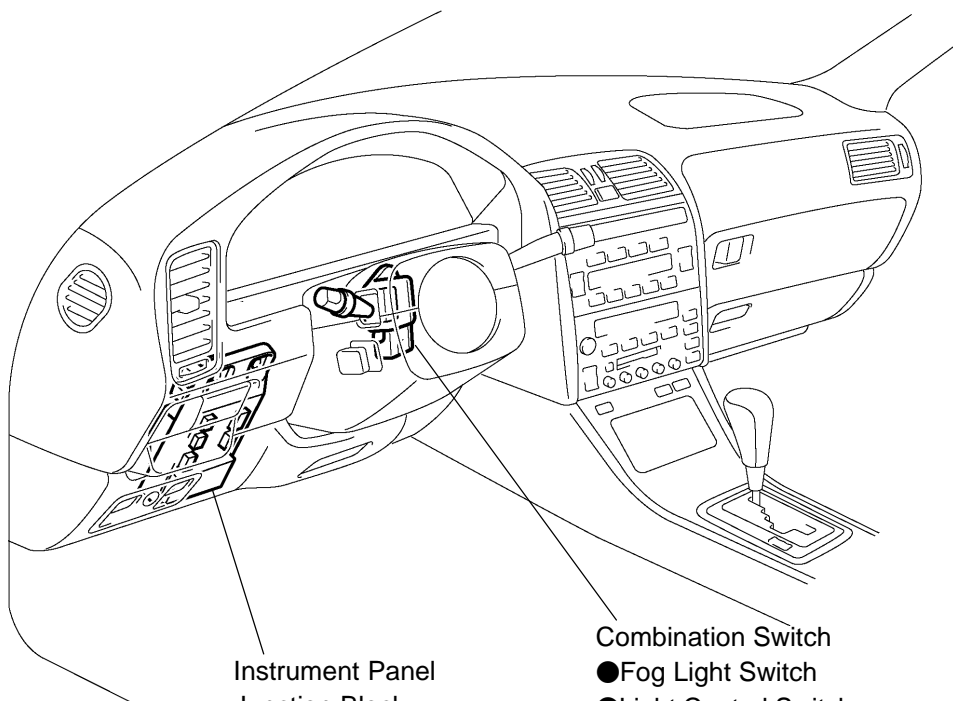
I03276

FOG LIGHT SYSTEM LOCATION

BE0BJ-01



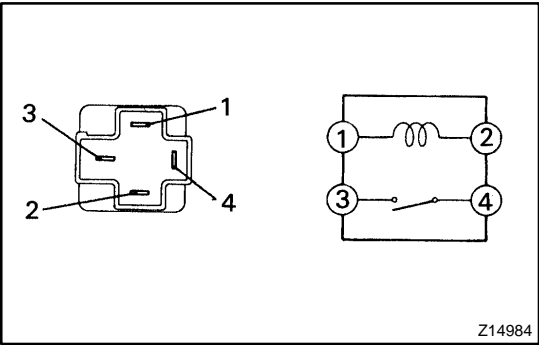
Headlight Assembly
●Fog Light



Instrument Panel
Junction Block
●FOG Fuse
●Fog Light Relay

Combination Switch
●Fog Light Switch
●Light Control Switch

I03229



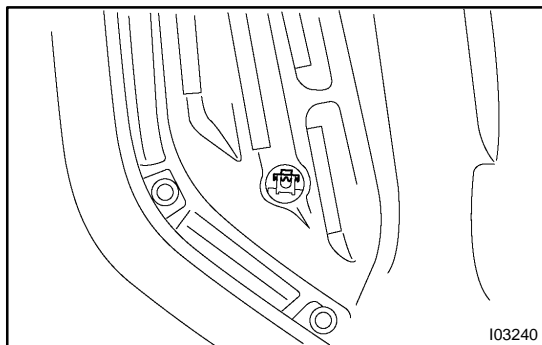
INSPECTION

1. INSPECT FOG LIGHT RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	3 – 4	Continuity

If continuity is not as specified, replace the relay.

2. INSPECT FOG LIGHT RELAY CIRCUIT (See page BE-23)



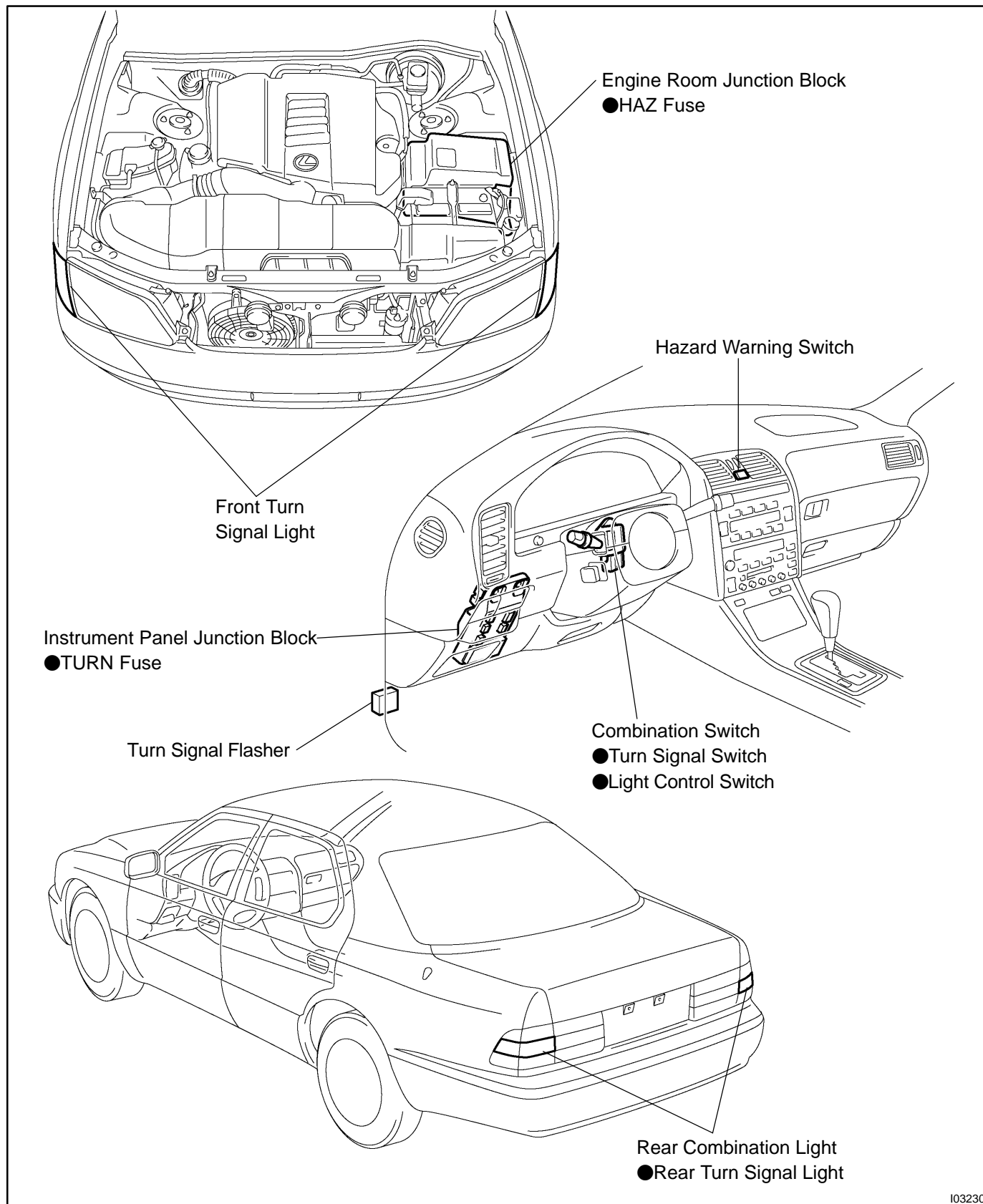
ADJUSTMENT

ADJUST FOG LIGHT AIM

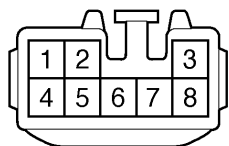
A-bolt: Vertical Direction

TURN SIGNAL AND HAZARD WARNING SYSTEM LOCATION

BE0BM-01



103230

Wire Harness Side

I03480

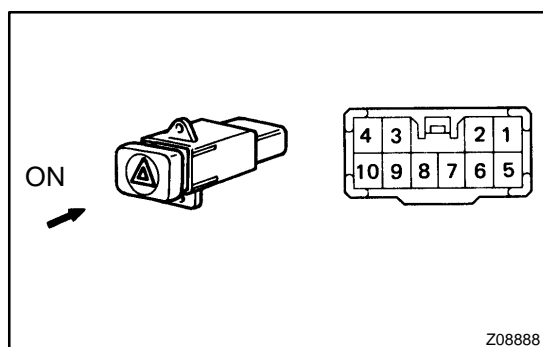
INSPECTION**1. INSPECT TURN SIGNAL FLASHER CIRCUIT**

Disconnect the connector from the combination switch and inspect the connect on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
3 – Ground	Constant	Continuity
5 – Ground	Turn signal switch RIGHT or OFF	No continuity
5 – Ground	Turn signal switch LEFT	Continuity
6 – Ground	Turn signal switch LEFT	No continuity
6 – Ground	Turn signal switch RIGHT	Continuity
7 – Ground	Constant	Continuity
8 – Ground	Hazard warning switch OFF	No continuity
8 – Ground	Hazard warning switch ON	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage
4 – Ground	Constant	Battery positive voltage

If circuit is as specified, replace the relay.

If circuit is not as specified, inspect the circuits connected to other parts.

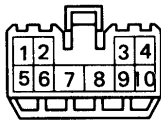


Z08888

2. INSPECT HAZARD WARNING SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	7 – 10	Continuity
ON	7 – 8	Continuity
Illumination circuit	2 – 3	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side

S-10-1

Z08740

3. INSPECT HAZARD WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connection on the wire harness side, as shown.

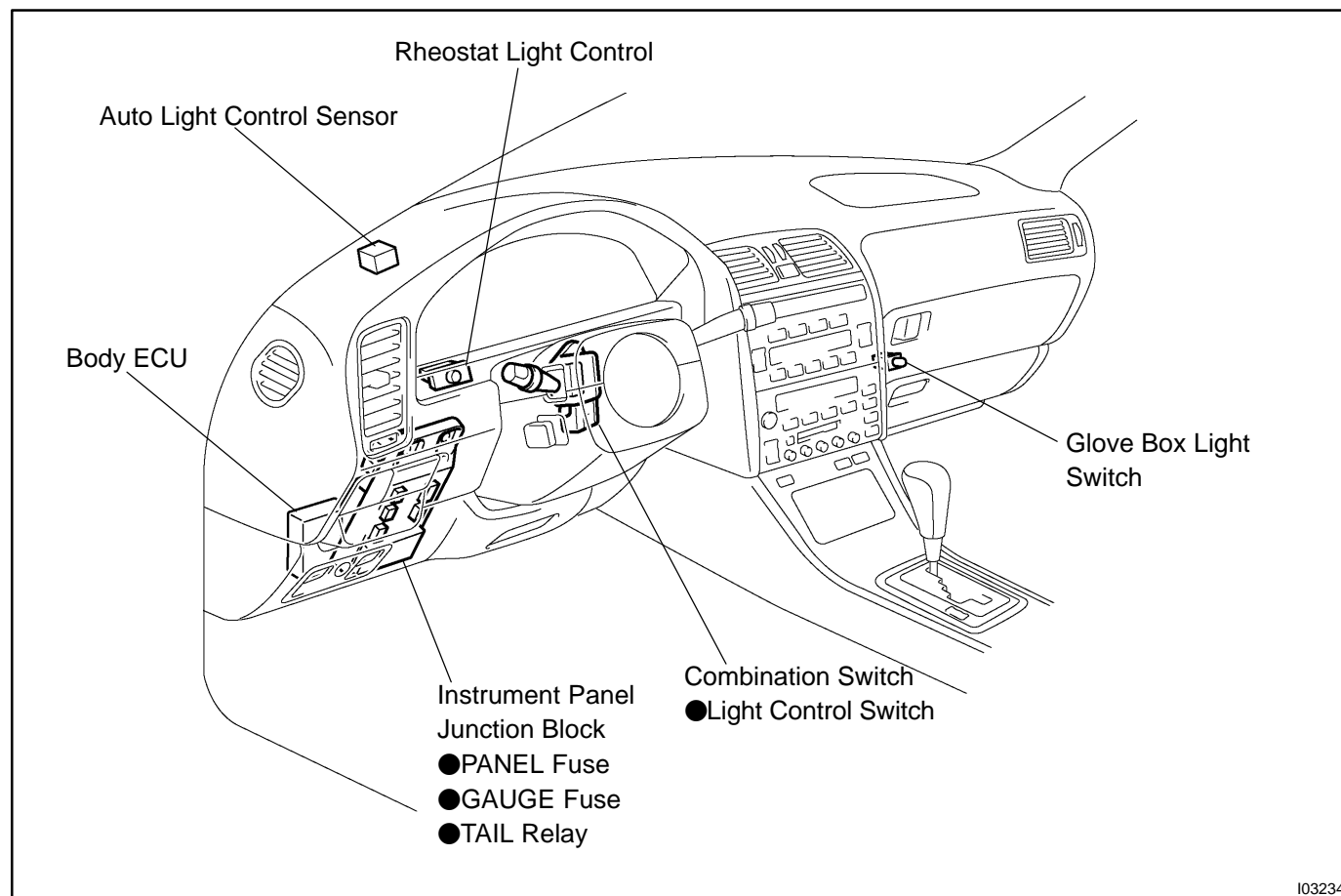
Tester connection	Condition	Specified condition
8 – Ground	Constant	Continuity
*2 – Ground	Light control switch position OFF	No voltage
*2 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

*: illumination

If the circuit is not as specified, inspect the circuits connected to other parts.

ILLUMINATION LIGHT SYSTEM LOCATION

BE0B0-01



I03234

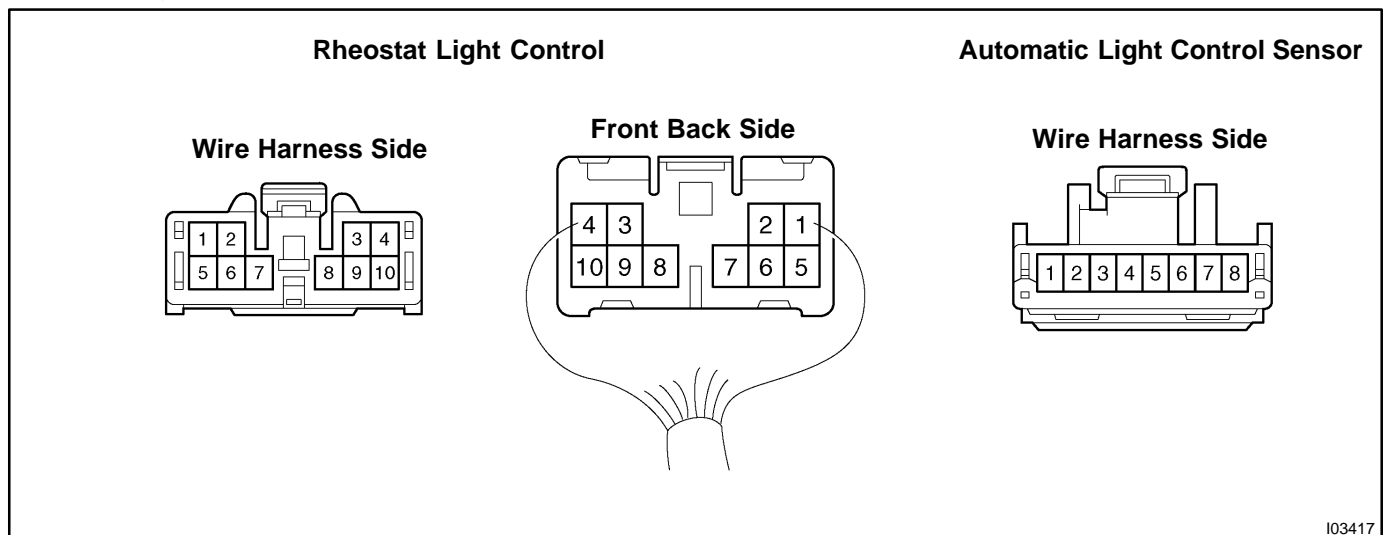
CIRCUIT

1. When checking voltage, resistance, etc., use a high impedance type tester (It is impossible with a simple tester).
2. When the ignition switch is turned to START, all meters will go out but this is normal.
3. When replacing the internal mechanism (computer parts) of the meter, 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 parts (spare parts).
4. Do not disconnect the battery while the engine is running as this would cause an instant reverse charge, resulting in damage to the components.
5. Always disconnect the battery terminals before pulling apart connectors or terminals.
6. To prevent damage, handle meters with care.

No.	Trouble
1	None of the illuminations can be adjusted.
2	Only the combination meter cannot be adjusted.
3	The combination meter can be adjusted, but not other illumination.
4	Tail cancellation does not work for the clock, air conditioner panel and combination meter.
5	Tail cancellation does not work for one of clock, air conditioner panel or combination meter.
6	Tail cancellation (illumination at 100 % brightness) does not occur when tail cancellation of the rheostat light control is released, the light control switch is put on AUTO and light strikes the automatic light control sensor. (Area surrounding vehicle is dark)

HINT:

Tail cancellation refers to the illumination brightness becoming 100 % when the rheostat light control is turned to the right beyond the moderate position. (Light is not applied to the automatic light control sensor at this time.)



I03417

1	None of the illuminations can be adjusted
---	--

HINT: While carrying, out the following inspection, make certain that the connectors and terminals are properly connected.

Connect the wire harness side connector to the rheostat light control and inspect wire harness side connector from the back side, as shown.

Ignition switch position ON.
Connect the positive (+) lead from the voltmeter to terminal 5 and negative (–) lead to the body ground. Is there battery positive voltage?

No

Replace GAUGE Fuse.
Then recheck system.

Yes

Turn light control switch to TAIL.
Taillight is normal?

No

Taillight system faulty. Inspect taillight circuit.
(See page [BE-23](#))
Then recheck system.

Yes

With light control switch at TAIL, Connect the positive (+) lead from the voltage to terminal 6 and negative (–) lead to the body ground. Is there battery positive voltage?

No

Replace PANEL Fuse.
Then recheck system.

Yes

Automatic light control system is normal?
(See page [BE-38](#))

No

Automatic light control system faulty.
Replace automatic light control sensor.
Then recheck system.

Yes

Disconnect connectors from rheostat light control and automatic light control sensor, then inspect wire harness side connector.

Is there continuity when an ohmmeter is connected to connector terminal 1 on the wire harness side of the rheostat light control and connector terminal 8 on the wire harness side of automatic light control sensor?

No

Replace wire harness between connector terminal 1 rheostat side and connector terminal 8 on sensor side.

Yes

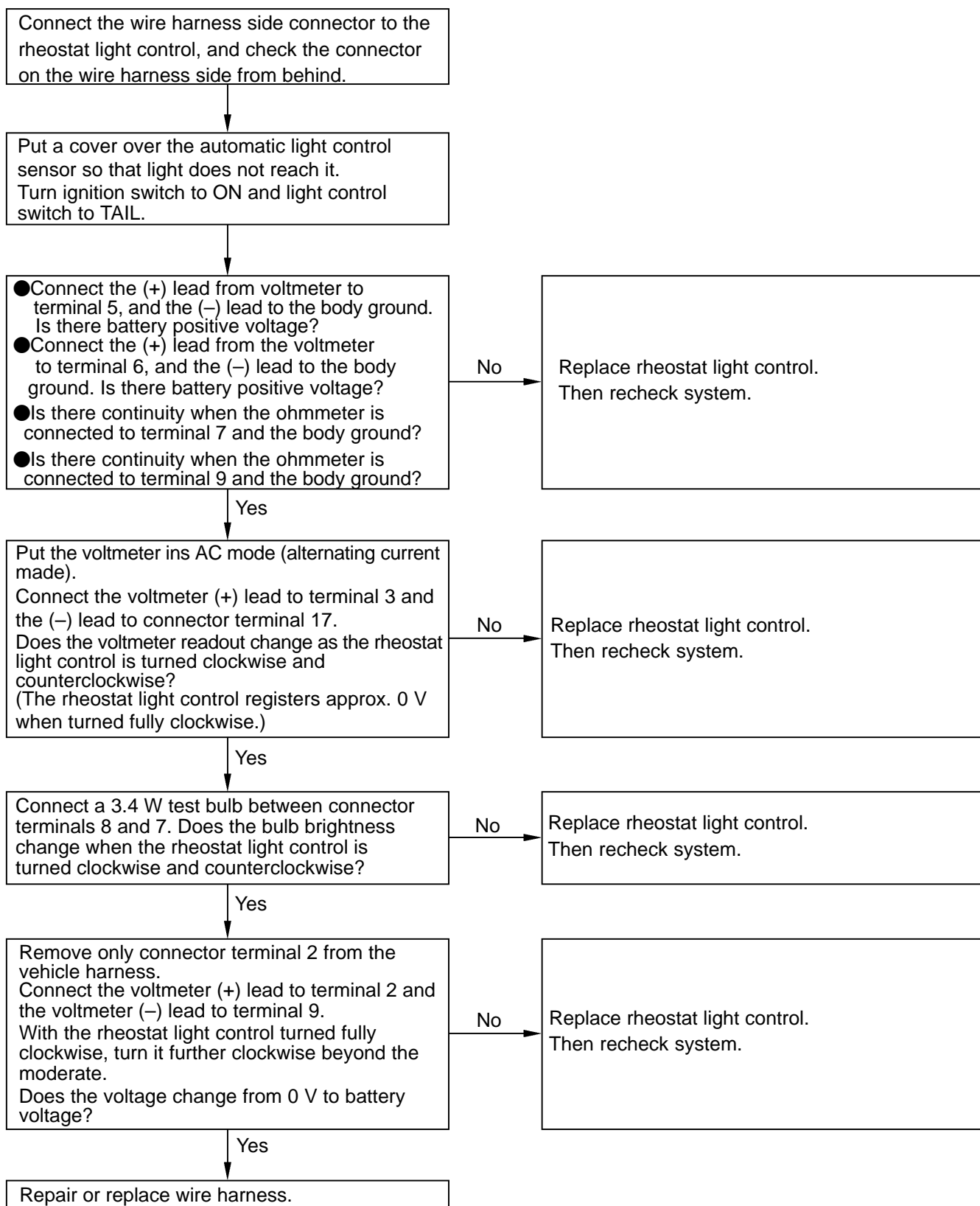
Is there continuity when and ohmmeter is connected to connector terminal 10 on wire harness side of rheostat light control and connector terminal 4 on wire harness side of automatic light control sensor?

No

Replace wire harness between connector terminal 10 on rheostat side and connector terminal 8 on sensor side.

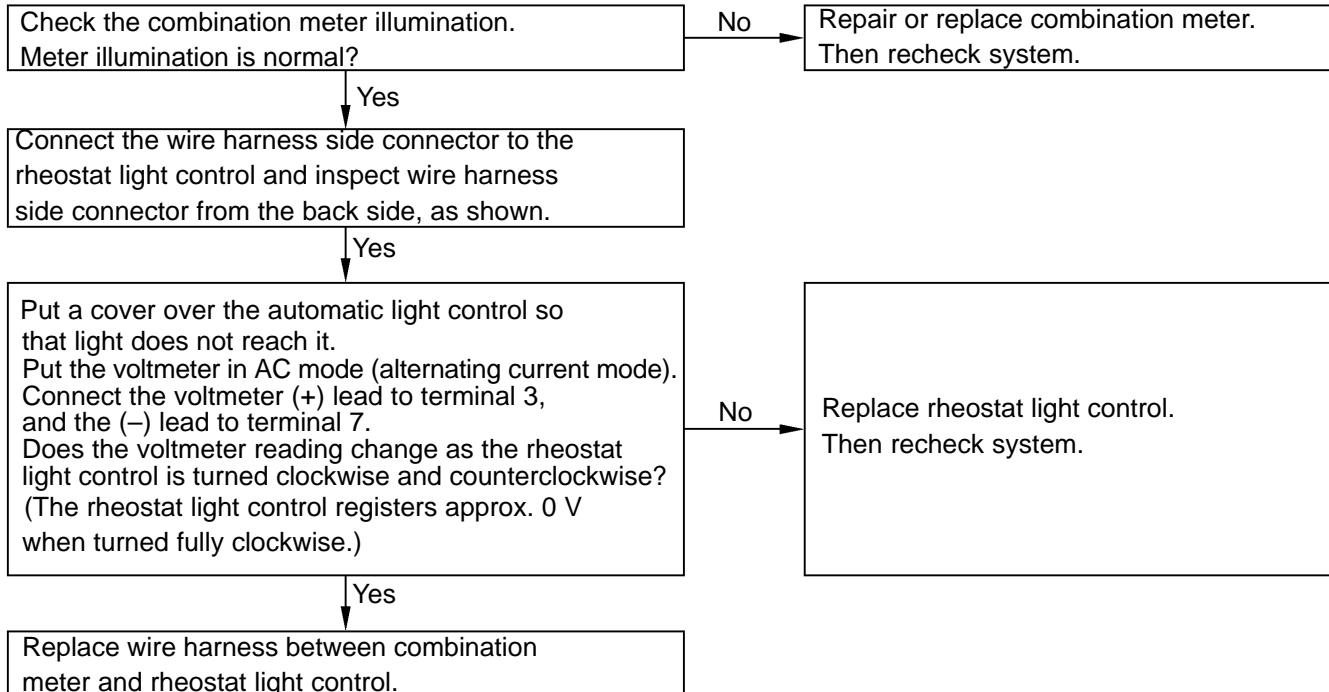
Yes

CONTINUED ON NEXT PAGE



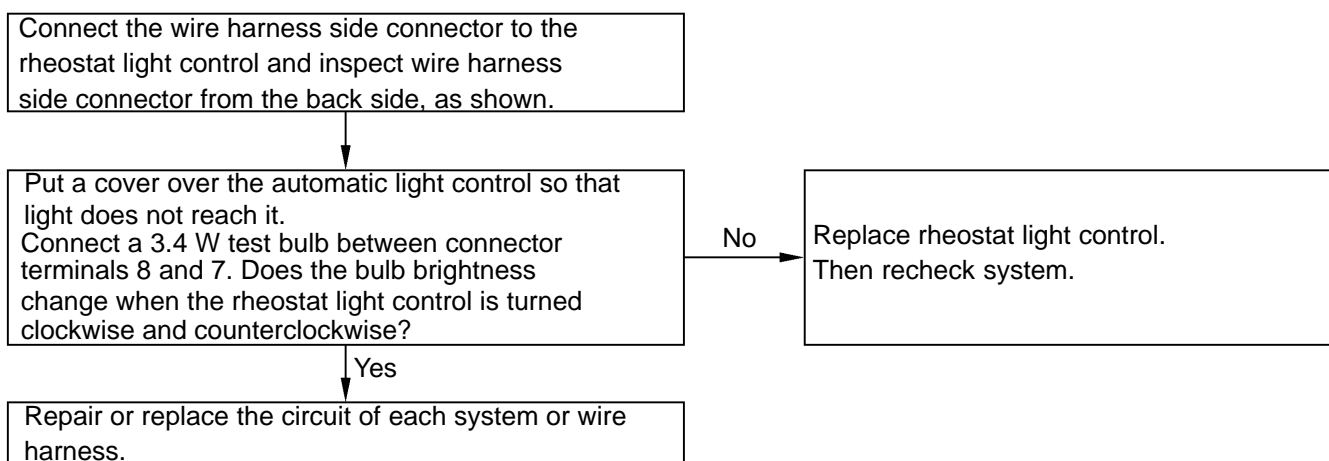
2 Only the combination meter cannot be adjusted

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



3 The combination meter can be adjusted, but not other illumination

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



4 Tail cancellation does not work for the clock, air conditioner panel or combination meter

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Connect the wire harness side connector to the rheostat light control and inspect wire harness side connector from the back side, as shown.

Put a cover over the automatic light control sensor so that light does not reach it.
Turn ignition switch to ON and light control switch to TAIL.
Remove only connector terminal 2 from the vehicle harness.
Connect the voltmeter (+) lead to terminal 2, and voltmeter (–) lead to terminal 9.
With the rheostat right control turned fully clockwise, turn it further clockwise beyond the moderate.
Does the voltage change from 0 V to battery positive voltage?

No

Replace rheostat light control.
Then recheck system.

Yes

Repair or replace wire harness.

5 Tail cancellation does not work for one of clock, air conditioner panel or combination meter.

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.

Clock

Check the clock illumination.
Clock illumination is normal?

No

Replace clock.

Yes

Replace wire harness between the rheostat and the clock

Air conditioner panel

Check the air conditioner panel illumination.
Air conditioner panel illumination is normal?

No

Replace air conditioner panel.

Yes

Replace wire harness between rheostat light control and air conditioner panel.

Combination meter

Check the combination meter illumination.
Combination meter illumination is normal?

No

Replace combination meter.

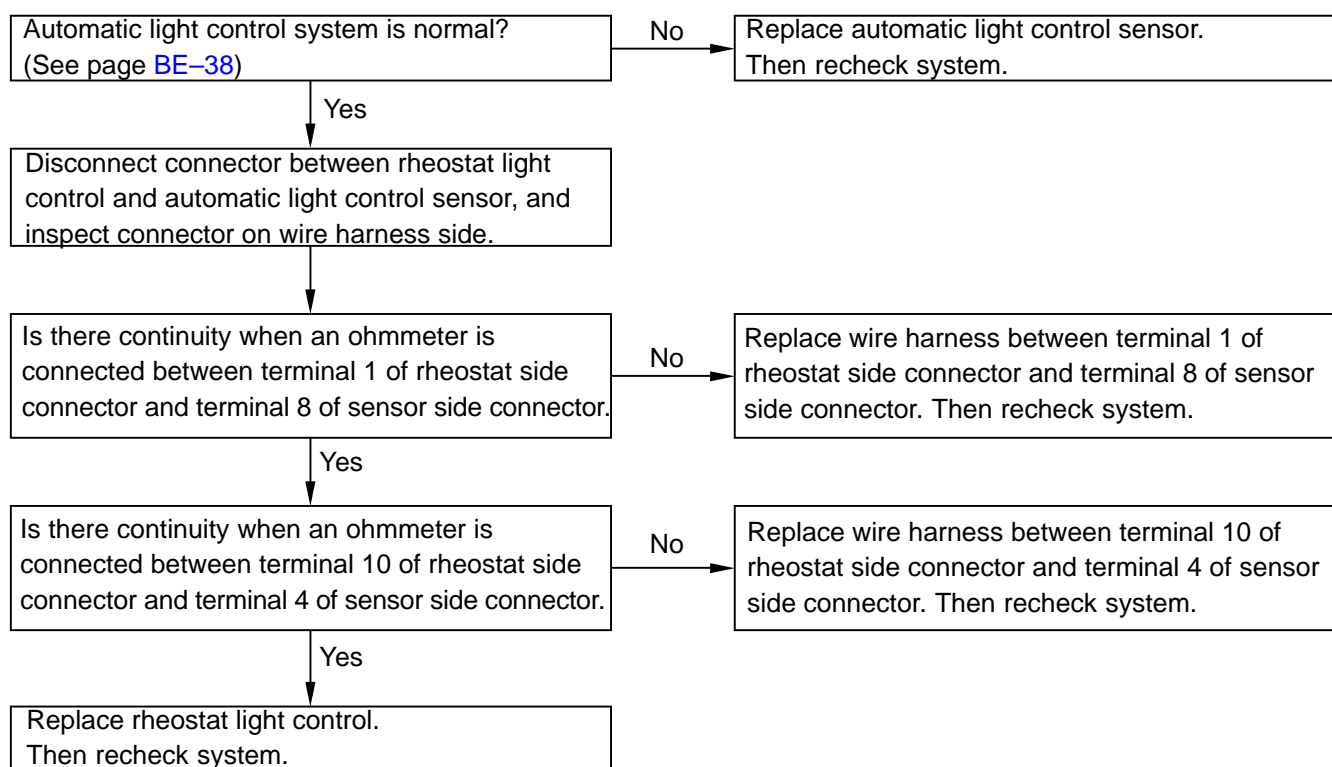
Yes

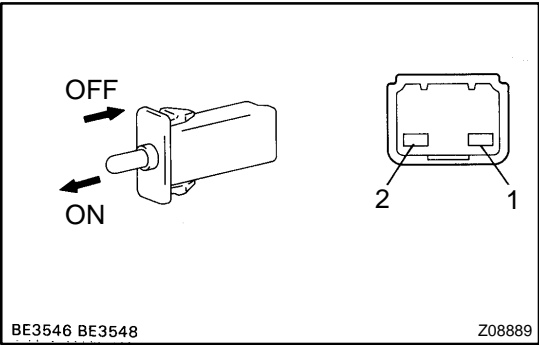
Replace wire harness between rheostat light control and combination meter.

6

Tail cancellation (illumination at 100% brightness) does not occur when tail cancellation of the rheostat light control is released, the light control switch is put on AUTO and light strikes the automatic light control sensor.
(Area surrounding vehicle is dark.)

HINT: While carrying out the following inspection, make certain that the connectors and terminals are properly connected.



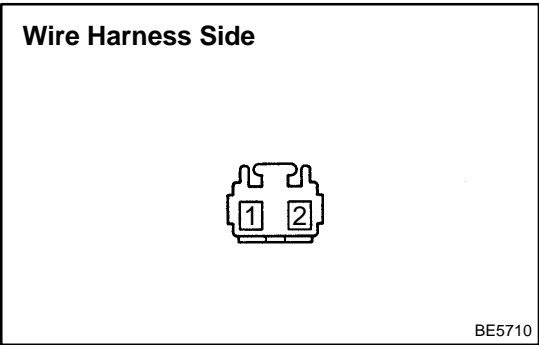


INSPECTION

1. INSPECT GLOVE BOX LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No Continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the relay.



2. INSPECT GLOVE BOX LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

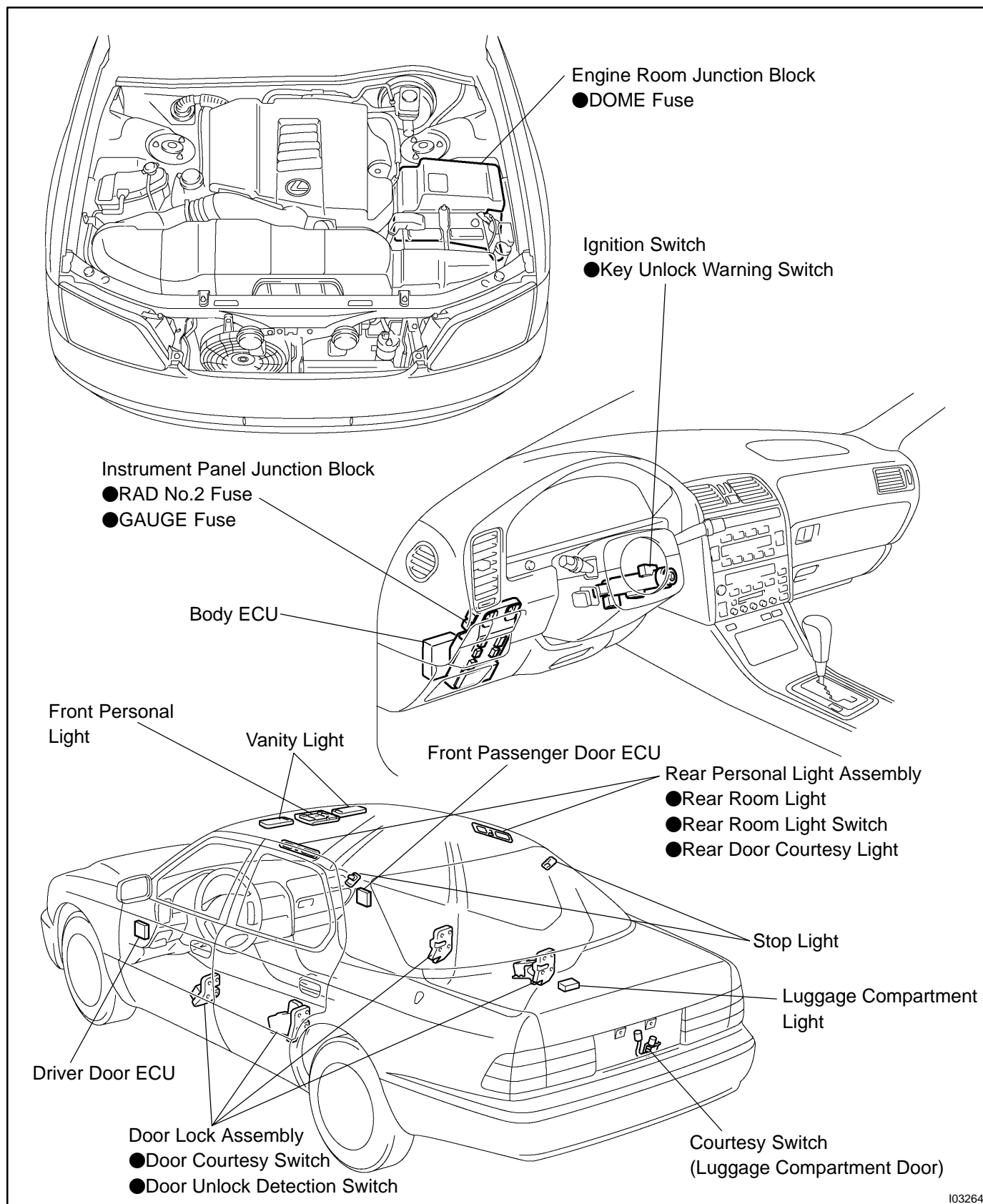
Tester connection	Condition	Specified condition
1 – Ground	Light control switch position OFF	No voltage
1 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage
2 – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.

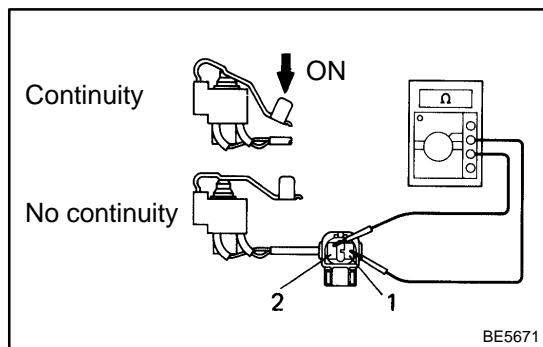
INTERIOR LIGHT SYSTEM

LOCATION

BE0BR-01



103264

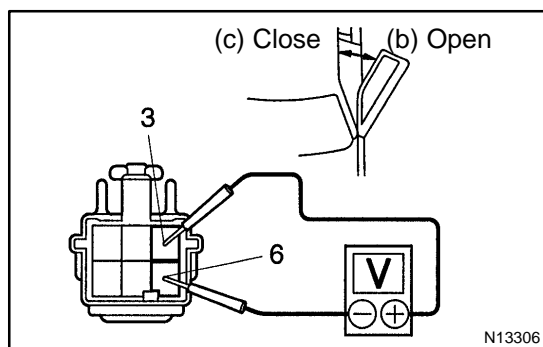


INSPECTION

1. INSPECT DOOR OUTSIDE HANDLE SWITCH CONTINUITY

- Check that there is continuity between terminals 1 and 2 when door outside handle is pulled.
- Check that there is no continuity between terminals 1 and 2 when door outside handle is released.

If operation is not as specified, replace the switch.



2. INSPECT COURTESY SWITCH CONTINUITY

- Connect the connector to the driver door ECU.
- Check that there is continuity between terminals 3 and 6 when door is opened.
- Check that there is no continuity between terminals 3 and 6 when door is closed.

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

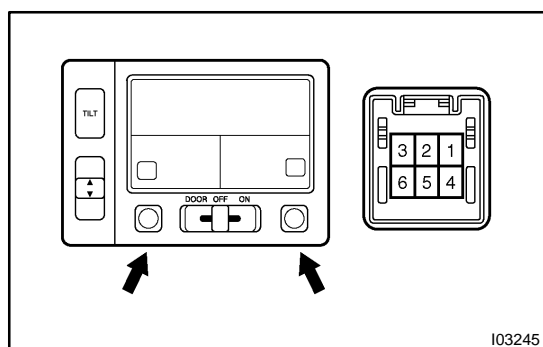
3. Driver's door: INSPECT COURTESY SWITCH CIRCUIT (See page [DI-745](#))

4. Passenger's door: INSPECT COURTESY SWITCH CIRCUIT (See page [DI-777](#))

5. Rear left door: INSPECT COURTESY SWITCH CIRCUIT (See page [DI-805](#))

6. Rear right door: INSPECT COURTESY SWITCH CIRCUIT (See page [DI-828](#))

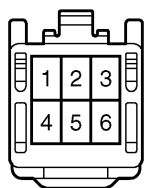
7. INSPECT FRONT PERSONAL LIGHT SWITCH CONTINUITY



Switch position	Tester connection	Specified condition
Interior Light Switch OFF (Lever Switch)	—	No continuity
Interior Light Switch DOOR (Lever Switch)	1 – 3	Continuity
Interior Light Switch ON (Lever Switch)	1 – 2	Continuity
Personal Light OFF (Push Switch)	—	No continuity
* Personal Light ON (Push Switch)	1 – 2	Continuity

* Set to the interior light switch to OFF or DOOR

If continuity is not as specified, replace the light assembly or bulb.

Wire Harness Side

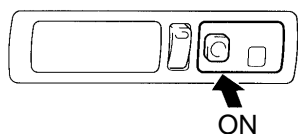
I03432

8. INSPECT FRONT PERSONAL LIGHT SWITCH CIRCUIT

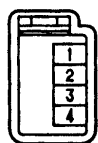
Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

If circuit is not as specified, inspect the power source or wire harness.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
5 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage
4 – Ground	Constant	Battery positive voltage

Rear Room Light

ON

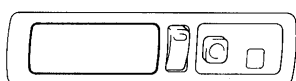


Z14891

9. INSPECT REAR PERSONAL LIGHT ASSEMBLY CONTINUITY**Rear room light:**

Switch position	Tester connection	Specified condition
Room light switch off and door close	–	No continuity
Room light switch on and door close	1 – 2	Continuity
Room light switch off or ON and door open	1 – 3	Continuity

If continuity is not as specified, replace bulb or rear personal light assembly.

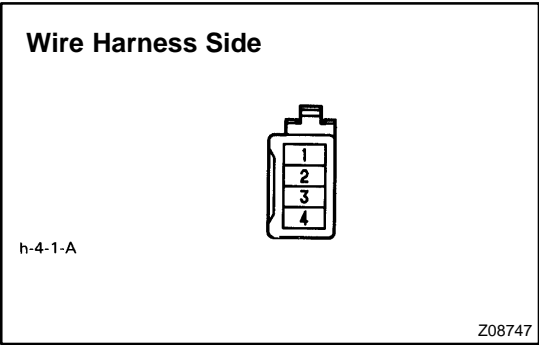
Rear Door Courtesy Light

Z14892

10. INSPECT REAR PERSONAL LIGHT ASSEMBLY CONTINUITY**Rear door courtesy light:**

Using the ohmmeter, check that there is continuity between terminals.

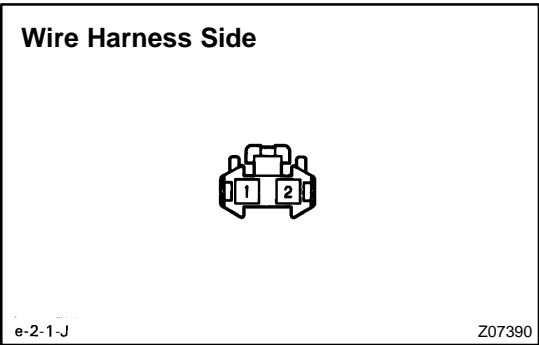
If continuity is not as specified, replace the bulb or rear personal light assembly.



11. Rear room light:
INSPECT REAR PERSONAL LIGHT ASSEMBLY CIRCUIT

Disconnect the connector from the light and inspect the connector on the wire harness side, as shown.
If circuit is not as specified, inspect the power source or wire harness.

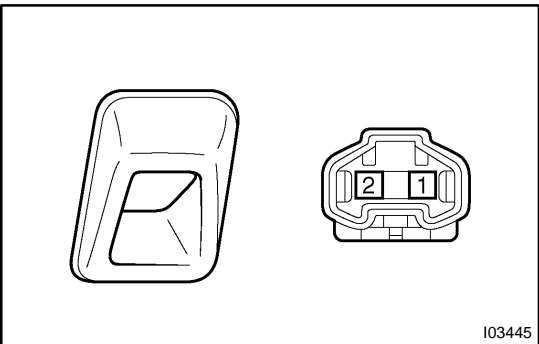
Terminal connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage



12. Rear door courtesy light:
INSPECT REAR PERSONAL LIGHT ASSEMBLY CIRCUIT

Disconnect the connector from the light and inspect the connector on the wire harness, as shown.
If circuit is not as specified, inspect the power source or wire harness.

Terminal connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage



13. INSPECT SPOT LIGHT CONTINUITY

Using the ohmmeter, check that there is continuity between terminals.
If continuity is not as specified, replace the bulb or spot light assembly.

Wire Harness Side

e-2-1-J

Z07390

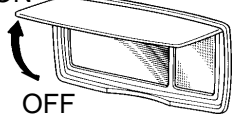
14. INSPECT SPOT LIGHT CIRCUIT

Disconnect the connector from the light and inspect the connector on the wire harness, as shown.

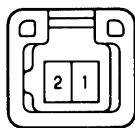
If circuit is not as specified, inspect the power source or wire harness.

Terminal connection	Condition	Specified condition
1 – Ground	Constant	Battery positive voltage

ON



OFF



Z14894

15. INSPECT VANITY LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – 2	Continuity

If continuity is not as specified, replace the bulb or vanity light.

Wire Harness Side

h-2-1-B

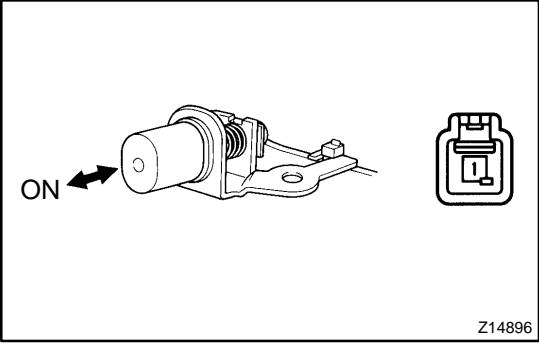
Z14895

16. INSPECT VANITY LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

If circuit is not as specified, inspect the power source or wire harness.

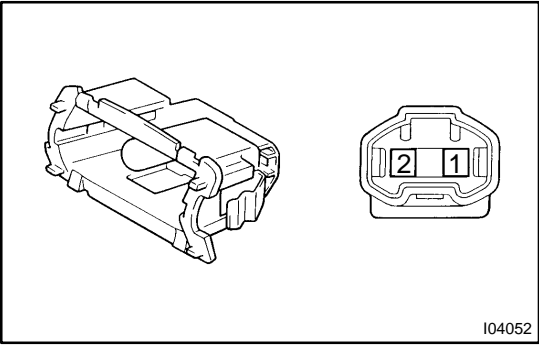
Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage



17. INSPECT LUGGAGE COMPARTMENT DOOR COURTESY SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Closed)	–	No continuity
ON (Opened)	1 – Switch body	Continuity

If operation is not as specified, replace the switch.



18. INSPECT DOOR COURTESY LIGHT CONTINUITY

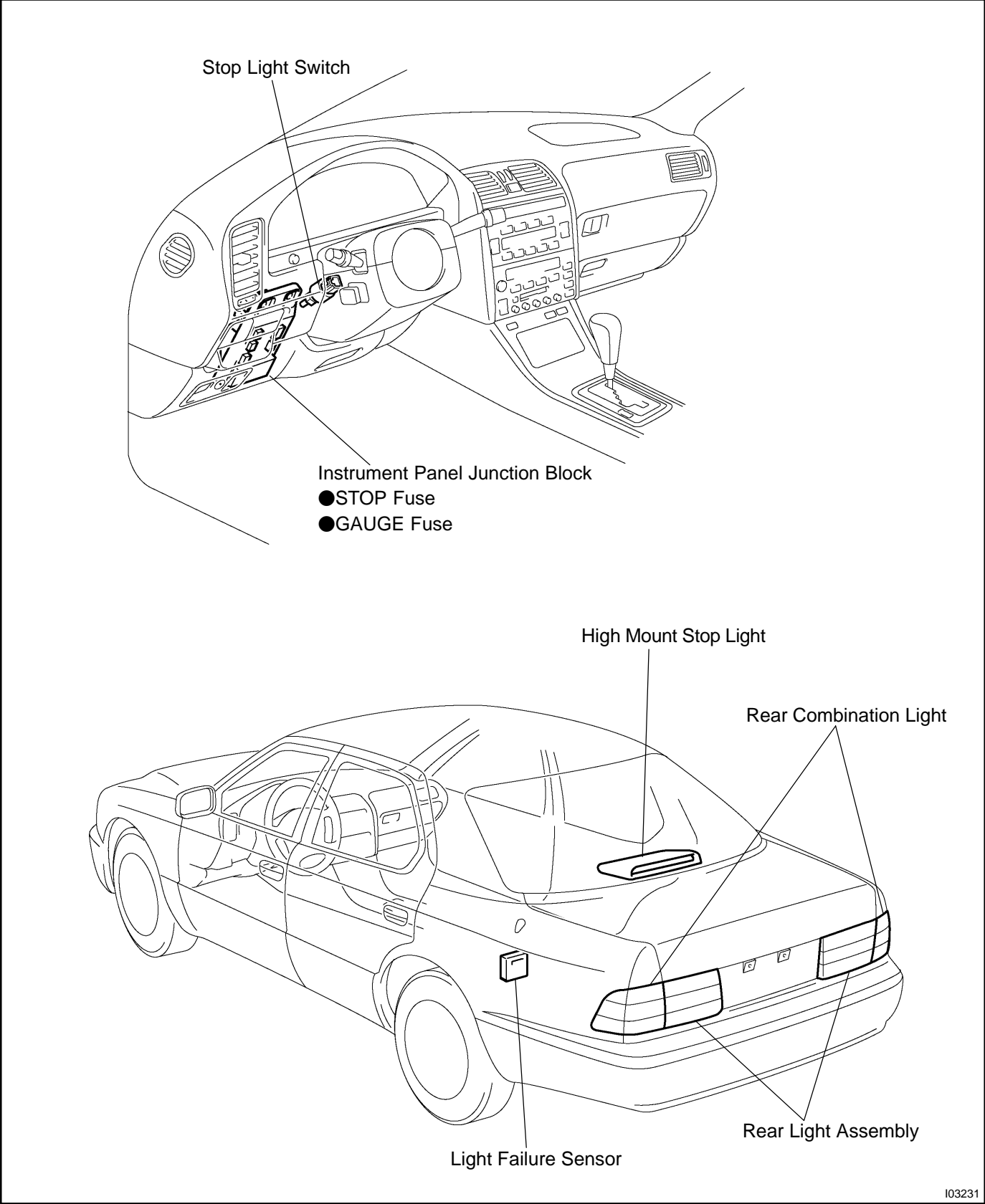
Using the ohmmeter, check that there is continuity between terminals.

If continuity is not as specified, replace the light assembly or bulb.

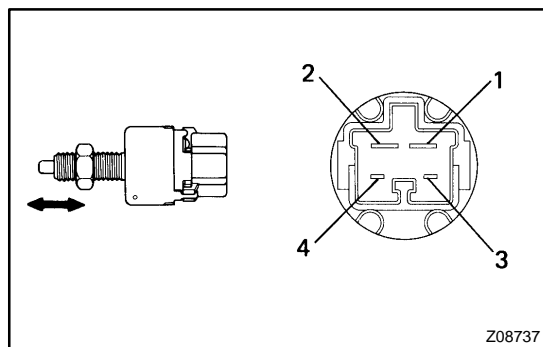
STOP LIGHT SYSTEM

LOCATION

BE0BT-01



I03231



Z08737

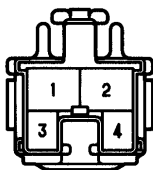
INSPECTION

1. INSPECT STOP LIGHT SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Switch pin free	1 – 2	Continuity
Switch pin pushed in	3 – 4	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side



eg-4-1

Z08738

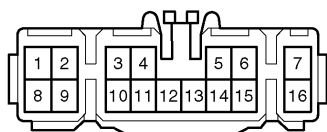
2. INSPECT STOP LIGHT SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the power source or wire harness.

Wire Harness Side



e-16-1-A

I03418

3. INSPECT LIGHT FAILURE SENSOR CIRCUIT

Disconnect the connector from the sensor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	* Continuity
3 – Ground	Constant	* Continuity
4 – Ground	Constant	* Continuity
6 – Ground	Constant	* Continuity
7 – Ground	Constant	* Continuity
11 – Ground	Constant	Continuity
16 – Ground	Constant	* Continuity
1 – Ground	Stop light switch position OFF	No voltage

BODY ELECTRICAL – STOP LIGHT SYSTEM

1 – Ground	Stop light switch position ON	Battery positive voltage
8 – Ground	Stop light switch position OFF	No voltage
8 – Ground	Stop light switch position ON	Battery positive voltage
9 – Ground	Ignition switch position LOCK or ACC	No voltage
9 – Ground	Ignition switch position ON	Battery positive voltage
14 – Ground	Ignition switch position LOCK or ACC	No voltage
14 – Ground	Ignition switch position ON	Battery positive voltage
16 – Ground	Light control switch position OFF	No voltage
16 – Ground	Light control switch position TAIL or HEAD	Battery positive voltage

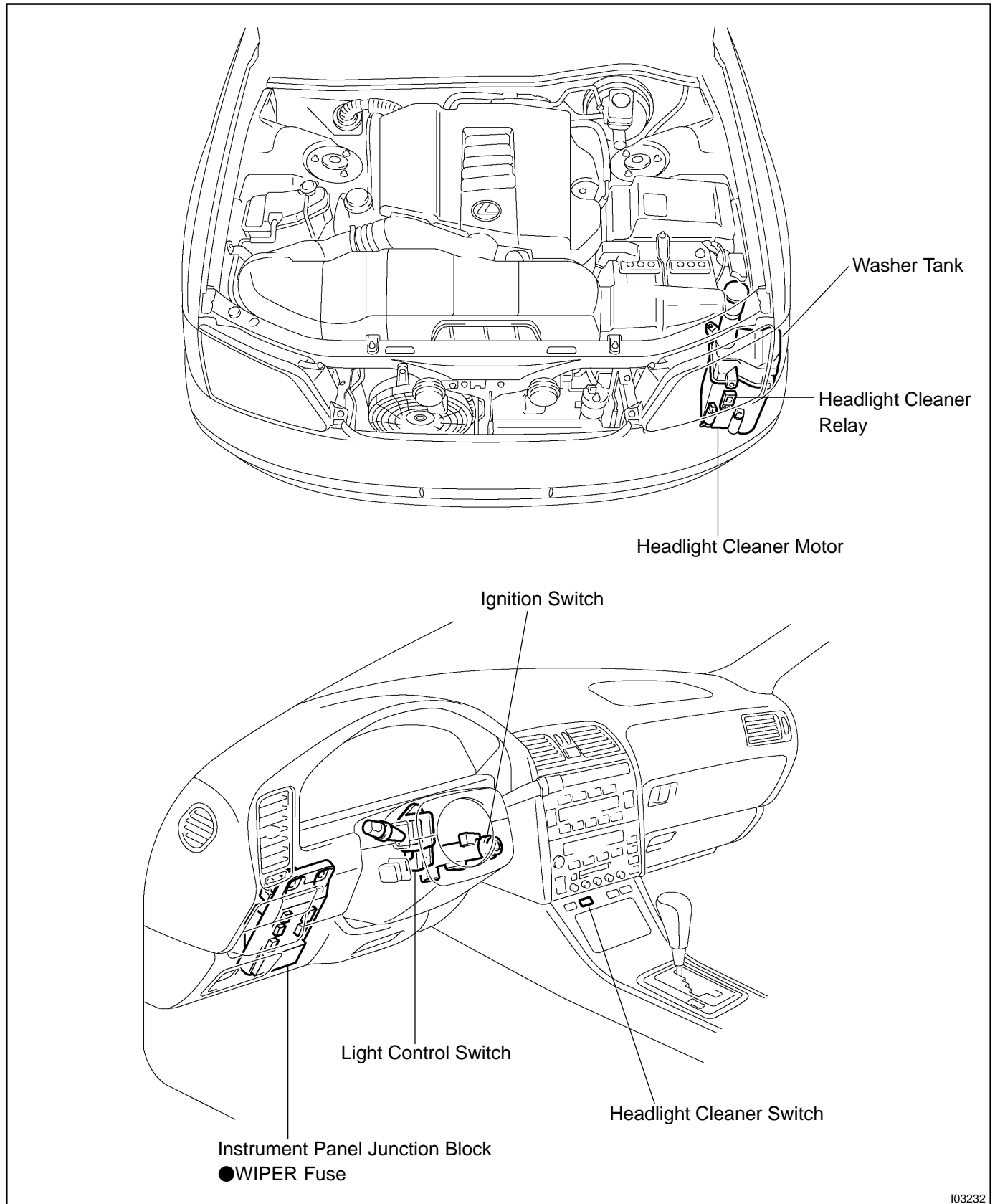
*: There is resistance because this circuit is grounded through the bulb.

If circuit is as specified, try replacing the sensor with a new one.

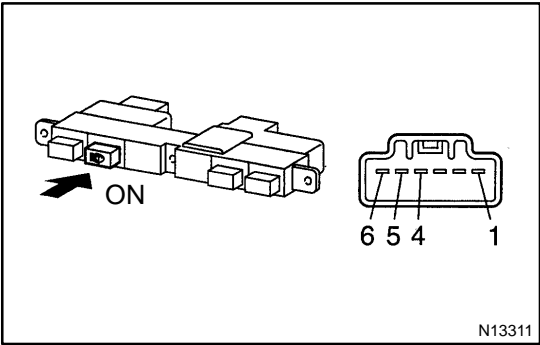
If the circuit is not as specified, inspect the circuits connected to other parts.

HEADLIGHT CLEANER SYSTEM LOCATION

BE0BV-01



I03232

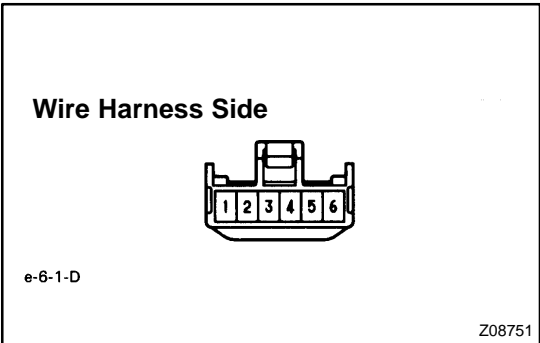


INSPECTION

1. INSPECT HEADLIGHT CLEANER SWITCH CONTINUITY

Condition	Tester connection	Specified condition
Switch OFF	–	No continuity
Switch ON	4 – 5	Continuity
Illumination circuit	1 – 6	Continuity

If continuity is not as specified, replace the switch.

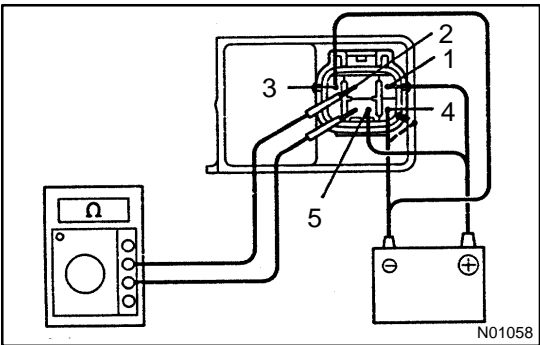


2. INSPECT HEADLIGHT CLEANER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

If circuit is not as specified, inspect the circuits connected to other parts.

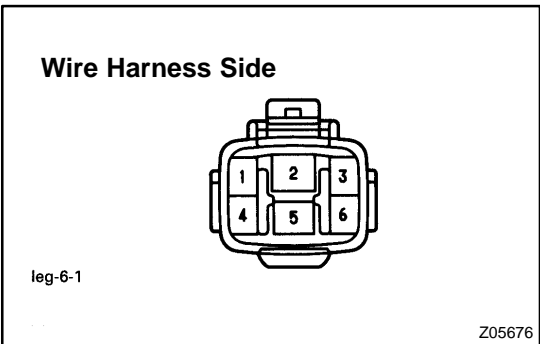
Tester connection	Condition	Specified condition
5 – Ground	Headlight Light OFF	No continuity
5 – Ground	Headlight Light ON	Continuity
4 – Ground	Ignition switch position LOCK or ACC	No voltage
4 – Ground	Ignition switch position ON	Battery positive voltage
6 – Ground	Headlight or taillight Light ON	Battery positive voltage



3. INSPECT HEADLIGHT CLEANER RELAY OPERATION

- Check that there is no continuity between terminals 2 and 5.
- Connect the positive (+) lead from the battery to terminals 1 and 5, and the negative (–) lead to terminal 3.
- Connect the negative (–) lead from the battery to terminal 4, and check that there is continuity between terminals 2 and 5 for 0.4 – 0.6 seconds, then there is no continuity.

If operation is not as specified, replace the relay.

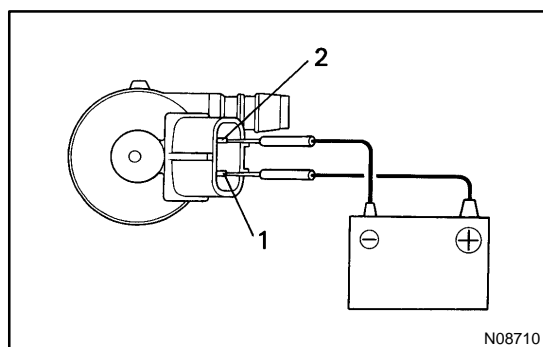


4. INSPECT HEADLIGHT CLEANER RELAY CIRCUIT

Disconnect the connector from the relay and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
4 – Ground	Ignition switch ON and light control switch turned to HEAD cleaner switch OFF	No continuity
4 – Ground	Ignition switch ON and light control switch turned to HEAD cleaner switch ON	Continuity
3 – Ground 2 – Ground	Constant	Continuity
1 – Ground	Ignition switch position LOCK or ACC	No voltage
1 – Ground	Ignition switch position ON	Battery positive voltage
5 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.



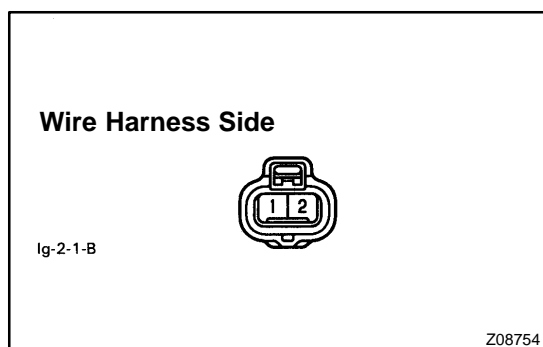
5. INSPECT HEADLIGHT CLEANER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor operates.

NOTICE:

This tests must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



6. INSPECT HEADLIGHT CLEANER MOTOR CIRCUIT

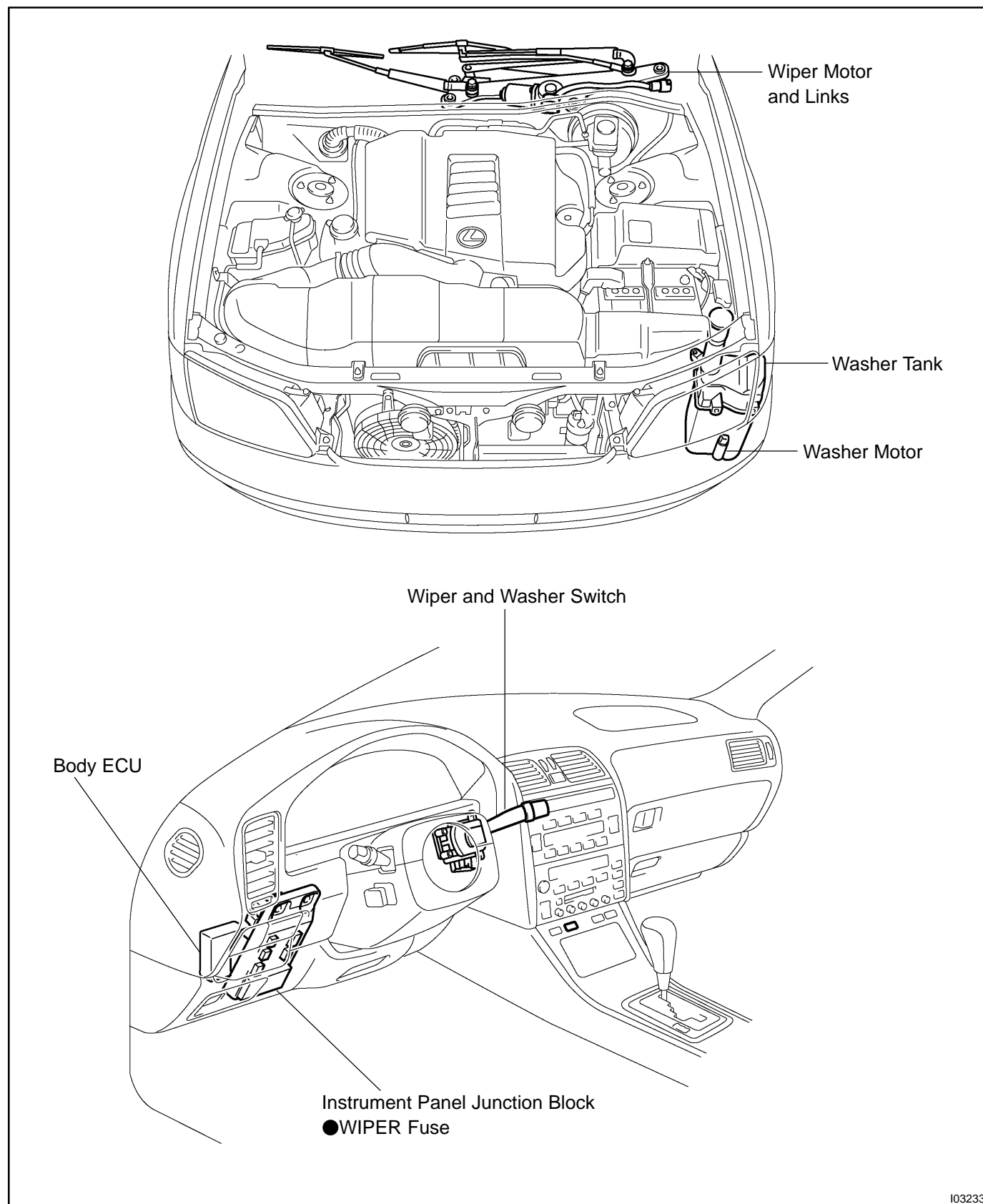
Disconnect the connector from the cleaner motor and inspect the connector on harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

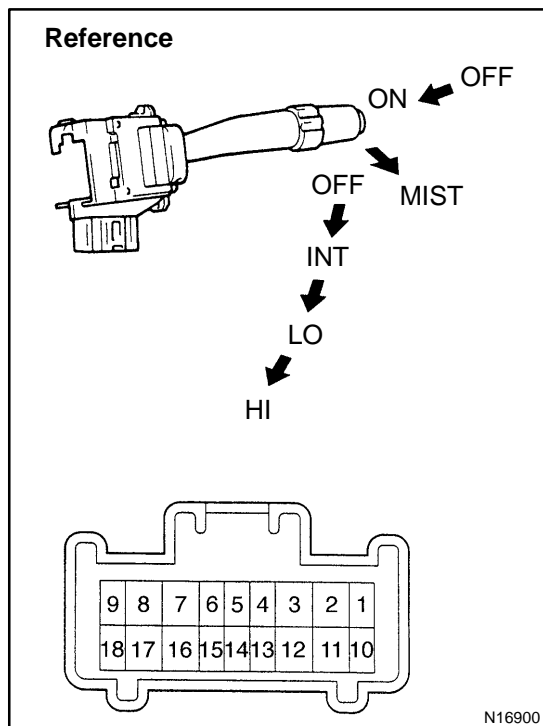
If circuit is not as specified, inspect the circuits connected to other parts.

WIPER AND WASHER SYSTEM LOCATION

BE0BX-01



I03233



INSPECTION

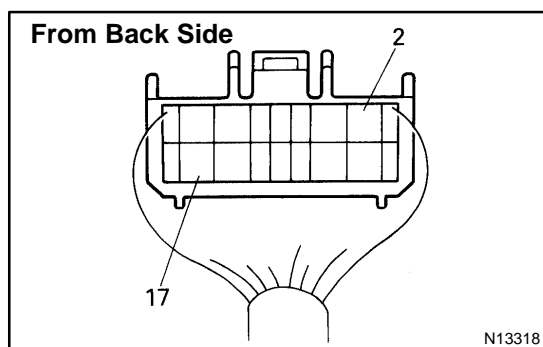
1. INSPECT WIPER AND WASHER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Wiper OFF	7 – 16	Continuity
Wiper OFF and MIST	7 – 17	Continuity
Wiper INT	7 – 16 2 – 4	Continuity
Wiper INT and MIST	7 – 17 2 – 4	Continuity
Wiper LO	7 – 17	Continuity
Wiper LO and MIST	7 – 17	Continuity
Wiper HI	8 – 17 1 – 2	Continuity
Wiper HI and MIST	8 – 17 1 – 2	Continuity
Washer OFF	–	No continuity
Washer ON	2 – 11	Continuity

If continuity is not as specified, replace the switch.

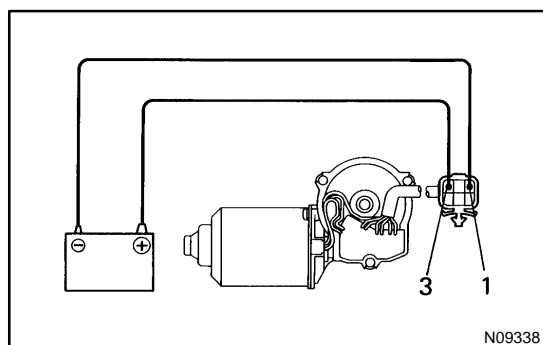
2. INSPECT WIPER AND WASHER SWITCH CIRCUIT

Disconnect the switch and wiper relay connector, and inspect the each connector on the wire harness side, as shown.



Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
17 – Ground	Ignition switch LOCK or ACC	No voltage
17 – Ground	Ignition switch ON	Battery positive voltage

If the circuit is not as specified, inspect the circuits connected to other parts.

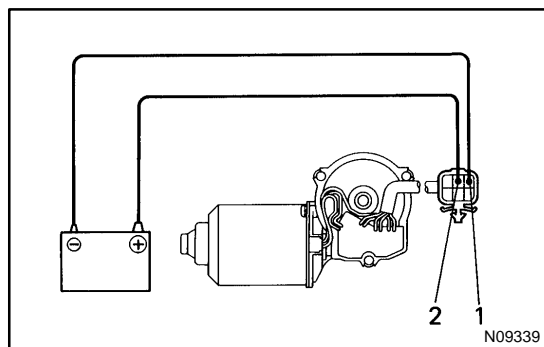


3. INSPECT WIPER MOTOR OPERATION

Low Speed:

Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 1, and check that the motor operates at low speed.

If operation is not as specified, replace the motor.

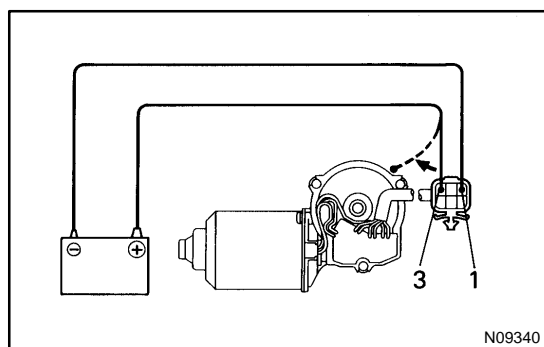


4. INSPECT WIPER MOTOR OPERATION

High Speed:

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor operates at high speed.

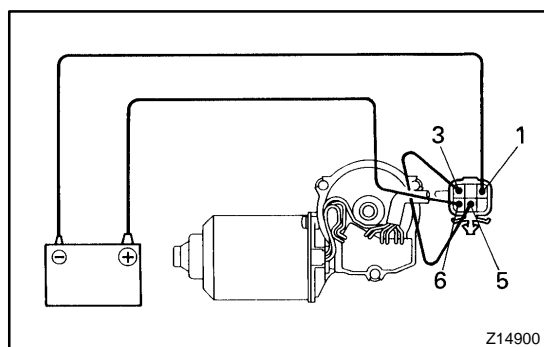
If operation is not as specified, replace the motor.



5. INSPECT WIPER MOTOR OPERATION

Stopping at Stop Position:

- (a) Operate the motor at low speed and stop the motor operation anywhere except at the stop position by disconnecting positive (+) lead from terminal 3.



- (b) Connect terminals 3 and 5.
(c) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 1, and check that the motor stops running at the stop position after the motor operates again.

If operation is not as specified, replace the motor.

Wire Harness Side

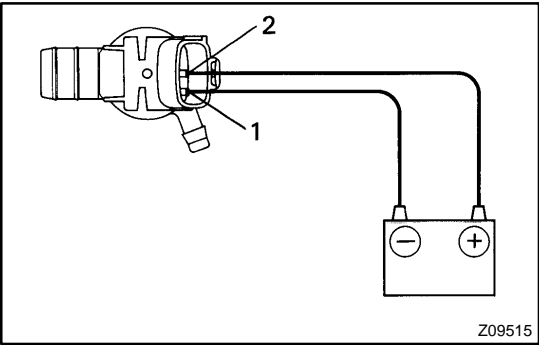


6. INSPECT WIPER MOTOR CIRCUIT

Disconnect the connector from the motor and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
1 – Ground	Constant	Continuity
6 – Ground	Ignition switch position LOCK or ACC	No voltage
6 – Ground	Ignition switch position ON	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.



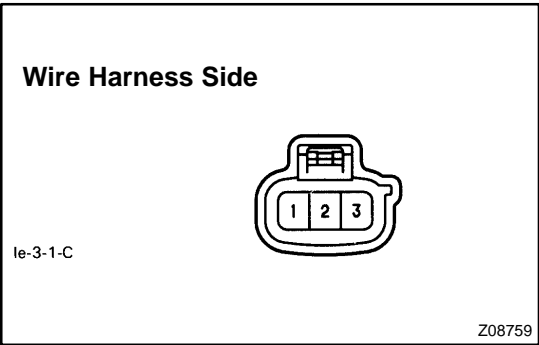
7. INSPECT WASHER MOTOR OPERATION

Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor operates.

NOTICE:

This test must be performed quickly (within 20 seconds) to prevent the coil from burning out.

If operation is not as specified, replace the motor.



8. INSPECT WASHER MOTOR CIRCUIT

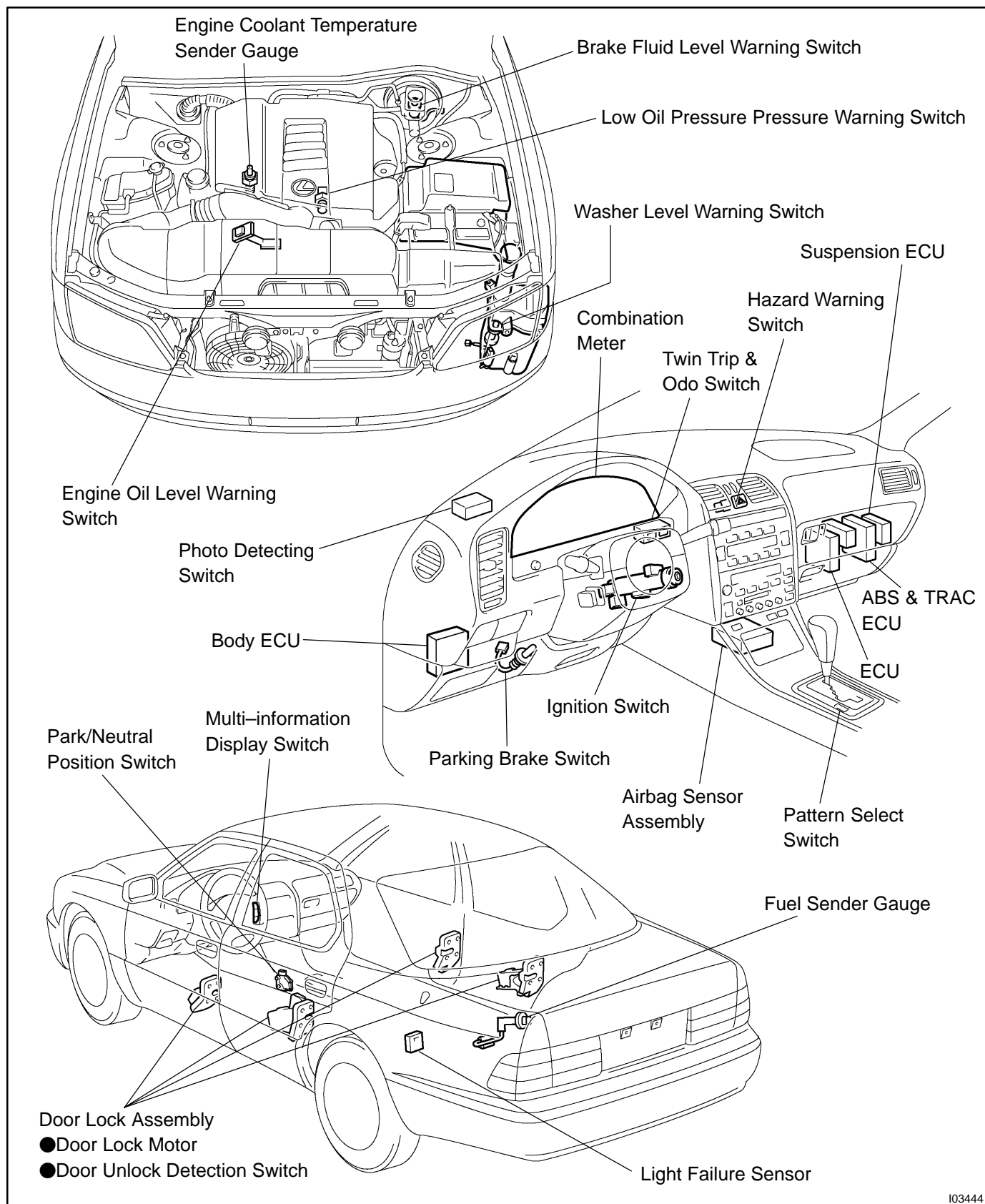
Disconnect the connector from the washer motor and inspect the connector on harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect wire harness, power source or wiper switch.

COMBINATION METER LOCATION

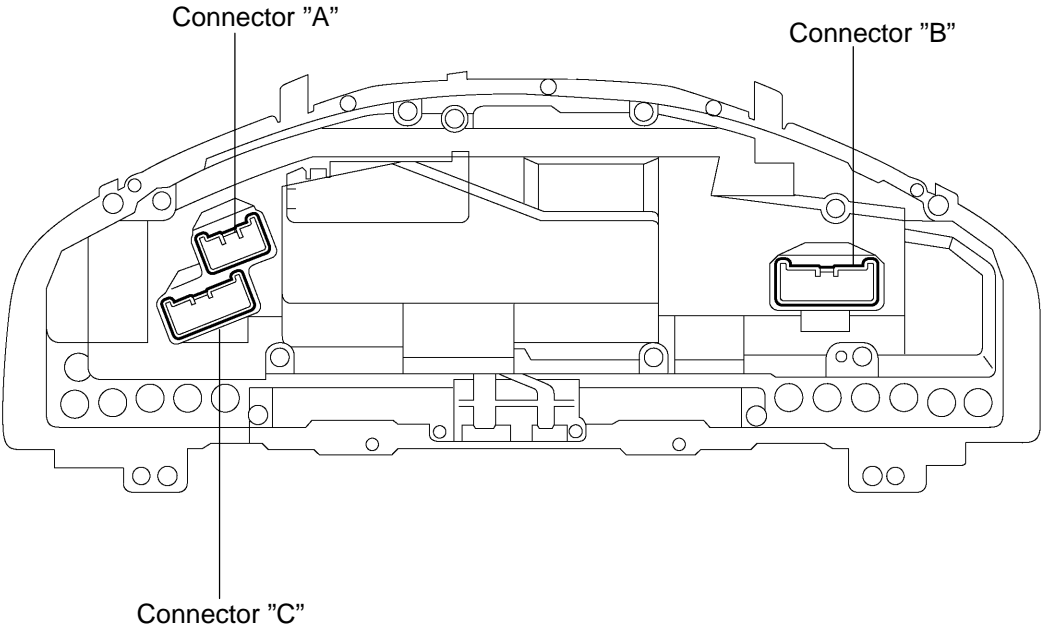
BE0BZ-01



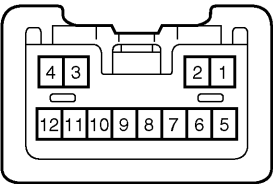
103444

CIRCUIT

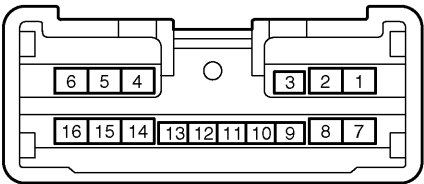
1. WIRING DIAGRAMS



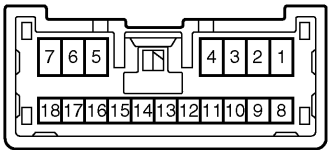
Connector "A"

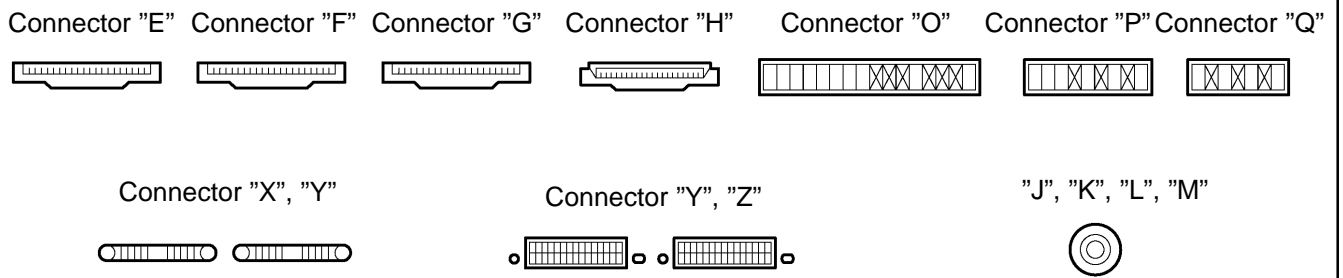
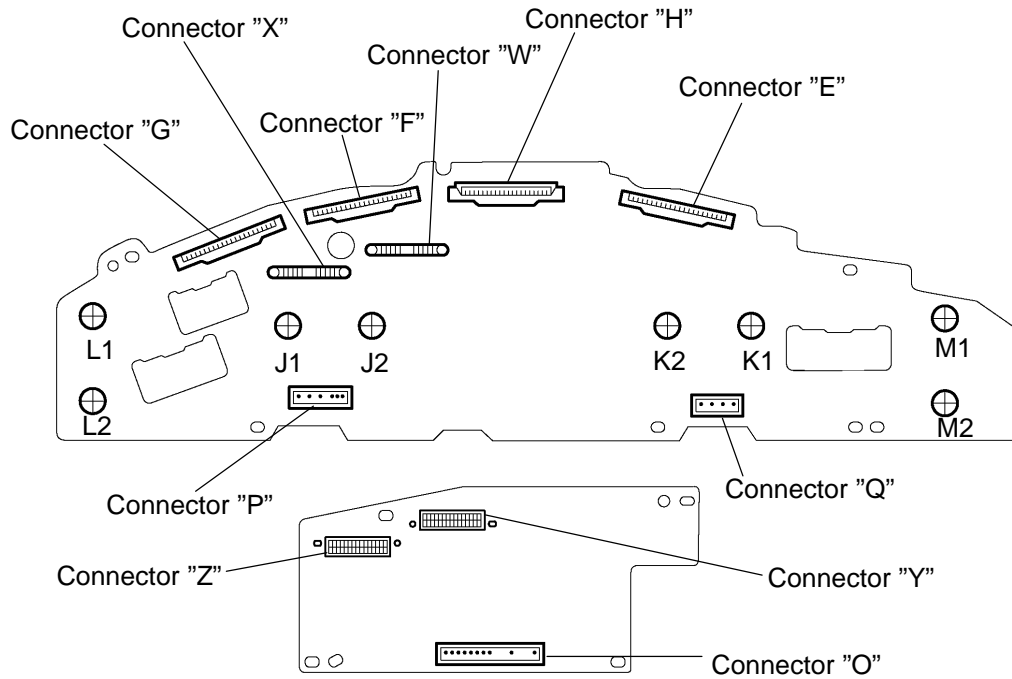


Connector "B"

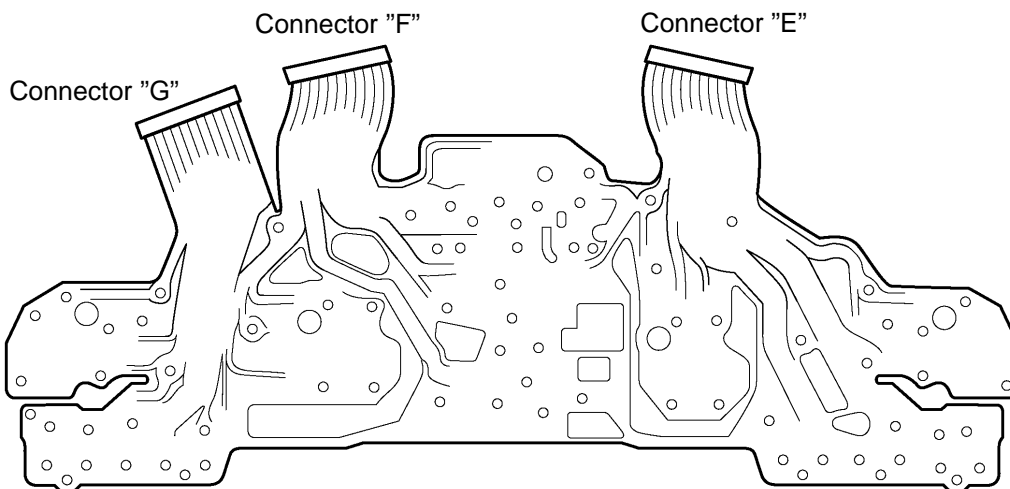


Connector "C"



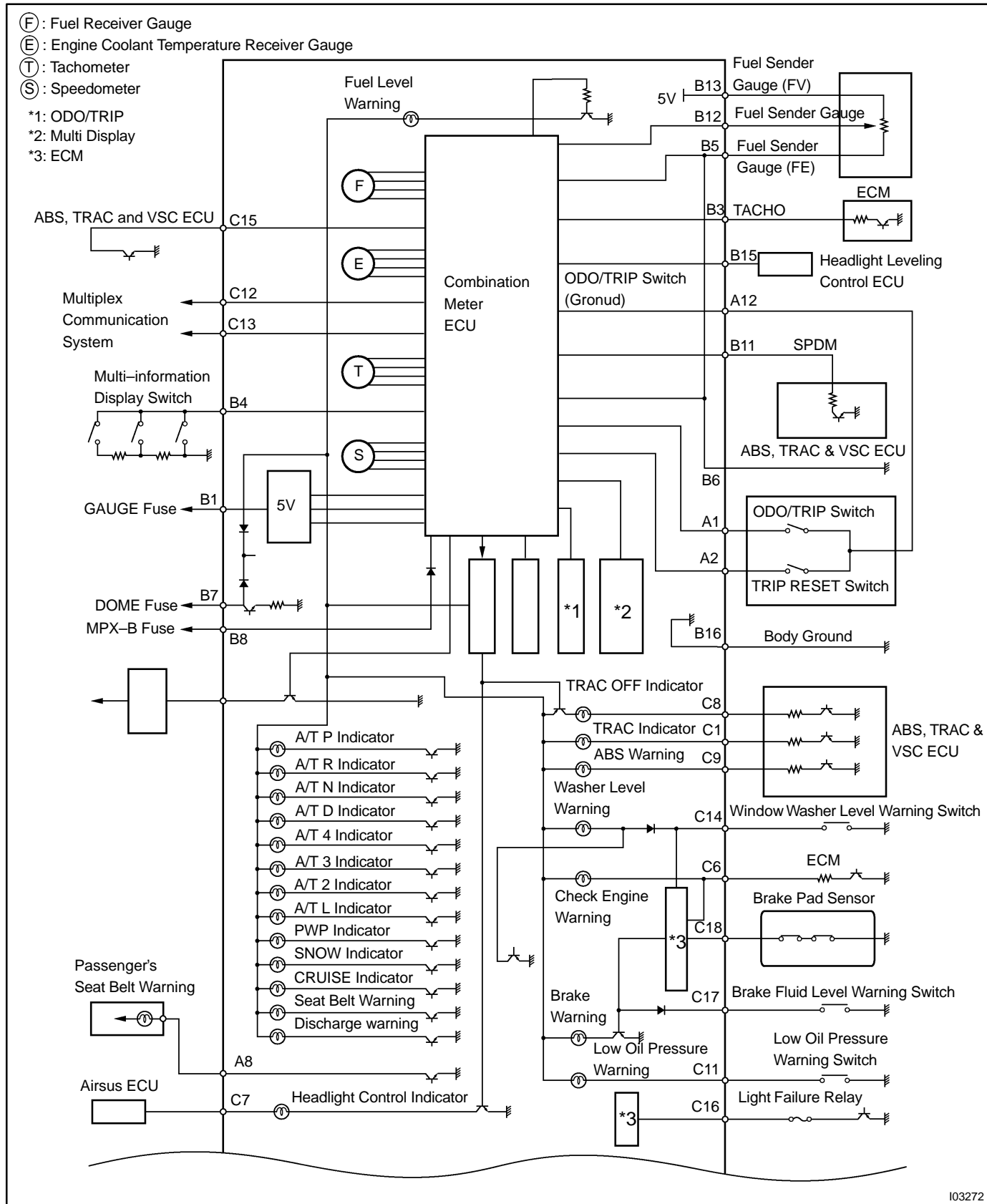


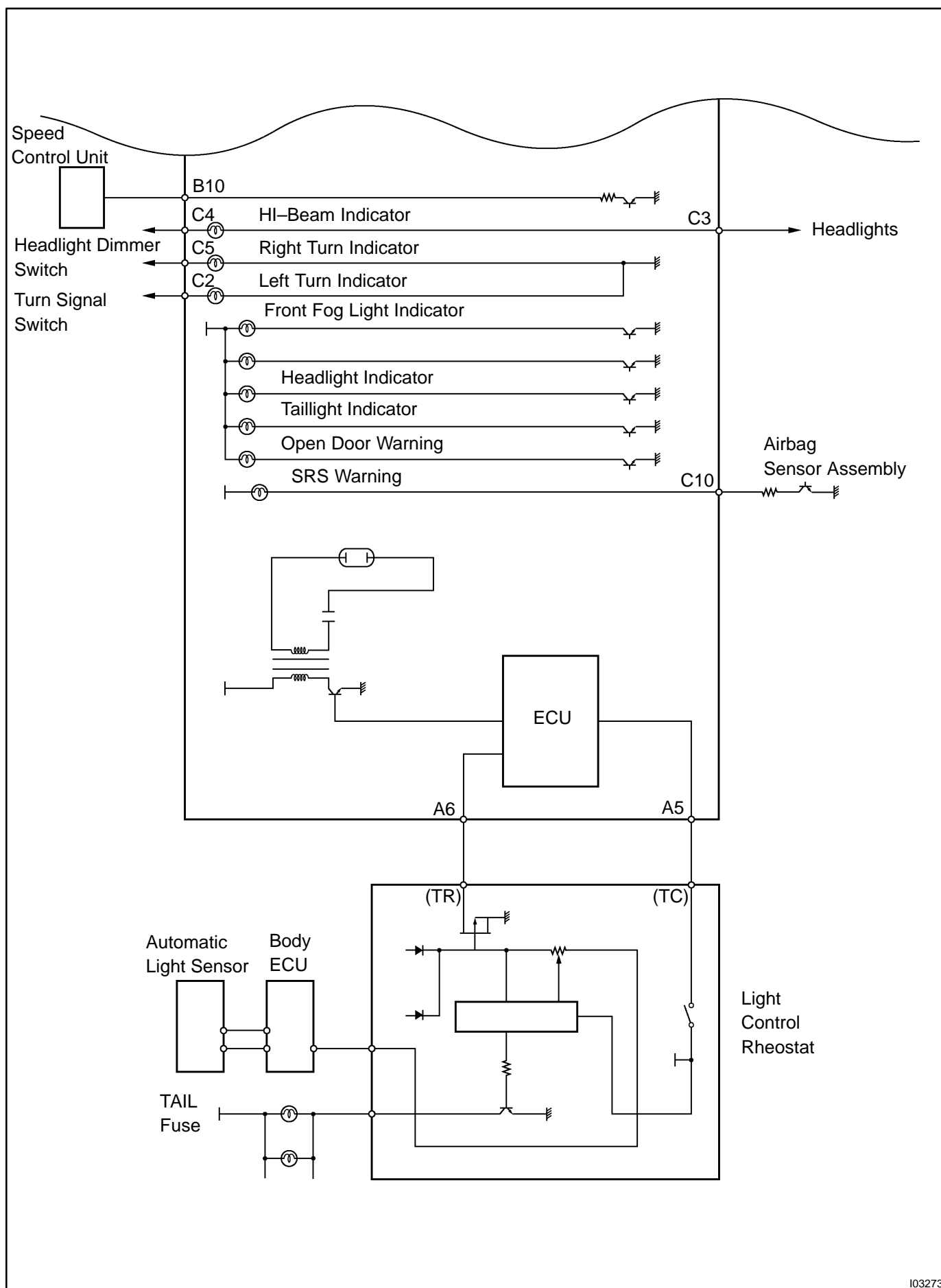
Circuit Plate



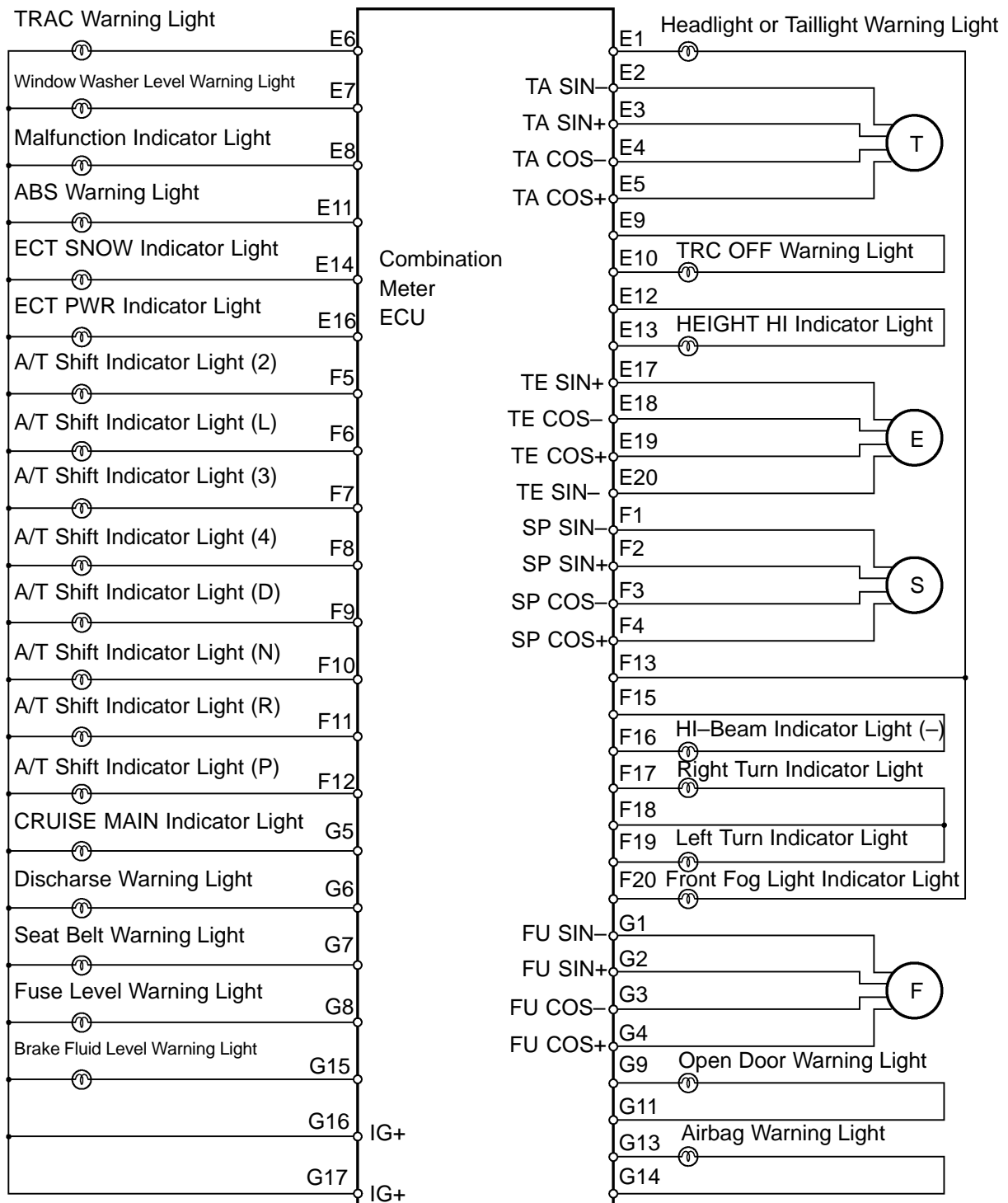
I03269

2. CONNECTOR DIAGRAMS





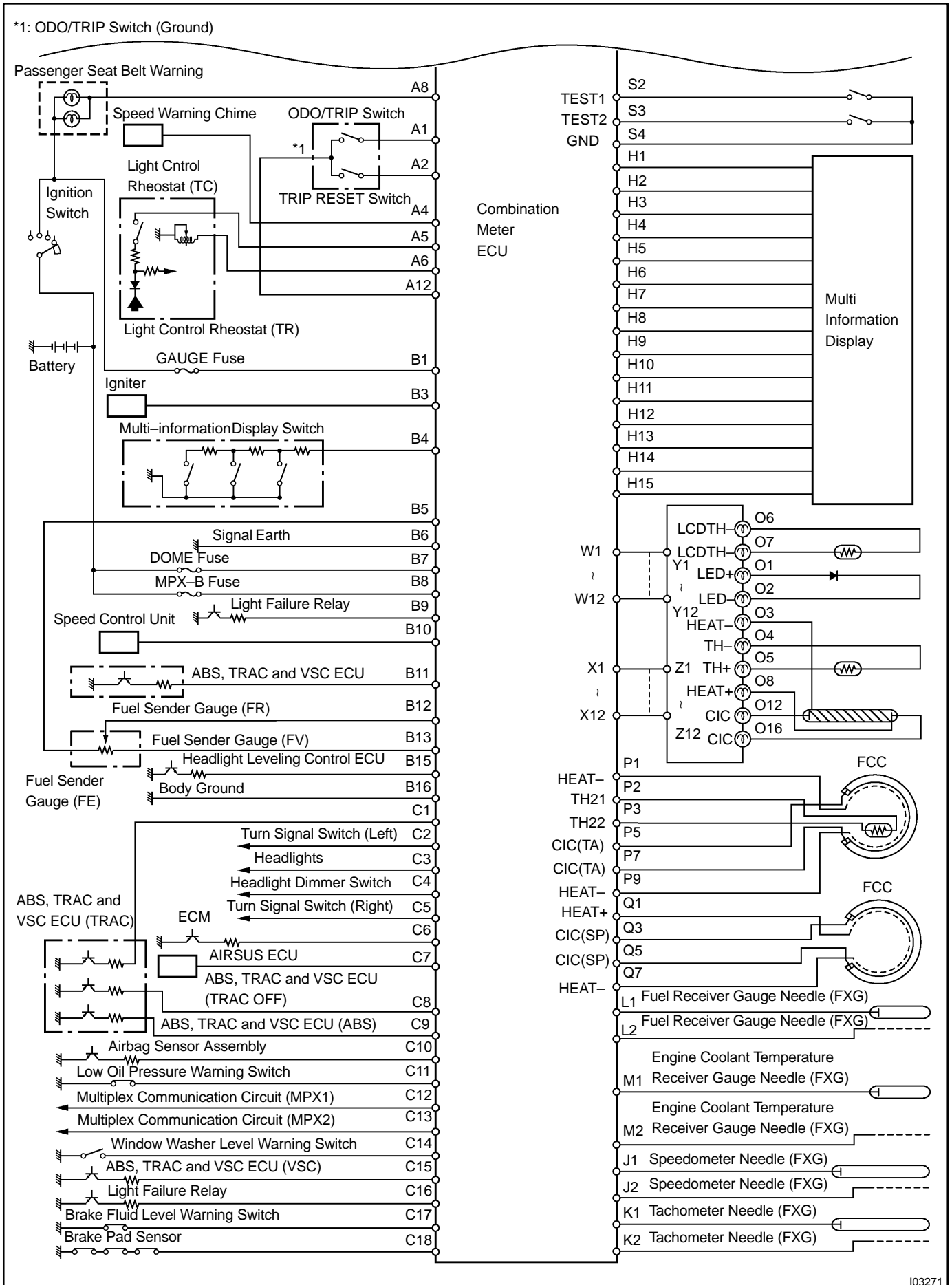
I03273



- (F) : Fuel Receiver Gauge
 (E) : Engine Coolant Temperature Receiver Gauge
 (T) : Tachometer
 (S) : Speedometer

I03270

BODY ELECTRICAL - COMBINATION METER



I03271

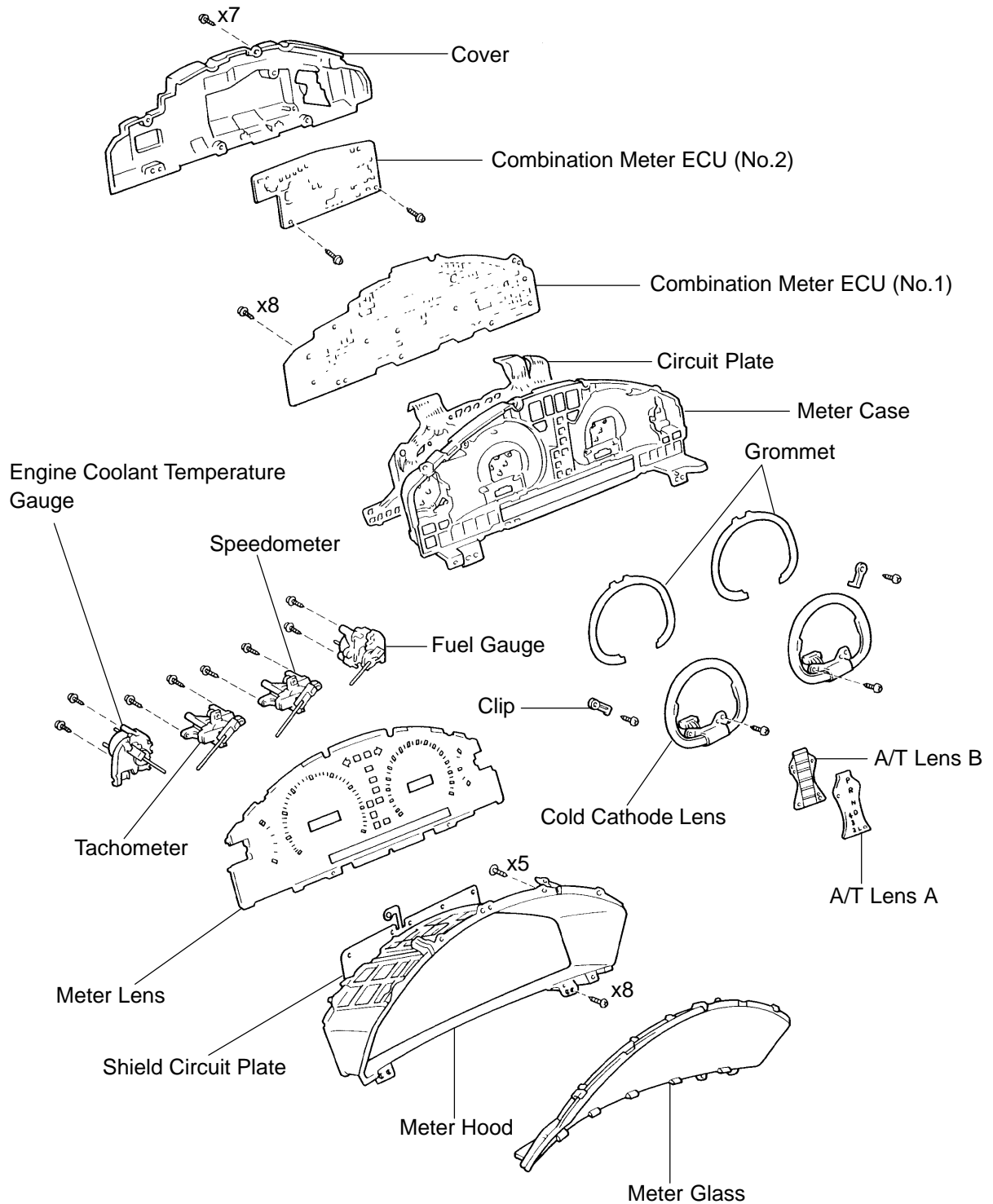
No.	Wire Harness Side (terminal name or HINT)	No.	Wire Harness Side (terminal name or HINT)
A	1 ODO/TRIP switch	E	1 Headlight or Taillight Warning Light
	2 TRIP RESET switch		2 Tachometer (SIN-)
	5 Light Control Rheostat (TC)		3 Tachometer (SIN+)
	6 Light Control Rheostat (TR)		4 Tachometer (COS-)
	8 Passenger seat belt warning		5 Tachometer (COS+)
	12 ODO/TRIP switch (Ground)		6 TRAC Warning Light
B	1 GAUGE Fuse		7 Window Washer Level Warning Light
	3 Igniter		8 Multifunction Indicator Light
	4 Steering switch		9 DIM+ terminal
	5 Fuel Sender Gauge (FE)		10 TRAC OFF Warning Light
	6 Signal Earth		11 ABS Warning Light
	7 DOME Fuse		12 DIM- terminal
	8 MPX-B Fuse		13 HEIGHT HI Indicator Light
	9 Light Failure Relay		14 ECT SNOW Indicator Light
	10 Speed Control Unit		16 ECT PWR Indicator Light
	11 ABS, TRAC and VSC ECU (SPDM)		17 Engine Coolant Temperature Receiver Gauge (SIN+)
	12 Fuel Sender Gauge (FR)		18 Engine Coolant Temperature Receiver Gauge (COS-)
	13 Fuel Sender Gauge (FV)		19 Engine Coolant Temperature Receiver Gauge (COS+)
C	15 Headlight Leveling Control ECU		20 Engine Coolant Temperature Receiver Gauge (SIN-)
	16 Body Ground	F	1 Speedometer (SIN-)
	1 ABS, TRAC and VSC ECU (TRAC)		2 Speedometer (SIN+)
	2 Turn Signal Switch (Left)		3 Speedometer (COS-)
	3 Headlights		4 Speedometer (COS+)
	4 Headlight Dimmer Switch		5 A/T Shift Indicator Light (2)
	5 Turn Signal Switch (Right)		6 A/T Shift Indicator Light (L)
	6 ECM		7 A/T Shift Indicator Light (3)
	7 AIRSUS ECU		8 A/T Shift Indicator Light (4)
	8 ABS, TRAC and VSC ECU (TRAC OFF)		9 A/T Shift Indicator Light (D)
	9 ABS, TRAC and VSC ECU (ABS)		10 A/T Shift Indicator Light (N)
	10 Airbag Sensor Assembly		11 A/T Shift Indicator Light (R)
	11 Low Oil Pressure Warning Switch		12 A/T Shift Indicator Light (P)
	12 Multiplex Communication Circuit (MPX1)		14 DOME-B terminal
	13 Multiplex Communication Circuit (MPX2)		15 Hi-Beam Indicator Light (+)
	14 Window Washer Level Warning Switch		16 Hi-Beam Indicator Light (-)
	15 ABS, TRAC and VSC ECU (VSC)		17 Right Turn Indicator Light
	16 Light Failure Relay		18 Turn Indicator Light (-)
	17 Brake Fluid Level Warning Switch		19 Left Turn Indicator Light (-)
	18 Brake Pad Sensor		20 Front Fog Light Indicator Light

BODY ELECTRICAL – COMBINATION METER

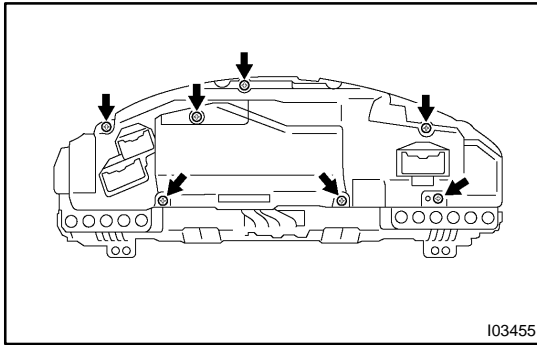
No.	Wire Harness Side (terminal name or HINT)	No.	Wire Harness Side (terminal name or HINT)
G	1 Fuel Receiver Gauge (SIN-)	J	1 Speedometer Needle (FXG)
	2 Fuel Receiver Gauge (SIN+)		2 Speedometer Needle (FXG)
	3 Fuel Receiver Gauge (COS-)	K	1 Tachometer Needle (FXG)
	4 Fuel Receiver Gauge (COS+)		2 Tachometer Needle (FXG)
	5 CRUISE MAIN Indicator Light	L	1 Fuel Receiver Gauge Needle (FXG)
	6 Discharge Warning Light		2 Fuel Receiver Gauge Needle (FXG)
	7 Seat Belt Warning Light	M	1 Engine Coolant Temperature Receiver Gauge Needle (FXG)
	8 Fuel Level Warning Light		2 Engine Coolant Temperature Receiver Gauge Needle (FXG)
	9 Open Door Warning Light	O	1 LED+ terminal
	11 DOME-B terminal		2 LED- terminal
	13 Airbag Warning Light		3 HEAT- terminal
	14 Airbag Warning terminal (+)		4 TH- terminal
	15 Brake Fluid Level Warning Light		5 TH+ terminal
	16 IG+ terminal		6 LCDTH- terminal
	17 IG+ terminal		7 LCDTH+ terminal
H	1 Multi Information Display and ODO/TRIP Display (VDISP)		8 HEAT+ terminal
	2 Multi Information Display and ODO/TRIP Display (5V IG)		12 C/C terminal
	3 Multi Information Display and ODO/TRIP Display (BLK)		16 C/C terminal
	4 Multi Information Display and ODO/TRIP Display (POR)	P	1 HEAT+ terminal
	5 Multi Information Display and ODO/TRIP Display (SCK)		2 TH21 terminal
	6 Multi Information Display and ODO/TRIP Display (SI)		3 TH22 terminal
	7 Multi Information Display and ODO/TRIP Display (A/D)		5 C/C (TA) terminal
	8 Multi Information Display and ODO/TRIP Display (LATCH)		7 C/C (TA) terminal
	9 Multi Information Display and ODO/TRIP Display (PTC)		9 HEAT- terminal
	10 Multi Information Display and ODO/TRIP Display (BLKOD)	Q	1 HEAT+ terminal
	11 Multi Information Display and ODO/TRIP Display (LAT)		3 C/C (SP) terminal
	12 Multi Information Display and ODO/TRIP Display (CLK)		5 C/C (SP) terminal
	13 Multi Information Display and ODO/TRIP Display (DIN)		7 HEAT- terminal
	14 Multi Information Display and ODO/TRIP Display (CLIN)	W	1 FCC11V terminal
	15 Ground		2 FXG11V terminal
	16 Ground		3 FCC+ terminal
	17 Ground		4 FXG+ terminal
	18 Ground		5 FCC DIM terminal
	19 Ground		8 C/C C terminal
	20 Ground		9 C/C DIM terminal
			10 C/C M terminal
			11 TH terminal
			12 E1 terminal

No.	Wire Harness Side
X	1 HEAT+ terminal 2 THLCD+ terminal 3 C/C+ terminal 4 THLCD– terminal 5 HEAT– terminal 8 SW d+B terminal 9 9.1 V terminal 10 LED– terminal 11 E2 terminal 12 E2 terminal
W	1 FCC11V terminal 2 FXG11V terminal 3 FCC+ terminal 4 FXG+ terminal 5 FCC DIM terminal 8 C/C C terminal 9 C/C DIM terminal 10 C/C M terminal 11 TH terminal 12 E1 terminal
Z	1 HEAT+ terminal 2 THLCD+ terminal 3 C/C+ terminal 4 THLCD– terminal 5 HEAT– terminal 8 SW d+B terminal 9 9.1 V terminal 10 LED– terminal 11 E2 terminal 12 E2 terminal

COMPONENTS



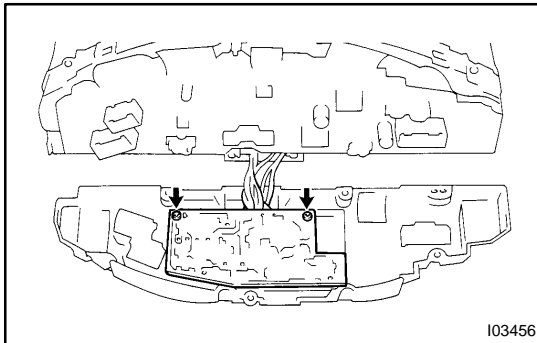
103454



DISASSEMBLY

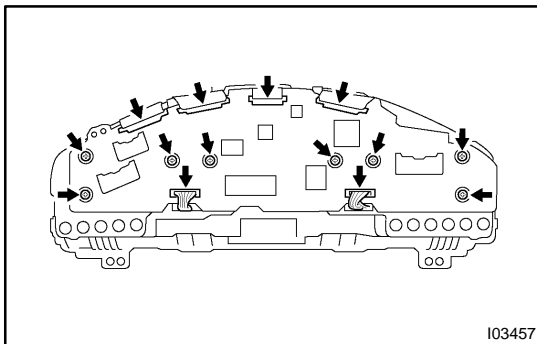
1. REMOVE COVER

- (a) Remove the 7 screws.
- (b) Disconnect the cover from the meter case.



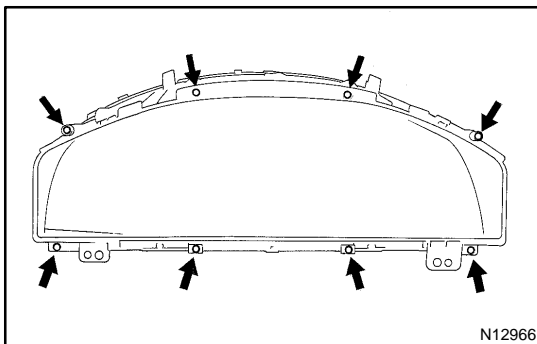
2. REMOVE COMBINATION METER ECU (No.2)

- (a) Remove the 2 screws.
- (b) Disconnect the connector.



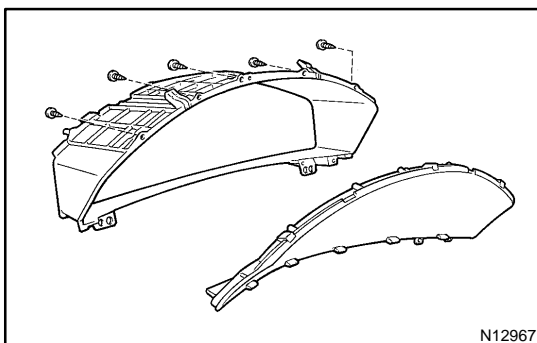
3. REMOVE COMBINATION METER ECU (No.1)

- (a) Remove the 8 screws and 6 connectors.
- (b) Remove the power source unit from the meter case.



4. REMOVE METER HOOD

Remove the 8 screws and the meter hood from the meter case.

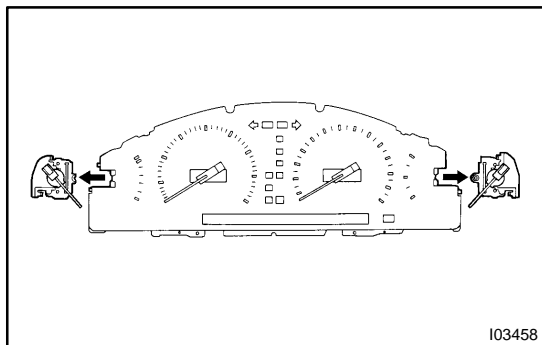


5. REMOVE METER GLASS

Remove the 5 screws and the meter glass.

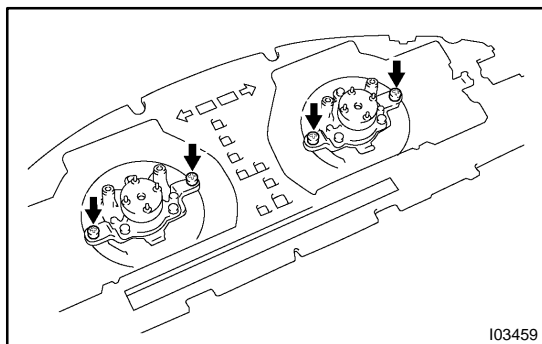
6. REMOVE METER LENS FROM CASE

Separate the meter lens together with the speedometer, tachometer and 2 gauges from the meter.



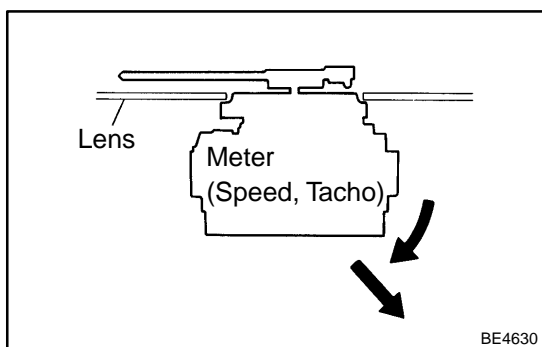
7. REMOVE FUEL AND TEMPERATURE GAUGE

Release and separate the 2 gauges from the lens.



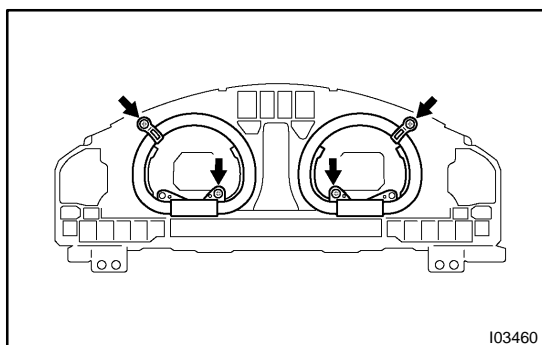
8. REMOVE SPEEDOMETER AND TACHOMETER

(a) Remove the 4 screws, and the speedometer and tachometer.



(b) Keep the indicator needle horizontal.

(c) Remove the indicator needle taking care not to strike the lens.



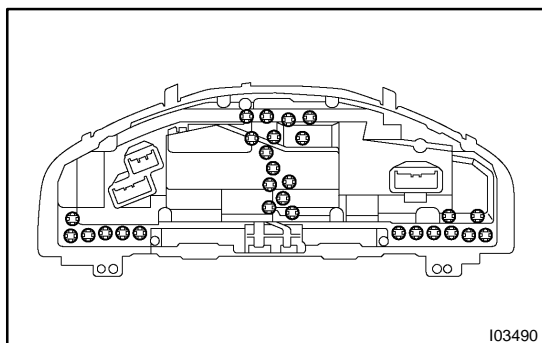
9. REMOVE 2 COLD CATHODE TUBES

(a) Remove the 4 screws and 2 clips.

(b) Remove the 2 cold cathode tubes.

(c) Remove the 2 grommets.

(d) Remove the A/T lens A and B.



10. REMOVE CIRCUIT PLATE

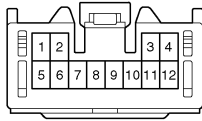
(a) Disconnect the A/T plate with the 2 screws.

(b) Remove the 28 warning lights.

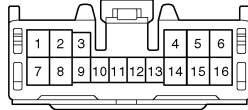
(c) Remove the circuit plate from the case.

Wire Harness Side

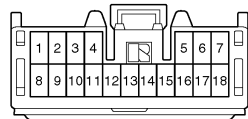
"A"



"B"



"C"



I03435

INSPECTION

1. INSPECT COMBINATION METER CIRCUIT

Connector disconnected:

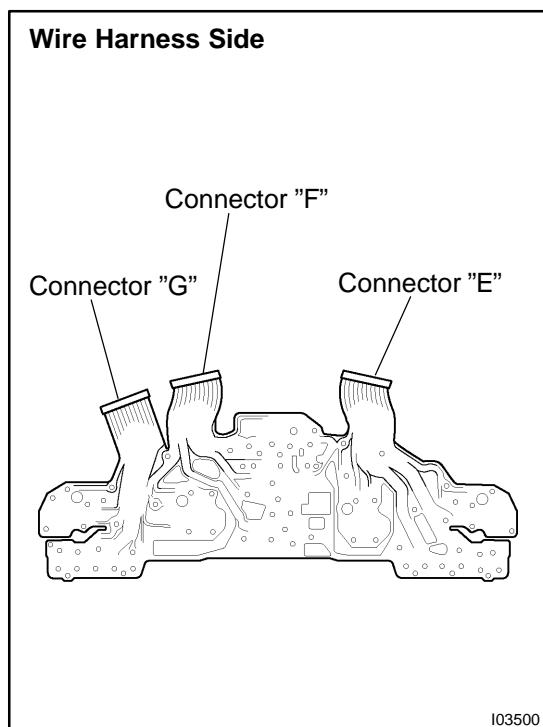
Disconnect connector "A", "B" and "C" from the combination meter and inspect the connectors on the wire harness side as follows.

Tester connection	Condition	Specified condition
A1 – A12	Driving monitor switch MODE Free	No continuity
A1 – A12	Driving monitor switch MODE Pushed in	Continuity
A2 – A12	Driving monitor switch RESET Free	No continuity
A2 – A12	Driving monitor switch RESET Pushed in	Continuity
A5 – A6	Light control switch TAIL or HEAD and turn rheostat volume knob	Voltage changes no voltage or voltage fluctuates
A8 – Ground	Ignition switch OFF or ACC	No voltage
A8 – Ground	Ignition switch ON or START	Battery positive voltage
B1 – Ground	Ignition switch OFF or ACC	No voltage
B1 – Ground	Ignition switch ON or START	Battery positive voltage
B3 – Ground	Engine running	Voltage fluctuates
B4 – Ground	Steering pad switch FUNCTION	Continuity
B4 – Ground	Steering pad switch RESET	Resistance 360 Ω
B4 – Ground	Steering pad switch MODE	Resistance 1,110 Ω
B5 – B12	Fuel Sender Gauge Float position Full	Resistance Approx. 21 Ω
B5 – B12	Fuel Sender Gauge Float position 1/2	Resistance Approx. 145.8 Ω
B5 – B12	Fuel Sender Gauge Float position Empty	Resistance Approx. 276 Ω
B5 – B13	Constant	Resistance Approx. 300 Ω
B6 – Ground	Constant	Continuity
B7 – Ground	Constant	Battery positive voltage
B8 – Ground	Constant	Battery positive voltage
B16 – Ground	Constant	Continuity
C2 – Ground	Turn signal switch LEFT	Continuity
C3 – Ground	Constant	Continuity

BODY ELECTRICAL – COMBINATION METER

C4 – Ground	Light control switch HI or FLASH	Battery positive voltage
C5 – Ground	Turn signal switch RIGHT	Continuity
C11 – Ground	Engine running	Continuity
C14 – Ground	Window washer level warning switch Float down	Continuity
C17 – Ground	Brake fluid level warning switch Float down	Continuity
C18 – Ground	Constant	Continuity

If circuit is not as specified, wiring diagram and inspect the circuit connected to other parts.



2. INSPECT COMBINATION METER CIRCUIT PLATE

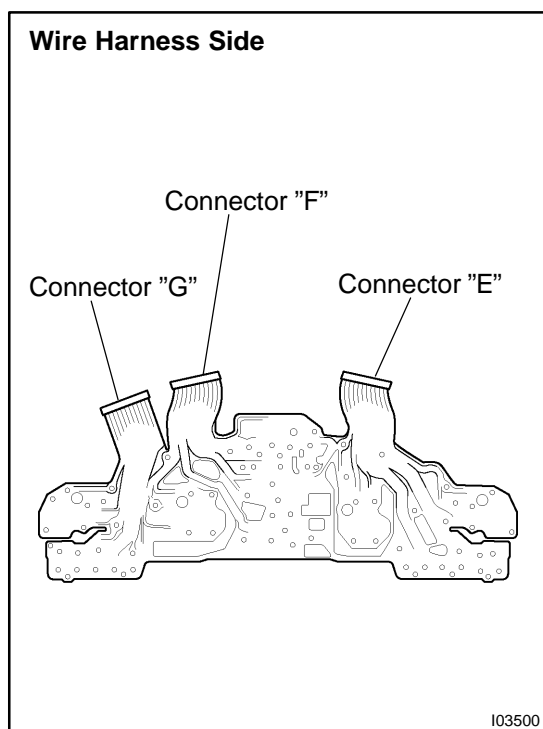
Warning light circuit plate:

- Remove the cover.
- Disconnect connector "E", "F" and "G" from the combination meter and inspect the connectors on the wire harness side as follows.

Tester connection	Check indicator light circuit	specified condition
E1 (–) – F14 (+)	Headlight indicator (USA models) Taillight indicator (CANADA models)	Continuity
E6 (–) – G16 (+) E6 (–) – G17 (+)	TRAC indicator light	Continuity
E7 (–) – G16 (+) E7 (–) – G17 (+)	Window washer level warning light	Continuity
E8 (–) – G16 (+) E8 (–) – G17 (+)	Malfunction indicator light	Continuity
E9 (+) – E10 (–)	VSC OFF indicator light	Continuity
E11 (–) – G16 (+) E11 (–) – G17 (+)	ABS warning light	Continuity
E12 (+) – E13 (–)	HEIGHT HI indicator light	Continuity
E14 (–) – G16 (+) E14 (–) – G17 (+)	ECT SNOW indicator light	Continuity
E16 (–) – G16 (+) E16 (–) – G17 (+)	ECT PWR indicator light	Continuity
F5 (–) – G16 (+) F5 (–) – G17 (+)	A/T shift indicator light (2)	Continuity

F6 (–) – G16 (+) F6 (–) – G17 (+)	A/T shift indicator light (L)	Continuity
F7 (–) – G16 (+) F7 (–) – G17 (+)	A/T shift indicator light (3)	Continuity
F8 (–) – G16 (+) F8 (–) – G17 (+)	A/T shift indicator light (4)	Continuity
F9 (–) – G16 (+) F9 (–) – G17 (+)	A/T shift indicator light (D)	Continuity
F10 (–) – G16 (+) F10 (–) – G17 (+)	A/T shift indicator light (N)	Continuity
F11 (–) – G16 (+) F11 (–) – G17 (+)	A/T shift indicator light (R)	Continuity
F12 (–) – G16 (+) F12 (–) – G17 (+)	A/T shift indicator light (P)	Continuity
F15 (+) – F16 (–)	Hi-beam indicator light	Continuity
F17 (+) – F18 (–)	Right turn signal indicator light	Continuity
F19 (+) – F18 (–)	Left turn signal indicator light	Continuity
F20 (+) – F14 (+)	Front fog light indicator light	Continuity
G5 (–) – G16 (+) G5 (–) – G17 (+)	CRUISE MAIN indicator light	Continuity
G6 (–) – G16 (+) G6 (–) – G17 (+)	Discharge warning light	Continuity
G7 (–) – G16 (+) G7 (–) – G17 (+)	Seat belt warning light	Continuity
G8 (–) – G16 (+) G8 (–) – G17 (+)	Fuel level warning light	Continuity
G9 (–) – G11 (+)	Open door warning light	Continuity
G14 (+) – G13 (–)	SRS warning light	Continuity
G15 (–) – G16 (+) G15 (–) – G17 (+)	Brake warning light	Continuity

If circuit is not as specified, replace the bulb or circuit plate.



3. INSPECT COMBINATION METER CIRCUIT PLATE

From combination meter ECU to gauges:

- (a) Remove the cover.
- (b) Disconnect connector "E", "F" and "G" from the combination meter and inspect the connectors on the wire harness side as follows.

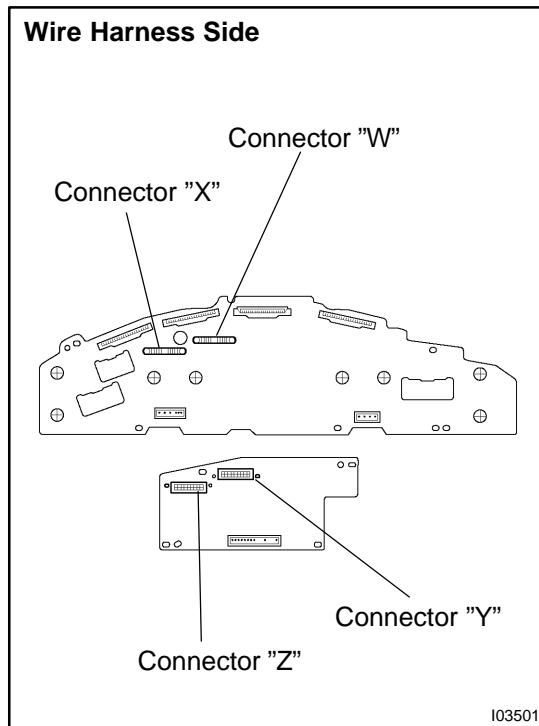
Terminal	Resistance (Ω)
E2 – E3	Approx. 151.8
E4 – E5	Approx. 164.2
E17 – E20	Approx. 151.8
E18 – E19	Approx. 164.2
F1 – F2	Approx. 151.8
F3 – F4	Approx. 164.2
G1 – G2	Approx. 151.8
G3 – G4	Approx. 164.2

If circuit is not as specified, inspect gauge*¹ or meter*². Then recheck.

If circuit is not as specified, replace the circuit plate.

*1 : Fuel Receiver Gauge and Engine Coolant Temperature Receiver Gauge

*2 : Speedometer and Tachometer



4. INSPECT COMBINATION METER CIRCUIT PLATE

From meter ECU main circuit plate to meter ECU sub circuit plate:

Disconnect connector "W", "X", "Y" and "Z" from the combination meter and inspect the connectors on the wire harness side as follows.

Terminal	Specified value
W1 – Y1	Continuity
W2 – Y2	Continuity
W3 – Y3	Continuity
W4 – Y4	Continuity
W5 – Y5	Continuity
W6 – Y6	Continuity
W7 – Y7	Continuity
W8 – Y8	Continuity
W9 – Y9	Continuity
W10 – Y10	Continuity
W11 – Y11	Continuity
W12 – Y12	Continuity
X1 – Z1	Continuity
X2 – Z2	Continuity
X3 – Z3	Continuity
X4 – Z4	Continuity
X5 – Z5	Continuity
X6 – Z6	Continuity
X7 – Z7	Continuity
X8 – Z8	Continuity
X9 – Z9	Continuity
X10 – Z10	Continuity
X11 – Z11	Continuity
X12 – Z12	Continuity

If circuit is not as specified, replace the wire harness.

5. INSPECT RHEOSTAT LIGHT CONTROL(See page [BE-62](#))**6. INSPECT COMBINATION METER ILLUMINATION****NOTICE:**

To avoid damage to the computer, be careful of the following.

- Do not make an error with another terminal number.
- Do not cause a short with another terminal.

Connect the connectors "P", "Q" and "H".

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.

mph (USA)		km/h (CANADA)	
Standard indication	Allowable range	Standard indication	Allowable range
20	18.5 – 21.5	20	18 – 23
40	40 – 43	40	38 – 42
60	60.5 – 64	60	57 – 61.5
80	81 – 85	80	76.5 – 81.5
100	102 – 107	100	96.5 – 101.5
120	122.5 – 128.5	120	116 – 121.5
140	136 – 142	160	155.5 – 162.5
180	175 – 183	200	194.5 – 203.5

8. INSPECT TACHOMETER ON-VEHICLE

- (a) Connect a tune-up test tachometer, and start the engine.

NOTICE:

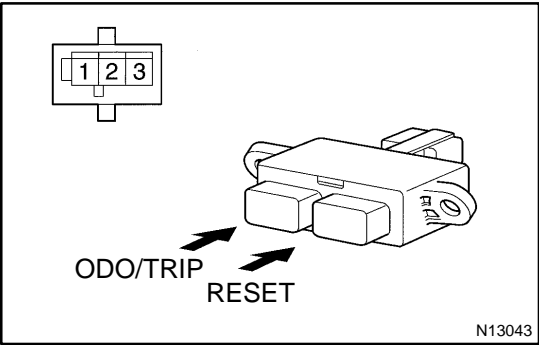
Reversing the connection of the tachometer will damage the transistors and diodes inside.

- (b) Compare the tester and tachometer indications.

If error is excessive, replace the tachometer.

RPM(DC 13.5 V, 25 °C (77 °F))

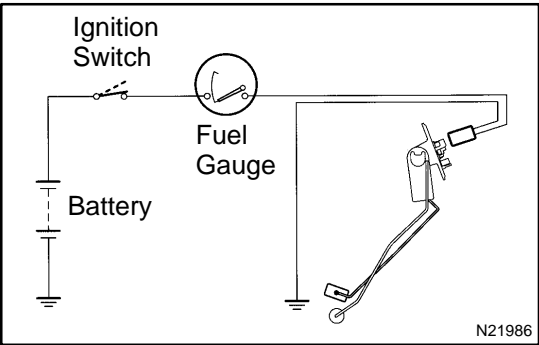
Standard indication	Allowable range
700	630 – 770
1000	925 – 1125
2000	1900 – 2200
3000	2845 – 3305
4000	3870 – 4330
5000	4925 – 5320
7000	6875 – 7475



9. INSPECT TWIN TRIP AND ODO SWITCH CONTINUITY

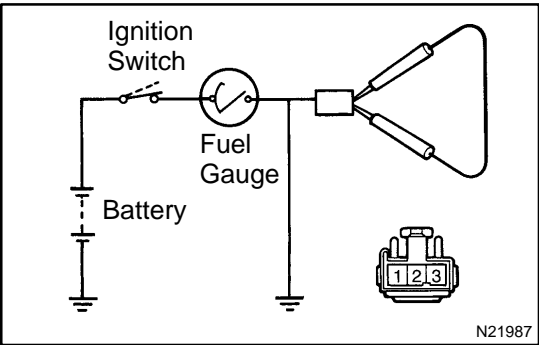
Switch position	Tester connection	Condition
ODO/TRIP Free	1 – 2	No continuity
ODO/TRIP Pushed in	1 – 2	Continuity
RESET Free	2 – 3	No continuity
RESET Pushed in	2 – 3	Continuity

If continuity is not as specified, replace the twin trip and odo switch.



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 the terminals 3 and 2 on the wire harness side connector.
- (d) Turn the ignition switch ON and check that the receiver gauge needle moves toward the full side.

HINT:
Because of the silicon oil in the gauge, it will take a short time for the needle to stabilize.

NOTICE:

Do not connect the terminals 1 and 3.

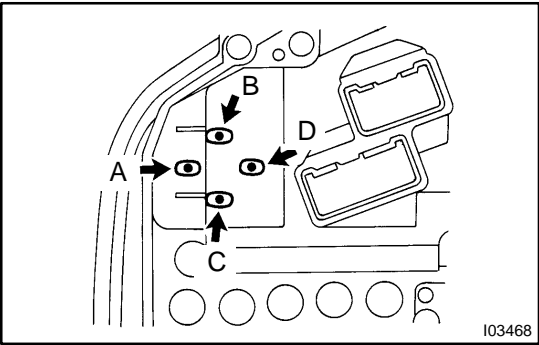
If operation is not as specified, inspect the power source unit.

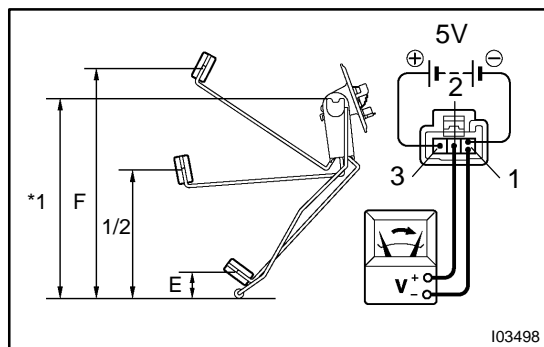
11. INSPECT FUEL RECEIVER GAUGE RESISTANCE

Measure the resistance between terminals.

Between terminals	Resistance (Ω)
A – B	Approx. 151.8
C – D	Approx. 164.2

If resistance value is not as specified, replace the fuel receiver gauge.





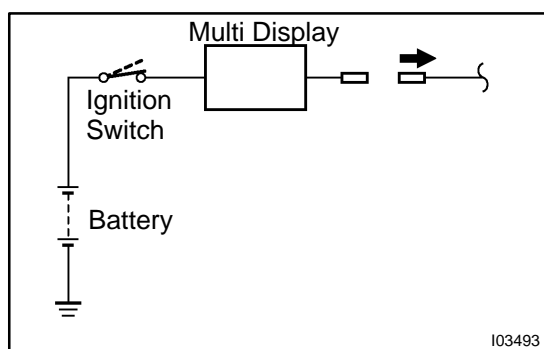
12. INSPECT FUEL SENDER GAUGE VOLTAGE

Measure the voltage between terminals 1 and 2 for each float position.

*1: Set value 270.7 mm (10.66 in.)

Float position	mm (in.)	Voltage (V)
F	Approx. 310.5 (12.22)	Approx. 4.6
1/2	Approx. 172.0 (6.77)	Approx. 2.43
E	Approx. 34.3 (1.35)	Approx. 0.35

If resistance value is not as specified, replace the sender gauge.



13. INSPECT BRAKE PAD SENSOR

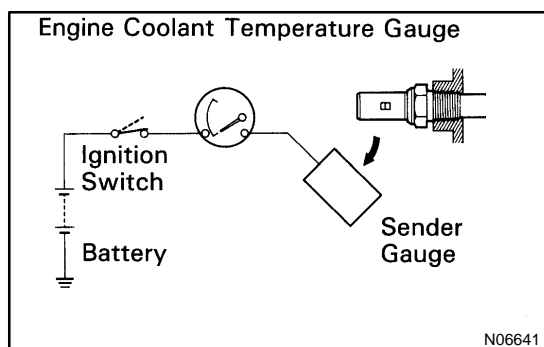
(Front side: See page BR-23)

(Rear side: See page BR-33)

14. INSPECT BRAKE PAD INDICATOR LIGHT

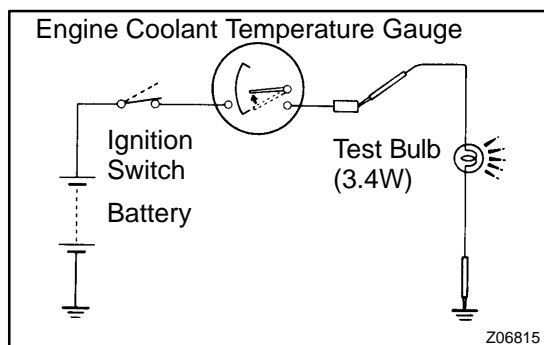
- Disconnect the connector from the brake pad sensor.
- Turn the ignition switch ON, check that the indicator light lights up.

If the indicator light does not light up, test the bulb or inspect wire harness.



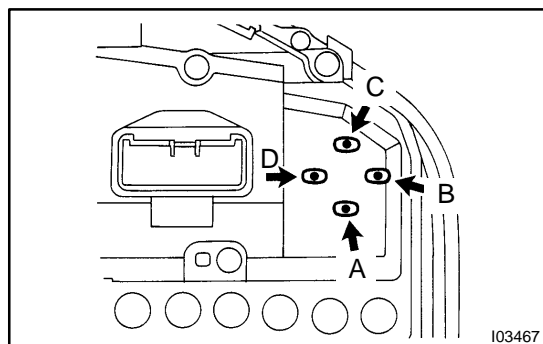
15. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE OPERATION

- Disconnect the connector from the sender gauge.
- Turn the ignition switch ON and check that the receiver gauge needle indicates COOL.



- Ground terminal on the wire harness side connector through a 3.4 W test bulb.
- Turn the ignition switch ON and check that the bulb lights up and the receiver gauge needle moves toward the hot side.
- Then recheck the system.

If operation is not as specified, measure the receiver gauge resistance.



16. INSPECT ENGINE COOLANT TEMPERATURE RECEIVER GAUGE RESISTANCE

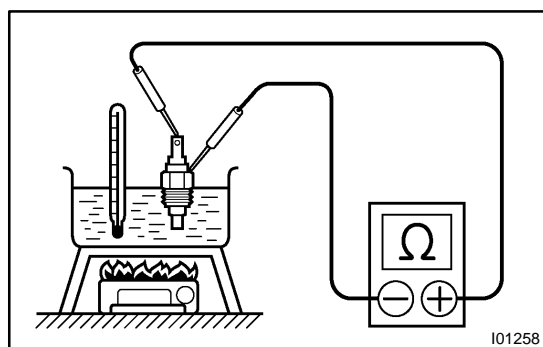
Measure the resistance between terminals.

HINT:

Connect the test leads so the current from the ohmmeter can flow according to the chart order.

Between terminals	Resistance (Ω)
A – B	Approx. 151.8
C – D	Approx. 164.2

If resistance value is not as specified, replace the engine coolant temperature receiver gauge.

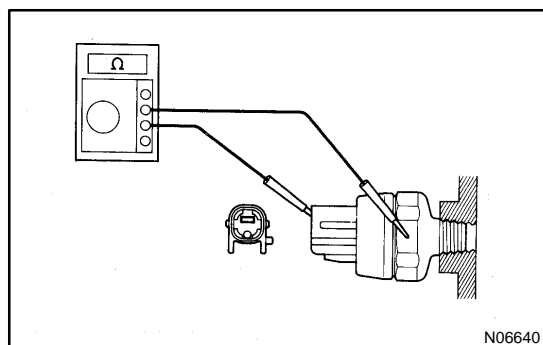


17. INSPECT ENGINE COOLANT TEMPERATURE SENDER GAUGE RESISTANCE

Measure the resistance between the terminal and gauge body.

Temperature $^{\circ}\text{C} (^{\circ}\text{F})$	Resistance (Ω)
50 (122.0)	160 – 240
120 (248.0)	17.1 – 21.2

If resistance value is not as specified, replace the engine coolant temperature sender gauge.



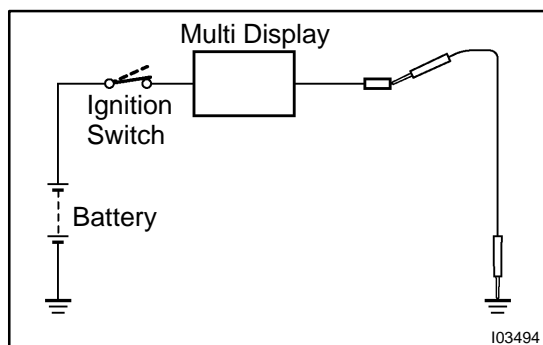
18. INSPECT LOW OIL PRESSURE WARNING SWITCH

- Check that there is continuity between terminal and ground with the engine stopped.
- Check that there is no continuity between terminal and ground with the engine running.

HINT:

Oil pressure should be over 24.5 kPa (0.25 kgf/cm, 3.6 psi).

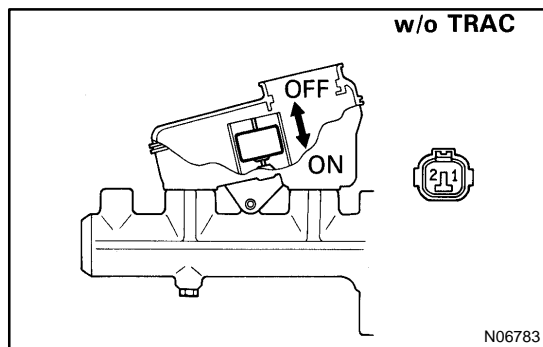
If operation is not as specified, replace the switch.



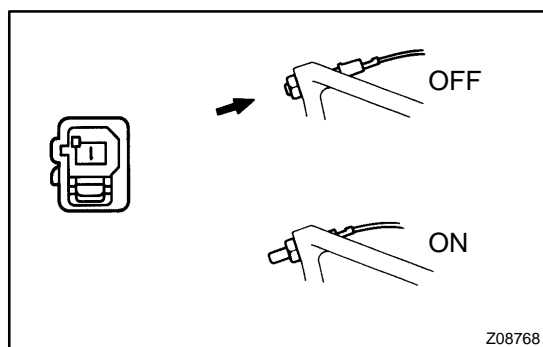
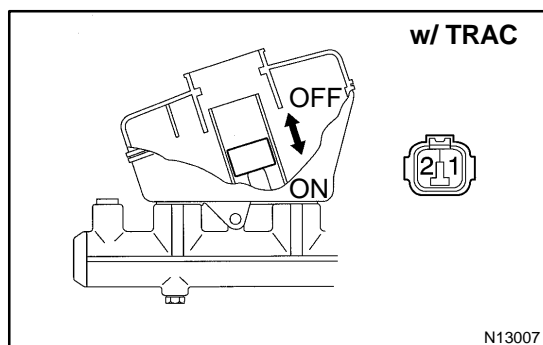
19. INSPECT LOW OIL PRESSURE WARNING LIGHT

- Disconnect the connector from the warning switch and ground terminal on the wire harness side connector.
- Turn the ignition switch ON and check that the warning light lights up.

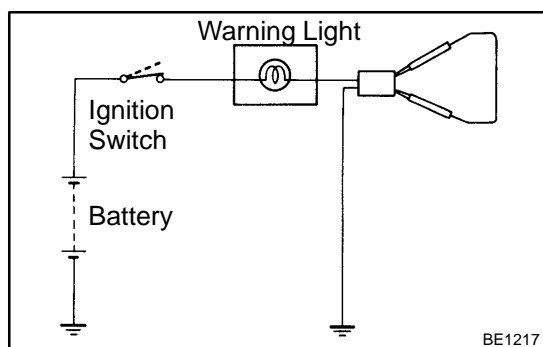
If the warning light does not light up, test the bulb or inspect the wire harness.

**20. INSPECT BRAKE FLUID LEVEL WARNING SWITCH**

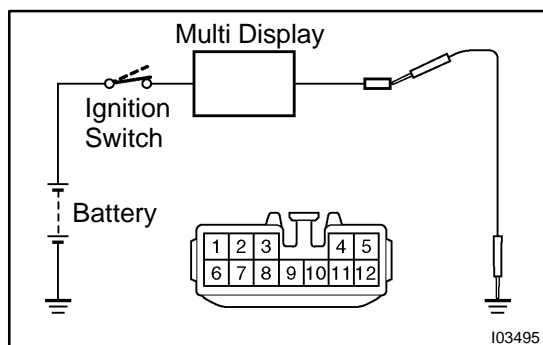
- Disconnect the connector.
 - Check that there is no continuity between terminals with the switch OFF (float up).
 - Use syphon, etc. to take fluid out of the reservoir tank.
 - Check that there is continuity between terminals with the switch ON (float down).
 - Pour the fluid back in reservoir tank.
- If operation is not as specified, replace the reservoir tank.

**21. INSPECT PARKING BRAKE SWITCH**

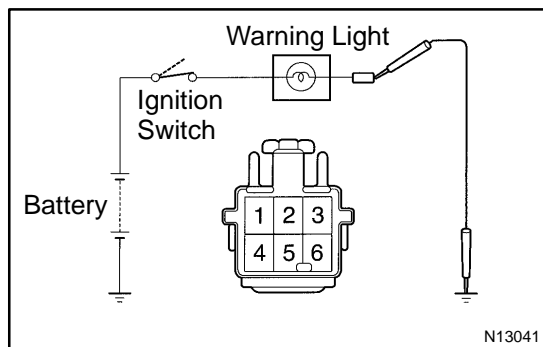
- Check that there is continuity between terminal and switch body with the switch ON (switch pin released).
 - Check that there is no continuity between terminal and switch body with the switch OFF (switch pin pushed in).
- If continuity is not as specified, replace the switch or inspect ground point.

**22. INSPECT BRAKE WARNING LIGHT**

- Disconnect the connector from the brake fluid warning switch.
- Release the parking brake pedal.
- Connect terminals on the wire harness side of the level warning switch connector.
- Start the engine and check that the warning light lights up. If the warning light does not light up, test the bulb.

**23. INSPECT LIGHT FAILURE SENSOR**(See page [BE-76](#))**24. INSPECT REAR LIGHT WARNING LIGHT**

- Disconnect the connector from the light failure sensor and ground terminal 4 on the wire harness side connector.
- Start the engine and check that the warning light lights up. If the warning light does not light up, test the bulb or inspect wire harness.

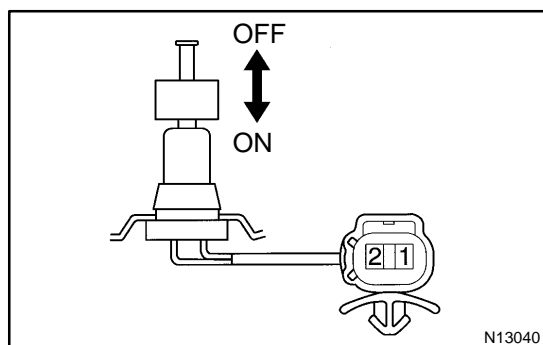


25. INSPECT COURTESY SWITCH
(See page [BE-70](#))

26. INSPECT OPEN DOOR WARNING LIGHT

- (a) Disconnect the connector from the door lock assembly and ground terminal 3 on the wire harness side connector, and check that the warning light lights up.

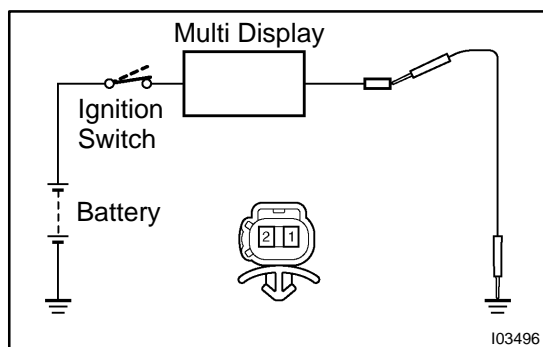
If the warning light does not light up, inspect the bulb or wire harness or body ECU.



27. INSPECT WASHER LEVEL WARNING SWITCH CONTINUITY

- (a) Remove the washer tank.
(b) Check that there is continuity between terminals (float down).
(c) Check that there is no continuity between terminals (float up).

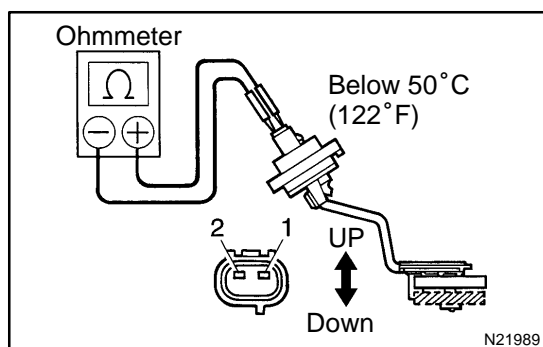
If continuity is not as specified, replace the switch.



28. INSPECT WASHER LEVEL WARNING LIGHT

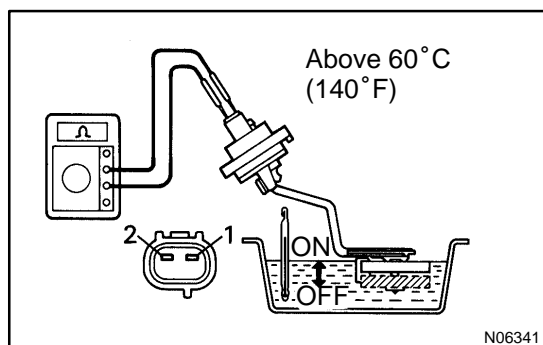
- (a) Disconnect the connector from the washer level warning switch and ground terminal 2 on the wire harness side connector.
(b) Start the engine, check that the warning light lights up.

If the warning light does not light up, inspect the bulb or wire harness.



29. INSPECT ENGINE OIL LEVEL WARNING SWITCH CONTINUITY

- (a) Check that there is continuity exists between terminals when the sensor-sensed temperature drops to 40°C or less with the float down.



- (b) Heat the switch to above 60°C (140°F) in an oil bath.
(c) Check that there is continuity between terminals with the switch ON (float up).
(d) Check that there is no continuity between terminals with the switch OFF (float down).

If operation is not as specified, replace the switch.

Wire Harness Side

le-2-1-h

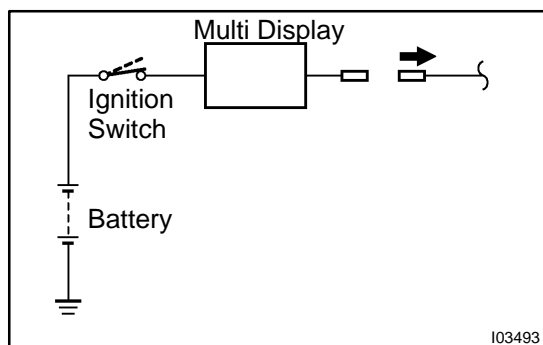
Z08774

30. INSPECT ENGINE OIL LEVEL WARNING SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity

If continuity is not as specified, inspect the wire harness or ground point.

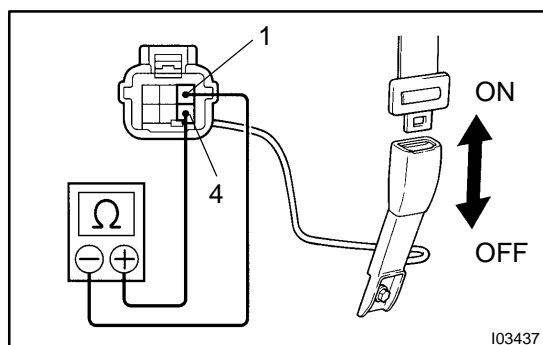


I03493

31. INSPECT ENGINE OIL LEVEL WARNING LIGHT

- Disconnect the connector from the switch.
- Turn the ignition switch ON. Check that the warning light lights up approximately 40 seconds later.

If the warning light does not light up, inspect the bulb or wire harness.

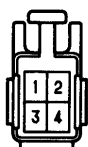


I03437

32. INSPECT BUCKLE SWITCH CONTINUITY

- Check that there is continuity between terminal 1 and 4 on the switch side connector with the switch ON (belt fastened).
- Check that there is no continuity between terminal 1 and 4 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the seat belt inner.

Wire Harness Side

e-4-1

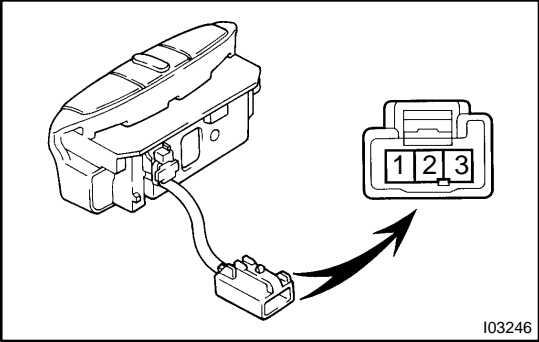
Z08777

33. INSPECT SEAT BELT WARNING SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
–	Turn the ignition switch ON	Chime sounds for 4 – 8 sec.
–	Ground terminal 2 and turn the ignition switch ON	No chime sound
1 – Ground	Constant	Continuity

If the circuit is not as specified, inspect the circuits connected to other parts.



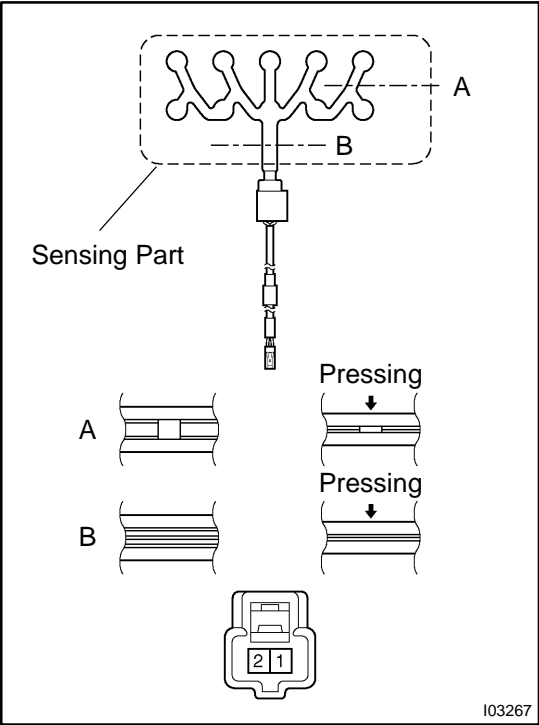
34. INSPECT MULTI-INFORMATION DISPLAY SWITCH

Measure the resistance between terminals 2 and 3.

Switch position	Resistance (Ω)
FUNCTION	0
RESET	Approx. 360
MODE	Approx. 1,110

If resistance value is not as specified, replace the switch.

35. INSPECT MULTI-INFORMATION DISPLAY SWITCH CIRCUIT (See page BE-86)



36. INSPECT SEAT BELT WARNING OCCUPANT DETECTION SENSOR

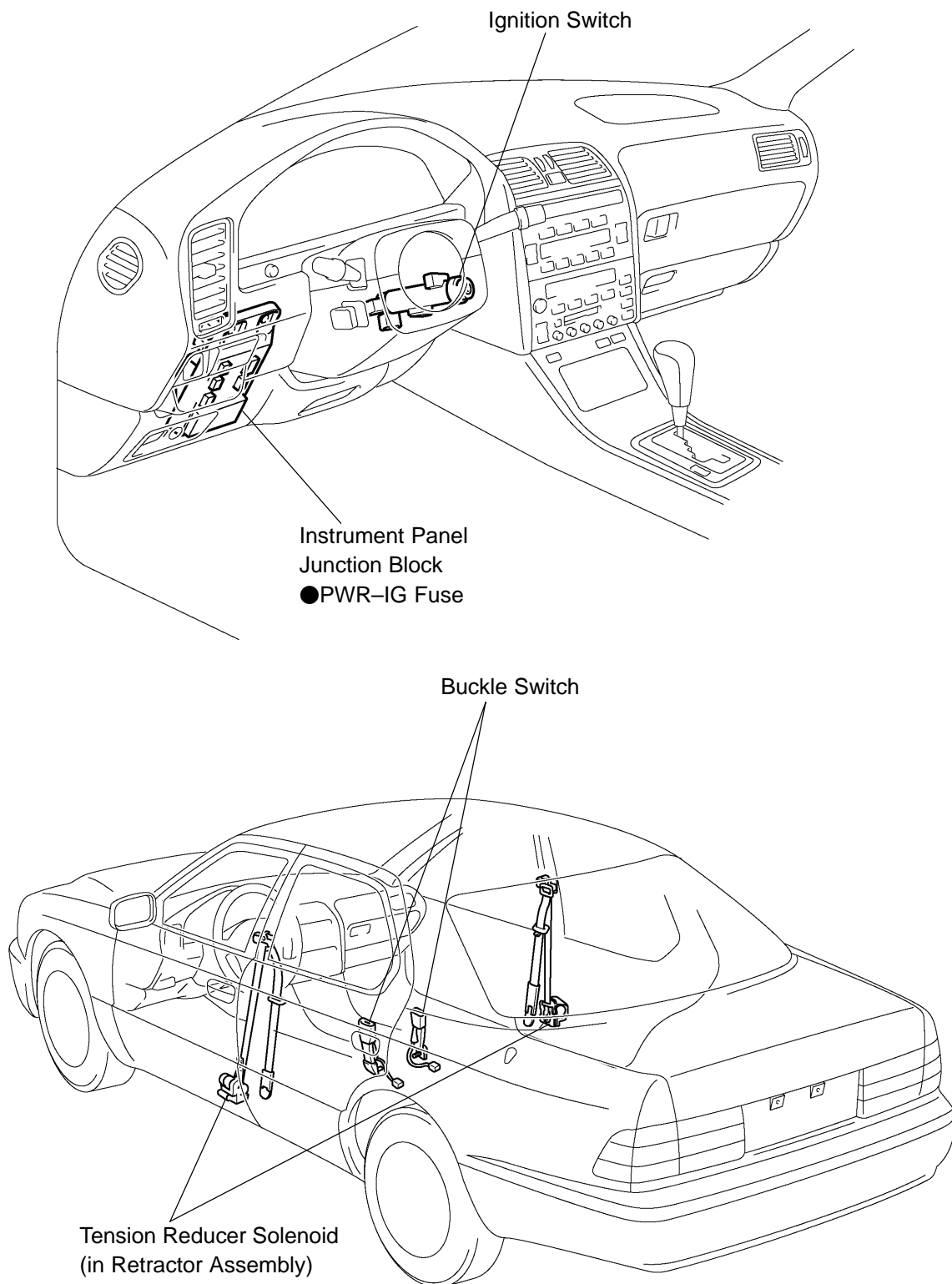
Check that continuity exists between terminal 1 and 2 when pressing the sensing part.

REASSEMBLY

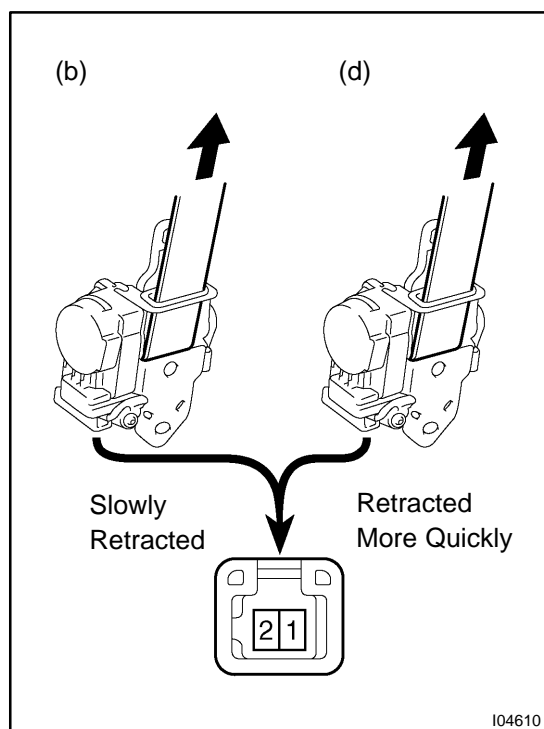
Installation is in the reverse order of disassembly. (See page [BE-96](#))

ELECTRIC TENSION REDUCER SYSTEM LOCATION

BE0C5-01



103265



INSPECTION

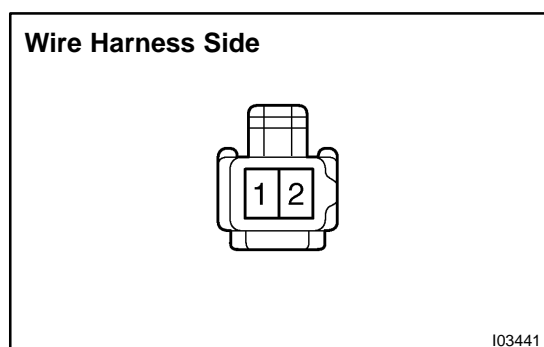
1. INSPECT TENSION REDUCER SOLENOID OPERATION

- Connect the positive (+) lead from the battery to terminal 1, and negative (–) lead to terminal 2.
- Pull the belt upward and check that the belt is slowly retracted when released.
- Disconnect the lead from the battery.
- Pull the belt upward and check that the belt is retracted more quickly when released than in (b).

HINT:

Do not tilt the retractor.

If the operation is not as specified, replace the front seat outer belt assembly.



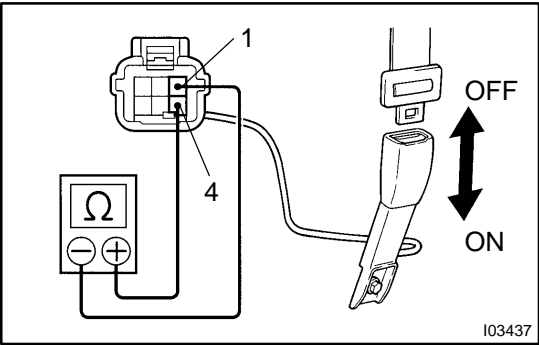
2. INSPECT TENSION REDUCER SOLENOID CIRCUIT

Disconnect the tension reducer solenoid connector and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Buckle switch position ON (belt fastened)	Continuity
2 – Ground	Buckle switch position OFF (belt unfastened)	No continuity
1 – Ground	Ignition switch ON	Battery positive voltage
1 – Ground	Ignition switch ACC or LOCK	No voltage

If the circuit is specified, replace the front seat outer belt assembly.

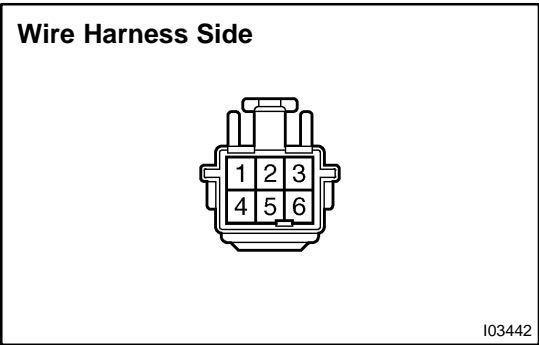
If the circuit is not as specified, inspect the circuits connected to other parts.



3. INSPECT BUCKLE SWITCH CONTINUITY

- (a) Check that there is continuity between terminal 1 and 4 on the switch side connector with the switch ON (belt fastened).
- (b) Check that there is no continuity between terminal 1 and 4 on the switch side connector with the switch OFF (belt unfastened).

If operation is not as specified, replace the seat belt inner.

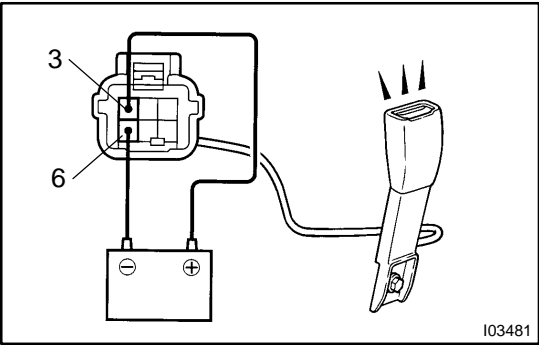


4. INSPECT BUCKLE SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
1 – Ground	Ignition switch ON	Battery positive voltage
1 – Ground	Ignition switch ACC or LOCK	No voltage

If the circuit is not as specified, inspect the circuits connected to other parts.



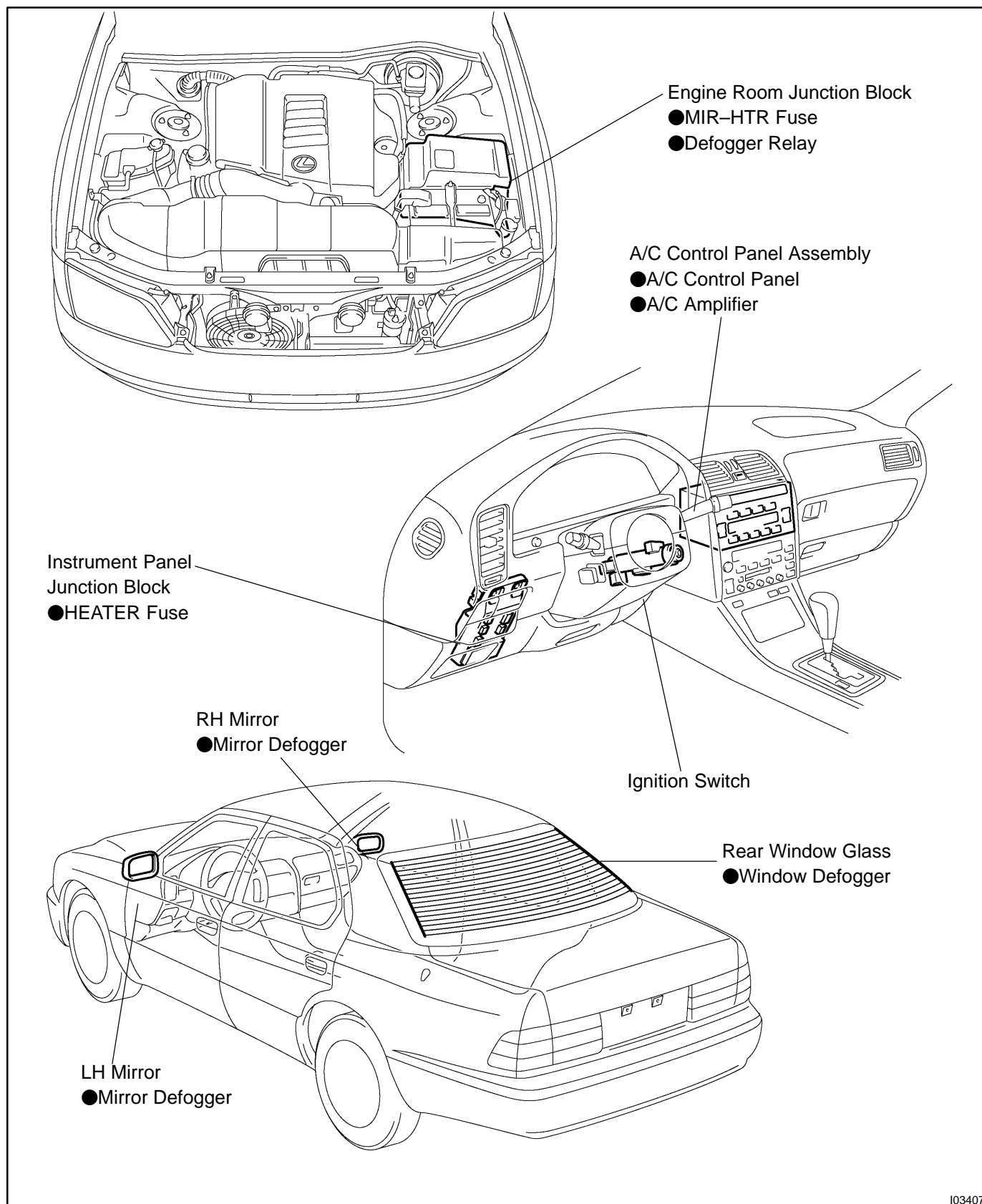
5. INSPECT BUCKLE SWITCH INDICATOR LIGHT OPERATION

Connect the positive (+) lead from the battery to terminal 3 and the negative (-) lead to terminal 6, and check that the indicator light does not light up, replace the switch.

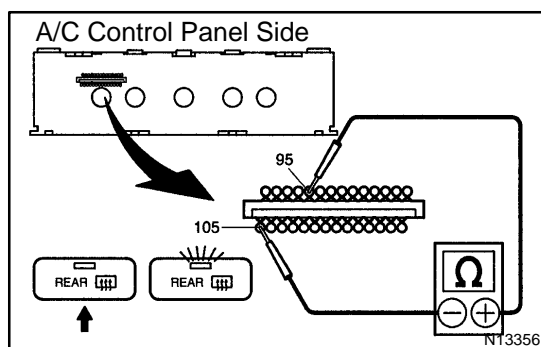
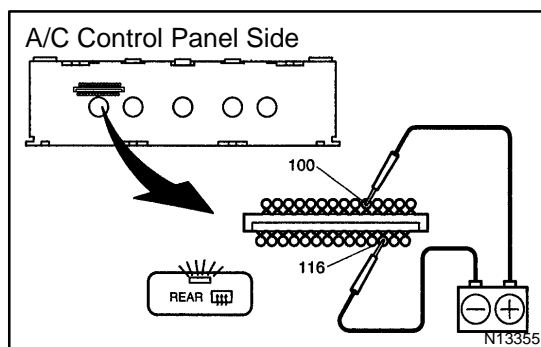
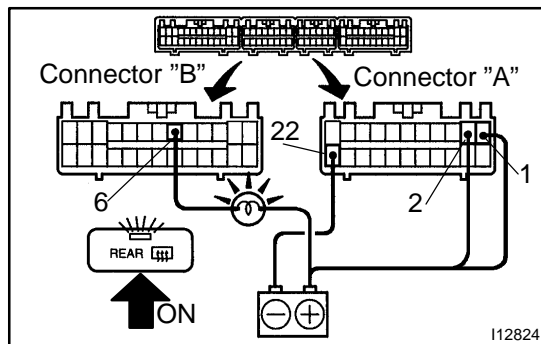
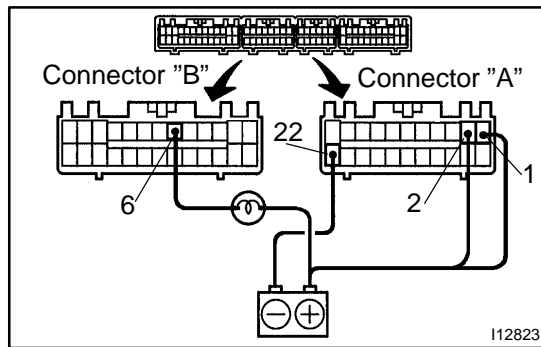
DEFOGGER SYSTEM

LOCATION

BE0C7-01



103407



INSPECTION

1. A/C control panel assembly:

INSPECT DEFOGGER SWITCH OPERATION

- Connect the positive (+) lead from the battery to terminal A1,A2 and negative (–) lead to terminal A22.
- Connect the positive (+) lead from the battery to terminal B6 through a 1.4 W test bulb.
- Turn the defogger switch ON and check that the test bulb and indicator light turn ON, then turn OFF after about 15 minutes.

If operation is not as specified, proceed to the next inspection.

2. A/C control panel:

INSPECT DEFOGGER SWITCH INDICATOR

- Separate control panel and A/C amplifier.
- Connect the positive (+) lead from the battery to terminal 100 and the negative (–) lead to terminal 116.
- Push the switch and check that the indicator light lights up.

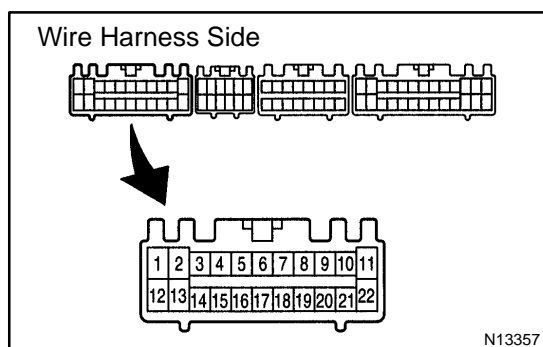
If operation is not as specified, replace the bulb.

3. INSPECT DEFOGGER SWITCH CONTINUITY

Condition	Tester connection	Specified condition
OFF	–	No continuity
ON	95 – 105	Continuity

If operation is as specified, replace the A/C amplifier.

If continuity is not as specified, replace the control panel.

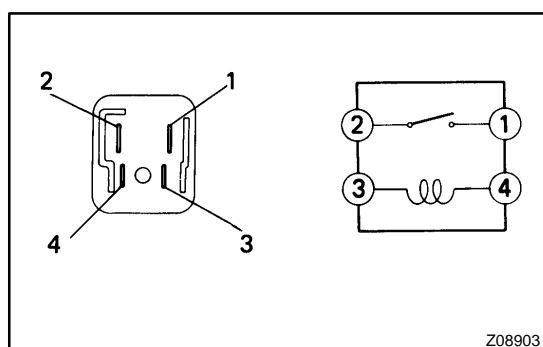


4. INSPECT DEFOGGER SWITCH CIRCUIT

Disconnect the connector from the switch and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
11 – Ground	Constant	Continuity
2 – Ground	Ignition switch ON	Battery positive voltage
2 – Ground	Ignition switch ACC or LOCK	No voltage

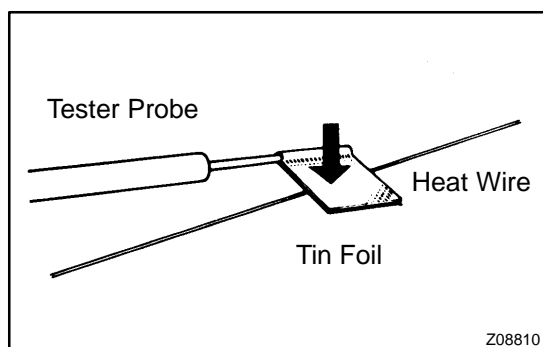
If the circuit is not as specified, inspect the circuits connected to other parts.



5. INSPECT DEFOGGER RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	3 – 4	Continuity
Apply B+ between terminals 3 and 4.	1 – 2	Continuity

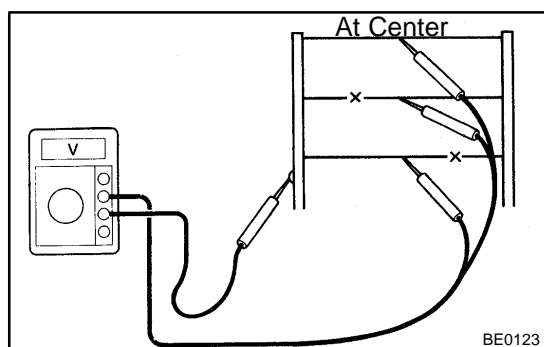
If continuity is not as specified, replace the relay.



6. INSPECT DEFOGGER WIRES

NOTICE:

When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage 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 fingers, as shown.

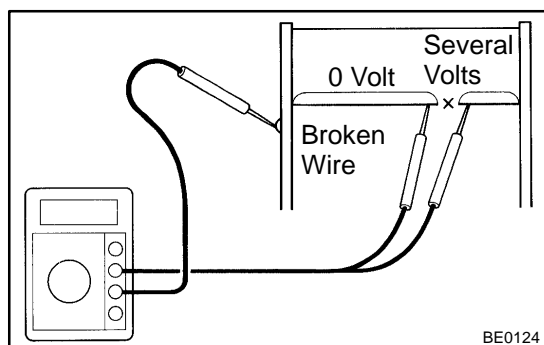


- Turn the ignition switch ON.
- Turn the defogger switch ON.
- Inspect the voltage at the center of each heat wire, as shown.

Voltage	Criteria
Approx. 5V	Okay (No break in wire)
Approx. 10V or 0V	Broken wire

HINT:

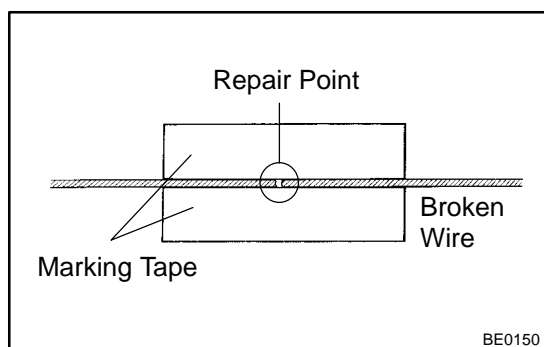
If there is approximately 10 V, the wire is broken between the center of the wire and the positive (+) end. If there is no voltage, the wire is broken between the center of the wire and ground.



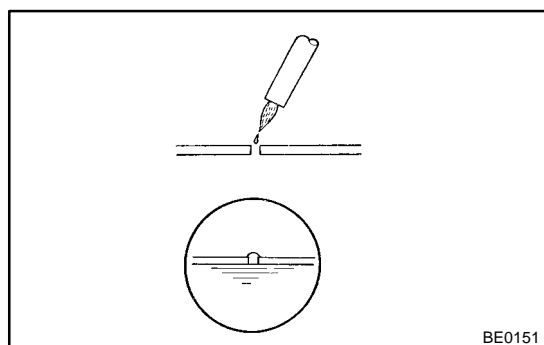
- Place the voltmeter positive (+) lead against the defogger positive (+) terminal.
- Place the voltmeter negative (–) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (–) terminal end.
- The point where the voltmeter deflects from zero to several V is the place where the heat wire is broken.

HINT:

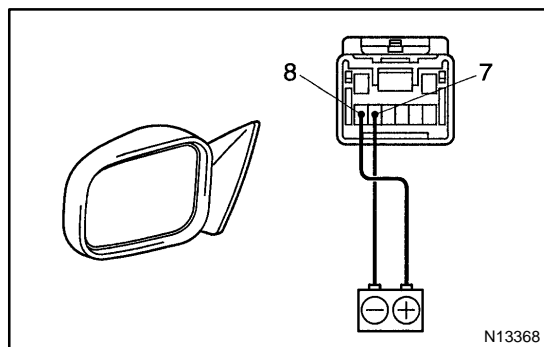
If the heat wire is not broken, the voltmeter indicates 0 V at the positive (+) end of the heat wire but gradually increases to about 12 V as the meter probe is moved to the other end.

**7. IF NECESSARY, REPAIR DEFOGGER WIRE**

- Clean the broken wire tips with a grease, wax and silicone remover.
- Place the masking tape along both sides of the wire to be repaired.
- Thoroughly mix the repair agent (DuPont paste No.4817).



- Using a fine tip brush, apply a small amount to the wire.
- After a few minutes, remove the masking tape.
- Allow the repair to stand at least 24 hours.

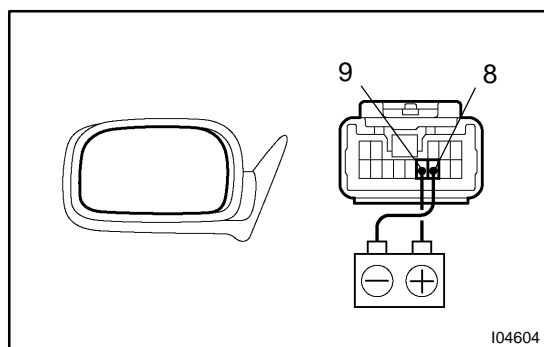


8. INSPECT MIRROR DEFOGGER w/o Memory:

- (a) Connect the positive (+) lead from the battery to terminal 8 and the negative (-) lead to terminal 7.
- (b) Check that the mirror becomes warm.

HINT:

It will take a short time for the mirror to become warm.



9. INSPECT MIRROR DEFOGGER w/ Memory:

- (a) Connect the positive (+) lead from the battery to terminal 9 and the negative (-) lead to terminal 8.
- (b) Check that the mirror becomes warm.

HINT:

It will take a short time for the mirror to become warm.

If mirror does not become warm, replace the mirror assembly.

POWER WINDOW CONTROL SYSTEM

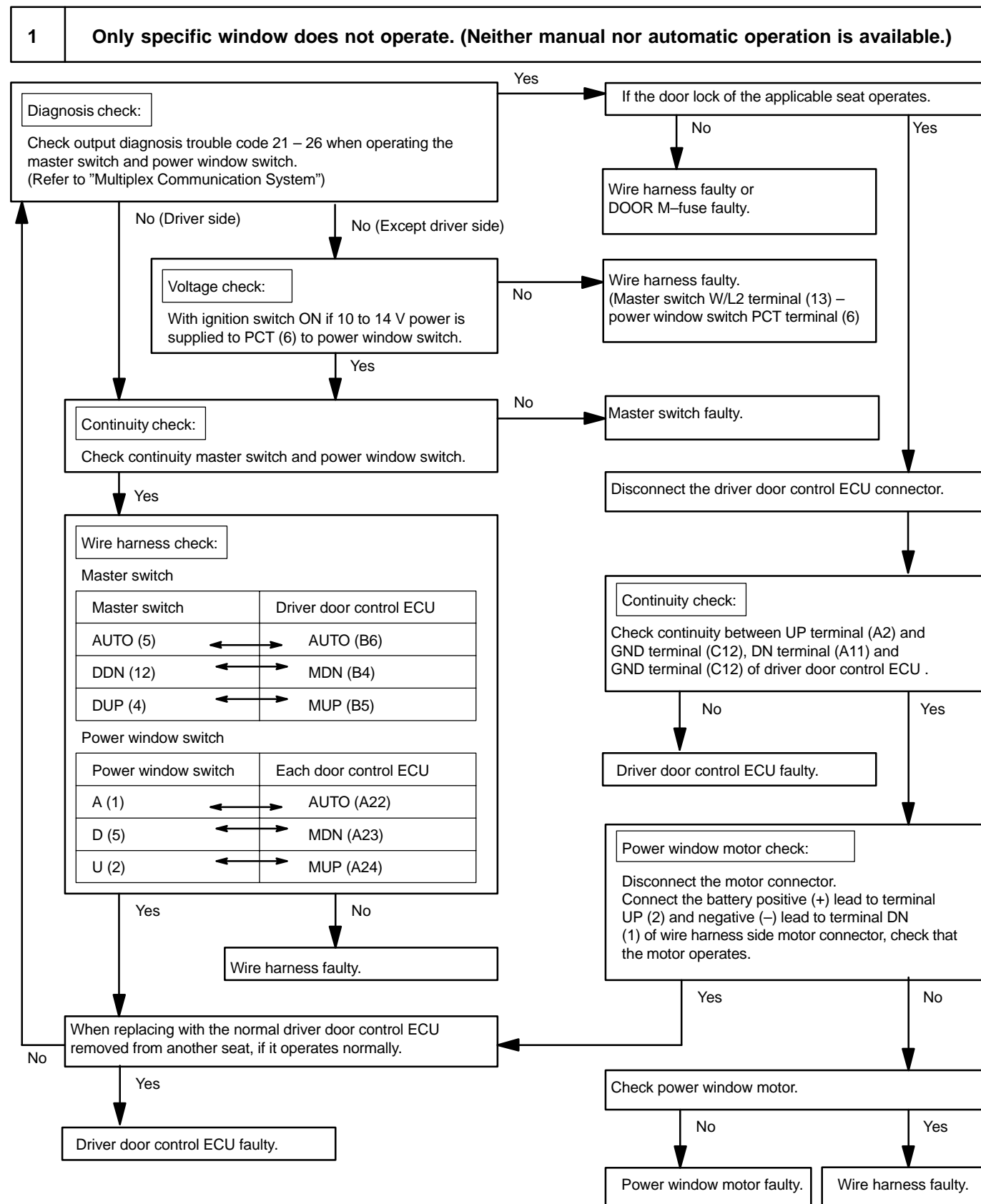
TROUBLESHOOTING

BE0C9-03

1. WINDOW DOES NOT OPERATE WITH POWER WINDOW MASTER SWITCH. (MANUAL OR AUTOMATIC OPERATION CAN NOT BE PERFORMED.)

Trouble	Suspect Area (terminal No.)	Parts name
All windows do not operate with master switch of each window.	Body ECU does not PWS terminal output ●Body ECU PWS terminal (B16) output ●Master Switch PW terminal (10) output ●Check wire harness between PWS terminal and PW terminal (10)	●Body ECU ●Master switch
Windows except driver's do not operate with master switch of each window.	Master switch (window lock circuit) faulty ●Check continuity between master switch PW terminal (10) and W/L2 terminal (13) ●Check wire harness between master switch W/L2 terminal (13) and each power window switches PCT terminal (6)	●Master switch
Only specific window does not operate. (Manual and automatic operation can not be performed.)	FLOW CHART <A>	—
Only specific window does not operate. (Automatic operation can not be performed.)	When "Jam Protection" sensor is defective, automatic function as a fail-safe function might be unable.	●Master switch ●Power window switch ●Door control ECU

FLOW CHART <A>



2. REMOVE CONTROL OF ALL WINDOWS (EXCEPT DRIVER'S) DOES NOT FUNCTIONS WITH MASTER SWITCH. (WINDOWS OPERATE NORMALLY WITH EACH OF MASTER SWITCH.

Trouble	Suspect Area (terminal No.)	Parts name
All windows (except driver's) do not operate by remote control.	Fail-safe mode caused by leaving the master switch ON or short circuit occurred in remote control switch of master switch. ●Check continuity of master switch.	●Master switch
Only passenger's door does not operate. (UP, DOWN and AUTO DOWN does not operate.)	Driver door control ECU DT1 terminal does not output. ●Driver door control ECU DT1 terminal (B3) ●Master switch DT1 terminal (1) ●Check wire harness between terminal DT1 (B3) and DT1 (1)	●Driver door control ECU ●Master switch
Only passenger's door does not operate. (Each operation does not operate.)	Master switch faulty ●Check continuity of master switch.	
Only rear right side door does not operate. (UP, DOWN and AUTO DOWN does not operate.)	Driver door control ECU DT2 terminal does not output. ●Driver door control ECU DT2 terminal (B2) ●Master switch DT2 terminal (2) ●Check wire harness between terminal DT2 (B2) and DT2 (2)	●Driver door control ECU ●Master switch
Only rear right side door does not operate. (Each operate.)	Master switch faulty ●Check continuity of master switch.	
Only rear left side door does not operate. (UP, DOWN and AUTO DOWN does not operate.)	Driver door control ECU DT3 terminal does not output. ●Driver door control ECU DT3 terminal (B1) ●Master switch DT3 terminal (3) ●Check wire harness between terminal DT3 (B1) and DT3 (3)	●Driver door control ECU ●Master switch
Only rear left side door does not operate. (Each operate.)	Master switch faulty ●Check continuity of master switch.	●Driver door control ECU ●Master switch
Only UP operation does not operate. (All window (Except driver side) door.)	Master switch ON SC2 terminal does not output. Driver door control ECU SC2 terminal does not input. ●Master switch SC2 terminal (8) ●Driver door control ECU SC2 terminal (B10) ●Check wire harness between terminal SC2 (8) and SC2 (B10)	●Driver door control ECU ●Master switch
Only UP operation does not operate. (Only specific window does not operate.)	Master switch faulty ●Check continuity of master switch.	
Only DOWN operation does not operate. (All window (Except driver side) door.)	Master switch ON SC1 terminal does not output. Driver door control ECU SC1 terminal does not input. ●Master switch SC1 terminal (7) ●Driver door control ECU SC1 terminal (B9) ●Check wire harness between terminal SC1 (7) and SC1 (B9)	●Driver door control ECU ●Master switch
Only DOWN operation does not operate. (Only specific window does not operate.)	Master switch faulty ●Check continuity of master switch.	

Only AUTO DOWN operation does not operate. (All window (Except driver side) door.)	Master switch ON SC3 terminal does not output. Driver door control ECU SC3 terminal does not input. ●Master switch SC3 terminal (9) ●Driver door control ECU SC3 terminal (B11) ●Check wire harness between terminal SC3 (9) and SC3 (B11)	●Driver door control ECU ●Master switch
Only AUTO DOWN operation does not operate. (Only specific window does not operate.)	Master switch faulty ●Check continuity of master switch.	

3. THE KEY RELATED POWER WINDOW OPERATION DOES NOT OPERATE WITH DRIVER SIDE DOOR KEY CYLINDER. (MASTER SWITCH OPERATION IS NORMAL.)

Trouble	Suspect Area (terminal No.)	Parts name
Door lock system does not operate by door key.	Refer to "POWER DOOR LOCK CONTROL SYSTEM".	–
Door lock system do operate by door key.	Fail-safe mode caused by error on jam protection sensor of power window. (Operation of power window with multi-function transmitter is prohibited.) HINT: DTC 31 – 38 output	Refer to "Multiplex Communication System".

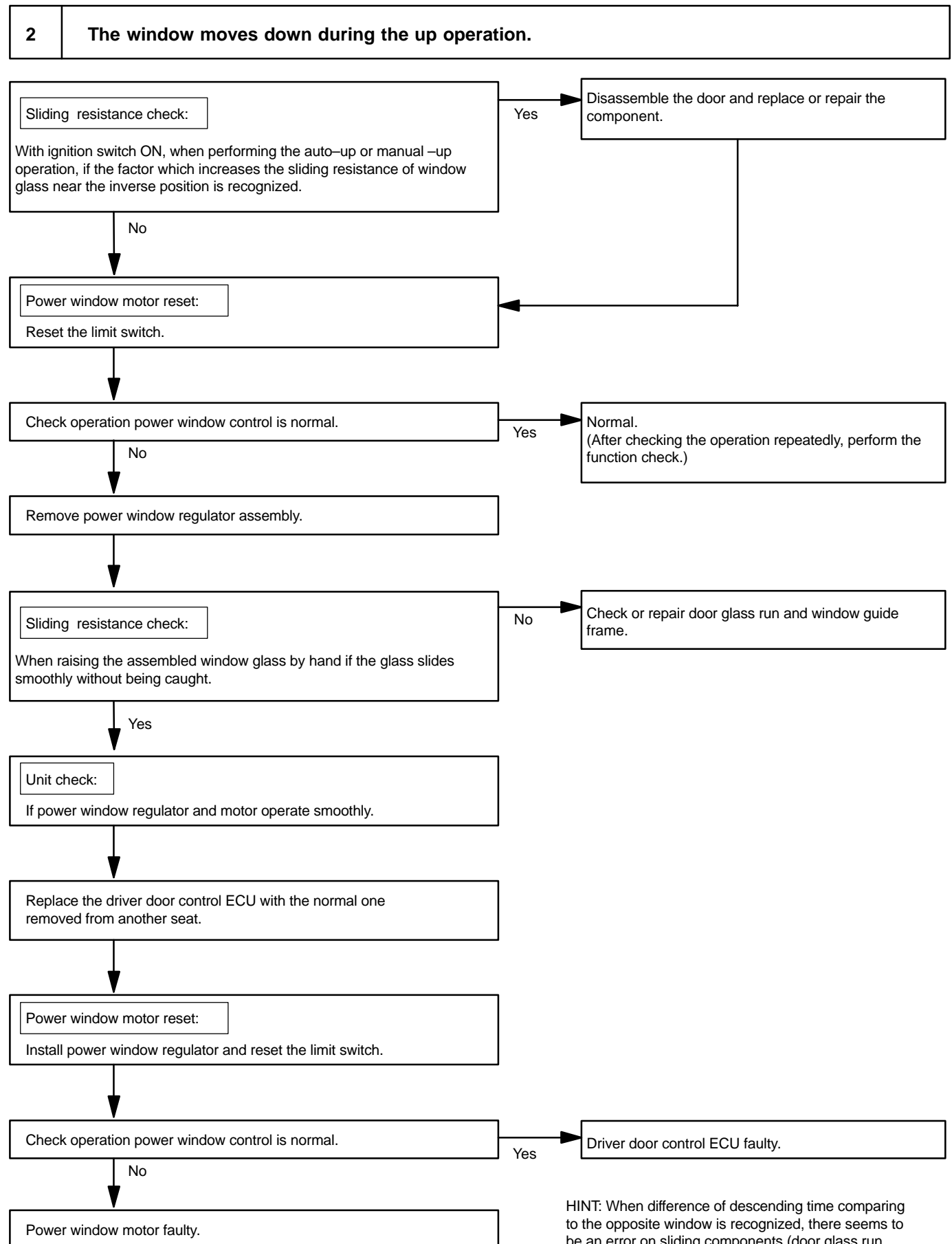
4. POWER WINDOW DOES NOT OPERATE WITH MULTI-FUNCTION TRANSMITTER. (WINDOWS OPERATE NORMALLY WITH MASTER SWITCH.)

Trouble	Suspect Area (terminal No.)	Parts name
Door lock and luggage compartment opener do not operate with multi-function transmitter.	Refer to "WIRELESS DOOR LOCK CONTROL SYSTEM".	–
Only luggage compartment opener operates with multi-function transmitter.	Wireless door lock transmitter faulty.	Check wireless door lock transmitter.
Door lock and luggage compartment opener operate with multi-function transmitter.	Fail-safe mode caused by error on jam protection sensor of power window. (Operation of power window with multi-function transmitter is prohibited.) HINT: DTC 31 – 38 output	Refer to "Multiplex Communication System".

5. WINDOW MOVES DOWN WITHOUT BEING ORDERED DURING THE UP OPERATION

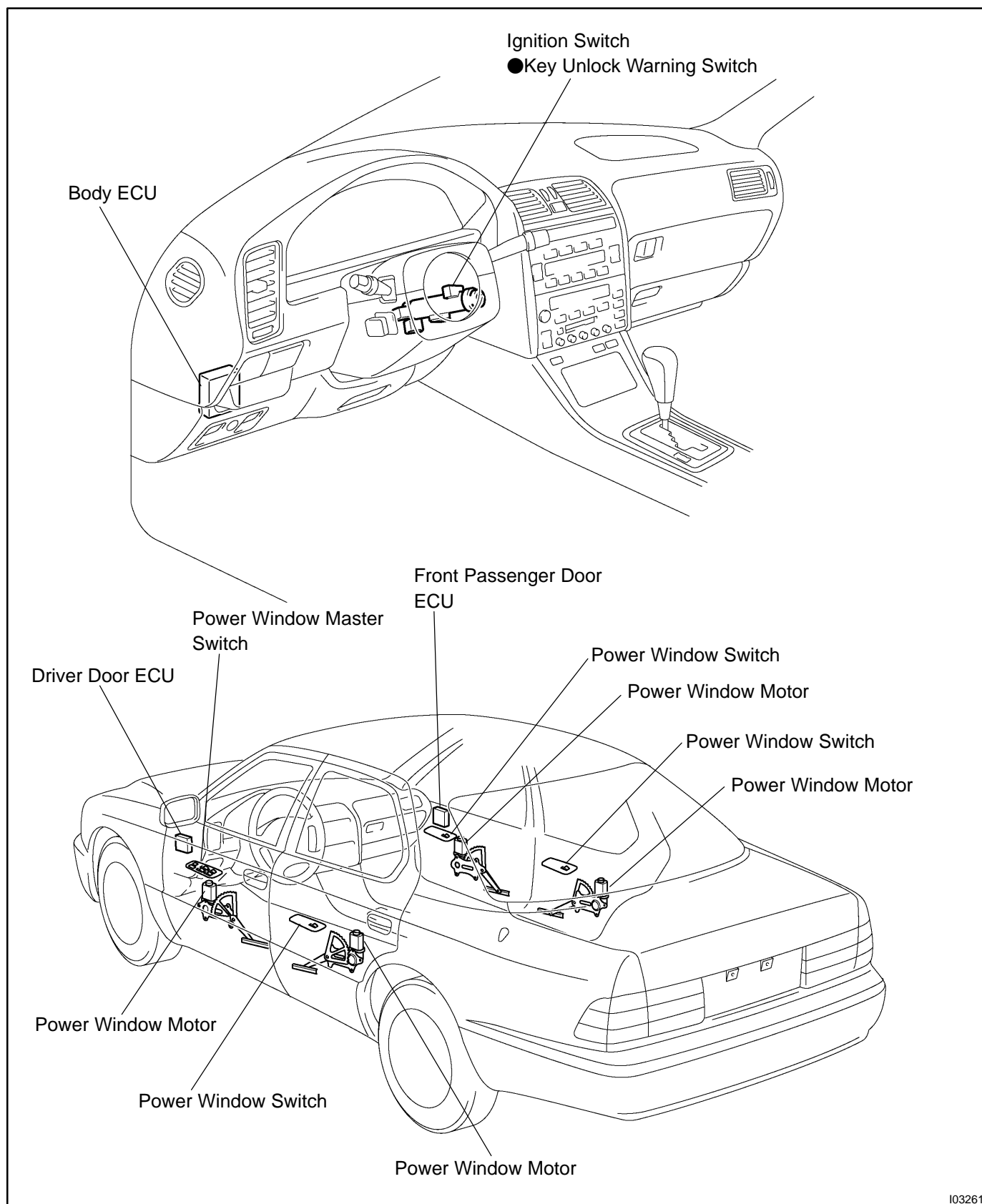
Trouble	Suspect Area (terminal No.)	Parts name
After the window is fully closed, it starts to move down.	Power window motor limit switch wire harness faulty. ●Power window motor reset switch is reset. ●Driver door control ECU LMT terminal (B12)	●Driver door control ECU
The window moves down during the up operation.	FLOW CHART 	–

FLOW CHART

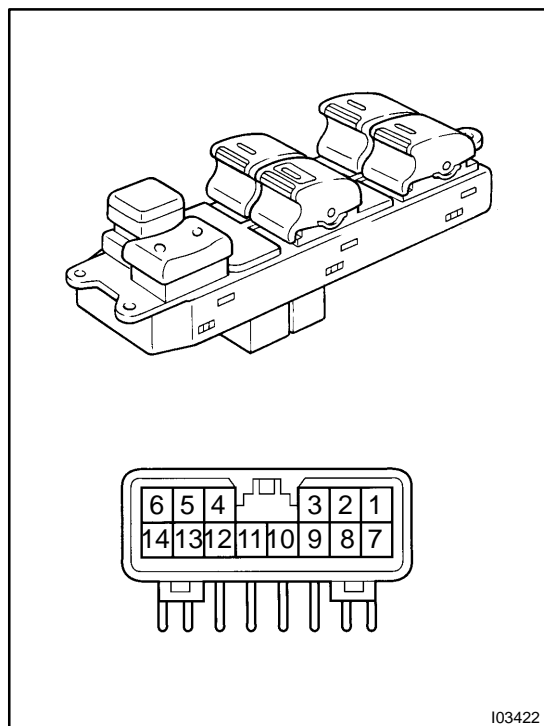


HINT: When difference of descending time comparing to the opposite window is recognized, there seems to be an error on sliding components (door glass run and window regulator.)

LOCATION



I03261



I03422

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

Front Driver's Switch

Switch position	Tester connection	Specified condition
UP AUTO	4 – 10, 5 – 10	Continuity
UP	4 – 10	Continuity
OFF	–	No continuity
DOWN	10 – 12	Continuity
DOWN AUTO	10 – 12, 5 – 10	Continuity

Front Passenger's Switch

Switch position	Tester connection	Specified condition
UP AUTO	1 – 8, 1 – 9	Continuity
UP	1 – 8	Continuity
OFF	–	No continuity
DOWN	1 – 7	Continuity
DOWN AUTO	1 – 7, 1 – 9	Continuity

Rear Left Switch

Switch position	Tester connection	Specified condition
UP AUTO	3 – 8, 7 – 9	Continuity
UP	3 – 8	Continuity
OFF	–	No continuity
DOWN	3 – 7	Continuity
DOWN AUTO	3 – 7, 3 – 9	Continuity

Rear Right Switch

Switch position	Tester connection	Specified condition
UP AUTO	2 – 8, 2 – 9	Continuity
UP	2 – 8	Continuity
OFF	–	No continuity
DOWN	2 – 7	Continuity
DOWN AUTO	2 – 7, 2 – 9	Continuity

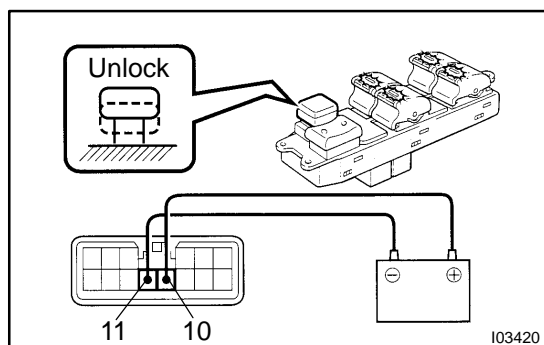
If continuity is not as specified, replace the master switch.

If continuity is as specified, inspect the master switch circuit.

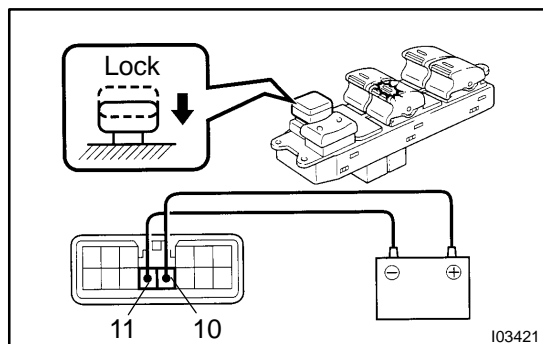
2. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT (See page [DI-737](#))

3. INSPECT POWER WINDOW MASTER SWITCH ILLUMINATION

- Set the window lock switch to the unlock position.
- Connect the positive (+) lead from the battery to terminal 10 and the negative (–) lead to terminal 11, and check that all the illuminations light up.

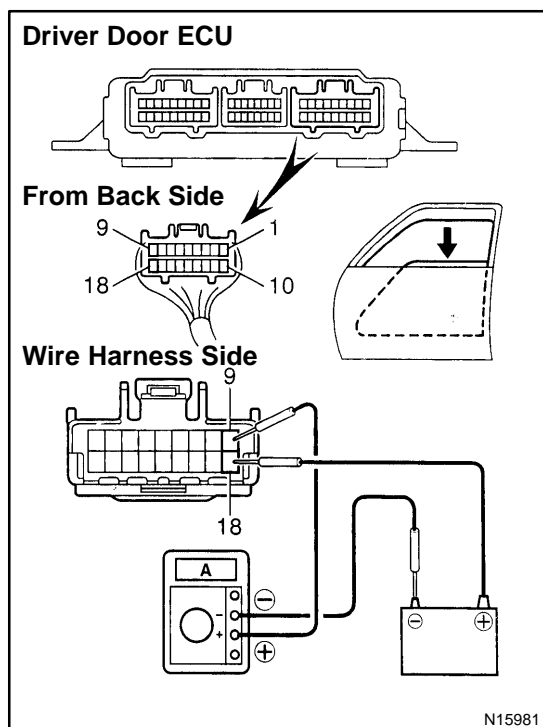


I03420



- (c) Set the window lock switch to the lock position and check that all the passenger's power window switch illuminations go out.

If operation is not as specified, replace the master switch.

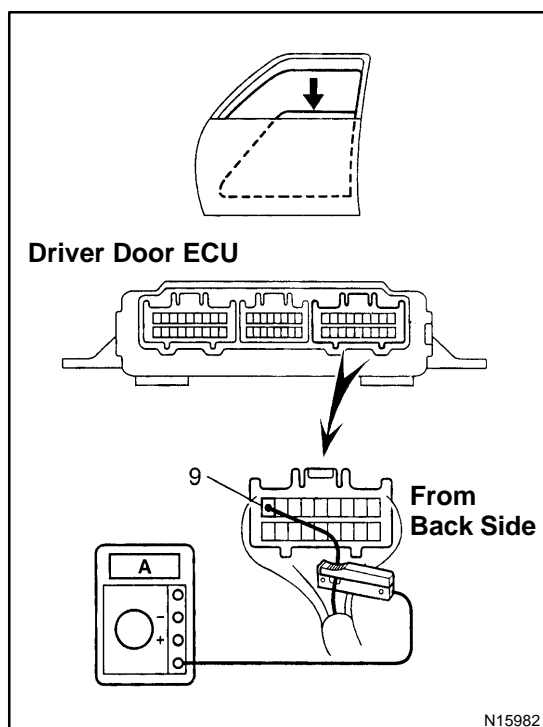


4. Using an ammeter: INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT

- Disconnect the connector from the driver door ECU.
- Connect the positive (+) lead from the ammeter to terminal 9 on the wire harness side connector and the negative (-) lead to negative terminal of the battery.
- Connect the positive (+) lead from the battery to terminal 18 on the wire harness side connector.
- As the window goes down, check that the current flow is approximately 7 A.
- Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:

The PTC opens some 4 – 90 seconds after the window stops going down, so check must be made before the PTC operates. If the operation is as specified, replace the driver door ECU.

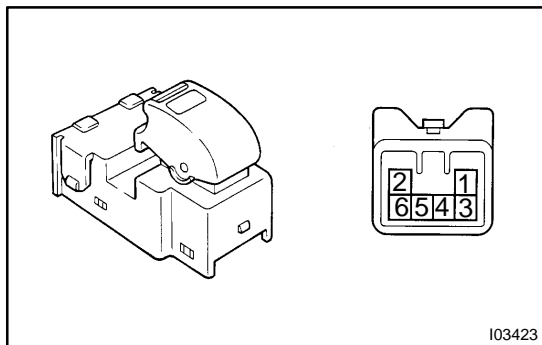


5. Using an ammeter with a current-measuring probe: INSPECT ONE TOUCH POWER WINDOW SYSTEM/ CURRENT OF CIRCUIT

- Remove the driver door ECU with connector connected.
- Attach a current-measuring probe to terminal 9 of the wire harness.
- Turn the ignition switch ON and set the power window switch in the down position.
- As the window goes down, check that the current flow is approximately 7 A.
- Check that the current increases up to approximately 14.5 A or more when the window stops going down.

HINT:

The PTC opens some 4 – 90 seconds after the window stops going down, so check must be made before the PTC operates. If operation is as specified, replace the driver door ECU.



6. Front Passenger's Door: INSPECT POWER WINDOW SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
UP AUTO	1 – 6, 2 – 6	Continuity
UP	2 – 6	Continuity
OFF	–	No continuity
DOWN	5 – 6	Continuity
DOWN AUTO	1 – 6, 5 – 6	Continuity

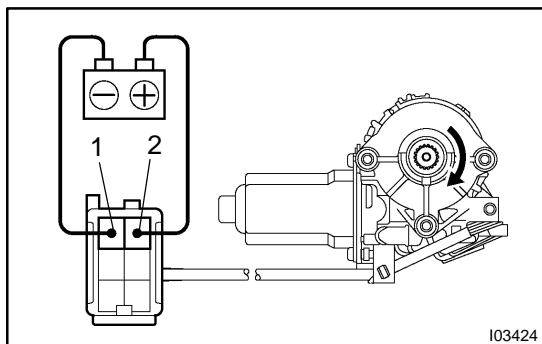
If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

7. Front passenger's door: INSPECT POWER WINDOW SWITCH CIRCUIT (See page DI-779)

8. Rear left door: INSPECT POWER WINDOW SWITCH CIRCUIT (See page DI-807)

9. Rear left door: INSPECT POWER WINDOW SWITCH CIRCUIT (See page DI-830)



10. Driver's door: INSPECT POWER WINDOW MOTOR OPERATION

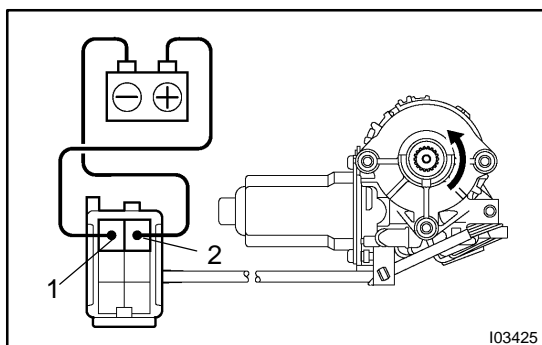
- (a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns clockwise.

- (b) Reverse the polarity and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

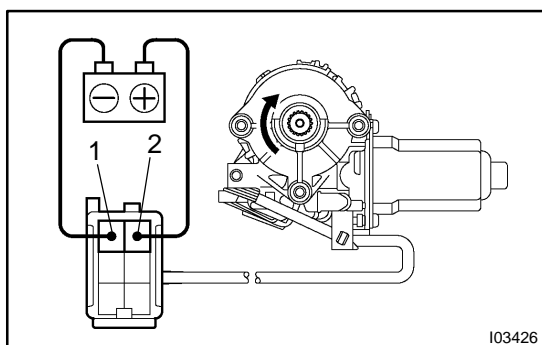
HINT:

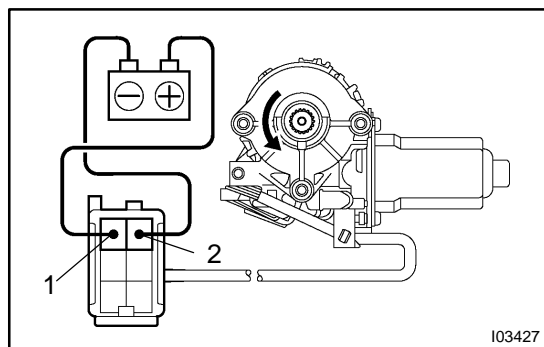
Since the jam protection may not work properly be sure to conduct procedures described in "How to Reset Power Window Motor (Reset switch and pulse switch)" after this inspection.



11. Front passenger's: INSPECT 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.



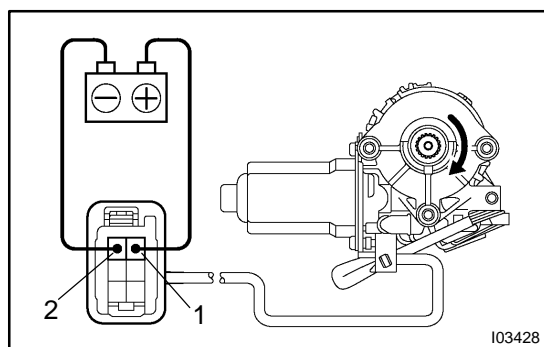


- (b) Reverse the polarity and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

HINT:

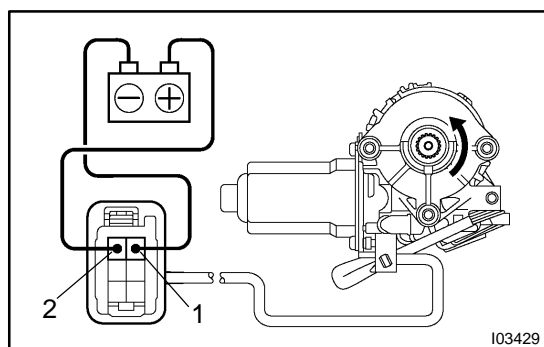
Since the jam protection may not work properly be sure to conduct procedures described in "How to Reset Power Window Motor (Reset switch and pulse switch)" after this inspection.



12. Rear left side:

INSPECT 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.

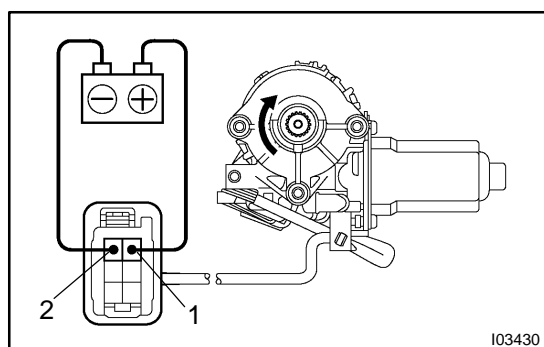


- (b) Reverse the polarity and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

HINT:

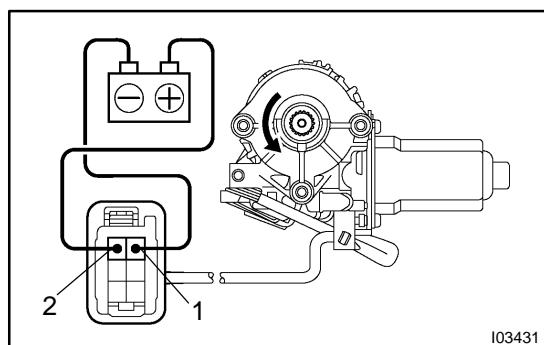
Since the jam protection may not work properly be sure to conduct procedures described in "How to Reset Power Window Motor (Reset switch and pulse switch)" after this inspection.



13. Rear right side:

INSPECT 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.

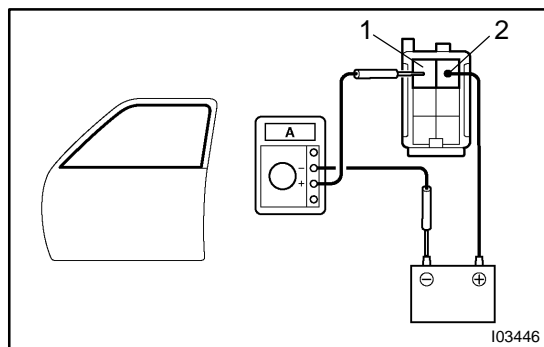


- (b) Reverse the polarity and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

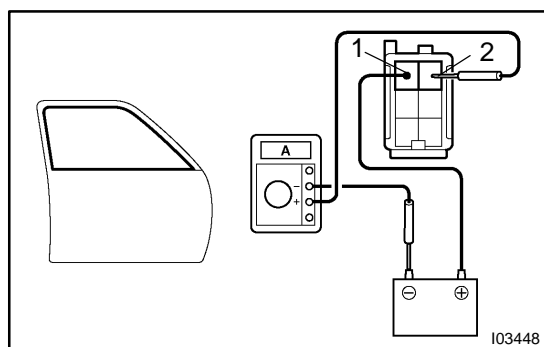
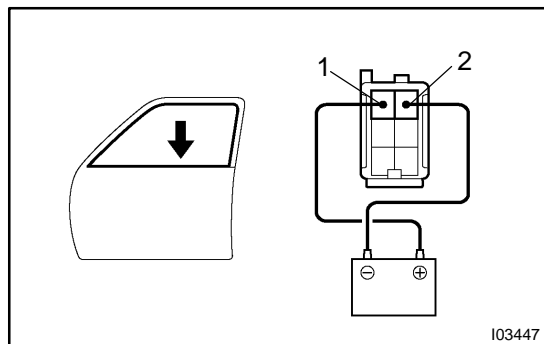
HINT:

Since the jam protection may not work properly be sure to conduct procedures described in "How to Reset Power Window Motor (Reset switch and pulse switch)" after this inspection.

**14. Driver's door:****INSPECT POWER WINDOW MOTOR PTC THERMISTOR OPERATION**

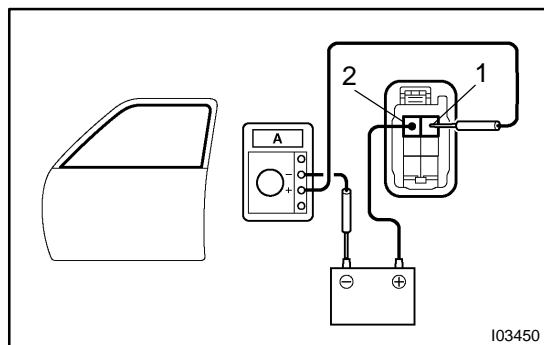
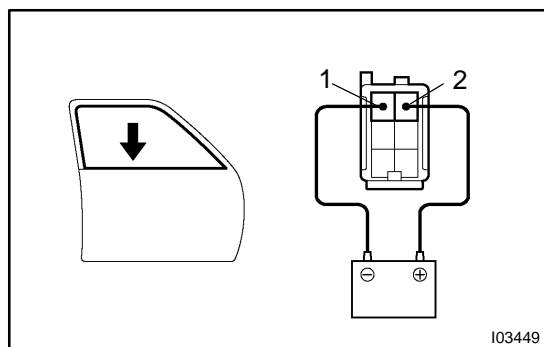
- Disconnect the connector from the driver door ECU.
- Connect the positive (+) lead from the ammeter to terminal 1 on the wire harness side connector and the negative (-) lead to negative terminal of the battery.
- Connect the positive (+) lead from the battery to terminal 2 on the wire harness side connector, and raise the window to the fully position.
- Continue to apply voltage, and check that the current changes to less than 1 A with 4 to 90 seconds.
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2, and check that the window begins to descend.

If operation is not as specified, replace the motor.

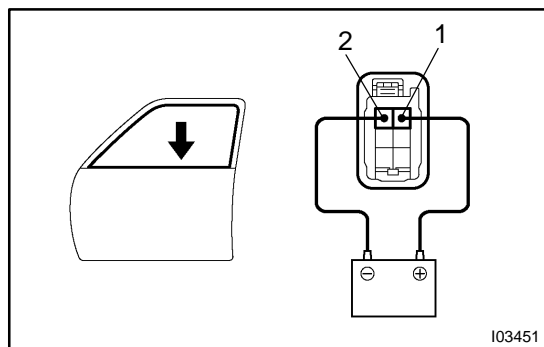
**15. Front Passenger's door:****INSPECT POWER WINDOW MOTOR PTC THERMISTOR OPERATION**

- Disconnect the connector from the front passenger door ECU .
- Connect the positive (+) lead from the ammeter to terminal 2 on the wire harness side connector and the negative (-) lead to negative terminal of the battery.
- Connect the positive (+) lead from the battery to terminal 1 on the wire harness side connector, and raise the window to the fully position.
- Continue to apply voltage and check that the current changes to less than 1 A within 4 to 90 seconds.
- Disconnect the leads from the terminals.
- Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the window begins to descend.

If operation is not as specified, replace the motor.

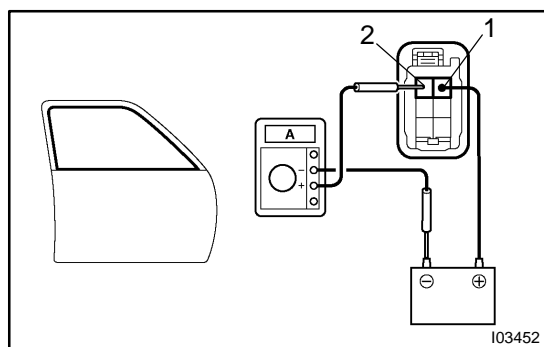
**16. Rear LH door:****INSPECT POWER WINDOW MOTOR PTC THERMISTOR OPERATION**

- Disconnect the connector from the Rear LH door ECU.
- 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.
- Connect the positive (+) lead from the battery to terminal 2 on the wire harness side connector, and raise the window to the fully position.



- (d) Continue to apply voltage and check that the current changes to less than 1 A within 4 to 90 seconds.
- (e) Disconnect the leads from the terminals.
- (f) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the window begins to descend.

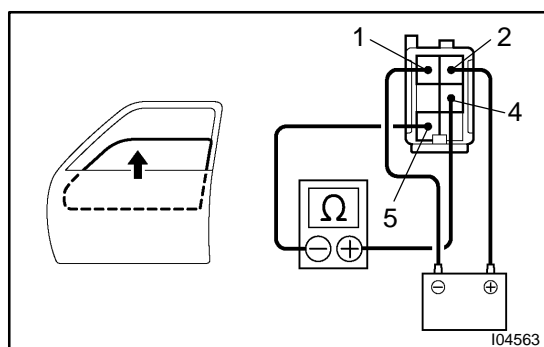
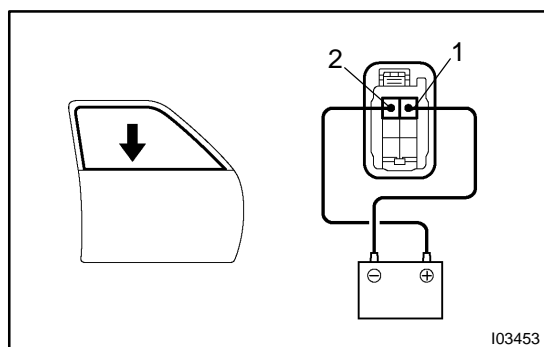
If operation is not as specified, replace the motor.



17. Rear RH door: INSPECT POWER WINDOW MOTOR PTC THERMISTOR OPERATION

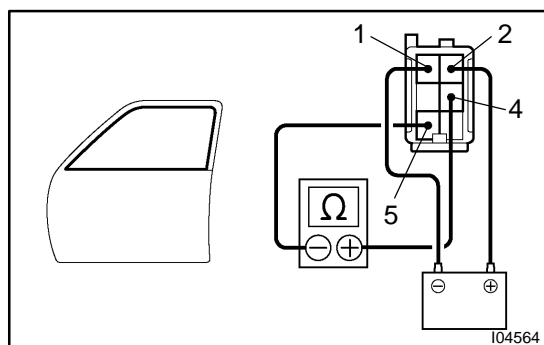
- (a) Disconnect the connector from the Rear RH door ECU.
- (b) Connect the positive (+) lead from the ammeter to terminal 2 on the wire harness side connector and the negative (-) lead to negative terminal of the battery.
- (c) Connect the positive (+) lead from the battery to terminal 1 on the wire harness side connector, and raise the window to the fully position.
- (d) Continue to apply voltage and check that the current changes to less than 1 A within 4 to 90 seconds.
- (e) Disconnect the leads from the terminals.
- (f) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the window begins to descend.

If operation is not as specified, replace the motor.



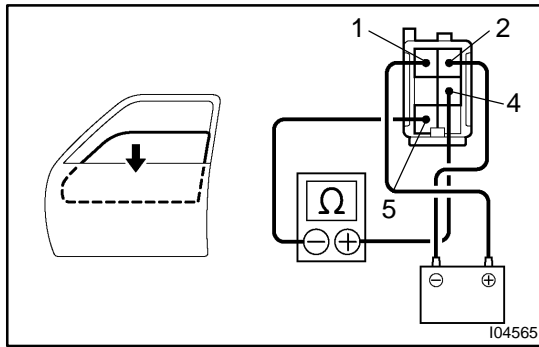
18. Driver's Door (Window Up): INSPECT JAM PROTECTION LIMIT SWITCH

- (a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (-) lead to terminal 5.
- (b) Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1.
- (c) Check that the continuity exists when the window goes up.

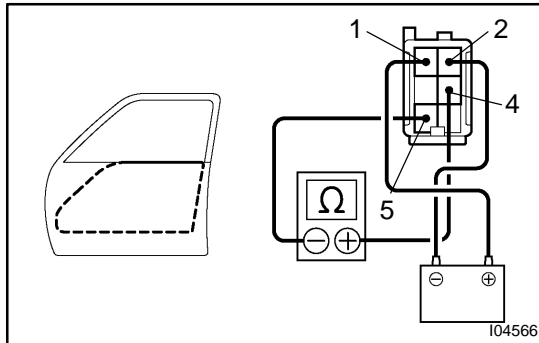


- (d) Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

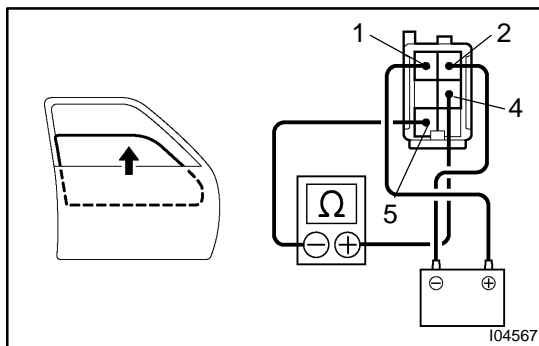
**19. Driver's Door (Window Down):****INSPECT JAM PROTECTION LIMIT SWITCH**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Check that the continuity exists when the window goes down.

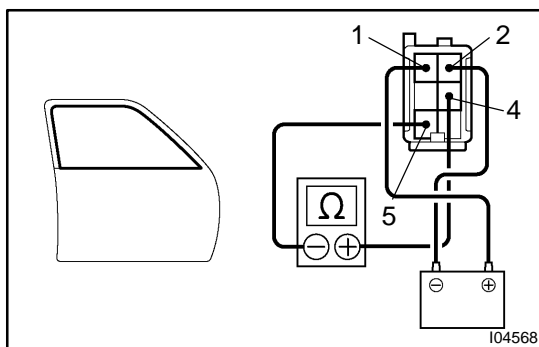


- Check that the no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.

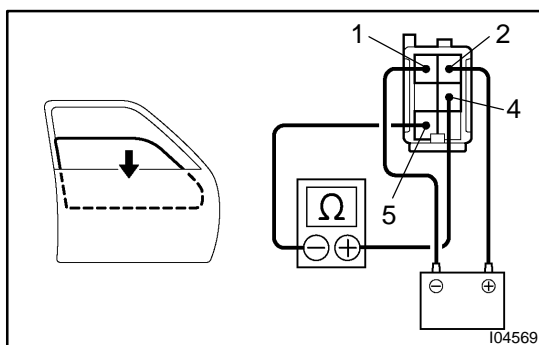
**20. Front Passenger's Door (Window Up):****INSPECT JAM PROTECTION LIMIT SWITCH**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Check that the continuity exists when the window goes up.

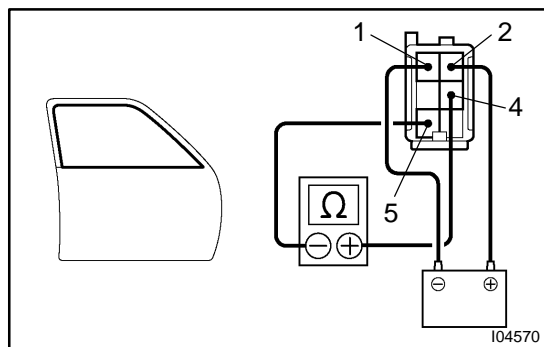


- Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

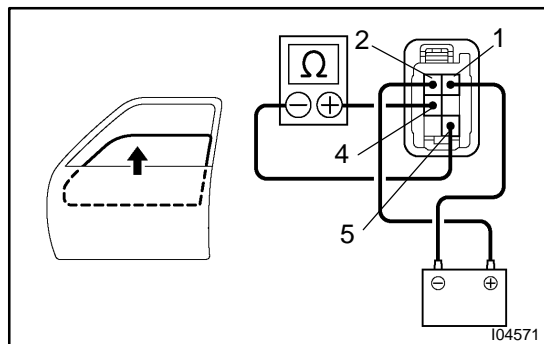
**21. Front Passenger's Door (Window Down):****INSPECT JAM PROTECTION LIMIT SWITCH**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1.
- Check that the continuity exists when the window goes down.



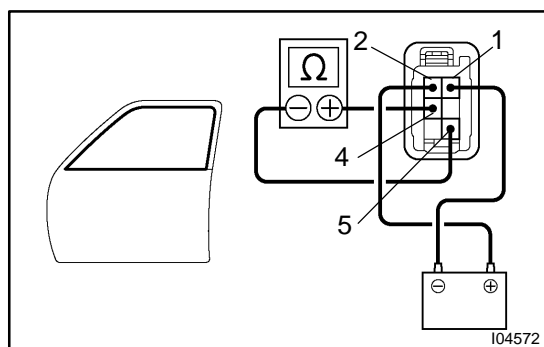
- (d) Check that the no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.



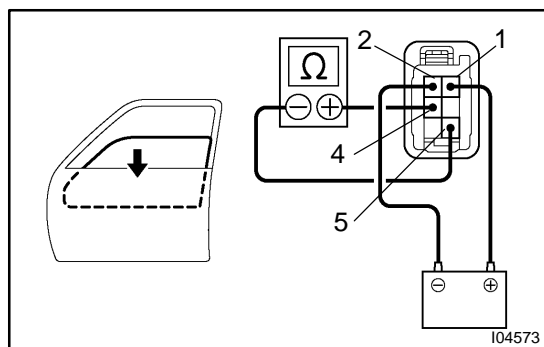
22. Rear LH Door (Window Up): INSPECT JAM PROTECTION LIMIT SWITCH

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1.
- Check that the continuity exists when the window goes up.



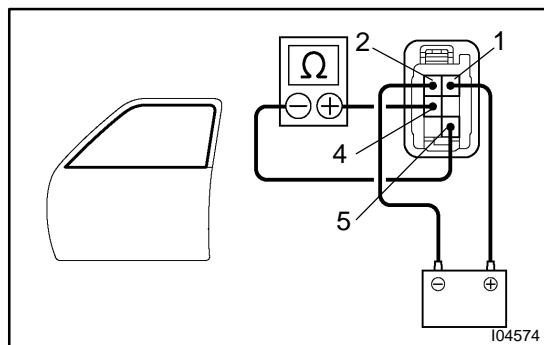
- (d) Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.



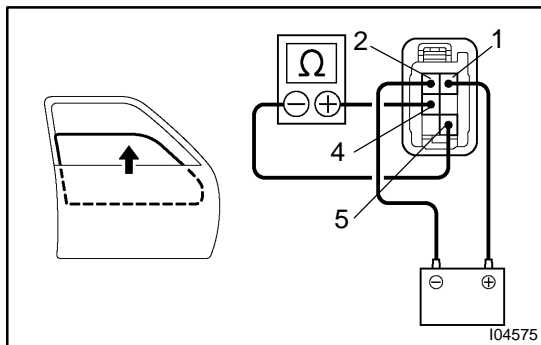
23. Rear LH Door (Window Down): INSPECT JAM PROTECTION LIMIT SWITCH

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (-) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Check that the continuity exists when the window goes down.

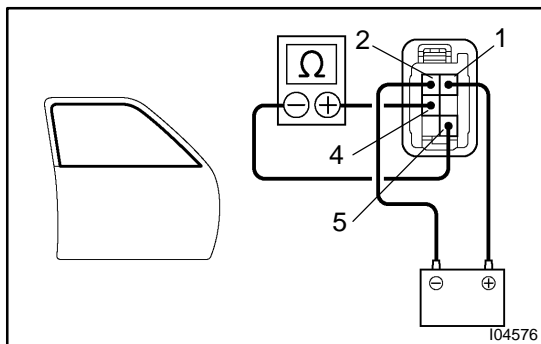


- (d) Check that the no continuity exists when the window is in the fully opened position.

If operation is not as specified, replace the motor.

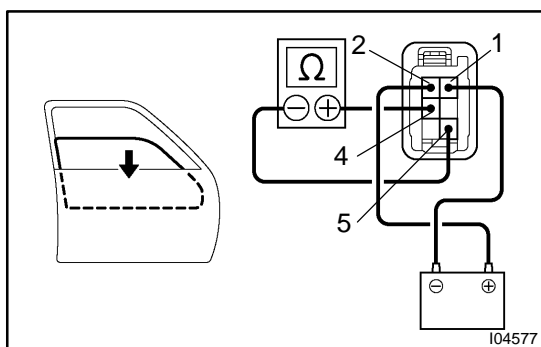
**24. Rear RH Door (Window Up):****INSPECT JAM PROTECTION LIMIT SWITCH**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
- Check that the continuity exists when the window goes up.

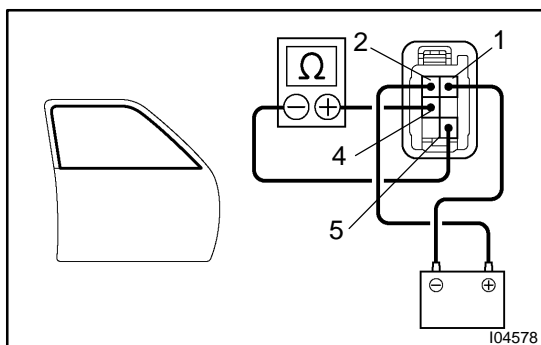


- Check that the no continuity exists when the window is in the fully closed position.

If operation is not as specified, replace the motor.

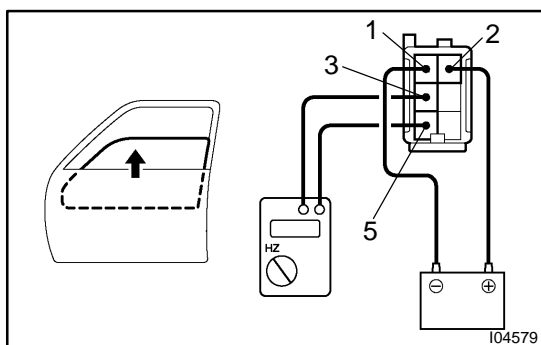
**25. Rear RH Door (Window Down):****INSPECT JAM PROTECTION LIMIT SWITCH**

- Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
- Check that the continuity exists when the window goes down.

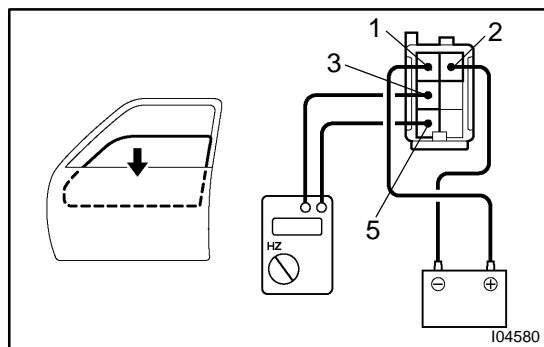


- Check that the no continuity exists when the window is in the fully opened position.

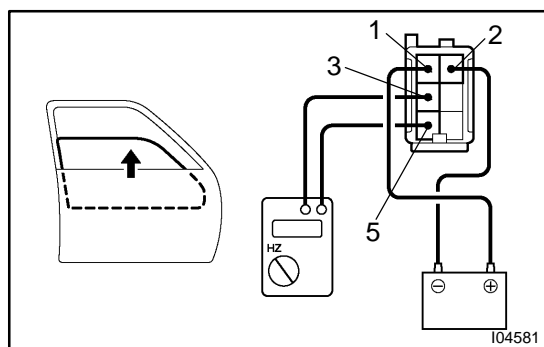
If operation is not as specified, replace the motor.

**26. Driver's Door:****INSPECT JAM PROTECTION PULSE SWITCH**

- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
- Check that pulse is generated during the motor running.

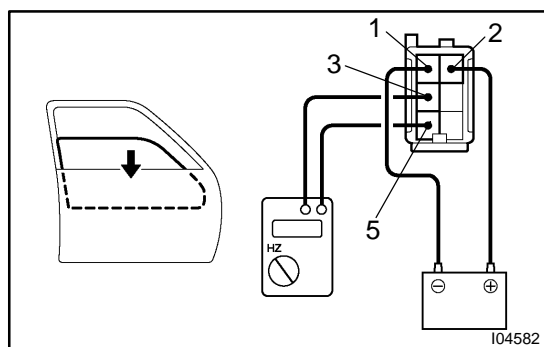


(d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

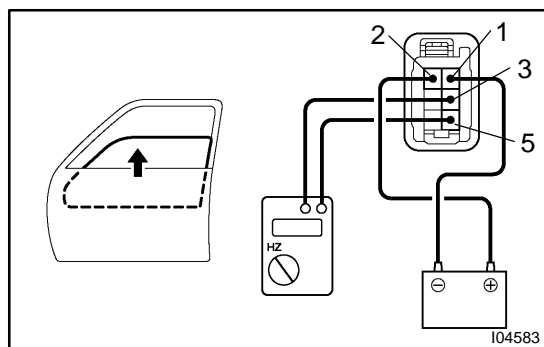


**27. Front Passenger's Door:
INSPECT JAM PROTECTION PULSE SWITCH**

- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
- Check that pulse is generated during the motor running.

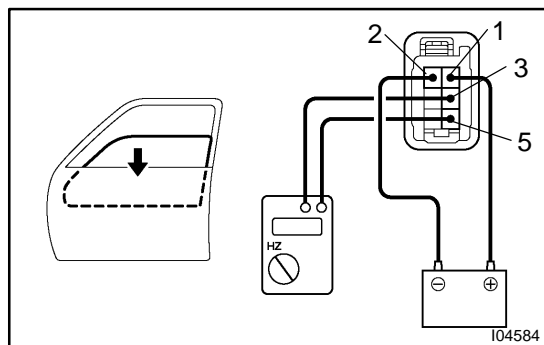


(d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

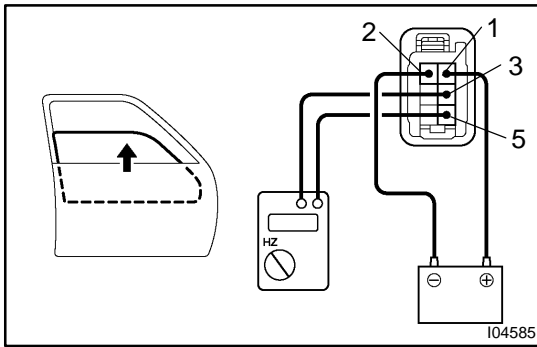


**28. Rear LH Door:
INSPECT JAM PROTECTION PULSE SWITCH**

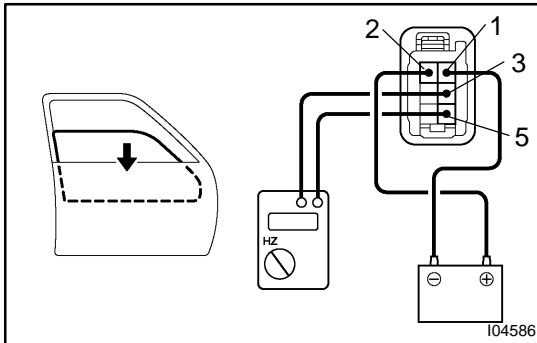
- Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (–) lead to terminal 5.
- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1.
- Check that pulse is generated during the motor running.



(d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

**29. Rear RH Door:****INSPECT JAM PROTECTION PULSE SWITCH**

- (a) Connect the positive (+) lead from the TOYOTA electrical tester to terminal 3 and the negative (–) lead to terminal 5.
- (b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2.
- (c) Check that pulse is generated during the motor running.



- (d) Reverse the polarity and check that pulse is generated. If operation is not as specified, replace the motor.

30. INSPECT JAM PROTECTION FUNCTION**NOTICE:**

Never, ever be caught any part of your body when checking.

HINT:

In case of performing resetting of the limit switch, do checking after repeating up and down of the glass with automatic operation.

- (a) Confirmation of AUTO up operation:
Confirm that the window will be fully close with AUTO up operation.
- (b) Checking of the operation of the jam protection function:
 - (1) Move up the window with AUTO up operation and check that the window will go down when it touches the handle of the hammer studded.
 - (2) Confirm that the window will then stop going down about 200 mm.

HINT:

In case of removing the glass, glass guide, regulator and etc. be sure to perform checking of the jam protection function.

If the jam protection is not function properly, adjust power window motor reset switch and pulse switch.

ADJUSTMENT

HOW TO RESET POWER WINDOW MOTOR (RESET SWITCH AND PULSE SWITCH)

If the jamprotection is not functioned properly, perform the following procedure.

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 (See page [BO-13](#), [BO-19](#)).

HINT:

Place the matchmarks on the power window motor and window regulator gear.

- (b) Connect the power window motor and power window switch to wire harness of the vehicle.
(c) Turn the ignition switch ON and operate the power window switch to idle the power window motor in UP side direction for more than 6 rotations or less than 10 rotates (4 seconds or more).
(d) 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.
- (e) Assemble the power window regulator and door glass.

HINT:

Never rotate the motor to the down direction until the completion of the window glass installation.

- (f) Connect power window switch to wire harness and turn the ignition switch ON.
(g) Repeat UP and DOWN operation several times manually.
(h) Check if AUTO UP → AUTO DOWN operates in automatic operation.

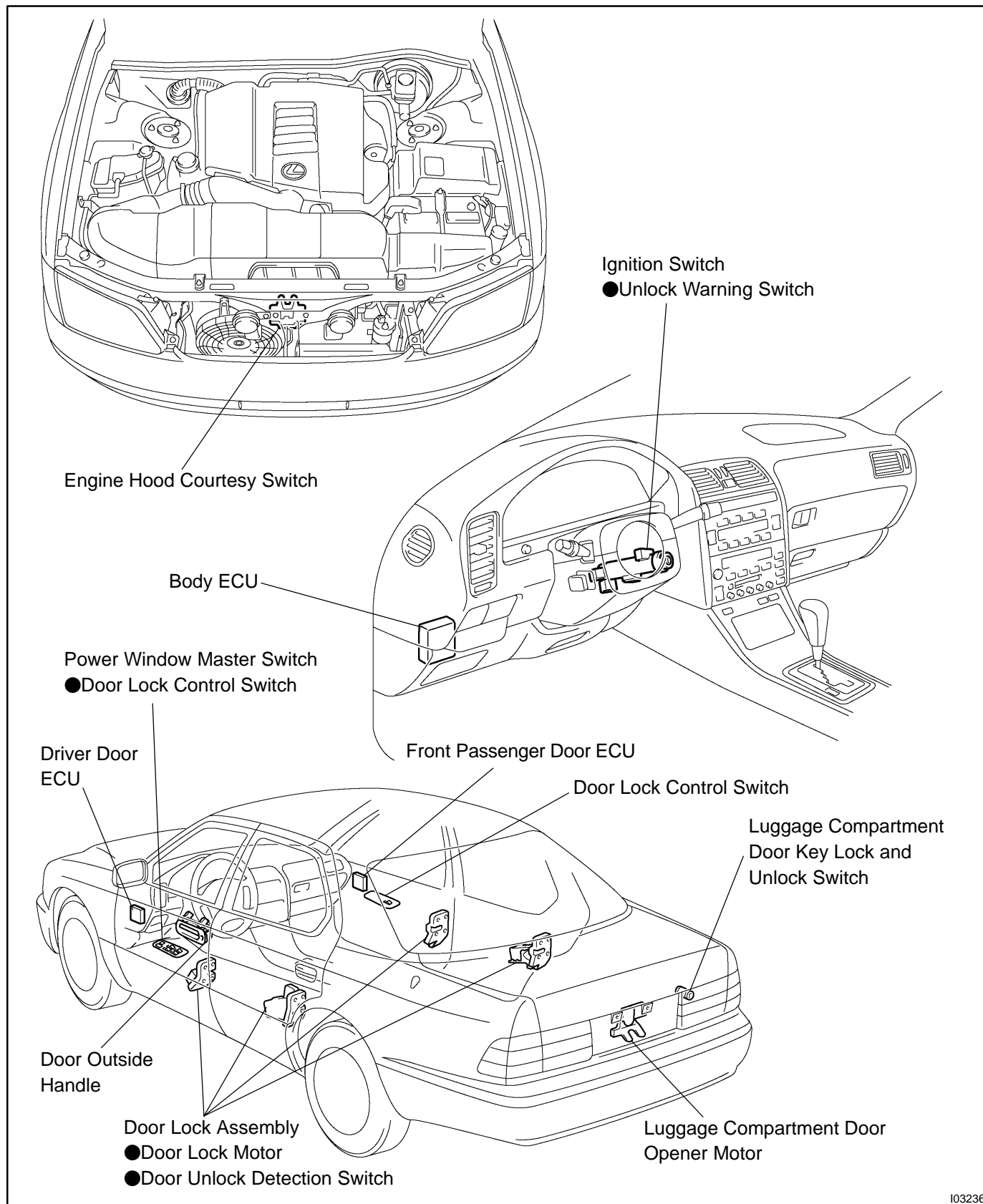
HINT:

- Take care that the jam protection function does not operate just after resetting.
 - Reset the regulator again when performing the reverse operating after closing the window fully by AUTO UP operation.
- (i) Check the power window function.

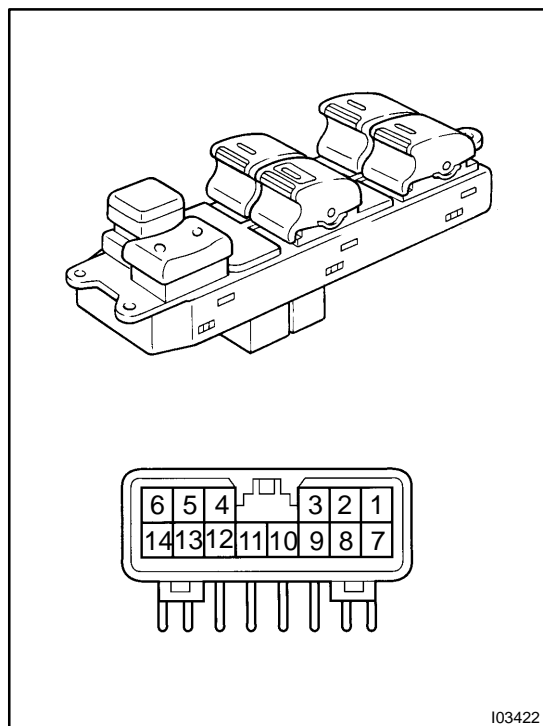
POWER DOOR LOCK CONTROL SYSTEM

LOCATION

BE0CC-01



103236



I03422

INSPECTION

1. INSPECT POWER WINDOW MASTER SWITCH CONTINUITY

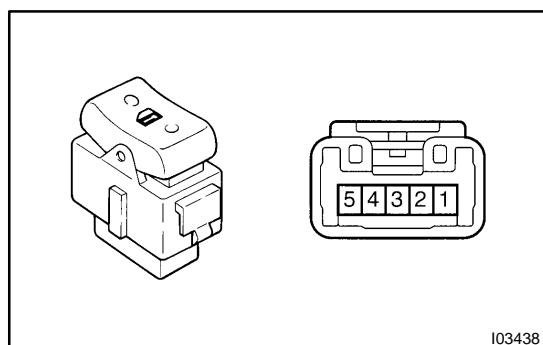
Master Switch: Driver's Door Lock Manual Switch

Switch position	Tester connection	Specified condition
LOCK	6 – 11	Continuity
OFF	–	No continuity
UNLOCK	11 – 14	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

2. INSPECT POWER WINDOW MASTER SWITCH CIRCUIT (See page BE-126)



I03438

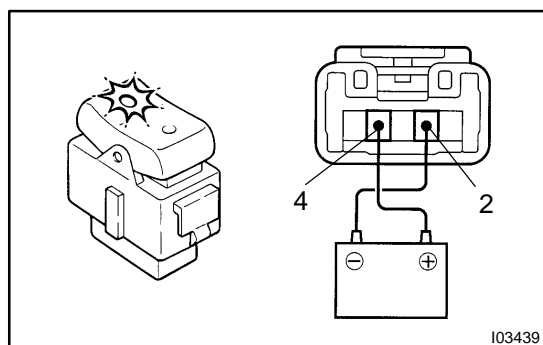
3. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	2 – 3	Continuity
OFF	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

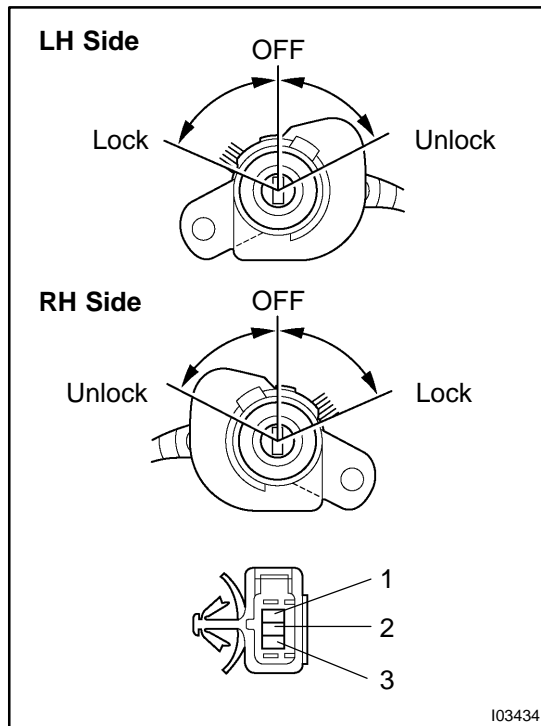
4. INSPECT PASSENGER'S DOOR LOCK CONTROL SWITCH CIRCUIT (See page DI-769)



I03439

5. INSPECT PASSENGER'S DOOR LOCK CONTROL INDICATOR LIGHT OPERATION

Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 2, and check that the indicator light does not light up, replace the switch.



6. INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
LOCK	1 – 2	Continuity
OFF	–	No continuity
UNLOCK	2 – 3	Continuity

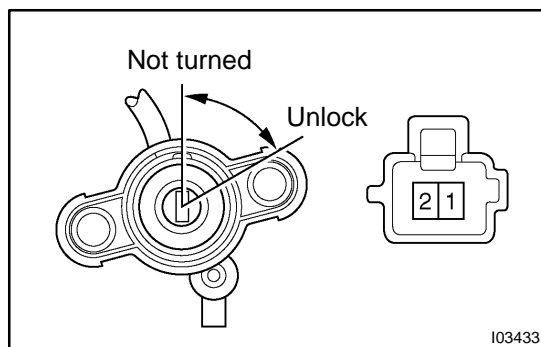
If continuity is not as specified, replace the switch.

HINT:

Door key lock and unlock switch is built into the front door lock assembly.

If continuity is as specified, inspect the switch circuit.

7. **Driver's door:**
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT (See page [DI-743](#))
8. **Passenger's door:**
INSPECT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT (See page [DI-775](#))



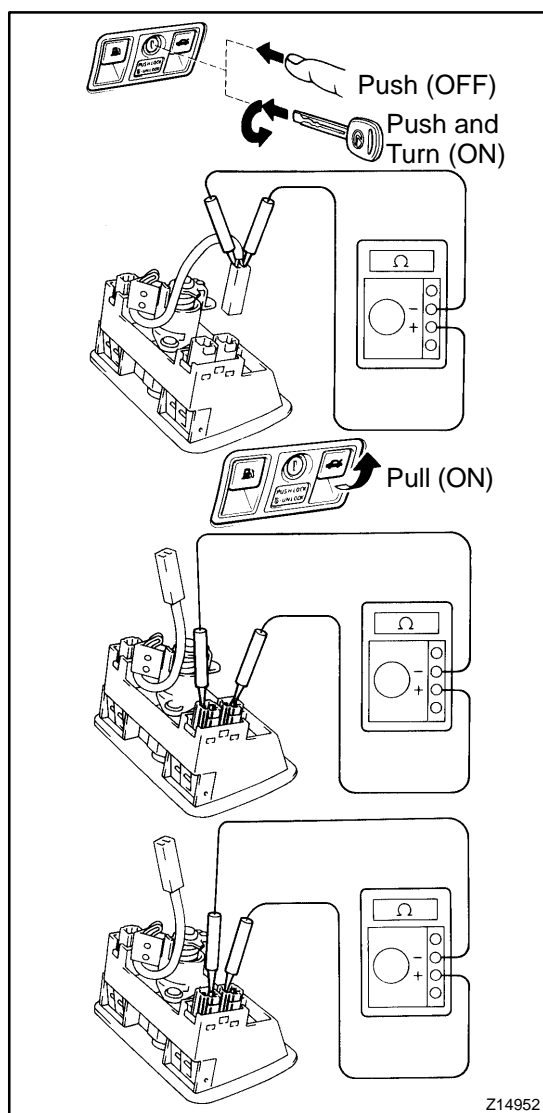
9. INSPECT LUGGAGE COMPARTMENT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Not turned	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

10. **INSPECT LUGGAGE COMPARTMENT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT (See page [DI-711](#))**



11. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Push)	–	No continuity
ON (Push and turn)	1 – 2	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

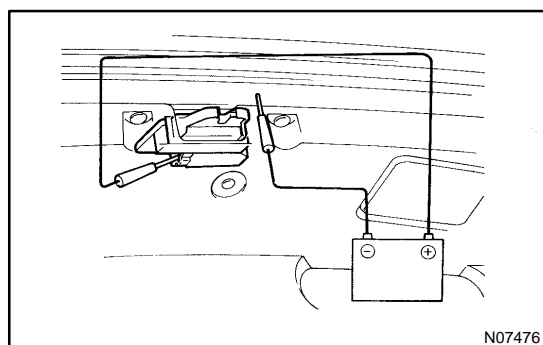
12. INSPECT LUGGAGE COMPARTMENT DOOR OPENER SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF	2 – B	Continuity
ON (Pull)	1 – L 2 – B	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

13. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MAIN SWITCH AND OPENER SWITCH CIRCUIT (See page [DI-692](#))

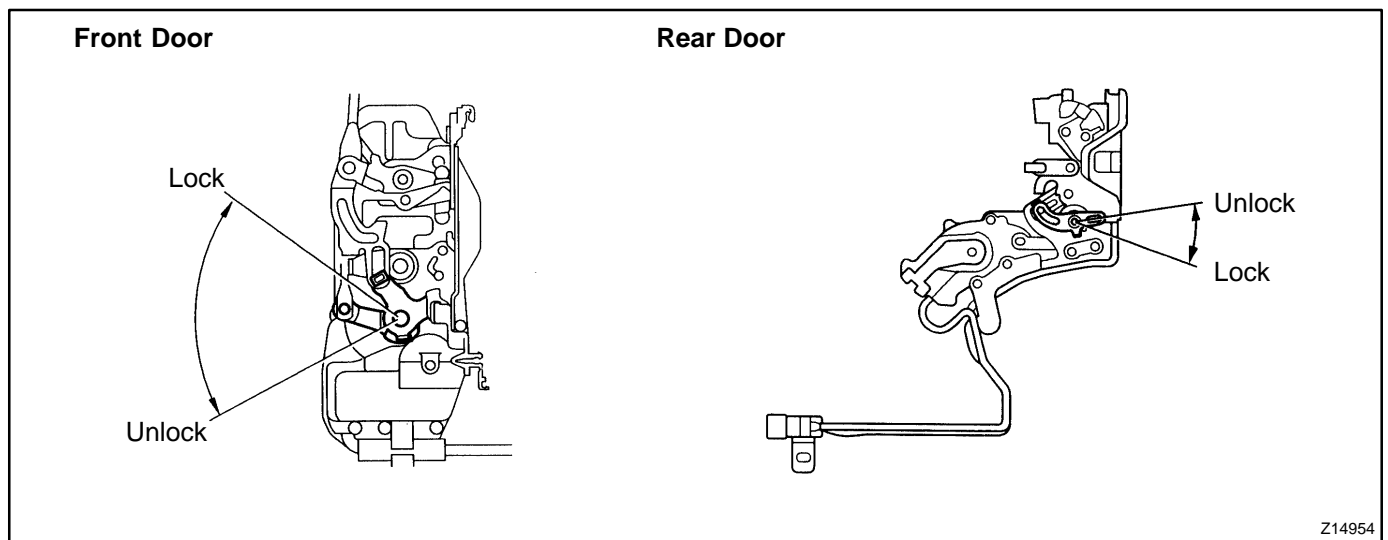


14. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR OPERATION

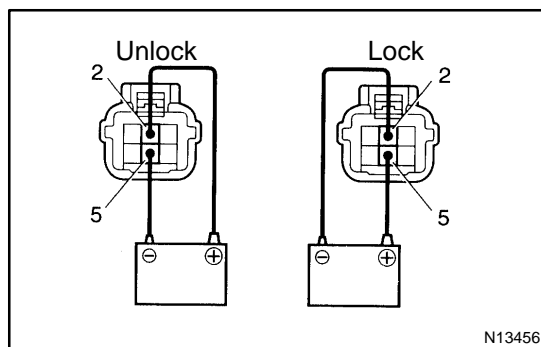
Connect positive (+) lead to the opener motor connector and negative (–) lead to the body of the opener motor, and check that the motor operates.

15. INSPECT LUGGAGE COMPARTMENT DOOR OPENER MOTOR CIRCUIT (See page [DI-694](#))

16. INSPECT DOOR LOCK MOTOR OPERATION



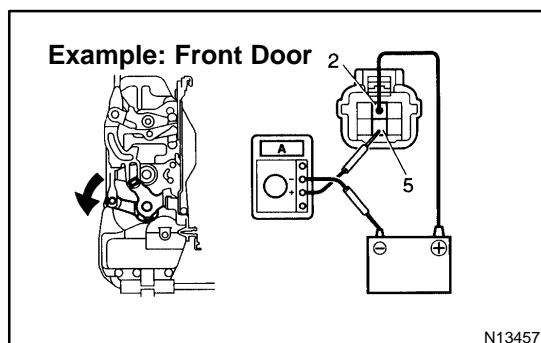
Z14954



N13456

- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 5, and check that the door lock link moves to UNLOCK position.
- Reverse the polarity and check that the door lock link move to LOCK position.

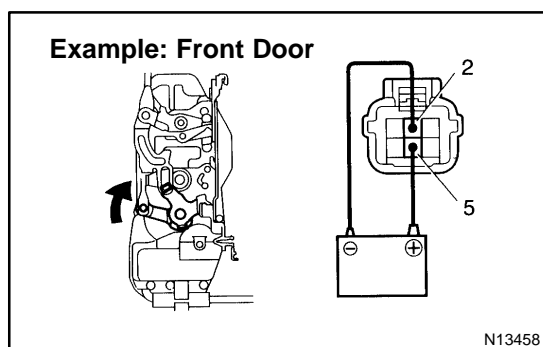
If operation is not as specified, replace the door lock assembly.



N13457

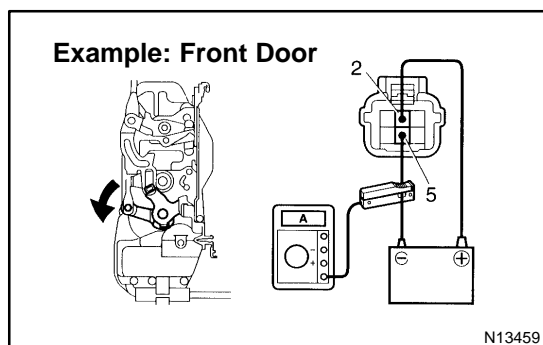
17. Using an ammeter: INSPECT POWER DOOR LOCK MOTOR PTC THERMISTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2.
- Connect the positive (+) lead from the ammeter to terminal 5 and the negative (-) lead to battery negative (-) terminal, and check that the current changes from approximately 3.2 ampere to less than 0.5 ampere with 20 to 70 seconds.



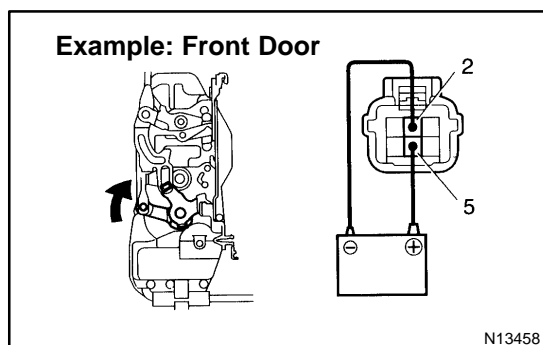
- (c) Disconnect the leads from terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 2, and check that the door lock moves to LOCK position.

If operation is not as specified, replace the door lock assembly.



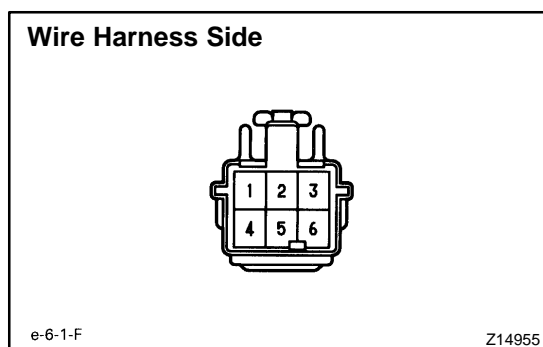
18. Using an ammeter with a current-measuring probe: INSPECT POWER DOOR LOCK MOTOR PTC THERMISTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 5.
- (b) Attach a current-measuring probe to either the positive (+) lead or the negative (–) lead, and check that the current changes from approximately 3.2 ampere to less than 0.5 ampere within 20 to 70 seconds.



- (c) Disconnect the leads from terminals.
- (d) Approximately 60 seconds later, reverse the polarity, then check that the door lock moves to LOCK position.

If operation is not as specified, replace the door lock assembly.



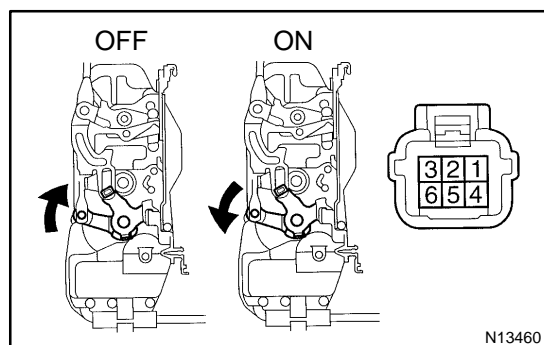
19. INSPECT POWER DOOR LOCK MOTOR CIRCUIT

- (a) Disconnect the connector from the motor.
- (b) Connect the connector to the driver door ECU, front passenger door ECU and Body ECU.
- (c) Inspect the connector on the wire harness side, as shown.

If the circuit is not as specified, inspect the circuits connected to other parts.

Tester connection	Condition	Specified condition
2 – Ground	Ignition switch ON and door lock control switch LOCK	No voltage
2 – Ground	Ignition switch ON and door lock control switch UNLOCK	Battery positive voltage
5 – Ground	Ignition switch ON and door lock control switch UNLOCK	No voltage
5 – Ground	Ignition switch ON and door lock control switch LOCK	Battery positive voltage

2 – Ground	Ignition switch ON and master switch LOCK	No voltage
2 – Ground	Ignition switch ON and master switch UNLOCK	Battery positive voltage
5 – Ground	Ignition switch ON and master switch UNLOCK	No voltage
5 – Ground	Ignition switch ON and master switch LOCK	Battery positive voltage



20. INSPECT DOOR UNLOCK DETECTION SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
OFF (Door lock set to LOCK)	–	No continuity
ON (Door lock set to UNLOCK)	1 – 4	Continuity

If continuity is not as specified, replace the door lock assembly.

HINT:

Door unlock detection switch is built into the door lock assembly.

If continuity is as specified, inspect the door lock assembly circuit.

21. Driver's door:

INSPECT DOOR LOCK ASSEMBLY CIRCUIT
(See page [DI-741](#))

22. Front passenger's door:

INSPECT DOOR LOCK ASSEMBLY CIRCUIT
(See page [DI-773](#))

23. Rear left door:

INSPECT DOOR LOCK ASSEMBLY CIRCUIT
(See page [DI-803](#))

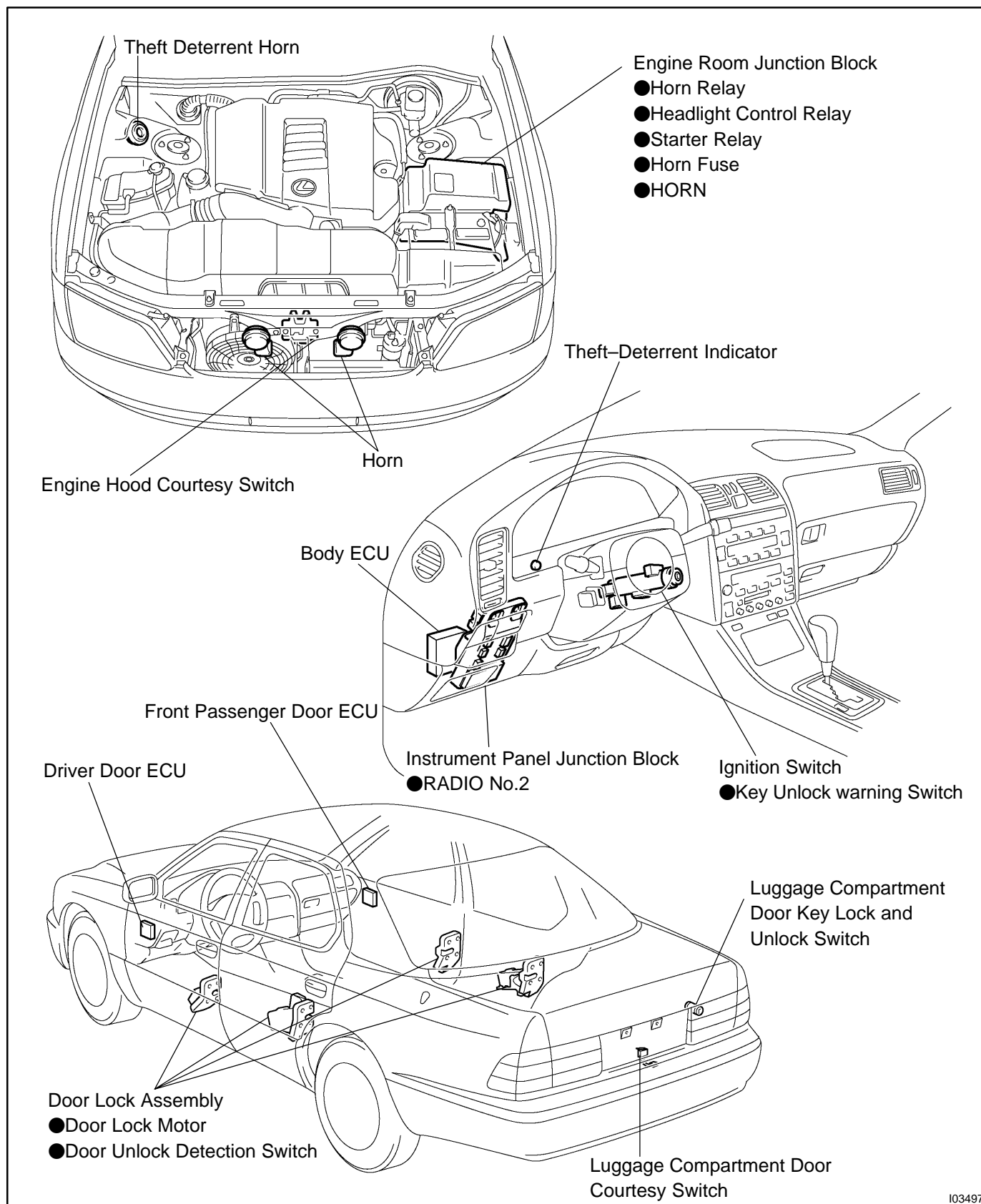
24. Rear right door:

INSPECT DOOR LOCK ASSEMBLY CIRCUIT
(See page [DI-826](#))

THEFT DETERRENT SYSTEM

LOCATION

BE0CE-01



103497

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 luggage compartment 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. (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 luggage compartment 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 luggage) 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.

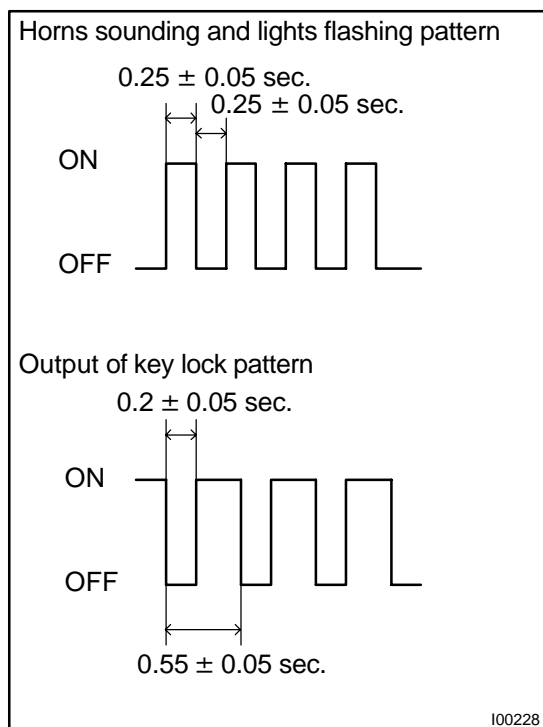
Setting Processes:

- (1) Remove the ignition key from the key cylinder.
- (2) Open and close any entry points (door, hood and luggage compartment door).
Now, all the entry points are closed.

- (3) About 30 seconds after the above process—(2), 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 0.55 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
- (3) The system receives panic signal from remote keyless entry. *3

*1: Only active arming mode.

*2: When the ignition key is not inserted in the key cylinder.

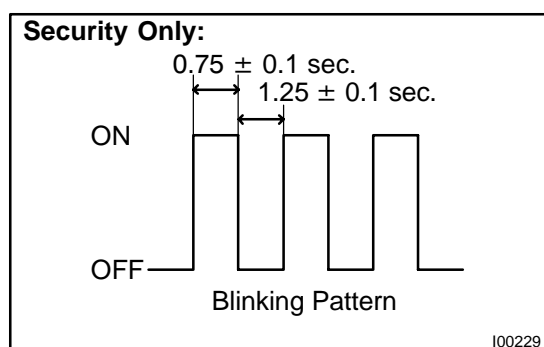
4. CANCELLATION OF THEFT DETERRENT OPERATION OR MODE

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 or keyless entry.	Uneffective	Effective
6	Unlock the luggage compartment door with the keyless entry.	Uneffective	Effective
7	If the system receives panic signal again or unlock signal 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, if all doors are closed.

*2: The alarm by the panic signal becomes the previous condition.



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

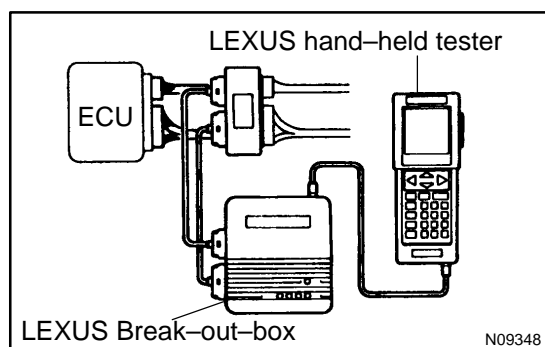
*: By the following 2 cases, the indicator flashes with the output from the immobiliser.

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.

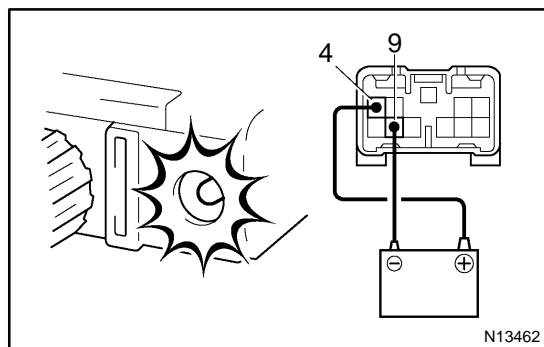
7. CHANGING METHOD OF PASSIVE MODE (ON or OFF)

Using a hand-held tester, the mode can be changed to the passive mode.



8. ECU TERMINAL VALUES MEASUREMENT BY USING LEXUS BREAK-OUT-BOX AND LEXUS HAND-HELD TESTER

- (a) Hook up the LEXUS break-out-box and LEXUS 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 LEXUS hand-held tester has a "Snapshot" function. This records the measured data and is effective in the diagnosis of intermittent problems.



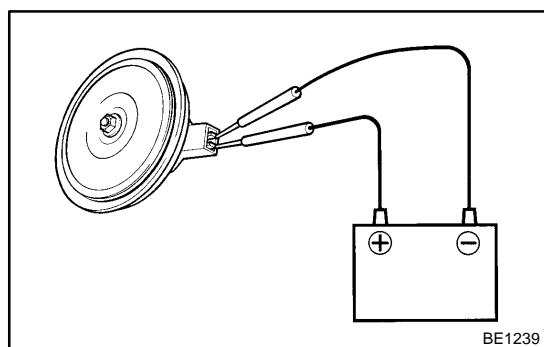
INSPECTION

1. INSPECT RHEOSTAT LIGHT CONTROL VOLUME OPERATION

Connect the positive (+) lead from the battery to terminal 4 and negative (–) lead to terminal 9, and check that the warning light lights up.

If operation is not as specified, replace the rheostat light control volume.

2. INSPECT RHEOSTAT LIGHT CONTROL VOLUME CIRCUIT (See page BE-62)

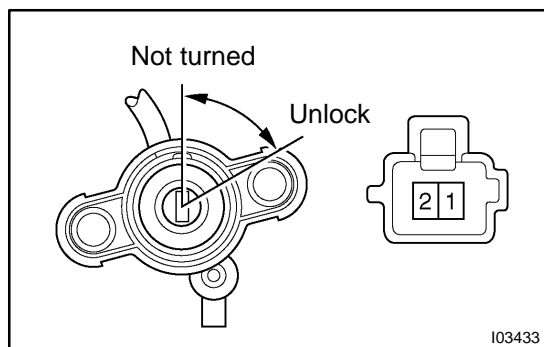


3. INSPECT HORN OPERATION

Connect positive (+) lead to terminal 1 and negative (–) lead to terminal 2 of theft deterrent horn connector, and that the theft deterrent horn blows.

If operation is not as specified, replace the horn.

4. INSPECT HORN CIRCUIT (See page DI-717)



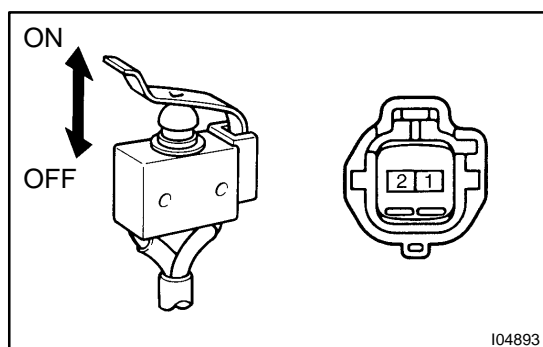
5. LUGGAGE COMPARTMENT DOOR KEY LOCK AND UNLOCK SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
Not turned	–	No continuity
UNLOCK	1 – 2	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

6. LUGGAGE COMPARTMENT DOOR KEY LOCK AND UNLOCK SWITCH CIRCUIT (See page DI-711)

**7. ENGINE HOOD COURTESY SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
LOCK	–	No continuity
UNLOCK	1 – 2	Continuity

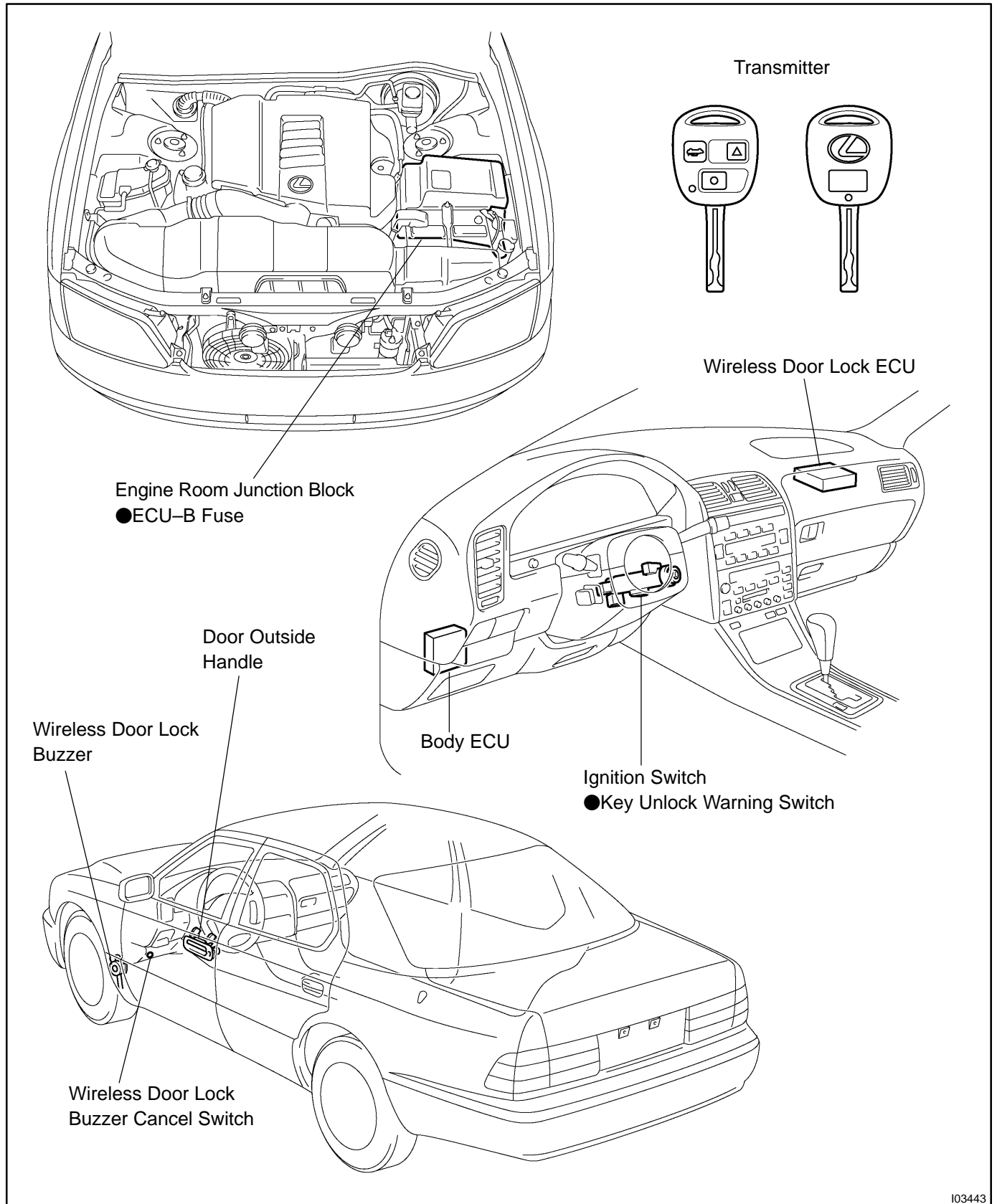
If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

8. ENGINE HOOD COURTESY SWITCH CIRCUIT
(See page [DI-707](#))

WIRELESS DOOR LOCK CONTROL SYSTEM LOCATION

BE0CH-01



103443

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.)

Make the vehicle in the initialized condition:

The initialized condition is the condition when the following conditions are satisfied.

- (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.
- (4) Wireless door lock control switch (Buzzer switch) is ON.

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 to the right direction from the outside handle of a driver's seat.
- (2) Face the transmitter toward the vehicle and press one of transmitter switches for about 1 sec.

<Reference>

●As of the security function, even the wireless function is normal, there may be the case that only UNLOCK operation will not work.

●As of the UNLOCK operation times adjustment function of body customize function, when using LEXUS hand-held tester to set "operation twice", only driver's seat is unlocked by unlock operation performed once.

No

Yes

Transmitter LED inspection:

Check when pressing UNLOCK switch and LOCK switch under standard operation, that the transmitter LED lights up one more once.

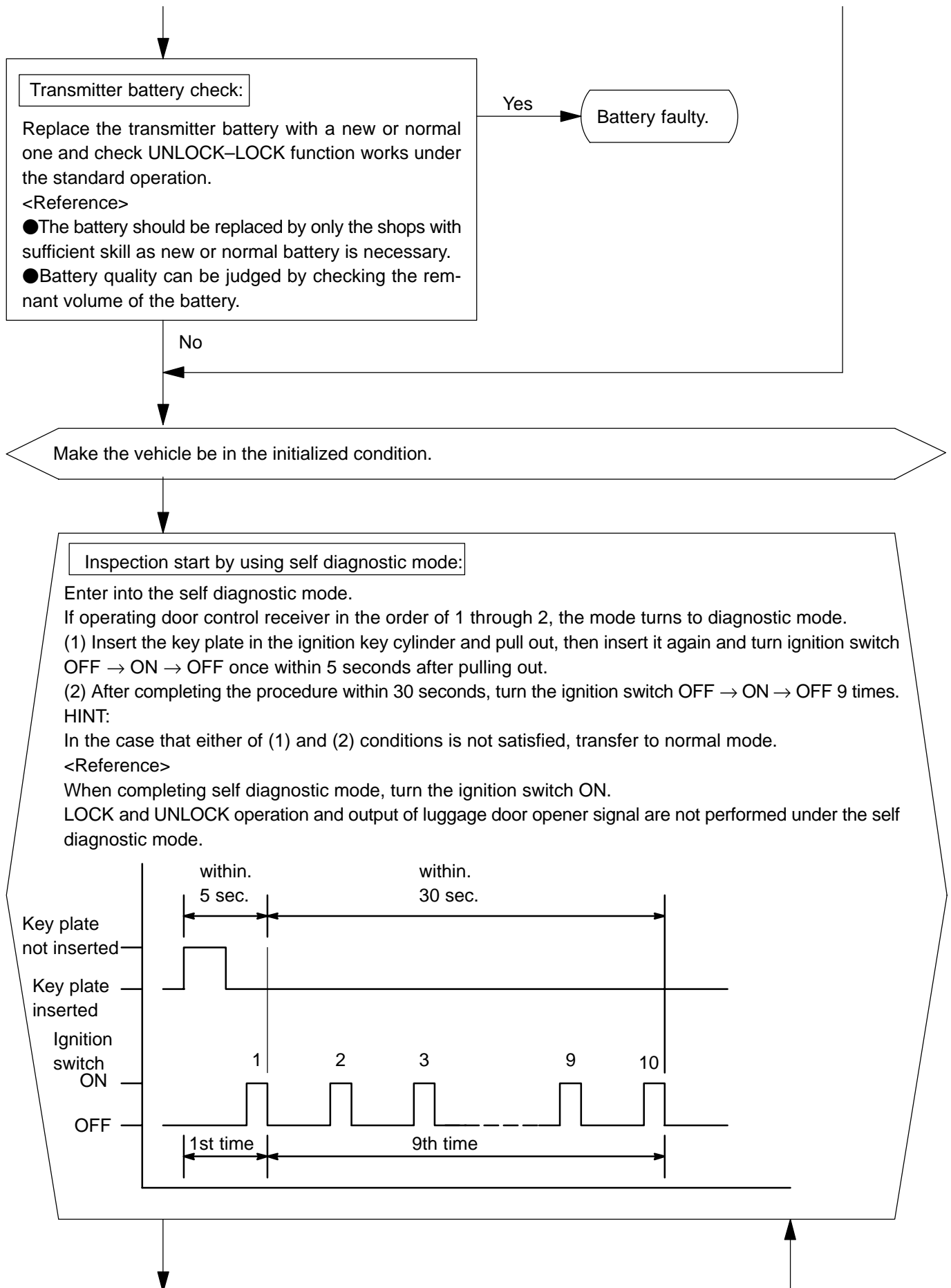
No

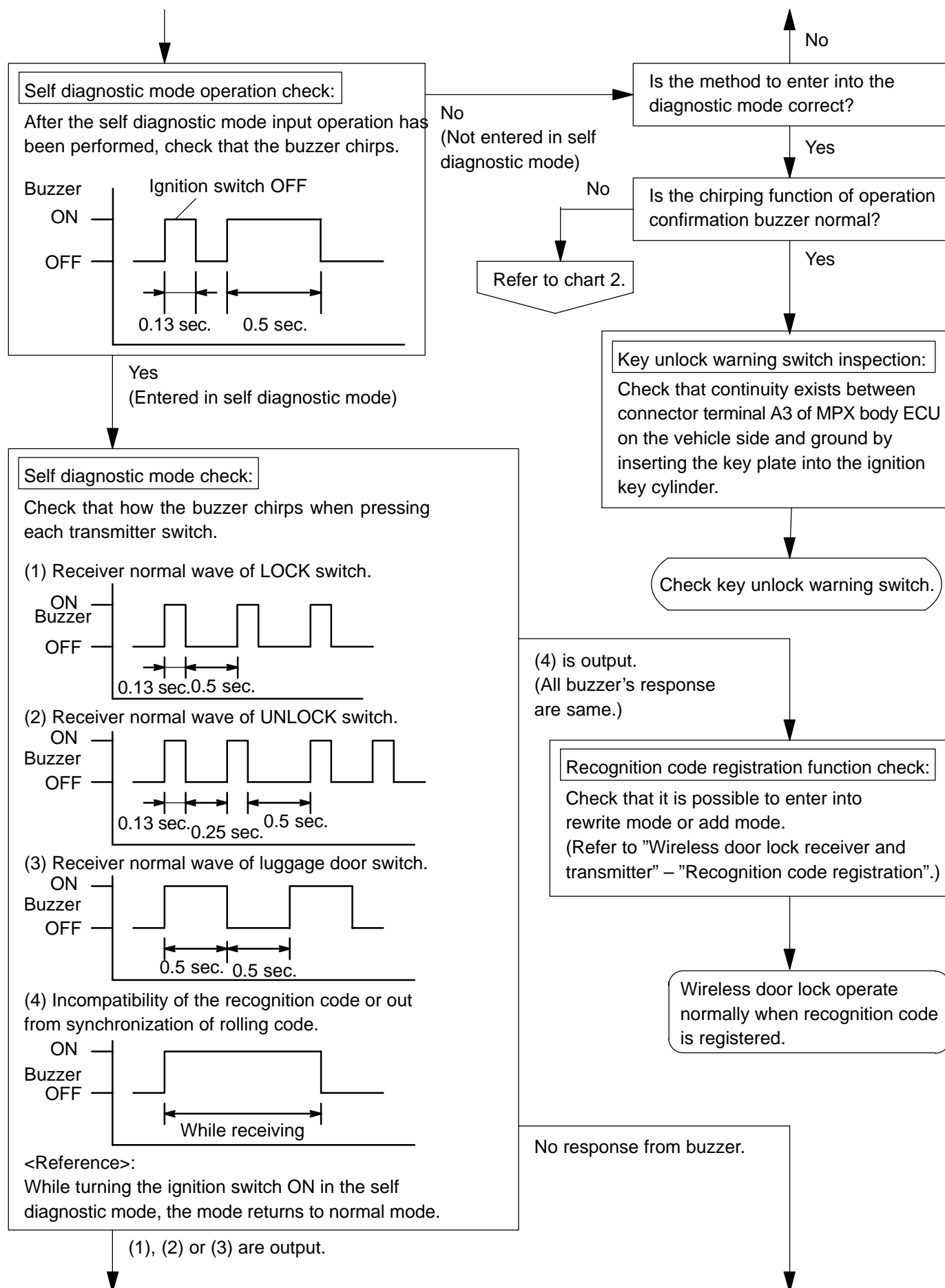
Yes

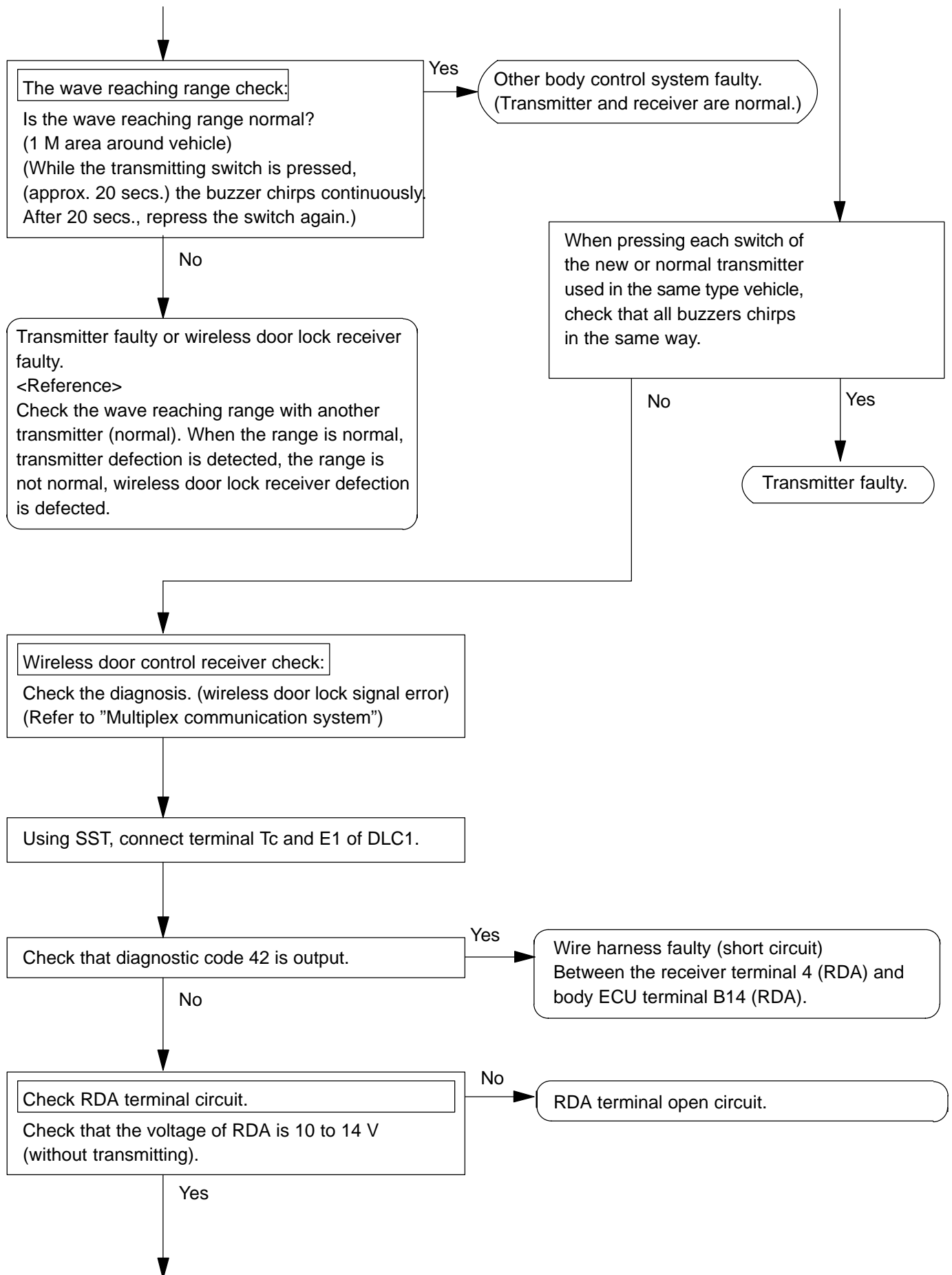
Normal

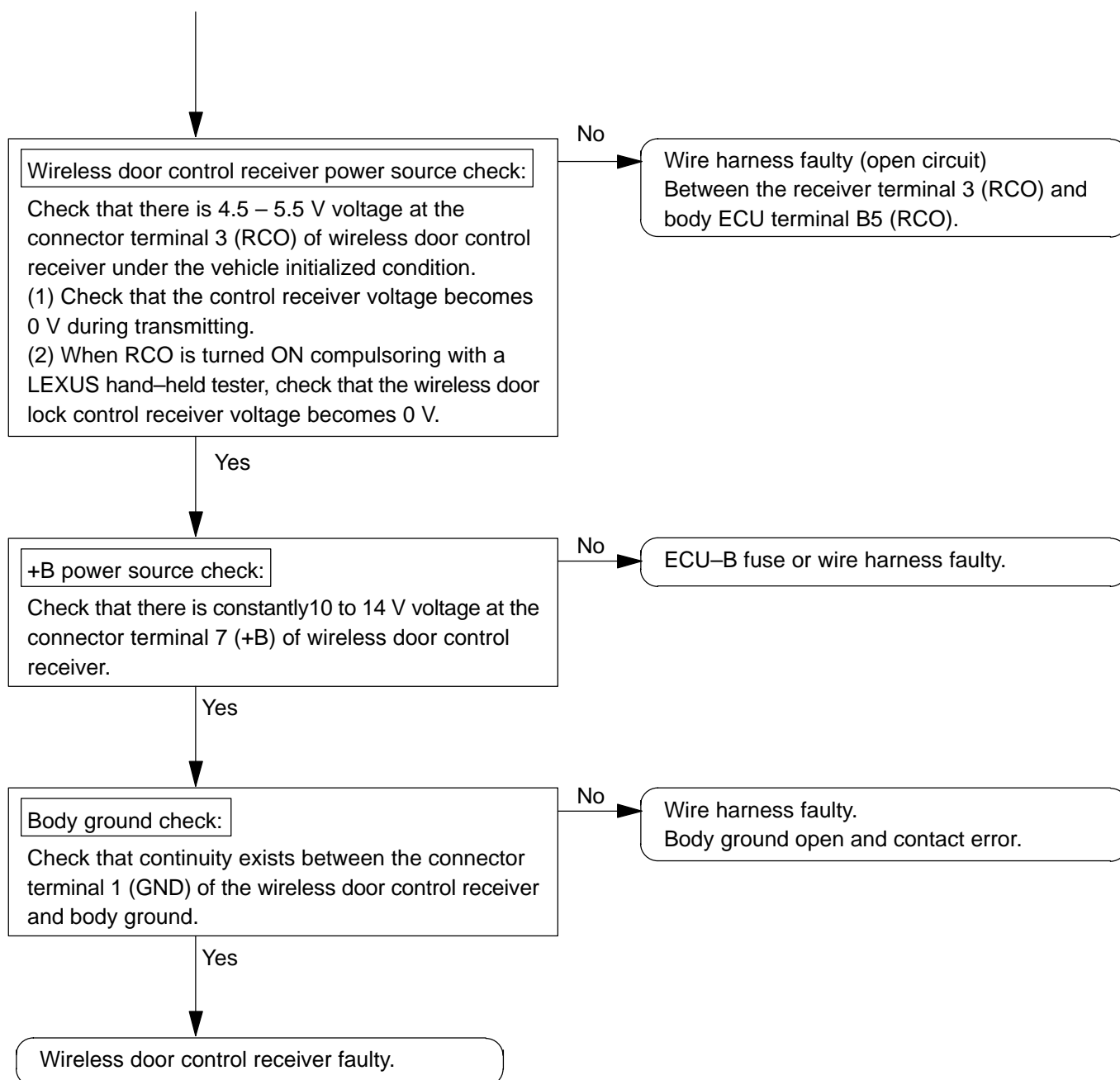
<Reference>

- Operative distance may differ according to an operator, the way of holding the transmitter or position.
- Because weak electric wave is used, when there is strong wave or noise in the used frequency, operation distance might be shortened.

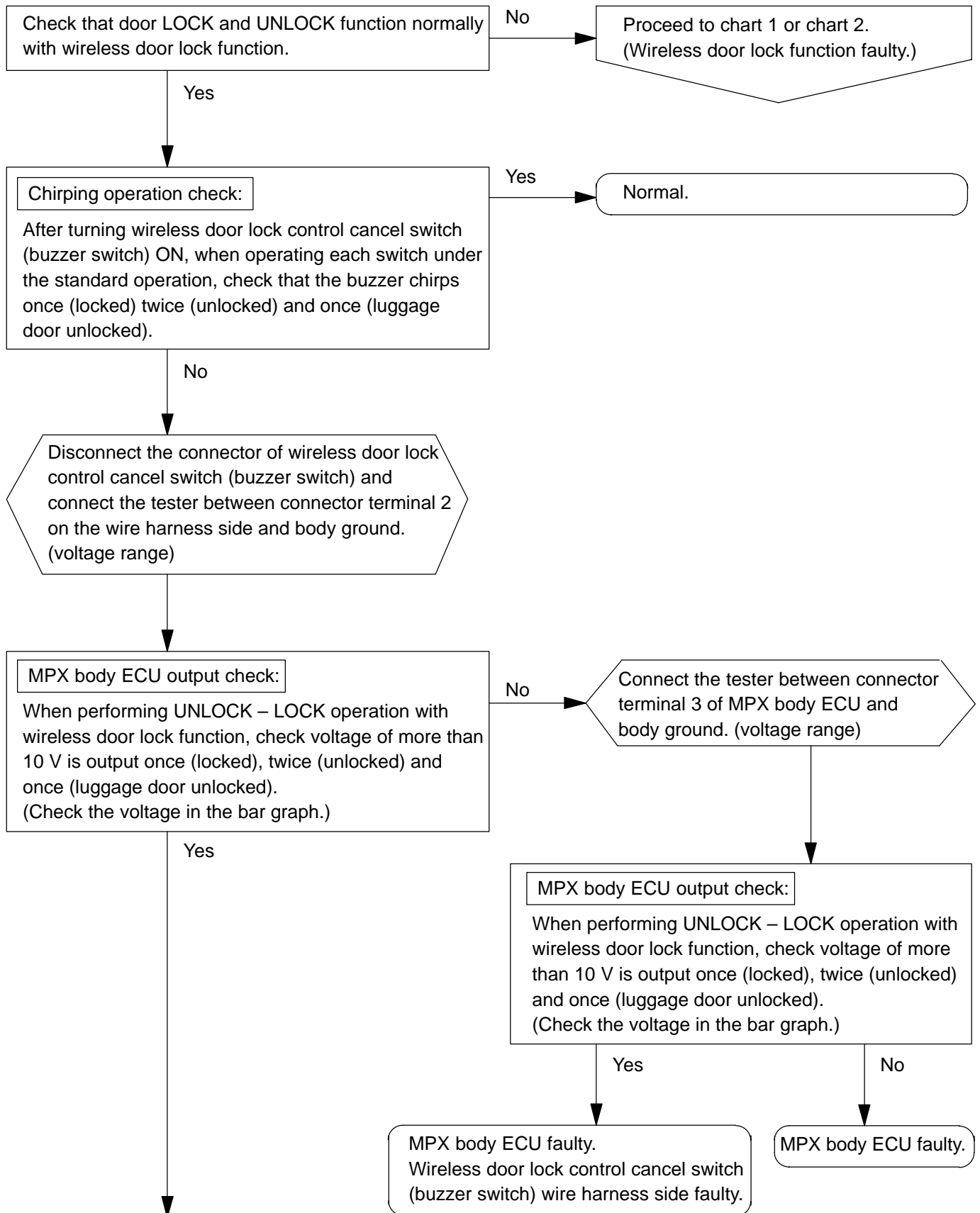


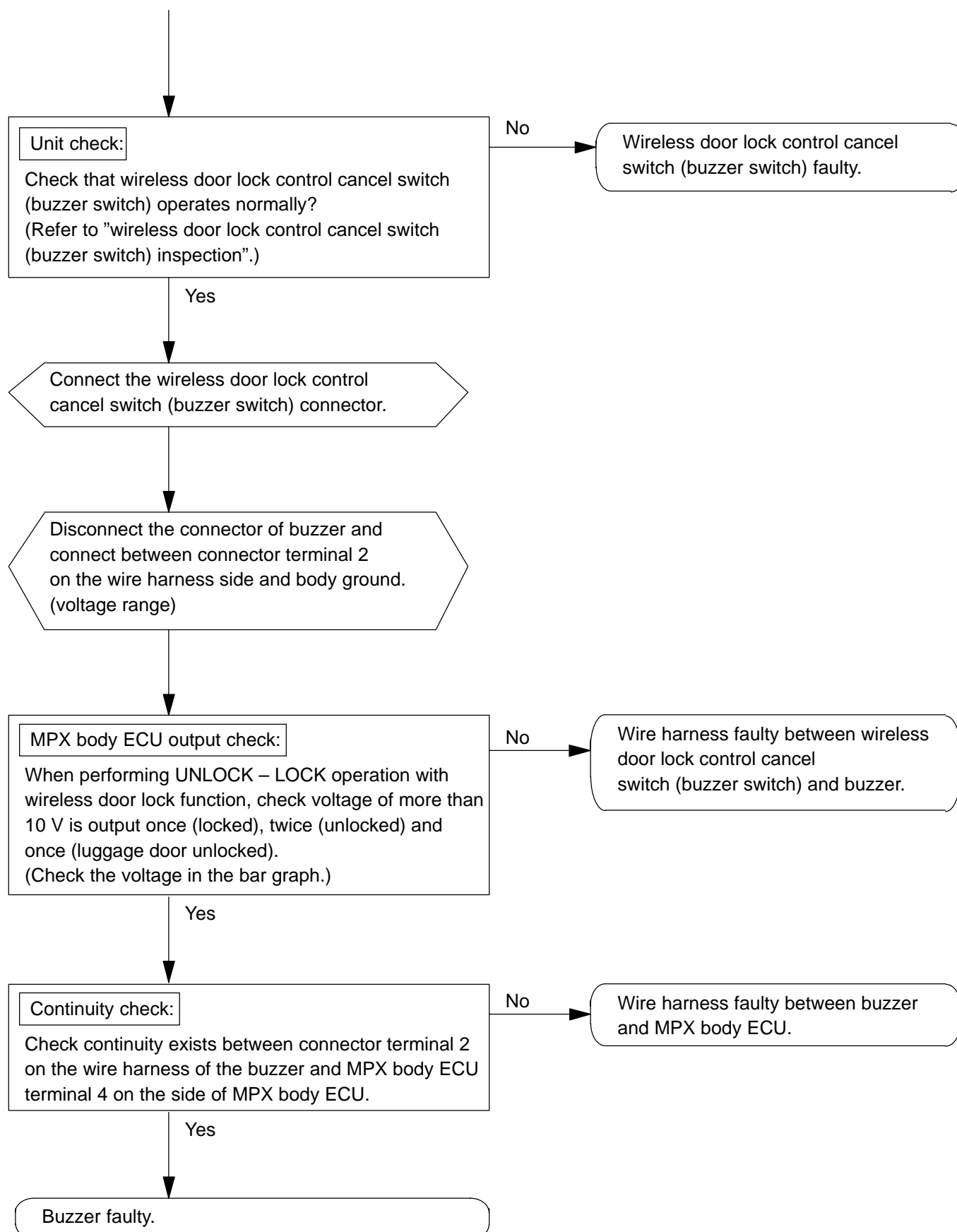






2 Wireless door lock buzzer does not chirp.





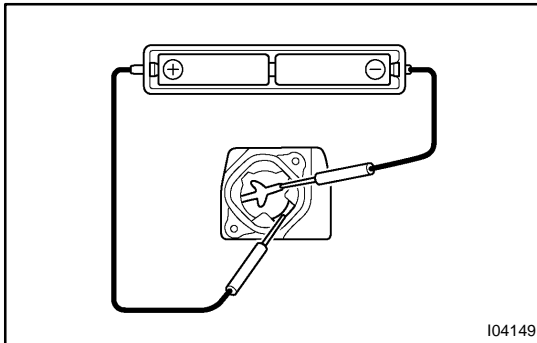
INSPECTION

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.
- LED lights up more than once.

HINT:

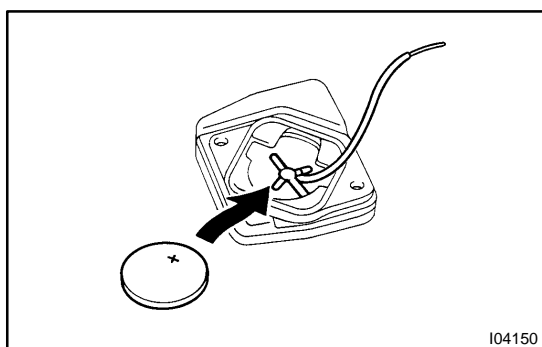
- The minimum operation distance differs according to operator, the way of holding, and location.
 - As weak wave is used, operation distance might be shortened when noise is detected in strong wave or used frequency.
- (e) Install the battery (lithium battery).
 - (f) Install a cover so that O-ring is not distorted or slipped off.
 - (g) Using a screwdriver, tighten the screw.

2. CHECK BATTERY CAPACITY

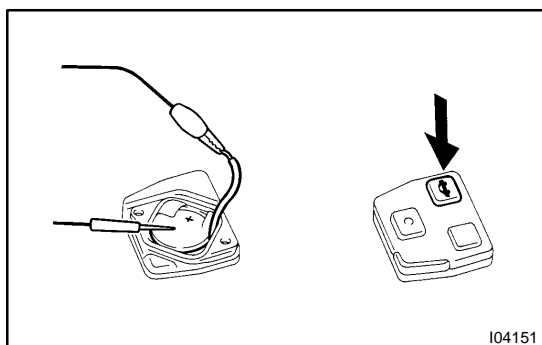
HINT:

- 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 k Ω).



- (a) Remove the screws and 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.

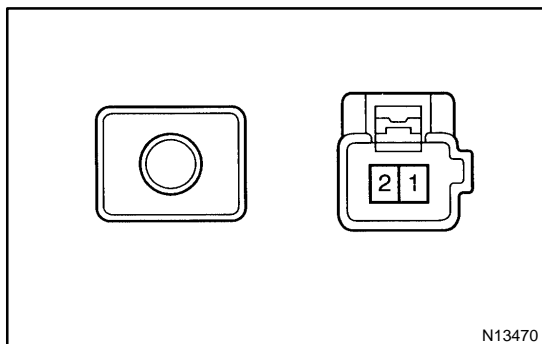


- (d) Connect the (+) tester to the (+) battery (lithium battery), and (–) tester to the lead respectively.
- (e) Press one of the transmitting switches on the transmitter for approx. 1 second.
- (f) Press the transmitting switch on the transmitter again to check the voltage.

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 0.8 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, so that the O-ring is not distorted or slipped off.
- (j) Using a screwdriver, tighten the screws.



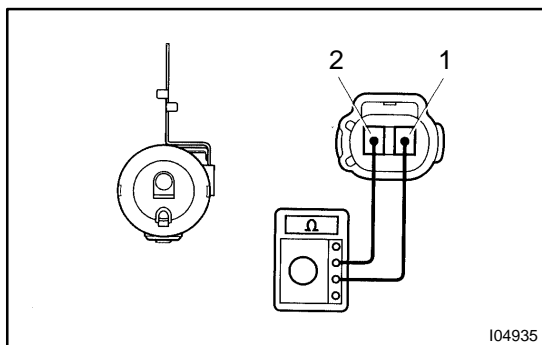
3. INSPECT WIRELESS DOOR LOCK CONTROL CANCEL SWITCH

Switch position	Tester connection	Specified condition
OFF	–	No continuity
ON	1 – 2	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

4. INSPECT WIRELESS DOOR LOCK CONTROL CANCEL SWITCH CIRCUIT (See page DI-689)

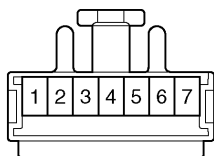


5. INSPECT WIRELESS DOOR LOCK BUZZER OPERATION

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.

6. INSPECT WIRELESS DOOR LOCK BUZZER CIRCUIT (See page DI-689)

Wire Harness Side

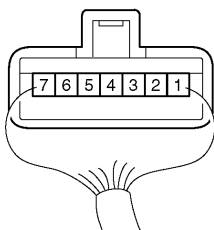
I04152

**7. Connector disconnected:
INSPECT WIRELESS DOOR LOCK CONTROL RE-
CEIVER CIRCUIT**

Disconnect the connector from the receiver and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
7 – Ground	Constant	Continuity
1 – Ground	Constant	Battery positive voltage

If the circuit is not as specified, inspect the circuit connected to other parts.

From Back Side

I04153

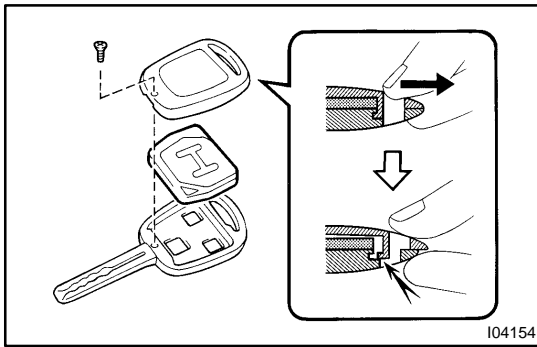
**8. Connector connected:
INSPECT WIRELESS DOOR LOCK CONTROL RE-
CEIVER CIRCUIT**

Connect the wire harness side connector to the receiver and inspect the wire harness side connector from the back side, as shown.

Tester connection	Condition	Specified condition
3 – Ground	Ignition switch position OFF Key removed Transmitter OFF → ON	4.5 – 5.5 V → below 1 V
3 – Ground	Ignition switch position OFF Key removed Transmitter OFF → ON	4.5 – 5.5 V → below 1 V
4 – Ground	Ignition switch position OFF Key removed Transmitter OFF	10 – 14 V

If circuit is as specified, replace the receiver.

If the circuit is not as specified, inspect the circuit connected to other parts.



REPLACEMENT

1. REPLACE TRANSMITTER (LITHIUM) BATTERY

NOTICE:

Special caution should be taken for handling each component as they are precision electronic components.

(a) Using a screwdriver, remove the screw and cover.

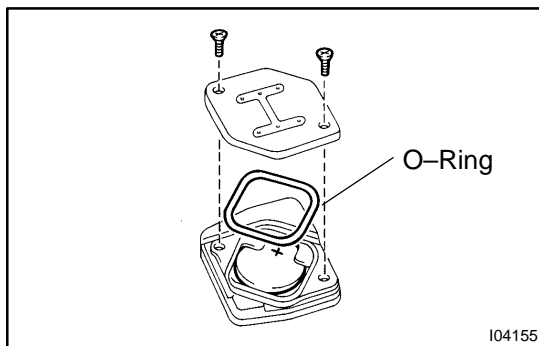
NOTICE:

Do not pry out the cover forcibly.

HINT:

Push the cover with a finger as shown in the illustration, so that there becomes clearance, then pry out the cover from that clearance.

(b) Remove the transmitter.

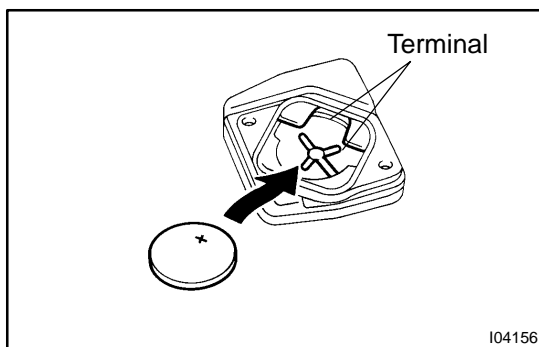


(c) Using a screwdriver, remove the 2 screws and cover.

(d) Remove the battery (lithium battery).

NOTICE:

- Do not push the terminals with a finger.
- If prying up the battery (lithium battery) forcibly to remove, the terminals are deformed.



(e) Install a battery (lithium battery) as shown in the illustration.

NOTICE:

Face the battery upward. Take care not to deform the terminals.

(f) Check that O-ring is not distorted or slipped off, and install the cover.

(g) Using a screwdriver, tighten the 2 screws.

NOTICE:

When the screws are tightened loosely, it might cause faulty contact of battery (lithium battery) and terminals.

(h) Assemble the transmitter to the key plate and the cover.

(i) Using a screwdriver, tighten the screw.

2. REPLACE DOOR CONTROL RECEIVER AND TRANSMITTER

NOTICE:

When replacing the door control receiver and transmitter, registration of recognition code is necessary because they are provided as a single components.

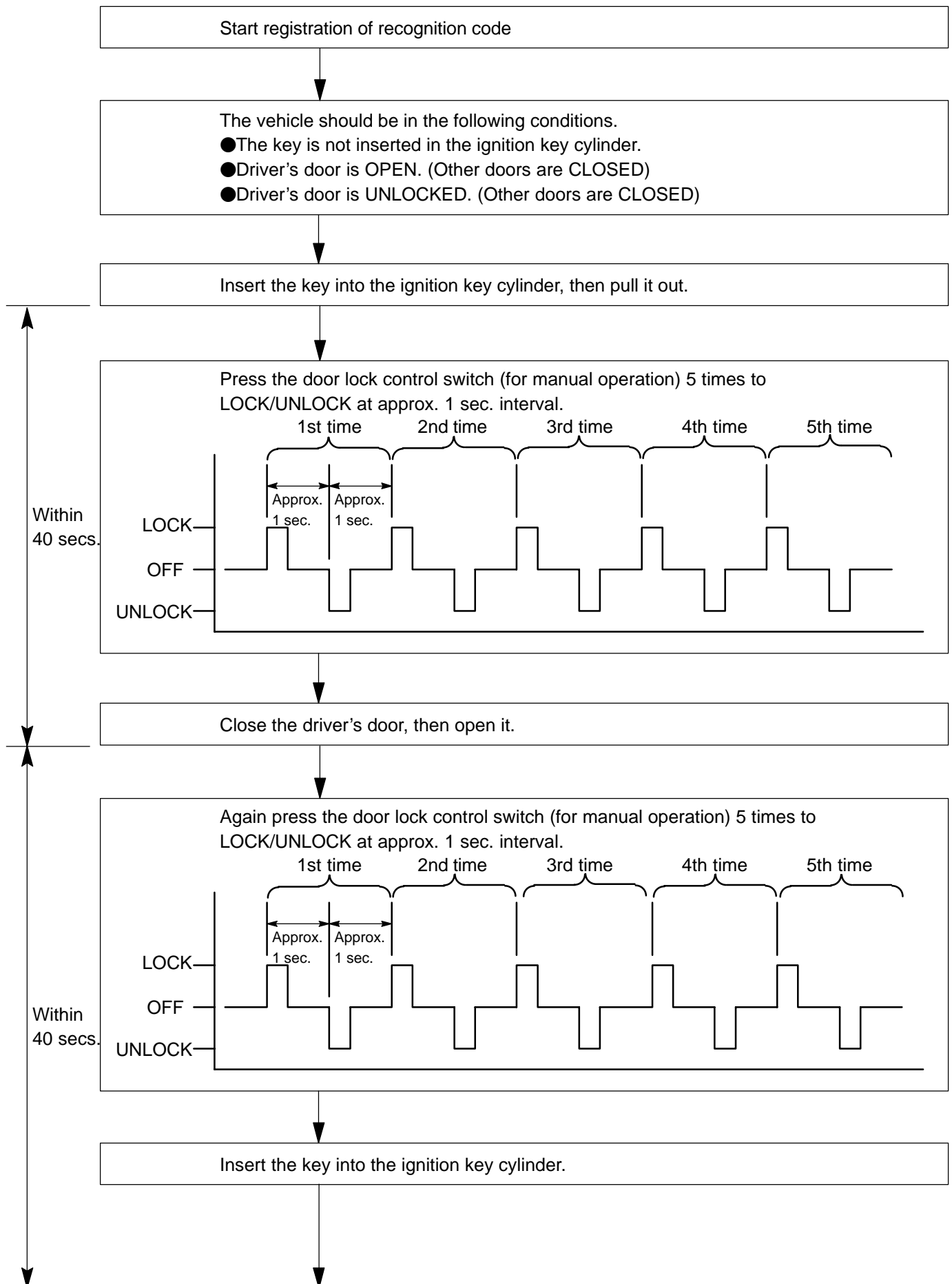
- (a) Select the operation mode to perform from the following operation modes.
- ☐ Add mode
 - ☐ Rewrite mode
 - ☐ Prohibition mode
 - ☐ Confirmation mode

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 are already registered before you register additional recognition codes.
- (b) Follow the chart on the following page to register the transmitter recognition code at the wireless door lock control receiver.

HINT:

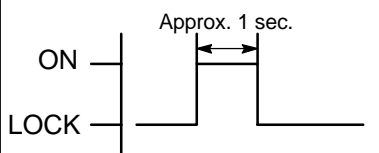
- ☐ When procedure is out of the specified, the operation returns to normal operation.
- ☐ Maximum 4 recognition codes can be registered.



Turn the ignition switch from ON to LOCK at approx. 1 sec. interval 1 to 5 times to select the mode.

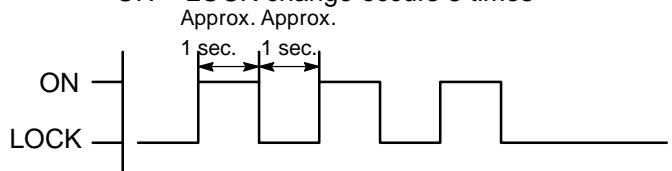
Add mode

ON – LOCK change occurs 1 time



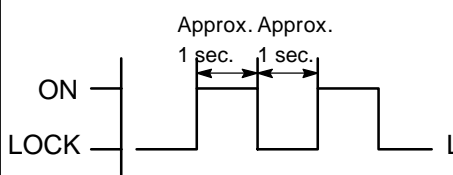
Confirmation mode

ON – LOCK change occurs 3 times



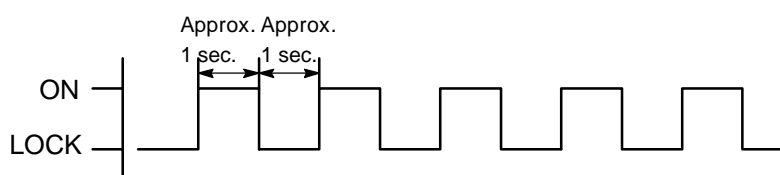
Rewrite mode

ON – LOCK change occurs 2 times



Prohibition mode

ON – LOCK change occurs 5 times



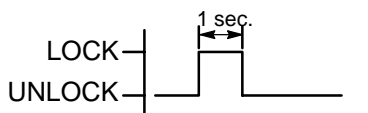
Pull out the key plate from the ignition key cylinder.

When add mode or rewrite mode is selected.

MPX 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.

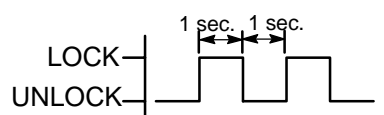
LOCK–UNLOCK occurs once

Indicates that add mode has been selected.



LOCK–UNLOCK occurs twice

Indicates that rewrite mode has been selected.



Within 3 secs.

When prohibition mode is selected.

When confirmation mode is selected.

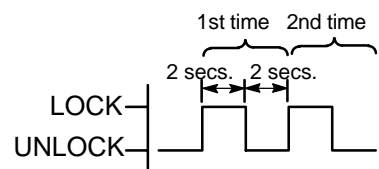
MPX body ECU automatically performs the LOCK–UNLOCK operation 1 to 4 times at 2 sec. interval to inform the operator of the number of the registered codes.

HINT:

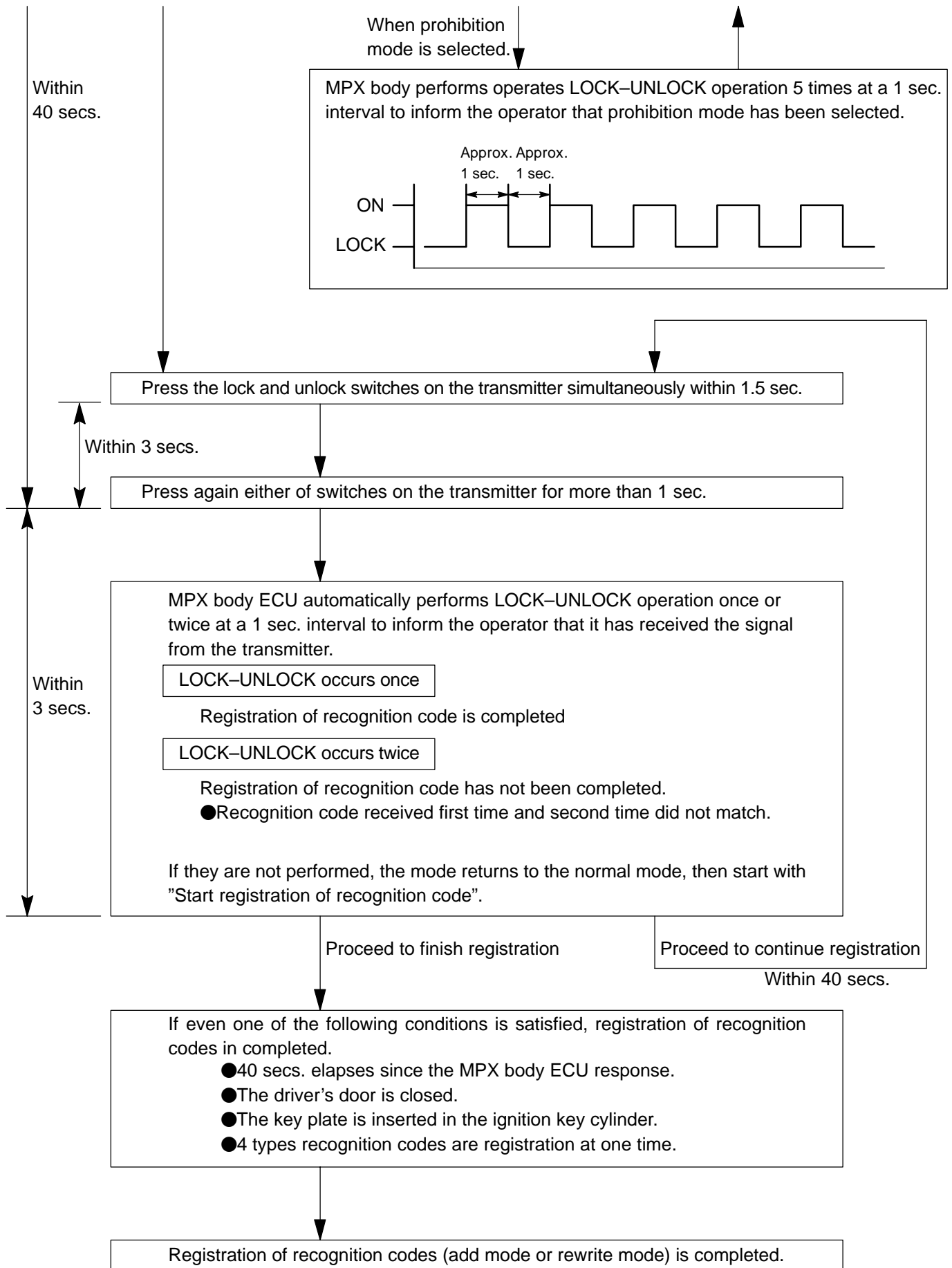
When the number of the registered code is 0, the operation is automatically performed 5 times.

Example:

When the operation is performed twice, it directs that 2 type of recognition code have been registered.



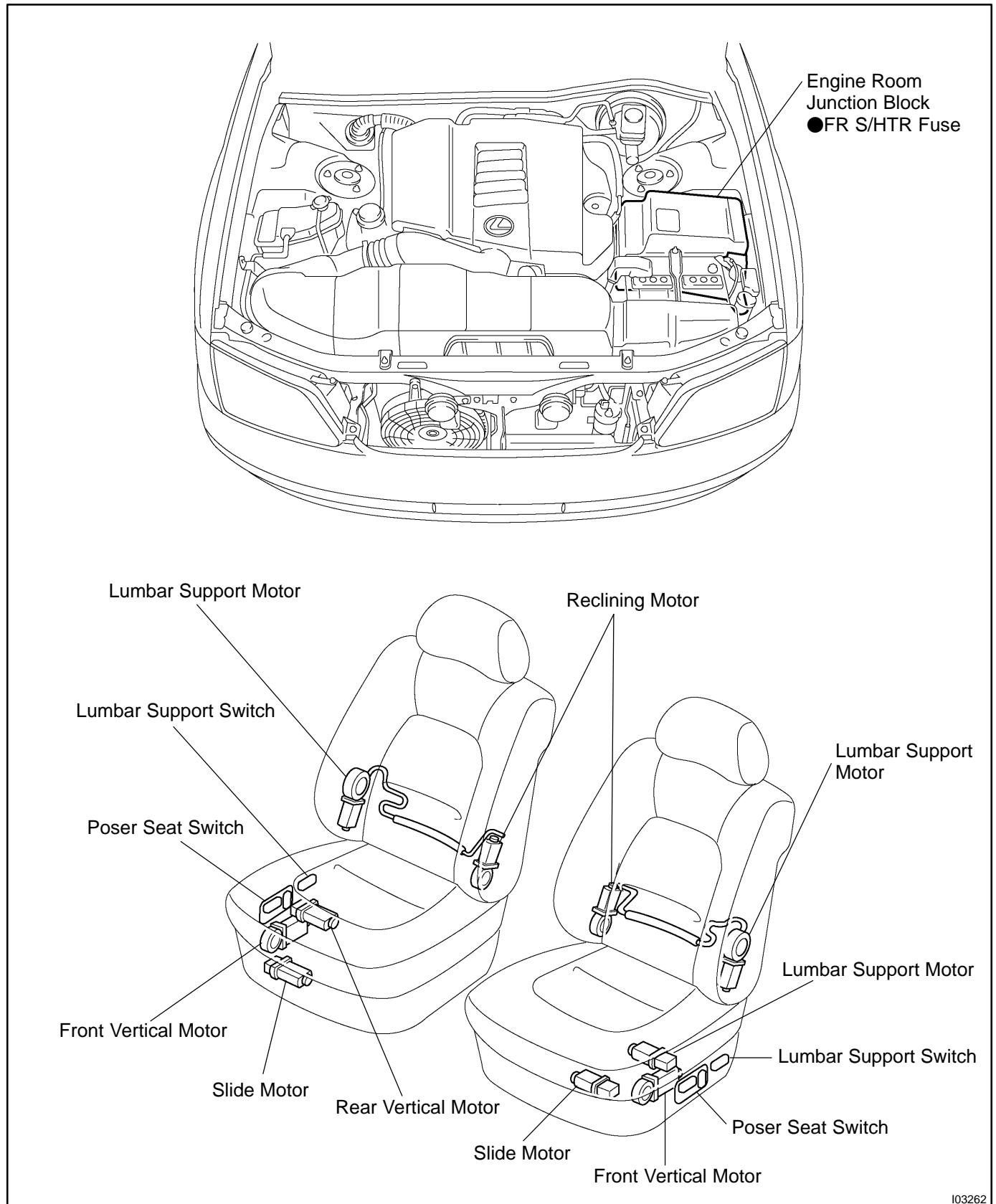
Registration of recognition code (Confirmation mode and probation mode) is completed.



POWER SEAT CONTROL SYSTEM (w/o Driving Position Memory)

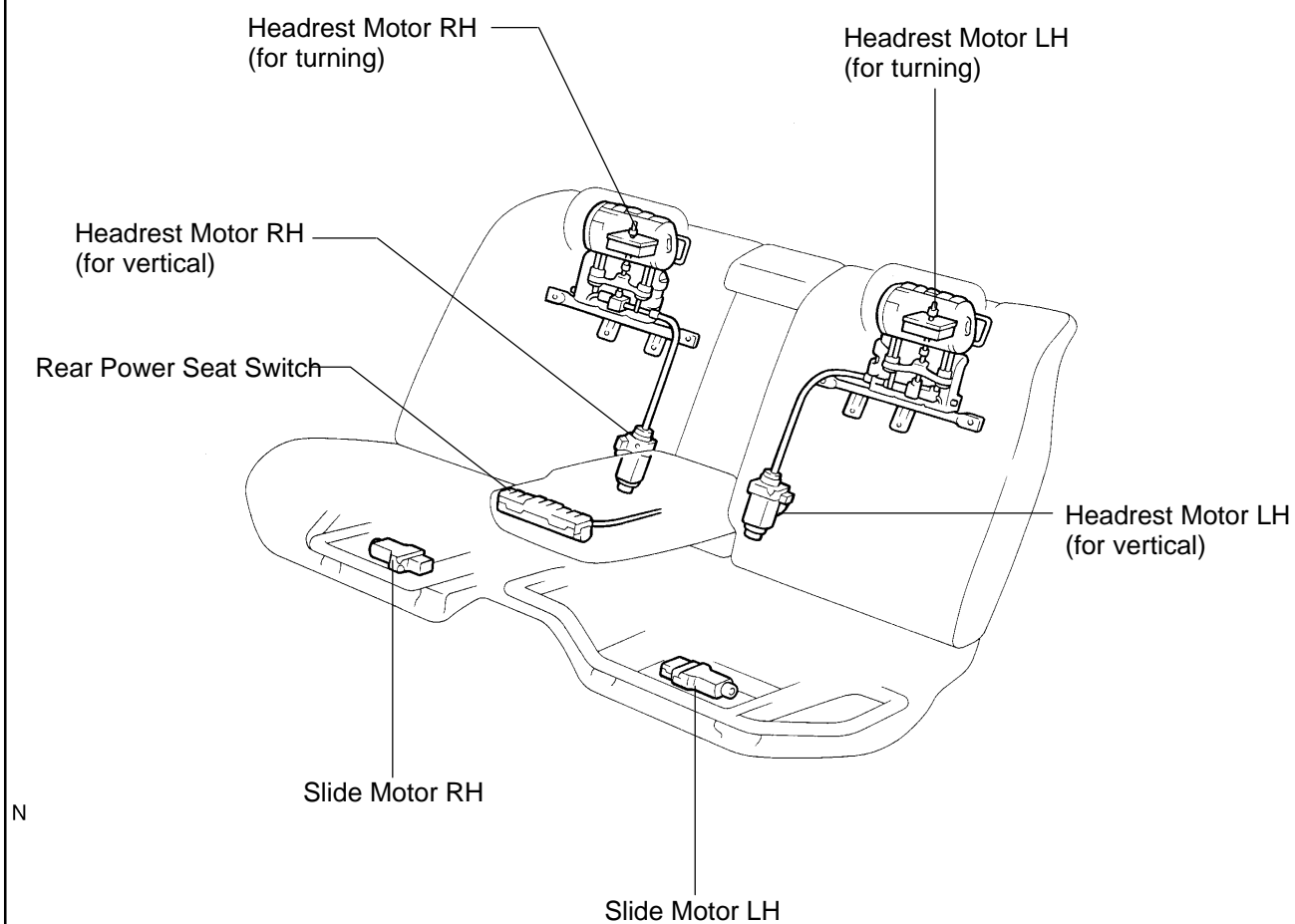
LOCATION

BE120-01

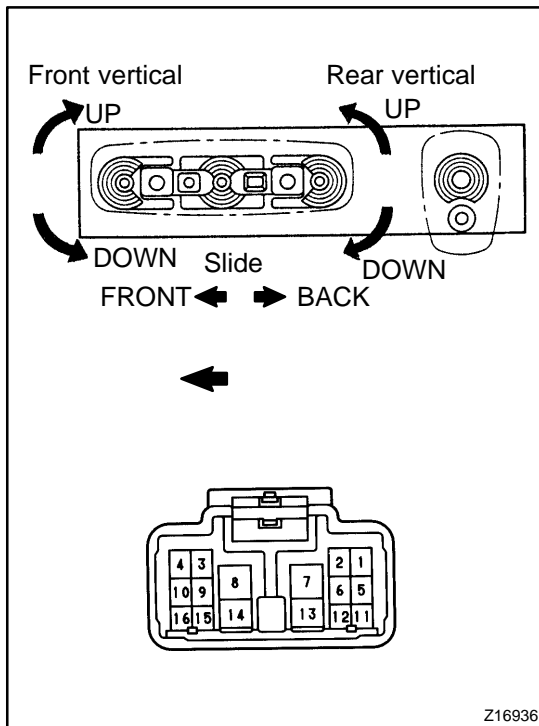


I03262

TAIWAN models:



I09274



INSPECTION

1. INSPECT FRONT POWER SEAT SWITCH CONTINUITY

Slide switch

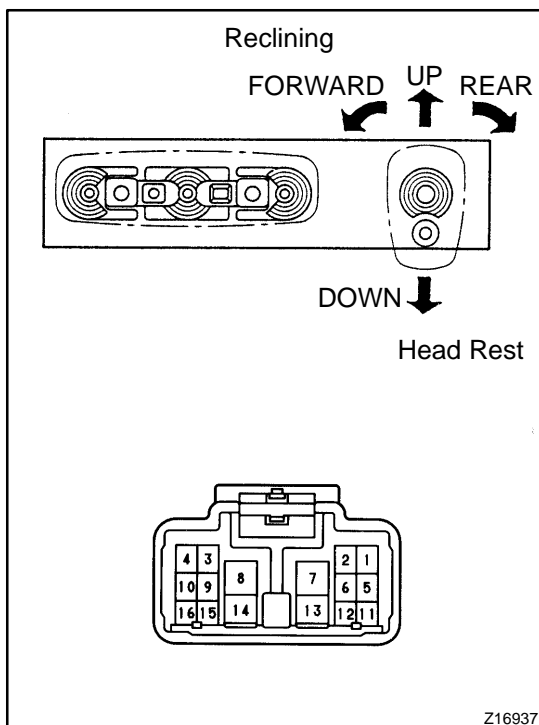
Switch position	Tester connection	Specified condition
FRONT	11 – 14 12 – 13	Continuity
OFF	11 – 13 12 – 13	Continuity
BACK	11 – 13 12 – 14	Continuity

Front vertical switch

Switch position	Tester connection	Specified condition
UP	9 – 14 10 – 13	Continuity
OFF	9 – 13 10 – 13	Continuity
DOWN	9 – 13 10 – 14	Continuity

Rear vertical switch

Switch position	Tester connection	Specified condition
UP	5 – 14 6 – 13	Continuity
OFF	5 – 13 6 – 13	Continuity
DOWN	5 – 13 6 – 14	Continuity



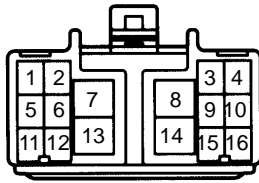
Reclining switch

Switch position	Tester connection	Specified condition
FORWARD	4 – 14 3 – 13	Continuity
OFF	4 – 13 3 – 13	Continuity
REAR	4 – 13 3 – 14	Continuity

Headrest switch

Switch position	Tester connection	Specified condition
UP	14 – 15 13 – 16	Continuity
OFF	13 – 15 13 – 16	Continuity
DOWN	13 – 15 14 – 16	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side

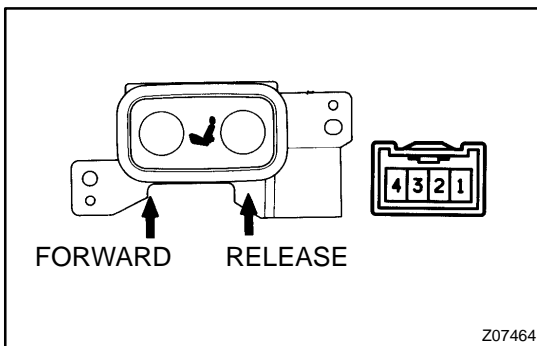
Z09315

2. INSPECT POWER SEAT SWITCH CIRCUIT

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
13 – Ground	Constant	Continuity
14 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.



Z07464

**3. INSPECT LUMBAR SUPPORT SWITCH CONTINUITY
(): Passenger's Seat**

Switch position	Tester connection	Specified condition
FORWARD	1(1) – 4(4) 2(2) – 3(3)	Continuity
OFF	1(2) – 3(3) 2(2) – 3(4)	Continuity
RELEASE	1(1) – 3(3) 2(2) – 4(4)	Continuity

If continuity is not as specified, replace the switch.

Wire Harness Side



Z06678

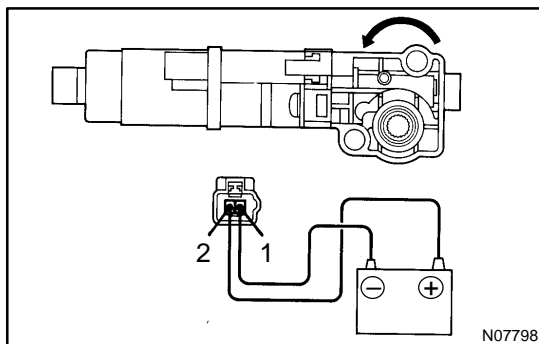
4. INSPECT LUMBAR SUPPORT SWITCH CIRCUIT

- Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- Inspect the connector on the wire harness side, as shown.

(): Passenger's Seat

Tester connection	Condition	Specified condition
3 – Ground (2 – Ground)	Constant	Continuity
4 – Ground (1 – Ground)	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

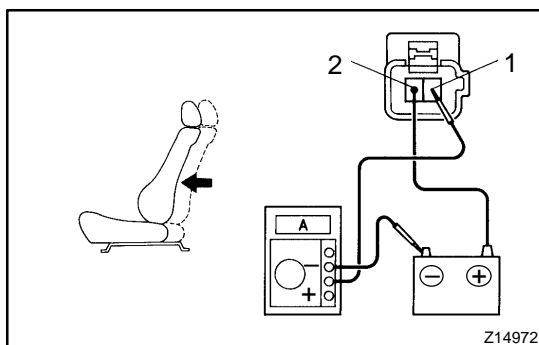


N07798

5. INSPECT SLIDE MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1 and check that the motor turns counterclockwise.
- Reverse the polarity and check that the motor turns clockwise.

If operation is not as specified, replace the motor.



Z14972

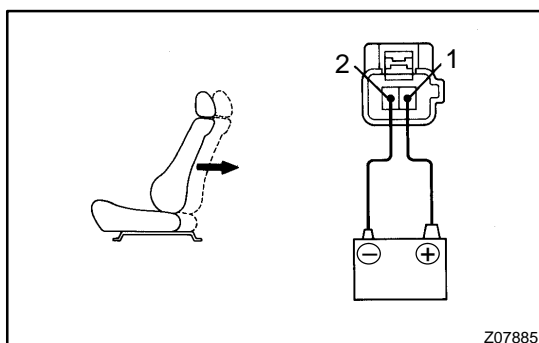
6. Driver's seat:

INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION

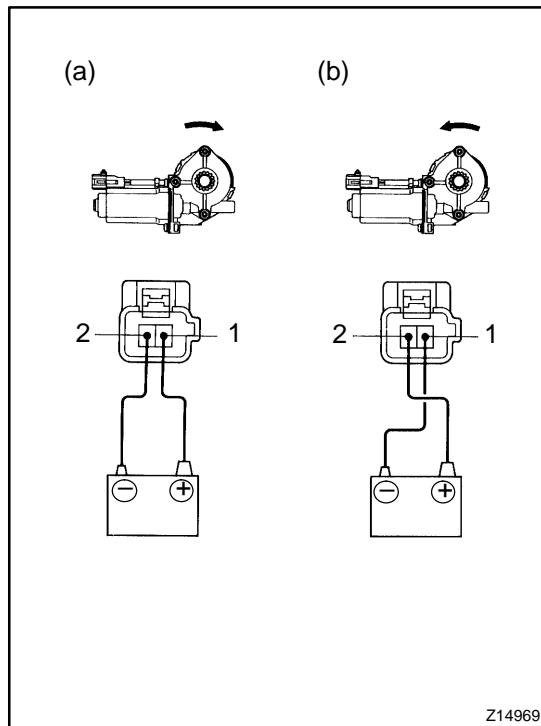
- Connect the positive (+) lead from the battery to terminal 2, the positive (+) lead from the ammeter to terminal 1, and the negative (-) lead to battery negative (-) terminal, then move the seat to front position.
- Continue to apply voltage and check that the current changes to less than 1 ampere with 4 to 90 seconds.

- Disconnect the lead from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 1 and the negative (-) lead to terminal 2 and check that the seat begins to move backwards.

If operation is not as specified, replace the motor.



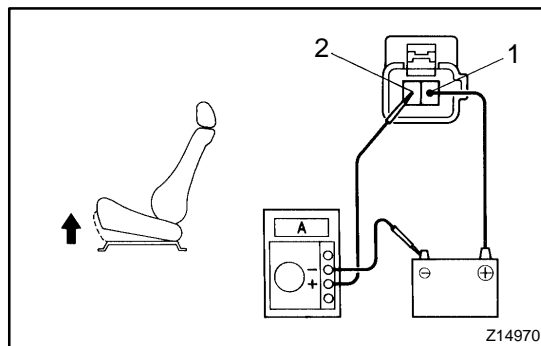
Z07885



7. INSPECT FRONT VERTICAL MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1 and check that the motor turns clockwise.
- Reverse the polarity and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

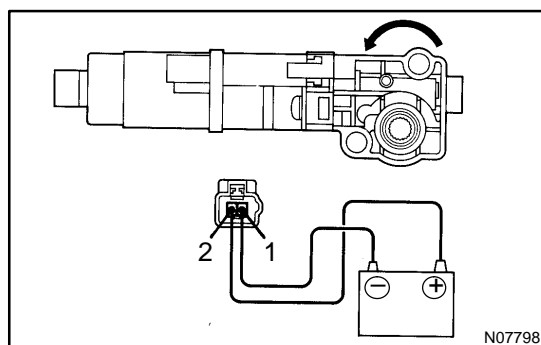
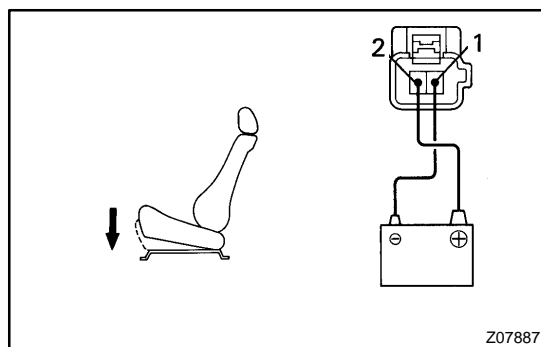


8. Driver's Seat:

INSPECT FRONT VERTICAL MOTOR PTC THERMISTOR OPERATION

- 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, then move the front edge of seat cushion to the highest position.
- Continue to apply voltage, and check the current changes to less than 1 ampere with 4 to 90 seconds.
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 2 and the negative (-) lead to terminal 1, and check that the seat cushion begins to descend.

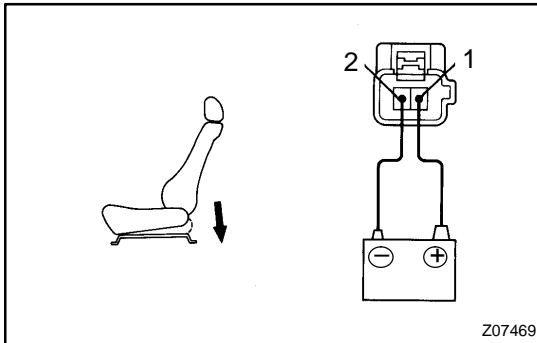
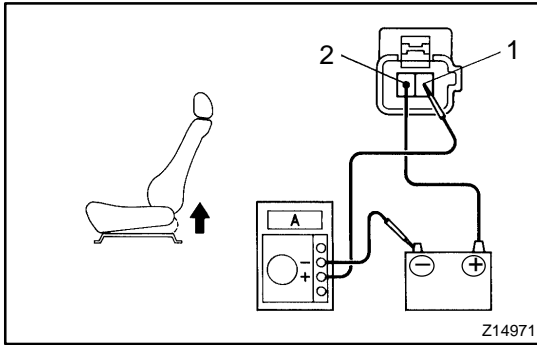
If operation is not as specified, replace the motor.



9. INSPECT REAR VERTICAL MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the motor turns clockwise.
- Reverse the polarity, and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

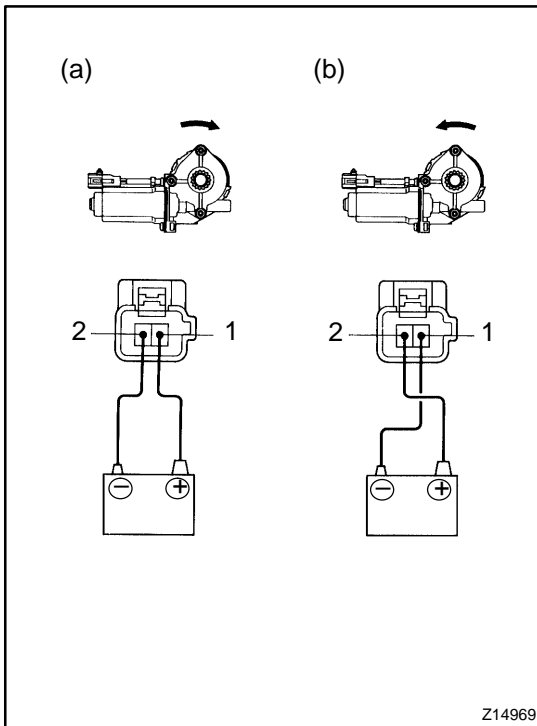


10. Driver's seat:

INSPECT REAR VERTICAL MOTOR PTC THERMISTOR OPERATION

- 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, then move the rear edge of seat cushion to the highest position.
- Continue to apply voltage, and check that the current changes to less than 1 ampere with 4 to 90 seconds.
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 1 and the negative (–) lead to terminal 2, and check that the seat cushion begins to descend.

If operation is not as specified, replace the motor.

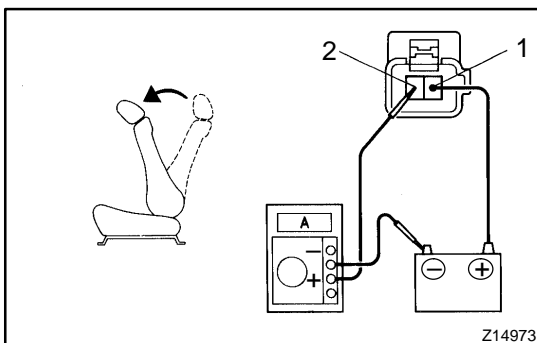


11. Driver's Seat:

INSPECT RECLINING MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the motor turns counterclockwise.
- Reverse the polarity, and check that the motor turns clockwise.

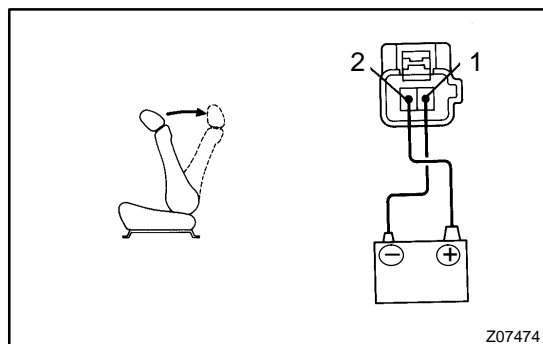
If operation is not as specified, replace the motor.



12. Driver's Seat:

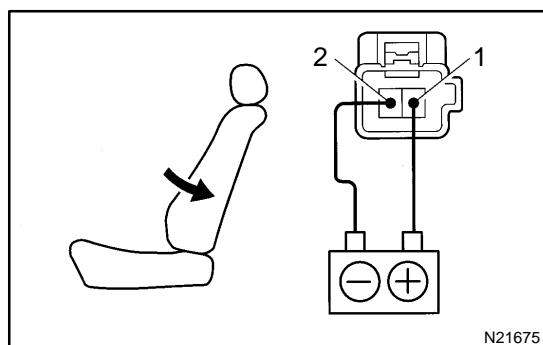
INSPECT RECLINING MOTOR PTC THERMISTOR OPERATION

- 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, then recline the seat back to the most forward position.
- Continue to apply voltage, and check that the current change to less than 1 ampere with 4 to 90 seconds.



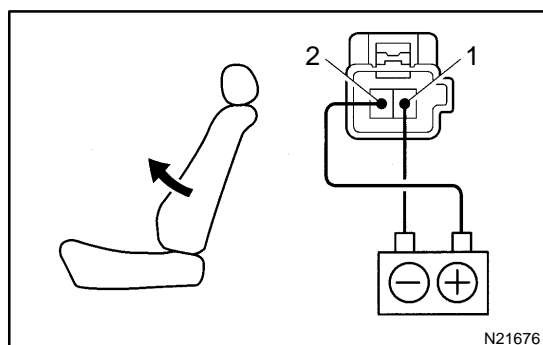
- (c) Disconnect the lead from terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 2 and the negative (-) lead to terminal 1, check that the seat back starts to fall backwards.

If operation is not as specified, replace the motor.



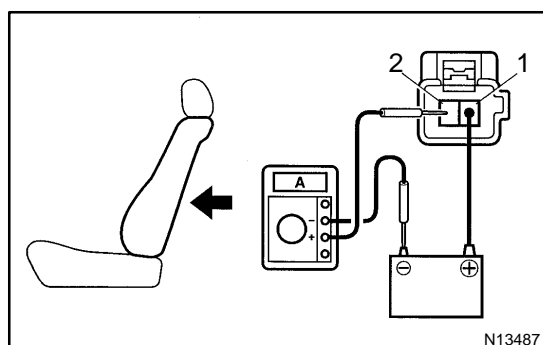
13. INSPECT LUMBAR SUPPORT MOTOR OPERATION

- (a) Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2, and check that the lumbar support moves release side.



- (b) Reverse the polarity, and check that the lumbar support moves forward.

If operation is not as specified, replace the motor.

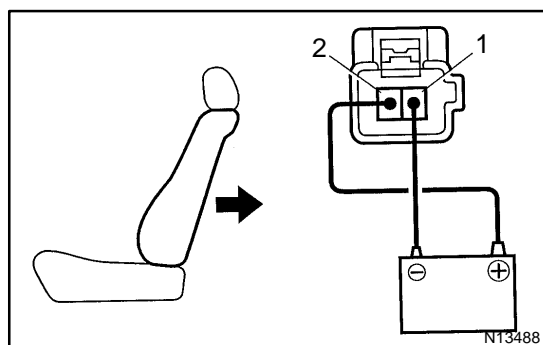


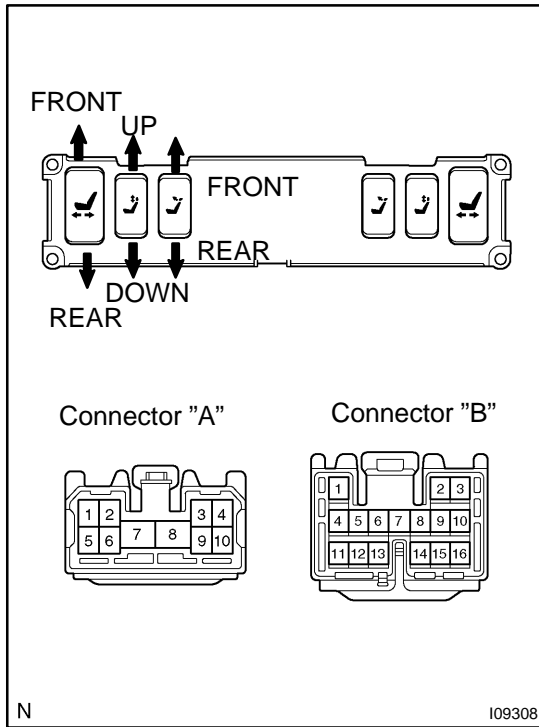
14. Driver's Seat:

INSPECT LUMBAR SUPPORT 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, then move the front edge of seat cushion to the highest position.
- (b) Continue to apply voltage, and check that the current changes to less than 1 ampere with 4 to 90 seconds.
- (c) Disconnect the leads from terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 2 and the negative (-) lead to terminal 1, and check that the seat cushion begins to descend.

If operation is not as specified, replace the motor.





15. Taiwan Models Only:

INSPECT REAR POWER SEAT SWITCH CONTINUITY

Slide switch LH:

Switch position	Tester connection	Specified condition
FRONT	B1 – B5 B5 – B7	Continuity
OFF	B1 – B7 B5 – B7	Continuity
REAR	B1 – B7 B5 – B6	Continuity

Slide switch RH:

Switch position	Tester connection	Specified condition
FRONT	B4 – B6 B9 – B7	Continuity
OFF	B4 – B7 B7 – B10	Continuity
REAR	B4 – B7 B7 – B10	Continuity

Headrest switch LH (for vertical):

Switch position	Tester connection	Specified condition
UP	B2 – B6 B7 – B8	Continuity
OFF	B2 – B7 B7 – B8	Continuity
DOWN	B2 – B7 B6 – B8	Continuity

Headrest switch RH (for vertical):

Switch position	Tester connection	Specified condition
UP	B3 – B6 B7 – B9	Continuity
OFF	B3 – B7 B7 – B9	Continuity
DOWN	B3 – B7 B6 – B9	Continuity

Headrest switch LH (for turning)

Switch position	Tester connection	Specified condition
FRONT	A4 – B7	Continuity
OFF	–	No continuity
REAR	A5 – B7	Continuity

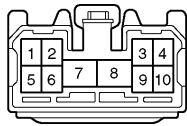
Headrest switch RH (for turning)

Switch position	Tester connection	Specified condition
FRONT	A4 – B7	Continuity
OFF	–	No continuity
REAR	A5 – B7	Continuity

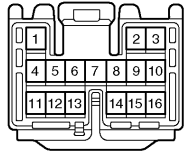
If continuity is not as specified, replace the switch.

Wire Harness Side

Connector "A"



Connector "B"



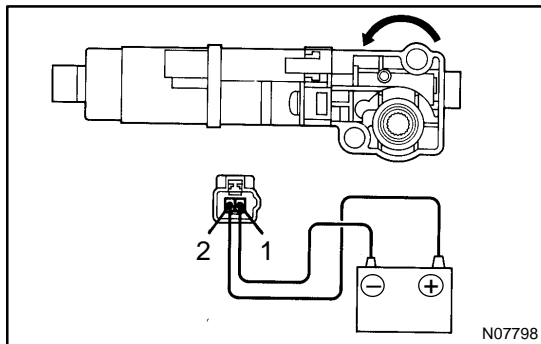
110509

16. INSPECT REAR POWER SEAT SWITCH CIRCUIT

- (a) Disconnect the switch connector and connect the seat wire harness to the floor wire harness.
- (b) Inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
B7 – Ground	Constant	Continuity
B8 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

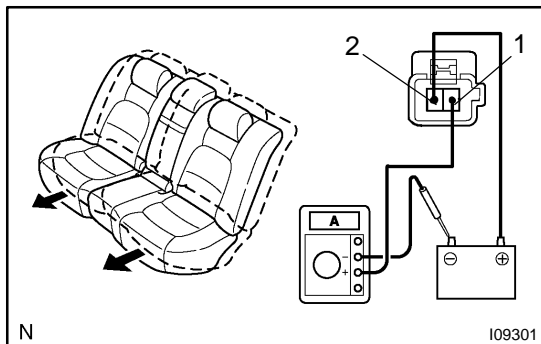


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17. INSPECT SLIDE MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1 and check that the motor turns counterclockwise.
- Reverse the polarity and check that the motor turns clockwise.

If operation is not as specified, replace the motor.

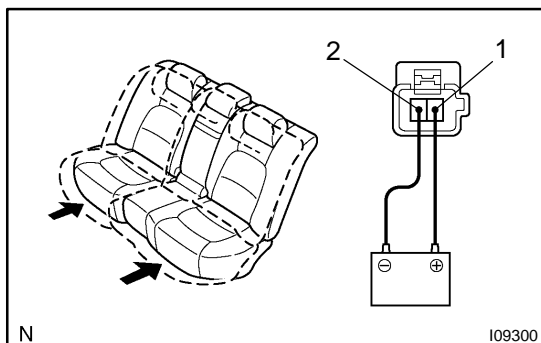


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18. INSPECT SLIDE MOTOR PTC THERMISTOR OPERATION

- (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, then move the seat to front position.
- (b) Continue to apply voltage and check that the current changes to less than 1 ampere with 4 to 90 seconds.

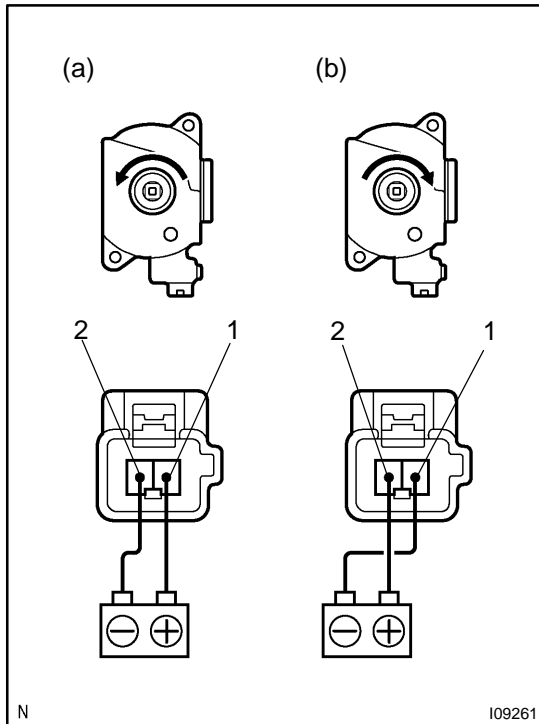


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- (c) Disconnect the lead from terminals.
- (d) Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 1 and the negative (–) lead to terminal 2 and check that the seat begins to move backwards.

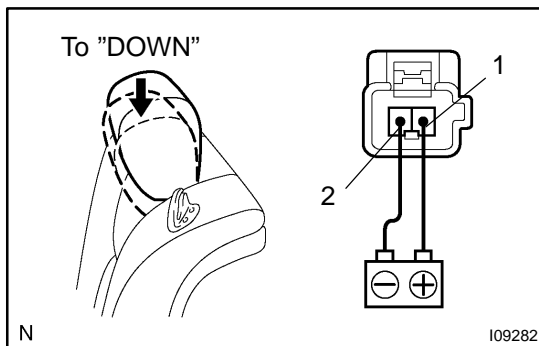
If operation is not as specified, replace the motor.



19. INSPECT HEADREST MOTOR OPERATION (For vertical)

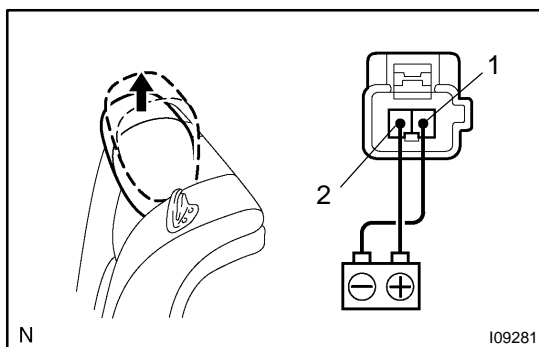
- Connect the positive (+) lead from the battery to terminal 2 and the negative (-) lead to terminal 1, and check that the motor turns counterclockwise.
- Reverse the polarity, and check that the motor turns clockwise.

If operation is not as specified, replace the motor.



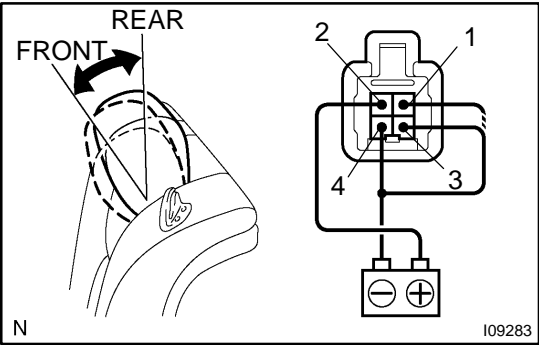
20. INSPECT HEADREST MOTOR CIRCUIT BREAKER OPERATION (For vertical)

- Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2 on the motor connector and move the headrest to DOWN position.



- Continue to apply voltage, check that there is a circuit breaker operation noise within 4 to 60 seconds.
- Reverse the polarity check that the headrest begins to move UP side within approx. 60 seconds.

If operation is not as specified, replace the headrest.



21. INSPECT HEADREST MOTOR OPERATION
(For turning)

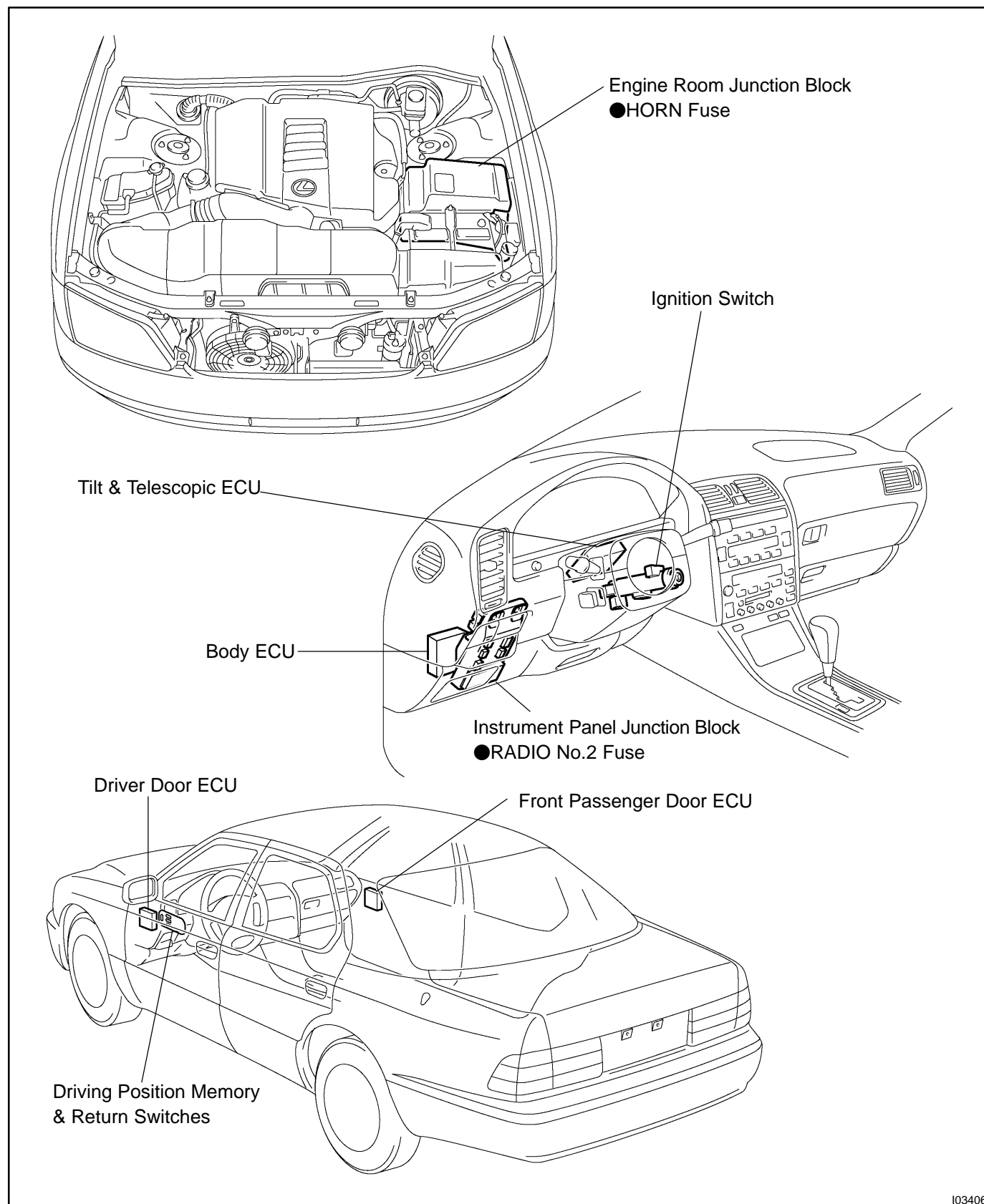
- (a) Connect the positive (+) lead from the battery to terminal 2 and negative (–) lead to terminal 4.
- (b) Connect the negative (–) lead to each terminal and check that the headrest turns at each position, as shown in the chart.

Tester connection	Position
1	FRONT
3	REAR

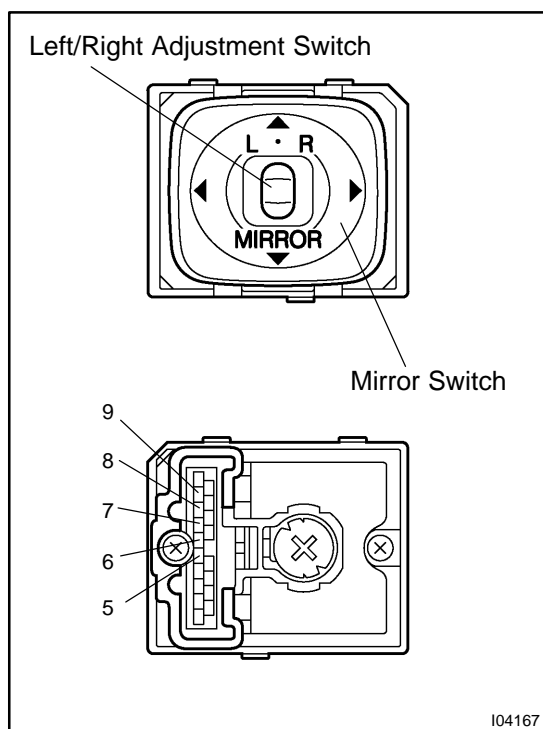
If operation is not as specified, replace the headrest.

POWER MIRROR CONTROL SYSTEM LOCATION

BEOCN-01



103406



INSPECTION

1. INSPECT MIRROR SWITCH CONTINUITY

Switch position	Tester connection	Resistance (Ω)
LEFT	8 – 9	100
RIGHT	8 – 9	0
Illumination	5 – 6	Continuity

If continuity is not as specified, replace the switch.

2. INSPECT MIRROR SWITCH RESISTANCE

Measure resistance between terminals 7 and 9 at each switch position, as shown in the chart.

Switch position	Resistance (Ω)
UP	Approx. 100
RIGHT	250
DOWN	470
LEFT	800

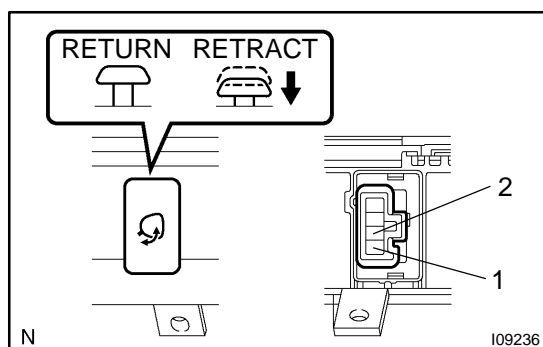
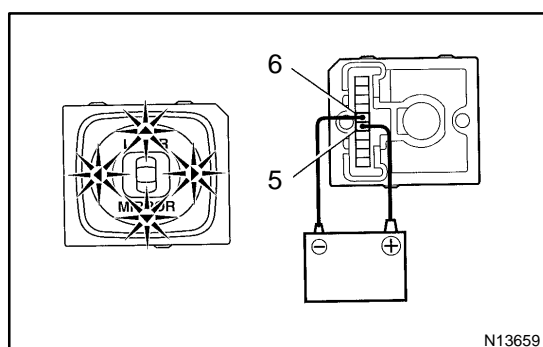
If resistance is not as specified, replace the switch.

3. INSPECT MIRROR SWITCH CIRCUIT

(See page [DI-452](#))

4. INSPECT MIRROR SWITCH INDICATOR LIGHT OPERATION

Connect the positive (+) lead from the battery to terminal 5 and the negative (–) lead to terminal 6, and check that the indicator light does not light up, replace the switch.



5. CANADA and TAIWAN models only:

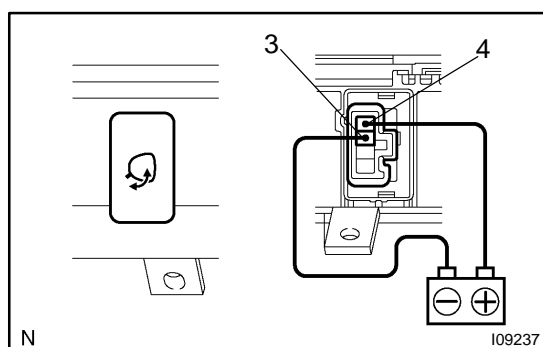
INSPECT RETRACT SWITCH CONTINUITY

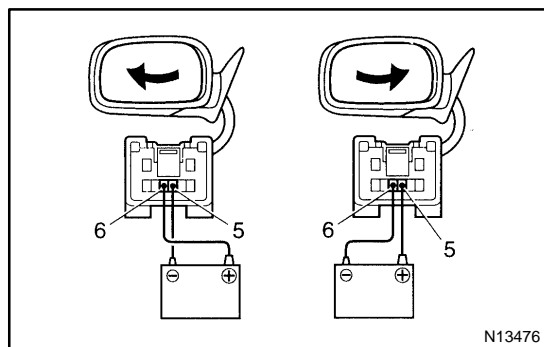
Switch position	Tester connection	Specified condition
RETURN	–	No continuity
RETRACT	1 – 2	Continuity

6. CANADA and TAIWAN models only:

INSPECT RETRACT SWITCH INDICATOR OPERATION

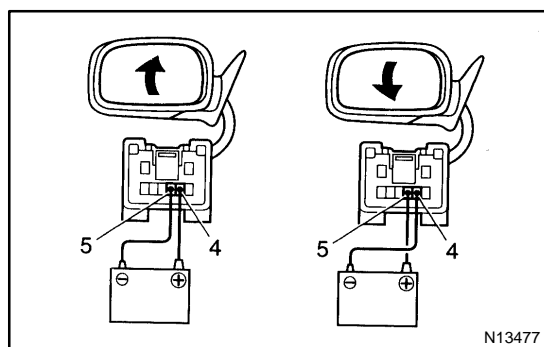
Connect the positive (+) lead from the battery to terminal 4 and negative (–) lead to terminal 3 and check that the indicator does not light up, replace the switch.



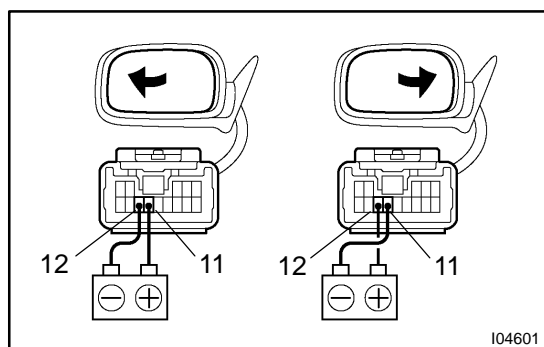


7. INSPECT MIRROR MOTOR OPERATION w/o Driving position memory:

- Connect the positive (+) lead from the battery to terminal 6 and negative (–) lead to terminal 5, then check that the mirror turns to left side.
- Reverse the polarity and check that the mirror turns to right side.

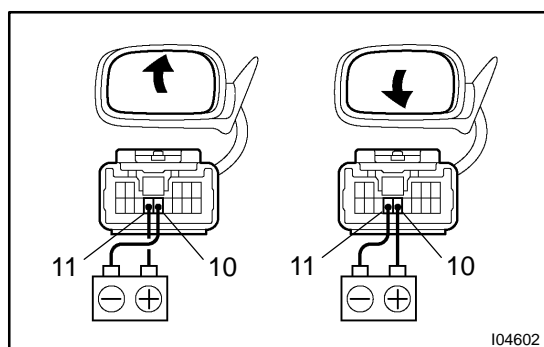


- Connect the positive (+) lead from the battery to terminal 4 and negative (–) lead to terminal 5, then check that the mirror turns upward.
- Reverse the polarity and check that the mirror turns downward.

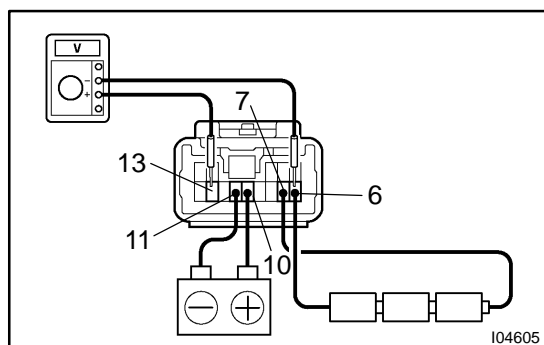


8. INSPECT MIRROR MOTOR OPERATION w/ Driving position memory:

- Connect the positive (+) lead from the battery to terminal 11 and negative (–) lead to terminal 12, then check that the mirror turns to left side.
- Reverse the polarity and check that the mirror turns to right side.



- Connect the positive (+) lead from the battery to terminal 11 and negative (–) lead to terminal 10, then check that the mirror turns upward.
- Reverse the polarity and check that the mirror turns downward.

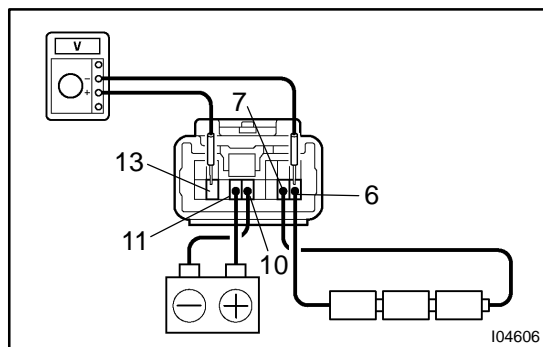


9. INSPECT MIRROR POSITION SENSORS

HINT:

Strip off the vinyl tape of the connector and remove terminals 6, 7, 10, 11, 12, 13 and 14 from the connector housing.

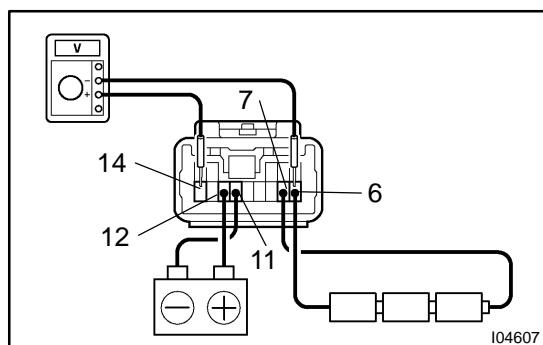
- Connect a series of three 1.5 V dry cell batteries.
- Connect the positive (+) lead from the dry cell batteries to terminal 7 and the negative (–) lead to terminal 6.
- Connect the positive (+) lead from the voltmeter to terminal 13 and the negative (–) lead to terminal 6.



- (d) Apply battery positive voltage to terminals 10 and 11, then check that the voltage gradually changes according to the table below while the mirror moves between the uppermost position and lowermost position.

Mirror position	Lowermost	Mirror position	Uppermost
Voltage	2.8 – 5.0	Changes gradually	0 – 0.9

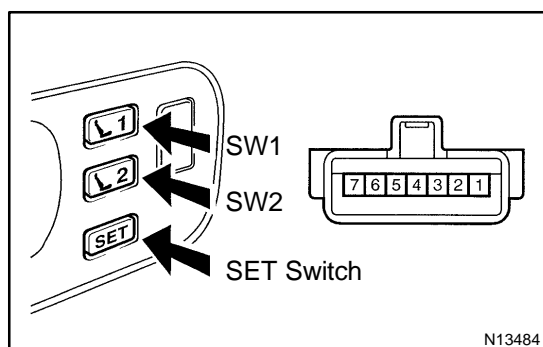
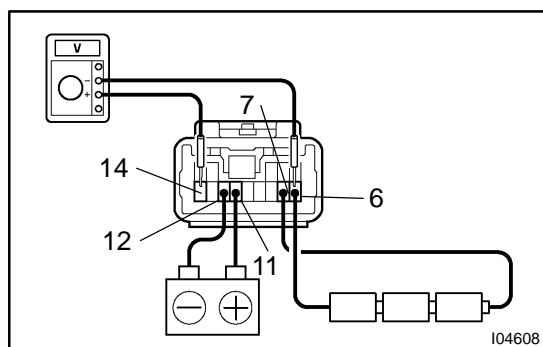
If voltage value is not as specified, replace the motor assembly.



- (e) Disconnect the 4 leads of the battery and voltmeter.
 (f) Connect the positive (+) lead from the voltmeter to terminal 14 and negative (–) lead to terminal 6.
 (g) Apply battery positive voltage to terminals 11 and 12, then inspect that the voltage gradually changes according to the table below while the mirror moves between the leftmost position and rightmost position.

Mirror position	Leftmost	Mirror position	Rightmost
Voltage LEFT	2.8 – 5.0	Changes gradually	0 – 0.9
Voltage RIGHT	0 – 0.9	Changes gradually	2.8 – 5.0

If voltage value is not as specified, replace the motor assembly.



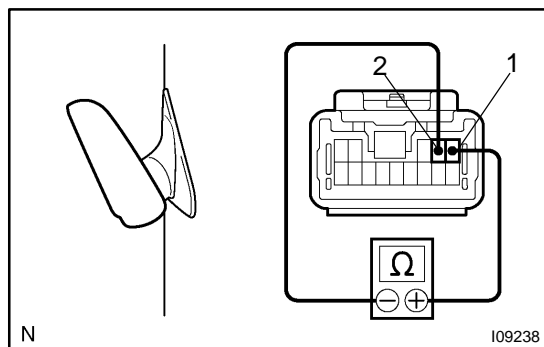
10. INSPECT DRIVING POSITION MEMORY AND RETURN SWITCH CONTINUITY

Switch position	Tester connection	Specified condition
SET switch ON	3 – 4	Continuity
Return SW1 ON	3 – 7	Continuity
Return SW2 ON	3 – 6	Continuity

If continuity is not as specified, replace the switch.

If continuity is as specified, inspect the switch circuit.

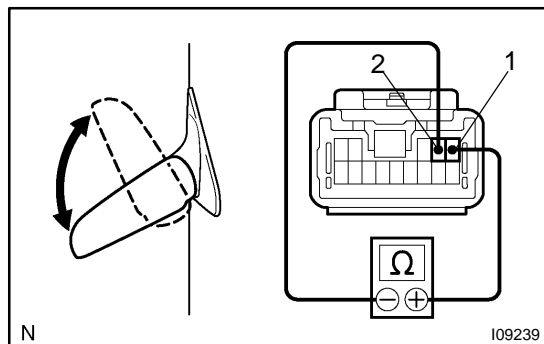
11. INSPECT DRIVING POSITION MEMORY AND RETURN SWITCH CIRCUIT (See page DI-755)



12. INSPECT ELECTRICAL RETRACT MOTOR CONTINUITY

- Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1, check that the no continuity exists in folding position.
- Reverse the polarity, check that no continuity exists in driving position.

If operation is not as specified, replace the mirror assembly.

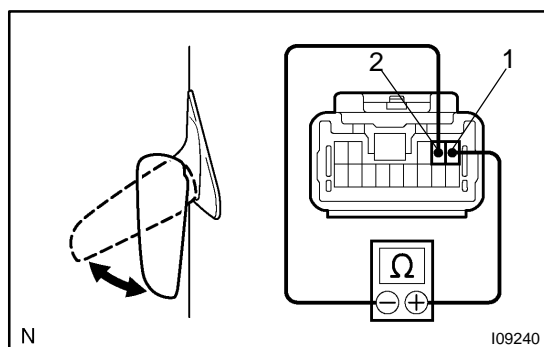


13. INSPECT ELECTRICAL RETRACT MOTOR CONTINUITY

At drive position:

- Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1, check that continuity exists in folding position.
- Reverse the polarity, check that no continuity exists in driving position.

If operation is not as specified, replace the mirror assembly.

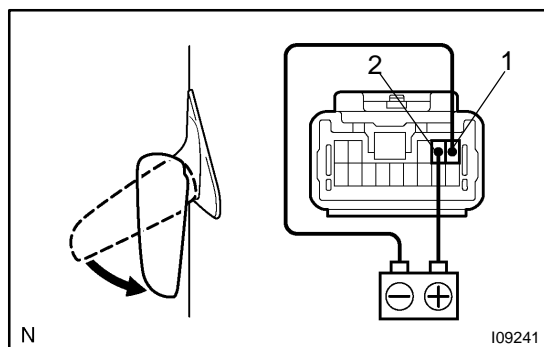


14. INSPECT ELECTRICAL RETRACT MOTOR CONTINUITY

Between drive position and retract position:

- Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1, check that continuity exists in folding position.
- Reverse the polarity, check that no continuity exists in driving position.

If operation is not as specified, replace the mirror assembly.

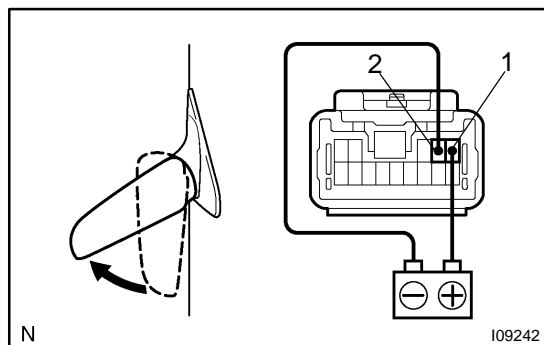


15. INSPECT MIRROR MOTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and negative (-) lead to terminal 1.
- Check that the motor turns (moves to folding position).

NOTICE:

These tests must be performed quickly (within 5 – 10 seconds) to prevent the coil from burning out.



- Connect the positive (+) lead from the battery to terminal 1 and negative (-) lead to terminal 2.
- Check that the motor turns (moves to driving position).

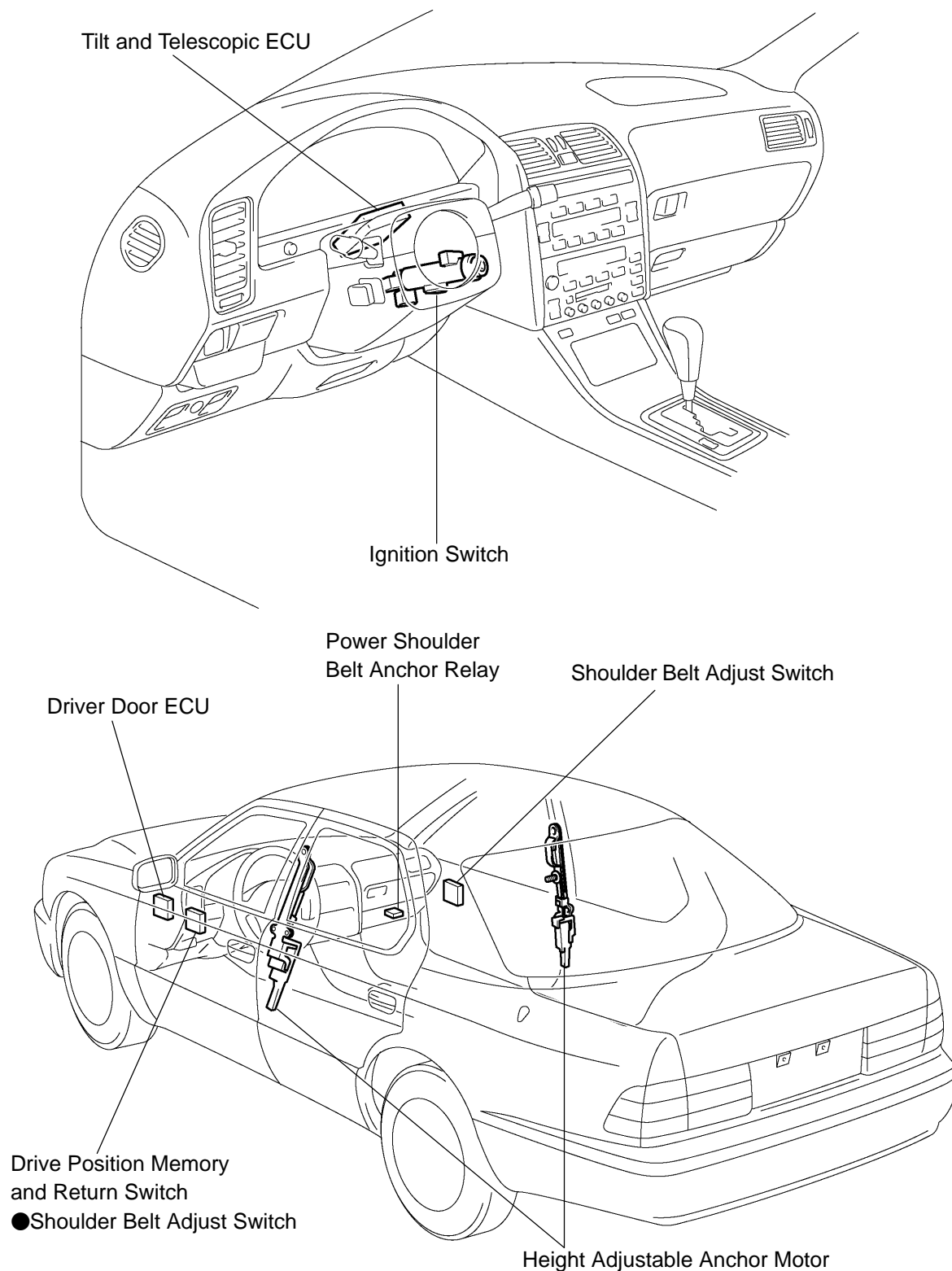
NOTICE:

These tests must be performed quickly (within 5 – 10 seconds) to prevent the coil from burning out.

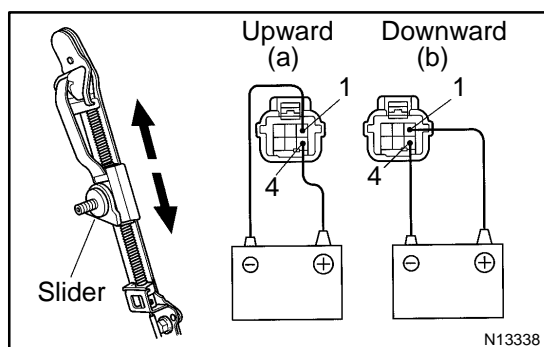
If operation is not as specified, replace the mirror assembly.

POWER SHOULDER BELT ANCHORAGE SYSTEM LOCATION

BE0CP-01



103235

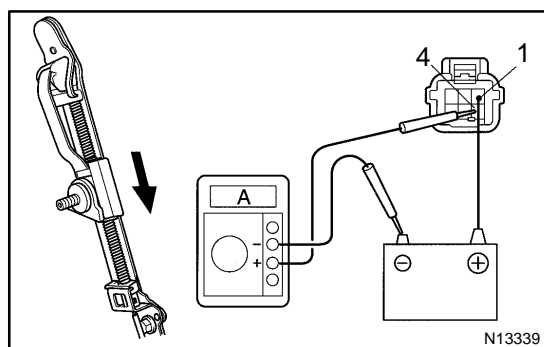


INSPECTION

1. INSPECT DRIVER'S HEIGHT ADJUSTABLE ANCHOR MOTOR AND SENSOR OPERATION

- Connect the positive (+) lead from the battery to terminal 4 and the negative (-) lead to terminal 1, and check that the slider moves upward.
- Reverse the polarity and check that the slider moves downward.

If operation is not as specified, replace the height adjustable anchor motor.

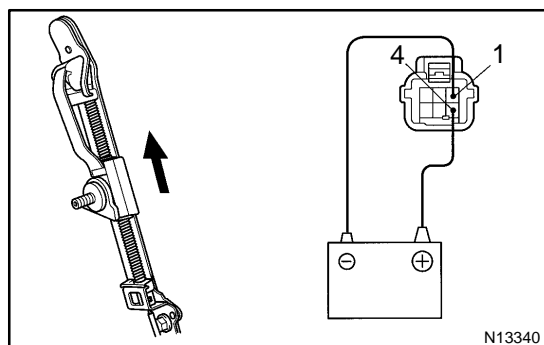


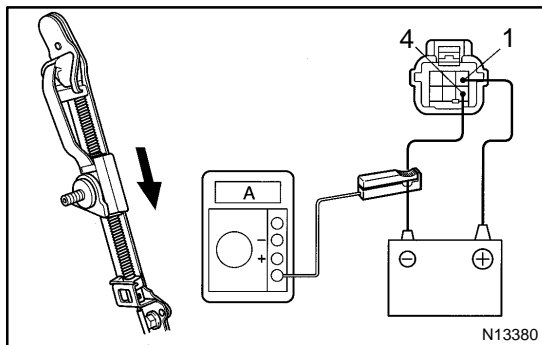
2. Inspection using an ammeter:

INSPECT DRIVER'S HEIGHT ADJUSTABLE ANCHOR MOTOR AND SENSOR PTC THERMISTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 1, the positive (+) lead from the ammeter to terminal 4, and the negative (-) lead to battery negative (-) terminal, then move the slider to end position.
- Continue to apply voltage and check the current changes to less than 0.1 A within 6 to 46 seconds.
- Disconnect the leads from terminals.
- Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 4 and the negative (-) lead to terminal 1, and check that the slider moves to the opposite side.

If operation is not as specified, replace the height adjustable anchor motor.

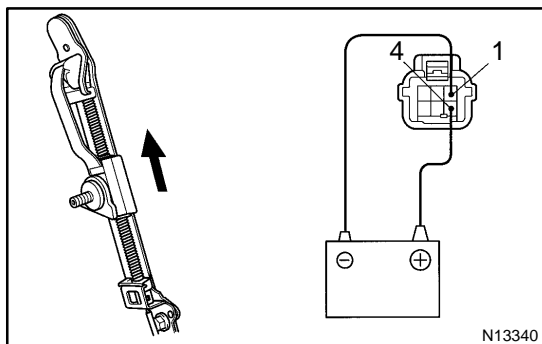




3. Inspection using an ammeter with a current-measuring probe:

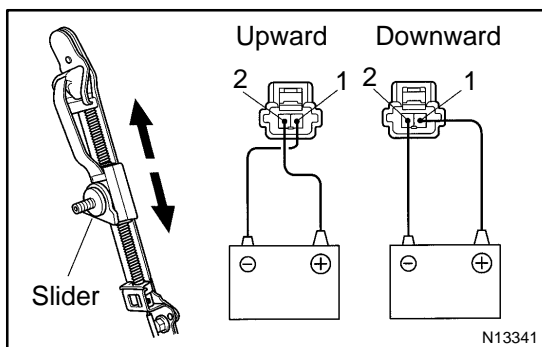
INSPECT DRIVER'S HEIGHT ADJUSTABLE ANCHOR MOTOR AND SENSOR PTC THERMISTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 4.
- Attach a current-measuring probe to the negative (–) lead, and move the slider to the end position.
- Check the current changes to less than 0.1 A with 6 to 46 seconds.



- Disconnect the leads from terminals.
- Approximately 60 seconds later, reverse the polarity, and check that the slider moves to the opposite side.

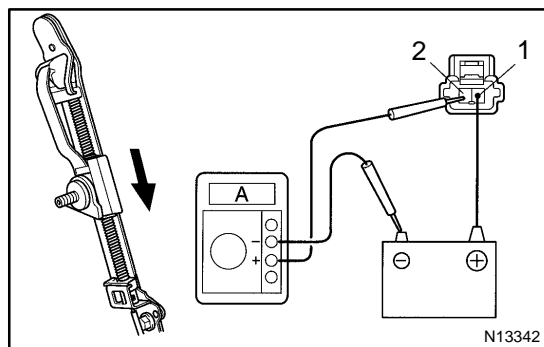
If operation is not as specified, replace the height adjustable anchor motor.



4. INSPECT PASSENGER'S HEIGHT ADJUSTABLE ANCHOR MOTOR AND SENSOR OPERATION

- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 1, and check that the slider moves upward.
- Reverse the polarity and check that the slider moves downward.

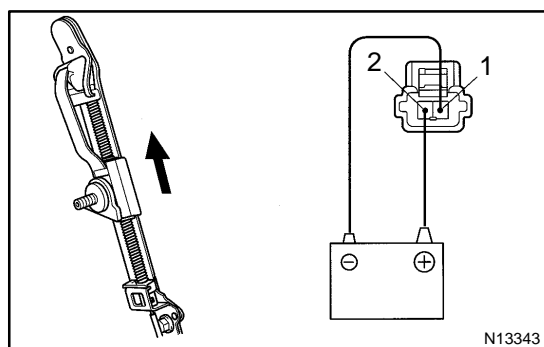
If operation is not as specified, replace the height adjustable anchor motor.



5. Inspection using an ammeter:

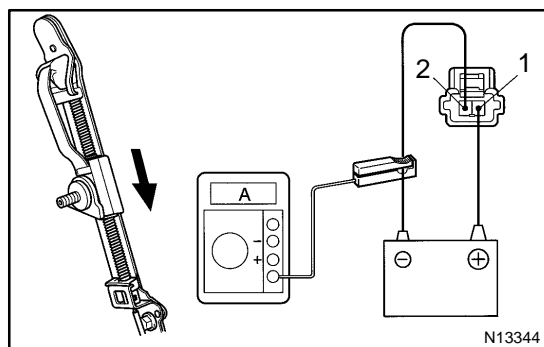
INSPECT PASSENGER'S HEIGHT ADJUSTABLE ANCHOR MOTOR AND SENSOR PTC THERMISTOR OPERATION

- 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, then move the slider to end position.
- Continue to apply voltage and check the current changes to less than 0.1 A within 6 to 46 seconds.
- Disconnect the leads from terminals.



- Approximately 60 seconds later, connect the positive (+) lead from battery to terminal 2 and the negative (-) lead to terminal 1, and check that the slider moves to the opposite side.

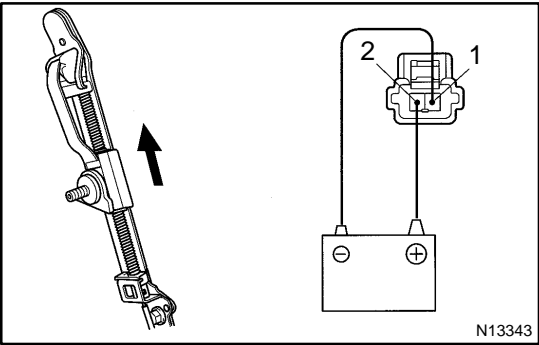
If operation is not as specified, replace the height adjustable anchor motor.



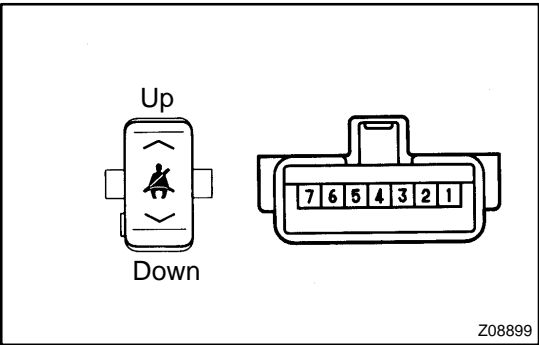
6. Inspection using an ammeter with a current-measuring probe:

INSPECT PASSENGER'S HEIGHT ADJUSTABLE ANCHOR MOTOR AND SENSOR PTC THERMISTOR OPERATION

- Connect the positive (+) lead from the battery to terminal 1 and the negative (-) lead to terminal 2.
- Attach a current-measuring probe to the negative (-) lead, and move the slider to the end position.
- Check the current changes to less than 0.1 A within 6 to 46 seconds.



- (d) Disconnect the leads from terminals.
 - (e) Approximately 60 seconds later, reverse the polarity and check that the slider moves to the opposite side.
- If operation is not as specified, replace the height adjustable anchor motor.



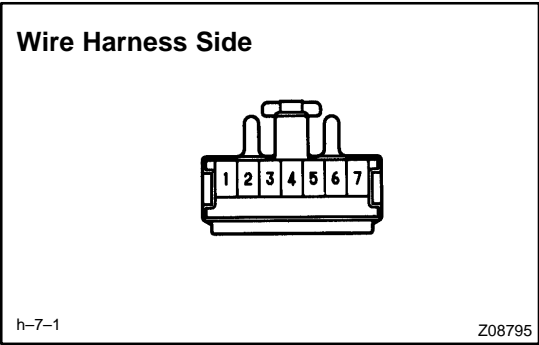
7. **INSPECT DRIVER'S SHOULDER BELT ADJUST SWITCH CIRCUIT** (See page [DI-755](#))
8. **INSPECT DRIVER'S SHOULDER BELT ADJUST SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
UP	2 – 3	Continuity
OFF	–	No continuity
DOWN	1 – 3	Continuity

9. **INSPECT PASSENGER'S SHOULDER BELT ADJUST SWITCH CONTINUITY**

Switch position	Tester connection	Specified condition
UP	1 – 7	Continuity
OFF	–	No continuity
DOWN	2 – 6	Continuity

If continuity is not as specified, replace the switch.

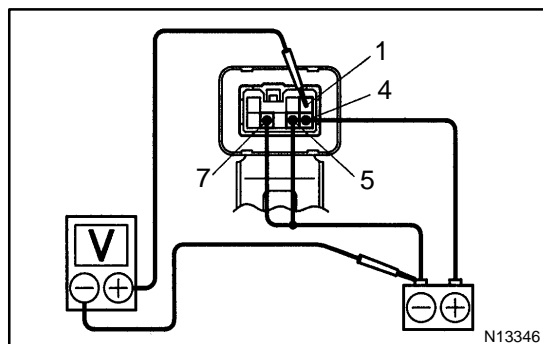


10. **INSPECT PASSENGER'S SHOULDER BELT ADJUST SWITCH CIRCUIT**

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

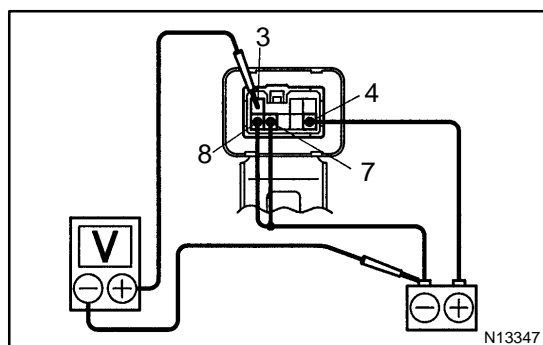
Tester connection	Condition	Specified condition
6 – Ground	Constant	Continuity
7 – Ground	Constant	Continuity

If circuit is not as specified, inspect wire harness.



**11. Upward:
INSPECT SHOULDER BELT ANCHOR RELAY OPERATION**

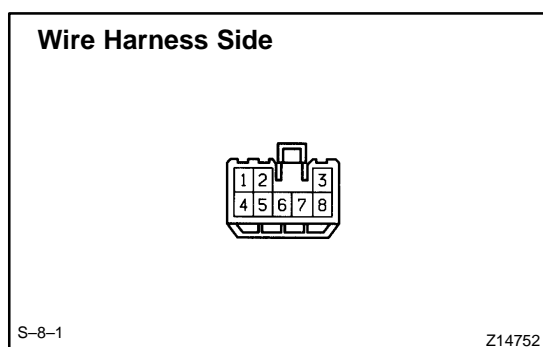
- Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 5 and 7.
- Connect the positive (+) lead from the voltmeter to terminal 1 and negative (–) lead to battery negative (–) terminal, and check that there is battery positive voltage.



**12. Downward:
INSPECT SHOULDER BELT ANCHOR RELAY OPERATION**

- Connect the positive (+) lead from the battery to terminal 4 and the negative (–) lead to terminal 7 and 8.
- Connect the positive (+) lead from the voltmeter to terminal 3 and negative (–) lead to battery negative (–) terminal, and check that there is battery positive voltage.

If operation is not as specified, replace rheostat light control.

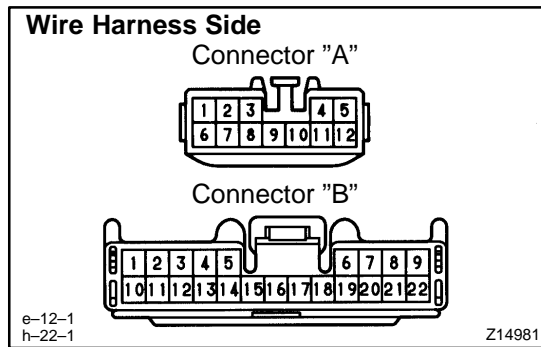


13. INSPECT SHOULDER BELT ANCHOR RELAY CIRCUIT

Disconnect the connector from the rheostat light control and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
5 – Ground	Seat belt adjust switch position UP	Continuity
7 – Ground	Constant	Continuity
8 – Ground	Seat belt adjust switch position DOWN	Continuity
4 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

**14. INSPECT TILT AND TELESCOPIC ECU CIRCUIT**

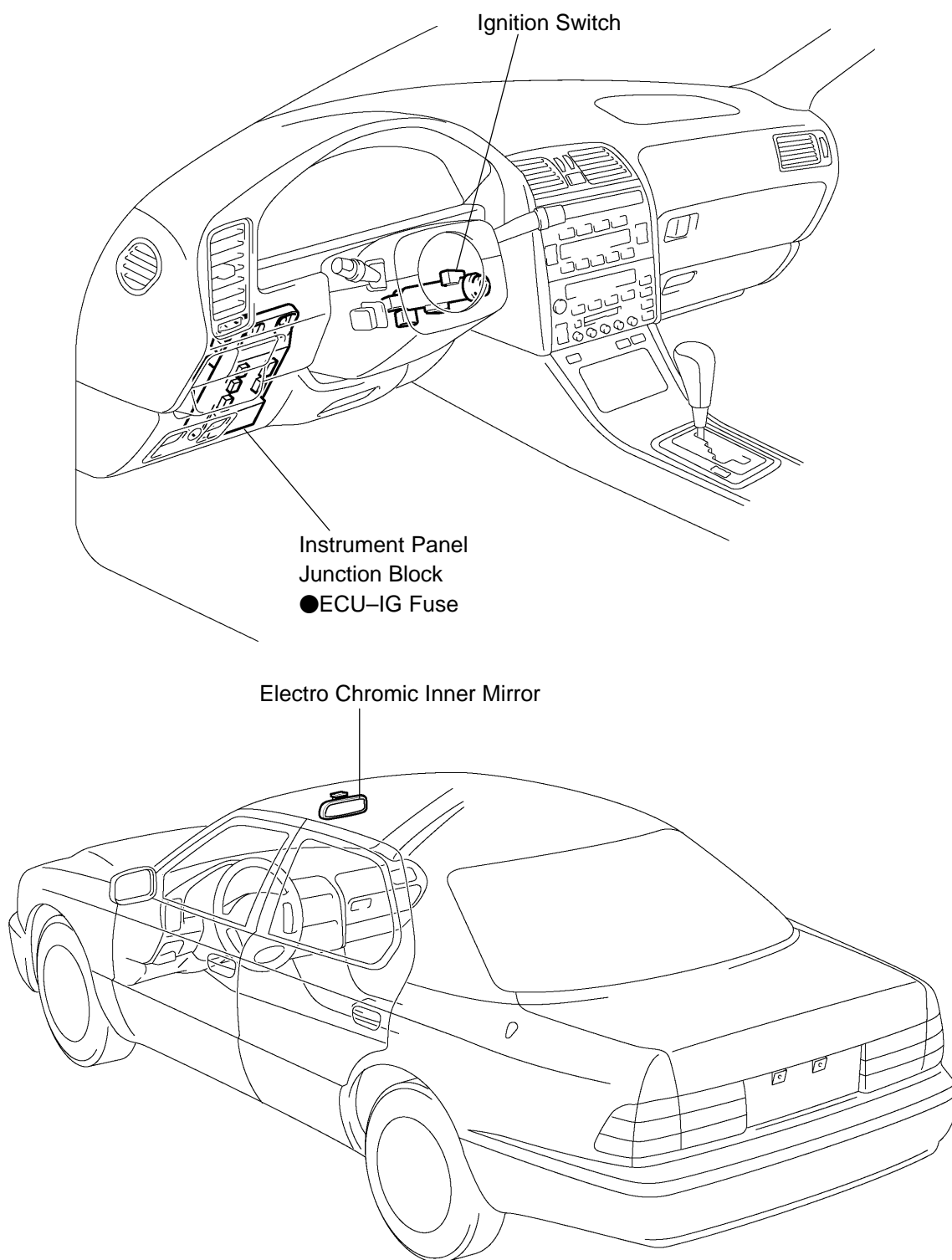
Disconnect the ECU connector, and inspect the connector on wire harness side, as shown.

Tester connection	Condition	Specified condition
A7 – Ground B9 – Ground	Constant	Continuity
A4 – Ground B22 – Ground	Constant	Battery positive voltage
B15 – Ground	Ignition switch turned to ON	Battery positive voltage
A6 – B8	Move the driver's height adjustable anchor sensor	Resistance changes from Approx. 0 to 5 k Ω
B8 – B17	Constant	Approx. 4 – 6 k Ω

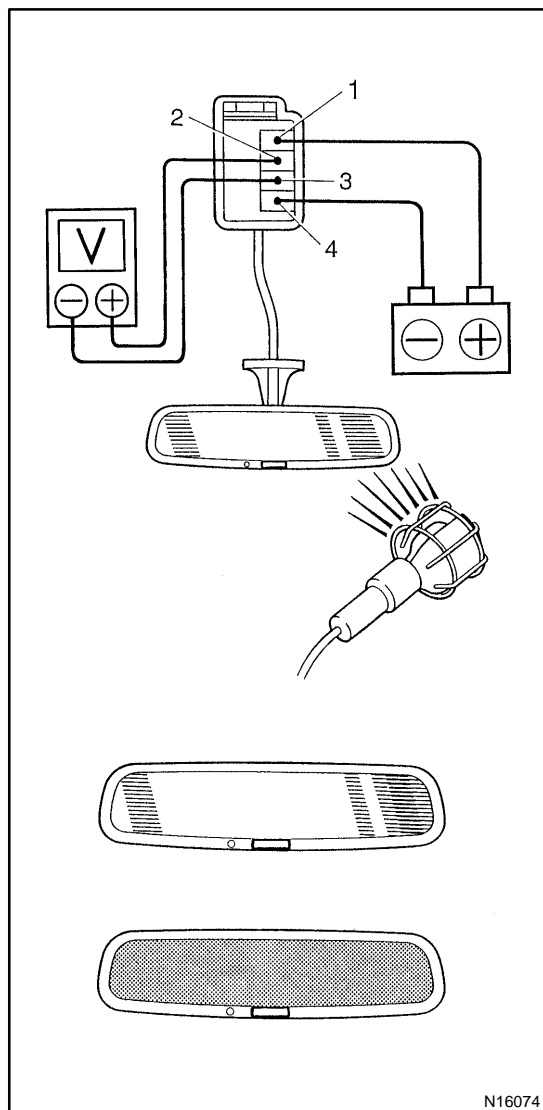
If circuit is not as specified, inspect the circuit connected to other parts.

ELECTRO CHROMIC MIRROR SYSTEM LOCATION

BE0CR-01



103408



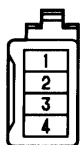
INSPECTION

1. INSPECT ELECTRO CHROMIC INNER MIRROR OPERATION

- Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 4.
- Connect the positive (+) lead from the voltmeter to terminal 2 and the negative (–) lead to terminal 3.
- Shine an electric light on the mirror, and check that there is battery positive voltage and mirror surface becomes "bright" to "dark".

If operation is not as specified, replace the inner mirror.

Wire Harness Side



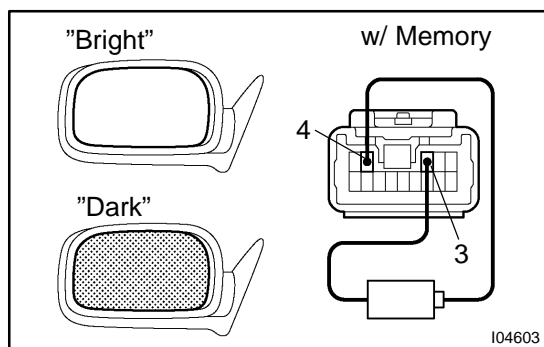
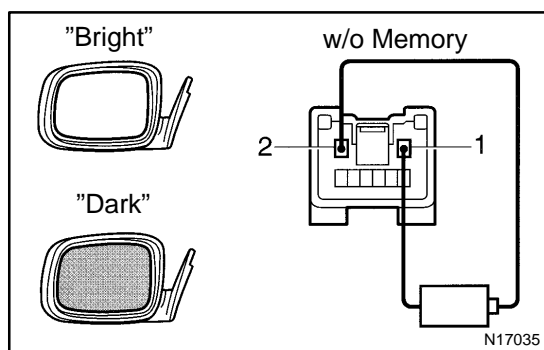
Z14965

2. INSPECT ELECTRO CHROMIC INNER MIRROR CIRCUIT

Disconnect the connector from the mirror and inspect the connector on the wire harness side, as shown.

If circuit is not as specified, inspect the circuits connected to other parts.

Tester connection	Condition	Specified condition
4 – Ground	Constant	Continuity
1 – Ground	Ignition switch LOCK or ACC	No voltage
1 – Ground	Ignition switch ON	Battery positive voltage



3. INSPECT ELECTRO CHROMIC OUTER MIRROR OPERATION

w/o Driving position memory:

- Disconnect the outer mirror connector.
- Connect the positive (+) lead from the dry through battery to terminal 2 and the negative (–) lead to terminal 1, then check that the mirror surface become "dark".
- Reconnect to the dry through battery by the reverse order, then check that the mirror surface become "bright".

If operation is not as specified, replace the mirror assembly.

4. INSPECT ELECTRO CHROMIC OUTER MIRROR OPERATION

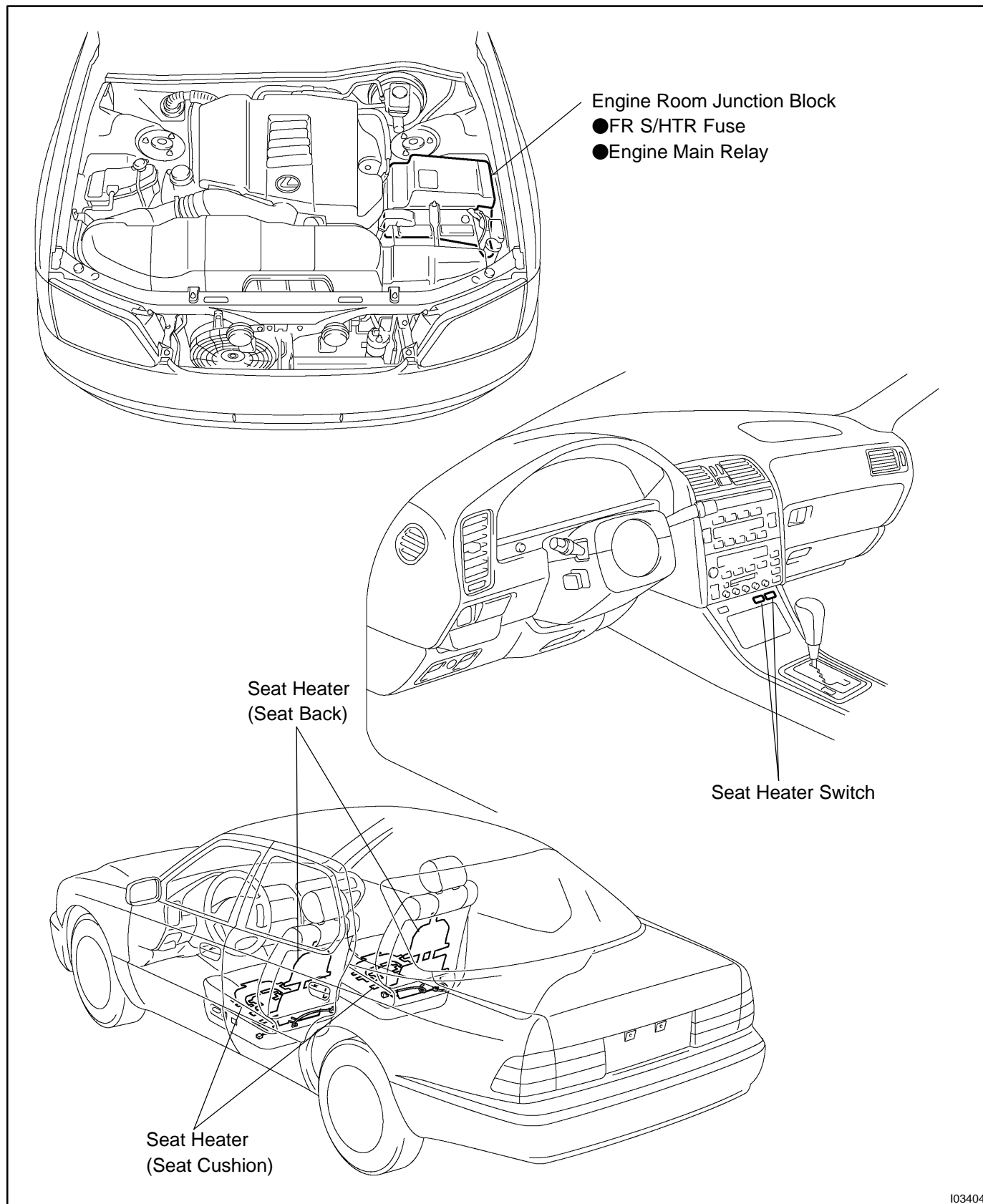
w/ Driving position memory:

- Disconnect the outer mirror connector.
- Connect the positive (+) lead from the dry through battery to terminal 4 and the negative (–) lead to terminal 3, then check that the mirror surface become "dark".
- Reconnect to the dry through battery by the reverse order, then check that the mirror surface become "bright".

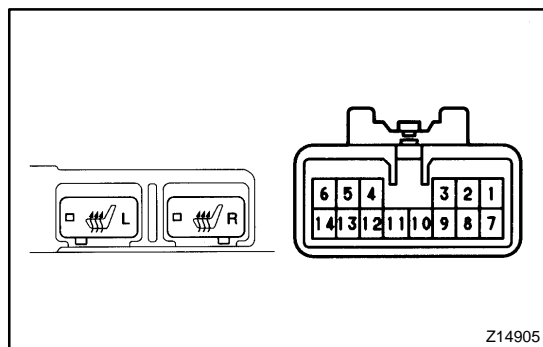
If operation is not as specified, replace the mirror assembly.

SEAT HEATER SYSTEM LOCATION

BE0CT-01



103404

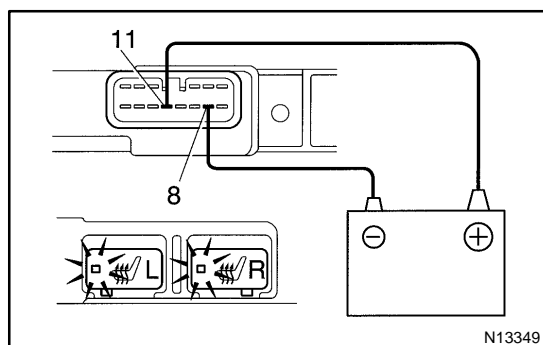


INSPECTION

1. INSPECT SEAT HEATER SWITCH CONTINUITY

Condition	Tester connection	Specified condition
OFF	–	No continuity
ON (Left)	8 – 9 – 11	Continuity
ON (Right)	8 – 11 – 13	Continuity
Illumination	10 – 12	Continuity

If continuity is not as specified, replace the switch or bulb.

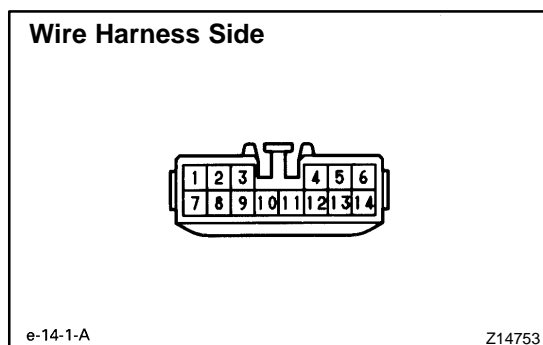


2. INSPECT SEAT HEATER SWITCH INDICATOR

- Connect the positive (+) lead from the battery to terminal 11 and the negative (–) lead to terminal 8.
- Push the switch and check that the indicator light lights up.

If operation is not as specified, replace the switch.

Wire Harness Side



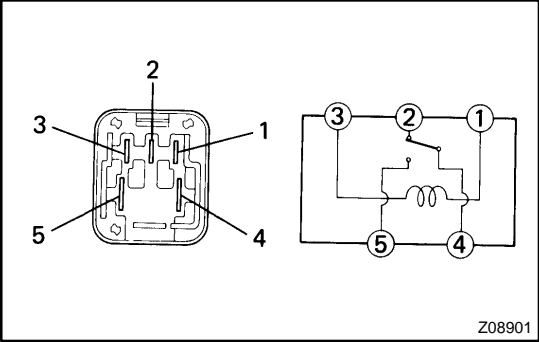
3. INSPECT SEAT HEATER SWITCH CIRCUIT

Disconnect the switch connector and inspect the connector on the wire harness side, as shown.

Tester connection to terminal number	Condition	Specified condition
8 – Ground	Constant	Continuity
9 – Ground	Constant	* Continuity
13 – Ground	Constant	* Continuity
11 – Ground	Ignition switch turned to ON	Battery positive voltage

*: There is resistance because this circuit is grounded through the relay coil.

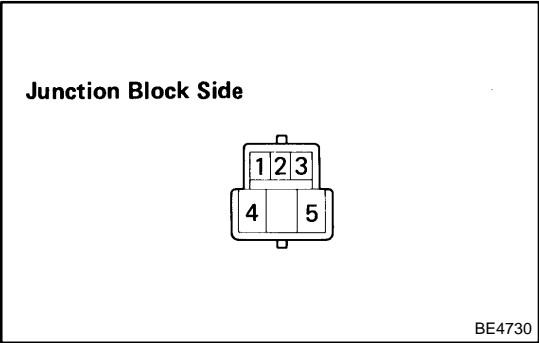
If circuit is not as specified, inspect the circuits connected to other parts.



4. INSPECT ENGINE MAIN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 3	Continuity
	2 – 4	
Apply B+ between terminals 1 and 3.	4 – 5	Continuity

If continuity is not as specified, replace the relay.

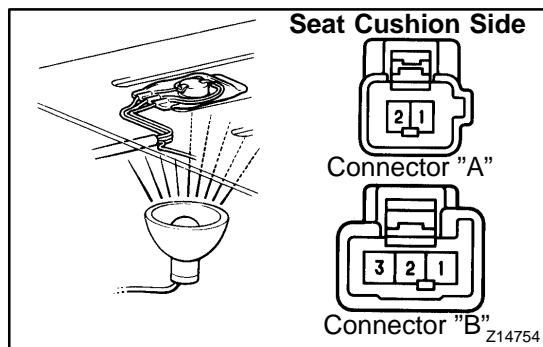


5. INSPECT ENGINE MAIN RELAY CIRCUIT

Remove the relay and inspect the connector on the junction block side, as shown.

Tester connection	Condition	Specified condition
2 – Ground	Constant	Continuity
3 – Ground	Constant	Continuity
1 – Ground	Ignition switch ON	Battery positive voltage
5 – Ground	Constant	Battery positive voltage

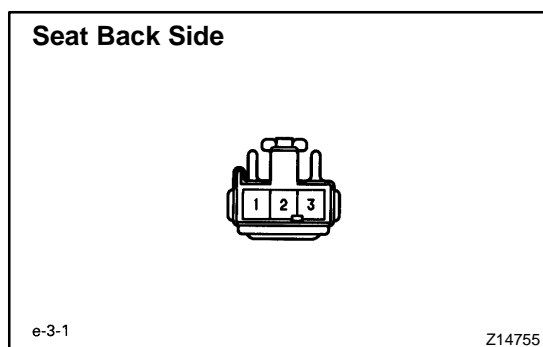
If circuit is not as specified, inspect the circuits connected to other parts.

**6. Seat Cushion:****INSPECT SEAT HEATER CONTINUITY**

- (a) Heat the thermostat with a light.
- (b) Inspect the seat heater continuity between terminals.

Tester connection	Condition	Specified condition
A2 – B3	Constant	Continuity
A1 – B1	Seat heater temperature below 25°C (77°F)	Continuity
B1 – B2	Seat heater temperature below 25°C (77°F)	Continuity
A1 – B2	Seat heater temperature below 25°C (77°F)	Continuity
A1 – B1	Seat heater temperature above 55°C (131°F)	No continuity
B1 – B2	Seat heater temperature above 45°C (113°F)	No continuity
A1 – B2	Seat heater temperature above 45°C (113°F)	No continuity

If continuity is not as specified, replace the seat cushion pad.

**7. Seat Back:****INSPECT SEAT HEATER CONTINUITY**

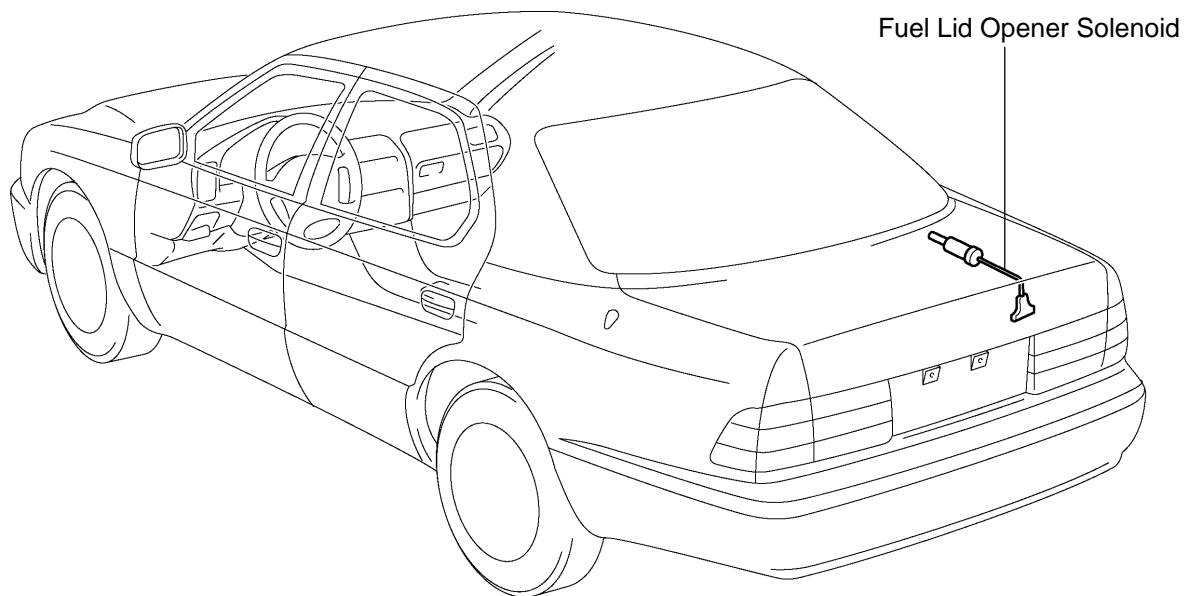
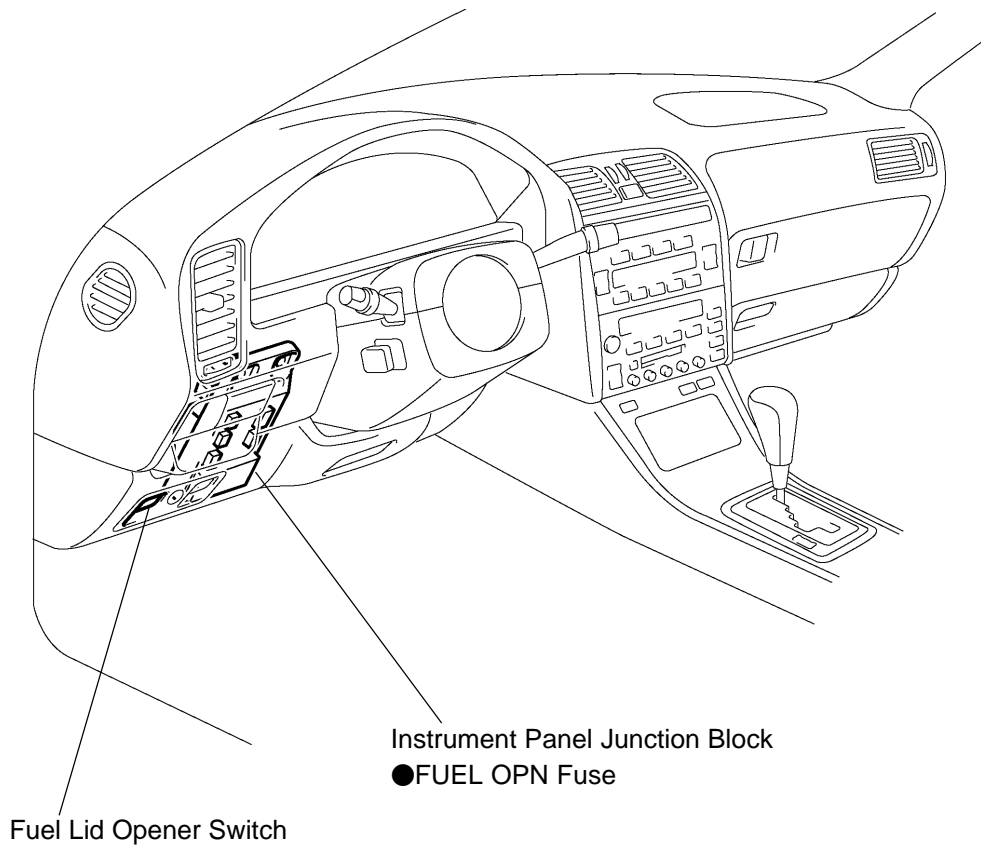
Inspect the seat heater continuity between terminals, as shown.

Tester connection	Condition	Specified condition
1 – 3	Constant	Continuity
2 – 3	Constant	Continuity

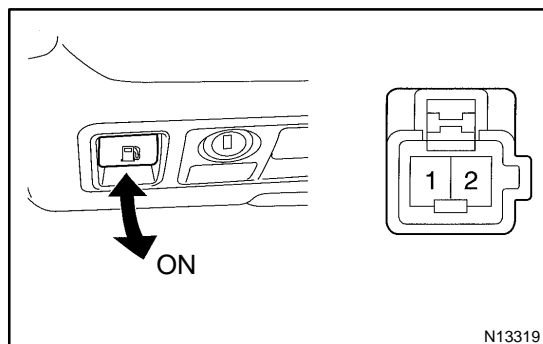
If continuity is not as specified, replace the seat back pad.

FUEL LID OPENER SYSTEM LOCATION

BE0CV-01



I03237

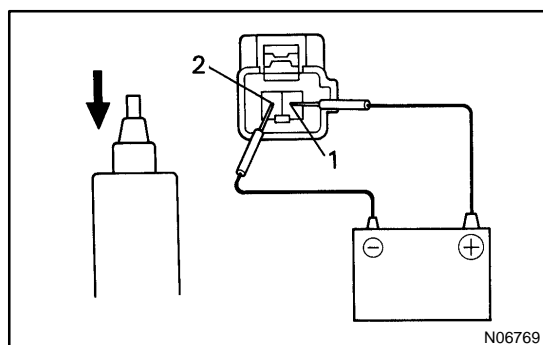


INSPECTION

1. INSPECT FUEL LID OPENER SWITCH CONTINUITY

- Check that there is continuity between terminals with the switch ON (Lever pulled).
- Check that there is no continuity between terminals with the switch OFF (Lever free).

If continuity is not as specified, replace the switch assembly.



2. INSPECT FUEL LID OPENER SOLENOID OPERATION

- Apply battery positive voltage to the terminals.
 - Check that the solenoid operates in the open direction.
- If operation is not as specified, replace the solenoid.

AUDIO SYSTEM DESCRIPTION

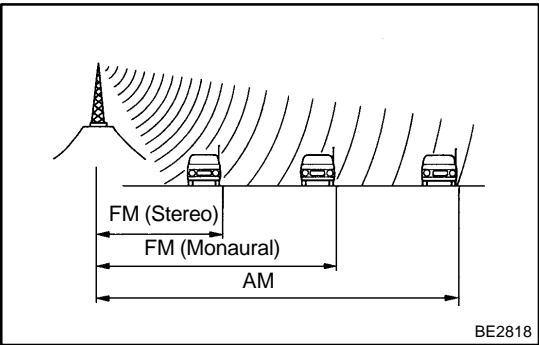
BE0CX-03

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 method	Amplitude modulation			Frequency modulation	

LF: Low frequency MF: Medium Frequency HF: High Frequency VHF: Very High Frequency

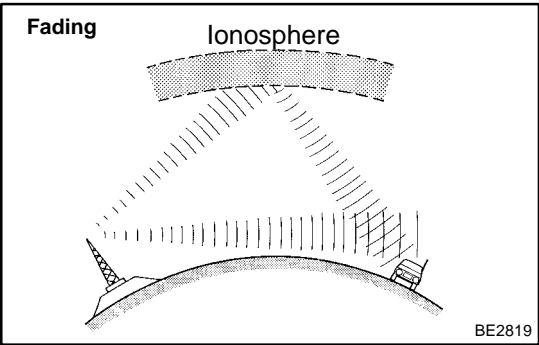


2. SERVICE AREA

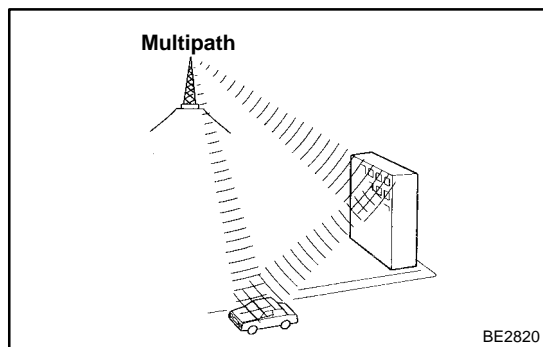
There are great differences in the size of the service area for AM and FM monaural. Sometimes FM stereo broadcasts cannot be received even though AM can be received very clearly. Not only does FM stereo have the smallest service area, but it also picks up static and other types of interference ("noise") easily.

3. RECEPTION PROBLEMS

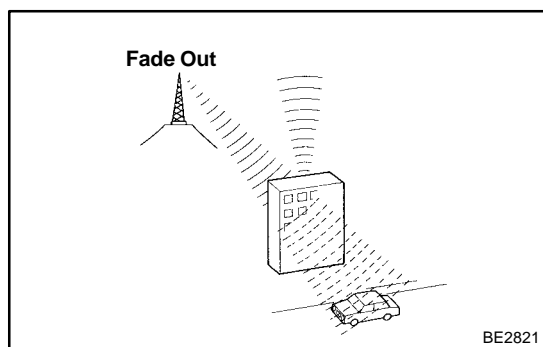
Besides the problem of static, there are also the problems called "fading", "multipath" and "fade out". These problems are caused not by electrical noise but by the nature of the radio waves themselves.



- (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. NOISE PROBLEMS

- (a) Questionnaire for noise:

It is very important for noise troubleshooting to have good understanding of the claims from the customers, so that make the best use of following questionnaire and diagnose the problem accurately.

AM	Noise occurs at a specific place.	Strong possibility of foreign noise.
	Noise occurs when listening to faint broadcasting.	There is a case that the same program is broadcasted from each local station and that may be the case you are listening different station if the program is the same.
	Noise occurs only at night.	Strong possibility of the beat from a distant broadcasting.
FM	Noise occurs while driving and at a specific place.	Strong possibility of multipath noise and fading noise caused by the changes of FM waves.

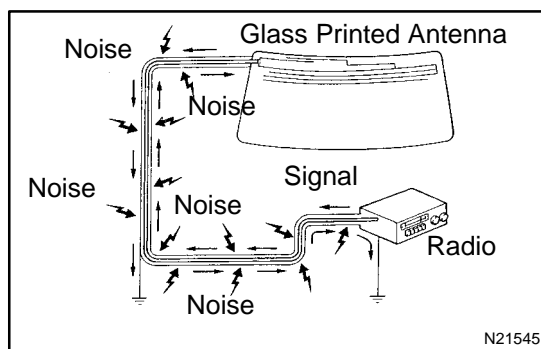
HINT:

In the case that the noise occurrence condition does not meet any of the above questionnaire, check based on the "Trouble Phenomenon".

Refer to above descriptions for multipath and fading.

(b) Matters that require attention when checking:

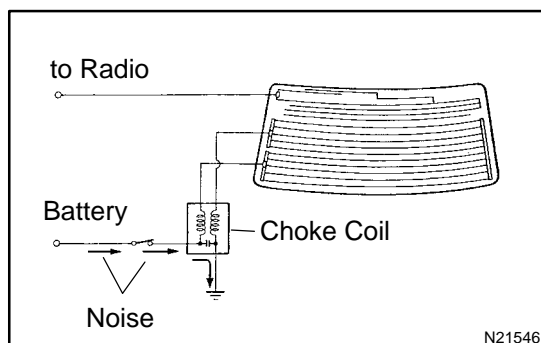
- Noise coming into the radio usually has no harm for practical use as the noise protection is taken and it is hardly thinkable for an extremely loud noise to come in. When extremely loud noise comes into the radio, check if the grounding is normal where the antenna is installed.
- Check if all the regular noise prevention parts are properly installed and if there is any installation of non-authorized parts and non-authorized wiring.
- If you leave the radio under out of tune (not tuning), it is easy to diagnose the phenomenon as noise occurs frequently.



(c) Antenna and noise:

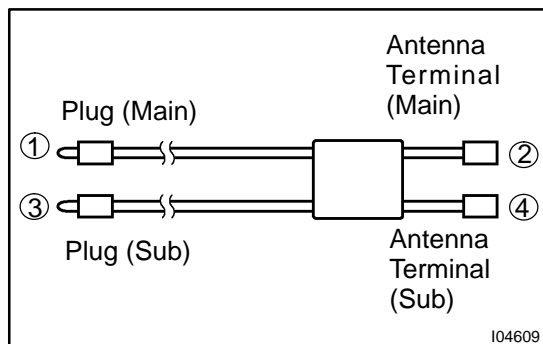
Electronic signal received by the antenna will reach to the radio transmitting through the core wire of the coaxial cable. Any noise wave other than radio wave is mixed into this core wire, that naturally causes noise in the radio and poor sound quality. In order to prevent these noises from mixing into the radio, the core wire inside the coaxial cable is covered with a mesh wire called shield wire. This shield wire shelters the noise and transmits it to the ground, thus preventing noise from mixing in.

If this shield wire has grounding failure, that causes noise.



(d) Choke coil and noise:

The choke coil is connected in the rear window defogger circuit. This is connected so to prevent noise from mixing into the radio by making the noise current included in the power source of the rear window defogger flow to the ground.



(e) Antenna code continuity check and grounding point:
HINT:

During troubleshooting, in case that the antenna code continuity check, grounding check and grounding check of the choke coil are needed, please check referring to the following illustration.

Terminal connection	Normal condition
(1) ↔ (2)	Continuity
(3) ↔ (4)	No continuity

5. COMPACT DISC PLAYER

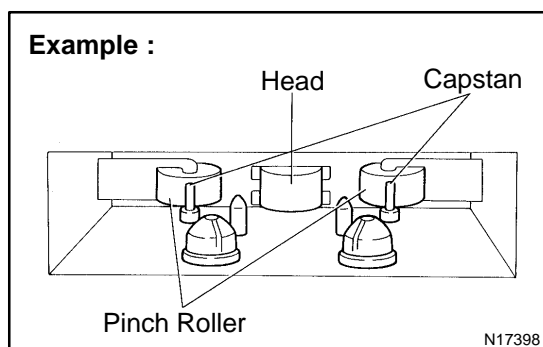
Compact Disc Players use a laser beam pick-up to read the digital signals recorded on the CD and reproduce analog signals of the music, etc.

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.

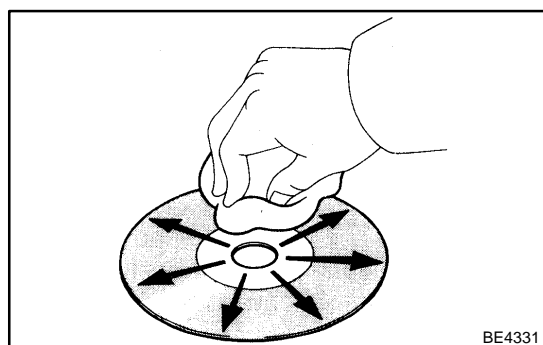
NOTICE:

CD players use an invisible laser beam which could cause hazardous radiation exposure. Be sure to operate the player correctly as instructed.



6. Tape Player/Head Cleaning: MAINTENANCE

- Raise the cassette door with your finger. Next, using a pencil or similar object, push in the guide.
- Using a cleaning pen or cotton applicator soaked in cleaner, clean the head surface, pinch rollers and capstans.



7. 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.

8. 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 heightened. This lies behind this standardization.

The concrete objectives are explained below.

- 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.
- Various types of after market products have been able to add or replace freely.
- Thanks to 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.
- Conventionally, a new product developed by a manufacture could not be used due to a lack of compatibility with other manufactures products. Thanks to this new standard, users can enjoy compatible products provided for them timely.

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.
- 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.

TROUBLESHOOTING

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).

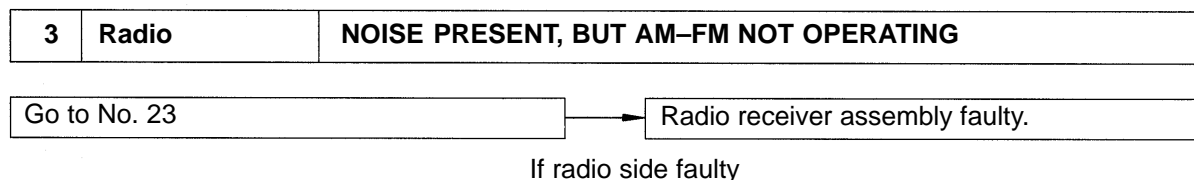
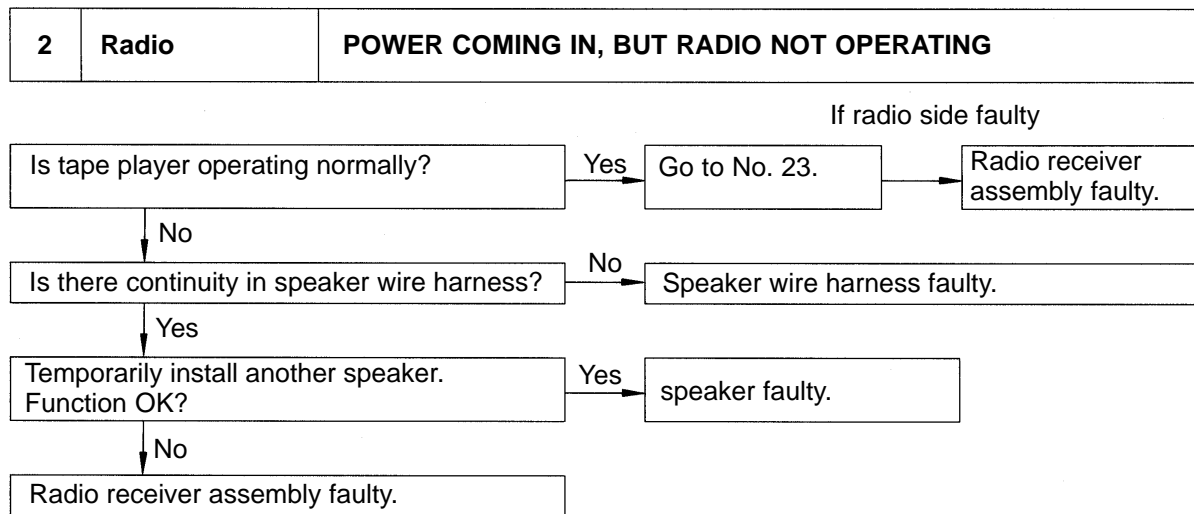
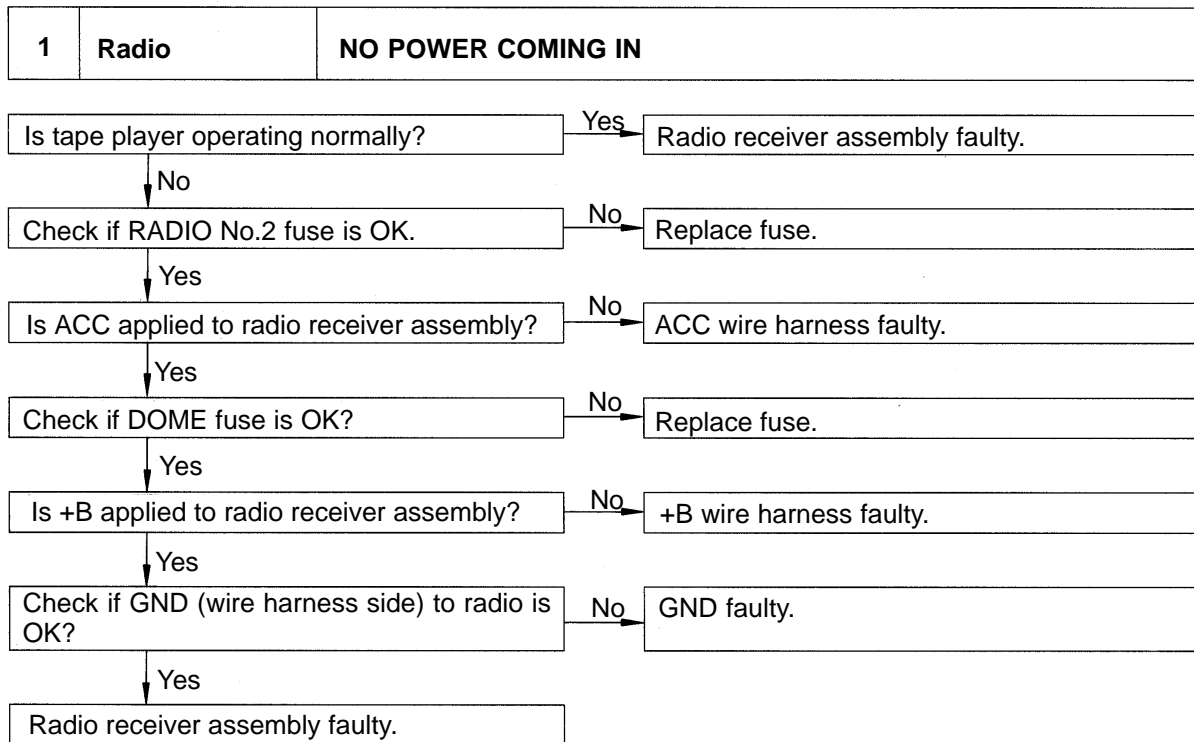
HINT:

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.).

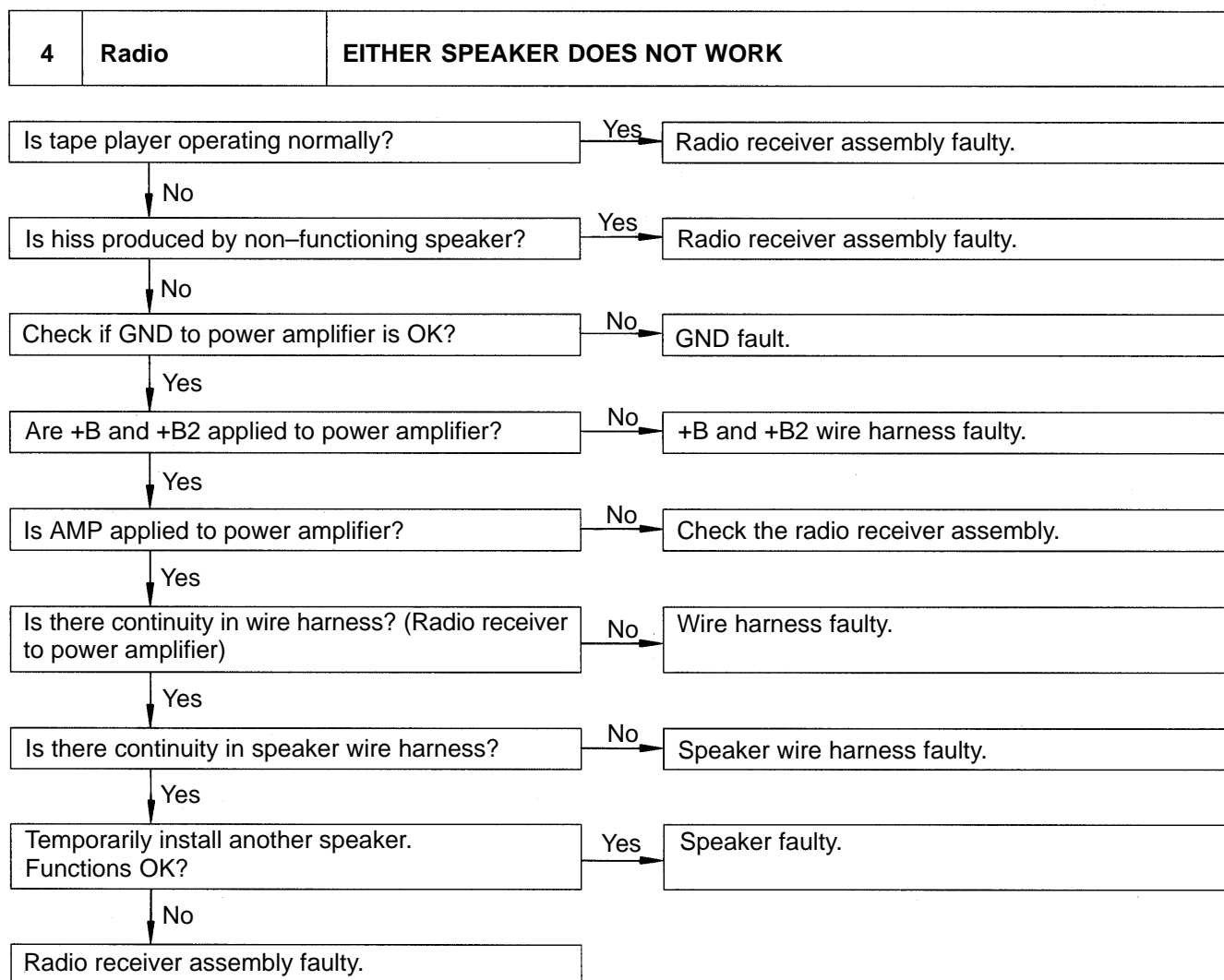
Always inspect the trouble taking the following items into consideration.

- Open or short circuit of the wire harness
- Connector or terminal connection fault

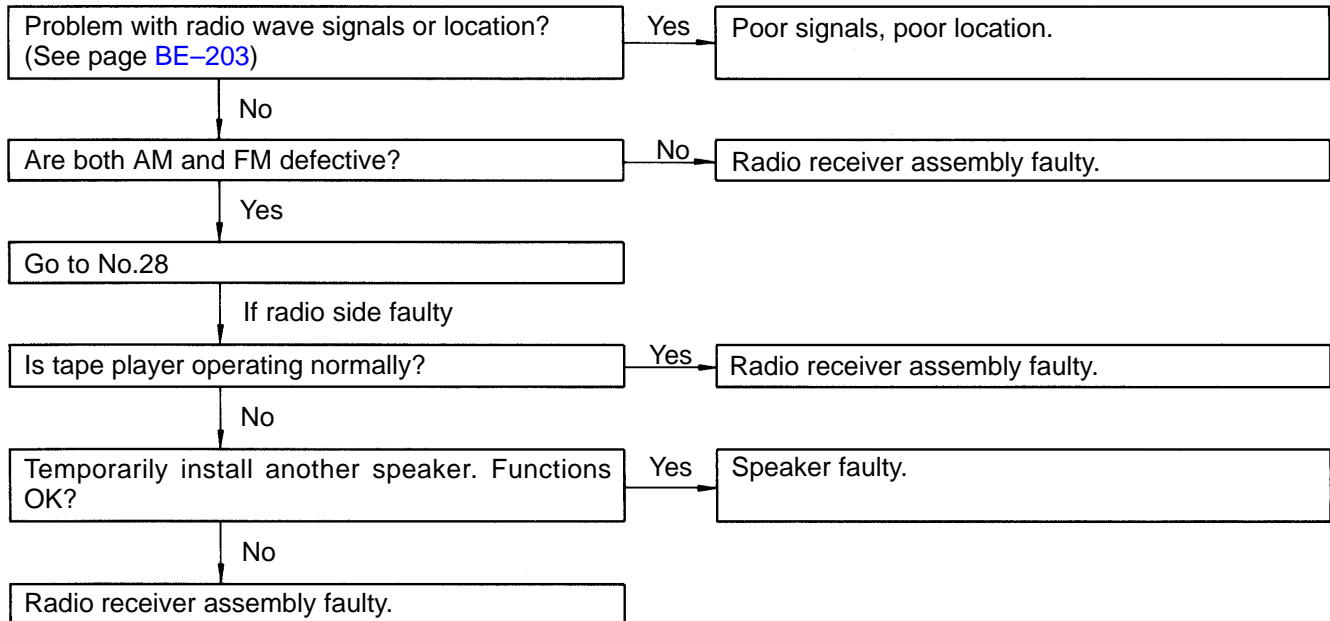
	Problem	No.
Radio	No power coming in.	1
	Power coming in, but radio not operating.	2
	Noise present, but AM – FM not operating.	3
	Either speaker does not work.	4
	Either AM or FM does not work.	5
	Reception poor (Volume faint).	5
	Few preset tuning bands.	5
	Sound quality poor.	6
	Cannot set station select button.	7
	Preset memory disappears.	7
Tape Player	Cassette tape cannot be inserted.	8
	Cassette tape inserts, but no power.	9
	Power coming in, but tape player not operating.	10
	Either speaker does not work.	11
	Sound quality poor (Volume faint).	12
	Tape jammed, malfunction with tape speed or auto–reverse.	13
	Cassette tape will not eject.	14
CD Player	CD cannot be inserted.	15
	CD inserts, but no power.	16
	Power coming in, but CD player not operating.	17
	Sound jumps.	18
	Sound quality poor (Volume faint).	19
	Either speaker does not work.	20
Amplifier	CD will not eject.	21
	No power coming in.	22
Noise	Either speaker does not work.	23
	Noise produced by vibration or shock while driving.	24
	Noise produced when engine starts.	25
	Noise occurs	26



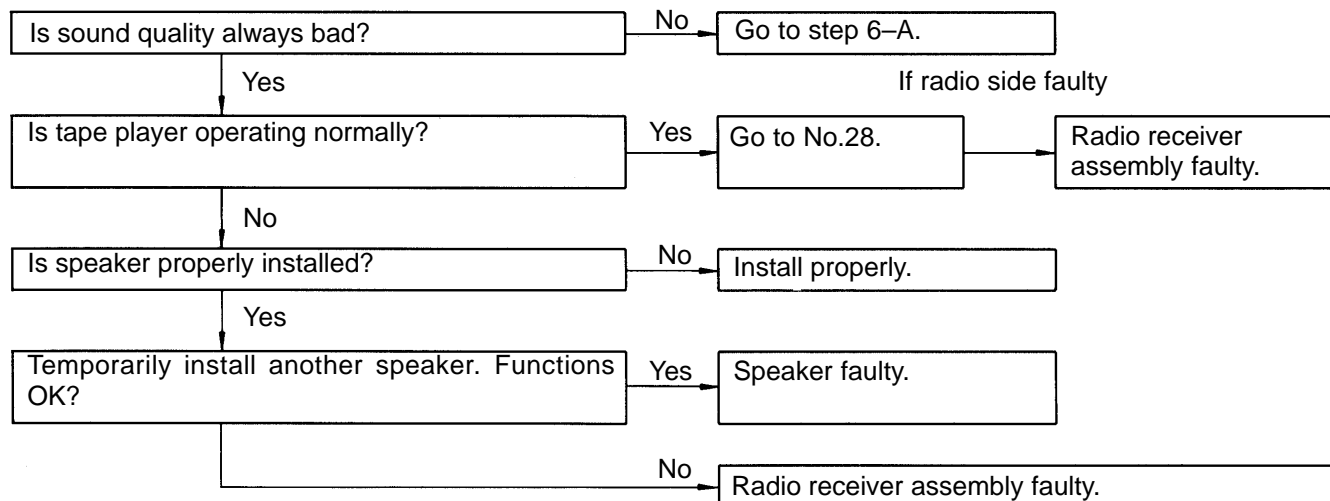
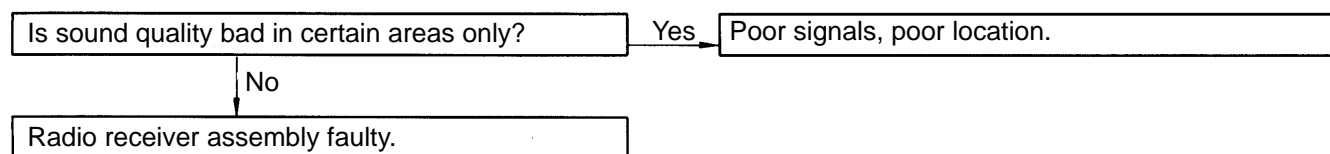
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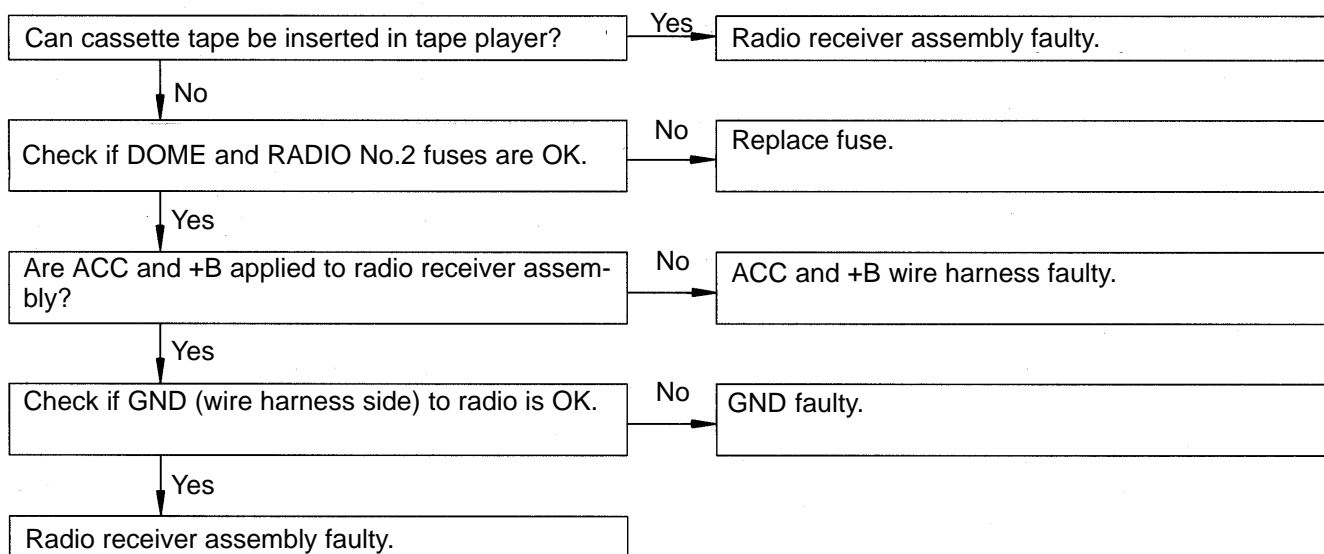
5	Radio	EITHER AM OR FM DOES NOT WORK, RECEPTION POOR (VOLUME FAINT), FEW PRESET TUNING BANDS
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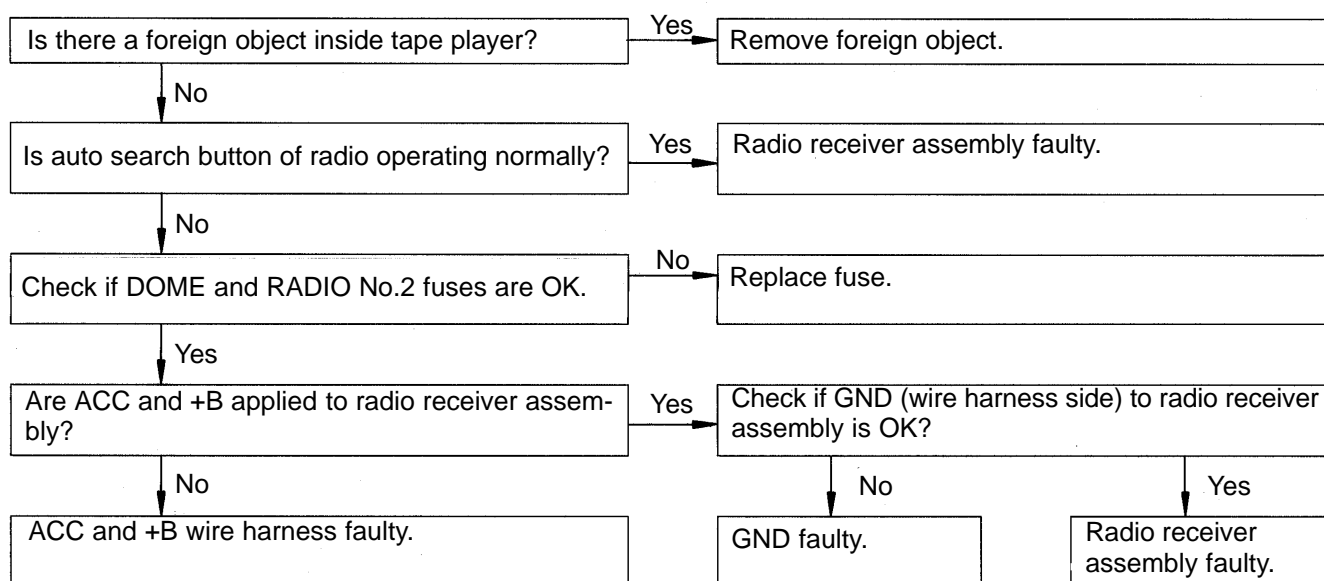
6	Radio	SOUND QUALITY POOR
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**6-A.**

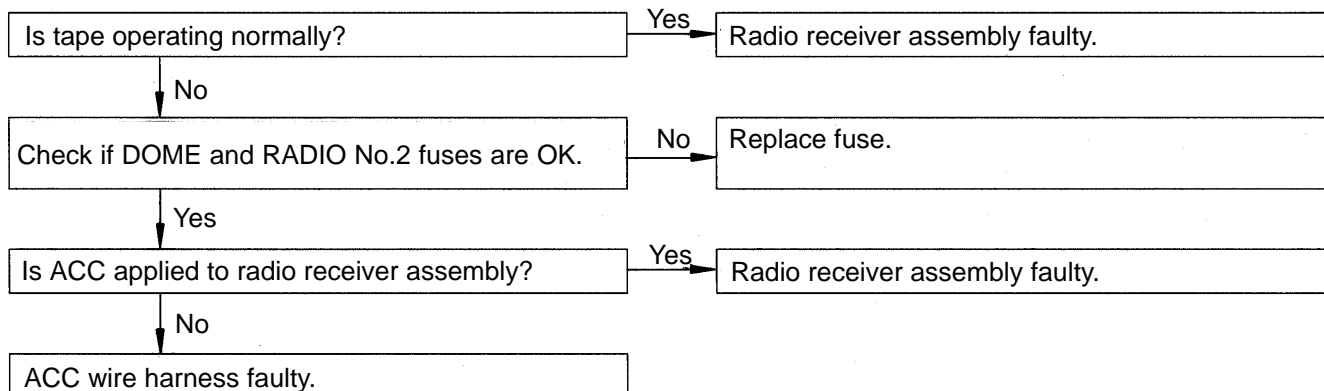
7	Radio	CANNOT SET STATION SELECT BUTTON, PRESET MEMORY DISAPPEARS
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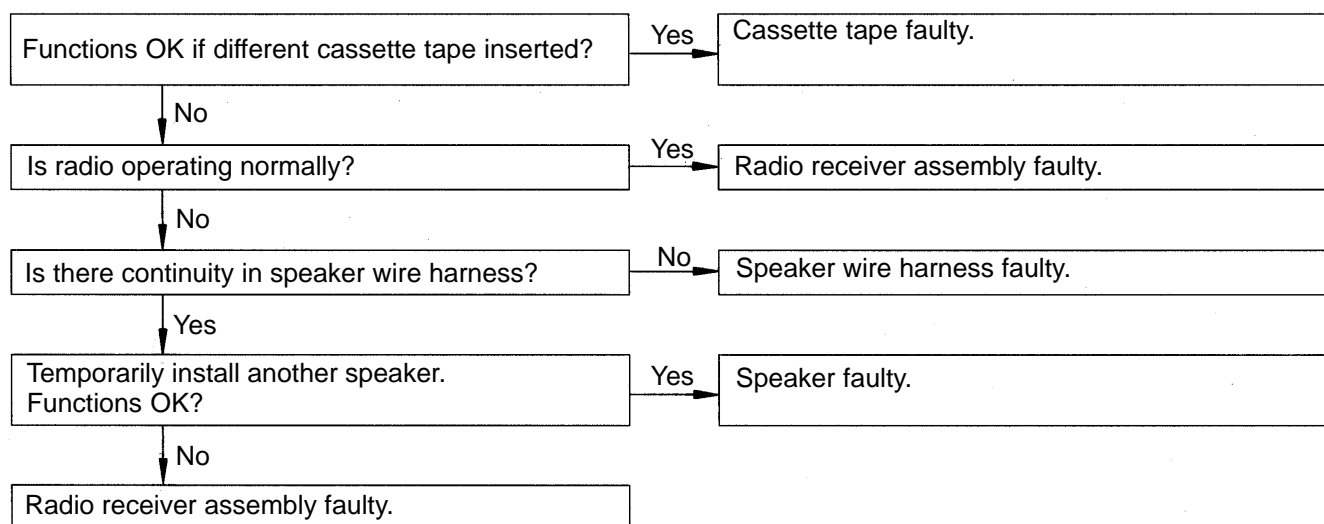
8	Tape Player	CASSETTE TAPE CANNOT BE INSERTED
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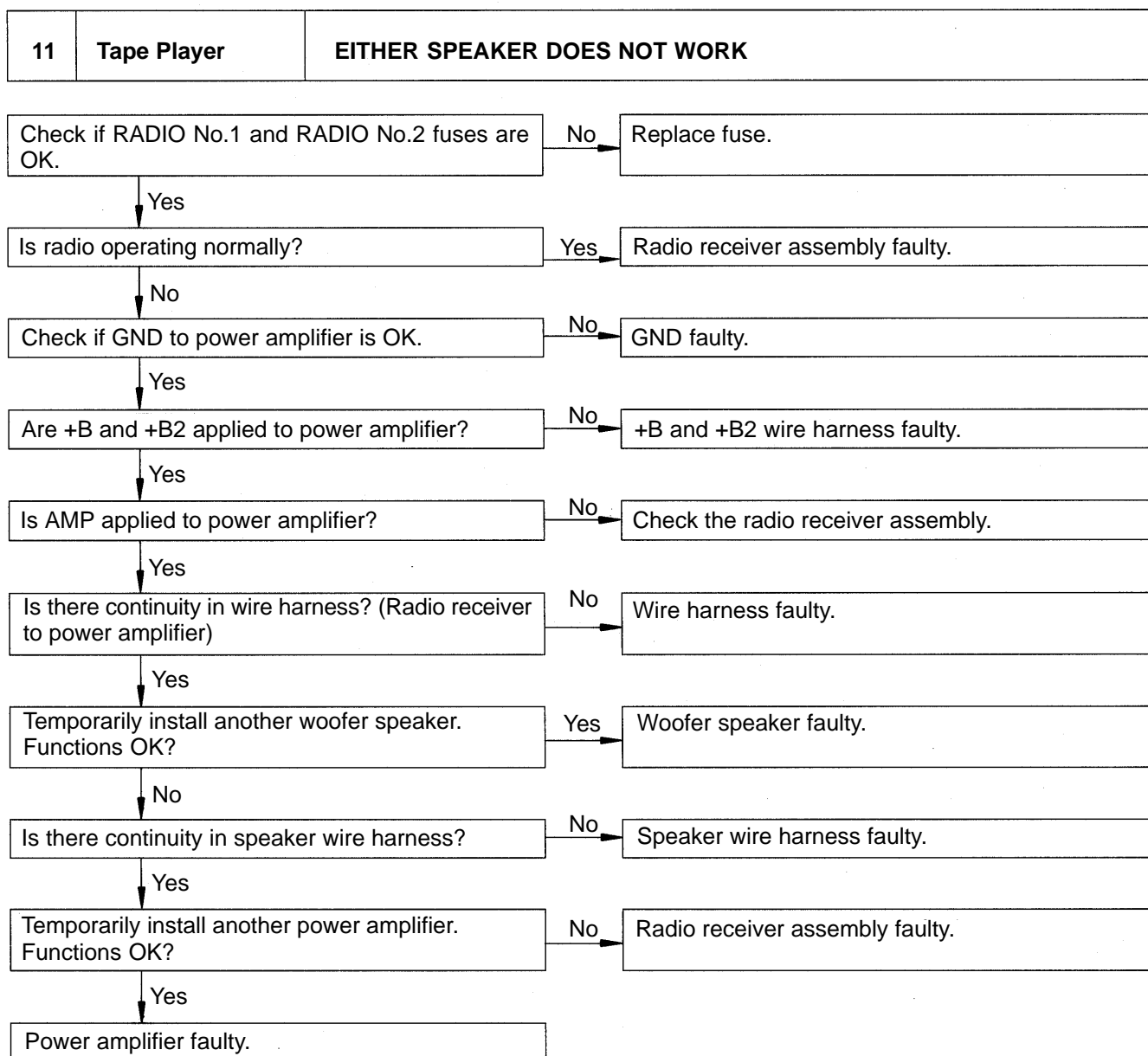


9	Tape Player	CASSETTE TAPE INSERTS, BUT NO POWER
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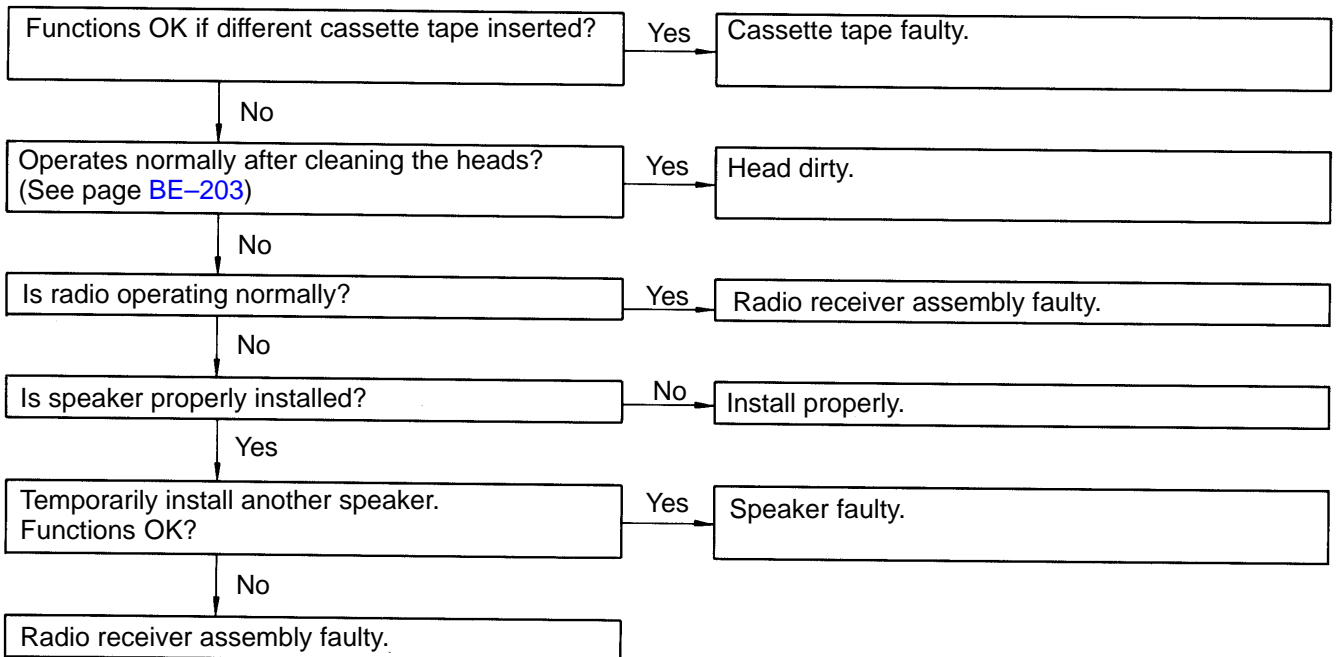


10	Tape Player	POWER COMING IN, BUT TAPE PLAYER NOT OPERATING
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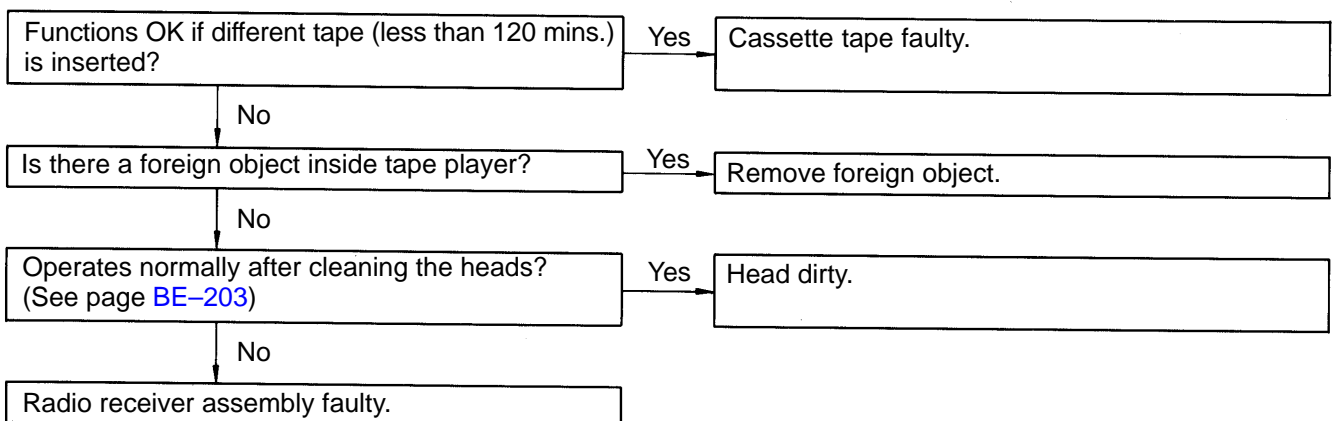




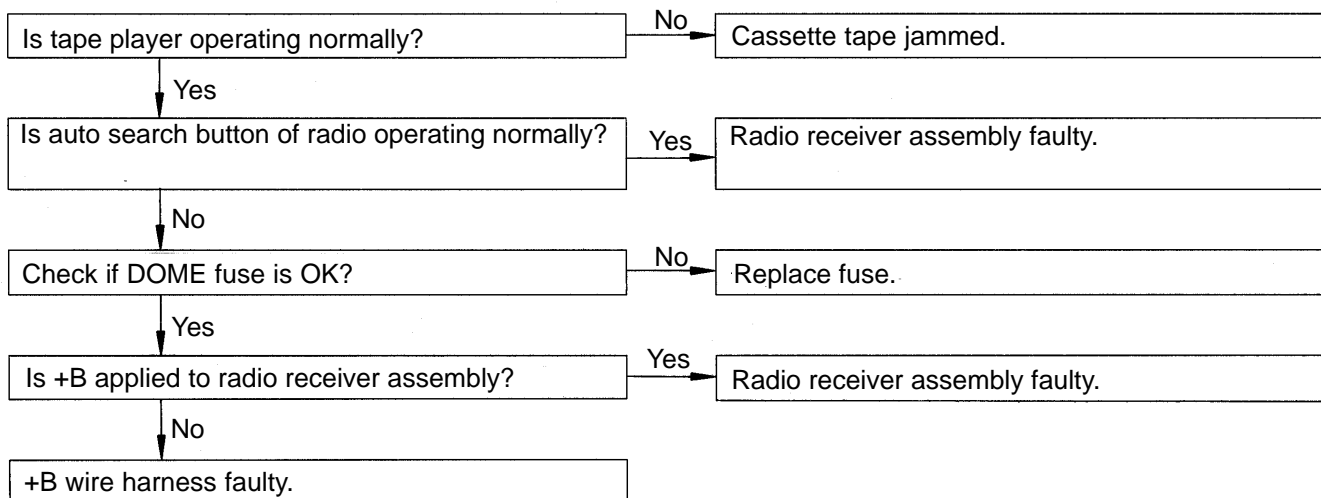
12	Tape Player	SOUND QUALITY POOR (VOLUME FAINT)
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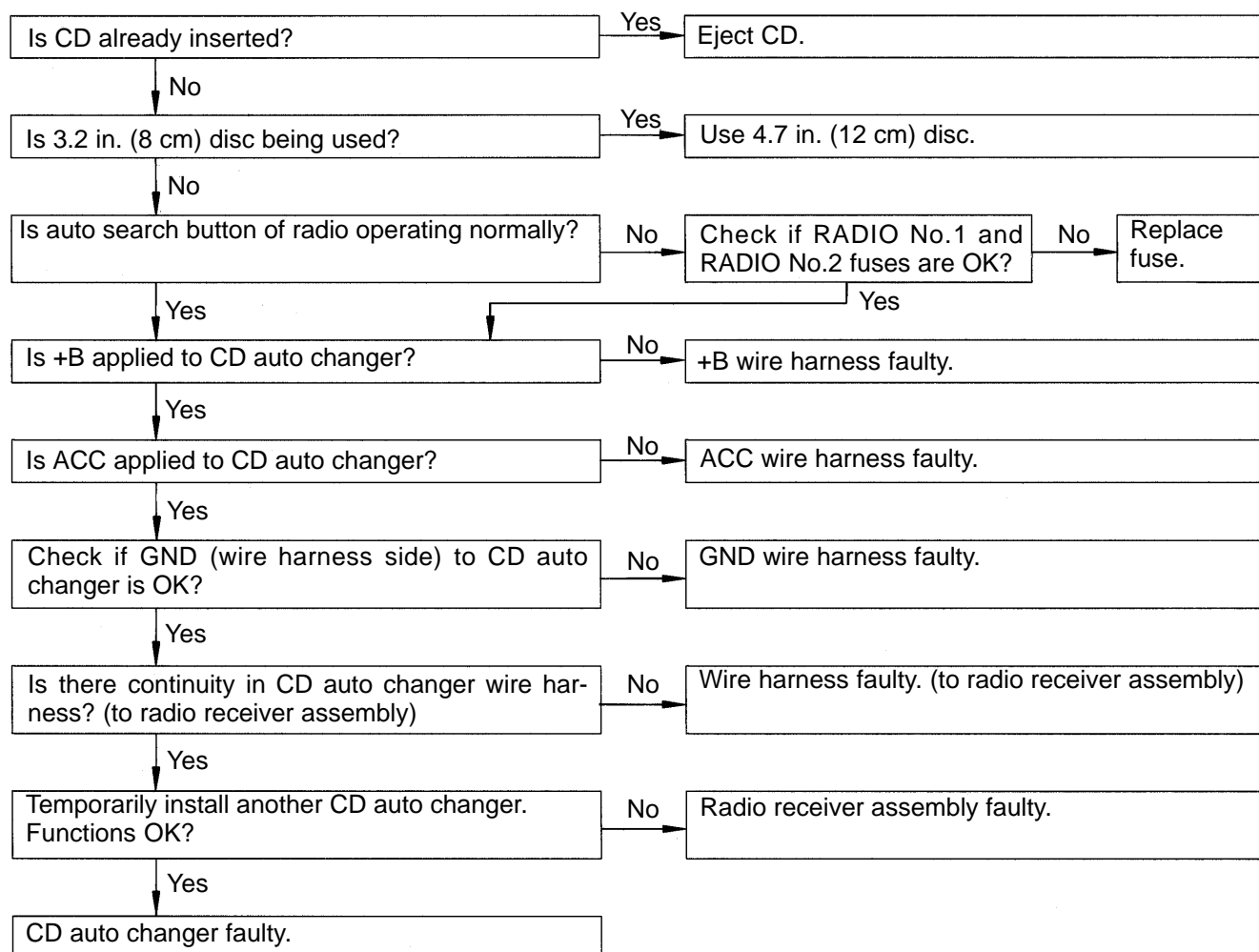
13	Tape Player	TAPE JAMMED, MALFUNCTION WITH TAPE SPEED OR AUTO-REVERSE
----	-------------	--

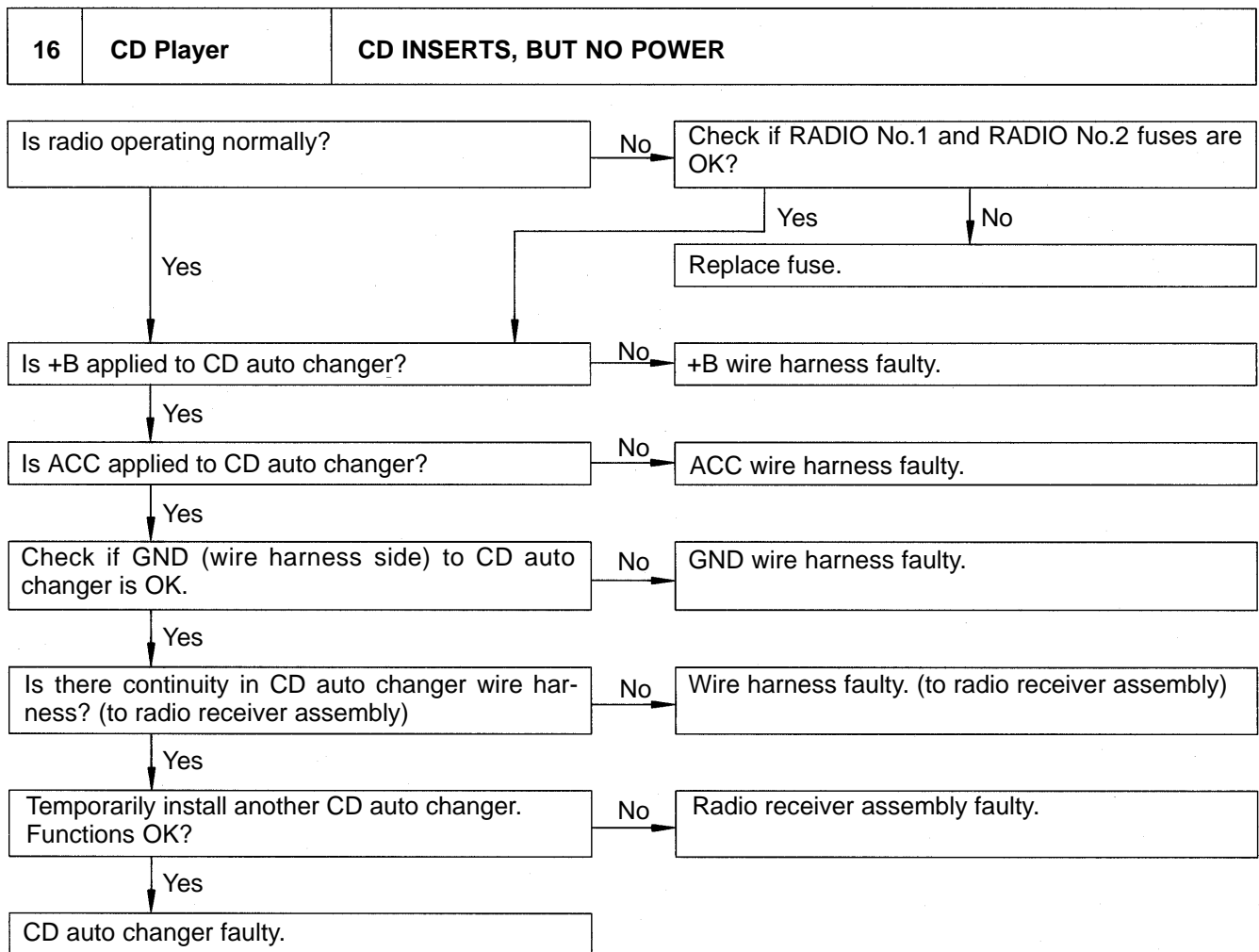


14	Tape Player	CASSETTE TAPE WILL NOT EJECT
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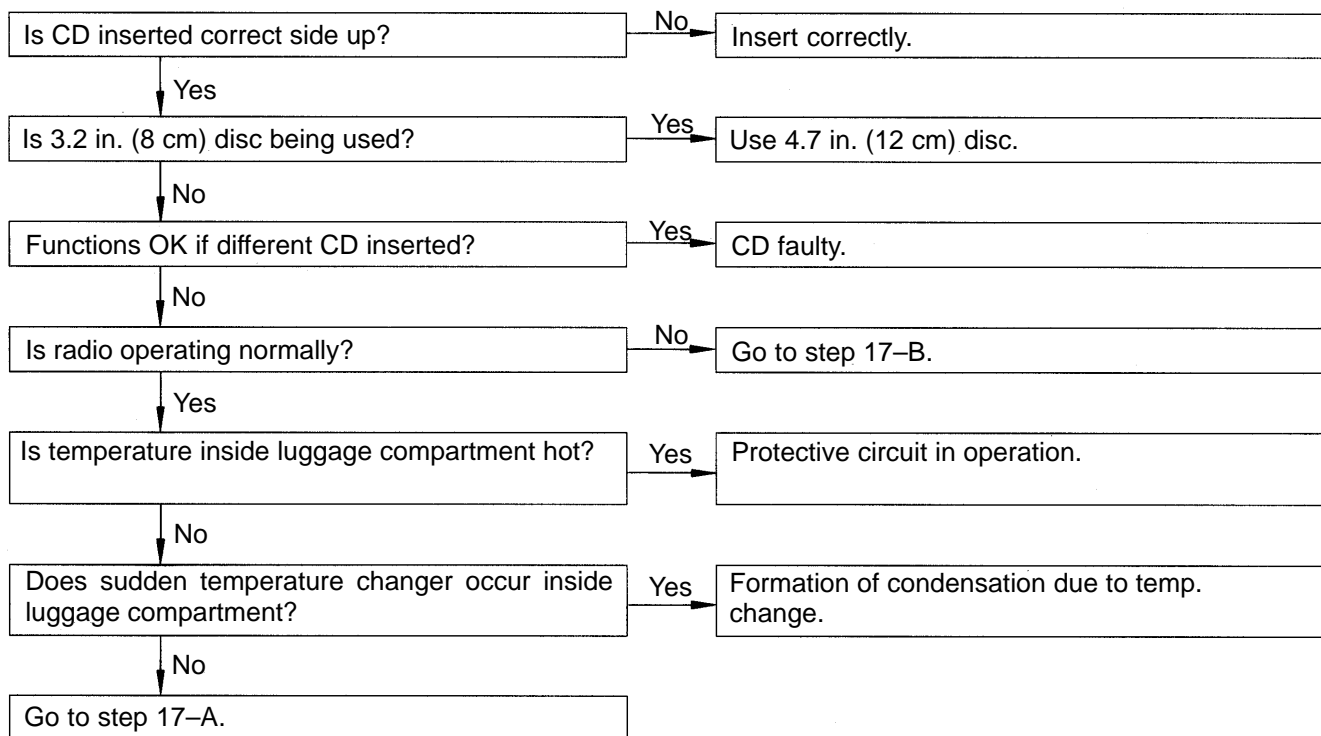
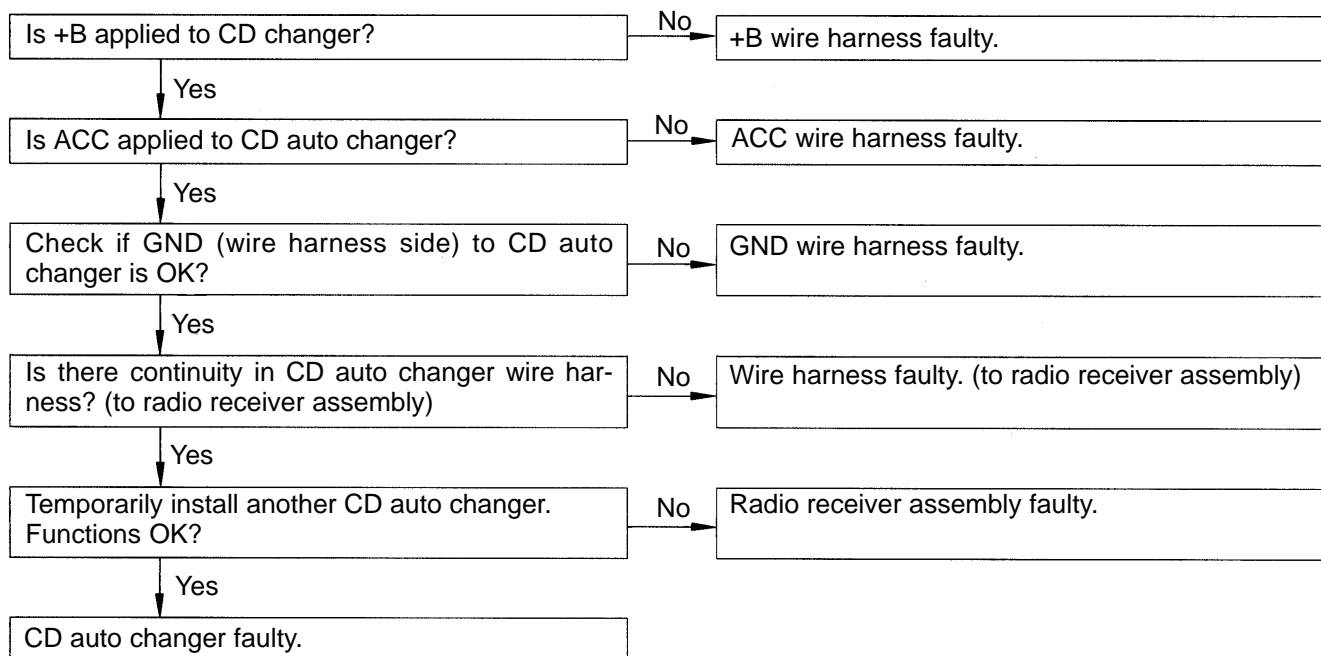


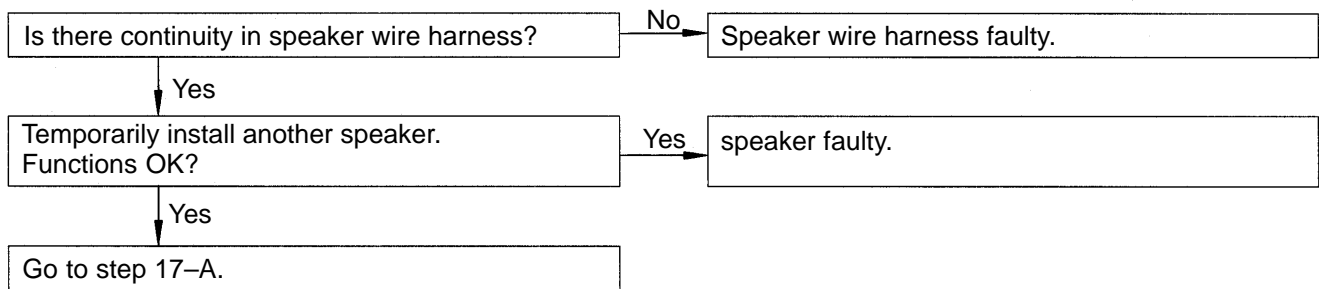
15	CD Player	CD CANNOT BE INSERTED
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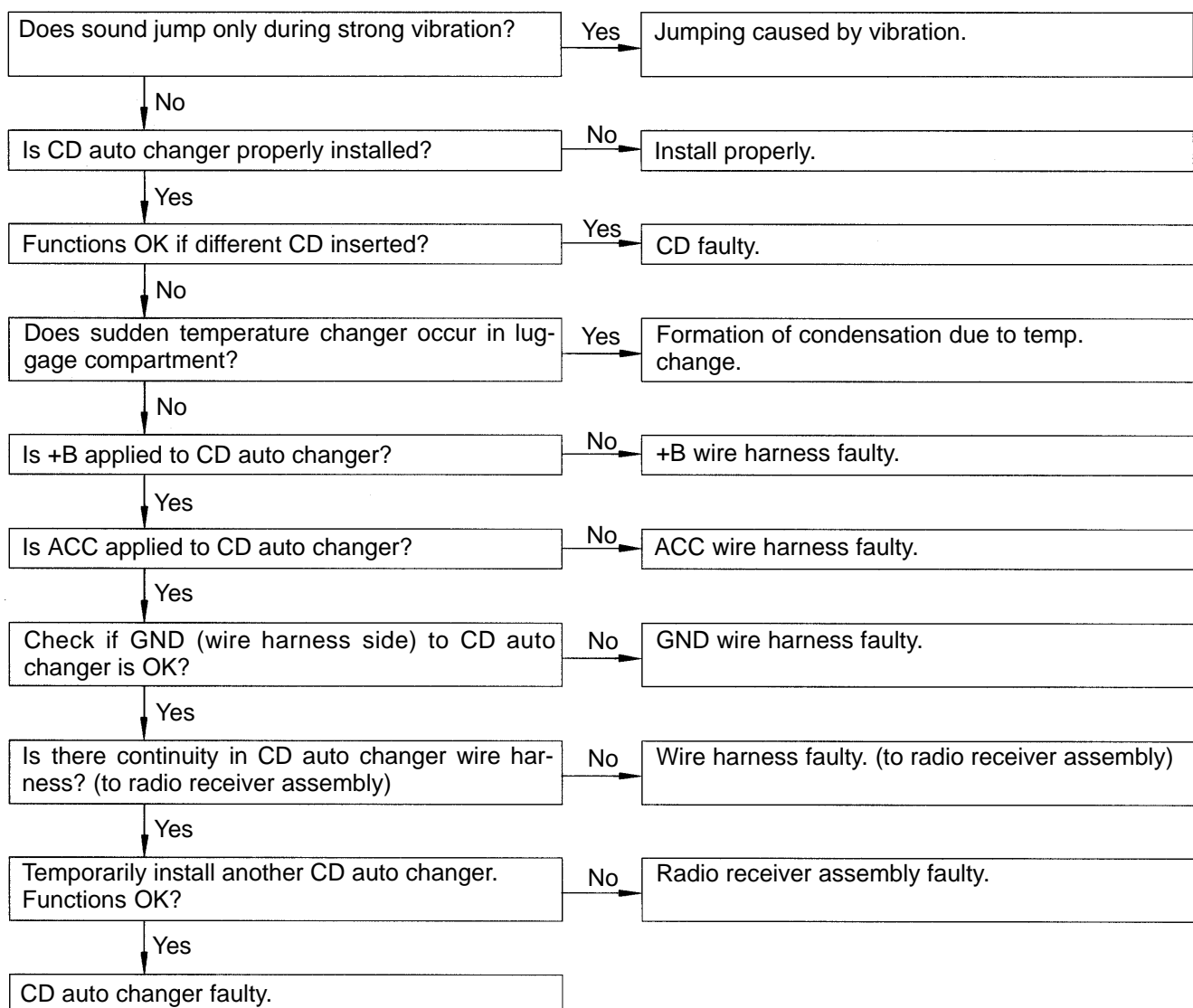


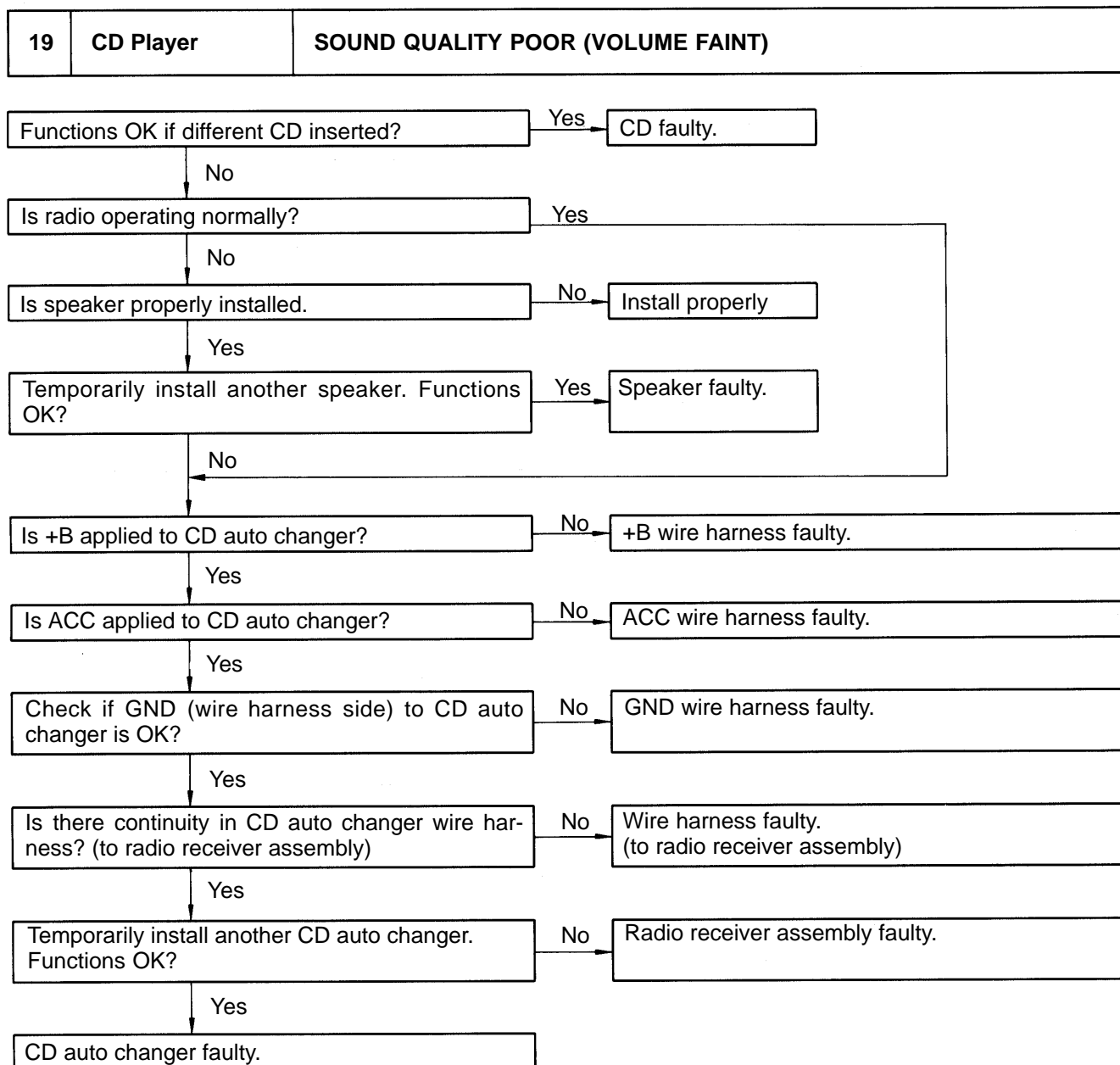
17	CD Player	POWER COMING IN, BUT PLAYER NOT OPERATING
----	-----------	---

**17-A.**

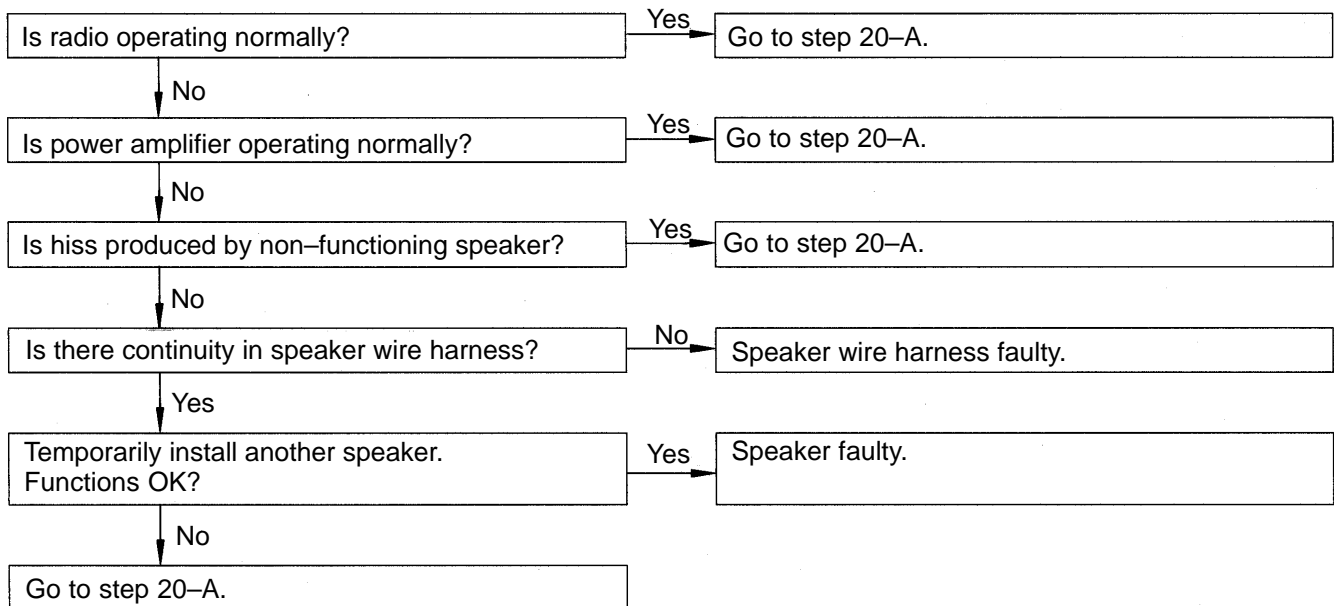
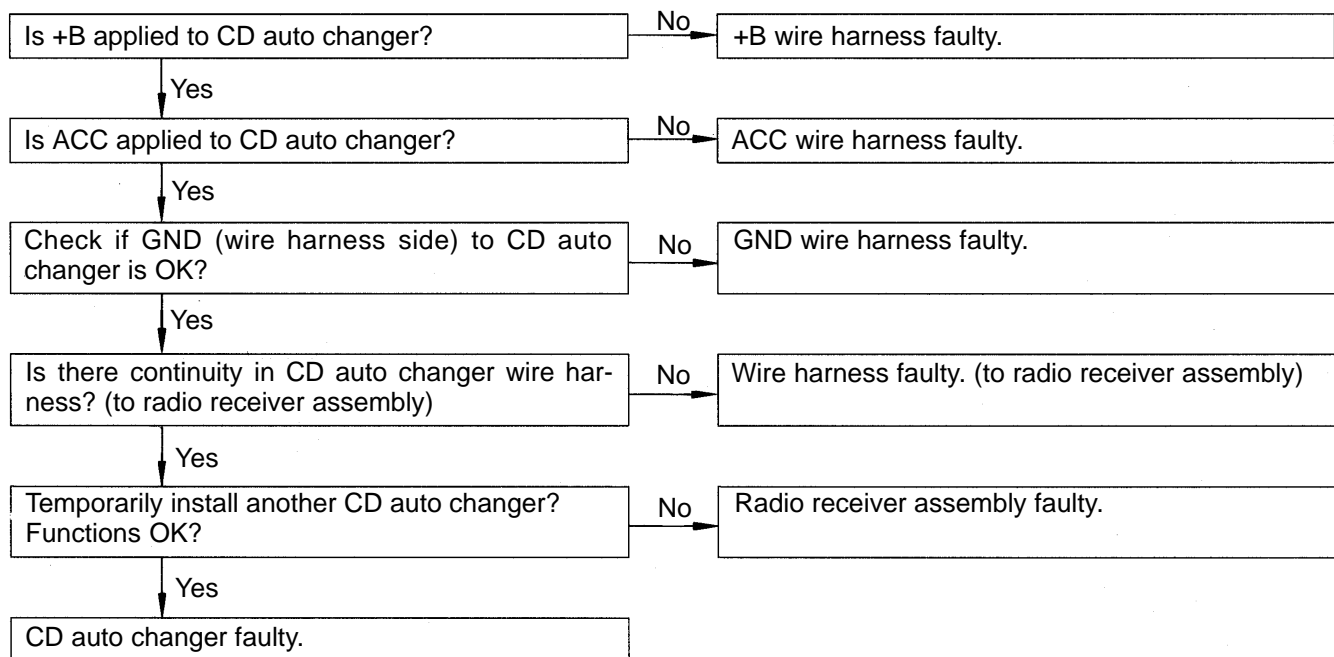
17-B.

18	CD Player	SOUND JUMPS
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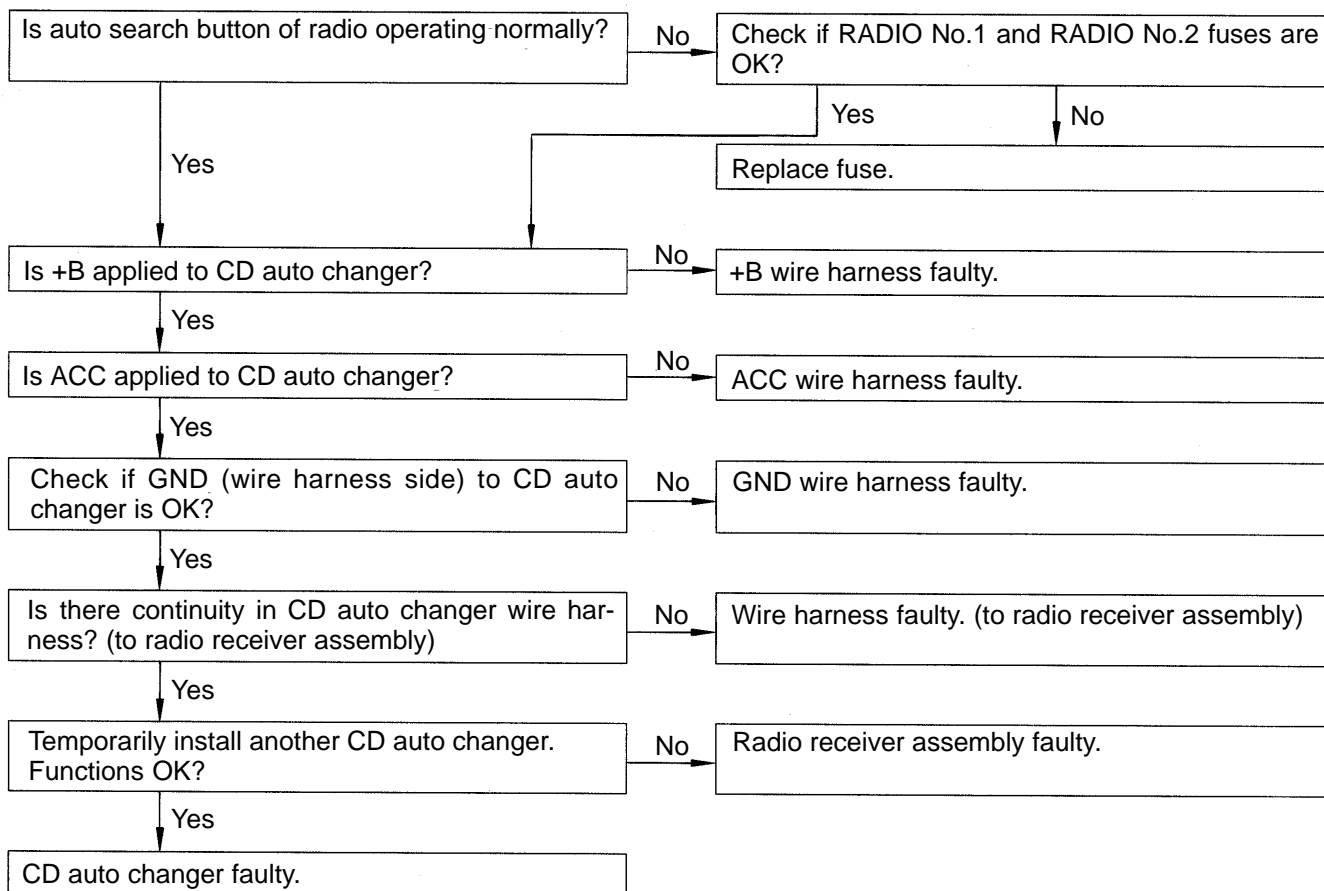




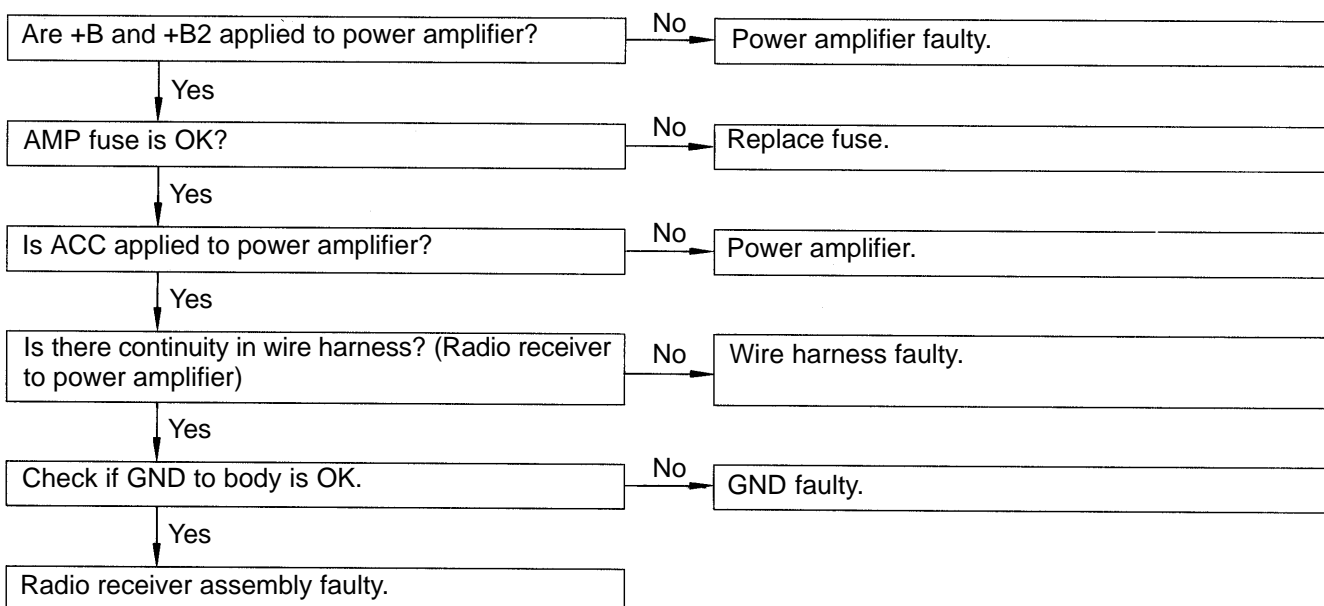
20	CD Player	EITHER SPEAKER DOES NOT WORK
-----------	------------------	-------------------------------------

**20-A**

21	CD Player	CD WILL NOT EJECT
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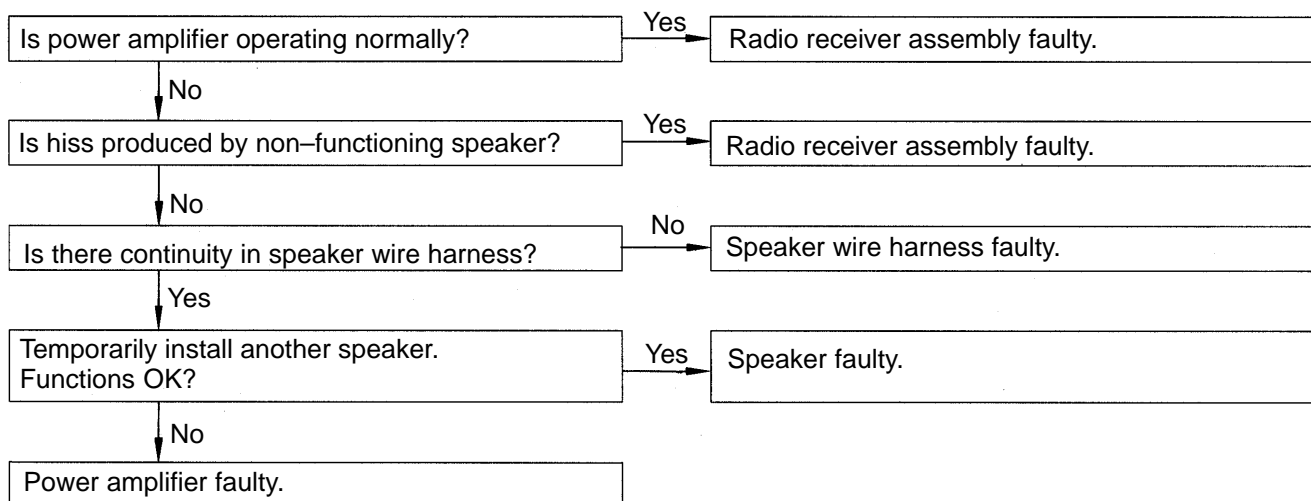


22	Amplifier	NO POWER COMING IN
-----------	------------------	---------------------------

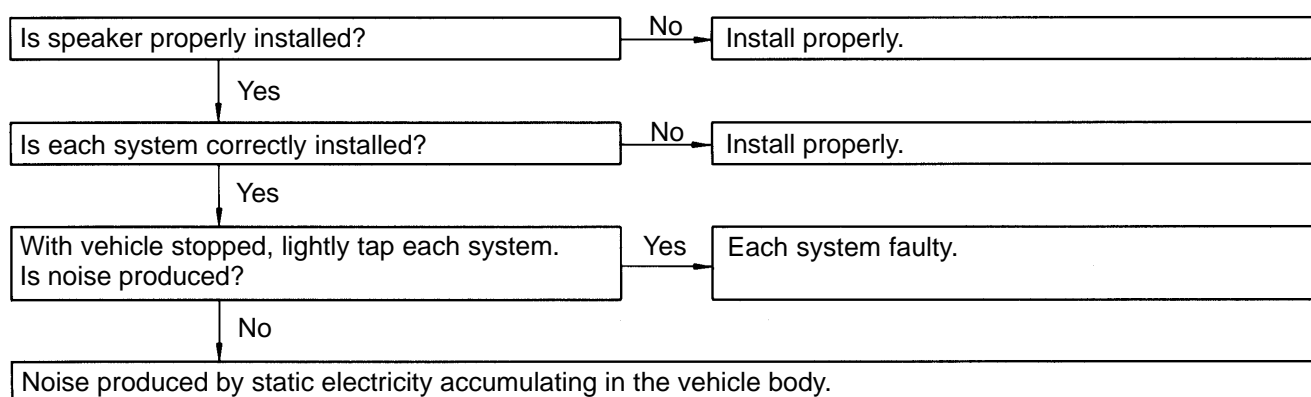


V06285

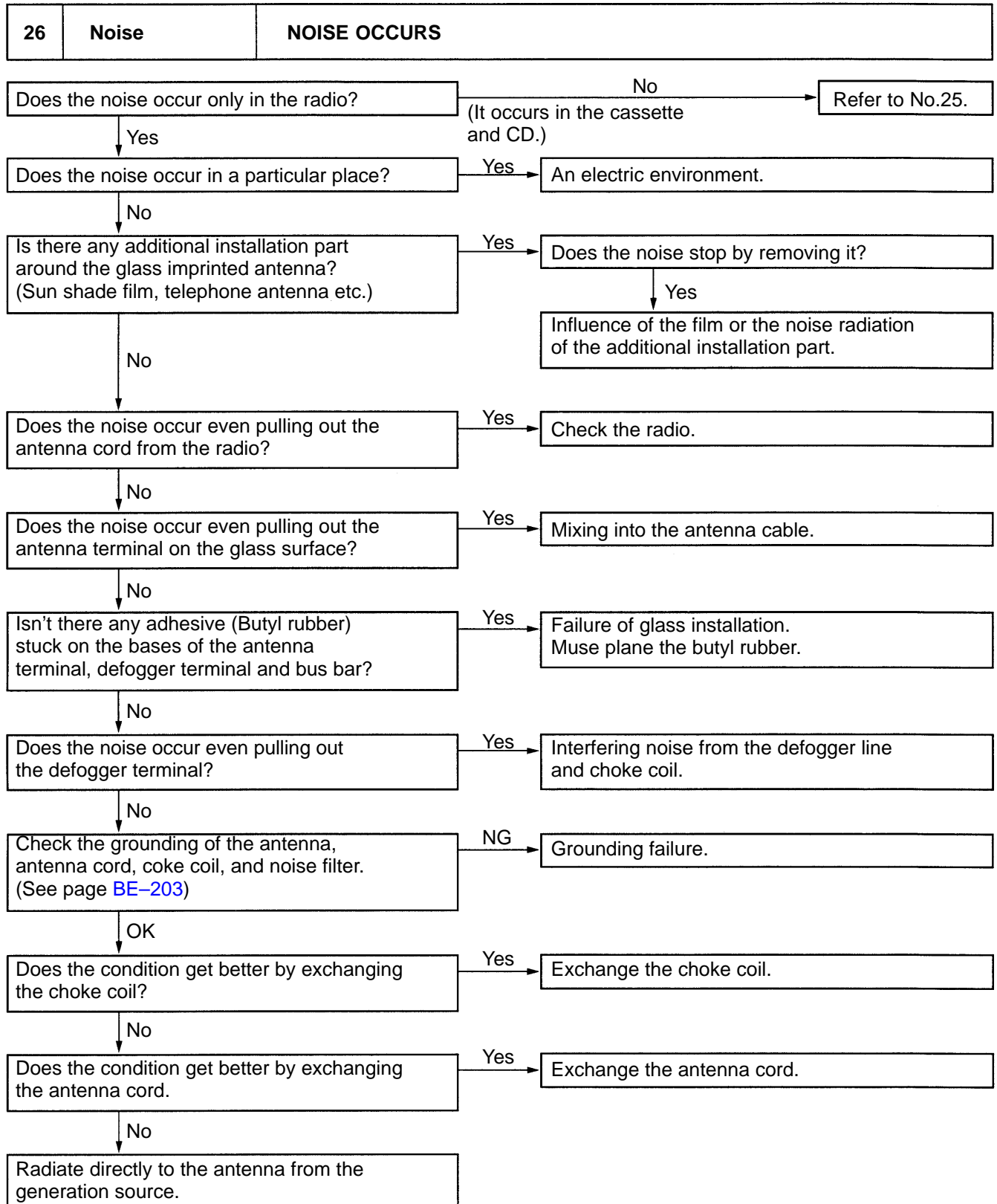
23	Amplifier	EITHER SPEAKER DOES NOT WORK
----	-----------	------------------------------



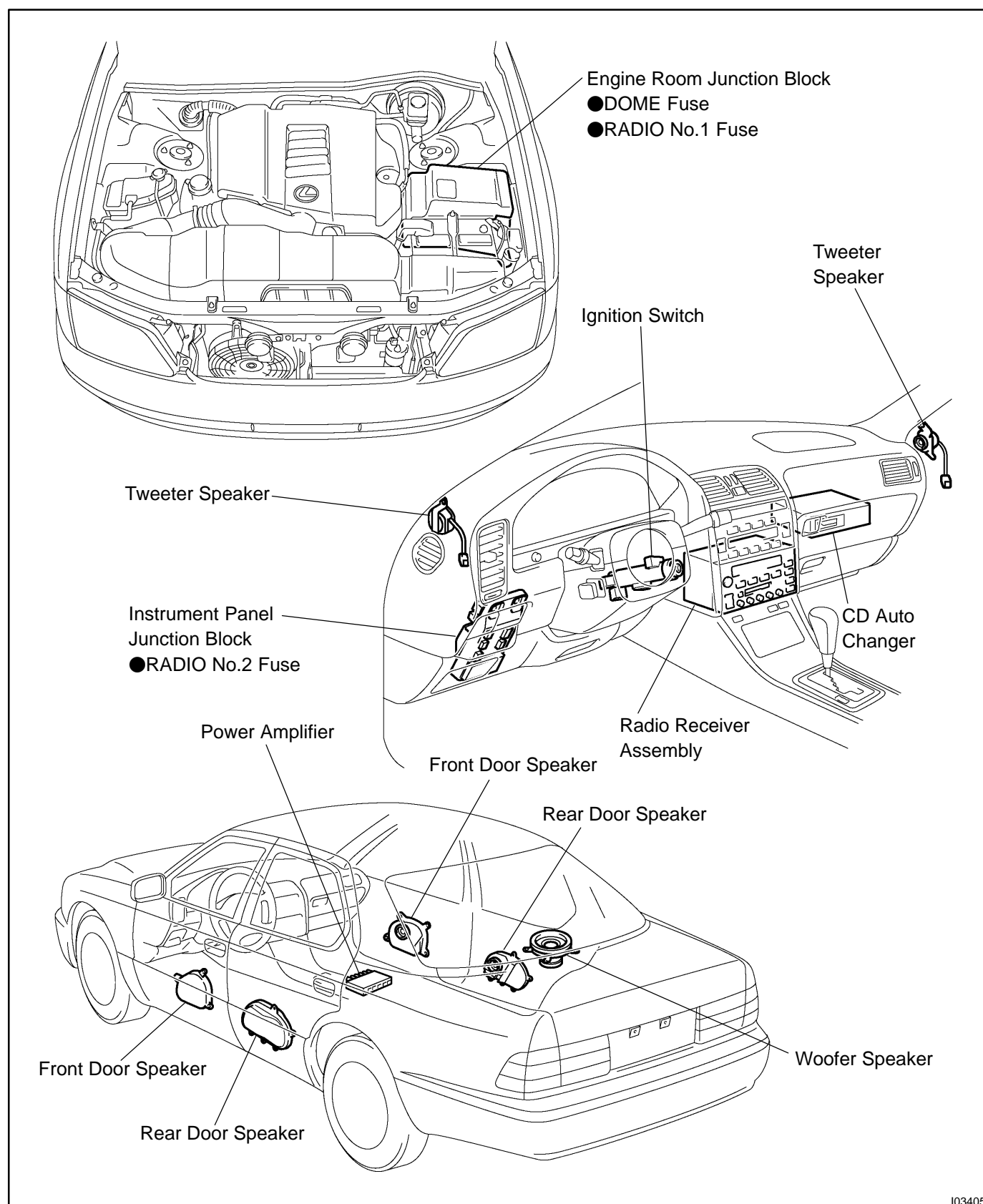
24	Noise	NOISE PRODUCED BY VIBRATION OR SHOCK WHILE DRIVING
----	-------	--



25	Noise	NOISE PRODUCED WHEN ENGINE STARTS
	Whistling noise which becomes high-pitched when accelerator strongly depressed, disappears shortly after engine stops.	Yes → Alternator noise.
	No	
	Whining noise occurs when A/C is operation.	Yes → A/C noise.
	No	
	Scratching noise occurs during sudden acceleration, driving on rough roads or when ignition switch is turned on.	Yes → Fuel gauge noise.
	No	
	Clicking sound heard when horn button is pressed, then released. Whirring/grating sound when pushed continuously.	Yes → Horn noise.
	No	
	Murmuring sound, stops when engine stops.	Yes → Ignition noise.
	No	
	Tick-tock noise, occurs in co-ordination with blinking of flasher.	Yes → Turn signal noise.
	No	
	Noise occurs during window washer operation.	Yes → Washer noise.
	No	
	Scratching noise occurs while engine is running and continues a while even after engine stops.	Yes → Engine coolant temp. gauge noise.
	No	
	Scraping noise in time wiper beat.	Yes → Wiper noise.
	No	
	Other type of noise.	



LOCATION



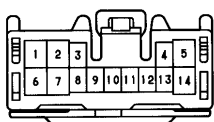
I03405

Wire Harness Side

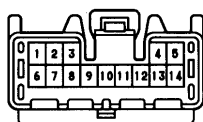
Connector "A"



Connector "B"



Connector "C"



Z14756

INSPECTION**1. Nakamichi made:****INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT**

Disconnect the connectors from the radio receiver assembly. And inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
B14 – Ground	Constant	Continuity
B6 – Ground	Ignition switch position ACC or ON	Battery positive voltage
B6 – Ground	Ignition switch position LOCK	No voltage
B1 – Ground	Constant	Battery positive voltage

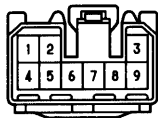
If circuit is not as specified, inspect the circuits connected to other parts.

HINT:

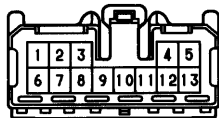
Check the wire harness between radio receiver assembly and the CD auto changer, between radio receiver assembly and power amplifier.

Wire Harness Side

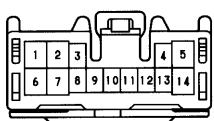
Connector "A"



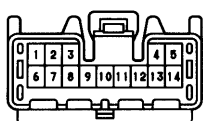
Connector "B"



Connector "C"



Connector "D"



e-9-1 e-13-1-A
eh-14-1 h-14-1-A

Z14757

2. Nakamichi made:**INSPECT POWER AMPLIFIER CIRCUIT**

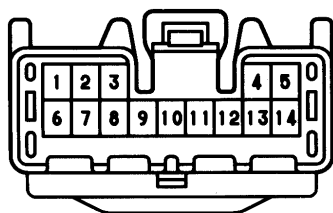
Disconnect the connector from the power amplifier and inspect the connector on the wire harness side, as shown.

BODY ELECTRICAL – AUDIO SYSTEM

Tester connection	Condition	Specified condition
A4 – Ground	Constant	Continuity
A5 – Ground	Constant	Battery positive voltage
A6 – Ground	Ignition switch position ACC or ON	Battery positive voltage
D6 – Ground	Ignition switch position ACC or ON Radio, Tape or CD switch ON	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

Wire Harness Side



h-14-1-A

Z14758

3. Nakamichi made:

INSPECT CD AUTO CHANGER CIRCUIT

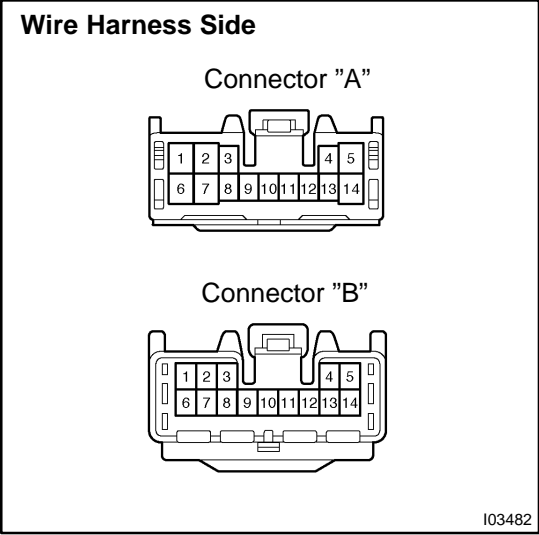
Disconnect the connectors from the controller and inspect the connector on the wire harness side, as shown.

Tester connection to terminal number	Condition	Specified condition
5 – Ground	Constant	Battery positive voltage
4 – Ground	Ignition switch LOCK	No voltage
4 – Ground	Ignition switch ACC or ON	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

HINT:

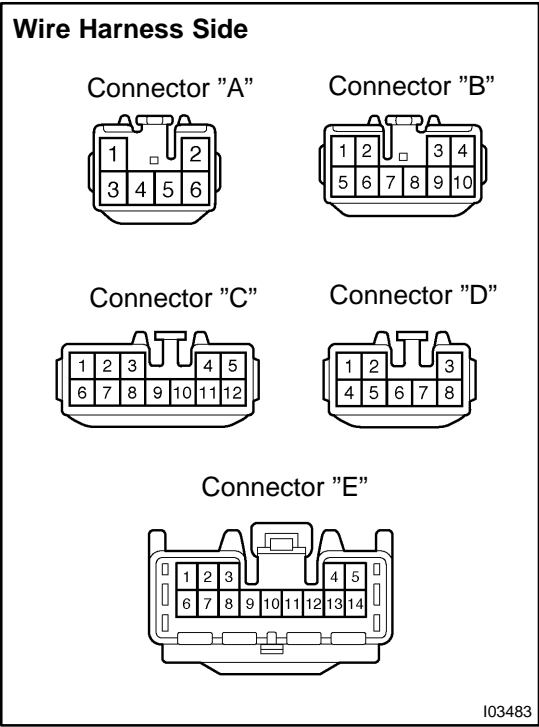
Since the signals to and from the AP+, AP–, SGND, GND1 terminals are serial signals, they cannot ordinarily be measured with a tester.



4. **Pioneer made:**
INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT
Disconnect the connectors from the radio receiver assembly. And inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
B1 – Ground	Constant	Continuity
A6 – Ground	Ignition switch position ACC or ON	Battery positive voltage
A6 – Ground	Ignition switch position LOCK	No voltage
A1 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.
HINT:
Check the wire harness between power amplifier and the CD auto changer, between radio receiver assembly and power amplifier.



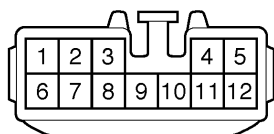
5. **Pioneer made and LEXUS navigation system:**
INSPECT POWER AMPLIFIER CIRCUIT
Disconnect the connector from the power amplifier and inspect the connector on the wire harness side, as shown.

BODY ELECTRICAL – AUDIO SYSTEM

Tester connection	Condition	Specified condition
B7 – Ground	Constant	Continuity
B4 – Ground	Constant	Battery positive voltage
C12 – Ground	Ignition switch position ACC or ON	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

Wire Harness Side



I03484

6. Pioneer made and LEXUS navigation system: INSPECT CD AUTO CHANGER CIRCUIT

Disconnect the connectors from the controller and inspect the connector on the wire harness side, as shown.

Tester connection to terminal number	Condition	Specified condition
5 – Ground	Constant	Battery positive voltage
12 – Ground	Ignition switch LOCK	No voltage
12 – Ground	Ignition switch ACC or ON	Battery positive voltage

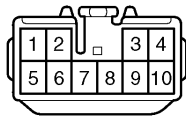
If circuit is not as specified, inspect the circuits connected to other parts.

HINT:

Since the signals to and from the AP+, AP–, SGND, GND1 terminals are serial signals, they cannot ordinarily be measured with a tester.

Wire Harness Side

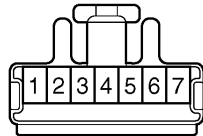
Connector "A"



Connector "B"



Connector "C"



I03485

7. LEXUS navigation system:**INSPECT RADIO RECEIVER ASSEMBLY CIRCUIT**

Disconnect the connectors from the radio receiver assembly. And inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
B2 – Ground	Constant	Continuity
B1 – Ground	Ignition switch position ACC or ON	Battery positive voltage
B1 – Ground	Ignition switch position LOCK	No voltage
B4 – Ground	Constant	Battery positive voltage

If circuit is not as specified, inspect the circuits connected to other parts.

HINT:

Check the wire harness between power amplifier and the CD auto changer, between radio receiver assembly and power amplifier.

8. INSPECT GLASS PRINTED ANTENNA

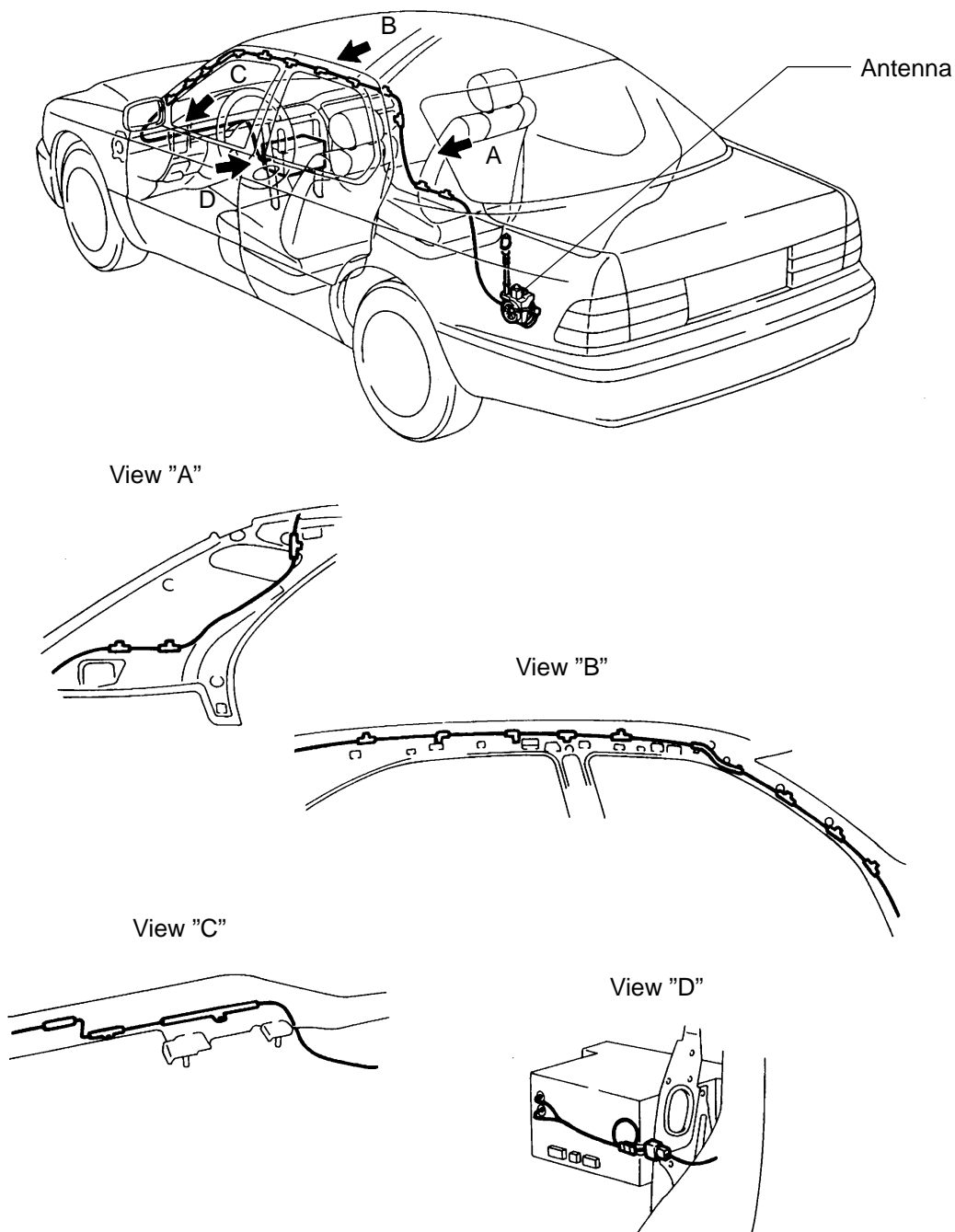
(Use same procedure as for "INSPECT DEFOGGER WIRES" on page [BE-116](#))

9. REPAIR GLASS PRINTED ANTENNA

(Use same procedure as for "REPAIR DEFOGGER WIRES" on page [BE-116](#))

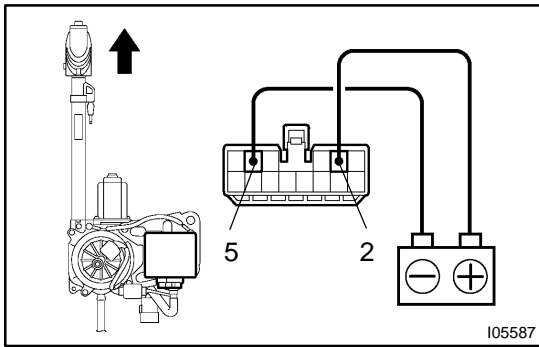
ANTENNA LOCATION

BE11X-01



N

I10507



INSPECTION

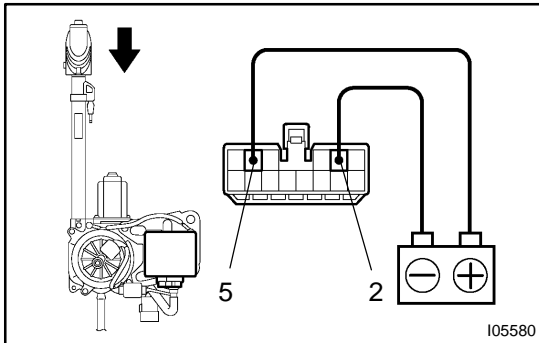
1. Auto Antenna Models:

INSPECT ANTENNA MOTOR

- Connect the positive (+) lead from the battery to terminal 2 and the negative (–) lead to terminal 5.
- Check that the motor turns (moves upward).

NOTICE:

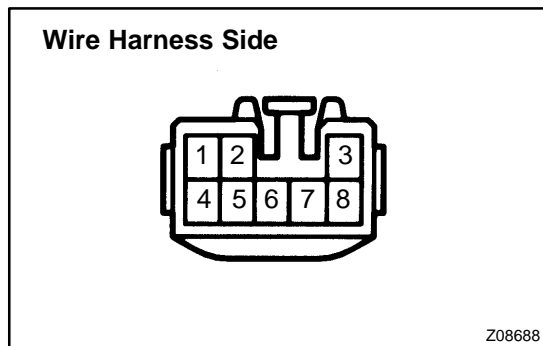
These tests must be done quickly (within 3 – 5 seconds) to prevent the coil from burning out.



- Then, reverse the polarity, 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.

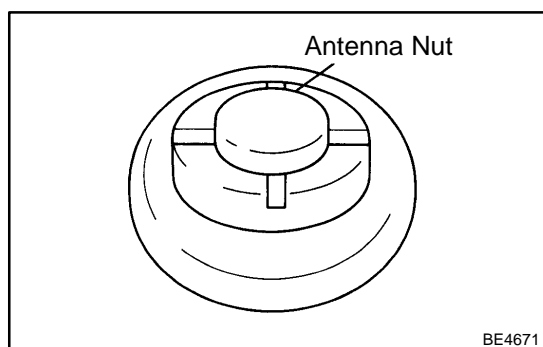


2. Auto Antenna Models:

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
7 – Ground	Constant	Continuity
1 – Ground	Ignition switch ACC or ON, and radio switch ON and Others	No voltage
1 – Ground	Ignition switch ACC or ON, and radio switch ON and AM	Battery voltage
2 – Ground	Ignition switch ACC or ON, and radio or tape or CD switch OFF	No voltage
2 – Ground	Ignition switch ACC or ON, and radio or tape or CD switch ON	Battery voltage
3 – Ground	Constant	Battery voltage
5 – Ground	Ignition switch ACC or ON, and radio switch OFF	No voltage
5 – Ground	Ignition switch ACC or ON, and radio switch ON	Battery voltage



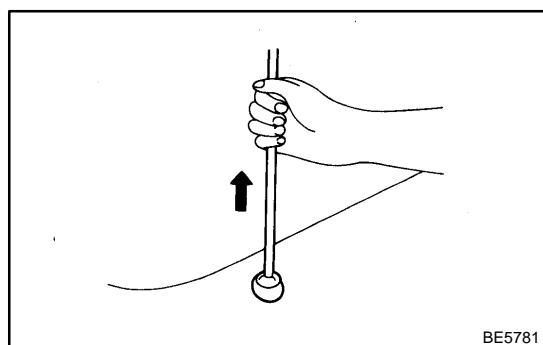
REPLACEMENT

1. Auto Antenna Models: REMOVE ANTENNA ROD

HINT:

Do this operation with the battery negative (–) cable connected to the battery terminal.

- Turn the ignition switch to "LOCK" position.
- Remove the antenna nut.



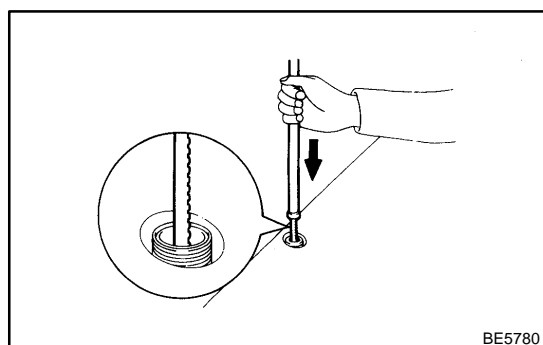
- Press the "AM, FM" buttons on the radio receiver, and simultaneously turn the ignition switch to "ACC" position.

HINT:

- The rod will extend fully and be released from the motor antenna.
- After removing the antenna rod, leave the ignition switch as "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

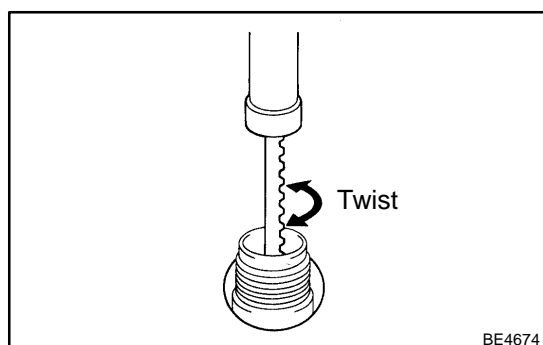
- Insert the cable of the rod until it reaches the bottom.

HINT:

- When inserting the cable, the teeth on the cable must face toward the rear of the vehicle.
 - Insert the antenna approx. 300 mm (11.8 in.).
- 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.
- Inspect the antenna rod operation by pushing the radio wave band select buttons.



CLOCK TROUBLESHOOTING

BE0D1-02

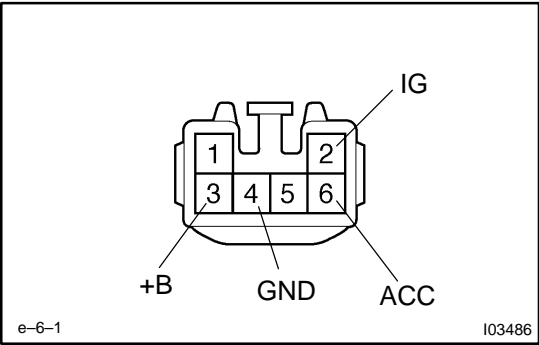
HINT:

Problem	No.
Clock will not operate	1
Clock loses or gains time	2

± 1.5 seconds / da

1. PROBLEM No.1

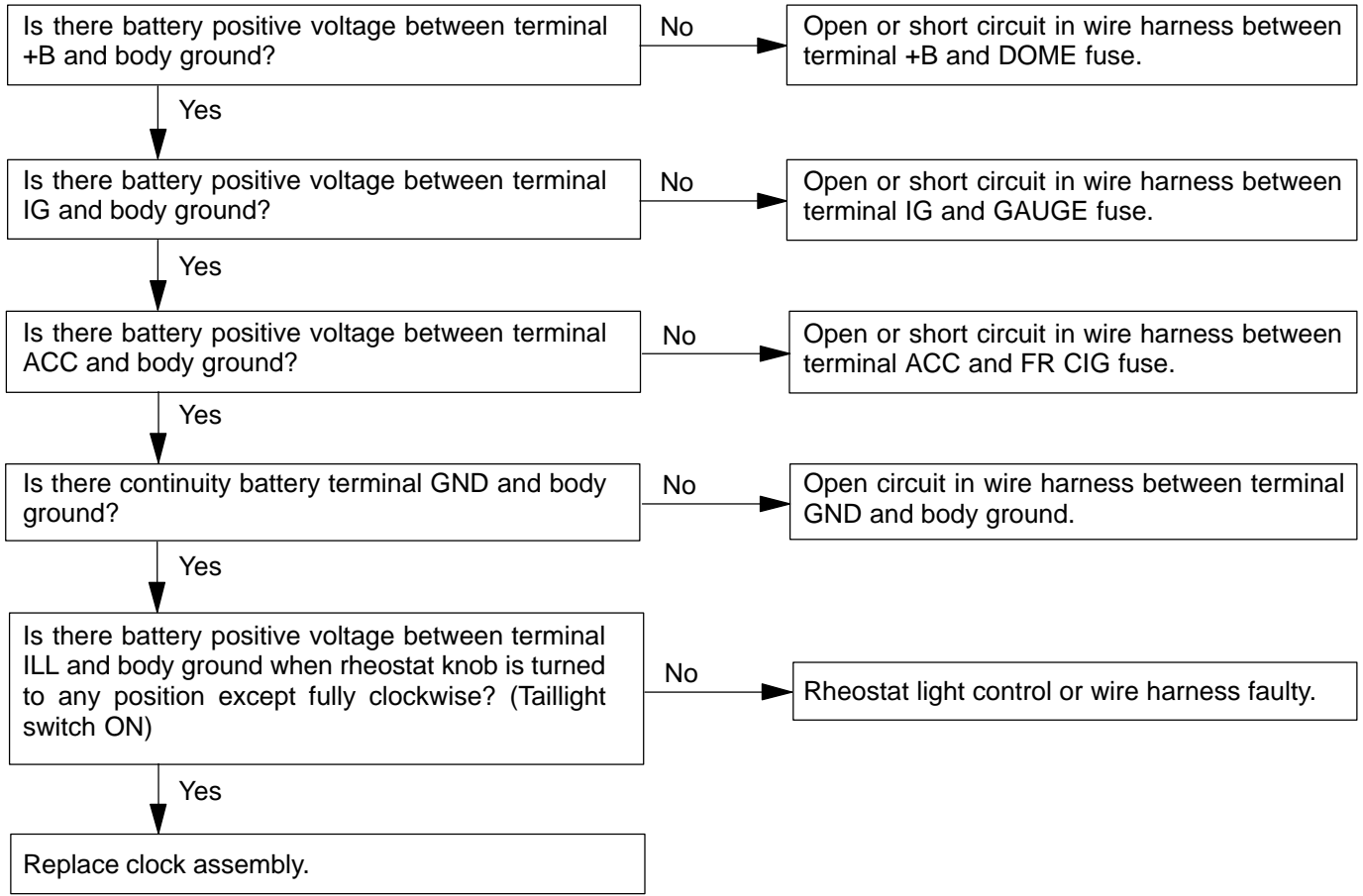
1	CLOCK WILL NOT OPERATE
---	------------------------



- (a) Turn the ignition switch ON.
- (b) Check that the battery positive voltage is 10 – 16 V. If voltage is not as specified, replace the battery.
- (c) Check that the DOME FR, GAUGE and FR CIG fuses in not below.
- (d) Troubleshoot the clock as follows.

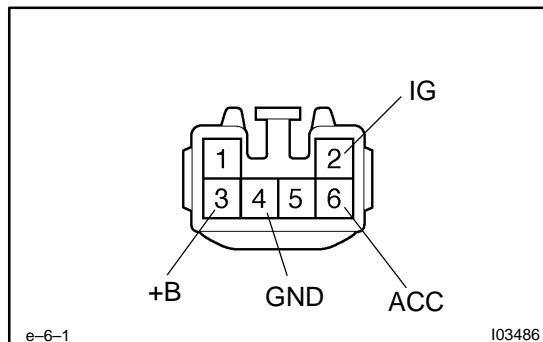
HINT:

Inspect the connector on the wire harness side.



2. PROBLEM No.2

2 CLOCK LOSES OR GAINS TIME



(a) Check that the battery positive voltage is 10 – 16 V. If voltage is not as specified, replace the battery.

(b) Inspect the error of the clock.

Allowable error (per day): ± 2.0 seconds

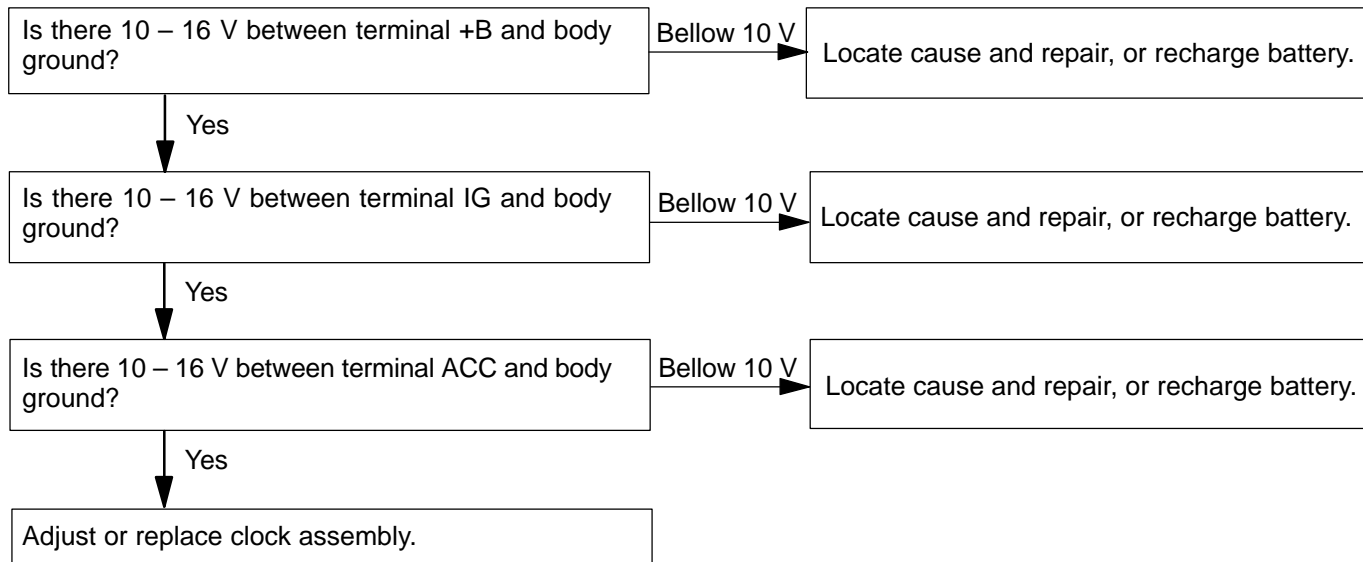
If the error exceeds the allowable error, replace the clock assembly.

(c) Check if the clock adjusting button is sticking in position and has failed to return.

(d) Troubleshoot the clock as follows.

HINT:

Inspect the connector on the wire harness side.



GARAGE DOOR OPENER SYSTEM REGISTRATION PROCEDURE

BE0D2-01

1. NEW CODE REGISTRATION

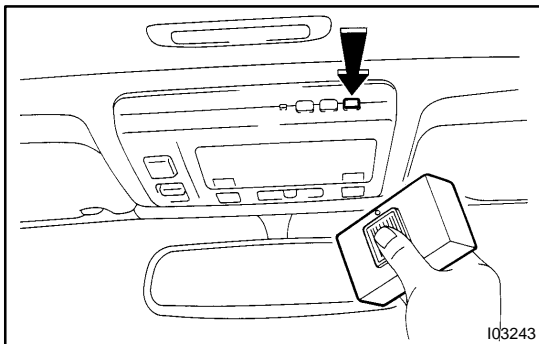
NOTICE:

- 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.

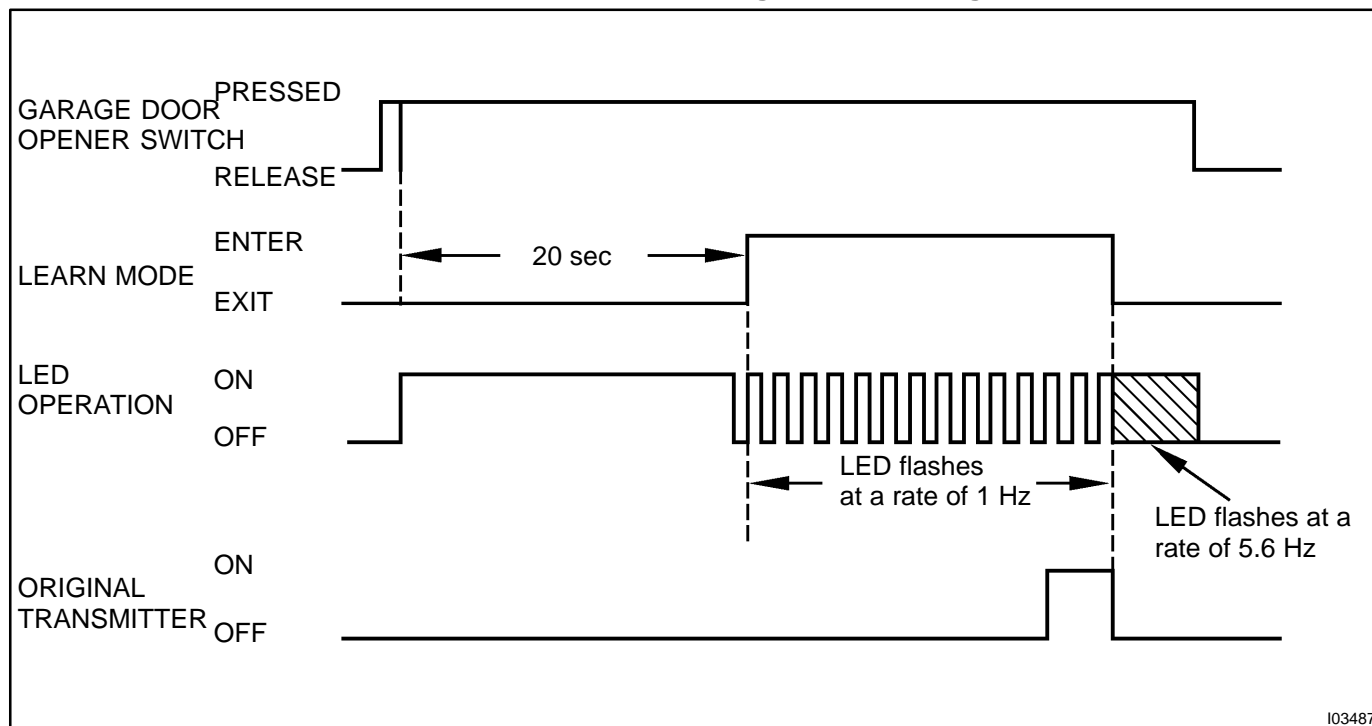


- (b) In the condition of (a), bring the original transmitter to within 1-inch area around the garage door opener and press the switch. (code transmitting).

HINT:

When code registration completes correctly, LED (red) blinks in 5.6 Hz cycle.

New code registration timing chart



I03487

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:

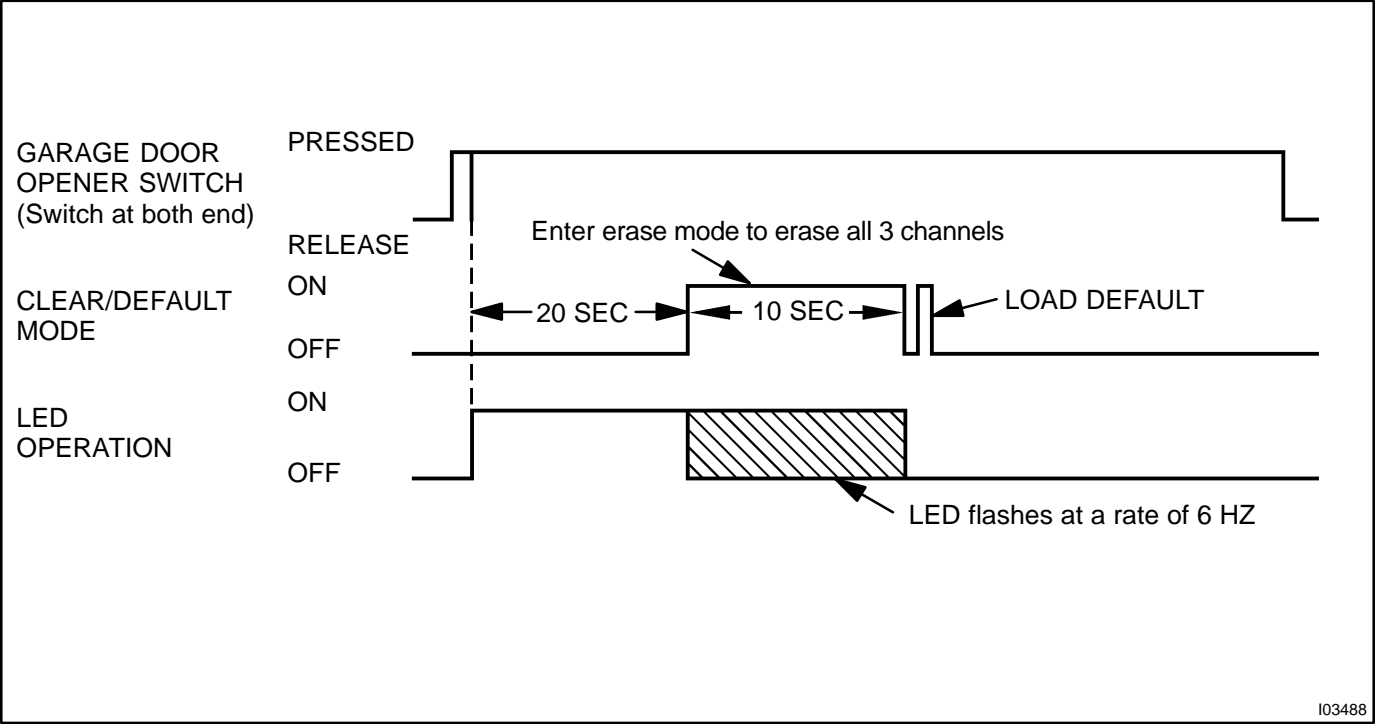
When transferring to deletion mode, LED (red) blinks in 6 Hz cycle.

- (b) When releasing the switch within 10 seconds after transferring to deletion mode, all the registered codes will be erased.

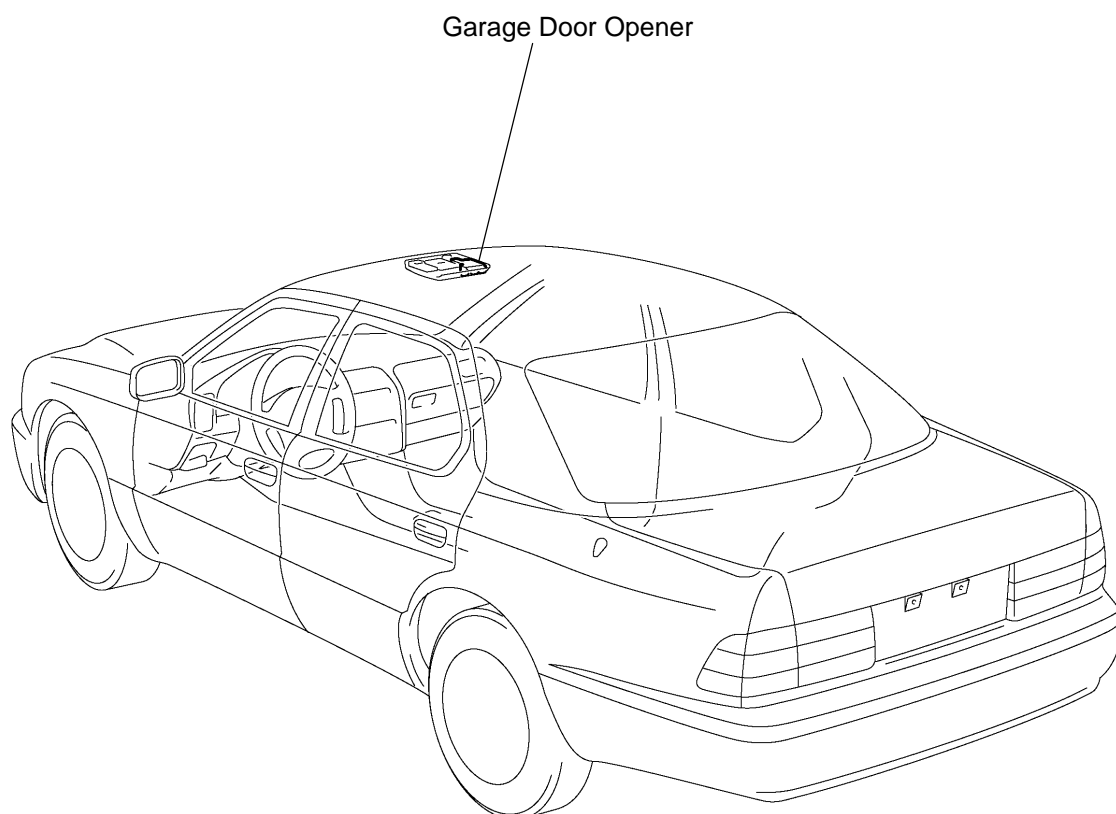
HINT:

Press the switch until blinking in 6 Hz cycle stops, so that the default code for check is set.

Code deletion timing chart



LOCATION



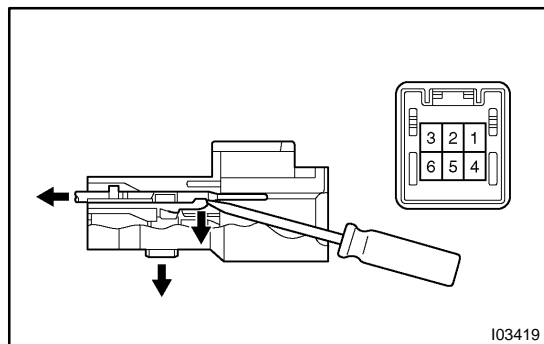
103403

REMOVAL

1. REMOVE FRONT PERSONAL LIGHT LENS

2. REMOVE FRONT PERSONAL LIGHT

- (a) Remove the 3 screws.
- (b) Disconnect the 2 connectors.

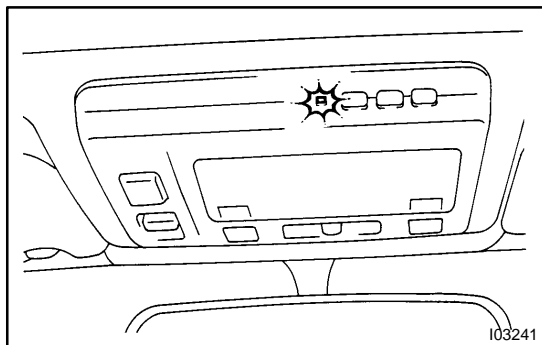


3. REMOVE GARAGE DOOR OPENER

- (a) Remove the 3 screws.
- (b) Remove the garage door opener connector from the personal light.
- (c) Disconnect the secondary locking device.
- (d) Release the locking plug of the terminal 4 and 5, and pull the terminals out from the rear.

HINT:

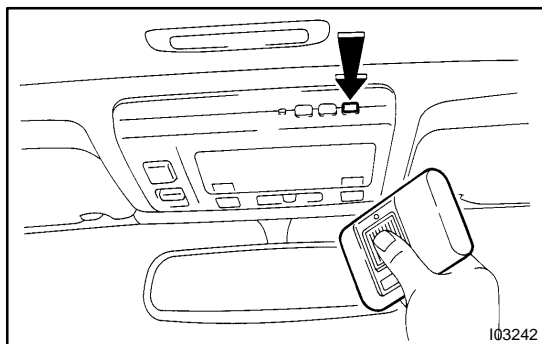
Use a small screw driver.



INSPECTION

1. INSPECT GARAGE DOOR OPENER

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

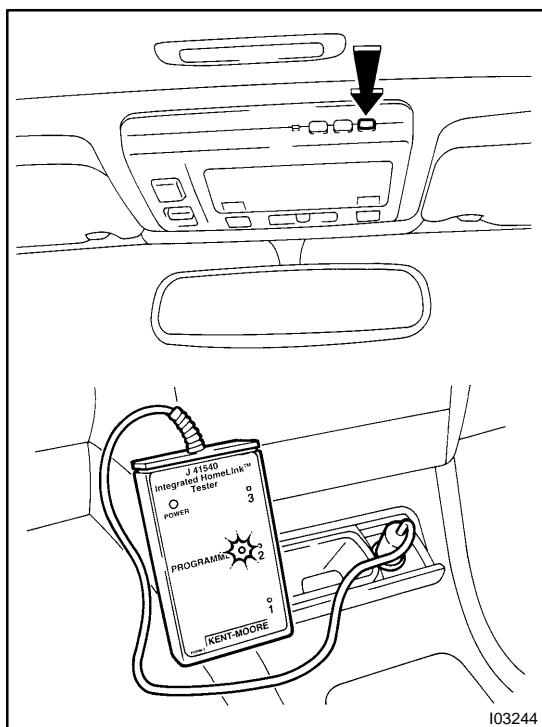
HINT:

Use the home link tester made by KENT MORE 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

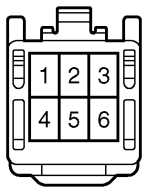
If the code can not be registered, replace garage door opener.



- (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.

Wire Harness Side



I03432

3. INSPECT GARAGE DOOR OPENER CIRCUIT

Disconnect the connector from the switch and inspect the connector on the wire harness side, as shown.

Tester connection	Condition	Specified condition
5 – Ground	Constant	Continuity
4 – Ground	Constant	Battery positive voltage

INSTALLATION

- 1. INSTALL GARAGE DOOR OPENER**
 - (a) Connect the wire harness to the terminal 4 and 5.
 - (b) Install the 3 screws.
- 2. INSTALL FRONT PERSONAL LIGHT**
 - (a) Connect the 2 connectors.
 - (b) Install the 3 screws.
- 3. INSTALL FRONT PERSONAL LIGHT LENS**

ENGINE IMMOBILISER SYSTEM

REGISTRATION PROCEDURE

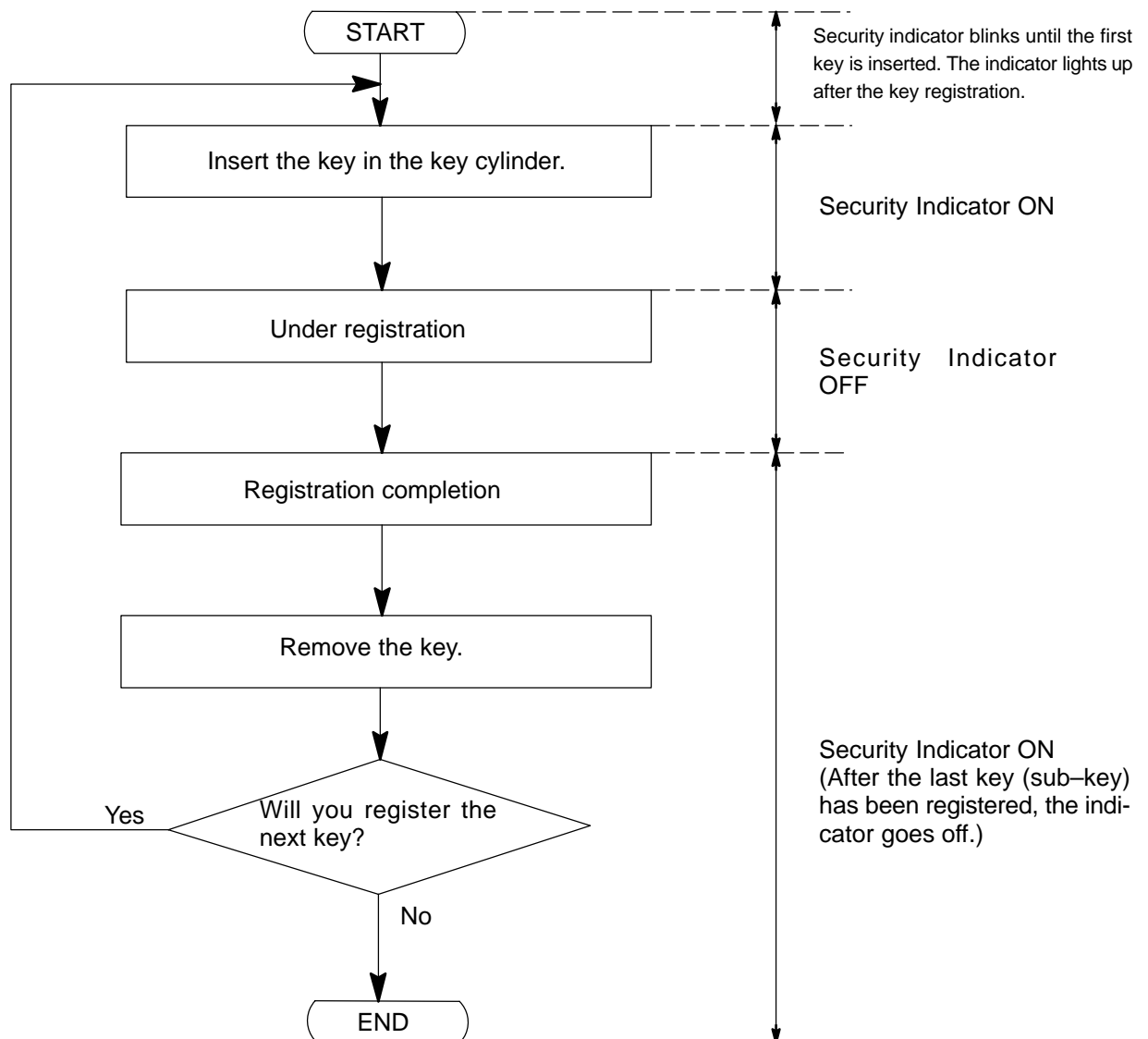
BE0D7-01

1. KEY REGISTRATION IN AUTOMATIC REGISTRATION MODE

(a) Registration of a new transponder key.

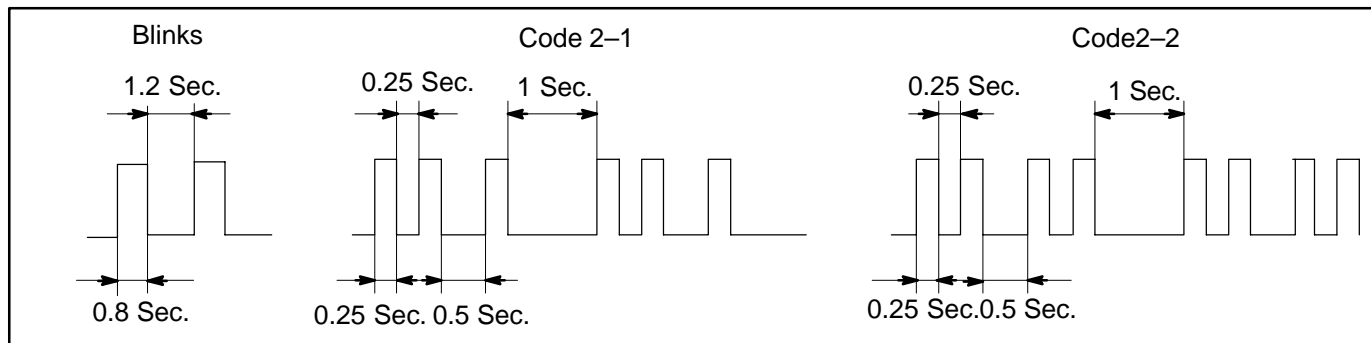
HINT:

- 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 4 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.

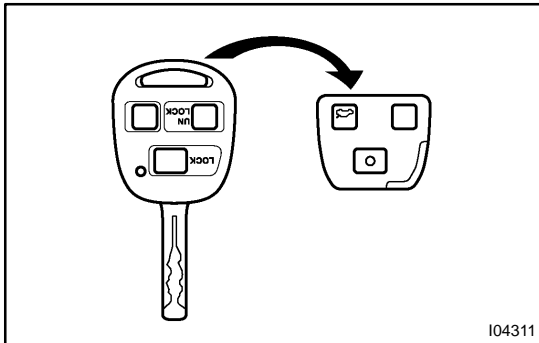
(1) Depress and release brake pedal 5 times or more within 15 sec.

(2) With the LEXUS hand-held tester, require automatic registration mode completion.

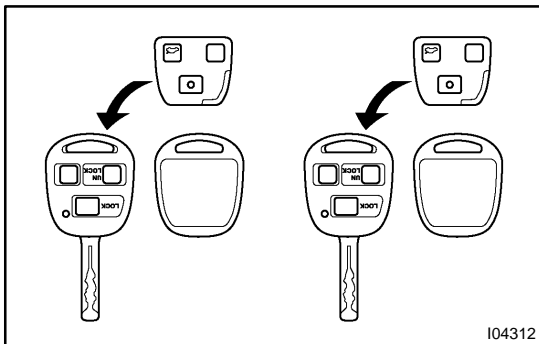
2. KEY REGISTRATION OF PROCEDURE NEW MASTER KEY AND NEW SUB-KEY ON THIS IS DESCRIBED BELOW

HINT:

Key registration of new master key and new sub-key on this vehicle when new ignition cylinder and key set, and new lock cylinder set including ignition key cylinder are installed.



- (a) Removing wire-less and immobiliser module from original master key.



- (b) Masking new master key.
After replacing and installing new ignition cylinder, install removed original modules into new 2 key housing as supply parts.

- (c) Registration of supplied new sub-key and /or master key
Register supplied new sub-key and /or master key by using new master key.
(See step 3 and 4)

NOTICE:

In case of replacing with ignition cylinder and key set, door locks cannot be opened by new ignition keys. Therefore, to avoid any trouble caused by empty battery of transmitter of new ignition key, please bring the original key while driving.

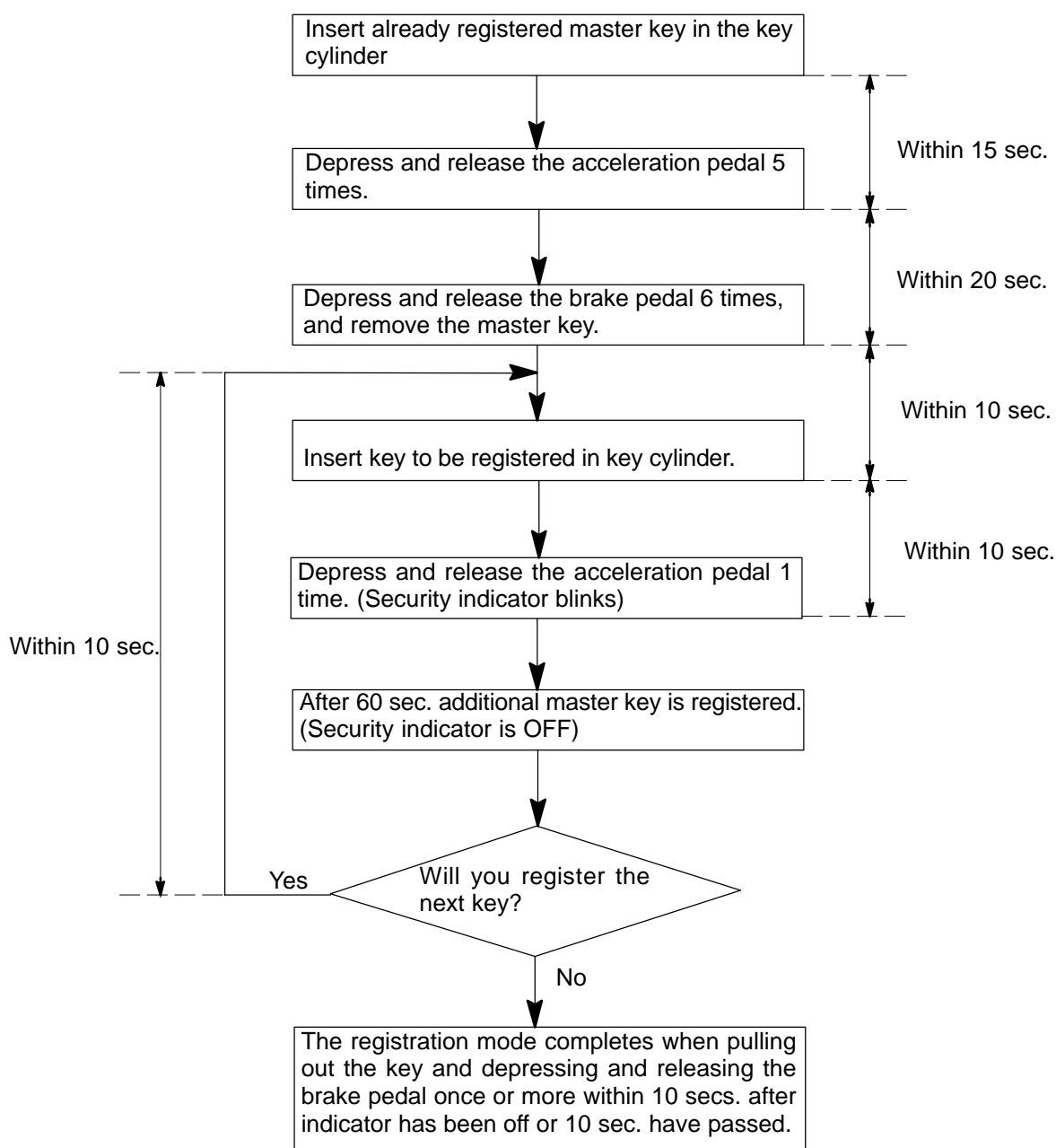
3. REGISTRATION OF ADDITIONAL MASTER KEY

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 LEXUS hand-held tester.

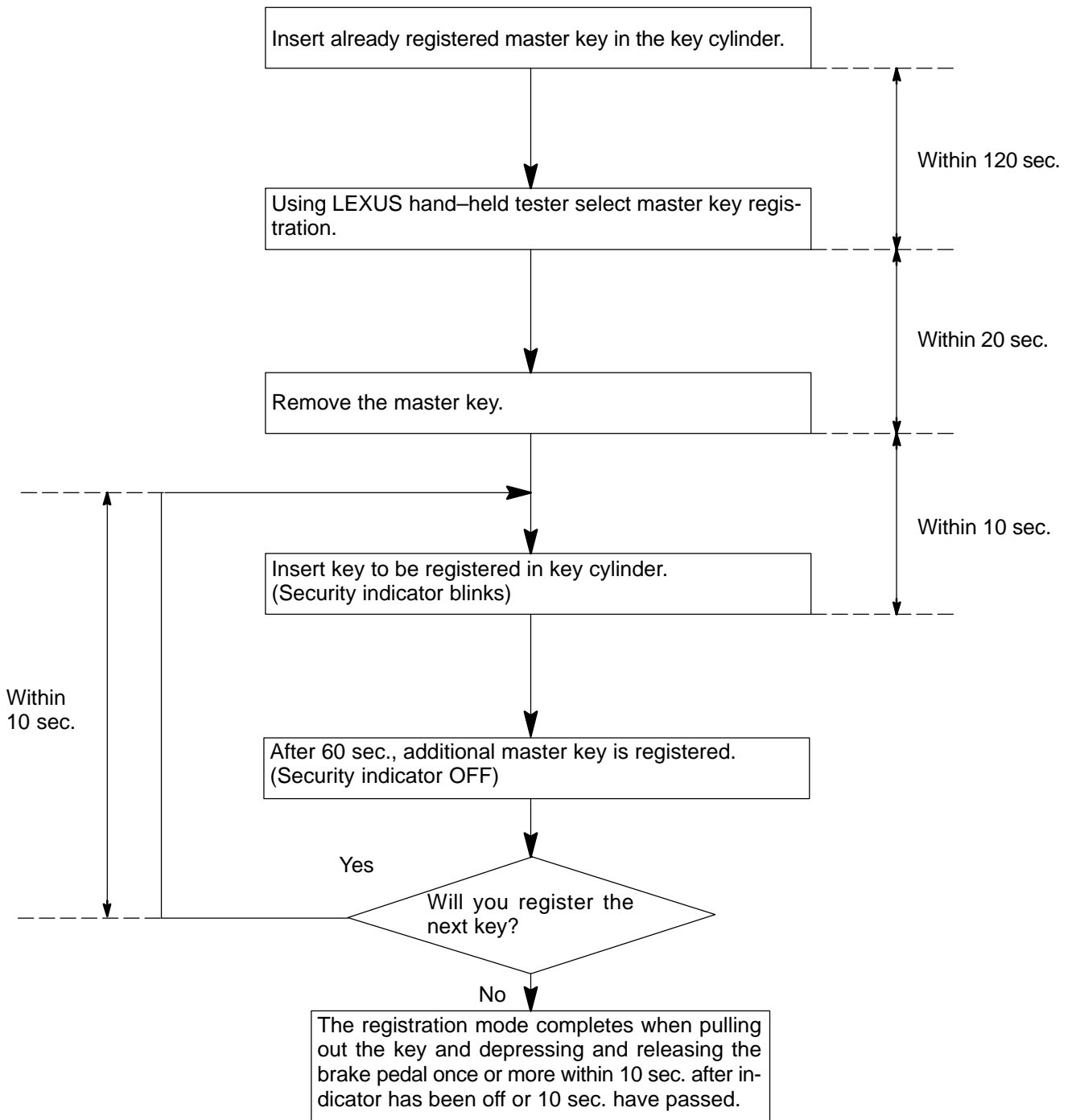
HINT:

- 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 LEXUS hand-held tester:



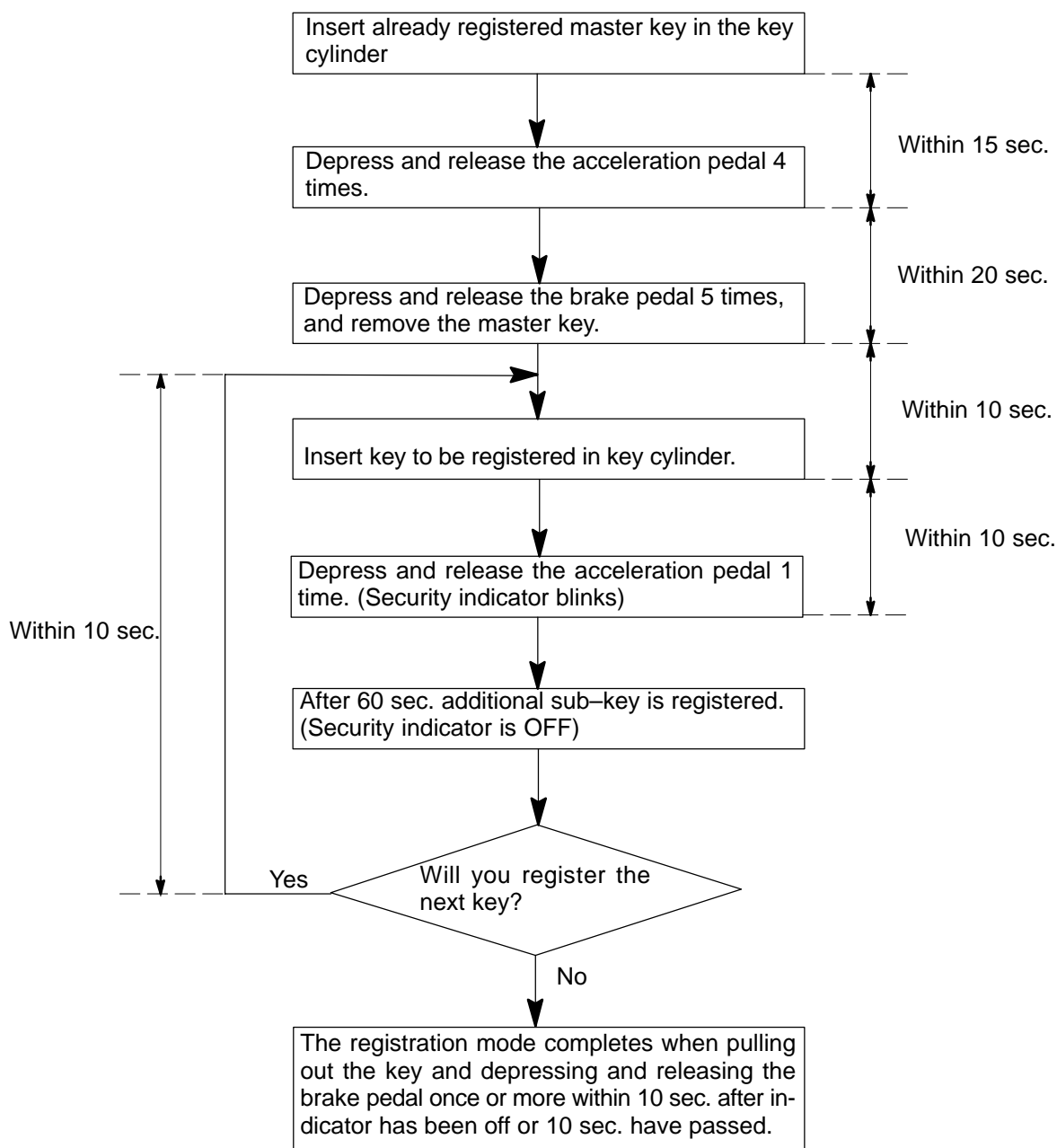
4. REGISTRATION OF ADDITIONAL SUB-KEY

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 LEXUS hand-held tester.

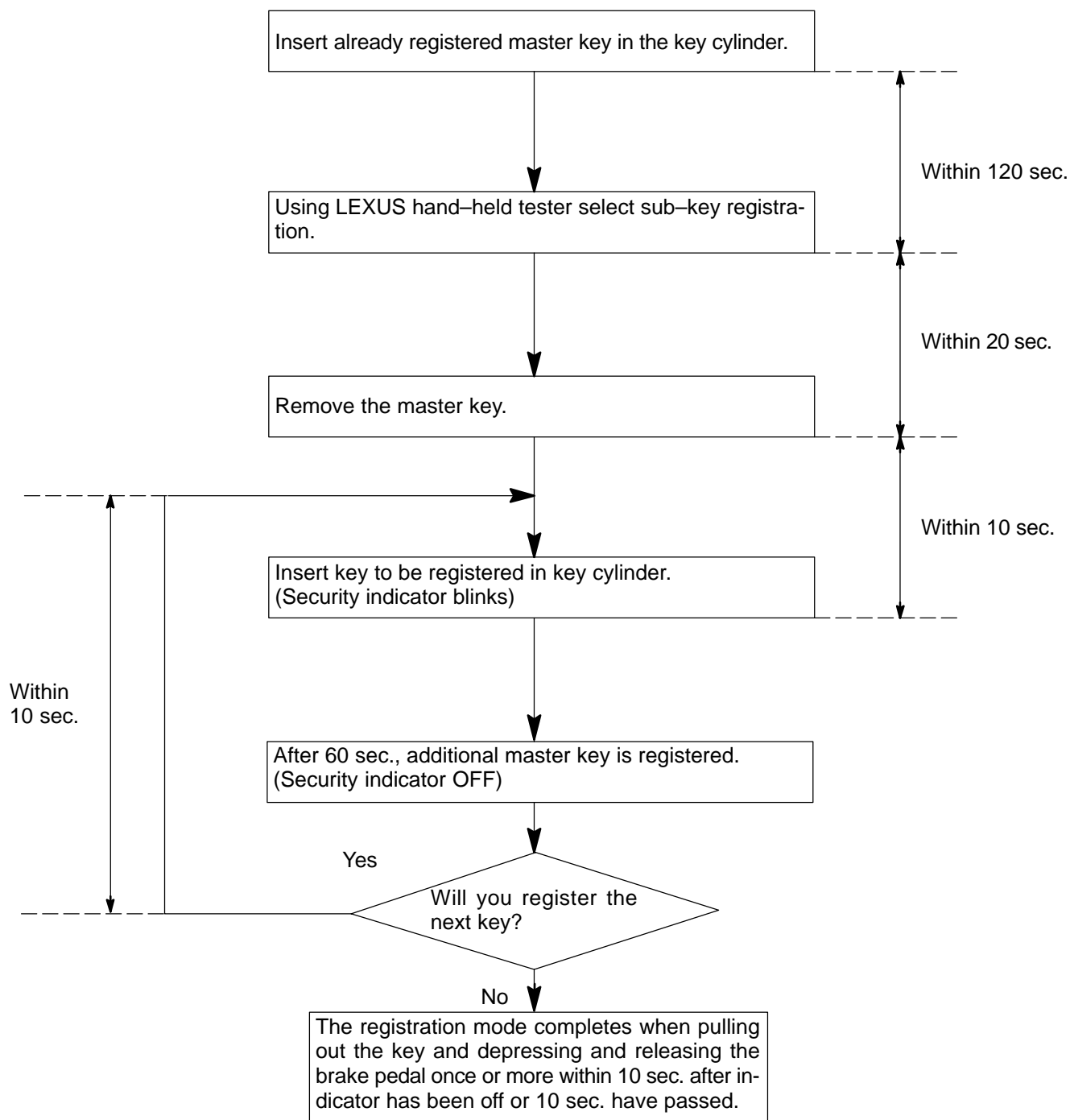
HINT:

- 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 LEXUS hand-held tester:



5. 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 LEXUS hand-held tester.

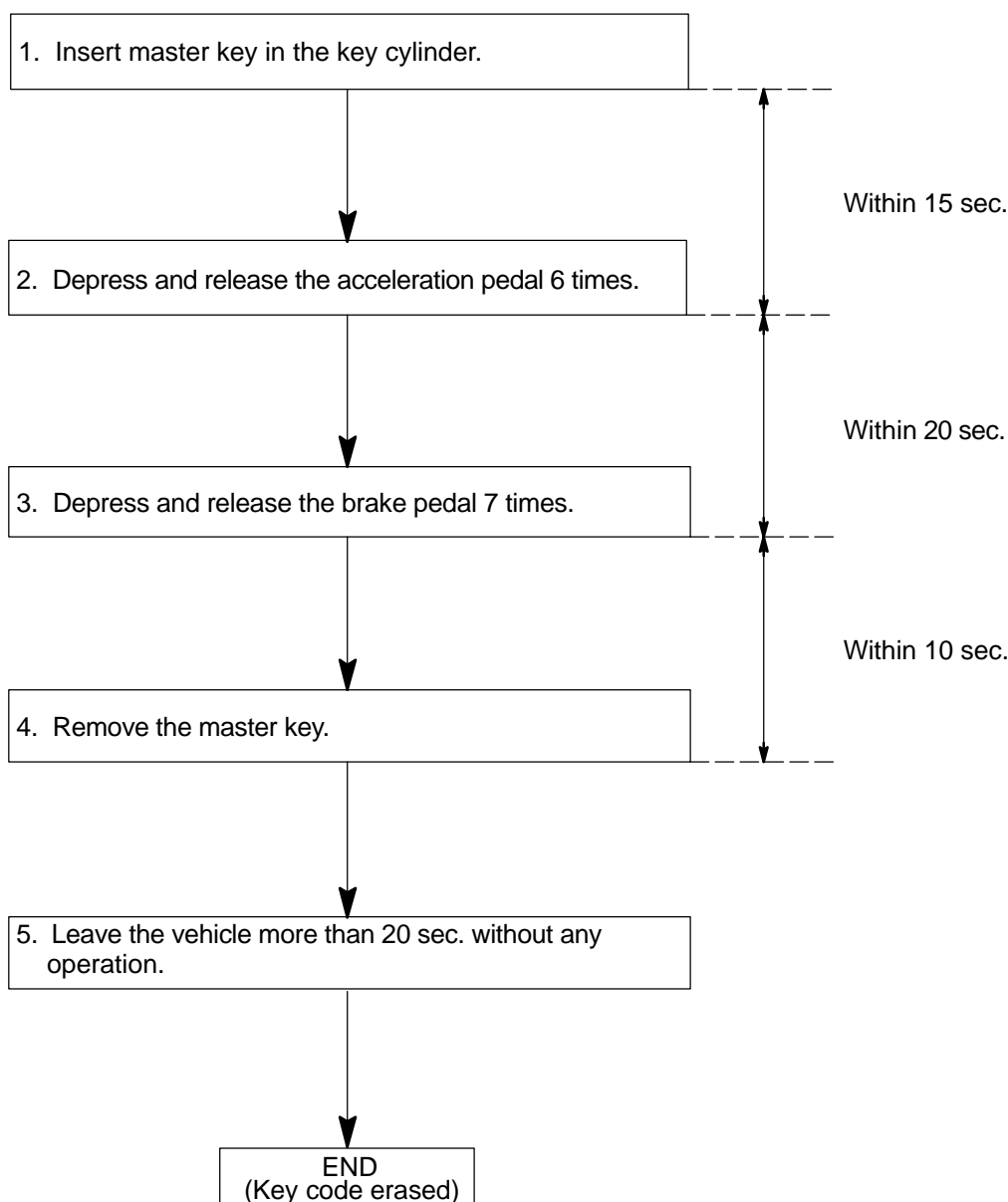
NOTICE:

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.

HINT:

- 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.

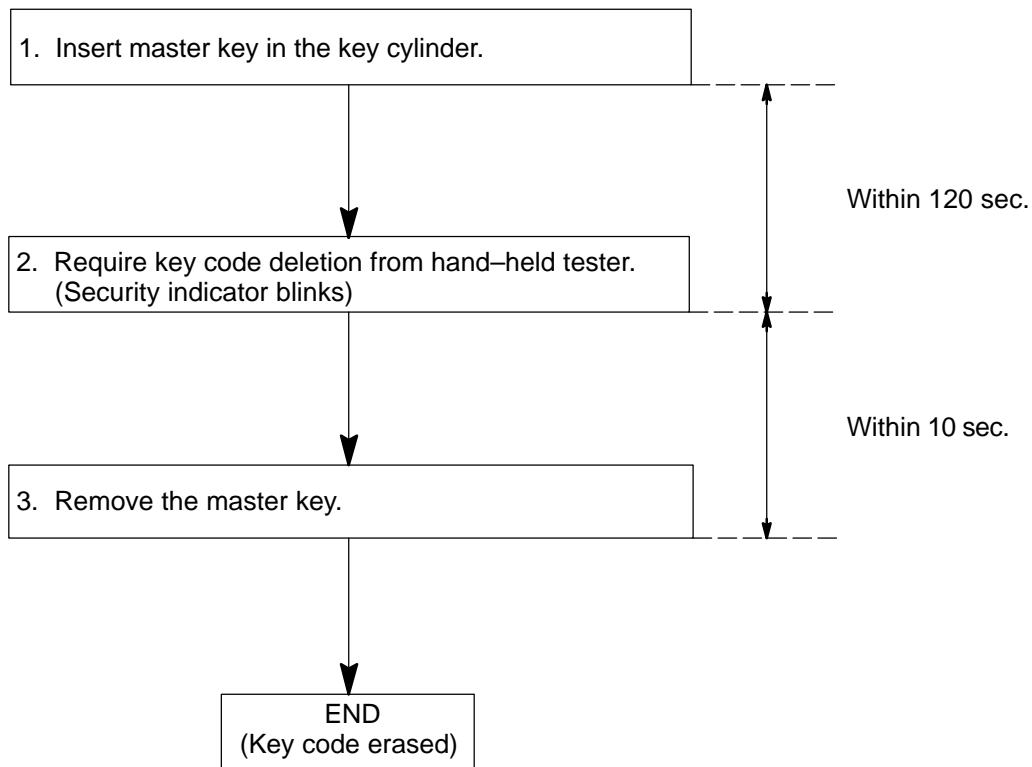
(1) Depressing brake pedal and acceleration pedal:



HINT:

If the key cannot be pulled out within 30 sec. from the first brake depression in the step 3, the key code deletion is canceled.

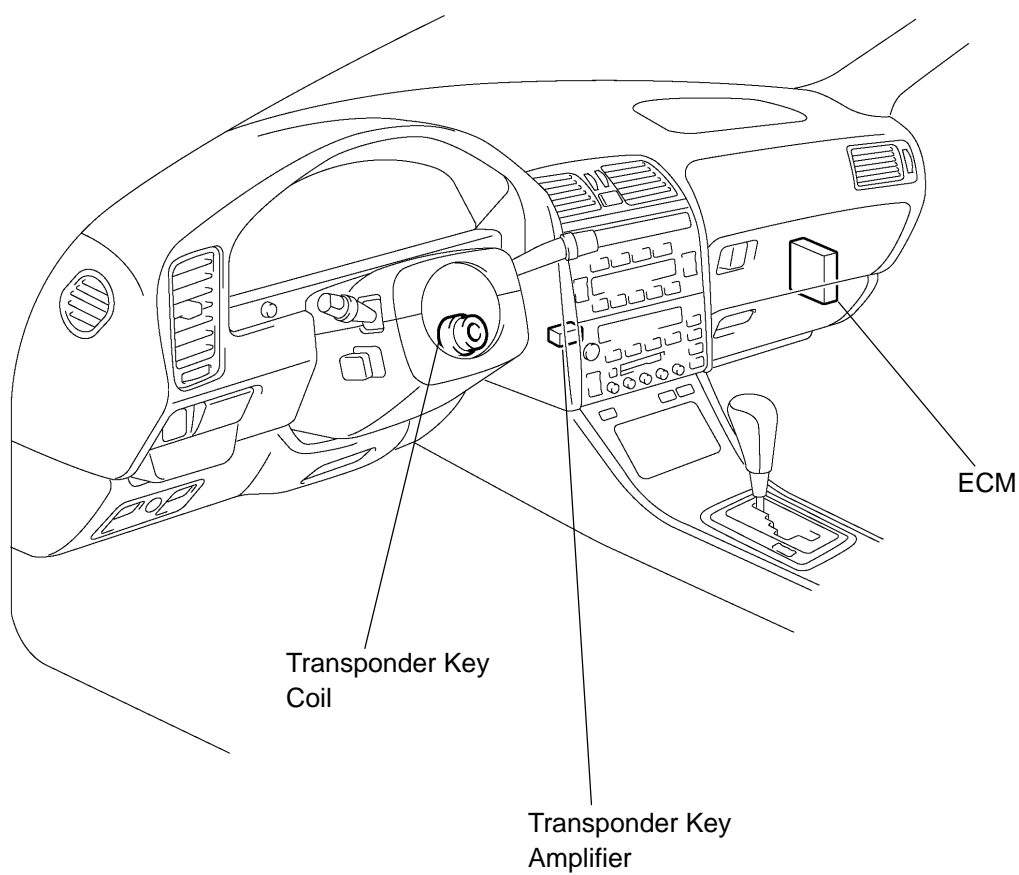
(2) Using LEXUS hand-held tester:



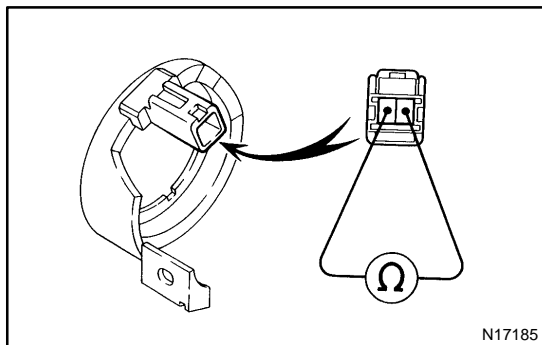
HINT:

When the key cannot be pulled out in the step 3, key code deletion is canceled.
(Security indicator is OFF.)

LOCATION



I03461



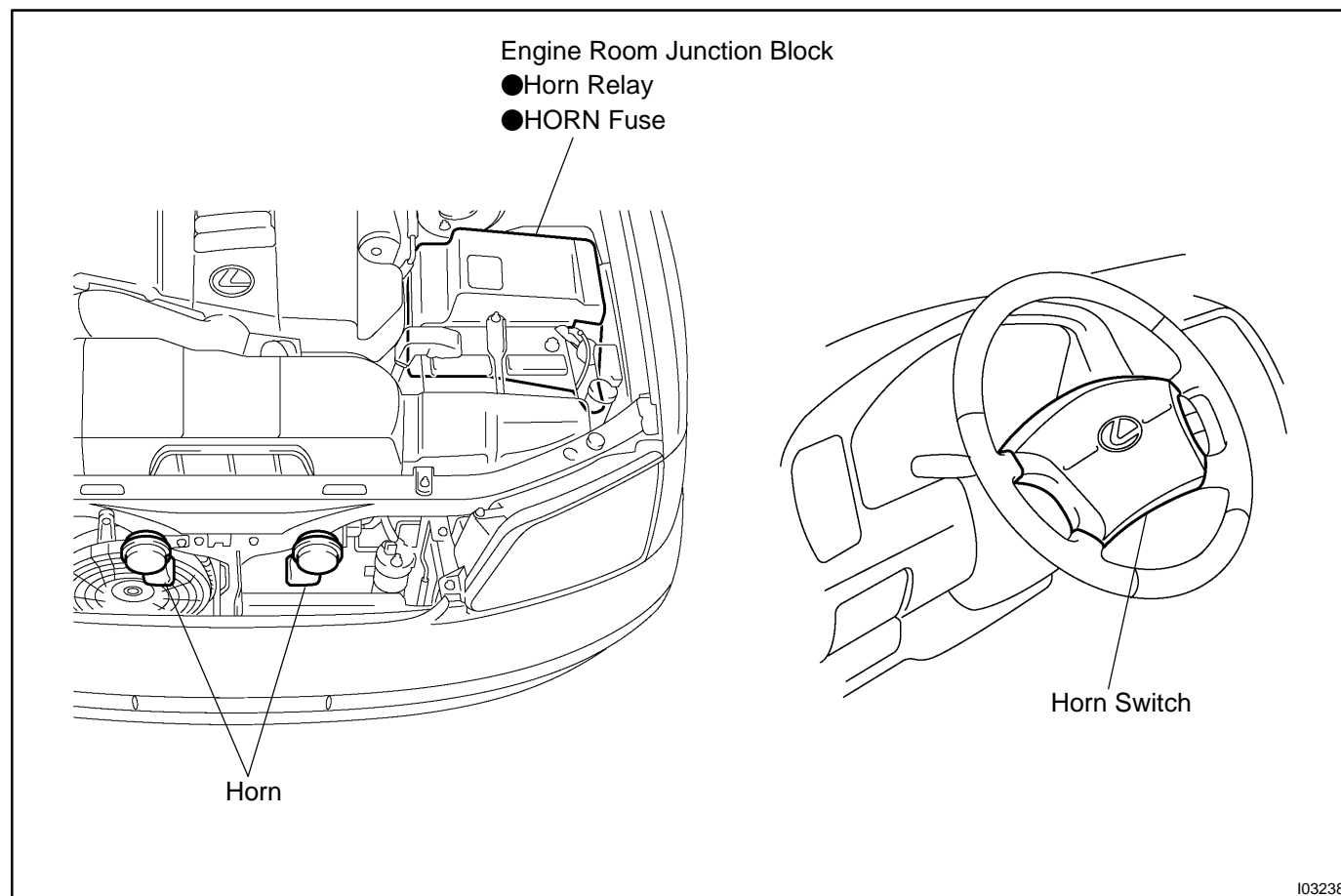
INSPECTION

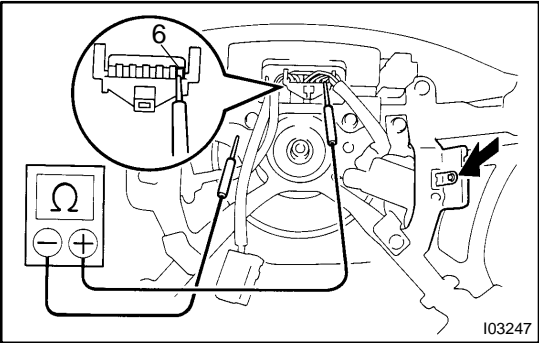
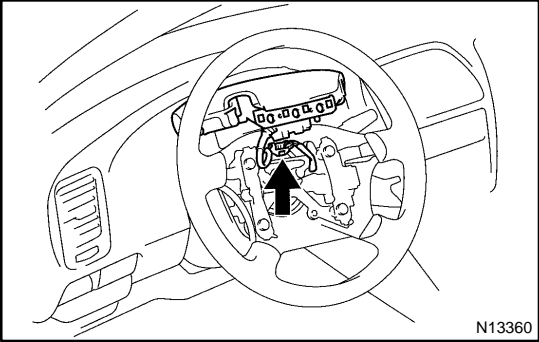
INSPECTION TRANSPONDER KEY COIL CONTINUITY

Check that there is continuity between terminal 1 and 2.
If continuity is not as specified, replace the coil.

HORN SYSTEM LOCATION

BE0DA-01





INSPECTION

1. INSPECT HORN SWITCH

- (a) Disconnect the negative (–) terminal from the battery.
- (b) Remove the left and right covers from the steering wheel.
- (c) Using a torx socket wrench, loosen the 2 bolts.
- (d) Pull up the horn pad and place it on the steering column, as shown.

HINT:

Do not disconnect the connector from the horn pad.

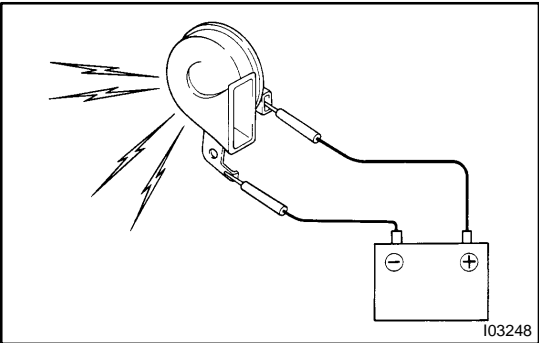
- (e) Disconnect the connector from the slip ring.
- (f) Check that there is no continuity between terminal 6 of the connector and body ground.
- (g) Check that there is continuity between terminal 6 of the connector and body ground when the horn contact plate is pressed against the steering spoke assembly.

If continuity is not as specified, repair or replace the steering wheel or wire harness as necessary.

- (h) Install the horn pad in place and using a torx socket wrench, torque the 2 bolts.

Torque: 7.1 N·m (72 kgf·cm, 62 in.-lbf)

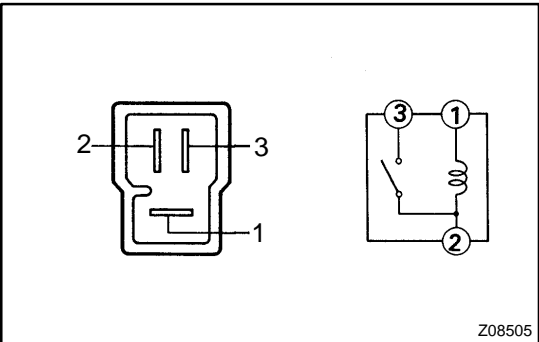
- (i) Install the left and right covers.
- (j) Connect the negative (–) terminal to the battery.



2. INSPECT HORN OPERATION

Connect the positive (+) lead from the battery to the terminal and negative (–) lead to the horn body and check that the horn blows.

If operation is not as specified, replace the horn.



3. INSPECT HORN RELAY CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2	Continuity
Apply B+ between terminals 1 and 2.	2 – 3	Continuity

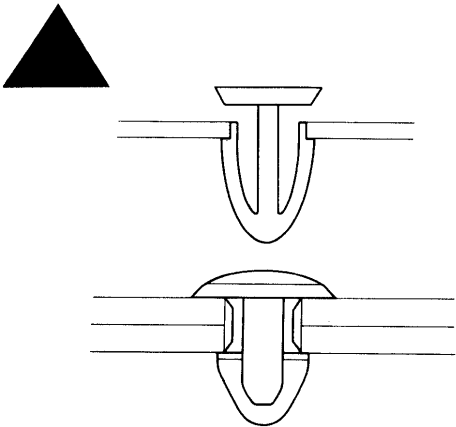
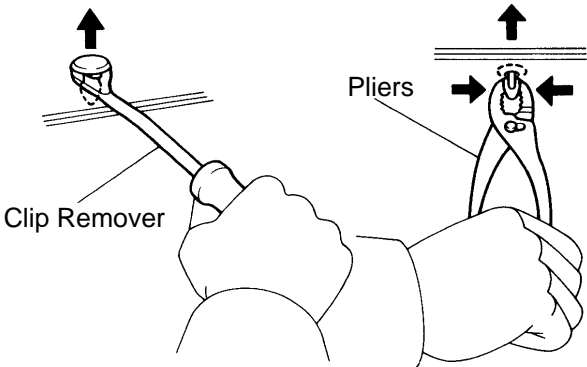
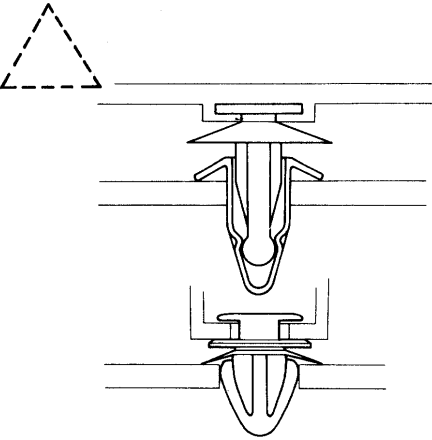
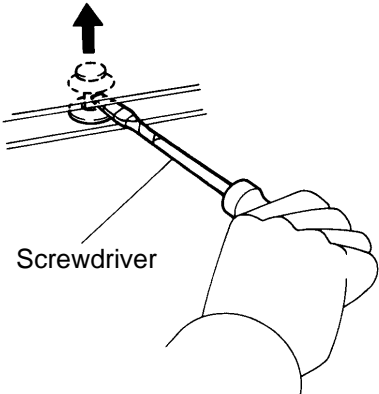
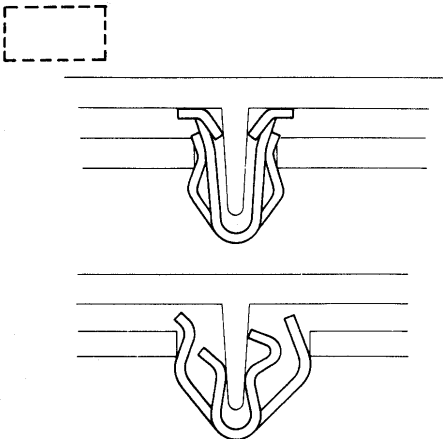
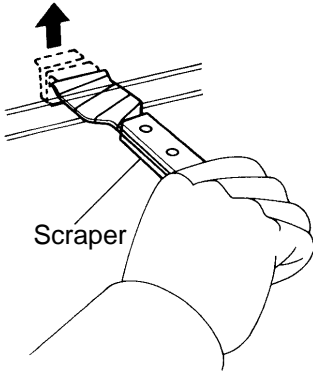
If continuity is not as specified, replace the relay.

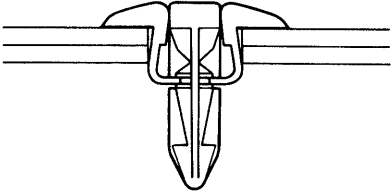
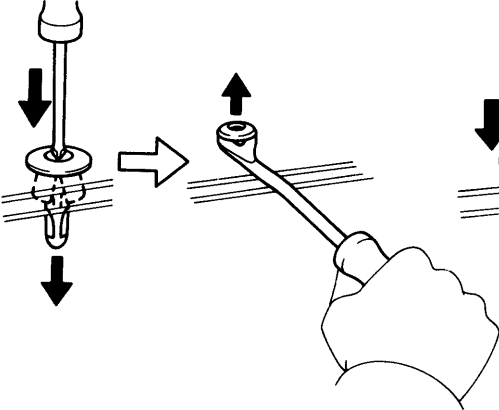
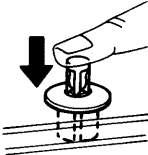
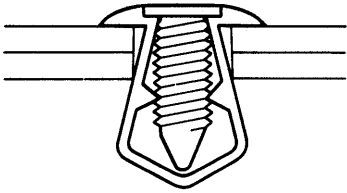
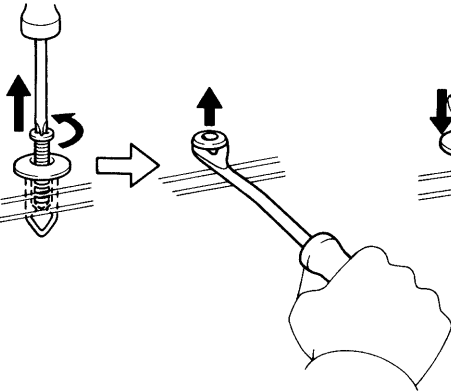
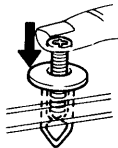
CLIP

REPLACEMENT

BO0NN-01

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
	
	
	

Shape (Example)	Removal/Installation
	<div>Removal</div>  <div>Installation</div> 
	<div>Removal</div>  <div>Installation</div> 

V00012

SRS AIRBAG

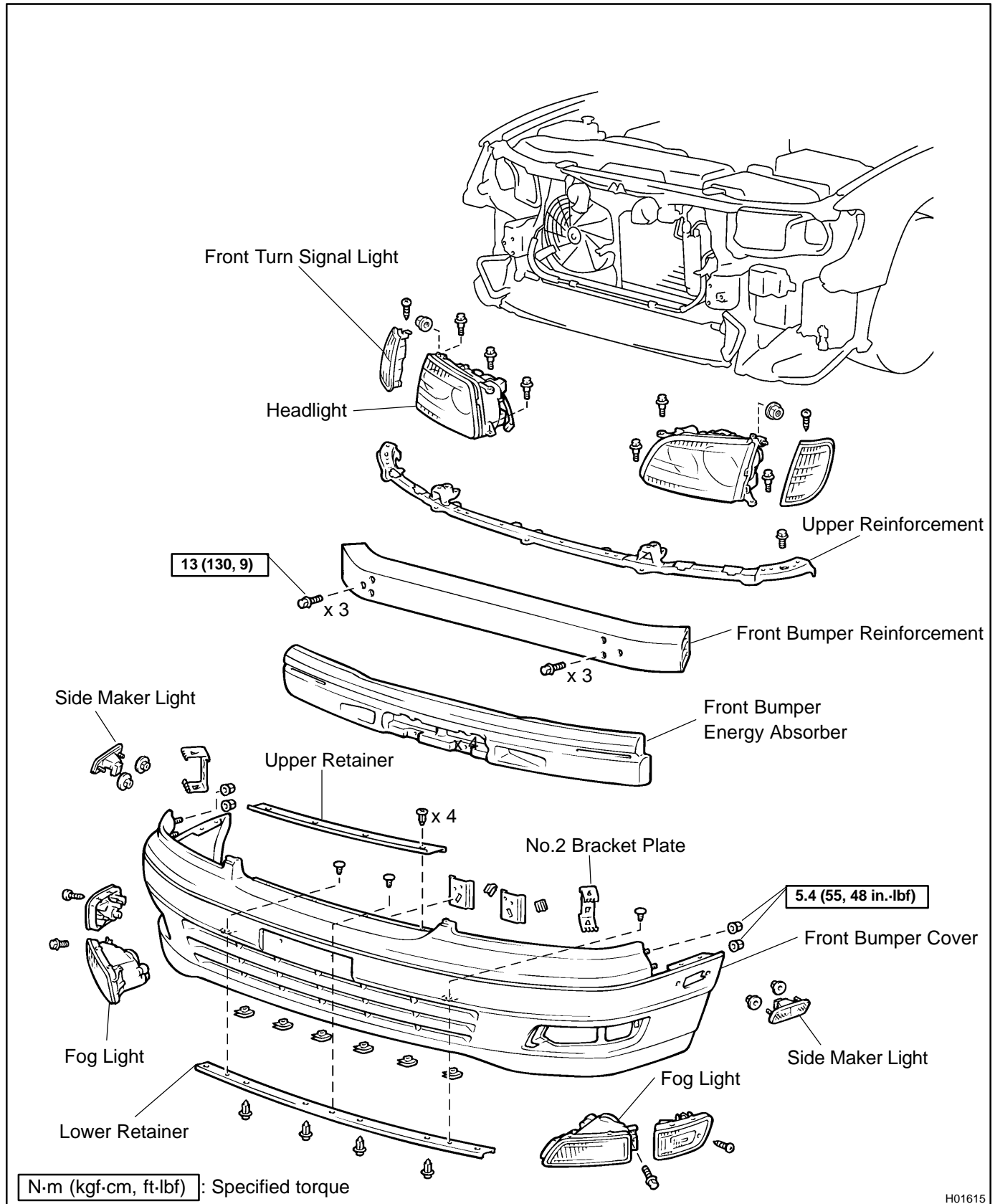
BO0NO-01

PRECAUTION

The LEXUS LS400 is equipped with an SRS (Supplemental Restraint System) such as the driver airbag, front passenger airbag, side airbag and seat belt pretensioner. 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

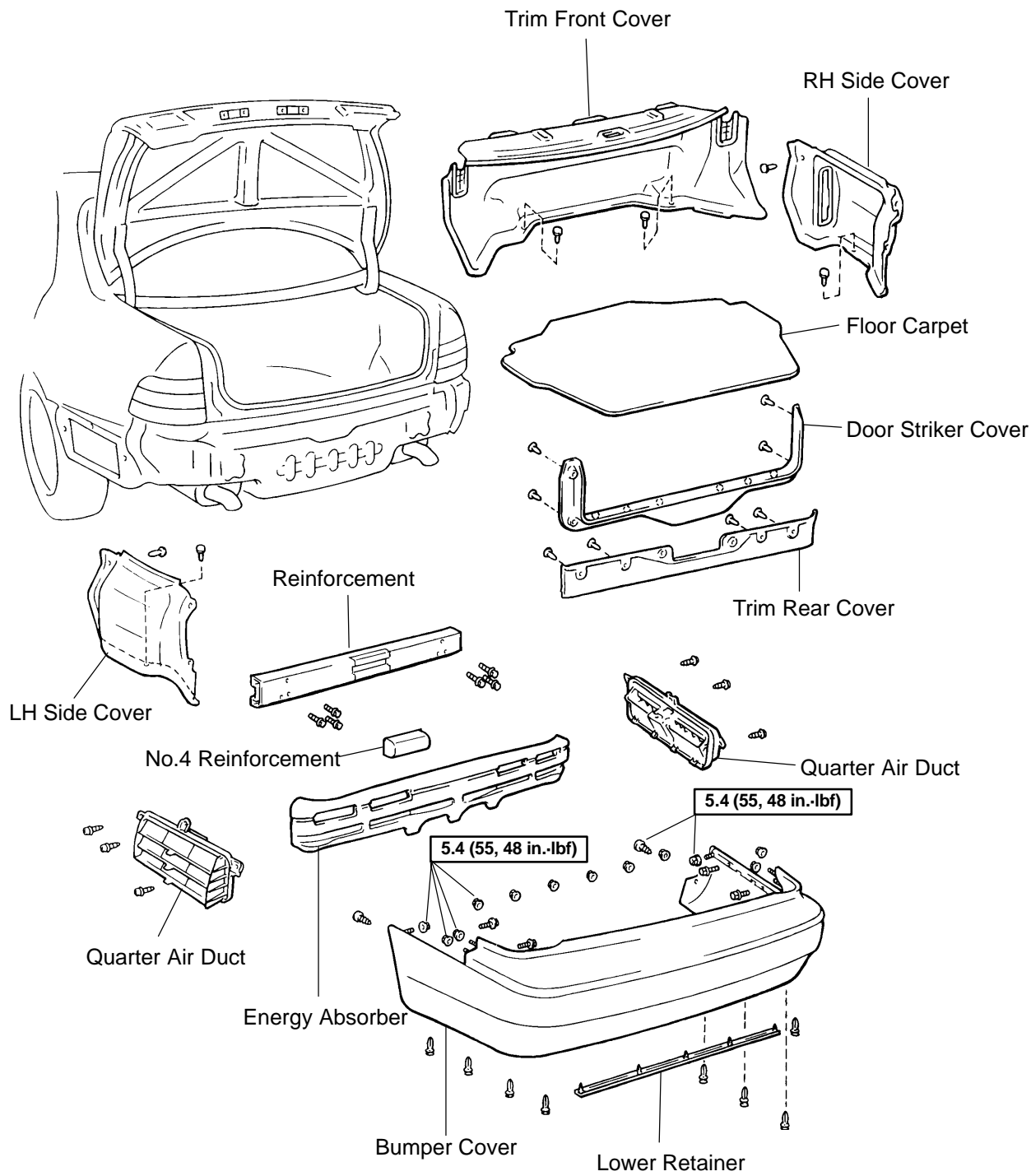
B00Q0-01



H01615

REAR BUMPER
COMPONENTS

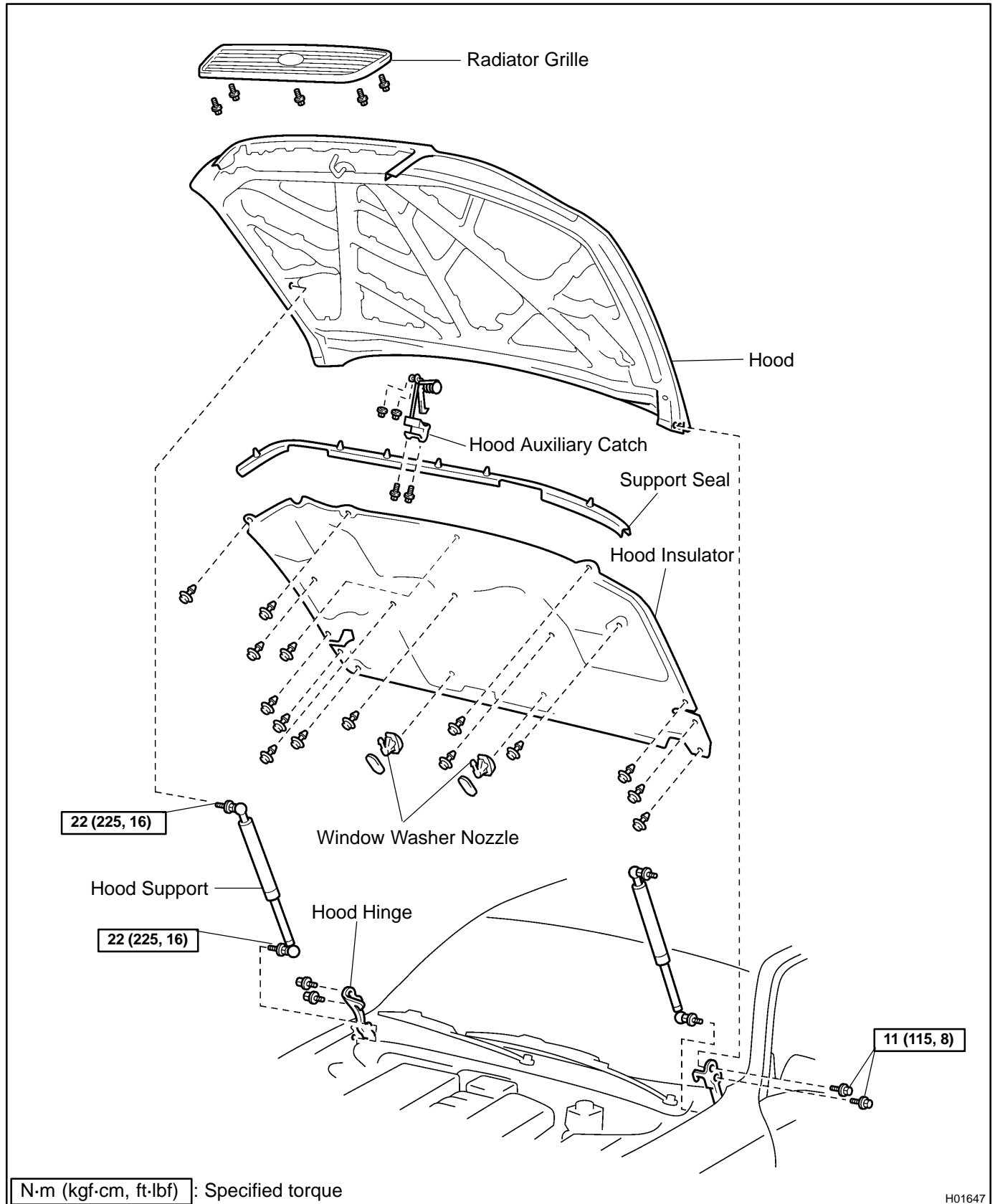
BOONP-01

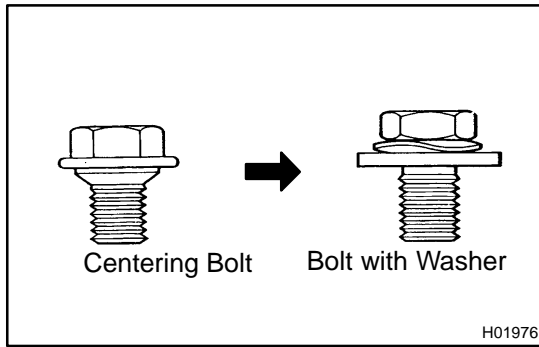


H03118

HOOD COMPONENTS

B00NQ-01

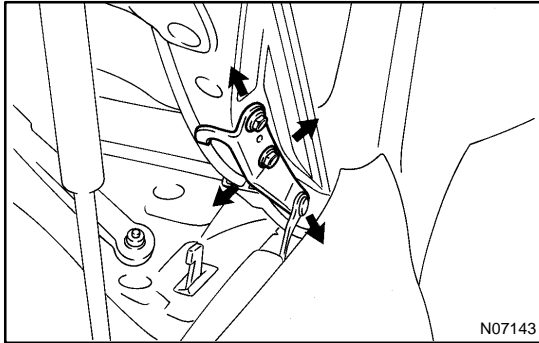




ADJUSTMENT

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 washer for the centering bolt.



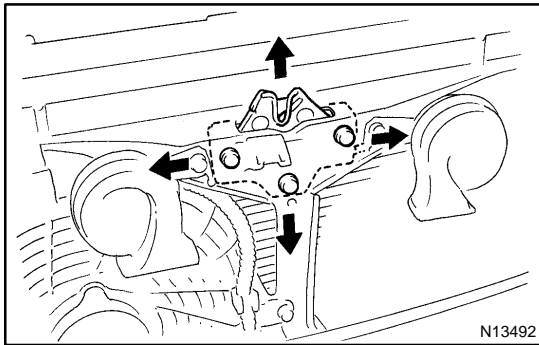
2. ADJUST HOOD IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Adjust the hood by loosening the hood side hinge bolts.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)

3. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Adjust the hood by turning the cushions.



4. ADJUST HOOD LOCK

Adjust the hood lock by loosening bolts.

Torque: 7.8 N·m (80 kgf·cm, 69 in·lbf)

HOOD SUPPORT REPLACEMENT

1. REMOVE SUPPORT FROM HOOD

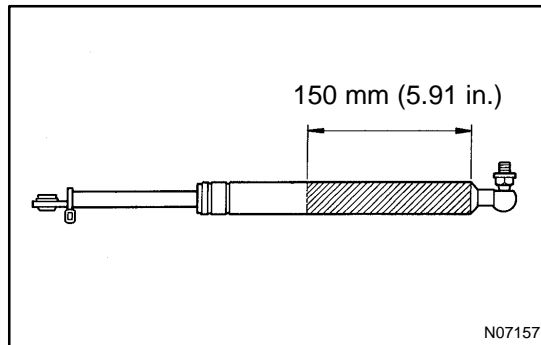
Remove the bolt and support from the hood.

HINT:

While supporting the hood by hand, remove the hood.

2. REMOVE SUPPORT FROM BODY

Remove the bolt and support.



3. IF NECESSARY, REPLACE HOOD SUPPORT

NOTICE:

Handling the support

- Do not disassemble the support as the cylinder is filled with pressurized gas.
- If the support is to be replaced, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the area 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 support carefully. Never score or scratch the exposed part of the piston rod, and allow any paint or oil to get on it.
- Do not turn the piston rod and cylinder with the support fully extended.

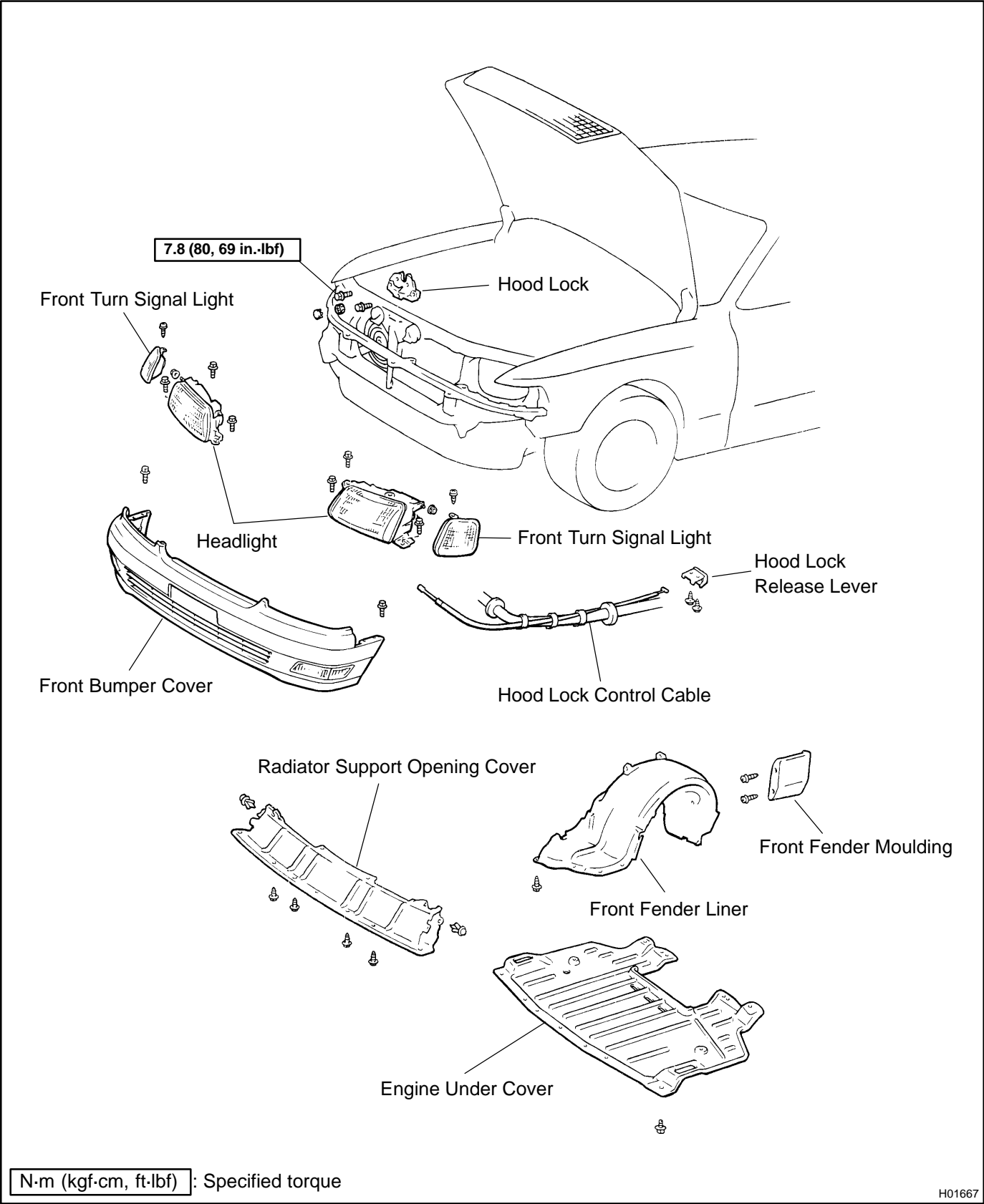
4. INSTALL HOOD SUPPORT

Install the hood support.

Torque: 22 N·m (225 kgf-cm, 16 ft-lbf)

HOOD LOCK CONTROL COMPONENTS

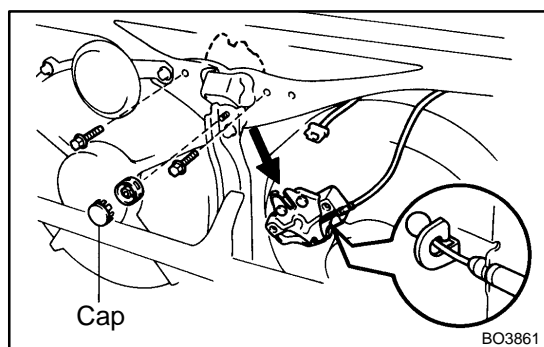
BOONT-01



REMOVAL

1. REMOVE THESE PARTS:

- (a) Engine under cover
- (b) Radiator support opening cover
- (c) Front fender moulding
- (d) Front fender liner
- (e) Front turn signal light
- (f) Headlight
- (g) Front bumper cover
- (h) Hood lock release lever



2. REMOVE HOOD LOCK

- (a) Using a screwdriver, pry out the cap.

HINT:

Tape the screwdriver tip before use.

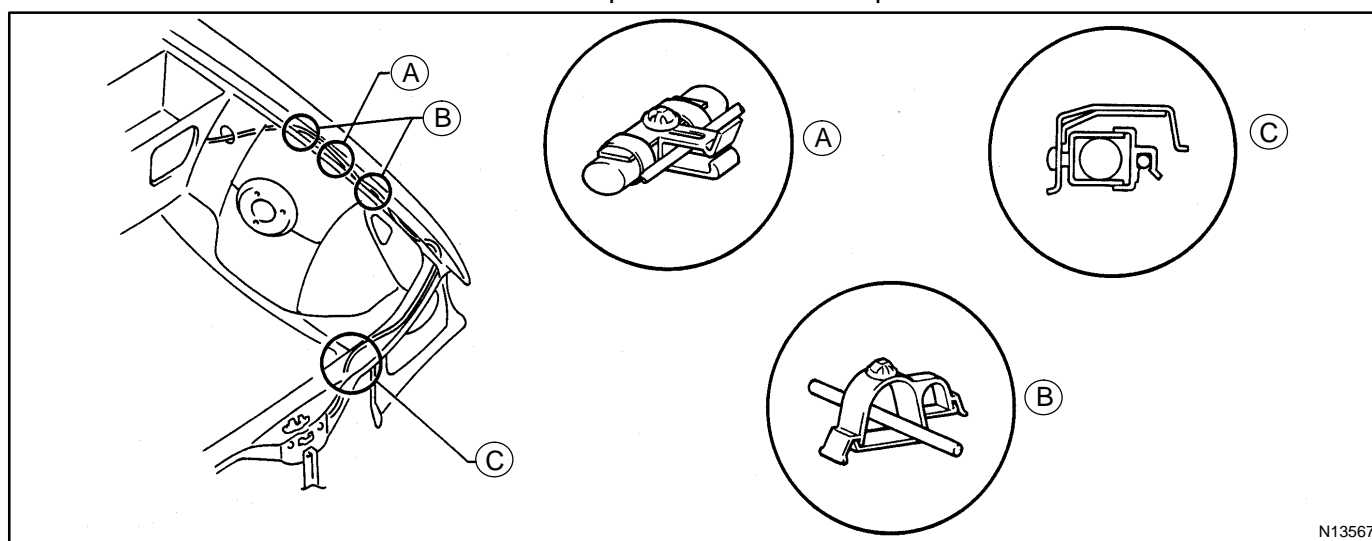
- (b) Remove the 2 bolts, nut and hood lock.
- (c) Disconnect the link from the lock.

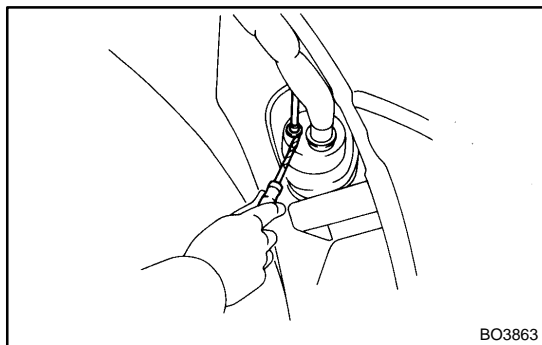
3. REMOVE HOOD LOCK CONTROL CABLE

- (a) Using a screwdriver, disconnect the cable from the clamps.

HINT:

Tape the screwdriver tip before use.

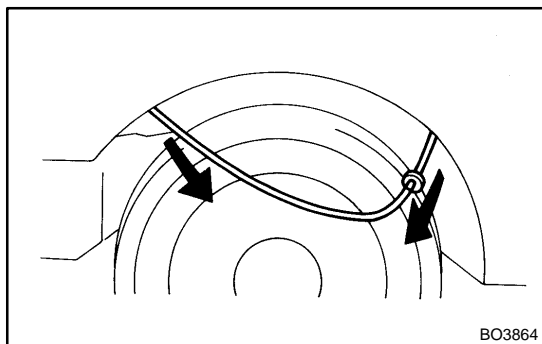




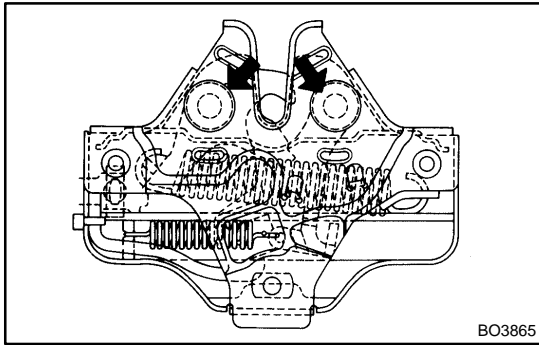
- (b) Using a screwdriver, pry out the cable stopper from the grommet.

HINT:

- Tape the screwdriver tip before use.
- Do not damage the grommet with the screwdriver.



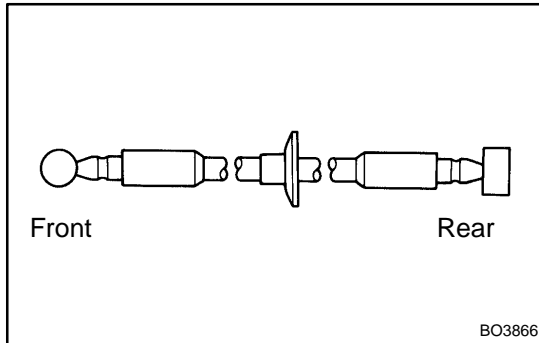
- (c) Pull off the cable from the front wheel housing to remove it.



INSTALLATION

1. BEFORE INSTALLING PARTS, COAT LOCK WITH MP GREASE

Apply MP grease to the sliding surface of the lock.



2. INSTALL HOOD LOCK CONTROL CABLE

- Push the rear side cable through the grommet.
- Using a screwdriver, push the cable stopper into the grommet.

HINT:

- Tape the screwdriver tip before use.
 - Do not damage the grommet with the screwdriver.
- Clamp the front side cable to the junction block.
 - Pass the front side cable through the upper radiator support.

3. INSTALL HOOD LOCK RELEASE LEVER

4. CHECK HOOD LOCK CONTROL FOR PROPER OPERATION

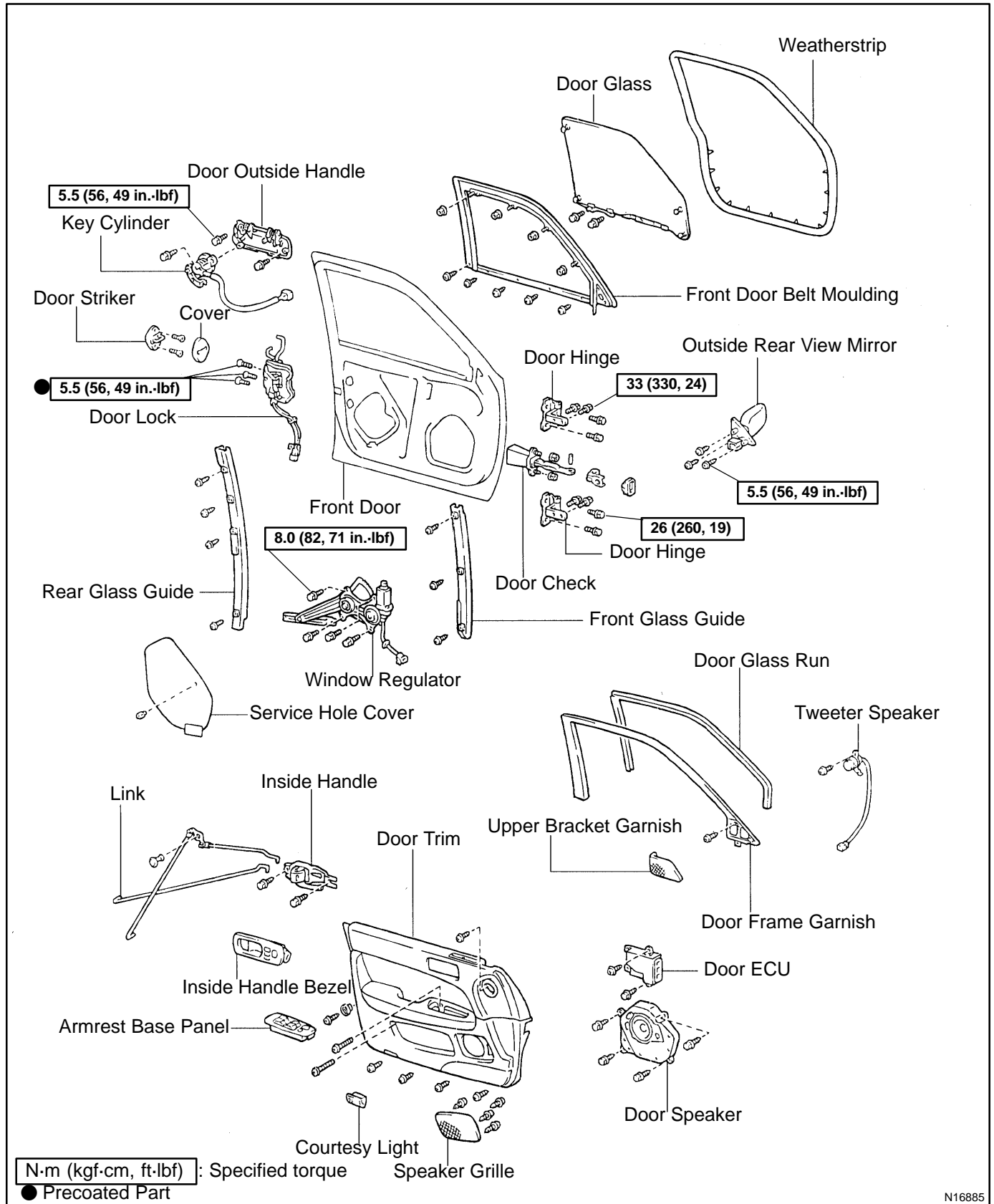
After checking for proper operation, tighten the nut and 2 bolts to install the lock.

5. INSTALL THESE PARTS:

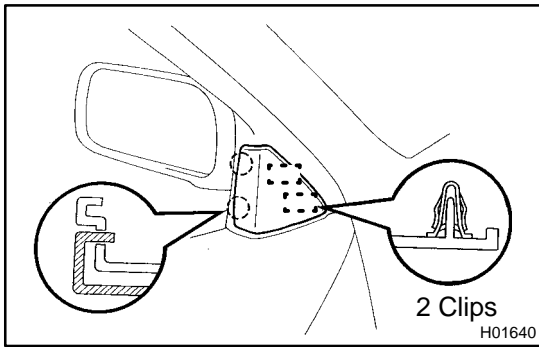
- Headlight
- Clearance light
- Front bumper cover
- Front fender liner
- Front fender moulding
- Radiator support opening cover
- Engine under cover

FRONT DOOR COMPONENTS

BOONW-01



N16885



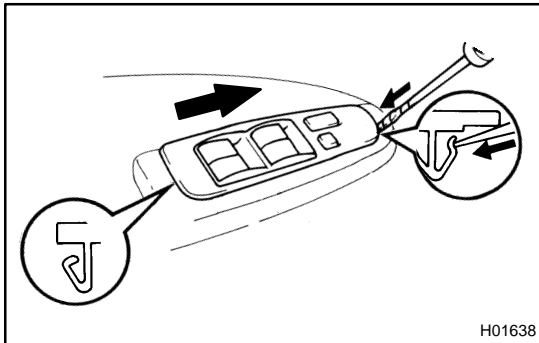
DISASSEMBLY

1. REMOVE UPPER BRACKET GARNISH

Using a screwdriver, remove the garnish.

HINT:

Tape the screwdriver tip before use.

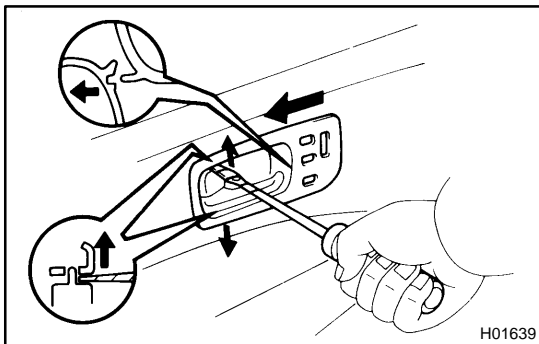


2. REMOVE ARMREST BASE PANEL

Using a screwdriver, remove the panel as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



3. REMOVE INSIDE HANDLE BEZEL

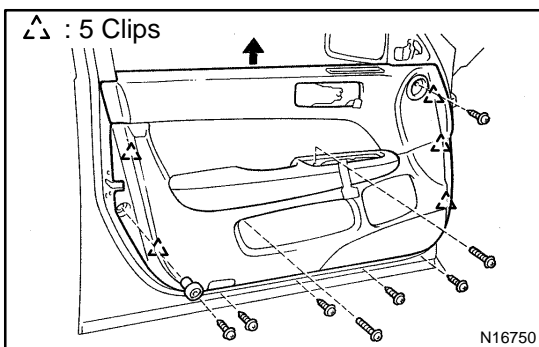
(a) Using a screwdriver, pry outward where the handle and bezel meet.

HINT:

Tape the screwdriver tip before use.

(b) With the door handle in open position, remove the bezel as shown in the illustration.

(c) Disconnect the connector.



4. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the courtesy light, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

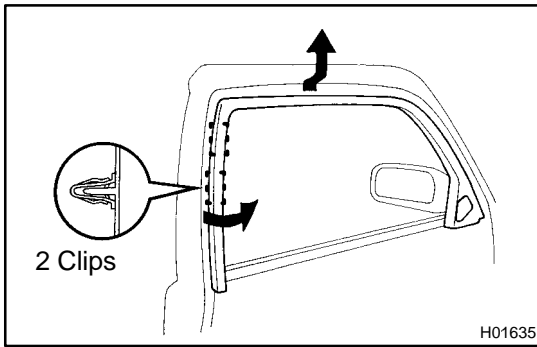
(b) Remove the 8 screws.

(c) Insert a screwdriver between the door panel and door trim to pry the trim out.

HINT:

Tape the screwdriver tip before use.

(d) Pull the trim upward to remove the door trim.

**5. REMOVE DOOR FRAME GARNISH**

- (a) Remove the screw.
- (b) Twist the garnish toward the vehicle interior.
- (c) Pull the whole garnish upwards.

6. REMOVE THESE PARTS:

- (a) Door weatherstrip

NOTICE:

Do not pull strongly off the weatherstrip as it may tear.

- (b) Door glass run

HINT:

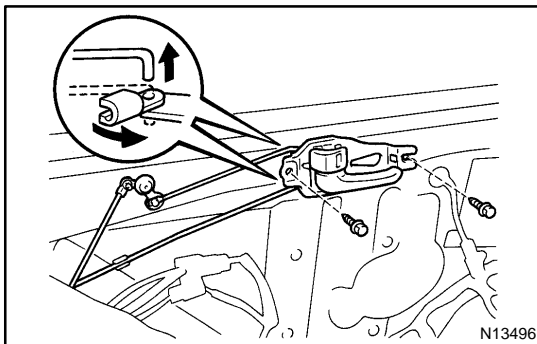
Pull the glass run upward.

- (c) Service hole cover

HINT:

Do not tear the service hole cover.

- (d) Door speaker

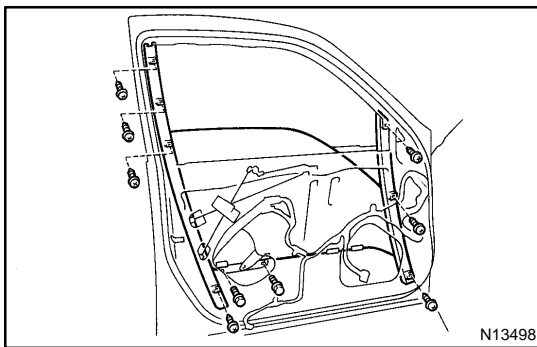
**7. REMOVE INSIDE HANDLE**

- (a) Remove the 2 screws.
- (b) Disconnect the 2 control links from the inside handle as shown in the illustration.

8. REMOVE THESE PARTS:

- (a) Tweeter speaker
- (b) Outside rear view mirror

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

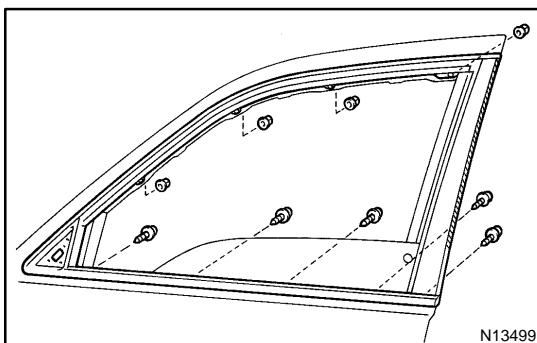
**9. REMOVE DOOR GLASS GUIDE AND DOOR GLASS**

- (a) Remove the 2 bolts joining the window regulator and glass.

HINT:

Insert a shop rag inside the panel to prevent scratching the glass.

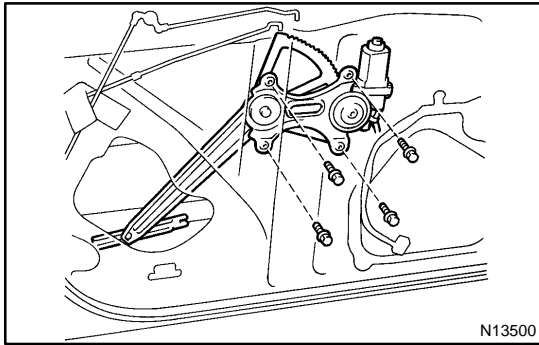
- (b) Remove the 3 screws and pull out the front glass guide.
- (c) Remove the 4 screws and pull out the rear glass guide.
- (d) Pull the door glass out of the panel carefully.

**10. REMOVE FRONT DOOR BELT MOULDING**

- (a) Remove the 5 screws and 4 nuts.
- (b) Using a scraper, remove the double – stick tape from the rear side.

HINT:

Tape the scraper tip before use.



11. REMOVE WINDOW REGULATOR

- (a) Disconnect the connector, then remove the 4 bolts and window regulator.

Torque: 8.0 N·m (82 kgf-cm, 71 in.-lbf)

HINT:

Remove the regulator through the service hole.

HINT:

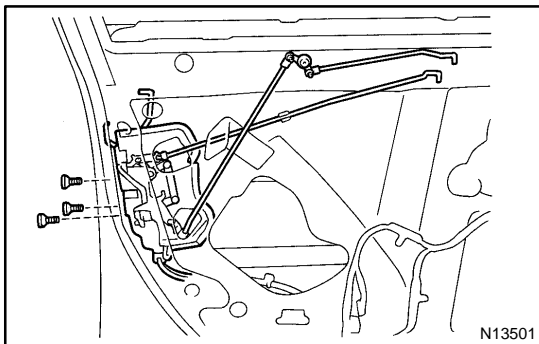
At the time of assembly, please refer to the following item.

Apply MP grease to the window regulator.

NOTICE:

At the time of assembly, please refer to the following item.

Do not apply grease to the spring of the window regulator.



12. REMOVE DOOR LOCK

- (a) Disconnect the opening control link and inside locking link from the door lock, then remove the links.
- (b) Disconnect the 2 links from the outside handle and key cylinder.
- (c) Disconnect the connector.
- (d) Remove the 3 screws and door lock.

Torque: 5.0 N·m (51 kgf-cm, 44 in.-lbf)

HINT:

Remove the regulator through the service hole.

HINT:

At the time of assembly, please refer to the following item.

Apply adhesive to 3 screws.

Part No.08833-00070, THREE BOND 1324 or equivalent.

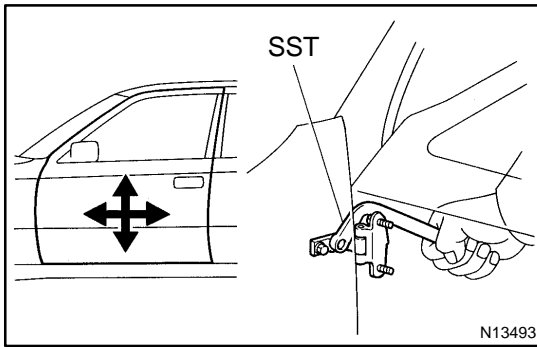
HINT:

At the time of assembly, please refer to the following item.

Apply MP grease to the sliding surface of the door lock.

13. REMOVE THESE PARTS:

- (a) Outside handle
Torque: 5.5 N·m (56 kgf-cm, 49 in.-lbf)
- (b) Key cylinder
Torque: 5.5 N·m (56 kgf-cm, 49 in.-lbf)
- (c) Weatherstrip



ADJUSTMENT

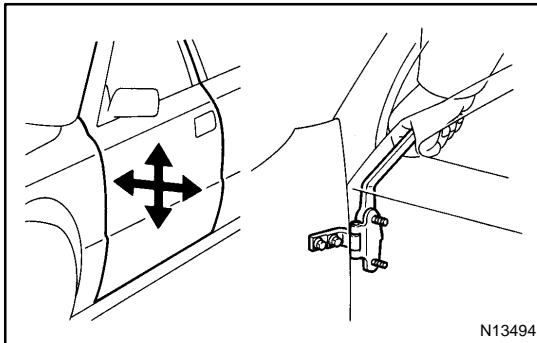
1. ADJUST FRONT DOOR

- (a) Adjust the front door in forward/rearward and vertical directions.

Using SST, loosen the body side hinge bolts to adjust.

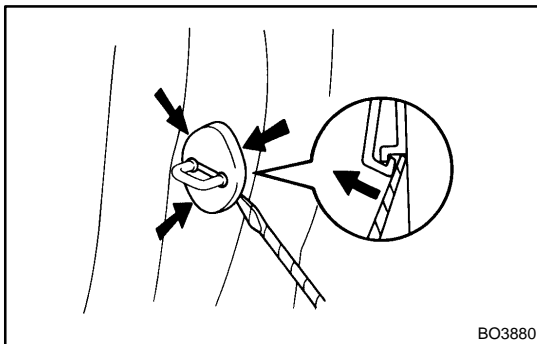
SST 09812-00010

Torque: 33 N·m (330 kgf-cm, 24 ft-lbf)



- (b) Adjust the front door in left/right and vertical directions. Loosen the door side hinge bolts to adjust.

Torque: 26 N·m (260 kgf-cm, 19 ft-lbf)



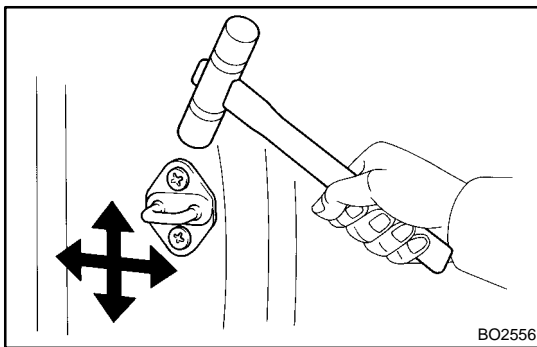
- (c) Adjust the front door lock striker.

- (1) Check that the door fit and door lock linkages are adjusted correctly.

- (2) Using a screwdriver, remove the striker cover.

HINT:

Tape the screwdriver tip before use.



- (3) Adjust the striker position by slightly loosening the striker mounting screws, and hitting the striker with a hammer. Tighten the striker mounting screws again.

- (4) Install the striker cover.

2. ADJUST FRONT DOOR GLASS

HINT:

Check that there is space between the glass guide and stopper.

- (a) Fully raise the glass and adjust the gap between the glass and door panel.

- (b) After adjustment, immobilize the guide, stoppers and 2 nuts.

HINT:

- Check that the edge of the glass does not come in contact with the bottom part of the weatherstrip when the glass is being raised or lowered.

- Check that the glass moves up and down smoothly and that the weatherstrip does not get caught by the glass.

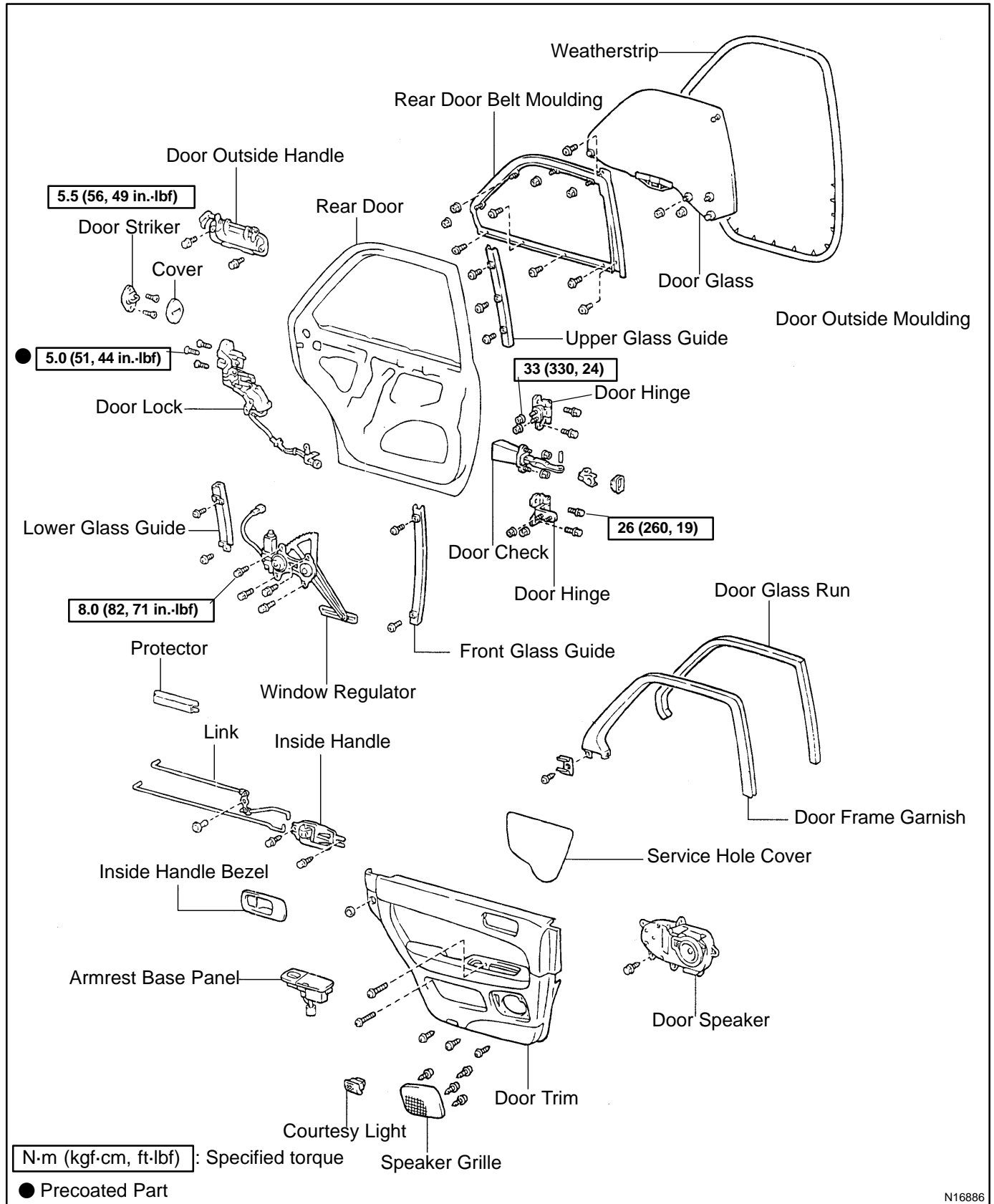
- (c) Raise the glass again and check the installation.

REASSEMBLY

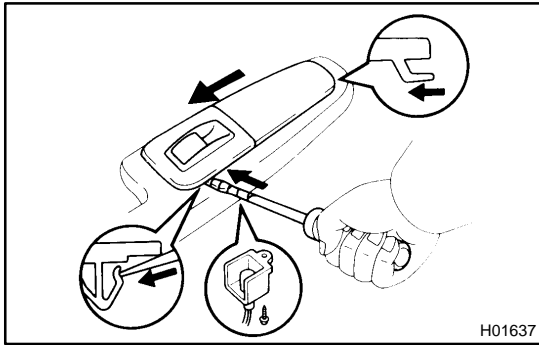
Reassembly is in the reverse order of disassembly (See page [BO-14](#)).

REAR DOOR COMPONENTS

B0000-01



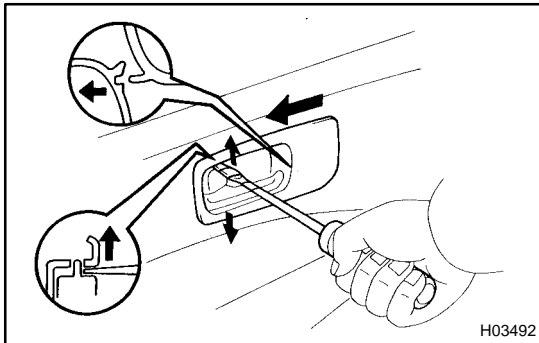
N16886



DISASSEMBLY

1. REMOVE ARMREST BASE PANEL

- (a) Using a screwdriver, remove the panel as shown in the illustration.
- (b) Disconnect the connector.



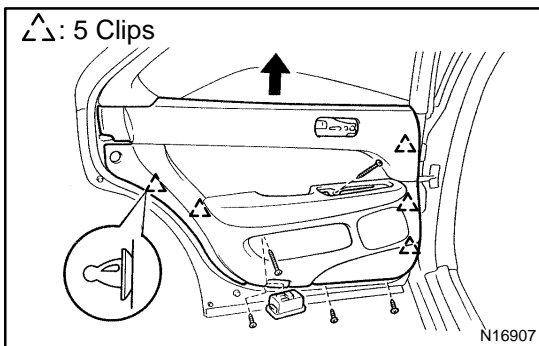
2. REMOVE INSIDE HANDLE BEZEL

- (a) Using a screwdriver, pry outward where the handle and bezel meet.

HINT:

Tape the screwdriver tip before use.

- (b) With the door handle in open position, remove the bezel as shown in the illustration.



3. REMOVE DOOR TRIM

- (a) Using a screwdriver, remove the courtesy light, then disconnect the connector.

HINT:

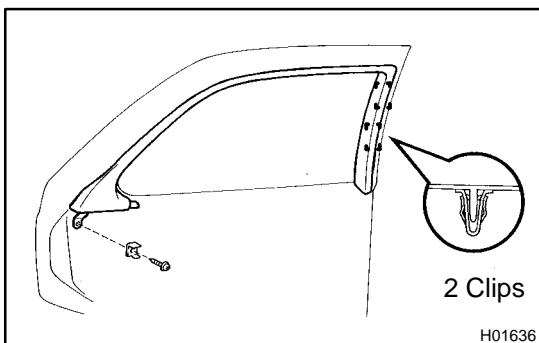
Tape the screwdriver tip before use.

- (b) Remove the child protector cover.
- (c) Remove the 5 screws.
- (d) Insert a screwdriver between the door panel and door trim to pry the trim out.

HINT:

Tape the screwdriver tip before use.

- (e) Pull the trim upward to remove the door trim.



4. REMOVE DOOR FRAME GARNISH

- (a) Remove the screw and clip.
- (b) Twist the garnish toward the vehicle exterior.
- (c) Pull the whole garnish upwards.

5. REMOVE THESE PARTS:

- (a) Door weatherstrip

NOTICE:

Do not pull strongly off the weatherstrip as it may tear.

(b) Door glass run

HINT:

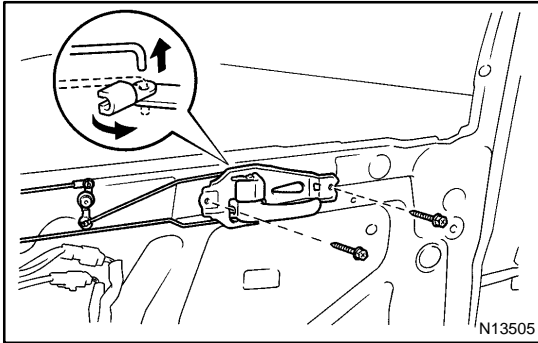
Pull the glass run upwards.

(c) Service hole cover

HINT:

Do not tear the service hole cover.

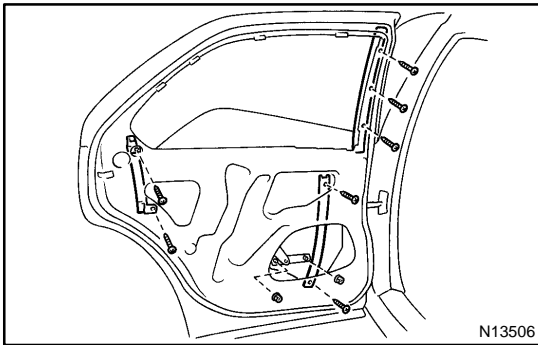
(d) Door speaker



6. REMOVE INSIDE HANDLE

(a) Remove the 2 screws.

(b) Disconnect the 2 control links from the inside handle as shown in the illustration.



7. REMOVE DOOR GLASS GUIDES AND DOOR GLASS

HINT:

At the time of assembly, please refer to the following item.

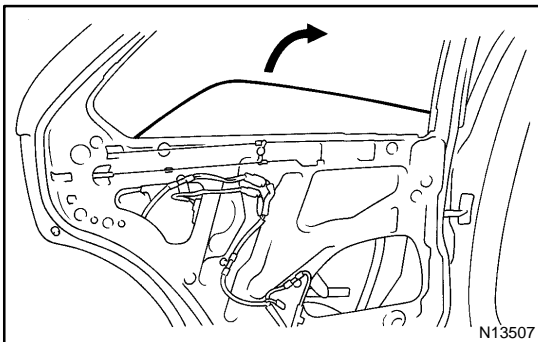
Check that the guide rollers on the rear side of the glass are firmly in the rear guide.

(a) Remove the 2 nuts joining the window regulator and glass.

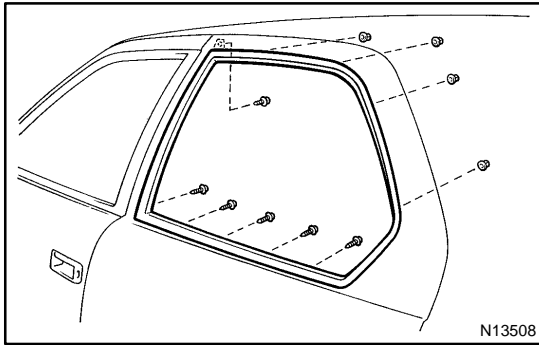
HINT:

Insert a shop rag inside the panel to prevent scratching the glass.

(b) Remove the 7 screws and pull out the 3 glass guides.



(c) Pull the glass up out of the panel.

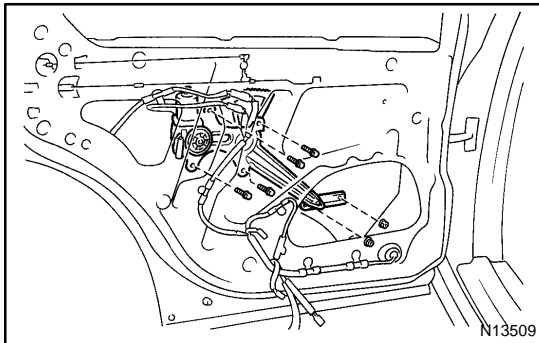


8. REMOVE DOOR BELT MOULDING

- Using a screwdriver, remove the clip.
- Remove the 5 screws and 4 nuts.
- Using a scraper, remove the double-sided tape from the front side.

HINT:

Tape the screwdriver and scraper tip before use.



9. REMOVE WINDOW REGULATOR

Disconnect the connector, then remove the 4 bolts and window regulator.

Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)

HINT:

Remove the regulator through the service hole.

HINT:

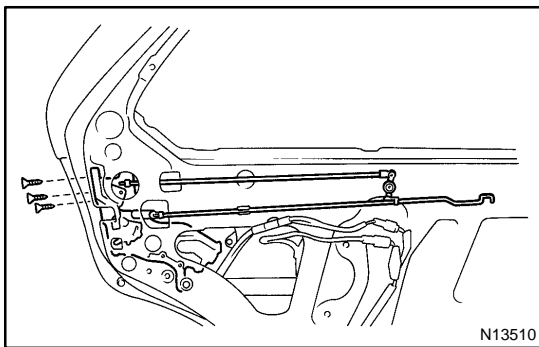
At the time of assembly, please refer to the following item.

Do not apply grease to the spring of the window regulator.

NOTICE:

At the time of assembly, please refer to the following item.

Do not apply grease to the spring of the window regulator.



10. REMOVE DOOR LOCK

- Disconnect the opening control link and inside locking link from the door lock, then remove the links.
- Disconnect the connector.
- Remove the 3 screws and door lock.

Torque: 5.0 N·m (51 kgf·cm, 44 in.-lbf)

HINT:

Remove the regulator through the service hole.

HINT:

At the time of assembly, please refer to the following item.

Apply adhesive to 3 screws.

Part No.08833-00070, THREE BOND 1324 or equivalent.

HINT:

At the time of assembly, please refer to the following item.

Apply MP grease to the sliding surface of the door lock.

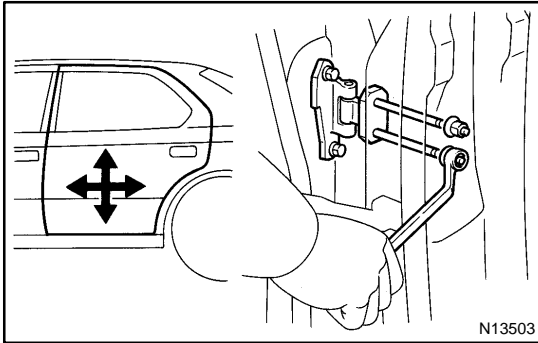
11. REMOVE OUTSIDE HANDLE

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

ADJUSTMENT

1. ADJUST REAR DOOR

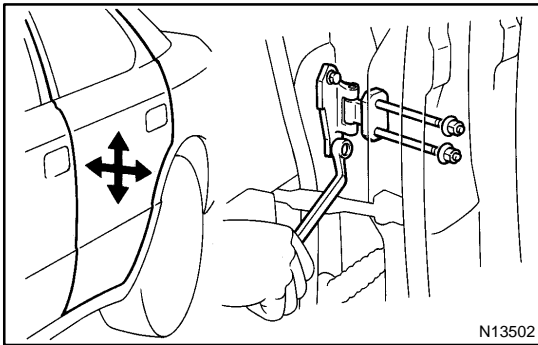
- (a) Remove these parts:
- (1) Front door scuff plate
 - (2) Rear door scuff plate
 - (3) Center pillar garnish
 - (4) Front seat belt retractor bolts



- (b) Adjust the rear door in forward/rearward and vertical directions.

Loosen the body side nuts to adjust.

Torque: 33 N·m (330 kgf-cm, 24 ft-lbf)



- (c) Adjust rear door in left/right and vertical directions.

Loosen the door side hinge bolts to adjust.

Torque: 26 N·m (260 kgf-cm, 19 ft-lbf)

- (d) Adjust the rear door lock striker.
Adjust the rear striker in the same manner as the front door.

2. ADJUST DOOR GLASS

Adjust the door glass.

HINT:

Check that there is space between the glass guide and stopper.

- (1) Fully raise the glass, and adjust the gap between the glass and door panel.
- (2) After adjustment, immobilize the guide, stoppers and 2 nuts.

HINT:

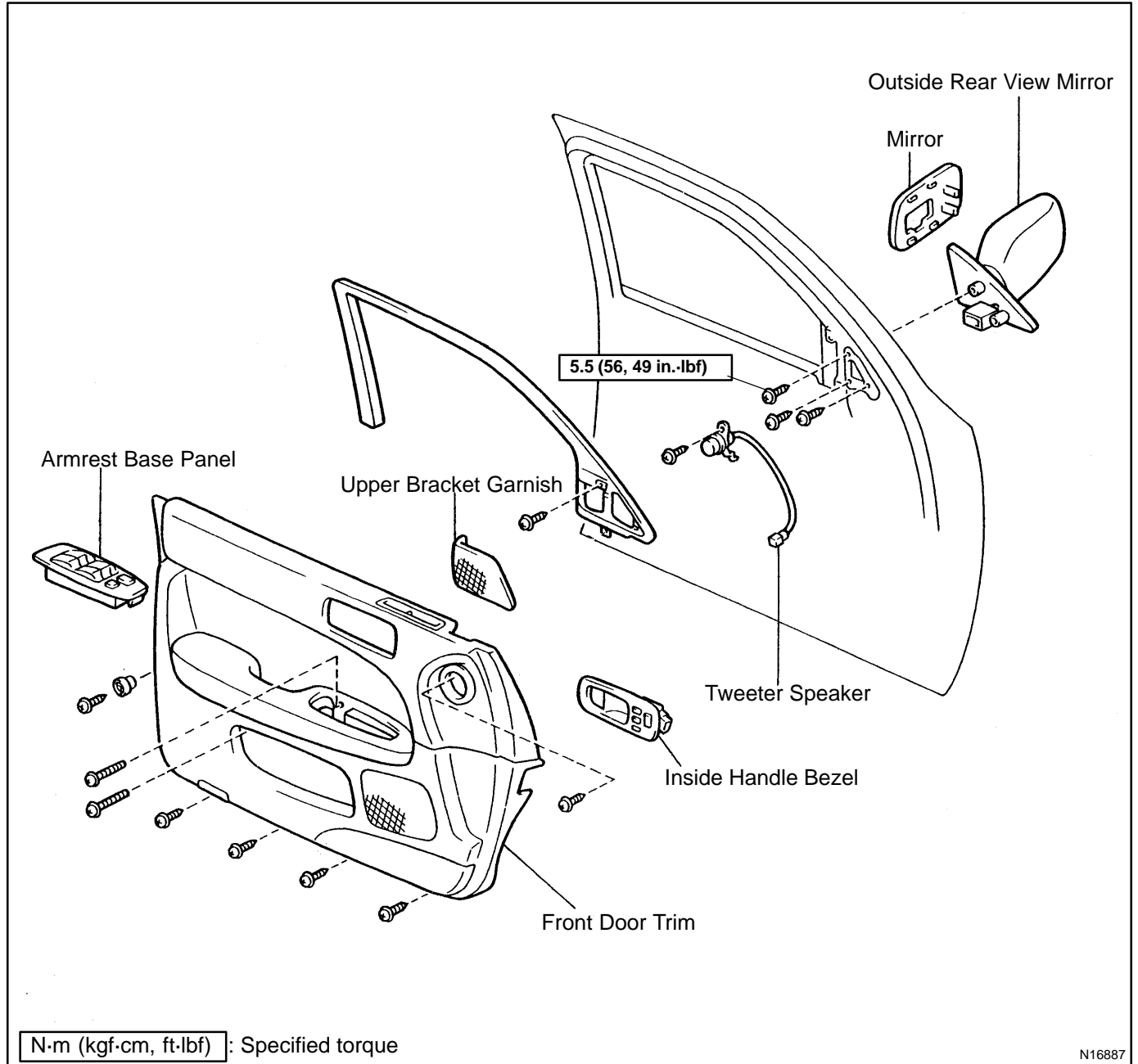
- Check that the edge of the glass does not come in contact with the bottom part of the weatherstrip when the glass is being raised or lowered.
- Check that the glass moves up and down smoothly and that the weatherstrip does not get caught by the glass.
- (3) Raise the glass again and check the installation.

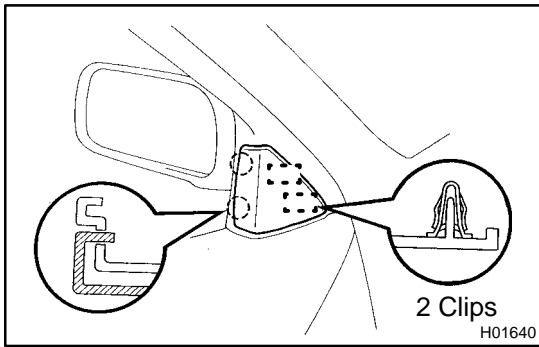
REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-20](#)).

OUTSIDE REAR VIEW MIRROR COMPONENTS

B0004-01





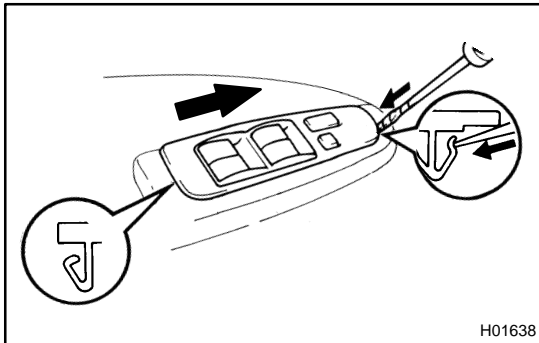
REMOVAL

1. REMOVE UPPER BRACKET GARNISH

Using a screwdriver, remove the garnish.

HINT:

Tape the screwdriver tip before use.

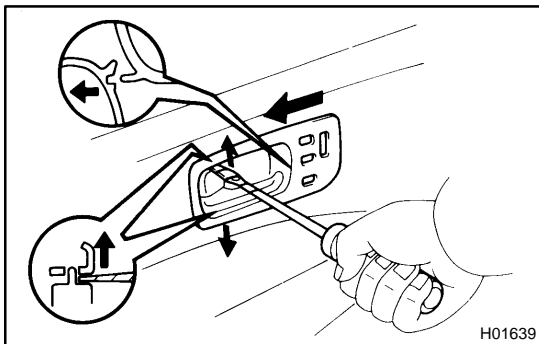


2. REMOVE ARMREST BASE PANEL

Using a screwdriver, remove the panel as shown in the illustration.

HINT:

Tape the screwdriver tip before use.



3. REMOVE INSIDE HANDLE BEZEL

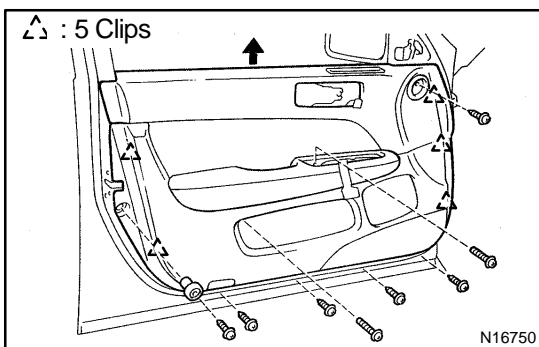
(a) Using a screwdriver, pry outward where the handle and bezel meet.

HINT:

Tape the screwdriver tip before use.

(b) With the door handle in open position, remove the bezel as shown in the illustration.

(c) Disconnect the connector.



4. REMOVE DOOR TRIM

(a) Using a screwdriver, remove the courtesy light, then disconnect the connector.

HINT:

Tape the screwdriver tip before use.

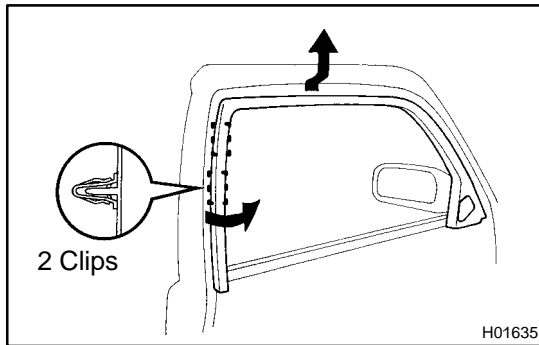
(b) Remove the 8 screws.

(c) Insert a screwdriver between the door panel and door trim to pry the trim out.

HINT:

Tape the screwdriver tip before use.

(d) Pull the trim upward to remove the door trim.

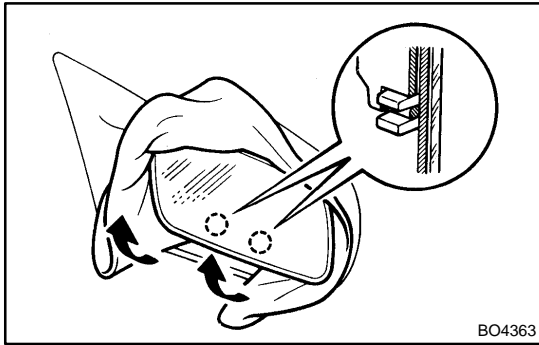
**5. REMOVE DOOR FRAME GARNISH**

- (a) Remove the screw.
- (b) Twist the garnish toward the vehicle interior.
- (c) Pull the whole garnish upwards.

6. REMOVE TWEETER SPEAKER**7. REMOVE OUTSIDE REAR VIEW MIRROR**

- (a) Disconnect the connector.
- (b) Remove the 3 screws and outside rear view mirror.

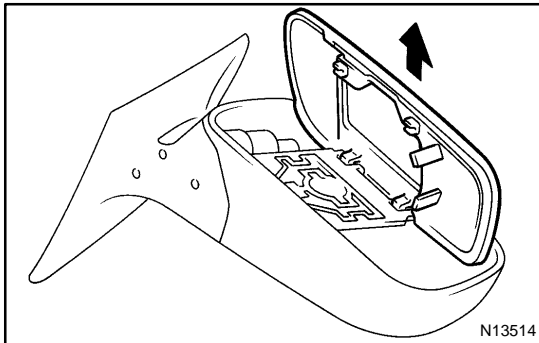
Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)



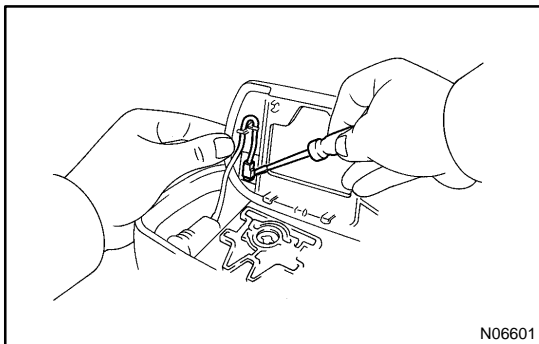
REPLACEMENT

1. IF NECESSARY, DISCONNECT MIRROR

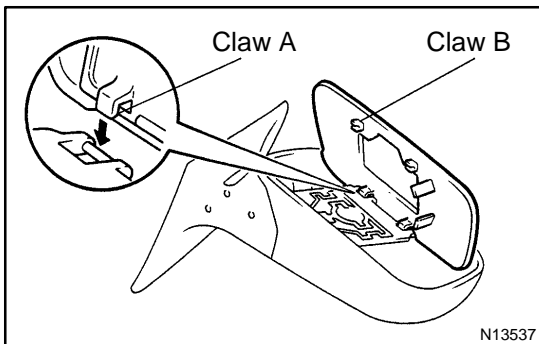
- (a) Insert the shop rag between the mirror and the mirror body to wrap up the mirror in the shop rag.
- (b) Pull up the lower side of the shop rag to disconnect the mirror joint.



- (c) Pull up the mirror and disconnect it.



- (d) Disconnect the connector.



2. CONNECT MIRROR

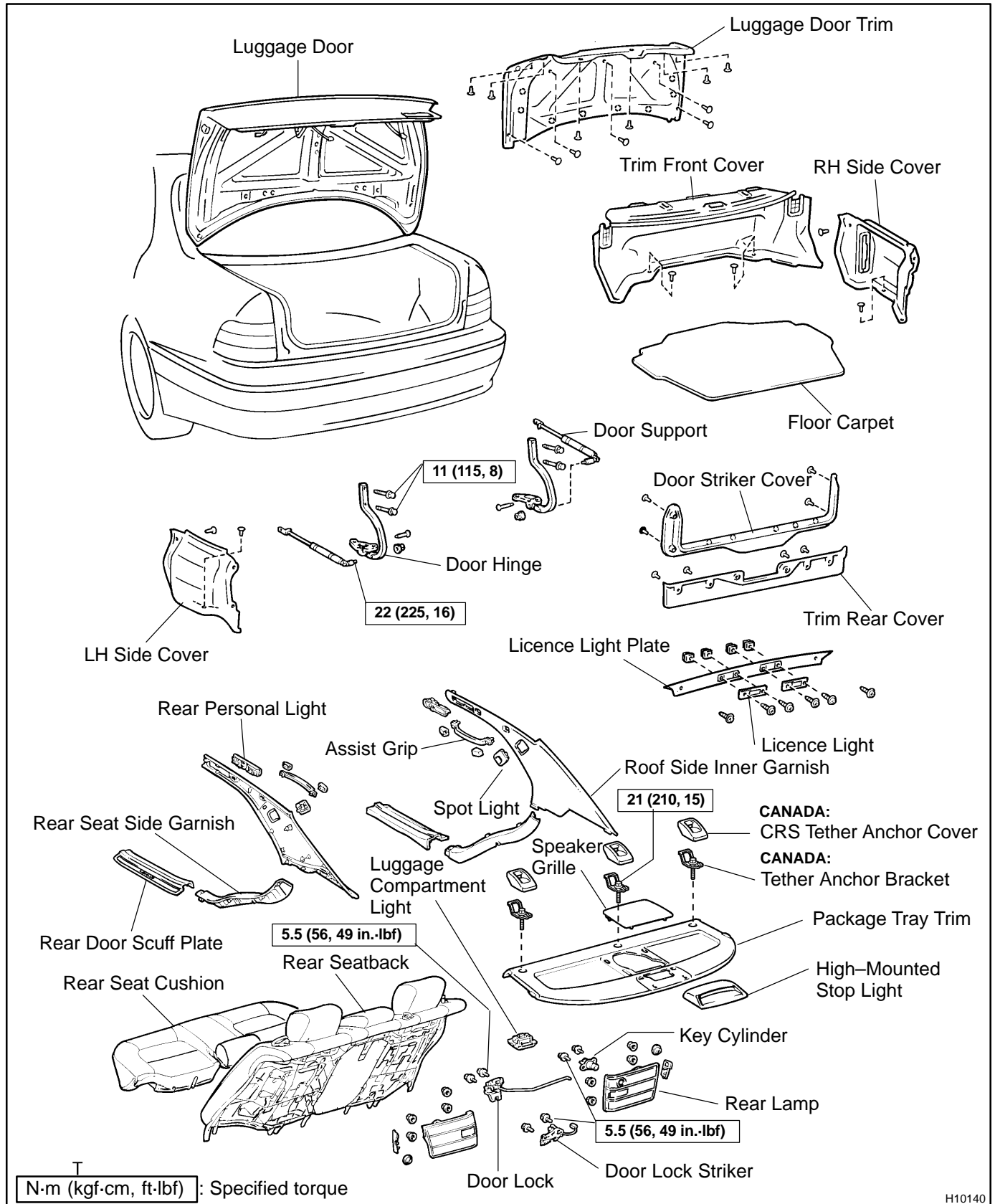
- (a) Connect the claws (A) and set the mirror to the mirror body.
- (b) Push the mirror to connect the claws (B) and connect it.

INSTALLATION

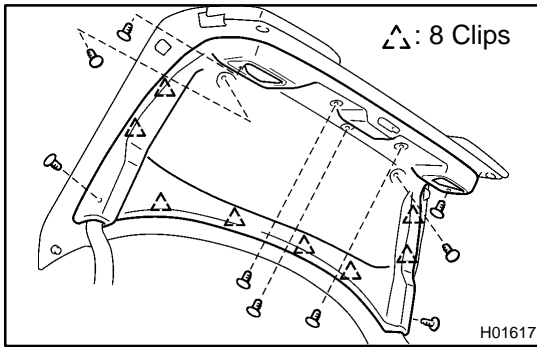
Installation is in the reverse order of removal (See page [BO-26](#)).

LUGGAGE COMPARTMENT DOOR AND HINGE COMPONENTS

B0008-02



H10140



REMOVAL

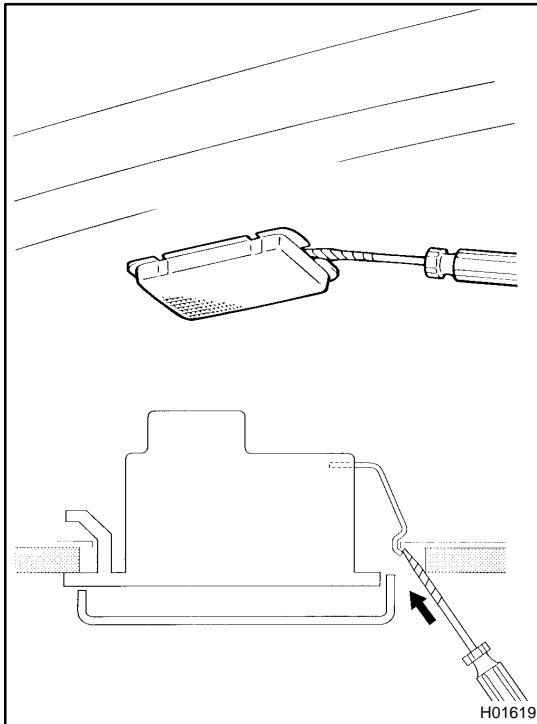
1. REMOVE LUGGAGE COMPARTMENT DOOR TRIM

Remove the 9 clips and trim.

2. REMOVE LUGGAGE COMPARTMENT DOOR

- Disconnect the connector.
- Using a clip remover, disconnect the clamps.
- Remove the 4 bolts and door.

Torque: 11 N·m (115 kgf·cm, 8 ft·lbf)



3. REMOVE LUGGAGE COMPARTMENT LIGHT

- Using a screwdriver, remove the light as shown in the illustration.
- Disconnect the connector.

4. REMOVE FLOOR CARPET

5. REMOVE DOOR STRIKER COVER

6. REMOVE TRIM REAR COVER

7. REMOVE RH TRIM COVER

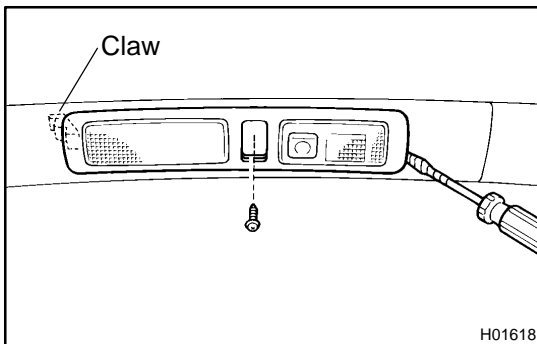
8. REMOVE LH TRIM COVER

9. REMOVE FRONT TRIM COVER

10. REMOVE REAR SEAT (See page [BO-111](#))

11. REMOVE REAR DOOR SCUFF PLATE

12. REMOVE REAR SEAT SIDE GARNISHES



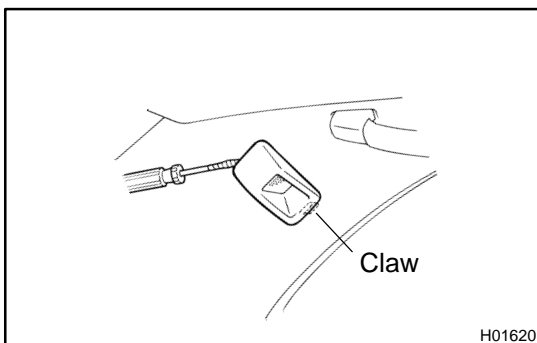
13. REMOVE REAR PERSONAL LIGHT

- Remove the screw.
- Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- Disconnect the connector.
- Employ the same manner described above to the other side.



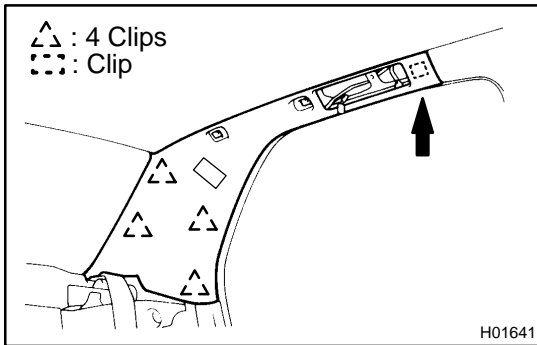
14. REMOVE SPOT LIGHT

- Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- Disconnect the connector.
- Employ the same manner described above to the other side.

**15. REMOVE ROOF SIDE INNER GARNISH**

- (a) Remove the roof side inner garnish.

NOTICE:

Paying enough attention remove the clip on the roof side inner garnish shown in the illustration. Otherwise, the roof side inner garnish or the front pillar garnish might be broken.

- (b) Employ the same manner described above to the other side.

16. REMOVE HIGH-MOUNTED STOP LIGHT**17. REMOVE SPEAKER GRILLE****18. CANADA:****REMOVE CRS TETHER ANCHOR COVERS AND TETHER ANCHOR BRACKETS**

Torque: 21 N·m (210 kgf-cm, 15 ft·lbf)

19. REMOVE PACKAGE TRAY TRIM**20. REMOVE REAR SEAT OUTER BELT RETRACTOR****21. REMOVE LUGGAGE COMPARTMENT DOOR SUPPORT**

- (a) Remove the door stay bolt from the door hinge.
 (b) Rotate the rear of the support downward and remove the door support from the bracket.

22. REMOVE LUGGAGE COMPARTMENT DOOR HINGE

Remove the 4 bolts and 2 hinges.

DISASSEMBLY

1. REMOVE DOOR LOCK

- (a) Disconnect the control link.
- (b) Remove the 2 bolts and lock.

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

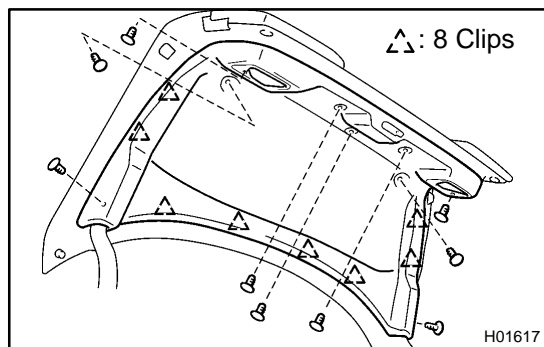
2. REMOVE KEY CYLINDER

Remove the 2 bolts and key cylinder.

Torque: 5.5 N·m (56 kgf·cm, 49 in.-lbf)

3. REMOVE THESE PARTS:

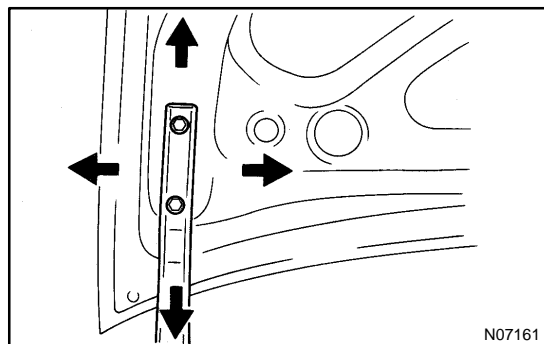
- (a) Rear lamp assembly
- (b) Licence light plate



ADJUSTMENT

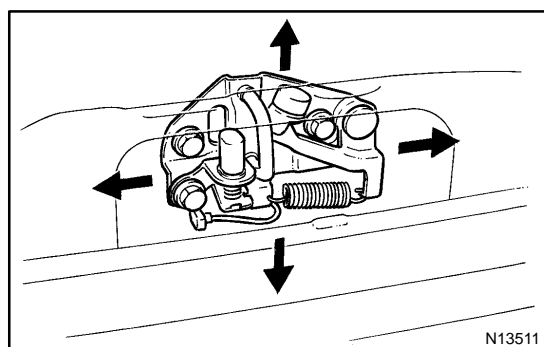
1. ADJUST LUGGAGE COMPARTMENT DOOR

- (a) Remove the 9 clips and trim.



- (b) For forward/rearward and left/right adjustment, loosen the bolts.
 (c) For vertical adjustment of front end of the door, increase or decrease the number of washers between the hinge and door.

Torque: 11 N·m (115 kgf·cm, 8.3 ft·lbf)



2. ADJUST DOOR LOCK STRIKER

Using a brass bar and hammer, tap the striker to adjust it.

Torque: 5.5 N·m (56 kgf·cm, 49 in·lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-33](#)).

INSTALLATION

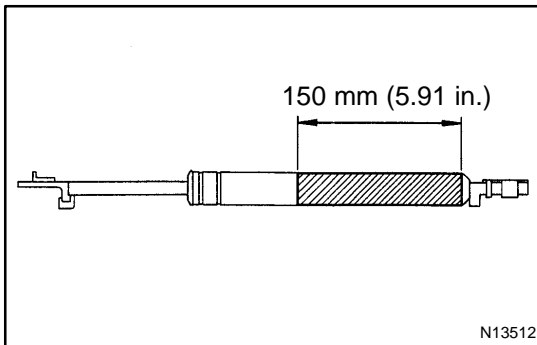
Installation is in the reverse order of removal (See page [BO-31](#)).

LUGGAGE COMPARTMENT DOOR SUPPORT REPLACEMENT

B000E-01

1. REMOVE LUGGAGE COMPARTMENT DOOR SUPPORT

- (a) Remove the door stay bolt from the door hinge.
- (b) Rotate the rear of the support downward and remove the door support from the bracket.

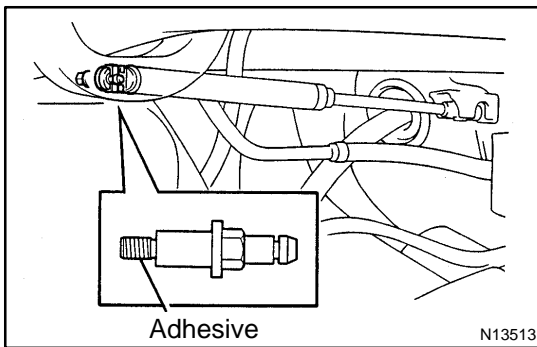


2. IF NECESSARY, REPLACE LUGGAGE COMPARTMENT DOOR SUPPORT

NOTICE:

Handling the support.

- Do not disassemble the support as the cylinder is filled with pressurized gas.
- If the support is to be replaced, drill a 2.0 ~ 3.0 mm (0.079 – 0.118 in.) hole in the area 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 support carefully. Never score or scratch the exposed part of the piston rod, and allow any paint or oil to get on it.
- Do not turn the piston rod and cylinder with the support fully extended.

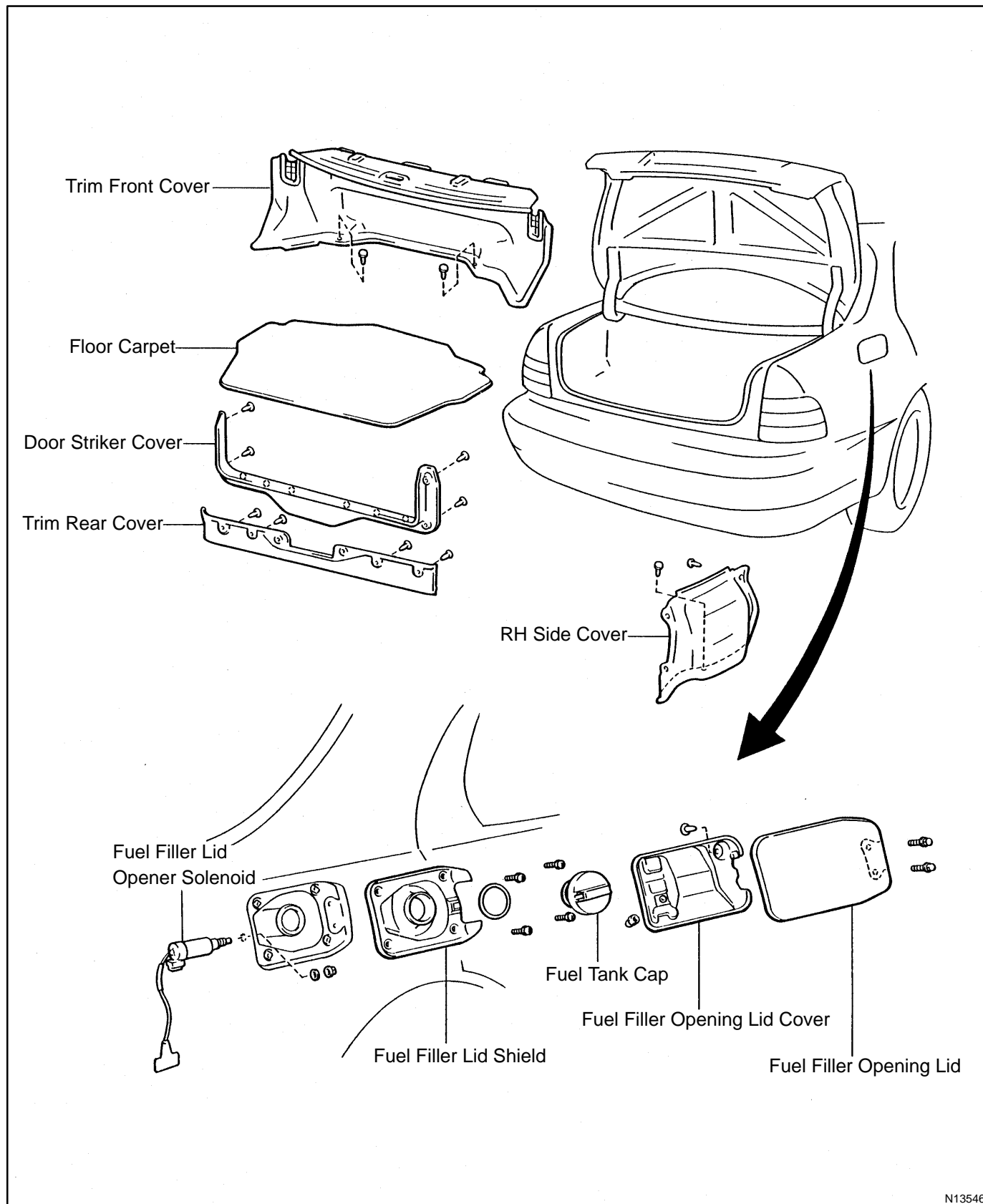


3. INSTALL LUGGAGE COMPARTMENT DOOR SUPPORT

- (a) Apply adhesive to the bolt.
Part No.08833-00070,THREE BOND 1324 or equivalent
- (b) Install the door support.
Torque: 22 N·m (225 kgf·cm, 16 ft·lbf)

FUEL LID COMPONENTS

B000F-01

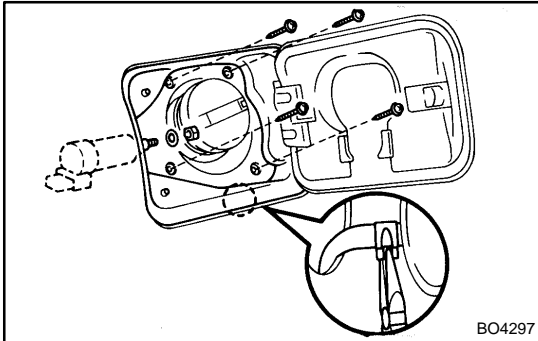


N13546

REMOVAL

1. REMOVE THESE PARTS:

- (a) Floor carpet
- (b) Door striker cover
- (c) Trim rear cover
- (d) Trim front cover
- (e) RH side cover

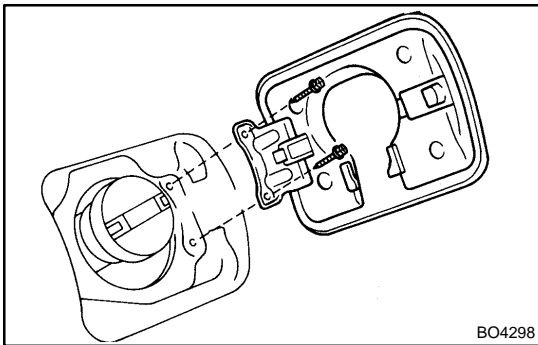


2. REMOVE FUEL FILLER LID SHIELD

- (a) Remove the nut, washer and fuel lid opener solenoid.
- (b) Disconnect the connector from the solenoid.
- (c) Remove the 4 screws.
- (d) Remove the fuel tank cap and lid shield.

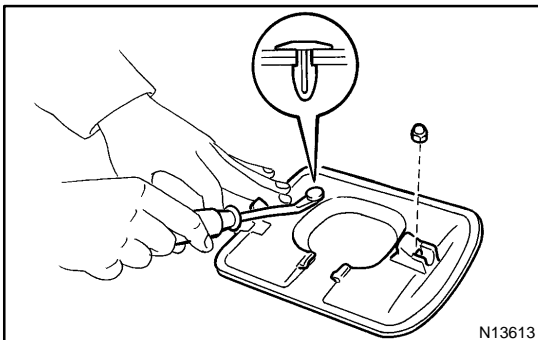
CAUTION:

- Always keep the tank cap closed when it is not required to be open.
- Keep all fire away during the operation.
- (e) Using pliers, disconnect the tube from the shield.
- (f) Install the cap quickly.



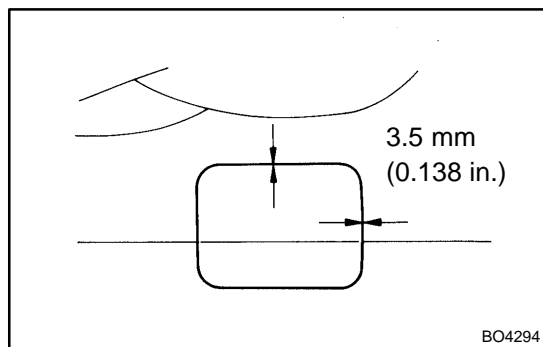
3. REMOVE FUEL FILLER OPENING LID

Remove the 2 screws and lid.



4. REMOVE FUEL FILLER OPENING LID COVER

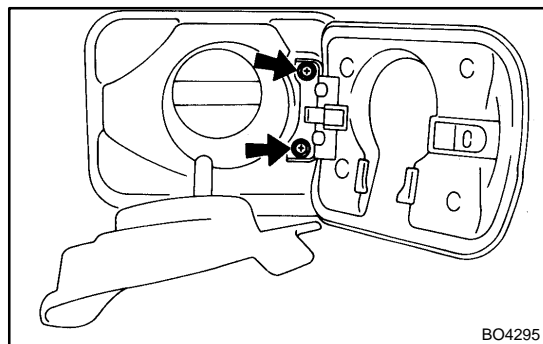
- (a) Remove the nut.
- (b) Using a clip remover, remove the clip and cover.



ADJUSTMENT

HINT:

Adjust the fuel lid according to the following method.



ADJUST FUEL FILLER OPENING LID

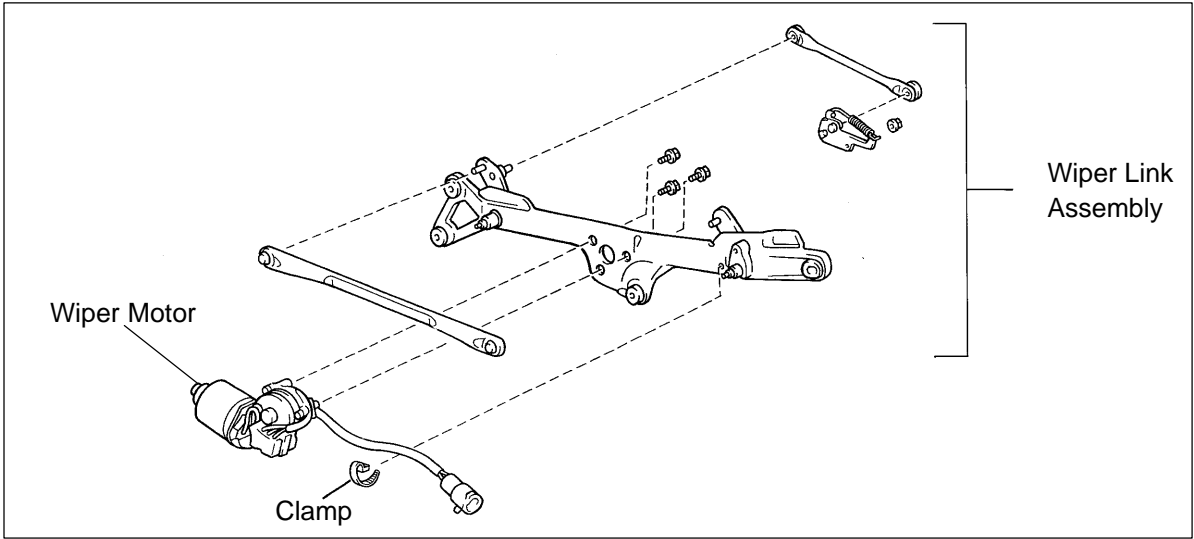
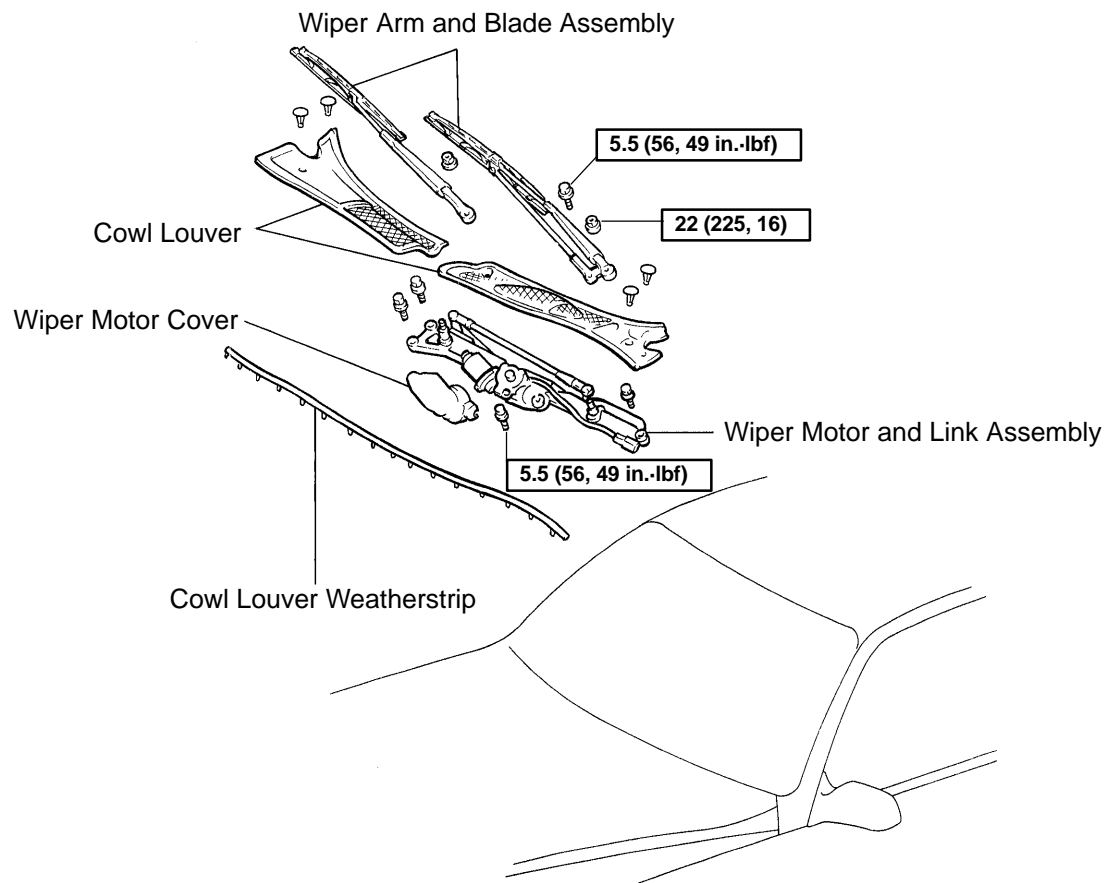
Loosen the 2 screws and adjust the lid as shown.

INSTALLATION

Installation is in the reverse order of removal (See page [BO-39](#)).

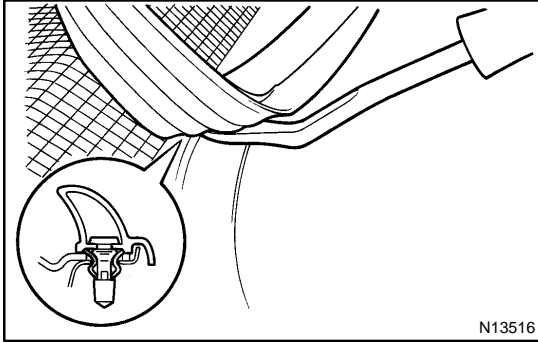
FRONT WIPER AND WASHER COMPONENTS

B000J-01



N·m (kgf·cm, ft·lbf) : Specified torque

H01649

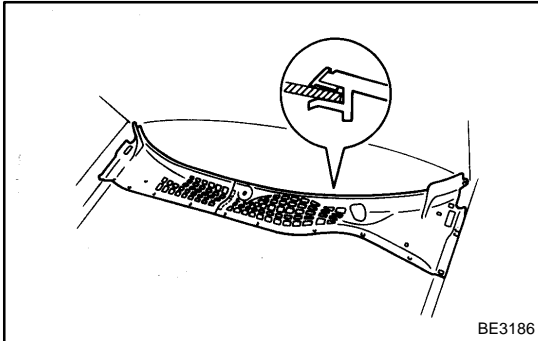


REMOVAL

1. REMOVE WIPER ARM AND BLADE ASSEMBLY

2. REMOVE COWL LOUVER WEATHERSTRIP

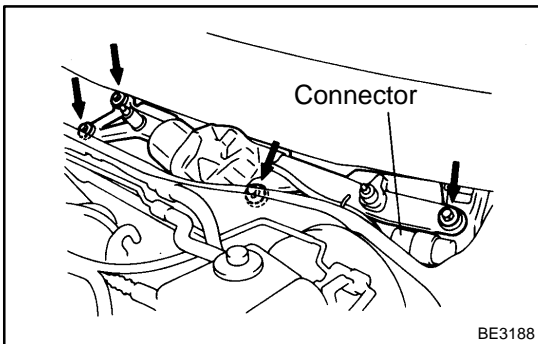
- (a) Remove the cowl louver weatherstrip from the hood.



- (b) Remove the cowl louver.

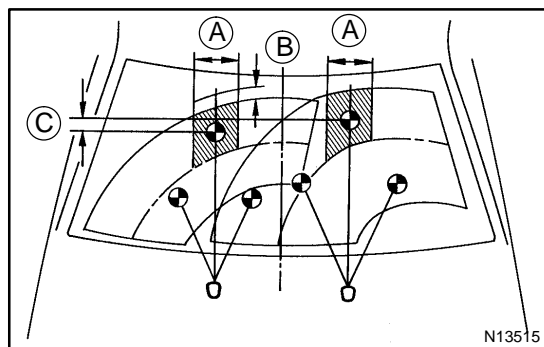
HINT:

Raise up the front side of the cowl louver and remove the cowl louver.



3. REMOVE WIPER MOTOR AND LINK ASSEMBLY

- (a) Remove the 4 set bolts.
 (b) Disconnect the connector.
 (c) Raise the front side of the wiper motor and link assembly up and remove the wiper motor and link assembly.
 (d) Remove the wiper motor cover.



INSPECTION

INSPECT WINDOW WASHER NOZZLE

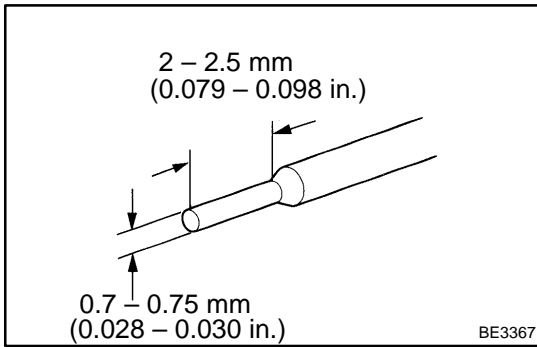
- (a) While operating the washer, check whether the point where the washer fluid hits the windshield glass and the up surge area are within the range indicated by the hatched line.

A: Approx. 150 mm (5.91 in.)

B: Approx. 50 mm (1.99 in.)

C: Approx. 0±50 mm (0±1.99 in.)

- (b) Check that the lower point where the washer fluid hits the windshield is within the range of the wiping pattern (the area of the glass which is wiped by the wiper blades).



ADJUSTMENT

ADJUST WINDOW WASHER NOZZLE

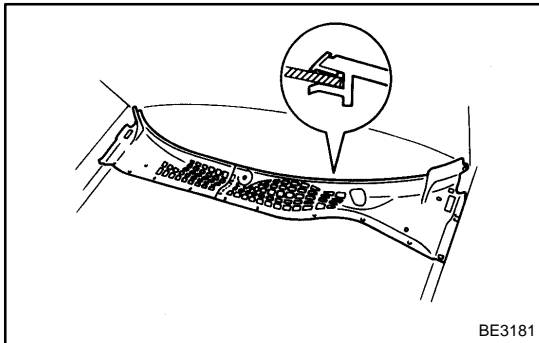
Using a tool like the one shown in the illustration, change the direction of the nozzle hole to adjust the point where washer fluid hits the windshield.

INSTALLATION

1. INSTALL WIPER MOTOR AND LINK ASSEMBLY

- Install the wiper motor cover.
- Install the wiper motor and link assembly.
- Connect the connector.
- Install and torque the 4 bolts.

Torque: 5.5 N·m (56 kgf-cm, 49 in.-lbf)



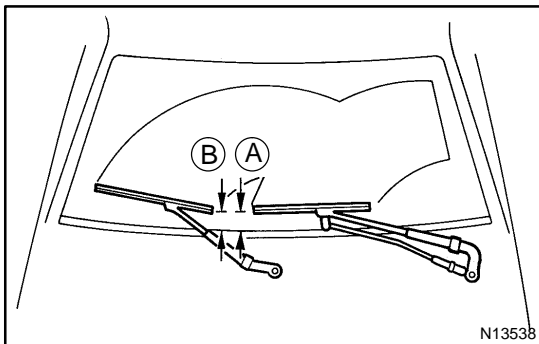
2. INSTALL COWL LOUVER

- Install the cowl louver.

HINT:

With the front side of the louver raised, install the protector on the glass, then push the louver down.

- Install the hood to cowl louver weatherstrip.



3. INSTALL WIPER ARM AND BLADE ASSEMBLY

- Install the wiper arms and blades, and operate the wipers once and turn the wiper switch OFF.
- Torque the sub arm stay set bolt.

Torque: 5.5 N·m (56 kgf-cm, 49 in.-lbf)

- Adjust the installation positions of the wiper arms and blades to the positions shown in the illustration.

A: Driver's blade – Louver seal

Approx. 80.0 mm (3.150 in.)

B: Passenger's blade – Louver seal

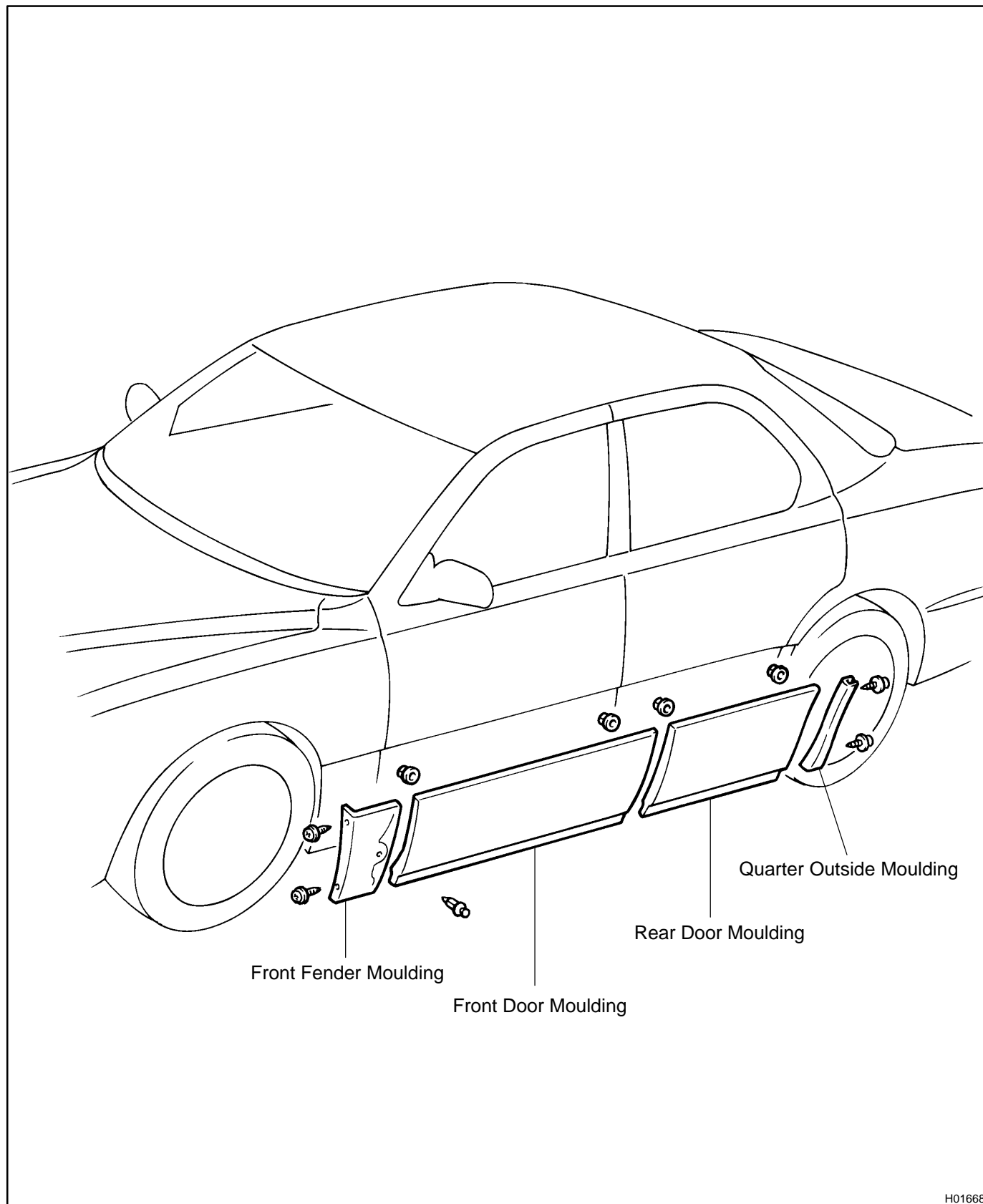
Approx. 25.0 mm (0.984 in.)

- Torque the nuts.

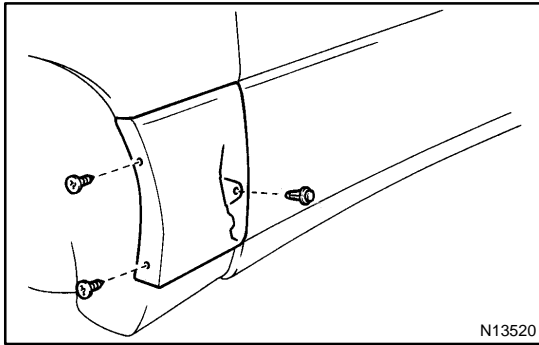
Torque: 22 N·m (225 kgf-cm, 16 ft-lbf)

BODY OUTSIDE MOULDING COMPONENTS

B0000-01



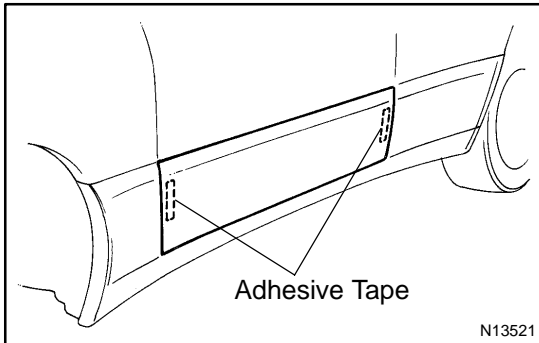
H01668



REMOVAL

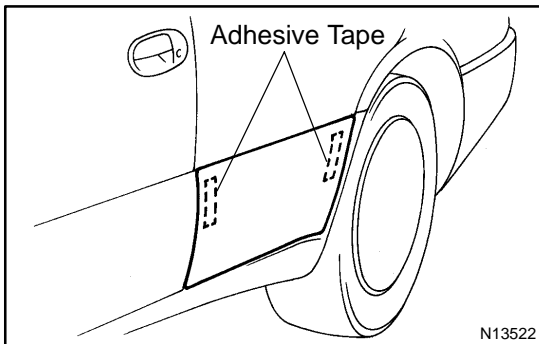
1. REMOVE FRONT FENDER MOULDING

- Using a hexagon wrench, remove the 2 screws.
- Remove the clip.
- Using a moulding remover, pry out the moulding.
- Remove the moulding.



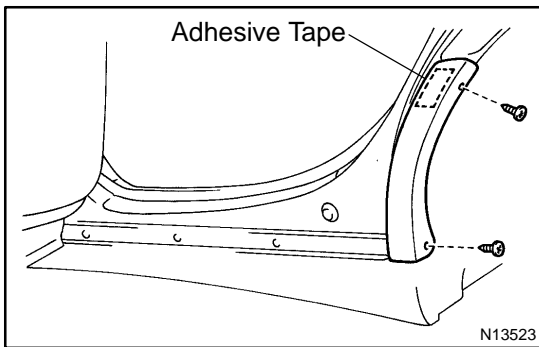
2. REMOVE FRONT DOOR OUTSIDE MOULDING

- Remove the 2 screws and 2 nuts.
- Using a moulding remover, pry out the moulding.
- Pull off the moulding by cutting the adhesive with a knife.
- Remove the moulding.



3. REMOVE REAR DOOR OUTSIDE MOULDING

- Remove the 2 screws and 2 nuts.
- Using a moulding remover, pry out the moulding.
- Pull off the moulding by cutting the adhesive with a knife.
- Remove the moulding.



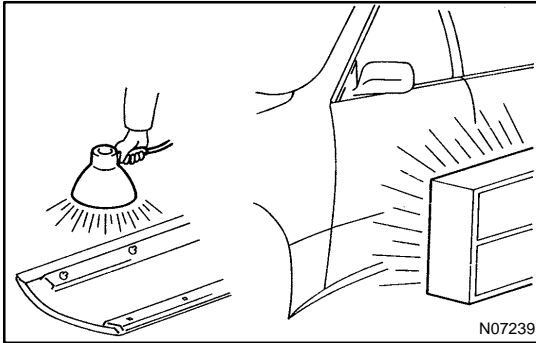
4. REMOVE QUARTER OUTSIDE MOULDING

- Using a hexagon wrench, remove the 2 screws.
- Using a moulding remover, pry out the moulding.

INSTALLATION

1. CLEAN MOULDING MOUNTING SURFACE

Wipe off stains with cleaner.



2. HEAT BODY MOUNTING SURFACE

Using a heat light, heat the body mounting surface to 40–60°C (104–140°F).

NOTICE:

When the moulding is installed, the temperature of the mounting surface should be 20°C (68°F) or higher.

3. HEAT MOULDING

Using a heat light, heat the moulding to 20–30°C (68–86°F).

NOTICE:

Do not heat moulding excessively.

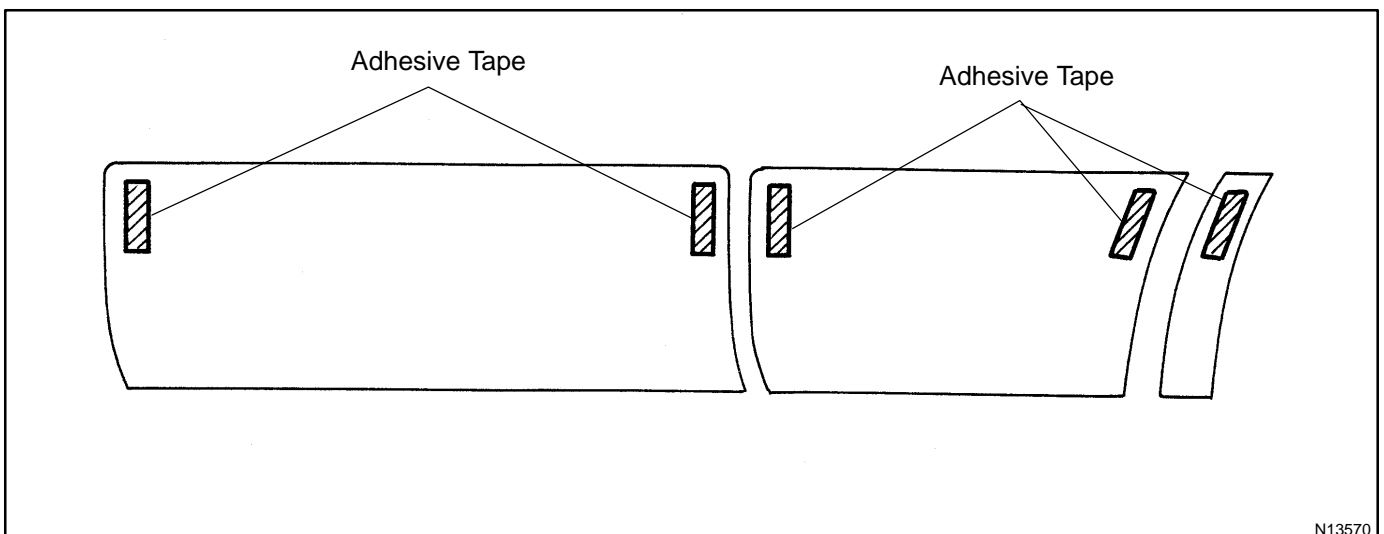
The temperature should not be higher than 80°C (176°F).

4. INSTALL MOULDING

- Align the bolts and the moulding with the body holes, and push the moulding to the body.
- Install the nuts.

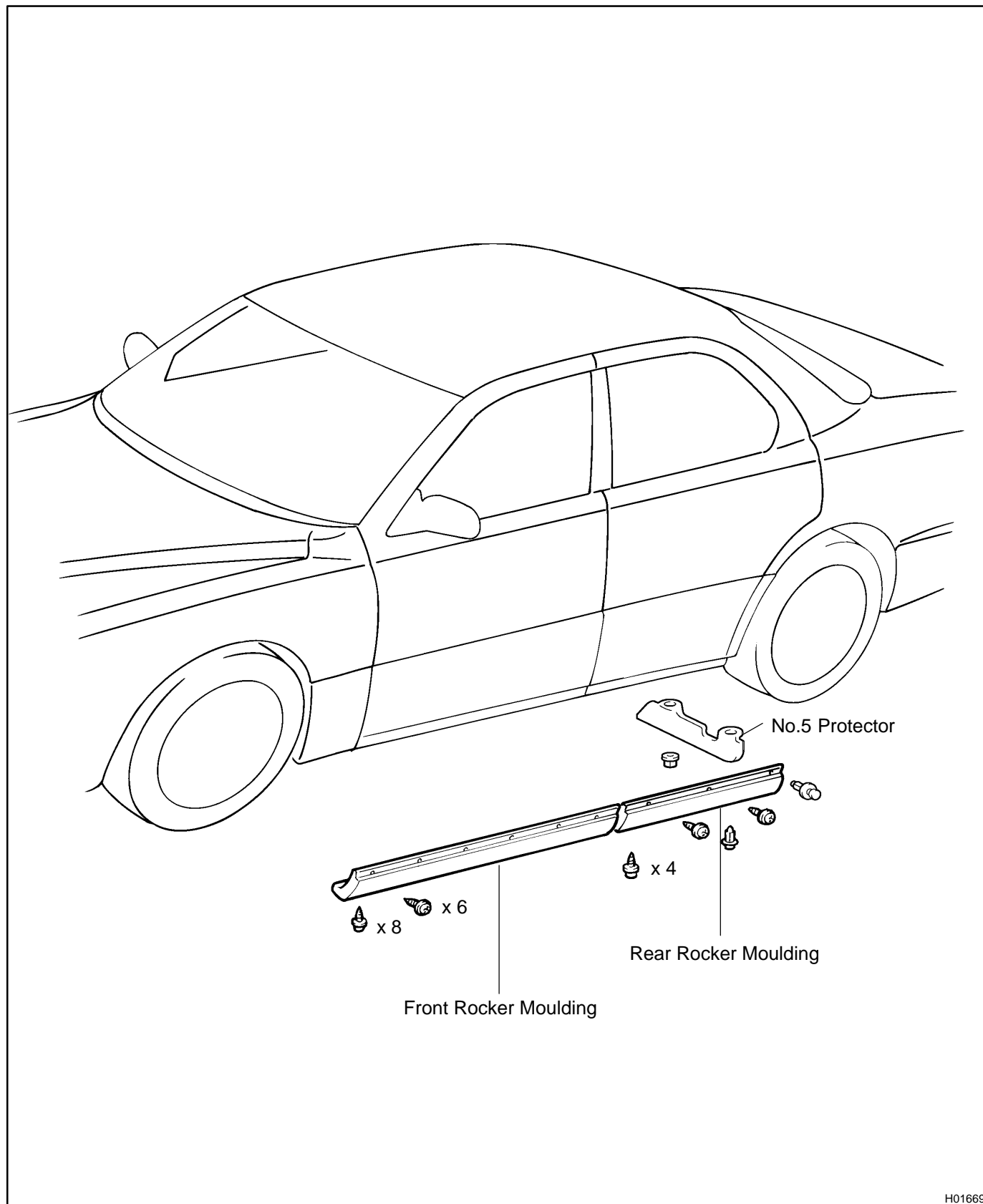
NOTICE:

- Be sure that the body and moulding are heated to the proper temperature.
- Do not depress the adhesive-coated parts excessively, just hold them down with your thumb.
- After installation, do not wash the vehicle for 24 hours.

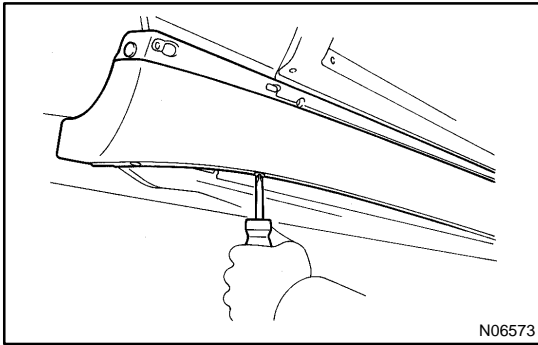


ROCKER PANEL MOULDING COMPONENTS

B00PX-01



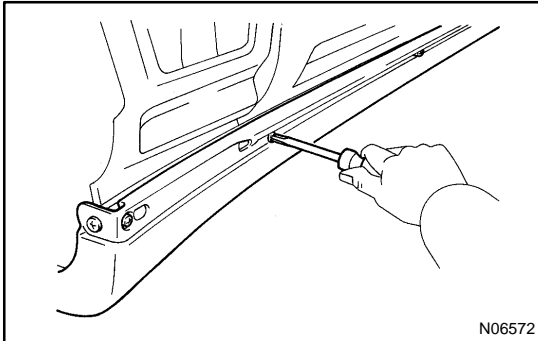
H01669



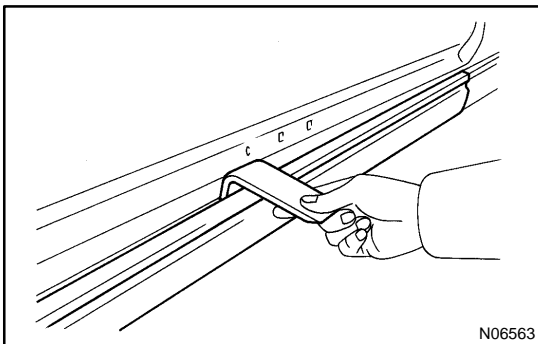
REMOVAL

1. REMOVE FRONT ROCKER PANEL MOULDING

- (a) Remove the 8 clips.

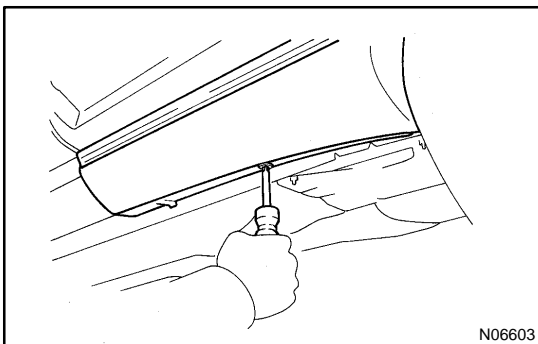


- (b) Remove the 6 screws.



- (c) Remove the moulding remover, pull out the rocker moulding.

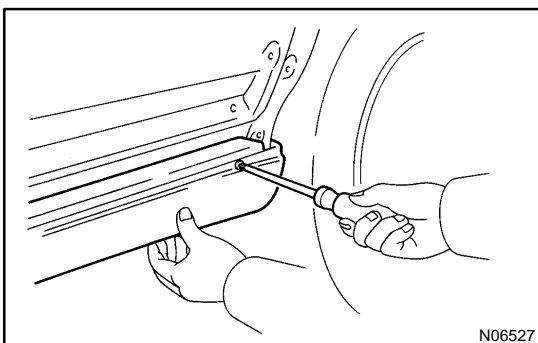
- (d) Remove the front rocker moulding.



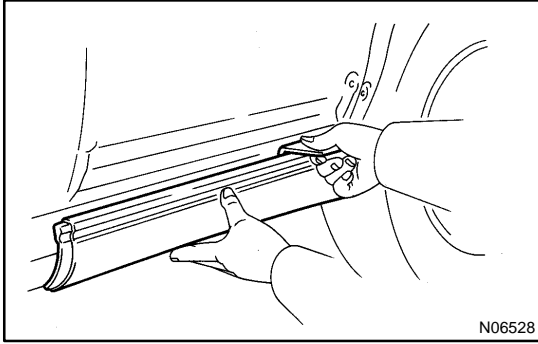
2. REMOVE REAR ROCKER PANEL MOULDING

- (a) Remove the 2 clips and No.5 protector.

- (b) Remove the 4 clips.



- (c) Remove the 2 screws and clip.



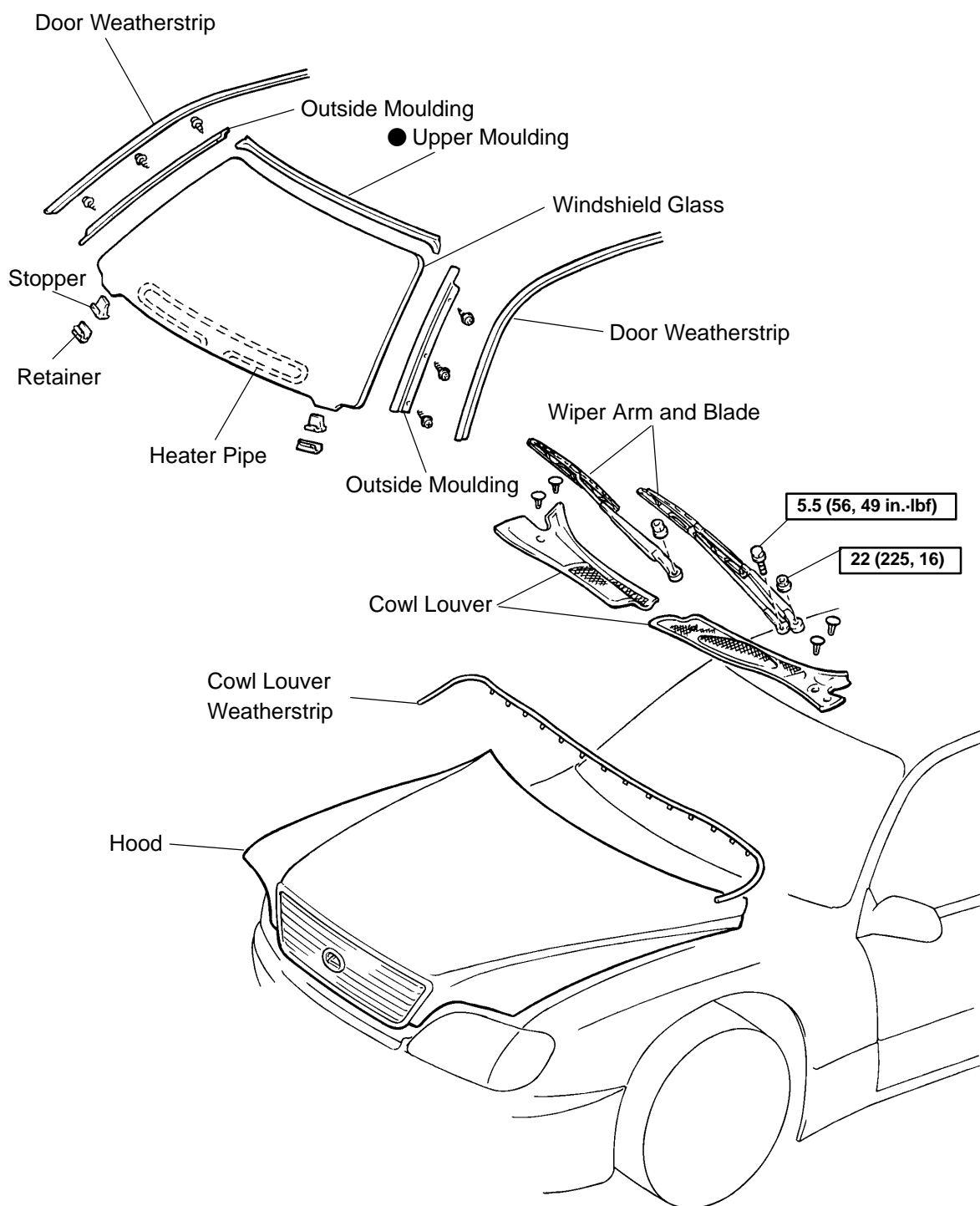
- (d) Remove the moulding remover, pull out the rocker moulding.
- (e) Remove the rear rocker moulding.

INSTALLATION

Installation is in the reverse order of removal (See page [BO-51](#)).

WINDSHIELD COMPONENTS

B000R-01

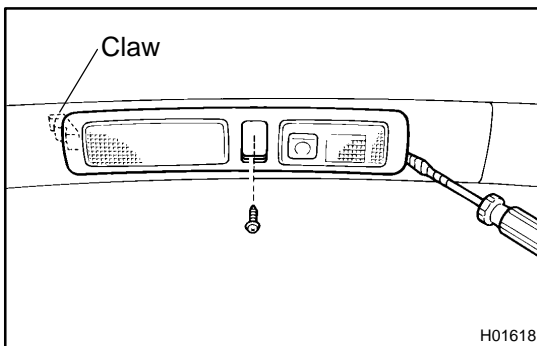
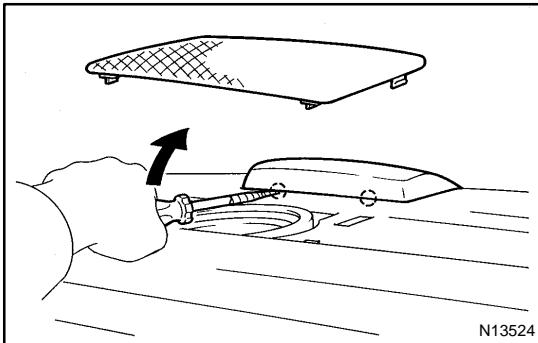


H03119

REMOVAL

1. REMOVE THESE PARTS:

- (a) Front seat
- (b) Rear seat cushion
- (c) Rear seat belt floor anchors
- (d) Rear seatback
- (e) Front door scuff plates
- (f) Rear door scuff plates
- (g) Rear seat side garnishes
- (h) High-mounted stop light
- (i) Speaker grille
- (j) Package tray trim
- (k) Assist grip
- (l) Center pillar garnish



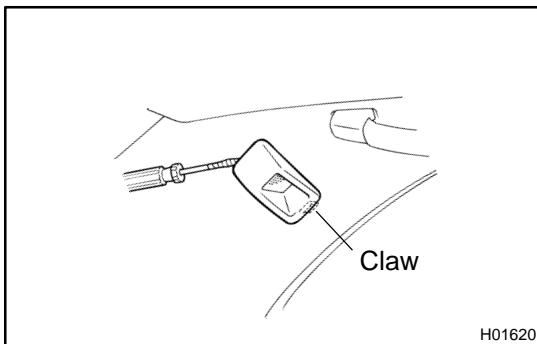
2. REMOVE REAR PERSONAL LIGHT

- (a) Remove the screw.
- (b) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the connector.



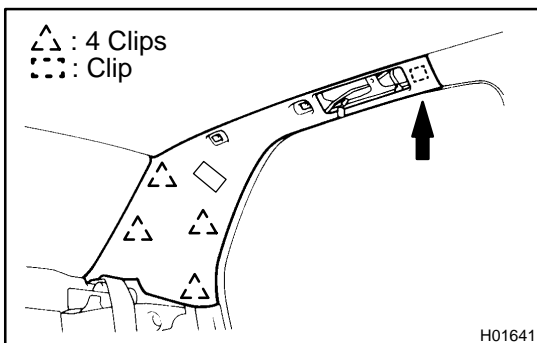
3. REMOVE SPOT LIGHT

- (a) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the connector.

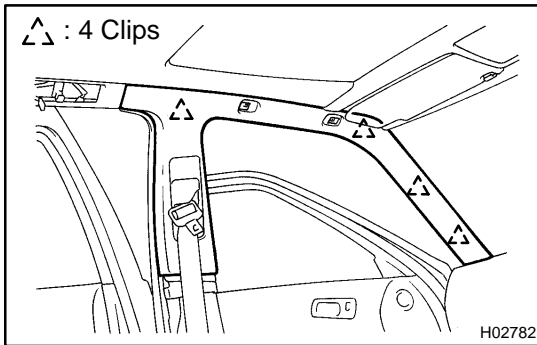


4. REMOVE ROOF SIDE INNER GARNISH

Remove the roof side inner garnish.

NOTICE:

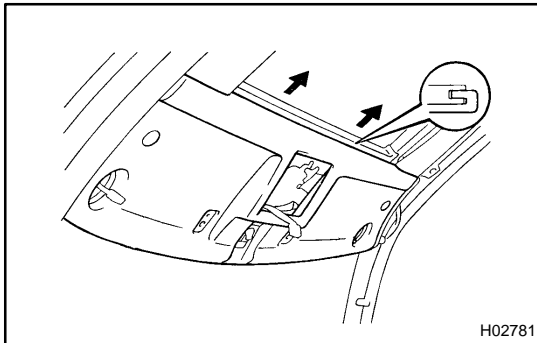
Paying enough attention remove the clip on the roof side inner garnish shown in the illustration. Otherwise, the roof side inner garnish or the front pillar garnish might be broken.

**5. REMOVE FRONT PILLAR GARNISH**

- (a) Remove the front seat outer belt shoulder anchor.
- (b) Remove the front pillar garnish.

6. REMOVE THESE PARTS:

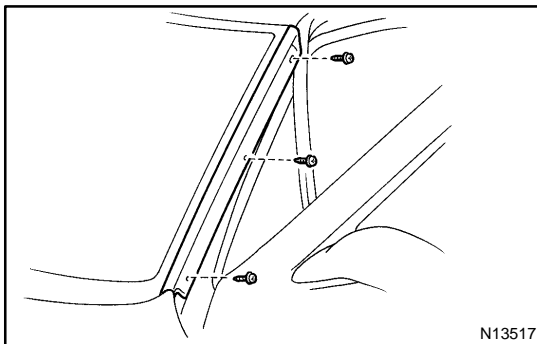
- (a) Sun visors and holders
- (b) Personal light
- (c) Center visor
- (d) Inner rear view mirror

**7. REMOVE FRONT ROOF HEADLINING**

Remove the front roof headlining as shown in the illustration.

8. REMOVE THESE PARTS:

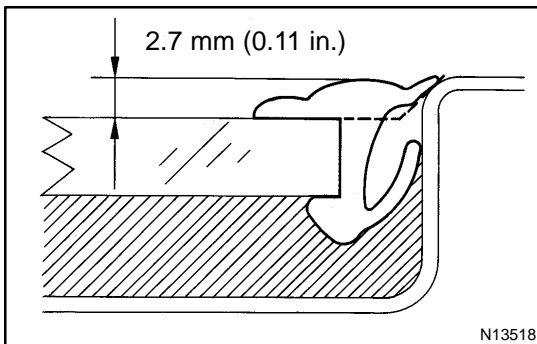
- (a) Hood
- (b) Wiper arms
- (c) Cowl louver weatherstrip
- (d) Cowl louver

**9. REMOVE FRONT DOOR WEATHERSTRIP**

Pull the weatherstrip by hand.

10. REMOVE OUTSIDE MOULDING

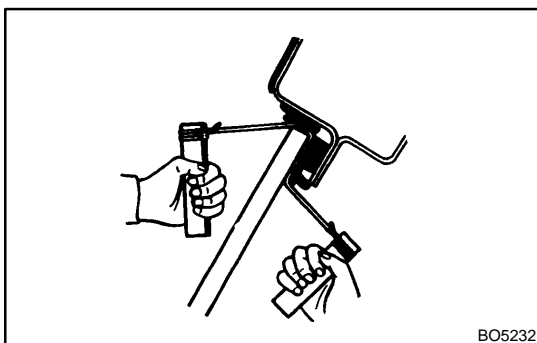
Remove the 3 screws and outside moulding.

**11. REMOVE WINDSHIELD UPPER MOULDING**

Using a knife, cut off the moulding as shown.

NOTICE:

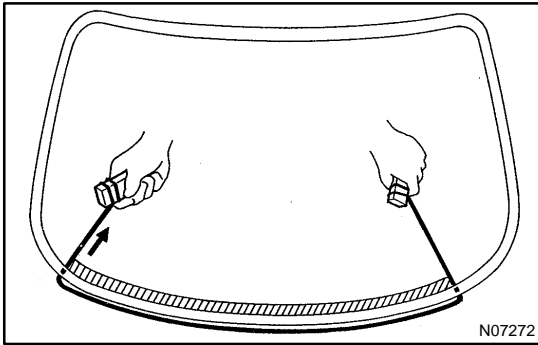
Do not damage the body with the knife.

**12. REMOVE WINDSHIELD GLASS**

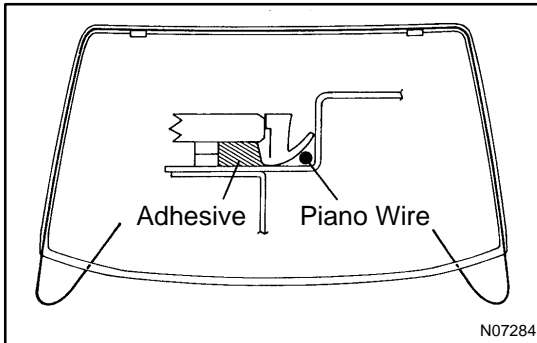
- (a) Push piano wire through between the body and glass from the interior.
- (b) Tie both wire ends to a wooden block or like object.

HINT:

Apply adhesive tape to the outer surface to keep the surface from being scratched.

**NOTICE:**

- When separating the glass, take care not to damage the paint, interior and exterior ornaments.
- To prevent scratching the instrument panel when removing the windshield, place a plastic sheet between the piano wire and instrument panel.

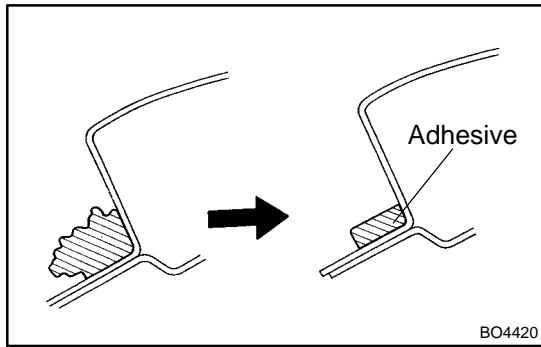


(c) Cut the adhesive by pulling the piano wire around it.

(d) Remove the glass.

NOTICE:

Leave as much of the adhesive on the body as possible when cutting off the glass.



INSTALLATION

- 1. CLEAN AND SHAPE CONTACT SURFACE OF BODY**
 - (a) Using a knife, cut away any rough areas on the body.

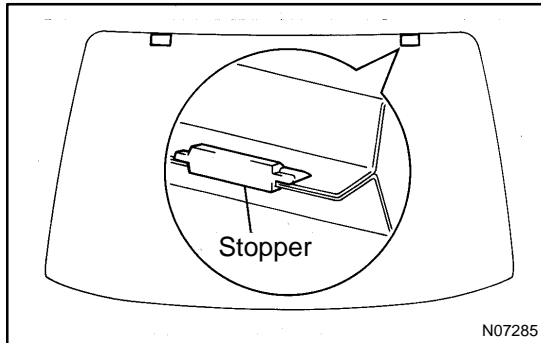
HINT:

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 a cleaner fluid.

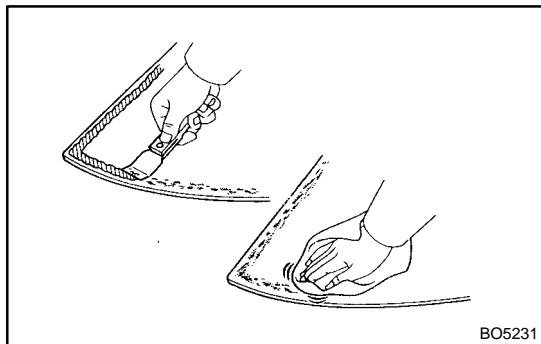
HINT:

Even if all the adhesive has been removed, clean the body.



- 2. IF NECESSARY, REPLACE STOPPER**

- (a) Using a knife, remove the stoppers.
- (b) Install new stopper.

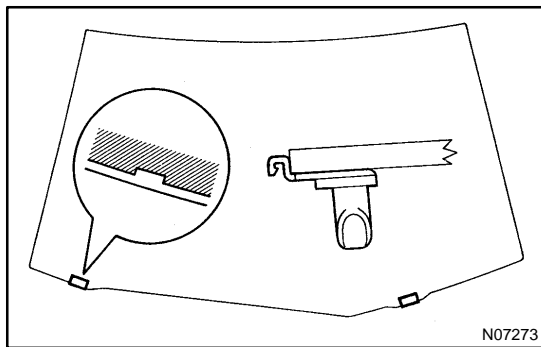


- 3. CLEAN REMOVED GLASS**

- (a) Using a scraper, remove the adhesive sticking to the glass.
- (b) Clean the glass with cleaner fluid.

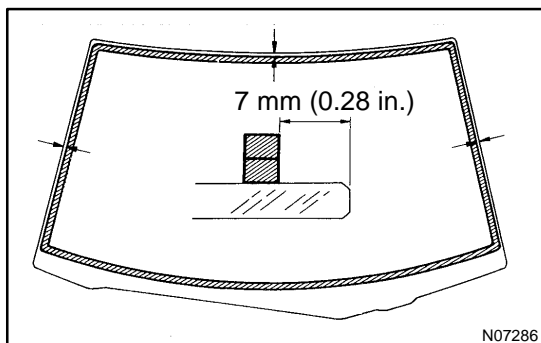
NOTICE:

Do not touch the glass surface after cleaning it.



- 4. IF NECESSARY, REPLACE RETAINER**

- (a) Using a knife, remove the retainer.
- (b) Install new retainer.

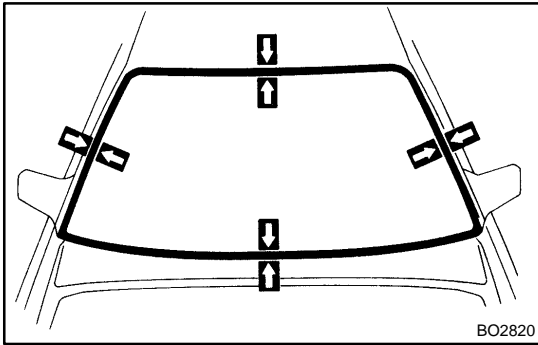


- 5. INSTALL DAM**

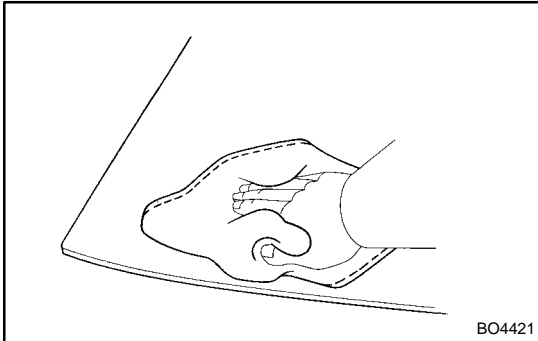
Install the dam with double-stick tape as shown in the illustration.

NOTICE:

Do not touch the glass surface after cleaning it.

**6. POSITION GLASS**

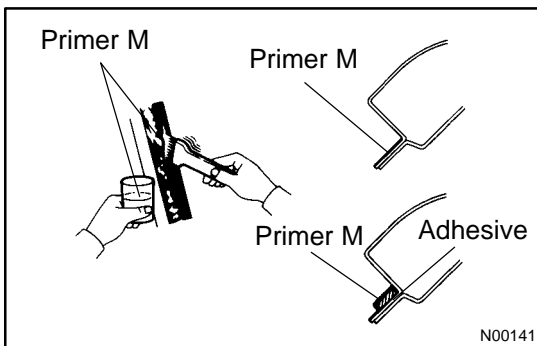
- (a) Place glass in correct position.
- (b) Place reference marks between the glass and body.
- (c) Remove the glass.

**7. CLEAN CONTACT SURFACE OF GLASS**

Using a cleaner, clean the contact surface which is black colored area around the entire glass rim.

NOTICE:

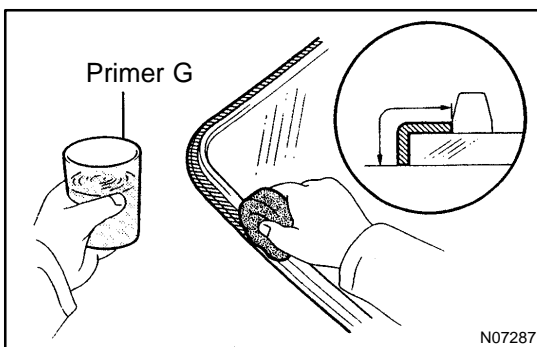
Do not touch the glass surface after cleaning it.

**8. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"**

Using a brush, coat the contact surface on the body with primer M.

NOTICE:

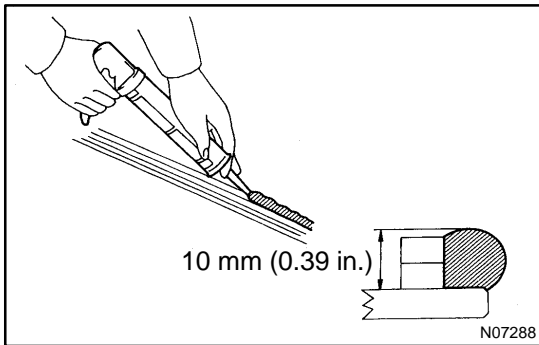
- Let the primer coating dry for 3 minutes or more.
- Do not coat the adhesive.
- Do not keep any of the opened Primer M for later use.

**9. 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 coat the adhesive.
- Do not keep any of the opened Primer G for later use.



10. APPLY ADHESIVE

- (a) Cut off the tip of the cartridge nozzle.

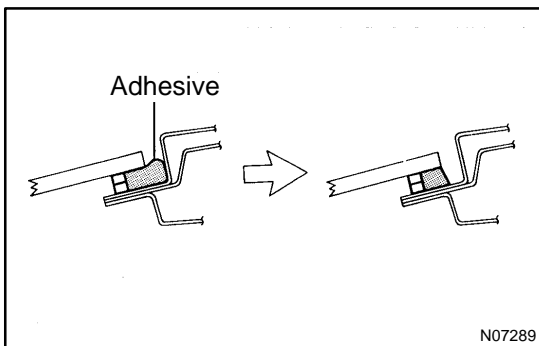
Part No. 08850-00801 or equivalent

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 minute
20 °C (68 °F)	100 minute
5 °C (41 °F)	8 hour

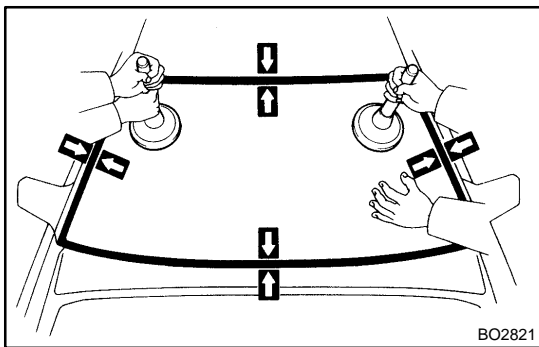
- (b) Load the cartridge into the sealer gun.
(c) Coat the glass with adhesive as shown.



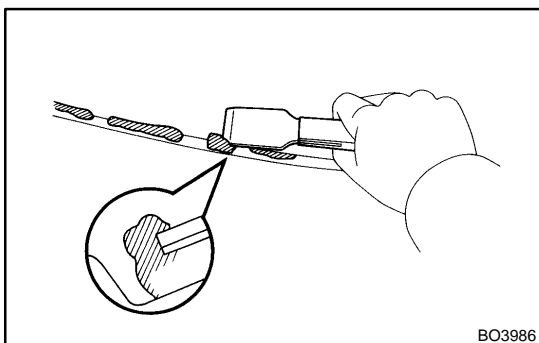
11. INSTALL GLASS

HINT:

Check that the dam is attached to the body panel as shown in the drawing.



- (a) Position the glass so that the reference marks are lined up, and press in gently along the rim.
(b) Using a spatula, apply adhesive on the glass rim.



- (c) Use a scraper to remove any excessive or protruding adhesive.
(d) Hold the glass in place securely with a protective tape or equivalent until the adhesive hardened.

NOTICE:

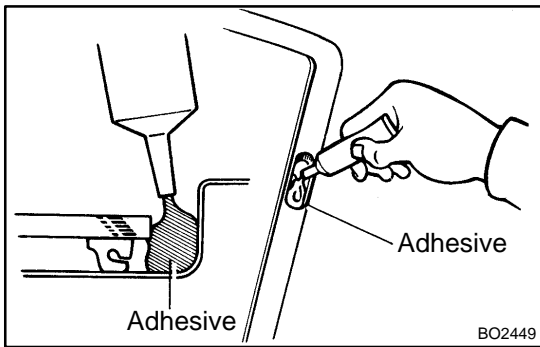
Take care not to drive the vehicle during the time described in the table below.

Temperature	Minimum time prior to drive the vehicle
35 °C (95 °F)	1.5 hour
20 °C (68 °F)	5 hour
5 °C (41 °F)	24 hour

12. INSPECT FOR LEAK AND REPAIR

- (a) Perform a leak test after the hardening time has elapsed.
- (b) Seal any leak with sealant.

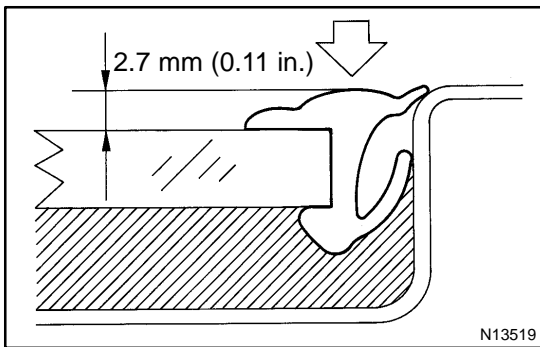
Part No. 08833-00030 or equivalent



13. APPLY ADHESIVE AT WINDSHIELD UPPER MOULD-ING INSTALLATION AREA

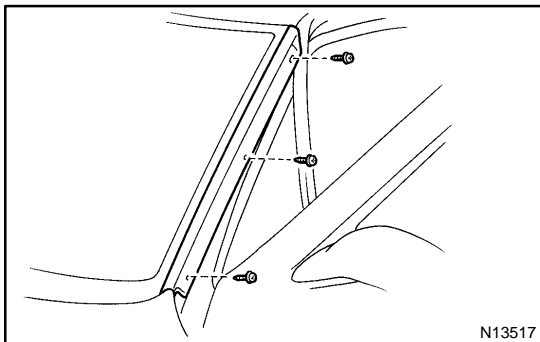
Coat the glass with adhesive at the moulding installation area.

Part No. 08833-00030 or equivalent



14. INSTALL WINDSHIELD UPPER MOULDING

Place the moulding onto the body and tap it by hand.



15. INSTALL OUTSIDE MOULDING

Install the 3 screws and outside moulding.

16. INSTALL FRONT DOOR WEATHERSTRIP

17. INSTALL THESE PARTS:

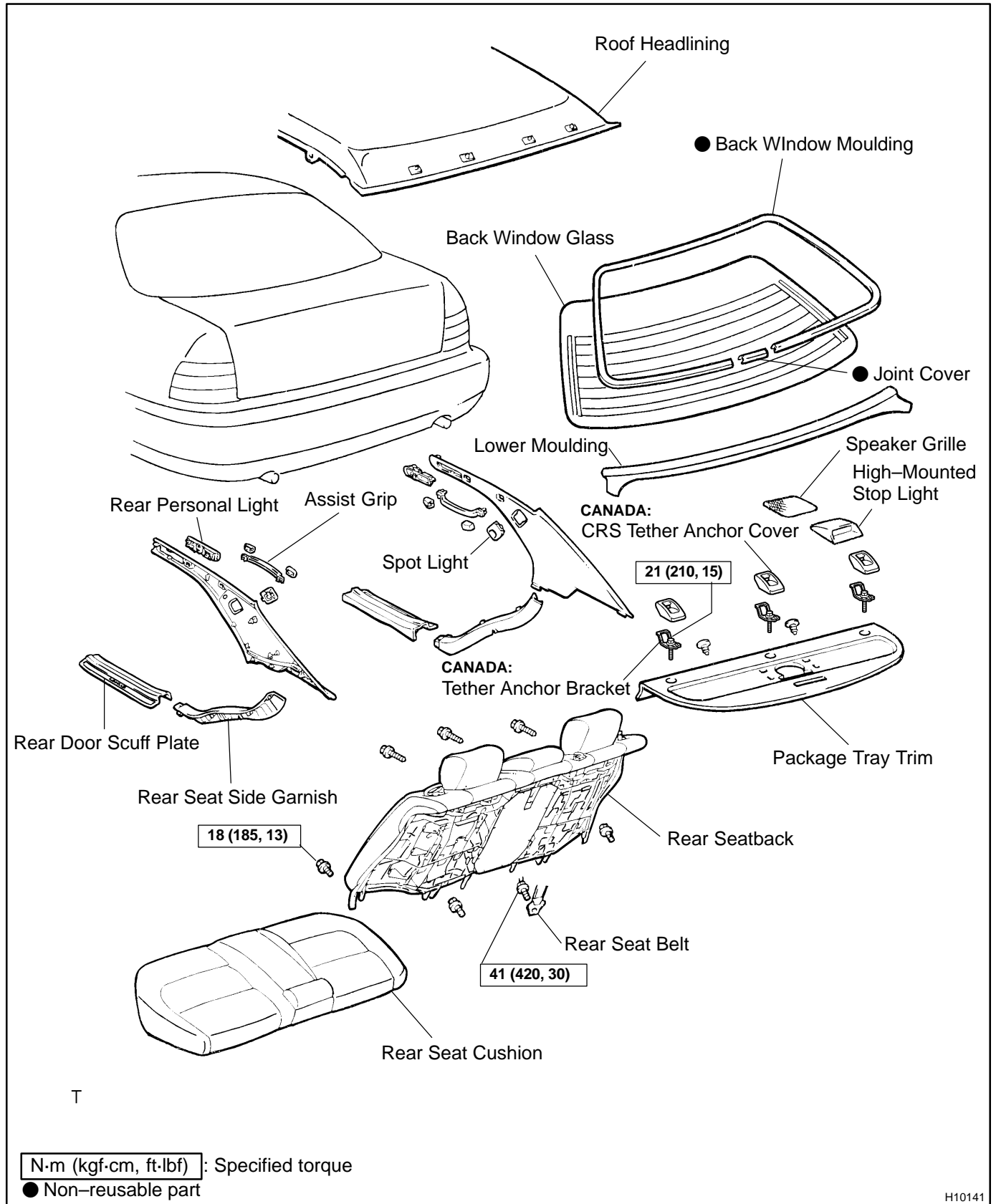
- (a) Cowl louver
- (b) Cowl louver weatherstrip
- (c) Wiper arms

Torque:**Bolt: 5.5 N·m (56 kgf-cm, 49 in.-lbf)****Nut: 22 N·m (225 kgf-cm, 16 ft-lbf)**

- (d) Hood
 - (e) Front roof headlining
 - (f) Inner rear view mirror
 - (g) Center visor
 - (h) Personal light
 - (i) Sun visors and holders
 - (j) Front pillar garnishes
 - (k) Front seat outer belt shoulder anchors
- Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)**
- (l) Roof side inner garnishes
 - (m) Rear spot light
 - (n) Rear personal light
 - (o) Center pillar garnishes
 - (p) Assist grips
 - (q) Package tray trim
 - (r) Speaker grille
 - (s) High-mounted stop light
 - (t) Rear seat side garnishes
 - (u) Rear door scuff plates
 - (v) Front door scuff plates
 - (w) Rear seatback
- Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)**
- (x) Rear seat belt floor anchor
- Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)**
- (y) Rear seat cushion
 - (z) Front seat
- Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)**

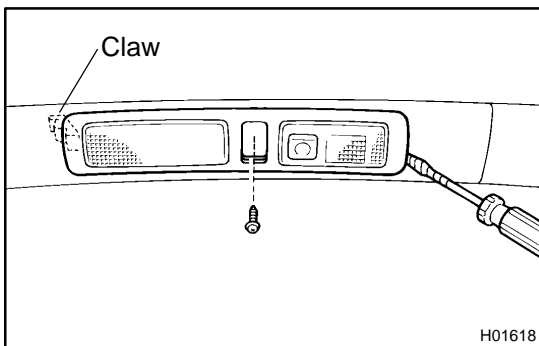
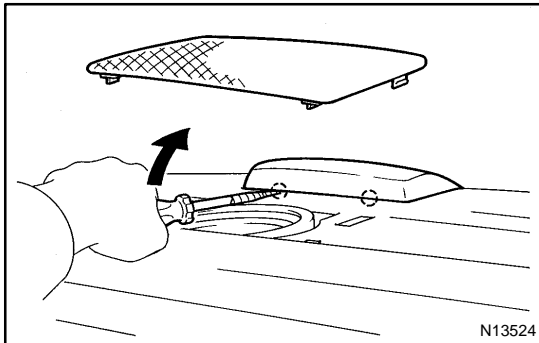
BACK WINDOW GLASS COMPONENTS

BO00U-02



REMOVAL

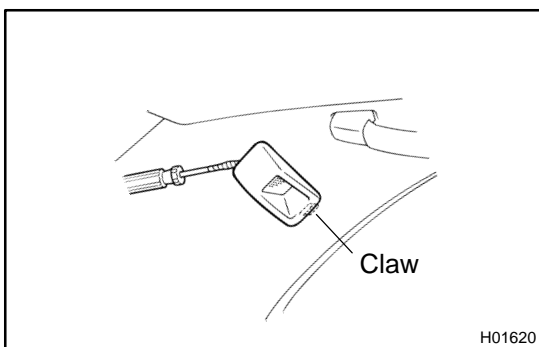
1. REMOVE REAR SEAT CUSHION
2. REMOVE REAR SEAT BELT FLOOR ANCHORS
3. REMOVE REAR SEATBACK
4. REMOVE REAR DOOR SCUFF PLATE
5. REMOVE REAR SEAT SIDE GARNISHES
6. REMOVE SPEAKER GRILLE
7. REMOVE HIGH-MOUNTED STOP LIGHT
8. CANADA:
REMOVE CRS TETHER ANCHOR COVERS AND TETHER ANCHOR BRACKETS
9. REMOVE PACKAGE TRAY TRIM
10. REMOVE ASSIST GRIPS



11. REMOVE REAR PERSONAL LIGHT
 - (a) Remove the screw.
 - (b) Using a screwdriver, remove the light as shown in the illustration.

HINT:
Tape the screwdriver tip before use.

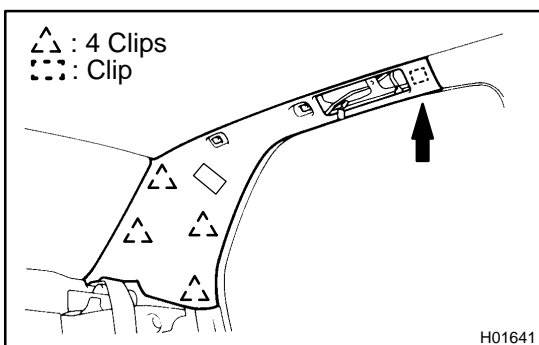
 - (c) Disconnect the connector.
 - (d) Employ the same manner described above to the other side.



12. REMOVE SPOT LIGHT
 - (a) Using a screwdriver, remove the light as shown in the illustration.

HINT:
Tape the screwdriver tip before use.

 - (b) Disconnect the connector.
 - (c) Employ the same manner described above to the other side.



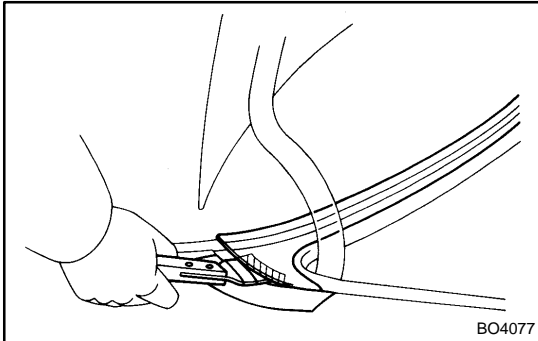
13. REMOVE ROOF SIDE INNER GARNISH
 - (a) Remove the roof side inner garnish.

NOTICE:
Paying enough attention remove the clip on the roof side inner garnish shown in the illustration. Otherwise, the roof side inner garnish or the front pillar garnish might be broken.

 - (b) Employ the same manner described above to the other side.

14. REMOVE ROOF HEADLINING

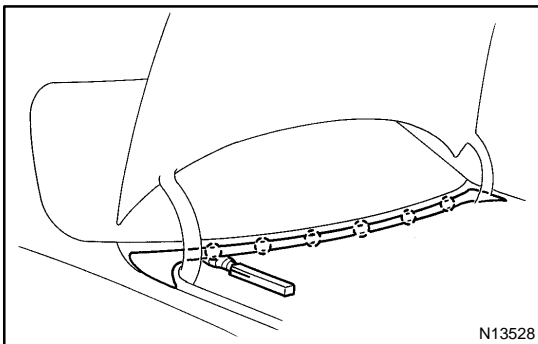
Remove the rear side of roof headlining.

**15. REMOVE LOWER MOULDING**

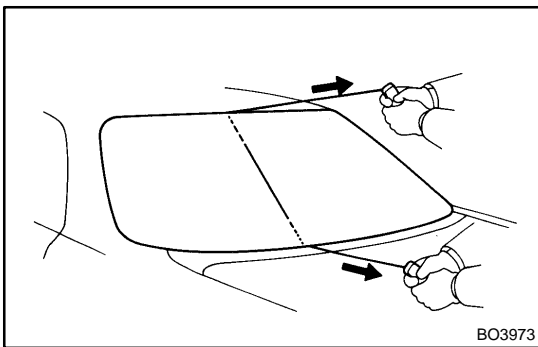
- (a) Using a scraper, cut loose the double-sided tape on both sides of the moulding as shown.

HINT:

Tape the scraper tip before use.



- (b) Using a scraper, pry off the moulding from the 6 clips and remove the moulding.

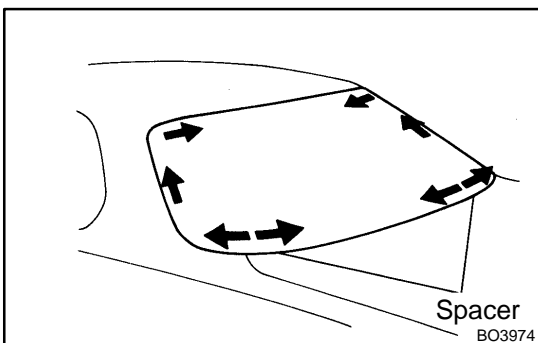
**16. REMOVE BACK WINDOW GLASS**

- (a) Disconnect the connectors.
 (b) Push the piano wire through between the body and glass from the interior.
 (c) Tie both wire ends to a wooden block.

HINT:

Apply adhesive tape to the outer surface to keep the surface from being scratched.

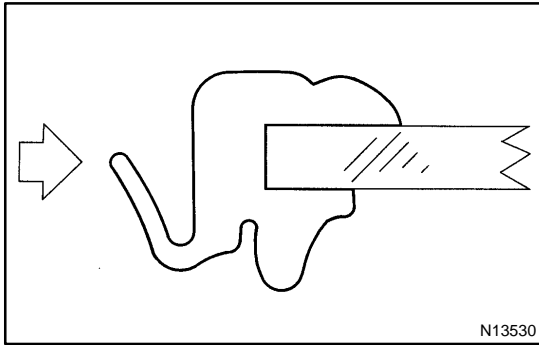
- (d) Cut the adhesive by pulling the piano wire around it.

**NOTICE:**

Do not damage the 2 spacers with the wire.

- (e) Remove the glass.

17. REMOVE BACK WINDOW MOULDING



INSTALLATION

HINT:

Refer to the installation of windshield, install back window glass by the following operations (See page [BO-58](#)).

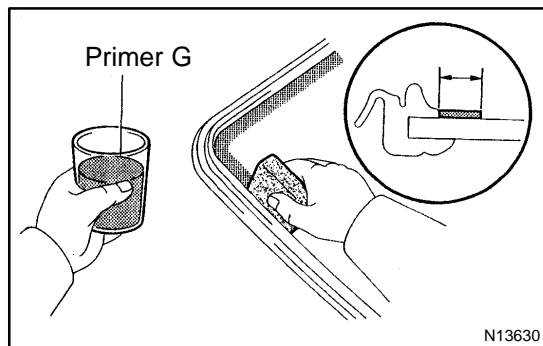
1. INSTALL BACK WINDOW MOULDING

Place the moulding around and install it by hand.

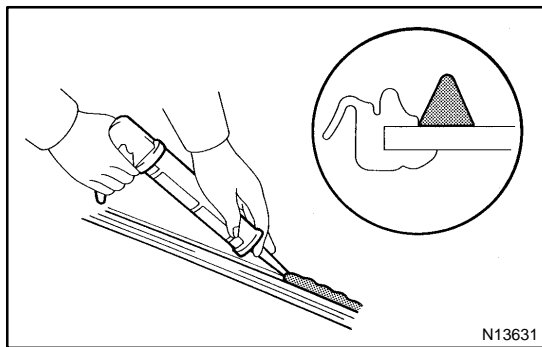
HINT:

Always remove the back window glass to install the moulding.

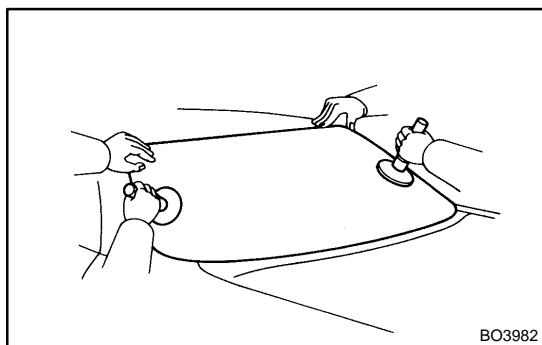
2. CLEAN AND SHAPE CONTACT SURFACE OF BODY
3. REPLACE STOPPER
4. CLEAN REMOVED GLASS
5. POSITION GLASS
6. CLEAN CONTACT SURFACE OF GLASS
7. COAT CONTACT SURFACE OF BODY WITH PRIMER
"M"



8. COAT CONTACT SURFACE OF GLASS WITH PRIMER
"G"

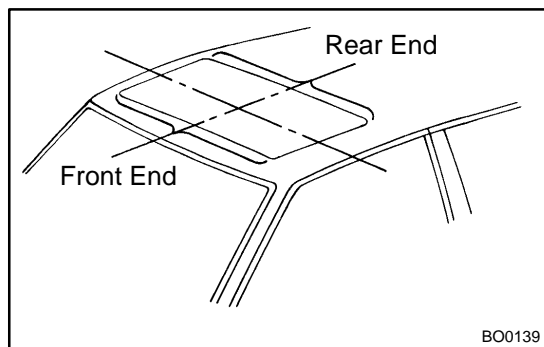


9. APPLY ADHESIVE



10. INSTALL GLASS
 11. INSPECT FOR LEAK AND REPAIR
 12. INSTALL BACK WINDOW OUTSIDE LOWER MouldING
- Place the moulding onto the body and tap it by hand.
13. CONNECT DEFOGGER WIRE CONNECTORS

14. **INSTALL ROOF HEADLINING**
15. **INSTALL ROOF SIDE INNER GARNISHES**
16. **INSTALL SPOT LIGHTS**
17. **INSTALL REAR PERSONAL LIGHTS**
18. **INSTALL ASSIST GRIPS**
19. **INSTALL PACKAGE TRAY TRIM**
20. **CANADA:**
INSTALL CRS TETHER ANCHOR COVERS AND
TETHER ANCHOR BRACKETS
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)
21. **INSTALL HIGH-MOUNTED STOP LIGHT**
22. **INSTALL SPEAKER GRILLE**
23. **INSTALL REAR SEAT SIDE GARNISHES**
24. **INSTALL REAR DOOR SCUFF PLATES**
25. **INSTALL REAR SEATBACK**
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
26. **INSTALL REAR SEAT BELT FLOOR ANCHORS**
Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)
27. **INSTALL REAR SEAT CUSHION**



SLIDING ROOF ON-VEHICLE INSPECTION

B000X-01

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:

$-0.5 \pm 1.5 \text{ mm } (-0.020 \pm 0.059 \text{ in.})$

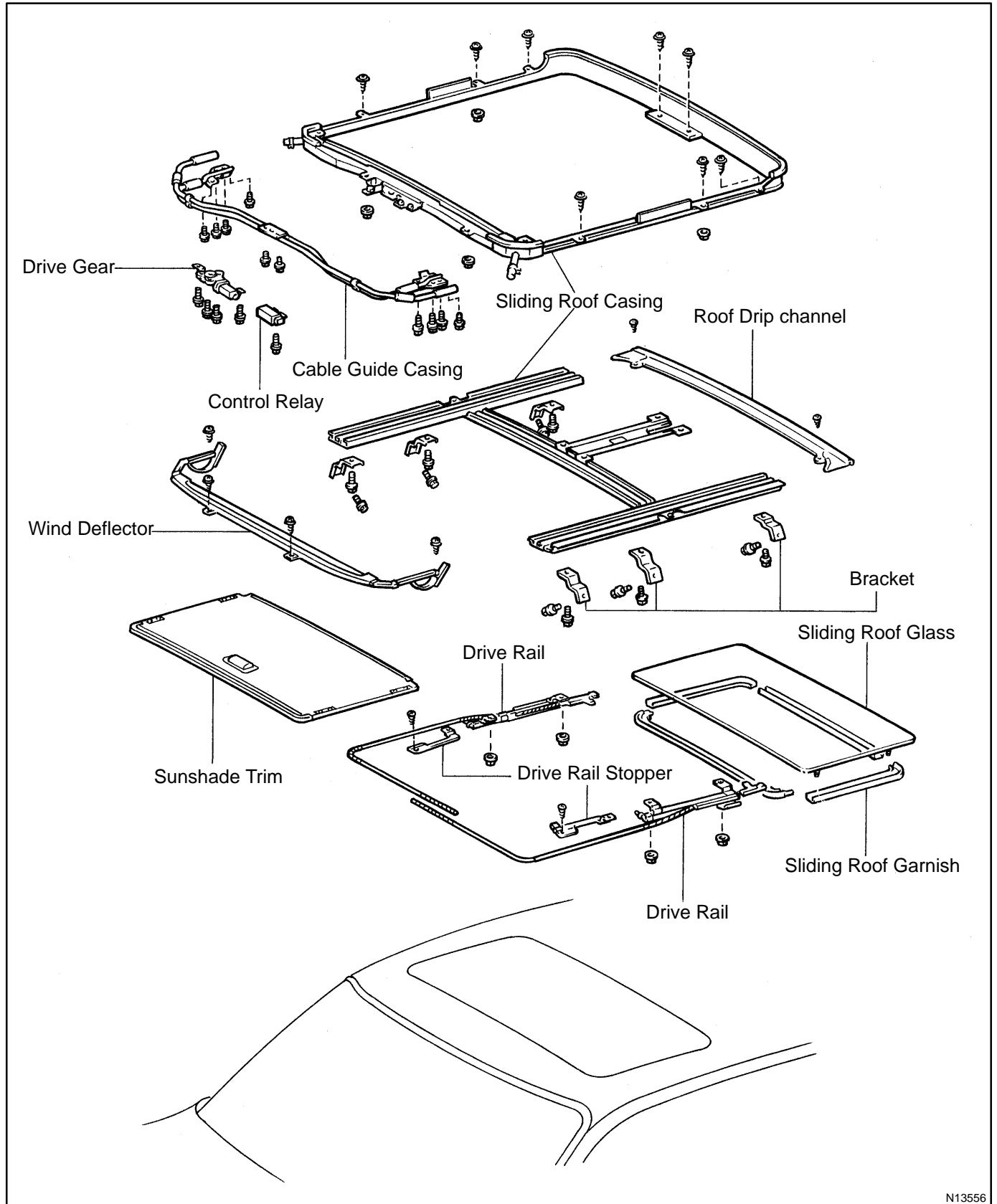
Center Line:

$0 \pm 1.5 \text{ mm } (0 \pm 0.059 \text{ in.})$

Rear End:

$0.5 \pm 1.5 \text{ mm } (0.020 \pm 0.059 \text{ in.})$

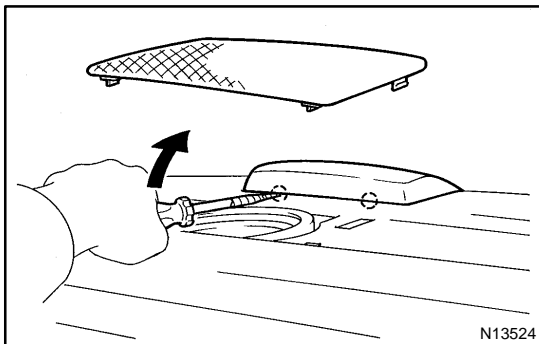
COMPONENTS



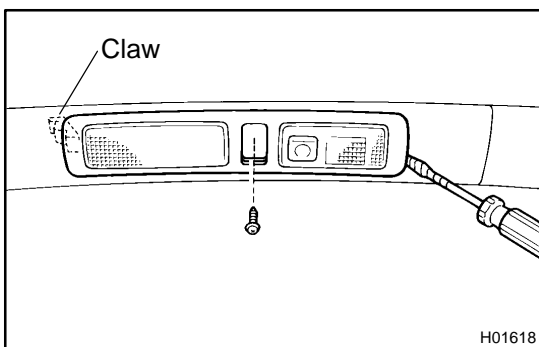
N13556

REMOVAL

1. REMOVE FRONT SEAT
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)
2. REMOVE REAR SEAT CUSHION
3. REMOVE REAR SEAT BELT FLOOR ANCHORS
Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)
4. REMOVE REAR SEATBACK
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
5. REMOVE FRONT DOOR SCUFF PLATES
6. REMOVE REAR DOOR SCUFF PLATES
7. REMOVE REAR SEAT SIDE GARNISHES



8. REMOVE HIGH-MOUNTED STOP LIGHT
9. REMOVE SPEAKER GRILLE
10. CANADA:
REMOVE CRS TETHER ANCHOR COVERS AND
TETHER ANCHOR BRACKETS
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)
11. REMOVE PACKAGE TRAY TRIM
12. REMOVE ASSIST GRIPS
13. REMOVE CENTER PILLAR GARNISHES

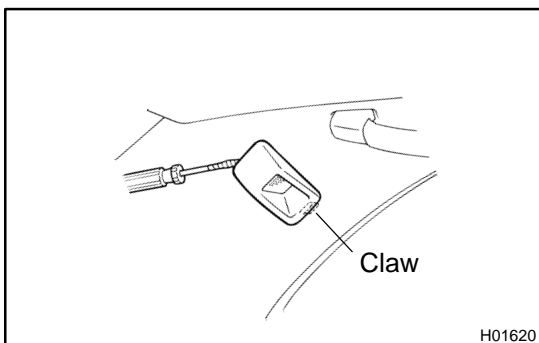


14. REMOVE REAR PERSONAL LIGHT
 - (a) Remove the screw.
 - (b) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the connector.
- (d) Employ the same manner described above to the other side.



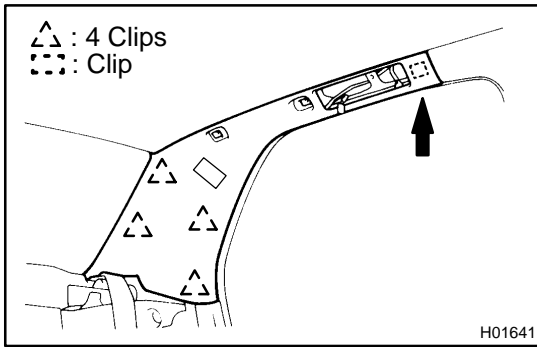
15. REMOVE SPOT LIGHT

- (a) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the connector.
- (c) Employ the same manner described above to the other side.

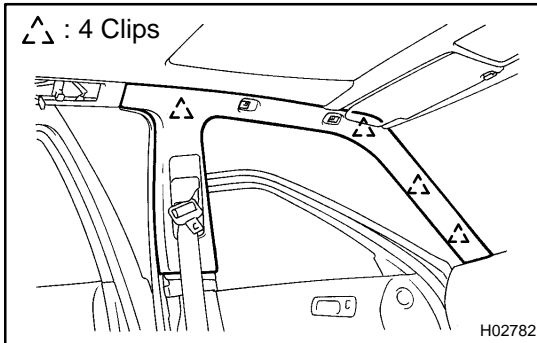
**16. REMOVE ROOF SIDE INNER GARNISH**

- (a) Remove the roof side inner garnish.

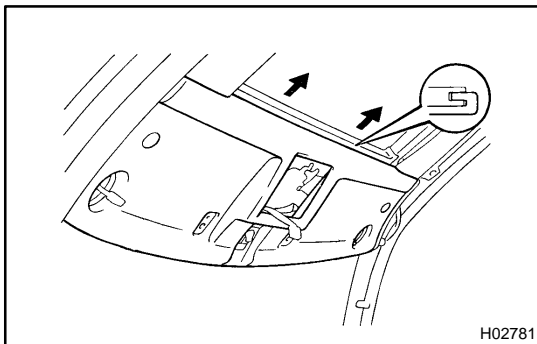
NOTICE:

Paying enough attention remove the clip on the roof side inner garnish shown in the illustration. Otherwise, the roof side inner garnish or the front pillar garnish might be broken.

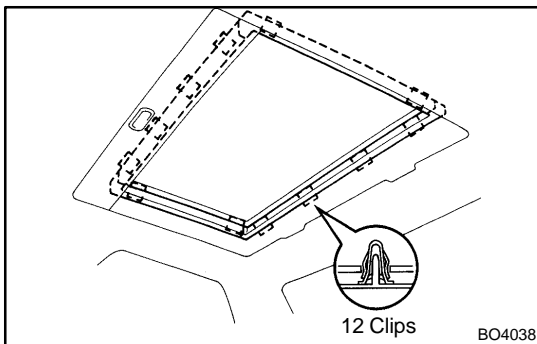
- (b) Employ the same manner described above to the other side.

**17. REMOVE FRONT PILLAR GARNISH**

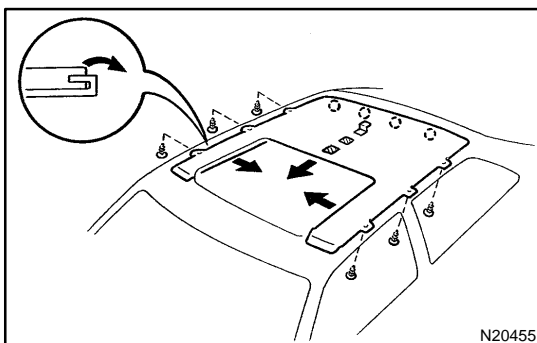
- (a) Remove the front seat outer belt shoulder anchor.
(b) Remove the front pillar garnish.
(c) Employ the same manner described above to the other side.

18. REMOVE SUN VISORS AND HOLDERS**19. REMOVE PERSONAL LIGHT****20. REMOVE CENTER VISOR****21. REMOVE INNER REAR VIEW MIRROR****22. REMOVE FRONT ROOF HEADLINING**

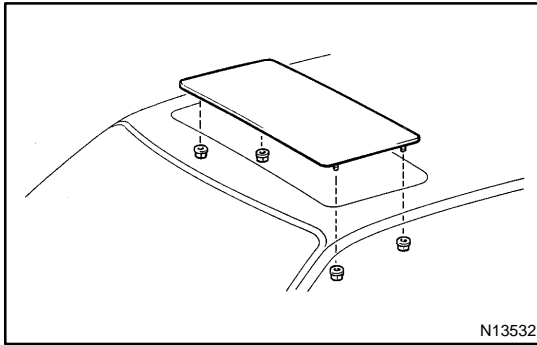
Remove the front roof headlining as shown in the illustration.

**23. REMOVE SLIDING ROOF GARNISH****HINT:**

- Do not scratch the glass or garnish with the screwdriver.
 - Tape a screwdriver tip before use.
- (a) Using the screwdriver, remove 4 sliding roof garnishes.

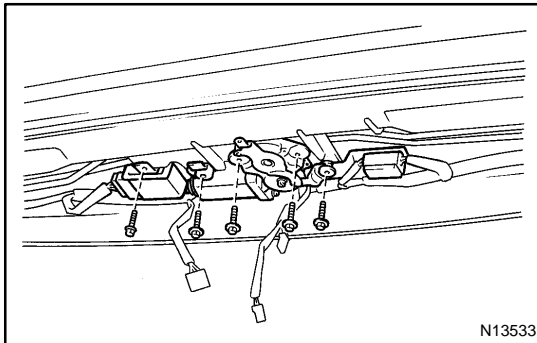


- (b) Remove the roof headlining.



24. REMOVE SLIDING ROOF GLASS

- (a) Remove the 4 nuts.
- (b) Pull the glass upward to remove it.

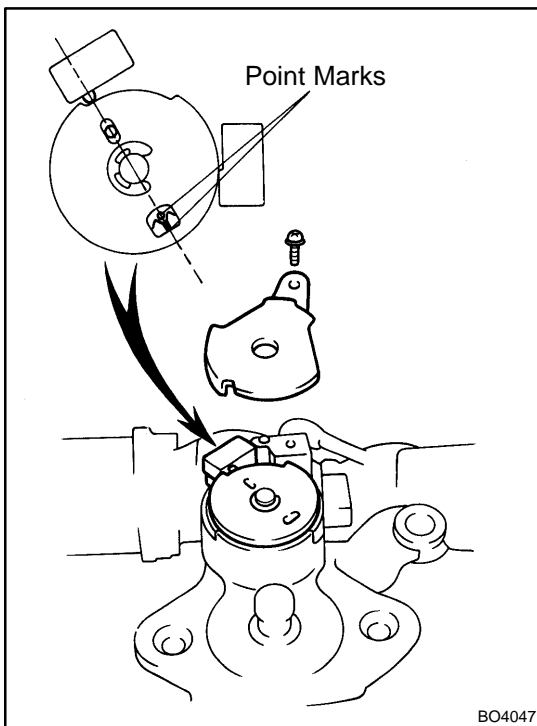


25. REMOVE SLIDING ROOF CONTROL RELAY AND DRIVE GEAR ASSEMBLY

NOTICE:

Remove the drive gear with the sliding roof full closed.

- (a) Disconnect the connectors.
- (b) Remove the bolt and relay.
- (c) Remove the 4 bolts and drive gear assembly.



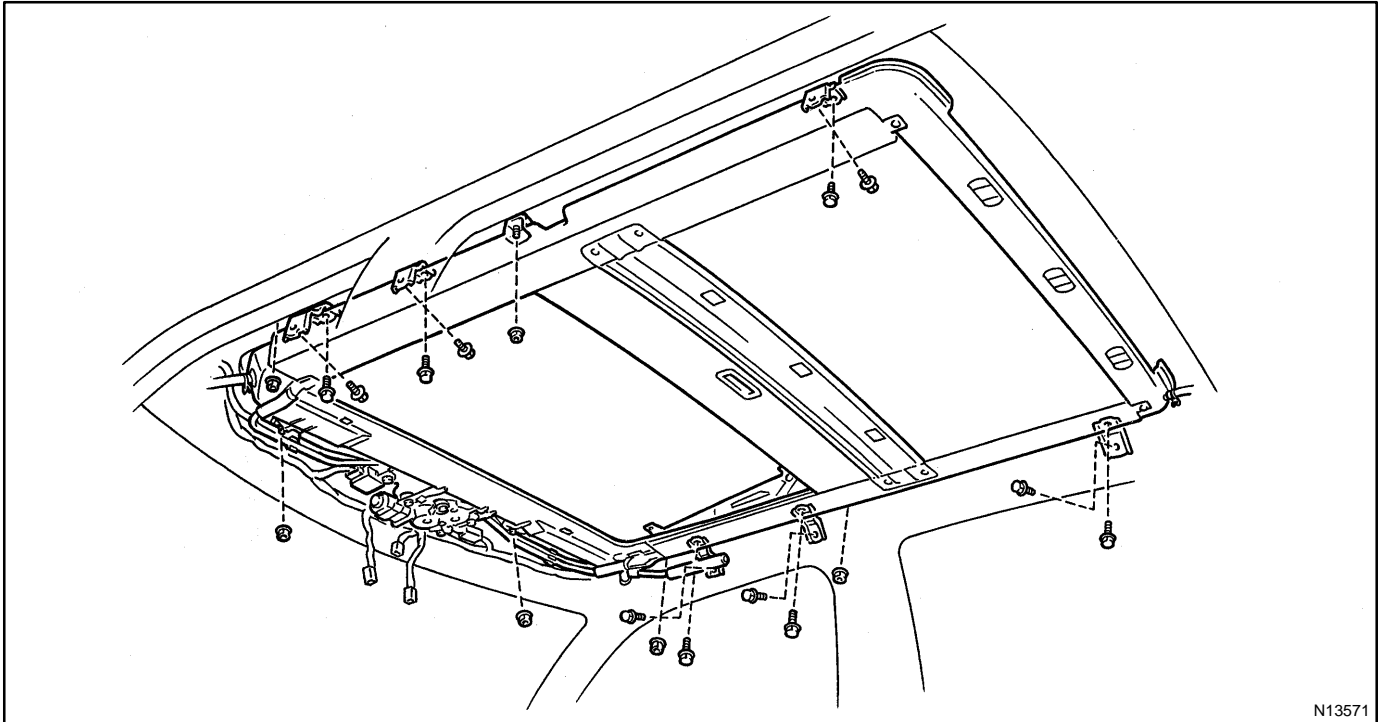
- (d) Remove the screw and cam plate cover.
- (e) Turn the drive shaft with a screwdriver to align the housing and gear point marks as shown.
- (f) Install the cam plate cover and screw.

NOTICE:

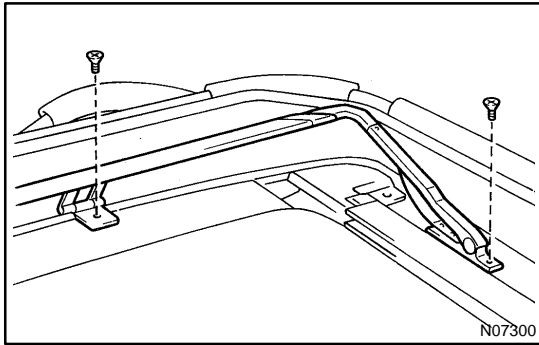
At the time of installation, please refer to the following item. If the sliding roof position and drive gear assembly full close position are not matched, the sliding roof does not operate normally.

26. REMOVE SLIDING ROOF HOUSING

- (a) Disconnect the 4 drain hoses from the housing.
- (b) Remove the 12 bolts and bracket.
- (c) Remove the 6 nuts, then remove the housing.



N13571



DISASSEMBLY

1. REMOVE WIND DEFLECTOR

- (a) Using a screwdriver, slide the drive rail backward.

HINT:

Tape the screwdriver tip before use.

B00P0-01

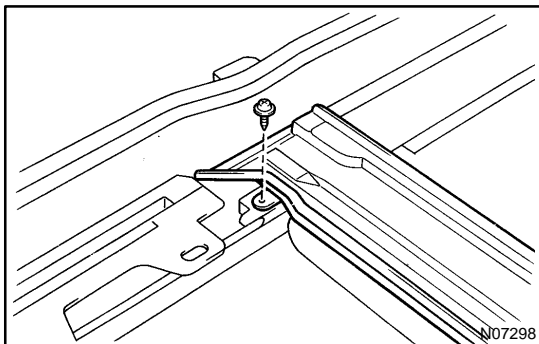
- (b) Remove the 4 screws and deflector.

2. REMOVE CABLE GUIDE CASING

- (a) Remove the 10 bolts from the cable guide casing.

- (b) Slide the drive rail forward.

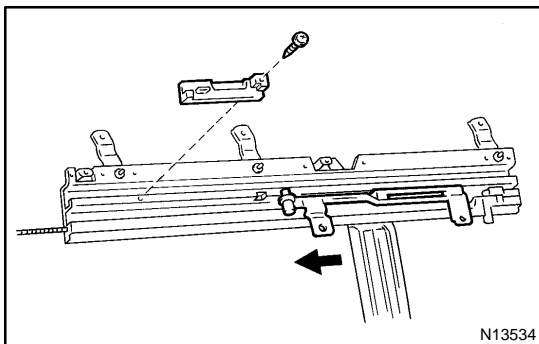
- (c) Remove the cable guide casing.



3. REMOVE ROOF DRIP CHANNEL

4. REMOVE SLIDING ROOF CASING

5. REMOVE SUNSHADE TRIM

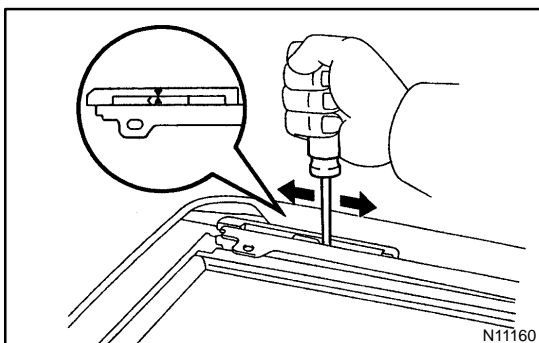


6. REMOVE DRIVE RAIL STOPPER

Remove the screw and stopper.

7. REMOVE DRIVE RAIL

Slide the drive rail forward, then remove it.



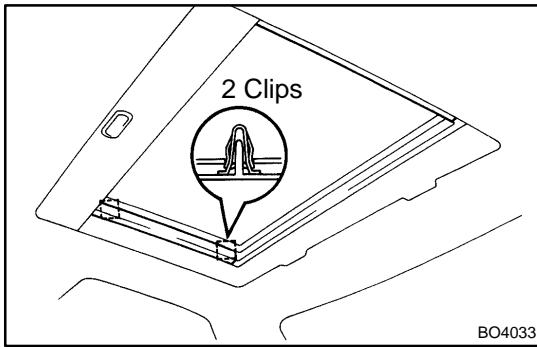
8. ADJUST DRIVE RAIL

HINT:

Adjust the drive rail to a closed and tilted down position.

- (a) Using a screwdriver, slide the link forward or backward to align the 2 marks as shown.

- (b) Slide the bracket to the forefront by hand.



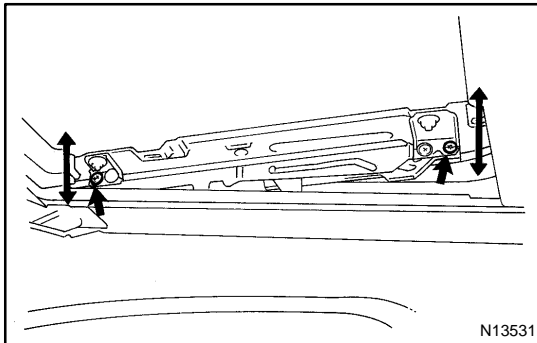
ADJUSTMENT

1. REMOVE SLIDING ROOF GARNISHES

Before making adjustments, remove the left and right sliding roof garnishes.

HINT:

After adjustment, reinstall the sliding roof garnishes.

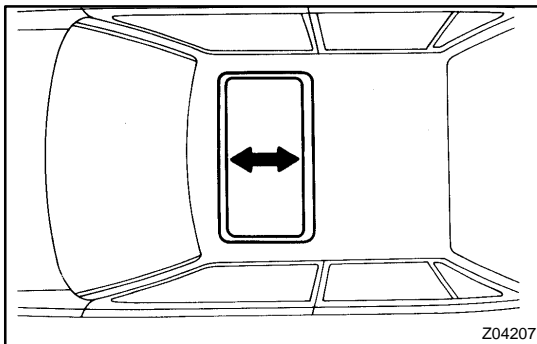


2. ADJUST SLIDING ROOF GLASS LEVEL DIFFERENCE

Using a torx driver, adjust the level difference by tightening or loosening the bolts.

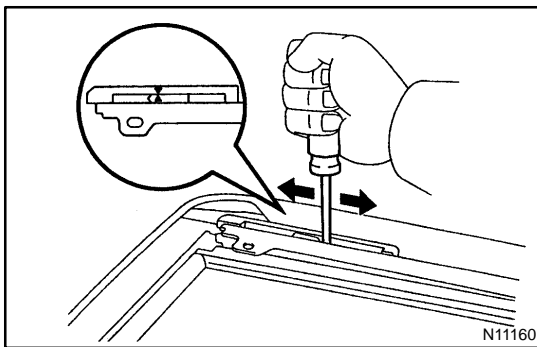
Clearance:

$0 \pm 2.0 \text{ mm}$ ($0 \pm 0.079 \text{ in.}$)

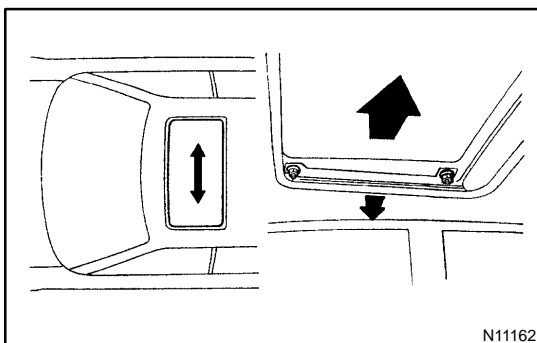


3. ADJUST SLIDING ROOF GLASS FORWARD OR REARWARD

- (a) Adjust by loosening the sliding roof installation nuts, and move the sliding roof bracket forward and backward.

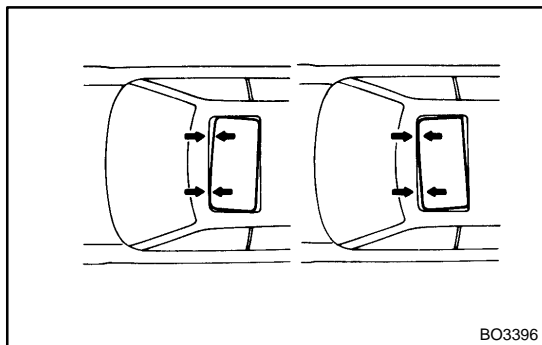


- (b) When the front or rear alignment is not correct, remove the glass and adjust the drive rail.
 (c) Using a screwdriver, slide the link forward or backward to align the 2 marks as shown.
 (d) Slide the bracket to the forefront with your hand.



4. ADJUST SLIDING ROOF GLASS RIGHT OR LEFT

Adjust by loosening the sliding roof rear shoe installation nuts, and move the sliding roof to the right and left.

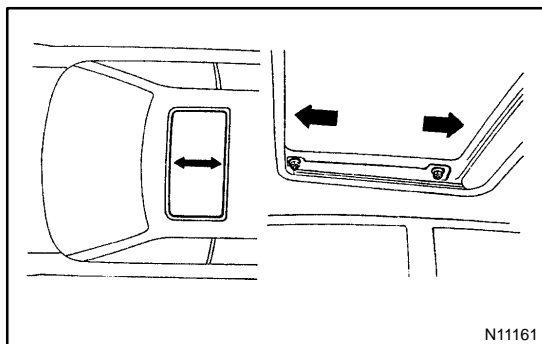


**5. ADJUST SLIDING ROOF GLASS IN CLEARANCE
(Difference in left and right clearance)**

- (a) When the front or rear alignment is not correct, remove the drive gear and sliding roof glass, then adjust the drive cable.

NOTICE:

Remove the driver gear with the sliding roof full closed.



- (b) Adjust by loosening the sliding roof installation nuts and readjust the sliding roof to the proper position.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BO-74](#)).

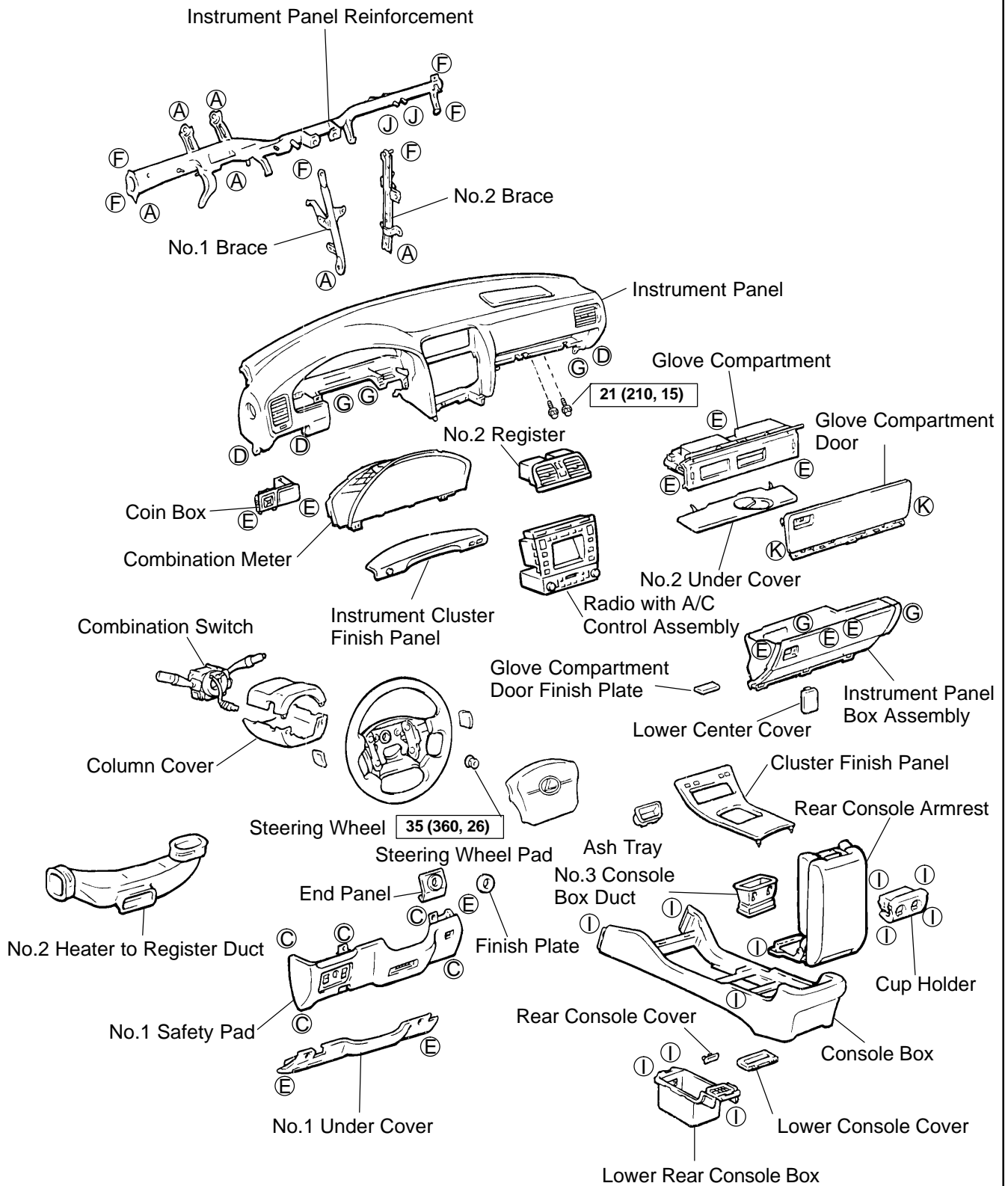
INSTALLATION

Installation is in the reverse order of removal (See page [BO-70](#)).

BO0P4-03

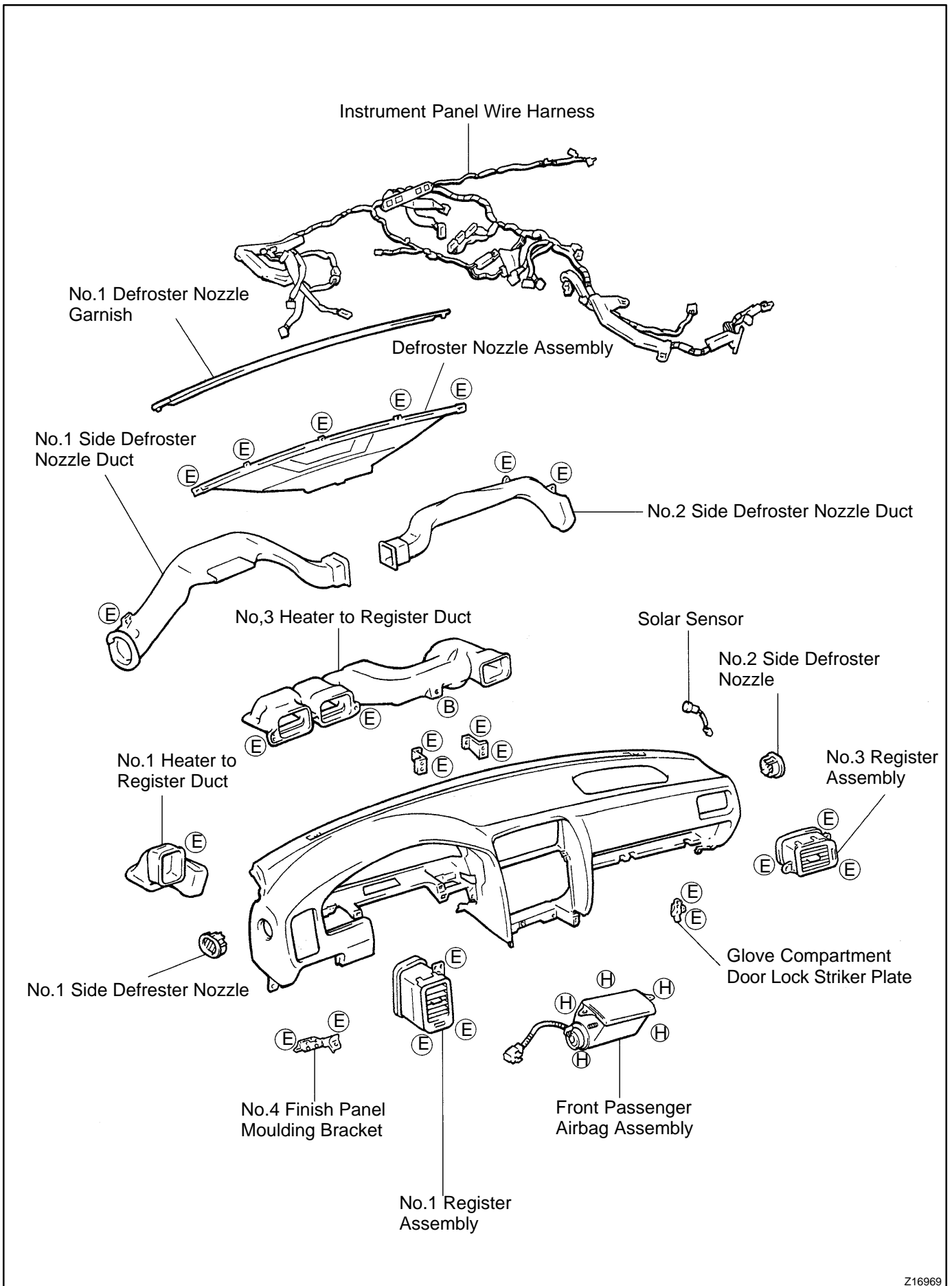


H10142



N·m (kgf·cm, ft·lbf) : Specified torque

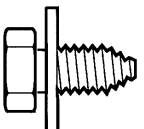
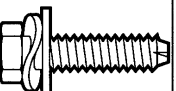
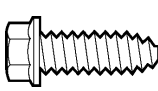
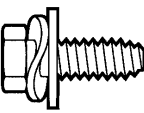
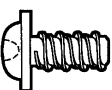

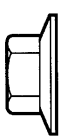
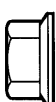

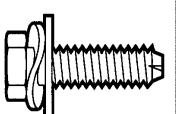
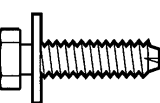
H01672



Z16969

HINT:

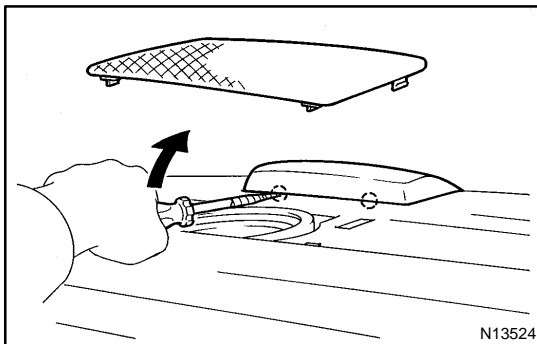
Screw shapes and sizes are indicated in the table below. The codes (A – K) correspond to those indicated on the previous page.

mm (in.)								
	Shape	Size		Shape	Size		Shape	Size
Ⓐ		∅ = 8 (0.31) L = 20 (0.79)	Ⓑ		∅ = 6 (0.24) L = 18 (0.71)	Ⓒ		∅ = 6 (0.24) L = 20 (0.79)
Ⓓ		∅ = 6 (0.24) L = 20 (0.79)	Ⓔ		∅ = 5 (0.20) L = 14 (0.55)	Ⓕ		∅ = 8 (0.31)
Ⓖ		∅ = 6 (0.24)	Ⓗ		∅ = 6 (0.24)	Ⓖ		∅ = 5.22 (0.2055) L = 16 (0.63)
Ⓙ		∅ = 8 (0.31) L = 18 (0.71)	Ⓚ		∅ = 6 (0.24) L = 25 (0.98)			

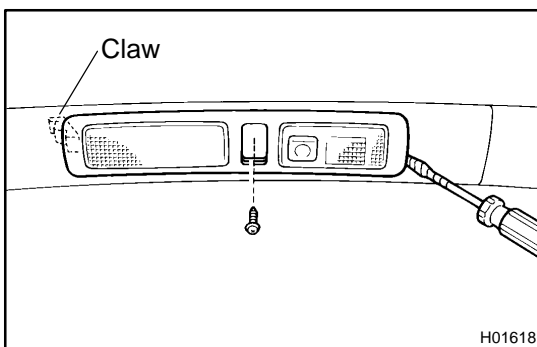
H03596

REMOVAL

1. TILT DOWN AND PULL OUT STEERING WHEEL
2. REMOVE FRONT SEAT
Torque: 37 N·m (375 kgf·cm, 27 ft·lbf)
3. REMOVE REAR SEAT CUSHION
4. REMOVE REAR SEAT BELT FLOOR ANCHOR
Torque: 43 N·m (440 kgf·cm, 32 ft·lbf)
5. REMOVE REAR SEATBACK
Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)
6. REMOVE FRONT DOOR SCUFF PLATES
7. REMOVE REAR DOOR SCUFF PLATES
8. REMOVE REAR SEAT SIDE GARNISHES



9. REMOVE HIGH-MOUNT STOP LIGHT
10. REMOVE SPEAKER GRILLE
11. CANADA:
REMOVE CRS TETHER ANCHOR COVERS AND
TETHER ANCHOR BRACKETS
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)
12. REMOVE PACKAGE TRAY TRIM
13. REMOVE ASSIST GRIPS
14. REMOVE CENTER PILLAR GARNISHES

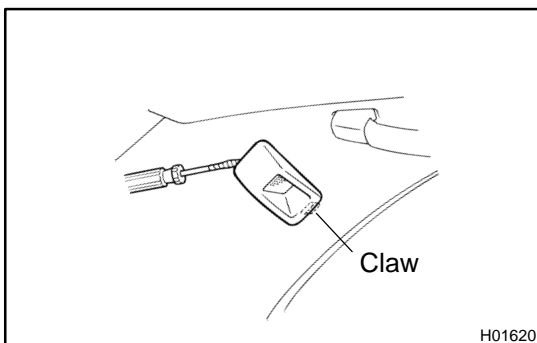


15. REMOVE REAR PERSONAL LIGHT
 - (a) Remove the screw.
 - (b) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the connector.
- (d) Employ the same manner described above to the other side.



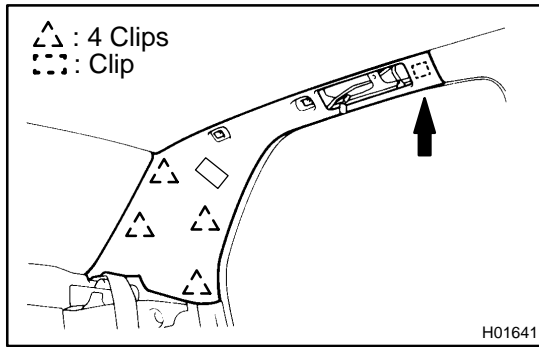
16. REMOVE SPOT LIGHT

- (a) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the connector.
- (c) Employ the same manner described above to the other side.

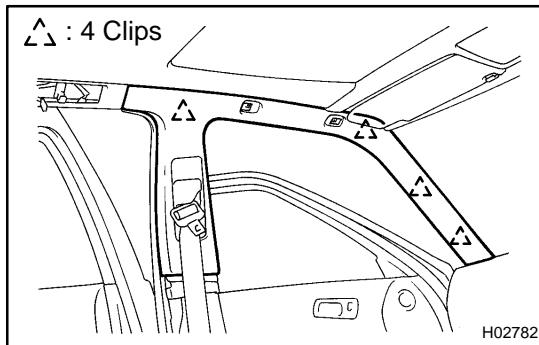
**17. REMOVE ROOF SIDE INNER GARNISH**

- (a) Remove the roof side inner garnish.

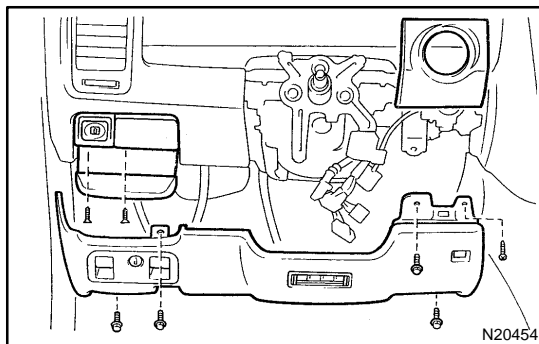
NOTICE:

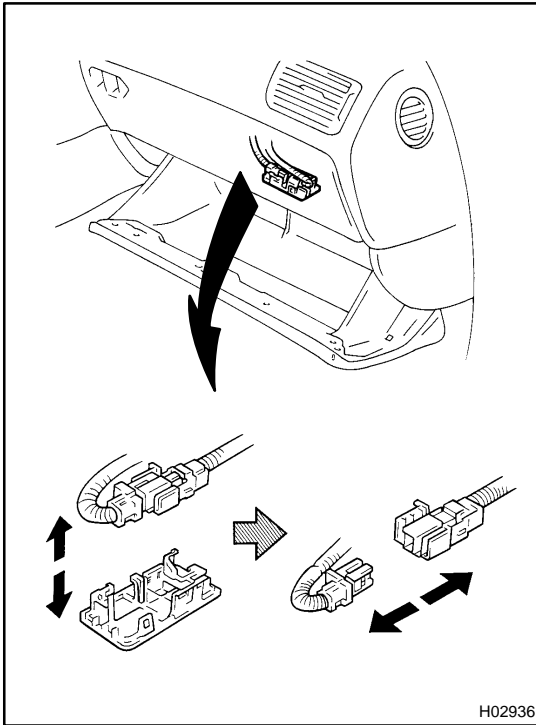
Paying enough attention remove the clip on the roof side inner garnish shown in the illustration. Otherwise, the roof side inner garnish or the front pillar garnish might be broken.

- (b) Employ the same manner described above to the other side.

**18. REMOVE FRONT PILLAR GARNISH**

- (a) Remove the front seat outer belt shoulder anchor.
(b) Remove the front pillar garnish.
(c) Employ the same manner described above to the other side.

19. REMOVE STEERING COLUMN COVER**20. REMOVE STEERING WHEEL (See page [SR-12](#))****21. REMOVE PARKING BRAKE RELEASE LEVER****22. REMOVE HOOD LOCK RELEASE LEVER****23. REMOVE NO.1 UNDER COVER****24. REMOVE FINISH PLATE****25. REMOVE END PLATE, NO.1 SAFETY PAD AND COIN BOX****26. REMOVE NO.2 HEATER TO REGISTER DUCT****27. REMOVE NO.2 UNDER COVER**



28. REMOVE INSTRUMENT PANEL BOX ASSEMBLY (See page RS-29)

- (a) Using a screwdriver, pry out the glove compartment door finish plate.

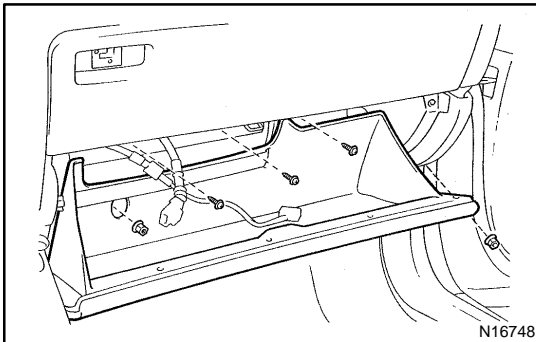
HINT:

Tape the screwdriver tip before use.

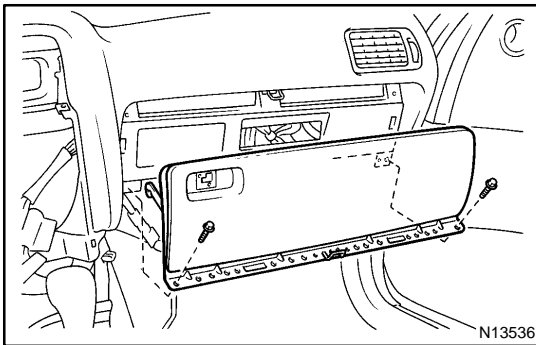
- (b) Remove the connector from the glove compartment door finish plate.
(c) Disconnect the airbag connector.

NOTICE:

When disconnecting the airbag connector, take care not to damage the airbag wire harness.



- (d) Remove the 3 screws and 2 nuts.
(e) Disconnect the connector, remove the instrument panel box assembly.

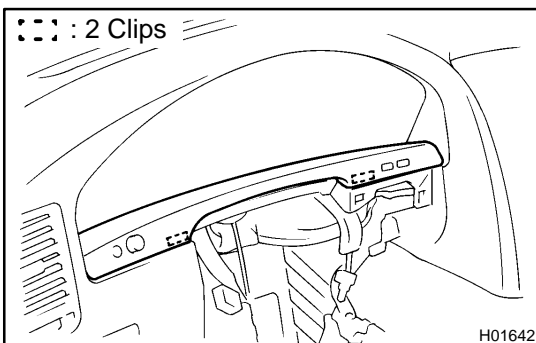


29. REMOVE GLOVE COMPARTMENT

- (a) Remove the 2 bolts and glove compartment door.
(b) Remove the 3 screws and glove compartment.

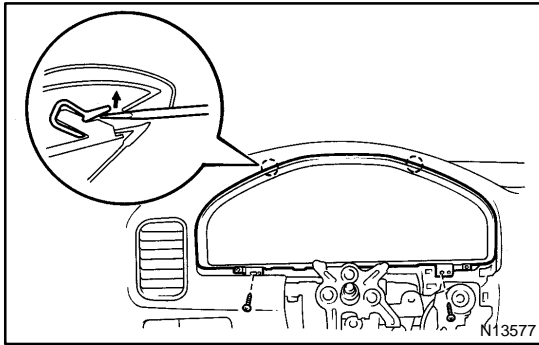
30. REMOVE STEERING COLUMN

(See page SR-12)



31. REMOVE UPPER CLUSTER FINISH PANEL

- (a) Using a screwdriver, remove the upper cluster finish panel.
(b) Disconnect the connectors.

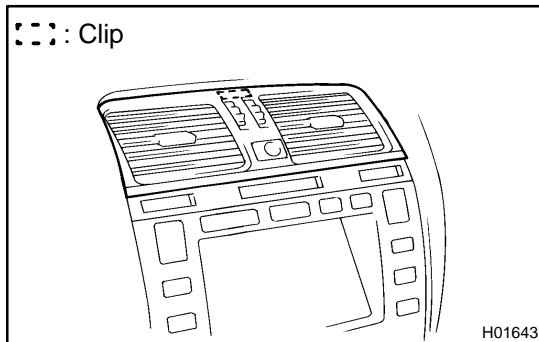
**32. REMOVE COMBINATION METER**

- (a) Remove the 2 screws.
- (b) Insert a screwdriver in the 2 clip holes, remove the combination meter.

HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the connectors.

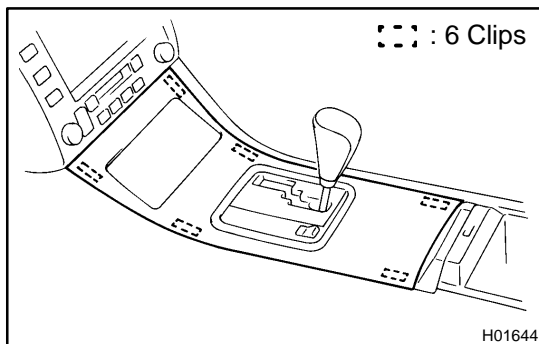
**33. REMOVE NO.2 REGISTER**

- (a) Using a screwdriver, remove the No.2 register as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the connector.

**34. REMOVE CLUSTER FINISH PANEL**

- (a) Using a screwdriver, remove the cluster finish panel.

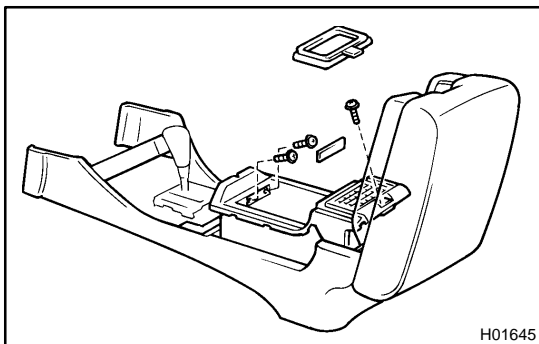
HINT:

Tape the screwdriver tip before use.

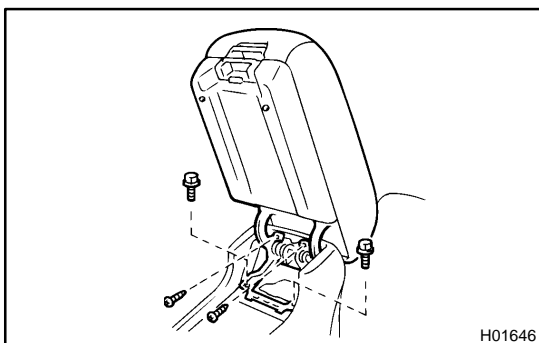
- (b) Disconnect the connector.

35. REMOVE THESE PARTS:

- (a) Radio with A/C control assembly
- (b) Cup holder

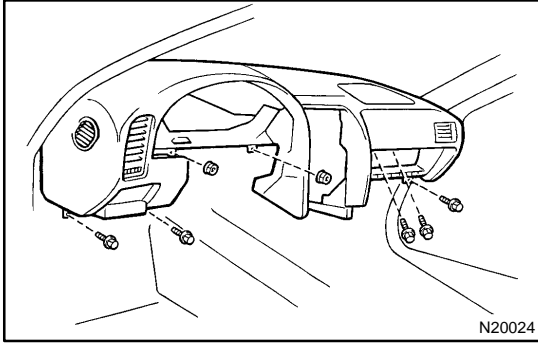
**36. REMOVE LOWER REAR CONSOLE BOX**

- (a) Remove the lower console cover.
- (b) Remove the rear console cover.
- (c) Disconnect the connector.
- (d) Remove the 3 screws and lower rear console box.

**37. REMOVE REAR CONSOLE ARMREST**

- (a) Remove the No.3 console box duct.
- (b) Remove the 2 bolts, 2 screws and rear console armrest.

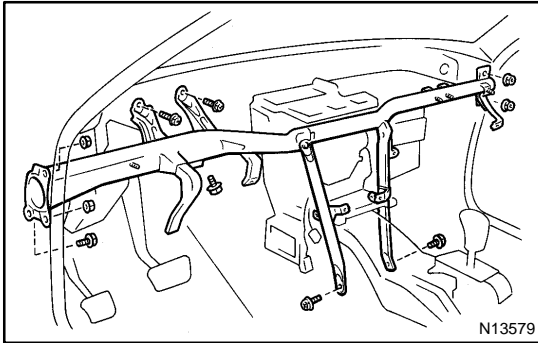
38. REMOVE CONSOLE BOX

**39. REMOVE INSTRUMENT PANEL**

- (a) Remove the 2 bolts from the front passenger airbag assembly.

Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)

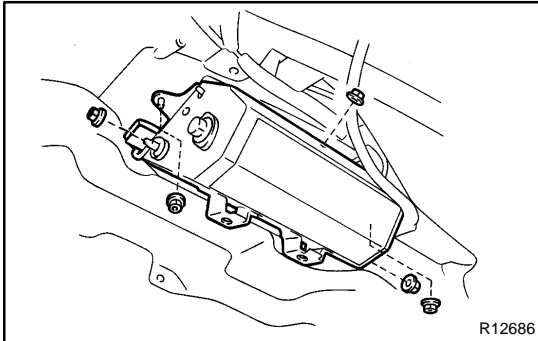
- (b) Remove the 3 bolts and 2 nuts.
(c) Disconnect the connectors.
(d) Remove the instrument panel.

**40. REMOVE INSTRUMENT PANEL REINFORCEMENT**

- (a) Remove the 4 nuts and 6 bolts.
(b) Remove the instrument panel reinforcement.

DISASSEMBLY

1. REMOVE NO.1 DEFROSTER NOZZLE GARNISH
2. REMOVE NO.2 SIDE DEFROSTER NOZZLE DUCT
3. REMOVE NO.1 SIDE DEFROSTER NOZZLE DUCT
4. REMOVE DEFROSTER NOZZLE ASSEMBLY



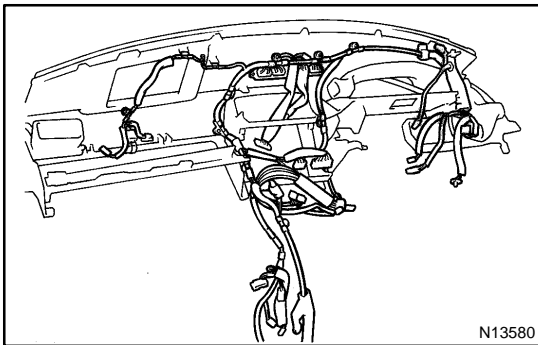
5. REMOVE FRONT PASSENGER AIRBAG ASSEMBLY
(See page [RS-29](#))

Remove the 5 nuts, front passenger airbag assembly and front passenger airbag door.

CAUTION:

- Do not store the front passenger airbag assembly with the airbag deployment side facing down.
- Never disassemble the front passenger airbag assembly.

6. REMOVE NO.3 HEATER TO REGISTER DUCT
7. REMOVE SOLAR SENSOR



8. REMOVE INSTRUMENT PANEL WIRE HARNESS
9. REMOVE GLOVE COMPARTMENT DOOR LOCK STRIKER PLATE
10. REMOVE NO.3 FINISH PANEL MOUNTING BRACKET
11. REMOVE NO.1 SIDE DEFROSTER NOZZLE
12. REMOVE NO.2 SIDE DEFROSTER NOZZLE
13. REMOVE NO.1 HEATER TO REGISTER DUCT
14. REMOVE NO.4 FINISH PANEL MOUNTING BRACKET
15. REMOVE NO.1 REGISTER ASSEMBLY
16. REMOVE NO.3 REGISTER ASSEMBLY

REASSEMBLY

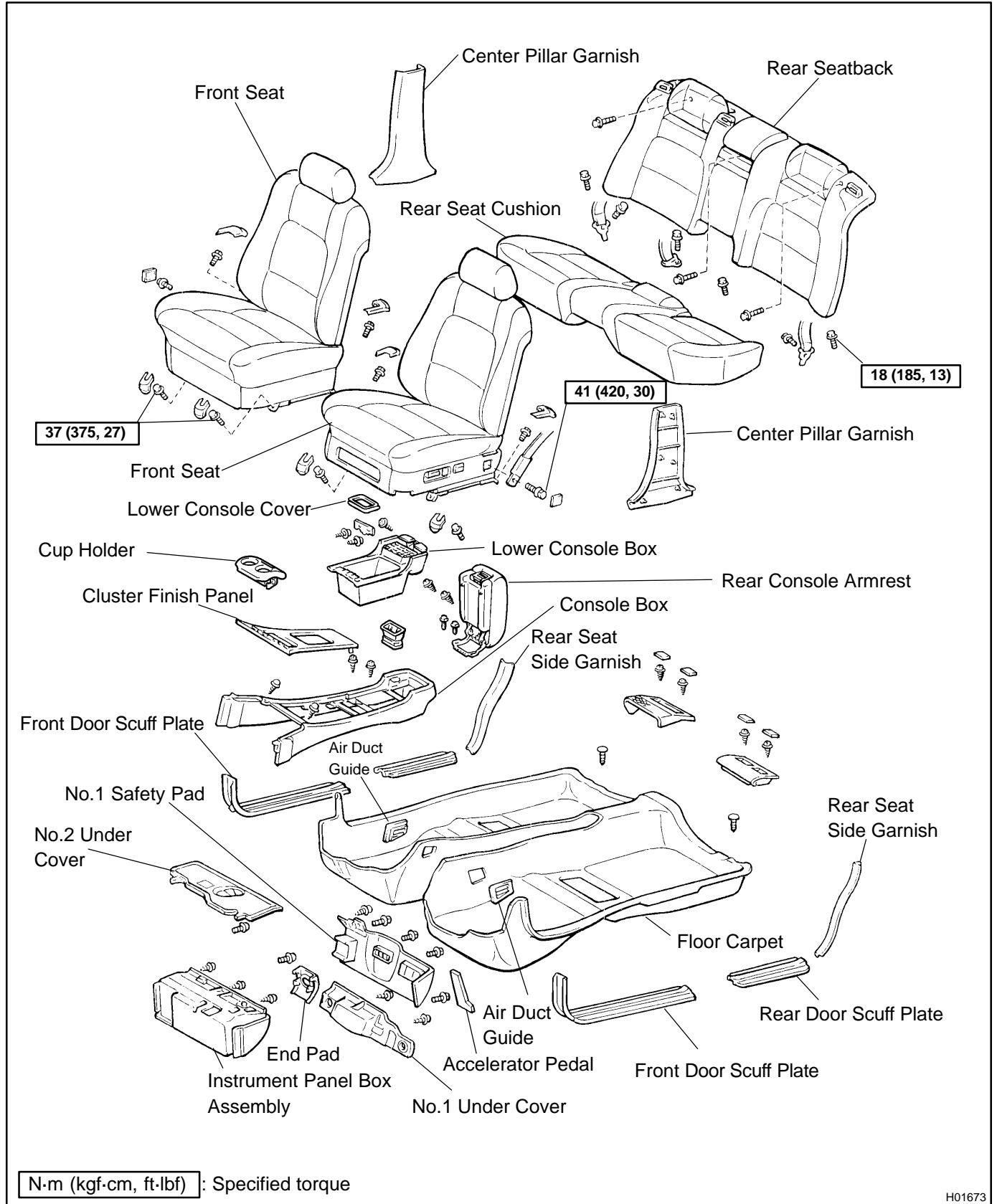
Reassembly is in the reverse order of disassembly (See page [BO-88](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [BO-83](#)).

FLOOR CARPET COMPONENTS

BO0P9-01

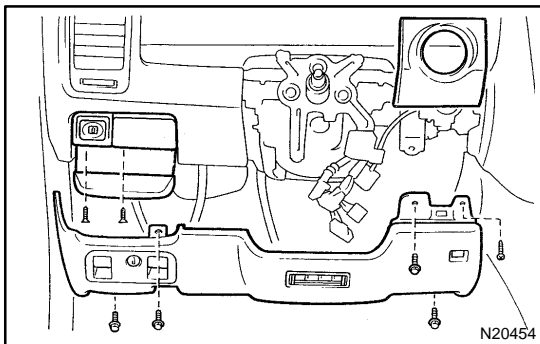


H01673

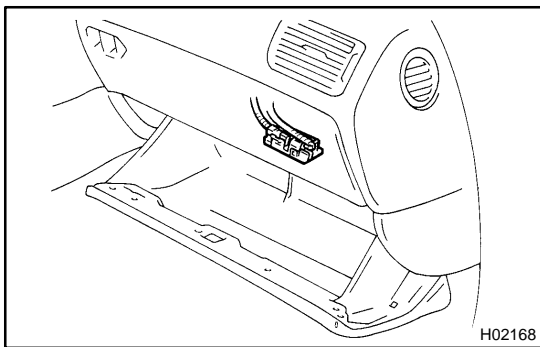
REMOVAL

1. REMOVE THESE PARTS:

- (a) Front seat
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)
- (b) Rear seat cushion
- (c) Rear seat belt lower side bolt
Torque: 41 N·m (420 kgf-cm, 30 ft-lbf)
- (d) Rear seatback
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
- (e) Front door scuff plates
- (f) Rear door scuff plates
- (g) Rear seat side garnishes
- (h) Center pillar garnishes



- (i) No.1 under cover
- (j) Finish plate
- (k) End pad
- (l) No.1 safety pad
- (m) No.2 under cover



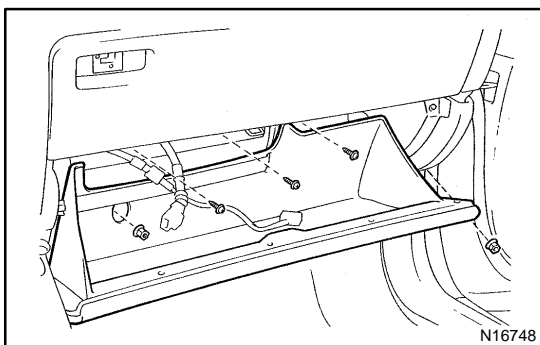
2. REMOVE INSTRUMENT PANEL BOX ASSEMBLY

- (a) Using a screwdriver, pry out the glove compartment door finish plate.

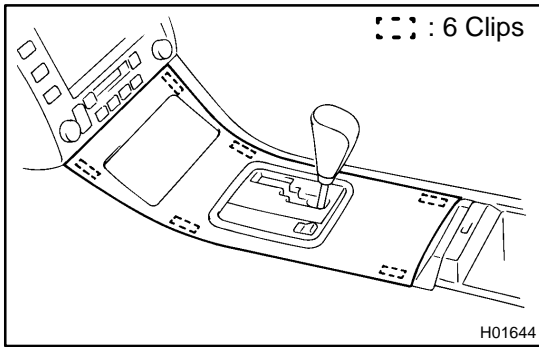
HINT:

Tape the screwdriver tip before use.

- (b) Remove the connector from the glove compartment door finish plate.



- (c) Remove the 3 screws and 2 nuts.
- (d) Disconnect the connector, remove the instrument panel box assembly.

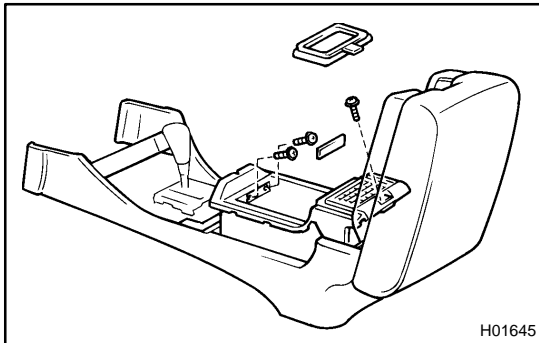
**3. REMOVE CLUSTER FINISH PANEL**

- (a) Using a screwdriver, remove the cluster finish panel.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the connector.

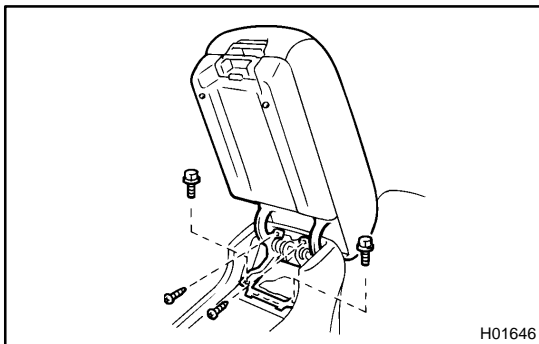
4. REMOVE CUP HOLDER**5. REMOVE LOWER REAR CONSOLE BOX**

- (a) Remove the lower console cover.

- (b) Remove the rear console cover.

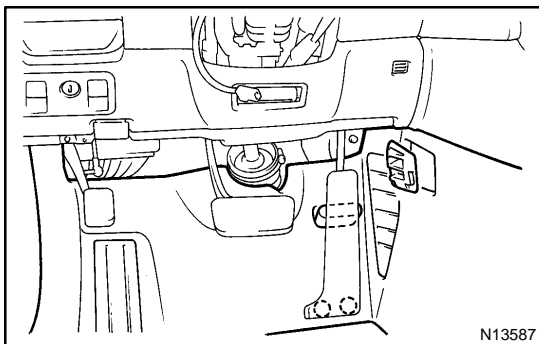
- (c) Disconnect the connector.

- (d) Remove the 3 screws and lower rear console box.

**6. REMOVE REAR CONSOLE ARMREST**

- (a) Remove the No.3 console box duct.

- (b) Remove the 2 bolts, 2 screws and rear console armrest.

7. REMOVE CONSOLE BOX**8. REMOVE FLOOR CARPET**

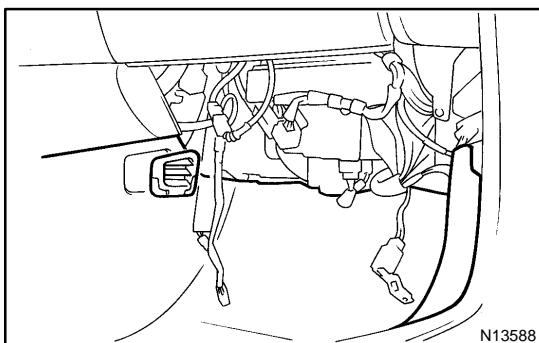
- (a) Observe the following items.(Driver's side)

- (1) Remove the heater air duct guide.

- (2) Pull out the accelerator pedal.

- (3) Raise the carpet and disconnect the hook.

- (4) Using a clip remover, remove the clip.

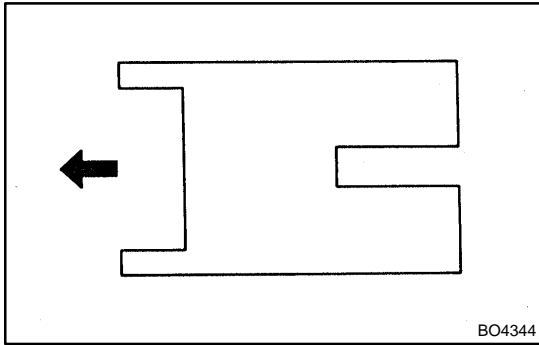


- (b) Observe the following items.(Passenger's side)

- (1) Remove the heater air duct guide.

- (2) Raise the carpet and disconnect the hook.

- (3) Using a clip remover, remove the clip.



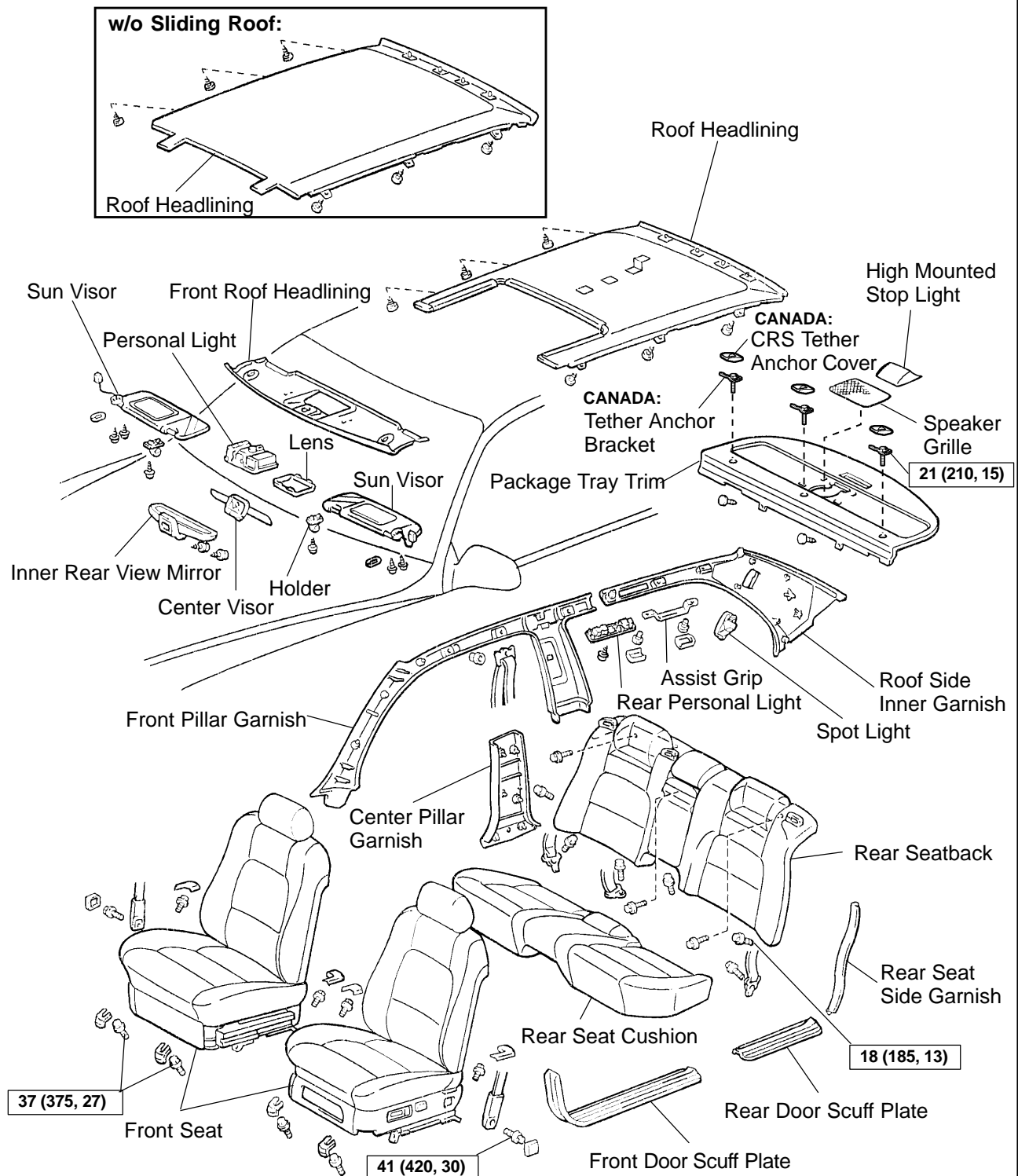
(c) Slide the carpet backward and remove it.

INSTALLATION

Installation is in the reverse order of removal (See page [BO-92](#)).

ROOF HEADLINING COMPONENTS

B00PC-02



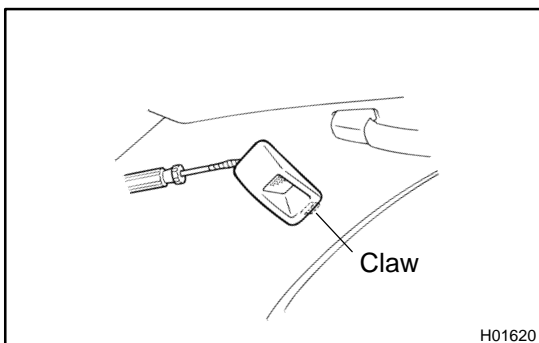
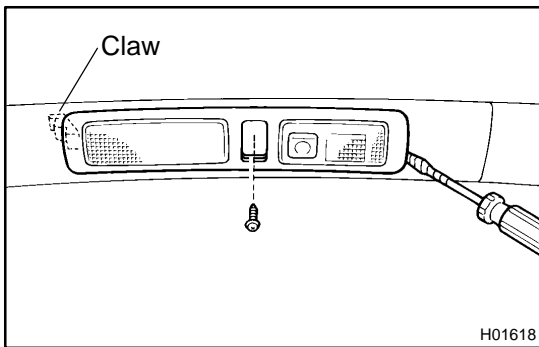
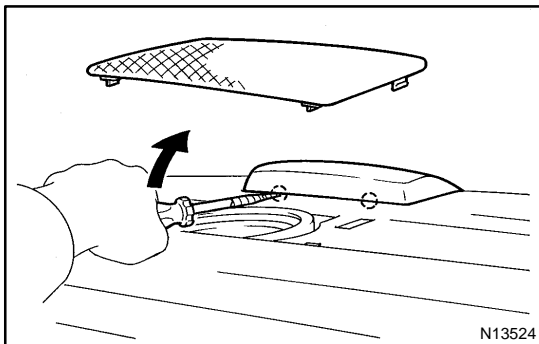
T

N·m (kgf·cm, ft·lbf) : Specified torque

H10143

REMOVAL

1. REMOVE FRONT SEAT
Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)
2. REMOVE REAR SEAT CUSHION
3. REMOVE REAR SEAT BELT FLOOR ANCHORS
Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)
4. REMOVE REAR SEATBACK
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)
5. REMOVE FRONT DOOR SCUFF PLATES
6. REMOVE REAR DOOR SCUFF PLATES
7. REMOVE REAR SEAT SIDE GARNISHES



8. REMOVE HIGH-MOUNTED STOP LIGHT
9. REMOVE SPEAKER GRILLE
10. CANADA:
REMOVE CRS TETHER ANCHOR COVERS AND
TETHER ANCHOR BRACKETS
Torque: 21 N·m (210 kgf-cm, 15 ft-lbf)
11. REMOVE CRS TETHER ANCHOR COVERS AND PACK-
AGE TRAY TRIM
12. REMOVE ASSIST GRIPS
13. REMOVE CENTER PILLAR GARNISHES
14. REMOVE REAR PERSONAL LIGHT
 - (a) Remove the screw.
 - (b) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (c) Disconnect the connector.
- (d) Employ the same manner described above to the other side.

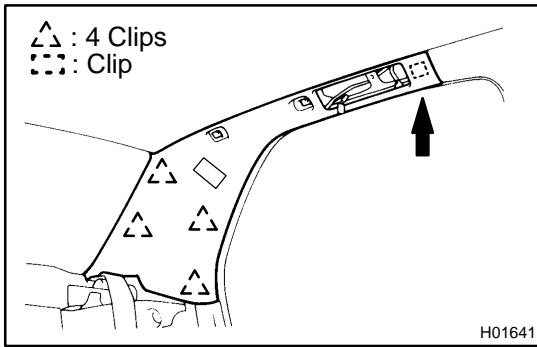
15. REMOVE SPOT LIGHT

- (a) Using a screwdriver, remove the light as shown in the illustration.

HINT:

Tape the screwdriver tip before use.

- (b) Disconnect the connector.
- (c) Employ the same manner described above to the other side.

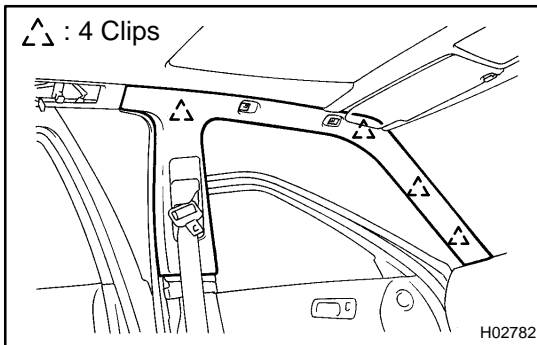
**16. REMOVE ROOF SIDE INNER GARNISH**

- (a) Remove the roof side inner garnish.

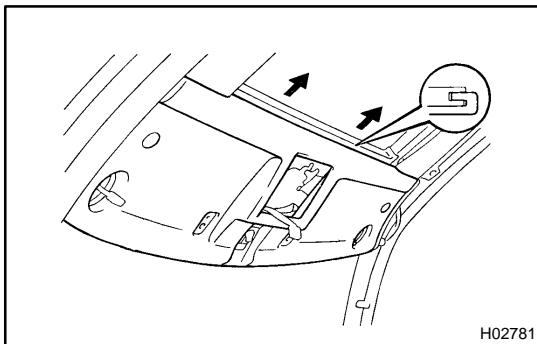
NOTICE:

Paying enough attention remove the clip on the roof side inner garnish shown in the illustration. Otherwise, the roof side inner garnish or the front pillar garnish might be broken.

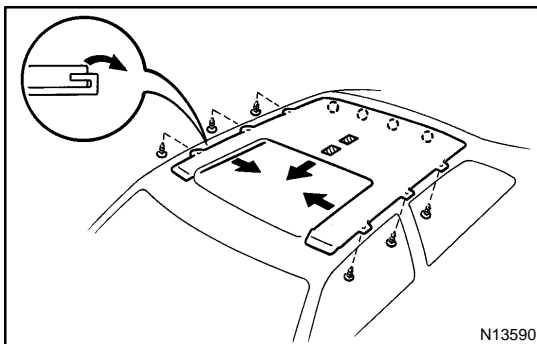
- (b) Employ the same manner described above to the other side.

**17. REMOVE FRONT PILLAR GARNISH**

- (a) Remove the front seat outer belt shoulder anchor.
(b) Remove the front pillar garnish.
(c) Employ the same manner described above to the other side.

18. REMOVE SUN VISORS AND HOLDERS**19. REMOVE PERSONAL LIGHT****20. REMOVE CENTER VISOR****21. REMOVE INNER REAR VIEW MIRROR****22. REMOVE FRONT ROOF HEADLINING AND ROOF HEADLINING**

- (a) Pull the headlining backward and remove the front roof headlining.



- (b) Pull out the portion fitting around the sliding roof.
(c) Using a clip remover, remove the 10 clips and release the fastener tapes, then remove the headlining.

NOTICE:

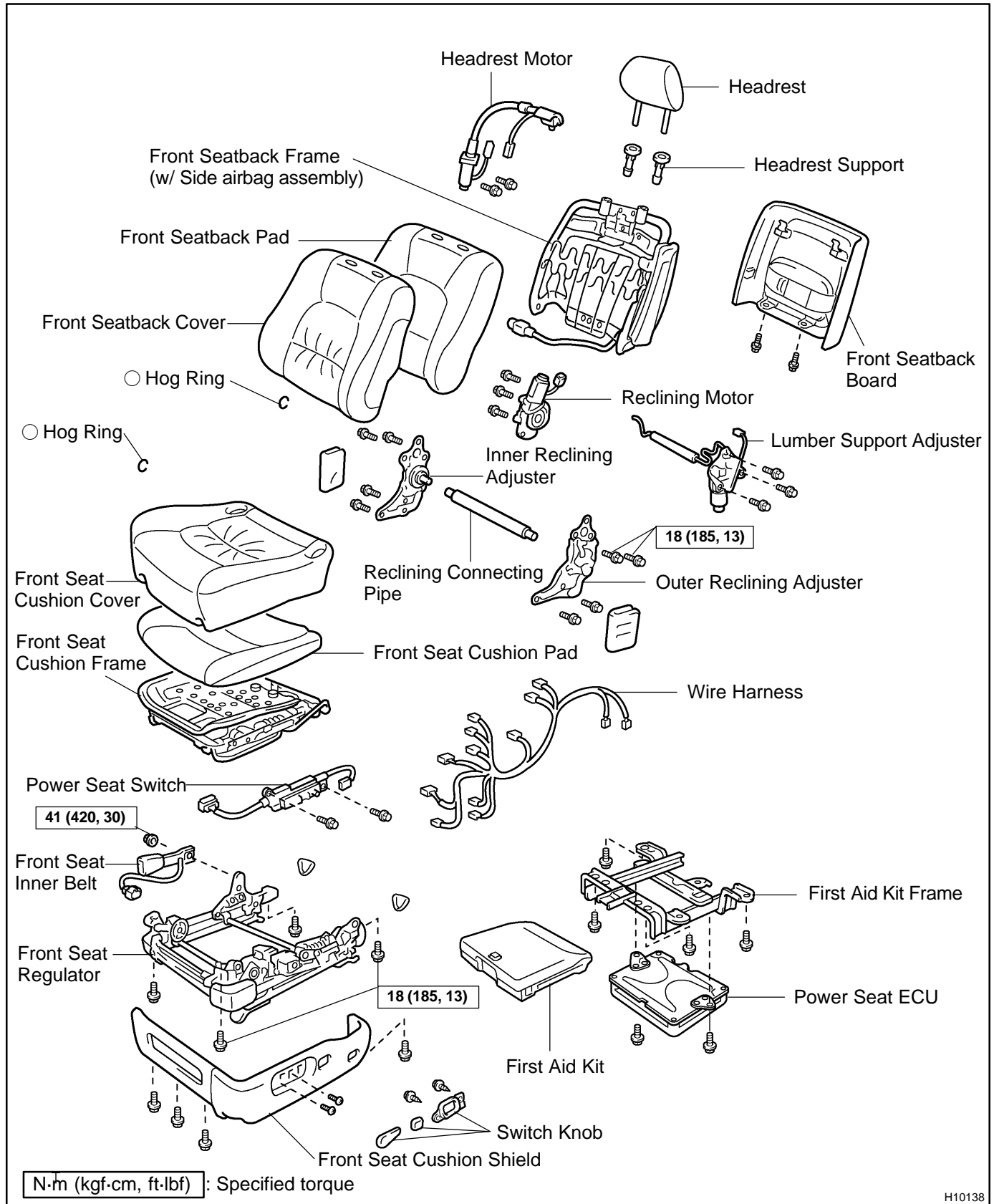
Do not fold down the headlining.

INSTALLATION

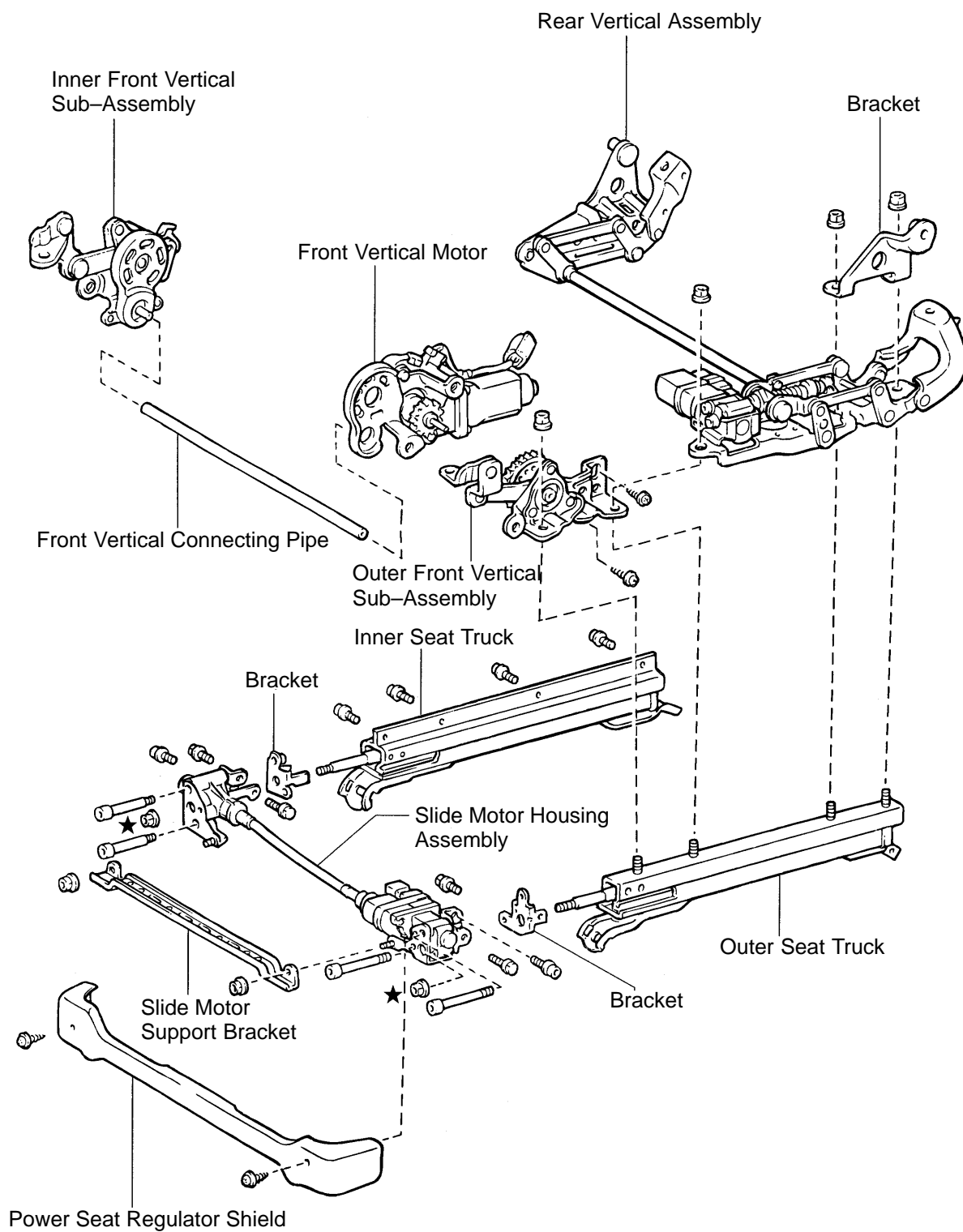
Installation is in the reverse order of removal (See page [BO-97](#)).

FRONT SEAT COMPONENTS

B00PF-02



H10138



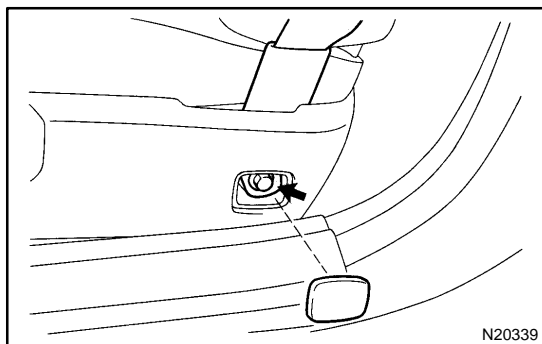
● Precoated part

N20456

REMOVAL

1. w/o Power Headrest: REMOVE HEADREST

While pushing the lock button, pull up the headrest to remove it.



2. REMOVE FRONT SEAT OUTER BELT FLOOR ANCHOR

- (a) Using a screwdriver, remove the seat belt anchor cover cap.

HINT:

Tape the screwdriver tip before use.

- (b) Remove the front seat outer belt floor anchor.

Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)

3. REMOVE SEAT TRACK COVER

Using a screwdriver, pry out the 4 covers.

HINT:

Tape the screwdriver tip before use.

4. REMOVE FRONT SEAT

- (a) Remove the 4 bolts.

Torque: 37 N·m (375 kgf-cm, 27 ft-lbf)

- (b) Disconnect the connectors.

DISASSEMBLY

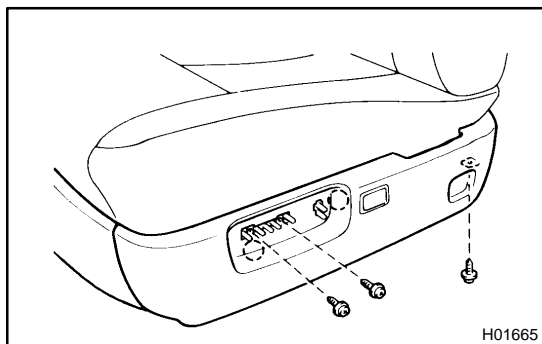
1. REMOVE FIRST AID KIT

2. REMOVE FRONT SEAT CUSHION SHIELD

- (a) Using a screwdriver, remove the 2 switch knobs.

HINT:

Tape the screwdriver tip before use.



- (b) Remove the 3 screws from the outside of cushion shield.
 (c) Remove the 3 screws from the front side of cushion shield.
 (d) Remove the cushion shield, then disconnect the connectors.
 (e) Remove the 2 screws and lumbar support switch from cushion shield.

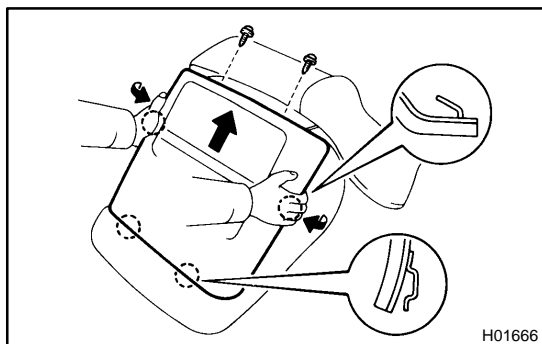
3. REMOVE FRONT SEAT INNER BELT

Disconnect the connector, then remove the bolts and inner belt.

Torque: 43 N·m (440 kgf-cm, 32 ft-lbf)

4. REMOVE FRONT SEATBACK BOARD

- (a) Remove the 2 screws.
 (b) Push the board as shown in the illustration with your hands.
 (c) Slide the board upward to remove it.



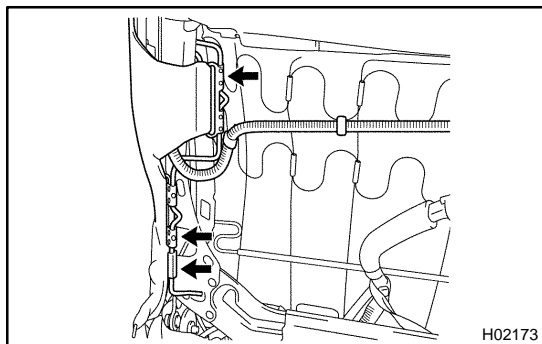
5. REMOVE SEATBACK ASSEMBLY

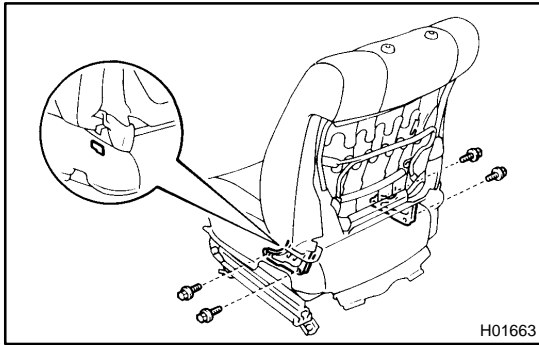
- (a) Remove the 2 yellow hooks and a black hook at the position shown in the illustration.

CAUTION:

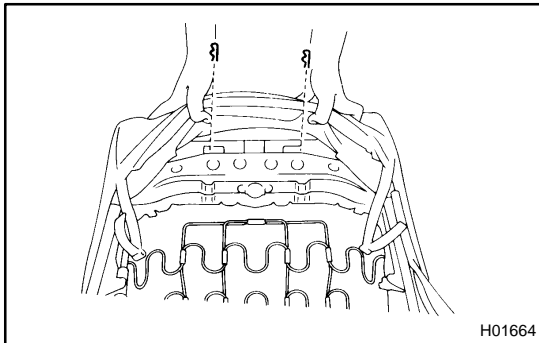
At the time of assembly, please refer to the following item. Hang the seat cover hook securely to the fitting, or the side airbag does not operate correctly.

- (b) Remove the 2 clamps from wire harness of side airbag installed under the seat, then pull out the wire harness.
 (c) Remove the side airbag connector from the bracket under the seat.





- (d) Remove the 4 bolts and seatback assembly.
Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)



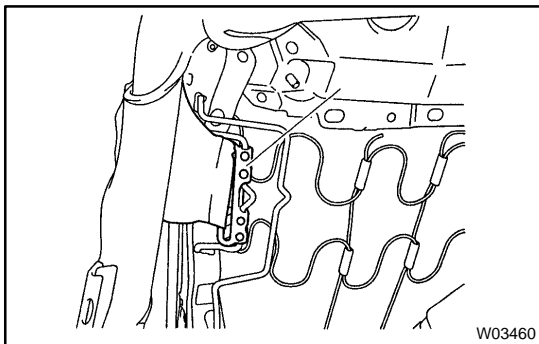
**6. w/ Power Headrest:
 REMOVE HEADREST**

- (a) Remove the hog rings from the seatback assembly.
 (b) Using a screwdriver, remove the 2 pins shown in the illustration.

HINT:

After the headrest has been removed, install the pins to the adjuster temporarily.

- (c) Remove the headrest from the seatback assembly.



7. REMOVE SEATBACK COVER

- (a) Remove the hook.

The position shown in the illustration is made to be hold by installing the side airbag assembly with the hook shown as "A" hung onto the seat frame.

CAUTION:

At the time of assembly, please refer to the following item. Take care to hung the hook securely. Otherwise the seat cover slides, it might cause incorrect deploying.

- (b) Remove the seatback frame from the seatback cover with pad.
 (c) Remove the seatback cover from the seatback pad.

8. REMOVE LUMBER SUPPORT ADJUSTER

9. REMOVE RECLINING MOTOR

10. REMOVE INNER RECLINING ADJUSTER

11. REMOVE RECLINING CONNECTING PIPE

12. REMOVE OUTER RECLINING ADJUSTER

13. REMOVE HEADREST MOTOR

14. REMOVE SEAT CUSHION ASSEMBLY

Remove the 4 bolts and seat cushion assembly.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

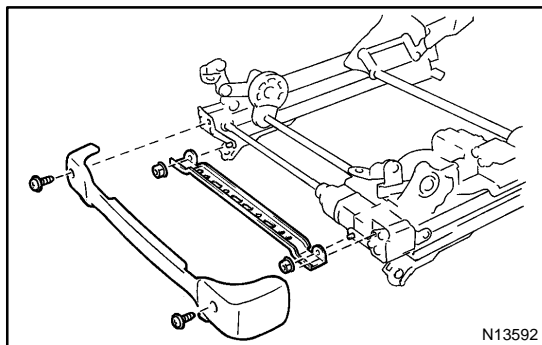
15. REMOVE SEAT CUSHION COVER

- (a) Remove the seat cushion frame from the seat cushion cover with pad.
 (b) Remove the power seat switch from the seatback frame.
 (c) Remove the seat cushion cover from the seat cushion pad.

16. REMOVE POWER SEAT ECU

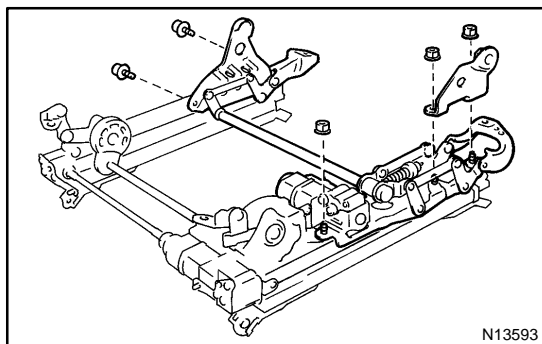
17. REMOVE FIRST AIDE KIT FRAME

18. REMOVE WIRE HARNESS



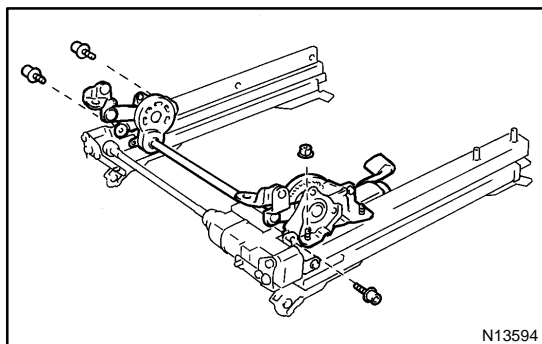
19. REMOVE POWER SEAT REGULATOR SHIELD AND SLIDE MOTOR SUPPORT BRACKET

- (a) Remove the 2 screws and regulator shield.
- (b) Remove the 2 nuts and support bracket.



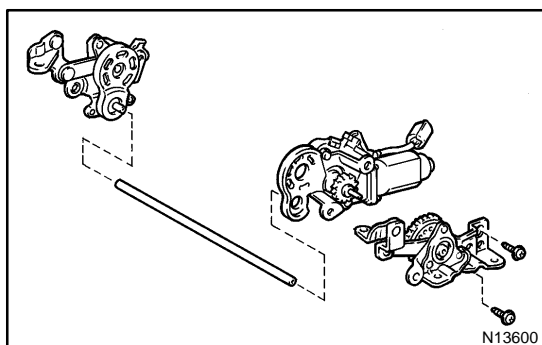
20. REMOVE REAR VERTICAL ASSEMBLY

- (a) Remove the 2 bolts from the rear vertical assembly inner side.
- (b) Remove the 3 nuts and bracket from the rear vertical assembly outer side.
- (c) Remove the rear vertical motor assembly.

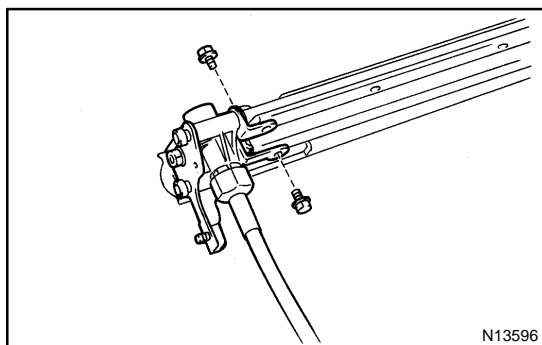


21. REMOVE FRONT VERTICAL ASSEMBLY

- (a) Using a torx wrench, remove the 3 screws.
- (b) Remove the nut and front vertical assembly.

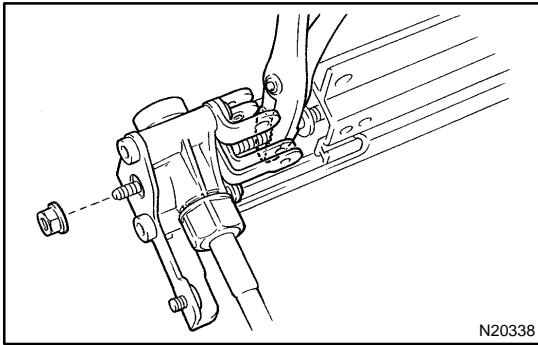


- (c) Remove the inner front vertical sub-assembly, outer front vertical sub-assembly, front vertical motor and front vertical connecting pipe.



22. REMOVE SLIDE MOTOR HOUSING ASSEMBLY

- (a) Remove the 2 bolts from the inner seat track.



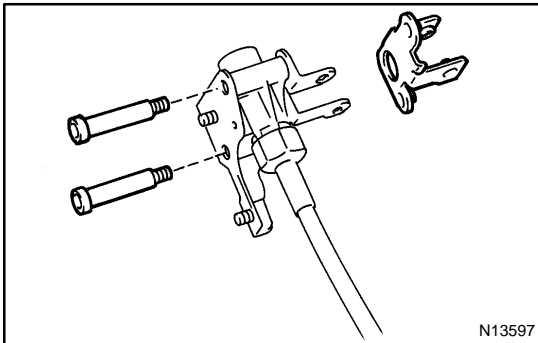
- (b) Move the upper rail rearward and hold the screw shaft with pliers.

- (c) Remove the nut.

HINT:

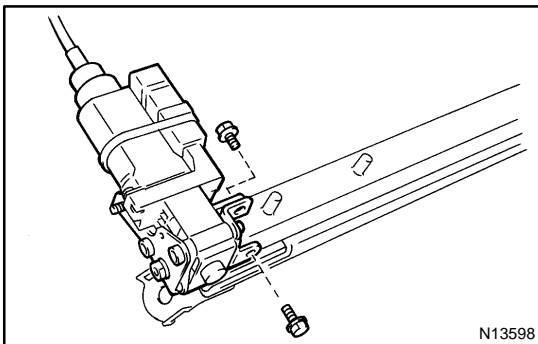
At the time of reassembly, please refer to the following item.
Apply adhesive to 3 screws.

Part No.08833-00070, THREE BOND 1324 or equivalent.



- (d) Using a hexagon wrench, remove the 2 screws.

- (e) Remove the inner bracket from the slide motor housing assembly.



- (f) Remove the 2 bolts from the outer set track.

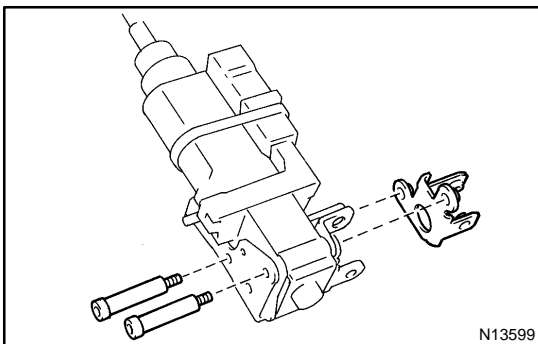
- (g) Move the upper rail rearward and hold the screw shaft with pliers.

- (h) Remove the nut and washer.

HINT:

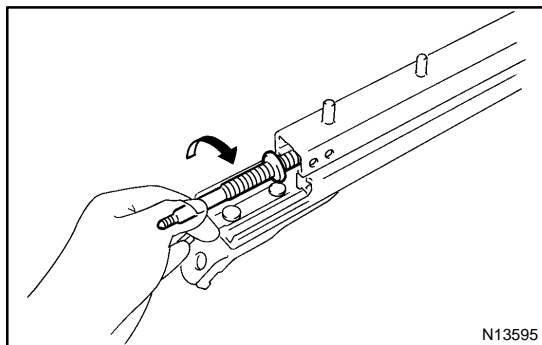
At the time of reassembly, please refer to the following item.
Apply adhesive to nut.

Part No.08833-00070, THREE BOND 1324 or equivalent.



- (i) Using a hexagon wrench, remove the 2 screws.

- (j) Remove the outer bracket from the slide motor housing assembly.



ADJUSTMENT

ADJUST FRONT SEAT ADJUSTER

- (a) Adjust the seat track screw shaft.
Fully hand-tighten the screw shafts of the outer and inner seat tracks.
- (b) Adjust the front vertical sub-assembly.
Align the match marks of outer and inner front vertical sub-assemblies.

REASSEMBLY

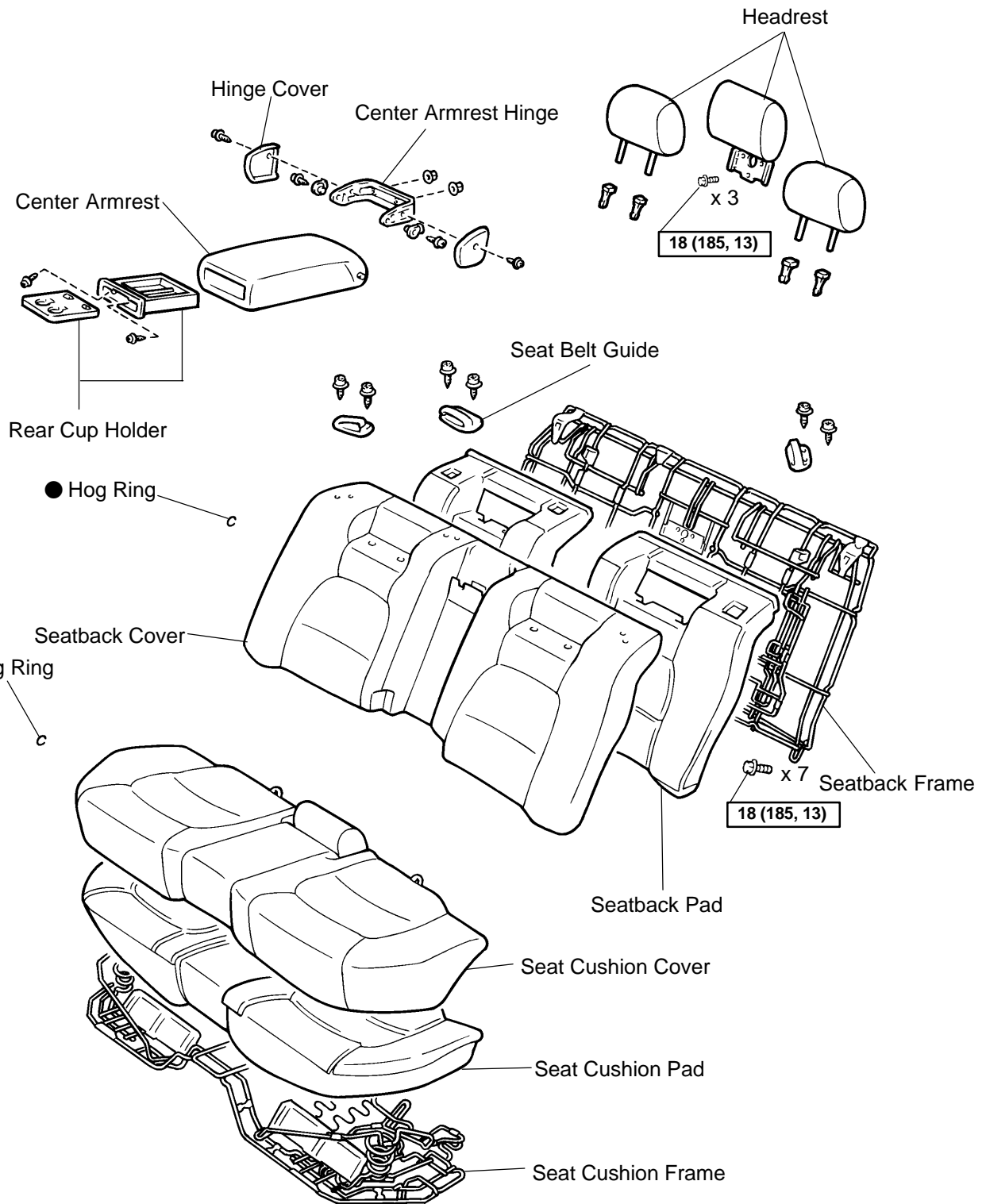
Reassembly is in the reverse order of disassembly (See page [BO-103](#)).

INSTALLATION

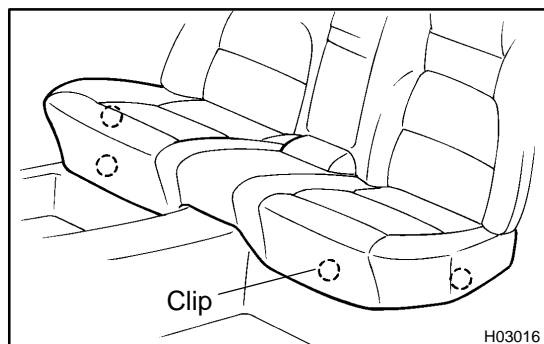
Installation is in the reverse order of removal (See page [BO-102](#)).

REAR SEAT COMPONENTS

B00PL-01



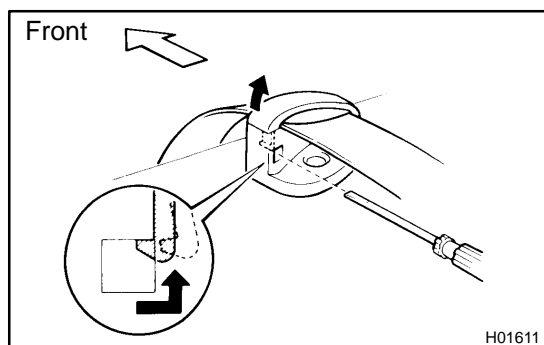
H01675



REMOVAL

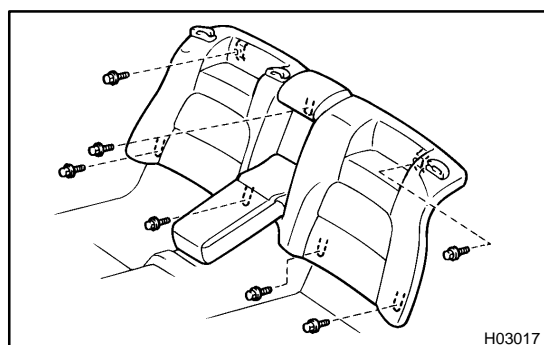
1. REMOVE SEAT CUSHION ASSEMBLY

Remove the seat cushion assembly.



2. REMOVE SEATBACK ASSEMBLY

- (a) Using a screwdriver, remove the rear seat belt from the belt guide as shown in the illustration.
- (b) Remove the LH and RH headrests.



- (c) Remove the 7 bolts, then raise the seatback assembly upward to remove the seatback assembly.

Torque: 18 N·m (185 kgf-cm, 13 ft-lbf)

DISASSEMBLY

1. REMOVE BELT GUIDE

Remove the 6 screws and 3 belt guides.

2. REMOVE SEATBACK COVER

- (a) Remove the 3 bolts and center headrest.
- (b) Remove the 4 headrest supports.
- (c) Remove the 2 nuts and center armrest assembly.
- (d) Remove the hog rings and seatback frame from the seatback cover with pad.
- (e) Remove the hog rings and seatback cover from the seatback pad.

3. REMOVE SEAT CUSHION COVER

- (a) Remove the hog rings and seat cushion frame from the seat cushion cover with pad.
- (b) Remove the hog rings and seat cushion cover from the seat cushion pad.

REASSEMBLY

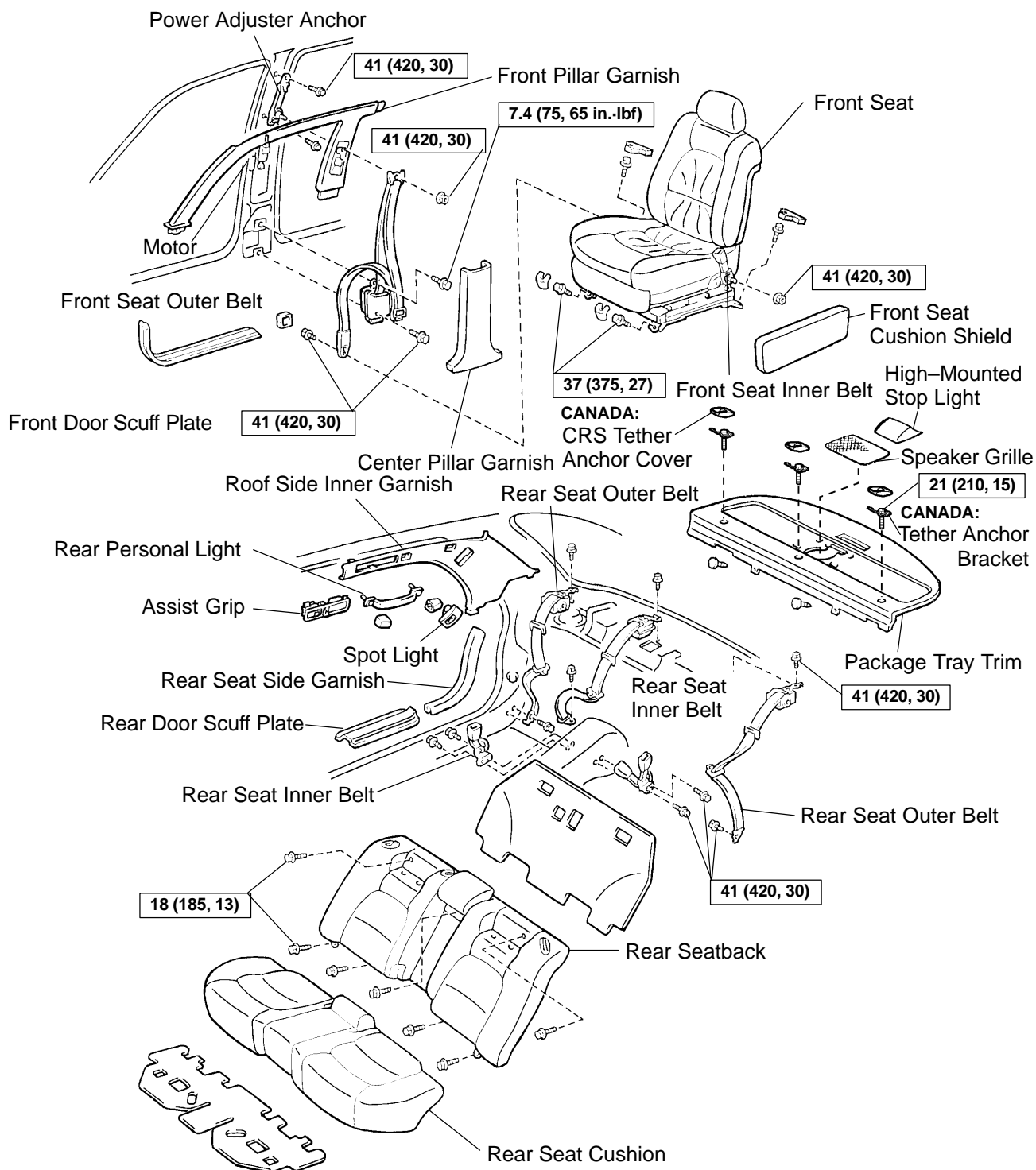
Reassembly is in the reverse order of disassembly (See page [BO-112](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [BO-111](#)).

SEAT BELT COMPONENTS

B00PQ-02



T

N·m (kgf·cm, ft·lbf) : Specified torque

H10144

INSPECTION

CAUTION:

Replace the seat belt assembly (outer belt, inner belt, bolts, nuts or sill-bar) if it has been used in a severe impact. The entire assembly should be replaced even if damage is not obvious.

1. All Seat Belt Type:

RUNNING TEST (IN SAFE AREA)

- (a) Fasten the front seat belts.
- (b) Drive the car at 10 mph (16 km/h) and slam on the brakes. Check that the belt locks and cannot be extended at this time.

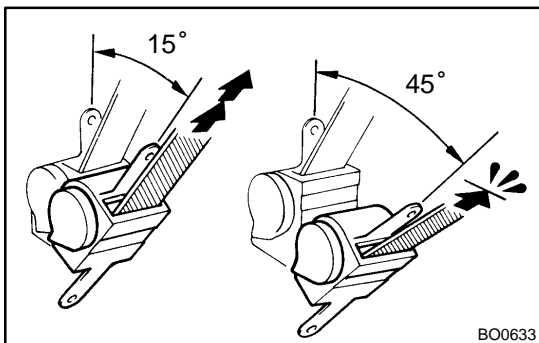
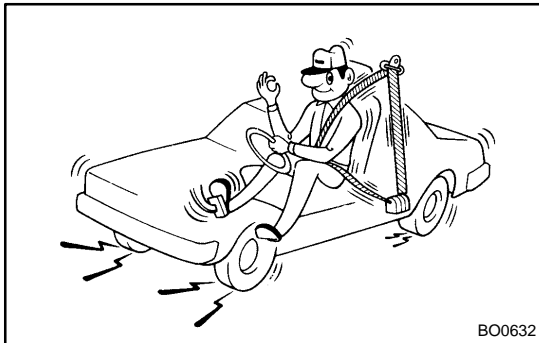
HINT:

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. Front 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.



- (d) Make sure that the belt can be pulled out at a tilt of 15 degrees or less, and cannot be pulled out over 45 degrees of tilt.

If a problem is found, replace the assembly.

3. Rear Seat Belt (ALR/ELR):

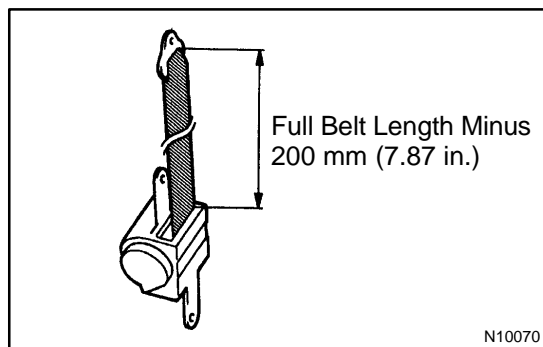
STATIC TEST

- (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.

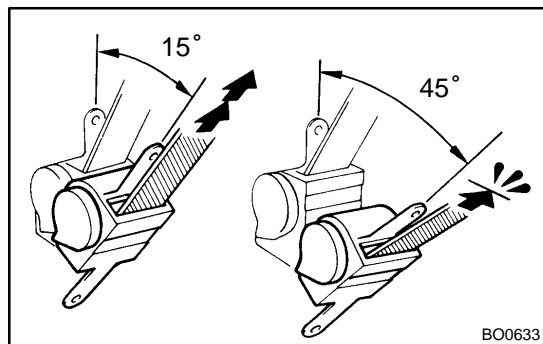
Then retract the belt slightly and pull it out again

- (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.

SEAT BELT PRETENSIONER REMOVAL

B00PS-01

NOTICE:

- If the wiring connector of the supplemental restraint system is disconnected with the ignition switch at ON or ACC, diagnostic trouble codes will be recorded.
- Never use SRS parts from another vehicle. When replacing parts, replace them with new parts.

1. REMOVE THESE PARTS:

- (a) Front door scuff plate
- (b) Rear door scuff plate
- (c) Center pillar garnish

2. REMOVE FRONT SEAT OUTER BELT**CAUTION:**

Never disassemble the front seat outer belt.

NOTICE:

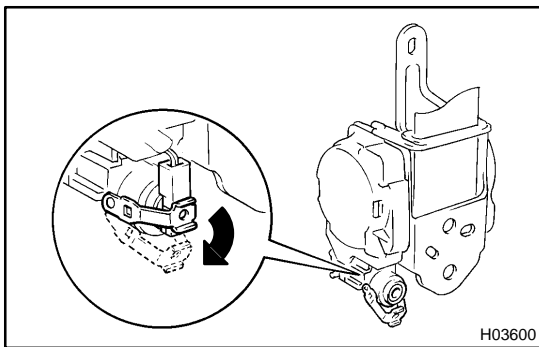
When removing the front outer seat belt, take care not to pull the seat belt pretensioner wire harness.

- (a) Remove the bolts and floor anchor.
- (b) Using a screwdriver, remove the anchor caps.

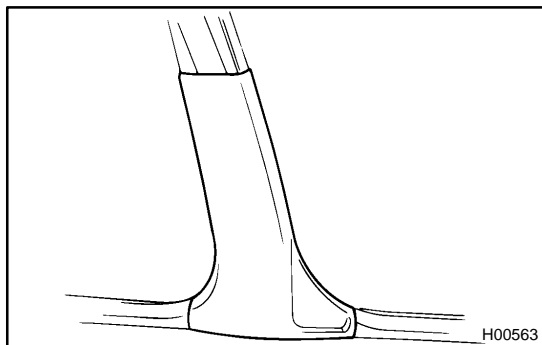
HINT:

Tape the screwdriver tip before use.

- (c) Remove the bolt and shoulder anchor.



- (d) Disconnect the pretensioner connector as shown in the illustration.
- (e) w/ Seat Belt Warning:
Disconnect the retractor switch connector.
- (f) Remove the 2 bolts and front seat outer belt.



H00563

INSPECTION

1. PRETENSIONER IS NOT ACTIVATED

- (a) Perform a diagnostic system check.
(See page [DI-459](#))
- (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 harnesses, and for chipping in connectors.
 - Check for deformation of the center pillar.

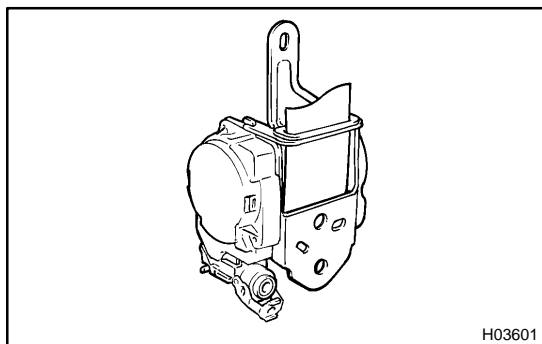
CAUTION:

For removal and installation of the front seat outer belt, see page [BO-118](#) and [BO-126](#).

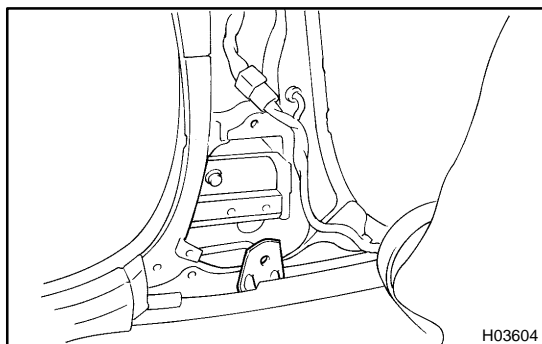
Be sure to follow the correct procedure.

2. PRETENSIONER IS ACTIVATED

- (a) Perform a diagnostic system check.
(See page [DI-459](#))
- (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 on the connector and wire harness.



H03601

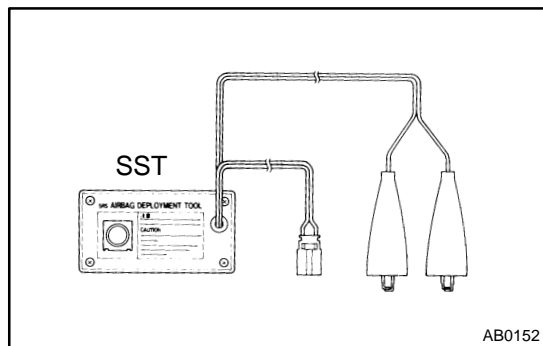


H03604

DISPOSAL

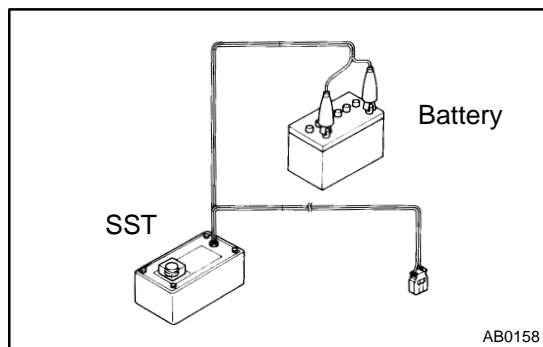
HINT:

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–(d) in "DISPOSAL".



CAUTION:

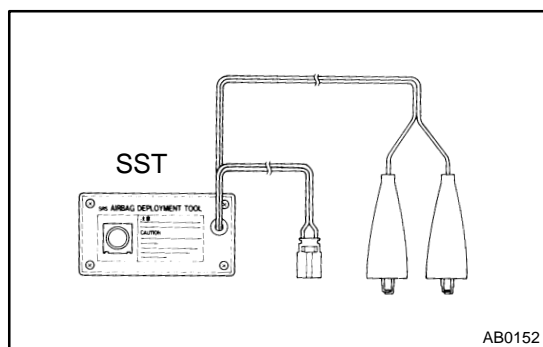
- Never dispose of front seat outer belt which has inactivated pretensioner.
- The seat belt pretensioner produces a sizeable exploding sound when it activates, so perform the operation out-of-door and where it will not create a nuisance to nearby residents.
- When activating the seat belt pretensioner, 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 activated pretensioner.
- Always wash your hands with water after completing the operation.
- Do not apply water, etc. to a front seat outer belt with activated pretensioner.



1. SEAT BELT PRETENSIONER DEPLOYMENT WHEN SCRAPPING VEHICLE

HINT:

Have a battery ready as the power source to activate the seat belt pretensioner.

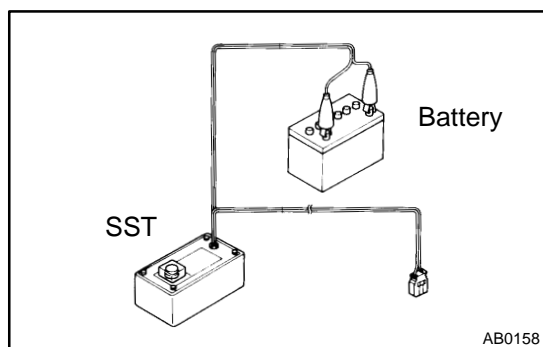


(a) Check functioning of SST

CAUTION:

When activate the seat belt pretensioner, always use the specified SST: SRS Airbag Deployment Tool.

SST 09082-00700, 09082-00740

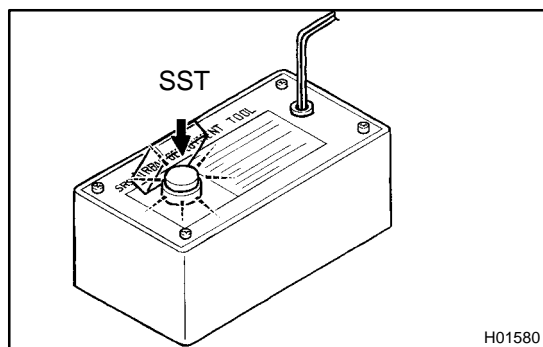


(1) Connect the SST to battery.

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.

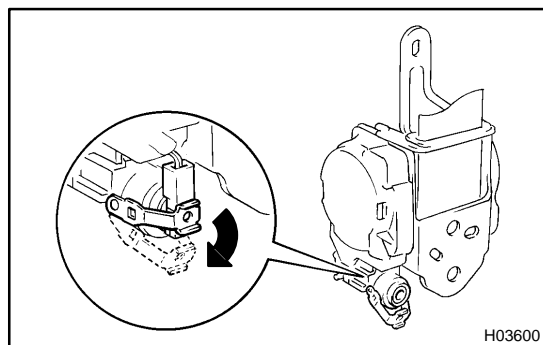
CAUTION:

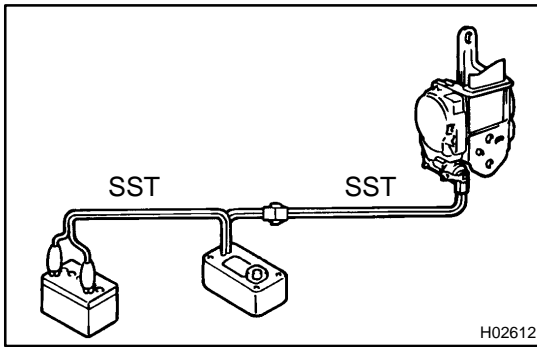
If the LED lights up when the activation switch is not being pressed, SST malfunction is probable, so definitely do not use the SST.

(b) Install the SST.

- (1) Remove the front door scuff plate.
- (2) Remove the center pillar lower garnish.
- (3) Disconnect the pretensioner connector as shown in the illustration.
- (4) 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.

SST 09082-00700, 09082-00740



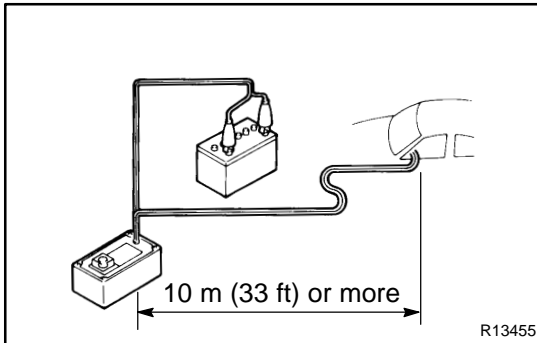


- (5) Connect the 2 SST each other, then connect them to the seat belt pretensioner.

SST 09082-00700, 09082-00740

NOTICE:

To avoid damaging the SST connector and wire harness, do not lock secondary lock of the twin lock.



- (6) Move the SST to at least 10m (33 ft) from the front of the vehicle.

- (7) Close all the doors and windows of the vehicle.

NOTICE:

Take care not to damage the SST wire harness.

- (8) Connect the SST red clip to the battery positive (–) terminal and the black clip to the negative (+) terminal.

- (c) Activate 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.

- (d) 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 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 activated seat belt pretensioner.

When scrapping a vehicle, activate the seat belt pretensioner and scrap the vehicle with 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.

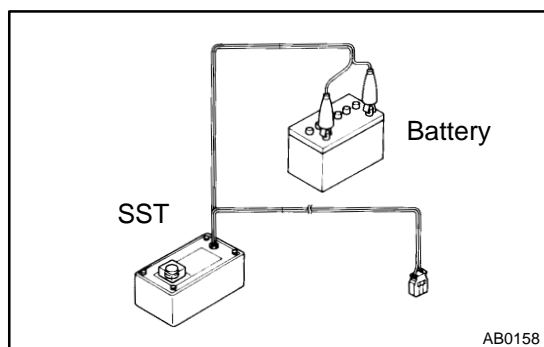
HINT:

Have a battery ready as the power source to activate the seat belt pretensioner.

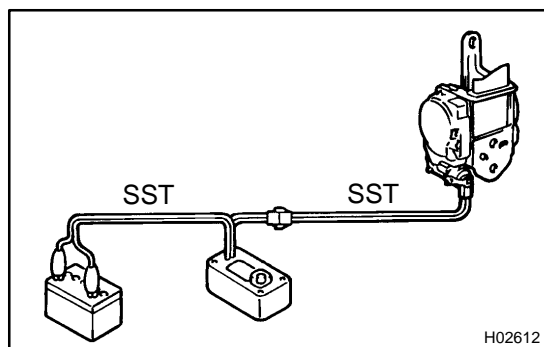
- (a) Remove the front seat outer belt
(See page [BO-115](#))

HINT:

Cut the belt near the seat belt retractor.



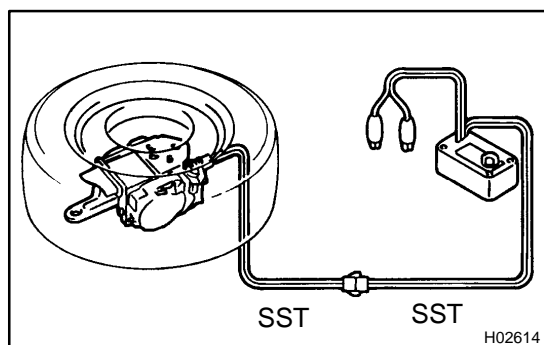
- (b) Check functioning of SST.
(See step 1-(a))
SST 09082-00700, 09082-00740



- (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.

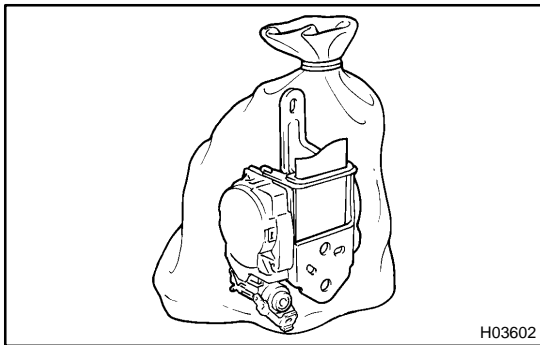
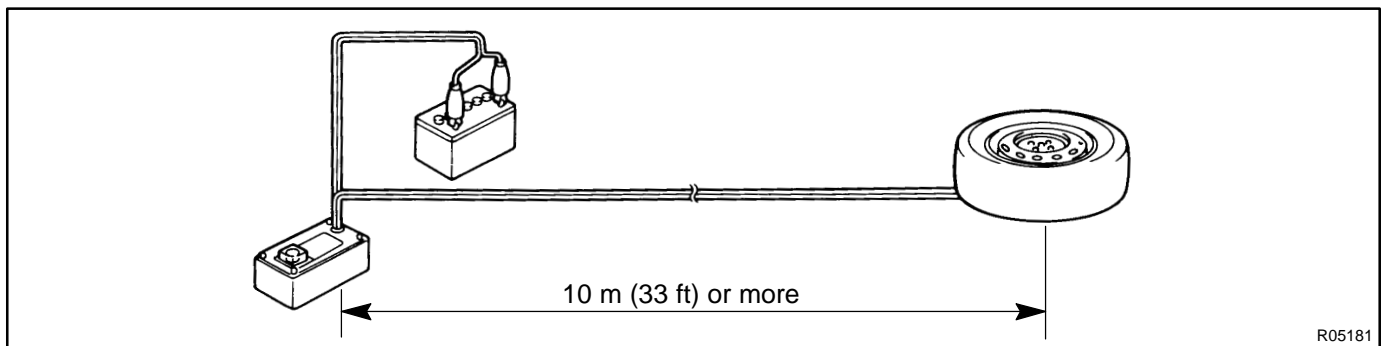
NOTICE:

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 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 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.

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 the check in 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-118](#) and [BO-126](#).

Be sure to follow the correct procedure.

INSTALLATION

NOTICE:

**Never use seat belt pretensioner from another vehicle.
When replace parts, replace them with new parts.**

1. INSTALL FRONT SEAT OUTER BELT

- (a) Install the front seat belt parts by following the reverse order of removal and torque the following bolts.

- (1) Front seat outer belt retractor

Torque:

Upper bolt: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

Lower bolt: 41 N·m (420 kgf·cm, 30 ft-lbf)

- (2) Seat belt shoulder anchor

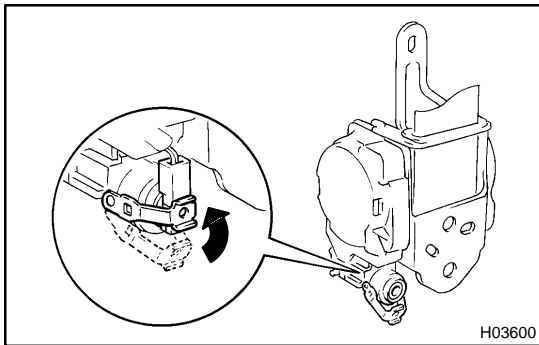
Torque: 41 N·m (420 kgf·cm, 30 ft-lbf)

- (3) Seat belt floor anchor

Torque: 41 N·m (420 kgf·cm, 30 ft-lbf)

NOTICE:

- **Make sure that the front seat outer belt is installed with 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.**

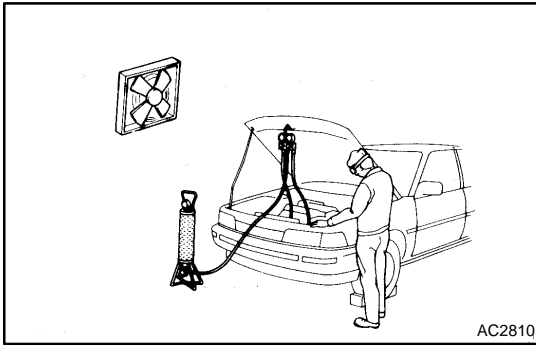


- (b) Connect the pretensioner connector as shown in the illustration.

- (c) w/ Seat Belt Warning:
Connect the retractor switch connector.

2. INSTALL THESE PARTS:

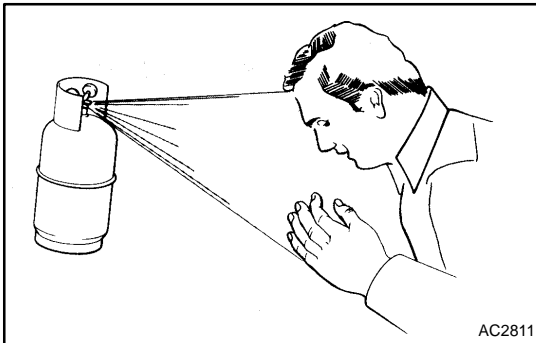
- (a) Center pillar garnish
(b) Rear door scuff plate
(c) Front door scuff plate



AIR CONDITIONING SYSTEM PRECAUTION

AC0NQ-01

1. **DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR WEAR EYE PROTECTION**
2. **ALWAYS WEAR EYE PROTECTION**



3. **BE CAREFUL NOT TO GET LIQUID REFRIGERANT IN YOUR EYES OR ON YOUR SKIN**

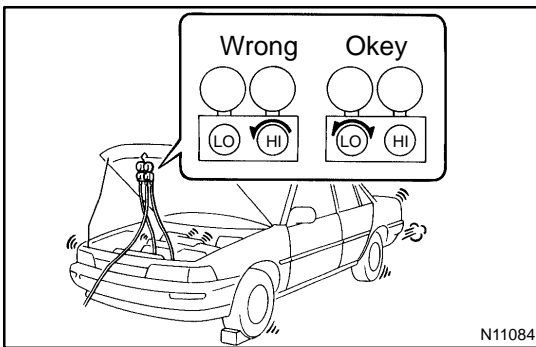
If liquid refrigerant gets in your eyes or on your skin.

- (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**



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 HIGH PRESSURE MANIFOLD VALVE WHILE COMPRESSOR IS OPERATING**

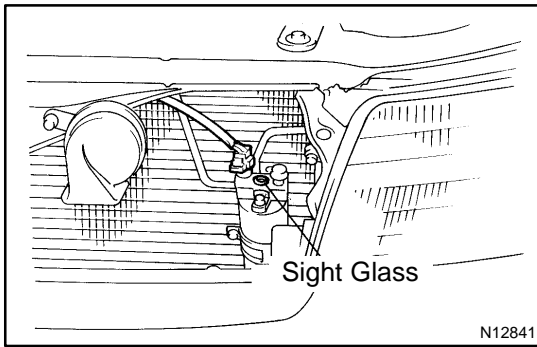
If the high pressure valves opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the only low pressure valve.

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 Lexus LS400 is equipped with an SRS (Supplemental Restraint System) such as the driver and passenger air bag. Failure to carry out service operations 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 servicing (including removal or installation of parts, inspection or replacement), be sure to read the following item carefully, then follow the correct procedure described in repair manual.



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 of 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

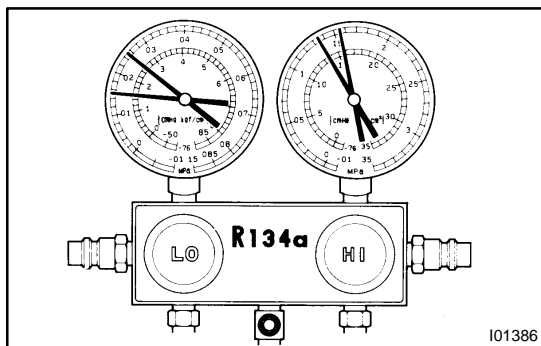
This is a method in which the trouble is located by using a manifold gauge set. Read the manifold gauge pressure when these conditions are established.

Test conditions:

- Temperature at the air inlet with the switch set at RECIRC is 30 – 35 °C (86 – 95 °F)
- Engine running at 2,000 rpm
- Blower speed control switch at "HI" position
- Temperature control dial on "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:

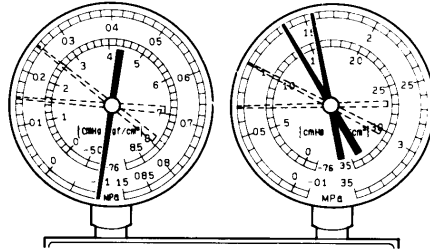
0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm²)

High pressure side:

1.37 – 1.55 MPa (14 – 15 kgf/cm²)

(2) Moisture present in refrigeration system.

Condition : Periodically cools and then fails to cool

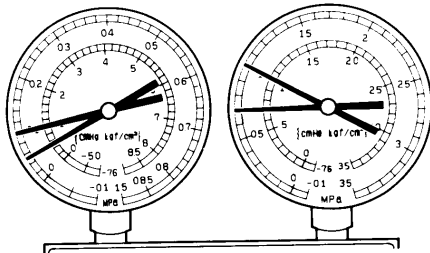


I01387

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	<ul style="list-style-type: none"> ○ Drier in oversaturated state ○ Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant 	<ul style="list-style-type: none"> (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

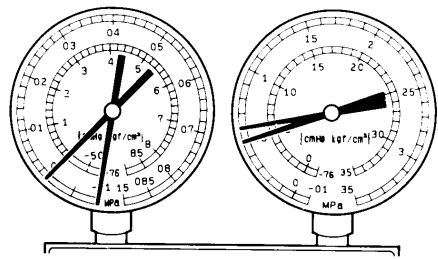


I01388

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> ○ 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	<ul style="list-style-type: none"> ○ Insufficient refrigerant in system ○ Refrigerant leaking 	<ul style="list-style-type: none"> (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

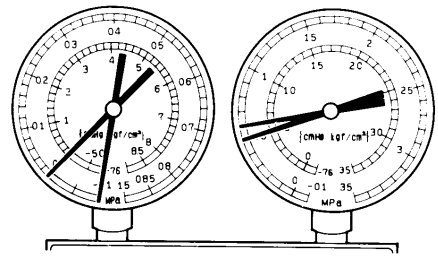


I01389

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none">○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)

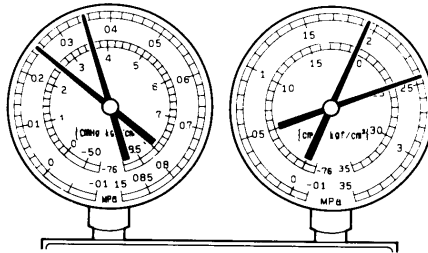


I01449

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none">○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	<ul style="list-style-type: none">○Refrigerant flow obstructed by moisture or dirt in refrigeration system○Refrigerant flow obstructed by gas leakage from expansion valve	Refrigerant does not circulate	<ul style="list-style-type: none">(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

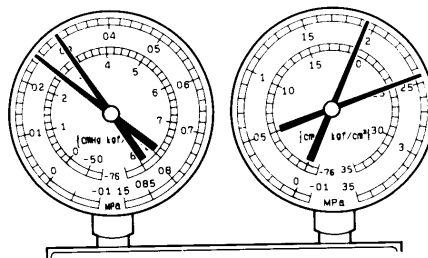


I01390

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> ○ Pressure too high on both low and high pressure sides ○ No air bubbles seen through the sight glass even when the engine rpm is lowered 	<ul style="list-style-type: none"> ○ Unable to develop sufficient performance due to excessive refrigeration system ○ Insufficient cooling of condenser 	<ul style="list-style-type: none"> ○ Excessive refrigerant in cycle → refrigerant over charged ○ Condenser cooling → condenser fins clogged of condenser fan faulty 	<ul style="list-style-type: none"> (1) Clean condenser (2) Check condenser fan motor 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



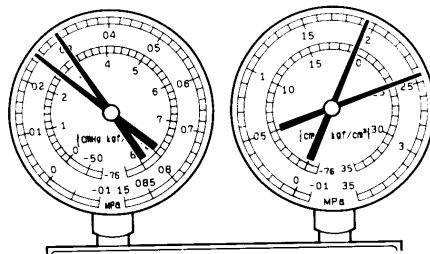
NOTE : These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

I01392

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> ○ Pressure too high on both low and high pressure sides ○ The low pressure piping hot to touch ○ Bubbles seen in sight glass 	Air entered in refrigeration system	<ul style="list-style-type: none"> ○ Air present in refrigeration system ○ Insufficient vacuum purging 	<ul style="list-style-type: none"> (1) Check compressor oil to see if it is dirty or insufficient (2) Evacuate air and charge new refrigerant

- (8) Expansion valve improperly Mounted/ Heat sensing tube defective
(Open too wide)

Condition: Insufficient cooling

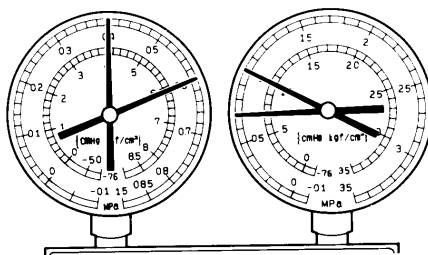


I01450

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> ○ 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 or heat sensing tube not installed correctly	<ul style="list-style-type: none"> ○ Excessive refrigerant in low pressure piping ○ Expansion valve opened too wide 	<ul style="list-style-type: none"> (1) Check heat sensing tube installed condition (2) Check expansion valve Replace if defective

- (9) Defective compression compressor

Condition : Does not cool



I01393

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
<ul style="list-style-type: none"> ○ Pressure too high on low and high pressure sides ○ Pressure too low on high pressure side 	Internal leak in compressor	<ul style="list-style-type: none"> ○ 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.

Test conditions:

- ☐ Blower speed control switch at "HI" position
- ☐ Temperature control dial at "COOL" position
- ☐ A/C switch ON
- ☐ Put gear shift in neutral

Magnetic clutch condition	Idle speed
Magnetic clutch not engaged	750 ± 50 rpm
Magnetic clutch engaged	800 ± 50 rpm

If idle speed is not as specified, check the ISC valve and air intake system.

4. INSPECT FOR LEAKAGE OF REFRIGERANT

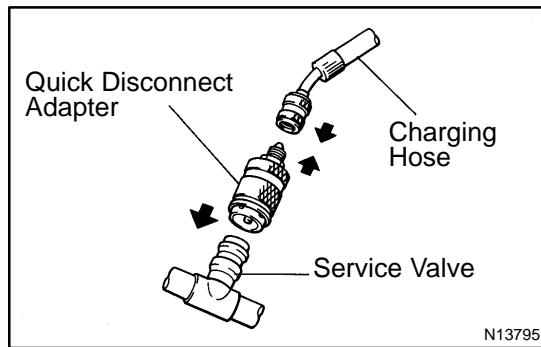
- (a) Perform in these conditions.
 - ☐ Stop engine.
 - ☐ Secure good ventilation (If the gas leak detector may not react to volatile gases which are not refrigerant, such as evaporated gasoline and exhaust gas.)
 - ☐ Repeat the test 2 or 3 times.
 - ☐ Make sure that there is some refrigerant remaining in the refrigeration system.
When compressor is OFF: approx. 392 – 588 kPa (4 – 6 kgf/cm², 57 – 85 psi)
- (b) Bring the gas leak detector close to the drain hose before performing the test.

HINT:

- ☐ After the blower motor has stopped, leave the cooling for more than 15 minutes.
- ☐ Expose the gas leak detector sensor 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.

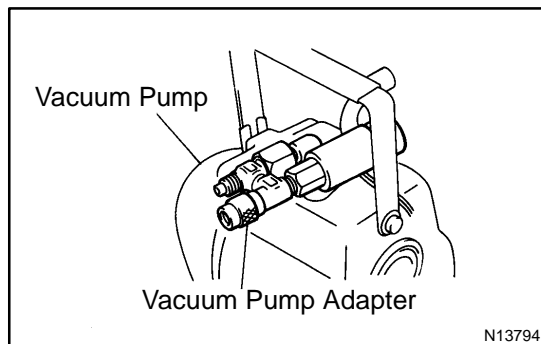
If such reaction is unavoidable, the vehicle must be lifted up.

- (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.

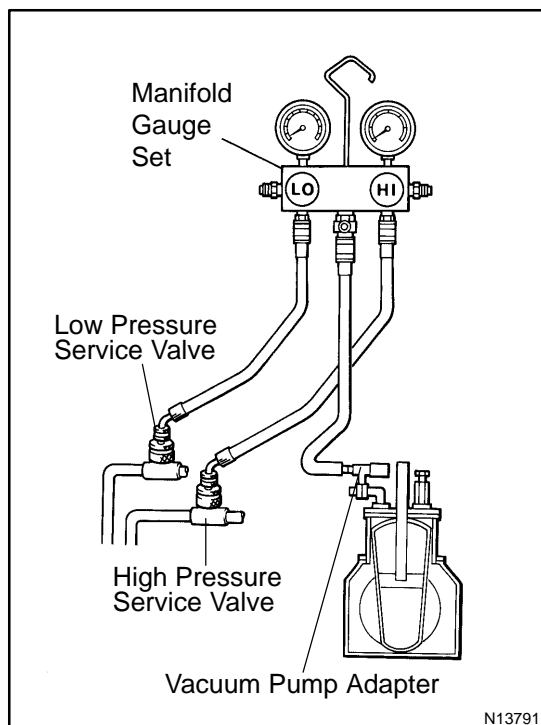


EVACUATING

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.

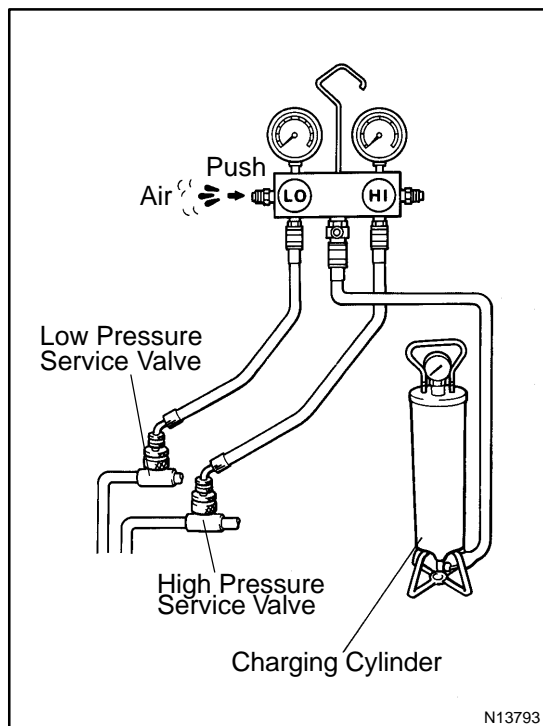


- (b) Connect the center hose of the manifold gauge set to the vacuum pump adapter.
- (c) Open both the high and low hand valves and run the vacuum pump.
- (d) After 10 minutes or more, check that the low pressure gauge indicates 750 mmHg (30 in. Hg) or more.

HINT:

If the reading is 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 if 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.



CHARGING

1. INSTALL CHARGING CYLINDER

HINT:

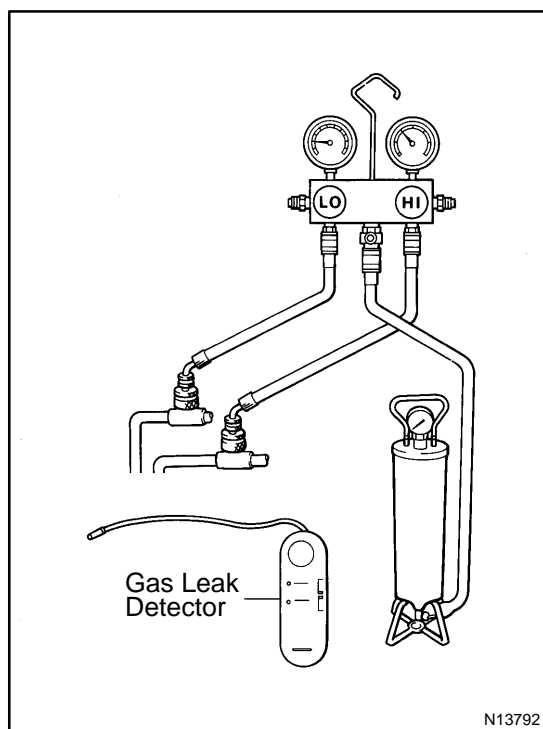
When handling the charging cylinder, always follow the directions given in the instruction manual.

- Charge the proper amount of refrigerant into the charging cylinder.
- Connect the center hose to the charging cylinder.

CAUTION:

Do not open both high and low hand valves of manifold gauge set.

- Open the valve of charging cylinder.
- Press the valve core on the side of manifold gauge and expel the air inside of the center hose.

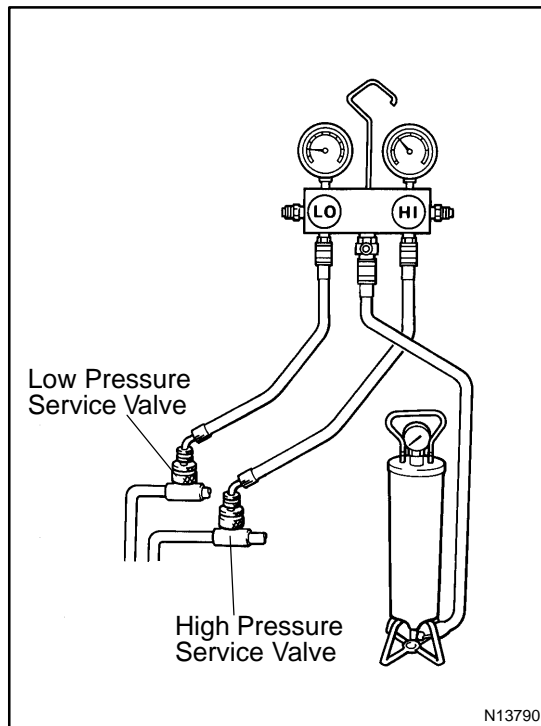


2. INSPECT REFRIGERATION SYSTEM FOR LEAKS

- Open the high pressure hand valve and charge refrigerant.
- When the low pressure gauge indicates 98 kPa (1 kgf/cm², 14 psi) close the high pressure hand valve.
- Using a gas leak detector, check the system for leakage. If leak is found, repair the faulty component or connection.

CAUTION:

Use the refrigerant recovery/ recycling machine to recover the refrigerant whenever replacing parts.



3. 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.

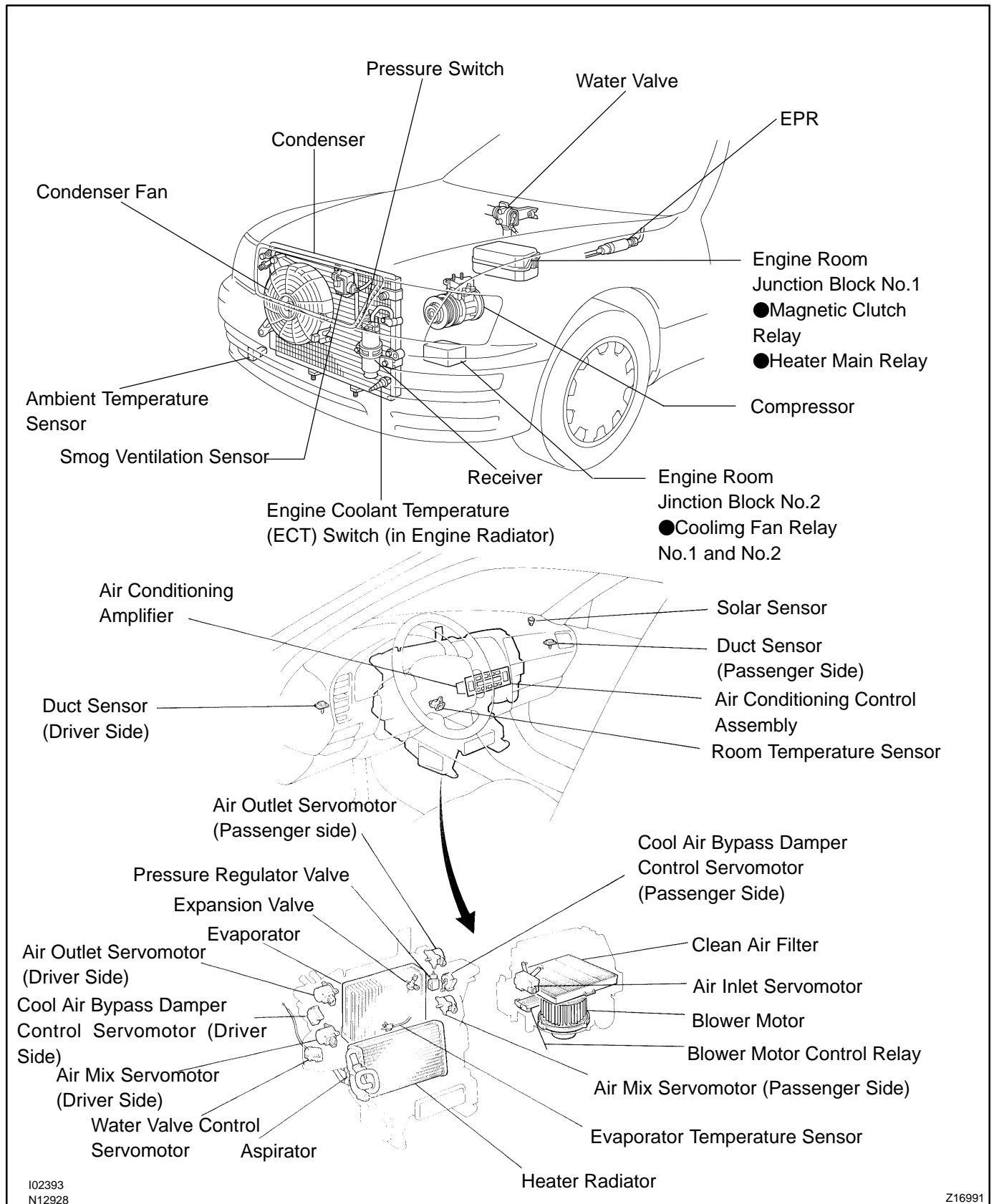
A fully charged system is indicated by the sight glass being free of any bubbles.

4. SET OFF MANIFOLD GAUGE SET

- (a) Close both hand valves of manifold gauge set.
- (b) Disconnect the quick disconnect adapters from the service valves.

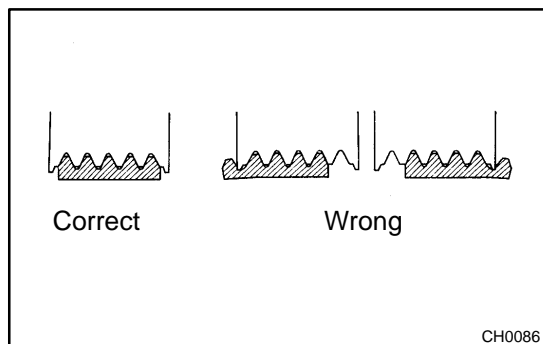
5. INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINES

LOCATION



I02393
N12928

Z16991

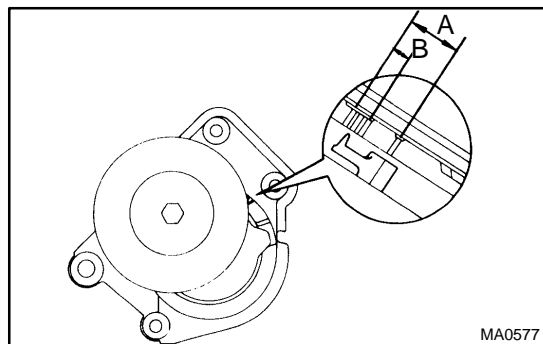


DRIVE BELT ON-VEHICLE INSPECTION

ACQNV-01

1. INSPECT DRIVE BELT'S INSTALLATION CONDITION

Check that drive belt fits properly in the ribbed grooves.



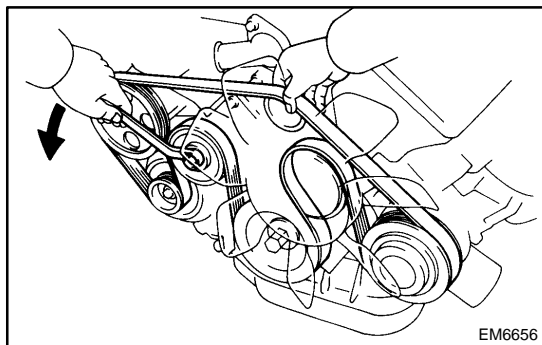
2. INSPECT DRIVE BELT TENSION

Check that the tension is within A range on the auto tensioner scale.

If the tension is not within the A range on the scale, replace the belt with a new one.

HINT:

When replacing the drive belt with a new one, the belt's tension should be within the B range on the belt tensioner scale.



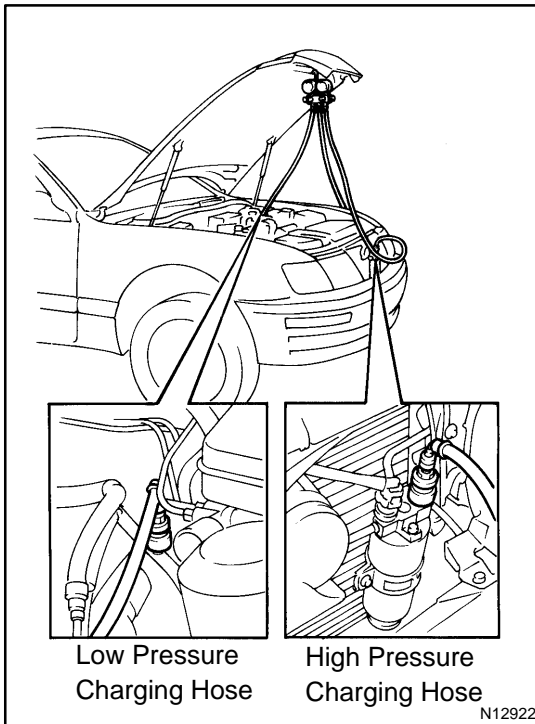
REMOVAL

REMOVE DRIVE BELT

Loosen the drive belt tension by turning the drive belt tensioner counterclockwise, and remove the drive belt.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-15](#)).



MANIFOLD GAUGE SET SET ON

ACONY-01

1. CONNECT CHARGING 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.

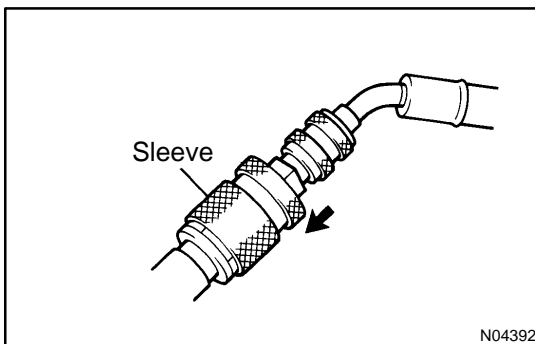
3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

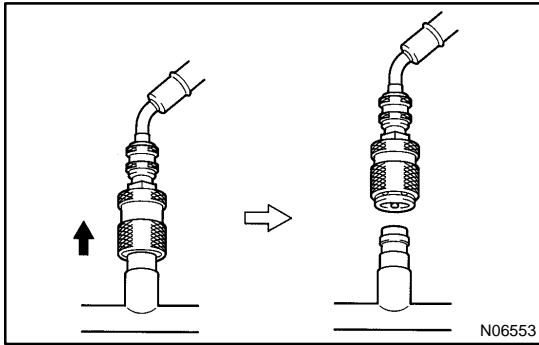
4. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINES

5. CONNECT QUICK DISCONNECT ADAPTERS TO SERVICE VALVES

HINT:

Push the quick disconnect adapter onto the service valve, slide, then slide the sleeve of the quick disconnect adapter downward to lock it.





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 LINES**

REFRIGERANT LINE

ON-VEHICLE INSPECTION

AC000-01

1. INSPECT HOSE AND TUBE CONNECTIONS FOR LOOSENESS
2. INSPECT HOSES AND TUBES FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

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 TO SPECIFIED TORQUE

NOTICE:

Connections should not be torqued tighter than the specified torqued.

Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Suction hose	10	100	7
Compressor x Discharge hose	10	100	7
Receiver x Liquid tube	5.4	55	48 in.·lbf
Condenser x Liquid tube	10	100	7
Condenser x Discharge tube	10	100	7
Pressure regulator valve x Tube	5.4	55	48 in.·lbf
Expansion valve x Liquid tube	19 mm nut	14	140
	24 mm nut	23	230
A/C unit x Suction tube	10	100	7
A/C unit Liquid tube	10	100	7
EPR x Equalizer tube	10	100	7
Pressure switch x Liquid tube	10	100	7
Tube x Tube	8 mm (0.31 in.) tube	14	140
	13 mm (0.51 in.) tube	23	230
	16 mm (0.63 in.) tube	32	330

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount: 700 ± 50 g (24.69 ± 1.76 oz.)

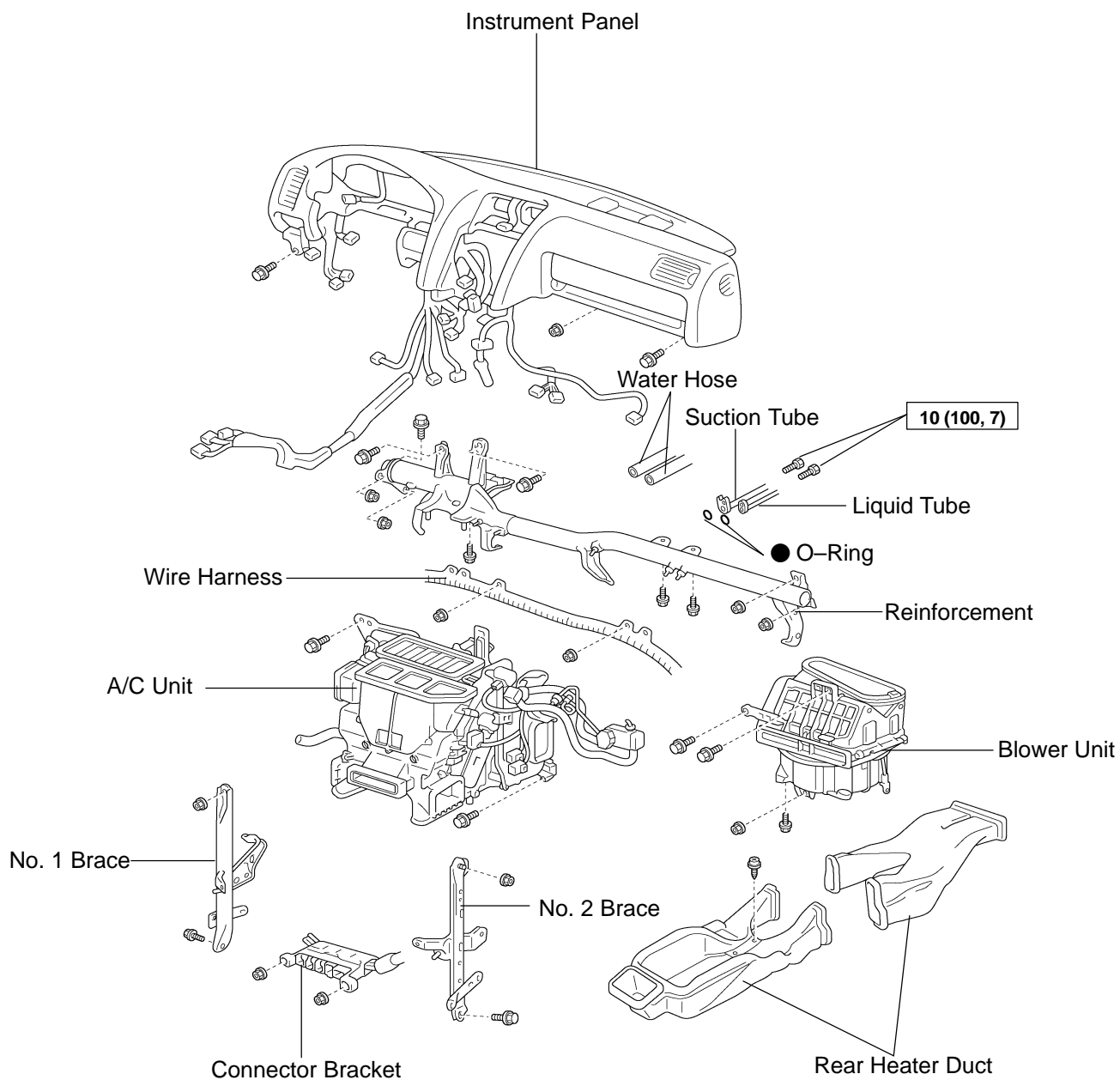
5. INSPECT FOR LEAKAGE OF REFRIGERANT

Using a gas leak detector, check for leakage of refrigerant.

6. INSPECT AIR CONDITIONING OPERATION

AIR CONDITIONING UNIT COMPONENTS

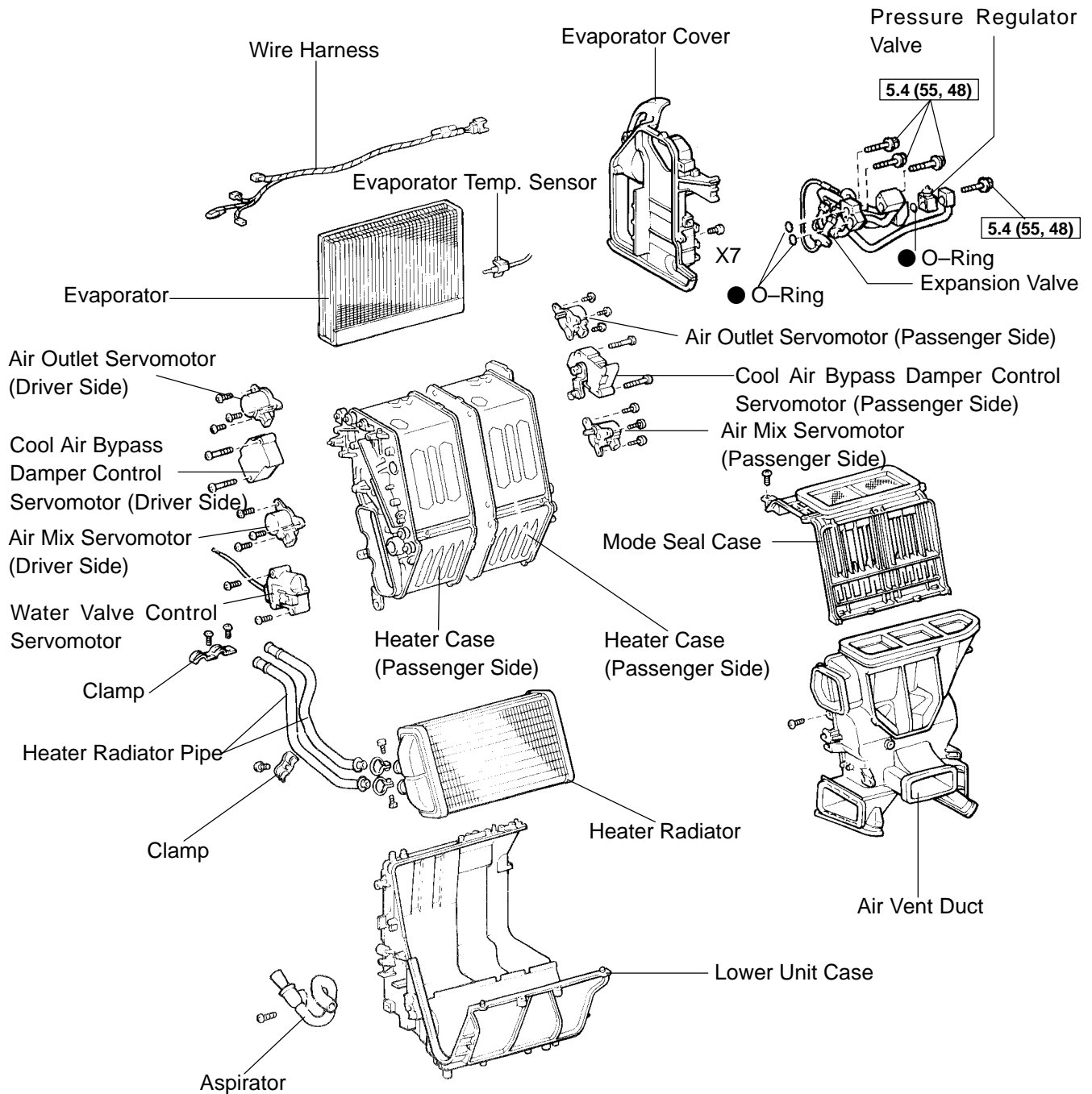
AC003-01



N·m (kgf·cm, ft·lbf) : Specified torque

● Non-reusable part

102389



N·m (kgf·cm, in.·lbf): Specified torque

● Non-reusable part

N13026

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

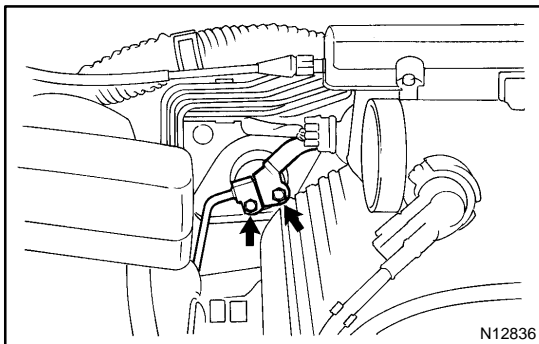
Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount : 700 ± 50 g (29.69 ± 1.76 oz.)

2. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.



3. DISCONNECT LIQUID AND SUCTION TUBES

Remove the 2 bolts and disconnect the both tubes.

Torque: 10 N·m (100 kgf-cm, 7ft-lbf)

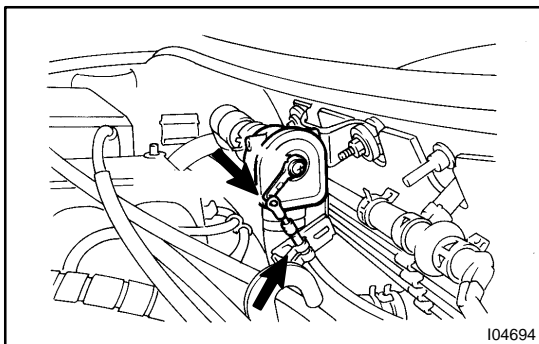
NOTICE:

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 2 new O-rings with compressor oil and install the tubes.

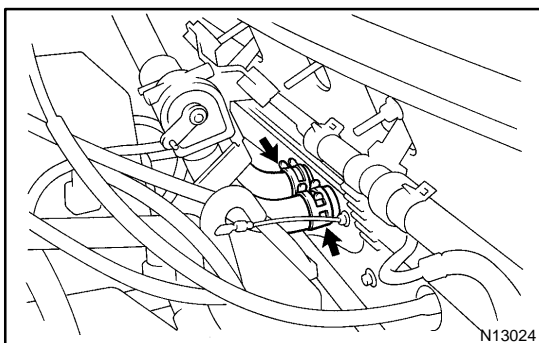


4. DISCONNECT WATER VALVE CONTROL CABLE

HINT:

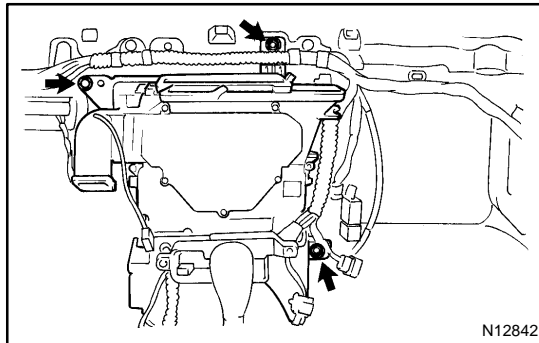
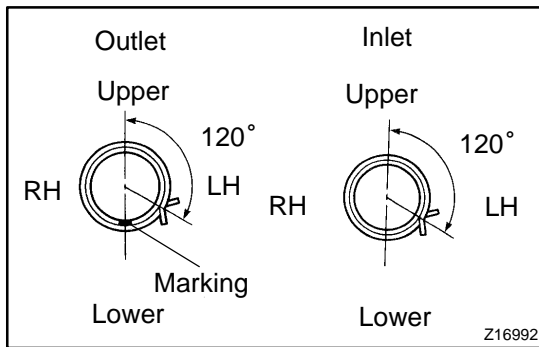
At the time of installation, please refer to the following item.

After connection, adjust the control cable (See page [AC-63](#)).



5. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

- Using pliers, grip the claw of the hose clip and slide the hose clip along the hose.
- 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 second ridge on the pipe and install the hose clip.
- Install the hose clip in the position, as shown in the illustration.

6. REMOVE INSTRUMENT PANEL AND REINFORCEMENT (See page [BO-83](#))

7. REMOVE BLOWER UNIT (See page [AC-31](#))

8. REMOVE A/C UNIT

- (a) Disconnect the connectors.
- (b) Remove the rear heater ducts.
- (c) Remove the wire harness set bolts.
- (d) Remove the 2 nuts, bolt and A/C unit.

DISASSEMBLY

1. REMOVE THESE PARTS:

- (a) Wire harness
- (b) Air mix servomotors
- (c) Water valve control servomotor
- (d) Air outlet servomotors
- (e) Aspirator
- (f) Cool air bypass damper control servomotors

2. REMOVE HEATER RADIATOR

- (a) Remove the 2 screws and 2 clamps.
- (b) Pull out the heater radiator.
- (c) Remove the 2 screws, 2 clamps and heater radiator pipes.
- (d) Remove the 2 O-rings.

HINT:

At the time of reassembly, please refer to the following item.
Do not reuse the 2 O-rings.

3. REMOVE LIQUID AND SUCTION TUBE

Using a hexagon wrench, remove the 3 bolts and tube.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

Lubricate 2 new O-rings with compressor oil and install the tube,

4. DISASSEMBLE LIQUID AND SUCTION TUBE

- (a) Pry out the packing.

HINT:

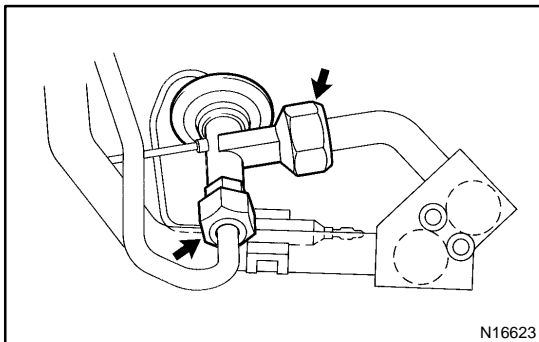
At the time of reassembly, please refer to the following item.
Do not reuse the packing.

- (b) Using a hexagon wrench, remove the bolt and valve.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

At the time of reassembly, please refer to the following item.
Lubricate a new O-ring with compressor oil and install the valve.



- (c) Remove the holder and disconnect the heat sensing tube of expansion valve.
- (d) Loosen the 2 nuts and remove the expansion valve.

Torque:

19 mm nut : 14 N·m (140 kgf·cm, 10 ft·lbf)

24 mm nut : 23 N·m (230 kgf·cm, 17 ft·lbf)

HINT:

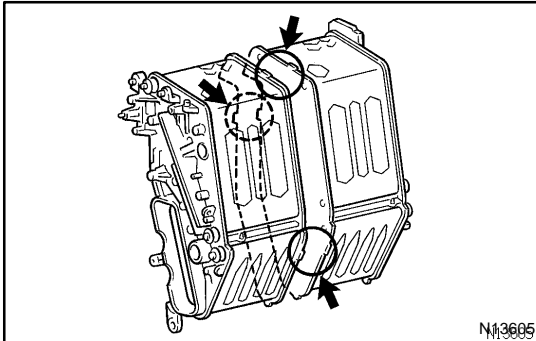
At the time of reassembly, please refer to the following item.
Lubricate 2 new O-rings with compressor oil and install the valve.

5. REMOVE EVAPORATOR

- (a) Remove the 7 screws and evaporator cover.
- (b) Pull out the evaporator.

6. REMOVE EVAPORATOR TEMPERATURE SENSOR**7. REMOVE AIR VENT DUCT****8. REMOVE HEATER CASE.**

- (a) Remove the 7 screws and heater case.
- (b) Remove 2 screws and make seal case.



- (c) Using a screwdriver, release the 3 claws and separate the heater cases.

HINT:

Tape the screwdriver tip before use.

REASSEMBLY

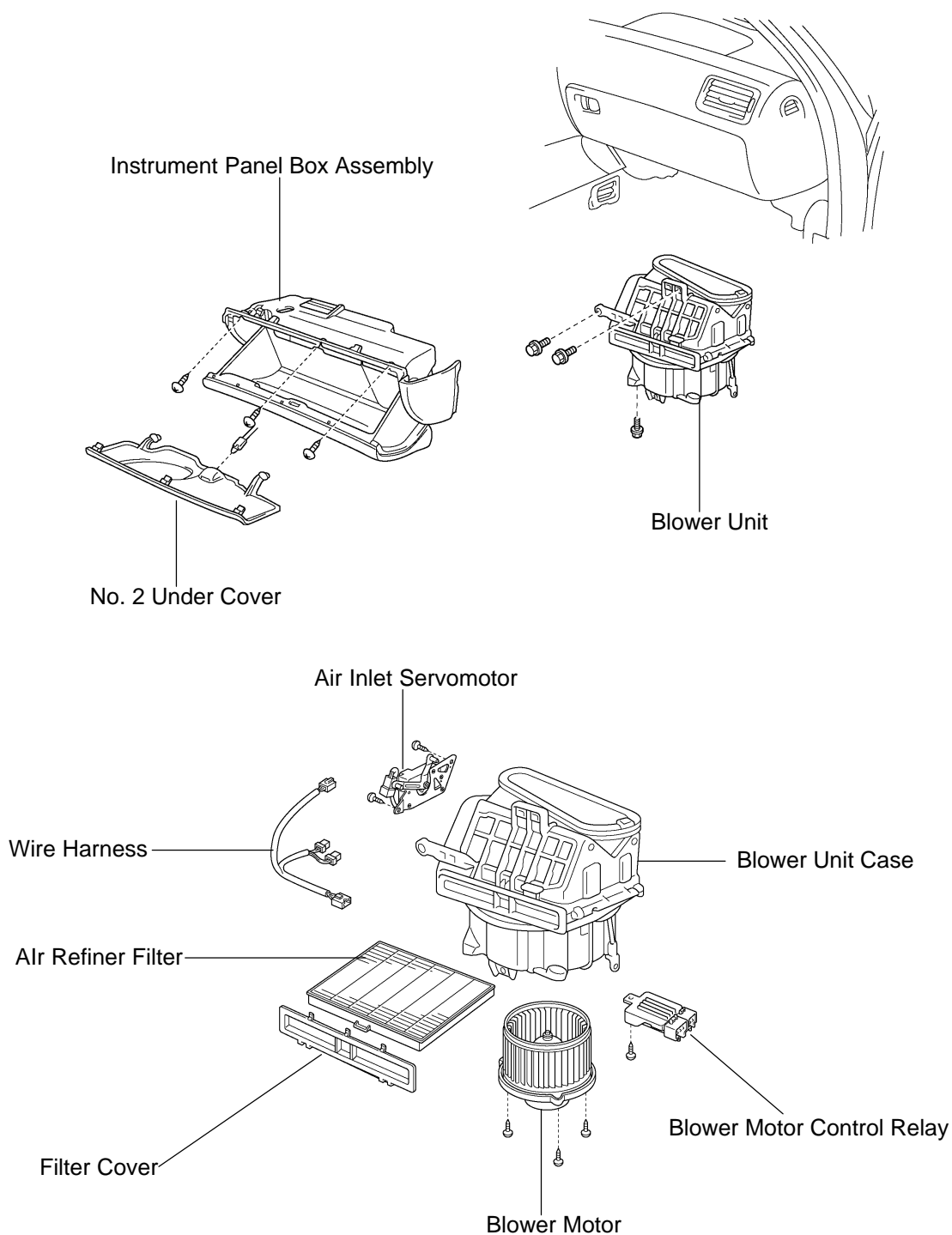
Reassembly is in the reverse order of disassembly (See page [AC-26](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [AC-24](#)).

BLOWER UNIT COMPONENTS

AC008-01

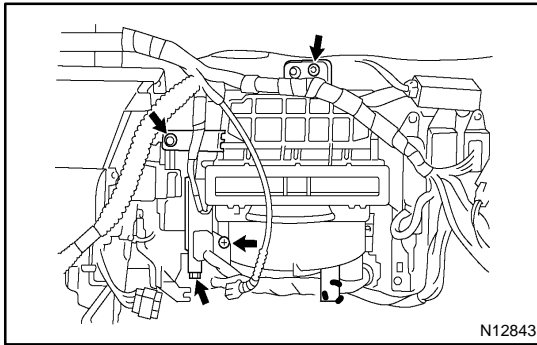


104695

REMOVAL

1. REMOVE THESE PARTS:

- (a) No. 2 under cover
- (b) Instrument panel box assembly
(See page [BO-83](#))



2. REMOVE BLOWER UNIT

- (a) Disconnect the connectors.
- (b) Remove the nut and disconnect the wire harness bracket.
- (c) Remove the screw and connect bracket.
- (d) Remove the 3 bolts, nut, and blower unit.

DISASSEMBLY

1. REMOVE WIRE HARNESS

2. REMOVE BLOWER MOTOR

Remove the 3 screws and blower motor.

3. REMOVE BLOWER MOTOR CONTROL RELAY

- (a) Disconnect the connectors.
- (b) Remove the screw and blower motor control relay.

4. REMOVE AIR INLET SERVOMOTOR

- (a) Disconnect the connector.
- (b) Remove the 2 screws and servomotor.

5. REMOVE CLEAN AIR FILTER

- (a) Disconnect the 3 claw and remove the filter cover.
- (b) Pull out the filter case.
- (c) Remove the clean air filter from the case.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [AC-32](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [AC-31](#)).

COMPRESSOR AND MAGNETIC CLUTCH

AC00D-01

ON-VEHICLE INSPECTION

1. SET ON MANIFOLD GAUGE SET

(See page [AC-17](#))

2. START ENGINE

3. INSPECT COMPRESSOR FOR METALLIC SOUND

Check if there is an abnormal metallic sound from the compressor when the A/C switch is on.

If abnormal 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-18](#))

8. MAKE THESE VISUAL CHECK:

- (a) Leakage of grease from the clutch bearing.
- (b) Signs of oil on the pressure plate.

If necessary, repair or replace.

9. INSPECT MAGNETIC CLUTCH BEARING FOR NOISE

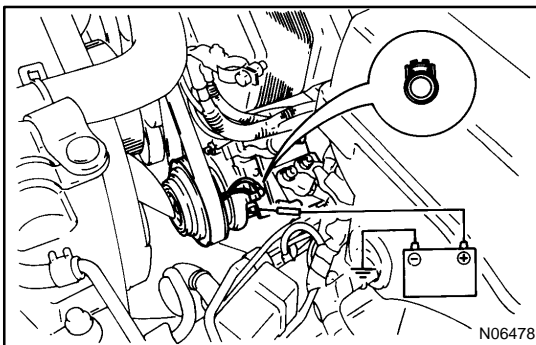
- (a) Start engine.
- (b) Check for abnormal noise near the compressor when the A/C switch is OFF.

If abnormal noise is being emitted, replace the magnetic clutch.

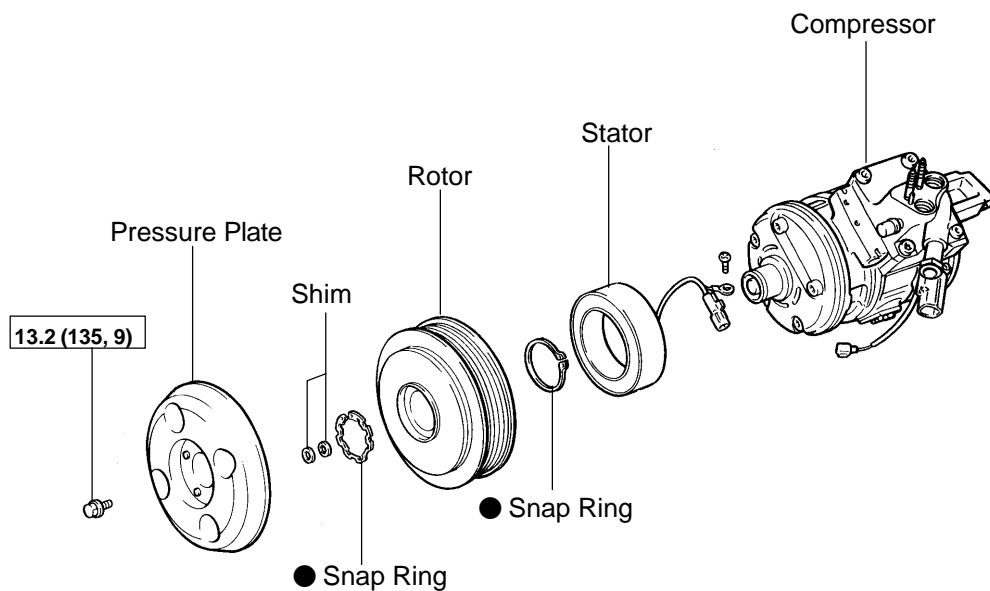
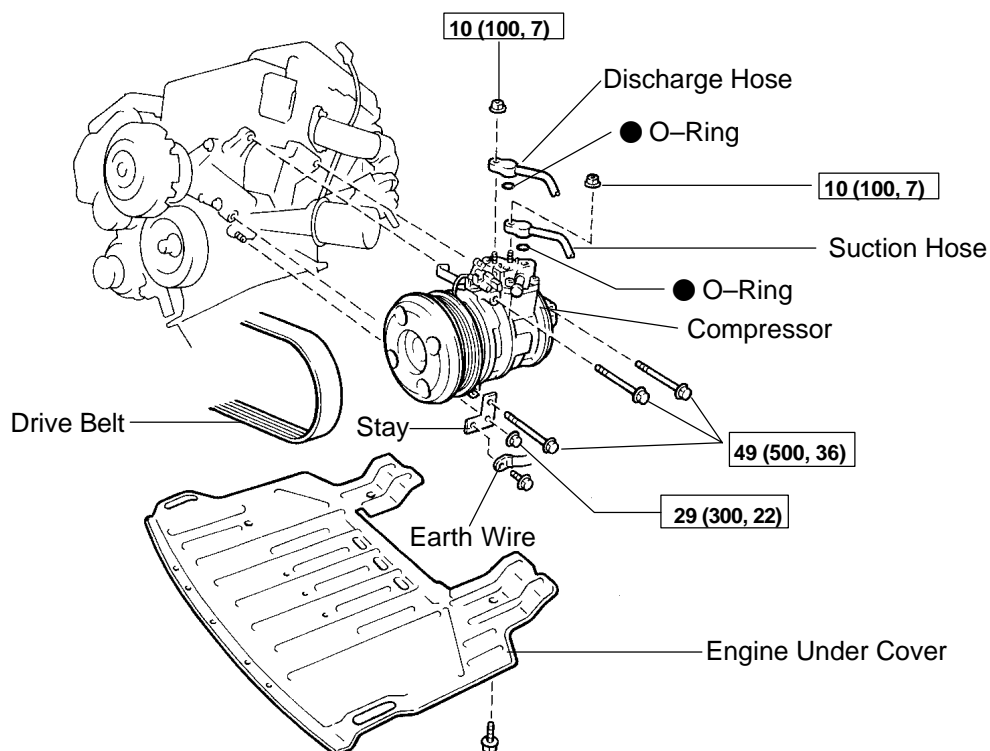
10. INSPECT MAGNETIC CLUTCH OPERATION

- (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.



COMPONENTS



[N·m (kgf·cm, ft·lbf)] : Specified torque

● Non-reusable part

104001

REMOVAL

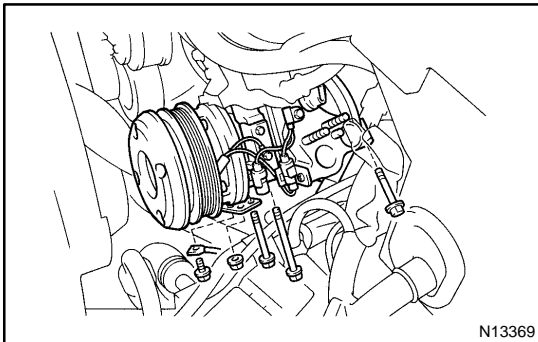
1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX. 10 MINUTES
2. STOP ENGINE
3. DISCONNECT NEGATIVE (–) TERMINAL CABLE FROM BATTERY
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
5. DISCONNECT DISCHARGE AND SUCTION HOSES

Remove the 2 nuts and disconnect the both hoses.

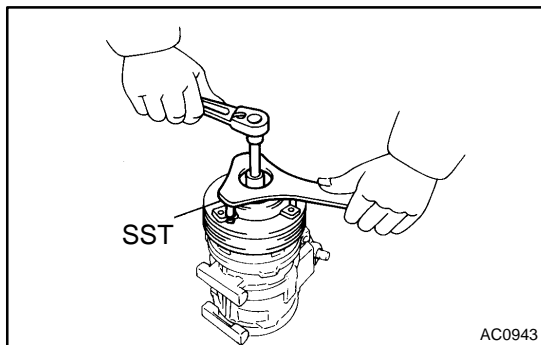
NOTICE:

Cap the open fittings immediately to keep moisture or dirt out of the system.

6. REMOVE DRIVE BELT
(See page [AC-15](#))
7. REMOVE ENGINE UNDER COVER



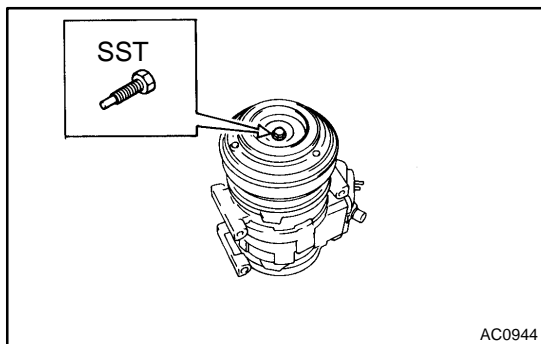
8. REMOVE COMPRESSOR
 - (a) Disconnect the connector.
 - (b) Remove the bolt and disconnect the earth wire.
 - (c) Remove the nut, the 3 bolts, compressor No.1 Stay and the compressor.



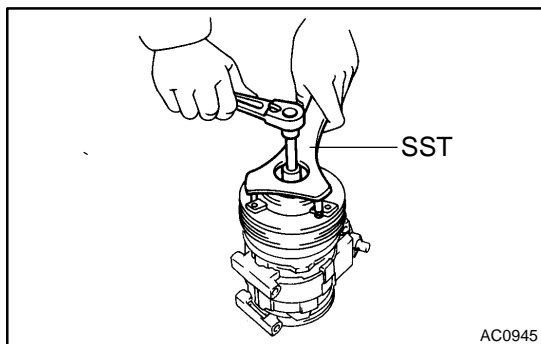
DISASSEMBLY

1. REMOVE PRESSURE PLATE

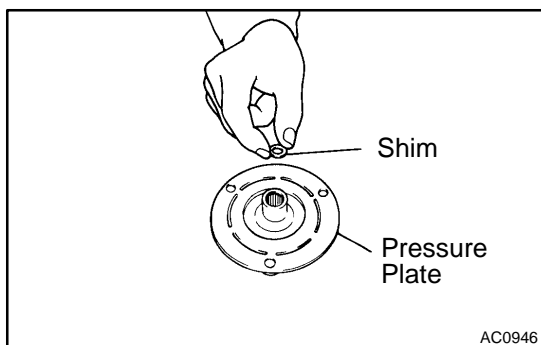
- (a) Using SST and a socket wrench, remove the shaft bolt.
Torque: 13.2 N·m (135 kgf·cm, 9 ft·lbf)
 SST 07112-76060



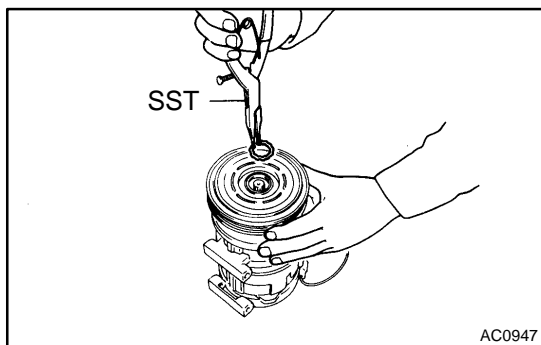
- (b) Install SST on the pressure plate.
 SST 07112-66040



- (c) Using SST and socket wrench, remove the pressure plate.
 SST 07112-66040, 07112-76060

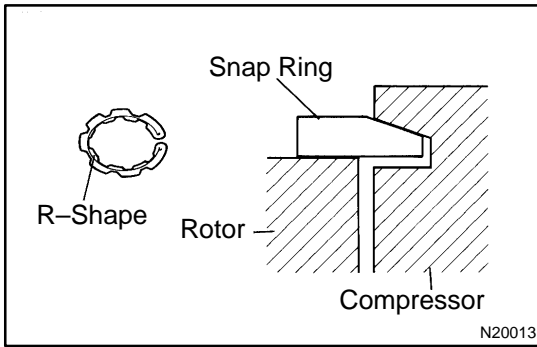


- (d) Remove the shims from the pressure plate.



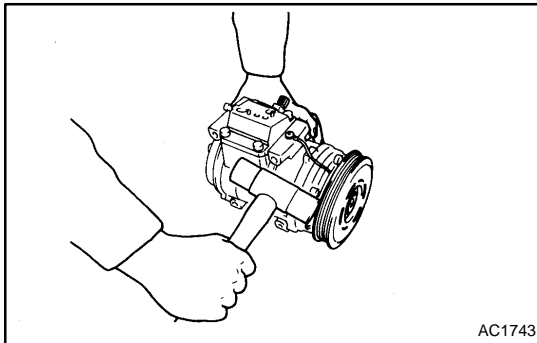
2. REMOVE ROTOR

- (a) Using SST, remove the snap ring.
 SST 07114-84020

**NOTICE:**

At the time of reassembly, please refer to the following item.

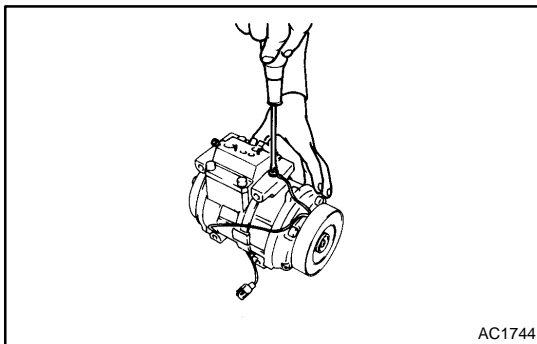
The snap ring should be installed so that beveled side faces up.



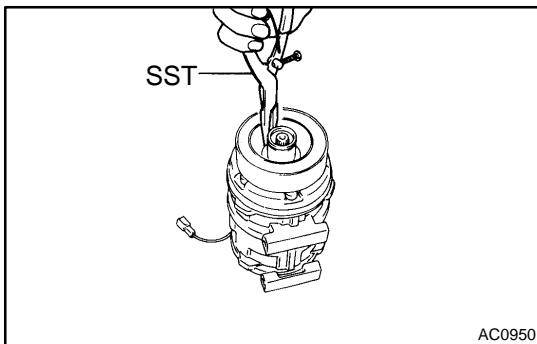
(b) Using a plastic hammer, tap the rotor off the shaft.

NOTICE:

Be careful not to damage the pulley when tapping on the rotor.

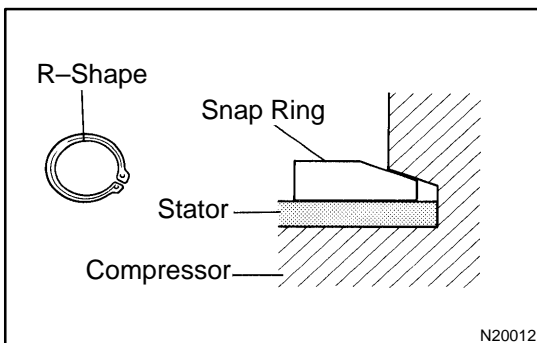
**3. REMOVE STATOR**

(a) Disconnect the stator lead wire from the compressor housing.



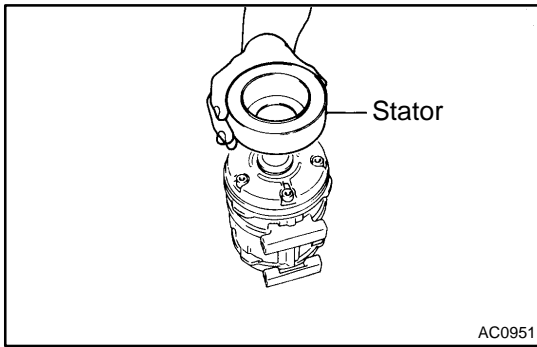
(b) Using SST, remove the snap ring.

SST 07114-84020

**NOTICE:**

At the time of reassembly, please refer to the following item.

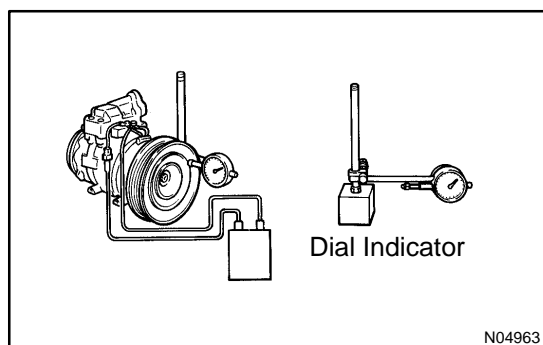
The snap ring should be installed so that its beveled side faces up.



(c) Remove the stator.

REASSEMBLY

Reassembly is in the reverse order of disassembly
(See page [AC-38](#)).



AFTER REASSEMBLY, CHECK MAGNETIC CLUTCH CLEARANCE

- Set the dial indicator to the pressure plate of the magnetic clutch.
- Connect the magnetic clutch lead wire to the positive (+) terminal of the battery.
- 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.)

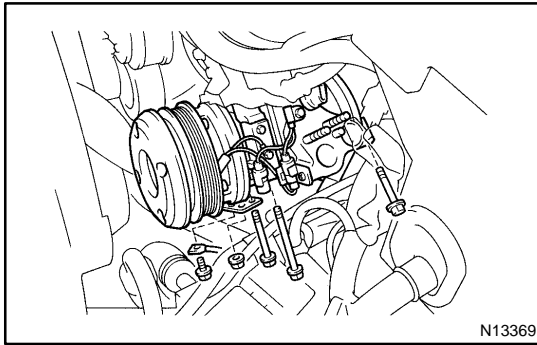
If the clearance is not within the standard clearance, adjust the clearance using shims to obtain the standard clearance.

Shim thickness:

0.1 mm (0.004 in.)

0.3 mm (0.012 in.)

0.5 mm (0.020 in.)



INSTALLATION

1. INSTALL COMPRESSOR

- (a) Install the compressor with the stay and 3 bolts..

Torque:

Bolts: 49 N·m (500 kgf-cm, 36 ft-lbf)

Nut: 29 N·m (300 kgf-cm, 22 ft-lbf)

- (b) Connect the earth wire harness with the bolts.
(c) Connect the connector.

2. INSTALL ENGINE UNDER COVER

3. CONNECT DISCHARGE AND SUCTION HOSES TO COMPRESSOR

Connect the both hoses with the 2 nuts.

Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)

NOTICE:

Hose should be connected immediately after the caps have been removed.

HINT:

Lubricate 2 new O-rings with compressor oil and install the hoses.

4. INSTALL AND CHECK DRIVE BELT

(See page [AC-16](#), [AC-14](#))

5. CONNECT NEGATIVE (-) TERMINAL CABLE TO BATTERY

6. EVACUATE AIR FROM REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT

Specified amount: 700 ± 50 g (24.69 ± 6.76 oz.)

7. 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.

8. INSPECT A/C OPERATION

RECEIVER

ON-VEHICLE INSPECTION

AC00J-01

INSPECT FITTINGS FOR LEAKAGE

Using a gas leak detector, check for leakage of refrigerant.

If there is leakage, check the fitting torque at the joints.

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

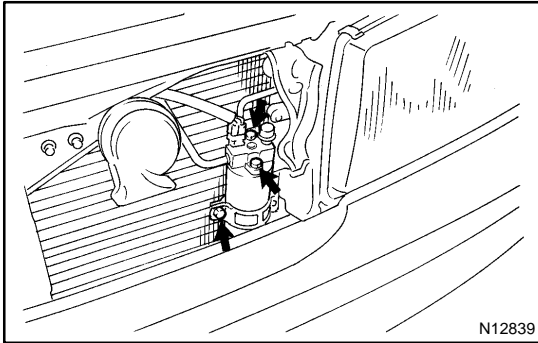
HINT:

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 : 700 ± 50 g (24.69 ± 1.76 oz.)



2. DISCONNECT 2 LIQUID TUBES

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 installation, please refer to the following item.

Lubricate 2 new O-rings with compressor oil and install the tubes.

3. REMOVE RECEIVER

Remove the holder bolt and pull out the receiver.

HINT:

At the time of installation, please refer to the following item.

If receiver is replaced, add compressor oil to receiver.

Add 10 cc (0.34 fl.oz.)

Compressor oil: ND-OIL 8 or equivalent

INSTALLATION

Installation is in the reverse order of removal (See page [AC-44](#)).

CONDENSER

AC00M-01

ON-VEHICLE INSPECTION

1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE

- If fins are clogged, wash them with water and dry with compressed air.

NOTICE:

Be careful no to damage the fins.

- If fins are bent, straighten them with a screwdriver or pliers.

2. INSPECT CONDENSER AND FITTING FOR LEAKAGE

Using a gas leak detector, check for leakage.

If there is leakage, check the tightening torque at the joints.

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

At the time of installation, please refer to the following item.

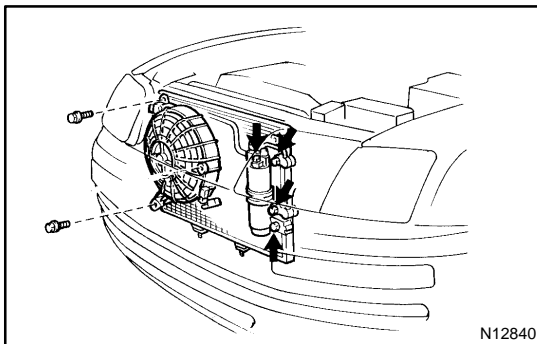
Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount : 700 ± 50 g (24.69 ± 1.76 oz.)

2. REMOVE THESE PARTS:

- (a) Air cleaner hose
- (b) Radiator upper mountings
- (c) Hood lock support
- (d) Hoses



3. REMOVE RECEIVER WITH RECEIVER HOLDER

Remove the 3 bolts and disconnect the liquid tubes.

Torque: 10 N·m (100 kgf-cm, 7 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 3 new O-rings with compressor oil and install the tubes.

4. REMOVE CONDENSER FAN

- (a) Disconnect the connector.
- (b) Remove the 2 bolts and fan.

5. DISCONNECT DISCHARGE HOSE

Remove the bolt and disconnect hose.

Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)

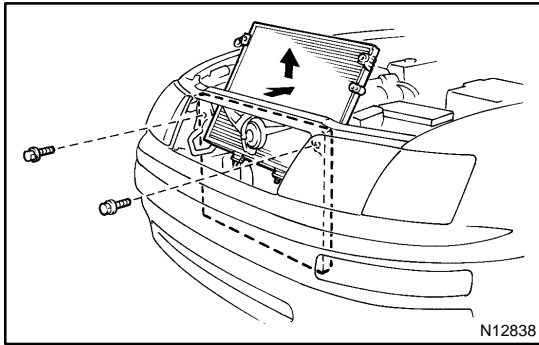
NOTICE:

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 the hose.

**6. REMOVE CONDENSER**

- (a) Remove the 2 condenser upper mounting bolts.
- (b) Push the radiator toward engine.
- (c) Push the condenser toward radiator and pull it upward.

HINT:

At the time of installation, please refer to the following item.

If condenser is replaced, add compressor oil to condenser.

Add 40 cc (1.4 fl.oz.)

Compressor oil : ND-OIL 8 or equivalent

INSTALLATION

Installation is in the reverse order of removal (See page [AC-47](#)).

EVAPORATOR REMOVAL

AC00P-01

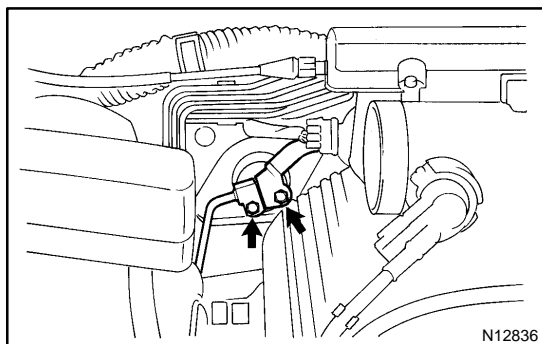
1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

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 : 700 ± 50 g (24.69 ± 1.76 oz.)



2. DISCONNECT LIQUID AND SUCTION TUBES FROM A/C UNIT

Remove the 2 bolts and disconnect the both tubes.

Torque: 10 N·m (100 kgf-cm, 7 ft-lbf)

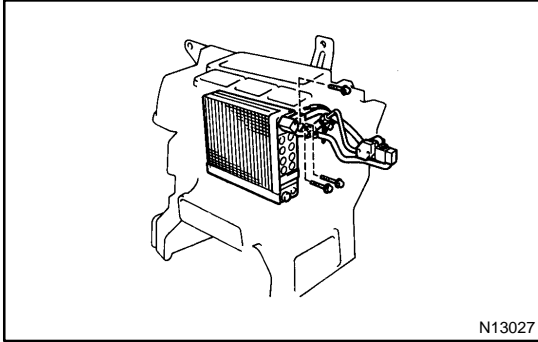
NOTICE:

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 2 new O-rings with compressor oil and install the tubes.

3. REMOVE BLOWER UNIT (See page [AC-31](#))



4. REMOVE LIQUID AND SUCTION TUBES FROM EVAPORATOR

- (a) Pry out the packing.

HINT:

At the time of installation, please refer to the following item.

Do not refer to the packing.

- (b) Using a hexagon wrench, remove the 3 bolts and separate the evaporator and 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 installation, please refer to the following item.

Lubricate 2 new O-rings with compressor oil and install the tubes.

5. REMOVE EVAPORATOR

- (a) Remove the 7 screws and evaporator cover.

- (b) Pull out the evaporator

HINT:

At the time of installation, please refer to the following item.

If evaporator is replaced, add compressor oil to the evaporator.

Add 40 cc (1.4 fl.oz.)

Compressor oil: ND-OIL 8 or equivalent

INSPECTION

1. INSPECT FINS FOR BLOCKAGE

If fins are clogged, clean them with compressed air.

NOTICE:

Never use water to clean the evaporator.

2. CHECK FITTING FOR CRACKS SCRATCHES

Repair as necessary.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-50](#)).

HEATER RADIATOR REMOVAL

AC00S-01

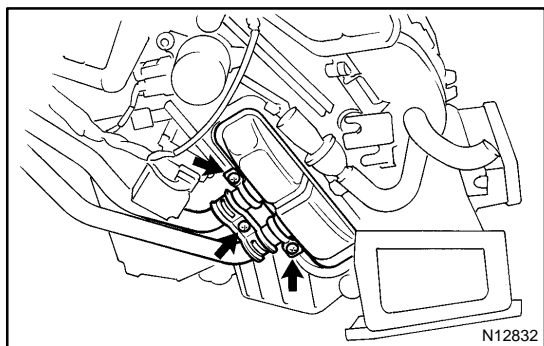
1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all coolant.

2. REMOVE THESE PARTS :

- (a) No.1 safety pad
 - (b) No.1 under cover
 - (c) No.2 heater to register duct
- (See page [BO-83](#))



3. REMOVE HEATER RADIATOR

- (a) Remove the screw and clamp.
- (b) Remove the 2 screws, 2 clamps and disconnect the heater radiator pipes.
- (c) Pull out the heater radiator.
- (d) Remove the 2 O-rings.

HINT:

At the time of installation, please refer to the following item.
Do not reuse 2 O-rings.

INSPECTION

INSPECT FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-54](#)).

EXPANSION VALVE

AC00V-02

ON-VEHICLE INSPECTION

1. CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE
2. SET ON MANIFOLD GAUGE SET
(See page [AC-17](#))

3. RUN ENGINE

Run the engine at 1,500 rpm for at least 5 minutes.

Then check that the high pressure reading is 1.37 – 1.53 MPa (14 – 16 kgf/cm², 199 – 228 psi).

4. CHECK EXPANSION VALVE

If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm², 0 psi), otherwise it is ok.

HINT:

When the low pressure drops to 0 kPa (0 kgf/cm², 0 psi), check the receiver's IN and OUT side for no temperature difference.

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

HINT:

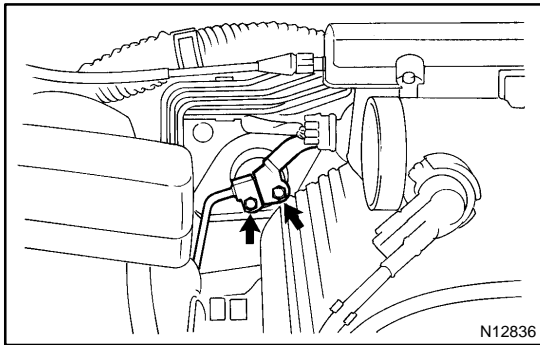
At the time of installation, please refer to the following item.

Evacuate air from refrigeration system.

Charge system with refrigerant and inspect for leakage of refrigerant.

Specified amount : 700 ± 50 g (24.69 ± 1.76 oz.)

2. REMOVE BLOWER UNIT (See page [AC-31](#))



3. DISCONNECT LIQUID AND SUCTION TUBES FROM A/C UNIT OUTLET FITTINGS

Remove the 2 bolts and disconnect the both tubes.

Torque: 10 N·m (100 kgf·cm, 7 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 2 new O-rings with compressor oil and install the tubes.

4. DISCONNECT EQUALIZER TUBE FROM EPR

Remove the bolt and disconnect the tube.

Torque: 10 N·m (100 kgf·cm, 7 ft·lbf)

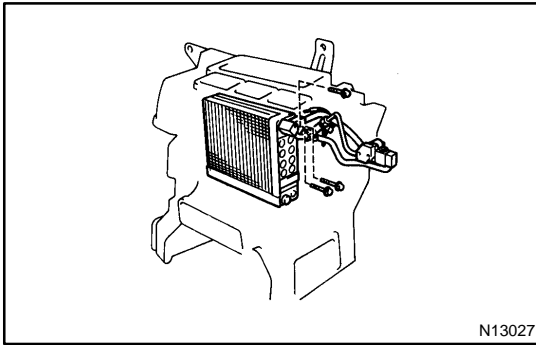
NOTICE:

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 2 new O-rings with compressor oil and install the tubes.



5. REMOVE LIQUID TUBE AND SUCTION TUBES FROM EVAPORATOR

- (a) Pry out the packing.

HINT:

At the time of installation, please refer to the following item.
Do not reuse the packing.

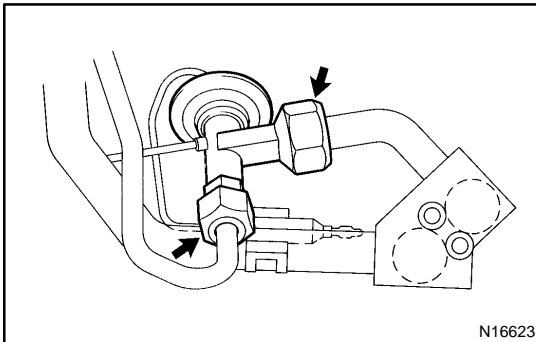
- (b) Using a hexagon wrench, remove the 3 bolts and tubes.

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 2 new O-rings with compressor oil and install the tubes.



6. REMOVE EXPANSION VALVE

- (a) Pry out the packing.

HINT:

At the time of installation, please refer to the following item.
Do not reuse the packing.

- (b) Remove the holder and disconnect the heat sensing tube.

- (c) Loosen the 3 nuts and remove the expansion valve.

Torque:

14 mm nut : 10 N·m (100 kgf·cm, 7 ft·lbf)

19 mm nut : 14 N·m (140 kgf·cm, 10 ft·lbf)

24 mm nut : 22 N·m (225 kgf·cm, 16 ft·lbf)

HINT:

At the time of installation, please refer to the following item.
Lubricate 3 new O-rings with compressor oil and install the valve.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-58](#)).

WATER VALVE

AC00Y-01

ON-VEHICLE INSPECTION

1. **WARM UP ENGINE**
2. **DISCONNECT WATER VALVE CONTROL CABLE**
3. **INSPECT WATER VALVE OPERATION**
 - (a) Check that warm air is blown out of the vent when the water valve lever is moved to "warm" position.
 - (b) Check that cool air is blown out of the vent when the water valve lever is moved to "cool" position.
4. **CONNECT WATER VALVE CONTROL CABLE**

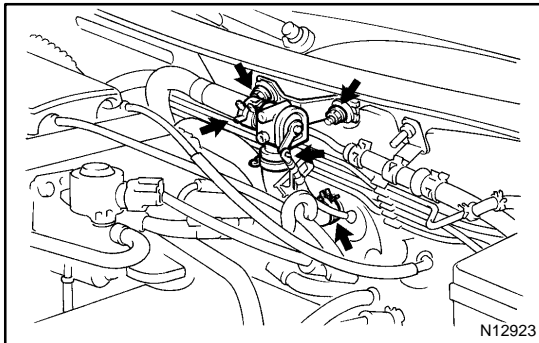
After connection, adjust the control cable (See page [AC-63](#)).

REMOVAL

1. DRAIN ENGINE COOLANT FROM RADIATOR

HINT:

It is not necessary to drain out all the coolant.



2. DISCONNECT WATER VALVE CONTROL CABLE

HINT:

At the time of installation, please refer to the following item.
After connection, check water valve operation.

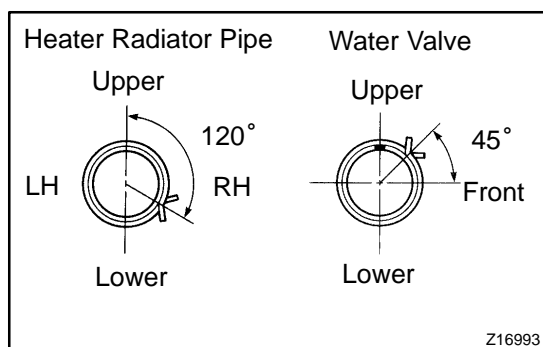
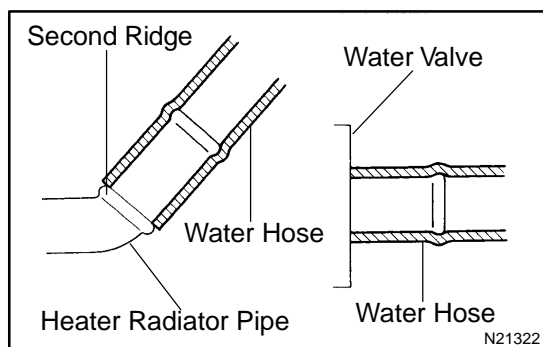
3. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPE AND WATER VALVE

- Using a pliers, grip the claw of the hose clip and slide the hose clip along the hose.
- Disconnect the water hoses.

HINT:

At the time of installation, please refer to the following item.

- Push the water hose onto the heater radiator pipe as far as the second ridge on the pipe.
- Push the water hose onto the water valve as far as the water valve.



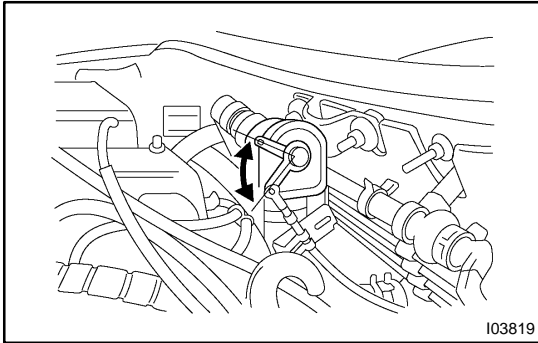
- Install the hose clip in a position, as shown in the illustration.

4. REMOVE WATER VALVE

Remove the 2 bolts and water valve.

INSTALLATION

Installation is in the reverse order of removal
(See page AC-62).



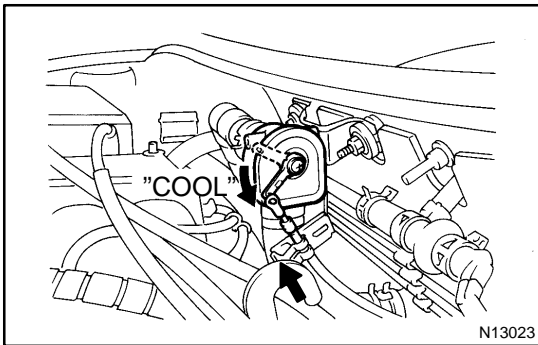
1. AFTER INSTALLATION, CHECK WATER VALVE OPERATION

- (a) Turn ignition switch to ON.
- (b) Operate temperature control switches to "MAX. COOL" and "MAX. WARM", then check that water valve operation, as shown in the illustration.

If operation is not as specified, next step.

2. ADJUST WATER VALVE CONTROL CABLE

- (a) Turn ignition switch to ON.
- (b) Disconnect the control cable.
- (c) Set temperature control switches "MAX. COOL".



- (d) Set the water valve lever on "COOL" position, connect the control cable and lock the clamp.

HINT:

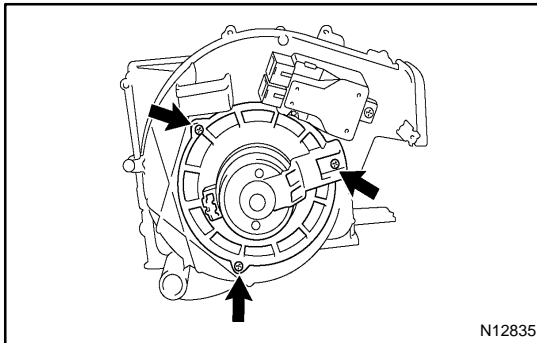
Lock the clamp while lightly pushing the outer cable in the direction, as shown in the illustration by an arrow.

BLOWER MOTOR REMOVAL

ACOP1-01

1. REMOVE THESE PARTS :

- (a) Front door scuff plate RH
 - (b) Cowl side trim RH
 - (c) No.2 under cover
- (See page [BO-83](#))



2. REMOVE BLOWER MOTOR

- (a) Disconnect the connector.
- (b) Remove the 3 screws and blower motor.

INSPECTION

INSPECT BLOWER MOTOR CIRCUIT

(See page [DI-1010](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-64](#)).

INSPECTION

INSPECT BLOWER MOTOR CONTROL RELAY CIRCUIT

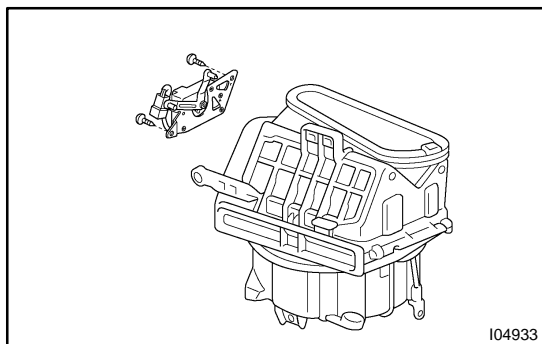
(See page [DI-1010](#))

SERVOMOTOR REMOVAL

1. REMOVE AIR INLET SERVOMOTOR

- (a) Remove the blower unit.

(See page [AC-31](#))



- (b) Remove the air inlet servomotor.

(1) Disconnect the connector.

(2) Remove the screw and servomotor.

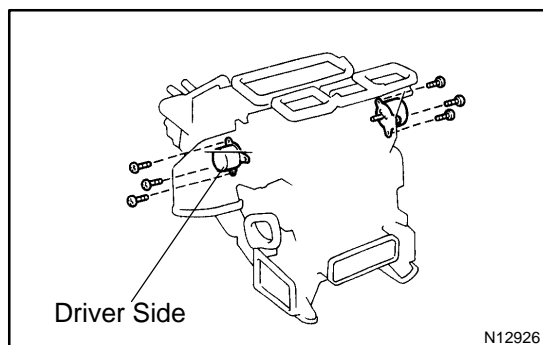
2. REMOVE AIR MIX SERVOMOTOR

- (a) Driver Side:

Remove the air mix servomotor.

- (1) Remove these parts:

- No. 1 under cover
- No. 1 safety pad
- No. 2 heater to register duct



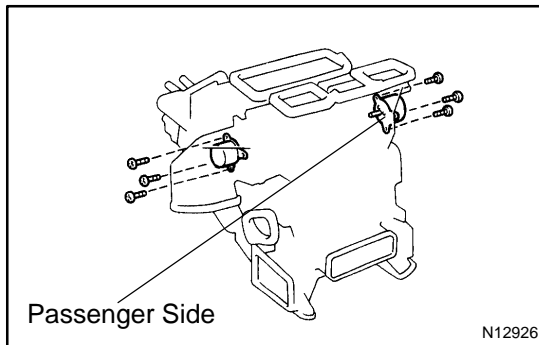
- (2) Disconnect the connector.

- (3) Remove the 3 screws and servomotor.

HINT:

Be careful not to pull out the pulley, when removing servomotor.

- (b) Passenger Side:
Remove the air mix servomotor.
(1) Remove the blower unit.
(See page [AC-31](#))



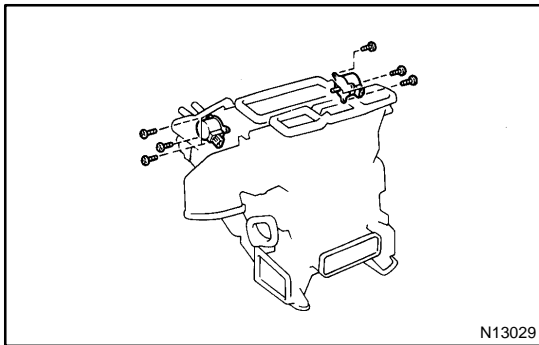
- (2) Disconnect the connector.
(3) Remove the 3 screws and servomotor.

HINT:

Be careful not to pull out the pulley, when removing servomotor.

3. REMOVE AIR OUTLET SERVOMOTORS

- (a) Remove the A/C unit.
(See page [AC-24](#))



- (b) Remove the air outlet servomotors
(1) Disconnect the connectors.
(2) Remove the 6 screws and both servomotors.

HINT:

Be careful not to pull out the pulley, when removing servomotor.

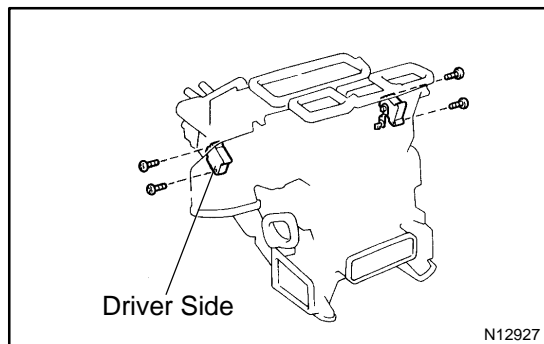
4. REMOVE COOL AIR BY-PASS DAMPER CONTROL SERVOMOTOR

(a) Driver Side:

Remove the cool air by-pass damper control servomotor.

(1) Remove the instrument panel.

(See page [BO-83](#))



(2) Disconnect the connector.

(3) Disconnect the cool air by-pass damper control cable.

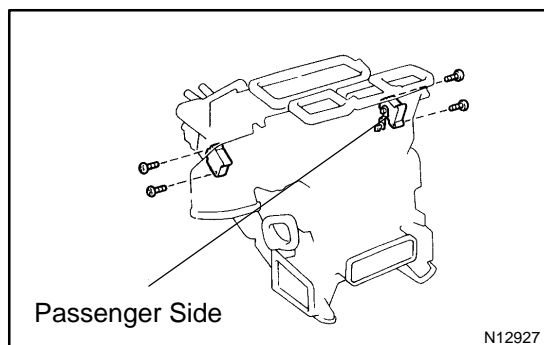
(4) Remove the 2 screws and servomotor.

(b) Passenger Side:

Remove cool air by-pass damper control servomotor.

(1) Remove the blower unit.

(See page [AC-31](#))



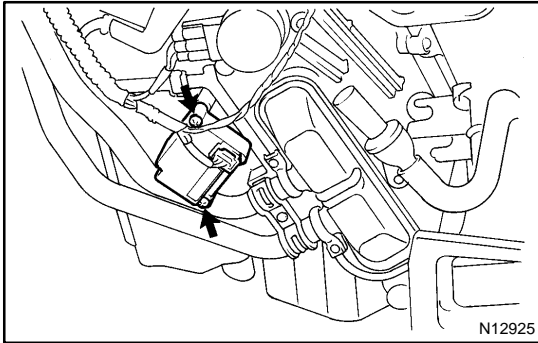
(2) Disconnect the connector.

(3) Disconnect the cool air by-pass damper control cable.

(4) Remove the 2 screws and servomotor.

5. REMOVE WATER VALVE CONTROL SERVOMOTOR

- (a) Remove these parts:
- (1) No. 1 under cover
 - (2) No. 1 safety pad
 - (3) No. 2 heater to register duct
- (See page [BO-83](#))



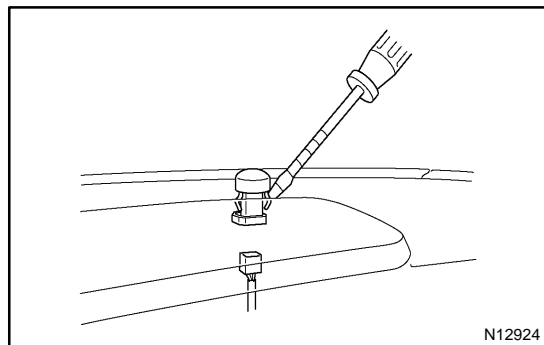
- (b) Remove the servomotor.
- (1) Disconnect the connector.
 - (2) Disconnect the control cable
 - (3) Remove the 2 screws and servomotor.

INSPECTION

1. INSPECT AIR INLET SERVOMOTOR CIRCUIT
(See page [DI-982](#))
2. INSPECT AIR INLET DAMPER POSITION SENSOR CIRCUIT
(See page [DI-982](#))
3. INSPECT AIR MIX SERVOMOTOR CIRCUIT
(See page [DI-997](#))
4. INSPECT AIR MIX DAMPER POSITION SENSOR CIRCUIT
(See page [DI-997](#))
5. COOL AIR BYPASS DAMPER CONTROL SERVOMOTOR CIRCUIT
Driver Side: (See page [DI-985](#))
Passenger Side: (See page [DI-988](#))
6. INSPECT AIR OUTLET SERVOMOTOR CIRCUIT
(See page [DI-991](#))
7. INSPECT AIR OUTLET DAMPER POSITION SENSOR CIRCUIT
(See page [DI-994](#))
8. INSPECT WATER VALVE CONTROL SERVOMOTOR CIRCUIT
(See page [DI-991](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-70](#)).



SENSOR REMOVAL

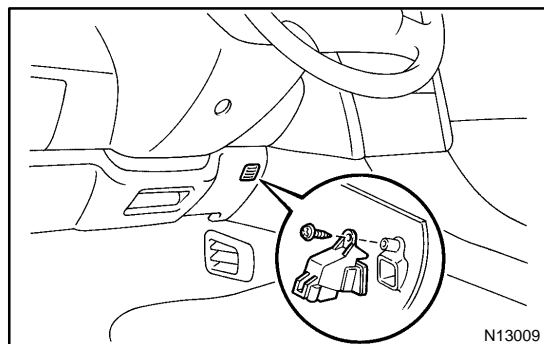
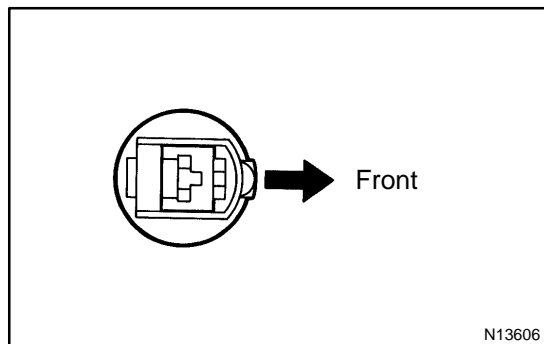
AC0PU-01

1. REMOVE SOLAR SENSOR

Using a screwdriver, pull out the sensor then disconnect the connector.

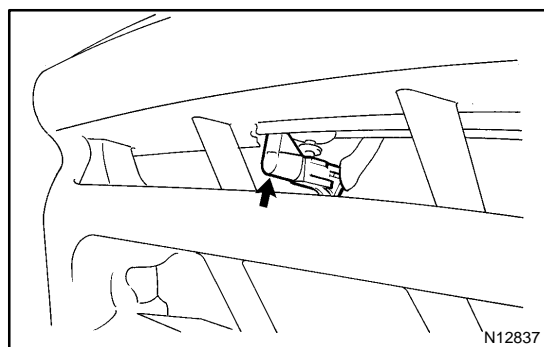
HINT:

- Tape the screwdriver tip before use.
- At the time of installation, please refer to the following item.
Install the sensor, as shown in the illustration.



2. REMOVE ROOM TEMPERATURE SENSOR

- (a) Remove the No.1 safety pad set bolts.
- (b) Disconnect No.1 safety pad.
- (c) Disconnect the connector and aspirator hose.
- (d) Remove the screw and sensor.

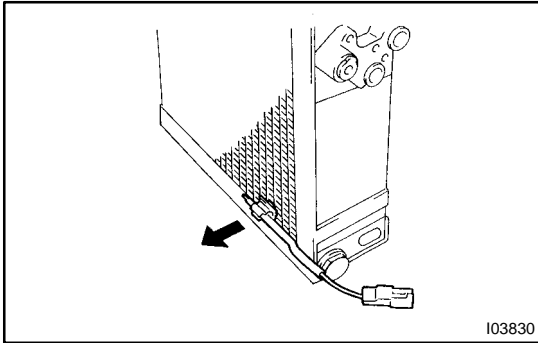


3. REMOVE AMBIENT TEMPERATURE SENSOR

- (a) Disconnect the connector.
- (b) Pull out the sensor.

4. REMOVE EVAPORATOR TEMPERATURE SENSOR

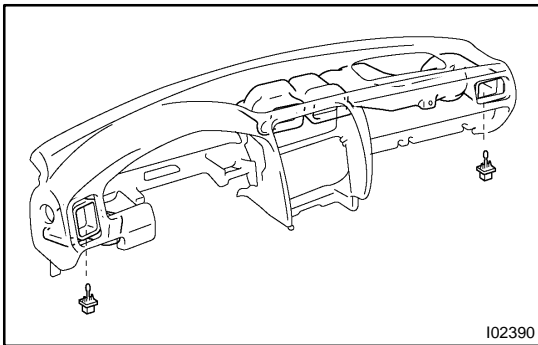
- (a) Remove the evaporator
(See page [AC-50](#))



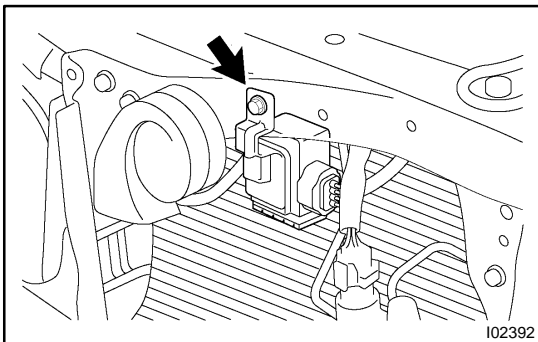
- (b) Remove the sensor.
(c) Pull out the sensor from evaporator.

5. REMOVE DUCT SENSOR

- (a) Remove the instrument panel
(See page [BO-83](#))



- (b) Remove the sensors.
(1) Disconnect the connector.
(2) Remove driver side sensor from the No.3 heater to resistor duct.
(3) Remove passenger side sensor from the No.1 heater to resistor duct.

**6. REMOVE SMOG VENTILATION SENSOR**

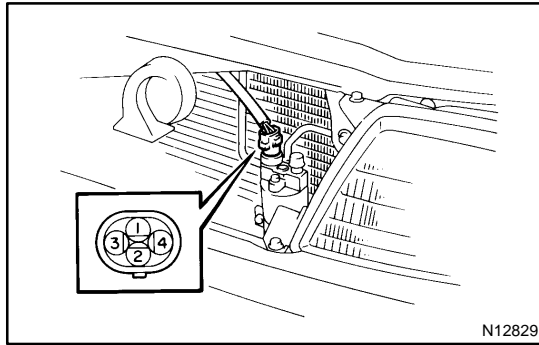
- (a) Disconnect the connector.
(b) Remove the bolt and sensor.

INSPECTION

1. INSPECT SOLAR SENSOR CIRCUIT
Driver Side : (See page [DI-970](#))
Passenger Side : (See page [DI-962](#))
2. INSPECT ROOM TEMP. SENSOR CIRCUIT
(See page [DI-944](#))
3. INSPECT AMBIENT TEMP. SENSOR CIRCUIT
(See page [DI-947](#))
4. INSPECT EVAPORATOR TEMPERATURE SENSOR CIRCUIT
(See page [DI-950](#))
5. INSPECT DUCT SENSOR CIRCUIT
Driver Side : (See page [DI-953](#))
Passenger Side : (See page [DI-956](#))
6. INSPECT SMOG VENTILATION SENSOR CIRCUIT
(See page [DI-959](#))

INSTALLATION

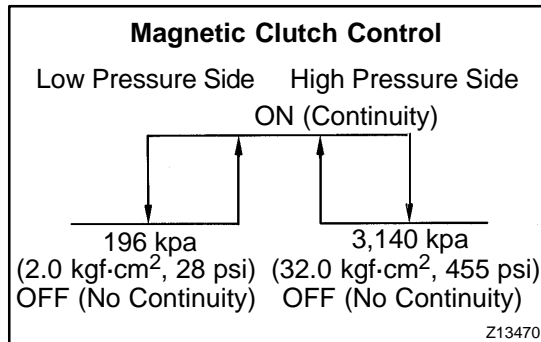
Installation is in the reverse order of removal (See page [AC-76](#))



PRESSURE SWITCH ON-VEHICLE INSPECTION

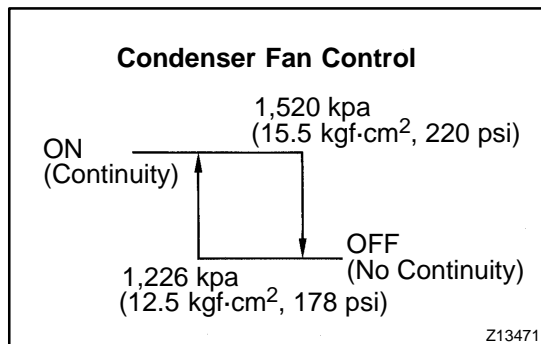
ACOP7-01

1. SET ON MANIFOLD GAUGE SET
(See page [AC-17](#))
2. DISCONNECT CONNECTOR FROM PRESSURE SWITCH
3. RUN ENGINE AT APPROX. 2,000 RPM



4. **Magnetic Clutch Control:**
INSPECT PRESSURE SWITCH OPERATION
 - (a) Connect the positive (+) lead from the ohmmeter to terminal 4 and the negative (–) lead to terminal 1.
 - (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.



5. **Condenser Fan Control:**
INSPECT PRESSURE SWITCH OPERATION
 - (a) Connect the positive (+) lead from the ohmmeter to terminal 2 and the negative (–) lead to terminal 3.
 - (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.
6. STOP ENGINE AND SET OFF MANIFOLD GAUGE SET
7. CONNECT CONNECTOR TO PRESSURE SWITCH

REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM

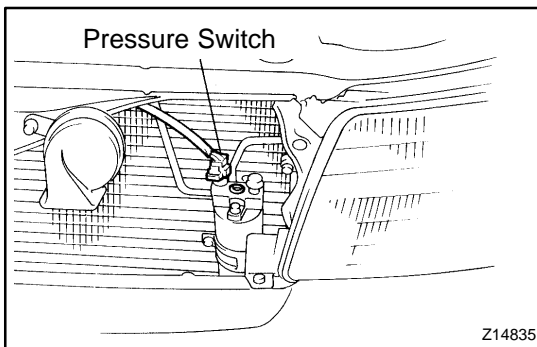
HINT:

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: 700 ± 50 g (26.45 ± 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)

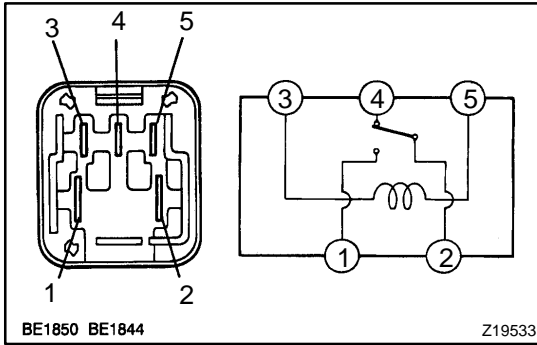
HINT:

- 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 the switch.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-81](#)).



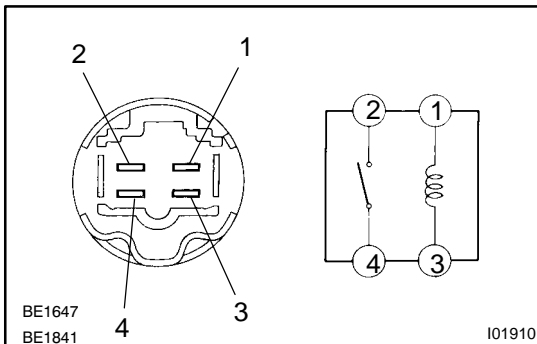
RELAY INSPECTION

AC0PA-01

1. INSPECT HEATER MAIN RELAY (Making: HTR RLY) CONTINUITY

Condition	Tester connection	Specified condition
Constant	2 – 4 3 – 5	Continuity
Apply B + between terminals 3 and 5.	1 – 2	Continuity

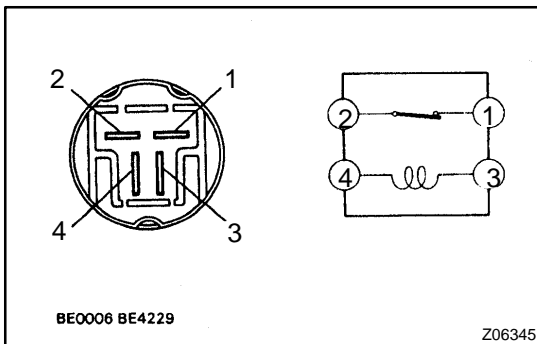
If continuity is not as specified, replace the relay.



2. INSPECT MAGNETIC CLUTCH RELAY (Marking: MG CLT RLY) CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 3	Continuity
Apply B + between terminals 1 and 3.	2 – 4	Continuity

If continuity is not as specified, replace the relay.



3. INSPECT COOLING FAN RELAY No.1 AND No.2 CONTINUITY

Condition	Tester connection	Specified condition
Constant	1 – 2 3 – 4	Continuity
Apply B + between terminals 3 and 4.	1 – 2	No Continuity

If continuity is not as specified, replace the relays.

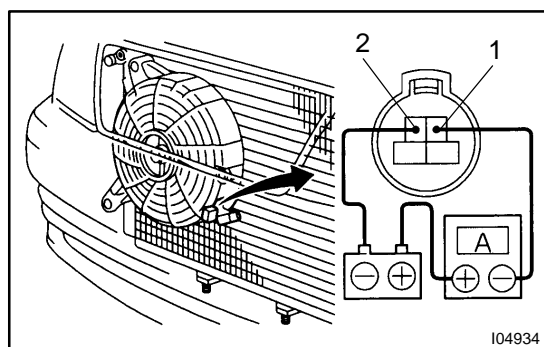
CONDENSER FAN ON-VEHICLE INSPECTION

1. INSPECT CONDENSER FAN OPERATION

Check the fan operation at each temperature and refrigerant pressure, as shown in the chart below.

Engine coolant and refrigerant condition	A/C switch	Magnetic clutch	Fan motor speed
83 °C (181 °F) or below	OFF or ON	OFF	OFF
90 °C (194 °F) or above	OFF or ON	OFF or ON	High
83 °C (181 °F) or below and the refrigerant pressure is approx. 1,520 kPa (15.5 kg/cm ² , 220 psi) or above	ON	ON	Low

If operation is not as specified, proceed next inspection.



2. INSPECT FAN MOTOR OPERATION

- Disconnect the connector.
- Connect the battery and ammeter to fan motor connector, as shown in the illustration.
- Check the fan rotates smoothly and check the reading on ammeter.

Specified amperage: 4.2 – 4.4 A

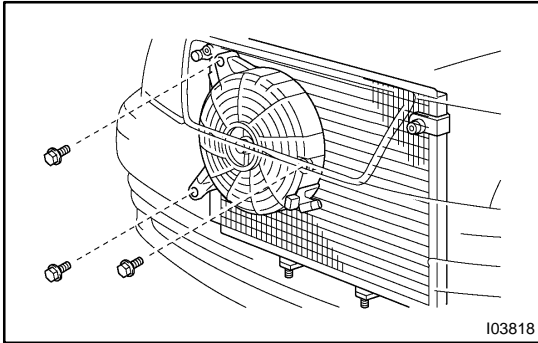
If operation is not as specified, replace the fan motor.

If operation is as specified, check the fan relay, pressure switch and pressure switch.

REMOVAL

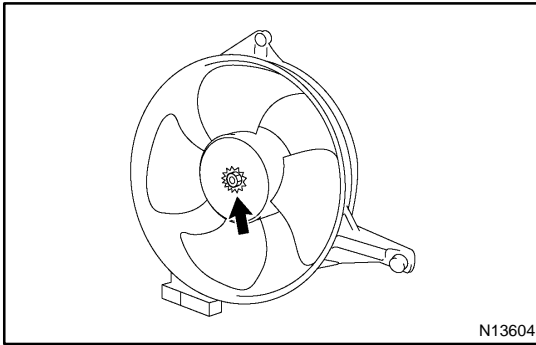
1. REMOVE THESE PARTS :

- (a) Hood lock support set bolts
- (b) Center brace



2. REMOVE CONDENSER FAN

- (a) Disconnect the connector.
- (b) Remove the 2 bolts and fan.

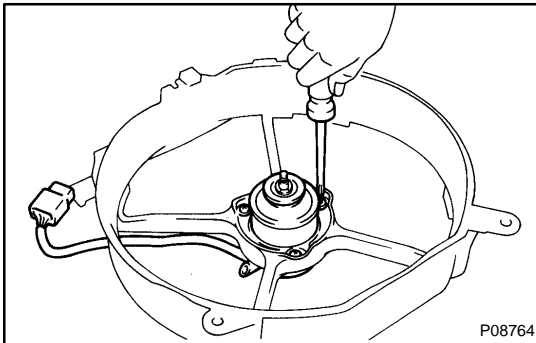


DISASSEMBLY

1. REMOVE FAN

Remove the nut and fan.

2. REMOVE FAN RESISTOR



3. REMOVE FAN MOTOR

- (a) Disconnect the wire harness and connector from the fan shroud.
- (b) Remove the 3 screws and fan motor.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [AC-86](#)).

INSTALLATION

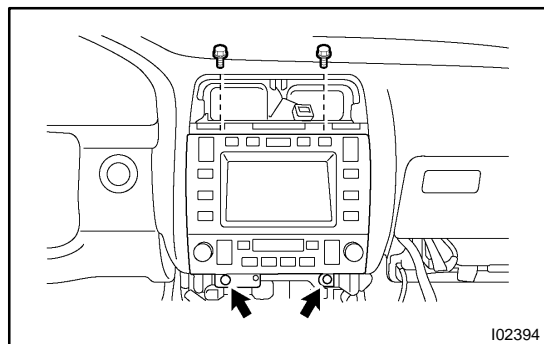
Installation is in the reverse order of removal (See page [AC-85](#)).

AIR CONDITIONING CONTROL ASSEMBLY (Electrical Multi Vision) REMOVAL

AC0PG-01

1. REMOVE THESE PARTS :

- (a) Cluster finish panel
- (b) No.2 register
(See page [BO-83](#))

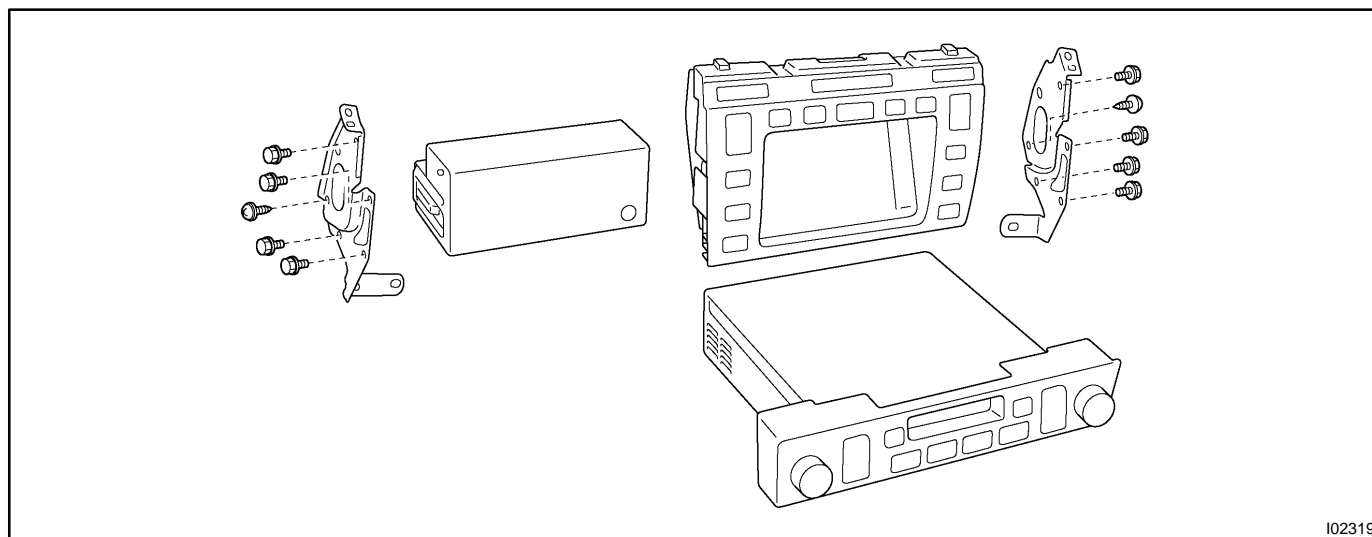


I02394

2. REMOVE A/C CONTROL ASSEMBLY

- (a) Remove the 4 bolts and pull out the A/C control assembly, then disconnect the connectors.

- (b) Remove the 8 bolts, 2 screws and 2 brackets.
- (c) Separate the A/C control assembly, radio and A/C amplifier.



I02319

INSPECTION

INSPECT A/C CONTROL ASSEMBLY

(See page [DI-939](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-89](#)).

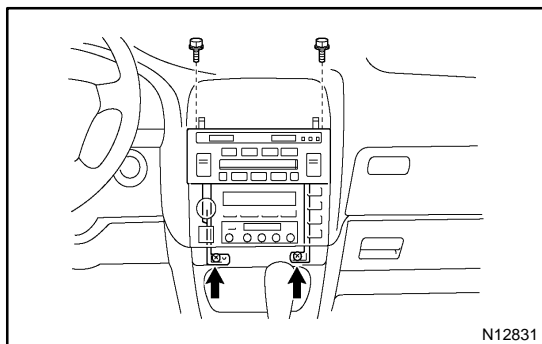
AIR CONDITIONING CONTROL ASSEMBLY (Except Electrical Multi Vision)

AC0PJ-01

REMOVAL

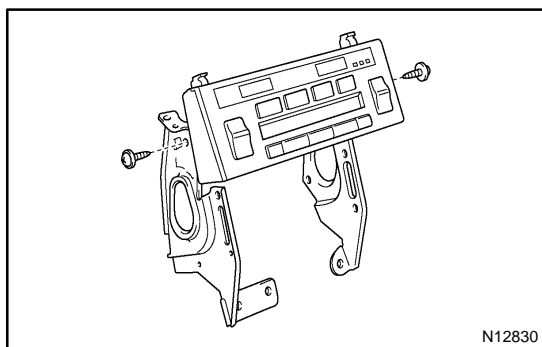
1. REMOVE THESE PARTS :

- (a) Cluster finish panel
- (b) No.2 register (See page [BO-83](#))



2. REMOVE A/C CONTROL ASSEMBLY

- (a) Remove the 4 bolts and pull out A/C control assembly, then disconnect the connectors.



- (b) Remove the 2 screws and A/C control assembly from the radio.

INSPECTION

INSPECT A/C CONTROL ASSEMBLY CIRCUIT

(See page [DI-939](#))

INSTALLATION

Installation is in the reverse order of removal (See page [AC-92](#)).

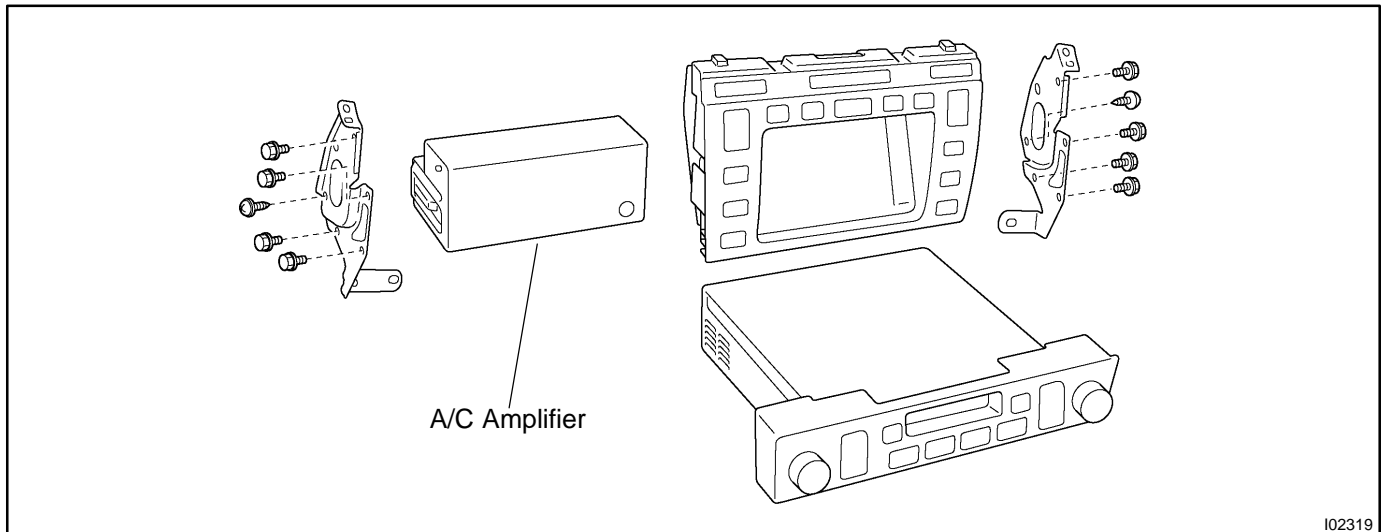
AIR CONDITIONING AMPLIFIER (Electrical Multi Vision) REMOVAL

ACOPM-01

1. REMOVE A/C CONTROL ASSEMBLY
(See page [AC-95](#))

2. REMOVE A/C AMPLIFIER

Remove the 8 bolts 2 screws and 2 bracket, then remove the amplifier.



I02319

INSPECTION

INSPECT A/C AMPLIFIER CIRCUIT

(See page [DI-939](#))

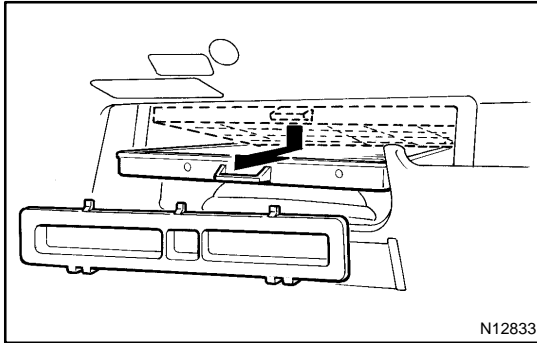
INSTALLATION

Installation is in the reverse order of removal (See page [AC-95](#)).

AIR REFINER FILTER REMOVAL

ACOPP-01

1. OPEN INSTRUMENT PANEL BOX ASSEMBLY



2. REMOVE AIR REFINER FILTER

- (a) Remove the glove box cover.
- (b) Remove the filter cover.
- (c) Pull out the filter assembly.
- (d) Remove the filter from filter case.

CAUTION:

Confirm the blower switch is off, when removing the filter.

INSTALLATION

Installation is in the reverse order of removal (See page [AC-98](#))